Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94085-3518
408-245-7800 Phone
408-245-3499 Fax

April 28, 2006

Mark Gandler
Netgear
4500 Great America Parkway
Santa Clara, CA 95054

Subject: FCC and Industry Canada Report, model WN511B

Dear Mr. Gandler:

A report has been created detailing the results of the FCC and IC electromagnetic emissions testing performed on the WN511B. This has been submitted to a TCB to obtain the appropriate equipment certifications. Please find this report enclosed.

This application has been granted by the FCC and Industry Canada. Attached you will find the grants.

If you have any questions, please don't hesitate to call us at 408-245-7800.

Sincerely,

Juan Martinez
Senior EMC Engineer

JM/dmg
Enclosure: Copy of Application Package

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April 28, 2006

Elliott TCB
684 West Maude Avenue
Sunnyvale, CA 94085

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to the following:

> Subpart C of Part 15 of FCC Rules (CFR 47)
> RSS-Gen Issue 1, September 2005, "General Requirements and Information for the Certification of Radiocommunication Equipment"
> RSS-210, Issue 6, September 2005, "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

Data within this report demonstrates that the equipment tested complies with the relevant limits for unlicensed wireless devices.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

Juan Martinez
Senior EMC Engineer

JM/dmg
Enclosures: Agent Authorization Letter
Emissions Test Report with Exhibits

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Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to Industry Canada RSS-Gen Issue 1 / RSS 210 Issue 6 FCC Part 15, Subpart C Section 15.247(DTS) on the Netgear Transmitter Model: WN511B

FCC ID:	PY306200046
GRANTEE:	Netgear 4500 Great America Parkway Santa Clara, CA 95054
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	April 28, 2006
FINAL TEST DATE:	April 25 and April 26, 2006

AUTHORIZED SIGNATORY: _____
Juan Martinez
Senior EMC Engineer

ACCREDITED
2016-01

Elliott Laboratories, Inc. is accredited by the A2LA, certificate number 2016-01, to perform the test(s) listed in this report. This report shall not be reproduced, except in its entirety, without the written approval of Elliott Laboratories, Inc.

Equipment Name and Model:

Transceiver, WN511B

Manufacturer:

Netgear
4500 Great America Parkway
Santa Clara, CA 95054

Tested to applicable standard:

Industry Canada RSS-Gen Issue 1
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart C requirements for DTS devices

Test Report Prepared For:
Mark Gandler
Netgear
4500 Great America Parkway
Santa Clara, CA 95054

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC4549-4 Dated March 10, 2009

Declaration of Compliance

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4: 2003 as referenced by FCC Part 15 and by section 1.0 of RSS-212, Issue 1, "Test Facilities and Test Methods for Radio Equipment" / RSS-Gen Issue 1); and that the equipment performed in accordance with the data submitted in this report.

Signature	Juan Martinez
Name	Juan Martinez
Title	Senior EMC Engineer Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	April 28, 2006

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SCOPE

An electromagnetic emissions test has been performed on the Netgear model WN511B pursuant to the following rules:

Industry Canada RSS-Gen Issue 1
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart C requirements for DTS devices

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003
RSS-212 Issue 1 Test Facilities and Test Methods for Radio Equipment

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Netgear model WN511B and therefore apply only to the tested sample. The sample was selected and prepared by Mark Gandler of Netgear

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section. Certification of these devices is required as a prerequisite to marketing in the US and Canada.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Netgear model WN511B complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 1
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart C requirements for DTS devices

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Part 15 Reference	RSS Reference	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses MIMO / OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	10 MHz Legacy 802.11b	>500kHz	Complies
15.247 (b) (3) Legacy 802.11b	RSS 210 A8.2 (4)	Output Power (multipoint systems)	18.8 dBm (0.076 Watts) EIRP = 0.054 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d) Legacy 802.11b	RSS 210 A8.2 (2)	Power Spectral Density	-1.2 dBm / 3kHz	8dBm/3kHz	Complies
15.247 (b) (3) Legacy 802.11g	RSS 210 A8.2 (4)	Output Power (multipoint systems)	18.5 dBm (0.07 Watts) EIRP = 0.05 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d) Legacy 802.11g	RSS 210 A8.2 (2)	Power Spectral Density	-2.4 dBm / 3kHz	8dBm/3kHz	Complies
15.247 (b) (3) MIMO 20MHz	RSS 210 A8.2 (4)	Output Power (multipoint systems)	21.4 dBm (0.137 Watts) EIRP = 0.095 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d) MIMO 20MHz	RSS 210 A8.2 (2)	Power Spectral Density	5.0 dBm / 3kHz	8dBm/3kHz	Complies
15.247 (b) (3) MIMO 40MHz	RSS 210 A8.2 (4)	Output Power (multipoint systems)	18.5 dBm (0.071 Watts) EIRP = 0.049 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d) MIMO 40MHz	RSS 210 A8.2 (2)	Power Spectral Density	-1.2 dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	< -30dBc	< -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.94 dBuV/m @ 2388.3 MHz (-0.07 dB)	15.209 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of –1.6 dBi for the highest EIRP multi-point system.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4 (4).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	RSS GEN	RF Connector	Integral antenna		Complies
15.109	RSS GEN	Receiver spurious emissions	N/A for FCC requirements	Note 1	N/A
15.207	RSS GEN	AC Conducted Emissions	49.1dBµV @ 0.161MHz (-6.3dB)	15.207	Complies (- 6.3 dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR report	Refer to OET 65, FCC Part 1 and RSS 102	Complies

Note 1: Per Canada receiver emissions is required for certification. This report or application was not submitted to Canada for certification.

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of *U*cispr and therefore no adjustment of the data for measurement uncertainty is required.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± ±6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Netgear model WN511B is a NETGEAR RangeMax NEXT Wireless Notebook Adapter that is designed to provide high speed wireless internet access. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT receives its power from the host computer. The electrical rating of the EUT is 120 - 240 Volts, 50/60 Hz, 1 Amps.

The sample was received on April 25, 2006 and tested on April 25 and April 26, 2006. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	WN511B	NETGEAR RangeMax NEXT Wireless Notebook Adapter	-	PY306200046

OTHER EUT DETAILS

List any items from the test log.

ANTENNA SYSTEM

The antenna system used with the Netgear model WN511B consists of two independent PCB traces. The gain of each antenna is –1.6dBi.

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	zv6000	Laptop	CND52904S1	DoC

No remote support equipment was used during emissions testing.

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop Power	AC Adapter	2 wire	Unshielded	2.0

EUT OPERATION

During MIMO testing the EUT was transmitting simultaneously on two RF chains at the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 20MHz or 40MHz signaling mode.
During legacy testing the EUT was transmitting on a single chain at the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 802.11b or 802.11g mode.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 25 and April 26, 2006 at the Elliott Laboratories Anechoic Chamber 4 located at 41039 Boyce Road, Fremont, California Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003 and RSS 212.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and RSS 212. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003 / RSS 212.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

Power measurements are made using either a power meter (typically with a peak power sensor) or as detailed in FCC KDB558074 using a spectrum analyzer and either the built-in channel power measurement function or software to integrate the power over the displayed spectrum.

When using the integration method the analyzer's internal function or software account for the equivalent noise bandwidth of the resolution bandwidth used when performing the integration. The bandwidths, detector (peak or sample) and trace data (max held or power averaging) are detailed in the test data. When using a power averaging function the device is either in a continuous transmit mode or the analyzer is configured to only sweep when the transmitter is active to ensure that the averaging is performed over a transmit burst and not over quiet periods.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4:2003 and RSS 212 secify that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

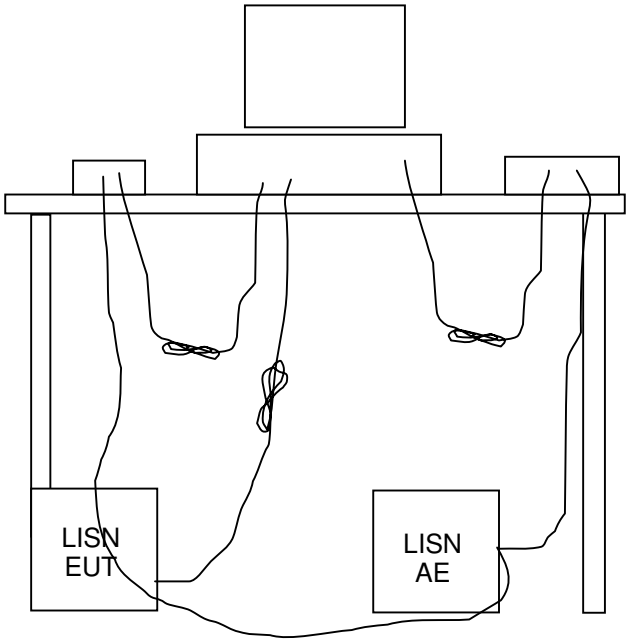
TEST PROCEDURES

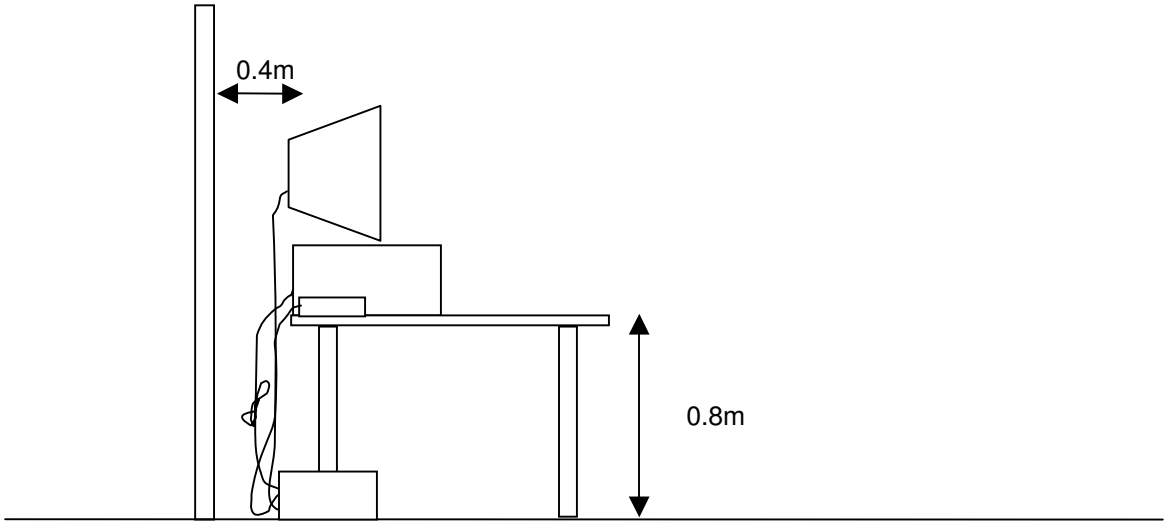
EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.


LISN
EUT
LISN
AE

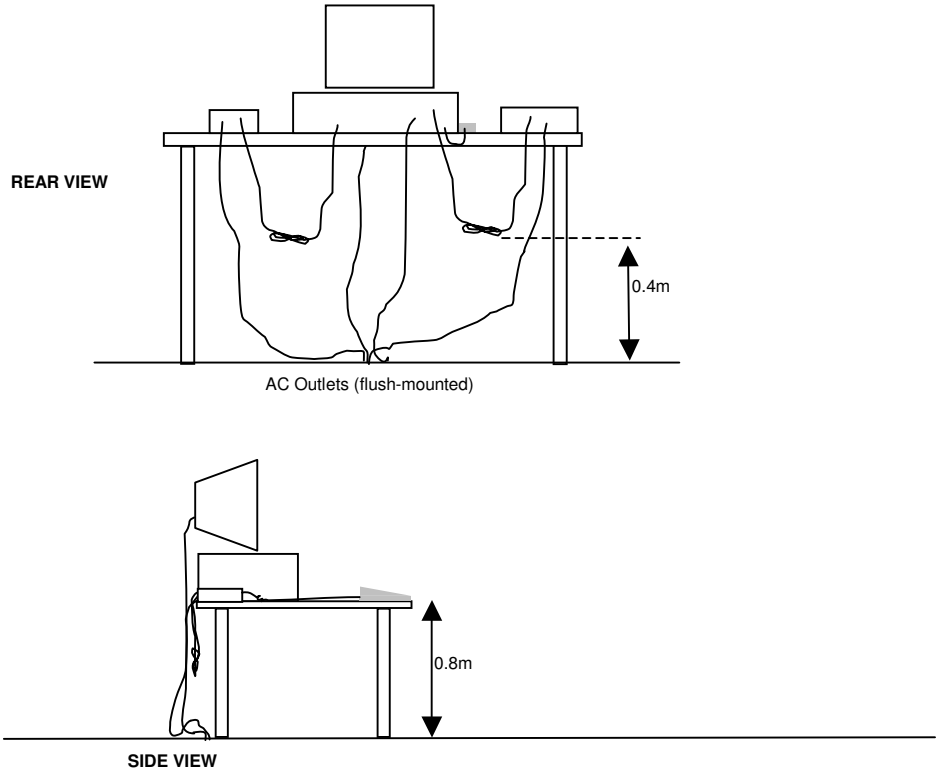

0.4m
0.8m

RADIATED EMISSIONS

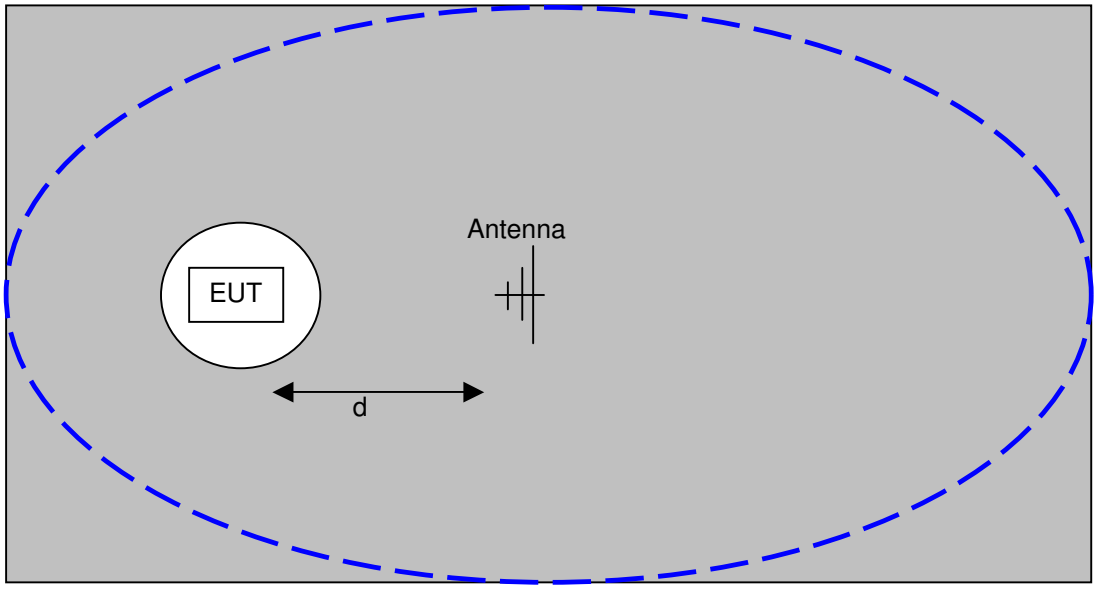
Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

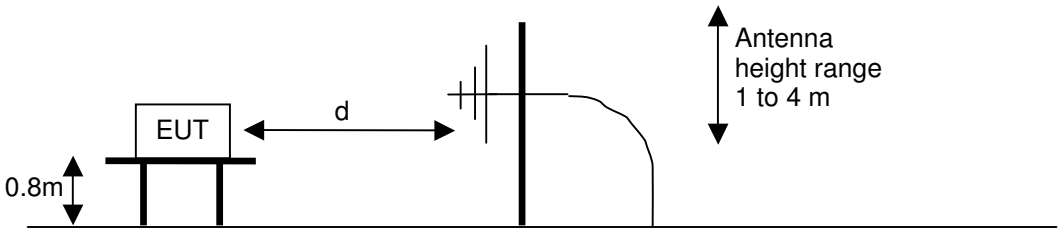
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.



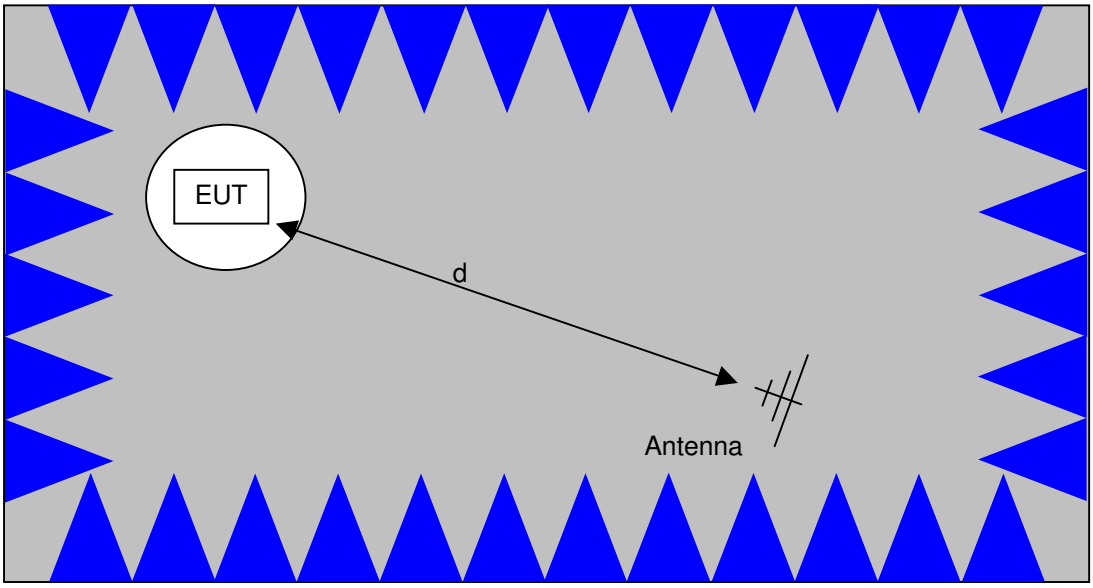
Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

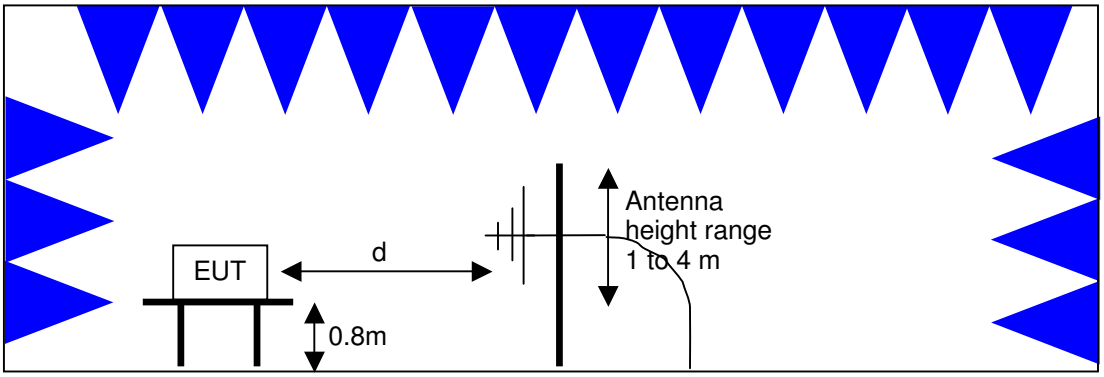


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

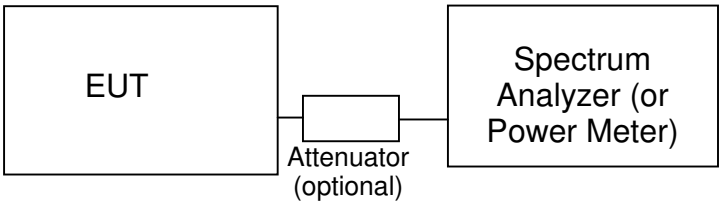
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and Elliott's test procedures for the type of radio being tested.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

2 Pages

Radiated Emissions, 1000 - 16,000 MHz, 11-Apr-06 and 12-Apr-06

Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Jan-07
Hewlett Packard	EMC Spectrum Analyzer 9KHz-26.5GHz, non programmable	8563E	284	22-Apr-06
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	868	20-Apr-06
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1630	28-Dec-06
Micro-Tronics	Band Reject Filter, 2400-2500MHz	BRM50702-02	1731	09-Jun-06

Radiated Emissions, 16,000 - 26,500 MHz, 21-Apr-06

Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	26-Apr-06
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	28-Nov-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Purple (SA40)	8564E (84125C)	1771	02-Aug-06
Hewlett Packard	Microwave EMI test system head lincludes W1 - W4 Purple	84125C	1772	04-Nov-06
EMCO	Horn antenna, 18-26.5 GHz (SA40 9kHz), Purple	3160-09 (84125C	1773	16-Nov-06

Antenna Conducted Emissions, 21-Apr-06

Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 30Hz -40GHz, Sunnyvale (SA40) Red	8564E (84125C)	1148	09-Sep-06
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1534	01-Mar-07
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1796	31-Jan-07

1000 - 26,500 MHz, 28-Apr-06

Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Jan-07
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	487	13-May-06
EMCO/Hewlett Packard/CMT	Horn Antenna, 18-26.5GHz (SA40)	84125C--80008/F	1387	11-Nov-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Fremont (SA40) Blue	8564E (84125C)	1393	10-Nov-06

Power Measurements, 28-Apr-06

Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1630	28-Dec-06

Radiated Emissions, 30 - 1,000 MHz, 13-Apr-06
Engineer: Chris Byleckie

Manufacturer	Description	Model #	Asset #	Cal Due
Com-Power Corp.	Pre Amplifier , 30-1000MHz	PA-103	1632	07-Jun-06
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1630	28-Dec-06
Sunol Sciences	Biconilog, 30-3000MHz	JB3	1549	26-Apr-06

Conducted Emissions - AC Power Ports, 21-Apr-06
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	08-Jul-06
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	06-Sep-06
Solar Electronics	LISN	8028-50-TS-24-BNC support	904	08-Jul-06
Hewlett Packard	EMC Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	17-Apr-07
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	23-May-06

EXHIBIT 2: Test Measurement Data

T63747 107 Pages
T63589 8 Pages

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Netgear

Model

WN511B

Date of Last Test:

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manger:	Esther Zhu
Contact:	Mark Gandler		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a NETGEAR RangeMax NEXT Wireless Notebook Adapter that is designed to provide high speed wireless internet access. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT receives its power from the host computer. The electrical rating of the EUT is 120 - 240 Volts , 50/60 Hz, 1 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	WN511B	MIMO cardbus	-	PY306200046

Other EUT Details

EUT Antenna

The EUT has 2Tx/Rx antennas that are automatically selected for use per the MCS index and STF mode selections. Each antenna has a gain of -1.6dBi. The antennas are integral to the device.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manger:	Esther Zhu
Contact:	Mark Gandler		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	zv6000	Laptop	CND52904S1	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop Power	AC Adapter	2 wire	Unshielded	2.0

EUT Operation During Transmitter Tests

During MIMO testing the EUT was transmitting simultaneously on two RF chains at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 20MHz or 40MHz signaling mode.
During legacy testing the EUT was transmitting on a single chain at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 802.11b or 802.11g mode.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manger:	Esther Zhu
Contact:	Mark Gandler		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #2

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	zv6000	Laptop	CND52904S1	DoC
Hewlett Packard	Deskjet 3820	Printer	CN2451B1	DoC
Hewlett Packard	F3-0507013399C	AC/DC adaptor	CN2451B1	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	EN104	Hub	ENT4B06271953	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop USB	Printer	Multiwire	Shielded	1.5
Laptop Ethernet	Hub	CAT 5	Unshielded	10.0
Laptop Power	AC Adapter	2 wire	Unshielded	2.0
AC adpater	AC Mains	3 wire	Unshielded	1.5

EUT Operation During Transmitter Tests

During MIMO testing the EUT was transmitting simultaneously on two RF chains at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 20MHz or 40MHz signaling mode.
During legacy testing the EUT was transmitting on a single chain at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 802.11b or 802.11g mode.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Antenna Port Power, Bandwidth and Spurious Emissions (802.11g)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/21/2006
Test Engineer: Jmartinez
Test Location: Chamber #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V, 60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. For the spurious emissions all transmit chains were connected simultaneously to the analyzer via a combiner. All other measurements were made on a single chain.

All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 57 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b)	Pass	Refer to run
2	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run
3	6dB Bandwidth	15.247(a)	Pass	Refer to run
4	Spurious emissions	15.247(b)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1: Output Power

Transmitted signal on chain is coherent ? No

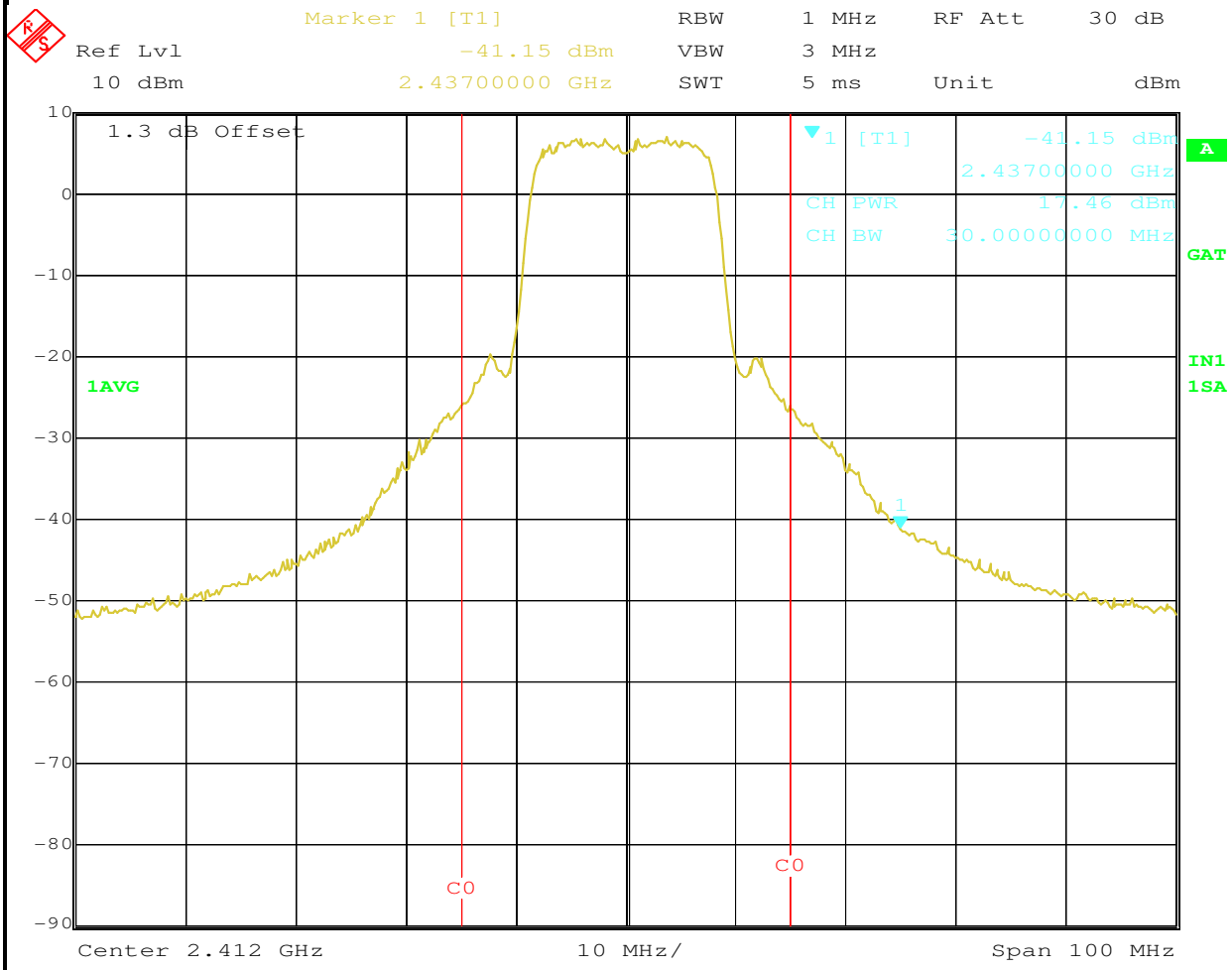
Regulatory Power Measurements:

Power	Frequency (MHz)	Output Power (dBm) Note 1			Antenna Gain (dBi) Note 3			EIRP Note 2	
-		Main	-	Total	Chain 1	Chain 2	Total	dBm	W
	2412	17.4		17.4	-1.6		-	15.9	0.039
	2437	18.5		18.5	-1.6		-	17.0	0.050
	2462	17.1		17.1	-1.6		-	15.6	0.037

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was tranmsitting) and power integration over 30 MHz
Note 2:	EIRP - if transmit chains are coherent then the EIRP is calculated from the sum of the antenna gains plus the total power (i.e. beam-forming is assumed because of coherency on the chains). If the individual chains are incoherent then the EIRP is calculated from the sum of the individual EIRPs for each chain.
Note 3:	If the transmit chains are coherent then the total system antenna gain is the sum of the numeric gains for each antenna. If the transmit chains are incoherent then the system antenna gain is not applicable as each transmit chain can be treated independently.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



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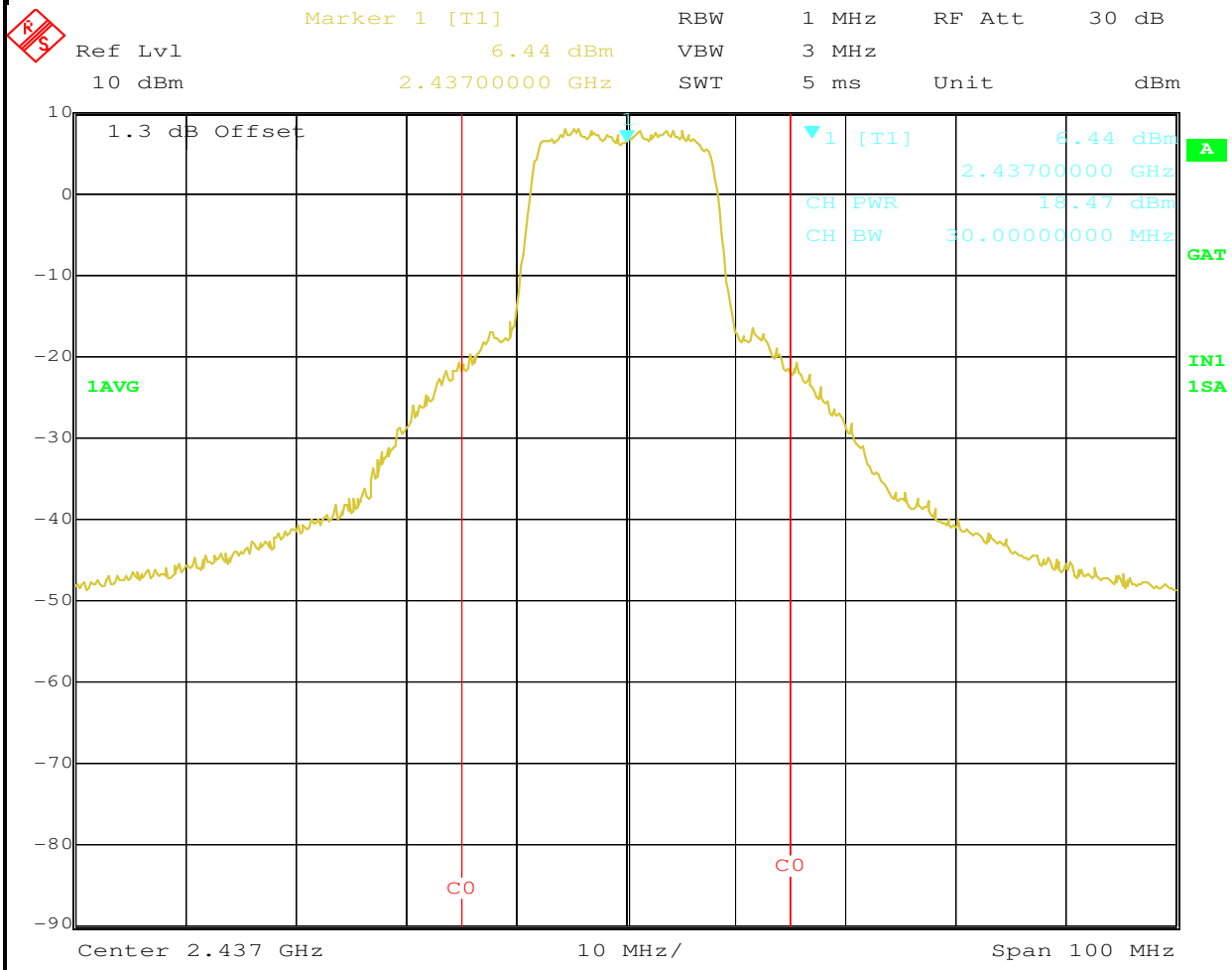
Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



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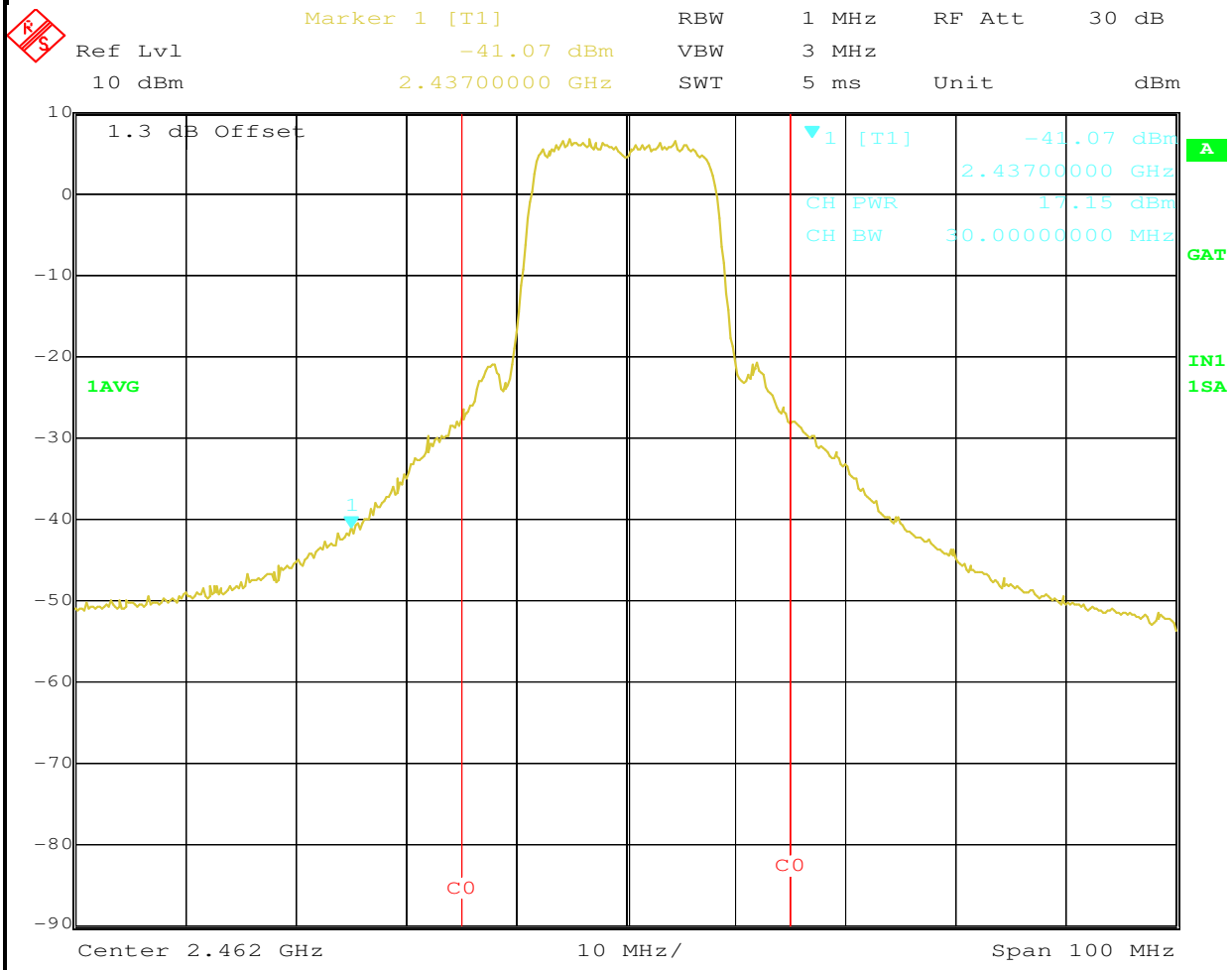
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



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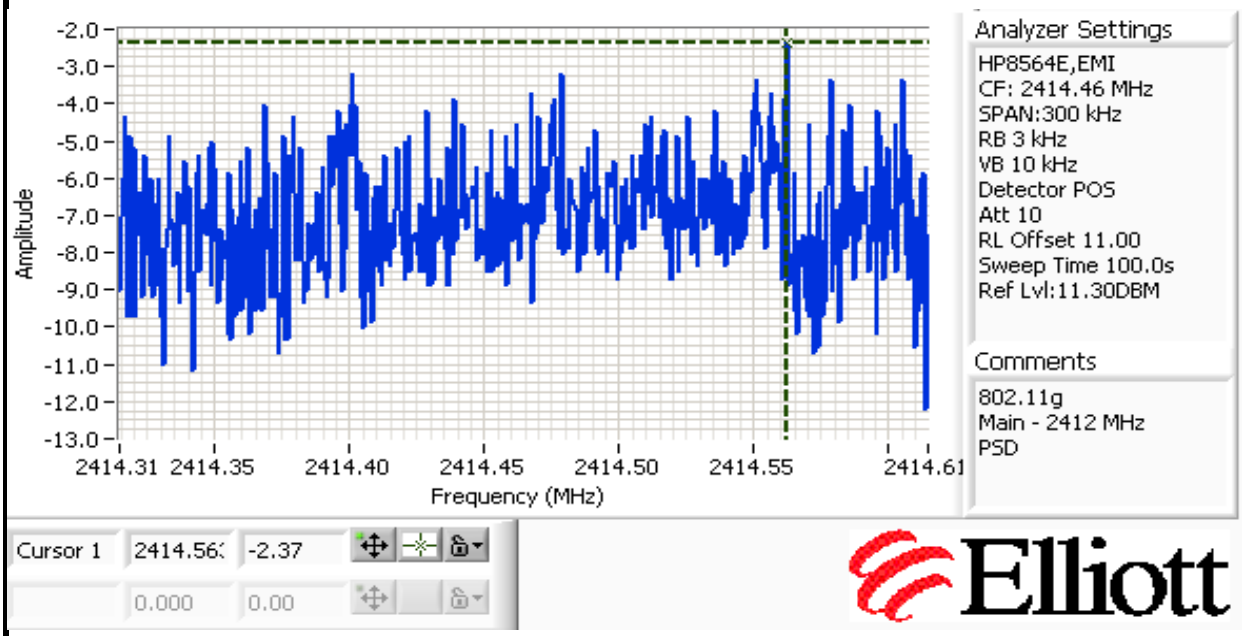
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2: Power Spectral Density

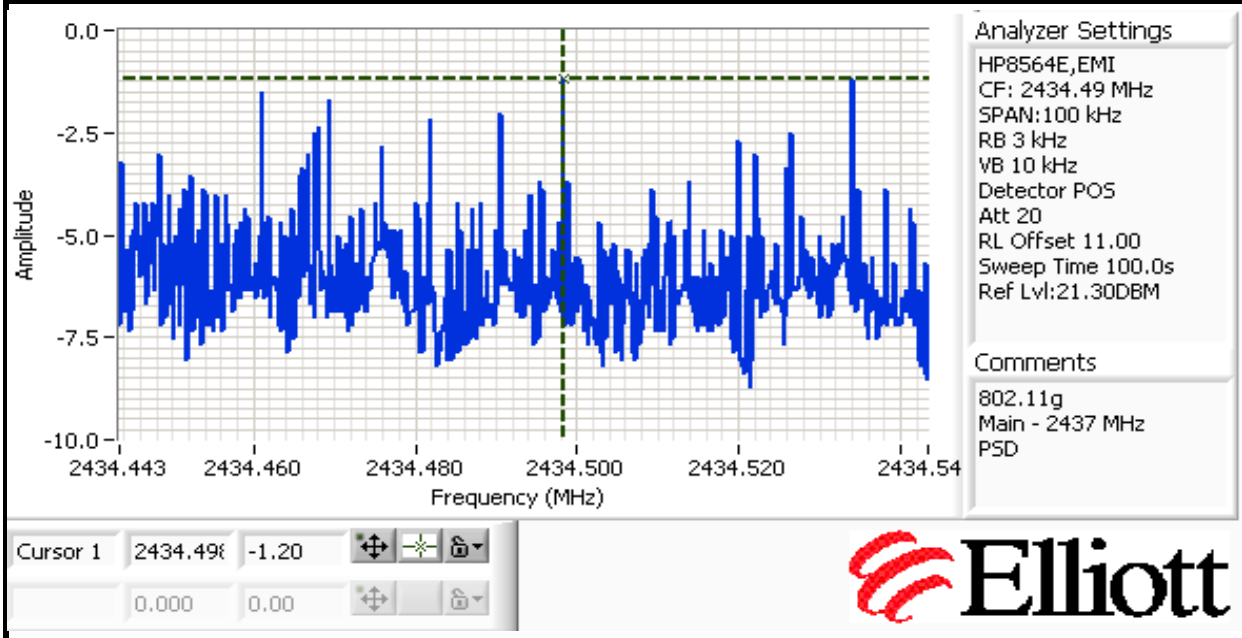
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Total	Limit dBm/3kHz	Result
	2412	-2.4			8.0	Pass
	2437	-1.2			8.0	Pass
	2462	-2.0			8.0	Pass

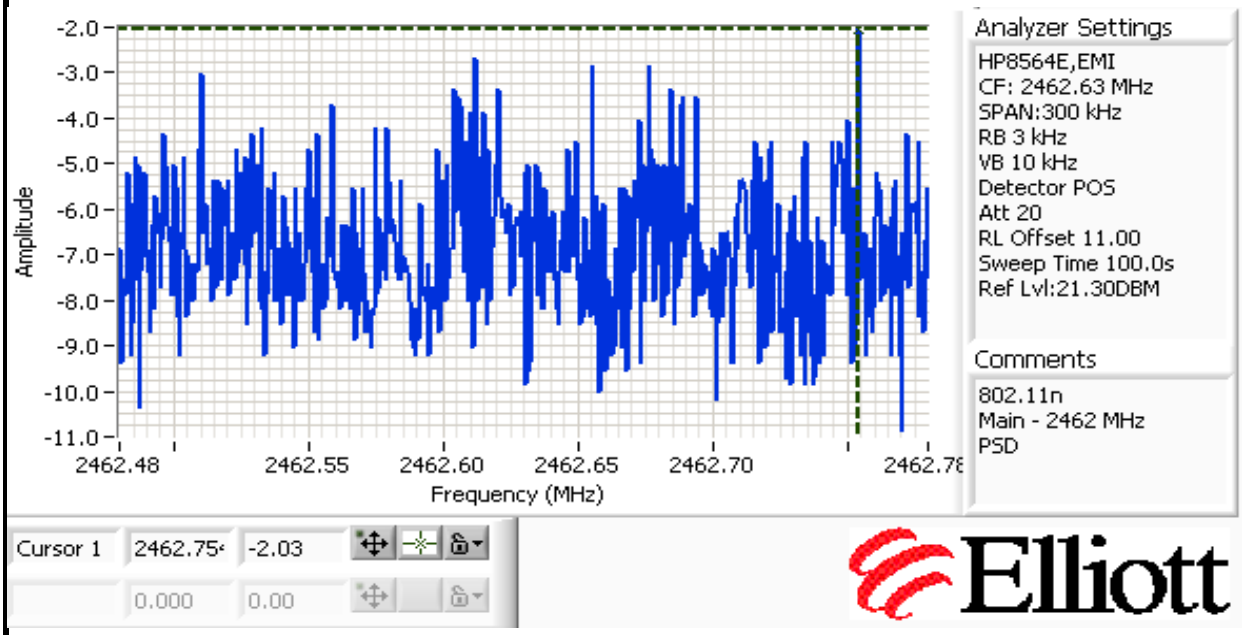
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





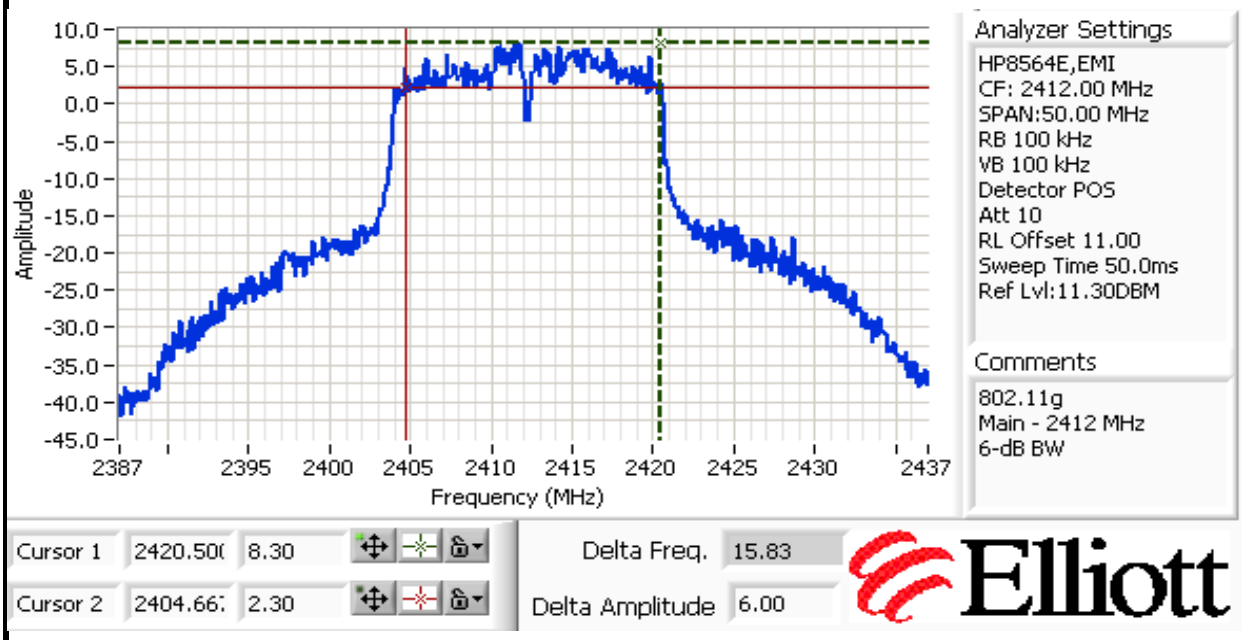
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Signal Bandwidth

