

4-Apr-16		1024ksps R2/3 HN INROUTE LINK BUDGET							
12:50 PM		Satellite: SatMex 7 Ku4 Return							
		0.51m Remote in SM7 Vancouver CA		7.6m hub in SM7, Detroit					
BASELINE PARAMETERS		Value	Unit	SUMMARY					
CARRIER	Carrier Info Rate	1365	Kbps	% Avail S/C Power Reqcd/Crr	1.26 %				
	FEC Code Rate	0.667		% Xponder Bandwidth Reqcd/Crr	2.67 %				
	Crr Symbol Rate	1024	Ksps	Clear Sky Link Margin	2.3 dB				
	CI Sky Reqcd Ebi/No	3.0	dB	Power Equivalent Bandwidth	0.68 MHz				
	DATA	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	31.0 dBW			
	Demod BT Product	1.00		LINK PERFORMANCE					
	Carrier Bandwidth	1024	kHz	CI Sky	Up Fade	Dn Fade	Unit		
	Crr Spacing Fctr	1.41	x Rs						
Carrier Spacing	1440	kHz							
SATELLITE	Satellite	SatMex 7 Ku4 Return		UPLINK	Satellite SFD	-97.5	-97.5	-97.5	dBW/m2
	Location	-115.0 WL		BUDGET	Agg Input B.O.	5.3	5.3	5.3	dB
	Hub EIRP Contour	53.0 dBW			Input Backoff/Crr	24.3	25.3	24.3	dB
	Remote G/T Contour	7.5 dB/K			Crr Flux Density	-121.8	-122.8	-121.8	dBW/m2
	Attn Setting	13.0 dB			Gain of a Sq meter	44.7	44.7	44.7	dBi
	Xponder Gain	197.0 dB			Uplink Path Losses	207.6	208.6	207.6	dB
	SFD at remote	-97.5 dBW/m2			Carrier Up EIRP	41.1	41.1	41.1	dBW
	Xponder Bandwidth	54.0 MHz			Satellite G/T	7.5	7.5	7.5	dB/K
	Agg Input BO	5.3 dB			C/N Uplink	9.5	8.5	9.5	dB
	Agg Output BO	3.5 dB			Saturation EIRP	53.0	53.0	53.0	dBW
	Uplink Frequency	14.5000 GHz		DOWNLINK	Agg Output B.O.	3.5	3.5	3.5	dB
	Dnlink Frequency	12.2000 GHz		BUDGET	Output Backoff/Crr	22.5	23.5	22.5	dB
Tx Antenna Dia	0.51 meters			Carrier Dn EIRP	30.5	29.5	30.5	dBW	
HPA Max Output Pwr	15.0 Watts			Dnlink Path Losses	206.3	206.3	208.2	dB	
Tx Antenna Gain	34.0 dBi			Rx Pointing Losses	0.4	0.4	0.4	dB	
Tx Pointing Losses	0.3 dB			CI Sky E/S G/T	35.4	35.4	35.4	dB/K	
Rx Antenna Dia	7.6 meters			Degradation in G/T	0.8	0.8	2.4	dB	
Rx Antenna Effcy	65 %			C/N Downlink	26.9	25.9	23.3	dB	
Rx Antenna Gain	57.2 dBi			C/N Uplink	9.5	8.5	9.5	dB	
Rx Pointing Losses	0.4 dB			C/N Downlink	26.9	25.9	23.3	dB	
Pre LNA Losses	0.2 dB			C/I Intermod (S/C)	16.0	15.0	16.0	dB	
LNA Noise Temp	90 K			C/I Uplink Adj Sat	12.7	11.7	12.7	dB	
Ant,etc Temp	45 K			C/I Downlink Adj Sat	30.3	29.3	30.3	dB	
CI Sky Noise Temp	135 K			C/I Xpol	19.5	18.5	18.7	dB	
Rx Clr Sky G/T	35.4 dB/K			C/I Adjacent Carrier	17.0	16.0	17.0	dB	
Uplink Rain Attn	1.0 dB			C/I co-freq beams	95.7	94.7	95.7	dB	
Dnlink Rain Attn	1.9 dB			C/(Nu,d)	9.4	8.4	9.3	dB	
Up Fade Pwr Cntrl	0.0 dB			C/(Nu,d,ims/c)	8.5	7.5	8.5	dB	
