In connection with this renewal application for Station WE2XXG, the following is noted:

1. This is to advise the Commission that the contract currently associated with the license has been changed to the following:

Agency/Customer: US Army

PM SAI/ ACC-APG DIVISION C

Contract No.: W56KGY-16-D-0013

Contract POC: Paul J. Kurzer, (443) 861-5368

paul.j.kurzer.civ@mail.mil

Because the license will also remain in effect to support non-government contract activity, no change to the 'XT" Station class should be made.

2. As the Commission is aware, FAA's previous coordination of the license required carveout of 1213-1215 MHz. See FAA email below dated 12/14/2018. Accordingly, it is requested that a Special Condition be added to the license (or the license be otherwise modified) to confirm no operations are permitted between 1213-1215 MHz:

From: Anuj.K.Sinha@faa.gov <mailto:Anuj.K.Sinha@faa.gov>

[mailto:Anuj.K.Sinha@faa.gov]

Sent: Wednesday, December 14, 2016 3:04 PM

To: Rummel, Jeffrey < <u>Jeffrey.Rummel@arentfox.com</u>

<mailto:Jeffrey.Rummel@arentfox.com>>

Cc: Stephanie.Thomas@faa.gov <mailto:Stephanie.Thomas@faa.gov>

Subject: RE: BAE Systems - Request for FAA Coordination - Pending Renewal and

Modification of Experimental License WE2XXG

Sir,

I have the assignment numbers for the renewal if BAE Systems concur to the change in frequency range from 1213MHz to 1215MHz

Pending Renewal Application - WE2XXG - File No. 0093-EX-CR-2016

1215MHz-1237MHz NGT 160474

1563MHz-1587MHz NGT 160473

Respectfully,

Anuj

Anuj Sinha Frequency Management Officer, Spectrum Engineer Federal Aviation Administration (FAA) ESA Spectrum Engineering Services, AJW-1C5 Office: 718 977 6609

3. Attached hereto are the licensee's calculations demonstrating compliance with NTIA GPS Re-Radiation Criteria – Section 8.3.28 of NTIA Regulations Maximum Equivalent Isotropically Radiated Power.

Compliance with NTIA GPS Re-Radiation Criteria – Section 8.3.28 of NTIA Regulations Maximum Equivalent Isotropically Radiated Power

Two distribution networks are used to re-radiate the GPS L1 (1575.42 MHz) and L2 (1227.60 MHz) signals at several locations inside the building designated PTP02 located at NL 42-42-09, WL 71-25-52. These systems (dual band) are configured similarly with an active receiving antenna, a signal-boost amplifier (where necessary), a leveling amplifier, RF distribution network and a re-radiating antenna for both frequencies at several locations within the building site.

Calculations are performed based on Section 8.3.28 of the NTIA regulations¹, wherein item f states:

"The equivalent isotropically radiated power (EIRP) must be such that the emissions are no greater than -140dBm/24 MHz as received by an isotropic antenna at a distance of 100 feet (30 meters) from the building where the test is being conducted. The calculation for maximum EIRP shall be based on free space propagation with no allowance for additional attenuation (e.g., building attenuation) as shown below.

$$P_{T \text{max}} = P_R + 20 \log_{10} f + 20 \log_{10} (30 + d) - 27.55$$

Where: PT_{max} is the maximum permissible EIRP in dBm PR is the power received at 30 meters from the building (i.e. -140 dBm/24 MHz) f is frequency in MHz (i.e. 1575.42 for L1, 1227.60 for L2, 1176.45 for L5) d is the distance between the radiator and the closest exterior wall of the building in meters.

 PT_{max} can then be converted to picowatts by using the formula: $PT_{\text{max}}(pW) = 10^{(PT_{\text{max}}/10) + 9}$

Applications requesting power greater than the *PT* max calculated at *d*=0 meters (i.e. 39.3 pW for L1, 23.8 pW for L2, and 21.9 pW for L5) must provide the distance from the transmit antenna to the nearest exterior wall so that reviewing agencies can determine if the requested power meets the maximum EIRP described above."

