Dickey Rural Networks

Winter 2016

Cold Weather Proof of Performance

January 19-20, 2016

Prepared by:

Technology Planners, LLC
ENGINEERING FOR TELECOMMUNICATIONS

Analog RF Proof of Performance Testing Methodology

System Description:

Dickey Rural Networks CATV network is a fiber to the home (FTTH) system with an RF overlay. The headend is based in Oakes, ND. This headend receives all video signals and processes them for distribution. There is no frequency altering equipment downstream from this location.

The total system bandwidth is 750 MHz. Per FCC rules; plant testing will be performed on the analog bandwidth using 12 analog test channels evenly spread across the widest possible frequency range.

Digital RF tier customers are supplied with set tops by the operator. The RF performance of these units is a matter of the manufacturer's specifications. All are well known units in common usage throughout the industry (Motorola/Arris, Scientific Atlanta/Cisco).

Testing Equipment & Procedures:

These system performance measurements were made by using the following test instruments: Tektronix 2715 spectrum analyzer, Tektronix TSG-120 test signal generator, JDSU SDA-4040D, CLI-1750, & CLI-1450 signal level meters, 100 Ft. length of RG-6 coaxial cable standard to the system.

SCTE Measurement Recommended Practices for Cable Systems are followed for all testing procedures. All tests were performed at locations meeting with FCC rules, and with the proper number of specified channels, based on system bandwidth.

The headend hardware was left in the normal operating condition, supplying the normal programming content for all tests that did not require alteration for testing. Second Order and C/N tests were performed during active video modulation, using vertical interface gating. The carrier was removed from the modulator to enable Composite Triple Beat testing. An FCC multiburst video test pattern was substituted for In Channel Frequency Response tests.

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Location Report: RF Modulating Site (Headend)

Test Location:	Dickey Rural Headend Oakes, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	18.8 ✓	55.249956 ✓	-14.3 ✓	4.500006 ✓
4	67.2500	CBS	19.6 ✓	67.249946 ✓	-14.9 ✓	4.499994 ✓
5	77.2500	CSPN	19.1 ✓	77.249958 ✓	-15.2 ✓	4.499998 ✓
6	83.2500	ABC	19.2 ✓	83.249933 ✓	-14.6 ✓	4.499993 ✓
95 A5	91.2500	BEKcen	19.0 ✓	91.250044 ✓	-15.2 ✓	4.500004 ✓
99 A1+	115.2750	TRNADO	18.9 ✓	115.274908 ✓	-15.4 ✓	4.499978 ✓
14 A-+	121.2375	HSN	19.0 ✓	121.237201 ✓	-15.5 ✓	4.499986 ✓
15 B++	127.2625	WEATHR	19.1 ✓	127.262188 ✓	-15.2 ✓	4.500018 ✓
16 C-+	133.2375	DRNCOM	19.2 ✓	133.236962 ✓	-15.1 ✓	4.499990 ✓
17 D	139.2500	QVC	19.1 ✓	139.249436 ✓	-15.6 ✓	4.499985 ✓
7	175.2500	BEK	17.9 ✓	175.250048 ✓	-15.2 ✓	4.499978 ✓
8	181.2500	CW	18.7 ✓	181.249558 ✓	-15.0 ✓	4.499992 ✓
9	187.2500	DRNWE	18.3 ✓	187.249540 ✓	-13.6 ✓	4.499988 ✓
10	193.2500	FOX	18.2 ✓	193.249854 ✓	-16.5 ✓	4.500035 ✓
11	199.2500	NBC	18.9 ✓	199.249851 ✓	-15.1 ✓	4.499998 ✓
12	205.2500	CSPAN2	18.7 ✓	205.249897 ✓	-15.6 ✓	4.499999 ✓
13	211.2500	PBS	18.5 ✓	211.249149 ✓	-15.3 ✓	4.499977 ✓
24 K+	223.2500	ESPN	18.9 ✓	223.249098 ✓	-14.9 ✓	4.499973 ✓
25 L++	229.2625	ESPN2	18.7 ✓	229.261273 ✓	-14.2 ✓	4.499979 ✓
26 M-+	235.2375	ESPNcl	19.1 ✓	235.236240 ✓	-14.6 ✓	4.499976 ✓
27 N-+	241.2375	ESPNew	19.2 ✓	241.236207 ✓	-14.9 ✓	4.499977 ✓
28 O-+	247.2375	TBS	19.3 ✓	247.236175 ✓	-15.9 ✓	4.499971 ✓
29 P-+	253.2375	LIFETM	19.7 ✓	253.236139 ✓	-15.9 ✓	4.499976 ✓
30 Q-+	259.2375	DISNEY	18.8 ✓	259.236108 ✓	-15.0 ✓	4.499966 ✓
31 R-+	265.2375	USA	19.1 ✓	265.236071 ✓	-15.2 ✓	4.499982 ✓
32 S-+	271.2375	ABCfam	19.0 ✓	271.236173 ✓	-15.2 ✓	4.499974 ✓
37 AA-+	301.2375	TNT	19.4 ✓	301.236024 ✓	-14.3 ✓	4.499978 ✓
38 BB-+	307.2375	DISCVR	19.4 ✓	307.235993 ✓	-14.9 ✓	4.499964 ✓
40 DD-+	319.2375	HEADLN	19.2 ✓	319.237259 ✓	-15.3 ✓	4.499998 ✓
41 EE-+	325.2375	FOXsn	19.2 ✓	325.237253 ✓	-15.7 ✓	4.499995 ✓
42 FF++	331.2750	ANIMAL	18.7 ✓	331.274154 ✓	-14.9 ✓	4.500004 ✓
43 GG-+	337.2375	AMC	19.2 ✓	337.236639 ✓	-14.6 ✓	4.499985 ✓
44 HH-+	343.2375	HISTRY	19.5 ✓	343.236075 ✓	-14.7 ✓	4.499973 ✓
45 II-+	349.2375	TLC	19.2 ✓	349.236046 ✓	-15.9 ✓	4.499979 ✓
46 JJ-+	355.2375	TOON	19.3 ✓	355.235137 ✓	-15.7 ✓	4.499970 ✓
47 KK++	361.2625	HGTV	19.0 ✓	361.261574 ✓	-15.1 ✓	4.499979 ✓
48 LL-+	367.2375	A&E	19.2 ✓	367.237844 ✓	-15.4 ✓	4.500001 ✓

Location Report: RF Modulating Site (Headend)