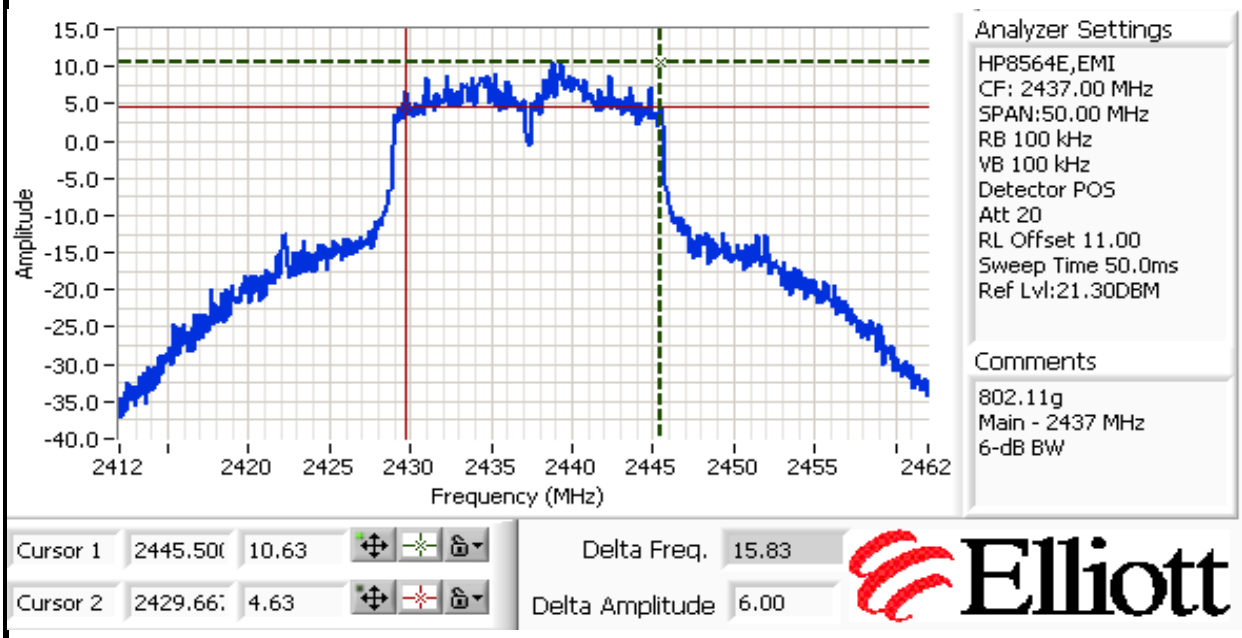
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signl Bandwidth (MHz)	99% Signal Bandwidth
	2412	100kHz	15.83	
	2437	100kHz	15.83	
	2462	100kHz	16.42	

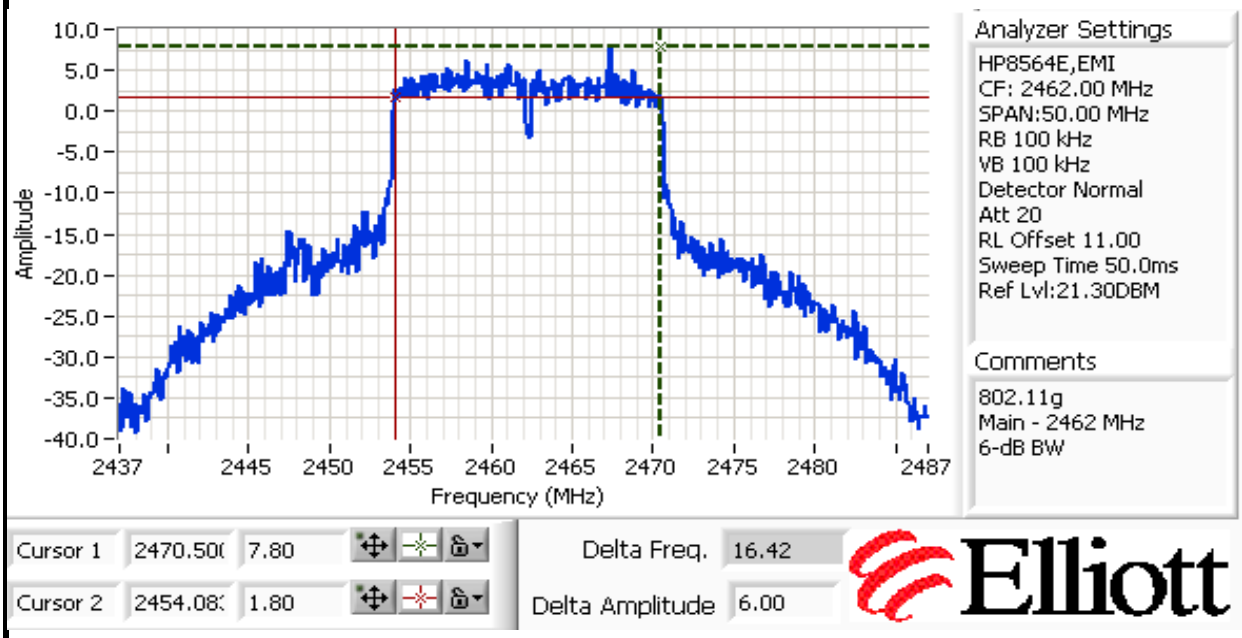
Note 1:	Measured on a single chain



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





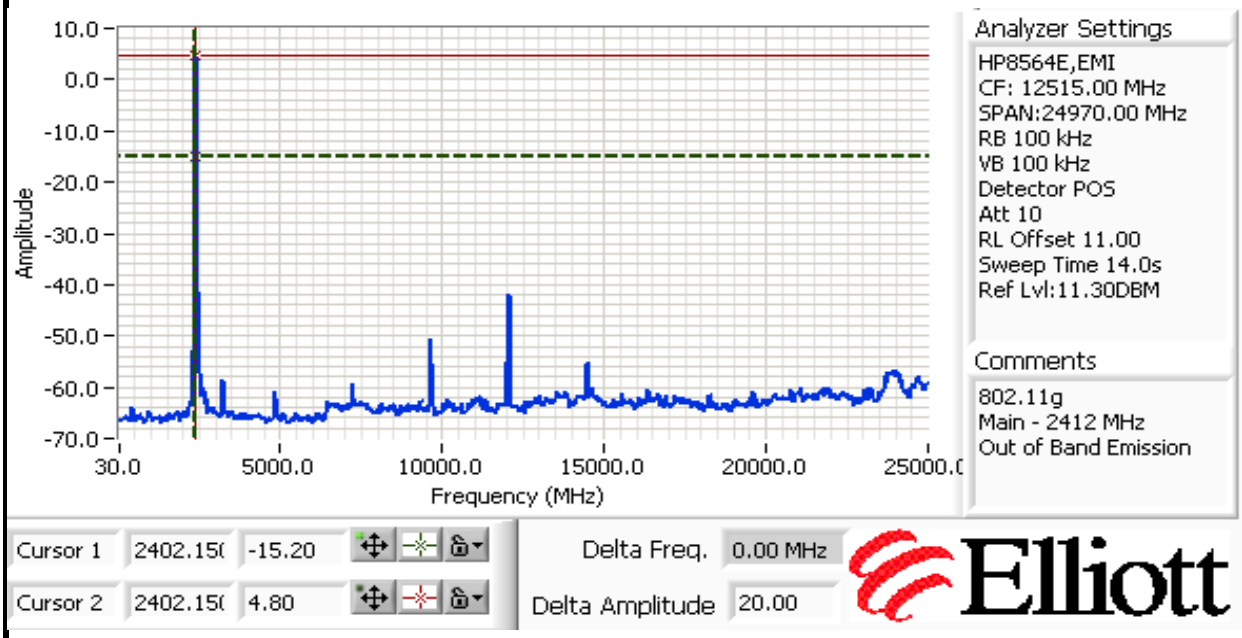
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #4: Out of Band Spurious Emissions

Power Setting Per Chain #1	#2	#3	Frequency (MHz)	Limit	Result
			2412	-30dBc	Refer to plot
			2437	-30dBc	Refer to plot
			2462	-30dBc	Refer to plot

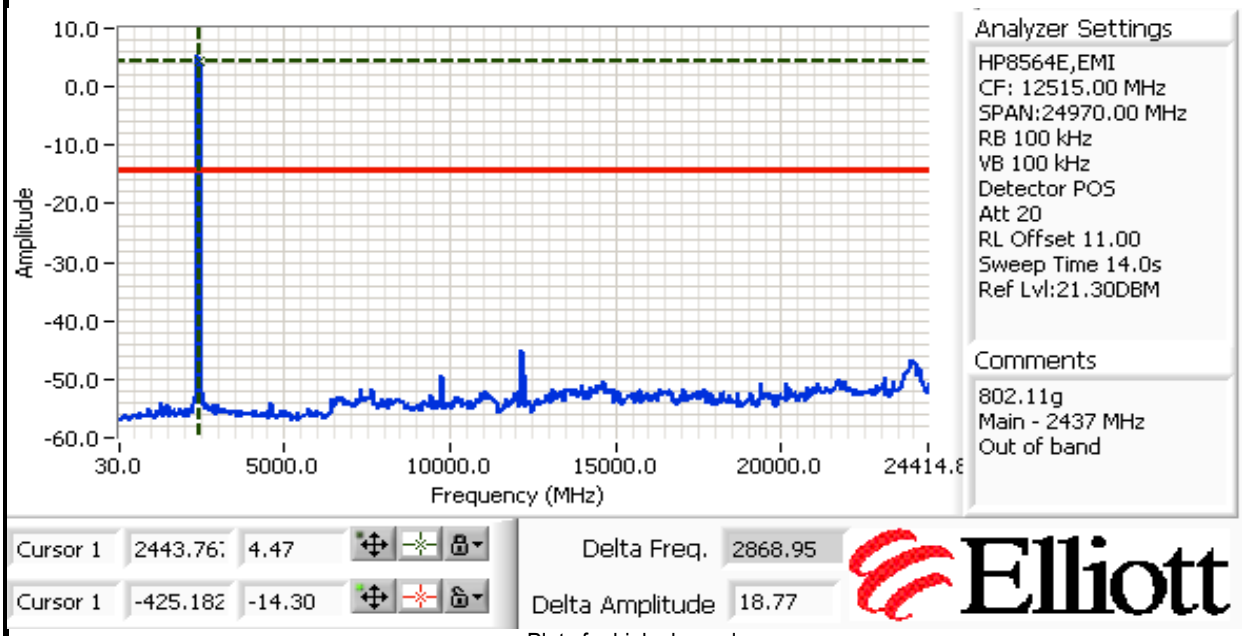
Plots for low channel



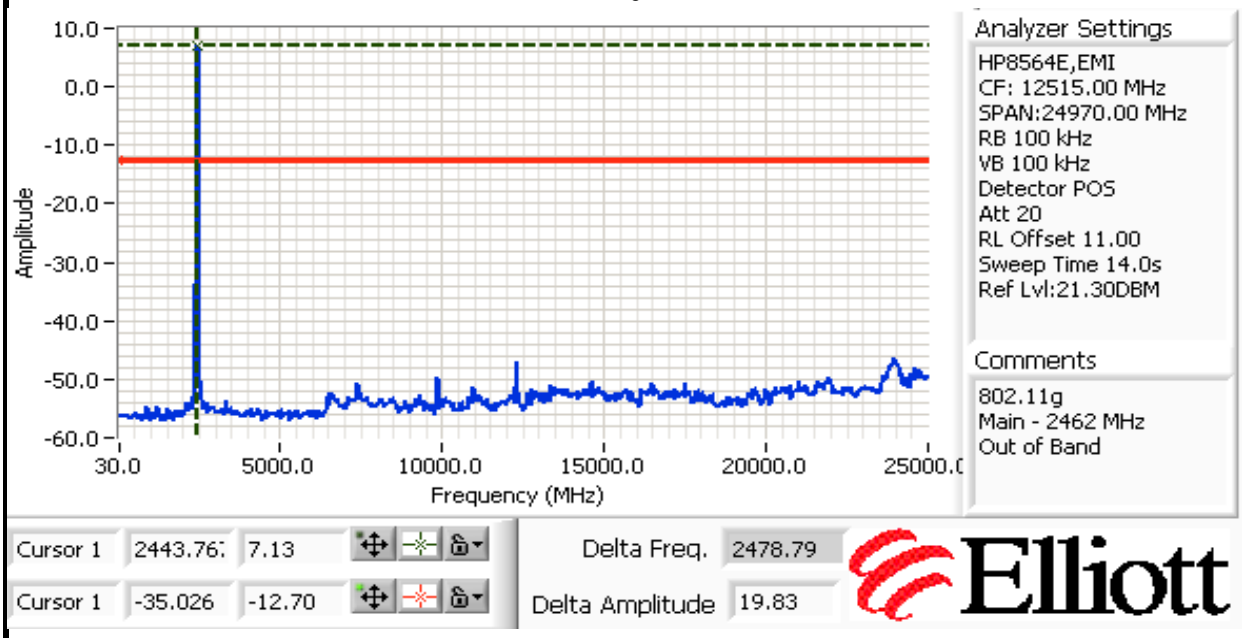
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for center channel



Plots for high channel



Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Power, Fundamental, and Spurious Emissions (802.11g)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/12/2006
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. Remote equipment was located underneat the table.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 19.5 °C
Rel. Humidity: 50 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power & Bandedges	FCC Part 15.209 / 15.247(c)	Pass	Refer to run
2	Radiated Spurious Emissions 1,000-26,500MHz	FCC Part 15.209 / 15.247(c)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

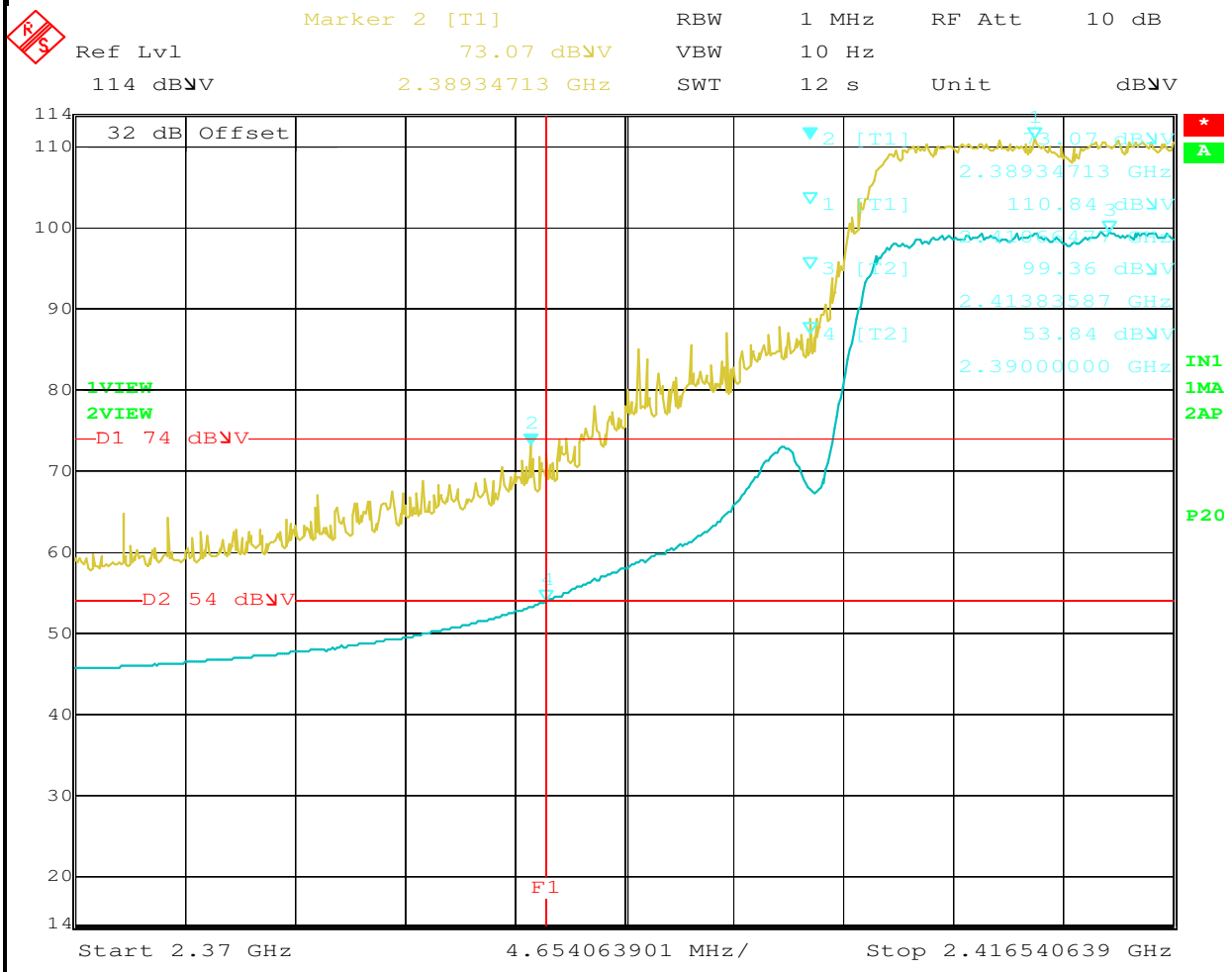
Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1a: Radiated Fundamental and Bandedge
(refer to power tables of run 1 of 802.11g data), Main (2412 MHz) 802.11g, 6Mbps (Horizontal)

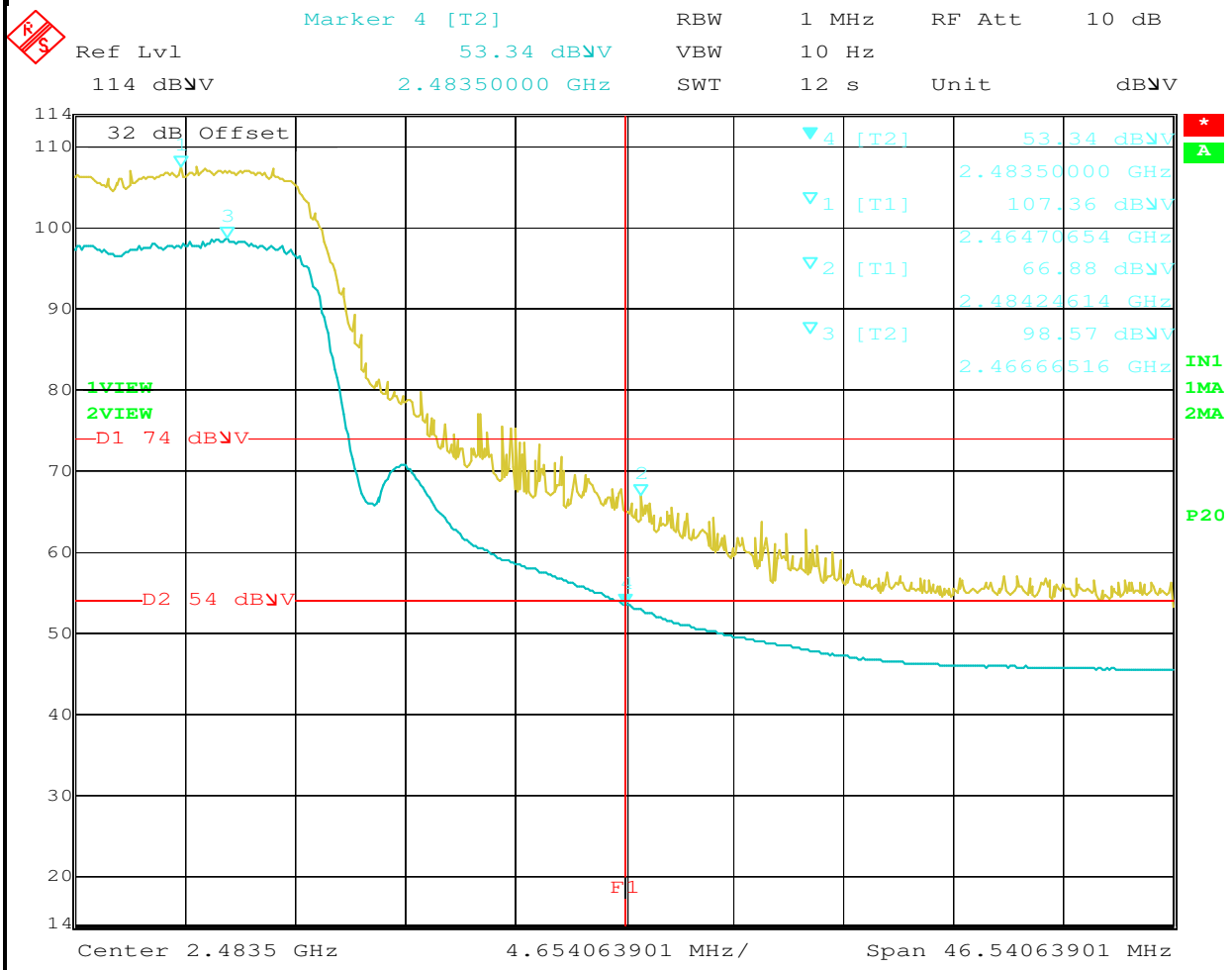


Date: 25.APR.2006 13:35:09

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1c: Radiated Fundamental and Bandedge
(refer to power tables of run 1 of 802.11g data) Main (2462 MHz) 802.11g, 6Mbps (Horizontal)



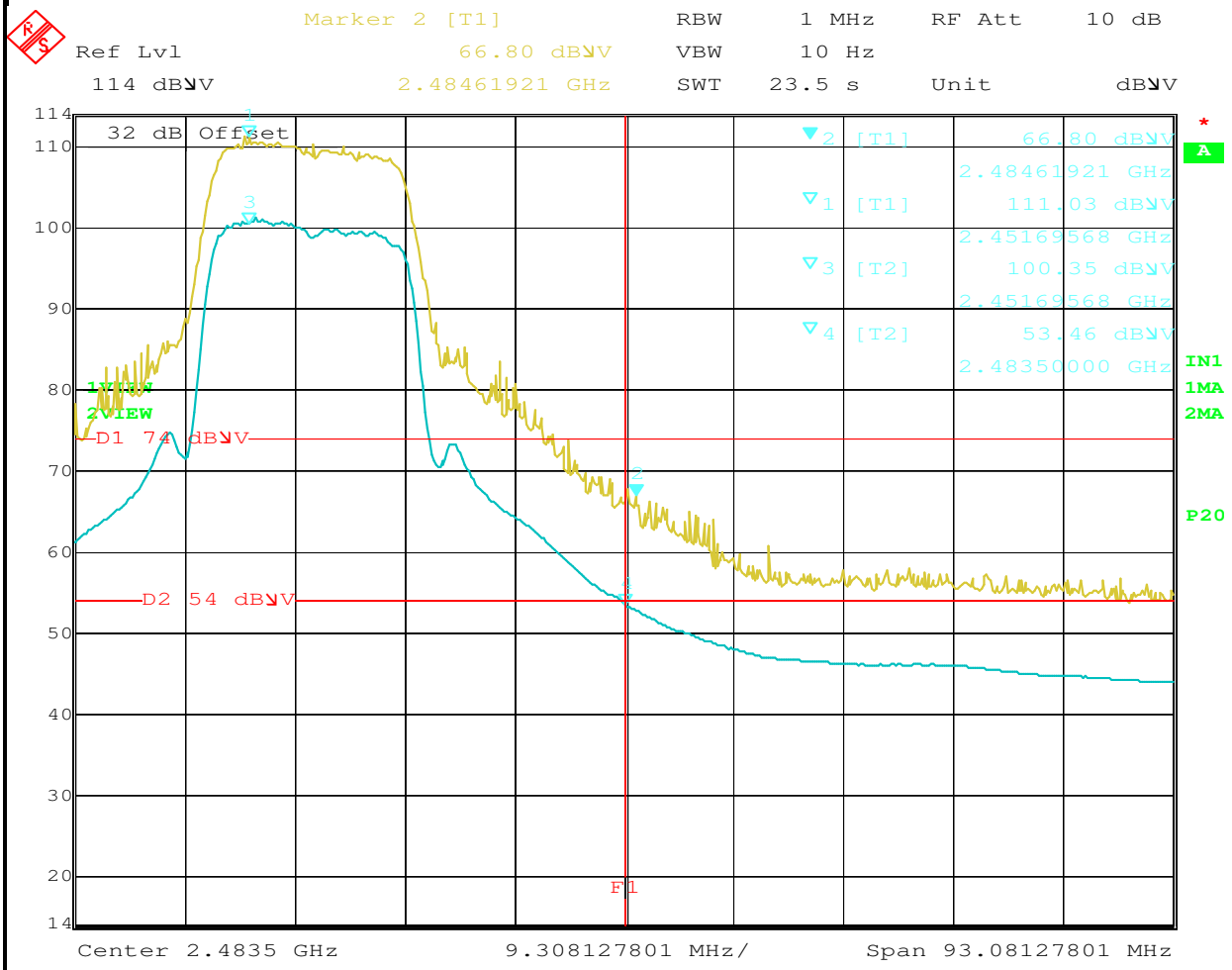
Date: 25.APR.2006 13:44:59

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1d: Radiated Fundamental and Bandedge

(refer to power tables of run 1 of 802.11g data) Main (2457 MHz) 802.11g, 6Mbps



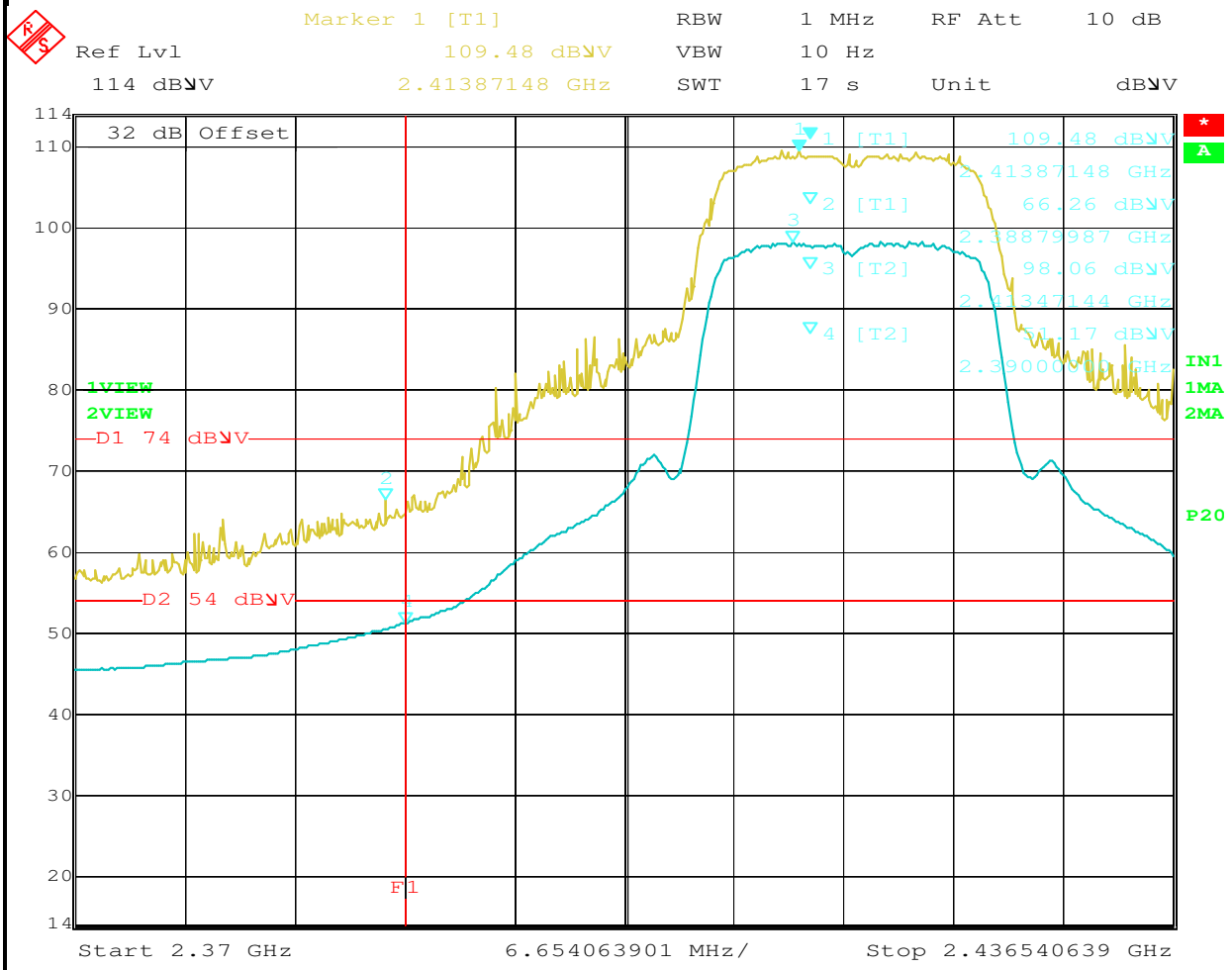
Date: 25.APR.2006 13:54:28

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1e: Radiated Fundamental and Bandedge

(refer to power tables of run 1 of 802.11g data) Main (2417 MHz) 802.11g, 6Mbps

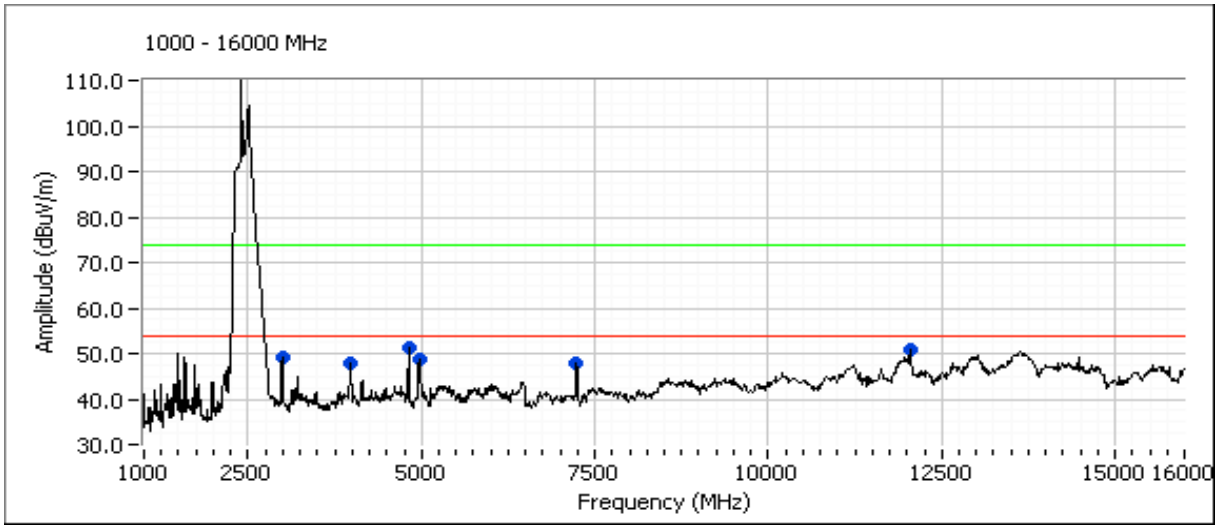


Date: 25.APR.2006 14:08:23

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2a: Radiated Spurious Emissions, 1000 - 26,500 MHz. Low Channel @ 2412 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.042	50.5	H	54.0	-3.5	AVG	80	1.4	Restricted
4824.042	52.5	H	74.0	-21.5	PK	80	1.4	Restricted
4981.885	33.1	V	54.0	-20.9	AVG	0	1.4	Restricted
4981.885	48.4	V	74.0	-25.6	PK	0	1.4	Restricted
3989.646	31.9	V	54.0	-22.1	AVG	20	1.4	Restricted
3989.646	48.4	V	74.0	-25.6	PK	20	1.4	Restricted
12049.12	40.7	H	54.0	-13.3	AVG	230	1.6	Restricted
12049.12	52.7	H	74.0	-21.3	PK	230	1.6	Restricted
2989.17	49.0	V	54.0	-5.0	Peak	312	1.4	Non-restricted
7233.40	48.0	H	54.0	-6.0	Peak	8	1.0	Non-Restricted

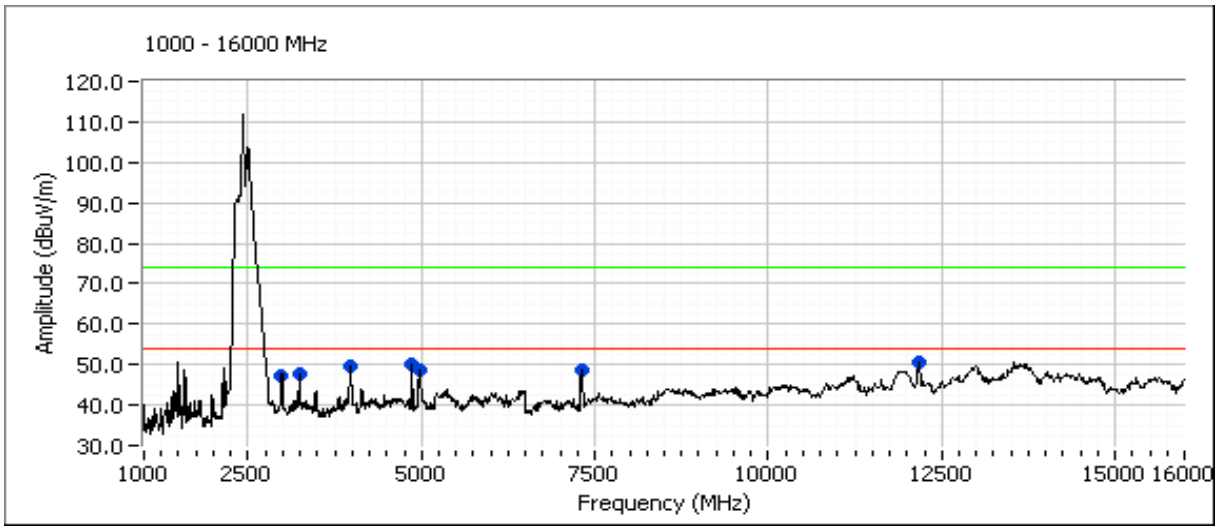
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2b: Radiated Spurious Emissions, 1000 - 16,000 MHz. Middle Channel @ 2437 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
2980.000	47.1	V	54.0	-6.9	Peak	320	1.2	Non-restricted
3245.833	47.9	H	54.0	-6.1	Peak	56	2.0	Non-restricted
3981.017	32.8	V	54.0	-21.2	AVG	10	1.0	Restricted
3981.017	49.0	V	74.0	-25.1	PK	10	1.0	Restricted
7314.534	35.0	H	54.0	-19.1	AVG	15	1.2	Restricted
7314.534	53.6	H	74.0	-20.4	PK	15	1.2	Restricted
4874.028	47.9	H	54.0	-6.1	AVG	81	1.4	Restricted
4874.028	49.9	H	74.0	-24.1	PK	81	1.4	Restricted
12183.74	41.1	H	54.0	-12.9	AVG	235	1.4	Restricted
12183.74	53.7	H	74.0	-20.3	PK	235	1.4	Restricted
4979.038	34.8	V	54.0	-19.2	AVG	357	1.2	Restricted
4979.038	49.7	V	74.0	-24.3	PK	357	1.2	Restricted

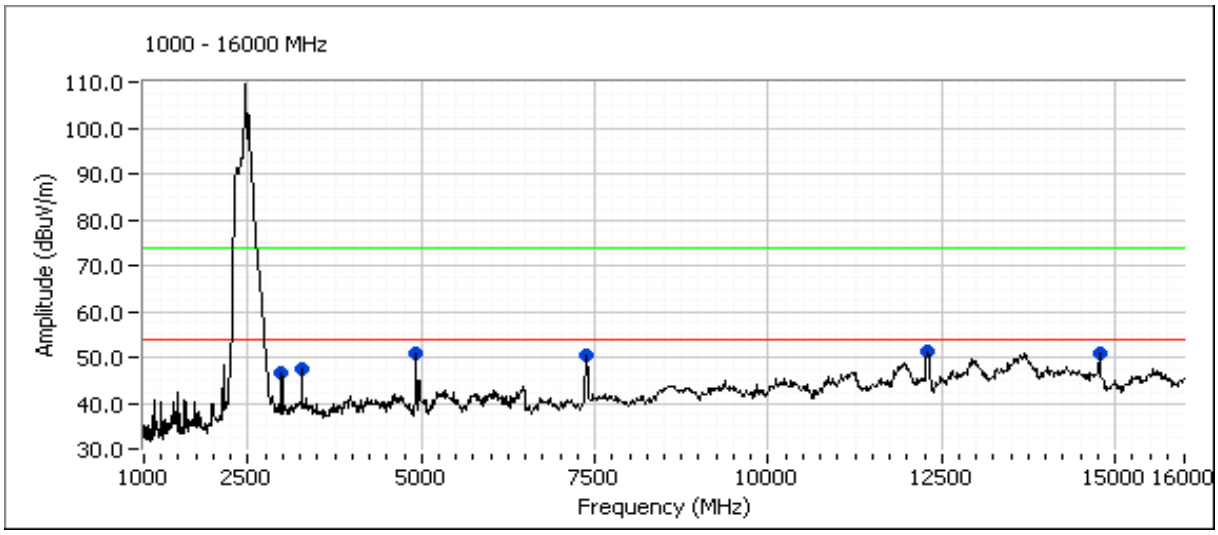
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2c: Radiated Spurious Emissions, 1000 - 26,500 MHz. High Channel @ 2462 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
14780.83	50.9	H	54.0	-3.1	Peak	45	1.0	Non-resctricted
2980.000	46.5	H	54.0	-7.5	Peak	350	1.4	Non-resctricted
12311.37	41.7	H	54.0	-12.3	AVG	226	1.0	Restricted
12311.37	53.6	H	74.0	-20.4	PK	226	1.0	Restricted
4924.013	47.9	H	54.0	-6.1	AVG	139	1.4	Restricted
4924.013	50.3	H	74.0	-23.7	PK	139	1.4	Restricted
3282.768	43.8	H	54.0	-10.2	AVG	32	1.2	Restricted
3282.768	47.0	H	74.0	-27.0	PK	32	1.2	Restricted
7384.450	35.3	H	54.0	-18.7	AVG	5	1.0	Restricted
7384.450	55.1	H	74.0	-18.9	PK	5	1.0	Restricted

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Antenna Port Power, Bandwidth and Spurious Emissions (802.11b)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/21/2006
Test Engineer: Jmartinez
Test Location: Chamber #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V, 60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. For the spurious emissions all transmit chains were connected simultaneously to the analyzer via a combiner. All other measurements were made on a single chain.

All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 57 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b)	Pass	Refer to run
2	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run
3	6dB Bandwidth	15.247(a)	Pass	Refer to run
4	Spurious emissions	15.247(b)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1: Output Power

Transmitted signal on chain is coherent ? No

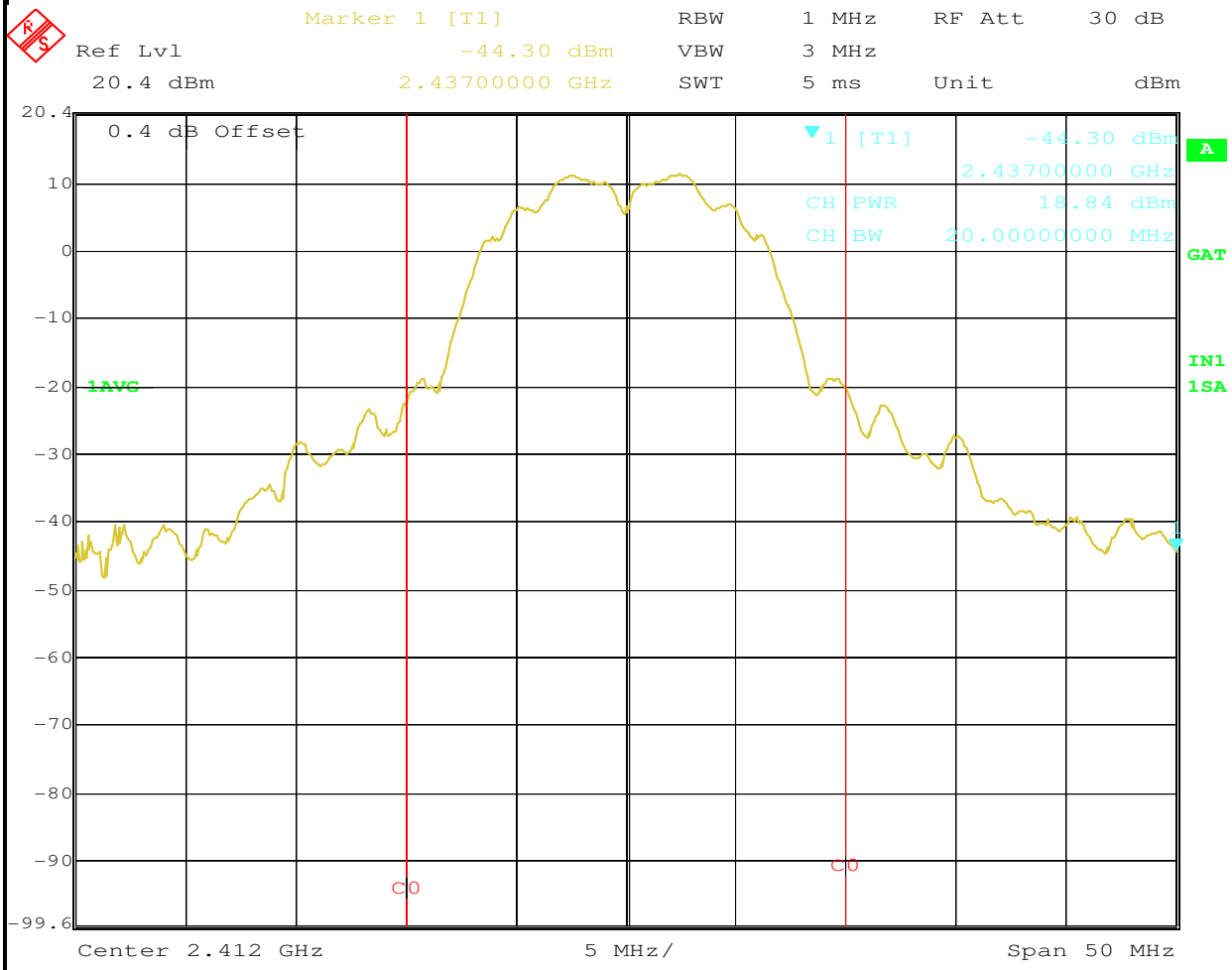
Regulatory Power Measurements:

Power	Frequency (MHz)	Output Power (dBm) Note 1			Antenna Gain (dBi) Note 3			EIRP Note 2	
-		Chain 1	Chain 2	Total	Chain 1	Chain 2	Total	dBm	W
	2412	18.8		18.8	-1.6		-	17.3	0.054
	2437	18.7		18.7	-1.6		-	17.1	0.051
	2462	18.2		18.2	-1.6		-	16.7	0.046

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was tranmsitting) and power integration over 20 MHz
Note 2:	EIRP - if transmit chains are coherent then the EIRP is calculated from the sum of the antenna gains plus the total power (i.e. beam-forming is assumed because of coherency on the chains). If the individual chains are incoherent then the EIRP is calculated from the sum of the individual EIRPs for each chain.
Note 3:	If the transmit chains are coherent then the total system antenna gain is the sum of the numeric gains for each antenna. If the transmit chains are incoherent then the system antenna gain is not applicable as each transmit chain can be treated independently.

