February 27, 2009

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington DC 20554

Re: Fixed Wireless Communications Coalition (FWCC) Ex Parte Comments in WTB Docket No. 07-121, In the Matter of Request for Declaratory Ruling by Wireless Strategies, Inc. Regarding Coordination of Microwave Links Under Part 101 of the Commission's Rules

Dear Ms. Dortch:

Pursuant to Section 1.1206(b)(1) of the Commission's Rules, the Fixed Wireless Communications Coalition ("FWCC") is electronically filing this written *ex parte* communication in regards to the aforementioned matter.[1]

Despite several *ex parte* presentations, meetings, and filings by Wireless Strategies, Inc. ("WSI"), [2] none of these filings have answered any of the specific and very valid interference and coordination questions and concerns that were raised by FWCC, NSMA, NCTA, API, Verizon, FiberTower, Sprint Nextel, SIA, SBE, Global VSAT Forum, United States Cellular, Alcatel Lucent, Comsearch, Harris-Stratex, SBE, TerreStar Networks, Inc., and Mobile Satellite Ventures Subsidiary, LLC. Each of these entities filed opposition to the request and submitted detailed Comments and Reply Comments on

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[1] 47 C.F.R. § 1.1206(b)(1)(2009).

[2] *See, e.g.,* In the Matter of Request for Declaratory Ruling by Wireless Strategies, Inc. Regarding Coordination of Microwave Links Under Part 101 of the Commission's Rules, WTB Docket No. 07-121, *Wireless Strategies Inc. Ex Parte Presentation* (filed Sept. 17, 2008). *See also* In the Matter of Request for Declaratory Ruling by Wireless Strategies, Inc. Regarding Coordination of Microwave Links Under Part 101 of the Commission's Rules, WTB Docket No. 07-121, *Exalt Communications Ex Parte Filing* (filed Nov. 24, 2008).

the many ways the request is both seriously technically flawed, and fails to meet several regulations under Part 101 of the Commission's Rules.

Attached please find an FWCC technical study that brings these issues into tighter focus.[3]

The WSI request to transmit from uncoordinated, unlicensed locations anywhere WSI so chooses, simply because the WSI uses TDD or a so-called "smart antenna", is plainly not allowed under the current rules. WSI claims that § 101.115 allows them to place an antenna's T/R element anywhere they so choose, but that approach fails to even provide the minimum technical information (a radiation pattern at a minimum) proving how such an antenna could possibly meet these requirements. The T/R element of an antenna is integral to forming the radiation pattern envelope, gain, and beamwidth, and must be located within close proximity of the antenna assembly to make any sense at all. How could one even develop a radiation pattern for an antenna that has T/R elements spread miles apart? Where would the reference point be? With such a setup there is no longer a "main beam" for the antenna since each disparately placed element would become the "main beam" every time it transmits. Furthermore, it is highly questionable to suggest that these disparately placed elements have any relation with the main antenna, since they would be transmitting different signals unrelated to the main antenna's transmissions or those of the other T/R elements. Under the Rules of this subpart, these are clearly separate transmit stations that must meet the antenna requirements, and thus must be individually coordinated and licensed.

Similarly, WSI proposal violates the long-standing and comprehensive Rules on Prior Frequency Coordination with the assertion that all areas within some unspecified and undefined distance from the main licensed station are somehow "concurrently" coordinated. The Rules under this subpart were expressly written for fixed point-to-point systems from specific coordinated and licensed locations.

Without seriously addressing these matters, WSI's request essentially comprises an attempted end-run around long-standing coordination protections and rules to establish wide-area point-to-multipoint services in these fixed point-to-point bands, at great harmful interference risk to established systems. The fixed point-to-point licensed bands historically serve numerous, sometimes hundreds, of licensees and systems in a market, often for core transport or backhaul requirements upon which entire end-user based systems depend. WSI essentially proposes the FCC allow a single applicant to seize all available spectrum on a channel throughout a market. Such tactics are hardly in the public interest and constrain an entire community for the benefit of one entity.

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[3] See Attachment 1: "**Technical Evaluation of WSI Request for Declaratory Ruling on Compliance of Fixed Microwave Antennas Having Distributed Radiating Elements.**"

Accordingly, FWCC calls for the FCC to uniformly deny the WSI request. If not dismissed outright, such far reaching and massive changes in context, as well as technical requirements, should only be seriously reviewed through a formal rulemaking request and process.

Please do not hesitate to contact us with questions.

Respectfully submitted,

Joseph M. Sandri, Jr.
Senior Vice President, FiberTower Corp.
for the Fixed Wireless Communications Coalition

Attachment

Attachment

Technical Evaluation of WSI Request for Declaratory Ruling on Compliance of Fixed Microwave Antennas Having Distributed Radiating Elements
WTB Docket No. 07-121

Introduction

The purpose of the study is to evaluate the potential for interference from a system deploying "Distributed Radiated Elements" (DRE) as described in Wireless Strategies, Inc. (WSI) Request for Declaratory Ruling (RDR) referenced in WTB Docket No. 07-121. WSI claims that the coordination and licensing of its "main link" between Site A and Site B will allow them to transmit and receive the same frequencies at multiple other locations on or near the "main link" without causing or receiving interference to other microwave systems. This study will show by the use of specific examples that interference can indeed occur between possible remote transceiver sites (so-called "DREs") and planned microwave links that are non-interfering with the WSI "main link". In other words, the remote transceiver sites can be shown to create interference levels that exceed the main link given for a variety of interference geometries. The three examples included in the study are representative of a number of interference geometries that could result in a calculation of unacceptable interference.

Discussion

The following steps were taken to set up the interference scenario between the system described by WSI in its RDR and typical 6 GHz point-to-point microwave links.

1. Retrieve WSI licensed "main link" path parameters from the FCC database for call signs WQGH696 and WQGH697 in Example 2, and WQHD217 and WQHD218 for Examples 1 and 3.
2. Propose a new 6 GHz microwave path that meets all FCC rule requirements and determine through industry-standard interference analysis practices if it can successfully coordinate with the WSI "main link" on a non-interfering basis.
3. If the new 6 GHz microwave path clears the WSI "main link", select one or more remote transceiver site locations pointed back to one of the "main link" sites.
4. Perform a detailed interference analysis between these remote transceiver links and the 6 GHz microwave path.
5. Summarize the interference case margins calculated.

Since there is very little technical detail provided by WSI, it was necessary to use the information from the particular paths that they licensed and make some reasonable assumptions on the possible location and operational parameters of the particular remote transceiver sites. No information was found in the record regarding some key specific operating parameters of the remote transceiver locations, such as antenna gain, antenna radiation pattern, typical transmit power, typical height above ground, etc.

Interference Analysis for Example 1

The tables below summarize the input parameters assumed for the WSI "main link" and a proposed 6 GHz microwave path that make up our Example 1. The full technical details of these links are given in Appendix B.

Call Sign	WQHD218	WQHD217
Site Name	BA Tower	Mt Laurel
Latitude (DMS)	39 57 19.5 N	39 57 52.4 N
Longitude (DMS)	75 10 8.4 W	74 53 45.6 W
Elevation (m)	11.28	9.15
EIRP (dBm)	67.2	67.2
Antenna Type	FCC Std A	FCC Std A
Antenna Height (m)	225.25	51.21
Bandwidth (MHz)	30	30

Table 1: WSI "main link" parameters

Call Sign	N/A	N/A
Site Name	Phila	Maple
Latitude (DMS)	39 57 22.1 N	39 56 18.3 N
Longitude (DMS)	75 09 43.3 W	74 58 2.4 W
Elevation (m)	13.9	14.0
EIRP (dBm)	68.0	68.0
Antenna Type	Andrew UHX10	Andrew UHX10
Antenna Height (m)	60.0	60.0
Bandwidth (MHz)	30	30

Table 2: Proposed 6 GHz microwave path parameters

A detailed interference analysis was conducted between the two paths identified in Example 1. This analysis involves the calculation of predicted interference levels at each receiver to determine whether it meets the required T/I interference objective for that particular radio receiver. The analysis considers the RF operating parameters including the antenna radiation patterns based on the particular angles involved in the specific case geometries. A summary of these calculations is shown in Table 4 below. The calculations show that the new 6 GHz microwave path meets the interference objective criteria and can be implemented without causing interference with the WSI "main link" between BA Tower and Mt Laurel.

One potential remote transceiver site location was then identified in this example to determine if it could potentially cause interference into the new 6 GHz microwave path between Phila and Maple. A summary of the location and the operating parameters of the remote transceiver station is shown below. It is directed to the WSI BA Tower site that is 1.6 km away and is using a 2-foot dish antenna. Specific link details are given in Appendix B.

Site Name	Sub1
Latitude (DMS)	39 57 18.3 N
Longitude (DMS)	75 09 1.5 W
Elevation (m)	11.5
EIRP (dBm)	18.3
Antenna Type	P2-57W
Antenna Height (m)	60
Bandwidth (MHz)	30

Table 3: Remote transceiver site parameters

Table 5 shows the interference case summary between this remote transceiver link and the new 6 GHz microwave path. The results clearly show that the predicted interference margin misses the objective by a wide margin of about 39 dB. It is reasonable to conclude that this remote transceiver location would cause harmful interference to the new 6 GHz microwave path. It appears that a large transmit power reduction at the remote transceiver would be necessary to avoid this predicted interference into the new 6 GHz microwave path. However, a reduction of this magnitude would result in the link's receive level falling below its own receiver threshold, failing to have a signal strong enough for a viable communication link. Figure 1 shows a map of the locations in this example.

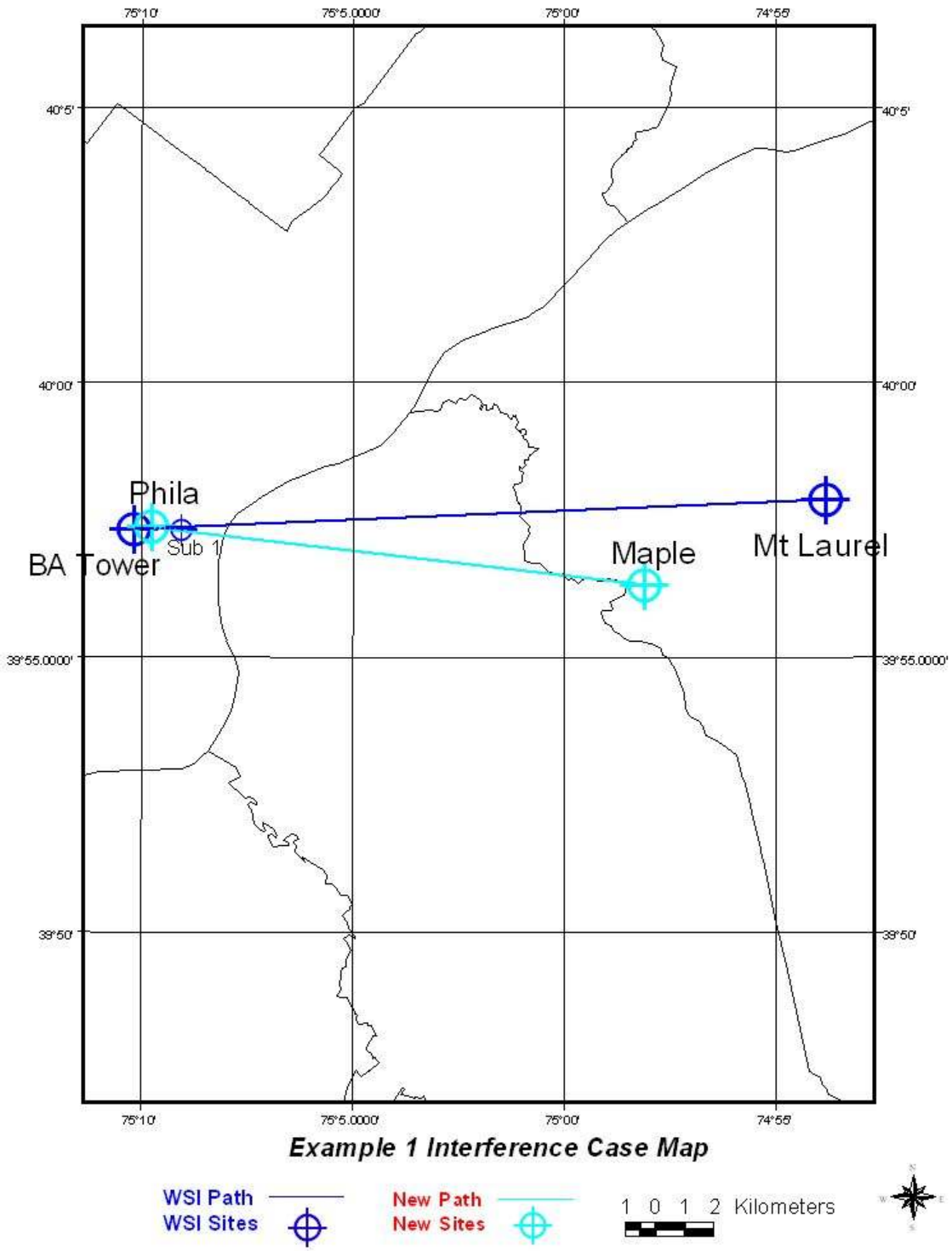

Figure 1: Path Layout for Example 1

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
1	Phila	BA Tower	262.3	0.60	103.90	68.00	80.00	38.20	25.00	1.00	-103.70	-70.00	33.70	33.70	0.00	Clear
2	Maple	Mt Laurel	64.5	6.75	124.90	68.00	80.00	38.20	36.00	1.00	-135.70	-70.00	65.70	33.70	32.00	Clear
3	BA Tower	Phila	82.3	0.60	103.90	67.20	25.00	42.40	80.00	2.40	-101.70	-63.00	38.70	35.20	3.50	Clear
4	Mt Laurel	Maple	244.6	6.75	124.90	67.20	36.00	42.40	80.00	2.40	-133.70	-63.00	70.70	35.20	35.50	Clear