Test Location:	Dickey Rural Headend Oakes, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
49 MM-+	373.2375	CNBC	19.3 ✓	373.237844 ✓	-15.2 ✓	4.500006 ✓
50 NN-+	379.2375	OWN	19.4 ✓	379.237857 ✓	-15.1 ✓	4.499999 ✓
51 OO-+	385.2375	TCM	19.2 ✓	385.237851 ✓	-15.2 ✓	4.500011 ✓
52 PP-+	391.2375	OUTDR	19.7 ✓	391.237864 ✓	-15.7 ✓	4.499993 ✓
53 QQ-+	397.2375	TRAVEL	19.3 ✓	397.237872 ✓	-15.0 ✓	4.500014 ✓
54 RR	403.2500	CNN	19.0 ✓	403.250375 ✓	-15.4 ✓	4.500008 ✓
55 SS	409.2500	DIY	18.9 ✓	409.250383 ✓	-13.3 ✓	4.500014 ✓
56 TT	415.2500	NATGEO	19.2 ✓	415.247238 ✓	-14.7 ✓	4.499966 ✓
57 UU	421.2500	FOXnew	19.3 ✓	421.247199 ✓	-13.6 ✓	4.499972 ✓
59 WW	433.2500	MSNBC	19.0 ✓	433.247120 ✓	-14.9 ✓	4.499971 ✓
60 XX	439.2500	BRAVO	19.5 ✓	439.247080 ✓	-13.1 ✓	4.499968 ✓
61 YY	445.2500	DSNYxd	19.1 ✓	445.248184 ✓	-15.4 ✓	4.499977 ✓
62 ZZ	451.2500	GOLF	19.0 ✓	451.247003 ✓	-15.7 ✓	4.499977 ✓
64 BBB	463.2500	FOOD	19.0 ✓	463.246902 ✓	-13.2 ✓	4.499971 ✓
65 CCC	469.2500	GSN	19.0 ✓	469.249437 ✓	-14.9 ✓	4.499998 ✓
67 EEE	481.2500	FX	19.1 ✓	481.249425 ✓	-15.7 ✓	4.499995 ✓
68 FFF	487.2500	FOXspt	19.2 ✓	487.249420 ✓	-14.9 ✓	4.499992 ✓
69 GGG	493.2500	YouToo	19.4 ✓	493.249413 ✓	-15.5 ✓	4.499989 ✓
70 HHH	499.2500	GAC	19.7 ✓	499.249405 ✓	-15.4 ✓	4.499995 ✓
71 III	505.2500	truTV	19.4 ✓	505.249401 ✓	-15.4 ✓	4.499998 ✓
72 JJJ	511.2500	HLMARK	19.6 ✓	511.249393 ✓	-14.4 ✓	4.499995 ✓
73 KKK	517.2500	OXYGEN	19.6 ✓	517.249738 ✓	-14.2 ✓	4.500003 ✓
74 LLL	523.2500	NBCspt	19.5 ✓	523.249738 ✓	-14.5 ✓	4.499993 ✓
75 MMM	529.2500	ION	19.4 ✓	529.249733 ✓	-14.5 ✓	4.499985 ✓
76 NNN	535.2500	RFD TV	19.7 ✓	535.248653 ✓	-15.0 ✓	4.499987 ✓
77 OOO	541.2500	SyFy	19.5 ✓	541.249727 ✓	-14.8 ✓	4.500001 ✓
78 PPP	547.2500	SPTMEN	19.5 ✓	547.249725 ✓	-15.0 ✓	4.499997 ✓

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Forbes, ND	
Date:	1/19/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	18.5 ✓	55.249958 ✓	-13.8 ✓	4.499989 ✓
7	175.2500	BEK	18.7 ✓	175.250060 ✓	-15.5 ✓	4.499988 ✓
26 M	235.2375	ESPNcl	19.0 ✓	235.236219 ✓	-14.5 ✓	4.499981 ✓
28 O-+	247.2375	TBS	19.1 ✓	247.236145 ✓	-15.8 ✓	4.499973 ✓
32 S-+	271.2375	ABCfam	19.0 ✓	271.236160 ✓	-15.3 ✓	4.499978 ✓
46 JJ-+	355.2375	TOON	19.4 ✓	355.235137 ✓	-15.5 ✓	4.499970 ✓
55 SS	409.2500	DIY	19.0 ✓	409.250391 ✓	-13.3 ✓	4.500007 ✓
59 WW	433.2500	MSNBC	19.2 ✓	433.247131 ✓	-14.3 ✓	4.499975 ✓
61 YY	445.2500	DSNYxd	18.4 ✓	445.248253 ✓	-15.7 ✓	4.500011 ✓
69 GGG	493.2500	YouToo	18.7 ✓	493.249422 ✓	-15.2 ✓	4.499988 ✓
71 III	505.2500	truTV	19.2 ✓	505.249414 ✓	-15.8 ✓	4.499994 ✓
78 PPP	547.2500	Sptman	19.2 ✓	547.249730 ✓	-14.9 ✓	4.500001 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	52.1 ✓	-67.70 ✓	-62.8 ✓	1.4 ✓
7	175.2500	BEK	51.6 ✓	-64.20 ✓	-59.8 ✓	1.3 ✓
26 M	235.2375	ESPNcl	51.9 ✓	-67.90 ✓	-62.0 ✓	0.9 ✓
28 O-+	247.2375	TBS	49.6 ✓	-68.80 ✓	-62.5 ✓	0.9 ✓
32 S-+	271.2375	ABCfam	52.9 ✓	-65.30 ✓	-63.0 ✓	1.2 ✓
46 JJ-+	355.2375	TOON	52.0 ✓	-67.10 ✓	-61.4 ✓	1.4 ✓
55 SS	409.2500	DIY	49.0 ✓	-65.20 ✓	-59.6 ✓	1.4 ✓
59 WW	433.2500	MSNBC	48.3 ✓	-63.40 ✓	-59.6 ✓	1.4 ✓
61 YY	445.2500	DSNYxd	49.7 ✓	-68.60 ✓	-58.6 ✓	1.3 ✓
69 GGG	493.2500	YouToo	49.7 ✓	-65.70 ✓	-60.7 ✓	1.3 ✓
71 III	505.2500	truTV	50.1 ✓	-66.60 ✓	-60.2 ✓	1.4 ✓
78 PPP	547.2500	Sptman	50.4 ✓	-66.80 ✓	-62.2 ✓	1.3 ✓

Hum & Low Frequency Disturbance	✓ 1.0%

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Forbes, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/19/2016	1/20/2016	
	Time	11:32:22 AM	5:32:22 PM	11:32:22 PM	5:32:22 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	16.9	15.5	16.3	16.0	1.4
4	67.2500	16.0	15.7	15.8	17.0	1.3
5	77.2500	15.6	16.0	17.1	16.4	1.5
6	83.2500	17.0	16.5	17.9	15.8	2.1
95 A5	91.2500	17.9	16.9	15.9	17.9	2.0
99 A1+	115.2750	18.2	16.7	15.8	16.4	2.4
14 A-+	121.2375	17.2	16.1	17.6	16.8	1.5
15 B++	127.2625	17.4	16.9	17.7	16.4	1.3
16 C-+	133.2375	17.4	16.6	17.5	17.2	0.9
17 D	139.2500	15.8	15.6	16.4	17.9	2.3
7	175.2500	15.5	16.8	16.4	17.5	2.0
8	181.2500	16.2	16.0	17.6	18.0	2.0
9	187.2500	17.4	17.2	17.5	17.7	0.5
10	193.2500	17.2	15.5	16.1	15.5	1.7
11	199.2500	16.0	17.5	17.8	16.4	1.8
12	205.2500	17.7	16.8	15.6	15.9	2.1
13	211.2500	16.3	15.8	17.6	15.5	2.1
24 K+	223.2500	17.1	16.8	15.5	18.1	2.6
25 L++	229.2625	15.5	16.2	16.5	17.8	2.3
26 M-+	235.2375	17.0	16.5	16.2	16.4	0.8
27 N-+	241.2375	16.0	16.4	17.5	16.8	1.5
28 O-+	247.2375	15.9	16.7	17.4	15.8	1.6
29 P-+	253.2375	16.3	16.0	17.3	16.9	1.3
30 Q-+	259.2375	17.1	15.7	15.8	15.6	1.5
31 R-+	265.2375	17.2	16.0	17.0	17.7	1.7
32 S-+	271.2375	16.8	15.8	17.9	17.7	2.1
37 AA-+	301.2375	16.8	18.1	17.4	17.3	1.3
38 BB-+	307.2375	17.6	17.4	16.8	16.8	0.8
40 DD-+	319.2375	15.5	17.7	17.7	17.8	2.3
41 EE-+	325.2375	16.4	17.9	15.8	16.3	2.1
42 FF++	331.2750	16.4	18.1	17.2	16.9	1.7
43 GG-+	337.2375	16.6	17.9	16.1	16.1	1.8
44 HH-+	343.2375	17.8	17.7	16.1	16.3	1.7
45 II-+	349.2375	17.4	15.6	17.5	17.8	2.2
46 JJ-+	355.2375	15.6	17.8	17.2	17.4	2.2
47 KK++	361.2625	16.5	16.4	17.6	17.0	1.2

