

EMC TEST REPORT

Report No.: TS09120111-EME

Model No.: HL-11N

Issued Date: Jan. 29, 2010

Applicant: Handlink Technologies Inc.
4F, No. 3, Prosperity Rd. 1, SBIP, Hsinchu, Taiwan

**Test Method/
Standard:** 47 CFR FCC Part 15.247 & ANSI C63.4 2003

Test By: Intertek Testing Services Taiwan Ltd.
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1. Summary of Test Data

Test/Requirement Description	Applicable Rule	Result
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum Output Power	15.247(b)	Pass
Power Spectral Density	15.247(e)	Pass
RF Antenna Conducted Spurious	15.247(d)	Pass
Radiated Spurious Emission	15.247(d), 15.205, 15.209	Pass
Emission on the Band Edge	15.247(d)	Pass
AC Power Line Conducted Emission	15.207	Pass

2. General Information

Identification of the EUT

Product:	802.11n WLAN Mini-PCI Module
Model No.:	HL-11N
FCC ID.:	TWS-HL-11N
Frequency Range:	2412 MHz to 2462 MHz for 802.11b/g/n HT20 2422 MHz to 2452 MHz for 802.11n HT40
Channel Number:	11 channels for 802.11b/g/n HT20 7 channels for 802.11n HT40
Rated Power:	DC 3.3V from Notebook PC
Power Cord:	N/A
Sample Received:	Dec. 28, 2009
Test Date(s):	Jan. 06, 2010 ~ Jan. 26, 2010
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Description of EUT

The EUT is a 802.11n WLAN Mini-PCI Module. It supports two transmitted and three received MIMO functions. It can transmit solely at 802.11b/g mode and transmit independently and simultaneously at 802.11n mode.

Both chain 0 and chain 1 would be tested separately when the modular operated at 802.11b/g mode. The worst case is found by chain 0 of 802.11b/g mode. And, only the worst data is shown on the test report.

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

Antenna description

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

Ant.	Model number	Antenna Type	Connector Type	Gain (dBi)
1	IWX-144RSXXX-257	Dipole Antenna	SMA Reverse	2
2	IWX-1511RSXX-999	Dipole Antenna	SMA Reverse	5
3	IWF-144XIPAX-257	Dipole Antenna attached with antenna cable	IPEX	2
4	C612-510008-A	Dipole Antenna	SMA Reverse	2

Antenna Cable description

Ant. Cable	Product Name	Connector Type	Cable Length (mm)
1	Cable Assy MI-113 L=160MM SMA For I-PEX	SMA Reverse to IPEX	160mm
2	Cable Assy MI-113 L=215MM SMA For I-PEX	SMA Reverse to IPEX	215mm

Operation mode

The EUT was supplied with DC 3.3V from Notebook PC (test voltage: 120 Vac, 60 Hz) and it was running in operating mode controlled by “QAtest” program.

The EUT was transmitted continuously during the test.

The following test mode(s) were pre-tested:

Test Mode		
Mode	Antenna	Antenna cable
1	IWX-144RSXXX-257	1
2	IWX-1511RSXX-999	1
3	IWF-144XIPAX-257	-
4	C612-510008-A	1
5	IWX-144RSXXX-257	2
6	IWX-1511RSXX-999	2
7	C612-510008-A	2

After pretest, the final tests were executed under test modes with highest emission and recorded in this report individually.

The following test modes were final test modes:

Final Test Mode	
Minimum 6 dB Bandwidth	Mode 1
99% Occupied Bandwidth	Mode 1
Maximum Output Power	Mode 1, Mode 2
Power Spectral Density	Mode 1
RF Antenna conducted Spurious	Mode 1
Radiated Spurious Emission	Mode 1, Mode 2
Emission on the Band Edge	Mode 1, Mode 2
Power Line Conducted Emission	Mode 1

After verifying, the worst case data rates was found at 1 Mbps data rate for 802.11b, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The final tests were executed under these conditions and recorded in this report individually.

802.11b ch6	
Data rate (Mbps)	PK(dBm)
1	20.55
2	20.34
5.5	20.08
11	19.97
802.11g ch6	
Data rate (Mbps)	PK(dBm)
6	23.75
9	23.54
12	23.34
18	23.31
24	23.21
36	23.09
48	22.87
54	22.82

802.11n HT20 ch6	
Data rate (Mbps)	PK(dBm)
6.5	23.56
13	23.34
19.5	23.28
26	23.19
39	29.39
52	22.97
58.5	22.87
65	22.65

802.11n HT40 ch6	
Data rate (Mbps)	PK(dBm)
13.5	22.02
27	21.98
40.5	21.82
54	21.76
81	24.35
108	21.38
121.5	21.27
135	21.09

3. Maximum 6 dB Bandwidth

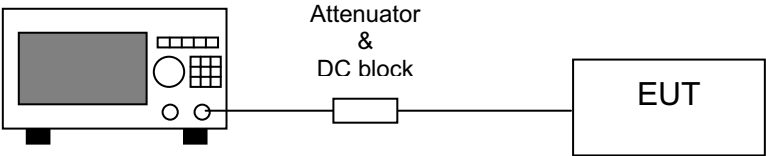
Name of Test	Maximum 6dB Bandwidth
Base Standard	FCC 15.247 (a)(2)

Test Result: Complies
Measurement Data: See Table & plots below

Method of Measurement:
Reference FCC document: KDB558074

A portion of the transmitted signal is coupled to a Spectrum Analyzer with a resolution bandwidth of at least 1 % of the bandwidth of the transmitted signal. The resolution bandwidth is chosen so as not to reduce the peak level of the measured waveform. The appropriate bandwidth mask is applied to the output waveform to verify compliance.

Test Diagram:



Spectrum Analyzer

Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 1. Maximum 6dB Bandwidth

Test Mode: Mode 1

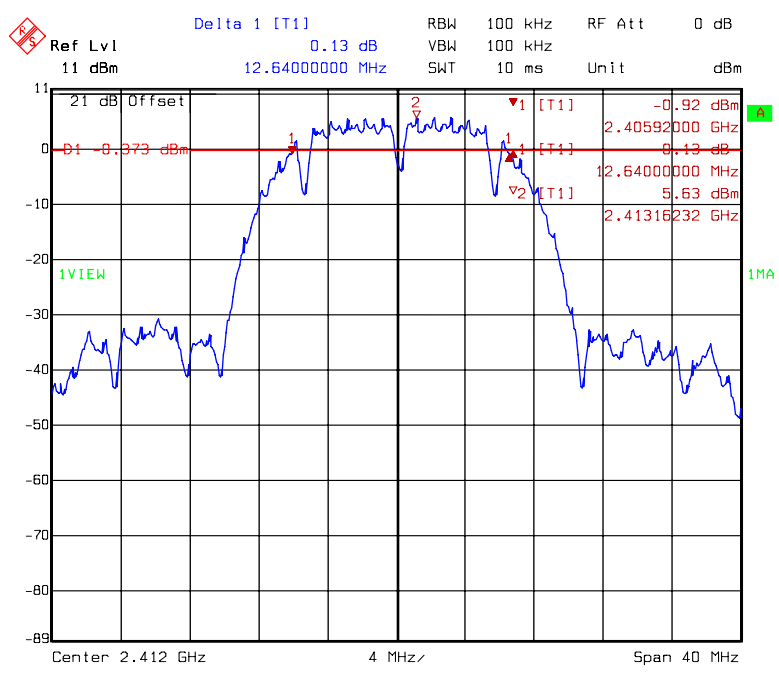
Single TX

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Pass/Fail
			Chain 0			
802.11b	1	2412	12.64		0.5	Pass
	6	2437	12.56		0.5	Pass
	11	2462	12.56		0.5	Pass
802.11g	1	2412	16.72		0.5	Pass
	6	2437	16.80		0.5	Pass
	11	2462	16.72		0.5	Pass

2TX

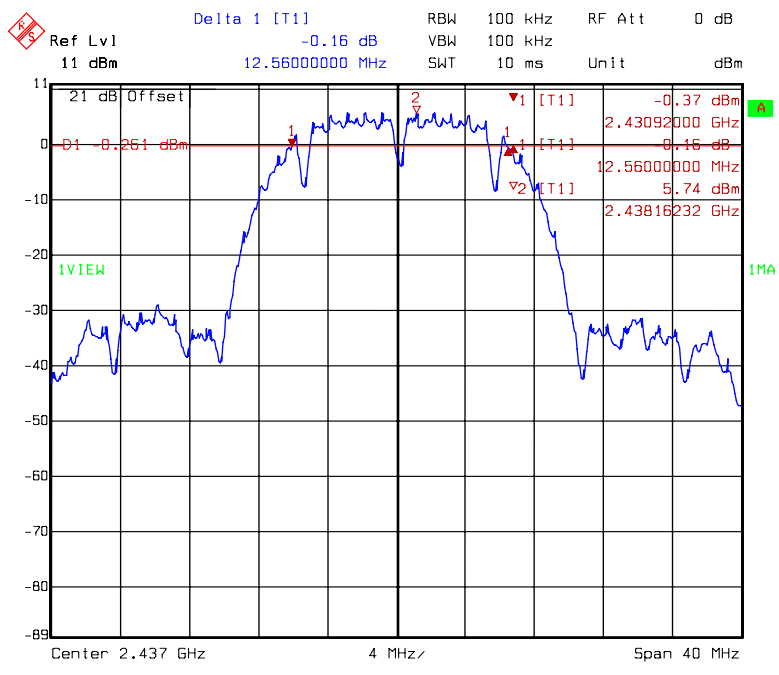
Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Pass/Fail
			Chain 0	Chain 1		
802.11n HT20	1	2412	17.84	17.84	0.5	Pass
	6	2437	17.92	17.84	0.5	Pass
	11	2462	17.84	17.84	0.5	Pass
802.11n HT40	3	2422	36.80	36.80	0.5	Pass
	6	2437	36.80	36.80	0.5	Pass
	9	2452	36.80	36.80	0.5	Pass

Chain 0: 6dB Bandwidth @ 802.11b mode channel 1



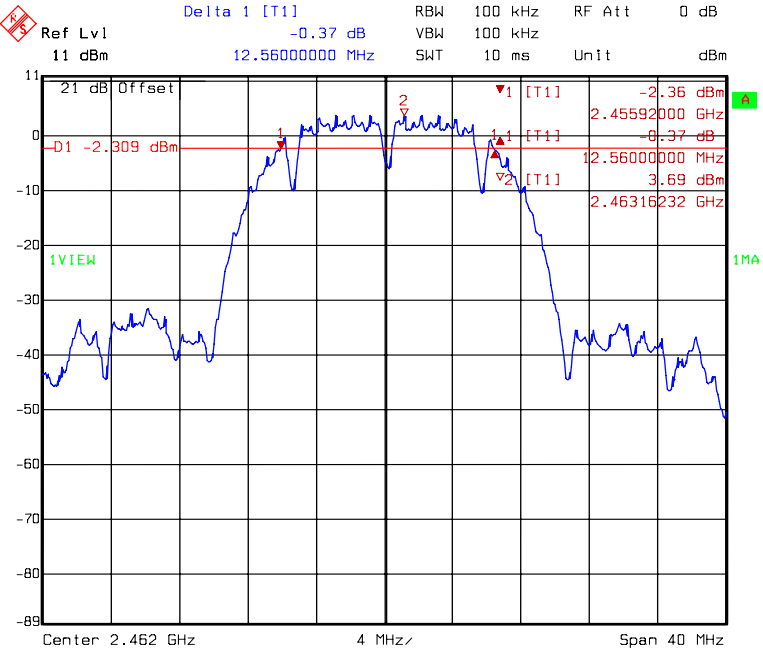
Title: 6dB Band-Width
 Comment A: CH 1 at 802.11b mode chain0
 Date: 13.JAN.2010 09:16:34

Chain 0: 6dB Bandwidth @ 802.11b mode channel 6



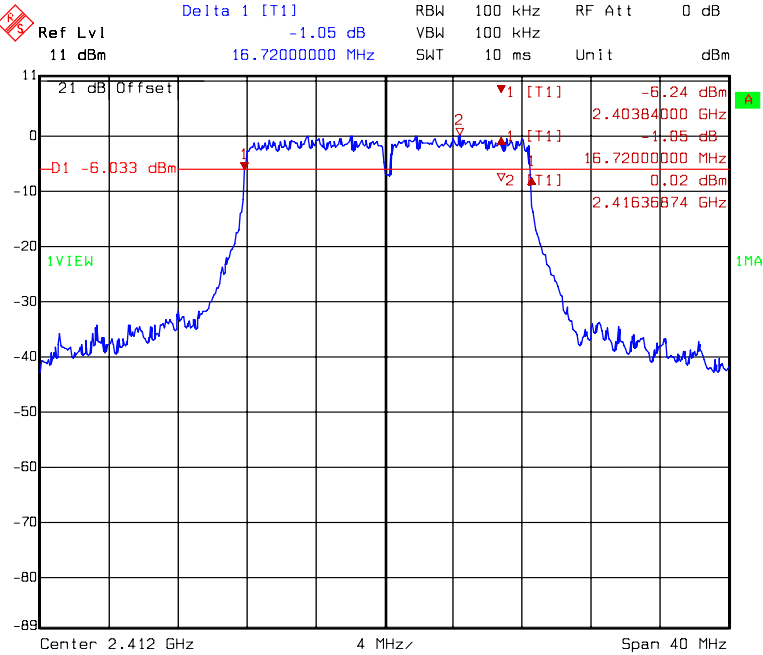
Title: 6dB Band-Width
 Comment A: CH 6 at 802.11b mode chain0
 Date: 13.JAN.2010 09:21:22

Chain 0: 6dB Bandwidth @ 802.11b mode channel 11



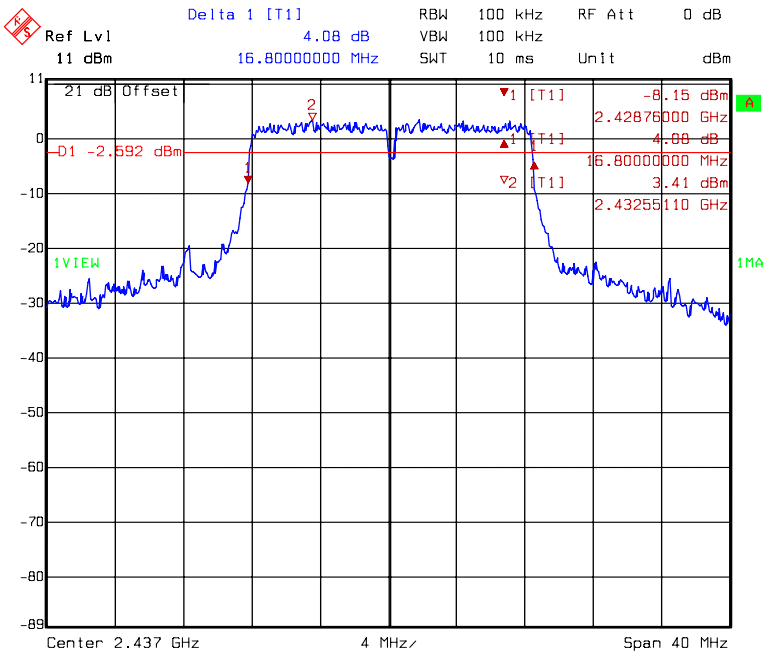
Title: 6dB Band-Width
Comment A: CH 11 at 802.11b mode chain0
Date: 13.JAN.2010 09:24:19

Chain 0: 6dB Bandwidth @ 802.11g mode channel 1



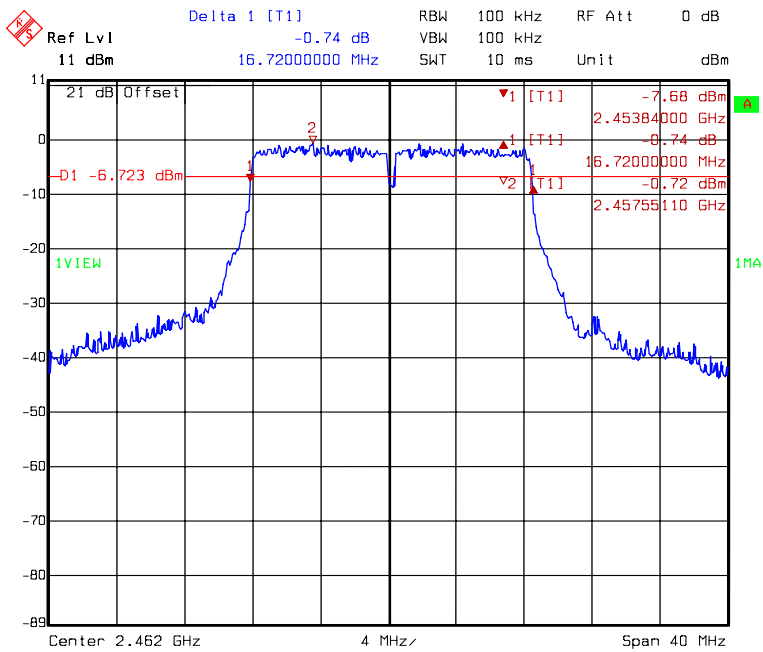
Title: 6dB Band-Width
Comment A: CH 1 at 802.11g mode chain0
Date: 13.JAN.2010 09:27:46

Chain 0: 6dB Bandwidth @ 802.11g mode channel 6



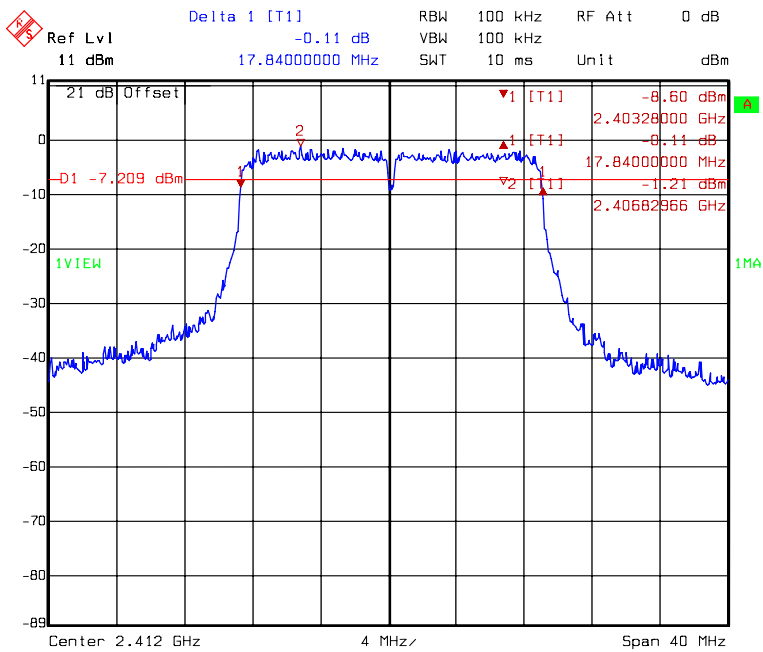
Title: 6dB Band-Width
 Comment A: CH 6 at 802.11g mode chain0
 Date: 13.JAN.2010 09:31:02

Chain 0: 6dB Bandwidth @ 802.11g mode channel 11



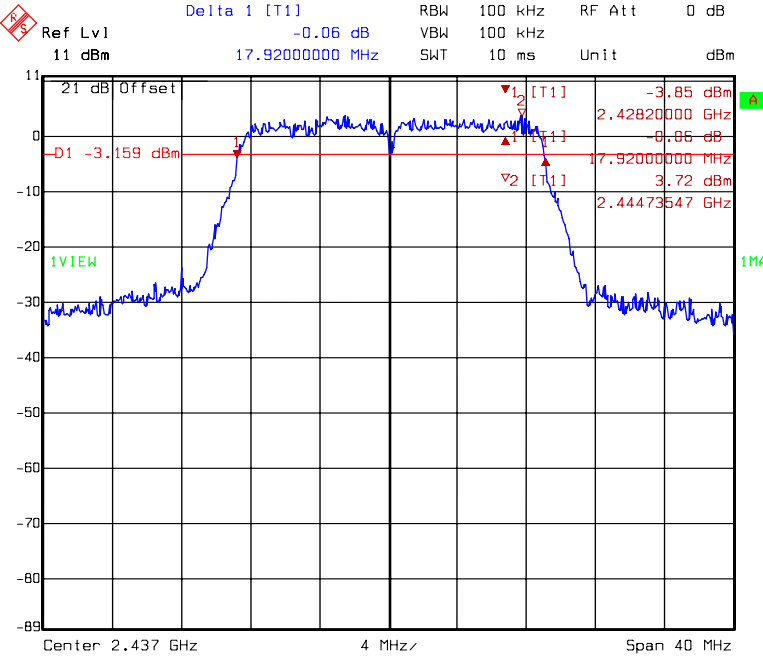
Title: 6dB Band-Width
 Comment A: CH 11 at 802.11g mode chain0
 Date: 13.JAN.2010 09:34:06

Chain 0: 6dB Bandwidth @ 802.11n HT20 mode channel 1



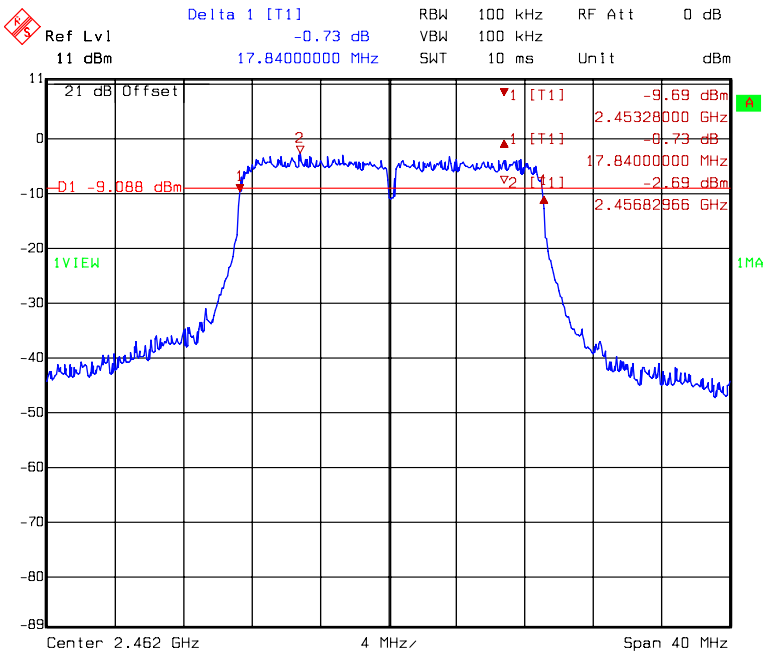
Title: 6dB Band-Width
 Comment A: CH 1 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:43:00

Chain 0: 6dB Bandwidth @ 802.11n HT20 mode channel 6



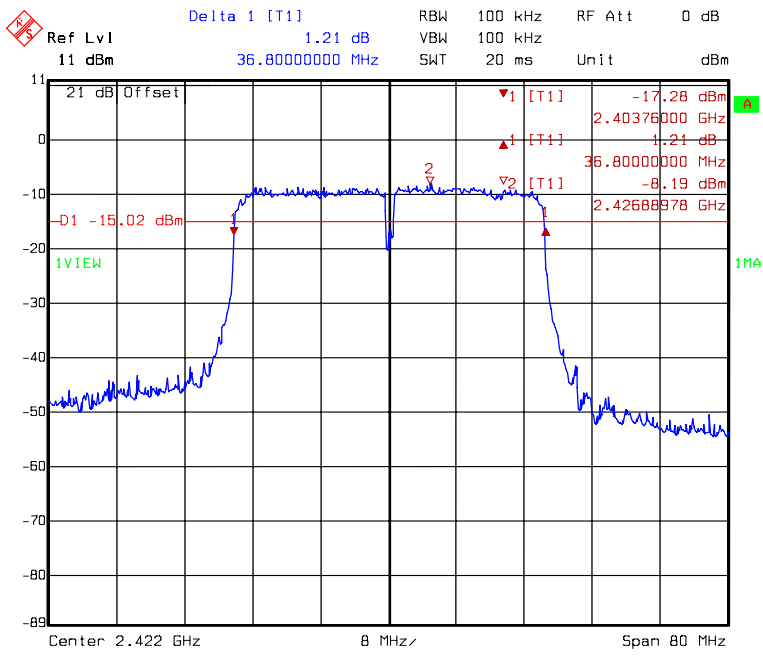
Title: 6dB Band-Width
 Comment A: CH 6 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:47:09

Chain 0: 6dB Bandwidth @ 802.11n HT20 mode channel 11



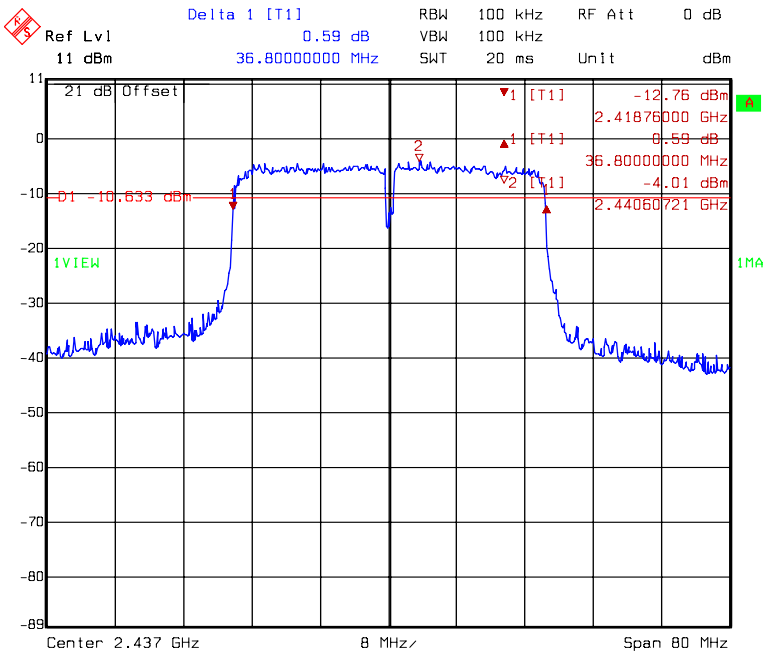
Title: 6dB Band-Width
 Comment A: CH 11 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:50:11

Chain 0: 6dB Bandwidth @ 802.11n HT40 mode channel 3



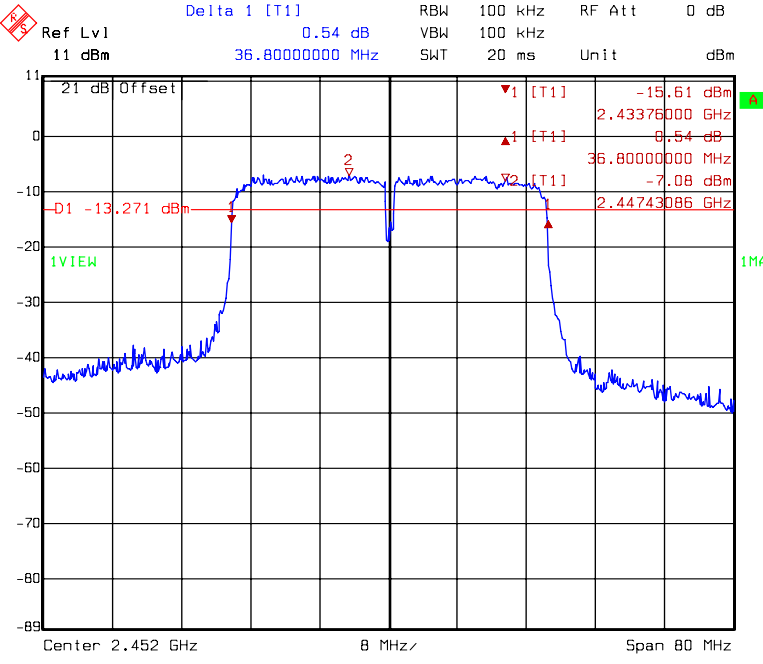
Title: 6dB Band-Width
 Comment A: CH 3 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:53:34

Chain 0: 6dB Bandwidth @ 802.11n HT40 mode channel 6



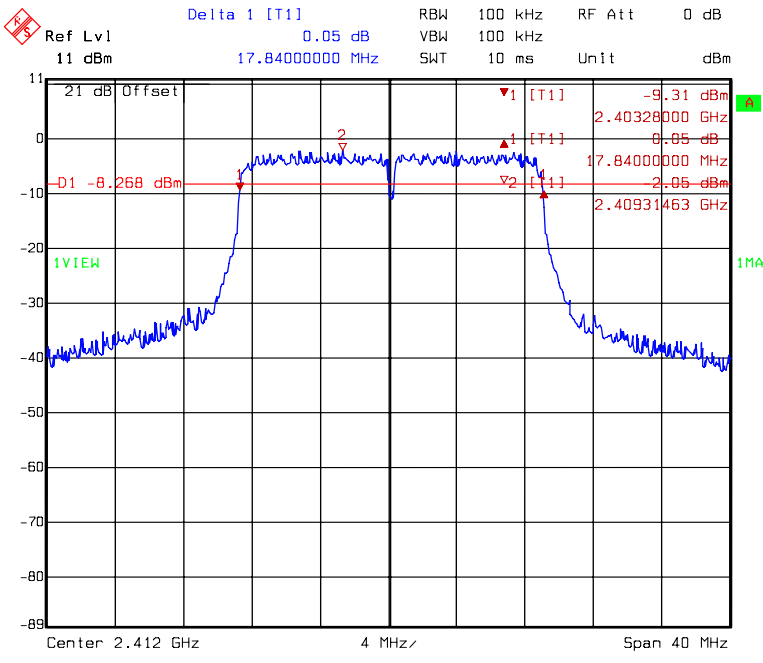
Title: 6dB Band-Width
 Comment A: CH 6 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:56:27

Chain 0: 6dB Bandwidth @ 802.11n HT40 mode channel 9



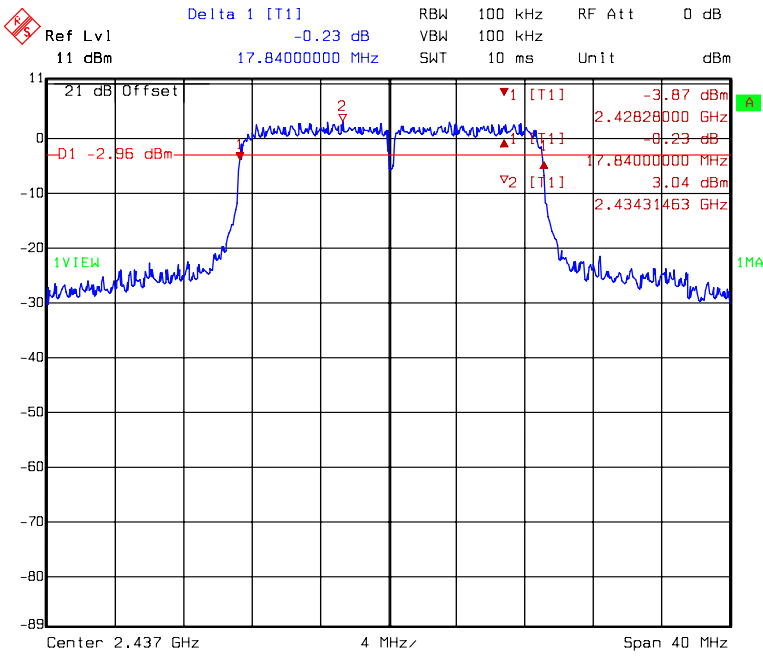
Title: 6dB Band-Width
 Comment A: CH 9 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 10:01:04

