

EXHIBIT 3



Channels

Overview Premium Sports A La Carte Latino International High Definition Local

Washington, DC/Hagerstown

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20170

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Station

- Washington, DC - ABC (WJLA)
- Washington, DC - CBS (WUSA)
- Washington, DC - CW (WDCW)
- Washington, DC - FOX (WTTG)
- Washington, DC - IND (WJAL)
- Washington, DC - ION (WPXW)
- Washington, DC - MNT (WDCA)
- Washington, DC - NBC (WHAG)
- Washington, DC - NBC (WRC)
- Washington, DC - PBS (WETA)
- Washington, DC - PBS (WHUT)
- Washington, DC - PBS (WVPY)
- Washington, DC - UNVSN (WFDC)

Local Channel Number

- SD HD 7
- SD HD 9
- SD HD 50
- SD HD 5
- SD 68
- SD HD 66
- SD HD 20
- SD HD 25
- SD HD 4
- SD HD 26
- SD HD 32
- SD 42
- SD HD 14

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SPORTS NETWORKS

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Offer Details



Local Channels on DIRECTV in Fairfax*

As of 11/11/15. Subject to change without notice.

Logo	Channel	Affiliate
	4	WRC
	5	WTTG
	7	WJLA
	8	NEWS8
	9	WUSA
	14	WFDC
	20	WDCA
	22	MPT
	26	WETA
	32	WHUT

 PBS	42	WVPY
 UNIMAS	47	WMDO
	50	WDCW
 PBS	56	WNVC
	66	ION

Regional Sports Channels on DIRECTV in Fairfax[†]



Comcast Sportsnet Mid-Atlantic

The home of the Washington Wizards, Washington Redskins, Washington Capitals and D.C. United. This regional sports network includes coverage from Atlantic Coast Conference (ACC) and Colonial Athletic Association (CAA). Comcast SportsNet also produces approximately 2000 original live shows each year. Programs vary from the network's live news programming SportsNite and SportsRise to Washington Post Live to a variety of post game wrap-ups, including Redskins Post Game Live and area college coaches' shows.



Mid-Atlantic Sports Network

Local sports coverage in Mid-Atlantic. 320 + Baltimore Orioles and Washington Nationals baseball games on MASN and MASN2.

National Channels: [Click here](#) for a full list of

FiOS TV Channels

Fairfax County (20170) Lineup - April 9, 2015

<u>Print</u>	Select HD	Preferred HD	Extreme HD	Ultimate HD	FiOS TV Local
	214 Ch, 46 HD	295 Ch, 79 HD	380 Ch, 105 HD	478 Ch, 150 HD	74 Ch, 14 HD
# Name					
3 WDCW CW-TV 50	✓	✓	✓	✓	✓
4 WRC NBC TV-4	✓	✓	✓	✓	✓
5 WTTG FOX TV-5	✓	✓	✓	✓	✓
6 WDCA My Network TV 20	✓	✓	✓	✓	✓
6 Comcast SportsNet Mid-Atlantic			✓		
7 WJLA ABC TV 7	✓	✓	✓	✓	✓
8 News Channel 8	✓	✓	✓	✓	✓
9 WUSA CBS-TV 9	✓	✓	✓	✓	✓
10 FPA Community Programming	✓	✓	✓	✓	✓
11 FCPS Teaching Channel	✓	✓	✓	✓	✓
12 City of Fairfax Government	✓	✓	✓	✓	✓
13 WPXW ION-TV 66	✓	✓	✓	✓	✓
14 WFDC Univision TV 14	✓	✓	✓	✓	✓
15 WDCA Mundo Fox	✓	✓	✓	✓	✓
16 Fairfax County Government 1	✓	✓	✓	✓	✓
17 WMDO UniMás TV 47	✓	✓	✓	✓	✓
18 George Mason University	✓	✓	✓	✓	✓
19 NoVA Community College	✓	✓	✓	✓	✓
20 WZDC Telemundo	✓	✓	✓	✓	✓
21 FCPS Red Apple 21	✓	✓	✓	✓	✓
22 WMPT PBS-TV 22 Herndon	✓	✓	✓	✓	✓
23 Community Channel	✓	✓	✓	✓	✓
25 FCPS Community Classroom 25	✓	✓	✓	✓	✓
26 WETA PBS-TV 26	✓	✓	✓	✓	✓
27 WQAW Azteca America Herndon	✓	✓	✓	✓	✓
28 Community TV [HCTV]	✓	✓	✓	✓	✓
30 FPA International [World 30]	✓	✓	✓	✓	✓
32 WHUT PBS TV 32	✓	✓	✓	✓	✓
36 Fairfax County	✓	✓	✓	✓	✓

	Public Access 4 Fairfax County					
37	Public Access 3 [WEBR]	✓	✓	✓	✓	✓
49	Weather Bug	✓	✓	✓	✓	✓
50	USA Network	✓	✓	✓	✓	
51	TNT		✓	✓	✓	
52	TBS	✓	✓	✓	✓	
53	FX	✓	✓	✓	✓	
54	Spike TV		✓	✓	✓	
68	WGNA		✓	✓	✓	
70	ESPN		✓	✓	✓	
72	ESPNews			✓	✓	
73	ESPN U		✓	✓	✓	
74	ESPN2		✓	✓	✓	
75	SEC Network National			✓	✓	
76	Comcast SportsNet Mid-Atlantic		✓		✓	
77	Mid-Atlantic Sports Network		✓	✓	✓	
78	Comcast SportsNet Mid-Atlantic Plus		✓	✓	✓	
79	Mid-Atlantic Sports Network 2 [MASN2]		✓	✓	✓	
83	Fox Sports 1		✓	✓	✓	
84	Fox Sports 2			✓	✓	
85	Big Ten Network		✓	✓	✓	
86	MLB Network			✓	✓	
87	NHL Network			✓	✓	
88	NFL Network			✓	✓	
89	NBA TV			✓	✓	
90	NBCSN		✓	✓	✓	
93	Golf Channel			✓	✓	
94	CBS Sports Network	\$	\$	✓	✓	\$
96	SportsNet New York				✓	
97	NESN National				✓	
100	CNN	✓	✓	✓	✓	
101	HLN	✓	✓	✓	✓	
102	CNBC		✓	✓	✓	
103	MSNBC	✓	✓	✓	✓	
104	Bloomberg TV	✓	✓	✓	✓	
105	CNN International			✓	✓	
106	CNBC World		✓		✓	
107	BBC World News	✓		✓	✓	
108	Fusion				✓	
109	C-SPAN		✓	✓	✓	
110	C-SPAN 2		✓	✓	✓	
111	C-SPAN 3		✓	✓	✓	
114	Al Jazeera America		✓	✓	✓	
115	Newsmax TV		✓	✓	✓	
116	One America News Network		✓	✓	✓	
	Fox Business				✓	

117	Network		✓	✓	✓
118	Fox News		✓	✓	✓
119	AccuWeather	✓	✓	✓	✓
120	Discovery Channel National	✓	✓	✓	✓
121	Geographic Channel	✓	✓	✓	✓
122	Science		✓	✓	✓
123	Investigation Discovery	✓	✓	✓	✓
124	DoD News	✓		✓	✓
125	American Heroes Channel		✓	✓	✓
126	Military History			✓	✓
127	H2		✓	✓	✓
128	History	✓	✓	✓	✓
129	fyi		✓	✓	✓
130	Animal Planet		✓	✓	✓
132	National Geographic Wild			✓	✓
134	Smithsonian Channel			✓	✓
139	TLC		✓	✓	✓
140	Lifetime	✓	✓	✓	✓
141	LMN		✓	✓	✓
142	Lifetime Real Women			✓	✓
144	Oxygen		✓	✓	✓
145	OWN: Oprah Winfrey Network			✓	✓
149	WE tv		✓	✓	✓
150	QVC	✓	✓	✓	✓
151	HSN	✓	✓	✓	✓
152	Jewelry Television	✓	✓	✓	✓
153	QVC Plus	✓	✓	✓	✓
157	evine LIVE	✓	✓	✓	✓
158	WOW		✓	✓	✓
159	Liquidation Channel	✓	✓	✓	✓
160	Esquire Network	✓		✓	✓
161	Discovery Life Channel			✓	✓
162	Z Living			✓	✓
163	Cooking Channel			✓	✓
164	Food Network	✓	✓	✓	✓
165	HGTV	✓	✓	✓	✓
167	DIY [Do It Yourself]			✓	✓
168	Destination America			✓	✓
169	A Wealth of Entertainment		✓	✓	✓
170	Travel Channel		✓	✓	✓
172	Rocks TV	✓	✓	✓	✓
180	Syfy		✓	✓	✓
181	A&E	✓	✓	✓	✓
	Crime &				

182	Investigation Network			✓	✓
183	truTV		✓	✓	✓
184	GSN	✓		✓	✓
185	Bravo	✓		✓	✓
187	Logo		✓	✓	✓
188	Ovation			✓	✓
189	BBC America	✓		✓	✓
190	Comedy Central		✓	✓	✓
191	FX	✓	✓	✓	✓
192	pivot			✓	✓
193	Chiller			✓	✓
194	POP		✓	✓	✓
196	E! Entertainment Television		✓	✓	✓
199	ABC Family	✓	✓	✓	✓
210	MTV		✓	✓	✓
211	MTV2		✓	✓	✓
212	mtvU			✓	✓
213	MTV Jams			✓	✓
214	MTV Hits			✓	✓
216	fuse			✓	✓
217	VH1	✓	✓	✓	✓
218	VH1 Classic		✓	✓	✓
219	VH1 Soul			✓	✓
220	Centric	✓	✓	✓	✓
221	CMT		✓	✓	✓
222	CMT Pure Country			✓	✓
223	Great American Country			✓	✓
224	UP	✓	✓	✓	✓
225	BET Gospel			✓	✓
229	Mnet	✓	✓	✓	✓
230	Turner Classic Movies		✓	✓	✓
231	AMC	✓	✓	✓	✓
232	FX Movie Channel			✓	✓
233	ReelzChannel	✓	✓	✓	✓
234	IFC		✓	✓	✓
235	SundanceTV			✓	✓
236	Cinémoi			✓	✓
239	Hallmark Movies & Mysteries	✓	✓		✓
240	Hallmark Channel		✓	✓	✓
241	TV Land		✓	✓	✓
245	RLTV	✓	✓		✓
246	Family Net	✓		✓	✓
247	RFD TV		✓		✓
250	Disney Channel	✓	✓	✓	✓
251	Disney XD		✓	✓	✓
252	Nickelodeon	✓	✓	✓	✓
253	Nick 2			✓	✓
254	Nick Toons	✓	✓	✓	✓
255	TeenNick	✓	✓	✓	✓
256	Nick Jr.	✓	✓	✓	✓
257	Cartoon Network	✓	✓	✓	✓
258	Boomerang			✓	✓

259	Discovery Family Channel		✓		✓		✓	
260	Disney Junior			✓		✓		✓
263	Sprout			✓		✓		✓
270	BET	✓		✓		✓		✓
271	TV One			✓		✓		✓
273	Tr3s: MTV, Musica y Mas			✓		✓		✓
273	MTV Tr3s			✓		✓		✓
274	Galavisión					✓		✓
275	NBC Universo					✓		✓
276	NUVO tv					✓		✓
277	CCTV News	✓				✓		✓
279	HITn					✓		✓
281	Sino TV Network					✓		✓
285	EWTN	✓		✓		✓		✓
286	INSP	✓		✓		✓		✓
288	Church Channel	✓		✓		✓		✓
290	BYU Television	✓				✓		✓
291	Three Angels Broadcasting	✓				✓		✓
292	The Word	✓		✓		✓		✓
293	Daystar	✓		✓		✓		✓
294	Smile of a Child	✓				✓		✓
295	TBN - TRINITY	✓		✓		✓		✓
	The SonLife							
297	Broadcasting Network	✓		✓		✓		✓
300	Fox College Sports Atlantic					✓		✓
301	Fox College Sports Central					✓		✓
302	Fox College Sports Pacific					✓		✓
303	Tennis Channel					✓		✓
307	Outdoor Channel	\$		\$		\$		\$
308	Sportsman Channel	\$		\$		\$		\$
309	ONE World Sports					✓		✓
310	ESPN Classic	\$		\$		\$		\$
311	Fox Deportes					✓		✓
315	TVG [Horse Racing]	\$		\$		\$		\$
316	HRTV	\$		\$		\$		\$
317	World Fishing Network	\$		\$		\$		\$
320	Longhorn Network [National]	\$		\$		\$		\$
330	Big Ten 1			✓		✓		✓
331	Big Ten 2			✓		✓		✓
332	SEC Network National Overflow					✓		✓
335	NFL Red Zone	\$		\$		\$		\$
340	Starz	\$		\$		\$		\$
341	Starz West	\$		\$		\$		\$
342	Starz Edge	\$		\$		\$		\$
343	Starz Edge West	\$		\$		\$		\$

344	Starz in Black	\$	\$	\$	\$	\$
345	Starz Kids & Family	\$	\$	\$	\$	\$
346	Starz Cinema	\$	\$	\$	\$	\$
347	Starz Comedy	\$	\$	\$	\$	\$
348	IndiePlex	\$	\$	\$	\$	\$
349	RetroPlex	\$	\$	\$	\$	\$
350	Encore	\$	\$	\$	\$	\$
351	Encore West	\$	\$	\$	\$	\$
352	Encore Classic	\$	\$	\$	\$	\$
353	Encore Classic West	\$	\$	\$	\$	\$
354	Encore Westerns	\$	\$	\$	\$	\$
355	Encore Westerns West	\$	\$	\$	\$	\$
356	Encore Suspense	\$	\$	\$	\$	\$
357	Encore Suspense West	\$	\$	\$	\$	\$
358	Encore Black	\$	\$	\$	\$	\$
359	Encore Black West	\$	\$	\$	\$	\$
360	Encore Action	\$	\$	\$	\$	\$
361	Encore Action West	\$	\$	\$	\$	\$
362	Encore Family	\$	\$	\$	\$	\$
363	Encore Español	\$	\$	\$	\$	\$
365	Showtime	\$	\$	\$	✓	\$
366	Showtime West	\$	\$	\$	✓	\$
367	Showtime Showcase	\$	\$	\$	✓	\$
368	Showtime Showcase West	\$	\$	\$	✓	\$
369	Showtime 2	\$	\$	\$	✓	\$
370	Showtime 2 West	\$	\$	\$	✓	\$
371	Showtime Beyond	\$	\$	\$	✓	\$
372	Showtime Beyond West	\$	\$	\$	✓	\$
373	Showtime Extreme	\$	\$	\$	✓	\$
374	Showtime Extreme West	\$	\$	\$	✓	\$
375	Showtime Women	\$	\$	\$	✓	\$
376	Showtime Women West	\$	\$	\$	✓	\$
377	Showtime Next	\$	\$	\$	✓	\$
378	Showtime Next West	\$	\$	\$	✓	\$
379	Showtime Family Zone	\$	\$	\$	✓	\$
380	Showtime Family Zone West	\$	\$	\$	✓	\$
385	The Movie Channel	\$	\$	\$	✓	\$
386	The Movie Channel West	\$	\$	\$	✓	\$
387	The Movie Channel Xtra	\$	\$	\$	✓	\$
388	The Movie Channel Xtra West	\$	\$	\$	✓	\$

390	Flix	\$	\$	\$	✓	\$
391	Flix West	\$	\$	\$	✓	\$
395	EPIX	\$	\$	\$	✓	\$
400	HBO	\$	\$	\$	\$	\$
401	HBO West	\$	\$	\$	\$	\$
402	HBO 2	\$	\$	\$	\$	\$
403	HBO 2 West	\$	\$	\$	\$	\$
404	HBO Signature	\$	\$	\$	\$	\$
405	HBO Signature West	\$	\$	\$	\$	\$
406	HBO Family	\$	\$	\$	\$	\$
407	HBO Family West	\$	\$	\$	\$	\$
408	HBO Comedy	\$	\$	\$	\$	\$
409	HBO Comedy West	\$	\$	\$	\$	\$
410	HBO Zone	\$	\$	\$	\$	\$
411	HBO Zone West	\$	\$	\$	\$	\$
412	HBO Latino	\$	\$	\$	\$	\$
413	HBO Latino West	\$	\$	\$	\$	\$
420	Cinemax	\$	\$	\$	✓	\$
421	Cinemax West	\$	\$	\$	✓	\$
422	More Max	\$	\$	\$	✓	\$
423	More Max West	\$	\$	\$	✓	\$
424	Action Max	\$	\$	\$	✓	\$
425	Action Max West	\$	\$	\$	✓	\$
426	Thriller Max	\$	\$	\$	✓	\$
427	Thriller Max West	\$	\$	\$	✓	\$
428	MovieMAX	\$	\$	\$	✓	\$
429	MAX Latino	\$	\$	\$	✓	\$
430	Five Star Max	\$	\$	\$	✓	\$
431	Outer Max	\$	\$	\$	✓	\$
440	Playboy TV	\$	\$	\$	\$	\$
441	Playboy TV en Español	\$	\$	\$	\$	\$
445	Here TV	\$	\$	\$	\$	\$
451	WNVC MHz Worldview	✓	✓	✓	✓	✓
452	WNVC MHz CCTV Documentary	✓	✓	✓	✓	✓
453	WNVT France 24	✓	✓	✓	✓	✓
454	WNVT RT en Español	✓	✓	✓	✓	✓
455	WNVC RT	✓	✓	✓	✓	✓
456	WNVC NHK World	✓	✓	✓	✓	✓
457	WNVC Blue Ocean Network	✓	✓	✓	✓	✓
458	WNVC CCTV News	✓	✓	✓	✓	✓
459	WUSA Bounce TV	✓	✓	✓	✓	✓
460	WRC Cozi TV	✓	✓	✓	✓	✓
461	WUSA The Justice Network	✓	✓	✓	✓	✓
462	WJLA Me TV	✓	✓	✓	✓	✓
463	WDCW This TV	✓	✓	✓	✓	✓
464	WFDC getTV	✓	✓	✓	✓	✓