EMC Test Data

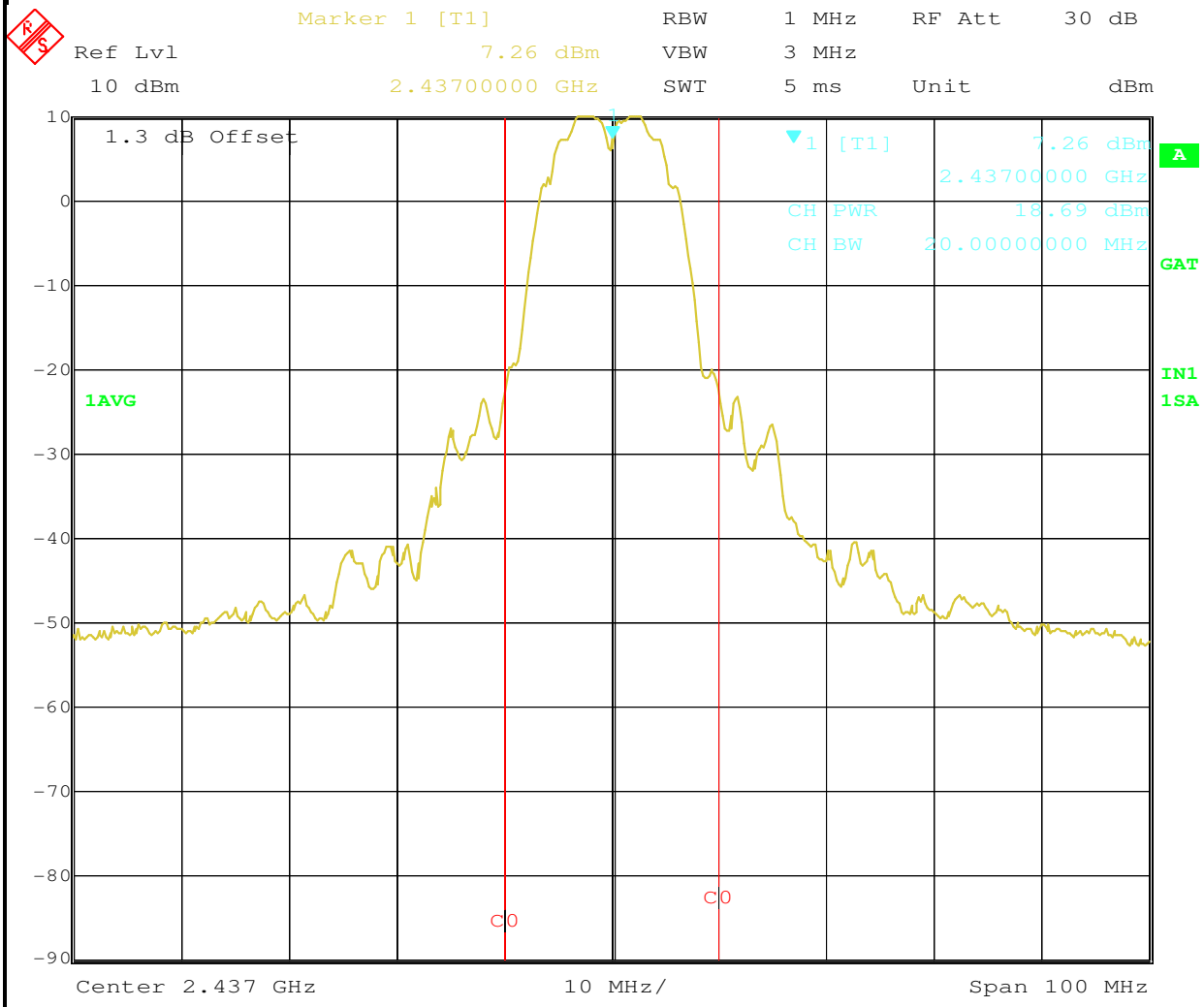
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 2.MAY.2006 12:05:38

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



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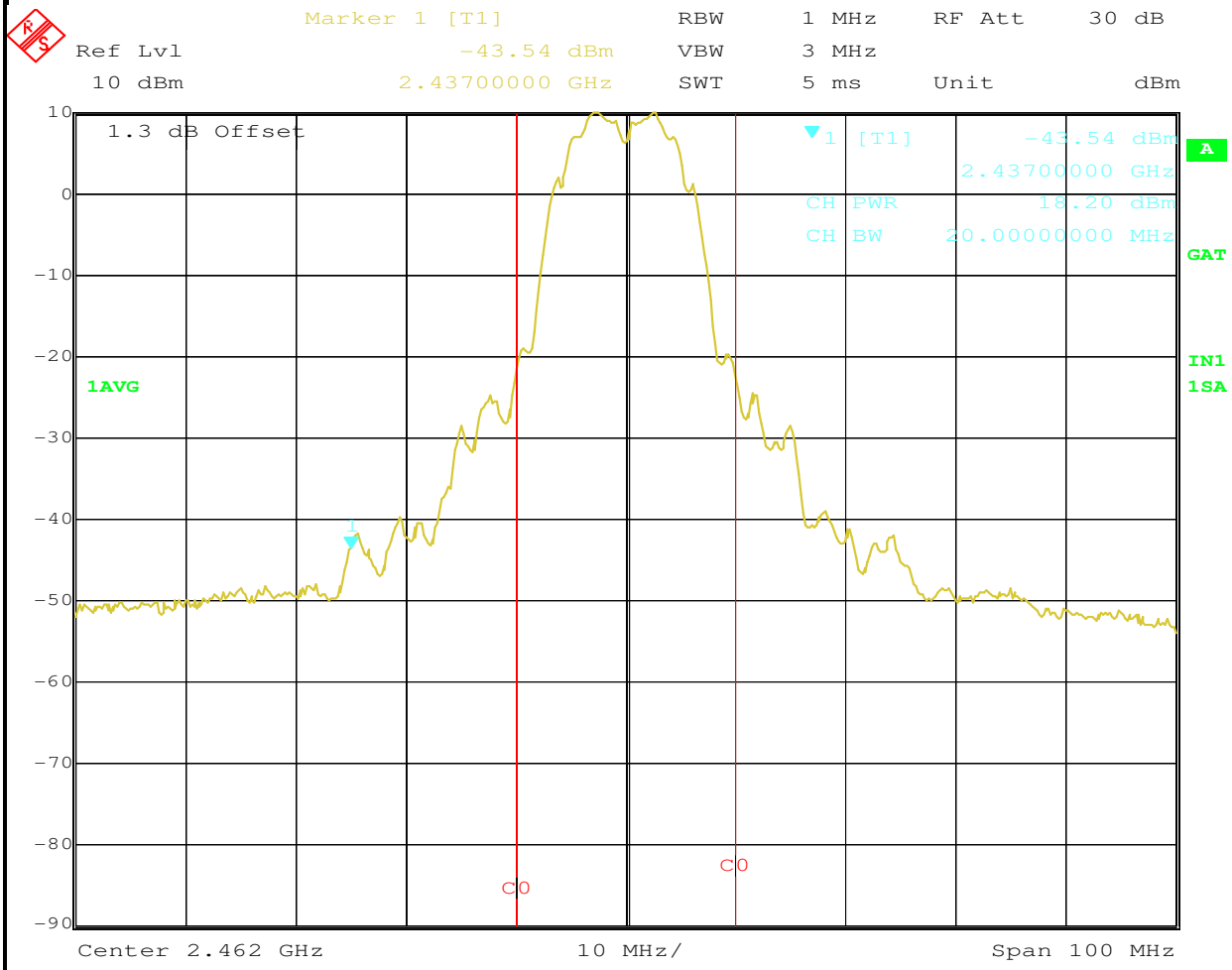
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



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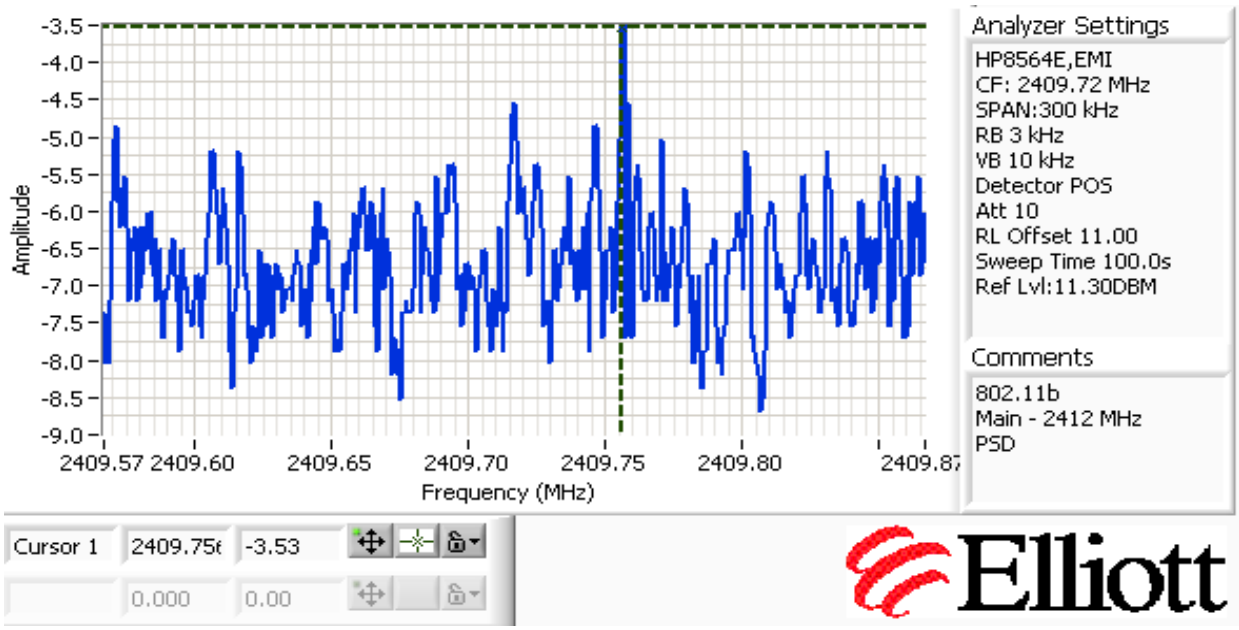
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Power Spectral Density

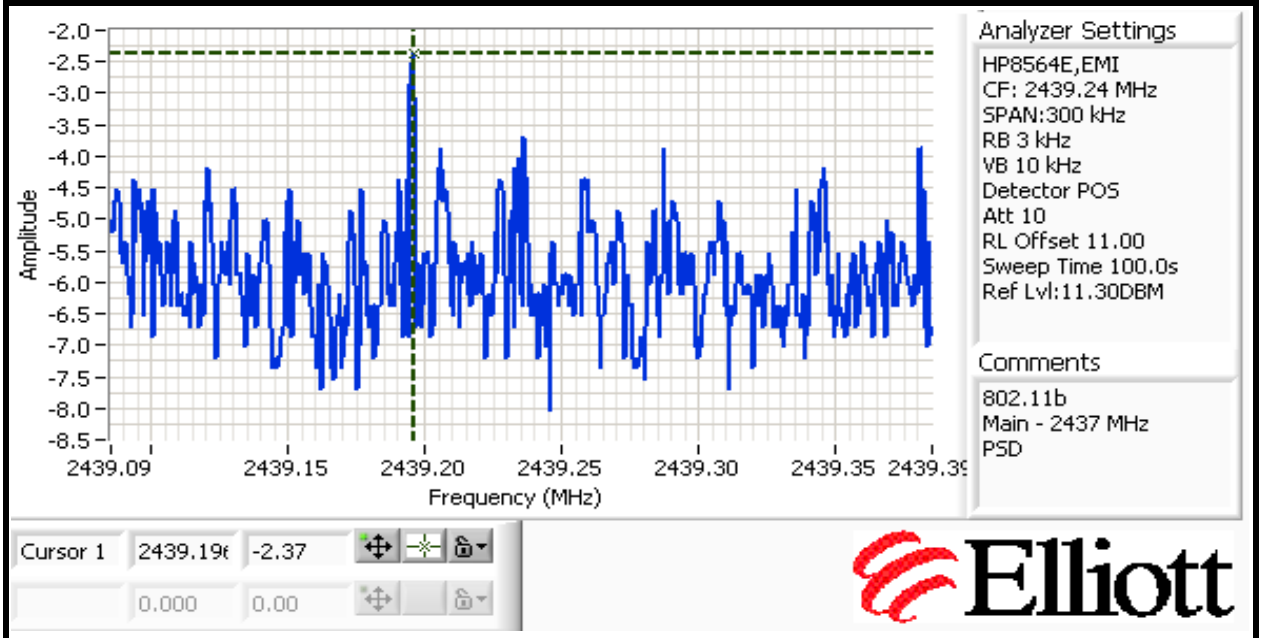
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Total	Limit dBm/3kHz	Result
	2412	-3.5			8.0	Pass
	2437	-2.4			8.0	Pass
	2462	-2.4			8.0	Pass

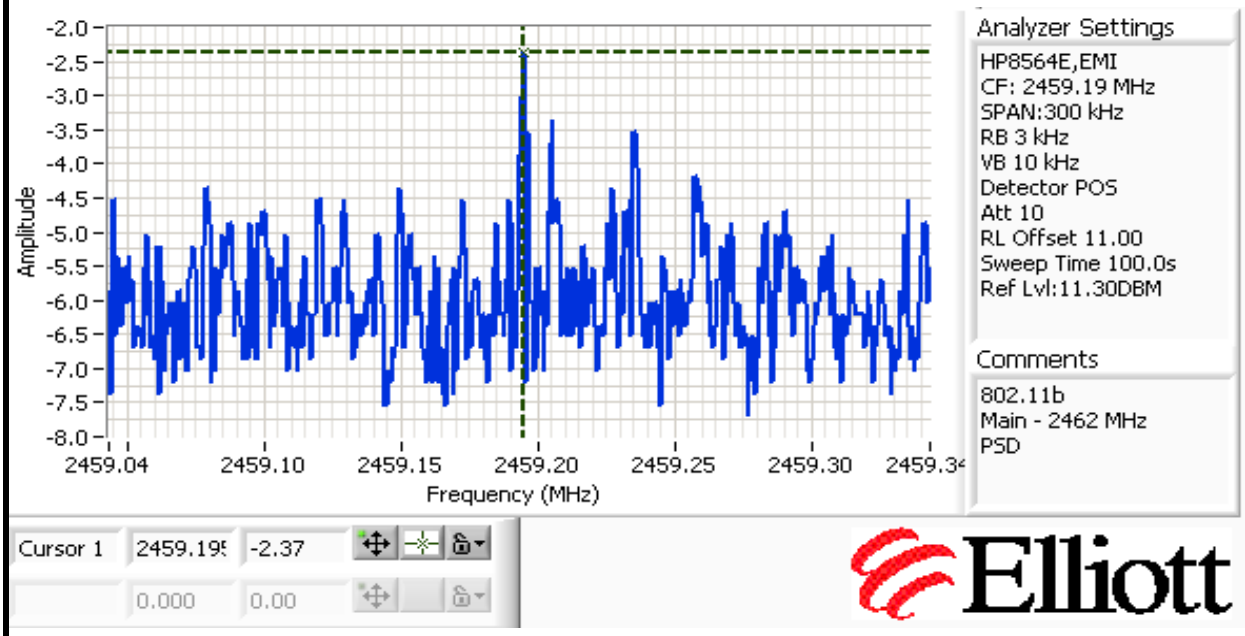
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





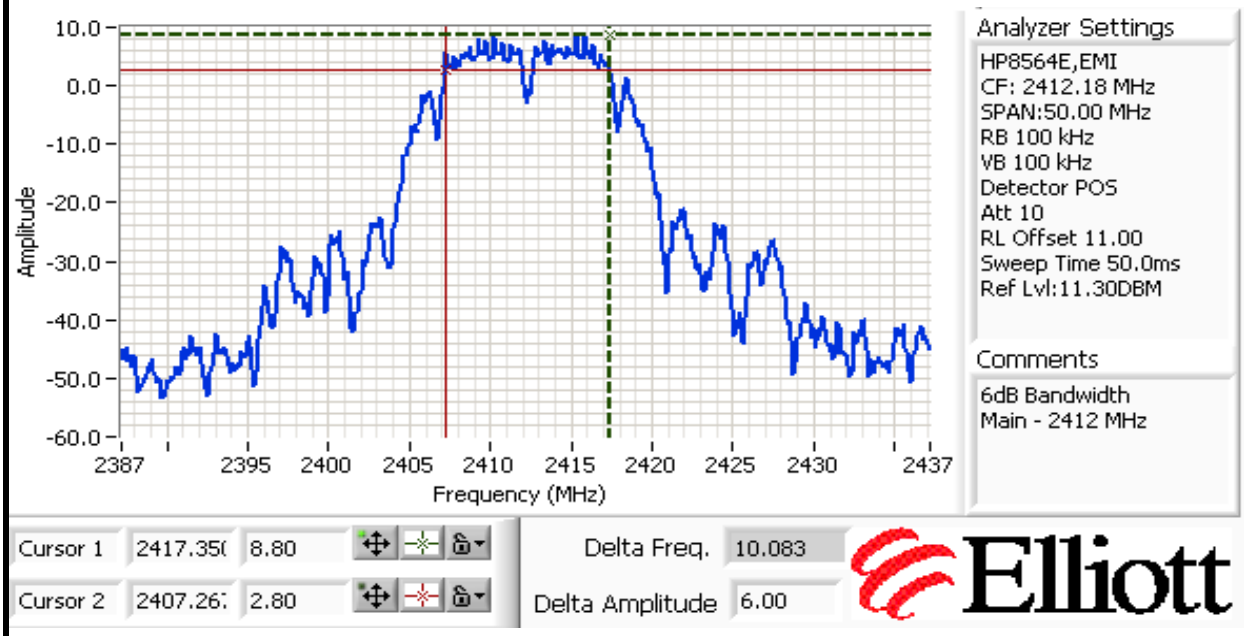
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Signal Bandwidth

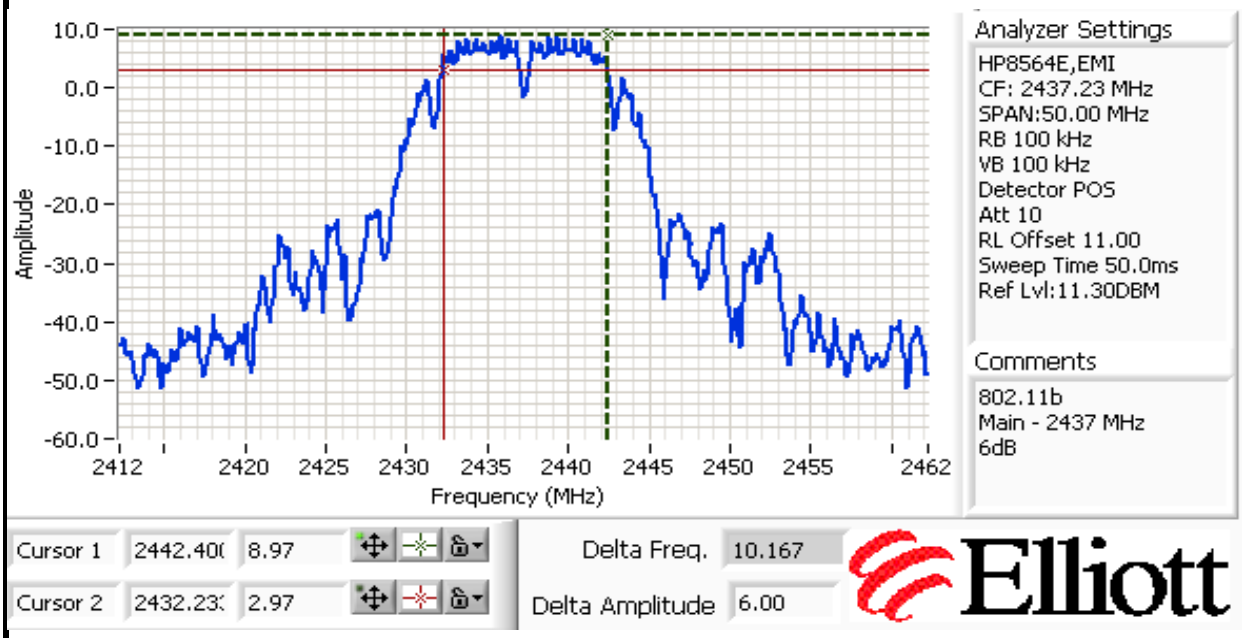
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signl Bandwidth (MHz)	99% Signal Bandwidth
	2412	100 kHz	10	
	2437	100 kHz	10	
	2462	100 kHz	10	

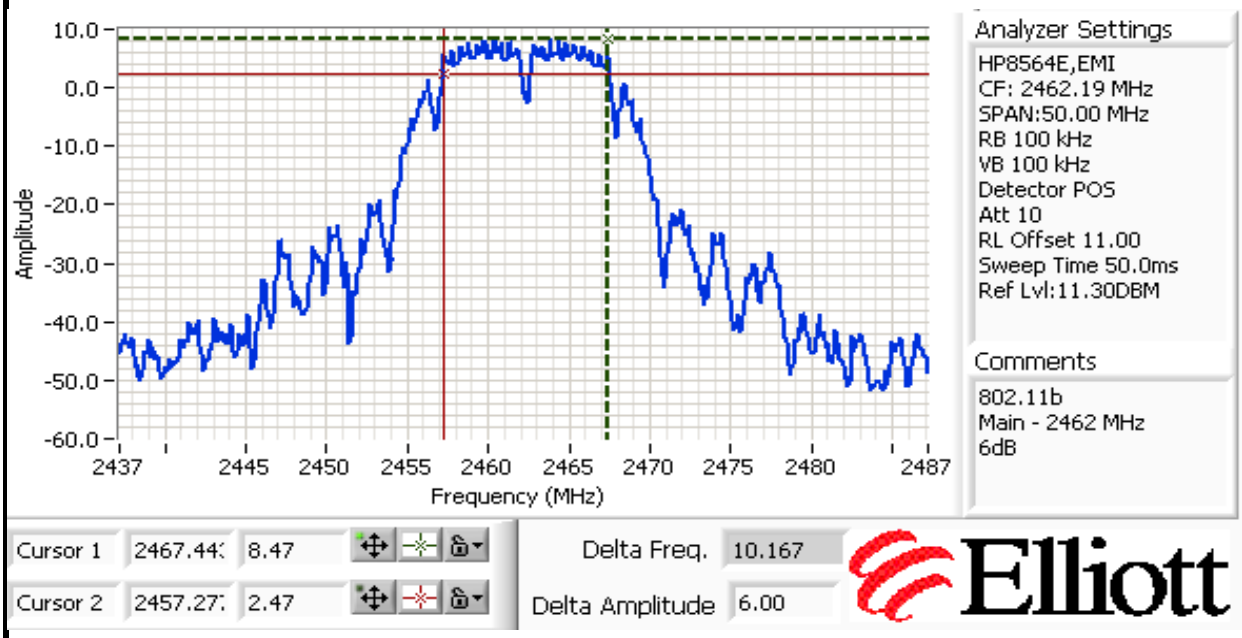
Note 1:	Measured on a single chain



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





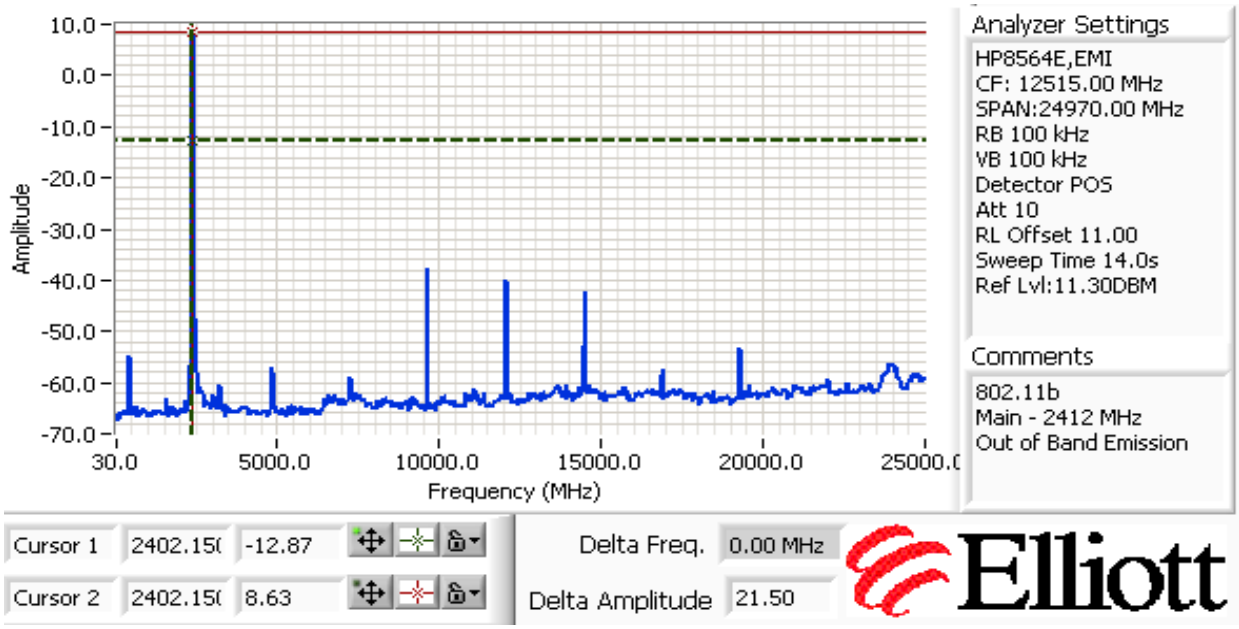
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #4: Out of Band Spurious Emissions

Power Setting Per Chain #1	#2	#3	Frequency (MHz)	Limit	Result
			2412	-30dBc	Refer to plot
			2437	-30dBc	Refer to plot
			2462	-30dBc	Refer to plot

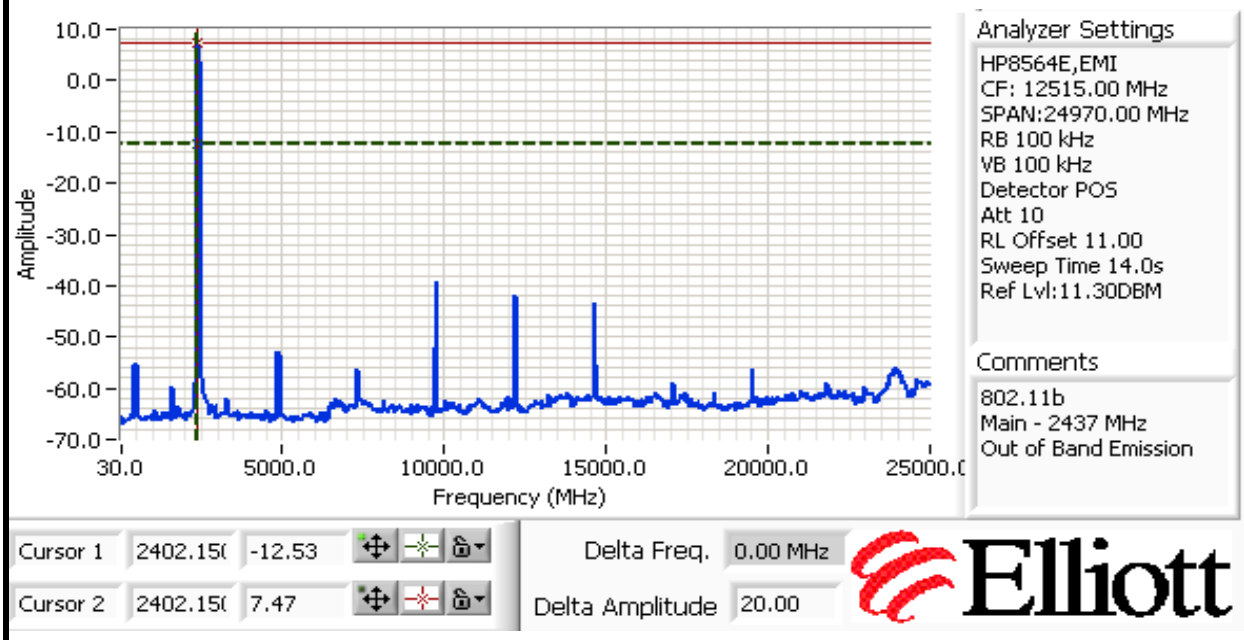
Plots for low channel



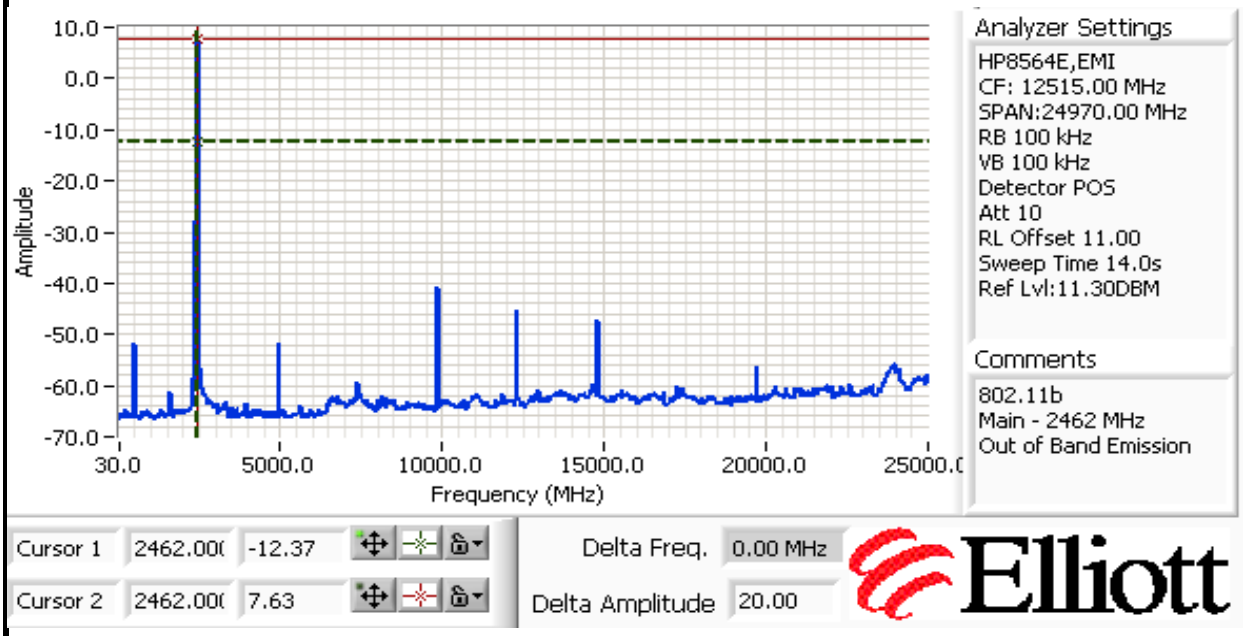
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for center channel



Plots for high channel



Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Power, Fundamental, and Spurious Emissions (802.11b)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/12/2006
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. Remote equipment was located underneat the table.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 19 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power & Bandedges	FCC Part 15.209 / 15.247(c)	Pass	Refer to run
2	Radiated Spurious Emissions 1,000-26,500MHz	FCC Part 15.209 / 15.247(c)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1: Output Power

Transmitted signal on chain is coherent ? No

Regulatory Power Measurements:

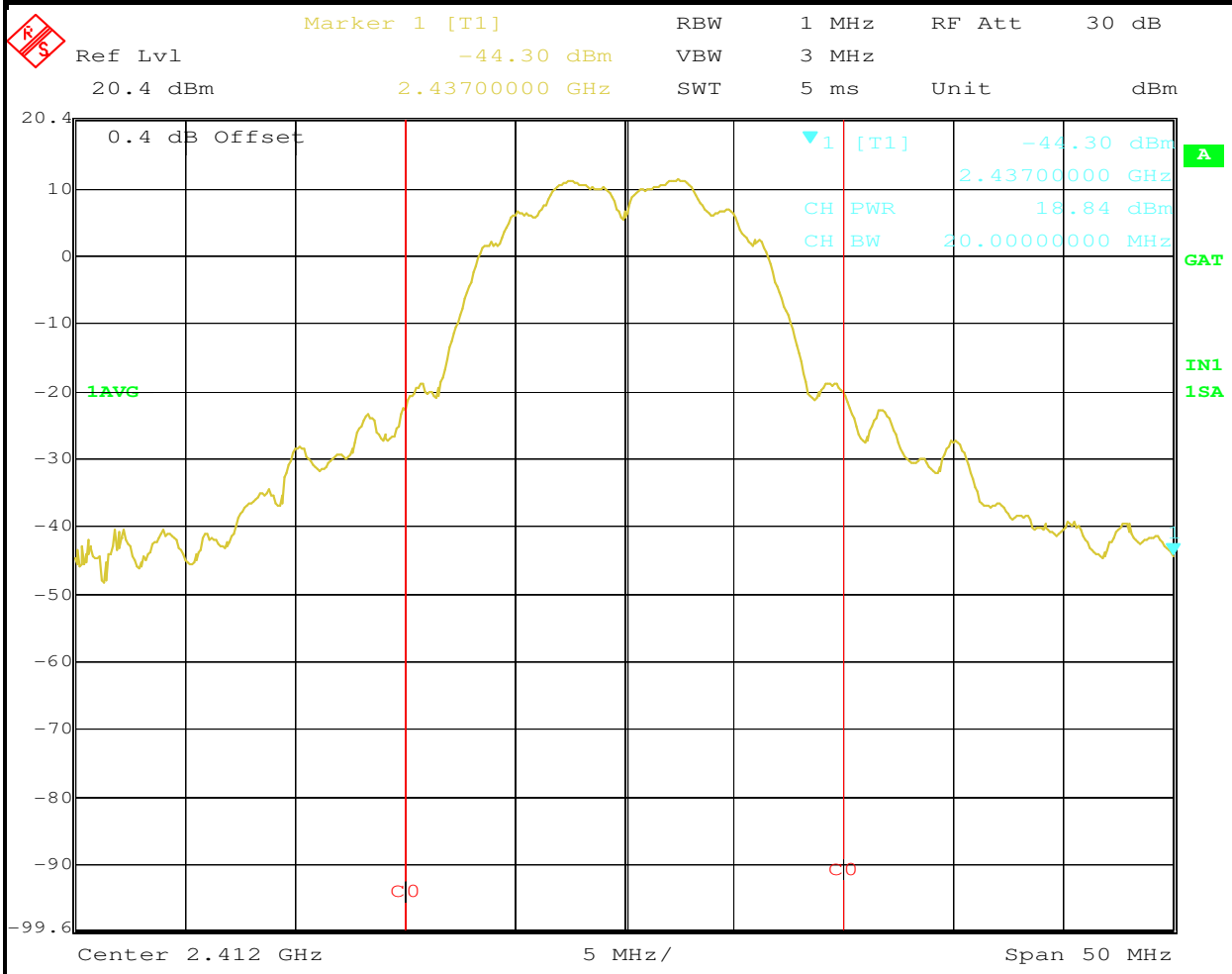
Note: Used 3dB attenuator

Power Setting	Frequency (MHz)	Output Power (dBm) Note 1			Antenna Gain (dBi) Note 3			EIRP Note 2	
		Chain 1	Chain 2	Total	Chain 1	Chain 2	Total	dBm	W
	2412	18.8		18.8	-1.6		-	17.3	0.054

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was tranmsitting) and power integration over 20 MHz
Note 2:	EIRP - if transmit chains are coherent then the EIRP is calculated from the sum of the antenna gains plus the total power (i.e. beam-forming is assumed because of coherency on the chains). If the individual chains are incoherent then the EIRP is calculated from the sum of the individual EIRPs for each chain.
Note 3:	If the transmit chains are coherent then the total system antenna gain is the sum of the numeric gains for each antenna. If the transmit chains are incoherent then the system antenna gain is not applicable as each transmit chain can be treated independently.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



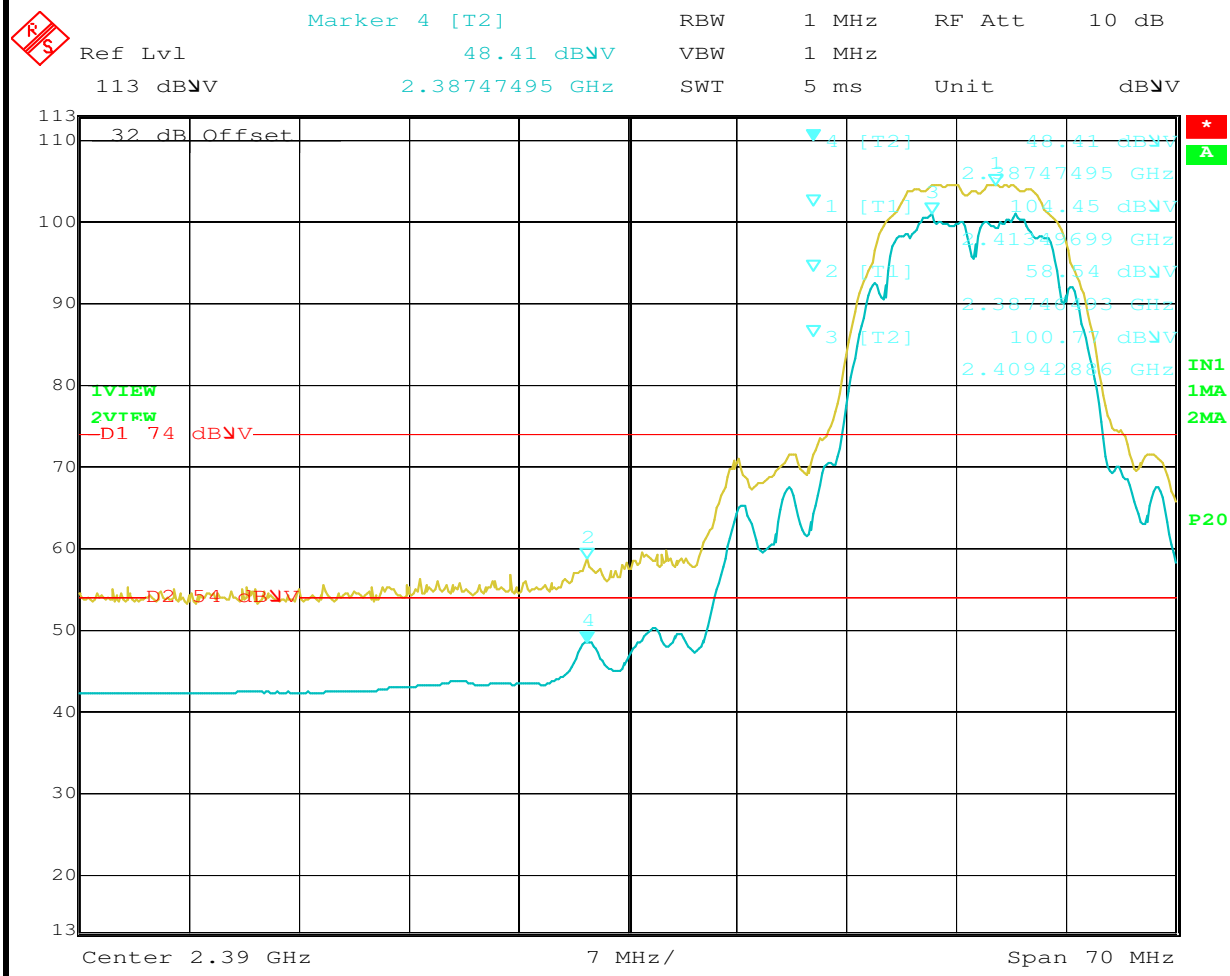
Date: 2.MAY.2006 12:05:38

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1a: Radiated Funadmental and Band edge.

(refer to power tables of run 1 of 802.11b data) Main, Channel 1 (2412 MHz), 802.11b (Vertical)

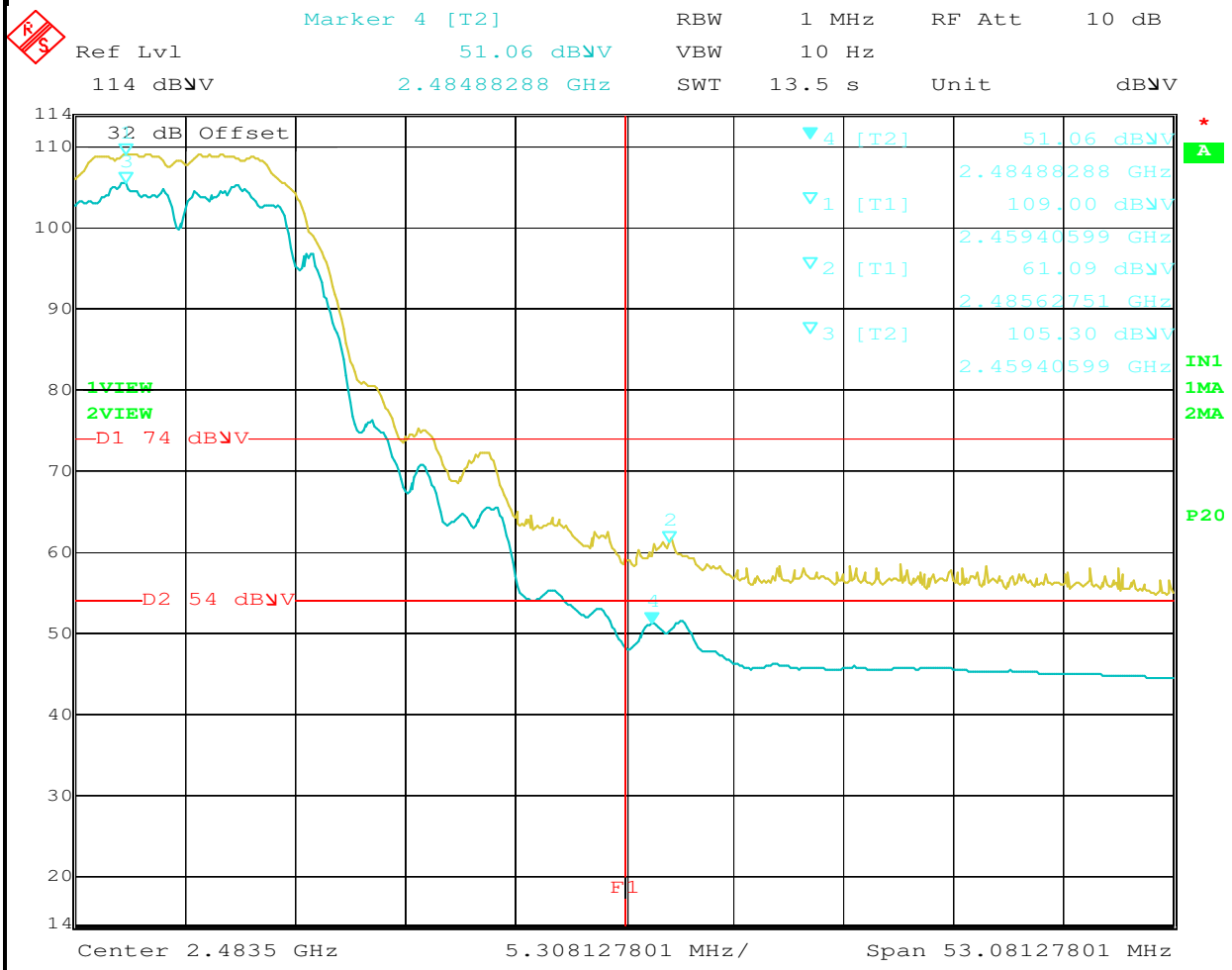


Date: 1.MAY.2006 16:44:34

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1b: Radiated Fundamnetal and Bandedge.
(refer to power tables of run 1 of 802.11b data) Main (2462 MHz) 802.11b, 1Mbps (Horizontal)



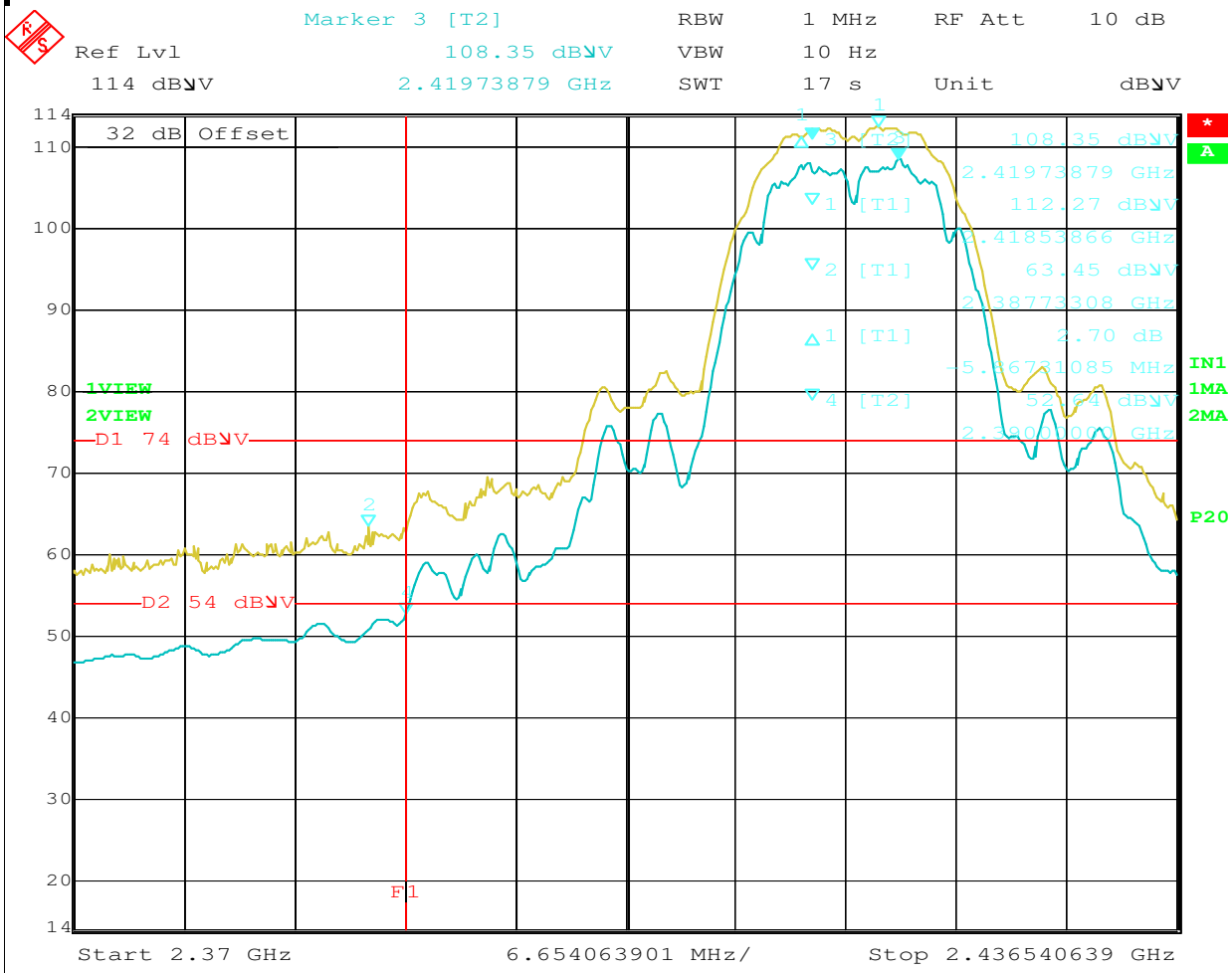
Date: 25.APR.2006 13:13:48

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1c: Radiated Fundamental and Bandedge

(refer to power tables of run 1 of 802.11b data) Main (2417 MHz) 802.11b, 1Mbps (Horizontal)



Date: 25.APR.2006 14:19:53

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2a: Radiated Spurious Emissions, 1000 - 26,500 MHz. Low Channel @ 2412 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.010	49.4	V	54.0	-4.6	AVG	72	1.4	
9647.917	48.3	V	54.0	-5.7	AVG	134	1.4	Not restricted (with restricted limit)
7238.300	47.1	V	54.0	-6.9	AVG	44	1.6	
4823.917	45.5	H	54.0	-8.5	AVG	17	1.5	
7238.333	42.9	H	54.0	-11.1	AVG	136	1.4	
7238.333	61.2	H	74.0	-12.8	PK	136	1.4	
7238.300	59.3	V	74.0	-14.7	PK	44	1.6	
4824.010	53.3	V	74.0	-20.7	PK	72	1.4	
9647.917	53.2	V	74.0	-20.8	PK	134	1.4	Not restricted (with restricted limit)
4823.917	50.5	H	74.0	-23.5	PK	17	1.5	

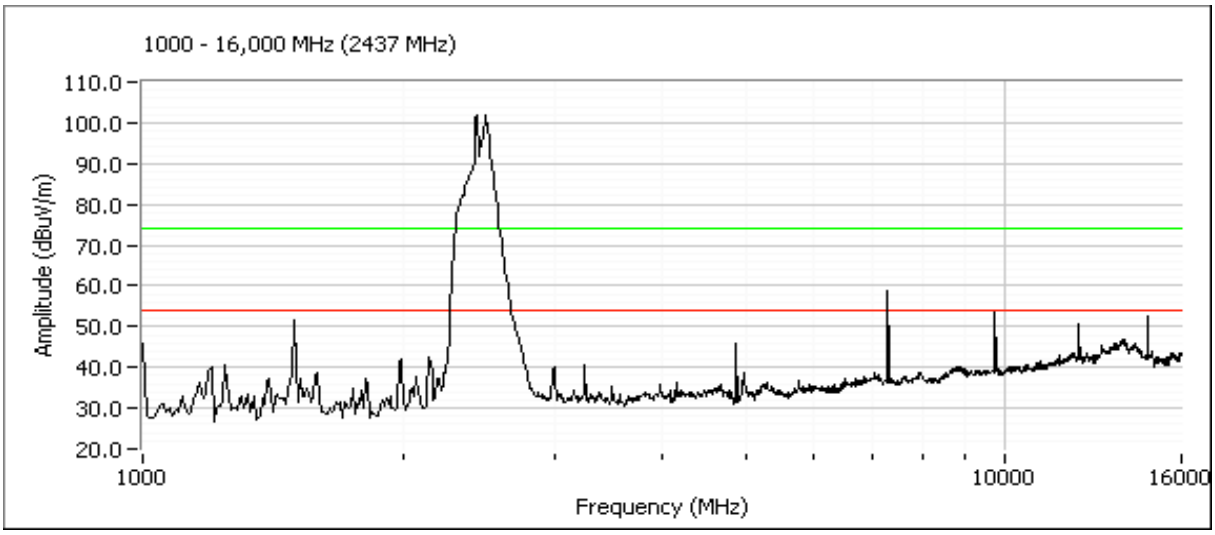
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2b: Radiated Spurious Emissions, 1000 - 26,500 MHz. Middle Channel @ 2437 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
1000.000	46.0	V	54.0	-8.0	Peak	340	1.0	Laptop emission(refer to base line)
1495.000	51.5	V	54.0	-2.5	Peak	88	1.0	Laptop emission(refer to base line)
1990.000	41.9	V	54.0	-12.1	Peak	248	1.2	Laptop emission(refer to base line)
Peak and Average Readings.								
12186.02	49.1	H	54.0	-4.9	AVG	33	1.4	
4873.86	42.6	V	54.0	-11.4	AVG	43	2.0	
7312.00	62.2	H	74.0	-11.8	PK	48	2.0	
7312.00	38.6	H	54.0	-15.4	AVG	48	2.0	
14621.82	56.1	H	74.0	-17.9	PK	82	1.4	Not in a restricted band
9747.89	55.9	H	74.0	-18.1	PK	89	1.6	Not in a restricted band
12186.02	55.5	H	74.0	-18.5	PK	33	1.4	
4873.86	46.4	V	74.0	-27.6	PK	43	2.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2c: Radiated Spurious Emissions, 1000 - 26,5600 MHz. High Channel @ 2462 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9847.887	51.3	V	54.0	-2.7	AVG	80	1.7	Not restricted (with restricted limit)
4924.050	49.2	H	54.0	-4.8	AVG	15	1.4	
4923.830	49.1	V	54.0	-5.0	AVG	14	1.0	
7384.066	63.9	H	74.0	-10.1	PK	40	1.4	
7386.833	43.8	V	54.0	-10.2	AVG	137	1.6	
7386.833	63.6	V	74.0	-10.4	PK	137	1.6	
7384.066	42.8	H	54.0	-11.2	AVG	40	1.4	
9847.887	55.1	V	74.0	-18.9	PK	80	1.7	Not restricted (with restricted limit)
4924.050	54.6	H	74.0	-19.4	PK	15	1.4	
4923.830	52.9	V	74.0	-21.1	PK	14	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Antenna Port Bandwidth and Spurious Emissions (802.11n, 20 MHz)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/21/2006
Test Engineer: Jmartinez
Test Location: Chamber #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V, 60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. For the spurious emissions all transmit chains were connected simultaneously to the analyzer via a combiner. All other measurements were made on a single chain.

