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EION BYTES

EION Wireless Link Budget Calculation Essential Parameters

What is Link Budget?

The wireless link budget is the term used that accounts for the power received at the receiver. This accounts for all the gains and losses from the transmitter to the point at which the receiver receives it. It includes losses from cables and other components in the Tx/Rx chain, gains from the antenna, amplifiers etc. and propagation loss when travelling through air.







Transmitter Power

The transmitter generates a signal and transmits it to the cable that connects the transmitter and antenna. Transmit power at the radio RF connector specified in dBm.



During the signal propagation in the cable, some of its energy is converted to heat, i.e. the antenna receives an attenuated signal. This parameter includes all the losses between the radio RF connector and the antenna, including signal attenuation as it propagates through the cable and losses in any connectors along the way.



Free Space Loss refers to the reduction of the signal strength as the signal radiates away from its source. When there are no obstructions, every time you double the distance, the movement is reduced by a factor of 4. This is equivalent to subtracting 6 dB from your signal strength. The Free Space Loss assumes no obstructions in the link path, sometimes referred to as having a "line of sight." However, note that "line of sight" means that at least "60% of the first Fresnel Zone " is clear of any obstructions.



The receiving antenna converts the radio signal energy into a current and transmits it through the cable to the receiver.

Receiver Sensitivity

An important receiver parameter is a sensitivity - the possibility of receiving weak signals. I.e. if the received signal power is below the sensitivity level, the signal will not be recognized.



The Fade Margin differs between the Received Signal Strength and the radio Receiver Sensitivity. When you deploy a link, you want a Receive Signal Strength that is sufficiently above the radio Receiver Sensitivity to survive signal fading due to various factors. These factors might include slight misalignment of the antennas, losses due to fog and rain, etc. As a rule of thumb, you should try to get at least 15 dB of fade margin in your links.

		Radio Link		
dit View Swap				
Azimuth=70.58*	Elev. angle=-0.428*	Clearance at 2.67km	Worst Fresnel=3.0F1	Distance=5.13km
Free Space=121.4 dB	Obstruction=-4.6 dB TR	Urban=0.0 dB	Forest=0.0 dB	Statistics=4.1 dB
-anicoss=120.900	E field=60.6dbµv/m	32*53'03 5"N 013*14'54 5	FX IEVEI+030.95µV	RX Relative=59.10D
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T	01011110 015	Dearburg		
Transmitter 32*52'08.4'1	N 013 11 48 3 E	Receiver	32°53'03.5"N 013°14'54.5"E	
		- A CONTRACTOR OF		
		S9+50		
NCB BAB BEN GHASH	R	S9+50 NCB-11	UNE	S9+5
NCB BAB BEN GHASH Role	R Master	S9+50 NCB-11. Role	JUNE Slave	S9+
NCB BAB BEN GHASH Role Tx system name	R Master SP 5300-58-24i	S9+50 NCB-111 Role Rx system	JUNE Stave m name SP 530	0-58-24i
NCB BAB BEN GHASH Role Tx system name Tx power	R Master SP 5300-58-24i 0.3981.W 26	S9+50 NCB-111 Role Rx system dBm Required	JUNE Slave m name SP 530 E Field 21.52 d	0-58-24i BuV/m
NCB BAB BEN GHASH Role Tx system name Tx power Line loss	R Master SP 5300-58-24i 0.3981 W 26 i 0.5 dB	S9+50 NCB-11 Role Rx syste dBm Required Antenna	UNE Slave m name SP 530 E Field 21.52 d gain 24 dBi	S9+ 0-58-24i BμV/m 21.8 dBd
NCB BAB BEN GHASH Role Tx system name Tx power Line loss Antenna gain	R Master SP 5300-58-24i 0.3981.W 26i 0.5 dB 24 dBi 21j	S9+50 NCB-111 Role Rx syste Required Antenna 8 dBd + Line loss	JUNE m name SP 530 E Field 21.52 d gain 24 dBi 0.5 dB	0-58-24i BµV/m 21.8 dBd
NCB BAB BEN GHASH Role Tx system name Tx power Line loss Antenna gain Radiated power	R Master SP 5300-58-24i 0.3981 W 26i 0.5 dB 24 dBi 21i EIPP-89.13 W EPF	S9+50 NCB-11 Role Rx syste dBm Antenna 8 dBd + Line loss >554.34 W	UNE Slave m name SP 530 E Field 21.52 d gain 24.68 0.5 dB tivity 1µV	S9+ 10-58-24i ВµV/m 21.8 dBd _107 dBm
NCB BAB BEN GHASH Role Tx system name Tx power Line loss Antenna gain Radiated power Antenna height (m)	R Master SP 5300-58-24i 0.3981.W 26i 0.5 dB 24 dBi 21i ERP-89.13 W ERF 39 - +	S9+50 Rk System dBm 8 dBd +54.34 W Undo System Antenna Ant	2.04E Stave m name [SP 530 E Field 21.52 d gain 24 dBi 0.5 dB tivity 1µ/ height (m) [17	0-58-24i BµV/m 21.8 dBd -107 dBm - + Undo
NCB BAB BEN GHASH Role Tx system name Tx power ne loss Anterna gain Padiated power Antenna height (m) Vet	R Master SP 5300-58-24i 0.3981.W 26- 0.5.68 24.68i 211 ERP-89.13 W ERF 39 • • •	\$9+50 NCB-11. Role Required dBm Required adem Antenna. b/b00 Antenna. Frequent Antenna.	2.RE Slave Slave m name SP 530 CE Field 21.52 d gain 24 dBi 0.5 dBi 1.12 Slave	S9+ 0-58-24i BµV/m 218 dBd -107 dBm -107 dBm -107 dBm
NCB BAB BEN GHASH Role Tx system name Tx power Line loss Antenna gain Radiated power Antenna height (m) Net	R Master SP 5300-58-24i 0.3981.W 26i 0.5 dB 21i ERP=89.13 W EP 39 • •	S9+50 S9+50 NCB-11. Role dBm Required Artenna k54.34 W Undo Frequenci Artenna Arte	JUNE Slave miname SP 530 EField 21.52 d gain 24 dBi 0.5 dBi 0.5 dBi yty JuV height (m) J7	S9+5 0-58-24i BµV/m 218 dBd -107 dBm - + Undo

