

Technical Information

Applicant		Manufacturer	
Name:	hField Technologies	Name:	hField Technologies
Address:	115 Research Drive	Address:	115 Research Drive
City, State, Zip:	Bethlehem, PA 18015	City, State, Zip:	Bethlehem, PA 18015

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Para. 15.247

Test Procedure: ANSI C63.4:2003

Test Sample Description

TEST SAMPLE: WiFi USB Network Adapter

BRANDNAME: hField Technologies

MODEL(s): HFWFG200

FCC ID: UILHFWFG200

TYPE: Digital Spread Spectrum Transmitter

POWER REQUIREMENTS: 5 VDC derived via USB Power

FREQUENCY OF OPERATION: 2412 – 2462 MHz

Tests Performed

The test methods performed on the WiFi USB Network are shown below:

FCC Part 15, Subpart C	Test Method
15.247(a)(2)	Occupied Bandwidth
15.247(b)(4)	Peak Power Output 2.4 GHz – 2.4835 GHz
15.247(d)	Antenna Conducted Emissions 30 MHz – 25 GHz
15.247(d)	Spurious Case Radiated Emissions 30 MHz – 25 GHz
15.247(d)	Band Edge Measurements 2.4 GHz – 2.4835 GHz
15.247(e)	Peak Power Spectral Density 2.4 GHz – 2.4835 GHz
15.209(a)	Spurious Radiated Emissions, 30 MHz to 25 GHz
15.247(d) and 15.205	Spurious Radiated Emissions 1 GHz to 25 GHz
15.207(a)	Conducted Emissions, Power Leads, 150 kHz to 30 MHz
--	RF Exposure Evaluation

Requirements and Test Results

Requirement:

FCC Section 15.247(a)(2)

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands. The minimum 6 dB bandwidths shall be at least 500 kHz.

- **Results:**
The minimum 6 dB bandwidth measured 550 kHz which complies with the requirement that the Bandwidth be no less than 500 kHz.

Requirement:

FCC Sections 15.247(b)(4)

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For systems using digital modulation in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antenna and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antenna and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

- **Results:**
The device operates in the 2400 – 2483.5 MHz band. The maximum peak output power was measured and was found to be 0.1524 Watts, in compliance with the specified limit of 691.8 mWatts.

The power output limit for the device as derived from CFR Title 47, Part 15, Section 15.247(b)(3), reduced in accordance with 15.247 (b)(4).

Maximum allowed power output = 1 Watt = 30 dBm

EUT antenna Gain = 7.6dBi

Therefore the limit is reduced by: Antenna Gain - 6 db = 7.6 – 6 dB = 1.6 dB

The maximum allowed power output given a 7.6 dBi gain antenna is therefore:

$$30 \text{ dBm} - 1.6 \text{ dB} = 28.4 \text{ dBm} = 691.8 \text{ mW}$$

Requirements and Test Results (con't)

Requirement:

FCC Section 15.247(d):

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) must also comply with the radiated emissions limits specified in Section 15.209(a) (see Section 15.205(c)).

- Results:

In any 100 kHz bandwidth outside the frequency band in which the Spread spectrum intentional radiator was operating, the radio frequency power that was produced by the intentional radiator was at least 20 dB below that in the 100 kHz bandwidth within the band that contained the highest level of the desired power. All emissions, which fell within the restricted bands specified in 15.205(a), were measured and found to be in compliance with the limits specified in 15.209(a).

Requirement:

FCC Section 15.247(e):

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

- **Results:**

The power spectral density conducted from the intentional radiator to the antenna was not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density was determined in accordance with Section 15.247(b)(3), herein. The same method of determining the conducted output power was used to determine the power spectral density.

Requirement:

FCC Section 15.209(a) - Radiated Emission Limits, General Requirements

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 1.

Table 1 - Radiated Emission Limits

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

- **Results:**

The field strength of spurious radiated emissions did not exceed the limits specified in Table 1.

Requirements and Test Results (con't)

Requirement:

FCC Section 15.207(a) - Conducted Limits

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits shown in Table 2, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of the paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network.

Table 2 - Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

*Decreases due to logarithm of the frequency

- Results:
The conducted emissions observed did not exceed the limits specified in Table 2.

Requirement:

RF Exposure Evaluation

The expected RF exposure complies with Table B (limits for General Population / Uncontrolled Environments) of OET Bulletin 65, Supplement C, Appendix A where:

$$S_{\max} = 1.0 \text{ mW/cm}^2$$

- Results:
The RF exposure was not greater than 1.0 mW/cm²
The RF exposure was measured to be 0.17 mW/cm²

Spectrum Analyzer Desensitization Considerations

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.

General Notes

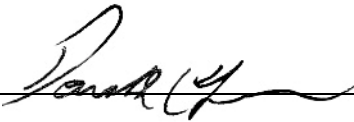
1. All readings were taken utilizing a peak detector/or average detector function at a test distance of 3 meters.
2. A 10 Hz Video Bandwidth was utilized in order to determine the average value of the emissions.
3. All measurements were made with the Host computer device powered by an AC Adapter with an input of 120 VAC, 60 Hz.
4. The frequency range was scanned from 30 MHz to 25 GHz. All emissions not reported were more than 20 dB below the specified limit.

Modifications

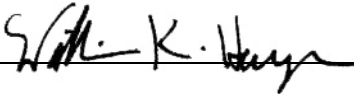
No Modifications were made during the course of this testing program in order to demonstrate compliance with the specified requirements.

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Donald Lerner
EMC Engineer



William K. Hayes
Executive Vice President
NARTE Certified Engineer EMC-000157-NE

Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Equipment Lists

Peak Power Output, 2.4 GHz – 2.4835 GHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
1016	30 dB Attenuator	Aeroflex/Weinschel	DC-40 GHz	75A-30-12	10/3/2008	10/3/2009
896	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	3/7/2009	3/7/2010

Antenna Conducted Emissions, 30 MHz – 25 GHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
1016	30 dB Attenuator	Aeroflex/Weinschel	DC-40 GHz	75A-30-12	10/3/2008	10/3/2009
896	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	3/7/2009	3/7/2010

Spurious Case Radiated Emissions, 30 MHz – 25 GHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
032F	H.P. Filter	Microlab/FXR	2 GHz	HD-20N	8/13/2008	8/13/2009
032H	H.P. Filter	Microlab/FXR	4 GHz	HD-40N	11/25/2008	11/25/2009
032J	H.P. Filter	Microlab/FXR	6 GHz	HD-60N	11/26/2008	11/26/2009
032K	L.P. Filter	Microlab/FXR	1 GHz	LA-10N	11/25/2008	11/25/2009
067	Open Area Test Site	Retlif	3/10 Meter	RNY	9/12/2006	9/12/2009
1049	H.P. Filter	Microlab/FXR	1 GHz	HD-10N	8/13/2008	8/13/2009
1232	Preamplifier	Agilent	1 - 26.5GHz	8449B	3/17/2009	3/17/2010
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	2/23/2009	2/23/2010
129F	High Gain Horn Antenna	Microlab/FXR	18 GHz - 26.5 GHz	K638A	7/10/2008	7/10/2009
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	5/6/2009	5/6/2010
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	5/5/2009	5/5/2010
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	5/5/2009	5/5/2010
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	5/6/2009	5/6/2010
298A	Waveguide Twist	FXR	18 GHz - 26.5 GHz	K625A	11/15/2007	11/15/2009
420	Amplifier	Hewlett Packard	2.0 GHz - 18 GHz	11975A	9/24/2008	9/24/2010
421	Harmonic Mixer	Hewlett Packard	18 GHz - 26.5 GHz	11970K	10/3/2006	10/3/2009
512	Graphics Plotter	Hewlett Packard	N/A	7470A	9/25/2008	9/25/2009
767	Biconilog	EMCO	26 - 2000 MHz	3142B	8/8/2008	8/8/2009

Band Edge Measurement, 2.4 GHz – 2.4835 GHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
831	10 DB Atten. (50 ohm)	Narda	DC - 11 GHz, 20W	768-10	3/19/2009	3/19/2010
896	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	3/7/2009	3/7/2010

Equipment Lists (cont'd)

Peak Power Spectral Density, 2.4 GHz – 2.4835 GHz

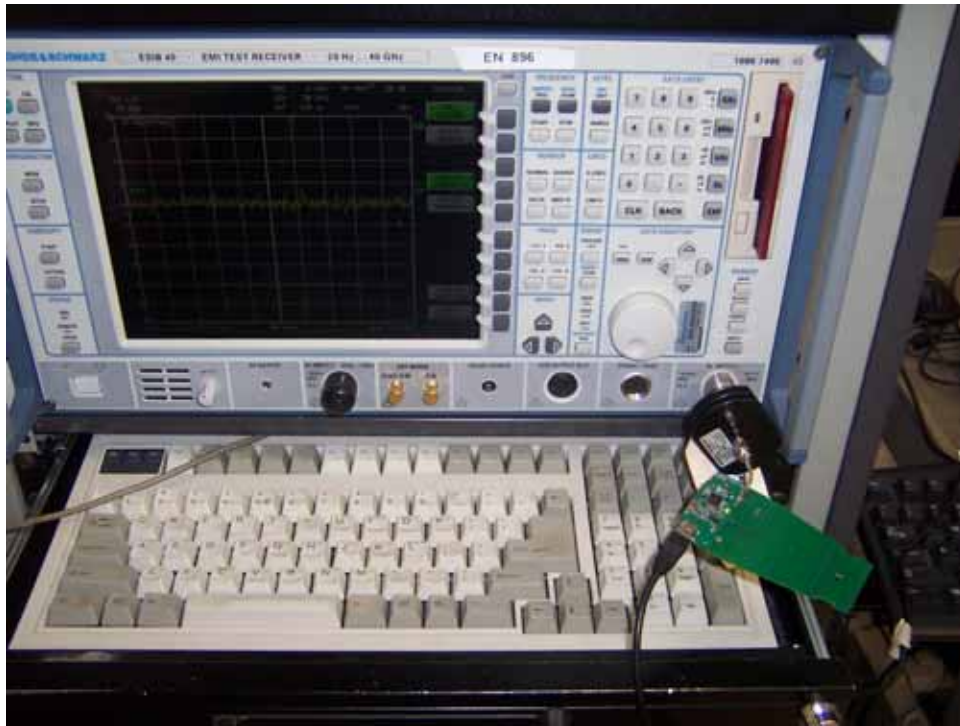
EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
1016	30 dB Attenuator	Aeroflex/Weinschel	DC-40 GHz	75A-30-12	10/3/2008	10/3/2009
896	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	3/7/2009	3/7/2010

Conducted Emissions, Power Leads, 150 kHz to 30 MHz

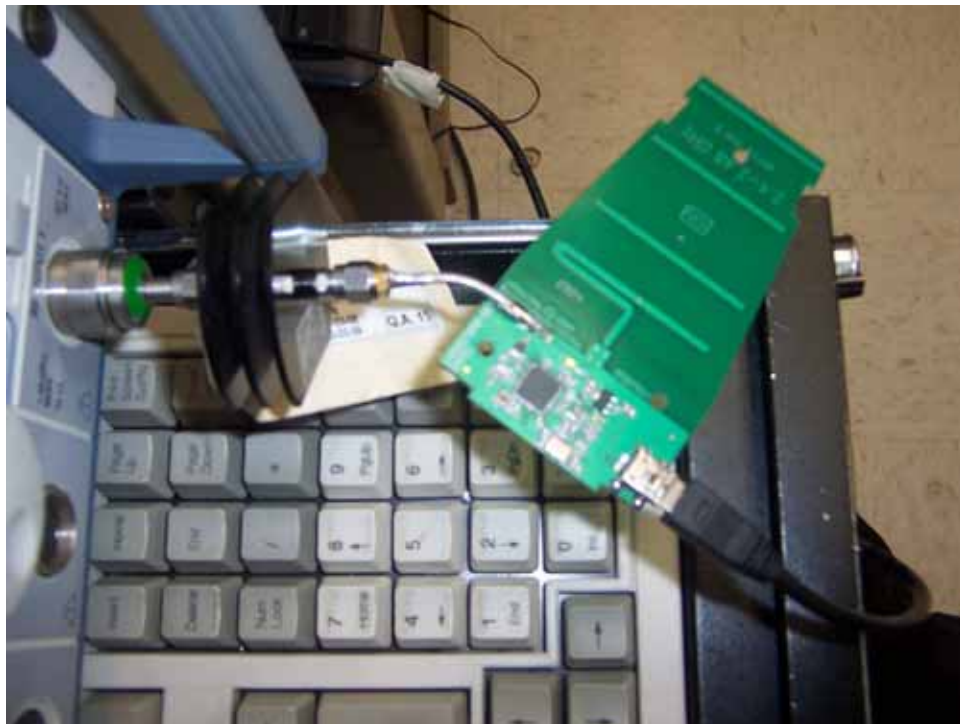
EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
078	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	5/29/2009	5/29/2010
079	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	5/27/2008	5/27/2010
456	LISN	Solar Electronics	DC - 60 Hz	9409-50-R-24	10/10/2008	10/10/2009
831	10 DB Atten. (50 ohm)	Narda	DC - 11 GHz, 20W	768-10	3/19/2009	3/19/2010
896	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	3/7/2009	3/7/2010

**Test Photograph(s)
Conducted Emissions, Peak Power Output
FCC Part 15, Subpart C, Section 15.247(b)(4)**

**Test Photograph(s)
Power Output**



Test Setup



Test Setup

RF Power Output Measurement

hField Technologies
FCC ID: UILHFWFG200

Peak Power Limit:

The power output limit for the device as derived from CFR Title 47, Part 15, Section 15.247(b)(3), reduced in accordance with 15.247 (b)(4).