For this application, distance to the nearest exterior wall is assumed to be zero. Calculating the maximum transmit power:

L1
$$P_{T\max(\text{pW})} = -140 + 20\log_{10}(1575.42) + 20\log_{10}(30) - 27.55 = -74.1 \text{ dBm}$$

L1 $P_{T\max(\text{pW})} = 10^{(-74.1/10)} + 9 = 39.3 \text{ pW}$

L2
$$PT_{\text{max}(dBm)} = -140 + 20 \log_{10}(1227.6) + 20 \log_{10}(30) - 27.55 = -76.2 \text{ dBm}$$

L2 $PT_{\text{max}(pW)} = 10^{(-76.2/10)} + 9 = 23.8 \text{ pW}$

 $^{1\ \} See\ \textit{Manual of Regulations and Procedures for Federal Radio\ Frequency\ \textit{Management}\ Para\ 8.3.28\ (May\ 2013\ Edition,\ Rev\ Sept\ 2015).$

The two distribution networks are designated Distribution Network A (with 5 re-radiating nodes) and Distribution Network B (with 1 re-radiating node). The GPS re-radiator signal strength calculations for each re-radiator follows:

The Distribution Network A path names are Star Lab Path, Eng Lab Path, AIM Factory Path, BTW Chamber Path, and Chamber 10 Path.

Note that for Distribution Network A, the amplified received signal from the roof-mounted antenna is connected to a Leveling Amp which is set to provide -77 dBm output signal for input signals within the range -115 to -85 dBm. Therefore, -77 dBm is used as the starting point for the calculations.

| Distribution Network A - Star Lab | Path | | | | | | |
|------------------------------------|----------------------------------|---------------------------------|------------|-----------|---------------|------------------|--|
| Component | Signal Level L1 (1575.42 MHz) | Signal Level L2 (1227.6 MHz) | | | Manufacturer | Part Number | Notes |
| GPS Signal Input (Pr) | -130 | -130 | dBm | (typical) | | | -110 to -149 dBm (-130 dBm typical) |
| Antenna Gain (Gr) | 7.7 | 4.7 | dBi | | Antcom | 123GM1215A4-XN-1 | |
| RX Antenna LNA (G Ina) | 40 | 40 | dB | (typical) | | | |
| Cable Loss, 100 ft (Lc1) | -25.5 | -21.5 | dB | | | RG58 | -25.5dB/100ft [L1], -21.5dB/100 ft [L2] |
| Leveling Amp Output Level (Ps) | -77 | -77 | dBm | set value | GPS Source | GLI-METRO | Automatic Level Control Set to -77 dBm |
| Amplifier (Ga1) | 16.4 | 17.9 | dB | (typical) | Mini Circuits | ZX60-33LN | |
| Power Divider Loss (Ld1) | -9.7 | -9.6 | dB | | Mini Circuits | ZN8PD1-53+ | 8-way Splitter |
| Amplifier (Ga2) | 28 | 28 | dB | | Tallysman | 32-0125B-00 | |
| Cable Loss, 340 ft (Lc2) | -44.9 | -39.8 | dB | | | LMR-200 | -13.2dB/100ft [L1], -11.7dB/100 ft [L2] |
| Re-Radiating Antenna (Gt) | 3.0 | 3.0 | dBi | | Antcom | 2.3G1215P-XRS-4 | |
| GPS Transmit Power | -84.18 | -77.48 | dBm | | | | |
| GPS Transmit Power | 3.82 | 17.86 | pW | | | | |
| Path Loss at 100 ft (Lfs) | -66.1 | -63.9 | dB | | | | Assume 0 ft distance from antenna to bldg wall |
| EIRP @ 100 ft from Bldg (Psig) | -150.28 | -141.38 | dBm/24 MHz | | | | |
| Psig (EIRP) = Ps + Ga1 + Ld1 + Ga2 | +1c2+Gt+1fs | | | | | | |

