Meintel, Sgrignoli, & Wallace

Technical Statement
STA Purpose & Justification
KSAT-TV San Antonio, TX
June 23, 2009

On Friday June 12, 2009 KSAT-TV San Antonio, TX transitioned its DTV operation to its former analog channel 12. Subsequently the station reports that it has received numerous complaints from viewers that are unable to receive its signal. In addition, KSAT-TV reports that station personnel have confirmed that it not possible to receive the station utilizing several different inside antennas while at various locations within the station's studio. The KSAT-TV studio is located approximately 18 miles from the transmitter site and therefore in an area where the signal level should be well above the minimum required for service.

There are several possible explanations for the problems that have been reported here and in other areas of the country with DTV reception on VHF channels. Some recent work done by this firm has caused us to believe that in some cases the power levels authorized for stations operating on VHF channels may not be sufficient for indoor reception in areas where viewers have come to expect such service. This may be due to the inability of the longer wavelength VHF frequencies to pass through windows without being attenuated while shorter wavelength UHF frequencies are able to pass through unaffected. It is also noted that manmade noise is much more prevalent at

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VHF frequencies than on UHF. Also the antennas available for indoor reception tend to perform poorly at VHF (see attached report by MSW on indoor antenna measurements). We further note that there may be many cases where viewers have been watching an inferior analog signal with noise and ghosting. Such reception was possible because the analog service degrades gracefully; however, digital will likely fail in such an environment.

Another issue that may also be related to the lower power levels of DTV stations on VHF channels (compared to analog) is interference from FM broadcast stations. KSAT-TV has actually documented a few cases where it has been possible to correct the reception problem by inserting a FM trap between the antenna and the DTV receiver. In the past the power of analog television stations was in general significantly higher than that of FM broadcast stations; however, most VHF DTV stations now have power levels well below that authorized for many FM stations.

On the other hand some of the reported problems may be the result of stations transitioning to their pre-transition analog antenna. It is known that many of the older analog antennas were designed to perform well only at the frequencies of the analog visual and aural carriers. Therefore the frequency response over the entire 6 MHz channel can be very poor. Because the frequency response for DTV needs to be relatively flat across the entire channel the performance can be severely degraded by a poor transmission system. In view of this, KSAT-TV is looking into the possibility that their problem is related to their transmission facility.

However, since some VHF reception problems may be improved with higher power levels KSAT-TV is requesting an STA that would allow it to increase power. KSAT-TV is currently authorized to operate with an effective radiated power (ERP) of 17.6 kW and is requesting that it be allowed to increase its ERP to 22.2 kW.

An OET-69 study (results are attached) indicates that with an ERP of 22.2 kW, new interference above the de minimis limit of 0.5% would be caused only to the Appendix B facility of KAMU-TV channel 12 College Station / Bryan, TX. New interference to all other authorized stations would be below the 0.5% limit.

The above was prepared by:

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OET-69 COVERAGE & INTERFERENCE EVALUTION

Percent allowed new interference: 0.500
Percent allowed new interference to Class A: 0.500
TW Census data selected 2000
Post Transition Data Base Selected /space/software/cdbs/pt_tvdb.sff

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 06-22-2009 Time: 11:48:59

Record Selected for Analysis

KSAT-TV USERRECORD-01 SAN ANTONIO TX US
Channel 12 ERP 22.2 kW HAAT 455. m RCAMSL 00613 m
Latitude 029-16-11 Longitude 0098-15-31
Status APP Zone 3 Border
Last update Cutoff date Docket
Comments
Applicant

Cell Size for Service Analysis 2.0 km/side

Distance Increments for Longley-Rice Analysis 1.00 km

Facility meets maximum height/power limits

Azimuth (Deg)	ERP (kW)	HAAT (m)	36.0 dBu F(50,90) (km)
0.0	22.200	441.6	109.8
45.0	22.200	438.8	109.5
90.0	22.200	437.7	109.4
135.0	22.200	462.6	111.4
180.0	22.200	476.3	112.4
225.0	22.200	468.8	111.9
270.0	22.200	456.5	111.0
315.0	22.200	454.0	110.8

Evaluation toward Class A Stations

Contour overlap to Class A station
KWDT-LP 12 CORPUS CHRISTI TX BPTVA 20030602AAA

Class A Evaluation Complete

SPACING VIOLATION FOUND BETWEEN STATION

KSAT-TV 12 SAN ANTONIO TX USERRECORD01

and station

SHORT TO: KAMU-TV 12 COLLEGE STATION TX DTVPLN DTVP0406
30 -37-48 96 -20-33
Req. separation 273.6 Actual separation 238.6 Short 35.0 km

SHORT TO: KAMU-TV 12 COLLEGESTATION/BRYAN TX BLEDT 20030319AFB
030-37-47 0096-20-33
Req. separation 273.6 Actual separation 238.6 Short 35.0 km

SHORT TO: KSAT-TV 12 SAN ANTONIO TX BSTA 20090205ABI
029-16-11 0098-15-31
Req. separation 273.6 Actual separation 0.0 Short 273.6 km

SHORT TO: KSAT-TV 12 SAN ANTONIO TX DTVPLN DTVP0407
29 -16-11 98 -15-31
Req. separation 273.6 Actual separation 0.0 Short 273.6 km

SHORT TO: KSAT-TV 12 SAN ANTONIO TX BMLCT 19790412KG
029-16-11 0098-15-31
Req. separation 273.6 Actual separation 0.0 Short 273.6 km

Proposed facility OK to FCC Monitoring Stations

Proposed facility OK toward West Virginia quiet zone

Proposed facility OK toward Table Mountain

Proposed facility is beyond the Canadian coordination distance

Proposed facility is within the Mexican coordination distance
Distance to border = 216.1km

Proposed station is OK toward AM broadcast stations

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Start of Interference Analysis

Proposed Station

Channel	Call	City/State	ARN
12	KSAT-TV	SAN ANTONIO TX	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KQUX-CA	AUSTIN TX	124.7	LIC	BLTVA - 20060613AAL
11	KVCT	VICTORIA TX	119.8	CP MOD	BMPCDT - 20021107AAS
11	KVCT	VICTORIA TX	119.8	PLN	DTVPLN - DTVP0351

12	KAMU-TV	COLLEGE STATION TX	238.6	PLN	DTVPLN - DTVP0406
12	KAMU-TV	COLLEGESTATION/BRYAN TX	238.5	LIC	BLEDT - 20030319AFB
12	KWDT-LP	CORPUS CHRISTI TX	184.0	APP	BPTVA - 20030602AAA
13	KRIS-TV	CORPUS CHRISTI TX	181.6	PLN	DTVPLN - DTVP0478
13	KRIS-TV	CORPUS CHRISTI TX	181.6	CP MOD	BMPCDT - 20060227AIF
13	KAKW-TV	KILLEEN TX	163.9	PLN	DTVPLN - DTVP0481
13	KAKW-TV	KILLEEN TX	163.9	LIC	BLCDT - 20060912ACJ

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Analysis of Interference to Affected Station 1

Analysis of current record

Channel	Call	City/State	Application Ref. No.
11	KQUX-CA	AUSTIN TX	BLTVA -20060613AAL

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
10	KWTX-TV	WACO TX	120.6	CP	BPCDT - 20090601AUH
10	KWTX-TV	WACO TX	120.7	PLN	DTVPLN - DTVP0295
11	KTVT	FORT WORTH TX	263.7	LIC	BMLCT - 20021028AAN
11	KTVT	FORT WORTH TX	263.7	PLN	DTVPLN - DTVP0347
11	KTVT	FORT WORTH TX	263.7	CP	BPCDT - 20080328ACY
11	KHOU-TV	HOUSTON TX	237.1	APP	BMPCDT - 20080618AAW
11	KHOU-TV	HOUSTON TX	237.1	PLN	DTVPLN - DTVP0348
11	KHOU-TV	HOUSTON TX	237.1	LIC	BLCT - 19920417KE
11	KHOU-TV	HOUSTON TX	237.1	APP	BSTA - 20080612ABN
11	KHOU-TV	HOUSTON TX	237.1	CP	BPCDT - 20080303ALI
11	KLST	SAN ANGELO TX	243.8	CP MOD	BMPCDT - 20070125ACQ
11	KLST	SAN ANGELO TX	243.8	PLN	DTVPLN - DTVP0350
11	KMHZ-LP	SAN ANTONIO TX	118.9	LIC	BLTVL - 20060609ACP
11	KVCT	VICTORIA TX	176.4	CP MOD	BMPCDT - 20021107AAS
11	KVCT	VICTORIA TX	176.4	PLN	DTVPLN - DTVP0351
12	KSAT-TV	SAN ANTONIO TX	124.7	APP	BSTA -

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20090205ABI
 12   KSAT-TV  SAN ANTONIO TX            124.7  PLN    DTVPLN    -
DTVP0407
 12   KSAT-TV  SAN ANTONIO TX            124.7  LIC    BMLCT     -
19790412KG
 12   KSAT-TV  SAN ANTONIO TX            124.7  APP    USERRECORD-01
 Proposal causes no interference

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     Analysis of Interference to Affected Station   2


Analysis of current record
Channel     Call           City/State        Application Ref. No.
   11      KVCT       VICTORIA TX              BMPCDT    -20021107AAS

     Stations Potentially Affecting This Station

Chan   Call      City/State           Dist(km) Status  Application Ref.
No.
 10   KZTV     CORPUS CHRISTI TX         135.8  CP     BPCDT     -
20080324AAT
 10   KZTV     CORPUS CHRISTI TX         128.3  PLN    DTVPLN    -
DTVP0294
 11   KTVT     FORT WORTH TX             415.3  PLN    DTVPLN    -
DTVP0347
 11   KTVT     FORT WORTH TX             415.3  CP     BPCDT     -
20080328ACY
 11   KHOU-TV  HOUSTON TX                176.6  APP    BMPCDT    -
20080618AAW
 11   KHOU-TV  HOUSTON TX                176.6  PLN    DTVPLN    -
DTVP0348
 11   KHOU-TV  HOUSTON TX                176.6  CP     BPCDT     -
20080303ALI
 11   KLST     SAN ANGELO TX             396.8  CP MOD BMPCDT    -
20070125ACQ
 11   KLST     SAN ANGELO TX             396.8  PLN    DTVPLN    -
DTVP0350
 12   KAMU-TV  COLLEGE STATION TX        212.3  PLN    DTVPLN    -
DTVP0406
 12   KAMU-TV  COLLEGESTATION/BRYAN TX   212.3  LIC    BLEDT     -
20030319AFB
 12   KSAT-TV  SAN ANTONIO TX            119.8  PLN    DTVPLN    -
DTVP0407
 12   KSAT-TV  SAN ANTONIO TX            119.8  APP    USERRECORD-01

 Total scenarios =   6


Result key:        1
Scenario        1  Affected station        2
Before Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
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   lost to NTSC IX                          0          0.0
   lost to additional IX by ATV         39040       4578.7
   lost to ATV IX only                  39040       4578.7
   lost to all IX                       39040       4578.7

 Potential Interfering Stations Included in above Scenario     1

10A TX CORPUS CHRISTI       BPCDT     20080324AAT  CP
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       40180       4884.0
   lost to ATV IX only                40180       4884.0
   lost to all IX                     40180       4884.0

 Potential Interfering Stations Included in above Scenario     1

10A TX CORPUS CHRISTI       BPCDT     20080324AAT  CP
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4439%

Result key:        2
Scenario       2  Affected station        2
Before Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       40751       5265.5
   lost to ATV IX only                40751       5265.5
   lost to all IX                     40751       5265.5

 Potential Interfering Stations Included in above Scenario     2

10A TX CORPUS CHRISTI       BPCDT     20080324AAT  CP
11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       41778       5518.6
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   lost to ATV IX only                41778       5518.6
   lost to all IX                     41778       5518.6

 Potential Interfering Stations Included in above Scenario     2

10A TX CORPUS CHRISTI       BPCDT     20080324AAT  CP
11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4025%

Result key:        3
Scenario       3  Affected station       2
Before Analysis

Results for: 11A TX VICTORIA            BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       39632       4598.8
   lost to ATV IX only                39632       4598.8
   lost to all IX                     39632       4598.8

 Potential Interfering Stations Included in above Scenario     3

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA            BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       40772       4904.1
   lost to ATV IX only                40772       4904.1
   lost to all IX                     40772       4904.1

 Potential Interfering Stations Included in above Scenario     3

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4449%

Result key:        4
Scenario       4  Affected station       2
Before Analysis

Results for: 11A TX VICTORIA            BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
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lost to NTSC IX	0	0.0
lost to additional IX by ATV	40761	5269.6
lost to ATV IX only	40761	5269.6
lost to all IX	40761	5269.6

Potential Interfering Stations Included in above Scenario 4

10A TX CORPUS CHRISTI	DTVPLN	DTVP0294	PLN
11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 11A TX VICTORIA BMPCDT 20021107AAS CP
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	41788	5522.6
lost to ATV IX only	41788	5522.6
lost to all IX	41788	5522.6

Potential Interfering Stations Included in above Scenario 4

10A TX CORPUS CHRISTI	DTVPLN	DTVP0294	PLN
11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4026%

Result key: 5
Scenario 5 Affected station 2
Before Analysis

Results for: 11A TX VICTORIA BMPCDT 20021107AAS CP
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	41234	5370.0
lost to ATV IX only	41234	5370.0
lost to all IX	41234	5370.0

Potential Interfering Stations Included in above Scenario 5

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 11A TX VICTORIA BMPCDT 20021107AAS CP
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	42261	5619.0

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   lost to ATV IX only                42261       5619.0
   lost to all IX                     42261       5619.0

 Potential Interfering Stations Included in above Scenario     5

10A TX CORPUS CHRISTI       BPCDT     20080324AAT  CP
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4033%

Result key:        6
Scenario        6  Affected station        2
Before Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       41234       5370.0
   lost to ATV IX only                41234       5370.0
   lost to all IX                     41234       5370.0

 Potential Interfering Stations Included in above Scenario     6

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             BMPCDT    20021107AAS  CP
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       42261       5619.0
   lost to ATV IX only                42261       5619.0
   lost to all IX                     42261       5619.0

 Potential Interfering Stations Included in above Scenario     6

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4033%

Worst case new IX    0.4449% Scenario      3

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     Analysis of Interference to Affected Station   3


Analysis of current record
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Channel	Call	City/State	Application Ref. No.
11	KVCT	VICTORIA TX	DTVPLN -DTVP0351

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
10	KZTV	CORPUS CHRISTI TX	135.8	CP	BPCDT - 20080324AAT
10	KZTV	CORPUS CHRISTI TX	128.3	PLN	DTVPLN - DTVP0294
11	KTVT	FORT WORTH TX	415.3	PLN	DTVPLN - DTVP0347
11	KTVT	FORT WORTH TX	415.3	CP	BPCDT - 20080328ACY
11	KHOU-TV	HOUSTON TX	176.6	APP	BMPCDT - 20080618AAW
11	KHOU-TV	HOUSTON TX	176.6	PLN	DTVPLN - DTVP0348
11	KHOU-TV	HOUSTON TX	176.6	CP	BPCDT - 20080303ALI
11	KLST	SAN ANGELO TX	396.8	CP MOD	BMPCDT - 20070125ACQ
11	KLST	SAN ANGELO TX	396.8	PLN	DTVPLN - DTVP0350
12	KAMU-TV	COLLEGE STATION TX	212.3	PLN	DTVPLN - DTVP0406
12	KAMU-TV	COLLEGESTATION/BRYAN TX	212.3	LIC	BLEDT - 20030319AFB
12	KSAT-TV	SAN ANTONIO TX	119.8	PLN	DTVPLN - DTVP0407
12	KSAT-TV	SAN ANTONIO TX	119.8	APP	USERRECORD-01

Total scenarios = 6

Result key: 7
Scenario 1 Affected station 3
Before Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	39040	4578.7
lost to ATV IX only	39040	4578.7
lost to all IX	39040	4578.7

Potential Interfering Stations Included in above Scenario 1

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	40180	4884.0
lost to ATV IX only	40180	4884.0
lost to all IX	40180	4884.0

Potential Interfering Stations Included in above Scenario 1

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4439%

Result key: 8
Scenario 2 Affected station 3
Before Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	40751	5265.5
lost to ATV IX only	40751	5265.5
lost to all IX	40751	5265.5

Potential Interfering Stations Included in above Scenario 2

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	41778	5518.6
lost to ATV IX only	41778	5518.6
lost to all IX	41778	5518.6

Potential Interfering Stations Included in above Scenario 2

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4025%

Result key: 9
Scenario 3 Affected station 3
Before Analysis

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Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       39632       4598.8
   lost to ATV IX only                39632       4598.8
   lost to all IX                     39632       4598.8

 Potential Interfering Stations Included in above Scenario     3

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       40772       4904.1
   lost to ATV IX only                40772       4904.1
   lost to all IX                     40772       4904.1

 Potential Interfering Stations Included in above Scenario     3

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4449%

Result key:       10
Scenario        4  Affected station        3
Before Analysis

Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       40761       5269.6
   lost to ATV IX only                40761       5269.6
   lost to all IX                     40761       5269.6

 Potential Interfering Stations Included in above Scenario     4

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
```

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	41788	5522.6
lost to ATV IX only	41788	5522.6
lost to all IX	41788	5522.6

Potential Interfering Stations Included in above Scenario 4

10A TX CORPUS CHRISTI	DTVPLN	DTVP0294	PLN
11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4026%

Result key: 11
Scenario 5 Affected station 3
Before Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	41234	5370.0
lost to ATV IX only	41234	5370.0
lost to all IX	41234	5370.0

Potential Interfering Stations Included in above Scenario 5

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 11A TX VICTORIA DTVPLN DTVP0351 PLN
HAAT 290.0 m, ATV ERP 18.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	297154	29211.5
not affected by terrain losses	295877	28833.9
lost to NTSC IX	0	0.0
lost to additional IX by ATV	42261	5619.0
lost to ATV IX only	42261	5619.0
lost to all IX	42261	5619.0

Potential Interfering Stations Included in above Scenario 5

10A TX CORPUS CHRISTI	BPCDT	20080324AAT	CP
11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4033%

Result key: 12
Scenario 6 Affected station 3
Before Analysis

```
Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       41234       5370.0
   lost to ATV IX only                41234       5370.0
   lost to all IX                     41234       5370.0

 Potential Interfering Stations Included in above Scenario     6

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 11A TX VICTORIA             DTVPLN    DTVP0351     PLN
   HAAT  290.0 m, ATV ERP   18.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      297154      29211.5
   not affected by terrain losses    295877      28833.9
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       42261       5619.0
   lost to ATV IX only                42261       5619.0
   lost to all IX                     42261       5619.0

 Potential Interfering Stations Included in above Scenario     6

10A TX CORPUS CHRISTI       DTVPLN    DTVP0294     PLN
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4033%

Worst case new IX    0.4449% Scenario      3

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     Analysis of Interference to Affected Station   4


Analysis of current record
Channel     Call          City/State        Application Ref. No.
   12      KAMU-TV    COLLEGE STATION TX        DTVPLN    -DTVP0406

     Stations Potentially Affecting This Station

Chan   Call      City/State           Dist(km) Status  Application Ref.
No.
 11   KTVT     FORT WORTH TX            224.2  PLN    DTVPLN    -
DTVP0347
 11   KTVT     FORT WORTH TX            224.2  CP     BPCDT     -
20080328ACY
 11   KHOU-TV  HOUSTON TX               143.7  APP    BMPCDT    -
20080618AAW
 11   KHOU-TV  HOUSTON TX               143.7  PLN    DTVPLN    -
DTVP0348
```

11	KHOU-TV	HOUSTON TX	143.7	CP	BPCDT	- 20080303ALI
11	KVCT	VICTORIA TX	212.3	CP MOD	BMPCDT	- 20021107AAS
11	KVCT	VICTORIA TX	212.3	PLN	DTVPLN	- DTVP0351
12	KBMT	BEAUMONT TX	240.4	PLN	DTVPLN	- DTVP0405
12	KBMT	BEAUMONT TX	240.5	CP MOD	BMPCDT	- 20090428AAQ
12	KSAT-TV	SAN ANTONIO TX	238.6	PLN	DTVPLN	- DTVP0407
12	KXII	SHERMAN TX	380.7	PLN	DTVPLN	- DTVP0408
12	KXII	SHERMAN TX	380.7	CP MOD	BMPCDT	- 20080609ACT
13	KTRK-TV	HOUSTON TX	143.0	PLN	DTVPLN	- DTVP0480
13	KTRK-TV	HOUSTON TX	143.0	CP	BPCDT	- 20080430AEB
13	KAKW-TV	KILLEEN TX	157.8	PLN	DTVPLN	- DTVP0481
13	KAKW-TV	KILLEEN TX	157.8	LIC	BLCDT	- 20060912ACJ
12	KSAT-TV	SAN ANTONIO TX	238.6	APP	USERRECORD-01	

Total scenarios = 24

Result key: 13
Scenario 1 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	14402	843.8
lost to ATV IX only	14402	843.8
lost to all IX	14402	843.8

Potential Interfering Stations Included in above Scenario 1

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20249	979.8

```
   lost to ATV IX only                 20249        979.8
   lost to all IX                      20249        979.8

 Potential Interfering Stations Included in above Scenario     1

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:     1
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       2.1010 to DTVPLN
DTVP0406


Result key:       14
Scenario        2  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       14402        843.8
   lost to ATV IX only                14402        843.8
   lost to all IX                     14402        843.8

 Potential Interfering Stations Included in above Scenario     2

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20249        979.8
   lost to ATV IX only                20249        979.8
   lost to all IX                     20249        979.8

 Potential Interfering Stations Included in above Scenario     2
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```
11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:     2
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       2.1010 to DTVPLN
DTVP0406


Result key:       15
Scenario        3  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15102        879.8
   lost to ATV IX only                15102        879.8
   lost to all IX                     15102        879.8

 Potential Interfering Stations Included in above Scenario     3

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20949       1015.8
   lost to ATV IX only                20949       1015.8
   lost to all IX                     20949       1015.8

 Potential Interfering Stations Included in above Scenario     3

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
```

13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 3
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1063 to DTVPLN DTVP0406

Result key: 16
Scenario 4 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15102	879.8
lost to ATV IX only	15102	879.8
lost to all IX	15102	879.8

Potential Interfering Stations Included in above Scenario 4

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20949	1015.8
lost to ATV IX only	20949	1015.8
lost to all IX	20949	1015.8

Potential Interfering Stations Included in above Scenario 4

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.

12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 4
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1063 to DTVPLN DTVP0406

Result key: 17
Scenario 5 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	14970	955.8
lost to ATV IX only	14970	955.8
lost to all IX	14970	955.8

Potential Interfering Stations Included in above Scenario 5

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20479	1079.8
lost to ATV IX only	20479	1079.8
lost to all IX	20479	1079.8

Potential Interfering Stations Included in above Scenario 5

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 5
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9836 to DTVPLN DTVP0406

Result key: 18
Scenario 6 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	14970	955.8
lost to ATV IX only	14970	955.8
lost to all IX	14970	955.8

Potential Interfering Stations Included in above Scenario 6

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20479	1079.8
lost to ATV IX only	20479	1079.8
lost to all IX	20479	1079.8

Potential Interfering Stations Included in above Scenario 6

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 6
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9836 to DTVPLN DTVP0406

Result key: 19
Scenario 7 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15619	983.8
lost to ATV IX only	15619	983.8
lost to all IX	15619	983.8

Potential Interfering Stations Included in above Scenario 7

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	21128	1107.8
lost to ATV IX only	21128	1107.8
lost to all IX	21128	1107.8

Potential Interfering Stations Included in above Scenario 7

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 7
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9883 to DTVPLN DTVP0406

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Result key:       20
Scenario        8  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15619        983.8
   lost to ATV IX only                15619        983.8
   lost to all IX                     15619        983.8

 Potential Interfering Stations Included in above Scenario     8

11A TX HOUSTON               DTVPLN    DTVP0348     PLN
12A TX BEAUMONT              BMPCDT    20090428AAQ  CP
13A TX HOUSTON               BPCDT     20080430AEB  CP
13A TX KILLEEN               BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO           DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       21128       1107.8
   lost to ATV IX only                21128       1107.8
   lost to all IX                     21128       1107.8

 Potential Interfering Stations Included in above Scenario     8

11A TX HOUSTON               DTVPLN    DTVP0348     PLN
12A TX BEAUMONT              BMPCDT    20090428AAQ  CP
13A TX HOUSTON               BPCDT     20080430AEB  CP
13A TX KILLEEN               BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO           USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:     8
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       1.9883 to DTVPLN
DTVP0406


Result key:       21
Scenario        9  Affected station        4
Before Analysis
```

```
Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       14402        843.8
   lost to ATV IX only                14402        843.8
   lost to all IX                     14402        843.8

 Potential Interfering Stations Included in above Scenario     9

11A TX HOUSTON               BPCDT     20080303ALI  CP
12A TX BEAUMONT              DTVPLN    DTVP0405     PLN
13A TX HOUSTON               DTVPLN    DTVP0480     PLN
13A TX KILLEEN               DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO           DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20249        979.8
   lost to ATV IX only                20249        979.8
   lost to all IX                     20249        979.8

 Potential Interfering Stations Included in above Scenario     9

11A TX HOUSTON               BPCDT     20080303ALI  CP
12A TX BEAUMONT              DTVPLN    DTVP0405     PLN
13A TX HOUSTON               DTVPLN    DTVP0480     PLN
13A TX KILLEEN               DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO           USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO           USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:     9
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       2.1010 to DTVPLN
DTVP0406


Result key:       22
Scenario       10  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
```

within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	14402	843.8
lost to ATV IX only	14402	843.8
lost to all IX	14402	843.8

Potential Interfering Stations Included in above Scenario 10

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20249	979.8
lost to ATV IX only	20249	979.8
lost to all IX	20249	979.8

Potential Interfering Stations Included in above Scenario 10

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 10
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1010 to DTVPLN
DTVP0406

Result key: 23
Scenario 11 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15102	879.8

```
   lost to ATV IX only                15102        879.8
   lost to all IX                     15102        879.8

 Potential Interfering Stations Included in above Scenario    11

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20949       1015.8
   lost to ATV IX only                20949       1015.8
   lost to all IX                     20949       1015.8

 Potential Interfering Stations Included in above Scenario    11

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    11
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       2.1063 to DTVPLN
DTVP0406


Result key:       24
Scenario       12  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15102        879.8
   lost to ATV IX only                15102        879.8
   lost to all IX                     15102        879.8

 Potential Interfering Stations Included in above Scenario    12
```

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20949	1015.8
lost to ATV IX only	20949	1015.8
lost to all IX	20949	1015.8

Potential Interfering Stations Included in above Scenario 12

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 12
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1063 to DTVPLN
DTVP0406

Result key: 25
Scenario 13 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	14970	955.8
lost to ATV IX only	14970	955.8
lost to all IX	14970	955.8

Potential Interfering Stations Included in above Scenario 13

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN

```
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20479       1079.8
   lost to ATV IX only                20479       1079.8
   lost to all IX                     20479       1079.8

 Potential Interfering Stations Included in above Scenario    13

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    13
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       1.9836 to DTVPLN
DTVP0406


Result key:       26
Scenario       14  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       14970        955.8
   lost to ATV IX only                14970        955.8
   lost to all IX                     14970        955.8

 Potential Interfering Stations Included in above Scenario    14

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis
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```
Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20479       1079.8
   lost to ATV IX only                20479       1079.8
   lost to all IX                     20479       1079.8

 Potential Interfering Stations Included in above Scenario    14

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    14
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       1.9836 to DTVPLN
DTVP0406


Result key:       27
Scenario       15  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15619        983.8
   lost to ATV IX only                15619        983.8
   lost to all IX                     15619        983.8

 Potential Interfering Stations Included in above Scenario    15

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
```

within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	21128	1107.8
lost to ATV IX only	21128	1107.8
lost to all IX	21128	1107.8

Potential Interfering Stations Included in above Scenario 15

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 15
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9883 to DTVPLN
DTVP0406

Result key: 28
Scenario 16 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15619	983.8
lost to ATV IX only	15619	983.8
lost to all IX	15619	983.8

Potential Interfering Stations Included in above Scenario 16

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	21128	1107.8

```
   lost to ATV IX only                21128       1107.8
   lost to all IX                     21128       1107.8

 Potential Interfering Stations Included in above Scenario    16

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    16
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       1.9883 to DTVPLN
DTVP0406


Result key:       29
Scenario       17  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       14921        855.8
   lost to ATV IX only                14921        855.8
   lost to all IX                     14921        855.8

 Potential Interfering Stations Included in above Scenario    17

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                 POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20768        991.8
   lost to ATV IX only                20768        991.8
   lost to all IX                     20768        991.8

 Potential Interfering Stations Included in above Scenario    17
```

```
11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    17
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       2.1050 to DTVPLN
DTVP0406


Result key:       30
Scenario       18  Affected station        4
Before Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       14921        855.8
   lost to ATV IX only                14921        855.8
   lost to all IX                     14921        855.8

 Potential Interfering Stations Included in above Scenario    18

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       20768        991.8
   lost to ATV IX only                20768        991.8
   lost to all IX                     20768        991.8

 Potential Interfering Stations Included in above Scenario    18

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
```

13A TX KILLEEN BLCDT 20060912ACJ LIC
12A TX SAN ANTONIO USERRECORD01 APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 18
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1050 to DTVPLN
DTVP0406

Result key: 31
Scenario 19 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15102	879.8
lost to ATV IX only	15102	879.8
lost to all IX	15102	879.8

Potential Interfering Stations Included in above Scenario 19

11A TX HOUSTON BMPCDT 20080618AAW APP
12A TX BEAUMONT DTVPLN DTVP0405 PLN
13A TX HOUSTON BPCDT 20080430AEB CP
13A TX KILLEEN DTVPLN DTVP0481 PLN
12A TX SAN ANTONIO DTVPLN DTVP0407 PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20949	1015.8
lost to ATV IX only	20949	1015.8
lost to all IX	20949	1015.8

Potential Interfering Stations Included in above Scenario 19

11A TX HOUSTON BMPCDT 20080618AAW APP
12A TX BEAUMONT DTVPLN DTVP0405 PLN
13A TX HOUSTON BPCDT 20080430AEB CP
13A TX KILLEEN DTVPLN DTVP0481 PLN
12A TX SAN ANTONIO USERRECORD01 APP

The following station failed the de minimis interference criteria.

