

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET			
10:36 AM		Satellite: AMC1 19K			
		0.63m Remote in AMC 1 San Diego, CA		7.6m hub in AMC-1, Woodbine, MD	
BASELINE PARAMETERS		Value	Unit	SUMMARY	
				% Avail S/C Power Reqd/Crr	0.23 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
				Clear Sky Link Margin	5.7 dB
				Power Equivalent Bandwidth	0.08 MHz
				Contract EIRP at reference contour	20.0 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	256	Kbps	Satellite SFD	-91.0
	FEC Code Rate	0.500		Agg Input B.O.	7.0
	Crr Symbol Rate	256	Ksps	Input Backoff/Crr	33.4
	CI Sky Reqd Ebi/No	2.1	dB	Crr Flux Density	-124.4
DATA	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.6
	Demod BT Product	1.00		Uplink Path Losses	207.2
	Spreading factor			Carrier Up EIRP	38.2
	Spread Bandwidth	1024	kHz	Satellite G/T	4.0
	Crr Spacing Fctr	1.41	x Rs		
	Carrier Spacing	1440	kHz	C/N Uplink	5.5
SATELLITE	Satellite	AMC1 19K		Saturation EIRP	48.0
	Location	-129.2	WL	Agg Output B.O.	4.0
	Hub EIRP Contour	48.0	dBW	Agg Output B.O.	4.0
	Remote G/T Contour	4.0	dB/K	Output Backoff/Crr	30.4
	Attn Setting	5.0	dB	Carrier Dn EIRP	17.6
DATA	Xponder Gain	186.6	dB	Dnlink Path Losses	206.8
	SFD at remote	-91.0	dBW/m2	Rx Pointing Losses	0.4
	Xponder Bandwidth	36.0	MHz	CI Sky E/S G/T	35.3
	Agg Input BO	7.0	dB	Degradation in G/T	1.1
	Agg Output BO	4.0	dB		
	Uplink Frequency	14.3800	GHz	C/N Downlink	15.0
	Dnlink Frequency	12.0800	GHz		
				C/N Uplink	5.5
				C/N Downlink	15.0
GROUND	Tx Antenna Dia	0.63	meters	C/I Intermod (S/C)	46.6
SEGMENT	HPA Max Output Pwr	25.0	Watts	C/I Uplink Adj Sat	6.4
				C/I Downlink Adj Sat	20.1
	Tx Antenna Gain	29.0	dBi	C/I Xpol	10.5
DATA	Tx Pointing Losses	0.3	dB	C/I Adjacent Carrier	17.0
	Rx Antenna Dia	7.6	meters	C/I co-freq beams	86.6
	Rx Antenna Effcy	65	%		
	Rx Antenna Gain	57.1	dBi	C/(Nu,d)	5.0
	Rx Pointing Losses	0.4	dB	C/(Nu,d,ims/c)	5.0
	Pre LNA Losses	0.2	dB	C/(Nu,d,im,i)Total	1.8
	LNA Noise Temp	90	K	LINK MARGIN	5.7
	Ant,etc Temp	45	K		
	CI Sky Noise Temp	135	K	Symbol Rate	256
				FEC Code Rate	1/2
	Rx Clr Sky G/T	35.3	dB/K	Minimum Ebi/No	2.1
RAIN	Uplink Rain Attn	1.0	dB	10*log(Rbt/Noise BW)	-3.0
MARGINS	Dnlink Rain Attn	3.0	dB	Minimum Reqd C/N	-3.9
	Up Fade Pwr Cntrl	0.0	dB		
	Target Link Availability E-E	97.7	%	RF Head Max Output Power	19.9
				Misc Feed Losses etc	3.8
SITE	Tx E/S Location	AMC 1 San Diego, CA		E/S EIRP Reqd twds S/C	dBW
GEOGRAPHIC	Tx E/S Latitude	32.8	N	(Note: reqd to achieve link margin)	
DATA	Tx E/S Longitude	-117.2	W	Tx Pointing Losses	0.3
	Tx E/S Elev Angle	49.7	deg	Max Clear Sky EIRP towards S/C	38.2
	Rx E/S Location	AMC-1, Woodbine, MD		RF Head Output BO (CI Sky)	0.7
	Rx E/S Latitude	39.4	N		
	Rx E/S Longitude	-77.1	W		
	Rx E/S Elev Angle	20.2	deg		
XPOL	S/C Isolation	36.0	dB		
ISOLATION	Tx E/S Isolation	35.0	dB		
DATA	Rx E/S Isolation	26.0	dB		
MISC	Uplnk Free Sp Loss	207.0	dB	Calculated EIRP Desity Limit per link budget	14.1
LOSSES	Dnlnk Free Sp Loss	206.0	dB	Calculated PSD Limit per link budget	-14.9
	Uplink Atmos Attn	0.2	dB	Co-ordination Offset	0.0
	Dnlink Atmos Attn	0.7	dB		

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET			
10:38 AM		Satellite: AMC1 19K			
		0.63m Remote in AMC 1 San Diego, CA		7.6m hub in AMC-1, Woodbine, MD	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	0.23 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
				Clear Sky Link Margin	2.7 dB
				Power Equivalent Bandwidth	0.08 MHz
				Contract EIRP at reference contour	20.0 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	512 Kbps	Satellite SFD	-91.0
		FEC Code Rate	0.500	Agg Input B.O.	7.0
		Crr Symbol Rate	512 Ksps	Input Backoff/Crr	33.4
		CI Sky Reqd Ebi/No	2.1 dB	Crr Flux Density	-124.4
DATA		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.6
		Demod BT Product	1.00	Uplink Path Losses	207.2
		Spreading factor		Carrier Up EIRP	38.2
		Spread Bandwidth	1024 kHz	Satellite G/T	4.0
		Crr Spacing Fctr	1.41 x Rs	C/N Uplink	5.5
		Carrier Spacing	1440 kHz	Saturation EIRP	48.0
				Agg Output B.O.	4.0
SATELLITE		Satellite	AMC1 19K	Output Backoff/Crr	30.4
		Location	-129.2 WL	Carrier Dn EIRP	17.6
		Hub EIRP Contour	48.0 dBW	Dnlink Path Losses	206.8
		Remote G/T Contour	4.0 dB/K	Rx Pointing Losses	0.4
		Attn Setting	5.0 dB	CI Sky E/S G/T	35.3
DATA		Xponder Gain	186.6 dB	Degradation in G/T	1.1
		SFD at remote	-91.0 dBW/m2	C/N Downlink	15.0
		Xponder Bandwidth	36.0 MHz	C/N Uplink	5.5
		Agg Input BO	7.0 dB	C/N Downlink	15.0
		Agg Output BO	4.0 dB	C/I Intermod (S/C)	40.6
		Uplink Frequency	14.3800 GHz	C/I Uplink Adj Sat	6.4
		Dnlink Frequency	12.0800 GHz	C/I Downlink Adj Sat	20.1
				C/I Xpol	10.5
				C/I Adjacent Carrier	17.0
				C/I co-freq beams	86.6
				C/(Nu,d)	5.0
				C/(Nu,d,ims/c)	5.0
				C/(Nu,d,im,i)Total	1.8
				LINK MARGIN	2.7
				Symbol Rate	512
				FEC Code Rate	1/2
				Minimum Ebi/No	2.1
				10*log(Rbt/Noise BW)	0.0
				Minimum Reqd C/N	-0.9
				RF Head Max Output Power	19.9 Watts
				Misc Feed Losses etc	3.8 dB
				E/S EIRP Reqd twds S/C	
				(Note: reqd to achieve link margin)	
				Tx Pointing Losses	0.3 dB
				Max Clear Sky EIRP towards S/C	38.2 dBW
				RF Head Output BO (CI Sky)	0.7 dB
				Calculated EIRP Desity Limit per link budget	14.1 dBW/4Hz
				Calculated PSD Limit per link budget	-14.9 dBW/4Hz
				Co-ordination Offset	0.0 dBW/4Hz
GROUND		Tx Antenna Dia	0.63 meters		
		HPA Max Output Pwr	25.0 Watts		
		Tx Antenna Gain	29.0 dBi		
		Tx Pointing Losses	0.3 dB		
SEGMENT		Rx Antenna Dia	7.6 meters		
		Rx Antenna Effcy	65 %		
DATA		Rx Antenna Gain	57.1 dBi		
		Rx Pointing Losses	0.4 dB		
		Pre LNA Losses	0.2 dB		
		LNA Noise Temp	90 K		
		Ant,etc Temp	45 K		
		CI Sky Noise Temp	135 K		
		Rx Clr Sky G/T	35.3 dB/K		
RAIN		Uplink Rain Attn	1.0 dB		
		Dnlink Rain Attn	3.0 dB		
MARGINS		Up Fade Pwr Cntrl	0.0 dB		
		Target Link Availability E-E	97.7 %		
SITE		Tx E/S Location	AMC 1 San Diego, CA	MODEM	
		Tx E/S Latitude	32.8 N		
		Tx E/S Longitude	-117.2 W		
GEOGRAPHIC		Tx E/S Elev Angle	49.7 deg		
DATA		Rx E/S Location	AMC-1, Woodbine, MD		
		Rx E/S Latitude	39.4 N		
		Rx E/S Longitude	-77.1 W		
		Rx E/S Elev Angle	20.2 deg		
XPOL		S/C Isolation	36.0 dB	EARTH	
ISOLATION		Tx E/S Isolation	35.0 dB	STATION	
DATA		Rx E/S Isolation	26.0 dB	HPA	
		Uplnk Free Sp Loss	207.0 dB		
		Dnlnk Free Sp Loss	206.0 dB		
		Uplink Atmos Attn	0.2 dB		
		Dnlink Atmos Attn	0.7 dB		

9/9/2016

HughesNet LINK BUDGET

10:39 AM

Satellite: AMC1 7K

0.63 m Remote Located in AMC 1 San Diego, CA

Crr EIRP Density = 11.1 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY			
				% Avail S/C Power Req'd/Crr	100.0	%	
				% Xponder Bandwidth Req'd/Crr	100.0	%	
Carrier Info Rate		21450	Kbps	Clear Sky Link Margin	3.9	dB	
Net FEC Code Rate		0.500		Power Equivalent Bandwidth	36.0	MHz	
Transmit Symbol Rate		30000	Ksps	EIRP at 50.4 dBW reference contour	49.9	dBW	
CARRIER	CI Sky Req'd Es/No	1.3	dB	LINK PERFORMANCE			
DATA	No of bits/symbol	2.0	Bits	CI Sky	Up Fade	Dn Fade	Unit
Demod BT Product		1.00		Satellite SFD	-90.0	-90.0	-90.0 dBW/m2
Crr Noise Bandwidth		30000	KHz	Agg Input B.O.	3.0	3.0	3.0 dB
Carrier Spacing		36000	KHz	Input Backoff/Crr	3.0	3.0	3.0 dB
Satellite		AMC1 7K		Crr Flux Density	-93.0	-93.0	-93.0 dBW/m2
Location		-129.2	WL	UPLINK Gain of a Sq meter	44.5	44.5	44.5 dBi
EIRP Contour at Remote		47.0	dBW	BUDGET Uplink Path Losses	208.3	213.3	208.3 dB
G/T Contour at Hub		4.0	dB/K	Carrier Up EIRP	70.3	75.3	70.3 dBW
Attn Setting		9.0	dB	Satellite G/T	4.0	4.0	4.0 dB/K
SATELLITE	Xponder Gain	184.0	dB	C/N Uplink	24.3	24.3	24.3 dB
DATA	SFD at Hub	-90.0	dBW/m2	EIRP Contour	47.0	47.0	47.0 dBW
Xponder Bandwidth		36.0	MHz	Agg Output B.O.	0.5	0.5	0.5 dB
Agg Input BO		3.0	dB	Output Backoff/Crr	0.5	0.5	0.5 dB
Agg Output BO		0.5	dB	Carrier Dn EIRP	46.5	46.5	46.5 dBW
Uplink Frequency		14.140	GHz	DOWNLINK Dnlink Path Losses	205.5	205.5	205.7 dB
Dnlink Frequency		11.840	GHz	BUDGET Rx Pointing Losses	0.2	0.2	0.2 dB
Tx Antenna Dia		7.6	meters	CI Sky E/S G/T	9.1	9.1	9.1 dB/K
HPA Max Output Pwr		150.0	Watts	Degradation in G/T	0.4	0.4	0.6 dB
Waveguide Losses		2.0	dB	C/N Downlink	7.8	7.8	7.5 dB
Tx Antenna Gain		59.2	dBi	C/N Uplink	24.3	24.3	24.3 dB
Tx Pointing Losses		0.6	dB	C/N Downlink	7.8	7.8	7.5 dB
Max EIRP Toward S/C		78.4	dB	C/I Intermod (S/C)	99.0	99.0	99.0 dB
GROUND	Rx Antenna Dia	0.63	meters	C/I Uplink Adj Sat	25.3	25.3	25.3 dB
SEGMENT	Rx Antenna Gain	29.0	dBi	COMPOSITE C/I Dnlink Adj Sat	9.5	9.5	9.5 dB
DATA	Rx Pointing Losses	0.2	dB	LINK C/I Xpol	18.4	16.3	18.4 dB
Pre LNA Losses		0.8	dB	C/I Intermod (E/S)	28.0	18.0	28.0 dB
LNA Noise Temp		9	K	C/(Nu,d)	7.7	7.7	7.4 dB
Ant,etc Temp		28	K	C/(Nu,d,ims/c)	7.7	7.7	7.4 dB
CI Sky Noise Temp		37	K	C/(Nu,d,im,i)Total	5.2	4.9	5.0 dB
Rx Clr Sky G/T		9.1	dB/K	LINK MARGIN	3.9	3.6	3.7 dB
RAIN	Uplink Rain Attn	5.0	dB	Modulation	QPSK	QPSK	QPSK
MARGINS	Dnlink Rain Attn	0.2	dB	FEC Rate	1/2	1/2	1/2
Target Link Availability E-E		97.71	%	Minimum Req'd Ebi/No	1.3	1.3	1.3 dB
Tx E/S Location		AMC-1, Woodbine, MD		MODEM			
Tx E/S Latitude		39.4	N	10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
Tx E/S Longitude		-77.1	W	Minimum Req'd C/N	1.3	1.3	1.3 dB
Tx E/S Elev Angle		20	deg	E/S EIRP/Crr Req'd (CI Sky)	70.3	dBW	
SITE	Rx E/S Location	AMC 1 San Diego, CA		Tx Gain - Pointing Loss	58.6	dB	
GEOGRAPHIC	Rx E/S Latitude	32.8	N	Waveguide Losses	2.0	dB	
DATA	Rx E/S Longitude	-117.2	W	STATION Tx Power Req'd/Cxr (clear sky)	13.6	dBW	
Rx E/S Elev Angle		49.7	deg	HPA	23.1	watts	
XPOL S/C Isolation		36.0	dB	Uplink Power Control	5.0	dB	
ISOLATION	Tx E/S Isolation	35.0	dB	TX Power Req'd/Cxr (full UPC)	18.6	dBW	
DATA	Rx E/S Isolation	20.0	dB		73.0	watts	
Uplink Free Sp Loss		207.4	dB	Dnlink EIRP Dens @ Beam Peak (50.4 dBW)	11.1	dBW/4KHz	
MISC	Dnlink Free Sp Loss	205.3	dB				
LOSSES	Uplink Atmos Attn	0.9	dB				
Dnlink Atmos Attn		0.2	dB				

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET					
12:47 PM		Satellite: AMC1 19K		0.63m Remote in AMC1 Orlando FL		7.6m hub in AMC-1, Woodbine, MD	
BASELINE PARAMETERS			Value	Unit	SUMMARY		
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr	0.21 %		
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr	4.00 %		
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	5.8 dB		
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.08 MHz		
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	19.5 dBw		
	Demod BT Product	1.00		LINK PERFORMANCE			
	Spreading factor			CI Sky	Up Fade	Dn Fade	Unit
	Spread Bandwidth	1024	kHz	Satellite SFD	-92.0	-92.0	-92.0 dBW/m2
	Crr Spacing Fctr	1.41	x Rs	Agg Input B.O.	7.0	7.0	7.0 dB
Carrier Spacing	1440	kHz	Input Backoff/Crr	33.9	35.2	33.9 dB	
SATELLITE DATA	Satellite	AMC1 19K		Crr Flux Density	-125.9	-127.2	-125.9 dBW/m2
	Location	-129.2 WL		Gain of a Sq meter	44.6	44.6	44.6 dBi
	Hub EIRP Contour	48.0 dBW		UPLINK Uplink Path Losses	208.1	209.5	208.1 dB
	Remote G/T Contour	5.0 dB/K		BUDGET Carrier Up EIRP	37.7	37.7	37.7 dBW
	Attn Setting	5.0 dB		Satellite G/T	5.0	5.0	5.0 dB/K
	Xponder Gain	187.6 dB		C/N Uplink	5.0	1.7	3.0 dB
	SFD at remote	-92.0 dBW/m2		Saturation EIRP	48.0	48.0	48.0 dBW
	Xponder Bandwidth	36.0 MHz		Agg Output B.O.	4.0	4.0	4.0 dB
	Agg Input BO	7.0 dB		Agg Output BO	30.9	32.2	30.9 dB
GROUND SEGMENT DATA	Agg Output BO	4.0 dB		Carrier Dn EIRP	17.1	15.8	17.1 dBW
	Uplink Frequency	14.3800 GHz		DOWNLINK Dnlink Path Losses	206.8	206.8	209.8 dB
	Dnlink Frequency	12.0800 GHz		BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Tx Antenna Dia	0.63 meters		CI Sky E/S G/T	35.3	35.3	35.3 dB/K
	HPA Max Output Pwr	18.5 Watts		Degradation in G/T	1.1	1.1	3.2 dB
	Tx Antenna Gain	29.0 dBi		C/N Downlink	14.6	11.3	7.6 dB
	Tx Pointing Losses	0.3 dB		C/N Uplink	5.0	1.7	3.0 dB
	Rx Antenna Dia	7.6 meters		C/N Downlink	14.6	11.3	7.6 dB
	Rx Antenna Effcy	65 %		C/I Intermod (S/C)	46.5	45.2	46.5 dB
RAIN MARGINS DATA	Rx Antenna Gain	57.1 dBi		COMPOSITE C/I Uplink Adj Sat	7.6	6.3	7.6 dB
	Rx Pointing Losses	0.4 dB		C/I Downlink Adj Sat	19.1	17.8	19.1 dB
	Pre LNA Losses	0.2 dB		LINK C/I Xpol	10.0	8.7	11.3 dB
	LNA Noise Temp	90 K		C/I Adjacent Carrier	17.0	15.7	17.0 dB
	Ant,etc Temp	45 K		C/I co-freq beams	86.2	84.9	86.2 dB
	CI Sky Noise Temp	135 K		C/(Nu,d)	4.6	1.2	1.7 dB
	Rx Clr Sky G/T	35.3 dB/K		C/(Nu,d,ims/c)	4.6	1.2	1.7 dB
	Uplink Rain Attn	1.3 dB		C/(Nu,d,im,i)Total	1.9	-0.7	0.2 dB
	Dnlink Rain Attn	3.0 dB		LINK MARGIN	5.8	3.3	4.1 dB
SITE GEOGRAPHIC DATA	Up Fade Pwr Cntrl	0.0 dB		Symbol Rate	256	256	256 ksps
	Target Link Availability E-E	97.7 %		FEC Code Rate	1/2	1/2	1/2
	Tx E/S Location	AMC1 Orlando FL		MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
	Tx E/S Latitude	28.5 N		10*log(Rbt/Noise BW)	-3.0	-3.0	-3.0 dB
	Tx E/S Longitude	-81.1 W		Minimum Reqd C/N	-3.9	-3.9	-3.9 dB
	Tx E/S Elev Angle	28.3 deg		RF Head Max Output Power	14.7 Watts		
	Rx E/S Location	AMC-1, Woodbine, MD		Misc Feed Losses etc	3.8 dB		
	Rx E/S Latitude	39.4 N		EARTH E/S EIRP Reqd twds S/C	dBW		
	Rx E/S Longitude	-77.1 W		(Note: reqd to achieve link margin)			
XPOL ISOLATION DATA	Rx E/S Elev Angle	20.2 deg		HPA Tx Pointing Losses	0.3 dB		
	S/C Isolation	36.0 dB		Max Clear Sky EIRP towards S/C	37.7 dBW		
	Tx E/S Isolation	35.0 dB		RF Head Output BO (CI Sky)	0.0 dB		
MISC LOSSES	Rx E/S Isolation	26.0 dB		Calculated EIRP Desity Limit per link budget	13.6 dBW/4Hz		
	Uplnk Free Sp Loss	207.4 dB		Calculated PSD Limit per link budget	-15.5 dBW/4Hz		
	Dnlnk Free Sp Loss	206.0 dB		Co-ordination Offset	0.0 dBW/4Hz		
	Uplink Atmos Attn	0.8 dB					
Dnlink Atmos Attn	0.7 dB						

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET					
12:49 PM		Satellite: AMC1 19K		0.63m Remote in AMC1 Orlando FL		7.6m hub in AMC-1, Woodbine, MD	
BASELINE PARAMETERS			Value	Unit	SUMMARY		
CARRIER DATA	Carrier Info Rate	512	Kbps	% Avail S/C Power Req'd/Crr	0.21 %		
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	4.00 %		
	Crr Symbol Rate	512	Ksps	Clear Sky Link Margin	2.8 dB		
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.08 MHz		
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	19.5 dBw		
	Demod BT Product	1.00		LINK PERFORMANCE			
	Spreading factor			CI Sky	Up Fade	Dn Fade	Unit
	Spread Bandwidth	1024	kHz	Satellite SFD	-92.0	-92.0	-92.0 dBW/m2
	Crr Spacing Fctr	1.41	x Rs	Agg Input B.O.	7.0	7.0	7.0 dB
Carrier Spacing	1440	kHz	Input Backoff/Crr	33.9	35.2	33.9 dB	
SATELLITE DATA	Satellite	AMC1 19K		Crr Flux Density	-125.9	-127.2	-125.9 dBW/m2
	Location	-129.2 WL		Gain of a Sq meter	44.6	44.6	44.6 dBi
	Hub EIRP Contour	48.0 dBW		UPLINK Uplink Path Losses	208.1	209.5	208.1 dB
	Remote G/T Contour	5.0 dB/K		BUDGET Carrier Up EIRP	37.7	37.7	37.7 dBW
	Attn Setting	5.0 dB		Satellite G/T	5.0	5.0	5.0 dB/K
	Xponder Gain	187.6 dB		C/N Uplink	5.0	1.7	3.0 dB
	SFD at remote	-92.0 dBW/m2		Saturation EIRP	48.0	48.0	48.0 dBW
	Xponder Bandwidth	36.0 MHz		Agg Output B.O.	4.0	4.0	4.0 dB
	Uplink Frequency	14.3800 GHz		Agg Output BO	30.9	32.2	30.9 dB
Dnlink Frequency	12.0800 GHz		Carrier Dn EIRP	17.1	15.8	17.1 dBW	
GROUND SEGMENT DATA	Tx Antenna Dia	0.63 meters		DOWNLINK Dnlink Path Losses	206.8	206.8	209.8 dB
	HPA Max Output Pwr	18.5 Watts		BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Tx Antenna Gain	29.0 dBi		CI Sky E/S G/T	35.3	35.3	35.3 dB/K
	Tx Pointing Losses	0.3 dB		Degradation in G/T	1.1	1.1	3.2 dB
	Rx Antenna Dia	7.6 meters		C/N Downlink	14.6	11.3	7.6 dB
	Rx Antenna Effcy	65 %		C/N Uplink	5.0	1.7	3.0 dB
	Rx Antenna Gain	57.1 dBi		C/N Downlink	14.6	11.3	7.6 dB
	Rx Pointing Losses	0.4 dB		C/I Intermod (S/C)	40.5	39.2	40.5 dB
	Pre LNA Losses	0.2 dB		C/I Uplink Adj Sat	7.6	6.3	7.6 dB
LNA Noise Temp	90 K		COMPOSITE C/I Downlink Adj Sat	19.1	17.8	19.1 dB	
Ant,etc Temp	45 K		LINK C/I Xpol	10.0	8.7	8.3 dB	
CI Sky Noise Temp	135 K		C/I Adjacent Carrier	17.0	15.7	17.0 dB	
Rx Clr Sky G/T	35.3 dB/K		C/I co-freq beams	86.2	84.9	86.2 dB	
RAIN MARGINS	Uplink Rain Attn	1.3 dB		C/(Nu,d)	4.6	1.2	1.7 dB
	Dnlink Rain Attn	3.0 dB		C/(Nu,d,ims/c)	4.6	1.2	1.7 dB
	Up Fade Pwr Cntrl	0.0 dB		C/(Nu,d,im,i)Total	1.9	-0.7	-0.1 dB
	Target Link Availability E-E	97.7 %		LINK MARGIN	2.8	0.2	0.8 dB
SITE GEOGRAPHIC DATA	Tx E/S Location	AMC1 Orlando FL		Symbol Rate	512	512	512 ksps
	Tx E/S Latitude	28.5 N		FEC Code Rate	1/2	1/2	1/2
	Tx E/S Longitude	-81.1 W		MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
	Tx E/S Elev Angle	28.3 deg		10*log(Rbt/Noise BW)	0.0	0.0	0.0 dB
	Rx E/S Location	AMC-1, Woodbine, MD		Minimum Req'd C/N	-0.9	-0.9	-0.9 dB
XPOL ISOLATION DATA	Rx E/S Latitude	39.4 N		RF Head Max Output Power	14.7 Watts		
	Rx E/S Longitude	-77.1 W		Misc Feed Losses etc	3.8 dB		
	Rx E/S Elev Angle	20.2 deg		EARTH E/S EIRP Req'd twds S/C	dBW		
	S/C Isolation	36.0 dB		(Note: req'd to achieve link margin)			
MISC LOSSES	Tx E/S Isolation	35.0 dB		HPA Tx Pointing Losses	0.3 dB		
	Rx E/S Isolation	26.0 dB		Max Clear Sky EIRP towards S/C	37.7 dBW		
	Uplnk Free Sp Loss	207.4 dB		RF Head Output BO (CI Sky)	0.0 dB		
	Dnlnk Free Sp Loss	206.0 dB		Calculated EIRP Desity Limit per link budget	13.6 dBW/4Hz		
Uplink Atmos Attn	0.8 dB		Calculated PSD Limit per link budget	-15.5 dBW/4Hz			
Dnlink Atmos Attn	0.7 dB		Co-ordination Offset	0.0 dBW/4Hz			

9/9/2016

HughesNet LINK BUDGET

10:18 AM

Satellite: AMC1 7K

0.63 m Remote Located in AMC1 Orlando FL

Crr EIRP Density = 11.1 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY				
				% Avail S/C Power Req'd/Crr	100.0	%		
				% Xponder Bandwidth Req'd/Crr	100.0	%		
Carrier Info Rate		21450	Kbps	Clear Sky Link Margin	0.9	dB		
Net FEC Code Rate		0.500		Power Equivalent Bandwidth	36.0	MHz		
Transmit Symbol Rate		30000	Ksps	EIRP at 50.4 dBW reference contour	49.9	dBW		
CARRIER	CI Sky Req'd Es/No	1.3	dB	LINK PERFORMANCE				
DATA	No of bits/symbol	2.0	Bits	CI Sky	Up Fade	Dn Fade	Unit	
	Demod BT Product	1.00		Satellite SFD	-90.0	-90.0	-90.0 dBW/m2	
	Crr Noise Bandwidth	30000	KHz	Agg Input B.O.	3.0	3.0	3.0 dB	
	Carrier Spacing	36000	KHz	Input Backoff/Crr	3.0	3.0	3.0 dB	
				Crr Flux Density	-93.0	-93.0	-93.0 dBW/m2	
SATELLITE	Satellite	AMC1 7K		UPLINK	Gain of a Sq meter	44.5	44.5	44.5 dBi
	Location	-129.2	WL	BUDGET	Uplink Path Losses	208.3	213.3	208.3 dB
	EIRP Contour at Remote	48.0	dBW		Carrier Up EIRP	70.3	75.3	70.3 dBW
	G/T Contour at Hub	4.0	dB/K		Satellite G/T	4.0	4.0	4.0 dB/K
	Attn Setting	9.0	dB		C/N Uplink	24.3	24.3	24.3 dB
	Xponder Gain	185.0	dB		EIRP Contour	48.0	48.0	48.0 dBW
DATA	SFD at Hub	-90.0	dBW/m2		Agg Output B.O.	0.5	0.5	0.5 dB
	Xponder Bandwidth	36.0	MHz		Output Backoff/Crr	0.5	0.5	0.5 dB
	Agg Input BO	3.0	dB		Carrier Dn EIRP	47.5	47.5	47.5 dBW
	Agg Output BO	0.5	dB	DOWNLINK	Dnlink Path Losses	206.2	206.2	207.1 dB
	Uplink Frequency	14.140	GHz	BUDGET	Rx Pointing Losses	0.2	0.2	0.2 dB
	Dnlink Frequency	11.840	GHz		CI Sky E/S G/T	9.1	9.1	9.1 dB/K
					Degradation in G/T	1.2	1.2	1.9 dB
	Tx Antenna Dia	7.6	meters		C/N Downlink	7.3	7.3	5.6 dB
	HPA Max Output Pwr	150.0	Watts		C/N Uplink	24.3	24.3	24.3 dB
	Waveguide Losses	2.0	dB		C/N Downlink	7.3	7.3	5.6 dB
	Tx Antenna Gain	59.2	dBi		C/I Intermod (S/C)	99.0	99.0	99.0 dB
	Tx Pointing Losses	0.6	dB		C/I Uplink Adj Sat	24.8	24.8	24.8 dB
	Max EIRP Toward S/C	78.4	dB		C/I Dnlink Adj Sat	4.0	4.0	4.0 dB
GROUND				COMPOSITE	C/I Xpol	18.4	16.3	18.3 dB
SEGMENT	Rx Antenna Dia	0.63	meters	LINK	C/I Intermod (E/S)	28.0	18.0	28.0 dB
DATA	Rx Antenna Gain	29.0	dBi		C/(Nu,d)	7.2	7.2	5.6 dB
	Rx Pointing Losses	0.2	dB		C/(Nu,d,ims/c)	7.2	7.2	5.6 dB
	Pre LNA Losses	0.8	dB		C/(Nu,d,im,i)Total	2.2	2.0	1.6 dB
	LNA Noise Temp	9	K		LINK MARGIN	0.9	0.7	0.3 dB
	Ant,etc Temp	28	K		Modulation	QPSK	QPSK	QPSK
	CI Sky Noise Temp	37	K		FEC Rate	1/2	1/2	1/2
	Rx Clr Sky G/T	9.1	dB/K		Minimum Req'd Ebi/No	1.3	1.3	1.3 dB
RAIN	Uplink Rain Attn	5.0	dB	MODEM	10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
	Dnlink Rain Attn	0.9	dB		Minimum Req'd C/N	1.3	1.3	1.3 dB
MARGINS	Up Fade Pwr Cntrl	5.0	dB		E/S EIRP/Crr Req'd (CI Sky)	70.3	dBW	
	Target Link Availability E-E	97.71	%		Tx Gain - Pointing Loss	58.6	dB	
					Waveguide Losses	2.0	dB	
SITE	Tx E/S Location	AMC-1, Woodbine, MD		EARTH	Tx Power Req'd/Cxr (clear sky)	13.6	dBW	
	Tx E/S Latitude	39.4	N	STATION	HPA	23.1	watts	
	Tx E/S Longitude	-77.1	W		Uplink Power Control	5.0	dB	
GEOGRAPHIC	Tx E/S Elev Angle	20	deg		TX Power Req'd/Cxr (full UPC)	18.6	dBW	
DATA	Rx E/S Location	AMC1 Orlando FL				73.0	watts	
	Rx E/S Latitude	28.5	N		Dnlink EIRP Dens @ Beam Peak (50.4 dBW)	11.1	dBW/4KHz	
	Rx E/S Longitude	-81.1	W					
	Rx E/S Elev Angle	28.3	deg					
ISOLATION	XPOL S/C Isolation	36.0	dB					
DATA	Tx E/S Isolation	35.0	dB					
	Rx E/S Isolation	20.0	dB					
MISC	Uplink Free Sp Loss	207.4	dB					
LOSSES	Dnlink Free Sp Loss	205.7	dB					
	Uplink Atmos Attn	0.9	dB					
	Dnlink Atmos Attn	0.6	dB					

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET					
09:34 AM		Satellite: AMC2 (inclined) 22K IB					
		0.63m Remote in AMC 2 Tampa, FL		7.6m hub in AMC-2, Woodbine, MD			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y			
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Req'd/Crr	1.00	%	
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	4.00	%	
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	7.2	dB	
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.36	MHz	
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	27.4	dBw	
	Demod BT Product	1.00		LINK PERFORMANCE			
	Spreading factor			CI Sky	Up Fade	Dn Fade	Unit
	Spread Bandwidth	1024	kHz	Satellite SFD	-96.5	-96.5	-96.5 dBW/m2
SATELLITE DATA	Satellite	AMC2 (inclined) 22K IB					
	Location	-85.0	WL	Agg Input B.O.	8.0	8.0	8.0 dB
	Hub EIRP Contour	49.0	dBW	Input Backoff/Crr	28.0	29.0	28.0 dB
	Remote G/T Contour	4.8	dB/K	Crr Flux Density	-124.5	-125.5	-124.5 dBW/m2
	Attn Setting	5.0	dB	Gain of a Sq meter	44.6	44.6	44.6 dBi
	Xponder Gain	194.1	dB	UPLINK Uplink Path Losses	207.3	208.3	207.3 dB
	SFD at remote	-96.5	dBW/m2	BUDGET Carrier Up EIRP	38.2	38.2	38.2 dBW
	Xponder Bandwidth	36.0	MHz	Satellite G/T	4.8	4.8	4.8 dB/K
	Agg Input BO	8.0	dB	C/N Uplink	6.1	3.1	4.1 dB
	Agg Output BO	4.0	dB	Saturation EIRP	49.0	49.0	49.0 dBW
GROUND SEGMENT DATA	Uplink Frequency	14.4310	GHz	Agg Output B.O.	4.0	4.0	4.0 dB
	Dnlink Frequency	11.8110	GHz	Output Backoff/Crr	24.0	25.0	24.0 dB
	Tx Antenna Dia	0.63	meters	Carrier Dn EIRP	25.0	24.0	25.0 dBW
	HPA Max Output Pwr	25.0	Watts	DOWNLINK Dnlink Path Losses	205.7	205.7	207.4 dB
	Tx Antenna Gain	29.0	dBi	BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Tx Pointing Losses	0.3	dB	CI Sky E/S G/T	35.1	35.1	35.1 dB/K
	Rx Antenna Dia	7.6	meters	Degradation in G/T	0.6	0.6	2.3 dB
	Rx Antenna Effcy	65	%	C/N Downlink	23.9	20.9	18.5 dB
	Rx Antenna Gain	56.9	dBi	C/N Uplink	6.1	3.1	4.1 dB
	Rx Pointing Losses	0.4	dB	C/N Downlink	23.9	20.9	18.5 dB
RAIN MARGINS	Pre LNA Losses	0.2	dB	C/I Intermod (S/C)	43.0	42.0	43.0 dB
	LNA Noise Temp	90	K	C/I Uplink Adj Sat	7.3	6.3	7.3 dB
	Ant,etc Temp	45	K	COMPOSITE C/I Downlink Adj Sat	25.9	24.9	25.9 dB
	CI Sky Noise Temp	135	K	LINK C/I Xpol	17.9	16.9	21.9 dB
	Rx Clr Sky G/T	35.1	dB/K	C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Uplink Rain Attn	1.0	dB	C/I co-freq beams	93.0	92.0	93.0 dB
	Dnlink Rain Attn	1.7	dB	C/(Nu,d)	6.1	3.1	4.0 dB
	Up Fade Pwr Cntrl	0.0	dB	C/(Nu,d,ims/c)	6.1	3.1	4.0 dB
	Target Link Availability E-E	97.7	%	C/(Nu,d,im,i)Total	3.3	1.1	2.1 dB
				LINK MARGIN	7.2	5.0	6.0 dB
SITE GEOGRAPHIC DATA	Tx E/S Location	AMC 2 Tampa, FL					
	Tx E/S Latitude	28.0	N	Symbol Rate	256	256	256 ksps
	Tx E/S Longitude	-82.4	W	FEC Code Rate	1/2	1/2	1/2
	Tx E/S Elev Angle	57.2	deg	MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
				10*log(Rbt/Noise BW)	-3.0	-3.0	-3.0 dB
XPOL ISOLATION DATA	Rx E/S Location	AMC-2, Woodbine, MD					
	Rx E/S Latitude	39.4	N	Minimum Req'd C/N	-3.9	-3.9	-3.9 dB
	Rx E/S Longitude	-77.1	W	RF Head Max Output Power		19.9	Watts
	Rx E/S Elev Angle	43.7	deg	Misc Feed Losses etc		3.8	dB
				EARTH E/S EIRP Req'd twds S/C			dBW
MISC LOSSES	S/C Isolation	36.0	dB	(Note: req'd to achieve link margin)			
	Tx E/S Isolation	35.0	dB	HPA Tx Pointing Losses		0.3	dB
	Rx E/S Isolation	26.0	dB	Max Clear Sky EIRP towards S/C		38.2	dBW
Uplink Free Sp Loss	206.9	dB	RF Head Output BO (CI Sky)		0.7	dB	
Dnlink Free Sp Loss	205.4	dB	Calculated EIRP Desity Limit per link budget		-14.1	dBW/4Hz	
Uplink Atmos Attn	0.4	dB	Calculated PSD Limit per link budget		-14.9	dBW/4Hz	
Dnlink Atmos Attn	0.3	dB	Co-ordinated Offset		0.0	dBW/4Hz	

