AGREEMENT
BETWEEN LAKE COUNTY EMERGENCY TELEPHONE SYSTEM BOARD (LCETSB) AND THE VILLAGE OF FOX LAKE FOR THE ATTACHMENT OF LCETSB OWNED WIRELESS NETWORK ANTENNAE AND APPARATUS ONTO THE VILLAGE-OWNED WATER TOWER LOCATED AT FOX LAKE POLICE DEPT., 301 S. RT. 59, FOX LAKE, ILLINOIS

THIS AGREEMENT is entered into this 27 day of January, A.D. 2015, by and between Lake County Emergency Telephone System Board, an Illinois body politic and corporate, acting by and through its Board of Directors and Chairman, hereinafter referred to as the ETSB, and the Village of Fox Lake, an Illinois Municipal Corporation, acting by and through its Mayor and Village Board, hereinafter referred to as the VILLAGE. ETSB and the VILLAGE are hereinafter referred to collectively as "parties" to this AGREEMENT, and either one is referred to individually as a "party" to this AGREEMENT.

WITNESSETH

WHEREAS, the VILLAGE owns a communication tower (hereinafter TOWER), the entrance to which is located at 301 S. Rt. 59, Fox Lake, Illinois, onto and inside of which the ETSB wishes to permanently install wireless communication equipment, including antennae, aluminum poles, mounting brackets, fittings, radios, various wires, cables. and other associated apparatus (hereinafter NETWORK EQUIPMENT); and,

WHEREAS, said NETWORK EQUIPMENT is intended to enable the ETSB to wirelessly provide responsible, professional public safety communication services to member agencies and their communities; and,

WHEREAS, the VILLAGE is willing to allow the permanent installation of the NETWORK EQUIPMENT in the interests of promoting the safe, efficient, and responsive 9-1-1 and Non-Emergency communication for all Police, Fire and EMS;

NOW, THEREFORE, for and in consideration of the mutual covenants contained herein, made pursuant to all applicable statutes, local ordinances and authority, the ETSB and the VILLAGE do hereby enter into the following:

SECTION I.
Recitals/Headings

1. It is mutually agreed by and between the parties hereto that the foregoing preambles are hereby incorporated herein as though fully set forth.

2. It is mutually agreed by and between the parties hereto that the "headings" as contained in this AGREEMENT are for reference only and the actual written provisions, paragraphs and words of this AGREEMENT shall control.

SECTION II.
Installation of the NETWORK EQUIPMENT

1. ETSB agrees to attach and install the NETWORK EQUIPMENT in accordance with the approved plans and specifications (hereinafter PLANS). Said PLANS, by reference herein, are hereby made a part hereof. Please see attachments.

2. ETSB shall, at its sole expense, install, or cause to be installed, the NETWORK EQUIPMENT onto and inside of the Police Department computer room. Should the ETSB contract with a contractor for the installations, the ETSB warrants that said contractor shall satisfy the Village's licensing and bonding requirements and that said contractor shall perform the work in a safe and conscientious manner, employing "best engineering practices." ETSB shall be responsible for one-hundred percent (100%) of all restoration costs for restorations resulting from the installation of the NETWORK EQUIPMENT. (Said restorations might, for instance, include the restoration of any pavement or landscaping disturbed in the installation process.)

3. ETSB shall be responsible for payment of all electric and telephone utility charges, property taxes, insurance premiums, repair and maintenance expenses and all other fees, charges, costs and expenses that arise from its installation and operation of the antenna and related equipment. It is acknowledged by the parties that so long as the NETWORK EQUIPMENT draws less than 101 watts of power from the Village's power service, ETSB shall not be responsible for the cost of the electrical power.

4. Except in cases of emergency, ETSB shall give no less than forty-eight (48) hours' notice to the Village Police Department of its intent to enter upon, onto or into the subject village department to perform installation, maintenance, replacement or removal activities. The Village shall approve said activities only by ETSB's submittal of appropriate plans and specifications. In the event of an emergency, ETSB shall provide such shorter notice as is practical under the circumstances. Notice under this paragraph may be given by telephonic, facsimile or written communication.

5. Should the installation of the NETWORK EQUIPMENT, or any portion thereof, require approvals by any regulatory bodies (e.g., the Federal Communications Commission and/or the Federal Aviation Administration), ETSB shall, at its sole expense, prepare all necessary applications and obtain the necessary approvals from all such regulatory bodies.

6. ETSB warrants that the operation of the NETWORK EQUIPMENT, or any part thereof, shall not create interference with any of the users now operating equipment at any VILLAGE-owned facility and the ETSB warrants that the operation of the NETWORK EQUIPMENT, or any part thereof, shall not create interference with any of such users.

7. ETSB agrees to perform, or cause to have performed, at its sole expense, maintenance upon the NETWORK EQUIPMENT, ensuring that it is kept in proper working order.

8. At any time and at the request of the VILLAGE, ETSB shall, at its sole expense, paint, or cause to be painted, the NETWORK EQUIPMENT (or portions thereof, as specified by the VILLAGE) in a color substantially similar to that of the TOWER.

9. ETSB shall, at its expense, keep the antenna and related equipment fully insured for fire, windstorm and other casualties and shall maintain general liability insurance, workman's compensation insurance and any other insurance reasonably requested by the VILLAGE. The general liability insurance shall have a minimum limit of $1,000,000 and the workman's compensation insurance shall meet applicable statutory requirements. ETSB's current self-insurance program is acceptable to the Village so long as the minimum coverages provided herein are met.

10. So long as the Network Equipment draws less than 101 watts of electricity, the VILLAGE agrees to pay one-hundred percent (100%) of all energy costs required for the operation of the NETWORK EQUIPMENT.

11. The VILLAGE reserves the right to perform maintenance on the TOWER as it sees fit, in its sole discretion. The VILLAGE reserves the right to request that ETSB, at its sole expense, temporarily remove (or at a minimum, protect) all or a portion of the NETWORK EQUIPMENT. At the completion of the VILLAGE's maintenance activity, ETSB shall, also at its sole expense, reinstall the necessary NETWORK equipment or portions thereof and return the installation to its condition prior to the commencement of the VILLAGE's maintenance activity. Except under emergency conditions, the VILLAGE shall provide to the ETSB a minimum of thirty (30) days written notice prior to the commencement of the VILLAGE's maintenance activity.