All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 57 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run
2	6dB Bandwidth	15.247(a)	Pass	Refer to run
3	Spurious emissions	15.247(b)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

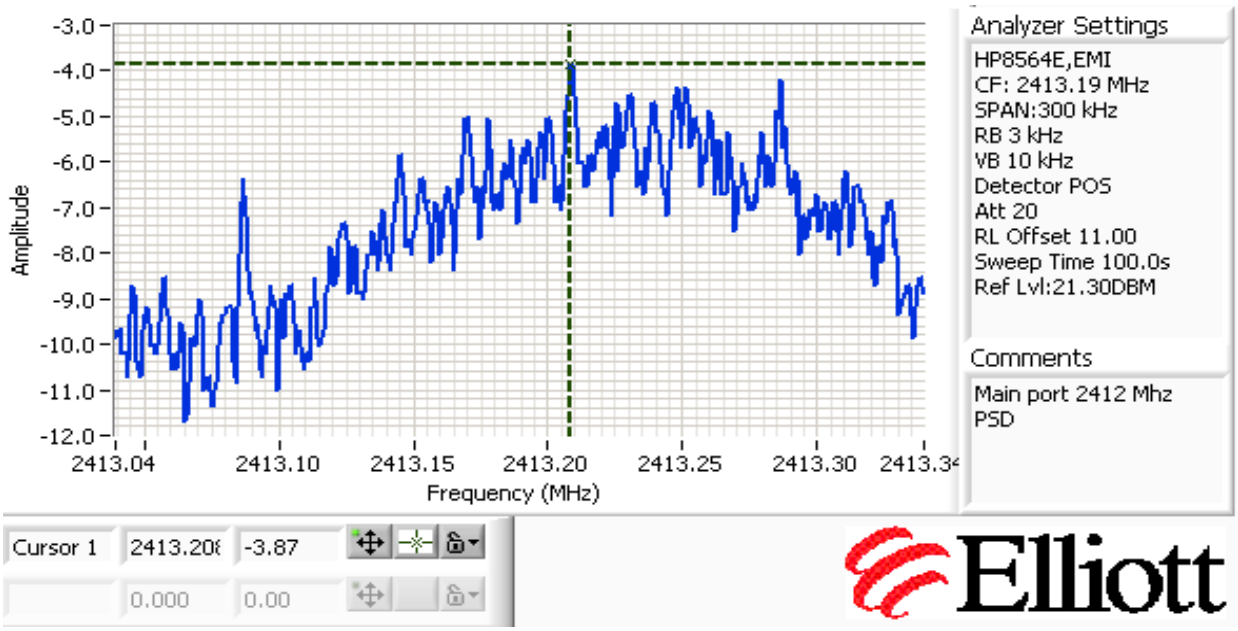
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1: Power Spectral Density

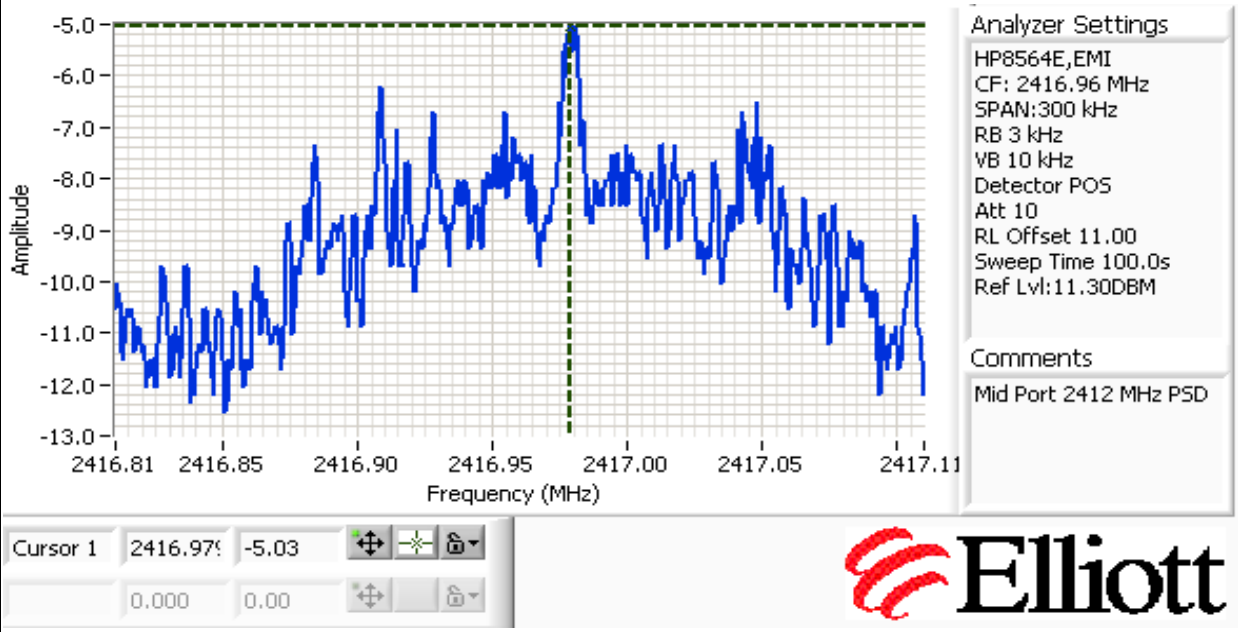
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1			Limit	Result
		Main	Aux	Total	dBm/3kHz	
	2412	-3.9	-3.5	-0.7	8.0	Pass
	2437	-2.0	-3.7	0.2	8.0	Pass
	2462	-4.7	-6.5	-2.5	8.0	Pass

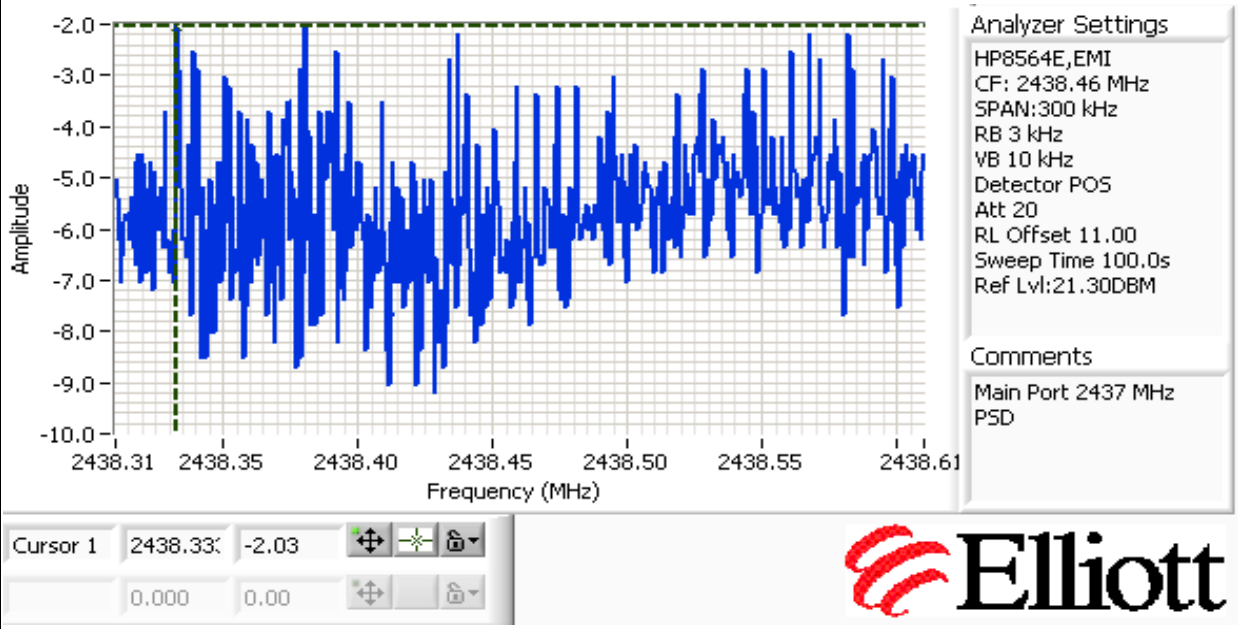
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



EMC Test Data

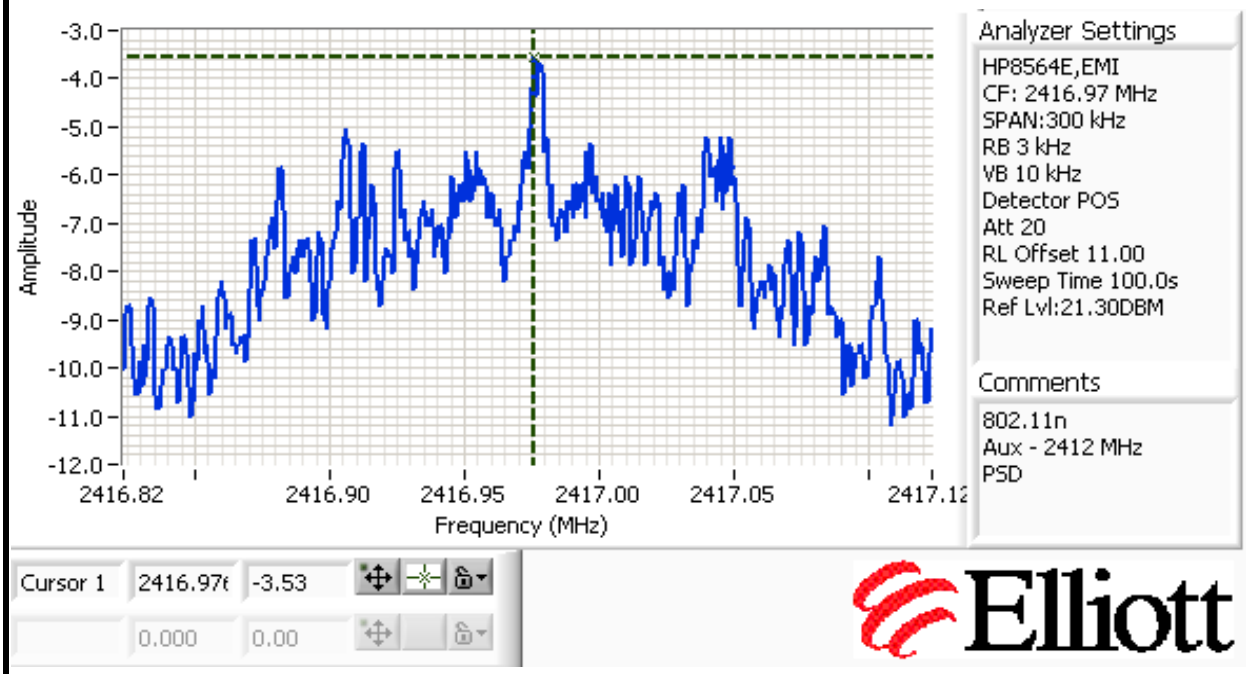
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

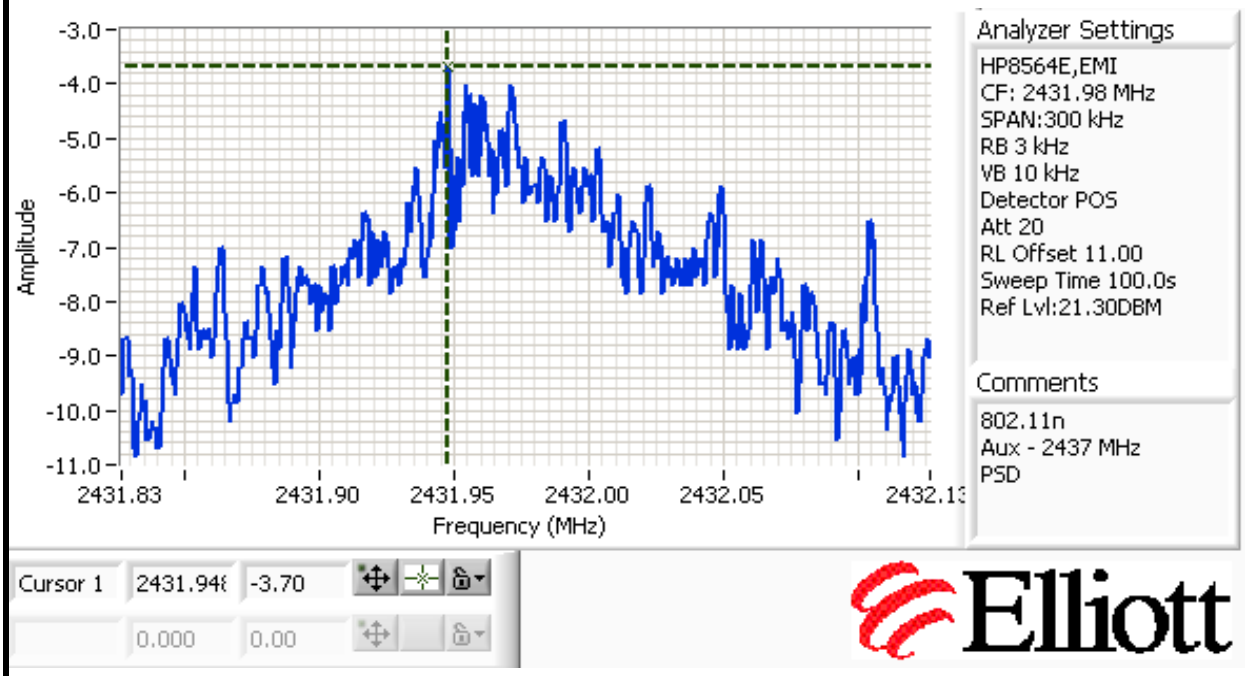




EMC Test Data

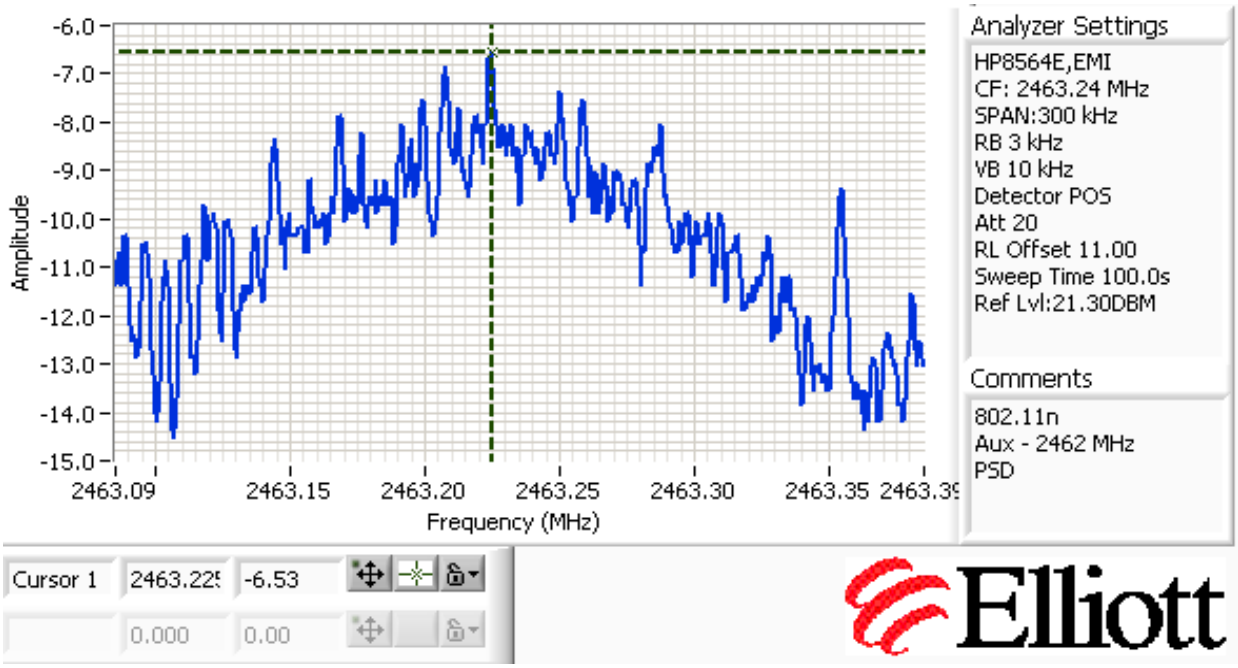
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



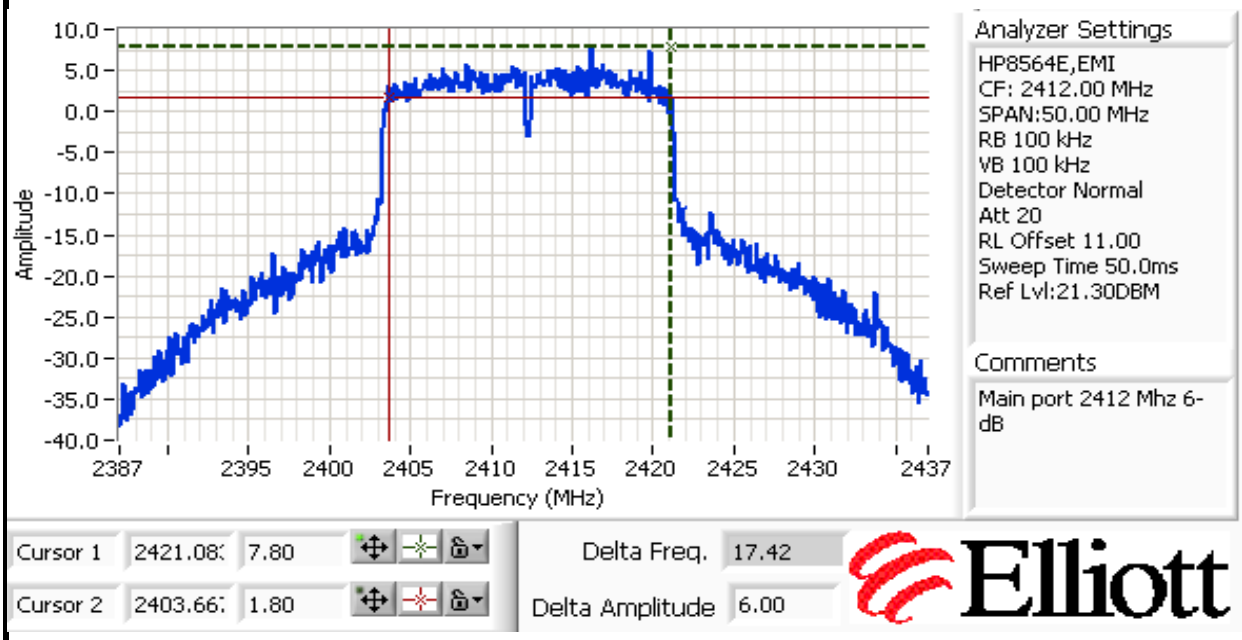
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2: Signal Bandwidth

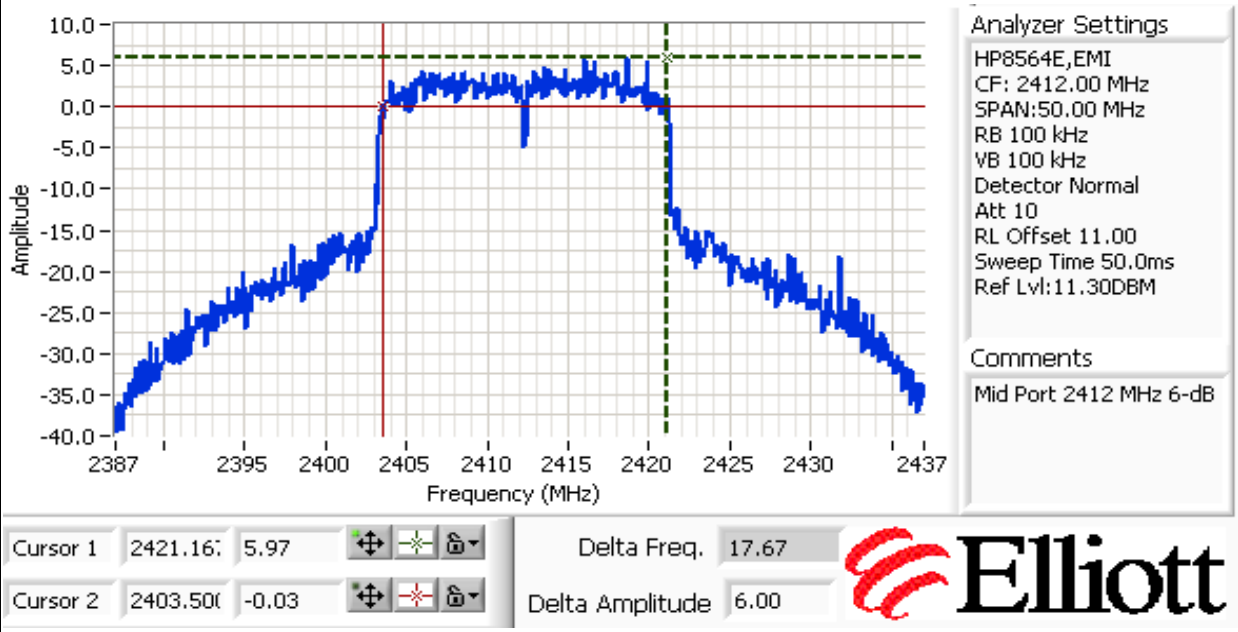
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth (MHz)	99% Signal Bandwidth
	2412	100 kHz	17.42	
	2437	100 kHz	17.5	
	2462	100 kHz	17.17	

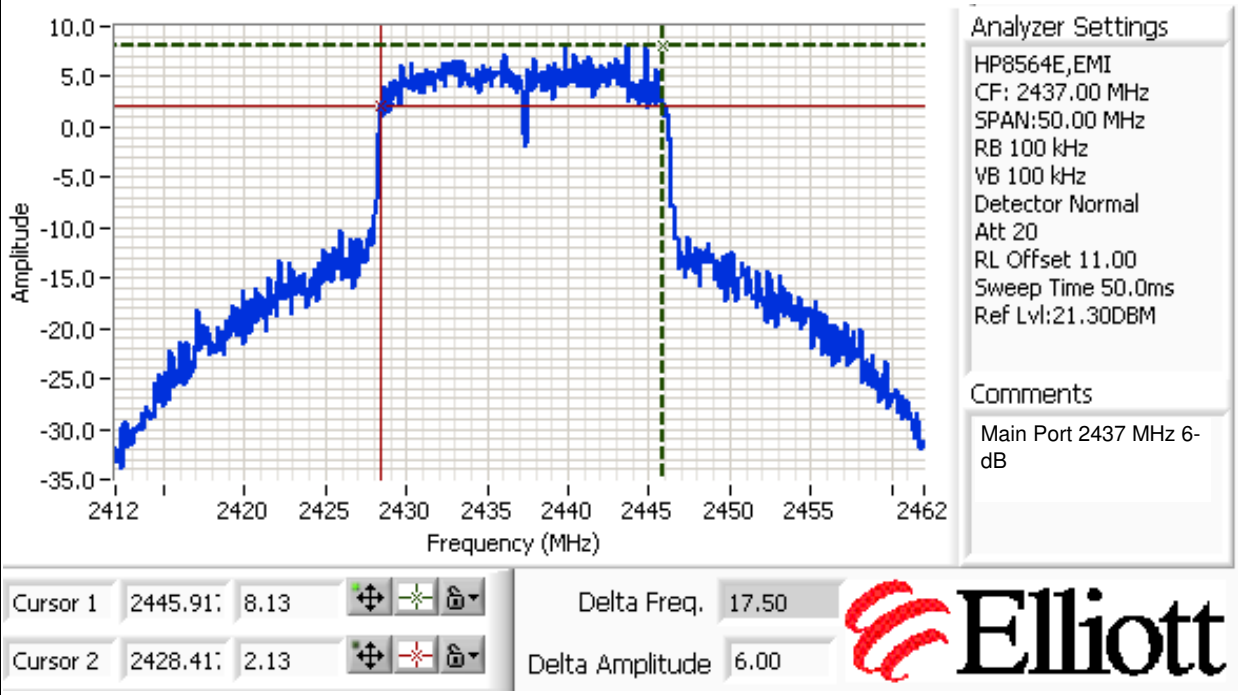
Note 1:	Measured on a single chain



EMC Test Data

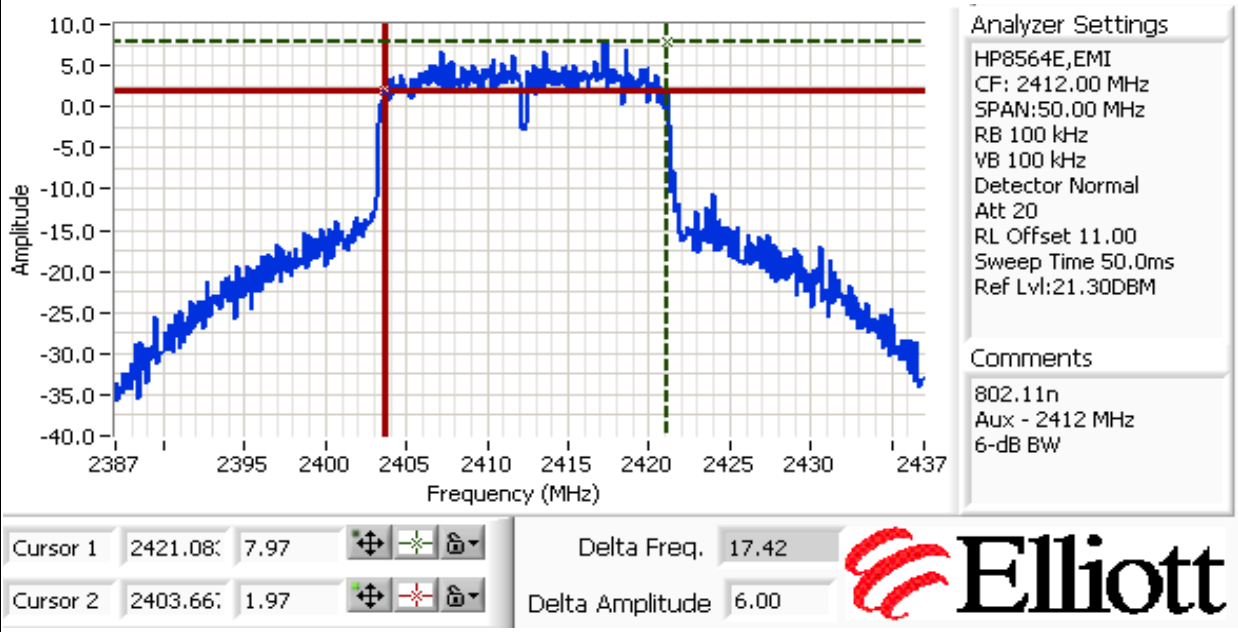
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

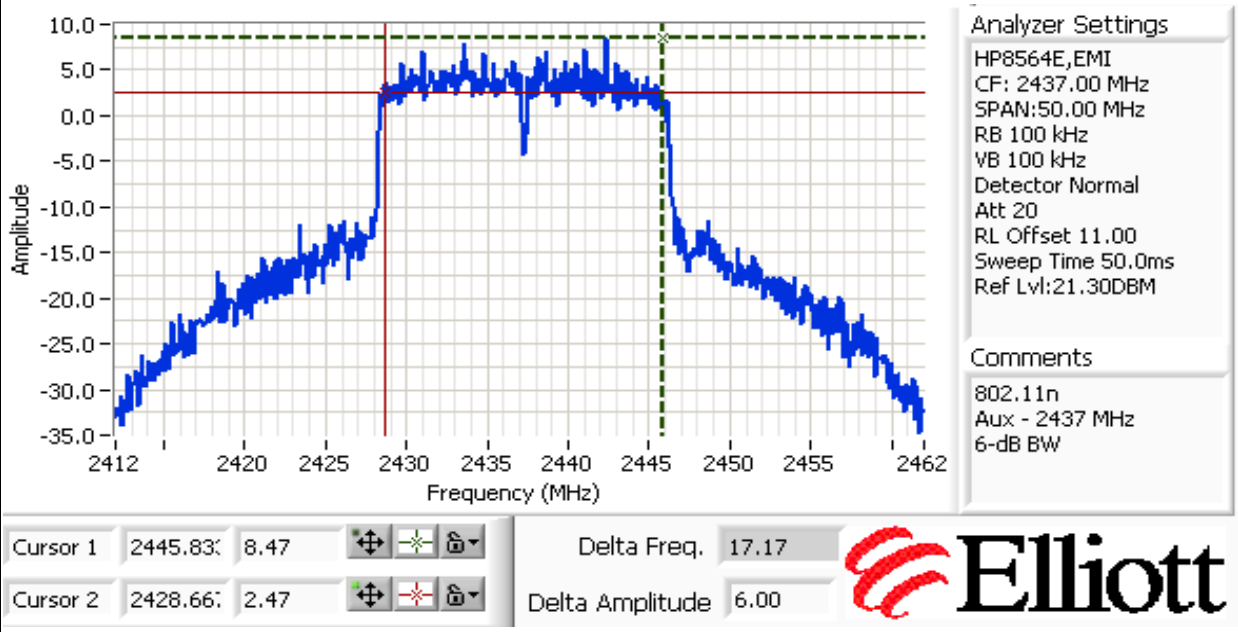




EMC Test Data

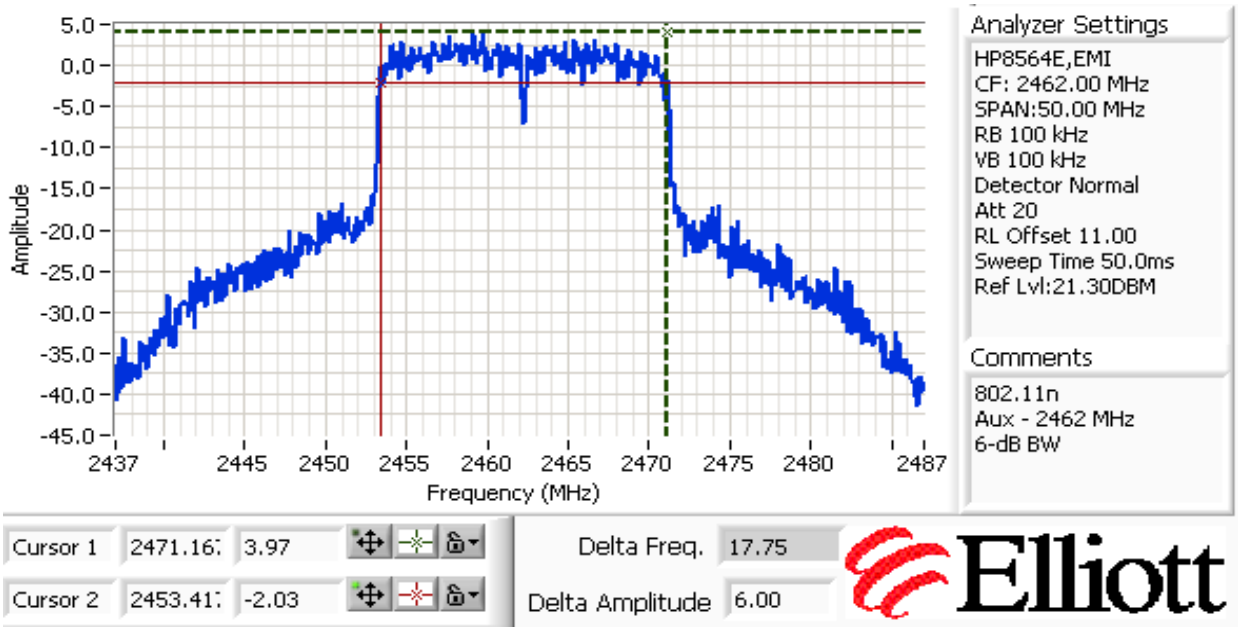
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Out of Band Spurious Emissions

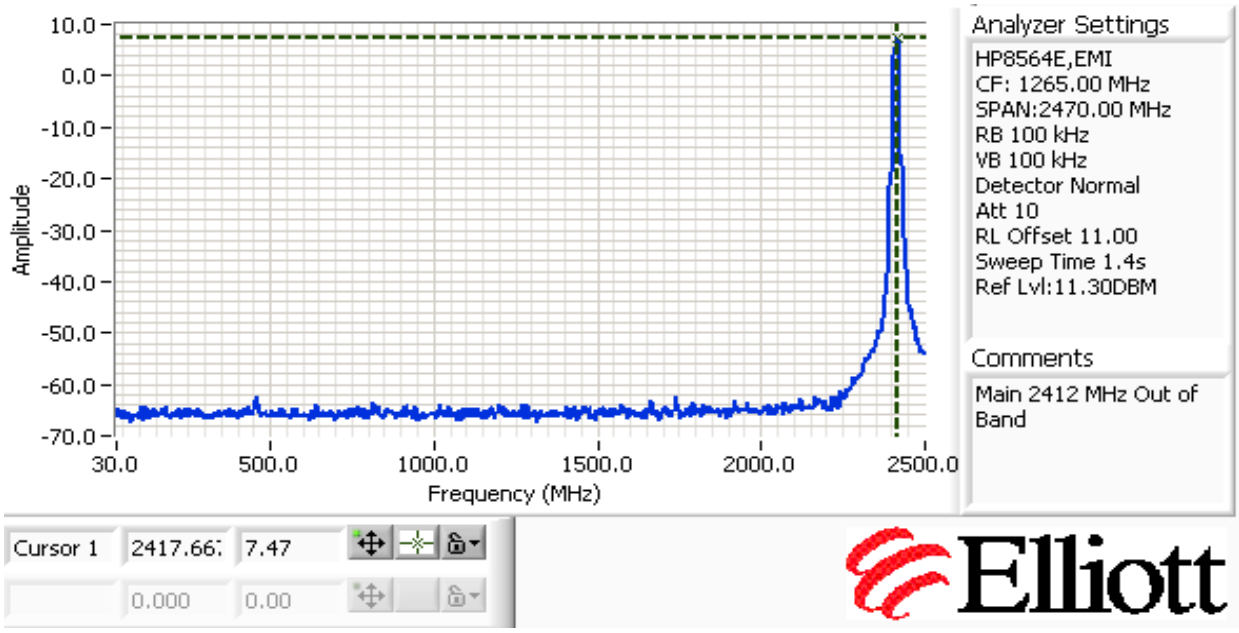
Power Setting Per Chain #1	#2	#3	Frequency (MHz)	Limit	Result
			2412	-30dBc	Refer to plot
			2437	-30dBc	Refer to plot
			2462	-30dBc	Refer to plot

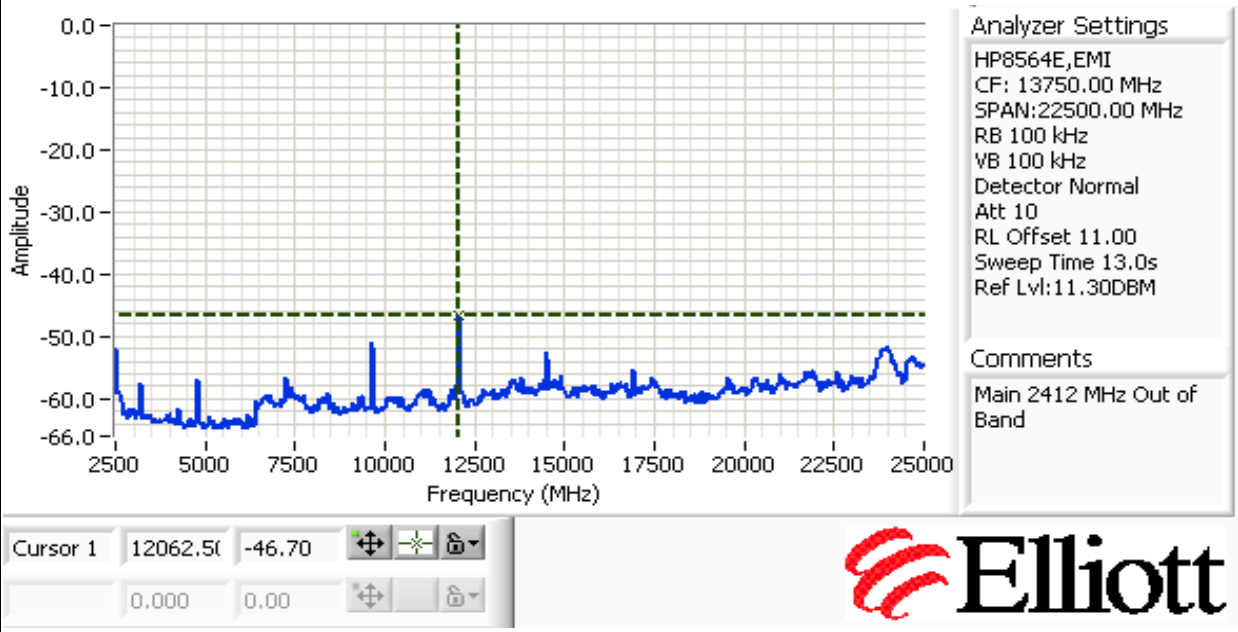
Note 1:	Measured with all chains connected together through a combiner, unused ports on the combiner terminated in 50ohms.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for low channel

