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Rate / Reach Guidelines
Uverse & iNID

Uverse Sync Requirements *07/12/2011*

1. Test F2 P-commit pair using test-set metallic test capabilities to detect faults

* Bonding and Grounding
* TDR Test (SELT if TDR not avail) – NO FAULTS! NO SVC AFF BRIDGED TAP! (R&R)
* EWL Loop length from VRAD to NID
* AT&T Copper Qualification Script (HST-3000 w/ VDSL Module)

Metallic Testing	Acceptable	Marginal	Not Acceptable	Notes
Foreign AC Voltage (T-R)	< 3 VAC	N/A	N/A	
Foreign AC Voltage (T-G & R-G)	< 4 VAC	N/A	N/A	
Foreign DC Voltage (T-R,T-G,R-G)	< 3 VDC	N/A	N/A	
Insulation Resist. (Leakage Test) T-R, T-G, R-G	> 20 Mohm	N/A	< 20 Mohm	Pair Imbal – A fault condition – A diff >40% from one reading (T-G or R-G) to the other
Capacitive Balance	< 1%			
Longitudinal Balance	> 60 dB	50 to 60 dB	< 50 dB	
Power Influence	< 80 dBm C	80 to 90 dBm C	>90 dBm C	If in sync and > 90 dBm, check for line errors
Circuit Noise	< 20 dBm C	20-30 dBm C	> 30 dBm C	
Wideband Noise	< -50 dBM			(J20K8 filter)
Impulse Noise			>= +/- 3dB (High/Low)	J20K8 filter 5-minute duration – threshold of -43dBM. >1 hit = Failed

2. Test with LSBBT for compliance with SAI/NID Thresholds (v08/20/2010)

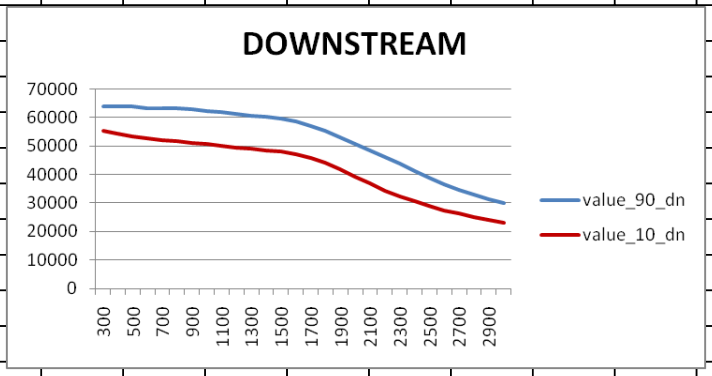
	19 MEG				25 MEG				32 MEG			
	3400 ft 26g EWL				3000 ft 26g EWL				2200 ft 26g EWL			
	SAI		NID		SAI		NID		SAI		NID	
SHOWTIME (VDSL2)	UP	DOWN	UP	DOWN	UP	DOWN	UP	DOWN	UP	DOWN	UP	DOWN
ACTUAL RATE	2.040m	19.192m	900k	19.192m	2.040m	25.208m	900k	25.208m	5.040m	32.200m	5.040m	32.200m
MAX LINE RATE	>2m	>55m	>2m	>19m	>2m	>55m	>2m	>25m	>4.95m	>55m	>4.95m	>32m
CAPACITY	!!!	!!!	!!!	!!!	!!!	!!!	!!!	!!!	!!!	!!!	!!!	!!!
NOISE MARGIN	>25db	>25db	≥6db	≥9db	>25db	>25db	≥6db	≥9db	>32db	>32db	>6db	>9db
CRC errors	0	0	<3/min	<3/min	0	0	<3/min	<3/min	0	0	<3/min	<3/min
FEC errors (per minute)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
all other errors	0	0	0	0	0	0	0	0	0	0	0	0
test duration is	3 minutes		3 minutes		3 minutes		3 minutes		3 minutes		3 minutes	