| Distribution Network A - Eng Lab | Path | | | | | | |
|--------------------------------------|----------------------------------|---------------------------------|------------|-----------|---------------|------------------|--|
| | | | | | | | |
| Component | Signal Level L1 (1575.42 MHz) | Signal Level L2 (1227.6 MHz) | | | Manufacturer | Part Number | Notes |
| GPS Signal Input (Pr) | -130 | -130 | dBm | (typical) | | | -110 to -149 dBm (-130 dBm typical) |
| Antenna Gain (Gr) | 7.7 | 4.7 | dBi | | Antcom | 123GM1215A4-XN-1 | |
| RX Antenna LNA (G Ina) | 40 | 40 | dB | (typical) | | | |
| Cable Loss, 100 ft (Lc1) | -25.5 | -21.5 | dB | | | RG58 | -25.5dB/100ft [L1], -21.5dB/100 ft [L2] |
| Leveling Amp Output Level (Ps) | -77 | -77 | dBm | set value | GPS Source | GLI-METRO | Automatic Level Control Set to -77 dBm |
| Amplifier (Ga1) | 16.4 | 17.9 | dB | (typical) | Mini Circuits | ZX60-33LN | |
| Power Divider Loss (Ld1) | -9.7 | -9.6 | dB | | Mini Circuits | ZN8PD1-53+ | 8-way Splitter |
| Attenuator (Latten) | -10 | -10 | dB | | Mini Circuits | BW-S10W2+ | |
| Cable Loss, 24 ft (Lc2) | -3.2 | -2.8 | dB | | | LMR-200 | -13.2dB/100ft [L1], -11.7dB/100 ft [L2] |
| Re-Radiating Antenna (Gt) | 3.0 | 3.0 | dBi | | Antcom | 2.3G1215P-XRS-4 | |
| GPS Transmit Power | -80.5 | -78.5 | dBm | | | | |
| GPS Transmit Power | 8.91 | 14.13 | pW | | | | |
| Path Loss at 100 ft (Lfs) | -66.1 | -63.9 | dB | | | | Assume 0 ft distance from antenna to bldg wall |
| EIRP @ 100 ft from Bldg (Psig) | -146.6 | -142.4 | dBm/24 MHz | | | | |
| Psig (EIRP) = Ps + Ga1 + Ld1 + Latte | en + Lc2 + Gt + Lfs | | | | | | |

