

October 5, 2015

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification
411 West Putnam Avenue, Greenwich, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains a roof-top wireless telecommunications facility at 411 West Putnam Avenue in Greenwich, Connecticut (the “Property”). By virtue of its 1992 approval of an AT&T facility at the Property, the Council maintains jurisdiction over this non-tower facility. The building and the Property are owned by 411 Properties LLC. Cellco’s facility consists of fifteen (15) panel antennas on the roof of the building. The antennas maintain a centerline height of approximately 52 feet above ground level. Cellco now intends to modify its facility by replacing nine (9) of its antennas with three (3) model 800 10734V01, 700 MHz antennas; three (3) model HBXX-6516DS, 1900 MHz antennas; and three (3) model HBXX-6516DS, 2100 MHz antennas, all at the same level and location on the roof. Cellco also intends to replace three (3) remote radio heads (“RRHs”) behind its 2100 MHz antennas. Included in Attachment 1 are specifications for Cellco’s new antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Peter Tesai, First Selectman for the Town of Greenwich, Katie DeLuca, Director of Planning and Zoning and 411 Properties LLC, the owner of the Property.

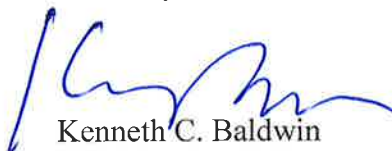
The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

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1. The proposed modifications will not result in an increase in the height of the existing antenna structures. The new antennas and RRHs will be located at the same height as the existing antennas.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The roof of the building at the Property can support Cellco's proposed modifications. A Structural Evaluation Letter is included in Attachment 3.

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Peter Tesai, Greenwich First Selectman
Katie DeLuca, Director Planning and Zoning
411 Properties LLC
Tim Parks

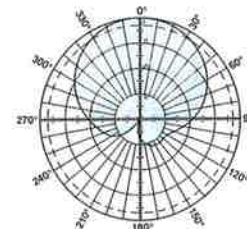
ATTACHMENT 1

Kathrein's X-polarized antennas are designed for use in digital polarization diversity systems.

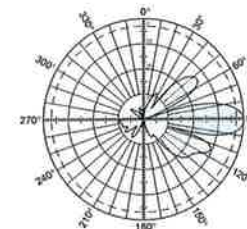
- X-polarized (+45° and -45°).
- UV resistant fiberglass radomes.
- Wideband vector dipole technology.
- DC Grounded metallic parts for impulse suppression.
- RET motor housed inside the radome and field replaceable.

General specifications:

Frequency range	698–894 MHz
VSWR	<1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Maximum input power	500 watts per input (at 50°C)
Connector	2 x 7-16 DIN female (long neck) (bottom mounted)
Isolation	>30 dB
Electrical downtilt	0–16 degrees (continuously adjustable)
<i>See reverse for order information.</i>	



Horizontal pattern
±45°- polarization



Vertical pattern
±45°- polarization
0°–16° electrical downtilt



Specifications:

	698–806 MHz	824–894 MHz
Gain	14.2 dBi	14.8 dBi
Front-to-back ratio	>30 dB (co-polar) 32 dB (average)	>30 dB (co-polar) 33 dB (average)
+45° and -45° polarization horizontal beamwidth	68° (half-power)	65° (half-power)
+45° and -45° polarization vertical beamwidth	16° (half-power)	14.8° (half-power)
Min. sidelobe suppression for first sidelobe above main beam average	0° 8° 16° T 16 17 17 dB 16 19 20 dB	0° 8° 16° T 18 17 16 dB 20 20 20 dB
Cross polar ratio		
Main direction	0°	24 dB (typical)
Sector	±60°	>10 dB, Average: 15 dB
		23 dB (typical)
		>10 dB, Average: 16 dB

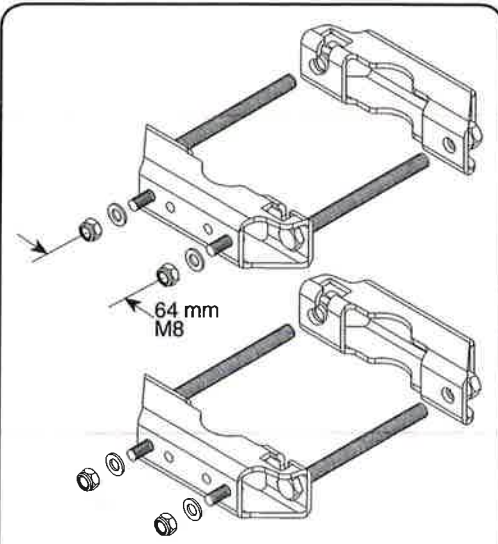
IRT specifications:

Logical interface ex factory ¹	3GPP/AISG 2.0
Protocols	AISG 1.1 and 3GPP/AISG 2.0 compliant
Hardware interface ²	2 x 8 pin connector acc. IEC 60130-9; according to AISG: – IRT in (male): Control / Daisy chain in – IRT in (female): Daisy chain out
Power supply	10–30 V
Power consumption	<1 watt (standby) <8.5 watts (motor activated)
Adjustment time (full range)	40 sec.
Adjustment cycles	>50,000
Certification	FCC 15.107 Class B Computing Devices

¹) The protocol of the logical interface can be switched from 3GPP/AISG 2.0 to AISG 1.1 and vice versa with a vendor specific command. Start-up operation of the RCU 86010149 is possible in an RET system supporting AISG 1.1 or supporting 3GPP/AISG 2.0 after performing a layer 2 reset before address assignment. The protocol can also be changed as follows: AISG 1.1 to 3GPP: Enter "3GPP" into the additional data filed "Installer's ID" and perform a layer 7 reset or a power reset. 3GPP to AISG 1.1: Enter "AISG 1" into the additional datafield "Installer's ID" and perform a layer 2 reset or a power reset. After switching the protocol any other information can be entered into the "Installer's ID" field.

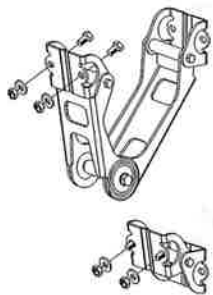
²) The tightening torque for fixing the connector must be 0.5 – 1.0 Nm ('hand-tightened'). The connector should be tightened by hand only!





Mounting Brackets

for use with 2-point mount antennas
Mast dia. 2–4.5 inches (50–115 mm)
Weight: 4.4 lb (2 kg)

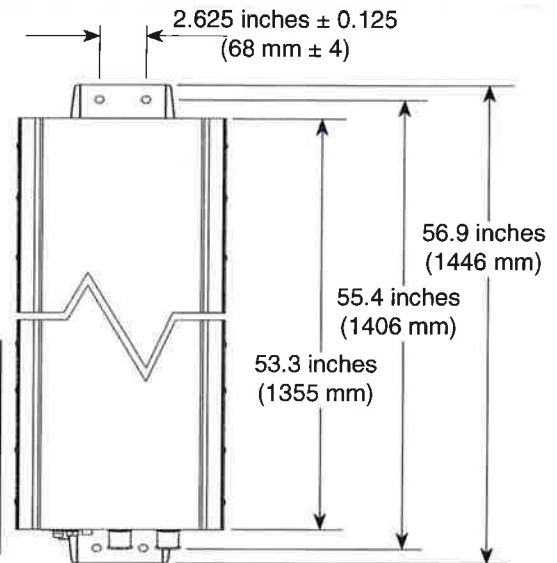


Mechanical Tilt Brackets

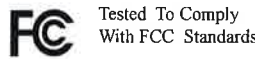
for use with 2-point mount antennas
Weight: 7.4 lb (3.7 kg)
(Model 850 10013)

Mechanical specifications:

Weight	24.3 lb (11 kg)	28.7 lb (13 kg) clamps included
Dimensions	H x W x D	53.3 x 11.9 x 3.9 inches (1355 x 303 x 99 mm)
Wind load	at 93 mph (150kph)	
Front/Side/Rear	140 lbf / 45 lbf / 160 lbf (620 N) / (200 N) / (710 N)	
Mounting category	M (Medium)	
Wind survival rating*	150 mph (240 kph)	
Shipping dimensions	56.3 x 12.4 x 4.5 inches (1430 x 315 x 115 mm)	
Shipping weight	33.1 lb (15 kg)	
Mounting bracket	2-point hot-dip galvanized with stainless steel hardware for 2 to 4.5 inch (50 to 115 mm) OD masts.	

