STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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IN RE:

APPLICATION OF OPTASITE TOWERS LLC AND OMNIPOINT COMMUNICATIONS, INC. FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A TELECOMMUNICATIONS FACIILITY AT 52 STADLEY ROUGH ROAD, DANBURY, CONNECTICUT

DOCKET NO. 366

ORIGINAL

August 29, 2008

WITNESS LIST

Party City of Danbury will present the following witnesses at the public hearing to be held on September 9, 2008:

1. Ronald E. Graiff, P.E., B.S. Electrical Engineering
2. Sharon Calitro – Deputy Planning Director, City of Danbury
3. Daniel Baroody – Senior Inspector, Environmental Health Division, City of Danbury

Party City of Danbury may present the following witnesses at the public hearing to be held on September 9, 2008:

1. Pastor David Hutchinson – Christ the Shepherd Church
2. Ronald J. Struski – Certified Real Estate Appraiser – Division St., Danbury
3. Colleen M. Lahood – Tax Assessor, City of Danbury
4. Mark D. Boughton, Mayor, City of Danbury

Dated at Danbury, Connecticut, this 29th day of August 2008.

City of Danbury

Robin L. Edwards
Assistant Corporation Counsel
City of Danbury
155 Deer Hill Avenue
Danbury, CT 06810
(203) 797-4518

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was delivered to the Connecticut Siting Council by Federal Express mail with an electronic copy sent via email, and one (1) original copy was served on the Applicant's legal counsel by Federal Express with an electronic copy sent via email, as follows:

Christopher Fisher, Esq.
Lucia Chiocchio, Esq.
Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, NY 10601

Dated: August 29 , 2008

City of Danbury

Robin L. Edwards
Assistant Corporation Counsel
City of Danbury
155 Deer Hill Avenue
Danbury, CT 06810
(203) 797-4518

STATE OF CONNECTICUT
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IN RE:

APPLICATION OF OPTASITE TOWERS LLC AND OMNIPOINT COMMUNICATIONS, INC. FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A TELECOMMUNICATIONS FACIILITY AT 52 STADLEY ROUGH ROAD, DANBURY, CONNECTICUT	DOCKET NO. 366 August 29, 2008

PRE-FILED TESTIMONY OF SHARON CALITRO, DEPUTY PLANNING DIRECTOR, CITY OF DANBURY

CITY OF DANBURY

155 DEER HILL AVENUE
DANBURY, CONNECTICUT 06810

PLANNING & ZONING DEPARTMENT
(203) 797-4525
(203) 797-4586 (FAX)

To: Les Pinter, Deputy Corporation Counsel

From: Department of Planning and Zoning

Date: August 26, 2008

Re: Proposed Wireless Telecommunications Tower Facility
52 Stadley Rough Road
Opstasite Towers LLC

The Department has reviewed the Application for Certificate of Environmental Compatibility and Need submitted by Optasite Towers LLC and Omnipoint Communications, Inc. dated June 30, 2008. The application was reviewed for compliance with Section 3.E.6. of the City of Danbury Zoning Regulations and in conjunction with the Department's correspondence dated May 17, 2006 regarding the former pre-application submittal. Comments are noted below.

1. A brief description of the proposal is as follows:
   - The proposed facility is a 140 foot high, self-supporting monopole with flush mounted antenna, associated equipment and other site improvements integral to a wireless community facility to be located on premises owned by Christ the Shepherd Church located at 52 Stadley Rough Road. The Church property totals approximately 5.0 acres in an RA-40 Zoning District.
   - The lease area on the site has been increased from 70 feet x 120 feet as noted in the 2006 documents to an area approximately 100 feet x 100 feet in size. As noted in the application, the location of the tower and the lease area has been shifted "approximately 100 feet towards the south-west corner of the church property."
   - The monopole is proposed to be installed within a 55 foot by 90 foot fenced and landscaped equipment compound within the lease area. The compound is proposed to be surrounded by an 8-foot high security fence.
2. Similar to the prior pre-application review comment, pursuant to Section 3.E.6.c. of the City of Danbury Zoning Regulations, the proposed new wireless facility is located in the 6th and least preferred location.

3. The application does not include a copy of the full lease agreement and is therefore incomplete. It has not been substantiated that the lessee has rights to relocate the lease area on the subject site.
4. The application document claims that the plans included therein are "survey based." However, a certified survey prepared by a licensed land surveyor has not been provided and therefore the information presented is incomplete and does not meet the minimum standards for an application submitted to the City for review.
5. Section 3.E.6.d.(2) of the City of Danbury Zoning Regulations provides minimum yard setback requirements for proposed towers. These were promulgated to protect public safety in the event of a tower collapse and to ensure a minimum setback distances between potentially conflicting land uses. Based on the proposed tower height, the minimum yard setback would be 165 feet. The tower location and radius as noted on Sheet A02 fails to meet the Zoning Regulations. More than one-half of the area of the "tower radius" is located on adjacent property and within what appears to be only a few feet from an adjacent residential building. The applicant fails to discuss safety implications in the fall zone area. Based on the information submitted, it has not been substantiated that the public safety will not be compromised based on the proposed tower location.
6. The Department reiterates its prior concerns regarding the visibility of the tower and appurtenant structures from adjacent properties and within view corridors. Even if the average 65 foot high tree canopy was accepted (this was the "average" as determined by VHB, Inc. as noted in Attachment F of the application), the tower would rise 75 feet above the average tree canopy. Additionally, as noted by the applicant, almost 10% of the study area is surface water of Candlewood Lake and most of the tree canopy is comprised of deciduous trees. Based on tree type, it is expected that leaf cover will be absent almost six months of the year. Considering the tree canopy comprises almost 50% of the study area and the Lake comprises 10% of the study area, one could expect the tower to be visible for longer time periods and from distant locations. A more thorough evaluation of the visual impacts of proposed tower should be provided.
7. Comments should be obtained from the Airport Administrator.
8. The Department has concerns regarding the compatibility of the proposed free-standing tower with surrounding single family residential uses and religious and City educational facilities.
9. The applicant failed to provide information regarding the requirements for the foundation and other structures necessary to support the tower. There is no information on depth to bedrock in the area and therefore no determination can be made regarding the need to blast to install the required foundation and footings. Blasting could impact adjacent wells in the area and present potential impacts to adjacent structures.
10. The proposed site of the tower and lease area is wooded and contains two wetlands areas immediately adjacent to the compound area. The Health Department should evaluate potential impacts of construction within regulated wetland areas.
11. The Department reiterates its concern regarding the potential possible depreciation of home values for properties located adjacent to or in the vicinity of the proposed new tower/facility. Reports from appraisers appear to suggest a diminution in value.
12. The Department suggests the application be forwarded to the Candlewood Lake Authority for review.

13. The tower will be located within the viewshed of six historic properties that would qualify for the National Register of Historic Places. The applicant has not addressed the impact on these properties (refer to correspondence from Jennifer Emminger to Nicole Piretti, dated February 17, 2006).
14. The applicant did not consider the Planning Department/Commission recommendation to provide service within a complete stealth pole rather than as a monopole. (refer to comment II.3 in correspondence dated May 17, 2006 from Jennifer Emminger to the Planning Commission, Tab 8).
15. The applicant did not consider additional and taller plantings around the compound to buffer the facility from adjacent properties. (refer to comment II.5 in correspondence dated May 17, 2006 from Jennifer Emminger to the Planning Commission, Tab 8).
16. The applicant failed to provide a noise and vibration analysis as previously requested. (refer to comments II.6 and II.7 in correspondence dated May17, 2006 from Jennifer Emminger to the Planning Commission, Tab 8).
17. The facility is inconsistent with the policies of the City of Danbury Plan of Conservation and Development related to the protection of single family neighborhoods from intrusions of incompatible uses.

In sum, the Department notes that the proposed tower is planned to be located in the least preferable location for a facility of this type, has insufficient setbacks based on the height of the tower and the size of the site posing potential safety concerns to the public, will likely be visible to distant locations and for longer periods of time than claimed, and is a use inconsistent with the existing single-family neighborhood uses. Additionally, the Department maintains that the application document is incomplete and lacks information to properly evaluate the need and impacts of the proposed project.

cc: Hon. Mayor Mark D. Boughton
Michael McLachlan, Chief of Staff
Les Pinter, Deputy Corporation Counsel
Robin L. Edwards, Assistant Corporation Counsel
Scott LeRoy, Director Health Department
Dan Baroody, Environmental Inspector

The information contained in the staff report above is true to the best of my knowledge.

August 29, 2008

Sharon Calitro,
Deputy Director of Planning

Subscribed and sworn to before me this 29th day of August 2008.