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET			
09:37 AM		Satellite: AMC2 (inclined) 22K IB			
		0.63m Remote in AMC 2 Tampa, FL		7.6m hub in AMC-2, Woodbine, MD	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	1.00 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
				Clear Sky Link Margin	4.2 dB
				Power Equivalent Bandwidth	0.36 MHz
				Contract EIRP at reference contour	27.4 dBw
CARRIER	Carrier Info Rate	512	Kbps	LINK PERFORMANCE	
	FEC Code Rate	0.500		CI Sky	Up Fade
	Crr Symbol Rate	512	Ksps		Dn Fade
	CI Sky Reqd Ebi/No	2.1	dB		Unit
DATA	No of bits/symbol	2.0	Bits	Satellite SFD	-96.5
	Demod BT Product	1.00		Agg Input B.O.	8.0
	Spreading factor			Input Backoff/Crr	28.0
	Spread Bandwidth	1024	kHz	Crr Flux Density	-124.5
	Crr Spacing Fctr	1.41	x Rs	Gain of a Sq meter	44.6
	Carrier Spacing	1440	kHz	Uplink Path Losses	207.3
SATELLITE	Satellite	AMC2 (inclined) 22K IB		Uplink BUDGET	208.3
	Location	-85.0 WL		Carrier Up EIRP	38.2
	Hub EIRP Contour	49.0 dBW		Satellite G/T	4.8
	Remote G/T Contour	4.8 dB/K		C/N Uplink	6.1
	Attn Setting	5.0 dB		Saturation EIRP	49.0
	Xponder Gain	194.1 dB		Agg Output B.O.	4.0
DATA	SFD at remote	-96.5 dBW/m2		Agg Input BO	8.0
	Xponder Bandwidth	36.0 MHz		Agg Output BO	4.0
	Agg Input BO	8.0 dB		Uplink Frequency	14.4310
	Agg Output BO	4.0 dB		Dnlink Frequency	11.8110
	Uplink Frequency	14.4310 GHz		DOWNLINK	Dnlink Path Losses
	Dnlink Frequency	11.8110 GHz		BUDGET	Rx Pointing Losses
GROUND	Tx Antenna Dia	0.63 meters			CI Sky E/S G/T
	HPA Max Output Pwr	25.0 Watts			Degradation in G/T
	Tx Antenna Gain	29.0 dBi			C/N Downlink
	Tx Pointing Losses	0.3 dB		C/N Uplink	6.1
SEGMENT	Rx Antenna Dia	7.6 meters		C/N Downlink	23.9
	Rx Antenna Effcy	65 %		C/I Intermod (S/C)	37.0
DATA	Rx Antenna Gain	56.9 dBi		C/I Uplink Adj Sat	7.3
	Rx Pointing Losses	0.4 dB		C/I Downlink Adj Sat	25.9
	Pre LNA Losses	0.2 dB		C/I Xpol	17.9
	LNA Noise Temp	90 K		C/I Adjacent Carrier	17.0
	Ant,etc Temp	45 K		C/I co-freq beams	93.0
	CI Sky Noise Temp	135 K		C/(Nu,d)	6.1
	Rx Clr Sky G/T	35.1 dB/K		C/(Nu,d,ims/c)	6.1
RAIN	Uplink Rain Attn	1.0 dB		C/(Nu,d,im,i)Total	3.3
	Dnlink Rain Attn	1.7 dB		LINK MARGIN	4.2
MARGINS	Up Fade Pwr Cntrl	0.0 dB		Symbol Rate	512
	Target Link Availability E-E	97.7 %		FEC Code Rate	1/2
	Tx E/S Location	AMC 2 Tampa, FL		MODEM	Minimum Ebi/No
	Tx E/S Latitude	28.0 N			2.1
SITE	Tx E/S Longitude	-82.4 W			2.1
	Tx E/S Longitude	-82.4 W			2.1
GEOGRAPHIC	Tx E/S Elev Angle	57.2 deg			10*log(Rbt/Noise BW)
					0.0
DATA					0.0
	Rx E/S Location	AMC-2, Woodbine, MD			0.0
	Rx E/S Latitude	39.4 N			-0.9
	Rx E/S Longitude	-77.1 W			-0.9
	Rx E/S Elev Angle	43.7 deg			-0.9
XPOL	S/C Isolation	36.0 dB		EARTH	RF Head Max Output Power
	Tx E/S Isolation	35.0 dB			19.9 Watts
ISOLATION	Rx E/S Isolation	26.0 dB		STATION	Misc Feed Losses etc
					3.8 dB
					E/S EIRP Reqd twds S/C
					dBW
					(Note: reqd to achieve link margin)
				HPA	Tx Pointing Losses
					0.3 dB
					Max Clear Sky EIRP towards S/C
					38.2 dBW
					RF Head Output BO (CI Sky)
					0.7 dB
MISC	Uplink Free Sp Loss	206.9 dB			Calculated EIRP Desity Limit per link budget
	Dnlink Free Sp Loss	205.4 dB			-14.1 dBW/4Hz
LOSSES	Uplink Atmos Attn	0.4 dB			Calculated PSD Limit per link budget
	Dnlink Atmos Attn	0.3 dB			-14.9 dBW/4Hz
					Co-ordinated Offset
					0.0 dBW/4Hz

9-Sep-16		1024ksps R1/2 HN INROUTE LINK BUDGET			
09:40 AM		Satellite: AMC2 (inclined) 22K IB			
		0.63m Remote in AMC 2 Tampa, FL		7.6m hub in AMC-2, Woodbine, MD	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	1.00 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
	Carrier Info Rate	1024	Kbps	Clear Sky Link Margin	1.2 dB
	FEC Code Rate	0.500		Power Equivalent Bandwidth	0.36 MHz
	Crr Symbol Rate	1024	Ksps	Contract EIRP at reference contour	27.4 dBw
CARRIER	CI Sky Reqd Ebi/No	2.1	dB	LINK PERFORMANCE	
DATA	No of bits/symbol	2.0	Bits	CI Sky	Up Fade Dn Fade Unit
	Demod BT Product	1.00		Satellite SFD	-96.5 -96.5 -96.5 dBW/m2
	Carrier Bandwidth	1024	kHz	Agg Input B.O.	8.0 8.0 8.0 dB
	Crr Spacing Fctr	1.41	x Rs	Input Backoff/Crr	28.0 29.0 28.0 dB
	Carrier Spacing	1440	kHz	Crr Flux Density	-124.5 -125.5 -124.5 dBW/m2
				Gain of a Sq meter	44.6 44.6 44.6 dBi
SATELLITE	Satellite	AMC2 (inclined) 22K IB		UPLINK	Uplink Path Losses
	Location	-85.0 WL		BUDGET	Carrier Up EIRP
	Hub EIRP Contour	49.0 dBW			Satellite G/T
	Remote G/T Contour	4.8 dB/K			C/N Uplink
	Attn Setting	5.0 dB			Saturation EIRP
	Xponder Gain	194.1 dB			Agg Output B.O.
DATA	SFD at remote	-96.5 dBW/m2			Agg Input BO
	Xponder Bandwidth	36.0 MHz			Output Backoff/Crr
	Agg Input BO	8.0 dB			Carrier Dn EIRP
	Agg Output BO	4.0 dB		DOWNLINK	Dnlink Path Losses
	Uplink Frequency	14.4310 GHz		BUDGET	Rx Pointing Losses
	Dnlink Frequency	11.8110 GHz			CI Sky E/S G/T
					Degradation in G/T
GROUND	Tx Antenna Dia	0.63 meters			C/N Downlink
	HPA Max Output Pwr	25.0 Watts			C/N Uplink
					C/N Downlink
	Tx Antenna Gain	29.0 dBi			C/I Intermod (S/C)
	Tx Pointing Losses	0.3 dB			C/I Uplink Adj Sat
SEGMENT	Rx Antenna Dia	7.6 meters		COMPOSITE	C/I Downlink Adj Sat
DATA	Rx Antenna Effcy	65 %		LINK	C/I Xpol
	Rx Antenna Gain	56.9 dBi			C/I Adjacent Carrier
	Rx Pointing Losses	0.4 dB			C/I co-freq beams
	Pre LNA Losses	0.2 dB			C/(Nu,d)
	LNA Noise Temp	90 K			C/(Nu,d,ims/c)
	Ant,etc Temp	45 K			C/(Nu,d,im,i)Total
	CI Sky Noise Temp	135 K			LINK MARGIN
					Symbol Rate
	Rx Clr Sky G/T	35.1 dB/K			FEC Code Rate
RAIN	Uplink Rain Attn	1.0 dB		MODEM	Minimum Ebi/No
	Dnlink Rain Attn	1.7 dB			10*log(Rbt/Noise BW)
MARGINS	Up Fade Pwr Cntrl	0.0 dB			Minimum Reqd C/N
	Target Link Availability E-E	97.7 %			RF Head Max Output Power
					Misc Feed Losses etc
SITE	Tx E/S Location	AMC 2 Tampa, FL			E/S EIRP Reqd twds S/C
	Tx E/S Latitude	28.0 N		EARTH	(Note: reqd to achieve link margin)
	Tx E/S Longitude	-82.4 W		STATION	Tx Pointing Losses
GEOGRAPHIC	Tx E/S Elev Angle	57.2 deg		HPA	Max Clear Sky EIRP towards S/C
DATA					RF Head Output BO (CI Sky)
	Rx E/S Location	AMC-2, Woodbine, MD			Calculated EIRP Desity Limit per link budget
	Rx E/S Latitude	39.4 N			Calculated PSD Limit per link budget
	Rx E/S Longitude	-77.1 W			Co-ordinated Offset
	Rx E/S Elev Angle	43.7 deg			
XPOL	S/C Isolation	36.0 dB			
ISOLATION	Tx E/S Isolation	35.0 dB			
DATA	Rx E/S Isolation	26.0 dB			
	Uplnk Free Sp Loss	206.9 dB			
MISC	Dnlink Free Sp Loss	205.4 dB			
LOSSES	Uplink Atmos Attn	0.4 dB			
	Dnlink Atmos Attn	0.3 dB			

9/9/2016

HughesNet LINK BUDGET

9:42 AM

Satellite: AMC2 (inclined) 8K

0.63 m Remote Located in AMC 2 Tampa, FL

Crr EIRP Density = 12.1 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY			
				% Avail S/C Power Req'd/Crr	100.0	%	
				% Xponder Bandwidth Req'd/Crr	100.0	%	
Carrier Info Rate		37620	Kbps	Clear Sky Link Margin	0.9	dB	
Net FEC Code Rate		0.667		Power Equivalent Bandwidth	36.0	MHz	
Transmit Symbol Rate		30000	Ksps	EIRP at 51.4 dBW reference contour	50.9	dBW	
CARRIER	CI Sky Req'd Es/No	3.4	dB	LINK PERFORMANCE			
DATA	No of bits/symbol	2.0	Bits	CI Sky	Up Fade	Dn Fade	Unit
Demod BT Product		1.00		Satellite SFD	-96.5	-96.5	-96.5 dBW/m2
Crr Noise Bandwidth		30000	KHz	Agg Input B.O.	3.0	3.0	3.0 dB
Carrier Spacing		36000	KHz	Input Backoff/Crr	3.0	3.0	3.0 dB
Satellite		AMC2 (inclined) 8K		Crr Flux Density	-99.5	-99.5	-99.5 dBW/m2
Location		-85.0	WL	UPLINK Gain of a Sq meter	44.5	44.5	44.5 dBi
EIRP Contour at Remote		47.5	dBW	BUDGET Uplink Path Losses	207.4	212.4	207.4 dB
G/T Contour at Hub		5.0	dB/K	Carrier Up EIRP	62.8	67.8	62.8 dBW
Attn Setting		9.0	dB	Satellite G/T	5.0	5.0	5.0 dB/K
SATELLITE	Xponder Gain	191.0	dB	C/N Uplink	17.3	17.3	17.3 dB
DATA	SFD at Hub	-96.5	dBW/m2	EIRP Contour	47.5	47.5	47.5 dBW
Xponder Bandwidth		36.0	MHz	Agg Output B.O.	0.5	0.5	0.5 dB
Agg Input BO		3.0	dB	Output Backoff/Crr	0.5	0.5	0.5 dB
Agg Output BO		0.5	dB	Carrier Dn EIRP	47.0	47.0	47.0 dBW
Uplink Frequency		14.160	GHz	DOWNLINK Dnlink Path Losses	205.5	205.5	206.1 dB
Dnlink Frequency		11.860	GHz	BUDGET Rx Pointing Losses	0.2	0.2	0.2 dB
Tx Antenna Dia		7.6	meters	CI Sky E/S G/T	9.1	9.1	9.1 dB/K
HPA Max Output Pwr		150.0	Watts	Degradation in G/T	0.7	0.7	1.3 dB
Waveguide Losses		2.0	dB	C/N Downlink	6.5	6.5	5.3 dB
Tx Antenna Gain		59.2	dBi	C/N Uplink	17.3	17.3	17.3 dB
Tx Pointing Losses		0.6	dB	C/N Downlink	6.5	6.5	5.3 dB
Max EIRP Toward S/C		78.4	dB	C/I Intermod (S/C)	99.0	99.0	99.0 dB
GROUND	Rx Antenna Dia	0.63	meters	C/I Uplink Adj Sat	16.5	16.5	16.5 dB
SEGMENT	Rx Antenna Gain	29.0	dBi	COMPOSITE C/I Dnlink Adj Sat	10.7	10.7	10.7 dB
DATA	Rx Pointing Losses	0.2	dB	LINK C/I Xpol	18.4	18.2	18.4 dB
Pre LNA Losses		0.8	dB	C/I Intermod (E/S)	28.0	18.0	28.0 dB
LNA Noise Temp		9	K	C/(Nu,d)	6.1	6.1	5.1 dB
Ant,etc Temp		28	K	C/(Nu,d,ims/c)	6.1	6.1	5.1 dB
CI Sky Noise Temp		37	K	C/(Nu,d,im,i)Total	4.3	4.2	3.6 dB
Rx Clr Sky G/T		9.1	dB/K	LINK MARGIN	0.9	0.8	0.2 dB
RAIN	Uplink Rain Attn	5.0	dB	Modulation	QPSK	QPSK	QPSK
MARGINS	Dnlink Rain Attn	0.5	dB	FEC Rate	2/3	2/3	2/3
Up Fade Pwr Cntrl		5.0	dB	Minimum Req'd Ebi/No	2.2	2.2	2.2 dB
Target Link Availability E-E		97.71	%	MODEM 10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
Tx E/S Location		AMC-2, Woodbine, MD		Minimum Req'd C/N	3.4	3.4	3.4 dB
Tx E/S Latitude		39.4	N	E/S EIRP/Crr Req'd (CI Sky)		62.8	dBW
Tx E/S Longitude		-77.1	W	Tx Gain - Pointing Loss		58.6	dB
SITE	Tx E/S Elev Angle	44	deg	Waveguide Losses		2.0	dB
GEOGRAPHIC	Rx E/S Location	AMC 2 Tampa, FL		EARTH Tx Power Req'd/Cxr (clear sky)		6.2	dBW
DATA	Rx E/S Latitude	28.0	N	HPA		4.1	watts
Rx E/S Longitude		-82.4	W	Uplink Power Control		5.0	dB
Rx E/S Elev Angle		57.2	deg	TX Power Req'd/Cxr (full UPC)		11.2	dBW
XPOL	S/C Isolation	36.0	dB			13.1	watts
ISOLATION	Tx E/S Isolation	35.0	dB	Dnlink EIRP Dens @ Beam Peak (51.4 dBW)		12.1	dBW/4KHz
DATA	Rx E/S Isolation	20.0	dB				
Uplink Free Sp Loss		207.0	dB				
MISC	Dnlink Free Sp Loss	205.2	dB				
LOSSES	Uplink Atmos Attn	0.4	dB				
Dnlink Atmos Attn		0.3	dB				

9-Sep-16		256ksps R1/3 HN INROUTE LINK BUDGET			
12:59 PM		Satellite: AMC2 (inclined) 22K IB			
0.63m Remote in AMC-2, Phoenix Arizona		7.6m hub in AMC-2, Woodbine, MD			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.82 %
				% Xponder Bandwidth Req'd/Crr	4.00 %
				Clear Sky Link Margin	7.7 dB
				Power Equivalent Bandwidth	0.30 MHz
				Contract EIRP at reference contour	26.5 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	171 Kbps	Satellite SFD	-96.5
		FEC Code Rate	0.333	Agg Input B.O.	8.0
		Crr Symbol Rate	256 Ksps	Input Backoff/Crr	28.9
DATA		CI Sky Req'd Ebi/No	2.7 dB	Crr Flux Density	-125.4
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.6
		Demod BT Product	1.00	UPLINK	
		Spreading factor		Uplink Path Losses	207.4
		Spread Bandwidth	1024 kHz	BUDGET	
		Crr Spacing Fctr	1.41 x Rs	Carrier Up EIRP	37.4
		Carrier Spacing	1440 kHz	Satellite G/T	6.8
SATELLITE		Satellite	AMC2 (inclined) 22K IB	C/N Uplink	5.3
		Location	-85.0 WL		
		Hub EIRP Contour	49.0 dBW	DOWNLINK	
		Remote G/T Contour	6.8 dB/K	Dnlink Path Losses	205.7
		Attn Setting	5.0 dB	BUDGET	
DATA		Xponder Gain	194.1 dB	Rx Pointing Losses	0.4
		SFD at remote	-96.5 dBW/m2	CI Sky E/S G/T	35.1
		Xponder Bandwidth	36.0 MHz	Degradation in G/T	0.6
		Agg Input BO	8.0 dB	C/N Downlink	21.0
		Agg Output BO	4.0 dB		
		Uplink Frequency	14.4310 GHz	C/N Uplink	5.3
		Dnlink Frequency	11.8110 GHz	C/N Downlink	21.0
GROUND		Tx Antenna Dia	0.63 meters	C/I Intermod (S/C)	42.9
		HPA Max Output Pwr	20.5 Watts	C/I Uplink Adj Sat	7.2
				C/I Downlink Adj Sat	22.8
		Tx Antenna Gain	29.0 dBi	C/I Xpol	15.0
		Tx Pointing Losses	0.3 dB	C/I Adjacent Carrier	17.0
SEGMENT		Rx Antenna Dia	7.6 meters	C/I co-freq beams	92.1
		Rx Antenna Effcy	65 %		
DATA		Rx Antenna Gain	56.9 dBi	C/(Nu,d)	5.2
		Rx Pointing Losses	0.4 dB	C/(Nu,d,ims/c)	5.2
		Pre LNA Losses	0.2 dB	C/(Nu,d,im,i)Total	2.6
		LNA Noise Temp	90 K	LINK MARGIN	7.7
		Ant,etc Temp	45 K		
		CI Sky Noise Temp	135 K	Symbol Rate	256
				FEC Code Rate	1/3
		Rx Clr Sky G/T	35.1 dB/K	MODEM	
				Minimum Ebi/No	2.7
RAIN		Uplink Rain Attn	1.0 dB		
		Dnlink Rain Attn	1.7 dB	10*log(Rbt/Noise BW)	-3.0
MARGINS		Up Fade Pwr Cntrl	0.0 dB	Minimum Req'd C/N	-5.1
		Target Link Availability E-E	97.7 %		
GEOGRAPHIC		Tx E/S Location	AMC-2, Phoenix Arizona		
		Tx E/S Latitude	39.0 N	EARTH	
DATA		Tx E/S Longitude	-96.0 W	RF Head Max Output Power	16.3 Watts
		Tx E/S Elev Angle	43.4 deg	Misc Feed Losses etc	3.8 dB
				E/S EIRP Req'd twds S/C	dBW
		Rx E/S Location	AMC-2, Woodbine, MD	(Note: req'd to achieve link margin)	
		Rx E/S Latitude	39.4 N	HPA	
		Rx E/S Longitude	-77.1 W	Tx Pointing Losses	0.3 dB
		Rx E/S Elev Angle	43.7 deg	Max Clear Sky EIRP towards S/C	37.4 dBW
ISOLATION		S/C Isolation	36.0 dB		
		Tx E/S Isolation	35.0 dB	RF Head Output BO (CI Sky)	0.7 dB
DATA		Rx E/S Isolation	26.0 dB		
MISC		Uplink Free Sp Loss	207.1 dB		
		Dnlink Free Sp Loss	205.4 dB	Calculated EIRP Density Limit per link budget	13.3 dBW/4Hz
LOSSES		Uplink Atmos Attn	0.3 dB	Calculated PSD Limit per link budget	-15.8 dBW/4Hz
		Dnlink Atmos Attn	0.3 dB	Co-ordination Offset	0.0 dBW/4Hz

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET							
01:00 PM		Satellite: AMC2 (inclined) 22K IB							
		0.63m Remote in AMC-2, Phoenix Arizona		7.6m hub in AMC-2, Woodbine, MD					
BASELINE PARAMETERS		Value	Unit	S U M M A R Y					
				% Avail S/C Power Reqd/Crr	0.82 %				
				% Xponder Bandwidth Reqd/Crr	4.00 %				
				Clear Sky Link Margin	3.5 dB				
				Power Equivalent Bandwidth	0.30 MHz				
				Contract EIRP at reference contour	26.5 dBw				
				LINK PERFORMANCE					
				CI Sky	Up Fade				
				Dn Fade	Unit				
CARRIER DATA	Carrier Info Rate	512	Kbps	Satellite SFD	-96.5	-96.5	-96.5	dBW/m2	
	FEC Code Rate	0.500		Agg Input B.O.	8.0	8.0	8.0	dB	
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	28.9	29.9	28.9	dB	
	CI Sky Reqd Ebi/No	2.1	dB	Crr Flux Density	-125.4	-126.4	-125.4	dBW/m2	
	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.6	44.6	44.6	dBi	
	Demod BT Product	1.00		UPLINK Uplink Path Losses	207.4	208.4	207.4	dB	
	Spreading factor			BUDGET Carrier Up EIRP	37.4	37.4	37.4	dBW	
	Spread Bandwidth	1024	kHz	Satellite G/T	6.8	6.8	6.8	dB/K	
	Crr Spacing Fctr	1.41	x Rs	C/N Uplink	5.3	4.3	5.3	dB	
Carrier Spacing	1440	kHz							
SATELLITE DATA	Satellite	AMC2 (inclined) 22K IB			DOWNLINK Saturation EIRP	49.0	49.0	49.0	dBW
	Location	-85.0 WL			Agg Output B.O.	4.0	4.0	4.0	dB
	Hub EIRP Contour	49.0 dBW			Output Backoff/Crr	24.9	25.9	24.9	dB
	Remote G/T Contour	6.8 dB/K			Carrier Dn EIRP	24.1	23.1	24.1	dBW
	Attn Setting	5.0 dB			DOWNLINK Dnlink Path Losses	205.7	205.7	207.4	dB
	Xponder Gain	194.1 dB			BUDGET Rx Pointing Losses	0.4	0.4	0.4	dB
	SFD at remote	-96.5 dBW/m2			CI Sky E/S G/T	35.1	35.1	35.1	dB/K
	Xponder Bandwidth	36.0 MHz			Degradation in G/T	0.6	0.6	2.3	dB
	Agg Input BO	8.0 dB			C/N Downlink	21.0	20.0	17.7	dB
Agg Output BO	4.0 dB								
Uplink Frequency	14.4310 GHz			C/N Uplink	5.3	4.3	5.3	dB	
Dnlink Frequency	11.8110 GHz			C/N Downlink	21.0	20.0	17.7	dB	
GROUND SEGMENT DATA	Tx Antenna Dia	0.63 meters			C/I Intermod (S/C)	34.5	33.5	34.5	dB
	HPA Max Output Pwr	20.5 Watts			C/I Uplink Adj Sat	7.2	6.2	7.2	dB
	Tx Antenna Gain	29.0 dBi			COMPOSITE C/I Downlink Adj Sat	22.8	21.8	22.8	dB
	Tx Pointing Losses	0.3 dB			LINK C/I Xpol	15.0	14.0	18.0	dB
	Rx Antenna Dia	7.6 meters			C/I Adjacent Carrier	17.0	16.0	17.0	dB
	Rx Antenna Effcy	65 %			C/I co-freq beams	92.1	91.1	92.1	dB
	Rx Antenna Gain	56.9 dBi			C/(Nu,d)	5.2	4.2	5.0	dB
	Rx Pointing Losses	0.4 dB			C/(Nu,d,ims/c)	5.2	4.2	5.0	dB
	Pre LNA Losses	0.2 dB			C/(Nu,d,im,i)Total	2.6	1.6	2.6	dB
LNA Noise Temp	90 K			LINK MARGIN	3.5	2.5	3.5	dB	
Ant,etc Temp	45 K								
CI Sky Noise Temp	135 K			Symbol Rate	512	512	512	ksps	
Rx Clr Sky G/T	35.1 dB/K			FEC Code Rate	1/2	1/2	1/2		
RAIN MARGINS	Uplink Rain Attn	1.0 dB			MODEM Minimum Ebi/No	2.1	2.1	2.1	dB
	Dnlink Rain Attn	1.7 dB			10*log(Rbt/Noise BW)	0.0	0.0	0.0	dB
	Up Fade Pwr Cntrl	0.0 dB			Minimum Req'd C/N	-0.9	-0.9	-0.9	dB
	Target Link Availability E-E	97.7 %							
SITE GEOGRAPHIC DATA	Tx E/S Location	AMC-2, Phoenix Arizona			RF Head Max Output Power	16.3 Watts			
	Tx E/S Latitude	39.0 N			Misc Feed Losses etc	3.8 dB			
	Tx E/S Longitude	-96.0 W			E/S EIRP Req'd twds S/C	dBW			
	Tx E/S Elev Angle	43.4 deg			(Note: req'd to achieve link margin)				
	Rx E/S Location	AMC-2, Woodbine, MD			HPA Tx Pointing Losses	0.3 dB			
XPOL ISOLATION DATA	Rx E/S Latitude	39.4 N			Max Clear Sky EIRP towards S/C	37.4 dBW			
	Rx E/S Longitude	-77.1 W							
	Rx E/S Elev Angle	43.7 deg			RF Head Output BO (CI Sky)	0.7 dB			
MISC LOSSES	S/C Isolation	36.0 dB			Calculated EIRP Density Limit per link budget	13.3 dBW/4Hz			
	Tx E/S Isolation	35.0 dB			Calculated PSD Limit per link budget	-15.8 dBW/4Hz			
	Rx E/S Isolation	26.0 dB			Co-ordination Offset	0.0 dBW/4Hz			
	Uplink Free Sp Loss	207.1 dB							
Dnlink Free Sp Loss	205.4 dB								
Uplink Atmos Attn	0.3 dB								
Dnlink Atmos Attn	0.3 dB								

BASELINE PARAMETERS		Value	Unit	SUMMARY					
9/9/2016 1:03 PM Satellite: AMC2 (inclined) 8K 0.63 m Remote Located in AMC-2, Phoenix Arizona Crr EIRP Density = 12.1 dBW/4 KHz									
Carrier Info Rate 21450 Kbps Net FEC Code Rate 0.500 Transmit Symbol Rate 30000 Ksps CARRIER CI Sky Reqd Es/No 1.3 dB DATA No of bits/symbol 2.0 Bits Demod BT Product 1.00 Crr Noise Bandwidth 30000 KHz Carrier Spacing 36000 KHz				% Avail S/C Power Reqd/Crr 100.0 % % Xponder Bandwidth Reqd/Crr 100.0 % Clear Sky Link Margin 4.9 dB Power Equivalent Bandwidth 36.0 MHz EIRP at 51.4 dBW reference contour 50.9 dBW					
				LINK PERFORMANCE					
				CI Sky	Up Fade	Dn Fade	Unit		
SATELLITE Satellite AMC2 (inclined) 8K Location -85.0 WL EIRP Contour at Remote 50.1 dBW G/T Contour at Hub 5.0 dB/K Attn Setting 9.0 dB Xponder Gain 193.6 dB DATA SFD at Hub -96.5 dBW/m2 Xponder Bandwidth 36.0 MHz Agg Input BO 3.0 dB Agg Output BO 0.5 dB Uplink Frequency 14.160 GHz Dnlink Frequency 11.860 GHz				UPLINK	Satellite SFD -96.5	-96.5	-96.5	dBW/m2	
				BUDGET	Agg Input B.O. 3.0	3.0	3.0	dB	
					Input Backoff/Crr 3.0	3.0	3.0	dB	
					Crr Flux Density -99.5	-99.5	-99.5	dBW/m2	
					Gain of a Sq meter 44.5	44.5	44.5	dBi	
				BUDGET	Uplink Path Losses 207.4	212.4	207.4	dB	
					Carrier Up EIRP 62.8	67.8	62.8	dBW	
					Satellite G/T 5.0	5.0	5.0	dB/K	
					C/N Uplink 18.3	18.3	18.3	dB	
				DOWNLINK	EIRP Contour 50.1	50.1	50.1	dBW	
				BUDGET	Agg Output B.O. 0.5	0.5	0.5	dB	
					Output Backoff/Crr 0.5	0.5	0.5	dB	
					Carrier Dn EIRP 49.6	49.6	49.6	dBW	
					Dnlink Path Losses 205.7	205.7	206.1	dB	
				BUDGET	Rx Pointing Losses 0.2	0.2	0.2	dB	
					CI Sky E/S G/T 9.2	9.2	9.2	dB/K	
					Degradation in G/T 0.6	0.6	1.0	dB	
					C/N Downlink 10.1	10.1	9.3	dB	
					C/N Uplink 18.3	18.3	18.3	dB	
					C/N Downlink 10.1	10.1	9.3	dB	
				COMPOSITE	C/I Intermod (S/C) 99.0	99.0	99.0	dB	
				LINK	C/I Uplink Adj Sat 17.3	17.3	17.3	dB	
					C/I Dnlink Adj Sat 10.4	10.4	10.4	dB	
					C/I Xpol 18.4	18.2	18.4	dB	
					C/I Intermod (E/S) 28.0	18.0	28.0	dB	
					C/(Nu,d) 9.5	9.5	8.8	dB	
					C/(Nu,d,ims/c) 9.5	9.5	8.8	dB	
					C/(Nu,d,im,i)Total 6.2	6.0	5.9	dB	
					LINK MARGIN 4.9	4.7	4.6	dB	
				MODEM	Modulation QPSK	QPSK	QPSK		
					FEC Rate 1/2	1/2	1/2		
					Minimum Reqd Ebi/No 1.3	1.3	1.3	dB	
					10*log(Rbt/Noise BW) 3.0	3.0	3.0	dB	
					Minimum Reqd C/N 1.3	1.3	1.3	dB	
				EARTH	E/S EIRP/Crr Reqd (CI Sky) 62.8			dBW	
				STATION	Tx Gain - Pointing Loss 58.6			dB	
				HPA	Waveguide Losses 2.0			dB	
					Tx Power Reqd/Cxr (clear sky) 6.2			dBW	
								4.1 watts	
					Uplink Power Control 5.0			dB	
					TX Power Reqd/Cxr (full UPC) 11.2			dBW	
								13.1 watts	
					Dnlink EIRP Dens @ Beam Peak (51.4 dBW)			12.1 dBW/4KHz	
GROUND SEGMENT Tx Antenna Dia 7.6 meters HPA Max Output Pwr 150.0 Watts Waveguide Losses 2.0 dB Tx Antenna Gain 59.2 dBi Tx Pointing Losses 0.6 dB Max EIRP Toward S/C 78.4 dB DATA Rx Antenna Dia 0.63 meters Rx Antenna Gain 29.1 dBi Rx Pointing Losses 0.2 dB Pre LNA Losses 0.8 dB LNA Noise Temp 9 K Ant,etc Temp 28 K CI Sky Noise Temp 37 K Rx Clr Sky G/T 9.2 dB/K									
RAIN Uplink Rain Attn 5.0 dB Dnlink Rain Attn 0.4 dB MARGINS Up Fade Pwr Cntrl 5.0 dB Target Link Availability E-E 97.71 %									
SITE GEOGRAPHIC DATA Tx E/S Location AMC-2, Woodbine, MD Tx E/S Latitude 39.4 N Tx E/S Longitude -77.1 W Tx E/S Elev Angle 44 deg Rx E/S Location AMC-2, Phoenix Arizona Rx E/S Latitude 39.0 N Rx E/S Longitude -96.0 W Rx E/S Elev Angle 43.4 deg									
ISOLATION DATA S/C Isolation 36.0 dB Tx E/S Isolation 35.0 dB Rx E/S Isolation 20.0 dB									
MISC LOSSES Uplink Free Sp Loss 207.0 dB Dnlink Free Sp Loss 205.4 dB Uplink Atmos Attn 0.4 dB Dnlink Atmos Attn 0.2 dB									

12-Jan-17		256ksps R1/2 HN INROUTE LINK BUDGET						
04:37 PM		Satellite: AMC3 24K Rtn						
		0.63m Remote in AMC-3 Chicago, IL		9.0m hub in AMC-3 Holmdel NJ				
BASELINE PARAMETERS		Value	Unit	SUMMARY				
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqcd/Crr	0.35 %			
	FEC Code Rate	0.500		% Xponder Bandwidth Reqcd/Crr	8.00 %			
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	6.6 dB			
	CI Sky Reqcd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.13 MHz			
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	21.3 dBw			
	Demod BT Product	1.00		LINK PERFORMANCE				
	Spreading factor			CI Sky	Up Fade	Dn Fade	Unit	
	Spread Bandwidth	2048	kHz	Satellite SFD	-93.0	-93.0	-93.0 dBW/m2	
SATELLITE DATA	Satellite	AMC3 24K Rtn		Agg Input B.O.	7.0	7.0	7.0 dB	
	Location	-72.0	WL	Input Backoff/Crr	31.7	32.7	31.7 dB	
	Hub EIRP Contour	48.0	dBW	Crr Flux Density	-124.7	-125.7	-124.7 dBW/m2	
	Remote G/T Contour	5.0	dB/K	Gain of a Sq meter	44.7	44.7	44.7 dBi	
	Attn Setting	5.0	dB	UPLINK	Uplink Path Losses	207.6	208.6	207.6 dB
	Xponder Gain	188.7	dB	BUDGET	Carrier Up EIRP	38.3	38.3	38.3 dBW
	SFD at remote	-93.0	dBW/m2		Satellite G/T	5.0	5.0	5.0 dB/K
	Xponder Bandwidth	36.0	MHz		C/N Uplink	2.1	0.1	1.1 dB
	Agg Input BO	7.0	dB		Saturation EIRP	48.0	48.0	48.0 dBW
	Agg Output BO	4.0	dB		Agg Output B.O.	4.0	4.0	4.0 dB
GROUND SEGMENT DATA	Uplink Frequency	14.4800	GHz	DOWNLINK	Output Backoff/Crr	28.7	29.7	28.7 dB
	Dnlink Frequency	12.1800	GHz	BUDGET	Carrier Dn EIRP	19.3	18.3	19.3 dBW
	Tx Antenna Dia	0.63	meters		Dnlink Path Losses	206.0	206.0	207.7 dB
	HPA Max Output Pwr	25.0	Watts		Rx Pointing Losses	0.6	0.6	0.6 dB
	Tx Antenna Gain	29.1	dBi		CI Sky E/S G/T	36.0	36.0	36.0 dB/K
	Tx Pointing Losses	0.3	dB		Degradation in G/T	0.6	0.6	2.0 dB
	Rx Antenna Dia	9.0	meters		C/N Downlink	14.7	12.7	10.6 dB
	Rx Antenna Effcy	65	%		C/N Uplink	2.1	0.1	1.1 dB
	Rx Antenna Gain	58.7	dBi		C/N Downlink	14.7	12.7	10.6 dB
	Rx Pointing Losses	0.6	dB		C/I Intermod (S/C)	45.1	44.1	45.1 dB
RAIN MARGINS	Pre LNA Losses	0.2	dB	COMPOSITE	C/I Uplink Adj Sat	6.3	5.3	6.3 dB
	LNA Noise Temp	120	K	LINK	C/I Downlink Adj Sat	18.6	17.6	18.6 dB
	Ant,etc Temp	45	K		C/I Xpol	7.8	6.8	15.9 dB
	CI Sky Noise Temp	165	K		C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Rx Clr Sky G/T	36.0	dB/K		C/I co-freq beams	85.4	84.4	85.4 dB
	Uplink Rain Attn	1.0	dB		C/(Nu,d)	1.9	-0.1	0.7 dB
	Dnlink Rain Attn	1.7	dB		C/(Nu,d,ims/c)	1.9	-0.1	0.7 dB
	Up Fade Pwr Cntrl	0.0	dB		C/(Nu,d,im,i)Total	-0.3	-1.9	-0.6 dB
	Target Link Availability E-E	98.7	%		LINK MARGIN	6.6	5.0	6.3 dB
	SITE GEOGRAPHIC DATA	Tx E/S Location	AMC-3 Chicago, IL		MODEM	Symbol Rate	256	256
Tx E/S Latitude		41.8	N		FEC Code Rate	1/2	1/2	1/2
Tx E/S Longitude		-87.6	W		Minimum Ebi/No	2.1	2.1	2.1 dB
Tx E/S Elev Angle		39.1	deg		10*log(Rbt/Noise BW)	-6.0	-6.0	-6.0 dB
Rx E/S Location		AMC-3 Holmdel NJ			Minimum Reqcd C/N	-6.9	-6.9	-6.9 dB
Rx E/S Latitude		40.4	N		RF Head Max Output Power		19.9	Watts
Rx E/S Longitude		-74.1	W		Misc Feed Losses etc		3.8	dB
Rx E/S Elev Angle		43.2	deg		EARTH	E/S EIRP Reqcd twds S/C		39.4 dBW
XPOL ISOLATION DATA	S/C Isolation	36.0	dB	STATION	(Note: reqd to achieve link margin)			
	Tx E/S Isolation	35.0	dB	HPA	Tx Pointing Losses		0.3	dB
	Rx E/S Isolation	26.0	dB		Max Clear Sky EIRP towards S/C		38.3	dBW
MISC LOSSES	Uplnk Free Sp Loss	207.2	dB		RF Head Output BO (CI Sky)		0.7	dB
	Dnlnk Free Sp Loss	205.7	dB		Calculated EIRP Desity Limit per link budget		11.2	dBW/4Hz
	Uplink Atmos Attn	0.4	dB		Calculated PSD Limit per link budget		-17.9	dBW/4Hz
	Dnlnk Atmos Attn	0.4	dB		Co-ordination Offset		0.0	dBW/4Hz

12-Jan-17		512ksps R1/2 HN INROUTE LINK BUDGET			
04:27 PM		Satellite: AMC3 24K Rtn			
0.63m Remote in AMC-3 Chicago, IL		9.0m hub in AMC-3 Holmdel NJ			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
CARRIER		Carrier Info Rate	512 Kbps	% Avail S/C Power Reqd/Crr	0.35 %
DATA		FEC Code Rate	0.500	% Xponder Bandwidth Reqd/Crr	8.00 %
		Crr Symbol Rate	512 Ksps	Clear Sky Link Margin	3.6 dB
		CI Sky Reqd Ebi/No	2.1 dB	Power Equivalent Bandwidth	0.13 MHz
		No of bits/symbol	2.0 Bits	Contract EIRP at reference contour	21.3 dBw
		Demod BT Product	1.00	LINK PERFORMANCE	
		Spreading factor		CI Sky	Up Fade
		Spread Bandwidth	2048 kHz		Dn Fade
		Crr Spacing Fctr	1.41 x Rs		Unit
		Carrier Spacing	2880 kHz	Satellite SFD	-93.0
SATELLITE		Satellite	AMC3 24K Rtn	Agg Input B.O.	7.0
DATA		Location	-72.0 WL	Input Backoff/Crr	31.7
		Hub EIRP Contour	48.0 dBW	Crr Flux Density	-124.7
		Remote G/T Contour	5.0 dB/K	Gain of a Sq meter	44.7
		Attn Setting	5.0 dB	Uplink Path Losses	207.6
		Xponder Gain	188.7 dB	Carrier Up EIRP	38.3
		SFD at remote	-93.0 dBW/m2	Satellite G/T	5.0
		Xponder Bandwidth	36.0 MHz		5.0
		Agg Input BO	7.0 dB	C/N Uplink	2.1
		Agg Output BO	4.0 dB		0.1
		Uplink Frequency	14.4800 GHz	Saturation EIRP	48.0
		Dnlink Frequency	12.1800 GHz	Agg Output B.O.	4.0
GROUND SEGMENT		Tx Antenna Dia	0.63 meters	Output Backoff/Crr	28.7
DATA		HPA Max Output Pwr	25.0 Watts	Carrier Dn EIRP	19.3
		Tx Antenna Gain	29.1 dBi	Dnlink Path Losses	206.0
		Tx Pointing Losses	0.3 dB	Rx Pointing Losses	0.6
		Rx Antenna Dia	9.0 meters	CI Sky E/S G/T	36.0
		Rx Antenna Effcy	65 %	Degradation in G/T	0.6
		Rx Antenna Gain	58.7 dBi		0.6
		Rx Pointing Losses	0.6 dB	C/N Downlink	14.7
		Pre LNA Losses	0.2 dB		12.7
		LNA Noise Temp	120 K	C/N Uplink	2.1
		Ant,etc Temp	45 K	C/N Downlink	14.7
		CI Sky Noise Temp	165 K	C/I Intermod (S/C)	39.0
		Rx Clr Sky G/T	36.0 dB/K	C/I Uplink Adj Sat	6.3
RAIN MARGINS		Uplink Rain Attn	1.0 dB	C/I Downlink Adj Sat	18.6
		Dnlink Rain Attn	1.7 dB	C/I Xpol	7.8
		Up Fade Pwr Cntrl	0.0 dB	C/I Adjacent Carrier	17.0
		Target Link Availability E-E	98.7 %	C/I co-freq beams	85.4
SITE GEOGRAPHIC DATA		Tx E/S Location	AMC-3 Chicago, IL	C/(Nu,d)	1.9
		Tx E/S Latitude	41.8 N	C/(Nu,d,ims/c)	1.9
		Tx E/S Longitude	-87.6 W	C/(Nu,d,im,i)Total	-0.3
		Tx E/S Elev Angle	39.1 deg	LINK MARGIN	3.6
		Rx E/S Location	AMC-3 Holmdel NJ	Symbol Rate	512
		Rx E/S Latitude	40.4 N	FEC Code Rate	1/2
		Rx E/S Longitude	-74.1 W	Minimum Ebi/No	2.1
		Rx E/S Elev Angle	43.2 deg	10*log(Rbt/Noise BW)	-3.0
XPOL ISOLATION DATA		S/C Isolation	36.0 dB	Minimum Req'd C/N	-3.9
		Tx E/S Isolation	35.0 dB	RF Head Max Output Power	19.9 Watts
		Rx E/S Isolation	26.0 dB	Misc Feed Losses etc	3.8 dB
MISC LOSSES		Uplink Free Sp Loss	207.2 dB	E/S EIRP Req'd twds S/C	42.4 dBW
		Dnlink Free Sp Loss	205.7 dB	(Note: req'd to achieve link margin)	
		Uplink Atmos Attn	0.4 dB	HPA Tx Pointing Losses	0.3 dB
		Dnlink Atmos Attn	0.4 dB	Max Clear Sky EIRP towards S/C	38.3 dBW
				RF Head Output BO (CI Sky)	0.7 dB
				Calculated EIRP Desity Limit per link budget	11.2 dBW/4Hz
				Calculated PSD Limit per link budget	-17.9 dBW/4Hz
				Co-ordination Offset	0.0 dBW/4Hz