SECTION III.
General Provisions

1. ETSB shall indemnify, defend, and hold harmless the VILLAGE (including its elected officials, duly appointed officials, officers, employees and agents) from any and all losses, damages, claims and causes of action, including attorneys' fees and court costs (hereinafter CLAIMS) arising from the installation, operation or maintenance of the NETWORK EQUIPMENT.

2. Nothing in this AGREEMENT is intended to, or should be construed to, create an employment relationship between the parties, the parties' employees, officers, appointed or elected officials, or their agents. The VILLAGE is to be and shall remain independent of the ETSB with respect to all services performed under this AGREEMENT.

3. It is mutually agreed by and between the parties hereto that each party warrants and represents to the other party and agrees that (1) This AGREEMENT is executed by duly authorized agents or officers of such party and that all such agents and officers have executed the same in accordance with the lawful authority vested in them, pursuant to all applicable and substantive requirements; (2) This AGREEMENT is binding and valid and will be specifically enforceable against each party; and (3) This AGREEMENT does not violate any presently existing provision of law nor any applicable order, writ, injunction or decree of any court or government department, commission, board, bureau, agency or instrumentality applicable to such party.

4. This agreement will become effective when all of the parties have signed it, and the date this Agreement is signed by the last party to sign it (as indicated by the date associated with that party's signature) will be deemed the "Effective Date" of this agreement. If a party signs but fails to date a signature, the date that the other party receives the signing party's signature will be deemed to be the date that the signing party signed this agreement, and the other party may inscribe that date as the date associated with the signing party's signature.

5. It is mutually agreed by and between the parties hereto that this AGREEMENT shall be enforceable in any court of competent jurisdiction by each of the parties hereto by any appropriate action at law or in equity, including any action to secure the performance of the representations, promises, covenants, agreements and obligations contained herein.

6. It is mutually agreed by and between the parties hereto that the provisions of this AGREEMENT are severable. If any provision, paragraph, section, subdivision, clause, phrase or word of this AGREEMENT is for any reason held to be contrary to law or contrary to any rule or regulation having the force and effect of law, such decision shall not affect the remaining portions of this AGREEMENT.

7. It is mutually agreed by and between the parties hereto that the agreement of the parties hereto is contained herein and that this AGREEMENT supersedes all oral agreements and negotiations between the parties hereto relating to the subject matter hereof. Any prior agreements between the parties hereto shall remain in full force and effect, except as modified by this AGREEMENT.

8. It is mutually agreed by and between the parties hereto that, at such time as the NETWORK EQUIPMENT is no longer of use to the ETSB, ETSB shall, at its sole expense, remove, or cause to be removed, the NETWORK EQUIPMENT from the TOWER. Following said removal, ETSB shall be responsible for returning the TOWER to, as nearly as possible, the same state and condition existing prior to the installation of the NETWORK EQUIPMENT.

9. It is mutually agreed by and between the parties hereto that any alterations, amendments, deletions or waivers of any provision of this AGREEMENT shall be valid only when expressed in writing and duly executed by the parties hereto.

10. Except as provided in Provision II 4, it is mutually agreed by and between the parties hereto that any written communication required under THIS AGREEMENT shall be conducted through standard U.S. Postal Service delivery, and shall be addressed as follows:

If to the ETSB:
911 Coordinator
1300 S. Gilmer Road
Volo, IL 60073 (or current address)

If to the VILLAGE:
Village Administrator
Village of Fox Lake
66 Thillen Drive
Fox Lake, IL 60020 (or current address)

12. It is mutually agreed by and between the parties hereto that this AGREEMENT shall be binding upon and inure to the benefit of the parties hereto, their successors and assigns. Provided, however, ETSB shall not sell, transfer or assign all or any portion of its rights under this AGREEMENT without first obtaining the prior written consent of the Village, which consent shall not be unreasonably withheld.

13. It is mutually agreed by and between the parties hereto that this AGREEMENT may be executed in multiple identical counterparts, and all of said counterparts shall, individually and taken together, constitute this AGREEMENT.

14. This AGREEMENT shall continue until terminated by either party on ninety (90) days prior written notice to the other party, except that in the event of a default or violation of any of the terms and conditions of this AGREEMENT by the ETSB , the Village may terminate this AGREEMENT on thirty (30) days written notice

to the ETSB unless the ETSB cures such default or violation within such time period.

15. Upon termination of this AGREEMENT, ETSB shall, at its expense, remove the NETWORK EQUIPMENT within thirty (30) days thereafter. In the event the ETSB fails to do so, the VILLAGE may thereupon remove or cause to be removed the antenna and related equipment and the ETSB shall reimburse the VILLAGE for the cost thereof within thirty (30) days of being invoiced by the VILLAGE for such cost.

Signed:

VILLAGE OF FOX LAKE An Illinois municipal corporation	COUNTY OF LAKE
Date: 1/27/15	Date: _____
By: _____	By: _____
Its: Mayor	Its: County Board Chairman
Attest:	Attest:
Village Clerk	County Clerk

Installation Notes for Cen Com Center	
Coordinates	42.36550N 088.10096W
Site Elevation	765 feet AMSL
Polarization	Vertical
Antenna Type	Cambium Networks 1ft HP Antenna 85010089057 - Direct
Antenna Beamwidth	3.30°
Antenna Height	166.0 feet AGL
Bearing to Fox Comm E-911 WT	299.60° from True North
Antenna Tilt angle	0.0°
Hardware Platform	PTP18800 with ODU-B - 85009318001
Link Name	Fox Comm E-911 WT to Cen Com Center
Site Name	Cen Com Center
RFU Platform	ODU-B
Antenna Gain	33.85 dBi
RF Feeder Loss	0.0 dB
Radio License Band	18 GHz
Radio License Region	FCC
Radio License Bandwidth	50 MHz
Radio License Mod Mode	adaptive
Radio License Max Mod Mode	256QAM 0.83
Radio License Min Mod Mode	QPSK 0.80
Radio License Max EIRP	100.0 dBm
Radio License Tx Freq	18115.0 MHz
Radio License Rx Freq	19675.0 MHz
Maximum Transmit Power	24.0 dBm
EIRP	57.9 dBm
Automatic Transmitter Power Control	Enabled
BNC Target Voltage	3.00 to 3.63 Volts
Predicted Receive Power	-40 dBm ± 5 dB while aligning
Predicted Operational Receive Power	-40 dBm ± 5 dB
Maximum Link Loss	132.73 dB ± 5.00 dB

Installation Instruction

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. Check with a GPS that you are installing at the correct location.

2. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.

Installation Instruction (continued)

3. When aligning antennas, it is important to find the centre of the main beam. This is done by adjusting the antenna at each end of the link in turn and monitoring the receive level until the peak is found. Once the peak level is found, it should be checked against the predicted receive power to ensure that the antennas have not been aligned on a side lobe.

4. An hour after alignment is complete check that the mean value for the link loss is as predicted (132.73 dB ± 5.00 dB). Also check that the received power is not greater than -35dBm.

Fox Comm E-911 WT Performance *	
Mean IP Throughput Predicted	299.99 Mbps
Mean IP Throughput Required	5.00 Mbps
Minimum IP Throughput Required	1.00 Mbps
Minimum IP Throughput Availability Predicted	99.9998% (unavailable for 1.2 mins/year)

Cen Com Center Performance *	
Mean IP Throughput Predicted	299.99 Mbps
Mean IP Throughput Required	5.00 Mbps
Minimum IP Throughput Required	1.00 Mbps
Minimum IP Throughput Availability Predicted	99.9998% (unavailable for 1.1 mins/year)

* Multipath availability calculated using ITU-R

Mode	Max Aggregate User IP Throughput (Mbps)	Max User IP Throughput in Either Direction (Mbps)	Fox Comm E-911 WT			Cen Com Center		
			Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)	Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)
256QAM 0.83	600.00	300.00	10.08	99.9780	99.9780	11.36	99.9837	99.9837
128QAM 0.82	515.66	257.83	19.10	99.9961	0.0180	20.38	99.9968	0.0130
64QAM 0.82	433.16	216.58	22.30	99.9975	0.0015	23.58	99.9979	0.0012
32QAM 0.87	357.36	178.68	29.03	99.9990	0.0014	30.31	99.9991	0.0012
16QAM 0.92	301.66	150.83	31.50	99.9992	0.0003	32.78	99.9993	0.0002
8PSK 0.84	207.58	103.79	34.35	99.9994	0.0002	35.63	99.9995	0.0002
QPSK 0.80	131.44	65.72	42.89	99.9998	0.0003	44.17	99.9998	0.0003

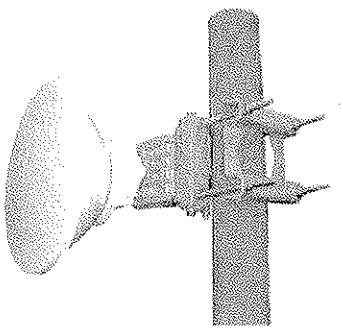
* Multipath availability calculated using ITU-R

Regulatory Conditions	
Regulation	FCC
Region Code	FCC
Max EIRP	58.49 dBm
Output Power	24.00 dBm

Part Number	Qty	Description
01010419001	4	Coaxial Cable Grounding Kits for 1/4" and 3/8" Cable
07009304001	2	Hoisting Grip for CNT-400 cable
30010194001	2	50 Ohm Braided Coaxial Cable - 75 meter
85009318001	1	ODU-B 18GHz, TR1560, Lo, B3 (17700.0 - 18140.0 MHz), Rectangular WG, Neg Pol
85009318002	1	ODU-B 18GHz, TR1560, Hi, B3 (19260.0 - 19700.0 MHz), Rectangular WG, Neg Pol
85010089057	2	1' HP Antenna, 17.70 - 19.70 GHz, Single Pol, Mot Interface
WB3480	2	PTP800 Modem 1000/100BaseT with Capacity CAP 10 Mbps
WB3545	2	PTP800/PTP810 Modem Capacity CAP - 300 Mbps (per Unit)
WB3616	2	Coaxial Cable Installation Assembly Kit (W/O LPU End Kit)
WB3618	2	Mains Lead- US 3pin to C5 (PTP800 AC-DC PSU)
WB3622	2	AC-DC Power Supply Convertor (no lead cable included). Converts 110/230V to 48V.
WB3657	2	LPU END KIT PTP800 (1 kit required per Coaxial cable)

Product Specifications

1 ft ValuLine® High Performance Low Profile Antenna, single-polarized, 17.7–19.7 GHz



General Specifications

Antenna Type	VHLP - ValuLine® High Performance Low Profile Antenna, single-polarized
Diameter, nominal	0.3 m | 1 ft
Antenna Input	Motorola ODU interface
Polarization	Single
Reflector Construction	One-piece reflector
Antenna Color	White
Radome Color	White
Radome Material Description	Polymer
Flash Included	No
Packing	Standard pack

Electrical Specifications

Operating Frequency Band	17.700 - 19.700 GHz
Gain, Top Band	34.5 dBi
Gain, Mid Band	34.2 dBi
Gain, Low Band	33.6 dBi
Front-to-Back Ratio	57 dB
Cross Polarization Discrimination (XPD)	30 dB
Beamwidth, Vertical	3.3 °
VSWR	1.30
Return Loss	17.7 dB
Radiation Pattern Envelope Reference (RPE)	7010C

From North America, toll free
Telephone: 1 800 255 1479
Fax: 1 800 349 5444

Outside North America
Telephone: +1 708 873 2307
Fax: +1 779 435 8679

Product Specifications

Electrical Compliance	Brazil Anatel Class 2 | ETSI 302 217 Class 2

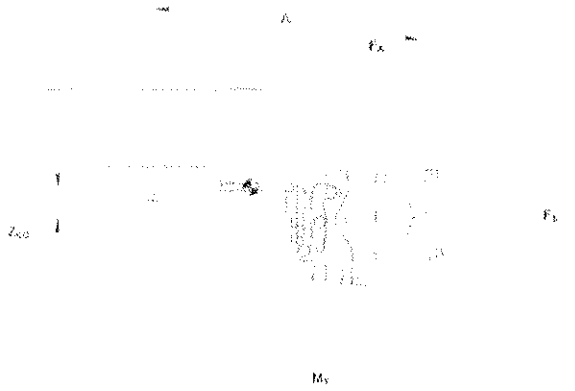
Mechanical Specifications

Wind Velocity Operational	113 km/h | 70 mph
Wind Velocity Survival Rating	249 km/h | 155 mph
Fine Azimuth Adjustment	±10°
Fine Elevation Adjustment	±25°
Mounting Pipe Diameter	50 mm–115 mm | 2 in–4.5 in
Side Struts, Included	0
Side Struts, Optional	0
Net Weight	6 kg | 14 lb