Robin L. Edwards
Commissioner of the Superior Court

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:

APPLICATION OF OPTASITE TOWERS LLC AND OMNIPOINT COMMUNICATIONS, INC. FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A TELECOMMUNICATIONS FACIILITY AT 52 STADLEY ROUGH ROAD, DANBURY, CONNECTICUT	DOCKET NO. 366 August 29, 2008

PRE-FILED TESTIMONY OF DANIEL BARODY, SR. INSPECTOR, ENVIRONMENTAL HEALTH DIVISION, CITY OF DANBURY

CITY OF DANBURY

155 DEER HILL AVENUE
DANBURY, CONNECTICUT 06810

ENVIRONMENTAL IMPACT COMMISSION
(203) 797-4525
(203) 797-4586 (FAX)

To: Les Pinter, Deputy Corporation Counsel

From: Daniel Baroody, Sr. Inspector, Danbury HH&W, Environmental Health Division

Date: August 22, 2008

Re: Proposed Wireless Telecommunications Tower Facility
52 Stadley Rough Road
Opstasite Towers LLC

I have reviewed the above referenced application for the Danbury Environmental Impact Commission (EIC) submitted by Optasite Towers LLC and Omnipoint Communications, Inc. dated June 30, 2008. In order to evaluate the nature of the probable environmental impact of the facility on the natural environment, and water purity and public health and safety, the application was reviewed for compliance with The Inland Wetlands and Watercourses Regulations, City of Danbury and Connecticut Public Health Code.

1. The applicant should submit an application for regulated activity to the Environmental Impact Commission (EIC) in order for the EIC to make appropriate finding and recommendation. The proposed activity is with the regulated area as defined in The City of Danbury Inland Wetlands and Watercourses Regulations.

   7.3. All applications shall include the following information in writing:

   (a) The applicant's name, home and business address and telephone numbers.

   (b) The owner's name, home and business address and telephone numbers and written consent to the proposed activity if the applicant is not the owner of the property involved in the applications. If the owner is a corporation or other non-individual entity the name, address, and phone number of a principal must be included.

   (c) Applicant's interest in the land.

(d) A sketch showing the geographical location of the land which is the subject of the proposed activity, and a description of the land in sufficient detail to allow identification of the inland wetlands and watercourses, the area(s) (in acres or square feet) of wetlands or watercourses to be disturbed, soil type(s), and wetland vegetation.

(e) The purpose and description of all proposed activities including computation of the area(s) in acres of wetlands or watercourses disturbance and the proposed amount of fill, and proposed erosion and sedimentation controls.

(f) A detailed narrative of the alternatives considered and subsequently rejected by the applicant and why the proposal to alter wetlands set forth in the application was chosen. The Commission may require the applicant to submit a site plan showing the alternatives.

(g) Two site plans with one showing the existing conditions, and one showing proposed conditions in relation to wetlands and watercourses, and identifying any further activities associated with or reasonably related to the proposed regulated activity which are made inevitable by the proposed regulated activity and which may have an impact on wetlands or watercourses.

(h) List of names and correct mailing addresses of all abutting property owners, and all owners of property across the street from the subject property. In the event that the Commission schedules a public hearing on the application, the applicant shall submit envelopes preaddressed to such owners no later than five (5) days following the date on which the Commission sets the matter down for a hearing. If land abutting or across the street from the subject property is a "common interest community" as defined in Chapter 828 of the Connecticut General Statutes, and a unit owners' association has been organized for such common interest community, the applicant need only submit the name of (and if applicable, an envelope preaddressed to) the unit owners' association.

(i) Certification that the applicant is familiar with these Regulations and all the information provided in the application and is aware of the penalties for obtaining a permit through deception or through inaccurate or misleading information.

(j) Authorization for the members and agents of the Commission and the City to inspect the property, at reasonable times: both before and after a final decision has been issued if a permit has been issued; while the regulated activities are being conducted; and at any time thereafter up to and including the period of time in which the applicant's bond or surety is in effect in order to ensure that the activities are being conducted in accordance with the permit.

(k) Whether the proposed regulated activity will require subdivision or re-subdivision approval, a zoning permit, special permit, special exception or exemption, or a variance, from the Zoning Commission, Planning Commission or Zoning Board of Appeals, as the case may be.

(l) Whether any of the following circumstances applies:

(i) Any portion of the property affected by the decision of the Commission is located within five hundred (500) feet of the boundary of an adjoining municipality;

(ii) A significant portion of the traffic to the completed project on the site will use streets within the adjoining municipality to enter or exit the site;

(iii) A significant portion of the sewer or water drainage from the project site will flow through and significantly impact the sewage or drainage system within the adjoining municipality; or,

(iv) Water run-off from the improved site will impact streets or other municipal or private property within the adjoining municipality.

(m) Any other information the applicant deems necessary to the understanding of what the applicant is proposing.

(n) Submission of the appropriate filing fee based on the fee schedule established in Section 12 of these Regulations.

(o) Any compensatory mitigation measures which the applicant wishes to propose to the Commission, in accordance with the criteria set forth in Section 9.2(d) of these Regulations. Notwithstanding any other provision of these Regulations, the applicant shall not be required to propose, either in the application or at the request of the Commission, any compensatory mitigation measure that would create or restore a wetland or watercourse that is larger than one and one half times the area of the wetland or watercourse that would be eliminated or degraded as a result of the proposed activity.

(p) A completed DEP reporting form; the Commission shall revise or correct the information provided by the applicant and submit the form to the Commissioner of Environmental Protection in accordance with Section 22a-39-14 of the Regulations of Connecticut State Agencies, as amended.

The Application for Certificate of Environmental Compatibility and Need submitted by Optasite Towers LLC and Omnipoint Communications, Inc. dated June 30, 2008, Introduction, Section VII. Consistency with Danbury Land Use Regulations, subsection D, page 17, paragraph one concludes that the activity "would have no significant impact". Under The Inland Wetlands and Watercourses Regulations, City of Danbury the Commission (EIC) will make finding and recommendations, after review of a properly submitted application.

2. The applicant must determine the size, location and the proximity to the proposed activity of the existing septic system serving the subject property and septic systems on adjacent properties, to be in compliance with Connecticut Public Health Code section 19-13-B103.

3. To be in compliance with Connecticut Public Health Code section 19-13-B51, the applicant must locate the existing water supply well on the subject property and adjacent properties in proximity to the proposed activity.

The information contained in the staff report above is true to the best of my knowledge.

August _____, 2008

Daniel Baroody
Sr. Inspector

Subscribed and sworn to before me this 29th day of August 2008.

Robin L. Edwards
Commissioner of the Superior Court

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:

APPLICATION OF OPTASITE TOWERS LLC AND OMNIPOINT COMMUNICATIONS, INC. FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A TELECOMMUNICATIONS FACIILITY AT 52 STADLEY ROUGH ROAD, DANBURY, CONNECTICUT	DOCKET NO. 366 August 29, 2008

PRE-FILED TESTIMONY OF RONALD GRAIFF, P.E.
RADIO FREQUENCY CONSULTING ENGINEER

TESTIMONY OF RONALD E GRAIFF, P.E.
IN DOCKET 366

My name is Ronald E. Graiff and I am an independent Radio Frequency Consulting Engineer. I have over 40 years of experience in radio frequency matters. I am a graduate electrical engineer from The Pennsylvania State University, and a licensed professional engineer. I have testified and provided guidance for hundreds of land use boards in New York, New Jersey, Pennsylvania, Vermont, Massachusetts as well as the Connecticut Siting Council ("CSC"). My CV is attached as **Exhibit 1** to this testimony for further review.

I have been asked by the City of Danbury to review and provide comment on the application of Optasite/T-Mobile to construct a 140 foot monopole at 52 Stadley Rough Road, Danbury, CT, Connecticut Siting Council ("CSC") Docket 366. This testimony is based on that review and analysis of the application as well as the applicants' responses to interrogatories of the CSC. The Findings of salient portions of application follow:

FINDING 1: LACK OF VERIFICATION OF THE PROPAGATION MODEL

The applicants have submitted numerous coverage maps depicting before and after coverage of the existing T-Mobile system as well as before and after coverage of some undetermined Sprint/Nextel System.[1] These coverage maps appear to have been prepared by a computer based propagation model. While such models are useful, there are so many variables that may be used in setting up the model, that a critical verification of the results presented is nearly impossible. The applicant may, for example, enter variables into the model that include tree leaf attenuation or do not consider it or include building clutter or not consider it. Such assumptions can have a dramatic affect on the coverage presentation. In addition there is no information presented on the accuracy of the terrain data base that is employed in the computer calculations. This accuracy is critical, especially when the applicant is asked, as the CSC did in its interrogatories, to provide coverage plots at a height above ground other than that applied for. The only method of critical analysis of need for a particular site and existing system conditions would be the drive test, recognized by most, if not all in the industry, as the "gold standard." Interestingly, when queried by the CSC in its interrogatories as to the level of signal strength existing in its no coverage areas the applicants responded with numerical values that were undoubtedly the result of drive test measurements. The applicants should be directed to provide drive test results of the existing and proposed facilities. These tests should also indicate at the time of year performed so as to determine the affects of leaf attenuation which is significant in the general area of coverage. Only then

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[1] Note that Sprint/Nextel operates two different systems, one at 700 MHz and one at 1950 MHz. The coverage maps do not indicate which system is depicted and make a complete analysis impossible.

will a critical evaluation and verification of the computer model be attainable to justify the need for the site.