12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 19
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1063 to DTVPLN DTVP0406

Result key: 32
Scenario 20 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15102	879.8
lost to ATV IX only	15102	879.8
lost to all IX	15102	879.8

Potential Interfering Stations Included in above Scenario 20

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20949	1015.8
lost to ATV IX only	20949	1015.8
lost to all IX	20949	1015.8

Potential Interfering Stations Included in above Scenario 20

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 20
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 2.1063 to DTVPLN DTVP0406

Result key: 33
Scenario 21 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15489	963.8
lost to ATV IX only	15489	963.8
lost to all IX	15489	963.8

Potential Interfering Stations Included in above Scenario 21

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20998	1087.8
lost to ATV IX only	20998	1087.8
lost to all IX	20998	1087.8

Potential Interfering Stations Included in above Scenario 21

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 21
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9874 to DTVPLN DTVP0406

Result key: 34
Scenario 22 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15489	963.8
lost to ATV IX only	15489	963.8
lost to all IX	15489	963.8

Potential Interfering Stations Included in above Scenario 22

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	20998	1087.8
lost to ATV IX only	20998	1087.8
lost to all IX	20998	1087.8

Potential Interfering Stations Included in above Scenario 22

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 22
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9874 to DTVPLN DTVP0406

Result key: 35
Scenario 23 Affected station 4
Before Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15619	983.8
lost to ATV IX only	15619	983.8
lost to all IX	15619	983.8

Potential Interfering Stations Included in above Scenario 23

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGE STATION DTVPLN DTVP0406 PLN
HAAT 119.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	295699	14448.9
not affected by terrain losses	292692	13889.0
lost to NTSC IX	0	0.0
lost to additional IX by ATV	21128	1107.8
lost to ATV IX only	21128	1107.8
lost to all IX	21128	1107.8

Potential Interfering Stations Included in above Scenario 23

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

The following station failed the de minimis interference criteria.
12D TX SAN ANTONIO USERRECORD01
ERP 22.20 kW HAAT 455.0 m RCAMSL 613.0 m
Antenna none

Due to interference to the following station and scenario: 23
12D TX COLLEGE STATION DTVPLN DTVP0406
ERP 3.20 kW HAAT 119.0 m RCAMSL 206.0 m
Antenna CDB 00000000074940

Percent new interference from proposal: 1.9883 to DTVPLN
DTVP0406

Result key: 36
Scenario 24 Affected station 4
Before Analysis

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Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15619        983.8
   lost to ATV IX only                15619        983.8
   lost to all IX                     15619        983.8

 Potential Interfering Stations Included in above Scenario    24

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
   HAAT  119.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      295699      14448.9
   not affected by terrain losses    292692      13889.0
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       21128       1107.8
   lost to ATV IX only                21128       1107.8
   lost to all IX                     21128       1107.8

 Potential Interfering Stations Included in above Scenario    24

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

 The following station failed the de minimis interference criteria.
 12D TX SAN ANTONIO          USERRECORD01
 ERP   22.20 kW  HAAT   455.0 m  RCAMSL   613.0 m
 Antenna     none

 Due to interference to the following station and scenario:    24
 12D TX COLLEGE STATION      DTVPLN    DTVP0406
 ERP    3.20 kW  HAAT   119.0 m  RCAMSL   206.0 m
 Antenna CDB 00000000074940

 Percent new interference from proposal:       1.9883 to DTVPLN
DTVP0406


Worst case new IX    2.1063% Scenario      3

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     Analysis of Interference to Affected Station   5
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Analysis of current record

Channel	Call	City/State	Application Ref. No.
12	KAMU-TV	COLLEGESTATION/BRYAN TX	BLEDT -20030319AFB

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KTVT	FORT WORTH TX	224.2	PLN	DTVPLN - DTVP0347
11	KTVT	FORT WORTH TX	224.2	CP	BPCDT - 20080328ACY
11	KHOU-TV	HOUSTON TX	143.7	APP	BMPCDT - 20080618AAW
11	KHOU-TV	HOUSTON TX	143.7	PLN	DTVPLN - DTVP0348
11	KHOU-TV	HOUSTON TX	143.7	CP	BPCDT - 20080303ALI
11	KVCT	VICTORIA TX	212.3	CP MOD	BMPCDT - 20021107AAS
11	KVCT	VICTORIA TX	212.3	PLN	DTVPLN - DTVP0351
12	KBMT	BEAUMONT TX	240.3	PLN	DTVPLN - DTVP0405
12	KBMT	BEAUMONT TX	240.5	CP MOD	BMPCDT - 20090428AAQ
12	KSAT-TV	SAN ANTONIO TX	238.5	PLN	DTVPLN - DTVP0407
12	KXII	SHERMAN TX	380.7	PLN	DTVPLN - DTVP0408
12	KXII	SHERMAN TX	380.7	CP MOD	BMPCDT - 20080609ACT
13	KTRK-TV	HOUSTON TX	142.9	PLN	DTVPLN - DTVP0480
13	KTRK-TV	HOUSTON TX	142.9	CP	BPCDT - 20080430AEB
13	KAKW-TV	KILLEEN TX	157.8	PLN	DTVPLN - DTVP0481
13	KAKW-TV	KILLEEN TX	157.8	LIC	BLCDT - 20060912ACJ
12	KSAT-TV	SAN ANTONIO TX	238.5	APP	USERRECORD-01

Total scenarios = 24

Result key: 37
Scenario 1 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15357	803.8
lost to ATV IX only	15357	803.8
lost to all IX	15357	803.8

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 Potential Interfering Stations Included in above Scenario     1

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16638        947.8
   lost to ATV IX only                16638        947.8
   lost to all IX                     16638        947.8

 Potential Interfering Stations Included in above Scenario     1

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4692%

Result key:       38
Scenario        2  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15357        803.8
   lost to ATV IX only                15357        803.8
   lost to all IX                     15357        803.8

 Potential Interfering Stations Included in above Scenario     2

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
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   lost to additional IX by ATV       16638        947.8
   lost to ATV IX only                16638        947.8
   lost to all IX                     16638        947.8

 Potential Interfering Stations Included in above Scenario     2

11A TX HOUSTON               DTVPLN    DTVP0348     PLN
12A TX BEAUMONT              DTVPLN    DTVP0405     PLN
13A TX HOUSTON               DTVPLN    DTVP0480     PLN
13A TX KILLEEN               BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO           USERRECORD01           APP

Percent new IX =    0.4692%

Result key:       39
Scenario        3  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16222        835.8
   lost to ATV IX only                16222        835.8
   lost to all IX                     16222        835.8

 Potential Interfering Stations Included in above Scenario     3

11A TX HOUSTON               DTVPLN    DTVP0348     PLN
12A TX BEAUMONT              DTVPLN    DTVP0405     PLN
13A TX HOUSTON               BPCDT     20080430AEB  CP
13A TX KILLEEN               DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO           DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17503        975.8
   lost to ATV IX only                17503        975.8
   lost to all IX                     17503        975.8

 Potential Interfering Stations Included in above Scenario     3

11A TX HOUSTON               DTVPLN    DTVP0348     PLN
12A TX BEAUMONT              DTVPLN    DTVP0405     PLN
13A TX HOUSTON               BPCDT     20080430AEB  CP
13A TX KILLEEN               DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO           USERRECORD01           APP

Percent new IX =    0.4707%

Result key:       40
Scenario        4  Affected station        5
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Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16222        835.8
   lost to ATV IX only                16222        835.8
   lost to all IX                     16222        835.8

 Potential Interfering Stations Included in above Scenario     4

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17503        975.8
   lost to ATV IX only                17503        975.8
   lost to all IX                     17503        975.8

 Potential Interfering Stations Included in above Scenario     4

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4707%

Result key:       41
Scenario        5  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16175        931.8
   lost to ATV IX only                16175        931.8
   lost to all IX                     16175        931.8

 Potential Interfering Stations Included in above Scenario     5

11A TX HOUSTON              DTVPLN    DTVP0348     PLN
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
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13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17131	1059.8
lost to ATV IX only	17131	1059.8
lost to all IX	17131	1059.8

Potential Interfering Stations Included in above Scenario 5

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3512%

Result key: 42
Scenario 6 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16175	931.8
lost to ATV IX only	16175	931.8
lost to all IX	16175	931.8

Potential Interfering Stations Included in above Scenario 6

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17131	1059.8
lost to ATV IX only	17131	1059.8
lost to all IX	17131	1059.8

Potential Interfering Stations Included in above Scenario 6

11A	TX HOUSTON	DTVPLN	DTVP0348	PLN
12A	TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A	TX HOUSTON	DTVPLN	DTVP0480	PLN
13A	TX KILLEEN	BLCDT	20060912ACJ	LIC
12A	TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3512%

Result key: 43
Scenario 7 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17040	963.8
lost to ATV IX only	17040	963.8
lost to all IX	17040	963.8

Potential Interfering Stations Included in above Scenario 7

11A	TX HOUSTON	DTVPLN	DTVP0348	PLN
12A	TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A	TX HOUSTON	BPCDT	20080430AEB	CP
13A	TX KILLEEN	DTVPLN	DTVP0481	PLN
12A	TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17996	1087.8
lost to ATV IX only	17996	1087.8
lost to all IX	17996	1087.8

Potential Interfering Stations Included in above Scenario 7

11A	TX HOUSTON	DTVPLN	DTVP0348	PLN
12A	TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A	TX HOUSTON	BPCDT	20080430AEB	CP
13A	TX KILLEEN	DTVPLN	DTVP0481	PLN
12A	TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3523%

Result key: 44
Scenario 8 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17040	963.8
lost to ATV IX only	17040	963.8
lost to all IX	17040	963.8

Potential Interfering Stations Included in above Scenario 8

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17996	1087.8
lost to ATV IX only	17996	1087.8
lost to all IX	17996	1087.8

Potential Interfering Stations Included in above Scenario 8

11A TX HOUSTON	DTVPLN	DTVP0348	PLN
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3523%

Result key: 45
Scenario 9 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15357	803.8
lost to ATV IX only	15357	803.8
lost to all IX	15357	803.8

Potential Interfering Stations Included in above Scenario 9

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16638	947.8
lost to ATV IX only	16638	947.8
lost to all IX	16638	947.8

Potential Interfering Stations Included in above Scenario 9

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4692%

Result key: 46
Scenario 10 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	15357	803.8
lost to ATV IX only	15357	803.8
lost to all IX	15357	803.8

Potential Interfering Stations Included in above Scenario 10

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16638	947.8
lost to ATV IX only	16638	947.8
lost to all IX	16638	947.8

Potential Interfering Stations Included in above Scenario 10

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN

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13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4692%

Result key:       47
Scenario       11  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16222        835.8
   lost to ATV IX only                16222        835.8
   lost to all IX                     16222        835.8

 Potential Interfering Stations Included in above Scenario    11

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17503        975.8
   lost to ATV IX only                17503        975.8
   lost to all IX                     17503        975.8

 Potential Interfering Stations Included in above Scenario    11

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4707%

Result key:       48
Scenario       12  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
```

```
   lost to additional IX by ATV       16222        835.8
   lost to ATV IX only                16222        835.8
   lost to all IX                     16222        835.8

 Potential Interfering Stations Included in above Scenario    12

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17503        975.8
   lost to ATV IX only                17503        975.8
   lost to all IX                     17503        975.8

 Potential Interfering Stations Included in above Scenario    12

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4707%

Result key:       49
Scenario       13  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16175        931.8
   lost to ATV IX only                16175        931.8
   lost to all IX                     16175        931.8

 Potential Interfering Stations Included in above Scenario    13

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
```

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17131	1059.8
lost to ATV IX only	17131	1059.8
lost to all IX	17131	1059.8

Potential Interfering Stations Included in above Scenario 13

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3512%

Result key: 50
Scenario 14 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16175	931.8
lost to ATV IX only	16175	931.8
lost to all IX	16175	931.8

Potential Interfering Stations Included in above Scenario 14

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17131	1059.8
lost to ATV IX only	17131	1059.8
lost to all IX	17131	1059.8

Potential Interfering Stations Included in above Scenario 14

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3512%

Result key: 51
Scenario 15 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17040	963.8
lost to ATV IX only	17040	963.8
lost to all IX	17040	963.8

Potential Interfering Stations Included in above Scenario 15

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17996	1087.8
lost to ATV IX only	17996	1087.8
lost to all IX	17996	1087.8

Potential Interfering Stations Included in above Scenario 15

11A TX HOUSTON	BPCDT	20080303ALI	CP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3523%

Result key: 52
Scenario 16 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17040	963.8
lost to ATV IX only	17040	963.8
lost to all IX	17040	963.8

```
 Potential Interfering Stations Included in above Scenario    16

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17996       1087.8
   lost to ATV IX only                17996       1087.8
   lost to all IX                     17996       1087.8

 Potential Interfering Stations Included in above Scenario    16

11A TX HOUSTON              BPCDT     20080303ALI  CP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.3523%

Result key:       53
Scenario       17  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15884        811.8
   lost to ATV IX only                15884        811.8
   lost to all IX                     15884        811.8

 Potential Interfering Stations Included in above Scenario    17

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
```

```
   lost to additional IX by ATV       17165        955.8
   lost to ATV IX only                17165        955.8
   lost to all IX                     17165        955.8

 Potential Interfering Stations Included in above Scenario    17

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4701%

Result key:       54
Scenario       18  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       15884        811.8
   lost to ATV IX only                15884        811.8
   lost to all IX                     15884        811.8

 Potential Interfering Stations Included in above Scenario    18

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17165        955.8
   lost to ATV IX only                17165        955.8
   lost to all IX                     17165        955.8

 Potential Interfering Stations Included in above Scenario    18

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4701%

Result key:       55
Scenario       19  Affected station        5
```

Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16222	835.8
lost to ATV IX only	16222	835.8
lost to all IX	16222	835.8

Potential Interfering Stations Included in above Scenario 19

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17503	975.8
lost to ATV IX only	17503	975.8
lost to all IX	17503	975.8

Potential Interfering Stations Included in above Scenario 19

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.4707%

Result key: 56
Scenario 20 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16222	835.8
lost to ATV IX only	16222	835.8
lost to all IX	16222	835.8

Potential Interfering Stations Included in above Scenario 20

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	DTVPLN	DTVP0405	PLN

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13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17503        975.8
   lost to ATV IX only                17503        975.8
   lost to all IX                     17503        975.8

 Potential Interfering Stations Included in above Scenario    20

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             DTVPLN    DTVP0405     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.4707%

Result key:       57
Scenario       21  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       16702        939.8
   lost to ATV IX only                16702        939.8
   lost to all IX                     16702        939.8

 Potential Interfering Stations Included in above Scenario    21

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17658       1067.8
   lost to ATV IX only                17658       1067.8
   lost to all IX                     17658       1067.8
```

Potential Interfering Stations Included in above Scenario 21

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3519%

Result key: 58
Scenario 22 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	16702	939.8
lost to ATV IX only	16702	939.8
lost to all IX	16702	939.8

Potential Interfering Stations Included in above Scenario 22

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	290991	14217.3
not affected by terrain losses	288369	13721.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	17658	1067.8
lost to ATV IX only	17658	1067.8
lost to all IX	17658	1067.8

Potential Interfering Stations Included in above Scenario 22

11A TX HOUSTON	BMPCDT	20080618AAW	APP
12A TX BEAUMONT	BMPCDT	20090428AAQ	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.3519%

Result key: 59
Scenario 23 Affected station 5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT 20030319AFB LIC
HAAT 105.0 m, ATV ERP 3.2 kW

```
                                     POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17040        963.8
   lost to ATV IX only                17040        963.8
   lost to all IX                     17040        963.8

 Potential Interfering Stations Included in above Scenario    23

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                     POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17996       1087.8
   lost to ATV IX only                17996       1087.8
   lost to all IX                     17996       1087.8

 Potential Interfering Stations Included in above Scenario    23

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              DTVPLN    DTVP0481     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.3523%

Result key:       60
Scenario       24  Affected station        5
Before Analysis

Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                     POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17040        963.8
   lost to ATV IX only                17040        963.8
   lost to all IX                     17040        963.8

 Potential Interfering Stations Included in above Scenario    24

11A TX HOUSTON              BMPCDT    20080618AAW  APP
12A TX BEAUMONT             BMPCDT    20090428AAQ  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN
```

After Analysis

```
Results for: 12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
   HAAT  105.0 m, ATV ERP    3.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour      290991      14217.3
   not affected by terrain losses    288369      13721.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       17996       1087.8
   lost to ATV IX only                17996       1087.8
   lost to all IX                     17996       1087.8
```

Potential Interfering Stations Included in above Scenario   24

```
11A TX HOUSTON             BMPCDT    20080618AAW  APP
12A TX BEAUMONT            BMPCDT    20090428AAQ  CP
13A TX HOUSTON             BPCDT     20080430AEB  CP
13A TX KILLEEN             BLCDT     20060912ACJ  LIC
12A TX SAN ANTONIO         USERRECORD01           APP
```

Percent new IX =   0.3523%

Worst case new IX   0.4707% Scenario   3

##

Analysis of Interference to Affected Station   6

Analysis of current record

```
Channel     Call          City/State        Application Ref. No.
   12      KWDT-LP    CORPUS CHRISTI TX         BPTVA     -20030602AAA
```

Stations Potentially Affecting This Station

```
Chan   Call      City/State           Dist(km) Status  Application Ref.
No.
 11   KVCT     VICTORIA TX              119.1  CP MOD BMPCDT    -
20021107AAS
 11   KVCT     VICTORIA TX              119.1  PLN    DTVPLN    -
DTVP0351
 12   KAMU-TV  COLLEGE STATION TX       330.6  PLN    DTVPLN    -
DTVP0406
 12   KAMU-TV  COLLEGESTATION/BRYAN TX   330.6  LIC    BLEDT     -
20030319AFB
 12   KSAT-TV  SAN ANTONIO TX           184.0  APP    BSTA      -
20090205ABI
 12   KSAT-TV  SAN ANTONIO TX           184.0  PLN    DTVPLN    -
DTVP0407
 12   KSAT-TV  SAN ANTONIO TX           184.0  LIC    BMLCT     -
19790412KG
 13   KRIS-TV  CORPUS CHRISTI TX         21.7  PLN    DTVPLN    -
DTVP0478
 13   KRIS-TV  CORPUS CHRISTI TX         21.7  CP MOD BMPCDT    -
20060227AIF
 12   KSAT-TV  SAN ANTONIO TX           184.0  APP    USERRECORD-01
```

Proposal causes no interference

##

Analysis of Interference to Affected Station 7

Analysis of current record

Channel	Call	City/State	Application Ref. No.
13	KRIS-TV	CORPUS CHRISTI TX	DTVPLN -DTVP0478

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
12	KSAT-TV	SAN ANTONIO TX	181.6	PLN	DTVPLN - DTVP0407
13	KTRK-TV	HOUSTON TX	289.5	PLN	DTVPLN - DTVP0480
13	KTRK-TV	HOUSTON TX	289.5	CP	BPCDT - 20080430AEB
13	KAKW-TV	KILLEEN TX	333.9	PLN	DTVPLN - DTVP0481
13	KAKW-TV	KILLEEN TX	333.9	LIC	BLCDT - 20060912ACJ
13	KVTV	LAREDO TX	190.6	PLN	DTVPLN - DTVP0482
13	KVTV	LAREDO TX	190.6	CP	BPCDT - 20080310AAQ
13	KRGV-TV	WESLACO TX	183.9	LIC	BLCDT - 20020904AAR
13	KRGV-TV	WESLACO TX	183.9	PLN	DTVPLN - DTVP0483
12	KSAT-TV	SAN ANTONIO TX	181.6	APP	USERRECORD-01

Proposal causes no interference

##

Analysis of Interference to Affected Station 8

Analysis of current record

Channel	Call	City/State	Application Ref. No.
13	KRIS-TV	CORPUS CHRISTI TX	BMPCDT -20060227AIF

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
12	KSAT-TV	SAN ANTONIO TX	181.6	PLN	DTVPLN - DTVP0407
13	KTRK-TV	HOUSTON TX	289.5	PLN	DTVPLN - DTVP0480
13	KTRK-TV	HOUSTON TX	289.5	CP	BPCDT - 20080430AEB
13	KAKW-TV	KILLEEN TX	333.9	PLN	DTVPLN - DTVP0481
13	KAKW-TV	KILLEEN TX	333.9	LIC	BLCDT - 20060912ACJ
13	KVTV	LAREDO TX	190.6	PLN	DTVPLN - DTVP0482

13   KVTV   LAREDO TX   190.6 CP   BPCDT   -
20080310AAQ
13   KRGV-TV WESLACO TX   183.9 LIC   BLCDT   -
20020904AAR
13   KRGV-TV WESLACO TX   183.9 PLN   DTVPLN   -
DTVP0483
12   KSAT-TV SAN ANTONIO TX   181.6 APP   USERRECORD-01
Proposal causes no interference

##

Analysis of Interference to Affected Station   9

Analysis of current record
Channel   Call   City/State   Application Ref. No.
13   KAKW-TV   KILLEEN TX   DTVPLN   -DTVP0481

Stations Potentially Affecting This Station

Chan   Call   City/State   Dist(km) Status Application Ref. No.
12   KAMU-TV COLLEGE STATION TX   157.8 PLN   DTVPLN   -
DTVP0406
12   KAMU-TV COLLEGESTATION/BRYAN TX   157.8 LIC   BLEDT   -
20030319AFB
12   KSAT-TV SAN ANTONIO TX   163.9 PLN   DTVPLN   -
DTVP0407
13   KRIS-TV CORPUS CHRISTI TX   333.9 PLN   DTVPLN   -
DTVP0478
13   KRIS-TV CORPUS CHRISTI TX   333.9 CP MOD BMPCDT   -
20060227AIF
13   KTRK-TV HOUSTON TX   271.9 PLN   DTVPLN   -
DTVP0480
13   KTRK-TV HOUSTON TX   271.9 CP   BPCDT   -
20080430AEB
13   KVTV   LAREDO TX   386.1 PLN   DTVPLN   -
DTVP0482
13   KVTV   LAREDO TX   386.2 CP   BPCDT   -
20080310AAQ
12   KSAT-TV SAN ANTONIO TX   163.9 APP   USERRECORD-01

Total scenarios =   4

Result key: 61
Scenario   1 Affected station   9
Before Analysis

Results for: 13A TX KILLEEN   DTVPLN   DTVP0481   PLN
HAAT 484.0 m, ATV ERP   45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23043	946.8
lost to ATV IX only	23043	946.8
lost to all IX	23043	946.8

```
 Potential Interfering Stations Included in above Scenario     1

13A TX CORPUS CHRISTI       DTVPLN    DTVP0478     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 13A TX KILLEEN              DTVPLN    DTVP0481     PLN
   HAAT  484.0 m, ATV ERP   45.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1910893      44746.1
   not affected by terrain losses   1851760      42608.8
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       23657        966.7
   lost to ATV IX only                23657        966.7
   lost to all IX                     23657        966.7

 Potential Interfering Stations Included in above Scenario     1

13A TX CORPUS CHRISTI       DTVPLN    DTVP0478     PLN
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.0336%

Result key:       62
Scenario        2  Affected station        9
Before Analysis

Results for: 13A TX KILLEEN              DTVPLN    DTVP0481     PLN
   HAAT  484.0 m, ATV ERP   45.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1910893      44746.1
   not affected by terrain losses   1851760      42608.8
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       28615       1382.2
   lost to ATV IX only                28615       1382.2
   lost to all IX                     28615       1382.2

 Potential Interfering Stations Included in above Scenario     2

13A TX CORPUS CHRISTI       DTVPLN    DTVP0478     PLN
13A TX HOUSTON              BPCDT     20080430AEB  CP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 13A TX KILLEEN              DTVPLN    DTVP0481     PLN
   HAAT  484.0 m, ATV ERP   45.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1910893      44746.1
   not affected by terrain losses   1851760      42608.8
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       29229       1402.2
   lost to ATV IX only                29229       1402.2
   lost to all IX                     29229       1402.2

 Potential Interfering Stations Included in above Scenario     2
```

13A TX CORPUS CHRISTI	DTVPLN	DTVP0478	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.0337%

Result key: 63
Scenario 3 Affected station 9
Before Analysis

Results for: 13A TX KILLEEN DTVPLN DTVP0481 PLN
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23043	946.8
lost to ATV IX only	23043	946.8
lost to all IX	23043	946.8

Potential Interfering Stations Included in above Scenario 3

13A TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 13A TX KILLEEN DTVPLN DTVP0481 PLN
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23657	966.7
lost to ATV IX only	23657	966.7
lost to all IX	23657	966.7

Potential Interfering Stations Included in above Scenario 3

13A TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.0336%

Result key: 64
Scenario 4 Affected station 9
Before Analysis

Results for: 13A TX KILLEEN DTVPLN DTVP0481 PLN
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	28615	1382.2
lost to ATV IX only	28615	1382.2
lost to all IX	28615	1382.2

Potential Interfering Stations Included in above Scenario 4

13A	TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP
13A	TX HOUSTON	BPCDT	20080430AEB	CP
12A	TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 13A TX KILLEEN DTVPLN DTVP0481 PLN
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	29229	1402.2
lost to ATV IX only	29229	1402.2
lost to all IX	29229	1402.2

Potential Interfering Stations Included in above Scenario 4

13A	TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP
13A	TX HOUSTON	BPCDT	20080430AEB	CP
12A	TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.0337%

Worst case new IX 0.0337% Scenario 2

##

Analysis of Interference to Affected Station 10

Analysis of current record

Channel	Call	City/State	Application Ref. No.
13	KAKW-TV	KILLEEN TX	BLCDT -20060912ACJ

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
12	KAMU-TV	COLLEGE STATION TX	157.8	PLN	DTVPLN - DTVP0406
12	KAMU-TV	COLLEGESTATION/BRYAN TX	157.8	LIC	BLEDT - 20030319AFB
12	KSAT-TV	SAN ANTONIO TX	163.9	PLN	DTVPLN - DTVP0407
13	KRIS-TV	CORPUS CHRISTI TX	333.9	PLN	DTVPLN - DTVP0478
13	KRIS-TV	CORPUS CHRISTI TX	333.9	CP MOD	BMPCDT - 20060227AIF
13	KTRK-TV	HOUSTON TX	271.9	PLN	DTVPLN - DTVP0480
13	KTRK-TV	HOUSTON TX	271.9	CP	BPCDT - 20080430AEB
13	KVTV	LAREDO TX	386.1	PLN	DTVPLN - DTVP0482
13	KVTV	LAREDO TX	386.2	CP	BPCDT - 20080310AAQ

12   KSAT-TV SAN ANTONIO TX   163.9 APP   USERRECORD-01

Total scenarios =   4

Result key: 65
Scenario   1 Affected station   10
Before Analysis

Results for: 13A TX KILLEEN   BLCDT   20060912ACJ LIC
HAAT 484.0 m, ATV ERP   45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23043	946.8
lost to ATV IX only	23043	946.8
lost to all IX	23043	946.8

Potential Interfering Stations Included in above Scenario   1

13A TX CORPUS CHRISTI	DTVPLN	DTVP0478	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 13A TX KILLEEN   BLCDT   20060912ACJ LIC
HAAT 484.0 m, ATV ERP   45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23657	966.7
lost to ATV IX only	23657	966.7
lost to all IX	23657	966.7

Potential Interfering Stations Included in above Scenario   1

13A TX CORPUS CHRISTI	DTVPLN	DTVP0478	PLN
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX =   0.0336%

Result key: 66
Scenario   2 Affected station   10
Before Analysis

Results for: 13A TX KILLEEN   BLCDT   20060912ACJ LIC
HAAT 484.0 m, ATV ERP   45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	28615	1382.2
lost to ATV IX only	28615	1382.2
lost to all IX	28615	1382.2

Potential Interfering Stations Included in above Scenario   2

13A TX CORPUS CHRISTI	DTVPLN	DTVP0478	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 13A TX KILLEEN BLCDT 20060912ACJ LIC
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	29229	1402.2
lost to ATV IX only	29229	1402.2
lost to all IX	29229	1402.2

Potential Interfering Stations Included in above Scenario 2

13A TX CORPUS CHRISTI	DTVPLN	DTVP0478	PLN
13A TX HOUSTON	BPCDT	20080430AEB	CP
12A TX SAN ANTONIO	USERRECORD01		APP

Percent new IX = 0.0337%

Result key: 67
Scenario 3 Affected station 10
Before Analysis

Results for: 13A TX KILLEEN BLCDT 20060912ACJ LIC
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23043	946.8
lost to ATV IX only	23043	946.8
lost to all IX	23043	946.8

Potential Interfering Stations Included in above Scenario 3

13A TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP
13A TX HOUSTON	DTVPLN	DTVP0480	PLN
12A TX SAN ANTONIO	DTVPLN	DTVP0407	PLN

