

10/10/12

VIA UPS Delivery



Ms. Linda Roberts, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: AT&T Mobility - Notice of Exempt Modification
705 West Johnson Ave. Cheshire CT 06410



Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility ("AT&T"). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Town Manager of Cheshire.

AT&T plans to modify the existing facility at 705 West Johnson Ave. Cheshire CT 06410, owned by Connecticut Light and Power (coordinates 41-33-21.0 N, 72-55-2.0 W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C. S.A. Section 16-50j-1 2(b)(2).

1. The height of the overall structure will be unaffected. AT&T will remove and replace Six (6) existing antennas with Nine (9) new antennas, six (6) RRU's and one (1) surge arrestor. Additionally, AT&T will install one (1) fiber cable and two (2) DC control cables within the existing coax.
2. The proposed changes will not extend the site boundaries. AT&T will install additional equipment in the existing equipment shelter. Thus, there will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed change will be negligible.
4. The changes to the facility will not increase the calculated "worst case"

power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environment as calculated for a mixed frequency site. As indicated in the attached power density calculations, AT&T's operations at the site will result in a power density of 4.79%; the combined site operations will result in a total power density of 31.92%.

Please feel free to call me with any questions or concerns regarding this matter.
Thank you for your consideration.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Matthew Bandle', with a stylized flourish at the end.

AT&T Mobility
Matthew Bandle, Consultant
MBandle@nexlinkgs.com
508-642-8801

Cc: Town Manager of Cheshire, Michael Milone. Town of Cheshire Building Officials

**CONNECTICUT SITING COUNCIL
NOTICE OF INTENT TO MODIFY AN EXISTING TOWER FACILITY
EXEMPT MODIFICATION FILING FORM**

Public Utility Environmental Standards Act, Connecticut General Statutes §§ 16-50g - 16-50aa
Regulations of Connecticut State Agencies §§ 16-50j-72(b)(2) and 16-50j-73

TO BE COMPLETED BY FILER

Date: 10/18/12

Filer Name and Contact Information

Name: Matthew Bandle

Address: Nexlink Global Services; Suite A Building 2
800 Marshall Phelps Road, Windsor, CT 06095

Phone Number: 508-642-8801

Wireless Carrier: AT&T

Tower Owner: Connecticut Light and Power

Tower Site Address: 705 West Johnson Ave. Cheshire CT 06410

Municipality and Name of Chief Elected Official Provided A Copy Of This Notice:
Town Manager of Cheshire, Michael Milone

Description of Exempt Modification (including antenna and equipment changes):

AT&T will remove and replace Six (6) existing antennas with Nine (9) new antennas, six (6) RRU's and one (1) surge arrestor. Additionally, AT&T will install one (1) fiber cable and two (2) DC control cables within the existing coax.

Attachments

____ Plans
____ Power density calculations if applicable
____ Tower structural report if applicable
____ \$625.00 Filing Fee

If required:

Municipality w/i 2,500' & Name of Chief Elected Official Provided A Copy Of This Notice:

Underlying Property Owner Provided A Copy Of This Notice:

FOR STAFF USE ONLY

____ Modification will not result in an increase in tower height
____ Modification is within existing site boundaries
____ Modification will not increase noise levels at the site boundary by 6 dbA or more, or to level that exceed State & local criteria
____ Modification will meet FCC and DEEP MPE limits
____ Modification will not result in significant adverse change in physical or environmental characteristics of the site
____ Modification will not impair the structural integrity of the facility as determined by PE
____ If yes to all of the above, approval of acknowledgement letter

PROJECT INFORMATION

SCOPE OF WORK: REMOVE AND REPLACE (6) EXISTING ANTENNAS WITH (9) NEW ANTENNAS ON AN EXISTING LATTICE TOWER. INSTALL FIBER AND POWER CONDUITS AND INSTALL ADDITIONAL EQUIPMENT INSIDE AN EXISTING SHELTER.

SITE ADDRESS: 705 WEST JOHNSON AVENUE
CHESIRE, CT 06410

LATITUDE: 41° 33' 21.0" (NAD 83)*
LONGITUDE: 72° 55' 2.0" (NAD 83)*
* PER HANDHELD GPS

JURISDICTION: CONNECTICUT SITING COUNCIL

CURRENT USE: TELECOMMUNICATIONS FACILITY
PROPOSED USE: TELECOMMUNICATIONS FACILITY

NAME OF APPLICANT: AT&T MOBILITY
500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

TOWER OWNER: CL&P
TOWER NUMBER: N/A

DRAWING INDEX

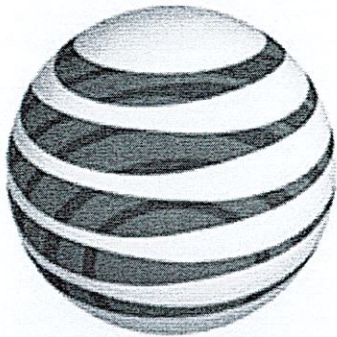
REV

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THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

CONTACT INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	GREG H. NAWROTZKI	DEWBERRY	(973) 576-9653
SAC:	DAVID COOPER	NEXLINK	(508) 802-5570
CONST.:	MARK ROBERTS	NEXLINK	(860) 420-8562

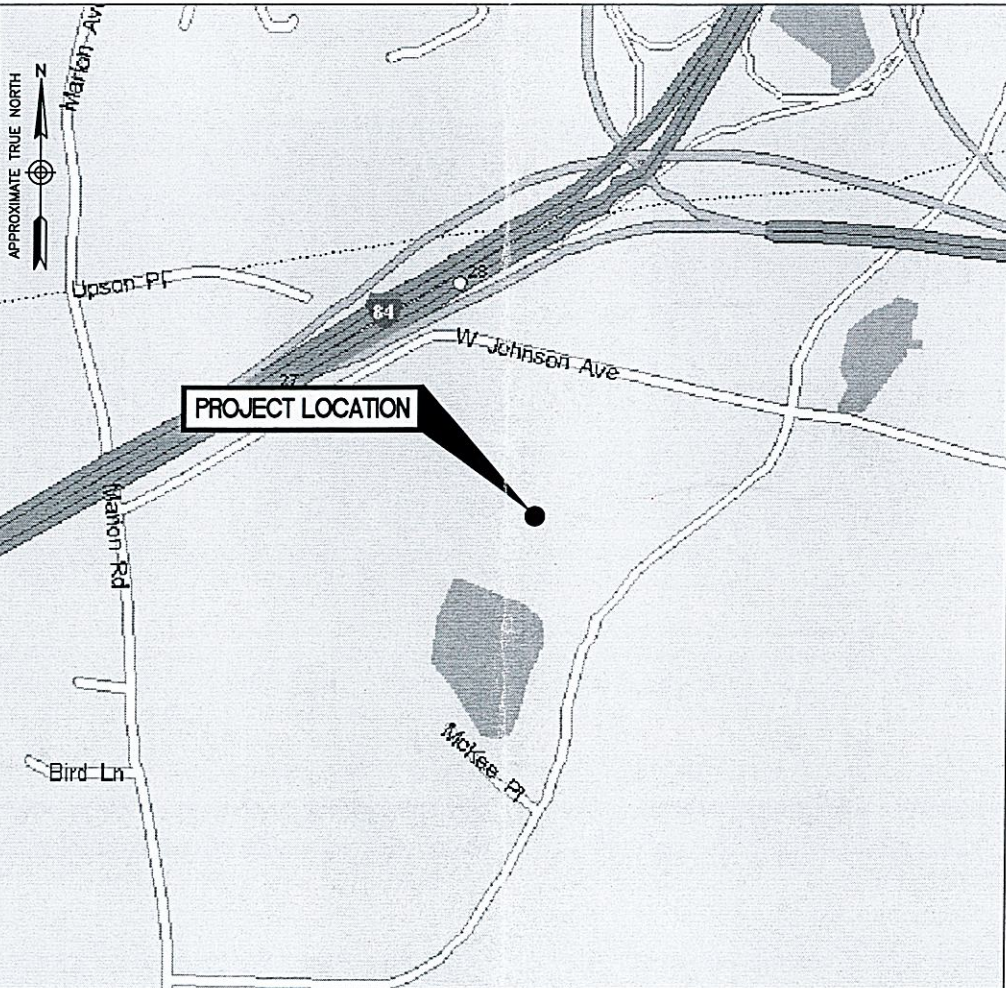


at&t

SITE NAME: CHESIRE - W. JOHNSON AVE.
SITE NUMBER: CT1212

VICINITY MAP

DIRECTIONS: (FROM ROCKY HILL, CT) TAKE I-91 S TOWARD NEW HAVEN. TAKE EXIT 18 TO MERGE ONTO I-691 W TOWARD MERIDEN WATERBURY. TAKE EXIT 3 FOR CT-10 TOWARD MILLDALE/CHESHIRE. TURN LEFT ONTO CT-10 S HIGHLAND AVE. TURN RIGHT ONTO W JOHNSON AVE. DESTINATION WILL BE ON THE LEFT.



APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARD NOTES, SYMBOLS AND DETAILS (SEE DRAWING INDEX FOR STANDARD NOTES AND DETAILS INCLUDED WITH TYPICAL DRAWING PACKAGE). CONTRACTOR WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
CONNECTICUT STATE BUILDING CODE (2005) & ALL SUBSEQUENT AMENDMENTS

ELECTRICAL CODE:
NATIONAL ELECTRICAL CODE (NEC 2005)

CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

Dewberry®
Dewberry Engineers, Inc.
280 SUMMER ST.
10TH FLOOR
BOSTON, MA 02210
PHONE: 617.695.3400
FAX: 617.695.3310

NEXLINK
GLOBAL SERVICES
800 MARSHALL PHELPS ROAD, #2A
WINDSOR, CT 06095

**CHESIRE - W. JOHNSON AVE.
SITE NO. CT1212**
705 WEST JOHNSON AVENUE
CHESIRE, CT 06410

at&t
500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	09/21/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
1	07/23/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
0	03/06/12	PRELIMINARY SUBMISSION	DAS	GHN	GHN
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE:	AS SHOWN	DESIGNED BY: DAS	DRAWN BY: MR		



TITLE SHEET

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048376	T01	2

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
PROJECT MANAGEMENT – NEXLINK
CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY
OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
10. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
14. CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
15. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
A) FALL PROTECTION
B) CONFINED SPACE
C) ELECTRICAL SAFETY
D) TRENCHING & EXCAVATION.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE AT&T SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST EARTH.....3 IN.
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 AND LARGER2 IN.
#5 AND SMALLER & WWF.....1 1/2 IN.
CONCRETE NOT EXPOSED TO EARTH OR WEATHER
OR NOT CAST AGAINST THE GROUND:
SLAB AND WALL3/4 IN.
BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
(A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT.
(B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION & TOPSOIL EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.
3. AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
4. COMPACTED SUBBASE SHALL BE UNIFORM & LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.
5. AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOFROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND-OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL-GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, AT&T ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK:
CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. CABLE LADDER RACK:
CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
7. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
8. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
13. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
16. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
23. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANOUT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
28. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
29. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
30. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.



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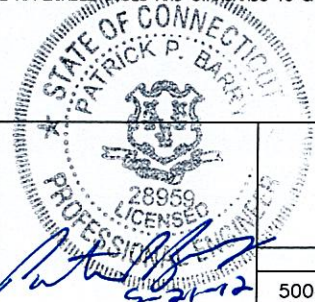
CHESIRE - W. JOHNSON AVE.
SITE NO. CT1212

705 WEST JOHNSON AVENUE
CHESIRE, CT 06410



500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

2	09/21/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
1	07/23/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
0	03/06/12	PRELIMINARY SUBMISSION	DAS	GHN	GHN
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE:		AS SHOWN	DESIGNED BY:	DAS	DRAWN BY: MR



GENERAL NOTES

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048376	G01	2



Existing Access Gate

Existing 12' Wide Dual Swing Gate

Existing 12'x20' AT&T Equipment Shelter

PROPOSED GPS ANTENNA ON EXISTING SHELTER (SEE NOTE 4)

5
A02

Existing GPS Antenna Mounted To Ice Bridge

PROPOSED FIBER AND POWER IN EXISTING ICE BRIDGE

Existing Ice Bridge (Typ.)

Existing 12'-0"x30'-0" Verizon Wireless Equipment Shelter

Existing Verizon GPS

Existing 140' Tall Lattice Tower

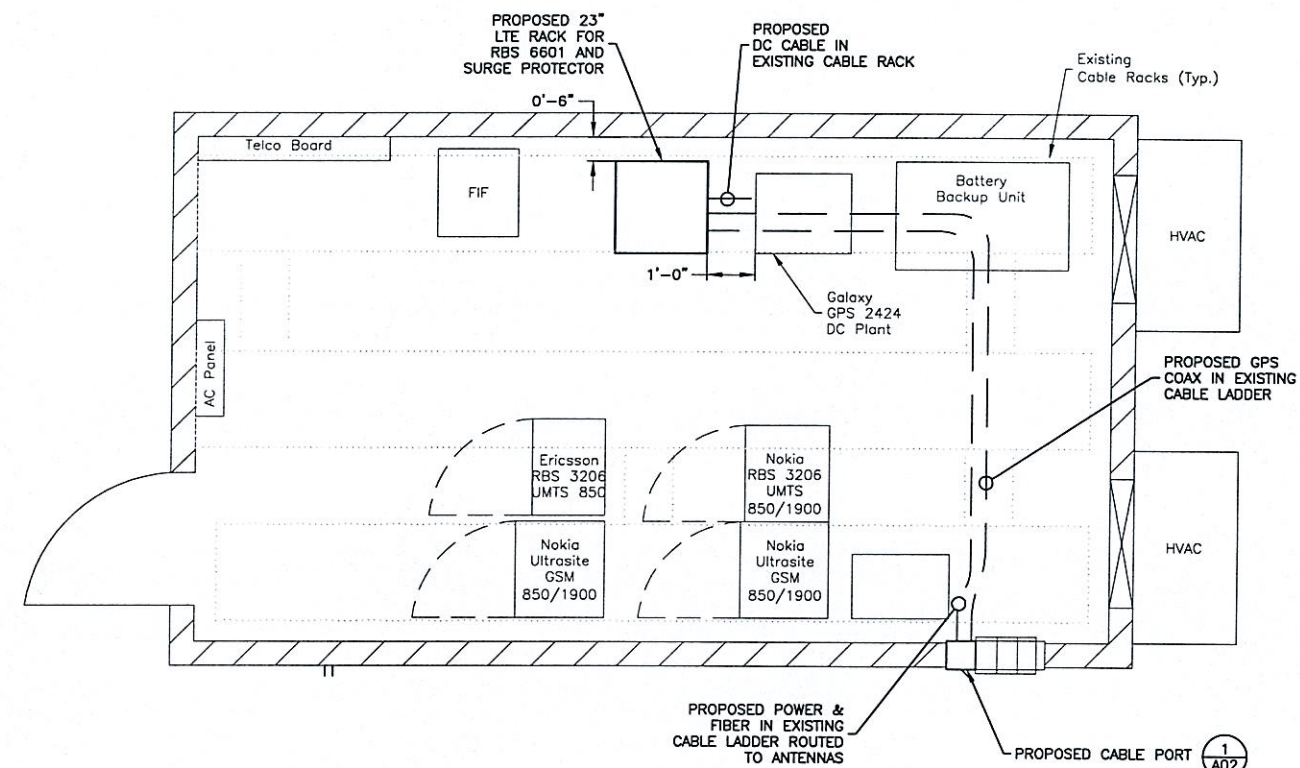
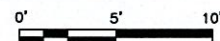
Existing Equipment Shelter

Existing Propane Tank On Concrete Pad

Existing Meter Rack

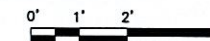
COMPOUND PLAN

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"



EQUIPMENT ROOM PLAN

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"



NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. MOUNT ALL ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY CENTEK ENGINEERING INC., DATED 08/09/12.
3. NOT ALL INFORMATION SHOWN FOR CLARITY.
4. FIELD LOCATE GPS A MINIMUM OF 10' HORIZONTALLY FROM EXISTING GPS UNIT.



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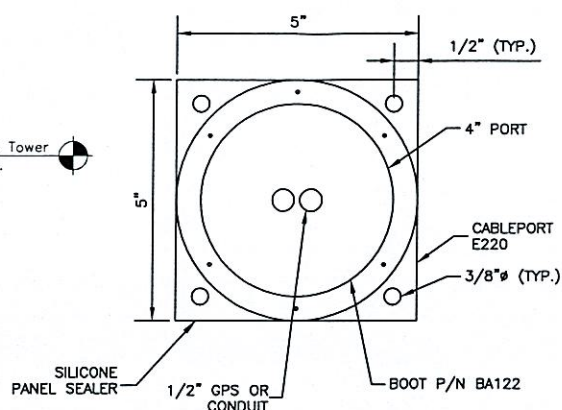
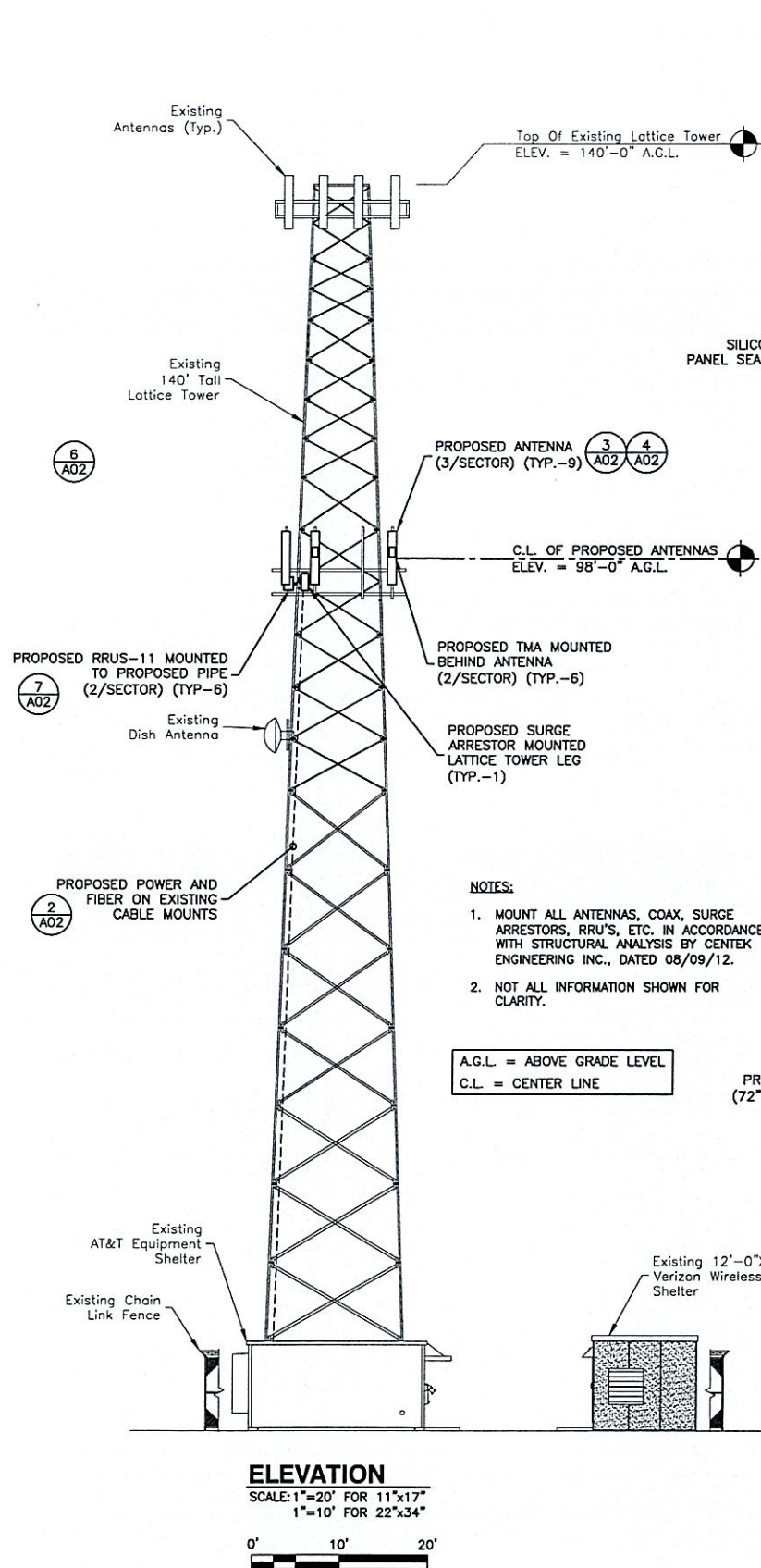
500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	09/21/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
1	07/23/12	ISSUED FOR CONSTRUCTION	DAS	GHN	GHN
0	03/06/12	PRELIMINARY SUBMISSION	DAS	GHN	GHN
SCALE: AS SHOWN DESIGNED BY: DAS DRAWN BY: MR					



COMPOUND & EQUIPMENT ROOM PLAN

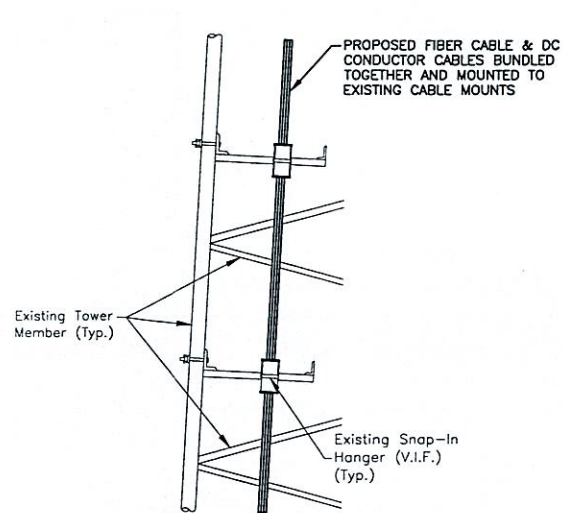
DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048376	A01	2



- NOTES:**
1. CONTRACTOR TO THOROUGHLY DRY AREA BEFORE CORING, INSTALLING AND SEALING CABLEPORT & BOOTS.
 2. ALL PART NUMBERS ARE SITE PRO ONE.
 3. WATERPROOF ALL EDGES AND HOLES.

SINGLE COAX PORT

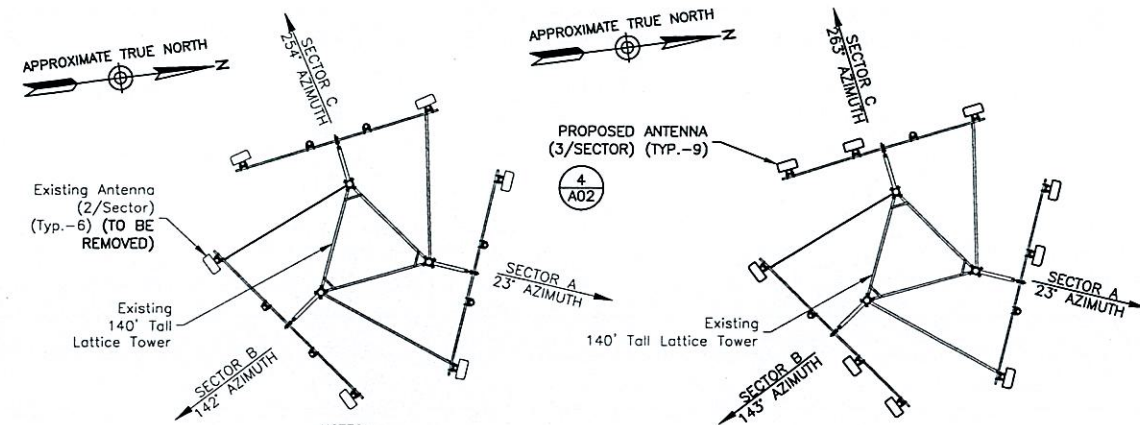
SCALE: N.T.S.



- NOTE:**
1. MODIFY OR IMPROVE EXISTING CABLE LADDER AS NEEDED.