FINDING 2: FAILURE TO DEPICT COVERAGE OF ADJACENT SITES

The coverage maps also suffer the flaw of not depicting coverage of all of the sites that are listed in the table "T-Mobile Surrounding Sites." Specifically, the following sites and their respective coverage are not shown on the propagation maps: CT-11924A, 78 Federal Road; CT-11196A, Carmen Hill; CT-11092J, 39 Sugar Hollow; CT-11197A, 18 Old Ridgebury Road and CT-11198A, 83 Wooster Heights Road. It appears in response to the CSC interrogatories that the applicant has now included the coverage of site CT-11924A. Particular attention must be paid to the lack of coverage depiction of Site CT-11196A, Carmen Hill. At that site T-Mobile has antennas at 298 feet above ground with a ground elevation of 686 feet AMSL. Attached to this testimony as **Exhibit 2** is a terrain profile derived from USCGS 7.5 minute topographic maps that depicts the terrain between the Carmen Hill site and an area along Stadley Rough Road that the applicants maintain is an area in need of coverage. This profile is without the antennas at 298 feet above ground. Please note the direct line of site coverage. This site will undoubtedly provide some coverage to the area purported to need coverage. All sites that are noted in the application should have their coverage depicted on the maps.

FINDING 3: NO EVIDENCE TO JUSTIFY MINIMUIM HEIGHT REQUIRED

In response to CSC interrogatories the applicant provided an additional computer model depiction of coverage at 127 feet AGL. A careful review of the two coverage plots indicates that in the purported area of need there is no difference in coverage provided by the reduced height. In fact the applicant states that 127 feet AGL is the minimum height needed to provide the relief it seeks. There has not, however, been a determination of the minimum height necessary. As noted above there is no information presented as to the accuracy of the underlying terrain data used for the calculations of coverage. Even with the very best 3 arc second terrain data, resolving a difference of 10 feet is un-reliable. It is generally recognized that in comparing height alternatives the minimum incremental height difference should be 20 feet. Notwithstanding that fact, if real world CW drive tests were to be conducted at the site with antennas placed at 90 feet 100 feet, 120 feet and 130 feet, it could truly be determined what the minimum height necessary to provide relief, to the existing measured system, might be. The applicant should be directed to perform CW drive tests at the site as noted above.

FINDING 4: FAILURE TO IDENTIFY AND PROPAGATE ALTERNATE SITES

The site search summary provided by the applicants is also flawed in its content and analysis. This summary notes 12 sites within 4 miles of the proposed installation. While, indeed, many of the sites noted will not provide any coverage relief, the applicant has incorrectly dismissed two of the sites noted and missed one other site that must be considered.

The applicants note that site 11 the water tank just 0.7 miles from the site has been determined by some unspecified radio frequency engineers not to provide coverage. There was not, however, a propagation map for this site included for review with the application. Attached to this testimony as **Exhibit 3** is the terrain profile, generated in the same manner as Exhibit 1 indicating the terrain between the site proposed at 52 Stadley Rough Road in the application and the same area of applicant stated poor coverage as in Exhibit 1. **Exhibit 4** is a terrain profile between the dismissed water tank location and the area of poor coverage. Note that these profiles, without the monopole or water tank depicted, still demonstrate, without question, the direct line of sight between the water tank site and the poor coverage area. It is incredible that the applicant could state that the site would not provide the coverage relief sought. The applicant should be directed to provide calculated coverage from the water tank site. This coverage map will be helpful in the critical review, once the model has been verified by drive testing.

The applicant notes that site 12 "Department of Public Works Garage" owned by the City of Danbury was analyzed by T-Mobile's Radio Frequency engineer and determined to be too far South to provide coverage to the target. This site is actually the State DOT garage on Rockwell Road. There was not, however, any calculated propagation map submitted to verify this claim, and no indication by the applicant as to how tall a structure was considered as there is a tower currently located there. The applicant should be directed to provide a coverage propagation map from this site at the **maximum** height that would **not** require FAA lighting. This coverage map will be helpful in the critical review, once the model has been verified by drive testing.

The site search summary, as noted, missed one possible site. There is an existing tower located either on or adjacent to the Federal Correction Institution on Padanaram Road in Danbury. Attached as **Exhibit 5** is an aerial photograph of the tower at this site. The ground elevation at this site is 782 feet AMSL. Attached to this testimony as **Exhibit 6** is a terrain profile as above between this site and the area of poor coverage. Please note the direct line of site path. In fact, this site was identified over 3 years ago during a Sprint application before the Danbury Planning Commission (pre CSC jurisdiction over PCS) to provide coverage to essentially the same area. At the hearing Sprint admitted that the site would serve its system to provide the coverage relief sought. The applicant should be directed to provide a coverage propagation map from this site at the **minimum** height necessary. This coverage map will be helpful in the critical review, once the model has been verified by drive testing.

FINDING 5: NO EVIDENCE TO SUPPORT STRUCTURAL SPACING

In CSC interrogatory Q 6 the applicant is asked what led to the change to a 140 foot tower from an original proposal for a 130 foot tower. The applicant replies that the change is a result of Sprint/Nextel's, an alleged co-locator, need for a centerline mounting height of 127 feet AGL. There is no evidence presented that 127 feet is the minimum height necessary for Sprint/Nextel. In addition there is no evidence presented that dictates that the antennas of T-Mobile and Sprint/Nextel be separated by 10 feet. The applicant must be directed to present evidence that Sprint/Nextel requires the 127 foot

height requested and compelling engineering reasons, in light of formally published papers by antenna manufacturers that such 10 foot spacing is not required and that antennas can be located as closely as 6 inches. A copy of the published paper is attached as **Exhibit 7.**

FINDING 6: NO EVIDENCE TO SUPPORT CLAIM OF EXISTING COVERAGE

In CSC interrogatory Q 16 the applicant is asked to specify the existing signal strength in the area T-Mobile would serve from the proposed site. T-Mobile replies that the existing signal strength is between -85 dBm and -110 dBm. There is no evidence presented by T-Mobile to support this claim. Drive tests of the system as it exists today must be presented to substantiate these signal levels.

FINDING 7: FAILURE TO DEMONSTRATE MINIMUM HEIGHT REQUIRED

In CSC interrogatory Q 20 the applicant is asked the minimum height at which T-Mobile could achieve its coverage objectives from the proposed site. T-Mobile responds that it needs 127 feet AGL to achieve the coverage objective from the proposed site. There is no evidence that this is the case. T-Mobile has presented in the application and in its response to the interrogatory a calculated coverage plot of the requested facility at 137 feet AGL that provides the relief it seeks along "2 miles along Stadley Rough Road," (response to CSC interrogatory Q 18). The CSC in interrogatory Q-21 goes on to request that the applicant provide a propagation map of the coverage at 10 feet below the antennas' proposed heights. T-Mobile responds with a propagation plot of the facility at 127 feet AGL that is essentially identical to the propagation plot at 137 feet especially in the claimed area of 2 miles along Stadley Rough Road. There is no propagation plot supplied at a height less than 127 feet that demonstrates that coverage in the area that the applicant seeks relief would suffer. The applicant must be required to present propagation maps at heights above ground of 120 feet AGL, 100 feet AGL and 90 feet AGL. These coverage maps will be helpful in the critical review, once the model has been verified by drive testing.

The deficiencies, lack of evidence and errors in the application noted in this testimony indicate without question that the application is not acceptable for a critical review and analysis and that the applicants' claims do not meet the standards of good engineering practice to justify a new telecommunications tower at the site requested. It must be dismissed.

Ronald E. Graiff
License # 050547

CURRICULUM VITAE
RONALD E. GRAIFF

Bachelor of Science Degree in Electrical Engineering, The Pennsylvania State University, 1968
Licensed Professional Engineer, New York State, 1974, License # 050547
Licensed by Federal Communications Commission with First Class (General Radiotelephone)
Past Member, Association of Federal Communications Commission Consulting Engineers
Recipient of CTIA "Industry Service Award" for Advancement of cellular Industry, 1989
Member, Institute of Electrical and Electronics Engineers

Current: Independent Radio Frequency consulting engineer engaged in evaluation, application and construction of radio, television, cellular and emerging technologies based communications systems. Providing expert guidance and advice to municipalities and companies in communication tower location, radio frequency propagation, evaluation of radio frequency radiation compliance and guidelines, and environmental impact statements for communication facilities. (A partial list of municipalities and companies are noted at the end of this document). Testified before hundreds of Zoning, Planning and Boards of Adjustment as well as the Federal Communications Commission in matters dealing with cellular, enhanced specialized mobile radio service, personal communications service and broadcast. Performed hundreds of FCC OET-65 analyses for single and complex multi emitter sites. Perform RF environmental measurements at single and multi user sites in accordance with ANSI/IEEE C95.3-1992 and NCRP Report 119.

Prior: 1975-1990, Vice President, Engineering, LIN Broadcasting Corporation. Public company engaged in radio, television, common carrier and cellular telephone. Personally responsible for the design, construction and implementation of numerous broadcasting projects ranging from 5,000 watts to 5,000,000 watts. Responsible for the specification and implementation of both guyed and self supporting towers from 250 feet tall to 2,000 feet tall. Applied for and designed cellular telephone systems in New York, Los Angeles, Philadelphia, Dallas-Ft Worth, and Houston. Prepared and provided direct testimony before the Federal Communications Commission with respect to the design of cellular telephone systems. Overall responsibility for the design and quick build of the five markets above as well as purchase responsibility for the RF and switching systems for same. Co-Chairman of the FCC/Industry interconnect committee, responsible for developing interconnection arrangements with the regional Bell operating companies and equitable use of the North American Numbering Plan. Co-Chairman of the Cellular Telecommunications Industry Association (CTIA) Advanced Technology Committee, responsible for evaluating and recommending the second generation TDMA digital systems. Chairman of the Engineering Committee of the Association of Maximum Service Telecasters and presented reports and testimony to the Federal Communications Commission on equivalent protection of television allocations and RF propagation.