Wind Forces At Wind Velocity Survival Rating

Axial Force (FA)	445 N | 100 lbf
Side Force (FS)	196 N | 44 lbf
Twisting Moment (MT)	159 N•m
Zcg without Ice	47 mm | 2 in
Zcg with 1/2" (12 mm) Radial Ice	91 mm | 4 in
Weight with 1/2" (12 mm) Radial Ice	12 kg | 27 lb

Wind Forces At Wind Velocity Survival Rating Image



Packed Dimensions

Gross Weight, Packed Antenna	8.9 kg | 19.7 lb
Length	635.0 mm | 25.0 in

From North America, toll free
Telephone 1 800 255 1479
Fax +1 708 349 5444

Outside North America
Telephone +1 708 873 2307
Fax +1 770 631 8572

Product Specifications

Width	457.2 mm | 18.0 in
Height	323.9 mm | 12.8 in
Volume	5737.5 in³

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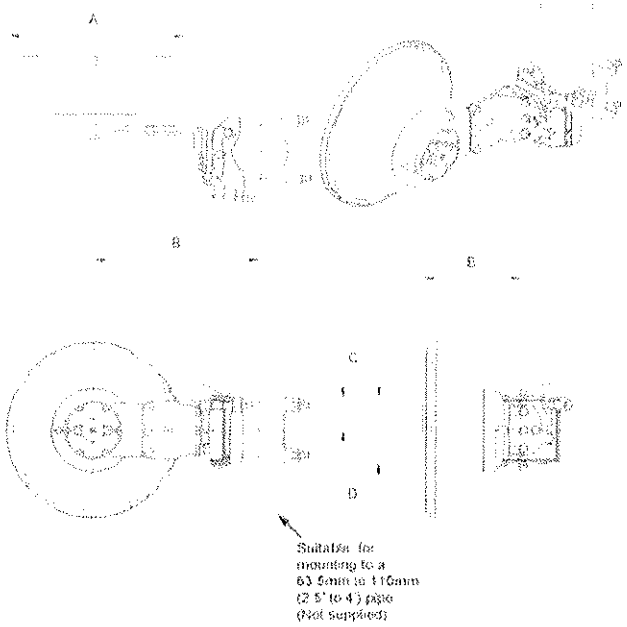
Fax +1 770 435 8579

Product Specifications

Antenna Dimensions And Mounting Information



ANTENNA DIMENSIONS All dimensions in mm (inches)			
A	389 (15.3)	D	143 (5.6)
B	358 (14.1)	E	220 (8.7)
C	72 (2.8)		

* Footnotes

Axial Force (FA)	Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.
Cross Polarization Discrimination (XPD)	The difference between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the 3 dB beamwidth of the co-polarized main beam.
Front-to-Back Ratio	Denotes highest radiation relative to the main beam, at 180° ± 40°, across the band. Production antennas do not exceed rated values by more than 2 dB unless stated otherwise.
Gain, Mid Band	For a given frequency band, gain is primarily a function of antenna size. The gain of Andrew antennas is determined by either gain by comparison or by computer integration of the measured antenna patterns.

From North America, toll free
Telephone: 1 800 255 1479
Fax: +1 800 349 5444

Outside North America
Telephone: +1 708 873 2307
Fax: +1 279 413 5853

Product Specifications

ANDREW
A CommScope Company

Operating Frequency Band	Bands correspond with CCIR recommendations or common allocations used throughout the world. Other ranges can be accommodated on special order.
Packing	Andrew standard packing is suitable for export. Antennas are shipped as standard in totally recyclable cardboard or wire-bound crates (dependent on product). For your convenience, Andrew offers heavy duty export packing options.
Radiation Pattern Envelope Reference (RPE)	Radiation patterns determine an antenna's ability to discriminate against unwanted signals under conditions of radio congestion. Radiation patterns are dependent on antenna series, size, and frequency.
Return Loss	The figure that indicates the proportion of radio waves incident upon the antenna that are rejected as a ratio of those that are accepted.
Side Force (FS)	Maximum axial forces exerted on support structures by side struts as a result of a 200 km/h (125 mph) wind from the most critical direction and extreme angle permitted. The forces are a component of, not in addition to, the maximum forces specified above.
Twisting Moment (MT)	Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.
VSWR	Maximum; is the guaranteed Peak Voltage-Standing-Wave-Ratio within the operating band.
Wind Velocity Operational	The wind speed where the antenna deflection is equal to or less than 0.1 degrees.
Wind Velocity Survival Rating	Microwave antennas, including mounts and radomes, where applicable, will withstand the simultaneous wind and ice conditions as specified.

From North America, toll free
Telephone 1 800 255 1479
Fax 1 858 349 5444

Outside North America
Telephone +1 708 873 2307
Fax +1 770 486 8570

Project Lake County ETSB PTP rev7 - FINAL, Link Fox Comm E-911 WT to Cen Com Center

LINKPlanner Installation Report

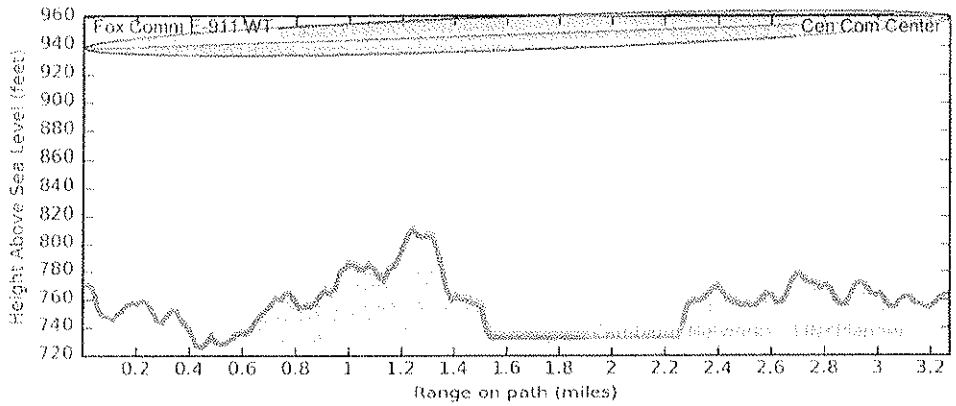
13 August 2014

Nilesh Sarathe
Organization: Current Technologies Corp
Phone: 630 388 0240
Email: nsarathe@currenttech.net

