



EM-POCKET-078-091103

**CONSTRUCTION SERVICES**

of Branford, LLC

October 30, 2009

S. Derek Phelps, Executive Director  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051



ORIGINAL

RE: **Notice of Exempt Modification to an existing monopole tower located at North Eagleville Road, Storrs (Mansfield), Connecticut**

**Latitude: 41 48 50 / Longitude: 72 15 33.95**

Dear Mr. Phelps:

Youghioghenny Communications-Northeast, LLC doing business as Pocket Communications ("Pocket") intends to install antennas and associated ground equipment at the existing 327' foot guyed lattice tower facility owned by WHUS Radio and located at North Eagleville Road, Storrs, Connecticut ("Facility"). Pocket provides prepaid, flat rate wireless voice and data services to more than a quarter of a million subscribers. Pocket is licensed by the Federal Communications Commission ("FCC") to provide PCS wireless telecommunications services in the State of Connecticut including the area to be served by the proposed installation. This proposed installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g et seq. and Connecticut Agencies Regs § 16-50j-72(b)(2). Pursuant to R.C.S.A. 16-50j-73, Pocket is providing notice to Elizabeth C. Paterson, Mayor of Mansfield.

Under the Council's regulations (Conn. Agencies Regs. Sec 16-50j-72(b)), Pocket's plans do not constitute a modification subject to the Council's review because Pocket will not change the height of the Tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Tower

The Facility consists of a three hundred twenty seven foot (327') foot high guyed lattice located at North Eagleville Road, Storrs (Mansfield), Connecticut (See Vicinity Map attached as hereto). The Tower is owned by WHUS Radio. The tower currently supports University of Connecticut Police Department antennas at the two hundred sixty foot (260') centerline AGL, Nextel antennas at the two hundred forty foot (240') centerline AGL, Cingular antennas at the one hundred eighty six foot (186') centerline AGL, Verizon antennas at the one hundred thirty eight foot (138') and eighty four foot

(84') centerline AGL as well as numerous other antennas of unknown owners at varying centerlines. The antenna locations are set forth on Drawing A-2 of the attached drawings in Exhibit A as well as in the attached structural report in Exhibit C.

Pocket proposes to install three (3) RFS APXV18-206517S-C flush mount antennas on the tower at the two hundred thirty foot (230') centerline AGL, and a Nortel CDMA Micro BTS 3231 cabinet which will be mounted on a frame and contained in a six foot by six foot (6'x 6') lease area. A small GPS antenna will be mounted on an ice bridge which will run from the lease area to the tower. Utilities will be run via a proposed underground conduit from an existing utility backboard within the compound (See Drawings A-1 through E-1 of Exhibit A attached hereto and Equipment Specifications attached as Exhibit B). To accommodate Pocket's equipment on a temporary basis, a mobile, EPA approved generator and small microwave dish antenna (approximately 14" x 14") will be used at the site to provide electricity until permanent power can be established by the utility provider. Pocket anticipates that the temporary generator will be in use for a maximum of eight weeks from the time of approval. The specifications for this proposed equipment are also included in Exhibit B. Due to the temporary use and low emissions from the generator, no permit is required from the Department of Environmental Protection. Pocket would propose to refuel the generator every 48 hours. The installation will have virtually no additional impact on the area beyond that which the current Tower imposes.

#### Structural Analysis

A structural analysis of the Tower was prepared by URS Corporation and is attached hereto as Exhibit C. The report indicates that the Tower, at present, is adequate to support the proposed modifications.

#### Need for the Facility

Pocket's antennas will be used to fill existing gaps in coverage in parts of Storrs/Mansfield including the University of Connecticut campus. Pocket has a need for the facility, and the proposed antennas installed at a centerline height of two hundred thirty feet (230') will satisfy the need for coverage in this area.

The addition of the proposed antennas will not adversely impact the health and safety of the surrounding community or the people working on the Tower. The total radio frequency exposure measured around the tower will be well below the National Council on Radiation Protection and Measurements' ("NCRP") standard adopted by the Federal Communications Commission ("FCC"). The "worst case" exposure calculated for the operation of this facility for the proposed antennas would be approximately 1.36% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, all of the antennas on the tower will emit only 40.93% of the NCRP's standard for maximum possible exposure (See Exhibit D attached hereto). Therefore, the power density levels will be well below the FCC mandated radio

frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions.

Conclusion

Pocket respectfully submits that the project presents the opportunity to install antennas on the existing Tower, thereby avoiding the unnecessary proliferation of new towers in the area. Pocket's proposal does not constitute a modification subject to the Council's jurisdiction because:

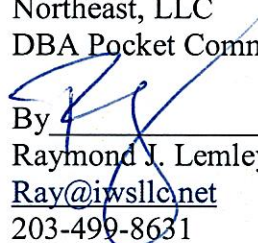
Pocket will not increase the height of the Tower;

Will not extend the boundaries of the site;

Will not increase the noise levels at the existing facility by six decibels or more; and

The total radio frequency electromagnetic radiation power density will stay within all applicable standards.

Respectfully submitted,  
Youghiogheny Communications-  
Northeast, LLC  
DBA Pocket Communications

By   
Raymond J. Lemley, consultant  
Ray@iwsllc.net  
203-499-8631

cc: Mansfield Mayor, Honorable Elizabeth C. Paterson  
Mansfield Director of Planning, Gregory Padick

**EXHIBIT A**  
**SITE DRAWINGS**





HFCT1465

NORTH EAGLEVILLE ROAD  
STORRS, CT 06268

FOR CONSTRUCTION

<b>PROJECT SCOPE</b>		<b>VICINITY MAP (NOT TO SCALE)</b>															
<p>THE PROPOSED SCOPE OF WORK GENERALLY ENTAILS THE INSTALLATION OF:</p> <ol style="list-style-type: none"><li>1. TELECOMMUNICATIONS ANTENNAS, COAX, ICE BRIDGE OR CABLE TRAY, ROAD &amp; PVC CONDUIT INCLUDING THE NECESSARY UTILITIES.</li><li>2. A TOTAL OF (3) PROPOSED PANEL ANTENNAS MOUNTED TO THE EXISTING STRUCTURE.</li><li>3. ELECTRIC &amp; TELCO SHALL BE ROUTED ABOVE OR UNDERGROUND TO THE PROPOSED EQUIPMENT IN ACCORDANCE WITH LATEST NEC EDITION ADOPTED BY LOCAL AUTHORITIES.</li></ol>																	
<b>PROJECT SUMMARY</b>		<b>CODE COMPLIANCE</b>															
<p><b>APPLICANT / LESSEE</b> YOUCHOCENEY COMMUNICATIONS NORTHEAST, LLC. 170 BROAD STREET, SUITE 200 SPRINGFIELD, MA 01105</p> <p><b>PROPERTY INFORMATION</b> <b>SITE ADDRESS:</b> NORTH EAGLEVILLE ROAD STORRS, CT 06268</p> <p><b>PROPERTY OWNER:</b> UNIVERSITY OF CONNECTICUT P.O. BOX 3038 STORRS, CT 06268</p> <p><b>TOWER OWNER:</b> WHIS RADIO UNIVERSITY OF CONNECTICUT STORRS, CT 06268</p> <p><b>POCKET COMMUNICATIONS CONSTRUCTION MANAGER:</b> BILL HINCKLEY</p> <p><b>STRUCTURE TYPE:</b> GUINED TOWER</p> <p><b>COORDINATES:</b> LATITUDE: N 41° 48' 50" LONGITUDE: W 72° 13' 33.95"</p>		<p>1. BUILDING CODE: SBC-2005, 2003 INTERNATIONAL BUILDING CODE WITH CT SUPPLEMENT.</p> <p>2. ELECTRICAL CODE: NEC-2005, 2003 NATIONAL ELECTRICAL CODE</p>															
<b>PROJECT INFORMATION</b>		<b>SHEET INDEX</b>															
<p>1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY CONSISTING OF RIS EQUIPMENT AND PANEL ANTENNAS. ALL ITEMS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED.</p> <p>2. THIS IS AN UNMANNED FACILITY. THE SITE WILL CREATE NO TRASH. THIS REQUIRES NO DUMPSTER.</p> <p>3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.</p> <p>4. EMERGENCY POWER SUPPLY IS A CELL PACK BATTERY SOURCE AND NOT A FLAMMABLE LIQUID SOURCE.</p> <p>5. NO PORTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.</p> <p>6. THE POCKET COMMUNICATIONS MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.</p> <p>7. FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.</p>		<table><tr><th>SHEET</th><th>DESCRIPTION</th></tr><tr><td>T-1</td><td>TITLE SHEET</td></tr><tr><td>GN-1</td><td>GENERAL NOTES</td></tr><tr><td>A-1</td><td>COMPONENT AND EQUIPMENT LAYOUT PLANS</td></tr><tr><td>A-2</td><td>EAST ELEVATION</td></tr><tr><td>A-3</td><td>CONSTRUCTION DETAILS</td></tr><tr><td>E-1</td><td>POWER AND GROUNDING RIGOR DIAGRAMS AND DETAILS</td></tr></table>		SHEET	DESCRIPTION	T-1	TITLE SHEET	GN-1	GENERAL NOTES	A-1	COMPONENT AND EQUIPMENT LAYOUT PLANS	A-2	EAST ELEVATION	A-3	CONSTRUCTION DETAILS	E-1	POWER AND GROUNDING RIGOR DIAGRAMS AND DETAILS
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<b>APPROVALS</b>		<b>GENERAL CONTRACTOR NOTES</b>															
<p><b>LANDLORD:</b></p> <p><b>CONSTRUCTION MANAGER:</b></p> <p><b>RE ENGINEER:</b></p> <p><b>SITE ACQUISITION AGENT:</b></p>		<p><b>UNDERGROUND SERVICE ALERT</b> CALL TOLL FREE 1-888-DIG-SAFE THREE WORKING DAYS BEFORE YOU DIG</p> <p><b>DO NOT SCALE DRAWINGS</b> CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.</p>															