Table 4: Example 1 Calculations[4] show non-interference between new 6 GHz microwave path and WSI BA Tower to Mt Laurel "main link"

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
1	Sub 1	Phila	276.7	1.00	108.30	18.30	8.70	42.40	0.10	2.40	-58.80	-63.00	-4.20	35.20	-39.40	Predicted Inteference

Table 5: Example 1 Calculations[1] show interference from WSI remote transceiver into new 6 GHz microwave path

[4] Interference Case Details are provided in Appendix A

Interference Analysis for Example 2

The tables below summarize the input parameters assumed for the WSI "main link" and a proposed 6 GHz microwave path that make up our Example2. This example involves the WSI "main link" from Jessup to WSL001P Legg and our proposed Amberton to Arnold 6 GHz path. The full technical details of these links are given in Appendix C.

Call Sign	WQGH697	WQGH698
Site Name	Jessup	WSL001P Legg
Latitude (DMS)	39 10 20.4 N	39 17 15.0 N
Longitude (DMS)	76 46 35.3 W	76 36 56.0 W
Elevation (m)	67.1	6.6
EIRP (dBm)	84.7	84.7
Antenna Type	FCC Std A	FCC Std A
Antenna Height (m)	85.3	162.0
Bandwidth (MHz)	30	30

Table 6: WSI "main link" parameters

Call Sign	N/A	N/A
Site Name	Amberton	Arnold
Latitude (DMS)	39 11 18.9 N	39 02 8.5 N
Longitude (DMS)	76 44 55.5 W	76 29 18.7 W
Elevation (m)	48.1	39.9
EIRP (dBm)	62.4	68.4
Antenna Type	Andrew UHX10	Andrew UHX10
Antenna Height (m)	60.0	60.0
Bandwidth (MHz)	30	30

Table 7: Proposed 6 GHz microwave path parameters

A detailed interference analysis was conducted between the two paths identified in Example 2. This analysis involves the calculation of predicted interference levels at each receiver to determine whether it meets the required T/I interference objective for that particular radio receiver. The analysis considers the RF operating parameters including the antenna radiation patterns based on the particular angles involved in the specific case geometries. A summary of these calculations is shown in Table 9 below. The calculations show that the new 6 GHz microwave path meets the interference objective criteria and can be implemented without causing interference with the WSI "main link".

Two potential remote transceiver site locations were then identified in this example to determine if they could potentially cause interference into the new 6 GHz microwave path between Amberton and Arnold. A summary of the locations and the operating parameters of these remote transceiver stations are shown below. Both are directed to the WSI Jessup site that is 3.3 and 4 km away and are using a flat panel type of antenna. Specific link details are given in Appendix C.

Site Name	DRE2	DRE3

Latitude (DMS)	39 11 5.5 N	39 10 40.0 N
Longitude (DMS)	76 44 32.1 W	76 43 48.9 W
Elevation (m)	34.2	43.1
EIRP (dBm)	26.5	26.5
Antenna Type	Flat Panel	Flat Panel
Antenna Height (m)	40.0	60.0
Bandwidth (MHz)	30	30

Table 8: Remote transceiver site parameters

Table 10 shows the interference case summaries between two remote transceiver links and the new 6 GHz microwave path. The results clearly show that the predicted interference margins miss the objectives by a wide margin (almost 49 dB short in Case 11). It is reasonable to conclude that these remote transceiver locations would cause harmful interference to the new 6 GHz microwave path and would receive significant interference from this path. It appears that a large transmit power reduction at the remote transceiver would be necessary to avoid this predicted interference into the new 6 GHz microwave path (greater than 25 dB for Case 9). However, a reduction of this magnitude would result in the link's receive level falling below its own receiver threshold, failing to have a signal strong enough for a viable communication link. Figure 2 shows a map of the locations in this example.

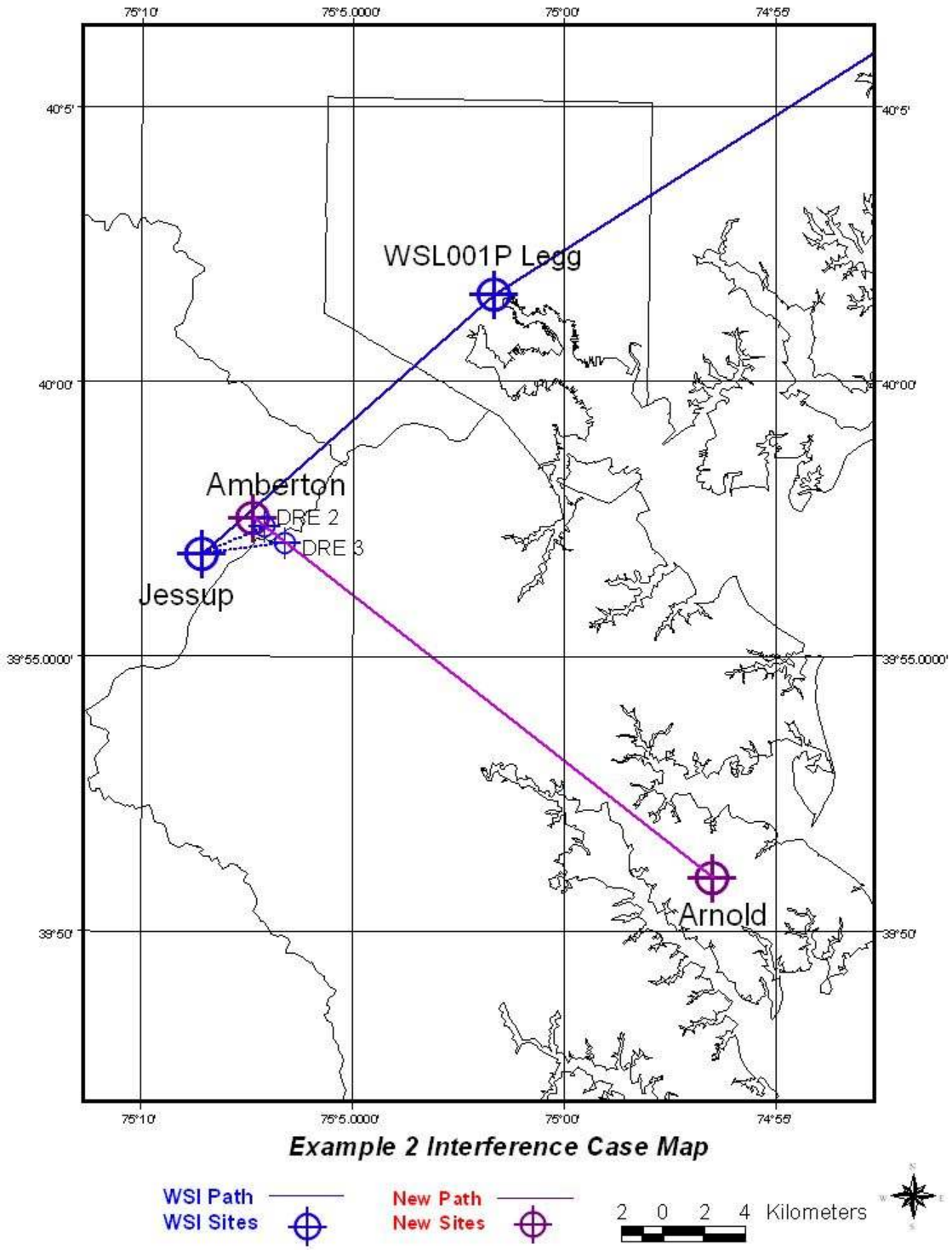

Figure 2: Path Layout for Example 2

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
1	Amberton	Jessup	233.0	3.00	117.80	60.40	80.00	38.20	25.00	1.00	-125.20	-70.00	55.20	33.70	21.50	Clear
2	Amberton	WSL001P Legg	46.3	15.90	132.30	60.40	80.00	38.20	2.90	1.00	-117.60	-70.00	47.60	33.70	13.90	Clear
3	Arnold	Jessup	301.4	29.16	137.60	68.40	34.50	38.20	55.00	1.00	-121.50	-70.00	51.50	33.70	17.80	Clear
4	Arnold	WSL001P Legg	338.6	30.03	137.80	68.40	68.20	38.20	42.00	1.00	-142.40	-70.00	72.40	33.70	38.70	Clear
5	Jessup	Arnold	121.3	29.16	137.60	84.70	55.00	42.40	34.50	2.00	-102.00	-63.00	39.00	35.20	3.80	Clear
6	WSL001P Legg	Arnold	158.5	30.03	137.80	84.70	42.00	42.40	68.20	2.00	-122.90	-63.00	59.90	35.20	24.70	Clear
7	Jessup	Amberton	53.0	3.00	117.80	84.70	25.00	42.40	80.00	10.00	-105.70	-63.00	42.70	35.20	7.50	Clear
8	WSL001P Legg	Amberton	226.4	15.90	132.30	84.70	2.90	42.40	80.00	10.00	-98.10	-63.00	35.10	35.20	-0.10	Clear

Table 9: Example 2 Calculations[5] show non-interference between new 6 GHz microwave path and WSI Jessup – WSL001P Legg "main link"

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
9	DRE 2	Amberton	306.4	0.70	105.10	26.50	1.70	42.40	25.00	8.00	-70.90	-62.00	8.90	35.50	-26.60	Predicted Inteference
10	DRE 3	Amberton	306.9	2.00	114.30	26.50	25.00	42.40	0.20	8.00	-78.60	-62.00	16.60	35.50	-18.90	Predicted Inteference
11	Amberton	DRE 2	126.3	0.70	105.10	62.40	1.70	16.50	25.00	1.00	-53.90	-70.00	-16.10	33.70	-49.80	Predicted Inteference
12	Amberton	DRE 3	126.9	2.00	114.30	62.40	0.20	16.50	25.00	1.00	-61.60	-70.00	-8.40	33.70	-42.10	Predicted Inteference

Table 10: Example 2 Calculations[2] show interference between WSI remote transceivers and new 6 GHz microwave path

[5] Interference Case Details are provided in Appendix A

Interference Analysis for Example 3

The tables below summarize the input parameters assumed for the WSI "main link" and a proposed 6 GHz microwave path that make up our Example 3. This example involves the WSI "main link" from BA Tower to Mt Laurel and a proposed 6 GHz path from Comcast Toe to Site 2. The full technical details of these links are given in Appendix D.

Call Sign	WQHD218	WQHD217
Site Name	BA Tower	Mt Laurel
Latitude (DMS)	39 57 19.5 N	39 57 52.4 N
Longitude (DMS)	75 10 8.4 W	74 53 45.6 W
Elevation (m)	11.28	9.15
EIRP (dBm)	67.2	67.2
Antenna Type	FCC Std A	FCC Std A
Antenna Height (m)	225.25	51.21
Bandwidth (MHz)	30	30

Table 11: WSI "main link" parameters

Call Sign	N/A	N/A
Site Name	Comcast Toe	Site 2
Latitude (DMS)	39 57 17.4 N	40 08 26.9 N
Longitude (DMS)	75 10 6.4 W	74 52 44.8 W
Elevation (m)	10.2	18.8
EIRP (dBm)	64.1	67.8
Antenna Type	Andrew UHX8	Andrew UHX8
Antenna Height (m)	297.2	51.21
Bandwidth (MHz)	30	30

Table 12: Proposed 6 GHz microwave path parameters

A detailed interference analysis was conducted between the two paths identified in Example 3. This analysis involves the calculation of predicted interference levels at each receiver to determine whether it meets the required T/I interference objective for that particular radio receiver. The analysis considers the RF operating parameters including the antenna radiation patterns based on the particular angles involved in the specific case geometries. A summary of these calculations is shown in Table 14 below. The calculations show that the new 6 GHz microwave path meets the interference objective criteria and can be implemented without causing interference with the WSI "main link" between BA Tower and Mt Laurel.

