EXHIBITS

EXHIBIT 1: Letter Requesting Confidentiality under Sec. 0.457(d)

EXHIBIT 2: Product Description and Operation Overview

EXHIBIT 3: Information for which Confidentiality is Requested

Schematics

EXHIBIT 4: Product Photographs

EXHIBIT 5: User Manual and FCC ID Label

EXHIBIT 6: RF Hazard Information per Sec. 1.1307

EXHIBIT 7: Report of Measurements

EXHIBIT 1: Letter Requesting Confidentiality under Sec. 0.457(d)

Thomas N. Cokenias *EMC &Radio Approvals*
Test & Consulting Services for Commercial, Military, International Compliance
P.O. Box 1086
El Granada, CA 94018

5 Sept 2000

FCC Laboratory
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Application Examiner
Reviewing Engineer

Re: Request for confidentiality per Section 0.459 of FCC Rules

Applicant: Wireless Inc.

FCC ID: EV9N2WLAX-5G3

To whom it may concern,

Request is hereby submitted, on behalf of my client Wireless Inc., to withhold from public review certain portions of the application for equipment certification for the referenced FCC identifier. In particular, the following sections of the application and report are requested to be kept confidential:

Schematics

Rationale for request for confidentiality:

Wirless Inc. has invested considerable time and materials in research and development to produce the referenced product. Disclosure of the confidential portions of this application to competitors would give them competitive advantage in developing similar products.

If you have questions or need further information, please contact the undersigned.

Sincerely,

THOMAS N. COKENIAS
EMC Consultant/Agent for Wireless Inc.

Tel 650 726 1263 *fax 650 726 1252* *trephonc@macconnect.com*

EXHIBIT 2: Product Description and Operation Overview

General Overview

The N2-4XE1 is a point to point Wireless Extension operating in the 5.3/5.7 GHz UNII band as authorized in rule sections 15.401 through 15.407.The unit is enclosed in a weather proof outdoor enclosure and is intended to provide data links over distances up to 10 km.The radio in the unit operates full duplex, transmitting and receiving data at the rate of 8.448 Mbps. The radio is modulated using BPSK.

The product uses two separate 100 MHz bands within the U-NII frequency spectrum. Within these bands,the N2-4XE1 series operates in one of many independent channels providing for frequency reuse and network flexibility.

Synthesized RF channel selection is field configurable,as are the power output options for the selection of antenna sizes..

Frequency Band: Full-duplex operation in the UNII band

Frequency Range: 5,250 -5,350 MHz

Digital Interface: ATM

5.3 GHz TX(Low Band)

Frequency Range: 5,250 -5,350 MHz
Output power: 0 dBm
+4 dBm
+8 dBm
+12 dBm

The Wireless UNII radio will be professionally installed. Antenna cables are provided with the EUT, antennas are specified for the installer to purchase. At present, there are two antennas specified for use with this radio:

RadioWaves Inc. model	FP17.5-5.5	Integrated 9” x 9” flat panel, 18 dBi
Gabriel	DFPD-552	17.5 dBi flat panel antenna

The radio will be provided with a 6 ft or a 12 ft long coaxial cable.

6 ft cable cable loss: 1.0 dB
12 ft cable loss: 1.9 dB

Cable loss will decrease RF power level delivered to the antenna.

A description of the theory of operation and product configuration is found in an attachment to this application and report.

System Interconnection

- refer to attachment *(block diagram)*

EXHIBIT 3: Information for which Confidentiality is Requested

Schematics

-refer to separate attachment

EXHIBIT 4: Product Photographs

-refer to separate attachments

EXHIBIT 5: User Manual and FCC ID Label

-refer to separate attachment

EXHIBIT 6: RF Hazard Information Per Sec. 1.1307

- see discussion re 15.407(f) RF Exposure Information, page 19

EXHIBIT 7: Report of Measurements

FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2.

2.1033(b)1 **Applicant:** Wireless Inc.
5452 Betsy Ross Drive
Santa Clara CA 95054-1101

2.1033(b)2 **FCC ID**: EV9N2WLAX-5G3

2.1033(b)3 **Installation instructions** are found in attached document.

2.1033(b)4 A **brief description of the circuit functions** is found in attached document

2.1033(b)5 **Block diagram** is found in attached document

2.1033(b)6 **Report of measurements** is found below.

2.1033(b)7 **Product photographs** are attached in JPEG format.

2.1033(b)8 The EUT is operated with **accessory devices** described below and in the attachments submitted.

2.1033(b) 9 NOT APPLICABLE

2.1033(b)10 - 12 NOT APPLICABLE

2.1091 The Wireless UNII radio will be professionally installed. Antenna cables are provided with the EUT, antennas are specified for the installer to purchase. At present, there is one antenna specified for use with the radio:

RadioWaves Inc. model FP17.5-5.5	Integrated 9” x 9” flat panel, 18 dBi
Gabriel Model No:DFPD .5-52	6” External , Flat Panel 17.5dBi

The radio will be provided with a 6 ft or a 12 ft long coaxial cable.

6 ft cable cable loss: 1.0 dB
12 ft cable loss: 1.9 dB

Cable loss will decrease RF power level delivered to the antenna.