VERTICAL CONDUCTOR DETAIL

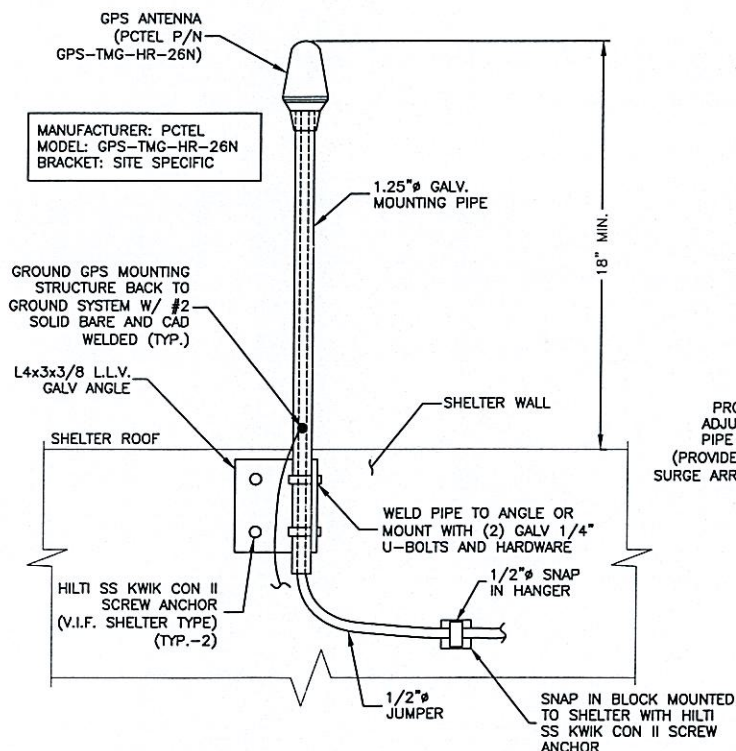
SCALE: N.T.S.



- NOTES:**
1. AZIMUTHS BASED ON TRUE NORTH.
 2. ALL PROPOSED EQUIPMENT TO BE INSTALLED PER STRUCTURAL ANALYSIS BY CENTEK ENGINEERING INC., DATED 05/30/12.
 3. ALL EXISTING ANTENNAS AND TMA UNITS TO BE REMOVED.

PLATFORM ANTENNA ORIENTATION

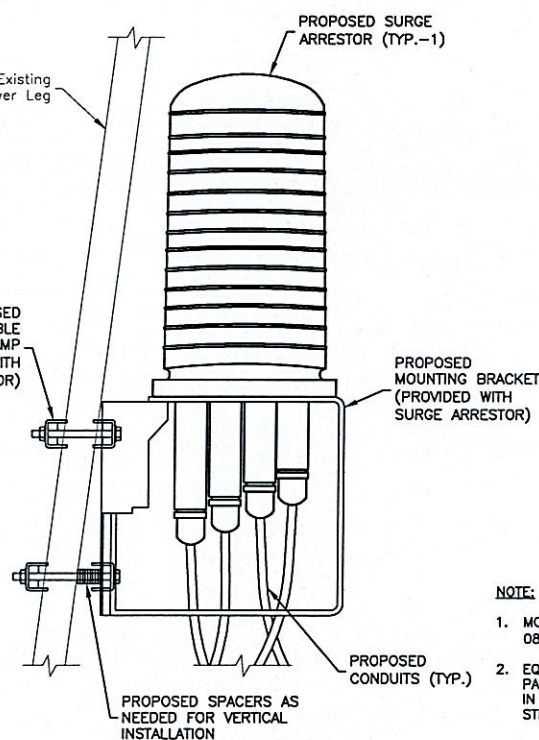
SCALE: N.T.S.



- GPS ANTENNA NOTES:**
1. GROUND ANTENNAS AND MOUNTS PER MANUFACTURERS RECOMMENDATIONS AND AT&T STANDARDS.
 2. FIELD LOCATE GPS ANTENNA A MINIMUM OF 10' HORIZONTALLY FROM EXISTING GPS ANTENNA WITH AT&T CM APPROVAL.
 3. SEAL ALL WALL PENETRATIONS WILL SILICONE SEALANT.

GPS ANTENNA

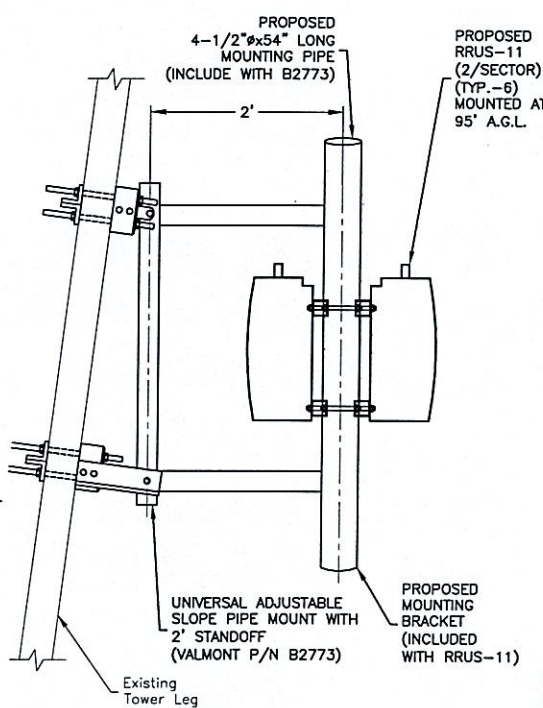
SCALE: N.T.S.



- NOTE:**
1. MOUNT PER STRUCTURAL ANALYSIS BY CENTEK ENGINEERING INC., DATED 08/09/12 AND MANUFACTURER SPECIFICATIONS.
 2. EQUIPMENT MOUNTING DETAIL IS PROVIDED AS SCHEMATIC WITH SUGGESTED PART NUMBERS. ACTUAL PARTS, MOUNTING METHOD & LOCATION MUST BE IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS OR CONFIRMED WITH THE STRUCTURAL ENGINEER THAT COMPLETED THE REPORT IF NOT PROVIDED.

SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.



- NOTE:**
1. MOUNT PER STRUCTURAL ANALYSIS BY CENTEK ENGINEERING INC., DATED 08/09/12 AND MANUFACTURER SPECIFICATIONS.
 2. EQUIPMENT MOUNTING DETAIL IS PROVIDED AS SCHEMATIC WITH SUGGESTED PART NUMBERS. ACTUAL PARTS, MOUNTING METHOD & LOCATION MUST BE IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS OR CONFIRMED WITH THE STRUCTURAL ENGINEER THAT COMPLETED THE REPORT IF NOT PROVIDED.

TYPICAL RRH MOUNTING DETAIL

SCALE: N.T.S.

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SCALE:	AS SHOWN	DESIGNED BY:	DAS	DRAWN BY:	MR

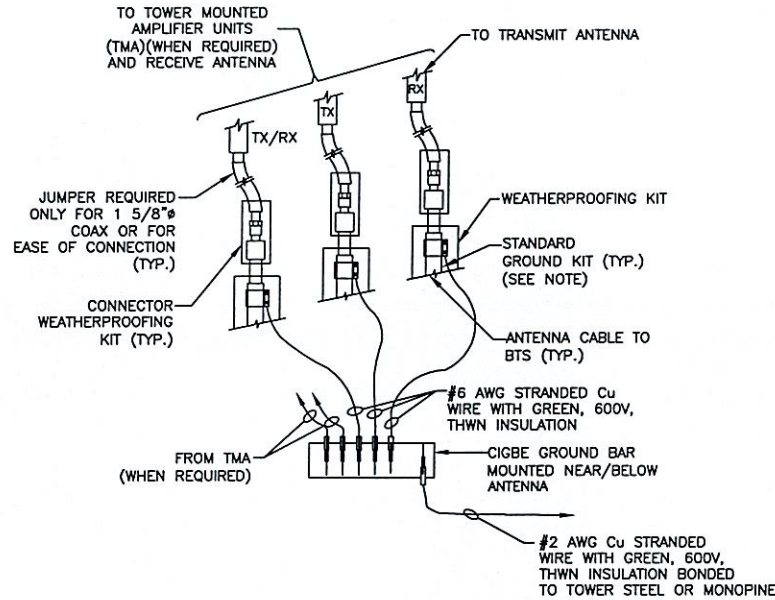


ELEVATION & CONSTRUCTION DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048376	A02	2

GROUNDING NOTES:

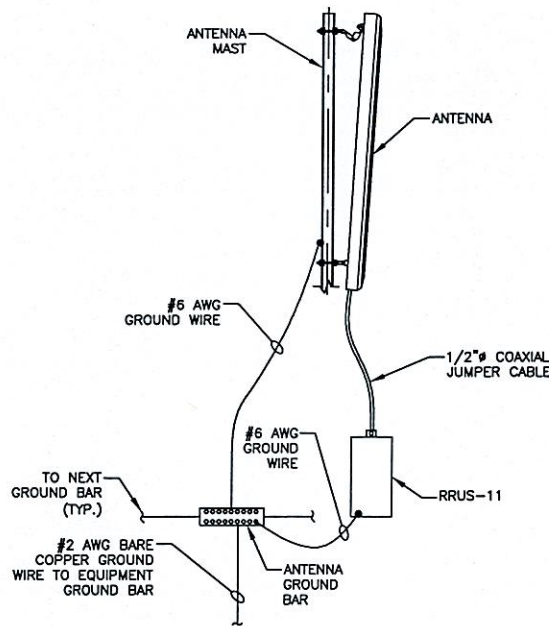
- THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
- ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
- THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY CONTRACTOR IN WRITING.
- THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
- THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
- METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
- METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
- CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
- EACH INTERIOR TRANSMISSION CABINET FRAME/PUNTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PUNTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM SA COMMUNICATIONS MARKET REPRESENTATIVE.
- EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
- ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
- ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTIONS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
- COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
- GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.



NOTE:

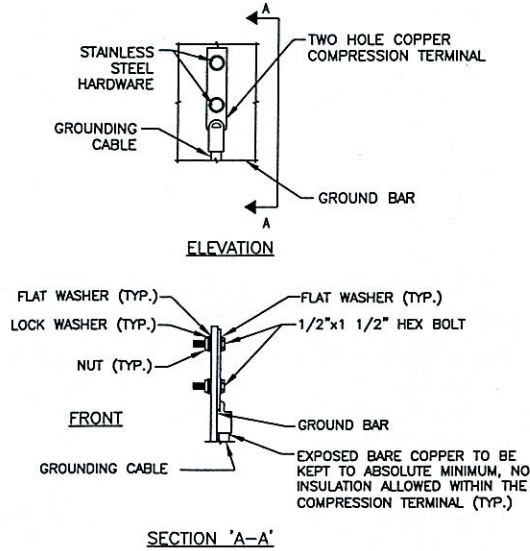
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)



TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S.

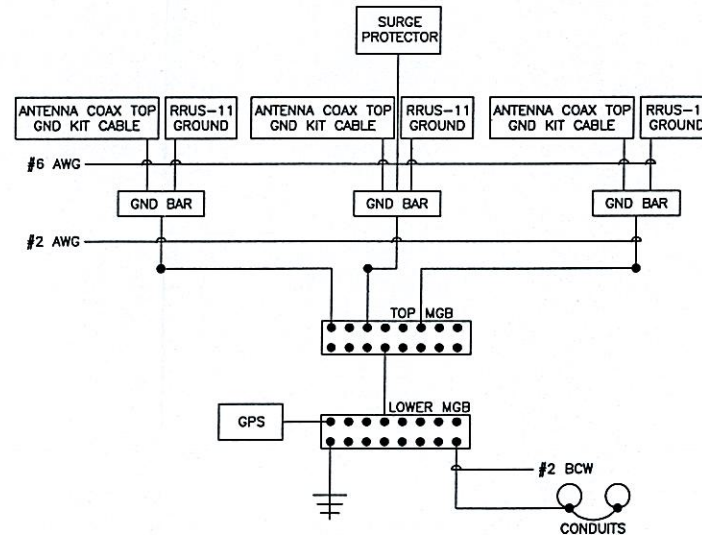


NOTES:

- DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
- OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL

SCALE: N.T.S.

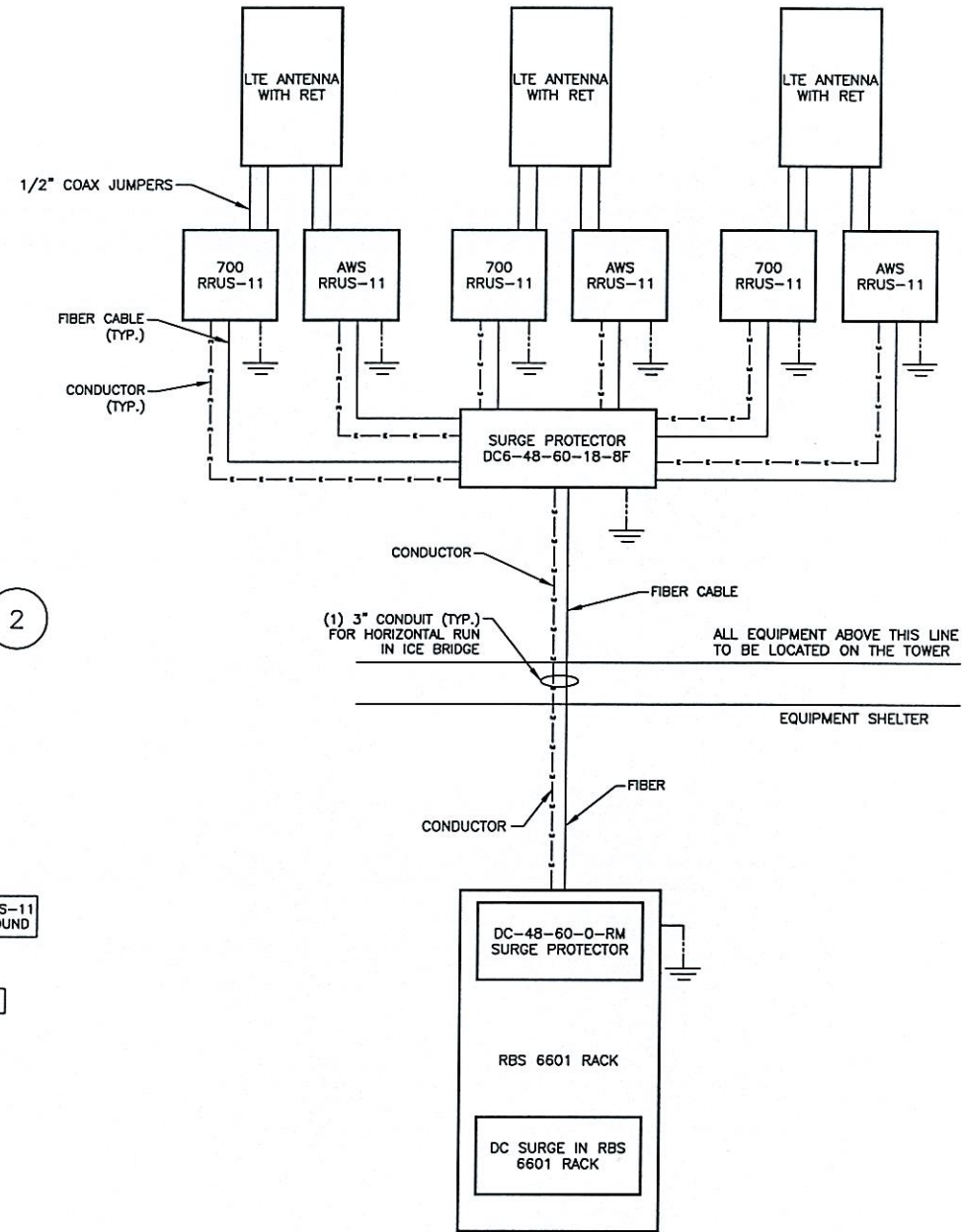


NOTES:

- BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
- BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.

SCHEMATIC GROUNDING DIAGRAM

SCALE: N.T.S.



NOTES:

- CONTRACTOR TO CONFIRM ALL PARTS.
- INSTALL ALL EQUIPMENT TO MANUFACTURER RECOMMENDATION.

PLUMBING DIAGRAM

SCALE: N.T.S.



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Calculated Radio Frequency Emissions



CT1212

(Cheshire NU)

705 West Johnson Ave, Cheshire, CT 06410

July 26, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the lattice tower located at 705 West Johnson Ave in Cheshire, CT. The coordinates of the tower are 41-33-21.05 N, 72-55-01.98 W.

AT&T is proposing the following modifications:

- 1) Replace six dual-band (850/1900 MHz) panel antennas with nine multi-band (700/850/1900/2100 MHz) panel antennas (three per sector).

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 Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), 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 (mW/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.

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:

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

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	%MPE
Cingular	98	880	2	296	0.0222	0.5867	3.78%
Cingular	98	1930	2	427	0.0320	1.0000	3.20%
CL&P Whip	103	low band	1	120	0.0041	0.2000	2.03%
CL&P Whip	103	150	1	120	0.0041	0.2000	2.03%
CL&P Microwave	78	Horizontal - No Significant RF to Reach the Ground					
Future CL&P Whip	85	450	1	250	0.0124	0.3000	4.15%
Pocket	110	2130	3	631	0.0563	1.0000	5.63%
Verizon	138	869	9	291	0.0494	0.5793	8.54%
Verizon	138	1970	3	420	0.0238	1.0000	2.38%
Verizon	138	757	1	632	0.0119	0.5047	2.36%
AT&T UMTS	98	880	2	982	0.0074	0.5867	1.25%
AT&T UMTS	98	1900	2	1355	0.0101	1.0000	1.01%
AT&T LTE	98	734	1	1313	0.0049	0.4893	1.00%
AT&T GSM	98	880	1	491	0.0018	0.5867	0.31%
AT&T GSM	98	1900	4	813	0.0122	1.0000	1.22%
						Total	31.92%

Table 1: Carrier Information^{1 2}

¹ The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

² Antenna height listed for AT&T is in reference to the Centek Engineering Structural Analysis dated May 30, 2012.

5. Conclusion

The above analysis verifies that emissions from the existing site will be 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 transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **31.92% of the FCC limit**.

As noted previously, 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 modifications.

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/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

July 26, 2012

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 Exposure³

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	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 Exposure⁴

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	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

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

³ 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

⁴ 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

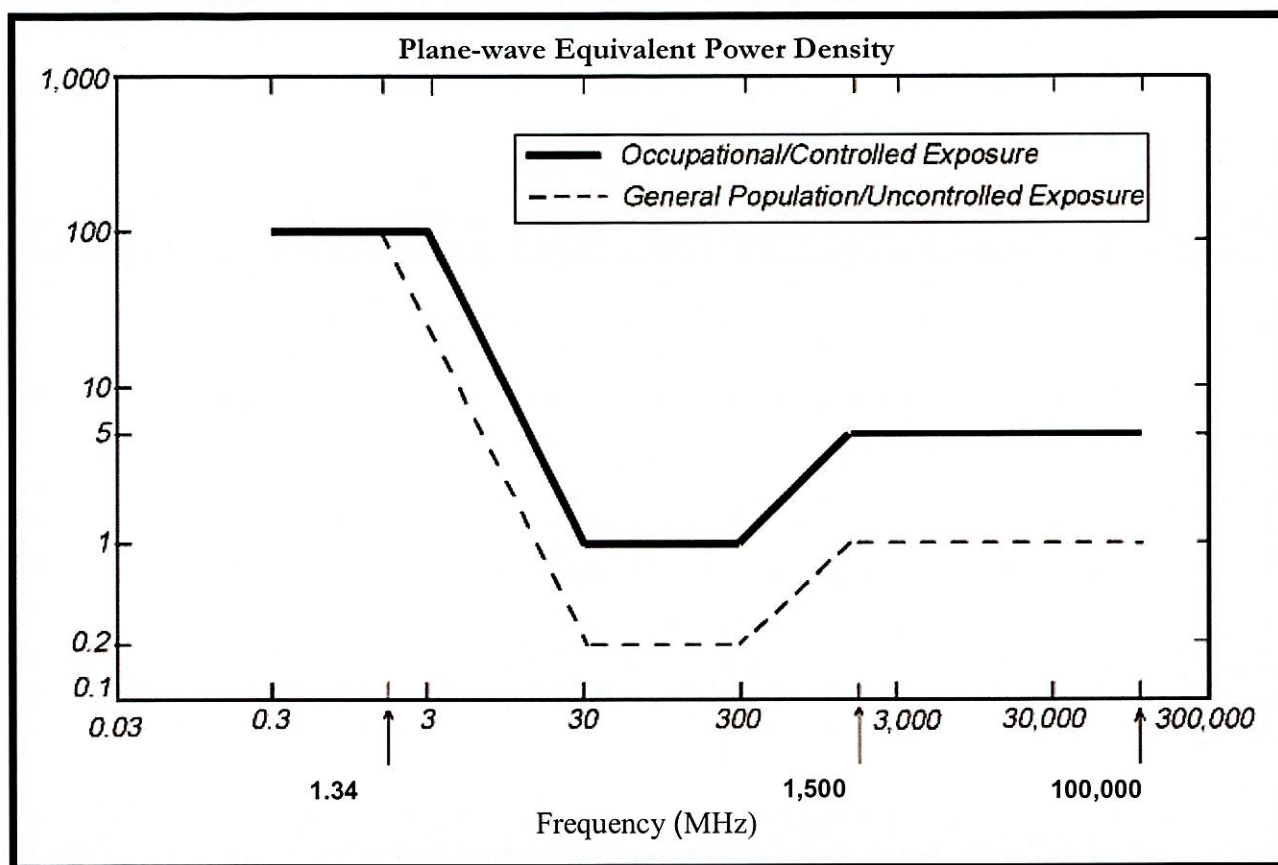
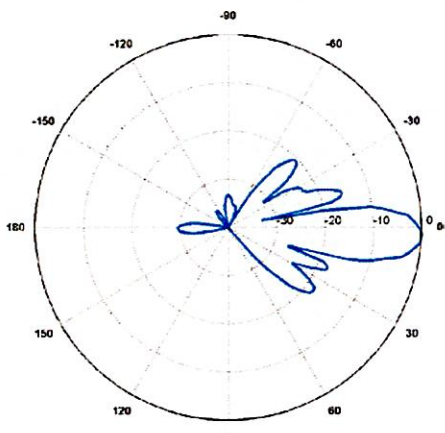
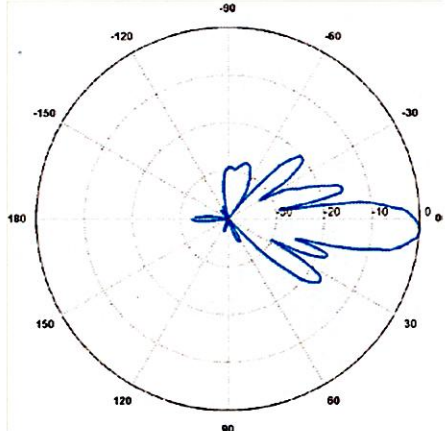
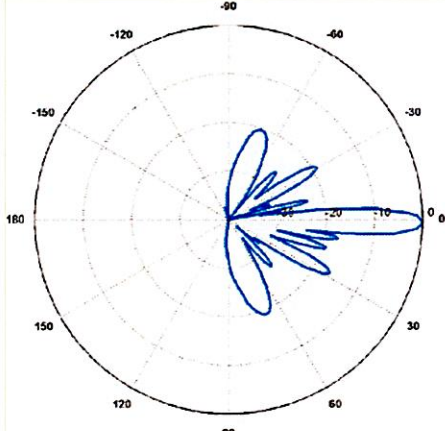


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

700 MHz Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 698-806 MHz Gain: 13.4 dBd Vertical Beamwidth: 12.3° Horizontal Beamwidth: 65° Polarization: Dual Slant $\pm 45^\circ$ Size L x W x D: 72.0" x 11.8" x 5.9"	
850 MHz Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 824-894 MHz Gain: 13.9 dBd Vertical Beamwidth: 11.5° Horizontal Beamwidth: 63° Polarization: Dual Slant $\pm 45^\circ$ Size L x W x D: 72.0" x 11.8" x 5.9"	
1900 MHz Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 1850-1900 MHz Gain: 15.3 dBd Vertical Beamwidth: 6° Horizontal Beamwidth: 67° Polarization: Dual Slant $\pm 45^\circ$ Size L x W x D: 72.0" x 11.8" x 5.9"	

Structural Analysis Report

140' Existing Lattice Tower

*Proposed AT&T Mobility
Antenna Upgrade*

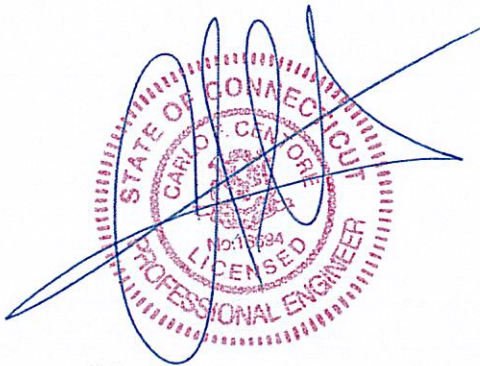
AT&T Mobility Site Ref: CT1212

*705 West Johnson Ave.
Cheshire, CT*

Centek Project No. 11118.CO68

~~Date: May 30, 2012~~

Rev 1: August 9, 2012



Prepared for:

*AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067*

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Introduction

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna installation/modification proposed by AT&T Mobility on the existing lattice tower located in Cheshire, Connecticut.