EXHIBIT 1

Extensive experience in the measurement and evaluation of Radio Frequency (RF) fields from both a design and biological point.

1970-1975 RF(Radio Frequency) Systems and Allocations Engineer, The American Broadcasting Company. General responsibility for all facets of the RF operations of ABC's 5 television stations and 14 radio stations as well as the specialized needs of ABC news and sports in their communication requirements. Designed and implemented the radio communication systems for ABC news at the 1972 political conventions in Miami as well as the radio communication system for ABC sports at the 1976 Winter Olympics in Innsbruck, Austria. Designed specialized RF systems from 26 MHz to 13 GHz utilized in ABC's entry into Electronic News Gathering in the early 70's.

Prior to 1970 employed by Philco-Ford Corporation as a field engineer working on classified military communication systems projects in many areas of south-east Asia and Europe.

Partial list of companies and municipalities for which work has been performed:

AT&T Wireless (CT, NJ, NY) Cellular One (NJ, NY,PA); General Dynamics (NY); Cingular Wireless(CT); Independent Wireless One; Nextel (CT,NJ,NY); MetroPCS (NY); Nextel Partners (MA,NY); Sprint Spectrum (NY); T-Mobile (NY); Verizon Wireless (CT,NJ,NY,MA,VT)

Airmont, NY; Andover Township, NJ; Township of Bedminister, NJ; Bernardsville, NJ; Danbury CT; Fairfield Township, NJ; Town of Gardiner, New York; Morris Township, NJ; Town of Harrison, NY; Township of Hazlet, NJ; Township of Jefferson, NJ; Town of Kent, NY; Kinnelon, NJ; Lenox, MA; Township of Livingston, NJ; Madison Borough, NJ; Morris Township, NJ; New Fairfield, CT; Ogdensburg, NJ; Town of Orangetown, NY; Town of Plattekill, New York; Borough of Pompton Lakes, NY; Village of Portchester, NY; Redding, CT; Rinebeck, NY; Shawangunk, NY; Trumbull, CT; Town of Van Buren, New York; West Caldwell, NJ; Village of Woodstock, NY; Yonkers, NY

The statements above are true and complete to the best of my knowledge.

AUGUST 28, 2008
Date

Ronald E. Graiff
Ronald E. Graiff. P.E.

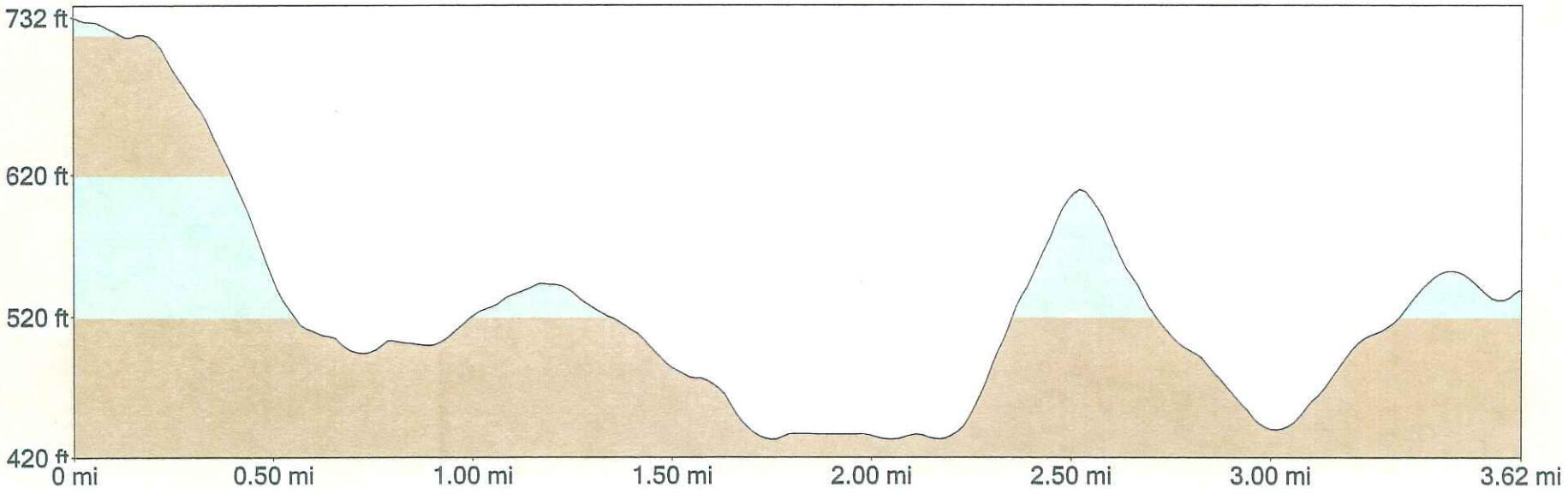

EXHIBIT 2

PATH PROFILE 37 CARMEN HILL TO "POOR COVERAGE AREA

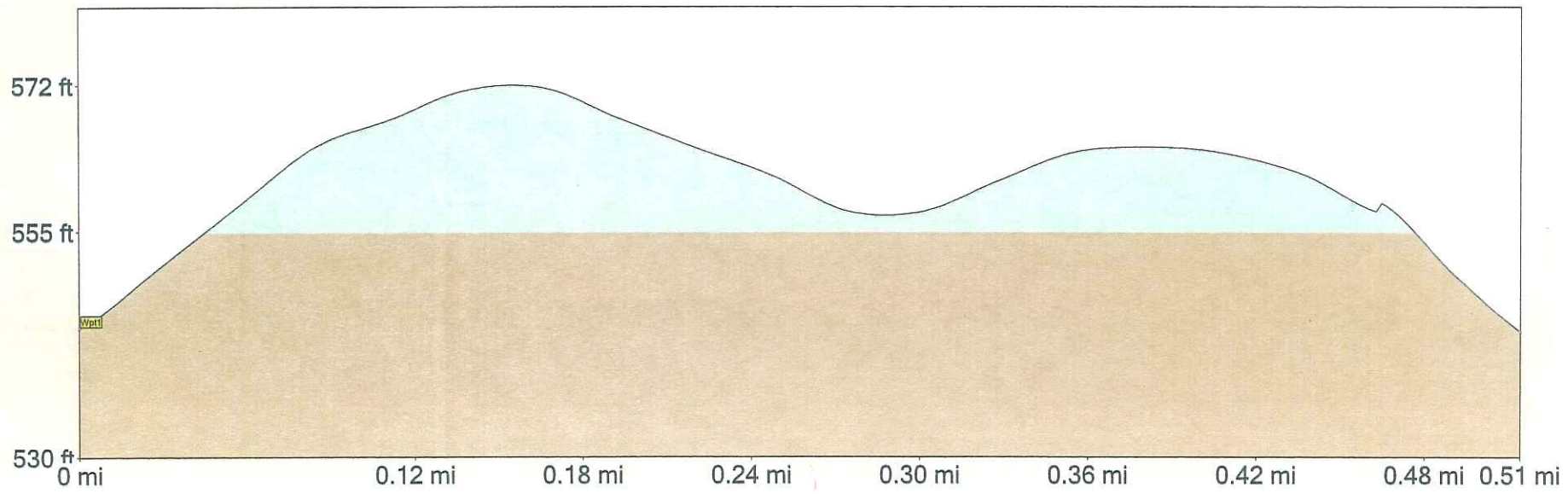

EXHIBIT 3

PATH PROFILE PROPOSED SITE TO "POOR COVERAGE AREA"

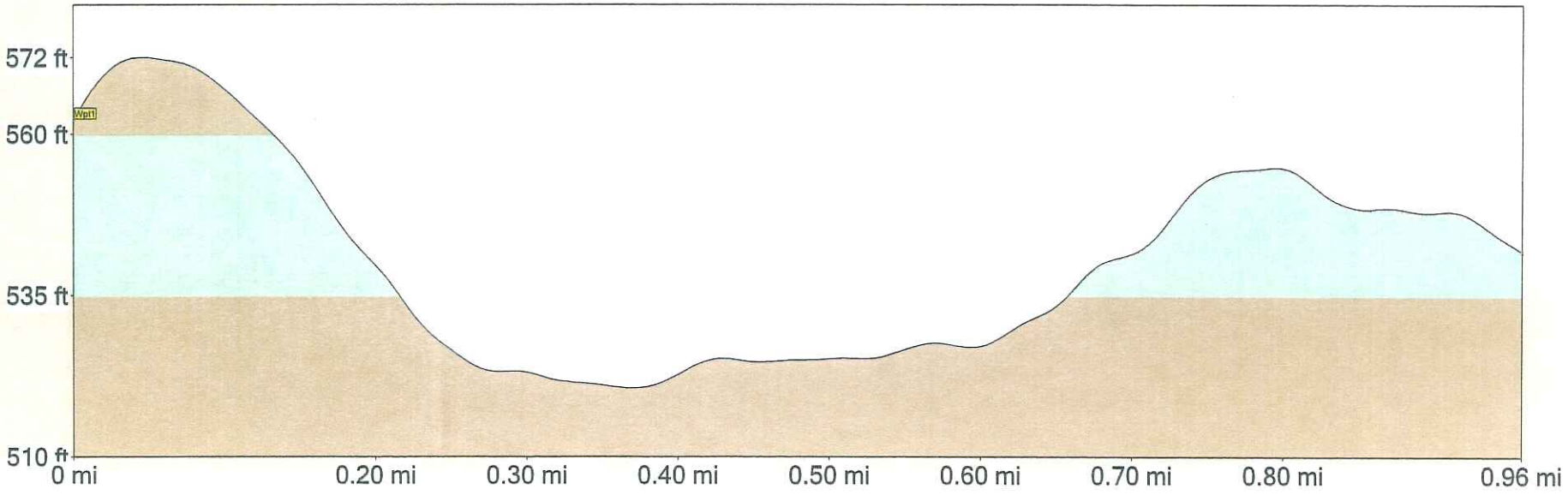

EXHIBIT 4

PATH PROFILE WATER TANK TO "POOR COVERAGE AREA"