Chain 1: 6dB Bandwidth @ 802.11n HT20 mode channel 1



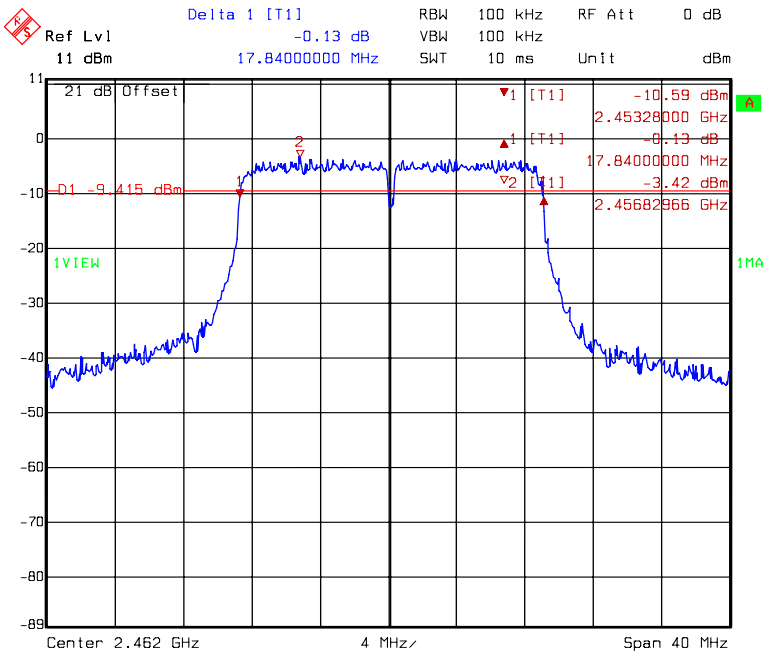
Title: 6dB Band-Width
 Comment A: CH 1 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:39:12

Chain 1: 6dB Bandwidth @ 802.11n HT20 mode channel 6



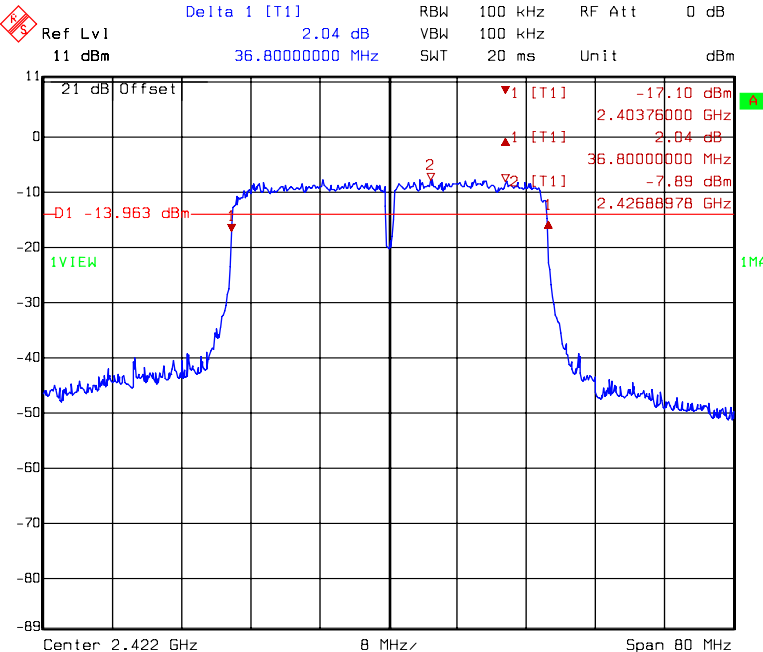
Title: 6dB Band-Width
 Comment A: CH 6 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:42:15

Chain 1: 6dB Bandwidth @ 802.11n HT20 mode channel 11



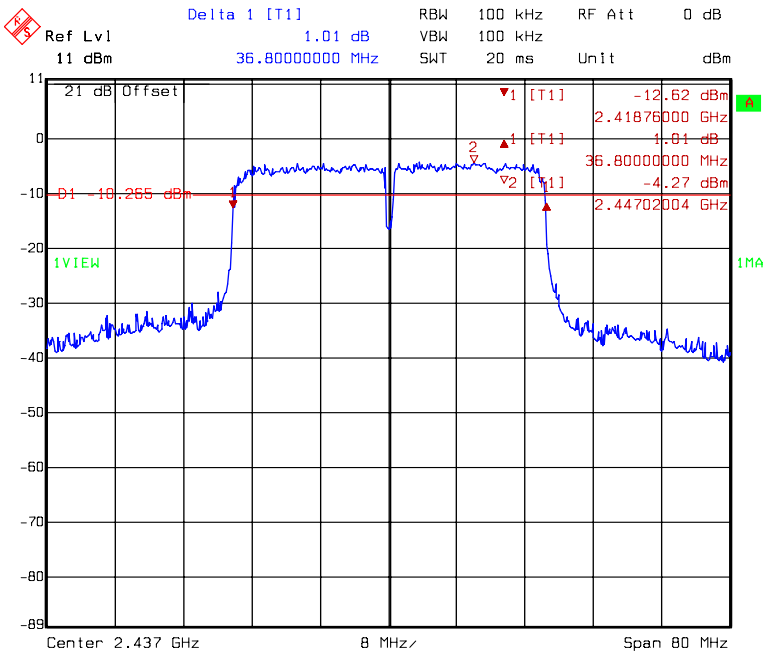
Title: 6dB Band-Width
 Comment A: CH 11 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:45:14

Chain 1: 6dB Bandwidth @ 802.11n HT40 mode channel 3



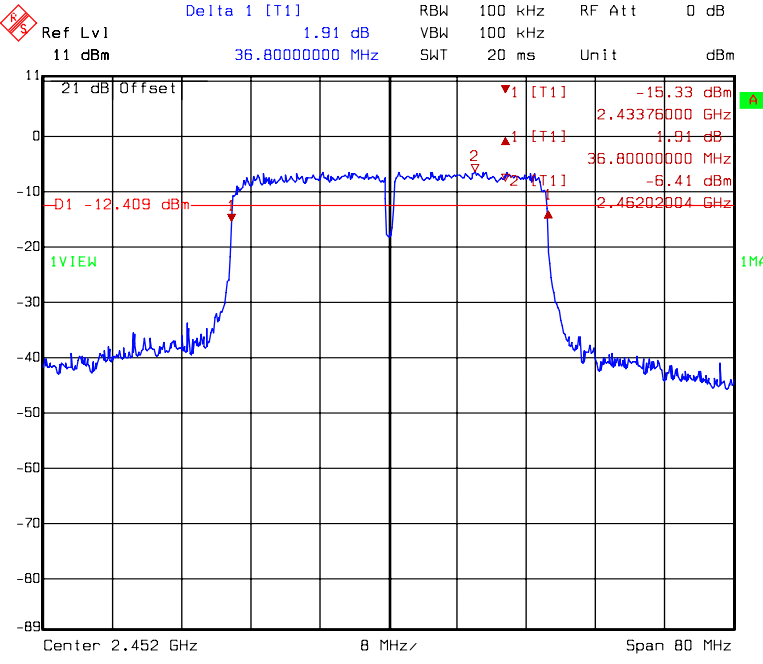
Title: 6dB Band-Width
 Comment A: CH 3 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:27:46

Chain 1: 6dB Bandwidth @ 802.11n HT40 mode channel 6



Title: 6dB Band-Width
 Comment A: CH 6 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:31:29

Chain 1: 6dB Bandwidth @ 802.11n HT40 mode channel 9



Title: 6dB Band-Width
 Comment A: CH 9 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:46:51

4. Maximum Output Power

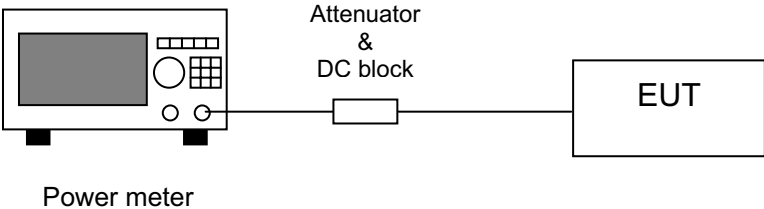
Name of Test	Maximum output power
Base Standard	FCC 15.247(b)

Measurement Uncertainty: ±0.392 dB (k=2)
Test Result: Complies
Measurement Data: See Table below

Method of Measurement:
Reference FCC document: KDB558074

The power output was measured on the EUT using a 50 ohm SMA Cable connected to peak power meter via power sensor for below 20MHz bandwidth. For 40MHz bandwidth (HT40 mode), the spectrum analyzer was used.
 Power output was measured with the maximum rated input level.

Test Diagram:



Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 3. Maximum output power

Test Mode: Mode 1

Single TX

Mode	Channel	Frequency (MHz)	Output Power		Limit (dBm)	Margin (dB)
			Chain 0			
			PK (dBm)	PK (mW)		
802.11b	1	2412	19.67	92.68	30	-10.33
	6	2437	20.55	113.50	30	-9.45
	11	2462	18.52	71.12	30	-11.48
802.11g	1	2412	22.99	199.07	30	-7.01
	6	2437	23.75	237.14	30	-6.25
	11	2462	22.95	197.24	30	-7.05

2TX

Mode	Channel	Frequency (MHz)	Output Power		Total Power (PK)		Limit (dBm)	Margin (dB)
			Chain 0	Chain 1	mW	dBm		
			PK (dBm)	PK (mW)				
802.11n HT20	1	2412	21.79	22.46	327.21	25.15	30	-4.85
	6	2437	23.56	23.54	452.93	26.56	30	-3.44
	11	2462	21.30	20.76	254.02	24.05	30	-5.95
802.11n HT40	3	2422	18.43	18.89	147.11	21.68	30	-8.32
	6	2437	22.02	22.56	339.52	25.31	30	-4.69
	9	2452	20.92	20.83	244.65	23.89	30	-6.11

Test Mode: Mode 2

Single TX

Mode	Channel	Frequency (MHz)	Output Power		Limit (dBm)	Margin (dB)
			Chain 0			
			PK (dBm)	PK (mW)		
802.11b	1	2412	18.05	63.83	30	-11.95
	6	2437	19.14	82.04	30	-10.86
	11	2462	16.92	49.20	30	-13.08
802.11g	1	2412	22.72	187.07	30	-7.28
	6	2437	23.75	237.14	30	-6.25
	11	2462	22.67	184.93	30	-7.33

2TX

Mode	Channel	Frequency (MHz)	Output Power		Total Power (PK)		Limit (dBm)	Margin (dB)
			Chain 0	Chain 1	mW	dBm		
			PK (dBm)	PK (mW)				
802.11n HT20	1	2412	20.54	21.67	260.13	24.15	30	-5.85
	6	2437	23.56	23.54	452.93	26.56	30	-3.44
	11	2462	21.30	20.76	254.02	24.05	30	-5.95
802.11n HT40	3	2422	17.12	17.48	107.50	20.31	30	-9.69
	6	2437	22.43	22.37	347.57	25.41	30	-4.59
	9	2452	20.38	20.28	215.80	23.34	30	-6.66

5. Power Spectral Density

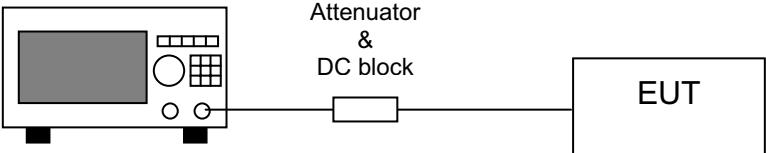
Name of Test	Power Spectral Density
Base Standard	FCC 15.247(e)

Test Result: Complies
Measurement Data: See Table & plots below

Method of Measurement:
Reference FCC document: KDB558074

A portion of the transmitted signal is coupled to a Spectrum Analyzer with a resolution bandwidth of at least 1 % of the bandwidth of the transmitted signal. The resolution bandwidth is chosen so as not to reduce the peak level of the measured waveform. The appropriate bandwidth mask is applied to the output waveform to verify compliance.

Test Diagram:



Spectrum Analyzer

Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 4. Power Spectral Density

Test Mode: Mode 1

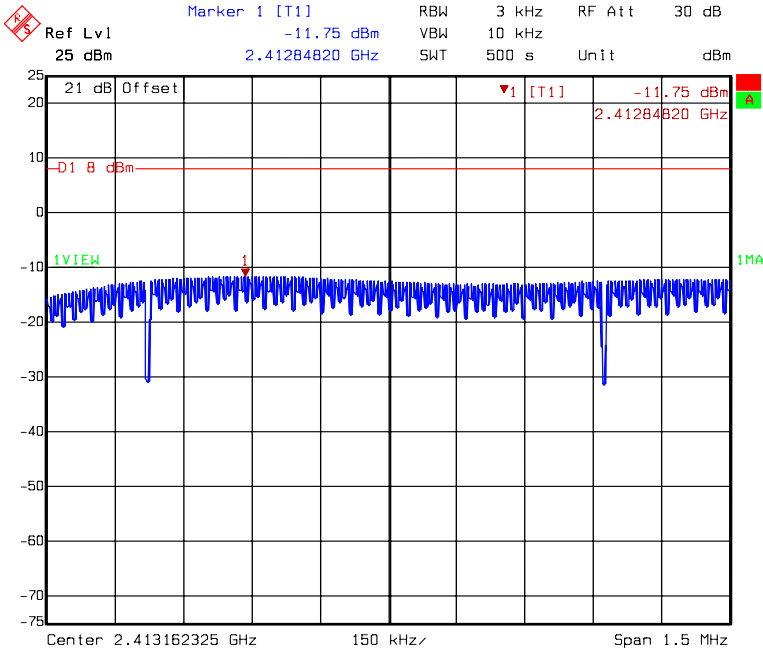
Single TX

Mode	Channel	Frequency (MHz)	Chain 0		Limit (dBm)	Margin (dB)
			PSD (dBm)	PSD (mW)		
802.11b	1	2412	-11.75	0.07	8	-19.75
	6	2437	-11.37	0.07	8	-19.37
	11	2462	-13.43	0.05	8	-21.43
802.11g	1	2412	-13.76	0.04	8	-21.76
	6	2437	-11.13	0.08	8	-19.13
	11	2462	-14.39	0.04	8	-22.39

2TX

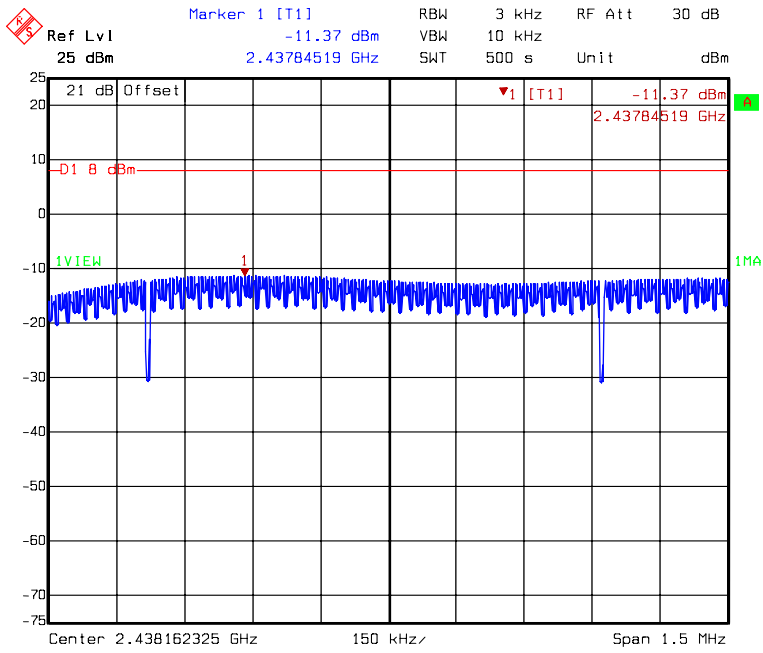
Mode	Channel	Frequency (MHz)	Chain 0	Chain 1	Total PSD		Limit (dBm)	Margin (dB)
			PSD (dBm)	PSD (dBm)	mW	dBm		
802.11n HT20	1	2412	-15.83	-15.97	0.05	-12.89	8	-20.89
	6	2437	-10.24	-10.84	0.18	-7.52	8	-15.52
	11	2462	-16.43	-17.28	0.04	-13.82	8	-21.82
802.11n HT40	3	2422	-21.57	-20.17	0.02	-17.80	8	-25.80
	6	2437	-17.55	-17.64	0.03	-14.58	8	-22.58
	9	2452	-20.57	-19.85	0.02	-17.18	8	-25.18

Chain 0: Power Spectral Density @ 802.11b mode channel 1



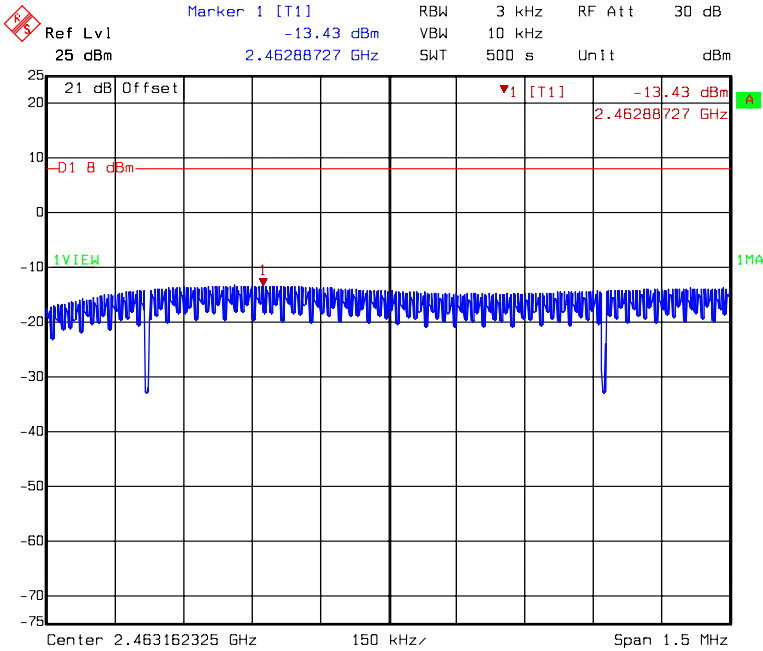
Title: Power density
 Comment A: CH 1 at 802.11b mode chain0
 Date: 13.JAN.2010 09:16:51

Chain 0: Power Spectral Density @ 802.11b mode channel 6



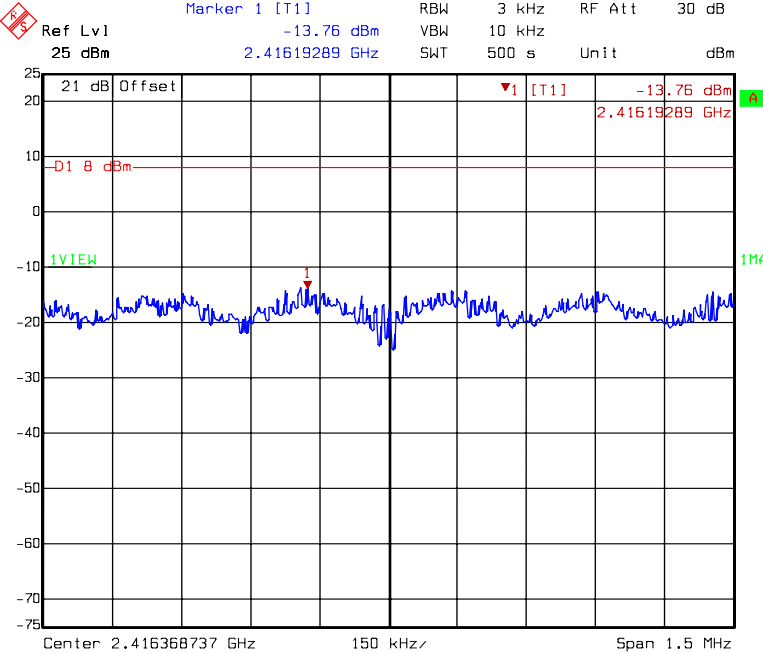
Title: Power density
 Comment A: CH 6 at 802.11b mode chain0
 Date: 13.JAN.2010 09:21:38

Chain 0: Power Spectral Density @ 802.11b mode channel 11



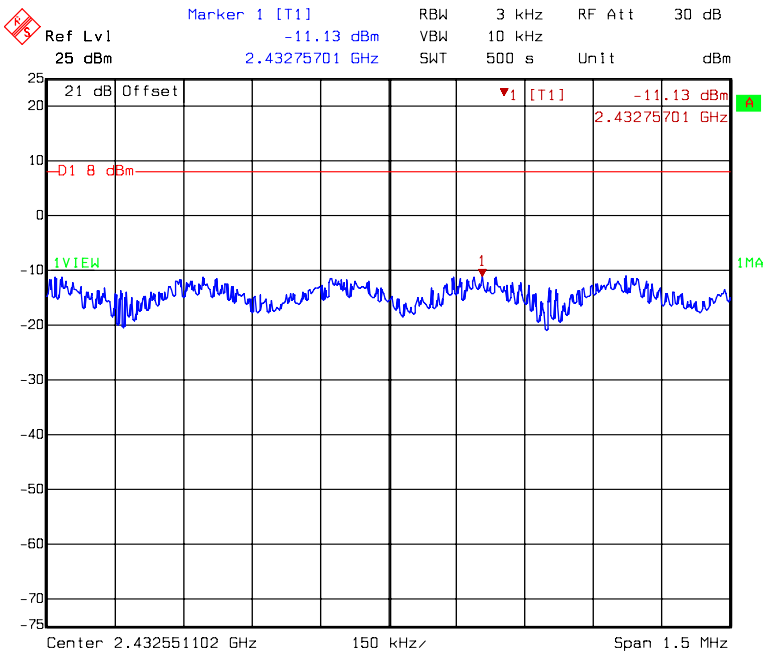
Title: Power density
 Comment A: CH 11 at 802.11b mode chain0
 Date: 13.JAN.2010 09:24:35

Chain 0: Power Spectral Density @ 802.11g mode channel 1

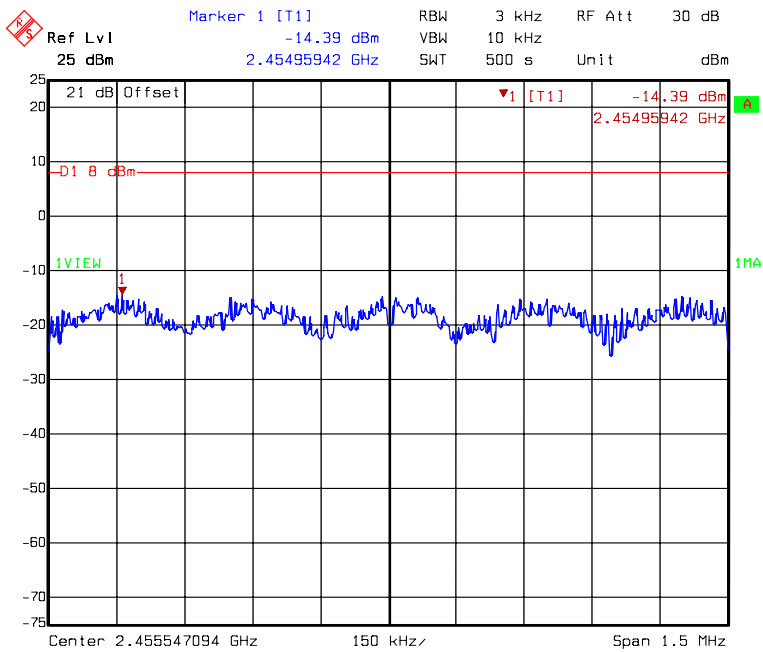


Title: Power density
 Comment A: CH 1 at 802.11g mode chain0
 Date: 13.JAN.2010 09:28:02

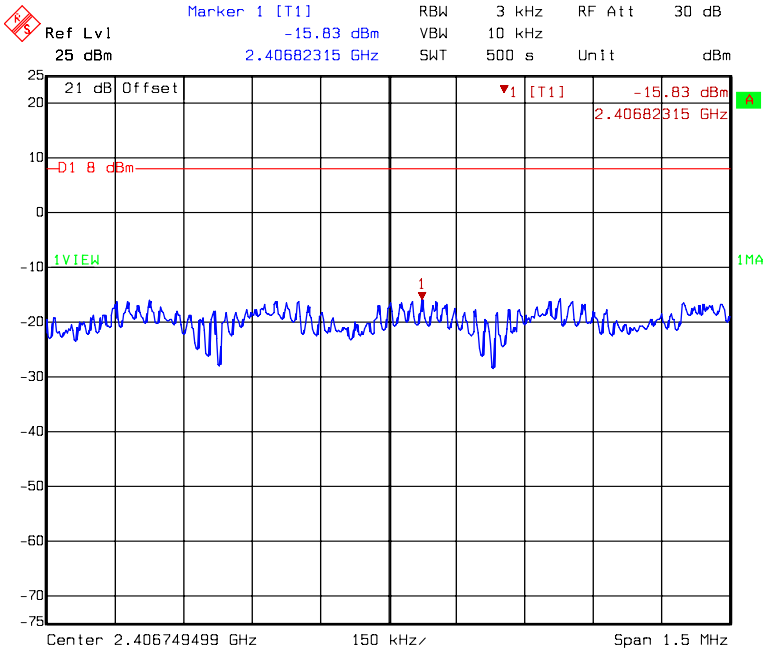
Chain 0: Power Spectral Density @ 802.11g mode channel 6



Chain 0: Power Spectral Density @ 802.11g mode channel 11

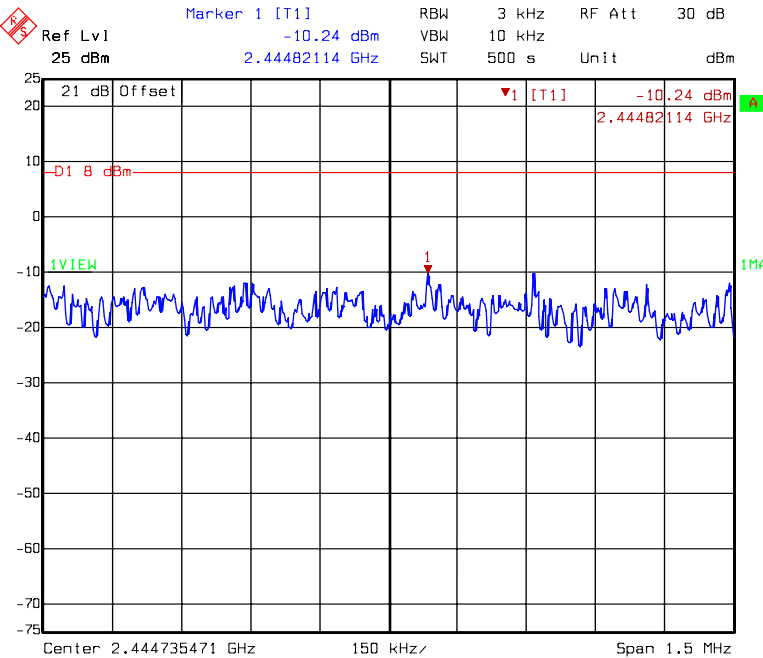


Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 1



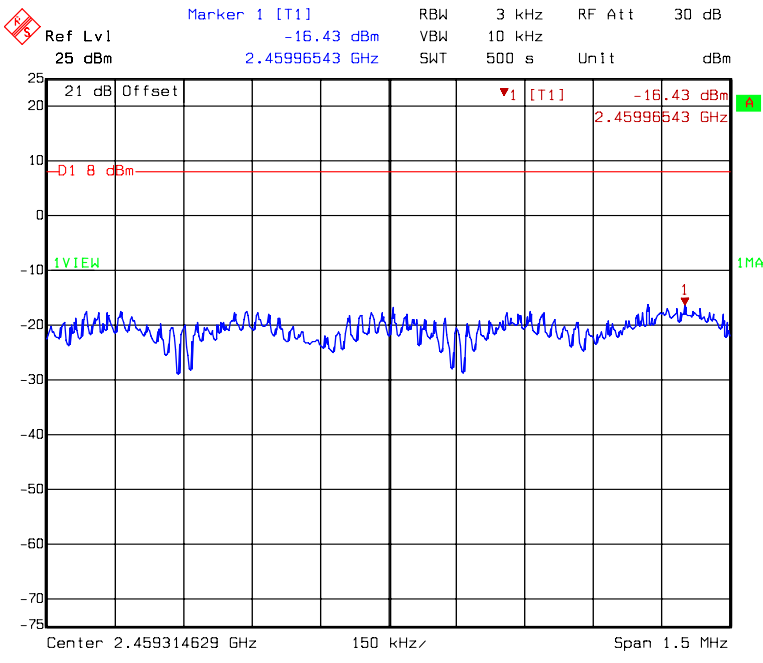
Title: Power density
Comment A: CH 1 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:43:15

Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 6



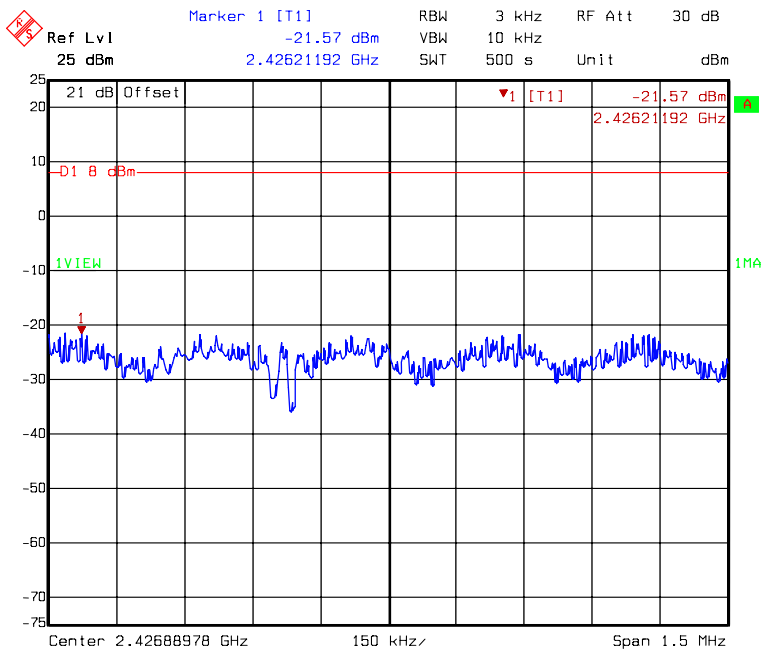
Title: Power density
Comment A: CH 6 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:47:25

Chain 0: Power Spectral Density @ 802.11n HT20 mode channel 11



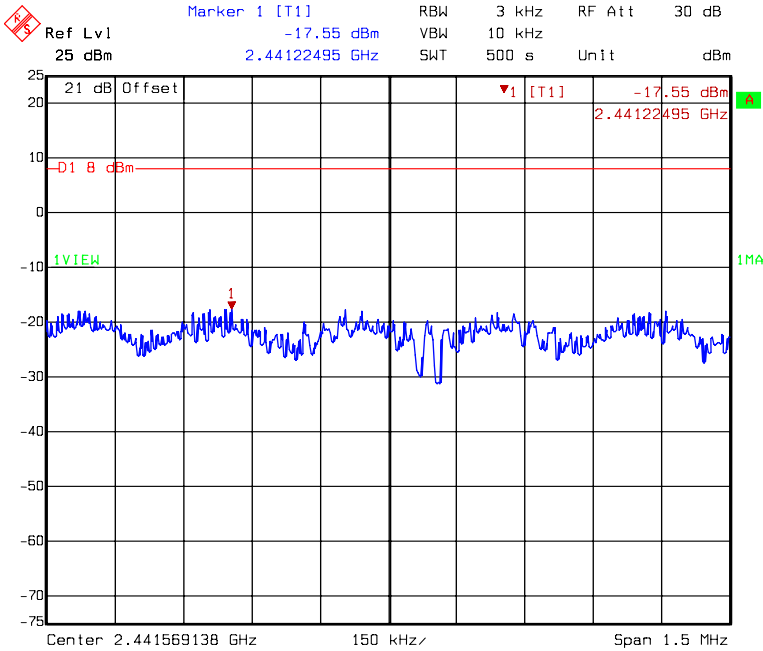
Title: Power density
 Comment A: CH 11 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:50:27