467	WJLA-7.3 ABC Live Well	✓	✓	✓	✓	✓
469	WDCA Movies!	✓	✓	✓	✓	✓
470	WHUT DT	✓	✓	✓	✓	✓
472	WETA Kids	✓	✓	✓	✓	✓
474	WETA UK	✓	✓	✓	✓	✓
475	WMDO - LATV	✓	✓	✓	✓	✓
478	Estrella TV	✓	✓	✓	✓	✓
480	WMPT MPT 2	✓	✓	✓	✓	✓
481	WMPT MPT V-ME	✓	✓	✓	✓	✓
482	WDCW Antenna TV	✓	✓	✓	✓	✓
491	WPXW qubo	✓	✓	✓	✓	✓
492	WPXW ION Life	✓	✓	✓	✓	✓
500	FiOS Quantum 50M Upgrade Here	✓	✓	✓	✓	✓
502	WMDE Soul of the South HD	✓	✓	✓	✓	✓
503	WDCW CW HD	✓	✓	✓	✓	✓
504	WRC NBC HD	✓	✓	✓	✓	✓
505	WTTG FOX HD	✓	✓	✓	✓	✓
506	WDCA My Network TV HD	✓	✓	✓	✓	✓
507	WJLA ABC HD	✓	✓	✓	✓	✓
508	News Channel 8 HD	✓	✓	✓	✓	✓
509	WUSA CBS HD	✓	✓	✓	✓	✓
513	WPXW ION HD	✓	✓	✓	✓	✓
514	WFDC Univision HD	✓	✓	✓	✓	✓
517	WMDO UniMás HD	✓	✓	✓	✓	✓
520	WZDC Telemundo HD	✓	✓	✓	✓	✓
522	MPT-HD	✓	✓	✓	✓	✓
526	WETA PBS HD	✓	✓	✓	✓	✓
550	USA HD	✓	✓	✓	✓	✓
551	TNT HD	✓	✓	✓	✓	✓
552	TBS HD	✓	✓	✓	✓	✓
553	FX HD	✓	✓	✓	✓	✓
554	Spike HD		✓	✓	✓	✓
558	ES.TV HD			✓	✓	✓
567	Universal HD			✓	✓	✓
568	WGNA HD			✓	✓	✓
569	AXS tv			✓	✓	✓
570	ESPN HD		✓	✓	✓	✓
571	ESPN Goal Line	\$	\$	\$	✓	\$
572	ESPNNews HD			✓	✓	✓
573	ESPN U HD		✓	✓	✓	✓
574	ESPN2 HD		✓	✓	✓	✓
575	SEC Network HD National			✓	✓	✓
576	Comcast SportsNet Mid-Atlantic HD		✓	✓	✓	✓
577	Mid-Atlantic Sports Network HD		✓	✓	✓	✓
578	Comcast SportsNet Mid-Atlantic Plus HD				✓	

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[MOVIES ON DEMAND](#)

Your Guide to What's on TV

TV Listings for 22030 [Change Lineup](#)

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X Hide Filters		3 pm 3:30 4 pm 4:30 5 pm 5:30 6 pm 6							
My Channels	XOD	XFINITY On Demand							
Favorites	001								
HD Only	HSN	Beauty Report: Sig...	Beauty Report: Sig...	Designer Gallery ...	Designer Gallery				
	003								
Movies Sports Kids	C-SPAN	U.S. House Legislative Business							U.S.
	004								
Primetime Now	MASN2	Halls ...	Destin...	Ball Up: Search Fo...	World Poker Tour	World Poker Tour			
	005								
Mon, May 18	family	Reba	Reba	Reba	Reba	Boy M...	Boy M...	Boy M...	Boy M...
	006								
	NBCSN	Barclays Premier League Soccer: West Br...			Premi...	NASC...	Pro Football Talk		
	007								
	ESPN2	SportsNation	His & Hers	Olber...	Baseb...	Aroun...	Pardo		
	008								
		NFL In...	NFL Live	Highly...	Aroun...	Pardo...	SportsCenter		
	009								
	Comcast	Best ...	Lands...	The Dan Patrick S...	The B...	Redsk...	Sports...	Sport	
	010								
	GOLF	PGA Tour Golf: Wells Fargo Championship					Golf Central		
	011								
	T	Lo Mejor de 'Caso...	Al Rojo Vivo con ...	Caso ...	Caso ...	Telen...	Notic		
	012								
	TV13	Council 13 Ch. 13 District Cablevision							
	013								
	UNIVISION	La rosa de Guadal...	El gordo y la flaca	Primer impacto	Notici...	Notic			
	014								

 015	El Chavo	El Palenque	El Chavo	Vecinos			
DCN 016	...	Press...	Jazz ...	Business Buzz	Distri...	Press...	Pres.
 017	Dateline on OWN	Dateline on OWN	Dateline on OWN	Dateline on OWN			
 018	In the Heat of the ...	Blue Bloods	Blue Bloods	America's Funnie			
 019	Silver Jewelry Sale	Gemstones Sale	Moissanite Jewel				
 020	The Wendy Willia...	The Real	Famil...	Famil...	Judge...	Judg	
 021	Aqua ...	Paid P...	Paid P...	Paid P...	Paid P...	Blackt...	DC Breakdown
 022	As Tim...	Ballykissangel	Lark Rise to Candl...	BBC ...	PBS NewsHour		
 023	The Bill Cunningh...	Maury	Friends	Friends	How I ...	How	
 024	The Ellen DeGener...	News4 at 4	News4 at 5	News4 at 6			
 025	TMZ Live	Judge...	Judge...	Fox 5 News @ 5	Fox 5 ...	TMZ	
 026	Call the Midwife	Mr. Selfridge on Masterpiece	BBC ...	Night			
 027	Hot B...	Hot B...	ABC7 News at 4	ABC7 News at 5	ABC7 ...	ABC	
 028	Afternoon Report	Afternoon Report	Afternoon Report	Afternoon Report			
 029	The In...	Inside...	Dr. Phil	wusa 9 News at 5pm	wusa ...	CBS	
 030	LOGO by Lori Gol...	Ryka Fit for Life	Lisa Rinna Collecti...	Inspired Style			
 032	Curio...	Curio...	Arthur	Cyber...	Wild K...	Odd S...	Democracy Now!
 033	Criminal Minds	Criminal Minds	Criminal Minds	Criminal Minds			

	Weather Center				Weather Center			
034								
	The Daily Share	The Daily Share	Foren...	Foren...	Foren...	Foren...	Foren...	Foren...
035								
	CNN Newsroom W...	The Lead With Jak...	Situation Room With Wolf Blitzer					
036								
	Shepard Smith Re...	Your World With N...	The Five	Special Report W				
037								
	The Cycle	NOW With Alex W...	The Ed Show	PoliticsNation WI				
038								
	Closing Bell	Fast Money		Mad Money				
039								
	Food Paradise	Bizarre Foods Wit...	Man v....	Man v....	Bizarre Foods Wi			
040								
	Street Outlaws	Street Outlaws	Street Outlaws		Street Outlaws			
041								
	MLB ...	Nats X...	ESPNEWS	The Mid-Atlantic Sports Report				
042								
	What Not to Wear	Say Y...	Say Y...	Four Weddings Uk	Toddlers & Tiaras			
043								
	River Monsters	River Monsters: U...	River Monsters: Unhooked					
044								
	Regul...	Regul...	The A...	The A...	Uncle ...	Claren...	Teen ...	Teen
045								
	I Didn'...	I Didn'...	Jessie	Jessie	Austin...	Austin...	Girl M...	Girl M
046								
	Spong...	Spong...	The F...	The F...	Spong...	Spong...	The T...	The T
047								
	Bonanza	Bonanza	Bonanza			Gilligan's		
048								
	Meet John Doe (1941)	Tunisian Victory (1944)	Westward the Women (
049								
	Swamp People	Swamp People	Swamp People	Swamp People				
050								
	Criminal Minds	The First 48	The First 48	The First 48				
051								

 052	Little House on th...		Little House on th...		The Waltons		The Waltons	
 053	Ghostbusters (1984) □			Ghostbusters II (1989) □				
 054	Grey's Anatomy		Celebrity Wife Swap		Celebrity Wife Swap		Celebrity Wife Sw	
 055	Love It or List It		Love It or List It		Love It or List It		Love It or List It	
 056	Giada ...	Giada ...	Barefo...	Barefo...	The Pi...	Farmh...	Guy's Grocery Ga	
 057	Snapped		Snapped		Botched		Botched	
 058	The Incredible Hulk		The Incredible Hulk		The Incredible Hulk		The Incredible Hu	
 059	Bruce Jenner - Th...		Keeping Up With t...		Keeping Up With t...		Keeping Up With	
 060	Shahs of Sunset		Shahs of Sunset		Shahs of Sunset		Shahs of Sunset	
 061	Haunted Collector		The Punisher (2004) □					Hellb
 062	Bones		Bones		Castle		Castle	
 063	How I ...	How I ...	How I ...	How I ...	Two a...	Two a...	Mike ...	Mike
 064	Top 20 Most Shoc...		Top 20 Most Shoc...		Top 20 Most Shoc...		Barnageddon	
 065	NCIS		NCIS		NCIS		NCIS	
 066	The Ki...	The Ki...	Friends	Friends	Friends	Friends	Seinfeld	Seinf
 067	Tattoo...	Tattoo...	Tattoo...	Tattoo...	Cops	Cops	Cops	Cops
 068	K Key & ...	Futura...	Futurama	Futura...	Futura...	The Nig...	The Dai...	
 069	Chain ...	Chain ...	Deal o...	Deal o...	Deal or No Deal		Famil...	Famil

 784	MLB Mosaic Chan...	MLB Mosaic Channel				
 785	UFC 186: Johnson vs. Horiguchi: From Montreal					
 789	MLB Baseball: Angel...	MLB Extra Innings				
 790	MLB Baseball: Angel...	MLB Extra Innings				
 794	La rosa de Guadal...	El gordo y la flaca	Primer Impacto	Notici...	Notic	
 795	El Chavo	El Palenque	El Chavo	Vecinos		
 796	Lo Mejor de 'Caso...	Al Rojo Vivo con ...	Caso ...	Caso ...	Telen...	Notic
 798	LOGO by Lori Gol...	Ryka Fit for Life	Lisa Rinna Collecti...	Inspired Style		
 799	C... R ...	My Ti...	The R...	Truth i...	EWTN...	EWTN... Walk
 800	Call the Midwife	Mr. Selfridge on Masterpiece			Tavis ...	Night
 801	Hi-Def On Demand					
 802	Curio...	Curio...	Arthur	Cyber...	Wild K...	Odd S... Democracy Now!
 803	The Bill Cunningh...	Maury	Friends	Friends	How I ...	How
 804	The Ellen DeGener...	News4 at 4	News4 at 5	News4 at 6		
 805	TMZ Live	Judge...	Judge...	Fox 5 News @ 5	Fox 5 ...	TMZ
 806	Aqua ...	Paid P...	Paid P...	Paid P...	Blackt...	DC Breakdown
 807	Hot B...	Hot B...	ABC7 News at 4	ABC7 News at 5	ABC7 ...	ABC
 808	Afternoon Report	Afternoon Report	Afternoon Report	Afternoon Report		

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Channel Lineups—RCN TV Channel Packages

With hundreds of channels available, there's always something on. Watch an amazing lineup of digital channels with high-definition channels, local channels, music channels and premium movie channels like HBO®, Showtime® and The Movie Channel®, and Cinemax®.

Digital Cable TV Packages

RCN offers four great channel packages—pick one that's right for you!

- **Limited Basic** — Our starter digital TV package that includes up to 60 SD and 21 HD channels (depending on the market). This package offers affordable family entertainment, with local broadcast networks. Enjoy sitcoms, sports, news, weather and more.
- **Signature** — Want more? RCN Signature Digital TV offers the most popular channels, many in HD. Get children's programming, sports, news, lifestyle and more. Our Signature package includes up to 240 SD and 70 HD channels (depending on the market).
- **Limited Basic + Premiere** — Get the best in local programming, plus premiere channels like BBC America, Sundance Channel, the Cooking Channel, CNN International, and the Science Channel.
- **Signature + Premiere** — Get the most choices in entertainment. Enjoy every channel RCN has to offer, including local programming, the most popular channels, and premiere shows.

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All Channels Standard Channels HD Channels

\$ available at a premium
✓ included in package
HD high definition channel

#	Channel Name	Category	Limited Basic	Signature	Premiere+Sig
3	WDCA 20 (My20)	Local / Government	✓	✓	✓
4	WRC 4 (NBC)	Local / Government	✓	✓	✓
5	WTTG 5 (Fox)	Local / Government	✓	✓	✓
7	WJLA - 7 (ABC)	Local / Government	✓	✓	✓
8	RCN TV	Local / Government	✓	✓	✓
9	WUSA 9 (CBS)	Local / Government	✓	✓	✓
10	DCTV	Local / Government	✓	✓	✓
11	DCTV	Local / Government	✓	✓	✓
13	Public Access	Local / Government	✓	✓	✓
14	Univision WFDC - 14	Local / Government	✓	✓	✓
15	WDCW 50 (The CW)	Local / Government	✓	✓	✓
16	District of Columbia Network, DCN	Local / Government	✓	✓	✓
17	UniMas	Local / Government	✓	✓	✓

18	District Knowledge Network, DKN	Local / Government			
19	UDC (DC)	Local / Government			
22	WMPT 22 (PBS)	Local / Government			
23	WHUT 32 (PBS)	Local / Government			
24	WPXW 66 (ION)	Local / Government			
26	WETA 26 (PBS)	Local / Government			
38	WETA Kids	Local / Government			
39	WETA UK	Local / Government			
44	MPT Select	Local / Government			
95	Justice Network	Local / Government			
100	Bounce TV	Local / Government			
308	News Channel 8	Local / Government			
313	Me-TV	Local / Government			
370	Comcast SportsNet	Local / Government			
371	Comcast SportsNet Plus	Local / Government			
603	WDCA 20 HD	Local / Government			HD
604	WRC HD (NBC)	Local / Government			HD
605	WTTG HD (Fox)	Local / Government			HD
607	WJLA HD (ABC)	Local / Government			HD
609	WUSA HD (CBS)	Local / Government			HD
611	WHUT HD	Local / Government			HD
612	WMPT HD (PBS)	Local / Government			HD
613	WETA HD (PBS)	Local / Government			HD
614	WFDC HD	Local / Government			HD
616	WDCW HD (CW)	Local / Government			HD
617	UniMas HD	Local / Government			HD
627	WGN HD	Local / Government			HD
678	RCN TV HD	Local / Government			HD
685	Comcast SportsNet HD	Local / Government			HD
803	UniMas	Local / Government			

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RCN provides industry-leading High-Speed Internet, all-Digital TV and Phone services for residential, small/medium and Enterprise business customers. RCN's affordably priced advanced digital services are delivered through our proprietary, state-of-the-art fiber-rich network and supported by 100% U.S.-based customer service. RCN's primary service areas include Boston, Chicago, New York City, the Lehigh Valley, Philadelphia and Washington, D.C.

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Flip right to your TV favorites

A complete channel guide

For the most recent Channel Line Up, please visit www.cox.com/channels

- 2 UniMas(WMDO)
- 3 WDCW(The CW)
- 4 WRC 4(NBC)
- 5 WTTG 5(FOX)
- 6 Galavisión
- 7 WJLA 7(ABC)
- 8 News Channel 8
- 9 WUSA 9(CBS)
- 10 Fairfax Cable Access*
- 11 Cities of Falls Church*
- 12 Cityscreen*
- 14 Univision(WFDC)

- 15 ion(WPXW)
- 16 Fairfax County Government*
- 17 TBS
- 18 George Mason University*
- 19 NVCC*
- 20 WDCA(My20)
- 21 FCPS Red Apple 21*
- 22 WMPT*
- 23 Herndon Community TV*
- 24 QVC
- 25 FCPS Community Classroom*
- 26 WETA

- 27 Town of Vienna Community Network*
- 29 ShopHQ*
- 30 FPA International Access*
- 32 WHUT*
- 34 HSN Channel 19 without receiver
- 36 Cox VA Fairfax 36*
- 37 FPA Community Board*
- 38 WizeBuys*
- 41 C-SPAN*
- 42 C-SPAN2*

- 43 C-SPAN3*
- 98 WGN America
- 99 FCPS Teaching Channel*
- 800 WETA Create*
- 801 WETA Family*
- 802 WETA World*
- 803 Cozi TV*
- 804 MeTV*
- 805 WUSA TV 9 Radar*
- 806 Live Well*
- 807 Bounce TV*
- 808 THIS TV*

- 809 Antenna TV*
- 810 Fairfax Cable Access*
- 811 MOVIE!*
- 812 WMPT 2*
- 813 Mundo Fox*
- 817 getTV*
- 821 Leased Access*
- 830 FPA International Access*
- 837 FPA Community Board*

TV Starter HD*

- 1002 UniMas HD
- 1003 WDCW HD
- 1004 NBC HD(WRC)
- 1005 FOX HD(WTTG)

- 1006 Galavisión HD
- 1007 ABC HD(WJLA)
- 1008 News Channel 8 HD
- 1009 CBS HD(WUSA)

- 1014 Univision HD
- 1015 ion HD
- 1017 TBS HD
- 1020 MyNetwork TV HD(WDCA)

- 1022 WMPT HD
- 1024 QVC HD
- 1026 PBS(WETA) HD
- 1041 CSPAN 1 HD*

- 1098 WGN HD

Faith & Values Pak[^] (No extra charge with TV Starter.)

130 TBN

131 Daystar

132 INSP

133 EWTN

134 The World

TV Essential (Includes TV Starter.)