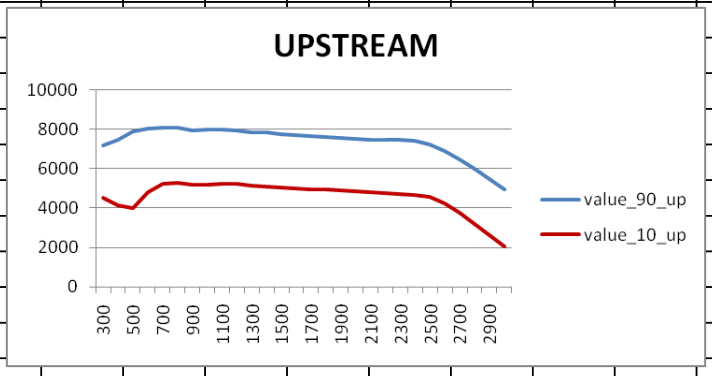
A combination of max line rate, Noise Margin (SNR), and error counts must be used to determine circuit health (i.e., not Capacity)!
Important: If the technician has tested the loop with a hand held test meter and all parameters pass and downstream noise margin readings are greater than or equal to 15dB or upstream rate of greater than or equal to 2040kbps for 19m and 25m/5040kbps for 32m (VDSL2) and there are no errors, it is not necessary to remove the BT unless the customer or Premises Technician is reporting a service affecting condition. Use LSBBT (http://lsbbt.sbc.com) to get the Max Upstream rate!

RATE & REACH NOTES: 19 Meg Profile	RATE & REACH NOTES: 25 Meg Profile	RATE & REACH NOTES: 32 Meg Profile
*I&R – 19Meg Profile – 2700' plus – at the NID if CBR (US) <900 Kbps check for other impairments.	*25 Meg Profile at the NID the goal is a CBR > 2 Mbps (US), if not check for other impairments.	*I&R – at the NID if < 4.9 Mbps check for other impairments. The test set and RG will sync at 2.12 Mbps. Marginal info is for troubleshooting purposes only.
** > 90% Capacity – check CBR (US) if > 900 then there is a > 50% chance that up to 95% Capacity is acceptable. > 90% Capacity use the combination of CBR and local installation practices.	**>90% Capacity & CBR > 900 Kbps & Sync - proceed with the installation and check BBT for errors. Errors – then check for other impairments. RG will sync at 832 Kbps.	**>90% Capacity & CBR > 2.0 Mbps & Sync – proceed with installation and check BBT for errors. Errors-check for other impairment.

The intent of the following charts and graphs is to provide a guide by which technicians can determine if the maximum bit rates (MABR) achieved on Uverse syncs is within the range it should be for the corresponding equivalent working length (EWL). It is NOT an absolute, but instead should be used to assist with Rate and Reach based on the EWL along with all other requirements on Uverse Syncs. These would include passing copper tests, Rate and Reach minimum MABR's, SNR readings and minimum error requirements.

	Downstream kbps		Upstream kbps	
EWL	MAX	MIN	MAX	MIN
300'	64000	58633	8142	5086
400'	64000	57994	8597	4749
500'	64000	57232	8994	4661
600'	64000	56645	9110	5543
700'	64000	56324	9138	5842
800'	64000	56025	9108	5842
900'	64000	55498	9033	5728
1000'	64000	54945	9082	5777
1100'	64000	54359	9089	5807
1200'	64000	53833	8987	5773
1300'	63839	53276	8942	5696
1400'	63231	52918	8890	5626
1500'	62637	52417	8837	5595
1600'	61576	51423	8743	5536
1700'	60052	49996	8743	5498
1800'	58397	48076	8691	5463
1900'	56421	45723	8646	5414
2000'	54416	43246	8590	5369
2100'	51995	40773	8576	5317
2200'	49981	38282	8534	5272
2300'	47833	35865	8556	5229
2400'	45757	33744	8532	5175
2500'	43452	31831	8321	5089
2600'	41215	29974	8038	4747
2700'	39007	28451	7651	4250
2800'	37113	27199	7130	3677
2900'	35925	26227	6673	3096
3000'	33964	25266	6190	2527





iNID Pair Bonding
Refer to ATT-TELCO-FLASH-000-000-532 for additional information

I*J5G	Uverse iNID Service Order
I*J58	Uverse iNID Service Order Returned to Cable

*=R for Residence or B for Business

Service Parameters

Metallic Characteristics		***Sync Characteristics***			
Measurement	*Criteria*	*Measurement*	*Pairs*		*Composite*
DC Voltag	<3 VDC T-R, R-G, T-G	Min Up-Stream	Pair 1	512 kbps	1 MBps
AC Voltage	<3 VAC T-R, <4 VAC R-G, T-G		Pair 2	512 kbps	
Leakage Resistance	>20 MOhm	Min Down-Stream	Pair 1	8.0 MBps	25 MBps (3.4-4.5 kft)
Longitudinal Balance	>= 60		Pair 2	8.0 MBps	19 MBps (4.5-5.5 kft)
Power Influence	<80 dBrn C	Upstream Noise Margin	Pair 1	6 dB	
Circuit Noise	<20 dBrn C		Pair 2	6 dB	
Load Coil	None	Downstream Noise Margin	Pair 1	9 dB	
Bridge Tap	None		Pair 2	9 dB	
WB Noise	< -50 dBm	CV	Pair 1	<4 / min	
Impulse Noise	< 1 hits in 2 min at or above -33dB		Pair 2	<4 / min	
	threshold (G-Filter) & -43dBm (J Filter)				