SUMMARY OF TEST RESULTS

15.407 General Technical Requirements

The UNII requirements for maximum power, peak power spectral density, minimum 26 dB emissions bandwidth, and maximum EIRP are interdependent variables. In addition, the level of transmitter spectral re-growth at the UNII band edges will limit the power output that may be transmitted into a particular antenna, since the emission limit is -17dBm/MHz and /or -27dBm/MHz EIRP, dependent on both antenna gain and power input.

The Wireless UNII radio has user programmable output power levels from 0 - 12 dBm.

The **26 dB channel bandwidth** is 10.8 MHz.

15.407(a)3 Power limits

11 dBm + 10 log (10.8) = **21.3 dBm max. for 5.25 - 5.35 GHZ band**

Peak power spectral density: = **11 dBm/MHz**

Defacto EIRP limit: 21.3 dBm + 6 dBi = 27.3 dBm EIRP

Defacto limit, power spectral density: 11 dBm/MHz+ 6 dBi = 17 dBm/MHz EIRP

Maximum Power, dBm, into antenna

	17.5 dBi Gabriel panel
fo MHz	Max P, dBm
5250-5350	0 + -1.7 dB cable loss = -1.7 dBm total

RF Output Power Measurements
Ref: 15.407(a)2

Measurement equipment used:

HP 436B Power meter
HP 8381A power sensor
HP 8566 spectrum analyzer
30 dB attenuator

Test set-up:

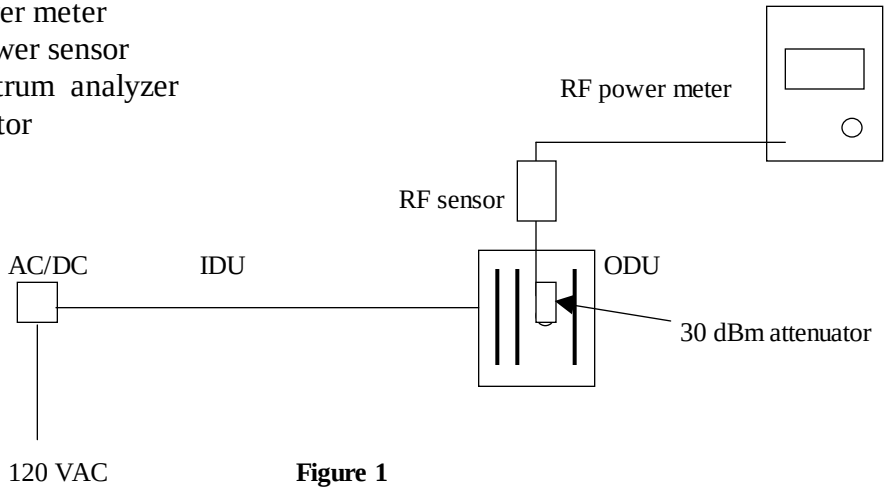


Figure 1

Test Procedures

1 Set the IDU to the desired channel and to maximum output power setting
2. RF Output = Meter reading dBm + 30 dB

Test Results: Power Output, Max

Chanel	Frequency, MHz	Pout, dBm	Cable loss, dB	dBm to antenna
1	5260.80	12.2	1.0	11.2
5	5301.76	12.6	1.0	11.6
8	5332.48	13.0	1.0	12.0

NOTE: In actual use, maximum power levels chosen must meet the defacto EIRP limit and power spectral density requirements of 15.407, as well as band edge undesired emissions levels of -27 dBm/MHz EIRP.

For this product, the user manual specifies a maximum output level of 0 dBm into an 18 dBi antenna is specified to insure compliance with the -27 dBm/MHz EIRP maximum out of band emission requirement.

Peak Power Spectral Density
Ref: 15.407(a)5

Measurement equipment used:

HP 8565E spectrum analyzer
3 dB attenuator

Test set-up: Refer to Figure 2 below

Test Procedures

1. Set EUT to lowest operating channel.
2. Set spectrum analyzer to TX output center frequency, RES BW = 1MHz, VID BW = 1MHz.
3. Using MKR PEAK to find the peak power spectral density
4. Repeat for middle channel and highest channel

Test Results

Measured peak power density at maximum power setting :

NOTE: Per user manual, this product will be operated at a maximum power output level of 0 dBm into an 18 dBi antenna. Power spectral density for 0 dBm is approximately 0 dBm, as shown on charts A and B below for Sample 2 .

Channel	F, MHz	PSD, dBm/MHz
1	5260.8	-1.1
8	5332.48	-0.4

Ratio: Peak Excursion Modulation Envelope to Peak Transmit Power
Ref: 15.407(a)6

The emission from the Wireless Inc. radio has a distinct peak at channel center. As such, the ratio between peak transmit power and peak excursion in a 1 MHz bandwidth (i.e., psd) is small at the center. For the rest of the passband, refer to attached spectrum analyzer chart labeled “Peak Excursion Modulation Envelope”.

