

GPS Re-Radiator Signal Strength Calculation for L2 Frequency

Component	Signal Level		Manufacturer	Part Number	Notes
GPS Signal Input (P_R)	-130	dBm	(typical)		-110 to -149 dBm (-130dBm typ)
Antenna Gain (G_R)	3.5	dBi	Antcom Puck Antenna	P/N 3G1215A1000	
Rx Antenna LNA (G_{LNA})	33	dB			
Cable Loss (L_{C1})	-4.2	dB	(~70ft)	LMR400-PL (-6dB/100ft)	
				LMR240-LL-PL (-10dB/100ft)	
Variable Attenuator (L_{C2})	-5.5	dB	(~55ft)		
Variable Attenuator (L_{attn})	-11	dB	(nominal)		-1 to -20dB adjustable
Amplifier (G_{amp})	40	dB	GPS Networking, Inc.	P/N NLA40RPDCN/4.5/110	
Re-Radiating Antenna (G_T)	3	dBi	Antcom Puck Antenna	P/N 1G121P1000	
GPS Transmit Power	-71.2	dBm			
Path Loss @ 167ft (L_{FS})	-69.2	dB			
EIRP @ 100ft from Bldg	-140.4	dBm/24 MHz			

Path Loss = 20 Log F (MHz) + 20 Log D (feet) - 37			
1227.6	MHz	Frequency L2	
100	ft	Outside Bldg	
67	ft	Antenna to Bldg Walls	
167	ft	Total Distance	

$P_{sig} (EIRP) = P_R + G_R + G_{LNA} + L_{C1} + L_{C2} + L_{attn} + G_{amp} + G_T + L_{FS} = -130 + 3.5 + 33 - 4.2 - 5.5 - 11 + 40 + 3 - 69.2 = \mathbf{-140.4 \text{ dBm/24 MHz}}$
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GPS Re-Radiator Signal Strength Calculation for L1 Frequency

Component	Signal Level			Manufacturer	Part Number	Notes
GPS Signal Input (P_R)	-130	dBm	(typical)			-110 to -149 dBm (-130dBm typ)
Antenna Gain (G_R)	3.5	dBi		Antcom Puck Antenna	P/N 3G1215A1000	
Rx Antenna LNA (G_{LNA})	33	dB				
Cable Loss (L_{C1})	-4.2	dB	(~70ft)		LMR400-PL (-6dB/100ft)	
					LMR240-LL-PL (-10dB/100ft)	
Variable Attenuator (L_{C2})	-5.5	dB	(~55ft)			
Variable Attenuator (L_{attn})	-11	dB	(nominal)			-1 to -20dB adjustable
Amplifier (G_{amp})	40	dB		GPS Networking, Inc.	P/N NLA40RPDCN/4.5/110	
Re-Radiating Antenna (G_T)	3	dBi		Antcom Puck Antenna	P/N 1G121P1000	
GPS Transmit Power	-71.2	dBm				
Path Loss @ 167ft (L_{FS})	-71.4	dB				
EIRP @ 100ft from Bldg	-142.6	dBm/24 MHz				

Path Loss = 20 Log F (MHz) + 20 Log D (feet) - 37			
1575.42	MHz		
100	ft		
67	ft		
167	ft		
		Frequency L1	
		Outside Bldg	
		Antenna to Bldg Walls	
		Total Distance	

$P_{sig} (EIRP) = P_R + G_R + G_{LNA} + L_{C1} + L_{C2} + L_{attn} + G_{amp} + G_T + L_{FS} = -130 + 3.5 + 33 - 4.2 - 5.5 - 11 + 40 + 3 - 71.4 = \mathbf{-142.6 \text{ dBm/24 MHz}}$
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