Target Link Availability E-E	97.7 %			C/(Nu,d,im,i)Total	6.5	5.5	6.4	dB	
Tx E/S Location	SM7 Vancouver CA		MODEM	LINK MARGIN	2.3	1.3	2.2	dB	
Tx E/S Latitude	49.3 N			Symbol Rate	1024	1024	1024	ksps	
Tx E/S Longitude	-123.1 W			FEC Code Rate	2/3	2/3	2/3		
Tx E/S Elev Angle	32.9 deg			Minimum Ebi/No	3.0	3.0	3.0	dB	
Rx E/S Location	SM7, Detroit			10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB	
Rx E/S Latitude	42.3 N			Minimum Reqcd C/N	4.2	4.2	4.2	dB	
Rx E/S Longitude	-83.1 W			RF Head Max Output Power			11.9	Watts	
Rx E/S Elev Angle	31.4 deg			Misc Feed Losses etc			4.7	dB	
S/C Isolation	36.0 dB		EARTH	E/S EIRP Reqcd twds S/C				dBW	
Tx E/S Isolation	35.0 dB		STATION	(Note: reqd to achieve link margin)					
Rx E/S Isolation	26.0 dB		HPA	Tx Pointing Losses			0.3	dB	
Uplink Free Sp Loss	207.4 dB			Max Clear Sky EIRP towards S/C			41.1	dBW	
Dnlink Free Sp Loss	205.9 dB			RF Head Output BO (CI Sky)			-0.4	dB	
Uplink Atmos Attn	0.3 dB			Required Calculated PSD Limit for compliant antenna			-12.0	dBW/4Hz	
Dnlink Atmos Attn	0.4 dB			Calculated PSD Limit per link budget			-12.3	dBW/4Hz	

4-Apr-16		2048ksps R2/3 HN INROUTE LINK BUDGET					
03:30 PM		Satellite: SatMex 7 Ku4 Return					
		0.51m Remote in SM7 Vancouver CA		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS				S U M M A R Y			
Value	Unit						
		% Avail S/C Power Reqcd/Crr		2.09	%		
		% Xponder Bandwidth Reqcd/Crr		5.34	%		
		Clear Sky Link Margin		1.7	dB		
		Power Equivalent Bandwidth		1.13	MHz		
		Contract EIRP at reference contour		33.2	dBw		
		LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
		Satellite SFD		-97.5	-97.5	-97.5	dBW/m2
		Agg Input B.O.		5.3	5.3	5.3	dB
		Input Backoff/Crr		22.1	23.1	22.1	dB
		Crr Flux Density		-119.6	-120.6	-119.6	dBW/m2
		Gain of a Sq meter		44.7	44.7	44.7	dBi
		UPLINK	Uplink Path Losses	207.6	208.6	207.6	dB
		BUDGET	Carrier Up EIRP	43.3	43.3	43.3	dBW
			Satellite G/T	7.5	7.5	7.5	dB/K
			C/N Uplink	8.7	7.7	8.7	dB
			Satellite SFD	-97.5	-97.5	-97.5	dBW/m2
			Agg Input B.O.	5.3	5.3	5.3	dB
			Input Backoff/Crr	22.1	23.1	22.1	dB
			Crr Flux Density	-119.6	-120.6	-119.6	dBW/m2
			Gain of a Sq meter	44.7	44.7	44.7	dBi
			Uplink Path Losses	207.6	208.6	207.6	dB
			Carrier Up EIRP	43.3	43.3	43.3	dBW
			Satellite G/T	7.5	7.5	7.5	dB/K
			C/N Uplink	8.7	7.7	8.7	dB
			Saturation EIRP	53.0	53.0	53.0	dBW
			Agg Output B.O.	3.5	3.5	3.5	dB
			Output Backoff/Crr	20.3	21.3	20.3	dB
			Carrier Dn EIRP	32.7	31.7	32.7	dBW
