9 Appendix

9.1 V-COMM Background Information

V-COMM is a leading provider of quality engineering and engineering related services to the worldwide telecommunications industry. V-COMM's staff of engineers are experienced in Cellular, Personal Communications Services (PCS), Enhanced Specialized Mobile Radio (ESMR), Paging, Wireless Data, Microwave, Signaling System 7, and Local Exchange Switching Networks. Further, V-COMM was selected by the FCC & Department of Justice to provide expert analysis and testimony in the Nextwave and Pocket Communications Bankruptcy cases. V-COMM has offices in Blue Bell, PA and Cranbury, NJ and provides services to both domestic and international markets. For additional information, please visit V-COMM's web site at www.vcomm-eng.com.

Biographies of Key Individuals

Dominic C. Villecco
President and Founder
V-COMM, L.L.C.

Dominic Villecco, President and founder of V-COMM, is a pioneer in wireless telecommunications engineering, with 22 years of executive-level experience and various engineering management positions. Under his leadership, V-COMM has grown from a start-up venture in 1996 to a highly respected full-service consulting telecommunications engineering firm.

In managing V-COMM's growth, Mr. Villecco has overseen expansion of the company's portfolio of consulting services, which today include a full range of RF & Network design, engineering & support; network design tools; measurement hardware; and software services; as well as time-critical engineering-related services such as business planning, zoning hearing expert witness testimony, regulatory advisory assistance, and project management.

Before forming V-COMM, Mr. Villecco spent 10 years with Comcast Corporation, where he held management positions of increasing responsibility, his last being Vice President of Wireless Engineering for Comcast International Holdings, Inc. Focusing on the international marketplace, Mr. Villecco helped develop various technical and business requirements for directing Comcast's worldwide wireless venture utilizing current and emerging technologies (GSM, PCN, ESMR, paging, etc.).

Previously he was Vice President of Engineering and Operations for Comcast Cellular Communications, Inc. His responsibilities included overall system design, construction and operation, capital budget preparation and execution, interconnection negotiations, vendor contract negotiations, major account interface, new product implementation, and cellular market acquisition. Following Comcast's acquisition of Metrophone, Mr. Villecco successfully merged the two technical departments and managed the combined department of 140 engineers and support personnel.

Mr. Villecco served as Director of Engineering for American Cellular Network Corporation (AMCELL), where he managed all system implementation and engineering design issues. He was responsible for activating the first cellular system in the world utilizing proprietary automatic call delivery software between independent carriers in Wilmington, Delaware. He also had responsibility for filing all FCC and FAA applications for AMCELL before it was acquired by Comcast.

Prior to joining AMCELL, Mr. Villecco worked as a staff engineer at Sherman and Beverage (S&B), a broadcast consulting firm. He designed FM radio station broadcasting systems and studio-transmitter link systems, performed AM field studies and interface analysis and TV interference analysis, and helped build a sophisticated six-tower arrangement for a AM antenna phasing system. He also designed and wrote software to perform FM radio station allocations pursuant to FCC Rules Part 73.

Mr. Villecco started his career in telecommunications engineering as a wireless engineering consultant at Jubon Engineering, where he was responsible for the design of cellular systems, both domestic and international, radio paging systems, microwave radio systems, two-way radio systems, microwave multipoint distribution systems, and simulcast radio link systems, including the drafting of all FCC and FAA applications for these systems.

Mr. Villecco has a BSEE from Drexel University, in Philadelphia, and is an active member of IEEE. Mr. Villecco also serves as an active member of the Advisory Council to the Drexel University Electrical and Computer Engineering (ECE) Department.

Relevant Expert Witness Testimony Experience

Over the past five years, Mr. Villecco had been previously qualified and provided expert witness testimony in the states of New Jersey, Pennsylvania, Delaware and Michigan. Mr. Villecco has also provided expert witness testimony in the following cases:

United States Bankruptcy Court

Nextwave Personal Communications, Inc. vs. Federal Communications Commission (FCC) **

Pocket Communications, Inc. vs. Federal Communications Commission (FCC) **

** In these cases, Mr. Villecco was retained by the FCC and the Department of Justice as a technical expert on their behalf, pertaining to matters of wireless network design, optimization and operation.

David K. Stern
Vice President and Co-Founder
V-COMM, L.L.C.

David Stern, Vice President and co-founder of V-COMM, has over 20 years of hands-on operational and business experience in telecommunications engineering. He began his career with Motorola, where he developed an in-depth knowledge of wireless engineering and all the latest technologies such as CDMA, TDMA, and GSM, as well as AMPS and Nextel's iDEN.

While at V-COMM, Mr. Stern oversaw the design and implementation of several major Wireless markets in the Northeast United States, including Omnipoint - New York, Verizon Wireless, Unitel Cellular, Alabama Wireless, PCS One and Conestoga Wireless. In his position as Vice President, he has testified at a number of Zoning and Planning Boards in Pennsylvania, New Jersey and Michigan.

Prior to joining V-COMM, Mr. Stern spent seven years with Comcast Cellular Communications, Inc., where he held several engineering management positions. As Director of Strategic Projects, he was responsible for all technical aspects of Comcast's wireless data business, including implementation of the CDPD Cellular Packet Data network. He also was responsible for bringing into commercial service the Cellular Data Gateway, a circuit switched data solution.

Also, Mr. Stern was the Director of Wireless System Engineering, charged with evaluating new digital technologies, including TDMA and CDMA, for possible adoption. He represented Comcast on several industry committees pertaining to CDMA digital

cellular technology and served on the Technology Committee of a wireless company on behalf of Comcast. He helped to direct Comcast's participation in the A- and B-block PCS auctions and won high praise for his recommendations regarding the company's technology deployment in the PCS markets.

At the beginning of his tenure with Comcast, Mr. Stern was Director of Engineering at Comcast, managing a staff of 40 technical personnel. He had overall responsibility for a network that included 250 cell sites, three MTSOs, four Motorola EMX-2500 switches, IS-41 connections, SS-7 interconnection to NACN, and a fiber optic and microwave "disaster-resistant" interconnect network.

Mr. Stern began his career at Motorola as a Cellular Systems Engineer, where he developed his skills in RF engineering, frequency planning, and site acquisition activities. His promotion to Program Manager-Northeast for the rapidly growing New York, New Jersey, and Philadelphia markets gave him the responsibility for coordinating all activities and communications with Motorola's cellular infrastructure customers. He directed contract preparations, equipment orders and deliveries, project implementation schedules, and engineering support services.

Mr. Stern earned a BSEE from the University of Illinois, in Urbana, and is a member of IEEE.

Sean Haynberg
Director of RF Technologies
V-COMM, L.L.C.

Sean Haynberg, Director of RF Technologies at V-COMM, has over 13 years of experience in wireless engineering. Mr. Haynberg has extensive experience in wireless system design, implementation, testing and optimization for wireless systems utilizing CDMA, TDMA, GSM, AMPS and NAMPS wireless technologies. In his career, he has conducted numerous first office applications, compatibility & interference studies, and new technology evaluations to assess, develop and integrate new technologies that meet industry and FCC guidelines. His career began with Bell Atlantic NYNEX Mobile, where he developed an in-depth knowledge of wireless engineering.

While at V-COMM, Mr. Haynberg was responsible for the performance of RF engineering team supplying total RF services to a diverse client group. Projects varied from managing a team of RF Engineers to design and implement new a PCS wireless network in the NY MTA; to the wireless system design & expansion of international markets in Brazil and Bermuda; to system performance testing and optimization for numerous markets in the north and southeast; to the development and procurement of hardware and software engineering tools; to special technology evaluations, system compatibility and interference testing. He has also developed tools and procedures to assist carriers in meeting compliance with FCC rules & regulations for RF Safety, and other FCC regulatory issues. In addition, Mr. Haynberg was instrumental in providing

leadership, technical analysis, engineering expertise, and management of a team of RF Engineers to deliver expert-level engineering analysis & reporting on behalf of the FCC & Department of Justice, in the Nextwave and Pocket Communications Bankruptcy proceedings.

Prior to joining V-COMM, Mr. Haynberg held various management and engineering positions at Bell Atlantic NYNEX Mobile (BANM). He was responsible for evaluating new technologies and providing support for the development, integration and implementation of first office applications (FOA), including CDMA, CDPD, and RF Fingerprinting Technology. Beyond this, Haynberg provided RF engineering guidelines and recommendations to the company's regional network operations, supported the deployment and integration of new wireless equipment and technologies, including indoor wireless PBX/office systems, phased/narrow-array smart antenna systems, interference and inter-modulation analysis and measurement, and cell site co-location and acceptance procedures. He was responsible for the procurement, development and support of engineering tools for RF, network and system performance engineers to enhance the system performance, network design and optimization of the regional cellular networks. He began his career as an RF Engineer responsible for the system design and expansion of over 100 cell sites for the cellular markets in New Jersey, Philadelphia, PA; Pittsburgh, PA; Washington, DC; and Baltimore, MD market areas.

Mr. Haynberg earned a Bachelor of Science degree in Electrical Engineering with high honors, and attended post-graduate work, at Rutgers University in Piscataway, New Jersey. While at Rutgers, Mr. Haynberg received numerous honors including membership in the National Engineering Honor Societies Tau Beta Pi and Eta Kappa Nu. In addition, Mr. Haynberg has qualified and provided expert witness testimony in the subject matter of RF engineering and the operation of wireless network systems for many municipalities in the state of New Jersey.

9.2 Cellular Switch-based Interference Detection Tools Are Not A Feasible Method For Measuring Potential Interference From AirCell Transmissions

In an *ex parte* document filed on March 22, 2000, AirCell, Inc. claimed that switch-based tools are available to cellular carriers to detect and track interference to terrestrial cellular systems from transmissions on AirCell's air-to-ground cellular service. For the purpose of evaluating the "real-world" impact of AirCell calls on terrestrial cellular systems, AirCell's claim is incorrect.

Switch-based interference detection tools cannot measure random events of intermittent interference at random cell sites, on random channels throughout the entire cellular network. That is the type of data necessary to evaluate the impact of AirCell calls, but it is just not possible to collect such data. Switch-based tools are only effective for collecting recurring interference events at the same cell site, on the same channels, and over a sustained period of time.

Switch-based tools generally collect large samples of data convoluting the results of any interference measured. For these reasons, operators do not rely on switch-based tools for measuring and resolving interference events from random sources. Since switch-based tools do not identify the source of the interference, a carrier would have no way to determine that any interference detected was a result of an AirCell transmission. Contrary to AirCell's contentions, it would be of no consequence to correlate any deviation in measured interference levels to AirCell call data. There is simply no way to prove a detected interference event was a result of AirCell transmissions.

There is yet another problem with the use of switch-based tools for measuring potential interference from AirCell calls. Airplane *location* information is not available. If one desired to correlate data from interference events on the ground with AirCell calls, airplane location information is essential in determining the "cause and effect" relationship of any interference. Without it, switch-based results will be inconclusive as to the source. For example, assume that switch-based tools in a terrestrial base station are reporting increased levels of interference, at the same time that AirCell calls were in operation for each of the two cases specified below:

A. Airplane located 0.1 miles away from the terrestrial cellular site and at an altitude of 3000 feet above ground level, as specified by an air traffic controller to keep under busy metropolitan controlled airspace;

B. Airplane located 180 miles away from the terrestrial cellular site and cruising on a jet at 40,000 feet above ground level.

With only time data, no further analysis is possible, and it cannot be concluded that AirCell caused the adverse performance effects. A carrier would have to have access to flight path data in order to reach reliable conclusions.

In its *ex parte* document, AirCell references the switch-based feature "interference detect," which looks at the interference levels before a *new* call or handoff call is assigned to an AMPS voice channel. This feature will miss 100% of the

interference that occurs *during* calls. The existence of this feature does not make AirCell's case. First, not all cellular carriers have access to this feature. It is not available on all equipment, and some carriers do not have the feature because they have elected not to purchase it. Also, the feature tests for interference at a fixed level during very brief periods (milliseconds), which is only for a small fraction of the time duration of a call. Consequently, it will not detect more than 99.9% of the interference that occurs for all calls. In cases where the feature is installed, many carriers do not use it because it does not work effectively, and causes adverse effects to cellular performance at the cell site. For these reasons, the feature is not used and is not effective in detecting interference from AirCell transmissions.

Aside from the problems with switch-based detection tools, the carriers are hampered in demonstrating "real world" evidence of AirCell interference because it is simply not available today. AirCell has not substantially deployed its system and service. It has not sold many phones and, today, usage is at very low levels in most of the country. For example, according to information provided by AirCell partner companies, five potentially busy northeast AirCell cell sites carried traffic usage levels in the first quarter of 2002 to approximately 3 minutes per day.

In addition to its very limited deployment and usage, an AirCell call could appear anywhere within a cell's coverage area, which is a 90-mile range or about 25,000 square mile area. Such a call could disrupt numerous cellular calls within this enormous area, and cellular carriers would be hard pressed to detect where and when it is occurring. Cellular systems can have more than 1,000 of their own cell sites within this 25,000 square mile area.

Despite the difficulty in isolating interference from individual AirCell calls, the overall impact of the introduction of air-to-ground transmissions would be significant in the introduction of random interference throughout a CGSA and the loss of flexibility to provide service at low noise thresholds.

Carriers do have methods of analyzing such interference. The most effective and conclusive test method is to perform a controlled drive test. For terrestrial tests, a cellular operator drives a predetermined route and measures events of interference to the system. In this way, the carrier can create the interference event and understand its impact. For the same reasons, a controlled aircraft flight test is required to determine the effect of AirCell's use of cellular spectrum. A flight test can be designed to isolate the service interruptions that are caused from typical AirCell calls. This is the only practicable method of measurement to identify the "real-world" effects of AirCell's use of cellular spectrum.

Controlled tests are common in statistical analyses. They isolate unusual and unpredictable events, which can distort or misrepresent the effect of an event. For example, to study the effects of new drugs, medical professionals conduct controlled tests, where one group is given the drug and another group is given a placebo. This allows the effect of the new drug to be measured. If data from the group taking the drug were to become corrupted or inter-mixed with data from other sources, the results would have to be deemed inconclusive. The same is true for analyzing switch-based data for

AirCell interference. AirCell interference would not be isolated; instead it would be inter-mixed and convoluted with other sources of interference.

A controlled test can provide additional information. During a controlled test, we can measure airplane location information with GPS receivers on the airplane recording GPS location along with time samples. Also, today AirCell calls are not allowed on channels assigned to digital service by the carriers. The only way to measure the impact to digital service, without potentially serious disruptions to cellular digital service, is to perform controlled tests on those channels.

In summary, due to the limitations of cellular system measurements and deployment of the AirCell service, "real world" measurements cannot be obtained to effectively determine the effects of AirCell's use of cellular spectrum. Hence, any "real world" measurements performed in this manner will be biased in favor of showing no harmful interference. The only effective way to measure the effects of AirCell's use of cellular spectrum is to conduct a controlled test, as has been proposed by the carriers and V-COMM.

In an *ex parte* document filed on May 2, 2000, AirCell, Inc. claims that switch-based tools are available to cellular carriers to detect and track interference to terrestrial cellular systems from transmissions on AirCell's air-to-ground cellular service. For the purpose of evaluating the "real-world" impact of AirCell calls on terrestrial cellular systems, AirCell's claim is incorrect.

As provided in V-COMM's engineering statement above, "switch-based interference detection tools cannot measure random events of intermittent interference at random cell sites, on random channels throughout the entire cellular network. That is the type of data necessary to evaluate the impact of AirCell calls, but it is just not possible to collect such data." In its document, AirCell states it coordinates frequencies with adjacent operators and has offered to provide call record data to a neutral third party, and thus, its system does not contain random elements preventing carriers to detect potential interference. V-COMM appreciates AirCell's claim but stands by conclusions in V-COMM's engineering statement.

Potential interference from AirCell transmissions will be unpredictable and random in nature. The transmissions can emanate from any airborne unit, on any flight pattern having various altitudes, distances, transmit power levels and channel occupancy, all contributing to that fact that any AirCell signals received by a terrestrial base station will not be consistent or predictable. Limiting the location of the airplane to within 25,000 square miles, and the number of possible channels to six, and providing past call record and channel data is not very helpful in detecting interference specifically from AirCell transmissions. These variables do not remove the randomness of AirCell signals, nor do they enable a carrier to use network diagnostic tools to effectively measure potential interference.

Switch-based tools generally collect large samples of data masking the results for any single event of interference measured. For this reason, operators cannot rely on switch-based tools for measuring or resolving interference events from AirCell calls. Switch-based tools do not identify the source of the interference and a carrier would have no way to determine that any interference detected was a result of an AirCell

transmission. Contrary to AirCell's contentions, it would also be of no consequence to correlate deviations in measured interference levels to AirCell call data. There is no way to prove that any interference measured was a result of AirCell transmissions. Moreover, given the rarity of AirCell calls at the present time, the lack of any statistically significant deviations in switch-based measured data would not permit the identification of AirCell interference even if every AirCell call caused actual harmful interference, however that were defined.[58]

In its documents, AirCell states that "to date, there have been no reported instances of harmful interference." Since network diagnostic tools cannot effectively track interference specific to AirCell and, today, AirCell has extremely limited usage on its network, little can be derived from this claim. Similarly, cellular customers can not report such instances, should they be occurring, because they have no way of concluding a specific service interruption or impairment was a result of AirCell transmissions. Hence, there is no mechanism that a carrier has to determine that interference is occurring specifically from AirCell transmissions, except by conducting a controlled test.

As stated in the V-COMM engineering statement above, a controlled test is the only practicable and conclusive method of measurement to identify the "real-world" effects of AirCell's use of cellular spectrum. In a controlled test, a carrier is able to isolate and measure the specific interference levels that result from AirCell transmissions. AirCell agrees with the benefits of a controlled test, stating that "a controlled test can minimize the effects of unwanted variables so that gathered data can accurately measure AirCell's system performance characteristics".

[58] If each of the two or three AirCell calls typically handled per day by an AirCell site caused harmful interference to terrestrial calls, as measured by switch-based tools, that would not result in a statistically significant difference between the interfered-with sites and other sites, given that a terrestrial site can serve a hundred thousand calls per day in a busy urban system.

9.3 Phase 1 Test – Flight Path Maps

Figure 9.3-A AirCell Phase 1 Test: Flight Paths – DPC Enabled Flight Tests

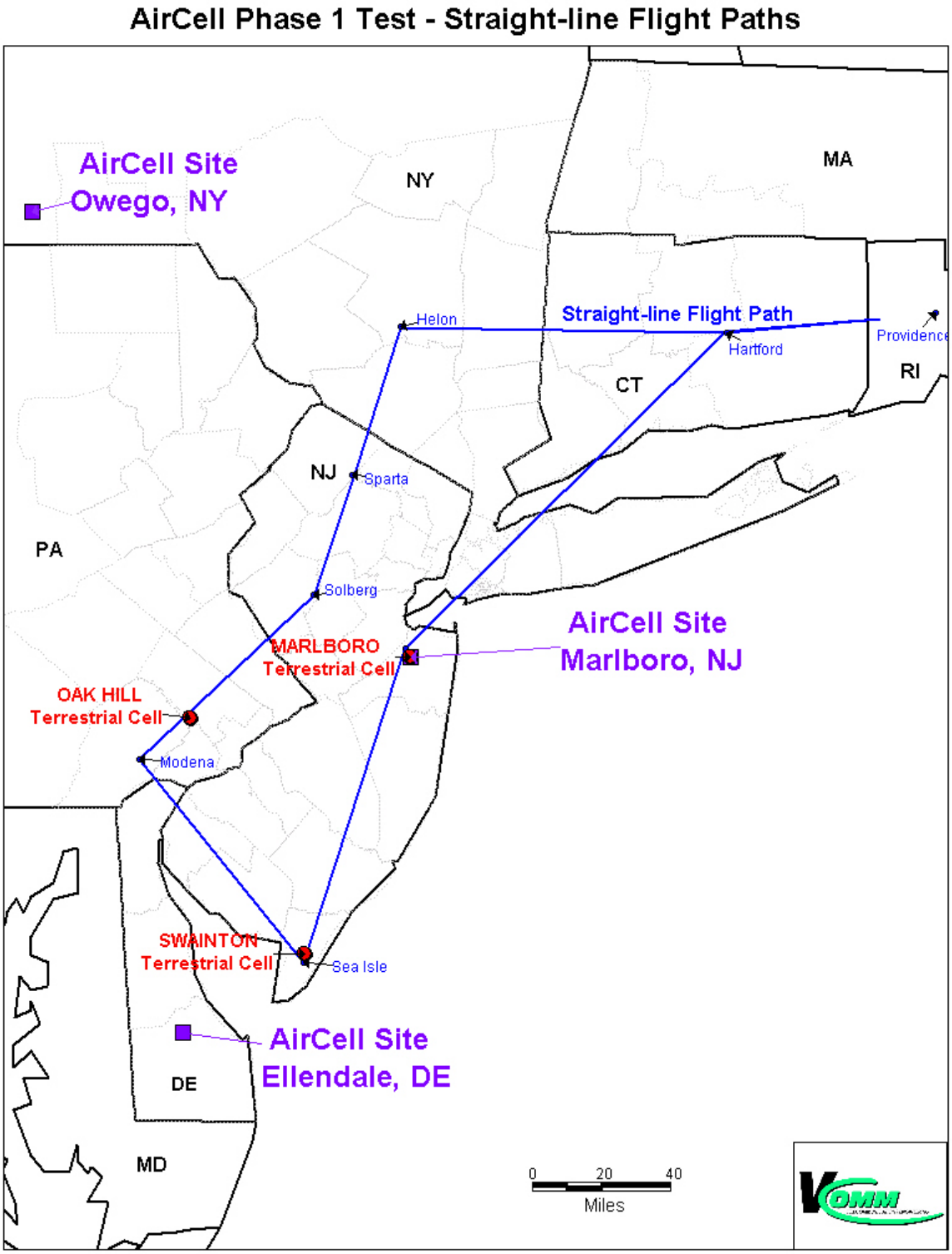
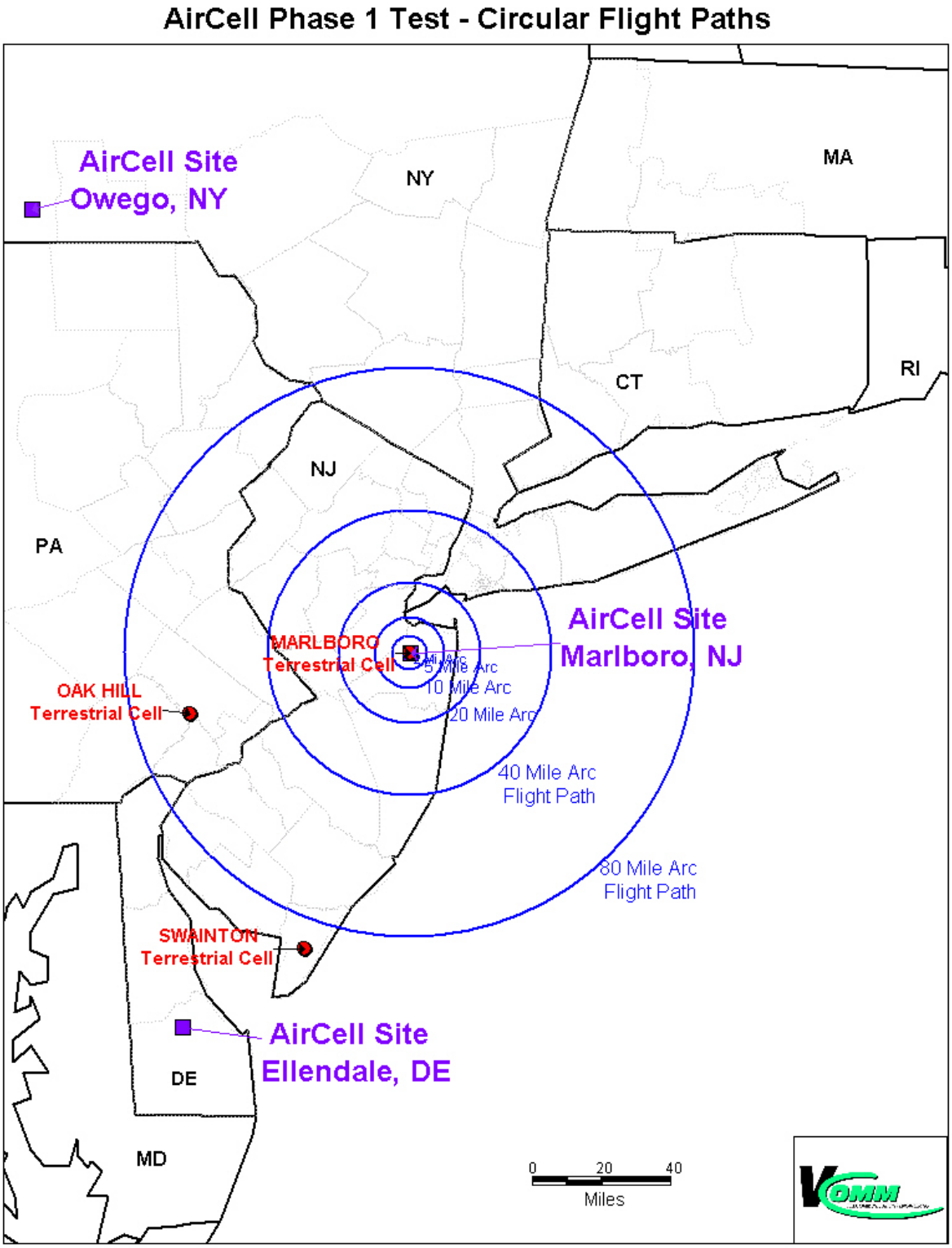


Figure 9.3-B AirCell Phase 1 Test: Flight Paths – DPC Disabled Flight Tests



9.4 Phase 1 Test Results – AirCell Signals Received per Terrestrial Antenna Azimuth

Figure 9.4-A Phase 1 Test Results, RSSI per Terrestrial Site Antenna Azimuth: H-POL Antenna, DPC Disabled

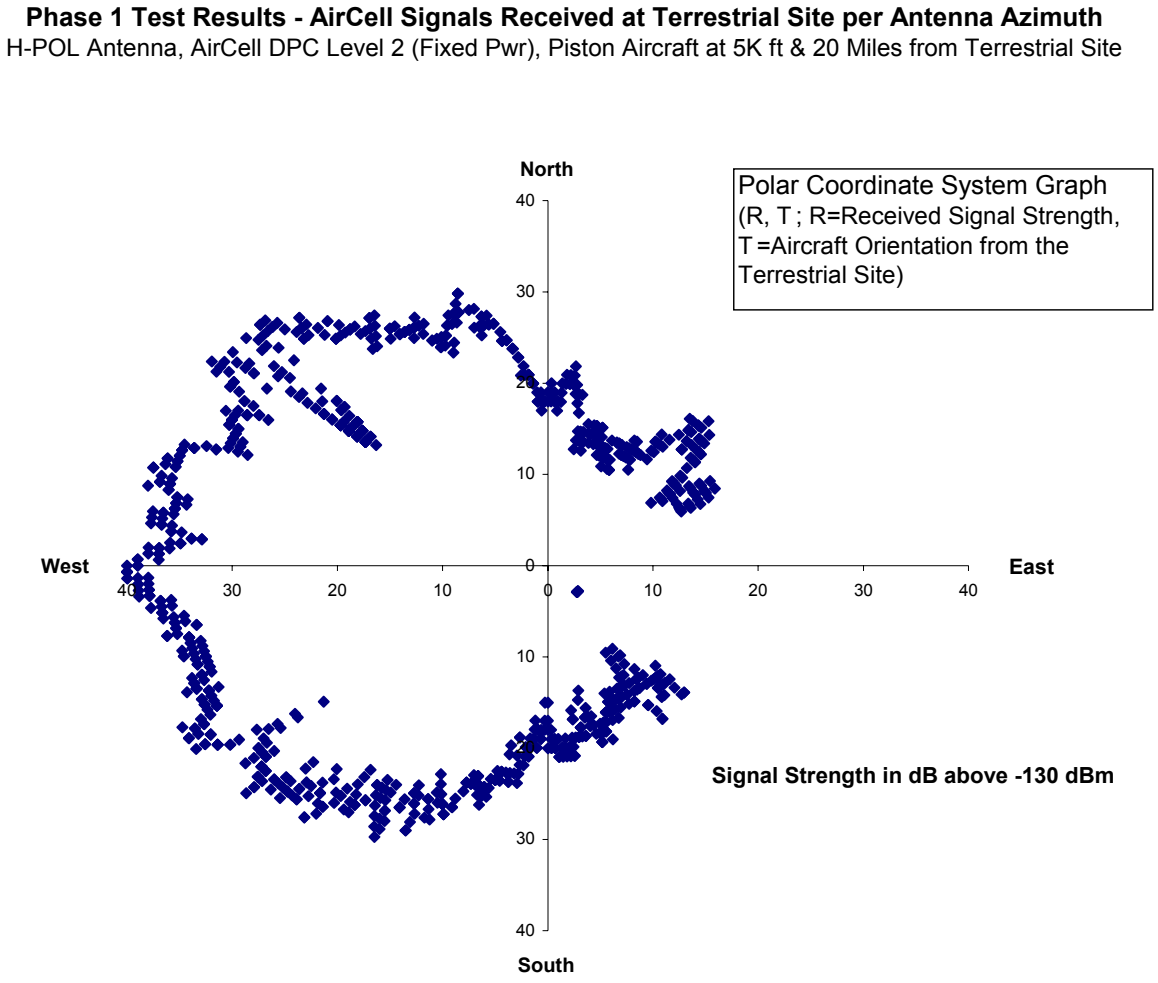


Figure 9.4-B Phase 1 Test Results, RSSI per Terrestrial Site Antenna Azimuth: SL45 Antenna, DPC Disabled

Phase 1 Test Results - AirCell Signals Received at Terrestrial Site per Antenna Azimuth

SL45 Antenna, AirCell DPC Level 2 (Fixed Pwr), Piston Aircraft at 5K ft & 20 Miles from Terrestrial Site

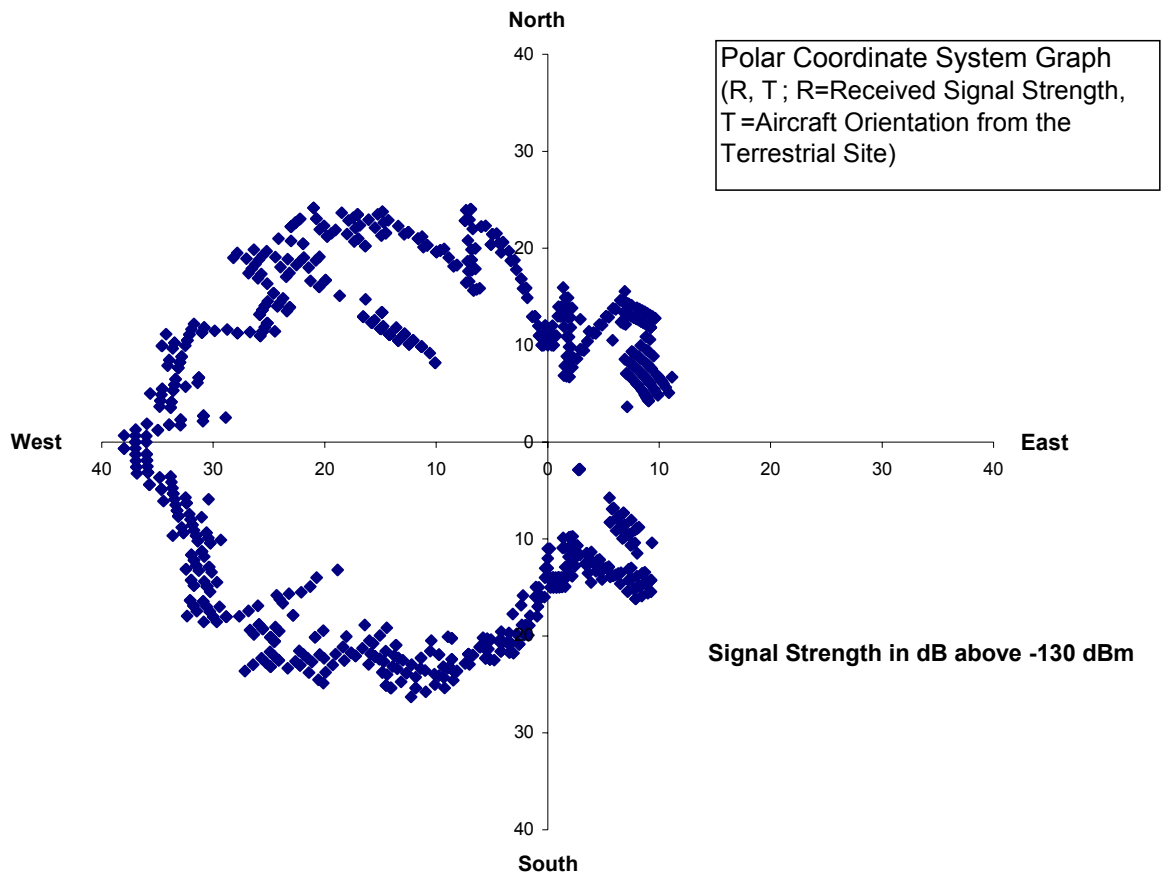


Figure 9.4-C Phase 1 Test Results, RSSI per Terrestrial Site Antenna Azimuth: V-POL Antenna, DPC Disabled

Phase 1 Test Results - AirCell Signals Received at Terrestrial Site per Antenna Azimuth

V-POL Antenna, AirCell DPC Level 2 (Fixed Pwr), Piston Aircraft at 5K ft & 20 Miles from Terrestrial Site

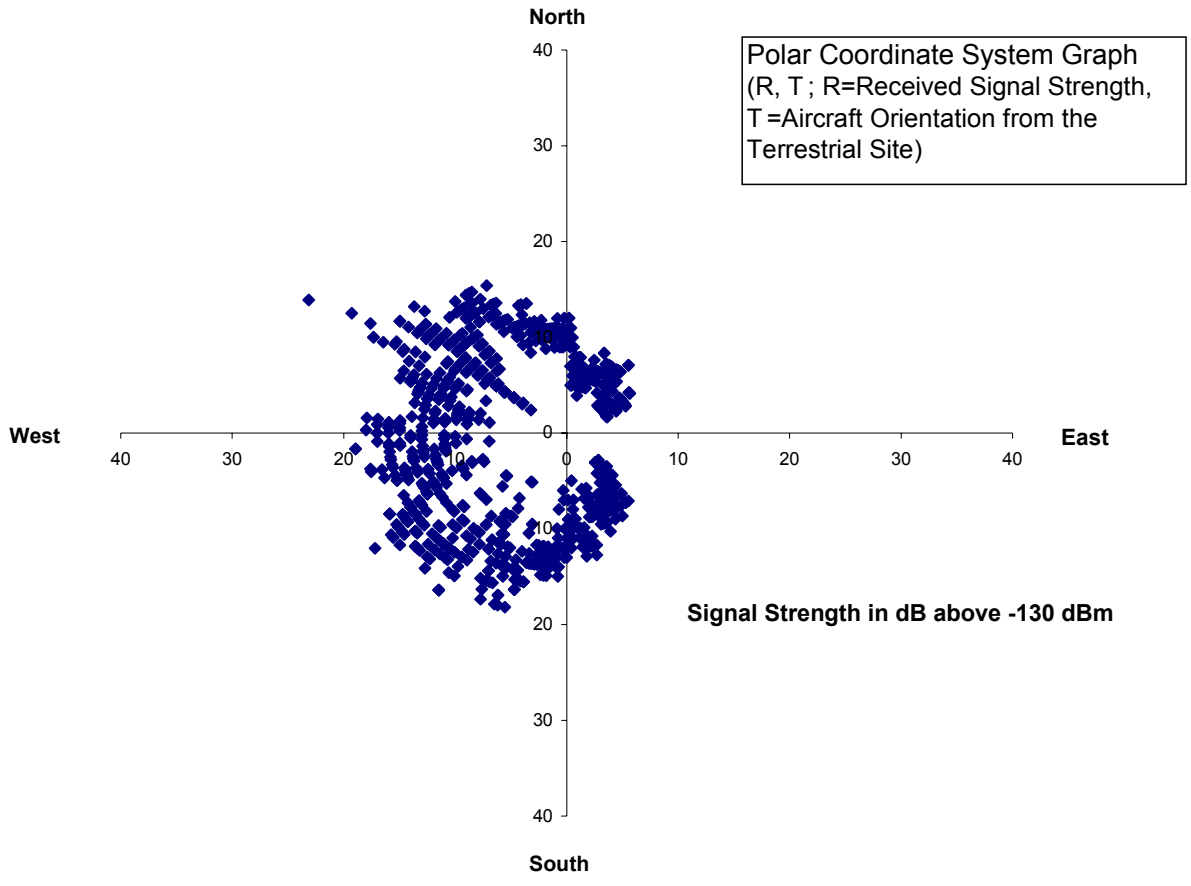
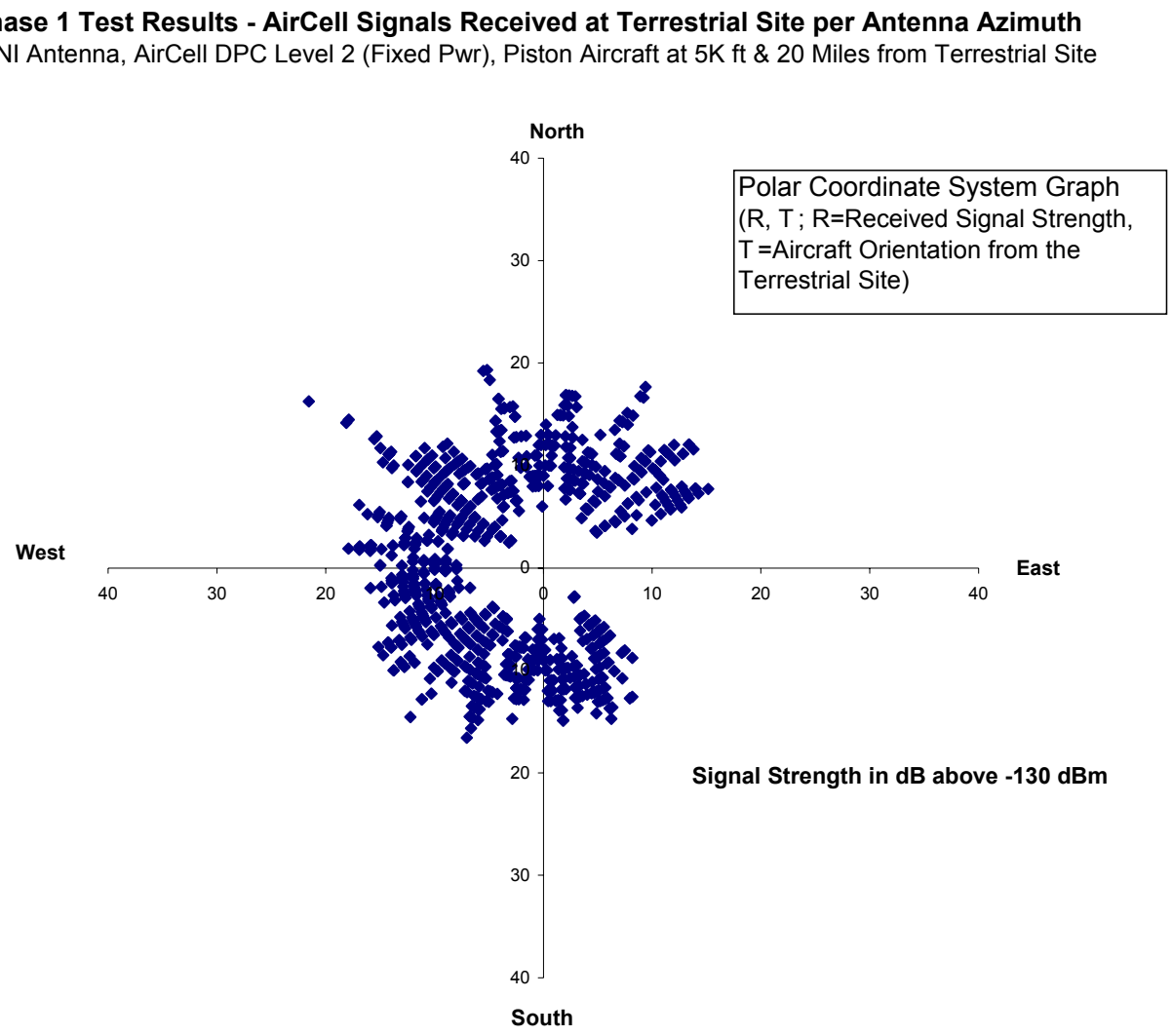