Pocket Communications  
170 Broad Street, Suite 200  
Springfield, MA 01105



IT IS A VIOLATION OF LAW FOR ANY PERSON TO REPRODUCE OR TRANSMIT UNDER THE PROTECTION OF A DESIGN OR INVENTION, TO ALTER THIS DOCUMENT.

DRAWING NO.  
**T-1**



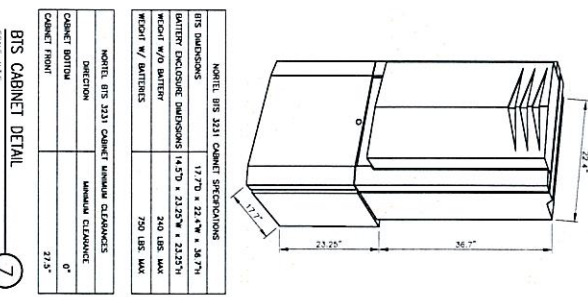
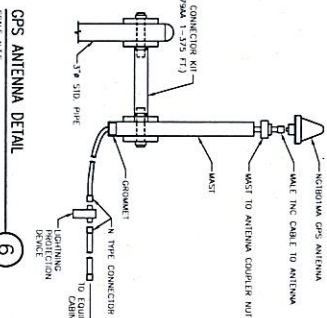
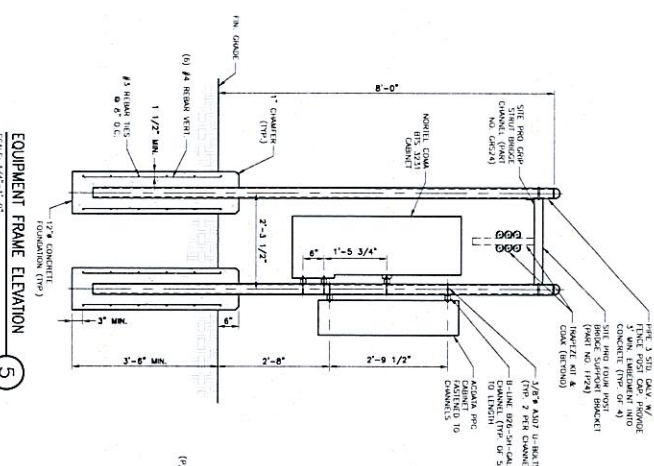
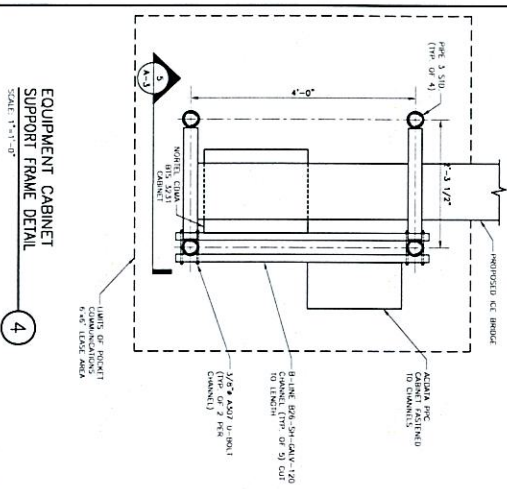
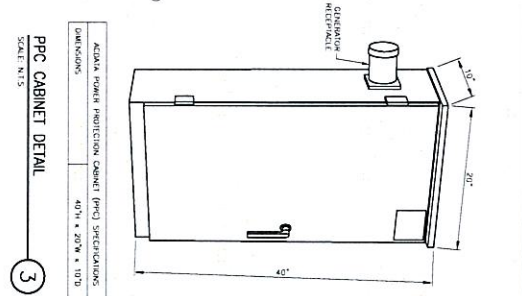
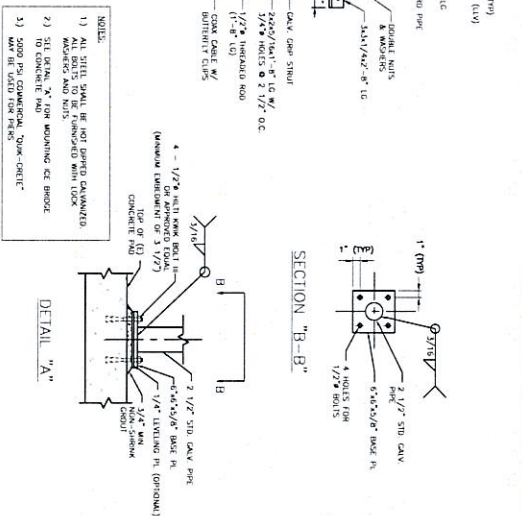
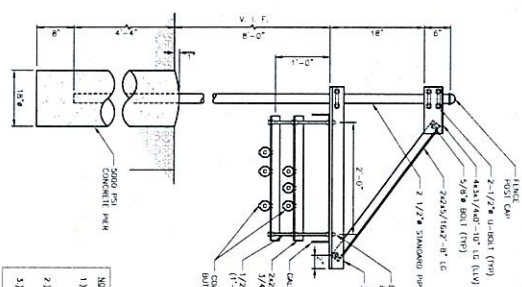
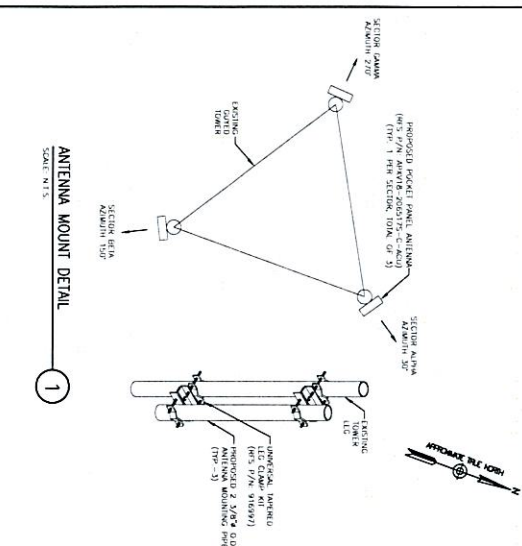


