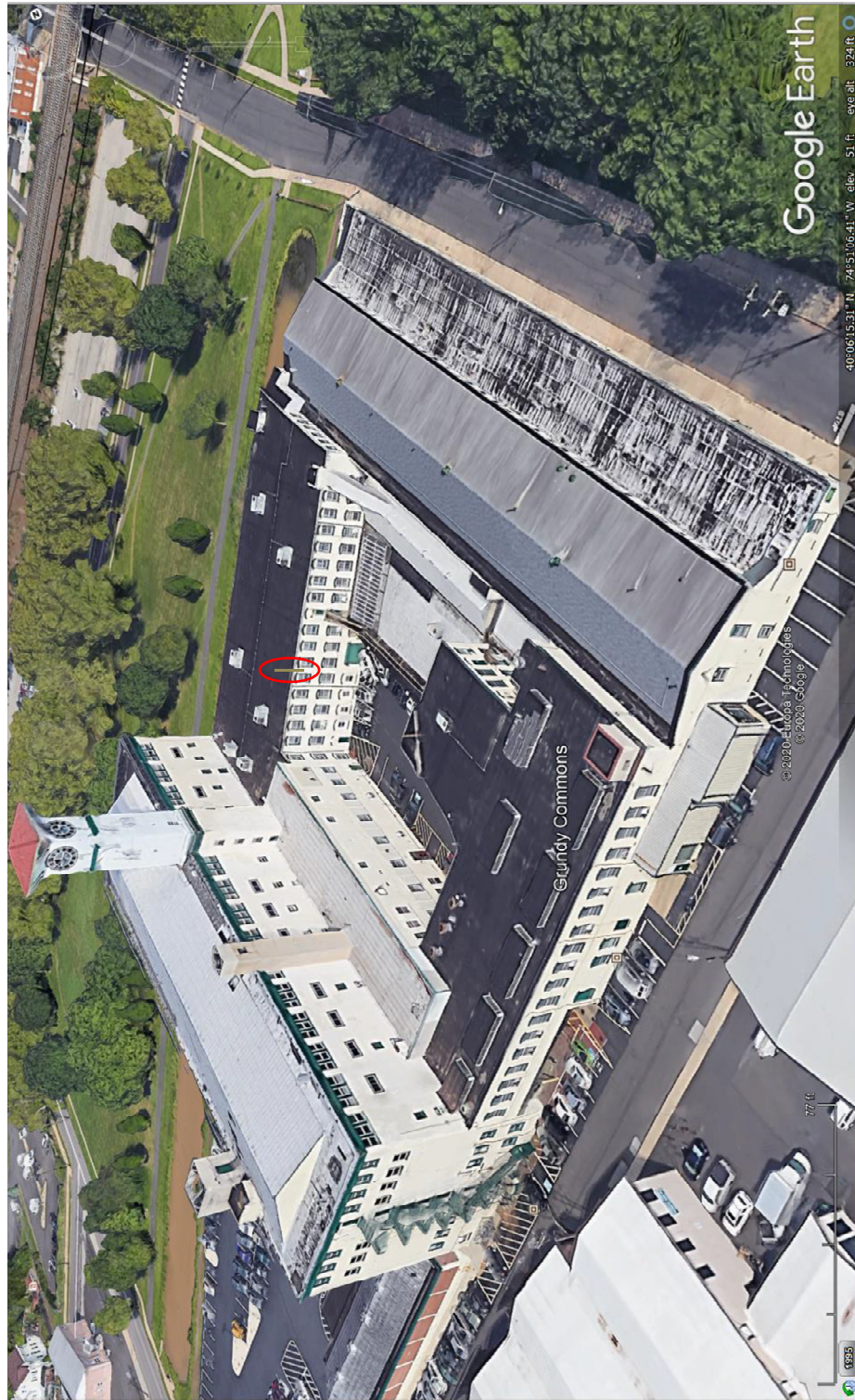


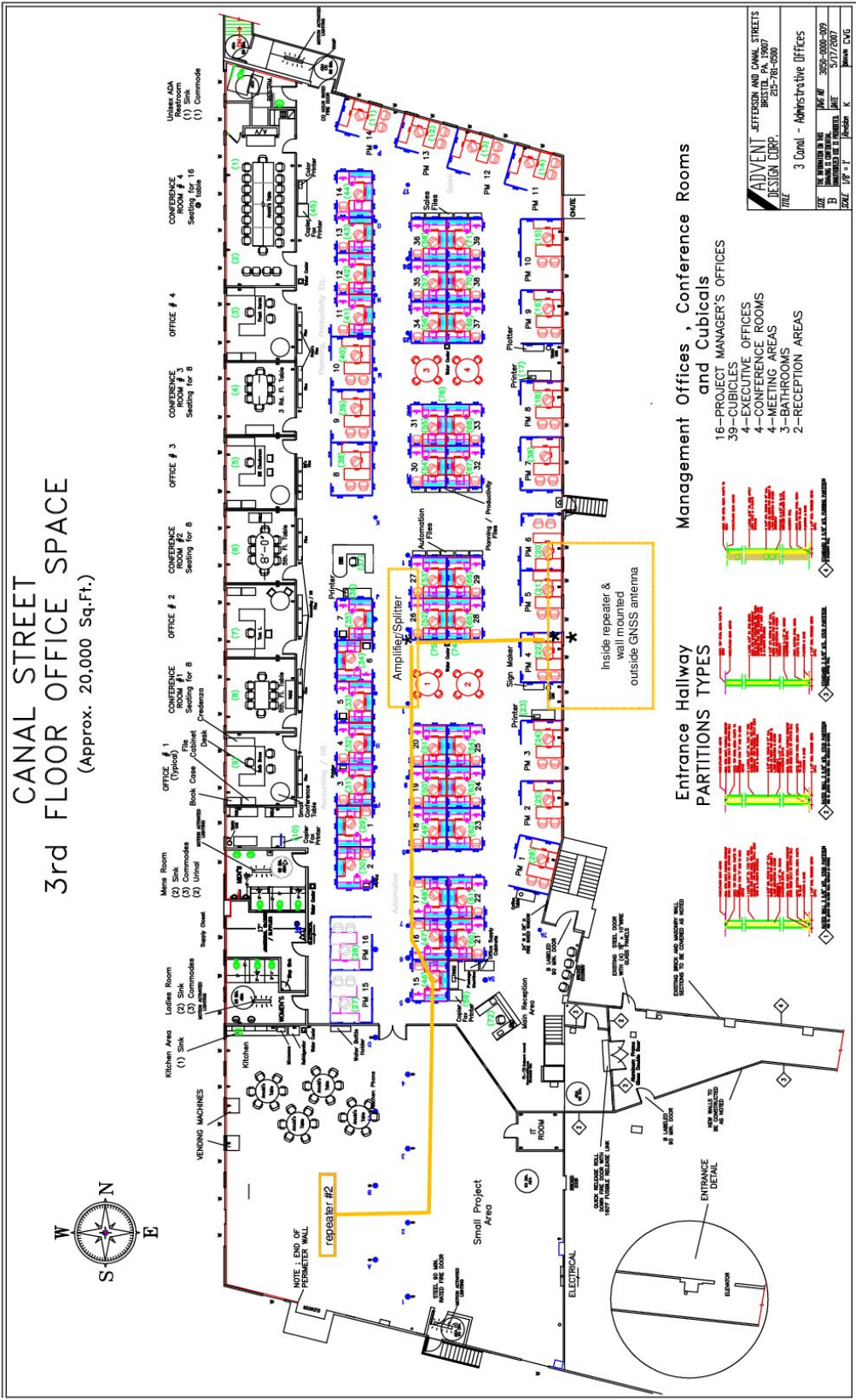
TESCO GNSS REPEATER Documentation

Installation Electronics for
Grundy Commons 3rd Floor
Including NTIA Manual Section
8.3.29 Items a. through f.

Outside Antenna Location



Tesco GNSS System Locations and Wiring



NTIA Manual Section 8.3.27

- a. **Tesco fully understands that the GNSS signal is not to extend outside the building.**

The Tesco GNSS system has two low power, short range repeaters. Their signals will cover only one small area at each repeater, on the third floor of the Grundy Commons building in our plant at Grundy Commons 925 Canal St. Bristol PA

A photo of the building, and the third floor, floor plan with the locations of the repeaters is provided on sheets 2 and 3.

- b. **Tesco GNSS Use:**

Tesco manufactures several portable test instruments that incorporate a embedded GNSS system to determine the units location and from it allow location associated equipment configuration, test setup, and data, and to be available automatically. We need GNSS signals at several very close locations inside our plant at Grundy Commons 925 Canal St. Bristol PA in order to develop these units and insure they function properly during test prior to sale.

Objective: To provide low level short range 1.5611 GHz, 1.57542 GHz, and 1.602 GHz GNSS signals indoors at our facility to allow testing of embedded GNSS receivers.