Cambium Networks

Summary	
Link Name	Fox Comm E-911 WT to Cen Com Center
Customer Company Name	Lake County ETSB
Link Type	Line-of-Sight
Equipment Type	PTP18800 with ODU-B
Maximum Obstruction	0 feet
Link Distance	3.271 miles
Free Space Path Loss	132.31 dB
Excess Path Loss	0.00 dB
User IP Throughput Expectation Aggregate	Aggregate 599.98 Mbps assuming PTP-800 Series running the 800-06-02 software
RF Frequency Band	18 GHz (17700 to 19700 MHz)
RF Channel Bandwidth	50 MHz

Path Profile



Link Configuration	
Link Type	1+0
T/R Spacing	1560 MHz
Bandwidth	50 MHz
Modulation Mode	Adaptive
Maximum Mod Mode	256QAM 0.83 (302.16Mbps)
Minimum Mod Mode	QPSK 0.80 (65.72Mbps)
Polarization	Vertical
ATPC	Enabled
Hi	Fox Comm E-911 WT
Lo	Cen Com Center

Installation Notes for Fox Comm E-911 WT	
Coordinates	42.38889N 088.15654W
Site Elevation	769 feet AMSL
Polarization	Vertical
Antenna Type	Cambium Networks 1ft HP Antenna 85010089057 - Direct
Antenna Beamwidth	3.30°
Antenna Height	169.0 feet AGL
Bearing to Cen Com Center	119.57° from True North
Antenna Tilt angle	0.1°
Hardware Platform	PTP18800 with ODU-B - 85009318002
Link Name	Fox Comm E-911 WT to Cen Com Center
Site Name	Fox Comm E-911 WT
RFU Platform	ODU-B
Antenna Gain	34.49 dBi
RF Feeder Loss	0.0 dB
Radio License Band	18 GHz

Installation Notes for Fox Comm E-911 WT (continued)	
Radio License Region	FCC
Radio License Bandwidth	50 MHz
Radio License Mod Mode	adaptive
Radio License Max Mod Mode	256QAM 0.83
Radio License Min Mod Mode	QPSK 0.80
Radio License Max EIRP	100.0 dBm
Radio License Tx Freq	19675.0 MHz
Radio License Rx Freq	18115.0 MHz
Maximum Transmit Power	24.0 dBm
EIRP	58.5 dBm
Automatic Transmitter Power Control	Enabled
BNC Target Voltage	2.92 to 3.55 Volts
Predicted Receive Power	-41 dBm ± 5 dB while aligning
Predicted Operational Receive Power	-41 dBm ± 5 dB
Maximum Link Loss	132.73 dB ± 5.00 dB

Installation Notes for Cen Com Center	
Coordinates	42.36550N 088.10096W
Site Elevation	765 feet AMSL
Polarization	Vertical
Antenna Type	Cambium Networks 1ft HP Antenna 85010089057 - Direct
Antenna Beamwidth	3.30°
Antenna Height	193.6 feet AGL
Bearing to Fox Comm E-911 WT	299.60° from True North
Antenna Tilt angle	-0.1°
Hardware Platform	PTP18800 with ODU-B - 85009318001
Link Name	Fox Comm E-911 WT to Cen Com Center
Site Name	Cen Com Center
RFU Platform	ODU-B
Antenna Gain	33.85 dBi
RF Feeder Loss	0.0 dB
Radio License Band	18 GHz
Radio License Region	FCC
Radio License Bandwidth	50 MHz
Radio License Mod Mode	adaptive
Radio License Max Mod Mode	256QAM 0.83
Radio License Min Mod Mode	QPSK 0.80
Radio License Max EIRP	100.0 dBm
Radio License Tx Freq	18115.0 MHz
Radio License Rx Freq	19675.0 MHz
Maximum Transmit Power	24.0 dBm
EIRP	57.9 dBm
Automatic Transmitter Power Control	Enabled
BNC Target Voltage	3.00 to 3.63 Volts

Installation Notes for Cen Com Center (continued)	
Predicted Receive Power	-40 dBm ± 5 dB while aligning
Predicted Operational Receive Power	-40 dBm ± 5 dB
Maximum Link Loss	132.73 dB ± 5.00 dB

Installation Instruction

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. Check with a GPS that you are installing at the correct location.

2. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.

3. When aligning antennas, it is important to find the centre of the main beam. This is done by adjusting the antenna at each end of the link in turn and monitoring the receive level until the peak is found. Once the peak level is found, it should be checked against the prediced receive power to ensure that the antennas have not been aligned on a side lobe.

4. An hour after alignment is complete check that the mean value for the link loss is as predicted (132.73 dB ± 5.00 dB). Also check that the received power is not greater than -35dBm.

Fox Comm E-911 WT Performance *	
Mean IP Throughput Predicted	299.99 Mbps
Mean IP Throughput Required	5.00 Mbps
Minimum IP Throughput Required	1.00 Mbps
Minimum IP Throughput Availability Predicted	99.9998% (unavailable for 1.2 mins/year)

Cen Com Center Performance *	
Mean IP Throughput Predicted	299.99 Mbps
Mean IP Throughput Required	5.00 Mbps
Minimum IP Throughput Required	1.00 Mbps
Minimum IP Throughput Availability Predicted	99.9998% (unavailable for 1.1 mins/year)

* Multipath availability calculated using ITU-R

Mode	Max Aggregate User IP Throughput (Mbps)	Max User IP Throughput in Either Direction (Mbps)	Fox Comm E-911 WT			Cen Com Center		
			Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)	Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)
256QAM 0.83	600.00	300.00	10.08	99.9780	99.9780	11.36	99.9837	99.9837
128QAM 0.82	515.66	257.83	19.10	99.9961	0.0180	20.38	99.9968	0.0130
64QAM 0.82	433.16	216.58	22.30	99.9975	0.0015	23.58	99.9979	0.0012
32QAM 0.87	357.36	178.68	29.04	99.9990	0.0014	30.32	99.9991	0.0012

(continued)