Figure 9.4-D Phase 1 Test Results, RSSI per Terrestrial Site Antenna Azimuth: OMNI Antenna, DPC Disabled



9.5 Phase 1 Test Results – AirCell Signals Received at Terrestrial Sites, DPC Disabled

Figure 9.5-A Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, All Altitudes, DPC Disabled

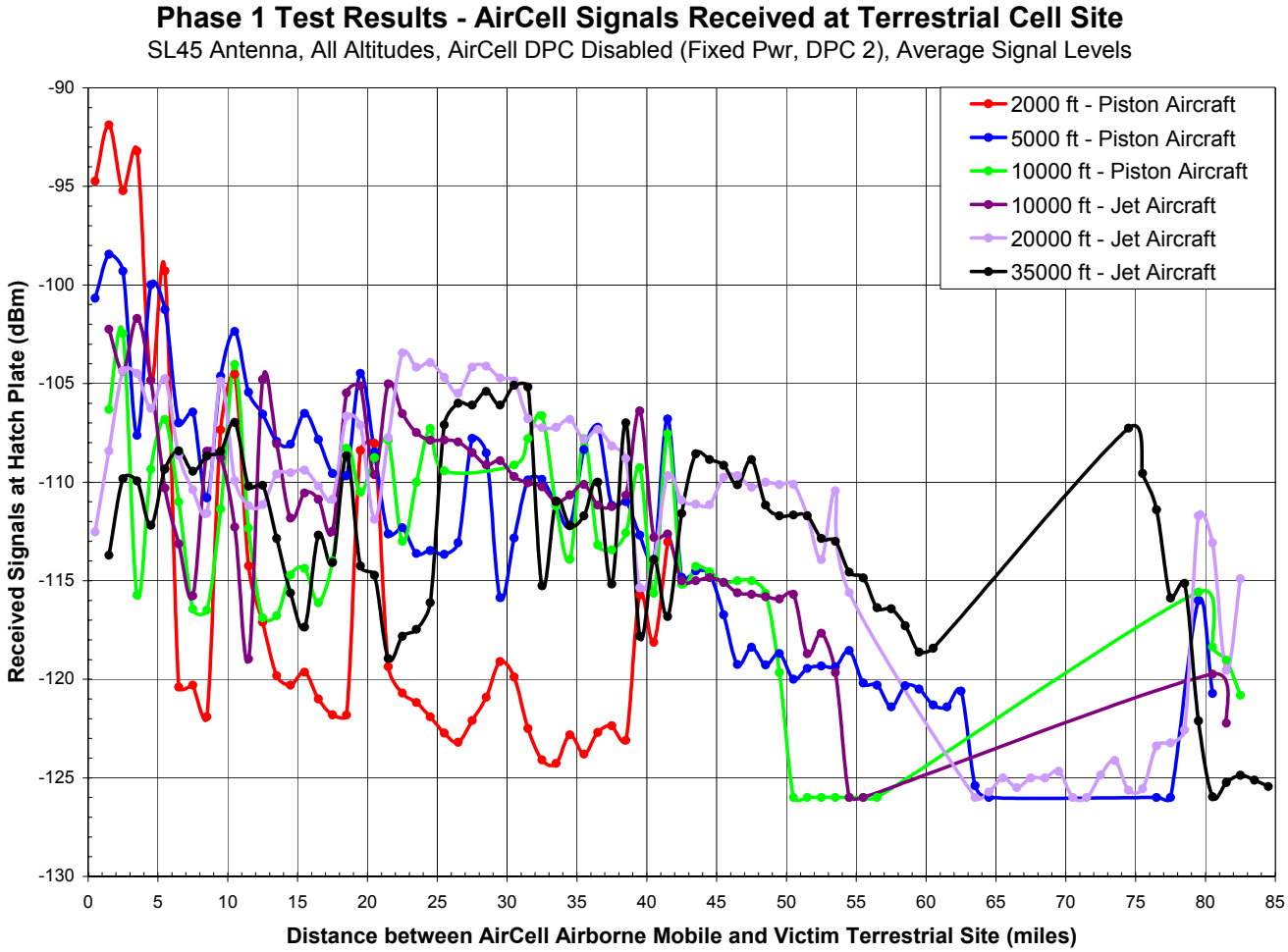


Figure 9.5-B Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, All Altitudes, DPC Disabled

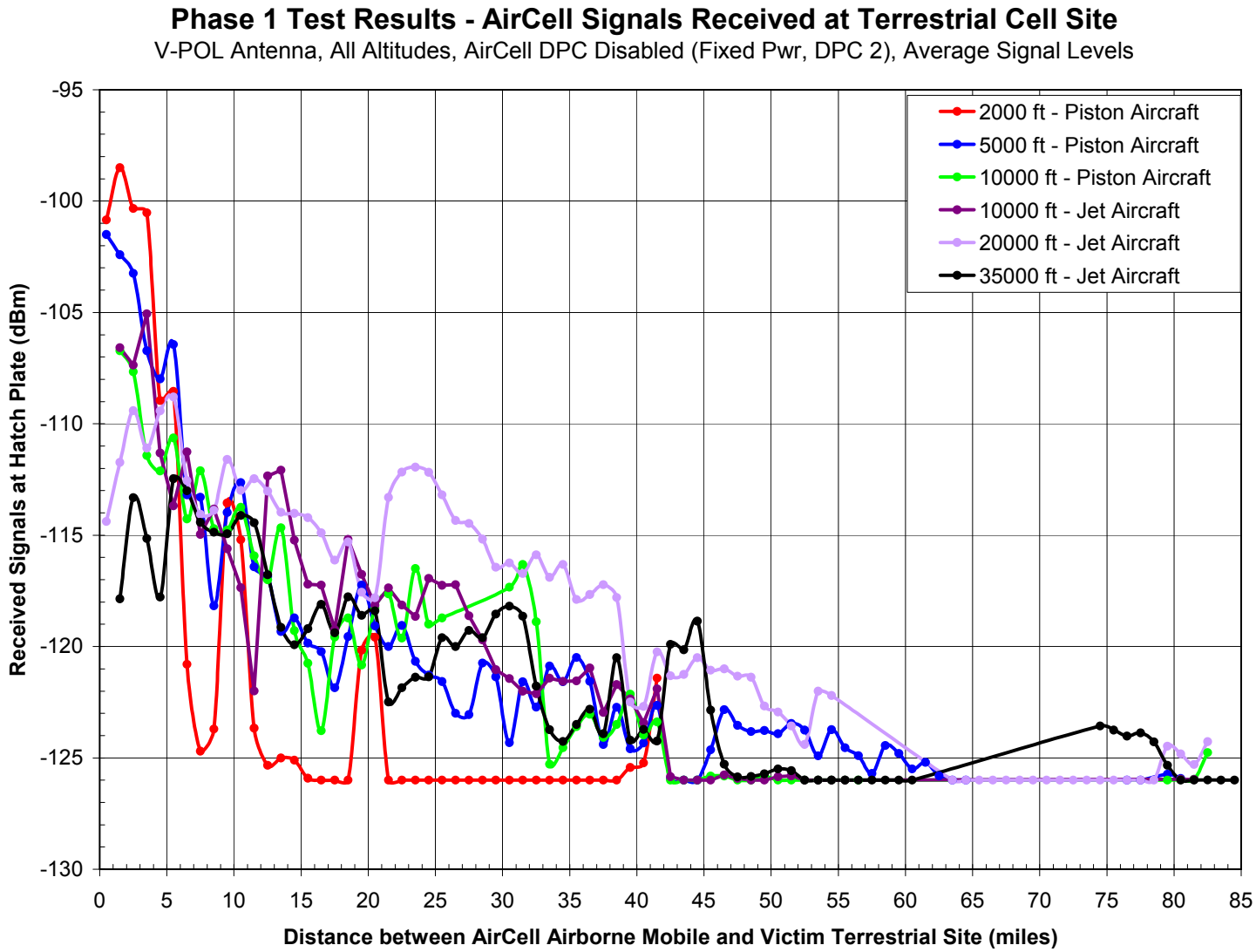


Figure 9.5-C Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, All Altitudes, DPC Disabled

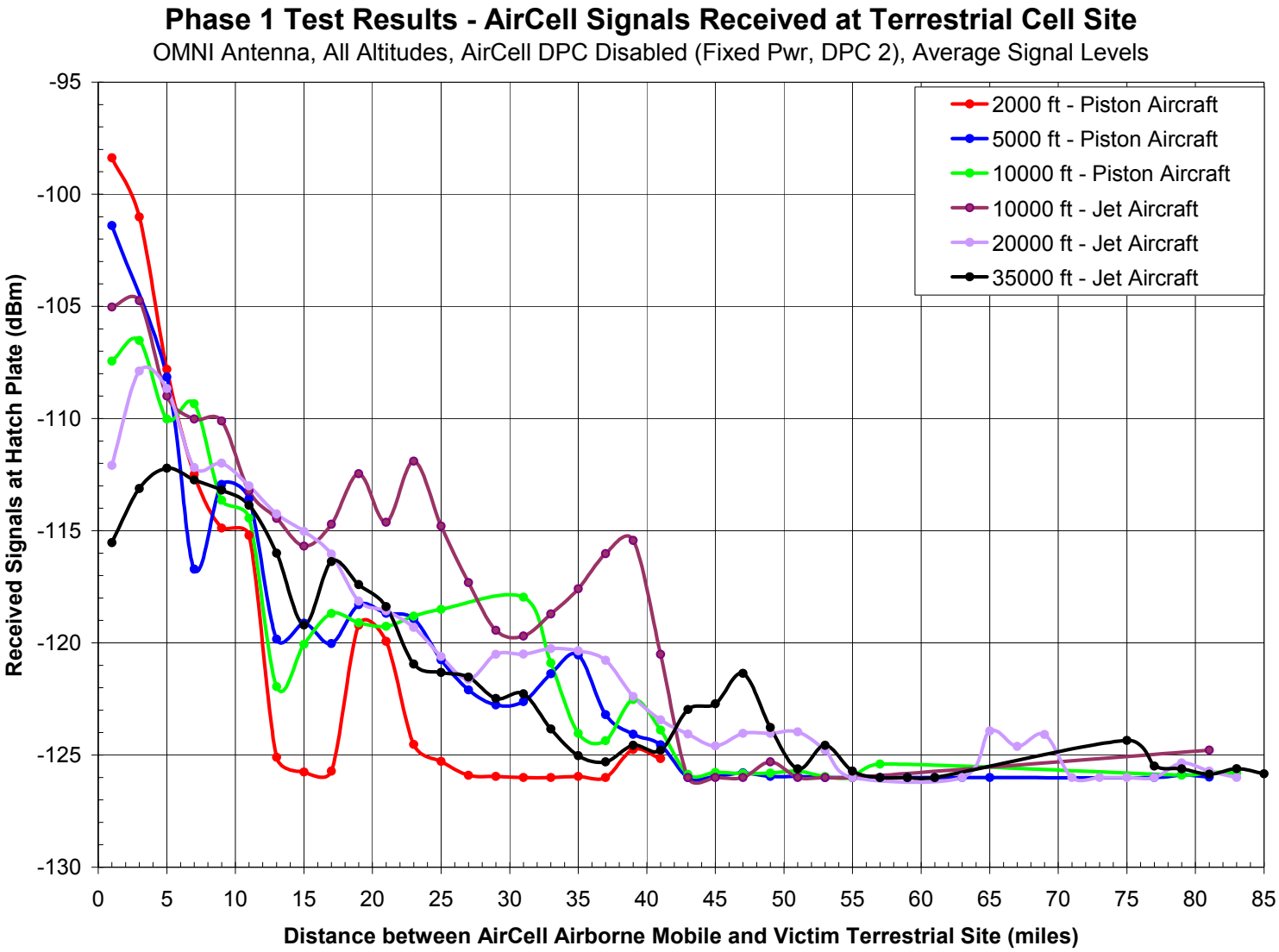


Figure 9.5-D Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, All Altitudes, DPC Disabled

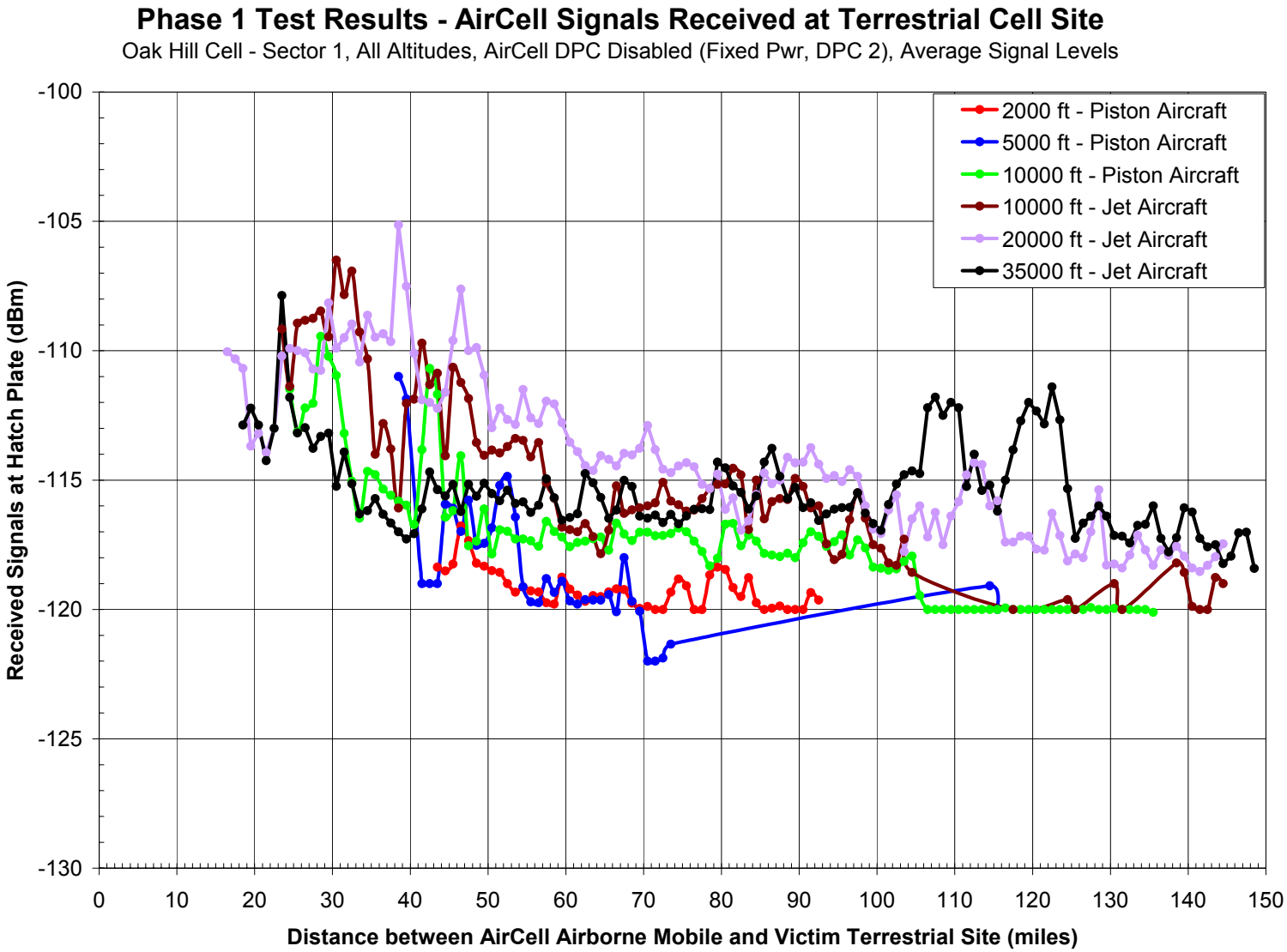


Figure 9.5-E Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, All Altitudes, DPC Disabled

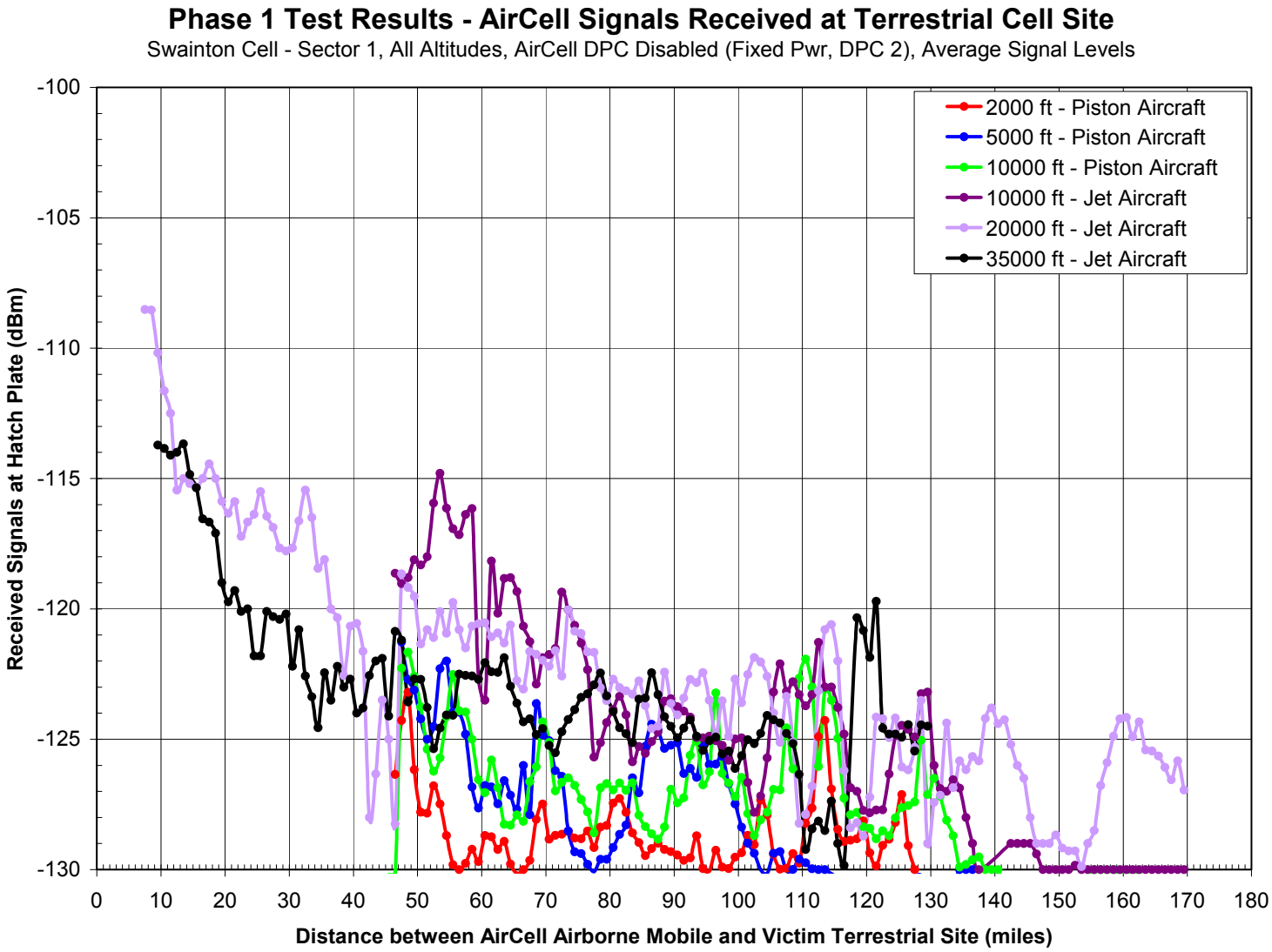


Figure 9.5-F Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 3, All Altitudes, DPC Disabled

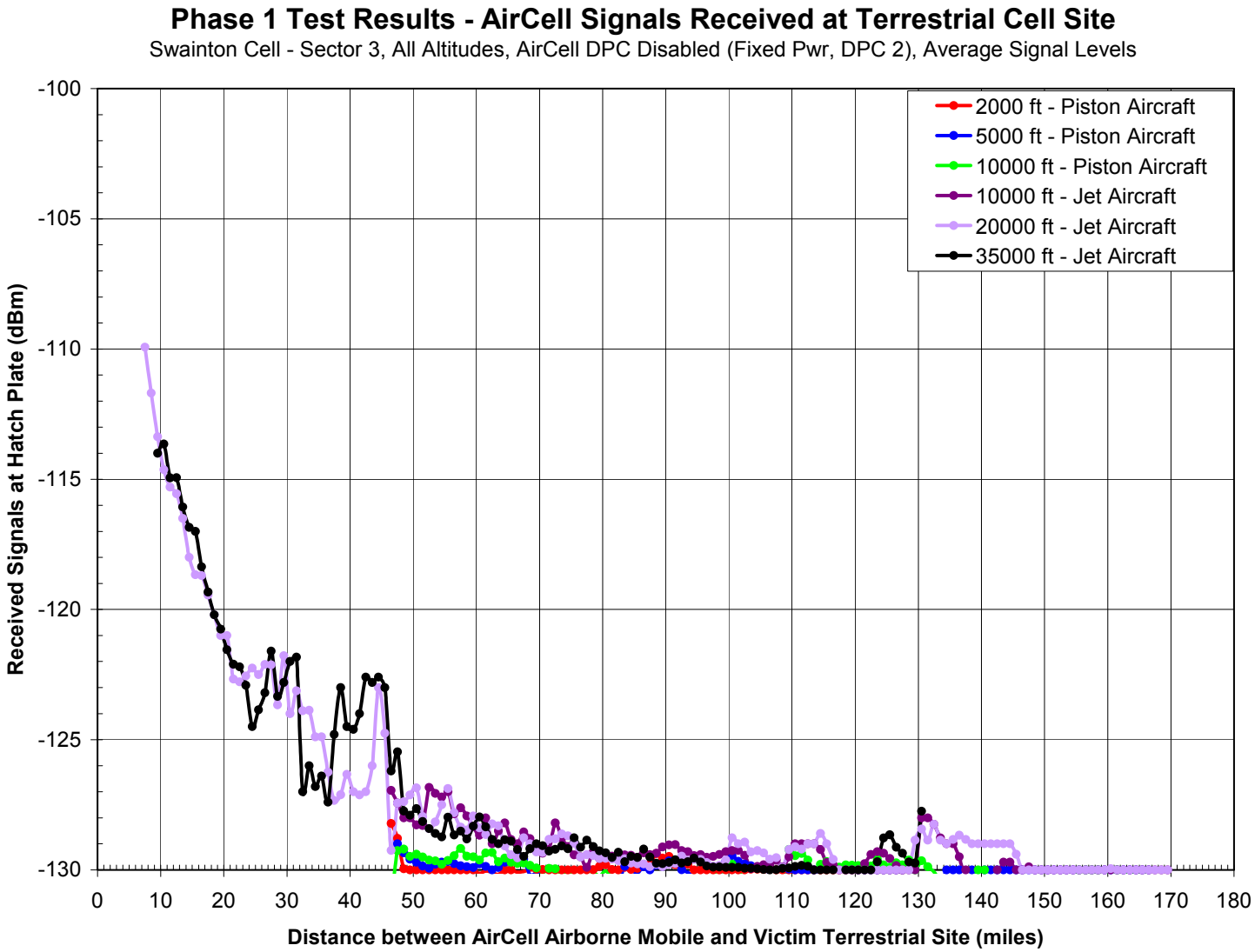


Figure 9.5-G Phase 1 Test Results, RSSI at Terrestrial Site: All Antennas, Piston Aircraft @ 2,000', DPC Disabled

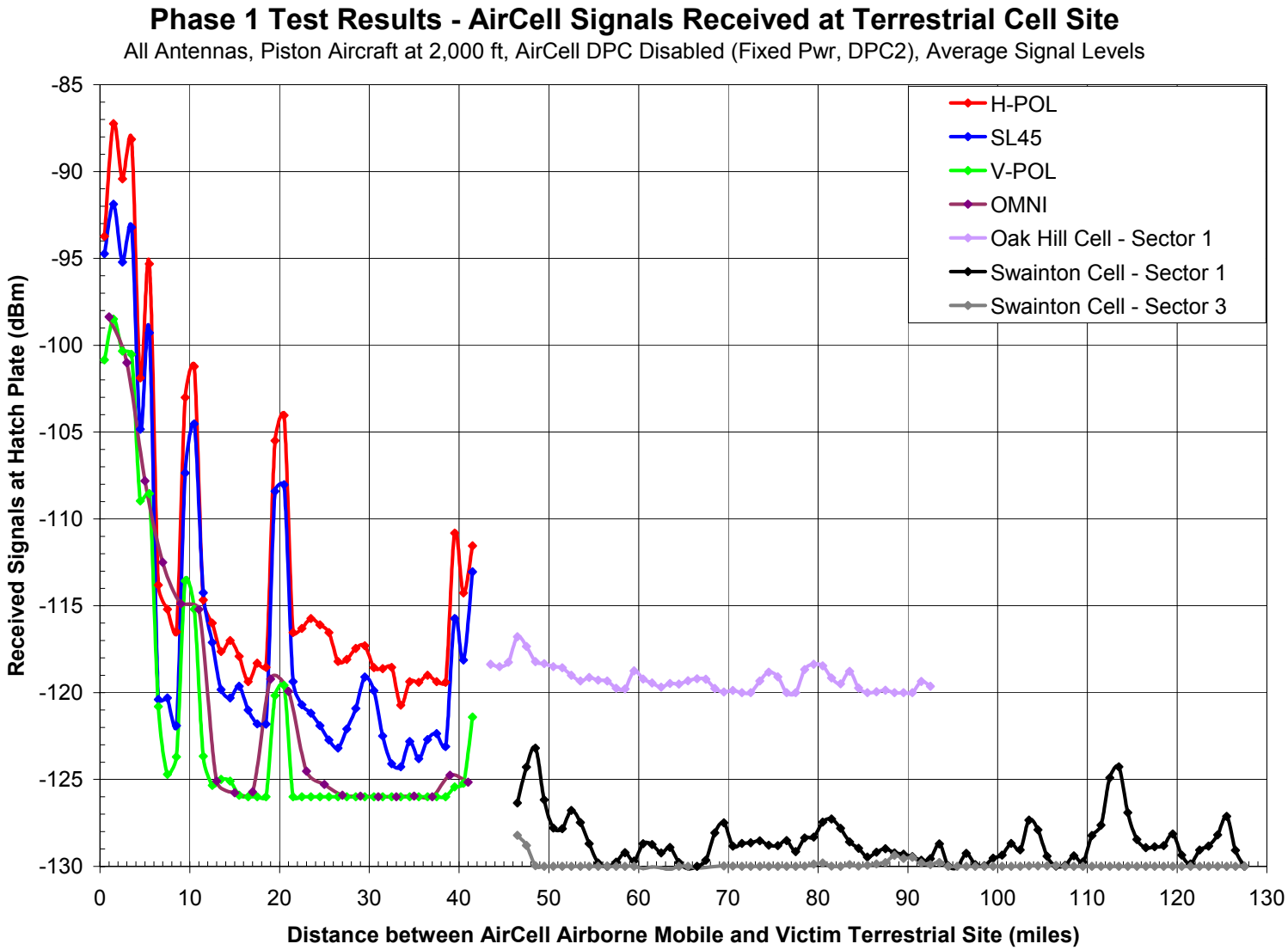


Figure 9.5-H Phase 1 Test Results, RSSI at Terrestrial Site: All Antennas, Piston Aircraft @ 10,000', DPC Disabled

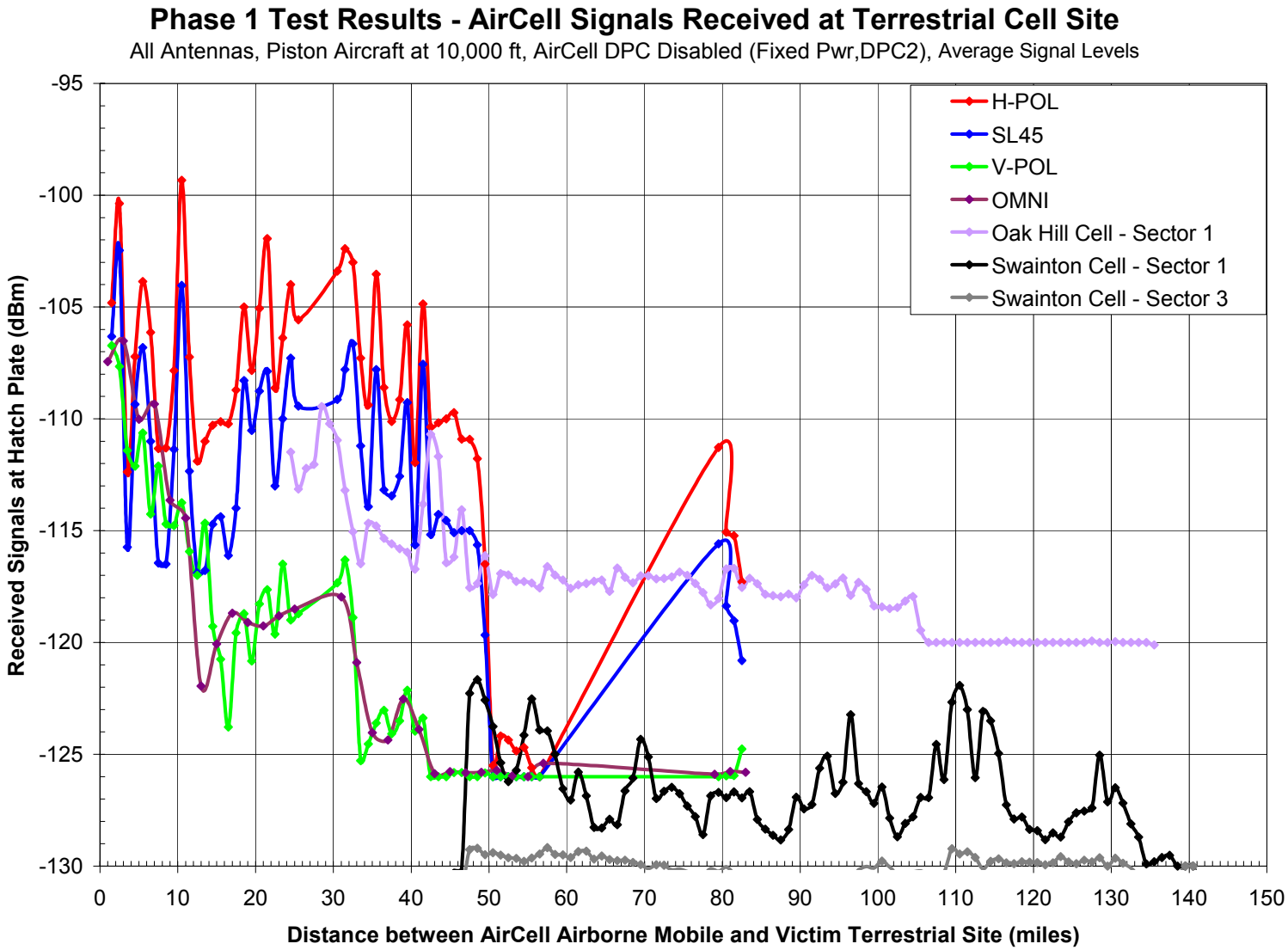


Figure 9.5-I Phase 1 Test Results, RSSI at Terrestrial Site: All Antennas, Jet Aircraft @ 10,000', DPC Disabled

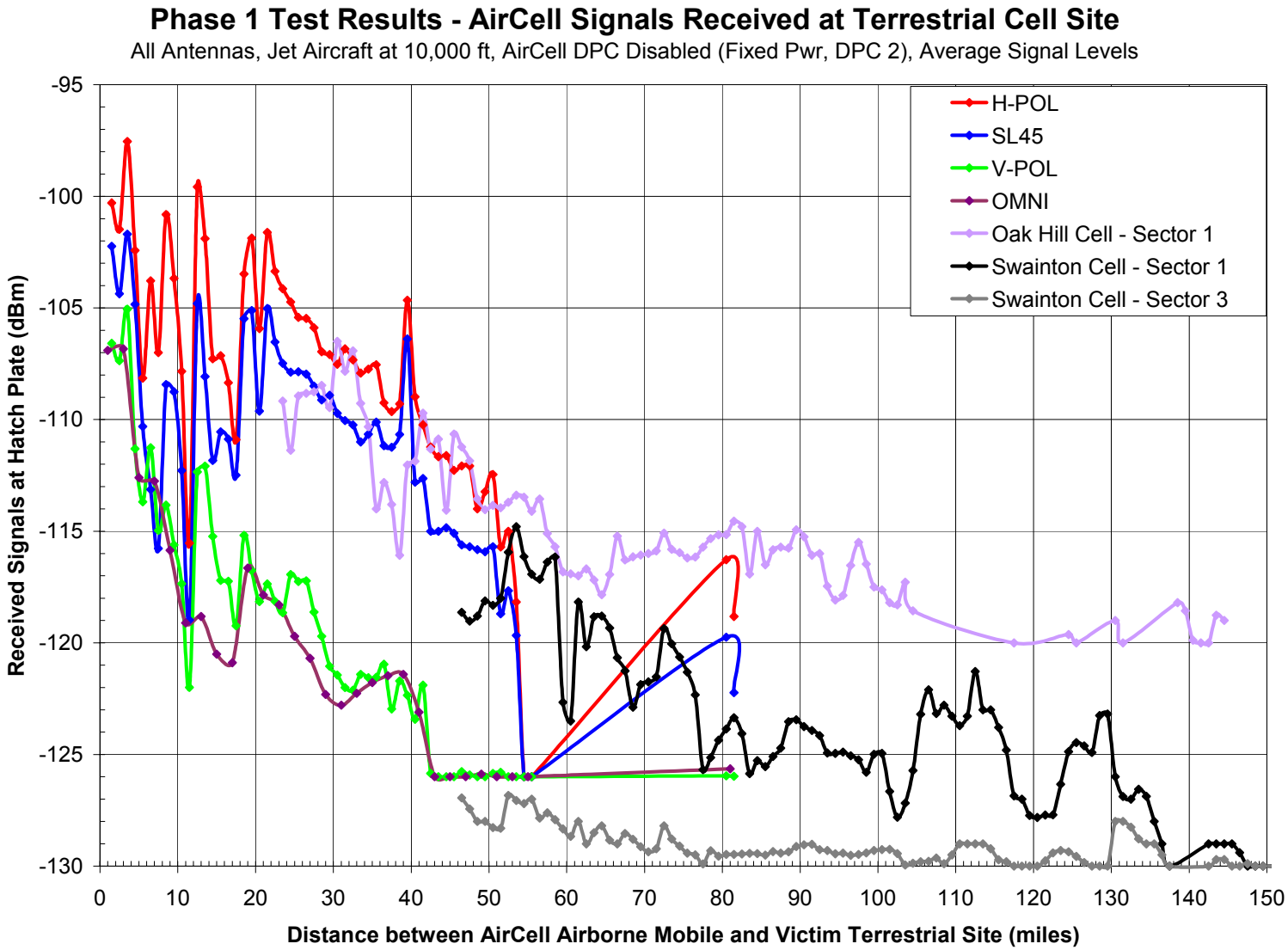


Figure 9.5-J Phase 1 Test Results, RSSI at Terrestrial Site: All Antennas, Jet Aircraft @ 35,000', DPC Disabled

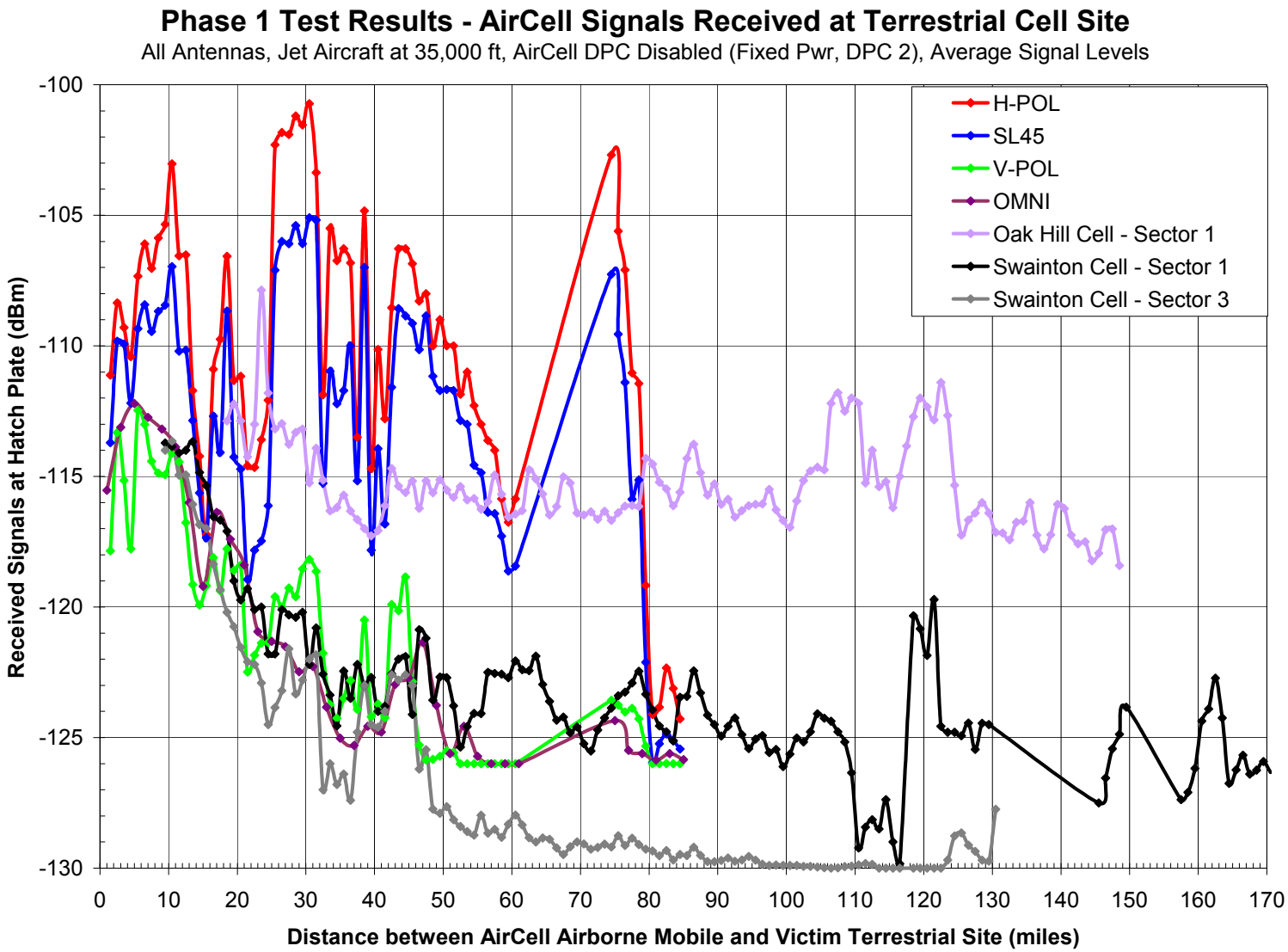


Figure 9.5-K Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Piston Aircraft @ 2,000', DPC Disabled