Spectrum analyzer RES BW setting is limited to 3 MHz, not sufficient for measuring peak power of 10.8 MHz wide signal. Measurements were taken at intermediate bandwidths and results were extrapolated to 11 MHz emissin bandwidth:

15.407(a)6 Maximum allowed excursion: 13 dB
Measured excursion, 100 kHz v 1 MHz BW: 6.05 dB
Theoretical excursion: 10 log (1/0.1) = 10 dB
Extrapolated excursion, 1 MHz v 10.8 MHz: 10 log(10.8/10) + 6.05 = 6.35 dB

Theoretical excursion: 10 log (10.8/1) = 10.3 dB

Antenna Conducted Output (For determining bandedge EIRP)

Ref: 15.407(b)2

Measurement equipment used:

HP 8565E spectrum analyzer
3 dB attenuator

Test set-up:

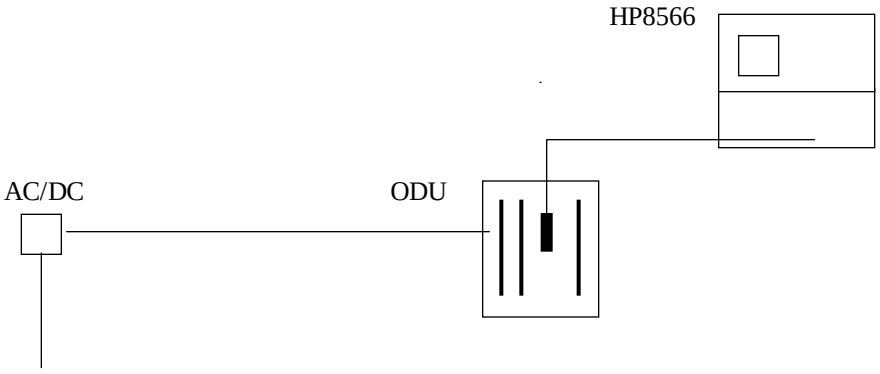


Figure 2

Test Procedures

1. Set EUT to lowest operating channel.
2. Set spectrum analyzer center frequency to TX output, RES BW = 1MHz, VID BW = 1 MHz
3. Use analyzer MKR funtion to measure output at bandedge and 10 MHz from bandedge
4. Add antenna gain and compare to -17dBm/MHz and /or -27dBm/MHz EIRP
5. Plot spectrum analyzer data
6. Repeat steps 1-6 for highest channel

Test Results

Refer to attached spectrum analyzer graphs.

Unwanted Emissions below 1 GHz
Ref: 15.407(b)6

15.207 AC Line Conducted Emissions

Refer to attached spectrum analyzer graph

15.109, 15.209 Radiated Emissions Below 1 GHz

Refer to radiated data below taken for model N24X, with digital board and DC to DC converter power circuitry virtually identical to the AX radio. Data is applicable to and representative of emissions below 1 GHz for the AX radios.

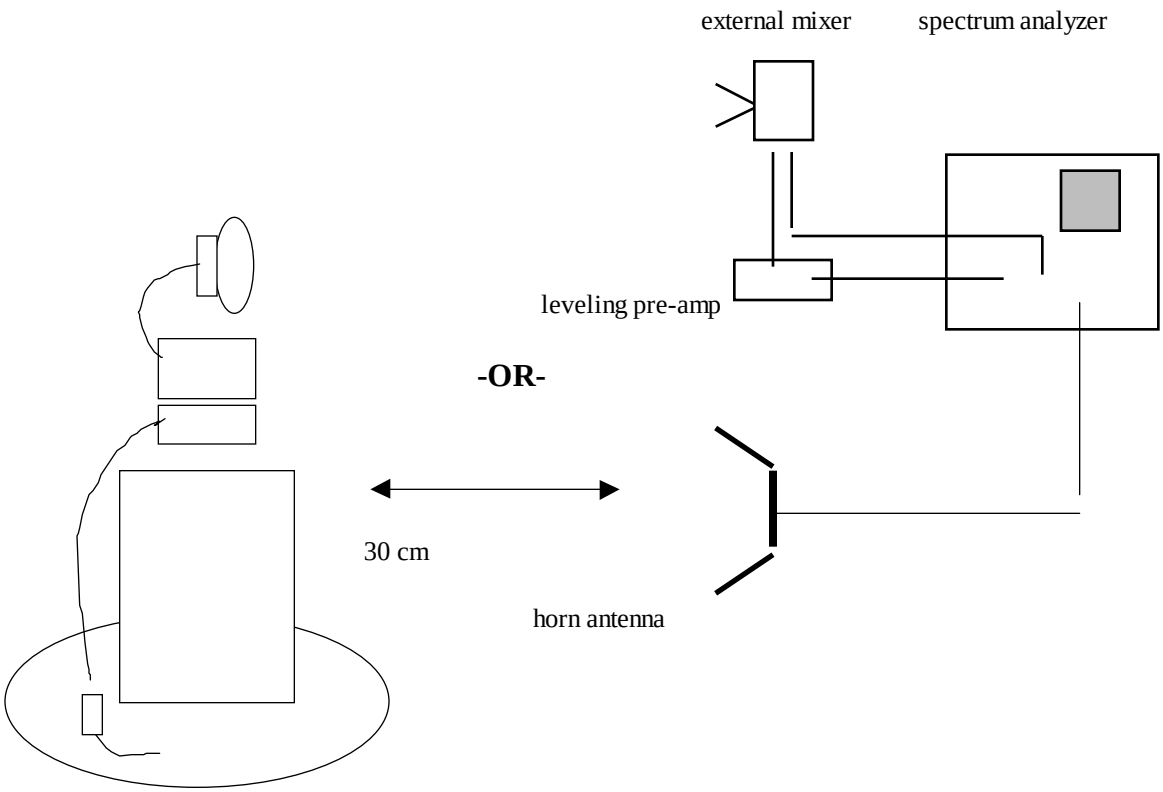
Field Strength of Spurious and Harmonic Radiation

