EMC
TEST REPORT

Report No. : **TS12030042-EME**
Model No. : **WiFiHU2-a, WiFiHU2-a-1-NE, WiFiHU2-c, WiFiHU2-c-1-NE**
Issued Date : **Mar. 23, 2012**

Applicant: **Radicom Research Inc.**
2148 Bering Dr., San Jose, CA. 95131, USA

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

Test By: **Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan

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These measurements were taken by: Sign on File
Terry Hsu / Engineer

The test report was reviewed by: Jimmy Yang

Name Jimmy Yang
Title Engineer

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1. Summary of Test Data

Test/Requirement Description	Applicable Rule	Result
Minimum 6 dB 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:	USB WiFi Module
Model No.:	WiFiHU2-a-1-NE, WiFiHU2-c-1-NE
FCC ID.:	K7T-WIFIHU2
Frequency Range:	1. 2412 MHz ~ 2462 MHz for 802.11b, 802.11g, 802.11n HT20 2. 2422 MHz ~ 2452 MHz for 802.11n HT40
Channel Number:	1. 11 channels for 2412 MHz ~ 2462 MHz 2. 7 channels for 2422 MHz ~ 2452 MHz
Rated Power:	DC 5 V
Power Cord:	N/A
Data Cable:	USB shielded cable 0.1 meter × 1
Sample Received:	Feb. 21 , 2012
Test Date(s):	Feb. 22, 2012 ~ Mar. 21, 2012
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 an USB WiFi Module, and was defined as information technology equipment.

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

The customer confirmed the models listed as below were series model to model WiFiHU2-a-1-NE, WiFiHU2-c-1-NE (EUT), the difference between main model and series model are listed as below.

Model Number	Product Description
WiFiHU2-a-1-NE	Modules (with on- board antenna)+ Carrier Boards
WiFiHU2-a	Modules (with on- board antenna)
WiFiHU2-c-1-NE	Modules (with two antenna connectors)+ Carrier Boards
WiFiHU2-c	Modules (with two antenna connectors)

Antenna description

(1) Antenna 1

The EUT uses a permanently connected antenna.

Antenna Gain : 0 dBi
Antenna Type : Chip antenna
Connector Type : N/A

(2) Antenna 2

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

Antenna Gain : 2 dBi
Antenna Type : Dipole antenna
Connector Type : IPX

Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Description of Data Cable
Notebook PC	DELL	Latitude D610	FXWZK1S	USB shielded cable 1 meter × 1
Wireless AP	BUFFALO	WZR-AGL300NH	44049200801905	N/A
Printer	HP	DeskJet 400	SG5CQ170C0	N/A
Modem	Dynalink	V1456VQE	00V230A00051494	N/A

Operation mode

The EUT was supplied with 5 Vdc from Notebook PC (Test voltage: 120Vac, 60Hz) and it was run in TX / RX mode that was controlled by “Realtek MP program”.

Plug the EUT into Notebook PC via USB interface, then turn on the Notebook PC power and run the test program “Realtek MP program” under windows OS, which provide by manufacturer.

With individual verifying, the maximum output power was found out 1 Mbps data rate for 802.11b mode and 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n HT 20 mode and 13 Mbps data rate for 802.11n HT 40 mode. The final tests were executed under these conditions recorded in this report individually. Please refer the details below:

For WiFiHU2-a-1-NE

Chain 0: 802.11b channel 6	
Data rate (Mbps)	PK(dBm)
1	17.71
2	17.54
5.5	17.47
11	17.41

Chain 0: 802.11n HT20 channel 6	
Data rate (Mbps)	PK(dBm)
6.5	24.64
13	24.53
19.5	24.44
26	24.37
39	16.54
52	16.44
58.5	24.07
65	24.01

Chain 0: 802.11g channel 6	
Data rate (Mbps)	PK(dBm)
6	24.79
9	24.72
12	24.65
18	24.58
24	24.50
36	24.43
48	24.36
54	24.27

Chain 0: 802.11n HT40 channel 6	
Data rate (Mbps)	PK(dBm)
13.5	23.79
27	23.74
40.5	23.68
54	23.61
81	23.54
108	23.47
121.5	23.40
135	23.35

For WiFiHU2-c-1-NE

Chain 0: 802.11b channel 6	
Data rate (Mbps)	PK(dBm)
1	15.84
2	15.78
5.5	15.71
11	15.63

Chain 0: 802.11n HT20 channel 6	
Data rate (Mbps)	PK(dBm)
6.5	24.10
13	24.01
19.5	23.94
26	23.86
39	16.54
52	16.44
58.5	23.65
65	23.56

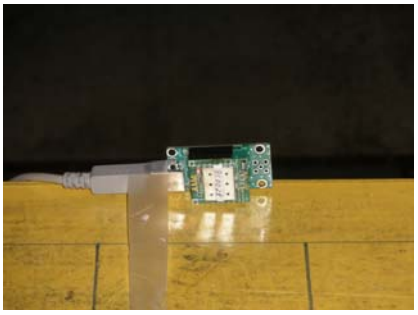
Chain 0: 802.11g channel 6	
Data rate (Mbps)	PK(dBm)
6	25.02
9	24.94
12	24.88
18	24.79
24	24.70
36	24.64
48	24.55
54	24.50

Chain 0: 802.11n HT40 channel 6	
Data rate (Mbps)	PK(dBm)
13.5	24.52
27	24.48
40.5	24.39
54	24.33
81	24.25
108	24.21
121.5	24.14
135	24.02

For the signal from USB WiFi Module is maximized through rotation and placement in the three orthogonal axes.

EUT : WiFiHU2-a-1-NE


X axis

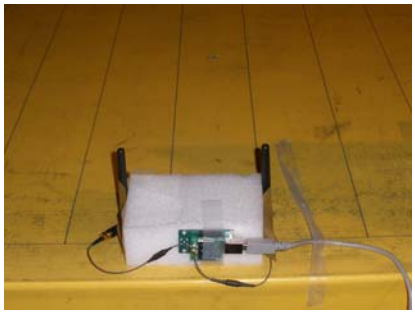

Y axis

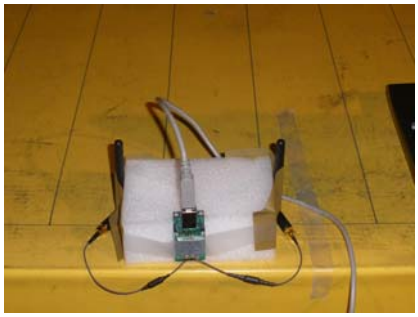

Z axis

After verifying three axes, we found the maximum electromagnetic field was occurred at Y axis. The final test data was executed under this configuration.

EUT : WiFiHU2-c-1-NE


X axis


Y axis


Z axis

After verifying three axes, we found the maximum electromagnetic field was occurred at X axis. The final test data was executed under this configuration.

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

3. Maximum 6 dB Bandwidth

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

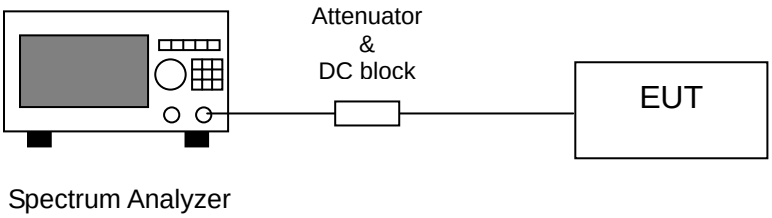
Test Result: Complies

Measurement Data: See Table & plots below

Method of Measurement:

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

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 Mbps data rate for 802.11n HT40 mode. The EUT was tuned to a low, middle and high channel.