Mode	Max Aggregate User IP Throughput (Mbps)	Max User IP Throughput in Either Direction (Mbps)	Fox Comm E-911 WT			Cen Com Center		
			Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)	Fade Margin (dB)	IP Throughput Availability (%) *	Receive time in Mode (%)
16QAM 0.92	301.66	150.83	31.50	99.9992	0.0003	32.78	99.9993	0.0002
8PSK 0.84	207.58	103.79	34.35	99.9994	0.0002	35.63	99.9995	0.0002
QPSK 0.80	131.44	65.72	42.89	99.9998	0.0003	44.17	99.9998	0.0003

* Multipath availability calculated using ITU-R

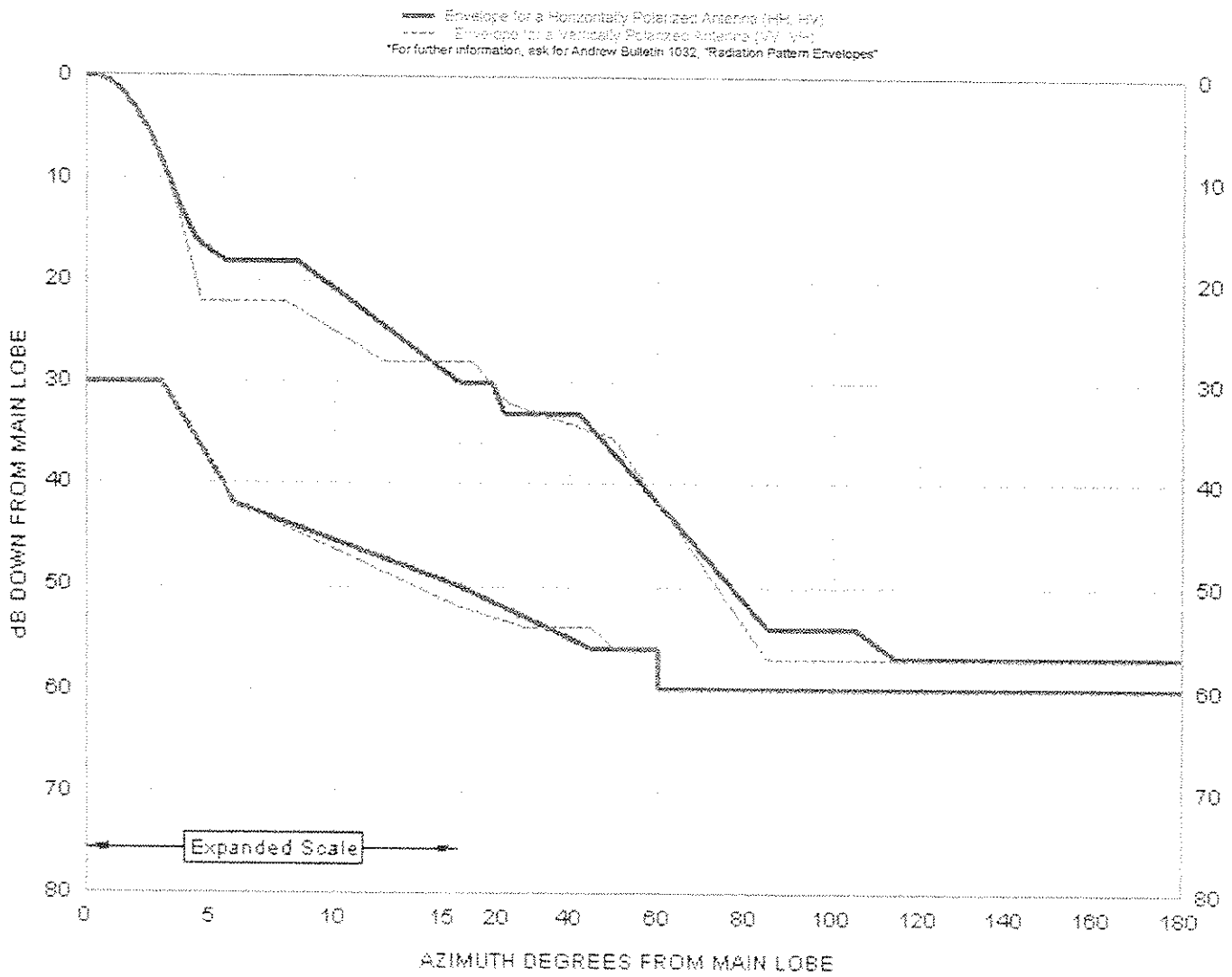
Regulatory Conditions	
Regulation	FCC
Region Code	FCC
Max EIRP	58.49 dBm
Output Power	24.00 dBm

Part Number	Qty	Description
01010419001	4	Coaxial Cable Grounding Kits for 1/4" and 3/8" Cable
07009304001	2	Hoisting Grip for CNT-400 cable
30010194001	2	50 Ohm Braided Coaxial Cable - 75 meter
85009318001	1	ODU-B 18GHz, TR1560, Lo, B3 (17700.0 - 18140.0 MHz), Rectangular WG, Neg Pol
85009318002	1	ODU-B 18GHz, TR1560, Hi, B3 (19260.0 - 19700.0 MHz), Rectangular WG, Neg Pol
85010089057	2	1' HP Antenna, 17.70 ~ 19.70 GHz, Single Pol, Mot Interface
WB3480	2	PTP800 Modem 1000/100BaseT with Capacity CAP 10 Mbps
WB3545	2	PTP800/PTP810 Modem Capacity CAP - 300 Mbps (per Unit)
WB3616	2	Coaxial Cable Installation Assembly Kit (W/O LPU End Kit)
WB3618	2	Mains Lead- US 3pin to C5 (PTP800 AC-DC PSU)
WB3622	2	AC-DC Power Supply Convertor (no lead cable included). Converts 110/230V to 48V.
WB3657	2	LPU END KIT PTP800 (1 kit required per Coaxial cable)