The host tower is a 140-ft, three legged, lattice tower originally designed and manufactured by Central Tower drawing no. S2476T-1 dated 10/13/2004. The tower geometry and structure member sizes were taken from a previous structural report prepared by URS project no. 36924479 dated January 31, 2012. Antenna and appurtenance inventory were taken from the aforementioned URS structural report, visual verification from grade by Centek personnel on May 30, 2012 and a RF data sheet.

The tower consists of seven (7) vertical sections consisting of solid round pipe legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 5-ft 0-in at the top and 14-ft 0-in at the bottom.

AT&T proposes the replacement of six (6) panel antennas and twelve (12) TMA's with nine (9) panel antennas and six (6) TMA's mounted to the existing three (3) T-Frames and the installation of six (6) RRU's and one (1) Surge Arrestor leg mounted. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- Northeast Utilities (Reserved):
Antennas: Two (2) 1142-2C Omni-directional whip antennas leg mounted with an elevation of ± 140 -ft above grade level.
Coax Cable: Two (2) 7/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- Northeast Utilities (Existing):
Antennas: One (1) 1142-2C Omni-directional whip antennas leg mounted with an elevation of ± 140 -ft above grade level.
Coax Cable: One (1) 7/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- Verizon (Existing):
Antennas: Six (6) Antel LPA185080-12CF panel antennas, three (3) Andrew DB854DG65ESX panel antennas, two (2) Powerwave P65-16-XL-2 panel antennas and one (1) Antel BXA-70063/6CF panel antenna and six (6) RFS FD9R6004/2C-3L Diplexers mounted on three (3) 12-ft T-Frames with a RAD center elevation of ± 138 -ft above grade level.
Coax Cable: Twelve (12) 1-5/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **MetroPCS (Reserved):**
Antennas: Six (6) Andrew HBX-6516DS panel antennas and six (6) Andrew ATM200-A20 Actuators mounted on three (3) sector mounts with a RAD center elevation of ± 120 -ft above grade level.
Coax Cable: Twelve (12) 1-5/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Northeast Utilities (Reserved):**
Antennas: Two (2) 6-ft $\varnothing$ dishes leg mounted with an elevation of ± 110 -ft above grade level.
Coax Cable: Two (2) EW63 cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Northeast Utilities (Reserved):**
Antennas: One (1) Andrew PL4-107 microwave dish leg mounted with an elevation of ± 78 -ft above grade level.
Coax Cable: One (1) WE65 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Northeast Utilities (Existing):**
Antennas: One (1) Andrew PL4-107 microwave dish leg mounted with an elevation of ± 78 -ft above grade level.
Coax Cable: One (1) E65 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **AT&T (Existing to Remain):**
Coax Cable: Twelve (12) 1-5/8" $\varnothing$ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **AT&T (Existing to Remove):**
Antenna: Six (6) panel antennas and twelve (12) TMA's mounted on three (3) 12-ft T-Frames with a RAD center elevation of ± 98 -ft above grade level.
- **AT&T (PROPOSED):**
Antennas: Nine (9) KMW AM-X-CD-16-65-00T panel antennas and six (6) CCI DTMABP7819VG12A TMA's mounted on three (3) 12-ft T-Frames with a RAD center elevation of ± 98 -ft above grade level.
- **AT&T (PROPOSED):**
Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrester leg mounted with an elevation of 95-ft above grade level.
Coax Cables: One (1) fiber cable and two (2) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

A n a l y s i s

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

T o w e r L o a d i n g

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	NU SUB-090; v = 85 mph (fastest mile)	[Northeast Utilities Substation Standard 090]
	Cheshire; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	[Appendix K of the 2005 CT Building Code Supplement]
	NU-SUB-090 wind speed controls	
Load Cases:	<u>Load Case 1</u> ; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design.	[Northeast Utilities Substation Standard 090]
	<u>Load Case 2</u> ; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	[Northeast Utilities Substation Standard 090]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per RISATower "Section Capacity Table", this tower was found to be at 81.0% of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Diagonal Bolts (T7)	0'-0"-20'-0"	81.0%	PASS
Leg (T3)	80'-0"-100'-0"	68.8%	PASS

- The combined tower deflection was found to be within allowable limits as prescribed by Northeast Utilities.

Deflection (degrees)	Proposed	Allowable	Result
Sway (Tilt)	0.5095	0.5	PASS
Twist	0.1139	0.5	PASS
Combined	0.5220	0.5	PASS

Note 1: Under the proposed Load Case 2 the tower marginally exceeds NU-SUB-90 limitation of 0.5 degrees. Tower deflection approved by Northeast Utilities per Steve Florio on 8.9.12.

Foundation and Anchors

The existing foundation consists of a three (3) 4-ft Ø x 5-ft long reinforced concrete piers concentrically bearing on a 30-ft square x 2-ft 6-in thick reinforced concrete mat. The sub grade conditions used in the foundation analysis were derived from the original foundation design drawing prepared by URS project no. 36917714 dated October 26, 2004. The base of the tower is connected to the foundation by means of (18) 1.25"Ø, ASTM A449 anchor bolts per leg embedded into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

CEN TEK Engineering, Inc.

Structural Analysis - 140-ft Lattice Tower
AT&T Mobility Antenna Upgrade – CT1212
Cheshire, CT
Rev 1 ~ August 9, 2012

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

Location	Vector	Proposed Base Reactions
Base	Shear	34 kips
	Compression	42 kips
	Moment	2905 kip-ft
Leg	Shear	22 kips
	Uplift	224 kips
	Compression	254 kips

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	61.0%	PASS

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS) ⁽¹⁾	Proposed Loading (FS) ⁽¹⁾	Result
Reinforced concrete pier (3) on reinforced concrete mat	OM	2.0	2.21	PASS

Note 1: FS denotes Factor of Safety

Conclusion

This analysis finds the subject tower **structurally adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer



Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

CEN TEK Engineering, Inc.
Structural Analysis - 140-ft Lattice Tower
AT&T Mobility Antenna Upgrade – CT1212
Cheshire, CT
Rev 1 ~ August 9, 2012

Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

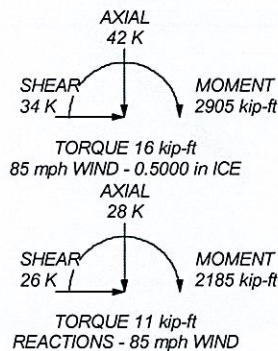
A vertical diagram of a 140-foot tower. The tower is a lattice structure that tapers from bottom to top. Height markers on the left side indicate 0.0 ft, 20.0 ft, 40.0 ft, 60.0 ft, 80.0 ft, 100.0 ft, 120.0 ft, and 140.0 ft. At the top (140.0 ft), there is a horizontal structure with four vertical poles labeled 'a', 'b', 'c', and 'd'. Below this, at approximately 120.0 ft, is a smaller horizontal structure. At 100.0 ft, there is a large horizontal structure with multiple vertical poles. To the right of the tower, there are two circular structures, one at approximately 100.0 ft and another at approximately 80.0 ft. A green semi-circular shape is attached to the right side of the tower at approximately 100.0 ft. A triangle symbol is located to the right of the tower at approximately 60.0 ft. The number '8' is at the bottom right of the diagram.

TYPE	ELEVATION	TYPE	ELEVATION
1142-2C (NU Existing)	140	(2) HBX-6516DS (MetroPCS Reserved)	120
1142-2C (NU Reserved)	140		
1142-2C (NU Reserved)	140	(2) ATM200-A20 Actuator (MetroPCS Reserved)	120
Pirot 12' T-Frame Sector Mount (1) (Verizon Existing)	138	(2) ATM200-A20 Actuator (MetroPCS Reserved)	120
Pirot 12' T-Frame Sector Mount (1) (Verizon Existing)	138	(2) ATM200-A20 Actuator (MetroPCS Reserved)	120
Pirot 12' T-Frame Sector Mount (1) (Verizon Existing)	138	6 FT DISH (NU Reserved)	110
DB854DG65ESX (Verizon Existing)	138	6 FT DISH (NU Reserved)	110
LPA-185080/12CF (Verizon Existing)	138	(3) AM-X-CD-16-65-00T-RET(72") (ATI Proposed)	98
P65-16-XL-2 (Verizon Existing)	138	(3) AM-X-CD-16-65-00T-RET(72") (ATI Proposed)	98
LPA-185080/12CF (Verizon Existing)	138	(3) AM-X-CD-16-65-00T-RET(72") (ATI Proposed)	98
DB854DG65ESX (Verizon Existing)	138	(3) AM-X-CD-16-65-00T-RET(72") (ATI Proposed)	98
LPA-185080/12CF (Verizon Existing)	138		
BXA-70063/6CF (Verizon Existing)	138	(2) DTMABP7819VG12A TMA (ATI Proposed)	98
LPA-185080/12CF (Verizon Existing)	138	(2) DTMABP7819VG12A TMA (ATI Proposed)	98
DB854DG65ESX (Verizon Existing)	138	(2) DTMABP7819VG12A TMA (ATI Proposed)	98
LPA-185080/12CF (Verizon Existing)	138	(2) DTMABP7819VG12A TMA (ATI Proposed)	98
P65-16-XL-2 (Verizon Existing)	138		
LPA-185080/12CF (Verizon Existing)	138	Pirot 12' T-Frame Sector Mount (1) (ATI Existing)	98
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	138	Pirot 12' T-Frame Sector Mount (1) (ATI Existing)	98
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	138	Pirot 12' T-Frame Sector Mount (1) (ATI Existing)	98
Pirot 4' Side Mount Standoff (1) (MetroPCS Reserved)	120	DC6-48-60-18-8F Surge Arrestor (ATI Proposed)	95
Pirot 4' Side Mount Standoff (1) (MetroPCS Reserved)	120	(2) RRUS-11 (ATI Proposed)	95
Pirot 4' Side Mount Standoff (1) (MetroPCS Reserved)	120	(2) RRUS-11 (ATI Proposed)	95
		(2) RRUS-11 (ATI Proposed)	95
		PL4-107 (NU Existing)	78
(2) HBX-6516DS (MetroPCS Reserved)	120	PL4-107 (NU Reserved)	78
(2) HBX-6516DS (MetroPCS Reserved)	120		

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

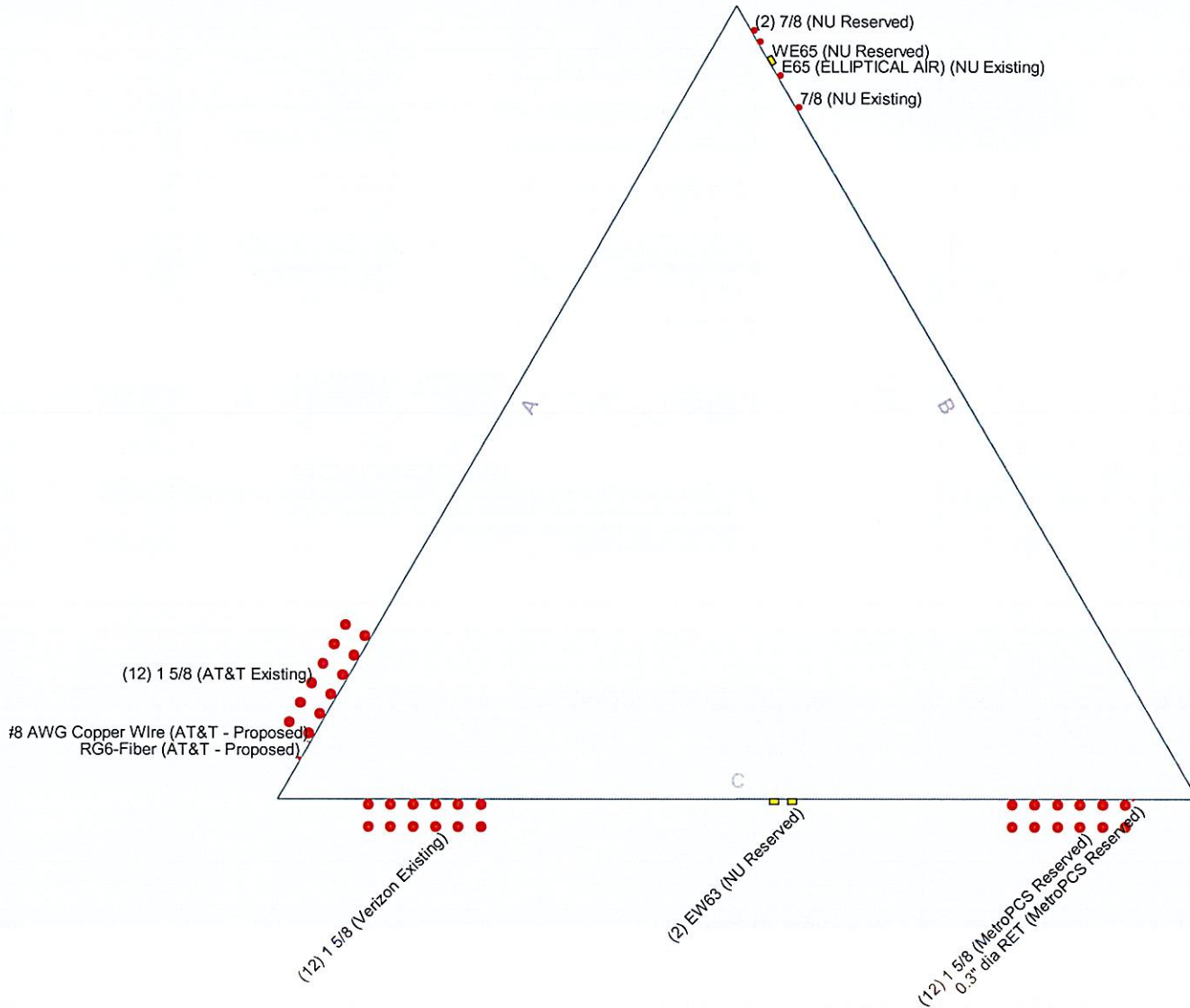
1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. TOWER RATING: 81%

DOWN: 254 K
UPLIFT: -224 K
SHEAR: 22 K



Feedline Plan

Round Flat App In Face App Out Face



Centek Engineering Inc.

63-2 North Branford Rd.

Branford, CT 06405

Phone: (203) 488-0580

FAX: (203) 488-8587

Job: **11118.CO68 - CT1212**

Project: **140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT**

Client: **AT&T Mobility**

Drawn by: **TJL**

App'd:

Code: **TIA/EIA-222-F**

Date: **08/09/12**

Scale: **NTS**

Path:

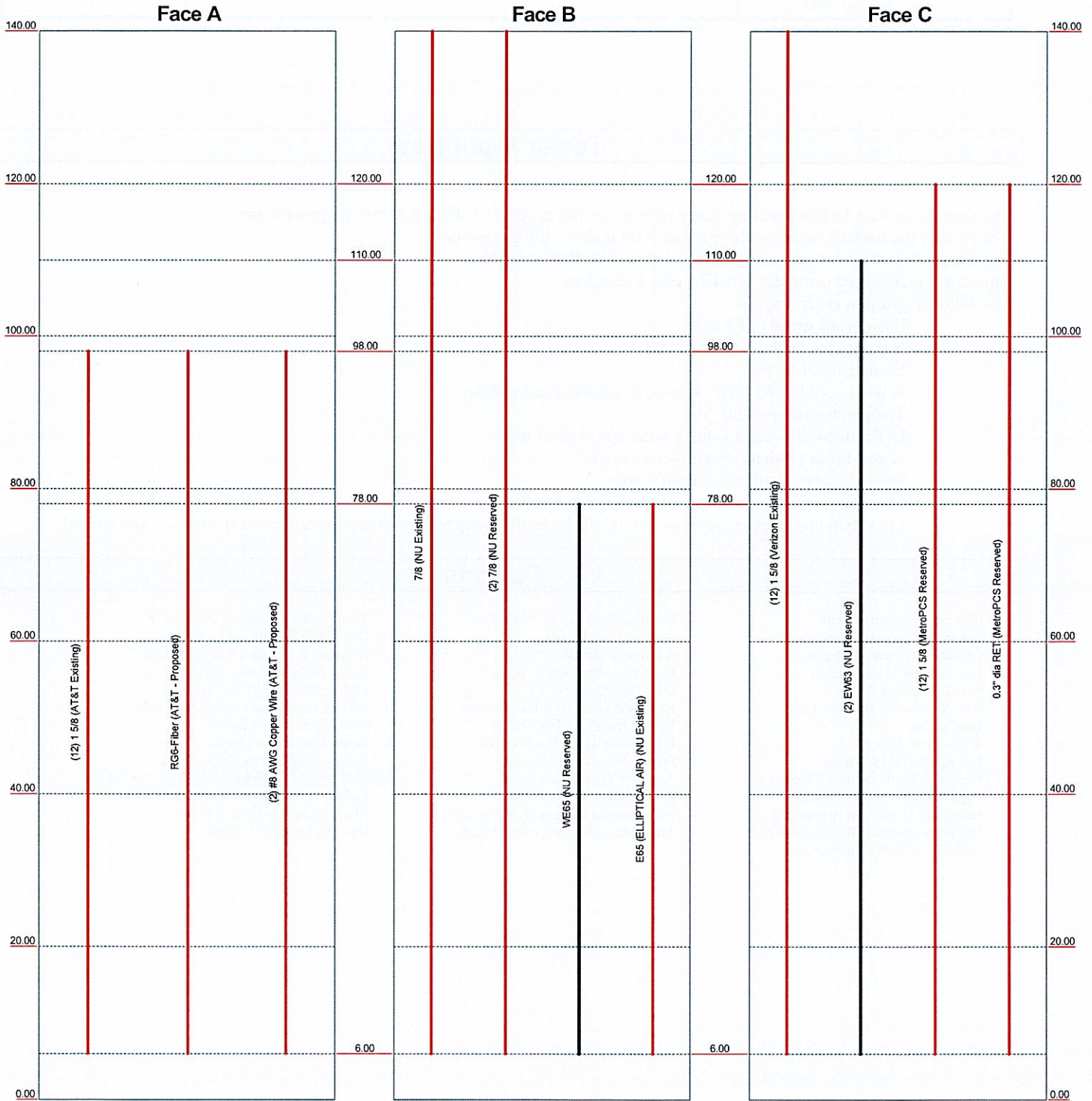
Dwg No. **E-7**

Feedline Distribution Chart

0' - 140'

Round Flat App In Face App Out Face Truss Leg

Elevation (ft)



Centek Engineering Inc.

63-2 North Branford Rd.

Branford, CT 06405

Phone: (203) 488-0580

FAX: (203) 488-8587

Job: 11118.CO68 - CT1212

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<i>RISATower</i> <i>Centek Engineering Inc.</i> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 1 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 5.00 ft at the top and 14.00 ft at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 85 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 85 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

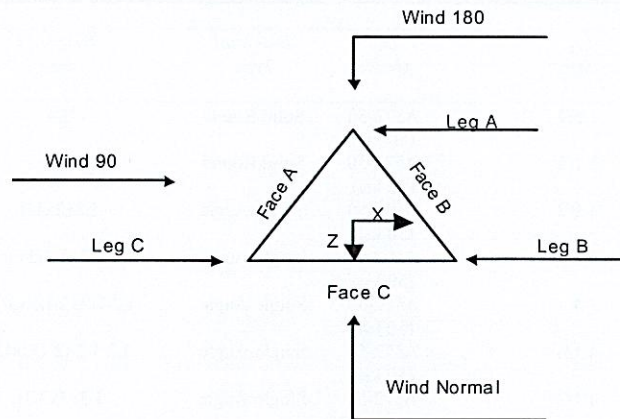
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	✓ Assume Rigid Index Plate	✓ Calculate Redundant Bracing Forces
Use Moment Magnification	✓ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
✓ Use Code Stress Ratios	✓ Use Clear Spans For KL/r	✓ SR Leg Bolts Resist Compression
✓ Use Code Safety Factors - Guys	Retention Guys To Initial Tension	✓ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	✓ Use Azimuth Dish Coefficients	✓ Consider Feedline Torque
Use Special Wind Profile	✓ Project Wind Area of Appurt.	Include Angle Block Shear Check
✓ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
✓ Leg Bolts Are At Top Of Section	✓ SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	✓ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

<i>RISA</i>Tower <i>Centek Engineering Inc.</i> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page	2 of 31
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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	140.00-120.00			5.00	1	20.00
T2	120.00-100.00			5.00	1	20.00
T3	100.00-80.00			5.00	1	20.00
T4	80.00-60.00			6.80	1	20.00
T5	60.00-40.00			8.60	1	20.00
T6	40.00-20.00			10.40	1	20.00
T7	20.00-0.00			12.20	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	140.00-120.00	3.21	X Brace	No	No	4.5000	4.5000
T2	120.00-100.00	3.21	X Brace	No	No	4.5000	4.5000
T3	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T4	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T5	60.00-40.00	6.67	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	6.67	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	6.67	X Brace	No	No	0.0000	0.0000

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Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 100.00-80.00	Solid Round	3 1/2	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T4 80.00-60.00	Solid Round	3 3/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.00-40.00	Solid Round	4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Solid Round	4 1/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T7 20.00-0.00	Solid Round	4 1/2	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 140.00-120.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 120.00-100.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

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Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
140.00-120.00														
T2	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
120.00-100.00														
T3	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
100.00-80.00														
T4 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry (cont'd)

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Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 140.00-120.00	Flange	0.0000	0	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T2 120.00-100.00	Flange	0.0000	0	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T3 100.00-80.00	Flange	0.7500	4	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T4 80.00-60.00	Flange	1.1250	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T5 60.00-40.00	Flange	1.1250	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T6 40.00-20.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T7 20.00-0.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (AT&T Existing)	A	Yes	Ar (CfAe)	98.00 - 6.00	0.0000	-0.36	12	6	1.9800	1.9800		1.04
1 5/8 (Verizon Existing)	C	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	0.34	12	6	1.9800	1.9800		1.04
7/8 (NU Existing)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.37	1	1	1.1100	1.1100		0.54
7/8 (NU Reserved)	B	Yes	Ar (CfAe)	140.00 - 6.00	0.0000	-0.46	2	2	1.1100	1.1100		0.54
WE65 (NU Reserved)	B	Yes	Af (CfAe)	78.00 - 6.00	0.0000	-0.43	1	1	1.5836	1.5836	5.1284	0.53
E65 (ELLIPTICAL AIR)	B	Yes	Ar (CfAe)	78.00 - 6.00	0.0000	-0.41	1	1	1.2000	1.2000		0.67
(NU Existing) EW63 (NU Reserved)	C	Yes	Af (CfAe)	110.00 - 6.00	0.0000	-0.05	2	2	1.5742	1.5742	5.0668	0.51
1 5/8 (MetroPCS Reserved)	C	Yes	Ar (CfAe)	120.00 - 6.00	0.0000	-0.36	12	6	1.9800	1.9800		1.04
0.3" dia RET (MetroPCS Reserved)	C	Yes	Ar (CfAe)	120.00 - 6.00	0.0000	-0.43	1	1	0.3000	0.3000		0.00
RG6-Fiber (AT&T - Proposed)	A	No	Ar (CfAe)	98.00 - 6.00	0.0000	-0.45	1	1	0.5000	0.5000		1.00
#8 AWG Copper Wire (AT&T - Proposed)	A	No	Ar (CfAe)	98.00 - 6.00	0.0000	-0.43	2	1	0.2500	0.1285		0.05

RISATower

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Job

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Project

140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT

Date

11:23:28 08/09/12

Client

AT&T Mobility

Designed by

TJL

Feed Line/Linear Appurtenances Section Areas

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face</i>	<i>A_R</i> <i>ft²</i>	<i>A_F</i> <i>ft²</i>	<i>C_AA_A</i> <i>In Face ft²</i>	<i>C_AA_A</i> <i>Out Face ft²</i>	<i>Weight</i> <i>K</i>
T1	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	0.000	0.000	0.000	0.03
		C	19.800	0.000	0.000	0.000	0.25
T2	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	5.550	0.000	0.000	0.000	0.03
		C	40.100	2.624	0.000	0.000	0.51
T3	100.00-80.00	A	18.763	0.000	0.000	0.000	0.24
		B	5.550	0.000	0.000	0.000	0.03
		C	40.100	5.247	0.000	0.000	0.52
T4	80.00-60.00	A	20.848	0.000	0.000	0.000	0.27
		B	7.350	2.375	0.000	0.000	0.05
		C	40.100	5.247	0.000	0.000	0.52
T5	60.00-40.00	A	20.848	0.000	0.000	0.000	0.27
		B	7.550	2.639	0.000	0.000	0.06
		C	40.100	5.247	0.000	0.000	0.52
T6	40.00-20.00	A	20.848	0.000	0.000	0.000	0.27
		B	7.550	2.639	0.000	0.000	0.06
		C	40.100	5.247	0.000	0.000	0.52
T7	20.00-0.00	A	14.593	0.000	0.000	0.000	0.19
		B	5.285	1.848	0.000	0.000	0.04
		C	28.070	3.673	0.000	0.000	0.36