EXHIBIT 5

AERIAL PHOTOGRAPH OF EXISTING TOWER AT FCI

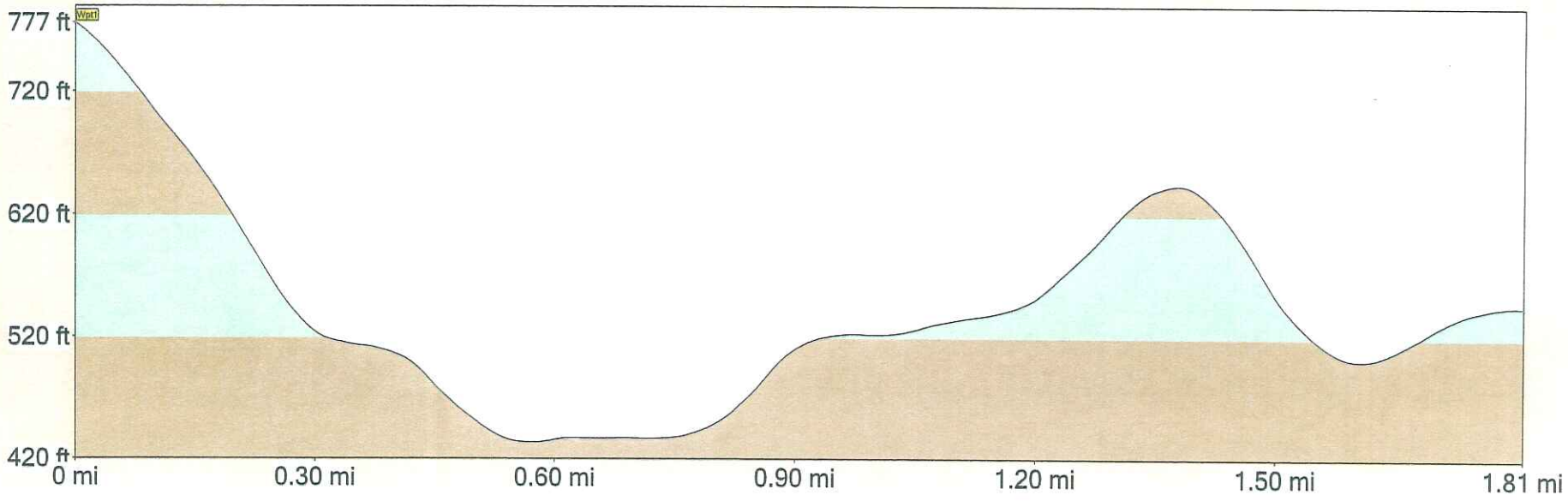

EXHIBIT 6

PATH PROFILE FCI TOWER TO "POOR COVERAGE AREA"

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A Division of EMS Technologies, Inc.

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Support From the EMS Professionals

Electrical Isolation of Co-Located Horizontally and Vertically Stacked Antennas

Don Button
Manager, EMS Wireless Technical Support
Re-issued 23 November 1999

Introduction:

Service Providers are facing rapidly increasing pressure from zoning boards to co-locate their base station antennas on the same tower structure as other providers. Traditionally, these antenna installations have been vertically spaced about 15 to 20 feet apart to ensure adequate antenna electrical isolation, intermodulation and harmonic signal rejection, and resistance to receiver noise desensitization. This note addresses the electrical coupling between horizontally and vertically spaced antennas. For in-band carriers (i.e. co-located A and B band 800 MHz carriers), a minimum of 50 dB isolation between the stacked antennas is frequently required. Measurement data presented in this note concludes that this required isolation can be achieved easily with just a few inches of vertical spacing. This is true even for small, low gain antennas with wide beamwidths. This allows the antennas to be stacked more closely together, thus conserving expensive tower space, reducing total tower count, and allowing higher center lines for providers who are not located on the top position on the monopole. Also, horizontal antenna spacing is sometimes used to achieve co-location as well as greater transmit channel capacity by installing additional antennas. Data presented here concludes that >35 dB electrical isolation is easily achieved with horizontal spacings of just 12 inches or less (for azimuth beamwidths <105 degrees). This allows packing the antennas quite tightly together, thus further conserving expensive tower space.

Coupling Test Procedure and Results:

A.) In-Band Measurements: A variety of electrical isolation tests were run at both 800 and 1900 MHz. A pair of like antennas was placed at various distances from each other, either end-to-end, or side-to-side, to simulate colocated antennas on a tower or monopole. A network analyzer was used inject a signal into one antenna. Then, transmission loss (S21) at the other antenna port was swept and plotted for the appropriate band (806-896 MHz or 1850-1990 MHz). These tests were run mostly in an anechoic chamber to avoid extraneous reflections. When the antenna spacing was too large to fit in the chamber, the antennas were placed on their backs, outdoors on the ground, so the environment was essentially reflectionless.

Vertical antenna separation distance was defined as in Figure 1, and horizontal separation distance was defined as in Figure 2. Then, for each frequency band, the antenna azimuth beamwidth and gain were varied to sample typical coupling values. Also, during the vertical separation test, the top antenna was mechanically downtilted 10 degrees, and the coupling test was repeated.

The 800 MHz cellular tests and results are detailed in Table 1. These results are plotted in

EXHIBIT 7
TECHNICAL PAPER ON VERTICALLY STACKED ANTENNAS

Figures 3, 4, and 5.

1900 MHz PCS tests and results are shown in Table 2. These results are plotted in Figures 6 and 7.

B.) Cross-Band Measurements: In these tests, an FV105-12-00DA2 800 MHz antenna and an RV90-17-00DP 1900 MHz antenna were stacked horizontally and vertically, as shown in Figures 8 and 9. Two network analyzer insertion loss sweeps were performed: One at 806-896 MHz, and another at 1850-1990 MHz. Results were tabulated in Table 3, and plotted in Figures 10 and 11.

Only vertically polarized antennas were used in this experiment. It was expected that the worst case isolation results would be found using vertically polarized antennas throughout so that the antenna pairs would be co-polarized relative to each other. Slant 45 dual polarized models could also be tested, but the results should be similar to those presented here.

Conclusions:

A.) In-Band Isolation of Horizontally Spaced Antennas:

1.) In every measured case, isolation of horizontally spaced 90 or 65 degree antennas was greater than 30 dB with as little as six inches spacing between the antennas.

2.) In every measured case, isolation of 105 degree antennas was greater than 30 dB with as little as 18 inches of spacing between the antennas.

3.) Isolation of horizontally spaced antennas was driven most strongly by the antenna's azimuth beamwidth. Broad beamwidth models (105 degrees) had the worst isolation.

B.) In-Band Isolation of Vertically Spaced Antennas:

1.) In every measured case, isolation was greater than 50 dB with as little as six inches of spacing between the antennas. Overall, isolation was excellent regardless of gain or frequency band.

2.) A moderate amount of mechanical downtilt did not appreciably degrade the isolation.

3.) Vertically spaced isolation was not driven by the antenna's gain (and, therefore, the antenna's elevation beamwidth).

C.) Cross-Band Isolation:

1.) With Cellular and PCS antennas stacked vertically, isolation was typically 60-70 dB, and varied little with spacing.

2.) With Cellular and PCS antennas stacked horizontally, the isolation was quite different, depending on whether the test was run at 800 or 1900 MHz. However, even a worst case result of 40 dB was easily achieved with only 18 inches spacing between the antennas.

It should be noted that these results may vary if the antennas are located behind architectural screening material for "stealth" applications. The scattering environment for these types of set-ups can be quite complex, and requires analysis of the particular site layout to be confident with the results.