- c. **Yes, please enter any frequency assignment in the GMF**

- d. **Tesco fully understands that the its' repeater license will have to be renewed every two years.**

Tesco is a manufacturer of electronic instruments (among other things). It intends to be in business for a long time and expects its' use of GNSS to grow. Tesco will comply and renew its GNSS repeater license as required.

- e. **The area of potential interference in from Tescos GNSS repeaters are fully under its control , and Tesco will take responsibility for maintaining that control, and of the areas they may effect.**

- f. The following calculations indicate that 30 meters of free space will attenuate Tesco GNSS repeater signal to below the allowed level anywhere within our walls.

Note that d , the distance from an outside wall to a repeater is set to 0.

COMMON	
$PT_{maxpW} := 7.9$	pW
$PR := -140$	dBm power received at 30 meter from the building (IE -140dBm/24MHz)
$d := 0$	distance from repeater to wall in meters
$PT_{max} := 10 \cdot \left(\left(\frac{PT_{maxpW}}{10} \right) - 9 \right) = -82.1$	
Biedou	
$f := 1561.1$	Freq of Biedou B1
$Pr := PT_{max} - 20 \cdot \log(f) - 20 \cdot \log(30 + d) + 27.55 = -147.961$	
GPS and GALILEO	
$f := 1575.42$	Freq of GPS and Galileo
$Pr := PT_{max} - 20 \cdot \log(f) - 20 \cdot \log(30 + d) + 27.55 = -148.04$	
GLONASS	
$f := 1602$	Freq of Glonass G1
$Pr := PT_{max} - 20 \cdot \log(f) - 20 \cdot \log(30 + d) + 27.55 = -148.186$	

- g. All GPS users in the area of potential influence will be tesco employess aware the the GNSS repeaters and their interference.**
- h. Yes, Tesco's use of its GNSS repeaters will be limited to its test of GNSS receivers.**
- i. I, Mark Heyman am the point of contact for this GNSS repeater system. My number at Tesco is 215-228-0500. Tesco will make all pertinent staff aware of the systems power switch, and we will put it on a timer with a timed override to insure the system is not powered after hours or when not in use.**

GNSS ELECTRONICS



Steffe's & Company, LLC.

22 Odara Dr., Suite 108
Forest, VA 24551
United States of America

Page 1 of 3
Date 08/28/2020

High Tech Products - Outstanding Service

The Eastern Specialty Company
Mr. Mark Heyman
925 Canal St
Bristol, PA 19007

Dear Mr. Heyman,

Thank you for your inquiry, and interest in ROGER-GPS products. We are pleased to offer you ROGER-GPS Repeater products, and we have prepared a proposal # 2005 for a ROGER-GPS repeater system including two GNSS-L1G1GA-US repeaters for repeating GPS L1, Galileo, Glonass and Beidou GNSS signals, a Splitter (GNSS-S), outdoor receiving antenna including adjustable bracket and cable spacer, a Lightning Protection Kit and all coaxial cables required.

A single ROGER-GPS Repeater is enough to provide a GNSS indoor coverage area of 40-50 meters (132 – 164 ft.) in diameter from the repeater. The unit has a built-in antenna that radiates signal in a cone-shaped pattern within a 140 - 180° angle of view. The unit can be mounted horizontally, for example on a ceiling, or vertically on a wall. Mount the external antenna on the roof of the building and connect the cable supplied with the kit to the antenna and to the repeater installed indoors. Connect the power supply unit to the repeater, adjust the repeater's transmission power according to the local conditions, to prevent a signal loopback, and indoor GNSS coverage is immediately available. The kit includes clear installation instructions. Several ROGER-GPS Repeater Packages can be installed in the same building. Alternatively, the signal coverage provided by a single package can be extended with ROGER-GPS Accessories, such as line amplifiers and signal splitters.

The GNSS-L1G1GA-RP-US Basic Package includes:

- GNSS-L1G1GA-US Repeater
- A mains power supply unit with a 6 ft. cable (US plug)
- Outdoor receiving antenna
- Adjustable installation bracket and cable spacer for receiving antenna
- A 20 m (~ 65 ft.) RF-195 type cable with connectors



Note that the above is the description of the Basic Kit and the system quoted to you includes some of the items in the kit.