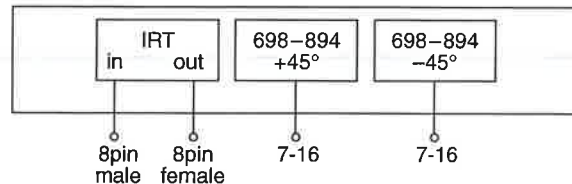
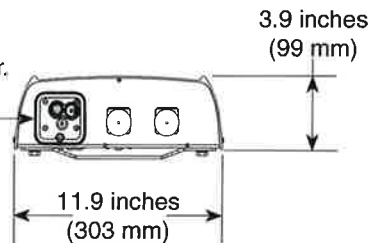


KATHREIN 860 10149



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: Refer to part number 860 10149 for the specifications of the remote control actuator.



Order Information:

Model	Description
800 10734V01	Antenna with mounting bracket 0°–16° electrical downtilt
800 10734V01K	Antenna with Antenna with mounting bracket and mechanical tilt bracket 0°–16° electrical downtilt

* Mechanical design is based on environmental conditions as stipulated in TIA-222-G-2 (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

All specifications are subject to change without notice. The latest specifications are available at www.kathrein-scala.com.



HBXX-6516DS-VTM

DualPol® Quad Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Fully supports PCS 1900, GSM 1800, UMTS 2100, and AWS spectrum
- Each DualPol® array can be independently adjusted for greater flexibility
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Great solution to maximize network coverage and capacity

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	17.7	18.0	18.0
Beamwidth, Horizontal, degrees	67	65	63
Beamwidth, Vertical, degrees	7.5	7.0	6.5
Beam Tilt, degrees	0–10	0–10	0–10
USLS, typical, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
Isolation, dB	30	30	30
VSWR Return Loss, dB	1.4:1 15.6	1.4:1 15.6	1.4:1 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm
Lightning Protection	dc Ground	dc Ground	dc Ground

Mechanical Specifications

Color Radome Material	Light gray PVC, UV resistant
Connector Interface Location Quantity	7-16 DIN Female Bottom 4
Wind Loading, maximum	419.5 N @ 150 km/h 94.3 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h 149.8 mph

Dimensions

Depth	166.0 mm 6.5 in
Length	1294.00 mm 50.94 in
Width	305.00 mm 12.01 in
Net Weight	13.90 kg 30.64 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator HBXX-6516DS-R2M
 Model with Factory Installed AISG 2.0 Actuator HBXX-6516DS-A2M

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2002/95/EC	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)

Product Specifications

COMMSCOPE®

HBXX-6516DS-VTM



ISO 9001:2008

Designed, manufactured and/or distributed under this quality management system

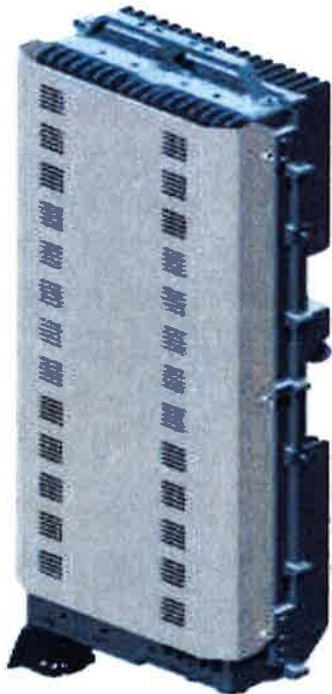


Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals

along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

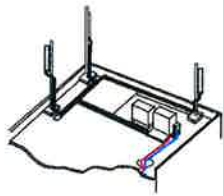
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

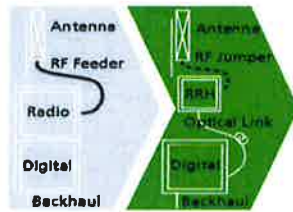
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

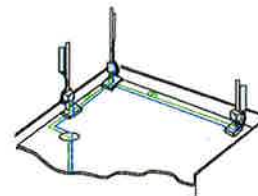
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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ATTACHMENT 2

