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March 21, 2024

TO: Federal Communications Commission – Experimental License System (ELS)

ATTENTION: Form 442 File: 0166-EX-CN-2024

RE: NTIA 8.3.28 – f.

In response to NTIA 8.3.28 requirements, Item f. we, Badger Meter Inc., hereby provide the following information:

Calculations provided by manufacturer (Roger-GPS) and distributor (Steffes and Company).

See next page.



Link Budget Calculation for Badger Meter

	Signal Level	mWatts	PicoWatts
GPS Roof Antenna Average Receive Power GPS Signal Input (PR.20)	-130		
Roof Antenna Gain	38		
Coaxial Cable	-11.2		
Repeater Gain	29.94		
Total system gain	56.74 dB		
Equivalent Isotropically Radiated Power EIRP	-73.26 dBi	4.72063E-08	47.2
Effective Radiated Power ERP (ERP = EIRP - 2.15)	-75.41 dBd	2.8774E-08	28.8



For reference, it is known 39.3pW translates to -74 dBm. This is the maximum permissible limit pursuant to Section 8.3.28 of NTIA manual.

The above calculations show the installed device will transmit less power than the allowed limit.

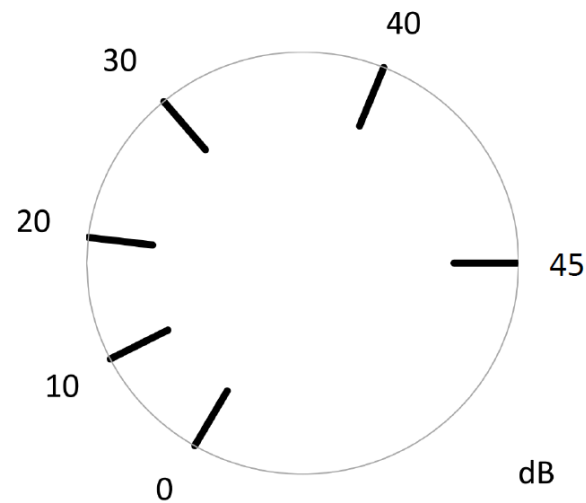
The equipment described in Form 442 (ROGER-GPS model: GNSS-L1G1GA-BP40-US) has a gain adjustment feature which will be set at or below 90° position. This setting will ensure the gain is **below** 25 dBm used in the calculation.
(Calculation combined gain and antenna = 29.94)
See calculation, page 2.

See illustration below provided by manufacturer (Roger-GPS).

Gain knob adjustment L1G1GA

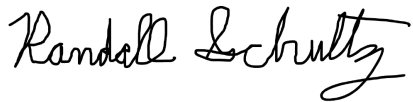


L1G1GA GAIN	
Degrees	Approx.Gain
0	0
40	10
80	20
120	30
175	40
240	45



The equipment will be installed out of reach of the employees and general public because it is located on the factory ceiling. Once in place, the gain cannot be further increased. If needed, the gain adjustment control knob could be permanently secured with a super glue or Loctite® adhesive.

Respectfully,

A handwritten signature in black ink that reads "Randall Schultz". The signature is written in a cursive, flowing style.

Randall Schultz – Senior Regulatory Compliance Engineer
Badger Meter, Inc.