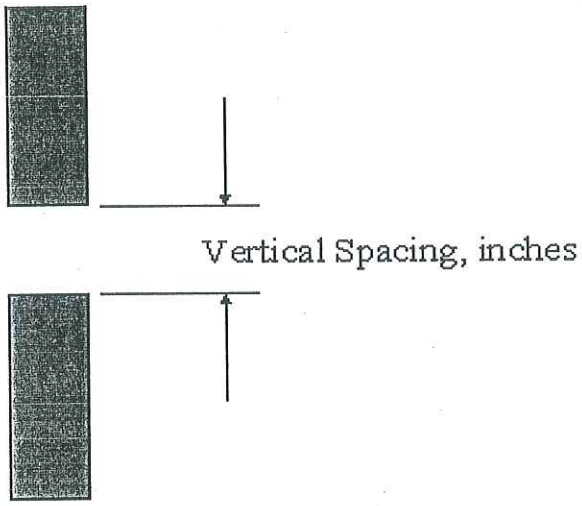


Figure 1: Antenna Vertical Spacing Definition

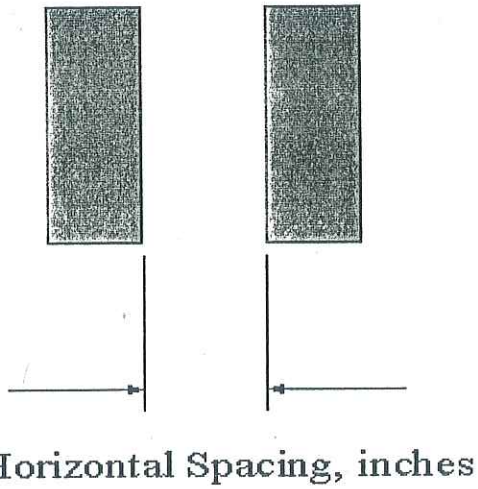


Figure 2: Antenna horizontal spacing definition

Table 1: Cell Band Coupling Tests:			
1.) Broad beamwidth, Low gain antennas (2 x FV90-09-00DA2):			
	Vertical Spacing		Horizontal Spacing
Spacing	0 deg d/t	10 deg d/t	0 deg d/t
0	-56.3	-69.8	-38.3
6	-59.5	-77.9	-41.0
12	-65.8	-78.9	-43.7
18	-68.6	-81.8	-45.2
24	-66.0	-86.6	-47.9
30	-68.8	-89.9	-48.9
36	-69.9	-85.0	-48.6
2.) Broad beamwidth, High gain antennas (2 x FV105-12-00DA2):			
	Vertical Spacing		Horizontal Spacing
Spacing	0 deg d/t	10 deg d/t	0 deg d/t
0	-60.7	-56.9	-23.9
6	-62.1	-64.2	-26.0
12	-62.1	-61.8	-27.6
18	-62.7	-63.1	-30.0
24	-64.0	-66.3	-29.8
30	-65.1	-65.7	-31.2
36	-67.3	-68.0	-31.7
3.) Narrow beamwidth, Low gain antennas (2 x FV65-11-00DA2):			
	Vertical Spacing		Horizontal Spacing
Spacing	0 deg d/t	10 deg d/t	0 deg d/t
0	-44.8	-45.3	-30.5
6	-57.3	-52.9	-35.3
12	-57.3	-52.8	-37.7
18	-61.8	-57.0	-39.9
24	-62.3	-60.0	-46.0
30	-64.6	-62.2	-49.0
36	-61.9	-57.4	-47.3

Figure 3: Broad Azimuth Beamwidth, Low Gain Isolation Test
800 Mhz (2 x FV90-09-00DA2)

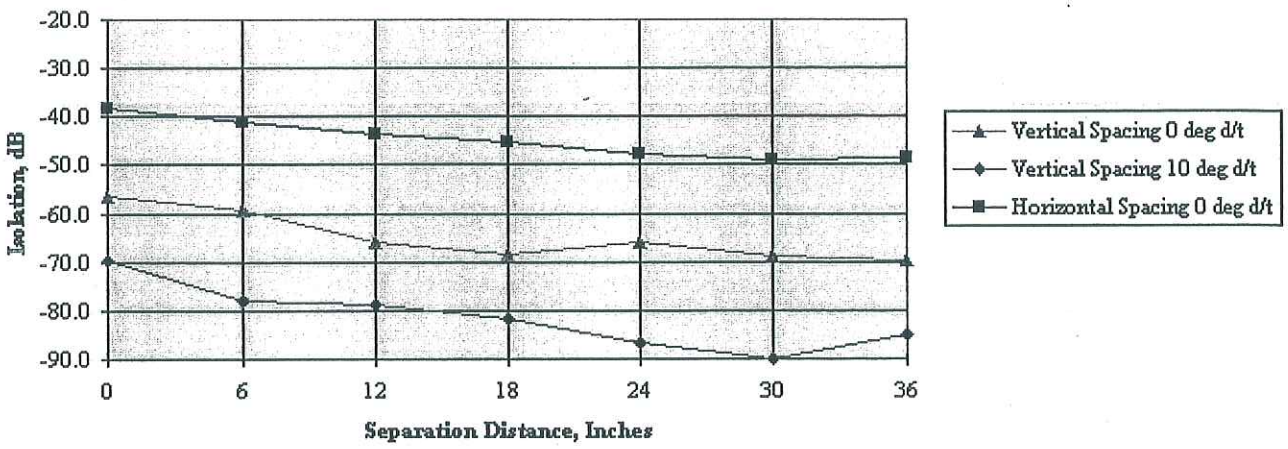


Figure 4: Broad Azimuth Beamwidth, High Gain Isolation Test
800 Mhz (2 x FV105-12-00DA2)

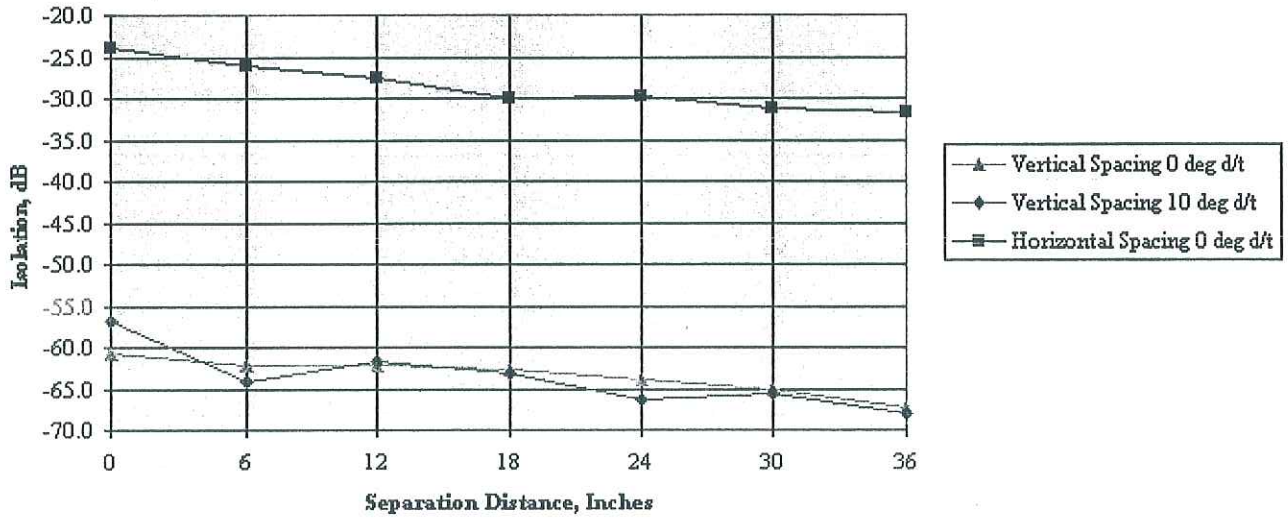


Figure 5: Narrow Azimuth Beamwidth, Low Gain Isolation Test
800 Mhz (2 x FV65-11-00DA2)

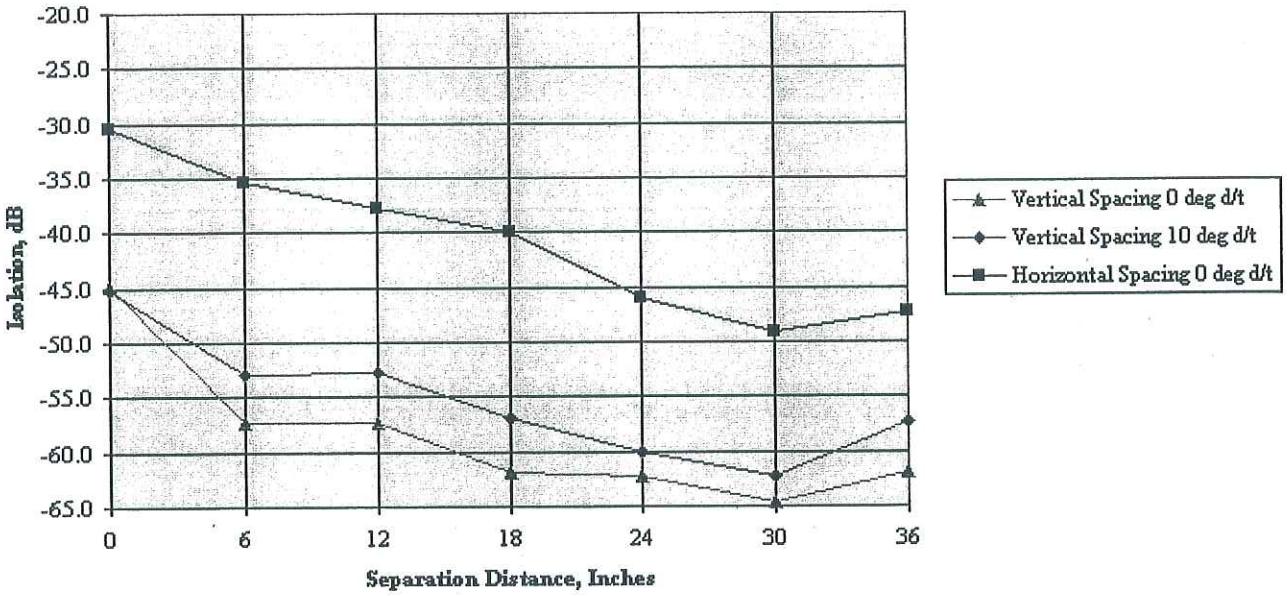


Table 2: PCS Band Coupling Tests

1.) Broad beamwidth, High gain (2 x RV90-17-00DP)