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Parameter Guidelines
IPDSLAM

IPDSLAM

IPDSLAM at this time is a CO solution U-verse HSIA IP based DSL service. While there is a BAN number associated with this account, it is not a VDSL signal. We must utilize an ADSL meter for testing. This product will be deployed as RT sometime in the future. I&M does only the sync on these and the Uverse Premise Tech does all inside work (except in non Uverse areas). The job types for IPDSL are I*J5O (Uverse areas) or I*JFO (non Uverse areas). Please refer to to ATT-TELCO-IS-002-202-176 for additional information.

22 State IPDSLAM - CO	Min Down-stream Data Rate (kbps)	Min Upstream Data Rate (kbps)	Max Upstream Atten. (dB)	Max Code Violations (CV) in 5 minutes	SNR / Target Noise Margin 6dB Profile	SNR / Target Noise Margin 9dB Profile	SNR / Target Noise Margin 12dB Profile	Max Loop Length 26g EWL (kFt)	Max DC Loop Resist. @ 70deg (Ohms)	Maximize Capacitive Length (kFt)
18 M (Max Plus)	12032	128	5	25	>= 6dB	>= 9dB	>= 12dB	4.8	400	7.5
12 M (Max)	6048	128	17	25	>= 6dB	>= 9dB	>= 12dB	8.1	680	12.7
6 M (Elite)	3040	128	26	25	>= 6dB	>= 9dB	>= 12dB	10.2	850	15.9
3 M (Pro)	1568	128	32	25	>= 6dB	>= 9dB	>= 12dB	11.7	980	18.0
1.5 M (Express)	800	128	35	25	>= 6dB	>= 9dB	>= 12dB	12.9	1080	18.0
768 K (Basic)	224	128	44	25	>= 6dB	>= 9dB	>= 12dB	15.0	1250	18.0

22 State IPDSLAM - RT	Min Down-stream Data Rate (kbps)	Min Upstream Data Rate (kbps)	Max Upstream Atten. (dB)	Max Code Violations (CV) in 5 minutes	SNR / Target Noise Margin 6dB Profile	SNR / Target Noise Margin 9dB Profile	SNR / Target Noise Margin 12dB Profile	Max Loop Length 26g EWL (kFt)	Max DC Loop Resist. @ 70deg (Ohms)	Maximize Capacitive Length (kFt)
18 M (Max Plus)	12032	128	5	25	>= 6dB	>= 9dB	>= 12dB	4.1	400	6.4
12 M (Max)	6048	128	19	25	>= 6dB	>= 9dB	>= 12dB	7.5	630	11.7
6 M (Elite)	3040	128	27	25	>= 6dB	>= 9dB	>= 12dB	9.7	810	15.2
3 M (Pro)	1568	128	32	25	>= 6dB	>= 9dB	>= 12dB	11.3	940	17.7
1.5 M (Express)	800	128	36	25	>= 6dB	>= 9dB	>= 12dB	12.5	1040	18.0
768 K (Basic)	224	128	45	25	>= 6dB	>= 9dB	>= 12dB	15.0	1250	18.0

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Parameter Guidelines
DSL

DSL

This document defines the acceptable loop parameters and the minimum data rates for each ADSL-based service offered in the AT&T 9-state footprint. Acceptable parameters are defined for cases where the line can initialize (sync) and for those cases where it cannot initialize (no sync). .

Minimum Data Rates

Product Name (Retail)	Min Down-stream Data Rate (kbps)	Min Upstream Data Rate (kbps)	Max Upstream Atten. (dB)	Max Code Violations (CV) in 5 minutes	Max Loop Length in LQS 26g EWL (kFt)	Max DC Loop Resist. @ 70deg (Ohms)	Maximize Capacitive Length (kFt)
Up to 6Mbps - Consumer	3040	128	20	100	6.5	540	10.2
Up to 6Mbps - (ADSL2+)	3040	128	20	100	8.0	670	12.5
Up to 3Mbps - Consumer	1568	128	24	50	9.5	790	14.8
Up to 1.5Mbps - Consumer	800	128	29	25	11.1	930	17.3
Up to 768kbps - Consumer	200	128	33	12	15.0	1250	18.0
4-6 Mbps - Business	4000	640	45	100	6.9	580	10.8
2-4 Mbps - Business	2016	640	21	50	8.1	680	12.7
1.5 Mbps - Business	1504	512	24	25	9.3	780	14.5
768 kbps - Business	768	512	28	12	9.4	780	14.7
384 kbps - Business	384	384	36	12	12.0	1000	18.0
192 kbps - Business	200	192	45	12	15.0	1250	18.0