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Forbes, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/19/2016	1/20/2016	
	Time	11:32:22 AM	5:32:22 PM	11:32:22 PM	5:32:22 AM	
	Ext Temp	15°F	12°F	10°F	10°F	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	18.2	16.0	17.9	16.0	2.2
49 MM-+	373.2375	16.8	17.0	16.6	17.5	0.9
50 NN-+	379.2375	16.3	17.4	17.4	18.0	1.7
51 OO-+	385.2375	18.1	18.2	17.8	17.0	1.2
52 PP-+	391.2375	17.6	15.5	15.7	17.8	2.3
53 QQ-+	397.2375	16.5	17.6	17.0	15.8	1.8
54 RR	403.2500	16.8	16.2	16.5	15.9	0.9
55 SS	409.2500	17.8	15.9	16.2	17.6	1.9
56 TT	415.2500	17.1	16.2	17.9	16.4	1.7
57 UU	421.2500	17.7	17.3	18.2	15.7	2.5
59 WW	433.2500	17.8	17.9	16.8	17.9	1.1
60 XX	439.2500	16.0	15.6	16.6	17.9	2.3
61 YY	445.2500	15.7	17.0	17.6	15.8	1.9
62 ZZ	451.2500	16.9	16.5	16.8	17.0	0.5
64 BBB	463.2500	17.1	17.4	15.7	16.4	1.7
65 CCC	469.2500	17.4	16.4	15.8	18.1	2.3
67 EEE	481.2500	15.8	18.2	17.8	17.7	2.4
68 FFF	487.2500	18.1	16.8	17.8	17.3	1.3
69 GGG	493.2500	16.2	16.8	17.5	16.9	1.3
70 HHH	499.2500	17.1	16.5	16.5	15.5	1.6
71 III	505.2500	16.2	16.1	16.6	17.5	1.4
72 JJJ	511.2500	15.5	16.8	17.9	15.5	2.4
73 KKK	517.2500	16.1	17.7	17.8	17.3	1.7
74 LLL	523.2500	15.9	15.5	16.6	16.0	1.1
75 MMM	529.2500	16.0	17.6	17.3	18.2	2.2
76 NNN	535.2500	16.4	17.7	16.5	16.0	1.7
77 OOO	541.2500	17.3	16.7	16.7	15.5	1.8
78 PPP	547.2500	16.9	18.0	17.2	16.0	2.0

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Fort Ransom, ND	
Date:	1/20/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	18.1 ✓	55.249953 ✓	-13.3 ✓	4.499991 ✓
7	175.2500	BEK	18.0 ✓	175.250046 ✓	-16.0 ✓	4.499977 ✓
26 M	235.2375	ESPNcl	20.1 ✓	235.236233 ✓	-15.0 ✓	4.499977 ✓
28 O-+	247.2375	TBS	20.3 ✓	247.236195 ✓	-16.1 ✓	4.499972 ✓
32 S-+	271.2375	ABCfam	19.5 ✓	271.236200 ✓	-15.4 ✓	4.499977 ✓
46 JJ-+	355.2375	TOON	18.8 ✓	355.235184 ✓	-14.8 ✓	4.499974 ✓
55 SS	409.2500	DIY	18.8 ✓	409.250428 ✓	-13.8 ✓	4.500008 ✓
59 WW	433.2500	MSNBC	19.2 ✓	433.247182 ✓	-16.2 ✓	4.499966 ✓
61 YY	445.2500	DSNYxd	19.7 ✓	445.248245 ✓	-16.1 ✓	4.499984 ✓
69 GGG	493.2500	YouToo	19.4 ✓	493.249431 ✓	-15.4 ✓	4.499986 ✓
71 III	505.2500	truTV	19.4 ✓	505.249415 ✓	-15.4 ✓	4.499988 ✓
78 PPP	547.2500	Sptman	19.6 ✓	547.249711 ✓	-15.0 ✓	4.499998 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	48.3 ✓	-66.60 ✓	-68.2 ✓	1.4 ✓
7	175.2500	BEK	48.8 ✓	-60.70 ✓	-67.6 ✓	1.0 ✓
26 M	235.2375	ESPNcl	51.1 ✓	-69.20 ✓	-67.1 ✓	1.0 ✓
28 O-+	247.2375	TBS	51.8 ✓	-68.10 ✓	-64.6 ✓	0.9 ✓
32 S-+	271.2375	ABCfam	51.6 ✓	-69.00 ✓	-67.3 ✓	1.4 ✓
46 JJ-+	355.2375	TOON	51.0 ✓	-67.60 ✓	-66.4 ✓	1.2 ✓
55 SS	409.2500	DIY	50.2 ✓	-66.70 ✓	-66.7 ✓	1.1 ✓
59 WW	433.2500	MSNBC	50.9 ✓	-67.60 ✓	-68.0 ✓	0.9 ✓
61 YY	445.2500	DSNYxd	50.9 ✓	-67.90 ✓	-65.5 ✓	1.2 ✓
69 GGG	493.2500	YouToo	49.8 ✓	-67.70 ✓	-66.7 ✓	1.3 ✓
71 III	505.2500	truTV	49.8 ✓	-68.50 ✓	-67.3 ✓	1.4 ✓
78 PPP	547.2500	Sptman	51.9 ✓	-67.50 ✓	-67.9 ✓	1.4 ✓

Hum & Low Frequency Disturbance	✓ 1.1%

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Fort Ransom, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	5:29:32 PM	11:29:32 PM	5:29:32 AM	11:29:32 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	20.6	20.6	20.2	20.7	0.5
4	67.2500	20.8	19.6	20.0	19.6	1.2
5	77.2500	19.3	20.8	20.9	19.9	1.6
6	83.2500	21.2	18.9	18.9	21.1	2.3
95 A5	91.2500	19.1	20.9	18.6	19.0	2.3
99 A1+	115.2750	20.7	19.7	20.2	19.9	1.0
14 A-+	121.2375	18.9	20.4	20.8	19.1	1.9
15 B++	127.2625	20.3	19.2	20.9	20.6	1.7
16 C-+	133.2375	18.7	20.7	19.4	19.1	2.0
17 D	139.2500	19.1	19.0	18.4	20.5	2.1
7	175.2500	21.0	20.7	20.9	20.6	0.4
8	181.2500	18.7	19.7	20.9	20.6	2.2
9	187.2500	18.6	20.7	19.4	20.1	2.1
10	193.2500	19.1	19.5	19.6	20.3	1.2
11	199.2500	18.9	20.0	19.2	19.6	1.1
12	205.2500	20.9	20.8	19.9	19.1	1.8
13	211.2500	19.8	18.9	19.1	20.5	1.6
24 K+	223.2500	20.8	20.1	21.2	18.4	2.8
25 L++	229.2625	19.4	20.5	19.8	21.2	1.8
26 M-+	235.2375	20.1	19.9	19.9	19.4	0.7
27 N-+	241.2375	20.4	18.8	18.7	19.2	1.7
28 O-+	247.2375	20.3	19.7	19.5	18.5	1.8
29 P-+	253.2375	19.4	19.1	18.9	20.8	1.9
30 Q-+	259.2375	19.7	19.1	20.9	20.2	1.8
31 R-+	265.2375	21.2	19.2	20.2	18.9	2.3
32 S-+	271.2375	21.0	20.8	19.4	19.3	1.7
37 AA-+	301.2375	19.1	18.7	19.1	18.7	0.4
38 BB-+	307.2375	19.2	20.0	19.2	18.4	1.6
40 DD-+	319.2375	19.6	18.3	18.5	20.0	1.7
41 EE-+	325.2375	20.8	19.2	18.8	18.4	2.4
42 FF++	331.2750	18.4	21.1	21.2	19.8	2.8
43 GG-+	337.2375	18.3	19.3	19.6	20.5	2.2
44 HH-+	343.2375	21.0	19.6	20.5	20.5	1.4
45 II-+	349.2375	19.0	20.2	19.9	20.0	1.2
46 JJ-+	355.2375	19.9	21.2	19.0	20.9	2.2
47 KK++	361.2625	19.5	20.2	19.2	20.2	1.0