			Dnlink Path Losses	206.3	206.3	208.2	dB
			Rx Pointing Losses	0.4	0.4	0.4	dB
			CI Sky E/S G/T	35.4	35.4	35.4	dB/K
			Degradation in G/T	0.8	0.8	2.4	dB
			C/N Downlink	26.1	25.1	22.5	dB
			C/N Uplink	8.7	7.7	8.7	dB
			C/N Downlink	26.1	25.1	22.5	dB
			C/I Intermod (S/C)	15.2	14.2	15.2	dB
			C/I Uplink Adj Sat	12.7	11.7	12.7	dB
			C/I Downlink Adj Sat	29.5	28.5	29.5	dB
			C/I Xpol	18.7	17.7	18.0	dB
			C/I Adjacent Carrier	17.0	16.0	17.0	dB
			C/I co-freq beams	94.9	93.9	94.9	dB
			C/(Nu,d)	8.6	7.6	8.5	dB
			C/(Nu,d,ims/c)	7.7	6.7	7.7	dB
			C/(Nu,d,im,i)Total	5.9	4.9	5.8	dB
			LINK MARGIN	1.7	0.7	1.6	dB
			Symbol Rate	2048	2048	2048	ksps
			FEC Code Rate	2/3	2/3	2/3	
			Minimum Ebi/No	3.0	3.0	3.0	dB
			10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
			Minimum Reqcd C/N	4.2	4.2	4.2	dB
			RF Head Max Output Power			19.9	Watts
			Misc Feed Losses etc			4.7	dB
			E/S EIRP Reqcd twds S/C				dBW
			(Note: reqd to achieve link margin)				
			Tx Pointing Losses			0.3	dB
			Max Clear Sky EIRP towards S/C			43.3	dBW
			RF Head Output BO (CI Sky)			-0.4	dB
			Required Calculated PSD Limit for compliant antenna			-12.0	dBW/4Hz
			Calculated PSD Limit for compliant antenna			-13.1	dBW/4Hz
			Uplink Free Sp Loss			207.4	dB
			Dnlnk Free Sp Loss			205.9	dB
			Uplink Atmos Attn			0.3	dB
			Dnlnk Atmos Attn			0.4	dB

4-Apr-16 12:54 PM		1024kspS R2/3 HN INROUTE LINK BUDGET		Satellite: SatMex 7 Ku4 Return			
		0.51m Remote in SM7 Alberta CA		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS		Value	Unit	SUMMARY			
				% Avail S/C Power Req'd/Crr	1.80 %		
				% Xponder Bandwidth Req'd/Crr	2.67 %		
				Clear Sky Link Margin	4.4 dB		
				Power Equivalent Bandwidth	0.97 MHz		
				Contract EIRP at reference contour	32.5 dBw		
				LINK PERFORMANCE			
					CI Sky	Up Fade	Dn Fade Unit
				Satellite SFD	-97.0	-97.0	-97.0 dBW/m2
				Agg Input B.O.	5.3	5.3	5.3 dB
				Input Backoff/Crr	22.8	23.8	22.8 dB
				Crr Flux Density	-119.8	-120.8	-119.8 dBW/m2
				Gain of a Sq meter	44.7	44.7	44.7 dBi
CARRIER	Carrier Info Rate	1365	Kbps	UPLINK	Uplink Path Losses	207.8	208.8 207.8 dB
	FEC Code Rate	0.667		BUDGET	Carrier Up EIRP	43.3	43.3 43.3 dBW
	Crr Symbol Rate	1024	KspS		Satellite G/T	9.0	9.0 9.0 dB/K
CARRIER	CI Sky Req'd Ebi/No	3.0	dB		C/N Uplink	13.0	12.0 13.0 dB
DATA	No of bits/symbol	2.0	Bits		Saturation EIRP	53.0	53.0 53.0 dBW
	Demod BT Product	1.00			Agg Output B.O.	3.5	3.5 3.5 dB
	Carrier Bandwidth	1024	kHz		Output Backoff/Crr	21.0	22.0 21.0 dB