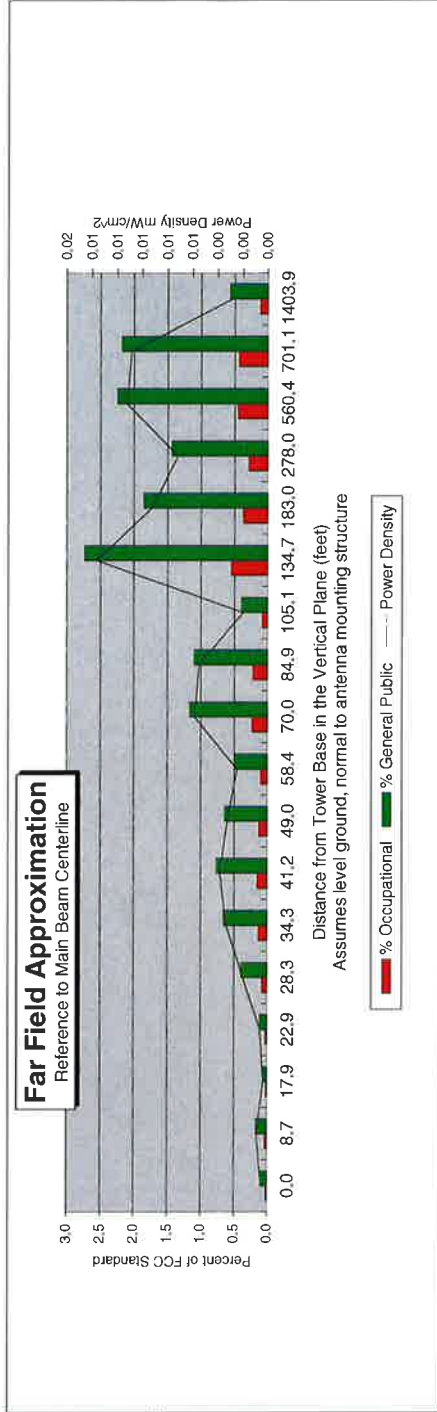
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole / Wire/ Yagi Antenna Types



Location:	GREENWICH SW, CT
Site #:	5-0092
Date:	09/14/15
Name:	Ryan Ulanday
File Name:	GREENWICH SW, CT - FF Tab

Operating Freq. (MHz)	746.0
Antenna Height (ft):	52.0
Antenna Gain (dBi):	14.4
Antenna Size (in.):	53.3
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	923.0
Number of Channels:	1



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	49.0	49.8	52.2	54.1	56.6	59.8	64.0	69.3	76.3	85.5	98.0	116.0	143.3	189.4	282.3	562.5	702.8	1404.7
Distance from Antenna Structure Base in Horizontal plane	0.0	8.7	17.9	22.9	28.3	34.3	41.2	49.0	58.4	70.0	84.9	105.1	134.7	183.0	278.0	560.4	701.1	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.5	0.4	0.3	0.5	0.4	0.1
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.6	0.5	1.2	1.1	0.4	2.7	1.9	1.4	2.3	2.2	0.6

Antenna Type: 800 10794
Max%: 2.74%

Instructions:

- 1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to be saved as.
- 2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
- 3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBi to obtain dBd), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pt
- 4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
- 5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
- 6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
- 7) An odd distance may be entered in the rightmost column of the lower table.