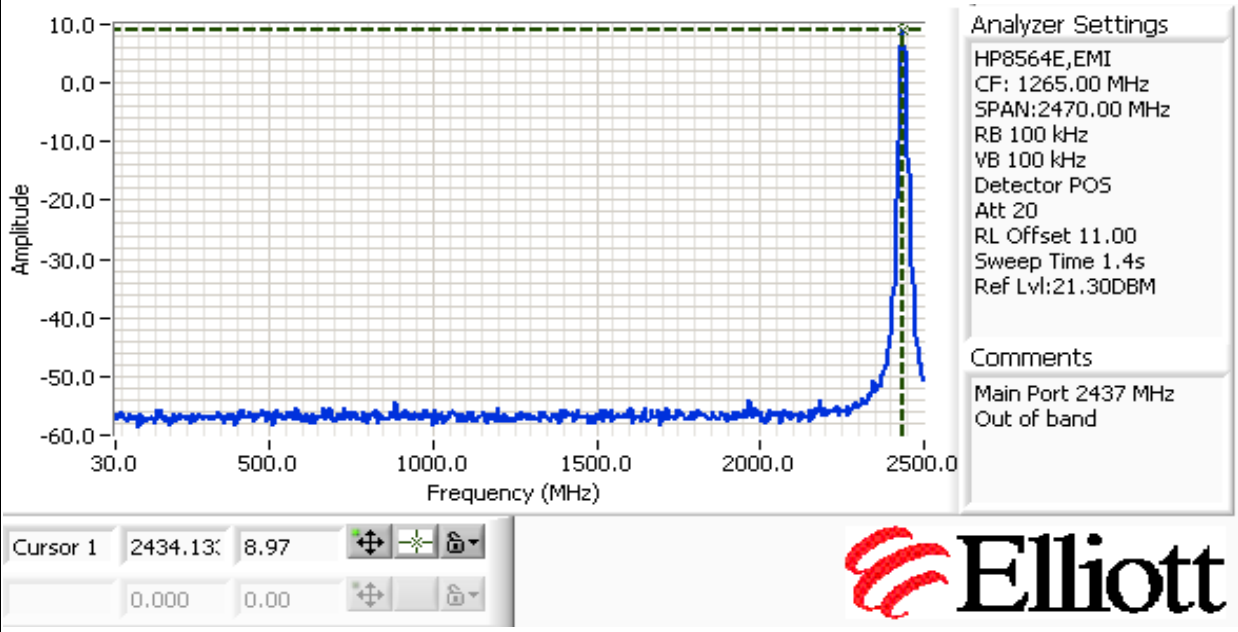


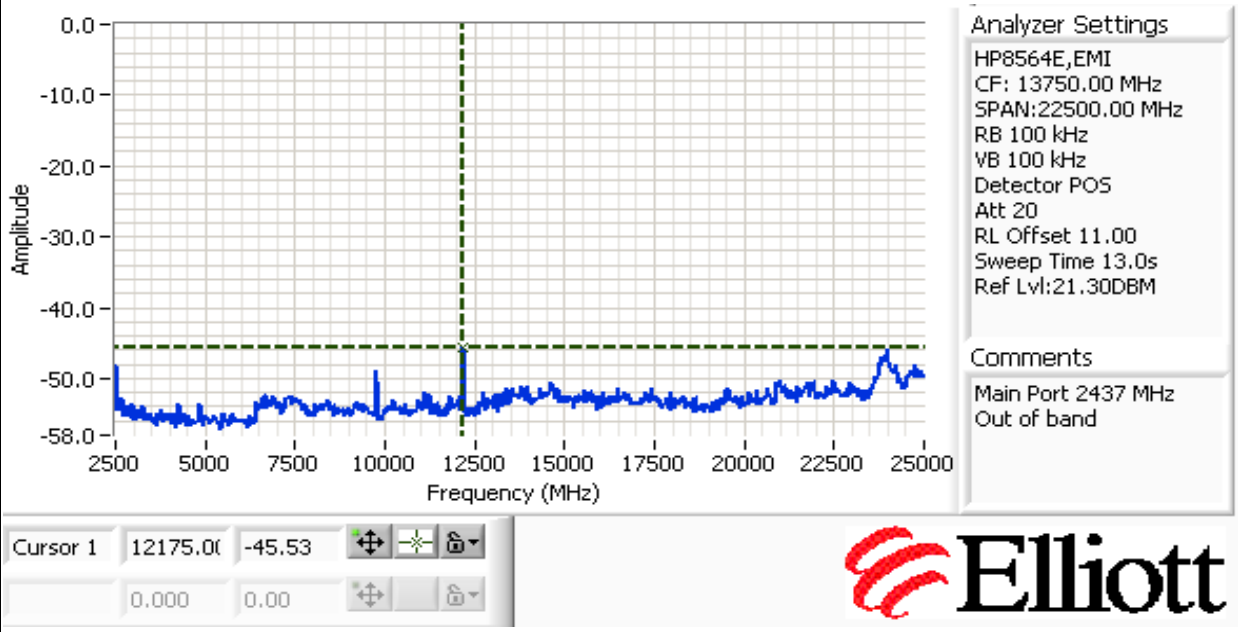


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for center channel

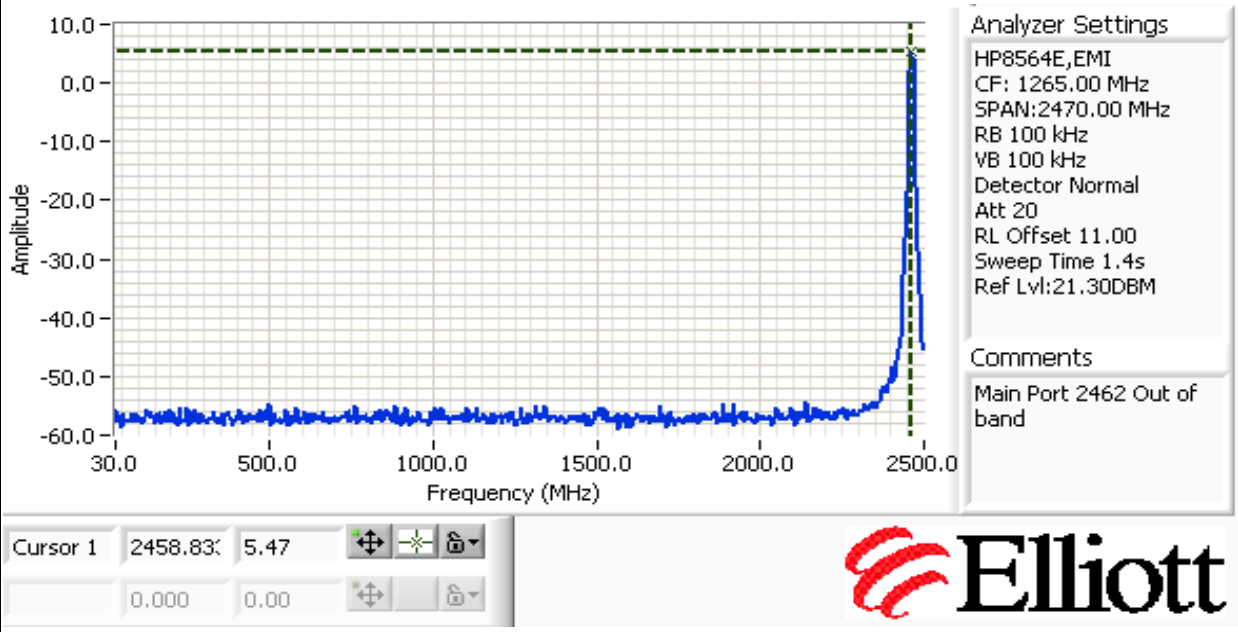


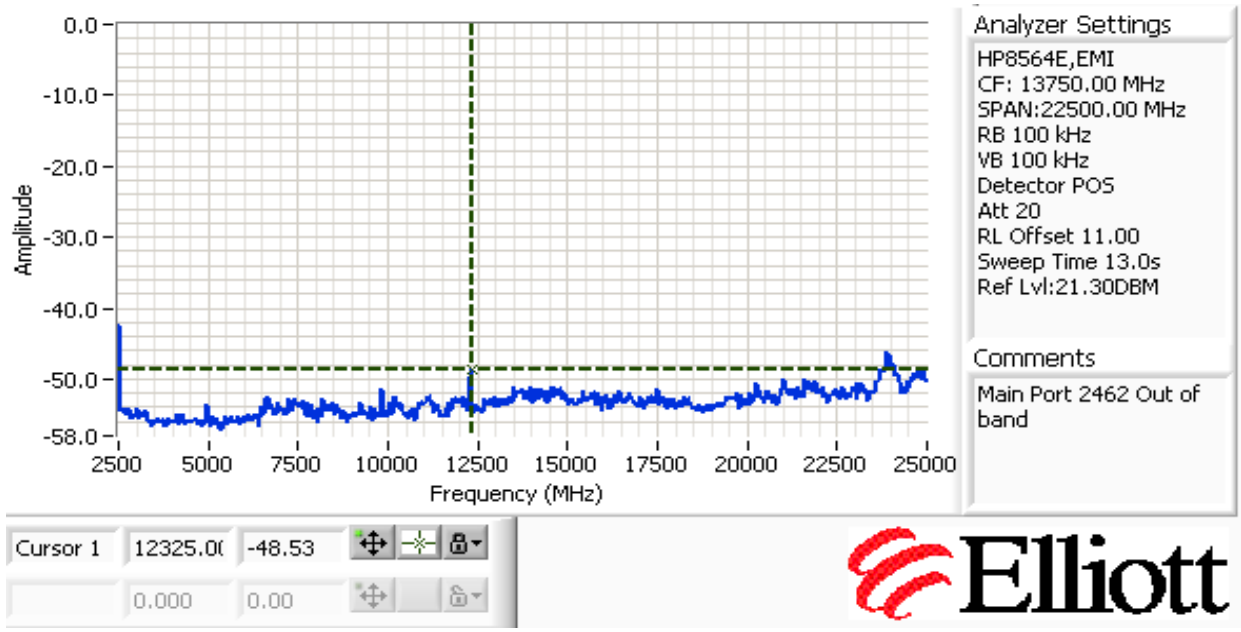


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for high channel

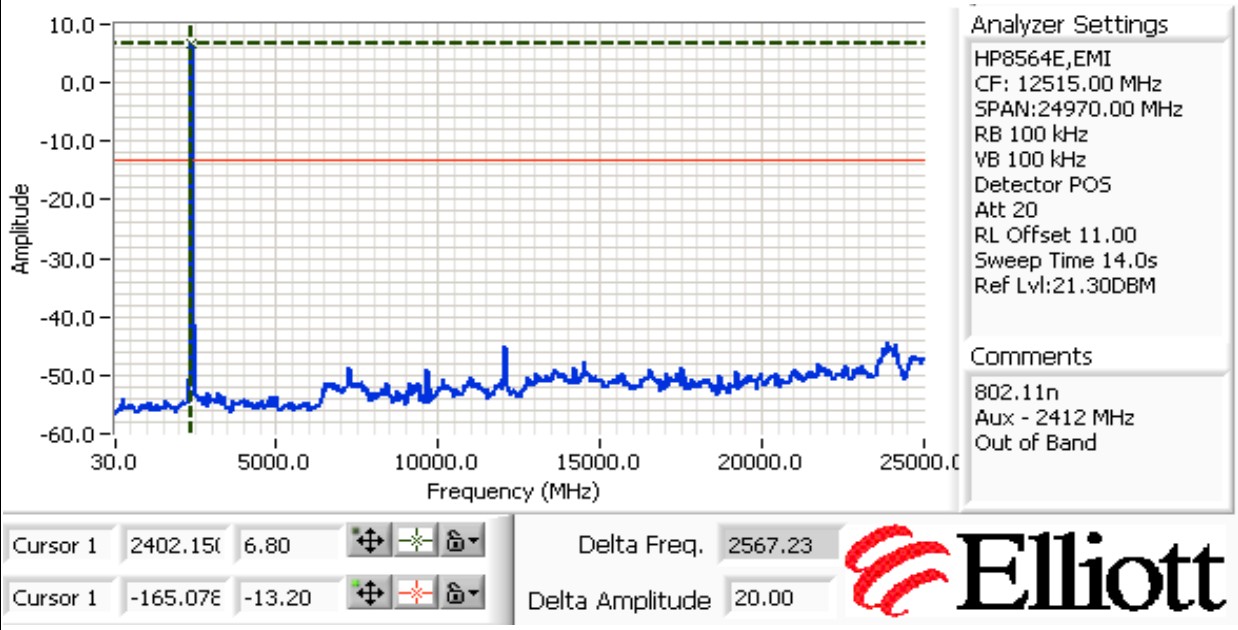




EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

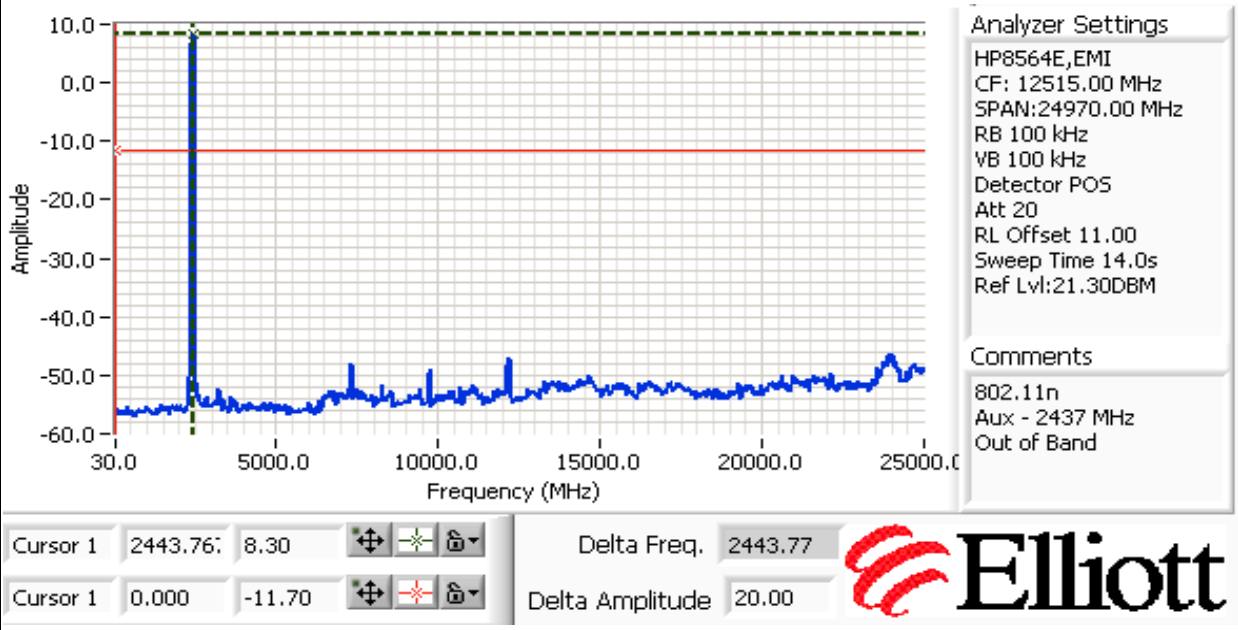
Plots for low channel



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

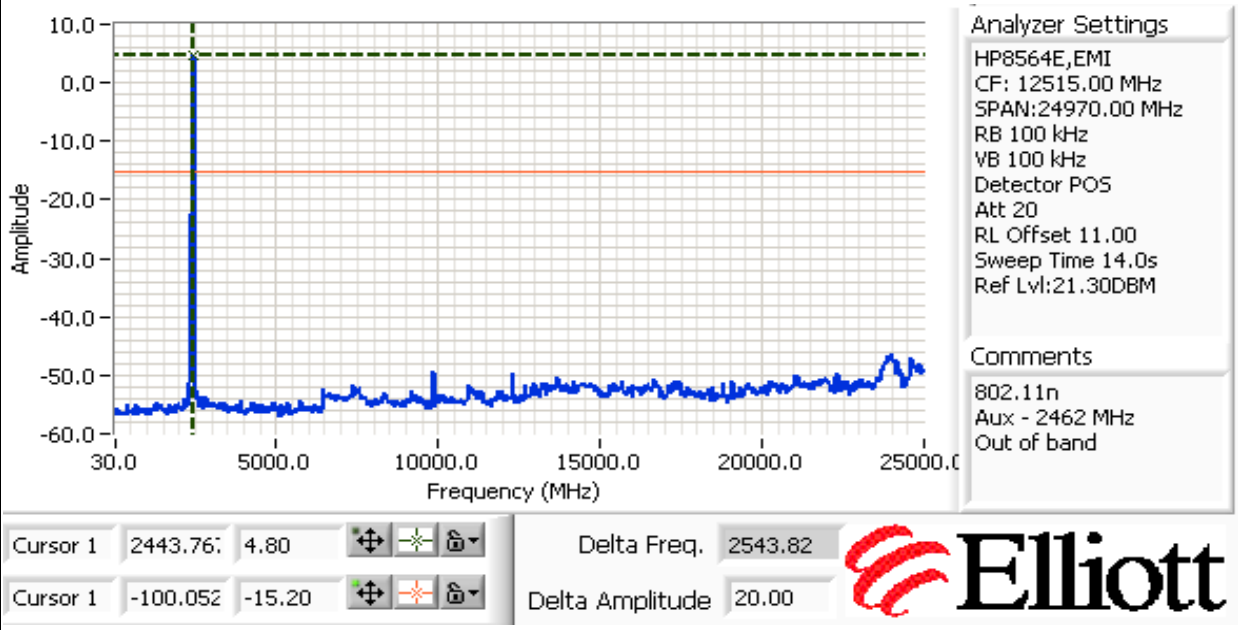
Plots for center channel



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for high channel



Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Power, Fundamental, and Spurious Emissions (802.11n, 20MHz)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/11/2006
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. Remote equipment was located underneat the table.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 20.2 °C
Rel. Humidity: 53 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power & Bandedges	FCC Part 15.209 / 15.247(c)	Pass	Refer to run
2	Radiated Spurious Emissions 1,000-26,500MHz	FCC Part 15.209 / 15.247(c)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

MAIN & AUX PORTS

Run #1: Output Power (MCS 0, CDD)

Transmitted signal on chain is coherent ? Yes

Regulatory Power Measurements:

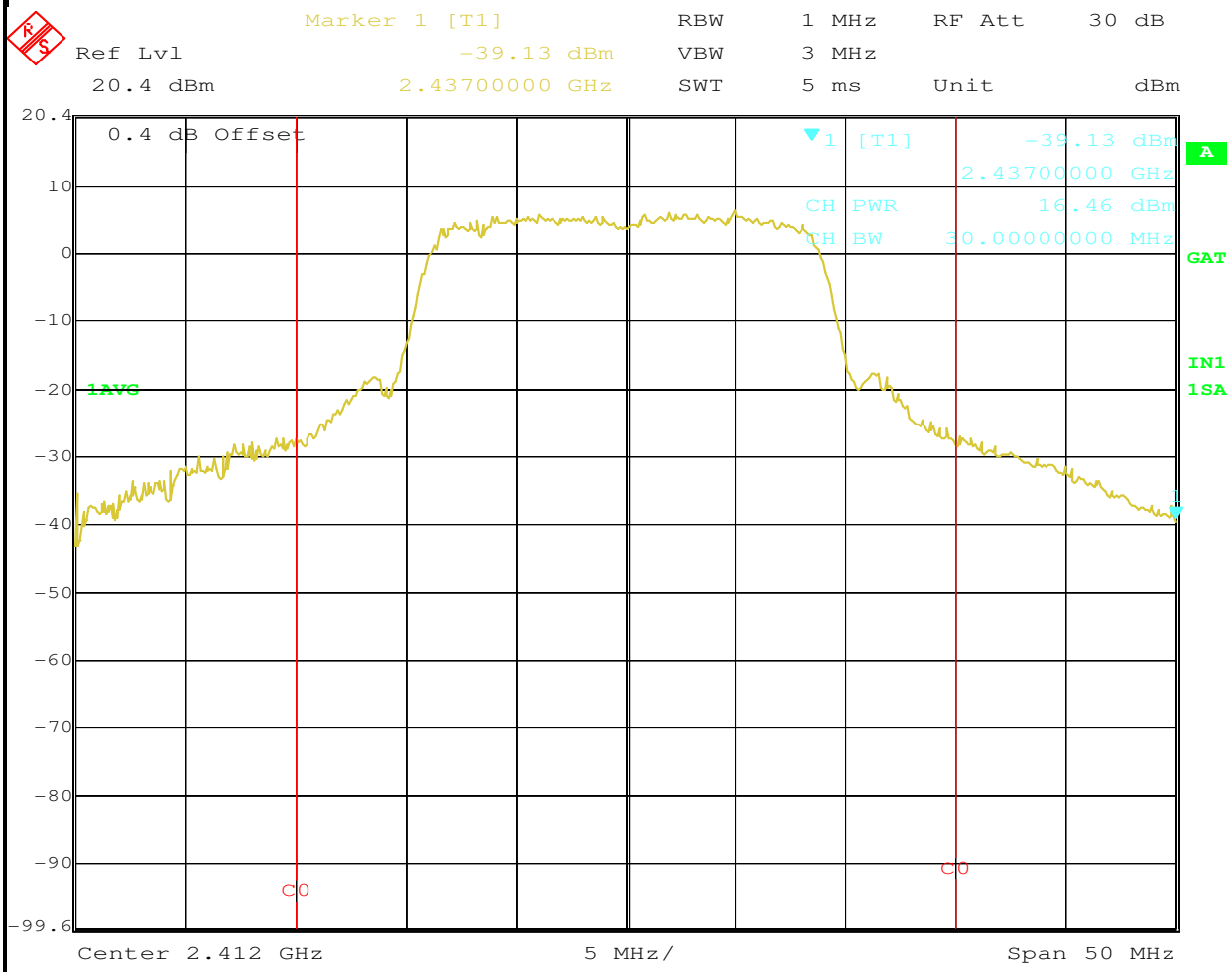
Power Setting	Frequency (MHz)	Output Power (dBm) Note 1			Antenna Gain (dBi) Note 3			EIRP Note 2	
		Main	Aux	Total	Main	Aux	Total	dBm	W
	2412	16.7	16.5	19.6	-1.6	-1.6	1.4	18.0	0.063
	2437	18.5	18.2	21.4	-1.6	-1.6	1.4	19.8	0.095
	2462	16.2	16.0	19.1	-1.6	-1.6	1.4	17.5	0.056

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was tranmsitting) and power integration over 30 MHz
Note 2:	EIRP - if transmit chains are coherent then the EIRP is calculated from the sum of the antenna gains plus the total power (i.e. beam-forming is assumed because of coherency on the chains). If the individual chains are incoherent then the EIRP is calculated from the sum of the individual EIRPs for each chain.
Note 3:	If the transmit chains are coherent then the total system antenna gain is the sum of the numeric gains for each antenna. If the transmit chains are incoherent then the system antenna gain is not applicable as each transmit chain can be treated independently.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

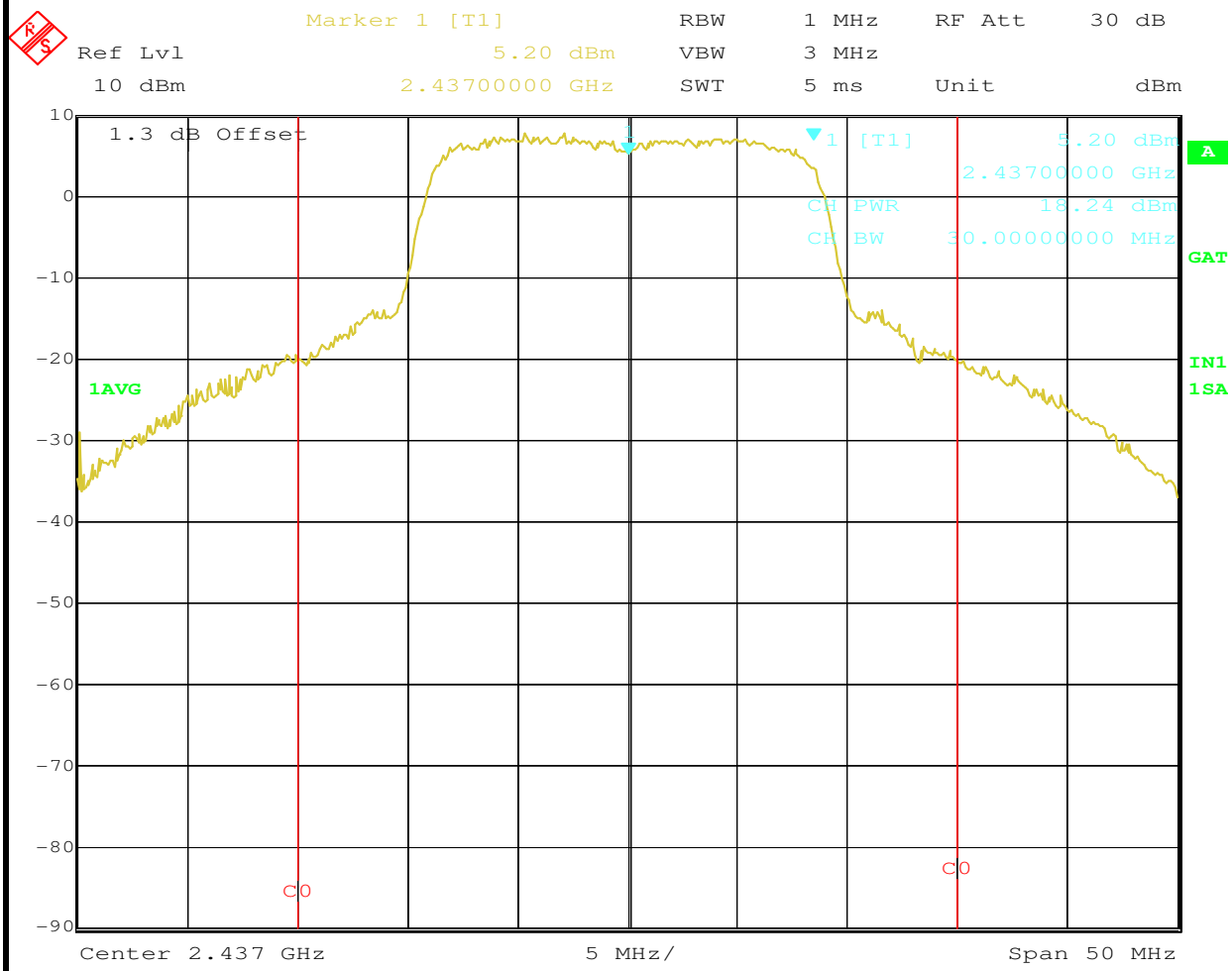
AUX PORT



Date: 2.MAY.2006 11:45:14

EMC Test Data

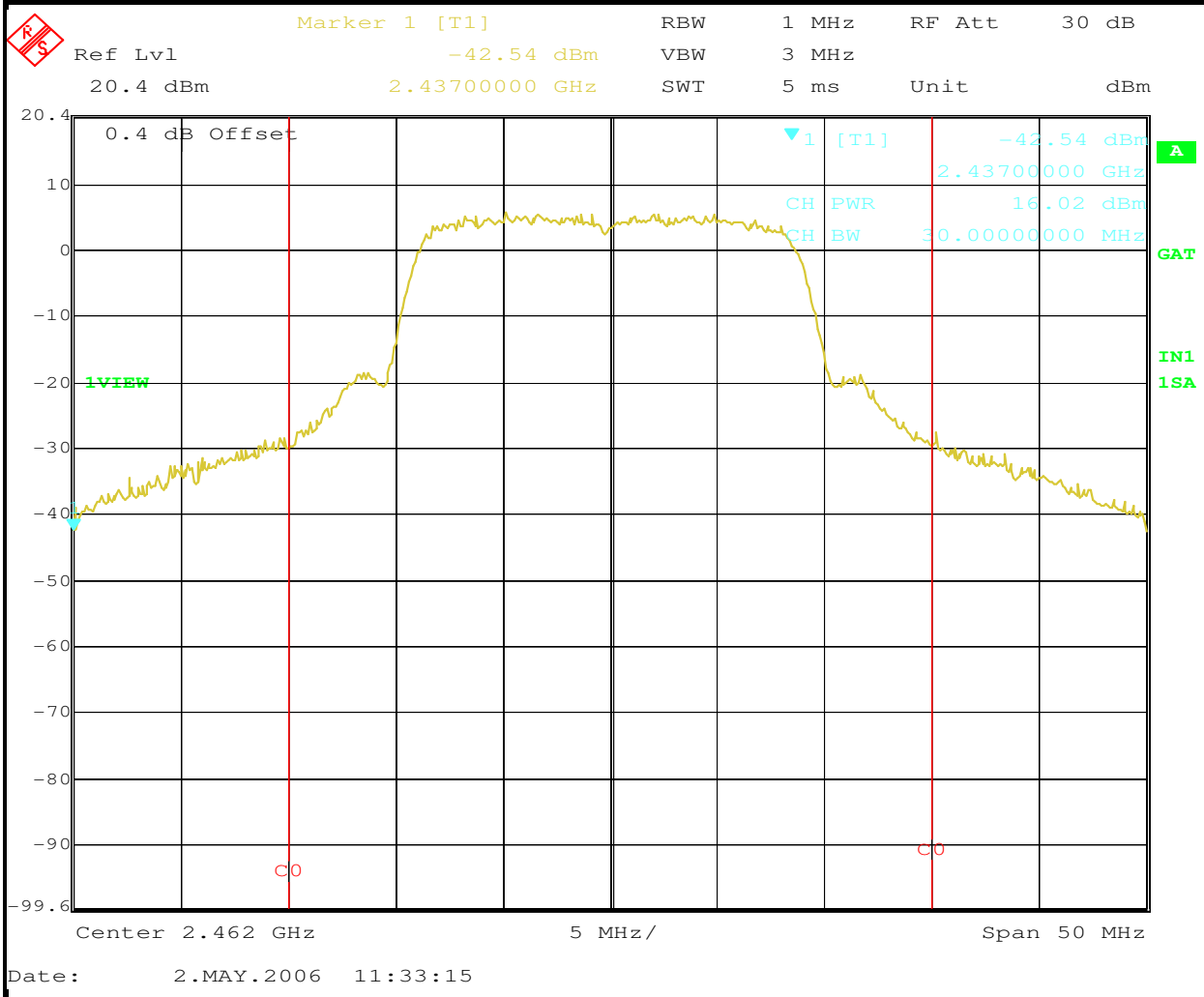
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 24.APR.2006 16:38:26

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

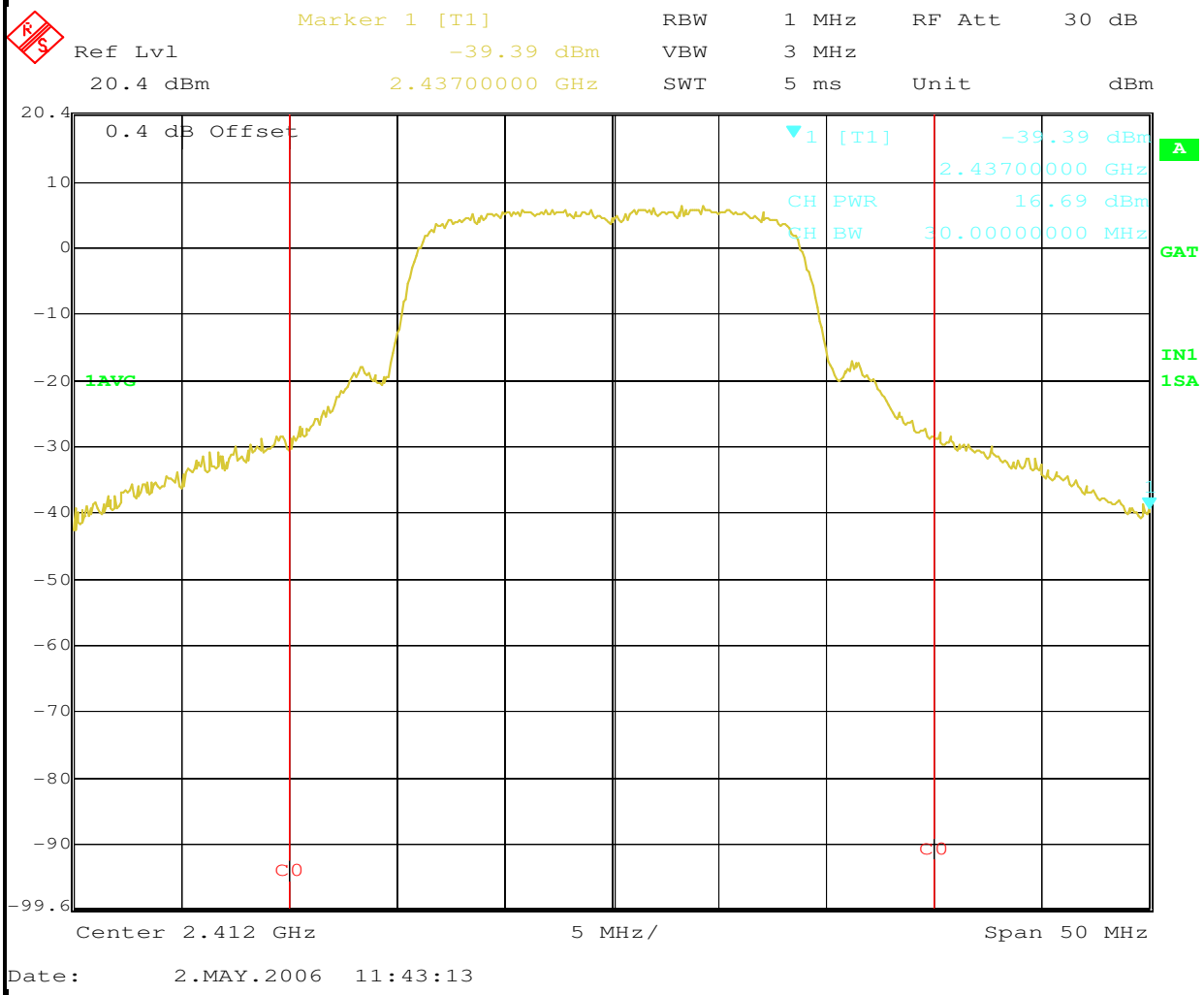


Date: 2.MAY.2006 11:33:15

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

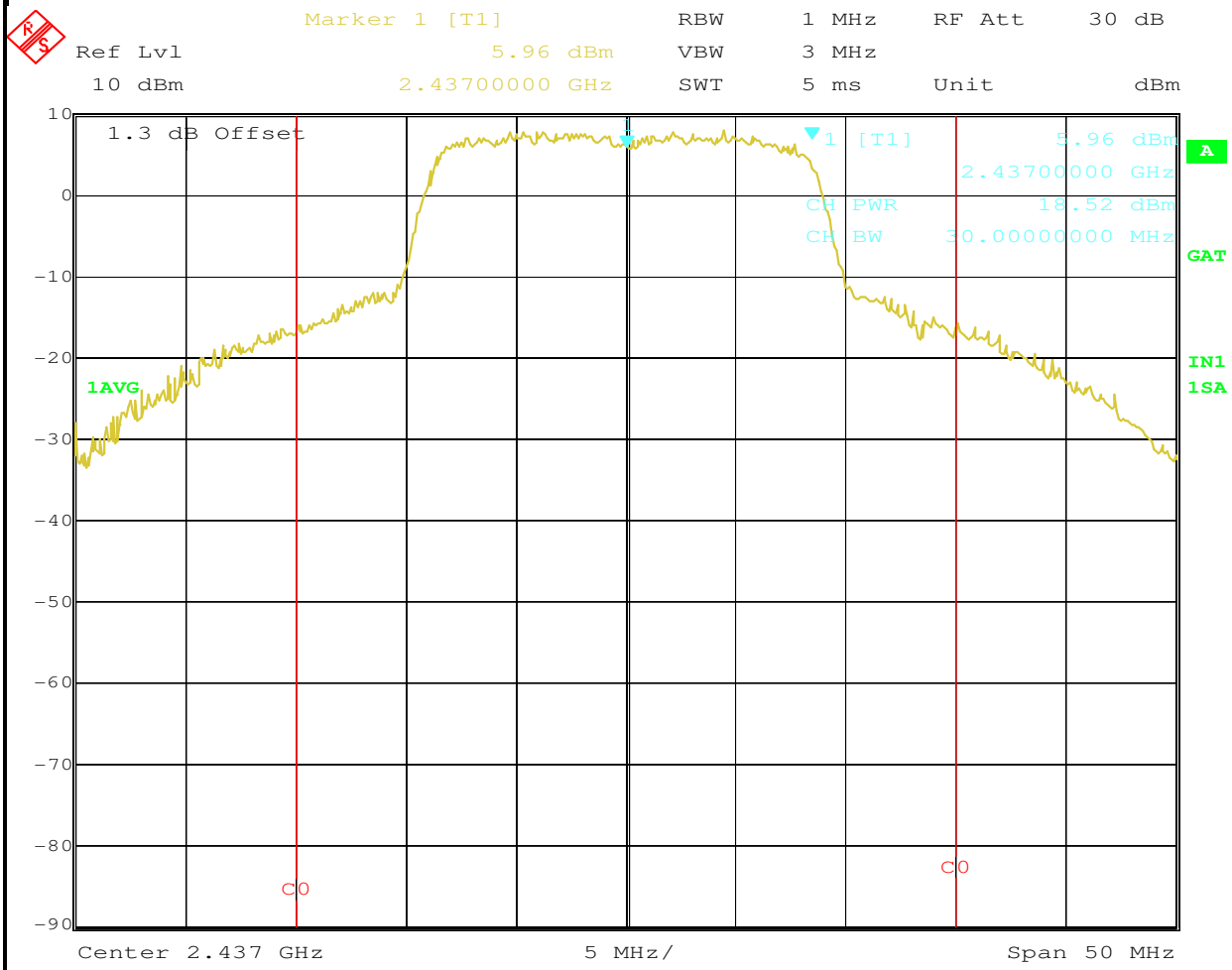
MAIN PORT



Date: 2.MAY.2006 11:43:13

EMC Test Data

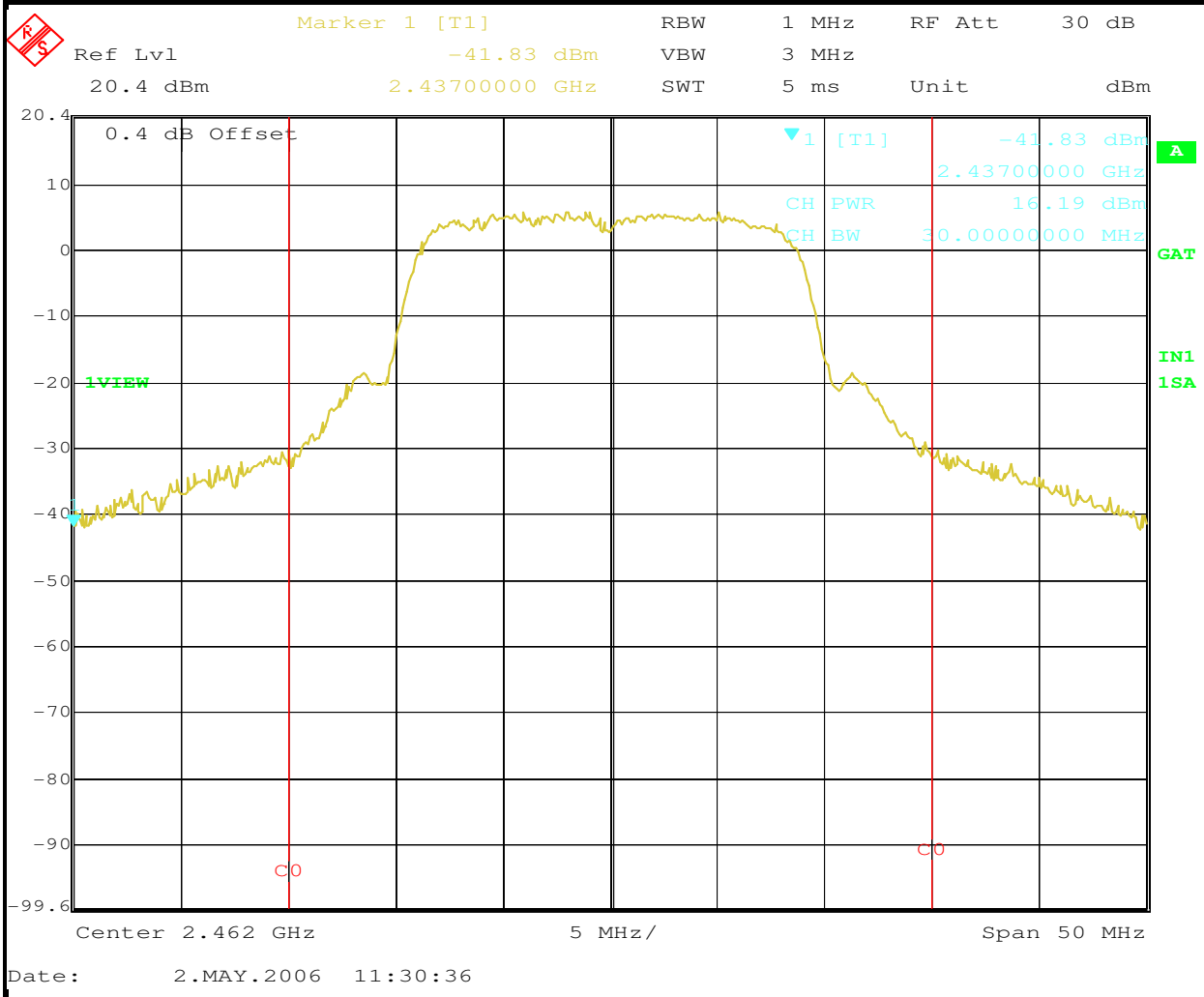
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 24.APR.2006 16:40:27

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



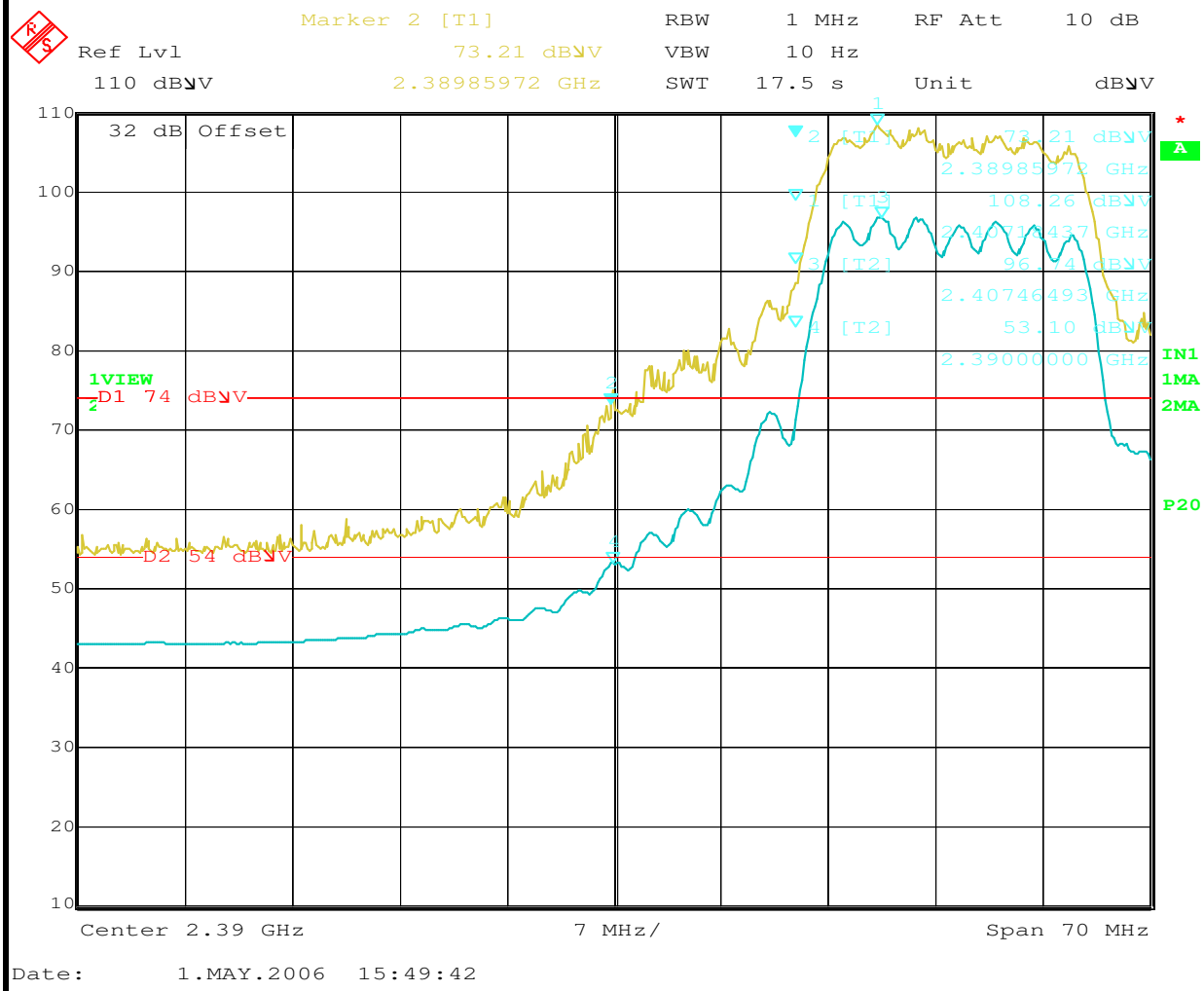
Date: 2.MAY.2006 11:30:36

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1a: Radiated Fundamental and Bandedge.

(refer to power tables of run 1 of 20MHz data), Channel 1 (2412 MHz), 20MHz (Horizontal)

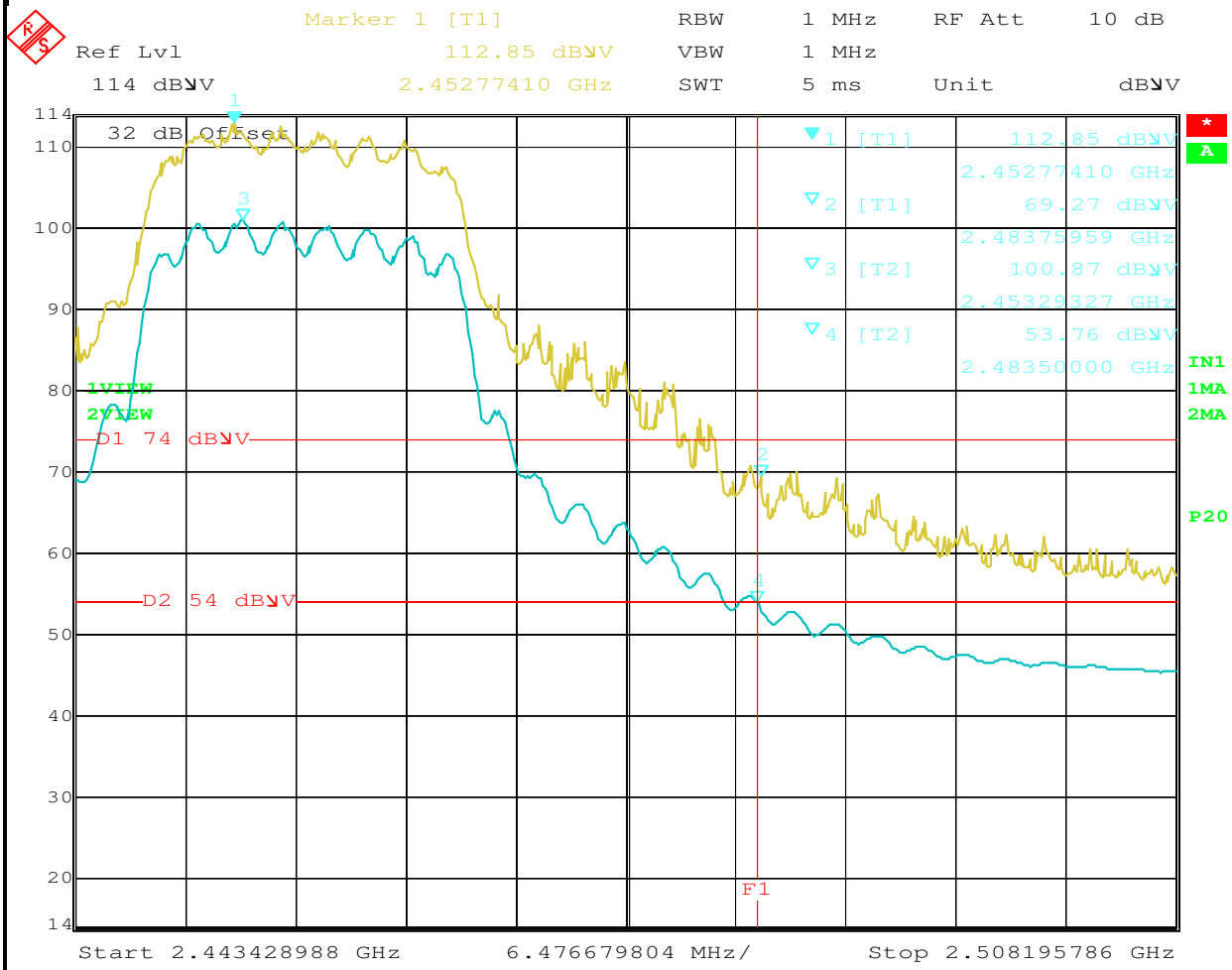


Date: 1.MAY.2006 15:49:42

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

20MHz, CDD MCS 0 (refer to power tables of run 1 of 20MHz data), Horizontal
Antennas: Main and Auxiliary (High Channel @ 2452 MHz)



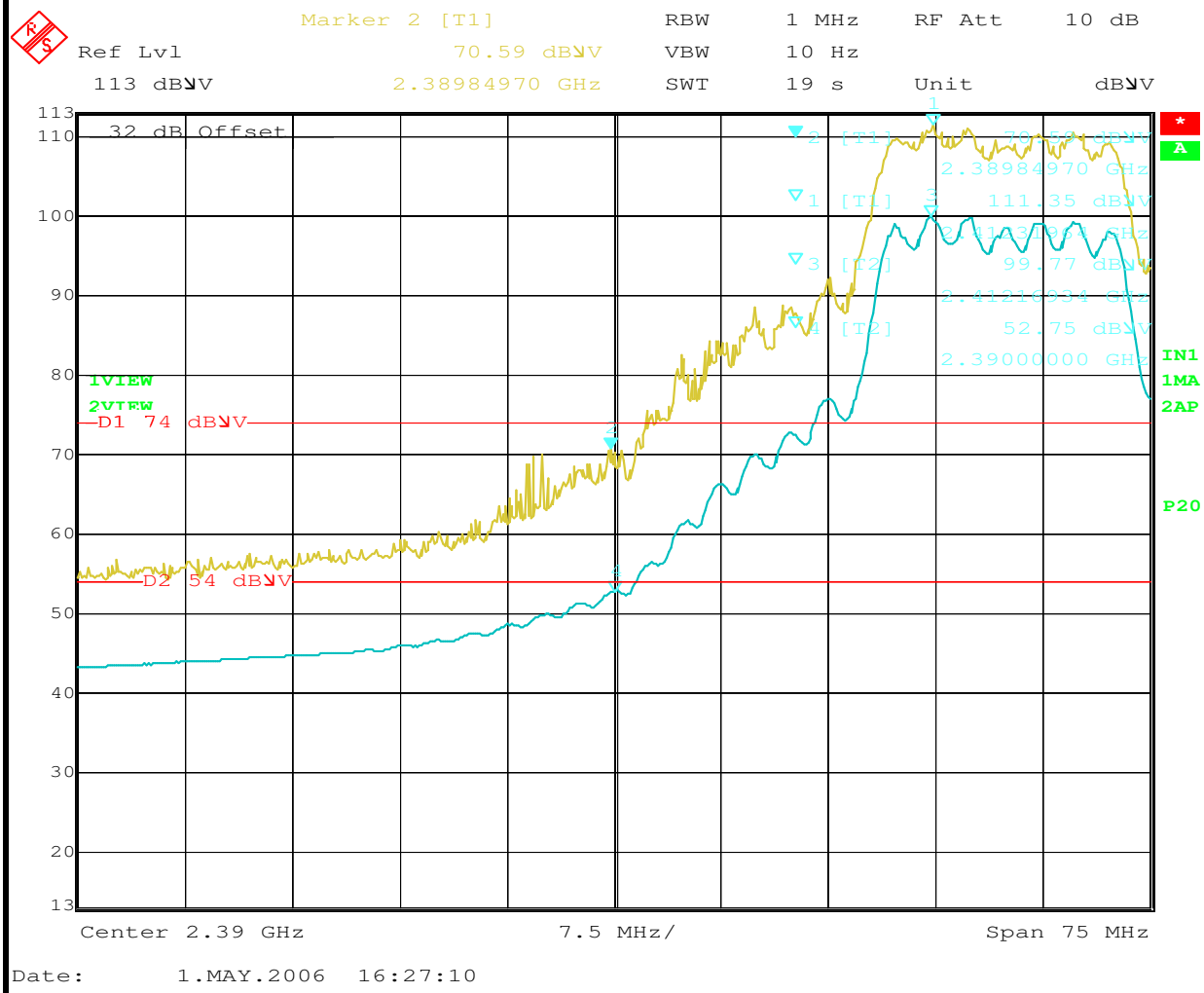
Date: 25.APR.2006 11:07:32

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1b: Radiated Fundamental and Bandedge.