12-Jan-17		1024ksps R1/2 HN INROUTE LINK BUDGET			
04:38 PM		Satellite: AMC3 24K Rtn			
0.63m Remote in AMC-3 Chicago, IL		9.0m hub in AMC-3 Holmdel NJ			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
CARRIER		Carrier Info Rate	1024 Kbps	% Avail S/C Power Reqd/Crr	0.35 %
DATA		FEC Code Rate	0.500	% Xponder Bandwidth Reqd/Crr	8.00 %
		Crr Symbol Rate	1024 Ksps	Clear Sky Link Margin	0.6 dB
		CI Sky Reqd Ebi/No	2.1 dB	Power Equivalent Bandwidth	0.13 MHz
		No of bits/symbol	2.0 Bits	Contract EIRP at reference contour	21.3 dBw
		Demod BT Product	1.00	LINK PERFORMANCE	
		Spreading factor		CI Sky	Up Fade
		Spread Bandwidth	2048 kHz		Dn Fade
		Crr Spacing Fctr	1.41 x Rs		Unit
		Carrier Spacing	2880 kHz	Satellite SFD	-93.0
SATELLITE		Satellite	AMC3 24K Rtn	Agg Input B.O.	7.0
DATA		Location	-72.0 WL	Input Backoff/Crr	31.7
		Hub EIRP Contour	48.0 dBW	Crr Flux Density	-124.7
		Remote G/T Contour	5.0 dB/K	Gain of a Sq meter	44.7
		Attn Setting	5.0 dB	Uplink Path Losses	207.6
		Xponder Gain	188.7 dB	Carrier Up EIRP	38.3
		SFD at remote	-93.0 dBW/m2	Satellite G/T	5.0
		Xponder Bandwidth	36.0 MHz	C/N Uplink	2.1
		Agg Input BO	7.0 dB	Saturation EIRP	48.0
		Agg Output BO	4.0 dB	Agg Output B.O.	4.0
		Uplink Frequency	14.4800 GHz	Output Backoff/Crr	28.7
		Dnlink Frequency	12.1800 GHz	Carrier Dn EIRP	19.3
GROUND SEGMENT		Tx Antenna Dia	0.63 meters	Dnlink Path Losses	206.0
DATA		HPA Max Output Pwr	25.0 Watts	Rx Pointing Losses	0.6
		Tx Antenna Gain	29.1 dBi	CI Sky E/S G/T	36.0
		Tx Pointing Losses	0.3 dB	Degradation in G/T	0.6
		Rx Antenna Dia	9.0 meters	C/N Downlink	14.7
		Rx Antenna Effcy	65 %	C/N Uplink	2.1
		Rx Antenna Gain	58.7 dBi	C/N Downlink	14.7
		Rx Pointing Losses	0.6 dB	C/I Intermod (S/C)	33.0
		Pre LNA Losses	0.2 dB	C/I Uplink Adj Sat	6.3
		LNA Noise Temp	120 K	C/I Downlink Adj Sat	18.6
		Ant,etc Temp	45 K	C/I Xpol	7.8
		CI Sky Noise Temp	165 K	C/I Adjacent Carrier	17.0
		Rx Clr Sky G/T	36.0 dB/K	C/I co-freq beams	85.4
RAIN MARGINS		Uplink Rain Attn	1.0 dB	C/(Nu,d)	1.9
		Dnlink Rain Attn	1.7 dB	C/(Nu,d,ims/c)	1.9
		Up Fade Pwr Cntrl	0.0 dB	C/(Nu,d,im,i)Total	-0.3
		Target Link Availability E-E	98.7 %	LINK MARGIN	0.6
SITE GEOGRAPHIC DATA		Tx E/S Location	AMC-3 Chicago, IL	Symbol Rate	1024
		Tx E/S Latitude	41.8 N	FEC Code Rate	1/2
		Tx E/S Longitude	-87.6 W	Minimum Ebi/No	2.1
		Tx E/S Elev Angle	39.1 deg	10*log(Rbt/Noise BW)	0.0
		Rx E/S Location	AMC-3 Holmdel NJ	Minimum Req'd C/N	-0.9
		Rx E/S Latitude	40.4 N	RF Head Max Output Power	19.9 Watts
		Rx E/S Longitude	-74.1 W	Misc Feed Losses etc	3.8 dB
		Rx E/S Elev Angle	43.2 deg	E/S EIRP Req'd twds S/C	45.5 dBW
XPOL ISOLATION DATA		S/C Isolation	36.0 dB	(Note: req'd to achieve link margin)	
		Tx E/S Isolation	35.0 dB	HPA Tx Pointing Losses	0.3 dB
		Rx E/S Isolation	26.0 dB	Max Clear Sky EIRP towards S/C	38.3 dBW
MISC LOSSES		Uplink Free Sp Loss	207.2 dB	RF Head Output BO (CI Sky)	0.7 dB
		Dnlink Free Sp Loss	205.7 dB	Calculated EIRP Desity Limit per link budget	11.2 dBW/4Hz
		Uplink Atmos Attn	0.4 dB	Calculated PSD Limit per link budget	-17.9 dBW/4Hz
		Dnlink Atmos Attn	0.4 dB	Co-ordination Offset	0.0 dBW/4Hz

1/12/2017

HughesNet LINK BUDGET

4:44 PM

Satellite: AMC3 24K Fwd

0.63 m Remote Located in AMC-3 Chicago, IL

Crr EIRP Density = 11.2 dBW/4 KHz

BASELINE PARAMETERS			SUMMARY					
	Value	Unit						
			% Avail S/C Power Req/Crr				100.0 %	
			% Xponder Bandwidth Req/Crr				100.0 %	
	Carrier Info Rate	37620 Kbps	Clear Sky Link Margin				0.6 dB	
	Net FEC Code Rate	0.667	Power Equivalent Bandwidth				36.0 MHz	
	Transmit Symbol Rate	30000 Ksps	EIRP at 50.0 dBW reference contour				50.0 dBW	
CARRIER	CI Sky Req'd Es/No	3.4 dB	LINK PERFORMANCE					
			CI Sky	Up Fade	Dn Fade	Unit		
DATA	No of bits/symbol	2.0 Bits	Satellite SFD	-93.0	-93.0	-93.0	dBW/m2	
	Demod BT Product	1.00	Agg Input B.O.	0.0	0.0	0.0	dB	
	Crr Noise Bandwidth	30000 KHz	Input Backoff/Crr	0.0	0.0	0.0	dB	
	Carrier Spacing	36000 KHz	Crr Flux Density	-93.0	-93.0	-93.0	dBW/m2	
SATELLITE	Satellite	AMC3 24K Fwd	UPLINK	Gain of a Sq meter	44.7	44.7	44.7	dBi
	Location	-72.0 WL	BUDGET	Uplink Path Losses	207.6	212.6	207.6	dB
	EIRP Contour at Remote	48.0 dBW		Carrier Up EIRP	69.1	74.1	69.1	dBW
	G/T Contour at Hub	2.0 dB/K		Satellite G/T	2.0	2.0	2.0	dB/K
	Attn Setting	9.0 dB		C/N Uplink	19.3	19.3	19.3	dB
DATA	Xponder Gain	185.7 dB		EIRP Contour	48.0	48.0	48.0	dBW
	SFD at Hub	-93.0 dBW/m2	DOWNLINK	Agg Output B.O.	0.0	0.0	0.0	dB
	Xponder Bandwidth	36.0 MHz		Output Backoff/Crr	0.0	0.0	0.0	dB
	Agg Input BO	0.0 dB		Carrier Dn EIRP	48.0	48.0	48.0	dBW
	Agg Output BO	0.0 dB	BUDGET	Dnlink Path Losses	206.0	206.0	206.5	dB
	Uplink Frequency	14.480 GHz		Rx Pointing Losses	0.2	0.2	0.2	dB
	Dnlink Frequency	12.180 GHz		CI Sky E/S G/T	9.4	9.4	9.4	dB/K
GROUND	Tx Antenna Dia	9.0 meters		Degradation in G/T	0.8	0.8	1.2	dB
SEGMENT	HPA Max Output Pwr	200.0 Watts		C/N Downlink	6.2	6.2	5.3	dB
	Waveguide Losses	2.0 dB		C/N Uplink	19.3	19.3	19.3	dB
	Tx Antenna Gain	60.9 dBi		C/N Downlink	6.2	6.2	5.3	dB
	Tx Pointing Losses	0.8 dB	COMPOSITE	C/I Intermod (S/C)	99.0	99.0	99.0	dB
	Max EIRP Toward S/C	81.1 dB	LINK	C/I Uplink Adj Sat	21.3	21.3	21.3	dB
DATA	Rx Antenna Dia	0.63 meters		C/I Dnlink Adj Sat	9.2	9.2	9.2	dB
	Rx Antenna Gain	29.3 dBi		C/I Xpol	18.4	18.4	18.4	dB
	Rx Pointing Losses	0.2 dB		C/I Intermod (E/S)	28.0	18.0	28.0	dB
	Pre LNA Losses	0.8 dB		C/(Nu,d)	6.0	6.0	5.1	dB
	LNA Noise Temp	9 K		C/(Nu,d,ims/c)	6.0	6.0	5.1	dB
	Ant,etc Temp	28 K		C/(Nu,d,im,i)Total	4.0	3.9	3.4	dB
	CI Sky Noise Temp	37 K		LINK MARGIN	0.6	0.5	0.0	dB
	Rx Clr Sky G/T	9.4 dB/K		Modulation	QPSK	QPSK	QPSK	
RAIN	Uplink Rain Attn	5.0 dB		FEC Rate	2/3	2/3	2/3	
MARGINS	Dnlink Rain Attn	0.5 dB		Minimum Req'd Ebi/No	2.2	2.2	2.2	dB
	Up Fade Pwr Cntrl	5.0 dB	MODEM	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Target Link Availability E-E	98.70 %		Minimum Req'd C/N	3.4	3.4	3.4	dB
SITE	Tx E/S Location	AMC-3 Holmdel NJ		E/S EIRP/Crr Req'd (CI Sky)	69.1 dBW			
	Tx E/S Latitude	40.4 N		Tx Gain - Pointing Loss	60.1 dB			
	Tx E/S Longitude	-74.1 W		Waveguide Losses	2.0 dB			
GEOGRAPHIC	Tx E/S Elev Angle	43 deg		STATION	Tx Power Req'd/Cxr (clear sky)			
DATA	Rx E/S Location	AMC-3 Chicago, IL		HPA	12.8 watts			
	Rx E/S Latitude	41.8 N			Uplink Power Control			
	Rx E/S Longitude	-87.6 W			5.0 dB			
	Rx E/S Elev Angle	39.1 deg			TX Power Req'd/Cxr (full UPC)			
ISOLATION	S/C Isolation	36.0 dB			16.1 dBW			
	Tx E/S Isolation	35.0 dB			40.5 watts			
DATA	Rx E/S Isolation	20.0 dB			Dnlink EIRP Dens @ Beam Peak (50.0 dBW)			
	Uplink Free Sp Loss	207.2 dB			11.2 dBW/4KHz			
MISC	Dnlnk Free Sp Loss	205.7 dB						
LOSSES	Uplink Atmos Attn	0.5 dB						
	Dnlink Atmos Attn	0.3 dB						

12-Jan-17		256ksps R1/2 HN INROUTE LINK BUDGET					
05:15 PM		Satellite: AMC3 24K Rtn					
		0.63m Remote in AMC-3 Los Angeles, CA		9.0m hub in AMC-3 Holmdel NJ			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y			
				% Avail S/C Power Reqd/Crr	0.39 %		
				% Xponder Bandwidth Reqd/Crr	8.00 %		
				Clear Sky Link Margin	6.1 dB		
				Power Equivalent Bandwidth	0.14 MHz		
				Contract EIRP at reference contour	21.9 dBw		
				LINK PERFORMANCE			
				CI Sky	Up Fade	Dn Fade	Unit
				Satellite SFD	-93.0	-93.0	-93.0 dBW/m2
				Agg Input B.O.	7.0	7.0	7.0 dB
				Input Backoff/Crr	31.1	32.1	31.1 dB
				Crr Flux Density	-124.1	-125.1	-124.1 dBW/m2
				Gain of a Sq meter	44.7	44.7	44.7 dBi
				UPLINK Uplink Path Losses	207.8	208.8	207.8 dB
				BUDGET Carrier Up EIRP	39.0	39.0	39.0 dBW
				Satellite G/T	5.0	5.0	5.0 dB/K
				C/N Uplink	1.7	0.7	1.7 dB
				Satellite	AMC3 24K Rtn		
				Location	-72.0 WL		
				Hub EIRP Contour	48.0 dBW		
				Remote G/T Contour	5.0 dB/K		
				Attn Setting	5.0 dB		
				SATELLITE Xponder Gain	188.7 dB		
				DATA SFD at remote	-93.0 dBW/m2		
				Xponder Bandwidth	36.0 MHz		
				Agg Input BO	7.0 dB		
				Agg Output BO	4.0 dB		
				Uplink Frequency	14.4800 GHz		
				Dnlink Frequency	12.1800 GHz		
				Tx Antenna Dia	0.63 meters		
				HPA Max Output Pwr	25.0 Watts		
				Tx Antenna Gain	29.1 dBi		
				Tx Pointing Losses	0.3 dB		
				GROUND Rx Antenna Dia	9.0 meters		
				SEGMENT Rx Antenna Effcy	65 %		
				DATA Rx Antenna Gain	58.7 dBi		
				Rx Pointing Losses	0.6 dB		
				Pre LNA Losses	0.2 dB		
				LNA Noise Temp	120 K		
				Ant,etc Temp	45 K		
				CI Sky Noise Temp	165 K		
				Rx Clr Sky G/T	36.0 dB/K		
				Uplink Rain Attn	1.0 dB		
				RAIN Dnlink Rain Attn	1.7 dB		
				MARGINS Up Fade Pwr Cntrl	0.0 dB		
				Target Link Availability E-E	98.7 %		
				Tx E/S Location	AMC-3 Los Angeles, CA		
				Tx E/S Latitude	34.0 N		
				SITE Tx E/S Longitude	-118.2 W		
				GEOGRAPHIC Tx E/S Elev Angle	27.3 deg		
				DATA Rx E/S Location	AMC-3 Holmdel NJ		
				Rx E/S Latitude	40.4 N		
				Rx E/S Longitude	-74.1 W		
				Rx E/S Elev Angle	43.2 deg		
				XPOL 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	207.5 dB		
				MISC Dnlink Free Sp Loss	205.7 dB		
				LOSSES Uplink Atmos Attn	0.4 dB		
				Dnlink Atmos Attn	0.4 dB		
				Calculated EIRP Desity Limit per link budget		11.9 dBW/4Hz	
				Calculated PSD Limit per link budget		-17.2 dBW/4Hz	
				Co-ordination Offset		0.0 dBW/4Hz	
				EARTH RF Head Max Output Power		19.9 Watts	
				Misc Feed Losses etc		3.8 dB	
				E/S EIRP Reqd twds S/C		39.8 dBW	
				(Note: reqd to achieve link margin)			
				HPA Tx Pointing Losses		0.3 dB	
				Max Clear Sky EIRP towards S/C		39.0 dBW	
				RF Head Output BO (CI Sky)		0.0 dB	

12-Jan-17		512ksps R1/2 HN INROUTE LINK BUDGET							
05:16 PM		Satellite: AMC3 24K Rtn		0.63m Remote in AMC-3 Los Angeles, CA		9.0m hub in AMC-3 Holmdel NJ			
BASELINE PARAMETERS			Value	Unit	S U M M A R Y				
				% Avail S/C Power Reqd/Crr		0.39 %			
				% Xponder Bandwidth Reqd/Crr		8.00 %			
				Clear Sky Link Margin		3.1 dB			
				Power Equivalent Bandwidth		0.14 MHz			
				Contract EIRP at reference contour		21.9 dBw			
				LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
				Satellite SFD		-93.0	-93.0	-93.0	dBW/m2
				Agg Input B.O.		7.0	7.0	7.0	dB
				Input Backoff/Crr		31.1	32.1	31.1	dB
				Crr Flux Density		-124.1	-125.1	-124.1	dBW/m2
				Gain of a Sq meter		44.7	44.7	44.7	dBi
				UPLINK Uplink Path Losses		207.8	208.8	207.8	dB
				BUDGET Carrier Up EIRP		39.0	39.0	39.0	dBW
				Satellite G/T		5.0	5.0	5.0	dB/K
				C/N Uplink		1.7	0.7	1.7	dB
				Saturation EIRP		48.0	48.0	48.0	dBW
				Agg Output B.O.		4.0	4.0	4.0	dB
				Output Backoff/Crr		28.1	29.1	28.1	dB
				Carrier Dn EIRP		19.9	18.9	19.9	dBW
				DOWNLINK Dnlink Path Losses		206.0	206.0	207.7	dB
				BUDGET Rx Pointing Losses		0.6	0.6	0.6	dB
				CI Sky E/S G/T		36.0	36.0	36.0	dB/K
				Degradation in G/T		0.6	0.6	2.0	dB
				C/N Downlink		14.2	13.2	11.1	dB
				C/N Uplink		1.7	0.7	1.7	dB
				C/N Downlink		14.2	13.2	11.1	dB
				C/I Intermod (S/C)		36.5	35.5	36.5	dB
				C/I Uplink Adj Sat		5.7	4.7	5.7	dB
				COMPOSITE C/I Downlink Adj Sat		17.8	16.8	17.8	dB
				LINK C/I Xpol		7.4	6.4	13.4	dB
				C/I Adjacent Carrier		17.0	16.0	17.0	dB
				C/I co-freq beams		85.9	84.9	85.9	dB
				C/(Nu,d)		1.4	0.4	1.2	dB
				C/(Nu,d,ims/c)		1.4	0.4	1.2	dB
				C/(Nu,d,im,i)Total		-0.8	-1.8	-0.5	dB
				LINK MARGIN		3.1	2.1	3.5	dB
				Symbol Rate		512	512	512	ksps
				FEC Code Rate		1/2	1/2	1/2	
				MODEM Minimum Ebi/No		2.1	2.1	2.1	dB
				10*log(Rbt/Noise BW)		-3.0	-3.0	-3.0	dB
				Minimum Req'd C/N		-3.9	-3.9	-3.9	dB
				RF Head Max Output Power		19.9		Watts	
				Misc Feed Losses etc		3.8		dB	
				EARTH E/S EIRP Req'd twds S/C		42.8		dBW	
				(Note: req'd to achieve link margin)					
				HPA Tx Pointing Losses		0.3		dB	
				Max Clear Sky EIRP towards S/C		39.0		dBW	
				RF Head Output BO (CI Sky)		0.0		dB	
				Calculated EIRP Density Limit per link budget		11.9		dBW/4Hz	
				Calculated PSD Limit per link budget		-17.2		dBW/4Hz	
				Co-ordination Offset		0.0		dBW/4Hz	

12-Jan-17		1024ksps R1/2 HN INROUTE LINK BUDGET					
05:18 PM		Satellite: AMC3 24K Rtn					
		0.63m Remote in AMC-3 Los Angeles, CA		9.0m hub in AMC-3 Holmdel NJ			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y			
				% Avail S/C Power Reqd/Crr	0.39 %		
				% Xponder Bandwidth Reqd/Crr	8.00 %		
				Clear Sky Link Margin	0.1 dB		
				Power Equivalent Bandwidth	0.14 MHz		
				Contract EIRP at reference contour	21.9 dBw		
				LINK PERFORMANCE			
				CI Sky	Up Fade	Dn Fade	Unit
				Satellite SFD	-93.0	-93.0	-93.0 dBW/m2
				Agg Input B.O.	7.0	7.0	7.0 dB
				Input Backoff/Crr	31.1	32.1	31.1 dB
				Crr Flux Density	-124.1	-125.1	-124.1 dBW/m2
				Gain of a Sq meter	44.7	44.7	44.7 dBi
				UPLINK Uplink Path Losses	207.8	208.8	207.8 dB
				BUDGET Carrier Up EIRP	39.0	39.0	39.0 dBW
				Satellite G/T	5.0	5.0	5.0 dB/K
				C/N Uplink	1.7	0.7	1.7 dB
				Satellite	AMC3 24K Rtn		
				Location	-72.0 WL		
				Hub EIRP Contour	48.0 dBW		
				Remote G/T Contour	5.0 dB/K		
				Attn Setting	5.0 dB		
				SATELLITE Xponder Gain	188.7 dB		
				DATA SFD at remote	-93.0 dBW/m2		
				Xponder Bandwidth	36.0 MHz		
				Agg Input BO	7.0 dB		
				Agg Output BO	4.0 dB		
				Uplink Frequency	14.4800 GHz		
				Dnlink Frequency	12.1800 GHz		
				Tx Antenna Dia	0.63 meters		
				HPA Max Output Pwr	25.0 Watts		
				Tx Antenna Gain	29.1 dBi		
				Tx Pointing Losses	0.3 dB		
				GROUND Rx Antenna Dia	9.0 meters		
				SEGMENT Rx Antenna Effcy	65 %		
				DATA Rx Antenna Gain	58.7 dBi		
				Rx Pointing Losses	0.6 dB		
				Pre LNA Losses	0.2 dB		
				LNA Noise Temp	120 K		
				Ant,etc Temp	45 K		
				CI Sky Noise Temp	165 K		
				Rx Clr Sky G/T	36.0 dB/K		
				Uplink Rain Attn	1.0 dB		
				RAIN Dnlink Rain Attn	1.7 dB		
				MARGINS Up Fade Pwr Cntrl	0.0 dB		
				Target Link Availability E-E	98.7 %		
				Tx E/S Location	AMC-3 Los Angeles, CA		
				Tx E/S Latitude	34.0 N		
				SITE Tx E/S Longitude	-118.2 W		
				GEOGRAPHIC Tx E/S Elev Angle	27.3 deg		
				DATA Rx E/S Location	AMC-3 Holmdel NJ		
				Rx E/S Latitude	40.4 N		
				Rx E/S Longitude	-74.1 W		
				Rx E/S Elev Angle	43.2 deg		
				XPOL 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	207.5 dB		
				MISC Dnlink Free Sp Loss	205.7 dB		
				LOSSES Uplink Atmos Attn	0.4 dB		
				Dnlink Atmos Attn	0.4 dB		
				Symbol Rate	1024	1024	1024 ksps
				FEC Code Rate	1/2	1/2	1/2
				MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
				10*log(Rbt/Noise BW)	0.0	0.0	0.0 dB
				Minimum Req'd C/N	-0.9	-0.9	-0.9 dB
				RF Head Max Output Power		19.9	Watts
				Misc Feed Losses etc		3.8	dB
				EARTH E/S EIRP Req'd twds S/C		45.9	dBW
				STATION (Note: req'd to achieve link margin)			
				HPA Tx Pointing Losses		0.3	dB
				Max Clear Sky EIRP towards S/C		39.0	dBW
				RF Head Output BO (CI Sky)		0.0	dB
				Calculated EIRP Density Limit per link budget		11.9	dBW/4Hz
				Calculated PSD Limit per link budget		-17.2	dBW/4Hz
				Co-ordination Offset		0.0	dBW/4Hz

1/12/2017

HughesNet LINK BUDGET

5:19 PM

Satellite: AMC3 24K Fwd

0.63 m Remote Located in AMC-3 Los Angeles, CA

Crr EIRP Density = 11.2 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY				
				% Avail S/C Power Req/Crr	100.0 %			
				% Xponder Bandwidth Req/Crr	100.0 %			
				Clear Sky Link Margin	0.7 dB			
				Power Equivalent Bandwidth	36.0 MHz			
				EIRP at 50.0 dBW reference contour	50.0 dBW			
				LINK PERFORMANCE				
				CI Sky	Up Fade	Dn Fade	Unit	
CARRIER	Carrier Info Rate	21450	Kbps	Satellite SFD	-93.0	-93.0	-93.0	dBW/m2
	Net FEC Code Rate	0.500		Agg Input B.O.	0.0	0.0	0.0	dB
	Transmit Symbol Rate	30000	Ksps	Input Backoff/Crr	0.0	0.0	0.0	dB
DATA	CI Sky Req/E/No	1.3	dB	Crr Flux Density	-93.0	-93.0	-93.0	dBW/m2
	No of bits/symbol	2.0	Bits	UPLINK Gain of a Sq meter	44.7	44.7	44.7	dBi
	Demod BT Product	1.00		BUDGET Uplink Path Losses	207.6	212.6	207.6	dB
	Crr Noise Bandwidth	30000	KHz	Carrier Up EIRP	69.1	74.1	69.1	dBW
	Carrier Spacing	36000	KHz	Satellite G/T	2.0	2.0	2.0	dB/K
SATELLITE	Satellite	AMC3 24K Fwd		C/N Uplink	19.3	19.3	19.3	dB
	Location	-72.0 WL		DOWNLINK EIRP Contour	48.0	48.0	48.0	dBW
	EIRP Contour at Remote	48.0 dBW		Agg Output B.O.	0.0	0.0	0.0	dB
	G/T Contour at Hub	2.0 dB/K		Output Backoff/Crr	0.0	0.0	0.0	dB
	Attn Setting	9.0 dB		Carrier Dn EIRP	48.0	48.0	48.0	dBW
DATA	Xponder Gain	185.7 dB		BUDGET Dnlink Path Losses	206.3	206.3	206.6	dB
	SFD at Hub	-93.0 dBW/m2		Rx Pointing Losses	0.2	0.2	0.2	dB
	Xponder Bandwidth	36.0 MHz		CI Sky E/S G/T	9.4	9.4	9.4	dB/K
	Agg Input BO	0.0 dB		Degradation in G/T	0.6	0.6	0.9	dB
	Agg Output BO	0.0 dB		C/N Downlink	6.2	6.2	5.5	dB
	Uplink Frequency	14.480 GHz		C/N Uplink	19.3	19.3	19.3	dB
	Dnlink Frequency	12.180 GHz		C/N Downlink	6.2	6.2	5.5	dB
GROUND	Tx Antenna Dia	9.0 meters		C/I Intermod (S/C)	99.0	99.0	99.0	dB
	HPA Max Output Pwr	200.0 Watts		C/I Uplink Adj Sat	20.9	20.9	20.9	dB
	Waveguide Losses	2.0 dB		COMPOSITE C/I Dnlink Adj Sat	4.6	4.6	4.6	dB
	Tx Antenna Gain	60.9 dBi		LINK C/I Xpol	18.4	18.4	18.4	dB
	Tx Pointing Losses	0.8 dB		C/I Intermod (E/S)	28.0	18.0	28.0	dB
	Max EIRP Toward S/C	81.1 dB		C/(Nu,d)	6.0	6.0	5.4	dB
SEGMENT	Rx Antenna Dia	0.63 meters		C/(Nu,d,ims/c)	6.0	6.0	5.4	dB
DATA	Rx Antenna Gain	29.3 dBi		C/(Nu,d,im,i)Total	2.0	2.0	1.8	dB
	Rx Pointing Losses	0.2 dB		LINK MARGIN	0.7	0.7	0.5	dB
	Pre LNA Losses	0.8 dB		Modulation	QPSK	QPSK	QPSK	
	LNA Noise Temp	9 K		FEC Rate	1/2	1/2	1/2	
	Ant,etc Temp	28 K		Minimum Req/Ebi/No	1.3	1.3	1.3	dB
	CI Sky Noise Temp	37 K		10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Rx Clr Sky G/T	9.4 dB/K		Minimum Req/C/N	1.3	1.3	1.3	dB
RAIN	Uplink Rain Attn	5.0 dB		E/S EIRP/Crr Req (CI Sky)	69.1 dBW			
MARGINS	Dnlink Rain Attn	0.4 dB		Tx Gain - Pointing Loss	60.1 dB			
	Up Fade Pwr Cntrl	5.0 dB		Waveguide Losses	2.0 dB			
	Target Link Availability E-E	98.70 %		STATION Tx Power Req/Cxr (clear sky)	11.1 dBW			
				HPA	12.8 watts			
SITE	Tx E/S Location	AMC-3 Holmdel NJ		Uplink Power Control	5.0 dB			
	Tx E/S Latitude	40.4 N		TX Power Req/Cxr (full UPC)	16.1 dBW			
	Tx E/S Longitude	-74.1 W			40.5 watts			
GEOGRAPHIC	Tx E/S Longitude	-74.1 W						
DATA	Tx E/S Elev Angle	43 deg		Dnlink EIRP Dens @ Beam Peak (50.0 dBW)	11.2 dBW/4KHz			
	Rx E/S Location	AMC-3 Los Angeles, CA						
	Rx E/S Latitude	34.0 N						
	Rx E/S Longitude	-118.2 W						
	Rx E/S Elev Angle	27.3 deg						
ISOLATION	S/C Isolation	36.0 dB						
DATA	Tx E/S Isolation	35.0 dB						
	Rx E/S Isolation	20.0 dB						
MISC	Uplink Free Sp Loss	207.2 dB						
LOSSES	Dnlink Free Sp Loss	205.9 dB						
	Uplink Atmos Attn	0.5 dB						
	Dnlink Atmos Attn	0.3 dB						

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET						
10:44 AM		Satellite: AMC 9 12K						
		0.63m Remote in AMC9, Staunton, VA		7.6m hub in AMC9 North Las Vegas, NV				
BASELINE PARAMETERS			Value	Unit	SUMMARY			
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr		0.26 %		
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr		4.00 %		
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin		4.9 dB		
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth		0.09 MHz		
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour		23.5 dBw		
	Demod BT Product	1.00		LINK PERFORMANCE		CI Sky Up Fade Dn Fade Unit		
	Spreading factor			Satellite SFD	-92.0	-92.0	-92.0 dBW/m2	
	Spread Bandwidth	1024	kHz	Agg Input B.O.	7.0	7.0	7.0 dB	
	Crr Spacing Fctr	1.41	x Rs	Input Backoff/Crr	32.9	33.9	32.9 dB	
Carrier Spacing	1440	kHz	Crr Flux Density	-124.9	-125.9	-124.9 dBW/m2		
SATELLITE DATA	Satellite	AMC 9 12K		UPLINK				
	Location	-83.0	WL	BUDGET				
	Hub EIRP Contour	48.0	dBW	Uplink Path Losses	207.3	208.3	207.3 dB	
	Remote G/T Contour	3.0	dB/K	Carrier Up EIRP	37.8	37.8	37.8 dBW	
	Attn Setting	5.0	dB	Satellite G/T	3.0	3.0	3.0 dB/K	
	Xponder Gain	188.0	dB	C/N Uplink	4.0	1.0	2.0 dB	
	SFD at remote	-92.0	dBW/m2	DOWNLINK				
	Xponder Bandwidth	36.0	MHz	BUDGET				
	Agg Input BO	7.0	dB	Saturation EIRP	48.0	48.0	48.0 dBW	
Agg Output BO	3.5	dB	Agg Output B.O.	3.5	3.5	3.5 dB		
Uplink Frequency	14.2400	GHz	Output Backoff/Crr	29.4	30.4	29.4 dB		
Dnlink Frequency	11.9400	GHz	Carrier Dn EIRP	18.6	17.6	18.6 dBW		
GROUND SEGMENT DATA	Tx Antenna Dia	0.63	meters	Dnlink Path Losses		205.8	205.8	206.5 dB
	HPA Max Output Pwr	25.0	Watts	Rx Pointing Losses	0.4	0.4	0.4 dB	
	Tx Antenna Gain	28.9	dBi	CI Sky E/S G/T	35.2	35.2	35.2 dB/K	
	Tx Pointing Losses	0.3	dB	Degradation in G/T	0.3	0.3	1.2 dB	
	Rx Antenna Dia	7.6	meters	C/N Downlink	17.8	14.8	14.2 dB	
	Rx Antenna Effcy	65	%	C/N Uplink	4.0	1.0	2.0 dB	
	Rx Antenna Gain	57.0	dBi	C/N Downlink	17.8	14.8	14.2 dB	
	Rx Pointing Losses	0.4	dB	C/I Intermod (S/C)	41.0	40.0	41.0 dB	
	Pre LNA Losses	0.2	dB	C/I Uplink Adj Sat	5.0	4.0	5.0 dB	
LNA Noise Temp	90	K	C/I Downlink Adj Sat	20.9	19.9	20.9 dB		
Ant,etc Temp	45	K	C/I Xpol	14.0	13.0	18.0 dB		
CI Sky Noise Temp	135	K	C/I Adjacent Carrier	17.0	16.0	17.0 dB		
Rx Clr Sky G/T	35.2	dB/K	C/I co-freq beams	87.1	86.1	87.1 dB		
RAIN MARGINS	Uplink Rain Attn	1.0	dB	C/(Nu,d)	3.9	0.9	1.8 dB	
	Dnlink Rain Attn	0.7	dB	C/(Nu,d,ims/c)	3.9	0.9	1.8 dB	
	Up Fade Pwr Cntrl	0.0	dB	C/(Nu,d,im,i)Total	1.0	-1.2	-0.1 dB	
	Target Link Availability E-E	97.7	%	LINK MARGIN	4.9	2.8	3.8 dB	
SITE GEOGRAPHIC DATA	Tx E/S Location	AMC9, Staunton, VA		MODEM				
	Tx E/S Latitude	38.1	N	Symbol Rate	256	256	256 ksps	
	Tx E/S Longitude	-79.1	W	FEC Code Rate	1/2	1/2	1/2	
	Tx E/S Elev Angle	45.7	deg	Minimum Ebi/No	2.1	2.1	2.1 dB	
	Rx E/S Location	AMC9 North Las Vegas, NV		10*log(Rbt/Noise BW)	-3.0	-3.0	-3.0 dB	
XPOL ISOLATION DATA	Rx E/S Latitude	36.2	N	Minimum Req'd C/N	-3.9	-3.9	-3.9 dB	
	Rx E/S Longitude	-115.1	W	EARTH				
	Rx E/S Elev Angle	36.1	deg	STATION				
	S/C Isolation	36.0	dB	RF Head Max Output Power	19.9	Watts		
	Tx E/S Isolation	35.0	dB	Misc Feed Losses etc	3.8	dB		
MISC LOSSES	Rx E/S Isolation	26.0	dB	E/S EIRP Req'd twds S/C		dBW		
	Uplnk Free Sp Loss	207.0	dB	(Note: req'd to achieve link margin)				
	Dnlnk Free Sp Loss	205.6	dB	HPA				
	Uplink Atmos Attn	0.3	dB	Tx Pointing Losses	0.3	dB		
Dnlink Atmos Attn	0.2	dB	Max Clear Sky EIRP towards S/C	37.8	dBW			
				RF Head Output BO (CI Sky)	0.9	dB		
				Calculated EIRP Desity Limit per link budget	13.8	dBW/4Hz		
				Calculated PSD Limit per link budget	-15.1	dBW/4Hz		
				Co-ordination Offset	0.0	dBW/4Hz		

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET			
10:46 AM		Satellite: AMC 9 12K			
		0.63m Remote in AMC9, Staunton, VA		7.6m hub in AMC9 North Las Vegas, NV	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	0.26 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
				Clear Sky Link Margin	2.9 dB
				Power Equivalent Bandwidth	0.09 MHz
				Contract EIRP at reference contour	23.5 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	512	Kbps	Satellite SFD	-92.0
	FEC Code Rate	0.500		Agg Input B.O.	7.0
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	32.9
DATA	CI Sky Reqd Ebi/No	2.1	dB	Crr Flux Density	-124.9
	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.5
	Demod BT Product	1.00		Uplink Path Losses	207.3
	Spreading factor			Carrier Up EIRP	37.8
	Spread Bandwidth	1024	kHz	Satellite G/T	3.0
	Crr Spacing Fctr	1.41	x Rs	C/N Uplink	5.0
	Carrier Spacing	1440	kHz	Saturation EIRP	48.0
SATELLITE	Satellite	AMC 9 12K		Agg Output B.O.	3.5
	Location	-83.0	WL	Output Backoff/Crr	29.4
	Hub EIRP Contour	48.0	dBW	Carrier Dn EIRP	18.6
	Remote G/T Contour	3.0	dB/K	Dnlink Path Losses	205.8
	Attn Setting	5.0	dB	Rx Pointing Losses	0.4
DATA	Xponder Gain	188.0	dB	CI Sky E/S G/T	35.2
	SFD at remote	-92.0	dBW/m2	Degradation in G/T	0.3
	Xponder Bandwidth	36.0	MHz	C/N Downlink	18.8
	Agg Input BO	7.0	dB	C/N Uplink	5.0
	Agg Output BO	3.5	dB	C/N Downlink	18.8
	Uplink Frequency	14.2400	GHz	C/I Intermod (S/C)	37.9
	Dnlink Frequency	11.9400	GHz	C/I Uplink Adj Sat	6.0
GROUND	Tx Antenna Dia	0.63	meters	C/I Downlink Adj Sat	21.9
	HPA Max Output Pwr	25.0	Watts	C/I Xpol	15.0
				C/I Adjacent Carrier	17.0
	Tx Antenna Gain	28.9	dBi	C/I co-freq beams	87.1
	Tx Pointing Losses	0.3	dB	C/(Nu,d)	4.9
SEGMENT	Rx Antenna Dia	7.6	meters	C/(Nu,d,ims/c)	4.9
	Rx Antenna Effcy	65	%	C/(Nu,d,im,i)Total	2.0
DATA	Rx Antenna Gain	57.0	dBi	LINK MARGIN	2.9
	Rx Pointing Losses	0.4	dB	Symbol Rate	512
	Pre LNA Losses	0.2	dB	FEC Code Rate	1/2
	LNA Noise Temp	90	K	Minimum Ebi/No	2.1
	Ant,etc Temp	45	K	10*log(Rbt/Noise BW)	0.0
	CI Sky Noise Temp	135	K	Minimum Reqd C/N	-0.9
	Rx Clr Sky G/T	35.2	dB/K	RF Head Max Output Power	19.9
RAIN	Uplink Rain Attn	1.0	dB	Misc Feed Losses etc	3.8
	Dnlink Rain Attn	0.7	dB	E/S EIRP Reqd twds S/C	dBW
MARGINS	Up Fade Pwr Cntrl	0.0	dB	(Note: reqd to achieve link margin)	
	Target Link Availability E-E	97.7	%	Tx Pointing Losses	0.3
				Max Clear Sky EIRP towards S/C	37.8
SITE	Tx E/S Location	AMC9, Staunton, VA		RF Head Output BO (CI Sky)	0.9
	Tx E/S Latitude	38.1	N		
GEOGRAPHIC	Tx E/S Longitude	-79.1	W	Calculated EIRP Desity Limit per link budget	13.8
DATA	Tx E/S Elev Angle	45.7	deg	Calculated PSD Limit per link budget	-15.1
	Rx E/S Location	AMC9 North Las Vegas, NV		Co-ordination Offset	0.0
	Rx E/S Latitude	36.2	N		
	Rx E/S Longitude	-115.1	W		
	Rx E/S Elev Angle	36.1	deg		
XPOL	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	207.0	dB		
MISC	Dnlink Free Sp Loss	205.6	dB		
LOSSES	Uplink Atmos Attn	0.3	dB		
	Dnlink Atmos Attn	0.2	dB		