Maximum allowed power output = 1 Watt = 30 dBm

EUT antenna Gain = 7.6dBi

Therefore the limit is reduced by: Antenna Gain - 6 db = 7.6 – 6 dB = 1.6 dB

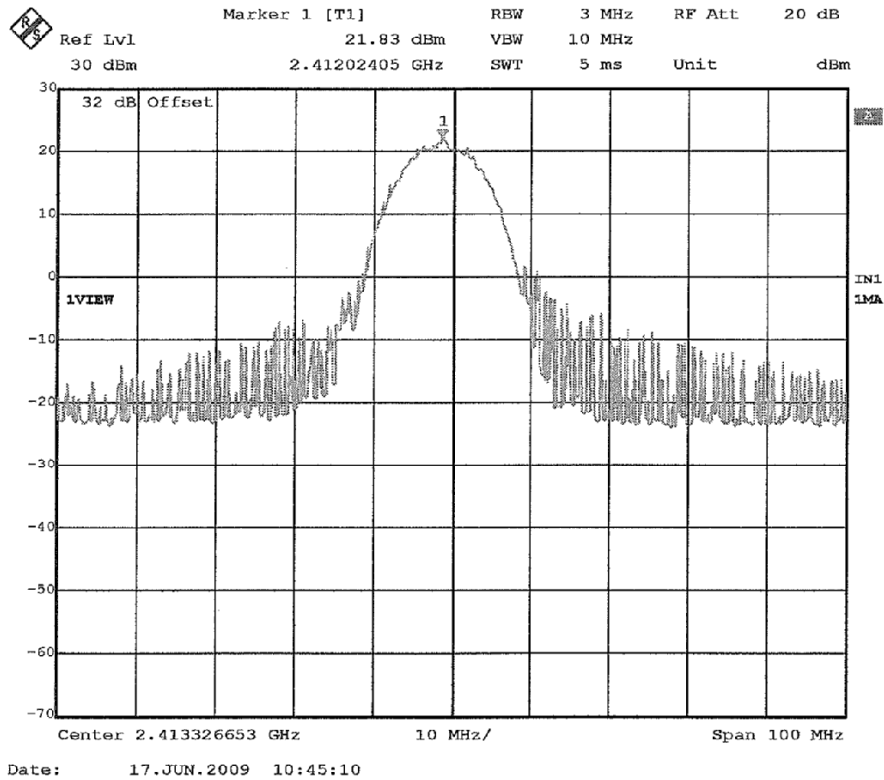
The maximum allowed power output given a 7.6 dBi gain antenna is therefore:

$$30 \text{ dBm} - 1.6 \text{ dB} = 28.4 \text{ dBm} = 691.8 \text{ mW}$$

Conducted Peak RF Power output of the equipment under test was measured as follows:

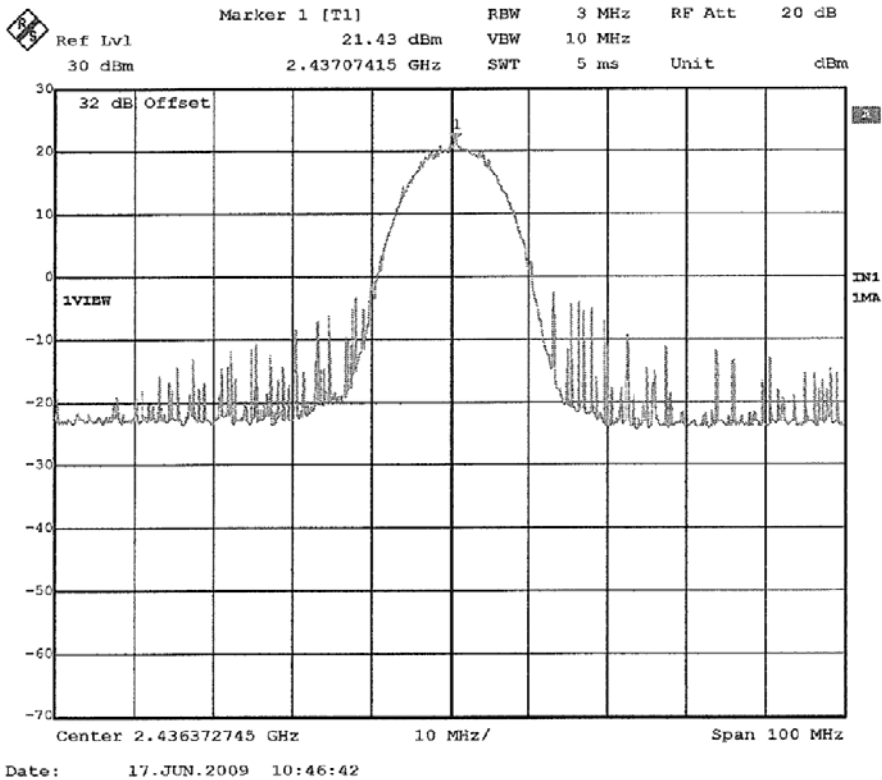
- 1) A SMA cable was connected to the EUT antenna trace.
- 2) The SMA connector was connected directly to a 30 dB attenuator (Aeroflex Model 75A-30-12, DC to 40 GHz) which was connected directly to the input of the Rhode and Schwarz EMI Test receiver.
- 3) The EUT was configured to transmit data continuously on Channel 1.
- 4) The peak output power was measured utilizing a peak detector on the Rhode and Schwarz EMI Test Receiver with an offset factor of 32dB accounting for the 30dB attenuator and 2dB cable loss.
- 5) These steps were repeated for Channels 6 and 11.
- 6) See attach plots for each channel peak power output below.

**FCC Part 15, Subpart C, 15.247 (b)(3) Peak Power Output
2.4 – 2.4835 GHz Range
Test Data**



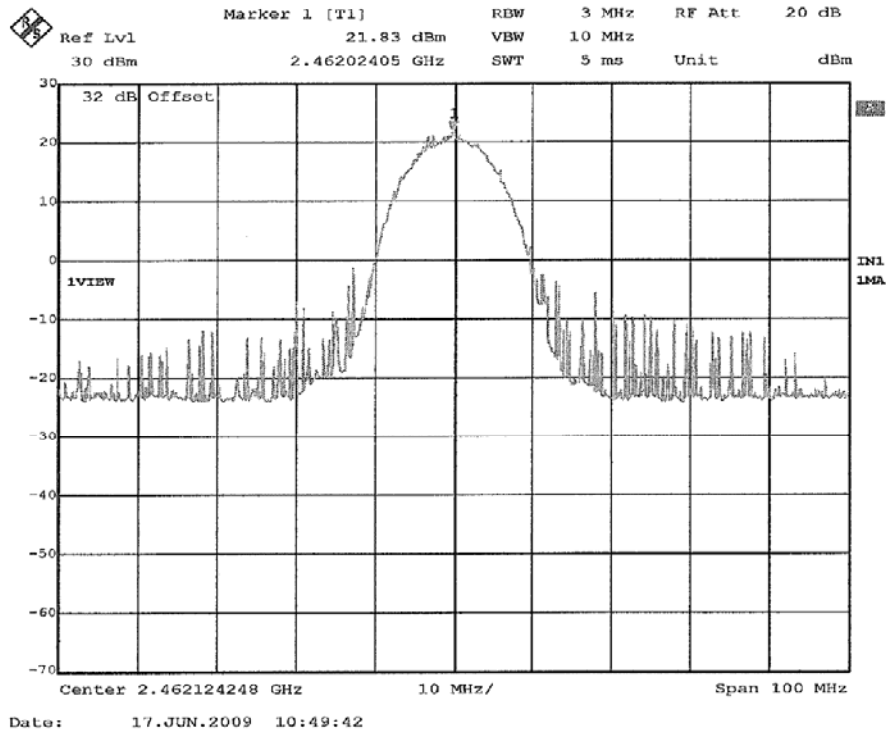
FCC Part 15, Subpart C, 15.247(b)(3) Peak Power Output, 2.4-2.4835 GHz Band
Peak Power Output Limit: Peak power measured = 21.83 dBm = 152.4mW (Limit = 691.8 mW)
Note: EUT transmitting on channel 1
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 1 of 3



FCC Part 15, Subpart C, 15.247(b)(3) Peak Power Output, 2.4-2.4835 GHz Band
Peak Power Output Limit: Peak power measured = 21.43 dBm = 139.0mW (Limit = 691.8 mW)
Note: EUT transmitting on channel 6
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 2 of 3

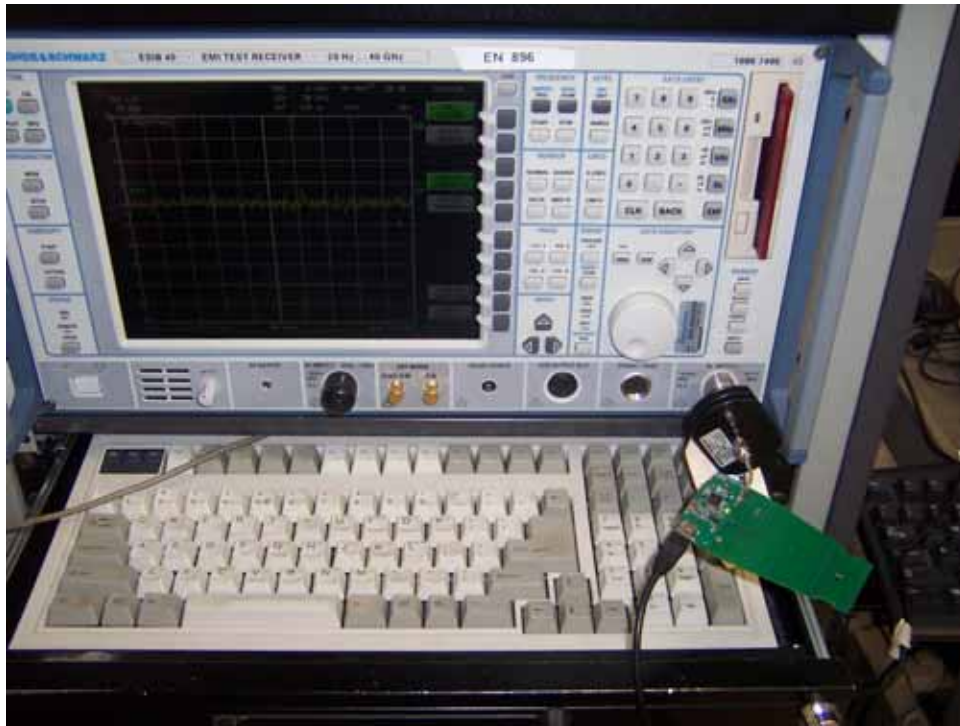


FCC Part 15, Subpart C, 15.247(b)(3) Peak Power Output, 2.4-2.4835 GHz Band
Peak Power Output Limit: Peak power measured = 21.83 dBm = 152.4mW (Limit = 691.8 mW)
Note: EUT transmitting on channel 11
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 3 of 3

Test Photograph(s)
Antenna Port, Conducted Emissions
FCC Part 15, Subpart C, Section 15.247(c)