After Analysis

Results for: 13A TX KILLEEN BLCDT 20060912ACJ LIC
HAAT 484.0 m, ATV ERP 45.0 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1910893	44746.1
not affected by terrain losses	1851760	42608.8
lost to NTSC IX	0	0.0
lost to additional IX by ATV	23657	966.7
lost to ATV IX only	23657	966.7
lost to all IX	23657	966.7

Potential Interfering Stations Included in above Scenario 3

13A TX CORPUS CHRISTI	BMPCDT	20060227AIF	CP

```
13A TX HOUSTON              DTVPLN    DTVP0480     PLN
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.0336%

Result key:       68
Scenario       4  Affected station       10
Before Analysis

Results for: 13A TX KILLEEN              BLCDT     20060912ACJ  LIC
   HAAT  484.0 m, ATV ERP   45.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1910893      44746.1
   not affected by terrain losses   1851760      42608.8
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       28615       1382.2
   lost to ATV IX only                28615       1382.2
   lost to all IX                     28615       1382.2

 Potential Interfering Stations Included in above Scenario     4

13A TX CORPUS CHRISTI       BMPCDT    20060227AIF  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
12A TX SAN ANTONIO          DTVPLN    DTVP0407     PLN

After Analysis

Results for: 13A TX KILLEEN              BLCDT     20060912ACJ  LIC
   HAAT  484.0 m, ATV ERP   45.0 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1910893      44746.1
   not affected by terrain losses   1851760      42608.8
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       29229       1402.2
   lost to ATV IX only                29229       1402.2
   lost to all IX                     29229       1402.2

 Potential Interfering Stations Included in above Scenario     4

13A TX CORPUS CHRISTI       BMPCDT    20060227AIF  CP
13A TX HOUSTON              BPCDT     20080430AEB  CP
12A TX SAN ANTONIO          USERRECORD01           APP

Percent new IX =    0.0337%

Worst case new IX    0.0337% Scenario      2

########################################################################


     Analysis of Interference to Affected Station  11


Analysis of current record
Channel     Call           City/State        Application Ref. No.
   12      KSAT-TV    SAN ANTONIO TX            USERRECORD-01

     Stations Potentially Affecting This Station

Chan   Call      City/State           Dist(km) Status  Application Ref.
```

No.						
11	KVCT	VICTORIA TX	119.8	CP MOD	BMPCDT	- 20021107AAS
11	KVCT	VICTORIA TX	119.8	PLN	DTVPLN	- DTVP0351
12	KAMU-TV	COLLEGE STATION TX	238.6	PLN	DTVPLN	- DTVP0406
12	KAMU-TV	COLLEGESTATION/BRYAN TX	238.5	LIC	BLEDT	- 20030319AFB
13	KRIS-TV	CORPUS CHRISTI TX	181.6	PLN	DTVPLN	- DTVP0478
13	KRIS-TV	CORPUS CHRISTI TX	181.6	CP MOD	BMPCDT	- 20060227AIF
13	KAKW-TV	KILLEEN TX	163.9	PLN	DTVPLN	- DTVP0481
13	KAKW-TV	KILLEEN TX	163.9	LIC	BLCDT	- 20060912ACJ

Total scenarios = 8

Result key: 69
Scenario 1 Affected station 11
Before Analysis

Results for: 12A TX SAN ANTONIO USERRECORD01 APP
HAAT 455.0 m, ATV ERP 22.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1999712	38570.5
not affected by terrain losses	1972146	37306.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	24315	1056.1
lost to ATV IX only	24315	1056.1
lost to all IX	24315	1056.1

Potential Interfering Stations Included in above Scenario 1

11A TX VICTORIA	BMPCDT	20021107AAS	CP
12A TX COLLEGE STATION	DTVPLN	DTVP0406	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN

Result key: 70
Scenario 2 Affected station 11
Before Analysis

Results for: 12A TX SAN ANTONIO USERRECORD01 APP
HAAT 455.0 m, ATV ERP 22.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1999712	38570.5
not affected by terrain losses	1972146	37306.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	24315	1056.1
lost to ATV IX only	24315	1056.1
lost to all IX	24315	1056.1

Potential Interfering Stations Included in above Scenario 2

11A TX VICTORIA	BMPCDT	20021107AAS	CP
12A TX COLLEGE STATION	DTVPLN	DTVP0406	PLN
13A TX KILLEEN	BLCDT	20060912ACJ	LIC

Result key: 71
Scenario 3 Affected station 11
Before Analysis

Results for: 12A TX SAN ANTONIO USERRECORD01 APP
HAAT 455.0 m, ATV ERP 22.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1999712	38570.5
not affected by terrain losses	1972146	37306.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	24315	1056.1
lost to ATV IX only	24315	1056.1
lost to all IX	24315	1056.1

Potential Interfering Stations Included in above Scenario 3

11A TX VICTORIA	BMPCDT	20021107AAS	CP
12A TX COLLEGESTATION/BRYAN	BLEDT	20030319AFB	LIC
13A TX KILLEEN	DTVPLN	DTVP0481	PLN

Result key: 72
Scenario 4 Affected station 11
Before Analysis

Results for: 12A TX SAN ANTONIO USERRECORD01 APP
HAAT 455.0 m, ATV ERP 22.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1999712	38570.5
not affected by terrain losses	1972146	37306.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	24315	1056.1
lost to ATV IX only	24315	1056.1
lost to all IX	24315	1056.1

Potential Interfering Stations Included in above Scenario 4

11A TX VICTORIA	BMPCDT	20021107AAS	CP
12A TX COLLEGESTATION/BRYAN	BLEDT	20030319AFB	LIC
13A TX KILLEEN	BLCDT	20060912ACJ	LIC

Result key: 73
Scenario 5 Affected station 11
Before Analysis

Results for: 12A TX SAN ANTONIO USERRECORD01 APP
HAAT 455.0 m, ATV ERP 22.2 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1999712	38570.5
not affected by terrain losses	1972146	37306.4
lost to NTSC IX	0	0.0
lost to additional IX by ATV	24315	1056.1
lost to ATV IX only	24315	1056.1
lost to all IX	24315	1056.1

