

## O3b Network Return Link Analysis - Tier 1 Service For Suva, Fiji

Link Budget Creator - Rev 1.1: July 16, 2010		Tier 1	Tier 1
<b>Ground Parameter</b>		<b>Teleport</b>	<b>Telco</b>
Location		Sunset Beach RHCP, United States	Suva
Latitude	(°)	21.3	-18.1
Longitude (East)	(°)	201.9	178.4
E/S Range to SV	(km)	9576.3	8611.6
E/S Elevation to SV	(°)	38.6	58.5
E/S Altitude	(m)	0.0	0.0
SV Beam Identifier	(#)		12
Minutes Into Pass (Sample #45)	(Min)		21.3
Telco Spot Beam Off-Angle	(°)		0.2
Telco Spot Beam Diameter	(km)		60.1
Maximum Roundtrip Latency	(msec)		121.3
<b>Modulation Parameters</b>		<b>Forward</b>	<b>Return</b>
Enter Receiver	Type		DVB-S2
Available Bandwidth	(Hz)		40,003,200
Channel Symbol Rate	(sps)		33,336,000
Channel Modulation Type			32APSK
Channel FEC Rate			0.83
Channel Spectral Efficiency	(bits/Hz)		4.17
Channel Throughput (100% / 100% of Full Rate)	(bps)		134,363,724.70
<b>Uplink</b>		<b>Forward</b>	<b>Return</b>
E/S Tx Channels per HPA	(#)		1
E/S Tx Carrier Frequency	(MHz)		28020.00
E/S Tx HPA Power Level	(W)		500.00
E/S Tx OBO	(dB)		-3.00
E/S Tx Post-HPA Losses	(dB)		-2.86
E/S Tx Antenna Gain (4 meter)	(dB)		58.96
E/S Tx EIRP Per Channel	(dBW)		80.09
E/S Tx Pointing Loss	(dB)		-0.50
E/S Tx RF Link Availability	(%)		96.000
E/S Tx Atmospheric Losses	(dB)		-4.68
E/S Tx Spreading Loss	(dB)		-149.69
<b>Satellite</b>		<b>Forward</b>	<b>Return</b>
SV Number of Channels per HPA	(#)		4
SV Rx G/T	(dB/K)		3.15
SV Rx Power Per Tier	(dBW)		-122.04
SV Rx Flux Density Per Tier	(dBW/m <sup>2</sup> )		-74.79
SV Tx OBO	(dB)		-5.80
SV Tx Post-TWTA Losses	(dB)		-1.50
SV Tx Antenna Gain	(dBi)		30.94
SV Tx EIRP Per Channel/Carrier	(dBW)		35.75
SV Tx Pointing Loss	(dB)		0.00
<b>Downlink</b>		<b>Forward</b>	<b>Return</b>
E/S Rx Carrier Frequency	(MHz)		18220.00
E/S Rx Spreading Loss	(dB)		-150.62
E/S Rx RF Link Availability	(%)		96.000
E/S Rx Atmospheric Losses	(dB)		-2.02
E/S Rx Pointing Loss	(dB)		-0.50
E/S Rx Antenna Gain ( 7.3 meter)	(dBi)		61.08
E/S Rx Effective G/T	(dB/K)		37.27
E/S Rx Power Per Channel	(dBW)		-102.98
E/S Rx Flux Density Per Channel	(dBW/m <sup>2</sup> )		-117.39
<b>Total Link</b>		<b>Forward</b>	<b>Return</b>
Carrier / Noise Bandwidth	(dB)		75.23
Carrier / Noise Uplink	(dB)		31.33
Carrier / Noise Downlink	(dB)		26.58
Carrier / Intermodulation Im (C/Im)	(dB)		22.34
(C/N) - Total Actual	(dB)		19.23
(C/N) - Total Required	(dB)		18.08
(E <sub>v</sub> /N <sub>o</sub> ) - Total Actual	(dB)		13.04
(E <sub>v</sub> /N <sub>o</sub> ) - Total Required	(dB)		11.88
<b>Excess Margin</b>	(dB)		<b>1.15</b>
<b>Fade Margin (to loss of link)</b>	(dB)		<b>20.38</b>