One potential remote transceiver site was then identified in this example to determine if it could potentially cause interference into the new 6 GHz microwave path between Comcast Toe and Site 2. A summary of the location and the operating parameters of the remote transceiver station are shown below. It is directed to the WSI BA Tower site that is 0.12 km away and is using a 2-foot dish antenna. Specific link details are given in Appendix D.

Site Name	DRE 500
Latitude (DMS)	39 57 19.4 N
Longitude (DMS)	75 10 3.3 W
Elevation (m)	10.7

EIRP (dBm)	-0.7
Antenna Type	P2-57W
Antenna Height (m)	297.2
Bandwidth (MHz)	30

Table 13: Remote transceiver site parameters

Table 15 shows the interference case summary between this remote transceiver link and the new 6 GHz microwave path. The results clearly show that the predicted interference margin misses the objective by a wide margin of about 21 dB. It is reasonable to conclude that this remote transceiver location would cause harmful interference to the new 6 GHz microwave path. It appears that a large transmit power reduction at the remote transceiver would be necessary to avoid this predicted interference into the new 6 GHz microwave path. However, a reduction of this magnitude would result in the link's receive level falling below its own receiver threshold, failing to have a signal strong enough for a viable communication link. Figure 3 shows a map of the locations in this example.

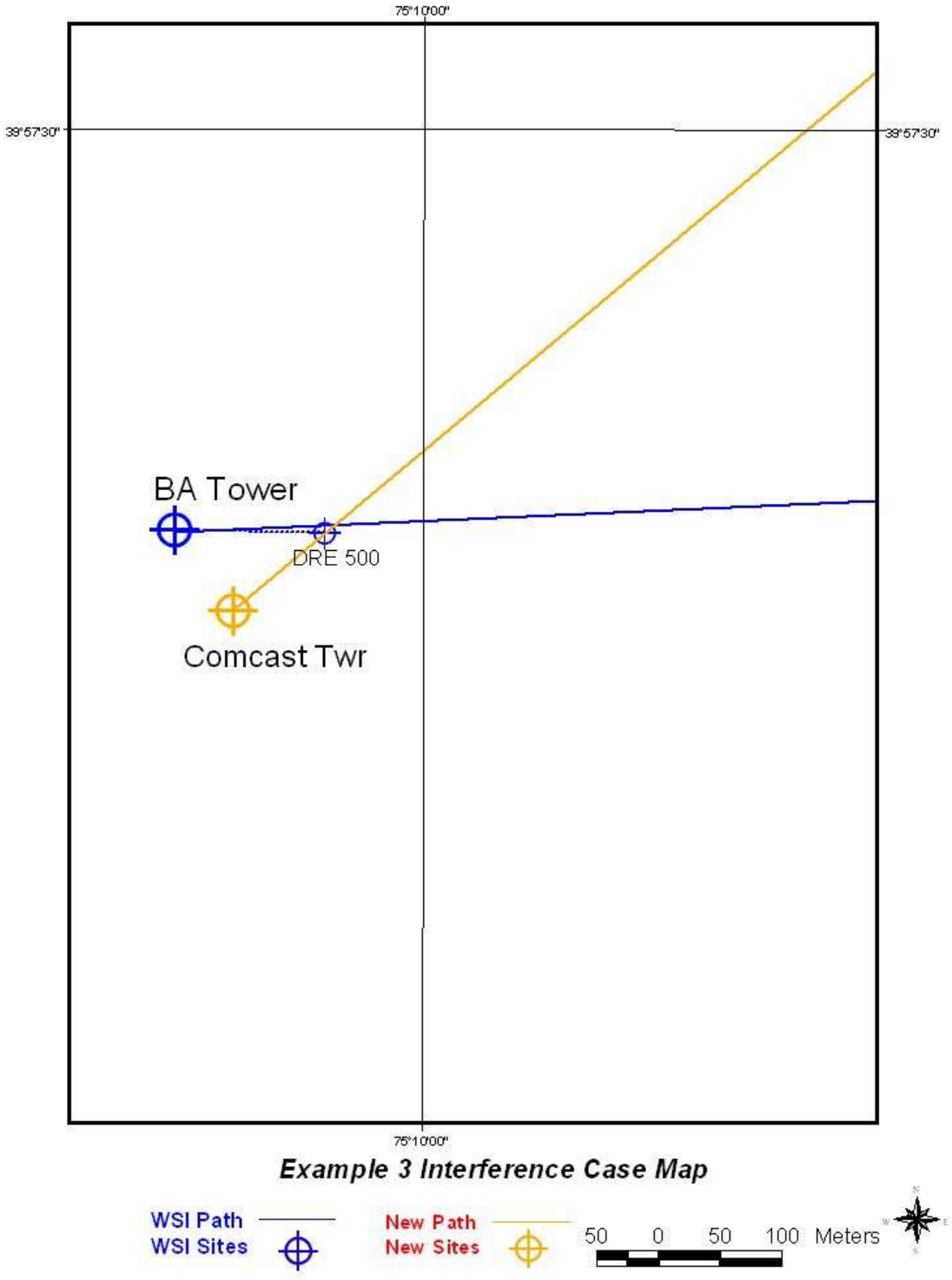

Figure 3: Path Layout for Example 3

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
1	BA Tower	Comcast Twr	143.8	0.08	86.40	67.20	42.00	41.30	76.60	7.20	-103.70	-70.00	33.70	33.70	0.00	Clear
2	Mt Laurel	Site 2	4.2	19.62	134.10	67.20	42.00	38.80	58.40	1.00	-129.50	-70.00	59.50	33.70	25.80	Clear
3	Comcast Twr	BA Tower	323.8	0.08	86.40	54.10	76.60	38.20	42.00	1.00	-113.70	-70.00	43.70	33.70	10.00	Clear
4	Site 2	Mt Laurel	184.2	19.62	134.10	57.80	58.40	38.20	42.00	1.00	-139.50	-70.00	69.50	33.70	35.80	Clear

Table 14: Example 3 Calculations[6] show non-interference between new 6 GHz microwave path and WSI BA Tower to Mt Laurel "main link"

Case #	Transmit Station	Receive Station	Interf. Path Azimuth (deg)	Interf. Path Distance (km)	Free Space Path Loss (dB)	TX EIRP (dBm)	TX Ant Discr. (dB)	RX Ant Gain (dBi)	RX Ant Discr. (dB)	RX Line Loss (dB)	LOS Interference Level (dBm)	RX Threshold (dBm)	Calculated T/I (dB)	T/I Obj (dB)	Margin (dB)	Result
5	DRE 500	Comcast Twr	230.0	0.10	87.90	-0.70	28.30	41.30	0.10	7.20	-82.90	-70.00	12.90	33.70	-20.80	Predicted Inteference

Table 15: Example 3 Calculations[3] show interference from WSI remote transceiver into new 6 GHz microwave path

[6] Interference Case Details are provided in Appendix A

Conclusion

The demonstration that a new path can be implemented on the same frequency in the sidelobes of the WSI "main path" counters the assertion that point-to-point microwave path sidelobes are somehow wasted and inefficient. New paths can be implemented in close proximity and on a non-interference basis with existing microwave facilities. This is a result of the FCC's Part 101 rules that have promoted high performance antennas, minimum power transmissions, and prior coordination procedures that enable the efficient re-use of frequencies in these bands.

The results involving the potential remote transceiver links clearly demonstrate that harmful interference could occur with another operator's link even though the "main link" was clear of predicted interference. This disproves the claim that "subsequent operation of those links will not cause harmful interference to other Fixed Service licensees". Resolving this interference in reaction to a new coordination would often require significantly reducing the remote transmitter EIRP or eliminating the remote transceiver link. The necessity of modifying remote link parameters to accommodate a new coordination disproves the notion that the remote link could have been considered to be "concurrently coordinated" with the main link.

Whether a remote transceiver link would produce harmful interference depends on its parameters and geometry relative to other environment links and the interference potential must be determined by a frequency coordination analysis. Because the remote transceiver links can produce interference in addition to that of the "main link" licensed stations, they must each be studied for interference and coordinated as required by §101.103(d). These remote transceiver sites must also be individually licensed following all applicable FCC rules.

Appendix A – Interference Case Details

Example 1 – Case 1

INTERFERING PATH		VICTIM PATH	
LICENSEE		Wireless Strategies, Inc.	
Site Names	**A)** PHILA to **B)** MAPLE	**C)** MT LAUREL to **D)** BA TOWER	
Call Signs	PHILA MAPLE	WQHD217 WQHD218	
Latitude	39 57 22.1 N 39 56 18.3 N	39 57 52.4 N 39 57 1	
Longitude	75 9 43.3 W 74 58 2.4 W	74 53 45.6 W 75 10 8	
Ground Elevation	13.90 m 14.00 m	9.15 m 11.28 m	
Path Azimuth	96.68 ° 276.81 °	267.60 ° 87.42 °	
Path Length	16.75 km / 10.41 mi	23.35 km / 14.51 mi	
Receive Signal Level	RX_B = -24.76 dBm	RX_D = -31.25 dBm	
PHILA, PA - Interfering Transmitter (A)		**BA TOWER, PA - Victim Receiver (D)**	
RADIO			
Manufacturer	CERAGON NETWORKS	ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP	MDR-8606-135	
Emission / Stability	28M0D7W 0.001 %	30M0D7W 0.001 %	
Loading / Data Rate	1 CH DIG 200000.000 kbps	2016CH DIG 138800.000 kbps	
Tx Power / Tx Loss	28.0 dBm 0.0 dB	Threshold = -70.0 dBm	
ANTENNA			
Manufacturer	ANDREW CORPORATION	Wireless Strategies	
Model	UHX10X-59D RF	AAS-106P	
Gain	42.4 dBi	38.2 dBi	
Centerline	60.00 m	225.25 m	
Common Loss	2.4 dB	1.0 dB	
FREQUENCY & POLARIZATION			
	6197.2400V	6197.2400V	

Interfering Path Distance 0.60 km / 0.37 mi
Azimuth 262.34 °
Free Space Loss (FSPL) 103.9 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		165.65 °	80.0	80.0	80.0	80.0	0.00 / 33.68	NA	NA
Site D: AAS-106P		354.91 °	25.0	45.0	25.0	45.0			
Total Discrimination			105.0	105.0	105.0	105.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**72.4**	72.4	72.4	72.4	**72.4**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		**72.4**	72.4	72.4	72.4	**72.4**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		**72.4**	72.4	72.4	72.4	**62.4**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**72.4**	**-0.0**			

Example 1 – Case 2

	INTERFERING PATH		VICTIM PATH	
LICENSEE			Wireless Strategies, Inc.	
Site Names	**A)** MAPLE	to **B)** PHILA	**C)** BA TOWER	to **D)** MT LAUREL
Call Signs	MAPLE	PHILA	WQHD218	WQHD217
Latitude	39 56 18.3 N	39 57 22.1 N	39 57 19.5 N	39 57 5
Longitude	74 58 2.4 W	75 9 43.3 W	75 10 8.4 W	74 53 4
Ground Elevation	14.00 m	13.90 m	11.28 m	9.15 m
Path Azimuth	276.81 °	96.68 °	87.42 °	267.60 °
Path Length	16.75 km / 10.41 mi		23.35 km / 14.51 mi	
Receive Signal Level	RX_B = -24.76 dBm		RX_D = -31.25 dBm	
	MAPLE, NJ - Interfering Transmitter (A)		**MT LAUREL, NJ - Victim Receiver (D)**	
RADIO				
Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX10X-59D RF		AAS-106P	
Gain	42.4 dBi		38.2 dBi	
Centerline	60.00 m		51.21 m	
Common Loss	2.4 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	5945.2000V		5945.2000V	

Interfering Path Distance 6.75 km / 4.20 mi
Azimuth 64.52 °
Free Space Loss (FSPL) 124.9 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		147.71 °	80.0	80.0	80.0	80.0	0.00 / 33.68	NA	NA
Site D: AAS-106P		336.97 °	36.0	54.3	36.0	54.3			
Total Discrimination			116.0	116.0	116.0	116.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**104.4**	104.4	104.4	104.4	**72.4**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		**104.4**	104.4	104.4	104.4	**72.4**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		**104.4**	104.4	104.4	104.4	**62.4**	NA	NA