**Test Photograph(s)
Antenna Port, Conducted Emissions**



Test Setup

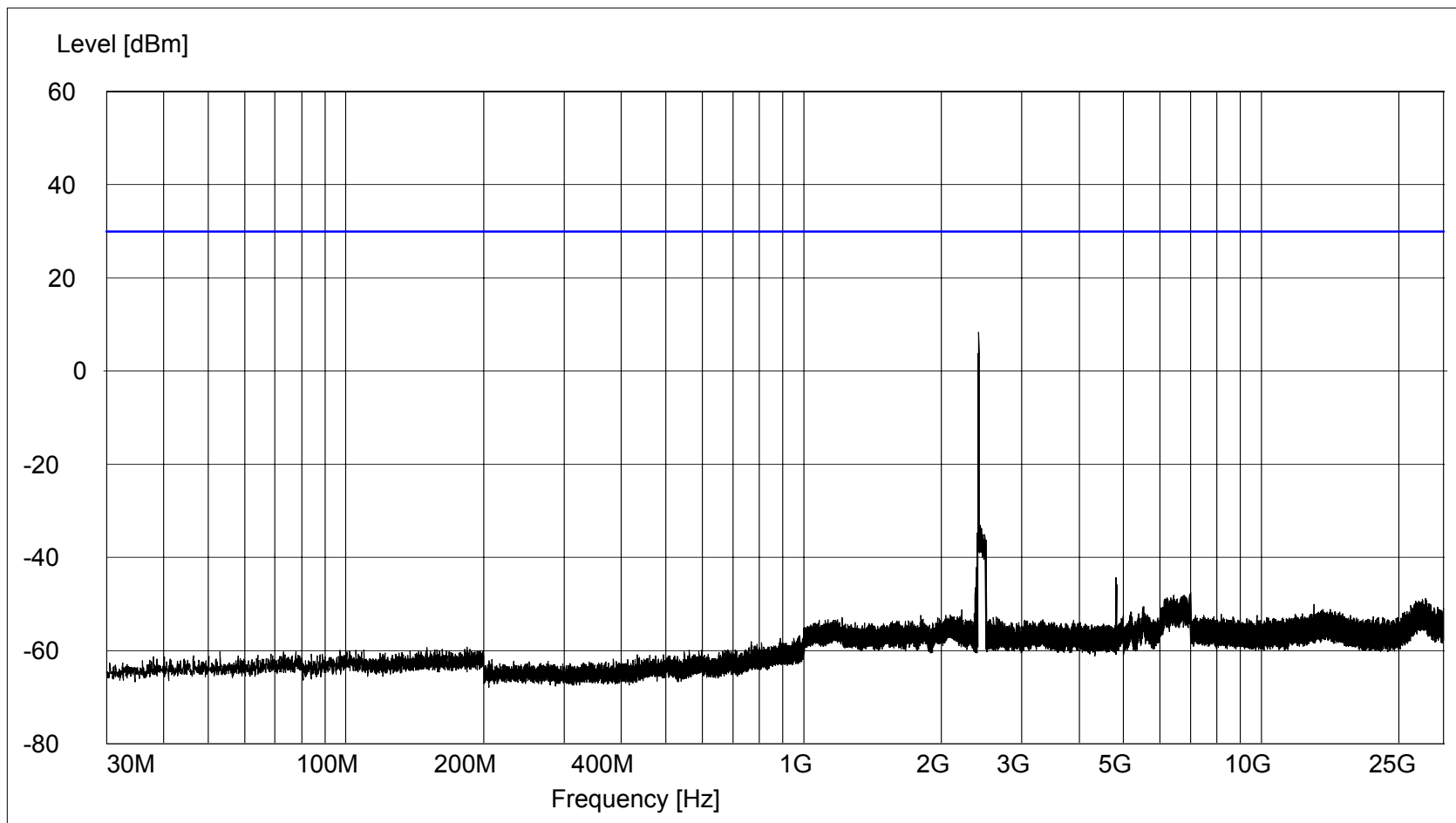


Test Setup

**FCC Part 15, Subpart C, Section 15.274(c), Antenna Conducted Emission
30 MHz to 25 GHz
Test Data**

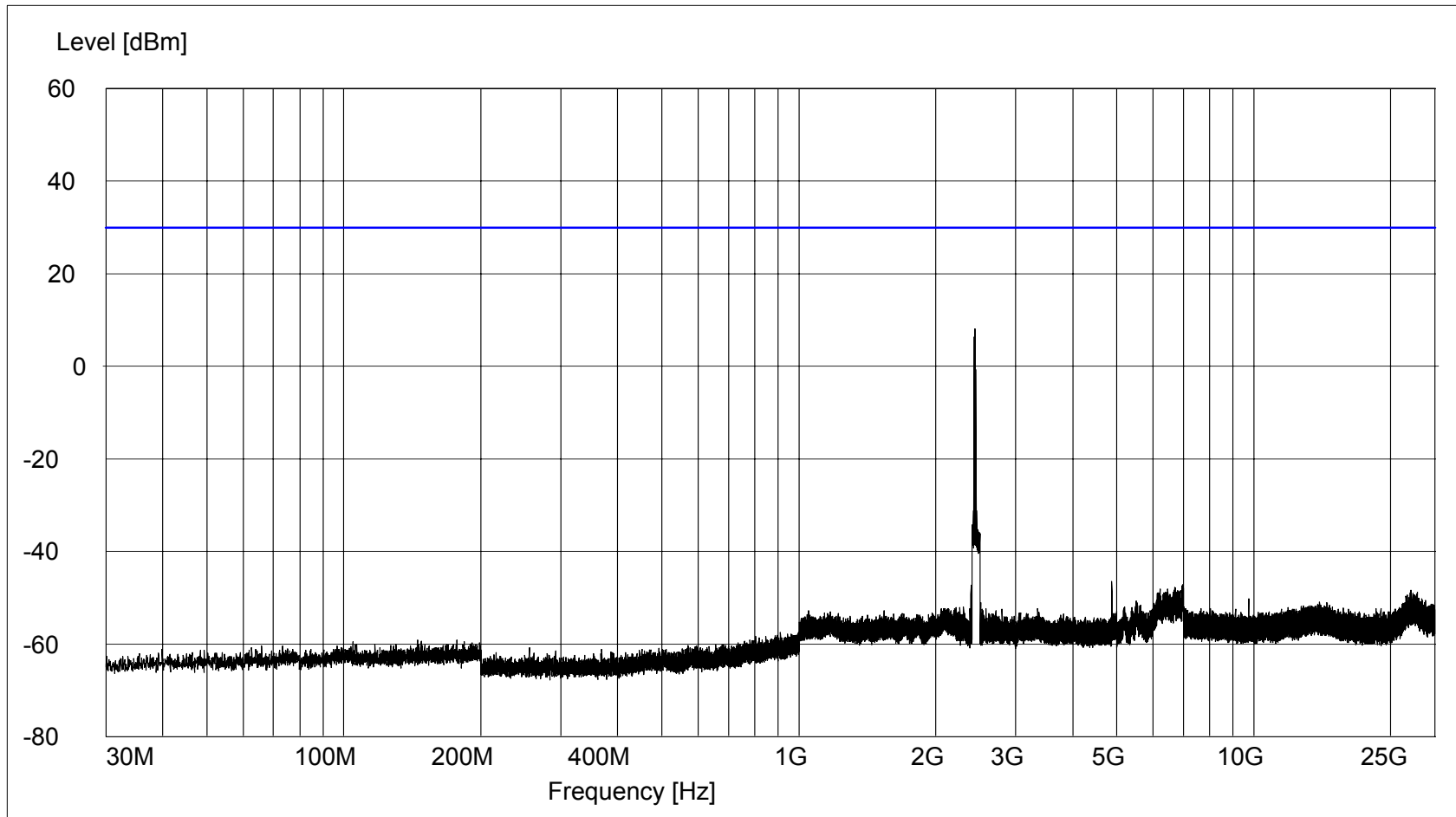
FCC Part 15, Subpart C, Antenna Conducted Emissions, 30 MHz to 25 GHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.247(c).
Mode of Operation: Continuous data transmit on channel 1.
Technician / Date: R. Soodoo / June 12, 2009.
Detector: Peak
Note: All spurious emissions are at least 20dB down from the fundamental peak output power.



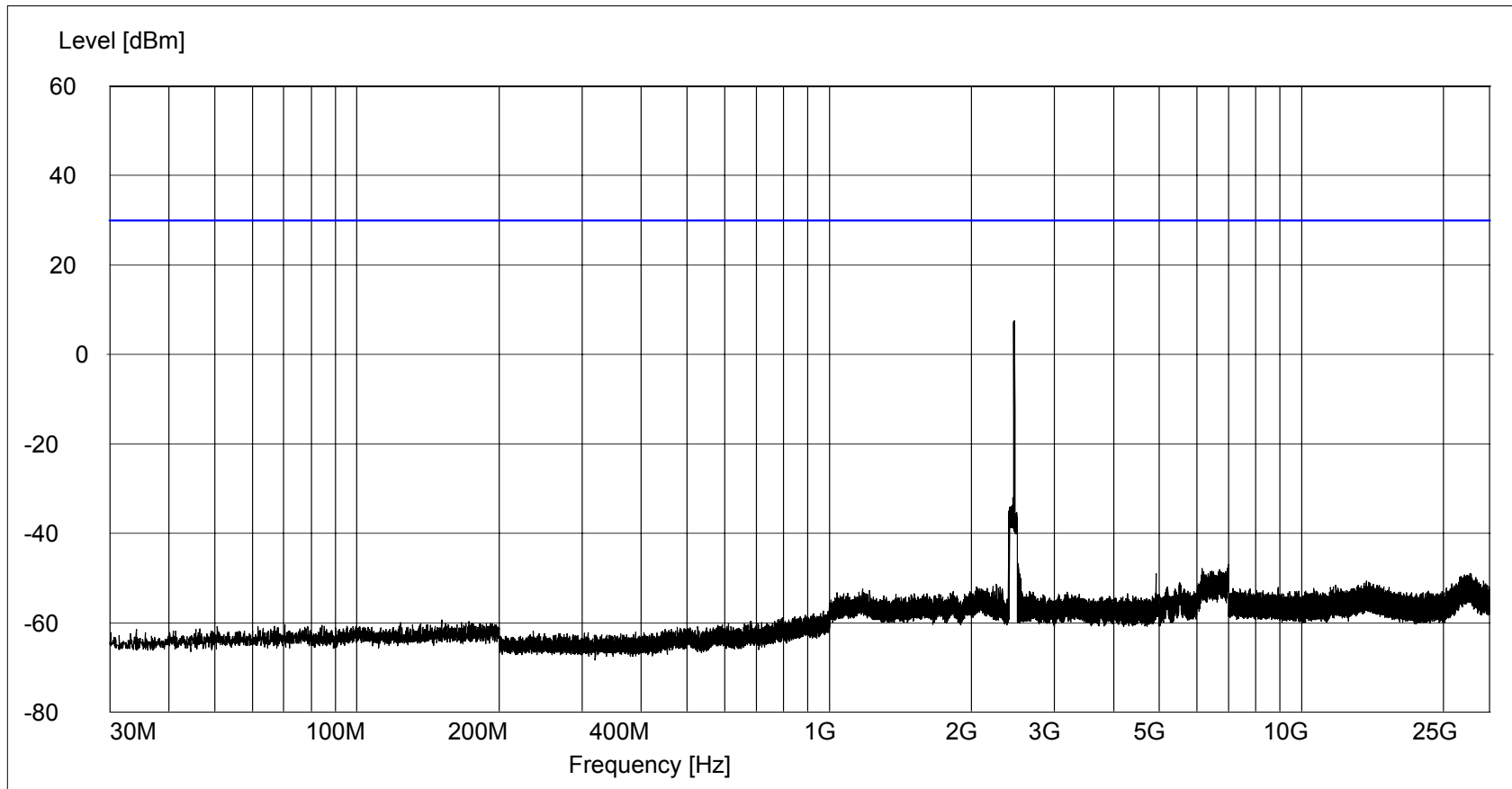
FCC Part 15, Subpart C, Antenna Conducted Emissions, 30 MHz to 25 GHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.247(c).
Mode of Operation: Continuous data transmit on channel 6.
Technician / Date: R. Soodoo / June 12, 2009.
Detector: Peak
Note: All spurious emissions are at least 20dB down from the fundamental peak output power.



FCC Part 15, Subpart C, Antenna Conducted Emissions, 30 MHz to 25 GHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UIILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.247(c).
Mode of Operation: Continuous data transmit on channel 11.
Technician / Date: R. Soodoo / June 12, 2009.
Detector: Peak
Note: All spurious emissions are at least 20dB down from the fundamental peak output power.