- 50 Jewelry TV*
- 51 FXX*
- 52 FOX Business Network*
- 53 MASN
- 54 Fox Sports 1
- 55 ESPN 2
- 56 ESPN
- 57 Comcast SportsNet
- 58 Lifetime
- 59 HGTV
- 60 Food Network
- 61 Spike
- 62 Bravo
- 63 MTV

- 64 VH1
- 65 CMT*
- 66 BET
- 67 msnbc
- 68 CNBC
- 69 The Weather Channel
- 70 HLN
- 71 CNN
- 72 FOX News Channel
- 73 Discovery Channel
- 74 Cox NOVA w/MASN2/CSN+
- 75 TLC
- 76 A&E
- 77 HISTORY

- 78 Animal Planet
- 79 truTV
- 80 USA Network
- 81 FX
- 82 Syfy
- 83 E! Entertainment Television
- 84 TV Land
- 85 Comedy Central
- 86 Travel Channel
- 87 TNT
- 88 Telemundo/WZDC
- 89 ABC Family
- 90 Cartoon Network
- 91 Nickelodeon

- 92 Disney Channel
- 93 AMC
- 94 TCM*
- 96 Golf Channel*
- 97 National Geographic*
- 100 Hallmark Channel*
- 101 Hallmark Movies & Mysteries*
- 102 GSN*
- 107 NBC Sports Network
- 109 BTN*
- 110 MoviePlex*
- 150 ID*
- 157 NASA*
- 159 Liquidation Channel*

- 163 TVGN*
- 171 NBCX1*
- 172 NBCX2*
- 173 NBCX3*
- 174 NBCX4*
- 175 NBCX5*
- 176 NBCX6*
- 177 NBCX7*

ZONE CHANNELS

- 897 NewsZone*
- 898 SportsZone*
- 899 KidsZone*

TV Essential HD[^]

- 1051 FXX HD
- 1052 FOX Business Network HD
- 1053 MASN HD
- 1054 Fox Sports 1 HD
- 1055 ESPN2 HD
- 1056 ESPN HD
- 1057 Comcast SportsNet HD
- 1058 Lifetime HD
- 1059 HGTV HD
- 1060 Food Network HD
- 1061 Spike HD

- 1062 Bravo HD
- 1063 MTV HD
- 1064 VH1 HD
- 1065 CMT HD
- 1066 BET HD
- 1067 msnbc HD
- 1068 CNBC HD
- 1069 The Weather Channel HD
- 1070 HLN HD
- 1071 CNN HD
- 1072 FOX News HD

- 1073 Discovery Channel HD
- 1074 Cox NOVA w/MASN2/CSN+ HD
- 1075 TLC HD
- 1076 A&E HD
- 1077 HISTORY HD
- 1078 Animal Planet HD
- 1079 truTV HD
- 1080 USA Network HD
- 1081 FX HD
- 1082 Syfy HD
- 1083 E! Entertainment Television HD

- 1084 TV Land HD
- 1085 Comedy Central HD
- 1086 Travel Channel HD
- 1087 TNT HD
- 1089 ABC Family HD
- 1090 Cartoon Network HD
- 1091 Nickelodeon HD
- 1092 The Disney Channel HD
- 1093 American Movie Classics HD
- 1094 TCM HD
- 1096 Golf Channel HD

- 1097 National Geographic HD
- 1100 Hallmark Channel HD
- 1101 Hallmark Movies & Mysteries HD
- 1107 NBC Sports Network HD
- 1109 BTN HD
- 1110 MoviePlex HD
- 1120 Velocity HD
- 1121 Palladia
- 1150 ID HD
- 1163 TVGN HD ◊

◊ Requires a separate Contour HD Channel.

* Digital or HD channel included with service level noted; requires rental of digital receiver or CableCARD™ except TV sets with Clear-QAM digital tuner will receive local broadcast channels without equipment rental. Contour HD Channels require rental of a Contour receiver. HD channel included with service level noted. A clear-QAM HD TV or an HD receiver rental required. Some digital video channels may be delivered via Switched Digital Video technology requiring an Advanced TV receiver or other two-way capable device, or a device equipped with a Cox CableCARD and SDV tuning adaptor to view the channel.

Advanced TV* (Includes TV Starter. TV Essential may be added for more choices.)

1 OnDemand*	911 Gospel	923 Teen MC	935 Contemporary Christian	947 Singers & Swing
MUSIC CHOICE	912 Reggae	924 Kidz Only	936 Pop Latino	948 Easy Listening
901 Hit List	913 Rock	925 Toddler Tunes	937 Musica Urbana	949 Classical Masterpieces
902 Pop Rhythmic	914 Metal	926 Y2K	938 Mexicana	950 Light Classical
903 Dance/EDM	915 Alternative	927 90's	939 Tropicales	MUSIC CHOICE HD
904 MC Indie	916 Adult Alternative	928 80's	940 Romances	1901-1950 Music Choice HD
905 Hip-Hop and R&B	917 Rock Hits	929 70's	941 Sounds of The Seasons	ITV
906 Rap	918 Classic Rock	930 Solid Gold Oldies	942 Stage & Screen	980 iWeather
907 Hip-Hop Classics	919 Soft Rock	931 Pop Country	943 Soundscapes	981 iGames
908 Throwback Jamz	920 Love Songs	932 Today's Country	944 Smooth Jazz	
909 R&B Classics	921 Pop Hits	933 Country Hits	945 Jazz	
910 R&B Soul	922 Party Favorites	934 Classic Country	946 Blues	

Bonus Pak* (Requires subscription to an Advanced TV Pak.)

149 OWN	152 Discovery Family Channel	154 American Heroes Channel	156 Nick Jr.	261 MLB Network
151 Destination America	153 Science	155 Weatherscan	256 Discovery Fit & Health	

Bonus Pak HD

1149 OWN HD	1152 Discovery Family Channel HD	1156 Nick Jr HD
1151 Destination America HD	1153 Science HD	1261 MLB Network HD

Variety Pak* (Includes Bonus Pak.)

189 Smithsonian Channel	212 mtvU	219 Nat Geo WILD	228 H2	237 VH1 Classic
193 Disney Junior	213 Oxygen	221 Disney XD	229 FYI	238 Chiller
194 El Rey	214 Logo	222 fuse	231 Cooking Channel	239 CMT Pure Country
197 MTV2	215 VH1 Soul	223 Centric	232 Esquire Network	240 TV One
198 Up	216 MTV Jams	224 ENCORE FAMILY	234 Nicktoons	900 MC PLAY
210 Mun2	217 Sprout	226 BBC America	235 TeenNick	
211 MTVTR35	218 Boomerang	227 Ovalton	236 MTV Hits	

Variety Pak HD

1219 Nat Geo WILD HD	1222 fuse HD	1229 FYI HD
1221 Disney XD HD	1226 BBC America HD	1231 Cooking Channel HD

*Requires subscription to Contour HD Channels.

Sports & Info Pak* (Includes Bonus Pak.)

220 beIN Sports	245 ESPN News	250 Bloomberg TV	257 GolfTV	265 Univision Deportes
230 beIN Sports en Español	246 ESPN2	251 CNN International	258 SEC Network	
241 Fusion	247 NBA TV	252 BBC World	259 Fox Sports 2	
243 ESPN Goal Line/Buzzer Beater	248 NHL Network	254 DIY Network	260 SEC Network 2	
244 ESPN Classic	249 NFL Network	255 Tennis Channel	262 CBS Sports Network	

Sports & Info Pak HD

1220 beIN Sports HD	1245 ESPN News HD	1248 NHL Network HD	1255 Tennis Channel HD	1262 CBS Sports Network HD
1230 beIN Sports en Español HD	1246 ESPN2 HD	1249 NFL HD	1258 SEC Network HD	1265 Univision Deportes
1243 ESPN Goal Line/Buzzer Beater	1247 NBA TV HD	1254 DIY Network HD	1260 SEC Network 2 HD	<small>*Requires subscription to Contour HD Channels.</small>

Sports Pak 2* (Includes Bonus Pak.)

158 Longhorn Network	161 NFL Network	165 Universal Sports	168 MLB StrikeZone
160 NFL RedZone [†]	162 MLB Network	166 Cox SportsTV	169 Pac-12 Network
<small>Requires subscription to Sports Information Pak, or is included with Sports Pak 2.</small>	164 Outside Television	167 Sportsman	170 World Fishing Network

Sports Pak 2 HD

1158 Longhorn Network HD	1161 NFL Network HD	1165 Universal Sports HD	1169 Pac-12 Network HD
1160 NFL RedZone HD [†]	1162 MLB Network HD	1167 Sportsman Channel HD	1170 World Fishing Network HD
<small>Requires subscription to Sports Information Pak, or is included with Sports Pak 2.</small>	1164 Outside Television HD	1168 MLB StrikeZone HD	<small>*Requires subscription to Contour HD Channels.</small>

* Digital or HD channel included with service level noted; requires rental of digital receiver or CableCARD™ except TV sets with Clear-QAM digital tuner will receive local broadcast channels without equipment rental. Contour HD Channels require rental of a Contour receiver. HD channel included with service level noted. A Clear-QAM HD TV or an HD receiver rental required. Some digital video channels may be delivered via Switched Digital Video technology requiring an Advanced TV receiver or other two-way capable device, or a device equipped with a Cox CableCARD and SDV tuning adaptor to view the channel. Subscription to TV Essential and Advanced TV required to receive Zone Channels. †Not available in all areas. ‡Requires subscription to Contour HD Channels.

Movie Pak[^] (Includes Bonus Pak.)

190 FXM	199 EPIX	202 ENCORE	205 ENCORE SUSPENSE	208 LMN
191 RetroPlex	200 IFC	203 ENCORE WESTERNS	206 ENCORE ACTION	209 WE tv
192 IndiePlex	201 SundanceTV	204 ENCORE CLASSIC	207 ENCORE BLACK	

Movie Pak HD

1191 RetroPlex HD ⁰	1199 EPIX HD	1201 Sundance TV HD	1204 Encore Classic HD ⁰	1208 LMN HD
1192 IndiePlex HD ⁰	1200 IFC HD	1202 ENCORE HD	1205 Encore Suspense HD ⁰	1209 WE tv HD

⁰Requires subscription to Contour HD Channels.

International Pak[^] (Includes Bonus Pak.)

450 WKTv 1 (Korean)	460 CCTV-4 (Mandarin Chinese)	470 MHz 1 Worldview DC	474 MHz 5 Blue Ocean Network (BON)	477 MHz 8 RT Español
451 WKTv 2	461 China 1-Phoenix News& Info	471 MHz 2 NHK World	475 MHz 6 CCTV Documentary (Chinese)	478 MHz 9 Arirang
452 WKTv 3	464 Myx	472 MHz 3 CCTV News (Chinese)	476 MHz 7 France 24	479 MHz 10 China News Channel
456 tvK (Korean)	465 Mnet	473 MHz 4 RT		480 MEA TV

Latino Pak[^] (Includes Bonus Pak.)

220 beIN Sports	408 Cinelatino	419 De Película	429 TV Chile	440 Fox Life
230 beIN Sports en Español	409 Go!TV	420 De Película Clásico	430 Discovery Channel Familia	441 Cine Estelar
400 Disney XD Español SAP	411 Nick2	421 Ritmoson Latino	431 Nat Geo Mundo	442 BabyTV
401 Discovery Channel en Español	412 Nicktoons	422 mun2	432 Centro America	443 Cheebies
402 MTVR3S	413 Foro TV	423 Music Choice - Música Urbana	433 WAPA	444 Nuestra Tele
403 Azteca America	414 Cartoon Network SAP	424 Music Choice - Pop Latino	434 Bandamax	445 Cine Sony
404 CNN en Español	415 EWTN Español	425 Music Choice - Tropicales	435 TeleHit	446 Univision Deportes
405 FOX Deportes	416 Telemundo	426 Music Choice - Mexicana	436 UniMás	447 El Rey
406 Boomerang Español SAP	417 Galavisión	427 Romances	437 Univision	
407 Canal Sur	418 HISTORY en Español	428 ESPN Deportes	438 t!Novelas	

Latino Pak HD

1220 beIN Sports HD	1230 beIN Sports en Español HD	1417 Galavisión HD	1446 Univision Deportes HD
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TV Economy[^] (Includes TV Starter.)

51 FXX	71 CNN	80 USANetwork	87 TNT	97 National Geographic Channel
58 Lifetime	72 FOX News Channel	81 FX	90 Cartoon Network	102 GSN
60 Food Network	73 Discovery Channel	82 Syfy	91 Nickelodeon	901-950 Music Choice
66 BET	77 HISTORY	83 E! Entertainment Television	92 Disney Channel	
67 msnbc	78 Animal Planet	84 TV Land	93 AMC	
69 The Weather Channel	79 truTV	85 Comedy Central	94 TCM	

EI Mix[^] (Includes TV Starter, Advanced TV, Latino Pak and Bonus Pak.)

59 HGTV	85 Comedy Central	216 MTV Jams	230 beIN Sports en Español	254 DIY Network
60 Food Network	90 Cartoon Network	217 Sprout	231 Cooking Channel	256 Discovery Fit and Health
63 MTV	91 Nickelodeon	218 Boomerang	234 Nicktoons	901-950 Music Choice
73 Discovery Channel	92 Disney Channel	220 beIN Sports	235 TeenNick	
78 Animal Planet	150 ID	221 Disney XD	236 MTV Hits	
83 E! Entertainment Television	213 Oxygen	222 fuse	241 Fusion	

EI Mix HD

1022 WMPH HD	1062 MTV HD	1085 Comedy Central HD	1122 NBCUniversal HD	1222 fuse HD
1051 FXX HD	1073 Discovery Channel HD	1090 Cartoon Network HD	1150 ID HD	1230 beIN Sports en Español HD
1059 HGTV HD	1078 Animal Planet HD	1091 Nickelodeon HD	1220 beIN Sports HD	1901-1950 Music Choice HD
1060 Food Network HD	1083 E! Entertainment Television HD	1092 The Disney Channel HD	1221 Disney XD HD	

[^] Digital or HD channel included with service level noted; requires rental of digital receiver or CableCARD[™] except TV sets with Clear-QAM digital tuner will receive local broadcast channels without equipment rental. Contour HD Channels require rental of a Contour receiver. HD channel included with service. ⁰Not available in all areas. ¹Part-time/seasonal channel. ⁰Requires subscription to Contour HD Channels.

Premium Channels*

199 EPIX	305 HBO Family	323 ActionMAX	342 SHOWTIME SHOWCASE	372 STARZ EDGE
298 FOX Soccer Plus	306 HBO Latino	330 MovieMAX	343 SHOWTIME EXTREME	373 STARZ In Black
300 HBO	310 HBO West	331 SStarMAX	344 SHOWTIME BEYOND	374 STARZ Kids & Family
301 HBO Comedy	311 HBO Family West	332 Cinemáx	360 TMC	375 STARZ Cinema
302 HBO Zone	320 Cinemax	333 OuterMAX	361 THE MOVIE CHANNEL XTRA	376 Playboy
303 HBO Signature	321 MoreMAX	340 SHOWTIME	370 STARZ Comedy	
304 HBO2	322 ThrillerMAX	341 SHOWTIME 2	371 STARZ	

Premium Channels HD

1199 EPIX HD	1306 HBO Latino HD	1323 ActionMAX HD	1350 SHOWTIME HD	1373 STARZ In Black HD
1300 HBO HD	1310 HBO HD	1331 SStarMAX HD	1360 TMC HD	1374 STARZ Kids & Family HD
1302 HBO Zone HD	1313 HBO2 HD (West)	1334 Cinemax HD	1366 TMC HD	1381 STARZ HD
1303 HBO Signature HD	1320 Cinemax HD	1340 SHOWTIME HD	1370 STARZ Comedy HD	
1304 HBO2 HD	1321 MoreMAX HD	1342 Show TIME Showcase HD	1371 STARZ HD	
1305 HBO Family HD	1322 ThrillerMAX HD	1343 Show TIME Extreme HD	1372 STARZ EDGE HD	

*Requires subscription to Contour HD Channels.

International Channels*

266 Tapes TV	274 Life Ok	282 GMA Pinoy TV (Filipino)	289 Arabic Radio and Television	298 FOX Soccer Plus
267 Channel One	275 STAR India PLUS	284 CTI-ZHONG TIAN CHANNEL (Chinese)	292 DW Amerika	439 TV Globo
268 PARS	276 STAR India GOLD	285 Phoenix North America Chinese Channel (Mandarin)	293 Channel One Russia	
270 Sony TV	279 Saigon Broadcasting Television Network	287 TV Japan	294 RTN (Russian)	
272 ZEE TV	281 TFC (The Filipino Channel)		295 TVSMONDE	
273 TV Asia			296 RAIITALIA (Italian)	

Subscription Sports Packages & Pay-Per-View*

264,600 NFL RedZone*	501-502 PPV Events	595 Adult On Demand	601-606 ESPN Sports
<small>Requires subscription to Sports & Information Pak, or is included with Sports Pak 2.</small>	590 Adult PPV	598 Adult en Español PPV	651-660 NBA/Direct Kick
500 IN DEMAND Preview Channel	591-594 Adult PPV	599 Adult On Demand	670-683 NHL/MLB

Subscription Sports Packages & Pay-Per-View HD

496 PPV - HD	1264 NFL RedZone HD*	1501 Pay Per View HD Events	1670-1678 NHL/MLB Pay Per View HD
	<small>Requires subscription to Sports & Information Pak, or is included with Sports Pak 2.</small>	1651-1659 NBA/MLS Pay Per View HD	

On DEMAND & Subscription Video On DEMAND (SVOD)* (Some SVOD services are not available in all areas)

(Tune to channel 1 for On DEMAND)

On DEMAND	Movies**	Subscription On DEMAND*	Playboy
Anime	MyPrimetime	Bollywood	Too Much For TV
Free Zone (free with subscription to Intra service)	Premium (free with subscription to Intra service)	Disney Family Movies	
The Jewish Channel	Adult On Demand	Here! TV	

*Monthly service fee applies! **Prices vary

* Digital or HD channel included with service level noted; requires rental of digital receiver or CableCARD™ except TV sets with Clear-QAM digital tuner will receive local broadcast channels without equipment rental. Contour HD Channels require rental of a Contour receiver. HD channel Included with service level noted: A clear-QAM HDTV or an HD receiver rental required. Some digital video channels may be delivered via Switched Digital Video technology requiring an Advanced TV receiver or other two-way capable device, or a device equipped with a Cox CableCARD and SDV tuning adaptor to view the channel. †Requires subscription to Contour HD Channels. ‡Not available in all areas. §Part-time/seasonal channel. Subscription to TV Essential and Advanced TV required to receive Zone Channels. If you wish to rent a CableCARD in lieu of a digital receiver, you must obtain the CableCARD from Cox. CableCARD is a registered trademark of Cable Television Laboratories, Inc. (CableLabs®) and is used with permission. Installation fees, taxes, franchise fees and other surcharges are additional. All channels and channel packs are subject to change. Other restrictions may apply. ©2015 CoxCom, LLC. All rights reserved.

* Canal digital o HD incluido con el nivel de servicio marcado; requiere alquiler de receptor digital o CableCARD™ excepto por televisores con sintonizador digital de QAM claro que recibirán canales de aire locales sin alquiler de equipo. Canales de Contour HD requieren alquiler de receptor Contour. Canal HD incluido con el nivel de servicio marcado: requiere un televisor HDTV con sintonizador de QAM claro o alquiler de receptor HD. Algunos canales de video digital pueden ser transmitidos usando tecnología de Video Digital Conmutado (SDV, por sus siglas en inglés) que requiere un receptor de Advanced TV, otro dispositivo con capacidad de transmisión de dos vías, o un dispositivo equipado con un CableCARD de Cox y un adaptador de sintonización SDV para ver dichos canales. †Requiere suscripción a canales de Contour HD. ‡No está disponible en todas las áreas. §Canal de temporada/ periodo parcial. Se requiere suscripción a TV Essential y Advanced TV para recibir Zone Channels. Si desea alquilar un CableCARD en lugar de un receptor digital, debes obtener el CableCARD de Cox. CableCARD es una marca registrada de Cable Television Laboratories, Inc. (CableLabs®) y es usada con permiso. Cargos por instalación, impuestos, cargos por franquicia y otros cargos son adicionales. Todos los canales y paquetes de canales están sujetos a cambios. Otras restricciones pueden aplicar. ©2015 CoxCom, LLC. Todos los derechos reservados.