(refer to power tables of run 1 of 20MHz data), Channel 2 (2417 MHz), 20MHz (Vertical)

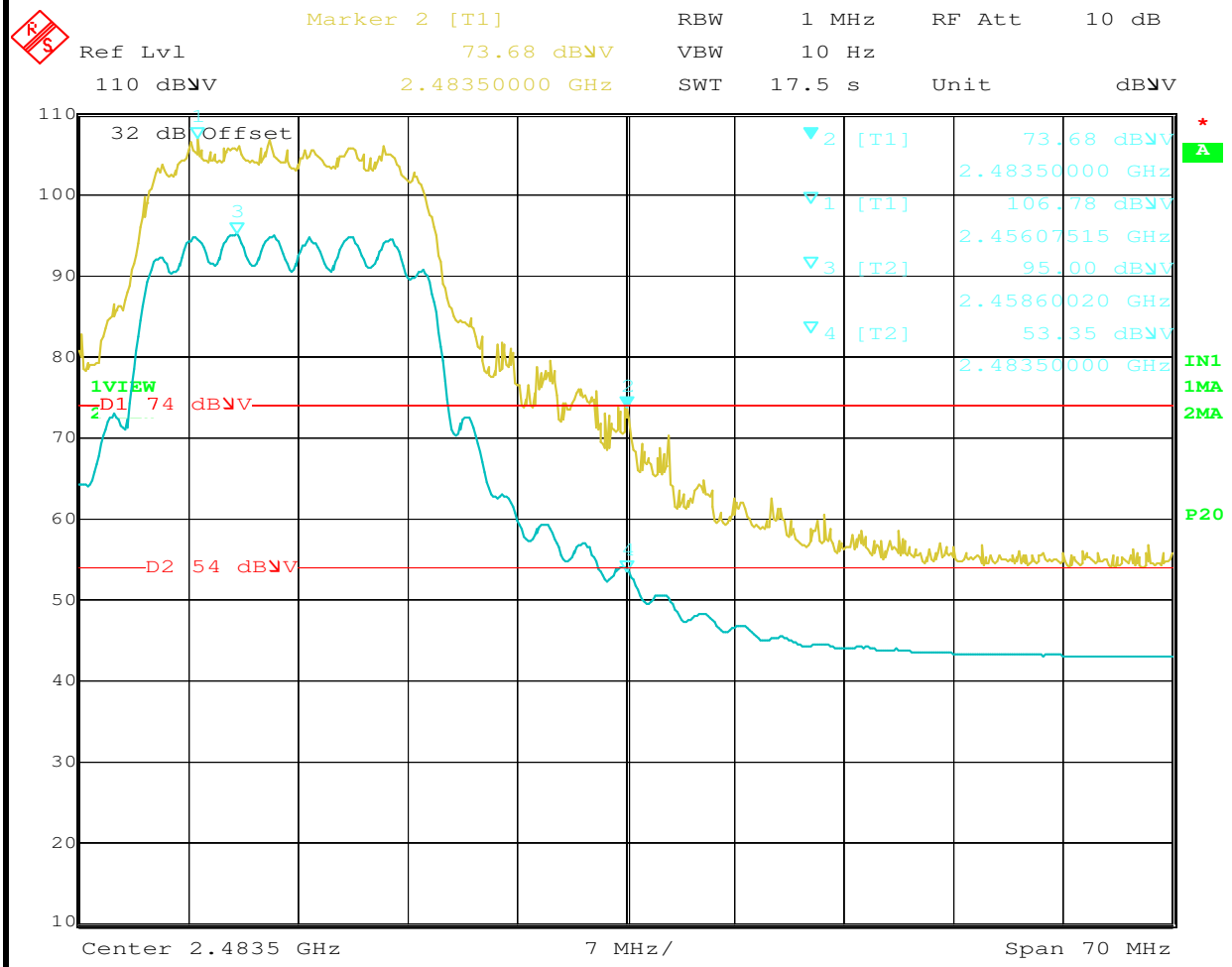


Date: 1.MAY.2006 16:27:10

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

(refer to power tables of run 1 of 20MHz data), Channel 11 (2462 MHz), 20MHz (Vertical)

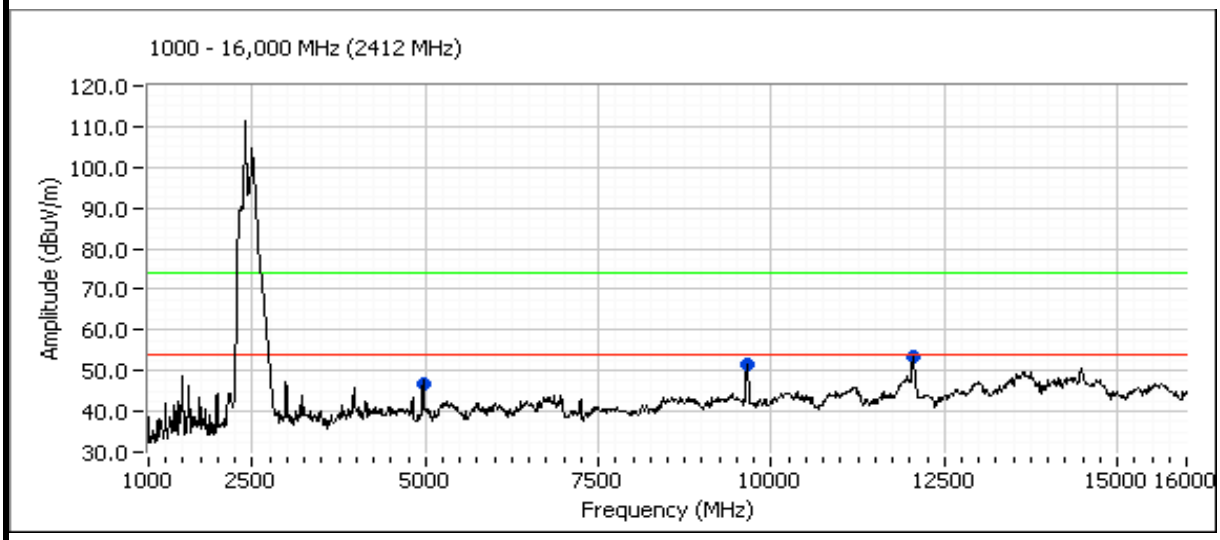


Date: 1.MAY.2006 16:09:54

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 26,500 MHz. Low Channel @ 2412 MHz, CDD MCS 0
(refer to power tables of run 1 of 20MHz data)+A555
Antennas: Main and Auxiliary



Harmonics 2412 MHz (20MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
4970.000	46.8	V	54.0	-7.2	Peak	162	1.2	Restricted, Note 2
9640.000	51.7	V	54.0	-2.3	Peak	276	1.2	Non-restricted, Note 2
12051.54	44.2	V	54.0	-9.8	AVG	253	1.6	
12051.54	56.7	V	74.0	-17.3	PK	253	1.6	

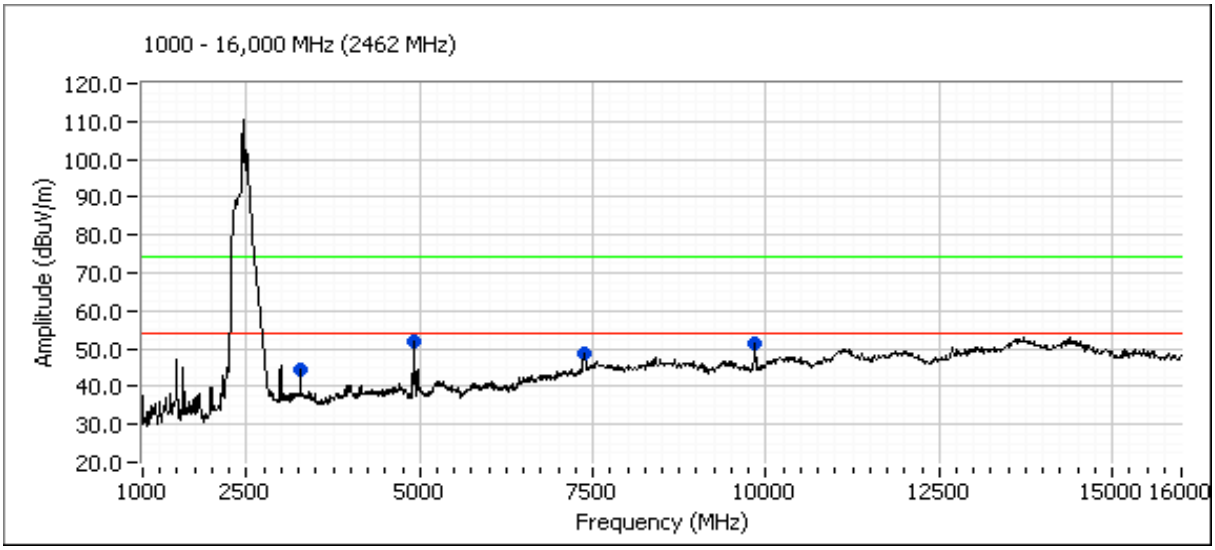
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Radiated Spurious Emissions, 100 - 26,500 MHz. High Channel @ 2462 MHz, CDD MCS 0
(refer to power tables of run 1 of 20MHz data)
Antennas: Main and Auxiliary



Harmonics 2462 (20MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
3280.000	44.5	H	54.0	-9.5	Peak	124	1.6	Non-restricted, Note 2
7375.000	48.8	V	54.0	-5.2	Peak	120	1.3	Restricted, Note 2
9850.000	51.3	V	54.0	-2.7	Peak	103	1.0	Non-restricted, Note 2
4923.937	50.0	V	54.0	-4.0	AVG	291	1.6	Restricted
4923.937	58.6	V	74.0	-15.5	PK	291	1.6	Restricted

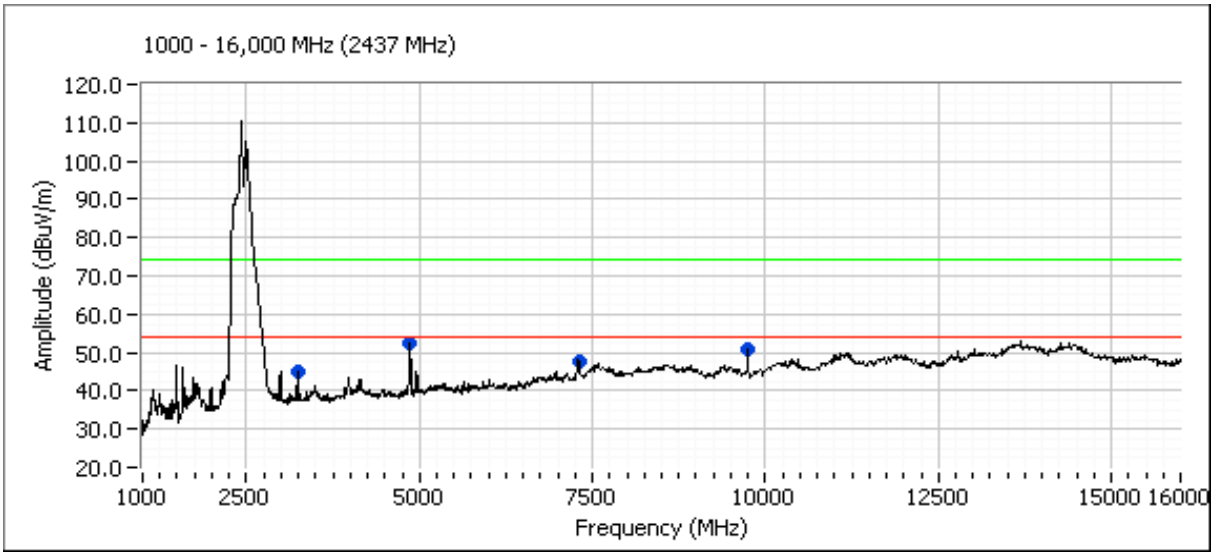
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #4: Radiated Spurious Emissions, 1000 - 16,000 MHz. Middle Channel @ 2437 MHz, CDD MCS 0
(refer to power tables of run 1 of 20MHz data)
Antennas: Main and Auxiliary



Harmonics 2437 (20MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
3240.000	45.0	H	54.0	-9.0	Peak	120	1.6	Non-restricted, Note 2
7315.000	47.7	V	54.0	-6.3	Peak	116	1.3	Restricted, Note 2
9745.000	50.9	V	54.0	-3.1	Peak	81	1.6	Non-restricted, Note 2
4874.167	51.7	V	54.0	-2.3	AVG	287	1.0	Restricted
4874.167	58.2	V	74.0	-15.8	PK	287	1.0	Restricted

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Antenna Port Bandwidth and Spurious Emissions (802.11n, 40 MHz)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/21/2006
Test Engineer: Jmartinez
Test Location: Chamber #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V, 60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. For the spurious emissions all transmit chains were connected simultaneously to the analyzer via a combiner. All other measurements were made on a single chain.

All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 57 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run
2	6dB Bandwidth	15.247(a)	Pass	Refer to run
3	Spurious emissions	15.247(b)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

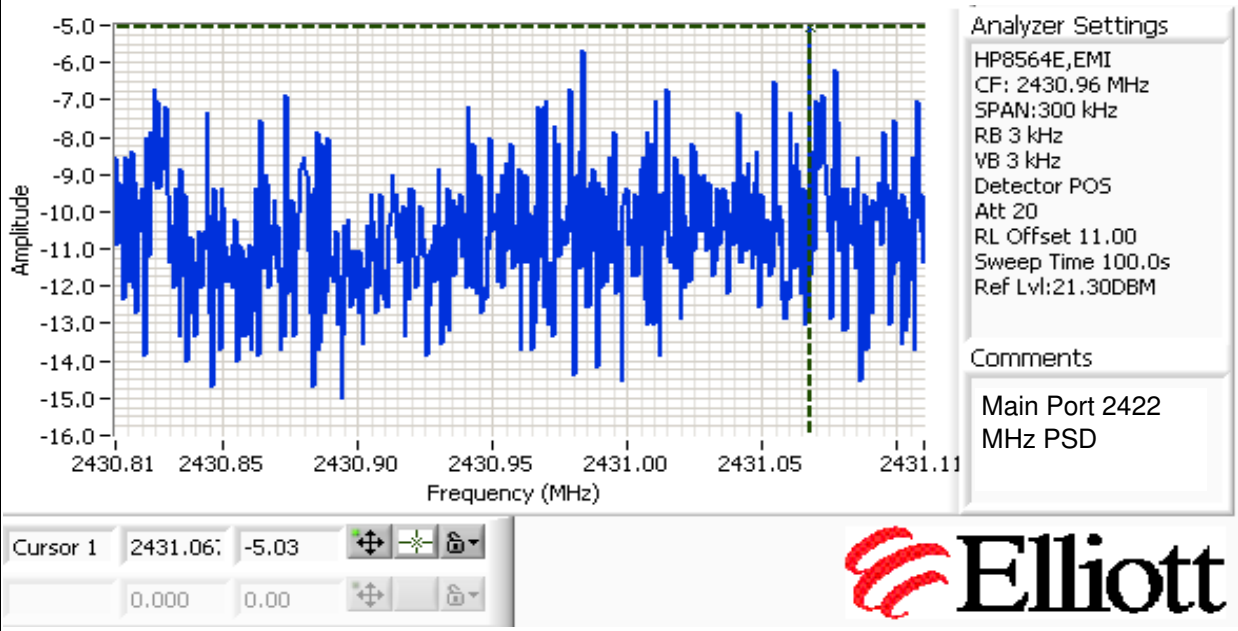
EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run# 1: Power Spectral Density

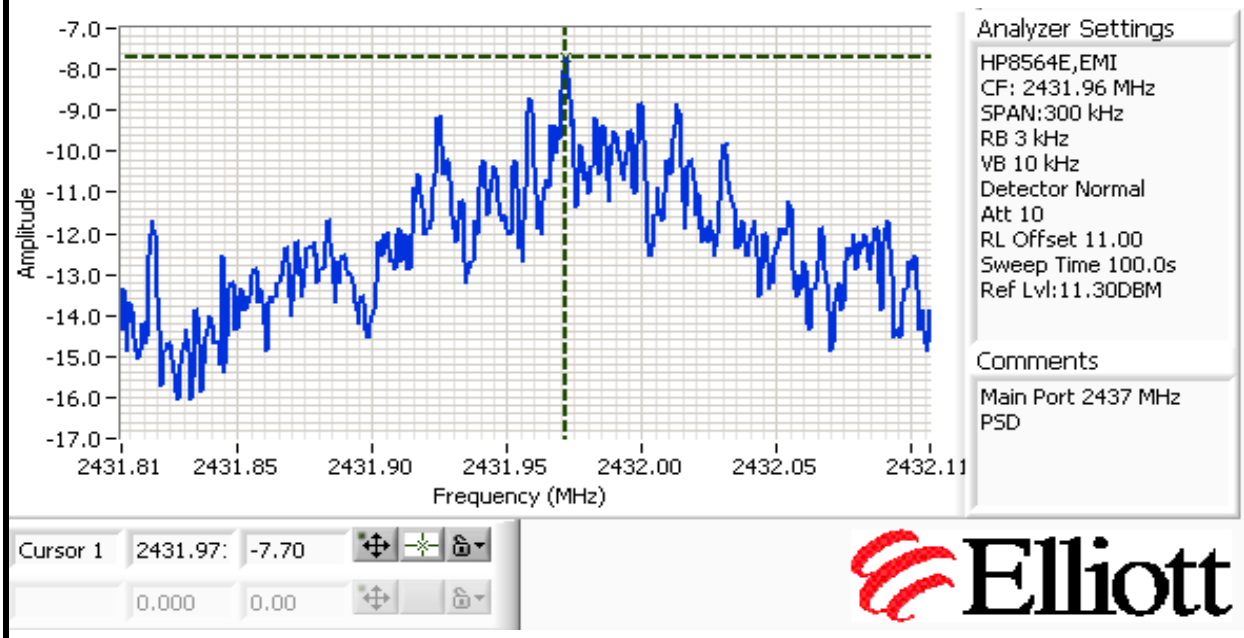
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1			Limit	Result
		Main	Aux	Total	dBm/3kHz	
	2422	-5.0	-7.9	-3.2	8.0	Pass
	2437	-7.7	-8.2	-4.9	8.0	Pass
	2452	-4.0	-4.7	-1.3	8.0	Pass

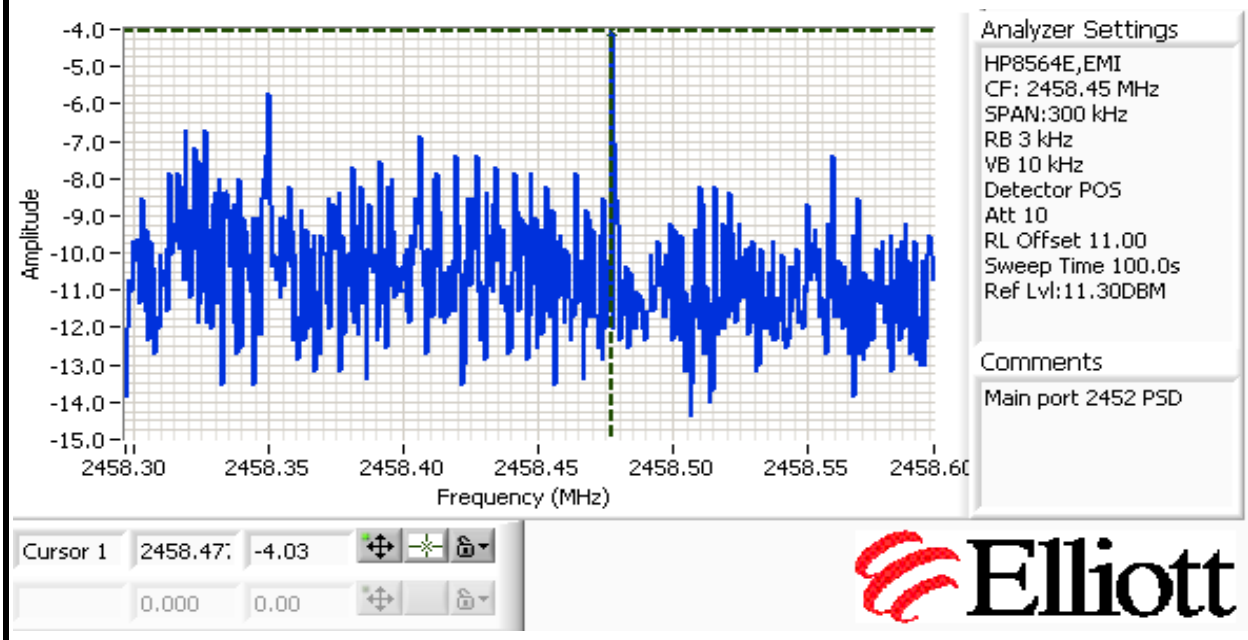
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



EMC Test Data

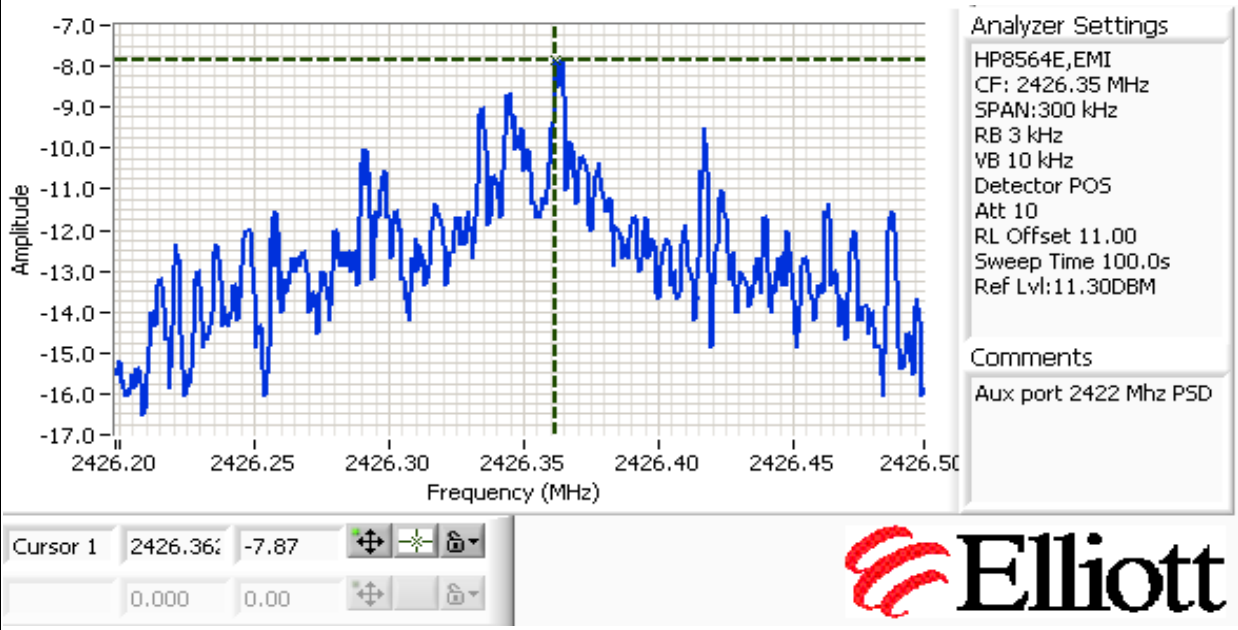
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

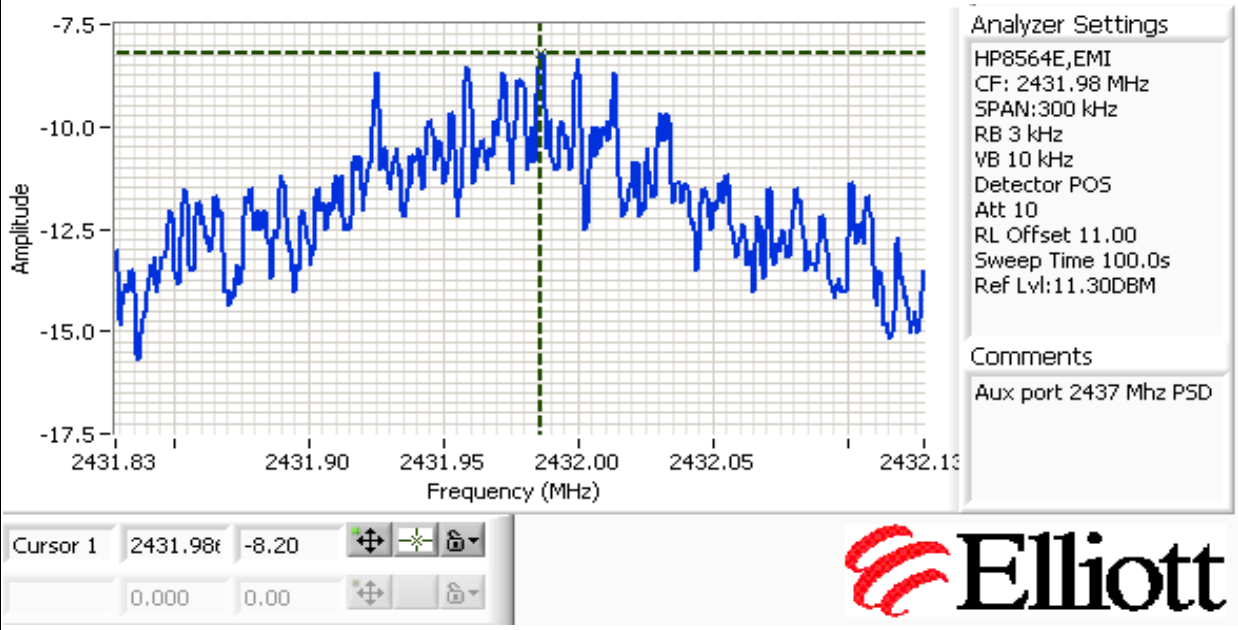




EMC Test Data

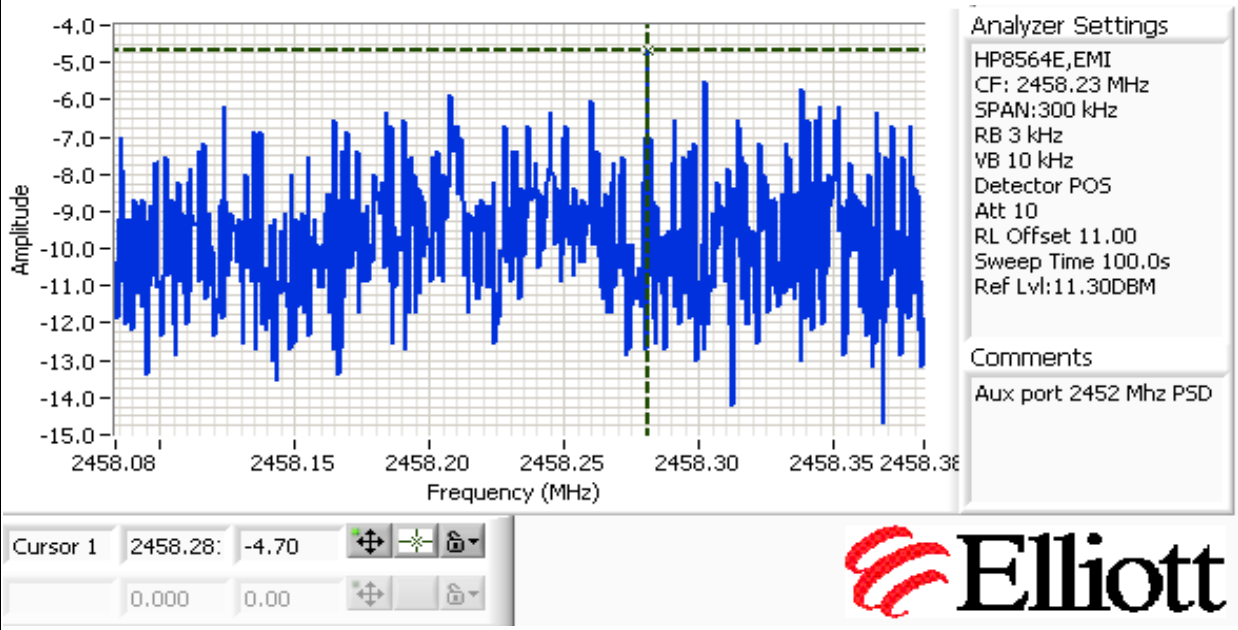
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

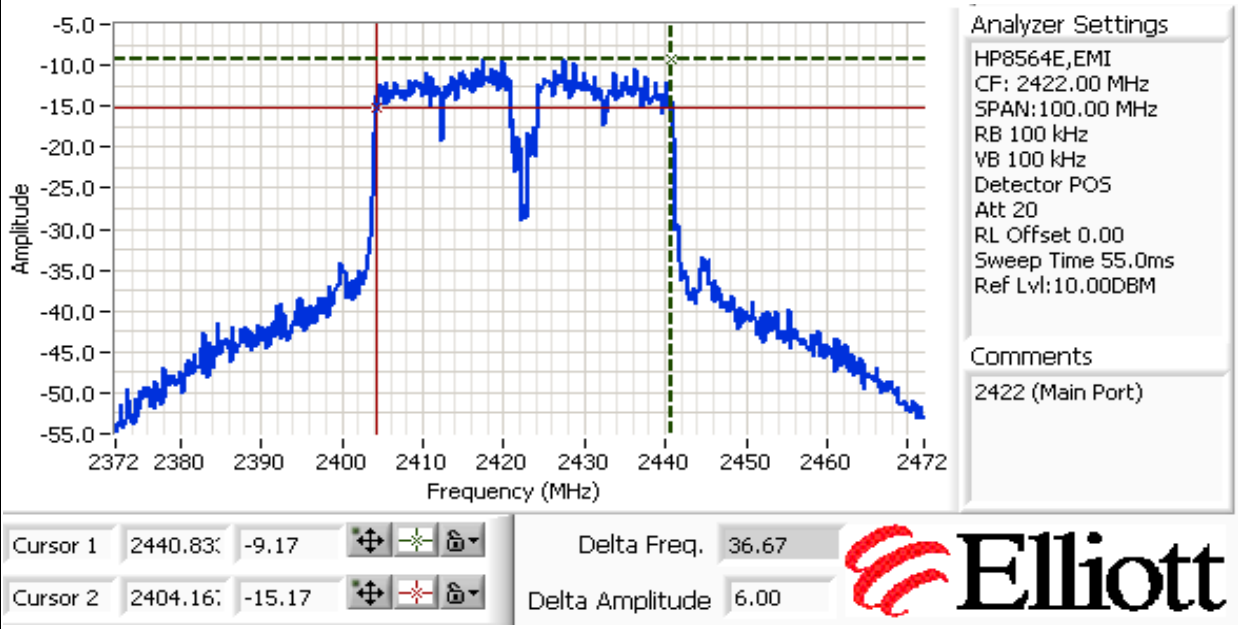
Run #2: Signal Bandwidth

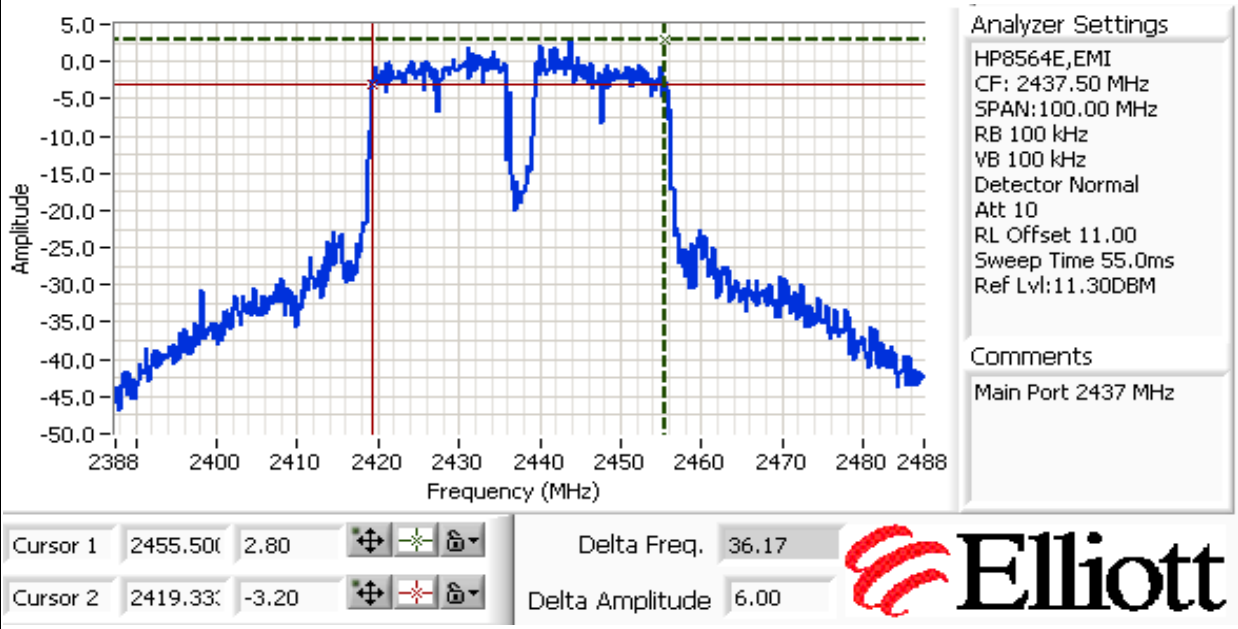
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth (MHz)	99% Signal Bandwidth
	2422	100 kHz	36.67	
	2437	100 kHz	36.17	
	2452	100 kHz	35.83	

Note 1:	Measured on a single chain

EMC Test Data

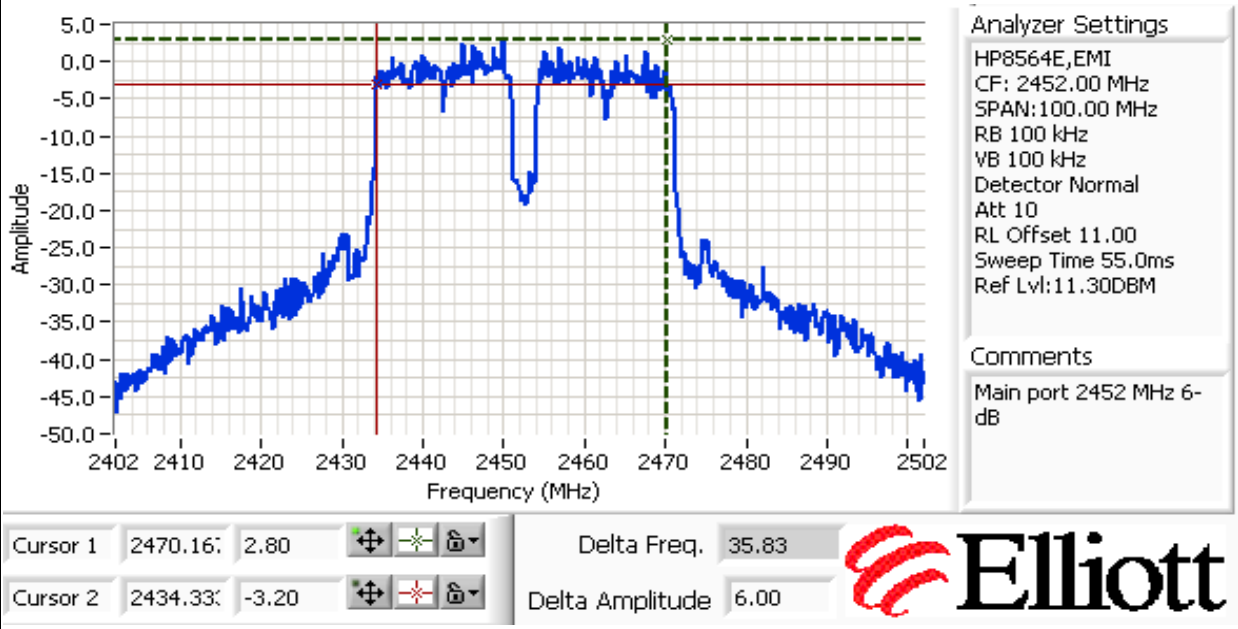
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

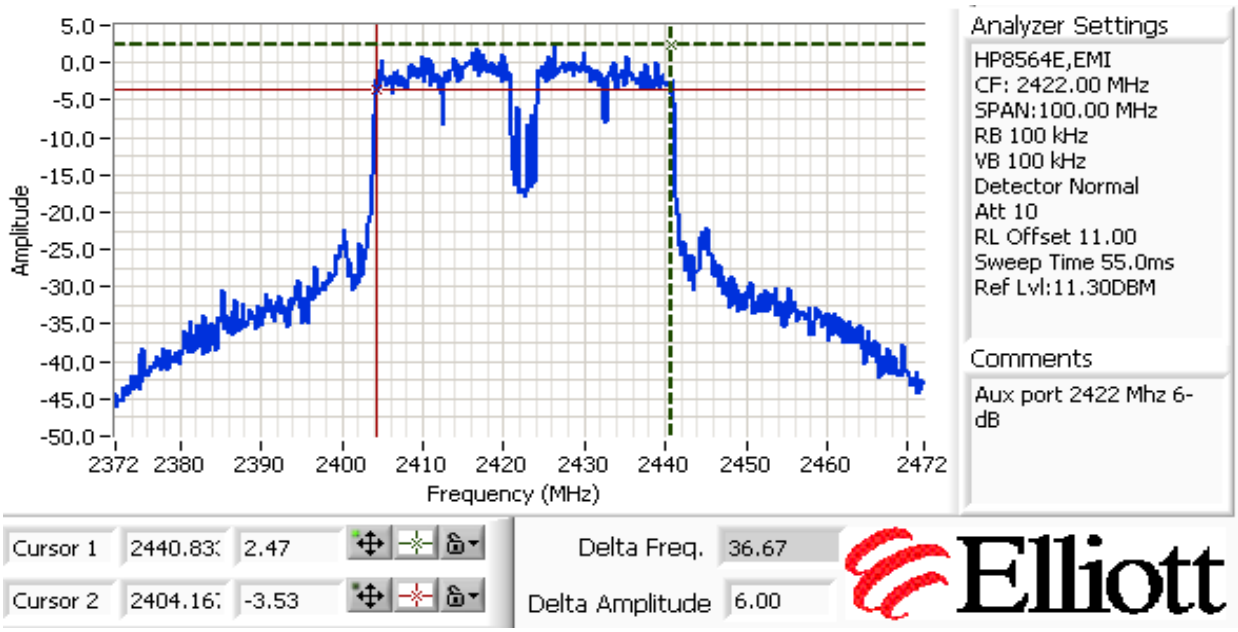




EMC Test Data

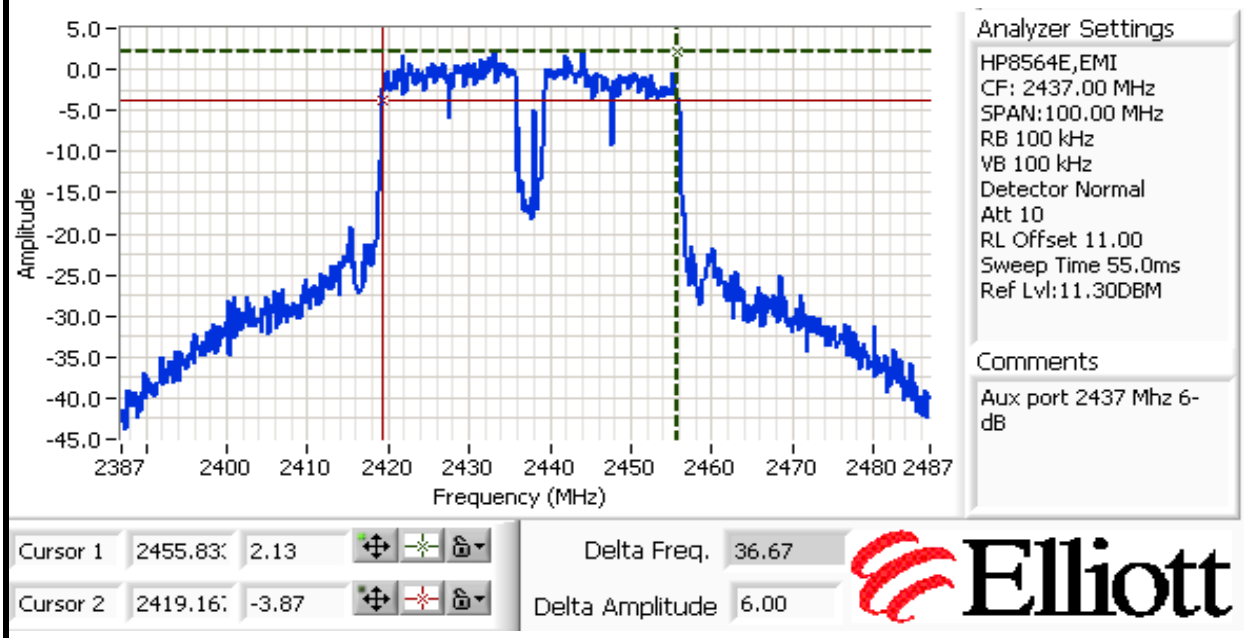
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

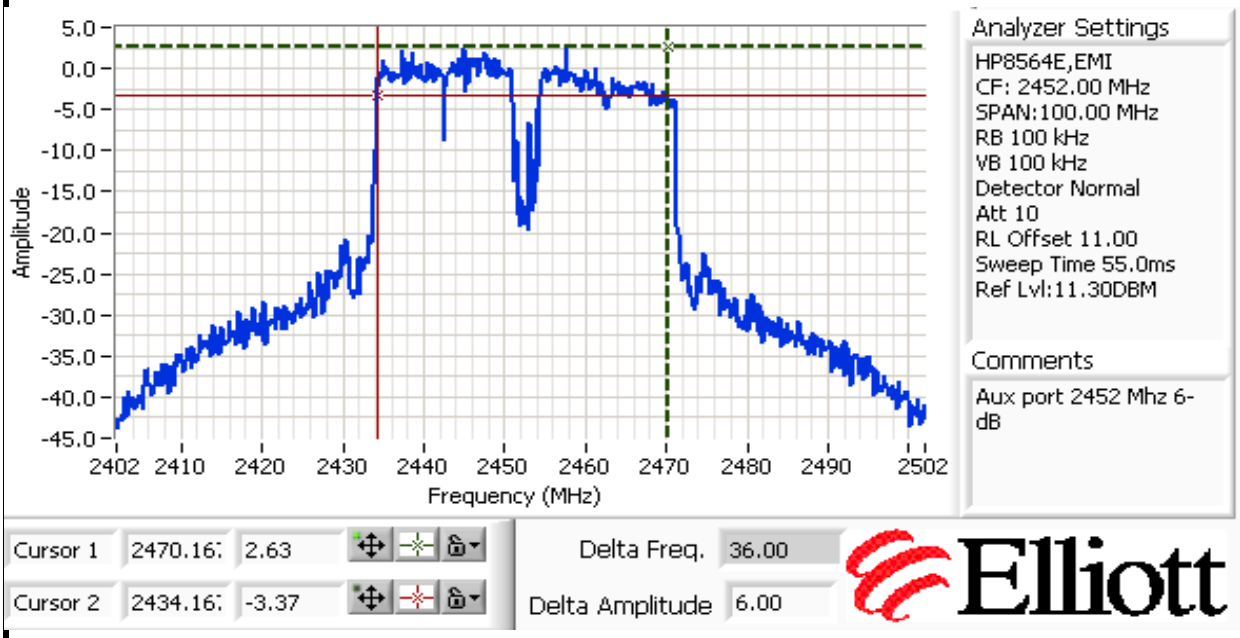




EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A





EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

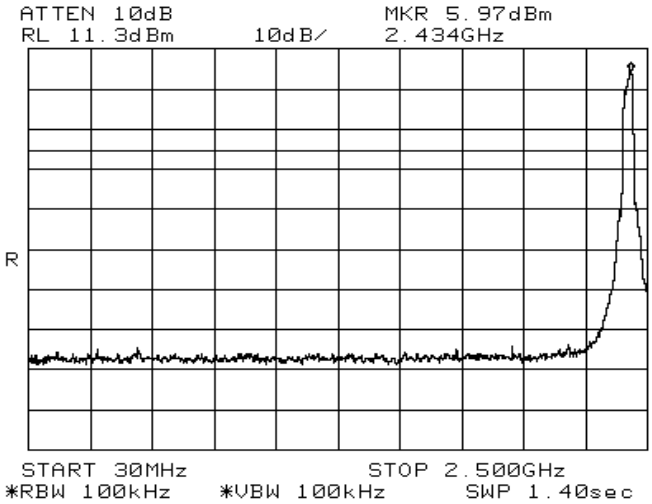
Run #3: Out of Band Spurious Emissions

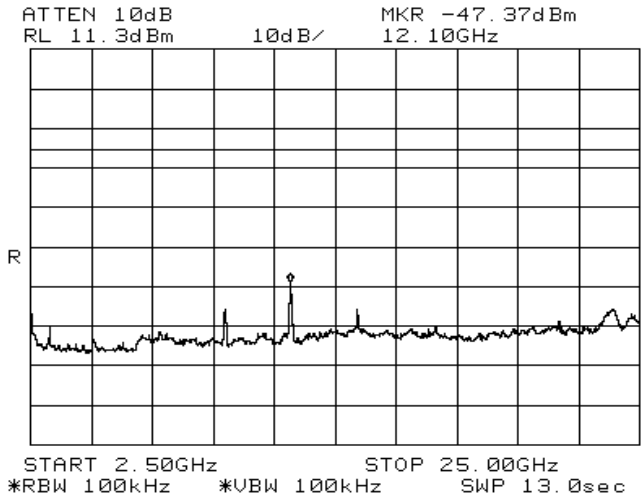
Power Setting Per Chain #1	#2	#3	Frequency (MHz)	Limit	Result
			2422	-30dBc	Refer to plots
			2437	-30dBc	Refer to plots
			2452	-30dBc	Refer to plots

Note 1:	Measured with all chains connected together through a combiner, unused ports on the combiner terminated in 50ohms.