Ref: 15.407(b)6

Measurement Equipment Used:

HP 8566 Spectrum Analyzer
HP 11975A Preamplifier, 2 - 8 GHz (used with HP11970 external mixers)
Antenna Research Associates MWH 1826/B, 18 - 26.5 GHz
HP 11970K Harmonic mixer, 18 - 26.5 GHz
HP 11970A Harmonic mixer, 26.5 - 40 GHz
HP 11970Q Harmonic mixer, 33 - 50 GHz
HP 11970V Harmonic mixer, 50 - 75 GHz
HP 11970W Harmonic mixer, 75 - 110 GHz
Low loss antenna cable (0.7 dB/ft @ 24 GHz)

Test Set-Up



Test Method
With the transmitter operating at full power, the EUT was rotated 360° and the search antenna was raised and lowered in both polarities, all in an attempt to maximize the levels of the received emission for each harmonic and spurious emission up to 40 GHz.

Test Results

Refer to worst-case radiated data sheet, separate attachment: *Ch1-2FT.xls*

No emissions above instrumentation noise floor were detected. Tests were performed for each of the 2 antennas at a LOW, MID, and HIGH channel.

Antenna conducted measurements confirmed there are no harmonic emissions generated by this transmitter above the noise floor of the spectrum analyzer (-51 dBm or lower). Using the relationship between field strength, output power and distance

EV/m = (•(30*PW*G))/d meters (E volts/m, P watts, G numeric gain over isotropic)

Assuming G=1, converting volts to microvolts and watts to milliwatts, simplifying and combining terms, and using a distance of d = 3m

E@3m, dBuV/m = (95.24 + PdBm) dBuV/m = 95.24- 51dBm **= 44.24 dBuV/m**

!5.205, 15.209 limit: 54 dBuV/m @ 3m

15.407(c) Automatic Transmitter Shut-off when No Data Present

If the RF transmitter synthesizer loses lock (frequency error) or the output transmitter cannot level power (Pout control error), logic signals are sent to the digital board to shut down the unit. This also happens if the negative power supply isn't present.

15.407(d) Integral Antenna Requirement 5.15 – 5.25 GHz

NOT APPLICABLE

15.407(e) Indoor Operation Limitation 5.15 – 5.25 GHz

NOT APPLICABLE

15.407(f) RF Exposure Information

MPE Calculations for 0 dBm into 18 dBi Antenna:

RF Hazard Distance Calculation

mW/cm2 from Table1: 1.00

Max RF Power P, dBm	TX Antenna G, dBi	MPE Safe Distance, cm
0.0	**18.0**	**2.2**

Basis of Calculations:

E^2/3770 = S, mW/cm2
E, V/m = (Pwatts*Ggain*30)^.5/d, meters
d = ((Pwatts*G*30)/3770*S))^0.5 Pwatts*Ggain = 10^(PdBm-30+GdBi)/10)

The product antenna will be installed in outdoor locations, on rooftops and on poles, and as such will be at least 2m away from persons during normal operations.

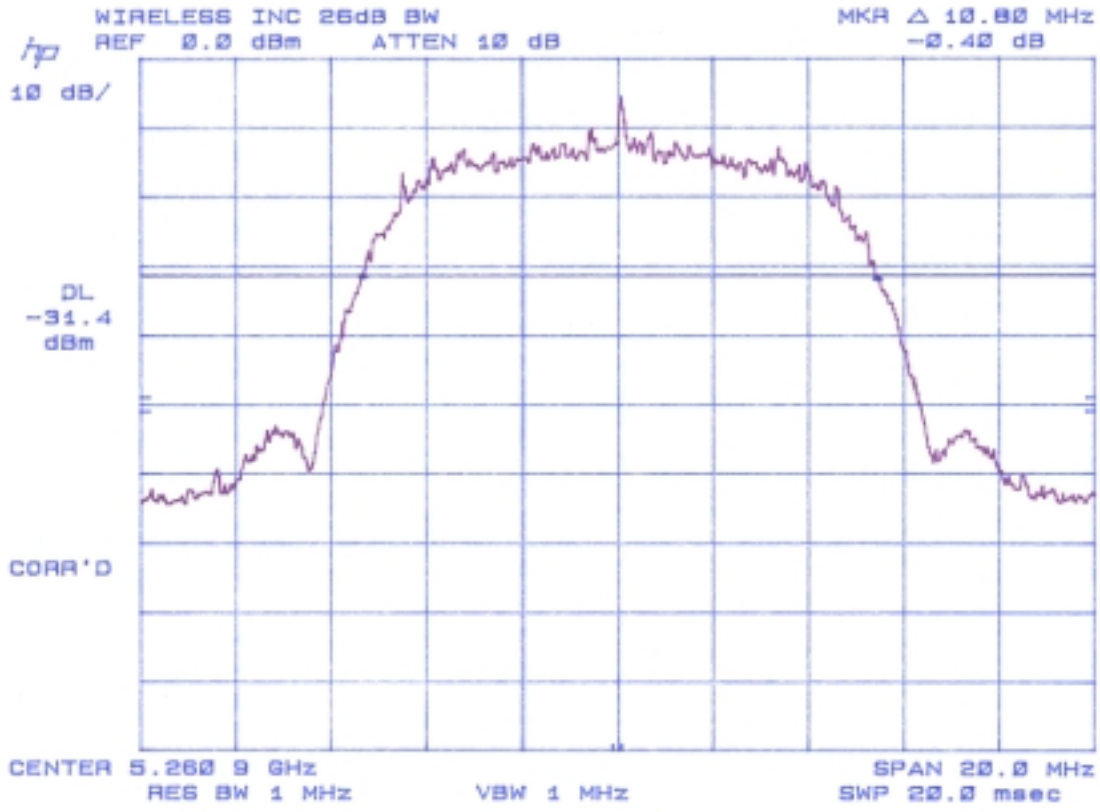
The user manual will require a minimum separation of 2 m for this product.