Table 1 Maximum 6 dB Bandwidth

WiFiHU2-a-1-NE

Single TX

Mode	Channel	Frequency (MHz)	6dB Bandwidth(MHz)	Limit (MHz)	Pass/Fail
			DAC0		
802.11b	1	2412	8.43	0.5	Pass
	6	2437	8.43	0.5	Pass
	11	2462	9.24	0.5	Pass
802.11g	1	2412	16.605	0.5	Pass
	6	2437	16.695	0.5	Pass
	11	2462	16.605	0.5	Pass

Mode	Channel	Frequency (MHz)	6dB Bandwidth(MHz)	Limit (MHz)	Pass/Fail
			DAC1		
802.11g	1	2412	16.605	0.5	Pass
	6	2437	16.605	0.5	Pass
	11	2462	16.605	0.5	Pass

2TX

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Pass/Fail
			DAC0	DAC1		
802.11n (HT 20)	1	2412	17.805	17.895	0.5	Pass
	6	2437	17.895	17.895	0.5	Pass
	11	2462	17.805	17.895	0.5	Pass
802.11n (HT 40)	3	2422	36.57	36.57	0.5	Pass
	6	2437	36.735	36.57	0.5	Pass
	9	2452	36.735	36.57	0.5	Pass

WiFiHU2-c-1-NE

Single TX

Mode	Channel	Frequency (MHz)	6dB Bandwidth(MHz)	Limit (MHz)	Pass/Fail
			DAC0		
802.11b	1	2412	8.43	0.5	Pass
	6	2437	8.43	0.5	Pass
	11	2462	9.24	0.5	Pass
802.11g	1	2412	16.605	0.5	Pass
	6	2437	16.605	0.5	Pass
	11	2462	16.605	0.5	Pass

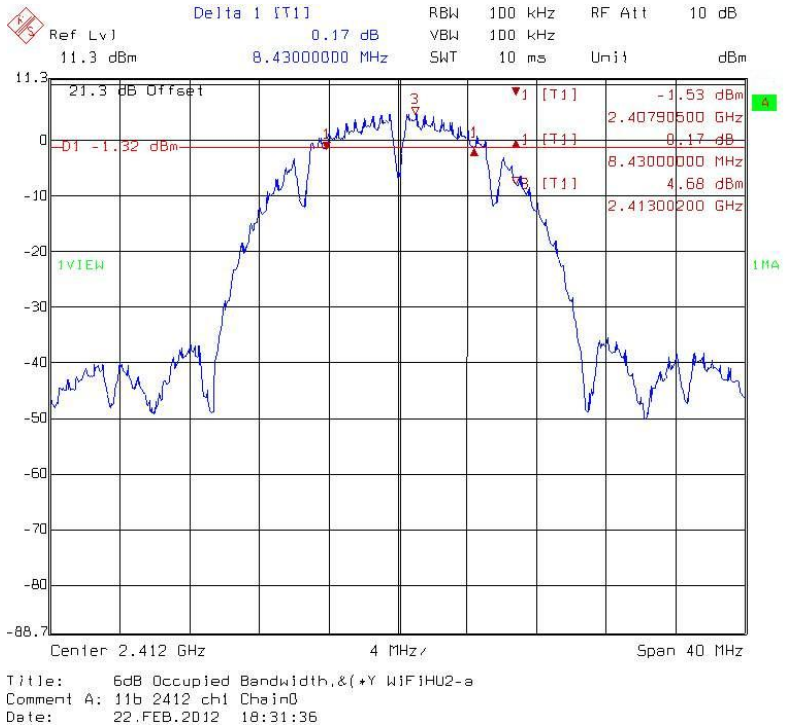
Mode	Channel	Frequency (MHz)	6dB Bandwidth(MHz)	Limit (MHz)	Pass/Fail
			DAC1		
802.11g	1	2412	16.605	0.5	Pass
	6	2437	16.605	0.5	Pass
	11	2462	16.605	0.5	Pass

2TX

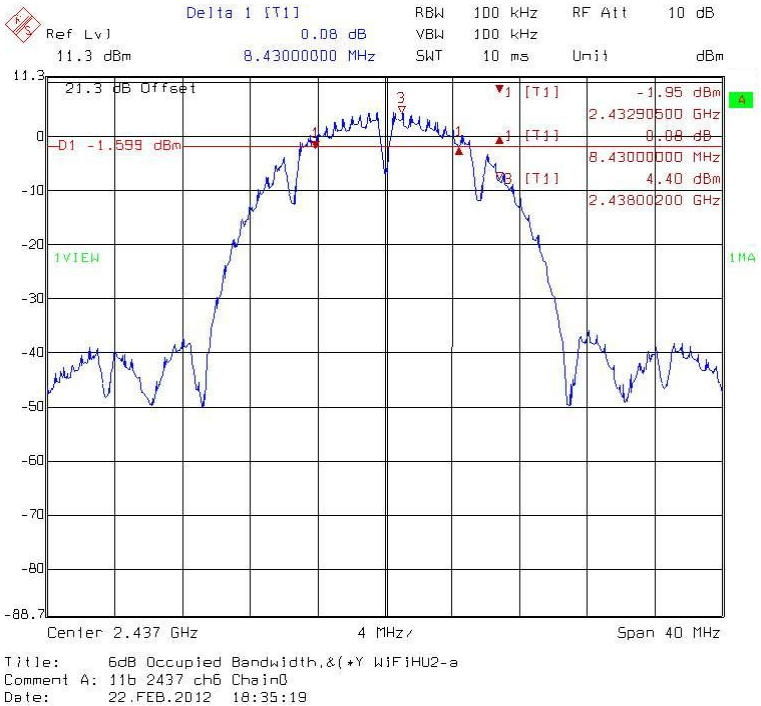
Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Pass/Fail
			DAC0	DAC1		
802.11n (HT 20)	1	2412	17.805	17.895	0.5	Pass
	6	2437	17.895	17.895	0.5	Pass
	11	2462	17.805	17.895	0.5	Pass
802.11n (HT 40)	3	2422	36.57	36.570	0.5	Pass
	6	2437	36.735	36.735	0.5	Pass
	9	2452	36.735	36.570	0.5	Pass

WiFiHU2-a-1-NE

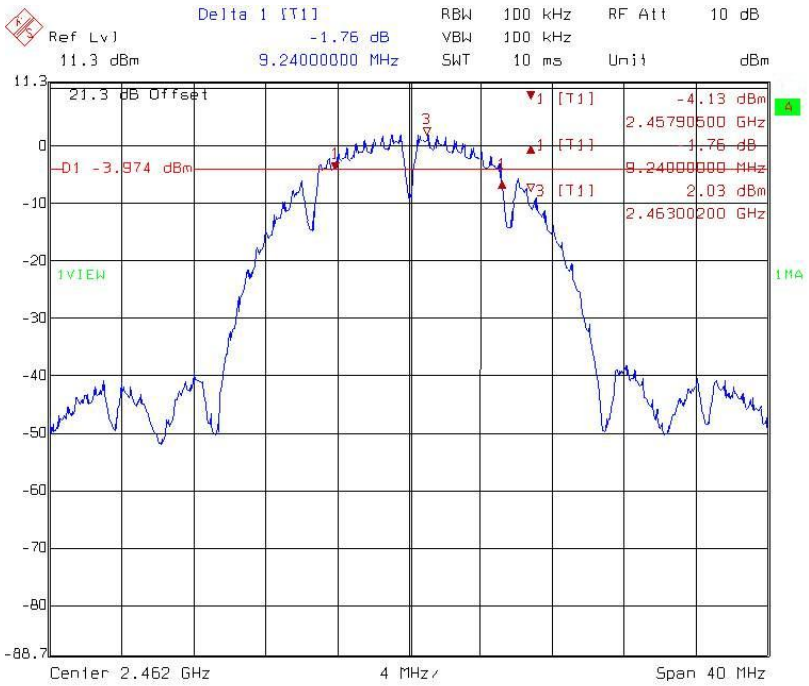
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 1