Potential Interfering Stations Included in above Scenario 5

11A TX VICTORIA	DTVPLN	DTVP0351	PLN
12A TX COLLEGE STATION	DTVPLN	DTVP0406	PLN
13A TX KILLEEN	DTVPLN	DTVP0481	PLN

```
Result key:       74
Scenario        6  Affected station       11
Before Analysis

Results for: 12A TX SAN ANTONIO          USERRECORD01           APP
   HAAT  455.0 m, ATV ERP   22.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1999712      38570.5
   not affected by terrain losses   1972146      37306.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       24315       1056.1
   lost to ATV IX only                24315       1056.1
   lost to all IX                     24315       1056.1

 Potential Interfering Stations Included in above Scenario     6

11A TX VICTORIA             DTVPLN    DTVP0351     PLN
12A TX COLLEGE STATION      DTVPLN    DTVP0406     PLN
13A TX KILLEEN              BLCDT     20060912ACJ  LIC

Result key:       75
Scenario        7  Affected station       11
Before Analysis

Results for: 12A TX SAN ANTONIO          USERRECORD01           APP
   HAAT  455.0 m, ATV ERP   22.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1999712      38570.5
   not affected by terrain losses   1972146      37306.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       24315       1056.1
   lost to ATV IX only                24315       1056.1
   lost to all IX                     24315       1056.1

 Potential Interfering Stations Included in above Scenario     7

11A TX VICTORIA             DTVPLN    DTVP0351     PLN
12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
13A TX KILLEEN              DTVPLN    DTVP0481     PLN

Result key:       76
Scenario        8  Affected station       11
Before Analysis

Results for: 12A TX SAN ANTONIO          USERRECORD01           APP
   HAAT  455.0 m, ATV ERP   22.2 kW
                                  POPULATION   AREA (sq km)
   within Noise Limited Contour     1999712      38570.5
   not affected by terrain losses   1972146      37306.4
   lost to NTSC IX                        0          0.0
   lost to additional IX by ATV       24315       1056.1
   lost to ATV IX only                24315       1056.1
   lost to all IX                     24315       1056.1

 Potential Interfering Stations Included in above Scenario     8

11A TX VICTORIA             DTVPLN    DTVP0351     PLN
12A TX COLLEGESTATION/BRYAN BLEDT     20030319AFB  LIC
13A TX KILLEEN              BLCDT     20060912ACJ  LIC
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##

FINISHED FINISHED FINISHED FINISHED FINISHED FINISHED

A Report

on

Television Indoor Antenna

Performance Attributes

May 8, 2007

Prepared By:

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INDOOR ANTENNA PERFORMANCE ATTRIBUTES

INTRODUCTION

Meintel, Sgrignoli, and Wallace (**MSW**), a broadcast consulting company, recently performed a general antenna survey of available consumer indoor antennas likely to be used for indoor reception. Over one-hundred antennas of various designs from a multitude of manufacturers were uncovered. However, many antennas shared a common design or even a common 3rd-party manufacturer that were then re-branded.

As part of this general antenna survey report, performance data was gathered for each antenna model to the extent that the data is published by the manufacturer or available publicly. This data included the following:

a. General Description including approximate size, connector type, and antenna type.
b. Gain of the antenna for Low-VHF, High-VHF, and UHF TV channels.
c. Available azimuth or elevation patterns for Low-VHF, High-VHF, and UHF TV channels.
d. Output Impedance for Low-VHF, High-VHF, and UHF TV channels.
e. Output VSWR for Low-VHF, High-VHF, and UHF TV channels.
f. Preamplifier Gain, noise figure, and overload (IP3) performance for active antennas.

The antenna survey report also summarized the status of the CEA/EIA 909 “Smart Antenna” standard and the current status of changes to the Smart Antenna Interface that are being proposed, as well as any further observations and status reports of various antenna activities in the Consumer Electronics area.

While there is often very little antenna technical data provided by consumer antenna manufacturers, what little information that is provided is often only “typical” or “expected” performance values and sometimes suspect. This project involved conducting Anechoic Chamber Measurements on **December 19-21, 2006** at the **Electronics Research Inc.** (ERI) facility in Chandler, Indiana on a sub-set of at *least* six antennas selected from the survey list developed by MSW. This anechoic chamber is certified and calibrated for use for High-VHF and UHF television channels. No Low-VHF Measurements (which would have required use of their *outdoor* far-field range) were made since these channels do not play a part in many post-transition markets (there are currently only 40 stations in the entire country that will be using low-VHF for their DTV channels after the DTV transition is complete). For each indoor receive antenna, measurements on High-VHF Channels 7 and 12 were performed well as on UHF Channels 18, 33, and 65. These five frequencies cover a large portion of the high-VHF and UHF frequency bands. On *some* of the tests (antenna gain measurements), CH 14 (lowest end of UHF band) and CH 51 (end of UHF band after the DTV transition is completed) were added for additional information.

Measured (and calculated) data taken during this project included the following:

a. Azimuth and elevation patterns data for each of the five test frequencies.
b. Antenna gain compared to a reference a dipole for each of the five frequencies.
c. Output return loss of each antenna over the entire high-VHF and UHF bands..
e. For active antennas, amplifier gain at each of the five test frequencies.
f. For active antennas, noise figure at each of the five test frequencies.
g. For active antennas, IP3at each of the five test frequencies.
h. General observations and comments relative to antenna ease of use, design, and performance.

The data has been analyzed, and the results summarized in this report.

ANTENNA DESCRIPTIONS

The following factors were taken into account in making the antenna selections:

Potential *availability* for consumer purchase
Identification of a range of expected *performance* from low to high
Identification of a range of *cost* from low to high
Different *manufacturers*
Range of antenna *size* – up to a maximum that consumers would likely deploy indoors
Inclusion of *amplified* and *non-amplified* antennas
Any *experience* or anecdotal information related to specific antennas

Note that the general survey has indicated that for most of the available indoor antennas, there are very little *published* technical specifications. **Table 1** below summarizes 10 antennas that were selected by MSW as possible units desirable for lab testing. Of these 10, six were selected as the ***minimum*** number for evaluation in the ERI anechoic chamber.

Antenna Manufacturer	Model #	Approx Price	Active/ Passive	TV Band Coverage	Special User Adjustments
RCA	ANT115	$10	Passive	Lo-VHF, Hi-VHF, UHF	Rabbit Ears
RCA	ANT585	$40	**Active**	Lo-VHF, Hi-VHF, UHF	Rabbit Ears
Philips	Silver Sensor	$25	Passive	UHF Only	None
Philips	MANT940	$40	**Active**	UHF Only	Vertical/Horizontal
Winegard	SS1000 Square Shooter	$90	Passive	Hi-VHF, UHF	15° Tilt for High-VHF
Winegard	SS2000 Square Shooter	$110	**Active**	Hi-VHF, UHF	15° Tilt for High VHF
Terk	TV25	$40	**Active**	Lo-VHF, Hi-VHF, UHF	Gain setting, local/distant switch
Antennas Direct	DB2	$50	Passive	UHF Only	None
Winegard or Terk	SS3000 Sharpshooter	$80	**Active**	Lo-VHF, Hi-VHF, UHF	Removable reflector
Terrestrial Digital	303F	$20	Passive	UHF Only	None

Table 1 Indoor antenna selection summary

The following paragraphs provide some further background information on the antennas, *as provided by the manufacturer*. Some of this information came from manufacturer websites while some came directly from the antenna packaging (outside of the cardboard box) or manuals that were included with the antennas.

RCA ANT115

This all-band model, shown in **Figure 1**, has a telescoping dipole "rabbit ears" antenna for VHF reception (which can be removed by unscrewing them from the base) and a loop for reception of UHF TV channels (which can also be easily removed from the base). The assumption is that the user will make adjustments to this antenna by moving the rabbit ears or moving the entire base until an acceptable picture is obtained. It represents what should be considered as the low end of the price and performance range, and has been identified as being available from Sears at a cost of $11.99 or on line directly from RCA for $9.95.

The available specifications indicate that the dipole antenna extends to 36 inches and that it connects to the receiver with an F connector and a 3-foot 75 ohm coaxial cable. The physical dimensions are listed a 7.8"L x 4.4"W x 1.7"H (these dimensions appear to be with the dipole antenna collapsed). This is a *passive* antenna. There are no other published specifications.

Figure 1 RCA ANT115

RCA ANT585

This all-band model, shown in **Figure 2**, also has a telescoping dipole "rabbit ears" antenna for VHF reception and a unique flat panel "synchronized to HDTV frequencies" for optimal reception of UHF TV channels. The assumption is that the user will make adjustments to this antenna by moving the rabbit ears or moving the entire base until an acceptable picture is obtained. It represents what should be considered as the middle-of-the-price range. It has been identified as being available from Sears at a cost of about $40 or on line directly from RCA for the same price.

The available specifications indicate that the dipole antenna extends to 39 inches and that the antenna connects to the receiver with an F connector and a 6-foot 75 ohm coaxial cable. This is an *amplified* antenna with a published fixed VHF gain of 25 dB (2.7 dB noise figure) and a fixed UHF gain of 22 dB (3.2 dB noise figure). An external wall-mounted power supply is used (DC inserter is *internal* to the amplifier).

Figure 2 RCA ANT585

PHILIPS SILVER SENSOR PHDTV1

This model, shown in **Figure 3**, is a log periodic antenna for reception of UHF TV channels only. It is also is sold under the Zenith name (ZHDTV1Z**)**. Although this antenna could probably be used for high VHF reception, its performance would likely be poor (unless used in a strong signal environment). This antenna represents a modestly priced antenna with reasonable performance. It has been identified as being available on line from Amazon.com for $29.99 and from Deeply Discounted Electronics for $19.79. It is also likely to be available from a number of other sources since it has been a very popular antenna in recent years.

The available specifications indicate that it has a gain in the range of 6 to 7 dB, good front-to-back ratio, and flat forward gain shape that delivers balanced reception throughout the

Figure 3 Philips Silver Sensor

UHF band. It comes equipped with a 75-Ohm F connector. The unit has a small footprint, with physical dimensions listed as 9.5"H x 13"W x 13.5"D and weighs 1.6 pounds. There are no other published specifications; however, MSW has experience with this antenna and believes that it performs well. It is a *passive* antenna.

PHILIPS MANT940

This model, shown in **Figure 4**, is advertised as an indoor/outdoor antenna having an unusual flat panel array optimized for good UHF reception. (It is *not* intended for VHF reception.) It also incorporates a low-noise amplifier, is weather resistant, and can be painted to match either interior or exterior décor. At an advertised cost of about $40, including 20 feet of coaxial cable with F connector and mounting hardware from Walmart, this antenna would be classified as moderate in cost.

Figure 4 Philips MANT940

The available specifications indicate that it has a total gain of about 18 dB (antenna plus preamp) and a 4 dB noise figure. It is also expected to be in the middle of the performance range. The physical dimensions are 12"H x 4.5"W x 1"D, and the antenna weighs approximately 1 pound without mounting hardware. An external wall-mounted power supply is used in conjunction with an *external* DC inserter that feeds power via the antenna's coaxial cable. One concern is that the picture on the box and in the manual show the antenna mounted vertically (for vertical-polarized signal reception) rather than a horizontal position, which is correct for receiving horizontally-polarized DTV signals.

WINEGARD SS1000 or SS2000 SQUARESHOOTER

This antenna, shown in **Figure 5**, is advertised as a directional antenna for DTV use at *high* VHF and UHF but is indicated to also be useable at low VHF by tilting the antenna backwards. Along with the Winegard SharpShooter, this is one of the few antennas in the survey for which significant technical specifications are published and they are listed below.

Figure 5 Winegard SS1000 or SS2000

Passive Model SS-1000; Amplified Model SS-2000 has a published amplifier gain of 12 dB
Average beamwidth 61° & average Front-to-Back ratio 13 dB
Average VSWR across band 1.3:1
Average gain across band 470-806 IS 4.5 dB (VHF gain is not specified)
Analog range is 45 miles; Digital range is 50 miles
Max. Width Housing 16" x 16" x 4"

This antenna is the largest of those selected, but at 16"W x 16"H x 4"D, it is still small enough to be used in an indoor environment. It also represents the most expensive of the antennas found in the survey. The passive SS1000 antenna costs about $90 and the active SS2000 antenna costs about $110.

TERK TV25

This antenna, shown in **Figure 6**, is advertised as a new unique "complementary symmetry" technology that minimizes multipath ("i.e., "ghosting") via its two "tuned" horizontal loop receiving elements. Low noise, high gain amplification also characterize this antenna. At a cost of $40, it represents what should be considered as the middle-of-the-price range.

Figure 6 Terk TV25

Available specs indicate that it is an *active* antenna with up to 40+ dB of variable gain (rotary knob on base) and an FM trap. There is the concern that an unsuspecting viewer might have the gain too high and experience interference, and then mistakenly increase the gain thinking that the problem was a weak signal. It is advertised as both a VHF and UHF antenna with an *external* wall-mounted power supply and *internal* DC inserter. The two horizontal loop antennas remove the need for long VHF rabbit ears and the associated space and adjustment. It has a local and distant switch for both urban and suburban locations when the received signal is either too strong or weak, respectively, and a separate F-connector input for a second source (e.g., cable or satellite) that allows convenient user switching between antenna and the 2nd source. Also included are LED indicators for power, media switch (antenna versus cable or satellite), and local/distant gain settings. The manufacturer claims that the small size of this antenna (5.25"H x 25"W x 11.5"D) allows easy placement and minimal adjustment.

ANTENNAS DIRECT DB2 (also Terrestrial Digital DB2)

Figure 7 Antennas Direct DB2

This antenna, shown in **Figure 7**, is a dual bow-tie with integrated back reflector design for UHF reception. According to the manufacturer, although the DB2 was originally designed for outdoor use (higher-gain 4-bay and 8-bay "cousins" are also sold), it has quickly become one of their most popular *indoor* antennas due to its small size and extraordinary gain (and directivity). The bowtie design provides strong gain across the entire UHF spectrum and it functions incredibly well in areas where a low-profile antenna is required. At a price of about $50, it is considered in the moderate price range.

According to published specs, it achieves a high gain in the UHF band of up to 11.4 dB. The dimensions of the antenna are 12"H x 19"W x 4"D, and it weighs about 2.8 lbs.

WINEGARD SS3000 SHARPSHOOTER (also Terk HDTVIp)

Figure 8 Winegard SS3000 Sharpshooter