EXHIBIT 4



Robert Lich
Vice President, Account Director

September 22, 2014

Matt Bray
President
Western Pacific Broadcast
400 N. Ashley Drive, Suite 2500
Tampa, FL 33602

Dear Mr. Bray:

As discussed, WMDE's petition has been reviewed by Robert Paine, VP, Policies and Procedures and approved for the 2014-2015 Television season based on the qualifying Market of Origin criteria described in WMDE (TV)'s license agreement with the Nielsen Company (US), LLC dated August 12th, 2014.

Beginning October 1st, 2014, WMDE-TV will be assigned to the Washington, DC (Hagerstown, MD) DMA.

If you have any additional questions, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert Lich", written in a cursive style.

Robert Lich
Vice President, Account Director
The Nielsen Company

EXHIBIT 5

DECLARATION OF SIGNAL STRENGTH TEST

I am Tedd Knarr and I hereby declare as follows:

1. I currently hold the position of Video Systems Specialist III with Cox Communications. I have 29 years of experience in the cable television industry. I have conducted signal surveys throughout those 29 years as required.
2. On January 22, 2015, I conducted tests of the signal strength of WMDE channel 5, at the Headend facility for the Cox Communications cable system.
3. The Cox Communications Principal Headend is located at 38°52'20" N 77°13'52" W at 2917 Eskridge Road Fairfax, Virginia 22031. I conducted the test by measuring the signal strength with an antenna mounted on a mast orientated parallel to the ground at a height of 198 feet. The antenna was properly oriented toward the television station's transmitter site at (according to the FCC's database) 38° 57' 17" N Latitude, 76° 05' 34" W Longitude (NAD 27). The antenna was properly orientated with the use of electronic maps.
4. **The test used the following equipment:**

Antenna Information		Signal Processing Equipment		Television	Down lead Wire	
Manufacturer:	Wineguard	Make:	Sunrise Telcom	Manufacturer: Emmerson	Make:	ComScope
Make:	Prostar	Model:	AT2500RQV	Model: LE290EM4	Model:	.625
Model:	PR-5000	Age:	3 years	2 years	Age:	15 years
Age:	10 years	Calibration Date:	10/24/14		Length:	220 ft.

5. Attached hereto is a true and correct copy of a block diagram depicting the configuration of the equipment used in the signal strength test. Also attached hereto are the spec sheets for the antenna, the signal processing equipment, and the down lead wire.
6. The signal strength test were conducted with the Sunrise Telcom AT2500RQV analyzer at a point that would be the same point as the input to the first piece of signal processing equipment if any had been used. The testing produced the following measurements on the output of the antenna down lead. The signal strength results were measured in dBmv and were properly converted to dBm.
7. **Description of signal quality:**

The signal test indicated that no detectable signal for VHF channel 5 was detectable above the noise floor of the instrument. The levels recorded in the table below represent the noise floor of the instrument at the frequency where the carrier would be if it had been present. No interfering carriers were observed on the analyzer. Since no carrier was detectable no carrier or signal to noise ratio readings was possible. The test instrument was disconnected from the antenna down lead and television receiver was connected to the antenna and the set was set to

scan for available channels. The television receiver did not discover any channel on VHF 5. When the set did not discover the carrier an attempt was made to manually program VHF channel 5 into the unit and in this case the television receiver also did not detect any signals present. As a result of these conditions no check of visual picture quality was possible.

Time EST	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
<u>10:00</u>	No Detectable Signal	<u>Foggy</u>	<u>Mid 30's</u>	No picture available
<u>12:00</u>	No Detectable Signal	<u>Foggy</u>	<u>Low 40's</u>	No picture available
<u>13:30</u>	No Detectable Signal	<u>Partly sunny</u>	<u>Low 40's</u>	No picture available
<u>18:00</u>	No Detectable Signal	<u>Partly sunny</u>	<u>Low 40's</u>	No picture available

8 To the best of my knowledge, information, and belief, I declare under penalty of perjury that the information contained in this declaration is true and correct.

Tedd Knarr
Dated: January 26, 2015



DECLARATION OF SIGNAL STRENGTH TEST

I am Tedd Knarr and I hereby declare as follows:

1. I currently hold the position of Video Systems Specialist III with Cox Communications. I have 29 years of experience in the cable television industry. I have conducted signal surveys throughout those 29 years as required.
2. On January 22, 2015, I conducted tests of the signal strength of WWTD 5 (36-1) delivered over the air on UHF channel 14, at the Headend facility for the Cox Communications cable system.
3. The Cox Communications Principal Headend is located at 38°52'20" N 77°13' W at 2917 Eskridge Road Fairfax, Virginia 22031. I conducted the test by measuring the signal strength with an antenna mounted on a mast orientated parallel to the ground at a height of 200 feet. The antenna was properly oriented toward the television station's transmitter site at (according to the FCC's database) 38° 56' 24" N Latitude, 76° 04' 54" W Longitude (NAD 27). The antenna was properly orientated with the use of electronic maps to 60° W.
4. **The test used the following equipment:**

Antenna Information		Signal Processing Equipment		Television	Down lead Wire	
Manufacturer:	Winegard	Make:	Sunrise Telcom	Manufacturer: Emmerson	Make:	ComScope
Make:	UHF/VHF/ FM	Model:	AT2500RQV	Model: LE290EM4	Model:	.625
Model:	7696	Age:	3 years	2 years	Age:	15 years
Age:	10 years	Calibration Date:	10/24/14		Length:	260 ft.
		Make:	Ericsson 8VSB receiver			
		Model:	RX8320			
		Age:	2 years			
		Calibration Date:	12/2013			

5. Attached hereto is a true and correct copy of a block diagram depicting the configuration of the equipment used in the signal strength test. Also attached hereto are the spec sheets for the antenna, the signal processing equipment, and the down lead wire.
6. The signal strength tests were conducted with the Sunrise Telcom AT2500RQV analyzer at a point that would be the same point as the input to the first piece of signal processing equipment if any had been used. The testing produced the following measurements on the output of the antenna down lead. The signal strength results were measured in dBmv and were properly converted to dBm.

7. Description of signal quality:

The signal test indicated that a detectable signal for UHF channel 14 was detectable at 16.43 dB above the noise floor of the instrument. The levels recorded in the table below represent the carrier. No interfering carriers were observed on the analyzer. The test instrument was disconnected from the antenna down lead and 8VSB receiver was connected to the antenna and the set was set to tune directly to channel 14. The 8VSB receiver did attempt to lock on the channel 14 signal but would continually lose RF Lock on channel 14. I again tuned to channel 14 approximately 2 hours later and although I could now tune to channel 14 on the 8VSB receiver, the receiver counted continual errors on the input signal and would drop from RF LOCK to RF UNLOCK causing the video output on the 8VSB to display severe video dropping in and out. When the 8VSB would register a RF LOCK signal the constant S/N alarm would cause the video output to produce a vast number of continual blocking artifacts.

Time EDT	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
<u>10:20</u>	<u>-67.2 dBm</u>	Foggy	<u>Mid 30's</u>	<u>Unable to lock</u>
<u>12:30</u>	<u>-67.3 dBm</u>	<u>foggy</u>	<u>Low 40's</u>	<u>Macro blocking and blanking out</u>
<u>13:40</u>	<u>-66.2 dBm</u>	<u>Partly sunny</u>	<u>Low 40's</u>	<u>Macro blocking and blanking out</u>
<u>18:35</u>	<u>-66.0 dBm</u>	<u>Partly sunny</u>	<u>Low 40's</u>	<u>Macro blocking and blanking out</u>

8 To the best of my knowledge, information, and belief, I declare under penalty of perjury that the information contained in this declaration is true and correct.

Tedd Knarr

Dated: January 26, 2015

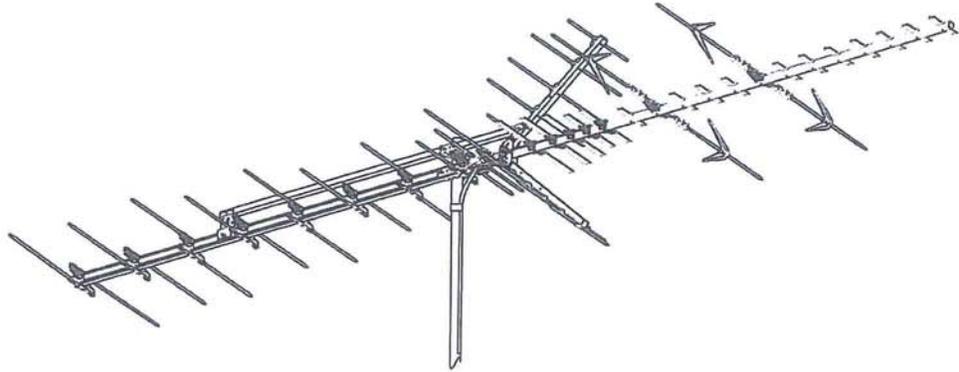




**PLATINUM
769 SERIES
HIGH DEFINITION
VHF/UHF ANTENNA**

engineering specifications

Model HD7698P



Active Elements	64		
UHF Elements	35		
VHF Elements	29		
Boom Length	168.25"		
Turning Radius	101"		
Maximum Width	53.5"		
Vertical Height	33"	Shpg. Weight	17 lbs.
Element Diameter	3/8"	Carton Dimensions	6.5"x7.75"x99.5"

Output Impedance: 75 ohm
Recommended Preamp: AP Series

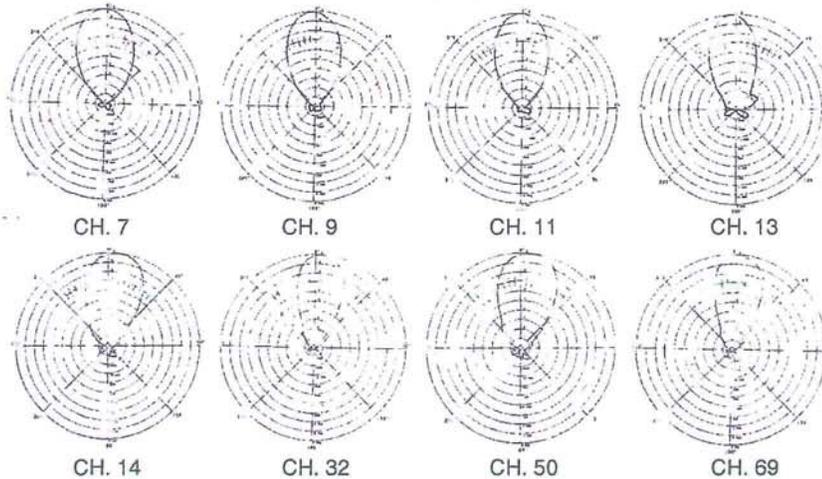


"UPS in shield design is a registered trademark of United Parcel Service of America, Inc. used by permission."

Made in U.S.A.

CHANNEL	CH.7	CH.9	CH.11	CH.13	CH.14	CH.32	CH.50	CH.69
dB gain over reference dipole	10.4	12.6	11	12	14.2	13.7	12.2	13
beamwidth at half power points	51°	48°	42°	41°	40°	41°	33°	23°
front-to-back ratio	greater than 20dB	greater than 20dB	19dB	18dB	13dB	20dB	greater than 20dB	10.5dB

POLAR PATTERNS





ERICSSON RX8320



ATSC Broadcast Receiver

As local terrestrial broadcasters begin to phase out their analog broadcasts and transition to an all-digital environment, the need to maintain access to the viewing public becomes critical. In many cases, viewers receive these broadcasts through cable, telco or satellite operators who either provide an analog transmission to their subscribers or provide a digital means for their subscribers to receive these local channels. The Ericsson RX8320 ATSC broadcast receiver is specifically designed to enable a simple, reliable solution to the ATSC broadcast transition for these operators.

The RX8320 provides both ASI and 8VSB inputs for reception of the broadcast services over terrestrial or fiber links. It then provides a pass-through capability so that operators can carry the digital signals all the way to a subscriber's home.

To support analog TV delivery the RX8320 also provides video decode capability with high quality composite output and audio decode capability, including 5.1 multi-channel to stereo down-mixing, to allow easy interfacing into the existing infrastructure. Any high definition (HDTV) digital TV service can be down-converted for analog SD delivery. Automatic picture aspect ratio conversion is performed based on any active format description (AFD) and bar data present on the incoming digital TV service. Legal and regulatory requirements are also fulfilled by the RX8320 for the transition of ATSC broadcast services into analog TV delivery, with the extraction and insertion of closed captions, Nielsen data, TV Guide data, and V-Chip program rating information into the analog video outputs.

PRODUCT OVERVIEW

Easy Migration to ATSC Digital Terrestrial Reception

The RX8320 is specifically designed to smooth the ATSC broadcast transition for cable, telco and satellite operators who re-transmit the local broadcast channels.

Complete Interoperability

The RX8320 ATSC Broadcast Receiver offers full translation capability between digital signaling and analog services. By offering automatic picture aspect ratio conversion and signaling via AFD and bar data, the RX8320 ensures that widescreen HD video is correctly displayed when down-converted to 4:3 SD video. Full support is provided to ensure that closed captions, TV Guide data and program rating (V-Chip) services continue to be supported.

Peace of Mind

Ericsson is a leading provider of ATSC broadcast headends and professional integrated receiver decoder (IRD) products worldwide. This in-depth knowledge and experience ensures that the RX8320 delivers the high quality and reliability on which broadcasters and service operators alike depend.

BASE UNIT FEATURES

RX8320 – ATSC Broadcast Receiver (RX8320/BAS, FAZ 101 0108/20)

The following features are available as standard:

- 8VSB demodulator
- Transport stream input with ASI connection
- Automatic redundancy switching between ASI and 8VSB inputs
- Transport stream output with ASI connection
- MPEG-2 SD 4:2:0 video decoding with CVBS output
- MPEG-2 HD 4:2:0 video down-conversion with SD CVBS output
- Two service Dolby® Digital audio decoding with 5.1 to 2.0 down-mixing
- Two stereo pairs balanced analog audio output
- Front panel and web browser control, with alarm relay

Optional Features Include:

- Transport stream over IP output
- MPEG-4 AVC video decoding
- Single service filtering and PID remapping
- Multi-service filtering and stream splitting



HARDWARE OPTIONS

Screw Terminal Audio Break-Out Cable (RX8XXX/CABLE/SCRTRM, FAZ 101 0108/23)

- Provides screw terminal connections for analog audio output
- 1x stereo pair per breakout cable

XLR Terminal Audio Break-Out Cable (RX8XXX/CABLE/XLR, FAZ 101 0108/24)

- Provides XLR terminal connections for analog audio output
- 1x stereo pair per breakout cable via 2x XLR connectors

SOFTWARE OPTIONS

Null Packet Detection Redundancy Switching (RX83XX/SWO/NULL, FAZ 101 0108/17)

- Redundancy switching from primary to secondary input triggered by presence of null packets in the incoming stream
- User definable percentage of null packets to trigger redundancy switch

IP Transport Stream Output (RX8320/SWO/IP/OUT, FAZ 101 0108/25)

- Enables IP transport stream output
- Encapsulation of transport stream output into IP multicast
- 2x Gigabit Ethernet RJ-45 interfaces always fitted, enabled with feature key

MPEG-4 AVC SD Decoding (RX83XX/SWO/MP2/MP4/SD, FAZ 101 0108/12)

- Future-proof for translation of MPEG-4 AVC based broadcast services
- Enables MPEG-4 AVC SD MP/HP@L3 video decoding

MPEG-4 AVC HD Down-conversion (RX83XX/SWO/MP2/MP4/SD/HD, FAZ 101 0108/11)

- Future-proof for translation of MPEG-4 AVC based broadcast services
- MPEG-4 AVC HD video is down-converted and presented as SD on CVBS output
- Supports MPEG-4 AVC HD MP/HP@L4 video decoding

Single Service Filtering (RX83XX/SWO/SING/SERVILT, FAZ 101 0108/15)

- Filter multiple services to output a single service
- Re-map PIDs for the outgoing service

Multi-Service Filtering (RX83XX/SWO/MULT/SERVILT, FAZ 101 0108/14)

- Filter N multiple incoming services to M outgoing services
- Re-map PIDs for a single service
- CBR MPTS transport stream output
- Service splitting for multiple IP SPTS output

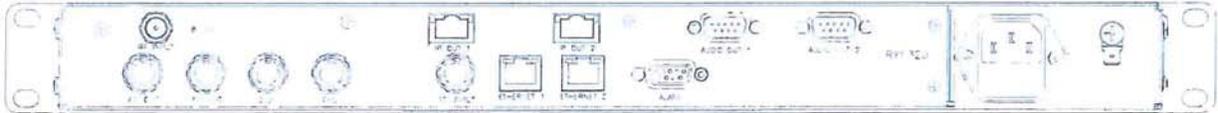
SMPTE 2022M Pro-MPEG FEC License on IP TS Output (RX83XX/SWO/IP/OUT/PROMPEG, FAZ 101 0108/8)

- Enables SMPTE 2022M Pro-MPEG FEC capability for the IP output card
- Requires IP output card

Password Protection of Web Browser (RX83XX/SWO/PW, FAZ 101 0108/29)

- Enables password protection feature on web browser control interface to protect from malicious or accidental changes

SAMPLE CONFIGURATION



SPECIFICATIONS

Video and Audio Formats

MPEG-2 SD Video Decode
 MPEG-2 MP@ML video decoding
 15 Mbps maximum video rate
 Input video format: 480i @ 29.97 fps

MPEG-2 HD with Down-conversion
 MPEG-2 MP@HL video decoding
 Input video format: 1080i @ 29.97 fps and 720p @ 59.94 fps
 80 Mbps maximum video input rate
 High definition video down-converted and presented as SD only
 SD video format: 480i @ 29.97 fps

Video Processing

AFD and bar data picture aspect ratio conversion and signaling per SMPTE 2016
 CEA-608 closed captions and XDS on line 21
 Nielsen AMOL in VBI

Ancillary and Metadata Processing
 SCTE 35 DPI cue message pass-through on transport stream output
 SCTE 127 (including Nielsen AMOL-48/96, TV Guide TVG2X) pass-through and translation to VBI
 Closed captions and XDS extracted from CEA-708 DTGCC transport channel
 PSIP pass-through on transport stream output
 Translation of PSIP content advisory to XDS program rating (V-Chip)

Audio Decoding

Two stereo pairs audio decoding
 Dolby Digital[®] 2.0 decoding
 Dolby Digital 5.1 down-mix to 2.0

Video and Audio Options

MPEG-4 AVC HD with Down-conversion
 MPEG-4 AVC MP@L4 and HP@L4 decoding
 20 Mbps maximum video input rate
 Video format: 1080i @ 29.97 fps and 720p @ 59.94 fps
 High definition video down-converted and presented as SD only
 SD video format: 480i @ 29.97 fps

MPEG-4 AVC SD
 MPEG-4 AVC MP@L3 and HP@L3 decoding
 12 Mbps maximum video input rate
 Video format: 480i @ 29.97 fps

Input Interfaces

Transport Stream Input
 ASI connector: 1x BNC 75 Ohm
 Max input rate: 160 Mbps
 Packet length: 188/204 bytes

8-VSB RF Input
 Connector: 1x F-Type (F), 75 Ohm
 Modulation: ATSC A/53 8-VSB
 Frequency range: 54 MHz to 863 MHz
 Input level: -80 dBm to -5 dBm
 Bit-rate: 19.39 Mbps

Outputs

Transport Stream Output
 ASI connector: 2x BNC 75 ohms

Composite Video Output
 Connector: 2x BNC 75 ohms
 Format: NTSC

Audio Output
 Analog balanced audio output
 2x 9-pin D-type with breakout cable to XLR connectors

Output Options

Transport Stream Output
 Transport stream encapsulation into IP
 MPTS/IP/UDP/RTP
 SPTS/IP/UDP/RTP with single service filtering - CBR mode
 IP output VBR mode - Null packets dropped
 2x Gigabit Ethernet outputs, 100/1000 auto-sensing
 Hardware always fitted, enabled with feature key

Features

Program selection for ATSC, DVB and MPEG-only streams
 Input transport stream rate up to 160 Mbps
 Alarm relay

Stream Processing

Single Service filtering
 Filter multiple services to one outgoing service^y
 Remap PIDs for the filtered service
 Output: CBR on ASI and IP^y SPTS

Multi-service filtering
 Filter N incoming services to M outgoing services^y
 Number of services: 24 max. as 1xMPTS
 Remap PIDs on a single service
 Output: CBR on ASI and IP^y MPTS
 Stream splitting - up to 8 services as IP SPTS

Control Options

Front panel keypad and LCD
 Ethernet
 Dual RJ45 10/100BaseT control interface
 SNMP traps and alarms
 Web browser interface

Physical and Power

Dimensions (W x D x H)
 440 x 400 x 44mm (17.3 x 15.75 x 1.73" approx.)