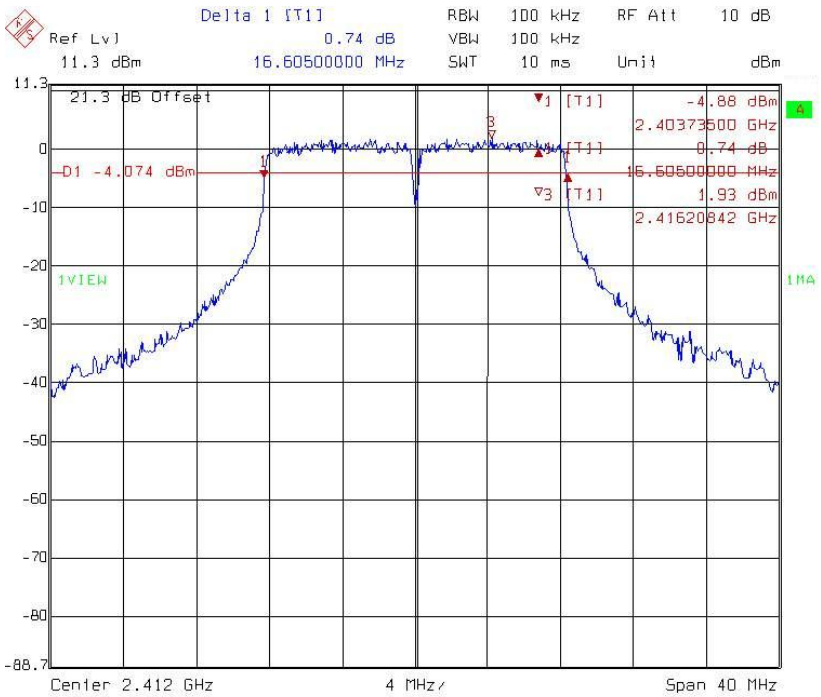
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 6



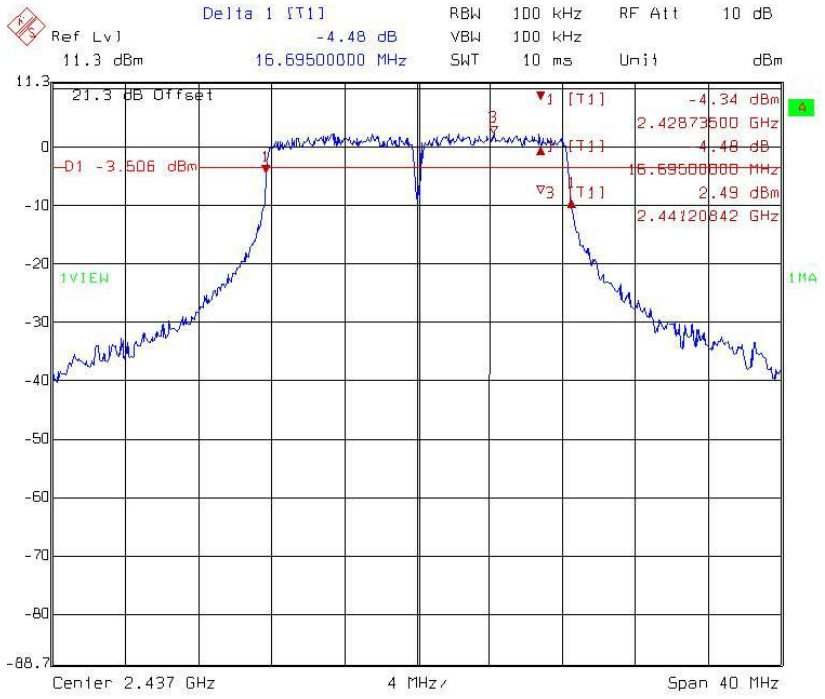
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 11



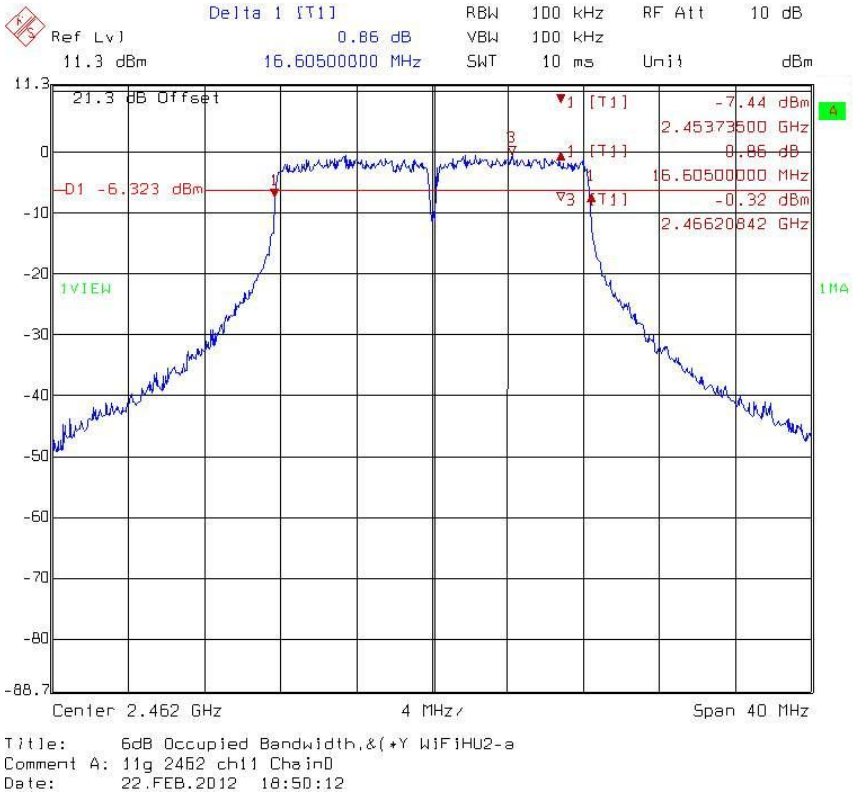
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 1



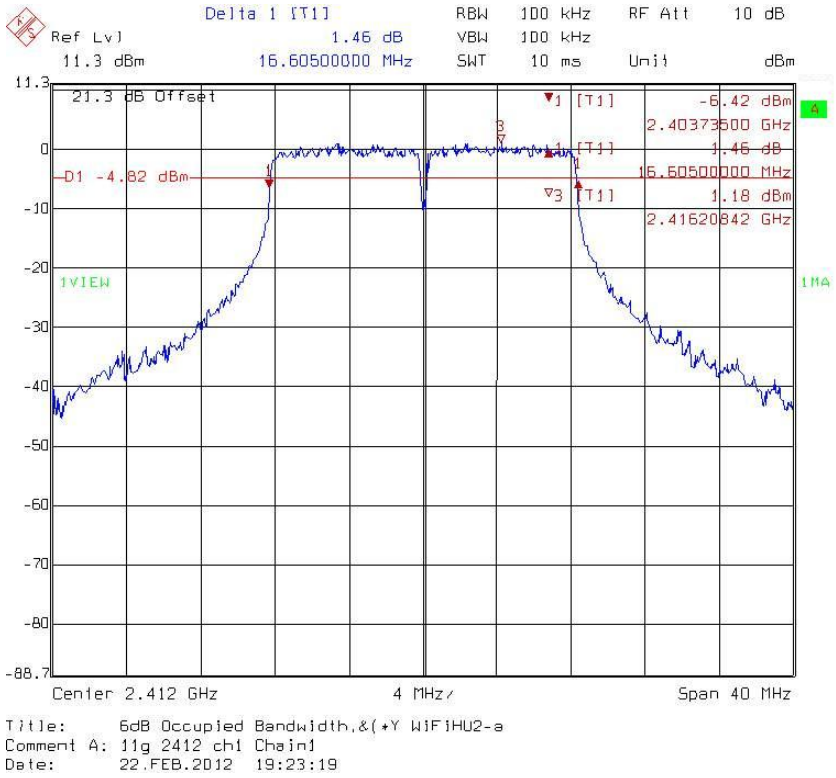
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 6