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 3



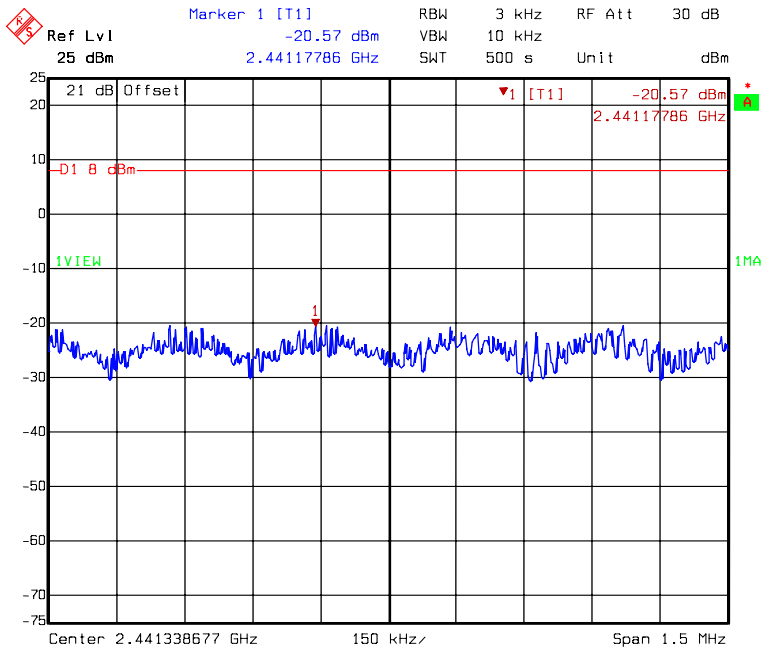
Title: Power density
 Comment A: CH 3 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:53:49

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 6



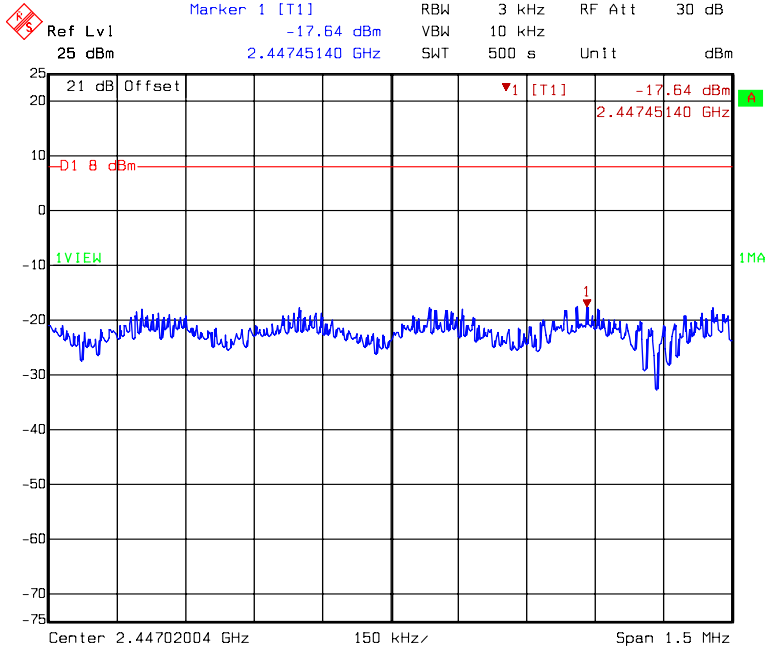
Title: Power density
Comment A: CH 6 at 802.11n 40MHz mode chain0
Date: 13.JAN.2010 09:56:43

Chain 0: Power Spectral Density @ 802.11n HT40 mode channel 9



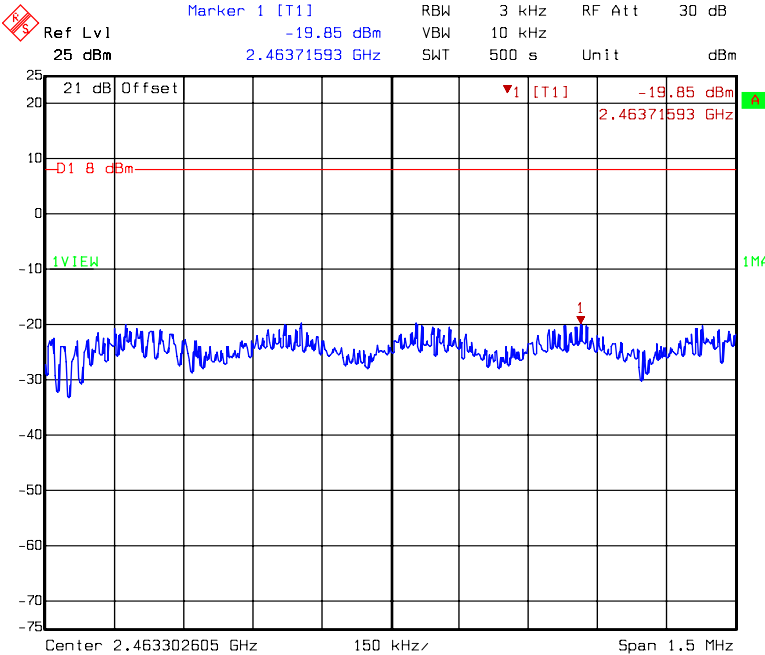
Title: Power density
Comment A: CH 9 at 802.11n 40MHz mode chain0
Date: 13.JAN.2010 10:01:52

Chain 1: Power Spectral Density @ 802.11n HT40 mode channel 6



Title: Power density
 Comment A: CH 6 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:31:46

Chain 1: Power Spectral Density @ 802.11n HT40 mode channel 9



Title: Power density
 Comment A: CH 9 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:47:07

6. RF Antenna conducted Spurious

Name of Test	RF Antenna Conducted Spurious
Base Standard	FCC 15.247(d)

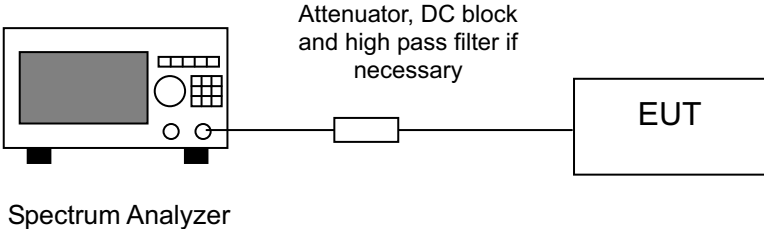
Test Result: Complies
Measurement Data: See plots below

Method of Measurement:

Reference FCC document: KDB558074

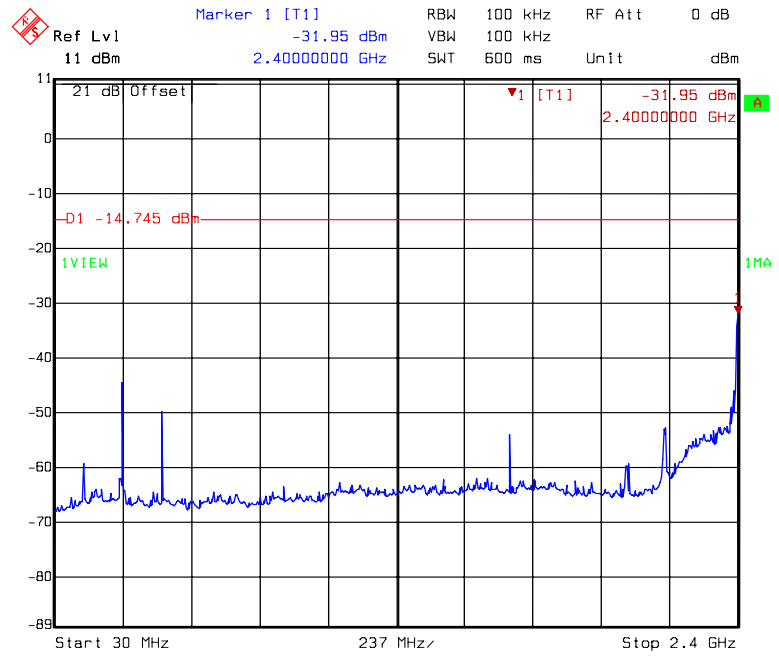
The measurements were performed from 30 MHz to 25 GHz RF antenna conducted per FCC 15.247 (d) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. Harmonics and spurious noise must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

Test Diagram:



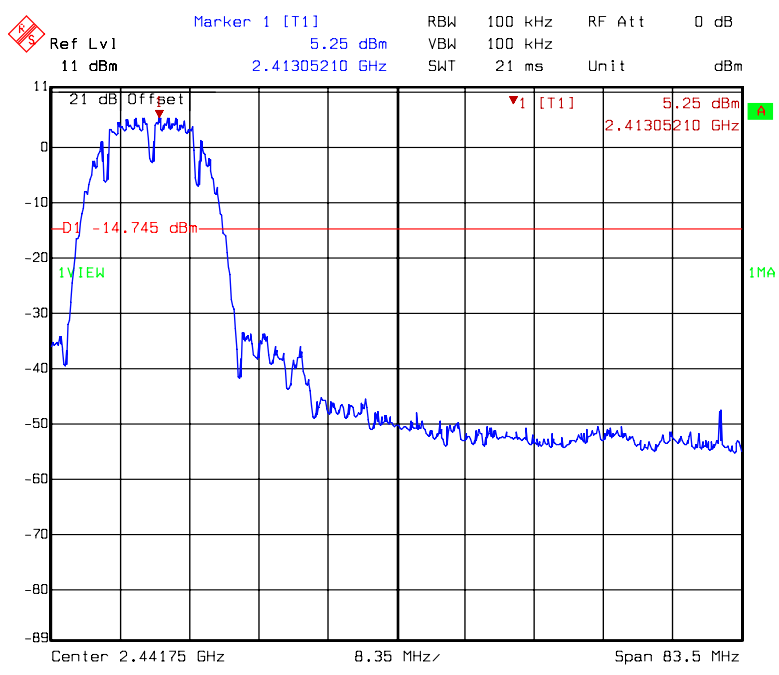
- Note:**
- (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.
 - (2) The EUT operating at 2.4 GHz ISM band. Frequency Range scanned from 30 MHz to 25 GHz.

Chain 0: conducted spurious @ 802.11b mode channel 1 (1 of 3)



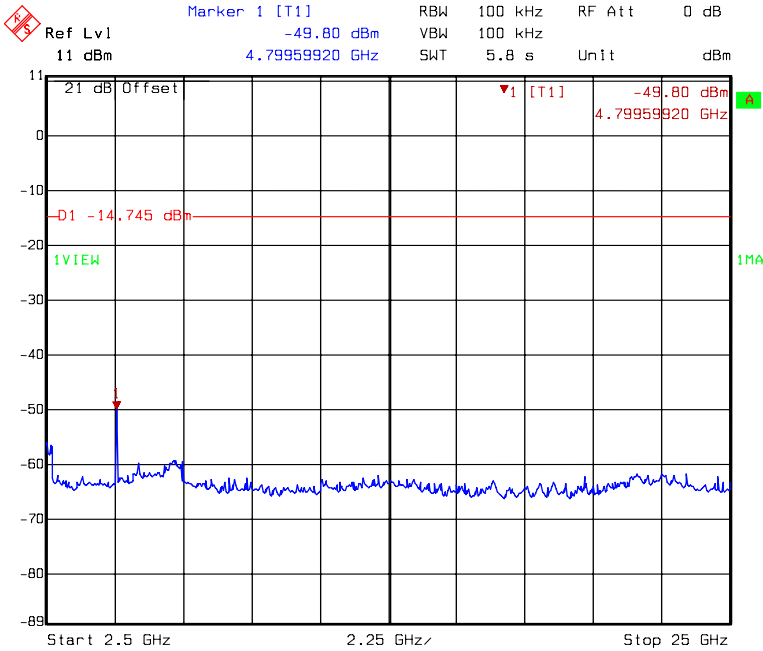
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 30MHz~2400MHzchain0
Date: 13.JAN.2010 09:17:34

Chain 0: conducted spurious @ 802.11b mode channel 1 (2 of 3)



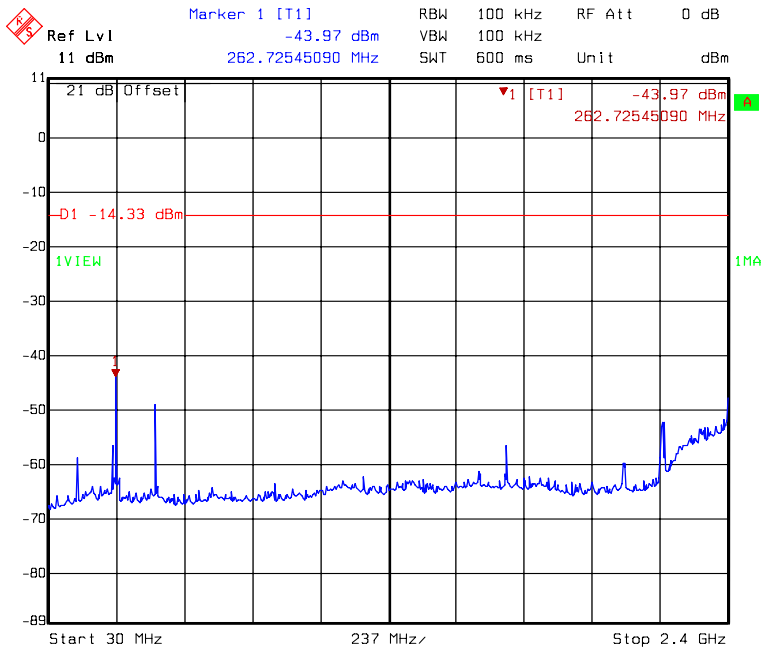
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2400MHz~2483.5MHzchain0
Date: 13.JAN.2010 09:17:12

Chain 0: conducted spurious @ 802.11b mode channel 1 (3 of 3)



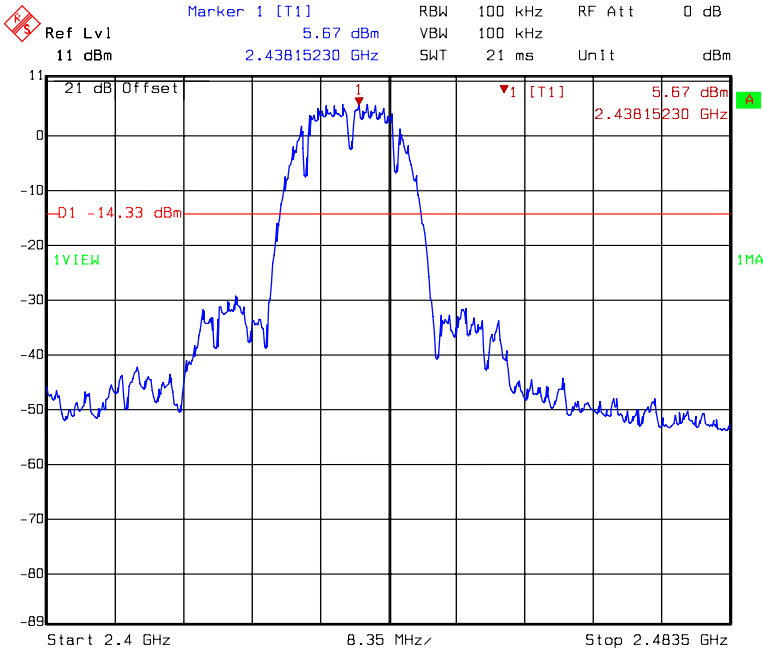
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11b mode 2483.5MHz~25GHzchain0
 Date: 13.JAN.2010 09:18:02

Chain 0: conducted spurious @ 802.11b mode channel 6 (1 of 3)



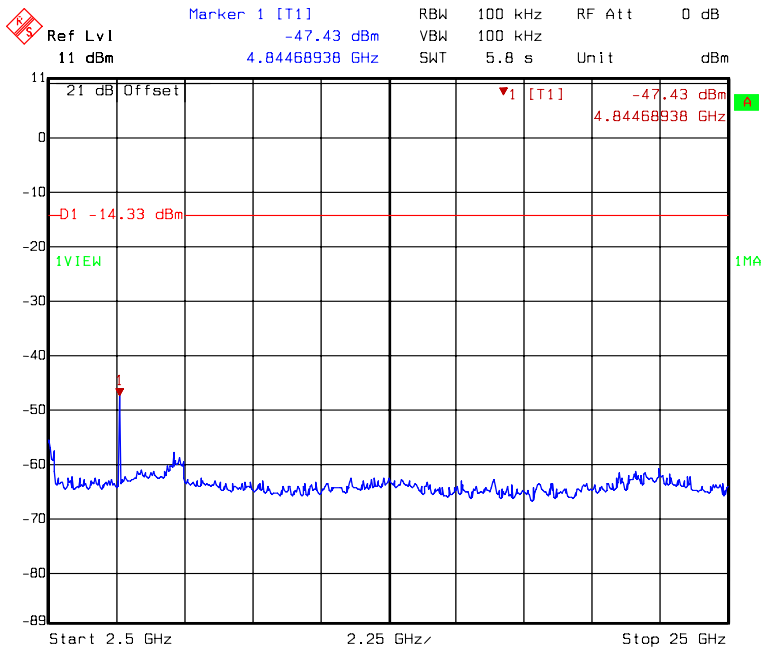
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 30MHz~2400MHzchain0
 Date: 13.JAN.2010 09:22:20

Chain 0: conducted spurious @ 802.11b mode channel 6 (2 of 3)



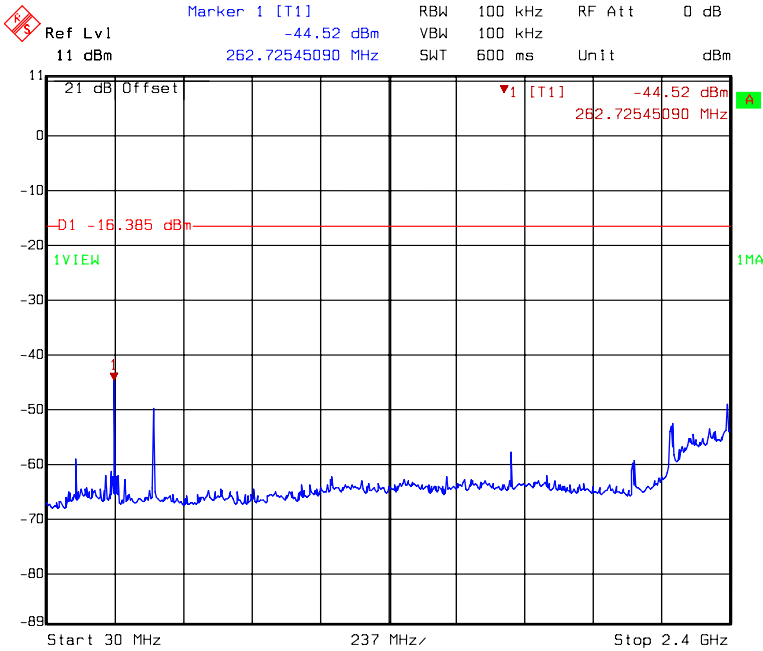
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 2400MHz~2483.5MHzchain0
 Date: 13.JAN.2010 09:21:58

Chain 0: conducted spurious @ 802.11b mode channel 6 (3 of 3)



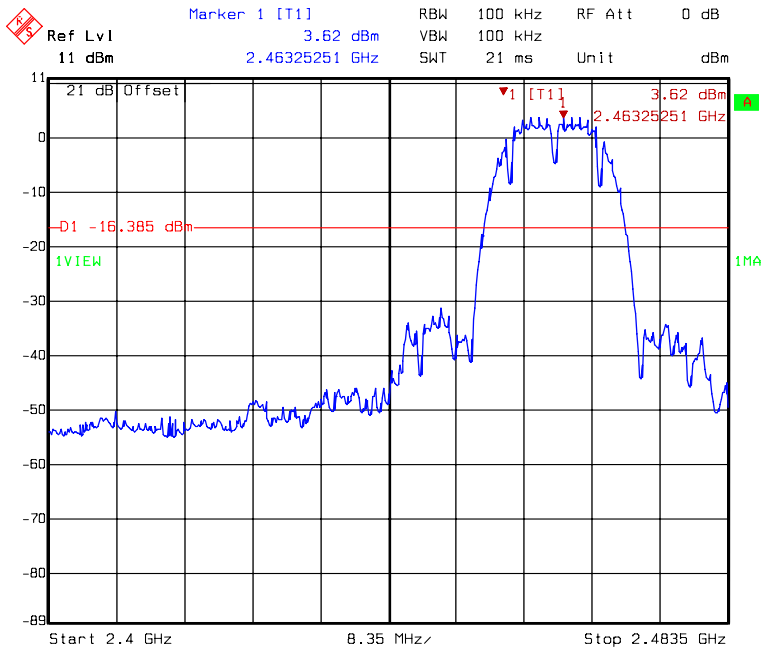
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 2483.5MHz~25GHzchain0
 Date: 13.JAN.2010 09:22:47

Chain 0: conducted spurious @ 802.11b mode channel 11 (1 of 3)



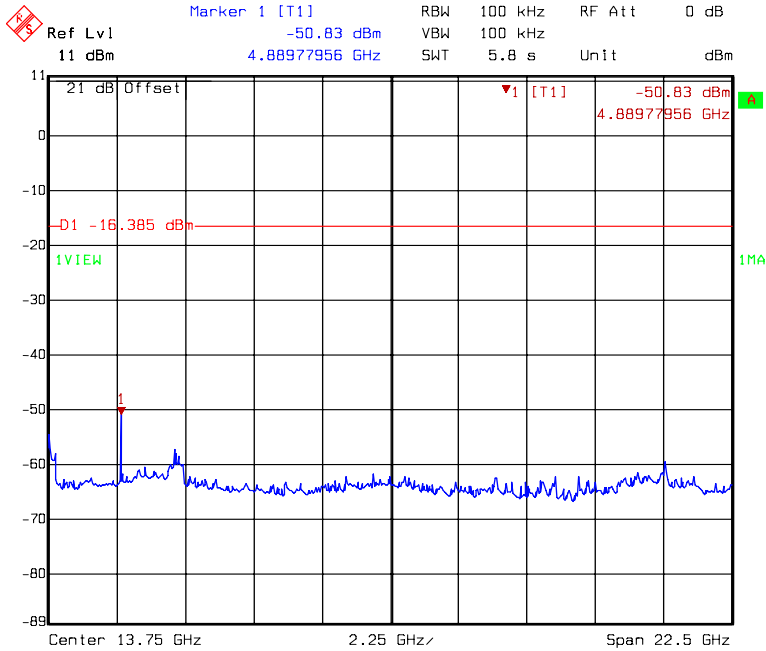
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHzchain0
Date: 13.JAN.2010 09:25:16

Chain 0: conducted spurious @ 802.11b mode channel 11 (2 of 3)



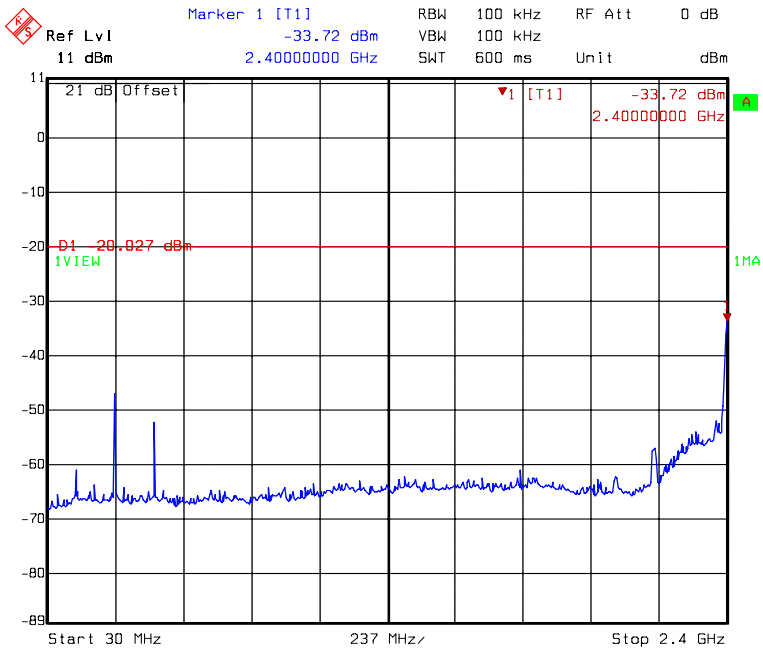
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2400MHz~2483.5MHzchain0
Date: 13.JAN.2010 09:24:55

Chain 0: conducted spurious @ 802.11b mode channel 11 (3 of 3)



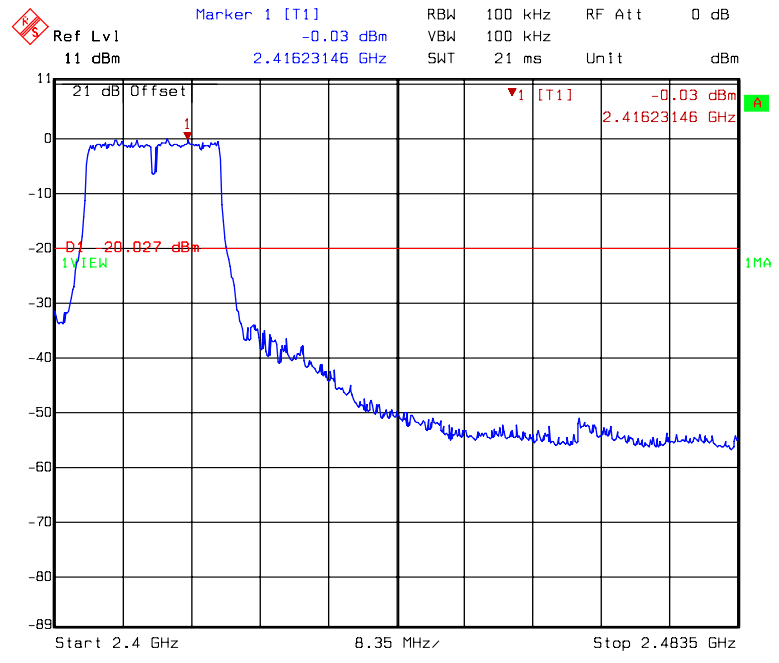
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2483.5MHz~256Hzchain0
Date: 13.JAN.2010 09:25:43

Chain 0: conducted spurious @ 802.11g mode channel 1 (1 of 3)



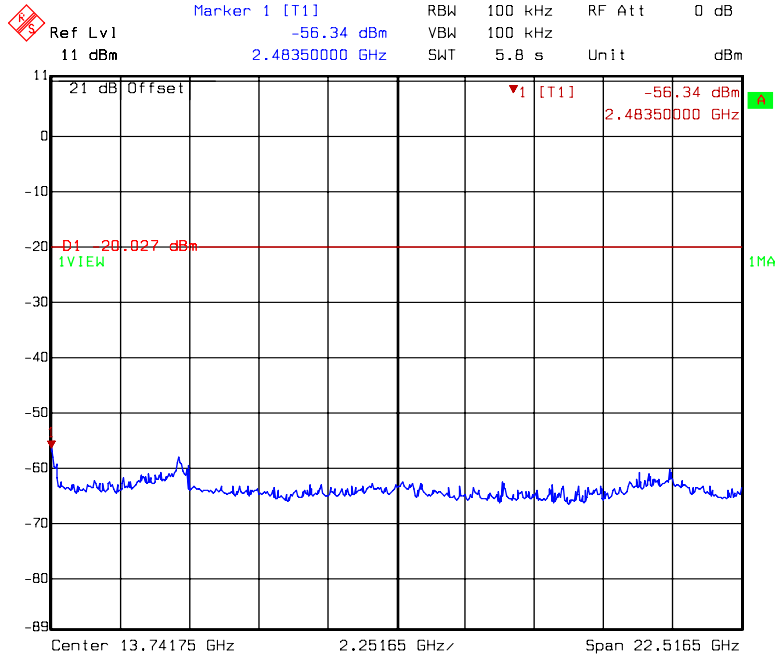
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 30MHz~2400MHzchain0
Date: 13.JAN.2010 09:28:43

Chain 0: conducted spurious @ 802.11g mode channel 1 (2 of 3)



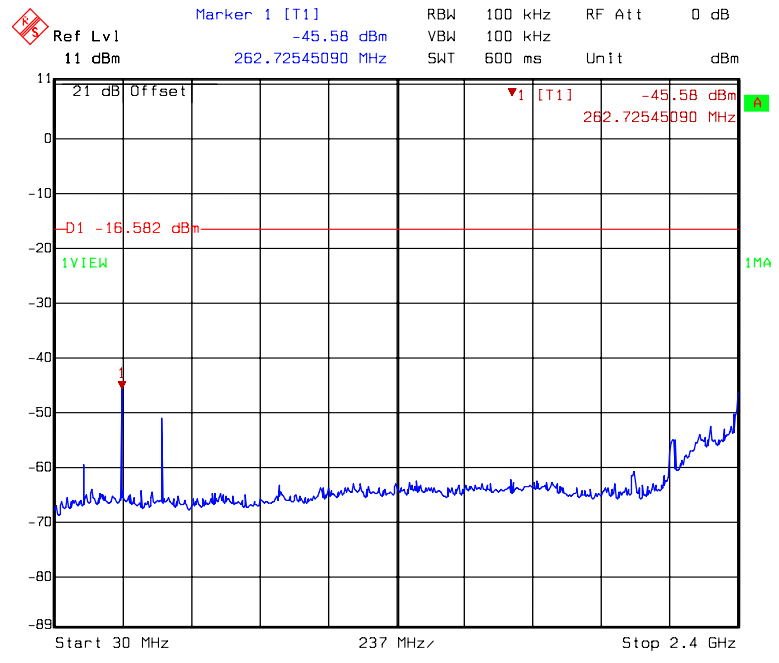
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11g mode 2400MHz~2483.5MHzchain0
 Date: 13.JAN.2010 09:28:22

Chain 0: conducted spurious @ 802.11g mode channel 1 (3 of 3)



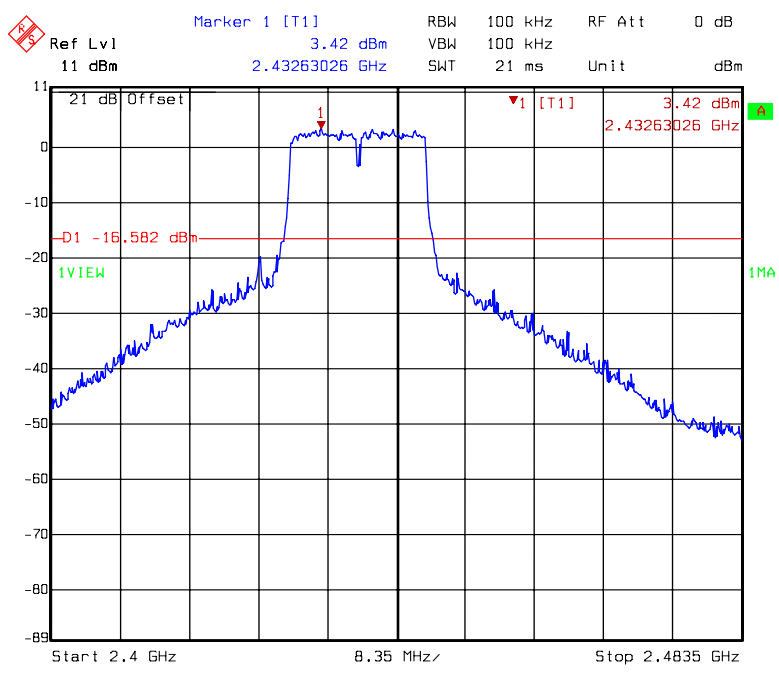
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11g mode 2483.5MHz~25000MHzchain0
 Date: 13.JAN.2010 09:29:10

Chain 0: conducted spurious @ 802.11g mode channel 6 (1 of 3)



