EXHIBIT 3 — EIRP CALCULATIONS

1. Requested authorization

−70.58 dBm EIRP (87.5 pW), derived from NTIA § 8.3.28(6) at a claimed 50 ft transmit-antenna-to-exterior-wall standoff.

Per-band ceilings at zero standoff, for reference:

Signal	Frequency	FSPL @ 100 ft	Max EIRP	
BeiDou B1I	**1561.098 MHz**	**65.85 dB**	**−74.15 dBm**	**38.5 pW**
GPS L1 / Galileo E1	1575.42 MHz	65.93 dB	−74.07 dBm	39.2 pW
GLONASS G1	1602 MHz	66.07 dB	−73.92 dBm	40.5 pW

BeiDou B1I binds, being the lowest frequency in the re-radiated passband and therefore the lowest path loss. These reconcile with the per-band caps NTIA publishes (39.3 / 23.8 / 21.9 pW for L1 / L2 / L5 at zero standoff).

Standoff

§ 8.3.28(6) evaluates at 100 feet from the building; where the transmit antenna stands off from the exterior wall by a distance *d*, the evaluation path becomes 100 feet plus *d*. Calculations use the 30 m value NTIA gives alongside 100 feet, that being the basis on which its published per-band caps reconcile.

Standoff	Evaluation distance	Ceiling
0 ft	100 ft	−74.15 dBm (38.5 pW)
50 ft (claimed)	**150 ft**	**−70.58 dBm (87.5 pW)**
62 ft (actual, centerd)	162 ft	−69.91 dBm (102.2 pW)

Figure 3 — Unit B plan: wall types, standoff, and containment

Front and rear walls are exterior. Side walls are interior demising walls shared with adjacent tenants.

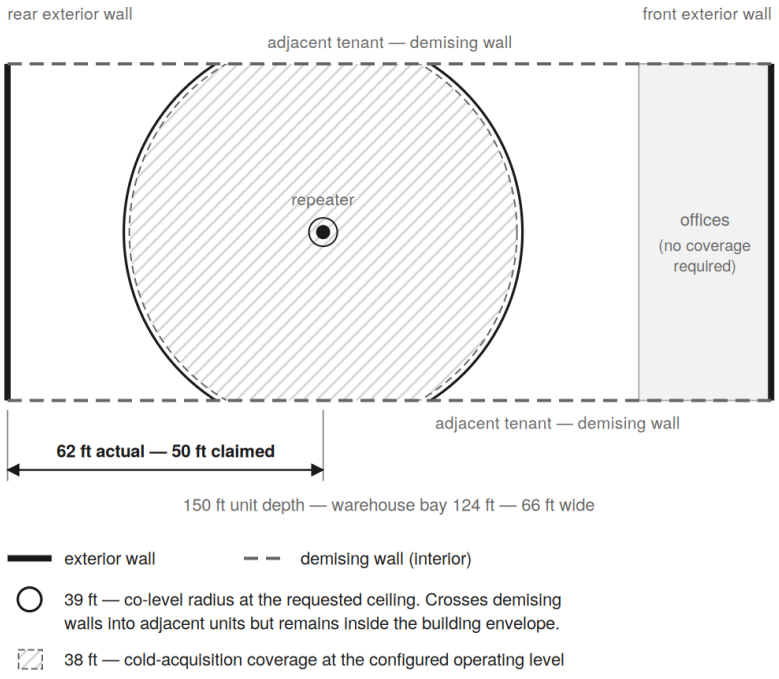

Exhibit 2 §5 / Exhibit 3 §1 — containment bound lies inside the building envelope

The premises measure 150 ft deep by 66 ft wide. The side walls are **interior demising walls** shared with adjacent tenants and are not exterior walls; the exterior walls are front and rear. A repeater centerd in the warehouse bay stands **62 ft** from the nearest exterior wall. The Applicant claims **50 ft**, forgoing 0.67 dB, so that modest relocation within the bay does not invalidate the licensed geometry.

What is not credited

§ 8.3.28(6) requires free-space assumptions with no allowance for additional attenuation. The metal-clad building envelope is **not credited** anywhere in this exhibit, notwithstanding that it presents an estimated 20–40 dB at L-band and is the reason the system is required.

2. Basis of calculation, and how it differs from precedent

Prior granted applications for GPS re-radiators compute the re-radiated signal from the **minimum guaranteed** received satellite power in IS-GPS-200 (−158.5 dBW / −128.5 dBm for L1 C/A). That convention suits demonstrating that a system will *function*. It does not suit establishing an emission *ceiling*, because a minimum input cannot bound a maximum output.

The Applicant computes instead from the specified **maximum** received power. IS-GPS-200 Rev N states that maximum received signal levels are not expected to exceed **−153.0 dBW for C/A on the L1 channel** — that is −123.0 dBm, 5.5 dB above the minimum used in the

precedent filings. Every other parameter is likewise stacked to increase emission:

Parameter	Value	Why chosen
Received satellite power	**−123.0 dBm**	IS-GPS-200 Rev N **maximum** (−153.0 dBW, C/A on L1)
Outdoor antenna gain	41.0 dB	TW3742 specified 38 dB *typical*; 3 dB allowed upward
Cable loss	5.5 dB	RF240, 66 ft; vendor states 6.0 dB over the run, less assumed
Repeater gain	40–47 dB swept	Specified only as "> 40 dB" — unbounded above
Transmit antenna gain	+6.15 dBi	Datasheet maximum (+4 dBd), not typical
Attenuator	40 dB, mechanical maximum	§ 4 below
Building attenuation	0 dB	Not credited, per § 8.3.28(6)

3. Result

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EIRP = P_sat(max) + G_antenna − L_cable + (G_repeater − 40 dB) + G_tx
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Figure 2 — Worst-case gain budget against the authorised ceiling

Every parameter stacked to maximise emission. Attenuator at mechanical endstop.