VHLP1-18 - Radiation Pattern Envelope

ANDREW

ANDREW
RPE: 7010C
Engineering Approved:
11 January 2007



VHLP1-18 - Radiation Pattern Envelope

ANDREW

ANDREW
RPE: 7010C
Engineering Approved:
11 January 2007

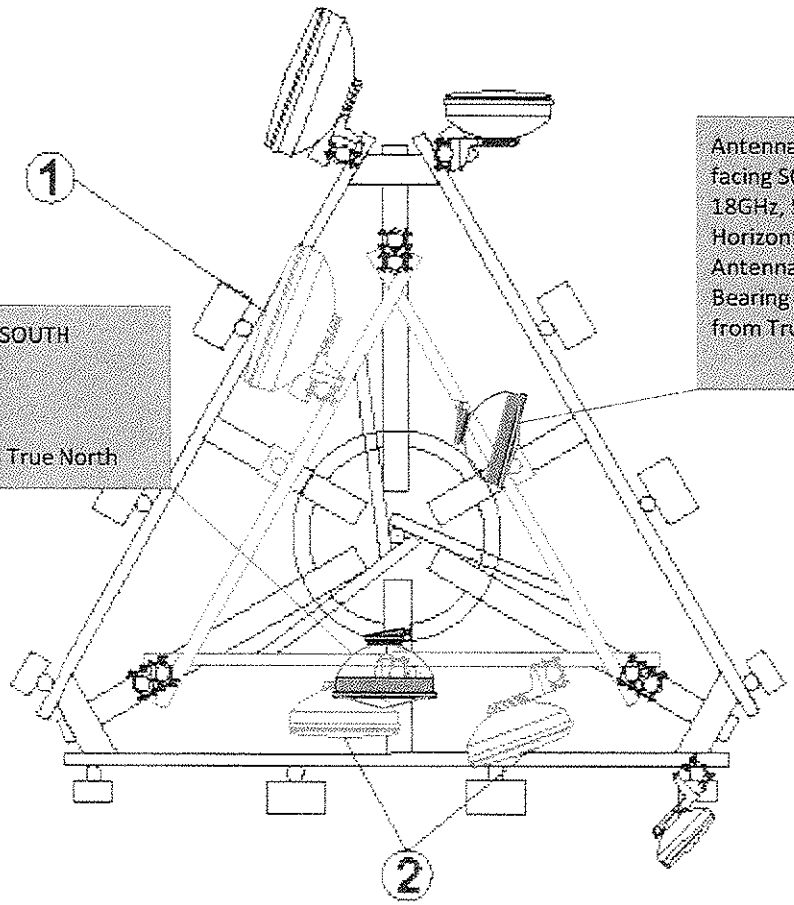
H/H		H/V		V/V		V/H	
Angle	dB	Angle	dB	Angle	dB	Angle	dB
0.00	0.00	0.00	-30.00	0.00	0.00	0.00	-30.00
0.50	-0.14	3.00	-30.00	0.25	0.00	3.00	-30.00
1.00	-0.67	6.00	-42.00	0.50	-0.10	6.00	-42.00
1.50	-1.76	15.00	-50.00	0.75	-0.41	15.00	-52.00
2.00	-3.30	45.00	-56.00	1.00	-0.71	30.00	-54.00
2.50	-5.34	59.99	-56.00	1.25	-1.22	45.00	-54.00
3.00	-8.12	60.00	-60.00	1.50	-1.88	50.00	-56.00
3.50	-11.20	180.00	-60.00	1.75	-2.54	59.99	-56.00
3.80	-13.00			2.00	-3.35	60.00	-60.00
4.40	-16.00			2.25	-4.37	180.00	-60.00
5.50	-18.00			2.50	-5.43		
8.50	-18.00			2.75	-6.70		
15.00	-30.00			3.00	-8.22		
22.50	-30.00			3.25	-9.85		
25.00	-33.00			3.50	-11.68		
42.00	-33.00			3.75	-13.65		
85.00	-54.00			4.00	-16.09		
105.00	-54.00			4.20	-17.87		
115.00	-57.00			4.60	-22.00		
180.00	-57.00			8.00	-22.00		
				12.00	-28.00		
				15.00	-28.00		
				18.00	-28.00		
				26.00	-32.00		
				50.00	-35.50		
				85.00	-57.00		
				180.00	-57.00		

Andrew Corporation
3 Westbrook Corporate Center
Suite 900
Westchester, Illinois 60154 USA

Corporate Web Site: http://www.andrew.com

Customer Service Center: 1-800-255-1479
Outside North America Telephone +1 708 873-2307

	Qty	Antenna Type	Manufacture	Part #	Weight	Antenna Size
1	1	Dish	Radiowave Inc.	HP3-18	22.5 KG	0.9 M
2	2	Dish	Radiowave Inc.	HP2-18	12.2 KG	0.6 M



Antenna to face ETSB site facing SOUTH
18GHz, 50MHz channel
Vertical Polarization
Antenna Beam width 3.30 deg
Bearing to ETSB 119.57 deg from True North

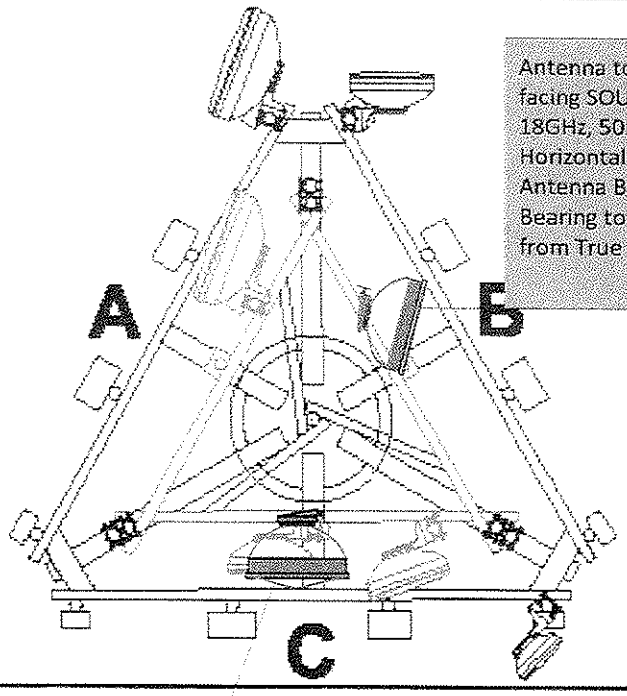
Antenna to face Cen Comm site facing SOUTH EAST
18GHz, 50MHz channel
Horizontal Polarization
Antenna Beam width 3.30 deg
Bearing to Cer Comm 173.0 deg from True North