Example 1 – Case 3

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** BA TOWER	to **B)** MT LAUREL	**C)** MAPLE	to **D)** PHILA
Call Signs	WQHD218	WQHD217	MAPLE	PHILA
Latitude	39 57 19.5 N	39 57 52.4	N	39 56 18.3 N	39 57 2
Longitude	75 10 8.4 W	74 53 45.6	W	74 58 2.4 W	75 9 4
Ground Elevation	11.28 m	9.15 m	14.00 m	13.90 m	
Path Azimuth	87.42 °	267.60 °	276.81 °	96.68 °	
Path Length	23.35 km / 14.51 mi		16.75 km / 10.41 mi	
Receive Signal Level	RX_B = -31.25 dBm		RX_D = -24.76 dBm	
	BA TOWER, PA - Interfering Transmitter (A)		**PHILA, PA - Victim Receiver (D)**	
RADIO				
Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	30.0 dBm	0.0 dB	Threshold = -63.0 dBm	
ANTENNA				
Manufacturer	Wireless Strategies		ANDREW CORPORATION	
Model	AAS-106P		UHX10X-59D RF	
Gain	38.2 dBi		42.4 dBi	
Centerline	225.25 m		60.00 m	
Common Loss	1.0 dB		2.4 dB	
FREQUENCY & POLARIZATION				
	5945.2000V		5945.2000V	

Interfering Path Distance 0.60 km / 0.37 mi
Azimuth 82.33 °
Free Space Loss (FSPL) 103.9 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		354.91 °	25.0	45.0	25.0	45.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		165.65 °	80.0	80.0	80.0	80.0			
Total Discrimination			105.0	105.0	105.0	105.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**76.9**	76.9	76.9	76.9	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		**76.9**	76.9	76.9	76.9	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		**76.9**	76.9	76.9	76.9	**63.4**	NA	NA

Example 1 – Case 4

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** MT LAUREL	to **B)** BA TOWER	**C)** PHILA	to **D)** MAPLE
Call Signs	WQHD217	WQHD218	PHILA	MAPLE
Latitude	39 57 52.4 N	39 57 19.5	N	39 57 22.1 N 39 56 1
Longitude	74 53 45.6 W	75 10 8.4	W	75 9 43.3 W 74 58 2
Ground Elevation	9.15 m	11.28 m	13.90 m	14.00 m
Path Azimuth	267.60 °	87.42 °	96.68 °	276.81 °
Path Length	23.35 km / 14.51 mi		16.75 km / 10.41 mi	
Receive Signal Level	RX_B = -31.25 dBm		RX_D = -24.76 dBm	

	MT LAUREL, NJ - Interfering Transmitter (A)		MAPLE, NJ - Victim Receiver (D)	
RADIO				
Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	30.0 dBm	0.0 dB	Threshold = -63.0 dBm	
ANTENNA				
Manufacturer	Wireless Strategies		ANDREW CORPORATION	
Model	AAS-106P		UHX10X-59D RF	
Gain	38.2 dBi		42.4 dBi	
Centerline	51.21 m		60.00 m	
Common Loss	1.0 dB		2.4 dB	
FREQUENCY & POLARIZATION				
	6197.2400V		6197.2400V	

Interfering Path Distance 6.75 km / 4.20 mi
Azimuth 244.56 °
Free Space Loss (FSPL) 124.9 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		336.97 °	36.0	54.3	36.0	54.3	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		147.71 °	80.0	80.0	80.0	80.0			
Total Discrimination			116.0	116.0	116.0	116.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**108.9**	108.9	108.9	108.9	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		**108.9**	108.9	108.9	108.9	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		**108.9**	108.9	108.9	108.9	**63.4**	NA	NA

Example 1 – Case 5

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** SUB1	to **B)** BA TOWER	**C)** MAPLE	to **D)** PHILA
Call Signs	SUB1	WQHD218	MAPLE	PHILA
Latitude	39 57 18.3 N	39 57 19.5	N 39 56 18.3 N	39 57 2
Longitude	75 9 1.5 W	75 10 8.4	W 74 58 2.4 W	75 9 4
Ground Elevation	11.50 m	11.28 m	14.00 m	13.90 m
Path Azimuth	271.34 °	91.33 °	276.81 °	96.68 °
Path Length	1.59 km / 0.99 mi		16.75 km / 10.41 mi	
Receive Signal Level	RX_B = -55.80 dBm		RX_D = -24.76 dBm	
	SUB1, PA - Interfering Transmitter (A)		**PHILA, PA - Victim Receiver (D)**	
RADIO				
Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	10.0 dBm	20.0 dB	Threshold = -63.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		ANDREW CORPORATION	
Model	P2-57W RF		UHX10X-59D RF	
Gain	29.3 dBi		42.4 dBi	
Centerline	297.18 m		60.00 m	
Common Loss	1.0 dB		2.4 dB	
FREQUENCY & POLARIZATION				
	5945.2000V		5945.2000V	

Interfering Path Distance 1.00 km / 0.62 mi
Azimuth 276.74 °
Free Space Loss (FSPL) 108.3 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: P2-57W RF		5.40 °	8.7	30.0	12.7	30.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		0.05 °	0.1	38.0	0.0	38.0			
Total Discrimination			8.8	30.0	12.7	30.1	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**34.0**	55.2	37.9	55.3	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		**34.0**	55.2	37.9	55.3	**73.4**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		**34.0**	55.2	37.9	55.3	**63.4**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**73.4**	**-39.4**			

Example 2 - Case 1

	INTERFERING PATH	VICTIM PATH
LICENSEE		Wireless Strategies, Inc.
Site Names	**A)** AMBERTON to **B)** ARNOLD	**C)** WSL001P LEGG to **D)** JESSUP
Call Signs	AMBERTON ARNOLD	WQGH696 WQGH697
Latitude	39 11 18.9 N 39 2 8.5 N	39 17 15.0 N 39 10 2
Longitude	76 44 55.5 W 76 29 18.7 W	76 36 56.0 W 76 46 3
Ground Elevation	48.10 m 39.90 m	6.60 m 67.10 m
Path Azimuth	126.94 ° 307.10 °	227.43 ° 47.33 °
Path Length	28.19 km / 17.52 mi	18.88 km / 11.73 mi
Receive Signal Level	RX_B = -36.48 dBm	RX_D = -11.90 dBm
	AMBERTON, MD - Interfering Transmitter (A)	**JESSUP, MD - Victim Receiver (D)**
RADIO		
Manufacturer	CERAGON NETWORKS	ALCATEL-LUCENT
Model	FIBEAIR IP-MAX2 HP	MDR-8606-135 & PA
Emission / Stability	28M0D7W 0.001 %	30M0D7W 0.001 %
Loading / Data Rate	1 CH DIG 200000.000 kbps	2016CH DIG 138800.000 kbps
Tx Power / Tx Loss	28.0 dBm 0.0 dB	Threshold = -70.0 dBm
ANTENNA		
Manufacturer	ANDREW CORPORATION	Wireless Strategies
Model	UHX10X-59D RF	AAS-106P
Gain	42.4 dBi	38.2 dBi
Centerline	60.00 m	85.30 m
Common Loss	10.0 dB	1.0 dB
FREQUENCY & POLARIZATION		
	6375.1400H	6375.1400V

Interfering Path Distance 3.00 km / 1.86 mi
Azimuth 233.02 °
Free Space Loss (FSPL) 117.8 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		106.09 °	80.0	80.0	80.0	80.0	0.00 / 33.68	NA	NA
Site D: AAS-106P		5.68 °	25.0	45.0	25.0	45.0			
Total Discrimination			105.0	105.0	105.0	105.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		113.3	113.3	113.3	**113.3**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		113.3	113.3	113.3	**113.3**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		113.3	113.3	113.3	**113.3**	**81.8**	NA	NA

Example 2 - Case 2

	INTERFERING PATH		VICTIM PATH	
LICENSEE			Wireless Strategies, Inc.	
Site Names	**A)** AMBERTON	to **B)** ARNOLD	**C)** JESSUP	to **D)** WSL001P LEGG
Call Signs	AMBERTON	ARNOLD	WQGH697	WQGH696
Latitude	39 11 18.9 N	39 2 8.5 N	39 10 20.4 N	39 17 1
Longitude	76 44 55.5 W	76 29 18.7 W	76 46 35.3 W	76 36 5
Ground Elevation	48.10 m	39.90 m	67.10 m	6.60 m
Path Azimuth	126.94 °	307.10 °	47.33 °	227.43 °
Path Length	28.19 km / 17.52 mi		18.88 km / 11.73 mi	
Receive Signal Level	RX_B = -36.48 dBm		RX_D = -11.90 dBm	
AMBERTON, MD - Interfering Transmitter (A)			**WSL001P LEGG, MD - Victim Receiver (D)**	
RADIO				
Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135 & PA	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX10X-59D RF		AAS-106P	
Gain	42.4 dBi		38.2 dBi	
Centerline	60.00 m		162.00 m	
Common Loss	10.0 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	6375.1400H		6375.1400V	

Interfering Path Distance 15.90 km / 9.88 mi
Azimuth 46.28 °
Free Space Loss (FSPL) 132.3 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		279.34 °	69.8	80.0	68.1	80.0	0.00 / 33.68	NA	NA
Site D: AAS-106P		358.93 °	2.9	30.0	2.9	30.0			
Total Discrimination			72.6	82.9	71.0	82.9	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		95.4	105.7	93.8	**105.7**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		95.4	105.7	93.8	**105.7**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		95.4	105.7	93.8	**105.7**	**81.8**	NA	NA

Example 2 - Case 3

	INTERFERING PATH		VICTIM PATH	
LICENSEE			Wireless Strategies, Inc.	
Site Names	**A)** ARNOLD	to **B)** AMBERTON	**C)** WSL001P LEGG	to **D)** JESSUP
Call Signs	ARNOLD	AMBERTON	WQGH696	WQGH697
Latitude	39 2 8.5 N	39 11 18.9 N	39 17 15.0 N	39 10 2
Longitude	76 29 18.7 W	76 44 55.5 W	76 36 56.0 W	76 46 3
Ground Elevation	39.90 m	48.10 m	6.60 m	67.10 m
Path Azimuth	307.10 °	126.94 °	227.43 °	47.33 °
Path Length	28.19 km / 17.52 mi		18.88 km / 11.73 mi	
Receive Signal Level	RX_B = -36.48 dBm		RX_D = -11.90 dBm	
	ARNOLD, MD - Interfering Transmitter (A)		**JESSUP, MD - Victim Receiver (D)**	
RADIO				
Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135 & PA	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX10X-59D RF		AAS-106P	
Gain	42.4 dBi		38.2 dBi	
Centerline	60.00 m		85.30 m	
Common Loss	2.0 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	6123.1000H		6123.1000V	

Interfering Path Distance 29.16 km / 18.12 mi
Azimuth 301.43 °
Free Space Loss (FSPL) 137.6 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		354.33 °	35.4	60.9	34.5	58.9	0.00 / 33.68	NA	NA
Site D: AAS-106P		73.92 °	42.0	55.0	42.0	55.0			
Total Discrimination			77.4	90.4	76.5	89.5	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		97.5	110.5	96.6	**109.6**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		97.5	110.5	96.6	**109.6**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		97.5	110.5	96.6	**109.6**	**81.8**	NA	NA

Example 2 - Case 4

	INTERFERING PATH		VICTIM PATH	
LICENSEE			Wireless Strategies, Inc.	
Site Names	**A)** ARNOLD	to **B)** AMBERTON	**C)** JESSUP	to **D)** WSL001P LEGG
Call Signs	ARNOLD	AMBERTON	WQGH697	WQGH696
Latitude	39 2 8.5 N	39 11 18.9	N	39 10 20.4 N	39 17 1
Longitude	76 29 18.7 W	76 44 55.5	W	76 46 35.3 W	76 36 5
Ground Elevation	39.90 m	48.10 m	67.10 m	6.60 m
Path Azimuth	307.10 °	126.94 °	47.33 °	227.43 °
Path Length	28.19 km / 17.52 mi		18.88 km / 11.73 mi	
Receive Signal Level	RX_B = -36.48 dBm		RX_D = -11.90 dBm	
ARNOLD, MD - Interfering Transmitter (A)			**WSL001P LEGG, MD - Victim Receiver (D)**	
RADIO				
Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135 & PA	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX10X-59D RF		AAS-106P	
Gain	42.4 dBi		38.2 dBi	
Centerline	60.00 m		162.00 m	
Common Loss	2.0 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	6123.1000H		6123.1000V	

Interfering Path Distance 30.03 km / 18.66 mi
Azimuth 338.60 °
Free Space Loss (FSPL) 137.8 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		31.49 °	57.1	68.7	56.5	68.2	0.00 / 33.68	NA	NA
Site D: AAS-106P		291.09 °	42.0	55.0	42.0	55.0			
Total Discrimination			99.1	110.7	98.5	110.2	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		119.4	131.0	118.8	**130.5**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		119.4	131.0	118.8	**130.5**	**91.8**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		119.4	131.0	118.8	**130.5**	**81.8**	NA	NA