Plots for low channel

Main port 2422 MHz

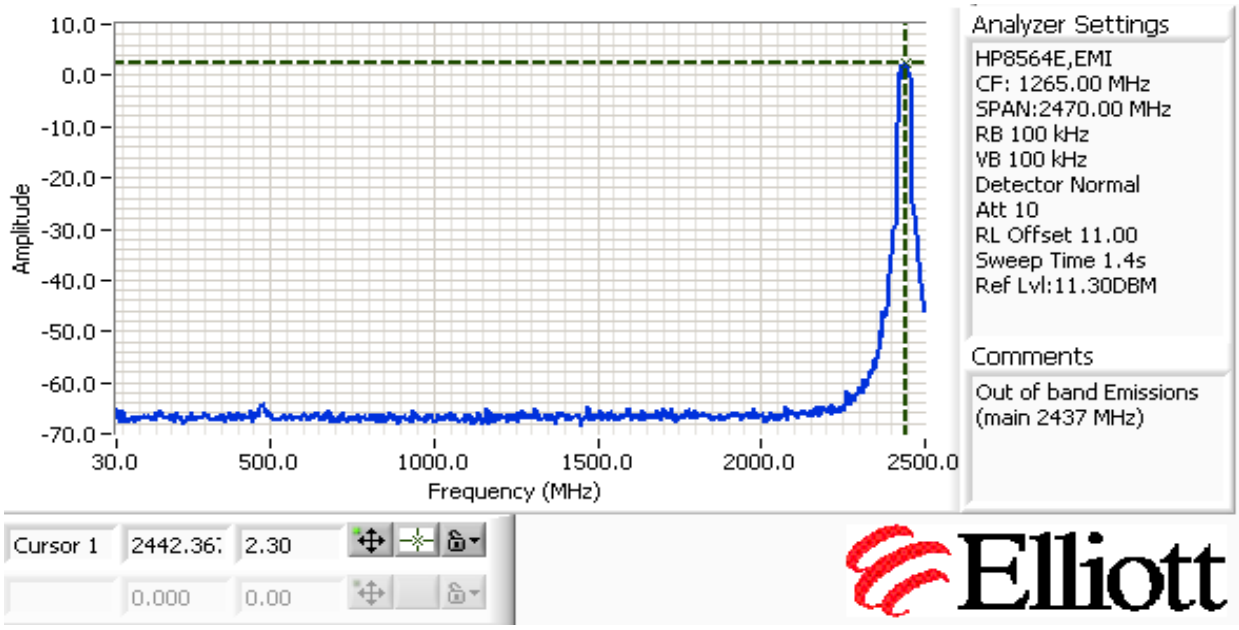


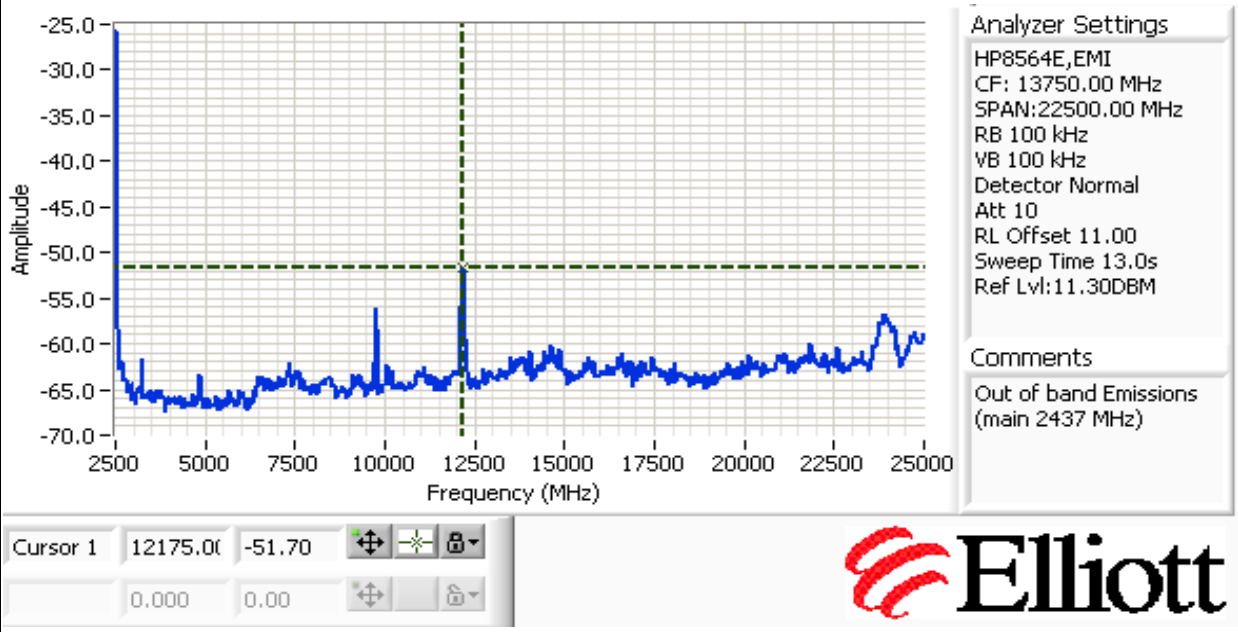


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for center channel

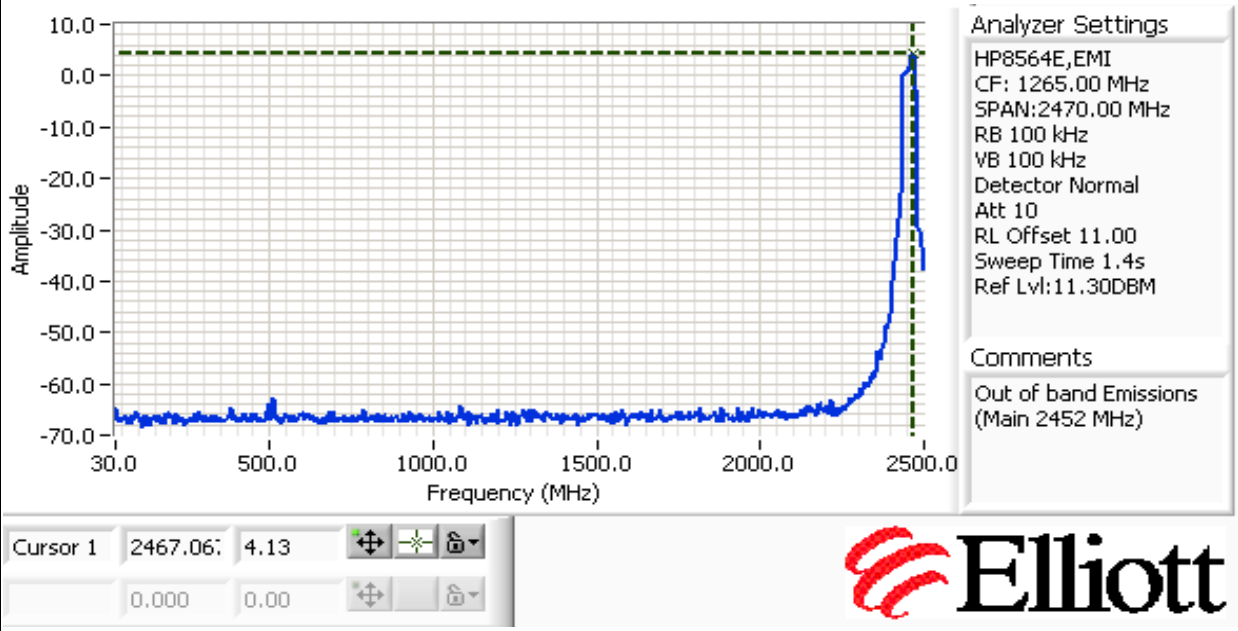


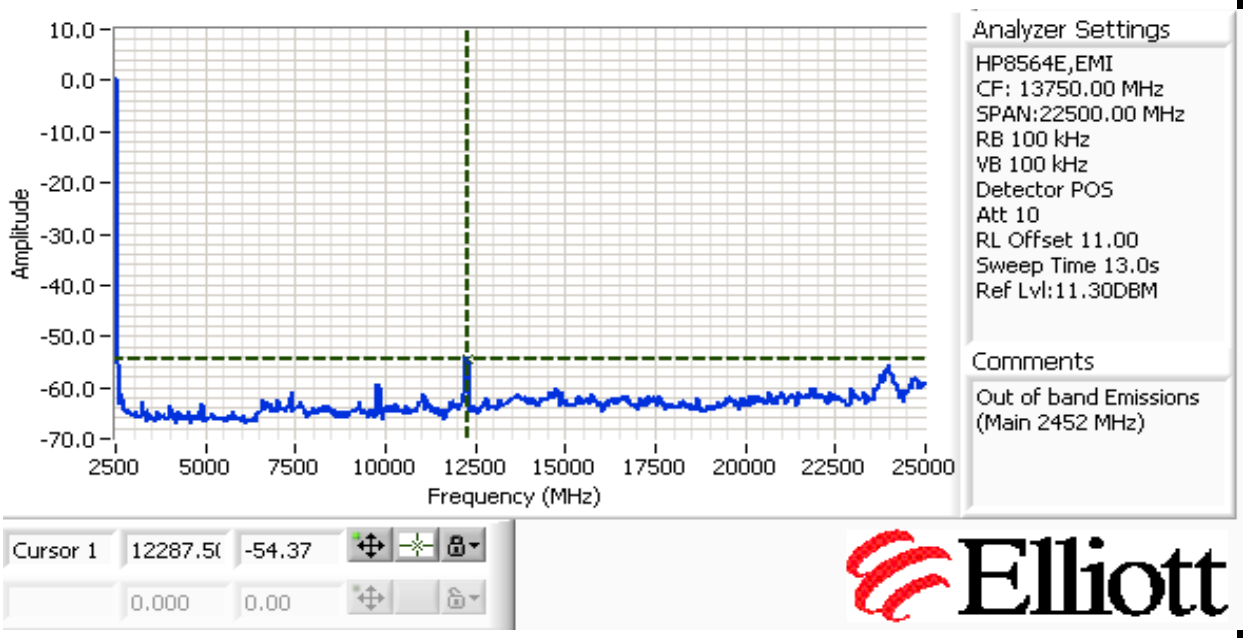


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for high channel

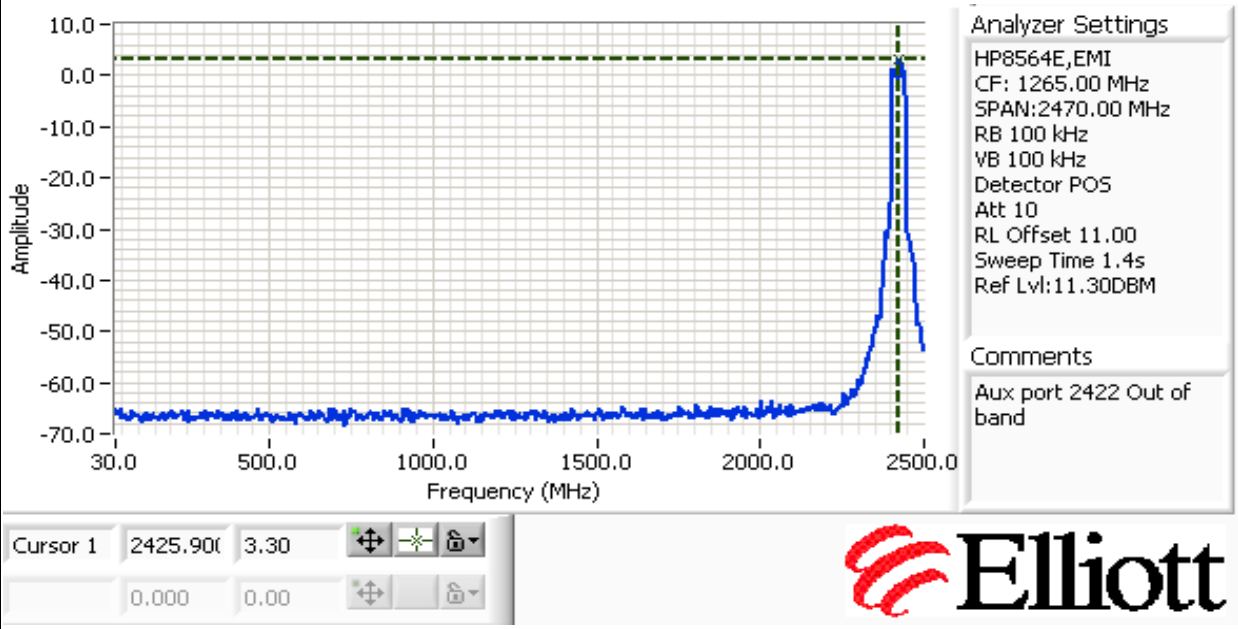


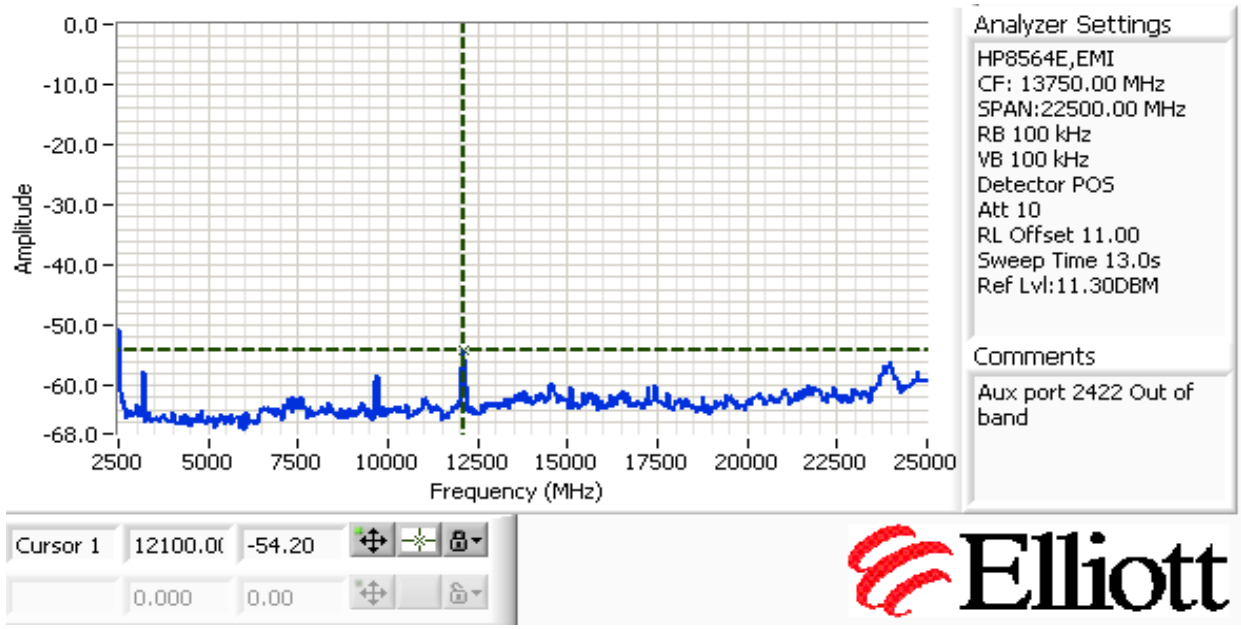


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for low channel

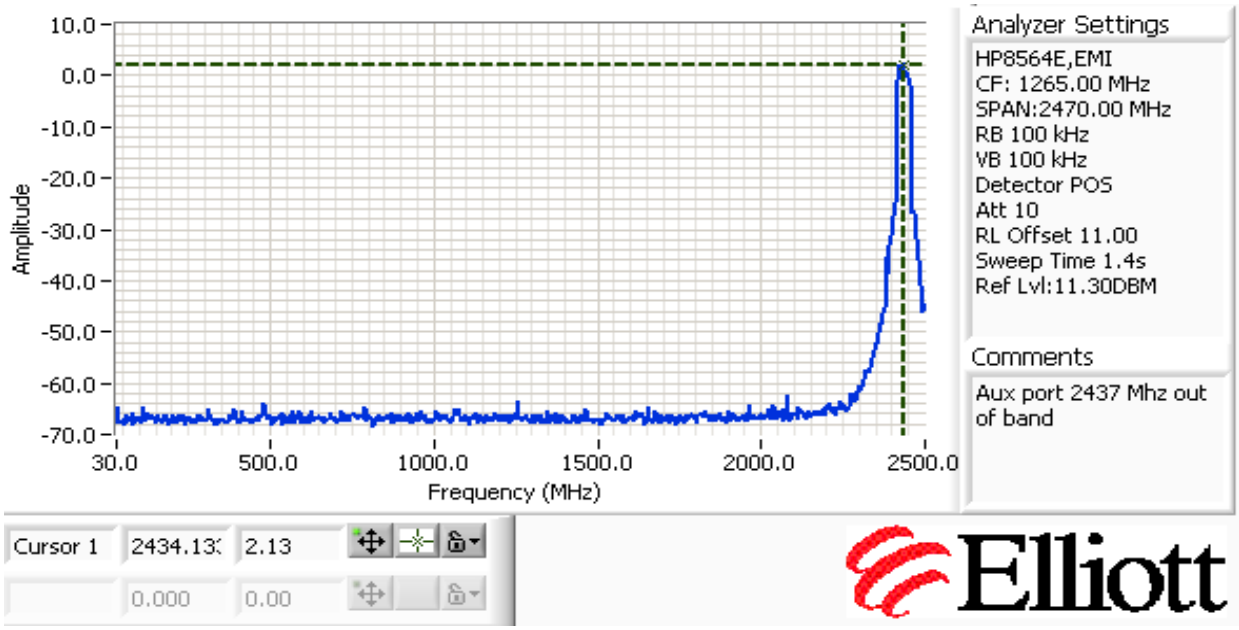


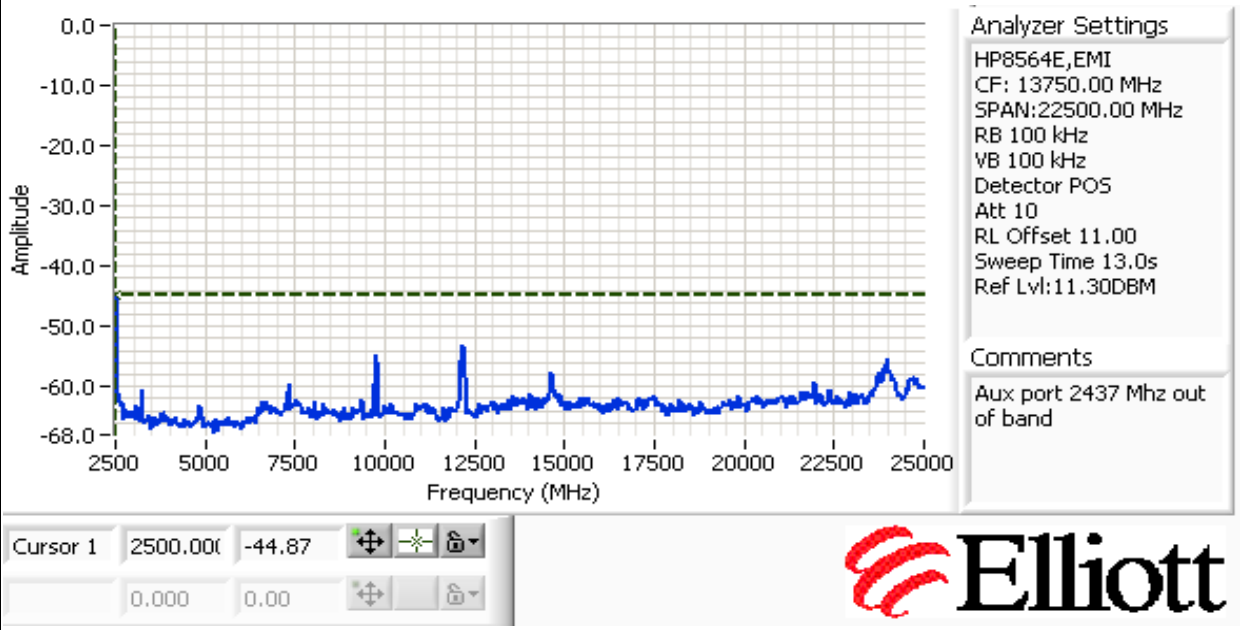


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for center channel

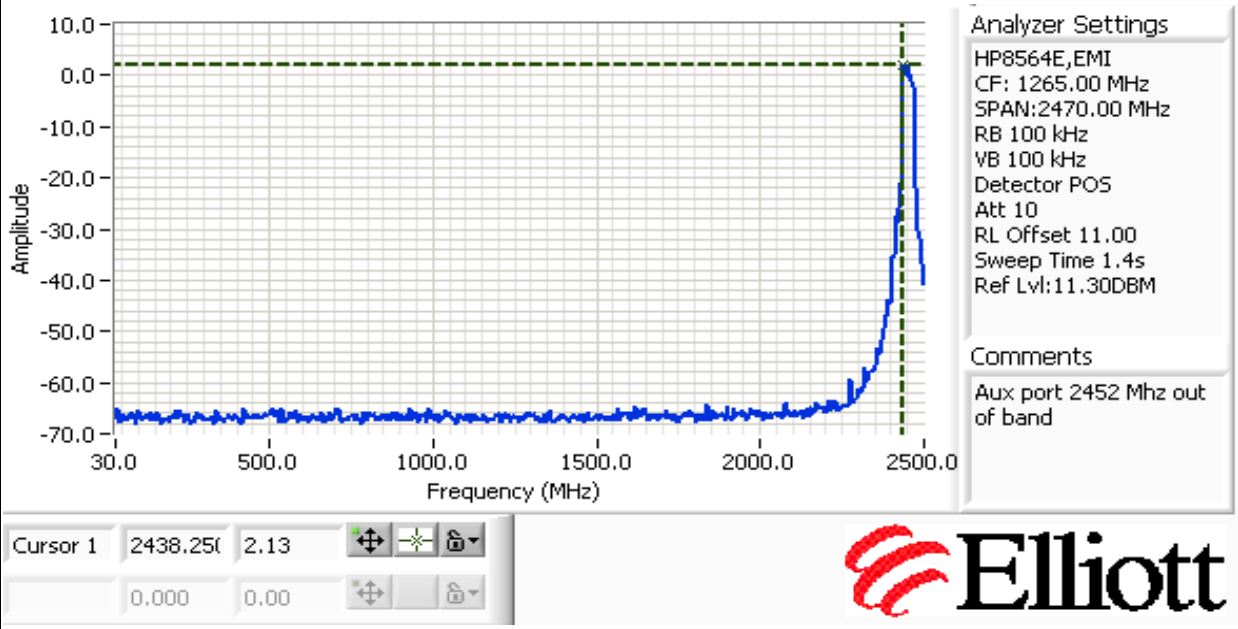


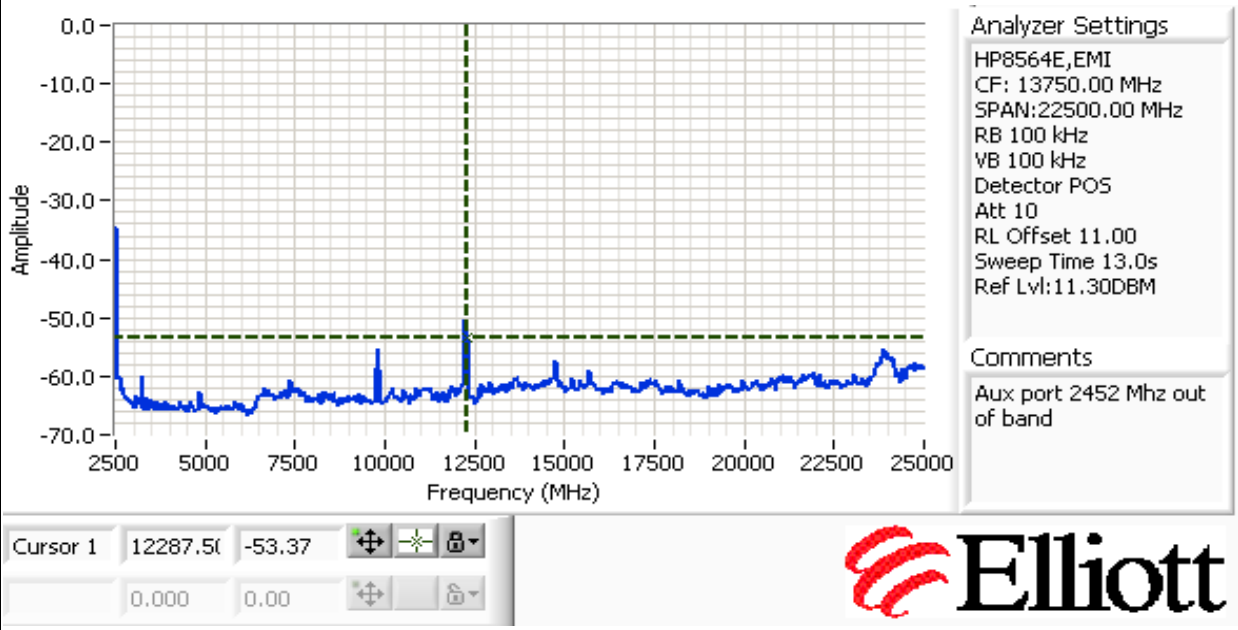


EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Plots for high channel





Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

FCC 15.247 DTS - Power, Fundamental, and Spurious Emissions (802.11n, 40MHz)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/11/2006
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. Remote equipment was located underneat the table.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 20.5 53
Rel. Humidity: 53 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power & Bandedges	FCC Part 15.209 / 15.247(c)	Pass	Refer to run
2	Radiated Spurious Emissions 1,000-26,500MHz	FCC Part 15.209 / 15.247(c)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

MAIN & AUX PORTS

Run #1: Output Power (MCS 32, CDD)

Transmitted signal on chain is coherent ? Yes

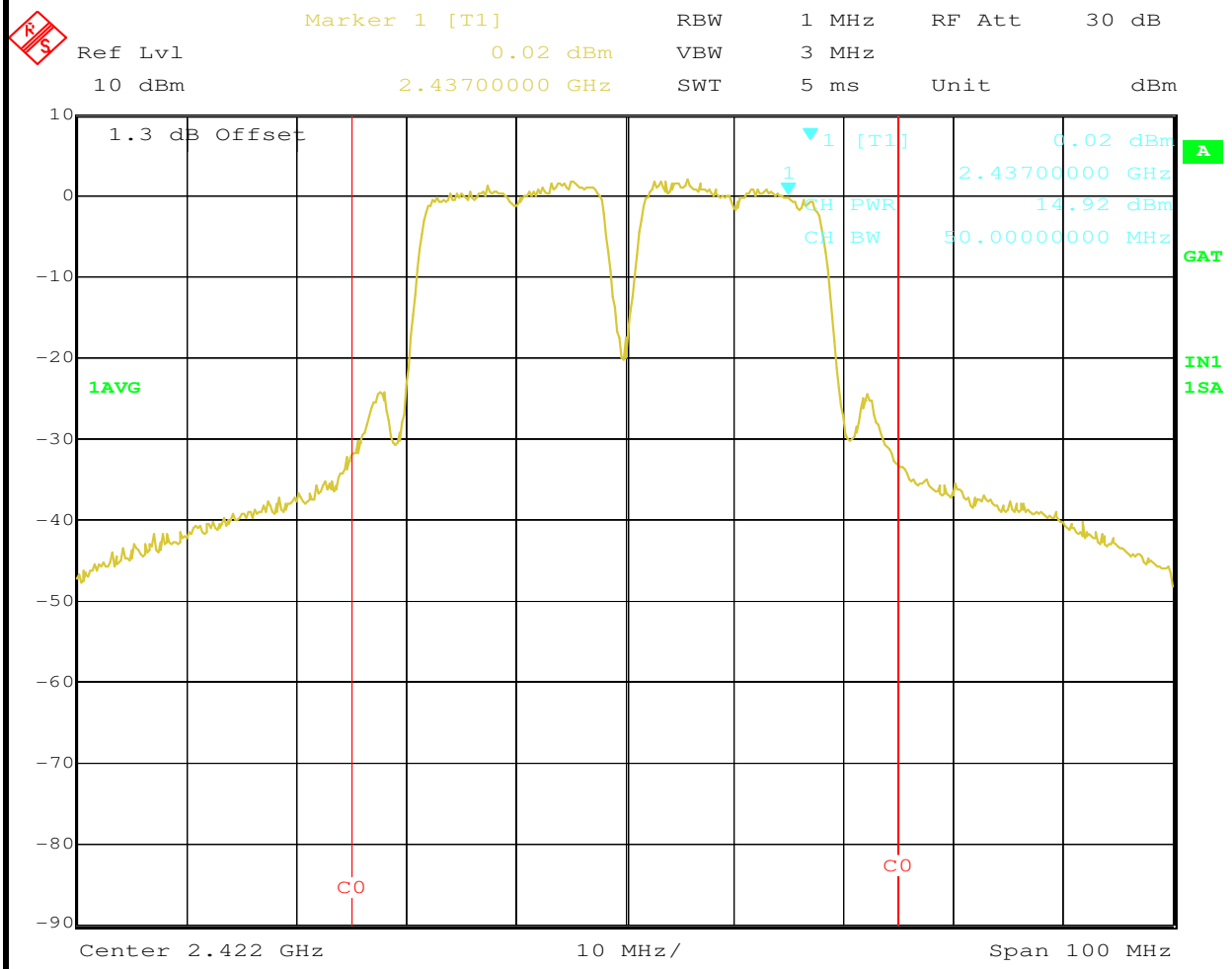
Power	Frequency (MHz)	Output Power (dBm) Note 1			Antenna Gain (dBi) Note 3			EIRP Note 2	
-		Main	Aux	Total	Main	Aux	Total	dBm	W
	2422	14.9	14.9	17.9	-1.6	-1.6	1.4	16.3	0.043
	2437	14.9	16.0	18.5	-1.6	-1.6	1.4	16.9	0.049
	2447	15.2	15.1	18.1	-1.6	-1.6	1.4	16.5	0.045
	2452	15.2	14.9	18.1	-1.6	-1.6	1.4	16.5	0.044

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was tranmsitting) and power integration over 30 MHz
Note 2:	EIRP - if transmit chains are coherent then the EIRP is calculated from the sum of the antenna gains plus the total power (i.e. beam-forming is assumed because of coherency on the chains). If the individual chains are incoherent then the EIRP is calculated from the sum of the individual EIRPs for each chain.
Note 3:	If the transmit chains are coherent then the total system antenna gain is the sum of the numeric gains for each antenna. If the transmit chains are incoherent then the system antenna gain is not applicable as each transmit chain can be treated independently.

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

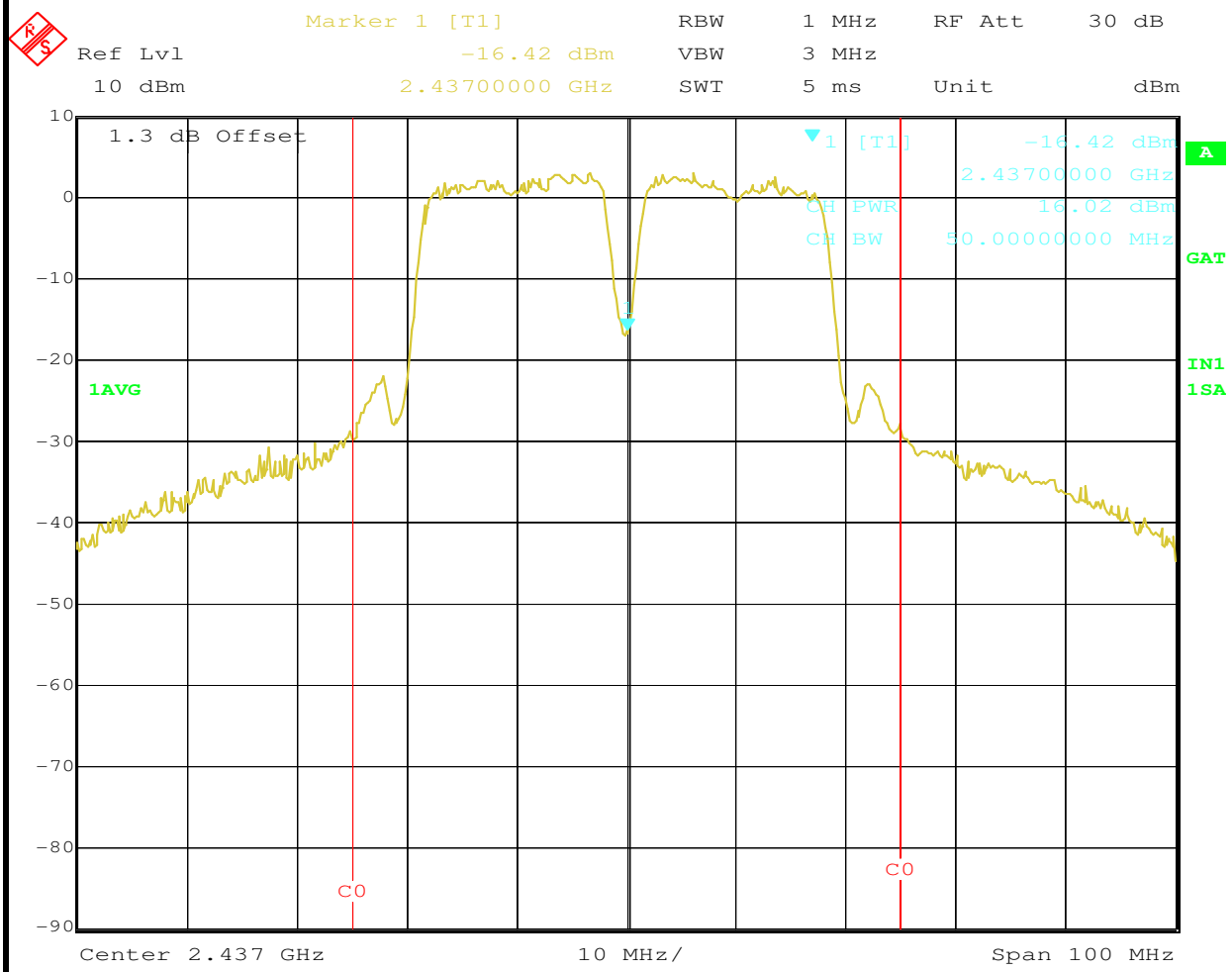
AUX PORT



Date: 24.APR.2006 17:38:11

EMC Test Data

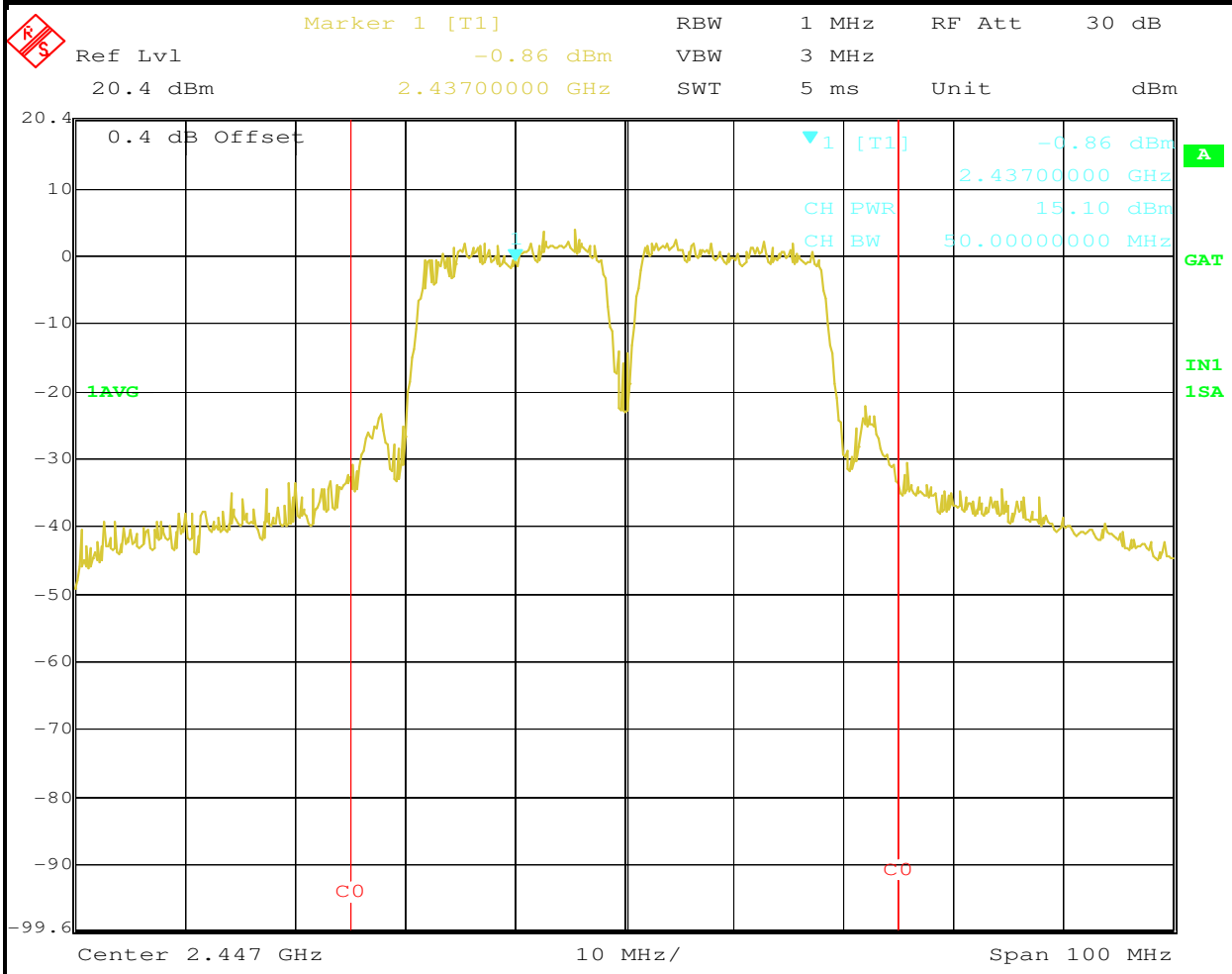
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 24.APR.2006 17:43:27

Elliott — EMC Test Data

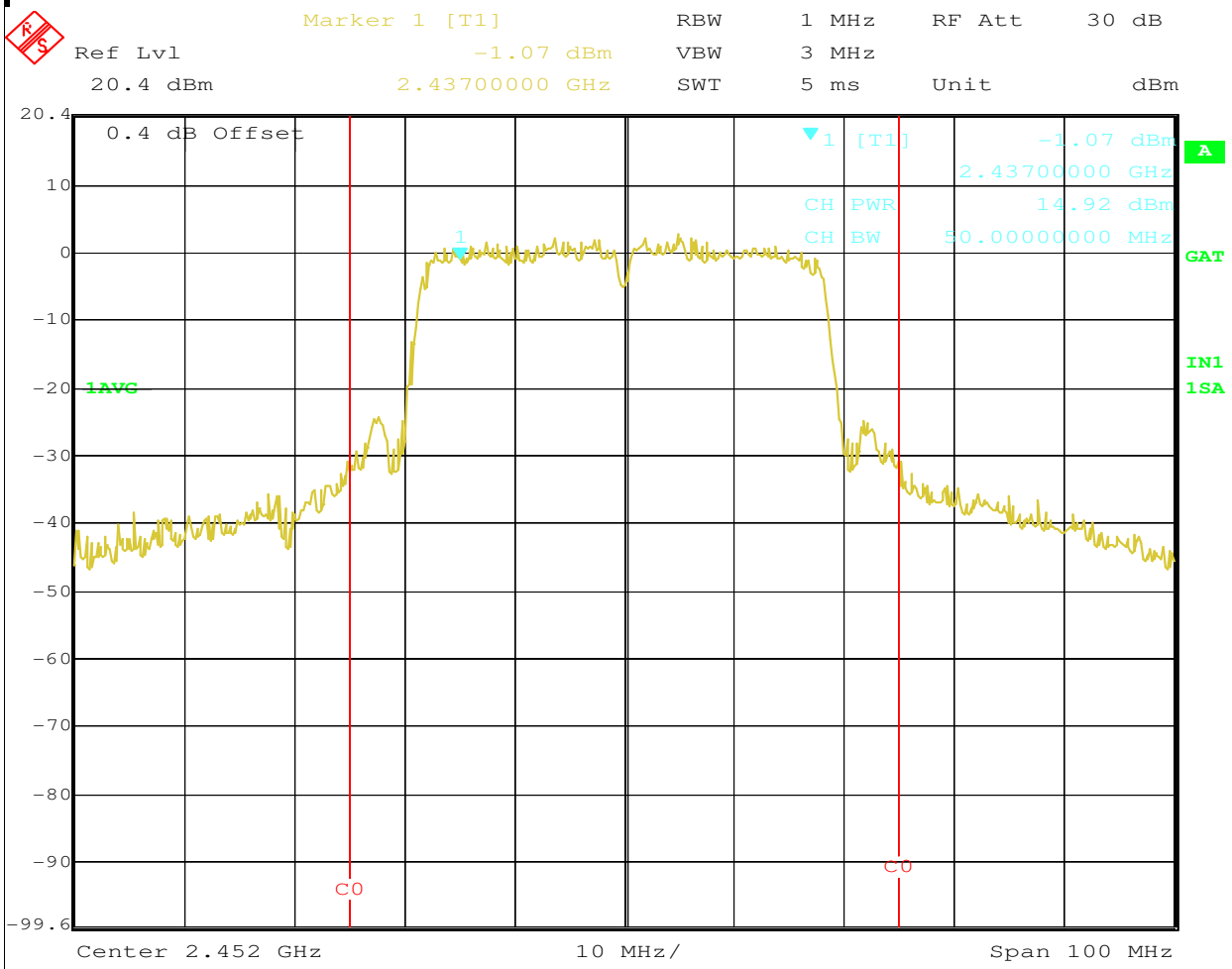
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 2.MAY.2006 11:59:21

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

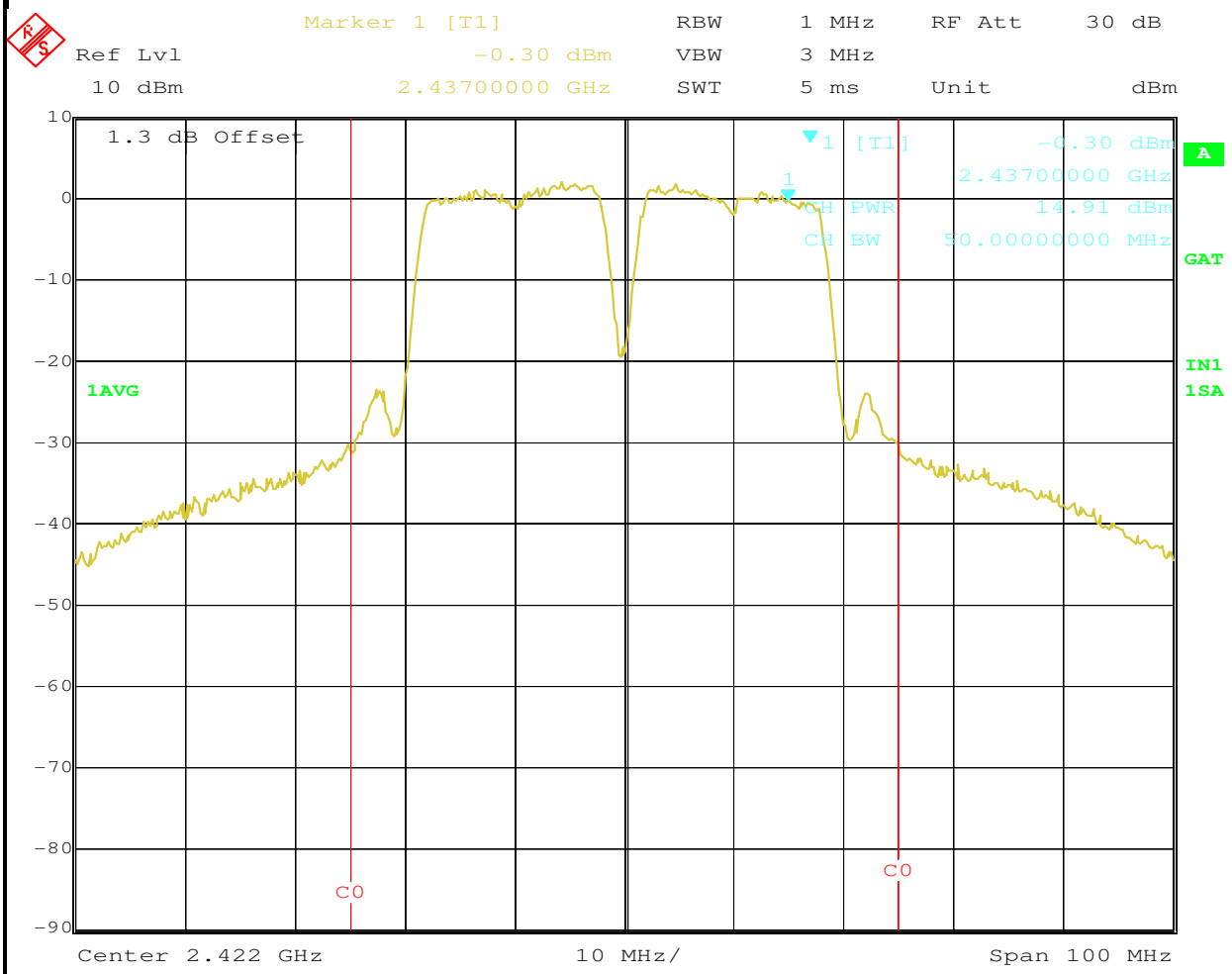


Date: 2.MAY.2006 11:49:31

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

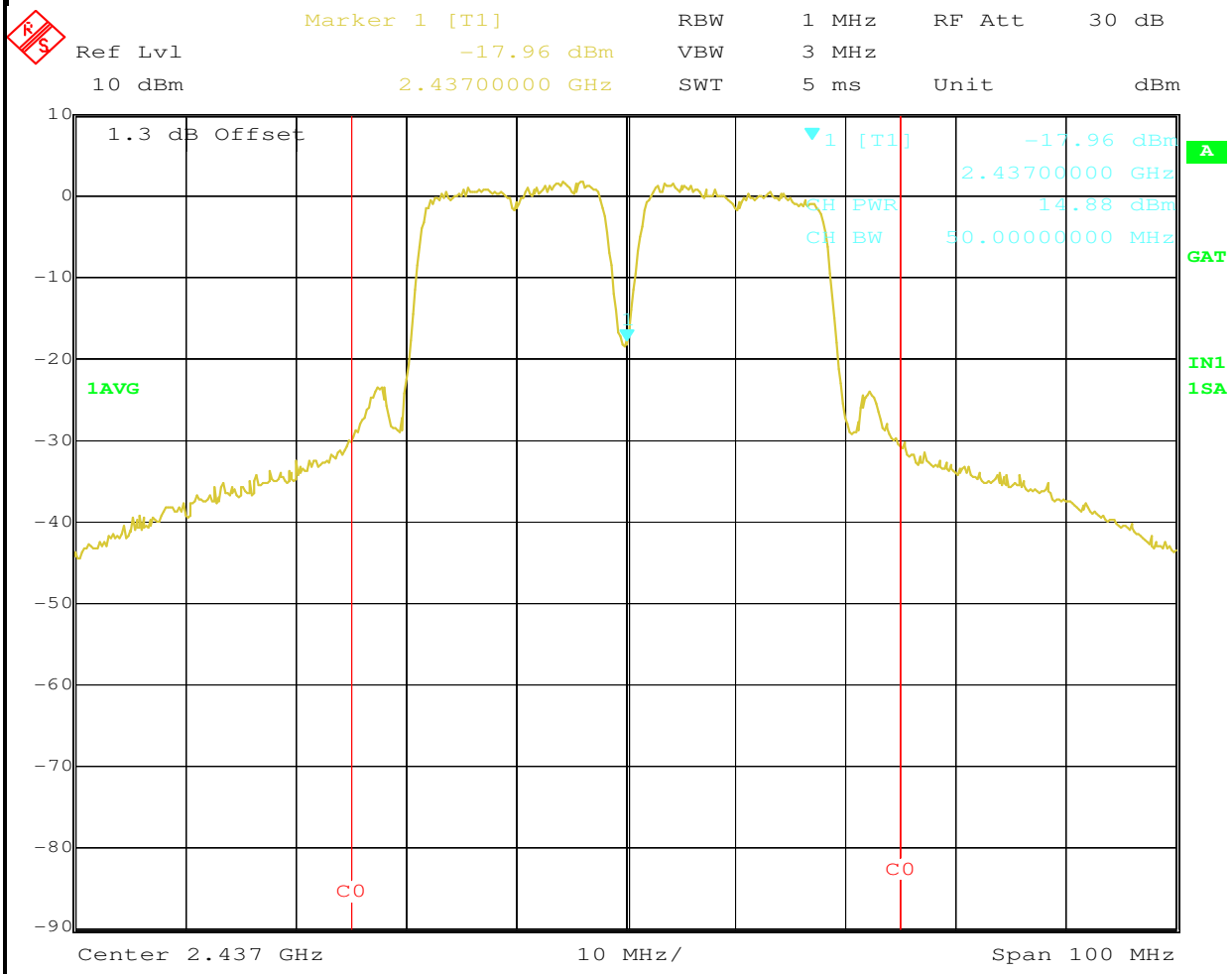
MAIN PORT



Date: 24.APR.2006 17:34:48

EMC Test Data

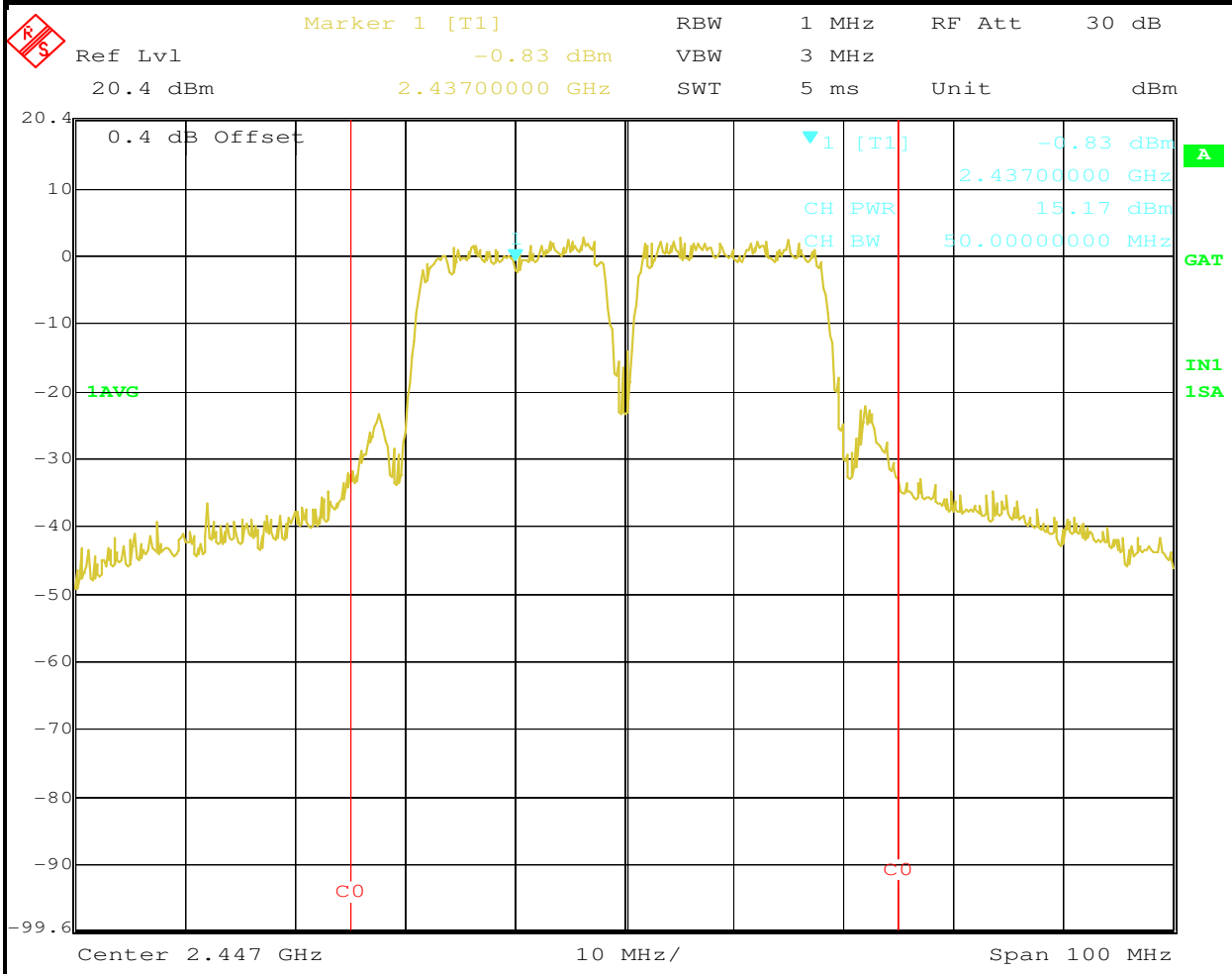
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 24.APR.2006 17:45:23