**FCC Part 15, Subpart C, Section 15.207(a), Conducted Emissions, Power Leads,
150 kHz to 30 MHz
Test Data**

**Test Photograph(s)
Conducted Emissions, Power Leads**



Test Setup



Rear View Cable Layout Test Setup

**Test Photograph(s)
Conducted Emissions, Power Leads**



Rear View Cable Layout Test Setup

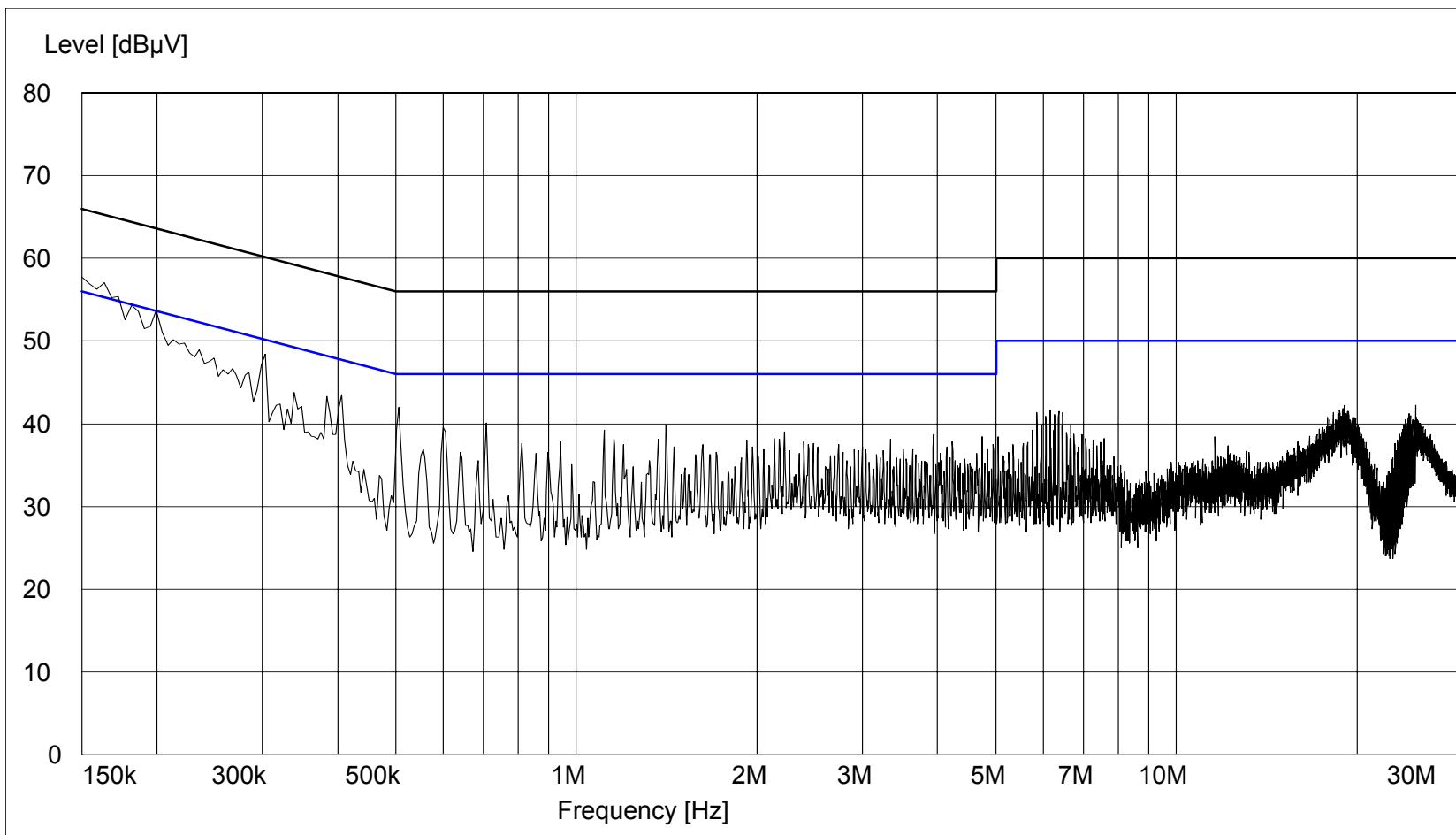


AC Mains Measurements Location Test Setup

**FCC Part 15, Subpart C, Section 15.207(a), Conducted Emissions, Power Leads,
150 kHz to 30 MHz
Test Data
Transmit mode**

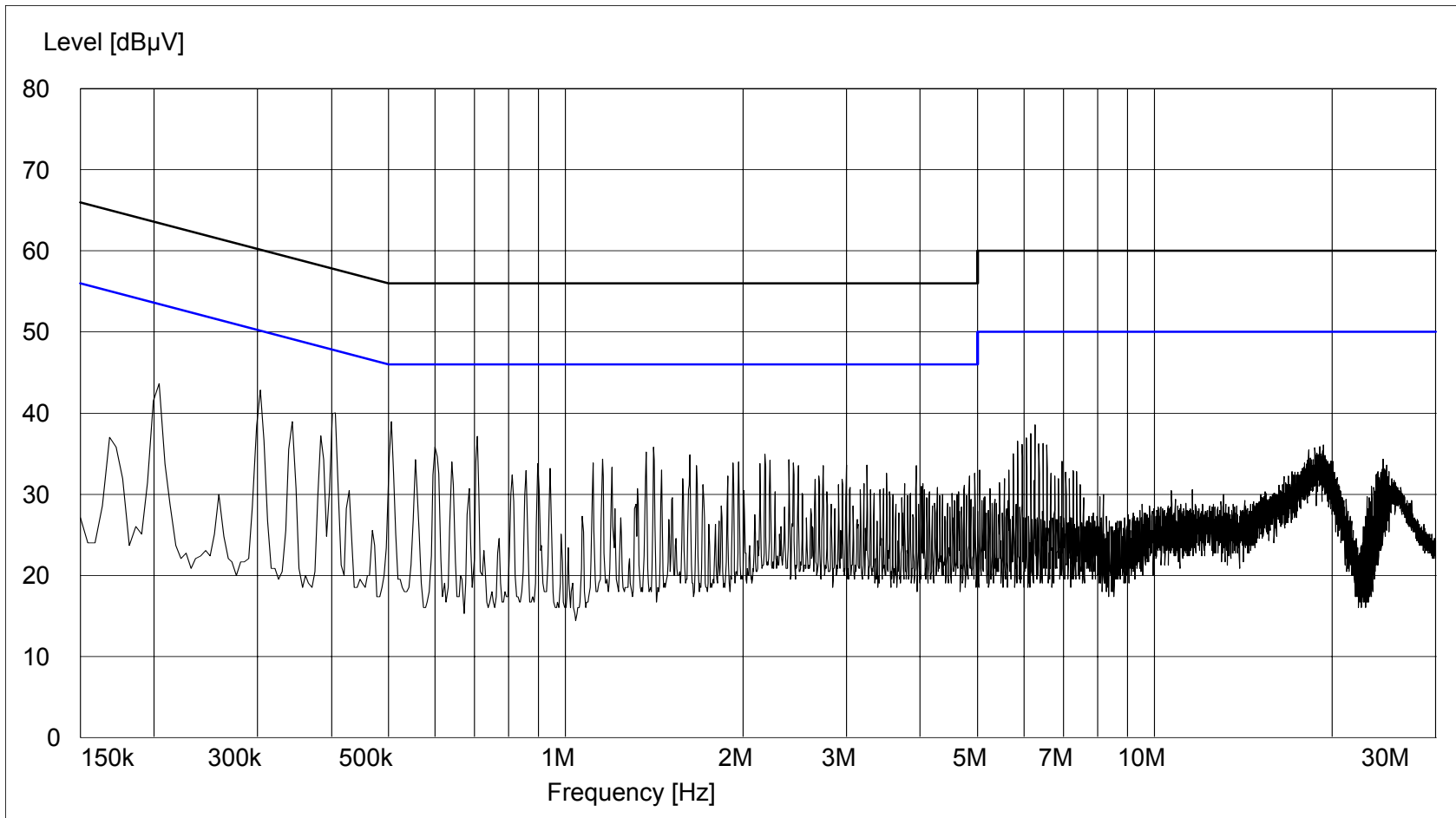
FCC Part 15, Subpart C, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.207(a). Class B
Mode of Operation: Continuous data transmit.
Lead Tested: 115 VAC, 60 Hz hot input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Peak / Peak emissions passed Quasi-peak limit.



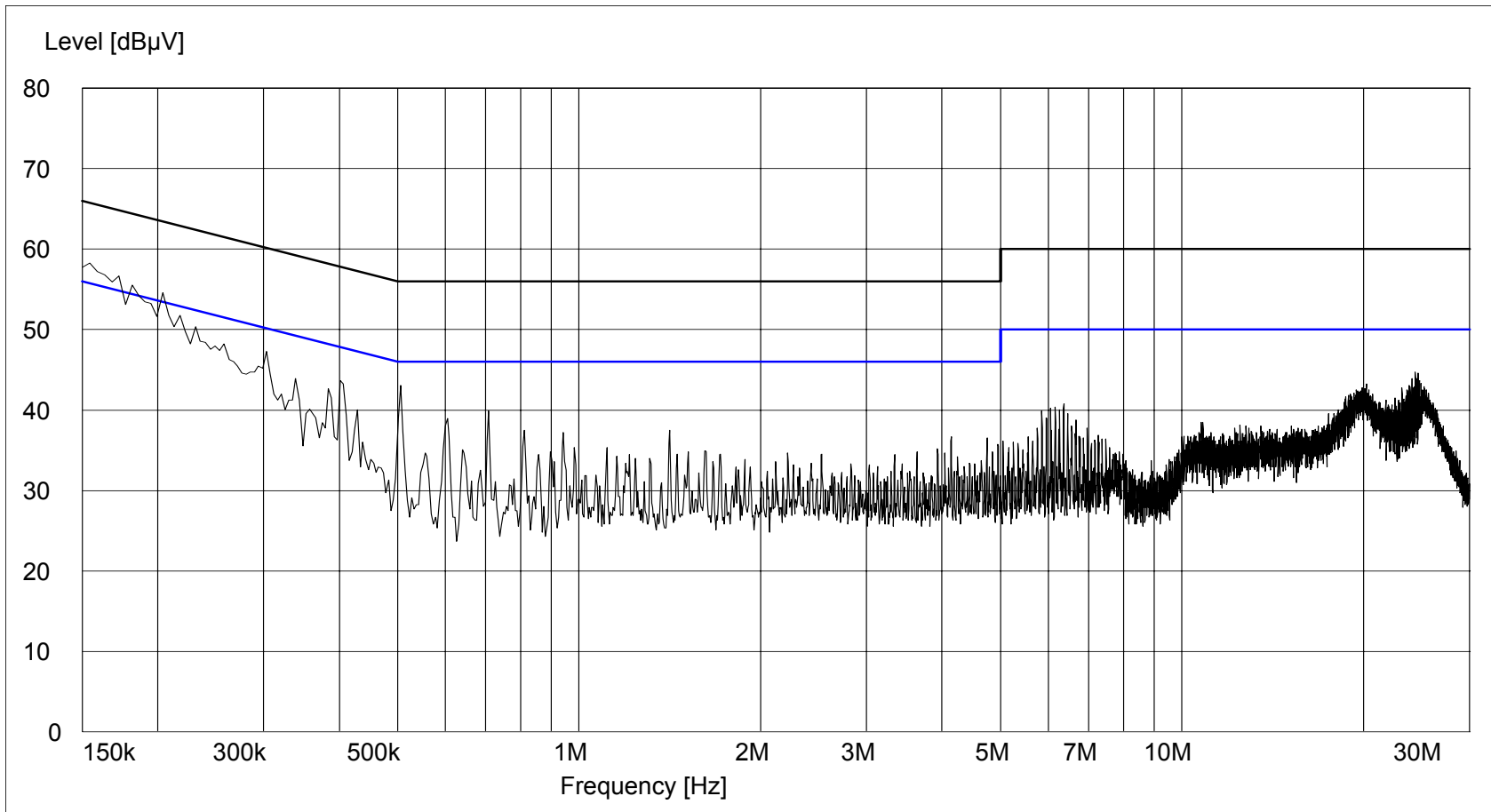
FCC Part 15, Subpart C, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UIILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.207(a). Class B
Mode of Operation: Continuous data transmit.
Lead Tested: 115 VAC, 60 Hz hot input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Average / Average emissions passed average limit.



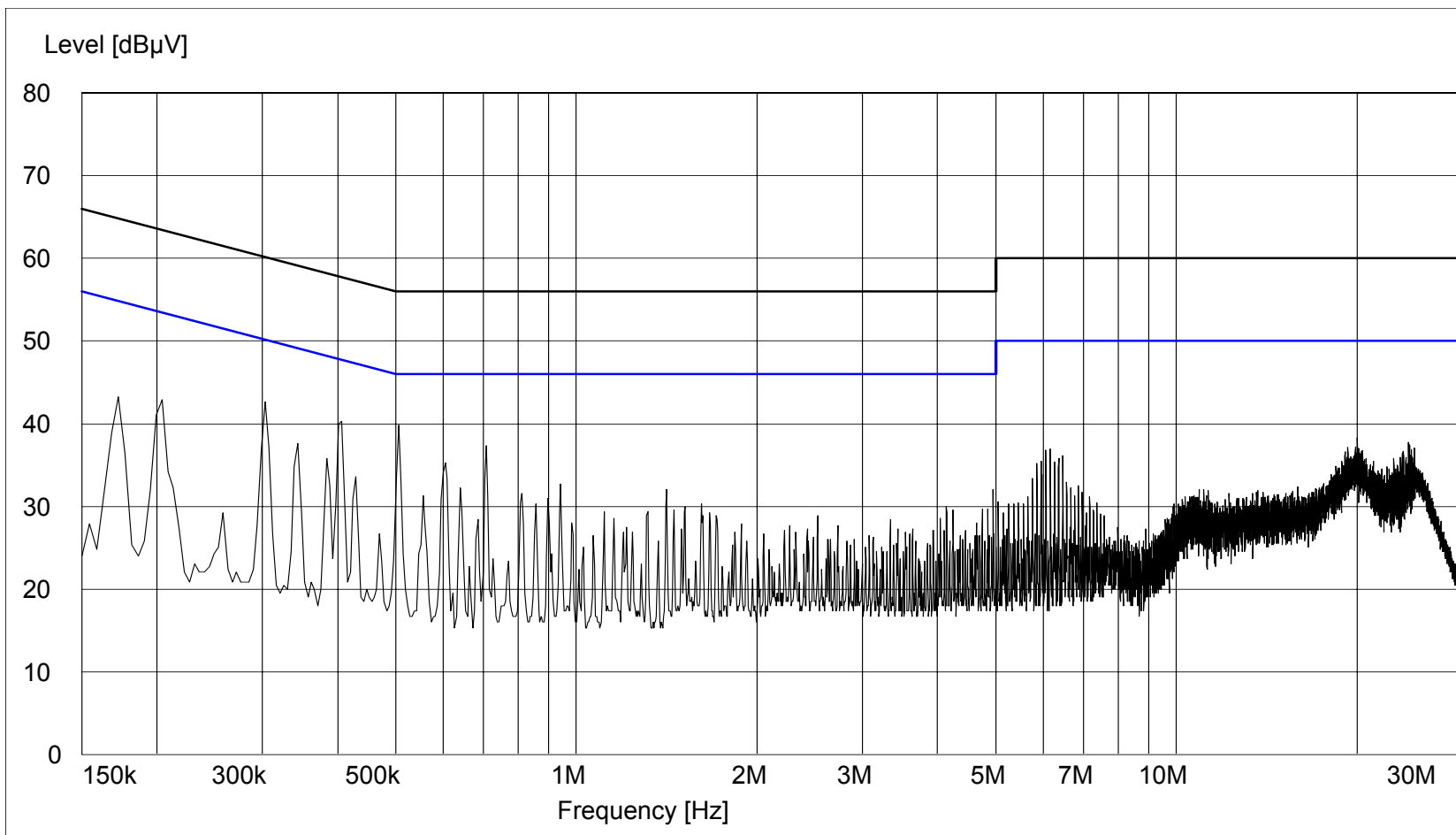
FCC Part 15, Subpart C, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UIILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.207(a). Class B
Mode of Operation: Continuous data transmit.
Lead Tested: 115 VAC, 60 Hz neutral input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Peak / Peak emissions passed Quasi-peak limit.