Input Voltage
 110 VAC / 240 VAC

Power Consumption
 45 Watt max. (depending on options fitted)

Cooling
 Integrated fans

Environmental Conditions

Operating Temperature
 0°C to 50°C (32° to 122°F)

Storage Temperature
 -20°C to 70°C (4° to 140°F)

Relative Humidity
 5% to 95% (Non-condensing)

Compliance

CE marked in accordance with EU Low Voltage and EMC Directives

EMC Compliance
 EN55022, EN61000-3-2¹⁰, EN61000-3-3¹⁰, EN55024, CISPR22, FCC CFR47 Part 15B Class A

Safety Compliance
 EN60950-1, IEC60950-1, UL60950-1



Broadband Solutions

5226303 | P3® 625 JCASS SM MT

75 Ohm P3® Trunk and Distribution Cable, black PE jacket, flooded for underground

Construction Materials

Corrosion Protection	Migraheal®
Jacket Material	PE
Center Conductor Material	Copper-clad aluminum
Construction Type	Swaged
Dielectric Material	PE
Outer Conductor Material	Aluminum

Dimensions

Diameter Over Center Conductor, nominal	3.480 mm		0.137 in
Diameter Over Dielectric, nominal	14.351 mm		0.565 in
Diameter Over Outer Conductor, nominal	15.875 mm		0.625 in
Diameter Over Inner Jacket, nominal	17.653 mm		0.695 in
Diameter Over Jacket, nominal	21.590 mm		0.850 in
Inner Jacket Thickness, nominal	0.762 mm		0.030 in
Jacket Thickness, nominal	0.7620 mm		0.0300 in
Outer Conductor Thickness, nominal	0.7620 mm		0.0300 in
Cable Length	732 m		2400 ft
Shipping Weight	187.00 lb/kft		

Electrical Specifications

dc Resistance, Inner Conductor, nominal	0.84 ohms/kft
dc Resistance, Outer Conductor, nominal	0.26 ohms/kft
dc Resistance, Loop, nominal	1.10 ohms/kft
dc Resistance Note	Nominal values based on a standard condition of 20 °C (68 °F)
Capacitance	50.2 pF/m 15.3 pF/ft
Capacitance Tolerance	±1.0 pF/ft
Characteristic Impedance	75 ohm
Characteristic Impedance Tolerance	±2 ohm
Jacket Spark Test Voltage	5000 Vac
Nominal Velocity of Propagation (NVP)	87 %
Operating Frequency Band	5–1000 MHz
Structural Return Loss	30 dB @ 5–1000 MHz

Environmental Specifications

Environmental Space	Buried
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General Specifications

Brand	P3®
Cable Type	625 series

Product Specifications



5226303 | P3@ 625 JCASS SM MT

Jacket Color	Black
Packaging Type	Reel
Short Description	P3 625 JCASS SM MT PR7278
Warranty	One year

Mechanical Specifications

Minimum Bend Radius, bonded	114.30 mm 4.50 in
Minimum Bend Radius, standard	177.80 mm 7.00 in
Pulling Tension, maximum	215 kg 475 lb

Electrical Performance

Frequency	Attenuation (dB/100 m)	Attenuation (dB/100 ft)
5 MHz	0.43	0.13
55 MHz	1.48	0.45
83 MHz	1.84	0.56
211 MHz	3.02	0.92
250 MHz	3.28	1.00
300 MHz	3.54	1.08
350 MHz	3.87	1.18
400 MHz	4.17	1.27
450 MHz	4.43	1.35
500 MHz	4.69	1.43
550 MHz	4.92	1.50
600 MHz	5.18	1.58
750 MHz	5.84	1.78
865 MHz	6.33	1.93
1000 MHz	6.79	2.07

* Attenuation listed represents maximum values at standard condition of 20 °C (68 °F)

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

AT2500RQv CATV/QAM/VIDEO SPECTRUM ANALYZER



*The world's only spectrum analyzer with
combined CATV, QAM and Video
measurement capabilities*

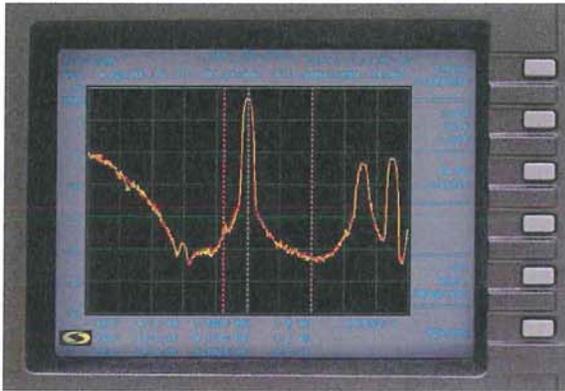
Sunrise Telecom Broadband is dedicated to providing our customers with the best test equipment possible. That is why our engineers have created a lightweight, battery powered analyzer designed for CATV headend and field portable applications. It features powerful modular options that allow you to expand measurement capabilities for future technology or individual requirements. Integrating QAM digital measurements and video demodulation into an affordable portable spectrum analyzer such as the Sunrise AT2500RQv is truly a breakthrough from both a cost and performance point of view.

**JUST ANOTHER WAY
WE'RE UNCOMPLICATING CABLE**


SUNRISE TELECOM
BROADBAND

.....measure CCN, CSO & CTB accurately and in-service.

CATV PACKAGE



Combined CCN, CSO and CTB Tests

All CATV tests, including complete in-service RF testing for Proof-of-Performance, can be executed quickly and accurately and without customer service interruptions:

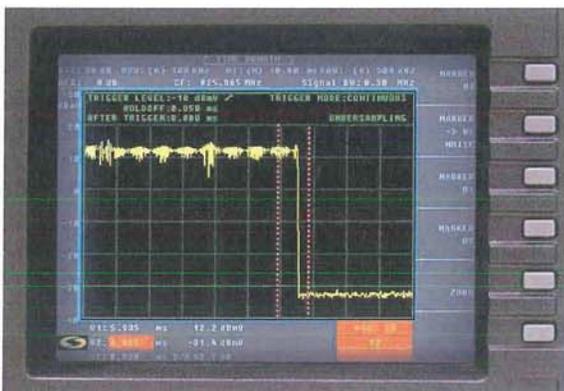
- Carrier Level
- Carrier Frequency
- Hum
- CCN (Carrier to Composite Noise)
- CSO (Composite Second Order)
- CTB (Composite Triple Beat) In-Service Measurement available
- DFI (Discrete Frequency Interference) Measurement Mode
- ICR (In-Channel Response)
- DOM (Depth of Modulation)
- Digital Channel Power

All these tests are easily performed by using the icons shown on the main menu.

CCN, CSO, CTB, DFI, Hum, In-Channel Frequency Response and Depth of Modulation can all be performed in-service with the proper VITS test signal inserter in the very accurate and reliable Gated Mode. With its high sensitivity, the Sunrise AT2500RQv can measure CCN ratios of better than 60 dB with only a 5 dBmV carrier level, eliminating the need for an external amplifier even at test points or subscriber drop levels.

The internal high/low pass preselection filters automatically filter out-of-band energy to provide improved dynamic range for measurements in a fully loaded cable system.

TIME DOMAIN MODULE



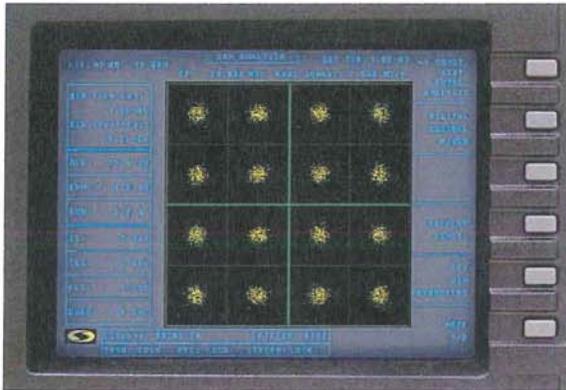
Time Domain Measurement

TDM mode simplifies analysis of upstream cable modem bursty signals and intermittent ingress for quick and accurate measurements. Because today's advanced services can have many different TDMA (Time-Division Multiple- Access) signals assigned to a particular frequency, the TDM module is standard on Sunrise AT2500 Series spectrum analyzers. This Time Domain Module eliminates the guesswork by providing quick and accurate analysis of complex upstream FSK, QPSK, and 16 QAM pulsed amplitude signals.

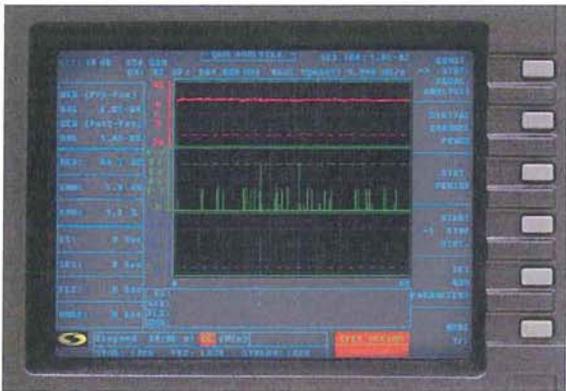
The comprehensive Time Domain Measurement mode fully utilizes the power of the Sunrise AT2500RQv's built-in triggered gating hardware capabilities to capture and isolate a signal source. Each packet of data from a cable modem's TDMA upstream signal can be captured, seen, and measured thanks to flexible control settings such as Trigger Level, Holdoff, Horizontal Sweep Time, delay after trigger, bandwidth correction, averaging, etc. The TDM mode allows fast, simple, and accurate in-service measurements, including an estimated channel power of the upstream DOCSIS channel, S/N of the burst (or D/U), and the burst level of the modems.

...the AT2500RQv QAM Analyzer is an essential tool for ensuring that revenue generating digital services remain operational.

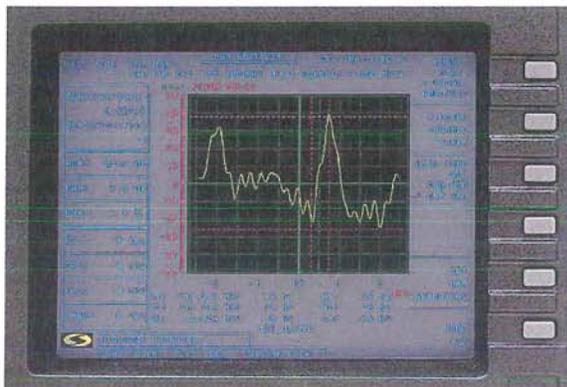
QAM DEMODULATOR OPTION



Constellation display of 16 QAM signal



60 minute statistics screen showing signal impairments over time



Zoomed Group Delay screen

As digital signals become part of our every day routine, performing accurate digital cable measurements is essential to efficiently install and maintain high quality level of service for your customers. Unlike analog pictures, digital video can appear to operate normally and yet it may be very close to failing. Digital measurements can be the only way to ensure that the system is operating well within limits. The digital channel power measurement allows accurate digital carrier power measurements over a desired bandwidth anywhere between 200 kHz and 1.5 GHz.

The Sunrise AT2500RQv QAM Analyzer demodulates and accurately measures the QAM signals carried through the cable system. It provides the measurement power the field technicians need for the latest 64/256 QAM digital technologies and is very simple to use, making the transition from analog to digital testing a breeze. The AT2500RQv displays Modulation Error Ratio (MER), pre and post Bit Error Rate (BER) and Error Vector Magnitude (EVM).

When paired with the CM1000 unit with an Upstream Signal Generator module, the AT2500 can demodulate a continuous 16 QAM in order to measure and characterize a network's return path performance for VoIP deployments. MER, BER as well as the reverse channel's frequency response and group delay characteristics can be precisely measured.

A statistics logging function is also included to test between 1–60 minutes with date/time reference, storing events of MER, Pre & Post BER, errored seconds, severely errored seconds, frame loss, and system unavailability. Up to 7 days of data can be captured with date/time reference using the WinQAM PC software.



QAM Impairment Analysis (QIA) displays 14 performance measurements on one screen

MER measures the ratio of the average signal power in the ideal constellation to the average error power, and provides a good measure of signal quality. While MER is well established as the best overall "figure of merit" measurement to determine QAM signal quality, it does not indicate the type of impairment affecting a signal. For more in depth analysis to determine the cause of signal impairments, Sunrise developed the patent pending QAM Impairment Analysis (QIA) mode.

QIA mode calculates and displays:

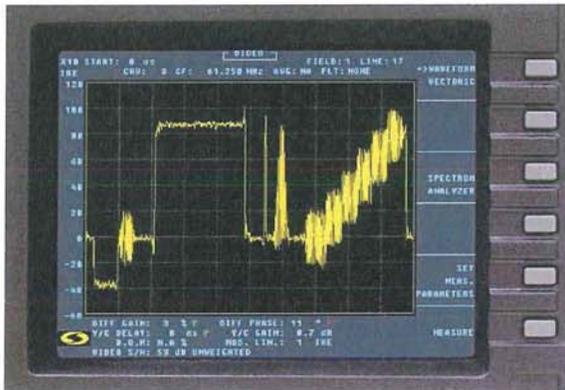
- MER
- EVM
- C/I (Carrier to Interference)
- Echo margin
- Compression
- I/Q gain difference
- I/Q phase difference
- Phase noise
- Noise margin
- System noise ratio
- Frequency response
- Symbol rate error
- Hum
- Carrier offset

... QIA provides important insight into the source of digital impairments.

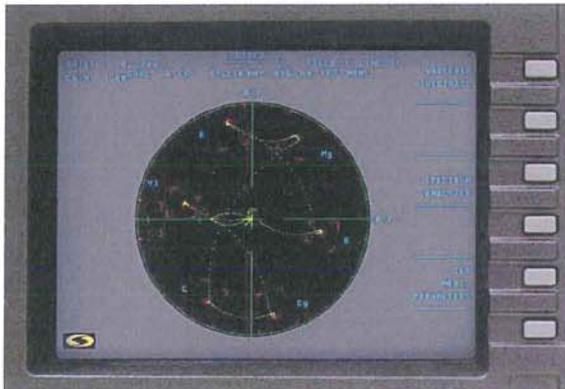
DIGITAL FEATURES

- 16/64/256 QAM DIGITAL MEASUREMENTS
- ITU-T J.83 ANNEX A, B & C COMPLIANT (DVS, DVB, DOCSIS, EURODOCSIS)
- HIGH RESOLUTION CONSTELLATION DISPLAY WITH ZOOM
- DATA LOGGING MODE OVER 1-60 MINUTES
- ADAPTIVE EQUALIZER DISPLAY WITH IN CHANNEL FREQUENCY RESPONSE AND GROUP DELAY
- RETURN PATH TESTING AND QUALIFICATION FOR VoIP
- MODULATION ERROR RATIO (MER) MEASUREMENT
- PRE AND POST BIT ERROR RATE TESTING (BER), REAL TIME AND AVERAGE
- AUTO ATTENUATOR SEARCH TO INSURE OPTIMUM QAM MEASUREMENTS
- POLARITY AUTO SEARCH FOR IF OR UP CONVERTED CARRIER FREQUENCIES
- QAM IMPAIRMENT ANALYSIS MODE
- DUAL BAND 6 & 8 MHZ IF FILTERS AVAILABLE
- ASI MPEG TRANSPORT STREAM OUTPUT AVAILABLE

NTSC VIDEO DEMODULATOR OPTION



Waveform Monitor Display of NTC 7 composite test signal



Vectorscope Display of color bars

The video demodulator option displays a specific video line and field to allow the cable operator to measure important video performance characteristics in either waveform monitor mode or vectorscope mode.

The waveform monitor mode demodulates and displays 1, 2 or 3 video lines with zoom, markers and various video filters (luminance, chroma and noise weighting). FCC required color and video tests such as differential gain and phase, Y/C gain and delay, depth of modulation, modulation linearity and video S/N (weighted and unweighted) can be performed at the touch of a button in this mode.

The vectorscope display presents color bar signals on the screen with adjustable gain and phase rotation to simplify verifying and adjusting analog TV channel modulators. The vectorscope graticule has targets for red, blue, green, cyan, magenta and yellow for easy reference.

...measure key video performance characteristics in either waveform monitor mode or vectorscope mode.