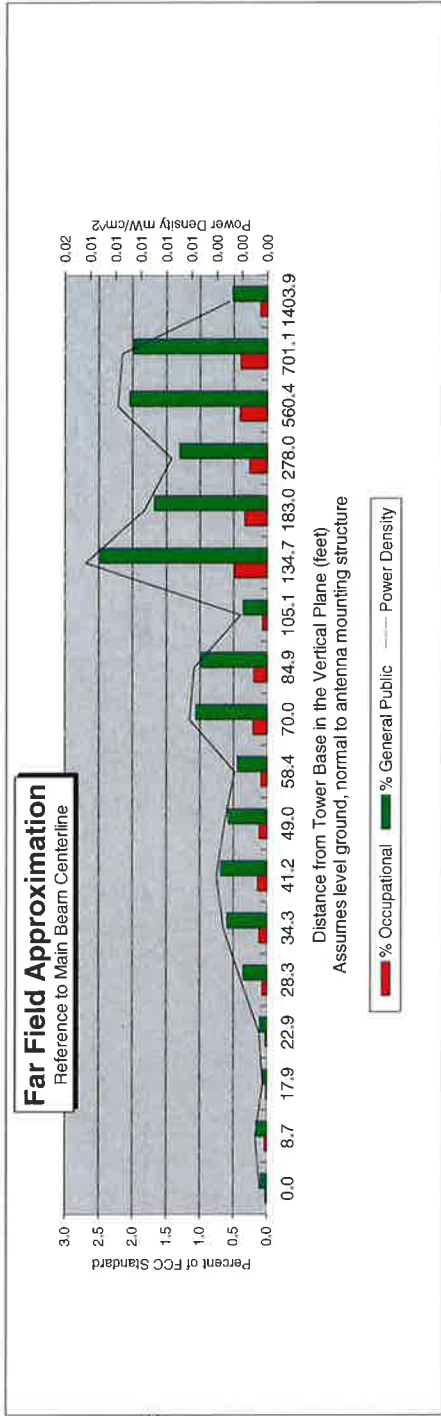
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
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Dipole / Wire/ Yagi Antenna Types



Location:	GREENWICH SW, CT
Site #:	5-0092
Date:	09/14/15
Name:	Ryan Ulanday
File Name:	GREENWICH SW, CT - FF Tab

Operating Freq. (MHz)	869.0
Antenna Height (ft):	52.0
Antenna Gain (dBi):	15.7
Antenna Size (in.):	48.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	3195.0
Number of Channels:	9



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	49.0	49.8	52.2	54.1	56.6	59.8	64.0	69.3	76.3	85.5	98.0	116.0	143.3	189.4	282.3	562.5	702.8	1404.7
Distance from Antenna Structure Base in Horizontal plane	0.0	8.7	17.9	22.9	28.3	34.3	41.2	49.0	58.4	70.0	84.9	105.1	134.7	183.0	278.0	560.4	701.1	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.4	0.4	0.1
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.6	0.7	0.6	0.4	1.1	1.0	0.4	2.5	1.7	1.3	2.0	2.0	0.5

Antenna Type DB844G65ZAXY_H
Max% 2.48%

Instructions:

- 1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to be saved as.
- 2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
- 3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pt
- 4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
- 5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
- 6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
- 7) An odd distance may be entered in the rightmost column of the lower table.

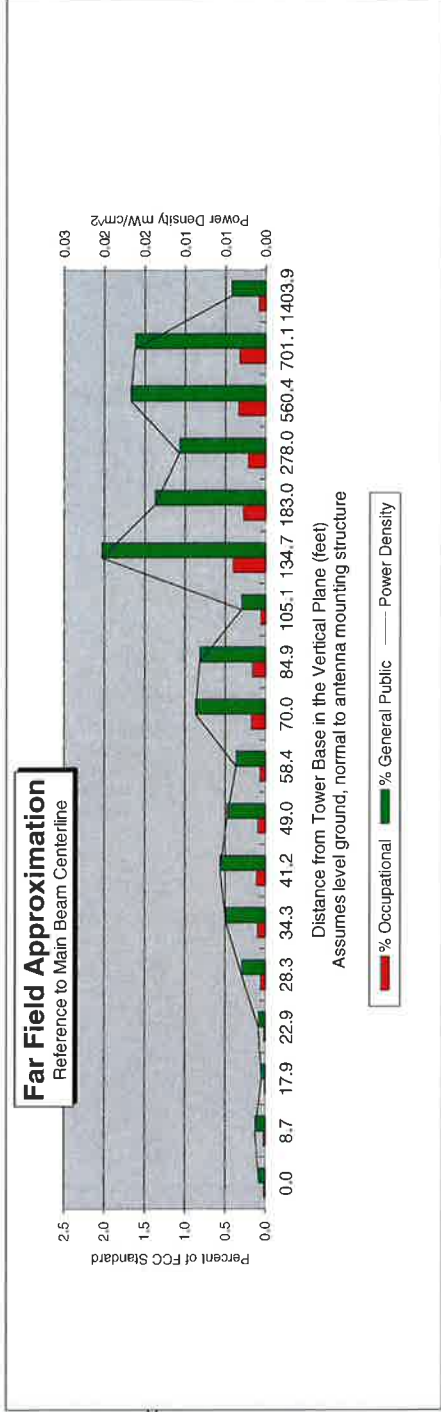
Far Field Approximation
with downtilt variation