Follow all POTS troubleshooting guidelines and test parameters with exception to the following:
Insulation Resistance - The dc insulation resistance, tip-to-ring, shall be at least 2.0 MΩ. The dc insulation resistance, measured both tip-to-ground and ring-to-ground, shall be at least 2.0 MΩ.
Foreign Voltage - The foreign dc voltage shall be measured, from either conductor to ground, with a voltmeter having a resistance of 100,000 Ω. As an objective, the foreign dc voltage should be 3.0 Vdc or less. In no case shall it exceed 5.0 Vdc. The foreign ac voltage, when measured from either conductor to ground with a voltmeter having a resistance of 100,000 Ω and with the far end not terminated, shall be 10 Vac or less.
Power Influence -While not directly applicable to DSL, this measurement provides insight into the overall effectiveness of bonding and grounding in the area
No load coils!! Watch for bridge taps close to the subscriber or DSLAM as they could cause service issues!!

Copper Testing Thresholds

Copper Test Parameter	Units	Acceptable	Marginal	Not Acceptable	**Notes**
TIP-RING VOLTS DC	V (DC)	0 to 3	3.1 to 5	>5	
RING-GROUND VOLTS DC	V (DC)	0 to 3	3.1 to 5	>5	
TIP-GROUND VOLTS DC	V (DC)	0 to 3	3.1 to 5	>5	
TIP-RING VOLTS AC	V (AC)	0 to 3	3.1 to 5	>5	
RING-GROUND VOLTS AC	V (AC)	0 to 4	4.1 to 6	>6	
TIP-GROUND VOLTS AC	V (AC)	0 to 4	4.1 to 6	>6	
TIP-RING RESISTANCE	MOhms	>=3.5	2 to 3.4	<2	
RING-GROUND RESISTANCE	MOhms	>=3.5	2 to 3.4	<2	
TIP-GROUND RESISTANCE	MOhms	>=3.5	2 to 3.4	<2	
METALLIC/CIRCUIT NOISE	dBmC	<=20	20 to 30	>30	
POWER INFLUENCE	dBmC	<=80		>80	
LONGITUDINAL BALANCE	dB	>=60	50 to 59	<50	
BALANCE (PI-N) aka noise bal	dB	>=60	50 to 59	<50	
STRESS (SIDEKICK)		<=20	21 to 30	>30	
LOAD COILS		Load coils must be removed for ADSL service			

Note that the values recommended here differ from, and are more stringent than, those typically used in support of voiceband (POTS) telecommunications. These values represent our best judgment regarding both the loop lengths used in support of DSL and the degree to which an ADSL may be impaired while providing acceptable service.

Insulation Resistance

The dc insulation resistance, tip-to-ring, shall be at least 1.0 MΩ. The dc insulation resistance, measured both tip-to-ground and ring-to-ground, shall be at least 2 MΩ.

Foreign Voltage

*The foreign dc voltage shall be measured, from either conductor to ground, with a voltmeter having a resistance of 100,000 Ω. As an objective, the foreign dc voltage should be 5.0 Vdc or less. The foreign ac voltage, when measured from either conductor to ground with a voltmeter having a resistance of 100,000 Ω and with the far end not terminated, should be 5.0 Vac or less. Note that lower values (5-10 Vac) of induced AC voltage while undesirable would not fail the circuit from being turned up. *For values of >50Vac contact a transmission engineer.*

Power Influence

While not directly applicable to DSL, this measurement provides insight into the overall effectiveness of bonding and grounding in the area. *The Power Influence, when measured using the „Noise to Ground¨ configuration in IEEE-743, shall* ***not exceed 80 dBrnC.***

** For in-depth transmission testing the technician should contact the regional "Transmission Engineer" for troubleshooting steps.*

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Copper Testing Guidelines
POTS

Copper Testing Thresholds

Copper Test Parameter	Units	Acceptable	Marginal	Not Acceptable	**Notes**
Voltage	V (DC)	48 to 52			
Loop Current	mA	>= -23	-20 to -23	< -20	
Circuit Loss	dBm	<= -8.5		> 8.5	
Power Influence	dBmC	<= 80	80 to 90	>= -90	
Circuit Noise	dBmC	<= 20	20 to 30	>= -30	
Balance	dB	>= 60	50 to 60	<= 50	
Station Ground Resistance	Ohms	<= 25			
Slope	dB	<= 7.5			