| (cf1) It 001 te sed hte | | | | | | | |
|--|---|---|--|-----------|--|---|---|
| (3) 1) +) 00 [tc 330 dtc | T'99- | 6.63- | 8p | | | | lew gbld ot ennetne mort eansteib it 0 emuseA |
| | | | | | | | |
| PS Transmit Power | 67.0 | 36'T | Wq | | | | |
| PS Transmit Power | T6- | 1.78- | mab | | | | |
| | | | | | | | |
| (10) ennetnA gniteibeA-e | 3.0 | 3.0 | iab | | zelgoeT | W1118.05.9T | |
| sple Loss, 55 ft (Lc3) | £. 7 - | č.ð- | 8b | | | LMR-200 | [L1] # 001/8b7.11- ,[L1] #001/8b2.51- |
| ower Divider Loss (Ld2) | 2.8- | 2.8- | 8b | | Mini Circuits | ZAPD-2-S+ | 8-way Splitter |
| Sable Loss, 80 ft (Lc2) | 7.51- | | | | | LMR-200 | [L1], -11.7dB/100 ft [L2] |
| ower Divider Loss (Ld1) | ۲.6- | 9.6- | 8p | | Mini Circuits | ZN8PD1-53+ | |
| (Ga1) | 16.4 | 6.7 <u>1</u> | | (typical) | Mini Circuits | N7EE-09XZ | |
| (29) level tuqtuO qmA gnileve | LL- | LL- | mab | eulev fez | GPS Source | GLI-METRO | mab TT- of 192 lontno level Level Automatic |
| sable Loss, 100 ft (Lc1) | 5.25.5 | 21.5 | 8b | | | RG58 | -25.5d8/100ft [L1], -21.5d8/100 ft [L2] |
| (snl O) AVJ snn9fnA X | 01⁄2 | 01⁄2 | 8b | (typical) | | | |
| (Gr) (Gr) | T.T | | iab | | moɔtnA | 1236M1215A4-XN-1 | |
| (19) Judni lengič S9 | -130 | -130 | mab | (typical) | | | (lesigyt m8b 0£1-) m8b 641- of 011- |
| omponent | (zHM S4.2721) | (xHM 0.7221) | | | Manufacturer | Part Number | sətoN |
| | £1 level L£ | Signal Level L2 | | | . , | | |
| | | | | | | | |
| istribution Network A - Chambe | 01 10 | | | | | | |
| | | | | | | | |
| sig (EIRP) = Ps + Ga1 + Ld1 + Lc2 + | 1+19+69+707 | 51 | | | | | |
| (2007) | | , | | | | | |
| (Bisq) gbl8 morf ff 001 @ 9AI | T'ZST- | тст- | ZHM 42/m8b | | | | |
| (2:30/2010 2034 47 001 @ 001 | 1231 | 131 | ziivi vcj aagp | | | | |
| (słJ) łł 00L te szoJ dfe | 1.88- | 6.63- | 8p | | | | Assume 0 ft distance from antenna to bldg wa |
| (-31) +3 001 + 44+1 | . 99 | 0 09 | up up | | | | |
| iPS Transmit Power | 67.0 | 26.£ | Wq | | | | |
| PS Transmit Power | 16- | | | | | | |
| 2 230. | - | | | | | | |
| (12) ennetnA gniteibeA-e | 3.0 | 3.0 | iab | | mostnA | 2.3G1215P-XRS-4 | |
| able Loss, 55 ft (Lc3) | £.7- | | | | | LMR-200 | -13.2dB/100ff [L1], -11.7dB/100 ft [L2] |
| ower Divider Loss (Ld2) | 2.8- | | | | Mini Circuits | ZAPD-2-S+ | 2-way Splitter |
| able Loss, 80 ft (Lc2) | 2.81- | | | | | LMR-200 | -13.2dB/100ff [L1], -11.7dB/100 ft [L2] |
| ower Divider Loss (Ld1) | 7.6- | 9'6- | | | Mini Circuits | +85-TQd8NZ | 8-way Splitter |
| (Ga1) | ⊅ '9T | | $\overline{}$ | (typical) | Mini Circuits | N788-09XZ | |
| (29) level tuqtuO qmA gnileve | <u>//-</u> | | | | GPS Source | GLI-METRO | Automatic Level Control Set to -77 dBm |
| able Loss, 100 ft (Lc1) | 5.25.5 | | | | | RG58 | [1] # 001/Bb2,t2-,[1] #001/Bb2,22- |
| (snl D) AVJ snnetnA X | 01/ | | 8p | (typical) | | 0300 | [0.1,1,000] 41 2 10 [11,1,000] 41 2 30 |