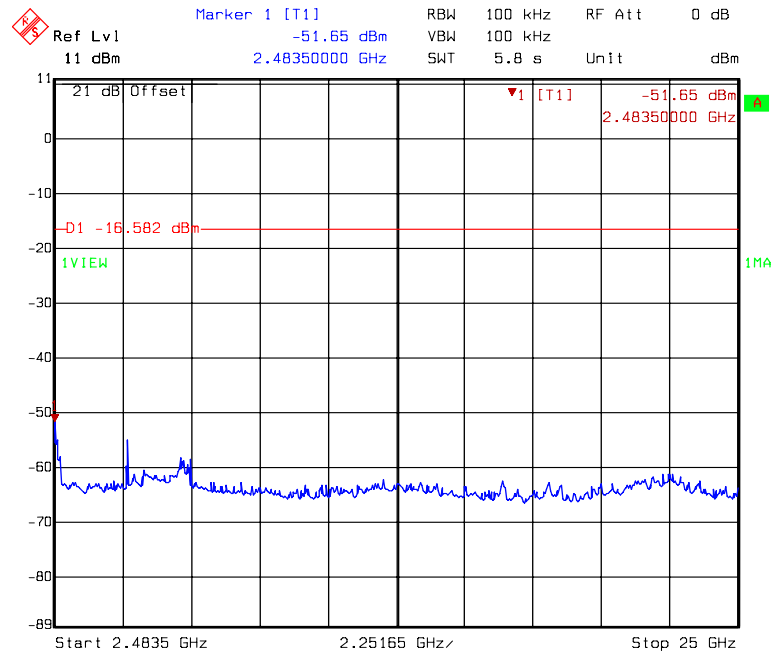
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 30MHz~2400MHzchain0
 Date: 13.JAN.2010 09:31:59

Chain 0: conducted spurious @ 802.11g mode channel 6 (2 of 3)



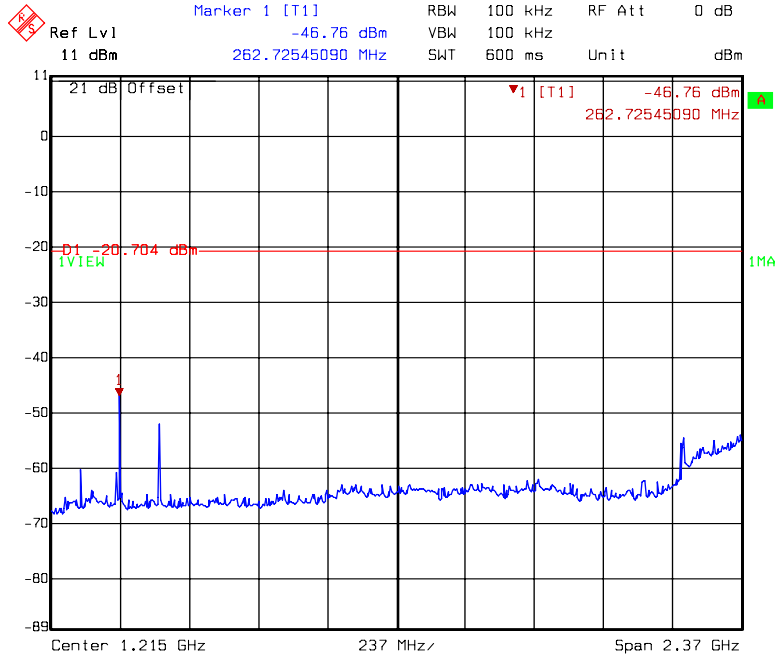
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 2400MHz~2483.5MHzchain0
 Date: 13.JAN.2010 09:31:38

Chain 0: conducted spurious @ 802.11g mode channel 6 (3 of 3)



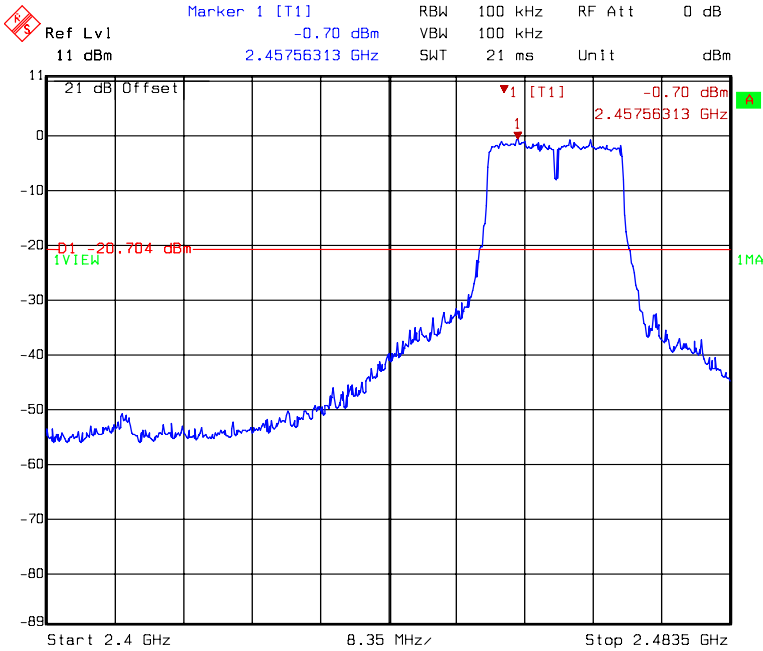
Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2483.5MHz~2500MHzchain0
Date: 13.JAN.2010 09:32:26

Chain 0: conducted spurious @ 802.11g mode channel 11 (1 of 3)



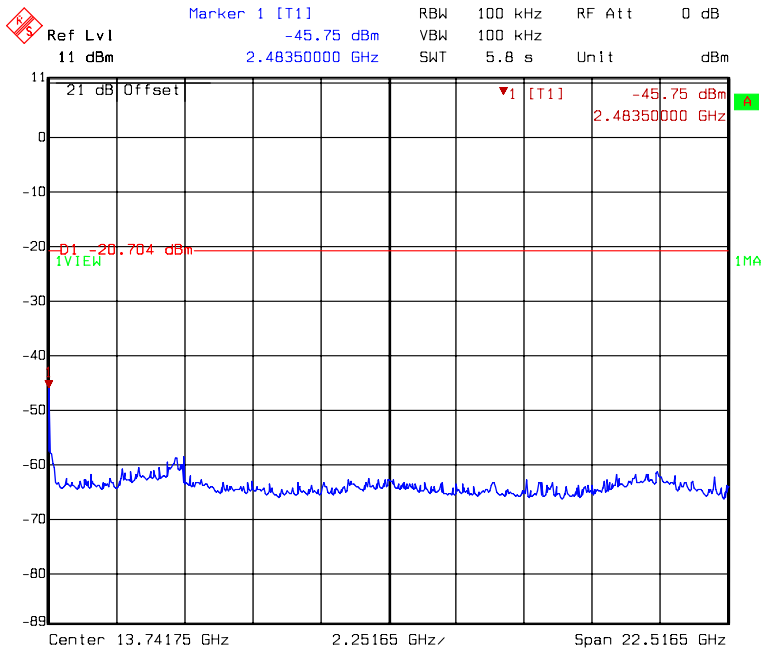
Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 30MHz~2400MHzchain0
Date: 13.JAN.2010 09:35:03

Chain 0: conducted spurious @ 802.11g mode channel 11 (2 of 3)



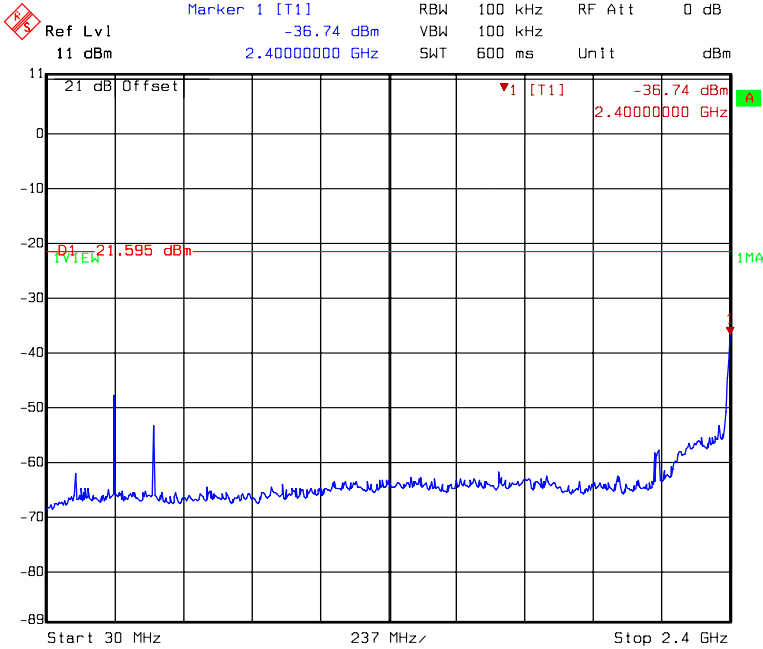
Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2400MHz~2483.5MHzchain0
Date: 13.JAN.2010 09:34:41

Chain 0: conducted spurious @ 802.11g mode channel 11 (3 of 3)



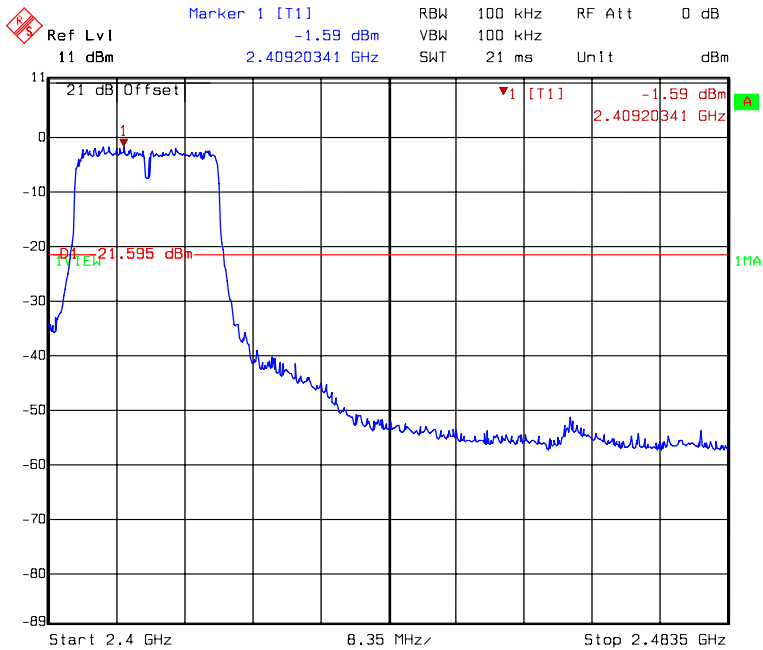
Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2483.5MHz~2500MHzchain0
Date: 13.JAN.2010 09:35:30

Chain 0: conducted spurious @ 802.11n HT20 mode channel 1 (1 of 3)



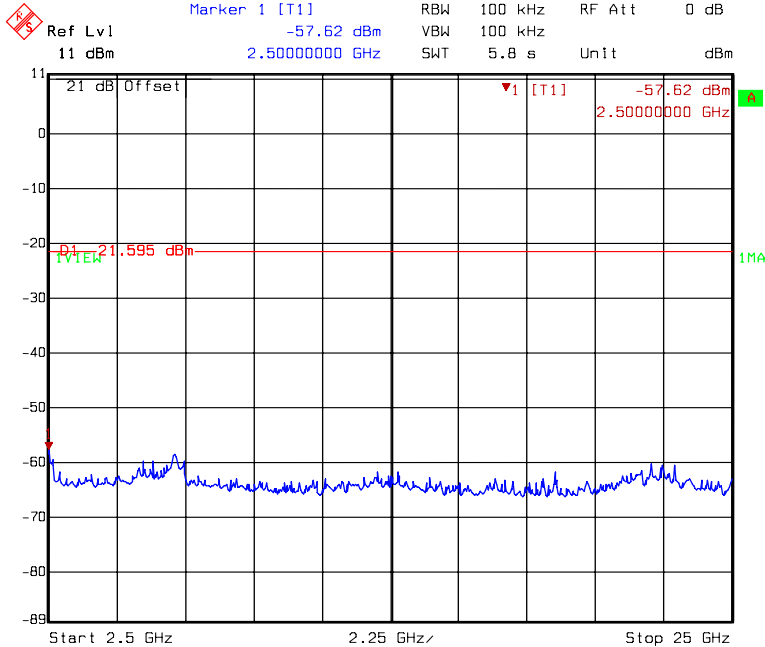
Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:43:57

Chain 0: conducted spurious @ 802.11n HT20 mode channel 1 (2 of 3)



Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:43:35

Chain 0: conducted spurious @ 802.11n HT20 mode channel 1 (3 of 3)



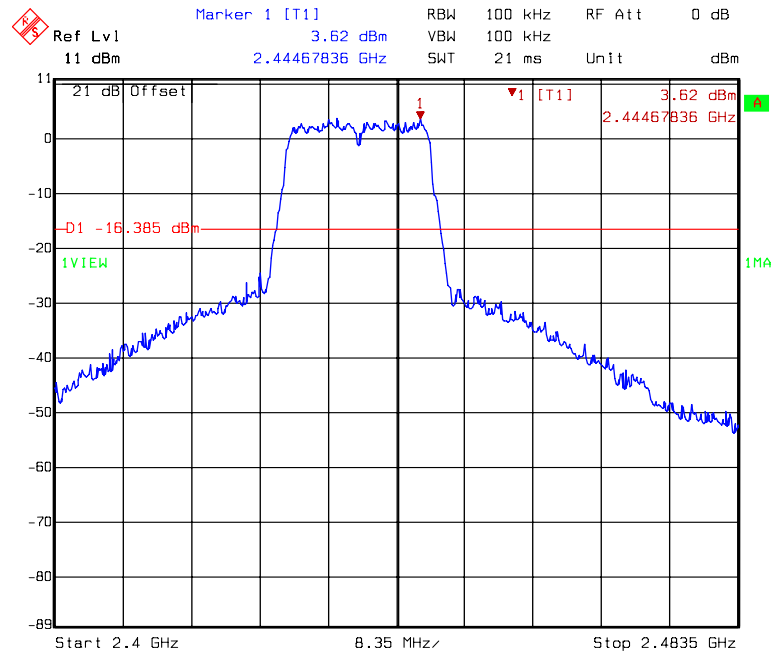
Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:44:24

Chain 0: conducted spurious @ 802.11n HT20 mode channel 6 (1 of 3)



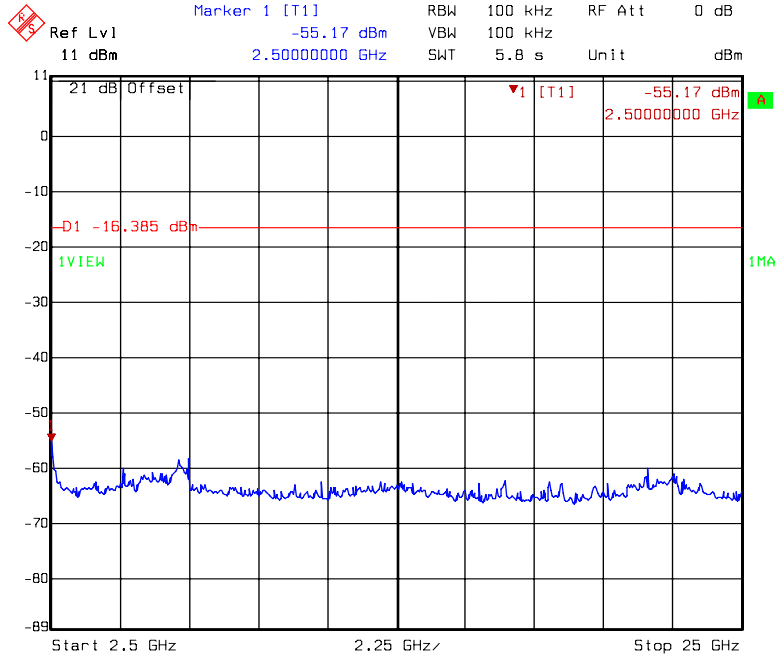
Title: Conductive-Spurious
Comment A: CH 6 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:48:07

Chain 0: conducted spurious @ 802.11n HT20 mode channel 6 (2 of 3)



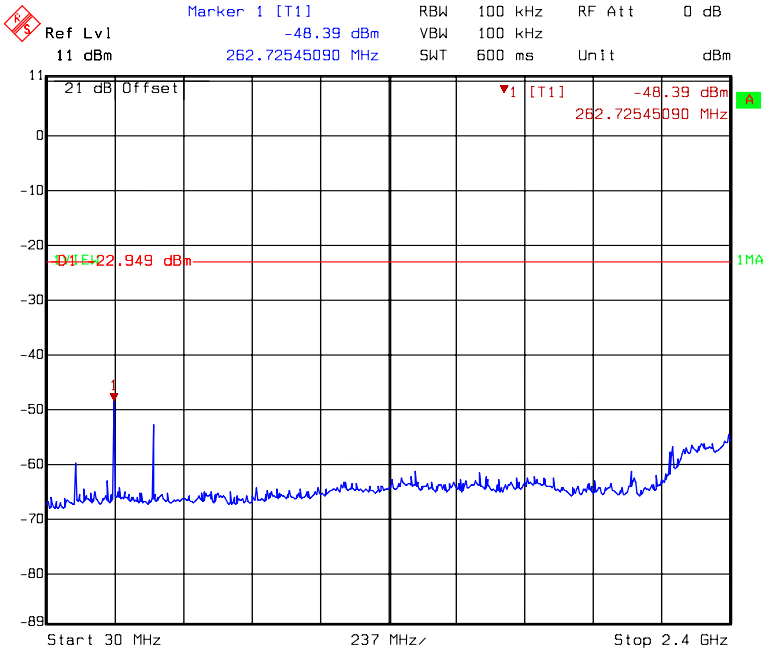
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:47:45

Chain 0: conducted spurious @ 802.11n HT20 mode channel 6 (3 of 3)



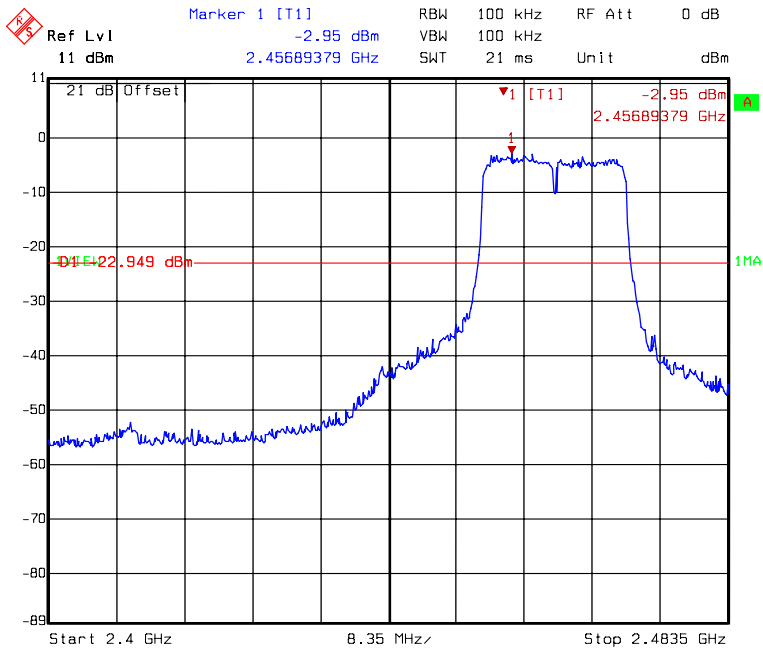
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 20MHz mode chain0
 Date: 13.JAN.2010 09:48:34

Chain 0: conducted spurious @ 802.11n HT20 mode channel 11 (1 of 3)



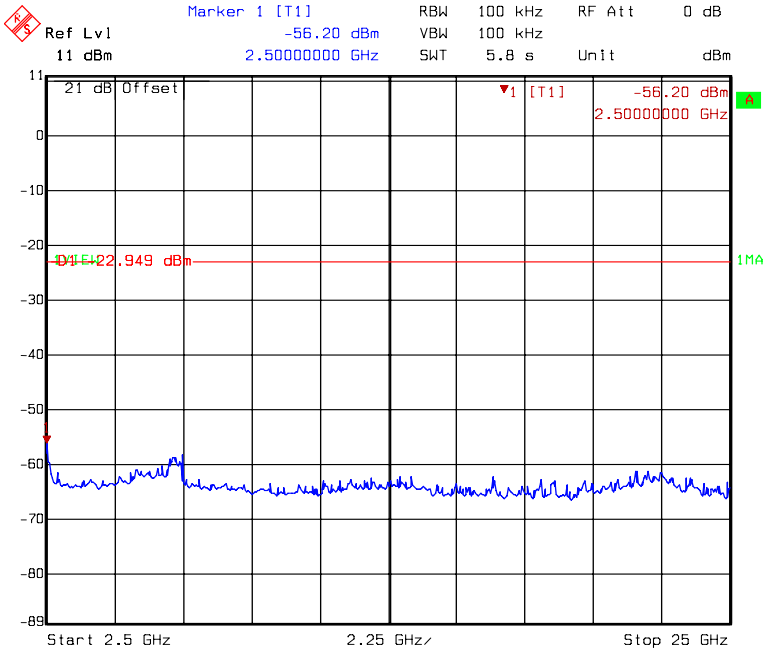
Title: Conductive-Spurious
Comment A: CH 11 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:51:08

Chain 0: conducted spurious @ 802.11n HT20 mode channel 11 (2 of 3)



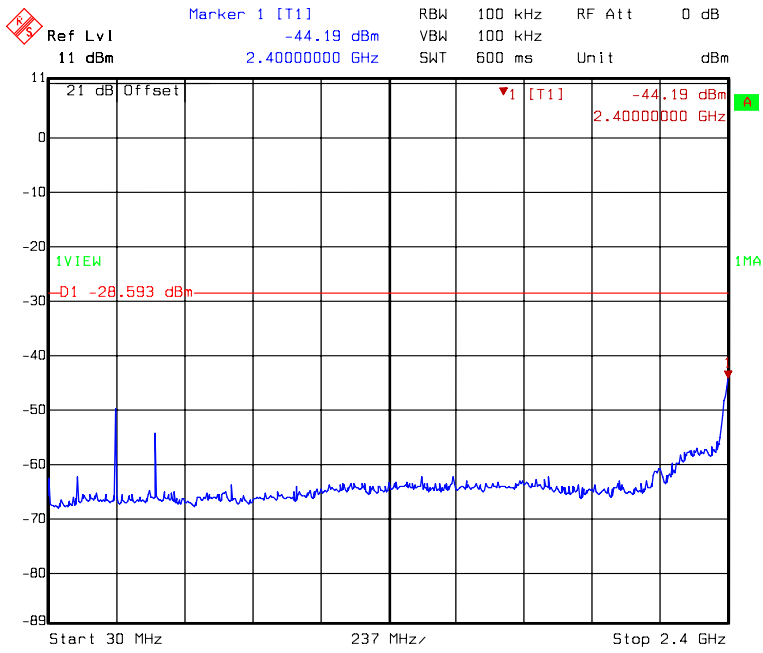
Title: Conductive-Spurious
Comment A: CH 11 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:50:47

Chain 0: conducted spurious @ 802.11n HT20 mode channel 11 (3 of 3)



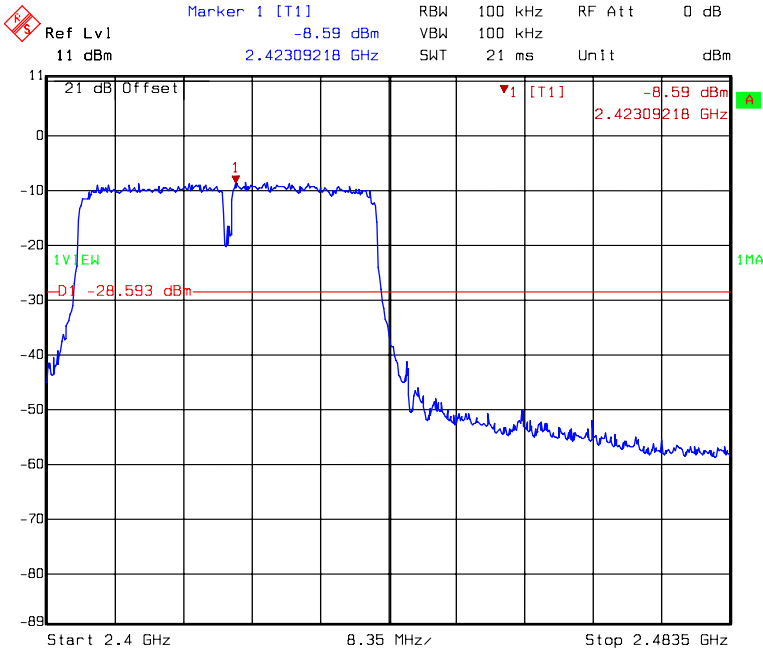
Title: Conductive-Spurious
Comment A: CH 11 at 802.11n 20MHz mode chain0
Date: 13.JAN.2010 09:51:35

Chain 0: conducted spurious @ 802.11n HT40 mode channel 3 (1 of 3)



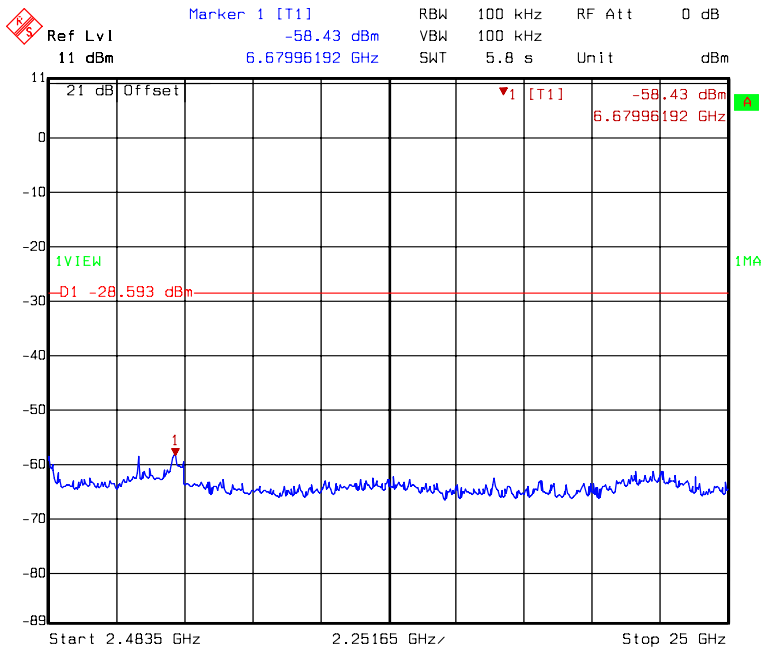
Title: Conductive-Spurious
Comment A: CH 3 at 802.11n 40MHz mode chain0
Date: 13.JAN.2010 09:54:31

Chain 0: conducted spurious @ 802.11n HT40 mode channel 3 (2 of 3)



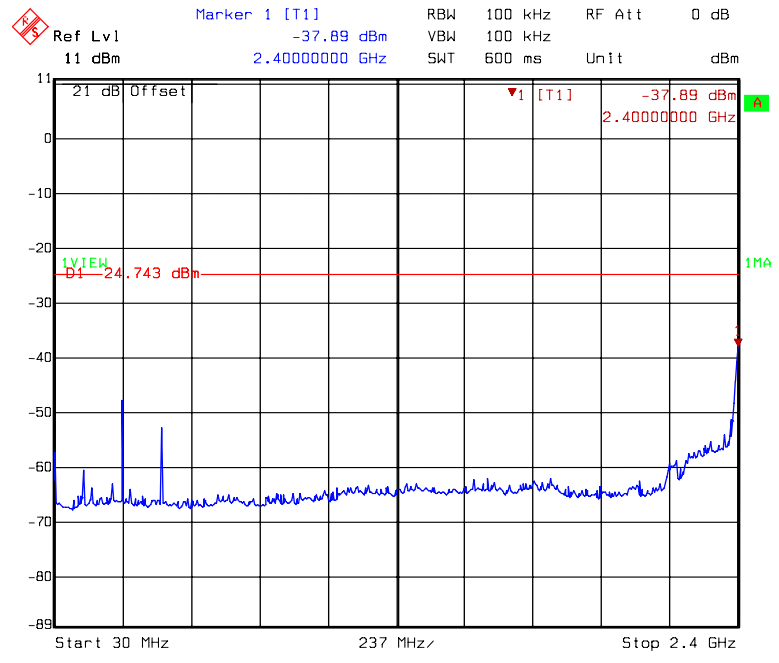
Title: Conductive-Spurious
Comment A: CH 3 at 802.11n 40MHz mode chain0
Date: 13.JAN.2010 09:54:10

Chain 0: conducted spurious @ 802.11n HT40 mode channel 3 (3 of 3)



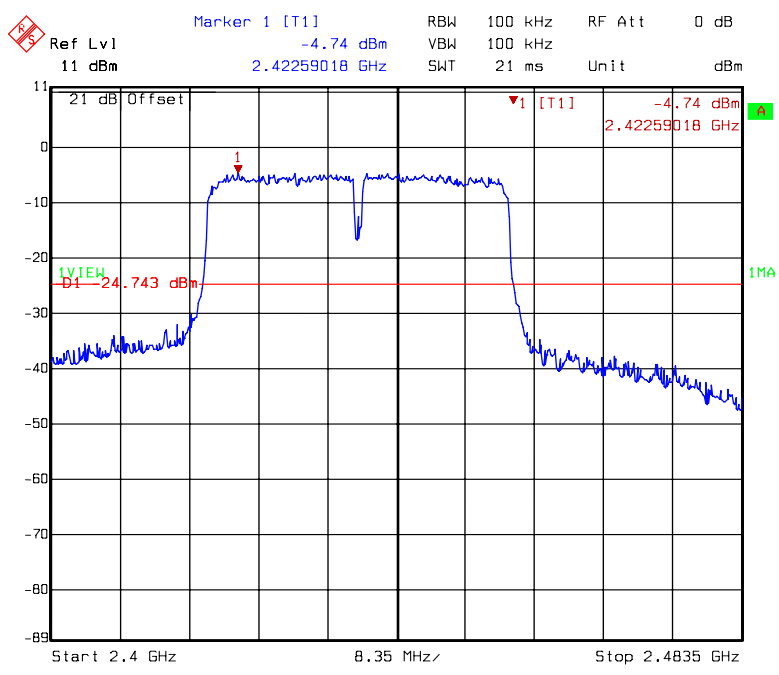
Title: Conductive-Spurious
Comment A: CH 3 at 802.11n 40MHz mode chain0
Date: 13.JAN.2010 09:54:58

Chain 0: conducted spurious @ 802.11n HT40 mode channel 6 (1 of 3)



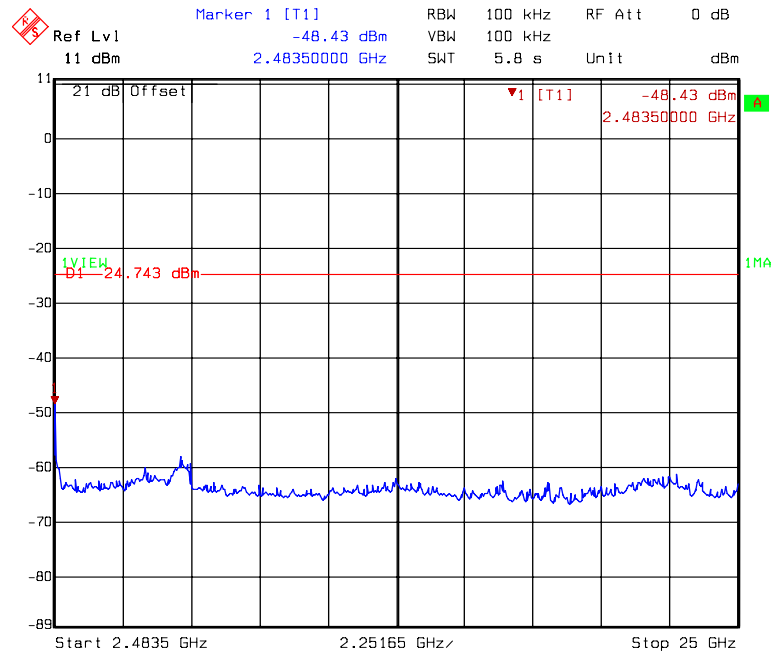
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:57:25