BASELINE PARAMETERS		Value	Unit	SUMMARY				
9/9/2016 10:50 AM Satellite: AMC 9 24K 0.63 m Remote Located in AMC9, Staunton, VA Crr EIRP Density = 13.7 dBW/4 KHz				% Avail S/C Power Reqd/Crr 100.0 % % Xponder Bandwidth Reqd/Crr 100.0 % Clear Sky Link Margin 2.6 dB Power Equivalent Bandwidth 36.0 MHz EIRP at 53.0 dBW reference contour 52.5 dBW				
				LINK PERFORMANCE				
				CI Sky	Up Fade	Dn Fade	Unit	
CARRIER	Carrier Info Rate	37620	Kbps	Satellite SFD	-92.0	-92.0	-92.0	dBW/m2
	Net FEC Code Rate	0.667		Agg Input B.O.	3.0	3.0	3.0	dB
	Transmit Symbol Rate	30000	Ksps	Input Backoff/Crr	3.0	3.0	3.0	dB
CARRIER	CI Sky Reqd Es/No	3.4	dB	Crr Flux Density	-95.0	-95.0	-95.0	dBW/m2
DATA	No of bits/symbol	2.0	Bits	UPLINK				
	Demod BT Product	1.00		BUDGET				
	Crr Noise Bandwidth	30000	KHz	Gain of a Sq meter	44.7	44.7	44.7	dBi
	Carrier Spacing	36000	KHz	Uplink Path Losses	207.5	212.5	207.5	dB
SATELLITE	Satellite	AMC 9 24K		Carrier Up EIRP	67.2	72.2	67.2	dBW
	Location	-83.0 WL		Satellite G/T	3.0	3.0	3.0	dB/K
	EIRP Contour at Remote	51.0	dBW	C/N Uplink	18.6	18.6	18.6	dB
	G/T Contour at Hub	3.0	dB/K	DOWNLINK				
	Attn Setting	9.0	dB	BUDGET				
	Xponder Gain	190.2	dB	EIRP Contour	51.0	51.0	51.0	dBW
DATA	SFD at Hub	-92.0	dBW/m2	Agg Output B.O.	0.5	0.5	0.5	dB
	Xponder Bandwidth	36.0	MHz	Output Backoff/Crr	0.5	0.5	0.5	dB
	Agg Input BO	3.0	dB	Carrier Dn EIRP	50.5	50.5	50.5	dBW
	Agg Output BO	0.5	dB	Dnlink Path Losses	205.9	205.9	206.3	dB
	Uplink Frequency	14.480	GHz	BUDGET				
	Dnlink Frequency	12.180	GHz	Rx Pointing Losses	0.2	0.2	0.2	dB
GROUND	Tx Antenna Dia	7.6	meters	CI Sky E/S G/T	9.3	9.3	9.3	dB/K
	HPA Max Output Pwr	150.0	Watts	Degradation in G/T	0.7	0.7	1.1	dB
	Waveguide Losses	2.0	dB	C/N Downlink	8.9	8.9	8.0	dB
	Tx Antenna Gain	59.4	dBi	COMPOSITE				
	Tx Pointing Losses	0.6	dB	LINK				
	Max EIRP Toward S/C	78.6	dB	C/N Uplink	18.6	18.6	18.6	dB
SEGMENT	Rx Antenna Dia	0.63	meters	C/N Downlink	8.9	8.9	8.0	dB
DATA	Rx Antenna Gain	29.2	dBi	C/I Intermod (S/C)	99.0	99.0	99.0	dB
	Rx Pointing Losses	0.2	dB	C/I Uplink Adj Sat	19.7	19.7	19.7	dB
	Pre LNA Losses	0.8	dB	C/I Dnlink Adj Sat	11.0	11.0	11.0	dB
	LNA Noise Temp	9	K	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	37	K	C/(Nu,d)	8.4	8.4	7.7	dB
	Rx Clr Sky G/T	9.3	dB/K	C/(Nu,d,ims/c)	8.4	8.4	7.7	dB
	Uplink Rain Attn	5.0	dB	C/(Nu,d,im,i)Total	6.0	5.7	5.6	dB
RAIN	Dnlink Rain Attn	0.4	dB	LINK MARGIN	2.6	2.3	2.2	dB
MARGINS	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	
	Tx E/S Location	AMC9 North Las Vegas, NV		Minimum Req'd Ebi/No	2.2	2.2	2.2	dB
SITE	Tx E/S Latitude	36.2	N	MODEM				
	Tx E/S Longitude	-115.1	W	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
GEOGRAPHIC	Tx E/S Elev Angle	36	deg	Minimum Req'd C/N	3.4	3.4	3.4	dB
DATA	Rx E/S Location	AMC9, Staunton, VA		E/S EIRP/Crr Req'd (CI Sky)				67.2 dBW
	Rx E/S Latitude	38.1	N	Tx Gain - Pointing Loss				58.8 dB
	Rx E/S Longitude	-79.1	W	Waveguide Losses				2.0 dB
	Rx E/S Elev Angle	45.7	deg	EARTH				
	XPOL	S/C Isolation	36.0	STATION				
ISOLATION	Tx E/S Isolation	35.0	dB	HPA				
DATA	Rx E/S Isolation	20.0	dB	Uplink Power Control				5.0 dB
	Uplink Free Sp Loss	207.3	dB	TX Power Req'd/Cxr (full UPC)				15.4 dBW
MISC	Dnlink Free Sp Loss	205.6	dB					34.7 watts
LOSSES	Uplink Atmos Attn	0.2	dB	Dnlink EIRP Dens @ Beam Peak (53.0 dBW)				13.7 dBW/4KHz
	Dnlink Atmos Attn	0.3	dB					

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET					
10:52 AM		Satellite: AMC 9 12K		0.63m Remote in AMC9 Los Angeles,CA US 7.6m hub in AMC9 North Las Vegas, NV			
BASELINE PARAMETERS			Value	Unit	SUMMARY		
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr		0.21 %	
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr		4.00 %	
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin		4.0 dB	
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth		0.08 MHz	
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour		22.7 dBw	
	Demod BT Product	1.00		LINK PERFORMANCE			
	Spreading factor			CI Sky	Up Fade	Dn Fade	Unit
	Spread Bandwidth	1024	kHz	Satellite SFD	-92.2	-92.2	-92.2 dBW/m2
	Crr Spacing Fctr	1.41	x Rs	Agg Input B.O.	7.0	7.0	7.0 dB
Carrier Spacing	1440	kHz	Input Backoff/Crr	33.8	34.8	33.8 dB	
SATELLITE DATA	Satellite	AMC 9 12K		Crr Flux Density	-126.0	-127.0	-126.0 dBW/m2
	Location	-83.0	WL	Gain of a Sq meter	44.5	44.5	44.5 dBi
	Hub EIRP Contour	48.0	dBW	UPLINK Uplink Path Losses	207.4	208.4	207.4 dB
	Remote G/T Contour	3.2	dB/K	BUDGET Carrier Up EIRP	36.9	36.9	36.9 dBW
	Attn Setting	5.0	dB	Satellite G/T	3.2	3.2	3.2 dB/K
	Xponder Gain	188.2	dB	C/N Uplink	3.2	0.2	1.2 dB
	SFD at remote	-92.2	dBW/m2	Saturation EIRP	48.0	48.0	48.0 dBW
	Xponder Bandwidth	36.0	MHz	Agg Output B.O.	3.5	3.5	3.5 dB
	Agg Input BO	7.0	dB	Agg Output BO	30.3	31.3	30.3 dB
GROUND SEGMENT DATA	Agg Output BO	3.5	dB	Carrier Dn EIRP	17.7	16.7	17.7 dBW
	Uplink Frequency	14.2400	GHz	DOWNLINK Dnlink Path Losses	205.8	205.8	206.5 dB
	Dnlink Frequency	11.9400	GHz	BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Tx Antenna Dia	0.63	meters	CI Sky E/S G/T	35.2	35.2	35.2 dB/K
	HPA Max Output Pwr	25.0	Watts	Degradation in G/T	0.3	0.3	1.2 dB
	Tx Antenna Gain	28.9	dBi	C/N Downlink	16.9	13.9	13.4 dB
	Tx Pointing Losses	0.3	dB	C/N Uplink	3.2	0.2	1.2 dB
	Rx Antenna Dia	7.6	meters	C/N Downlink	16.9	13.9	13.4 dB
	Rx Antenna Effcy	65	%	C/I Intermod (S/C)	40.1	39.1	40.1 dB
RAIN MARGINS DATA	Rx Antenna Gain	57.0	dBi	C/I Uplink Adj Sat	4.0	3.0	4.0 dB
	Rx Pointing Losses	0.4	dB	COMPOSITE C/I Downlink Adj Sat	19.8	18.8	19.8 dB
	Pre LNA Losses	0.2	dB	LINK C/I Xpol	13.2	12.2	17.1 dB
	LNA Noise Temp	90	K	C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Ant,etc Temp	45	K	C/I co-freq beams	86.2	85.2	86.2 dB
	CI Sky Noise Temp	135	K	C/(Nu,d)	3.0	0.0	0.9 dB
	Rx Clr Sky G/T	35.2	dB/K	C/(Nu,d,ims/c)	3.0	0.0	0.9 dB
	Uplink Rain Attn	1.0	dB	C/(Nu,d,im,i)Total	0.1	-2.1	-1.0 dB
	Dnlink Rain Attn	0.7	dB	LINK MARGIN	4.0	1.9	2.9 dB
SITE GEOGRAPHIC DATA	Up Fade Pwr Cntrl	0.0	dB	Symbol Rate	256	256	256 ksps
	Target Link Availability E-E	97.7	%	FEC Code Rate	1/2	1/2	1/2
	Tx E/S Location	AMC9 Los Angeles,CA US		MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
	Tx E/S Latitude	34.0	N	10*log(Rbt/Noise BW)	-3.0	-3.0	-3.0 dB
	Tx E/S Longitude	-118.2	W	Minimum Reqd C/N	-3.9	-3.9	-3.9 dB
	Tx E/S Elev Angle	35.6	deg	RF Head Max Output Power		19.9	Watts
	Rx E/S Location	AMC9 North Las Vegas, NV		Misc Feed Losses etc		3.8	dB
	Rx E/S Latitude	36.2	N	EARTH E/S EIRP Reqd twds S/C			dBW
	Rx E/S Longitude	-115.1	W	(Note: reqd to achieve link margin)			
XPOL ISOLATION DATA	Rx E/S Elev Angle	36.1	deg	HPA Tx Pointing Losses		0.3	dB
	S/C Isolation	36.0	dB	Max Clear Sky EIRP towards S/C		36.9	dBW
	Tx E/S Isolation	35.0	dB	RF Head Output BO (CI Sky)		1.9	dB
MISC LOSSES	Rx E/S Isolation	26.0	dB	Calculated EIRP Desity Limit per link budget		12.8	dBW/4Hz
	Uplnk Free Sp Loss	207.1	dB	Calculated PSD Limit per link budget		-16.1	dBW/4Hz
	Dnlnk Free Sp Loss	205.6	dB	Co-ordination Offset		0.0	dBW/4Hz
	Uplink Atmos Attn	0.3	dB				
Dnlink Atmos Attn	0.2	dB					

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET			
10:55 AM		Satellite: AMC 9 12K			
		0.63m Remote in AMC9 Los Angeles,CA US		7.6m hub in AMC9 North Las Vegas, NV	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.21 %
				% Xponder Bandwidth Req'd/Crr	4.00 %
				Clear Sky Link Margin	2.9 dB
				Power Equivalent Bandwidth	0.08 MHz
				Contract EIRP at reference contour	22.7 dBw
				LINK PERFORMANCE	CI Sky Up Fade Dn Fade Unit
CARRIER		Carrier Info Rate	512 Kbps	Satellite SFD	-92.2 -92.2 -92.2 dBW/m2
DATA		FEC Code Rate	0.500	Agg Input B.O.	7.0 7.0 7.0 dB
		Crr Symbol Rate	512 Ksps	Input Backoff/Crr	33.8 34.8 33.8 dB
		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-126.0 -127.0 -126.0 dBW/m2
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.5 44.5 44.5 dBi
		Demod BT Product	1.00	UPLINK	
		Spreading factor		BUDGET	
		Spread Bandwidth	1024 kHz	Uplink Path Losses	207.4 208.4 207.4 dB
		Crr Spacing Fctr	1.41 x Rs	Carrier Up EIRP	36.9 36.9 36.9 dBW
		Carrier Spacing	1440 kHz	Satellite G/T	3.2 3.2 3.2 dB/K
SATELLITE		Satellite	AMC 9 12K	C/N Uplink	5.2 0.2 1.2 dB
DATA		Location	-83.0 WL	Saturation EIRP	48.0 48.0 48.0 dBW
		Hub EIRP Contour	48.0 dBW	Agg Output B.O.	3.5 3.5 3.5 dB
		Remote G/T Contour	3.2 dB/K	Output Backoff/Crr	30.3 31.3 30.3 dB
		Attn Setting	5.0 dB	Carrier Dn EIRP	17.7 16.7 17.7 dBW
		Xponder Gain	188.2 dB	DOWNLINK	
		SFD at remote	-92.2 dBW/m2	BUDGET	
		Xponder Bandwidth	36.0 MHz	Dnlink Path Losses	205.8 205.8 206.5 dB
		Agg Input BO	7.0 dB	Rx Pointing Losses	0.4 0.4 0.4 dB
		Agg Output BO	3.5 dB	CI Sky E/S G/T	35.2 35.2 35.2 dB/K
		Uplink Frequency	14.2400 GHz	Degradation in G/T	0.3 0.3 1.2 dB
		Dnlink Frequency	11.9400 GHz	C/N Downlink	18.9 13.9 13.4 dB
GROUND		Tx Antenna Dia	0.63 meters	C/N Uplink	5.2 0.2 1.2 dB
SEGMENT		HPA Max Output Pwr	25.0 Watts	C/N Downlink	18.9 13.9 13.4 dB
DATA		Tx Antenna Gain	28.9 dBi	C/I Intermod (S/C)	39.9 38.9 39.9 dB
		Tx Pointing Losses	0.3 dB	C/I Uplink Adj Sat	6.0 5.0 6.0 dB
		Rx Antenna Dia	7.6 meters	COMPOSITE	
		Rx Antenna Effcy	65 %	LINK	
		Rx Antenna Gain	57.0 dBi	C/I Downlink Adj Sat	21.8 20.8 21.8 dB
		Rx Pointing Losses	0.4 dB	C/I Xpol	15.2 14.2 14.1 dB
		Pre LNA Losses	0.2 dB	C/I Adjacent Carrier	17.0 16.0 17.0 dB
		LNA Noise Temp	90 K	C/I co-freq beams	86.2 85.2 86.2 dB
		Ant,etc Temp	45 K	C/(Nu,d)	5.0 0.0 0.9 dB
		CI Sky Noise Temp	135 K	C/(Nu,d,ims/c)	5.0 0.0 0.9 dB
		Rx Clr Sky G/T	35.2 dB/K	C/(Nu,d,im,i)Total	2.0 -1.4 -0.5 dB
RAIN		Uplink Rain Attn	1.0 dB	LINK MARGIN	2.9 -0.5 0.4 dB
MARGINS		Dnlink Rain Attn	0.7 dB	Symbol Rate	512 512 512 ksps
		Up Fade Pwr Cntrl	0.0 dB	FEC Code Rate	1/2 1/2 1/2
		Target Link Availability E-E	97.7 %	MODEM	
				Minimum Ebi/No	2.1 2.1 2.1 dB
SITE		Tx E/S Location	AMC9 Los Angeles,CA US	10*log(Rbt/Noise BW)	0.0 0.0 0.0 dB
GEOGRAPHIC		Tx E/S Latitude	34.0 N	Minimum Req'd C/N	-0.9 -0.9 -0.9 dB
DATA		Tx E/S Longitude	-118.2 W		
		Tx E/S Elev Angle	35.6 deg		
		Rx E/S Location	AMC9 North Las Vegas, NV		
		Rx E/S Latitude	36.2 N	EARTH	
		Rx E/S Longitude	-115.1 W	STATION	
		Rx E/S Elev Angle	36.1 deg	HPA	
XPOL		S/C Isolation	36.0 dB	Tx Pointing Losses	0.3 dB
ISOLATION		Tx E/S Isolation	35.0 dB	Max Clear Sky EIRP towards S/C	36.9 dBW
DATA		Rx E/S Isolation	26.0 dB	RF Head Output BO (CI Sky)	1.9 dB
MISC		Uplink Free Sp Loss	207.1 dB		
LOSSES		Dnlink Free Sp Loss	205.6 dB	Calculated EIRP Desity Limit per link budget	12.8 dBW/4Hz
		Uplink Atmos Attn	0.3 dB	Calculated PSD Limit per link budget	-16.1 dBW/4Hz
		Dnlink Atmos Attn	0.2 dB	Co-ordination Offset	0.0 dBW/4Hz

9/9/2016

HughesNet LINK BUDGET

10:58 AM

Satellite: AMC 9 24K

0.63 m Remote Located in AMC9 Los Angeles,CA US

Crr EIRP Density = 13.7 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY					
				% Avail S/C Power Reqd/Crr	100.0 %				
				% Xponder Bandwidth Reqd/Crr	100.0 %				
				Clear Sky Link Margin	1.1 dB				
				Power Equivalent Bandwidth	36.0 MHz				
				EIRP at 53.0 dBW reference contour	52.5 dBw				
				LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
CARRIER	Carrier Info Rate	32250	Kbps	Satellite SFD	-92.0	-92.0	-92.0	dBW/m2	
	Net FEC Code Rate	0.600		Agg Input B.O.	3.0	3.0	3.0	dB	
	Transmit Symbol Rate	30000	Ksps	Input Backoff/Crr	3.0	3.0	3.0	dB	
CARRIER	CI Sky Reqd Es/No	2.5	dB	Crr Flux Density	-95.0	-95.0	-95.0	dBW/m2	
DATA	No of bits/symbol	2.0	Bits	UPLINK Gain of a Sq meter	44.7	44.7	44.7	dBi	
	Demod BT Product	1.00		BUDGET Uplink Path Losses	207.5	212.5	207.5	dB	
	Crr Noise Bandwidth	30000	KHz	Carrier Up EIRP	67.2	72.2	67.2	dBW	
	Carrier Spacing	36000	KHz	Satellite G/T	3.0	3.0	3.0	dB/K	
SATELLITE	Satellite	AMC 9 24K		C/N Uplink	18.6	18.6	18.6	dB	
	Location	-83.0 WL		EIRP Contour	50.5	50.5	50.5	dBW	
	EIRP Contour at Remote	50.5	dBW	Agg Output B.O.	0.5	0.5	0.5	dB	
	G/T Contour at Hub	3.0	dB/K	Output Backoff/Crr	0.5	0.5	0.5	dB	
	Attn Setting	9.0	dB	Carrier Dn EIRP	50.0	50.0	50.0	dBW	
SATELLITE	Xponder Gain	189.7	dB	DOWNLINK Dnlink Path Losses	206.0	206.0	206.3	dB	
DATA	SFD at Hub	-92.0	dBW/m2	BUDGET Rx Pointing Losses	0.2	0.2	0.2	dB	
	Xponder Bandwidth	36.0	MHz	CI Sky E/S G/T	9.3	9.3	9.3	dB/K	
	Agg Input BO	3.0	dB	Degradation in G/T	0.5	0.5	0.7	dB	
	Agg Output BO	0.5	dB	C/N Downlink	8.5	8.5	8.0	dB	
	Uplink Frequency	14.480	GHz	C/N Uplink	18.6	18.6	18.6	dB	
	Dnlink Frequency	12.180	GHz	C/N Downlink	8.5	8.5	8.0	dB	
GROUND	Tx Antenna Dia	7.6	meters	C/I Intermod (S/C)	99.0	99.0	99.0	dB	
	HPA Max Output Pwr	150.0	Watts	C/I Uplink Adj Sat	19.5	19.5	19.5	dB	
	Waveguide Losses	2.0	dB	C/I Dnlink Adj Sat	5.9	5.9	5.9	dB	
	Tx Antenna Gain	59.4	dBi	C/I Xpol	18.4	17.2	18.4	dB	
	Tx Pointing Losses	0.6	dB	C/I Intermod (E/S)	28.0	18.0	28.0	dB	
	Max EIRP Toward S/C	78.6	dB	C/(Nu,d)	8.1	8.1	7.7	dB	
GROUND	Rx Antenna Dia	0.63	meters	C/(Nu,d,ims/c)	8.1	8.1	7.7	dB	
SEGMENT	Rx Antenna Gain	29.2	dBi	C/(Nu,d,im,i)Total	3.6	3.4	3.4	dB	
DATA	Rx Pointing Losses	0.2	dB	LINK MARGIN	1.1	0.9	0.9	dB	
	Pre LNA Losses	0.8	dB	Modulation	QPSK	QPSK	QPSK		
	LNA Noise Temp	9	K	FEC Rate	3/5	3/5	3/5		
	Ant,etc Temp	28	K	Minimum Reqd Ebi/No	1.7	1.7	1.7	dB	
	CI Sky Noise Temp	37	K	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB	
	Rx Clr Sky G/T	9.3	dB/K	Minimum Reqd C/N	2.5	2.5	2.5	dB	
RAIN	Uplink Rain Attn	5.0	dB	E/S EIRP/Crr Reqd (CI Sky)	67.2 dBW				
MARGINS	Dnlink Rain Attn	0.2	dB	Tx Gain - Pointing Loss	58.8 dB				
	Up Fade Pwr Cntrl	5.0	dB	Waveguide Losses	2.0 dB				
	Target Link Availability E-E	97.71	%	Tx Power Reqd/Cxr (clear sky)	10.4 dBW				
				HPA	11.0 watts				
SITE	Tx E/S Location	AMC9 North Las Vegas, NV		Uplink Power Control	5.0 dB				
	Tx E/S Latitude	36.2 N		TX Power Reqd/Cxr (full UPC)	15.4 dBW				
	Tx E/S Longitude	-115.1 W			34.7 watts				
GEOGRAPHIC	Tx E/S Longitude	-115.1 W							
DATA	Tx E/S Elev Angle	36 deg		Dnlink EIRP Dens @ Beam Peak (53.0 dBW)	13.7 dBW/4KHz				
	Rx E/S Location	AMC9 Los Angeles,CA US							
	Rx E/S Latitude	34.0 N							
	Rx E/S Longitude	-118.2 W							
	Rx E/S Elev Angle	35.6 deg							
ISOLATION	S/C Isolation	36.0	dB						
DATA	Tx E/S Isolation	35.0	dB						
	Rx E/S Isolation	20.0	dB						
MISC	Uplink Free Sp Loss	207.3	dB						
LOSSES	Dnlink Free Sp Loss	205.8	dB						
	Uplink Atmos Attn	0.2	dB						
	Dnlink Atmos Attn	0.2	dB						

2-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET						
03:05 PM		Satellite: SatMex 7 Ku4 Return						
		0.63m Remote in SM7 Alberta,Canada		7.6m hub in SM7, Detroit				
BASELINE PARAMETERS			Value	Unit	SUMMARY			
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Req'd/Crr	0.52 %			
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	0.67 %			
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	7.5 dB			
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.28 MHz			
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	27.1 dBw			
	Demod BT Product	1.00		LINK PERFORMANCE				
	Carrier Bandwidth	256	kHz	CI Sky	Up Fade	Dn Fade	Unit	
	Crr Spacing Fctr	1.41	x Rs	Satellite SFD	-99.0	-99.0	-99.0 dBW/m2	
Carrier Spacing	360	kHz	Agg Input B.O.	5.3	5.3	5.3 dB		
SATELLITE DATA	Satellite	SatMex 7 Ku4 Return			Input Backoff/Crr	28.2	29.2	28.2 dB
	Location	-115.0 WL			Crr Flux Density	-127.2	-128.2	-127.2 dBW/m2
	Hub EIRP Contour	53.0 dBW			Gain of a Sq meter	44.7	44.7	44.7 dBi
	Remote G/T Contour	9.0 dB/K			UPLINK Uplink Path Losses	207.8	208.8	207.8 dB
	Attn Setting	13.0 dB			BUDGET Carrier Up EIRP	35.9	35.9	35.9 dBW
	Xponder Gain	198.5 dB			Satellite G/T	9.0	9.0	9.0 dB/K
	SFD at remote	-99.0 dBW/m2			C/N Uplink	15.3	10.6	11.6 dB
	Xponder Bandwidth	54.0 MHz			Saturation EIRP	53.0	53.0	53.0 dBW
GROUND SEGMENT DATA	Tx Antenna Dia	0.63 meters			Agg Output B.O.	3.5	3.5	3.5 dB
	HPA Max Output Pwr	13.7 Watts			Output Backoff/Crr	26.4	27.4	26.4 dB
	Tx Antenna Gain	29.2 dBi			Carrier Dn EIRP	26.6	25.6	26.6 dBW
	Tx Pointing Losses	0.3 dB			DOWNLINK Dnlink Path Losses	206.3	206.3	208.2 dB
	Rx Antenna Dia	7.6 meters			BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Rx Antenna Effcy	65 %			CI Sky E/S G/T	35.4	35.4	35.4 dB/K
	Rx Antenna Gain	57.2 dBi			Degradation in G/T	0.8	0.8	2.4 dB
	Rx Pointing Losses	0.4 dB			C/N Downlink	32.7	28.0	25.4 dB
RAIN MARGINS DATA	Pre LNA Losses	0.2 dB			C/N Uplink	15.3	10.6	11.6 dB
	LNA Noise Temp	90 K			C/N Downlink	32.7	28.0	25.4 dB
	Ant,etc Temp	45 K			C/I Intermod (S/C)	21.8	20.8	21.8 dB
	CI Sky Noise Temp	135 K			C/I Uplink Adj Sat	12.9	11.9	12.9 dB
	Rx Clr Sky G/T	35.4 dB/K			COMPOSITE C/I Downlink Adj Sat	35.9	34.9	35.9 dB
	Uplink Rain Attn	1.0 dB			LINK C/I Xpol	25.3	24.3	20.9 dB
	Dnlink Rain Attn	1.9 dB			C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Up Fade Pwr Cntrl	0.0 dB			C/I co-freq beams	97.9	96.9	97.9 dB
SITE GEOGRAPHIC DATA	Target Link Availability E-E	98.7 %			C/(Nu,d)	15.2	10.5	11.4 dB
	Tx E/S Location	SM7 Alberta,Canada			C/(Nu,d,ims/c)	14.4	10.2	11.1 dB
	Tx E/S Latitude	54.1 N			C/(Nu,d,im,i)Total	9.6	7.2	8.0 dB
	Tx E/S Longitude	-116.5 W			LINK MARGIN	7.5	5.1	5.9 dB
	Tx E/S Elev Angle	28.3 deg			MODEM Symbol Rate	256	256	256 ksps
	Rx E/S Location	SM7, Detroit			FEC Code Rate	1/2	1/2	1/2
	Rx E/S Latitude	42.3 N			Minimum Ebi/No	2.1	2.1	2.1 dB
	Rx E/S Longitude	-83.1 W			10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
ISOLATION DATA	Rx E/S Elev Angle	31.4 deg			Minimum Req'd C/N	2.1	2.1	2.1 dB
	S/C Isolation	36.0 dB			RF Head Max Output Power	10.9 Watts		
	Tx E/S Isolation	35.0 dB			Misc Feed Losses etc	3.8 dB		
	Rx E/S Isolation	26.0 dB			E/S EIRP Req'd twds S/C	dBW		
	Uplnk Free Sp Loss	207.4 dB			(Note: req'd to achieve link margin)			
	Dnlnk Free Sp Loss	205.9 dB			HPA Tx Pointing Losses	0.3 dB		
	Uplink Atmos Attn	0.3 dB			Max Clear Sky EIRP towards S/C	35.9 dBW		
	Dnlink Atmos Attn	0.4 dB			RF Head Output BO (CI Sky)	0.5 dB		
MISC LOSSES				Calculated EIRP Desity Limit per link budget	17.8 dBW/4Hz			
				Calculated PSD Limit per link budget	-11.3 dBW/4Hz			
				Co-ordination Offset	0.0 dBW/4Hz			

2-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET			
02:50 PM		Satellite: SatMex 7 Ku4 Return			
0.63m Remote in SM7 Alberta,Canada		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.94 %
				% Xponder Bandwidth Req'd/Crr	1.34 %
				Clear Sky Link Margin	10.3 dB
				Power Equivalent Bandwidth	0.51 MHz
				Contract EIRP at reference contour	29.7 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	256 Kbps	Satellite SFD	-99.0 -99.0 -99.0 dBW/m2
DATA		FEC Code Rate	0.500	Agg Input B.O.	5.3 5.3 5.3 dB
		Crr Symbol Rate	256 Ksps	Input Backoff/Crr	25.6 26.6 25.6 dB
		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-124.6 -125.6 -124.6 dBW/m2
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.7 44.7 44.7 dBi
		Demod BT Product	1.00	UPLINK	
		Spreading factor		Uplink Path Losses	207.8 208.8 207.8 dB
		Spread Bandwidth	512 kHz	BUDGET	
		Crr Spacing Fctr	1.41 x Rs	Carrier Up EIRP	38.5 38.5 38.5 dBW
		Carrier Spacing	720 kHz	Satellite G/T	9.0 9.0 9.0 dB/K
SATELLITE		Satellite	SatMex 7 Ku4 Return	C/N Uplink	14.9 10.2 11.2 dB
DATA		Location	-115.0 WL	Saturation EIRP	53.0 53.0 53.0 dBW
		Hub EIRP Contour	53.0 dBW	Agg Output B.O.	3.5 3.5 3.5 dB
		Remote G/T Contour	9.0 dB/K	Output Backoff/Crr	23.8 24.8 23.8 dB
		Attn Setting	13.0 dB	Carrier Dn EIRP	29.2 28.2 29.2 dBW
		Xponder Gain	198.5 dB	DOWNLINK	
		SFD at remote	-99.0 dBW/m2	Dnlink Path Losses	206.3 206.3 208.2 dB
		Xponder Bandwidth	54.0 MHz	BUDGET	
		Agg Input BO	5.3 dB	Rx Pointing Losses	0.4 0.4 0.4 dB
		Agg Output BO	3.5 dB	CI Sky E/S G/T	35.4 35.4 35.4 dB/K
		Uplink Frequency	14.5000 GHz	Degradation in G/T	0.8 0.8 2.4 dB
		Dnlink Frequency	12.2000 GHz	C/N Downlink	32.3 27.6 25.0 dB
GROUND		Tx Antenna Dia	0.63 meters	C/N Uplink	14.9 10.2 11.2 dB
SEGMENT		HPA Max Output Pwr	25.0 Watts	C/N Downlink	32.3 27.6 25.0 dB
DATA		Tx Antenna Gain	29.2 dBi	C/I Intermod (S/C)	21.4 20.4 21.4 dB
		Tx Pointing Losses	0.3 dB	C/I Uplink Adj Sat	12.9 11.9 12.9 dB
		Rx Antenna Dia	7.6 meters	COMPOSITE	
		Rx Antenna Effcy	65 %	C/I Downlink Adj Sat	35.5 34.5 35.5 dB
		Rx Antenna Gain	57.2 dBi	C/I Xpol	24.9 23.9 23.5 dB
		Rx Pointing Losses	0.4 dB	C/I Adjacent Carrier	17.0 16.0 17.0 dB
		Pre LNA Losses	0.2 dB	C/I co-freq beams	97.5 96.5 97.5 dB
		LNA Noise Temp	90 K	C/(Nu,d)	14.8 10.1 11.0 dB
		Ant,etc Temp	45 K	C/(Nu,d,ims/c)	14.0 9.8 10.7 dB
		CI Sky Noise Temp	135 K	C/(Nu,d,im,i)Total	9.4 7.0 7.9 dB
		Rx Clr Sky G/T	35.4 dB/K	LINK MARGIN	10.3 7.9 8.8 dB
RAIN		Uplink Rain Attn	1.0 dB	Symbol Rate	256 256 256 ksps
MARGINS		Dnlink Rain Attn	1.9 dB	FEC Code Rate	1/2 1/2 1/2
		Up Fade Pwr Cntrl	0.0 dB	MODEM	
		Target Link Availability E-E	98.7 %	Minimum Ebi/No	2.1 2.1 2.1 dB
SITE		Tx E/S Location	SM7 Alberta,Canada	10*log(Rbt/Noise BW)	0.0 0.0 0.0 dB
GEOGRAPHIC		Tx E/S Latitude	54.1 N	Minimum Req'd C/N	-0.9 -0.9 -0.9 dB
DATA		Tx E/S Longitude	-116.5 W		
		Tx E/S Elev Angle	28.3 deg	EARTH	
		Rx E/S Location	SM7, Detroit	RF Head Max Output Power	19.9 Watts
		Rx E/S Latitude	42.3 N	Misc Feed Losses etc	3.8 dB
		Rx E/S Longitude	-83.1 W	E/S EIRP Req'd twds S/C	dBW
		Rx E/S Elev Angle	31.4 deg	(Note: req'd to achieve link margin)	
XPOL		S/C Isolation	36.0 dB	HPA	
ISOLATION		Tx E/S Isolation	35.0 dB	Tx Pointing Losses	0.3 dB
DATA		Rx E/S Isolation	26.0 dB	Max Clear Sky EIRP towards S/C	38.5 dBW
		Uplink Free Sp Loss	207.4 dB	RF Head Output BO (CI Sky)	0.5 dB
MISC		Dnlink Free Sp Loss	205.9 dB		
LOSSES		Uplink Atmos Attn	0.3 dB	Calculated EIRP Desity Limit per link budget	17.4 dBW/4Hz
		Dnlink Atmos Attn	0.4 dB	Calculated PSD Limit per link budget	-11.7 dBW/4Hz
				Co-ordination Offset	0.0 dBW/4Hz

2-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			
02:51 PM		Satellite: SatMex 7 Ku4 Return			
0.63m Remote in SM7 Alberta,Canada		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	0.94 %
				% Xponder Bandwidth Reqd/Crr	1.34 %
				Clear Sky Link Margin	7.3 dB
				Power Equivalent Bandwidth	0.51 MHz
				Contract EIRP at reference contour	29.7 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	512	Kbps	Satellite SFD	-99.0
	FEC Code Rate	0.500		Agg Input B.O.	5.3
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	25.6
	CI Sky Reqd Ebi/No	2.1	dB	Crr Flux Density	-124.6
DATA	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.7
	Demod BT Product	1.00		Uplink Path Losses	207.8
	Carrier Bandwidth	512	kHz	Carrier Up EIRP	38.5
	Crr Spacing Fctr	1.41	x Rs	Satellite G/T	9.0
	Carrier Spacing	720	kHz	C/N Uplink	14.9
				Saturation EIRP	53.0
SATELLITE	Satellite	SatMex 7 Ku4 Return			
	Location	-115.0	WL	Agg Output B.O.	3.5
	Hub EIRP Contour	53.0	dBW	Output Backoff/Crr	23.8
	Remote G/T Contour	9.0	dB/K	Carrier Dn EIRP	29.2
	Attn Setting	13.0	dB	Dnlink Path Losses	206.3
	Xponder Gain	198.5	dB	Rx Pointing Losses	0.4
DATA	SFD at remote	-99.0	dBW/m2	CI Sky E/S G/T	35.4
	Xponder Bandwidth	54.0	MHz	Degradation in G/T	0.8
	Agg Input BO	5.3	dB	C/N Downlink	32.3
	Agg Output BO	3.5	dB	C/N Uplink	14.9
	Uplink Frequency	14.5000	GHz	C/N Downlink	32.3
	Dnlink Frequency	12.2000	GHz	C/I Intermod (S/C)	21.4
				C/I Uplink Adj Sat	12.9
GROUND	Tx Antenna Dia	0.63	meters	C/I Downlink Adj Sat	35.5
	HPA Max Output Pwr	25.0	Watts	C/I Xpol	24.9
				C/I Adjacent Carrier	17.0
	Tx Antenna Gain	29.2	dBi	C/I co-freq beams	97.5
	Tx Pointing Losses	0.3	dB	C/(Nu,d)	14.8
SEGMENT	Rx Antenna Dia	7.6	meters	C/(Nu,d,ims/c)	14.0
	Rx Antenna Effcy	65	%	C/(Nu,d,im,i)Total	9.4
DATA	Rx Antenna Gain	57.2	dBi	LINK MARGIN	7.3
	Rx Pointing Losses	0.4	dB	Symbol Rate	512
	Pre LNA Losses	0.2	dB	FEC Code Rate	1/2
	LNA Noise Temp	90	K	Minimum Ebi/No	2.1
	Ant,etc Temp	45	K	10*log(Rbt/Noise BW)	3.0
	CI Sky Noise Temp	135	K	Minimum Req'd C/N	2.1
				RF Head Max Output Power	19.9
	Rx Clr Sky G/T	35.4	dB/K	Misc Feed Losses etc	3.8
RAIN	Uplink Rain Attn	1.0	dB	E/S EIRP Req'd twds S/C	dBW
	Dnlink Rain Attn	1.9	dB	(Note: req'd to achieve link margin)	
MARGINS	Up Fade Pwr Cntrl	0.0	dB	Tx Pointing Losses	0.3
	Target Link Availability E-E	98.7	%	Max Clear Sky EIRP towards S/C	38.5
				RF Head Output BO (CI Sky)	0.5
SITE	Tx E/S Location	SM7 Alberta,Canada			
	Tx E/S Latitude	54.1	N	Calculated EIRP Desity Limit per link budget	17.4
	Tx E/S Longitude	-116.5	W	Calculated PSD Limit per link budget	-11.7
GEOGRAPHIC	Tx E/S Elev Angle	28.3	deg	Co-ordination Offset	0.0
DATA					
	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		
XPOL	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		