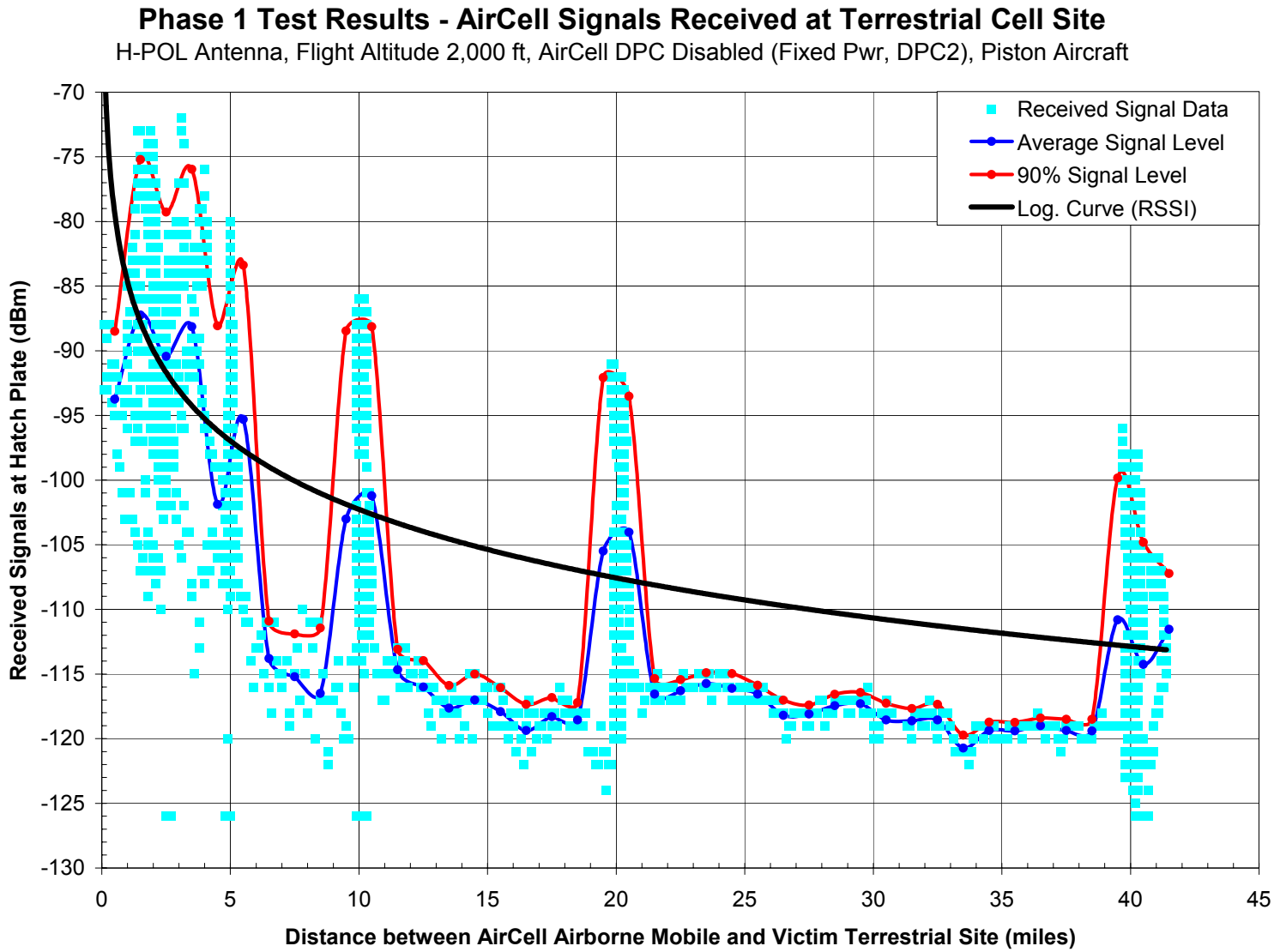


Figure 9.5-L Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Piston Aircraft @ 5,000', DPC Disabled

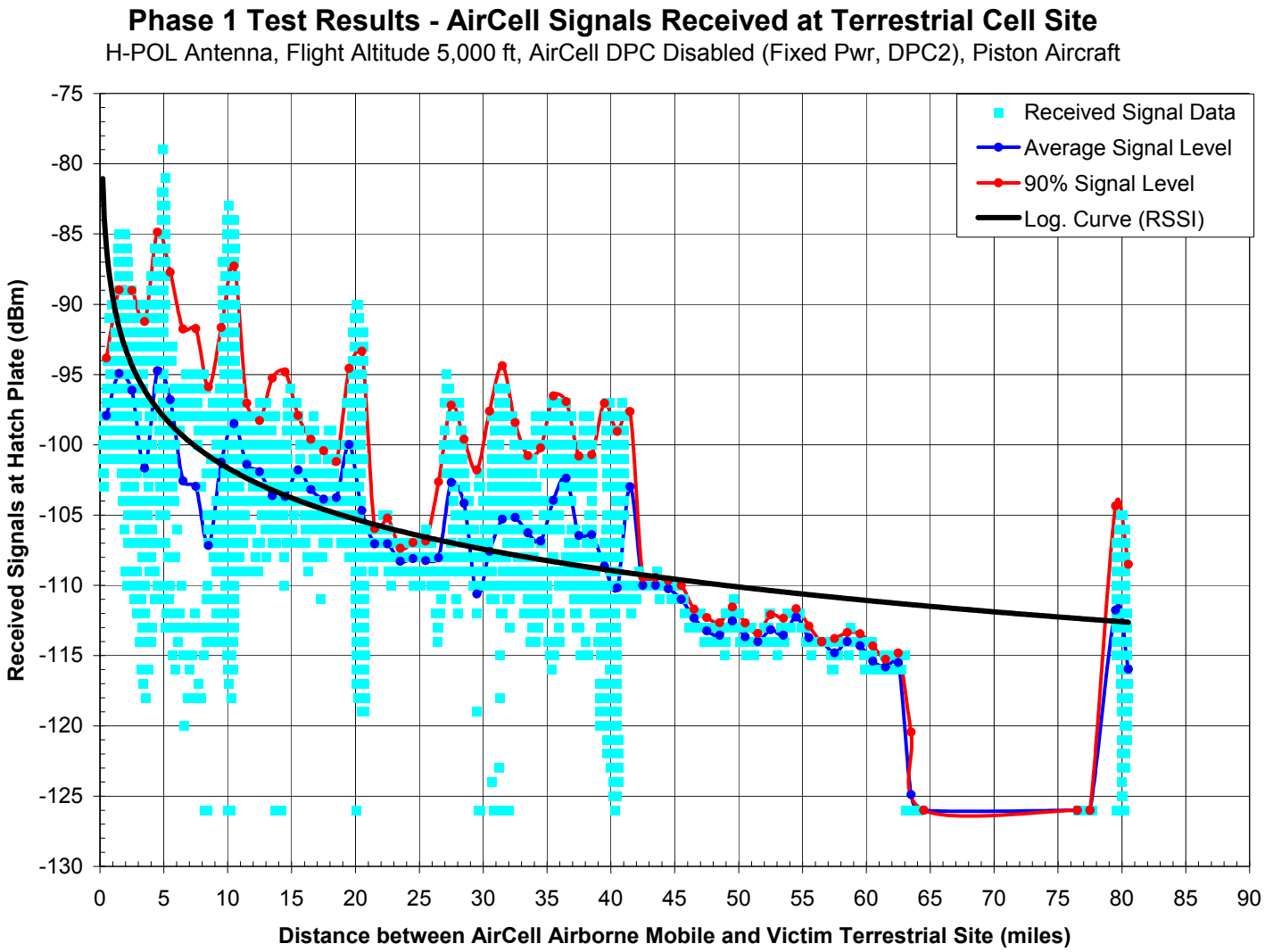


Figure 9.5-M Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Piston Aircraft @ 10,000', DPC Disabled

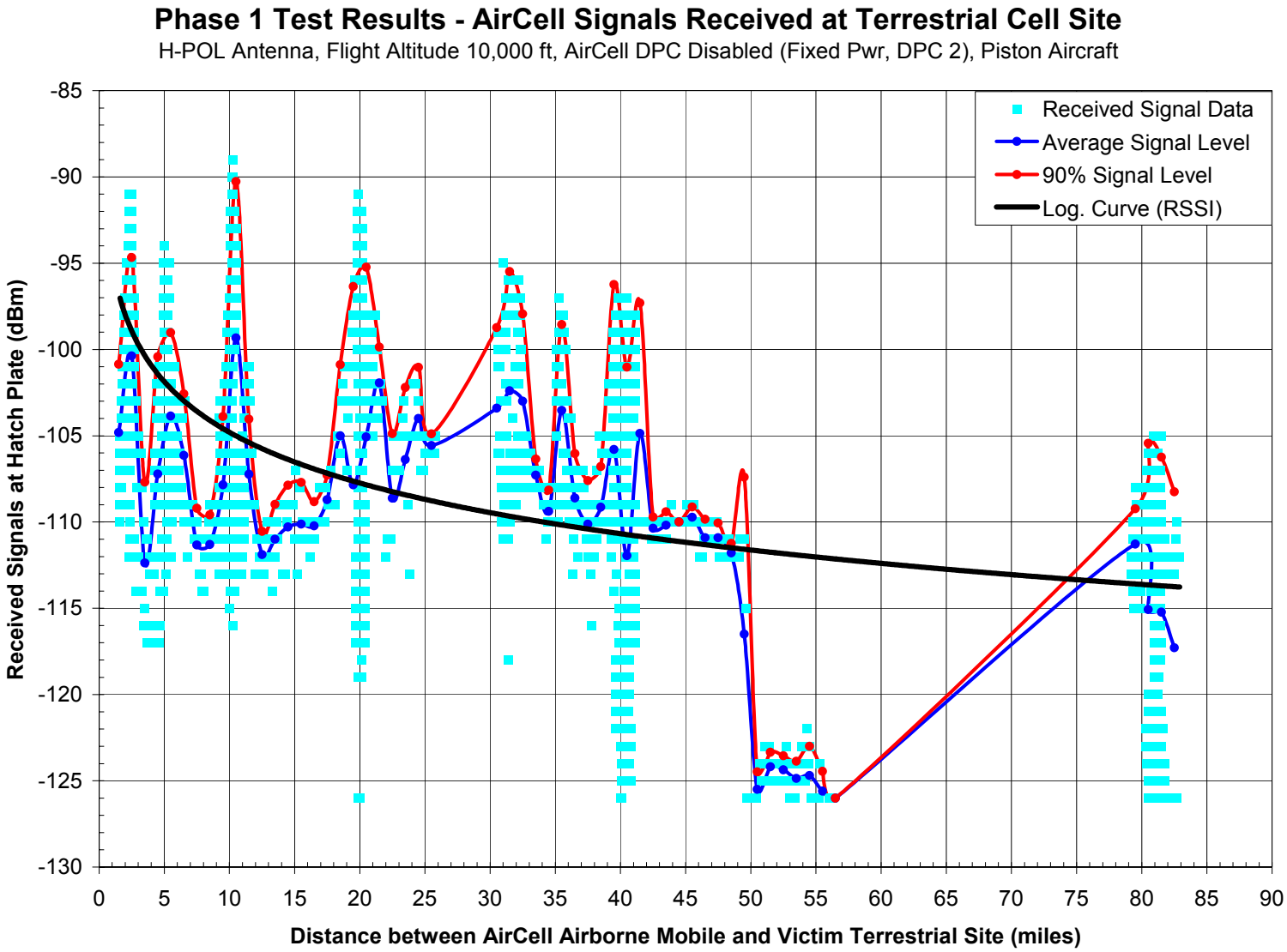


Figure 9.5-N Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 10,000', DPC Disabled

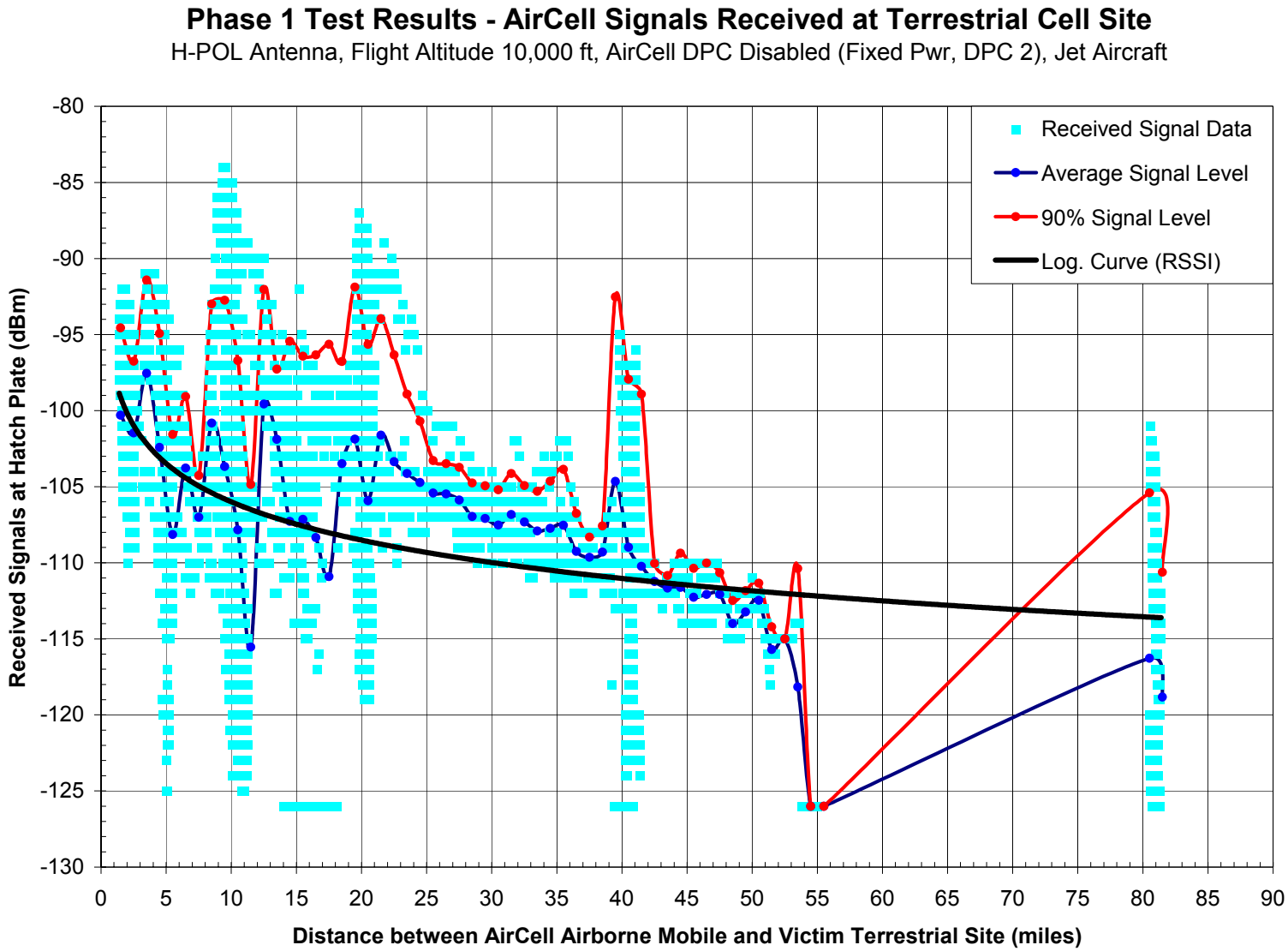


Figure 9.5-O Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 20,000', DPC Disabled

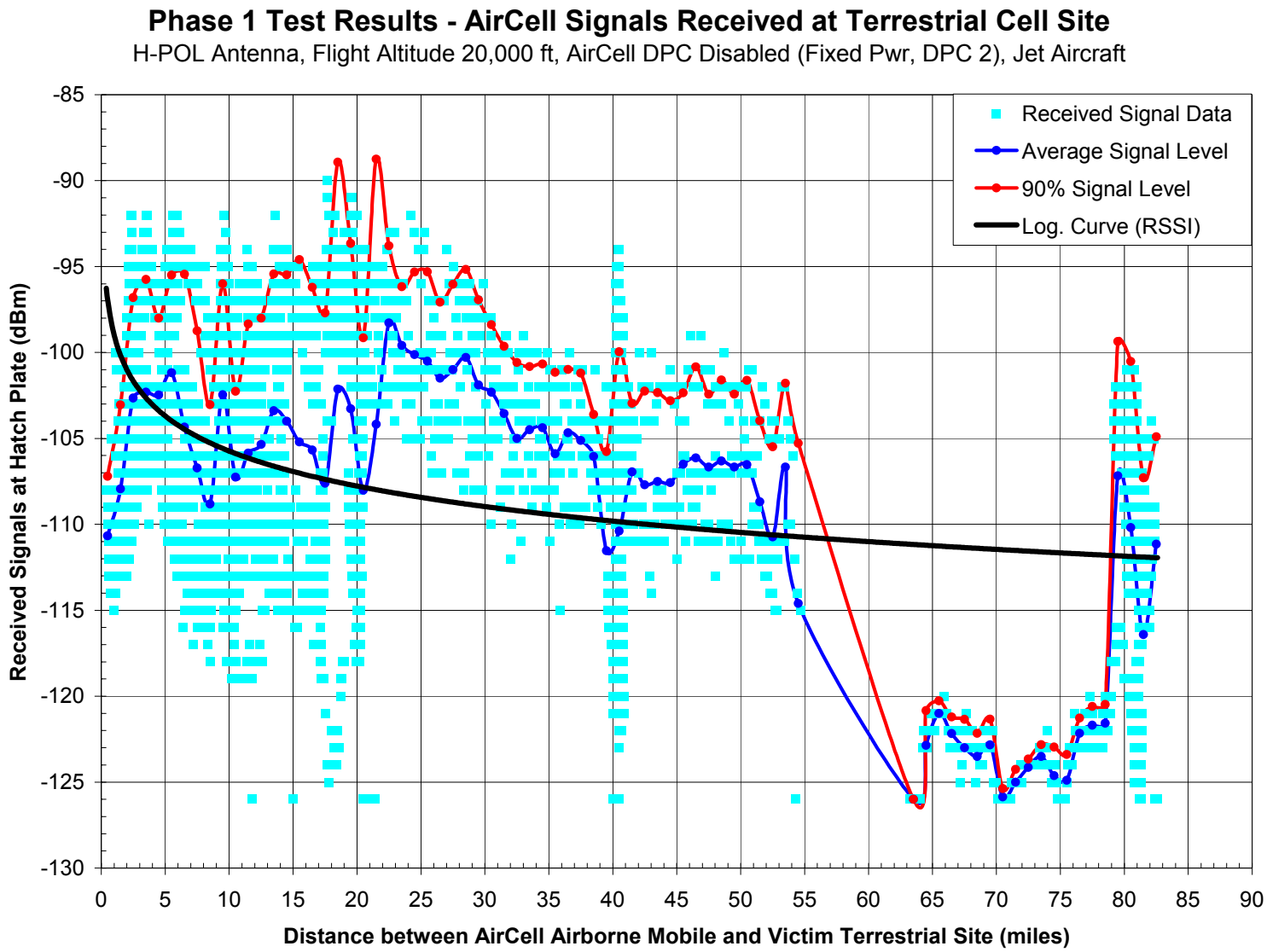


Figure 9.5-P Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 35,000', DPC Disabled

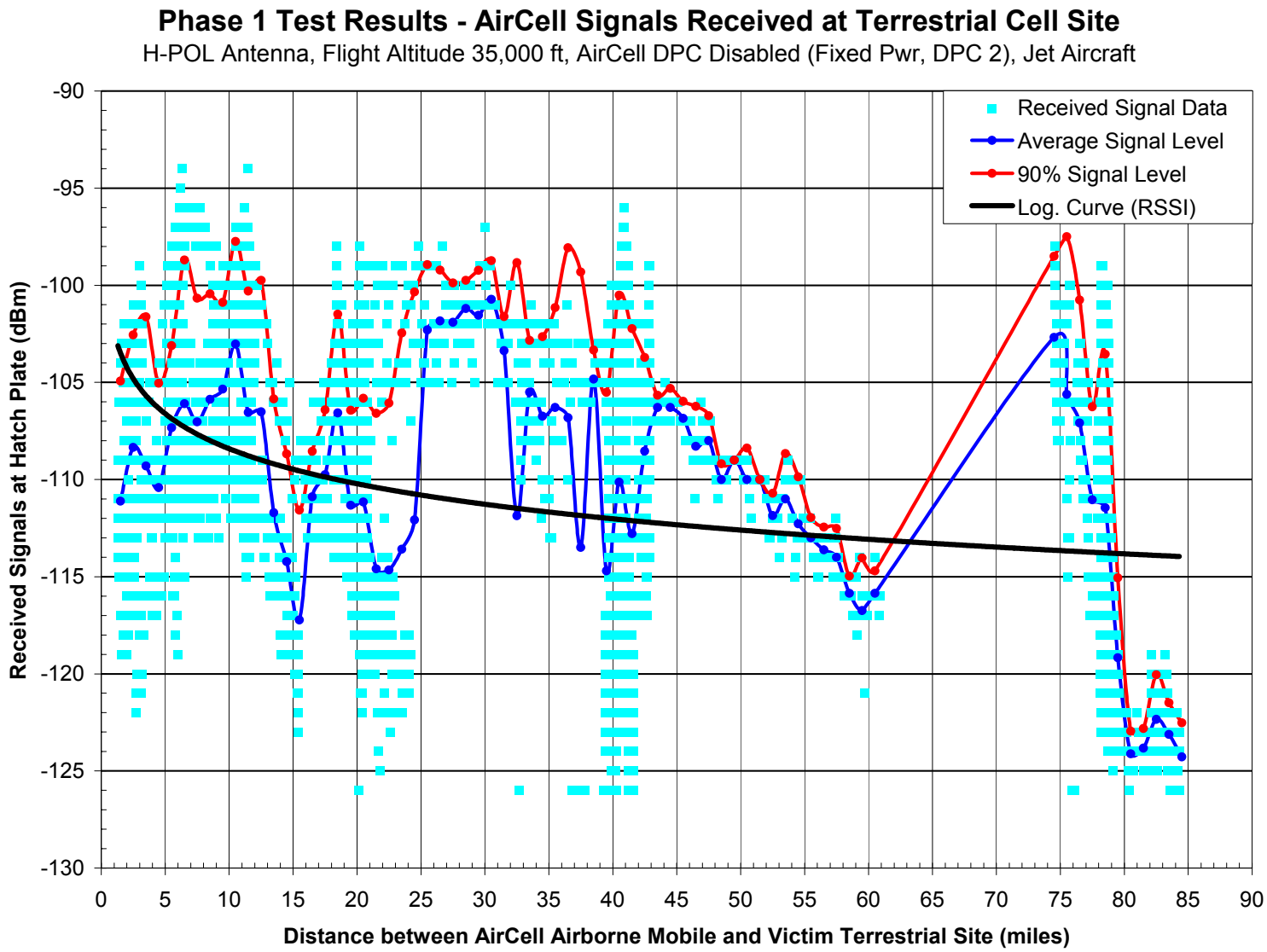


Figure 9.5-Q Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Piston Aircraft @ 2,000', DPC Disabled

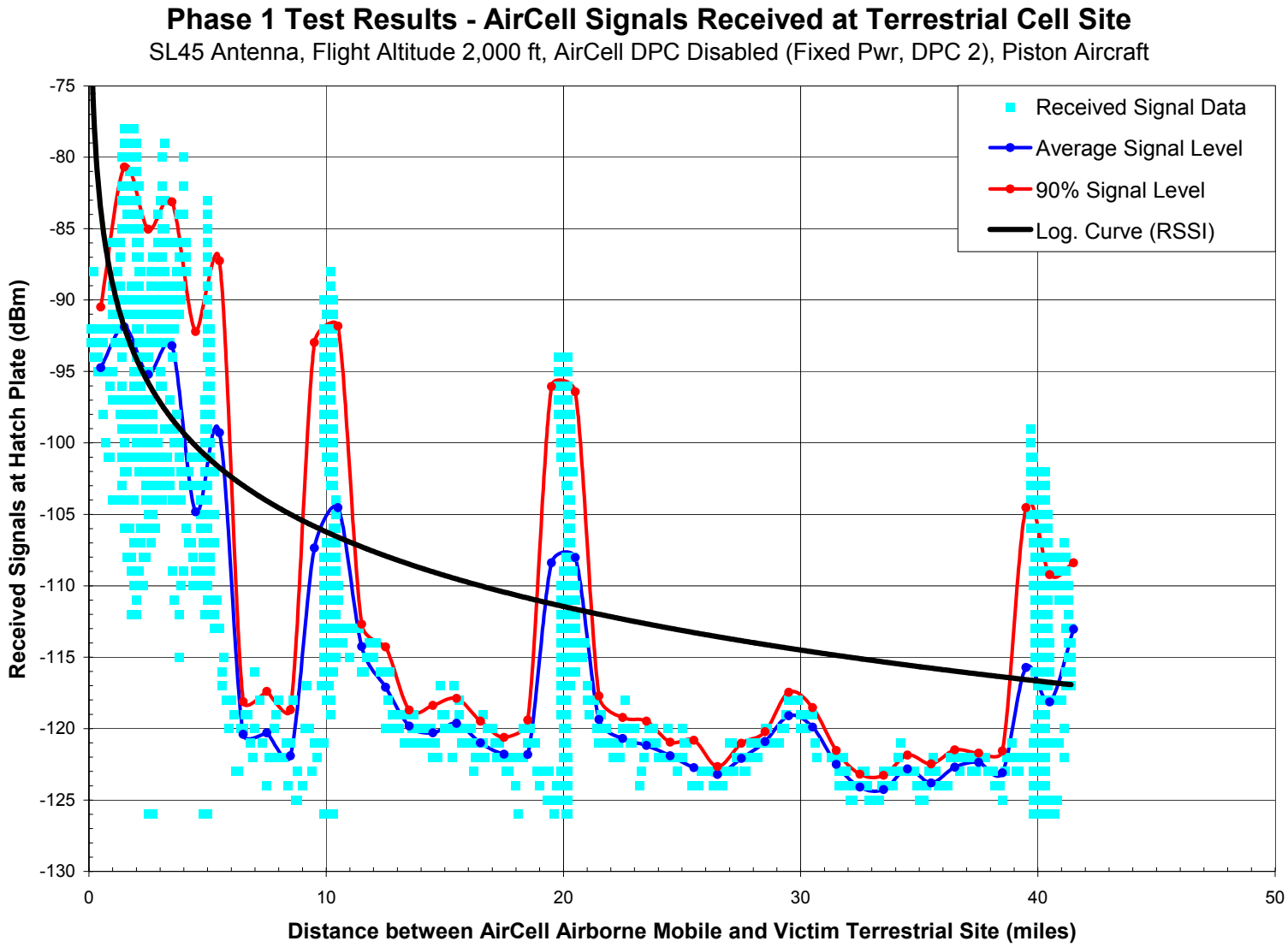


Figure 9.5-R Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Piston Aircraft @ 5,000', DPC Disabled

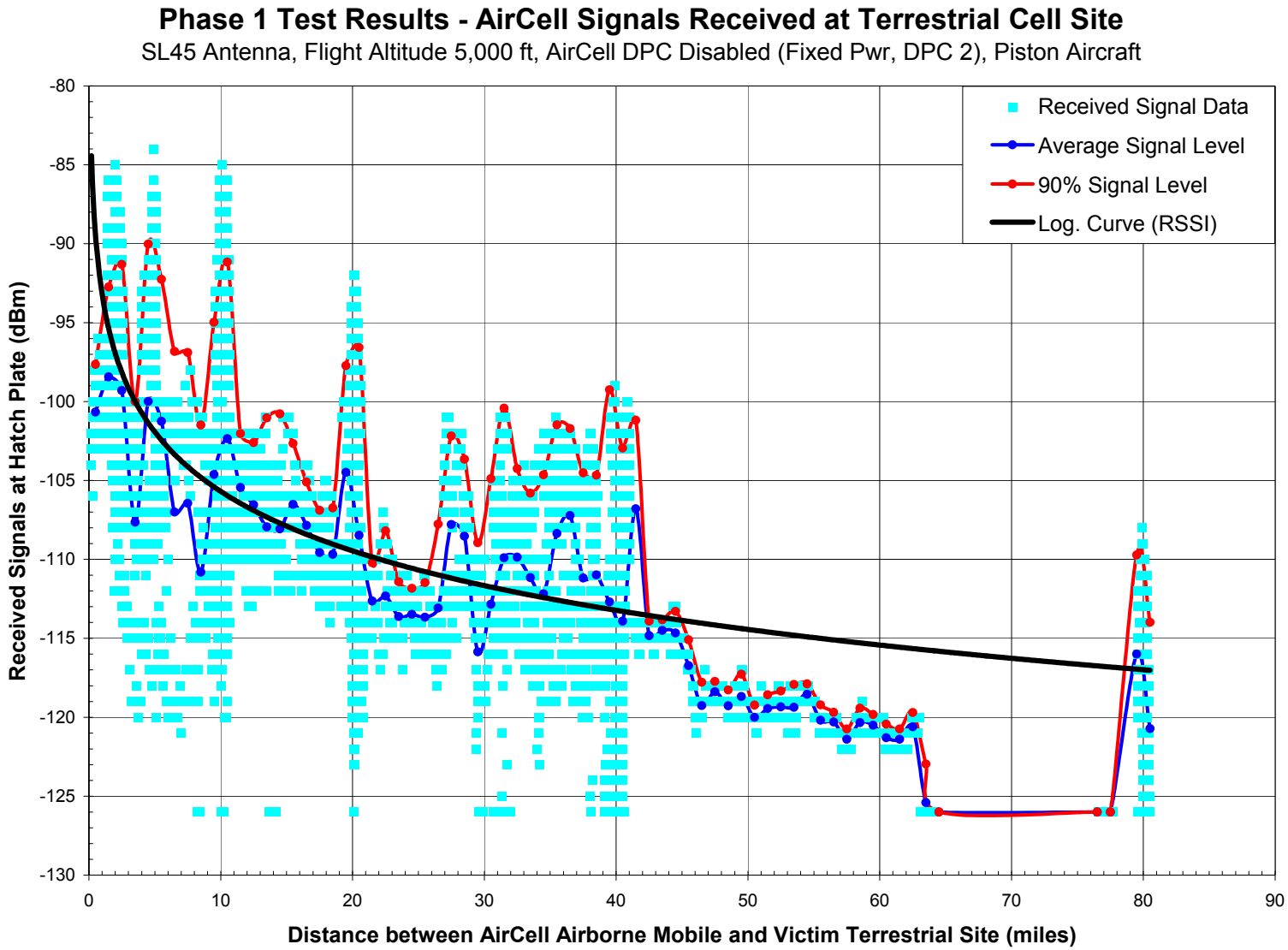


Figure 9.5-S Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Piston Aircraft @ 10,000', DPC Disabled

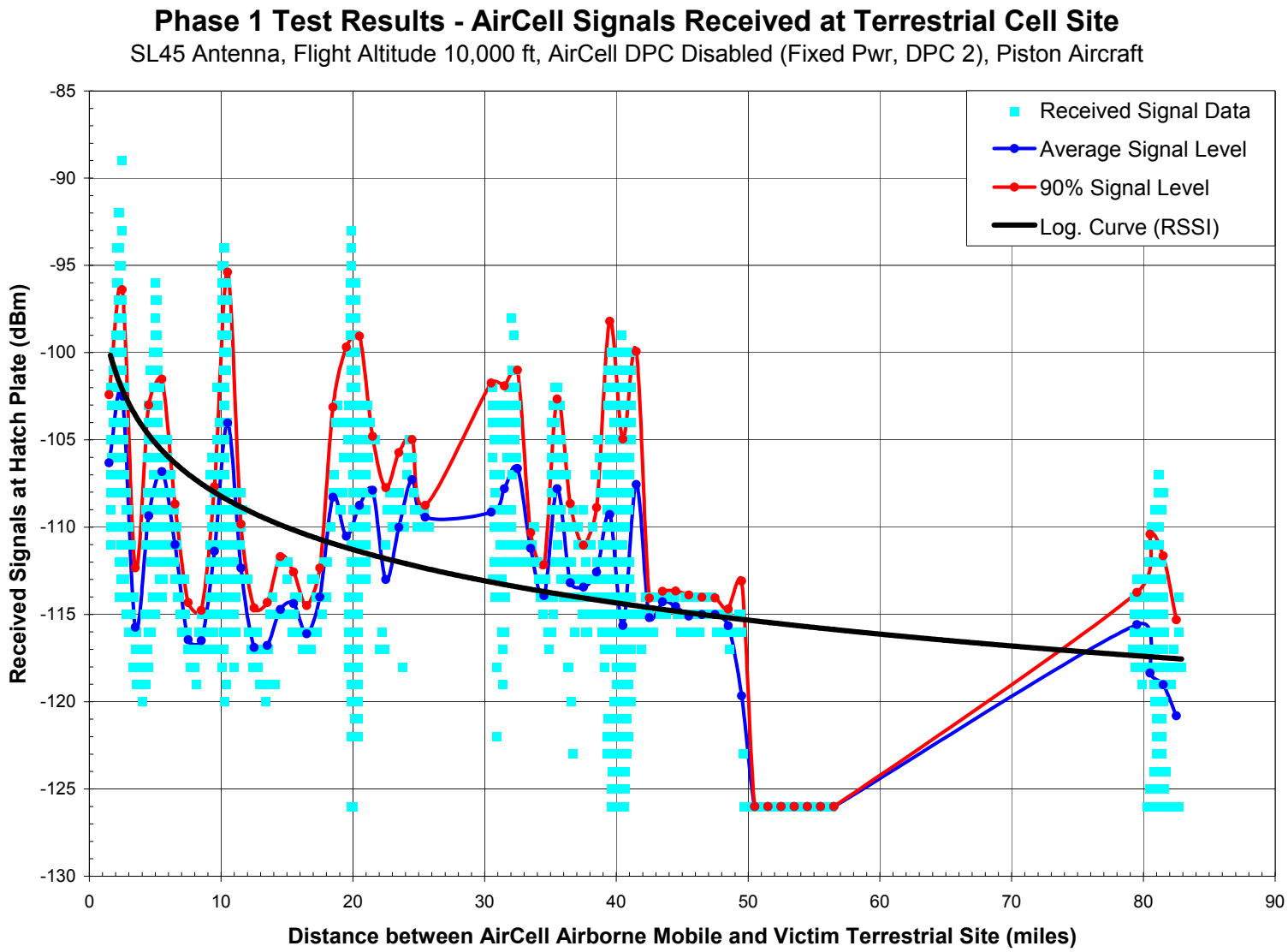


Figure 9.5-T Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 10,000', DPC Disabled

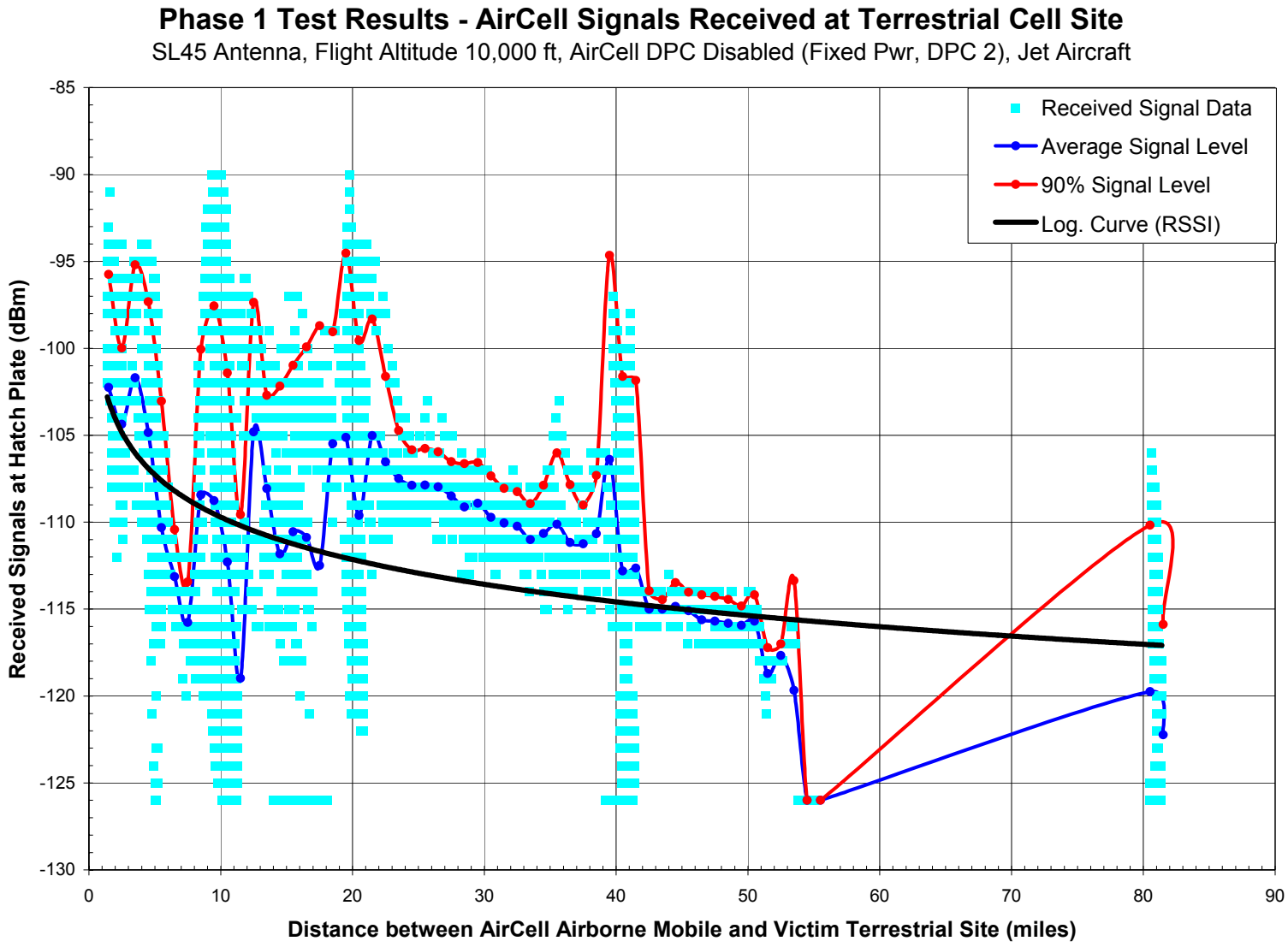


Figure 9.5-U Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 20,000', DPC Disabled