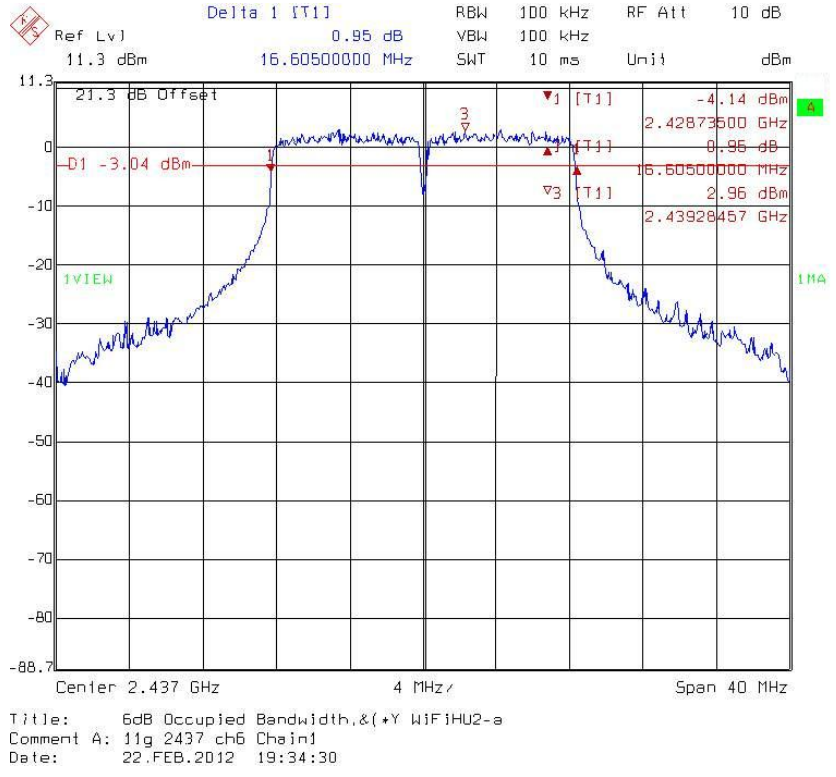
Chain 0: 6 dB Bandwidth @ 802.11g mode channel 11



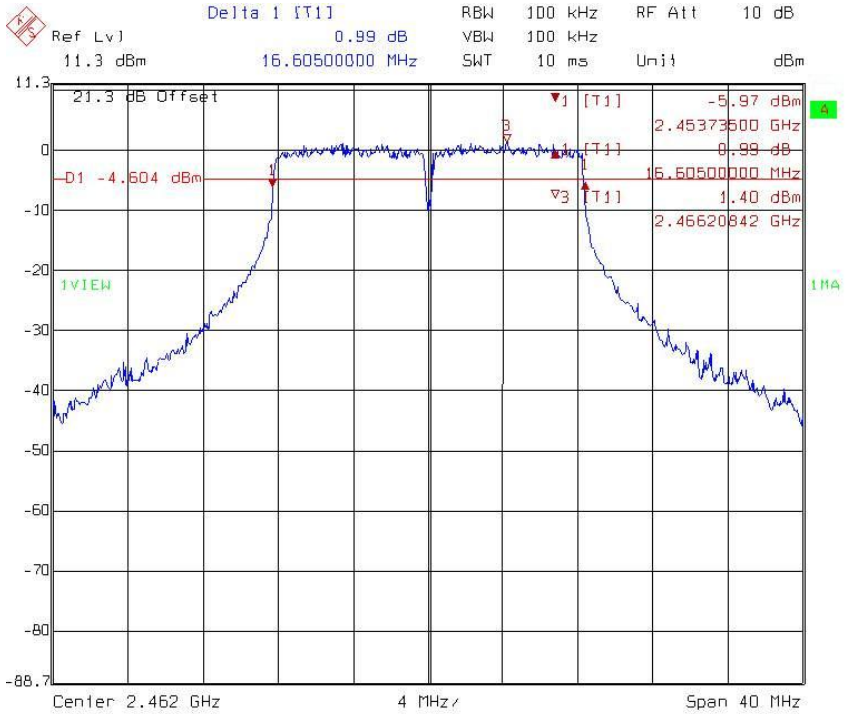
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 1



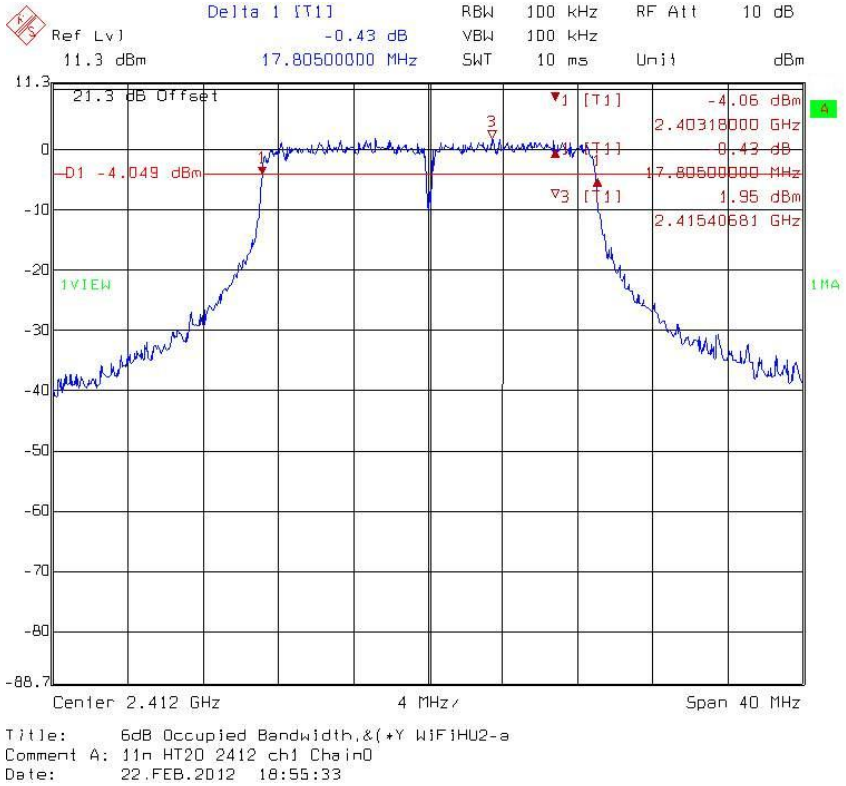
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 6



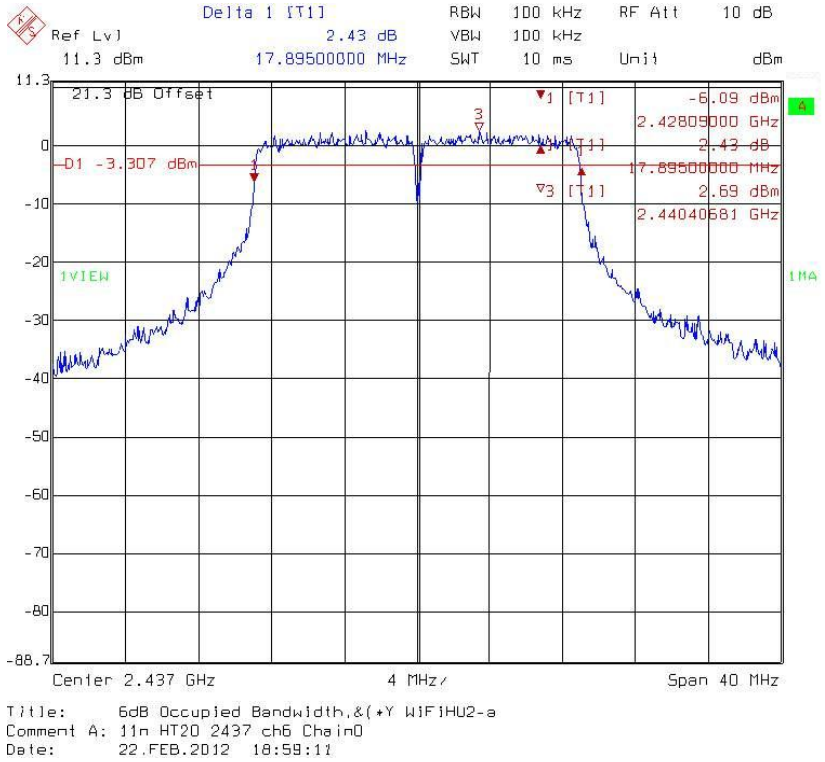
Chain 1: 6 dB Bandwidth @ 802.11g mode channel 11