Feed Line/Linear Appurtenances Section Areas - With Ice

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face or Leg</i>	<i>Ice Thickness in</i>	<i>A_R</i> <i>ft²</i>	<i>A_F</i> <i>ft²</i>	<i>C_AA_A</i> <i>In Face ft²</i>	<i>C_AA_A</i> <i>Out Face ft²</i>	<i>Weight</i> <i>K</i>
T1	140.00-120.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	0.000	0.000	0.000	0.09
		C		29.800	0.000	0.000	0.000	0.61
T2	120.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.550	0.000	0.000	0.000	0.09
		C		61.767	3.735	0.000	0.000	1.27
T3	100.00-80.00	A	0.500	30.763	0.000	0.000	0.000	0.60
		B		10.550	0.000	0.000	0.000	0.09
		C		61.767	7.470	0.000	0.000	1.31
T4	80.00-60.00	A	0.500	34.181	0.000	0.000	0.000	0.66
		B		13.850	3.375	0.000	0.000	0.16
		C		61.767	7.470	0.000	0.000	1.31
T5	60.00-40.00	A	0.500	34.181	0.000	0.000	0.000	0.66
		B		14.217	3.750	0.000	0.000	0.16
		C		61.767	7.470	0.000	0.000	1.31
T6	40.00-20.00	A	0.500	34.181	0.000	0.000	0.000	0.66
		B		14.217	3.750	0.000	0.000	0.16
		C		61.767	7.470	0.000	0.000	1.31
T7	20.00-0.00	A	0.500	23.927	0.000	0.000	0.000	0.46
		B		9.952	2.625	0.000	0.000	0.11
		C		43.237	5.229	0.000	0.000	0.92

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Feed Line Shielding

Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T1	140.00-120.00	A	0.000	0.000	0.000	0.000
		B	0.282	1.251	0.000	0.000
		C	1.006	3.533	0.000	0.000
T2	120.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.329	1.340	0.000	0.000
		C	2.532	8.390	0.000	0.000
T3	100.00-80.00	A	0.000	1.016	1.350	2.033
		B	0.000	0.400	0.421	0.800
		C	0.000	2.666	3.437	5.331
T4	80.00-60.00	A	0.000	0.988	1.640	2.469
		B	0.000	0.587	0.806	1.468
		C	0.000	2.331	3.757	5.828
T5	60.00-40.00	A	0.000	0.911	1.514	2.278
		B	0.000	0.566	0.779	1.416
		C	0.000	2.151	3.466	5.377
T6	40.00-20.00	A	0.000	0.866	1.438	2.164
		B	0.000	0.538	0.740	1.345
		C	0.000	2.043	3.293	5.108
T7	20.00-0.00	A	0.000	0.585	1.167	1.756
		B	0.000	0.364	0.600	1.092
		C	0.000	1.382	2.672	4.146

Feed Line Center of Pressure

Section	Elevation	CP_x	CP_z	$CP_{x_{Ice}}$	$CP_{z_{Ice}}$
	ft	in	in	in	in
T1	140.00-120.00	-6.5615	3.8423	-5.2447	2.4805
T2	120.00-100.00	0.6331	7.3720	0.8224	6.2206
T3	100.00-80.00	-4.0915	7.7505	-4.3155	7.6273
T4	80.00-60.00	-4.9007	7.4267	-5.3037	7.4127
T5	60.00-40.00	-5.6584	8.4256	-6.1627	8.4534
T6	40.00-20.00	-6.3518	9.4392	-6.9585	9.5250
T7	20.00-0.00	-5.0518	7.4928	-5.7597	7.8585

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	$C_{AA_{Front}}$	$C_{AA_{Side}}$	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
1142-2C (NU Existing)	A	From Leg	1.00	0.0000	140.00	No Ice	2.09	0.02
			0.00			1/2" Ice	3.37	0.04
			7.00					
1142-2C	B	From Leg	1.00	0.0000	140.00	No Ice	2.09	0.02

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 8 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(NU Reserved)			0.00		1/2" Ice	3.37	3.37	0.04
1142-2C	C	From Leg	7.00					
(NU Reserved)			1.00	0.0000	140.00	No Ice	2.09	0.02
			0.00		1/2" Ice	3.37	3.37	0.04
			7.00					
Pirod 12' T-Frame Sector Mount (1)	A	From Leg	2.00	0.0000	98.00	No Ice	13.60	0.47
(AT&T Existing)			0.00		1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1)	B	From Leg	2.00	0.0000	98.00	No Ice	13.60	0.47
(AT&T Existing)			0.00		1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1)	C	From Leg	2.00	0.0000	98.00	No Ice	13.60	0.47
(AT&T Existing)			0.00		1/2" Ice	18.40	18.40	0.60
(3)	A	From Leg	4.00	0.0000	98.00	No Ice	8.26	0.05
AM-X-CD-16-65-00T-RET(7 2")			0.00		1/2" Ice	8.81	5.09	0.10
(AT&T Proposed)			0.00					
(3)	B	From Leg	4.00	0.0000	98.00	No Ice	8.26	0.05
AM-X-CD-16-65-00T-RET(7 2")			0.00		1/2" Ice	8.81	5.09	0.10
(AT&T Proposed)			0.00					
(3)	C	From Leg	4.00	0.0000	98.00	No Ice	8.26	0.05
AM-X-CD-16-65-00T-RET(7 2")			0.00		1/2" Ice	8.81	5.09	0.10
(AT&T Proposed)			0.00					
(2)DTMABP7819VG12A TMA	A	From Leg	4.00	0.0000	98.00	No Ice	1.59	0.02
(AT&T Proposed)			0.00		1/2" Ice	1.76	0.70	0.03
(2)DTMABP7819VG12A TMA	B	From Leg	4.00	0.0000	98.00	No Ice	1.59	0.02
(AT&T Proposed)			0.00		1/2" Ice	1.76	0.70	0.03
(2)DTMABP7819VG12A TMA	C	From Leg	4.00	0.0000	98.00	No Ice	1.59	0.02
(AT&T Proposed)			0.00		1/2" Ice	1.76	0.70	0.03
(2)RRUS-11	A	From Face	0.00	0.0000	95.00	No Ice	2.99	0.05
(AT&T Proposed)			0.00		1/2" Ice	3.23	1.41	0.07
(2)RRUS-11	B	From Face	0.00	0.0000	95.00	No Ice	2.99	0.05
(AT&T Proposed)			0.00		1/2" Ice	3.23	1.41	0.07
(2)RRUS-11	C	From Face	0.00	0.0000	95.00	No Ice	2.99	0.05
(AT&T Proposed)			0.00		1/2" Ice	3.23	1.41	0.07
DC6-48-60-18-8F Surge Arrestor	C	From Face	0.00	0.0000	95.00	No Ice	2.23	0.02
(AT&T Proposed)			0.00		1/2" Ice	2.45	2.45	0.04
Pirod 12' T-Frame Sector Mount (1)	A	From Leg	2.00	0.0000	138.00	No Ice	13.60	0.47
(Verizon Existing)			0.00		1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1)	B	From Leg	2.00	0.0000	138.00	No Ice	13.60	0.47
(Verizon Existing)			0.00		1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1)	C	From Leg	2.00	0.0000	138.00	No Ice	13.60	0.47
(Verizon Existing)			0.00		1/2" Ice	18.40	18.40	0.60
DB854DG65ESX	A	From Leg	4.00	0.0000	138.00	No Ice	5.88	0.02

<i>RISATower</i> <i>Centek Engineering Inc.</i> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 9 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(Verizon Existing)			-6.00		1/2" Ice	6.28	3.06	0.05
LPA-185080/12CF	A	From Leg	0.00					
(Verizon Existing)			4.00	0.0000	138.00	No Ice	3.53	0.01
			-4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
P65-16-XL-2	A	From Leg	4.00	0.0000	138.00	No Ice	8.40	0.02
(Verizon Existing)			0.00		1/2" Ice	8.95	4.56	0.06
			0.00					
LPA-185080/12CF	A	From Leg	4.00	0.0000	138.00	No Ice	3.53	0.01
(Verizon Existing)			4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
DB854DG65ESX	B	From Leg	4.00	0.0000	138.00	No Ice	5.88	0.02
(Verizon Existing)			-6.00		1/2" Ice	6.28	3.06	0.05
			0.00					
LPA-185080/12CF	B	From Leg	4.00	0.0000	138.00	No Ice	3.53	0.01
(Verizon Existing)			-4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
BXA-70063/6CF	B	From Leg	4.00	0.0000	138.00	No Ice	7.73	0.02
(Verizon Existing)			0.00		1/2" Ice	8.27	4.60	0.06
			0.00					
LPA-185080/12CF	B	From Leg	4.00	0.0000	138.00	No Ice	3.53	0.01
(Verizon Existing)			4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
DB854DG65ESX	C	From Leg	4.00	0.0000	138.00	No Ice	5.88	0.02
(Verizon Existing)			-6.00		1/2" Ice	6.28	3.06	0.05
			0.00					
LPA-185080/12CF	C	From Leg	4.00	0.0000	138.00	No Ice	3.53	0.01
(Verizon Existing)			-4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
P65-16-XL-2	C	From Leg	4.00	0.0000	138.00	No Ice	8.40	0.02
(Verizon Existing)			0.00		1/2" Ice	8.95	4.56	0.06
			0.00					
LPA-185080/12CF	C	From Leg	4.00	0.0000	138.00	No Ice	3.53	0.01
(Verizon Existing)			4.00		1/2" Ice	3.96	5.01	0.04
			0.00					
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	138.00	No Ice	0.37	0.00
Diplexer			0.00		1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00					
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	138.00	No Ice	0.37	0.00
Diplexer			0.00		1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00					
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	138.00	No Ice	0.37	0.00
Diplexer			0.00		1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00					
Pirot 4' Side Mount Standoff	A	From Leg	1.00	0.0000	120.00	No Ice	2.72	0.05
(1)			0.00		1/2" Ice	4.91	4.91	0.09
(MetroPCS Reserved)			0.00					
Pirot 4' Side Mount Standoff	B	From Leg	1.00	0.0000	120.00	No Ice	2.72	0.05
(1)			0.00		1/2" Ice	4.91	4.91	0.09
(MetroPCS Reserved)			0.00					
Pirot 4' Side Mount Standoff	C	From Leg	1.00	0.0000	120.00	No Ice	2.72	0.05
(1)			0.00		1/2" Ice	4.91	4.91	0.09
(MetroPCS Reserved)			0.00					
(2) HBX-6516DS	A	From Leg	2.00	0.0000	120.00	No Ice	3.33	0.01
(MetroPCS Reserved)			0.00		1/2" Ice	3.66	2.31	0.03
			0.00					
(2) HBX-6516DS	B	From Leg	2.00	0.0000	120.00	No Ice	3.33	0.01

RISATower

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job

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Project

140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT

Date

11:23:28 08/09/12

Client

AT&T Mobility

Designed by

TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(MetroPCS Reserved)			0.00		1/2" Ice	3.66	2.31	0.03
(2) HBX-6516DS (MetroPCS Reserved)	C	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	3.33 3.66	0.01 0.03
(2) ATM200-A20 Actuator (MetroPCS Reserved)	A	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.22 0.29	0.00 0.00
(2) ATM200-A20 Actuator (MetroPCS Reserved)	B	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.22 0.29	0.00 0.00
(2) ATM200-A20 Actuator (MetroPCS Reserved)	C	From Leg	0.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.22 0.29	0.00 0.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
6 FT DISH (NU Reserved)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		110.00	6.00	No Ice 1/2" Ice	28.27 29.05
6 FT DISH (NU Reserved)	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		110.00	6.00	No Ice 1/2" Ice	28.27 29.05
PL4-107 (NU Existing)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		78.00	4.00	No Ice 1/2" Ice	12.60 13.09
PL4-107 (NU Reserved)	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		78.00	4.00	No Ice 1/2" Ice	12.60 13.09

Tower Pressures - No Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000

<i>RISA</i>Tower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 11 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
120.00-100.00					B	0.000	19.235		43.32	0.000	0.000
					C	2.624	51.581		15.37	0.000	0.000
T3	90.00	1.332	25	123.839	A	7.141	30.445	11.682	31.08	0.000	0.000
100.00-80.00					B	8.071	17.232		46.17	0.000	0.000
					C	10.303	51.782		18.82	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.587	33.364	12.517	28.48	0.000	0.000
					B	13.797	19.867		37.18	0.000	0.000
					C	13.718	52.617		18.87	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.495	34.199	13.351	28.59	0.000	0.000
					B	15.869	20.901		36.31	0.000	0.000
					C	15.790	53.451		19.28	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.457	35.033	14.186	28.66	0.000	0.000
					B	17.795	21.736		35.89	0.000	0.000
					C	17.850	54.286		19.67	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.260	29.613	15.020	30.12	0.000	0.000
					B	22.674	20.305		34.95	0.000	0.000
					C	22.428	43.090		22.93	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.138$$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1	130.00	1.48	27	0.5000	104.583	A	0.000	20.676	9.167	44.34	0.000	0.000
140.00-120.00						B	0.000	29.975		30.58	0.000	0.000
						C	0.000	46.943		19.53	0.000	0.000
T2	110.00	1.411	26	0.5000	105.833	A	0.000	23.839	11.667	48.94	0.000	0.000
120.00-100.00						B	0.000	33.049		35.30	0.000	0.000
						C	3.735	77.215		14.41	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	0.5000	125.508	A	6.459	49.013	15.020	27.08	0.000	0.000
						B	7.692	29.416		40.48	0.000	0.000
						C	10.630	78.367		16.88	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	0.5000	161.925	A	9.759	53.939	15.855	24.89	0.000	0.000
						B	14.134	34.008		32.93	0.000	0.000
						C	13.869	80.181		16.86	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	0.5000	198.342	A	11.731	55.562	16.689	24.80	0.000	0.000
						B	16.343	35.943		31.92	0.000	0.000
						C	16.101	81.908		17.03	0.000	0.000
T6 40.00-20.00	30.00	1	18	0.5000	234.759	A	13.731	57.197	17.524	24.71	0.000	0.000
						B	18.301	37.560		31.37	0.000	0.000
						C	18.257	83.605		17.20	0.000	0.000
T7 20.00-0.00	10.00	1	18	0.5000	271.176	A	19.671	48.842	18.358	26.80	0.000	0.000
						B	22.960	35.088		31.63	0.000	0.000
						C	22.510	67.355		20.43	0.000	0.000

Tower Pressure - Service

$$G_H = 1.138$$

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 12 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 140.00-120.00	130.00	1.48	27	102.917	A	0.000	10.766	5.833	54.18	0.000	0.000
					B	0.000	16.034		36.38	0.000	0.000
					C	0.000	29.560		19.73	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	104.167	A	0.000	14.014	8.333	59.47	0.000	0.000
					B	0.000	19.235		43.32	0.000	0.000
					C	2.624	51.581		15.37	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	123.839	A	7.141	30.445	11.682	31.08	0.000	0.000
					B	8.071	17.232		46.17	0.000	0.000
					C	10.303	51.782		18.82	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	160.256	A	10.587	33.364	12.517	28.48	0.000	0.000
					B	13.797	19.867		37.18	0.000	0.000
					C	13.718	52.617		18.87	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	196.673	A	12.495	34.199	13.351	28.59	0.000	0.000
					B	15.869	20.901		36.31	0.000	0.000
					C	15.790	53.451		19.28	0.000	0.000
T6 40.00-20.00	30.00	1	18	233.091	A	14.457	35.033	14.186	28.66	0.000	0.000
					B	17.795	21.736		35.89	0.000	0.000
					C	17.850	54.286		19.67	0.000	0.000
T7 20.00-0.00	10.00	1	18	269.508	A	20.260	29.613	15.020	30.12	0.000	0.000
					B	22.674	20.305		34.95	0.000	0.000
					C	22.428	43.090		22.93	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	1	1	9.338			
			C	0.287	2.331	0.612	1	1	18.093			
T2 120.00-100.00	0.54	1.50	A	0.135	2.829	0.579	1	1	8.117	2.18	108.97	C
			B	0.185	2.648	0.587	1	1	11.298			
			C	0.52	1.875	0.708	1	1	39.148			
T3 100.00-80.00	0.80	2.48	A	0.304	2.287	0.617	1	1	25.926	2.47	123.63	C
			B	0.204	2.582	0.591	1	1	18.261			
			C	0.501	1.898	0.698	1	1	46.456			
T4 80.00-60.00	0.85	2.82	A	0.274	2.367	0.608	1	1	30.885	2.57	128.40	C
			B	0.21	2.563	0.593	1	1	25.568			
			C	0.414	2.037	0.657	1	1	48.307			
T5 60.00-40.00	0.85	3.21	A	0.237	2.476	0.599	1	1	32.972	2.55	127.46	C
			B	0.187	2.64	0.588	1	1	28.156			
			C	0.352	2.167	0.633	1	1	49.636			
T6 40.00-20.00	0.85	3.86	A	0.212	2.555	0.593	1	1	35.232	2.46	122.97	C
			B	0.17	2.701	0.585	1	1	30.503			
			C	0.309	2.271	0.619	1	1	51.444			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	1	1	37.657	2.50	124.94	C
			B	0.159	2.737	0.583	1	1	34.511			
			C	0.243	2.458	0.6	1	1	48.288			
Sum Weight:	4.75	18.96						OTM	1038.97 kip-ft	16.04		

Tower Forces - No Ice - Wind 45 To Face

<i>RISA</i>Tower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 13 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.825	1	9.338			
			C	0.287	2.331	0.612	0.825	1	18.093			
T2 120.00-100.00	0.54	1.50	A	0.135	2.829	0.579	0.825	1	8.117	2.15	107.69	C
			B	0.185	2.648	0.587	0.825	1	11.298			
			C	0.52	1.875	0.708	0.825	1	38.689			
T3 100.00-80.00	0.80	2.48	A	0.304	2.287	0.617	0.825	1	24.676	2.38	118.83	C
			B	0.204	2.582	0.591	0.825	1	16.848			
			C	0.501	1.898	0.698	0.825	1	44.653			
T4 80.00-60.00	0.85	2.82	A	0.274	2.367	0.608	0.825	1	29.032	2.44	122.02	C
			B	0.21	2.563	0.593	0.825	1	23.154			
			C	0.414	2.037	0.657	0.825	1	45.907			
T5 60.00-40.00	0.85	3.21	A	0.237	2.476	0.599	0.825	1	30.785	2.41	120.37	C
			B	0.187	2.64	0.588	0.825	1	25.379			
			C	0.352	2.167	0.633	0.825	1	46.873			
T6 40.00-20.00	0.85	3.86	A	0.212	2.555	0.593	0.825	1	32.702	2.31	115.50	C
			B	0.17	2.701	0.585	0.825	1	27.389			
			C	0.309	2.271	0.619	0.825	1	48.321			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.825	1	34.111	2.30	114.79	C
			B	0.159	2.737	0.583	0.825	1	30.543			
			C	0.243	2.458	0.6	0.825	1	44.363			
Sum Weight:	4.75	18.96						OTM	1004.99 kip-ft	15.30		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00-100.00	0.54	1.50	A	0.135	2.829	0.579	0.8	1	8.117	2.15	107.51	C
			B	0.185	2.648	0.587	0.8	1	11.298			
			C	0.52	1.875	0.708	0.8	1	38.624			
T3 100.00-80.00	0.80	2.48	A	0.304	2.287	0.617	0.8	1	24.497	2.36	118.14	C
			B	0.204	2.582	0.591	0.8	1	16.646			
			C	0.501	1.898	0.698	0.8	1	44.396			
T4 80.00-60.00	0.85	2.82	A	0.274	2.367	0.608	0.8	1	28.767	2.42	121.10	C
			B	0.21	2.563	0.593	0.8	1	22.809			
			C	0.414	2.037	0.657	0.8	1	45.564			
T5 60.00-40.00	0.85	3.21	A	0.237	2.476	0.599	0.8	1	30.473	2.39	119.35	C
			B	0.187	2.64	0.588	0.8	1	24.982			
			C	0.352	2.167	0.633	0.8	1	46.478			
T6 40.00-20.00	0.85	3.86	A	0.212	2.555	0.593	0.8	1	32.340	2.29	114.44	C
			B	0.17	2.701	0.585	0.8	1	26.944			
			C	0.309	2.271	0.619	0.8	1	47.874			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.8	1	33.605	2.27	113.33	C
			B	0.159	2.737	0.583	0.8	1	29.976			
			C	0.243	2.458	0.6	0.8	1	43.802			
Sum Weight:	4.75	18.96						OTM	1000.13 kip-ft	15.19		

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	Project 140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client AT&T Mobility	Designed by TJL

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
140.00-120.00			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2	0.54	1.50	A	0.135	2.829	0.579	0.85	1	8.117	2.16	107.88	C
120.00-100.00			B	0.185	2.648	0.587	0.85	1	11.298			
			C	0.52	1.875	0.708	0.85	1	38.755			
T3	0.80	2.48	A	0.304	2.287	0.617	0.85	1	24.854	2.39	119.52	C
100.00-80.00			B	0.204	2.582	0.591	0.85	1	17.050			
			C	0.501	1.898	0.698	0.85	1	44.911			
T4	0.85	2.82	A	0.274	2.367	0.608	0.85	1	29.297	2.46	122.93	C
80.00-60.00			B	0.21	2.563	0.593	0.85	1	23.499			
			C	0.414	2.037	0.657	0.85	1	46.250			
T5	0.85	3.21	A	0.237	2.476	0.599	0.85	1	31.098	2.43	121.38	C
60.00-40.00			B	0.187	2.64	0.588	0.85	1	25.775			
			C	0.352	2.167	0.633	0.85	1	47.268			
T6	0.85	3.86	A	0.212	2.555	0.593	0.85	1	33.063	2.33	116.57	C
40.00-20.00			B	0.17	2.701	0.585	0.85	1	27.834			
			C	0.309	2.271	0.619	0.85	1	48.767			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.85	1	34.618	2.32	116.24	C
			B	0.159	2.737	0.583	0.85	1	31.110			
			C	0.243	2.458	0.6	0.85	1	44.924			
Sum Weight:	4.75	18.96						OTM	1009.84 kip-ft	15.40		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.70	1.13	A	0.198	2.604	0.59	1	1	12.197	1.94	97.14	C
140.00-120.00			B	0.287	2.332	0.612	1	1	18.342			
			C	0.449	1.975	0.673	1	1	31.581			
T2	1.36	1.82	A	0.225	2.514	0.596	1	1	14.205	3.77	188.56	C
120.00-100.00			B	0.312	2.264	0.62	1	1	20.482			
			C	0.765	1.794	0.868	1	1	70.787			
T3	2.00	2.94	A	0.442	1.987	0.67	1	1	39.280	3.76	187.81	C
100.00-80.00			B	0.296	2.308	0.615	1	1	25.771			
			C	0.709	1.777	0.826	1	1	75.396			
T4	2.13	3.40	A	0.393	2.077	0.649	1	1	44.761	3.48	173.95	C
80.00-60.00			B	0.297	2.303	0.615	1	1	35.052			
			C	0.581	1.817	0.742	1	1	73.368			
T5	2.14	3.86	A	0.339	2.197	0.629	1	1	46.664	3.30	165.03	C
60.00-40.00			B	0.264	2.397	0.605	1	1	38.105			
			C	0.494	1.908	0.695	1	1	72.989			
T6	2.14	4.58	A	0.302	2.29	0.617	1	1	48.996	3.11	155.70	C
40.00-20.00			B	0.238	2.474	0.599	1	1	40.795			
			C	0.434	2.001	0.666	1	1	73.939			
T7 20.00-0.00	1.50	5.14	A	0.253	2.43	0.603	1	1	49.100	3.02	150.83	C
			B	0.214	2.55	0.593	1	1	43.781			