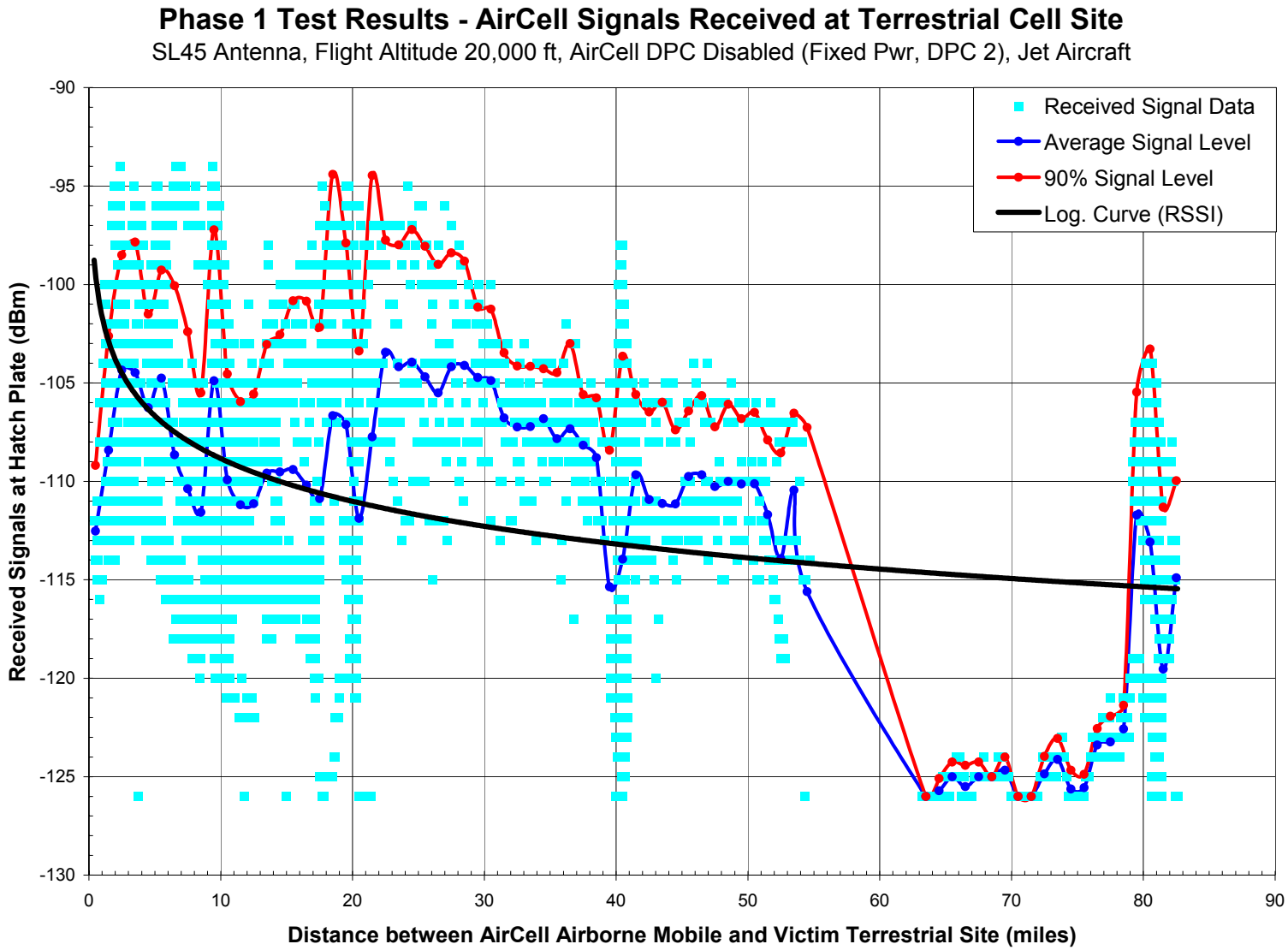


Figure 9.5-V Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 35,000', DPC Disabled

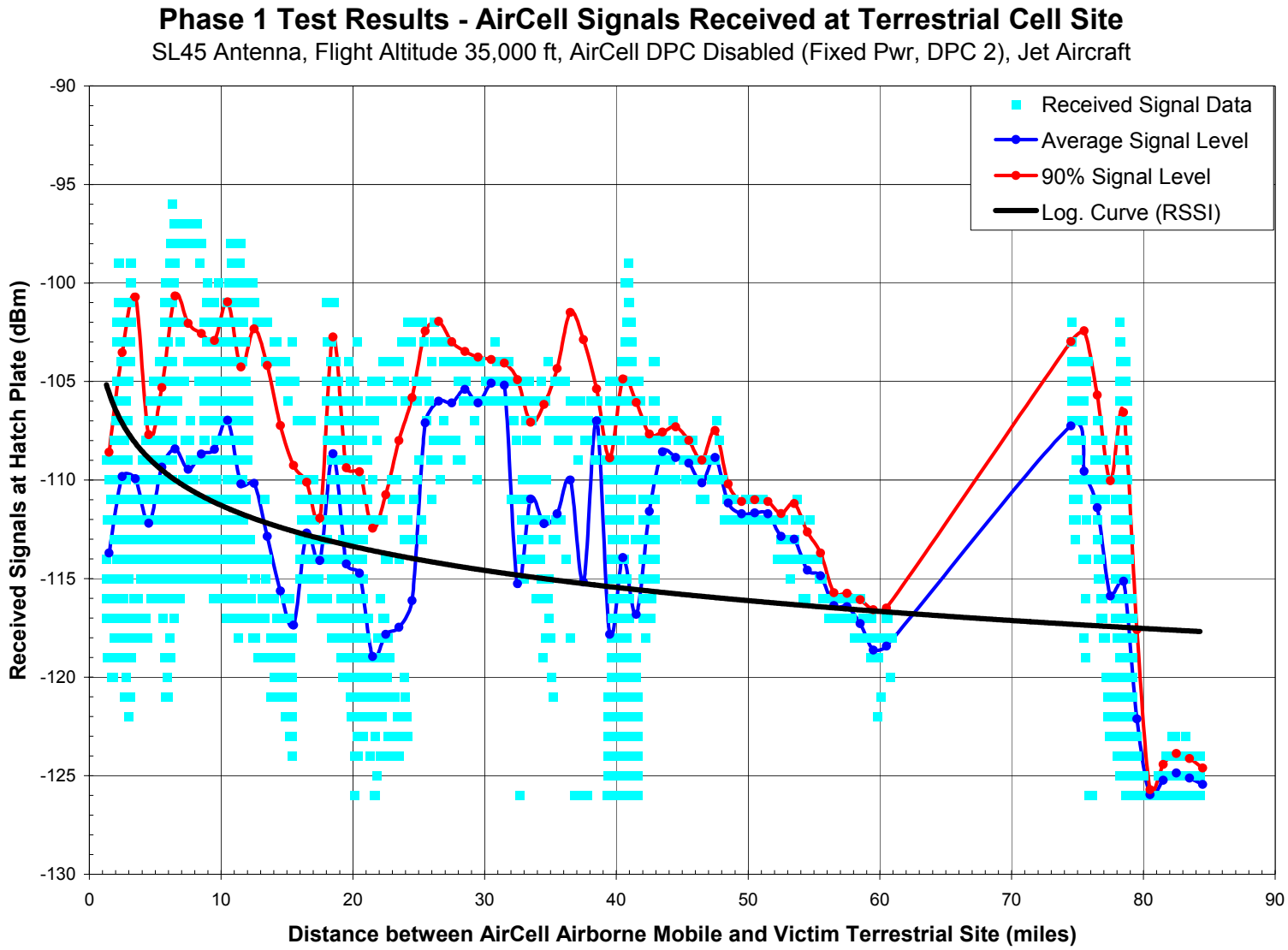


Figure 9.5-W Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Piston Aircraft @ 2,000', DPC Disabled

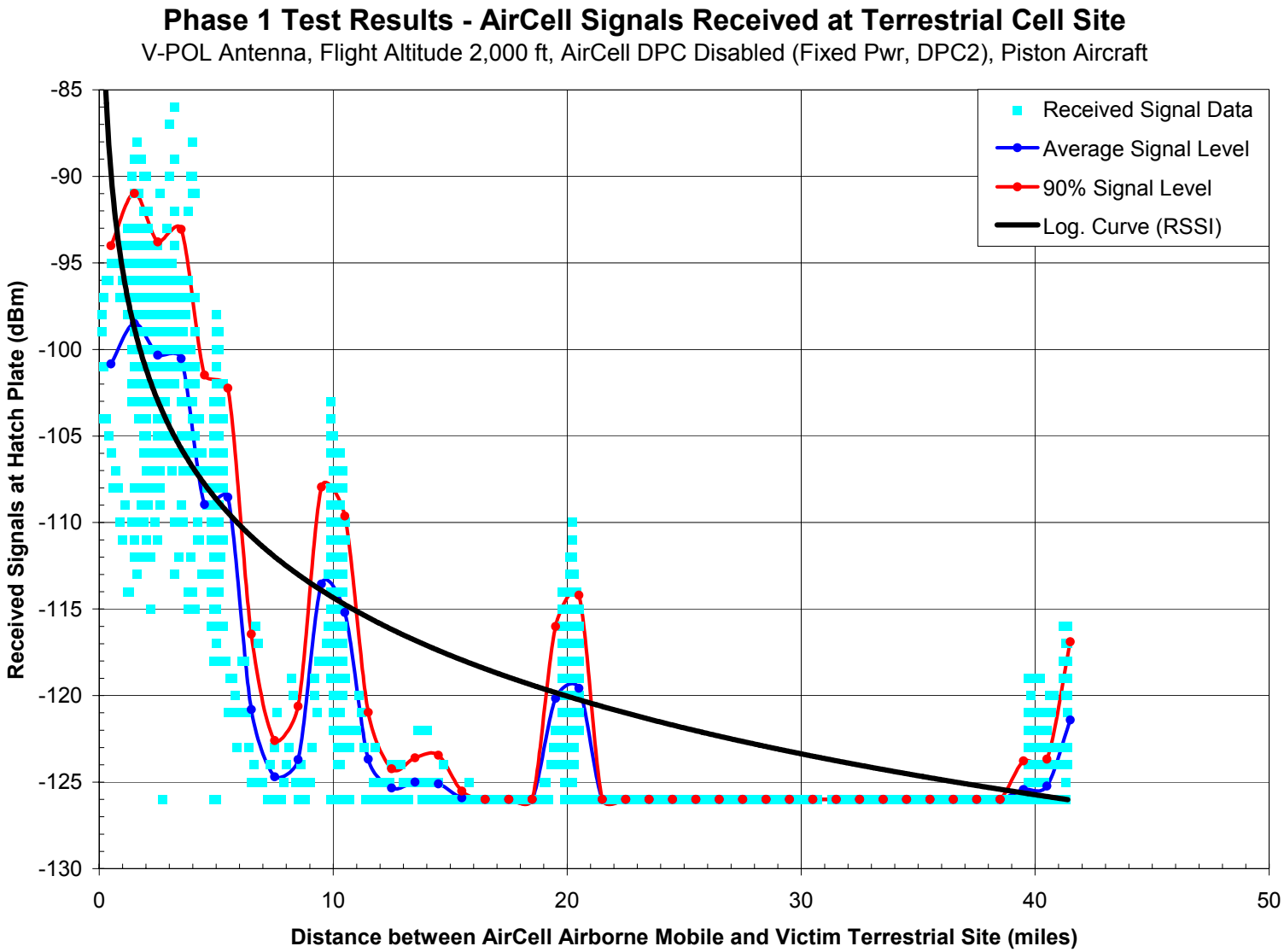


Figure 9.5-X Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Piston Aircraft @ 5,000', DPC Disabled

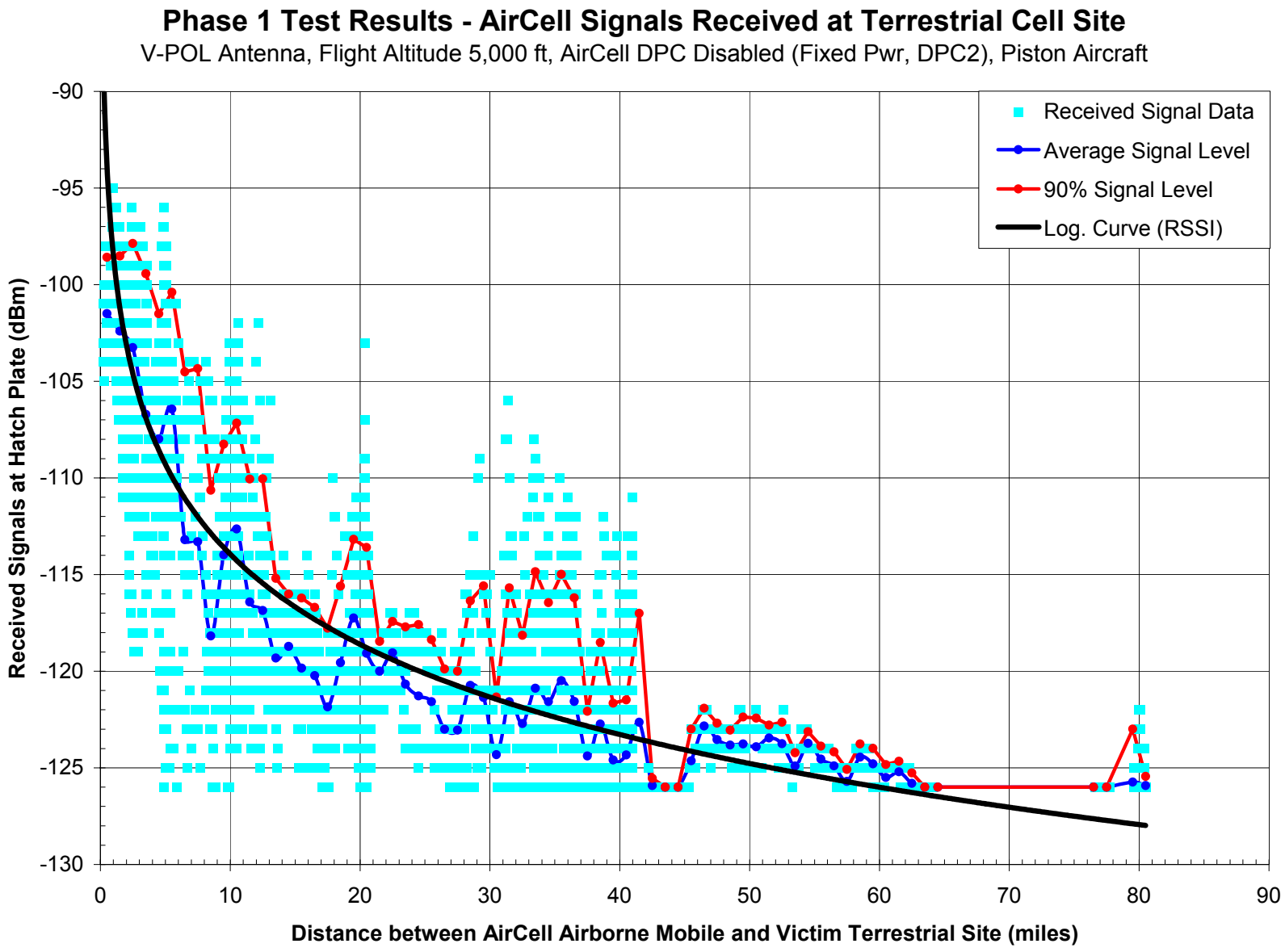


Figure 9.5-Y Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Piston Aircraft @ 10,000', DPC Disabled

Figure 9.5-Z Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 10,000', DPC Disabled

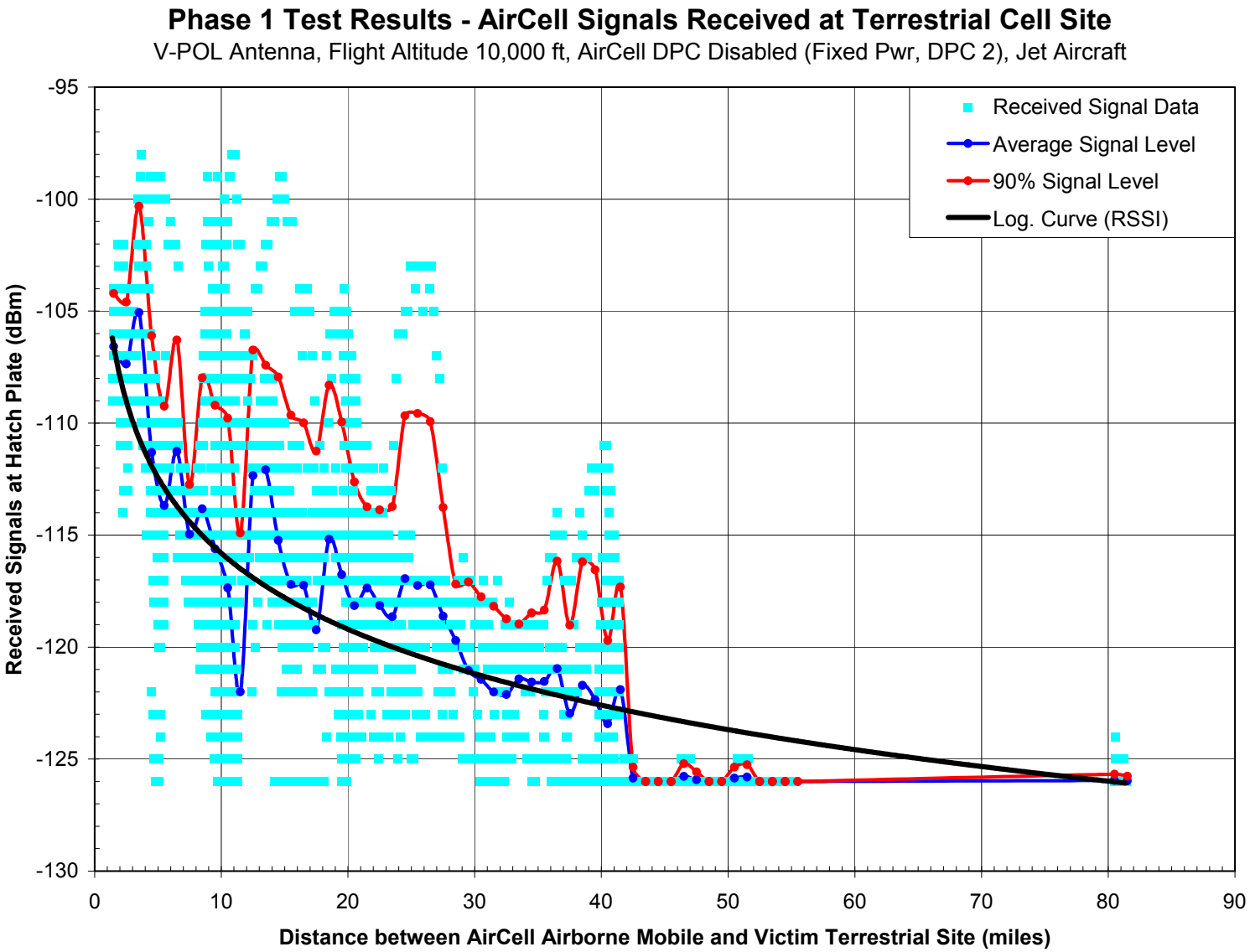


Figure 9.5-AA Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 20,000', DPC Disabled

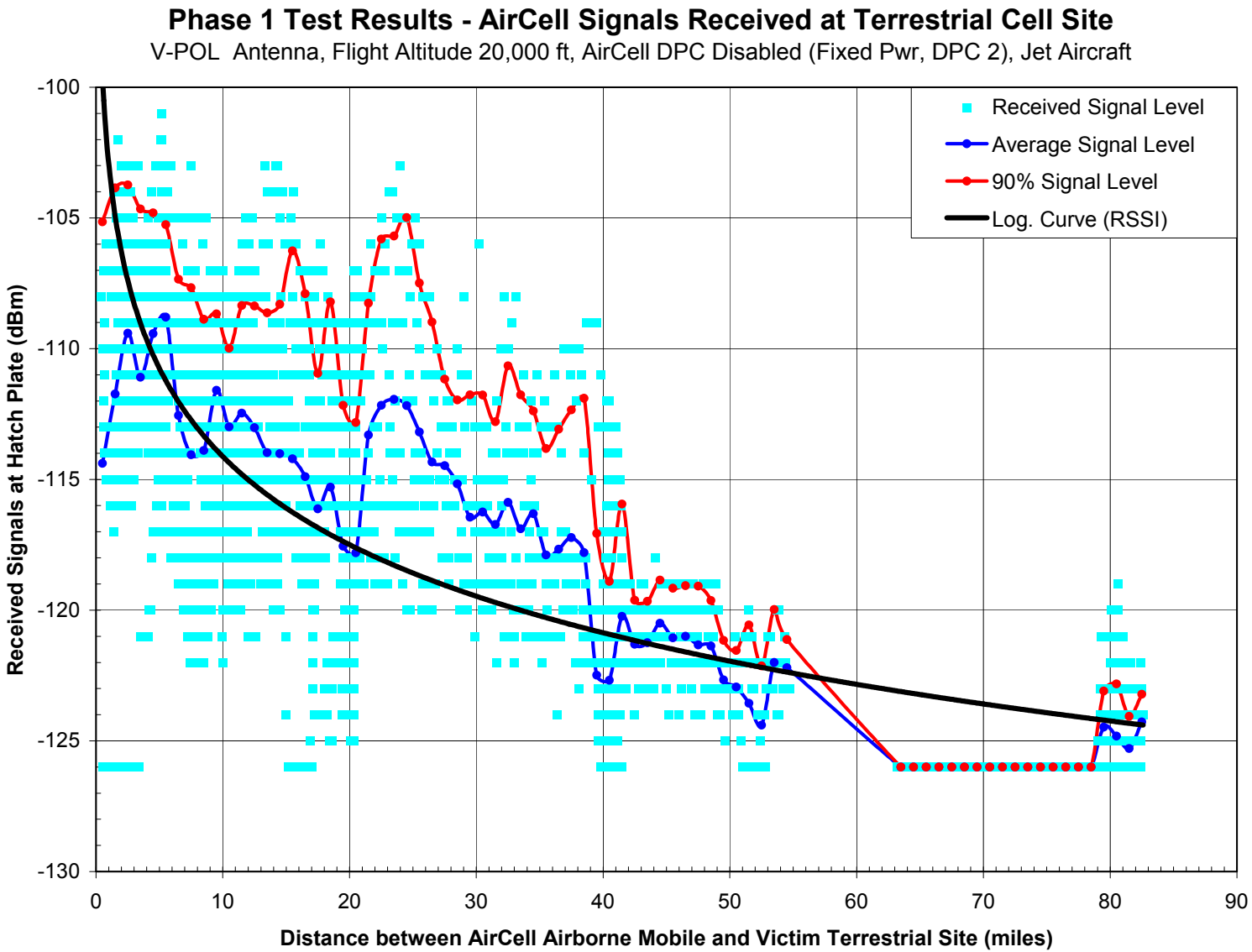


Figure 9.5-BB Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 35,000', DPC Disabled

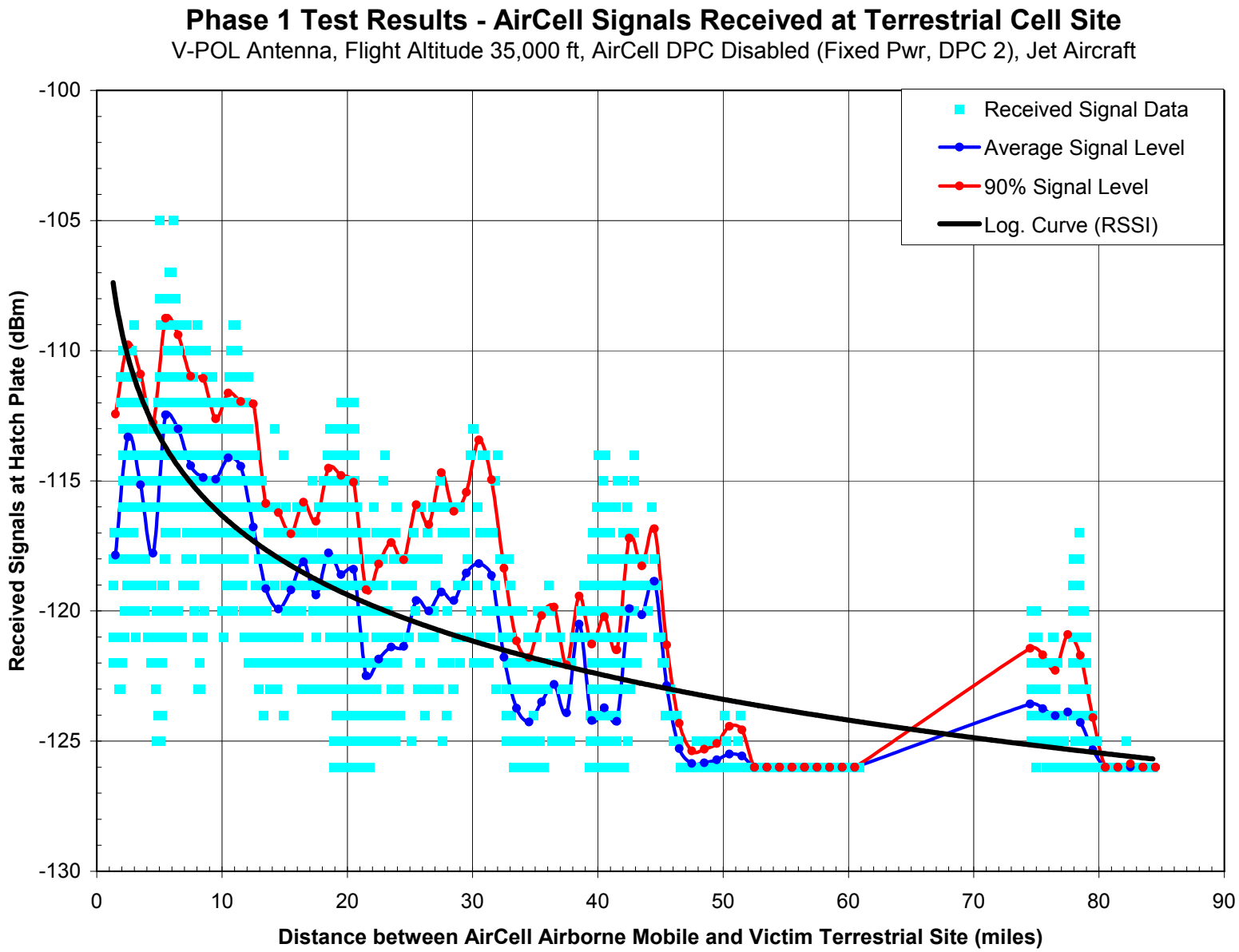


Figure 9.5-CC Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Piston Aircraft @ 2,000', DPC Disabled

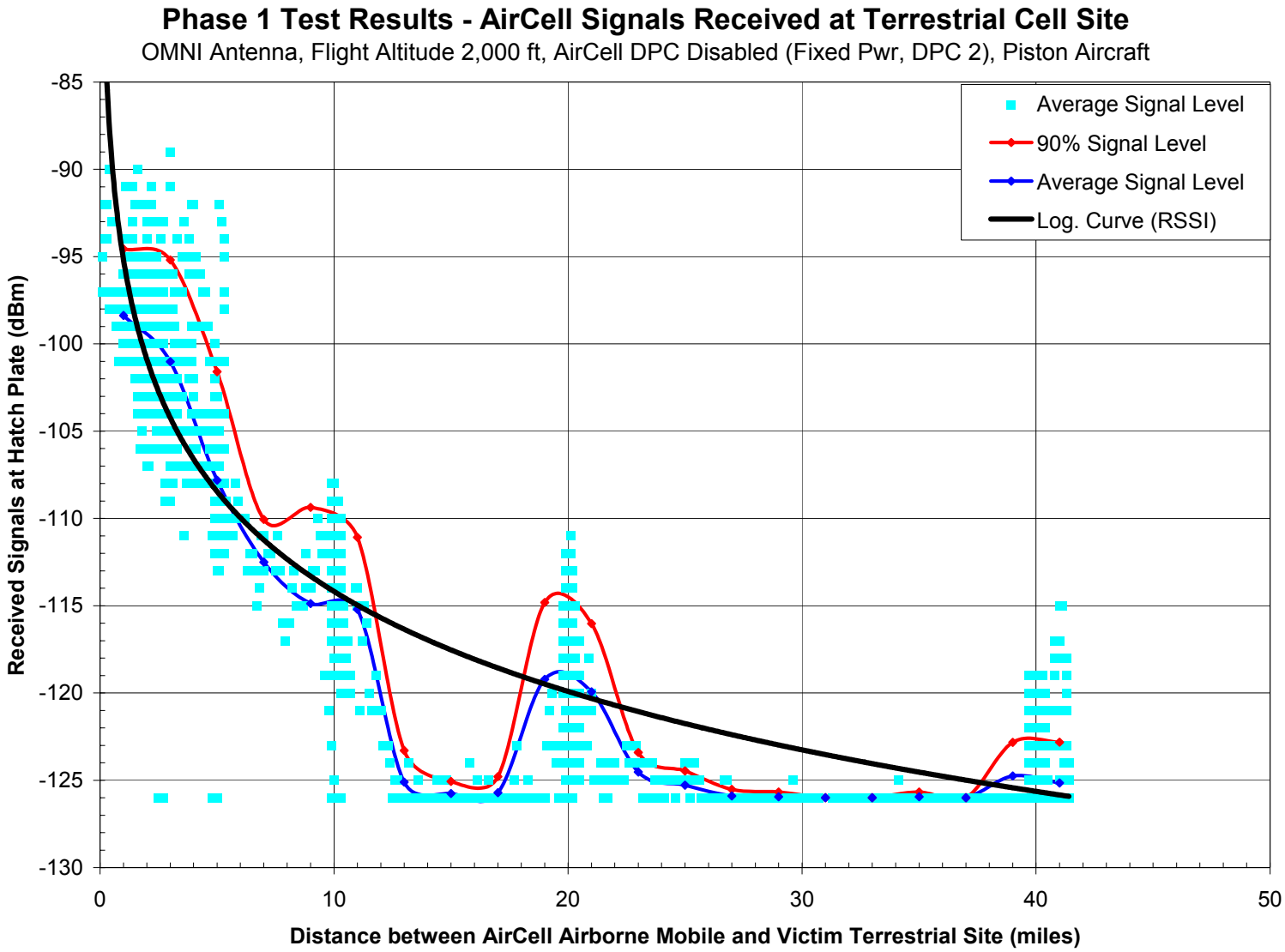


Figure 9.5-DD Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Piston Aircraft @ 5,000', DPC Disabled

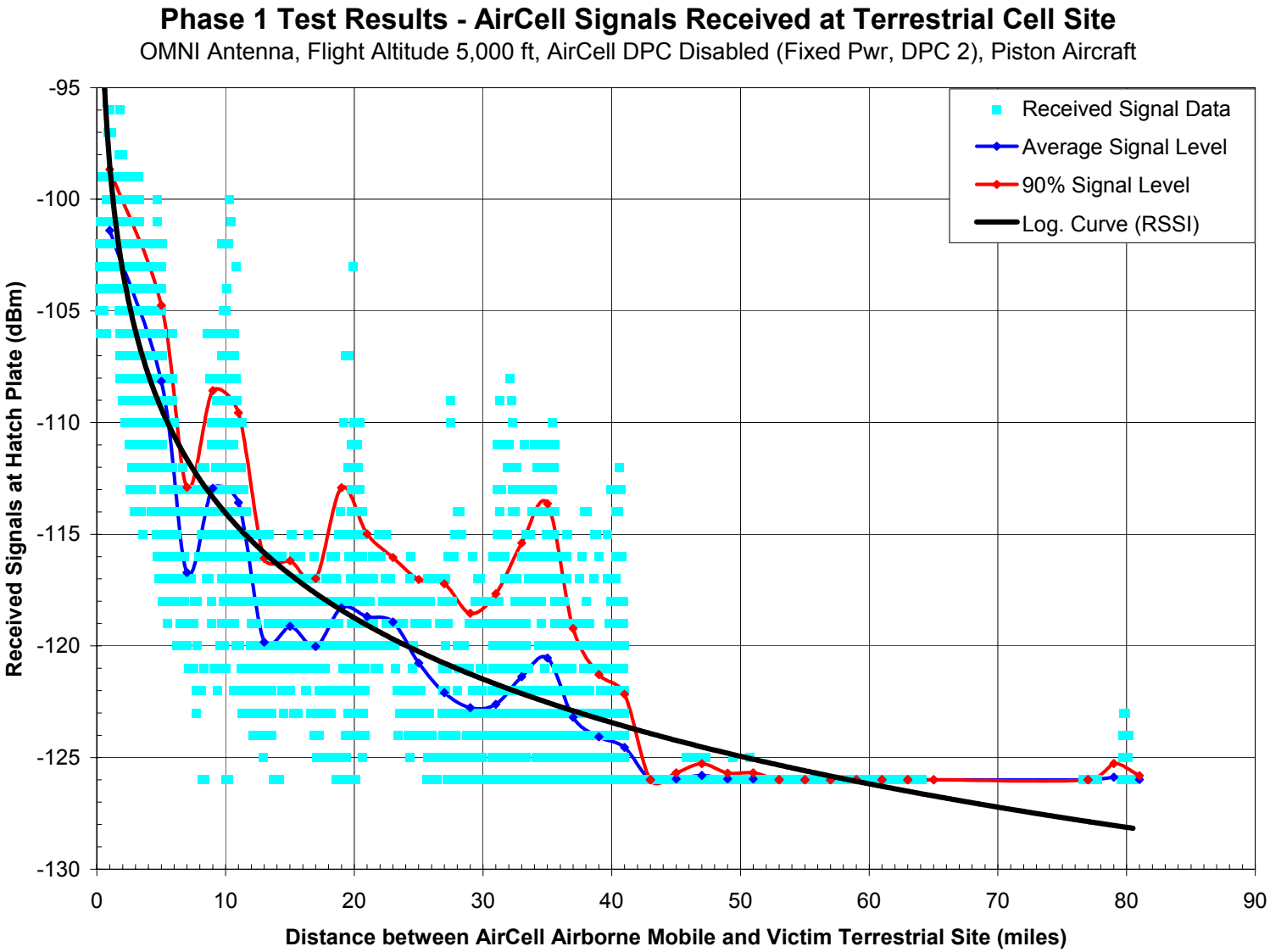


Figure 9.5-EE Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Piston Aircraft @ 10,000', DPC Disabled

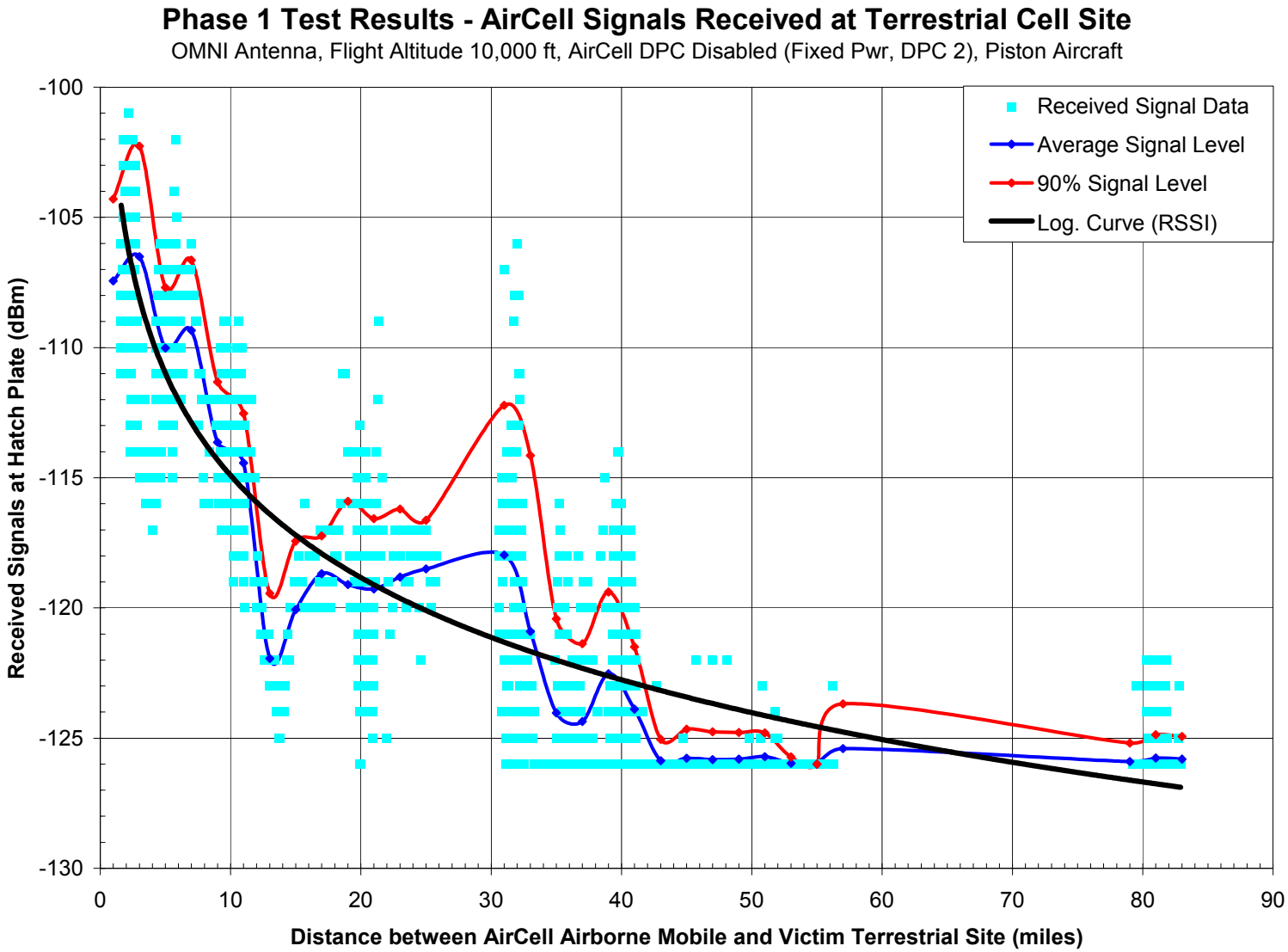


Figure 9.5-FF Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 10,000', DPC Disabled