	Crr Spacing Fctr	1.41	x Rs		Carrier Dn EIRP	32.0	31.0 32.0 dBW
	Carrier Spacing	1440	kHz	DOWNLINK	Dnlink Path Losses	206.3	206.3 208.2 dB
	Satellite	SatMex 7 Ku4 Return		BUDGET	Rx Pointing Losses	0.4	0.4 0.4 dB
	Location	-115.0 WL			CI Sky E/S G/T	35.4	35.4 35.4 dB/K
	Hub EIRP Contour	53.0 dBW			Degradation in G/T	0.8	0.8 2.4 dB
	Remote G/T Contour	9.0 dB/K			C/N Downlink	28.4	27.4 24.9 dB
	Attn Setting	13.0 dB			C/N Uplink	13.0	12.0 13.0 dB
SATELLITE	Xponder Gain	196.5 dB			C/N Downlink	28.4	27.4 24.9 dB
DATA	SFD at remote	-97.0 dBW/m2			C/I Intermod (S/C)	17.5	16.5 17.5 dB
	Xponder Bandwidth	54.0 MHz		COMPOSITE	C/I Uplink Adj Sat	14.0	13.0 14.0 dB
	Agg Input BO	5.3 dB		LINK	C/I Downlink Adj Sat	31.8	30.8 31.8 dB
	Agg Output BO	3.5 dB			C/I Xpol	21.0	20.0 20.3 dB
	Uplink Frequency	14.5000 GHz			C/I Adjacent Carrier	17.0	16.0 17.0 dB
	Dnlink Frequency	12.2000 GHz			C/I co-freq beams	97.3	96.3 97.3 dB
	Tx Antenna Dia	0.51 meters			C/(Nu,d)	12.9	11.9 12.8 dB
	HPA Max Output Pwr	25.0 Watts			C/(Nu,d,ims/c)	11.6	10.6 11.5 dB
	Tx Antenna Gain	34.0 dBi			C/(Nu,d,im,i)Total	8.6	7.6 8.5 dB
	Tx Pointing Losses	0.3 dB			LINK MARGIN	4.4	3.4 4.3 dB
GROUND	Rx Antenna Dia	7.6 meters			Symbol Rate	1024	1024 1024 kspS
SEGMENT	Rx Antenna Effcy	65 %			FEC Code Rate	2/3	2/3 2/3
DATA	Rx Antenna Gain	57.2 dBi		MODEM	Minimum Ebi/No	3.0	3.0 3.0 dB
	Rx Pointing Losses	0.4 dB			10*log(Rbt/Noise BW)	3.0	3.0 3.0 dB
	Pre LNA Losses	0.2 dB			Minimum Req'd C/N	4.2	4.2 4.2 dB
	LNA Noise Temp	90 K			RF Head Max Output Power	19.9 Watts	
	Ant,etc Temp	45 K			Misc Feed Losses etc	4.7 dB	
	CI Sky Noise Temp	135 K			E/S EIRP Req'd twds S/C	dBW	
	Rx Clr Sky G/T	35.4 dB/K		EARTH	(Note: req'd to achieve link margin)		
	Uplink Rain Attn	1.0 dB		STATION	Tx Pointing Losses	0.3 dB	
RAIN	Dnlink Rain Attn	1.9 dB		HPA	Max Clear Sky EIRP towards S/C	43.3 dBW	
MARGINS	Up Fade Pwr Cntrl	0.0 dB			RF Head Output BO (CI Sky)	-0.4 dB	
	Target Link Availability E-E	97.7 %			Required Calculated PSD Limit for compliant antenna	-10.0 dBW/4Hz	
	Tx E/S Location	SM7 Alberta CA			Calculated PSD Limit per link budget	-10.1 dBW/4Hz	
SITE	Tx E/S Latitude	54.1 N					
GEOGRAPHIC	Tx E/S Longitude	-116.7 W					
DATA	Tx E/S Elev Angle	28.2 deg					
	Rx E/S Location	SM7, Detroit					
	Rx E/S Latitude	42.3 N					
	Rx E/S Longitude	-83.1 W					
	Rx E/S Elev Angle	31.4 deg					
	S/C Isolation	36.0 dB					
ISOLATION	Tx E/S Isolation	35.0 dB					
DATA	Rx E/S Isolation	26.0 dB					