15.407(g) Frequency Stability Under All Conditions of Normal Operations

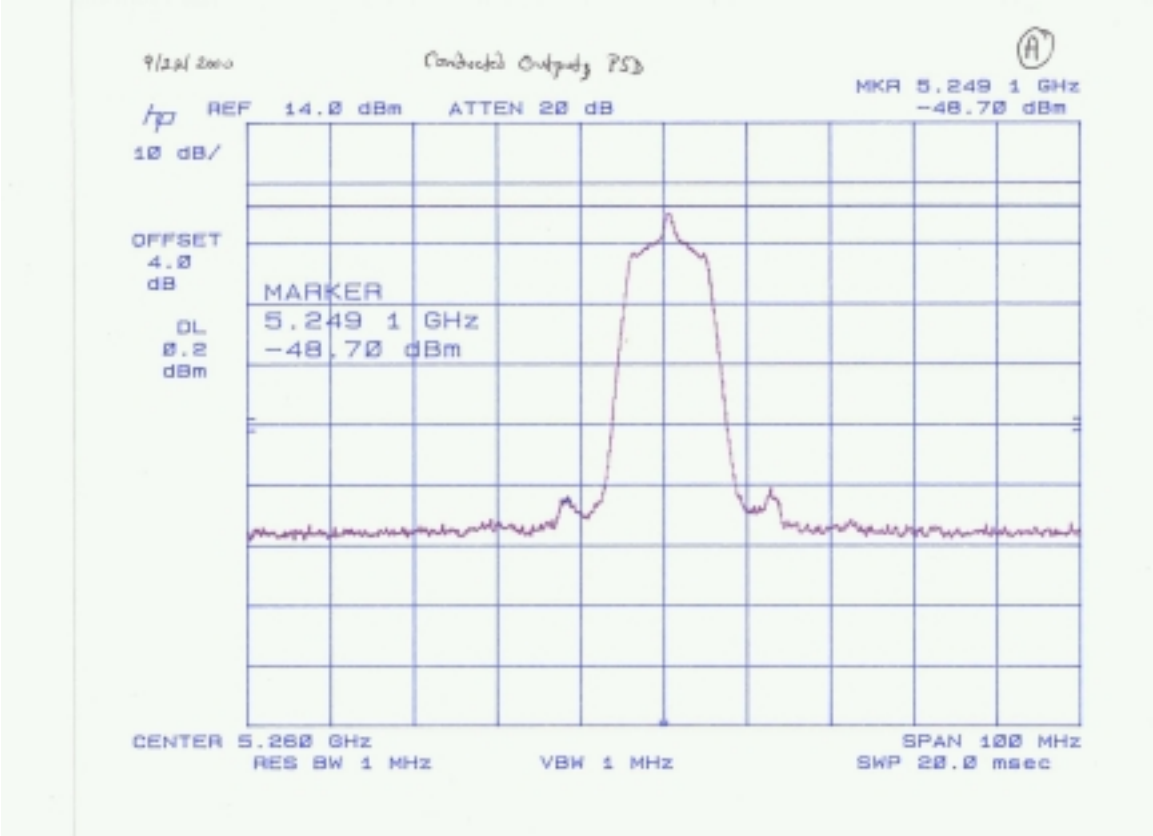
The EUT was placed in the temperature chamber. The EUT was set to one of the operating channels and the output mask was monitored on the spectrum analyzer. The chamber temperature was increased to +65C (highest temperature specified by mfr), and then was brought down to -35C (the lowest operating temperature specified by the mfr). The mask center frequency was compared to the center frequency at +25 C.

Data indicates that the EUT stays within its operating frequency range across the manufacturer specified operating frequency range.