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Fort Ransom, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	5:29:32 PM	11:29:32 PM	5:29:32 AM	11:29:32 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	18.6	19.9	20.6	21.2	2.6
49 MM-+	373.2375	18.4	18.9	21.1	19.9	2.7
50 NN-+	379.2375	18.7	19.0	19.5	20.1	1.4
51 OO-+	385.2375	20.7	19.4	19.8	20.2	1.3
52 PP-+	391.2375	21.1	19.1	19.5	20.7	2.0
53 QQ-+	397.2375	20.6	20.5	19.9	19.5	1.1
54 RR	403.2500	19.5	19.9	21.2	18.3	2.9
55 SS	409.2500	18.5	18.6	19.3	20.6	2.1
56 TT	415.2500	19.2	18.4	20.9	19.7	2.5
57 UU	421.2500	19.5	18.7	18.6	20.9	2.3
59 WW	433.2500	21.2	19.2	19.2	18.8	2.4
60 XX	439.2500	18.7	18.8	20.1	19.3	1.4
61 YY	445.2500	20.3	21.1	20.9	20.0	1.1
62 ZZ	451.2500	19.6	18.4	19.0	19.1	1.2
64 BBB	463.2500	21.2	19.2	20.9	19.6	2.0
65 CCC	469.2500	19.7	19.6	19.3	19.2	0.5
67 EEE	481.2500	20.1	20.2	20.5	18.8	1.7
68 FFF	487.2500	19.0	20.6	18.5	18.4	2.2
69 GGG	493.2500	19.8	18.4	20.9	21.0	2.6
70 HHH	499.2500	20.2	18.6	20.1	20.6	2.0
71 III	505.2500	20.8	20.9	19.7	19.8	1.2
72 JJJ	511.2500	20.4	20.3	21.1	18.5	2.6
73 KKK	517.2500	18.7	18.7	21.2	20.6	2.5
74 LLL	523.2500	18.5	19.0	19.0	19.0	0.5
75 MMM	529.2500	19.4	18.9	19.6	21.0	2.1
76 NNN	535.2500	18.7	19.5	18.8	21.0	2.3
77 OOO	541.2500	19.2	20.2	20.2	20.7	1.5
78 PPP	547.2500	21.2	21.2	19.0	18.9	2.3

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Jud, ND	
Date:	1/19/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	19.0 ✓	55.249953 ✓	-13.9 ✓	4.499993 ✓
7	175.2500	BEK	19.2 ✓	175.250093 ✓	-15.5 ✓	4.499978 ✓
26 M	235.2375	ESPNcl	19.1 ✓	235.236223 ✓	-14.5 ✓	4.499973 ✓
28 O-+	247.2375	TBS	19.3 ✓	247.236160 ✓	-15.8 ✓	4.499973 ✓
32 S-+	271.2375	ABCfam	19.0 ✓	271.236158 ✓	-15.3 ✓	4.499969 ✓
46 JJ-+	355.2375	TOON	19.4 ✓	355.235127 ✓	-15.5 ✓	4.499970 ✓
55 SS	409.2500	DIY	19.1 ✓	409.250381 ✓	-13.5 ✓	4.500002 ✓
59 WW	433.2500	MSNBC	19.1 ✓	433.247095 ✓	-15.4 ✓	4.499976 ✓
61 YY	445.2500	DSNYxd	18.6 ✓	445.248092 ✓	-15.6 ✓	4.499978 ✓
69 GGG	493.2500	YouToo	19.1 ✓	493.249368 ✓	-15.2 ✓	4.499995 ✓
71 III	505.2500	truTV	19.5 ✓	505.249348 ✓	-15.6 ✓	4.499995 ✓
78 PPP	547.2500	Sptman	19.5 ✓	547.249682 ✓	-14.9 ✓	4.500002 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	48.2 ✓	-66.60 ✓	-66.5 ✓	1.1 ✓
7	175.2500	BEK	46.2 ✓	-61.30 ✓	-60.4 ✓	1.4 ✓
26 M	235.2375	ESPNcl	49.3 ✓	-67.00 ✓	-63.1 ✓	1.0 ✓
28 O-+	247.2375	TBS	49.6 ✓	-67.90 ✓	-63.4 ✓	1.2 ✓
32 S-+	271.2375	ABCfam	48.3 ✓	-66.10 ✓	-62.2 ✓	1.1 ✓
46 JJ-+	355.2375	TOON	50.0 ✓	-66.60 ✓	-62.0 ✓	1.4 ✓
55 SS	409.2500	DIY	48.3 ✓	-61.70 ✓	-62.5 ✓	1.4 ✓
59 WW	433.2500	MSNBC	48.0 ✓	-65.80 ✓	-62.4 ✓	1.2 ✓
61 YY	445.2500	DSNYxd	49.0 ✓	-67.10 ✓	-62.2 ✓	1.1 ✓
69 GGG	493.2500	YouToo	48.0 ✓	-66.60 ✓	-61.6 ✓	1.3 ✓
71 III	505.2500	truTV	48.7 ✓	-68.10 ✓	-61.7 ✓	1.3 ✓
78 PPP	547.2500	Sptman	50.1 ✓	-67.50 ✓	-64.6 ✓	1.0 ✓