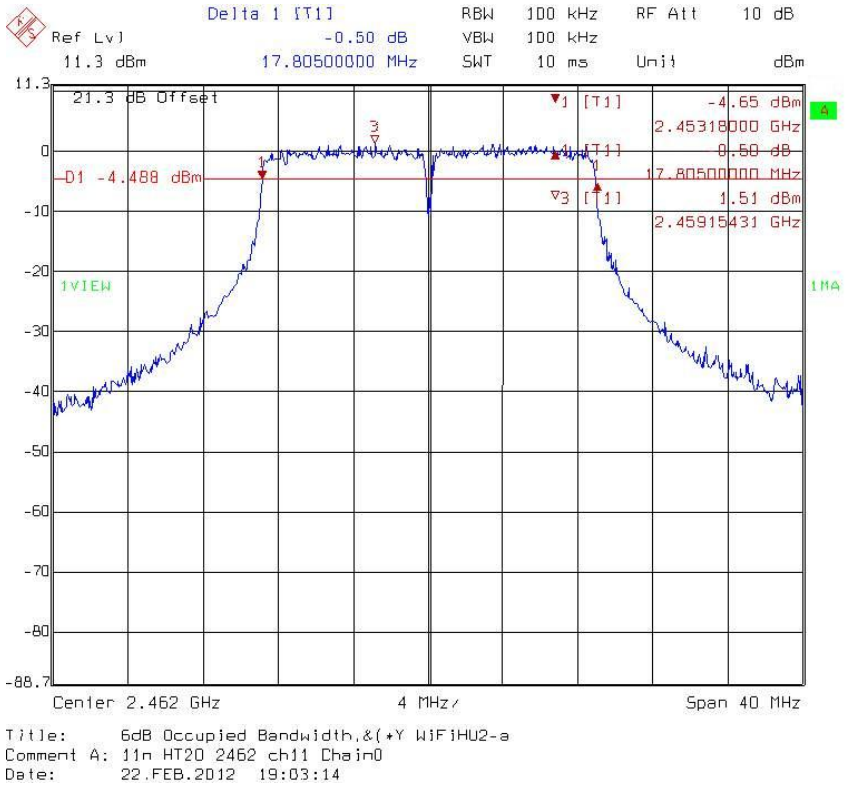
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 1



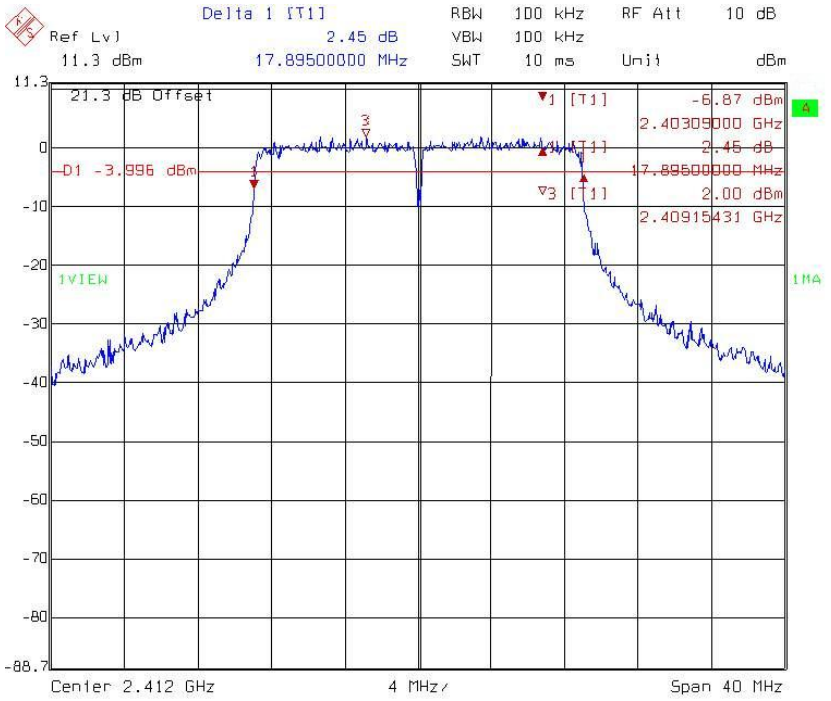
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 6



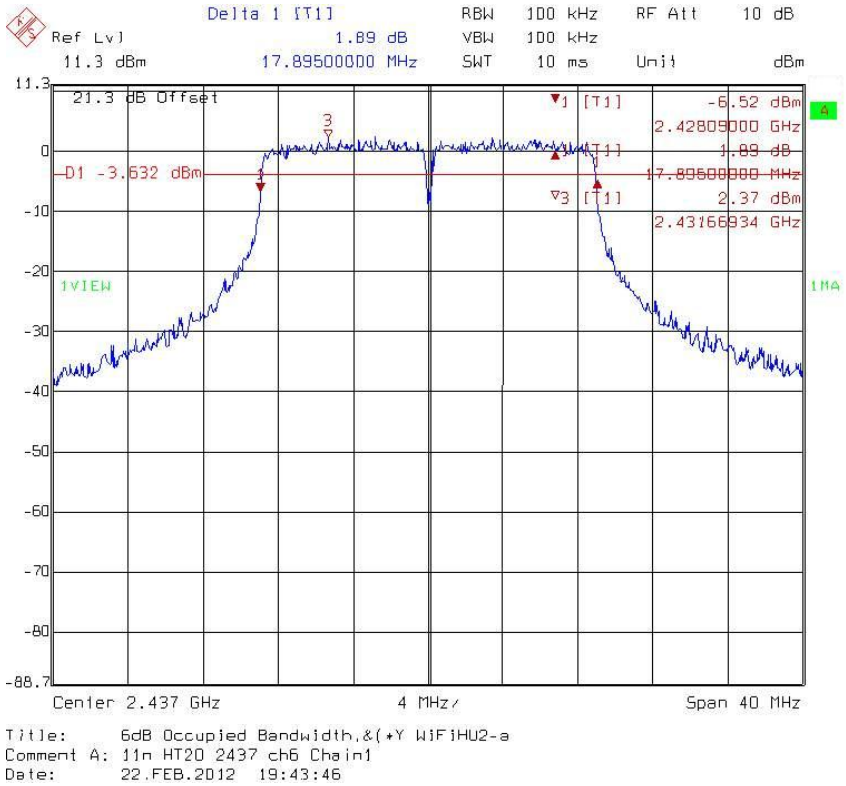
Chain 0: 6 dB Bandwidth @ 802.11n HT20 mode channel 11