Example 2 - Case 5

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** JESSUP	to **B)** WSL001P LEGG	**C)** AMBERTON	to **D)** ARNOLD
Call Signs	WQGH697	WQGH696	AMBERTON	ARNOLD
Latitude	39 10 20.4 N	39 17 15.0	N 39 11 18.9 N	39 2 8
Longitude	76 46 35.3 W	76 36 56.0	W 76 44 55.5 W	76 29 1
Ground Elevation	67.10 m	6.60 m	48.10 m	39.90 m
Path Azimuth	47.33 °	227.43 °	126.94 °	307.10 °
Path Length	18.88 km / 11.73 mi		28.19 km / 17.52 mi	
Receive Signal Level	RX_B = -11.90 dBm		RX_D = -36.48 dBm	

	JESSUP, MD - Interfering Transmitter (A)		ARNOLD, MD - Victim Receiver (D)	
RADIO				
Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135 & PA		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	47.5 dBm	0.0 dB	Threshold = -63.0 dBm	
ANTENNA				
Manufacturer	Wireless Strategies		ANDREW CORPORATION	
Model	AAS-106P		UHX10X-59D RF	
Gain	38.2 dBi		42.4 dBi	
Centerline	85.30 m		60.00 m	
Common Loss	1.0 dB		2.0 dB	
FREQUENCY & POLARIZATION				
	6375.1400V		6375.1400H	

Interfering Path Distance 29.16 km / 18.12 mi
Azimuth 121.25 °
Free Space Loss (FSPL) 137.6 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		73.92 °	42.0	55.0	42.0	55.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		354.33 °	35.4	60.9	34.5	58.9			
Total Discrimination			77.4	89.5	76.5	90.4	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		53.4	**65.5**	52.5	66.4	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		53.4	**65.5**	52.5	66.4	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		53.4	**65.5**	52.5	66.4	**51.7**	NA	NA

Example 2 - Case 6

	INTERFERING PATH	VICTIM PATH
LICENSEE	Wireless Strategies, Inc.	
Site Names	**A)** WSL001P LEGG to **B)** JESSUP	**C)** AMBERTON to **D)** ARNOLD
Call Signs	WQGH696 WQGH697	AMBERTON ARNOLD
Latitude	39 17 15.0 N 39 10 20.4	N 39 11 18.9 N 39 2 8
Longitude	76 36 56.0 W 76 46 35.3	W 76 44 55.5 W 76 29 1
Ground Elevation	6.60 m 67.10 m	48.10 m 39.90 m
Path Azimuth	227.43 ° 47.33 °	126.94 ° 307.10 °
Path Length	18.88 km / 11.73 mi	28.19 km / 17.52 mi
Receive Signal Level	RX_B = -11.90 dBm	RX_D = -36.48 dBm

	WSL001P LEGG, MD - Interfering Transmitter (A)	ARNOLD, MD - Victim Receiver (D)
RADIO		
Manufacturer	ALCATEL-LUCENT	CERAGON NETWORKS
Model	MDR-8606-135 & PA	FIBEAIR IP-MAX2 HP
Emission / Stability	30M0D7W 0.001 %	28M0D7W 0.001 %
Loading / Data Rate	2016CH DIG 138800.000 kbps	1 CH DIG 200000.000 kbps
Tx Power / Tx Loss	47.5 dBm 0.0 dB	Threshold = -63.0 dBm
ANTENNA		
Manufacturer	Wireless Strategies	ANDREW CORPORATION
Model	AAS-106P	UHX10X-59D RF
Gain	38.2 dBi	42.4 dBi
Centerline	162.00 m	60.00 m
Common Loss	1.0 dB	2.0 dB
FREQUENCY & POLARIZATION		
	6375.1400V	6375.1400H

Interfering Path Distance 30.03 km / 18.66 mi
Azimuth 158.52 °
Free Space Loss (FSPL) 137.8 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		291.09 °	42.0	55.0	42.0	55.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		31.49 °	57.1	68.7	56.5	68.2			
Total Discrimination			99.1	110.2	98.5	110.7	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		75.4	**86.5**	74.7	87.0	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		75.4	**86.5**	74.7	87.0	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		75.4	**86.5**	74.7	87.0	**51.7**	NA	NA

Example 2 - Case 7

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** JESSUP	to **B)** WSL001P LEGG	**C)** ARNOLD	to **D)** AMBERTON
Call Signs	WQGH697	WQGH696	ARNOLD	AMBERTON
Latitude	39 10 20.4 N	39 17 15.0	N	39 2 8.5 N	39 11 1
Longitude	76 46 35.3 W	76 36 56.0	W	76 29 18.7 W	76 44 5
Ground Elevation	67.10 m	6.60 m	39.90 m	48.10 m	
Path Azimuth	47.33 °	227.43 °	307.10 °	126.94 °	
Path Length	18.88 km / 11.73 mi		28.19 km / 17.52 mi	
Receive Signal Level	RX_B = -11.90 dBm		RX_D = -36.48 dBm	
	JESSUP, MD - Interfering Transmitter (A)		**AMBERTON, MD - Victim Receiver (D)**	
RADIO				
Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135 & PA		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	47.5 dBm	0.0 dB	Threshold = -63.0 dBm	
ANTENNA				
Manufacturer	Wireless Strategies		ANDREW CORPORATION	
Model	AAS-106P		UHX10X-59D RF	
Gain	38.2 dBi		42.4 dBi	
Centerline	85.30 m		60.00 m	
Common Loss	1.0 dB		10.0 dB	
FREQUENCY & POLARIZATION				
	6123.1000V		6123.1000H	

Interfering Path Distance 3.00 km / 1.86 mi
Azimuth 53.01 °
Free Space Loss (FSPL) 117.8 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		5.68 °	25.0	45.0	25.0	45.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		106.09 °	80.0	80.0	80.0	80.0			
Total Discrimination			105.0	105.0	105.0	105.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		69.2	**69.2**	69.2	69.2	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		69.2	**69.2**	69.2	69.2	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		69.2	**69.2**	69.2	69.2	**51.7**	NA	NA

Example 2 - Case 8

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.			
Site Names	**A)** WSL001P LEGG	to **B)** JESSUP	**C)** ARNOLD	to **D)** AMBERTON
Call Signs	WQGH696	WQGH697	ARNOLD	AMBERTON
Latitude	39 17 15.0 N	39 10 20.4	N	39 2 8.5 N	39 11 1
Longitude	76 36 56.0 W	76 46 35.3	W	76 29 18.7 W	76 44 5
Ground Elevation	6.60 m	67.10 m	39.90 m	48.10 m	
Path Azimuth	227.43 °	47.33 °	307.10 °	126.94 °	
Path Length	18.88 km / 11.73 mi		28.19 km / 17.52 mi	
Receive Signal Level	RX_B = -11.90 dBm		RX_D = -36.48 dBm	

	WSL001P LEGG, MD - Interfering Transmitter (A)	AMBERTON, MD - Victim Receiver (D)
RADIO		
Manufacturer	ALCATEL-LUCENT	CERAGON NETWORKS
Model	MDR-8606-135 & PA	FIBEAIR IP-MAX2 HP
Emission / Stability	30M0D7W 0.001 %	28M0D7W 0.001 %
Loading / Data Rate	2016CH DIG 138800.000 kbps	1 CH DIG 200000.000 kbps
Tx Power / Tx Loss	47.5 dBm 0.0 dB	Threshold = -63.0 dBm
ANTENNA		
Manufacturer	Wireless Strategies	ANDREW CORPORATION
Model	AAS-106P	UHX10X-59D RF
Gain	38.2 dBi	42.4 dBi
Centerline	162.00 m	60.00 m
Common Loss	1.0 dB	10.0 dB
FREQUENCY & POLARIZATION		
	6123.1000V	6123.1000H

Interfering Path Distance 15.90 km / 9.88 mi
Azimuth 226.36 °
Free Space Loss (FSPL) 132.3 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		358.93 °	2.9	30.0	2.9	30.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		279.34 °	69.8	80.0	68.1	80.0			
Total Discrimination			72.6	82.9	71.0	82.9	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		51.4	**61.6**	49.7	61.6	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		51.4	**61.6**	49.7	61.6	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		51.4	**61.6**	49.7	61.6	**51.7**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**61.7**		**-0.1**		

Example 2 - Case 9

INTERFERING PATH		VICTIM PATH	
LICENSEE			
Site Names	**A)** DRE2 to **B)** JESSUP	**C)** ARNOLD to **D)** AMBERTON	
Call Signs	DRE2 JESSUP	ARNOLD AMBERTON	
Latitude	39 11 5.5 N 39 10 20.4	N 39 2 8.5 N 39 11 1	
Longitude	76 44 32.1 W 76 46 35.3	W 76 29 18.7 W 76 44 5	
Ground Elevation	34.20 m 67.10 m	39.90 m 48.10 m	
Path Azimuth	244.82 ° 64.80 °	307.10 ° 126.94 °	
Path Length	3.27 km / 2.03 mi	28.19 km / 17.52 mi	
Receive Signal Level	RX_B = -53.87 dBm	RX_D = -36.48 dBm	
DRE2, MD - Interfering Transmitter (A)		**AMBERTON, MD - Victim Receiver (D)**	
RADIO			
Manufacturer	ALCATEL-LUCENT	CERAGON NETWORKS	
Model	MDR-8606-135 & PA	FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W 0.001 %	28M0D7W 0.001 %	
Loading / Data Rate	2016CH DIG 138800.000 kbps	1 CH DIG 200000.000 kbps	
Tx Power / Tx Loss	10.0 dBm 0.0 dB	Threshold = -63.0 dBm	
ANTENNA			
Manufacturer	Wireless Strategies	ANDREW CORPORATION	
Model	AAS-106S	UHX10X-59D RF	
Gain	16.5 dBi	42.4 dBi	
Centerline	40.00 m	60.00 m	
Common Loss	0.0 dB	10.0 dB	
FREQUENCY & POLARIZATION			
	6123.1000V		6123.1000H
Interfering Path Distance		0.70 km / 0.43 mi	
Azimuth		306.35 °	
Free Space Loss (FSPL)		105.1 dB	

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106S		61.53 °	0.7	25.0	0.7	25.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		359.41 °	4.3	38.0	1.7	38.0			
Total Discrimination			5.0	26.7	2.4	29.3	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		14.8	**36.5**	12.1	39.1	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		14.8	**36.5**	12.1	39.1	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		14.8	**36.5**	12.1	39.1	**51.7**	NA	NA

C/I Summary — **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**61.7**		**-25.2**		

Example 2 - Case 10

INTERFERING PATH	VICTIM PATH

LICENSEE

	A)	B)	C)	D)
Site Names	DRE3 to	JESSUP	ARNOLD to	AMBERTON
Call Signs	DRE3	JESSUP	ARNOLD	AMBERTON
Latitude	39 10 40.0 N	39 10 20.4 N	39 2 8.5 N	39 11 18.9 N
Longitude	76 43 48.9 W	76 46 35.3 W	76 29 18.7 W	76 44 55.5 W
Ground Elevation	43.10 m	67.10 m	39.90 m	48.10 m
Path Azimuth	261.41 °	81.38 °	307.10 °	126.94 °
Path Length	4.04 km / 2.51 mi		28.19 km / 17.52 mi	
Receive Signal Level	RX_B = -55.71 dBm		RX_D = -36.48 dBm	

DRE3, MD - Interfering Transmitter (A)

AMBERTON, MD - Victim Receiver (D)

RADIO

Manufacturer	ALCATEL-LUCENT		CERAGON NETWORKS	
Model	MDR-8606-135 & PA		FIBEAIR IP-MAX2 HP	
Emission / Stability	30M0D7W	0.001 %	28M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	1 CH DIG	200000.000 kbps
Tx Power / Tx Loss	10.0 dBm	0.0 dB	Threshold = -63.0 dBm	

ANTENNA

Manufacturer	Wireless Strategies	ANDREW CORPORATION
Model	AAS-106S	UHX10X-59D RF
Gain	16.5 dBi	42.4 dBi
Centerline	60.00 m	60.00 m
Common Loss	0.0 dB	10.0 dB

FREQUENCY & POLARIZATION

6123.1000V	6123.1000H

Interfering Path Distance	2.00 km / 1.24 mi
Azimuth	306.89 °
Free Space Loss (FSPL)	114.3 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106S		45.48 °	0.3	25.0	0.3	25.0	0.00 / 35.18	NA	NA
Site D: UHX10X-59D RF		359.94 °	0.4	38.0	0.2	38.0			
Total Discrimination			0.7	25.2	0.4	25.4	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		19.6	**44.1**	19.3	44.3	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		19.6	**44.1**	19.3	44.3	**61.7**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		19.6	**44.1**	19.3	44.3	**51.7**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**61.7**		**-17.6**		