	Uplink Free Sp Loss	207.4 dB					
MISC	Dnlink Free Sp Loss	205.9 dB					
LOSSES	Uplink Atmos Attn	0.3 dB					
	Dnlink Atmos Attn	0.4 dB					

4-Apr-16		2048ksps R2/3 HN INROUTE LINK BUDGET						
03:04 PM		Satellite: SatMex 7 Ku4 Return						
0.51m Remote in SM7 Alberta CA		7.6m hub in SM7, Detroit						
BASELINE PARAMETERS			Value	Unit	SUMMARY			
CARRIER	Carrier Info Rate	2731	Kbps	% Avail S/C Power Req'd/Crr	1.80 %			
	FEC Code Rate	0.667		% Xponder Bandwidth Req'd/Crr	5.34 %			
	Crr Symbol Rate	2048	Ksps	Clear Sky Link Margin	2.5 dB			
	CI Sky Req'd Ebi/No	3.0	dB	Power Equivalent Bandwidth	0.97 MHz			
	DATA	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	32.5 dBW		
		Demod BT Product	1.00		LINK PERFORMANCE			
		Carrier Bandwidth	2048	kHz	CI Sky	Up Fade	Dn Fade	Unit
		Crr Spacing Fctr	1.41	x Rs				
	Carrier Spacing	2880	kHz	Satellite SFD	-97.0	-97.0	-97.0 dBW/m2	
SATELLITE	Satellite	SatMex 7 Ku4 Return		Agg Input B.O.	5.3	5.3	5.3 dB	
	Location	-115.0 WL		Input Backoff/Crr	22.8	23.8	22.8 dB	
	Hub EIRP Contour	53.0 dBW		Crr Flux Density	-119.8	-120.8	-119.8 dBW/m2	
	Remote G/T Contour	9.0 dB/K		Gain of a Sq meter	44.7	44.7	44.7 dBi	
	Attn Setting	13.0 dB		UPLINK				
	Xponder Gain	196.5 dB		Uplink Path Losses	207.8	208.8	207.8 dB	
	DATA	SFD at remote	-97.0 dBW/m2		BUDGET			
	Xponder Bandwidth	54.0 MHz		Carrier Up EIRP	43.3	43.3	43.3 dBW	
	Agg Input BO	5.3 dB		Satellite G/T	9.0	9.0	9.0 dB/K	
	Agg Output BO	3.5 dB		C/N Uplink	10.0	9.0	10.0 dB	
GROUND	Uplink Frequency	14.5000 GHz		Saturation EIRP	53.0	53.0	53.0 dBW	
	Dnlink Frequency	12.2000 GHz		Agg Output B.O.	3.5	3.5	3.5 dB	
	Tx Antenna Dia	0.51 meters		Output Backoff/Crr	21.0	22.0	21.0 dB	
	HPA Max Output Pwr	25.0 Watts		Carrier Dn EIRP	32.0	31.0	32.0 dBW	
	Tx Antenna Gain	34.0 dBi		DOWNLINK				
	Tx Pointing Losses	0.3 dB		Dnlink Path Losses	206.3	206.3	208.2 dB	
	Rx Antenna Dia	7.6 meters		BUDGET				
	Rx Antenna Effcy	65 %		Rx Pointing Losses	0.4	0.4	0.4 dB	
	Rx Antenna Gain	57.2 dBi		CI Sky E/S G/T	35.4	35.4	35.4 dB/K	
	Rx Pointing Losses	0.4 dB		Degradation in G/T	0.8	0.8	2.4 dB	
SEGMENT	Pre LNA Losses	0.2 dB		C/N Downlink	25.4	24.4	21.8 dB	
	LNA Noise Temp	90 K		C/N Uplink	10.0	9.0	10.0 dB	
	Ant,etc Temp	45 K		C/N Downlink	25.4	24.4	21.8 dB	
	CI Sky Noise Temp	135 K		C/I Intermod (S/C)	14.5	13.5	14.5 dB	
	Rx Clr Sky G/T	35.4 dB/K		C/I Uplink Adj Sat	14.0	13.0	14.0 dB	
	Uplink Rain Attn	1.0 dB		COMPOSITE				
	Dnlink Rain Attn	1.9 dB		C/I Downlink Adj Sat	28.8	27.8	28.8 dB	