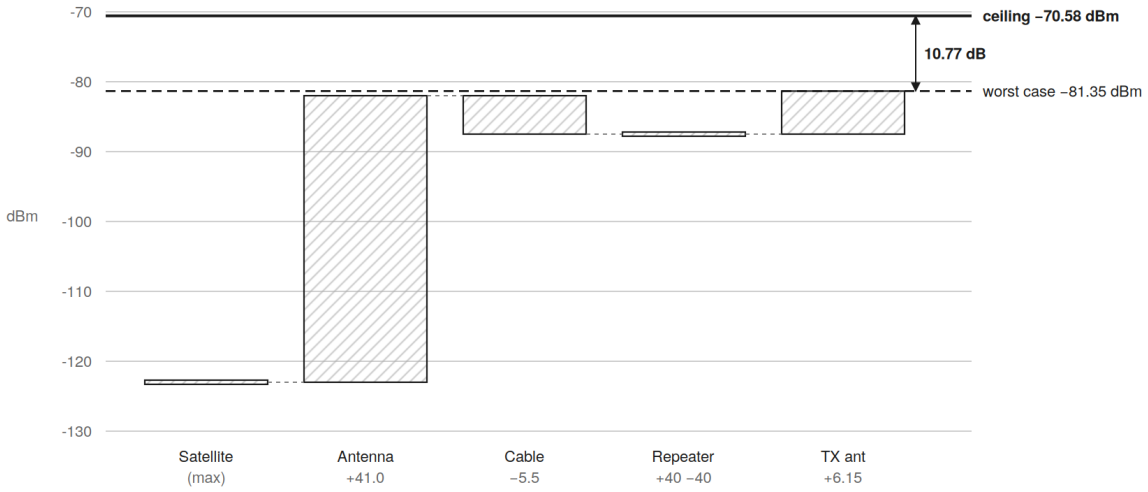

Exhibit 3 §3 — worst-case emission 10.77 dB below the requested ceiling

Repeater nominal gain	Net after attenuation	Worst-case EIRP	Margin	
40 dB (stated minimum)	**0.0 dB**	**−81.35 dBm**	**10.77 dB**	Pass

Repeater nominal gain	Net after attenuation	Worst-case EIRP	Margin	
42 dB	2.0 dB	−79.35 dBm	8.72 dB	Pass
43 dB	3.0 dB	−78.35 dBm	7.72 dB	Pass
45 dB	5.0 dB	−76.35 dBm	5.72 dB	Pass
47 dB	7.0 dB	−74.35 dBm	3.72 dB	Pass

The station remains within the requested ceiling throughout, including the case where the repeater delivers 7 dB more gain than specified while simultaneously receiving a satellite at maximum specified power through an antenna 3 dB above typical into a cable below its rated loss.

4. Compliance control — attenuator at mechanical maximum

The repeater provides a manually adjustable 0–40 dB attenuator. **The licensed configuration is this control at its maximum-attenuation mechanical endstop.**

This was chosen over an intermediate setting deliberately. An endstop is a physical limit, verifiable by eye and by photograph, requiring no instrumentation. An intermediate setting cannot be verified without calibrated measurement equipment, which is not available at the site. The Applicant does not represent to the Commission a setting it cannot confirm.

The Applicant commits that:

1. The attenuator will be set to maximum attenuation at installation and witness-marked.
2. Installation will be documented photographically showing the control at its endstop, and the record retained for the license term.
3. The setting will not be altered without recalculation and, where the recalculated EIRP exceeds the authorized value, an application to modify.
4. No line amplifier, active splitter, or other gain element will be added without a new analysis and, if required, a modification application.

5. Consequence for the experiment

Operating at maximum attenuation is conservative and costs coverage. At typical component values and minimum satellite power the operating EIRP is −90.35 dBm, supporting cold acquisition to approximately 38 ft from the repeater, reacquisition to 107 ft, and tracking to 151 ft.

Centerd in the warehouse bay this covers the full 66 ft width and the central 76 ft of the 124 ft bay length — the area in which vessel GNSS testing is conducted.

The Applicant accepts this constraint. Should greater coverage prove necessary, the Applicant will either apply to add a further licensed repeater, or obtain calibrated measurement and apply to modify on the basis of measured rather than bounded values. **The Applicant will not increase gain within the existing authorization to obtain coverage.**

6. Cross-check against device output limit

The repeater incorporates automatic gain limitation with a stated maximum output of −60 dBm, corresponding to −53.85 dBm EIRP with the +6.15 dBi transmit antenna. That limiter is a protective backstop against oscillation and overdrive; it is not the operating point and is not relied upon for compliance. Compliance is established by the gain budget in § 3 with the attenuator at maximum per § 4.

7. Verification status

The following are taken from vendor documentation and are **not measured**. They are recorded here so the basis of the filing is transparent:

Item	Source	Treatment
TW3742 LNA gain 38 dB typ	Tallysman line card (TW3740 = 40, TW3742 = 38)	3 dB tolerance allowed upward
RF240 loss 6.0 dB over the run @ 1575 MHz	Roger distributor	Less loss assumed (5.5 dB)
Repeater gain "> 40 dB"	Roger datasheet	Unbounded above; swept to 47 dB
Attenuator range 0–40 dB	Roger datasheet	Endstop used, not a calibrated value
Maximum received power −153.0 dBW (C/A on L1)	IS-GPS-200 Rev N	Confirmed against current revision

Should calibrated measurement become available, the Applicant will compare it against this analysis and notify the Commission if measured EIRP exceeds the authorized value.