This antenna, shown in **Figure 8**, is indicated by the manufacturer to be a "Scatter-Plane". The back reflector (scatter plane) can be removed for bi-directional operation in locations that desire such performance. This "ultra" low-noise active antenna is designed for both VHF and UHF bands, and can receive reflected (non-line-of-sight) signals while rejecting multipath. It is one of the few antennas in the survey for which significant technical specifications are published, as listed below.

Mechanical
26.75"W x 5"H x 4.25"D and 1.5 lbs.

Electrical
Bandpass .... 54-806 MHz
Power requirements .... 150mA@12 VDC
Amplifier gain .... 7-10 dB ave. VHF/UHF
Amplifier noise figure .... 1.0 dB or lower VHF/UHF

VHF Low Band (54-88 MHz, CH 2-6)
Non-amplified element gain .... -5 dB
Ave. half power beam width .... 87°
Ave. front to back ratio .... 1.2 dB
VSWR 2.0- 2.1

VHF High Band (174-216 MHz, CH 7-13)
Non-amplified element gain .... -5 dB
Amplified gain 7 dB
Ave. half power beam width .... 70°
Ave. front to back ratio .... 11.3 dB
VSWR 2.2- 2.3

UHF (470-806 MHz, CH 14-69)
Non-amplified element gain .... 0 dB
Amplified antenna gain 10 dB
Ave. half power beam width .... 36°
Ave. front to back ratio .... 7.5 dB
VSWR 2.2- 3.3

It was selected because its published specifications indicate that it should provide reasonable performance for both VHF and UHF reception, and is physically fairly compact and its unique design may attract the uninformed customer. It comes with a standard coaxial cable with an F connector, inline amplifier and power supply. It has been found available on line from Warren Electronics for $77.76, which puts it in the higher cost category.

TERRESTRIAL DIGITAL 303F (Antennas Direct SR8)

Figure 9 Terrestrial Digital 303F

This antenna, shown in **Figure 8**, is a Yagi design for UHF reception. It is advertised as achieving best results when used within a short range (15-miles) from the DTV transmitter in areas with strong multi-path conditions. At a price of $18, this antenna is considered in the low-cost range.

Published specs indicate a 6.5 dB gain over the UHF band for this passive antenna, and it comes with 75-Ohm coaxial cable fitted with connectors. It has relatively small size (6"H x 8"W x 12"D), and weighs only 1 lb, which can easily fit most indoor antenna space requirements.

ANTENNA TEST SETUP

A block diagram of the antenna measurement test setup used at ERI's anechoic chamber can be found in **Figure 10**.

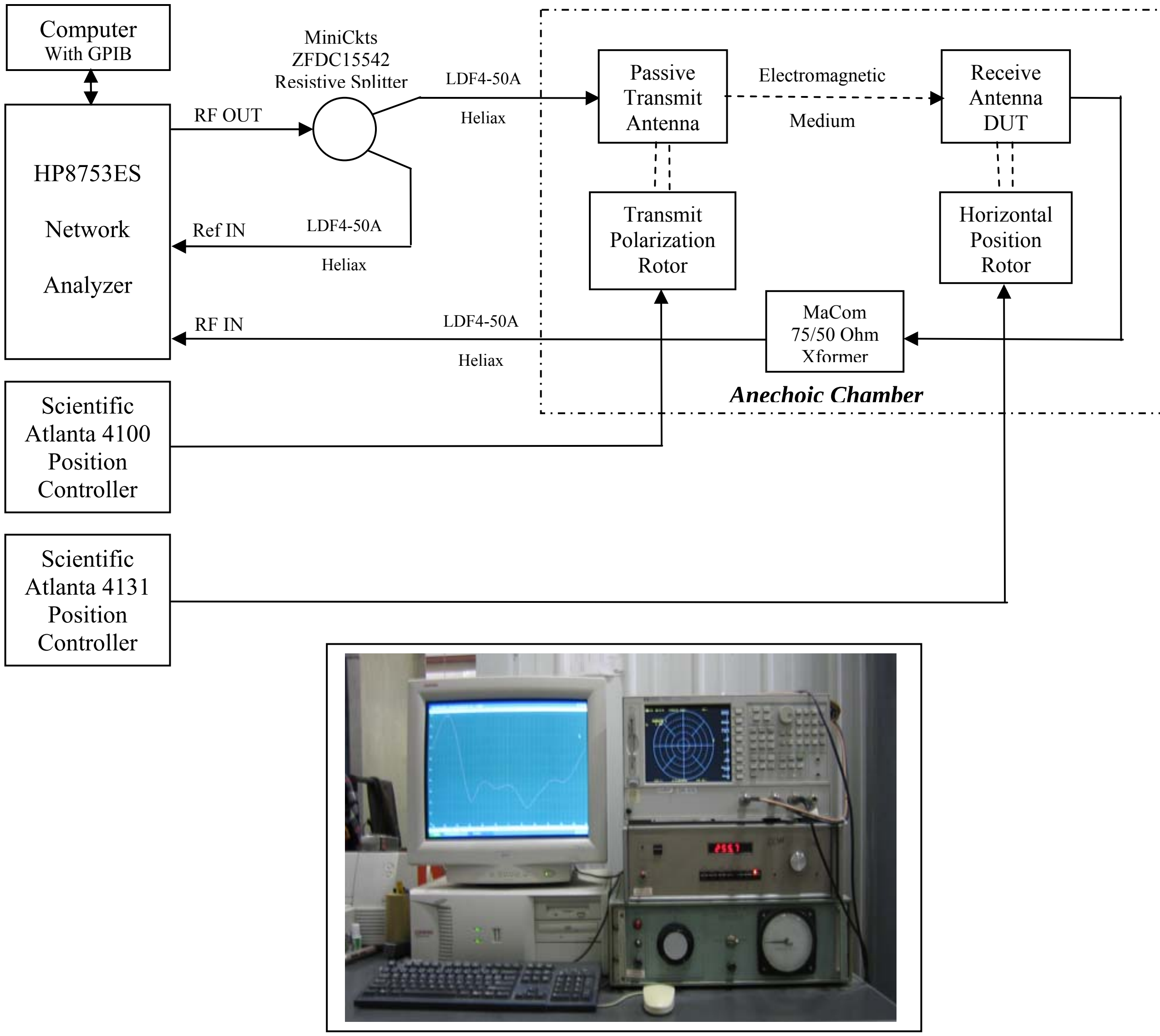
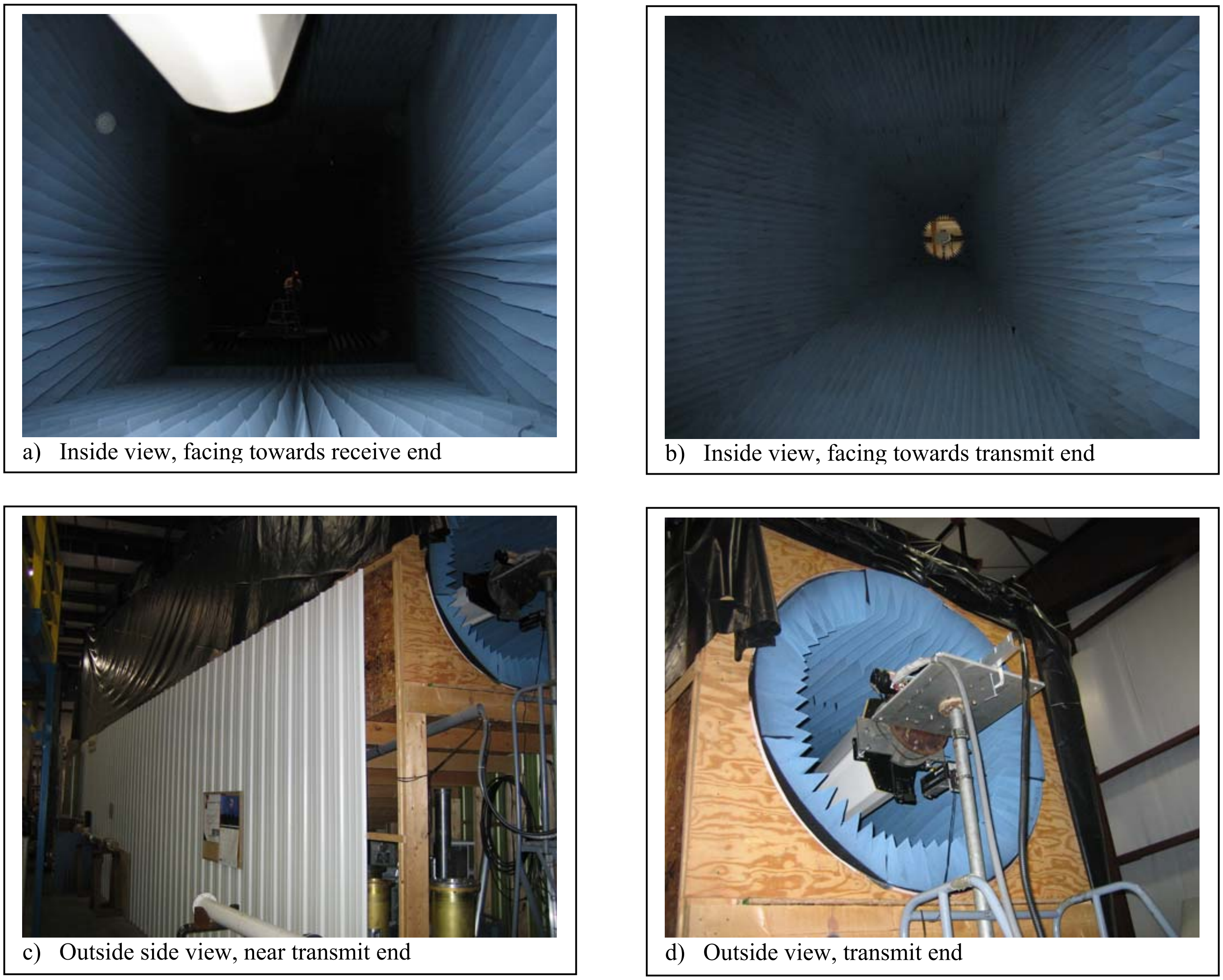


Figure 10 Antenna Measurement Test Bed Block Diagram

The anechoic chamber, shown from several different angles in **Figure 11**, is 65' long, 20' high, and 20' wide at one end where the antennas under test are placed. The chamber tapers down towards the other end to about 37" square where a transmit antenna (either high-VHF or UHF – this chamber is *not* designed for low-VHF testing) launches the electromagnetic waves. The chamber is built with 4' cones of RF absorptive material (for maximum absorption and minimum reflections off of the walls, floor, and ceiling) for testing the entire high VHF band (starting at 174 MHz) and the entire UHF band (ending at 803 MHz).



a) Inside view, facing towards receive end

b) Inside view, facing towards transmit end

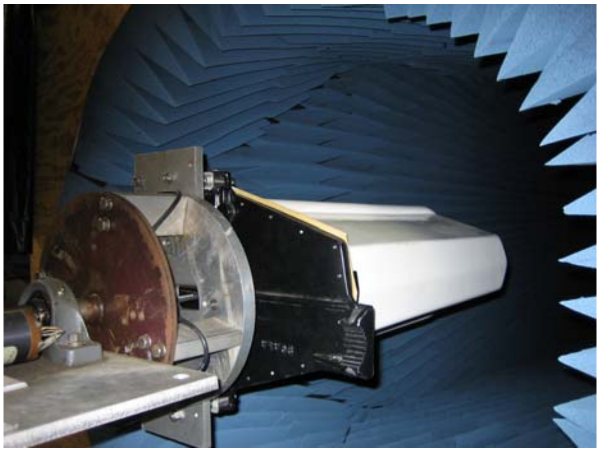
c) Outside side view, near transmit end

d) Outside view, transmit end

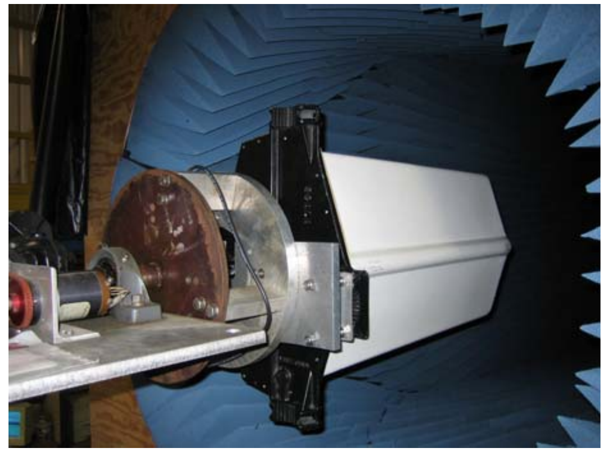
Figure 11 Anechoic chamber

The source antenna can be either a custom-built (ERI) log periodic antenna (with about 6 dBd of gain) for high-VHF testing or a Scala CL1469 log periodic antenna (with about 7 dBd of gain) for UHF testing. These antennas are carefully aimed by pointing the red laser pointer attached to the transmit antenna support to "hit" the receive antenna 6'fiberglass support post near its top (the chamber quiet zone center), where the antennas under test are attached. The use of a fiberglass material for the mounting post minimizes the effect that this pole might have on the electromagnetic field near the antenna DUT. This guarantees that the electromagnetic wave is optimally launched towards the receive antenna and remains that way as it reaches the receive antenna under test, with minimal amounts of the opposite polarization present at the receive antenna input.

Each of the source antennas can be physically rotated 90 degrees (using remote control capability), allowing testing with either *horizontally*-polarized or *vertically*-polarized electromagnetic waves. **Figure 12** shows both the UHF and high-VHF log-periodic antennas in their horizontal and vertical polarization positions. The remotely controlled rotor, which rotates whichever antenna is mounted to its face plate, is also shown in the figure.



a) CL1469 UHF antenna (horizontal polarization)



b) CL1469 UHF antenna (vertical Polarization)

C) ERI VHF antenna (horizontal polarization)

d) ERI VHF antenna (vertical polarization)

Figure 12 UHF and high-VHF transmit antennas

The network analyzer is under computer control. The PC sets the analyzer to a single frequency, typically the *center* frequency of the desired test channel. A high amplitude level CW signal, such as 0 dBm, is conveyed via low-loss, well-shielded cable (1/2" foam Heliax) to the transmit antenna. The electromagnetic wave (either high-VHF or UHF, depending on which transmit antenna is connected) is then launched from the far (small) end of the anechoic chamber and received at the large end by the antenna under test. The output of the 75-Ohm indoor receive antenna is fed back to the network analyzer through a 75-to-50 Ohm transformer to the analyzer via low-loss, well-shielded Heliax cable. The network analyzer determines the magnitude and phase of this received signal by comparing it to the source signal (via one output of the resistive splitter). This comparison is performed at various *azimuth* and *elevation* angles, as determined by the position of the receiver rotor, which is controlled by the azimuth position controller and read by the computer via a GPIB interface. Once the network analyzer data is read by the computer via a second GPIB interface and stored, it can be plotted in either rectangular or polar coordinates as well as saved in an ASCII data file for later computer processing. Likewise, the polarization position controller adjusts the physical orientation (i.e., angle with respect to horizontal) of the transmit antenna, and thus determines the polarization of the launched electromagnetic test wave.

ANTENNA TEST METHODOLOGY

The methodology used during the testing of the indoor receive antennas will now be described. This will include the logistical steps in determining the antenna's maximum gain (at a given azimuth angle), the co-polarization and cross-polarization patterns for 360 degrees of the *azimuth* pattern as well as the co-polarization and cross-polarization patterns for 360 degrees of the *elevation* pattern. Additionally, the methodology of determining antenna return loss and active antennas' preamplifier parameters (gain, noise figure, and 3rd order intercept (IP3)) will be described.

MAXIMUM ANTENNA GAIN

The *absolute* maximum antenna gain measurements are made by comparing the antenna output signal level to that of a calibrated reference *half*-wave dipole antenna that was properly adjusted for each test channel center frequency. This "substitution method" provides the traditional antenna gain parameter of dBd (i.e., dB over the gain of a ½-wave dipole).

A calibrated dipole antenna is attached (typically with duct tape) to the 6' fiberglass support pole at the receive end of the anechoic chamber in the proper position (dipole elements perpendicular to the incoming electromagnetic wave front) that produces the maximum gain (i.e., peak of lobe). The two elements of the dipole are each extended an equal amount such that the total distance end-to-end is approximately equal to ½ the wavelength of the test channel center frequency. The output signal level and phase are then measured on the network analyzer, and sent to the computer for recording and plotting.

The antenna gain (in dBd) of the DUT is then calculated by subtracting the maximum output signal level (in dBm) of the dipole reference antenna (in dBm) from the test antenna output signal level at the azimuth position (angle of incidence, in degrees) that provides its *maximum* value (i.e., "peak lobe" value). However, the test antenna position for maximum gain is sometimes *not* where intuition might indicate. Also, due to the unbalanced design of some of the antennas, the azimuth and elevation patterns were affected by the positioning of the coaxial output cable. This means that the maximum antenna gain that is measured in this test might not line up exactly with the antenna patterns that were measured at a separate time (i.e., *exact* reproducibility is not possible).

AZIMUTH PATTERN (Co-Polarization and Cross-Polarization)

The *relative* azimuth pattern for each antenna under test was measured in the anechoic chamber to determine the performance of the receive antenna from signals received from different horizontal directions (i.e., from the front, back, and sides of the antenna). Each of the antennas was individually attached to the 6' fiberglass pole in such a manner that the zero degree rotor position was defined as the *expected* antenna orientation for optimum reception of a *horizontally*-polarized electromagnetic signal (which is determined by the orientation of the *electric* field, per standard engineering convention). The computer references this particular rotor position as zero degrees in the *horizontal* (azimuth) domain. An example of this is shown in **Figure 13a** using a Silver Sensor log periodic antenna.

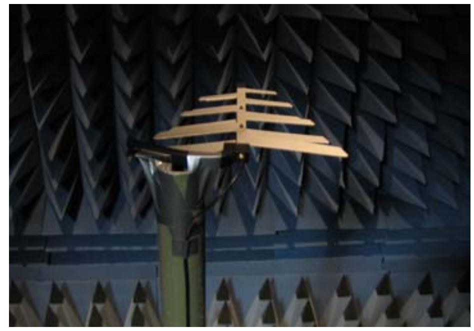
The physical angle of the transmit (source) *antenna* is set to 0° degrees by the polarization position controller so that a horizontally-polarized signal is transmitted. With the receive antenna rotor position still at zero degrees in the *horizontal* (azimuth) domain, the network analyzer provides a large (0 dBm) CW output signal at a frequency equal to the *center* frequency of the desired test channel (e.g., CH 7, 12, 18, 33, and 65). This signal is sent to the transmitter antenna via the low-loss, well-shielded coaxial cable, launching a horizontally-polarized electromagnetic wave in the anechoic chamber towards the receive antenna. The electromagnetic wave is picked up by the receive antenna, with a CW signal level appearing at the antenna output port and conveyed to the network analyzer via low-loss, well-shielded cable. The network analyzer compares this received signal to the one that was sent to the transmit antenna. The computer then reads the received signal's magnitude and phase from the network analyzer, both storing data (in relative *linear* magnitude) from this one azimuth angle as well as plotting this level as one azimuth point (either polar or rectangular) on the computer screen.

With the source still transmitting a horizontally-polarized CW signal, rotation is initiated so that the computer collects horizontal angular position in 0.1 degree increments (in the ±θ horizontal direction) over the entire 360 degrees (total of 3601 data points). **Figure 13a-d** illustrates this concept for four (0, 90, 180, and 270 degrees) of the 3600 different azimuth positions. After one complete revolution, the co-polarization *azimuth* pattern has been measured, stored, and plotted. It is defined as the azimuth ***co***-polarization pattern since the receive antenna is set up in its expected horizontally-polarized (azimuth) position and the transmitted electromagnetic signal is horizontally-polarized (*same* as the receive antenna polarization). This data, however, is defined at only one elevation angle (0 degrees, which is a signal coming directly from a horizontal position).

The transmit (source) *antenna* is then rotated by 90° so that a *vertically*-polarized CW signal is launched into the anechoic chamber. The antenna, still in its horizontally-polarized receive position, is rotated once again in 0.1 degree increments over 360 degrees, taking data as described above for each desired *azimuth* angle. After completing one complete revolution, the cross-polarization azimuth patter has been measured, stored, and plotted. It is defined as the azimuth ***cross***-polarization pattern since the receive antenna is set up in its expected horizontally-polarized (azimuth) position but the transmitted signal is vertically-polarized (*opposite* of the receive antenna polarization). Likewise, this data is also defined at only one elevation angle (0 degrees, which is a signal coming directly from a horizontal position).

This two-phase azimuth pattern process (co-polarization and cross-polarization) is then repeated for *each* desired test channel.

a) 0-degree test position



b) 90-degree test position

c) 180-degree test position

d) 270-degree test position

Figure 13 Antenna positions for *azimuth* pattern testing.

ELEVATION PATTERN (Co-Polarization and Cross-Polarization)

The *relative* elevation pattern for each antenna under test was also measured in the anechoic chamber to determine the performance of the receive antenna from signals received from different vertical directions (i.e., above and below the antenna's horizontal plane). The logistical steps are very similar to those described above for the azimuth pattern tests.

The most straightforward elevation pattern measurement methodology would be to attach the antenna under test to the fiberglass pole in the same horizontally-polarized reception position (as described above), and then rotate the antenna upward and downward (in the ±φ vertical direction) covering 360 degrees with the appropriately polarized incoming electromagnetic wave (horizontal for *co*-polarization or vertical for *cross*-polarization).

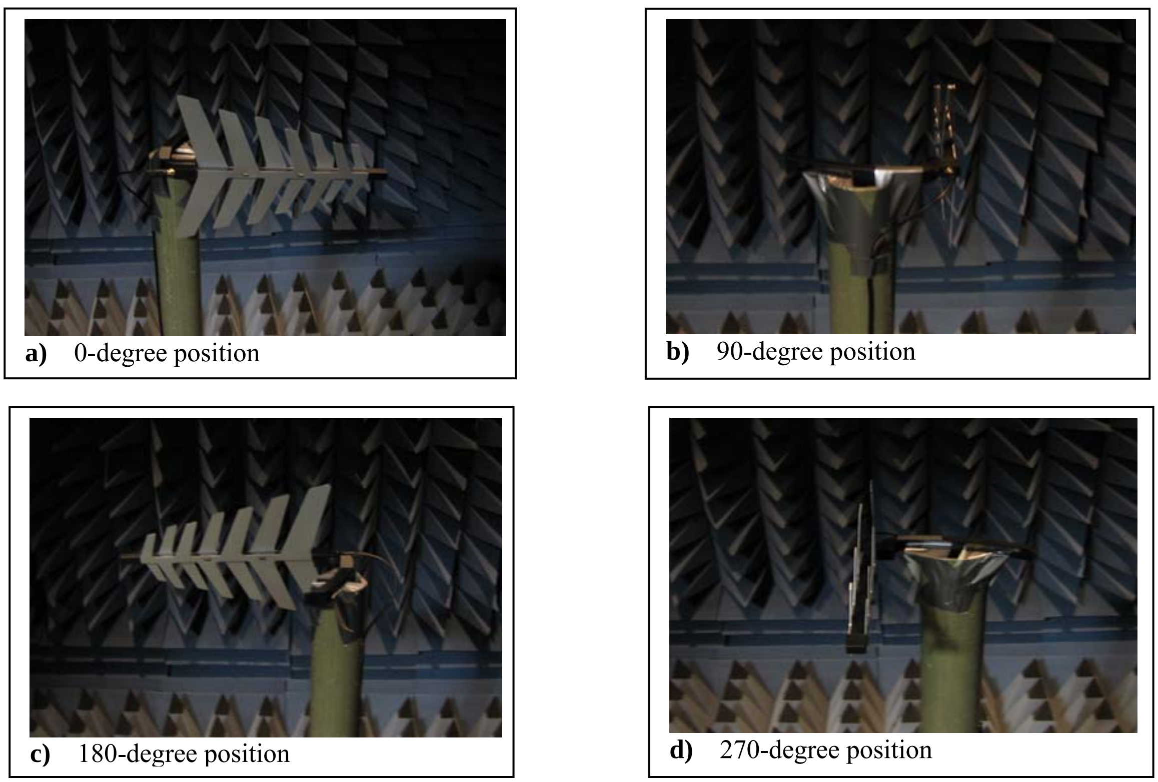
However, this anechoic chamber did not have rotor movement in the vertical direction. Therefore, an alternative method is commonly used to measure the vertical elevation pattern that makes use of the horizontal rotor that exists in the chamber. The solution involves the following. Each of the antennas under test was individually attached to the 6' fiberglass support pole in such a manner that the zero degree rotor position is defined as the *expected* antenna position for optimum reception of a *vertically*-polarized electromagnetic signal (determined by the orientation of the electric field, per standard engineering convention). An example of this is shown in **Figure 14a** using a Silver Sensor antenna as an example.

However, the angle of the transmit antenna is set to 90° by the polarization position controller so that a vertically-polarized signal is transmitted. This conditions *mimics* a horizontally-positioned receive antenna receiving a horizontally-polarized electromagnet wave, except that the system appears to be operating "on its side". The computer references this particular rotor position as zero degrees in the *vertical* (elevation) domain. With the receive antenna rotor position still at zero degrees in the *vertical* (elevation) domain, the network analyzer provides a large (0 dBm) CW output signal at a frequency equal to the *center* frequency of the desired test channel (e.g., CH 7, 12, 18, 33, and 65). This signal is sent to the transmitter antenna via the low-loss, well-shielded coaxial cable, launching a vertically-polarized electromagnetic wave in the anechoic chamber towards the receive antenna. The electromagnetic wave is picked up by the receive antenna, with a CW signal level appearing at the antenna output port and conveyed to the network analyzer via low-loss, well-shielded cable. The network analyzer compares this signal to the one that was sent to the transmit antenna. The computer then reads the received signal's magnitude and phase from the network analyzer, both storing data (in relative *linear* magnitude) from this one elevation angle as well as plotting this level as one elevation point (either polar or rectangular) on the computer screen.