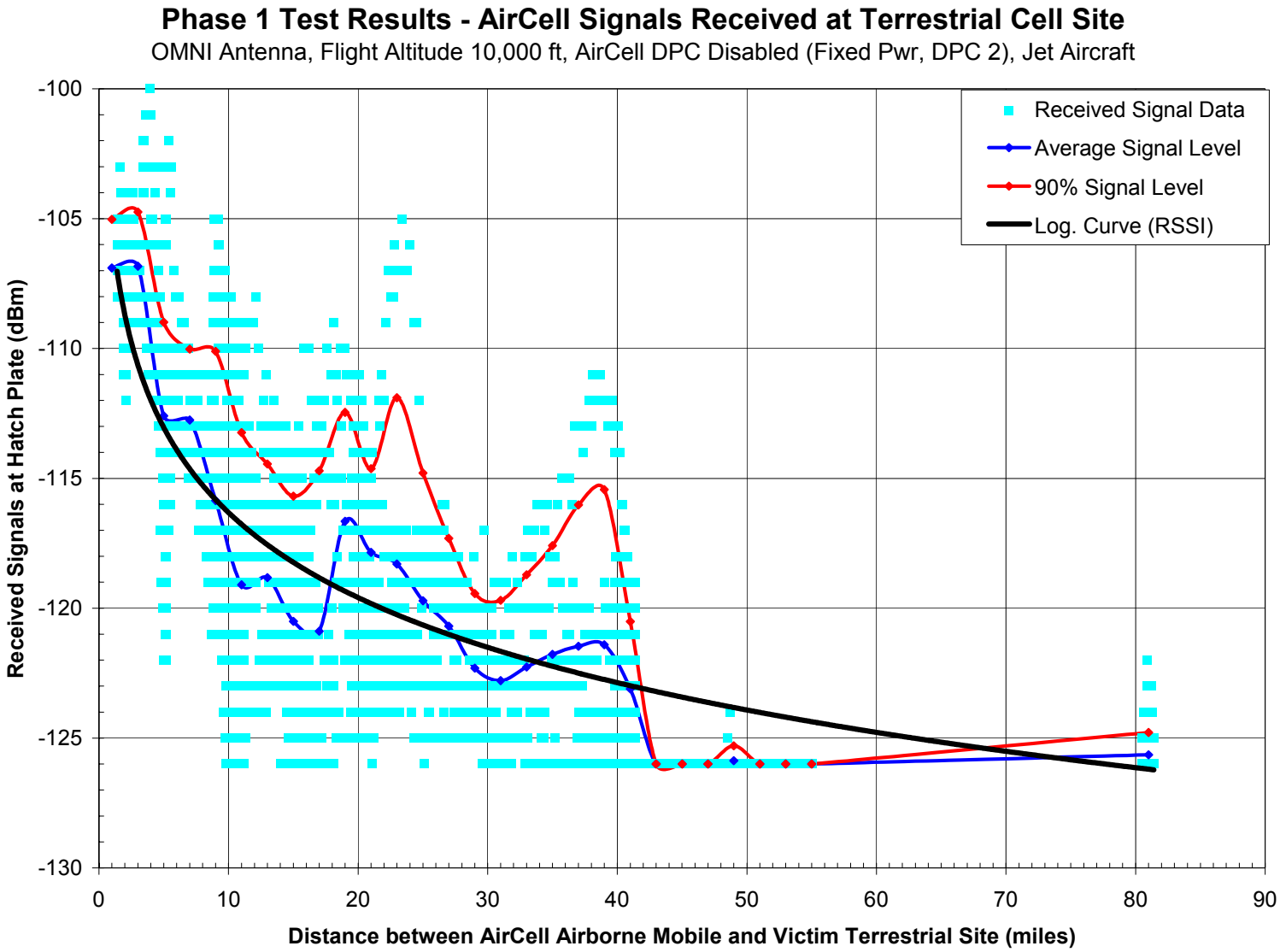


Figure 9.5-GG Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 20,000', DPC Disabled

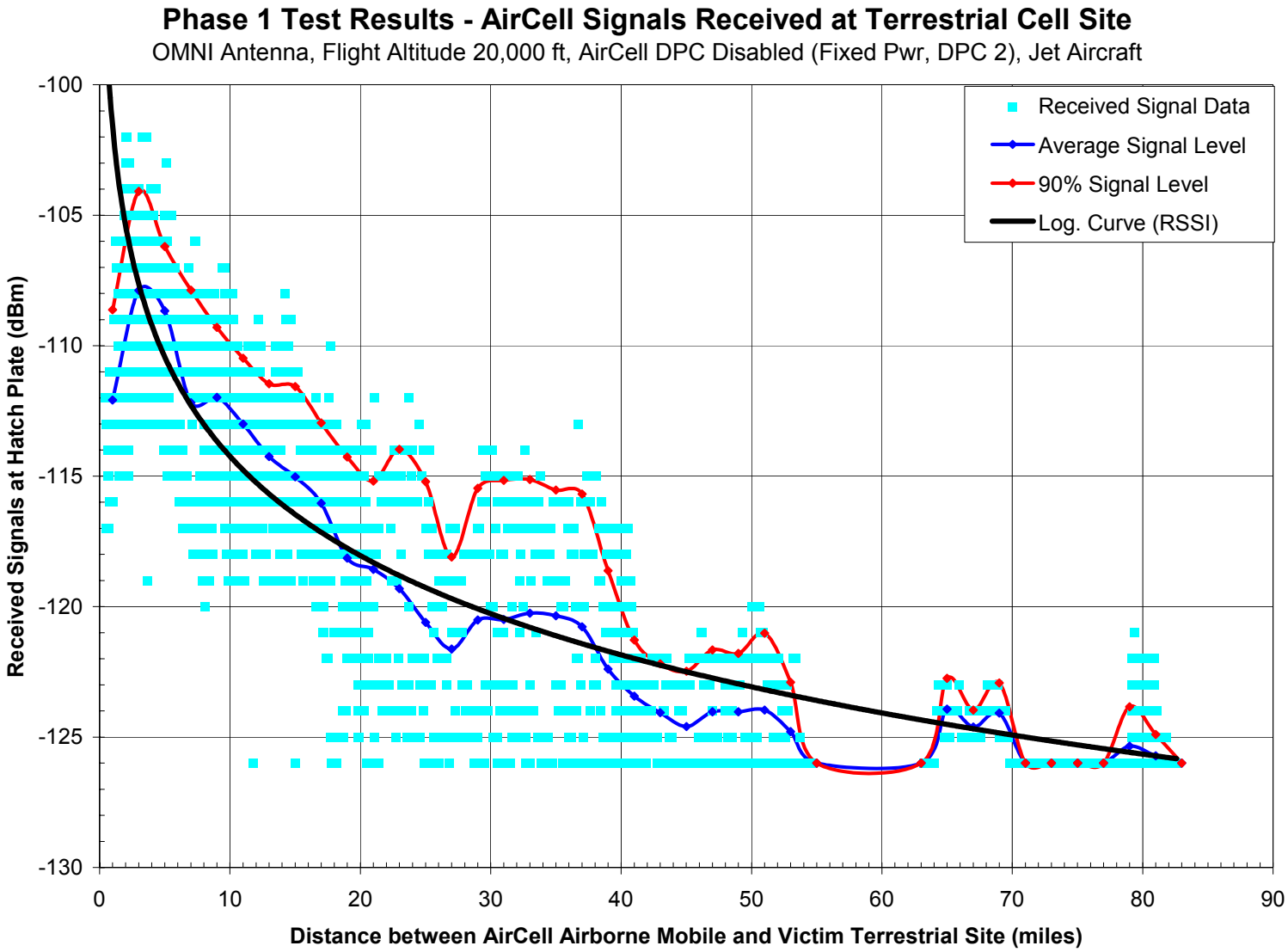


Figure 9.5-HH Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 35,000', DPC Disabled

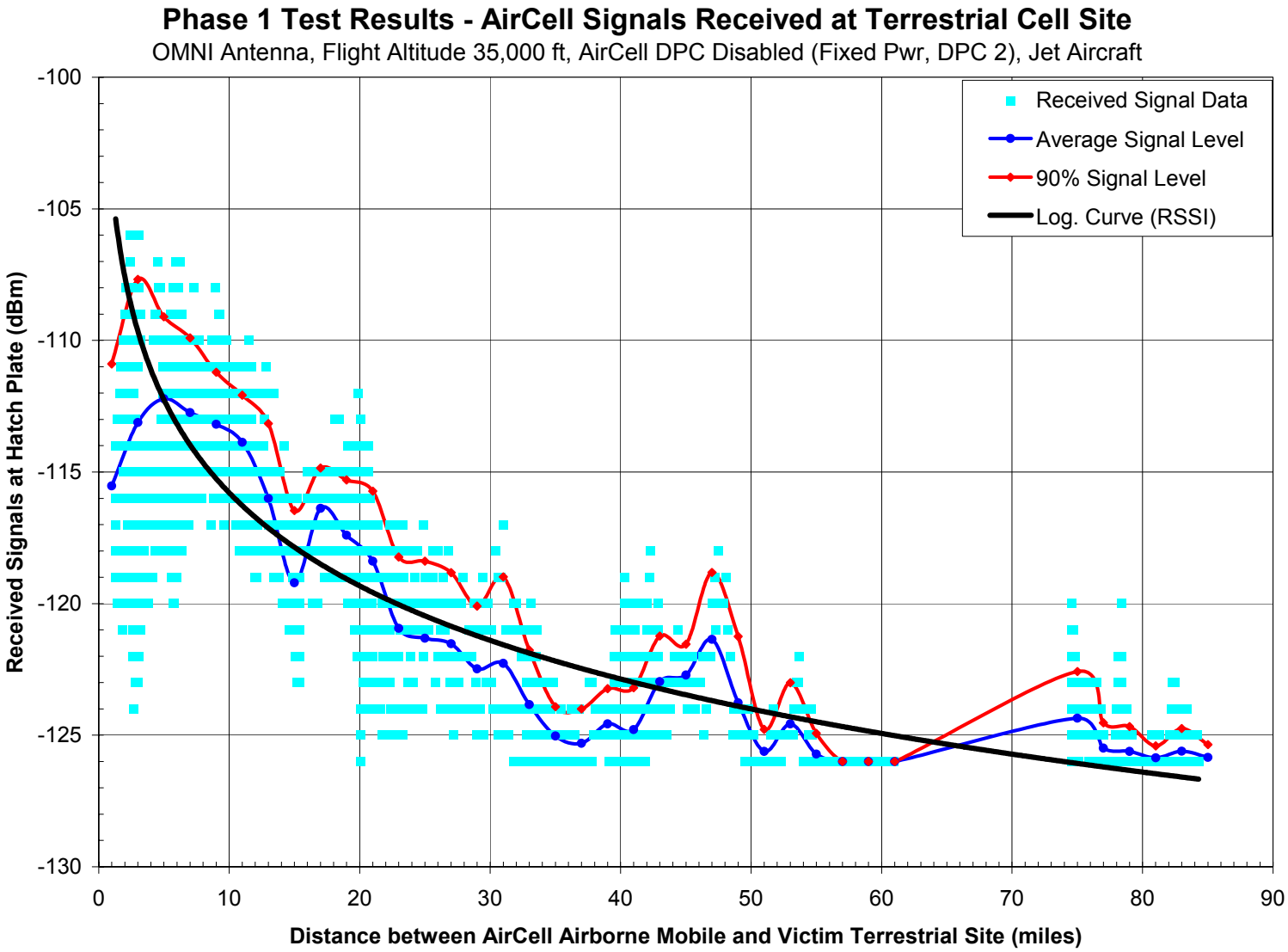


Figure 9.5-II Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Piston Aircraft @ 2,000', DPC Disabled

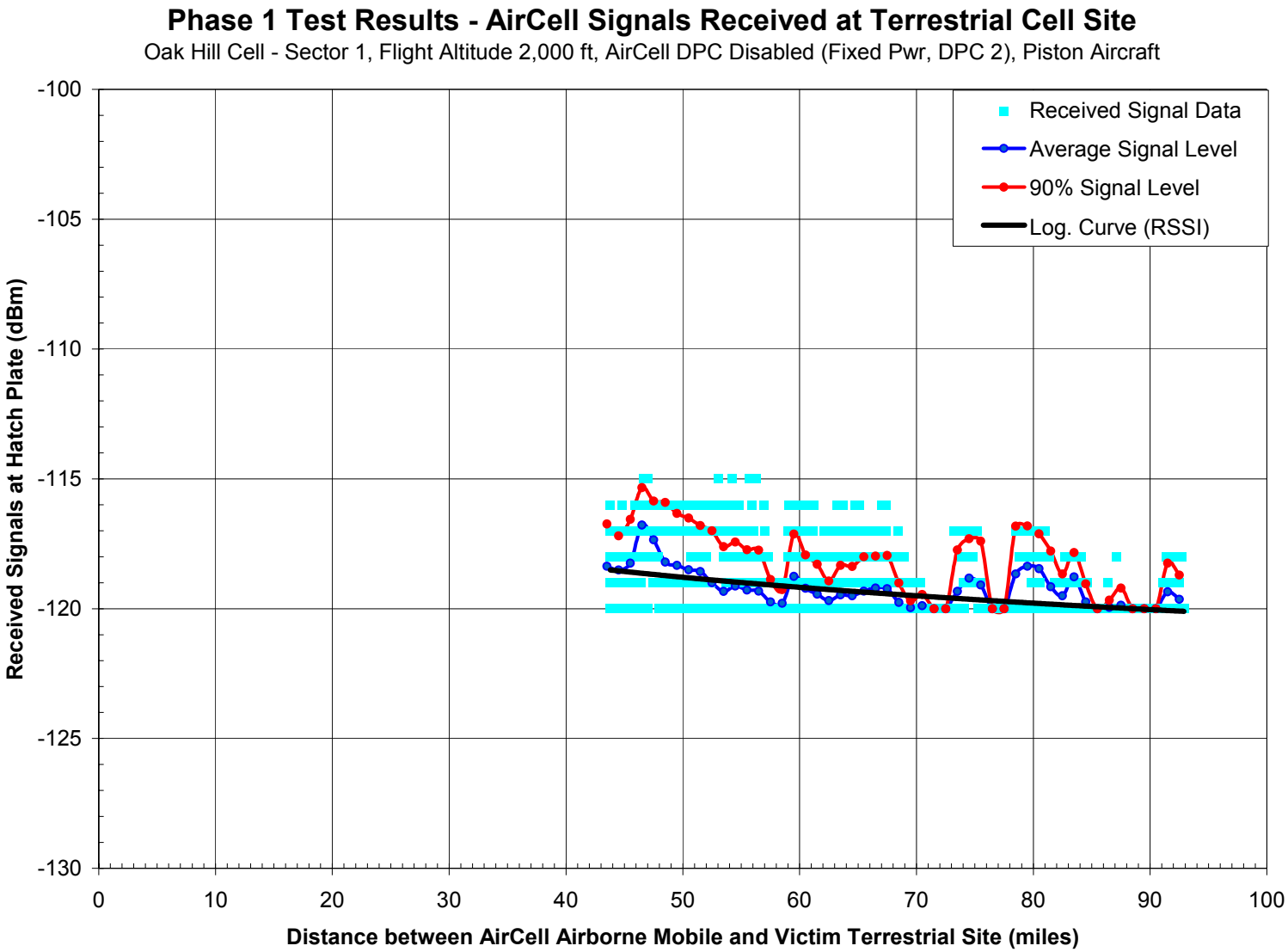


Figure 9.5-JJ Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Piston Aircraft @ 5,000', DPC Disabled

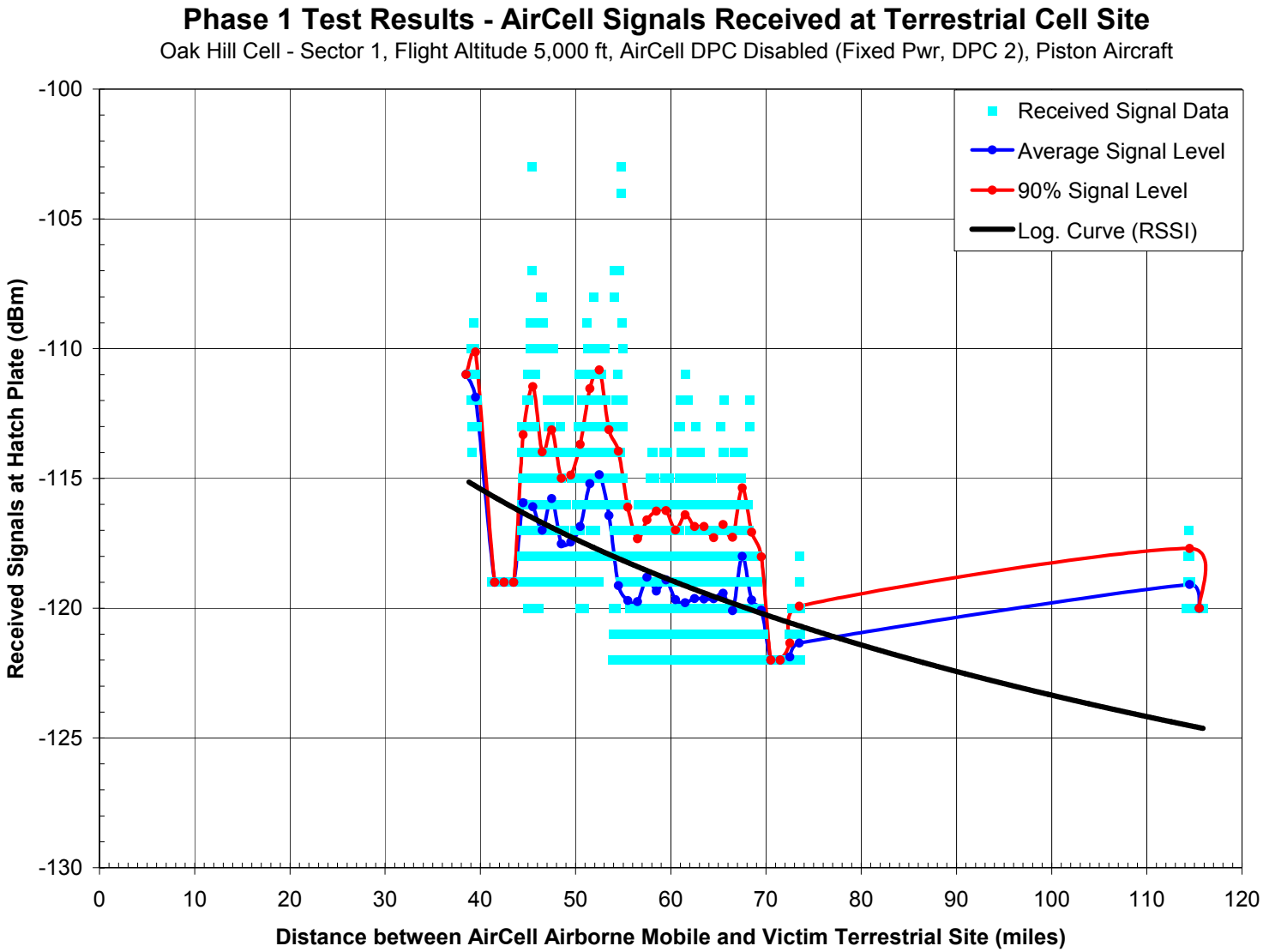


Figure 9.5-KK Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Piston Aircraft @ 10,000', DPC Disabled

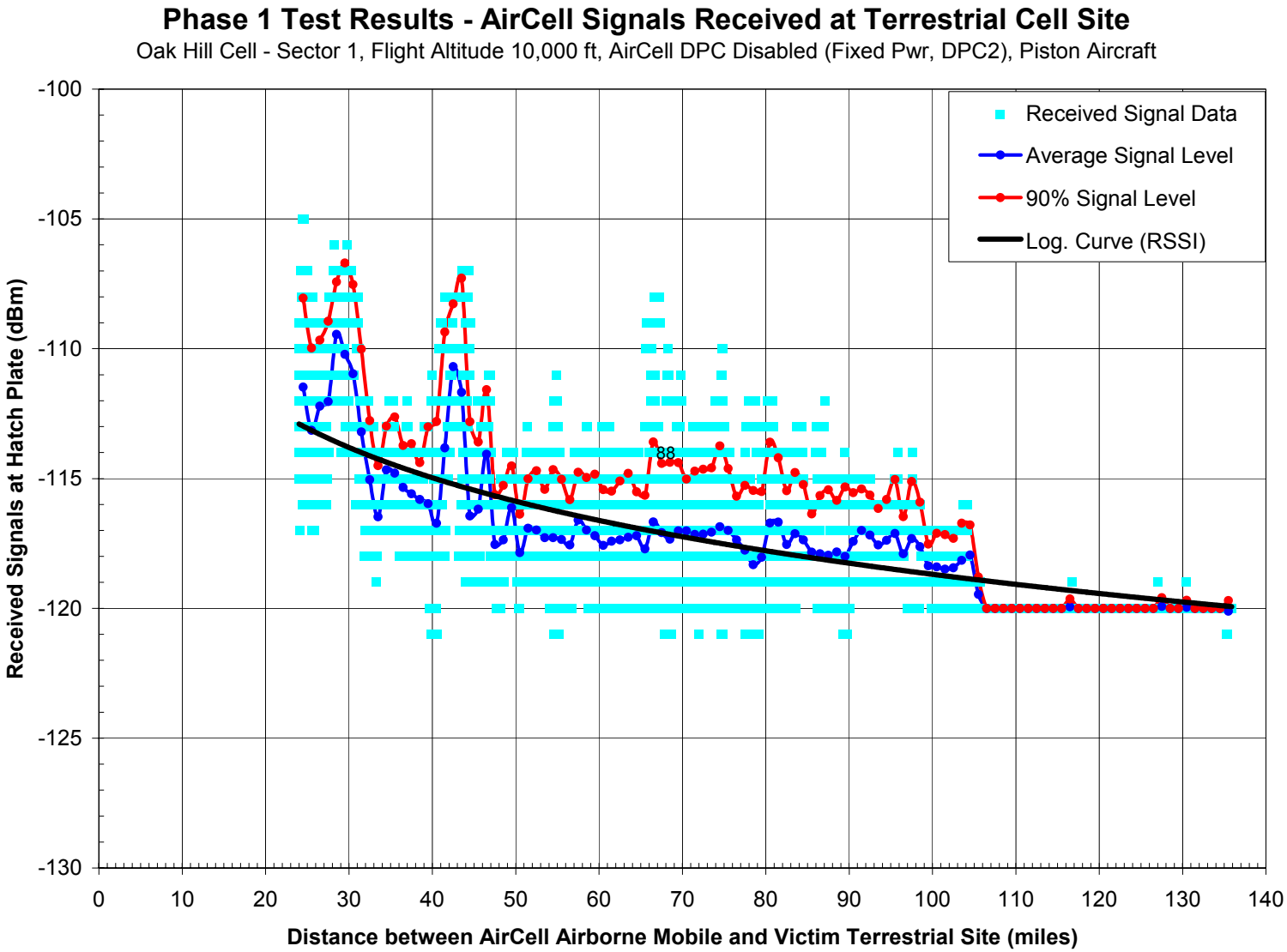


Figure 9.5-LL Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Jet Aircraft @ 10,000', DPC Disabled

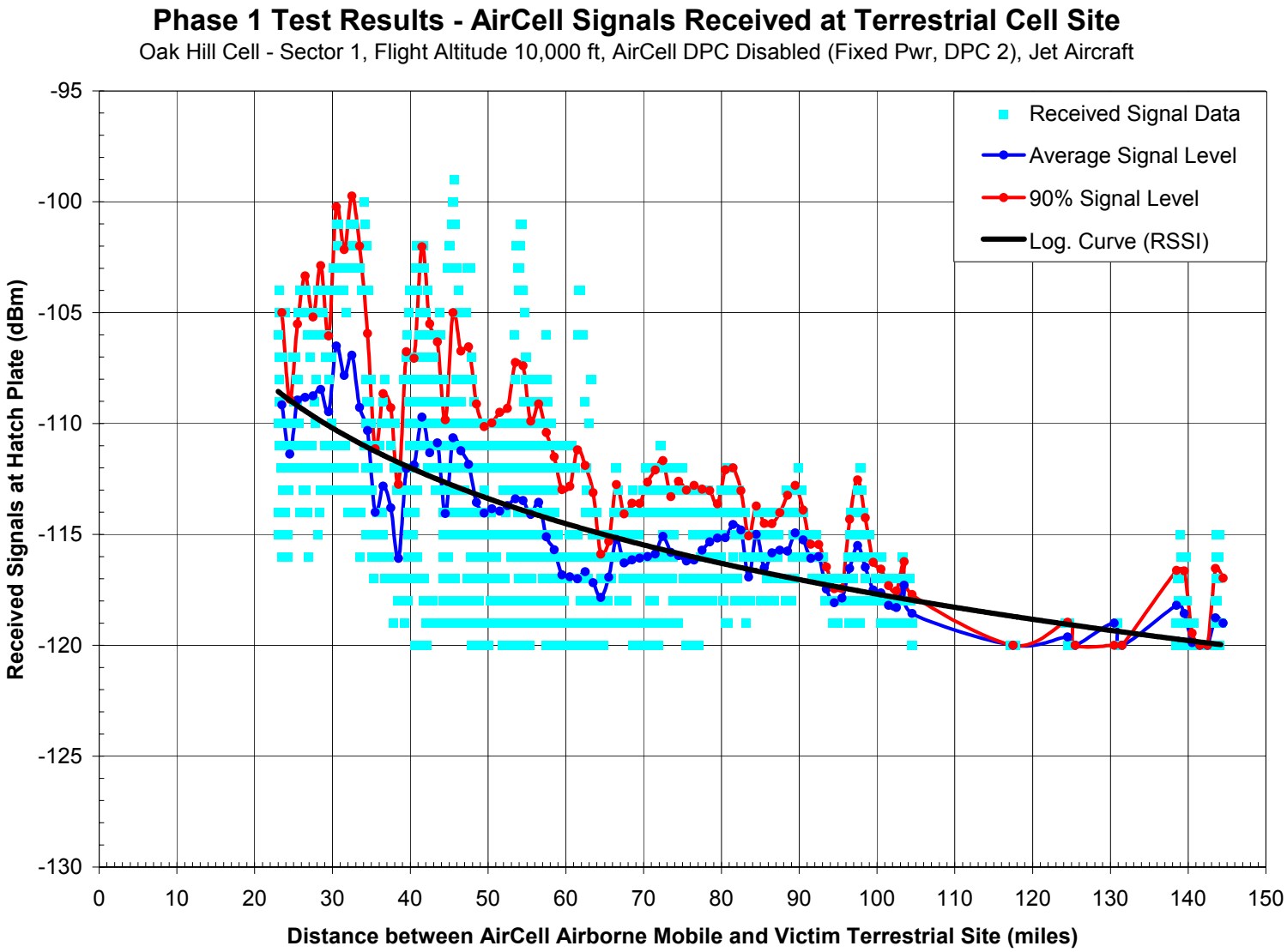


Figure 9.5-MM Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Jet Aircraft @ 20,000', DPC Disabled

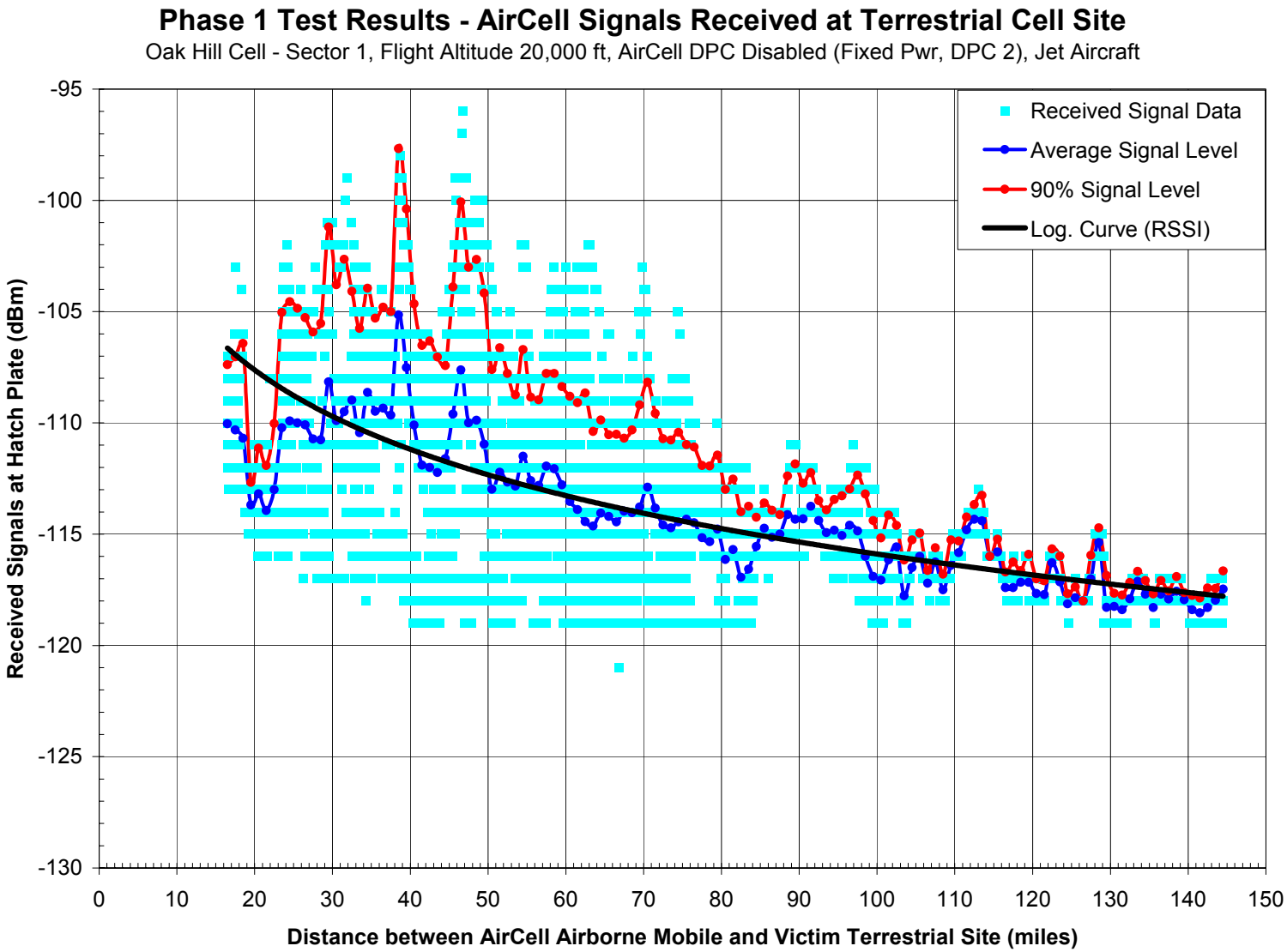


Figure 9.5-NN Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Jet Aircraft @ 35,000', DPC Disabled

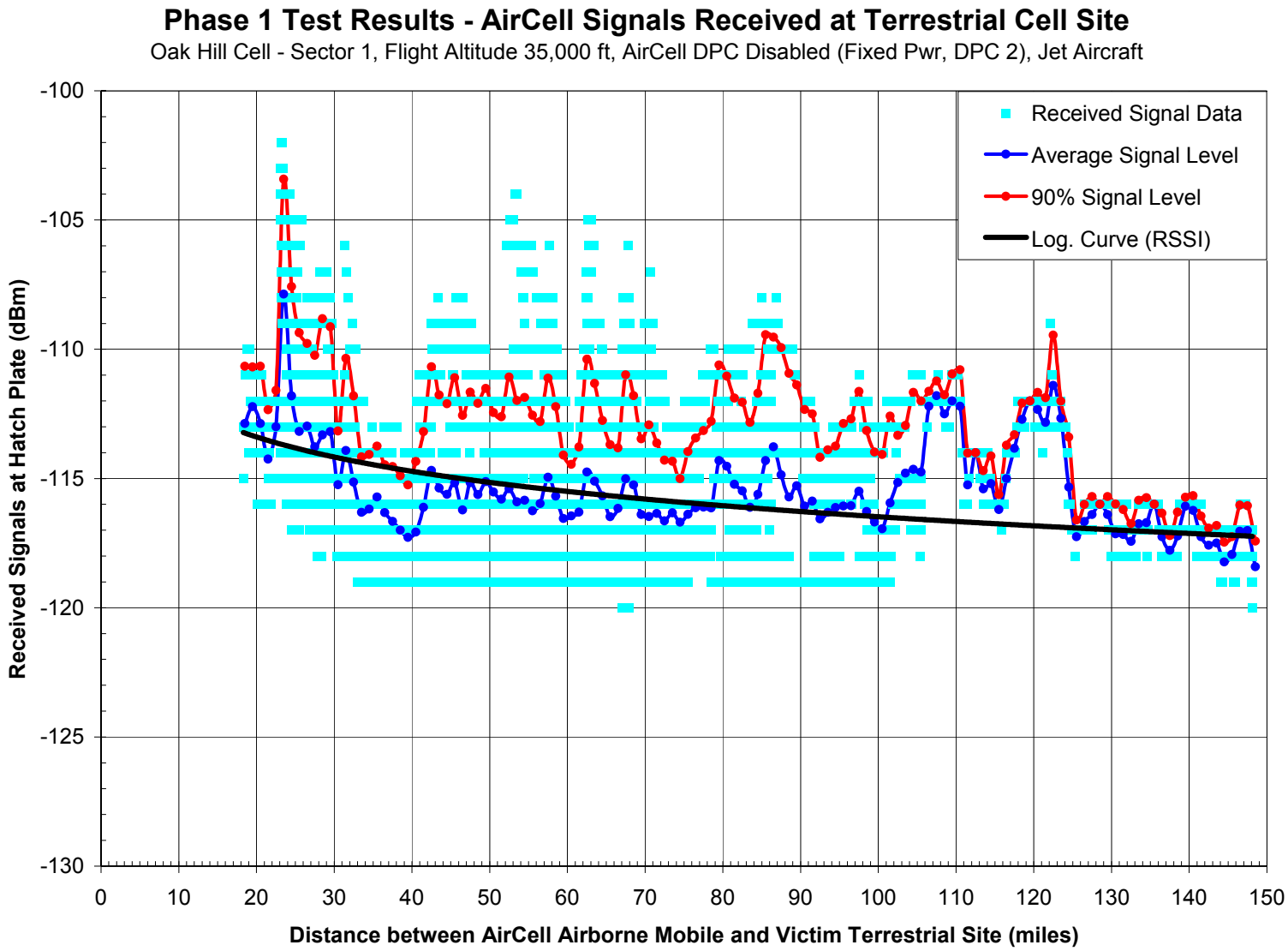


Figure 9.5-OO Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Piston Aircraft @ 2,000', DPC Disabled

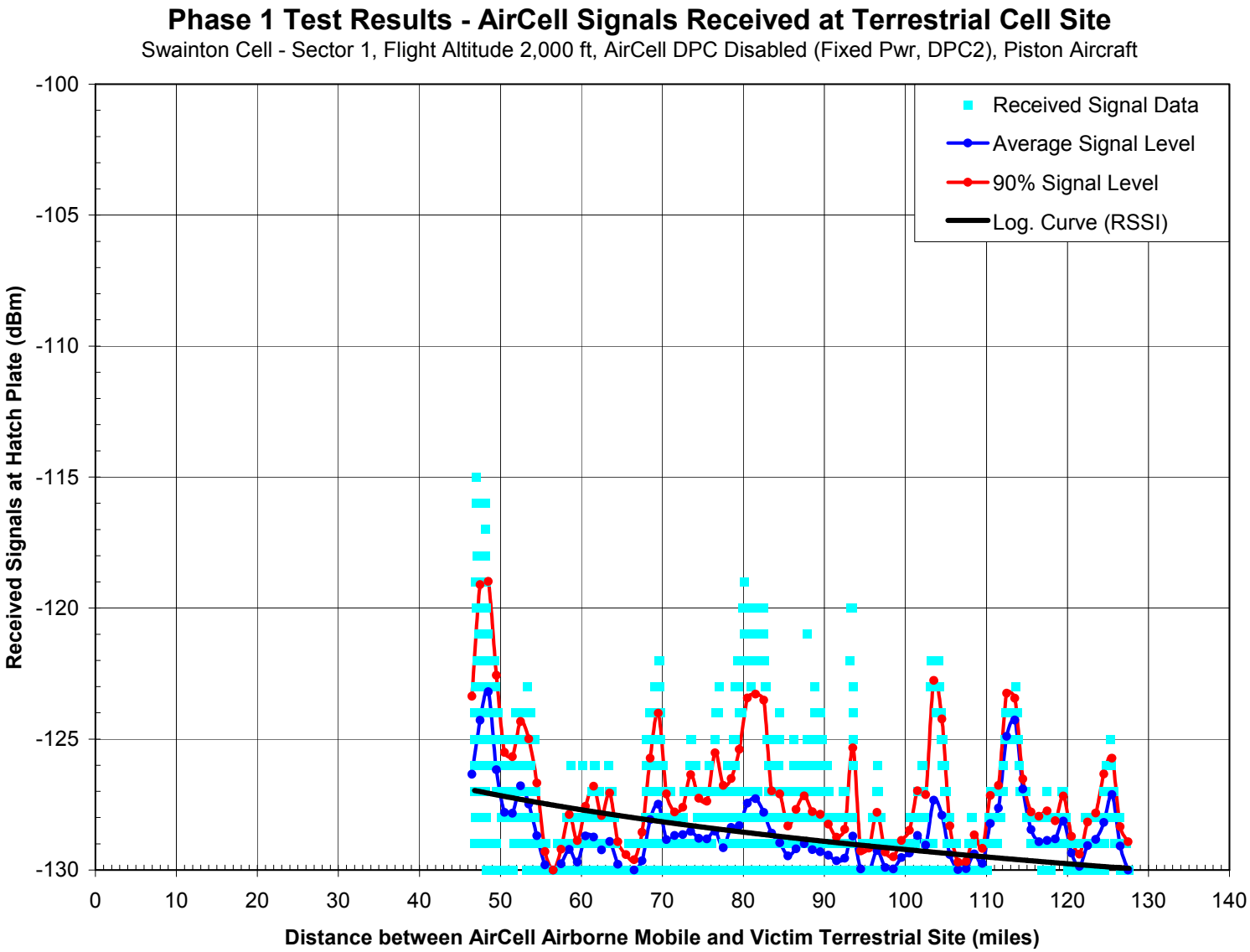


Figure 9.5-PP Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Piston Aircraft @ 5,000', DPC Disabled