	Vertical Spacing		Horizontal Spacing
Spacing, inches	0 deg d/t	10 deg d/t	0 deg d/t
0	-64.0	-63.5	-27.2
6	-71.7	-71.5	-30.2
12	-71.9	-73.8	-35.9
18	-74.1	-74.5	-39.1
24	-73.9	-75.6	-39.2
30	-76.4	-75.6	-38.8
36	-76.8	-72.8	-40.3

2.) Narrow beamwidth, High gain (2 x RV65-18-00DP)

	Vertical Spacing		Horizontal Spacing
Spacing, inches	0 deg d/t	10 deg d/t	0 deg d/t
0	-62.2	-64.2	-32.5
6	-71.1	-71.6	-37.1
12	-74.6	-73.1	-40.1
18	-74.6	-77.8	-40.1
24	-76.4	-77.0	-42.5
30	-77.7	-77.5	-42.9
36	-79.1	-77.5	-43.9

Figure 6: Broad Azimuth Beamwidth, High Gain Isolation Test
1900 Mhz (2 x RV90-17-00DP)

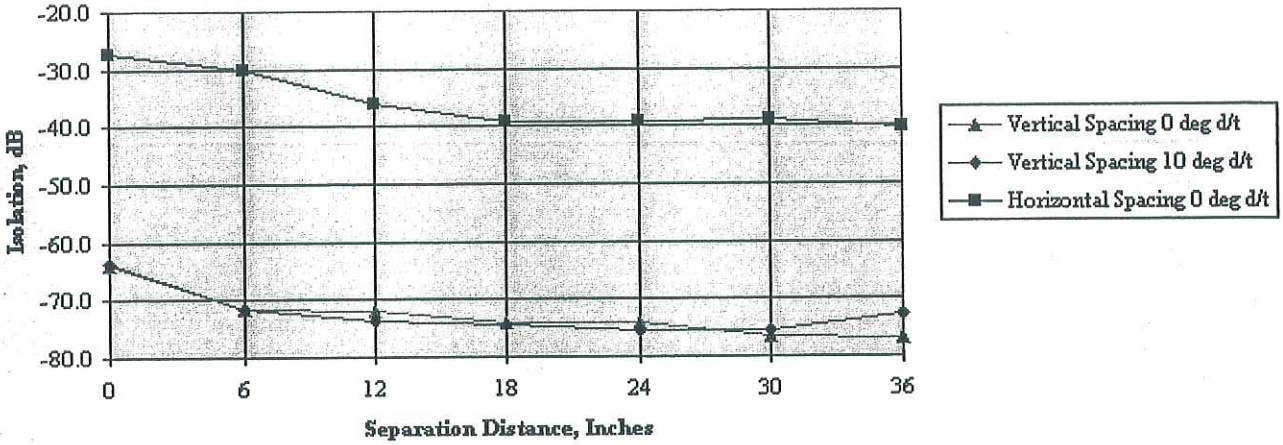
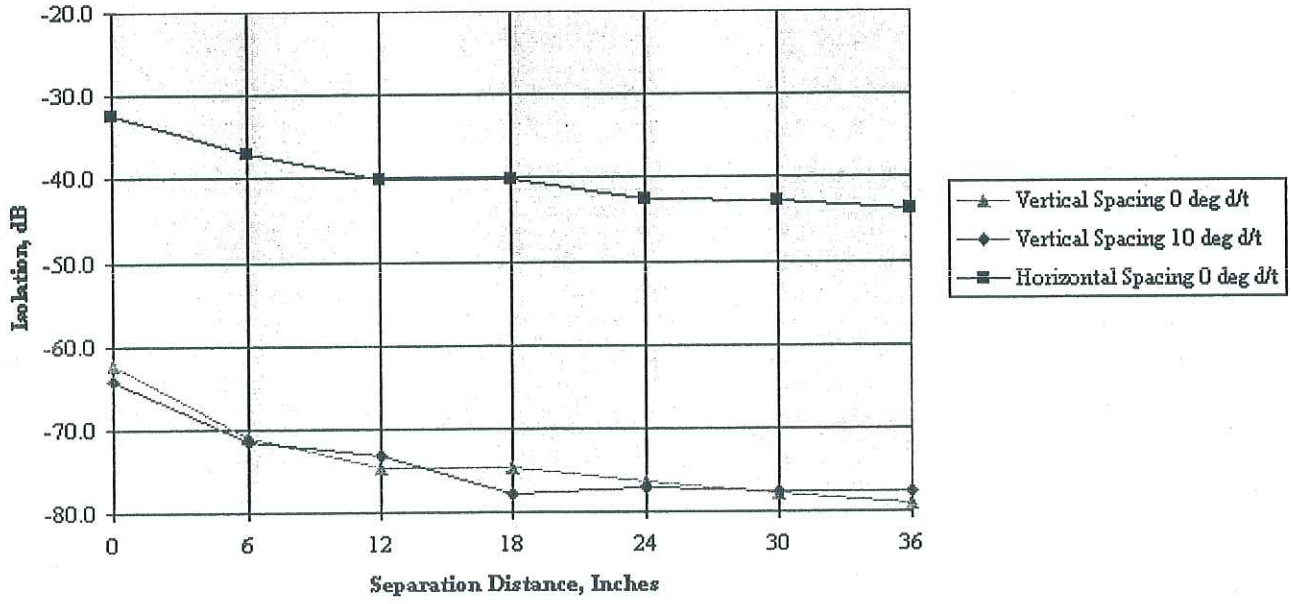


Figure 7: Narrow Azimuth Beamwidth, High Gain Isolation Test
1900 Mhz (2 x RV65-18-00DP)