<i>RISA</i>Tower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page	15 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date	11:23:28 08/09/12
	Client	AT&T Mobility	Designed by	TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
Sum Weight:	11.97	22.86	C	0.331	2.216	0.626	1	1 OTM	64.675 1537.59 kip-ft	22.38		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.825	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.825	1	18.342			
			C	0.449	1.975	0.673	0.825	1	31.581			
T2 120.00-100.00	1.36	1.82	A	0.225	2.514	0.596	0.825	1	14.205	3.74	186.81	C
			B	0.312	2.264	0.62	0.825	1	20.482			
			C	0.765	1.794	0.868	0.825	1	70.133			
T3 100.00-80.00	2.00	2.94	A	0.442	1.987	0.67	0.825	1	38.149	3.66	183.17	C
			B	0.296	2.308	0.615	0.825	1	24.425			
			C	0.709	1.777	0.826	0.825	1	73.536			
T4 80.00-60.00	2.13	3.40	A	0.393	2.077	0.649	0.825	1	43.053	3.36	168.20	C
			B	0.297	2.303	0.615	0.825	1	32.579			
			C	0.581	1.817	0.742	0.825	1	70.941			
T5 60.00-40.00	2.14	3.86	A	0.339	2.197	0.629	0.825	1	44.611	3.17	158.66	C
			B	0.264	2.397	0.605	0.825	1	35.245			
			C	0.494	1.908	0.695	0.825	1	70.172			
T6 40.00-20.00	2.14	4.58	A	0.302	2.29	0.617	0.825	1	46.593	2.98	148.97	C
			B	0.238	2.474	0.599	0.825	1	37.592			
			C	0.434	2.001	0.666	0.825	1	70.744			
T7 20.00-0.00	1.50	5.14	A	0.253	2.43	0.603	0.825	1	45.658	2.83	141.65	C
			B	0.214	2.55	0.593	0.825	1	39.763			
			C	0.331	2.216	0.626	0.825	1	60.735			
Sum Weight:	11.97	22.86						OTM	1505.12 kip-ft	21.69		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.70	1.13	A	0.198	2.604	0.59	0.8	1	12.197	1.94	97.14	C
			B	0.287	2.332	0.612	0.8	1	18.342			
			C	0.449	1.975	0.673	0.8	1	31.581			
T2 120.00-100.00	1.36	1.82	A	0.225	2.514	0.596	0.8	1	14.205	3.73	186.57	C
			B	0.312	2.264	0.62	0.8	1	20.482			
			C	0.765	1.794	0.868	0.8	1	70.040			
T3 100.00-80.00	2.00	2.94	A	0.442	1.987	0.67	0.8	1	37.988	3.65	182.51	C
			B	0.296	2.308	0.615	0.8	1	24.233			
			C	0.709	1.777	0.826	0.8	1	73.270			
T4 80.00-60.00	2.13	3.40	A	0.393	2.077	0.649	0.8	1	42.809	3.35	167.37	C
			B	0.297	2.303	0.615	0.8	1	32.225			

RISATower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page	16 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date	11:23:28 08/09/12
	Client	AT&T Mobility	Designed by	TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T5	2.14	3.86	C	0.581	1.817	0.742	0.8	1	70.594			
60.00-40.00			A	0.339	2.197	0.629	0.8	1	44.317	3.15	157.75	C
			B	0.264	2.397	0.605	0.8	1	34.836			
			C	0.494	1.908	0.695	0.8	1	69.769			
T6	2.14	4.58	A	0.302	2.29	0.617	0.8	1	46.250	2.96	148.01	C
40.00-20.00			B	0.238	2.474	0.599	0.8	1	37.134			
			C	0.434	2.001	0.666	0.8	1	70.288			
T7 20.00-0.00	1.50	5.14	A	0.253	2.43	0.603	0.8	1	45.166	2.81	140.33	C
			B	0.214	2.55	0.593	0.8	1	39.189			
			C	0.331	2.216	0.626	0.8	1	60.173			
Sum Weight:	11.97	22.86						OTM	1500.48 kip-ft	21.59		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.70	1.13	A	0.198	2.604	0.59	0.85	1	12.197	1.94	97.14	C
140.00-120.00			B	0.287	2.332	0.612	0.85	1	18.342			
			C	0.449	1.975	0.673	0.85	1	31.581			
T2	1.36	1.82	A	0.225	2.514	0.596	0.85	1	14.205	3.74	187.06	C
120.00-100.00			B	0.312	2.264	0.62	0.85	1	20.482			
			C	0.765	1.794	0.868	0.85	1	70.226			
T3	2.00	2.94	A	0.442	1.987	0.67	0.85	1	38.311	3.68	183.83	C
100.00-80.00			B	0.296	2.308	0.615	0.85	1	24.617			
			C	0.709	1.777	0.826	0.85	1	73.802			
T4	2.13	3.40	A	0.393	2.077	0.649	0.85	1	43.297	3.38	169.02	C
80.00-60.00			B	0.297	2.303	0.615	0.85	1	32.932			
			C	0.581	1.817	0.742	0.85	1	71.287			
T5	2.14	3.86	A	0.339	2.197	0.629	0.85	1	44.904	3.19	159.57	C
60.00-40.00			B	0.264	2.397	0.605	0.85	1	35.653			
			C	0.494	1.908	0.695	0.85	1	70.574			
T6	2.14	4.58	A	0.302	2.29	0.617	0.85	1	46.937	3.00	149.94	C
40.00-20.00			B	0.238	2.474	0.599	0.85	1	38.050			
			C	0.434	2.001	0.666	0.85	1	71.201			
T7 20.00-0.00	1.50	5.14	A	0.253	2.43	0.603	0.85	1	46.150	2.86	142.96	C
			B	0.214	2.55	0.593	0.85	1	40.337			
			C	0.331	2.216	0.626	0.85	1	61.298			
Sum Weight:	11.97	22.86						OTM	1509.76 kip-ft	21.79		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.28	0.86	A	0.105	2.946	0.576	1	1	6.197	1.31	65.66	C
140.00-120.00			B	0.156	2.75	0.582	1	1	9.338			

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
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	Project 140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client AT&T Mobility	Designed by TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T2	0.54	1.50	C	0.287	2.331	0.612	1	1	18.093			
120.00-100.00			A	0.135	2.829	0.579	1	1	8.117	2.18	108.97	C
			B	0.185	2.648	0.587	1	1	11.298			
			C	0.52	1.875	0.708	1	1	39.148			
T3	0.80	2.48	A	0.304	2.287	0.617	1	1	25.926	2.47	123.63	C
100.00-80.00			B	0.204	2.582	0.591	1	1	18.261			
			C	0.501	1.898	0.698	1	1	46.456			
T4	0.85	2.82	A	0.274	2.367	0.608	1	1	30.885	2.57	128.40	C
80.00-60.00			B	0.21	2.563	0.593	1	1	25.568			
			C	0.414	2.037	0.657	1	1	48.307			
T5	0.85	3.21	A	0.237	2.476	0.599	1	1	32.972	2.55	127.46	C
60.00-40.00			B	0.187	2.64	0.588	1	1	28.156			
			C	0.352	2.167	0.633	1	1	49.636			
T6	0.85	3.86	A	0.212	2.555	0.593	1	1	35.232	2.46	122.97	C
40.00-20.00			B	0.17	2.701	0.585	1	1	30.503			
			C	0.309	2.271	0.619	1	1	51.444			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	1	1	37.657	2.50	124.94	C
			B	0.159	2.737	0.583	1	1	34.511			
			C	0.243	2.458	0.6	1	1	48.288			
Sum Weight:	4.75	18.96						OTM	1038.97 kip-ft	16.04		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.28	0.86	A	0.105	2.946	0.576	0.825	1	6.197	1.31	65.66	C
140.00-120.00			B	0.156	2.75	0.582	0.825	1	9.338			
			C	0.287	2.331	0.612	0.825	1	18.093			
T2	0.54	1.50	A	0.135	2.829	0.579	0.825	1	8.117	2.15	107.69	C
120.00-100.00			B	0.185	2.648	0.587	0.825	1	11.298			
			C	0.52	1.875	0.708	0.825	1	38.689			
T3	0.80	2.48	A	0.304	2.287	0.617	0.825	1	24.676	2.38	118.83	C
100.00-80.00			B	0.204	2.582	0.591	0.825	1	16.848			
			C	0.501	1.898	0.698	0.825	1	44.653			
T4	0.85	2.82	A	0.274	2.367	0.608	0.825	1	29.032	2.44	122.02	C
80.00-60.00			B	0.21	2.563	0.593	0.825	1	23.154			
			C	0.414	2.037	0.657	0.825	1	45.907			
T5	0.85	3.21	A	0.237	2.476	0.599	0.825	1	30.785	2.41	120.37	C
60.00-40.00			B	0.187	2.64	0.588	0.825	1	25.379			
			C	0.352	2.167	0.633	0.825	1	46.873			
T6	0.85	3.86	A	0.212	2.555	0.593	0.825	1	32.702	2.31	115.50	C
40.00-20.00			B	0.17	2.701	0.585	0.825	1	27.389			
			C	0.309	2.271	0.619	0.825	1	48.321			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.825	1	34.111	2.30	114.79	C
			B	0.159	2.737	0.583	0.825	1	30.543			
			C	0.243	2.458	0.6	0.825	1	44.363			
Sum Weight:	4.75	18.96						OTM	1004.99 kip-ft	15.30		

RISA Tower

Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

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Project

140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT

Date

11:23:28 08/09/12

Client

AT&T Mobility

Designed by

TJL

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.8	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.8	1	9.338			
			C	0.287	2.331	0.612	0.8	1	18.093			
T2 120.00-100.00	0.54	1.50	A	0.135	2.829	0.579	0.8	1	8.117	2.15	107.51	C
			B	0.185	2.648	0.587	0.8	1	11.298			
			C	0.52	1.875	0.708	0.8	1	38.624			
T3 100.00-80.00	0.80	2.48	A	0.304	2.287	0.617	0.8	1	24.497	2.36	118.14	C
			B	0.204	2.582	0.591	0.8	1	16.646			
			C	0.501	1.898	0.698	0.8	1	44.396			
T4 80.00-60.00	0.85	2.82	A	0.274	2.367	0.608	0.8	1	28.767	2.42	121.10	C
			B	0.21	2.563	0.593	0.8	1	22.809			
			C	0.414	2.037	0.657	0.8	1	45.564			
T5 60.00-40.00	0.85	3.21	A	0.237	2.476	0.599	0.8	1	30.473	2.39	119.35	C
			B	0.187	2.64	0.588	0.8	1	24.982			
			C	0.352	2.167	0.633	0.8	1	46.478			
T6 40.00-20.00	0.85	3.86	A	0.212	2.555	0.593	0.8	1	32.340	2.29	114.44	C
			B	0.17	2.701	0.585	0.8	1	26.944			
			C	0.309	2.271	0.619	0.8	1	47.874			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.8	1	33.605	2.27	113.33	C
			B	0.159	2.737	0.583	0.8	1	29.976			
			C	0.243	2.458	0.6	0.8	1	43.802			
Sum Weight:	4.75	18.96						OTM	1000.13 kip-ft	15.19		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 140.00-120.00	0.28	0.86	A	0.105	2.946	0.576	0.85	1	6.197	1.31	65.66	C
			B	0.156	2.75	0.582	0.85	1	9.338			
			C	0.287	2.331	0.612	0.85	1	18.093			
T2 120.00-100.00	0.54	1.50	A	0.135	2.829	0.579	0.85	1	8.117	2.16	107.88	C
			B	0.185	2.648	0.587	0.85	1	11.298			
			C	0.52	1.875	0.708	0.85	1	38.755			
T3 100.00-80.00	0.80	2.48	A	0.304	2.287	0.617	0.85	1	24.854	2.39	119.52	C
			B	0.204	2.582	0.591	0.85	1	17.050			
			C	0.501	1.898	0.698	0.85	1	44.911			
T4 80.00-60.00	0.85	2.82	A	0.274	2.367	0.608	0.85	1	29.297	2.46	122.93	C
			B	0.21	2.563	0.593	0.85	1	23.499			
			C	0.414	2.037	0.657	0.85	1	46.250			
T5 60.00-40.00	0.85	3.21	A	0.237	2.476	0.599	0.85	1	31.098	2.43	121.38	C
			B	0.187	2.64	0.588	0.85	1	25.775			
			C	0.352	2.167	0.633	0.85	1	47.268			
T6 40.00-20.00	0.85	3.86	A	0.212	2.555	0.593	0.85	1	33.063	2.33	116.57	C
			B	0.17	2.701	0.585	0.85	1	27.834			
			C	0.309	2.271	0.619	0.85	1	48.767			
T7 20.00-0.00	0.59	4.23	A	0.185	2.647	0.587	0.85	1	34.618	2.32	116.24	C
			B	0.159	2.737	0.583	0.85	1	31.110			
			C	0.243	2.458	0.6	0.85	1	44.924			
Sum Weight:	4.75	18.96						OTM	1009.84	15.40		

RISATower**Centek Engineering Inc.**

63-2 North Branford Rd.

Branford, CT 06405

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Job

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Project

140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT

Date

11:23:28 08/09/12

Client

AT&T Mobility

Designed by

TJL

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
									kip-ft			

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	14.44					
Bracing Weight	4.52					
Total Member Self-Weight	18.96			8.41	4.42	
Total Weight	28.35			8.41	4.42	
Wind 0 deg - No Ice		-1.53	-26.03	-2166.32	158.27	-5.40
Wind 30 deg - No Ice		12.14	-21.12	-1762.08	-1012.74	-0.13
Wind 45 deg - No Ice		17.35	-16.91	-1408.14	-1456.09	2.57
Wind 60 deg - No Ice		20.95	-12.10	-1010.81	-1758.23	5.61
Wind 90 deg - No Ice		24.35	0.03	11.43	-2035.13	9.99
Wind 120 deg - No Ice		21.76	14.34	1229.01	-1799.34	11.33
Wind 135 deg - No Ice		16.98	18.81	1615.58	-1417.87	9.64
Wind 150 deg - No Ice		11.97	22.54	1921.82	-995.04	7.74
Wind 180 deg - No Ice		0.19	25.28	2154.57	-14.11	2.50
Wind 210 deg - No Ice		-11.62	22.06	1873.10	969.05	-2.93
Wind 225 deg - No Ice		-17.53	17.87	1520.93	1482.70	-5.42
Wind 240 deg - No Ice		-22.52	13.01	1095.71	1884.99	-5.93
Wind 270 deg - No Ice		-24.89	-0.95	-87.19	2099.27	-6.93
Wind 300 deg - No Ice		-21.78	-12.80	-1080.71	1851.09	-8.11
Wind 315 deg - No Ice		-18.27	-17.61	-1477.50	1556.59	-8.29
Wind 330 deg - No Ice		-13.52	-21.65	-1815.19	1159.41	-7.74
Member Ice	3.90					
Total Weight Ice	42.03			20.76	10.99	
Wind 0 deg - Ice		-1.58	-34.08	-2857.72	169.50	-7.75
Wind 30 deg - Ice		16.18	-28.11	-2357.67	-1357.01	-0.46
Wind 45 deg - Ice		23.07	-22.62	-1891.54	-1946.62	3.34
Wind 60 deg - Ice		27.95	-16.15	-1349.71	-2360.01	7.44
Wind 90 deg - Ice		32.41	0.03	23.89	-2730.44	13.47
Wind 120 deg - Ice		28.71	18.41	1597.27	-2399.88	15.48
Wind 135 deg - Ice		22.68	24.57	2129.46	-1907.28	13.74
Wind 150 deg - Ice		16.00	29.57	2546.43	-1338.82	11.47
Wind 180 deg - Ice		0.19	33.40	2872.71	-8.12	4.78
Wind 210 deg - Ice		-15.64	29.07	2496.22	1324.89	-2.69
Wind 225 deg - Ice		-23.25	23.60	2031.92	1986.90	-6.28
Wind 240 deg - Ice		-29.49	17.04	1459.91	2500.95	-7.72
Wind 270 deg - Ice		-32.98	-0.98	-77.75	2809.40	-10.32
Wind 300 deg - Ice		-28.81	-16.87	-1421.77	2468.58	-12.22
Wind 315 deg - Ice		-24.01	-23.33	-1963.03	2063.06	-12.35
Wind 330 deg - Ice		-17.59	-28.66	-2412.41	1521.03	-11.47
Total Weight	28.35			8.41	4.42	
Wind 0 deg - Service		-1.53	-26.03	-2175.23	152.94	-5.40
Wind 30 deg - Service		12.14	-21.12	-1770.99	-1018.07	-0.13
Wind 45 deg - Service		17.35	-16.91	-1417.04	-1461.42	2.57
Wind 60 deg - Service		20.95	-12.10	-1019.71	-1763.56	5.61
Wind 90 deg - Service		24.35	0.03	2.52	-2040.45	9.99
Wind 120 deg - Service		21.76	14.34	1220.11	-1804.67	11.33
Wind 135 deg - Service		16.98	18.81	1606.68	-1423.19	9.64
Wind 150 deg - Service		11.97	22.54	1912.91	-1000.37	7.74
Wind 180 deg - Service		0.19	25.28	2145.67	-19.43	2.50

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 20 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 210 deg - Service		-11.62	22.06	1864.20	963.73	-2.93
Wind 225 deg - Service		-17.53	17.87	1512.03	1477.37	-5.42
Wind 240 deg - Service		-22.52	13.01	1086.81	1879.66	-5.93
Wind 270 deg - Service		-24.89	-0.95	-96.09	2093.95	-6.93
Wind 300 deg - Service		-21.78	-12.80	-1089.62	1845.77	-8.11
Wind 315 deg - Service		-18.27	-17.61	-1486.41	1551.26	-8.29
Wind 330 deg - Service		-13.52	-21.65	-1824.10	1154.09	-7.74

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service

<i>RISA</i>Tower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 21 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Comb. No.	Description
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	140 - 120	Leg	Max Tension	27	20.72	-0.02	0.43
			Max. Compression	30	-23.67	0.42	-0.24
			Max. Mx	31	-0.87	-0.81	-0.00
			Max. My	27	-1.45	0.02	0.81
			Max. Vy	31	-2.28	0.44	-0.07
		Diagonal	Max. Vx	19	-2.46	-0.02	0.48
			Max Tension	28	2.59	0.00	0.00
			Max. Compression	28	-2.59	0.00	0.00
			Max. Mx	30	0.08	-0.00	0.00
			Max. My	28	-2.02	-0.00	0.00
		Top Girt	Max. Vy	29	-0.00	-0.00	0.00
			Max. Vx	28	0.00	0.00	0.00
			Max Tension	5	0.07	0.00	0.00
			Max. Compression	19	-0.08	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
		Bottom Girt	Max. My	23	-0.00	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
			Max Tension	27	0.89	0.00	0.00
			Max. Compression	30	-0.89	0.00	0.00
T2	120 - 100	Leg	Max. Mx	18	0.01	0.01	0.00
			Max. My	24	0.48	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Diagonal	Max Tension	27	64.69	-0.05	-2.14
			Max. Compression	30	-69.95	1.94	-1.04
			Max. Mx	30	-69.95	1.94	-1.04
			Max. My	19	-69.25	0.03	2.20
			Max. Vy	30	-6.18	1.94	-1.04
		Top Girt	Max. Vx	19	-7.01	0.03	2.20
			Max Tension	26	5.04	0.00	0.00
			Max. Compression	26	-5.04	0.00	0.00
			Max. Mx	29	3.61	-0.00	-0.00
			Max. My	29	-4.44	-0.00	-0.00
		Bottom Girt	Max. Vy	29	0.01	-0.00	-0.00
			Max. Vx	29	0.00	-0.00	-0.00
			Max Tension	19	1.02	0.00	0.00
			Max. Compression	22	-1.01	0.00	0.00
			Max. Mx	18	-0.00	0.01	0.00
			Max. My	23	-0.05	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
			Max Tension	30	0.35	0.00	0.00
			Max. Compression	22	-0.48	0.00	0.00
			Max. Mx	18	-0.04	0.01	0.00
			Max. My	23	-0.05	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00

RISA Tower

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63-2 North Branford Rd.
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Job

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Project

140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT

Date

11:23:28 08/09/12

Client

AT&T Mobility

Designed by

TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	100 - 80	Leg	Max. Vx	23	-0.00	0.00	0.00
			Max. Tension	27	100.21	-0.12	-0.03
			Max. Compression	30	-110.44	0.26	0.02
			Max. Mx	19	-75.80	2.20	-0.03
			Max. My	23	-3.39	-0.05	-1.11
			Max. Vy	32	-1.23	-2.13	0.02
		Diagonal	Max. Vx	34	0.95	0.10	0.76
			Max. Tension	23	6.21	0.00	0.00
			Max. Compression	23	-6.25	0.00	0.00
			Max. Mx	30	4.88	0.03	0.00
			Max. My	23	-5.93	-0.01	-0.01
			Max. Vy	27	0.01	0.03	-0.00
			Max. Vx	23	0.00	0.00	0.00
			Max. Tension	27	137.66	-0.20	-0.03
T4	80 - 60	Leg	Max. Compression	30	-151.98	0.24	0.01
			Max. Mx	32	112.20	-0.33	-0.00
			Max. My	25	18.93	-0.04	-0.37
			Max. Vy	34	-0.23	-0.31	-0.13
			Max. Vx	24	-0.26	-0.11	-0.36
			Max. Tension	23	5.92	0.00	0.00
		Diagonal	Max. Compression	23	-6.02	0.00	0.00
			Max. Mx	30	4.27	0.04	0.00
			Max. My	23	-5.91	-0.01	-0.01
			Max. Vy	27	0.02	0.04	-0.00
			Max. Vx	23	0.00	0.00	0.00
			Max. Tension	27	168.94	-0.13	-0.01
T5	60 - 40	Leg	Max. Compression	30	-187.93	0.18	0.02
			Max. Mx	32	167.09	-0.46	0.04
			Max. My	26	-16.93	-0.14	-0.35
			Max. Vy	22	0.09	-0.45	-0.02
			Max. Vx	33	-0.07	-0.06	0.34
			Max. Tension	23	5.83	0.00	0.00
		Diagonal	Max. Compression	23	-5.92	0.00	0.00
			Max. Mx	27	4.54	0.04	-0.00
			Max. My	23	-5.85	0.01	-0.01
			Max. Vy	27	0.02	0.04	-0.00
			Max. Vx	23	0.00	0.00	0.00
			Max. Tension	27	196.50	-0.66	-0.01
T6	40 - 20	Leg	Max. Compression	30	-219.65	0.87	0.00
			Max. Mx	19	-216.65	0.88	-0.01
			Max. My	26	-17.33	-0.14	-0.35
			Max. Vy	22	-0.21	-0.66	-0.01
			Max. Vx	33	0.07	-0.06	0.34
			Max. Tension	23	6.08	0.00	0.00
		Diagonal	Max. Compression	23	-6.44	0.00	0.00
			Max. Mx	27	4.08	0.06	-0.00
			Max. My	24	-5.95	0.02	-0.01
			Max. Vy	27	0.03	0.06	-0.00
			Max. Vx	24	0.00	0.00	0.00
			Max. Tension	27	219.04	0.93	-0.01
T7	20 - 0	Leg	Max. Compression	30	-250.36	-0.00	-0.00
			Max. Mx	19	-235.88	1.49	-0.02
			Max. My	26	-23.83	1.21	-0.58
			Max. Vy	22	-0.39	-1.37	-0.01
			Max. Vx	26	-0.14	1.21	-0.58
			Max. Tension	23	7.34	0.00	0.00
		Diagonal	Max. Compression	23	-7.15	0.00	0.00
			Max. Mx	27	3.40	0.09	-0.01
			Max. My	23	-7.13	0.05	-0.01
			Max. Vy	27	0.03	0.09	-0.01
			Max. Vx	23	0.00	0.00	0.00

<i>RISA</i>Tower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 23 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
-------------	--------------	----------------	-----------	-----------------	---------	--------------------------	--------------------------

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	253.63	16.73	-9.27
	Max. H _x	30	253.63	16.73	-9.27
	Max. H _z	21	-203.75	-17.31	10.47
	Min. Vert	22	-210.96	-18.19	10.15
	Min. H _x	22	-210.96	-18.19	10.15
	Min. H _z	30	253.63	16.73	-9.27
Leg B	Max. Vert	24	252.07	-16.83	-9.05
	Max. H _x	32	-221.72	18.90	10.35
	Max. H _z	33	-215.05	18.14	10.53
	Min. Vert	32	-221.72	18.90	10.35
	Min. H _x	24	252.07	-16.83	-9.05
	Min. H _z	24	252.07	-16.83	-9.05
Leg A	Max. Vert	19	250.47	-0.26	19.10
	Max. H _x	31	20.44	1.67	-0.73
	Max. H _z	19	250.47	-0.26	19.10
	Min. Vert	27	-223.70	0.18	-21.58
	Min. H _x	23	12.03	-1.54	-1.36
	Min. H _z	27	-223.70	0.18	-21.58