2-Nov-16		1024ksps R1/2 HN INROUTE LINK BUDGET			
02:55 PM		Satellite: SatMex 7 Ku4 Return			
		0.63m Remote in SM7 Alberta,Canada		7.6m hub in SM7, Detroit	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.94 %
				% Xponder Bandwidth Req'd/Crr	2.67 %
				Clear Sky Link Margin	5.9 dB
				Power Equivalent Bandwidth	0.51 MHz
				Contract EIRP at reference contour	29.7 dBw
CARRIER		Carrier Info Rate	1024 Kbps	LINK PERFORMANCE	
DATA		FEC Code Rate	0.500	CI Sky	Up Fade
		Crr Symbol Rate	1024 Ksps	Dn Fade	Unit
		CI Sky Req'd Ebi/No	2.1 dB	Satellite SFD	-99.0 -99.0 -99.0 dBW/m2
		No of bits/symbol	2.0 Bits	Agg Input B.O.	5.3 5.3 5.3 dB
		Demod BT Product	1.00	Input Backoff/Crr	25.6 26.6 25.6 dB
		Carrier Bandwidth	1024 kHz	Crr Flux Density	-124.6 -125.6 -124.6 dBW/m2
		Crr Spacing Fctr	1.41 x Rs	Gain of a Sq meter	44.7 44.7 44.7 dBi
		Carrier Spacing	1440 kHz	UPLINK	
SATELLITE		Satellite	SatMex 7 Ku4 Return	BUDGET	
DATA		Location	-115.0 WL	Uplink Path Losses	207.8 208.8 207.8 dB
		Hub EIRP Contour	53.0 dBW	Carrier Up EIRP	38.5 38.5 38.5 dBW
		Remote G/T Contour	9.0 dB/K	Satellite G/T	9.0 9.0 9.0 dB/K
		Attn Setting	13.0 dB	C/N Uplink	11.9 7.2 8.2 dB
		Xponder Gain	198.5 dB	Saturation EIRP	53.0 53.0 53.0 dBW
		SFD at remote	-99.0 dBW/m2	Agg Output B.O.	3.5 3.5 3.5 dB
		Xponder Bandwidth	54.0 MHz	Output Backoff/Crr	23.8 24.8 23.8 dB
		Agg Input BO	5.3 dB	Carrier Dn EIRP	29.2 28.2 29.2 dBW
		Agg Output BO	3.5 dB	DOWNLINK	
		Uplink Frequency	14.5000 GHz	BUDGET	
		Dnlink Frequency	12.2000 GHz	Dnlink Path Losses	206.3 206.3 208.2 dB
		Tx Antenna Dia	0.63 meters	Rx Pointing Losses	0.4 0.4 0.4 dB
		HPA Max Output Pwr	25.0 Watts	CI Sky E/S G/T	35.4 35.4 35.4 dB/K
		Tx Antenna Gain	29.2 dBi	Degradation in G/T	0.8 0.8 2.4 dB
		Tx Pointing Losses	0.3 dB	C/N Downlink	29.3 24.6 22.0 dB
GROUND		Rx Antenna Dia	7.6 meters	C/N Uplink	11.9 7.2 8.2 dB
SEGMENT		Rx Antenna Effcy	65 %	C/N Downlink	29.3 24.6 22.0 dB
DATA		Rx Antenna Gain	57.2 dBi	C/I Intermod (S/C)	18.4 17.4 18.4 dB
		Rx Pointing Losses	0.4 dB	C/I Uplink Adj Sat	12.9 11.9 12.9 dB
		Pre LNA Losses	0.2 dB	COMPOSITE	
		LNA Noise Temp	90 K	LINK	
		Ant,etc Temp	45 K	C/I Downlink Adj Sat	32.5 31.5 32.5 dB
		CI Sky Noise Temp	135 K	C/I Xpol	21.9 20.9 17.5 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	94.5 93.5 94.5 dB
RAIN		Dnlink Rain Attn	1.9 dB	C/(Nu,d)	11.8 7.1 8.0 dB
MARGINS		Up Fade Pwr Cntrl	0.0 dB	C/(Nu,d,ims/c)	11.0 6.7 7.7 dB
		Target Link Availability E-E	98.7 %	C/(Nu,d,im,i)Total	8.0 5.1 5.8 dB
		Tx E/S Location	SM7 Alberta,Canada	LINK MARGIN	5.9 3.0 3.7 dB
SITE		Tx E/S Latitude	54.1 N	Symbol Rate	1024 1024 1024 ksps
GEOGRAPHIC		Tx E/S Longitude	-116.5 W	FEC Code Rate	1/2 1/2 1/2
DATA		Tx E/S Elev Angle	28.3 deg	MODEM	
		Rx E/S Location	SM7, Detroit	Minimum Ebi/No	2.1 2.1 2.1 dB
		Rx E/S Latitude	42.3 N	10*log(Rbt/Noise BW)	3.0 3.0 3.0 dB
		Rx E/S Longitude	-83.1 W	Minimum Req'd C/N	2.1 2.1 2.1 dB
		Rx E/S Elev Angle	31.4 deg	EARTH	
XPOL		S/C Isolation	36.0 dB	STATION	
ISOLATION		Tx E/S Isolation	35.0 dB	HPA	
DATA		Rx E/S Isolation	26.0 dB	Tx Pointing Losses	0.3 dB
		Uplink Free Sp Loss	207.4 dB	Max Clear Sky EIRP towards S/C	38.5 dBW
MISC		Dnlink Free Sp Loss	205.9 dB	RF Head Output BO (CI Sky)	0.5 dB
LOSSES		Uplink Atmos Attn	0.3 dB	Calculated EIRP Desity Limit per link budget	14.4 dBW/4Hz
		Dnlink Atmos Attn	0.4 dB	Calculated PSD Limit per link budget	-14.7 dBW/4Hz
				Co-ordination Offset	0.0 dBW/4Hz

11/2/2016

HughesNet LINK BUDGET

2:56 PM

Satellite: SatMex 7 Ku4 Return

0.63 m Remote Located in SM7 Alberta,Canada

Crr EIRP Density = 9.7 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY			
				% Avail S/C Power Req/Crr		7.1	%
				% Xponder Bandwidth Req/Crr		7.0	%
				Clear Sky Link Margin		2.0	dB
				Power Equivalent Bandwidth		3.8	MHz
				EIRP at 53.5 dBW reference contour		38.5	dBW
				LINK PERFORMANCE			
				CI Sky	Up Fade	Dn Fade	Unit
CARRIER	Carrier Info Rate	3565	Kbps	Satellite SFD	-96.5	-96.5	-96.5 dBW/m2
	Net FEC Code Rate	0.600		Agg Input B.O.	5.3	5.3	5.3 dB
	Transmit Symbol Rate	3000	Ksps	Input Backoff/Crr	16.8	16.8	16.8 dB
CARRIER	CI Sky Req/Es/No	2.6	dB	Crr Flux Density	-113.3	-113.3	-113.3 dBW/m2
DATA	No of bits/symbol	2.0	Bits	UPLINK			
	Demod BT Product	1.00		BUDGET			
	Crr Noise Bandwidth	3000	KHz	Gain of a Sq meter	44.7	44.7	44.7 dBi
	Carrier Spacing	3750	KHz	Uplink Path Losses	207.9	212.9	207.9 dB
				Carrier Up EIRP	49.3	54.3	49.3 dBW
SATELLITE	Satellite	SatMex 7 Ku4 Return		Satellite G/T	6.5	6.5	6.5 dB/K
	Location	-115.0 WL		C/N Uplink	16.7	16.7	16.7 dB
	EIRP Contour at Remote	52.0 dBW		DOWNLINK			
	G/T Contour at Hub	6.5 dB/K		BUDGET			
	Attn Setting	13.0 dB		EIRP Contour	52.0	52.0	52.0 dBW
SATELLITE	Xponder Gain	195.0 dB		Agg Output B.O.	3.5	3.5	3.5 dB
DATA	SFD at Hub	-96.5 dBW/m2		Output Backoff/Crr	15.0	15.0	15.0 dB
	Xponder Bandwidth	54.0 MHz		Carrier Dn EIRP	36.7	36.7	36.7 dBW
	Agg Input BO	5.3 dB		Dnlink Path Losses	206.2	206.2	206.6 dB
	Agg Output BO	3.5 dB		BUDGET			
	Uplink Frequency	14.500 GHz		Rx Pointing Losses	0.2	0.2	0.2 dB
	Dnlink Frequency	12.200 GHz		CI Sky E/S G/T	9.4	9.4	9.4 dB/K
				Degradation in G/T	0.6	0.6	0.8 dB
GROUND	Tx Antenna Dia	7.6 meters		C/N Downlink	7.9	7.9	7.3 dB
	HPA Max Output Pwr	150.0 Watts		C/N Uplink	16.7	16.7	16.7 dB
	Waveguide Losses	2.0 dB		C/N Downlink	7.9	7.9	7.3 dB
	Tx Antenna Gain	59.4 dBi		C/I Intermod (S/C)	23.2	23.2	23.2 dB
	Tx Pointing Losses	0.6 dB		C/I Uplink Adj Sat	14.4	14.4	14.4 dB
	Max EIRP Toward S/C	78.6 dB		C/I Dnlink Adj Sat	9.7	9.7	9.7 dB
GROUND	Rx Antenna Dia	0.63 meters		C/I Xpol	18.4	17.2	18.4 dB
SEGMENT	Rx Antenna Gain	29.3 dBi		C/I Intermod (E/S)	28.0	18.0	28.0 dB
DATA	Rx Pointing Losses	0.2 dB		C/(Nu,d)	7.4	7.4	6.9 dB
	Pre LNA Losses	0.8 dB		C/(Nu,d,ims/c)	7.3	7.3	6.8 dB
	LNA Noise Temp	9 K		C/(Nu,d,im,i)Total	4.6	4.4	4.3 dB
	Ant,etc Temp	28 K		LINK MARGIN	2.0	1.7	1.7 dB
	CI Sky Noise Temp	37 K		Modulation	QPSK	QPSK	QPSK
	Rx Clr Sky G/T	9.4 dB/K		FEC Rate	3/5	3/5	3/5
RAIN	Uplink Rain Attn	5.0 dB		Minimum Req/Crr	1.8	1.8	1.8 dB
MARGINS	Dnlink Rain Attn	0.3 dB		MODEM			
	Up Fade Pwr Cntrl	5.0 dB		10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
	Target Link Availability E-E	98.70 %		Minimum Req/C/N	2.6	2.6	2.6 dB
				E/S EIRP/Crr Req (CI Sky)		49.3	dBW
SITE	Tx E/S Location	SM7, Detroit		Tx Gain - Pointing Loss		58.9	dB
	Tx E/S Latitude	42.3 N		Waveguide Losses		2.0	dB
	Tx E/S Longitude	-83.1 W		EARTH			
GEOGRAPHIC	Tx E/S Elev Angle	31 deg		STATION			
DATA	Rx E/S Location	SM7 Alberta,Canada		HPA		0.2	watts
	Rx E/S Latitude	54.1 N		Uplink Power Control		5.0	dB
	Rx E/S Longitude	-116.5 W		TX Power Req/Cxr (full UPC)		-2.5	dBW
	Rx E/S Elev Angle	28.3 deg				0.6	watts
XPOL	S/C Isolation	36.0 dB		Dnlink EIRP Dens @ Beam Peak (53.5 dBW)		9.7	dBW/4KHz
ISOLATION	Tx E/S Isolation	35.0 dB					
DATA	Rx E/S Isolation	20.0 dB					
	Uplink Free Sp Loss	207.4 dB					
MISC	Dnlink Free Sp Loss	205.9 dB					
LOSSES	Uplink Atmos Attn	0.6 dB					
	Dnlink Atmos Attn	0.3 dB					

2-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET			
03:09 PM		Satellite: SatMex 7 Ku4 Return			
		0.63m Remote in SM7 Nova Scotia, Canada		7.6m hub in SM7, Detroit	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.27 %
				% Xponder Bandwidth Req'd/Crr	0.67 %
				Clear Sky Link Margin	5.0 dB
				Power Equivalent Bandwidth	0.15 MHz
				Contract EIRP at reference contour	24.2 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	256 Kbps	Satellite SFD	-97.0 -97.0 -97.0 dBW/m2
		FEC Code Rate	0.500	Agg Input B.O.	5.3 5.3 5.3 dB
		Crr Symbol Rate	256 Ksps	Input Backoff/Crr	31.1 32.3 31.1 dB
DATA		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-128.1 -129.3 -128.1 dBW/m2
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.7 44.7 44.7 dBi
		Demod BT Product	1.00	UPLINK	
		Carrier Bandwidth	256 kHz	Uplink Path Losses	208.5 209.7 208.5 dB
		Crr Spacing Fctr	1.41 x Rs	BUDGET	
		Carrier Spacing	360 kHz	Carrier Up EIRP	35.7 35.7 35.7 dBW
				Satellite G/T	7.0 7.0 7.0 dB/K
SATELLITE		Satellite	SatMex 7 Ku4 Return	C/N Uplink	12.4 7.5 8.7 dB
DATA		Location	-115.0 WL		
		Hub EIRP Contour	53.0 dBW	Saturation EIRP	53.0 53.0 53.0 dBW
		Remote G/T Contour	7.0 dB/K	Agg Output B.O.	3.5 3.5 3.5 dB
		Attn Setting	13.0 dB	Output Backoff/Crr	29.3 30.5 29.3 dB
		Xponder Gain	196.5 dB	Carrier Dn EIRP	23.7 22.5 23.7 dBW
		SFD at remote	-97.0 dBW/m2	DOWNLINK	
		Xponder Bandwidth	54.0 MHz	Dnlink Path Losses	206.3 206.3 208.2 dB
		Agg Input BO	5.3 dB	BUDGET	
		Agg Output BO	3.5 dB	Rx Pointing Losses	0.4 0.4 0.4 dB
		Uplink Frequency	14.5000 GHz	CI Sky E/S G/T	35.4 35.4 35.4 dB/K
		Dnlink Frequency	12.2000 GHz	Degradation in G/T	0.8 0.8 2.4 dB
GROUND		Tx Antenna Dia	0.63 meters	C/N Downlink	29.8 24.9 22.5 dB
SEGMENT		HPA Max Output Pwr	15.0 Watts	C/N Uplink	12.4 7.5 8.7 dB
DATA		Tx Antenna Gain	29.2 dBi	C/N Downlink	29.8 24.9 22.5 dB
		Tx Pointing Losses	0.3 dB	C/I Intermod (S/C)	18.9 17.7 18.9 dB
		Rx Antenna Dia	7.6 meters	C/I Uplink Adj Sat	10.1 8.9 10.1 dB
		Rx Antenna Effcy	65 %	COMPOSITE	
		Rx Antenna Gain	57.2 dBi	C/I Downlink Adj Sat	32.7 31.5 32.7 dB
		Rx Pointing Losses	0.4 dB	LINK	
		Pre LNA Losses	0.2 dB	C/I Xpol	22.4 21.2 18.0 dB
		LNA Noise Temp	90 K	C/I Adjacent Carrier	17.0 15.8 17.0 dB
		Ant,etc Temp	45 K	C/I co-freq beams	95.1 93.8 95.1 dB
		CI Sky Noise Temp	135 K	C/(Nu,d)	12.4 7.4 8.6 dB
		Rx Clr Sky G/T	35.4 dB/K	C/(Nu,d,ims/c)	11.5 7.1 8.2 dB
RAIN		Uplink Rain Attn	1.2 dB	C/(Nu,d,im,i)Total	7.1 4.4 5.4 dB
MARGINS		Dnlink Rain Attn	1.9 dB	LINK MARGIN	5.0 2.3 3.3 dB
		Up Fade Pwr Cntrl	0.0 dB		
		Target Link Availability E-E	98.7 %	Symbol Rate	256 256 256 ksps
SITE		Tx E/S Location	SM7 Nova Scotia, Canada	FEC Code Rate	1/2 1/2 1/2
GEOGRAPHIC		Tx E/S Latitude	44.7 N	MODEM	
DATA		Tx E/S Longitude	-63.6 W	Minimum Ebi/No	2.1 2.1 2.1 dB
		Tx E/S Elev Angle	18.1 deg	10*log(Rbt/Noise BW)	3.0 3.0 3.0 dB
		Rx E/S Location	SM7, Detroit	Minimum Req'd C/N	2.1 2.1 2.1 dB
		Rx E/S Latitude	42.3 N		
		Rx E/S Longitude	-83.1 W	EARTH	
		Rx E/S Elev Angle	31.4 deg	RF Head Max Output Power	11.9 Watts
XPOL		S/C Isolation	36.0 dB	Misc Feed Losses etc	3.8 dB
ISOLATION		Tx E/S Isolation	35.0 dB	EARTH	
DATA		Rx E/S Isolation	26.0 dB	E/S EIRP Req'd twds S/C	47.3 dBW
				(Note: req'd to achieve link margin)	
		Uplink Free Sp Loss	207.7 dB	HPA	
MISC		Dnlink Free Sp Loss	205.9 dB	Tx Pointing Losses	0.3 dB
LOSSES		Uplink Atmos Attn	0.8 dB	Max Clear Sky EIRP towards S/C	35.7 dBW
		Dnlink Atmos Attn	0.4 dB	RF Head Output BO (CI Sky)	1.1 dB
				Calculated EIRP Density Limit per link budget	17.7 dBW/4Hz
				Calculated PSD Limit per link budget	-11.5 dBW/4Hz
				Co-ordination Offset	0.0 dBW/4Hz

2-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET			
03:12 PM		Satellite: SatMex 7 Ku4 Return			
		0.63m Remote in SM7 Nova Scotia, Canada		7.6m hub in SM7, Detroit	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.44 %
				% Xponder Bandwidth Req'd/Crr	1.34 %
				Clear Sky Link Margin	7.7 dB
				Power Equivalent Bandwidth	0.24 MHz
				Contract EIRP at reference contour	26.4 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	256 Kbps	Satellite SFD	-97.0
		FEC Code Rate	0.500	Agg Input B.O.	5.3
		Crr Symbol Rate	256 Ksps	Input Backoff/Crr	28.9
DATA		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-125.9
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.7
		Demod BT Product	1.00	UPLINK	
		Spreading factor		Uplink Path Losses	208.5
		Spread Bandwidth	512 kHz	BUDGET	
		Crr Spacing Fctr	1.41 x Rs	Carrier Up EIRP	37.9
		Carrier Spacing	720 kHz	Satellite G/T	7.0
SATELLITE		Satellite	SatMex 7 Ku4 Return	C/N Uplink	11.6
		Location	-115.0 WL	Saturation EIRP	53.0
		Hub EIRP Contour	53.0 dBW	Agg Output B.O.	3.5
		Remote G/T Contour	7.0 dB/K	Output Backoff/Crr	27.1
		Attn Setting	13.0 dB	Carrier Dn EIRP	25.9
DATA		Xponder Gain	196.5 dB	DOWNLINK	
		SFD at remote	-97.0 dBW/m2	Dnlink Path Losses	206.3
		Xponder Bandwidth	54.0 MHz	BUDGET	
		Agg Input BO	5.3 dB	Rx Pointing Losses	0.4
		Agg Output BO	3.5 dB	CI Sky E/S G/T	35.4
		Uplink Frequency	14.5000 GHz	Degradation in G/T	0.8
		Dnlink Frequency	12.2000 GHz	C/N Downlink	29.0
GROUND		Tx Antenna Dia	0.63 meters	C/N Uplink	11.6
		HPA Max Output Pwr	25.0 Watts	C/N Downlink	29.0
		Tx Antenna Gain	29.2 dBi	C/I Intermod (S/C)	18.1
SEGMENT		Tx Pointing Losses	0.3 dB	C/I Uplink Adj Sat	10.1
		Rx Antenna Dia	7.6 meters	COMPOSITE	
DATA		Rx Antenna Effcy	65 %	C/I Downlink Adj Sat	31.9
		Rx Antenna Gain	57.2 dBi	C/I Xpol	21.6
		Rx Pointing Losses	0.4 dB	C/I Adjacent Carrier	17.0
		Pre LNA Losses	0.2 dB	C/I co-freq beams	94.2
		LNA Noise Temp	90 K	C/(Nu,d)	11.6
		Ant,etc Temp	45 K	C/(Nu,d,ims/c)	10.7
		CI Sky Noise Temp	135 K	C/(Nu,d,im,i)Total	6.8
		Rx Clr Sky G/T	35.4 dB/K	LINK MARGIN	7.7
RAIN		Uplink Rain Attn	1.2 dB	Symbol Rate	256
		Dnlink Rain Attn	1.9 dB	FEC Code Rate	1/2
MARGINS		Up Fade Pwr Cntrl	0.0 dB	MODEM	
		Target Link Availability E-E	98.7 %	Minimum Ebi/No	2.1
				10*log(Rbt/Noise BW)	0.0
SITE		Tx E/S Location	SM7 Nova Scotia, Canada	Minimum Req'd C/N	-0.9
GEOGRAPHIC		Tx E/S Latitude	44.7 N		
DATA		Tx E/S Longitude	-63.6 W	EARTH	
		Tx E/S Elev Angle	18.1 deg	RF Head Max Output Power	19.9 Watts
		Rx E/S Location	SM7, Detroit	Misc Feed Losses etc	3.8 dB
		Rx E/S Latitude	42.3 N	E/S EIRP Req'd twds S/C	dBW
		Rx E/S Longitude	-83.1 W	(Note: req'd to achieve link margin)	
		Rx E/S Elev Angle	31.4 deg	HPA	
XPOL		S/C Isolation	36.0 dB	Tx Pointing Losses	0.3 dB
ISOLATION		Tx E/S Isolation	35.0 dB	Max Clear Sky EIRP towards S/C	37.9 dBW
DATA		Rx E/S Isolation	26.0 dB	RF Head Output BO (CI Sky)	1.1 dB
MISC		Uplink Free Sp Loss	207.7 dB		
LOSSES		Dnlink Free Sp Loss	205.9 dB	Calculated EIRP Density Limit per link budget	16.9 dBW/4Hz
		Uplink Atmos Attn	0.8 dB	Calculated PSD Limit per link budget	-12.3 dBW/4Hz
		Dnlink Atmos Attn	0.4 dB	Co-ordination Offset	0.0 dBW/4Hz

2-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			
03:28 PM		Satellite: SatMex 7 Ku4 Return			
0.63m Remote in SM7 Nova Scotia, Canada		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS		Value	Unit		
CARRIER DATA	Carrier Info Rate	512	Kbps		
	FEC Code Rate	0.500			
	Crr Symbol Rate	512	Ksps		
	CI Sky Reqd Ebi/No	2.1	dB		
	No of bits/symbol	2.0	Bits		
	Demod BT Product	1.00			
	Carrier Bandwidth	512	kHz		
	Crr Spacing Fctr	1.41	x Rs		
Carrier Spacing	720	kHz			
SATELLITE DATA	Satellite	SatMex 7 Ku4 Return			
	Location	-115.0	WL		
	Hub EIRP Contour	53.0	dBW		
	Remote G/T Contour	7.0	dB/K		
	Attn Setting	13.0	dB		
	Xponder Gain	196.5	dB		
	SFD at remote	-97.0	dBW/m2		
	Xponder Bandwidth	54.0	MHz		
	Agg Input BO	5.3	dB		
	Agg Output BO	3.5	dB		
GROUND SEGMENT DATA	Tx Antenna Dia	0.63	meters		
	HPA Max Output Pwr	25.0	Watts		
	Tx Antenna Gain	29.2	dBi		
	Tx Pointing Losses	0.3	dB		
	Rx Antenna Dia	7.6	meters		
	Rx Antenna Efficcy	65	%		
	Rx Antenna Gain	57.2	dBi		
	Rx Pointing Losses	0.4	dB		
	Pre LNA Losses	0.2	dB		
	LNA Noise Temp	90	K		
Ant,etc Temp	45	K			
CI Sky Noise Temp	135	K			
Rx Clr Sky G/T	35.4	dB/K			
RAIN MARGINS	Uplink Rain Attn	1.2	dB		
	Dnlink Rain Attn	1.9	dB		
	Up Fade Pwr Cntrl	0.0	dB		
	Target Link Availability E-E	98.7	%		
SITE GEOGRAPHIC DATA	Tx E/S Location	SM7 Nova Scotia, Canada			
	Tx E/S Latitude	44.7	N		
	Tx E/S Longitude	-63.6	W		
	Tx E/S Elev Angle	18.1	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			
XPOL ISOLATION DATA	S/C Isolation	36.0	dB		
	Tx E/S Isolation	35.0	dB		
	Rx E/S Isolation	26.0	dB		
MISC LOSSES	Uplink Free Sp Loss	207.7	dB		
	Dnlink Free Sp Loss	205.9	dB		
	Uplink Atmos Attn	0.8	dB		
Dnlink Atmos Attn	0.4	dB			

S U M M A R Y					
% Avail S/C Power Reqd/Crr		0.44		%	
% Xponder Bandwidth Reqd/Crr		1.34		%	
Clear Sky Link Margin		4.7		dB	
Power Equivalent Bandwidth		0.24		MHz	
Contract EIRP at reference contour		26.4		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	28.9	30.1	28.9	dB	
Crr Flux Density	-125.9	-127.1	-125.9	dBW/m2	
Gain of a Sq meter	44.7	44.7	44.7	dBi	
UPLINK	Uplink Path Losses	208.5	209.7	208.5	dB
BUDGET	Carrier Up EIRP	37.9	37.9	37.9	dBW
	Satellite G/T	7.0	7.0	7.0	dB/K
	C/N Uplink	11.6	6.7	7.9	dB
	Saturation EIRP	53.0	53.0	53.0	dBW
	Agg Output B.O.	3.5	3.5	3.5	dB
	Output Backoff/Crr	27.1	28.3	27.1	dB
	Carrier Dn EIRP	25.9	24.7	25.9	dBW
DOWNLINK	Dnlink Path Losses	206.3	206.3	208.2	dB
BUDGET	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	29.0	24.1	21.8	dB
	C/N Uplink	11.6	6.7	7.9	dB
	C/N Downlink	29.0	24.1	21.8	dB
	C/I Intermod (S/C)	18.1	16.9	18.1	dB
	C/I Uplink Adj Sat	10.1	8.9	10.1	dB
COMPOSITE	C/I Downlink Adj Sat	31.9	30.7	31.9	dB
LINK	C/I Xpol	21.6	20.4	17.2	dB
	C/I Adjacent Carrier	17.0	15.8	17.0	dB
	C/I co-freq beams	94.2	93.0	94.2	dB
	C/(Nu,d)	11.6	6.7	7.8	dB
	C/(Nu,d,ims/c)	10.7	6.3	7.4	dB
	C/(Nu,d,im,i)Total	6.8	4.0	4.9	dB
	LINK MARGIN	4.7	1.9	2.8	dB
	Symbol Rate	512	512	512	ksps
	FEC Code Rate	1/2	1/2	1/2	
MODEM	Minimum Ebi/No	2.1	2.1	2.1	dB
	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Minimum Req'd C/N	2.1	2.1	2.1	dB
EARTH STATION HPA	RF Head Max Output Power	19.9		Watts	
	Misc Feed Losses etc	3.8		dB	
	E/S EIRP Req'd twds S/C	47.9		dBW	
	(Note: req'd to achieve link margin)	0.3		dB	
	Tx Pointing Losses	37.9		dBW	
	Max Clear Sky EIRP towards S/C	1.1		dB	
	RF Head Output BO (CI Sky)	16.9		dBW/4Hz	
	Calculated PSD Limit per link budget	-12.3		dBW/4Hz	
	Co-ordination Offset	0.0		dBW/4Hz	

2-Nov-16		1024ksps R1/2 HN INROUTE LINK BUDGET			
03:27 PM		Satellite: SatMex 7 Ku4 Return			
0.63m Remote in SM7 Nova Scotia, Canada		7.6m hub in SM7, Detroit			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.44 %
				% Xponder Bandwidth Req'd/Crr	2.67 %
				Clear Sky Link Margin	3.1 dB
				Power Equivalent Bandwidth	0.24 MHz
				Contract EIRP at reference contour	26.4 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	1024	Kbps	Satellite SFD	-97.0
	FEC Code Rate	0.500		Agg Input B.O.	5.3
	Crr Symbol Rate	1024	Ksps	Input Backoff/Crr	28.9
DATA	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.9
	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.7
	Demod BT Product	1.00		Uplink Path Losses	208.5
	Carrier Bandwidth	1024	kHz	Carrier Up EIRP	37.9
	Crr Spacing Fctr	1.41	x Rs	Satellite G/T	7.0
	Carrier Spacing	1440	kHz	C/N Uplink	8.6
SATELLITE	Satellite	SatMex 7 Ku4 Return			
DATA	Location	-115.0	WL	Saturation EIRP	53.0
	Hub EIRP Contour	53.0	dBW	Agg Output B.O.	3.5
	Remote G/T Contour	7.0	dB/K	Output Backoff/Crr	27.1
	Attn Setting	13.0	dB	Carrier Dn EIRP	25.9
	Xponder Gain	196.5	dB	Dnlink Path Losses	206.3
	SFD at remote	-97.0	dBW/m2	Rx Pointing Losses	0.4
	Xponder Bandwidth	54.0	MHz	CI Sky E/S G/T	35.4
	Agg Input BO	5.3	dB	Degradation in G/T	0.8
	Agg Output BO	3.5	dB	C/N Downlink	26.0
	Uplink Frequency	14.5000	GHz	C/N Uplink	8.6
	Dnlink Frequency	12.2000	GHz	C/N Downlink	26.0
GROUND	Tx Antenna Dia	0.63	meters	C/I Intermod (S/C)	15.1
SEGMENT	HPA Max Output Pwr	25.0	Watts	C/I Uplink Adj Sat	10.1
DATA	Tx Antenna Gain	29.2	dBi	C/I Downlink Adj Sat	28.9
	Tx Pointing Losses	0.3	dB	C/I Xpol	18.6
	Rx Antenna Dia	7.6	meters	C/I Adjacent Carrier	17.0
	Rx Antenna Effcy	65	%	C/I co-freq beams	91.2
	Rx Antenna Gain	57.2	dBi	C/(Nu,d)	8.6
	Rx Pointing Losses	0.4	dB	C/(Nu,d,ims/c)	7.7
	Pre LNA Losses	0.2	dB	C/(Nu,d,im,i)Total	5.2
	LNA Noise Temp	90	K	LINK MARGIN	3.1
	Ant,etc Temp	45	K	Symbol Rate	1024
	CI Sky Noise Temp	135	K	FEC Code Rate	1/2
	Rx Clr Sky G/T	35.4	dB/K	Minimum Ebi/No	2.1
RAIN	Uplink Rain Attn	1.2	dB	10*log(Rbt/Noise BW)	3.0
MARGINS	Dnlink Rain Attn	1.9	dB	Minimum Req'd C/N	2.1
	Up Fade Pwr Cntrl	0.0	dB	RF Head Max Output Power	19.9
	Target Link Availability E-E	98.7	%	Misc Feed Losses etc	3.8
SITE	Tx E/S Location	SM7 Nova Scotia, Canada			
GEOGRAPHIC	Tx E/S Latitude	44.7 N			
DATA	Tx E/S Longitude	-63.6 W			
	Tx E/S Elev Angle	18.1 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			
ISOLATION	S/C Isolation	36.0	dB	E/S EIRP Req'd twds S/C	dBW
DATA	Tx E/S Isolation	35.0	dB	(Note: req'd to achieve link margin)	
	Rx E/S Isolation	26.0	dB	Tx Pointing Losses	0.3
	Uplink Free Sp Loss	207.7	dB	Max Clear Sky EIRP towards S/C	37.9
MISC	Dnlink Free Sp Loss	205.9	dB	RF Head Output BO (CI Sky)	1.1
LOSSES	Uplink Atmos Attn	0.8	dB	Calculated EIRP Desity Limit per link budget	13.9
	Dnlink Atmos Attn	0.4	dB	Calculated PSD Limit per link budget	-15.3
				Co-ordination Offset	0.0

11/2/2016

HughesNet LINK BUDGET

3:29 PM

Satellite: SatMex 7 Ku4 Return

0.63 m Remote Located in SM7 Nova Scotia, Canada

Crr EIRP Density = 9.7 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY				
				% Avail S/C Power Req'd/Crr		7.1	%	
				% Xponder Bandwidth Req'd/Crr		7.0	%	
				Clear Sky Link Margin		1.4	dB	
				Power Equivalent Bandwidth		3.8	MHz	
				EIRP at 53.5 dBW reference contour		38.5	dBW	
CARRIER				LINK PERFORMANCE				
	CI Sky Req'd Es/No	1.2	dB	CI Sky	Up Fade	Dn Fade	Unit	
DATA				Satellite SFD	-96.5	-96.5	-96.5	dBW/m2
	No of bits/symbol	2.0	Bits	Agg Input B.O.	5.3	5.3	5.3	dB
	Demod BT Product	1.00		Input Backoff/Crr	16.8	16.8	16.8	dB
	Crr Noise Bandwidth	3000	KHz	Crr Flux Density	-113.3	-113.3	-113.3	dBW/m2
	Carrier Spacing	3750	KHz	UPLINK				
Satellite		SatMex 7 Ku4 Return		BUDGET				
Location		-115.0 WL		Gain of a Sq meter	44.7	44.7	44.7	dBi
EIRP Contour at Remote		53.0 dBW		Uplink Path Losses	207.9	212.9	207.9	dB
G/T Contour at Hub		6.5 dB/K		Carrier Up EIRP	49.3	54.3	49.3	dBW
Attn Setting		13.0 dB		Satellite G/T	6.5	6.5	6.5	dB/K
Xponder Gain		196.0 dB		C/N Uplink	16.7	16.7	16.7	dB
SATELLITE				EIRP Contour	53.0	53.0	53.0	dBW
DATA				Agg Output B.O.	3.5	3.5	3.5	dB
	SFD at Hub	-96.5 dBW/m2		Output Backoff/Crr	15.0	15.0	15.0	dB
	Xponder Bandwidth	54.0 MHz		Carrier Dn EIRP	37.7	37.7	37.7	dBW
	Agg Input BO	5.3 dB		DOWNLINK				
	Agg Output BO	3.5 dB		BUDGET				
	Uplink Frequency	14.500 GHz		Dnlink Path Losses	206.8	206.8	207.7	dB
	Dnlink Frequency	12.200 GHz		Rx Pointing Losses	0.2	0.2	0.2	dB
Tx Antenna Dia		7.6 meters		CI Sky E/S G/T	9.4	9.4	9.4	dB/K
HPA Max Output Pwr		150.0 Watts		Degradation in G/T	1.5	1.5	1.9	dB
Waveguide Losses		2.0 dB		C/N Downlink	7.4	7.4	6.1	dB
Tx Antenna Gain		59.4 dBi		C/N Uplink	16.7	16.7	16.7	dB
Tx Pointing Losses		0.6 dB		C/N Downlink	7.4	7.4	6.1	dB
Max EIRP Toward S/C		78.6 dB		C/I Intermod (S/C)	23.2	23.2	23.2	dB
GROUND				C/I Uplink Adj Sat	14.1	14.1	14.1	dB
SEGMENT				COMPOSITE				
DATA				LINK				
	Rx Antenna Dia	0.63 meters		C/I Dnlink Adj Sat	5.4	5.4	5.4	dB
	Rx Antenna Gain	29.3 dBi		C/I Xpol	18.4	17.2	18.3	dB
	Rx Pointing Losses	0.2 dB		C/I Intermod (E/S)	28.0	18.0	28.0	dB
	Pre LNA Losses	0.8 dB		C/(Nu,d)	6.9	6.9	5.7	dB
	LNA Noise Temp	9 K		C/(Nu,d,ims/c)	6.8	6.8	5.7	dB
	Ant,etc Temp	28 K		C/(Nu,d,im,i)Total	2.6	2.4	2.1	dB
	CI Sky Noise Temp	37 K		LINK MARGIN	1.4	1.2	0.9	dB
	Rx Clr Sky G/T	9.4 dB/K		Modulation	QPSK	QPSK	QPSK	
Uplink Rain Attn		5.0 dB		FEC Rate	1/2	1/2	1/2	
RAIN				Minimum Req'd Ebi/No	1.2	1.2	1.2	dB
Dnlink Rain Attn		0.9 dB		MODEM				
MARGINS				10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Up Fade Pwr Cntrl	5.0 dB		Minimum Req'd C/N	1.2	1.2	1.2	dB
	Target Link Availability E-E	98.70 %		E/S EIRP/Crr Req'd (CI Sky)		49.3	dBW	
Tx E/S Location		SM7, Detroit		Tx Gain - Pointing Loss		58.9	dB	
Tx E/S Latitude		42.3 N		Waveguide Losses		2.0	dB	
Tx E/S Longitude		-83.1 W		EARTH				
Tx E/S Elev Angle		31 deg		STATION				
GEOGRAPHIC				HPA				
DATA				Uplink Power Control		5.0	dB	
	Rx E/S Location	SM7 Nova Scotia, Canada		TX Power Req'd/Cxr (full UPC)		-2.5	dBW	
	Rx E/S Latitude	44.7 N				0.6	watts	
	Rx E/S Longitude	-63.6 W		Dnlink EIRP Dens @ Beam Peak (53.5 dBW)		9.7	dBW/4KHz	
	Rx E/S Elev Angle	18.1 deg						
XPOL								
ISOLATION								
DATA								
	S/C Isolation	36.0 dB						
	Tx E/S Isolation	35.0 dB						
	Rx E/S Isolation	20.0 dB						
MISC								
LOSSES								
	Uplink Free Sp Loss	207.4 dB						
	Dnlink Free Sp Loss	206.2 dB						
	Uplink Atmos Attn	0.6 dB						
	Dnlink Atmos Attn	0.7 dB						

4-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET			Satellite: IS 29e Ku Uplink						
01:28 PM		0.63m Remote in IS29e Mt Vernon, Ohio			7.6m hub in IS29e, USA, Germantown, Maryland						
BASELINE PARAMETERS				Value	Unit	S U M M A R Y					
CARRIER	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr	0.34	%					
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr	0.65	%					
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	2.3	dB					
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.19	MHz					
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	21.4	dBw					
	Demod BT Product	1.00		LINK PERFORMANCE				CI Sky	Up Fade	Dn Fade	Unit
	Carrier Bandwidth	256	kHz	Satellite SFD	-96.8	-96.8	-96.8	dBW/m2			
SATELLITE	Satellite	IS 29e Ku Uplink	Location	301.0	EL	Agg Input B.O.	6.0	6.0	6.0	dB	
	Hub EIRP Contour	48.1	dBW	Remote G/T Contour	1.8	dB/K	Input Backoff/Crr	30.7	31.7	30.7	dB
	Attn Setting	5.0	dB	Xponder Gain	192.3	dB	Crr Flux Density	-127.5	-128.5	-127.5	dBW/m2
	Xponder Gain	192.3	dB	SFD at remote	-96.8	dBW/m2	Gain of a Sq meter	44.4	44.4	44.4	dBi
	SFD at remote	-96.8	dBW/m2	Xponder Bandwidth	56.2	MHz	Uplink Path Losses	207.3	208.3	207.3	dB
	Xponder Bandwidth	56.2	MHz	Agg Input BO	6.0	dB	Carrier Up EIRP	35.4	35.4	35.4	dBW
	Agg Input BO	6.0	dB	Agg Output BO	3.0	dB	Satellite G/T	1.8	1.8	1.8	dB/K
	Agg Output BO	3.0	dB	Uplink Frequency	14.0000	GHz	C/N Uplink				
	Uplink Frequency	14.0000	GHz	Dnlink Frequency	11.7000	GHz	9.4	3.4	4.4	dB	
	Dnlink Frequency	11.7000	GHz	Tx Antenna Dia	0.63	meters	DOWNLINK				
GROUND	Rx Antenna Dia	7.6	meters	HPA Max Output Pwr	14.5	Watts	Saturation EIRP	48.1	48.1	48.1	dBW
	Rx Antenna Effcy	65	%	Tx Antenna Gain	28.8	dBi	Agg Output B.O.	3.0	3.0	3.0	dB
	Rx Antenna Gain	56.9	dBi	Tx Pointing Losses	0.3	dB	Output Backoff/Crr	27.7	28.7	27.7	dB
	Rx Pointing Losses	0.4	dB	Rx Antenna Dia	7.6	meters	Carrier Dn EIRP	20.4	19.4	20.4	dBW
	Pre LNA Losses	0.2	dB	Rx Antenna Effcy	65	%	Dnlink Path Losses	205.7	205.7	207.4	dB
	LNA Noise Temp	90	K	Rx Antenna Gain	56.9	dBi	Rx Pointing Losses	0.4	0.4	0.4	dB
	Ant,etc Temp	45	K	Rx Pointing Losses	0.4	dB	CI Sky E/S G/T	35.0	35.0	35.0	dB/K
	Ant,etc Temp	45	K	Pre LNA Losses	0.2	dB	Degradation in G/T	0.6	0.6	2.3	dB
	CI Sky Noise Temp	135	K	LNA Noise Temp	90	K	C/N Downlink				
	Rx Clr Sky G/T	35.0	dB/K	LNA Noise Temp	90	K	28.2	22.2	19.8	dB	
RAIN	Uplink Rain Attn	1.0	dB	Ant,etc Temp	45	K	C/N Uplink	9.4	3.4	4.4	dB
	Dnlink Rain Attn	1.7	dB	CI Sky Noise Temp	135	K	C/N Downlink	28.2	22.2	19.8	dB
	Up Fade Pwr Cntrl	0.0	dB	Rx Clr Sky G/T	35.0	dB/K	C/I Intermod (S/C)	21.2	20.2	21.2	dB
	Target Link Availability E-E	98.7	%	Uplink Free Sp Loss	207.0	dB	C/I Uplink Adj Sat	6.5	5.5	6.5	dB
MARGINS	Uplink Free Sp Loss	207.0	dB	Uplink Rain Attn	1.0	dB	C/I Downlink Adj Sat	33.2	32.2	33.2	dB
	Dnlink Free Sp Loss	205.3	dB	Dnlink Rain Attn	1.7	dB	C/I Xpol	99.0	98.0	99.0	dB
	Uplink Atmos Attn	0.4	dB	Target Link Availability E-E	98.7	%	C/I Adjacent Carrier	17.0	16.0	17.0	dB
	Dnlink Atmos Attn	0.4	dB	Tx E/S Location	IS29e Mt Vernon, Ohio		C/I co-freq beams	96.2	95.2	96.2	dB
SITE	Tx E/S Location	IS29e Mt Vernon, Ohio	Tx E/S Latitude	40.4	N	COMPOSITE LINK					
	Tx E/S Latitude	40.4	N	Tx E/S Longitude	-82.5	W	C/(Nu,d)	9.3	3.3	4.3	dB
	Tx E/S Longitude	-82.5	W	Tx E/S Elev Angle	37.4	deg	C/(Nu,d,ims/c)	9.1	3.2	4.2	dB
	Tx E/S Elev Angle	37.4	deg	Rx E/S Location	IS29e, USA, Germantown, Maryland		C/(Nu,d,im,i)Total	4.4	1.1	2.0	dB
GEOGRAPHIC	Rx E/S Location	IS29e, USA, Germantown, Maryland	Rx E/S Latitude	38.9	N	LINK MARGIN	2.3	-1.0	-0.1	dB	
	Rx E/S Latitude	38.9	N	Rx E/S Longitude	-76.5	W	Symbol Rate	256	256	256	ksps
	Rx E/S Longitude	-76.5	W	Rx E/S Elev Angle	41.4	deg	FEC Code Rate	1/2	1/2	1/2	
	Rx E/S Elev Angle	41.4	deg	Uplink Free Sp Loss	207.0	dB	Minimum Ebi/No	2.1	2.1	2.1	dB
ISOLATION	S/C Isolation	99.0	dB	Uplink Free Sp Loss	207.0	dB	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Tx E/S Isolation	35.0	dB	Dnlink Free Sp Loss	205.3	dB	Minimum Req'd C/N	2.1	2.1	2.1	dB
	Rx E/S Isolation	26.0	dB	Uplink Atmos Attn	0.4	dB	EARTH STATION				
LOSSES	Rx E/S Isolation	26.0	dB	Dnlink Atmos Attn	0.4	dB	RF Head Max Output Power	11.5	Watts		
	Uplink Free Sp Loss	207.0	dB	Uplink Atmos Attn	0.4	dB	Misc Feed Losses etc	3.8	dB		
	Dnlink Free Sp Loss	205.3	dB	Dnlink Atmos Attn	0.4	dB	E/S EIRP Req'd twds S/C		dBW		
MISC	Uplink Free Sp Loss	207.0	dB	Uplink Atmos Attn	0.4	dB	(Note: req'd to achieve link margin)				
	Dnlink Free Sp Loss	205.3	dB	Dnlink Atmos Attn	0.4	dB	Tx Pointing Losses	0.3	dB		
	Uplink Atmos Attn	0.4	dB	Dnlink Atmos Attn	0.4	dB	Max Clear Sky EIRP towards S/C	35.4	dBW		
LOSSES	Uplink Atmos Attn	0.4	dB	Uplink Atmos Attn	0.4	dB	RF Head Output BO (CI Sky)	0.9	dB		
	Dnlink Atmos Attn	0.4	dB	Dnlink Atmos Attn	0.4	dB	HPA				
	Dnlink Atmos Attn	0.4	dB	Dnlink Atmos Attn	0.4	dB	Calculated EIRP Density Limit per link budget	17.4	dBW/4Hz		
LOSSES	Uplink Atmos Attn	0.4	dB	Uplink Atmos Attn	0.4	dB	Calculated PSD Limit per link budget	-11.5	dBW/4Hz		
	Dnlink Atmos Attn	0.4	dB	Dnlink Atmos Attn	0.4	dB	Co-ordination Offset	0.0	dBW/4Hz		
	Dnlink Atmos Attn	0.4	dB	Dnlink Atmos Attn	0.4	dB					