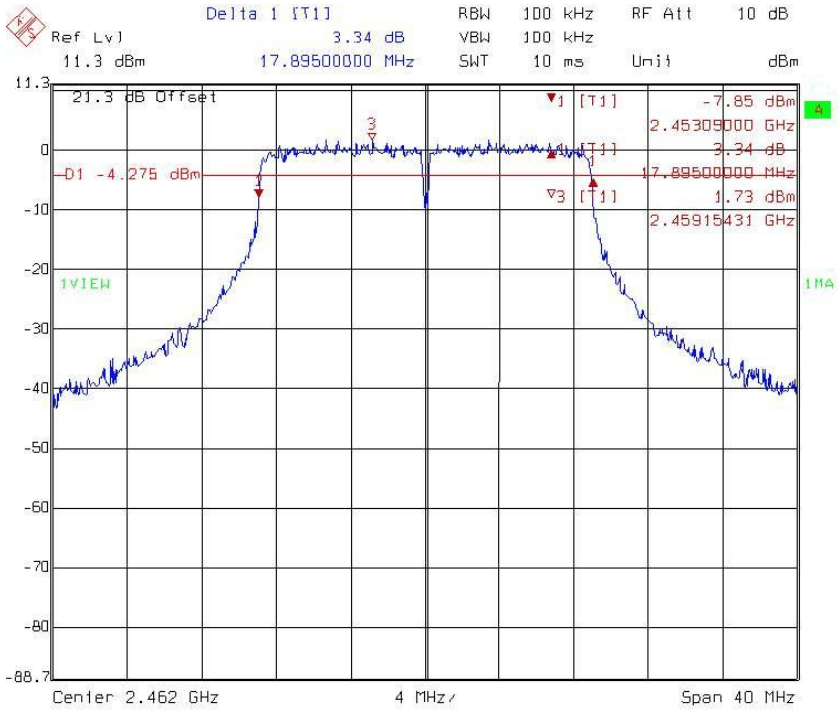
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 1



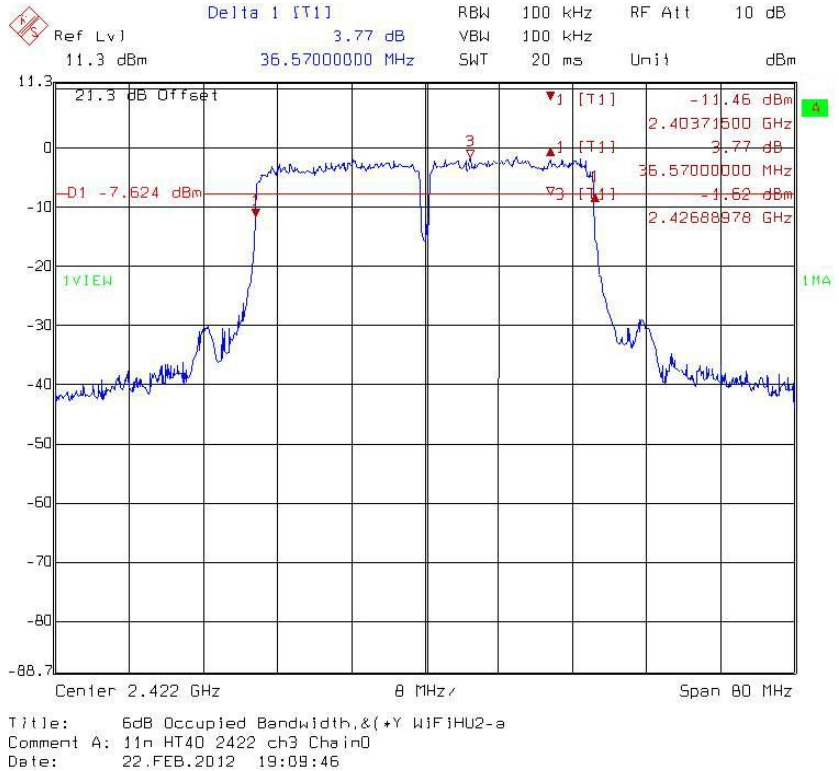
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 6



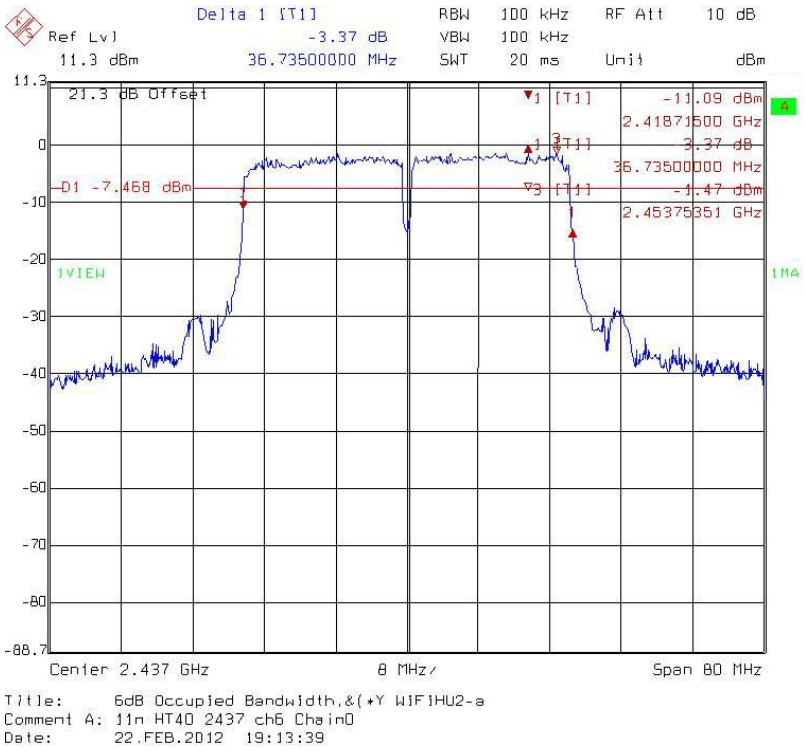
Chain 1: 6 dB Bandwidth @ 802.11n HT20 mode channel 11



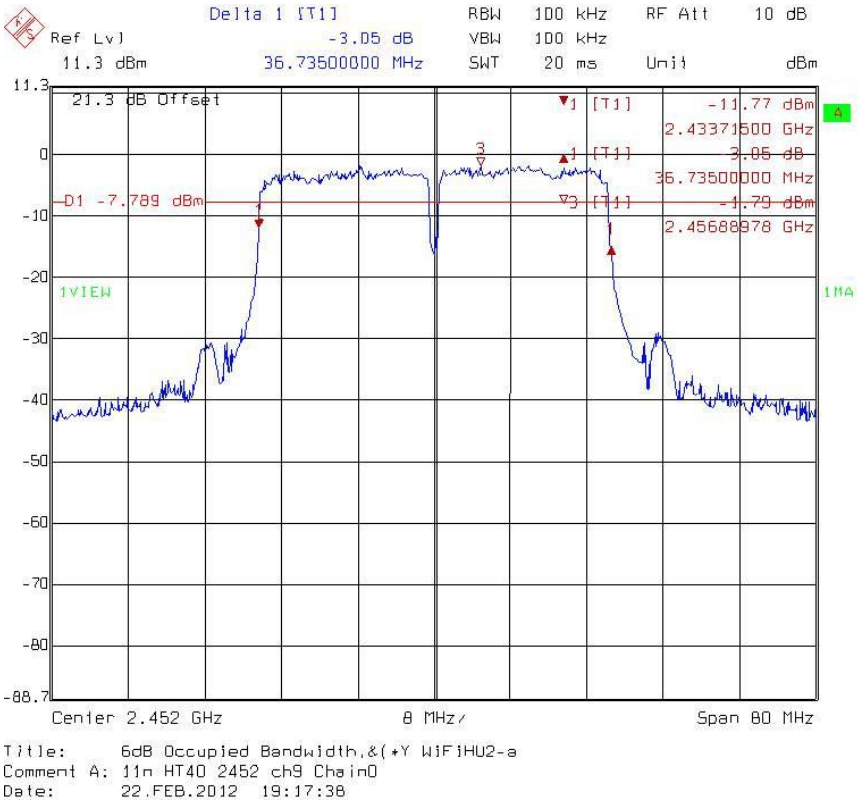
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 3