With the source still transmitting a vertically-polarized CW signal, the computer then directs the azimuth rotor to move its horizontal angular position in 0.1 degree increments (in the ±θ horizontal direction) over the entire 360 degrees (total of 3601 data points), and the process is repeated. However, since the antenna is mounted for vertical polarization and the source is vertically-polarized, this is the same as measuring the response of one particular azimuth angle. **Figure 14a-d** illustrates this for four (0, 90, 180, and 270 degrees) of the 3600 different elevation positions. After one complete revolution, the co-polarization *elevation* pattern has been stored and plotted. It is defined as the elevation ***co***-polarization pattern since the receive antenna is set up in its expected simulated ("on its side") horizontally-polarized (elevation) position and the transmitted signal is a simulated (i.e., "on its side") horizontally-polarized (*same* as the antenna polarization). This data, however, is defined in only one azimuth angle (0 degrees, which is a signal coming directly from a frontal position).

The transmit (source) *antenna* is then rotated by 90° so that a *horizontally*-polarized CW signal is launched into the anechoic chamber. The receive antenna, still in its *simulated* horizontally-polarized receive position (i.e., "on its side"), is rotated once again over 360 degrees in 0.1 degree steps, taking data as described above for each desired *elevation* angle. After completing one complete revolution, the cross-polarization azimuth patter has been store and plotted. It is defined as the azimuth ***cross***-polarization pattern since the receive antenna is set up in its expected horizontally-polarized (azimuth) position but the transmitted signal is vertically-polarized (*opposite* of the receive antenna polarization). However, this data is defined in only one azimuth angle (0 degrees, which is a signal coming directly from a frontal position).

This two-phase elevation pattern process (co-polarization and cross-polarization) is then repeated for *each* desired test channel.



a) 0-degree position

b) 90-degree position

c) 180-degree position

d) 270-degree position

Figure 14 Antenna positions for *elevation* pattern testing

A rough idea of the anechoic chamber performance can be determined by observing the co-polarization and cross-polarization azimuth and elevation patterns of a reference dipole. At the peak azimuth locations for UHF channels, the cross-pole is more than 20 dB below these values. **Appendix D** contains these azimuth and elevation dipole antenna pattern plots for channel 33.

OUTPUT RETURN LOSS

Antenna return loss is a measurement that determines the difference between the actual antenna output impedance and some nominal impedance (typically 50 or 75 Ohms), and is an indication of how much signal power is reflected back to the source due to the mismatch at the load. A complete mismatch (either a short or open) will reflect all of the signal power back to the source, and register a 0 dB return loss, while a very good match (one where most of the signal power is absorbed by the load and little of it is reflected back towards the source) has a very low logarithmic value (i.e., large negative number in dB). Antenna output return loss indicates how well the consumer receive antenna is matched to a 75 Ohm load such as the input to an external preamplifier or a DTV tuner.

Antenna return loss measurements were made using a network analyzer and a directional bridge. With the antenna connected to the directional bridge output and the network analyzer transmitting a large signal that is sweeping over the desired frequency range, any reflected signal back from the antenna is passed through the reflection port to the network analyzer and compared to the source level in magnitude and phase. The assumption is that the antenna is pointed in a direction where there will be little or no signal energy reflected back to the antenna (from surrounding objects near the test bed) that may appear as mismatch reflection. Hence, there is a need for an anechoic chamber or a location that simulates one (i.e., one with little or no reflections). **Figure 15** illustrates the setup used for these tests, which involved the same type of 4' absorptive material cones.

By sweeping the network analyzer from 174 MHz to 803 MHz, the entire high-VHF band as well as the entire UHF band is measured. However, it should be noted that return loss measurements on passive antennas will essentially indicate the antenna's true return loss, but measurements on active antennas will *primarily* (although not entirely) indicate the internal preamplifier output return loss.

a) RCA ANT115 antenna

b) Antennas Direct DB2 antenna

Figure 15 Return loss measurement setup

ACTIVE ANTENNA PARAMETERS (GAIN, NOISE FIGURE, IP3)

Active antennas often have their low-noise preamplifiers *internal* to the antenna housing, making certain antenna measurements difficult at best. In the case of preamplifier gain, noise figure, and 3rd order intercept point (IP3), the antenna case must first be disassembled and removed in order to carefully insert (and solder) a short semi-rigid cable to provide a test port. From this "make-shift" test port, a reference RF signal can be inserted relatively easily into the preamplifier without the need of an electromagnetic signal traveling through the antenna elements. However, it should be noted that this test method has some known errors such as the absence of the effects from any antenna impedance-matching or filtering circuitry nor any baluns that are sometimes used to convert from a balanced antenna structure to an unbalanced preamplifier structure. However, this methodology still allows "ballpark" performance values to be obtained as well as comparison among the various active antennas.

All of these active consumer antennas have 75-Ohm output ports for connection to DTV receivers. In *all* of these active antenna tests (gain, noise figure, and IP3), 50-Ohm test equipment was employed in concert with lossy impedance-conversion circuits, with subsequent application of appropriate calculation techniques to account for the additional losses. For example, the 50-Ohm input test signals were fed from 50 Ohm sources via a high-quality (low-loss, well-shielded) 50-Ohm semi-rigid coaxial cable that contained a series 24 Ohm resistor for proper impedance matching (and 1.76 dB of loss) to the *assumed* 75-Ohm preamplifier input. At the antenna amplifier output (either on the output F-connector mounted on the case or at the end of an integrally-attached cable with F-connector), a 75-to-50-Ohm minimum loss (5.7 dB) matching pad was employed to properly match to the 50-Ohm test equipment inputs. However, the additional losses associated with these two impedance conversions were accounted for in subsequent calculations (e.g., losses algebraically applied to gain and IP3 values and losses properly inserted into the Friis formula for noise figure determination).

Preamplifier gain and noise figure were measured together using an HP 8970A noise figure meter (along with noise source Model # HP346A with about 5 dB excess noise). Measurements were made on the desired DTV channels (7, 12, 18, 33, and 65).

In the process of measuring noise figure, the test equipment must also determine the broadband amplifier *gain* at the center of the test channel, displaying its value on the front panel. This gain includes any losses from attached output coaxial cables integral to the antenna as well as any *external* power inserters (that supply power remotely via the coaxial cable). A large gain value (in dB) means a large signal gain. A typical value of antenna preamplifier gain, which allows for the minimization of coaxial feedline losses as well as white noise effects from a DTV receiver, is *generally* between 10 – 20 dB, depending on the expected amount of output cable loss and any extraneous splitters.

Noise figure is a measure of how much the amplifier noise output level is beyond the *ideal* case where only kTB exists at its input (i.e., noise from a matched resistive system at a given temperature). A small value (in dB) is desired for low-noise amplifier performance, meaning there is only a small amount of *excess* noise being added by the active amplifier. Noise figure values in the range of 3 – 4 dB are considered *good* for consumer amplifier devices.

However, it should be noted that these gain and noise figure measurements represent the values when the preamplifier is connected to *an equivalent 75-Ohm resistive source* (as was the case during these particular laboratory measurements). When the preamplifiers are re-connected to their respective antennas for normal use, whose impedances can be significantly different from a resistive 75 Ohms, the gain and noise figure can *possibly* be degraded anywhere from minimal amounts up to several dB. In addition to this, any baluns or filters that are present in the antenna input circuitry but not utilized during this laboratory preamplifier testing, may also degrade the gain and noise figure values. Therefore, these noise figure measurements provide only "ballpark" absolute figures yet allow for antenna comparisons.

IP3 measurements, which indicate amplifier robustness to overload and interference conditions, were conducted by using the 2-tone test method. This method inserts into the input of each amplifier two closely-spaced, equal-level CW carriers (separated by **1 MHz**) that are centered in each DTV channel under test (CH 7, 12, 18, 33, and 65). An HP435B power meter with HP8484A power sensor was used for accurately measuring the *absolute* values of the CW tones inserted into the amplifiers (with appropriate calculations to correct the 24 Ohm impedance-matching series resistor). The two 3rd order components, which occur on *each* side of the pair of CW signals due to 3rd order non-linearities, are then measured *relative* to the signal level of the two equal-power CW tones. Appropriate calculations are made that account for the fact that the 3rd order components increase 3 dB for every 1 dB of fundamental signal pair increase (i.e., *both* fundamental CW tones increasing equally). These calculations then provide the theoretical 3rd order intercept point (a fictitious situation where the 3rd order component levels equal the fundamental signal levels). A larger IP3 value (in dBm) means a more robust amplifier. The IP3 levels were referenced to both the amplifier *input* (IIP3) and the *output* (OIP3), related by the gain of the preamplifier at the frequency under test. A typical value for a *robust* consumer amplifier is an OIP3 of +25 dBm or greater.

TEST RESULTS

The test results can be broken down into several categories. For all antennas, the following data was obtained: (1) the *peak* antenna gain compared to that of a ½-wave dipole for channels 7, 12, 14, 18, 33, 51, and 65, (2) the antenna azimuth and elevation patterns (for channels 7, 12, 18, 33, and 65), (3) the antenna output return loss over the high-VHF and UHF bands, and (4) the active antennas' preamplifier performance parameters (gain, noise figure, and IP3).

The main focus of this report is to summarize the details of each antenna's performance, and this is done in the following tables and figures. However, additional comments and observations on the antenna test results are included below as well.

ANTENNA GAIN

The maximum antenna gain of each antenna, along with its corresponding "peak lobe" azimuth angle, is shown in **Table 2** below, and allows easy comparison of all the antennas. A further summary of these gain results can also be found in **Table 6**. As described above, the gains are described in terms relative to a ½-wave dipole antenna at the desired test frequencies, and are therefore in units of dBd (gain over dipole). The angle describes the antenna azimuth angle where the maximum gain occurred (i.e., its "peak lobe" angle), which was not always in the expected 0 degrees position. When multiple significant lobes existed, the one with the largest value was selected. However, if more than one significant lobe existed that had equal gains, then the one closest to 0 degrees was selected.

Indoor Antennas	Active/ Passive	CH 7 dBd/deg	C12 dBd/deg	CH14 dBd/deg	CH 18 dBd/deg	CH33 dBd/deg	CH 51 dBd/deg	CH65 dBd/deg
ANT115	Passive All Band	-5.2 dBd -20 deg	-1.1 dBd 2 deg	-2.7 dBd -2 deg	-6.4 dBd 23 deg	-6.2 dBd 170 deg	-0.8 dBd 2 deg	1.7 dBd/ -2 deg
ANT585	**Active** All Band	13.4 dBd -160 deg	18.7 dBd -170 deg	11.7 dBd 20 deg	14.0 dBd 18 deg	21.0 dBd 38 deg	15.6 dBd -130 deg	14.5 dBd 107 deg
Silver Sensor	Passive UHF Only	-25.0 dBd -90 deg	-12.5 dBd 71 deg	3.1 dBd 6 deg	2.4 dBd 1 deg	2.4 dBd 0 deg	3.0 dBd 0 deg	5.4 dBd 5 deg
MANT940	**Active** UHF Only	7.2 dBd -44 deg	15.3 dBd 0 deg	16.4 dBd -15 deg	15.8 dBd 2 deg	18.1 dBd 16 deg	20.5 dBd -5 deg	18.3 dBd -29 deg
SS1000 Square Shooter	Passive Hi-VHF, UHF	-20.4 dBd -150 deg	-19.5 dBd 180 deg	2.5 dBd 0 deg	0.5 dBd 0 deg	6.0 dBd -4 deg	2.7 dBd -2 deg	6.9 dBd -2 deg
SS2000 Square Shooter	**Active** Hi-VHF, UHF	-10.5 dBd 45 deg	-9.4 dBd 180 deg	12.3 dBd 0 deg	12.7 dBd 1 deg	15.8 dBd 0 deg	14.6 dBd 0 deg	14.9 dBd 3 deg
TV25	**Active** All Band	24.3 dBd 0 deg	21.9 dBd -14 deg	12.4 dBd -135 deg	14.2 dBd -135 deg	13.7 dBd -50 deg	12.6 dBd -50 deg	17.9 dBd 180 deg
DB2	Passive UHF Only	-14.1 dBd 180 deg	-11.8 dBd 180 deg	6.4 dBd -7 deg	5.6 dBd -5 deg	7.3 dBd -2 deg	5.7 dBd 5 deg	9.5 dBd -1 deg
SS-3000 Sharp Shooter	**Active** All Band	-3.8 dBd -1 deg	1.5 dBd -1 deg	13.3 dBd 8 deg	11.2 dBd 7 deg	15.4 dBd 4 deg	13.6 dBd 5 deg	12.3 dBd 3 deg
303F	Passive UHF Only	-18.2 dBd 121 deg	-18.9 dBd 105 deg	-1.4 dBd 0 deg	-2.7 dBd -4 deg	-1.3 dBd 3 deg	4.7 dBd 0 deg	5.6 dBd -2 deg

TABLE 2 Measured maximum antenna gain values & the associated azimuth angle of the maximum gain.

While the above table provides all the *detailed* information for the reader regarding the gains of each antenna, the following sections will provide some *general* observations. It is obvious that the active antennas have more gain than the passive ones (i.e., within the television band for which their use is recommended). Also, some of the antennas require adjustment of their "rabbit ears" while all of them can be "adjusted" by rotating the entire unit.

Note that UHF-only antennas were also measured in these tests at high-VHF to determine the gain or loss that exists at these frequencies should consumers decide to use them to receive high-VHF (although it is *not* recommended, it *may* happen). Also remember that the focus of this test was to measure antennas that could be used as *indoor* antennas in urban and suburban areas. These are reception areas where moderate to large signal levels exist (within 20-25 miles from the transmitter) outside the house, rather than in areas of very weak signal levels (such as in the fringe coverage areas). However, the signal level inside the house may or may not be similar to the levels outside depending on the height above ground level of the indoor antenna (e.g., 1st or 2nd floor of the house) as well as the building attenuation loss. In the case of a DTS system, these types of indoor antennas are to be used primarily in areas that have strong signal levels to overcome not only the usual losses associated with reduced indoor receive antenna height and building penetration loss but also severe multipath conditions (both naturally occurring and DTS-induced).

High-VHF Performance

For UHF-only *passive* antennas (Silver Sensor, DB2, 303F), the gains at **high-VHF** varied from about -25 dBd to -12 dBd. While these antennas *might* be acceptable for areas with *strong* high-VHF signal levels, their use for high-VHF can be risky since these measured values represent the *maximum* antenna gains at a given azimuth angle. Obviously, at other azimuth angles, the gain is reduced to even lower levels. Use at high-VHF is therefore not recommended. However, if one of these UHF-only *passive* antennas ***must*** be used for high-VHF *indoor* reception, the one with the largest gain would obviously be recommended (e.g., DB2).

The one UHF-only *active* antenna (MANT940) had enough preamplifier gain so that it provided a net antenna high-VHF gain of about +7 dBd to +15 dBd. This means that this antenna would *possibly* work acceptably with *moderate*-level as well as strong-level high-VHF DTV signals, depending on the required antenna patterns.