Example 2 - Case 11

INTERFERING PATH **VICTIM PATH**

LICENSEE

Site Names	**A)** AMBERTON	to	**B)** ARNOLD	**C)** JESSUP	to	**D)** DRE2	
Call Signs	AMBERTON		ARNOLD	JESSUP		DRE2	
Latitude	39 11 18.9 N		39 2 8.5 N	39 10 20.4 N		39 11 5.5 N	
Longitude	76 44 55.5 W		76 29 18.7 W	76 46 35.3 W		76 44 32.1 W	
Ground Elevation	48.10 m		39.90 m	67.10 m		34.20 m	
Path Azimuth	126.94 °		307.10 °	64.80 °		244.82 °	
Path Length	28.19 km / 17.52 mi			3.27 km / 2.03 mi			
Receive Signal Level	RX_B = -36.48 dBm			RX_D = -53.87 dBm			

AMBERTON, MD - Interfering Transmitter (A)

DRE2, MD - Victim Receiver (D)

RADIO

Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135 & PA	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	

ANTENNA

Manufacturer	ANDREW CORPORATION	Wireless Strategies
Model	UHX10X-59D RF	AAS-106S
Gain	42.4 dBi	16.5 dBi
Centerline	60.00 m	40.00 m
Common Loss	10.0 dB	0.0 dB

FREQUENCY & POLARIZATION

6375.1400H

6375.1400V

Interfering Path Distance 0.70 km / 0.43 mi
Azimuth 126.34 °
Free Space Loss (FSPL) 105.1 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		359.41 °	4.3	38.0	1.7	38.0	0.00 / 33.68	NA	NA
Site D: AAS-106S		61.53 °	0.7	25.0	0.7	25.0			
Total Discrimination			5.0	29.3	2.4	26.7	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		-20.6	3.7	-23.3	**1.1**	**49.8**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		-20.6	3.7	-23.3	**1.1**	**49.8**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		-20.6	3.7	-23.3	**1.1**	**39.8**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**49.8**				**-48.7**

Example 2 - Case 12

INTERFERING PATH **VICTIM PATH**

LICENSEE

Site Names	**A)** AMBERTON	to **B)** ARNOLD	**C)** JESSUP	to **D)** DRE3
Call Signs	AMBERTON	ARNOLD	JESSUP	DRE3
Latitude	39 11 18.9 N	39 2 8.5 N	39 10 20.4 N	39 10 40.0 N
Longitude	76 44 55.5 W	76 29 18.7 W	76 46 35.3 W	76 43 48.9 W
Ground Elevation	48.10 m	39.90 m	67.10 m	43.10 m
Path Azimuth	126.94 °	307.10 °	81.38 °	261.41 °
Path Length	28.19 km / 17.52 mi		4.04 km / 2.51 mi	
Receive Signal Level	RX_B = -36.48 dBm		RX_D = -55.71 dBm	

AMBERTON, MD - Interfering Transmitter (A)

DRE3, MD - Victim Receiver (D)

RADIO

Manufacturer	CERAGON NETWORKS		ALCATEL-LUCENT	
Model	FIBEAIR IP-MAX2 HP		MDR-8606-135 & PA	
Emission / Stability	28M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	1 CH DIG	200000.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	28.0 dBm	0.0 dB	Threshold = -70.0 dBm	

ANTENNA

Manufacturer	ANDREW CORPORATION	Wireless Strategies
Model	UHX10X-59D RF	AAS-106S
Gain	42.4 dBi	16.5 dBi
Centerline	60.00 m	60.00 m
Common Loss	10.0 dB	0.0 dB

FREQUENCY & POLARIZATION

6375.1400H

6375.1400V

Interfering Path Distance 2.00 km / 1.24 mi
Azimuth 126.88 °
Free Space Loss (FSPL) 114.3 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX10X-59D RF		359.94 °	0.4	38.0	0.2	38.0	0.00 / 33.68	NA	NA
Site D: AAS-106S		45.48 °	0.3	25.0	0.3	25.0			
Total Discrimination			0.7	25.4	0.4	25.2	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		-17.6	7.1	-17.9	**6.9**	**48.0**	NA	NA
0.0 dB OH Loss	**C/I (20%)**		-17.6	7.1	-17.9	**6.9**	**48.0**	NA	NA
0.0 dB OH Loss	**C/I (0.01%)**		-17.6	7.1	-17.9	**6.9**	**38.0**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**48.0**				**-41.1**

Example 3 - Case 1

INTERFERING PATH **VICTIM PATH**

LICENSEE	Wireless Strategies, Inc.		New Licensee.	
Site Names	**A)** BA TOWER	to **B)** MT LAUREL	**C)** SITE 2	to **D)** COMCAST TWR
Call Signs	WQHD218	WQHD217	SITE2	COMCASTT
Latitude	39 57 19.5 N	39 57 52.4 N	40 8 26.9 N	39 57 17.4 N
Longitude	75 10 8.4 W	74 53 45.6 W	74 52 44.8 W	75 10 6.4 W
Ground Elevation	11.28 m	9.15 m	18.80 m	10.20 m
Path Azimuth	87.42 °	267.60 °	230.19 °	50.00 °
Path Length	23.35 km / 14.51 mi		32.19 km / 20.00 mi	
Receive Signal Level	RX_B = -31.25 dBm		RX_D = -36.53 dBm	

BA TOWER, PA - Interfering Transmitter (A)

COMCAST TWR, PA - Victim Receiver (D)

RADIO

Manufacturer	ALCATEL-LUCENT		ALCATEL-LUCENT	
Model	MDR-8606-135		MDR-8606-135	
Emission / Stability	30M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	30.0 dBm	0.0 dB	Threshold = -70.0 dBm	

ANTENNA

			Receive
Manufacturer	Wireless Strategies		ANDREW CORPORATION
Model	AAS-106P		UHX8-59J LF
Gain	38.2 dBi		41.3 dBi
Centerline	225.25 m		297.18 m
Common Loss	1.0 dB		7.2 dB

FREQUENCY & POLARIZATION

5945.2000V	5945.2000V

Interfering Path Distance 0.08 km / 0.05 mi
Azimuth 143.76 °
Free Space Loss (FSPL) 86.4 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		56.34 °	42.0	55.0	42.0	55.0	0.00 / 33.70	NA	NA
Site D: UHX8-59J LF		273.76 °	76.6	80.0	76.6	80.0			
Total Discrimination			118.6	122.0	118.6	122.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**67.2**	70.5	67.2	70.5	**67.2**	NA	NA
NA dB OH Loss	**C/I (20%)**		NA	NA	NA	NA	**NA**	NA	NA
NA dB OH Loss	**C/I (0.01%)**		NA	NA	NA	NA	**NA**	NA	NA

Example 3 – Case 2

INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.	Wireless Strategies, Inc.	
Site Names	**A)** MT LAUREL to **B)** BA TOWER	**C)** COMCAST TWR to **D)** SITE 2	
Call Signs	WQHD217 WQHD218	COMCASTT SITE2	
Latitude	39 57 52.4 N 39 57 19.5	N 39 57 17.4 N 40 8 2	
Longitude	74 53 45.6 W 75 10 8.4	W 75 10 6.4 W 74 52 4	
Ground Elevation	9.15 m 11.28 m	10.20 m 18.80 m	
Path Azimuth	267.60 ° 87.42 °	50.00 ° 230.19 °	
Path Length	23.35 km / 14.51 mi	32.19 km / 20.00 mi	
Receive Signal Level	RX_B = -31.25 dBm	RX_D = -36.53 dBm	
MT LAUREL, NJ - Interfering Transmitter (A)		**SITE 2, PA - Victim Receiver (D)**	
RADIO			
Manufacturer	ALCATEL-LUCENT	ALCATEL-LUCENT	
Model	MDR-8606-135	MDR-8606-135	
Emission / Stability	30M0D7W 0.001 %	30M0D7W 0.001 %	
Loading / Data Rate	2016CH DIG 138800.000 kbps	2016CH DIG 138800.000 kbps	
Tx Power / Tx Loss	30.0 dBm 0.0 dB	Threshold = -70.0 dBm	
ANTENNA			
Manufacturer	Wireless Strategies	ANDREW CORPORATION	
Model	AAS-106P	UHX6-59K RF	
Gain	38.2 dBi	38.8 dBi	
Centerline	51.21 m	51.21 m	
Common Loss	1.0 dB	1.0 dB	
FREQUENCY & POLARIZATION			
	6197.2400V	6197.2400V	

Interfering Path Distance 19.62 km / 12.19 mi
Azimuth 4.21 °
Free Space Loss (FSPL) 134.1 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: AAS-106P		96.61 °	42.0	55.0	42.0	55.0	0.00 / 33.70	NA	NA
Site D: UHX6-59K RF		314.03 °	58.4	69.0	55.4	67.6			
Total Discrimination			100.4	109.6	97.4	111.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**93.0**	102.2	90.0	103.6	**67.2**	NA	NA
NA dB OH Loss	**C/I (20%)**		NA	NA	NA	NA	**NA**	NA	NA
NA dB OH Loss	**C/I (0.01%)**		NA	NA	NA	NA	**NA**	NA	NA

Example 3 – Case 3

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.		Wireless Strategies, Inc.	
Site Names	**A)** COMCAST TWR	to **B)** SITE 2	**C)** MT LAUREL	to **D)** BA TOWER
Call Signs	COMCASTT	SITE2	WQHD217	WQHD218
Latitude	39 57 17.4 N	40 8 26.9 N	39 57 52.4 N	39 57 1
Longitude	75 10 6.4 W	74 52 44.8 W	74 53 45.6 W	75 10 8
Ground Elevation	10.20 m	18.80 m	9.15 m	11.28 m
Path Azimuth	50.00 °	230.19 °	267.60 °	87.42 °
Path Length	32.19 km / 20.00 mi		23.35 km / 14.51 mi	
Receive Signal Level	RX_B = -36.53 dBm		RX_D = -31.25 dBm	

	COMCAST TWR, PA - Interfering Transmitter (A)		BA TOWER, PA - Victim Receiver (D)	
RADIO				
Manufacturer	ALCATEL-LUCENT		ALCATEL-LUCENT	
Model	MDR-8606-135		MDR-8606-135	
Emission / Stability	30M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	20.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX8-59J LF		AAS-106P	
Gain	41.3 dBi		38.2 dBi	
Centerline	297.18 m		225.25 m	
Common Loss	7.2 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	6197.2400V		6197.2400V	

Interfering Path Distance 0.08 km / 0.05 mi
Azimuth 323.76 °
Free Space Loss (FSPL) 86.4 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX8-59J LF		273.76 °	76.6	80.0	76.6	80.0	0.00 / 33.70	NA	NA
Site D: AAS-106P		56.34 °	42.0	55.0	42.0	55.0			
Total Discrimination			118.6	122.0	118.6	122.0	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**82.5**	85.8	82.5	85.8	**72.5**	NA	NA
NA dB OH Loss	**C/I (20%)**		NA	NA	NA	NA	**NA**	NA	NA
NA dB OH Loss	**C/I (0.01%)**		NA	NA	NA	NA	**NA**	NA	NA

Example 3 – Case 4

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.		Wireless Strategies, Inc.	
Site Names	**A)** SITE 2	to **B)** COMCAST TWR	**C)** BA TOWER	to **D)** MT LAUREL
Call Signs	SITE2	COMCASTT	WQHD218	WQHD217
Latitude	40 8 26.9 N	39 57 17.4	N 39 57 19.5 N	39 57 5
Longitude	74 52 44.8 W	75 10 6.4	W 75 10 8.4 W	74 53 4
Ground Elevation	18.80 m	10.20 m	11.28 m	9.15 m
Path Azimuth	230.19 °	50.00 °	87.42 °	267.60 °
Path Length	32.19 km / 20.00 mi		23.35 km / 14.51 mi	
Receive Signal Level	RX_B = -36.53 dBm		RX_D = -31.25 dBm	

	SITE 2, PA - Interfering Transmitter (A)		MT LAUREL, NJ - Victim Receiver (D)	
RADIO				
Manufacturer	ALCATEL-LUCENT		ALCATEL-LUCENT	
Model	MDR-8606-135		MDR-8606-135	
Emission / Stability	30M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	20.0 dBm	0.0 dB	Threshold = -70.0 dBm	
ANTENNA				
Manufacturer	ANDREW CORPORATION		Wireless Strategies	
Model	UHX6-59K RF		AAS-106P	
Gain	38.8 dBi		38.2 dBi	
Centerline	51.21 m		51.21 m	
Common Loss	1.0 dB		1.0 dB	
FREQUENCY & POLARIZATION				
	5945.2000V		5945.2000V	