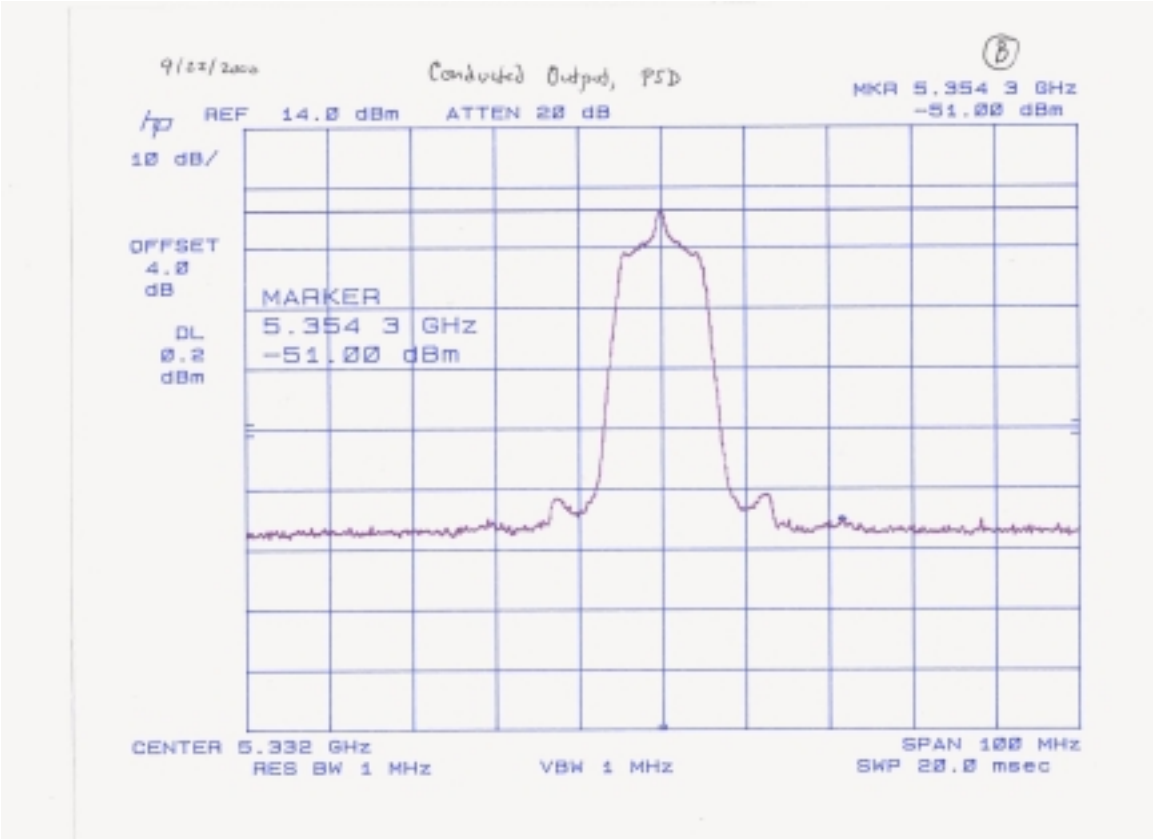
26 dB Bandwidth



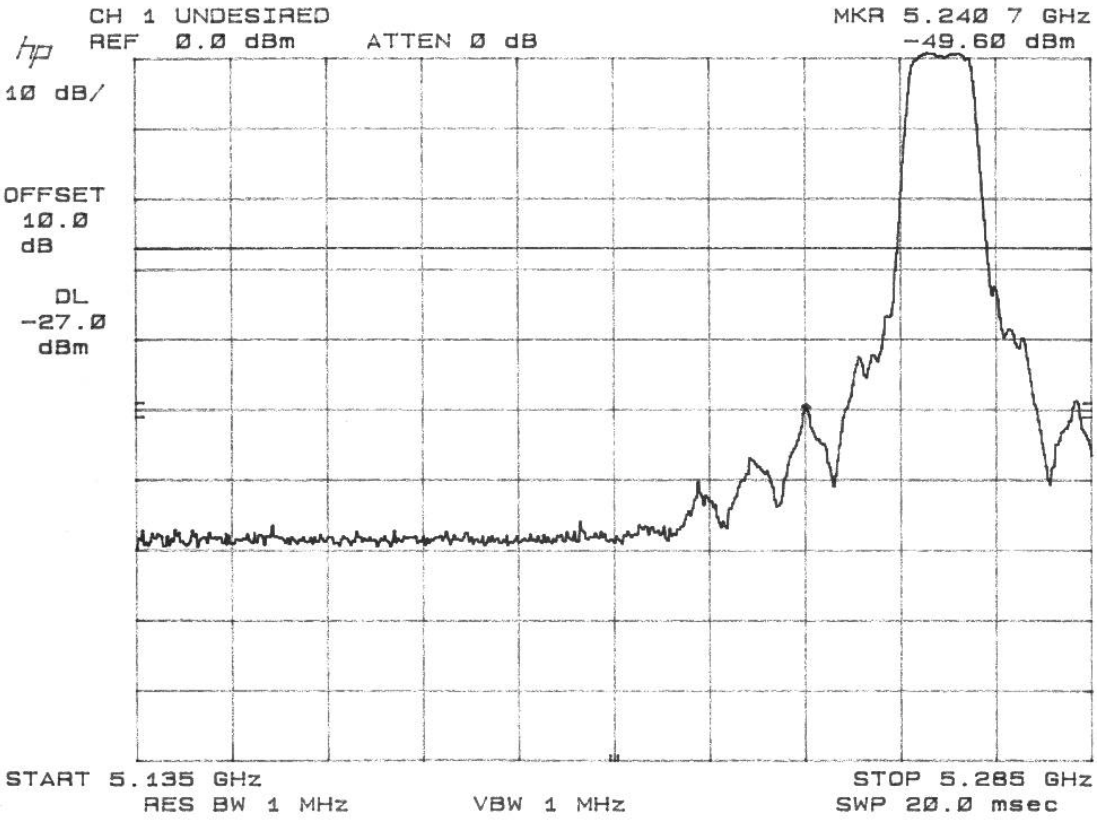
Spectrum Analyzer Graphs – Bandedge (sample 2)