A-1



A-2





**FOR CONSTRUCTION**

**pocket**  
WIRELESS

Pocket Communications  
1 Federal Street  
Building #111  
Springfield, MA 01105

**MAXTON**  
ARCHITECTURAL, INC.  
**BAY STATE  
DESIGN**

241 Boston Post Rd. Phone: 508-228-1100  
Wareham, MA 01956 Fax: 508-465-5217  
(Copyright © 2001 by Jay Douglas Woodward)

ENGINEER/LAND SURVEYOR		DATE
<p>IT IS A VIOLATION OF LAW FOR ANY UNLICENSED PERSON TO SIGN, SEAL OR STAMP THE APPLICATION AND ACCEPTED DESIGNATION OF A PROFESSIONAL DESIGNATION ENGINEER, TO ALTER THIS DESIGNATION</p>		
REVISIONS		
NO.	DATE	REASON FOR REVISION
0	10/22/79	ISSUED FOR REVIEW
1		
2		
3		
4		
5		
PROJECT #	SECOND PR. NO.	SCALE
2002 170	00000	AS NOTED
SHEET NO. 1 OF 1		
SHEET NAME		

<p> <b>H-C11465A</b>  <b>STORRS, CT</b> </p>	<p> <b>SITE ADDRESS:</b>  <b>NORTH EAGLEVILLE ROAD</b>  <b>STORRS, CT 06268</b> </p>	<p> <b>DRAWING TITLE:</b>  <b>CONSTRUCTION</b>  <b>DETAILS</b> </p>	<p> <b>DRAWING NO:</b>  <b>A-3</b> </p>
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# **EXHIBIT B**

## **EQUIPMENT SPECIFICATIONS**

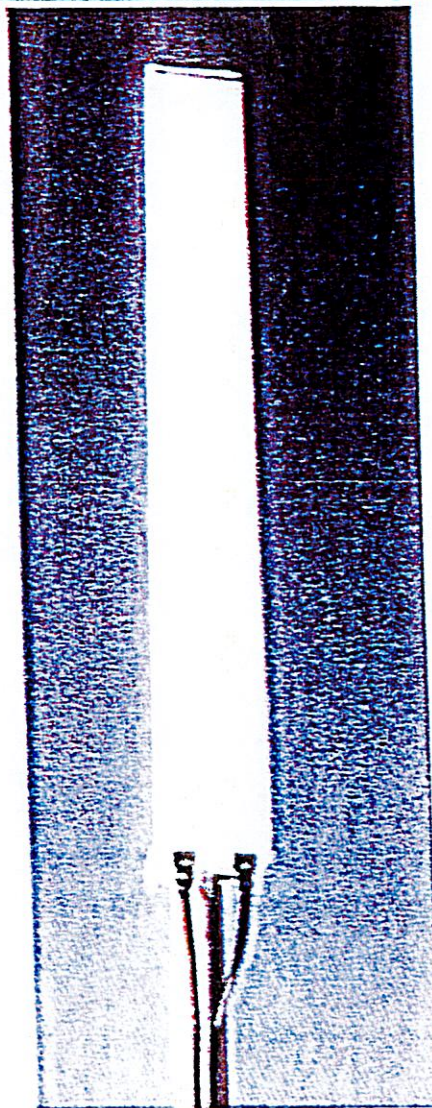




## Optimizer® Panel Dual Polarized Antenna

## Product Description

This variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features null fill and a wide downtilt range with optional remote tilt.



## Features/Benefits

- Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is in-field adjustable 0-10 deg.
- High Suppression of all Upper Sidelobes (Typically <-20dB).
- Optional remote tilt - can be retrofitted
- Broadband design.
- Dual polarization.
- Low profile for low visual impact.

## Main Features

Frequency Band	3G/UMTS (Single, Broad, Dual and Triple-Band)
Horizontal Pattern	Directional
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable



## Optimizer® Panel Dual Polarized Antenna

Gain, dBi (dBd)	13.8 (15.7) , 19.0 (15.9)
Frequency Range, MHz	1710-1900 , 1900-2170
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Electrical Downtilt, deg	0-10
Horizontal Beamwidth, deg	67 , 63
Mounting Hardware	APM40-2
Rated Wind Speed, km/h (mph)	160 (100)
VSWR	< 1.5:1
Vertical Beamwidth, deg	5.0 , 4.6
Upper Sidelobe Suppression, dB	>17 , >18 all (Typically >20)
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	> 30
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	> 150
7th Order IMP @ 2x46 dBm, dBc	> 170
Overall Length, m (ft)	1.85 (6.06)
Dimensions - HxWxD, mm (in)	1850 x 175 x 80 (72.0 x 6.8 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	12 (26.4)
Weight w/ Mtg Hardware, kg (lb)	14.8 (32.5)
Radiating Element Material	Brass
Radome Material	Fiberglass
Reflector Material	Aluminum
Max Wind Loading Area, m <sup>2</sup> (ft <sup>2</sup> )	0.31 (3.3)
Survival Wind Speed, km/h (mph)	200 (125)
Maximum Thrust @ Rated Wind, N (lbf)	558 (125)
Front Thrust @ Rated Wind, N (lbf)	558 (125)
Shipping Weight, kg (lb)	18.3 (39.8)
Packing Dimensions, HxWxD, mm (in)	2021 x 260 x 200 (79.5 x 10.2 x 7.8)
Packing Dimensions - HxWxD, m (ft)	2.0 x 0.25 x 0.2 (6.5 x 0.85 x 0.65)

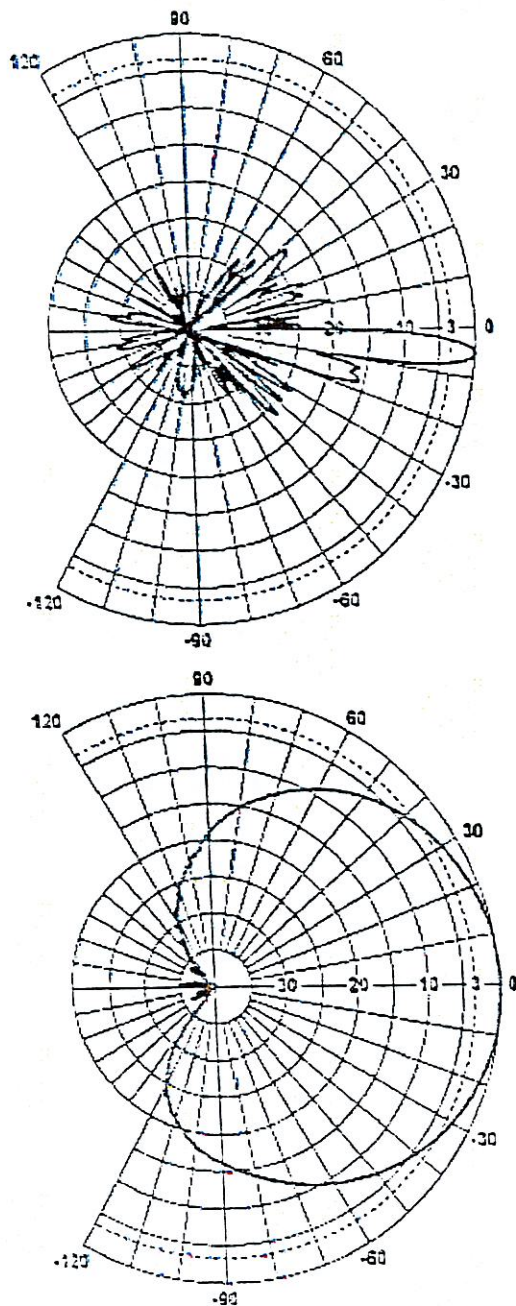
## Notes:

For additional mounting information please click "Additional Product Information" below.