4-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET								
01:33 PM		Satellite: IS 29e Ku Uplink								
		0.63m Remote in IS29e Mt Vernon, Ohio		7.6m hub in IS29e, USA, Germantown, Maryland						
BASELINE PARAMETERS		Value	Unit	S U M M A R Y						
				% Avail S/C Power Req'd/Crr	0.58 %					
				% Xponder Bandwidth Req'd/Crr	1.29 %					
				Clear Sky Link Margin	2.1 dB					
				Power Equivalent Bandwidth	0.33 MHz					
				Contract EIRP at reference contour	23.7 dBw					
				LINK PERFORMANCE						
				CI Sky	Up Fade					
				Dn Fade	Unit					
CARRIER DATA	Carrier Info Rate	256	Kbps	Satellite SFD	-96.8	-96.8	-96.8	dBW/m2		
	FEC Code Rate	0.500		Agg Input B.O.	6.0	6.0	6.0	dB		
	Crr Symbol Rate	256	Ksps	Input Backoff/Crr	28.4	29.4	28.4	dB		
	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.2	-126.2	-125.2	dBW/m2		
	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.4	44.4	44.4	dBi		
	Demod BT Product	1.00		Uplink Path Losses	207.3	208.3	207.3	dB		
	Spreading factor			Carrier Up EIRP	37.8	37.8	37.8	dBW		
	Spread Bandwidth	512	kHz	Satellite G/T	1.8	1.8	1.8	dB/K		
	Crr Spacing Fctr	1.41	x Rs							
Carrier Spacing	720	kHz								
SATELLITE DATA	Satellite	IS 29e Ku Uplink			C/N Uplink		5.8	2.8	3.8	dB
	Location	301.0 EL			Saturation EIRP		48.1	48.1	48.1	dBW
	Hub EIRP Contour	48.1 dBW			Agg Output B.O.		3.0	3.0	3.0	dB
	Remote G/T Contour	1.8 dB/K			Output Backoff/Crr		25.4	26.4	25.4	dB
	Attn Setting	5.0 dB			Carrier Dn EIRP		22.7	21.7	22.7	dBW
	Xponder Gain	192.3 dB			Dnlink Path Losses		205.7	205.7	207.4	dB
	SFD at remote	-96.8 dBW/m2			Rx Pointing Losses		0.4	0.4	0.4	dB
	Xponder Bandwidth	56.2 MHz			CI Sky E/S G/T		35.0	35.0	35.0	dB/K
	Agg Input BO	6.0 dB			Degradation in G/T		0.6	0.6	2.3	dB
Agg Output BO	3.0 dB			C/N Downlink		24.5	21.5	19.2	dB	
Uplink Frequency	14.0000 GHz			C/N Uplink		5.8	2.8	3.8	dB	
Dnlink Frequency	11.7000 GHz			C/N Downlink		24.5	21.5	19.2	dB	
GROUND SEGMENT DATA	Tx Antenna Dia	0.63 meters			C/I Intermod (S/C)		17.5	16.5	17.5	dB
	HPA Max Output Pwr	25.0 Watts			C/I Uplink Adj Sat		3.5	2.5	3.5	dB
	Tx Antenna Gain	28.8 dBi			C/I Downlink Adj Sat		29.5	28.5	29.5	dB
	Tx Pointing Losses	0.3 dB			C/I Xpol		99.0	98.0	99.0	dB
RAIN MARGINS DATA	Rx Antenna Dia	7.6 meters			C/I Adjacent Carrier		17.0	16.0	17.0	dB
	Rx Antenna Effcy	65 %			C/I co-freq beams		95.5	94.5	95.5	dB
	Rx Antenna Gain	56.9 dBi			C/(Nu,d)		5.7	2.7	3.6	dB
	Rx Pointing Losses	0.4 dB			C/(Nu,d,ims/c)		5.4	2.5	3.5	dB
	Pre LNA Losses	0.2 dB			C/(Nu,d,im,i)Total		1.2	-0.6	0.4	dB
	LNA Noise Temp	90 K			LINK MARGIN		2.1	0.3	1.3	dB
	Ant,etc Temp	45 K			Symbol Rate		256	256	256	ksps
	CI Sky Noise Temp	135 K			FEC Code Rate		1/2	1/2	1/2	
	Rx Clr Sky G/T	35.0 dB/K			Minimum Ebi/No		2.1	2.1	2.1	dB
SITE GEOGRAPHIC DATA	Uplink Rain Attn	1.0 dB			10*log(Rbt/Noise BW)		0.0	0.0	0.0	dB
	Dnlink Rain Attn	1.7 dB			Minimum Req'd C/N		-0.9	-0.9	-0.9	dB
	Up Fade Pwr Cntrl	0.0 dB			RF Head Max Output Power		19.9 Watts			
	Target Link Availability E-E	98.7 %			Misc Feed Losses etc		3.8 dB			
XPOL ISOLATION DATA	Tx E/S Location	IS29e Mt Vernon, Ohio			E/S EIRP Req'd twds S/C		39.8 dBW			
	Tx E/S Latitude	40.4 N			(Note: req'd to achieve link margin)					
	Tx E/S Longitude	-82.5 W			Tx Pointing Losses		0.3 dB			
	Tx E/S Elev Angle	37.4 deg			Max Clear Sky EIRP towards S/C		37.8 dBW			
MISC LOSSES	Rx E/S Location	IS29e, USA, Germantown, Maryland			RF Head Output BO (CI Sky)		0.9 dB			
	Rx E/S Latitude	38.9 N			Calculated EIRP Desity Limit per link budget		16.7 dBW/4Hz			
	Rx E/S Longitude	-76.5 W			Calculated PSD Limit per link budget		-12.1 dBW/4Hz			
	Rx E/S Elev Angle	41.4 deg			Co-ordination Offset		0.0 dBW/4Hz			
MODEM	S/C Isolation	99.0 dB								
	Tx E/S Isolation	35.0 dB								
	Rx E/S Isolation	26.0 dB								
	Uplink Free Sp Loss	207.0 dB								
EARTH STATION HPA	Dnlink Free Sp Loss	205.3 dB								
	Uplink Atmos Attn	0.4 dB								
	Dnlink Atmos Attn	0.4 dB								

4-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			
01:34 PM		Satellite: IS 29e Ku Uplink			
		0.63m Remote in IS29e Mt Vernon, Ohio		7.6m hub in IS29e, USA, Germantown, Maryland	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.58 %
				% Xponder Bandwidth Req'd/Crr	1.29 %
				Clear Sky Link Margin	2.0 dB
				Power Equivalent Bandwidth	0.33 MHz
				Contract EIRP at reference contour	23.7 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	512	Kbps	Satellite SFD	-96.8
	FEC Code Rate	0.500		Agg Input B.O.	6.0
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	28.4
	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.2
DATA	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.4
	Demod BT Product	1.00		Uplink Path Losses	207.3
	Carrier Bandwidth	512	kHz	Carrier Up EIRP	37.8
	Crr Spacing Fctr	1.41	x Rs	Satellite G/T	1.8
	Carrier Spacing	720	kHz	C/N Uplink	8.8
SATELLITE	Satellite	IS 29e Ku Uplink		UPLINK	
	Location	301.0 EL		BUDGET	
	Hub EIRP Contour	48.1 dBW		Saturation EIRP	48.1
	Remote G/T Contour	1.8 dB/K		Agg Output B.O.	3.0
	Attn Setting	5.0 dB		Output Backoff/Crr	25.4
	Xponder Gain	192.3 dB		Carrier Dn EIRP	22.7
DATA	SFD at remote	-96.8 dBW/m2		Dnlink Path Losses	205.7
	Xponder Bandwidth	56.2 MHz		Rx Pointing Losses	0.4
	Agg Input BO	6.0 dB		CI Sky E/S G/T	35.0
	Agg Output BO	3.0 dB		Degradation in G/T	0.6
	Uplink Frequency	14.0000 GHz		C/N Downlink	27.5
	Dnlink Frequency	11.7000 GHz		C/N Uplink	8.8
	Tx Antenna Dia	0.63 meters		C/N Downlink	27.5
	HPA Max Output Pwr	25.0 Watts		C/I Intermod (S/C)	20.5
	Tx Antenna Gain	28.8 dBi		C/I Uplink Adj Sat	6.5
	Tx Pointing Losses	0.3 dB		C/I Downlink Adj Sat	32.5
GROUND	Rx Antenna Dia	7.6 meters		C/I Xpol	99.0
SEGMENT	Rx Antenna Effcy	65 %		C/I Adjacent Carrier	17.0
DATA	Rx Antenna Gain	56.9 dBi		C/I co-freq beams	95.5
	Rx Pointing Losses	0.4 dB		C/(Nu,d)	8.7
	Pre LNA Losses	0.2 dB		C/(Nu,d,ims/c)	8.4
	LNA Noise Temp	90 K		C/(Nu,d,im,i)Total	4.1
	Ant,etc Temp	45 K		LINK MARGIN	2.0
	CI Sky Noise Temp	135 K		Symbol Rate	512
	Rx Clr Sky G/T	35.0 dB/K		FEC Code Rate	1/2
	Uplink Rain Attn	1.0 dB		Minimum Ebi/No	2.1
RAIN	Dnlink Rain Attn	1.7 dB		10*log(Rbt/Noise BW)	3.0
MARGINS	Up Fade Pwr Cntrl	0.0 dB		Minimum Req'd C/N	2.1
	Target Link Availability E-E	98.7 %		RF Head Max Output Power	19.9 Watts
	Tx E/S Location	IS29e Mt Vernon, Ohio		Misc Feed Losses etc	3.8 dB
	Tx E/S Latitude	40.4 N		E/S EIRP Req'd twds S/C	42.9 dBW
	Tx E/S Longitude	-82.5 W		(Note: req'd to achieve link margin)	
	Tx E/S Elev Angle	37.4 deg		Tx Pointing Losses	0.3 dB
SITE	Rx E/S Location	IS29e, USA, Germantown, Maryland		Max Clear Sky EIRP towards S/C	37.8 dBW
GEOGRAPHIC	Rx E/S Latitude	38.9 N		RF Head Output BO (CI Sky)	0.9 dB
DATA	Rx E/S Longitude	-76.5 W			
	Rx E/S Elev Angle	41.4 deg			
	S/C Isolation	99.0 dB			
ISOLATION	Tx E/S Isolation	35.0 dB			
DATA	Rx E/S Isolation	26.0 dB			
	Uplink Free Sp Loss	207.0 dB			
MISC	Dnlink Free Sp Loss	205.3 dB		Calculated EIRP Desity Limit per link budget	16.7 dBW/4Hz
LOSSES	Uplink Atmos Attn	0.4 dB		Calculated PSD Limit per link budget	-12.1 dBW/4Hz
	Dnlink Atmos Attn	0.4 dB		Co-ordination Offset	0.0 dBW/4Hz

4-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			
01:38 PM		Satellite: IS 29e Ku Uplink			
		0.63m Remote in IS29e Mt Vernon, Ohio		7.6m hub in IS29e, USA, Germantown, Maryland	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.58 %
				% Xponder Bandwidth Req'd/Crr	2.57 %
				Clear Sky Link Margin	2.7 dB
				Power Equivalent Bandwidth	0.33 MHz
				Contract EIRP at reference contour	23.7 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	512	Kbps	Satellite SFD	-96.8
	FEC Code Rate	0.500		Agg Input B.O.	6.0
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	28.4
DATA	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.2
	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.4
	Demod BT Product	1.00		Uplink Path Losses	207.3
	Spreading factor			Carrier Up EIRP	37.8
	Spread Bandwidth	1024	kHz	Satellite G/T	1.8
	Crr Spacing Fctr	1.41	x Rs	C/N Uplink	4.7
	Carrier Spacing	1440	kHz		-0.3
SATELLITE	Satellite	IS 29e Ku Uplink		Saturation EIRP	48.1
	Location	301.0 EL		Agg Output B.O.	3.0
	Hub EIRP Contour	48.1 dBW		Output Backoff/Crr	25.4
	Remote G/T Contour	1.8 dB/K		Carrier Dn EIRP	22.7
	Attn Setting	5.0 dB		Dnlink Path Losses	205.7
DATA	Xponder Gain	192.3 dB		Rx Pointing Losses	0.4
	SFD at remote	-96.8 dBW/m2		CI Sky E/S G/T	35.0
	Xponder Bandwidth	56.2 MHz		Degradation in G/T	0.6
	Agg Input BO	6.0 dB		C/N Downlink	23.5
	Agg Output BO	3.0 dB			18.5
	Uplink Frequency	14.0000 GHz		C/N Uplink	4.7
	Dnlink Frequency	11.7000 GHz		C/N Downlink	23.5
GROUND	Tx Antenna Dia	0.63 meters		C/I Intermod (S/C)	16.5
	HPA Max Output Pwr	25.0 Watts		C/I Uplink Adj Sat	5.5
				C/I Downlink Adj Sat	28.5
SEGMENT	Tx Antenna Gain	28.8 dBi		C/I Xpol	99.0
	Tx Pointing Losses	0.3 dB		C/I Adjacent Carrier	17.0
DATA	Rx Antenna Dia	7.6 meters		C/I co-freq beams	92.5
	Rx Antenna Effcy	65 %		C/(Nu,d)	4.7
	Rx Antenna Gain	56.9 dBi		C/(Nu,d,ims/c)	4.4
	Rx Pointing Losses	0.4 dB		C/(Nu,d,im,i)Total	1.8
	Pre LNA Losses	0.2 dB		LINK MARGIN	2.7
	LNA Noise Temp	90 K			-0.8
	Ant,etc Temp	45 K		Symbol Rate	512
	CI Sky Noise Temp	135 K		FEC Code Rate	1/2
				Minimum Ebi/No	2.1
	Rx Clr Sky G/T	35.0 dB/K		10*log(Rbt/Noise BW)	0.0
RAIN	Uplink Rain Attn	1.0 dB		Minimum Req'd C/N	-0.9
	Dnlink Rain Attn	1.7 dB			-0.9
MARGINS	Up Fade Pwr Cntrl	0.0 dB		RF Head Max Output Power	19.9 Watts
	Target Link Availability E-E	98.7 %		Misc Feed Losses etc	3.8 dB
				E/S EIRP Req'd twds S/C	40.9 dBW
SITE	Tx E/S Location	IS29e Mt Vernon, Ohio		(Note: req'd to achieve link margin)	
	Tx E/S Latitude	40.4 N		Tx Pointing Losses	0.3 dB
	Tx E/S Longitude	-82.5 W		Max Clear Sky EIRP towards S/C	37.8 dBW
GEOGRAPHIC	Tx E/S Longitude	-82.5 W			
DATA	Tx E/S Elev Angle	37.4 deg		RF Head Output BO (CI Sky)	0.9 dB
	Rx E/S Location	IS29e, USA, Germantown, Maryland			
	Rx E/S Latitude	38.9 N			
	Rx E/S Longitude	-76.5 W			
	Rx E/S Elev Angle	41.4 deg			
ISOLATION	S/C Isolation	99.0 dB			
	Tx E/S Isolation	35.0 dB			
DATA	Rx E/S Isolation	26.0 dB			
MISC	Uplink Free Sp Loss	207.0 dB		Calculated EIRP Density Limit per link budget	13.7 dBW/4Hz
	Dnlink Free Sp Loss	205.3 dB		Calculated PSD Limit per link budget	-15.1 dBW/4Hz
LOSSES	Uplink Atmos Attn	0.4 dB		Co-ordination Offset	0.0 dBW/4Hz
	Dnlink Atmos Attn	0.4 dB			

4-Nov-16		1024ksps R1/2 HN INROUTE LINK BUDGET			
01:36 PM		Satellite: IS 29e Ku Uplink			
		0.63m Remote in IS29e Mt Vernon, Ohio		7.6m hub in IS29e, USA, Germantown, Maryland	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.58 %
				% Xponder Bandwidth Req'd/Crr	2.57 %
				Clear Sky Link Margin	0.6 dB
				Power Equivalent Bandwidth	0.33 MHz
				Contract EIRP at reference contour	23.7 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	1024	Kbps	Satellite SFD	-96.8
	FEC Code Rate	0.500		Agg Input B.O.	6.0
	Crr Symbol Rate	1024	Ksps	Input Backoff/Crr	28.4
	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.2
DATA	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.4
	Demod BT Product	1.00		Uplink Path Losses	207.3
	Carrier Bandwidth	1024	kHz	Carrier Up EIRP	37.8
	Crr Spacing Fctr	1.41	x Rs	Satellite G/T	1.8
	Carrier Spacing	1440	kHz	C/N Uplink	5.7
					-0.3
					0.7
SATELLITE	Satellite	IS 29e Ku Uplink		UPLINK	
	Location	301.0 EL		BUDGET	
	Hub EIRP Contour	48.1 dBW		Saturation EIRP	48.1
	Remote G/T Contour	1.8 dB/K		Agg Output B.O.	3.0
	Attn Setting	5.0 dB		Output Backoff/Crr	25.4
	Xponder Gain	192.3 dB		Carrier Dn EIRP	22.7
DATA	SFD at remote	-96.8 dBW/m2		Dnlink Path Losses	205.7
	Xponder Bandwidth	56.2 MHz		Rx Pointing Losses	0.4
	Agg Input BO	6.0 dB		CI Sky E/S G/T	35.0
	Agg Output BO	3.0 dB		Degradation in G/T	0.6
	Uplink Frequency	14.0000 GHz		C/N Downlink	24.5
	Dnlink Frequency	11.7000 GHz			18.5
					16.2
					17.5
					6.5
					29.5
					99.0
					17.0
					92.5
					5.7
					5.4
					2.7
					0.6
					-3.6
					-2.6
					1024
					1/2
					1/2
					2.1
					2.1
					2.1
					3.0
					3.0
					3.0
					2.1
					2.1
					2.1
					19.9
					3.8
					dBW
					0.3
					37.8
					dBW
					0.9
					dB
					207.0
					205.3
					0.4
					0.4
					13.7
					-15.1
					0.0

11/4/2016

HughesNet LINK BUDGET

1:39 PM

Satellite: IS 29e Ku Downlink

0.63 m Remote Located in IS29e Mt Vernon, Ohio

Crr EIRP Density = 7.9 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY					
				% Avail S/C Power Req/Crr				38.0 %	
				% Xponder Bandwidth Req/Crr				34.8 %	
				Clear Sky Link Margin				1.3 dB	
				Power Equivalent Bandwidth				13.7 MHz	
				EIRP at 49.1 dBW reference contour				41.9 dBW	
				LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
CARRIER	Carrier Info Rate	9889	Kbps	Satellite SFD	-90.8	-90.8	-90.8	dBW/m2	
	Net FEC Code Rate	0.500		Agg Input B.O.	6.0	6.0	6.0	dB	
	Transmit Symbol Rate	10000	Ksps	Input Backoff/Crr	10.2	10.2	10.2	dB	
CARRIER	CI Sky Req/Es/No	1.2	dB	Crr Flux Density	-101.0	-101.0	-101.0	dBW/m2	
DATA	No of bits/symbol	2.0	Bits	UPLINK					
	Demod BT Product	1.00		BUDGET					
	Crr Noise Bandwidth	10000	KHz	Gain of a Sq meter	44.4	44.4	44.4	dBi	
	Carrier Spacing	12500	KHz	Uplink Path Losses	207.4	212.4	207.4	dB	
SATELLITE	Satellite	IS 29e Ku Downlink		Carrier Up EIRP	61.4	66.4	61.4	dBW	
	Location	301.0 EL		Satellite G/T	1.8	1.8	1.8	dB/K	
	EIRP Contour at Remote	48.0 dBW		C/N Uplink	18.4	18.4	18.4	dB	
	G/T Contour at Hub	1.8 dB/K		DOWNLINK					
	Attn Setting	9.0 dB		BUDGET					
	Xponder Gain	186.2 dB		EIRP Contour	48.0	48.0	48.0	dBW	
DATA	SFD at Hub	-90.8 dBW/m2		Agg Output B.O.	3.0	3.0	3.0	dB	
	Xponder Bandwidth	36.0 MHz		Output Backoff/Crr	7.2	7.2	7.2	dB	
	Agg Input BO	6.0 dB		Carrier Dn EIRP	40.5	40.5	40.5	dBW	
	Agg Output BO	3.0 dB		Dnlink Path Losses	205.7	205.7	206.2	dB	
	Uplink Frequency	14.000 GHz		Rx Pointing Losses	0.2	0.2	0.2	dB	
	Dnlink Frequency	11.700 GHz		CI Sky E/S G/T	9.1	9.1	9.1	dB/K	
				Degradation in G/T	0.8	0.8	1.2	dB	
GROUND	Tx Antenna Dia	7.6 meters		C/N Downlink	5.5	5.5	4.5	dB	
	HPA Max Output Pwr	150.0 Watts		C/N Uplink	18.4	18.4	18.4	dB	
	Waveguide Losses	2.0 dB		C/N Downlink	5.5	5.5	4.5	dB	
	Tx Antenna Gain	59.1 dBi		C/I Intermod (S/C)	24.2	24.2	24.2	dB	
	Tx Pointing Losses	0.6 dB		C/I Uplink Adj Sat	20.4	20.4	20.4	dB	
	Max EIRP Toward S/C	78.3 dB		C/I Dnlink Adj Sat	6.0	6.0	6.0	dB	
SEGMENT	Rx Antenna Dia	0.63 meters		C/I co-freq beams	24.4	24.4	24.4	dB	
DATA				C/I Intermod (E/S)	28.0	18.0	28.0	dB	
	Rx Antenna Gain	29.0 dBi		C/(Nu,d)	5.3	5.3	4.3	dB	
	Rx Pointing Losses	0.2 dB		C/(Nu,d,ims/c)	5.2	5.2	4.3	dB	
	Pre LNA Losses	0.8 dB		C/(Nu,d,im,i)Total	2.5	2.4	2.0	dB	
	LNA Noise Temp	9 K		LINK MARGIN	1.3	1.2	0.8	dB	
	Ant,etc Temp	28 K		Modulation	QPSK	QPSK	QPSK		
	CI Sky Noise Temp	37 K		FEC Rate	1/2	1/2	1/2		
	Rx Clr Sky G/T	9.1 dB/K		Minimum Req/ Ebi/No	1.2	1.2	1.2	dB	
RAIN	Uplink Rain Attn	5.0 dB		MODEM					
	Dnlink Rain Attn	0.5 dB		10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB	
MARGINS	Up Fade Pwr Cntrl	5.0 dB		Minimum Req/ C/N	1.2	1.2	1.2	dB	
	Target Link Availability E-E	98.70 %		E/S EIRP/Crr Req/ (CI Sky)				61.4 dBW	
				Tx Gain - Pointing Loss				58.5 dB	
SITE	Tx E/S Location	IS29e, USA, Germantown, Mar		Waveguide Losses				2.0 dB	
	Tx E/S Latitude	38.9 N		EARTH					
	Tx E/S Longitude	-76.5 W		STATION					
GEOGRAPHIC	Tx E/S Longitude	-76.5 W		HPA					
DATA	Tx E/S Elev Angle	41 deg		Uplink Power Control				5.0 dB	
	Rx E/S Location	IS29e Mt Vernon, Ohio		TX Power Req/ Cxr (full UPC)				9.8 dBW	
	Rx E/S Latitude	40.4 N						9.6 watts	
	Rx E/S Longitude	-82.5 W							
	Rx E/S Elev Angle	37.4 deg							
XPOL	S/C Isolation	99.0 dB							
ISOLATION	Tx E/S Isolation	35.0 dB							
DATA	Rx E/S Isolation	20.0 dB							
	Uplink Free Sp Loss	206.9 dB							
MISC	Dnlink Free Sp Loss	205.4 dB							
LOSSES	Uplink Atmos Attn	0.5 dB							
	Dnlink Atmos Attn	0.3 dB							
				Dnlink EIRP Dens @ Beam Peak (49.1 dBW)				7.9 dBW/4KHz	

4-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET		Satellite: IS 29e Ku Uplink		
01:49 PM		0.63m Remote in IS29e Los Angeles, CA		7.6m hub in IS29e, USA, Germantown, Maryland		
BASELINE PARAMETERS				S U M M A R Y		
	Value	Unit				
CARRIER	Carrier Info Rate	256	Kbps	% Avail S/C Power Req'd/Crr	0.23	%
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	0.65	%
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	1.0	dB
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.13	MHz
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	19.7	dBw
	Demod BT Product	1.00				
	Carrier Bandwidth	256	kHz			
SATELLITE	Satellite	IS 29e Ku Uplink				
	Location	301.0	EL			
	Hub EIRP Contour	48.1	dBW			
	Remote G/T Contour	0.8	dB/K			
	Attn Setting	5.0	dB			
	Xponder Gain	191.3	dB			
	SFD at remote	-95.8	dBW/m2			
GROUND	Tx Antenna Dia	0.63	meters			
	HPA Max Output Pwr	25.0	Watts			
	Tx Antenna Gain	28.8	dBi			
	Tx Pointing Losses	0.3	dB			
	Rx Antenna Dia	7.6	meters			
	Rx Antenna Effcy	65	%			
	Rx Antenna Gain	56.9	dBi			
SEGMENT	Rx Pointing Losses	0.4	dB			
	Pre LNA Losses	0.2	dB			
	LNA Noise Temp	90	K			
	Ant,etc Temp	45	K			
	CI Sky Noise Temp	135	K			
	Rx Clr Sky G/T	35.0	dB/K			
	Uplink Rain Attn	1.0	dB			
RAIN	Dnlink Rain Attn	1.7	dB			
	Up Fade Pwr Cntrl	0.0	dB			
	Target Link Availability E-E	98.7	%			
SITE	Tx E/S Location	IS29e Los Angeles, CA				
	Tx E/S Latitude	34.1	N			
	Tx E/S Longitude	-118.3	W			
	Tx E/S Elev Angle	16.7	deg			
	Rx E/S Location	IS29e, USA, Germantown, Maryland				
	Rx E/S Latitude	38.9	N			
	Rx E/S Longitude	-76.5	W			
GEOGRAPHIC	Rx E/S Elev Angle	41.4	deg			
	S/C Isolation	99.0	dB			
	Tx E/S Isolation	35.0	dB			
	Rx E/S Isolation	26.0	dB			
	Uplink Free Sp Loss	207.4	dB			
	Dnlink Free Sp Loss	205.3	dB			
	Uplink Atmos Attn	0.6	dB			
MISC	Dnlink Atmos Attn	0.4	dB			
				LINK PERFORMANCE		
				CI Sky	Up Fade	Dn Fade
				Unit		
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8
				C/N Uplink	9.7	1.7
				Satellite SFD	-95.8	-95.8
				Agg Input B.O.	6.0	6.0
				Input Backoff/Crr	32.4	33.4
				Crr Flux Density	-128.2	-129.2
				Gain of a Sq meter	44.4	44.4
				Uplink Path Losses	208.0	209.0
				Carrier Up EIRP	35.4	35.4
				Satellite G/T	0.8	0.8

4-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET					
01:53 PM		Satellite: IS 29e Ku Uplink					
		0.63m Remote in IS29e Los Angeles, CA		7.6m hub in IS29e, USA, Germantown, Maryland			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y			
				% Avail S/C Power Req'd/Crr	0.23 %		
				% Xponder Bandwidth Req'd/Crr	1.29 %		
				Clear Sky Link Margin	3.1 dB		
				Power Equivalent Bandwidth	0.13 MHz		
				Contract EIRP at reference contour	19.7 dBw		
				LINK PERFORMANCE			
				CI Sky	Up Fade	Dn Fade	Unit
				Satellite SFD	-95.8	-95.8	-95.8 dBW/m2
				Agg Input B.O.	6.0	6.0	6.0 dB
				Input Backoff/Crr	32.4	33.4	32.4 dB
				Crr Flux Density	-128.2	-129.2	-128.2 dBW/m2
				Gain of a Sq meter	44.4	44.4	44.4 dBi
				UPLINK Uplink Path Losses	208.0	209.0	208.0 dB
				BUDGET Carrier Up EIRP	35.4	35.4	35.4 dBW
				Satellite G/T	0.8	0.8	0.8 dB/K
				C/N Uplink	6.7	-1.3	-0.3 dB
				Satellite	IS 29e Ku Uplink		
				Location	301.0 EL		
				Hub EIRP Contour	48.1 dBW		
				Remote G/T Contour	0.8 dB/K		
				Attn Setting	5.0 dB		
				SATELLITE Xponder Gain	191.3 dB		
				DATA SFD at remote	-95.8 dBW/m2		
				Xponder Bandwidth	56.2 MHz		
				Agg Input BO	6.0 dB		
				Agg Output BO	3.0 dB		
				Uplink Frequency	14.0000 GHz		
				Dnlink Frequency	11.7000 GHz		
				Tx Antenna Dia	0.63 meters		
				HPA Max Output Pwr	25.0 Watts		
				Tx Antenna Gain	28.8 dBi		
				Tx Pointing Losses	0.3 dB		
				GROUND Rx Antenna Dia	7.6 meters		
				SEGMENT Rx Antenna Effcy	65 %		
				DATA Rx Antenna Gain	56.9 dBi		
				Rx Pointing Losses	0.4 dB		
				Pre LNA Losses	0.2 dB		
				LNA Noise Temp	90 K		
				Ant,etc Temp	45 K		
				CI Sky Noise Temp	135 K		
				Rx Clr Sky G/T	35.0 dB/K		
				RAIN Uplink Rain Attn	1.0 dB		
				Dnlink Rain Attn	1.7 dB		
				MARGINS Up Fade Pwr Cntrl	0.0 dB		
				Target Link Availability E-E	98.7 %		
				Tx E/S Location	IS29e Los Angeles, CA		
				Tx E/S Latitude	34.1 N		
				SITE Tx E/S Longitude	-118.3 W		
				GEOGRAPHIC Tx E/S Elev Angle	16.7 deg		
				DATA Rx E/S Location	IS29e, USA, Germantown, Maryland		
				Rx E/S Latitude	38.9 N		
				Rx E/S Longitude	-76.5 W		
				Rx E/S Elev Angle	41.4 deg		
				XPOL S/C Isolation	99.0 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	205.3 dB		
				LOSSES Uplink Atmos Attn	0.6 dB		
				Dnlink Atmos Attn	0.4 dB		
				EARTH STATION HPA			
				RF Head Max Output Power	19.9 Watts		
				Misc Feed Losses etc	3.8 dB		
				E/S EIRP Req'd twds S/C			
				(Note: req'd to achieve link margin)			
				Tx Pointing Losses	0.3 dB		
				Max Clear Sky EIRP towards S/C	35.4 dBW		
				RF Head Output BO (CI Sky)	3.4 dB		
				Calculated EIRP Density Limit per link budget	14.3 dBW/4Hz		
				Calculated PSD Limit per link budget	-14.6 dBW/4Hz		
				Co-ordination Offset	0.0 dBW/4Hz		

4-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET						
01:54 PM		Satellite: IS 29e Ku Uplink						
		0.63m Remote in IS29e Los Angeles, CA		7.6m hub in IS29e, USA, Germantown, Maryland				
BASELINE PARAMETERS		Value	Unit	S U M M A R Y				
				% Avail S/C Power Req'd/Crr	0.23 %			
				% Xponder Bandwidth Req'd/Crr	1.29 %			
				Clear Sky Link Margin	0.1 dB			
				Power Equivalent Bandwidth	0.13 MHz			
				Contract EIRP at reference contour	19.7 dBw			
				LINK PERFORMANCE				
				CI Sky	Up Fade	Dn Fade	Unit	
				Satellite SFD	-95.8	-95.8	-95.8 dBW/m2	
				Agg Input B.O.	6.0	6.0	6.0 dB	
				Input Backoff/Crr	32.4	33.4	32.4 dB	
				Crr Flux Density	-128.2	-129.2	-128.2 dBW/m2	
				Gain of a Sq meter	44.4	44.4	44.4 dBi	
CARRIER	CI Sky Req'd Ebi/No	2.1	dB	UPLINK	Uplink Path Losses	208.0	209.0	208.0 dB
DATA	No of bits/symbol	2.0	Bits	BUDGET	Carrier Up EIRP	35.4	35.4	35.4 dBW
	Demod BT Product	1.00			Satellite G/T	0.8	0.8	0.8 dB/K
	Carrier Bandwidth	512	kHz		C/N Uplink	6.7	-1.3	-0.3 dB
	Crr Spacing Fctr	1.41	x Rs		Saturation EIRP	48.1	48.1	48.1 dBW
	Carrier Spacing	720	kHz		Agg Output B.O.	3.0	3.0	3.0 dB
	Satellite	IS 29e Ku Uplink			Output Backoff/Crr	29.4	30.4	29.4 dB
	Location	301.0 EL			Carrier Dn EIRP	18.7	17.7	18.7 dBW
	Hub EIRP Contour	48.1 dBW		UPLINK	Dnlink Path Losses	205.7	205.7	207.4 dB
	Remote G/T Contour	0.8 dB/K		BUDGET	Rx Pointing Losses	0.4	0.4	0.4 dB
	Attn Setting	5.0 dB			CI Sky E/S G/T	35.0	35.0	35.0 dB/K
SATELLITE	Xponder Gain	191.3 dB			Degradation in G/T	0.6	0.6	2.3 dB
DATA	SFD at remote	-95.8 dBW/m2			C/N Downlink	25.5	17.5	15.1 dB
	Xponder Bandwidth	56.2 MHz			C/N Uplink	6.7	-1.3	-0.3 dB
	Agg Input BO	6.0 dB			C/N Downlink	25.5	17.5	15.1 dB
	Agg Output BO	3.0 dB			C/I Intermod (S/C)	18.5	17.5	18.5 dB
	Uplink Frequency	14.0000 GHz			C/I Uplink Adj Sat	4.5	3.5	4.5 dB
	Dnlink Frequency	11.7000 GHz		DOWNLINK	C/I Downlink Adj Sat	29.9	28.9	29.9 dB
	Tx Antenna Dia	0.63 meters		BUDGET	C/I Xpol	99.0	98.0	99.0 dB
	HPA Max Output Pwr	25.0 Watts			C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Tx Antenna Gain	28.8 dBi			C/I co-freq beams	91.5	90.5	91.5 dB
	Tx Pointing Losses	0.3 dB			C/(Nu,d)	6.6	-1.4	-0.4 dB
GROUND	Rx Antenna Dia	7.6 meters			C/(Nu,d,ims/c)	6.4	-1.4	-0.5 dB
SEGMENT	Rx Antenna Effcy	65 %			C/(Nu,d,im,i)Total	2.2	-2.7	-1.7 dB
DATA	Rx Antenna Gain	56.9 dBi		COMPOSITE	LINK MARGIN	0.1	-4.8	-3.8 dB
	Rx Pointing Losses	0.4 dB		LINK	Symbol Rate	512	512	512 ksps
	Pre LNA Losses	0.2 dB			FEC Code Rate	1/2	1/2	1/2
	LNA Noise Temp	90 K			Minimum Ebi/No	2.1	2.1	2.1 dB
	Ant,etc Temp	45 K			10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
	CI Sky Noise Temp	135 K			Minimum Req'd C/N	2.1	2.1	2.1 dB
	Rx Clr Sky G/T	35.0 dB/K			RF Head Max Output Power	19.9 Watts		
	Uplink Rain Attn	1.0 dB			Misc Feed Losses etc	3.8 dB		
RAIN	Dnlink Rain Attn	1.7 dB			E/S EIRP Req'd twds S/C	dBW		
MARGINS	Up Fade Pwr Cntrl	0.0 dB			(Note: req'd to achieve link margin)			
	Target Link Availability E-E	98.7 %			HPA	Tx Pointing Losses	0.3 dB	
	Tx E/S Location	IS29e Los Angeles, CA		MODEM	Max Clear Sky EIRP towards S/C	35.4 dBW		
	Tx E/S Latitude	34.1 N			RF Head Output BO (CI Sky)	3.4 dB		
	Tx E/S Longitude	-118.3 W			Calculated EIRP Desity Limit per link budget	14.3 dBW/4Hz		
SITE	Tx E/S Elev Angle	16.7 deg			Calculated PSD Limit per link budget	-14.6 dBW/4Hz		
GEOGRAPHIC	Rx E/S Location	IS29e, USA, Germantown, Maryland			Co-ordination Offset	0.0 dBW/4Hz		
DATA	Rx E/S Latitude	38.9 N		EARTH				
	Rx E/S Longitude	-76.5 W		STATION				
	Rx E/S Elev Angle	41.4 deg		HPA				
	S/C Isolation	99.0 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	205.3 dB						
LOSSES	Uplink Atmos Attn	0.6 dB						
	Dnlink Atmos Attn	0.4 dB						