Chain 0: conducted spurious @ 802.11n HT40 mode channel 6 (2 of 3)



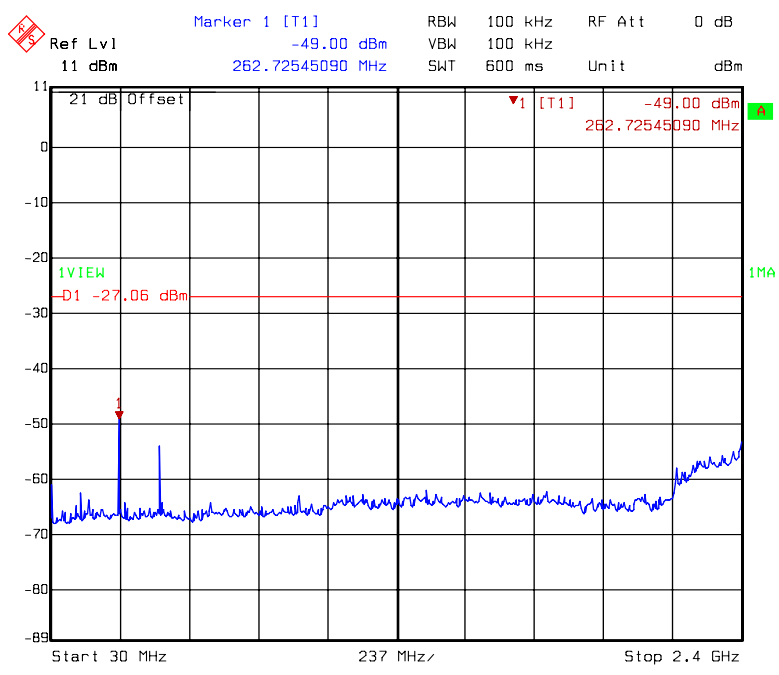
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:57:03

Chain 0: conducted spurious @ 802.11n HT40 mode channel 6 (3 of 3)



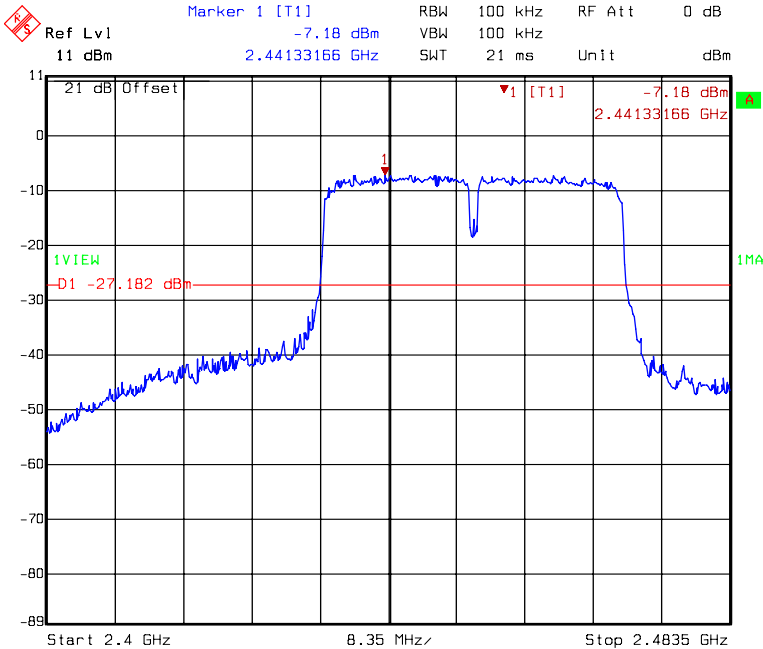
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 09:58:08

Chain 0: conducted spurious @ 802.11n HT40 mode channel 9 (1 of 3)



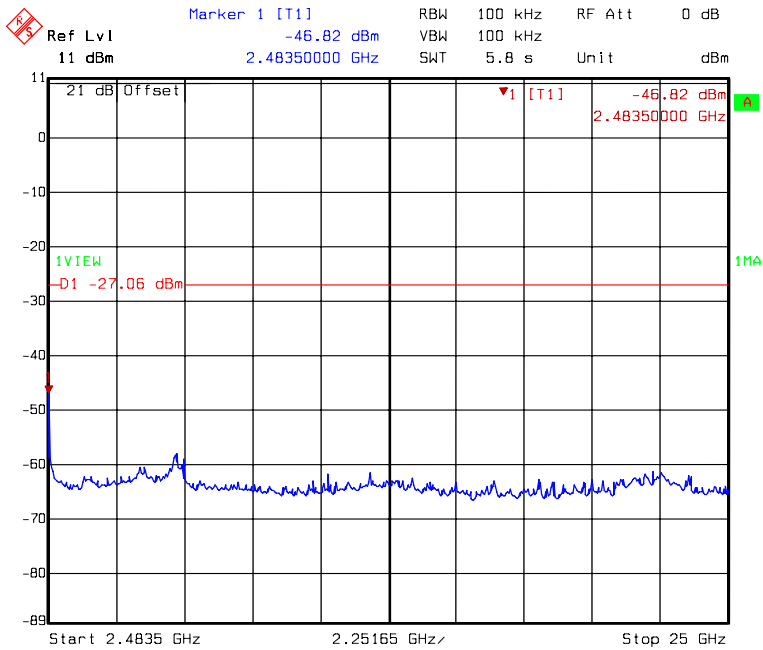
Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 10:12:20

Chain 0: conducted spurious @ 802.11n HT40 mode channel 9 (2 of 3)



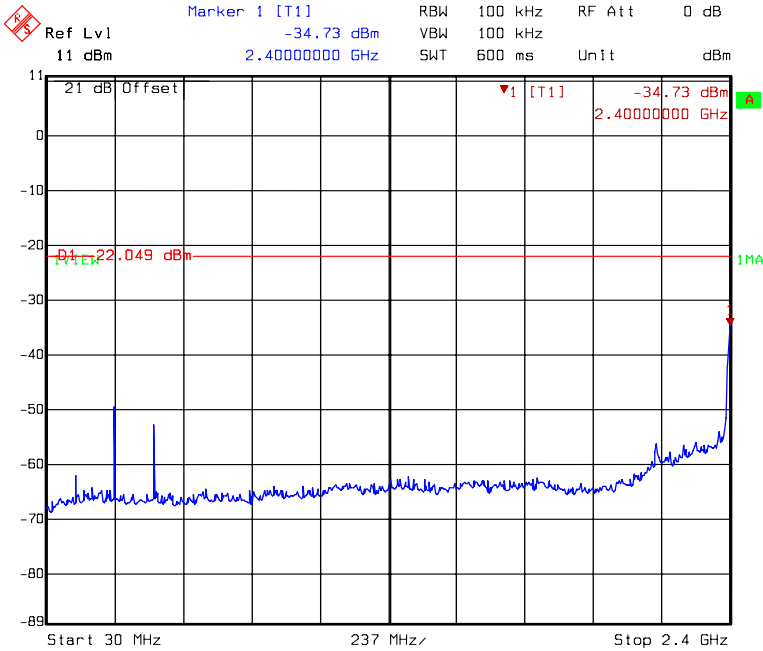
Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 10:02:53

Chain 0: conducted spurious @ 802.11n HT40 mode channel 9 (3 of 3)



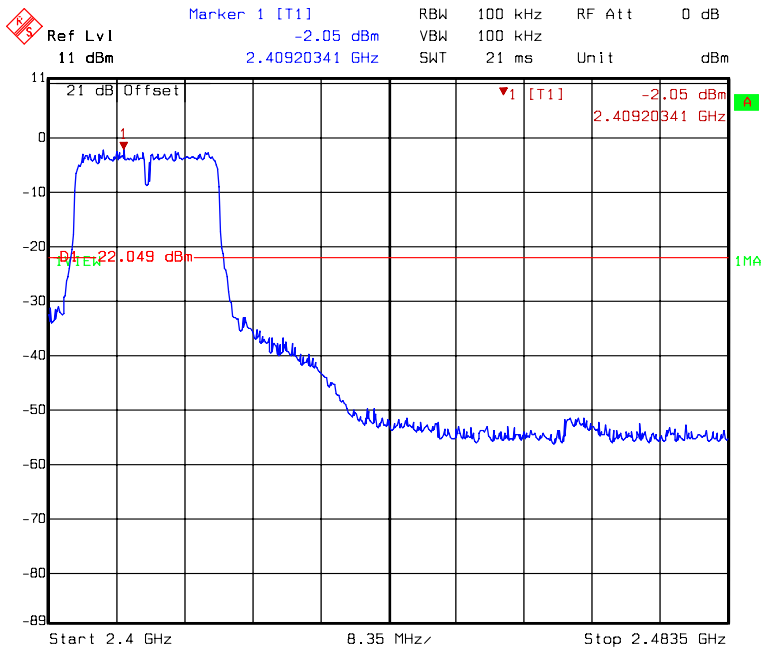
Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain0
 Date: 13.JAN.2010 10:12:57

Chain 1: conducted spurious @ 802.11n HT20 mode channel 1 (1 of 3)



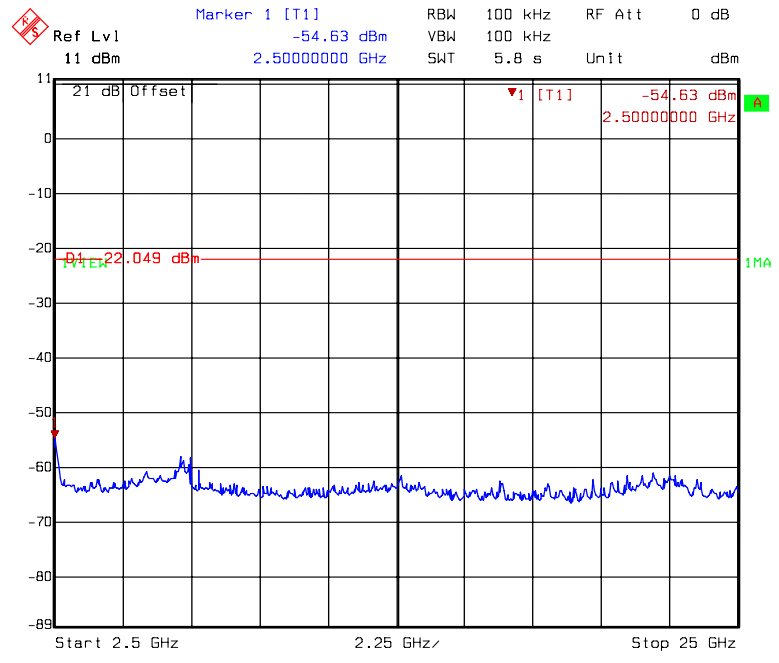
Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain1
Date: 13.JAN.2010 13:40:10

Chain 1: conducted spurious @ 802.11n HT20 mode channel 1 (2 of 3)



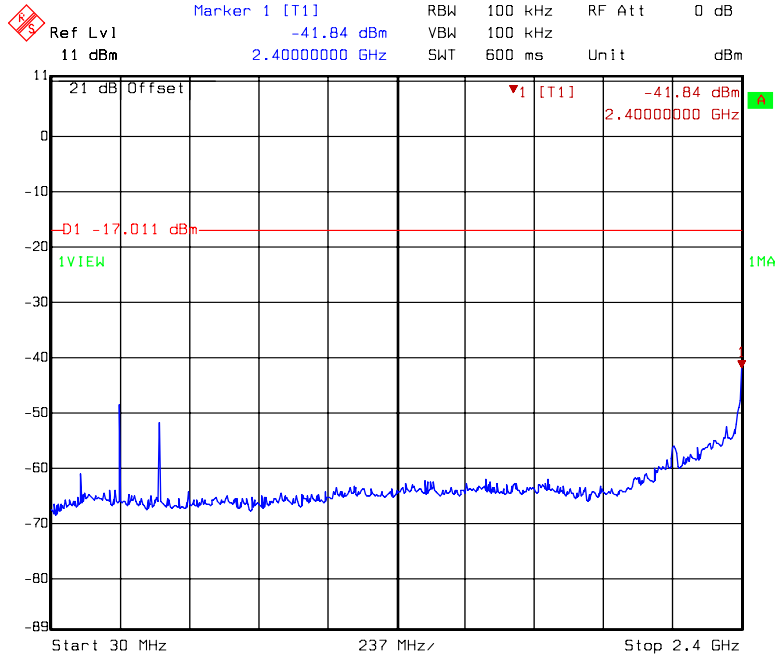
Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain1
Date: 13.JAN.2010 13:39:49

Chain 1: conducted spurious @ 802.11n HT20 mode channel 1 (3 of 3)



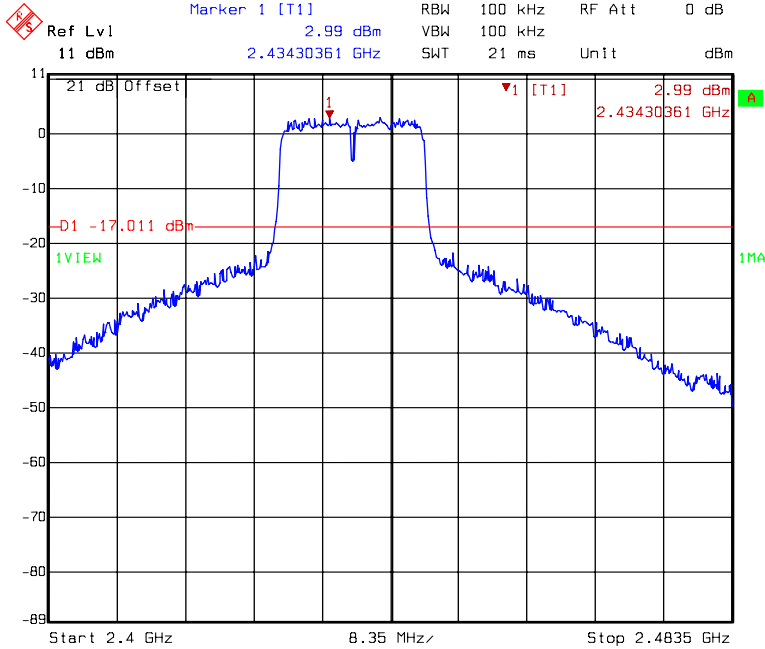
Title: Conductive-Spurious
Comment A: CH 1 at 802.11n 20MHz mode chain1
Date: 13.JAN.2010 13:40:37

Chain 1: conducted spurious @ 802.11n HT20 mode channel 6 (1 of 3)



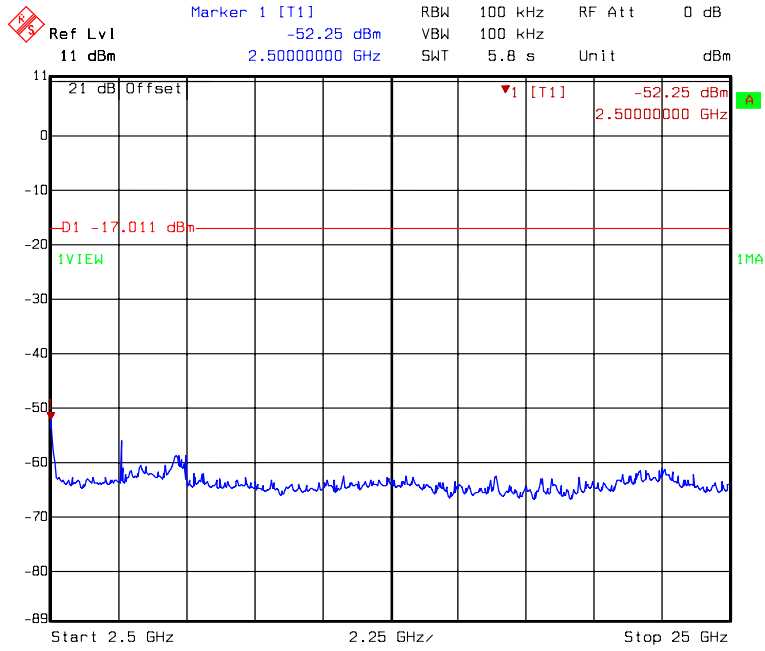
Title: Conductive-Spurious
Comment A: CH 6 at 802.11n 20MHz mode chain1
Date: 13.JAN.2010 13:43:13

Chain 1: conducted spurious @ 802.11n HT20 mode channel 6 (2 of 3)



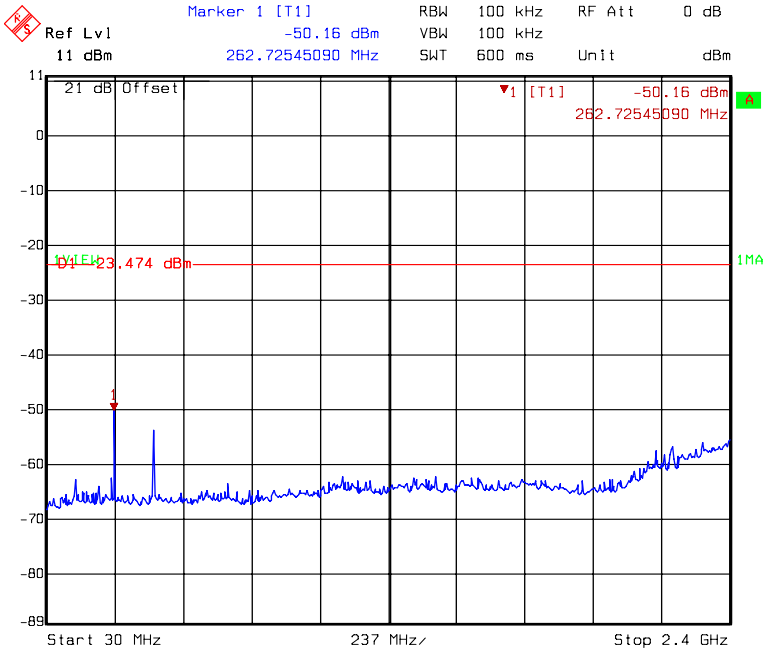
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:42:51

Chain 1: conducted spurious @ 802.11n HT20 mode channel 6 (3 of 3)



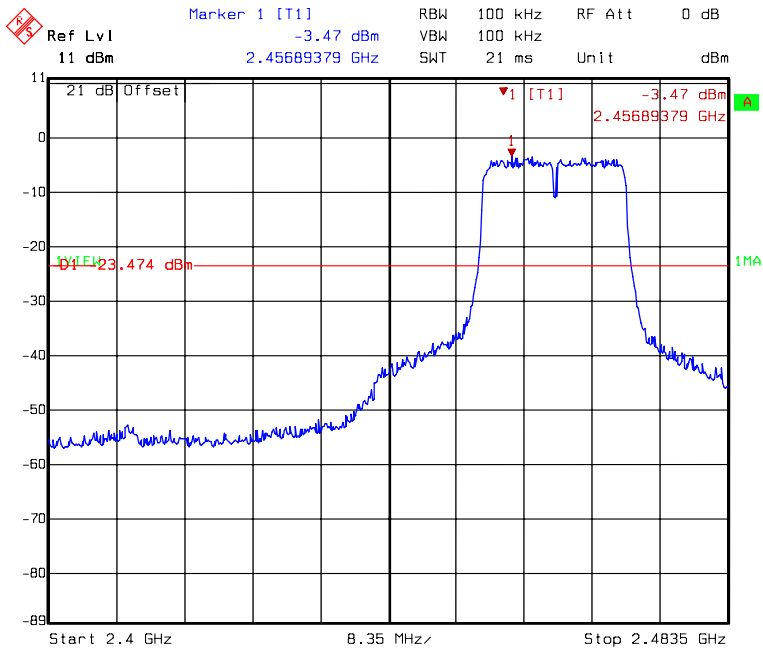
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:43:40

Chain 1: conducted spurious @ 802.11n HT20 mode channel 11 (1 of 3)



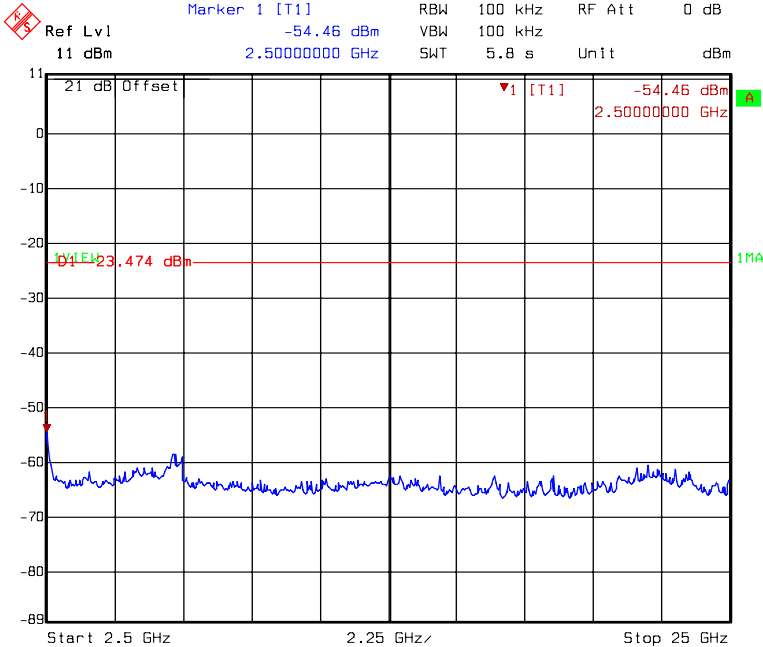
Title: Conductive-Spurious
 Comment A: CH 11 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:46:12

Chain 1: conducted spurious @ 802.11n HT20 mode channel 11 (2 of 3)



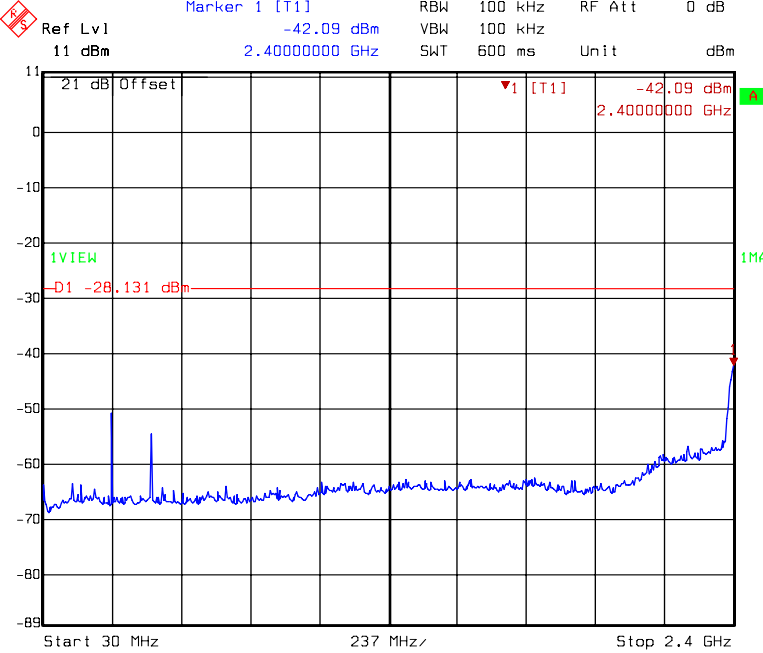
Title: Conductive-Spurious
 Comment A: CH 11 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:45:50

Chain 1: conducted spurious @ 802.11n HT20 mode channel 11 (3 of 3)



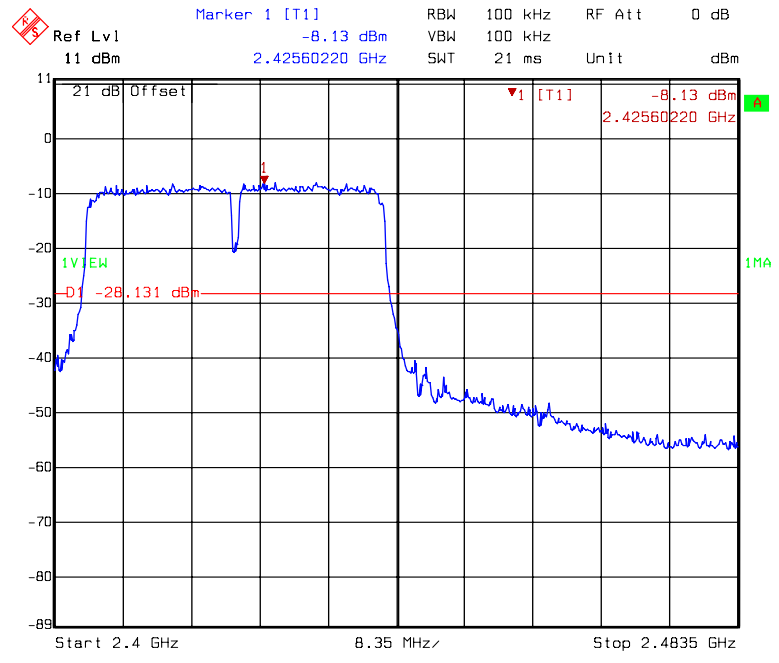
Title: Conductive-Spurious
 Comment A: CH 11 at 802.11n 20MHz mode chain1
 Date: 13.JAN.2010 13:46:39

Chain 1: conducted spurious @ 802.11n HT40 mode channel 3 (1 of 3)



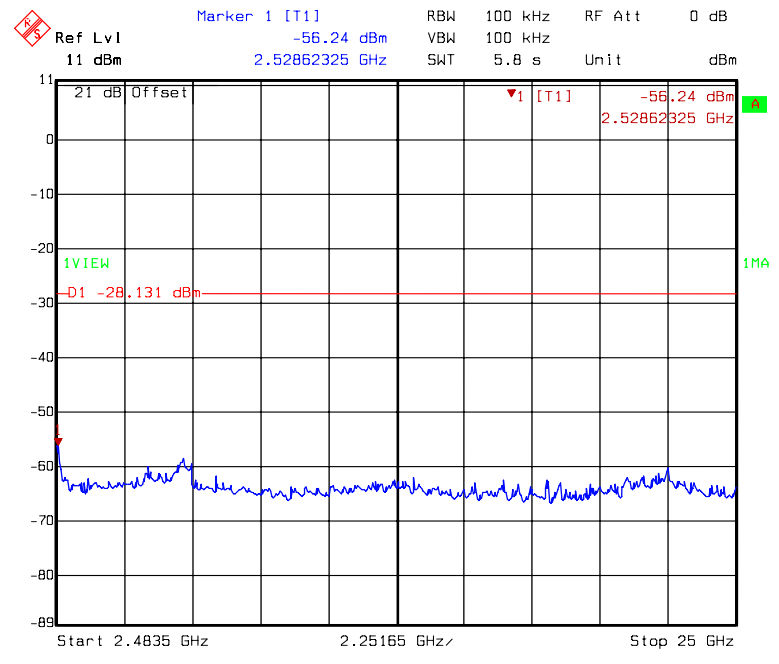
Title: Conductive-Spurious
 Comment A: CH 3 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:29:13

Chain 1: conducted spurious @ 802.11n HT40 mode channel 3 (2 of 3)



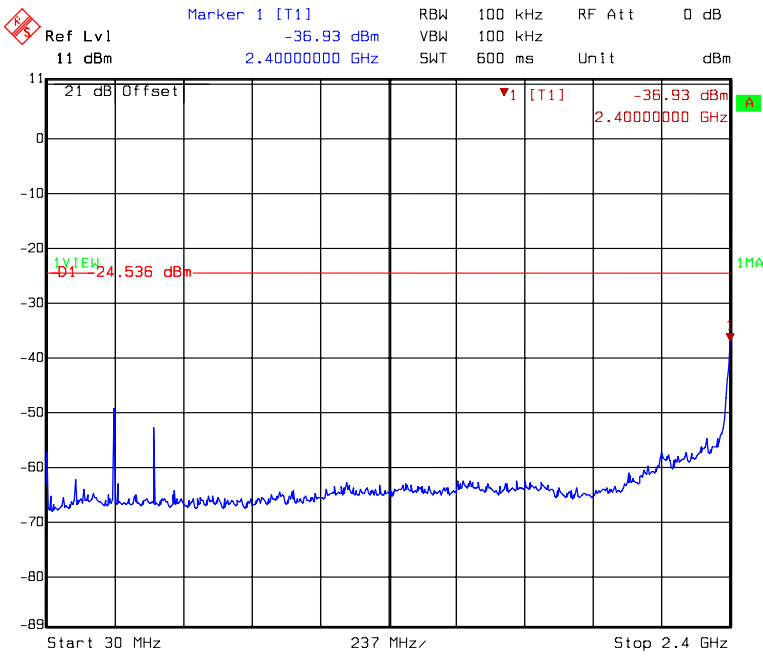
Title: Conductive-Spurious
 Comment A: CH 3 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:28:42

Chain 1: conducted spurious @ 802.11n HT40 mode channel 3 (3 of 3)



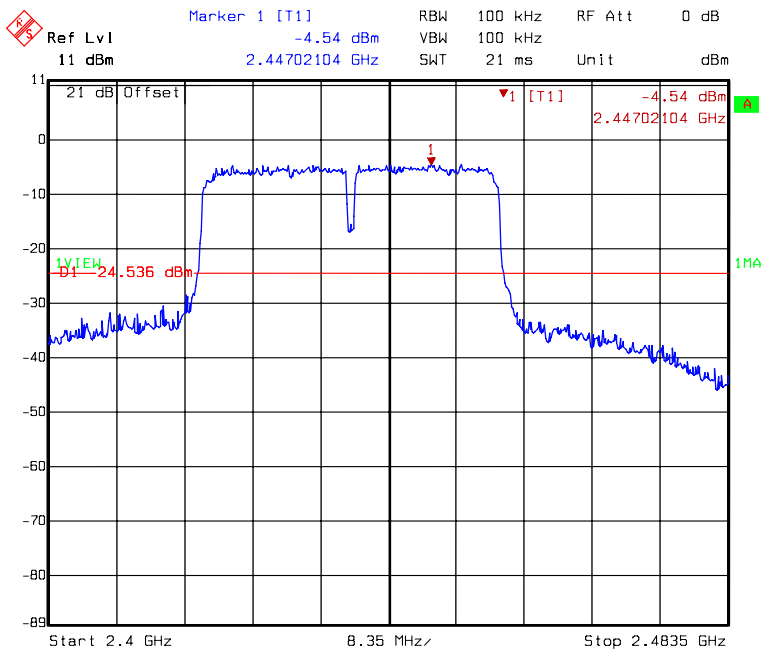
Title: Conductive-Spurious
 Comment A: CH 3 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:29:46

Chain 1: conducted spurious @ 802.11n HT40 mode channel 6 (1 of 3)