	Up Fade Pwr Cntrl	0.0 dB		C/I Xpol	18.0	17.0	17.3 dB	
	Target Link Availability E-E	97.7 %		C/I Adjacent Carrier	17.0	16.0	17.0 dB	
				C/I co-freq beams	94.3	93.3	94.3 dB	
MARGINS	Tx E/S Location	SM7 Alberta CA		C/(Nu,d)	9.9	8.9	9.8 dB	
	Tx E/S Latitude	54.1 N		C/(Nu,d,ims/c)	8.6	7.6	8.5 dB	
	Tx E/S Longitude	-116.7 W		C/(Nu,d,im,i)Total	6.7	5.7	6.6 dB	
	Tx E/S Elev Angle	28.2 deg		LINK MARGIN	2.5	1.5	2.4 dB	
	Rx E/S Location	SM7, Detroit		Symbol Rate	2048	2048	2048 ksps	
	Rx E/S Latitude	42.3 N		FEC Code Rate	2/3	2/3	2/3	
	Rx E/S Longitude	-83.1 W		MODEM				
	Rx E/S Elev Angle	31.4 deg		Minimum Ebi/No	3.0	3.0	3.0 dB	
	XPOL	S/C Isolation	36.0 dB		10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
	ISOLATION	Tx E/S Isolation	35.0 dB		Minimum Req'd C/N	4.2	4.2	4.2 dB
DATA	Rx E/S Isolation	26.0 dB		RF Head Max Output Power	19.9 Watts			
				Misc Feed Losses etc	4.7 dB			
MISC	Uplink Free Sp Loss	207.4 dB		E/S EIRP Req'd twds S/C	dBW			
	Dnlink Free Sp Loss	205.9 dB		(Note: req'd to achieve link margin)				
	Uplink Atmos Attn	0.3 dB		HPA	Tx Pointing Losses			
LOSSES	Dnlink Atmos Attn	0.4 dB			0.3 dB			
					Max Clear Sky EIRP towards S/C			
					43.3 dBW			
					RF Head Output BO (CI Sky)			
					-0.4 dB			
					Required Calculated PSD Limit for compliant antenna			
					-10.0 dBW/4Hz			
					Calculated PSD Limit per link budget			
					-13.1 dBW/4Hz			

4/4/2016

HughesNet LINK BUDGET

12:24 PM

Satellite: SatMex 7 Ku4 FWD
 0.51 m Remote Located in SM7 Vancouver CA
 Crr EIRP Density = 9.6 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY				
CARRIER	Carrier Info Rate	3967	Kbps	% Avail S/C Power Req'd/Crr	6.9 %			
	Net FEC Code Rate	0.667		% Xponder Bandwidth Req'd/Crr	7.0 %			
	Transmit Symbol Rate	3000	Ksps	Clear Sky Link Margin	1.1 dB			
	CI Sky Req'd Es/No	3.3	dB	Power Equivalent Bandwidth	3.7 MHz			
	DATA	No of bits/symbol	2.0	Bits	EIRP at 53.5 dBW reference contour	38.4 dBw		
		Demod BT Product	1.00		LINK PERFORMANCE			
		Crr Noise Bandwidth	3000	KHz	CI Sky	Up Fade	Dn Fade	Unit
	Carrier Spacing	3750	KHz	Satellite SFD	-90.5	-90.5	-90.5 dBW/m2	
SATELLITE	Satellite	SatMex 7 Ku4 FWD			Agg Input B.O.	5.3	5.3	5.3 dB
	Location	-115.0 WL			Input Backoff/Crr	16.9	16.9	16.9 dB
	EIRP Contour at Remote	52.0 dBW			Crr Flux Density	-107.4	-107.4	-107.4 dBW/m2
	G/T Contour at Hub	6.5 dB/K			UPLINK Gain of a Sq meter	44.7	44.7	44.7 dBi
	Attn Setting	22.0 dB			BUDGET Uplink Path Losses	207.9	212.9	207.9 dB