EMC Test Data

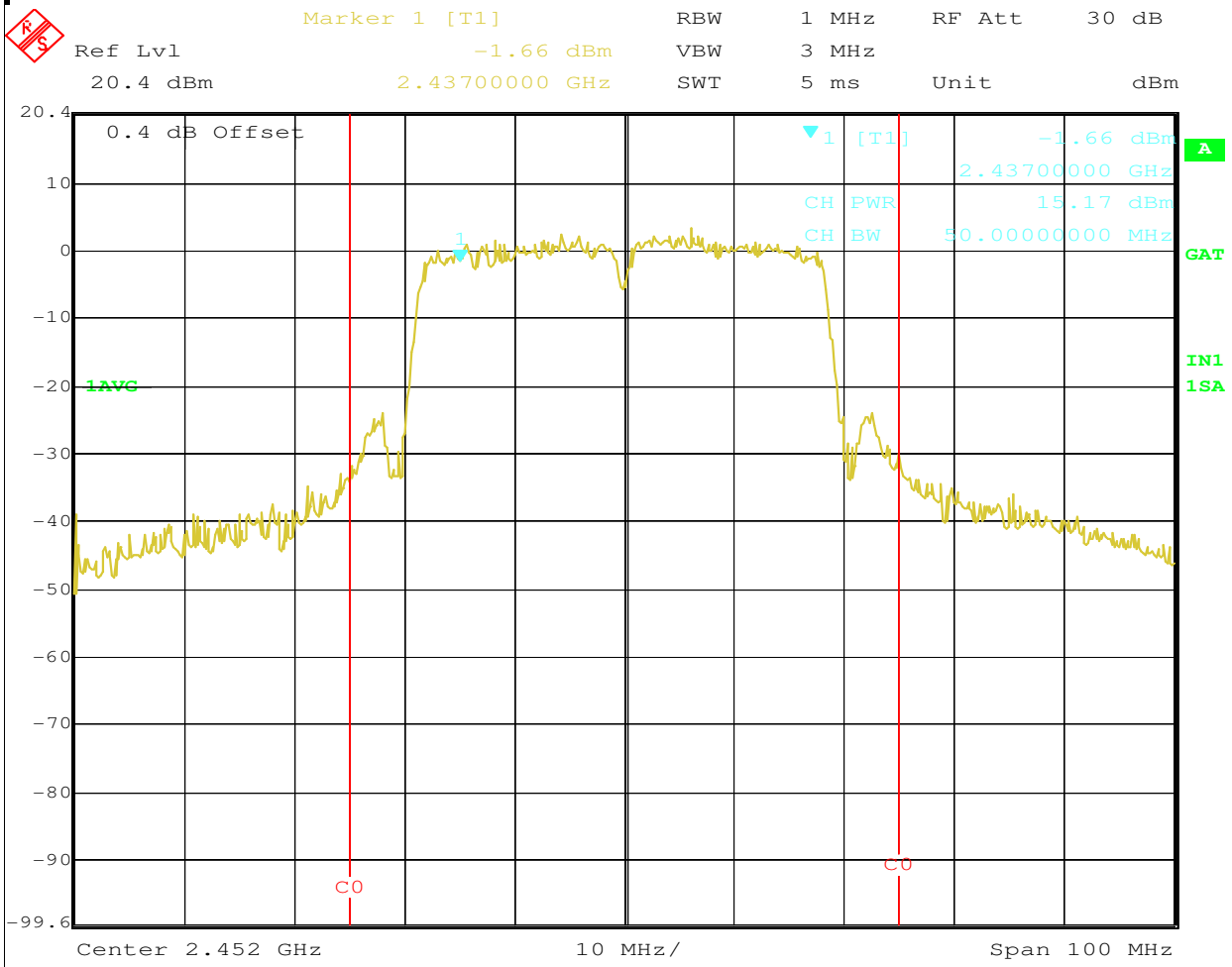
Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



Date: 2.MAY.2006 11:55:13

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A



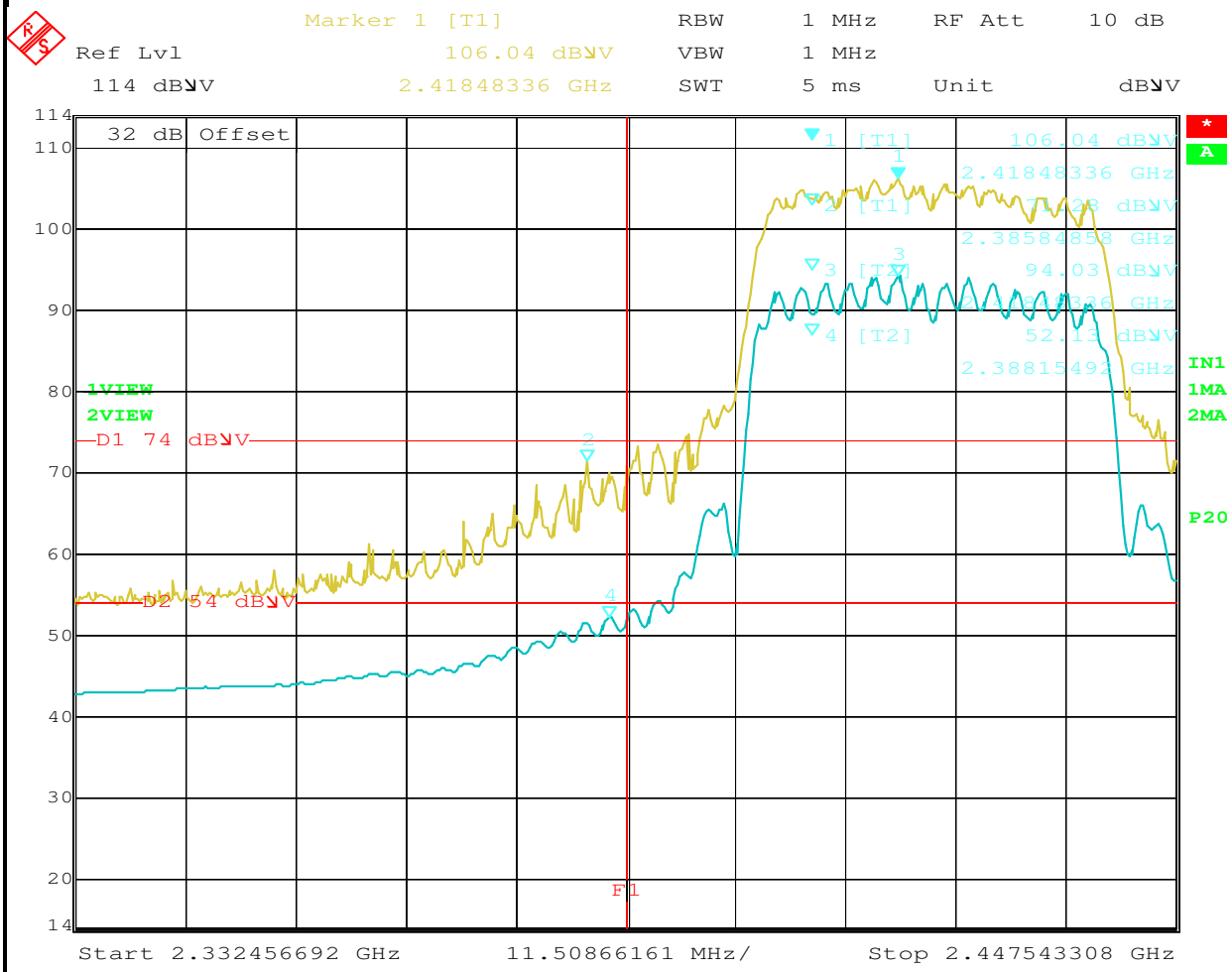
Date: 2.MAY.2006 11:51:52

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1a: Radiated Fundamental and Band Edge.

40MHz, CDD MCS 32 (refer to power tables of run 1 of 40MHz data), Horizontal
Antennas: Main and Auxiliary (Low Channel @ 2422 MHz)



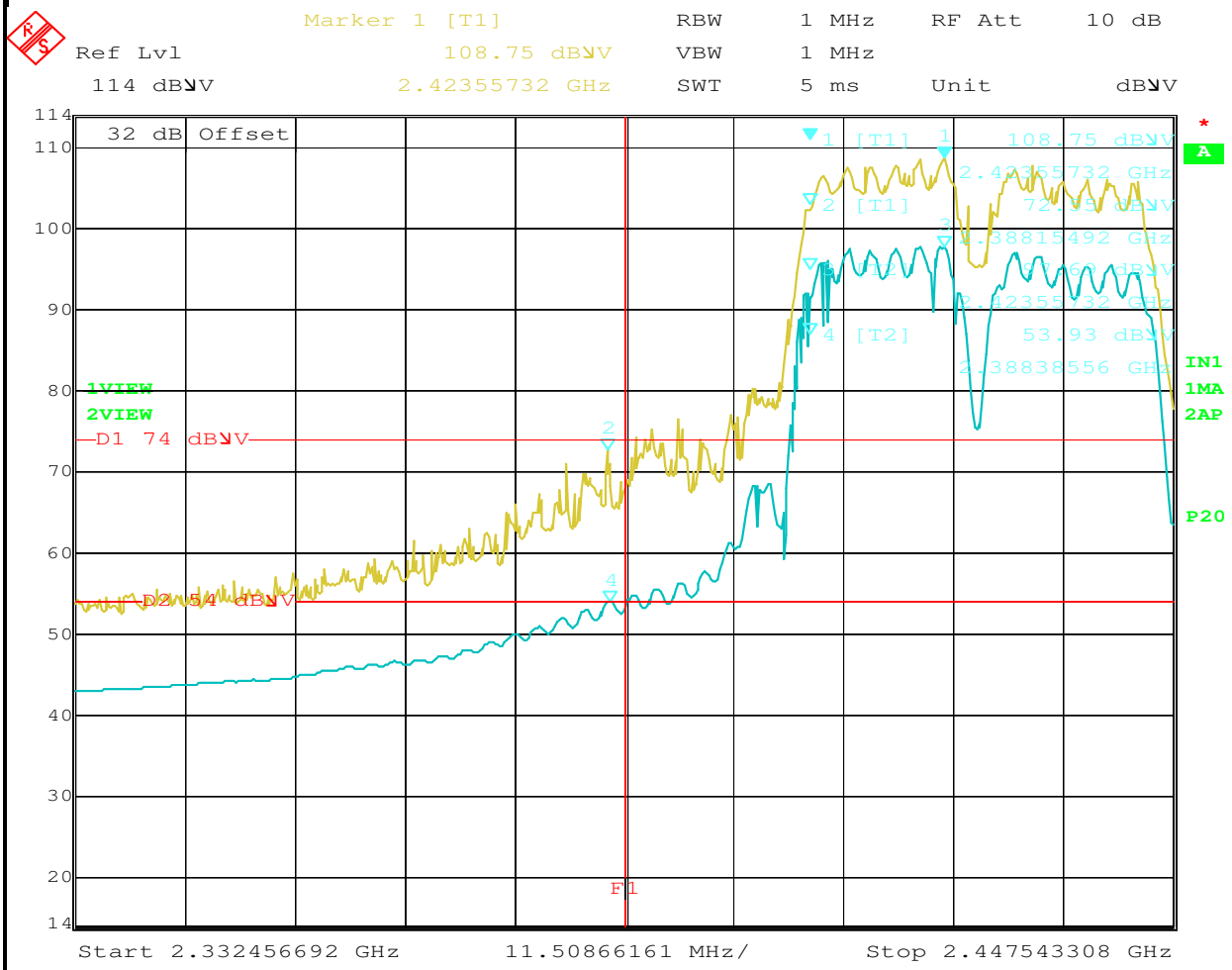
Date: 25.APR.2006 12:14:56

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #1b: Radiated Fundamental and Band Edge.

40MHz, CDD MCS 32 (refer to power tables of run 1 of 40MHz data), Horizontal
Antennas: Main and Auxiliary (Low Channel @ 2427 MHz)

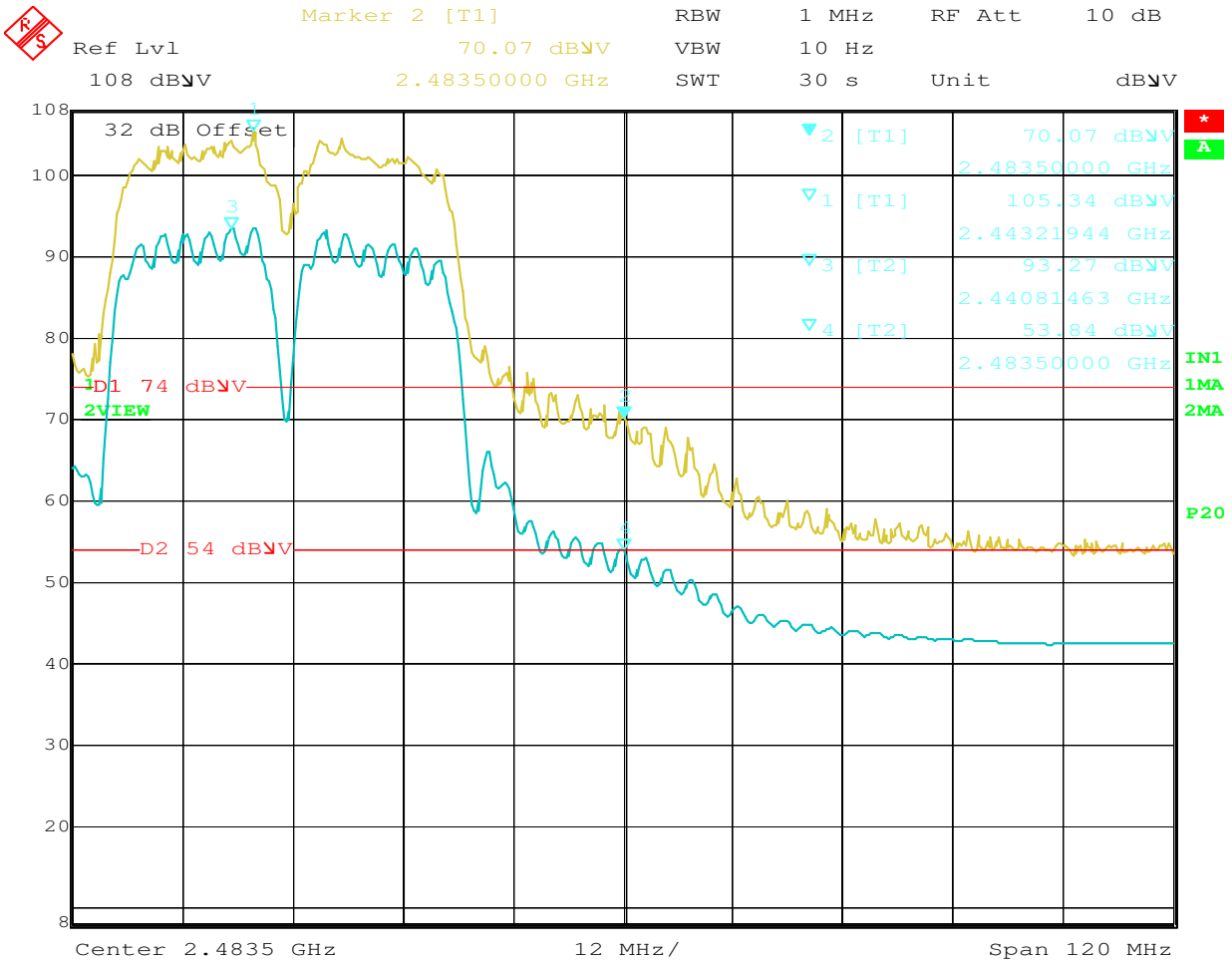


Date: 25.APR.2006 12:25:19

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

(refer to power tables of run 1 of 40MHz data), Channel 8 (2447 MHz), 40MHz (Vertical)

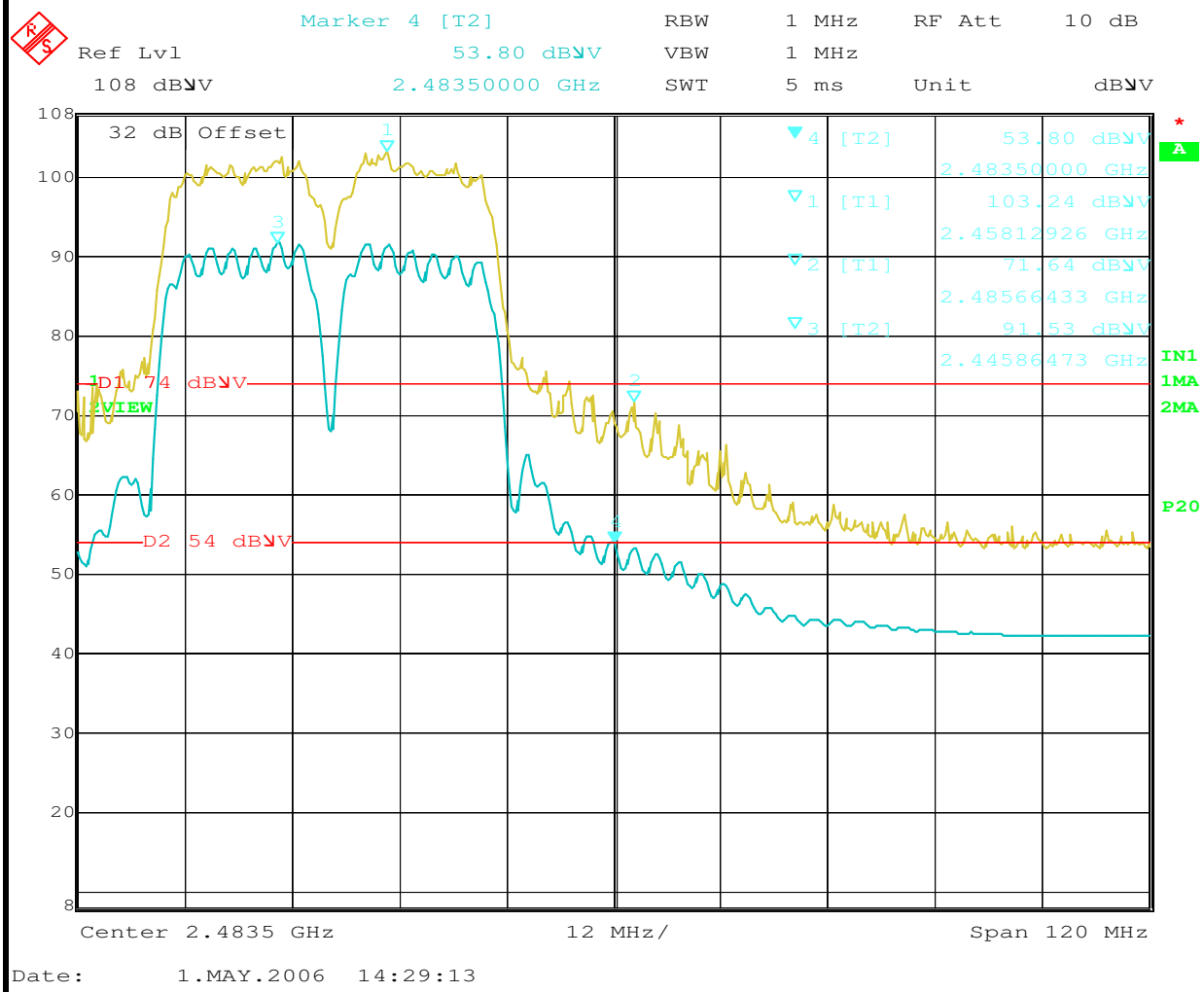


Date: 1.MAY.2006 15:06:27

Elliott — EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

(refer to power tables of run 1 of 40MHz data), Aux, Channel 9 (2452 MHz), 40MHz (Horizontal)

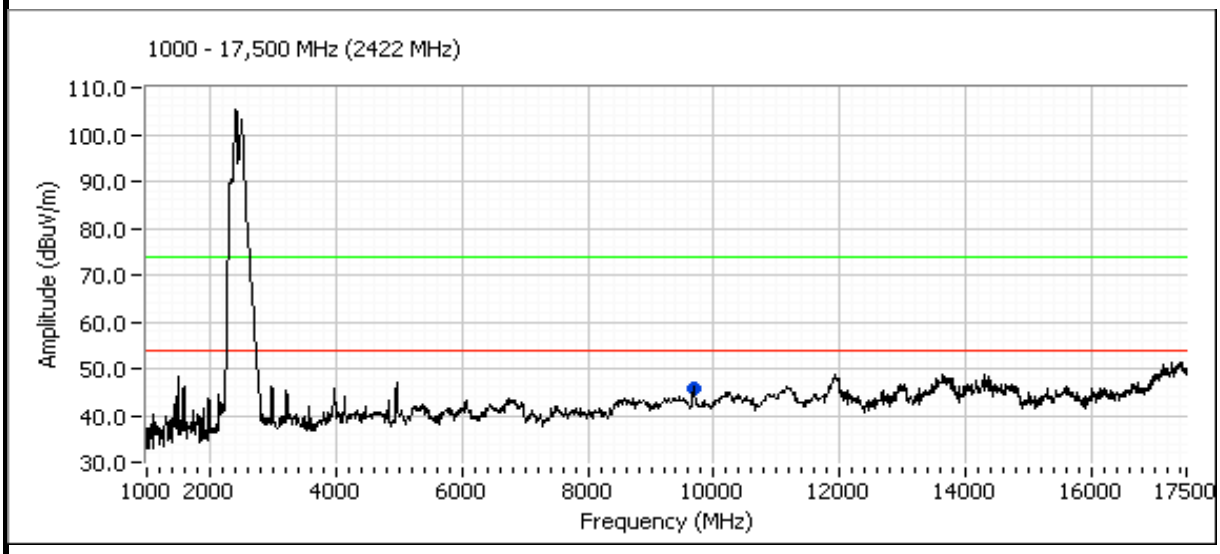


Date: 1.MAY.2006 14:29:13

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 16,000 MHz. Low Channel @ 2422 MHz, CDD MCS 32
(refer to power tables of run 1 of 40MHz data)
Antennas: Main and Auxiliary



Harmonics 2422 MHz (40MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
9670.000	45.9	V	54.0	-8.1	Peak	273	1.2	Non-restricted, Note 2

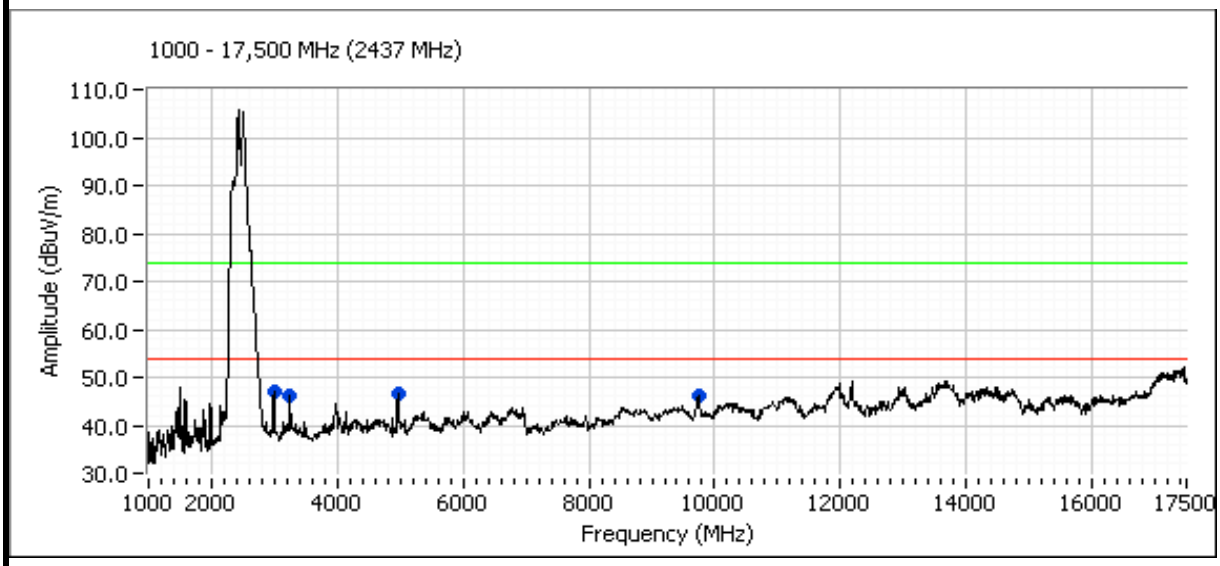
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 17.5 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #3: Radiated Spurious Emissions, 1000 - 16,000 MHz. Middle Channel @ 2437 MHz, CDD MCS 32
(refer to power tables of run 1 of 40MHz data)
Antennas: Main and Auxiliary



Harmonics 2437 MHz (40MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
9670.000	45.9	V	54.0	-8.1	Peak	273	1.2	Note 2
3240.000	46.0	H	54.0	-8.0	Peak	197	1.6	Note 2
2990.000	46.9	V	54.0	-7.1	Peak	206	1.0	Note 2
4970.000	46.6	V	54.0	-7.4	Peak	188	1.4	Note 2
9745.000	46.3	V	54.0	-7.7	Peak	268	1.2	Note 2

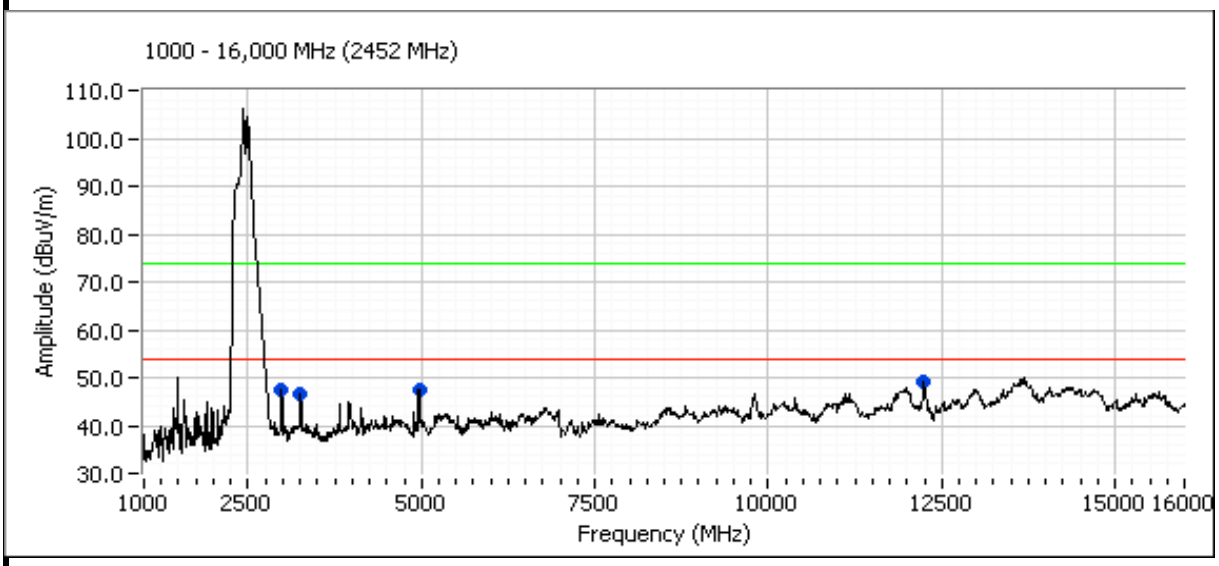
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 17.5 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

EMC Test Data

Client:	Netgear	Job Number:	J63735
Model:	WN511B	T-Log Number:	T63747
		Account Manager:	Esther Zhu
Contact:	Mark Gandler		
Spec:	FCC 15.247	Class:	N/A

Run #4: Radiated Spurious Emissions, 1000 - 16,000 MHz. Middle Channel @ 2452 MHz, CDD MCS 32
(refer to power tables of run 1 of 40MHz data)
Antennas: Main and Auxiliary



Harmonics 2452 MHz (40MHz) Highest Power

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Peak Readings.								
2980.000	47.6	V	54.0	-6.4	Peak	193	1.0	Note 2
3260.000	46.7	H	54.0	-7.3	Peak	191	1.6	Note 2
4970.000	47.5	V	54.0	-6.6	Peak	188	1.4	Note 2
12235.00	49.1	V	54.0	-4.9	Peak	253	1.6	Note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below
Note 2:	Peak emssion below the average limit. No average readings taken.

No emissions were detected within 20-dB of the limit from 16 - 26.5 GHz. Measurements were performed at Chamber# 5 on April 25, 2006 by Juan Martinez

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	Test-Log Number:	T63589
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247, EN55022	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Netgear

Model

WN511B

Date of Last Test: 4/24/2006

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	Test-Log Number:	T63589
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247, EN55022	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

The following information was collected during the test sessions(s).

General Description

The EUT is a MIMO and legacy cardbus card that is designed to provide high speed wireless internet access. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT receives it power from the host computer system. The electrical rating of the host computer is 120 -

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BMC93321CB2	MIMO cardbus	-	TBD

Other EUT Details

The Broadcom model BMC93321CB was considered representative of the Netgear WN511B. They are identical in all respects except for cosmetic changes necessary for rebranding.

EUT Antenna (Intentional Radiators Only)

The antenna is integral to the device.

EUT Enclosure

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247, EN55022	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	zv6000	Laptop	CND52904S1	DoC
Hewlett Packard	Deskjet 3820	Printer	CN2451B1	DoC
Hewlett Packard	F3-0507013399C	AC/DC adaptor	CN2451B1	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	EN104	Hub	ENT4B06271953	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop USB	Printer	Multiwire	Shielded	1.5
Laptop Ethernet	Hub	CAT 5	Unshielded	10.0
Laptop Power	AC Adapter	2 wire	Unshielded	2.0
AC adpater	AC Mains	3 wire	Unshielded	1.5

EUT Operation During Transmitter Tests

During MIMO testing the EUT was transmitting simultaneously on two RF chains at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 20MHz or 40MHz signaling mode.
During legacy testing the EUT was transmitting on a single chain at either the low, 2412MHZ, the middle, 2437MHz, or the high, 2462MHz in either the 802.11b or 802.11g mode.

EUT Operation During Emissions Tests

During emissions testing the EUT was transmitting at full power on channel #6, 2437MHz in either MIMO, multiple transmitters, mode or 802.11b legacy mode, single transmitter

Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Account Manager:	Esther Zhu
Contact:	David Boldy		
Spec:	FCC 15.247, EN55022	Class:	Radio

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/21/2006
Test Engineer: Juan Martinez
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: Refer to individual run

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 80 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	EN55022 B	Pass	49.1dBµV @ 0.161MHz (-6.3dB)
2	CE, AC Power,120V/60Hz	EN55022 B	Pass	49.2dBµV @ 0.154MHz (-6.6dB)

Modifications Made During Testing:

No modifications were made to the EUT during testing

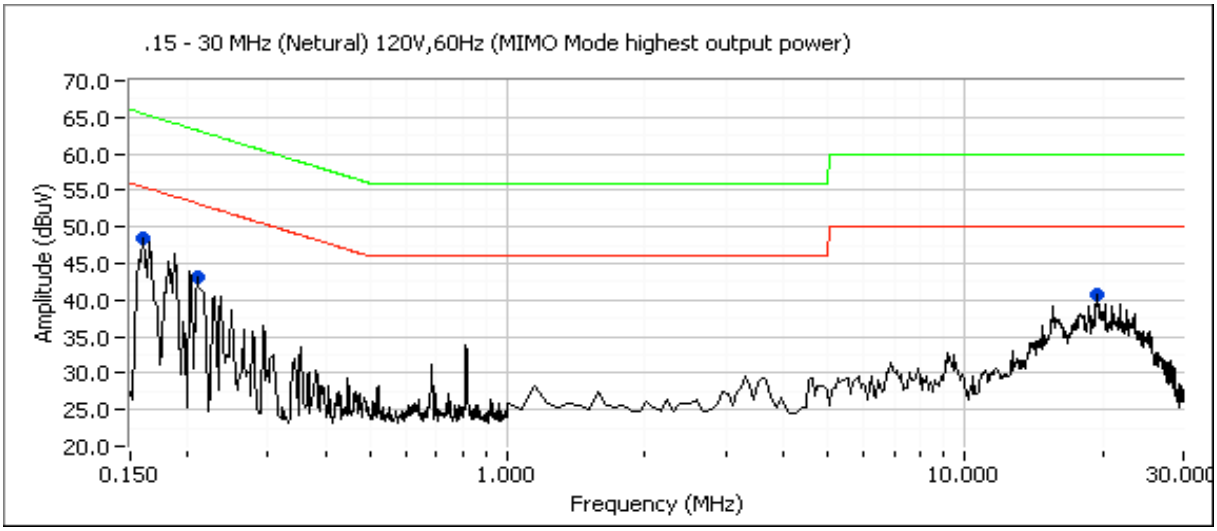
Deviations From The Standard

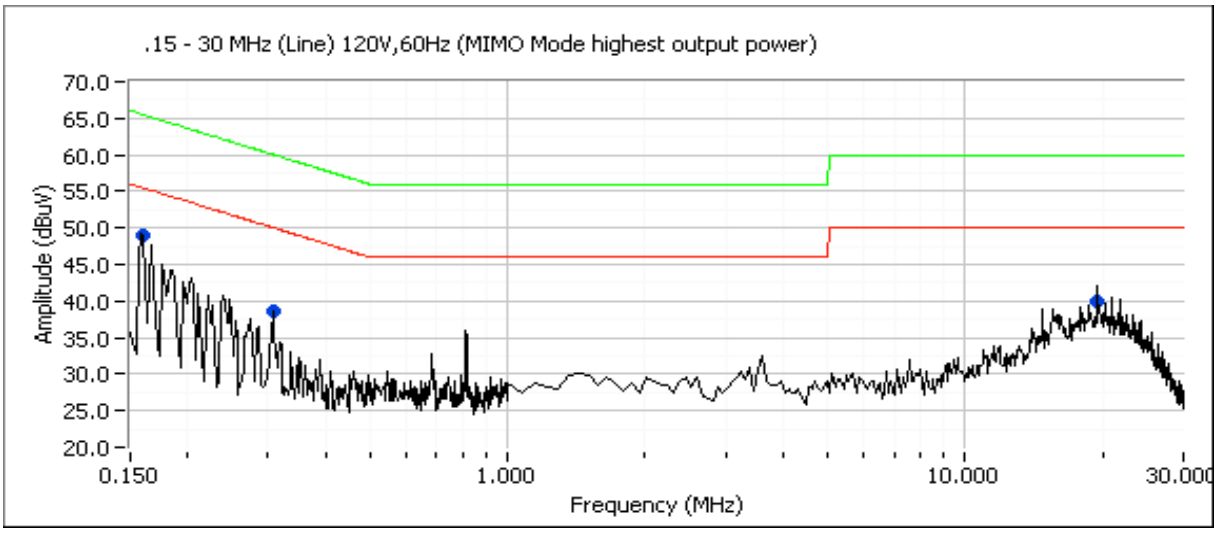
No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Account Manager:	Esther Zhu
Contact:	David Boldy		
Spec:	FCC 15.247, EN55022	Class:	Radio

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz (MIMO Mode)





Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Account Manager:	Esther Zhu
Contact:	David Boldy		
Spec:	FCC 15.247, EN55022	Class:	Radio

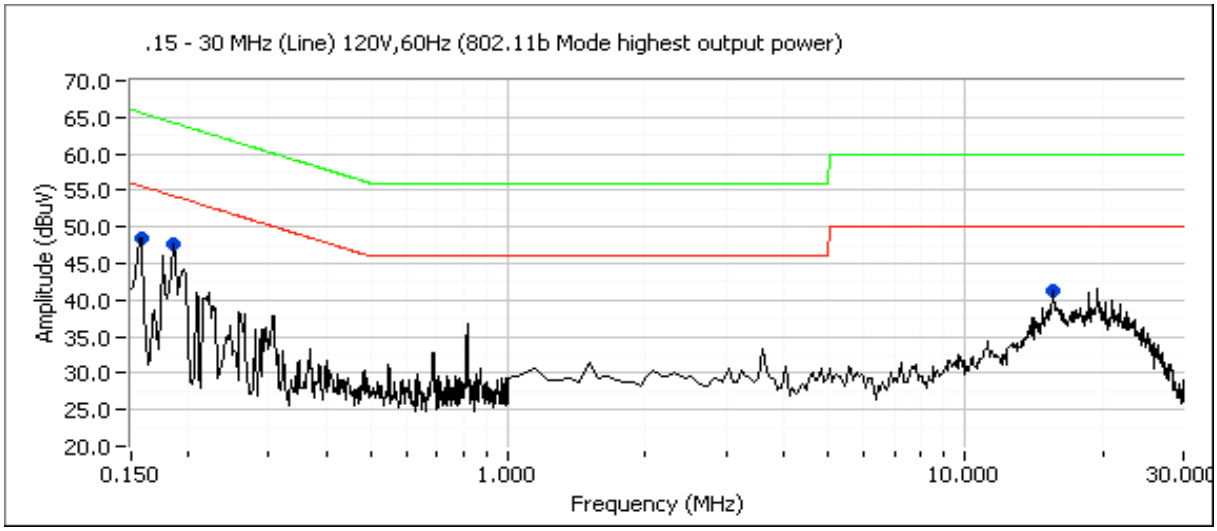
Frequency MHz	Level dBµV	AC Line	EN55022 B Limit	EN55022 B Margin	Detector QP/Ave	Comments
0.1606	49.1	Line 1	55.4	-6.3	Peak	Note 1
0.1606	48.4	Neutral	55.4	-7.1	Peak	Note 1
19.488	40.6	Neutral	50.0	-9.4	Peak	Note 1
0.210	43.1	Neutral	53.2	-10.1	Peak	Note 1
19.488	39.9	Line 1	50.0	-10.1	Peak	Note 1
0.307	38.7	Line 1	50.0	-11.4	Peak	Note 1

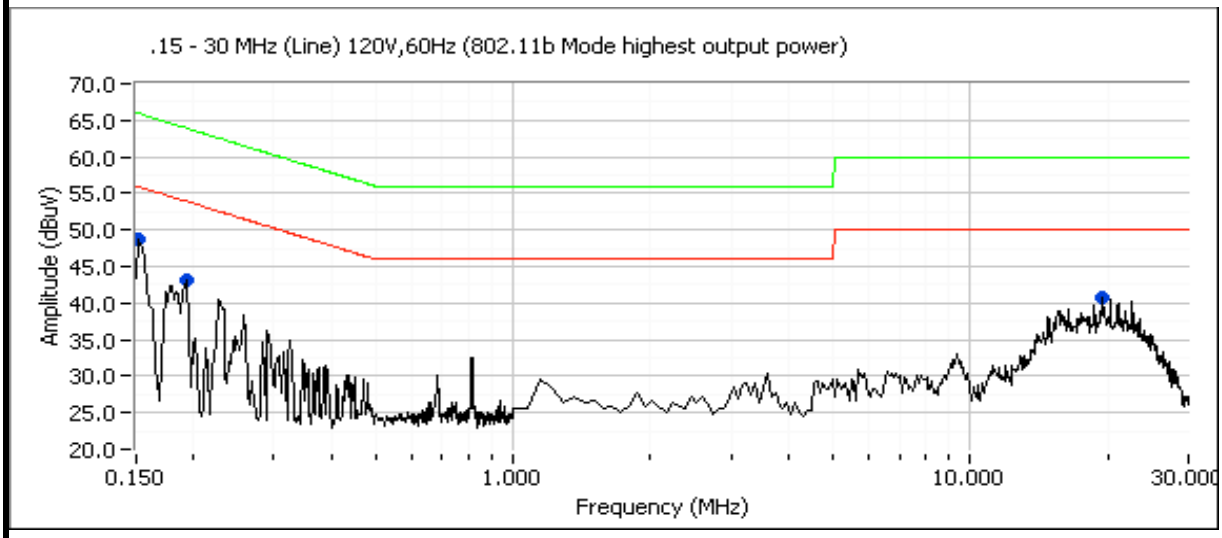
Note 1: No QP readings taken. Peak readings are more then 6-dB below the average limit.

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Account Manager:	Esther Zhu
Contact:	David Boldy		
Spec:	FCC 15.247, EN55022	Class:	Radio

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz (802.11b)





Elliott

EMC Test Data

Client:	Netgear	Job Number:	J63498
Model:	WN511B	T-Log Number:	T63589
		Account Manager:	Esther Zhu
Contact:	David Boldy		
Spec:	FCC 15.247, EN55022	Class:	Radio

Frequency MHz	Level dBµV	AC Line	EN55022 B Limit	EN55022 B Margin	Detector QP/Ave	Comments
0.154	49.2	Line 1	55.8	-6.6	Peak	Note 1
0.152	48.8	Neutral	55.9	-7.1	Peak	Note 1
0.167	46.8	Line 1	55.1	-8.3	Peak	Note 1
15.573	41.4	Line 1	50.0	-8.6	Peak	Note 1
19.488	40.7	Neutral	50.0	-9.3	Peak	Note 1
0.193	43.2	Neutral	53.9	-10.8	Peak	Note 1

Note 1: No QP readings taken. Peak readings are more then 6-dB below the average limit.

EXHIBIT 3: Photographs of Test Configurations

Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs of Netgear Model WN511B Construction

Pages

EXHIBIT 6: Operator's Manual for Netgear Model WN511B

Pages

EXHIBIT 7: Block Diagram of Netgear Model WN511B

Pages

EXHIBIT 8: Schematic Diagrams for Netgear Model WN511B

Pages

EXHIBIT 9: Theory of Operation for Netgear Model WN511B

Pages

EXHIBIT 10: Advertising Literature

Pages

EXHIBIT 11: RF Exposure Information

Pages