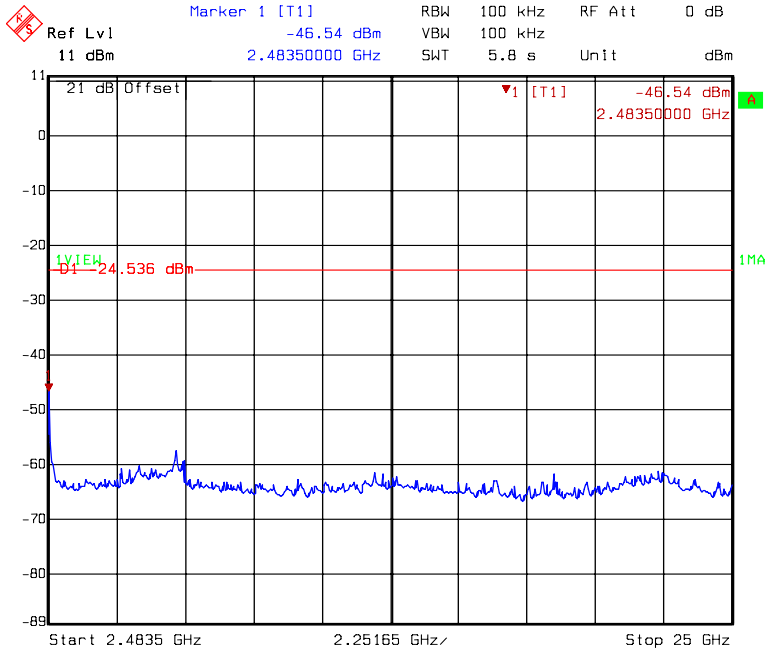
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:32:30

Chain 1: conducted spurious @ 802.11n HT40 mode channel 6 (2 of 3)



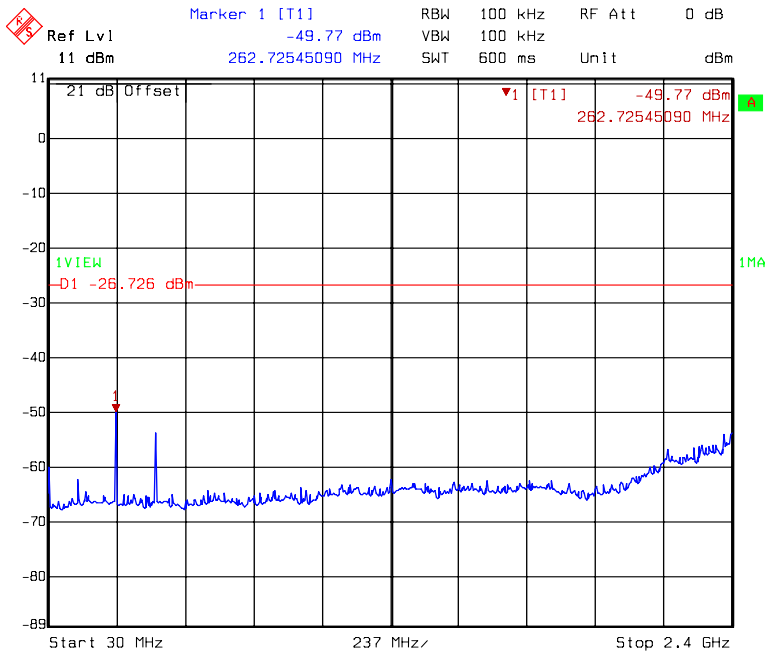
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:32:07

Chain 1: conducted spurious @ 802.11n HT40 mode channel 6 (3 of 3)



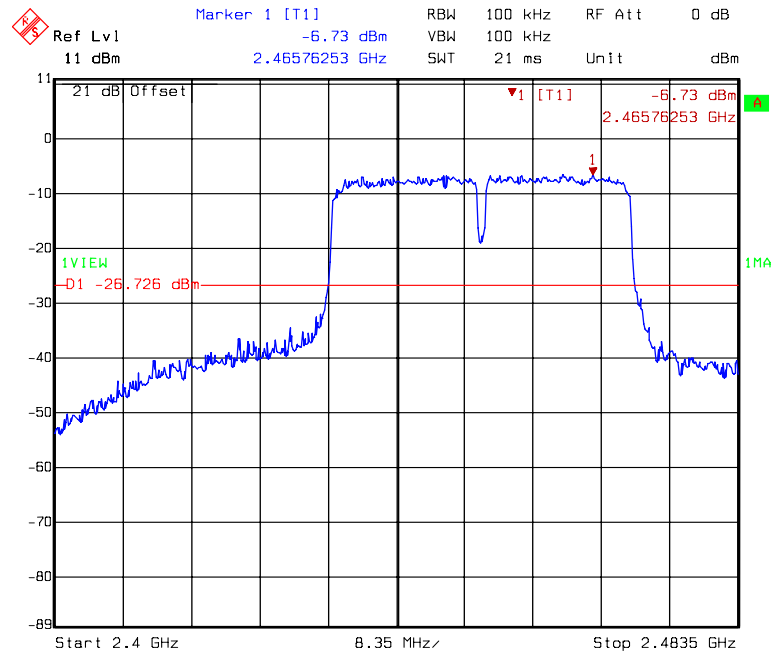
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:32:59

Chain 1: conducted spurious @ 802.11n HT40 mode channel 9 (1 of 3)



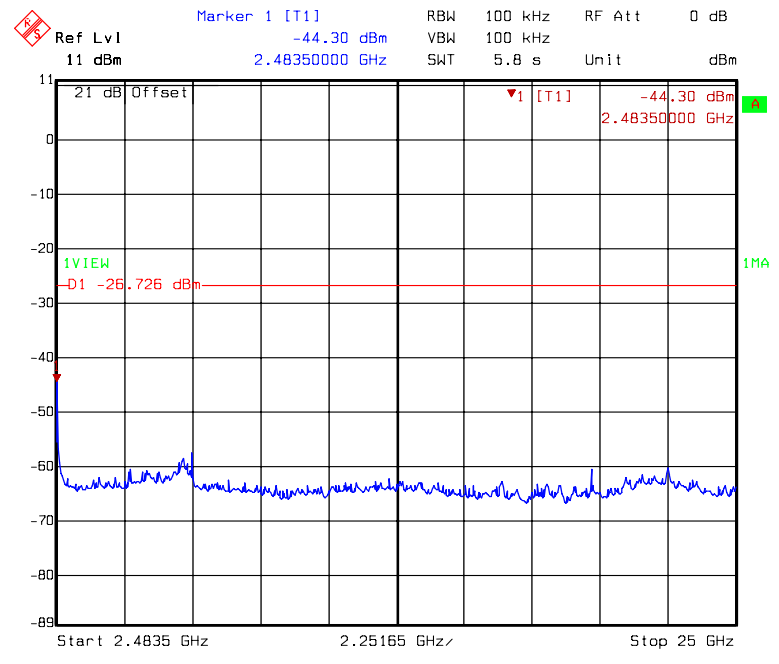
Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:47:52

Chain 1: conducted spurious @ 802.11n HT40 mode channel 9 (2 of 3)



Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:47:29

Chain 1: conducted spurious @ 802.11n HT40 mode channel 9 (3 of 3)



Title: Conductive-Spurious
 Comment A: CH 9 at 802.11n 40MHz mode chain1
 Date: 13.JAN.2010 10:48:19

7. Radiated Spurious Emission

Name of Test	Radiated Spurious Emission
Base Standard	FCC 15.247(d), 15.209, 15.205

Test Result: Complies
Measurement Data: See Tables below

Method of Measurement:

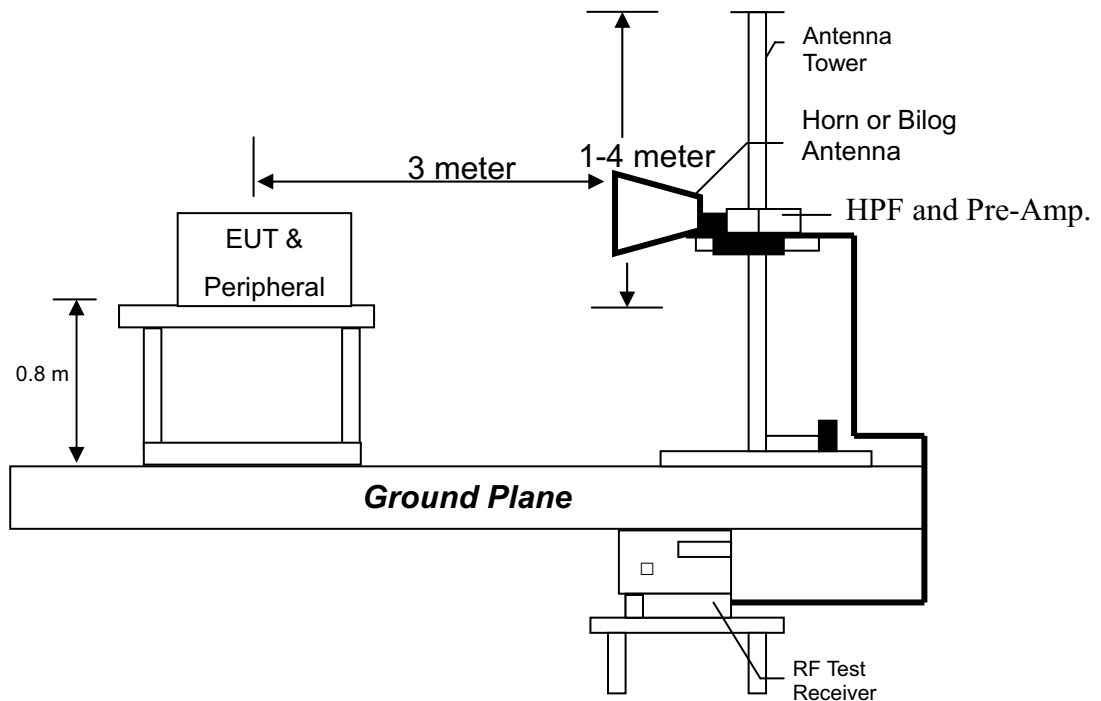
Reference FCC document: KDB558074, ANSI C63.4

The frequency range from 30 MHz to 1000 MHz using Bilog Antenna.
The frequency range over 1 GHz using Horn Antenna.

Radiated emissions were investigated cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/VBW) recorded also on the report. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter. The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meters reading using inverse scaling with distance.

The EUT configuration please refer to the "Spurious set-up photo.pdf".

Test Diagram:



Emission Limit:

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

Frequency (MHz)	Limits (dBµV/m@ 3 meter)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

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

- Note:**
- (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.
 - (2) The EUT operating at 2.4 GHz ISM band. Frequency Range scanned from 30 MHz to 25 GHz.

Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11b/g/n continuously dual transmitting mode. The low, middle and high channels were verified. The worst case occurred at 802.11b Tx channel 6.

Test Mode: Mode 1

EUT : HL-11N
Worst Case : 802.11b Tx at channel 6

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	182.29	QP	13.10	18.56	31.66	43.50	-11.84
V	439.34	QP	17.64	18.04	35.68	46.00	-10.32
V	450.01	QP	17.68	27.40	45.08	46.00	-0.92
V	476.20	QP	18.43	16.58	35.01	46.00	-10.99
V	737.13	QP	22.74	13.67	36.41	46.00	-9.59
V	881.66	QP	24.35	10.95	35.30	46.00	-10.70
H	145.43	QP	13.24	23.73	36.97	43.50	-6.53
H	209.45	QP	10.78	30.09	40.87	43.50	-2.63
H	249.22	QP	12.36	31.01	43.37	46.00	-2.63
H	450.01	QP	18.16	14.85	33.01	46.00	-12.99
H	737.13	QP	22.95	15.81	38.76	46.00	-7.24
H	862.26	QP	24.12	13.61	37.73	46.00	-8.27

Remark:

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

Test Mode: Mode 2

EUT : HL-11N
Worst Case : 802.11b Tx at channel 6

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	73.65	QP	10.39	23.16	33.55	40.00	-6.45
V	153.19	QP	15.83	22.59	38.42	43.50	-5.08
V	207.51	QP	11.53	21.79	33.32	43.50	-10.18
V	471.35	QP	17.68	14.80	32.48	46.00	-13.52
V	752.65	QP	22.81	12.36	35.17	46.00	-10.83
V	843.83	QP	23.62	12.05	35.67	46.00	-10.33
H	82.38	QP	9.45	25.62	35.07	40.00	-4.93
H	136.70	QP	12.32	28.81	41.13	43.50	-2.37
H	182.29	QP	12.08	27.62	39.70	43.50	-3.80
H	249.22	QP	12.36	27.72	40.08	46.00	-5.92
H	315.18	QP	14.32	17.59	31.91	46.00	-14.09
H	749.74	QP	22.95	16.08	39.03	46.00	-6.97

Remark:

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

Measurement results: frequency above 1GHz

Test Mode: Mode 1

EUT : HL-11N
Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	42.36	44.80	54	-9.20
4824.00	PK	V	35.10	38.54	51.73	55.17	74	-18.83
4824.00	AV	V	35.10	38.54	49.97	53.41	54	-0.59
7236.00	PK	V	33.00	44.60	39.15	50.75	54	-3.25
9648.00	PK	V	32.70	49.30	39.67	56.27	74	-17.73
9648.00	AV	V	32.70	49.30	35.15	51.75	54	-2.25
4824.00	PK	H	35.10	38.54	41.84	45.28	54	-8.72
7236.00	PK	H	33.00	44.60	35.89	47.49	54	-6.51
9648.00	PK	H	32.70	49.30	40.63	57.23	74	-16.77
9648.00	AV	H	32.70	49.30	36.89	53.49	54	-0.51

Remark:

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

EUT : HL-11N
 Test : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	33.80	36.24	40.19	42.63	54	-11.37
4874.00	PK	V	35.10	38.54	51.72	55.16	74	-18.84
4874.00	AV	V	35.10	38.54	49.98	53.42	54	-0.58
7311.00	PK	V	33.00	44.60	39.50	51.10	54	-2.90
9748.00	PK	V	32.70	49.30	42.02	58.62	74	-15.38
9748.00	AV	V	32.70	49.30	36.92	53.52	54	-0.48
4874.00	PK	H	35.10	38.54	46.32	49.76	54	-4.24
7311.00	PK	H	33.00	44.60	37.39	48.99	54	-5.01
9748.00	PK	H	32.70	49.30	39.36	55.96	74	-18.04
9748.00	AV	H	32.70	49.30	36.52	53.12	54	-0.88

Remark:

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

EUT : HL-11N
 Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924.00	PK	V	35.10	38.54	47.49	50.93	54	-3.07
7386.00	PK	V	33.00	44.60	40.78	52.38	54	-1.62
9848.00	AV	V	32.70	49.30	35.64	52.24	54	-1.76
4924.00	PK	H	35.10	38.54	41.97	45.41	54	-8.59
7386.00	PK	H	33.00	44.60	37.59	49.19	54	-4.81
9848.00	PK	H	32.70	49.30	39.88	56.48	74	-17.52
9848.00	AV	H	32.70	49.30	36.92	53.52	54	-0.48

Remark:

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

EUT : HL-11N
 Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	42.01	44.45	54	-9.55
4824.00	PK	V	35.10	38.54	42.98	46.42	54	-7.58
7236.00	PK	V	33.00	44.60	36.71	48.31	54	-5.69
4824.00	PK	H	35.10	38.54	38.00	41.44	54	-12.56

Remark:

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

EUT : HL-11N
Test Condition : 802.11g Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874.00	PK	V	35.10	38.54	46.99	50.43	54	-3.57
7311.00	PK	V	33.00	44.60	42.76	54.36	74	-19.64
7311.00	AV	V	33.00	44.60	31.51	43.11	54	-10.89
4874.00	PK	H	35.10	38.54	38.61	42.05	54	-11.95

Remark:

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

EUT : HL-11N
Test Condition : 802.11g Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924.00	PK	V	35.10	38.54	40.51	43.95	54	-10.05
7386.00	PK	V	33.00	44.60	38.63	50.23	54	-3.77
4924.00	PK	H	35.10	38.54	37.06	40.50	54	-13.50

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	40.77	43.21	54	-10.79
4824.00	PK	V	35.10	38.54	43.79	47.23	54	-6.77
7236.00	PK	V	33.00	44.60	37.43	49.03	54	-4.97
4824.00	PK	H	35.10	38.54	36.71	40.15	54	-13.85

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874.00	PK	V	35.10	38.54	51.52	54.96	74	-19.04
4874.00	AV	V	35.10	38.54	37.31	40.75	54	-13.25
7311.00	PK	V	33.00	44.60	50.73	62.33	74	-11.67
7311.00	AV	V	33.00	44.60	35.16	46.76	54	-7.24
4874.00	PK	H	35.10	38.54	40.81	44.25	54	-9.75
7311.00	PK	H	33.00	44.60	40.88	52.48	54	-1.52

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4924.00	PK	V	35.10	38.54	42.57	46.01	54	-7.99
7386.00	PK	V	33.00	44.60	38.03	49.63	54	-4.37
4924.00	PK	H	35.10	38.54	37.54	40.98	54	-13.02

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT40 Tx at channel 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4844.00	PK	V	35.10	38.54	38.68	42.12	54	-11.88
4844.00	PK	H	35.10	38.54	37.29	40.73	54	-13.27

Remark:

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

EUT : HL-11N
 Test Condition : 802.11n HT40 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4874.00	PK	V	35.10	38.54	40.60	44.04	54	-9.96
7311.00	PK	V	33.00	44.60	38.75	50.35	54	-3.65
4874.00	PK	H	35.10	38.54	36.89	40.33	54	-13.67

Remark:

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

EUT : HL-11N
 Test Condition : 802.11n HT40 Tx at channel 9

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4904.00	PK	V	35.10	38.54	36.92	40.36	54	-13.64
4904.00	PK	H	35.10	38.54	37.39	40.83	54	-13.17

Remark:

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

Test Mode: Mode 2

EUT : HL-11N
 Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	43.73	46.17	54	-7.83
4824.00	PK	V	35.10	38.54	47.53	50.97	54	-3.03
7311.00	PK	V	33.00	44.60	38.13	49.73	54	-4.27
9648.00	PK	V	32.70	49.30	35.11	51.71	54	-2.29
4824.00	PK	H	35.10	38.54	40.95	44.39	54	-9.61
9648.00	PK	H	32.70	49.30	36.65	53.25	54	-0.75

Remark:

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

EUT : HL-11N
 Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	33.80	36.24	43.06	45.50	54	-8.50
4874.00	PK	V	35.10	38.54	51.95	55.39	74	-18.61
4874.00	AV	V	35.10	38.54	50.15	53.59	54	-0.41
7311.00	PK	V	33.00	44.60	40.43	52.03	54	-1.97
9748.00	PK	V	32.70	49.30	39.96	56.56	74	-17.44
9748.00	AV	V	32.70	49.30	35.52	52.12	54	-1.88
4874.00	PK	H	35.10	38.54	43.74	47.18	54	-6.82
7311.00	PK	H	33.00	44.60	37.50	49.10	54	-4.90
9748.00	PK	H	32.70	49.30	41.15	57.75	74	-16.25
9748.00	AV	H	32.70	49.30	37.02	53.62	54	-0.38

Remark:

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

EUT : HL-11N
Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270.00	PK	V	33.80	36.24	44.37	46.81	54	-7.19
4924.00	PK	V	35.10	38.54	47.40	50.84	54	-3.16
7386.00	PK	V	33.00	44.60	38.71	50.31	54	-3.69
9848.00	AV	V	32.70	49.30	34.83	51.43	54	-2.57
4924.00	PK	H	35.10	38.54	40.96	44.40	54	-9.60
7386.00	PK	H	33.00	44.60	35.84	47.44	54	-6.56
9848.00	PK	H	32.70	49.30	35.61	52.21	54	-1.79

Remark:

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

EUT : HL-11N
Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	42.75	45.19	54	-8.81
4824.00	PK	V	35.10	38.54	43.40	46.84	54	-7.16
7236.00	PK	V	33.00	44.60	37.12	48.72	54	-5.28
4824.00	PK	H	35.10	38.54	37.42	40.86	54	-13.14

Remark:

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

EUT : HL-11N
Test Condition : 802.11g Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	33.80	36.24	44.01	46.45	54	-7.55
4874.00	PK	V	35.10	38.54	51.54	54.98	74	-19.02
4874.00	AV	V	35.10	38.54	37.23	40.67	54	-13.33
7311.00	PK	V	33.00	44.60	47.07	58.67	74	-15.33
7311.00	AV	V	33.00	44.60	34.00	45.60	54	-8.40
4874.00	PK	H	35.10	38.54	41.53	44.97	54	-9.03
7311.00	PK	H	33.00	44.60	39.97	51.57	54	-2.43

Remark:

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

EUT : HL-11N
Test Condition : 802.11g Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270.00	PK	V	33.80	36.24	42.33	44.77	54	-9.23
4924.00	PK	V	35.10	38.54	41.23	44.67	54	-9.33
7386.00	PK	V	33.00	44.60	37.92	49.52	54	-4.48
4924.00	PK	H	35.10	38.54	37.32	40.76	54	-13.24

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	41.33	43.77	54	-10.23
4824.00	PK	V	35.10	38.54	43.74	47.18	54	-6.82
4824.00	PK	H	35.10	38.54	36.93	40.37	54	-13.63

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	33.80	36.24	43.32	45.76	54	-8.24
4874.00	PK	V	35.10	38.54	55.05	58.49	74	-15.51
4874.00	AV	V	35.10	38.54	40.94	44.38	54	-9.62
7311.00	PK	V	33.00	44.60	54.49	66.09	74	-7.91
7311.00	AV	V	33.00	44.60	36.46	48.06	54	-5.94
9748.00	PK	V	32.70	49.30	39.73	56.33	74	-17.67
9748.00	AV	V	32.70	49.30	24.38	40.98	54	-13.02
4874.00	PK	H	35.10	38.54	44.33	47.77	54	-6.23
7311.00	PK	H	33.00	44.60	47.03	58.63	74	-15.37
7311.00	AV	H	33.00	44.60	28.61	40.21	54	-13.79
9748.00	PK	H	32.70	49.30	36.13	52.73	54	-1.27

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT20 Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270.00	PK	V	33.80	36.24	41.81	44.25	54	-9.75
4924.00	PK	V	35.10	38.54	44.11	47.55	54	-6.45
7386.00	PK	V	33.00	44.60	37.99	49.59	54	-4.41
4924.00	PK	H	35.10	38.54	37.96	41.40	54	-12.60

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT40 Tx at channel 3

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3210.00	PK	V	33.80	36.24	42.98	45.42	54	-8.58
4844.00	PK	V	35.10	38.54	36.97	40.41	54	-13.59
4844.00	PK	H	35.10	38.54	37.46	40.90	54	-13.10

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT40 Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	33.80	36.24	42.74	45.18	54	-8.82
4874.00	PK	V	35.10	38.54	42.22	45.66	54	-8.34
4874.00	PK	H	35.10	38.54	36.77	40.21	54	-13.79

Remark:

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

EUT : HL-11N
Test Condition : 802.11n HT40 Tx at channel 9

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270.00	PK	V	33.80	36.24	42.69	45.13	54	-8.87
4904.00	PK	V	35.10	38.54	39.11	42.55	54	-11.45
4904.00	PK	H	35.10	38.54	37.83	41.27	54	-12.73

Remark:

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

8. Emission on Band Edge

Name of Test	Emission Band Edge
Base Standard	FCC 15.247(d)

Test Result: Complies
Measurement Data: See Tables & plots below

Method of Measurement:

Reference FCC document: KDB558074, ANSI C63.4

The frequency range from 30 MHz to 1000 MHz using Bilog Antenna.
The frequency range over 1 GHz using Horn Antenna.

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

Note: The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT20 mode and 13.5 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Test Mode: Mode 1

Test Mode: 802.11b operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	62.52	74	-11.48
		AV	52.58	54	-1.42
11 (highest)	2483.5-2500	PK	63.40	74	-10.60
		AV	53.39	54	-0.61

Test Mode: 802.11g operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	69.38	74	-4.62
		AV	52.63	54	-1.37
11 (highest)	2483.5-2500	PK	67.63	74	-6.37
		AV	52.90	54	-1.10

Test Mode: 802.11n HT20 operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	69.15	74	-4.85
		AV	53.02	54	-0.98
11 (highest)	2483.5-2500	PK	72.07	74	-1.93
		AV	53.48	54	-0.52

Test Mode: 802.11n HT40 operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3 (lowest)	2310-2390	PK	67.15	74	-6.85
		AV	53.13	54	-0.87
9 (highest)	2483.5-2500	PK	66.39	74	-7.61
		AV	53.09	54	-0.91

Test Mode: Mode 2

Test Mode: 802.11b operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	64.07	74	-9.93
		AV	53.38	54	-0.62
11 (highest)	2483.5-2500	PK	62.91	74	-11.81
		AV	53.59	54	-0.41

Test Mode: 802.11g operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	72.86	74	-1.14
		AV	53.08	54	-0.92
11 (highest)	2483.5-2500	PK	68.13	74	-5.87
		AV	53.11	54	-0.89

Test Mode: 802.11n HT20 operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	68.20	74	-5.80
		AV	52.76	54	-1.24
11 (highest)	2483.5-2500	PK	71.88	74	-2.12
		AV	53.55	54	-0.45

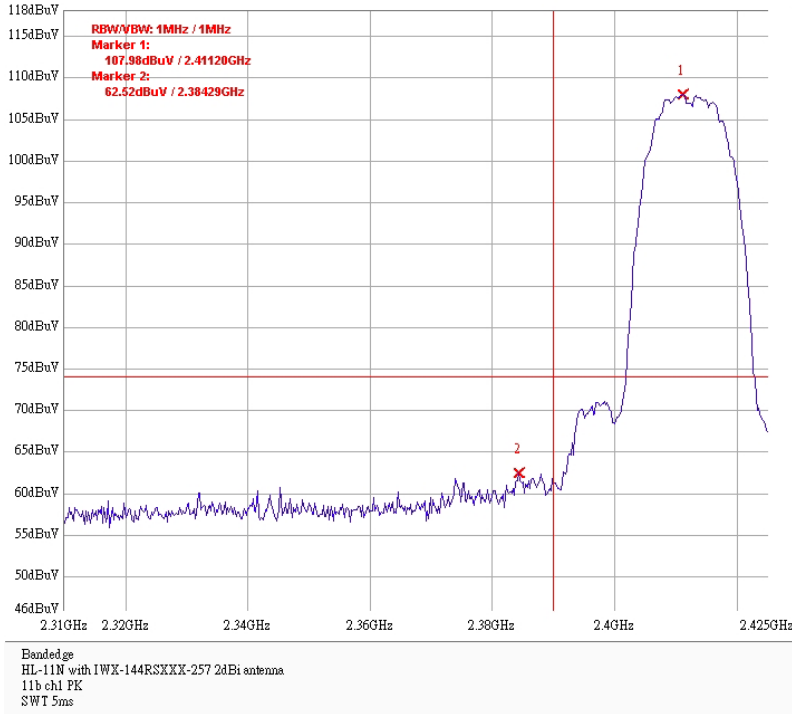
Test Mode: 802.11n HT40 operating mode

Channel	Measurement Freq. Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3 (lowest)	2310-2390	PK	66.47	74	-7.53
		AV	53.04	54	-0.96
9 (highest)	2483.5-2500	PK	68.24	74	-5.76
		AV	53.12	54	-0.88

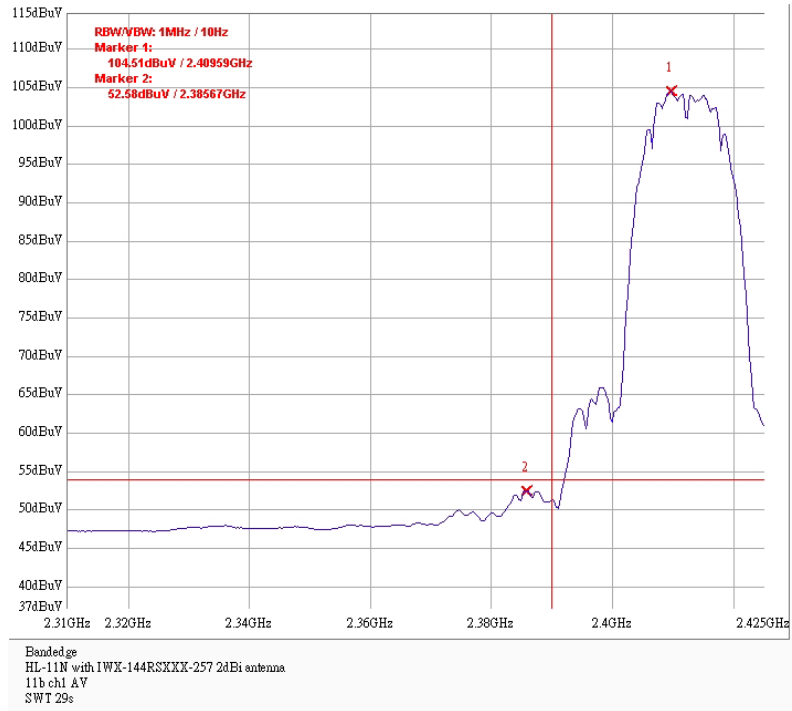
Please see the plot below.