FREQUENCY

Frequency range: 0 MHz–1.5 GHz
 Calibrated frequency range: 5 MHz–1.5 GHz
 Frequency Reference:
 Aging: ±1 PPM/Yr
 Temperature Stability: ±1 PPM (0°C to 50°C)
 Frequency counter:
 Accuracy: ±1 PPM ±1 count
 Resolution: 10 Hz
 Stability (Noise sidebands offset from CW signal):
 -85 dBc / Hz @ ±10kHz offset typical

SPAN

Frequency Span:
 Range: Variable from Max Span 1500 MHz to 100 kHz & Zero Span
 Accuracy: < 2 PPM
 Sweep Time:
 Range: 2ms, 4ms, 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1000ms, 2000ms, 5000ms
 Stability: < 2 PPM
 Sweep Trigger: Free Run, Pwr Lock and TV Frame
 Resolution Bandwidth:
 Range: 1 MHz, 300 kHz, 30 kHz & 10 kHz
 Selectivity (60 dB / 3 dB Ratio): 5.3:1, 3:1, 2:1, 2:1
 Accuracy: ±5%
 Video Bandwidth:
 Range: 1 MHz, 100 kHz & 10 kHz

AMPLITUDE

Response Flatness: ±0.75 dB (5–1500 MHz)
 Sensitivity: -65 dBmV (300 kHz RBW) to +65 dBmV
 Level accuracy: ±0.75 dB @ 25°C
 Level resolution: 0.1 dB
 Impedance at RF input: 75 ohm
 Input Return Loss: >20 dB typical (>5 dB attenuation)
 Maximum safe input: +68 dBmV
 Spurious free dynamic range: > 70 dB
 Internal calibrator: 48 MHz @ -5 dBmV
 Up to 4 simultaneous traces on screen with Avg, Peak & Min Hold
 Selectable Positive, Negative or Sample detector
 Vertical, Horizontal & Tilt Markers
 Peak Search, Next Peak & Tracking on Vertical Markers
 Vertical scale: 10, 5, 2 dB/Division
BAND SELECT FILTERS (Auto or Manual) :
 7 high pass filters, 7 low pass filters and 21 bandpass filter combinations.
 High Pass Cutoff Frequencies: 35, 78, 164, 270, 360, 450, 540 MHz
 Low Pass Cutoff Frequencies: 45, 88, 174, 280, 370, 460, 550 MHz

MECHANICAL

Size: 304 x 177 x 355 mm (12"W x 7"H x 14"D)
 Weight: 10 Kg (22 pounds)
 Temperature
 Operating: 0 to 50°C (32 to 122°F)
 Storage: -20 to 55°C (-4 to 131°F)
 Display type: TFT Active Matrix Color LCD
 Display size: 162.5 mm (6.4 inches)

POWER

Battery Type: Rechargeable lead acid, 12 Volt 7 Ah
 Internal Battery Charger: Automatic Fast / Slow / Floating
 Power Supply: PSU2065 100V/250V, 50/60 Hz, 16 VDC, 4.06 A
 Charge Time: < 4 hours
 Operating Time: >2 hours

CATV MEASUREMENT SPECIFICATIONS

Channel Selection:
 Frequency, Channel Video, Channel Audio
 Channel Plans:
 Custom plans, NTSC (EIA, HRC, IRC), PAL (B/G, I, D) or other. Maximum of 350 signals (analog, digital, FM, upstream, test, etc.). PC-based and internal complete channel plan editor

TV Channel Amplitude Range:
 -40 dBmV to +65 dBmV ±0.75 dB for S/N > 30 dB
 TV Visual Frequency:
 Accuracy: Carrier Frequency, ±1 PPM
 Resolution: 10 Hz
 Visual/Aural Delta Frequency:
 Range: 1 - 10 MHz
 Accuracy: ±200 Hz
 Resolution: 10 Hz
 Visual/Aural Delta Amplitude: ±0.75 dB for S/N > 30 dB
 FM Deviation
 Range: ±150 kHz, de-emphasis 75 µsec
 Accuracy: ±2 kHz, 1–75 kHz, ±5 kHz to 150 kHz

HUM/LOW FREQ. DISTURBANCES

Modes: CW or Video (In-Service)
 Range: 1–10%
 Accuracy: ±0.5% from 1 to 5%, ±1% from 5 to 10%

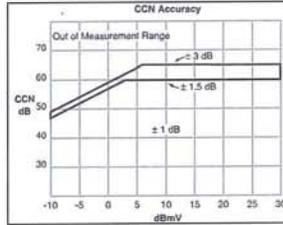
MODULATION DEPTH

AM Range: 40 to 95%
 Resolution: 0.1%
 Accuracy: ±1.5% (CCN > 40 dB)
 Signal type: VITS line with white reference

IN-CHANNEL RESPONSE

Range: ±10 dB
 Resolution: 0.1 dB
 Accuracy: ±0.25 dB
 Signal type: VITS line with full amplitude CATV Multiburst signal, Video sweep or Ghost Canceling Reference signal

CARRIER-TO-COMPOSITE NOISE RATIO

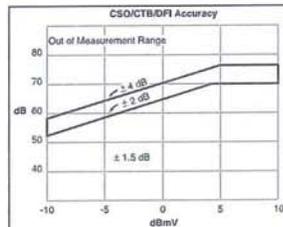


Note: CCN specifications with band select filters on auto and 77 channel loading

Optimum Signal Range: +3 dBmV to +10 dBmV, noise measured with 0 dB Attenuation
 CCN range: 60 dB with ±1 dB accuracy, 65 dB with ±3 dB accuracy
 Resolution: 0.1 dB

CSO/CTB/DFI

Optimum Signal Range: 0 dBmV to +4 dBmV, beat measured with 0 dB Attenuation
 CSO/CTB/DFI Range: 64 dB with ±1.5 dB
 71 dB with ±4 dB accuracy
 Resolution 0.1 dB



Note: CSO, CTB and DFI specifications with band select filters on auto and 77 channel loading

TDM MEASUREMENT

Frequency Span: Zero Span
 Horizontal Time: 50 µsec to 500 msec (1, 2, 5 settings)

Resolution Bandwidth: 1 MHz, 300 kHz, 30 kHz, 10 kHz
 Video Bandwidth: 1 MHz, 100 kHz, 10 kHz
 Bandwidth Correction Range: 10 kHz to 9.9 MHz
 Pulse Level Accuracy: ±0.75 dB in 5 µsec, 1 MHz RBW
 Trigger Modes: Free run, Continuous, Single
 Trigger Level Range: -70 dBmV to +65 dBmV
 Trigger Delay Range: 0 to 100 msec, in 1 µsec steps
 Trigger Holdoff Range: 50 µsec to 100 msec, in 1 µsec steps

DIGITAL MEASUREMENT QAM 16/64/256 SPECIFICATIONS

Modulation Type: 16/64/256 QAM ITU-T J.83 Annex A, B & C (DVS, DVB, DOCSIS, EuroDOCSIS)
 Constellation Display Size: 16, 64 and 256 QAM
 Full constellation with zoom capability
 Adaptive Equalizer Display - Number of Taps: 8 feed-forward; 24 feedback
 Scale: +10 to -80 dBc
 Mask: DOCSIS
 Frequency response, over signal BW: +5 to -5 dB
 Group Delay, over signal BW: -1000 to +1000 nsec
 Digital Carrier Average Power Measurement
 Amplitude Range: -30 to +65 dBmV
 Resolution: 0.1 dB
 Absolute Accuracy: ±1.5 dB
 Bandwidth Range: 200 kHz to 1.5 GHz
 Modulation Error Ratio (MER)
 Range: 22 to 40 dB
 Accuracy: ±1 dB typical
 Error Vector Magnitude (EVM)
 Range: 0.65% to 4.1%
 Bit Error Rate (BER), Before and After R-S Decoding, per 1 second period
 Range: 0 to 1.0 x 10⁻⁴
 Average Bit Error Rate (BER), Before and After R-S Decoding
 Range: 0 to 1.0 x 10⁻⁴
 Estimated Noise Margin
 Range: 1 to 12 dB
 Accuracy: ±1dB typical
 Statistics Logging
 User-selectable Test Period: 1 to 60 minutes, up to 7 days with WinQAM
 MER, Pre and Post BER, Errored Seconds, Severely Errored Seconds, Frame Loss, System Unavailability time

Symbol Rate
 Range: 1.28 to 7 MS / s
 (Continuous QAM measurements at <30°C)

VIDEO DEMOD MEASUREMENT (NTSC ONLY)

Differential Phase: ± 3° maximum
 Differential Gain: ± 2% maximum
 Luminance to Chrominance Delay: ± 40 nsec maximum
 Luminance to Chrominance Gain: ± 3% maximum
 Depth of Modulation: ± 2% maximum
 Modulation Linearity: ± 2 IRE maximum
 Signal to Noise (unweighted): ± 4 dB maximum
 Signal to Noise (weighted): ± 4 dB maximum

Note: All specifications apply over the standard 0°C to +50°C operating temperature range, after a minimum of 2 hours of storage within the operating temperature range, if the unit is not fully at ambient temperature. The AT2500RDv meets all its specifications within 1 minute after it is turned on, providing that the AT2500RDv is within the one year calibration cycle. Sunrise Telecom Broadband's unique AutoCal feature assures accuracy by periodically self-testing and triggering a non-obstructive calibration, as required.

Specifications subject to change without notice.

FIELD-PROVEN SOLUTIONS

For detailed information on the AT2500R, visit our website at www.sunrisetelecom.com for the name of your local Sunrise representative. Or telephone us at 1-800-297-9726 (Int'l calls: 1-514-725-6652).

Sunrise Telecom Broadband is a leader in digital broadband and DOCSIS test instruments for the cable industry. As part of the Sunrise Telecom family, we leverage the strength of one of the world's largest communications test and measurement companies.

Sunrise Telecom Broadband's field-proven solutions include installation and maintenance instruments; portable headend analyzers; and network test systems and software. Our goal is to enable service providers to rapidly deploy television, high-speed Internet, and digital video applications.

Based on our core strength in RF testing, we have established a successful track record as a provider of leading edge solutions that incorporate innovative test methods, intuitive user interfaces, and thorough product training. At Sunrise Telecom Broadband, we uncomplicate the cable broadband engineer's and field technician's day.

JUST ANOTHER WAY WE'RE UNCOMPLICATING CABLE



North American Toll-Free:
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1-408-363-8000
Fax: 1-408-363-8313

ORDERING INFORMATION

AT2500R 1.5 GHZ PORTABLE CATV SPECTRUM ANALYZER

Includes:

PSU2065 Power Supply, Rechargeable lead acid battery,
User Manual, 2-Year Warranty, Padded Protective Soft Case
AT2VIDOUT Baseband NTSC video output
AT2VGAOUT VGA Output (15 Pin D Connector)
10Base-T Network connection (RJ45)
High/Low preselection filters
AT2CATVPAK CATV Measurement package
Carrier measurement, Precision frequency counter,
In-service Hum, CCN, CSO and CTB, Digital Channel Power
AT2TDM Time Domain Measurement package
A99026010 WinCom II Data Management Software (license for 1 PC)

AT2500Rv 1.5 GHZ PORTABLE CATV/VIDEO SPECTRUM ANALYZER

Includes all AT2500R features plus:

NTSC Video Demodulator Measurement Option

AT2500RQ 1.5 GHZ PORTABLE CATV/QAM SPECTRUM ANALYZER

Includes all AT2500R features plus:

16/64/256 QAM Digital Measurement Analyzer
(Constellation, BER, MER Adaptive EQ, Data Logging)
AT2Q+QIA QAM+ Impairment Analysis Mode

AT2500RQv 1.5 GHZ PORTABLE CATV/QAM/VIDEO SPECTRUM ANALYZER

Includes all AT2500R features plus:

QAM and Video Demodulator Options

OPTIONS AND ACCESSORIES

HARDWARE OPTIONS

These options are factory installed and must be ordered with product—requires AT2500RQ or AT2500RQv

AT206-8 64/256 QAM RQ+ Euro/Annex A/B/C, Dual 6 - 8 MHz band width (Required for Annex A)
AT2Q-ASI MPEG ASI Output through BNC Connector

WINDOWS PC SOFTWARE FOR SUNRISE AT2500RQV (1 LICENSE PER PC)

Includes: CD, User Manual, A65000909 Serial Cable and A65000945 RJ-45 Ethernet Crossover Cable

A99026010 WinCom II - Data Management Software (licenses for additional PCs)

A99026020 WinRemote - Remote Control Spectrum Analyzer Software

A99026050 WinQAM - Remote Control QAM Digital Measurements Software (Requires AT2500RQ or AT2500RQv)

ACCESSORIES

A99025600 Padded Protective Soft Case for Sunrise AT2500RQv

A90093030 Model BTA Bucket Truck Adapter

CALIBRATION OPTIONS

AT-W32 3-Year Calibration Program

AT-W52 5-Year Calibration Program

AT2-CC Certificate of Calibration/compliance (N/C when requested at time of purchase)

AT2-CCM Certificate of Calibration/compliance with measurement data (requested at the time of purchase only)

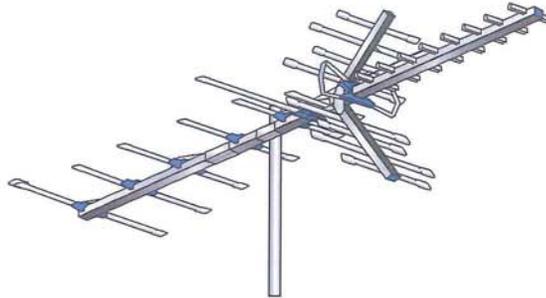


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Engineering Specifications

AntennaCraft

Model **HBU33** High Band VHF and UHF Antenna



Model Number:	HBU33
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General:	
Channels	7 - 69
Electronic Elements	31
Output Impedance	300 ohms

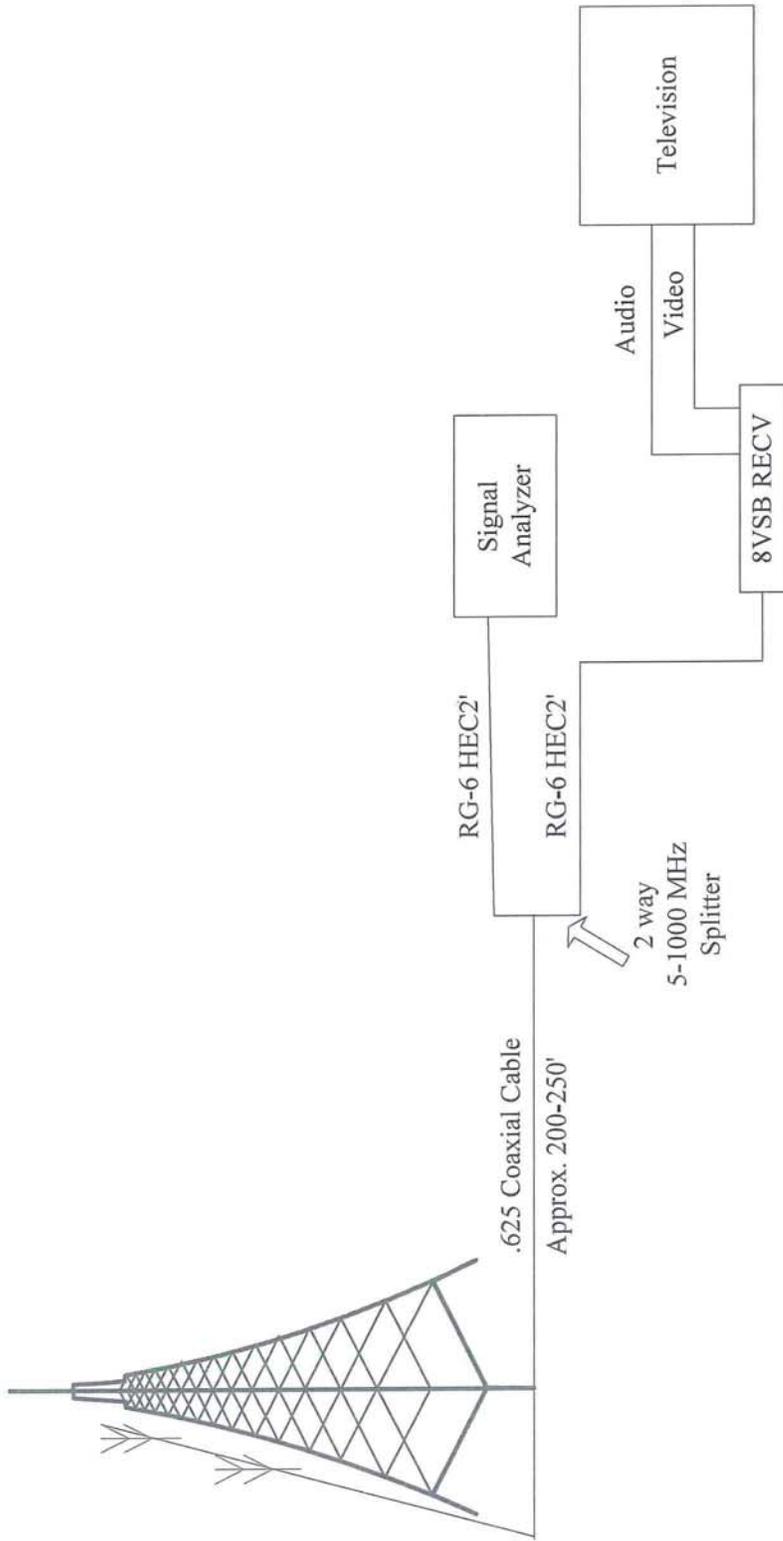
Physical:	
Boom Length	85"
Maximum Width	43.5"
Vertical Height	23.5"
Turning Radius	48"
Element Diameter	.375"
Shipping Weight	6.0 lbs.
Carton Dimensions	6.0" x 6.25" x 59.75"

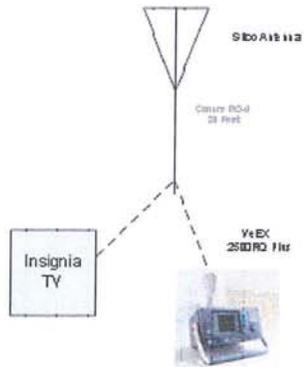
Performance:	
1 Gain (dB)	
VHF Low Band	N/A
VHF High Band	7.6
UHF Band	7.7
2 Half-Power Beamwidth (deg.)	
VHF Low Band	N/A
VHF High Band	57.0
UHF Band	52.0
3 Front-To-Back Ratio (dB)	
VHF Low Band	N/A
VHF High Band	20.4
UHF Band	14.8

1: Over Half-Wave Tuned Dipole (Ch. 7 - 62)

2: -3 dB Down Points

3: Opposite Hemisphere





Off Air Antenna Survey Configuration

EXHIBIT 6

DECLARATION OF SIGNAL STRENGTH TESTS

I am Dennis Wallace, C.B.T.E., and I hereby declare as follows:

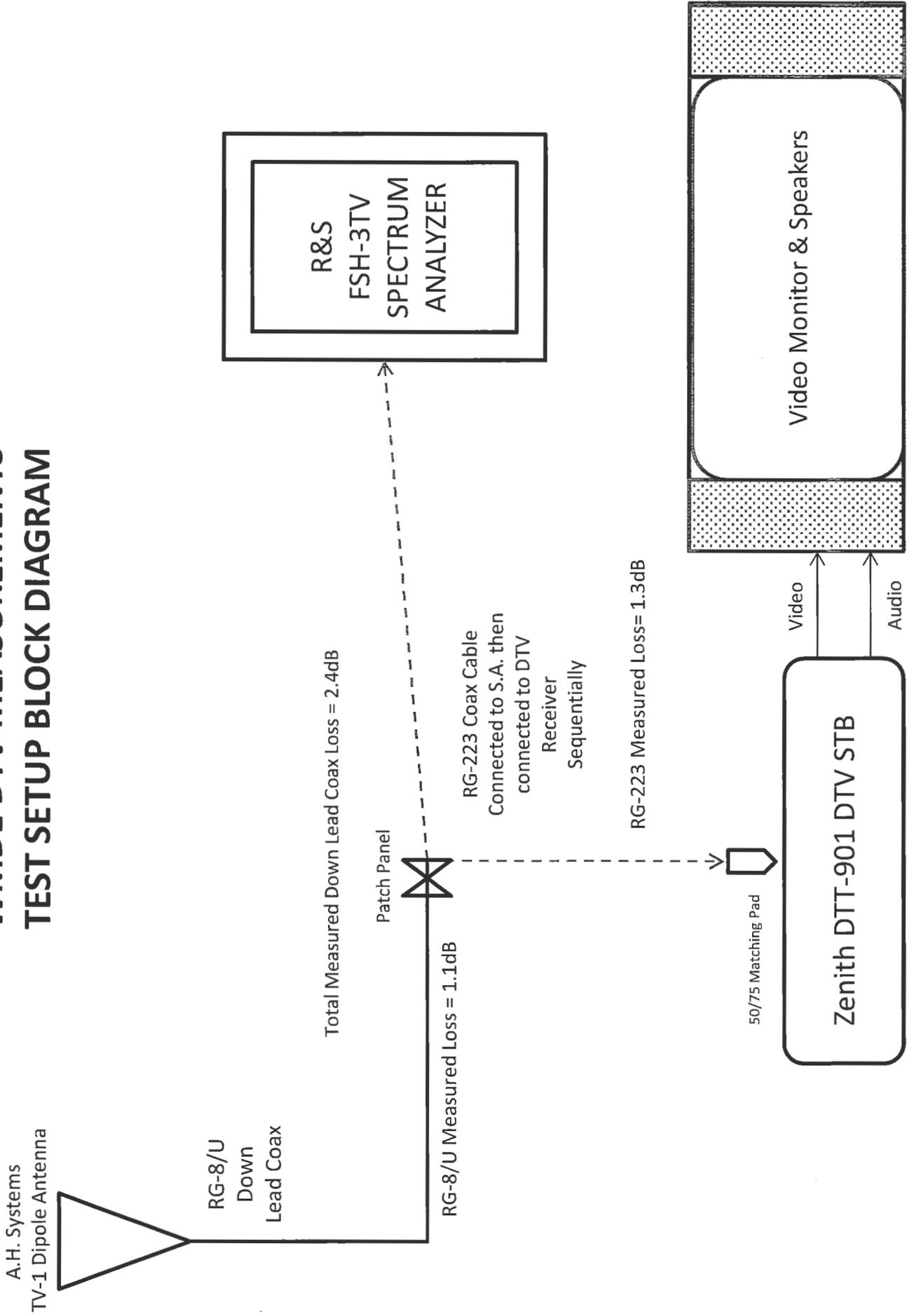
1. I am a principal in the consulting firm of Meintel, Sgrignoli, & Wallace, which specializes in Digital and Analog Television and Radio Transmission Systems, Consumer and Professional Electronics, Technical Software applications and Propagation Studies, as well as engineering education (seminars, tutorials, *etc.*). I have over 26 years' experience in the television industry. I managed all the Laboratory RF Testing of the Grand Alliance ATSC HDTV System, served as the RF Systems Engineer at the Advanced Television Test Center (ATTC), and managed test plans, configurations, and operations for Grand Alliance Testing and several data-casting systems. I also have held positions in Field Operations Engineering, Applications Engineering, and served as Product Manager for two Television transmitter manufacturers. In addition, I have authored several papers on the topics of Digital Television transmission and results of testing of the DTV systems, which have been published in the IEEE Transactions and other publications, have been a presenter at the IEEE Broadcast Technology Symposium, NAB, and several SBE Conferences, and have provided DTV presentations for SCTE and IEEE Chapters. I have made extensive field measurements of both Digital and Analog Television and Radio systems, including over 5,000 Digital Television field measurements. I am a Certified Broadcast Television Engineer by the Society of Broadcast Engineers, am a member of the IEEE Broadcast Technology Society, SMPTE, an Associate member of the Federal Communications Bar Association, and am active on several industry standards committees and the ATSC.
2. On May 8 through 10, I conducted fifteen tests of the signal strength of WMDE, Channel 5 (Dover, DE), at various locations specified below in my report. The test locations included locations both inside and outside WMDE's noise limited signal contour, and all but three of the fifteen test locations were in areas where the Longley-Rice methodology predicted 28 dB μ or higher field strength. The test details below confirm that no viewable WMDE picture could be received at any of the test locations.
3. I conducted the tests by measuring the signal strength with a dipole antenna mounted on a mast orientated parallel to the ground at a height of thirty feet AGL using a DTV Field Test Vehicle with a pneumatic mast. The antenna was properly oriented toward WMDE's transmitter site at (according to the FCC's database) 38° 57' 17" N Latitude, 76° 05' 34" W Longitude (NAD27), with the use of electronic maps. After orientating the antenna with the maps and in accordance with good engineering practices the test antenna was panned through 360 degrees in an attempt to locate and maximize the received signal.

4. The test used the following equipment:

Antenna Information		Signal Measurement Equipment		Digital TV Receiver		Down-lead Wire	
Manufacturer:	A.H. Systems	Manufacturer:	Rohde & Schwarz	Manufacturer:	Zenith	Make:	Belden RG-8/U
Model:	TV-1	Model:	FSH-3 TV	Model:	DTT-901	Model:	9913
Age:	12 years	Age:	12 years	Age:	12 years	Age:	8 years
Type:	Dipole	Calibration Date:	05/07/2015	Notes:	5 th Gen CECB STB	Length:	~ 75 Ft.

5. Attached hereto is a true and correct copy of a block diagram depicting the configuration of the equipment used in the signal strength tests. Also attached hereto are the spec sheets for the antenna, the signal measurement equipment, and the down lead wire.
6. In order to ensure that the test receiver was able to properly receive and decode the WMDE Channel 5 signal, a setup location was chosen in Maryland that was able to receive a sufficient signal to scan the test receiver. The test receiver was scanned and programmed to receive the signal from WMDE at a location well within the 28dBuV/m contour; but outside the Cox Cable service area.
7. The signal strength tests were conducted with the Rhode & Schwarz FSH-3 TV analyzer at a point that would be the same point as the input to the first piece of signal processing equipment if any had been used. The testing produced the following measurements on the output of the antenna down lead. The signal strength results were measured in dBm.
8. Once a signal level measurement was made with the spectrum analyzer the download cable was disconnected from the spectrum analyzer and connected to the DTV Test Receiver in order to check for reception and picture quality.
9. The location and results for each of the signal tests follow.

WMDE DTV MEASUREMENTS TEST SETUP BLOCK DIAGRAM



Test # 1

Date: May 10, 2015

Test Location: 6616 Melrose Ave, McLean, VA.

Coordinates: 38-56-40.4N

77-10-16.3W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

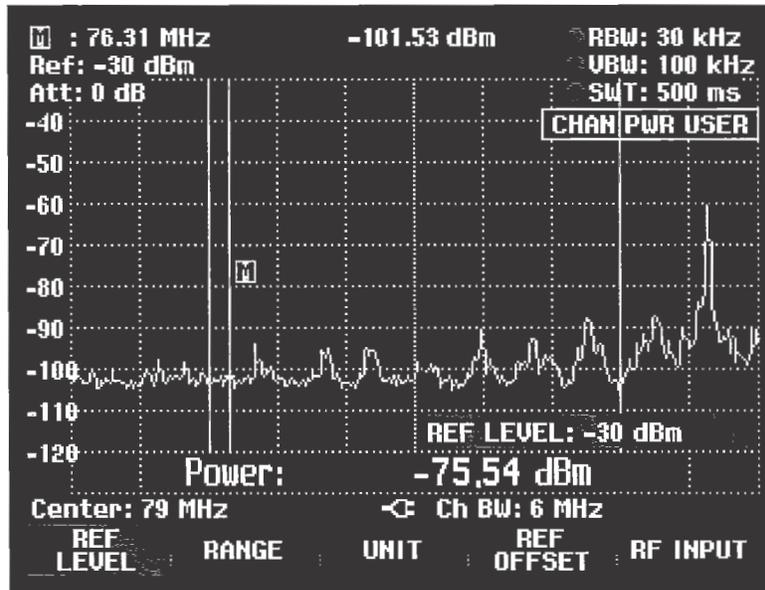
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below. However, even if there was no impulse noise evident in this location, the signal level of the channel 5 signal was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
11:20AM	-75.54	Mostly Cloudy	78°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #1



Test # 2

Date: May 10, 2015

Test Location: 1633 Dineen Drive, McLean, VA.

Coordinates: 38-55-24.4N

77-09-58.5W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

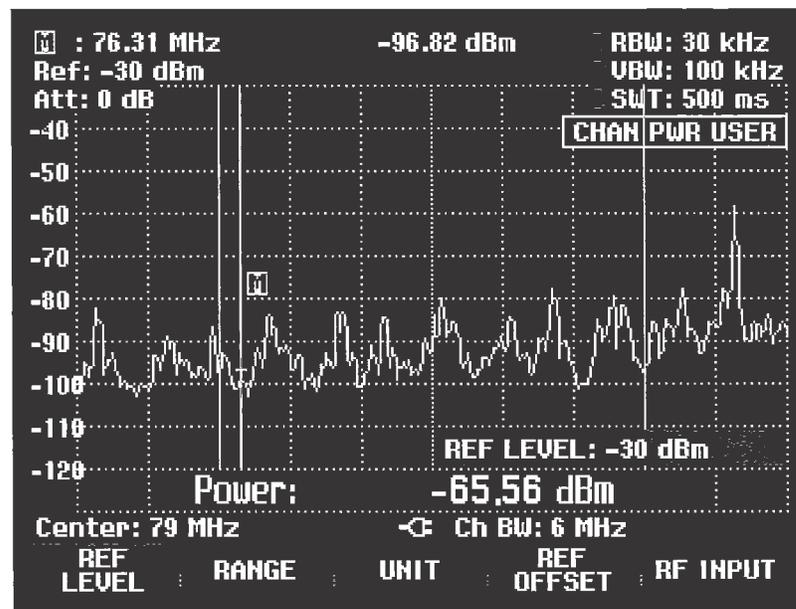
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some moderate impulse noise was observed as shown in the spectrum plot shown below; which accounts for the higher channel power as recorded below.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
11:47AM	-65.56	Mostly Cloudy	78°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #2



Test # 3

Date: May 10, 2015

Test Location: 7304 Yates Ct., Falls Church, VA.

Coordinates: 38-56-05.3N

77-11-55.2W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

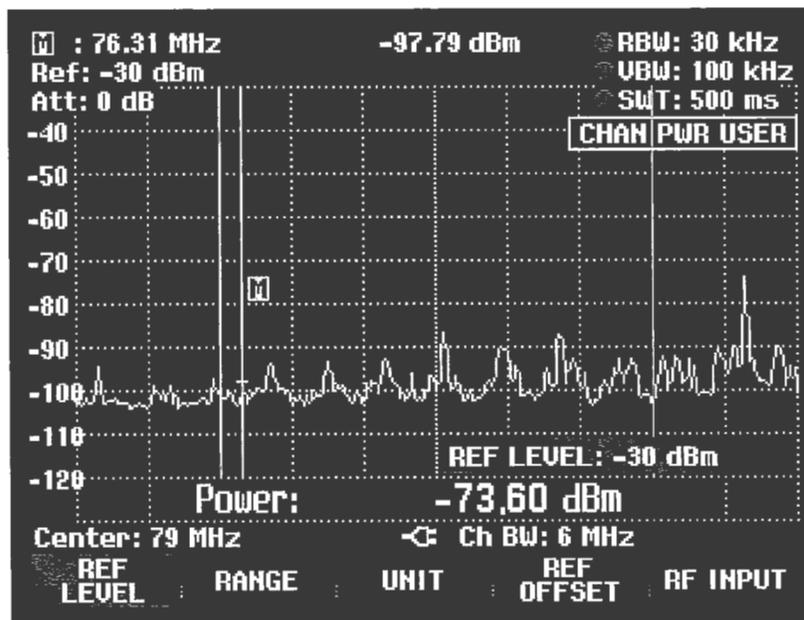
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below. However, even if there was no impulse noise evident in this location, the signal level of the channel 5 signal was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
12:56PM	-73.6	Mostly Cloudy	80°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #3



Test # 4

Date: May 10, 2015

Test Location: Scoville Street at intersection with Paul Street, Bailey's Crossroads, VA.

Coordinates: 38-50-43.5N

77-07-38.5W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

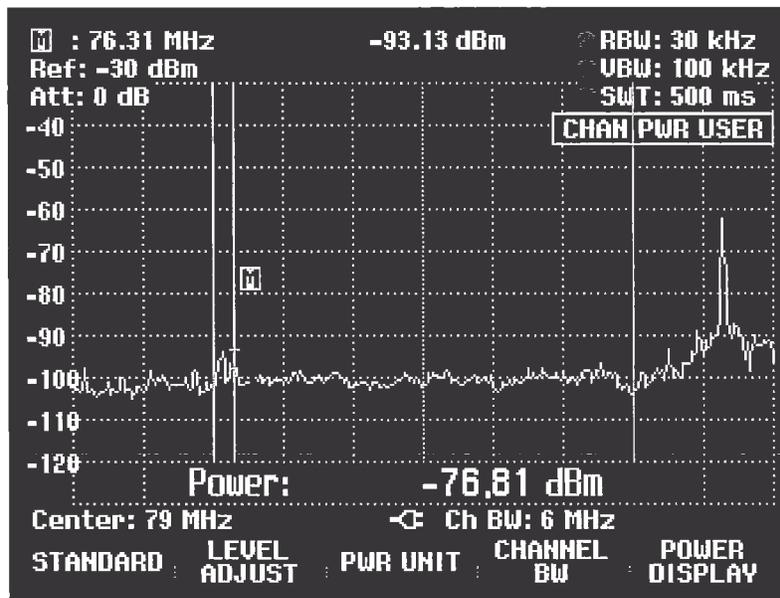
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. No evidence of the channel 5 signal was visible. For reference, however, it is noted that the visual carrier for an LPTV station on Channel 6 is visible in the upper adjacent channel.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
14:07PM	-76.81	Mostly Cloudy	83°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #4



Test # 5

Date: May 9, 2015

Test Location: Devereaux Circle at LaRoche Court, Fairfax County, VA.

Coordinates: 38-46-06.0N

77-07-40.8W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

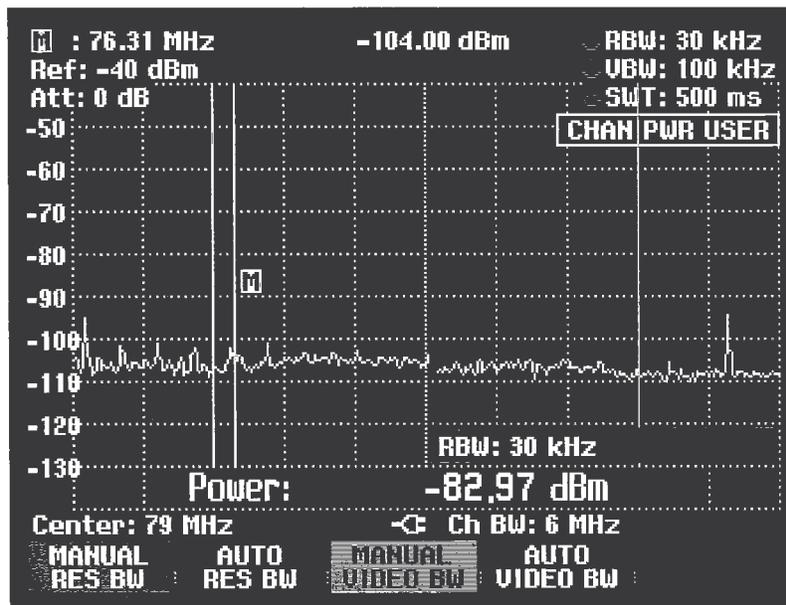
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
17:58PM	-82.97	Partly Cloudy	81°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #5



Test # 6

Date: May 9, 2015

Test Location: 2629 East Side Drive, Fairfax County, VA.

Coordinates: 38-46-03.4N

77-04-40.2W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

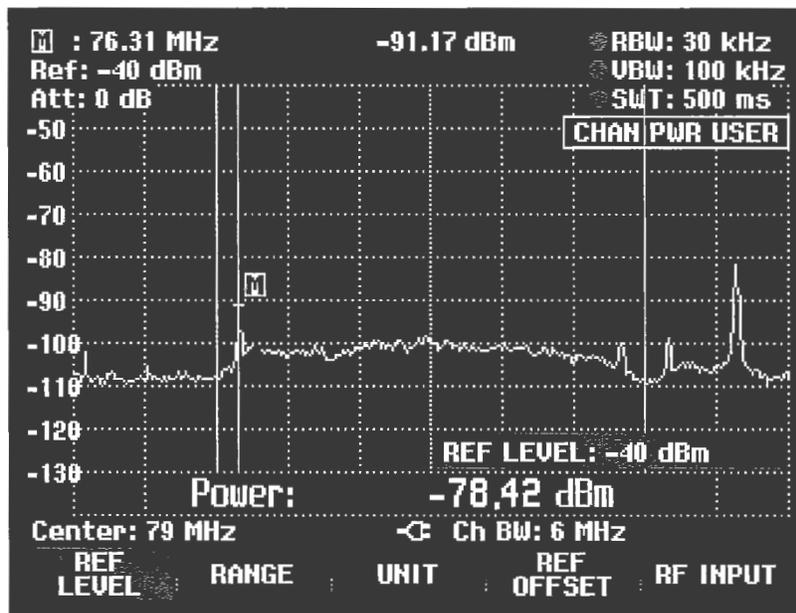
Description of signal quality: The signal test indicated that a very weak signal was detectable for VHF Channel 5 as shown in the spectrum plot below. However, the signal was significantly below the threshold for a DTV set to receive the signal. In this case, the signal was only approximately 6-8dB above the noise floor and therefore did not achieve the 15dB C/N required for reception.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any pictures or sound on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
19:15PM	-78.42	Partly Cloudy	81°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #6



Test # 7

Date: May 9, 2015

Test Location: 8507 Crossley Place, Fairfax County, VA.