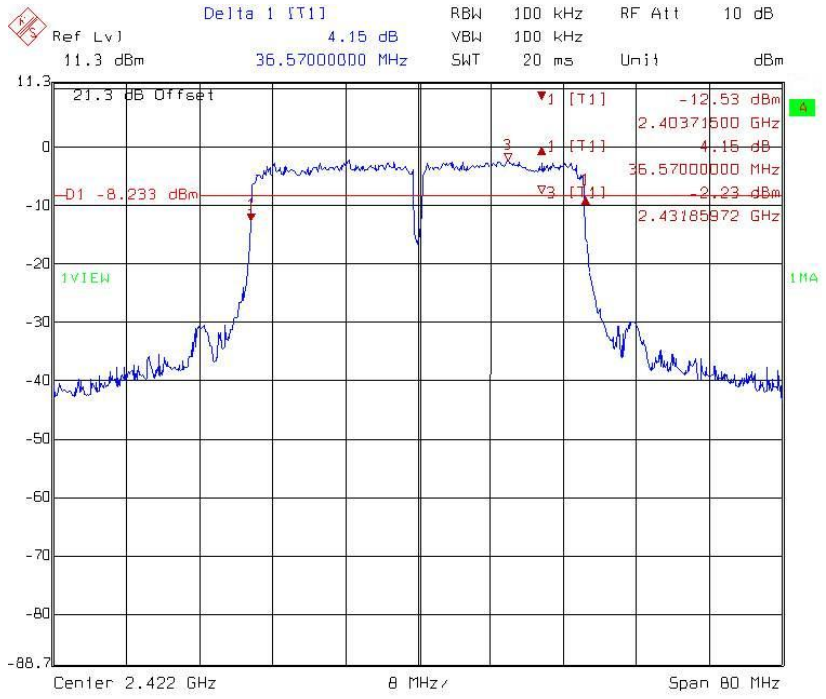
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 6



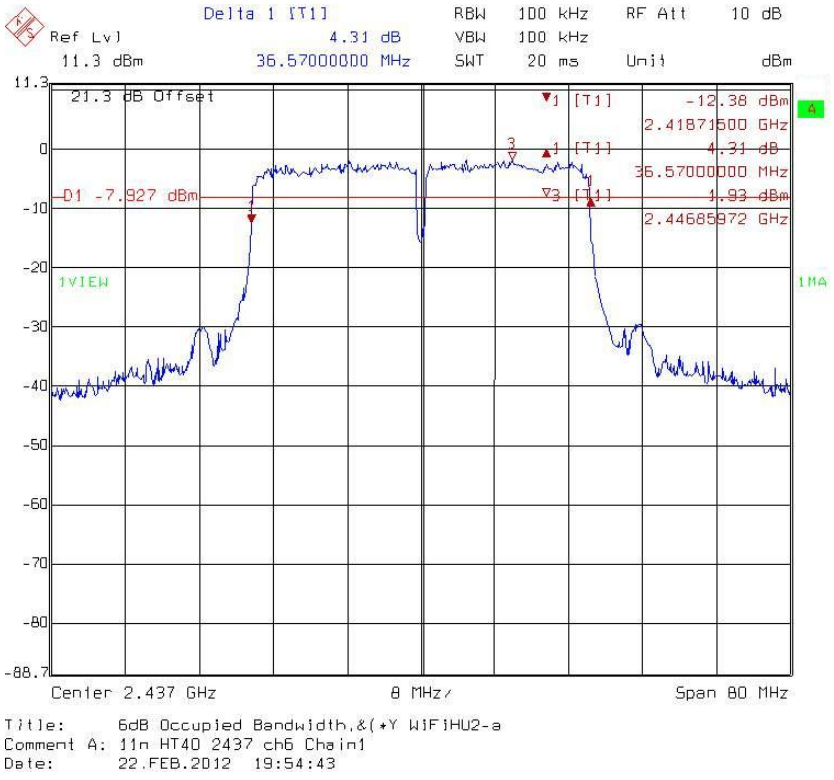
Chain 0: 6 dB Bandwidth @ 802.11n HT40 mode channel 9



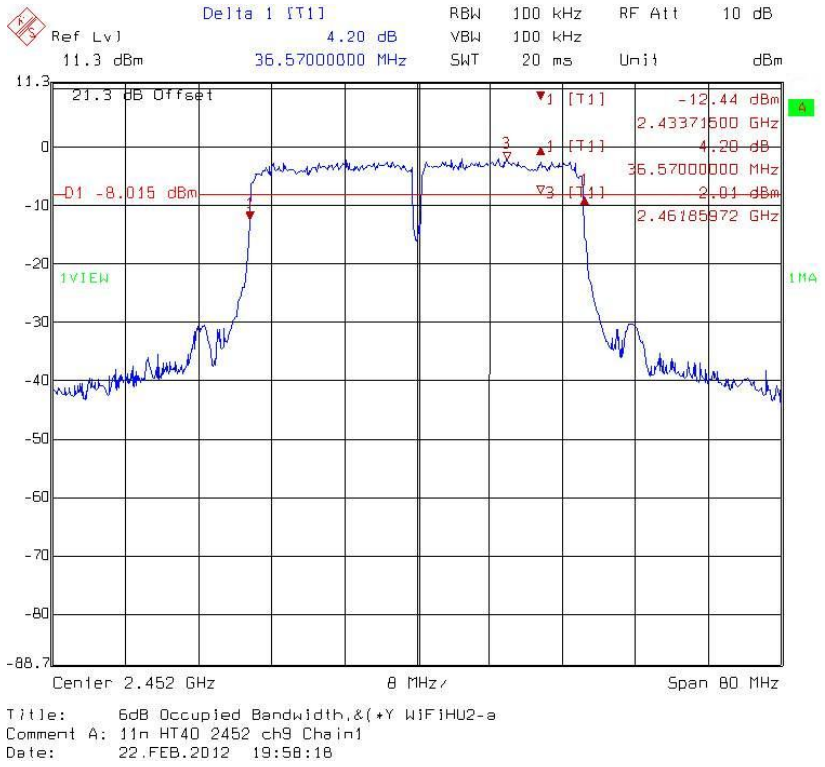
Chain 1: 6 dB Bandwidth @ 802.11n HT40 mode channel 3