Test Mode: Mode 1

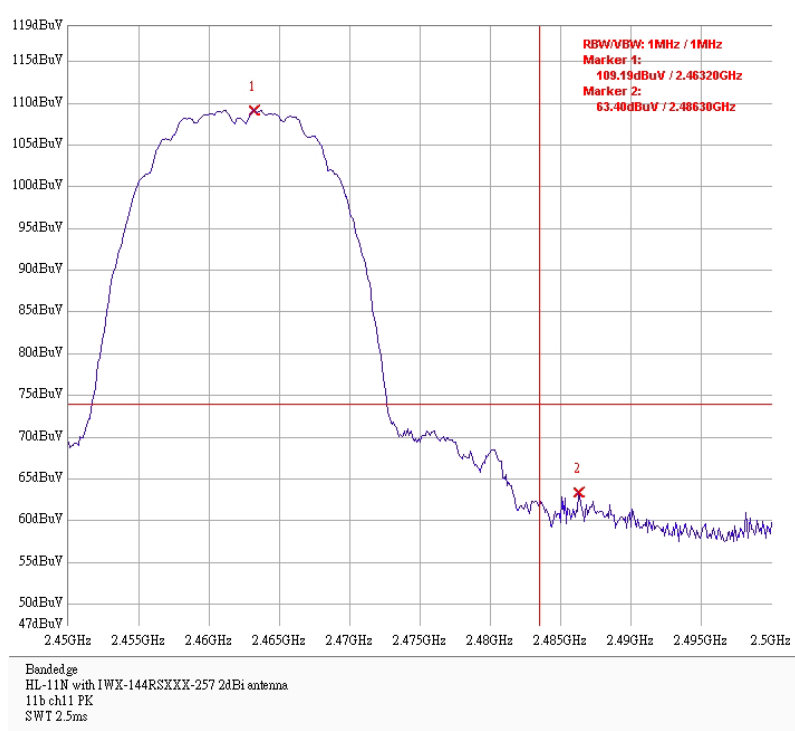
Band edge @ 802.11b mode channel 1 PK



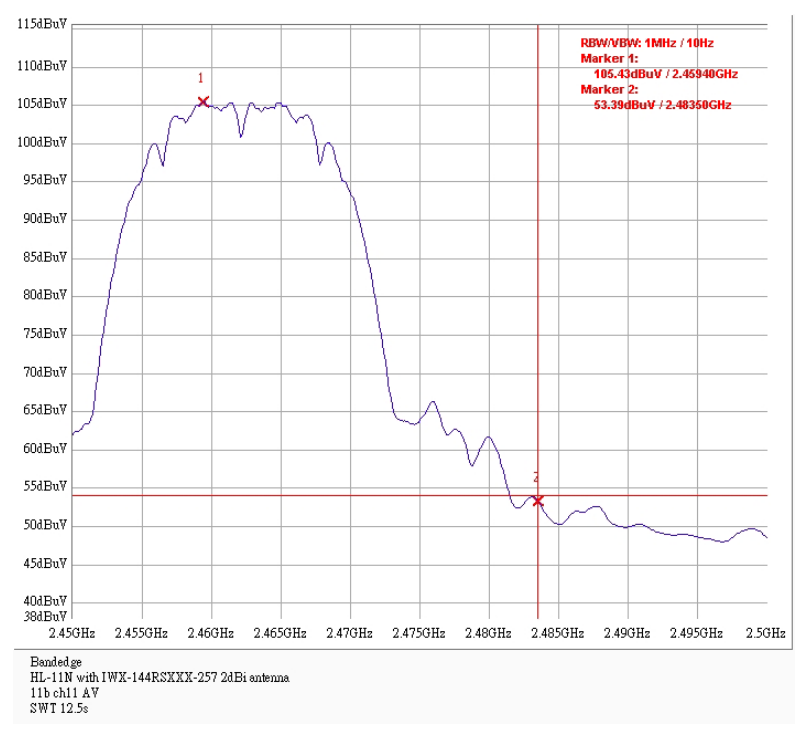
Band edge @ 802.11b mode channel 1 AV



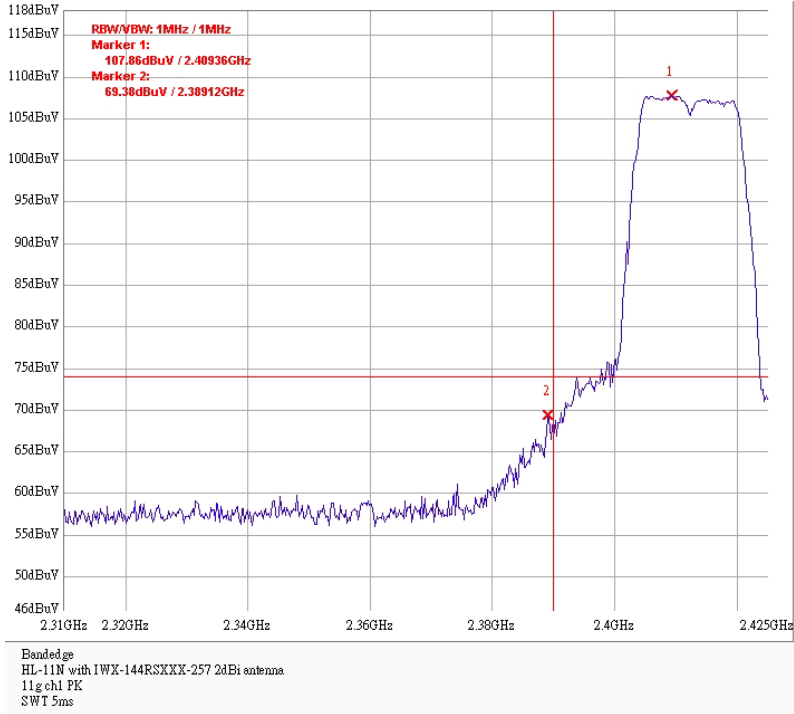
Band edge @ 802.11b mode channel 11 PK



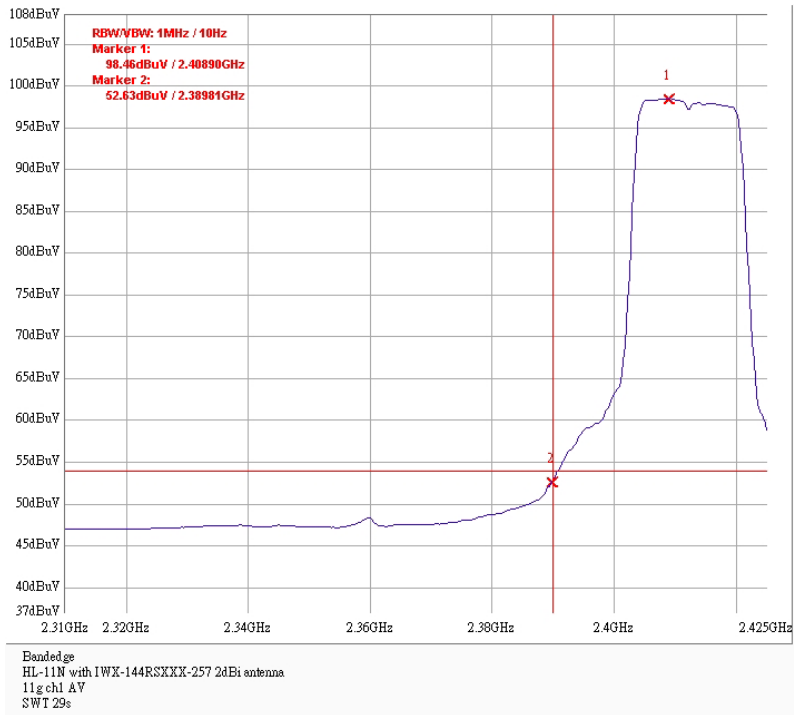
Band edge @ 802.11b mode channel 11 AV



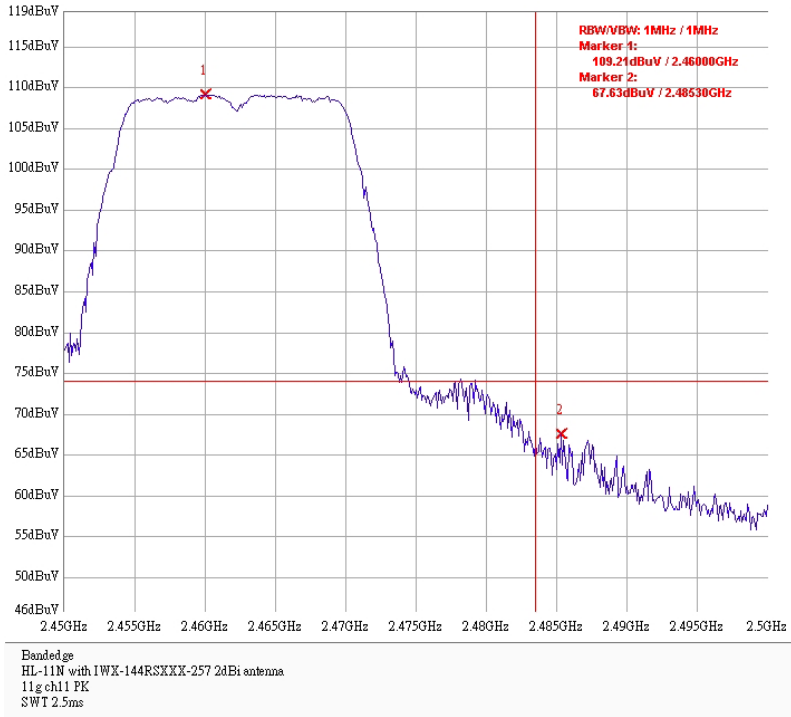
Band edge @ 802.11g mode channel 1 PK



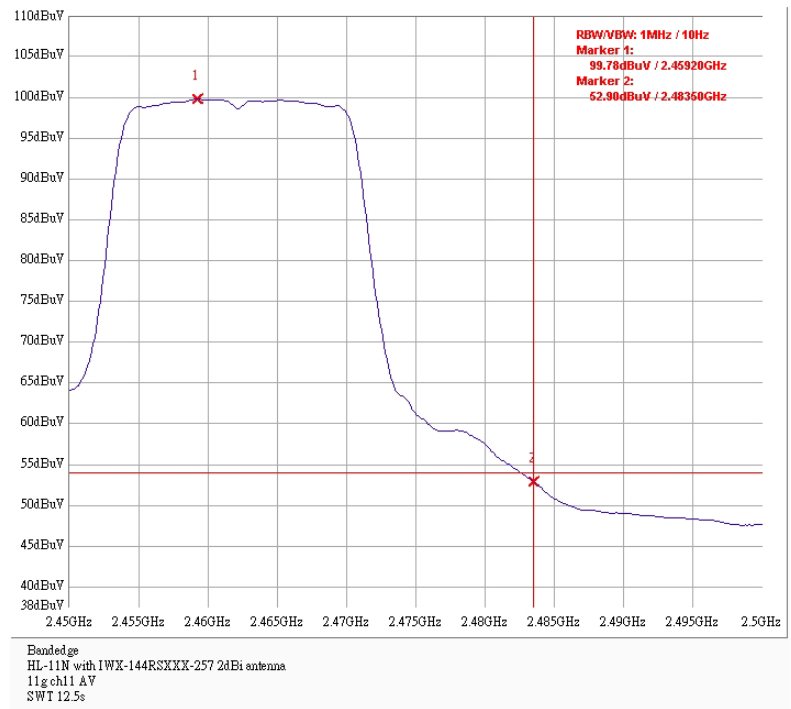
Band edge @ 802.11g mode channel 1 AV



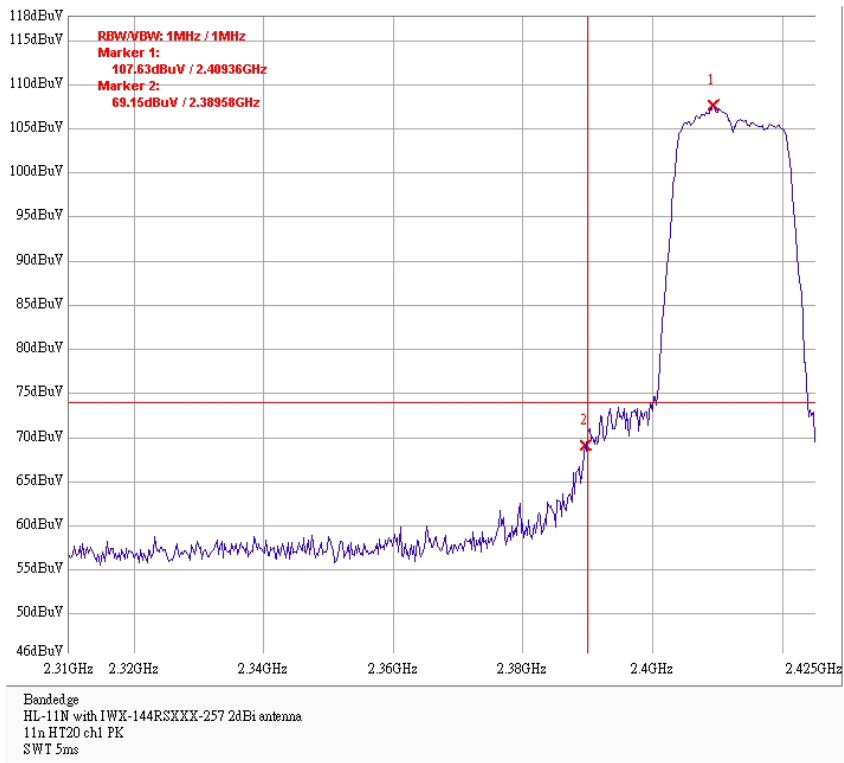
Band edge @ 802.11g mode channel 11 PK



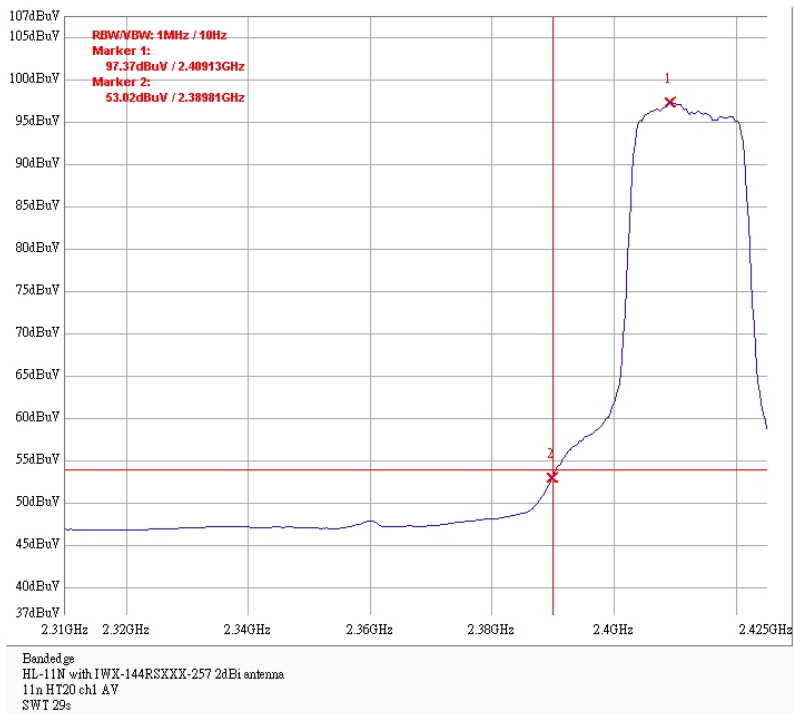
Band edge @ 802.11g mode channel 11 AV



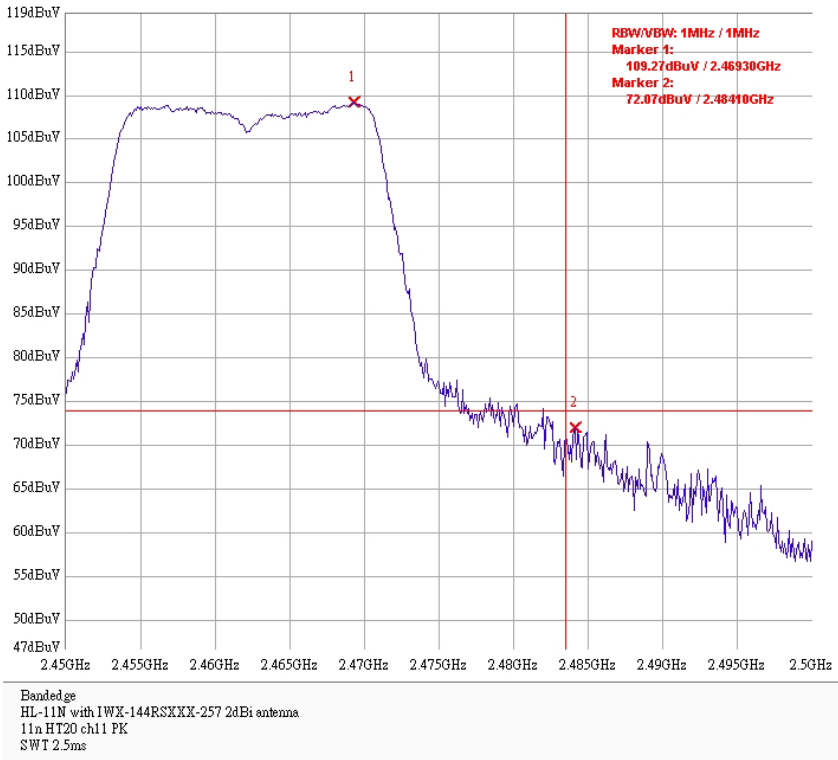
Band edge @802.11n HT20 mode channel 1 PK



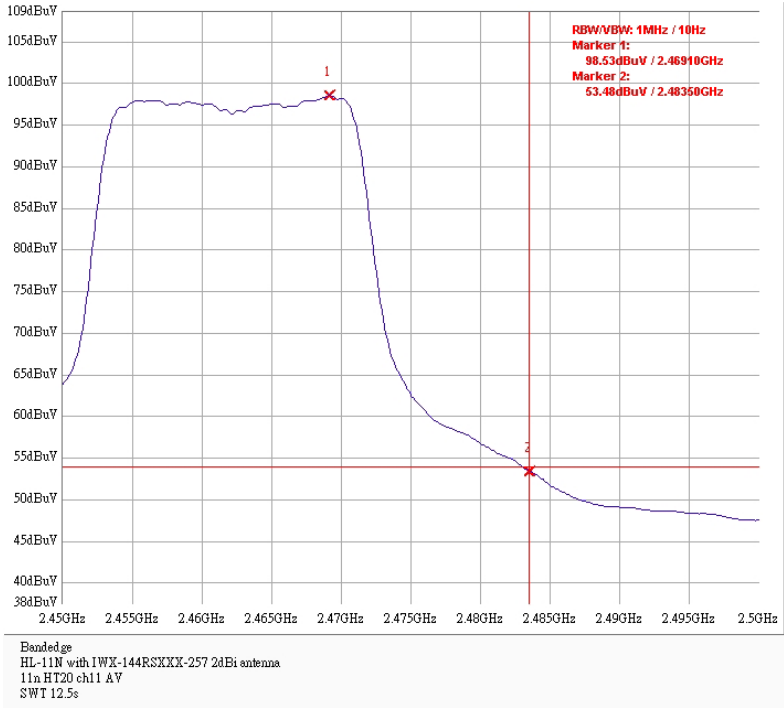
Band edge @802.11n HT20 mode channel 1 AV



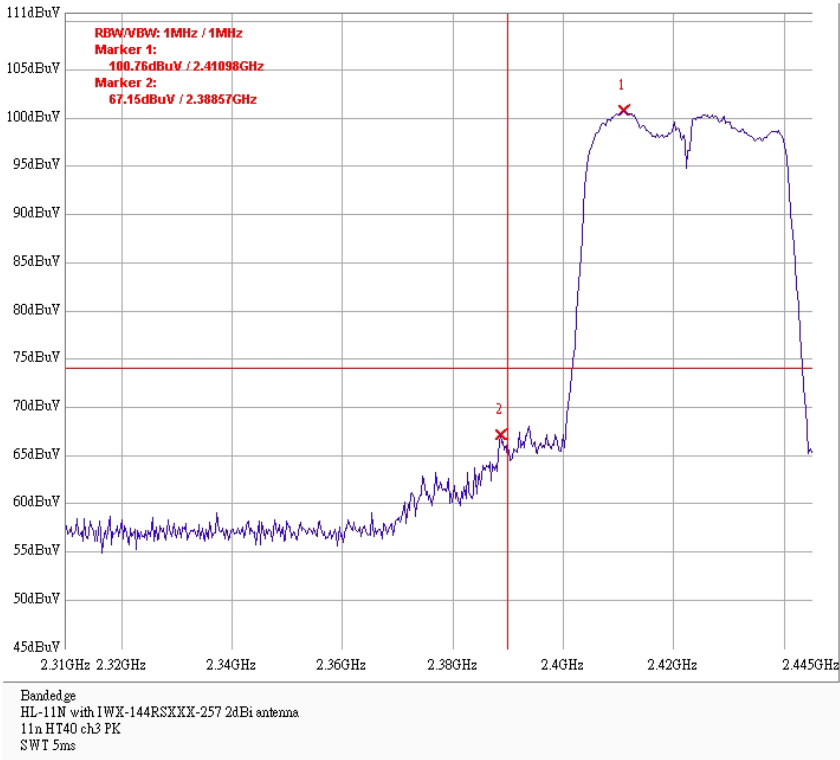
Band edge @802.11n HT20 mode channel 11 PK



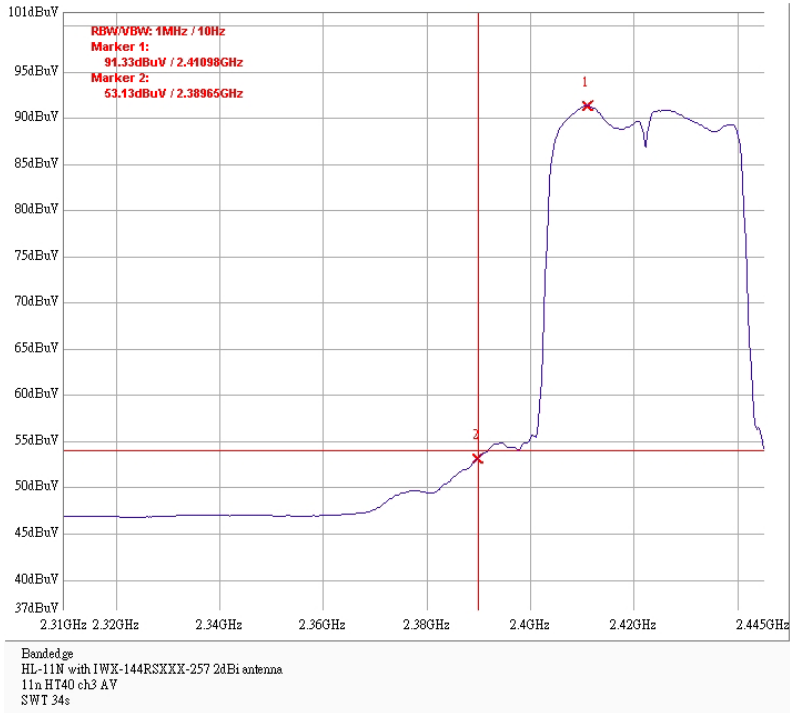
Band edge @802.11n HT20 mode channel 11 AV



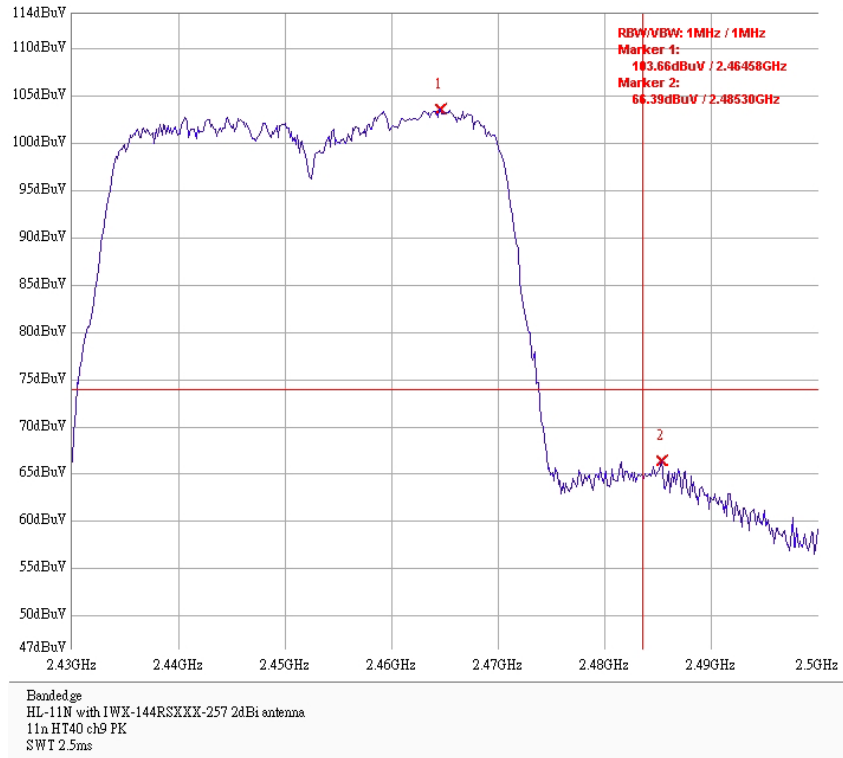
Band edge @802.11n HT40 mode channel 3 PK



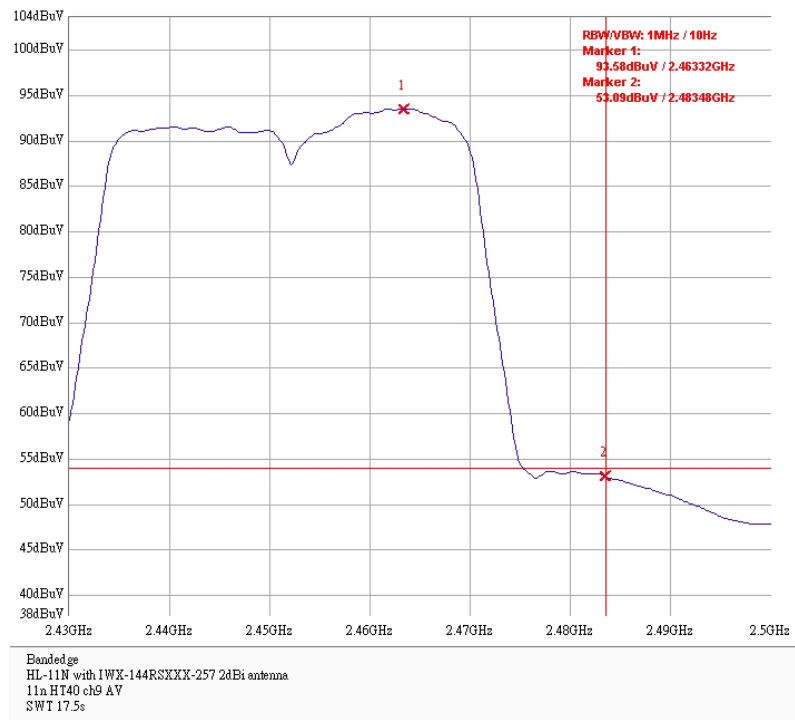
Band edge @802.11n HT40 mode channel 3 AV