Coordinates: 38-43-34.8N

77-03-27.5W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

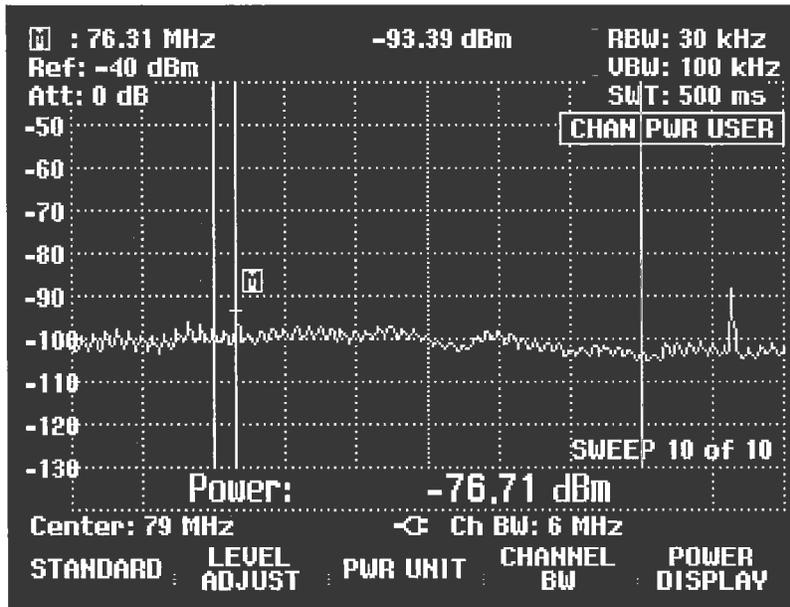
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some moderate impulse noise was observed as shown in the spectrum plot shown below.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
19:50PM	-76.71	Partly Cloudy	79°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #7



Test # 8

Date: May 10, 2015

Test Location: 8790 Richmond Highway, Fort Belvoir, VA.

Coordinates: 38-43-13.8N

77-07-35.3W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

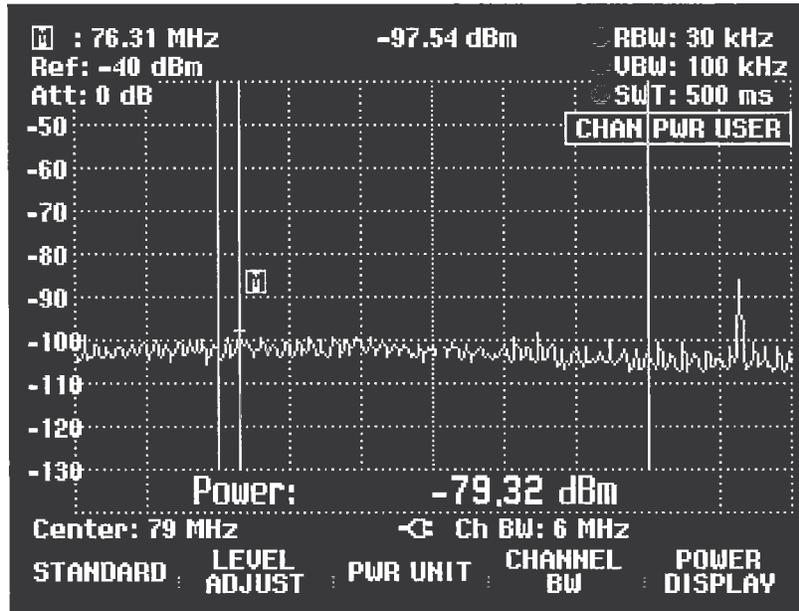
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
17:45PM	-79.32	Mostly Cloudy	84°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #8



Test # 9

Date: May 10, 2015

Test Location: 5920 Erving Street, Springfield, VA.

Coordinates: 38-47-19.8N

77-11-30.6W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

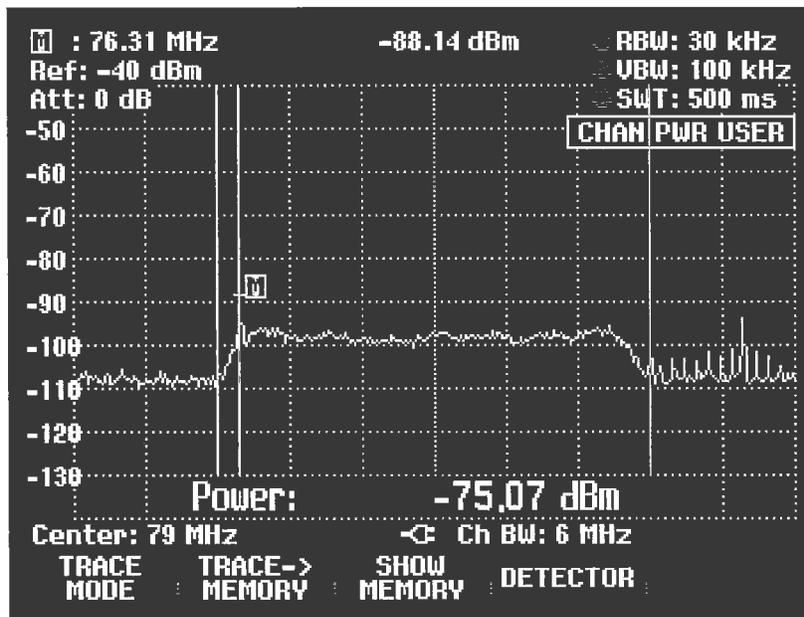
Description of signal quality: The signal test indicated that a very weak signal was detected for VHF Channel 5 on the spectrum analyzer. However, the signal was only approximately 10dB above the noise floor; and was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
15:47PM	-75.07	Mostly Cloudy	84°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #9



Test # 10

Date: May 10, 2015

Test Location: Village Center Parking Lot, Great Falls, VA.

Coordinates: 38-59-46.0N
77-17-21.7W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

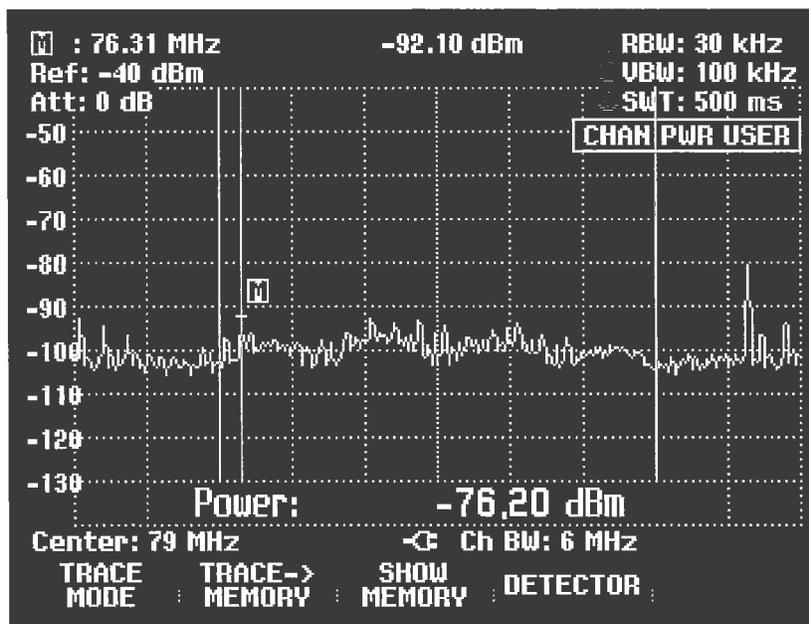
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
10:32AM	-76.2	Overcast	70°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #10



Test # 11

Date: May 10, 2015

Test Location: 1107 Westbriar, Vienna, VA.

Coordinates: 38-54-57.2N

77-14-44.3W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

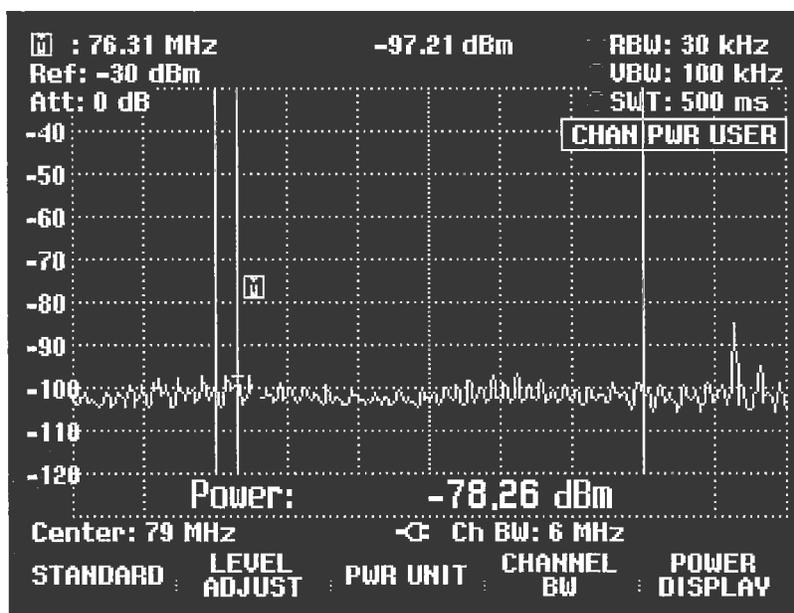
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below. However, even if there was no impulse noise evident in this location, the signal level of the channel 5 signal was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
13:17PM	-78.26	Mostly Cloudy	76°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #11



Test # 12

Date: May 10, 2015

Test Location: 4231 Markham St., Annandale, VA.

Coordinates: 38-49-58.4N

77-11-51.8W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

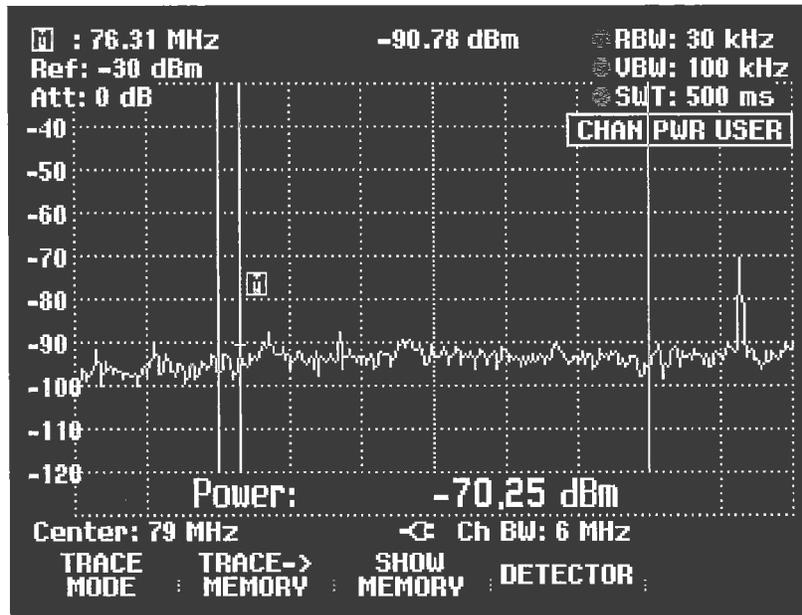
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor. Some impulse noise was observed as shown in the spectrum plot shown below. However, even if there was no impulse noise evident in this location, the signal level of the channel 5 signal was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
14:47PM	-70.25	Mostly Cloudy	83°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #12



Test # 13

Date: May 10, 2015

Test Location: 6710 Anders Terrace, Springfield, VA.

Coordinates: 38-48-28.3N

77-10-40.3W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

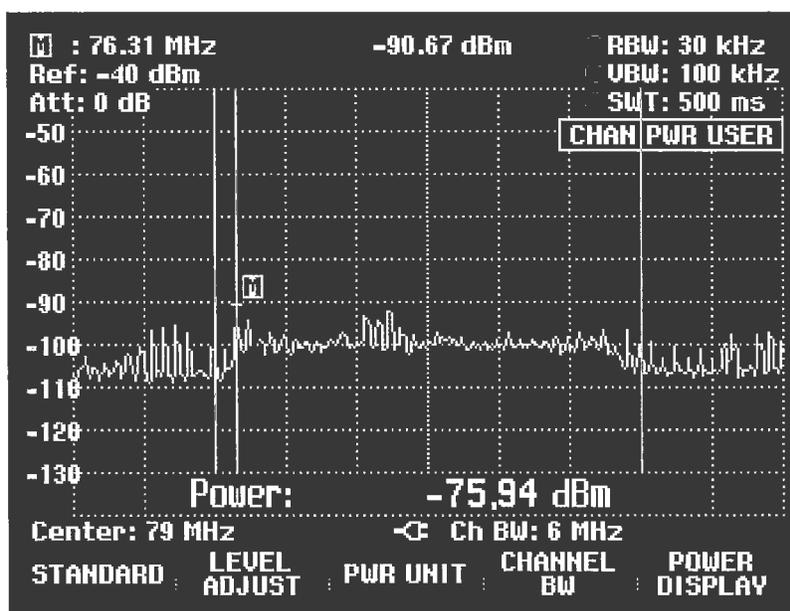
Description of signal quality: The signal test indicated that a very weak signal was detectable on the spectrum analyzer for VHF Channel 5. The channel 5 signal was visible at approximately 5dB above the noise floor. This level is well below the signal level required for reception. In addition, moderate to heavy impulse noise was observed as shown in the spectrum plot shown below; which would likely preclude reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
15:18PM	-75.94	Mostly Cloudy	84°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #13



Test # 14

Date: May 10, 2015

Test Location: Coffers Road at Blencoe Court, Burke, VA.

Coordinates: 38-47-35.2N

77-16-33.1W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

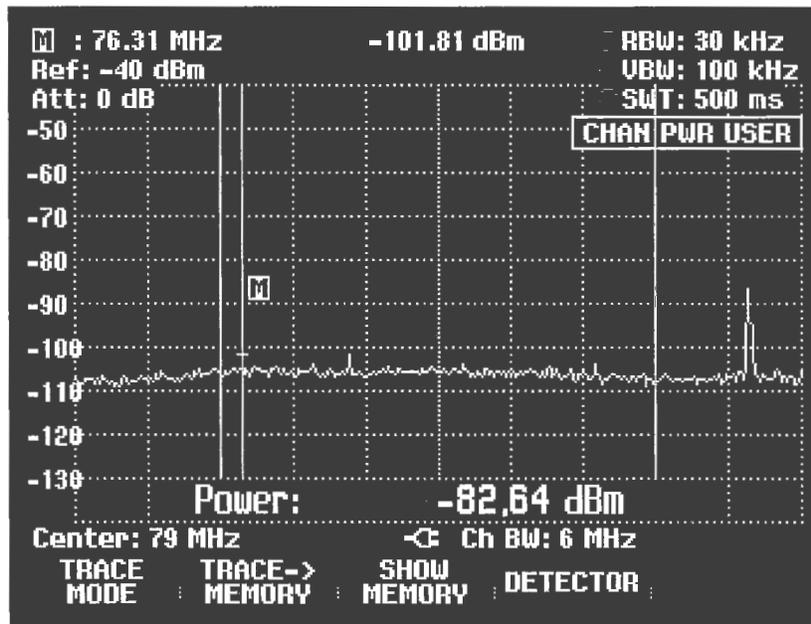
Description of signal quality: The signal test indicated that no detectable signal for VHF Channel 5 was detectable above the noise floor.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
16:29PM	-82.64	Mostly Cloudy	84°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #14



Test # 15;

Date: May 10, 2015

Test Location: 7956 Twist Lane, Newington, VA.

Coordinates: 38-44-28.1N

77-12-32.0W

Test Results: The received signal level was insufficient for reception for WMDE, Channel 5.

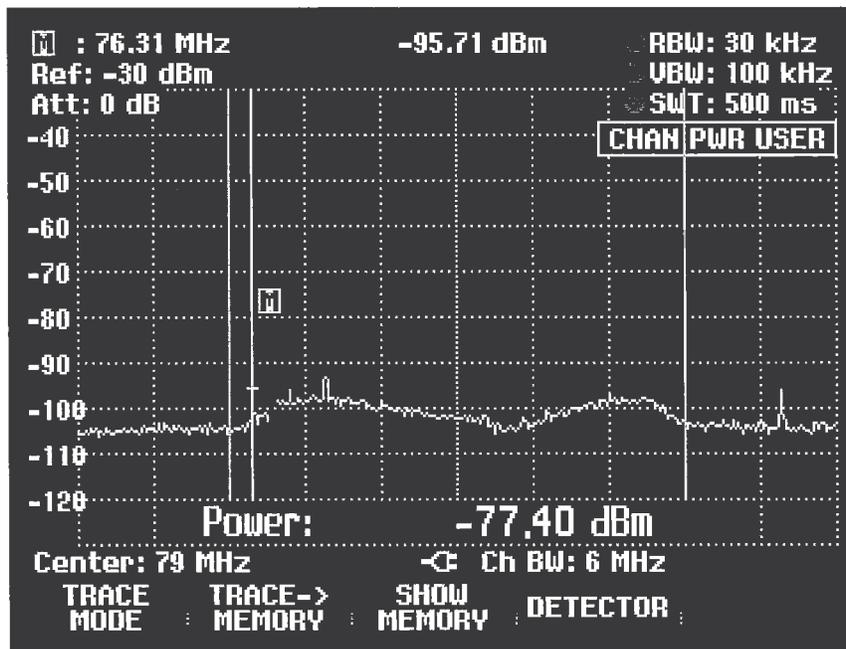
Description of signal quality: The signal test indicated that a very weak signal was detectable on the spectrum analyzer for VHF Channel 5. However, the signal was only 3-6dB above the noise floor. This signal level was much too weak for reception in this location.

The spectrum analyzer was disconnected from the antenna down lead and television receiver was connected to the antenna and the receiver was set to Channel 5. The television receiver did not decode any television signal on channel 5. As a result of these conditions no check of visual picture quality was possible.

Time (Eastern)	Signal Strength (dBm)	Weather Conditions	Temperature	Picture Quality
17:13PM	-77.4	Mostly Cloudy	84°F	No Picture

Description of picture quality: No picture.

Spectrum Plot: Test Location #15



To the best of my knowledge, information, and belief, I declare under penalty of perjury that the information contained in this declaration is true and correct.

Dennis Wallace, C.B.T.E.
Managing Partner
Meintel, Sgrignoli, & Wallace, LLC
1282 Smallwood Drive
Suite 372
Waldorf, MD 20603

Dated: May 14, 2015