11-Nov-16		256ksps R1/2 HN INROUTE LINK BUDGET		Satellite: IS 29e K02 uplink		
01:57 PM		0.63m Remote in IS29e Beam K02 Mt Vernon, Ohio		7.6m hub in IS29e Beam K02, USA, Germantown, Maryland		
BASELINE PARAMETERS				S U M M A R Y		
	Value	Unit				
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr	0.27	%
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr	1.28	%
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin	10.0	dB
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.15	MHz
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	33.8	dBw
	Demod BT Product	1.00		LINK PERFORMANCE		
	Spreading factor			CI Sky	Up Fade	Dn Fade
	Spread Bandwidth	512	kHz			Unit
	Crr Spacing Fctr	1.41	x Rs	Satellite SFD	-92.2	-92.2
	Carrier Spacing	720	kHz	Agg Input B.O.	7.0	7.0
SATELLITE DATA	Satellite	IS 29e K02 uplink		Input Backoff/Crr	32.7	33.7
	Location	310.0 EL		Crr Flux Density	-124.9	-125.9
	Hub EIRP Contour	62.3 dBW		Gain of a Sq meter	44.6	44.6
	Remote G/T Contour	17.2 dB/K		Uplink Path Losses	207.7	208.7
	Attn Setting	5.0 dB		Carrier Up EIRP	38.2	38.2
	Xponder Gain	202.7 dB		Satellite G/T	17.2	17.2
	SFD at remote	-92.2 dBW/m2		C/N Uplink	19.2	18.2
	Xponder Bandwidth	56.3 MHz		Saturation EIRP	62.3	62.3
	Agg Input BO	7.0 dB		Agg Output B.O.	3.5	3.5
	Agg Output BO	3.5 dB		Output Backoff/Crr	29.2	30.2
GROUND SEGMENT DATA	Uplink Frequency	14.4060 GHz		Carrier Dn EIRP	33.1	32.1
	Dnlink Frequency	12.1360 GHz		Dnlink Path Losses	206.1	206.1
	Tx Antenna Dia	0.63 meters		Rx Pointing Losses	0.4	0.4
	HPA Max Output Pwr	25.0 Watts		CI Sky E/S G/T	35.3	35.3
	Tx Antenna Gain	29.1 dBi		Degradation in G/T	0.7	0.7
	Tx Pointing Losses	0.3 dB		C/N Downlink	32.7	31.7
	Rx Antenna Dia	7.6 meters		C/N Uplink	19.2	18.2
	Rx Antenna Effcy	65 %		C/N Downlink	32.7	31.7
	Rx Antenna Gain	57.2 dBi		C/I Intermod (S/C)	11.7	10.7
	Rx Pointing Losses	0.4 dB		C/I Uplink Adj Sat	17.3	16.3
RAIN MARGINS	Pre LNA Losses	0.2 dB		C/I Downlink Adj Sat	26.9	25.9
	LNA Noise Temp	90 K		C/I Xpol	25.3	24.3
	Ant,etc Temp	45 K		C/I Adjacent Carrier	17.0	16.0
	CI Sky Noise Temp	135 K		C/I co-freq beams	92.2	91.2
	Rx Clr Sky G/T	35.3 dB/K		C/(Nu,d)	19.0	18.0
	Uplink Rain Attn	1.0 dB		C/(Nu,d,ims/c)	11.0	10.0
	Dnlink Rain Attn	2.0 dB		C/(Nu,d,im,i)Total	9.1	8.1
	Up Fade Pwr Cntrl	0.0 dB		LINK MARGIN	10.0	9.0
	Target Link Availability E-E	98.7 %		Symbol Rate	256	256
				FEC Code Rate	1/2	1/2
SITE GEOGRAPHIC DATA	Tx E/S Location	IS29e Beam K02 Mt Vernon, Ohio		Minimum Ebi/No	2.1	2.1
	Tx E/S Latitude	40.4 N		10*log(Rbt/Noise BW)	0.0	0.0
	Tx E/S Longitude	-82.5 W		Minimum Req'd C/N	-0.9	-0.9
	Tx E/S Elev Angle	32.7 deg		RF Head Max Output Power	19.9	Watts
	Rx E/S Location	IS29e Beam K02, USA, Germantown, Maryland		Misc Feed Losses etc	3.8	dB
	Rx E/S Latitude	38.9 N		E/S EIRP Req'd twds S/C		dBW
	Rx E/S Longitude	-76.5 W		(Note: req'd to achieve link margin)		
	Rx E/S Elev Angle	37.2 deg		HPA Tx Pointing Losses	0.3	dB
	XPOL S/C Isolation	36.0 dB		Max Clear Sky EIRP towards S/C	38.2	dBW
	Tx E/S Isolation	35.0 dB		RF Head Output BO (CI Sky)	0.7	dB
ISOLATION DATA	Rx E/S Isolation	26.0 dB		Calculated EIRP Desity Limit per link budget	17.2	dBW/4Hz
	Uplink Free Sp Loss	207.3 dB		Calculated PSD Limit per link budget	-11.9	dBW/4Hz
	Dnlink Free Sp Loss	205.7 dB		Co-ordination Offset	0.0	dBW/4Hz
	Uplink Atmos Attn	0.4 dB				
MISC LOSSES	Dnlink Atmos Attn	0.4 dB				

11-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			Satellite: IS 29e K02 uplink						
01:59 PM		0.63m Remote in IS29e Beam K02 Mt Vernon, Ohio			7.6m hub in IS29e Beam K02, USA, Germantown, Maryland						
BASELINE PARAMETERS				Value	Unit	S U M M A R Y					
CARRIER DATA	Carrier Info Rate	512	Kbps	% Avail S/C Power Req'd/Crr	0.27	%					
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	1.28	%					
	Crr Symbol Rate	512	Ksps	Clear Sky Link Margin	7.0	dB					
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.15	MHz					
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	33.8	dBW					
	Demod BT Product	1.00		LINK PERFORMANCE				CI Sky	Up Fade	Dn Fade	Unit
	Carrier Bandwidth	512	kHz	Satellite SFD	-92.2	-92.2	-92.2	dBW/m2			
Crr Spacing Fctr	1.41	x Rs	Agg Input B.O.	7.0	7.0	7.0	dB				
Carrier Spacing	720	kHz	Input Backoff/Crr	32.7	33.7	32.7	dB				
Satellite	IS 29e K02 uplink			Crr Flux Density	-124.9	-125.9	-124.9	dBW/m2			
Location	310.0	EL	Gain of a Sq meter	44.6	44.6	44.6	dBi				
Hub EIRP Contour	62.3	dBW	Uplink Path Losses	207.7	208.7	207.7	dB				
Remote G/T Contour	17.2	dB/K	Carrier Up EIRP	38.2	38.2	38.2	dBW				
Attn Setting	5.0	dB	Satellite G/T	17.2	17.2	17.2	dB/K				
Xponder Gain	202.7	dB	C/N Uplink	19.2	18.2	19.2	dB				
SFD at remote	-92.2	dBW/m2	Saturation EIRP	62.3	62.3	62.3	dBW				
Xponder Bandwidth	56.3	MHz	Agg Output B.O.	3.5	3.5	3.5	dB				
Agg Input BO	7.0	dB	Agg Output BO	29.2	30.2	29.2	dB				
Agg Output BO	3.5	dB	Output Backoff/Crr	29.2	30.2	29.2	dB				
Uplink Frequency	14.4060	GHz	Carrier Dn EIRP	33.1	32.1	33.1	dBW				
Dnlink Frequency	12.1360	GHz	Dnlink Path Losses	206.1	206.1	208.1	dB				
Tx Antenna Dia	0.63	meters	Rx Pointing Losses	0.4	0.4	0.4	dB				
HPA Max Output Pwr	25.0	Watts	CI Sky E/S G/T	35.3	35.3	35.3	dB/K				
Tx Antenna Gain	29.1	dBi	Degradation in G/T	0.7	0.7	2.5	dB				
Tx Pointing Losses	0.3	dB	C/N Downlink	32.7	31.7	28.9	dB				
Rx Antenna Dia	7.6	meters	C/N Uplink	19.2	18.2	19.2	dB				
Rx Antenna Effcy	65	%	C/N Downlink	32.7	31.7	28.9	dB				
Rx Antenna Gain	57.2	dBi	C/I Intermod (S/C)	11.7	10.7	11.7	dB				
Rx Pointing Losses	0.4	dB	C/I Uplink Adj Sat	17.3	16.3	17.3	dB				
Pre LNA Losses	0.2	dB	C/I Downlink Adj Sat	26.9	25.9	26.9	dB				
LNA Noise Temp	90	K	C/I Xpol	25.3	24.3	24.7	dB				
Ant,etc Temp	45	K	C/I Adjacent Carrier	17.0	16.0	17.0	dB				
CI Sky Noise Temp	135	K	C/I co-freq beams	92.2	91.2	92.2	dB				
Rx Clr Sky G/T	35.3	dB/K	C/(Nu,d)	19.0	18.0	18.8	dB				
Uplink Rain Attn	1.0	dB	C/(Nu,d,ims/c)	11.0	10.0	10.9	dB				
Dnlink Rain Attn	2.0	dB	C/(Nu,d,im,i)Total	9.1	8.1	9.0	dB				
Up Fade Pwr Cntrl	0.0	dB	LINK MARGIN	7.0	6.0	6.9	dB				
Target Link Availability E-E	98.7	%	Symbol Rate	512	512	512	ksps				
Tx E/S Location	IS29e Beam K02 Mt Vernon, Ohio			FEC Code Rate	1/2	1/2	1/2				
Tx E/S Latitude	40.4	N	Minimum Ebi/No	2.1	2.1	2.1	dB				
Tx E/S Longitude	-82.5	W	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB				
Tx E/S Elev Angle	32.7	deg	Minimum Req'd C/N	2.1	2.1	2.1	dB				
Rx E/S Location	IS29e Beam K02, USA, Germantown, Maryland			RF Head Max Output Power	19.9	Watts					
Rx E/S Latitude	38.9	N	Misc Feed Losses etc	3.8	dB						
Rx E/S Longitude	-76.5	W	E/S EIRP Req'd twds S/C		dBW						
Rx E/S Elev Angle	37.2	deg	(Note: req'd to achieve link margin)								
S/C Isolation	36.0	dB	Tx Pointing Losses	0.3	dB						
Tx E/S Isolation	35.0	dB	Max Clear Sky EIRP towards S/C	38.2	dBW						
Rx E/S Isolation	26.0	dB	RF Head Output BO (CI Sky)	0.7	dB						
Uplink Free Sp Loss	207.3	dB	Calculated EIRP Desity Limit per link budget	17.2	dBW/4Hz						
Dnlink Free Sp Loss	205.7	dB	Calculated PSD Limit per link budget	-11.9	dBW/4Hz						
Uplink Atmos Attn	0.4	dB	Co-ordination Offset	0.0	dBW/4Hz						
Dnlink Atmos Attn	0.4	dB									

11-Nov-16		1024ksps R1/2 HN INROUTE LINK BUDGET		Satellite: IS 29e K02 uplink			
02:01 PM		0.63m Remote in IS29e Beam K02 Mt Vernon, Ohio		7.6m hub in IS29e Beam K02, USA, Germantown, Maryland			
BASELINE PARAMETERS				SUMMARY			
	Value	Unit					
CARRIER DATA	Carrier Info Rate	1024	Kbps	% Avail S/C Power Req'd/Crr	0.27 %		
	FEC Code Rate	0.500		% Xponder Bandwidth Req'd/Crr	2.56 %		
	Crr Symbol Rate	1024	Ksps	Clear Sky Link Margin	4.7 dB		
	CI Sky Req'd Ebi/No	2.1	dB	Power Equivalent Bandwidth	0.15 MHz		
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour	33.8 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	Satellite SFD	-92.2	-92.2	-92.2 dBW/m2
	Carrier Spacing	1440	kHz	Agg Input B.O.	7.0	7.0	7.0 dB
				Input Backoff/Crr	32.7	33.7	32.7 dB
SATELLITE DATA	Satellite	IS 29e K02 uplink		Crr Flux Density	-124.9	-125.9	-124.9 dBW/m2
	Location	310.0 EL		Gain of a Sq meter	44.6	44.6	44.6 dBi
	Hub EIRP Contour	62.3 dBW		Uplink Path Losses	207.7	208.7	207.7 dB
	Remote G/T Contour	17.2 dB/K		Carrier Up EIRP	38.2	38.2	38.2 dBW
	Attn Setting	5.0 dB		Satellite G/T	17.2	17.2	17.2 dB/K
	Xponder Gain	202.7 dB		C/N Uplink	16.2	15.2	16.2 dB
	SFD at remote	-92.2 dBW/m2		Saturation EIRP	62.3	62.3	62.3 dBW
	Xponder Bandwidth	56.3 MHz		Agg Output B.O.	3.5	3.5	3.5 dB
	Agg Input BO	7.0 dB		Output Backoff/Crr	29.2	30.2	29.2 dB
	Agg Output BO	3.5 dB		Carrier Dn EIRP	33.1	32.1	33.1 dBW
GROUND SEGMENT DATA	Uplink Frequency	14.4060 GHz		Dnlink Path Losses	206.1	206.1	208.1 dB
	Dnlink Frequency	12.1360 GHz		Rx Pointing Losses	0.4	0.4	0.4 dB
	Tx Antenna Dia	0.63 meters		CI Sky E/S G/T	35.3	35.3	35.3 dB/K
	HPA Max Output Pwr	25.0 Watts		Degradation in G/T	0.7	0.7	2.5 dB
	Tx Antenna Gain	29.1 dBi		C/N Downlink	29.7	28.7	25.9 dB
	Tx Pointing Losses	0.3 dB		C/N Uplink	16.2	15.2	16.2 dB
	Rx Antenna Dia	7.6 meters		C/N Downlink	29.7	28.7	25.9 dB
	Rx Antenna Effcy	65 %		C/I Intermod (S/C)	8.7	7.7	8.7 dB
	Rx Antenna Gain	57.2 dBi		C/I Uplink Adj Sat	17.3	16.3	17.3 dB
	Rx Pointing Losses	0.4 dB		C/I Downlink Adj Sat	23.9	22.9	23.9 dB
RAIN MARGINS	Pre LNA Losses	0.2 dB		C/I Xpol	22.3	21.3	21.7 dB
	LNA Noise Temp	90 K		C/I Adjacent Carrier	17.0	16.0	17.0 dB
	Ant,etc Temp	45 K		C/I co-freq beams	89.2	88.2	89.2 dB
	CI Sky Noise Temp	135 K		C/(Nu,d)	16.0	15.0	15.7 dB
	Rx Clr Sky G/T	35.3 dB/K		C/(Nu,d,ims/c)	8.0	7.0	7.9 dB
	Uplink Rain Attn	1.0 dB		C/(Nu,d,im,i)Total	6.8	5.8	6.8 dB
	Dnlink Rain Attn	2.0 dB		LINK MARGIN	4.7	3.7	4.7 dB
	Up Fade Pwr Cntrl	0.0 dB		Symbol Rate	1024	1024	1024 ksps
	Target Link Availability E-E	98.7 %		FEC Code Rate	1/2	1/2	1/2
	SITE GEOGRAPHIC DATA	Tx E/S Location	IS29e Beam K02 Mt Vernon, Ohio		Minimum Ebi/No	2.1	2.1
Tx E/S Latitude		40.4 N		10*log(Rbt/Noise BW)	3.0	3.0	3.0 dB
Tx E/S Longitude		-82.5 W		Minimum Req'd C/N	2.1	2.1	2.1 dB
Tx E/S Elev Angle		32.7 deg		RF Head Max Output Power	19.9 Watts		
Rx E/S Location		IS29e Beam K02, USA, Germantown, Maryland		Misc Feed Losses etc	3.8 dB		
Rx E/S Latitude		38.9 N		E/S EIRP Req'd twds S/C	49.3 dBW		
Rx E/S Longitude		-76.5 W		(Note: req'd to achieve link margin)			
Rx E/S Elev Angle		37.2 deg		Tx Pointing Losses	0.3 dB		
S/C Isolation		36.0 dB		Max Clear Sky EIRP towards S/C	38.2 dBW		
Tx E/S Isolation		35.0 dB		RF Head Output BO (CI Sky)	0.7 dB		
ISOLATION DATA	Rx E/S Isolation	26.0 dB		Calculated EIRP Desity Limit per link budget	14.1 dBW/4Hz		
	Uplink Free Sp Loss	207.3 dB		Calculated PSD Limit per link budget	-15.0 dBW/4Hz		
	Dnlink Free Sp Loss	205.7 dB		Co-ordination Offset	0.0 dBW/4Hz		
	Uplink Atmos Attn	0.4 dB					
MISC LOSSES	Dnlink Atmos Attn	0.4 dB					

11/11/2016

HughesNet LINK BUDGET

2:02 PM

Satellite: IS 29e K02 Downlink

0.63 m Remote Located in IS29e Beam K02 Mt Vernon, Ohio

Crr EIRP Density = 18.8 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY					
				% Avail S/C Power Req'd/Crr		21.4	%		
				% Xponder Bandwidth Req'd/Crr		10.7	%		
				Clear Sky Link Margin		2.4	dB		
				Power Equivalent Bandwidth		24.1	MHz		
				EIRP at 63.0 dBW reference contour		52.8	dBW		
				LINK PERFORMANCE					
				CI Sky	Up Fade	Dn Fade	Unit		
CARRIER	CI Sky Req'd Es/No	1.2	dB	Satellite SFD	-92.0	-92.0	-92.0	dBW/m2	
DATA	No of bits/symbol	2.0	Bits	Agg Input B.O.	7.0	7.0	7.0	dB	
	Demod BT Product	1.00		Input Backoff/Crr	13.7	13.7	13.7	dB	
	Crr Noise Bandwidth	10000	KHz	Crr Flux Density	-105.7	-105.7	-105.7	dBW/m2	
	Carrier Spacing	12000	KHz						
SATELLITE	Satellite	IS 29e K02 Downlink		UPLINK	Gain of a Sq meter	44.6	44.6	44.6	dB
	Location	310.0 EL		BUDGET	Uplink Path Losses	207.8	212.8	207.8	dB
	EIRP Contour at Remote	63.4 dBW			Carrier Up EIRP	56.8	61.8	56.8	dBW
	G/T Contour at Hub	16.0 dB/K			Satellite G/T	16.0	16.0	16.0	dB/K
	Attn Setting	9.0 dB			C/N Uplink	26.7	26.7	26.7	dB
	Xponder Gain	203.5 dB			EIRP Contour	63.4	63.4	63.4	dBW
DATA	SFD at Hub	-92.0 dBW/m2			Agg Output B.O.	3.5	3.5	3.5	dB
	Xponder Bandwidth	112.5 MHz			Output Backoff/Crr	10.2	10.2	10.2	dB
	Agg Input BO	7.0 dB			Carrier Dn EIRP	52.9	52.9	52.9	dBW
	Agg Output BO	3.5 dB		DOWNLINK	Dnlink Path Losses	206.2	206.2	206.8	dB
	Uplink Frequency	14.406 GHz		BUDGET	Rx Pointing Losses	0.2	0.2	0.2	dB
	Dnlink Frequency	12.136 GHz			CI Sky E/S G/T	9.4	9.4	9.4	dB/K
					Degradation in G/T	0.9	0.9	1.4	dB
					C/N Downlink	16.6	16.6	15.5	dB
GROUND	Tx Antenna Dia	7.6 meters			C/N Uplink	26.7	26.7	26.7	dB
	HPA Max Output Pwr	150.0 Watts			C/N Downlink	16.6	16.6	15.5	dB
	Waveguide Losses	2.0 dB			C/I Intermod (S/C)	20.2	20.2	20.2	dB
	Tx Antenna Gain	59.4 dBi			C/I Uplink Adj Sat	14.8	14.8	14.8	dB
	Tx Pointing Losses	0.6 dB		COMPOSITE	C/I Dnlink Adj Sat	4.5	4.5	4.5	dB
	Max EIRP Toward S/C	78.6 dB		LINK	C/I Xpol	18.4	17.4	18.3	dB
SEGMENT	Rx Antenna Dia	0.63 meters			C/I Intermod (E/S)	28.0	18.0	28.0	dB
DATA	Rx Antenna Gain	29.3 dBi			C/(Nu,d)	16.2	16.2	15.1	dB
	Rx Pointing Losses	0.2 dB			C/(Nu,d,ims/c)	14.8	14.8	14.0	dB
	Pre LNA Losses	0.8 dB			C/(Nu,d,im,i)Total	3.6	3.4	3.5	dB
	LNA Noise Temp	9 K			LINK MARGIN	2.4	2.2	2.3	dB
	Ant,etc Temp	28 K			Modulation	QPSK	QPSK	QPSK	
	CI Sky Noise Temp	37 K			FEC Rate	1/2	1/2	1/2	
	Rx Clr Sky G/T	9.4 dB/K			Minimum Req'd Ebi/No	1.2	1.2	1.2	dB
RAIN	Uplink Rain Attn	5.0 dB		MODEM	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Dnlink Rain Attn	0.6 dB			Minimum Req'd C/N	1.2	1.2	1.2	dB
MARGINS	Up Fade Pwr Cntrl	5.0 dB			E/S EIRP/Crr Req'd (CI Sky)		56.8	dBW	
	Target Link Availability E-E	98.70 %			Tx Gain - Pointing Loss		58.8	dB	
					Waveguide Losses		2.0	dB	
SITE	Tx E/S Location	IS29e Beam K02, USA, Germany		EARTH	Tx Power Req'd/Cxr (clear sky)		0.0	dBW	
	Tx E/S Latitude	38.9 N		STATION	HPA		1.0	watts	
	Tx E/S Longitude	-76.5 W			Uplink Power Control		5.0	dB	
GEOGRAPHIC	Tx E/S Elev Angle	37 deg			TX Power Req'd/Cxr (full UPC)		5.0	dBW	
DATA	Rx E/S Location	IS29e Beam K02 Mt Vernon, Ohio					3.2	watts	
	Rx E/S Latitude	40.4 N			Dnlink EIRP Dens @ Beam Peak (63.0 dBW)		18.8	dBW/4KHz	
	Rx E/S Longitude	-82.5 W							
	Rx E/S Elev Angle	32.7 deg							
ISOLATION	S/C Isolation	36.0 dB							
DATA	Tx E/S Isolation	35.0 dB							
	Rx E/S Isolation	20.0 dB							
MISC	Uplink Free Sp Loss	207.2 dB							
LOSSES	Dnlink Free Sp Loss	205.8 dB							
	Uplink Atmos Attn	0.5 dB							
	Dnlink Atmos Attn	0.4 dB							

BASELINE PARAMETERS		Value	Unit	S U M M A R Y					
11-Nov-16 01:36 PM				256ksps R1/2 HN INROUTE LINK BUDGET					
				Satellite: IS 29e K05 uplink					
				0.63m Remote in IS29e Beam K05, Los Angeles 7.6m hub in IS29e Beam K02, USA, Germantown, Maryland					
CARRIER DATA				LINK PERFORMANCE					
Carrier Info Rate				256	Kbps	% Avail S/C Power Req'd/Crr	0.23	%	
FEC Code Rate				0.500		% Xponder Bandwidth Req'd/Crr	1.28	%	
Crr Symbol Rate				256	Ksps	Clear Sky Link Margin	8.0	dB	
CI Sky Req'd Ebi/No				2.1	dB	Power Equivalent Bandwidth	0.13	MHz	
No of bits/symbol				2.0	Bits	Contract EIRP at reference contour	34.4	dBw	
Demod BT Product				1.00					
Spreading factor									
Spread Bandwidth				512	kHz				
Crr Spacing Fctr				1.41	x Rs				
Carrier Spacing				720	kHz				
Satellite				IS 29e K05 uplink					
Location				310.0	EL				
Hub EIRP Contour				62.3	dBW				
Remote G/T Contour				7.1	dB/K				
Attn Setting				5.0	dB				
Xponder Gain				203.8	dB				
SFD at remote				-92.1	dBW/m2				
Xponder Bandwidth				56.3	MHz				
Agg Input BO				7.0	dB				
Agg Output BO				2.2	dB				
Uplink Frequency				14.3438	GHz				
Dnlink Frequency				12.0738	GHz				
Tx Antenna Dia				0.63	meters				
HPA Max Output Pwr				24.5	Watts				
Tx Antenna Gain				29.1	dBi				
Tx Pointing Losses				0.3	dB				
Rx Antenna Dia				7.6	meters				
Rx Antenna Effcy				65	%				
Rx Antenna Gain				57.1	dBi				
Rx Pointing Losses				0.4	dB				
Pre LNA Losses				0.2	dB				
LNA Noise Temp				90	K				
Ant,etc Temp				45	K				
CI Sky Noise Temp				135	K				
Rx Clr Sky G/T				35.3	dB/K				
Uplink Rain Attn				1.3	dB				
Dnlink Rain Attn				2.0	dB				
Up Fade Pwr Cntrl				0.0	dB				
Target Link Availability E-E				98.7	%				
Tx E/S Location				IS29e Beam K05, Los Angeles, CA					
Tx E/S Latitude				34.1	N				
Tx E/S Longitude				-118.3	W				
Tx E/S Elev Angle				9.3	deg				
Rx E/S Location				IS29e Beam K02, USA, Germantown, Maryland					
Rx E/S Latitude				38.9	N				
Rx E/S Longitude				-76.5	W				
Rx E/S Elev Angle				37.2	deg				
S/C Isolation				36.0	dB				
Tx E/S Isolation				35.0	dB				
Rx E/S Isolation				26.0	dB				
Uplink Free Sp Loss				207.8	dB				
Dnlink Free Sp Loss				205.7	dB				
Uplink Atmos Attn				1.2	dB				
Dnlink Atmos Attn				0.4	dB				
				S U M M A R Y					
				% Avail S/C Power Req'd/Crr					
				0.23 %					
				% Xponder Bandwidth Req'd/Crr					
				1.28 %					
				Clear Sky Link Margin					
				8.0 dB					
				Power Equivalent Bandwidth					
				0.13 MHz					
				Contract EIRP at reference contour					
				34.4 dBw					
				LINK PERFORMANCE					
				CI Sky	Up Fade	Dn Fade	Unit		
				Satellite SFD	-92.1	-92.1	-92.1	dBW/m2	
				Agg Input B.O.	7.0	7.0	7.0	dB	
				Input Backoff/Crr	33.4	34.7	33.4	dB	
				Crr Flux Density	-125.5	-126.8	-125.5	dBW/m2	
				Gain of a Sq meter	44.6	44.6	44.6	dBi	
				Uplink Path Losses	208.9	210.2	208.9	dB	
				Carrier Up EIRP	38.8	38.8	38.8	dBW	
				Satellite G/T	7.1	7.1	7.1	dB/K	
				C/N Uplink	12.0	7.2	8.5	dB	
				Saturation EIRP	62.3	62.3	62.3	dBW	
				Agg Output B.O.	2.2	2.2	2.2	dB	
				Output Backoff/Crr	28.6	29.9	28.6	dB	
				Carrier Dn EIRP	33.7	32.4	33.7	dBW	
				Dnlink Path Losses	206.1	206.1	208.0	dB	
				Rx Pointing Losses	0.4	0.4	0.4	dB	
				CI Sky E/S G/T	35.3	35.3	35.3	dB/K	
				Degradation in G/T	0.7	0.7	2.5	dB	
				C/N Downlink	36.8	32.0	29.6	dB	
				C/N Uplink	12.0	7.2	8.5	dB	
				C/N Downlink	36.8	32.0	29.6	dB	
				C/I Intermod (S/C)	15.8	14.5	15.8	dB	
				C/I Uplink Adj Sat	10.7	9.4	10.7	dB	
				C/I Downlink Adj Sat	30.3	29.0	30.3	dB	
				C/I Xpol	29.4	28.1	28.3	dB	
				C/I Adjacent Carrier	17.0	15.7	17.0	dB	
				C/I co-freq beams	91.5	90.2	91.5	dB	
				C/(Nu,d)	12.0	7.2	8.5	dB	
				C/(Nu,d,ims/c)	10.5	6.5	7.8	dB	
				C/(Nu,d,im,i)Total	7.1	4.3	5.6	dB	
				LINK MARGIN	8.0	5.2	6.5	dB	
				Symbol Rate	256	256	256	ksps	
				FEC Code Rate	1/2	1/2	1/2		
				Minimum Ebi/No	2.1	2.1	2.1	dB	
				10*log(Rbt/Noise BW)	0.0	0.0	0.0	dB	
				Minimum Req'd C/N	-0.9	-0.9	-0.9	dB	
				RF Head Max Output Power		19.5	Watts		
				Misc Feed Losses etc		3.8	dB		
				E/S EIRP Req'd twds S/C			dBW		
				(Note: req'd to achieve link margin)					
				Tx Pointing Losses		0.3	dB		
				Max Clear Sky EIRP towards S/C		38.8	dBW		
				RF Head Output BO (CI Sky)		0.0	dB		
				Calculated EIRP Density Limit per link budget		17.8	dBW/4Hz		
				Calculated PSD Limit per link budget		-11.3	dBW/4Hz		
				Co-ordination Offset		0.0	dBW/4Hz		

11-Nov-16		512ksps R1/2 HN INROUTE LINK BUDGET			
01:40 PM		Satellite: IS 29e K05 uplink			
		0.63m Remote in IS29e Beam K05, Los Angeles 7.6m hub in IS29e Beam K02, USA, Germantown, Maryland			
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.23 %
				% Xponder Bandwidth Req'd/Crr	1.28 %
				Clear Sky Link Margin	5.0 dB
				Power Equivalent Bandwidth	0.13 MHz
				Contract EIRP at reference contour	34.4 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER	Carrier Info Rate	512	Kbps	Satellite SFD	-92.1
	FEC Code Rate	0.500		Agg Input B.O.	7.0
	Crr Symbol Rate	512	Ksps	Input Backoff/Crr	33.4
	CI Sky Req'd Ebi/No	2.1	dB	Crr Flux Density	-125.5
DATA	No of bits/symbol	2.0	Bits	Gain of a Sq meter	44.6
	Demod BT Product	1.00		Uplink Path Losses	208.9
	Carrier Bandwidth	512	kHz	Carrier Up EIRP	38.8
	Crr Spacing Fctr	1.41	x Rs	Satellite G/T	7.1
	Carrier Spacing	720	kHz	C/N Uplink	12.0
				Saturation EIRP	62.3
SATELLITE	Satellite	IS 29e K05 uplink		Agg Output B.O.	2.2
	Location	310.0	EL	Output Backoff/Crr	28.6
	Hub EIRP Contour	62.3	dBW	Carrier Dn EIRP	33.7
	Remote G/T Contour	7.1	dB/K	Dnlink Path Losses	206.1
	Attn Setting	5.0	dB	Rx Pointing Losses	0.4
	Xponder Gain	203.8	dB	CI Sky E/S G/T	35.3
DATA	SFD at remote	-92.1	dBW/m2	Degradation in G/T	0.7
	Xponder Bandwidth	56.3	MHz	C/N Downlink	36.8
	Agg Input BO	7.0	dB	C/N Uplink	12.0
	Agg Output BO	2.2	dB	C/N Downlink	36.8
	Uplink Frequency	14.3438	GHz	C/I Intermod (S/C)	15.8
	Dnlink Frequency	12.0738	GHz	C/I Uplink Adj Sat	10.7
				C/I Downlink Adj Sat	30.3
				C/I Xpol	29.4
				C/I Adjacent Carrier	17.0
				C/I co-freq beams	91.5
				C/(Nu,d)	12.0
				C/(Nu,d,ims/c)	10.5
				C/(Nu,d,im,i)Total	7.1
				LINK MARGIN	5.0
				Symbol Rate	512
				FEC Code Rate	1/2
				Minimum Ebi/No	2.1
				10*log(Rbt/Noise BW)	3.0
				Minimum Req'd C/N	2.1
				RF Head Max Output Power	19.5
				Misc Feed Losses etc	3.8
				E/S EIRP Req'd twds S/C	dBW
				(Note: req'd to achieve link margin)	
				Tx Pointing Losses	0.3
				Max Clear Sky EIRP towards S/C	38.8
				RF Head Output BO (CI Sky)	0.0
				Calculated EIRP Density Limit per link budget	17.8
				Calculated PSD Limit per link budget	-11.3
				Co-ordination Offset	0.0
GROUND	Tx Antenna Dia	0.63	meters		
	HPA Max Output Pwr	24.5	Watts		
	Tx Antenna Gain	29.1	dBi		
	Tx Pointing Losses	0.3	dB		
SEGMENT	Rx Antenna Dia	7.6	meters		
DATA	Rx Antenna Effcy	65	%		
	Rx Antenna Gain	57.1	dBi		
	Rx Pointing Losses	0.4	dB		
	Pre LNA Losses	0.2	dB		
	LNA Noise Temp	90	K		
	Ant,etc Temp	45	K		
	CI Sky Noise Temp	135	K		
	Rx Clr Sky G/T	35.3	dB/K		
RAIN	Uplink Rain Attn	1.3	dB		
MARGINS	Dnlink Rain Attn	2.0	dB		
	Up Fade Pwr Cntrl	0.0	dB		
	Target Link Availability E-E	98.7	%		
SITE	Tx E/S Location	IS29e Beam K05, Los Angeles, CA			
GEOGRAPHIC	Tx E/S Latitude	34.1	N		
DATA	Tx E/S Longitude	-118.3	W		
	Tx E/S Elev Angle	9.3	deg		
	Rx E/S Location	IS29e Beam K02, USA, Germantown, Maryland			
	Rx E/S Latitude	38.9	N		
	Rx E/S Longitude	-76.5	W		
	Rx E/S Elev Angle	37.2	deg		
XPOL	S/C Isolation	36.0	dB		
ISOLATION	Tx E/S Isolation	35.0	dB		
DATA	Rx E/S Isolation	26.0	dB		
MISC	Uplink Free Sp Loss	207.8	dB		
LOSSES	Dnlink Free Sp Loss	205.7	dB		
	Uplink Atmos Attn	1.2	dB		
	Dnlink Atmos Attn	0.4	dB		

BASELINE PARAMETERS		Value	Unit	S U M M A R Y					
11-Nov-16 01:42 PM				1024ksps R1/2 HN INROUTE LINK BUDGET					
				Satellite: IS 29e K05 uplink					
				0.63m Remote in IS29e Beam K05, Los Angeles 7.6m hub in IS29e Beam K02, USA, Germantown, Maryland					
CARRIER				LINK PERFORMANCE					
DATA				CI Sky	Up Fade	Dn Fade	Unit		
Carrier Info Rate		1024	Kbps	Satellite SFD	-92.1	-92.1	-92.1	dBW/m2	
FEC Code Rate		0.500		Agg Input B.O.	7.0	7.0	7.0	dB	
Crr Symbol Rate		1024	Ksps	Input Backoff/Crr	33.4	34.7	33.4	dB	
CI Sky Req'd Ebi/No		2.1	dB	Crr Flux Density	-125.5	-126.8	-125.5	dBW/m2	
No of bits/symbol		2.0	Bits	Gain of a Sq meter	44.6	44.6	44.6	dB	
Demod BT Product		1.00		Uplink Path Losses	208.9	210.2	208.9	dB	
Carrier Bandwidth		1024	kHz	Carrier Up EIRP	38.8	38.8	38.8	dBW	
Crr Spacing Fctr		1.41	x Rs	Satellite G/T	7.1	7.1	7.1	dB/K	
Carrier Spacing		1440	kHz	C/N Uplink	9.0	4.2	5.5	dB	
SATELLITE	Satellite	IS 29e K05 uplink			UPLINK				
DATA	Location	310.0 EL			BUDGET				
	Hub EIRP Contour	62.3 dBW			Saturation EIRP				
	Remote G/T Contour	7.1 dB/K			Agg Output B.O.				
	Attn Setting	5.0 dB			Output Backoff/Crr				
	Xponder Gain	203.8 dB			Carrier Dn EIRP				
	SFD at remote	-92.1 dBW/m2			Dnlink Path Losses				
	Xponder Bandwidth	56.3 MHz			Rx Pointing Losses				
	Agg Input BO	7.0 dB			CI Sky E/S G/T				
	Agg Output BO	2.2 dB			Degradation in G/T				
	Uplink Frequency	14.3438 GHz			C/N Downlink				
	Dnlink Frequency	12.0738 GHz			C/N Uplink				
	Tx Antenna Dia	0.63 meters			C/N Downlink				
	HPA Max Output Pwr	24.5 Watts			C/I Intermod (S/C)				
	Tx Antenna Gain	29.1 dBi			C/I Uplink Adj Sat				
	Tx Pointing Losses	0.3 dB			C/I Downlink Adj Sat				
GROUND	Rx Antenna Dia	7.6 meters			C/I Xpol				
SEGMENT	Rx Antenna Effcy	65 %			C/I Adjacent Carrier				
DATA	Rx Antenna Gain	57.1 dBi			C/I co-freq beams				
	Rx Pointing Losses	0.4 dB			C/(Nu,d)				
	Pre LNA Losses	0.2 dB			C/(Nu,d,ims/c)				
	LNA Noise Temp	90 K			C/(Nu,d,im,i)Total				
	Ant,etc Temp	45 K			LINK MARGIN				
	Ant,etc Temp	45 K			Symbol Rate				
	CI Sky Noise Temp	135 K			FEC Code Rate				
	Rx Clr Sky G/T	35.3 dB/K			Minimum Ebi/No				
	Uplink Rain Attn	1.3 dB			10*log(Rbt/Noise BW)				
RAIN	Dnlink Rain Attn	2.0 dB			Minimum Req'd C/N				
MARGINS	Up Fade Pwr Cntrl	0.0 dB			RF Head Max Output Power				
	Target Link Availability E-E	98.7 %			Misc Feed Losses etc				
	Tx E/S Location	IS29e Beam K05, Los Angeles, CA			E/S EIRP Req'd twds S/C				
SITE	Tx E/S Latitude	34.1 N			(Note: req'd to achieve link margin)				
GEOGRAPHIC	Tx E/S Longitude	-118.3 W			Tx Pointing Losses				
DATA	Tx E/S Elev Angle	9.3 deg			Max Clear Sky EIRP towards S/C				
	Rx E/S Location	IS29e Beam K02, USA, Germantown, Maryland			RF Head Output BO (CI Sky)				
	Rx E/S Latitude	38.9 N			Calculated EIRP Density Limit per link budget				
	Rx E/S Longitude	-76.5 W			Calculated PSD Limit per link budget				
	Rx E/S Elev Angle	37.2 deg			Co-ordination Offset				
XPOL	S/C Isolation	36.0 dB							
ISOLATION	Tx E/S Isolation	35.0 dB							
DATA	Rx E/S Isolation	26.0 dB							
MISC	Uplink Free Sp Loss	207.8 dB							
LOSSES	Dnlink Free Sp Loss	205.7 dB							
	Uplink Atmos Attn	1.2 dB							
	Dnlink Atmos Attn	0.4 dB							