Some of the main advantages of choosing ROGER-GPS:

1. ROGER-GPS Repeater™ products are designed and manufactured in Finland.
2. ROGER-GPS Repeater™ products are carefully tested and are delivered with a two-year warranty.
3. ROGER-GPS Repeater™ products are CE-certified.
4. ROGER-GPS Repeater™ has a proprietary gain control system that provides up to 15dB more signal than other systems in the market.
5. ROGER-GPS active gain control provides up to 10 times more gain signal while adhering to the ETSI EN 302 645 standard.
6. ROGER-GPS intelligent repeater provides more gain in difficult conditions and an oscillation protection to protect your GPS signals.
7. ROGER-GPS Repeater™ is in one small and light weight box, simple to install and take into use.

Distributors for:

pāncomp

Time & Attendance tracking for mobile workforces in Real-time

ROGER
GNSS REPEATER

Delivering your GNSS signals & coverage indoors

Phone: +1 434 660 7411

E-mail: info@steffesandco.com

Fax: +1 434 253 1810



ROGER-GPS Repeater (GNSS-L1G1GA-US)



A single ROGER-GPS Repeater is enough to provide a GPS L1 (1.57542 GHz), Glonass G1 (1.602 GHz), and Galileo E1 (1.57542 GHz) indoor signal coverage area of ~ 10,700 ft² and a distance of up to 164 ft. from the repeater center. Mount the external antenna on the roof of the building and connect the cable supplied with the kit to the antenna and to the repeater installed indoors.

Connect the power supply unit to the repeater, adjust the repeater's transmission power according to the local conditions, to prevent a signal loopback, and indoor GPS coverage is immediately available.

Several ROGER-GPS Repeater Packages can be installed in the same building. Alternatively, the signal coverage provided by a single package can be extended with ROGER-GPS Accessories, such as line amplifiers and signal splitters.

WHAT'S IN THE BOX

- ROGER-GPS Repeater unit (GNSS-L1G1GA-US)
- Power supply
- Manual



TECHNICAL SPECIFICATIONS		
Frequency	1.57542 GHz, 1.602 GHz	GPS L1 and Galileo E1 (1.57542 GHz), Glonass G1 (1.602 GHz)
Size	4.33 x 5.63 x 1.10 inches (110 X 143 x 28 mm)	
Weight	5.82 ounce (165 g)	
Overall Gain	> 40 dB	
Noise Figure	< 2 dB	
Adjustable attenuation	0 - 40 dB	
Impedance	50 Ω	
Input connector	SMA-female	
Operating temperature	-13 - 131°F (-25 - + 55°C)	
Power supply	+12VDC, 1,5 A	Power supply with US plug included
Antenna power output	+5VDC, 100mA	
TX antenna gain	+4 dBd, RHCP polarization	
Type Approval	CE 1986 (!) R&TTE Directive (Directive 199/5/EC)	
Antenna Gain	+38 dB	

gnss-l1g1ga-us_steffes

High Tech Products – Outstanding Service

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22 Odara Dr. Ste 108

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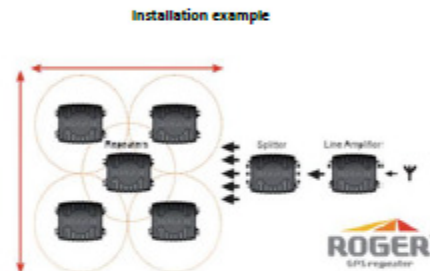
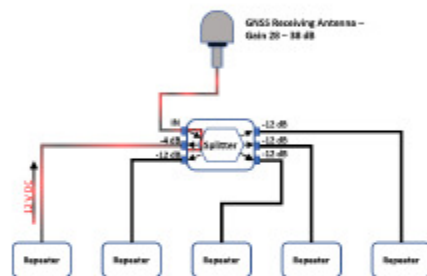
info@steffesandco.com



ROGER-GPS Splitter (GNSS-S)



With the ROGER-GPS Signal Splitter, the signal from one external antenna can be redistributed to up to five repeater units. It is advisable to use a separate amplifier with the signal splitter in order to ensure adequate transmission power to all the five repeaters. If the signal is to be transmitted to fewer than five repeaters, the unused ports should be terminated. Termination should be done with ROGER-GPS Terminator 50 Ohm.



TECHNICAL SPECIFICATIONS		
Size	4.33 x 5.63 x 1.10 inches (110 X 143 x 28 mm)	
Weight	6.52 ounce (185 g)	
Connectors	1 TNC-female input / 5 TNC-female output	1 x -4dB with DC pass, 4 x -12 dB
Operating Temperature	-13 to 131°F (-25 to +55°C)	
Frequency Range	1,200 – 1,700 MHz	
Impedance	50 Ω	
Power Supply	None required	The Splitter is powered by the repeater through the coaxial cable.

GNSS-steffes

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