FCC Part 15, Subpart C, Conducted Emissions, 150 KHz to 30 MHz.

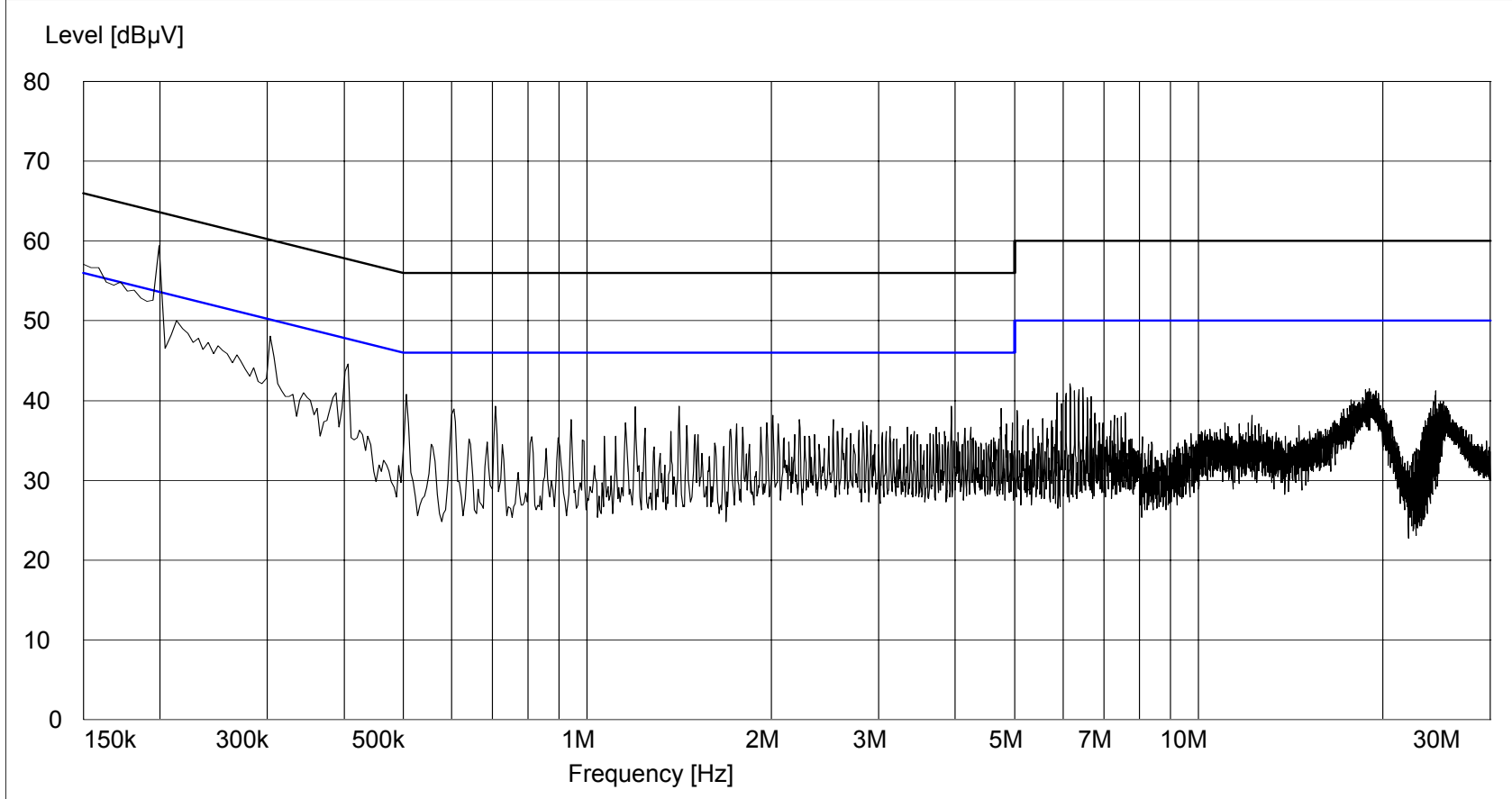
Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart C, Section 15.207(a). Class B
Mode of Operation: Continuous data transmit.
Lead Tested: 115 VAC, 60 Hz hot input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Average / Average emissions passed average limit.



**FCC Part 15, Subpart C, Section 15.207(a), Conducted Emissions, Power Leads,
150 kHz to 30 MHz
Test Data
Idle mode**

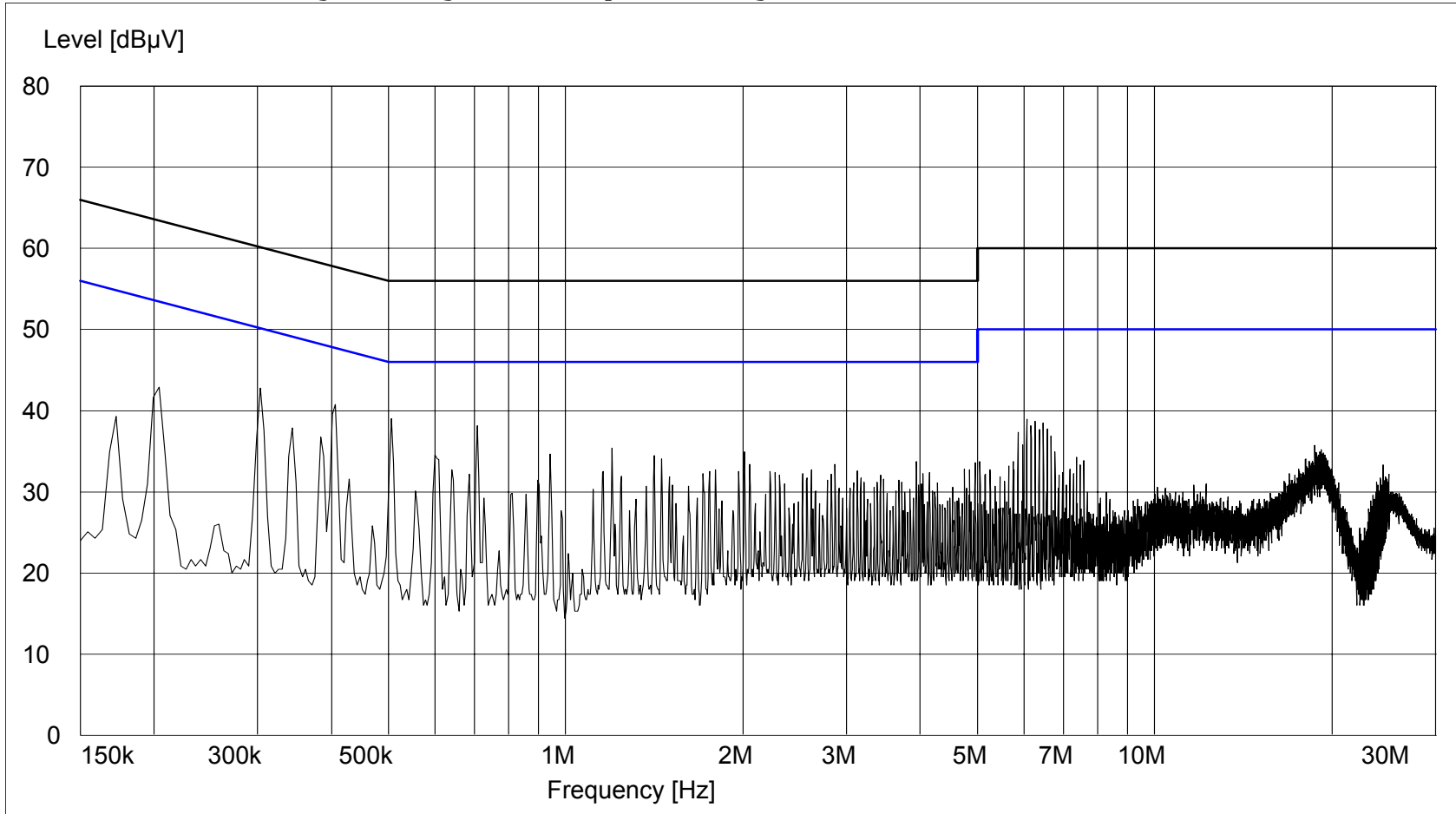
FCC Part 15, Subpart B, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart B, Section 15.107(a). Class B
Mode of Operation: Idle mode.
Lead Tested: 115 VAC, 60 Hz hot input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Peak / Peak emissions passed Quasi-peak limit.



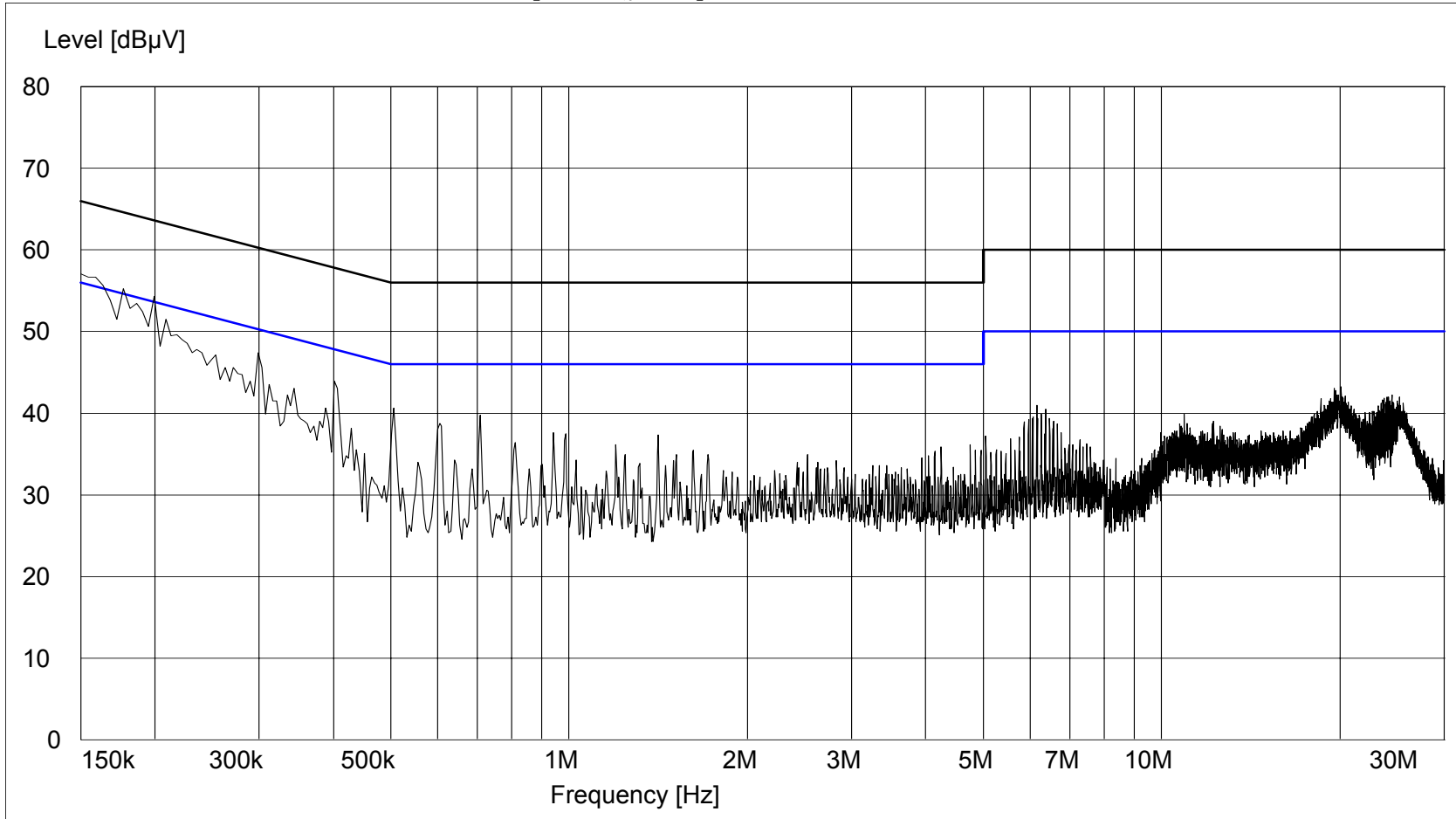
FCC Part 15, Subpart B, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart B, Section 15.107(a). Class B
Mode of Operation: Idle mode.
Lead Tested: 115 VAC, 60 Hz hot input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Average / Average emissions passed average limit.