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	28.35	0.00	0.00	8.41	4.42	0.00
Dead+Wind 0 deg - No Ice	28.35	-1.53	-26.03	-2171.34	158.64	-5.41
Dead+Wind 30 deg - No Ice	28.35	12.14	-21.12	-1766.19	-1015.11	-0.13
Dead+Wind 45 deg - No Ice	28.35	17.35	-16.91	-1411.42	-1459.49	2.58
Dead+Wind 60 deg - No Ice	28.35	20.95	-12.10	-1013.16	-1762.34	5.63
Dead+Wind 90 deg - No Ice	28.35	24.35	0.03	11.46	-2039.87	10.02
Dead+Wind 120 deg - No Ice	28.35	21.76	14.34	1231.87	-1803.51	11.35
Dead+Wind 135 deg - No Ice	28.35	16.98	18.81	1619.35	-1421.17	9.66
Dead+Wind 150 deg - No Ice	28.35	11.97	22.54	1926.29	-997.36	7.76
Dead+Wind 180 deg - No Ice	28.35	0.19	25.28	2159.59	-14.14	2.51
Dead+Wind 210 deg - No Ice	28.35	-11.62	22.06	1877.46	971.30	-2.93
Dead+Wind 225 deg - No Ice	28.35	-17.53	17.87	1524.47	1486.14	-5.43
Dead+Wind 240 deg - No Ice	28.35	-22.52	13.01	1098.25	1889.35	-5.94
Dead+Wind 270 deg - No Ice	28.35	-24.89	-0.95	-87.39	2104.16	-6.96
Dead+Wind 300 deg - No Ice	28.35	-21.78	-12.80	-1083.23	1855.41	-8.14
Dead+Wind 315 deg - No Ice	28.35	-18.27	-17.61	-1480.94	1560.21	-8.31
Dead+Wind 330 deg - No Ice	28.35	-13.52	-21.65	-1819.41	1162.12	-7.76
Dead+Ice+Temp	42.03	0.00	0.00	20.76	10.99	-0.00
Dead+Wind 0 deg+Ice+Temp	42.03	-1.58	-34.08	-2866.96	170.12	-7.79
Dead+Wind 30 deg+Ice+Temp	42.03	16.18	-28.11	-2365.37	-1361.46	-0.45
Dead+Wind 45 deg+Ice+Temp	42.03	23.07	-22.62	-1897.72	-1953.00	3.37
Dead+Wind 60 deg+Ice+Temp	42.03	27.95	-16.15	-1354.12	-2367.76	7.49
Dead+Wind 90 deg+Ice+Temp	42.03	32.41	0.03	23.98	-2739.38	13.54

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 120 deg+Ice+Temp	42.03	28.71	18.41	1602.48	-2407.69	15.55
Dead+Wind 135 deg+Ice+Temp	42.03	22.68	24.57	2136.38	-1913.55	13.81
Dead+Wind 150 deg+Ice+Temp	42.03	16.00	29.57	2554.74	-1343.19	11.54
Dead+Wind 180 deg+Ice+Temp	42.03	0.19	33.40	2882.08	-8.15	4.81
Dead+Wind 210 deg+Ice+Temp	42.03	-15.64	29.07	2504.36	1329.20	-2.70
Dead+Wind 225 deg+Ice+Temp	42.03	-23.25	23.60	2038.45	1993.46	-6.31
Dead+Wind 240 deg+Ice+Temp	42.03	-29.49	17.04	1464.71	2508.99	-7.77
Dead+Wind 270 deg+Ice+Temp	42.03	-32.98	-0.98	-78.00	2818.57	-10.39
Dead+Wind 300 deg+Ice+Temp	42.03	-28.81	-16.87	-1426.41	2476.66	-12.30
Dead+Wind 315 deg+Ice+Temp	42.03	-24.01	-23.33	-1969.44	2069.81	-12.43
Dead+Wind 330 deg+Ice+Temp	42.03	-17.59	-28.66	-2420.28	1526.01	-11.54
Dead+Wind 0 deg - Service	28.35	-1.53	-26.03	-2171.34	158.64	-5.41
Dead+Wind 30 deg - Service	28.35	12.14	-21.12	-1766.19	-1015.11	-0.13
Dead+Wind 45 deg - Service	28.35	17.35	-16.91	-1411.42	-1459.49	2.58
Dead+Wind 60 deg - Service	28.35	20.95	-12.10	-1013.16	-1762.34	5.63
Dead+Wind 90 deg - Service	28.35	24.35	0.03	11.46	-2039.87	10.02
Dead+Wind 120 deg - Service	28.35	21.76	14.34	1231.87	-1803.51	11.35
Dead+Wind 135 deg - Service	28.35	16.98	18.81	1619.35	-1421.17	9.66
Dead+Wind 150 deg - Service	28.35	11.97	22.54	1926.29	-997.36	7.76
Dead+Wind 180 deg - Service	28.35	0.19	25.28	2159.59	-14.14	2.51
Dead+Wind 210 deg - Service	28.35	-11.62	22.06	1877.46	971.30	-2.93
Dead+Wind 225 deg - Service	28.35	-17.53	17.87	1524.47	1486.14	-5.43
Dead+Wind 240 deg - Service	28.35	-22.52	13.01	1098.25	1889.35	-5.94
Dead+Wind 270 deg - Service	28.35	-24.89	-0.95	-87.39	2104.16	-6.96
Dead+Wind 300 deg - Service	28.35	-21.78	-12.80	-1083.23	1855.41	-8.14
Dead+Wind 315 deg - Service	28.35	-18.27	-17.61	-1480.94	1560.21	-8.31
Dead+Wind 330 deg - Service	28.35	-13.52	-21.65	-1819.41	1162.12	-7.76

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-28.35	0.00	0.00	28.35	0.00	0.000%
2	-1.53	-28.35	-26.03	1.53	28.35	26.03	0.000%
3	12.14	-28.35	-21.12	-12.14	28.35	21.12	0.000%
4	17.35	-28.35	-16.91	-17.35	28.35	16.91	0.000%
5	20.95	-28.35	-12.10	-20.95	28.35	12.10	0.000%
6	24.35	-28.35	0.03	-24.35	28.35	-0.03	0.000%
7	21.76	-28.35	14.34	-21.76	28.35	-14.34	0.000%
8	16.98	-28.35	18.81	-16.98	28.35	-18.81	0.000%
9	11.97	-28.35	22.54	-11.97	28.35	-22.54	0.000%
10	0.19	-28.35	25.28	-0.19	28.35	-25.28	0.000%
11	-11.62	-28.35	22.06	11.62	28.35	-22.06	0.000%
12	-17.53	-28.35	17.87	17.53	28.35	-17.87	0.000%
13	-22.52	-28.35	13.01	22.52	28.35	-13.01	0.000%
14	-24.89	-28.35	-0.95	24.89	28.35	0.95	0.000%
15	-21.78	-28.35	-12.80	21.78	28.35	12.80	0.000%
16	-18.27	-28.35	-17.61	18.27	28.35	17.61	0.000%
17	-13.52	-28.35	-21.65	13.52	28.35	21.65	0.000%
18	0.00	-42.03	0.00	0.00	42.03	0.00	0.000%
19	-1.58	-42.03	-34.08	1.58	42.03	34.08	0.000%
20	16.18	-42.03	-28.11	-16.18	42.03	28.11	0.000%
21	23.07	-42.03	-22.62	-23.07	42.03	22.62	0.000%
22	27.95	-42.03	-16.15	-27.95	42.03	16.15	0.000%
23	32.41	-42.03	0.03	-32.41	42.03	-0.03	0.000%
24	28.71	-42.03	18.41	-28.71	42.03	-18.41	0.000%
25	22.68	-42.03	24.57	-22.68	42.03	-24.57	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
26	16.00	-42.03	29.57	-16.00	42.03	-29.57	0.000%
27	0.19	-42.03	33.40	-0.19	42.03	-33.40	0.000%
28	-15.64	-42.03	29.07	15.64	42.03	-29.07	0.000%
29	-23.25	-42.03	23.60	23.25	42.03	-23.60	0.000%
30	-29.49	-42.03	17.04	29.49	42.03	-17.04	0.000%
31	-32.98	-42.03	-0.98	32.98	42.03	0.98	0.000%
32	-28.81	-42.03	-16.87	28.81	42.03	16.87	0.000%
33	-24.01	-42.03	-23.33	24.01	42.03	23.33	0.000%
34	-17.59	-42.03	-28.66	17.59	42.03	28.66	0.000%
35	-1.53	-28.35	-26.03	1.53	28.35	26.03	0.000%
36	12.14	-28.35	-21.12	-12.14	28.35	21.12	0.000%
37	17.35	-28.35	-16.91	-17.35	28.35	16.91	0.000%
38	20.95	-28.35	-12.10	-20.95	28.35	12.10	0.000%
39	24.35	-28.35	0.03	-24.35	28.35	-0.03	0.000%
40	21.76	-28.35	14.34	-21.76	28.35	-14.34	0.000%
41	16.98	-28.35	18.81	-16.98	28.35	-18.81	0.000%
42	11.97	-28.35	22.54	-11.97	28.35	-22.54	0.000%
43	0.19	-28.35	25.28	-0.19	28.35	-25.28	0.000%
44	-11.62	-28.35	22.06	11.62	28.35	-22.06	0.000%
45	-17.53	-28.35	17.87	17.53	28.35	-17.87	0.000%
46	-22.52	-28.35	13.01	22.52	28.35	-13.01	0.000%
47	-24.89	-28.35	-0.95	24.89	28.35	0.95	0.000%
48	-21.78	-28.35	-12.80	21.78	28.35	12.80	0.000%
49	-18.27	-28.35	-17.61	18.27	28.35	17.61	0.000%
50	-13.52	-28.35	-21.65	13.52	28.35	21.65	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000094
20	Yes	4	0.00000001	0.00000110
21	Yes	4	0.00000001	0.00000101
22	Yes	4	0.00000001	0.00000091
23	Yes	4	0.00000001	0.00000194
24	Yes	4	0.00000001	0.00000104
25	Yes	4	0.00000001	0.00000179
26	Yes	4	0.00000001	0.00000129

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27	Yes	4	0.00000001	0.00000098
28	Yes	4	0.00000001	0.00000124
29	Yes	4	0.00000001	0.00000115
30	Yes	4	0.00000001	0.00000096
31	Yes	4	0.00000001	0.00000112
32	Yes	4	0.00000001	0.00000120
33	Yes	4	0.00000001	0.00000116
34	Yes	4	0.00000001	0.00000128
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	7.330	46	0.4690	0.0967
T2	120 - 100	5.368	40	0.4256	0.0888
T3	100 - 80	3.641	40	0.3351	0.0724
T4	80 - 60	2.314	40	0.2586	0.0547
T5	60 - 40	1.310	40	0.1832	0.0389
T6	40 - 20	0.607	40	0.1146	0.0237
T7	20 - 0	0.190	35	0.0533	0.0122

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	1142-2C	46	7.330	0.4690	0.0967	80583
138.00	Pirol 12' T-Frame Sector Mount (1)	46	7.130	0.4660	0.0961	80583
120.00	Pirol 4' Side Mount Standoff (1)	40	5.368	0.4256	0.0888	20222
110.00	6 FT DISH	40	4.461	0.3827	0.0815	13625
98.00	Pirol 12' T-Frame Sector Mount (1)	40	3.490	0.3264	0.0706	10630
95.00	(2) RRUS-11	40	3.272	0.3141	0.0678	11211
78.00	PL4-107	40	2.200	0.2513	0.0531	16232

Maximum Tower Deflections - Design Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	9.752	30	0.6222	0.1313
T2	120 - 100	7.150	30	0.5659	0.1228
T3	100 - 80	4.849	30	0.4466	0.1024
T4	80 - 60	3.080	30	0.3450	0.0777
T5	60 - 40	1.741	30	0.2445	0.0546
T6	40 - 20	0.804	30	0.1529	0.0329
T7	20 - 0	0.250	24	0.0712	0.0169

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	1142-2C	30	9.752	0.6222	0.1313	64097
138.00	Pirol 12' T-Frame Sector Mount (1)	30	9.487	0.6183	0.1307	64097
120.00	Pirol 4' Side Mount Standoff (1)	30	7.150	0.5659	0.1228	15973
110.00	6 FT DISH	30	5.942	0.5095	0.1139	10402
98.00	Pirol 12' T-Frame Sector Mount (1)	30	4.648	0.4351	0.1000	7985
95.00	(2) RRUS-11	30	4.357	0.4187	0.0963	8419
78.00	PL4-107	30	2.928	0.3352	0.0753	12190

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	140	Diagonal	A325N	0.7500	1	2.59	9.28	0.279 ✓	1.333	Bolt Shear
T2	120	Diagonal	A325N	0.7500	1	5.04	9.28	0.543 ✓	1.333	Bolt Shear
T3	100	Leg	A325N	0.7500	4	17.81	19.43	0.916 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.21	9.06	0.686 ✓	1.333	Member Bearing
T4	80	Leg	A325N	1.1250	6	18.90	43.74	0.432 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	5.92	6.80	0.870 ✓	1.333	Member Bearing
T5	60	Leg	A325N	1.1250	6	24.78	43.74	0.567 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	5.83	6.80	0.857 ✓	1.333	Member Bearing
T6	40	Leg	A325N	1.2500	6	29.77	54.00	0.551 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.44	9.28	0.694 ✓	1.333	Bolt Shear
T7	20	Leg	A325N	1.2500	6	33.98	54.00	0.629 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	7.34	6.80	1.080 ✓	1.333	Member Bearing

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Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0 K=1.00	17.365	2.4053	-23.67	41.77	0.567 ✓
T2	120 - 100	2 1/2	20.00	3.21	61.6 K=1.00	22.442	4.9087	-69.95	110.16	0.635 ✓
T3	100 - 80	3 1/2	20.03	6.68	91.6 K=1.00	16.602	9.6211	-110.44	159.73	0.691 ✓
T4	80 - 60	3 3/4	20.03	6.68	85.4 K=1.00	17.901	11.0447	-151.98	197.71	0.769 ✓
T5	60 - 40	4	20.03	6.68	80.1 K=1.00	18.991	12.5664	-187.93	238.65	0.787 ✓
T6	40 - 20	4 1/4	20.03	6.68	75.4 K=1.00	19.917	14.1863	-219.65	282.55	0.777 ✓
T7	20 - 0	4 1/2	20.03	6.68	71.2 K=1.00	20.713	15.9043	-250.36	329.43	0.760 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.94	2.88	138.4 K=0.75	7.794	0.4418	-2.59	3.44	0.753 ✓
T2	120 - 100	7/8	5.94	2.85	117.1 K=0.75	10.692	0.6013	-5.04	6.43	0.783 ✓
T3	100 - 80	L2x2x1/4	9.31	4.52	138.6 K=1.00	7.772	0.9380	-5.97	7.29	0.820 ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	10.65	5.17	125.3 K=1.00	9.506	0.9020	-5.92	8.57	0.691 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	142.7 K=1.00	7.335	0.9020	-5.80	6.62	0.877 ✓
T6	40 - 20	L2 1/2x2 1/2x1/4	13.64	6.64	162.4 K=1.00	5.664	1.1900	-6.44	6.74	0.956 ✓
T7	20 - 0	L3x3x3/16	14.70	7.16	144.2 K=1.00	7.178	1.0900	-7.15	7.82	0.914 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5	3.158	0.4418	-0.08	1.40	0.060

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
					K=0.70					✓
T2	120 - 100	KL/R > 200 (C) - 4 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-1.01	2.65	0.380 ✓

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	3/4	5.00	4.85	217.5 K=0.70	3.158	0.4418	-0.89	1.40	0.641 ✓
T2	120 - 100	KL/R > 200 (C) - 8 7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.48	2.65	0.181 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	140 - 120	1 3/4	20.00	3.21	88.0	30.000	2.4053	20.72	72.16	0.287 ✓
T2	120 - 100	2 1/2	20.00	3.21	61.6	30.000	4.9087	64.69	147.26	0.439 ✓
T3	100 - 80	3 1/2	20.03	6.68	91.6	30.000	9.6211	100.21	288.63	0.347 ✓
T4	80 - 60	3 3/4	20.03	6.68	85.4	30.000	11.0447	137.66	331.34	0.415 ✓
T5	60 - 40	4	20.03	6.68	80.1	30.000	12.5664	168.94	376.99	0.448 ✓
T6	40 - 20	4 1/4	20.03	6.68	75.4	30.000	14.1863	196.50	425.59	0.462 ✓
T7	20 - 0	4 1/2	20.03	6.68	71.2	30.000	15.9043	219.04	477.13	0.459 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
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<i>RISATower</i> <i>Centek Engineering Inc.</i> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page	30 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date	11:23:28 08/09/12
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio $\frac{P}{P_a}$
T1	140 - 120	3/4	5.94	2.88	184.6	21.600	0.4418	2.59	9.54	0.272 ✓
T2	120 - 100	7/8	5.94	2.85	156.2	21.600	0.6013	5.04	12.99	0.388 ✓
T3	100 - 80	L2x2x1/4	8.90	4.32	88.1	21.600	0.9380	6.21	20.26	0.307 ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	9.74	4.73	75.2	21.600	0.9020	5.92	19.48	0.304 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.10	5.89	93.0	21.600	0.9020	5.83	19.48	0.299 ✓
T6	40 - 20	L2 1/2x2 1/2x1/4	13.12	6.39	101.9	21.600	1.1900	6.08	25.70	0.236 ✓
T7	20 - 0	L3x3x3/16	15.24	7.43	96.8	21.600	1.0900	7.34	23.54	0.312 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio $\frac{P}{P_a}$
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.07	9.54	0.008 ✓
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	1.02	12.99	0.078 ✓

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio $\frac{P}{P_a}$
T1	140 - 120	3/4	5.00	4.85	310.7	21.600	0.4418	0.89	9.54	0.094 ✓
T2	120 - 100	7/8	5.00	4.79	262.9	21.600	0.6013	0.35	12.99	0.027 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T1	140 - 120	Leg	1 3/4	1	-23.67	55.68	42.5	Pass
T2	120 - 100	Leg	2 1/2	46	-69.95	146.85	47.6	Pass
T3	100 - 80	Leg	3 1/2	91	-110.44	212.92	51.9	Pass
							68.8 (b)	
T4	80 - 60	Leg	3 3/4	112	-151.98	263.55	57.7	Pass
T5	60 - 40	Leg	4	133	-187.93	318.12	59.1	Pass

<i>RISATower</i> Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	11118.CO68 - CT1212	Page 31 of 31
	Project	140' Lattice Tower - 705 West Johnson Ave., Cheshire, CT	Date 11:23:28 08/09/12
	Client	AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T6	40 - 20	Leg	4 1/4	154	-219.65	376.64	58.3	Pass
T7	20 - 0	Leg	4 1/2	175	-250.36	439.13	57.0	Pass
T1	140 - 120	Diagonal	3/4	15	-2.59	4.59	56.5	Pass
T2	120 - 100	Diagonal	7/8	57	-5.04	8.57	58.8	Pass
T3	100 - 80	Diagonal	L2x2x1/4	95	-5.97	9.72	61.5	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	116	-5.92	11.43	51.8	Pass
							65.3 (b)	
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	137	-5.80	8.82	65.8	Pass
T6	40 - 20	Diagonal	L2 1/2x2 1/2x1/4	158	-6.44	8.98	71.7	Pass
T7	20 - 0	Diagonal	L3x3x3/16	185	-7.15	10.43	68.6	Pass
							81.0 (b)	
T1	140 - 120	Top Girt	3/4	4	-0.08	1.86	4.5	Pass
T2	120 - 100	Top Girt	7/8	50	-1.01	3.54	28.5	Pass
T1	140 - 120	Bottom Girt	3/4	8	-0.89	1.86	48.1	Pass
T2	120 - 100	Bottom Girt	7/8	53	-0.48	3.54	13.6	Pass
							Summary	
						Leg (T3)	68.8	Pass
						Diagonal (T7)	81.0	Pass
						Top Girt (T2)	28.5	Pass
						Bottom Girt (T1)	48.1	Pass
						Bolt Checks	81.0	Pass
						RATING =	81.0	Pass

Tower Anchor Bolt Analysis**Max Leg Reactions:**

Uplift = Uplift := 224 kips (User Input)

Shear = Shear := 22 kips (User Input)

Compression = Compression := 254 kips (User Input)

Anchor Bolt Data:

ASTMA449

Number of Anchor Bolts = N := 6 (User Input)

Bolt Ultimate Strength = $F_u := 105 \text{ ksi}$ (User Input)Bolt Yield Strength = $F_y := 81 \text{ ksi}$ (User Input)

Diameter of Bolts = D := 1.25 in (User Input)

Threads per Inch = n := 7 (User Input)

Coefficient of Friction = $\mu := 0.55$ (User Input)**Anchor Bolt Area:**Gross Area of Bolt = $A_g := \frac{\pi}{4} D^2 = 1.227 \text{ in}^2$ Net Area of Bolt = $A_n := \frac{\pi}{4} \left(D - \frac{0.9743 \text{ in}}{n} \right)^2 = 0.969 \text{ in}^2$ (AISC 13th Ed. pg. 7-83)

Subject:

Anchor Bolt Analysis

Location:

Cheshire, CT

Rev. 1: 8/9/12

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 11118.CO68Check Tensile Force:

Maximum Tensile Force (Gross Area) =

$$F_{\text{gross.area}} := 1.33 \left(0.33 \cdot A_g \cdot F_u \right) = 56.6 \text{ kips}$$

Maximum Tensile Force (Net Area) =

$$F_{\text{net.area}} := 1.3 \left(0.60 \cdot A_n \cdot F_y \right) = 61.2 \text{ kips}$$

Allowable Tension =

$$\text{AllowableTension} := \begin{cases} F_{\text{gross.area}} & \text{if } F_{\text{gross.area}} < F_{\text{net.area}} \\ F_{\text{net.area}} & \text{if } F_{\text{net.area}} < F_{\text{gross.area}} \end{cases}$$

$$\text{AllowableTension} = 56.6 \text{ kips}$$

Applied Tension =

$$\text{MaxTension} := \frac{\text{Uplift}}{N} = 37.33 \text{ kips}$$

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 61.0 \%$$

$$\text{Condition1} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition1 = "OK"

Check Anchor Bolt Area:Based on the ASCE 10-97 Design of Latticed
Steel Transmission Structures

Required Area =

$$A_{s1} := \frac{\text{Uplift}}{F_y} + \frac{\text{Shear}}{\mu \cdot .85 \cdot F_y} = 3.3 \text{ in}^2$$

$$A_{s2} := \left[\frac{\text{Shear} - (0.3 \cdot \text{Compression})}{\mu \cdot .85 \cdot F_y} \right] = -1.431 \text{ in}^2$$

Provided Area =

$$A_{\text{provided}} := A_n \cdot N = 5.8 \text{ in}^2$$

$$\text{Condition2} := \text{if} \left(\frac{A_{s1}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition2 = "OK"

$$\text{Condition3} := \text{if} \left(\frac{A_{s2}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition3 = "OK"

Mat Foundation Analysis:**Input Data:**Tower Data

Overturing Moment =	OM := 2905 ft-kips	(User Input from RISATower)
Shear Force =	S _t := 34 kip	(User Input from RISATower)
Axial Force =	WT _t := 42 kip	(User Input from RISATower)
Max Compression Force =	C _t := 254 kip	(User Input from RISATower)
Max Uplift Force =	U _t := 224 kip	(User Input from RISATower)
Tower Height =	H _t := 140 ft	(User Input)
Tower Width =	W _t := 14 ft	(User Input)
Tower Position on Foundation (1=offset, 2=centered) =	Pos _t := 1	(User Input)

Footing Data:

Overall Depth of Footing =	D _f := 7 ft	(User Input)
Thickness of Footing =	T _f := 2.5 ft	(User Input)
Width of Footing =	W _f := 30 ft	(User Input)
Length of Pier =	L _p := 5 ft	(User Input)
Extension of Pier Above Grade =	L _{pag} := 0.5 ft	(User Input)
Diameter of Pier =	d _p := 4 ft	(User Input)

Material Properties:

Concrete Compressive Strength =	f _c := 4000 psi	(User Input)
Steel Reinforcement Yield Strength =	f _y := 60000 psi	(User Input)
Internal Friction Angle of Soil =	Φ _s := 34 deg	(User Input)
Allowable Soil Bearing Capacity =	q _s := 3000 psf	(User Input)
Unit Weight of Soil =	γ _{soil} := 120 pcf	(User Input)
Unit Weight of Concrete =	γ _{conc} := 150 pcf	(User Input)
Foundation Bouyancy =	Bouyancy := 1	(User Input) (Yes=1 / No=0)
Depth to Neglect =	n := 0 ft	(User Input)
Cohesion of Clay Type Soil =	c := 0 ksf	(User Input) (Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input) (UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)

Pier Reinforcement:

Bar Size =	BS _{pier} := 7	(User Input)	
Bar Diameter =	d _{bpier} := 0.875 in	(User Input)	
Number of Bars =	NB _{pier} := 26	(User Input)	
Clear Cover of Reinforcement =	Cvr _{pier} := 3.0 in	(User Input)	
Reinforcement Location Factor =	α _{pier} := 1.0	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	β _{pier} := 1.0	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	λ _{pier} := 1.0	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	γ _{pier} := 1.0	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	d _{Tie} := 3 in	(User Input)	

Pad Reinforcement:

Bar Size =	BS _{top} := 10	(User Input)	(Top of Pad)
Bar Diameter =	d _{btop} := 1.27 in	(User Input)	(Top of Pad)
Number of Bars =	NB _{top} := 29	(User Input)	(Top of Pad)
Bar Size =	BS _{bot} := 10	(User Input)	(Bottom of Pad)
Bar Diameter =	d _{bbot} := 1.27 in	(User Input)	(Bottom of Pad)
Number of Bars =	NB _{bot} := 29	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	Cvr _{pad} := 3.0 in	(User Input)	
Reinforcement Location Factor =	α _{pad} := 1.0	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	β _{pad} := 1.0	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	λ _{pad} := 1.0	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	γ _{pad} := 1.0	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =	$A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.601 \cdot \text{in}^2$	
Pad Top Reinforcement Bar Area =	$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.267 \cdot \text{in}^2$	
Pad Bottom Reinforcement Bar Area =	$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.267 \cdot \text{in}^2$	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.537$	
Load Factor =	$LF := \begin{cases} 1.333 & \text{if } H_t \leq 700 \text{ ft} \\ 1.7 & \text{if } H_t \geq 1200 \text{ ft} \\ 1.333 + \left(\frac{H_t - 700 \text{ ft}}{1200 \text{ ft} - 700 \text{ ft}} \right) \cdot 0.4 & \text{otherwise} \end{cases}$	= 1.333

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{conc}} - 62.4 \text{ pcf}, \gamma_{\text{conc}}) = 87.6 \text{ pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{soil}} - 62.4 \text{ pcf}, \gamma_{\text{soil}}) = 57.6 \text{ pcf}$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \text{ ksf}$$

$$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0.917 \text{ ksf}$$

$$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] = 0.917 \text{ ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.426 \text{ ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.171 \text{ ksf}$$

$$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 2.5$$

$$A_p := W_f \cdot T_p = 75$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 87.862 \text{ kip}$$

Weight of Concrete Pad =

$$WT_{pad} := (W_f^2 \cdot T_f) \cdot \gamma_c = 197.1 \text{ kip}$$

Weight of Concrete Piers =

$$WT_{pier} := 3 \cdot \left[\left(L_p \cdot \frac{d_p^2 \cdot \pi}{4} \right) \cdot \gamma_c \right] = 16.512 \text{ kip}$$

Total Weight of Concrete =

$$WT_c := WT_{pad} + WT_{pier} = 214 \text{ kip}$$

Weight of Soil Above Footing =

$$WT_{s1} := \left(W_f^2 - 3 \cdot \frac{d_p^2 \cdot \pi}{4} \right) \cdot (L_p - L_{pag}) \cdot \gamma_s = 224 \text{ kip}$$

Weight of Soil Above Footing =

$$WT_{s2} := \left[\frac{\tan(\Phi_s) \cdot (L_p - L_{pag})^2}{2} \cdot W_f \right] \cdot \gamma_s = 12 \text{ kip}$$

Tower Offset =

$$X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cos(30 \text{ deg}))}{2} \right] \quad X_{t2} := \frac{W_f}{2} - \frac{(W_t \cos(30 \text{ deg}))}{3}$$

$$X_t := \text{if}(\text{Post}_t, X_{t1}, X_{t2}) = 8.938$$

$$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t \cos(30 \text{ deg}))}{3} + X_t \right] = 2.021$$

Resisting Moment =

$$M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \left[W_f + \frac{\tan(\Phi_s) \cdot (L_p - L_{pag})}{3} \right]$$

Overturning Moment =

$$M_{ot} := OM + S_t \cdot (L_p + T_f) = 3160 \text{ kip-ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 2.21$$

Factor of Safety Required =

$$FS_{req} := 2$$

$$\text{OverTurning_Moment_Check} := \text{if}(FS \geq FS_{req}, \text{"Okay"}, \text{"No Good"})$$

$$\text{OverTurning_Moment_Check} = \text{"Okay"}$$

Bearing Pressure Caused by Footing:

Total Load =

$$\text{Load}_{\text{tot}} := \text{WT}_c + \text{WT}_{s1} + \text{WT}_t = 479 \text{ kip}$$

Area of the Mat =

$$A_{\text{mat}} := W_f^2 = 900$$

Section Modulus of Mat =

$$S := \frac{W_f^3}{6} = 4500 \text{ ft}^3$$

Maximum Pressure in Mat =

$$P_{\text{max}} := \frac{\text{Load}_{\text{tot}}}{A_{\text{mat}}} + \frac{M_{\text{ot}}}{S} = 1.235 \text{ ksf}$$

$$\text{Max_Pressure_Check} := \text{if}(P_{\text{max}} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{Max_Pressure_Check} = \text{"Okay"}$$

Minimum Pressure in Mat =

$$P_{\text{min}} := \frac{\text{Load}_{\text{tot}}}{A_{\text{mat}}} - \frac{M_{\text{ot}}}{S} = -0.17 \text{ ksf}$$

$$\text{Min_Pressure_Check} := \text{if}((P_{\text{min}} \geq 0) \cdot (P_{\text{min}} < q_s), \text{"Okay"}, \text{"No Good"})$$

$$\text{Min_Pressure_Check} = \text{"No Good"}$$

Distance to Resultant of Pressure Distribution =

$$X_p := \frac{P_{\text{max}}}{\frac{P_{\text{max}} - P_{\text{min}}}{W_f}} \cdot \frac{1}{3} = 8.791$$

Distance to Kern =

$$X_k := \frac{W_f}{6} = 5$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity =

$$e := \frac{M_{\text{ot}}}{\text{Load}_{\text{tot}}} = 6.595$$

Adjusted Soil Pressure =

$$P_a := \frac{2 \cdot \text{Load}_{\text{tot}}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e \right)} = 1.267 \text{ ksf}$$

$$q_{\text{adj}} := \text{if}(P_{\text{min}} < 0, P_a, P_{\text{max}}) = 1.267 \text{ ksf}$$

$$\text{Pressure_Check} := \text{if}(q_{\text{adj}} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{Pressure_Check} = \text{"Okay"}$$

Concrete Bearing Capacity:

Strength Reduction Factor =

$$\Phi_c := 0.65 \quad (\text{ACI-2008 9.3.2.2})$$

Bearing Strength Between Pier and Pad =

$$P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 3.999 \times 10^3 \text{ kips} \quad (\text{ACI-2008 10.14})$$

$$\text{Bearing_Check} := \text{if}(P_b > \text{LF} \cdot C_t, \text{"Okay"}, \text{"No Good"})$$

$$\text{Bearing_Check} = \text{"Okay"}$$

Shear Strength of Concrete:

Beam Shear:

(Critical section located at a distance d from the face of Pier)

(ACI 11.3.1.1)

$$\phi_c := 0.85$$

(ACI 9.3.2.5)

$$d := T_f - C_{vr_{pad}} - d_{bbot} = 25.73 \text{ in}$$

$$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$$

$$d_2 := d_1 - d$$

$$L := \left(\frac{W_f}{2} - e \right) \cdot 3$$

$$\text{Slope} := \text{if} \left(L > W_f, \frac{P_{\max} - P_{\min}}{W_f}, \frac{q_{adj}}{L} \right)$$

$$V_{req} := LF \cdot \left[(q_{adj} - \text{Slope} \cdot d_1) + \left(\frac{\text{Slope} \cdot d_1}{2} \right) \right] \cdot W_f \cdot d_1 = 488.803 \text{ kip}$$

$$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c} \cdot \text{psi} \cdot W_f \cdot d = 996 \text{ kip} \quad (\text{ACI-2008 11.2.1.1})$$

$$\text{Beam_Shear_Check} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Beam_Shear_Check} = \text{"Okay"}$$

Punching Shear:

(Critical Section Located at a distance of d/2 from the face of pier)

(ACI 11.11.1.2)

$$\text{Critical Perimeter of Punching Shear} =$$

$$b_o := (d_p + d) \cdot \pi = 19.3$$

$$\text{Area Included Inside Perimeter} =$$

$$A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4} = 29.6$$

$$\text{Area Outside of Perimeter} =$$

$$A_{out} := A_{mat} - A_{bo} = 870.4$$

$$\text{Guess Value} =$$

$$v_u := 1 \text{ ksf}$$

(From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

$$\text{Given}$$

$$d^2 + d_p \cdot d = \frac{\text{Load}_{tot}}{\pi \cdot v_u}$$

$$v_u := \text{Find}(v_u) = 1.2 \times 10^4 \text{ lbf}$$

$$V_u := v_u \cdot d \cdot W_f = 744.7 \text{ kips}$$

Required Shear Strength =

$$V_{req} := LF \cdot V_u = 992.6 \text{ kips}$$

Available Shear Strength =

$$V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \text{ psi}} \cdot b_o \cdot d = 1281.6 \text{ kip} \quad (\text{ACI-2008 11.11.2.1})$$

$$\text{Punching_Shear_Check} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Punching_Shear_Check} = \text{"Okay"}$$

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor =

$$\phi_m := .90$$

(ACI-2008 9.3.2.1)

$$M_{nT} := LF \cdot \left[U_t \cdot \left(W_t \cdot \sin(60 \text{ deg}) - \frac{d_p}{2} \right) + S_t \cdot (D_f + L_{pag}) \right] - W_{T_t} \cdot X_{off} = 3278 \text{ ft-k}$$

$$M_{nS} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \text{ deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot [\gamma_s \cdot (T_f - T_f)] \right]$$

$$M_{nC} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \text{ deg}) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot (\gamma_c \cdot T_f) \right]$$

Design Moment =

$$M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m} = 3.148 \times 10^3 \text{ kips-ft}$$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \text{ psi} \leq f_c \leq 4000 \text{ psi} \\ 0.65 & \text{if } f_c > 8000 \text{ psi} \end{cases} = 0.85$$

(ACI-2008 10.2.7.3)

$$\left[\left[0.85 - \left[\frac{\left(\frac{f_c}{\text{psi}} - 4000 \right)}{1000} \right] \cdot 0.5 \right] \right] \text{ otherwise}$$

$$b_{eff} := W_t \cdot \cos(30 \text{ deg}) + d_p = 193.492 \text{ in}$$

$$d := T_f - C_{vr_{pad}} - d_{bbot} = 25.73 \text{ in}$$

$$A_s := \frac{M_n}{(f_y \cdot d)} = 24.467 \text{ in}^2$$

$$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{eff}} = 2.231 \text{ in}$$

$$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2} \right)} = 25.576 \text{ in}^2$$

$$\rho := \frac{A_s}{b_{eff} \cdot d} = 0.00514$$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \text{ psi} \\ .0020 & \text{otherwise} \end{cases} = 0.0018 \quad (\text{ACI-2008 7.12.2.1})$$

Check Bottom Bars:

$$A_s := \begin{cases} (\rho \cdot b_{eff} \cdot d) & \text{if } (\rho \cdot b_{eff} \cdot d) > \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d \\ \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d & \text{otherwise} \end{cases} = 25.576 \text{ in}^2$$

$$A_{sprov} := A_{bbot} \cdot NB_{bot} = 36.7 \text{ in}^2$$

$$Pad_Reinforcement_Bot := \text{if}(A_{sprov} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$Pad_Reinforcement_Bot = \text{"Okay"}$$

Check top Bars:

$$A_s := \text{if} \left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d \right) = 25.6 \text{ in}^2$$

$$A_{sprov} := A_{btop} \cdot NB_{top} = 36.7 \text{ in}^2$$

$$Pad_Reinforcement_Top := \text{if}(A_{sprov} > A_s, \text{"Okay"}, \text{"No Good"})$$

$$Pad_Reinforcement_Top = \text{"Okay"}$$

Development Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot C_{vrpad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 11.33 \text{ in}$$

Spacing or Cover Dimension =

$$c := \text{if} \left(C_{vrpad} < \frac{B_{sPad}}{2}, C_{vrpad}, \frac{B_{sPad}}{2} \right) = 3 \text{ in}$$

Transverse Reinforcement Index =

$$k_{tr} := 0 \quad (\text{ACI-2008 12.2.3})$$

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \beta_{pad} \gamma_{pad} \lambda_{pad}}{40 \cdot \sqrt{f_c' \text{ psi}} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 38.3 \text{ in}$$

Minimum Development Length =

$$L_{dbmin} := 12 \text{ in} \quad (\text{ACI-2008 12.2.1})$$

$$L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"}) = \text{"Use L.dbt"}$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - C_{vrpad} = 93 \text{ in}$$

$$L_{pad_Check} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$$

$$L_{pad_Check} = \text{"Okay"}$$

Steel Reinforcement in Pier:

Area of Pier =

$$A_p := \frac{\pi \cdot d_p^2}{4} = 1809.56 \text{ in}^2$$

$$A_{smin} := 0.01 \cdot 0.05 \cdot A_p = 0.9 \text{ in}^2 \quad (\text{ACI-2008 10.8.4 \& 10.9.1})$$

$$A_{sprov} := N_{B_{pier}} \cdot A_{B_{pier}} = 15.63 \text{ in}^2$$

$$\text{Steel_Area_Check} := \text{if}(A_{sprov} > A_{smin}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Steel_Area_Check} = \text{"Okay"}$$

Bar Spacing In Pier =

$$B_{SPier} := \frac{d_p \cdot \pi}{N_{B_{pier}}} - d_{B_{pier}} = 4.925 \text{ in}$$

Diameter of Reinforcement Cage =

$$\text{Diam}_{cage} := d_p - 2 \cdot C_{vr_{pier}} = 42 \text{ in}$$

Maximum Moment in Pier =

$$M_p := \left[S_f \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF = 2991.3 \text{ in-kips}$$

Pier Check evaluated from outside program and results are listed below;

$$(D \ N \ n \ P_u \ M_{xu}) := \left(d_p \cdot 12 \ N_{B_{pier}} \ B_{SPier} \ \frac{C_t \cdot 1.333}{\text{kips}} \ \frac{M_p}{\text{in-kips}} \right)$$

$$(D \ N \ n \ P_u \ M_{xu}) = (48 \ 26 \ 7 \ 338.6 \ 2991.3)$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := (0 \ 0 \ 0 \ 0)$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P'_n (D, N, n, P_u, M_{xu})^T$$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (2319.5 \ 20492 \ -39.8 \ 0)$$

$$\text{Axial_Load_Check} := \text{if}(\phi P_n \geq P_u, \text{"Okay"}, \text{"No Good"})$$

$$\text{Axial_Load_Check} = \text{"Okay"}$$

$$\text{Bending_Check} := \text{if}(\phi M_{xn} \geq M_{xu}, \text{"Okay"}, \text{"No Good"})$$

$$\text{Bending_Check} = \text{"Okay"}$$

Development Length Pier Reinforcement:

Available Length in Foundation:

$$L_{\text{pier}} := L_p - C_{\text{vr}}_{\text{pier}} = 57 \cdot \text{in}$$

$$L_{\text{pad}} := T_f - C_{\text{vr}}_{\text{pad}} = 27 \cdot \text{in}$$

Tension:

(ACI-2008 12.2.3)

Spacing or Cover Dimension =

$$c := \text{if} \left(C_{\text{vr}}_{\text{pier}} < \frac{B_{\text{SPier}}}{2}, C_{\text{vr}}_{\text{pier}}, \frac{B_{\text{SPier}}}{2} \right) = 2.462 \cdot \text{in}$$

Transverse Reinforcement =

$$k_{\text{tr}} := 0 \quad (\text{ACI-2008 12.2.3})$$

$$L_{\text{dbt}} := \frac{3 \cdot f_y \alpha_{\text{pier}} \beta_{\text{pier}} \gamma_{\text{pier}} \lambda_{\text{pier}}}{40 \cdot \sqrt{f_c} \cdot \text{psi} \cdot \left(\frac{c + k_{\text{tr}}}{d_{\text{bpier}}} \right)} \cdot d_{\text{bpier}} = 22.12 \cdot \text{in}$$

Minimum Development Length =

Pier reinforcement bars are standard 90 degree hooks and therefore development in the pad is computed as follows:

$$L_{\text{dh}} := \frac{1200 \cdot d_{\text{bpier}}}{\sqrt{\frac{f_c}{\text{psi}}}} \cdot .7 = 11.621 \cdot \text{in} \quad (\text{ACI 12.2.1})$$

$$L_{\text{db}} := \max(L_{\text{dbt}}, L_{\text{dbmin}})$$

$$L_{\text{tension_Check}} := \text{if}(L_{\text{pier}} + L_{\text{pad}} > L_{\text{dbt}}, \text{"Okay"}, \text{"No Good"})$$

$$L_{\text{tension_Check}} = \text{"Okay"}$$

Compression:

(ACI-2008 12.3.2)

$$L_{\text{dbc1}} := \frac{.02 \cdot d_{\text{bpier}} \cdot f_y}{\sqrt{f_c} \cdot \text{psi}} = 16.602 \cdot \text{in}$$

$$L_{\text{dbmin}} := 0.0003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{\text{bpier}} \cdot f_y) = 15.75 \cdot \text{in}$$

$$L_{\text{dbc}} := \text{if}(L_{\text{dbc1}} \geq L_{\text{dbmin}}, L_{\text{dbc1}}, L_{\text{dbmin}}) = 16.602 \cdot \text{in}$$

$$L_{\text{compression_Check}} := \text{if}(L_{\text{pier}} + L_{\text{pad}} > L_{\text{dbc}}, \text{"Okay"}, \text{"No Good"})$$

$$L_{\text{compression_Check}} = \text{"Okay"}$$

Tie Size and Spacing in Column:

Minimum Tie Size =

$$Tie_{min} := \text{if}(BS_{pier} \leq 10, 3, 4) = 3$$

Used #3 Ties

Seismic Factor =

$$z := \text{if}(Z \leq 2, 1, 0.5) = 1 \quad (\text{ACI-2008 21.10.5})$$

$$s_{lim1} := 16 \cdot d_{bpier} \cdot z = 14 \cdot \text{in}$$

$$s_{lim2} := \frac{48 \cdot d_{Tie}}{8} \cdot z = 18 \cdot \text{in}$$

$$s_{lim3} := D_f \cdot z = 84 \cdot \text{in}$$

$$s_{lim4} := 18 \text{ in}$$

Maximum Spacing =

$$s_{tie} := \min \left(\begin{matrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{matrix} \right) = 14 \cdot \text{in}$$

Number of Ties Required =

$$n_{tie} := \frac{L_{pier} - 3 \cdot \text{in}}{s_{tie}} + 1 = 4.857$$

Check Anchor Steel Embedment:

Depth Available =

$$D_{ab} := L_{st} - A_{BP} = 5 \cdot \text{ft}$$

Length of Anchor Bolt =

$$L_{anchor} := \frac{(0.11 \cdot f_{ya}) \cdot \text{in}}{\sqrt{f_c} \cdot \text{psi}} = 10.87 \cdot \text{ft}$$

$$\text{Depth_Check} := \text{if}(D_{ab} \geq L_{anchor}, \text{"Okay"}, \text{"No Good"})$$

Depth_Check = "No Good"

Note: Anchor plate is provided

Section 1 - RFDS GENERAL INFORMATION										
RFDS NAME:	CT 1212		DATE:	3/2/2012 16:30		RF DESIGN ENG:	Evan Thibodeau		RF PER ENG:	
ISSUE:	Preliminary	Approved? (Y/N)	Y		RF DESIGN PHONE:	(603) 320-8556		RF PER PHONE:		
REVISION:	V01	RF MANAGER:	Walter Sackig		RF DESIGN EMAIL:	et2267@att.com		RF PER EMAIL:		
INITIATIVE / PROJECT:	LTE Wave 3 Prelim								TRIDENT: GSM FREQUENCY: UMTS FREQUENCY: LTE FREQUENCY: I-PLAN JOB # 1: I-PLAN JOB # 2: I-PLAN JOB # 3: I-PLAN JOB # 4:	
Section 2 - LOCATION INFORMATION										
USID:	61207		FA LOCATION CODE:	10035403		LOCATION NAME:	Cheshire NJ		ORACLE PRIT # 1:	
REGION:	NORTHEAST		MARKET CLUSTER:	NEW ENGLAND		MARKET:	CT		ORACLE PRIT # 2:	
ADDRESS:	705 West Johnson Rd		CITY:	Cheshire		STATE:	CT		ORACLE PRIT # 3:	
ZIP CODE:	06410		COUNTY:			MSA/ISA:	TBD		ORACLE PRIT # 4:	
LATITUDE (D-M-S):	41° 33' 21.4"		LONGITUDE (D-M-S):	-72° 55' 4.4"		LAT (DEC DEG.):	41 55504444		SEARCH RING NAME:	
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	TBD								SEARCH RING ID: BTA: LONG (DEC DEG.): BORDER CELL WITH CONT: AM STUDY REQ'D (Y/N): FREQ COORD:	
Section 3 - LICENSE COVERAGE/FILING INFORMATION										
CGSA - NO FILING TRIGGERED:	TBD		CGSA LOSS:	TBD		PCS REDUCED - UPS ZIP:	TBD			
CGSA - MINOR FILING NEEDED:	TBD		CGSA EXT AGMT NEEDED:	TBD		PCS POPS REDUCED:	TBD			
CGSA - MAJOR FILING NEEDED:	TBD		CGSA SCORECARD UPDATED:	TBD						
Section 4 - TOWER/REGULATORY INFORMATION										
STRUCTURE ATTS OWNED:	TBD		GROUND ELEVATION (ft):			STRUCTURE TYPE:	MONOPOLE		MKT LOCATION 850 MHZ CALL SIGN(S):	
ADDITIONAL REGULATORY?:	TBD		HEIGHT OVERALL (ft):			FCC ASR NUMBER:	TBD		MKT LOCATION 1900 MHZ CALL SIGN(S):	
SUB-LEASE RIGHTS?:	TBD		STRUCTURE HEIGHT (ft):						MKT LOCATION 700 MHZ CALL SIGN(S):	
LIGHTING TYPE:	TBD									
	PSAP NAME:		PSAP ID:		E911 PHASE:		MPC SVC PROVIDER:		ESRN:	
ALPHA	TBD		TBD		TBD		TBD		TBD	
BETA	TBD		TBD		TBD		TBD		TBD	
GAMMA	TBD		TBD		TBD		TBD		TBD	
DELTA										
EPSILON										
PSI										
Section 6 - RBS GENERAL INFORMATION										
4-DIGIT SITE ID:	1212		COW OR LOY?:	NO		CELLULAR NETWORK:			GO	
CELL SITE TYPE:	SECTORIZED		SITE TYPE:	MACRO		OPS DISTRICT:			TB	
BTS LOCATION ID:	TBD		ORIGINATING CO:	ATT		RF DISTRICT:			TB	
Section 7 - RBS SPECIFIC INFORMATION										
	GSM RBSs		UMTS 1ST CARRIER RBSs		UMTS 2ND CARRIER RBSs		UMTS 3RD CARRIER RBSs		UMTS 4TH CARRIER RBSs	
MSC	TBD		TBD		TBD		TBD		N/A	
BSC/RNC	TBD		TBD		TBD		TBD		N/A	
IAC	TBD		TBD		TBD		TBD		N/A	
RAC	TBD		TBD		TBD		TBD		N/A	
EQUIPMENT VENDOR	NOKIA		ERICSSON		ERICSSON		N/A		N/A	
EQUIPMENT TYPE	TBD		TBD		TBD		N/A		N/A	
LOCATION	TBD		TBD		TBD		N/A		N/A	
CABINET LOCATION	TBD		TBD		TBD		N/A		N/A	
Section 8 - RBS INDIVIDUAL INFORMATION										
	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
CELL ID/BCE	318G1212	318P1212	CTV1212	CTU1212	NA	NA	N/A	N/A	N/A	N/A
CTS COMMON ID	318G1212	318P1212	CTV1212	CTU1212	NA	NA	N/A	N/A	N/A	N/A
Section 9 - SOFT SECTOR ID										
	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	318G12121	318P12121	CTV12121	CTU12121	NA	NA	N/A	N/A	N/A	N/A
BETA	318G12122	318P12122	CTV12122	CTU12122	NA	NA	N/A	N/A	N/A	N/A
GAMMA	318G12123	318P12123	CTV12123	CTU12123	NA	NA	N/A	N/A	N/A	N/A
DELTA										
EPSILON										
PSI										
Section 10 - CID/SAC										
	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	12121	12121	12121	12127	NA	NA	NA	NA	NA	NA
BETA	12122	12122	12122	12128	NA	NA	NA	NA	NA	NA
GAMMA	12123	12123	12123	12129	NA	NA	NA	NA	NA	NA
DELTA										
EPSILON										
PSI										
Section 11 - CURRENT RADIO COUNTS (Existing)										
	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
BETA	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
GAMMA	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
DELTA										
EPSILON										
PSI										
Section 12 - CURRENT BASE BAND CONFIGURATION (Existing)										
	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet		UMTS 2nd Cabinet		UMTS 3rd Cabinet			
#T1s	TBD	TBD	TBD		TBD		TBD			
LINK PROFILE	TBD	TBD	TBD		TBD		TBD			
RF Combining										
Fiber or Ethernet?	TBD	TBD	TBD		TBD		TBD			
Tx Board Model										
Tx Board QTY										
RAX/ECU Board Model										
RAX/ECU Board QTY										
BBU Board Model										
BBU Board QTY										
RRU - Type(Qty-Model)										
Fiber Jumper										
DC Cable										
DC/Fiber Dem. Box										
Bundled Fiber Cable										
Bundled DC Cable										
Section 13 - NEWPROPOSED RADIO COUNTS										
	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
BETA	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
GAMMA	TBD	TBD	TBD	TBD	TBD	TBD	N/A	N/A	N/A	N/A
DELTA										
EPSILON										
PSI										
Section 14 - NEWPROPOSED BASE BAND CONFIGURATION										
	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet		UMTS 2nd Cabinet		UMTS 3rd Cabinet			
#T1s	TBD	TBD	TBD		TBD		TBD			
LINK PROFILE										
RF Combining										
Fiber or Ethernet?										
Tx Board Model										
Tx Board QTY										
RAX/ECU Board Model										
RAX/ECU Board QTY										
BBU Board Model										
BBU Board QTY										
RRU - Type(Qty-Model)										
Fiber Jumper										
DC Cable										
DC/Fiber Dem. Box										
Bundled Fiber Cable										
Bundled DC Cable										