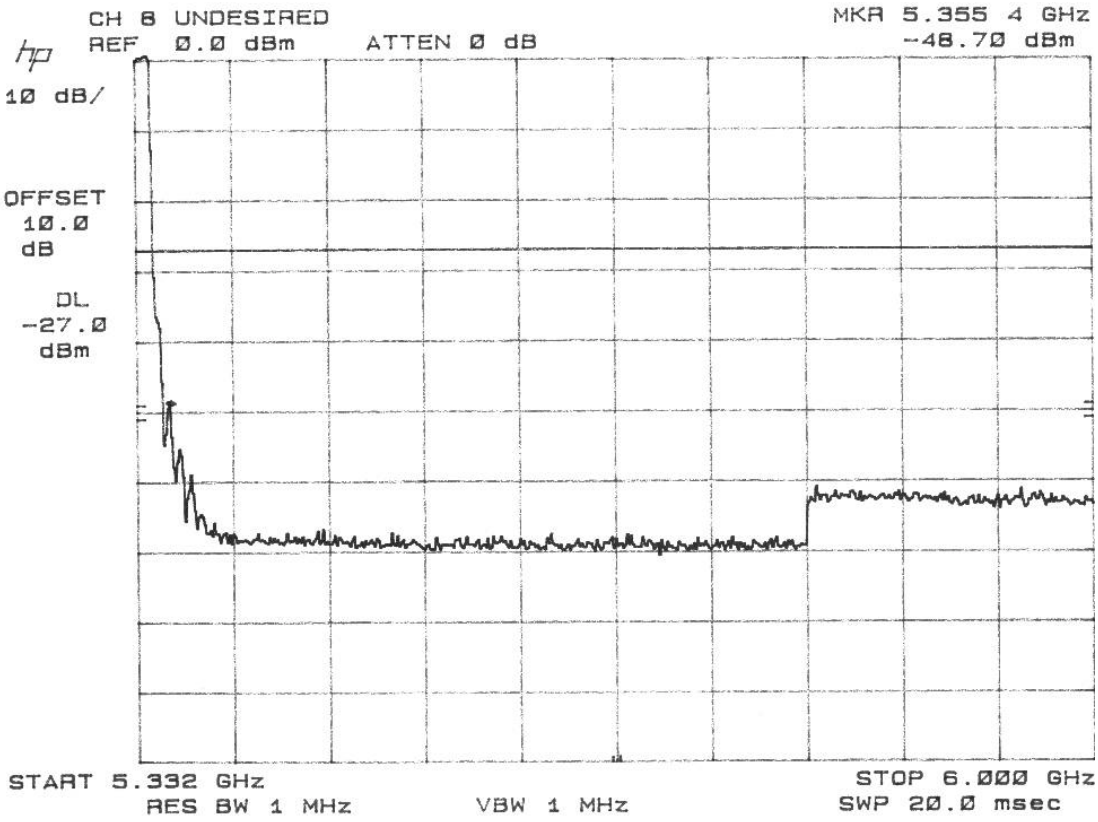
Spectrum Analyzer Graphs – Bandedge (sample 2)