| (Gr) (Gr) | T.T | 7. ₽ | iab | | moɔtnA | 123GM1215A4-XN-1 | |
| (Pr) Signal Input (Pr) | 061- | -130 | | (typical) | | | -110 to -149 dBm (-130 dBm typical) |
| | | (SHM 8.7551) | | , | | | |
| | (4HM 54.2521) | | | | Manufacturer | Part Number | Notes |
| tnenoquo. | (1575.42 IMHz) | _ | | | | | |
| | Signal Level L1 (54M Sp.2721) | Signal Level L2 | | | | | |
| omponent | Signal Level L1 | _ | | | | | |
| | Signal Level L1 | _ | | | | | |
| ch WT8 - A Yrowdyn Neftholitribii | amber Signal Level L1 | _ | | | | | |
| omponent | amber Signal Level L1 | _ | | | | | |
| sig (EIRP) = Ps + Ga1 + Lb1 + Lb2 + Lb2 + Lb3 + | - Gt + Lfs amber Signal Level L1 | Signal Level L2 | | | | | |
| ch WT8 - A Yrowdyn Neftholitribii | amber Signal Level L1 | Signal Level L2 | ZHW 4Z/w8P | | | | |
| 180 @ 100 ft from Bldg (Psig) 191 + 151 + 153 + 29 = (1913) giv 1924 - A Arowdau noitudintsi | -146.6 - 4 + Lfs - 4 + Lfs | E.141 | | | | | |
| sig (EIRP) = Ps + Ga1 + Lb1 + Lb2 + Lb2 + Lb3 + | - Gt + Lfs amber Signal Level L1 | E.141 | | | | | sw gbld of ennefine mort eansteib ft 0 emuzzA |
| IRP @ 100 ft (Lfs) IRP @ 100 ft from Bldg (Psig) Isig (EIRP) = Ps + Ga1 + Ld1 + Ld2 + Ld2 + Ld2 + Ld3 + Ld | 7.99- - 146.6 - 61 + 15 - 61 + 15 - 61 + 15 - 61 + 15 - 61 + 15 | 6.59- E.141 Signal Level I.3 | 8p | | | | ow gbld of ennefine mort eaneteib It 0 emuzzA |
| PS Transamit Power (21) 17 001 ft (Lfs) 18 | 16.8 1.4-1.6 1 | 28.29 - 141.3 - 241.3 | Wq 8b | | | | ow gbld of ennefine morf eanefzib ff 0 emuzzA |
| IRP @ 100 ft (Lfs) IRP @ 100 ft from Bldg (Psig) Isig (EIRP) = Ps + Ga1 + Ld1 + Ld2 + Ld2 + Ld2 + Ld3 + Ld | 7.99- - 146.6 - 61 + 15 - 61 + 15 - 61 + 15 - 61 + 15 - 61 + 15 | 6.59- E.141 Signal Level I.3 | Wq 8b | | | | ew gbld of ennefine morf eonefzib ff 0 emuzzA |
| Power Transmit Power Power 120 | 16.8 1.4-1.6 1 | 28.29 - 141.3 - 241.3 | Wq 8b | | | | ew gbld of ennefine morf eanetzib ff 0 emuzzA |
| Pe-Madiating Antanna (Gt) Power Pow | 16.8 1.4-1.6 1 | 28.19 28.20 2.141 2.141 | Wq 8b | | mootinA | \$-58X-d5T2T9E-4 | ew gbld of ennefne morf eonefrib ff 0 emuzzA |
| Power Transmit Power Power 120 | 2.08- 2.08- 1.46.6 1.46.6 1.46.6 1.46.6 1.46.6 1.46.6 1.46.6 | 0.81 6.63- 9.41- 2.141- | i8b Wq 8b | | moɔfnA | 5'3G1215P-XRS-4 TWR-200 | E1-2dB/100f (L1), -11.7dB/100 ft (L2) ft (L2) ft (L2) ft (L2) ft distance from antenna to bldg w |
| ower Divider Loss (Ld1) sable Loss, 100 ff (Lc2) e-Radiating Antenna (Gt) sp5 Transmit Power sp5 Transmit Power sth Loss at 100 ft (Lfs) sp6 100 ft from Bldg (Psig) sp6 100 ft from Bldg (Psig) sp7 (EIRP) = Ps + Ga1 + Ld1 + Lc2 + sp8 (EIRP) = Ps + Ga1 + Ld1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + sp8 (EIRP) = Ps + Ga1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) | 7.62-7.62-7.62-7.62-7.62-7.62-7.62-7.62- | 6.5- 0.8 7.11- 0.8 0.81 6.83- 6.141- 7.141- 7.141- 7.141- | 8b 8b | | Mini Circuits | TMB-500 SM8bDT-23+ | |