Interfering Path Distance 19.62 km / 12.19 mi
Azimuth 184.22 °
Free Space Loss (FSPL) 134.1 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: UHX6-59K RF		314.03 °	58.4	69.0	55.4	67.6	0.00 / 33.70	NA	NA
Site D: AAS-106P		96.61 °	42.0	55.0	42.0	55.0			
Total Discrimination			100.4	111.0	97.4	109.6	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**108.3**	118.9	105.3	117.5	**72.5**	NA	NA
NA dB OH Loss	**C/I (20%)**		NA	NA	NA	NA	**NA**	NA	NA
NA dB OH Loss	**C/I (0.01%)**		NA	NA	NA	NA	**NA**	NA	NA

Example 3 - Case 5

	INTERFERING PATH		VICTIM PATH	
LICENSEE	Wireless Strategies, Inc.		New Licensee.	
Site Names	**A)** DRE 500	to **B)** BA TOWER	**C)** SITE 2	to **D)** COMCAST TWR
Call Signs	DRE500	WQHD218	SITE2	COMCASTT
Latitude	39 57 19.4 N	39 57 19.5	N	40 8 26.9 N	39 57 1
Longitude	75 10 3.3 W	75 10 8.4	W	74 52 44.8 W	75 10 6
Ground Elevation	10.70 m	11.28 m	18.80 m	10.20 m
Path Azimuth	271.46 °	91.46 °	230.19 °	50.00 °
Path Length	0.12 km / 0.08 mi		32.19 km / 20.00 mi	
Receive Signal Level	RX_B = -74.44 dBm		RX_D = -36.53 dBm	
	DRE 500, PA - Interfering Transmitter (A)		**COMCAST TWR, PA - Victim Receiver (D)**	
RADIO				
Manufacturer	ALCATEL-LUCENT		ALCATEL-LUCENT	
Model	MDR-8606-135		MDR-8606-135	
Emission / Stability	30M0D7W	0.001 %	30M0D7W	0.001 %
Loading / Data Rate	2016CH DIG	138800.000 kbps	2016CH DIG	138800.000 kbps
Tx Power / Tx Loss	0.0 dBm	29.0 dB	Threshold = -70.0 dBm	
ANTENNA			Receive	
Manufacturer	ANDREW CORPORATION		ANDREW CORPORATION	
Model	P2-57W RF		UHX8-59J LF	
Gain	29.3 dBi		41.3 dBi	
Centerline	297.18 m		297.18 m	
Common Loss	1.0 dB		7.2 dB	
FREQUENCY & POLARIZATION				
	5945.2000V		5945.2000V	

Interfering Path Distance 0.10 km / 0.06 mi
Azimuth 230.03 °
Free Space Loss (FSPL) 87.9 dB

Antenna Model		Disc Angle	VV	VH	HH	HV	Separation (MHz) / T/I Obj		
Site A: P2-57W RF		318.57 °	28.3	42.6	29.5	37.5	0.00 / 33.70	NA	NA
Site D: UHX8-59J LF		0.03 °	0.1	33.0	0.1	33.0			
Total Discrimination			28.4	42.7	29.6	37.6	**Objective (dB)**		
Terrain Loss	**C/I Actual (FSPL)**		**46.4**	60.7	47.6	55.6	**67.2**	NA	NA
NA dB OH Loss	**C/I (20%)**		NA	NA	NA	NA	**NA**	NA	NA
NA dB OH Loss	**C/I (0.01%)**		NA	NA	NA	NA	**NA**	NA	NA

C/I Summary **Margin to Objective (dB)**

Separation (MHz)	C/I OBJ (dB)	VV	VH	HH	HV
0.00	**67.2**	**-20.8**			

Appendix B – Path Data for Example 1

Administrative Information	**PHILA PA**	**MAPLE NJ**
City/County	Philadelphia/Philadelphia	/Burlington
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY
OPERATION		
Call Sign		
Licensee Code		
Licensee Name		
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 22.1” N	39 ° 56’ 18.3” N
Longitude (NAD 83)	75 ° 9’ 43.3” W	74 ° 58’ 2.4” W
Ground Elevation (m/ft-AMSL)	13.90 / 45.6	14.00 / 45.9
Antenna Structure Registration #		
Path Azimuth (°)	96.682	276.807
Path Length (km / miles)	16.755 / 10.411	
Transmit Antenna	A74250	A74250
Manufacturer	ANDREW CORPORATION	ANDREW CORPORATION
Model	UHX10X-59D RF	UHX10X-59D RF
Gain (dBi) / Beamwidth (°) / Tilt (°)	42.4 / 1.10 / -0.06	42.4 / 1.10 / -0.06
Centerline (m / ft - AGL)	60.00 / 196.9	60.00 / 196.9
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMR78	TEMR78
Manufacturer	CERAGON NETWORKS	CERAGON NETWORKS
Model	FIBEAIR IP-MAX2 HP	FIBEAIR IP-MAX2 HP
Model Description	GigE & (8XT1) 256 QAM	GigE & (8XT1) 256 QAM
Emission Designator / Modulation	28M0D7W 256 QAM	28M0D7W 256
QAM		
Loading	1 CH DIG 200000.000	1 CH DIG 200000.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated
	Maximum	
Power (dBm)	28.0	28.0
Received Level (dBm)	-24.8	-24.8
EIRP (dBm)	68.0	68.0
Fixed Loss: Tx / Common (dB)	0.0 / 2.4	0.0 / 2.4
Free Space Loss (dB)	132.8	
Transmit Frequencies (MHz)	6197.2400V(21T)	5945.2000V(11T)

Administrative Information	**BA TOWER PA**	**MT LAUREL NJ**
City/County	Philadelphia/Philadelphia	/Burlington
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY
OPERATION		
Call Sign	WQHD218	WQHD217
Licensee Code	WIREST	WIREST
Licensee Name	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 19.5” N	39 ° 57’ 52.4” N
Longitude (NAD 83)	75 ° 10’ 8.4” W	74 ° 53’ 45.6” W
Ground Elevation (m/ft-AMSL)	11.28 / 37.0	9.15 / 30.0
Antenna Structure Registration #		1062485
Path Azimuth (°)	87.422	267.597
Path Length (km / miles)	23.349 / 14.508	
Transmit Antenna	106P4W	106P4W
Manufacturer	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Model	AAS-106P	AAS-106P
Gain (dBi) / Beamwidth (°) / Tilt (°)	38.2 / 2.20 / -0.51	38.2 / 2.20 / 0.35
Centerline (m / ft - AGL)	225.25 / 739.0	51.21 / 168.0
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMX95	TEMX95
Manufacturer	ALCATEL-LUCENT	ALCATEL-LUCENT
Model	MDR-8606-135	MDR-8606-135
Model Description	MDR-8000	MDR-8000
Emission Designator / Modulation	30M0D7W 64 QAM	30M0D7W 64 QAM
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum Maximum	Nominal Coordinated
Power (dBm)	30.0	30.0
Received Level (dBm)	-31.2	-31.2
EIRP (dBm)	67.2	67.2
Fixed Loss: Tx / Common (dB)	0.0 / 1.0	0.0 / 1.0
Free Space Loss (dB)	135.6	
Transmit Frequencies (MHz)	5945.2000V(11T)	6197.2400V(21T)

Administrative Information	**SUB1 PA**	**BA TOWER PA**
City/County	Philadelphia/Philadelphia	Philadelphia/Philadelphia
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY OPERATION
Call Sign		WQHD218
Licensee Code	WIREST	WIREST
Licensee Name	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 18.3” N	39 ° 57’ 19.5” N
Longitude (NAD 83)	75 ° 9’ 1.5” W	75 ° 10’ 8.4” W
Ground Elevation (m/ft-AMSL)	11.50 / 37.7	11.28 / 37.0
Antenna Structure Registration #		
Path Azimuth (°)	271.341	91.329
Path Length (km / miles)	1.588 / 0.987	
Transmit Antenna	42892A	
Manufacturer	ANDREW CORPORATION	
Model	P2-57W RF	
Gain (dBi) / Beamwidth (°) / Tilt (°)	29.3 / 5.80 / 5.93	
Centerline (m / ft - AGL)	60.00 / 196.9	
Receive Antenna		106P4W
Manufacturer		Wireless Strategies, Inc.
Model		AAS-106P
Gain (dBi) / Beamwidth (°)		38.2 / 2.20
Centerline (m / ft - AGL)		225.25 / 739.0
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMX95	999999
Manufacturer	ALCATEL-LUCENT	RECEIVE
Model	MDR-8606-135	ONLY
Model Description	MDR-8000	
Emission Designator / Modulation	30M0D7W 64 QAM	
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated Maximum
Power (dBm)	10.0	
Received Level (dBm)		-55.8
EIRP (dBm)	18.3	
Fixed Loss: Tx / Common (dB)	20.0 / 1.0	0.0 / 0.0
Free Space Loss (dB)	112.3	
Transmit Frequencies (MHz)	5945.2000V(11T)	

Appendix C – Path Data for Example 2

Administrative Information	**WSL001P LEGG MD**			**JESSUP MD**	
Status / License Basis	License / PRIMARY OPERATION			License / PRIMARY OPERATION	
Call Sign	WQGH696			WQGH697	
Licensee Code	WIREST			WIREST	
Licensee Name	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Radio Service / Station Class	MG -- Microwave Industrial/Business Pool			FXO -- Fixed	
File Number / Application Date	0002828718	11/27/2006		0002828719	11/27/2006
Effective / Expiration Date	01/22/2007	01/22/2017		01/22/2007	
	01/22/2017				
Site Information					
Latitude (NAD 83)	39 ° 17’ 15.0” N			39 ° 10’ 20.4” N	
Longitude (NAD 83)	76 ° 36’ 56.0” W			76 ° 46’ 35.3” W	
Ground Elevation (m/ft-AMSL)	3.96 / 13.0			67.10 / 220.1	
Antenna Structure Registration #				1045861	
Path Azimuth (°)	227.432			47.330	
Path Length (km / miles)			18.882 / 11.733		
Transmit Antenna	106P4W			106P4W	
Manufacturer	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Model	AAS-106P			AAS-106P	
Gain (dBi) / Beamwidth (°) / Tilt (°)	38.2 / 2.20 / -0.10			38.2 / 2.20 / -0.02	
Centerline (m / ft - AGL)	162.00 / 531.5			85.30 / 279.9	
Receive Antenna	Same As Transmit				
Manufacturer					
Model					
Gain (dBi) / Beamwidth (°)					
Centerline (m / ft - AGL)					
Diversity Receive Antenna	106S4W			106S4W	
Manufacturer	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Model	AAS-106S			AAS-106S	
Gain (dBi) / Beamwidth (°)	16.5 / 163.00			16.5 / 163.00	
Centerline (m / ft - AGL)	162.00 / 531.5			85.30 / 279.9	
Radio Information	TEMJ96			TEMJ96	
Manufacturer	ALCATEL-LUCENT			ALCATEL-LUCENT	
Model	MDR-8606-135 & PA			MDR-8606-135 & PA	
Model Description	MDR-8000 WITH 60 WATT PA			MDR-8000 WITH 60 WATT PA	
Emission Designator / Modulation	30M0D7W	64 QAM		30M0D7W	64 QAM
Loading	2016CH DIG 138800.0			2016CH DIG 138800.0	
Stability (%)	0.001			0.001	
	Nominal	Coordinated	Maximum	Nominal	Coordinated
	Maximum				
Power (dBm)		47.5			47.5
Received Level (dBm)		-11.9			-11.9
EIRP (dBm)		84.7			84.7
Fixed Loss: Tx / Common (dB)	0.0 / 1.0			0.0 / 1.0	
Free Space Loss (dB)			133.8		
Transmit Frequencies (MHz)	6375.1400V(27T)			6123.1000V(17T)	