**Estimated Radiated Emission
Single Emmitter Far Field Model
Dipole / Wire/ Yagi Antenna Types**



Location:	GREENWICH SW, CT
Site #:	5-0092
Date:	09/14/15
Name:	Ryan Ulanday
File Name:	GREENWICH SW, CT - FF Tab

Operating Freq. (MHz)	1971.0
Antenna Height (ft)	52.0
Antenna Gain (dBi)	17.2
Antenna Size (in.)	50.9
Downtilt (degrees)	0.0
Feedline Loss (dB)	0.0
Power @ J4 (w)	1694.0
Number of Channels:	1



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	49.0	49.8	52.2	54.1	56.6	59.8	64.0	69.3	76.3	85.5	98.0	116.0	143.3	189.4	282.3	562.5	702.8	1404.7
Distance from Antenna Structure Base in Horizontal plane	0.0	8.7	17.9	22.9	28.3	34.3	41.2	49.0	58.4	70.0	84.9	105.1	134.7	183.0	278.0	560.4	701.1	1403.9
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.3	0.3	0.1
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.6	0.5	0.4	0.9	0.8	0.3	2.0	1.4	1.1	1.7	1.6	0.4

Antenna Type: HBXX-6516DS-A2M
Max%: 2.03%

Instructions:

- 1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to be saved as.
- 2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
- 3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pt
- 4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
- 5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
- 6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
- 7) An odd distance may be entered in the rightmost column of the lower table.

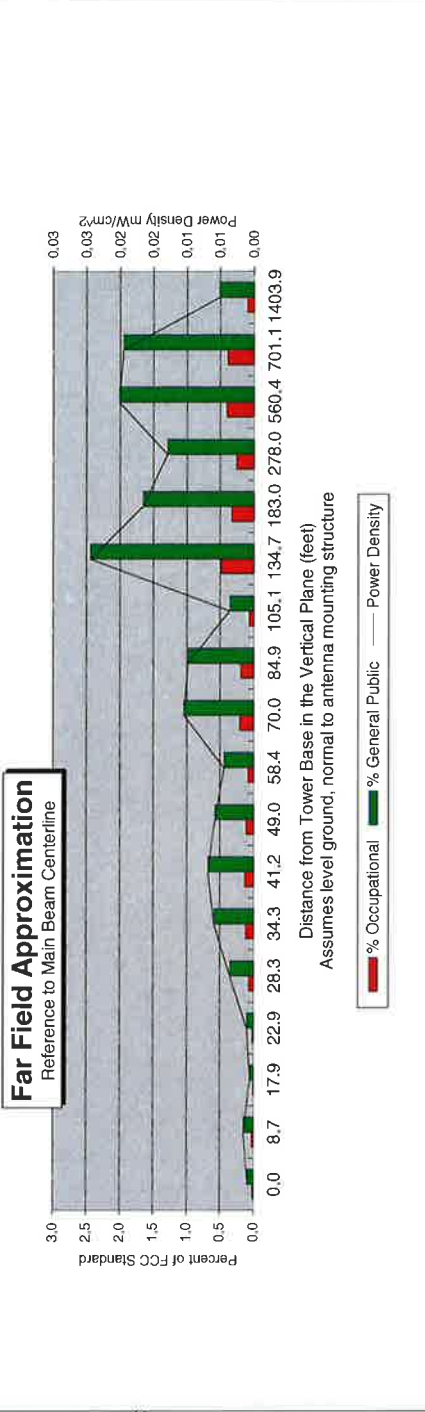
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole / Wire/ Yagi Antenna Types



Location:	GREENWICH SW, CT
Site #:	5-0092
Date:	09/14/15
Name:	Ryan Ulanday
File Name:	GREENWICH SW, CT - FF Tab

Operating Freq. (MHz)	2110.0
Antenna Height (ft):	52.0
Antenna Gain (dBi):	18.0
Antenna Size (in.):	50.9
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	1750.0
Number of Channels:	1