| mplifier (Ga1) 'ower Divider Loss (Ld1) sible Loss, 100 ff (Lc2) se-Radiating Antenna (Gt) Partiansmit Power 'ath Loss at 100 ff (Lfs) IRP @ 100 ff from Bldg (Psig) 'sig (EIRP) = Ps + Ga1 + Ld1 + Lc2 + 'sig (EIRP) = Ps + Ga1 + Ld2 + Ld2 + 'sig (EIRP) = Ps + Ga1 + Ld2 + 'sig (EIRP) = Ps + Ga1 + Ld2 + 'sig (EIRP) = Ps + 'sig (| 2.61- 146.6 2.21- 146.6 2.92- 2.08- 2.08- 3.08- | 6.51. 6.6- 6.29. 6.10- 6.1 | 8P 8P | (¿Abical) | Mini Circuits Mini Circuits | TMB-500 SM8bDT-23+ SX60-33FM | 8-way Splitter 13.2de/100f [L1], -11.7d8/100 ff [L2] |
| ower Divider Loss (Ld1) sable Loss, 100 ff (Lc2) e-Radiating Antenna (Gt) sp5 Transmit Power sp5 Transmit Power sth Loss at 100 ft (Lfs) sp6 100 ft from Bldg (Psig) sp6 100 ft from Bldg (Psig) sp7 (EIRP) = Ps + Ga1 + Ld1 + Lc2 + sp8 (EIRP) = Ps + Ga1 + Ld1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) = Ps + Ga1 + sp8 (EIRP) = Ps + Ga1 + sp8 (EIRP) = Ps + Ga1 + Ld1 + sp8 (EIRP) | 7.62-7.62-7.62-7.62-7.62-7.62-7.62-7.62- | 6.51. 6.6- 6.29. 6.10- 6.1 | 8P 8P | (typical) | Mini Circuits | TMB-500 SM8bDT-23+ | [2J] # 001/8b7.££- ([LJ] #001/8b2.££- |
| eveling Amp Output Level (Ps) eveling Amp Output Level (Ps) myhlfler (Ga1) ower Divider Divider (LG2) e-Radiating Antenna (Gt) pp Transmit Power eith Loss at 100 ft (Lfs) into Divider | 2.61- 146.6 2.21- 146.6 2.92- 2.08- 2.08- 3.08- | 6.51. 6.6- 6.29. 6.10- 6.1 | 8P 8P | | Mini Circuits Mini Circuits | TMB-500 SM8bDT-23+ SX60-33FM | 8-way Splitter 13.2de/100f [11], -11.7d8/100 ff [12] |
| (Fig. 100 ff (Ict.) (Seling Antenna LMA (G Ina) (Sable Loss, 100 ff (Ict.) (Many Output Level (Ps) (Many Output Level (Ps) (Sable Loss, 100 ff (Ict.) (Sabadiating Antenna (Gt) (Sp. Transmit Power (Sp. Trans | 2.52 0.6.2.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.2.3.0.2.2.2.3.0.2.2.2.2 | 0.6 2.1.2- 0.6 2.7.1 7.7- 2.8.2 0.8.2 0.8.2 0.8.3.9 2.1.94-3 langie | 8p 8 | | GPS Source Mini Circuits Mini Circuits | ГМВ-DD-23+ 2X60-33LN GLI-WETRO | Automatic Level Control Set to -77 d8m 8-way Splitter -13.2dB/100ft [L1], -1.1.7dB/100 ft [L2] |
| eveling Amp Output Level (Ps) eveling Amp Output Level (Ps) myhlfler (Ga1) ower Divider Divider (LG2) e-Radiating Antenna (Gt) pp Transmit Power eith Loss at 100 ft (Lfs) into Divider | 11 Javaj lengis 12 Javaj lengis 13 Javaj lengis | 0.6 2.1.2- 0.6 2.7.1 7.7- 2.8.2 0.8.2 0.8.2 0.8.3.9 2.1.94-3 langie | 8p 8 | ənlev təs | Mini Circuits Mini Circuits | ГМВ-DD-23+ 2X60-33LN GLI-WETRO | Automatic Level Control Set to -77 dBm 8-way Splitter -13.2dB/100ff [L1], -11.7dB/100 ff [L2] |