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

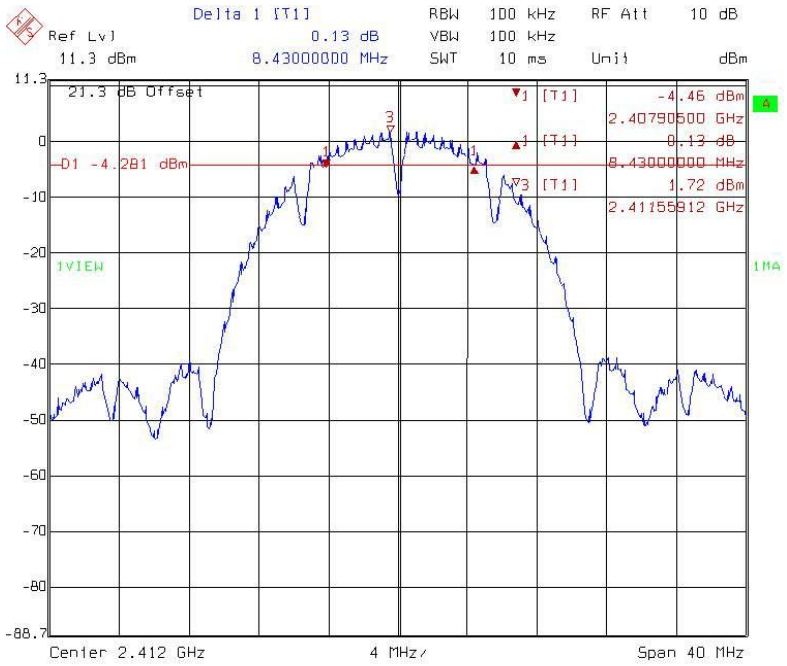


Chain 1: 6 dB Bandwidth @ 802.11n HT40 mode channel 9

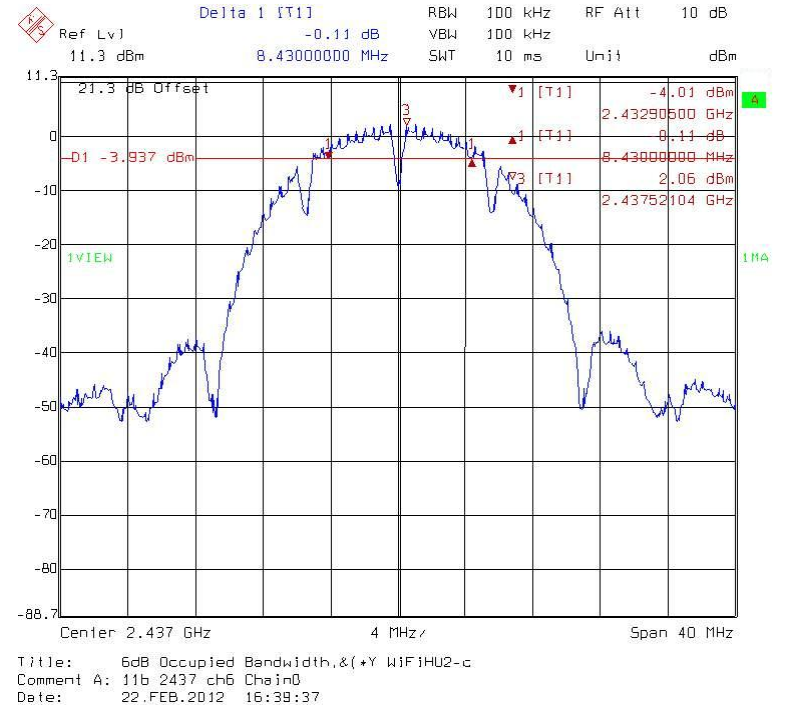


WiFiHU2-c-1-NE

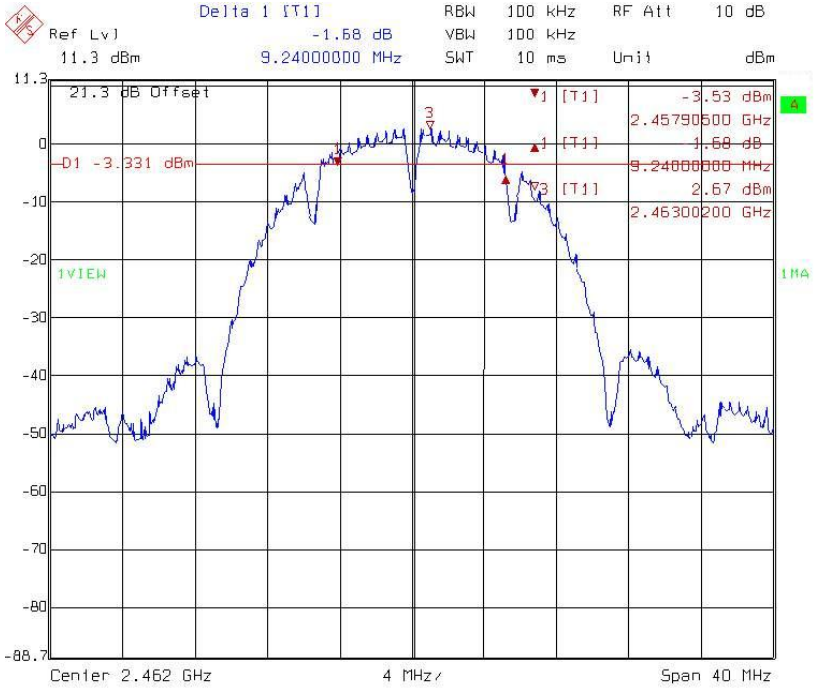
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 1



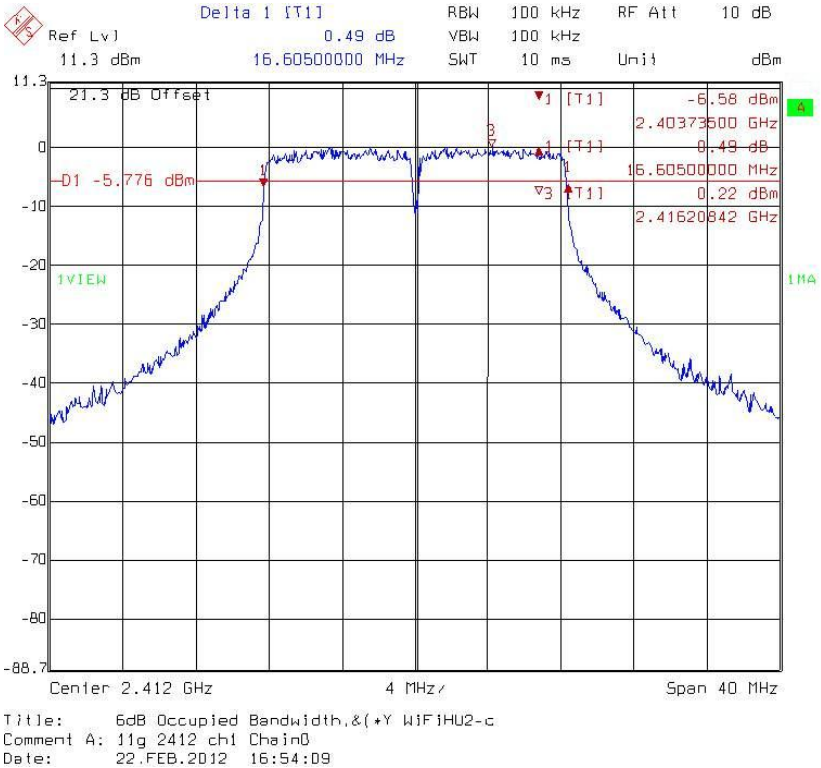
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 6



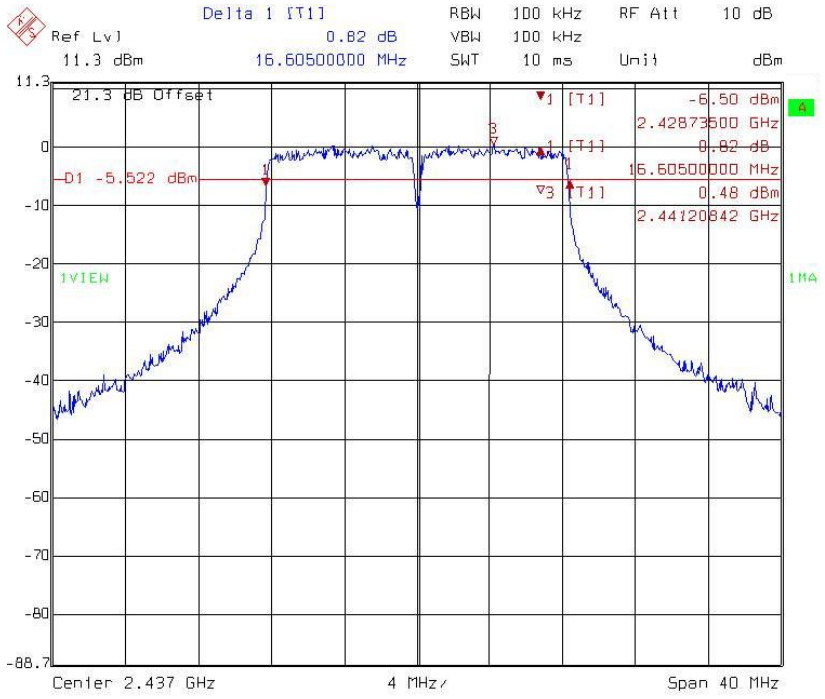
Chain 0: 6 dB Bandwidth @ 802.11b mode channel 11



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



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



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