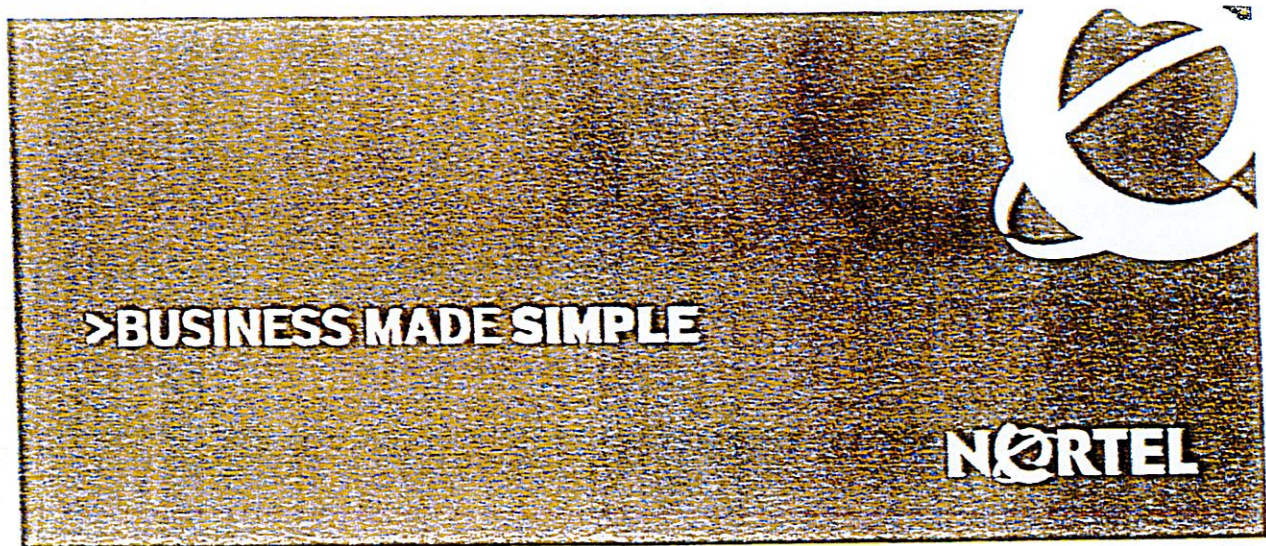




Optimizer® Panel Dual Polarized Antenna







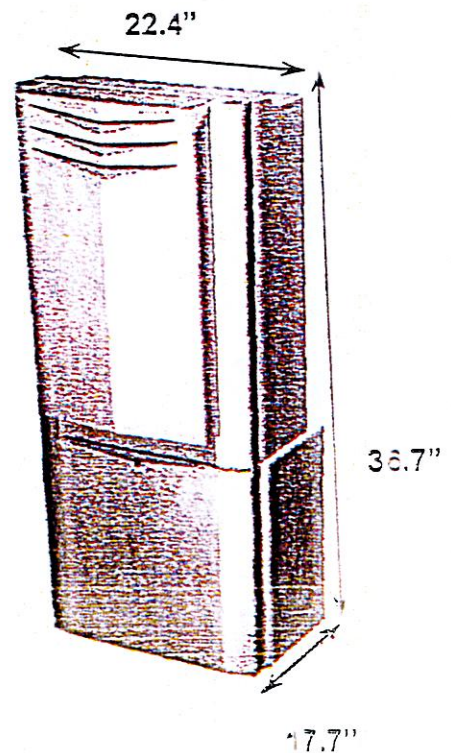
## CDMA BTS 3231 AWS 1.7/2.1 GHz (Outdoor/Indoor)

### CDMA BTS 3231

*Industry's Highest Capacity  
AWS Micro BTS*

The CDMA BTS 3231 is the latest extension to Nortel Networks BTS (Base Transceiver Station) portfolio providing the ideal solution for urban, sub-urban and rural deployments. The CDMA BTS 3231 is a 3-carrier, 3-sector outdoor indoor BTS operating at the AWS band of 1.7/2.1 GHz supporting IS-95, 1XRTT and 1xEV-DO simultaneously. BTS 3231 provides flexible deployments solutions including floor, rack, and wall mount options. The power consumption of BTS3231 is industry leading consuming only 630W for 3C3S. The BTS 3231 is also very light at 240 lbs making it easy

to transport to hard to reach locations such as the top of a high rise building.



### *CDMA BTS 3231*

The 3 sector functionality of the 3231 will provide a 4-6dB gain over an omni unit of comparable size in both the forward and reverse links as a result of the increased gain of the antennas. This increase in gain will translate directly into an increase in coverage allowing the customer to minimize the number of cell sites deployed.

Focused on reducing deployment expenses the BTS 3231 implements a simplified architecture that minimizes module count to 2 primary units, the radio module and the digital module. This simplification results in reduced time for deployment, reduced replacement time, and a lighter weight product collectively resulting in reduced operational expense. Small, light and feature rich the BTS3231 facilitates rapid network deployments allowing an operator to generate revenues from geographical areas that had no or very poor coverage. The BTS 3231 requires NBSS15.0 load.

## KEY CUSTOMER BENEFITS

- High RF Coverage with ample Channel Element Support:
  - 3 sector product provides 4-6dB gain over an Omni equivalent
  - High forward link power of 18w/carrier-sector provides excellent coverage
  - Extended Coverage for Rural / Coastal areas with 54W PA power, 75W with Sector Power Pooling enabled offering better performance and capacity
- Excellent reverse link RX Sensitivity of -127 dBm for balanced link
- Reduces cell site count providing significant network savings
- Up to 896 channel elements providing ample BTS-to-mobile links planning for capacity increases from SPP and EVRC-B
- Ease of Deployment and Reduced Operational Expenditure:
  - Light weight 240 lbs for easy shipment and installation
  - Reduced size and weight simplifies zoning issues, provides more deployment options, improves time to market
  - High power efficiency with 630W typical for reduced utility expenses
  - Simplified architecture enables easy deployment and reduced replacement time and cost
  - Reduced noise level equivalent to typical office environment
  - Enhanced VSWR feature reduces site visits for antenna tests
- Multiple Deployment Options:
  - Floor mounting
  - Pole mounting enables footprint savings with minimal loading of 240lbs
  - Supports overlay with PCS Metro Cell products, PCS BTS3031, and PCS BTS3030

## TECHNICAL SPECIFICATIONS

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Capacity:	<p>1-3 Carriers, 1-3 Sectors (any combination of DO or 1X)</p> <p>High channel element capacity 896 max (integrated 128 CE's)</p> <p>4 digital expansion slots for XCEM's / DOMs</p> <p>Up to 3 DOM-A or Up to 4 XCEM192 (Mix of DOM-A/XCEM192)</p>
Physical Parameters:	<p>Physical dimensions W22.4"xH36.7"xD17.7"</p> <p>Weight 240 lbs max w/o battery</p> <p>785 lbs max w/ batteries</p>
Enhanced Features:	<p>Patented Sector Power Pooling</p> <p>Enhanced VSWR <math>\pm 1</math> dB accuracy (0-10db return loss)</p>
RF Performance:	<p>Tx Power 18 Watt / Carrier-Sector, up to 25W with SPP enabled</p> <p>High Power Mode provides 54W/sector, up to 75W with SPP enabled</p> <p>Rx Sensitivity performance of -127 dBm (typical)</p> <p>Optional BAS IMF filters (target delivery 4Q08)</p>
Backhaul:	<p>IP Backhaul NBSS16.0</p> <p>4 T1/E1 Backhaul (1x) + 4 T1/E1 per DOM</p> <p>Supports Daisy Chaining</p> <p>2U of user space (example - microwave backhaul)</p>
Power System	<p>Input Voltage AC 180 to 240 VAC</p> <p>VLRA batteries, 12 hrs backup for 3C3S (typical conditions)</p> <p>Customer equipment AC outlet (120 VAC, 15A)</p>
Deployment considerations:	<p>6 customer configurable alarms</p> <p>Supports floor, pole and wall mounting</p> <p>Operating temperature: -40°C to +50°C</p>



No battery enclosure, Radio Module and Digital Module installed,  
4 CEM/DOM modules in door.