| (Fig. 100 ff (Ict.) (Seling Antenna LMA (G Ina) (Sable Loss, 100 ff (Ict.) (Many Output Level (Ps) (Many Output Level (Ps) (Sable Loss, 100 ff (Ict.) (Sabadiating Antenna (Gt) (Sp. Transmit Power (Sp. Trans | 2.52 0.6.2.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.3.0.2.2.2.3.0.2.2.2.3.0.2.2.2.2 | 2,12- 0,6 6,71 7,7- 2,8,9 6,6- 6,59- 6,59- 6,59- 7,14- 8,14- 9,50- 1,14- | 8P 8 | ənlev təs | GPS Source Mini Circuits Mini Circuits | TWE-500 SV8bDT-23+ SX60-33FN GFI-WELKO KG28 | Automatic Level Control Set to -77 dBm 8-way Splitter -13.2dB/100ff [L1], -11.7dB/100 ff [L2] |
| interna Gain (6r) X Antenna Gain (6r) X Antenna Gain (6r) Sable Loss, 100 ft (Lc1) Sable Loss, 100 ft (Lc2) Sable Loss at 100 ft (Lfs) | 7.7 0.2.2 0.2.2 0.2.2 0.2.2 0.2.2 0.3.0 0.4.1.1 0.4.4.1.1 0.5.1.1 0.6.1 | (2HM 8.7S21) 0£1- (2, 0) 7, 4 0, 6 6, 7, 7 7, - 0, 8 7, 11- 0, 8 6, 6 6, 7 1, 1 7, - 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1 | 8P 8 | (typical) | Antcom GPS Source Mini Circuits Mini Circuits | TS3GM1215A4-XN-1 | -110 to -149 dBm (-130 dBm typical) -25.5dB/100ff [L1], -21.5dB/100 ff [L2] Automatic Level Control Set to -77 dBm |
| nntenna Gain (Gr) X Antenna LIA (G Ina) Seble Loss, 100 ft (Lc1) seveling Amp Output Level (Ps) mplifier (Ga1) sover Divider Loss (Ld1) se-Radiating Antenna (Gt) pp Transmit Power sp Transmit Power sp Transmit Power pp Transmit Power st Loss at 100 ft (Lfs) | 7.7 9.04 7.7 9.04 6.25.5 9.08 | 067-7.4 0047-7.4 0.2.12-004 0.2.81 0.2.81 0.2.81 0.2.81 0.2.81 0.2.81 0.2.81 | 8P 8 | (typical) | GPS Source Mini Circuits Mini Circuits | TS3GM1215A4-XN-1 | -25.5dB/100ff [L1], -21.5dB/100 ff [L2] Aufomatic Level Control Set to -77 dBm 8-way Splitter -13.2dB/100ff [L1], -1.1.7dB/100 ff [L2] |
| interna Gain (6r) X Antenna Gain (6r) X Antenna Gain (6r) Sable Loss, 100 ft (Lc1) Sable Loss, 100 ft (Lc2) Sable Loss at 100 ft (Lfs) | (ZHM SP.27272) 1.46-6 2.25- 2.62- 2.62- 2.62- 2.62- 2.64- 2.62- 2.62- 2.62- 2.63- 2.64- | (2HM 8.7S21) 0£1- (2, 0) 7, 4 0, 6 6, 7, 7 7, - 0, 8 7, 11- 0, 8 6, 6 6, 7 1, 1 7, - 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1 | 8P 8 | (typical) | Antcom GPS Source Mini Circuits Mini Circuits | TS3GM1215A4-XN-1 | -110 to -149 dBm (-130 dBm typical) -25.5dB/100ft [L1], -21.5dB/100 ft [L2] -25.5dB/100ft [L1], -21.5dB/100 ft [L2] -25.5dB/100ft [L1], -11.7dB/100 ft [L2] |
| interna Gain (6r) X Antenna Gain (6r) X Antenna Gain (6r) Sable Loss, 100 ft (Lc1) Sable Loss, 100 ft (Lc2) Sable Loss at 100 ft (Lfs) | 11 layal langi? (5.4M Sp.2721) (5.4M Sp.2721) (7.7 (7.7 (2.6) (2.6) (3.0 (3.0 (3.0 (3.0 (3.0 (3.0 (3.0 (3.0 | (2HM 8.7S21) 0£1- (2, 0) 7, 4 0, 6 6, 7, 7 7, - 0, 8 7, 11- 0, 8 6, 6 6, 7 1, 1 7, - 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1, 1 1 | 8P 8 | (typical) | Antcom GPS Source Mini Circuits Mini Circuits | TS3GM1215A4-XN-1 | -110 to -149 dBm (-130 dBm typical) -25.5dB/100ft [L1], -21.5dB/100 ft [L2] Automatic Level Control Set to -77 dBm 8-way Splitter 8-way Splitter [L2] # 001/dB/1.1[L1] # 1001/dB/1.6. |