Band edge @802.11n HT40 mode channel 9 PK

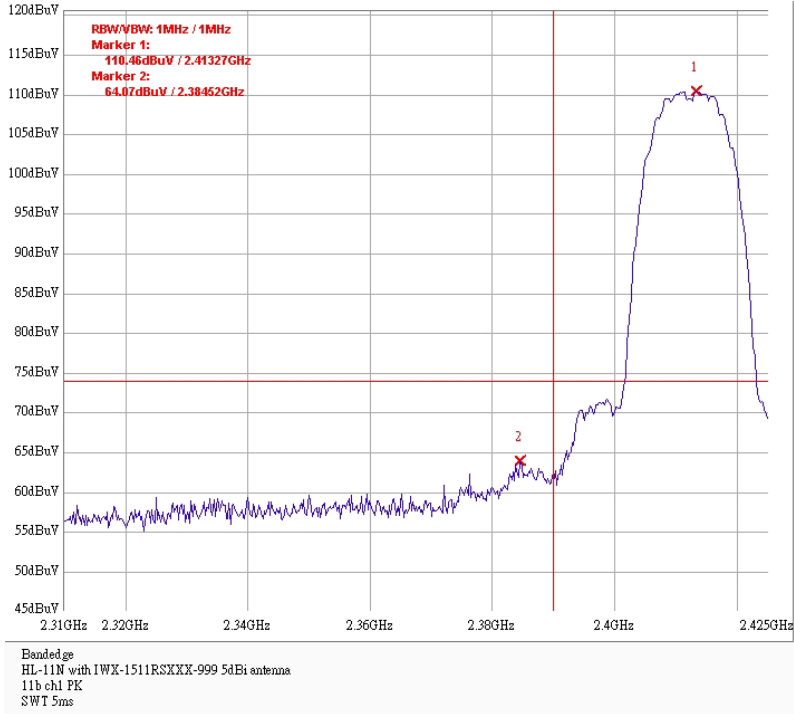


Band edge @802.11n HT40 mode channel 9 AV

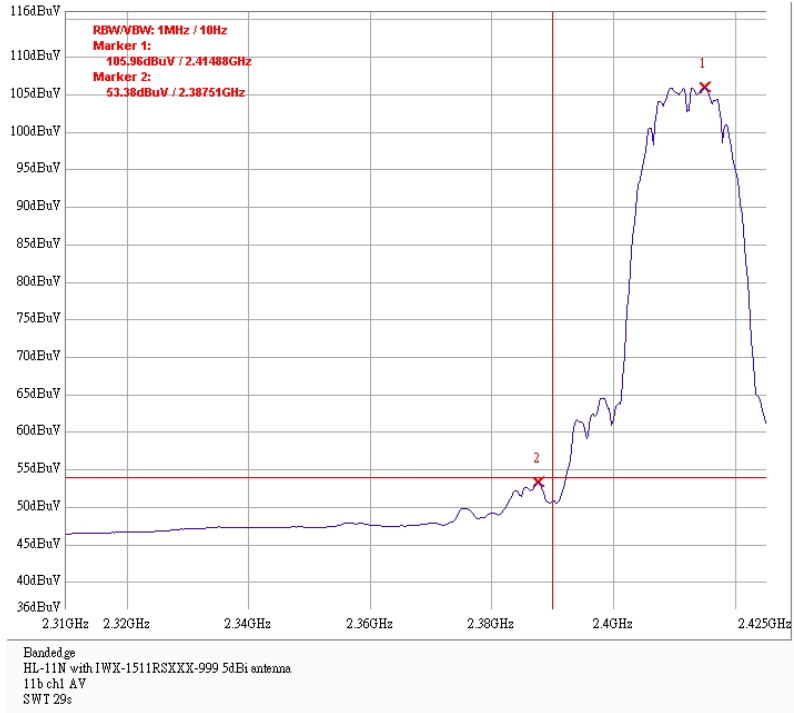


Test Mode: Mode 2

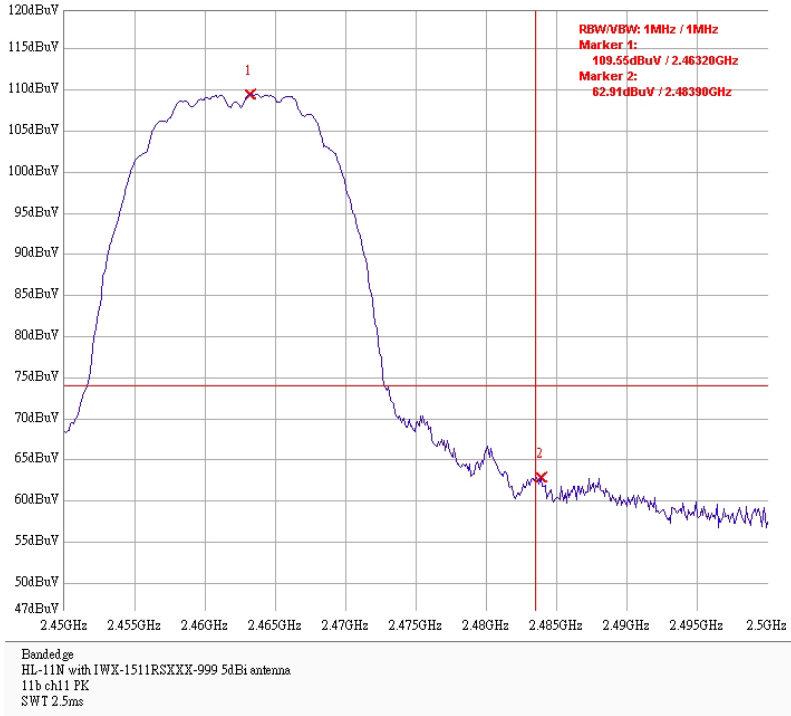
Band edge @ 802.11b mode channel 1 PK



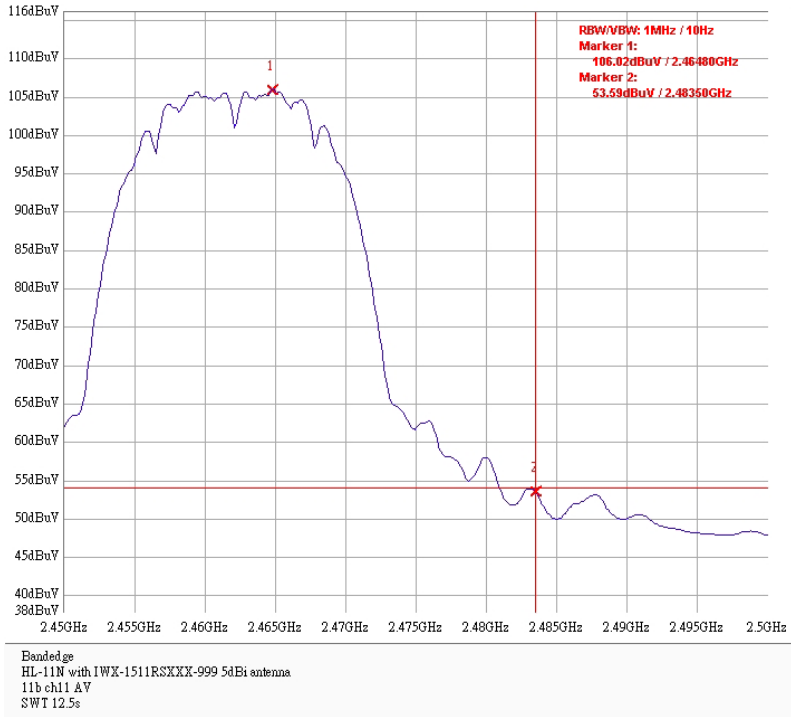
Band edge @ 802.11b mode channel 1 AV



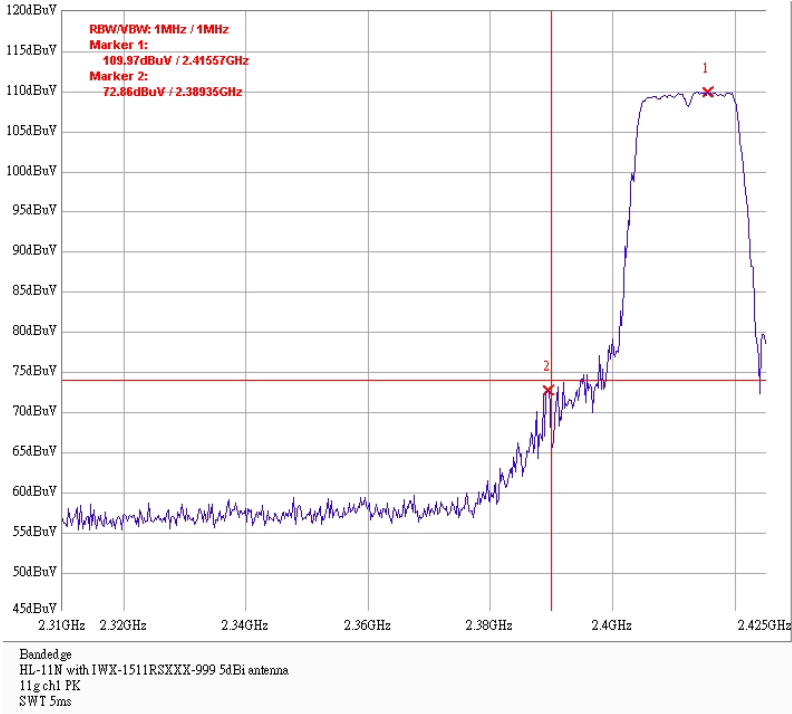
Band edge @ 802.11b mode channel 11 PK



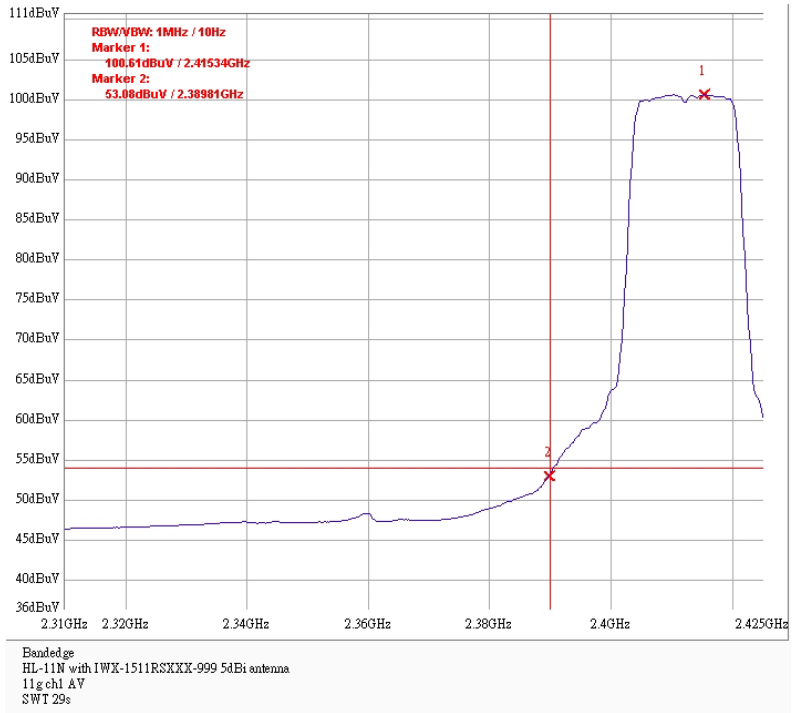
Band edge @ 802.11b mode channel 11 AV



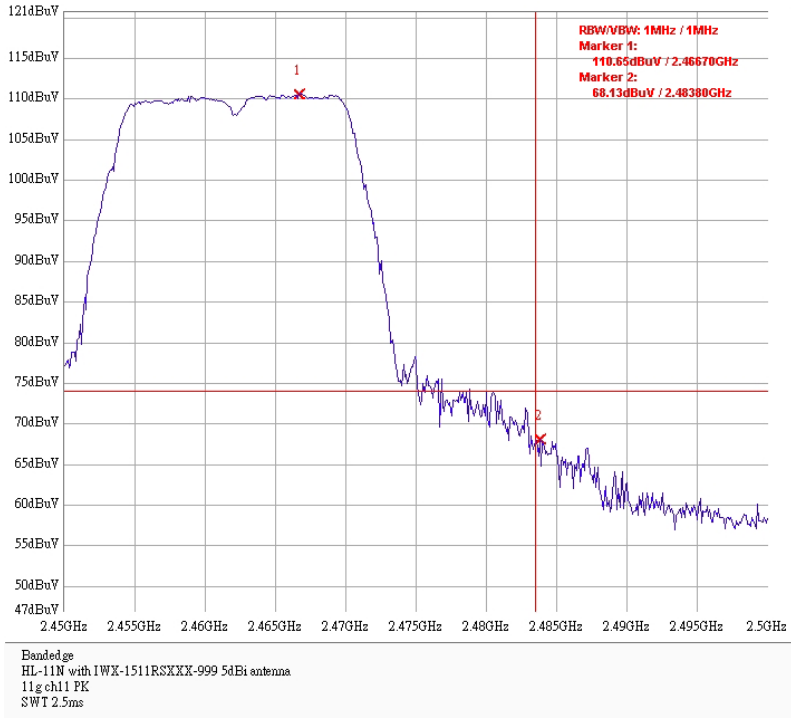
Band edge @ 802.11g mode channel 1 PK



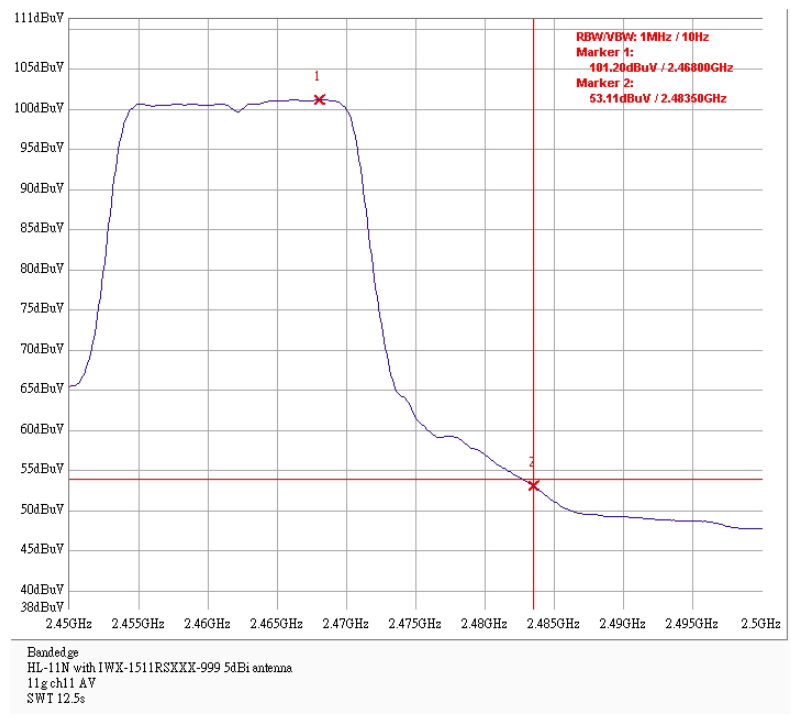
Band edge @ 802.11g mode channel 1 AV



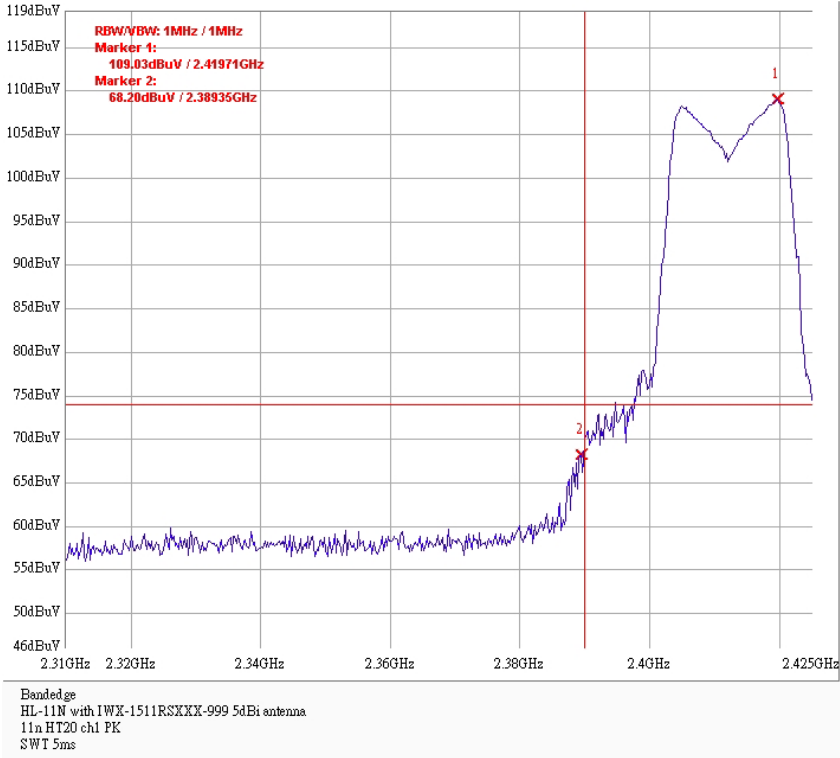
Band edge @ 802.11g mode channel 11 PK



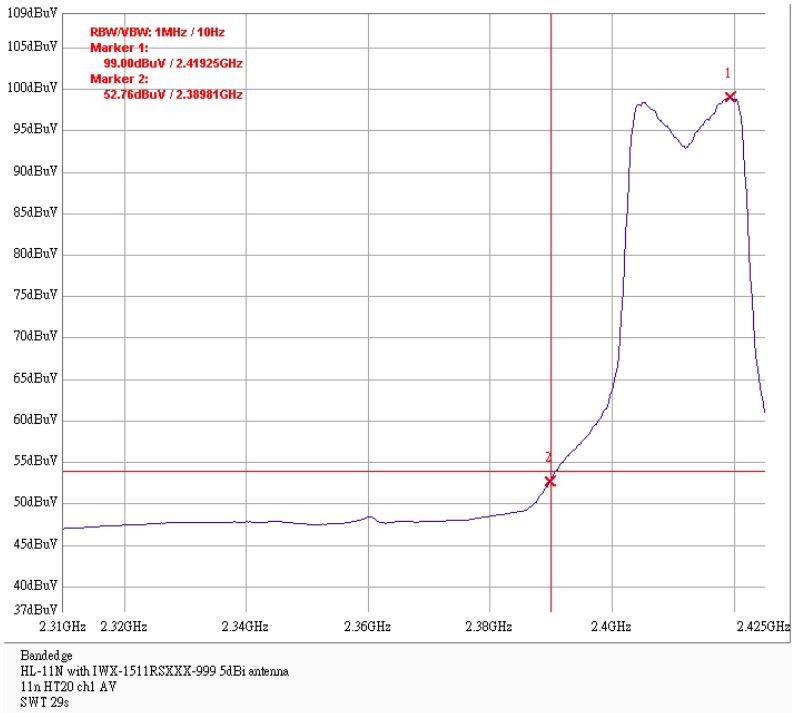
Band edge @ 802.11g mode channel 11 AV



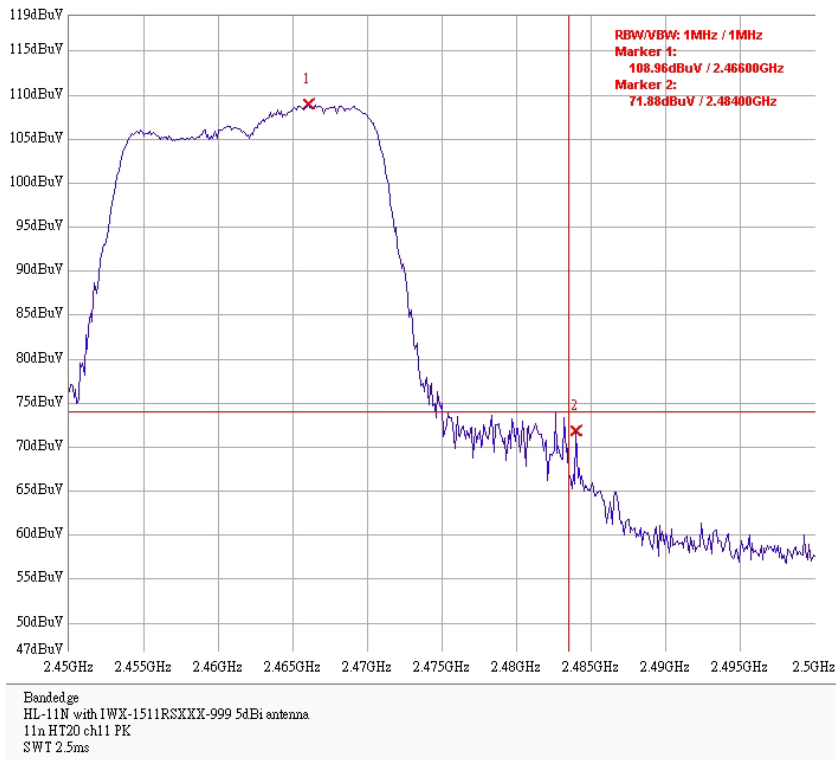
Band edge @802.11n HT20 mode channel 1 PK



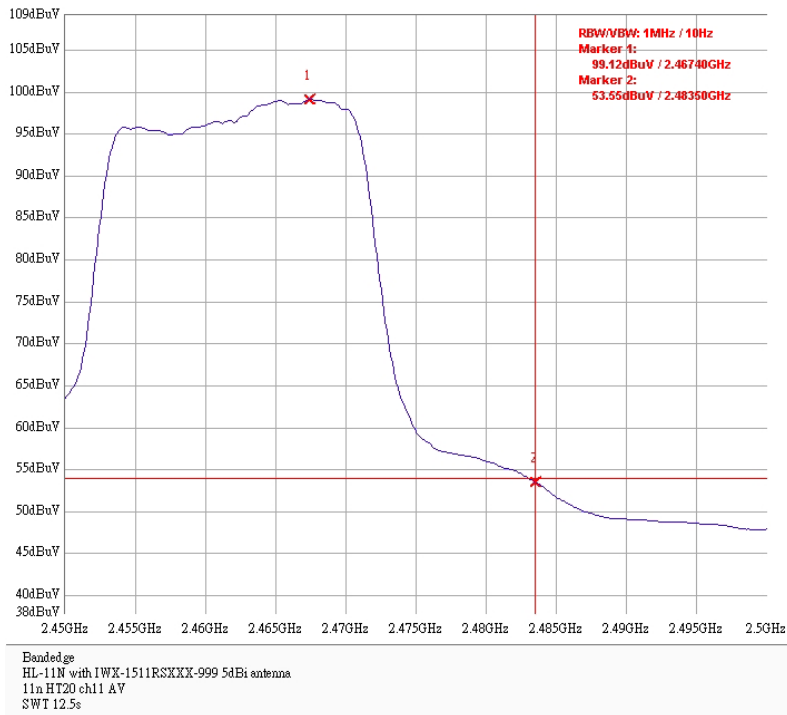
Band edge @802.11n HT20 mode channel 1 AV



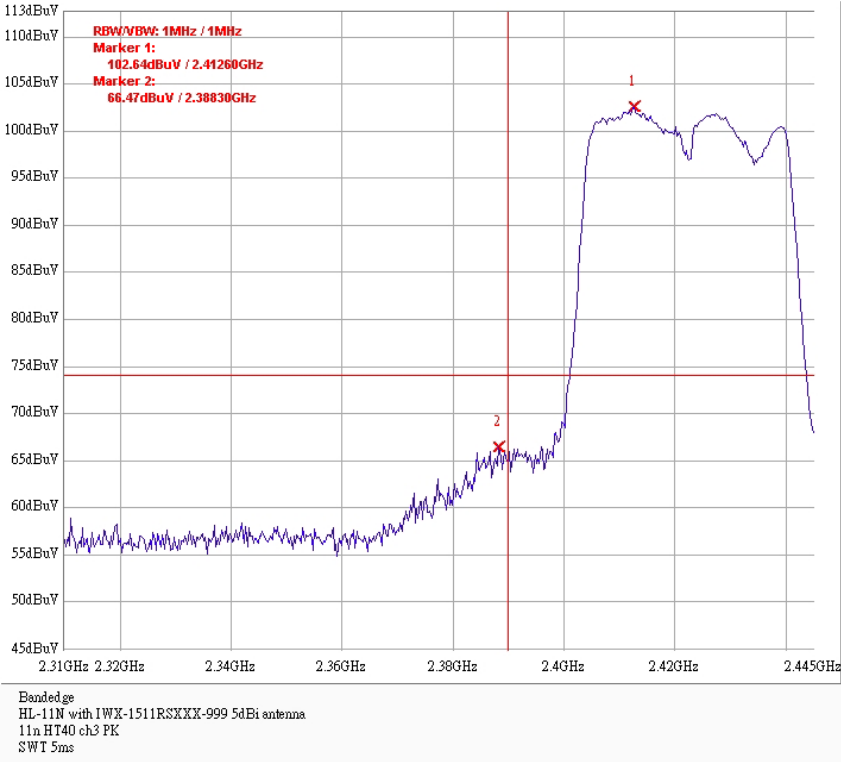
Band edge @802.11n HT20 mode channel 11 PK



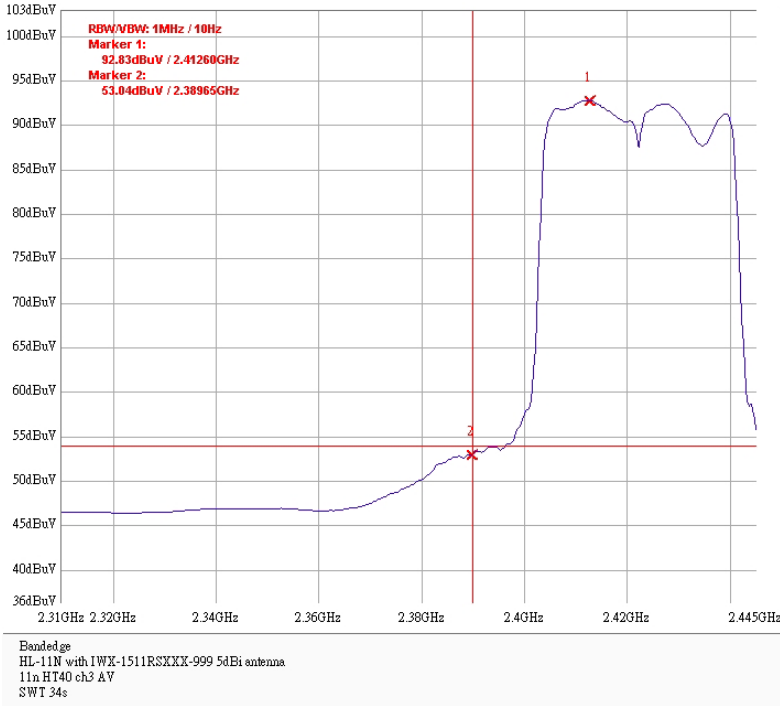
Band edge @802.11n HT20 mode channel 11 AV



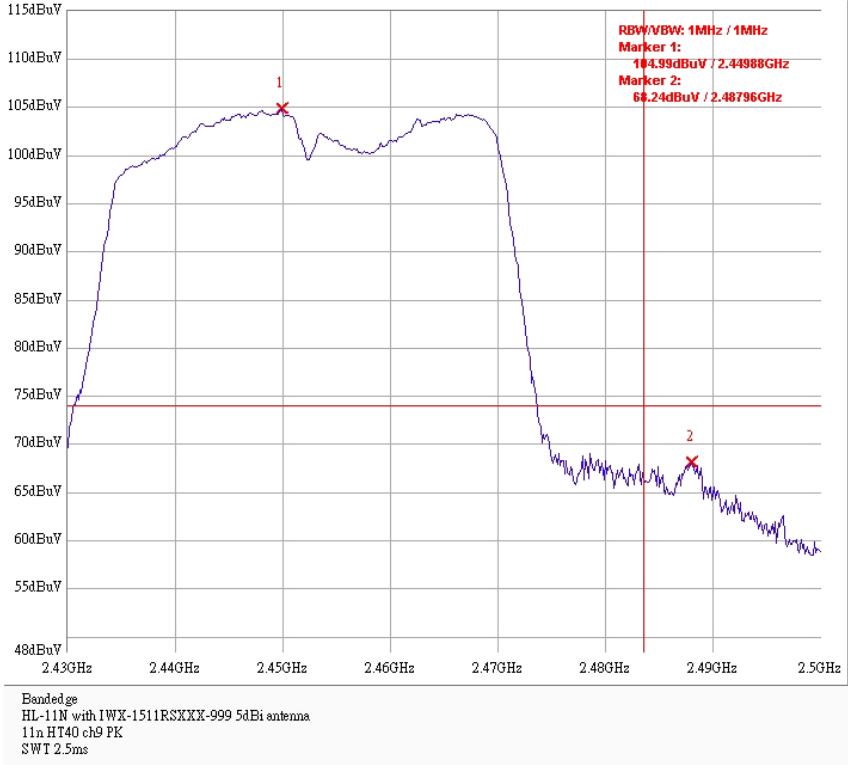
Band edge @802.11n HT40 mode channel 3 PK



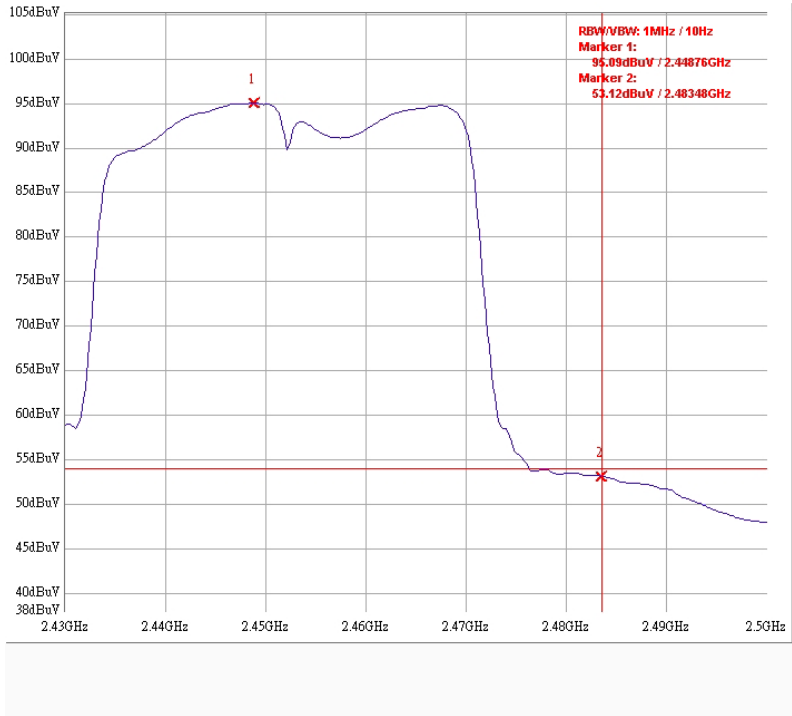
Band edge @802.11n HT40 mode channel 3 AV



Band edge @802.11n HT40 mode channel 9 PK



Band edge @802.11n HT40 mode channel 9 AV



9. AC power line conducted emission

Name of Test	AC power line conducted emission
Base Standard	FCC 15.207

Test Result: Complies
Measurement Data: See Tables & plots below
Method of Measurement:
Reference FCC document: KDB558074, ANSI C63.4

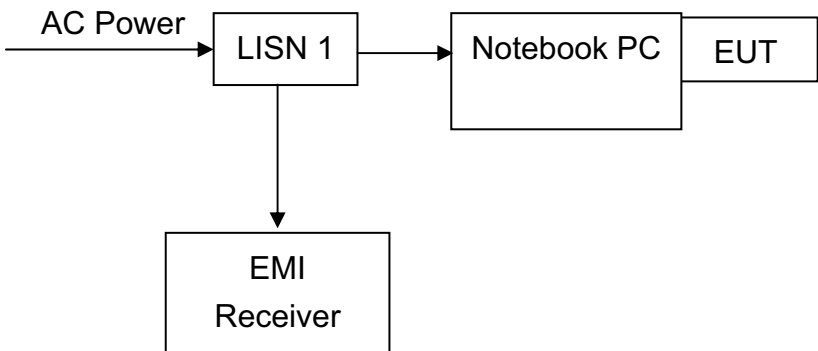
The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/ 50 uH coupling impedance with 50 ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

Test Diagram:



Emission Limit:

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

Note: The EUT was tested in continuous transmission mode.

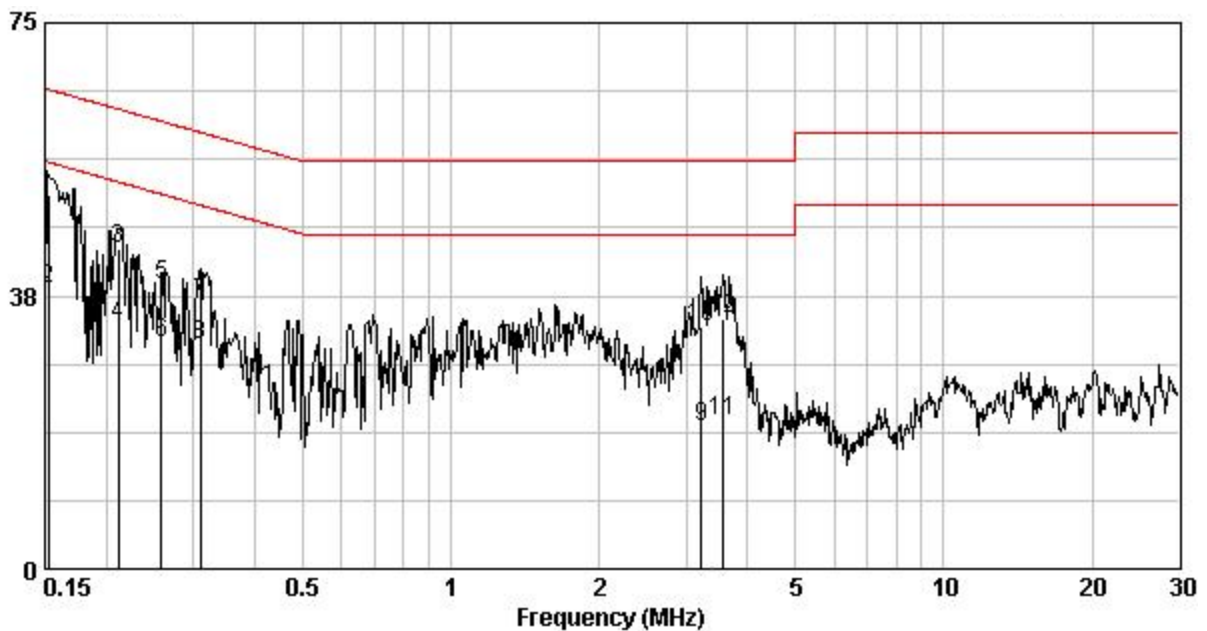
Test Mode: Mode 1

Phase : Line
EUT : HL-11N
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.15	0.81	51.26	65.87	38.41	55.87	-14.61	-17.46
0.21	0.75	43.86	63.14	33.52	53.14	-19.28	-19.62
0.26	0.55	38.96	61.47	31.16	51.47	-22.51	-20.31
0.31	0.36	36.66	59.97	30.74	49.97	-23.31	-19.23
3.22	0.21	33.20	56.00	19.51	46.00	-22.80	-26.49
3.57	0.23	34.25	56.00	20.20	46.00	-21.75	-25.80

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

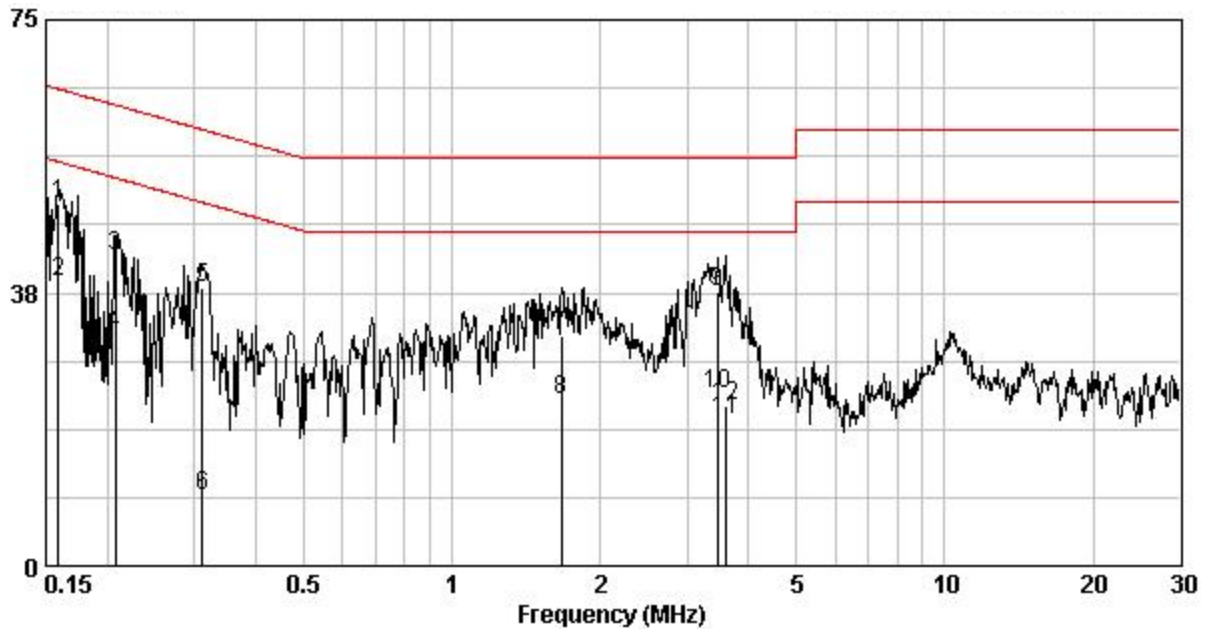


Phase : Neutral
EUT : HL-11N
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.16	0.11	49.63	65.52	38.97	55.52	-15.89	-16.55
0.21	0.11	42.53	63.32	32.00	53.32	-20.79	-21.32
0.31	0.11	38.29	59.93	9.55	49.93	-21.64	-40.38
1.67	0.12	31.66	56.00	22.69	46.00	-24.34	-23.31
3.45	0.22	37.53	56.00	23.60	46.00	-18.47	-22.40
3.58	0.23	20.14	56.00	21.91	46.00	-35.86	-24.09

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Appendix A: Test Equipment List

Equipment	Brand	Model No.
EMI Test Receiver	Rohde & Schwarz	ESCS 30
Spectrum Analyzer	Rohde & Schwarz	FSP 30
Spectrum Analyzer	Rohde & Schwarz	FSEK 30
Signal Generator	Rohde & Schwarz	SMR27
Horn Antenna	SCHWARZBECK	BBHA 9120 D
Horn Antenna	SCHWARZBECK	BBHA 9170
Bilog Antenna	SCHWARZBECK	VULB 9168
Pre-Amplifier	MITEQ	919981
Pre-Amplifier	MITEQ	828825
Controller	HDGmbH	CM 100
Antenna Tower	HDGmbH	MA 2400
LISN	Rohde & Schwarz	ESH3-Z5
Wideband Peak Power Meter/ Sensor	Anritsu	ML2495A/ MA2411B
Temperature Humidity Test Chamber	Juror	TR-4010

- Note: 1. The above equipments are within the valid calibration period.
 2. The test antennas (receiving antenna) are calibration per 3 years.
 3. The video bandwidth of the power meter and sensor can be up to 65 MHz.

Measurement Uncertainty:

Measurement uncertainty was calculated in accordance with TR 100 028-1.

Parameter	Uncertainty
Radiated Emission	±5.056 dB
Conducted Emission	±2.786 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.