	Xponder Gain	189.0 dB			Carrier Up EIRP	55.2	60.2	55.2 dBW
	DATA SFD at Hub	-90.5 dBW/m2			Satellite G/T	6.5	6.5	6.5 dB/K
	Xponder Bandwidth	54.0 MHz			C/N Uplink	19.6	19.6	19.6 dB
	Agg Input BO	5.3 dB			DOWNLINK EIRP Contour	52.0	52.0	52.0 dBW
	Agg Output BO	3.5 dB			Agg Output B.O.	3.5	3.5	3.5 dB
GROUND SEGMENT	Uplink Frequency	14.500 GHz			Output Backoff/Crr	15.1	15.1	15.1 dB
	Dnlink Frequency	12.200 GHz			Carrier Dn EIRP	36.6	36.6	36.6 dBW
	Tx Antenna Dia	7.6 meters			BUDGET Dnlink Path Losses	206.1	206.1	206.3 dB
	HPA Max Output Pwr	250.0 Watts			Rx Pointing Losses	0.2	0.2	0.2 dB
	Waveguide Losses	2.0 dB			CI Sky E/S G/T	12.6	12.6	12.6 dB/K
	Tx Antenna Gain	59.4 dBi			Degradation in G/T	0.6	0.6	0.8 dB
	Tx Pointing Losses	0.6 dB			C/N Downlink	8.1	8.1	7.6 dB
	Max EIRP Toward S/C	80.8 dB			C/N Uplink	19.6	19.6	19.6 dB
	Rx Antenna Dia	0.51 meters			C/N Downlink	8.1	8.1	7.6 dB
	Rx Antenna Gain	31.5 dBi			C/I Intermod (S/C)	20.1	20.1	20.1 dB
RAIN MARGINS	Rx Pointing Losses	0.2 dB			C/I Uplink Adj Sat	17.4	17.4	17.4 dB
	Pre LNA Losses	0.1 dB			COMPOSITE C/I Dnlink Adj Sat	8.2	8.2	8.2 dB
	LNA Noise Temp	43 K			LINK C/I Xpol	18.4	17.2	18.4 dB
	Ant,etc Temp	28 K			C/I Intermod (E/S)	28.0	18.0	28.0 dB
	CI Sky Noise Temp	71 K			C/(Nu,d)	7.8	7.8	7.3 dB
	Rx Crr Sky G/T	12.6 dB/K			C/(Nu,d,ims/c)	7.5	7.5	7.1 dB
	Uplink Rain Attn	5.0 dB			C/(Nu,d,im,i)Total	4.4	4.2	4.2 dB
	Dnlink Rain Attn	0.3 dB			LINK MARGIN	1.1	0.9	0.9 dB
	Up Fade Pwr Cntrl	5.0 dB			Modulation	QPSK	QPSK	QPSK
	Target Link Availability E-E	97.71 %			FEC Rate	2/3	2/3	2/3
SITE GEOGRAPHIC	Tx E/S Location	SM7, Detroit			Minimum Req'd Ebi/No	2.1	2.1	2.1 dB
	Tx E/S Latitude	42.3 N			MODEM 10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
	Tx E/S Longitude	-83.1 W			Minimum Req'd C/N	3.3	3.3	3.3 dB
	Tx E/S Elev Angle	31 deg			E/S EIRP/Crr Req'd (CI Sky)	55.2 dBW		
	Rx E/S Location	SM7 Vancouver CA			Tx Gain - Pointing Loss	58.9 dB		
	Rx E/S Latitude	49.3 N			WAVEGUIDE Losses	2.0 dB		
ISOLATION	Rx E/S Longitude	-123.1 W			STATION Tx Power Req'd/Cxr (clear sky)	-1.6 dBW		
	Rx E/S Elev Angle	32.9 deg			HPA	0.7 watts		
	S/C Isolation	36.0 dB			Uplink Power Control	5.0 dB		
	Tx E/S Isolation	35.0 dB			TX Power Req'd/Cxr (full UPC)	3.4 dBW		
	Rx E/S Isolation	20.0 dB				2.2 watts		
	MISC LOSSES	Uplink Free Sp Loss	207.4 dB			Dnlink EIRP Dens @ Beam Peak (53.5 dBW)	9.6 dBW/4KHz	
Dnlink Free Sp Loss		205.9 dB						
Uplink Atmos Attn		0.6 dB						
Dnlink Atmos Attn		0.2 dB						