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)							
ANTENNA CONFIG (FROM BACK):	ANTENNA 1		ANTENNA 2		ANTENNA 3		ANTENNA 4
	GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850 GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS
Feeder Length (feet)	115'	115'					115'
ANTENNA ATOLL							
ANTENNA MAKE - MODEL	DUO1417-8670						DUO1417-8670
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010
ANTENNA SIZE (H x W x D)	48.0 x 14.0 x 9.0						48.0 x 14.0 x 9.0
ANTENNA WEIGHT	20.3						20.3
ANTENNA GAIN							
AZIMUTH							
RADIATION CENTER (feet)	98'						98'
ANTENNA TIP HEIGHT	100'						100'
ELECTRICAL TILT (700/850/1900/AWS)	N/A	N/A					N/A
MECHANICAL DOWNTILT							
FEEDER AMOUNT	2						2
Antenna RET Motor (QTY/MODEL)	N/A						N/A
Antenna RET Splitter (QTY/MODEL)							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)							
Antenna RET Surge Arrestor (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site							
DC BLOCK (QTY/MODEL)							
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMA (QTY/MODEL) usually per site							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	N/A						N/A
HYBRID COMBINER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
FILTER (QTY/MODEL)							
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A
Additional Component1							
Additional Component2							
Additional Component3							
MAGNETIC DECLINATION	-14 °						-14 °
HATCHPLATE POWER (Watts)							
ERP (Watts)							
Local Market Note1							
Local Market Note2							
Local Market Note3							
Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA							
ANTENNA CONFIG (FROM BACK):	ANTENNA 1		ANTENNA 2		ANTENNA 3		ANTENNA 4
	GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850 GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS
Feeder Length (feet)	115'	115'					115'
ANTENNA ATOLL							
ANTENNA MAKE - MODEL	DUO1417-8670						DUO1417-8670
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010
ANTENNA SIZE (H x W x D)	48.0 x 14.0 x 9.0						48.0 x 14.0 x 9.0
ANTENNA WEIGHT	20.3						20.3
ANTENNA GAIN							
AZIMUTH							
RADIATION CENTER (feet)	98'						98'
ANTENNA TIP HEIGHT	100'						100'
ELECTRICAL TILT (700/850/1900/AWS)	N/A	N/A					N/A
MECHANICAL DOWNTILT							
FEEDER AMOUNT	2						2
Antenna RET Motor (QTY/MODEL)	N/A						N/A
Antenna RET Splitter (QTY/MODEL)							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)							
Antenna RET Surge Arrestor (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site							
DC BLOCK (QTY/MODEL)							
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMA (QTY/MODEL) usually per site							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	N/A						N/A
HYBRID COMBINER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
FILTER (QTY/MODEL)							
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A
Additional Component1							
Additional Component2							
Additional Component3							
MAGNETIC DECLINATION	-14 °						-14 °
HATCHPLATE POWER (Watts)							
ERP (Watts)							
Local Market Note1							
Local Market Note2							
Local Market Note3							
Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA							
ANTENNA CONFIG (FROM BACK):	ANTENNA 1		ANTENNA 2		ANTENNA 3		ANTENNA 4
	GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)		GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850 GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS
Feeder Length (feet)	115'	115'					115'
ANTENNA ATOLL							
ANTENNA MAKE - MODEL	DUO1417-8670						DUO1417-8670
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010
ANTENNA SIZE (H x W x D)	48.0 x 14.0 x 9.0						48.0 x 14.0 x 9.0
ANTENNA WEIGHT	20.3						20.3
ANTENNA GAIN							
AZIMUTH							
RADIATION CENTER (feet)	98'						98'
ANTENNA TIP HEIGHT	100'						100'
ELECTRICAL TILT (700/850/1900/AWS)	N/A	N/A					N/A
MECHANICAL DOWNTILT							
FEEDER AMOUNT	2						2
Antenna RET Motor (QTY/MODEL)	N/A						N/A
Antenna RET Splitter (QTY/MODEL)							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)							
Antenna RET Surge Arrestor (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site							
DC BLOCK (QTY/MODEL)							
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMA (QTY/MODEL) usually per site							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	N/A						N/A
HYBRID COMBINER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
FILTER (QTY/MODEL)							
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A
Additional Component1							
Additional Component2							
Additional Component3							
MAGNETIC DECLINATION	-14 °						-14 °
HATCHPLATE POWER (Watts)							
ERP (Watts)							
Local Market Note1							
Local Market Note2							
Local Market Note3							

Section 150 - CURRENT SECTOR/CELL INFORMATION - DELTA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - ALPHA (OR OMNI)									
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		
TX/RX?	TxRx-TxRx		TxRx-TxRx		TxRx-Rx		TxRx-TxRx		
TECHNOLOGY	UMTS / 850		UMTS / 1900		LTE / 700		GSM / 850		GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A		N/A		TOP		N/A		N/A
FEEDERS TYPE	1 5/8" - RFS		1 5/8" - RFS				1 5/8" - RFS		1 5/8" - RFS
Feeder Length (feet)	115'		115'				115'		115'
ANTENNA ATOLL									
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET		
ANTENNA VENDOR	KMW				KMW		KMW		
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9		
ANTENNA WEIGHT	48.5				48.5		48.5		
ANTENNA GAIN									
AZIMUTH	143 °				23 °		143 °		
RADIATION CENTER (feet)	98'				98'		98'		
ANTENNA TIP HEIGHT	101'				101'		101'		
ELECTRICAL TILT (700/850/1900/AWS)	N/A		N/A		TBD		N/A		N/A
MECHANICAL DOWNTILT	N/A				0 °		N/A		N/A
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2		
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment		
Antenna RET Splitter (QTY/MODEL)									
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)									
Antenna RET Surge Arrestor (QTY/MODEL)									
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site									
DC BLOCK (QTY/MODEL)									
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				TBD / 2 Ericsson RRU		1 / CCI / DTMABP7819VG12A		
CURRENT INJECTORS FOR TMA (QTY/MODEL)									
PDU FOR TMAS (QTY/MODEL) usually per site									
SURGE ARRESTOR (QTY/MODEL)									
DIPLEXER (QTY/MODEL)	N/A						N/A		
HYBRID COMBINER (QTY/MODEL)									
DUPLEXER (QTY/MODEL)									
FILTER (QTY/MODEL)									
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT	No Rx/IT	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC	No LLC	
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A	
Additional Component1									
Additional Component2									
Additional Component3					RET connected to RRU for control				
MAGNETIC DECLINATION	-14 °				-14 °		-14 °		
HATCHPLATE POWER (Watts)									
ERP (Watts)									
Local Market Note1									
Local Market Note2									
Local Market Note3									

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - BETA									
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		
TX/RX?	TxRx-TxRx		TxRx-TxRx		TxRx-Rx		TxRx-TxRx		
TECHNOLOGY	UMTS / 850		UMTS / 1900		LTE / 700		GSM / 850		GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A		N/A		TOP		N/A		N/A
FEEDERS TYPE	1 5/8" - RFS		1 5/8" - RFS				1 5/8" - RFS		1 5/8" - RFS
Feeder Length (feet)	115'		115'				115'		115'
ANTENNA ATOLL									
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET		
ANTENNA VENDOR	KMW				KMW		KMW		
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9		
ANTENNA WEIGHT	48.5				48.5		48.5		
ANTENNA GAIN									
AZIMUTH	263 °				143 °		263 °		
RADIATION CENTER (feet)	98'				98'		98'		
ANTENNA TIP HEIGHT	101'				101'		101'		
ELECTRICAL TILT (700/850/1900/AWS)	N/A		N/A		TBD		N/A		N/A
MECHANICAL DOWNTILT	N/A				0 °		N/A		N/A
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2		
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment		
Antenna RET Splitter (QTY/MODEL)									
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)									
Antenna RET Surge Arrestor (QTY/MODEL)									
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site									
DC BLOCK (QTY/MODEL)									
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				TBD / 2 Ericsson RRU		1 / CCI / DTMABP7819VG12A		
CURRENT INJECTORS FOR TMA (QTY/MODEL)									
PDU FOR TMAS (QTY/MODEL) usually per site									
SURGE ARRESTOR (QTY/MODEL)									
DIPLEXER (QTY/MODEL)	N/A						N/A		
HYBRID COMBINER (QTY/MODEL)									
DUPLEXER (QTY/MODEL)									
FILTER (QTY/MODEL)									
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT	No Rx/IT	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC	No LLC	
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A	
Additional Component1									
Additional Component2									
Additional Component3					RET connected to RRU for control				
MAGNETIC DECLINATION	-14 °				-14 °		-14 °		
HATCHPLATE POWER (Watts)									
ERP (Watts)									
Local Market Note1									
Local Market Note2									
Local Market Note3									

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - GAMMA									
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		
TX/RX?	TxRx-TxRx		TxRx-TxRx		TxRx-Rx		TxRx-TxRx		
TECHNOLOGY	UMTS / 850		UMTS / 1900		LTE / 700		GSM / 850		GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A		N/A		TOP		N/A		N/A
FEEDERS TYPE	1 5/8" - RFS		1 5/8" - RFS				1 5/8" - RFS		1 5/8" - RFS
Feeder Length (feet)	115'		115'				115'		115'
ANTENNA ATOLL									
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET		
ANTENNA VENDOR	KMW				KMW		KMW		
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9		
ANTENNA WEIGHT	48.5				48.5		48.5		
ANTENNA GAIN									
AZIMUTH	23 °				263 °		23 °		
RADIATION CENTER (feet)	98'				98'		98'		
ANTENNA TIP HEIGHT	101'				101'		101'		
ELECTRICAL TILT (700/850/1900/AWS)	N/A		N/A		TBD		N/A		N/A
MECHANICAL DOWNTILT	N/A				0 °		N/A		N/A
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2		
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment		
Antenna RET Splitter (QTY/MODEL)									
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)									
Antenna RET Surge Arrestor (QTY/MODEL)									
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site									
DC BLOCK (QTY/MODEL)									
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				TBD / 2 Ericsson RRU		1 / CCI / DTMABP7819VG12A		
CURRENT INJECTORS FOR TMA (QTY/MODEL)									
PDU FOR TMAS (QTY/MODEL) usually per site									
SURGE ARRESTOR (QTY/MODEL)									
DIPLEXER (QTY/MODEL)	N/A						N/A		
HYBRID COMBINER (QTY/MODEL)									
DUPLEXER (QTY/MODEL)									
FILTER (QTY/MODEL)									
RX/IT KIT MODULE?	No Rx/IT	No Rx/IT					No Rx/IT	No Rx/IT	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	No LLC	No LLC					No LLC	No LLC	
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A	
Additional Component1									
Additional Component2									
Additional Component3					RET connected to RRU for control				
MAGNETIC DECLINATION	-14 °				-14 °		-14 °		
HATCHPLATE POWER (Watts)									
ERP (Watts)									
Local Market Note1									
Local Market Note2									
Local Market Note3									

Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMA (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RX/IT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

AM-X-CD-16-65-00T-RET(6' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V12°

1710 ~ 2170MHz, X-pol., H65° / V6.0°

Electrical Specification

Frequency Range	698~894MHz	1710~2170MHz
Impedance	50Ω	
Polarization	Dual, Slant ±45°	
Gain	15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth	Horizontal	65° @ 698-806MHz 63° @ 824-894MHz
	Vertical	65° @ 1710-1755MHz 67° @ 1850-1900MHz 69° @ 2110-2155MHz
	Horizontal	12.3° @ 698-806MHz 11.5° @ 824-894MHz
	Vertical	6.5° @ 1710-1755MHz 6.0° @ 1850-1900MHz 5.7° @ 2110-2155MHz
VSWR	≤1.5:1	
Front-to-Back Ratio	≥27 dB	
Electrical Downtilt Range	2° ~ 16°	0° ~ 10°
Isolation Between Ports	≥30 dB	
Isolation Between Ports of Different Frequency Elements	≥35 dB	
Cross Pole Discrimination	10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression	16dB	
Side Lobe Suppression	> 16 dB @ 0-6° Tilt > 18 dB @ 7-12° Tilt (Up to 10° from Boresight)	> 16 dB @ 0-6° Tilt > 18 dB @ 7-10° Tilt (Up to 10° from Boresight)
Passive Intermodulation	≤ -150 dBc @ 2x20w	
Input Maximum CW Power	500 W	300 W
Environmental Compliance	IP65 for Radome IP67 for Connectors	
RET Motor Configuration	Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0	AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

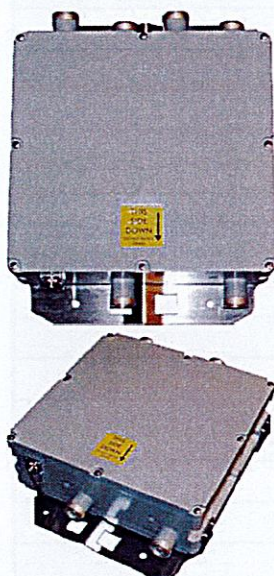
Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338

Fax: 201-342-3339

www.cciproduts.com

General Information



CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Duplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.



Model

DTMABP7819VG12A

Contents:

General Info and Technical Description	1
Electrical & Mechanical Specs (AISG TMA)	2
Block Diagram & Outline Drawing (AISG TMA)	3

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are duplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications



Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C), 1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C), 1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40° C to +65° C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.ccipproducts.com

Communication Components Inc.

Tel: 201-342-3338

CCI Confidential

Fax: 201-342-3339

RRUS 11

Frequency (AT&T)

- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

RF Characteristics

- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

RET/TMA Support

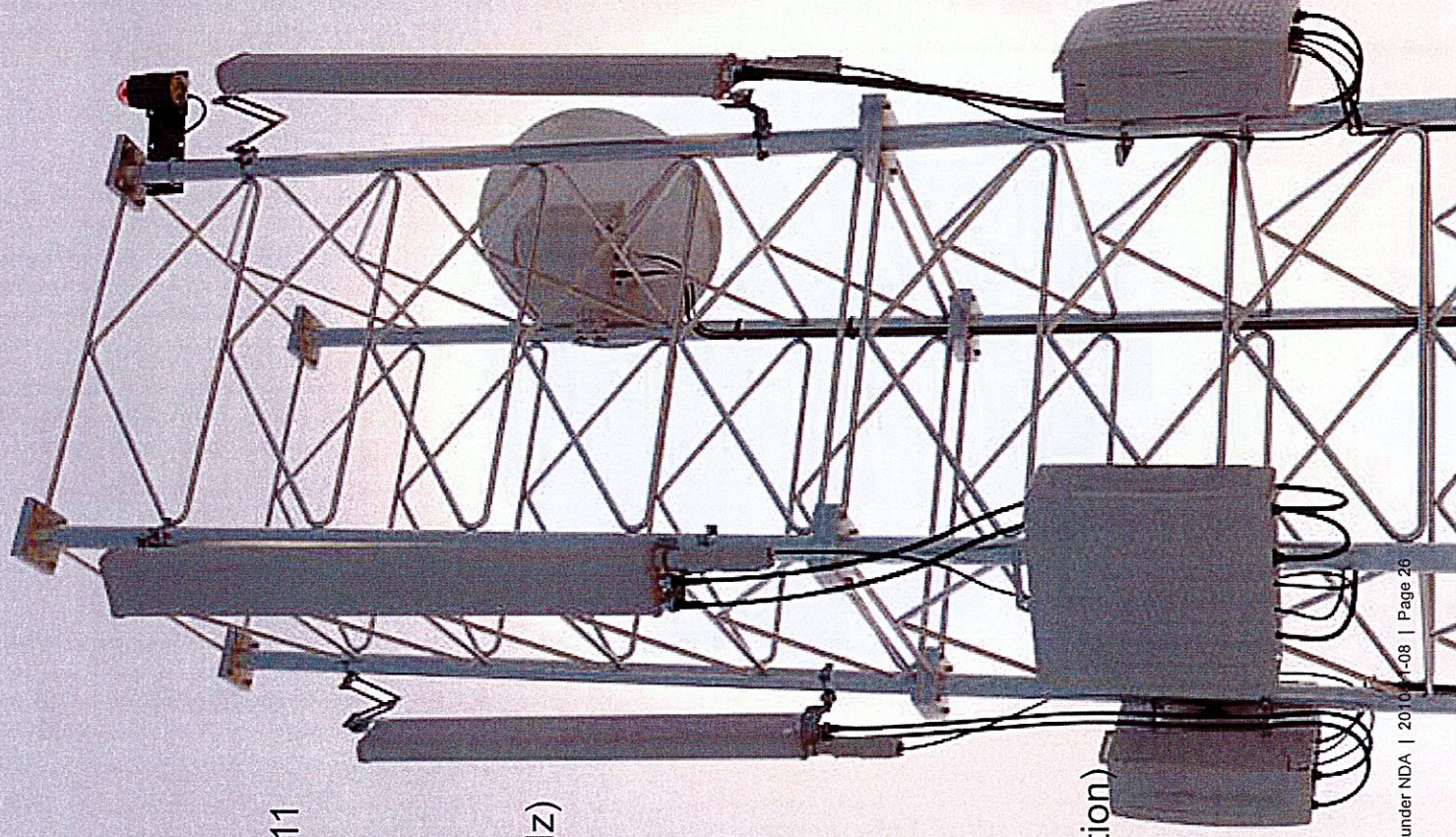
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

Environmental

- ✓ Self Convection
- ✓ Temperature -40 to 131 F

Power

- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
 - Recommended: 25 A
- ✓ Power Consumption:
 - Typical 200 Watts
 - Max 310 Watts
 - Excl. RET and TMA load



RRUS 11 Mechanics

Wall and pole mounting brackets

- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:

- Above ≥ 16 in.
- Below ≥ 12 in.
- Side ≥ 0 mm

DC connector

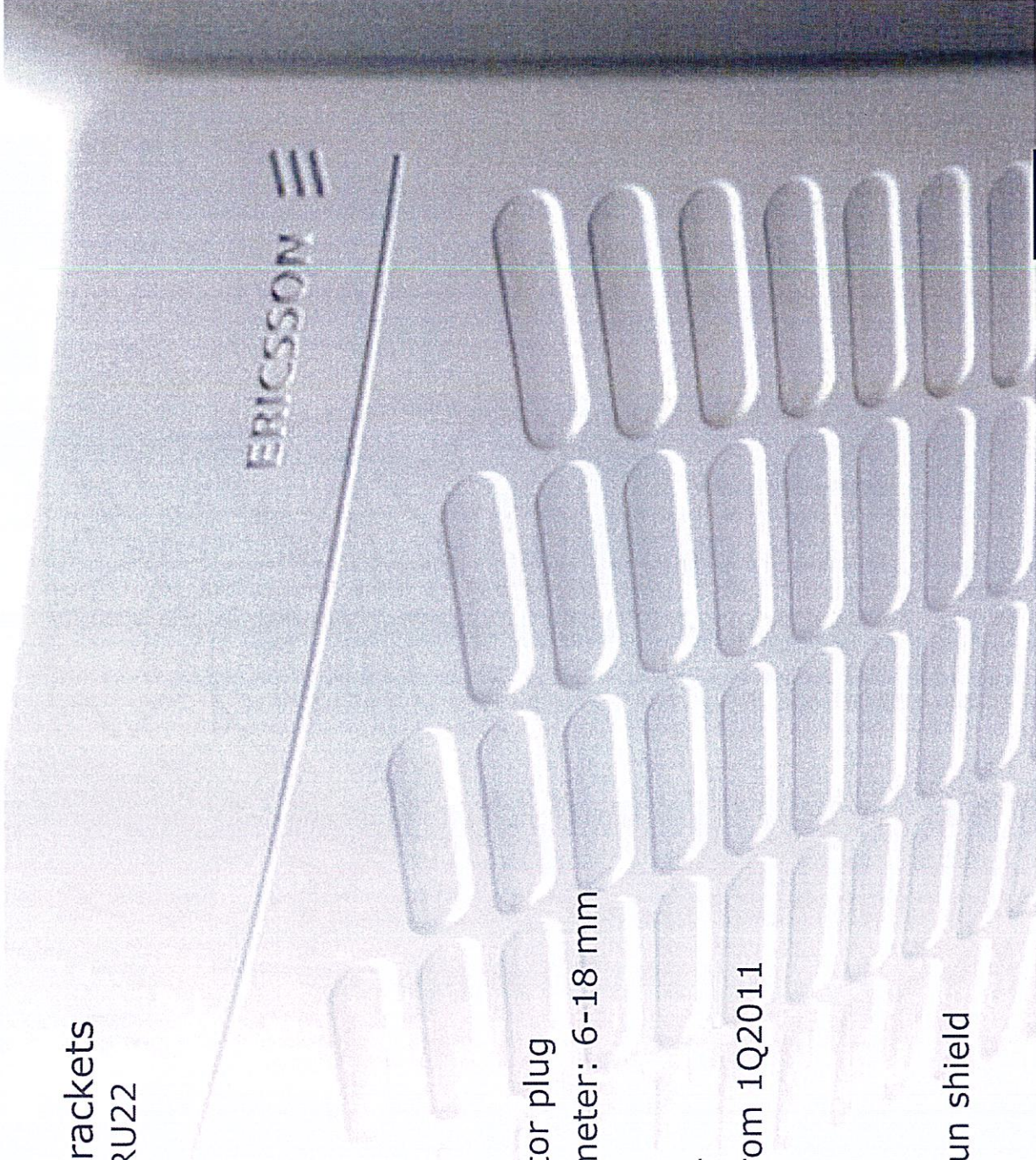
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector

- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight

- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8" x 17.3" x 7.2" incl. sun shield



POWER

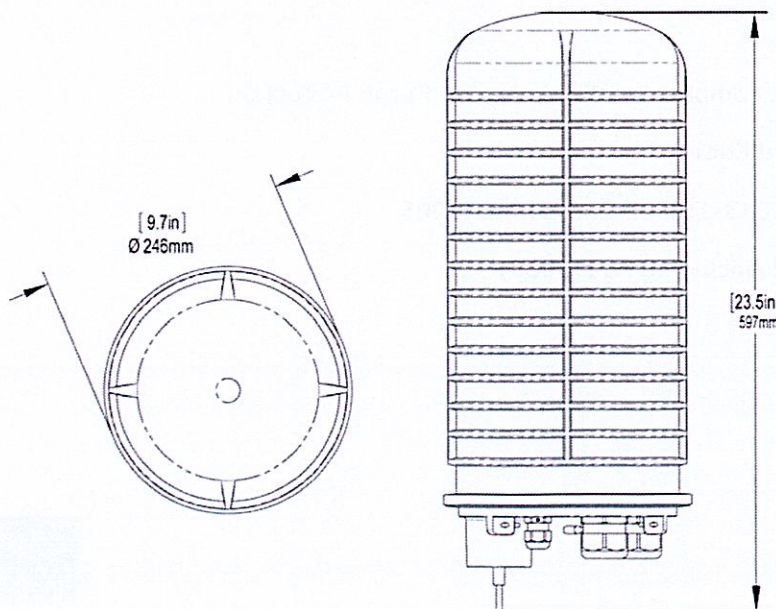
DC6-48-60-18-8F

DC Surge Suppression Solution

The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.



Raycap

DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 μ s
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 μ s
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 - 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)



Raycap

G02-00-068 REV 050610



GS-07F-0435V



Certified to
ISO 9001:2000



TUV Rheinland
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