-End-

### Electrical requirements

The BTS 3231 is available in a North American AC Powered outdoor enclosure. BTS 3231 supports integrated battery back-up through a single string of VRLA batteries.

### AC power

The AC Power enters the BTS 3231 through a three conductor feed (L1, L2 & N) with an optional ACEG which terminates at the DU. The AC feed consists of closely coupled conductors with optional ACEG to minimize differential impedance and EMC effects. The AC connections are attached onto a terminal strip located in the GFI assembly. For power feed cable length constraints, refer to "AC Power Feed Gauge and Length" (page 26). The Protective Earth Ground (PEG) for the AC system is not the ACEG. The PEG terminates at the designated location on the back of the enclosure. Refer to "Grounding" (page 32).

Table 7  
BTS 3231 AC Input Power Specifications

Specification		Min.	Nom.	Max.	Units
Input Operating Voltage, $V_i$	Normal continuous	175	200 - 240	275	Vrms
	Normal continuous conditional <sup>b</sup>			300	Vrms
	Normal continuous conditional <sup>b</sup> <sub>c</sub>	150			Vrms
	Abnormal, temporary, no damage <sup>b</sup> <sub>d</sub>			325	Vrms
	Dropout $V_{in, nom}$ to 0V to $V_{in, nom}$ , no operational upset <sub>a</sub>	20	70		ms
Input Operating frequency		45	50/60	66	Hz
BTS Input Current Rating	BTS 3231, North America			13	A

Notes: CDMA, BTS 3231  
Fundamentals  
M00001-012 15 0204 Preliminary  
23 Jul 2003

**Table 7**  
**BTS 3231 AC Input Power Specifications (cont'd.)**

Recommended BTS Input Circuit Breaker Rating	BTS 3231, North America	20			A
Input Inrush Current	Magnitude, excluding EMC Capacitors			25	Apk
Input feed type	BTS 3231, North America	3 W + PE			
Input Power Factor	BTS transmitting RF	0.96			
Input Flicker	IEC 61000-3-3	Compliant			
Input Harmonic Distortion	IEC 61000-3-2	Compliant			
<p>The hold-up duration will be longer for lower RF transmit levels and lower voltage magnitude dips. In this extended region certain AC input specifications such as power factor may not be met. In this extended region the BTS may shut-down or transfer to battery back-up when present when operating fully configured and at full capacity.</p> <p>In this extended region the BTS may shutdown or transfer to battery back-up when present to self protect.</p> <p>1.2/50 <math>\mu</math>s voltage transient combination waveform, 2 <math>\Omega</math> generator output impedance.</p>					

### AC Power Feed Gauge and Length

The minimum required cable gauge is determined by the larger of:

- the input overcurrent protection device (BTS power feed circuit breaker) rating and the resulting required minimum cable ampacity and therefore gauge, or
- the maximum allowable voltage drop and the resulting required minimum gauge.

Table 8 "BTS 3231 Minimum AC Power Feed Conductor Gauge" (page 26) presents the recommended minimum AC power feed conductor gauge according to generally accepted ampacity guidelines.

**Table 8**  
**BTS 3231 Minimum AC Power Feed Conductor Gauge**

System	Feed Breaker	System Rating	Cable Gauge
BTS 3231	20 A	16 A	#12 AWG (3.3 mm <sup>2</sup> )



The maximum distance at which BTS 3231 can be deployed from its power source is a function of both the feeder resistive voltage drop and inductance and is generally dictated by national and local building electrical codes. A general guideline for the maximum allowed voltage drop is 3% of the line voltage.

Table 9 "BTS 3231 Maximum AC Feed Cable Length, One Way" (page 27) presents the maximum one way cable lengths possible, given the accepted range of feed cable gauges and the assumptions indicated in the list.

Table 9  
BTS 3231 Maximum AC Feed Cable Length, One Way

Wire Gauge	Cable Length, Meters	
	208 V AC	240 V AC
#6 AWG (13 mm <sup>2</sup> )	123	162
#8 AWG (8.4 mm <sup>2</sup> )	77	102
#10 AWG (5.3 mm <sup>2</sup> )	48	63
#12 AWG (3.3 mm <sup>2</sup> )	29	39

1. All lengths are one way straight distances in meters (i.e. the length of each of the supply and return conductor).
2. Worst case operation with full rectifier output capacity (i.e. full battery charging), full auxiliary AC outlet loading, and full continuous cabinet AC heater operation (i.e. cold start) is assumed.
3. A round trip feed cable voltage drop of 3% is assumed.
4. A worst case maximum external ambient temperature of 50 °C assumed.
5. A 90 °C cable rating is assumed.
6. BTS 3231 accepts #6 AWG solid conductor or #8 AWG multi-stranded conductor maximum.
7. BTS 3231 requires #12 AWG minimum to meet general code requirements.

### Power Budget

Refer to section "Power Consumption Estimations" (page 29) and Table 12 "BTS 3231 AC Input Power Consumption" (page 29) to determine the overall BTS power consumption. Use the thermal load power values to determine expected longer term average power consumption for purposes such as determining battery back-up durations, or average thermal loading. Use the input operating power values to determine the limits of short term peak power for purposes such as rectifier, and feed breaker capacity sizing.

### Power Provisioning

No additional power provisioning is required when an AC BTS 3231 is ordered.



# CH&E Power Zone

EMPOWERING REAL PEOPLE

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[Employment](#)

## Products

- o Combination Units
- o Generators
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## GLOSSARY

## MLG15 Lite Generator Interim Tier IV EPA Approved Engine

Magnum recognizes environmental responsibility and continues to meet emission regulations with the addition of their Interim Tier IV Generator line. The MLG15 generator is powered by a Mitsubishi diesel engine. Proven power you can trust, while maximizing fuel efficiency and high performance.



## More Information

### Manuals

- o [Operating & Parts](#)

Search Site



Affordable, Reliable, Mobile

ALWAYS  
check for

## Power

The MLG15 diesel generator provides just the right combination of output, flexibility, ruggedness, efficiency and affordability for on-the-go, smaller-to-midsized, single phase power needs.

## Features

### Tough

- Full tubular steel frame, with lockable enclosure
- Durable, fade resistant, white baked on powder coat finish
- Stainless steel hinges, exterior hardware and pad lockable door latches

### Reliable

- Key switch to preheat (glow plug), start & stop
- Automatic low oil level / high temp shutdown alerts
- 70A Start limit main breaker
- 2 year - 2,000 hour warranty
- Marathon voltage regulation within +/- 1%

### Ease for Your Users

- Self-priming 4 cylinder Mitsubishi engine
- External convenience outlets with individual breaker switches
- External emergency stop switch

## Specifications

### Output

3 Phase - Standby kW (kVA)	N/A
Amps 480V (208V)	N/A
3 Phase - Prime kW (kVA)	N/A
Amps 480V (208V)	N/A
1 Phase - Standby kW (kVA)	14.0 (14.0)
Amps 240V	58
1 Phase - Prime kW (kVA)	13.0 (13.0)
Amps 240V	54
AC Voltage 1-phase	120, 240
AC Voltage 3-phase	N/A
Frequency Hz	60
Power Factor	1.0 (1 Phase)
Generator - Brand / Type / Insulation	Marathon / Brushless / F
Sound (dB(A) 23 ft @ prime)	68
<b>Size and Weight</b>	
Skid Mounted - L x W x H in (m)	N/A
Dry Weight lbs (kg)	N/A
Operating Weight lbs (kg)	N/A
Trailer Mounted - L x W x H in (m)	105 x 67 x 56 (2.67 x 1.70 x 1.42)
Dry Weight lbs (kg)	1425 (646)

updated  
parts  
information  
before  
placing a  
parts  
order.