zHM 42/m8b L21-

Psig (EIRP) = Ps + Ga1 + Ld1 + Lc2 + Ld2 + Lc3 + Gt + Lfs

1.721-

(gi24) gbl8 morf ff om Bldg (Psig)

The only path in Distribution Network B is named Production Lab Path.

| Component | • | Signal Level L2 (1227.6 MHz) | | | Manufacturer | Part Number | Notes |
|--------------------------------|--------|---------------------------------|------------|-----------|--------------|----------------------|--|
| GPS Signal Input (Pr) | -130 | -130 | dBm | (typical) | | | -110 to -149 dBm (-130 dBm typical) |
| Antenna Gain (Gr) | 3 | 3 | dBi | | GPS Source | L1L2-2GA-PM-NF | |
| RX Antenna LNA (G lna) | 33 | 33 | dB | (typical) | | | |
| Cable Loss, 100 ft (Lc1) | -10.2 | -9 | dB | | | LMR240 | -10.2dB/100ft [L1], -9dB/100 ft [L2] |
| 16-way Splitter, Active (Gsp) | 8 | 8 | dB | (typical) | GPS Source | RMS116-A08-P110/5-NF | 16-way Splitter |
| Cable Loss, 100 ft (Lc2) | -10.2 | -9 | dB | | | LMR240 | -10.2dB/100ft [L1], -9dB/100 ft [L2] |
| Amplifier (Ga1) | 30 | 30 | dB | (typical) | GPS Source | A11-P110/5-NF | |
| Attenuator (Latten) | -10 | -10 | dB | | MiniCircuits | 15542 | |
| Re-Radiating Antenna (Gt) | 3.0 | 3.0 | dBi | | GPS Source | L1L2-2GP | |
| GPS Transmit Power | -83.4 | -81 | dBm | | | | |
| GPS Transmit Power | 4.57 | 7.94 | pW | | | | |
| Path Loss at 100 ft (Lfs) | -66.1 | -63.9 | dB | | | | Assume 0 ft distance from antenna to bldg wall |
| EIRP @ 100 ft from Bldg (Psig) | -149.5 | -144.9 | dBm/24 MHz | | | | |