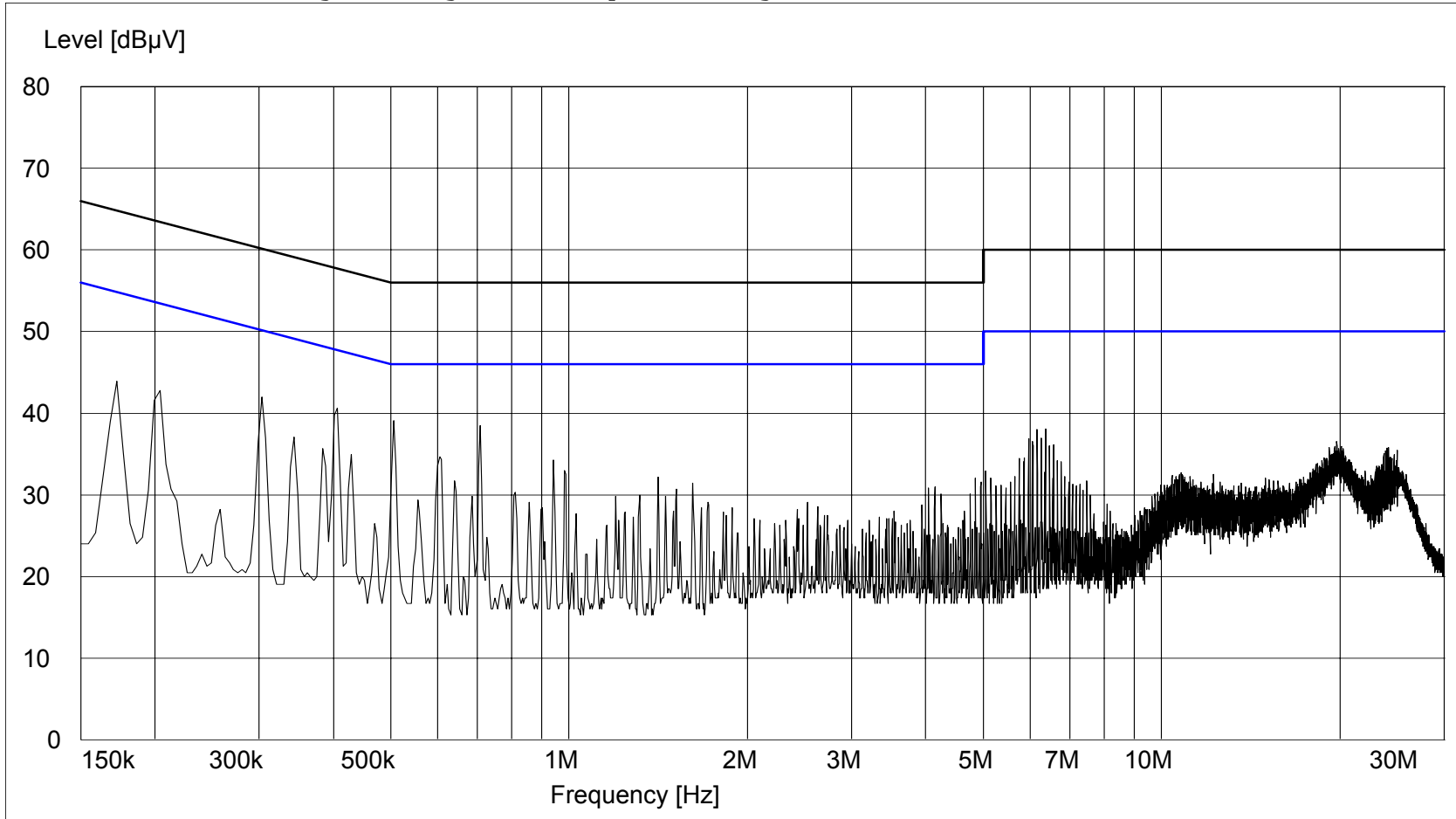
FCC Part 15, Subpart B, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart B, Section 15.107(a). Class B
Mode of Operation: Idle mode.
Lead Tested: 115 VAC, 60 Hz neutral input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Peak / Peak emissions passed Quasi-peak limit.



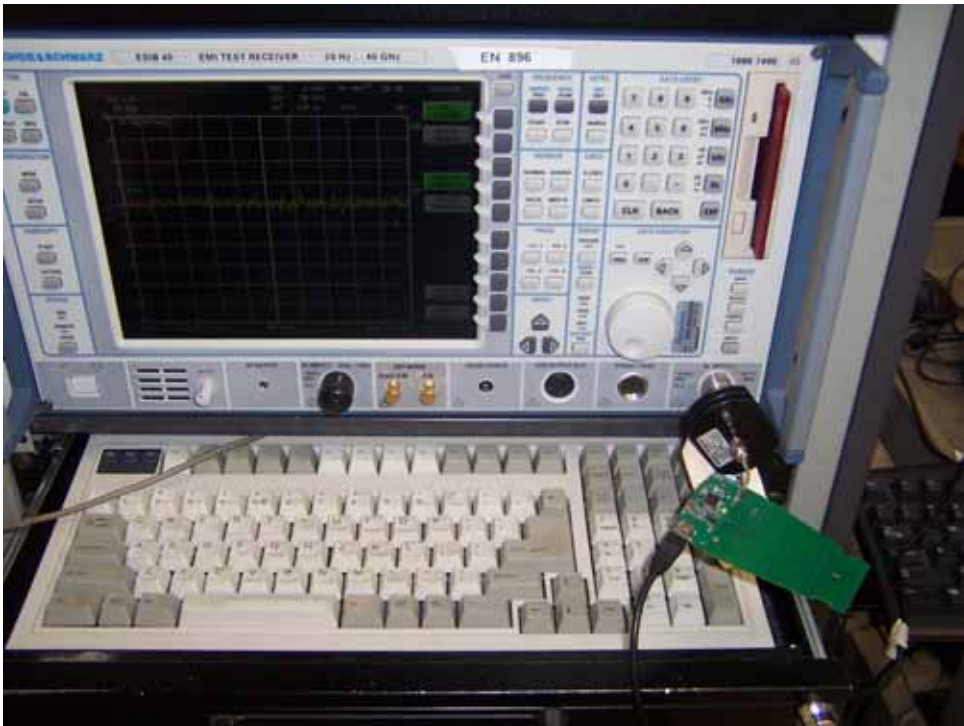
FCC Part 15, Subpart B, Conducted Emissions, 150 KHz to 30 MHz.

Customer: hField Technologies
Test Sample: WiFi USB Network Adapter
Model Number: HFWFG200
FCC ID Number: UILHFWFG200
Test Specification: FCC Part 15, Subpart B, Section 15.107(a). Class B
Mode of Operation: Idle mode.
Lead Tested: 115 VAC, 60 Hz neutral input to PC.
Technician / Date: R. Soodoo / June 11, 2009.
Detector / Note: Average / Average emissions passed average limit.



**Test Photograph(s)
Peak Power Spectral Density
FCC Part 15, Subpart C, Section 15.247(e)**

**Test Photograph(s)
Peak Power Spectral Density**

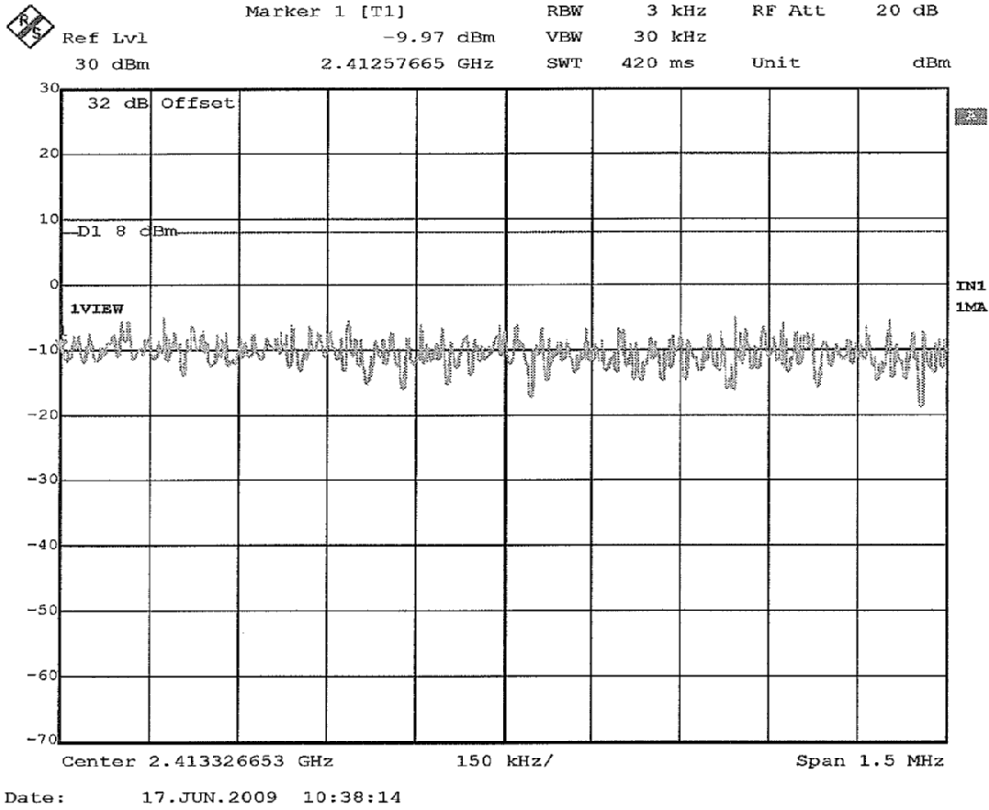


Test Setup



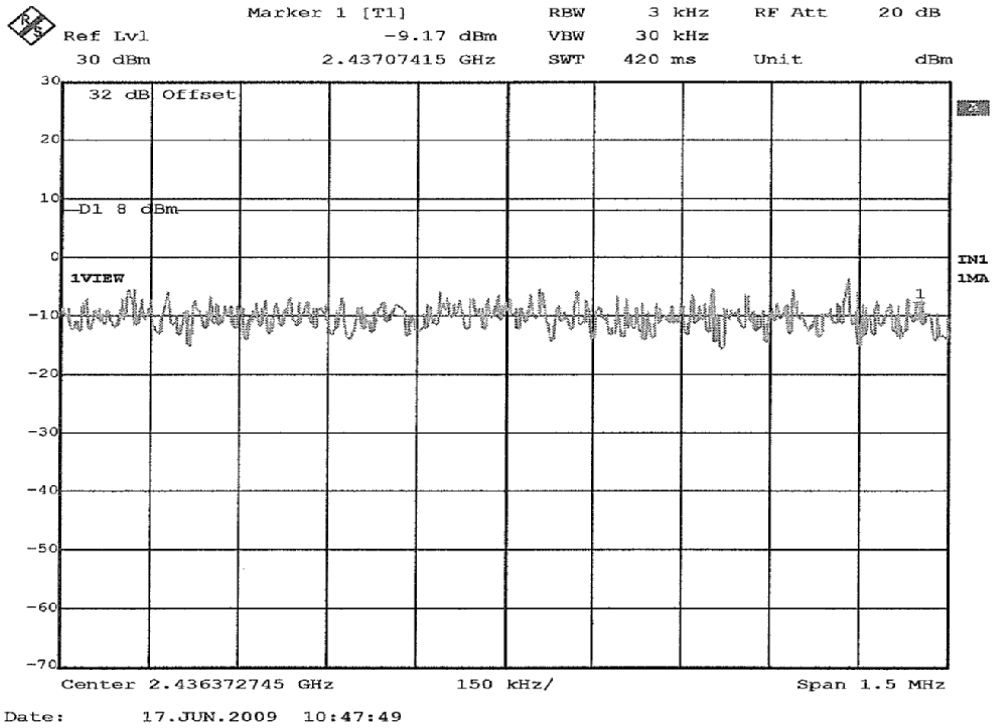
Test Setup

**FCC Part 15, Subpart C, 15.247 (d) Peak Power Spectral Density
2.4 – 2.4835 GHz Range
Test Data**



FCC Part 15, Subpart C, 15.247(d) Peak Power Spectral Density, 2.4-2.4835 GHz Band
Power Spectral Density Limit: The power spectral density conducted from the EUT antenna shall not be greater than 8 dBm in any 3 kHz bandwidth.
Note: EUT transmitting on channel 1
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 1 of 3