Administrative Information	**WSL001P LEGG MD**			**JESSUP MD**	
Status / License Basis	License / PRIMARY OPERATION			License / PRIMARY OPERATION	
Call Sign	WQGH696			WQGH697	
Licensee Code	WIREST			WIREST	
Licensee Name	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Radio Service / Station Class	MG -- Microwave Industrial/Business Pool			FXO -- Fixed	
File Number / Application Date	0002828718	11/27/2006		0002828719	11/27/2006
Effective / Expiration Date	01/22/2007	01/22/2017		01/22/2007	
	01/22/2017				
Site Information					
Latitude (NAD 83)	39 ° 17’ 15.0” N			39 ° 10’ 20.4” N	
Longitude (NAD 83)	76 ° 36’ 56.0” W			76 ° 46’ 35.3” W	
Ground Elevation (m/ft-AMSL)	3.96 / 13.0			67.10 / 220.1	
Antenna Structure Registration #				1045861	
Path Azimuth (°)	227.432			47.330	
Path Length (km / miles)			18.882 / 11.733		
Transmit Antenna	106P4W			106P4W	
Manufacturer	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Model	AAS-106P			AAS-106P	
Gain (dBi) / Beamwidth (°) / Tilt (°)	38.2 / 2.20 / -0.10			38.2 / 2.20 / -0.02	
Centerline (m / ft - AGL)	162.00 / 531.5			85.30 / 279.9	
Receive Antenna			Same As Transmit		
Manufacturer					
Model					
Gain (dBi) / Beamwidth (°)					
Centerline (m / ft - AGL)					
Diversity Receive Antenna	106S4W			106S4W	
Manufacturer	Wireless Strategies, Inc.			Wireless Strategies, Inc.	
Model	AAS-106S			AAS-106S	
Gain (dBi) / Beamwidth (°)	16.5 / 163.00			16.5 / 163.00	
Centerline (m / ft - AGL)	162.00 / 531.5			85.30 / 279.9	
Radio Information	TEMJ96			TEMJ96	
Manufacturer	ALCATEL-LUCENT			ALCATEL-LUCENT	
Model	MDR-8606-135 & PA			MDR-8606-135 & PA	
Model Description	MDR-8000 WITH 60 WATT PA			MDR-8000 WITH 60 WATT PA	
Emission Designator / Modulation	30M0D7W	64 QAM		30M0D7W	64 QAM
Loading	2016CH DIG 138800.0			2016CH DIG 138800.0	
Stability (%)	0.001			0.001	
	Nominal	Coordinated	Maximum	Nominal	Coordinated
	Maximum				
Power (dBm)		47.5			47.5
Received Level (dBm)		-11.9			-11.9
EIRP (dBm)		84.7			84.7
Fixed Loss: Tx / Common (dB)	0.0 / 1.0			0.0 / 1.0	
Free Space Loss (dB)			133.8		
Transmit Frequencies (MHz)	6123.1000V(17T)			6375.1400V(27T)	

Administrative Information	**AMBERTON MD**	**ARNOLD MD**
City/County	/Howard	Arnold/Anne Arundel
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY
OPERATION		
Call Sign		
Licensee Code		
Licensee Name		
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 11’ 18.9” N	39 ° 2’ 8.5” N
Longitude (NAD 83)	76 ° 44’ 55.5” W	76 ° 29’ 18.7” W
Ground Elevation (m/ft-AMSL)	48.10 / 157.8	39.90 / 130.9
Antenna Structure Registration #		
Path Azimuth (°)	126.939	307.103
Path Length (km / miles)	28.190 / 17.516	
Transmit Antenna	A74250	A74250
Manufacturer	ANDREW CORPORATION	ANDREW CORPORATION
Model	UHX10X-59D RF	UHX10X-59D RF
Gain (dBi) / Beamwidth (°) / Tilt (°)	42.4 / 1.10 / -0.11	42.4 / 1.10 / -0.08
Centerline (m / ft - AGL)	60.00 / 196.9	60.00 / 196.9
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMR78	TEMR78
Manufacturer	CERAGON NETWORKS	CERAGON NETWORKS
Model	FIBEAIR IP-MAX2 HP	FIBEAIR IP-MAX2 HP
Model Description	GigE & (8XT1) 256 QAM	GigE & (8XT1) 256 QAM
Emission Designator / Modulation	28M0D7W 256 QAM	28M0D7W 256
QAM		
Loading	1 CH DIG 200000.000	1 CH DIG 200000.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated
	Maximum	
Power (dBm)	28.0	28.0
Received Level (dBm)	-36.5	-36.5
EIRP (dBm)	60.4	68.4
Fixed Loss: Tx / Common (dB)	0.0 / 10.0	0.0 / 2.0
Free Space Loss (dB)	137.3	
Transmit Frequencies (MHz)	6375.1400H(27T)	6123.1000H(17T)

Administrative Information	**DRE2 MD**	**JESSUP MD**
City/County	/Howard	Jessup/Howard
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY
OPERATION		
Call Sign		
Licensee Code		
Licensee Name		
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 11’ 5.5” N	39 ° 10’ 20.4” N
Longitude (NAD 83)	76 ° 44’ 32.1” W	76 ° 46’ 35.3” W
Ground Elevation (m/ft-AMSL)	34.20 / 112.2	67.10 / 220.1
Antenna Structure Registration #		
Path Azimuth (°)	244.823	64.801
Path Length (km / miles)	3.268 / 2.031	
Transmit Antenna	106S4W	
Manufacturer	Wireless Strategies, Inc.	
Model	AAS-106S	
Gain (dBi) / Beamwidth (°) / Tilt (°)	16.5 / 163.00 / 1.36	
Centerline (m / ft - AGL)	40.00 / 131.2	
Receive Antenna		106P4W
Manufacturer		Wireless Strategies, Inc.
Model		AAS-106P
Gain (dBi) / Beamwidth (°)		38.2 / 2.20 / -1.38
Centerline (m / ft - AGL)		85.30 / 279.9
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMJ96	999999
Manufacturer	ALCATEL-LUCENT	RECEIVE
Model	MDR-8606-135 & PA	ONLY
Model Description	MDR-8000 WITH 60 WATT PA	
Emission Designator / Modulation	30M0D7W 64 QAM	
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated Maximum
Power (dBm)	10.0	
Received Level (dBm)		-53.9
EIRP (dBm)	26.5	
Fixed Loss: Tx / Common (dB)	0.0 / 0.0	0.0 / 0.0
Free Space Loss (dB)	118.6	
Transmit Frequencies (MHz)	6123.1000V(17T)	

Administrative Information	**DRE3 MD**	**JESSUP MD**
City/County	/Anne Arundel	Jessup/Howard
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY
OPERATION		
Call Sign		
Licensee Code		
Licensee Name		
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 10’ 40.0” N	39 ° 10’ 20.4” N
Longitude (NAD 83)	76 ° 43’ 48.9” W	76 ° 46’ 35.3” W
Ground Elevation (m/ft-AMSL)	43.10 / 141.4	67.10 / 220.1
Antenna Structure Registration #		
Path Azimuth (°)	261.410	81.381
Path Length (km / miles)	4.040 / 2.510	
Transmit Antenna	106S4W	
Manufacturer	Wireless Strategies, Inc.	
Model	AAS-106S	
Gain (dBi) / Beamwidth (°) / Tilt (°)	16.5 / 163.00 / 0.69	
Centerline (m / ft - AGL)	60.00 / 196.9	
Receive Antenna		106P4W
Manufacturer		Wireless Strategies, Inc.
Model		AAS-106P
Gain (dBi) / Beamwidth (°)		38.2 / 2.20 / -0.71
Centerline (m / ft - AGL)		85.30 / 279.9
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMJ96	999999
Manufacturer	ALCATEL-LUCENT	RECEIVE
Model	MDR-8606-135 & PA	ONLY
Model Description	MDR-8000 WITH 60 WATT PA	
Emission Designator / Modulation	30M0D7W 64 QAM	
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated Maximum
Power (dBm)	10.0	
Received Level (dBm)		-55.7
EIRP (dBm)	26.5	
Fixed Loss: Tx / Common (dB)	0.0 / 0.0	0.0 / 0.0
Free Space Loss (dB)	120.4	
Transmit Frequencies (MHz)	6123.1000V(17T)	

Appendix D – Path Data for Example 3

Administrative Information	**BA TOWER PA**	**MT LAUREL NJ**
City/County	Philadelphia/Philadelphia	/Burlington
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY OPERATION
Call Sign	WQHD218	WQHD217
Licensee Code	WIREST	WIREST
Licensee Name	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 19.5” N	39 ° 57’ 52.4” N
Longitude (NAD 83)	75 ° 10’ 8.4” W	74 ° 53’ 45.6” W
Ground Elevation (m/ft-AMSL)	11.28 / 37.0	9.15 / 30.0
Antenna Structure Registration #		1062485
Path Azimuth (°)	87.422	267.597
Path Length (km / miles)	23.349 / 14.508	
Transmit Antenna	106P4W	106P4W
Manufacturer	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Model	AAS-106P	AAS-106P
Gain (dBi) / Beamwidth (°) / Tilt (°)	38.2 / 2.20 / -0.51	38.2 / 2.20 / 0.35
Centerline (m / ft - AGL)	225.25 / 739.0	51.21 / 168.0
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMX95	TEMX95
Manufacturer	ALCATEL-LUCENT	ALCATEL-LUCENT
Model	MDR-8606-135	MDR-8606-135
Model Description	MDR-8000	MDR-8000
Emission Designator / Modulation	30M0D7W 64 QAM	30M0D7W 64 QAM
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum Coordinated Maximum	Nominal
Power (dBm)	30.0	30.0
Received Level (dBm)	-31.2	-31.2
EIRP (dBm)	67.2	67.2
Fixed Loss: Tx / Common (dB)	0.0 / 1.0	0.0 / 1.0
Free Space Loss (dB)	135.6	
Transmit Frequencies (MHz)	5945.2000V(11T)	6197.2400V(21T)

Administrative Information	**COMCAST TWR PA**	**SITE 2 PA**
City/County	Philadelphia/Philadelphia	Levittown/Bucks
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY OPERATION
Call Sign		
Licensee Code		
Licensee Name	New Licensee	New Licensee.
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 17.4” N	40 ° 8’ 26.9” N
Longitude (NAD 83)	75 ° 10’ 6.4” W	74 ° 52’ 44.8” W
Ground Elevation (m/ft-AMSL)	10.20 / 33.5	18.80 / 61.7
Antenna Structure Registration #		
Path Azimuth (°)	50.001	230.187
Path Length (km / miles)	32.187 / 20.000	
Transmit Antenna	1654JA	41731A
Manufacturer	ANDREW CORPORATION	ANDREW CORPORATION
Model	UHX8-59J LF	UHX6-59K RF
Gain (dBi) / Beamwidth (°) / Tilt (°)	41.3 / 1.40 / -0.53	38.8 / 1.80 / 0.31
Centerline (m / ft - AGL)	297.18 / 975.0	51.21 / 168.0
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMX95	TEMX95
Manufacturer	ALCATEL-LUCENT	ALCATEL-LUCENT
Model	MDR-8606-135	MDR-8606-135
Model Description	MDR-8000	MDR-8000
Emission Designator / Modulation	30M0D7W 64 QAM	30M0D7W 64 QAM
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum	Nominal Coordinated Maximum
Power (dBm)	20.0 20.0 30.0	20.0 20.0 30.0
Received Level (dBm)	-46.5 -46.5 -36.5	-46.5 -46.5 -36.5
EIRP (dBm)	64.1	67.8
Fixed Loss: Tx / Common (dB)	0.0 / 7.2	0.0 / 1.0
Free Space Loss (dB)	138.4	
Transmit Frequencies (MHz)	6197.2400V(21T)	5945.2000V(11T)

Administrative Information	**DRE 500 PA**	**BA TOWER PA**
City/County	Philadelphia/Philadelphia Philadelphia/Philadelphia	
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY OPERATION
Call Sign		WQHD218
Licensee Code	WIREST	WIREST
Licensee Name	Wireless Strategies, Inc.	Wireless Strategies, Inc.
Radio Service / Station Class	CF -- Point-to-Point Microwave, Common Carrier	FXO -- Fixed
Site Information		
Latitude (NAD 83)	39 ° 57’ 19.4” N	39 ° 57’ 19.5” N
Longitude (NAD 83)	75 ° 10’ 3.3” W	75 ° 10’ 8.4” W
Ground Elevation (m/ft-AMSL)	10.70 / 35.1	11.28 / 37.0
Antenna Structure Registration #		
Path Azimuth (°)	271.460	91.459
Path Length (km / miles)	0.121 / 0.075	
Transmit Antenna	42892A	
Manufacturer	ANDREW CORPORATION	
Model	P2-57W RF	
Gain (dBi) / Beamwidth (°) / Tilt (°)	29.3 / 5.80 / -30.51	
Centerline (m / ft - AGL)	297.18 / 975.0	
Receive Antenna		106P4W
Manufacturer		Wireless Strategies, Inc.
Model		AAS-106P
Gain (dBi) / Beamwidth (°)		38.2 / 2.20
Centerline (m / ft - AGL)		225.25 / 739.0
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEMX95	999999
Manufacturer	ALCATEL-LUCENT	RECEIVE
Model	MDR-8606-135	ONLY
Model Description	MDR-8000	
Emission Designator / Modulation	30M0D7W 64 QAM	
Loading	2016CH DIG 138800.000	2016CH DIG 138800.000
Stability (%)	0.001	0.001
	Nominal Coordinated Maximum Coordinated Maximum	Nominal
Power (dBm)	0.0	
Received Level (dBm)		-74.4
EIRP (dBm)	-0.7	
Fixed Loss: Tx / Common (dB)	29.0 / 1.0	0.0 / 22.0
Free Space Loss (dB)	89.9	
Transmit Frequencies (MHz)	5945.2000V(11T)	