The two antennas that cover the high-VHF and UHF bands together (SS1000 and SS2000) differ from each other only in the presence of a low-noise preamplifier (SS2000). The SS1000 had only about -20 dBd of gain (i.e., significant loss) at high-VHF despite its recommended use at high-VHF, which means that it too should only be used with strong high-VHF DTV signals (e.g., urban areas close to the transmitter). However, its active version (SS2000) increases the net antenna gain up to about -10 dBd (still a loss compared to a ½-wave dipole), which is about 10 dB more sensitive than its passive version, possibly allowing it to be used in both urban and suburban areas with *strong* and *moderate* levels of high-VHF signal level, respectively.

The *passive* antenna recommended for all three bands (ANT115) had only modest high-VHF losses (with its "rabbit ears" fully extended a 45-degree angle), with gain values in the range of about -5 dBd to -1 dBd. This antenna can operate in both *moderate* and *strong* high-VHF signal level conditions if properly adjusted.

The remaining three all-band antennas were *active* (ANT585, TV25, SS3000). At high-VHF their gain varied from –4 dBd to +24 dBd. The lowest gain antenna in this group (SS3000) has acceptable gain performance for high-VHF and less chance for overload, while the largest gain antenna (TV25) has a *variable* preamplifier gain that can be easily misadjusted by consumers for increased risk of overload.

UHF Performance

All the antennas that were tested are designed for UHF reception. This analysis will consider the passive antennas separate from the active antennas.

The *passive* antennas (ANT115, Silver Sensor, SS1000, DB2, 303F) had UHF gains varying from about –6 dBd to +9 dBd. While these gains are less than the FCC's *outdoor* planning factors for UHF antennas (NO *indoor* FCC planning factors exist), the coaxial feedline is expected to be less than 4 dB of loss from these indoor antennas, which means that an antenna gain of less than 10 dB is required. However, the primary need for additional antenna gain is to overcome the receive antenna being at a lower height than a typical roof top antenna plus any building penetration loss. Therefore, these passive antennas should be used only in strong (outdoor) signal environments.

The active antennas (ANT585, MANT940, SS2000, TV25, SS3000) obviously had more gain due to the presence of a low-noise preamplifier that is built within the antenna structure. The preamplifier serves two purposes. First, it provides a low-noise front end that, assuming it has a gain of 10 dB or more, decreases the effective receiver noise figure (typically from a relatively high value of about 7 – 10 dB or higher to a low value of 3 - 4 dB). Second, it provides isolation between the typically poor antenna output impedance and the typically bad tuner input impedance, minimizing potentially severe reflections due to mismatches. The active antennas had UHF gains that ranged approximately between +11 dBd and +21 dBd. On average, the extra 10-20 dB of indoor antenna gain, assuming that the preamplifiers are *robust* enough (i.e., large IP3) to avoid overload and interference problems, will help the DTV receivers work in *moderate* DTV signal levels, even in the presence of severe multipath.

It should be noted that the comments in the paragraphs above consider only the net antenna *maximum gain* without regard to actual azimuth and elevation *patterns* that each antenna provides, nor the preamplifier *specific* performance such as gain, noise figure, and amount of interference robustness (IP3). Ease of antenna adjustability for the viewer is also another issue when considering antennas. The next section describes the antenna patterns in detail followed by the section on the preamplifier performance.

ANTENNA PATTERNS

For ease in comparison, all the measured antenna azimuth and elevation patterns are found in a series of plots contained within **Appendix A**. Antenna pattern data for high-VHF channels 7 and 12 are presented as well as data from UHF channels 18, 33, and 65. Each azimuth pattern plot contains both *co*-polarization and *cross*-polarization data. The same is true for each elevation pattern. By comparing the responses of the two polarizations as well as comparing the responses of the azimuth and elevation patterns at each desired channel, an idea of how well the antennas *might* work in various propagation conditions can be obtained.

The pattern plots themselves are the main data presented in this report, and can be studied by all interested parties from their own perspective and particular applications. However, from these plots, a number of *general* comments can be made.

1) Some antennas (Silver Sensor, SS1000, SS2000, DB2, SS3000) are very well-behaved *directional* UHF antennas with good front-to-back ratios (typically >10 dB) and good front-to-sidelobe ratios (>10 dB). These antennas can be used (after proper adjustment in a direction towards the maximum signal level) to reduce UHF multipath echoes as well as any analog or digital interference, assuming that the multipath and interfering signals are coming from a direction other than the one in which the antenna is pointed. This phenomenon can be observed by viewing their *azimuth* patterns and looking for a lobe that has a dominant response centered around some azimuth angle while all the other lobes are significantly below this peak value. These same five directional antennas also generally have good horizontal-to-vertical polarization separation (i.e., polarization isolation), which is observed when the cross-polarization (vertical polarization) azimuth pattern is at least 6-10 dB below the co-polarization (horizontal polarization) azimuth pattern, particularly at or near the *peak* of the azimuth pattern (main lobe) where the primary signal would be received after antenna adjustment. This fact may reduce some of the multipath from de-polarized signals that have been transformed from horizontal polarization into vertical polarization during propagation. Likewise, these particular antennas all have some amount of elevation pattern directionality to help reduce horizontally-polarized multipath coming from an angle *above* or *below* their horizontal plane.

2) One *all-band* antenna (SS3000) is a well-behaved antenna at *both* UHF and high-VHF channels, although there is not a lot of net gain at high VHF. The high-VHF performance of this antenna exhibits a dominant peak at a well-defined azimuth angle, and also still has good cross-polarization isolation.

3) As a matter of interest, one UHF-only antenna (Silver Sensor) has a distorted figure-8 pattern at high-VHF frequencies, with its main lobe at 90 degrees from the location of the main UHF lobe (perhaps not obvious to most users). However, the antenna loss at high-VHF frequencies is not insignificant, and therefore this antenna is not recommended for use in this frequency band unless in a very strong signal environment. An additional matter of interest is that another UHF-only antenna (DB2) actually has some *modest* directionality (5-10 dB front-to-back ratio) at high-VHF, but the main lobe also occurs at 180 degrees from the location of the main UHF lobe (i.e., on its back side). This antenna has less loss than the previous antenna (Silver Sensor), but still would not be recommended for use with high-VHF signals except in strong signal conditions. Two of the antennas (SS1000 and SS2000), which *are* recommended for high-VHF reception, can receive the high-VHF signals, but with little or no directionality (3 – 7 dB front-to-back ratio), and require a slight mechanical tilt *upwards* for optimum reception performance (something that probably needs to be pointed out to most users).

4) Some antennas (ANT115, ANT585, MANT940, TV25, 303F) can be generally described as *quasi*-omni-directional antennas over *most* of the high-VHF and UHF bands since there is not much directionality due to multiple *broad* lobes in their azimuth patterns that can be used to receive signals from different directions, with the recent generation of VSB decoder chips having to do the job of canceling or minimizing the effects of any multipath. These antennas typically do *not* have good horizontal-to-vertical polarization isolation either, which adds to the non-directional feature and perhaps provides a form of polarization diversity that might help to minimize deep fades when a de-polarized reflected signal is present. Most of these antennas actually have greater gain for vertically-polarized signals than for horizontally-polarized signals at some frequencies. Another antenna (TV25) can be viewed as a dipole at high-VHF channels, with a perfect figure-eight pattern and multiple (between 4 and\8) main lobes over the UHF band (more lobes at higher frequencies). Most of the above antennas have very broad *elevation* patterns, meaning that there is not a lot of discrimination against signals from above and below the horizontal plane of the receive antenna, also contributing to their pseudo-omni directional nature.

5) Three of the active antennas (ANT585, MANT940, TV25) typically have enough broadband gain so that they can work in both *strong* and *moderate* signal level conditions in either the high-VHF or UHF bands. These three antennas are also *quasi*-omni-directional, making them candidates for DTS systems where the signals can come from various directions not only due to multipath propagation but from multiple DTS low-power transmitters. The other two active antennas (SS2000, SS3000) do not have quite as much gain at high-VHF, and therefore require to be in *stronger* signal level conditions (another 10 – 15 dB) in this band. However, these same two antennas do have significant gain at UHF and will work in *moderate* signal level conditions in this band, although with a directional pattern that requires some adjustment for optimum performance.

6) One antenna has an *adjustable* gain (TV25) that is available to the user. While this can be a good practice for engineers working in the field who want to vary some of the receive variables, it can be dangerous for typical (i.e., non-engineer) consumers to have this kind of control since it can lead to overload conditions (and disappointed DTV viewers). This antenna has more gain than what is really needed (increasing risk of overload), and the gain adjustment has too much range that leads to awkward user control.

As a peripheral test to the normal antenna patterns, one of the antennas (ANT115) was used to perform an experiment, with the associated plots contained in **Appendix B**. Since it had both adjustable and removable telescoping VHF dipoles, multiple azimuth plots were made with (1) the dipoles adjusted to a *horizontal* position, as shown in **Figure B-1**, and (2) the dipoles adjusted to a *vertical* position, as shown in **Figure B-2**.

A summary of all the antenna patterns measurement results can be found in **Table 6**.

From observation of the antennas after removing their outside cases, a rough idea of the circuit topography and design philosophy was obtained. **Table 3** outlines some of the general observations of these antenna designs. Note the differences between those with baluns and those without baluns. With the exception of the Silver Sensor, those without baluns are at risk for having their azimuth and elevation patterns noticeably affected by how the output coaxial cable is draped near the antenna. Another point to consider are those antennas that have some form of input filtering that help to protect the active elements, some of which are MMIC devices while others are discrete transistors (either 1 or 2 devices).

Antenna Model #	Active/Passive	Baluns	Comments
ANT115	Passive	YES	Printed circuit versions for both VHF & UHF Insensitive to output cable placement
ANT585	**Active**	NO	Sensitive to output cable placement Diplexer on input MMIC for active device
Silver Sensor	Passive	NO	Balun **NOT** needed due to design structure Insensitive to RF cable placement at UHF
MANT940	**Active**	NO	Sensitive to output cable placement Output filter has notch between VHF & UHF band 2 discrete transistors for active element
SS1000 Square Shooter	Passive	YES	Insensitive to output cable placement
SS2000 Square Shooter	**Active**	YES	Insensitive to output cable placement MMIC for active device Simple input FM trap
TV25	**Active**	YES	Insensitive to output cable placement 2 discrete transistors for active element
DB2	Passive	YES	Insensitive to output cable placement
SS-3000 Sharpshooter	**Active**	YES	Insensitive to output cable placement Simple input FM trap MMIC for active element
303F	Passive	NO	Sensitive to output cable placement

Table 3 Summary of indoor antenna designs

ANTENNA OUTPUT RETURN LOSS

For ease in comparison, all the antenna return loss plots are found in **Appendix C**. A summary of the return loss measurement results can be found in **Table 6**.

Note that return loss, which indicates the amount of matching at a given frequency or in a given frequency band, is anything but constant for these antennas. Not surprising is the measured difference in the return loss not only between the high-VHF band and the UHF band, but even within each of these bands themselves. This relatively common occurrence in low-cost consumer television antennas, particularly indoor antennas, adds to the variance in antenna gain from one channel to the next. It also makes designing a preamplifier (for active antennas) challenging as amplifier gain and noise figure are often affected by the frequency-sensitive impedances. Different preamplifier design philosophies produce amplifiers with varying amounts of input-to-output isolation, thus affecting the output return loss.

Generally, the *passive* antennas have a return loss that is worse (higher values, which is a smaller negative number) than the *active* antennas. The unit with the best return loss across both the high-VHF and UHF bands is the SS3000 active all-band antenna. The two next best antennas with regard to output return loss are the SS2000 and the TV25, both of which are active.

ACTIVE ANTENNA PREAMPLIFIER GAIN, NOISE FIGURE, AND 3RD ORDER INTERCEPT

Each of the five active indoor antennas was evaluated for preamplifier performance, particularly in the areas of amplifier gain, noise figure, and 3rd order intermodulation intercept point (*both* IIP3 at the input and OIP3 at the output). Each active antenna was carefully disassembled in order to make a semi-rigid coaxial cable connection to the input as described earlier in this report. The existing antenna output connector was used to measure the amplified output signal. All measurements were made at room temperature and at the *final* output of the antenna, which includes any integrally-attached coaxial cables and external power inserters on the output.

The results are summarized in **Table 4** below. Note that the active antennas with poor amplifiers only had an OIP3 in the range of +15 dBm to +20 dBm while the better amplified antennas had an OIP3 of greater than +20 dBm, with the highest VHF value (at one test channel) about +31 dBm and the highest UHF value (at one test channel) about +27 dBm. Most had amplifier gains either in the 10 dB or 23 dB *vicinity*. Noise figures typically fell between 3 – 5 dB. **Table 6** also contains a summary of the active antenna RF performance results.

Antenna	RF Parameter	CH 7	CH 12	CH 18	CH 33	CH 65
ANT585	IIP3 / OIP3 (dBm)	-3.0 / +17.3	-1.5 / +19.0	-3.5 / +17.9	-3.0 / +18.5	-8.5 / +12.3
	Gain (dB)	20.3	20.5	21.4	21.5	20.8
	Noise Figure (dB)	5.2	4.8	3.2	3.1	3.8
MANT940	IIP3 / OIP3 (dBm)	-2.0 / +18.9	-2.0 / +18.9	-2.9 / +17.3	-3.0 / +17.9	0.0 / +19.3
	Gain (dB)	20.9	20.9	20.2	20.9	19.3
	Noise Figure (dB)	3.8	3.8	3.6	3.6	3.8
	Power Inserter Loss (dB)	0.1	0.1	0.3	0.3	0.3
SS2000	IIP3 / OIP3 (dBm)	+15.5 / +26.9	+16.0 / +27.2	+17.5 / +26.8	+17.5 / +26.3	+19.0 / +26.2
	Gain (dB)	11.4	11.2	9.3	8.8	7.2
	Noise Figure (dB)	3.8	3.7	4.4	4.6	5.2
	Power Inserter Loss (dB)	0.1	0.1	0.2	0.3	0.9
TV25	IIP3 / OIP3 (dBm)	-0.5 / +25.9	+0.5 / +25.8	-1.0 / +22.1	-0.5 / +21.0	+6.0 / +22.8
	Gain (dB)	26.4	25.3	23.1	21.5	16.8
	Noise Figure (dB)	3.3	3.2	3.6	3.9	4.8
SS3000	IIP3 / OIP3 (dBm)	+19.5 / +30.7	+16.5 / +27.5	+16.5 / +25.7	+17.0 / +25.6	+18.0 / 24.9
	Gain (dB)	11.2	11.0	9.2	8.6	6.9
	Noise Figure (dB)	3.4	3.5	4.3	4.7	5.2
	Power Inserter Loss (dB)	0.3	0.4	0.4	0.6	1.2

Table 4 *Active* antenna preamplifier RF performance results (note that only 3 of the antennas have *external* "power inserters").