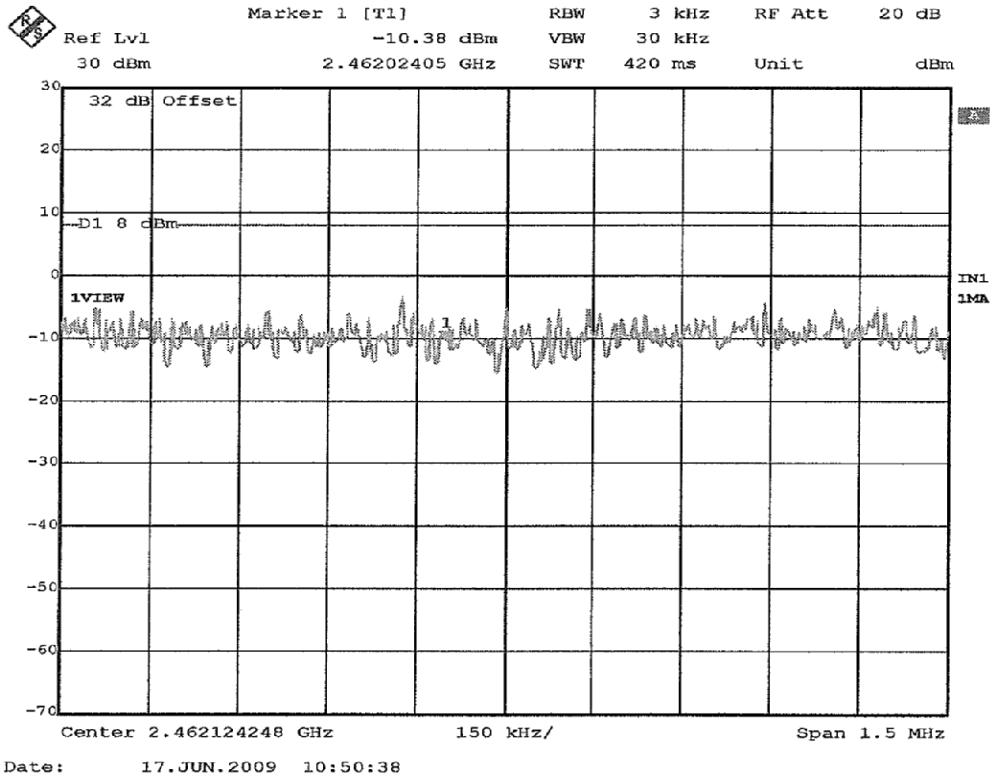
FCC Part 15, Subpart C, 15.247(d) Peak Power Spectral Density, 2.4-2.4835 GHz Band

Power Spectral Density Limit: The power spectral density conducted from the EUT antenna shall not be greater than 8 dBm in any 3 kHz bandwidth.

Note: EUT transmitting on channel 6

FCC ID: UILHFWFG200

Customer	hField Technologies		
Test Sample	WiFi USB Network Adapter		
Product Number	HFWFG200		
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 2 of 3	



FCC Part 15, Subpart C, 15.247(d) Peak Power Spectral Density, 2.4-2.4835 GHz Band

Power Spectral Density Limit: The power spectral density conducted from the EUT antenna shall not be greater than 8 dBm in any 3 kHz bandwidth.

Note: EUT transmitting on channel 11

FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: June 17, 2009	Tech: R.Soodoo.	Sheet 3 of 3

**Spurious Radiated Emissions, 30 MHz to 25 GHz
FCC Part 15, Subpart B, Section 15.209(a)
Test Data**

Test Photograph(s)
FCC Part 15, Subpart C, Section 15.247(d) and 15.205
Spurious Radiated Emissions, 30 MHz to 25 GHz

Test Photograph(s)
Spurious Case Radiated Emissions, 30 MHz to 25 GHz



Front View Test Setup



Rear View Test Setup

Test Photograph(s)
Spurious Case Radiated Emissions, 30 MHz to 25 GHz



Vertical Polarity Biconilog Antenna Test Setup



Horizontal Polarity Biconilog Antenna Test Setup

Test Photograph(s)
Spurious Case Radiated Emissions, 30 MHz to 25 GHz



Vertical Polarity DRG Antenna Test Setup



Horizontal Polarity DRG Antenna Test Setup

**Spurious Case Radiated Emissions, 30 MHz to 25 GHz
FCC Part 15, Subpart C, Section 15.247(d) and 15.205
Test Data**

**FCC Part 15 Subpart C, Spurious Case Radiated Emissions,
Paragraph 15.247(d)
Test Data
EUT transmitting on channel 1**

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)						
Customer:	hField Technologies				Job No.:	R-12953-1	
Test Sample:	WiFi USB Network Adapter						
Model No.:	HFWFG200				FCC ID:	UILHFWFG200	
Operating Mode:	Continuous Data Transmit						
Technician:	R.Soodoo				Date:	May 27-28, 2009	
Notes:	Test Distance: 3 Meters		Temp: 14.0°C		Relative Humidity: 32.0%		
	Detector: Quasi-Peak						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
37.5	V / 1.0	200.0	42.5	-4.0	38.5	84.1	
50.7	V / 1.0	200.0	51.0	-12.0	39.0	89.1	
67.2	V / 1.0	200.0	51.2	-12.2	39.0	89.1	
80.3	V / 1.0	193.0	40.0	-11.6	28.4	26.3	
88.00							100
88.00							150
120.0	V / 1.0	107.0	40.0	-11.0	29.0	28.2	
133.4	V / 1.0	103.0	44.0	-11.0	33.0	44.7	
157.0	H / 1.0	200.0	34.8	-9.2	25.6	19.1	
216.0							150
216.0							200
216.5	V / 1.0	200.0	31.2	-7.0	24.2	16.2	
233.0	H / 1.0	144.0	37.3	-6.2	31.1	35.9	
252.4	H / 1.0	38.0	39.6	-5.8	33.8	49.0	
276.5	H / 1.0	200.0	37.3	-5.1	32.2	40.7	
300.2	V / 1.0	193.0	28.7	-4.1	24.6	17.0	
333.0	H / 1.0	192.0	36.6	-2.6	34.0	50.1	
366.0	V / 1.0	200.0	30.8	-1.7	29.1	28.5	
400.0	H / 1.0	19.0	34.9	-0.9	34.0	50.1	
405.0	V / 1.0	121.0	27.2	-0.9	26.3	20.7	
433.7	H / 1.0	131.0	32.2	-0.6	31.6	38.0	
466.0	H / 1.0	193.0	32.3	0.3	32.6	42.7	
500.0	H / 1.0	200.0	30.7	1.1	31.8	38.9	
566.0	V / 1.2	150.0	33.1	2.6	35.7	61.0	
665.5	V / 1.0	62.0	33.0	5.1	38.1	80.4	
800.0	V / 1.0	200.0	31.2	7.2	38.4	83.2	
960.0							200
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)						
Customer:	hField Technologies			Job No.:	R-12953-1		
Test Sample:	WiFi USB Network Adapter						
Model No.:	HFWFG200			FCC ID:	UILHFWFG200		
Operating Mode:	Continuous Data Transmit						
Technician:	R.Soodoo			Date:	May 27-28, 2009		
Notes:	Test Distance: 3 Meters		Temp: 14.0°C		Relative Humidity: 32.0%		
	Detector: Average						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
960.0							500
1063.0	V / 1.0	163.0	42.6	7.4	50.0	316.2	
1065.0	H / 1.0	133.0	28.4	7.4	35.8	61.7	
1195.0	V / 1.2	157.0	30.0	6.0	36.0	63.1	
1198.0	H / 1.0	43.0	31.7	6.0	37.7	76.7	
1330.0	V / 1.1	165.0	31.4	5.0	36.4	66.1	
1331.0	H / 1.0	65.0	28.9	5.0	33.9	49.5	
1467.0	V / 1.0	193.0	29.4	3.5	32.9	44.2	
1463.0	H / 1.8	125.0	31.2	3.5	34.7	54.3	
2338.3	V / 2.3	186.0	33.1	4.3	37.4	74.1	
2338.5	H / 1.4	146.0	35.5	4.3	39.8	97.7	
25000.0							500
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							

**FCC Part 15 Subpart C, Spurious Case Radiated Emissions,
Paragraph 15.247(d)
Test Data
EUT transmitting on channel 6**

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)						
Customer:	hField Technologies				Job No.:	R-12953-1	
Test Sample:	WiFi USB Network Adapter						
Model No.:	HFWFG200				FCC ID:	UILHFWFG200	
Operating Mode:	Continuous Data Transmit						
Technician:	R.Soodoo				Date:	May 27-28, 2009	
Notes:	Test Distance: 3 Meters		Temp: 14.0°C		Relative Humidity: 32.0%		
	Detector: Quasi-Peak						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
37.5	V / 1.0	200.0	42.5	-4.0	38.5	84.1	
50.7	V / 1.0	200.0	51.0	-12.0	39.0	89.1	
67.2	V / 1.0	200.0	51.2	-12.2	39.0	89.1	
80.3	V / 1.0	193.0	40.0	-11.6	28.4	26.3	
88.00							100
88.00							150
120.0	V / 1.0	107.0	40.0	-11.0	29.0	28.2	
133.4	V / 1.0	103.0	44.0	-11.0	33.0	44.7	
157.0	H / 1.0	200.0	34.8	-9.2	25.6	19.1	
216.0							150
216.0							200
216.5	V / 1.0	200.0	31.2	-7.0	24.2	16.2	
233.0	H / 1.0	144.0	37.3	-6.2	31.1	35.9	
252.4	H / 1.0	38.0	39.6	-5.8	33.8	49.0	
276.5	H / 1.0	200.0	37.3	-5.1	32.2	40.7	
300.2	V / 1.0	193.0	28.7	-4.1	24.6	17.0	
333.0	H / 1.0	192.0	36.6	-2.6	34.0	50.1	
366.0	V / 1.0	200.0	30.8	-1.7	29.1	28.5	
400.0	H / 1.0	19.0	34.9	-0.9	34.0	50.1	
405.0	V / 1.0	121.0	27.2	-0.9	26.3	20.7	
433.7	H / 1.0	131.0	32.2	-0.6	31.6	38.0	
466.0	H / 1.0	193.0	32.3	0.3	32.6	42.7	
500.0	H / 1.0	200.0	30.7	1.1	31.8	38.9	
566.0	V / 1.2	150.0	33.1	2.6	35.7	61.0	
665.5	V / 1.0	62.0	33.0	5.1	38.1	80.4	
800.0	V / 1.0	200.0	31.2	7.2	38.4	83.2	
960.0							200
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							

Test Method:		FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)					
Customer:		hField Technologies			Job No.:		R-12953-1
Test Sample:		WiFi USB Network Adapter					
Model No.:		HFWFG200			FCC ID:		UILHFWFG200
Operating Mode:		Continuous Data Transmit					
Technician:		R.Soodoo			Date:		May 27-28, 2009
Notes:		Test Distance: 3 Meters		Temp: 14.0°C		Relative Humidity: 32.0%	
		Detector: Average					
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
960.0							500
1063.0	V / 1.0	163.0	42.6	7.4	50.0	316.2	
1065.0	H / 1.0	133.0	28.4	7.4	35.8	61.7	
1195.0	V / 1.2	157.0	30.0	6.0	36.0	63.1	
1198.0	H / 1.0	43.0	31.7	6.0	37.7	76.7	
1330.0	V / 1.1	165.0	31.4	5.0	36.4	66.1	
1331.0	H / 1.0	65.0	28.9	5.0	33.9	49.5	
1467.0	V / 1.0	193.0	29.4	3.5	32.9	44.2	
1463.0	H / 1.8	125.0	31.2	3.5	34.7	54.3	
2338.3	V / 2.3	186.0	33.1	4.3	37.4	74.1	
2338.5	H / 1.4	146.0	35.5	4.3	39.8	97.7	
25000.0							500
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							
Emissions not recorded were more than 20dB under the specified limit.							