Hum & Low Frequency Disturbance	✓ 0.8%

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Jud, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	2:20:18 PM	8:20:18 PM	2:20:18 AM	8:20:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	19.0	18.7	19.9	18.6	1.3
4	67.2500	18.5	20.0	19.9	19.3	1.5
5	77.2500	19.1	18.8	19.5	19.2	0.7
6	83.2500	18.6	18.9	18.8	19.5	0.9
95 A5	91.2500	18.3	19.9	19.7	18.7	1.6
99 A1+	115.2750	18.3	19.5	18.0	19.9	1.9
14 A-+	121.2375	18.9	19.7	18.4	19.0	1.3
15 B++	127.2625	18.8	18.3	18.0	19.7	1.7
16 C-+	133.2375	19.9	18.5	19.1	19.9	1.4
17 D	139.2500	19.5	19.7	19.2	19.7	0.5
7	175.2500	19.3	18.2	19.2	19.2	1.1
8	181.2500	19.4	18.6	18.4	18.3	1.1
9	187.2500	18.7	19.8	18.6	18.1	1.7
10	193.2500	18.8	19.0	19.0	18.4	0.6
11	199.2500	19.6	18.2	19.4	18.9	1.4
12	205.2500	18.3	18.9	19.5	18.0	1.5
13	211.2500	19.5	19.3	19.9	18.0	1.9
24 K+	223.2500	19.3	19.9	19.5	18.4	1.5
25 L++	229.2625	18.5	19.6	18.1	19.5	1.5
26 M-+	235.2375	19.2	18.4	18.9	20.0	1.6
27 N-+	241.2375	19.6	19.3	20.0	19.2	0.8
28 O-+	247.2375	18.9	18.6	18.5	19.5	1.0
29 P-+	253.2375	19.8	19.8	18.0	18.0	1.8
30 Q-+	259.2375	20.0	18.3	18.0	18.7	2.0
31 R-+	265.2375	19.0	19.7	19.8	20.0	1.0
32 S-+	271.2375	18.0	18.9	18.6	19.4	1.4
37 AA-+	301.2375	18.4	19.1	18.4	18.9	0.7
38 BB-+	307.2375	19.6	19.1	19.7	19.3	0.6
40 DD-+	319.2375	18.9	19.8	19.7	19.8	0.9
41 EE-+	325.2375	20.0	18.0	18.5	20.0	2.0
42 FF++	331.2750	19.8	18.1	20.0	19.1	1.9
43 GG-+	337.2375	19.6	18.2	18.4	18.7	1.4
44 HH-+	343.2375	19.5	18.8	18.3	20.0	1.7
45 II-+	349.2375	18.2	18.9	19.8	18.0	1.8
46 JJ-+	355.2375	18.2	18.2	18.1	19.2	1.1
47 KK++	361.2625	18.3	20.0	19.0	19.7	1.7

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Jud, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	2:20:18 PM	8:20:18 PM	2:20:18 AM	8:20:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	18.9	19.3	18.8	19.0	0.5
49 MM-+	373.2375	19.3	19.1	18.3	18.3	1.0
50 NN-+	379.2375	18.4	18.3	19.6	19.0	1.3
51 OO-+	385.2375	18.2	18.1	19.9	18.3	1.8
52 PP-+	391.2375	18.4	19.6	19.1	18.5	1.2
53 QQ-+	397.2375	18.9	18.0	18.9	19.1	1.1
54 RR	403.2500	19.4	19.4	19.9	18.2	1.7
55 SS	409.2500	19.3	18.9	18.3	19.9	1.6
56 TT	415.2500	19.8	19.9	19.1	19.4	0.8
57 UU	421.2500	19.3	19.7	19.7	20.0	0.7
59 WW	433.2500	19.8	19.9	19.7	19.5	0.4
60 XX	439.2500	19.3	18.5	18.4	19.9	1.5
61 YY	445.2500	18.5	19.4	18.3	18.9	1.1
62 ZZ	451.2500	20.0	19.3	18.1	19.9	1.9
64 BBB	463.2500	18.1	19.9	18.3	19.5	1.8
65 CCC	469.2500	19.7	19.1	18.2	18.3	1.5
67 EEE	481.2500	18.9	18.2	18.8	18.1	0.8
68 FFF	487.2500	19.0	19.8	19.6	18.0	1.8
69 GGG	493.2500	19.0	19.7	19.6	19.6	0.7
70 HHH	499.2500	18.6	19.2	19.7	18.4	1.3
71 III	505.2500	18.8	19.4	18.3	18.3	1.1
72 JJJ	511.2500	19.5	19.9	19.8	18.8	1.1
73 KKK	517.2500	20.0	18.7	19.3	18.8	1.3
74 LLL	523.2500	19.7	19.9	19.0	18.5	1.4
75 MMM	529.2500	18.4	19.1	18.3	19.2	0.9
76 NNN	535.2500	18.8	19.2	19.3	18.7	0.6
77 OOO	541.2500	20.0	18.1	18.7	19.8	1.9
78 PPP	547.2500	19.0	19.2	18.8	19.1	0.4

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Lisbon, ND	
Date:	1/20/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	20.2 ✓	55.249945 ✓	-13.9 ✓	4.499996 ✓
7	175.2500	BEK	19.0 ✓	175.250100 ✓	-15.7 ✓	4.499990 ✓
26 M	235.2375	ESPNcl	19.2 ✓	235.236238 ✓	-14.7 ✓	4.499974 ✓
28 O-+	247.2375	TBS	19.5 ✓	247.236154 ✓	-15.6 ✓	4.499974 ✓
32 S-+	271.2375	ABCfam	19.6 ✓	271.236160 ✓	-15.4 ✓	4.499981 ✓
46 JJ-+	355.2375	TOON	19.7 ✓	355.235135 ✓	-15.6 ✓	4.499973 ✓
55 SS	409.2500	DIY	19.7 ✓	409.250375 ✓	-13.7 ✓	4.499990 ✓
59 WW	433.2500	MSNBC	19.4 ✓	433.247105 ✓	-15.2 ✓	4.499983 ✓
61 YY	445.2500	DSNYxd	19.4 ✓	445.248088 ✓	-15.6 ✓	4.499984 ✓
69 GGG	493.2500	YouToo	19.1 ✓	493.249370 ✓	-15.0 ✓	4.499989 ✓
71 III	505.2500	truTV	19.5 ✓	505.249345 ✓	-15.5 ✓	4.499988 ✓
78 PPP	547.2500	Sptman	20.3 ✓	547.249660 ✓	-14.8 ✓	4.499999 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	53.3 ✓	-70.10 ✓	-68.2 ✓	1.0 ✓
7	175.2500	BEK	53.5 ✓	-66.00 ✓	-68.7 ✓	0.8 ✓
26 M	235.2375	ESPNcl	53.9 ✓	-66.50 ✓	-68.5 ✓	1.0 ✓
28 O-+	247.2375	TBS	53.0 ✓	-71.30 ✓	-68.5 ✓	1.1 ✓
32 S-+	271.2375	ABCfam	53.3 ✓	-70.90 ✓	-68.2 ✓	1.1 ✓
46 JJ-+	355.2375	TOON	54.8 ✓	-70.50 ✓	-68.4 ✓	1.4 ✓
55 SS	409.2500	DIY	53.0 ✓	-68.70 ✓	-69.3 ✓	1.1 ✓
59 WW	433.2500	MSNBC	52.9 ✓	-71.00 ✓	-69.0 ✓	1.4 ✓
61 YY	445.2500	DSNYxd	53.2 ✓	-69.80 ✓	-69.3 ✓	0.9 ✓
69 GGG	493.2500	YouToo	53.0 ✓	-68.30 ✓	-69.3 ✓	1.3 ✓
71 III	505.2500	truTV	53.6 ✓	-69.30 ✓	-69.3 ✓	1.3 ✓
78 PPP	547.2500	Sptman	55.2 ✓	-70.60 ✓	-69.3 ✓	1.4 ✓