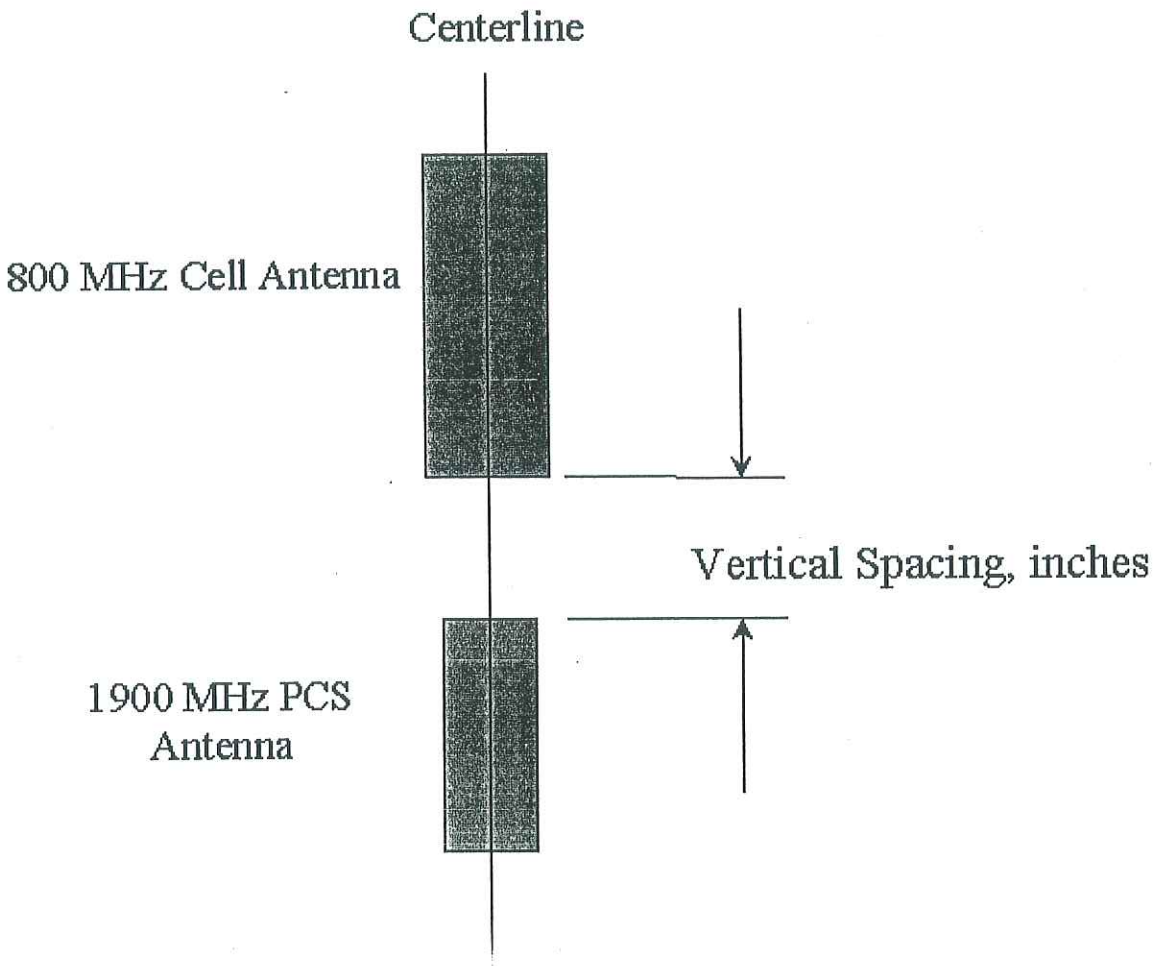


Figure 8: Cross-Band Isolation Test, Vertical Stacking

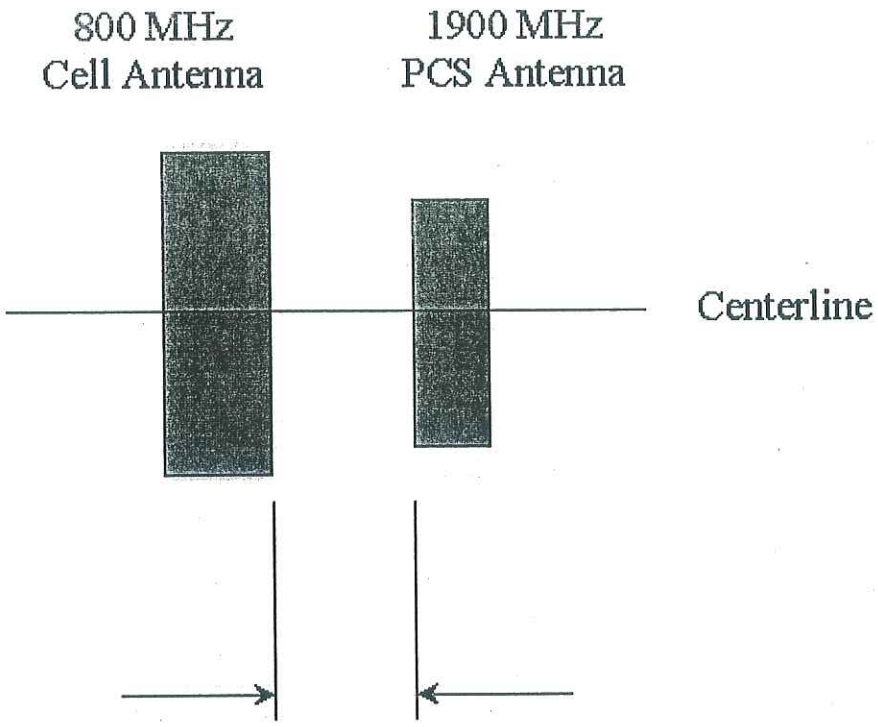


Figure 9: Cross-Band Isolation Test, Horizontal Stacking

Table 3: Cross-Band Coupling Tests:

1.) Swept at 800 MHz:

Spacing	Vertical Spacing	Horizontal Spacing
0	-68.9	-53.3
6	-69.5	-56.5
12	-71.0	-57.3
18	-72.0	-58.9
24	-73.0	-61.5
30	-73.5	-62.4
36	-74.0	-60.5

2.) Swept at 1900 MHz:

Spacing	Vertical Spacing	Horizontal Spacing
0	-63.5	-33.5
6	-65.8	-36.4
12	-66.1	-38.6
18	-67.6	-40.3
24	-65.4	-41.6
30	-67.2	-42.2
36	-67.2	-42.4

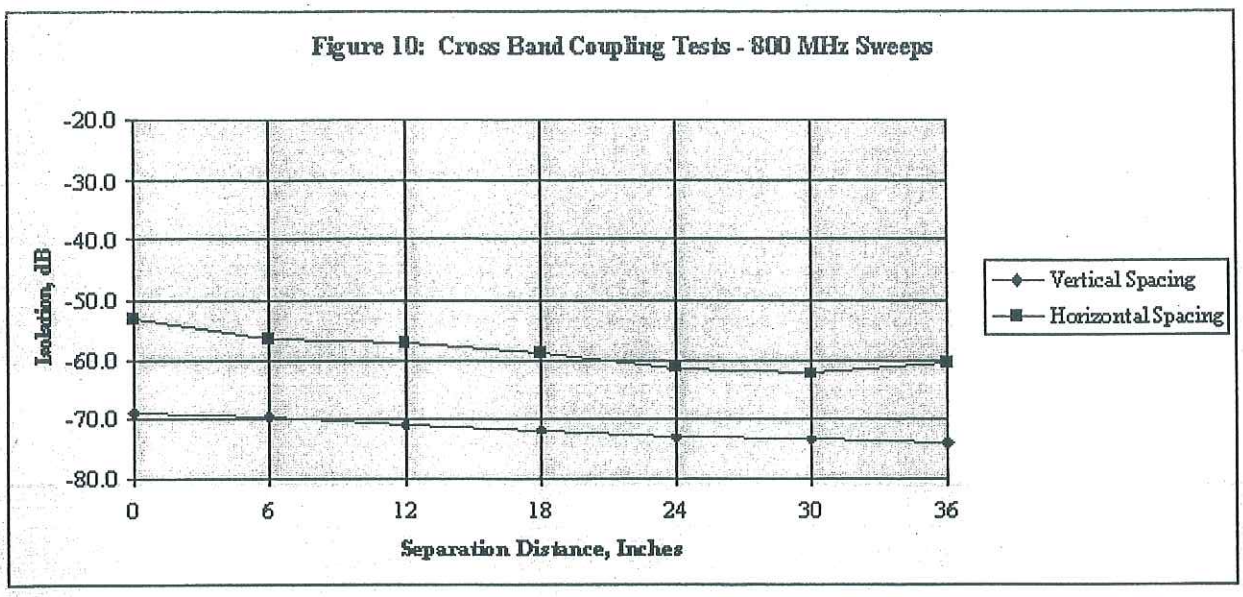


Figure 10: Cross Band Coupling Tests - 800 MHz Sweeps
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Isolation, dB
0
6
12
18
24
30
36
Separation Distance, Inches
Vertical Spacing
Horizontal Spacing

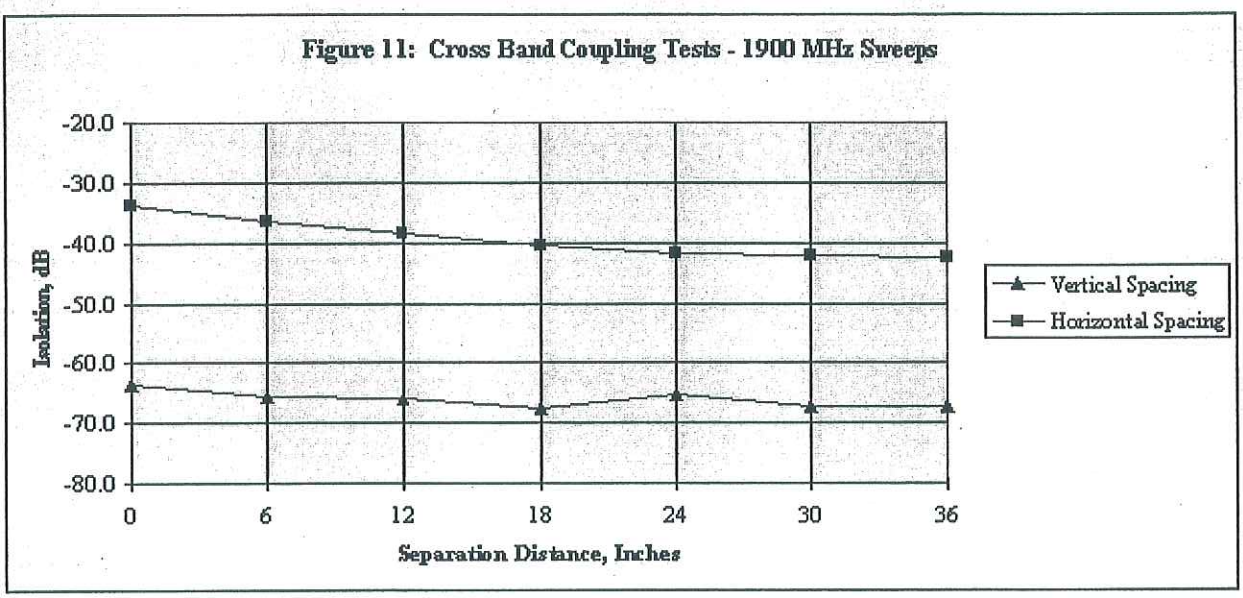


Figure 11: Cross Band Coupling Tests - 1900 MHz Sweeps
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Isolation, dB
0
6
12
18
24
30
36
Separation Distance, Inches
Vertical Spacing
Horizontal Spacing