NORTH

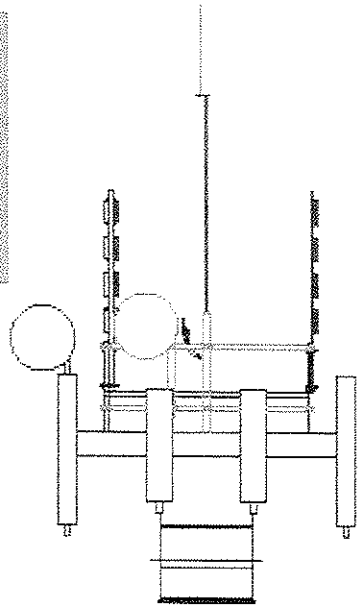
Village of Fox Lake

N-02

TOP VIEW
NEW ANTENNAS
NEW SUPPORT STRUCTURE

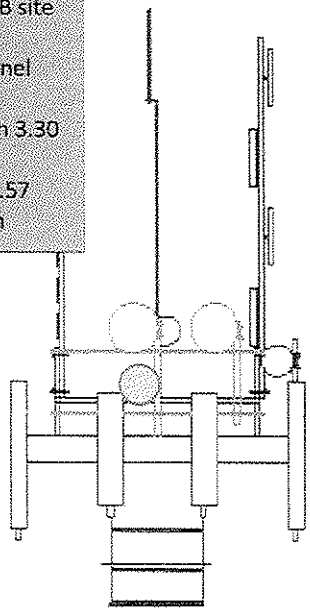


Antenna to face Cen Comm site
facing SOUTH EAST
18GHz, 50MHz channel
Horizontal Polarization
Antenna Beam width 3.30 deg
Bearing to Cen Comm 173.0 deg
from True North



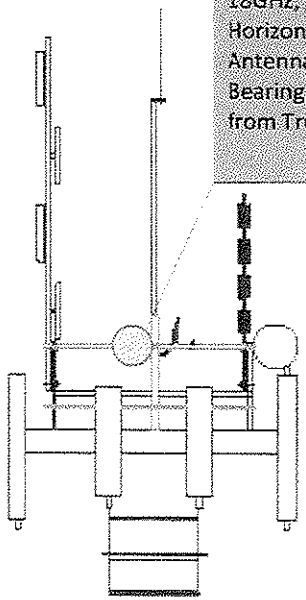
A

Antenna to face ETSB site
facing SOUTH
18GHz, 50MHz channel
Vertical Polarization
Antenna Beam width 3.30
deg
Bearing to ETSB 119.57
deg from True North



C

Antenna to face Cen Comm site
facing SOUTH EAST
18GHz, 50MHz channel
Horizontal Polarization
Antenna Beam width 3.30 deg
Bearing to Cen Comm 173.0 deg
from True North



B

Village of Fox Lake

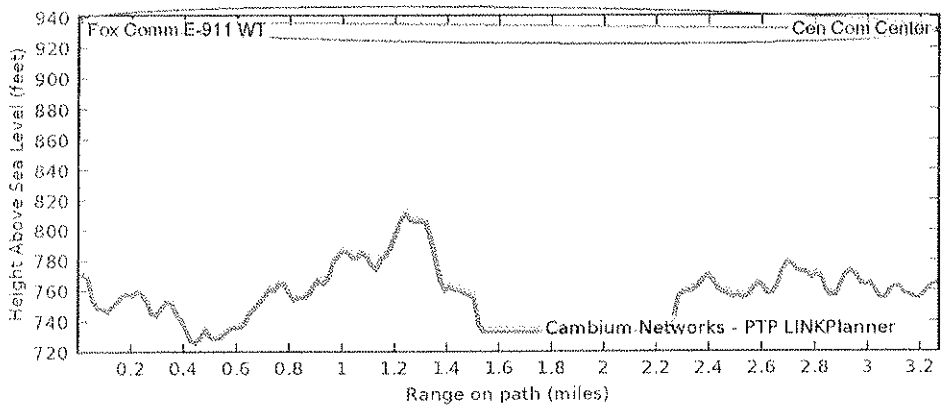
N-01

NEW ANTENNAS AND
NEW SUPPORT STRUCTURE

3. Fox Comm E-911 WT to Cen Com Center

Summary	
Link Name	Fox Comm E-911 WT to Cen Com Center
Customer Company Name	Lake County ETSB
Link Type	Line-of-Sight
Equipment Type	PTP18800 with ODU-B
Maximum Obstruction	0 feet
Link Distance	3.271 miles
Free Space Path Loss	132.31 dB
Excess Path Loss	0.00 dB
User IP Throughput Expectation Aggregate	Aggregate 599.98 Mbps assuming PTP-800 Series running the 800-06-01 software
RF Frequency Band	18 GHz (17700 to 19700 MHz)
RF Channel Bandwidth	50 MHz

Path Profile



Link Configuration	
Link Type	1+0
T/R Spacing	1560 MHz
Bandwidth	50 MHz
Modulation Mode	Adaptive
Maximum Mod Mode	256QAM 0.83 (302.16Mbps)
Minimum Mod Mode	QPSK 0.80 (65.72Mbps)
Polarization	Vertical

Link Configuration (continued)	
ATPC	Enabled
Hi	Fox Comm E-911 WT
Lo	Cen Com Center

Installation Notes for Fox Comm E-911 WT	
Coordinates	42.38889N 088.15654W
Site Elevation	769 feet AMSL
Polarization	Vertical
Antenna Type	Cambium Networks 1ft HP Antenna 85010089057 - Direct
Antenna Beamwidth	3.30°
Antenna Height	169.0 feet AGL
Bearing to Cen Com Center	119.57° from True North
Antenna Tilt angle	-0.0°
Hardware Platform	PTP18800 with ODU-B - 85009318002
Link Name	Fox Comm E-911 WT to Cen Com Center
Site Name	Fox Comm E-911 WT
RFU Platform	ODU-B
Antenna Gain	34.49 dBi
RF Feeder Loss	0.0 dB
Radio License Band	18 GHz
Radio License Region	FCC
Radio License Bandwidth	50 MHz
Radio License Mod Mode	adaptive
Radio License Max Mod Mode	256QAM 0.83
Radio License Min Mod Mode	QPSK 0.80
Radio License Max EIRP	100.0 dBm
Radio License Tx Freq	19675.0 MHz
Radio License Rx Freq	18115.0 MHz
Maximum Transmit Power	24.0 dBm
EIRP	58.5 dBm
Automatic Transmitter Power Control	Enabled
BNC Target Voltage	2.92 to 3.55 Volts
Predicted Receive Power	-41 dBm ± 5 dB while aligning
Predicted Operational Receive Power	-41 dBm ± 5 dB
Maximum Link Loss	132.73 dB ± 5.00 dB