		Distance in feet below:																	
		0.0	8.7	17.9	22.9	28.3	34.3	41.2	49.0	58.4	70.0	84.9	105.1	134.7	183.0	278.0	560.4	701.1	1403.9
Calc. Angle		90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna		49.0	49.8	52.2	54.1	56.6	59.8	64.0	69.3	76.3	85.5	96.0	116.0	143.3	189.4	282.3	562.5	702.8	1404.7
Distance from Antenna Structure Base in Horizontal plane		0.0	8.7	17.9	22.9	28.3	34.3	41.2	49.0	58.4	70.0	84.9	105.1	134.7	183.0	278.0	560.4	701.1	1403.9
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Reflection Coefficient (1 to 4, 2.56 typical)		2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm²)		0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.02	0.02	0.01	0.02	0.02	0.01
Percent of Occupational Standard		0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.4	0.4	0.1
Percent of General Population Standard		0.1	0.1	0.1	0.1	0.3	0.6	0.7	0.6	0.4	1.0	1.0	0.4	2.4	1.7	1.3	2.0	1.9	0.5

Antenna Type HBXX-6516DS-A2M
Max% 2.44%

Instructions:

- 1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to be saved as.
- 2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
- 3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pt
- 4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
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- 6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
- 7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

September 17, 2015

Mr. Aleksey Tyurin
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

*Re: Structural Evaluation Letter ~ Antenna Upgrade
Verizon Wireless Site Ref ~ Greenwich SW
411 West Putnam Ave
Greenwich, CT 06830*

Centek Project No. 14067.058 ~ Rev 1

Dear Mr. Tyurin,

Centek Engineering, Inc. has reviewed the proposed Verizon Wireless antenna upgrade at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing 47-ft +/- tall host building to support the proposed modified antenna configuration. The existing installation consists of three (3) antenna sectors located on roof mounted ballast frames. The review considered the effects of wind load, dead load, ice load and seismic forces in accordance with the 2005 Connecticut State Building Code as amended by the 2009 Connecticut State Supplement.

The existing, proposed, and future Verizon Wireless loads considered in this analysis consist of the following:

- **Verizon (Existing to Remain):**
Antennas: Six (6) Andrew DB844G65ZAXY panel antennas and six (6) RFS FD9R6004/2C-3L diplexers mounted on existing ballast frames with a RAD center elevation of 52-ft +/- AGL.
Appurtenances: Three (3) RFS DB-E1-3B-8AB-OZ sector distribution boxes mounted on existing ballast frames. Additionally one (1) RFS DB-T1-6Z-8AB-OZ main distribution box mounted within the existing Verizon Wireless equipment room.
Coax: Twelve (12) 1-5/8-in dia. coaxial cables, one (1) 1-5/8-in dia. Hybriflex Fiber main cable, and three (3) 1-1/4-in dia. Hybriflex Fiber jumper cables routed within the existing cable tray system.
- **Verizon (Existing to Remove):**
Antennas: Six (6) RYMSA MG D3-800T0 panel antennas, two (2) Antel BXA-70063-6CF panel antennas, one (1) Swedcom SLXW5514 panel antenna mounted on ballast frames with a RAD center elevation of 52-ft +/- AGL.
Appurtenances: Three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads mounted on existing ballast frames.
- **Verizon (Proposed):**
Antennas: Three (3) Kathrein 800-10734 panel antennas and six (6) Andrew HBXX-6516DS panel antennas to be mounted on existing ballast frames with a RAD center elevation of 52-ft +/- AGL.
Appurtenances: Three (3) Alcatel-Lucent RRH2x60-AWS Remote Radio Heads mounted on existing ballast frames.

CEN TEK engineering, INC.
Structural Evaluation Letter
Verizon Wireless ~ Greenwich SW
411 West Putnam Ave
Greenwich, CT 06830

The proposed antenna installation meets the requirements of the 2005 Connecticut State Building Code considering the basic wind speed (3-second gust) of 100 mph as required in Appendix K of the Connecticut supplement per Table 1609.3.1 considering Exposure Category C. Our findings are based on the assumption that the hosting structure, all structural members and appurtenances were properly designed, detailed, fabricated, installed and have been properly maintained since erection.

In conclusion, the proposed Verizon antenna upgrade will not negatively impact the structural integrity of the existing antenna support structure or host building. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:



Carlo F. Centore, PE
Principal ~ Structural Engineer