### Tech. Specs.

- [MLG15](#)

### Literature / Sales

- [Generator Lit.](#)
- [Service Kit Lit.](#)
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- [Warranty Overview](#)
- [Warranty Claim Policy](#)

Operating Weight <b>lbs (kg)</b>	1823 (827)
<b>Engine</b>	
Type	Interim Tier IV
Brand	Mitsubishi
Aspiration	Natural
Power - Prime @ 1800 rpm <b>hp (kWm)</b>	22.3 (16.6)
Displacement <b>cubic in (L)</b>	107 (1.8)
Cylinders	4
Speed <b>rpm</b>	1800
Fuel Consumption - Prime <b>gph (Lph)</b>	1.30 (4.92)
<b>Capacities</b>	
Fuel Tank <b>gal (L)</b>	56 (212)
Approximate Run Time <b>hrs</b>	43
Coolant <b>qt (L)</b>	11.6 (11.0)
<b>Electrical Distribution</b>	
Battery - 12V	1 - 12V 440 CCA Wet Cell
Main Circuit Breaker Size <b>A</b>	70
Voltage Selection	N/A
Voltage Regulation	+/-1%
120V - 20A GFI Duplex Outlets - qty	2
240V - 30A Twist Lock Outlets - qty	2
240V - 50A Twist Lock Outlets - qty	2
<b>Trailer</b>	
Number of Axles	1
Capacity - Axle Rating <b>lbs (kg)</b>	2200 (998)
Tire Size <b>in</b>	15
Brakes	N/A
Hitch	2" Ball
Maximum Tire Pressure <b>psi</b>	50
<b>Options</b>	
Powertrain (Engine/Gen)	<ul style="list-style-type: none"> <li>• 60/40 Coolant</li> <li>• Heated Fuel Filter</li> <li>• Engine Heater - Lower Radiator Hose</li> <li>• Oil Drain Valve Kit</li> </ul>
<b>Controls</b>	<ul style="list-style-type: none"> <li>• Battery, 720 CCA Gel Cell</li> <li>• Battery, 720 CCA Wet Cell</li> <li>• Battery, 685 CCA Gel Cell</li> <li>• No Battery</li> <li>• Battery Disconnect, Lockable</li> <li>• Battery Charger, 2 Amp</li> <li>• Alternative Outlet Panel Options</li> </ul> (Consult factory for details)

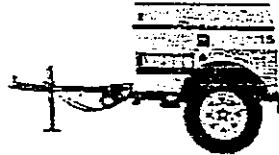


## Cabinet/Fuel Tank

## Trailer

- Interior Cabinet Light
- Level Indicator
- 56 Gallon Fuel Tank
- Fuel Tank Cap - Vent w/ Lanyard
- Spare Tire & Carrier
- Lift Structure
- Liquid Containment/Quiet Pack
- Tube & Sleeve Jack
- Combo Hitch - 2.5" Ring/2" Ball
- 2.5" Ring
- 3" Ring
- 3" Ring (1.625 TH)
- Plug Adapter, 4 Flat to 6 Round
- Plug Adapter, 4 Flat to 7 Pin
- Plug Adapter, 4 Flat to 7 Round
- Spade
- Outrigger Package

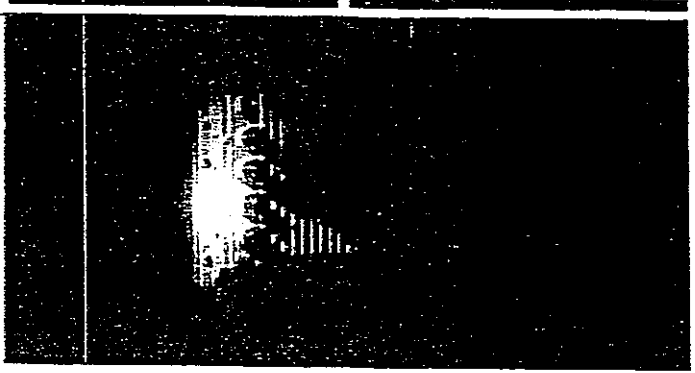
Product Images (click small image to pop-up larger version)



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## EX-5r Series



### All-Outdoor, Carrier-Class, Tri-Band 5 GHz TDD Radio System for Low, Medium and High Capacity Ethernet and TDM Applications

The EX-5r series of all-outdoor digital microwave radios is the first family of carrier-class, tri-band TDD radios available in the 5.2 – 5.8 GHz license-exempt bands. Radios in the EX-5r line support capacities ranging from 27 Mbps to an industry-leading 440 Mbps of aggregate user throughput, from zero to four T1/E1s and both 100BaseT and GbE interfaces. Featuring native TDM and native Ethernet transport and full software configurability and upgradeability, the EX-5r series was designed to meet demanding backhaul requirements of enterprise organizations and service providers seeking the performance benefits of an all-outdoor configuration.

**Carrier-class TDD.** The EX-5r series radios combine native TDM and native Ethernet transport with low, fixed latency to deliver guaranteed throughput and service quality. Capacity can be allocated variably between TDM and Ethernet via software, while the selectable throughput symmetry control feature enables radio capacity to efficiently match asymmetric traffic requirements.

**Industry-leading Spectrum Management.** The EX-5r radios include selectable channel bandwidth and 1 MHz tuning resolution,

yielding up to 54 non-overlapping frequency channels and up to 415 center frequencies of operation. These capabilities, combined with selectable modulation and superior system gain, provide unparalleled interference avoidance and transmission resiliency. A built-in spectrum analyzer is even included to accelerate deployment and simplify troubleshooting.

**ExaltSync Synchronization.** The ExaltSync technology embedded in the EX-5r series radios allows multiple radio systems to be collocated in close proximity without self-interference, minimizing antenna separation and ensuring reuse of scarce spectrum across all collocated systems.

**Security, Management and Data Networking.** The EX-5r radios deliver the highest data and management security available with optional 128- and 256-bit AES encryption and secure SNMP v3 management, together with enhanced fault management and diagnostic features. The 802.1Q VLAN option provides built-in network administration and security flexibility.

EX-5r series radios are available in both integrated antenna and external antenna (connectorized) versions.



Primary Specifications		EX-5r Lite / EX-5r-c Lite	EX-5r v3 / EX-5r-c v2	EX-5r GigE / EX-5r-c GigE
Maximum Capacity <sup>1</sup>	TDM	4xT1/E1		
	Ethernet (Aggregate)	100 Mbps	200 Mbps	440 Mbps
Frequency (GHz)		Tri-band: 5.250-5.350, 5.470-5.725, 5.725-5.850		
Range <sup>2</sup>		> 30 miles at 99.999% throughput availability		

<sup>1</sup> Please refer to the Exalt Throughput and Range Specification document for detailed capacity information.

<sup>2</sup> Distance based upon FCC regulations, average climate and terrain, 5' dish antennas, 3 dB transmission system losses at each end. Longer or shorter distances will apply for alternative antennas, country regulations, transmission system losses, path topologies and radio configurations. See Exalt's link budget and path planning tool to model your scenario.