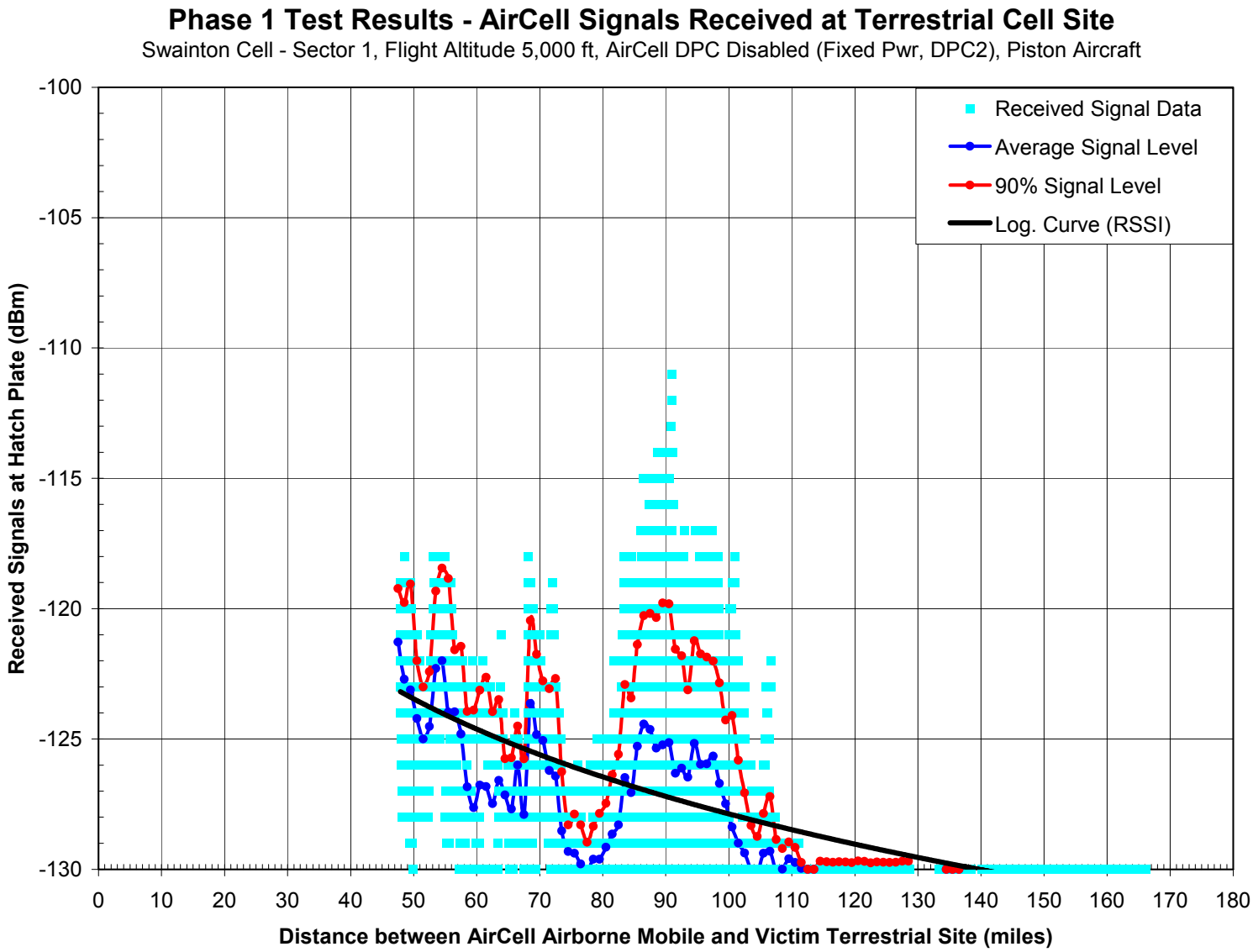


Figure 9.5-QQ Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Piston Aircraft @ 10,000', DPC Disabled

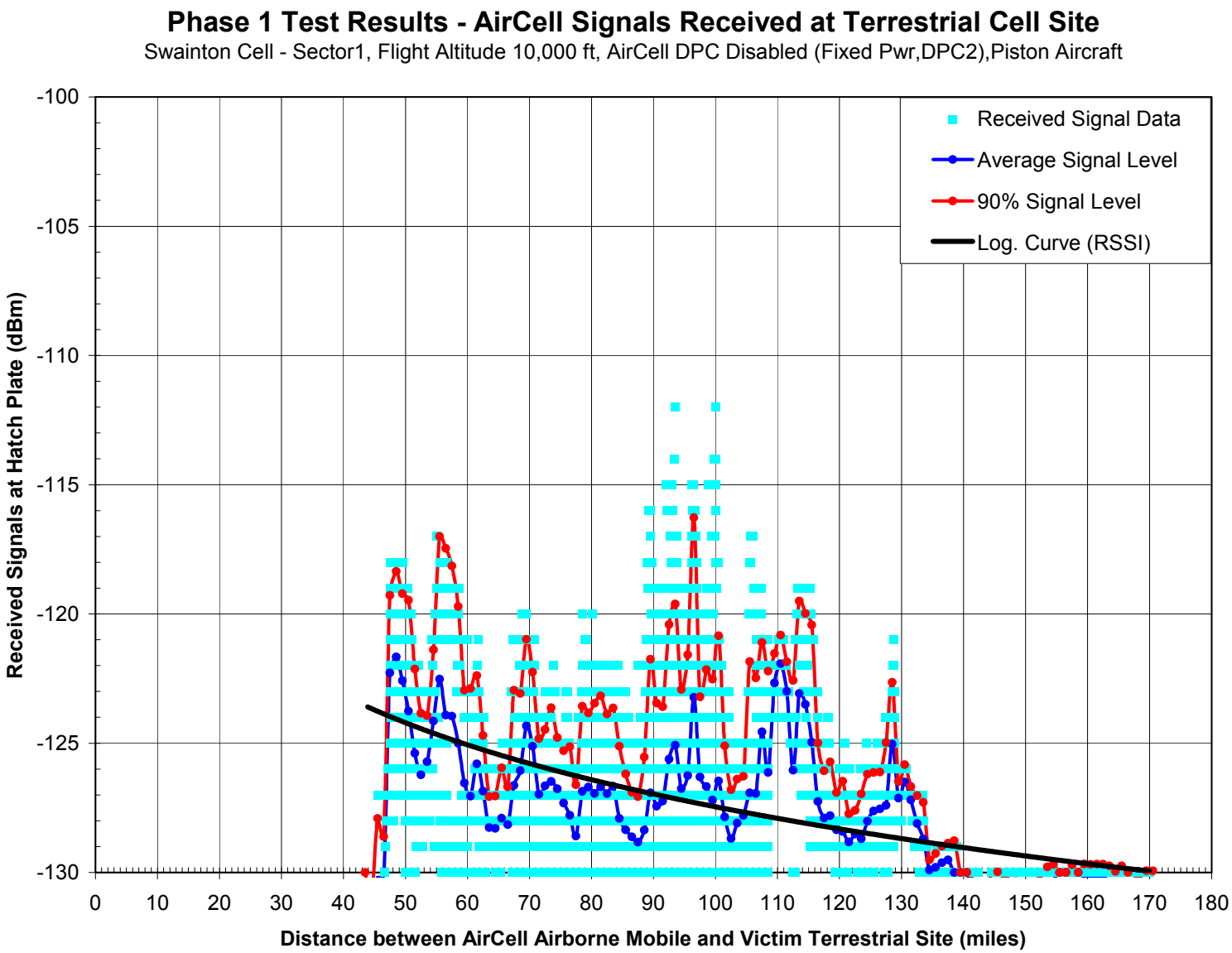


Figure 9.5-RR Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 10,000', DPC Disabled

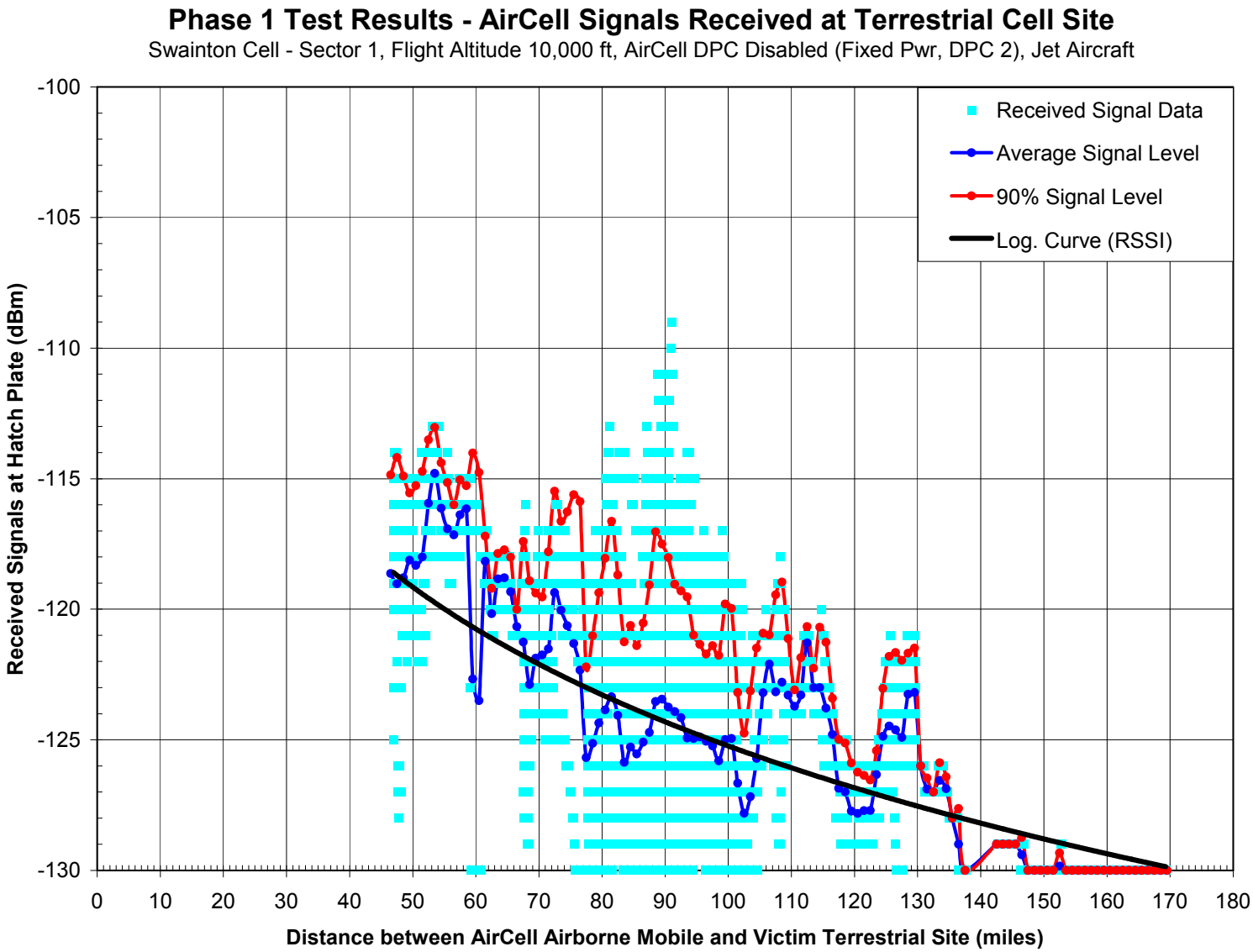


Figure 9.5-SS Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 20,000', DPC Disabled

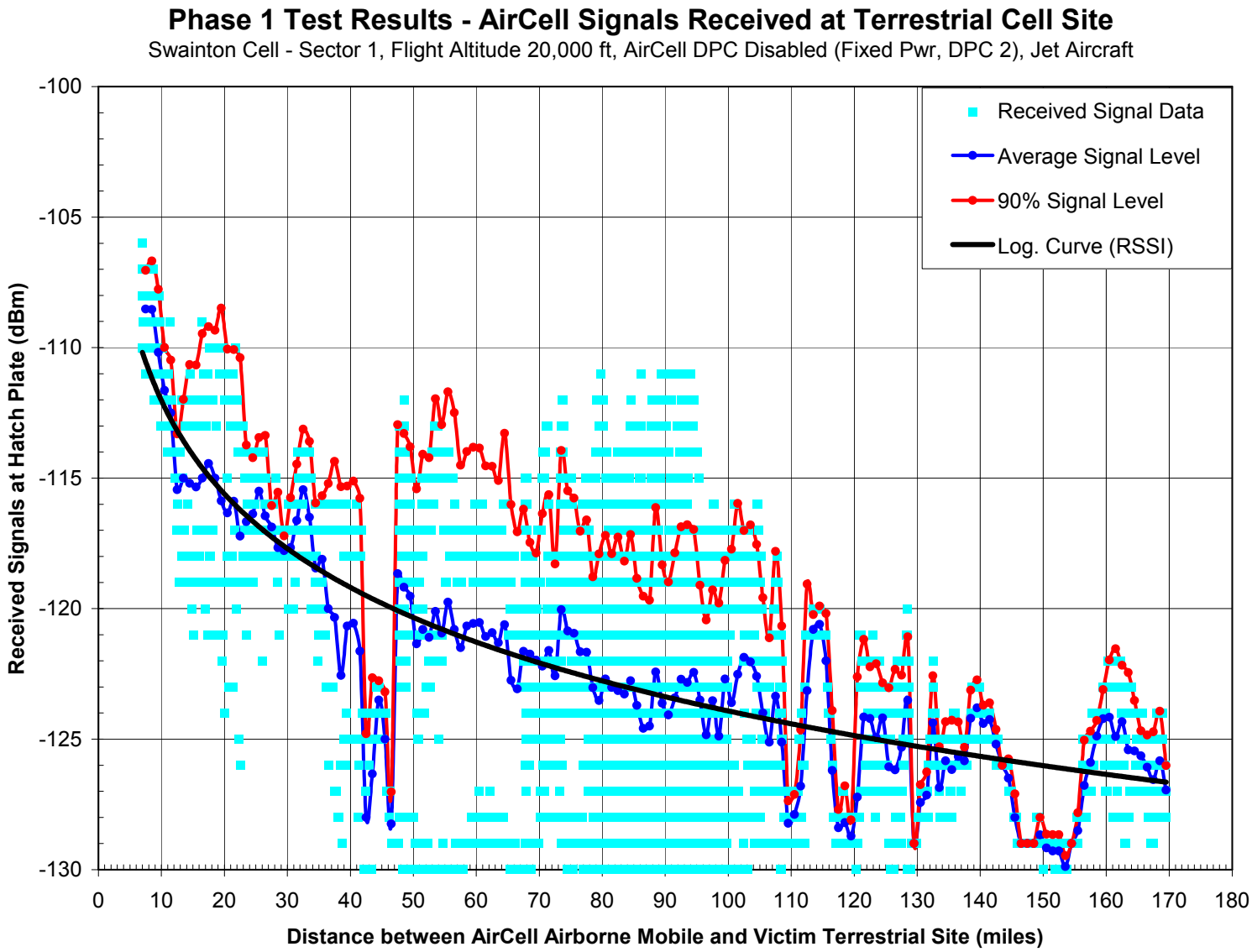


Figure 9.5-TT Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 35,000', DPC Disabled

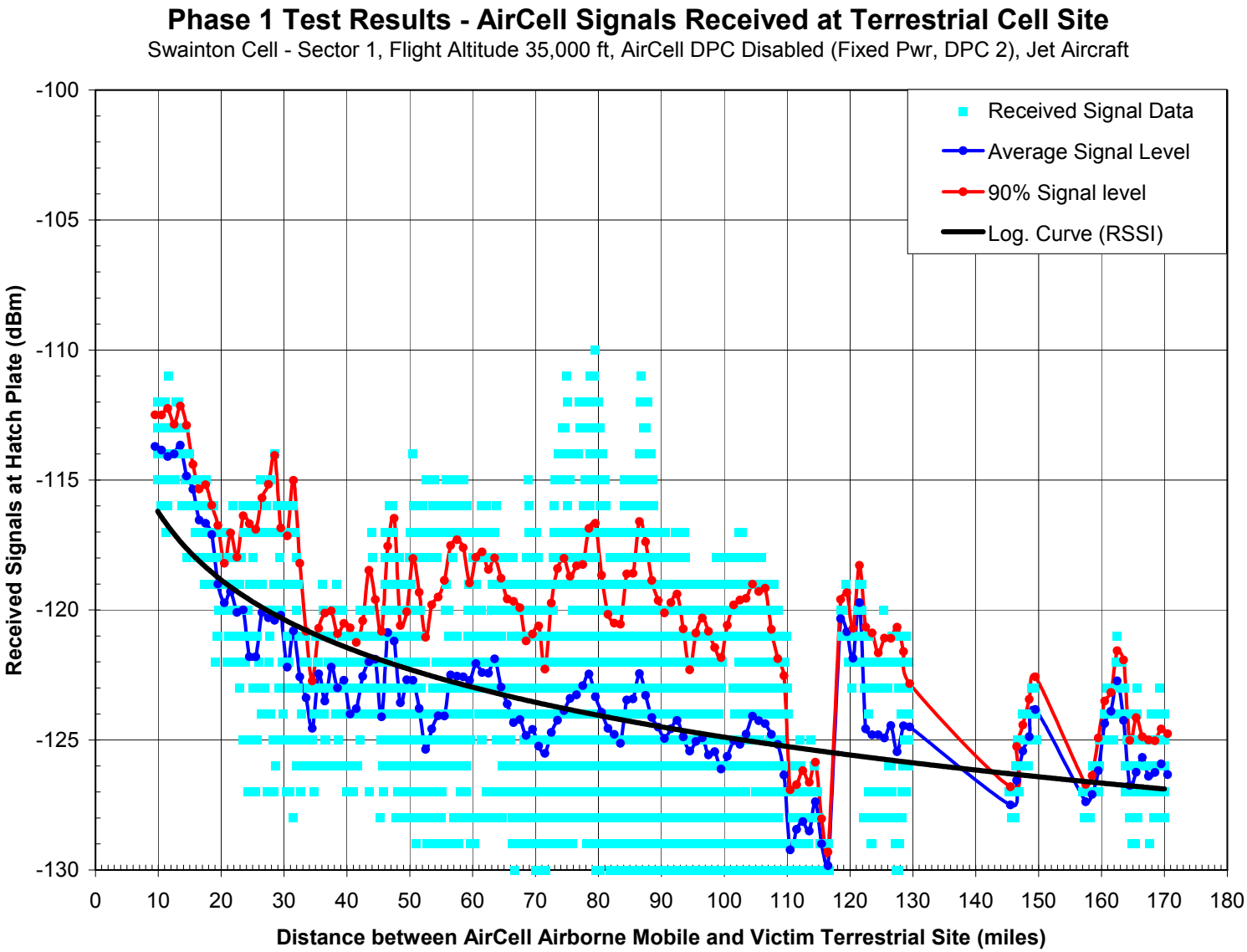


Figure 9.5-UU Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 3, Jet Aircraft @ 10,000', DPC Disabled

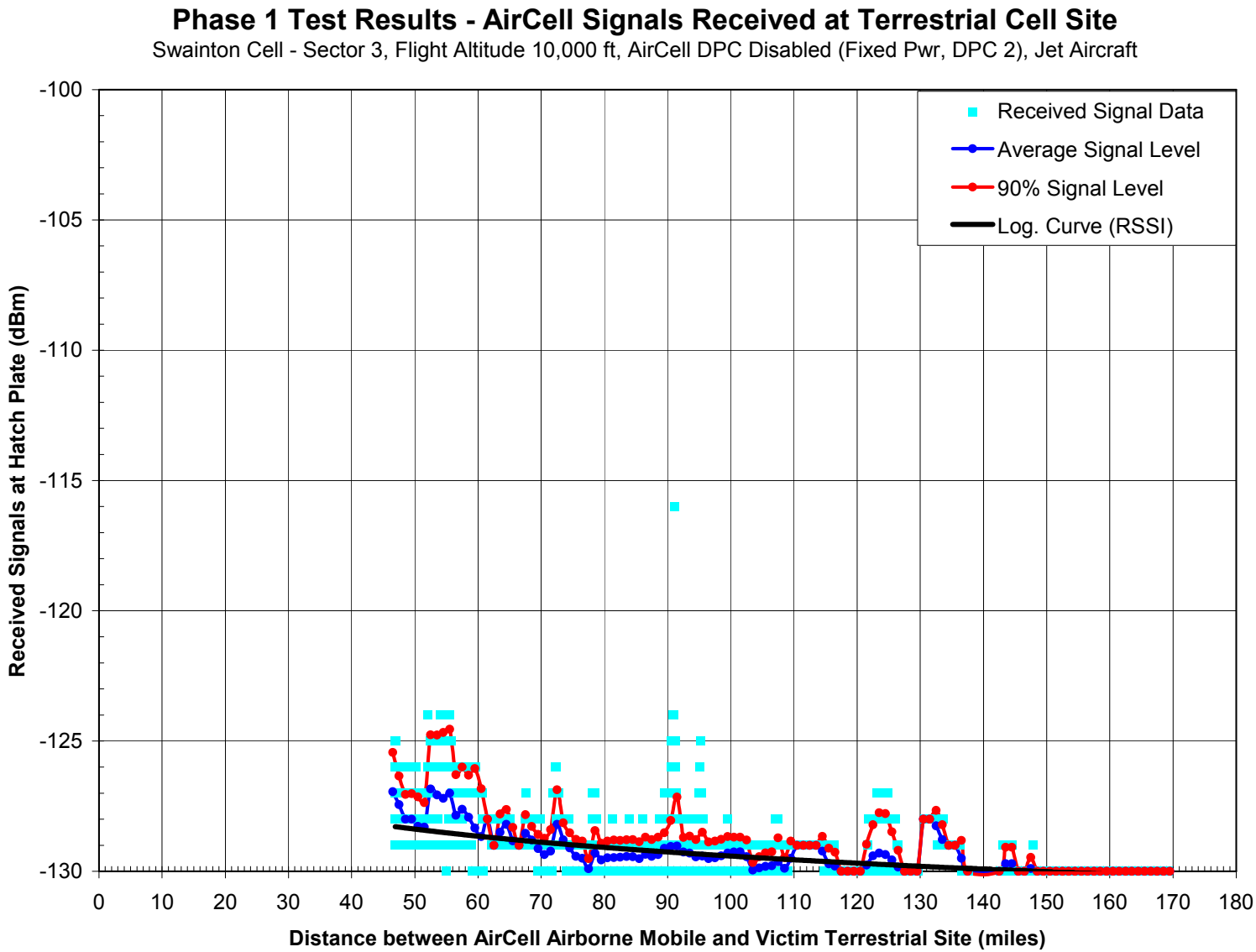


Figure 9.5-VV Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 3, Jet Aircraft @ 20,000', DPC Disabled

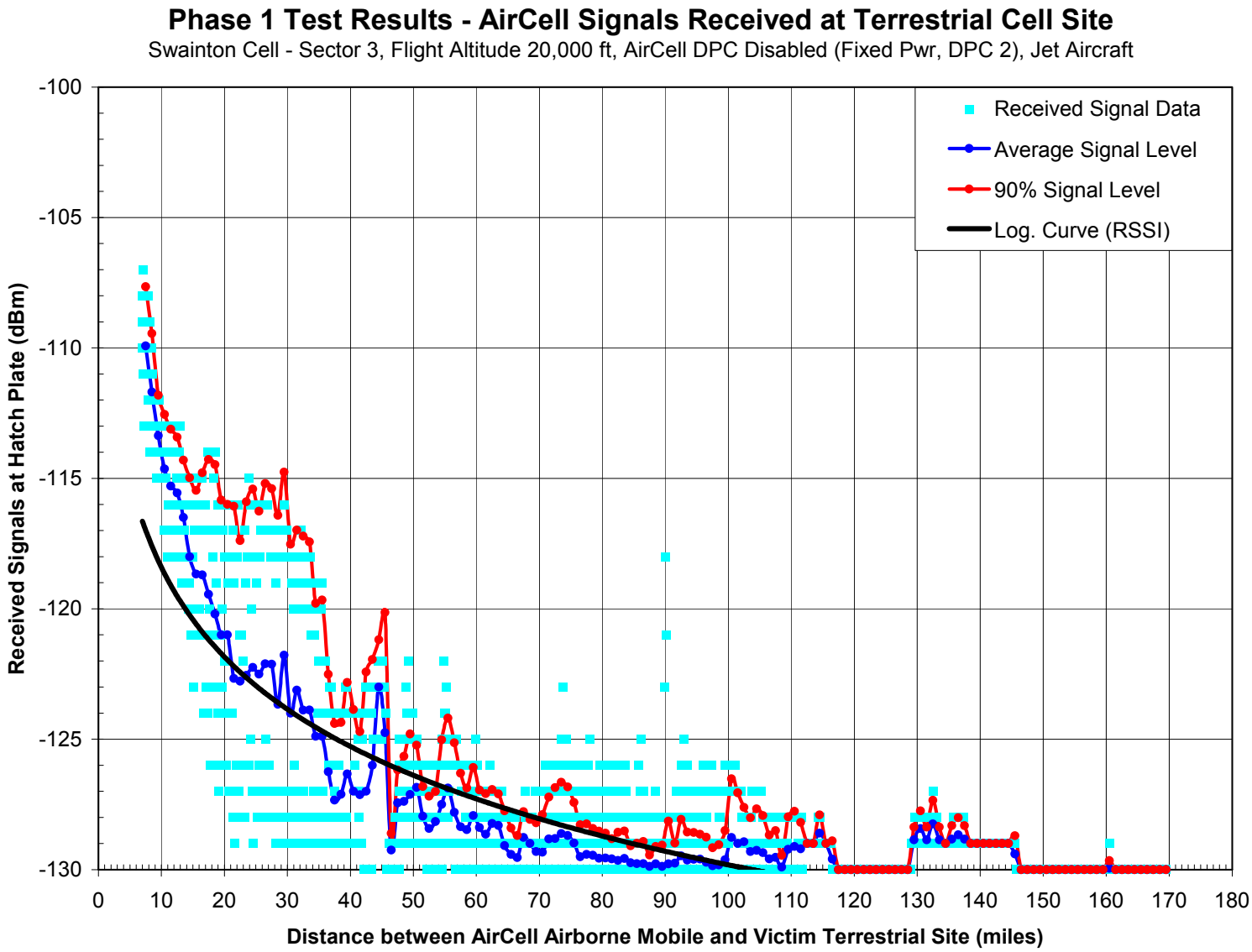
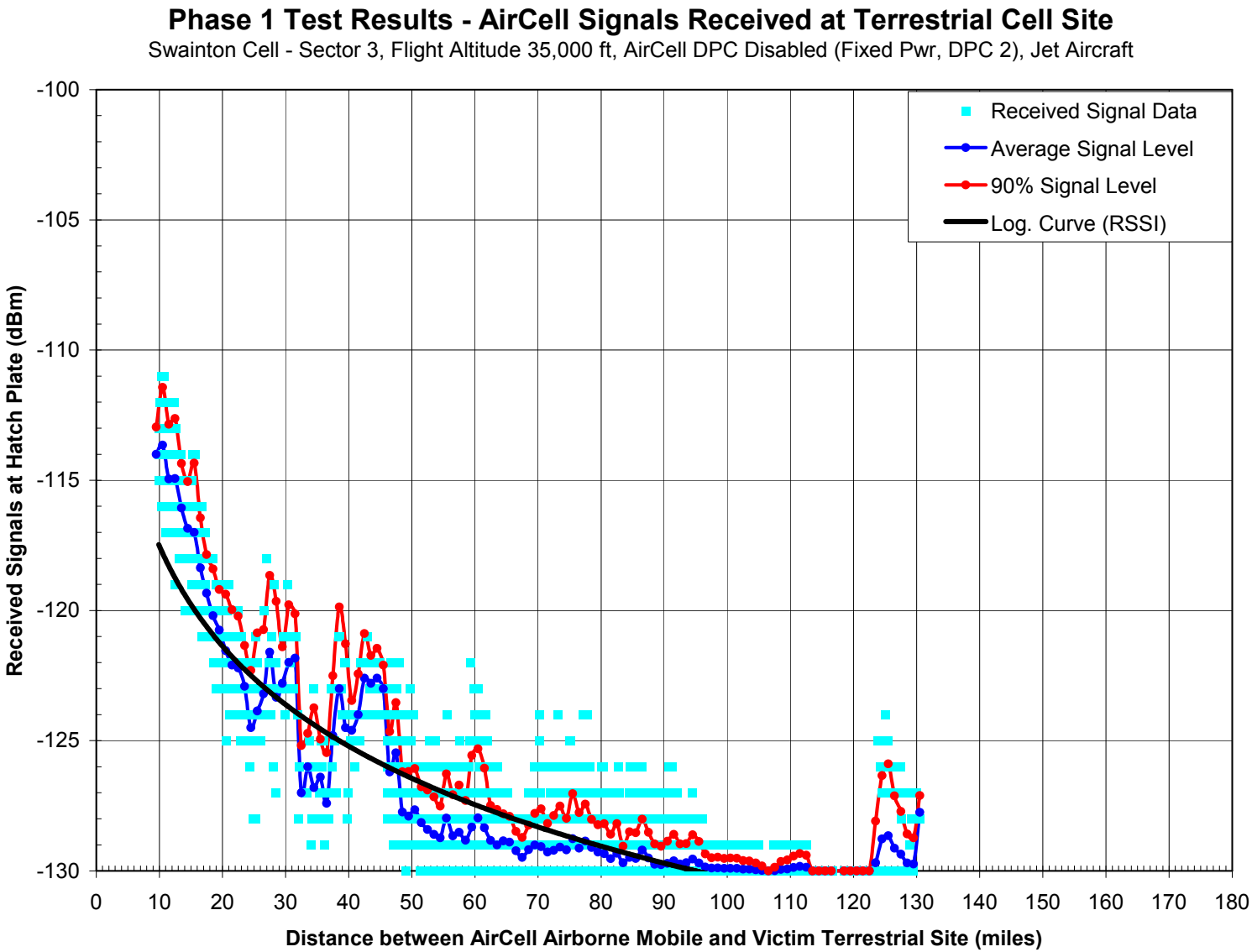


Figure 9.5-WW Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 3, Jet Aircraft @ 35,000', DPC Disabled



9.6 Phase 1 Test Results – AirCell Mobile DPC Levels, DPC Enabled

Figure 9.6-A Phase 1 Test Results, AirCell Mobile DPC Levels: Piston & Jet Aircraft, All Altitudes, DPC Enabled

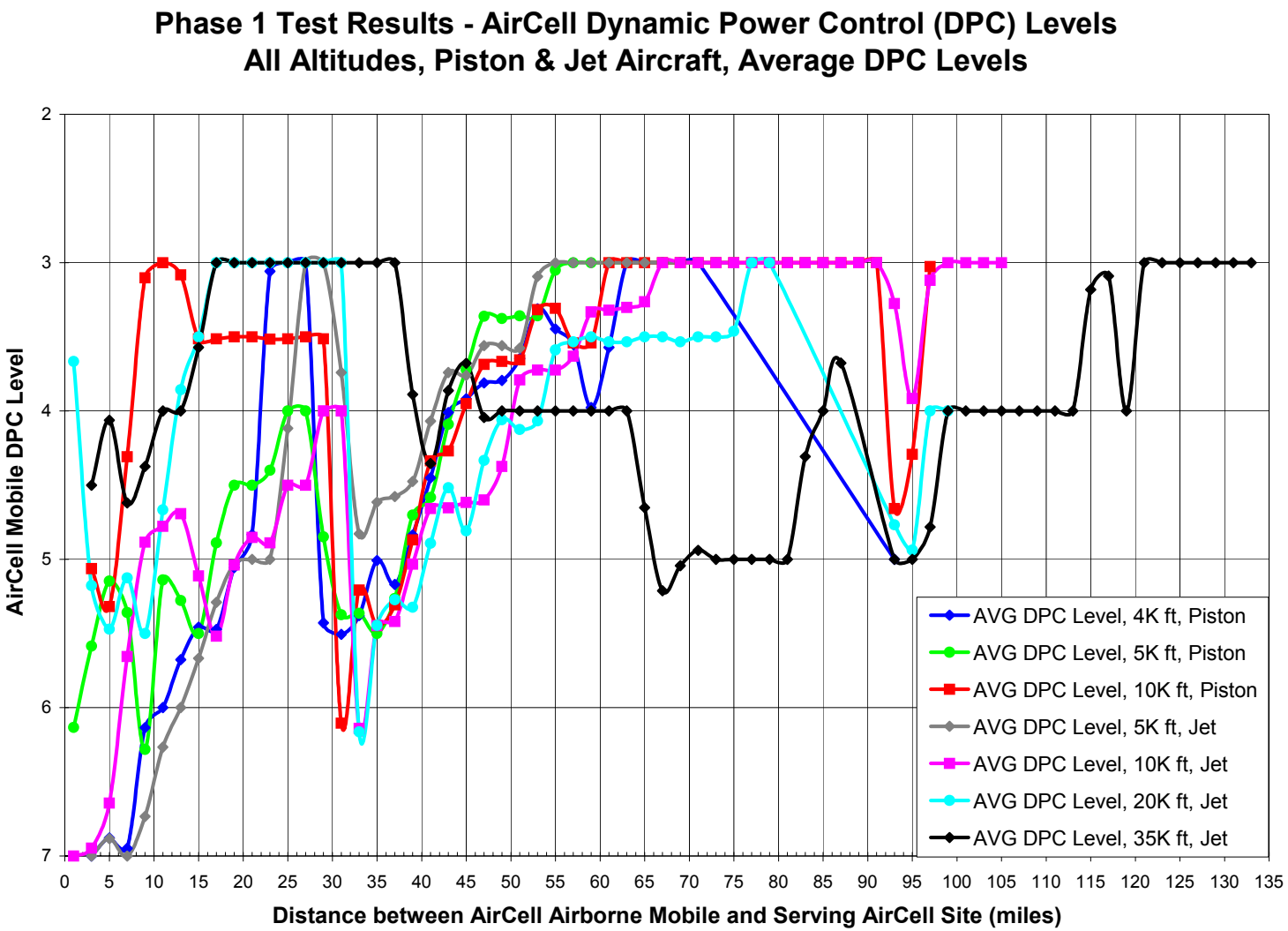


Figure 9.6-B Phase 1 Test Results, AirCell Mobile DPC Levels: Piston & Jet @ 5,000 & 10,000', DPC Enabled

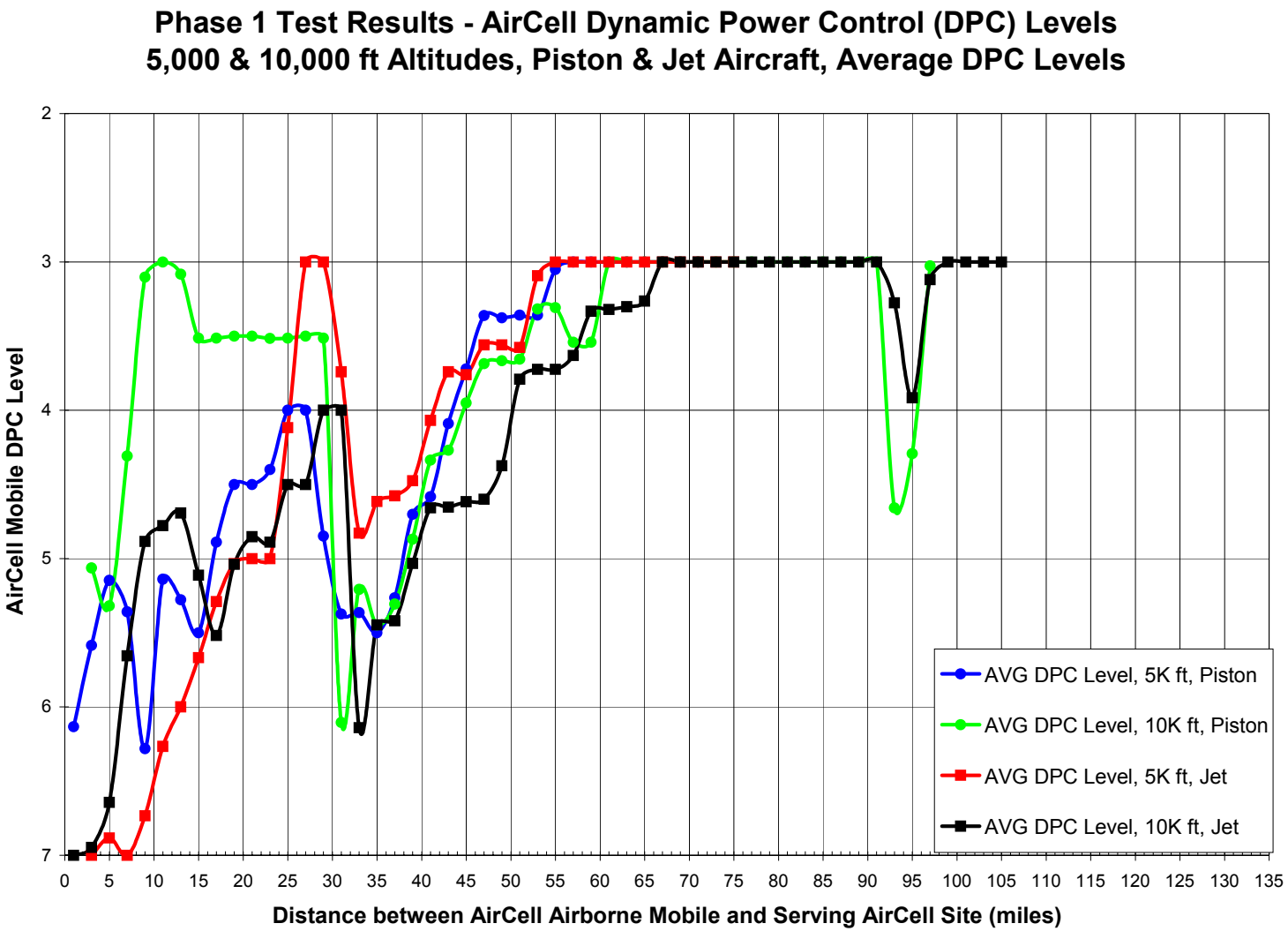


Figure 9.6-C Phase 1 Test Results, AirCell Mobile DPC Levels: Jet Aircraft, All Altitudes, DPC Enabled

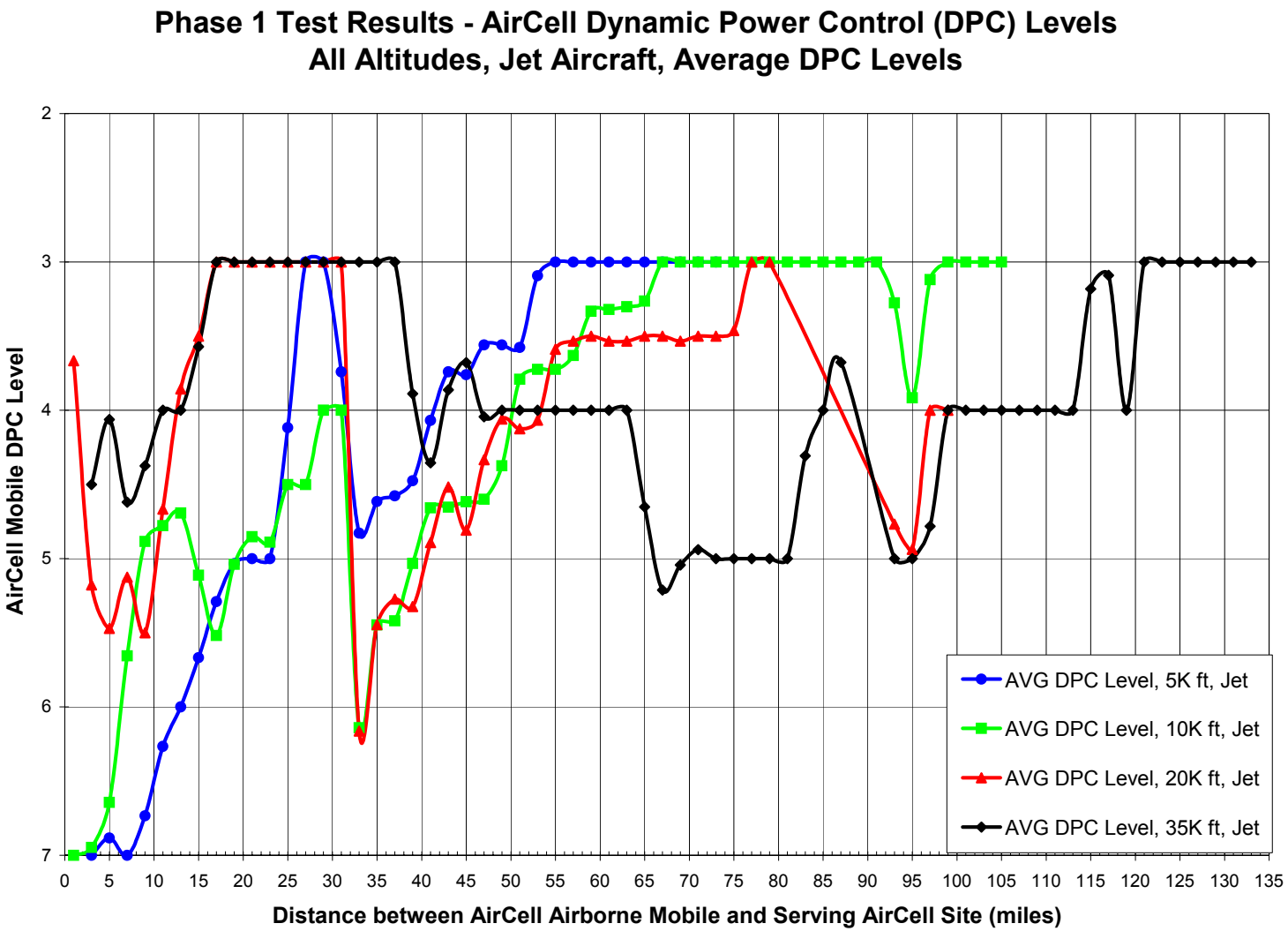


Figure 9.6-D Phase 1 Test Results, AirCell Mobile DPC Levels: Piston & Jet Aircraft @ 0 to 4,000', DPC Enabled