Hum & Low Frequency Disturbance	✓ 0.9%

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Lisbon, ND
Date:	1/20/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	2:20:18 PM	8:20:18 PM	2:20:18 AM	8:20:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	12.5	13.0	12.1	13.1	1.0
4	67.2500	13.9	12.1	14.0	13.9	1.9
5	77.2500	14.9	14.6	14.9	14.5	0.4
6	83.2500	12.8	12.2	12.3	14.2	2.0
95 A5	91.2500	14.3	12.8	12.1	12.5	2.2
99 A1+	115.2750	13.2	13.0	12.2	15.0	2.8
14 A-+	121.2375	13.5	14.8	13.9	13.8	1.3
15 B++	127.2625	14.2	12.4	13.7	12.9	1.8
16 C-+	133.2375	14.6	14.6	14.5	14.5	0.1
17 D	139.2500	13.2	12.6	13.6	15.0	2.4
7	175.2500	12.5	14.9	12.6	15.0	2.5
8	181.2500	14.3	13.3	13.0	14.6	1.6
9	187.2500	14.7	13.9	13.4	12.7	2.0
10	193.2500	12.2	14.8	13.6	14.4	2.6
11	199.2500	12.7	12.2	14.7	12.4	2.5
12	205.2500	13.2	14.0	13.2	14.2	1.0
13	211.2500	14.9	12.5	14.8	12.7	2.4
24 K+	223.2500	12.7	14.1	14.4	12.8	1.7
25 L++	229.2625	15.1	12.1	14.2	12.9	3.0
26 M-+	235.2375	15.1	14.9	14.2	13.7	1.4
27 N-+	241.2375	15.1	13.4	12.2	12.4	2.9
28 O-+	247.2375	12.6	14.4	13.4	13.3	1.8
29 P-+	253.2375	13.0	13.7	13.7	13.9	0.9
30 Q-+	259.2375	13.6	13.2	12.2	15.0	2.8
31 R-+	265.2375	14.3	12.1	13.2	13.7	2.2
32 S-+	271.2375	13.0	12.6	13.1	14.9	2.3
37 AA-+	301.2375	13.1	14.3	12.7	12.6	1.7
38 BB-+	307.2375	12.2	14.6	12.5	12.9	2.4
40 DD-+	319.2375	14.4	14.3	12.8	13.5	1.6
41 EE-+	325.2375	15.1	14.2	13.7	14.6	1.4
42 FF++	331.2750	14.4	14.3	12.4	12.2	2.2
43 GG-+	337.2375	14.0	13.0	14.9	13.0	1.9
44 HH-+	343.2375	14.1	12.3	13.3	15.1	2.8
45 II-+	349.2375	15.1	13.4	13.9	14.5	1.7
46 JJ-+	355.2375	12.7	14.0	14.5	13.7	1.8
47 KK++	361.2625	14.9	14.6	13.6	14.9	1.3

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Lisbon, ND
Date:	1/20/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	2:20:18 PM	8:20:18 PM	2:20:18 AM	8:20:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	13.7	12.5	12.7	13.1	1.2
49 MM-+	373.2375	14.8	12.9	13.1	13.8	1.9
50 NN-+	379.2375	14.3	13.0	13.7	13.3	1.3
51 OO-+	385.2375	12.9	14.1	14.2	12.1	2.1
52 PP-+	391.2375	15.0	14.1	15.0	13.7	1.3
53 QQ-+	397.2375	13.1	12.8	12.2	14.2	2.0
54 RR	403.2500	14.7	12.1	14.6	14.1	2.6
55 SS	409.2500	13.5	14.4	12.6	13.0	1.8
56 TT	415.2500	14.0	15.1	12.5	12.2	2.9
57 UU	421.2500	13.1	13.2	14.4	14.2	1.3
59 WW	433.2500	14.3	12.5	14.9	12.4	2.5
60 XX	439.2500	13.0	13.0	13.6	14.6	1.6
61 YY	445.2500	13.5	12.7	12.3	15.1	2.8
62 ZZ	451.2500	13.0	13.3	14.9	12.2	2.7
64 BBB	463.2500	13.2	14.6	13.2	14.3	1.4
65 CCC	469.2500	13.2	12.6	13.5	13.7	1.1
67 EEE	481.2500	14.9	14.6	12.5	13.4	2.4
68 FFF	487.2500	13.2	14.1	14.2	14.3	1.1
69 GGG	493.2500	15.0	13.8	12.9	13.3	2.1
70 HHH	499.2500	13.9	13.0	14.7	15.0	2.0
71 III	505.2500	13.7	14.1	12.1	15.1	3.0
72 JJJ	511.2500	14.7	13.0	13.2	14.5	1.7
73 KKK	517.2500	12.1	12.2	13.1	13.6	1.5
74 LLL	523.2500	14.7	13.4	14.6	13.4	1.3
75 MMM	529.2500	13.4	14.9	12.7	13.1	2.2
76 NNN	535.2500	12.4	14.9	14.1	13.5	2.5
77 OOO	541.2500	14.7	13.5	14.7	14.6	1.2
78 PPP	547.2500	12.9	13.3	13.4	12.4	1.0

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Litchville, ND	
Date:	1/19/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	12.3 ✓	55.249955 ✓	-13.2 ✓	4.500007 ✓
7	175.2500	BEK	13.4 ✓	175.250067 ✓	-15.4 ✓	4.499990 ✓
26 M	235.2375	ESPNcl	14.1 ✓	235.236221 ✓	-14.7 ✓	4.499964 ✓
28 O-+	247.2375	TBS	14.0 ✓	247.236148 ✓	-15.6 ✓	4.499980 ✓
32 S-+	271.2375	ABCfam	14.2 ✓	271.236154 ✓	-15.4 ✓	4.499972 ✓
46 JJ-+	355.2375	TOON	13.6 ✓	355.235122 ✓	-14.8 ✓	4.499969 ✓
55 SS	409.2500	DIY	14.2 ✓	409.250361 ✓	-14.0 ✓	4.500012 ✓
59 WW	433.2500	MSNBC	14.0 ✓	433.247101 ✓	-15.6 ✓	4.499972 ✓
61 YY	445.2500	DSNYxd	13.7 ✓	445.248202 ✓	-15.9 ✓	4.499982 ✓
69 GGG	493.2500	YouToo	13.9 ✓	493.249390 ✓	-15.1 ✓	4.499990 ✓
71 III	505.2500	truTV	14.2 ✓	505.249379 ✓	-14.9 ✓	4.499999 ✓
78 PPP	547.2500	Sptman	14.6 ✓	547.249704 ✓	-15.4 ✓	4.499995 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	46.4 ✓	-64.80 ✓	-65.1 ✓	1.4 ✓
7	175.2500	BEK	45.2 ✓	-60.00 ✓	-59.6 ✓	1.3 ✓
26 M	235.2375	ESPNcl	47.5 ✓	-63.70 ✓	-63.0 ✓	1.1 ✓
28 O-+	247.2375	TBS	47.6 ✓	-63.90 ✓	-63.2 ✓	1.0 ✓
32 S-+	271.2375	ABCfam	46.6 ✓	-63.30 ✓	-62.0 ✓	1.2 ✓
46 JJ-+	355.2375	TOON	46.6 ✓	-63.20 ✓	-63.5 ✓	1.4 ✓
55 SS	409.2500	DIY	45.9 ✓	-60.70 ✓	-59.0 ✓	1.3 ✓
59 WW	433.2500	MSNBC	46.5 ✓	-63.40 ✓	-63.7 ✓	1.4 ✓
61 YY	445.2500	DSNYxd	46.5 ✓	-63.40 ✓	-62.2 ✓	1.2 ✓
69 GGG	493.2500	YouToo	45.9 ✓	-63.80 ✓	-61.5 ✓	1.2 ✓
71 III	505.2500	truTV	46.5 ✓	-63.50 ✓	-61.9 ✓	1.1 ✓
78 PPP	547.2500	Sptman	48.5 ✓	-63.40 ✓	-62.2 ✓	1.1 ✓