# **EXHIBIT C**

## **STRUCTURAL ANALYSIS**



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# DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 327' GUYED LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

Site I.D: HFCT1465 – UCONN  
WHUS Tower  
Address: North Eagleville Road  
Storrs, CT

---

*prepared for*



## POCKET WIRELESS

2810 NW Loop 410  
San Antonio, Texas 78230

*prepared by*



URS CORPORATION  
500 ENTERPRISE DRIVE, SUITE 3B  
ROCKY HILL, CT 06067  
TEL. 860-529-8882

36924930.00000  
PC1 079 (Rev 1)

September 28, 2009

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## 1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 327' guyed lattice tower located on North Eagleville Road in Storrs, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard, and the University of Connecticut (UCONN) requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 1/2" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Pocket Wireless modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
<b>Install:</b>		
<b>(3) RFS APXV18-206517S antennas</b>	<b>Pocket (proposed)</b>	<b>@ 230'</b>

The results of the analysis indicate that the tower structure is in compliance with the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and all the existing and proposed antenna loading.**

This analysis is based on:


- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes taken from original construction drawings (Sabre Job #: 98-0659) prepared by Sabre Communications Corporation, signed and sealed November 6, 1998.
- 3) Structural analysis performed by URS, job number F300001804.47/F12 for SNET Mobility, Inc signed and sealed April 27, 2000.
- 4) Structural analysis performed by Tectonic, W.O. 2993.0931C for Nextel Communications signed and sealed January 20, 2003.
- 5) Structural analysis performed by URS, job number VZ1-064 for Verizon Wireless signed and sealed June 10, 2004.
- 6) Structural analysis performed by URS, job number VZ1-064 Rev 1 for Verizon Wireless signed and sealed July 10, 2006.
- 7) Antenna and mount configuration as specified on the following page of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower and connections. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

**URS Corporation**

  
Richard A. Sambor, P.E.  
Manager Facilities Design

RAS/kab

cc: IA, CF/Book – URS





## 2. INTRODUCTION

The subject tower is located on North Eagleville Road in Storrs, Connecticut. The structure is a 327' guyed lattice tower designed and manufactured by Sabre Communications Corporation.

The tower geometry and structural member sizes taken from original construction drawings (Sabre Job #: 98-0659) prepared by Sabre Communications Corporation, signed and sealed November 6, 1998.

The inventory is summarized in the table below:

<b>Antenna Type</b>	<b>Carrier</b>	<b>Mount</b>	<b>Antenna Centerline Elevation</b>	<b>Cable</b>
Lightning Rod	Tower (existing)	Direct Mount	325'	---
Flash Beacon	Tower (existing)	Direct Mount	323'	Rigid Conduit
(1) 2-Bay 6813 w/Radome	Unknown (existing)	Flush Mount	305'	(1) 7/8" coax cable
(1) PD1150 and (1) DB809M-XC	Unknown (existing)	(1) Sidearm	280'	(2) 1 5/8" coax cables
(2) OGC9-825, (1) AP-16-850/065, (2) DB810K, and (2) TMA's	Unknown (existing)	(3) Sidearms	260'	(4) 1 5/8" coax cables and (1) 7/8" coax cable
(12) DB844H90 antennas	Nextel (existing)	(3) T-Frames	240'	(12) 1 5/8" coax cables
<b>(3) RFS APXV18-206517S antennas</b>	<b>Pocket (proposed)</b>	<b>Leg Mount</b>	<b>230'</b>	<b>(6) 1 5/8" coax cables</b>
(1) 1-Bay 6813 w/o Radome or equal	Unknown (existing)	(1) Sidearm	209'	(1) 7/8" coax cable
(1) 1-Bay 6813 w/Radome	Unknown (existing)	(1) Sidearm	198'	(1) 7/8" coax cable
(1) MB100RR650200DPAL (9) CSS DUO1417-8670 and (9) TMA's	Cingular (existing)	(3) T-Frames	186'	(12) 1 5/8" coax cables
(1) DB872	Unknown (existing)	Direct Mount	172'	(1) 7/8" coax cable
(1) DB806	Unknown (existing)	(1) Sidearm	170'	(1) 1 1/4" coax cable
(1) TMA	Unknown (existing)	Direct Mount	166'	---
(1) DB872	Unknown (existing)	Direct Mount	158'	(1) 7/8" coax cable
(1) DB589	Unknown (existing)	(1) Sidearm	154'	(1) 7/8" coax cable
(1) 7' Omni	Unknown (existing)	Direct Mount	142'	(1) 1/2" coax cable
(1) Andrew P4F-57W Dish	Verizon (existing)	(1) Dish Mount	138'	(1) EW63 coax cable
(1) PD1108	Unknown (existing)	(1) Sidearm	124'	(1) 1/2" coax cable
(1) 6FT Dish w/ Ice Shield	Unknown (existing)	(1) Dish Mount	115'	(1) EW63 coax cable
(1) 6FT Dish w/ Ice Shield	Unknown (existing)	(1) Dish Mount	112'	(1) EW63 coax cable

## 2. INTRODUCTION (continued)

<b>Antenna Type</b>	<b>Carrier</b>	<b>Mount</b>	<b>Antenna Centerline Elevation</b>	<b>Cable</b>
(1) PD1108	Unknown (existing)	(1) Sidearm	110'	(1) 1/2" coax cable
(1) 8FT Dish	Unknown (existing)	(1) Dish Mount	104'	(1) EW63 coax cable
(1) ASP-962 and (1) PR-850	Unknown (existing)	Direct Mount	94'	(2) 1/2" coax cables
(6) RFS APL196516-42T2 and (6) RFS APL866513-42T0	Verizon (existing)	(1) Platform	84'	(12) 1 5/8" coax cables
(1) DB212-C	Unknown (existing)	Direct Mount	74'	(1) 1/2" coax cable
(1) CL-24	Unknown (existing)	(1) Sidearm	18'	(1) 1/4" coax cable
(1) 1.2M Lightweight Satellite Dish	Unknown (existing)	(1) Sidearm	13'	(1) 1/4" coax cable

This structural analysis of the communications tower was performed by URS Corporation (URS) for Pocket Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

## 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, University of Connecticut (UConn) requirements, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.3. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load (without ice) + Tower Dead Load

Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

#### 4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were below the allowable stresses. Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. Additionally, the foundation and guy anchors were found to be structurally adequate. At the microwave dish levels, the maximum twist is less than 0.5 degrees and the maximum sway is less than 0.3 degrees.

##### Tower Reactions

Component	Value (kips)
Base Shear	5.35
Base Compression	352.9
Anchor Uplift	148.7
Anchor Shear	178.9

##### Twist and Sway at Microwave Dishes

Height	Dish Model	Twist		Sway	
		Existing	Proposed	Existing	Proposed
138'	P4F-57W	0.4132	0.3190	0.1178	0.1368
115'	6 Ft Dish	0.4421	0.3518	0.2145	0.2429
112'	6 Ft Dish	0.4442	0.3546	0.2261	0.2536
104'	8 Ft Dish	0.4510	0.3621	0.2257	0.2800

##### Guy and torque arm usage:

Elevation (A.G.L.)	Guy Force (kips)	Guy Usage (%)	Torque Arm Usage (%)
286'	20.20	69.3	74.5
257'	22.17	76.1	80.1
217'	23.31	80.0	80.4
167'	25.92	88.9	79.9
107'	20.70	97.7	51.8
57'	9.38	90.2	22.0

For detailed reactions, see Section 6 of this report

##### Foundation:

Component / Controlling Element	Usage (%)
Base Foundation / Compression (%)	84.7
Guy Anchor / Uplift (%)	86.3
Guy Anchor / Shear (%)	85.8

For detailed reactions, see Section 6 of this report



4. FINDINGS AND EVALUATION (continued)

Member Usage Summary:

Elevation Range (from base)	Leg		Diagonal		Horizontal	
	Force (kips)	Usage (%)	Force (kips)	Usage (%)	Force (kips)	Usage (%)
327 - 291.84	3.87	17.0	---	---	---	---
291.84 - 279.84	29.05	33.7	5.48	23.9	0.92	8.2
279.84 - 259.84	35.56	44.7	3.87	17.9	0.42	3.7
259.84 - 239.84	86.86	79.0	8.09	37.1	0.91	8.1
239.84 - 219.84	87.69	79.8	8.56	39.3	1.03	4.5
219.84 - 199.84	98.21	68.2	8.89	30.5	0.84	7.4
199.84 - 179.84	99	68.7	10.84	70.1	1.76	15.5
179.84 - 159.84	106.66	58.5	13.95	47.6	1.43	6.3
159.84 - 139.84	105.46	73.2	9.37	42.7	1.14	5.1
139.84 - 119.84	107.54	59.0	6.23	39.8	1.34	5.9
119.84 - 99.84	117.69	64.6	14.93	50.9	1.99	8.8
99.84 - 79.84	161.86	72.1	11.84	53.0	2.37	10.5
79.84 - 59.84	166.54	74.2	5.69	35.9	1.55	6.8
59.84 - 39.84	177.91	79.3	6.72	42.4	1.54	6.8
39.84 - 19.84	177.84	79.2	6.48	40.9	1.48	6.6
19.84 - 6.5	160.92	71.7	8.28	52.3	1.7	7.5
6.5 - 0	142.83	70.7	---	---	25.36	19.6

For detailed member analysis, see RISA Tower output data in Section 6 of this report

## 5. CONCLUSIONS

The results of the analysis indicate that the tower structure is in compliance with the proposed loading conditions. **The tower and its foundation are structurally adequate under the wind load classification specified above and the proposed antenna loadings.**

### Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed as specified in Section 6 of this report.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

- A. Adding antennas
- B. Removing/replacing antennas
- C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

### Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

**EXHIBIT D**  
**EMISSIONS STUDY**





C Squared Systems, LLC  
920 Candia Road  
Manchester, NH 03109  
Phone: (603) 657 9702  
E-mail:

[support@csquaredsystems.com](mailto:support@csquaredsystems.com)

---

## Calculated Radio Frequency Emissions



HFCT1465A

North Eagleville Road, Storrs, CT 06269

aka: Mansfield, No. Eagleville Rd (WHUS)

---

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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Pocket antennas to be installed on the existing WHUS guyed tower located on North Eagleville Road in Mansfield, CT 06269.

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include limits for Maximum Permissible Exposure (MPE) for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP), the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.



### 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right)$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance =  $\sqrt{H^2 + V^2}$

H = Horizontal Distance from antenna

V = Vertical Distance from antenna radiation centerline

1.6 = Ground Reflection Factor

## 4. Calculation Results

Table 1 below outlines the power density information for the site. All information for carriers other than Pocket is based on the current CSC database, except where otherwise noted<sup>1</sup>.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Power Density (mw/cm <sup>2</sup> )	Limit	%MPE
The CSC database lists one %MPE value to encompass all existing UHF/VHF carriers.							14.12%
UConn PD	260	866	3	197	0.0033	0.5773	0.57%
Nextel	240	851	9	100	0.0056	0.5673	0.99%
Cingular GSM	185	880	2	296	0.0062	0.5867	1.06%
Cingular GSM	185	1930	2	427	0.0090	1.0000	0.90%
Cingular UMTS	185	1935	1	500	0.0053	1.0000	0.53%
Verizon	84	869	9	200	0.1063	0.5793	18.35%
Verizon	84	1900	3	200	0.0306	1.0000	3.06%
Pocket	230	2130-2133.81	3	631	0.0136	1.0000	1.36%
<b>Total</b>							<b>40.93%</b>

**Table 1: Proposed Carrier Information**

<sup>1</sup> According to the structural analysis report submitted on July 10, 2006 by the engineering firm of URS, Verizon's centerline is 84' (CSC database shows 80' for cellular and 84' for PCS.) Also, the centerline of the UConn Police Department's panel antennas is 260' (CSC database shows 180'). The total %MPE value was calculated based on the included updates to Table 1 for the purpose of the composite analysis. (Gray type indicates recommended updates to the CSC database.)

## 5. Conclusion

The above analysis verifies that emissions from the proposed site configuration will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed and existing transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 40.93% of the FCC limit.

As noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

## 6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

A handwritten signature in black ink, appearing to read "Daniel L. Goulet", is written over a horizontal line.

Daniel L. Goulet  
C Squared Systems, LLC

October 5, 2009  
Date



## **Attachment A: References**

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

## Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

### (A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

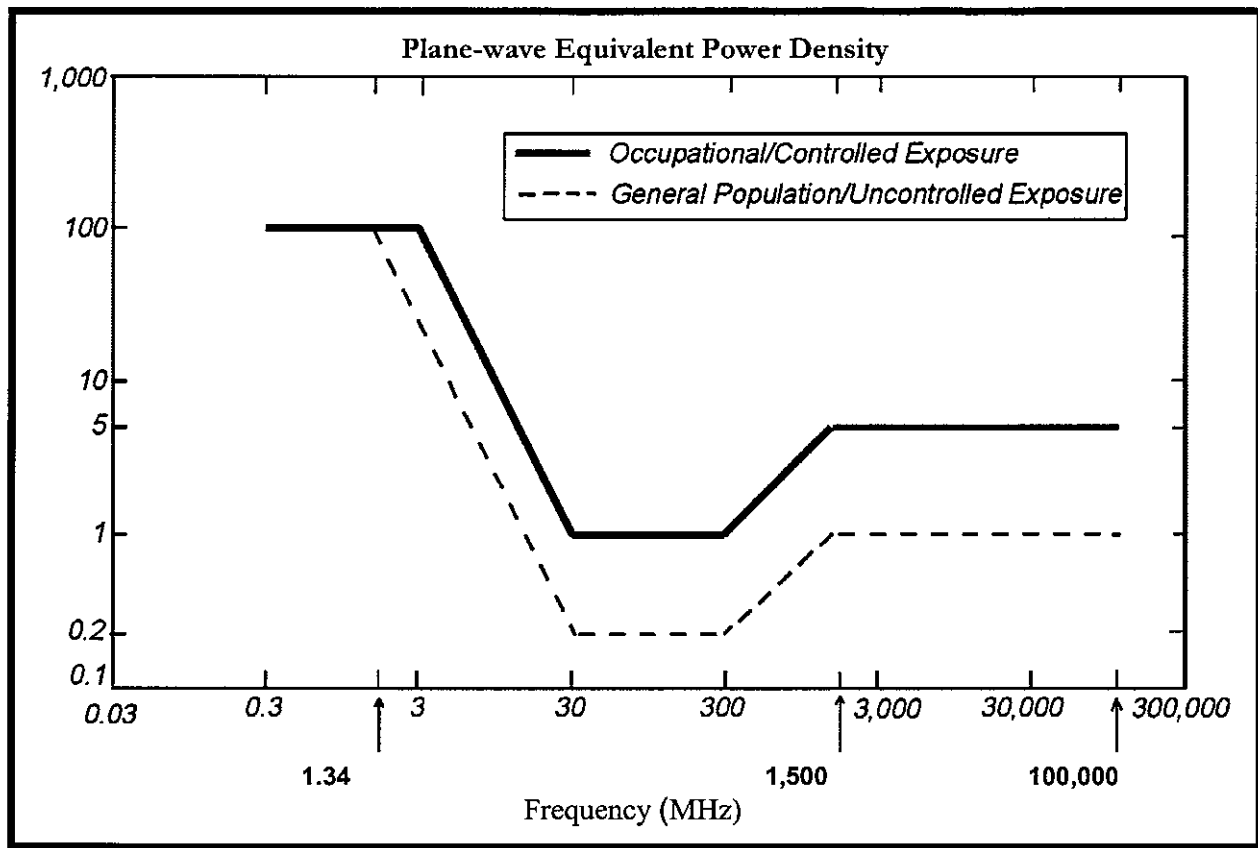
### (B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz \* Plane-wave equivalent power density

**NOTE 1:** Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

**NOTE 2:** General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



• FCC Limits for Maximum Permissible Exposure (MPE)