An acceptable (i.e., modest) set of consumer *indoor* antenna preamplifier performance factors would be a moderate *gain* of at least 13 dB (but not much more than 20 dB), a *noise figure* less than 4 dB, and an OIP3 that is at least +25 dBm.

SUMMARY AND CONCLUSION

Ten different consumer indoor television antennas were evaluated in an anechoic chamber. A summary of these test results can be found in **Table 6** that the reader can use to compare these indoor antennas.

These ten antennas represent a variety of features. Within this group of 10 antennas, there were 5 passive and 5 active units. They covered different frequency bands: four were all-band, two were high-VHF and UHF, and four were UHF only. Two of them had adjustable "rabbit ear" antennas for VHF reception, one had an adjustable gain control, and the remaining antennas were small enough to easily rotate for best UHF reception. This group of antennas can be described as having a variety of shapes and sizes for consumers to consider.

The antennas that were evaluated in this study basically represent commonly found antennas, either from retailers (stores) or from the internet, and can be divided generally into three levels of pricing:

Low cost in the $10 - $25 range

Moderate cost in the $30 - $60 range

High cost in the $70 - $100 range

The antennas can be broken down into several categories for consideration.

Active (high gain with good output return loss) versus **Passive** (low gain with poor output return loss)

Directional (Directional Isolation) versus **Non-directional** (Directional Diversity)

Polarization Isolation versus **Polarization Diversity**

The antenna parameters that are the most important depend on the particular application. For weak signal areas or for areas where the multipath is originating from fairly well-defined *different* locations, a directional antenna will be desired to adjust for maximum main signal reception while reducing multipath from different directions to reasonable levels for the VSB decoder to handle. Of course, under these conditions, it would be desirable to have all the desired DTV transmitters to be located in one general direction.

On the other hand, if the multipath is strong and generally coming from similar directions, even causing deep fades, then a non-directional antenna or one with polarization diversity *might* be a better choice. This may even be desirable in DTS situations where the distributed transmitters may be sending signals to potential receivers from greatly different direction than the main transmitter.

The planning factors that could be used for predicting indoor service with these various indoor antennas is difficult at best to determine since all the antennas vary so greatly, especially the ones that require significant adjustment (e.g., "rabbit ears"). However, by looking over the ten antennas and the information that we have presently, and breaking them down into the 5 passive and 5 active antennas, the following chart *might* serve as a very general guideline. These numbers generally represent *rough* median values of the important parameters on the *better* active antennas, and can serve as a design goal for future antenna designs.

Antenna Parameter	*Passive* Indoor Antennas		*Active* Indoor Antennas	
	High-VHF Band	UHF Band	High-VHF Band	UHF Band
Net Antenna Gain	-5 dBd	+3 dBd	+11 dBd	+14 dBd
Preamplifier Gain	NA	NA	+20 dB	+17 dB
Preamplifier Noise Figure	NA	NA	3.5 dB	4.0 dB
Preamplifier OIP3	NA	NA	+25 dBm	+25 dBm
Output Return Loss	3 dB	6 dB	10 dB	10 dB

Table 5 *General* indoor antenna service planning factors for the high-VHF and UHF bands.

RECOMMENDATIONS

While over 100 *indoor* antenna models have been identified as being on the market in 2007, there is yet very little publicized information to the general public about indoor (or outdoor, for that matter) antennas. Also, when specs are published, it often a single value that represents some average across the band that is being specified. Some of the better passive and active antennas could also have improved performance in the *future* with some *redesign* (e.g., Silver Sensor with added VHF "rabbit ears", external robust preamplifiers matched to each antenna or a Sharp Shooter with separate diplexed preamplifiers with better matching to the antenna).

This lack of specific information goes hand in hand with the lack of *public education* about the existence of free, over-the-air (terrestrial) DTV in general, or the upcoming end of the transition and cessation of analog television in February 2009. Broadcasters can help themselves enormously if they educate themselves regarding not only DTV transmission, but also specific *components* that can provide optimal DTV reception for their viewers. This can include promoting good outdoor and indoor antennas, preamplifiers, downlead coaxial cable, and even some DTV receivers with good VSB decoder RF performances (and properly working PSIP interpreters for closed captioning and program guides).

Additionally, general over-the-air reception principles and specific reception components can also be included in educational material for consumers, which can then be disseminated to the public via broadcast programs (on both analog and digital channels as well as on broadcaster websites.

ACKNOWLEDGEMENTS

MSW wishes to thank ERI for the use of their calibrated anechoic chamber and test equipment during the three-day testing period. MSW also thanks ERI for the support provided by their engineering staff, particularly that from Ron Lile, Myron Fanton, and Dave Kramp. Their contributions were invaluable to completing this project in an accurate and timely manner.

Antenna Model # (Active/Passive)	**High-VHF Performance**					**UHF Performance**				
	Net Gain [4] Min (dBd) Max (dBd)	Azimuth Elevation Description	Return Loss Description	Azimuth (H-Pol/V-Pol) Elevation (H-Pol/V-Pol) Polarization Isolation [1]	Preamp Gain (dB) Noise Figure (dB) OIP3 (dBm)	Net Gain [4] Min (dBd) Max (dBd)	Azimuth Elevation Description	Return Loss Description Max Value	Azimuth (H-Pol/V-Pol) Elevation (H-Pol/V-Pol) Polarization Isolation [1]	Preamp Gain (dB) Noise Figure (dB) IIP3 / OIP3 (dBm)
ANT115 Passive	-5.2 -1.1	Pseudo -Omni Pseudo -Omni	Poor -3 dB max	Very Poor [2] Average	N/A N/A N/A	-6.2 +1.7	Pseudo -Omni Pseudo -Omni	Poor -5 dB max	Very Poor [2] Very Poor [2]	N/A N/A N/A
ANT585 Active	+13.4 +18.7	Pseudo-Dipole Pseudo-Dipole	Good -12 dB max	Very Poor [2] Very Poor [2]	20.3 – 20.5 4.8 – 5.2 17.3 – 19.0	+11.7 +21.0	Pseudo -Omni Pseudo -Omni	Average -9 dB max	Very Poor [2] Very Poor [2]	23 – 21.5 3.1 – 3.8 12.3 – 18.5
Silver Sensor Passive	-25.0 -12.5	Pseudo -Omni Pseudo -Omni	Poor -3 dB max	Very Poor [2] Very Poor [2]	N/A N/A N/A	+2.4 +5.4	Directional Directional	Poor -5 dB max	Very Good Very Good	N/A N/A N/A
MANT940 [3] Active	+7.2 +15.3	Pseudo -Omni Pseudo-Dipole	Good -12 dB max	Very Poor [2, 3] Very Poor [2, 3]	20.9 – 20.9 3.8 – 3.8 18.9 – 18.9	+15.8 +20.5	Pseudo -Dipole Pseudo -Omni	Average -8 dB max	Very Poor [2, 3] Very Poor [2, 3]	19.3 – 20.9 3.6 – 3.8 17.3 – 19.3
SS1000 Passive	-20.4 -19.5	Not tested Not tested	Poor -6 dB max	Not tested (see SS2000) Not tested (see SS2000)	N/A N/A N/A	+0.5 +6.9	Directional Directional	Poor -4 dB max	Very Good Very Good	N/A N/A N/A
SS2000 Active	-10.5 -9.4	Pseudo -Dipole Pseudo -Omni	Good -12 dB max	Very Poor [2] Very Poor [2]	11.2 – 11.4 3.7 – 3.8 26.9 – 27.2	+12.3 +15.8	Directional Directional	Average -9 dB max	Very Good Very Good	7.2 – 9.3 4.4 – 5.2 26.2 – 26.8
TV25 Active	+21.9 +24.3	Dipole Omni	Good -12 dB max	Very Good Very Good	25.3 – 26.4 3.2 – 3.4 25.8 – 25.9	+12.4 +17.9	Pseudo-Omni Pseudo -Omni	Average -7 dB max	Good Very Poor [2]	16.8 – 23.1 3.6 – 4.8 21.0 – 22.8
DB2 Passive	-14.1 -11.8	Pseudo-Dipole Dipole	Poor -2 dB max	Average Good	N/A N/A N/A	+5.6 +9.5	Directional Directional	Average -8 dB max	Very Good Very Good	N/A N/A N/A
SS-3000 Active	-3.8 +1.5	Directional Directional	Very Good -16 dB max	Very Good Very Good	11.0 – 12.2 3.4 – 3.5 25.8 – 31.7	+11.2 +15.4	Directional Directional	Very Good -15 dB max	Very Good Very Good	6.9 – 9.2 4.3 – 5.2 24.9 – 25.8
303F Passive	-18.9 -18.2	Pseudo -Omni Pseudo-Dipole	Poor -2 dB max	Very Poor [2] Average)	N/A N/A N/A	-2.7 +5.6	Pseudo -Omni Pseudo-Omni	Poor -4 dB max	Average Very Good	N/A N/A N/A

Table 6 Summary of indoor consumer antenna test results

(1) Azimuth & elevation polarization isolation is referenced to the maximum level(s) of the horizontally-polarized antenna pattern at the corresponding azimuth or elevation angle.

(2) Vertical polarization signal has greater antenna gain than horizontal polarization at the angle where maximum azimuth gain occurs, and by definition is a very poor isolation.

(3) MANT940 was tested physically mounted as shown in their picture (vertically) even though it was observed to be vertically polarized in this position. Horizontal mounting results were much better in terms of polarization isolation (Very Good polarization isolation for both High-VHF & UHF bands).

(4) Net gain for high-VHF is determined from measurements on CH 7 & 12; Net gain for UHF is determined from measurements on CH 14, 18, 33, 51, & 65.

APPENDIX A Azimuth and Elevation Antenna Patterns

The following plots contain the *azimuth* and *elevation* patterns for the ten indoor antennas tested in an anechoic chamber. Pattern testing was performed at 5 different channel frequencies: CH 7 (177 MHz), CH 12 (207 MHz), CH 18 (497 MHz), CH 33 (587 MHz), and CH 65 (779 MHz).

Both the *azimuth* pattern and the *elevation* pattern were measured and recorded for these ten antennas. All plots are in rectangular format, each one plotted from -180 degrees to +180 degrees. Zero degrees is defined as the antenna pointed straight into the on-coming electromagnetic wave with the antenna placed in its expected *horizontally*-polarized receive position. Each of the azimuth and elevation plots has two curves: *co*-polarization (horizontally-polarized electromagnetic source) and *cross*-polarization (vertically-polarized electromagnetic source).

Table 6 contains summary comments on these pattern plots.

Figure A-1 RCA ANT115 Passive Antenna VHF Plots

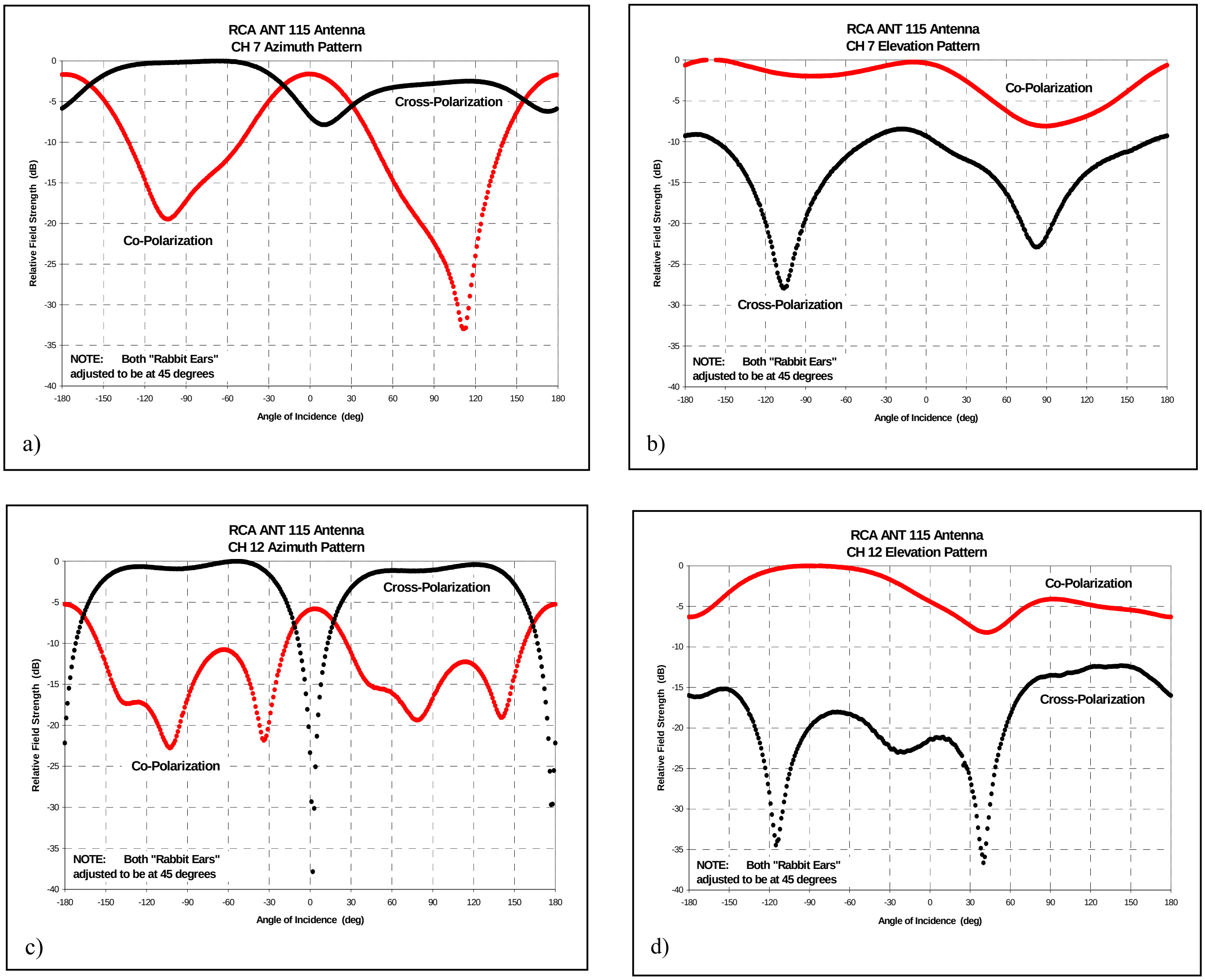


Figure A-2 RCA ANT115 Passive Antenna UHF Plots

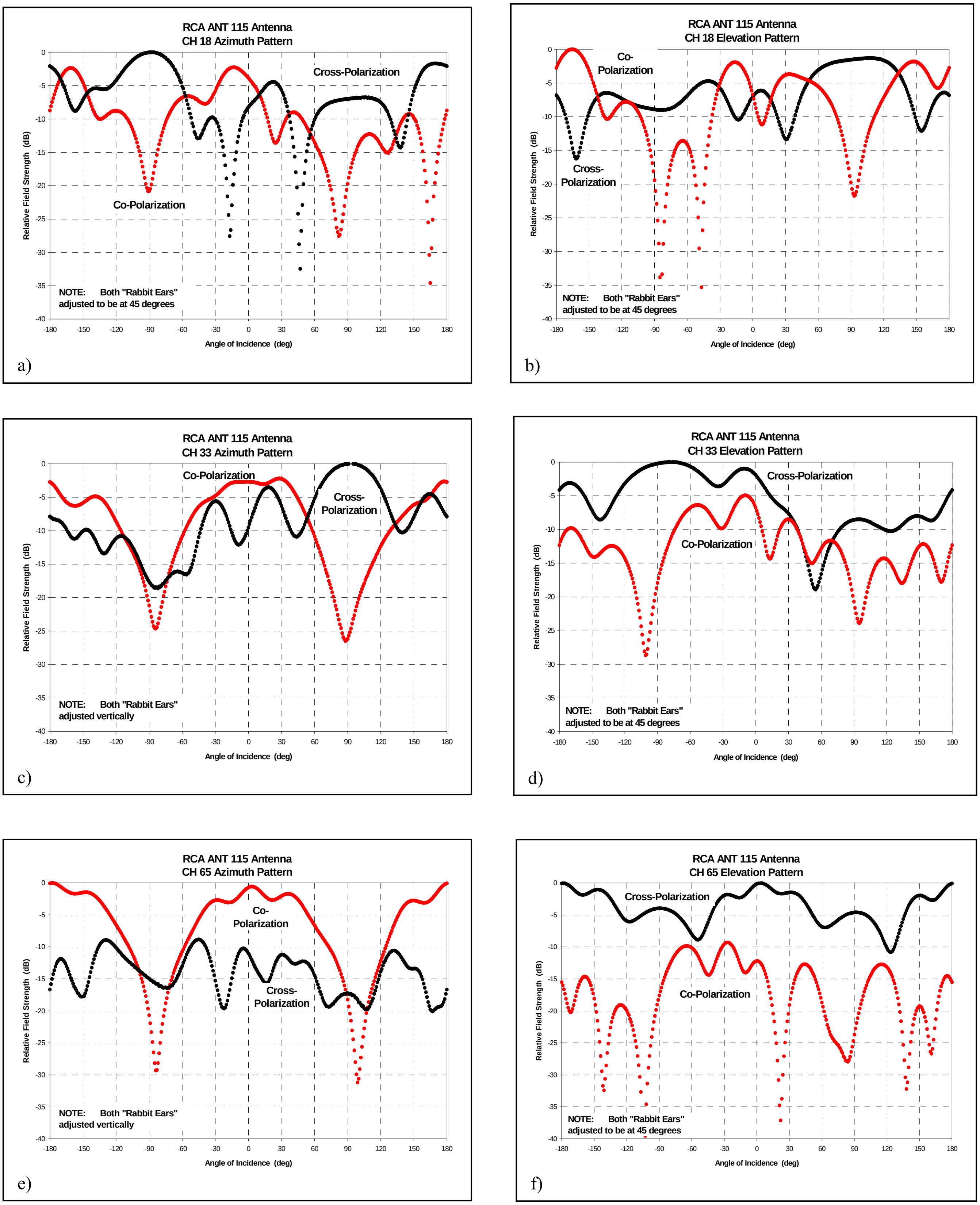


Figure A-2 RCA ANT585 Active Antenna VHF Plots

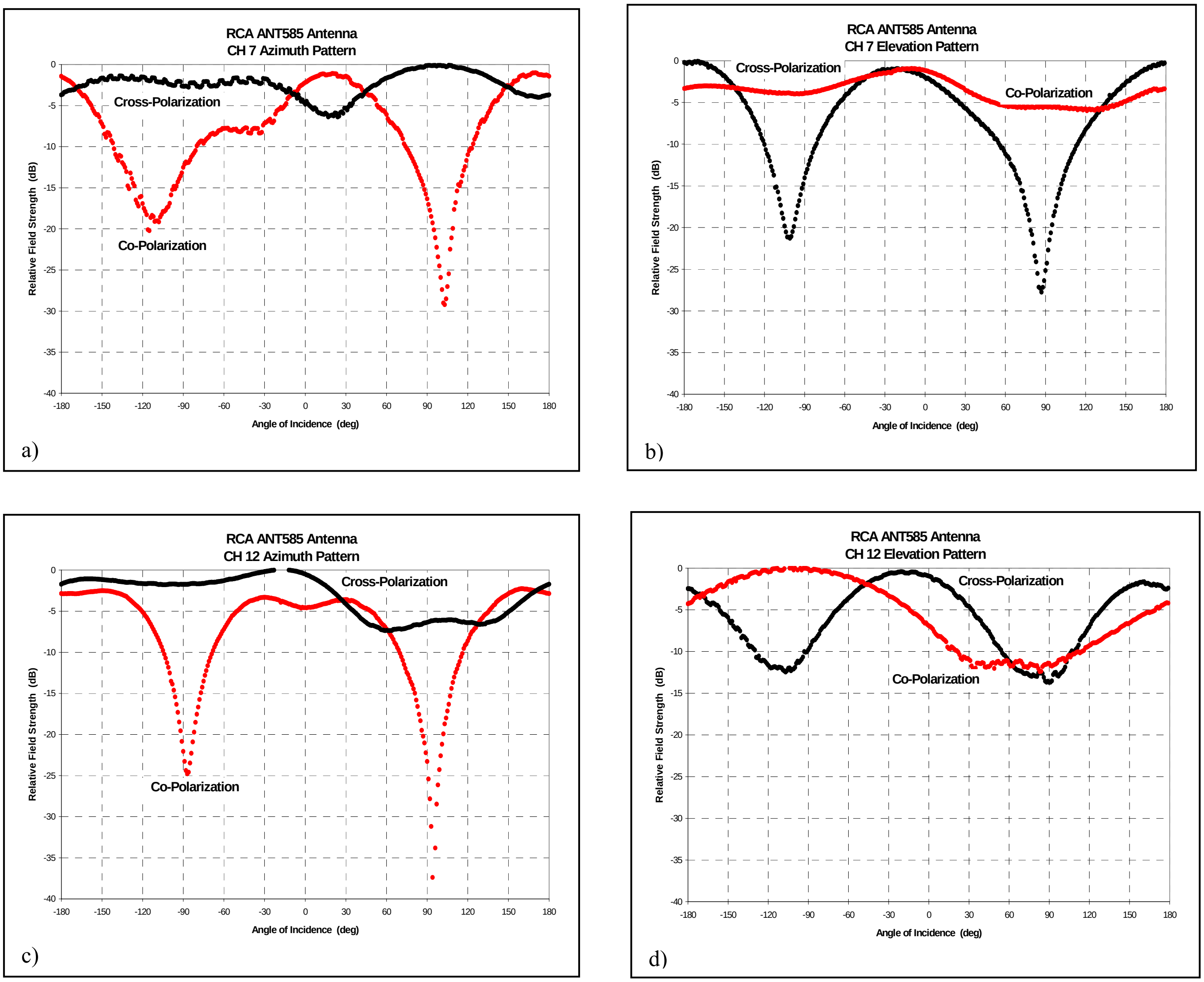


Figure A-4 RCA ANT585 Active Antenna UHF Plots

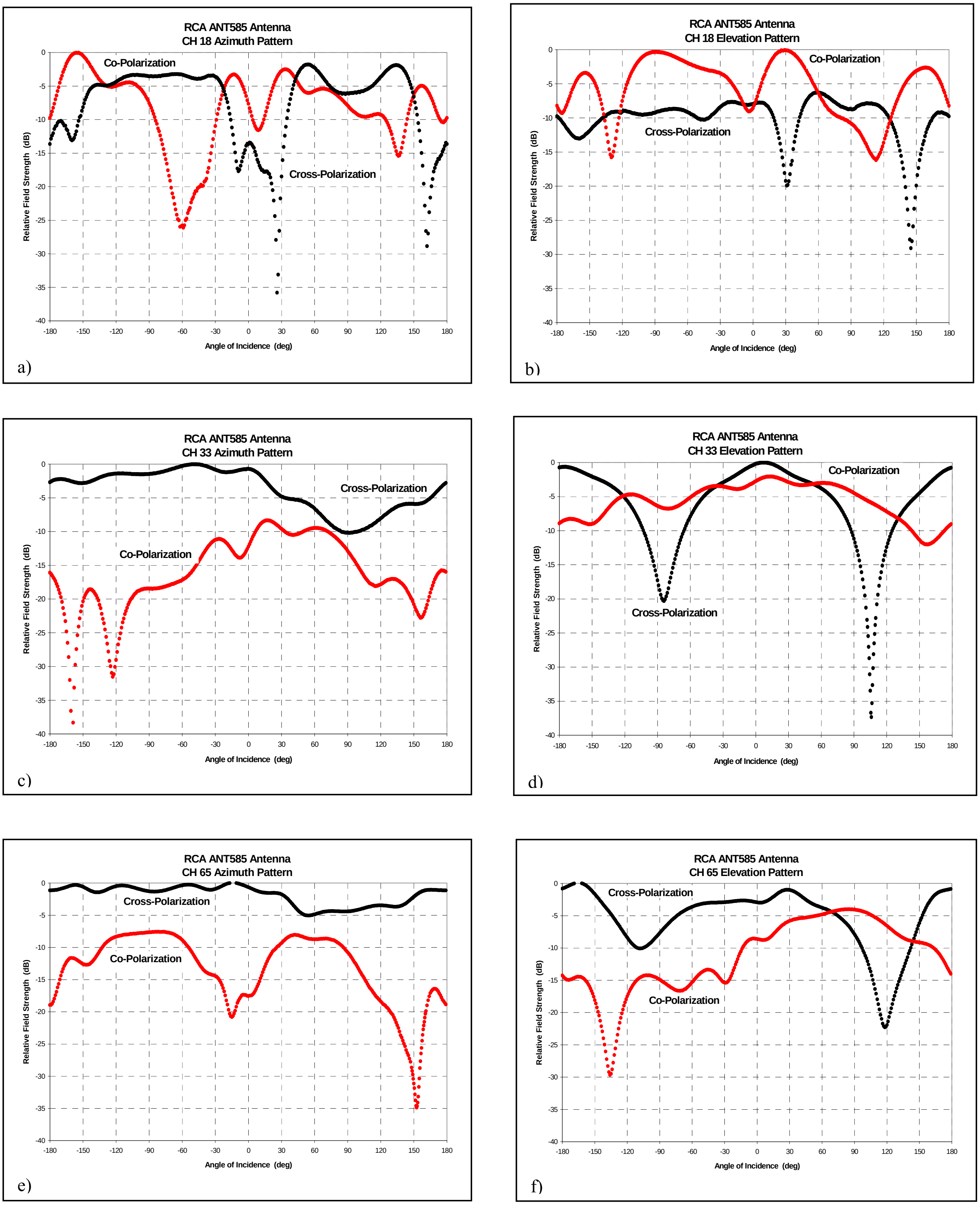


Figure A-5 Philips Silver Sensor Passive Antenna VHF Plots

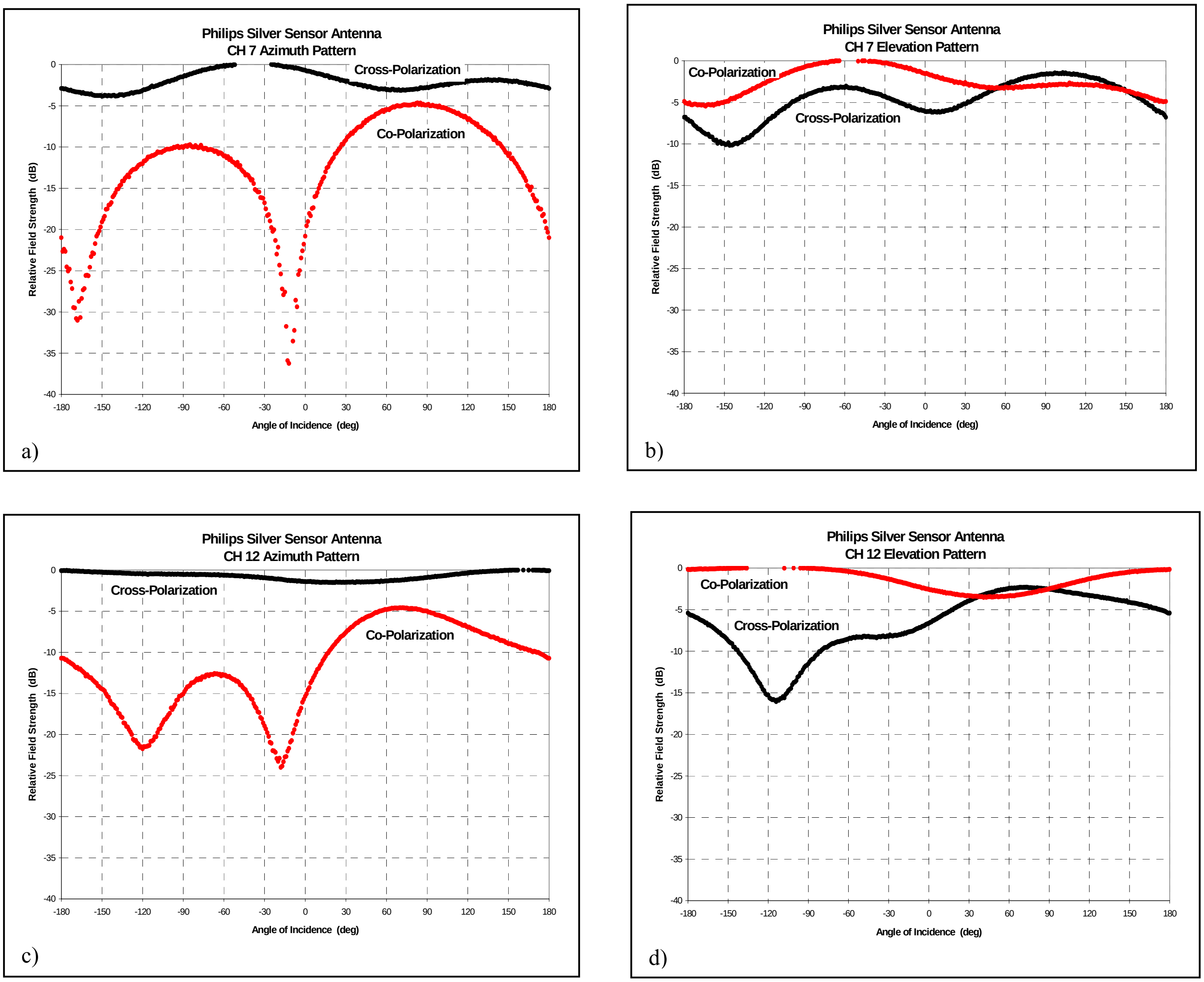


Figure A-6 Philips Silver Sensor Passive Antenna UHF Plots

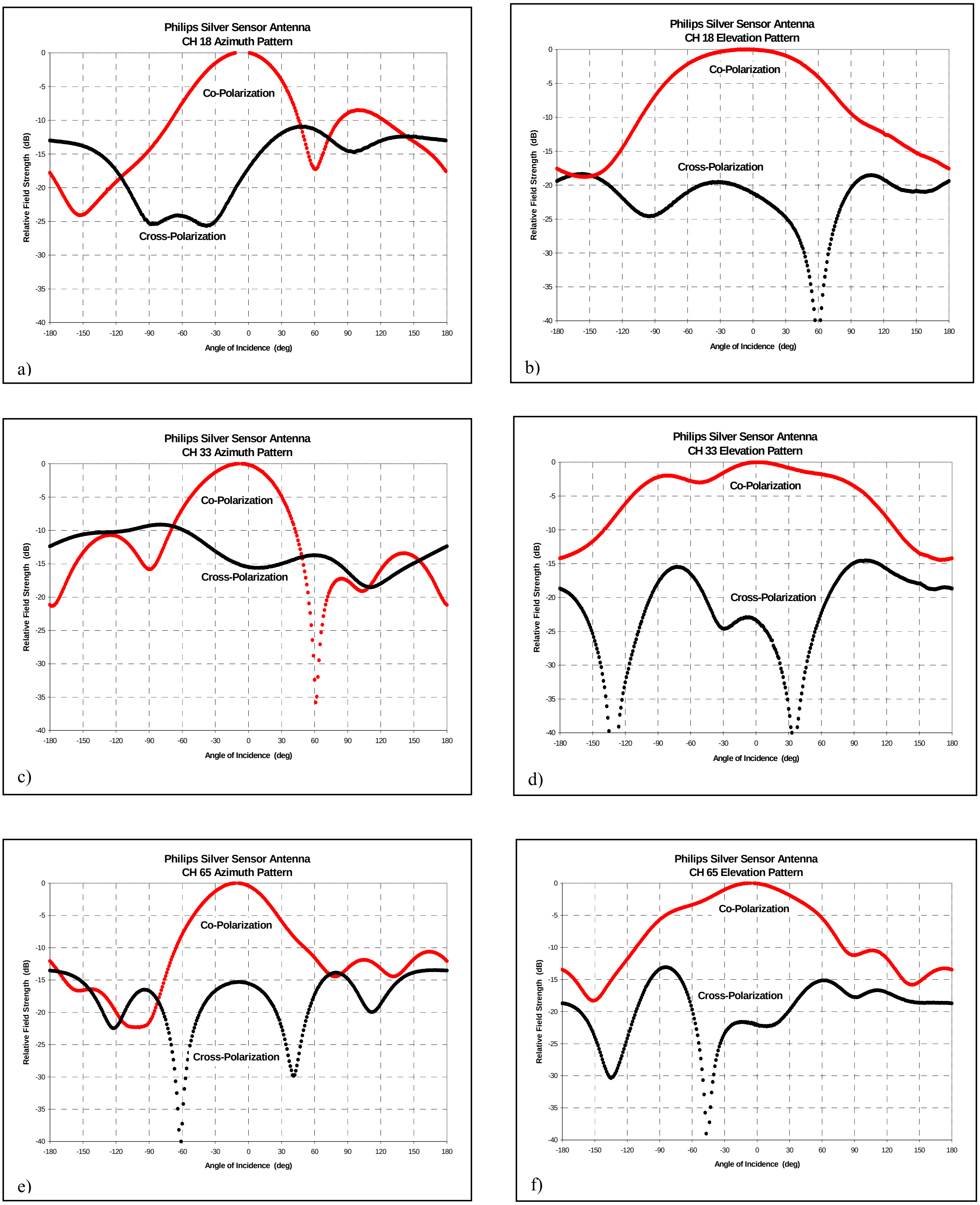


Figure A-7 Philips MANT940 Active Antenna VHF Plots

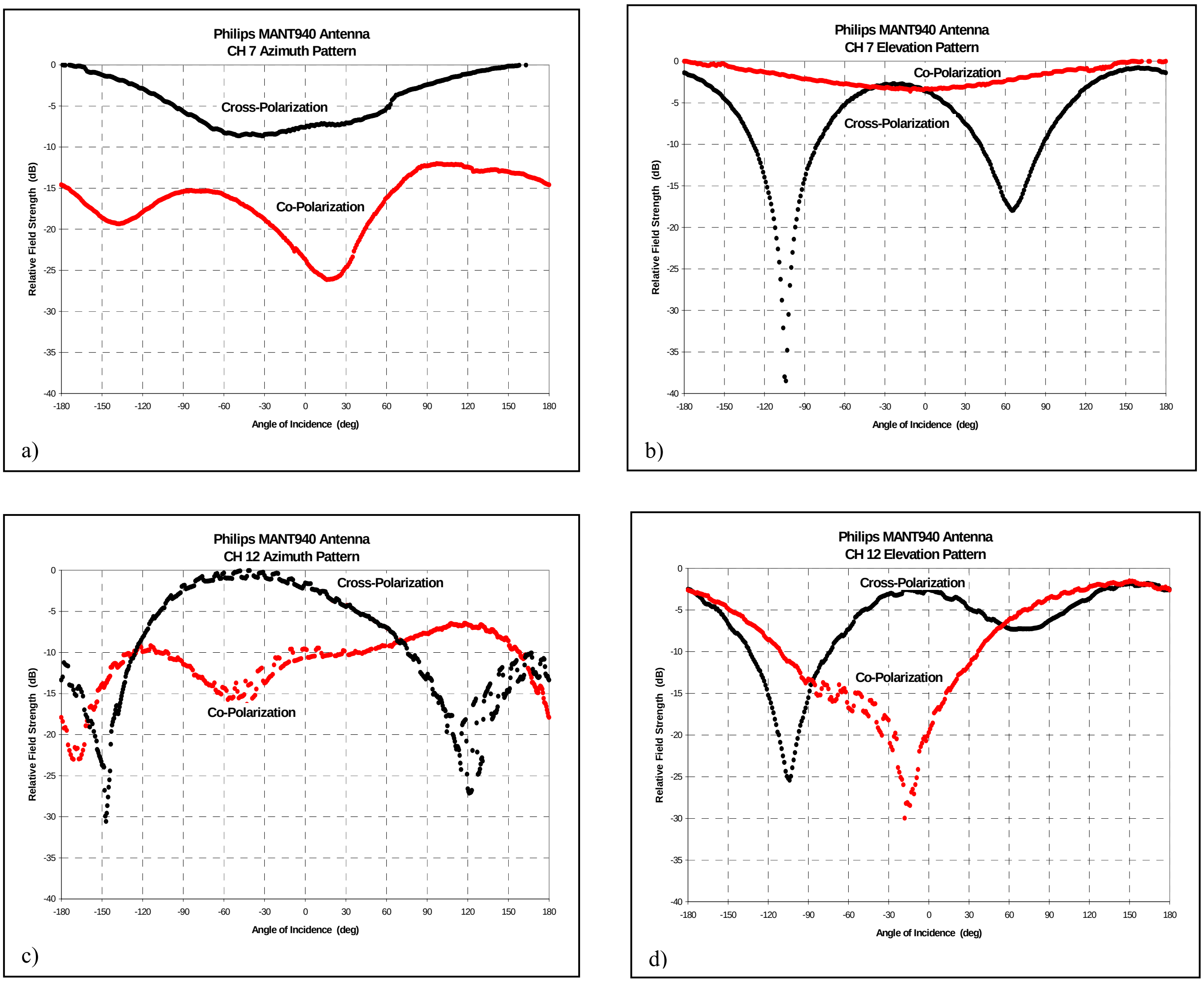


Figure A-8 Philips MANT940 Active Antenna UHF Plots

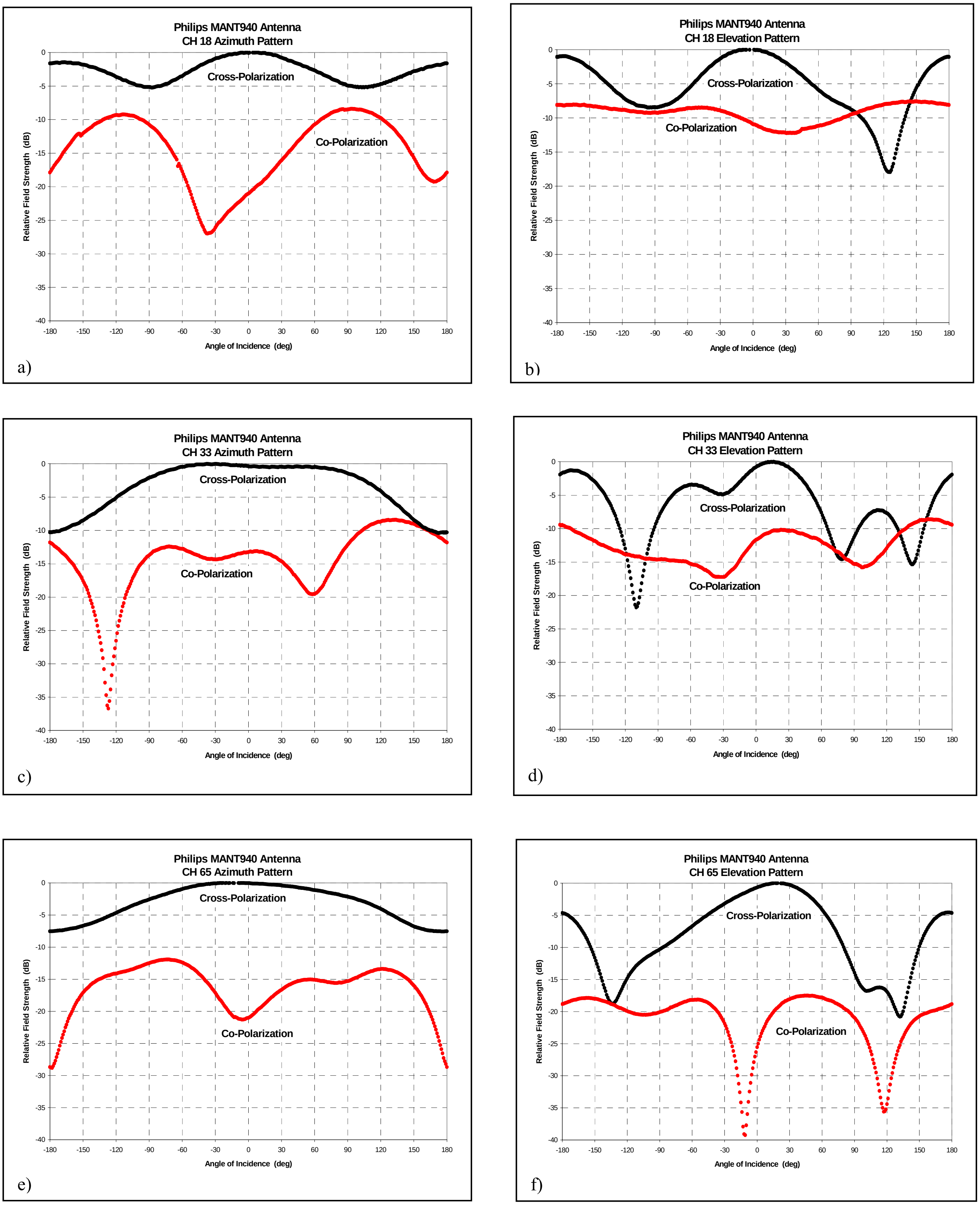


Figure A-9 Winegard SS1000 Passive Antenna VHF Plots

a) Not Measured – See SS2000 High-VHF Plots

b) Not Measured – See SS2000 High-VHF Plots

c) Not Measured – See SS2000 High-VHF Plots

d) Not Measured – See SS2000 High-VHF Plots

Figure A-10 Winegard SS1000 Passive Antenna UHF Plots

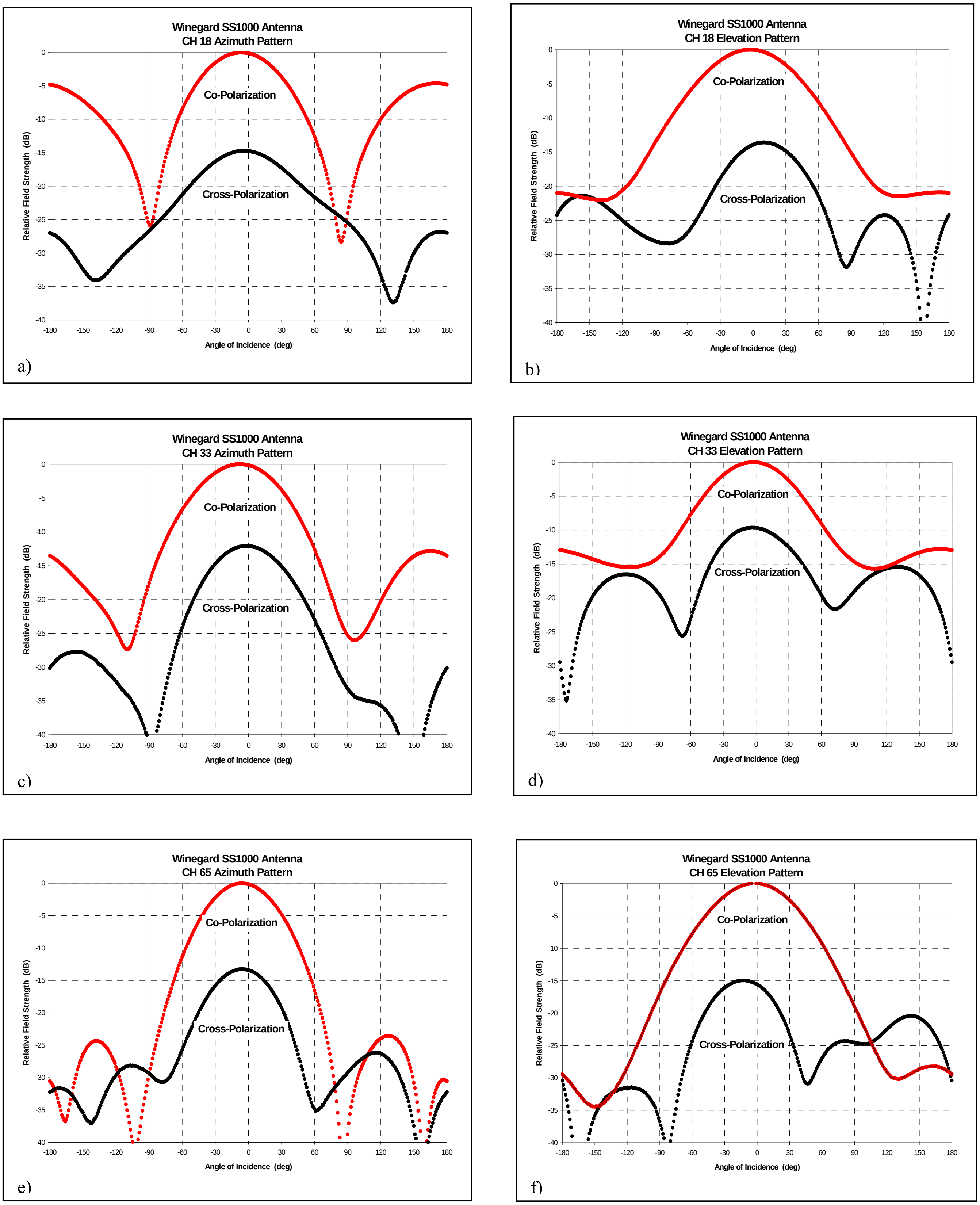


Figure A-11 Winegard SS2000 Active Antenna VHF Plots

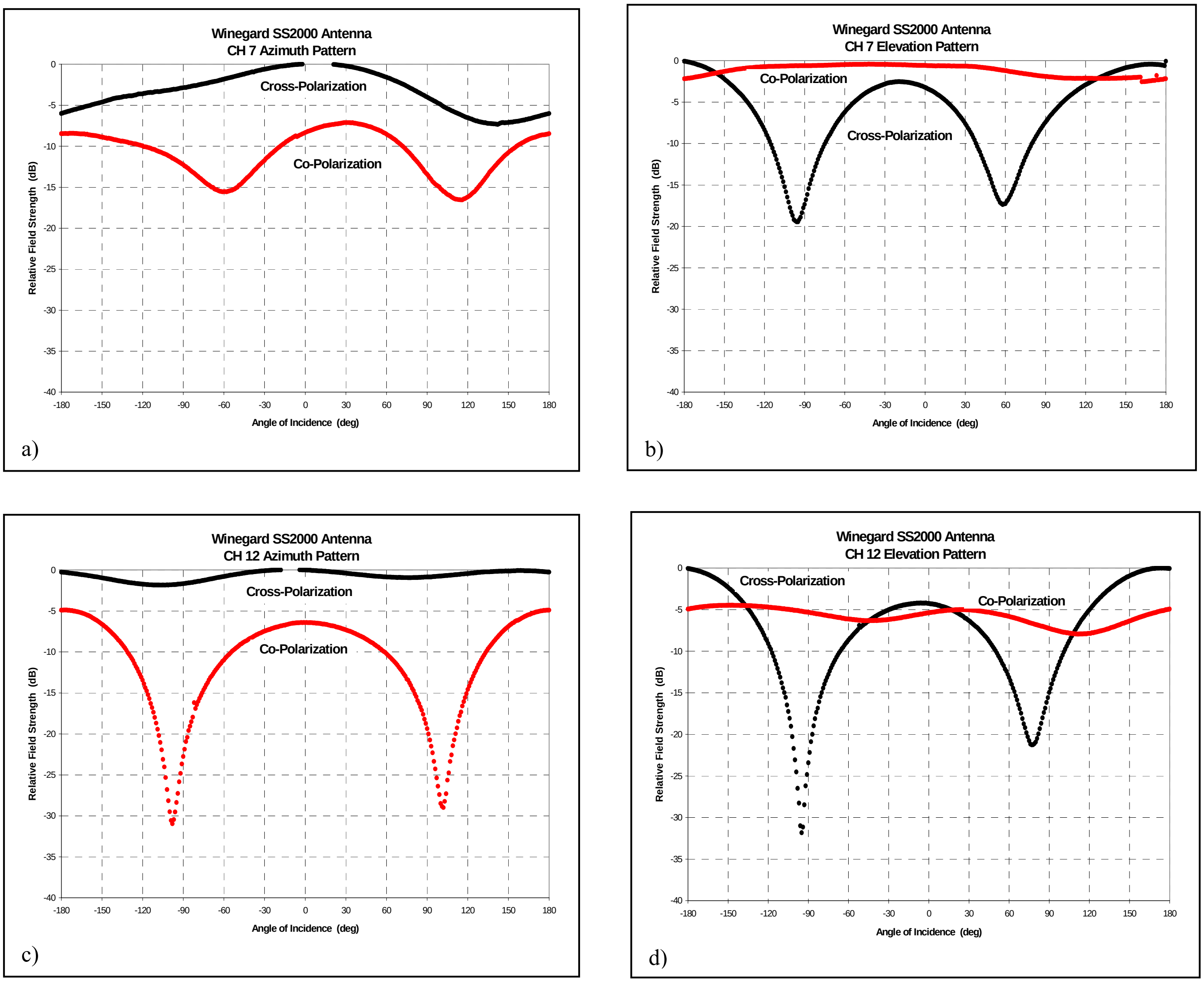
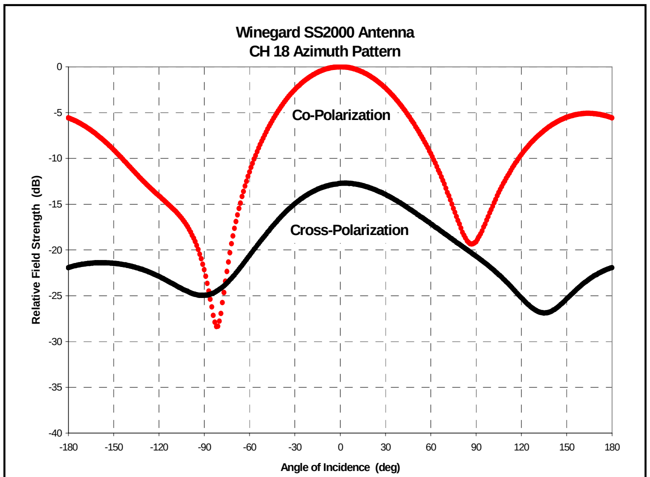
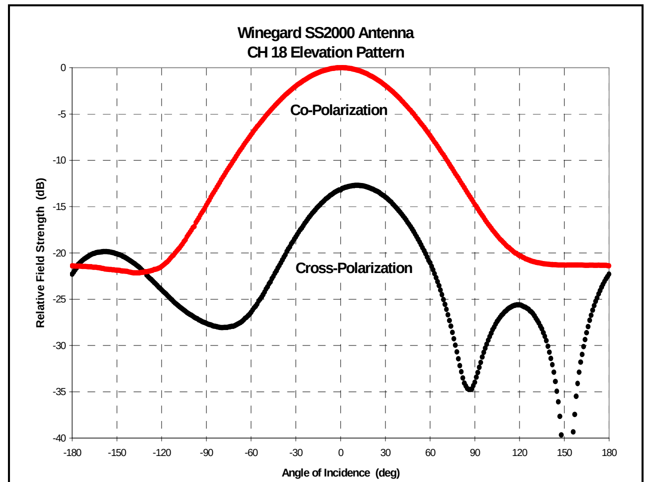


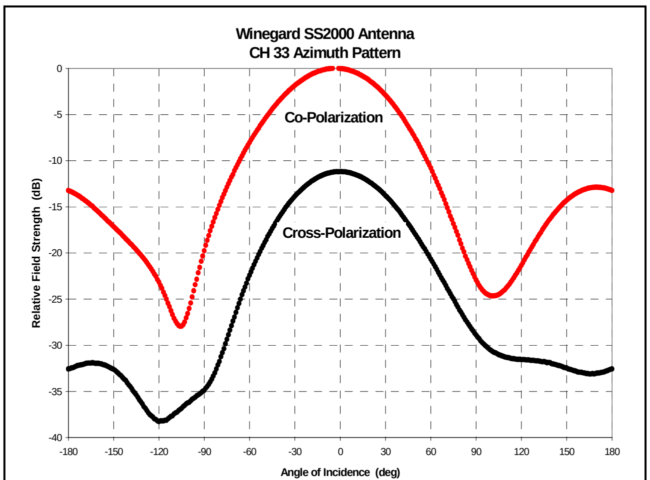
Figure A-12 Winegard SS2000 Active Antenna UHF Plots



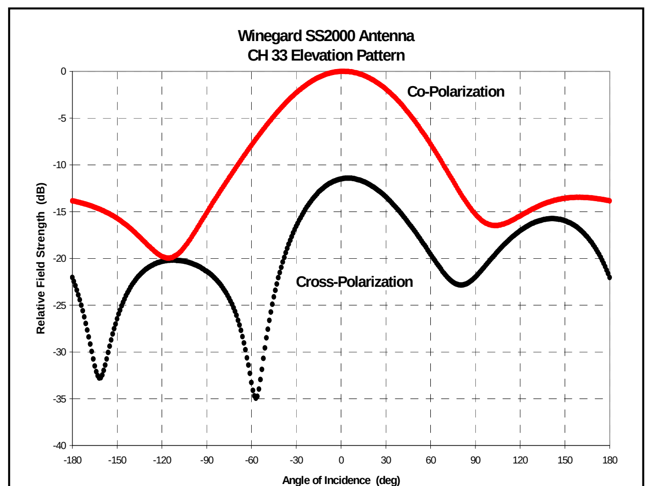
a)



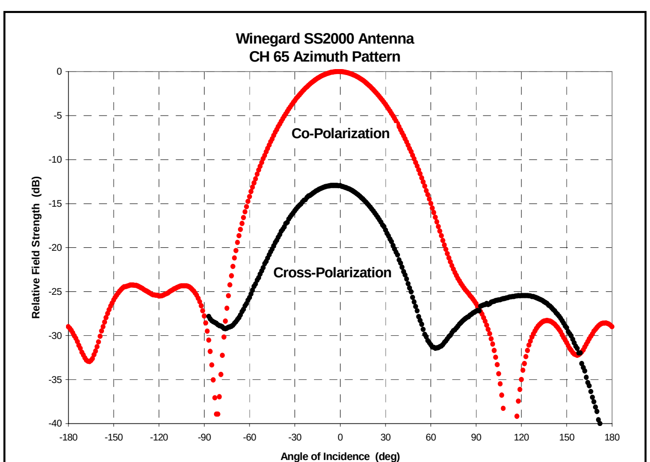
b)



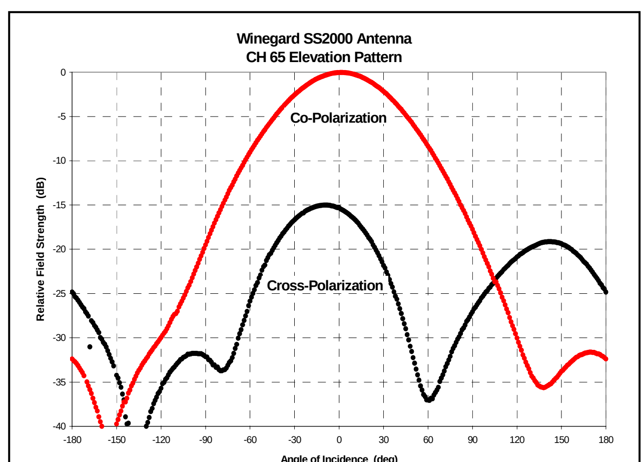
c)



d)



e)



f)

Figure A-13 Terk TV25 Active Antenna VHF Plots

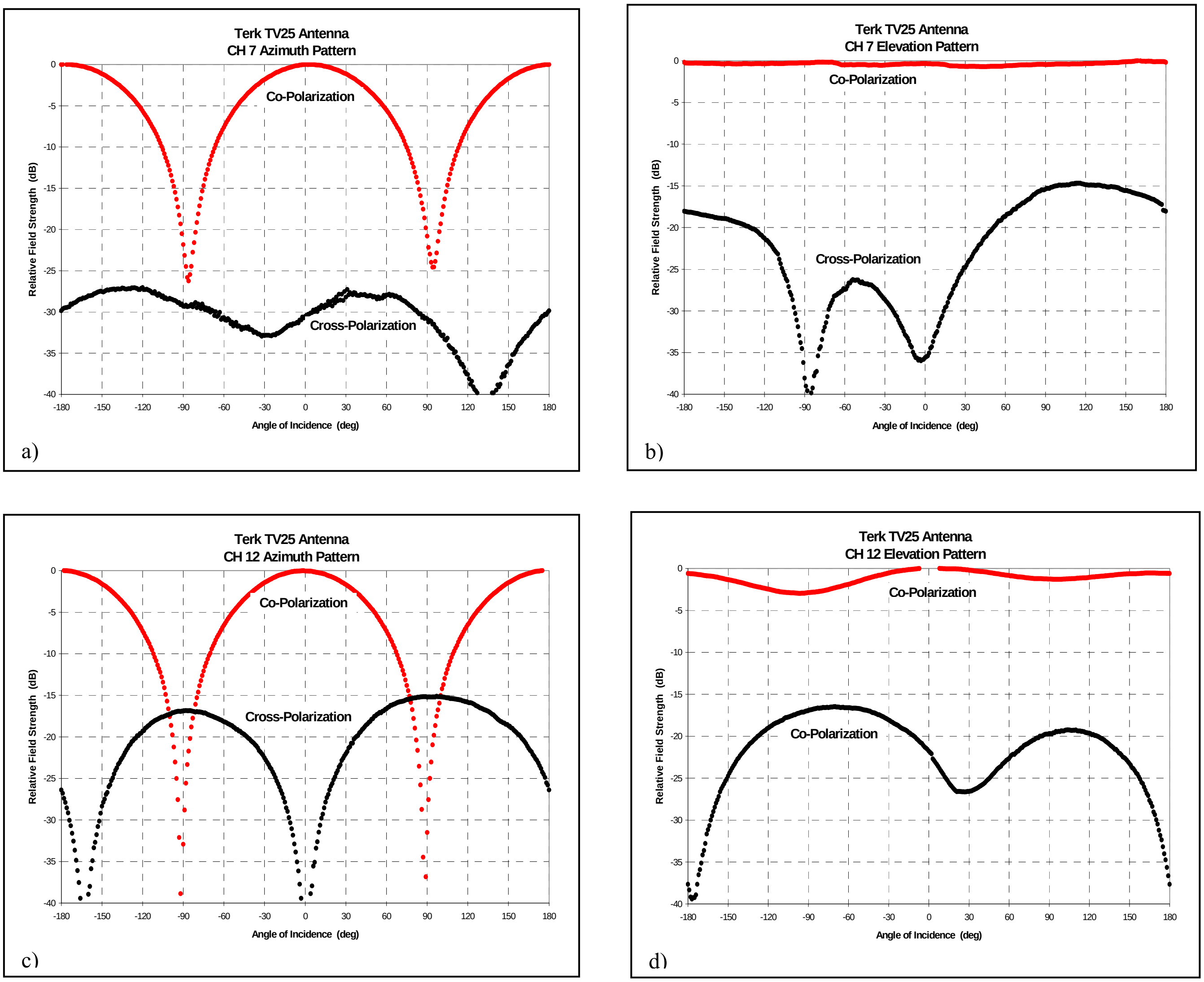


Figure A-14 Terk TV25 Active Antenna UHF Plots

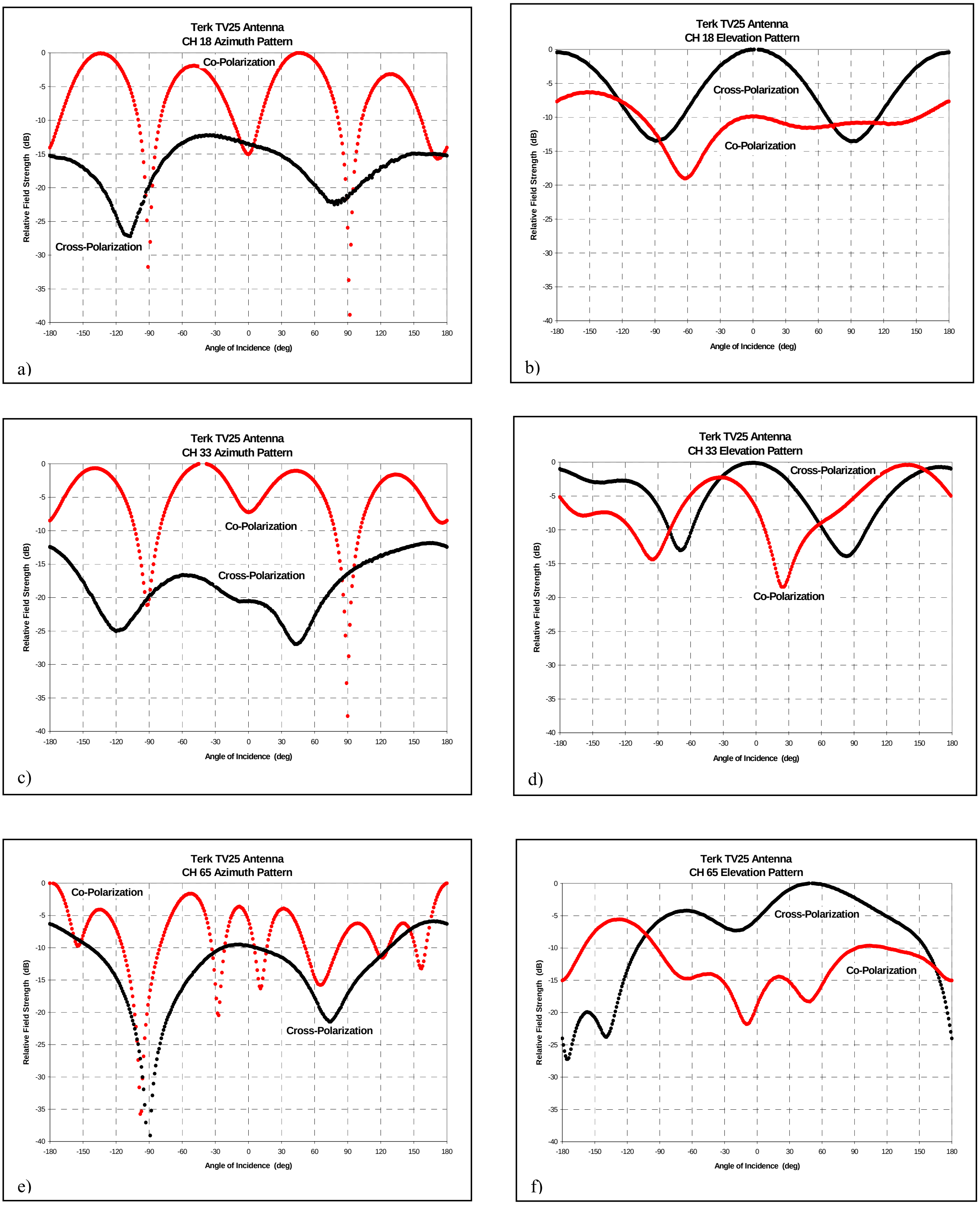


Figure A-15 Antennas Direct DB2 Passive Antenna VHF Plots

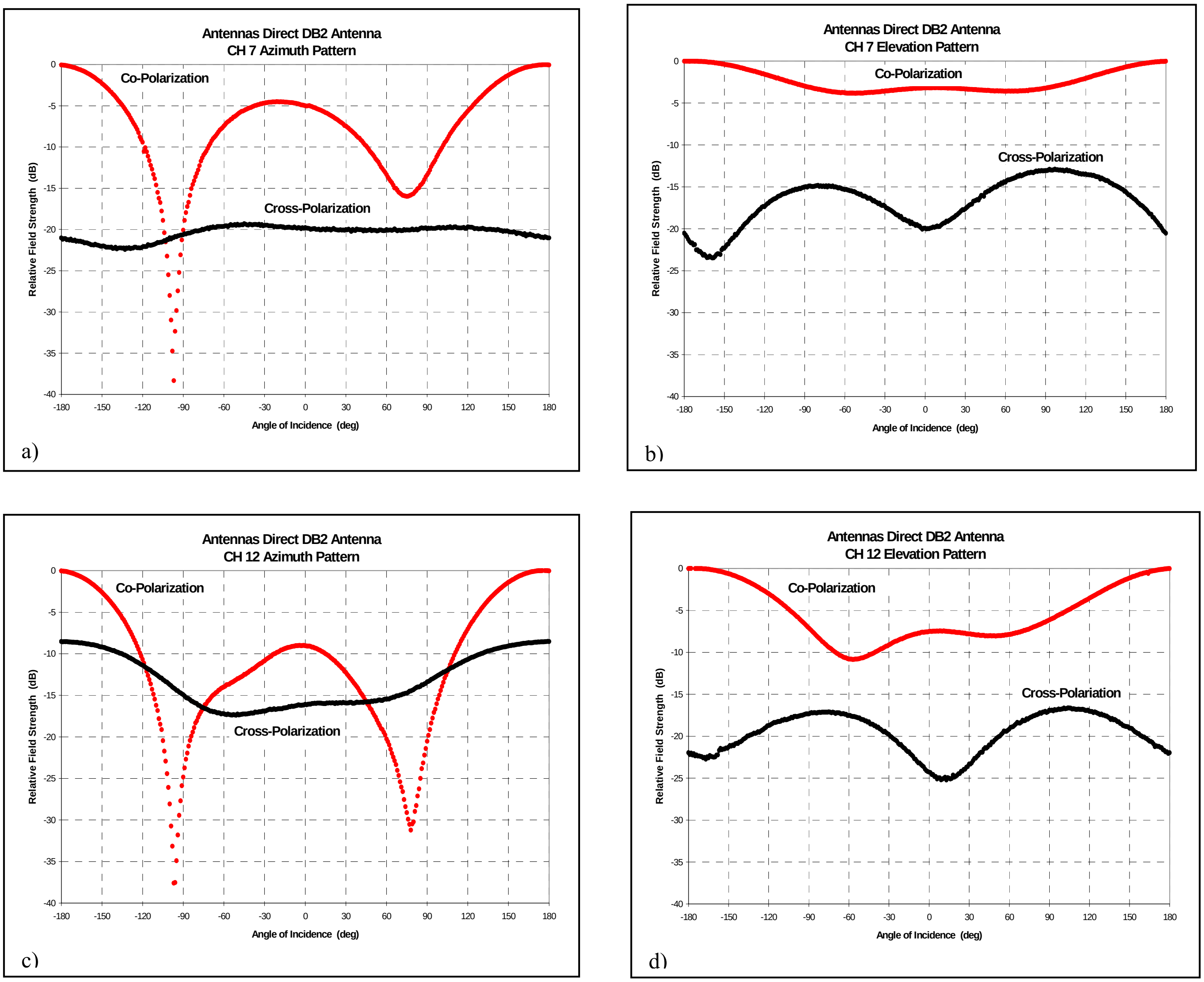


Figure A-16 Antennas Direct DB2 Passive Antenna UHF Plots

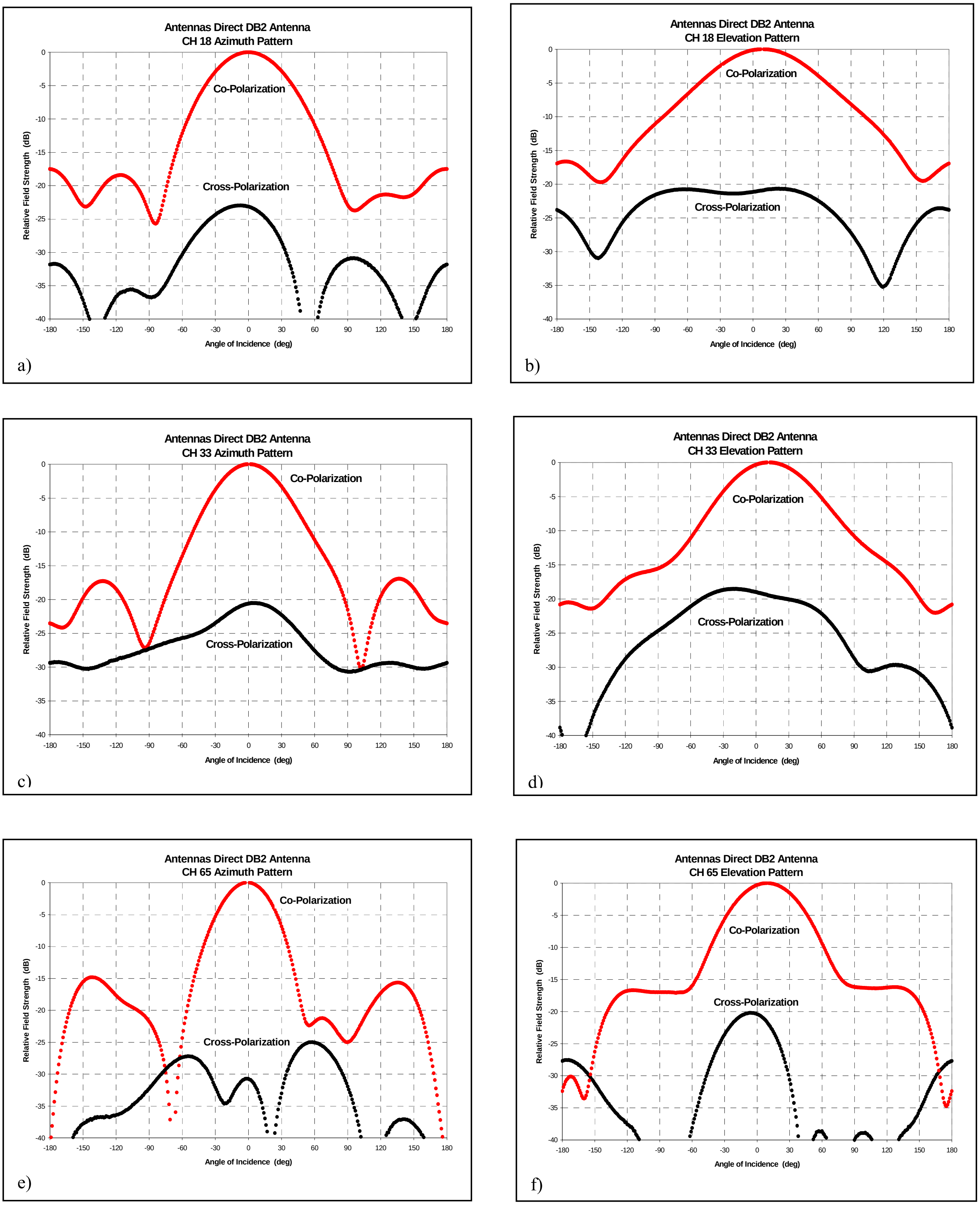


Figure A-17 Winegard SS3000 Sharpshooter Active Antenna VHF Plots

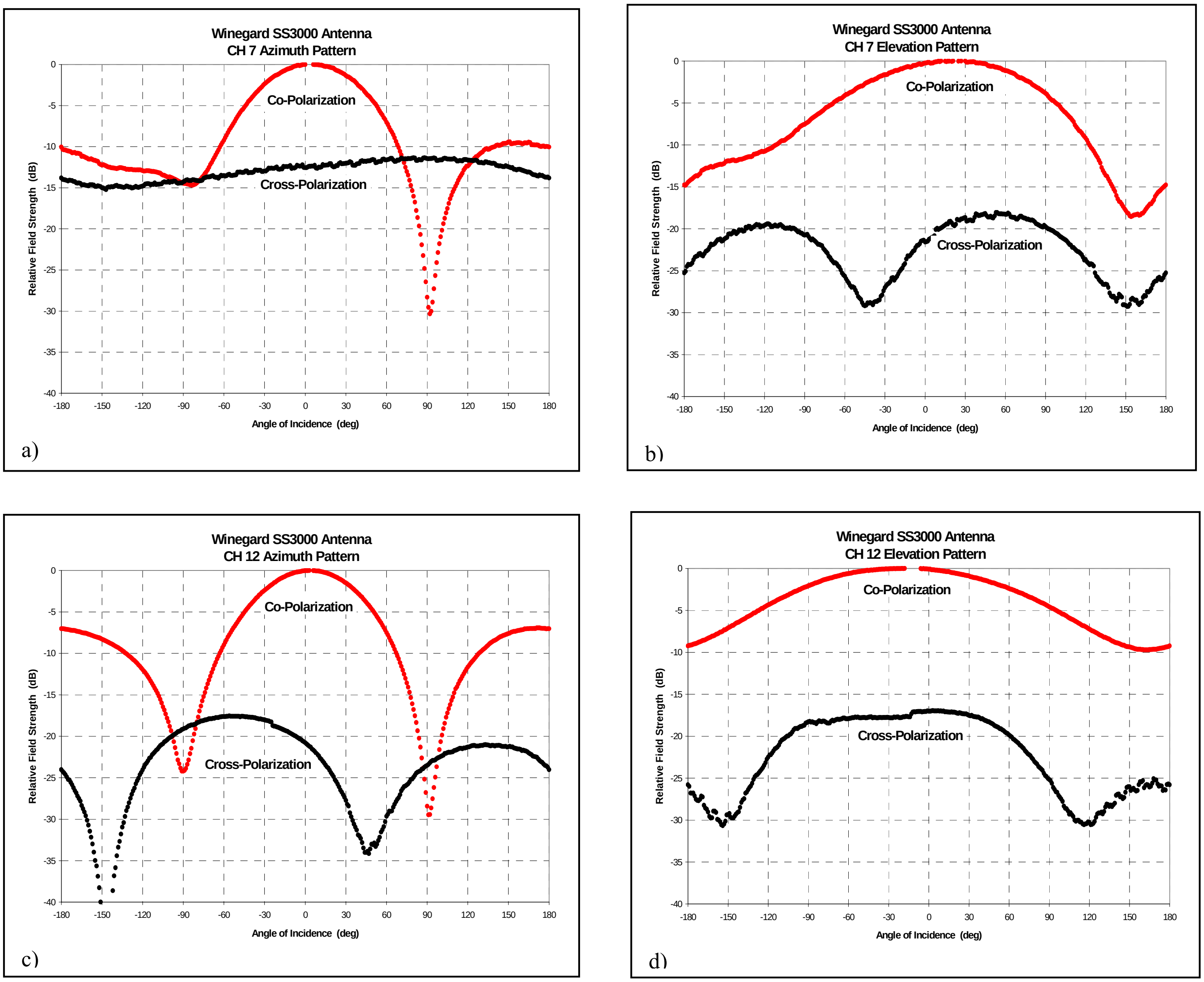


Figure A-18 Winegard SS3000 Sharpshooter Active Antenna UHF Plots

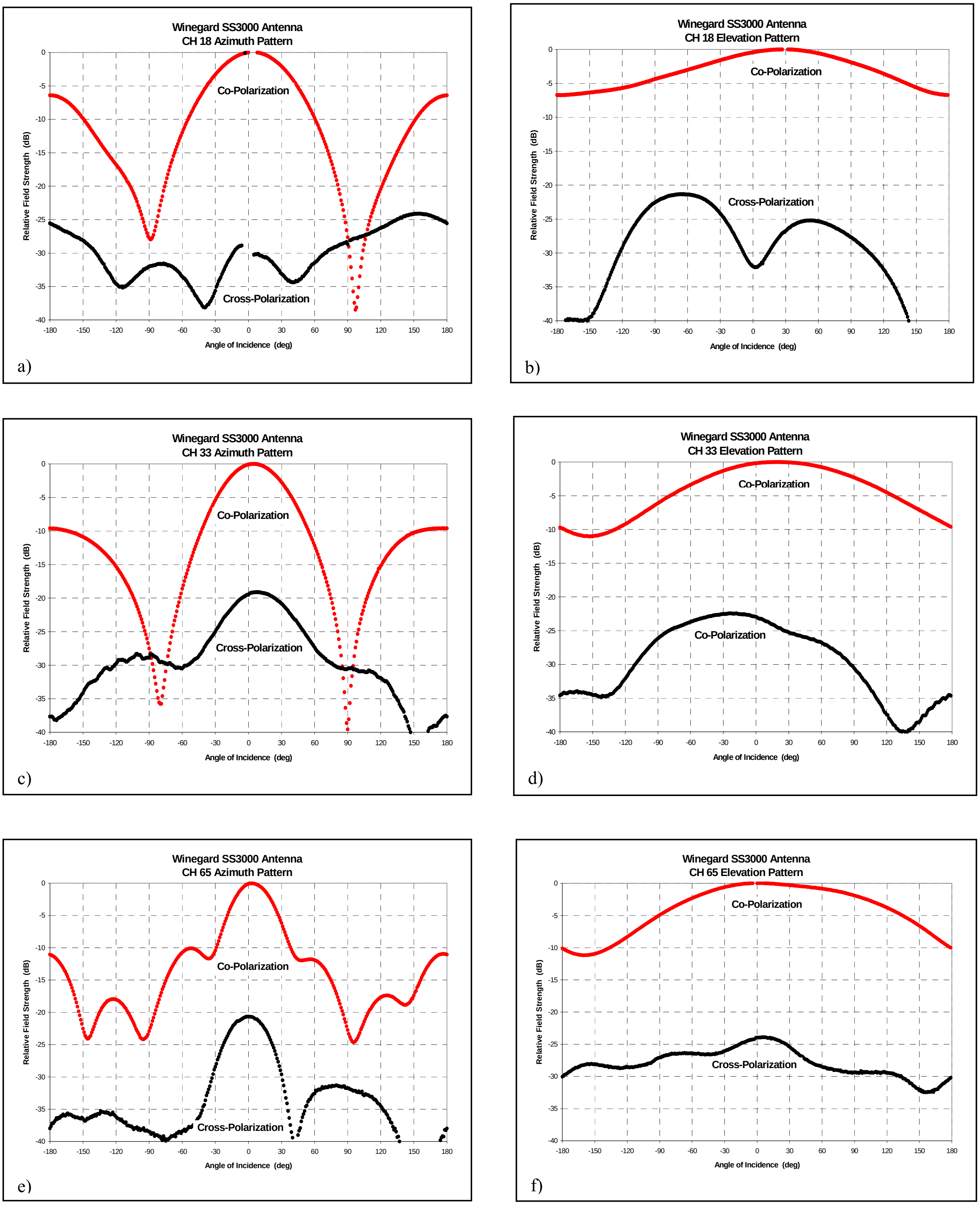


Figure A-19 Terrestrial Digital 303F Passive Antenna VHF Plots

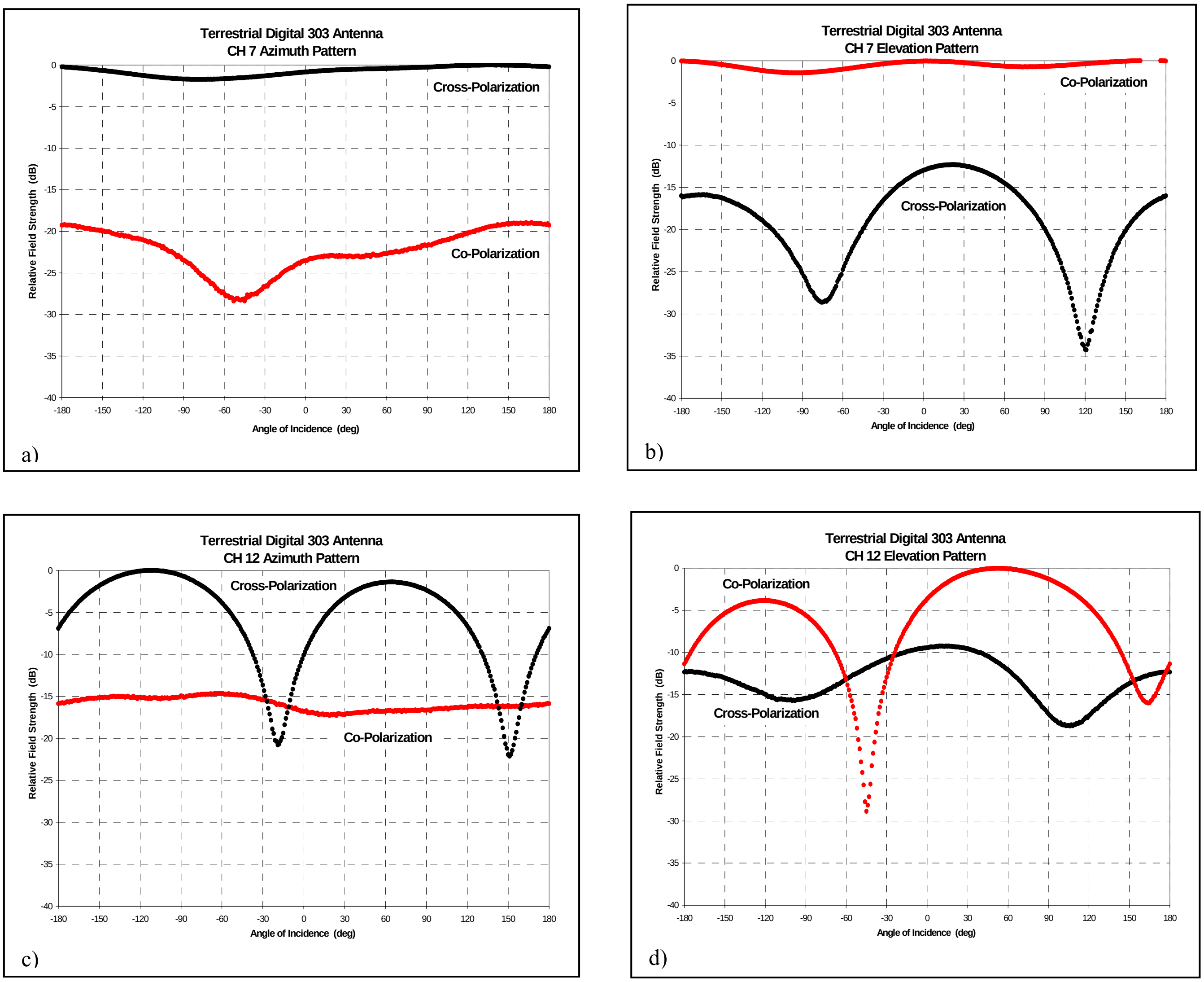
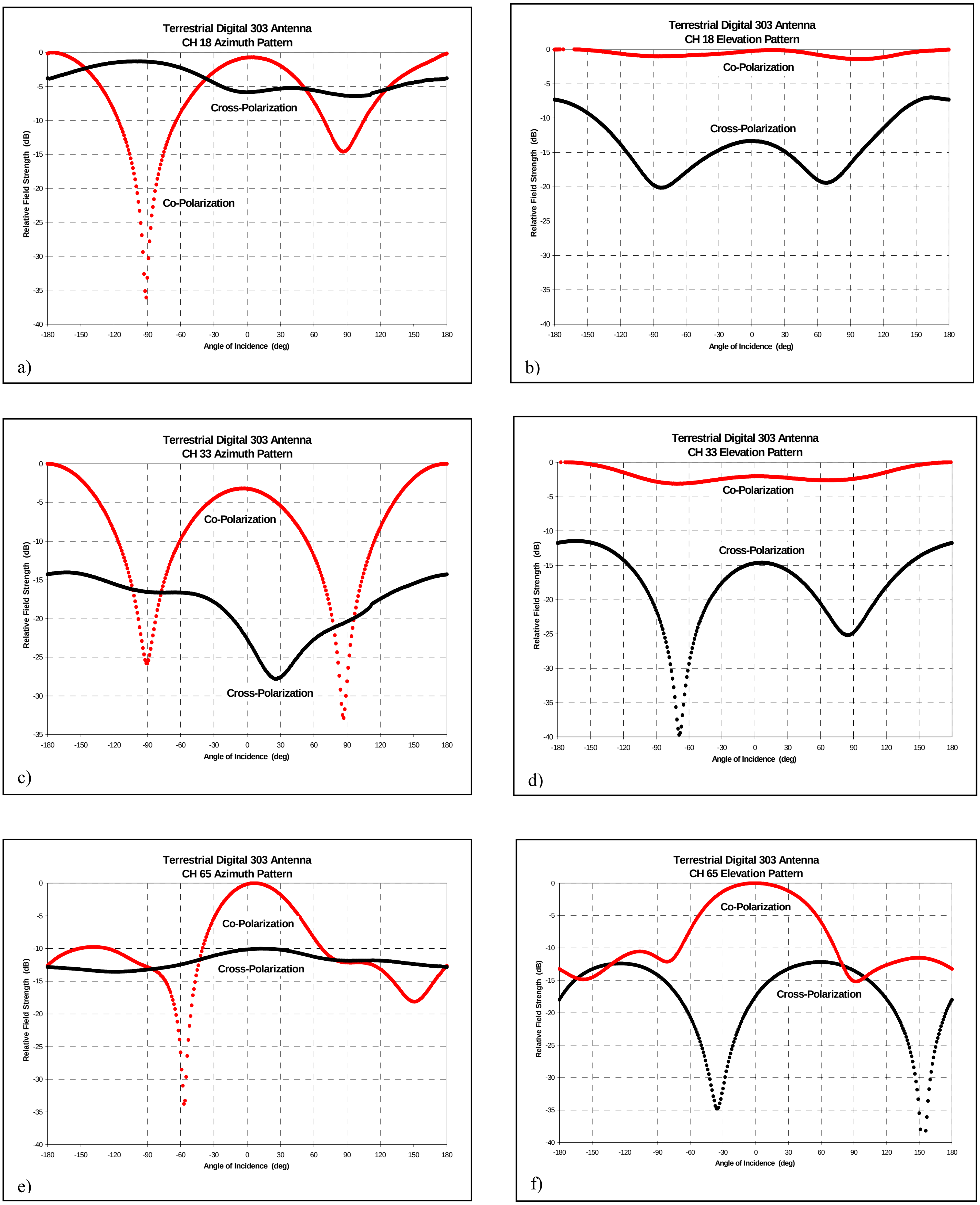


Figure A-20 Terrestrial Digital 303F Passive Antenna UHF Plots



APPENDIX B VHF Dipole Effects on UHF Reception

An interesting peripheral test was performed on the **RCA ANT115** antenna on CH 18. The VHF dipole antennas on this particular antenna can be not only adjusted in length and rotated in angle, but they can also be removed completely. While all the previous tests that involved adjustable VHF dipoles were performed with the VHF "rabbit ears" (dipoles) set at a 45-degree angle, a couple of special tests were also performed with *both* dipoles positioned horizontally and with *both* dipoles positioned vertically. Compare the *co*-polarization pattern to the *cross*-polarization pattern to determine the amount of polarization isolation.

The following plots illustrate the antenna patterns for these special test cases.

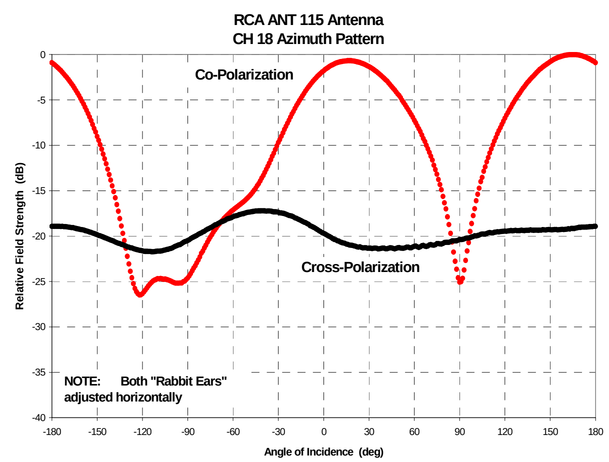


Figure B-1 Horizontal rabbit ears

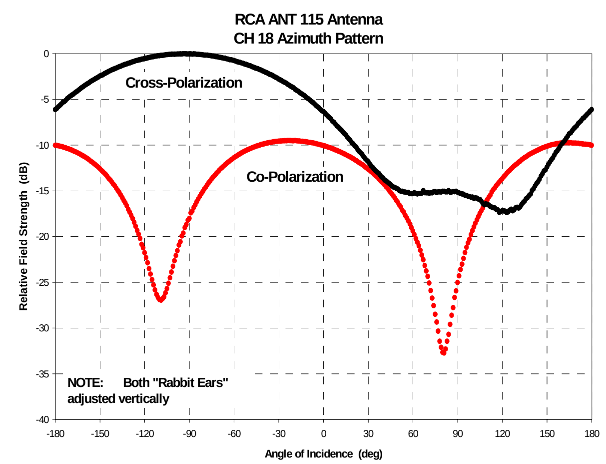
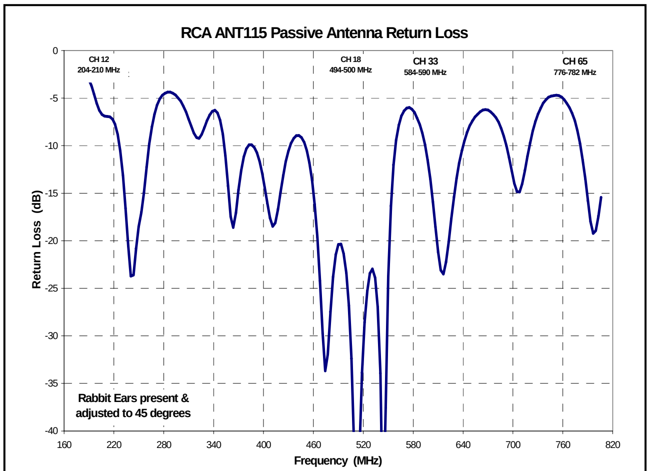


Figure B-2 Vertical rabbit ears

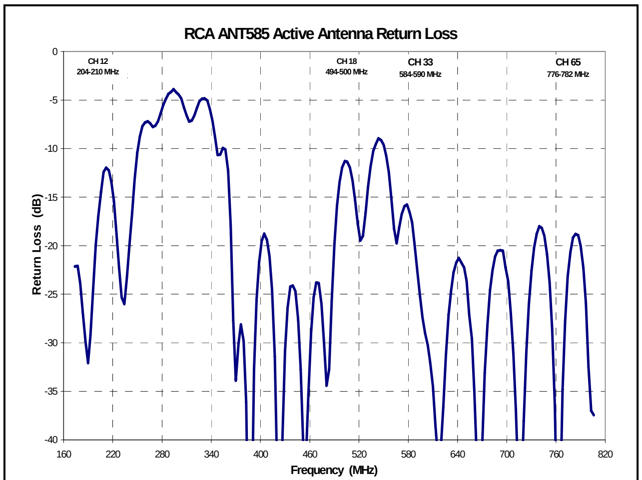
APPENDIX C Antenna Output Return Loss

The following plots illustrate the measured output return loss for each of the 10 indoor antennas tested. A low return loss value (i.e., one with a large negative number) represents less signal power reflected by a mismatch than a value with a large return loss value (i.e., one with a smaller negative number). These plots were generated in a 75-Ohm system.

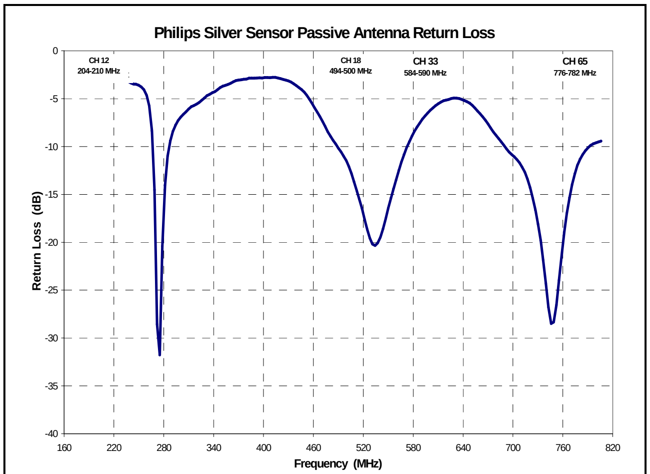
Table 6 has summary data on all of the output return loss plots.



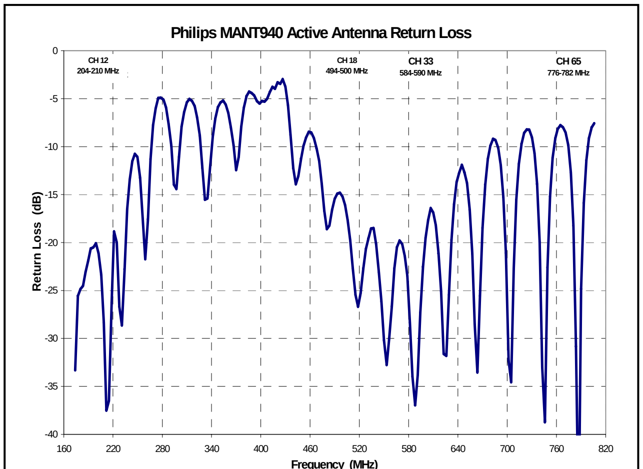
a) Figure C-1



b) Figure C-2



c) Figure C-3



d) Figure C-4

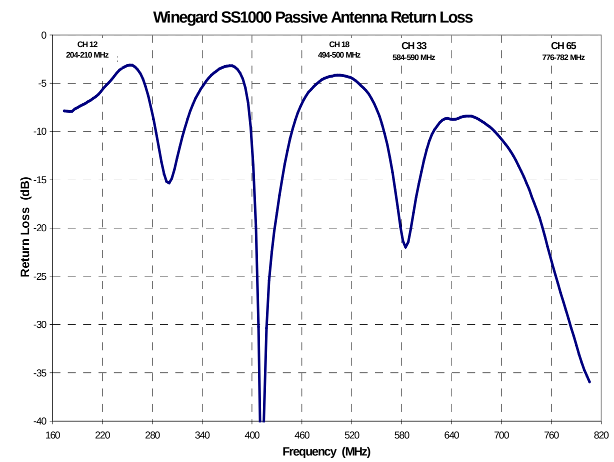


Figure C-5

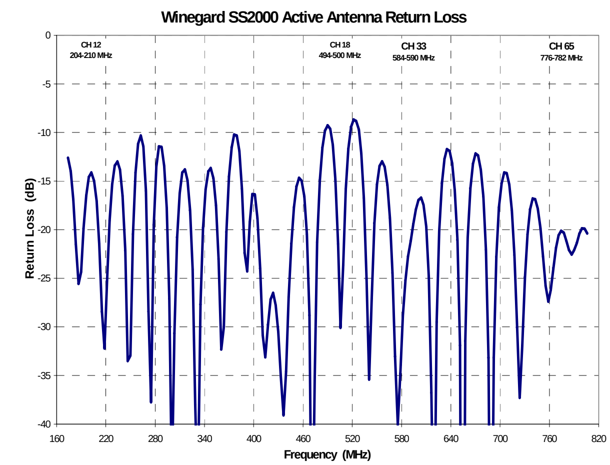


Figure C-6

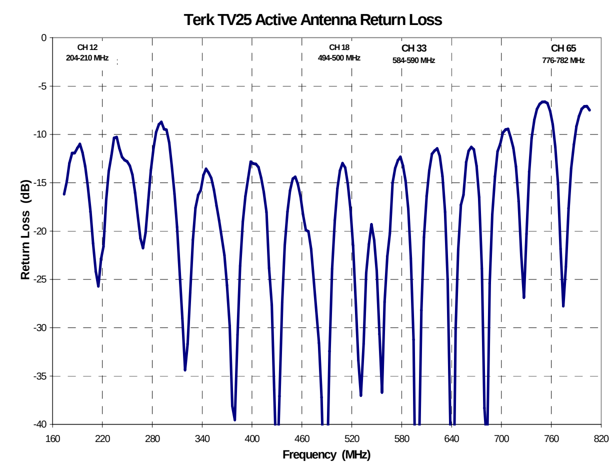


Figure C-7

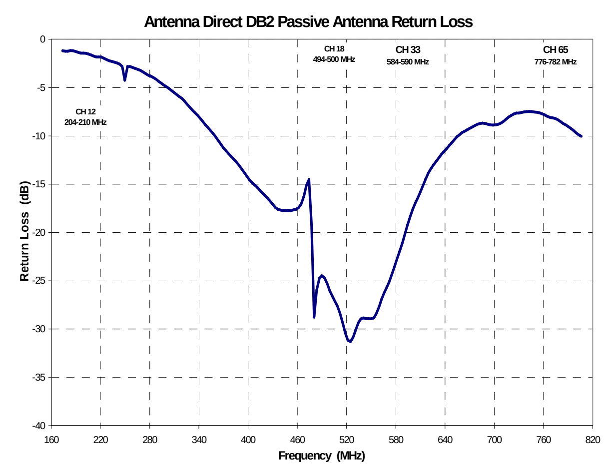


Figure C-8

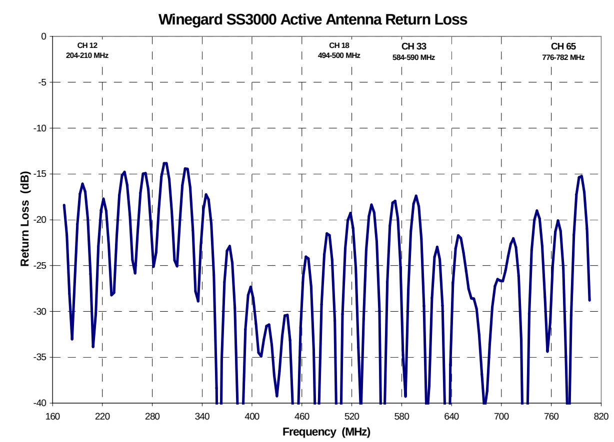


Figure C-9

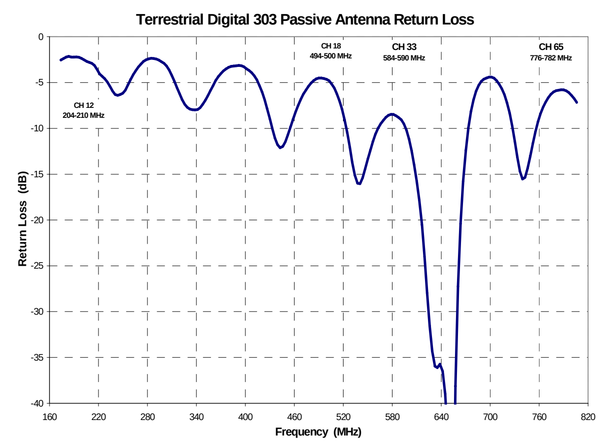


Figure C-10

APPENDIX D Anechoic Chamber Performance

The following plots illustrate the azimuth and elevation patterns of a calibrated reference dipole at channel 33 (i.e., mid-UHF band). Ideally, the azimuth pattern of an ideal dipole antenna would be a "figure-8" for the co-polarization pattern and essentially zero for the orthogonal cross-polarization pattern. The ideal dipole antenna elevation pattern would be a circle, with equal outputs at any elevation angle.

However, in the "real" world, things are not perfect, including hardware such as dipole antennas, cables, and anechoic chambers. But a measure of how good things are can be obtained through measurements such as the ones in **Figure D-1** and **Figure D-2**.

Note that the measured "figure 8"azimuth co-polarization pattern is pretty close to ideal. While the cross-polarization pattern is not perfectly zero, it is 23 dB below the co-polarization pattern at the peak of the "figure-8" azimuth patter (i.e., at 0 degrees and 180 degrees). This error is due to slight mismatches in the dipole antenna, including the balun used to create an unbalanced signal from the balanced dipole antenna. This means that measurements down to at least 13 dB (i.e., 10 dB better than the reference dipole) are very accurate.

While the measured "circle" elevation co-polarization pattern noticeably deviates from the ideal, the error ripple is only about 3 dB. This error is believed to be caused by the balun on the dipole that is horizontal and extends beyond the dipole antenna itself such that it and the coaxial output cable affect the radiation pattern. This may be a worst-case phenomenon due to the particular balun used in the reference dipole pattern testing.

The two plots below illustrate these effects.

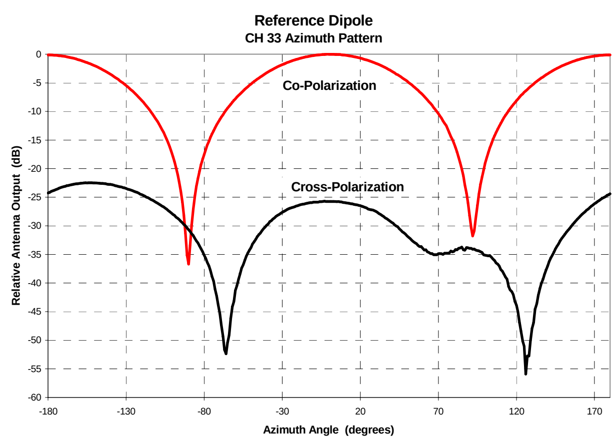


Figure D-1 Reference dipole azimuth patterns

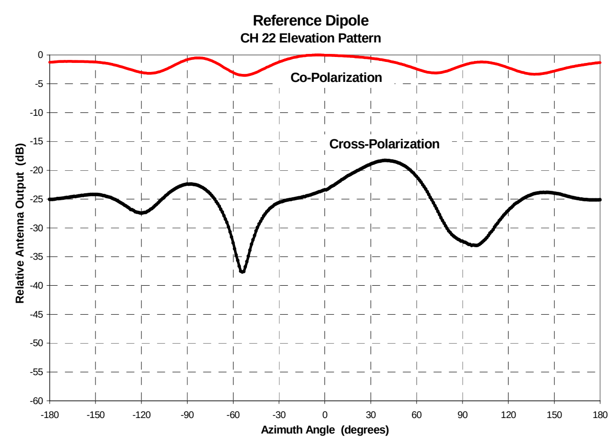


Figure D-2 Reference dipole elevation patterns