Hum & Low Frequency Disturbance	0.8% ✓

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Litchville, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	4:35:18 PM	10:35:18 PM	4:35:18 AM	10:35:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	20.1	19.5	20.0	18.7	1.4
4	67.2500	19.4	19.5	18.7	19.3	0.8
5	77.2500	19.2	20.1	19.2	19.7	0.9
6	83.2500	19.1	19.9	19.6	19.4	0.8
95 A5	91.2500	19.0	18.9	19.2	19.5	0.6
99 A1+	115.2750	19.2	19.1	18.8	19.9	1.1
14 A-+	121.2375	19.1	19.2	18.8	19.2	0.4
15 B++	127.2625	19.1	19.1	19.6	19.0	0.6
16 C-+	133.2375	19.9	20.1	18.8	19.2	1.3
17 D	139.2500	19.0	19.3	18.8	18.8	0.5
7	175.2500	19.5	18.8	18.8	19.1	0.7
8	181.2500	20.0	20.1	19.4	19.4	0.7
9	187.2500	19.2	19.5	18.9	19.1	0.6
10	193.2500	18.8	19.7	19.8	19.0	1.0
11	199.2500	18.9	19.8	18.7	19.1	1.1
12	205.2500	19.1	19.6	19.1	19.7	0.6
13	211.2500	18.7	19.7	20.1	18.9	1.4
24 K+	223.2500	20.0	20.0	20.1	18.8	1.3
25 L++	229.2625	19.5	20.2	20.0	20.1	0.7
26 M-+	235.2375	19.6	19.0	19.9	20.2	1.2
27 N-+	241.2375	18.8	18.9	19.3	19.3	0.5
28 O-+	247.2375	19.5	18.7	19.3	20.0	1.3
29 P-+	253.2375	19.4	20.2	20.1	19.9	0.8
30 Q-+	259.2375	19.5	19.1	19.7	19.9	0.8
31 R-+	265.2375	19.2	20.0	19.0	19.6	1.0
32 S-+	271.2375	19.0	19.2	19.0	19.3	0.3
37 AA-+	301.2375	19.4	20.0	19.7	19.8	0.6
38 BB-+	307.2375	20.0	20.1	18.9	19.0	1.2
40 DD-+	319.2375	19.0	19.3	19.7	20.2	1.2
41 EE-+	325.2375	19.6	20.1	19.9	19.1	1.0
42 FF++	331.2750	20.2	19.7	19.6	18.8	1.4
43 GG-+	337.2375	19.8	18.9	19.4	19.2	0.9
44 HH-+	343.2375	19.0	19.9	19.5	18.8	1.1
45 II-+	349.2375	19.9	19.3	19.0	19.8	0.9
46 JJ-+	355.2375	18.9	19.4	19.3	20.2	1.3
47 KK++	361.2625	19.2	19.0	19.6	18.7	0.9

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Litchville, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	4:35:18 PM	10:35:18 PM	4:35:18 AM	10:35:18 AM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	19.9	20.2	19.9	19.3	0.9
49 MM-+	373.2375	19.8	18.9	19.0	20.0	1.1
50 NN-+	379.2375	19.2	20.0	20.0	18.9	1.1
51 OO-+	385.2375	20.0	18.8	19.9	19.2	1.2
52 PP-+	391.2375	18.7	20.0	18.9	19.4	1.3
53 QQ-+	397.2375	19.1	20.0	19.2	20.1	1.0
54 RR	403.2500	19.0	19.0	20.1	19.4	1.1
55 SS	409.2500	20.0	19.6	20.1	19.4	0.7
56 TT	415.2500	19.1	20.0	18.9	18.7	1.3
57 UU	421.2500	18.9	19.2	20.2	20.1	1.3
59 WW	433.2500	18.7	19.4	19.8	19.3	1.1
60 XX	439.2500	19.2	19.5	19.0	19.3	0.5
61 YY	445.2500	19.3	19.8	20.2	19.4	0.9
62 ZZ	451.2500	18.7	18.8	19.9	19.3	1.2
64 BBB	463.2500	20.0	19.7	19.5	19.8	0.5
65 CCC	469.2500	18.7	19.1	19.9	19.2	1.2
67 EEE	481.2500	20.2	19.8	18.8	20.2	1.4
68 FFF	487.2500	19.7	18.7	19.9	19.1	1.2
69 GGG	493.2500	19.7	20.2	19.3	19.0	1.2
70 HHH	499.2500	19.7	19.4	18.9	18.8	0.9
71 III	505.2500	20.0	19.9	19.6	19.7	0.4
72 JJJ	511.2500	19.0	18.8	19.2	19.3	0.5
73 KKK	517.2500	20.0	19.3	19.9	19.5	0.7
74 LLL	523.2500	19.5	20.2	18.7	19.6	1.5
75 MMM	529.2500	19.8	19.8	20.1	19.2	0.9
76 NNN	535.2500	19.3	20.0	19.2	19.8	0.8
77 OOO	541.2500	19.6	19.2	19.1	18.8	0.8
78 PPP	547.2500	19.9	19.7	18.8	19.1	1.1

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗

Location Report: Analog RF Subscriber NID (FTTH)

Test Location:	Rutland, ND	
Date:	1/20/2016	
Video Standard:	NTSC	
	Pass ✓	Fail ✗

Selected Test Channels

EIA Channel	Standard Frequency (MHz)	Program	Visual Carrier Level (dBmV)	Visual Carrier Frequency (MHz)	Aural Carrier Δ (dBc)	Aural Carrier Frequency Offset (MHz)
2	55.2500	GUIDE	13.0 ✓	55.249952 ✓	-13.7 ✓	4.500019 ✓
7	175.2500	BEK	13.8 ✓	175.250070 ✓	-15.8 ✓	4.499999 ✓
26 M	235.2375	ESPNcl	15.1 ✓	235.236203 ✓	-15.1 ✓	4.499973 ✓
28 O-+	247.2375	TBS	14.9 ✓	247.236131 ✓	-15.8 ✓	4.499972 ✓
32 S-+	271.2375	ABCfam	14.8 ✓	271.236132 ✓	-15.5 ✓	4.499977 ✓
46 JJ-+	355.2375	TOON	14.6 ✓	355.235114 ✓	-15.6 ✓	4.499986 ✓
55 SS	409.2500	DIY	14.3 ✓	409.250358 ✓	-13.3 ✓	4.500001 ✓
59 WW	433.2500	MSNBC	14.5 ✓	433.247074 ✓	-14.9 ✓	4.499968 ✓
61 YY	445.2500	DSNYxd	14.8 ✓	445.248093 ✓	-15.5 ✓	4.499982 ✓
69 GGG	493.2500	YouToo	14.9 ✓	493.249360 ✓	-15.1 ✓	4.499989 ✓
71 III	505.2500	truTV	15.3 ✓	505.249352 ✓	-15.4 ✓	4.499996 ✓
78 PPP	547.2500	Sptman	15.0 ✓	547.249685 ✓	-14.5 ✓	4.499999 ✓