11/11/2016

HughesNet LINK BUDGET

1:44 PM

Satellite: IS 29e K02 Downlink

0.63 m Remote Located in IS29e Beam K05, Los Angeles, CA

Crr EIRP Density = 18.8 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY					
				% Avail S/C Power Req/Crr			21.4	%	
				% Xponder Bandwidth Req/Crr			10.7	%	
				Clear Sky Link Margin			2.1	dB	
				Power Equivalent Bandwidth			24.1	MHz	
				EIRP at 63.0 dBW reference contour			52.8	dBW	
				LINK PERFORMANCE					
				CI Sky	Up Fade	Dn Fade	Unit		
CARRIER	Carrier Info Rate	9889	Kbps	Satellite SFD	-92.0	-92.0	-92.0	dBW/m2	
	Net FEC Code Rate	0.500		Agg Input B.O.	7.0	7.0	7.0	dB	
	Transmit Symbol Rate	10000	Ksps	Input Backoff/Crr	13.7	13.7	13.7	dB	
CARRIER	CI Sky Req/E/No	1.2	dB	Crr Flux Density	-105.7	-105.7	-105.7	dBW/m2	
DATA	No of bits/symbol	2.0	Bits	UPLINK	Gain of a Sq meter	44.6	44.6	44.6	dB
	Demod BT Product	1.00		BUDGET	Uplink Path Losses	207.8	212.8	207.8	dB
	Crr Noise Bandwidth	10000	KHz		Carrier Up EIRP	56.8	61.8	56.8	dBW
	Carrier Spacing	12000	KHz		Satellite G/T	16.0	16.0	16.0	dB/K
SATELLITE	Satellite	IS 29e K02 Downlink			C/N Uplink	33.7	33.7	33.7	dB
	Location	310.0 EL		DOWNLINK	EIRP Contour	46.7	46.7	46.7	dBW
	EIRP Contour at Remote	46.7 dBW		BUDGET	Agg Output B.O.	3.5	3.5	3.5	dB
	G/T Contour at Hub	16.0 dB/K			Output Backoff/Crr	10.2	10.2	10.2	dB
	Attn Setting	9.0 dB			Carrier Dn EIRP	36.2	36.2	36.2	dBW
	Xponder Gain	186.8 dB			Dnlink Path Losses	207.3	207.3	208.4	dB
DATA	SFD at Hub	-92.0 dBW/m2		BUDGET	Rx Pointing Losses	0.2	0.2	0.2	dB
	Xponder Bandwidth	112.5 MHz			CI Sky E/S G/T	9.4	9.4	9.4	dB/K
	Agg Input BO	7.0 dB			Degradation in G/T	1.4	1.4	2.2	dB
	Agg Output BO	3.5 dB			C/N Downlink	5.3	5.3	3.3	dB
	Uplink Frequency	14.406 GHz		COMPOSITE	C/N Uplink	33.7	33.7	33.7	dB
	Dnlink Frequency	12.136 GHz		LINK	C/N Downlink	5.3	5.3	3.3	dB
GROUND	Tx Antenna Dia	7.6 meters			C/I Intermod (S/C)	27.2	27.2	27.2	dB
SEGMENT	HPA Max Output Pwr	150.0 Watts			C/I Uplink Adj Sat	21.1	21.1	21.1	dB
	Waveguide Losses	2.0 dB			C/I Dnlink Adj Sat	8.3	8.3	8.3	dB
	Tx Antenna Gain	59.4 dBi			C/I Xpol	18.4	17.4	18.2	dB
	Tx Pointing Losses	0.6 dB			C/I Intermod (E/S)	28.0	18.0	28.0	dB
	Max EIRP Toward S/C	78.6 dB			C/(Nu,d)	5.3	5.3	3.3	dB
DATA	Rx Antenna Dia	0.63 meters			C/(Nu,d,ims/c)	5.3	5.3	3.3	dB
	Rx Antenna Gain	29.3 dBi			C/(Nu,d,im,i)Total	3.3	3.1	1.9	dB
	Rx Pointing Losses	0.2 dB			LINK MARGIN	2.1	1.9	0.7	dB
	Pre LNA Losses	0.8 dB			Modulation	QPSK	QPSK	QPSK	
	LNA Noise Temp	9 K			FEC Rate	1/2	1/2	1/2	
	Ant,etc Temp	28 K			Minimum Req/Ebi/No	1.2	1.2	1.2	dB
	CI Sky Noise Temp	37 K		MODEM	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
	Rx Clr Sky G/T	9.4 dB/K			Minimum Req/C/N	1.2	1.2	1.2	dB
RAIN	Uplink Rain Attn	5.0 dB			E/S EIRP/Crr Req (CI Sky)			56.8	dBW
MARGINS	Dnlink Rain Attn	1.1 dB			Tx Gain - Pointing Loss			58.8	dB
	Up Fade Pwr Cntrl	5.0 dB			Waveguide Losses			2.0	dB
	Target Link Availability E-E	98.70 %			Tx Power Req/Cxr (clear sky)			0.0	dBW
SITE	Tx E/S Location	IS29e Beam K02, USA, Germa			HPA			1.0	watts
	Tx E/S Latitude	38.9 N			Uplink Power Control			5.0	dB
	Tx E/S Longitude	-76.5 W			TX Power Req/Cxr (full UPC)			5.0	dBW
GEOGRAPHIC	Tx E/S Elev Angle	37 deg						3.2	watts
DATA	Rx E/S Location	IS29e Beam K05, Los Angeles,		EARTH	E/S EIRP/Crr Req (CI Sky)			56.8	dBW
	Rx E/S Latitude	34.1 N		STATION	Tx Gain - Pointing Loss			58.8	dB
	Rx E/S Longitude	-118.3 W			Waveguide Losses			2.0	dB
	Rx E/S Elev Angle	9.3 deg		HPA	Tx Power Req/Cxr (clear sky)			0.0	dBW
XPOL	S/C Isolation	36.0 dB						1.0	watts
ISOLATION	Tx E/S Isolation	35.0 dB			Uplink Power Control			5.0	dB
DATA	Rx E/S Isolation	20.0 dB			TX Power Req/Cxr (full UPC)			5.0	dBW
MISC	Uplink Free Sp Loss	207.2 dB						3.2	watts
LOSSES	Dnlink Free Sp Loss	206.3 dB			Dnlink EIRP Dens @ Beam Peak (63.0 dBW)			18.8	dBW/4KHz
	Uplink Atmos Attn	0.5 dB							
	Dnlink Atmos Attn	1.0 dB							

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET			
11:02 AM		Satellite: SES1 16K IB			
		0.63m Remote in SES1 Houston, TX		7.6m hub in SES1 North Las Vegas, NV	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Reqd/Crr	0.42 %
				% Xponder Bandwidth Reqd/Crr	4.00 %
				Clear Sky Link Margin	5.0 dB
				Power Equivalent Bandwidth	0.15 MHz
				Contract EIRP at reference contour	24.0 dBw
				LINK PERFORMANCE	CI Sky Up Fade Dn Fade Unit
CARRIER		Carrier Info Rate	256 Kbps	Satellite SFD	-93.0 -93.0 -93.0 dBW/m2
		FEC Code Rate	0.500	Agg Input B.O.	8.0 8.0 8.0 dB
		Crr Symbol Rate	256 Ksps	Input Backoff/Crr	31.8 32.8 31.8 dB
DATA		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-124.8 -125.8 -124.8 dBW/m2
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.5 44.5 44.5 dBi
		Demod BT Product	1.00	UPLINK	
		Spreading factor		Uplink Path Losses	207.2 208.2 207.2 dB
		Spread Bandwidth	1024 kHz	BUDGET	
		Crr Spacing Fctr	1.41 x Rs	Carrier Up EIRP	37.9 37.9 37.9 dBW
		Carrier Spacing	1440 kHz	Satellite G/T	5.0 5.0 5.0 dB/K
SATELLITE		Satellite	SES1 16K IB	C/N Uplink	4.2 3.2 4.2 dB
		Location	-101.0 WL		
		Hub EIRP Contour	49.0 dBW	DOWNLINK	
		Remote G/T Contour	5.0 dB/K	Saturation EIRP	49.0 49.0 49.0 dBW
		Attn Setting	5.0 dB	Agg Output B.O.	4.0 4.0 4.0 dB
DATA		Xponder Gain	190.5 dB	Output Backoff/Crr	27.8 28.8 27.8 dB
		SFD at remote	-93.0 dBW/m2	Carrier Dn EIRP	21.2 20.2 21.2 dBW
		Xponder Bandwidth	36.0 MHz	BUDGET	
		Agg Input BO	8.0 dB	Dnlink Path Losses	205.6 205.6 206.1 dB
		Agg Output BO	4.0 dB	Rx Pointing Losses	0.4 0.4 0.4 dB
		Uplink Frequency	14.2400 GHz	CI Sky E/S G/T	35.2 35.2 35.2 dB/K
		Dnlink Frequency	11.9400 GHz	Degradation in G/T	0.2 0.2 1.0 dB
GROUND		Tx Antenna Dia	0.63 meters	C/N Downlink	18.7 17.7 17.4 dB
		HPA Max Output Pwr	25.0 Watts	C/N Uplink	4.2 3.2 4.2 dB
				C/N Downlink	18.7 17.7 17.4 dB
		Tx Antenna Gain	28.9 dBi	C/I Intermod (S/C)	40.6 39.6 40.6 dB
SEGMENT		Tx Pointing Losses	0.3 dB	C/I Uplink Adj Sat	5.2 4.2 5.2 dB
				COMPOSITE	
DATA		Rx Antenna Dia	7.6 meters	C/I Downlink Adj Sat	20.7 19.7 20.7 dB
		Rx Antenna Effcy	65 %	C/I Xpol	13.0 12.0 19.0 dB
		Rx Antenna Gain	57.0 dBi	C/I Adjacent Carrier	17.0 16.0 17.0 dB
		Rx Pointing Losses	0.4 dB	C/I co-freq beams	89.2 88.2 89.2 dB
		Pre LNA Losses	0.2 dB		
		LNA Noise Temp	90 K	C/(Nu,d)	4.0 3.0 4.0 dB
		Ant,etc Temp	45 K	C/(Nu,d,ims/c)	4.0 3.0 4.0 dB
		CI Sky Noise Temp	135 K	C/(Nu,d,im,i)Total	1.1 0.1 1.3 dB
				LINK MARGIN	5.0 4.0 5.2 dB
		Rx Clr Sky G/T	35.2 dB/K		
RAIN		Uplink Rain Attn	1.0 dB	MODEM	
		Dnlink Rain Attn	0.5 dB	Symbol Rate	256 256 256 ksps
MARGINS		Up Fade Pwr Cntrl	0.0 dB	FEC Code Rate	1/2 1/2 1/2
		Target Link Availability E-E	97.7 %	Minimum Ebi/No	2.1 2.1 2.1 dB
				10*log(Rbt/Noise BW)	-3.0 -3.0 -3.0 dB
SITE		Tx E/S Location	SES1 Houston, TX	Minimum Req'd C/N	-3.9 -3.9 -3.9 dB
		Tx E/S Latitude	29.8 N		
GEOGRAPHIC		Tx E/S Longitude	-95.4 W		
DATA		Tx E/S Elev Angle	54.7 deg		
				EARTH	
		Rx E/S Location	SES1 North Las Vegas, NV	RF Head Max Output Power	19.9 Watts
		Rx E/S Latitude	36.2 N	Misc Feed Losses etc	3.8 dB
		Rx E/S Longitude	-115.1 W	E/S EIRP Req'd twds S/C	dBW
		Rx E/S Elev Angle	45.4 deg	(Note: req'd to achieve link margin)	
XPOL		S/C Isolation	36.0 dB	HPA	
		Tx E/S Isolation	35.0 dB	Tx Pointing Losses	0.3 dB
ISOLATION		Rx E/S Isolation	26.0 dB	Max Clear Sky EIRP towards S/C	37.9 dBW
				RF Head Output BO (CI Sky)	0.9 dB
MISC		Uplink Free Sp Loss	206.8 dB		
		Dnlink Free Sp Loss	205.4 dB	Calculated EIRP Density Limit per link budget	13.8 dBW/4Hz
LOSSES		Uplink Atmos Attn	0.4 dB	Calculated PSD Limit per link budget	-15.1 dBW/4Hz
		Dnlink Atmos Attn	0.2 dB	Co-ordination Offset	0.0 dBW/4Hz

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET			
11:04 AM		Satellite: SES1 16K IB			
		0.63m Remote in SES1 Houston, TX		7.6m hub in SES1 North Las Vegas, NV	
BASELINE PARAMETERS		Value	Unit	S U M M A R Y	
				% Avail S/C Power Req'd/Crr	0.42 %
				% Xponder Bandwidth Req'd/Crr	4.00 %
				Clear Sky Link Margin	2.0 dB
				Power Equivalent Bandwidth	0.15 MHz
				Contract EIRP at reference contour	24.0 dBw
				LINK PERFORMANCE	
				CI Sky	Up Fade
				Dn Fade	Unit
CARRIER		Carrier Info Rate	512 Kbps	Satellite SFD	-93.0
		FEC Code Rate	0.500	Agg Input B.O.	8.0
		Crr Symbol Rate	512 Ksps	Input Backoff/Crr	31.8
DATA		CI Sky Req'd Ebi/No	2.1 dB	Crr Flux Density	-124.8
		No of bits/symbol	2.0 Bits	Gain of a Sq meter	44.5
		Demod BT Product	1.00	Uplink Path Losses	207.2
		Spreading factor		Carrier Up EIRP	37.9
		Spread Bandwidth	1024 kHz	Satellite G/T	5.0
		Crr Spacing Fctr	1.41 x Rs	C/N Uplink	4.2
		Carrier Spacing	1440 kHz		
SATELLITE		Satellite	SES1 16K IB	Saturation EIRP	49.0
		Location	-101.0 WL	Agg Output B.O.	4.0
		Hub EIRP Contour	49.0 dBW	Output Backoff/Crr	27.8
		Remote G/T Contour	5.0 dB/K	Carrier Dn EIRP	21.2
		Attn Setting	5.0 dB	Dnlink Path Losses	205.6
DATA		Xponder Gain	190.5 dB	Rx Pointing Losses	0.4
		SFD at remote	-93.0 dBW/m2	CI Sky E/S G/T	35.2
		Xponder Bandwidth	36.0 MHz	Degradation in G/T	0.2
		Agg Input BO	8.0 dB	C/N Downlink	18.7
		Agg Output BO	4.0 dB		
		Uplink Frequency	14.2400 GHz	C/N Uplink	4.2
		Dnlink Frequency	11.9400 GHz	C/N Downlink	18.7
GROUND		Tx Antenna Dia	0.63 meters	C/I Intermod (S/C)	34.6
		HPA Max Output Pwr	25.0 Watts	C/I Uplink Adj Sat	5.2
				C/I Downlink Adj Sat	20.7
		Tx Antenna Gain	28.9 dBi	C/I Xpol	13.0
		Tx Pointing Losses	0.3 dB	C/I Adjacent Carrier	17.0
SEGMENT		Rx Antenna Dia	7.6 meters	C/I co-freq beams	89.2
		Rx Antenna Effcy	65 %	C/(Nu,d)	4.0
DATA		Rx Antenna Gain	57.0 dBi	C/(Nu,d,ims/c)	4.0
		Rx Pointing Losses	0.4 dB	C/(Nu,d,im,i)Total	1.1
		Pre LNA Losses	0.2 dB	LINK MARGIN	2.0
		LNA Noise Temp	90 K		
		Ant,etc Temp	45 K	Symbol Rate	512
		CI Sky Noise Temp	135 K	FEC Code Rate	1/2
				Minimum Ebi/No	2.1
		Rx Clr Sky G/T	35.2 dB/K	10*log(Rbt/Noise BW)	0.0
RAIN		Uplink Rain Attn	1.0 dB	Minimum Req'd C/N	-0.9
		Dnlink Rain Attn	0.5 dB		
MARGINS		Up Fade Pwr Cntrl	0.0 dB	RF Head Max Output Power	19.9 Watts
		Target Link Availability E-E	97.7 %	Misc Feed Losses etc	3.8 dB
				E/S EIRP Req'd twds S/C	dBW
SITE		Tx E/S Location	SES1 Houston, TX	(Note: req'd to achieve link margin)	
		Tx E/S Latitude	29.8 N	Tx Pointing Losses	0.3 dB
GEOGRAPHIC		Tx E/S Longitude	-95.4 W	Max Clear Sky EIRP towards S/C	37.9 dBW
DATA		Tx E/S Elev Angle	54.7 deg		
				RF Head Output BO (CI Sky)	0.9 dB
		Rx E/S Location	SES1 North Las Vegas, NV		
		Rx E/S Latitude	36.2 N		
		Rx E/S Longitude	-115.1 W		
		Rx E/S Elev Angle	45.4 deg		
XPOL		S/C Isolation	36.0 dB		
ISOLATION		Tx E/S Isolation	35.0 dB		
DATA		Rx E/S Isolation	26.0 dB		
MISC		Uplink Free Sp Loss	206.8 dB	Calculated EIRP Desity Limit per link budget	13.8 dBW/4Hz
		Dnlink Free Sp Loss	205.4 dB	Calculated PSD Limit per link budget	-15.1 dBW/4Hz
LOSSES		Uplink Atmos Attn	0.4 dB	Co-ordination Offset	0.0 dBW/4Hz
		Dnlink Atmos Attn	0.2 dB		

BASELINE PARAMETERS		Value	Unit	SUMMARY					
9/9/2016		HughesNet LINK BUDGET							
11:07 AM		Satellite: SES1 12K OB							
		0.63 m Remote Located in		SES1 Houston, TX					
		Crr EIRP Density =		13.0 dBW/4 KHz					
CARRIER		Carrier Info Rate	37620 Kbps	% Avail S/C Power Reqd/Crr 100.0 %					
DATA		Net FEC Code Rate	0.667	% Xponder Bandwidth Reqd/Crr 100.0 %					
		Transmit Symbol Rate	30000 Ksps	Clear Sky Link Margin 1.5 dB					
		CI Sky Req'd Es/No	3.4 dB	Power Equivalent Bandwidth 36.0 MHz					
		No of bits/symbol	2.0 Bits	EIRP at 51.8 dBW reference contour 51.3 dBW					
		Demod BT Product	1.00	LINK PERFORMANCE					
		Crr Noise Bandwidth	30000 KHz	CI Sky	Up Fade	Dn Fade	Unit		
		Carrier Spacing	36000 KHz	Satellite SFD	-90.5	-90.5	-90.5	dBW/m2	
SATELLITE		Satellite	SES1 12K OB	Agg Input B.O.	3.0	3.0	3.0	dB	
DATA		Location	-101.0 WL	Input Backoff/Crr	3.0	3.0	3.0	dB	
		EIRP Contour at Remote	49.0 dBW	Crr Flux Density	-93.5	-93.5	-93.5	dBW/m2	
		G/T Contour at Hub	4.0 dB/K	UPLINK	Gain of a Sq meter	44.6	44.6	44.6	dB
		Attn Setting	9.0 dB	BUDGET	Uplink Path Losses	207.2	212.2	207.2	dB
		Xponder Gain	186.6 dB		Carrier Up EIRP	68.5	73.5	68.5	dBW
		SFD at Hub	-90.5 dBW/m2		Satellite G/T	4.0	4.0	4.0	dB/K
		Xponder Bandwidth	36.0 MHz		C/N Uplink	21.2	21.2	21.2	dB
		Agg Input BO	3.0 dB		EIRP Contour	49.0	49.0	49.0	dBW
		Agg Output BO	0.5 dB		Agg Output B.O.	0.5	0.5	0.5	dB
		Uplink Frequency	14.320 GHz	DOWNLINK	Output Backoff/Crr	0.5	0.5	0.5	dB
		Dnlink Frequency	12.020 GHz	BUDGET	Carrier Dn EIRP	48.5	48.5	48.5	dBW
		Tx Antenna Dia	7.6 meters		Dnlink Path Losses	205.6	205.6	206.1	dB
		HPA Max Output Pwr	150.0 Watts		Rx Pointing Losses	0.2	0.2	0.2	dB
		Waveguide Losses	2.0 dB		CI Sky E/S G/T	9.2	9.2	9.2	dB/K
		Tx Antenna Gain	59.3 dBi		Degradation in G/T	0.7	0.7	1.2	dB
		Tx Pointing Losses	0.6 dB		C/N Downlink	7.0	7.0	6.0	dB
		Max EIRP Toward S/C	78.5 dB		C/N Uplink	21.2	21.2	21.2	dB
GROUND		Rx Antenna Dia	0.63 meters		C/N Downlink	7.0	7.0	6.0	dB
DATA		Rx Antenna Gain	29.0 dBi	COMPOSITE	C/I Intermod (S/C)	99.0	99.0	99.0	dB
		Rx Pointing Losses	0.2 dB	LINK	C/I Uplink Adj Sat	21.2	21.2	21.2	dB
		Pre LNA Losses	0.8 dB		C/I Dnlink Adj Sat	10.3	10.3	10.3	dB
		LNA Noise Temp	9 K		C/I Xpol	18.4	18.0	18.4	dB
		Ant,etc Temp	28 K		C/I Intermod (E/S)	28.0	18.0	28.0	dB
		CI Sky Noise Temp	37 K		C/(Nu,d)	6.8	6.8	5.9	dB
		Rx Clr Sky G/T	9.2 dB/K		C/(Nu,d,ims/c)	6.8	6.8	5.9	dB
		Uplink Rain Attn	5.0 dB		C/(Nu,d,im,i)Total	4.9	4.7	4.3	dB
RAIN		Dnlink Rain Attn	0.5 dB		LINK MARGIN	1.5	1.3	0.9	dB
MARGINS		Up Fade Pwr Cntrl	5.0 dB	MODEM	Modulation	QPSK	QPSK	QPSK	
		Target Link Availability E-E	97.71 %		FEC Rate	2/3	2/3	2/3	
		Tx E/S Location	SES1 North Las Vegas, NV		Minimum Req'd Ebi/No	2.2	2.2	2.2	dB
SITE		Tx E/S Latitude	36.2 N		10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB
GEOGRAPHIC		Tx E/S Longitude	-115.1 W		Minimum Req'd C/N	3.4	3.4	3.4	dB
DATA		Tx E/S Elev Angle	45 deg		E/S EIRP/Crr Req'd (CI Sky)	68.5 dBW			
		Rx E/S Location	SES1 Houston, TX		Tx Gain - Pointing Loss	58.7 dB			
		Rx E/S Latitude	29.8 N	EARTH	Waveguide Losses	2.0 dB			
		Rx E/S Longitude	-95.4 W	STATION	Tx Power Req'd/Cxr (clear sky)	11.8 dBW			
		Rx E/S Elev Angle	54.7 deg	HPA		15.1 watts			
ISOLATION		S/C Isolation	36.0 dB		Uplink Power Control	5.0 dB			
DATA		Tx E/S Isolation	35.0 dB		TX Power Req'd/Cxr (full UPC)	16.8 dBW			
		Rx E/S Isolation	20.0 dB			47.7 watts			
MISC		Uplink Free Sp Loss	207.0 dB		Dnlink EIRP Dens @ Beam Peak (52.3 dBW)	13.0 dBW/4KHz			
LOSSES		Dnlink Free Sp Loss	205.4 dB						
		Uplink Atmos Attn	0.2 dB						
		Dnlink Atmos Attn	0.3 dB						

9-Sep-16		256ksps R1/2 HN INROUTE LINK BUDGET					
11:14 AM		Satellite: SES1 16K IB					
		0.63m Remote in SES1 Raleigh NC		7.6m hub in SES1 North Las Vegas, NV			
BASELINE PARAMETERS			Value	Unit	SUMMARY		
CARRIER DATA	Carrier Info Rate	256	Kbps	% Avail S/C Power Reqd/Crr		0.41 %	
	FEC Code Rate	0.500		% Xponder Bandwidth Reqd/Crr		4.00 %	
	Crr Symbol Rate	256	Ksps	Clear Sky Link Margin		4.9 dB	
	CI Sky Reqd Ebi/No	2.1	dB	Power Equivalent Bandwidth		0.15 MHz	
	No of bits/symbol	2.0	Bits	Contract EIRP at reference contour		23.8 dBw	
	Demod BT Product	1.00		LINK PERFORMANCE		CI Sky Up Fade Dn Fade Unit	
	Spreading factor			Satellite SFD	-93.0	-93.0	-93.0 dBW/m2
	Spread Bandwidth	1024	kHz	Agg Input B.O.	8.0	8.0	8.0 dB
	Crr Spacing Fctr	1.41	x Rs	Input Backoff/Crr	32.0	33.0	32.0 dB
Carrier Spacing	1440	kHz	Crr Flux Density	-125.0	-126.0	-125.0 dBW/m2	
SATELLITE DATA	Satellite	SES1 16K IB		Gain of a Sq meter	44.5	44.5	44.5 dBi
	Location	-101.0	WL	UPLINK Uplink Path Losses	207.5	208.5	207.5 dB
	Hub EIRP Contour	49.0	dBW	BUDGET Carrier Up EIRP	38.0	38.0	38.0 dBW
	Remote G/T Contour	5.0	dB/K	Satellite G/T	5.0	5.0	5.0 dB/K
	Attn Setting	5.0	dB	C/N Uplink	4.0	3.0	4.0 dB
	Xponder Gain	190.5	dB	Saturation EIRP	49.0	49.0	49.0 dBW
	SFD at remote	-93.0	dBW/m2	Agg Output B.O.	4.0	4.0	4.0 dB
	Xponder Bandwidth	36.0	MHz	Agg Output BO	28.0	29.0	28.0 dB
	Agg Input BO	8.0	dB	Carrier Dn EIRP	21.0	20.0	21.0 dBW
GROUND SEGMENT DATA	Agg Output BO	4.0	dB	DOWNLINK Dnlink Path Losses	205.6	205.6	206.1 dB
	Uplink Frequency	14.2400	GHz	BUDGET Rx Pointing Losses	0.4	0.4	0.4 dB
	Dnlink Frequency	11.9400	GHz	CI Sky E/S G/T	35.2	35.2	35.2 dB/K
	Tx Antenna Dia	0.63	meters	Degradation in G/T	0.2	0.2	1.0 dB
	HPA Max Output Pwr	25.0	Watts	C/N Downlink	18.5	17.5	17.2 dB
	Tx Antenna Gain	29.0	dBi	C/N Uplink	4.0	3.0	4.0 dB
	Tx Pointing Losses	0.3	dB	C/N Downlink	18.5	17.5	17.2 dB
	Rx Antenna Dia	7.6	meters	C/I Intermod (S/C)	40.4	39.4	40.4 dB
	Rx Antenna Effcy	65	%	C/I Uplink Adj Sat	5.0	4.0	5.0 dB
RAIN MARGINS DATA	Rx Antenna Gain	57.0	dBi	COMPOSITE C/I Downlink Adj Sat	20.3	19.3	20.3 dB
	Rx Pointing Losses	0.4	dB	LINK C/I Xpol	12.9	11.9	18.9 dB
	Pre LNA Losses	0.2	dB	C/I Adjacent Carrier	17.0	16.0	17.0 dB
	LNA Noise Temp	90	K	C/I co-freq beams	89.1	88.1	89.1 dB
	Ant,etc Temp	45	K	C/(Nu,d)	3.9	2.9	3.8 dB
	CI Sky Noise Temp	135	K	C/(Nu,d,ims/c)	3.9	2.9	3.8 dB
	Rx Clr Sky G/T	35.2	dB/K	C/(Nu,d,im,i)Total	0.9	-0.1	1.1 dB
	Uplink Rain Attn	1.0	dB	LINK MARGIN	4.9	3.9	5.0 dB
	Dnlink Rain Attn	0.5	dB	MODEM Symbol Rate	256	256	256 ksps
SITE GEOGRAPHIC DATA	Up Fade Pwr Cntrl	0.0	dB	FEC Code Rate	1/2	1/2	1/2
	Target Link Availability E-E	97.7	%	MODEM Minimum Ebi/No	2.1	2.1	2.1 dB
	Tx E/S Location	SES1 Raleigh NC		10*log(Rbt/Noise BW)	-3.0	-3.0	-3.0 dB
	Tx E/S Latitude	35.8	N	Minimum Reqd C/N	-3.9	-3.9	-3.9 dB
	Tx E/S Longitude	-78.6	W	RF Head Max Output Power		19.9	Watts
	Tx E/S Elev Angle	42.1	deg	Misc Feed Losses etc		3.8	dB
	Rx E/S Location	SES1 North Las Vegas, NV		E/S EIRP Reqd twds S/C			dBW
	Rx E/S Latitude	36.2	N	(Note: reqd to achieve link margin)			
	Rx E/S Longitude	-115.1	W	HPA Tx Pointing Losses		0.3	dB
XPOL ISOLATION DATA	Rx E/S Elev Angle	45.4	deg	Max Clear Sky EIRP towards S/C		38.0	dBW
	S/C Isolation	36.0	dB	RF Head Output BO (CI Sky)		0.9	dB
	Tx E/S Isolation	35.0	dB	Calculated EIRP Desity Limit per link budget		13.8	dBW/4Hz
MISC LOSSES	Rx E/S Isolation	26.0	dB	Calculated PSD Limit per link budget		-15.1	dBW/4Hz
	Uplnk Free Sp Loss	207.0	dB	Co-ordination Offset		0.0	dBW/4Hz
	Dnlnk Free Sp Loss	205.4	dB				
Uplink Atmos Attn	0.4	dB					
Dnlink Atmos Attn	0.2	dB					

9-Sep-16		512ksps R1/2 HN INROUTE LINK BUDGET									
11:17 AM		Satellite: SES1 16K IB		0.63m Remote in SES1 Raleigh NC		7.6m hub in SES1 North Las Vegas, NV					
BASELINE PARAMETERS			Value	Unit	S U M M A R Y						
CARRIER					% Avail S/C Power Reqd/Crr	0.41	%				
DATA					% Xponder Bandwidth Reqd/Crr	4.00	%				
CARRIER			Carrier Info Rate	512	Kbps	Clear Sky Link Margin	1.8	dB			
DATA			FEC Code Rate	0.500		Power Equivalent Bandwidth	0.15	MHz			
CARRIER			Crr Symbol Rate	512	Ksps	Contract EIRP at reference contour	23.8	dBW			
DATA			CI Sky Reqd Ebi/No	2.1	dB	LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
DATA			No of bits/symbol	2.0	Bits	Satellite SFD	-93.0	-93.0	-93.0	dBW/m2	
DATA			Demod BT Product	1.00		Agg Input B.O.	8.0	8.0	8.0	dB	
DATA			Spreading factor			Input Backoff/Crr	32.0	33.0	32.0	dB	
DATA			Spread Bandwidth	1024	kHz	Crr Flux Density	-125.0	-126.0	-125.0	dBW/m2	
DATA			Crr Spacing Fctr	1.41	x Rs	Gain of a Sq meter	44.5	44.5	44.5	dB	
DATA			Carrier Spacing	1440	kHz	UPLINK	Uplink Path Losses	207.5	208.5	207.5	dB
SATELLITE			Satellite	SES1 16K IB		BUDGET	Carrier Up EIRP	38.0	38.0	38.0	dBW
DATA			Location	-101.0	WL	Satellite G/T	5.0	5.0	5.0	dB/K	
DATA			Hub EIRP Contour	49.0	dBW	C/N Uplink	4.0	3.0	4.0	dB	
DATA			Remote G/T Contour	5.0	dB/K	Saturation EIRP	49.0	49.0	49.0	dBW	
DATA			Attn Setting	5.0	dB	Agg Output B.O.	4.0	4.0	4.0	dB	
DATA			Xponder Gain	190.5	dB	Output Backoff/Crr	28.0	29.0	28.0	dB	
DATA			SFD at remote	-93.0	dBW/m2	Carrier Dn EIRP	21.0	20.0	21.0	dBW	
DATA			Xponder Bandwidth	36.0	MHz	DOWNLINK	Dnlink Path Losses	205.6	205.6	206.1	dB
DATA			Agg Input BO	8.0	dB	BUDGET	Rx Pointing Losses	0.4	0.4	0.4	dB
DATA			Agg Output BO	4.0	dB	CI Sky E/S G/T	35.2	35.2	35.2	dB/K	
DATA			Uplink Frequency	14.2400	GHz	Degradation in G/T	0.2	0.2	1.0	dB	
DATA			Dnlink Frequency	11.9400	GHz	C/N Downlink	18.5	17.5	17.2	dB	
GROUND			Tx Antenna Dia	0.63	meters	C/N Uplink	4.0	3.0	4.0	dB	
SEGMENT			HPA Max Output Pwr	25.0	Watts	C/N Downlink	18.5	17.5	17.2	dB	
DATA			Tx Antenna Gain	29.0	dB	C/I Intermod (S/C)	34.4	33.4	34.4	dB	
DATA			Tx Pointing Losses	0.3	dB	C/I Uplink Adj Sat	5.0	4.0	5.0	dB	
DATA			Rx Antenna Dia	7.6	meters	COMPOSITE	C/I Downlink Adj Sat	20.3	19.3	20.3	dB
DATA			Rx Antenna Effcy	65	%	LINK	C/I Xpol	12.9	11.9	15.9	dB
DATA			Rx Antenna Gain	57.0	dB	C/I Adjacent Carrier	17.0	16.0	17.0	dB	
DATA			Rx Pointing Losses	0.4	dB	C/I co-freq beams	89.1	88.1	89.1	dB	
DATA			Pre LNA Losses	0.2	dB	C/(Nu,d)	3.9	2.9	3.8	dB	
DATA			LNA Noise Temp	90	K	C/(Nu,d,ims/c)	3.9	2.9	3.8	dB	
DATA			Ant,etc Temp	45	K	C/(Nu,d,im,i)Total	0.9	-0.1	1.1	dB	
DATA			CI Sky Noise Temp	135	K	LINK MARGIN	1.8	0.8	2.0	dB	
DATA			Rx Clr Sky G/T	35.2	dB/K	Symbol Rate	512	512	512	ksps	
RAIN			Uplink Rain Attn	1.0	dB	FEC Code Rate	1/2	1/2	1/2		
MARGINS			Dnlink Rain Attn	0.5	dB	MODEM	Minimum Ebi/No	2.1	2.1	2.1	dB
MARGINS			Up Fade Pwr Cntrl	0.0	dB		10*log(Rbt/Noise BW)	0.0	0.0	0.0	dB
MARGINS			Target Link Availability E-E	97.7	%		Minimum Reqd C/N	-0.9	-0.9	-0.9	dB
SITE			Tx E/S Location	SES1 Raleigh NC		EARTH		RF Head Max Output Power	19.9	Watts	
GEOGRAPHIC			Tx E/S Latitude	35.8	N	STATION	Misc Feed Losses etc	3.8	dB		
DATA			Tx E/S Longitude	-78.6	W	HPA	E/S EIRP Reqd twds S/C		dBW		
DATA			Tx E/S Elev Angle	42.1	deg		(Note: reqd to achieve link margin)				
DATA			Rx E/S Location	SES1 North Las Vegas, NV			Tx Pointing Losses	0.3	dB		
DATA			Rx E/S Latitude	36.2	N		Max Clear Sky EIRP towards S/C	38.0	dBW		
DATA			Rx E/S Longitude	-115.1	W		RF Head Output BO (CI Sky)	0.9	dB		
DATA			Rx E/S Elev Angle	45.4	deg						
XPOL			S/C Isolation	36.0	dB	MISC		Upnk Free Sp Loss	207.0	dB	
ISOLATION			Tx E/S Isolation	35.0	dB	LOSSES		Dnlink Free Sp Loss	205.4	dB	
DATA			Rx E/S Isolation	26.0	dB			Uplink Atmos Attn	0.4	dB	
								Dnlink Atmos Attn	0.2	dB	
								Calculated EIRP Desity Limit per link budget	13.8	dBW/4Hz	
								Calculated PSD Limit per link budget	-15.1	dBW/4Hz	
								Co-ordination Offset	0.0	dBW/4Hz	

9/9/2016

HughesNet LINK BUDGET

11:17 AM

Satellite: SES1 12K OB

0.63 m Remote Located in SES1 Raleigh NC

Crr EIRP Density = 13.0 dBW/4 KHz

BASELINE PARAMETERS		Value	Unit	SUMMARY					
				% Avail S/C Power Req/Crr	100.0 %				
				% Xponder Bandwidth Req/Crr	100.0 %				
				Clear Sky Link Margin	0.9 dB				
				Power Equivalent Bandwidth	36.0 MHz				
				EIRP at 51.8 dBW reference contour	51.3 dBW				
				LINK PERFORMANCE		CI Sky	Up Fade	Dn Fade	Unit
CARRIER	Carrier Info Rate	37620	Kbps	Satellite SFD	-90.5	-90.5	-90.5	dBW/m2	
	Net FEC Code Rate	0.667		Agg Input B.O.	3.0	3.0	3.0	dB	
	Transmit Symbol Rate	30000	Ksps	Input Backoff/Crr	3.0	3.0	3.0	dB	
CARRIER	CI Sky Req/Es/No	3.4	dB	Crr Flux Density	-93.5	-93.5	-93.5	dBW/m2	
DATA	No of bits/symbol	2.0	Bits	UPLINK Gain of a Sq meter	44.6	44.6	44.6	dBi	
	Demod BT Product	1.00		BUDGET Uplink Path Losses	207.2	212.2	207.2	dB	
	Crr Noise Bandwidth	30000	KHz	Carrier Up EIRP	68.5	73.5	68.5	dBW	
	Carrier Spacing	36000	KHz	Satellite G/T	4.0	4.0	4.0	dB/K	
SATELLITE	Satellite	SES1 12K OB		C/N Uplink	21.2	21.2	21.2	dB	
	Location	-101.0 WL		DOWNLINK EIRP Contour	50.0	50.0	50.0	dBW	
	EIRP Contour at Remote	50.0	dBW	Agg Output B.O.	0.5	0.5	0.5	dB	
	G/T Contour at Hub	4.0	dB/K	Output Backoff/Crr	0.5	0.5	0.5	dB	
	Attn Setting	9.0	dB	Carrier Dn EIRP	49.5	49.5	49.5	dBW	
SATELLITE	Xponder Gain	187.6	dB	DOWNLINK Dnlink Path Losses	205.9	205.9	206.4	dB	
DATA	SFD at Hub	-90.5	dBW/m2	BUDGET Rx Pointing Losses	0.2	0.2	0.2	dB	
	Xponder Bandwidth	36.0	MHz	CI Sky E/S G/T	9.3	9.3	9.3	dB/K	
	Agg Input BO	3.0	dB	Degradation in G/T	0.9	0.9	1.3	dB	
	Agg Output BO	0.5	dB	C/N Downlink	7.7	7.7	6.7	dB	
	Uplink Frequency	14.320	GHz	C/N Uplink	21.2	21.2	21.2	dB	
	Dnlink Frequency	12.020	GHz	C/N Downlink	7.7	7.7	6.7	dB	
GROUND	Tx Antenna Dia	7.6	meters	C/I Intermod (S/C)	99.0	99.0	99.0	dB	
	HPA Max Output Pwr	150.0	Watts	C/I Uplink Adj Sat	20.9	20.9	20.9	dB	
	Waveguide Losses	2.0	dB	COMPOSITE C/I Dnlink Adj Sat	7.6	7.6	7.6	dB	
	Tx Antenna Gain	59.3	dBi	LINK C/I Xpol	18.4	18.0	18.4	dB	
	Tx Pointing Losses	0.6	dB	C/I Intermod (E/S)	28.0	18.0	28.0	dB	
	Max EIRP Toward S/C	78.5	dB	C/(Nu,d)	7.5	7.5	6.5	dB	
GROUND	Rx Antenna Dia	0.63	meters	C/(Nu,d,ims/c)	7.5	7.5	6.5	dB	
SEGMENT	Rx Antenna Gain	29.0	dBi	C/(Nu,d,im,i)Total	4.3	4.1	3.8	dB	
DATA	Rx Pointing Losses	0.2	dB	LINK MARGIN	0.9	0.7	0.4	dB	
	Pre LNA Losses	0.8	dB	Modulation	QPSK	QPSK	QPSK		
	LNA Noise Temp	9	K	FEC Rate	2/3	2/3	2/3		
	Ant,etc Temp	28	K	Minimum Req/Crr	2.2	2.2	2.2	dB	
	CI Sky Noise Temp	37	K	10*log(Rbt/Noise BW)	3.0	3.0	3.0	dB	
	Rx Clr Sky G/T	9.3	dB/K	Minimum Req/C/N	3.4	3.4	3.4	dB	
RAIN	Uplink Rain Attn	5.0	dB	E/S EIRP/Crr Req/Crr (CI Sky)	68.5 dBW				
MARGINS	Dnlink Rain Attn	0.5	dB	Tx Gain - Pointing Loss	58.7 dB				
	Up Fade Pwr Cntrl	5.0	dB	Waveguide Losses	2.0 dB				
	Target Link Availability E-E	97.71	%	TX Power Req/Cxr (clear sky)	11.8 dBW				
				HPA	15.1 watts				
SITE	Tx E/S Location	SES1 North Las Vegas, NV		Uplink Power Control	5.0 dB				
	Tx E/S Latitude	36.2 N		TX Power Req/Cxr (full UPC)	16.8 dBW				
	Tx E/S Longitude	-115.1 W			47.7 watts				
GEOGRAPHIC	Tx E/S Longitude	-115.1 W		Dnlink EIRP Dens @ Beam Peak (52.3 dBW)	13.0 dBW/4KHz				
DATA	Tx E/S Elev Angle	45 deg							
	Rx E/S Location	SES1 Raleigh NC							
	Rx E/S Latitude	35.8 N							
	Rx E/S Longitude	-78.6 W							
	Rx E/S Elev Angle	42.1 deg							
ISOLATION	S/C Isolation	36.0	dB						
DATA	Tx E/S Isolation	35.0	dB						
	Rx E/S Isolation	20.0	dB						
MISC	Uplink Free Sp Loss	207.0	dB						
LOSSES	Dnlink Free Sp Loss	205.6	dB						
	Uplink Atmos Attn	0.2	dB						
	Dnlink Atmos Attn	0.3	dB						