**FCC Part 15 Subpart C, Spurious Case Radiated Emissions,
Paragraph 15.247(d)
Test Data
EUT transmitting on channel 11**

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)						
Customer:	hField Technologies				Job No.:	R-12953-1	
Test Sample:	WiFi USB Network Adapter						
Model No.:	HFWFG200				FCC ID:	UILHFWFG200	
Operating Mode:	Continuous Data Transmit						
Technician:	R.Soodoo				Date:	May 27-28, 2009	
Notes:	Test Distance: 3 Meters		Temp: 14.0°C		Relative Humidity: 32.0%		
	Detector: Quasi-Peak						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
37.5	V / 1.0	200.0	42.5	-4.0	38.5	84.1	
50.7	V / 1.0	200.0	51.0	-12.0	39.0	89.1	
67.2	V / 1.0	200.0	51.2	-12.2	39.0	89.1	
80.3	V / 1.0	193.0	40.0	-11.6	28.4	26.3	
88.00							100
88.00							150
120.0	V / 1.0	107.0	40.0	-11.0	29.0	28.2	
133.4	V / 1.0	103.0	44.0	-11.0	33.0	44.7	
157.0	H / 1.0	200.0	34.8	-9.2	25.6	19.1	
216.0							150
216.0							200
216.5	V / 1.0	200.0	31.2	-7.0	24.2	16.2	
233.0	H / 1.0	144.0	37.3	-6.2	31.1	35.9	
252.4	H / 1.0	38.0	39.6	-5.8	33.8	49.0	
276.5	H / 1.0	200.0	37.3	-5.1	32.2	40.7	
300.2	V / 1.0	193.0	28.7	-4.1	24.6	17.0	
333.0	H / 1.0	192.0	36.6	-2.6	34.0	50.1	
366.0	V / 1.0	200.0	30.8	-1.7	29.1	28.5	
400.0	H / 1.0	19.0	34.9	-0.9	34.0	50.1	
405.0	V / 1.0	121.0	27.2	-0.9	26.3	20.7	
433.7	H / 1.0	131.0	32.2	-0.6	31.6	38.0	
466.0	H / 1.0	193.0	32.3	0.3	32.6	42.7	
500.0	H / 1.0	200.0	30.7	1.1	31.8	38.9	
566.0	V / 1.2	150.0	33.1	2.6	35.7	61.0	
665.5	V / 1.0	62.0	33.0	5.1	38.1	80.4	
800.0	V / 1.0	200.0	31.2	7.2	38.4	83.2	
960.0							200
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.247(d)						
Customer:	hField Technologies	Job No.:		R-12953-1			
Test Sample:	WiFi USB Network Adapter						
Model No.:	HFWFG200	FCC ID:		UILHFWFG200			
Operating Mode:	Continuous Data Transmit						
Technician:	R.Soodoo	Date:		May 27-28, 2009			
Notes:	Test Distance: 3 Meters	Temp: 14.0°C		Relative Humidity: 32.0%			
	Detector: Average						
Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
960.0							500
1195.0	V / 1.2	157.0	30.0	6.0	36.0	63.1	
1198.0	H / 1.0	43.0	31.7	6.0	37.7	76.7	
1330.0	V / 1.1	165.0	31.4	5.0	36.4	66.1	
1331.0	H / 1.0	65.0	28.9	5.0	33.9	49.5	
1467.0	V / 1.0	193.0	29.4	3.5	32.9	44.2	
1463.0	H / 1.8	125.0	31.2	3.5	34.7	54.3	
2338.3	V / 2.3	186.0	33.1	4.3	37.4	74.1	
2338.5	H / 1.4	146.0	35.5	4.3	39.8	97.7	
2483.5	V / 2.0	194.0	26.3	4.8	31.1	35.9	
2483.5	H / 2.6	93.0	33.2	4.8	38.0	79.4	
25000.0							500
The frequency range was scanned from 30 MHz to 25.0 GHz. The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 20dB under the specified limit.							

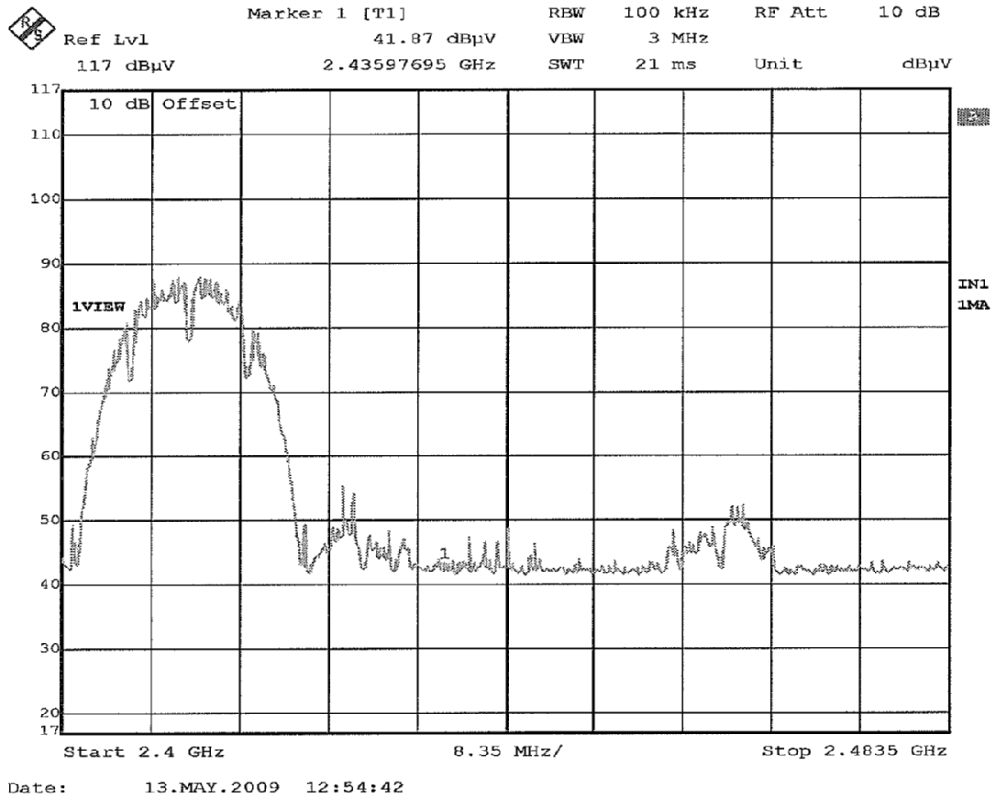
Test Photographs
FCC Part 15, Subpart C, Section 15.247(d) Band Edge Measurement,
2.4 GHz – 2.4835 GHz

Test Photographs
Band Edge Measurement



Test Setup

**FCC Part 15, Subpart C, 15.247(d) Band Edge Measurements
2.4 GHz – 2.4835 GHz Range
Test Data**



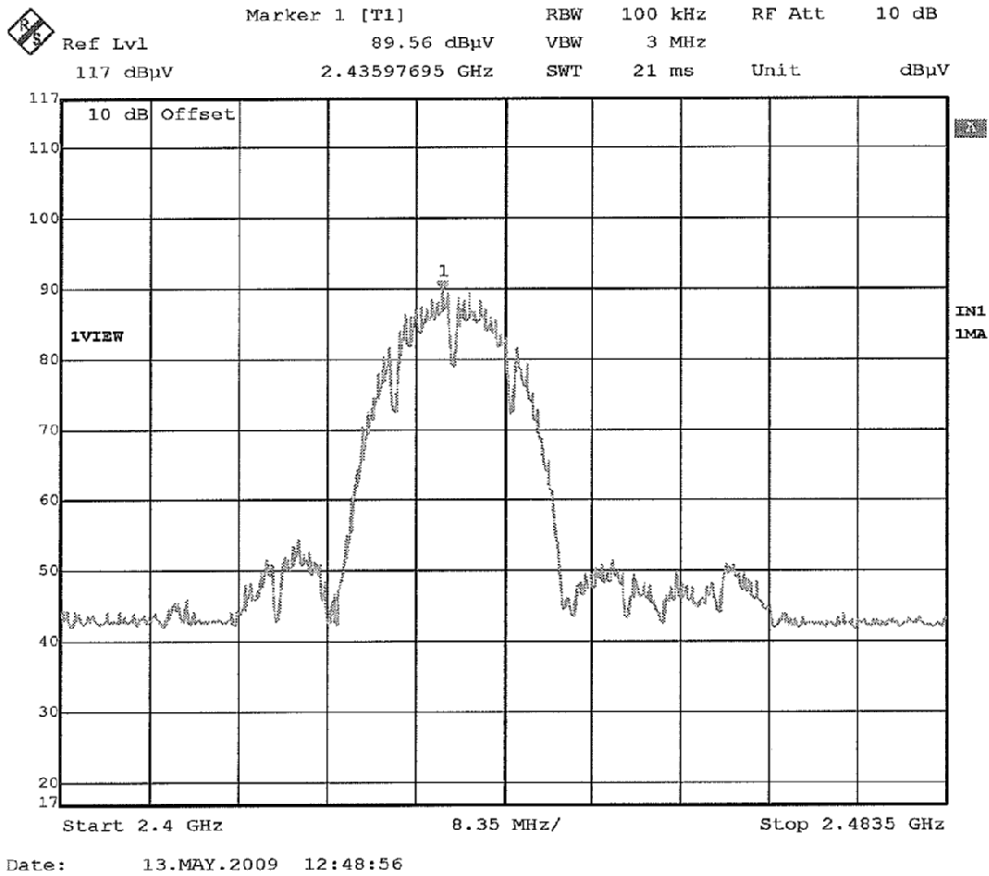
FCC Part 15, Subpart C, 15.247(d) Band Edge Measurements, 2.4-2.4835 GHz Band

Note: The EUT complies with the Band Edge Measurements.

Note: EUT transmitting on channel 1 at 11 Mbps

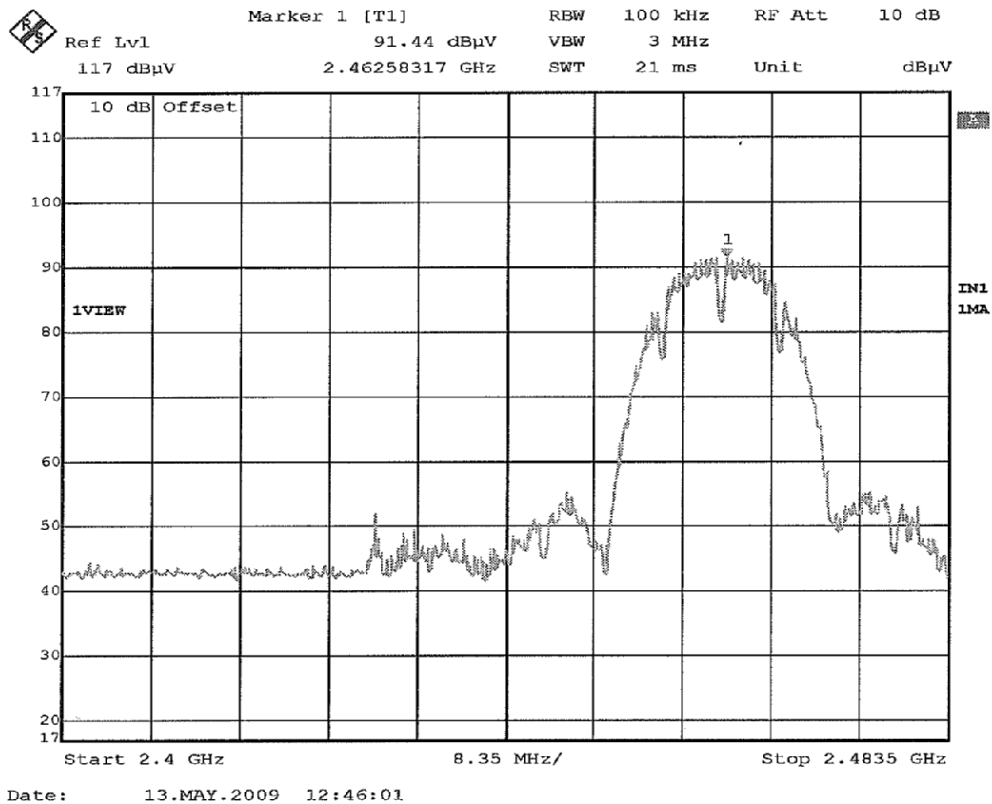
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: May 13, 2009	Tech: R.Soodoo.	Sheet 1 of 3



FCC Part 15, Subpart C, 15.247(d) Band Edge Measurements, 2.4-2.4835 GHz Band
Note: The EUT complies with the Band Edge Measurements.
Note: EUT transmitting on channel 6 at 11 Mbps
FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: May 13, 2009	Tech: R.Soodoo.	Sheet 2 of 3



FCC Part 15, Subpart C, 15.247(d) Band Edge Measurements, 2.4-2.4835 GHz Band

Note: The EUT complies with the Band Edge Measurements.

Note: EUT transmitting on channel 11 at 11 Mbps

FCC ID: UILHFWFG200

Customer	hField Technologies	
Test Sample	WiFi USB Network Adapter	
Product Number	HFWFG200	
Date: May 13, 2009	Tech: R.Soodoo.	Sheet 3 of 3

**RF Exposure
Test Data**

Operating Frequency: 2400 to 2483.5 MHz

The expected RF exposure at 20 cm is calculated as follows:

$$S = \frac{P G}{4 \pi D^2}$$

Where:

S = Power density in mW/cm²

P = Power to antenna in mW

G = Numeric gain of antenna

D = separation distance in cm (20 cm)

Power to Antenna:

P_{measured (dBm)} = 21.83 dBm

Converting to mw:

P_{measured (mW)} = 10^{(P_{measured(dBm)"/10)}}

P_{measured (mW)} = 10^(21.83/10) = 10^(2.183) = 152.4 mW

Antenna Gain:

G = 7.6 dBi

Converting to numeric gain:

G_{numeric} = 10^{(G (dBi)/10)}

G_{numeric} = 10^(7.6/10) = 10^(0.76) = 5.75

$$S = \frac{152.4 * 5.75}{4 \pi 20^2}$$

$$S = \frac{876.3}{5026.554}$$

$$S = 0.17 \text{ mW/cm}^2$$

The expected RF exposure complies with Table B (limits for General Population / Uncontrolled Environments) of OET Bulletin 65, Supplement C, Appendix A where:

$$S_{\text{max}} = 1.0 \text{ mW/cm}^2$$