RF Carrier Performance Measurements

EIA Channel	Standard Frequency (MHz)	Program	Carrier to Noise (dB)	Coherent Second Order (dBc)	Coherent Triple Beat (dBc)	In Channel Response (dB)
2	55.2500	GUIDE	50.6 ✓	-69.60 ✓	-68.4 ✓	0.9 ✓
7	175.2500	BEK	52.2 ✓	-66.00 ✓	-67.2 ✓	1.1 ✓
26 M	235.2375	ESPNcl	51.4 ✓	-70.80 ✓	-68.1 ✓	0.8 ✓
28 O-+	247.2375	TBS	52.9 ✓	-70.80 ✓	-66.8 ✓	1.0 ✓
32 S-+	271.2375	ABCfam	51.4 ✓	-71.00 ✓	-68.0 ✓	1.1 ✓
46 JJ-+	355.2375	TOON	51.1 ✓	-70.20 ✓	-67.4 ✓	1.4 ✓
55 SS	409.2500	DIY	51.2 ✓	-70.50 ✓	-67.7 ✓	1.4 ✓
59 WW	433.2500	MSNBC	50.5 ✓	-70.00 ✓	-67.7 ✓	1.4 ✓
61 YY	445.2500	DSNYxd	50.9 ✓	-69.20 ✓	-67.6 ✓	1.4 ✓
69 GGG	493.2500	YouToo	53.0 ✓	-69.90 ✓	-68.8 ✓	1.3 ✓
71 III	505.2500	truTV	52.7 ✓	-69.50 ✓	-69.1 ✓	1.4 ✓
78 PPP	547.2500	Sptman	53.4 ✓	-69.90 ✓	-66.1 ✓	1.1 ✓

Hum & Low Frequency Disturbance	✓ 1.0%

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Rutland, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ / Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	6:32:18 PM	12:32:18 AM	6:32:18 AM	12:32:18 PM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
2	55.2500	15.0	15.0	14.6	16.0	1.4
4	67.2500	13.8	14.6	14.3	15.8	2.0
5	77.2500	13.6	14.6	14.2	14.7	1.1
6	83.2500	15.2	15.9	14.1	15.5	1.8
95 A5	91.2500	15.2	15.5	15.4	15.1	0.4
99 A1+	115.2750	14.9	14.6	14.9	16.0	1.4
14 A-+	121.2375	16.1	14.3	13.7	15.7	2.4
15 B++	127.2625	14.4	16.1	15.9	15.6	1.7
16 C-+	133.2375	14.1	16.1	16.1	14.9	2.0
17 D	139.2500	15.2	14.2	13.6	14.3	1.6
7	175.2500	14.0	14.0	14.6	15.1	1.1
8	181.2500	13.7	15.7	14.3	15.3	2.0
9	187.2500	14.1	13.8	14.6	16.1	2.3
10	193.2500	15.0	16.4	15.6	14.2	2.2
11	199.2500	15.3	15.9	14.6	15.7	1.3
12	205.2500	16.1	16.4	14.9	16.3	1.5
13	211.2500	14.5	16.1	15.0	16.2	1.7
24 K+	223.2500	14.1	14.4	16.0	13.8	2.2
25 L++	229.2625	16.4	15.0	14.4	14.3	2.1
26 M-+	235.2375	14.9	13.7	15.2	13.9	1.5
27 N-+	241.2375	14.3	14.9	14.5	15.1	0.8
28 O-+	247.2375	14.8	15.4	15.4	15.0	0.6
29 P-+	253.2375	13.9	15.4	14.1	14.0	1.5
30 Q-+	259.2375	15.7	15.9	16.2	15.9	0.5
31 R-+	265.2375	14.6	13.7	16.1	15.6	2.4
32 S-+	271.2375	14.9	15.4	15.9	14.6	1.3
37 AA-+	301.2375	15.2	15.4	15.5	14.6	0.9
38 BB-+	307.2375	15.6	13.9	15.6	15.2	1.7
40 DD-+	319.2375	15.1	15.0	13.9	14.7	1.2
41 EE-+	325.2375	15.7	13.9	16.0	15.5	2.1
42 FF++	331.2750	13.6	14.2	15.4	15.2	1.8
43 GG-+	337.2375	14.5	15.2	15.5	13.6	1.9
44 HH-+	343.2375	15.4	14.8	15.1	16.0	1.2
45 II-+	349.2375	14.9	14.7	14.3	14.0	0.9
46 JJ-+	355.2375	14.0	16.0	15.6	16.2	2.2
47 KK++	361.2625	16.1	15.3	13.8	13.6	2.5

24 Hour Test Report: Analog RF Subscriber NID (FTTH)

Test Location:	Rutland, ND
Date:	1/19/2016
Video Standard:	NTSC
	Pass ✓ Fail ✗

		Test #1	Test #2	Test #3	Test #4	
	Date	1/19/2016	1/19/2016	1/20/2016	1/20/2016	
	Time	6:32:18 PM	12:32:18 AM	6:32:18 AM	12:32:18 PM	
	Ext Temp	**15°F**	**12°F**	**10°F**	**10°F**	
EIA Channel	Standard Frequency (MHz)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	Video Level (dBmV)	24 Hour Deviation
48 LL-+	367.2375	14.5	14.3	15.7	15.0	1.4
49 MM-+	373.2375	15.4	15.7	14.4	15.3	1.3
50 NN-+	379.2375	15.3	16.3	14.5	15.9	1.8
51 OO-+	385.2375	15.9	15.8	15.1	15.4	0.8
52 PP-+	391.2375	13.9	15.3	15.0	14.3	1.4
53 QQ-+	397.2375	14.3	16.1	14.9	15.3	1.8
54 RR	403.2500	14.3	14.6	13.7	16.0	2.3
55 SS	409.2500	14.3	16.1	14.6	15.3	1.8
56 TT	415.2500	16.4	13.8	15.3	16.4	2.6
57 UU	421.2500	15.9	14.5	13.6	15.7	2.3
59 WW	433.2500	16.0	13.9	13.8	14.8	2.2
60 XX	439.2500	16.1	15.0	13.8	16.1	2.3
61 YY	445.2500	14.2	15.5	13.9	15.9	2.0
62 ZZ	451.2500	14.0	15.3	15.6	14.4	1.6
64 BBB	463.2500	14.0	13.8	16.1	16.0	2.3
65 CCC	469.2500	15.2	16.1	16.0	15.0	1.1
67 EEE	481.2500	13.6	14.7	16.4	15.6	2.8
68 FFF	487.2500	13.7	14.9	13.9	14.7	1.2
69 GGG	493.2500	14.1	15.4	14.0	14.3	1.4
70 HHH	499.2500	14.3	15.8	14.2	16.3	2.1
71 III	505.2500	14.1	14.0	14.2	16.2	2.2
72 JJJ	511.2500	15.4	14.4	15.7	14.8	1.3
73 KKK	517.2500	15.6	15.5	15.3	14.5	1.1
74 LLL	523.2500	16.1	16.3	14.6	14.7	1.7
75 MMM	529.2500	16.2	16.4	13.6	16.1	2.8
76 NNN	535.2500	14.1	15.7	15.8	15.1	1.7
77 OOO	541.2500	15.5	15.5	15.4	15.8	0.4
78 PPP	547.2500	15.5	14.4	14.6	14.8	1.1

	Limits		
Minimum Video Carrier Level	3.0 dBmV	Pass ✓	Fail ✗
Max Delta Video Level	15.0 dB	Pass ✓	Fail ✗
Minimum Delta Video/Audio	10.0 dB	Pass ✓	Fail ✗
Max Delta Video/Audio	17.0 dB	Pass ✓	Fail ✗
Max Delta Adjacent Channels	3.0 dB	Pass ✓	Fail ✗
Max 24 Hour Deviation	8.0 dB	Pass ✓	Fail ✗