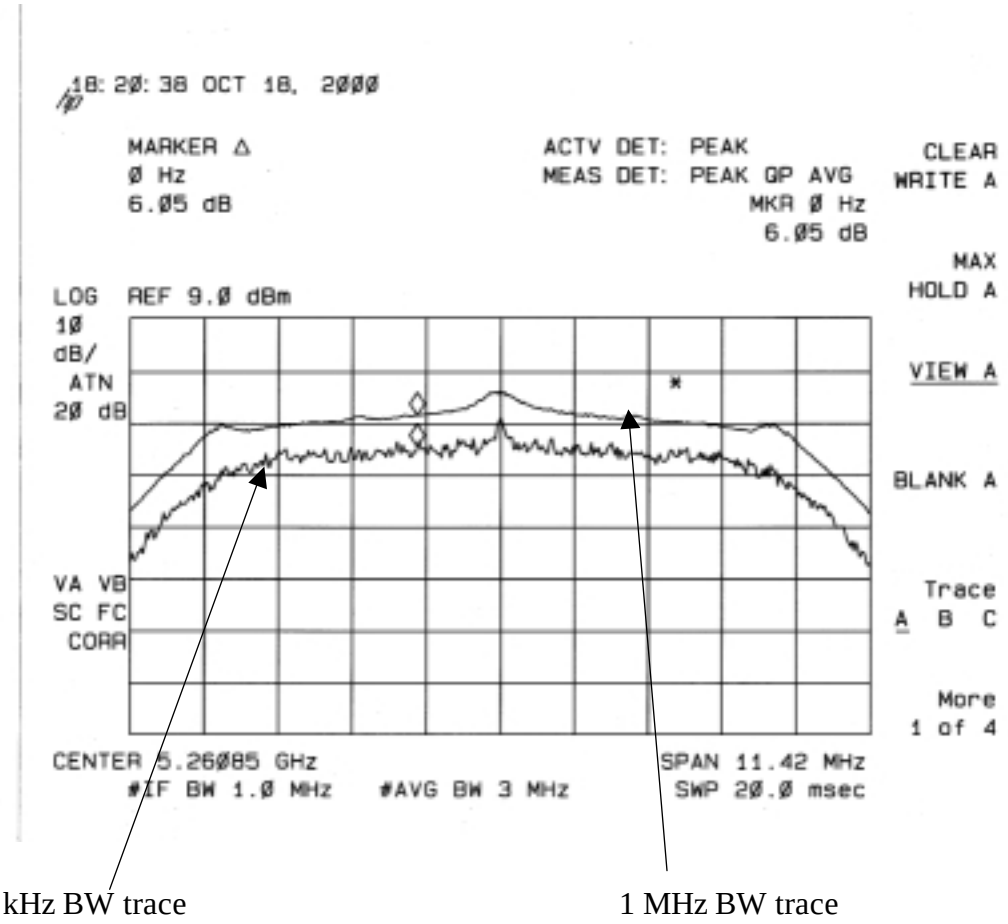
Spectrum Analyzer Graphs – Bandedge (sample 1)



Spectrum Analyzer Graphs – Bandedge (sample 1)



Peak Excursion Modulation Envelope



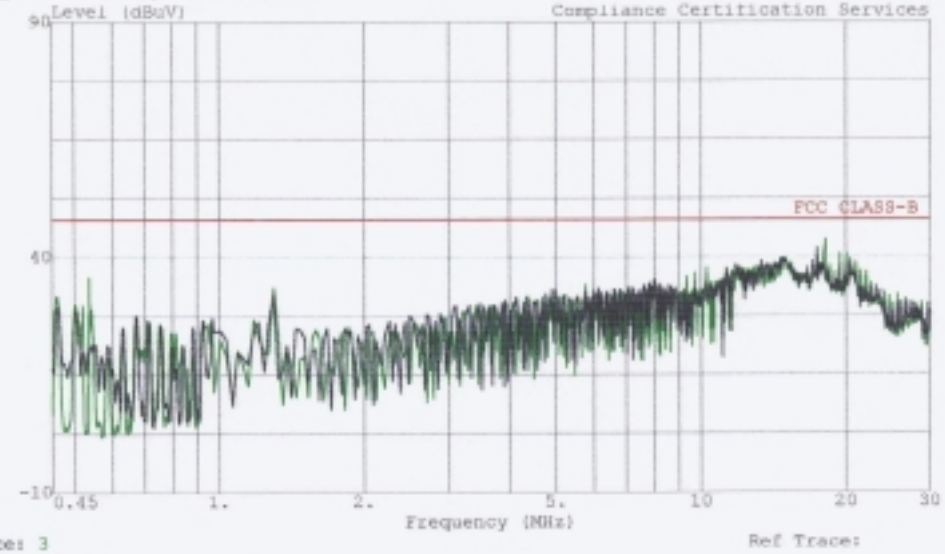
100 kHz BW trace

1 MHz BW trace

15.207 AC Line Conducted Emissions

COMPLIANCE Engineering Services, Inc.
1366 Bordeaux Dr.
Sunnyvale, CA 94089-1005 USA
Tel: (408) 752-8166
Fax: (408) 752-8168

Data#: 7 File#: WIRELESS.EM1 Date: 10-19-2000 Time: 10:47:15



Trace: 3 Ref Trace:
Project No. :
Report No. : 0010195C
Test Engr : Thu Chan
Company : Wireless AX
EUT Description : 5G3
Model :
EUT Config. : EUT only
Type of Test : FCC Class B
Mode of Operation: Tx mode
: PA: L1(green), L2(black)
: 115Vac, 60Hz

15.109, 15.209 Radiated Emissions

Project No. : 0002281
Compliance Engineering Services Inc. Report No. : 000228B2
Date : 02/28/2000
Time : 13:14
>> 3 M RADIATED EMISSION DATA << Test Engr : RONNY CASTILLO

Company : WIRELESS INC
Equipment Under Test : INDOOR UNIT FOR WIRELESS DATA SYSTEM MN N24X IDU
Test Configuration : EUT/ODU
Type of Test : FCC CLASS B
Mode of Operation : NORMAL

Freq.	dBuV	PreAmp	Ant	Cable	dBuV/m	Limit	Margin	Pol	Hgt(m)	Az
Bilog 2586 ; Pre-pamp = 8447D-P8 2944A06589:										
520.00	46.50	-27.62	18.31	5.40	42.59	46.00	-3.41	H	2.0	180
309.98	44.30	-26.47	14.17	3.98	35.97	46.00	-10.03	H	2.0	270

Total # of data 2
V. 112999b