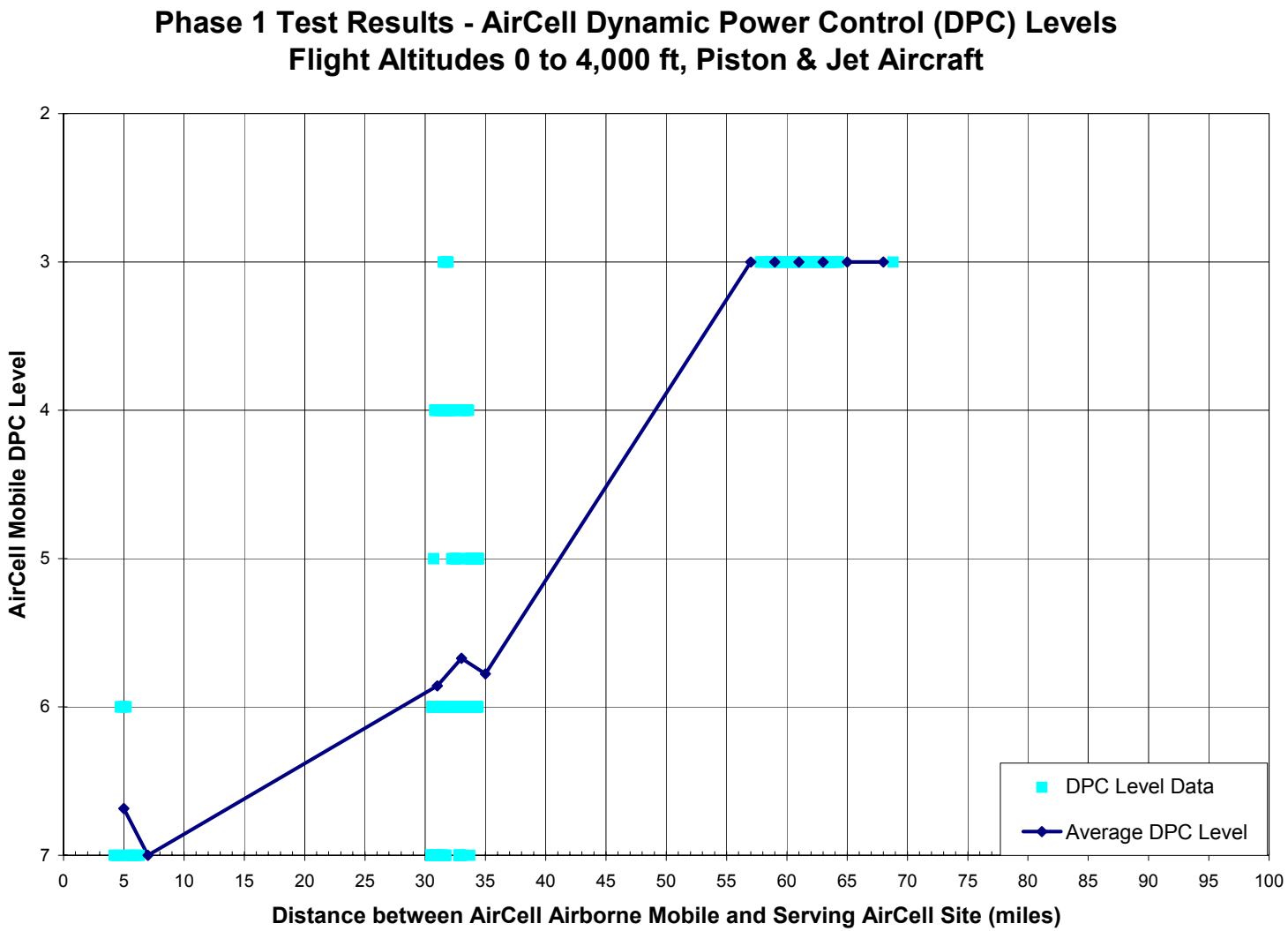


Figure 9.6-E Phase 1 Test Results, AirCell Mobile DPC Levels: Piston Aircraft @ 4,000', DPC Enabled

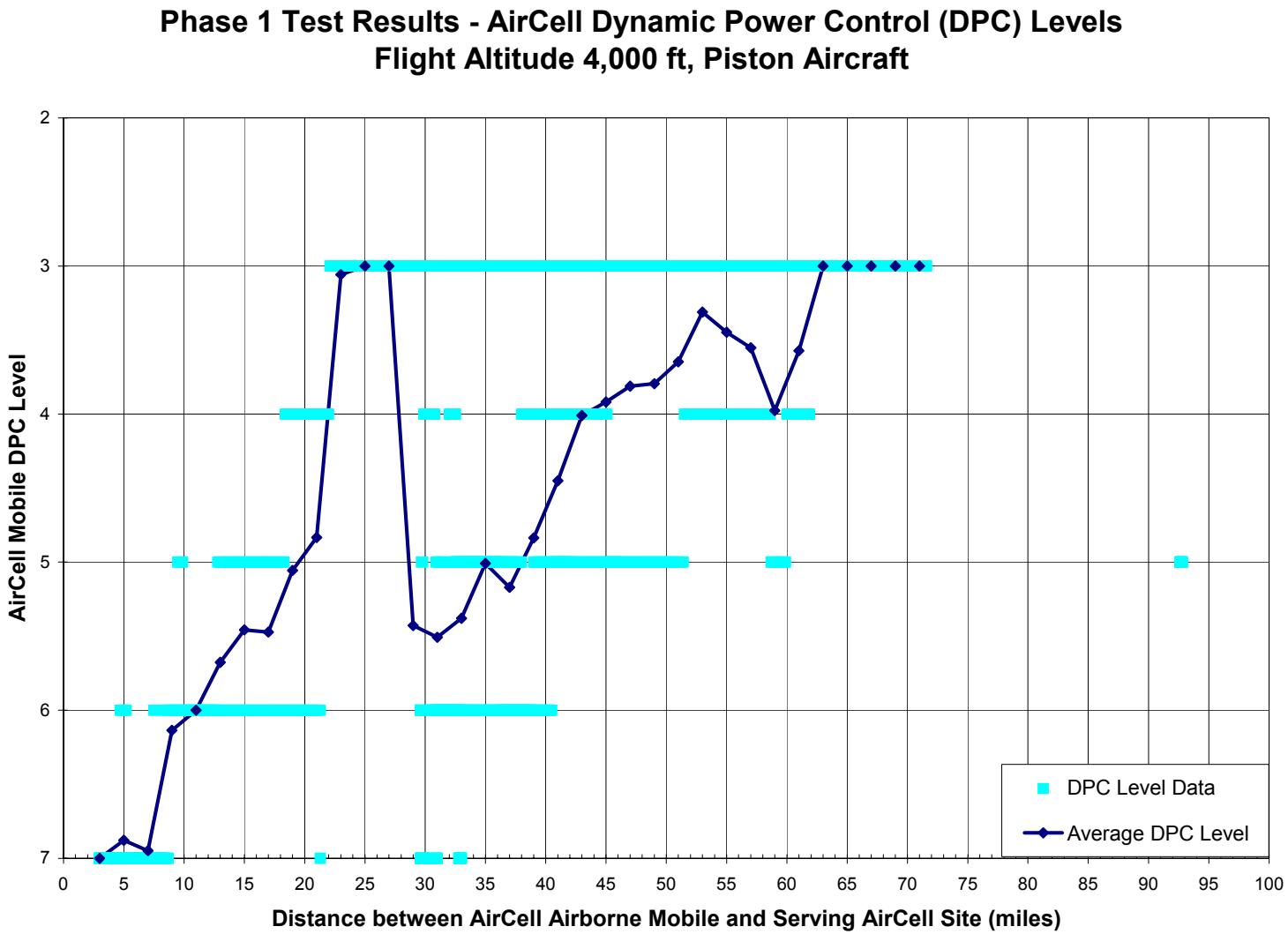


Figure 9.6-F Phase 1 Test Results, AirCell Mobile DPC Levels: Piston Aircraft @ 5,000', DPC Enabled

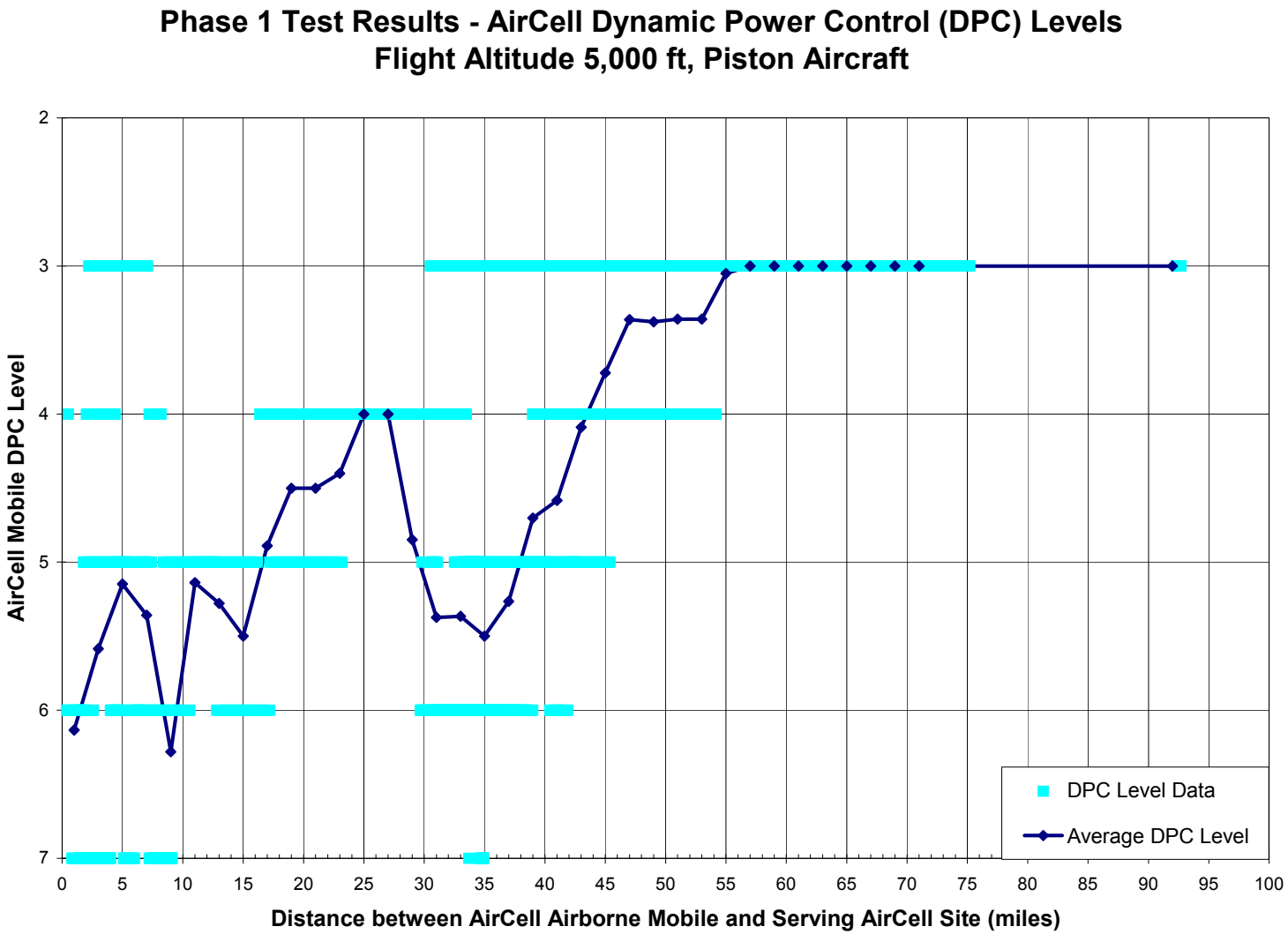


Figure 9.6-G Phase 1 Test Results, AirCell Mobile DPC Levels: Jet Aircraft @ 5,000', DPC Enabled

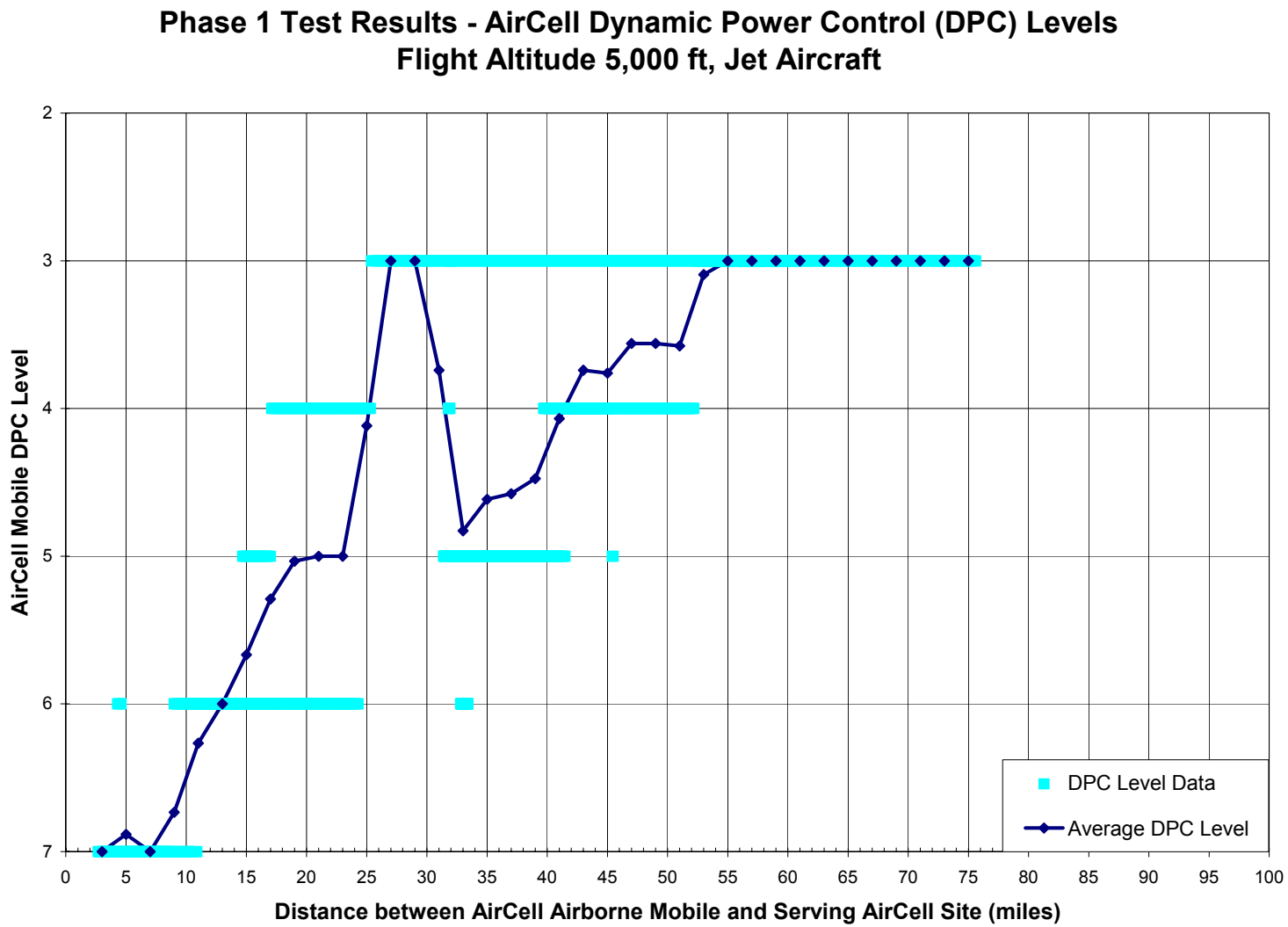


Figure 9.6-H Phase 1 Test Results, AirCell Mobile DPC Levels: Piston Aircraft @ 10,000', DPC Enabled

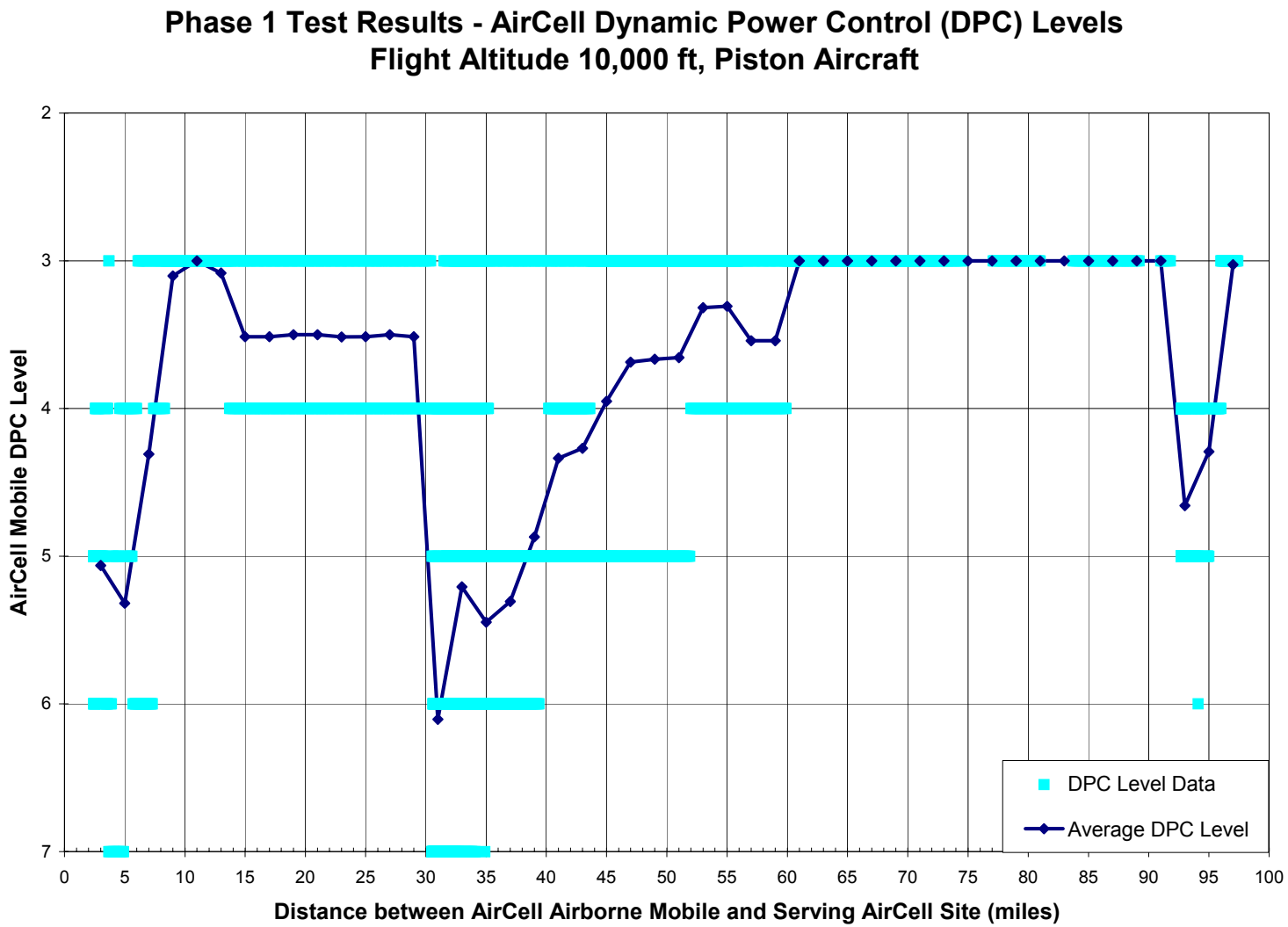


Figure 9.6-I Phase 1 Test Results, AirCell Mobile DPC Levels: Jet Aircraft @ 10,000', DPC Enabled

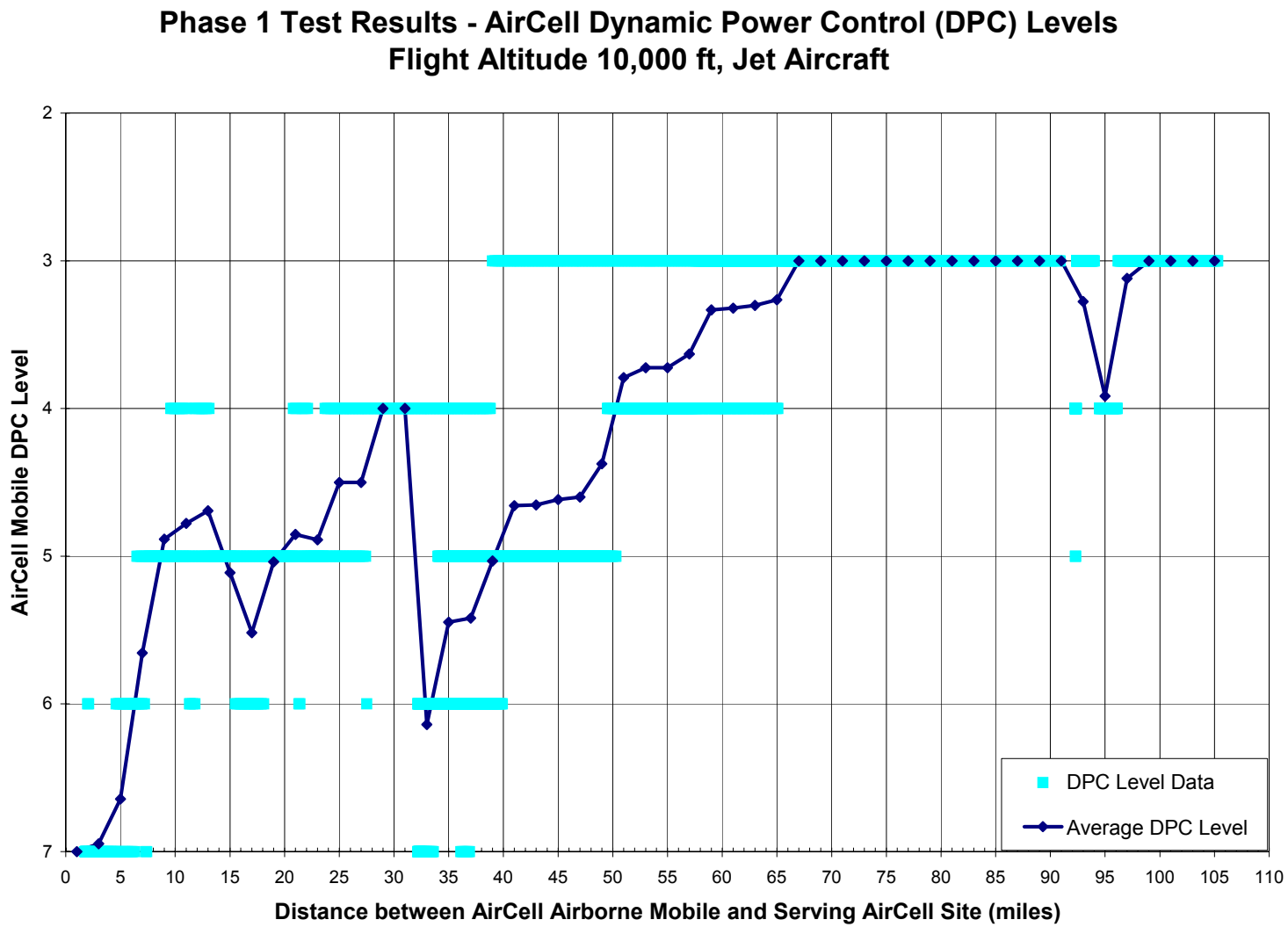


Figure 9.6-J Phase 1 Test Results, AirCell Mobile DPC Levels: Jet Aircraft @ 20,000', DPC Enabled

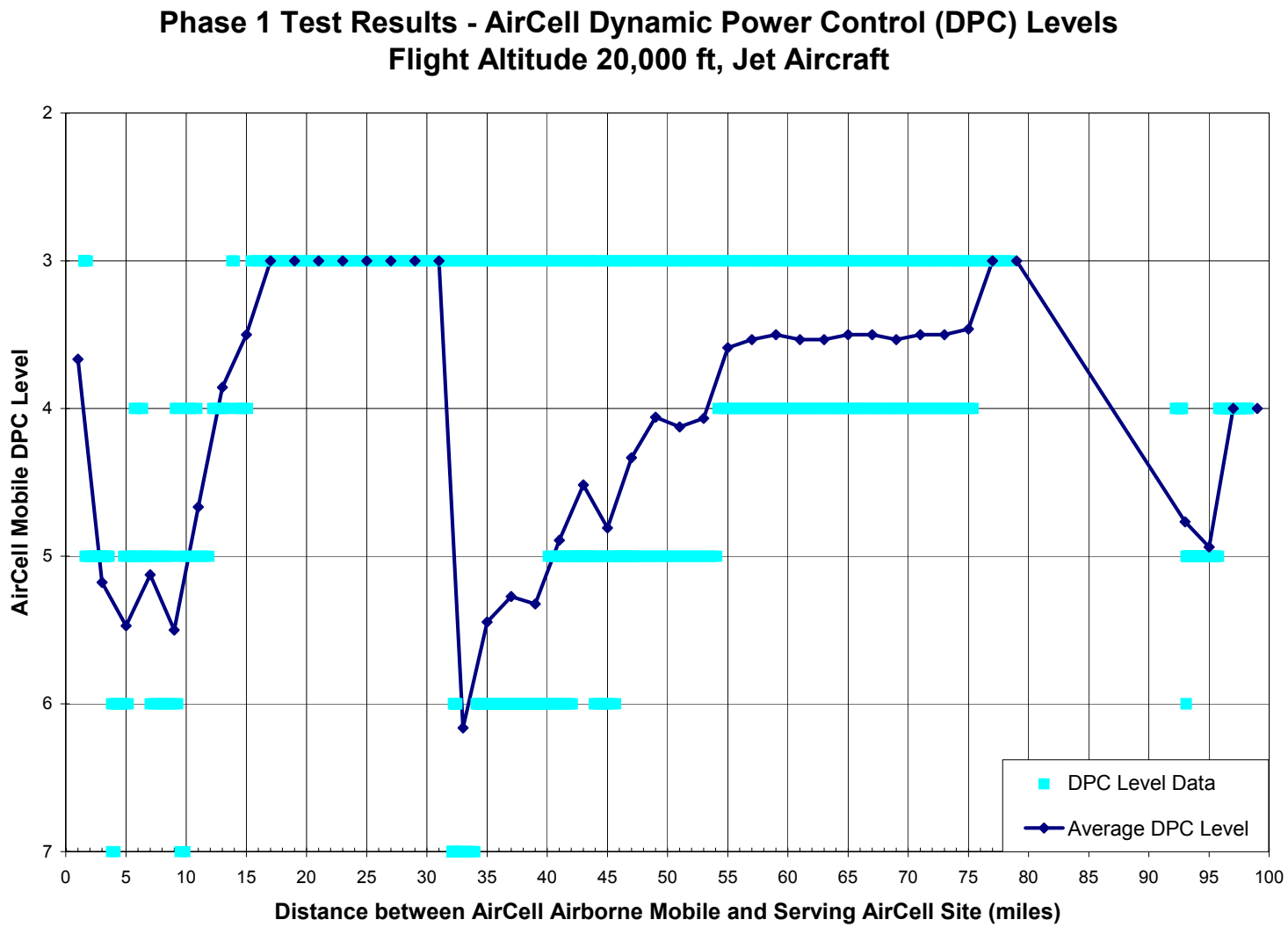
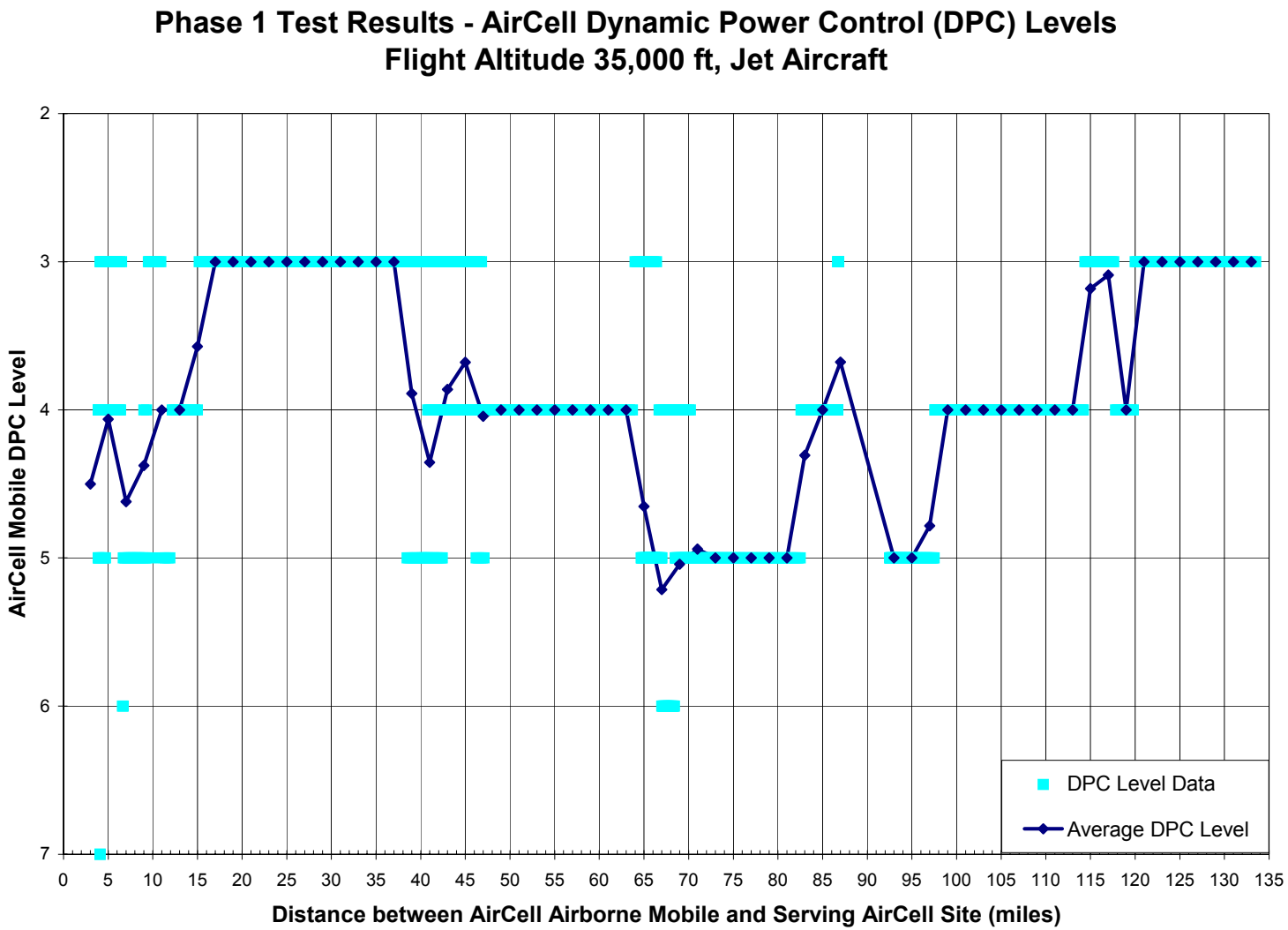
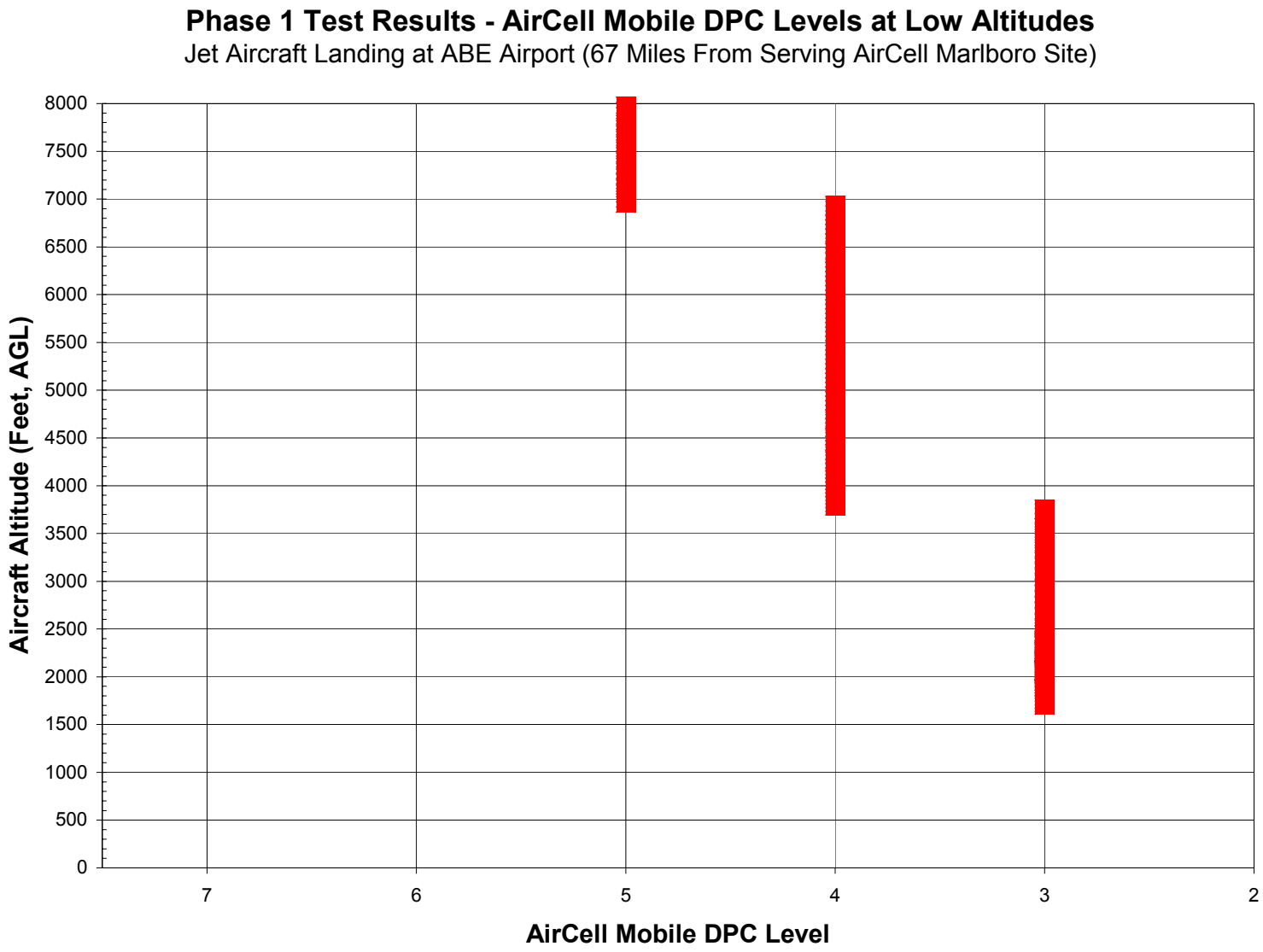


Figure 9.6-K Phase 1 Test Results, AirCell Mobile DPC Levels: Jet Aircraft @ 35,000', DPC Enabled



9.7 Phase 1 Test Results – AirCell Mobile DPC at Low Altitudes, DPC Enabled

Figure 9.7-A Phase 1 Test Results, AirCell Mobile DPC Levels at Low Altitudes: Landing at ABE Airport, DPC Enabled



9.8 Phase 1 Test Results – AirCell Signals Received at Terrestrial Sites, DPC Enabled

Figure 9.8-A Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Piston Aircraft @ 4,000', DPC Enabled

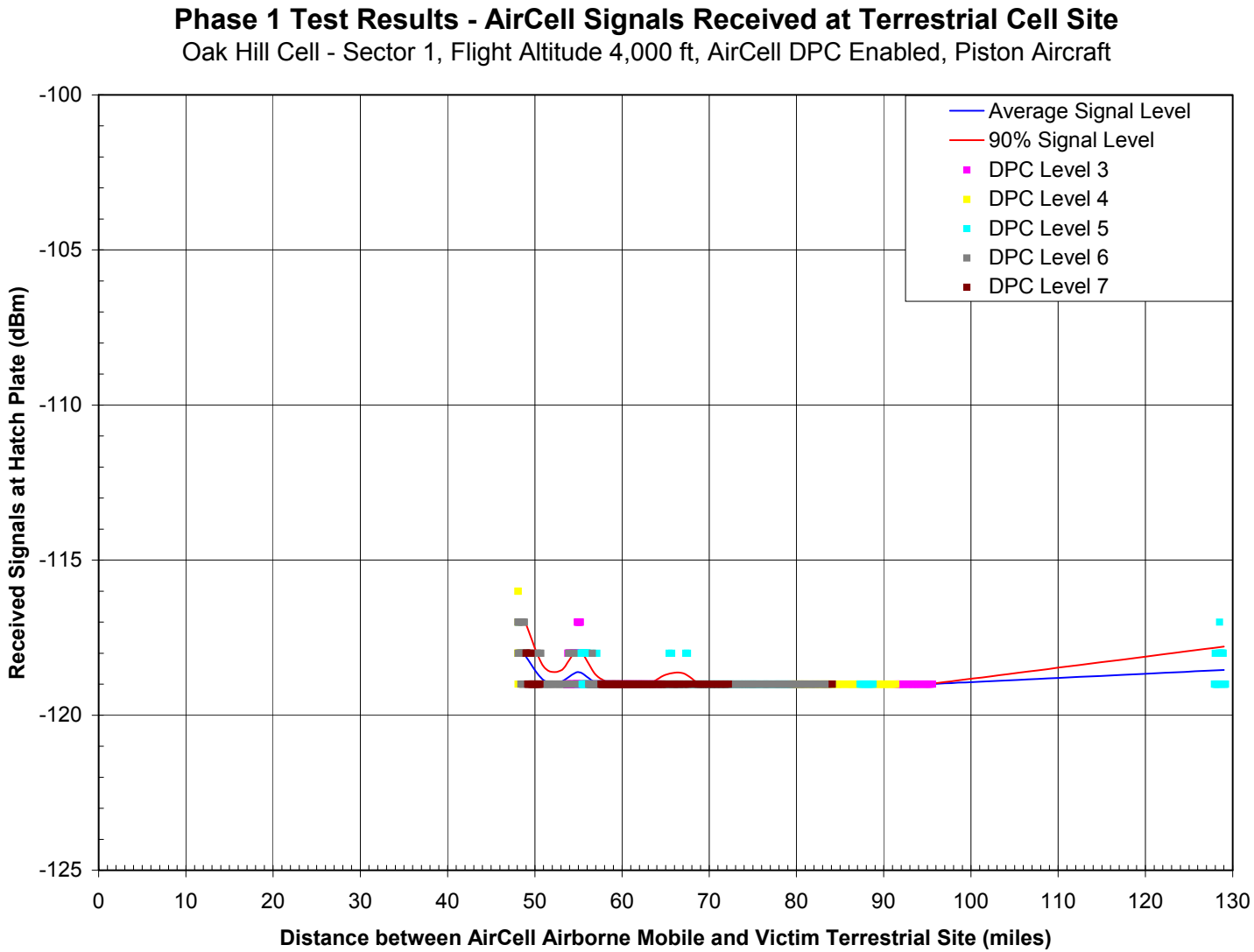


Figure 9.8-B Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Piston Aircraft @ 5,000', DPC Enabled

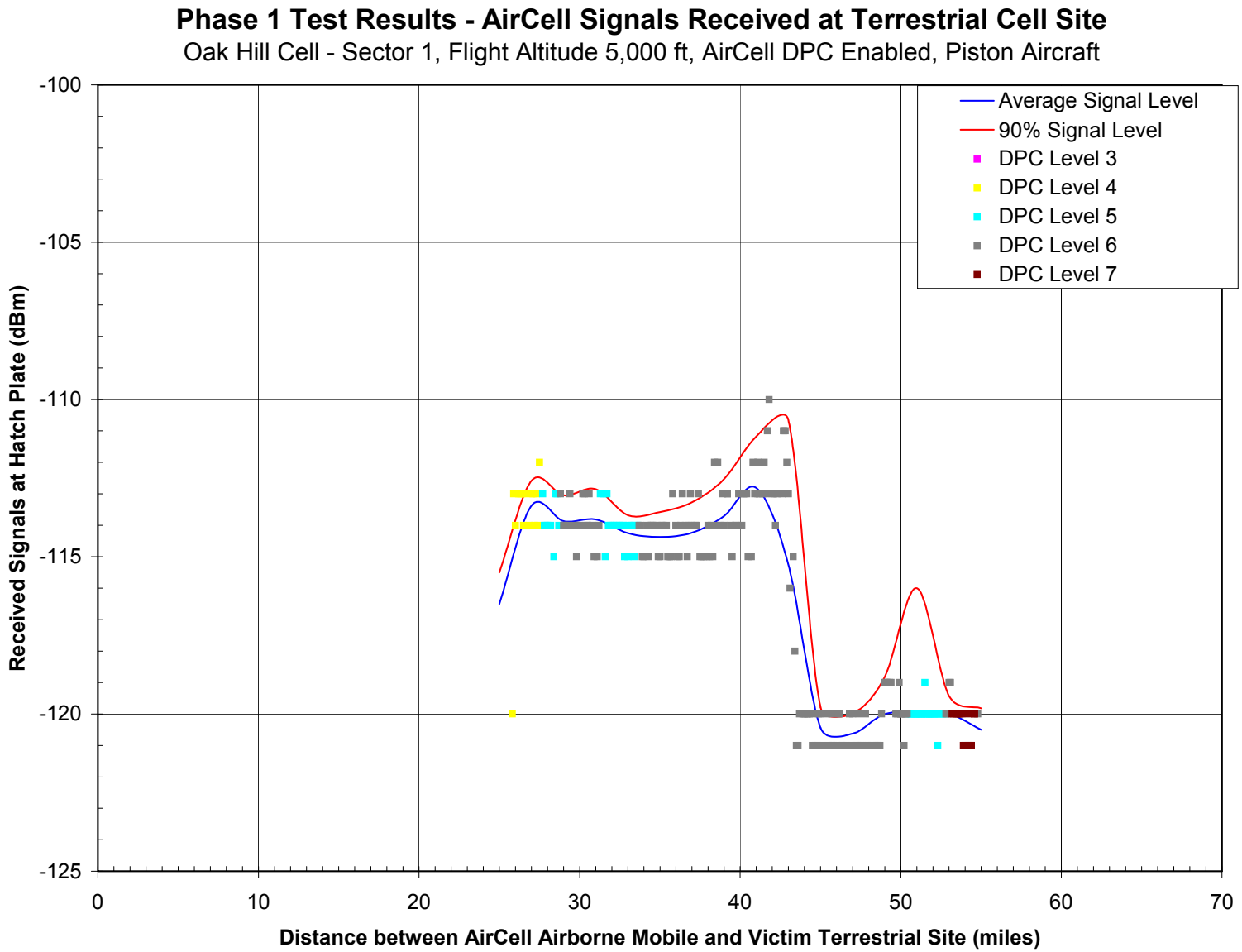


Figure 9.8-C Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Jet Aircraft @ 20,000', DPC Enabled

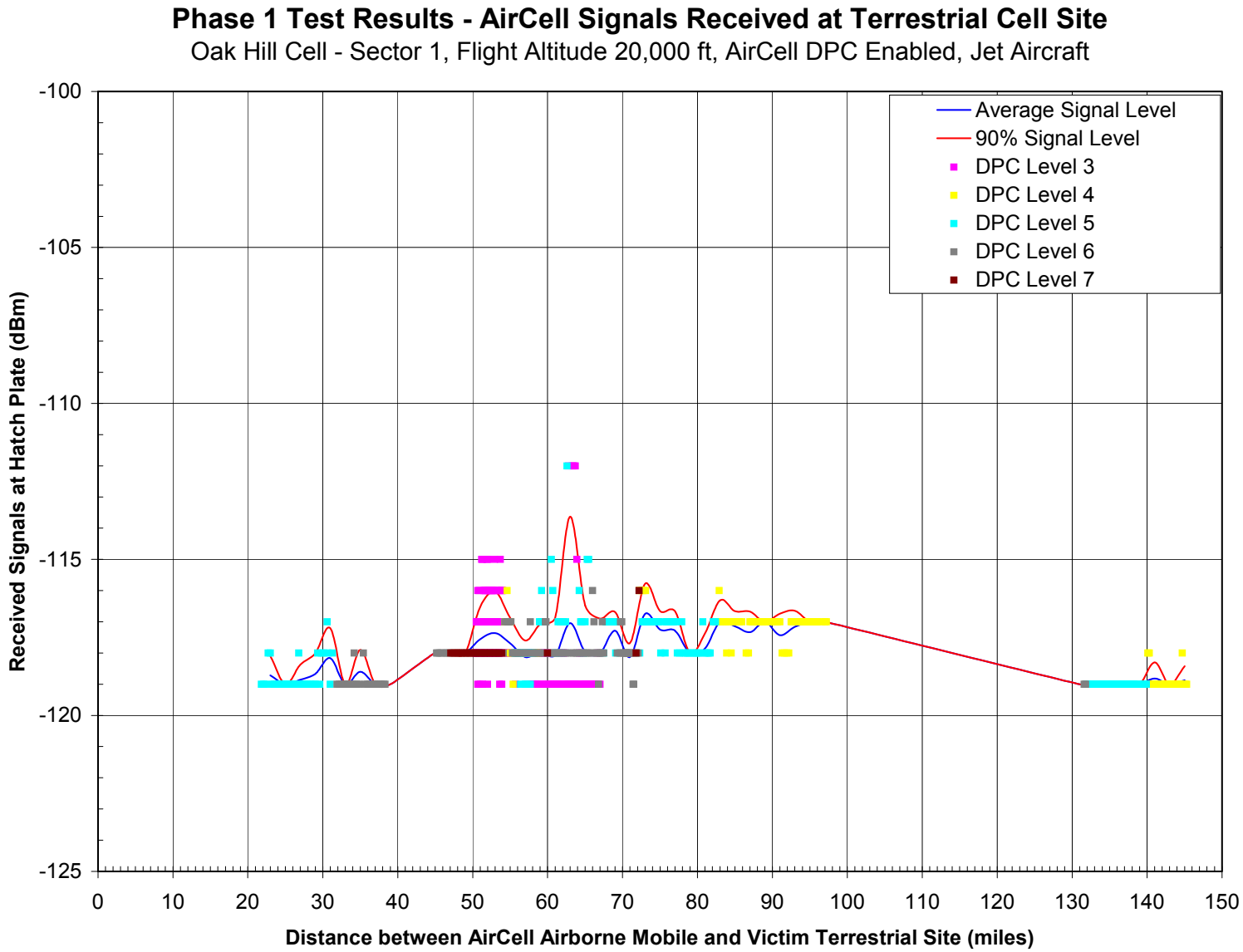


Figure 9.8-D Phase 1 Test Results, RSSI at Terrestrial Site: Oak Hill Sector 1, Jet Aircraft @ 35,000', DPC Enabled

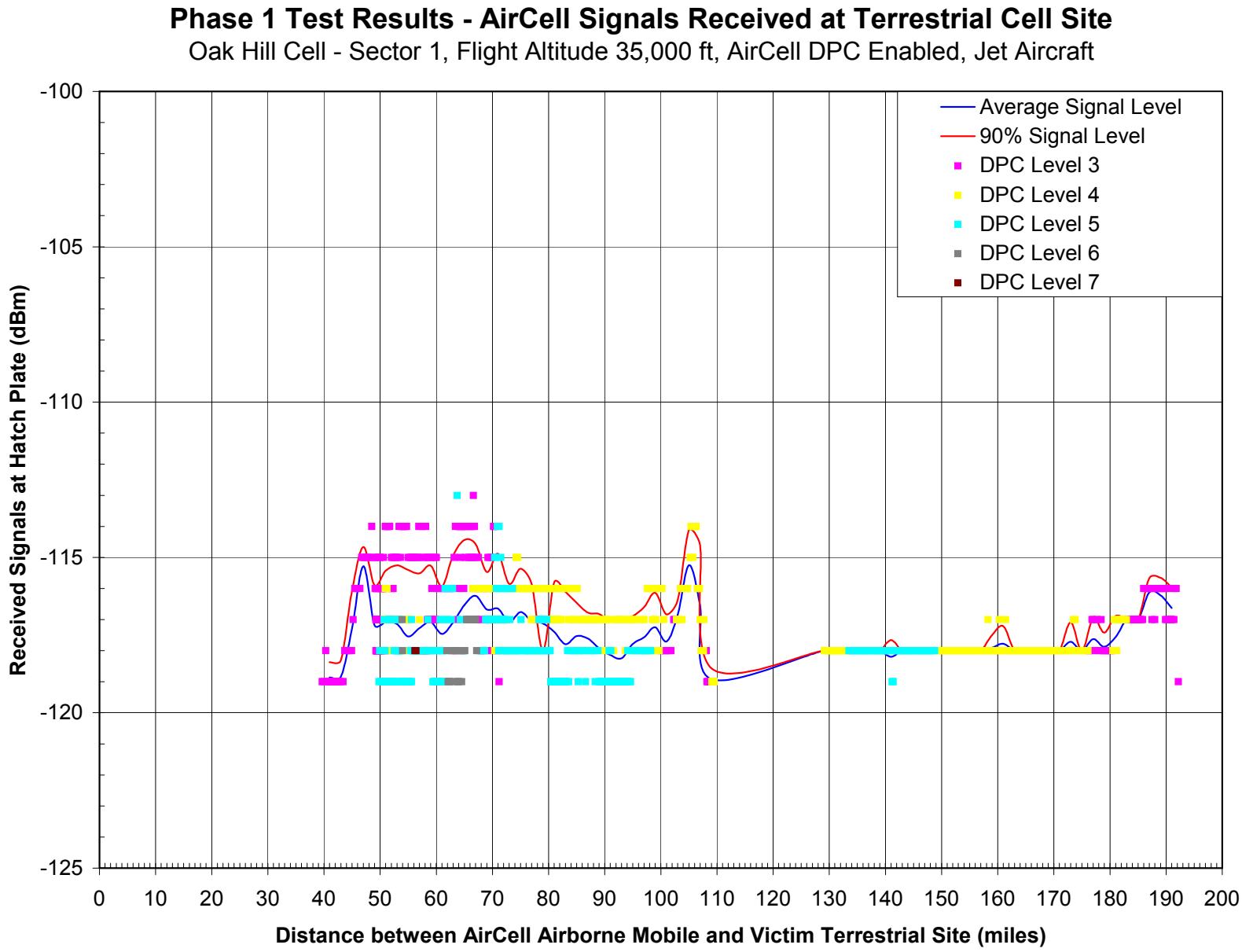


Figure 9.8-E Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Piston Aircraft @ 4,000', DPC Enabled

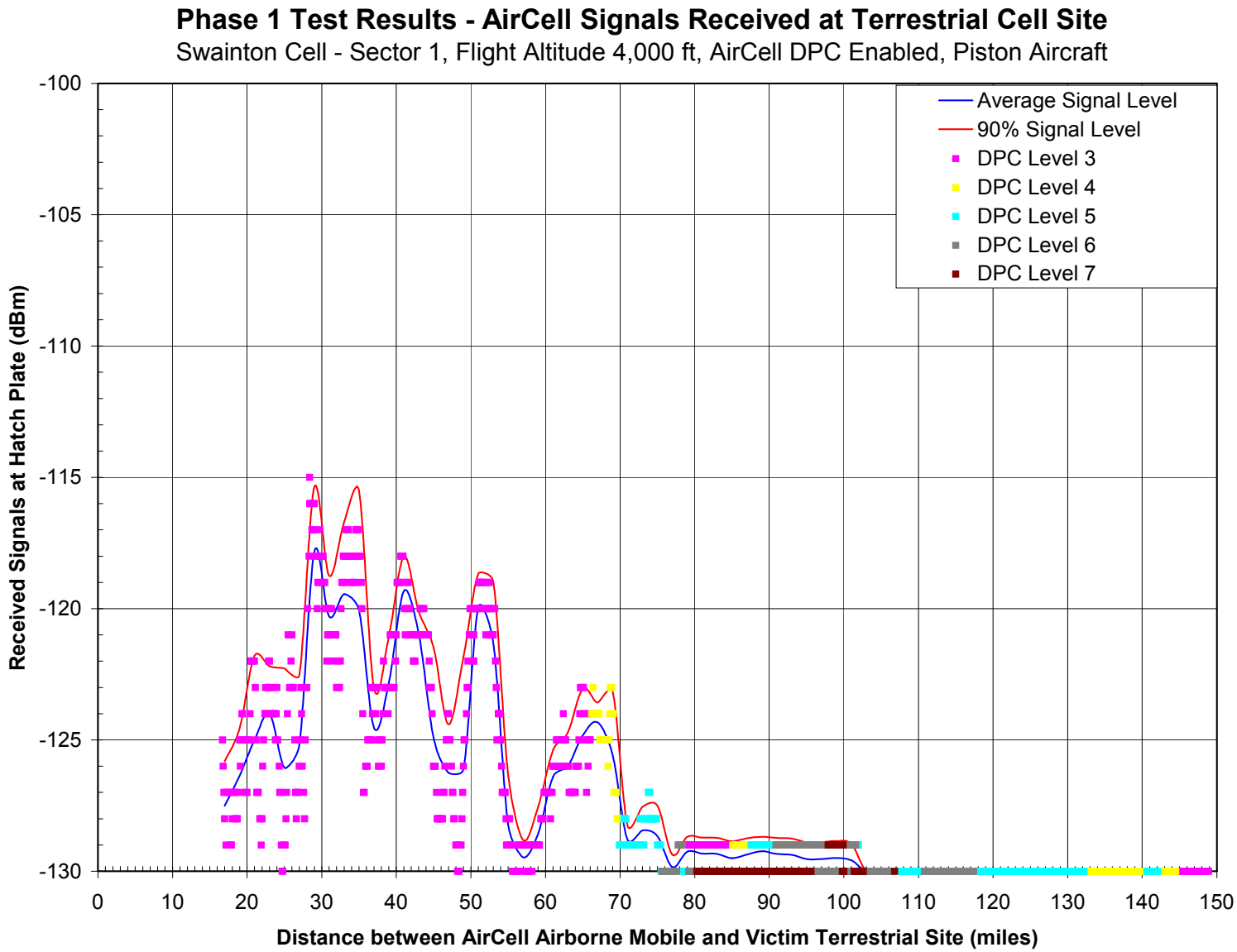


Figure 9.8-F Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 5,000', DPC Enabled

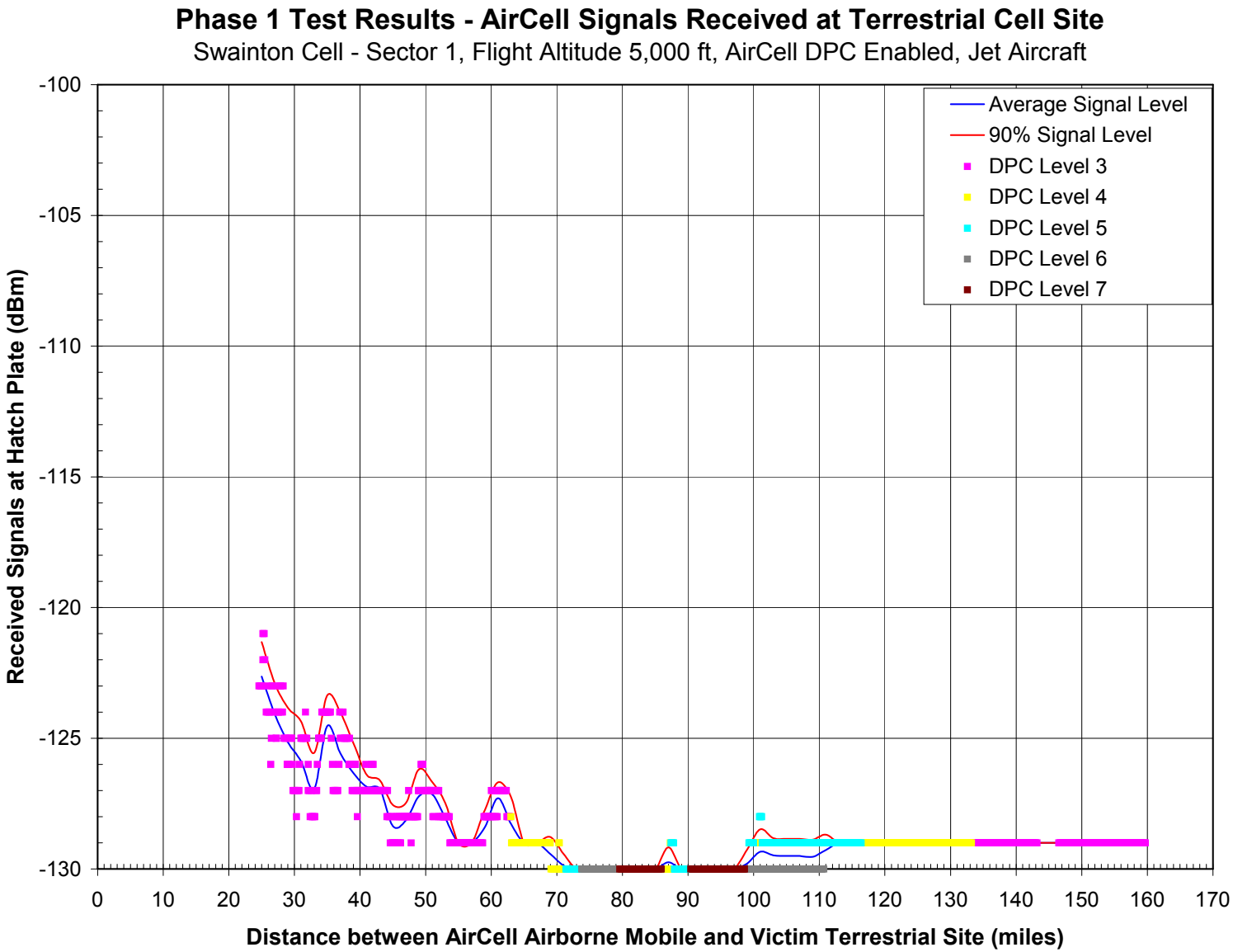


Figure 9.8-G Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 10,000', DPC Enabled

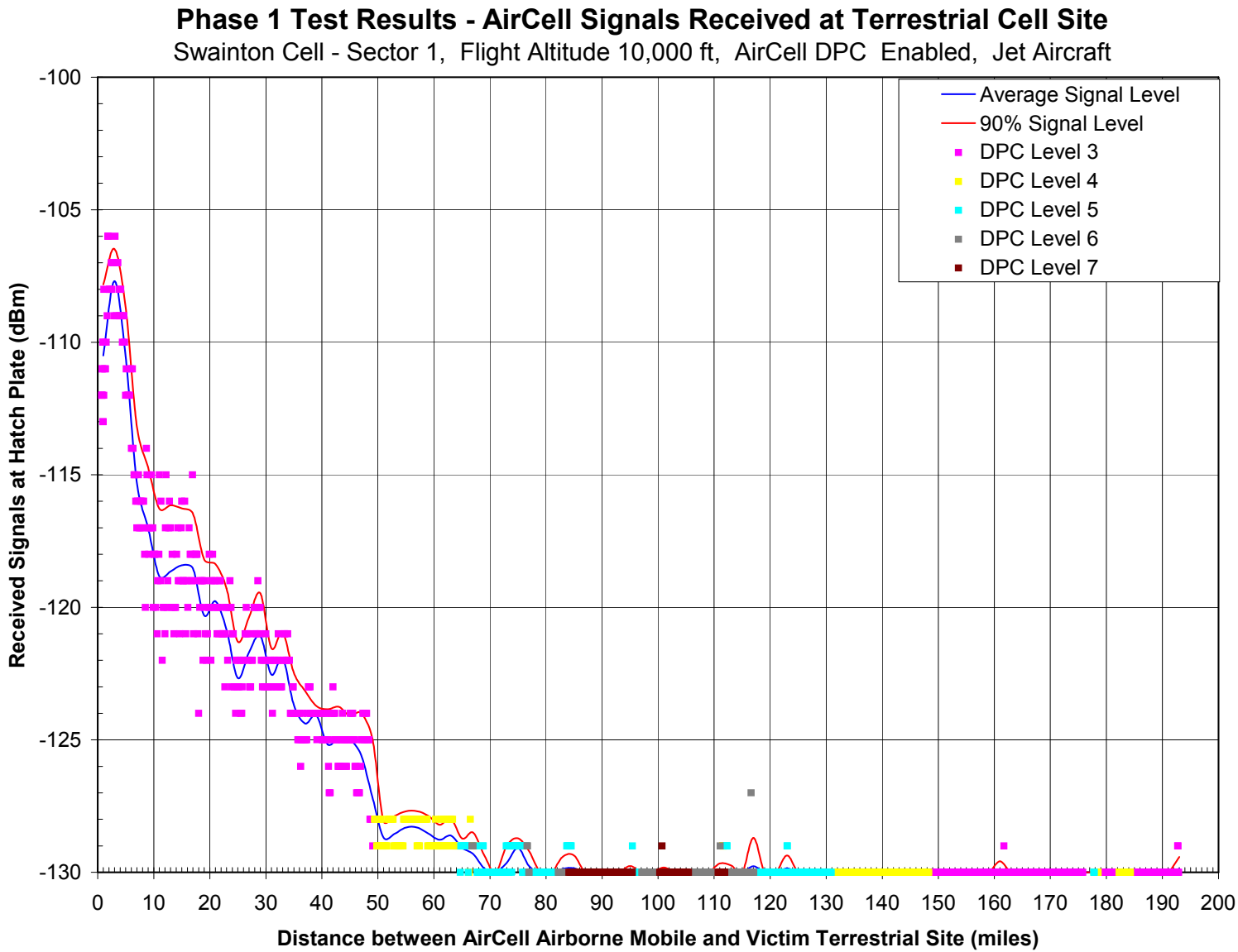


Figure 9.8-H Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 20,000', DPC Enabled

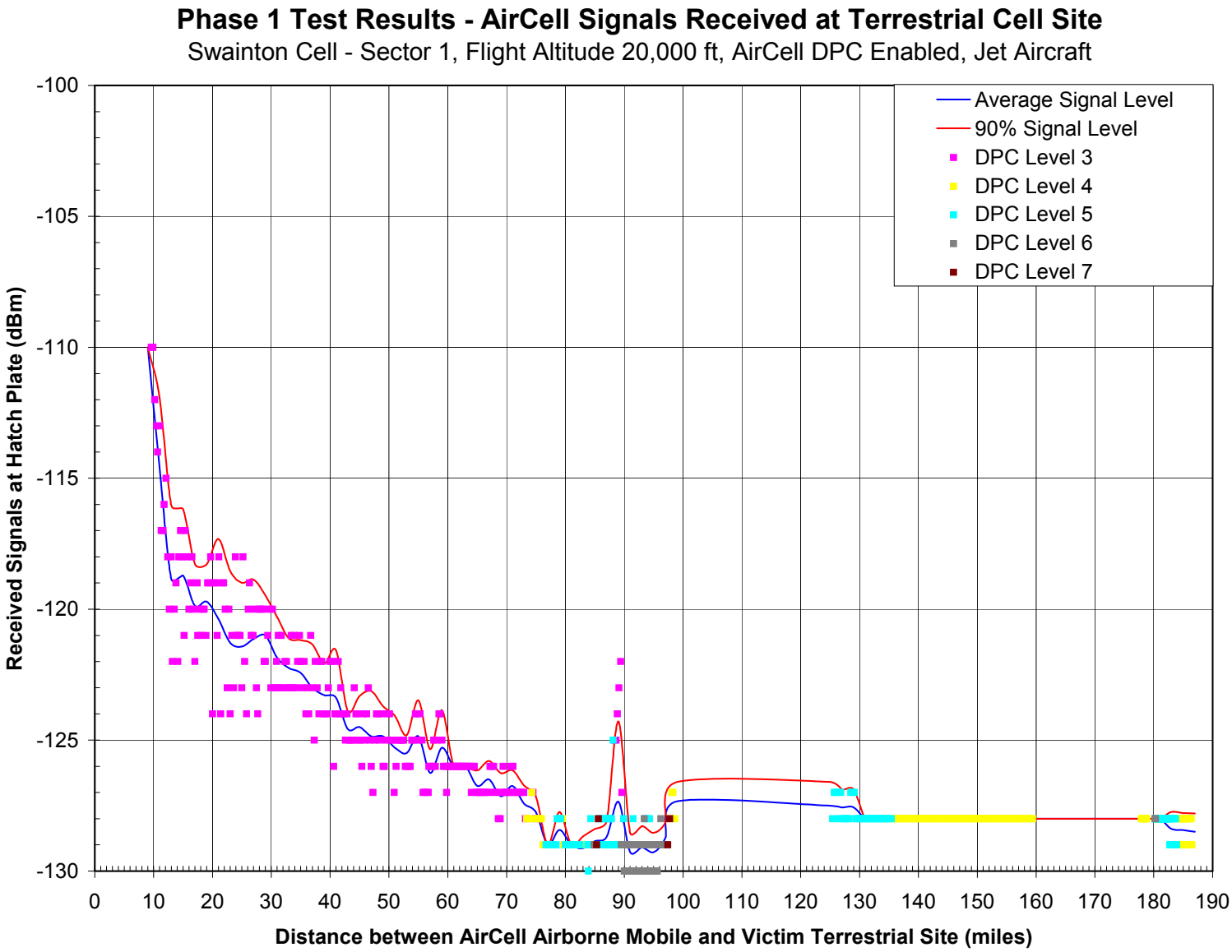


Figure 9.8-I Phase 1 Test Results, RSSI at Terrestrial Site: Swainton Sector 1, Jet Aircraft @ 35,000', DPC Enabled

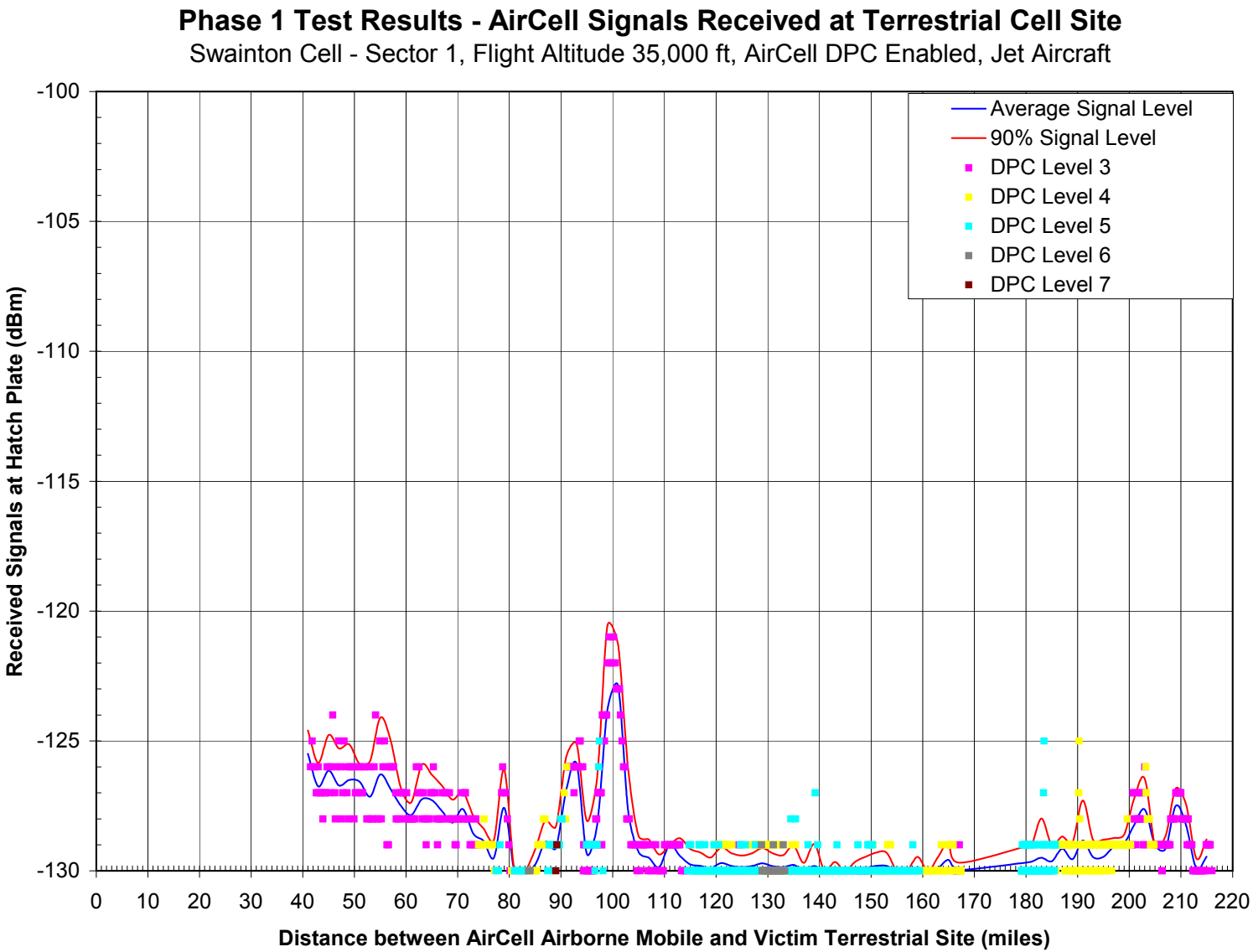


Figure 9.8-J Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Piston Aircraft @ 4,000', DPC Enabled

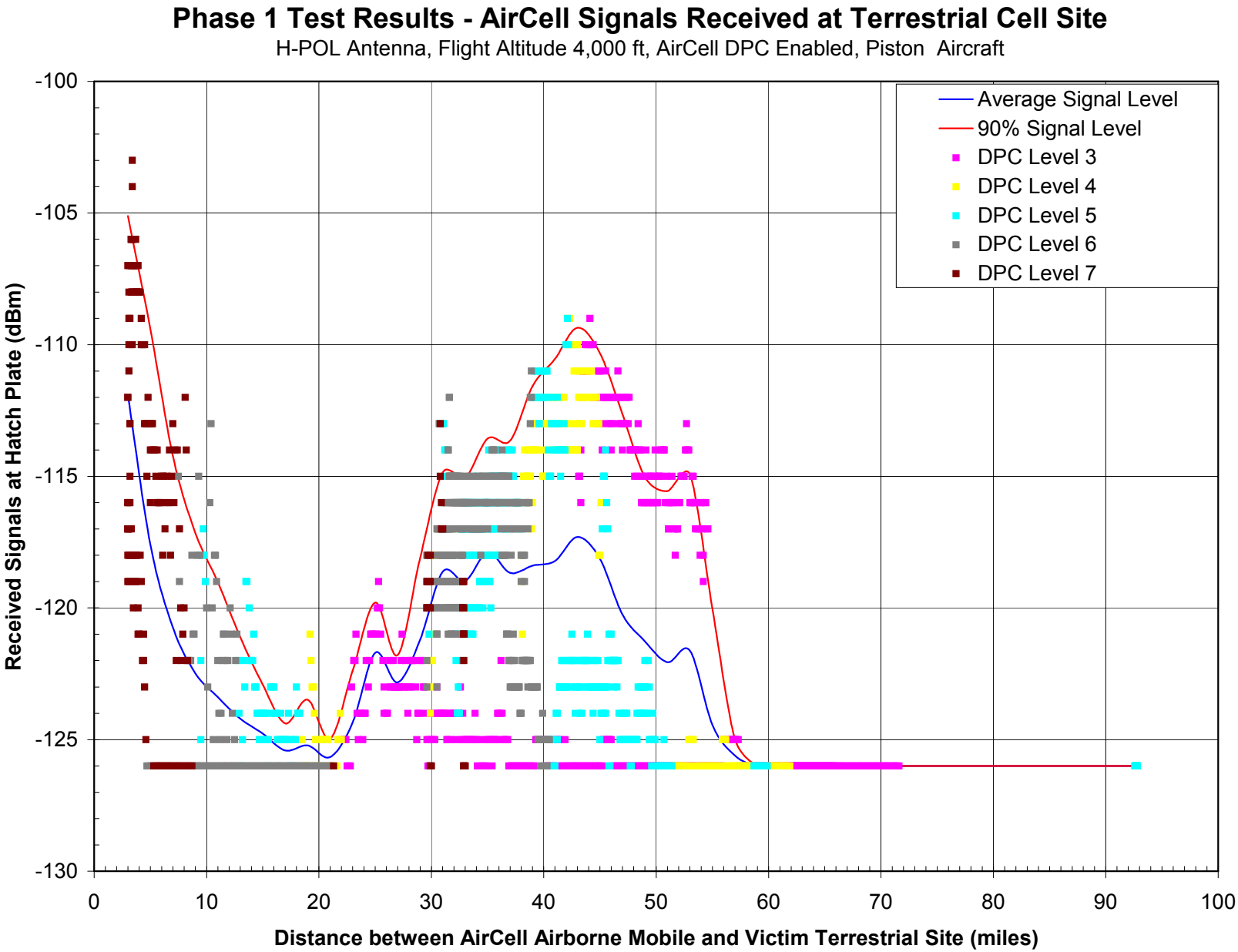


Figure 9.8-K Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Piston Aircraft @ 10,000', DPC Enabled

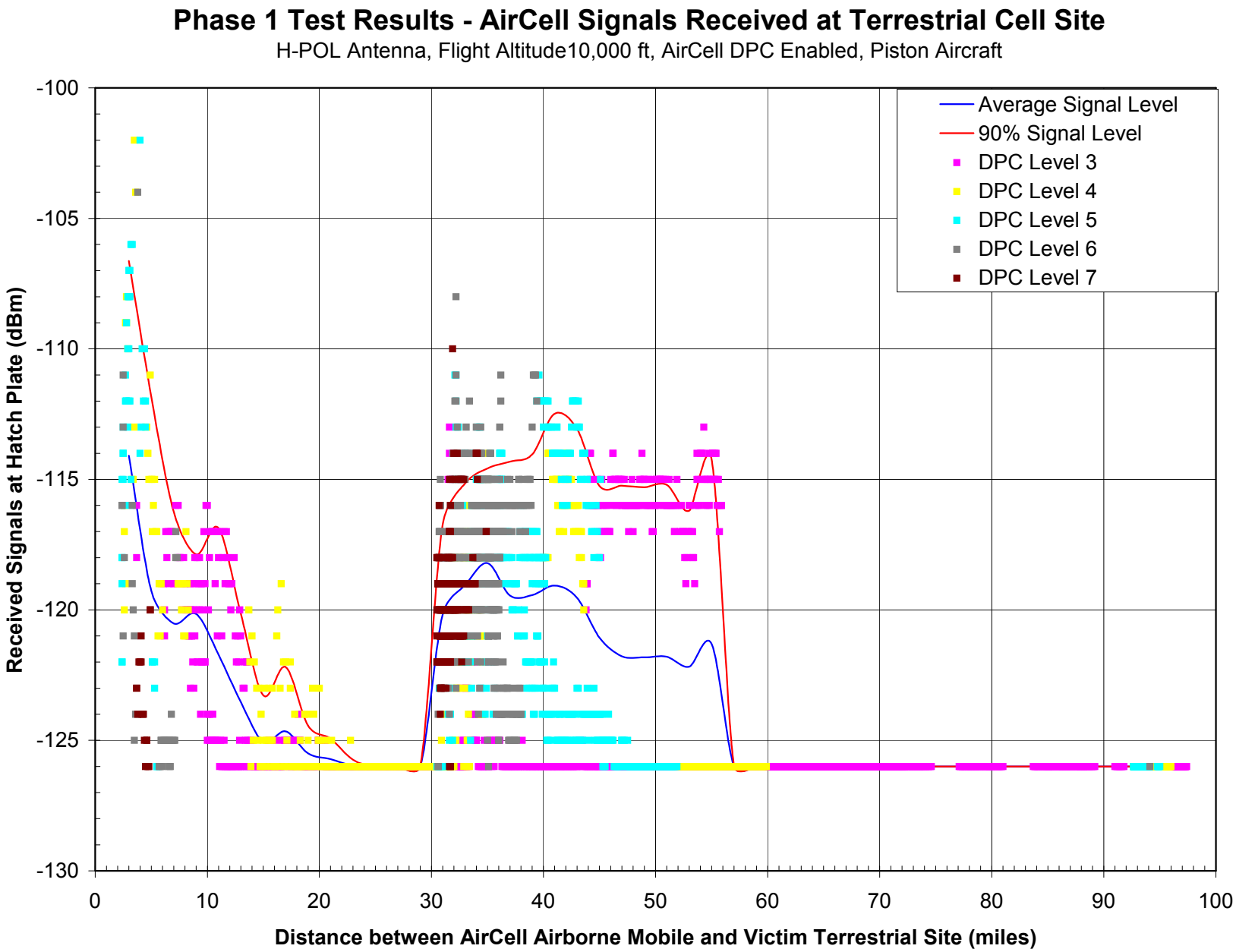


Figure 9.8-L Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 10,000', DPC Enabled

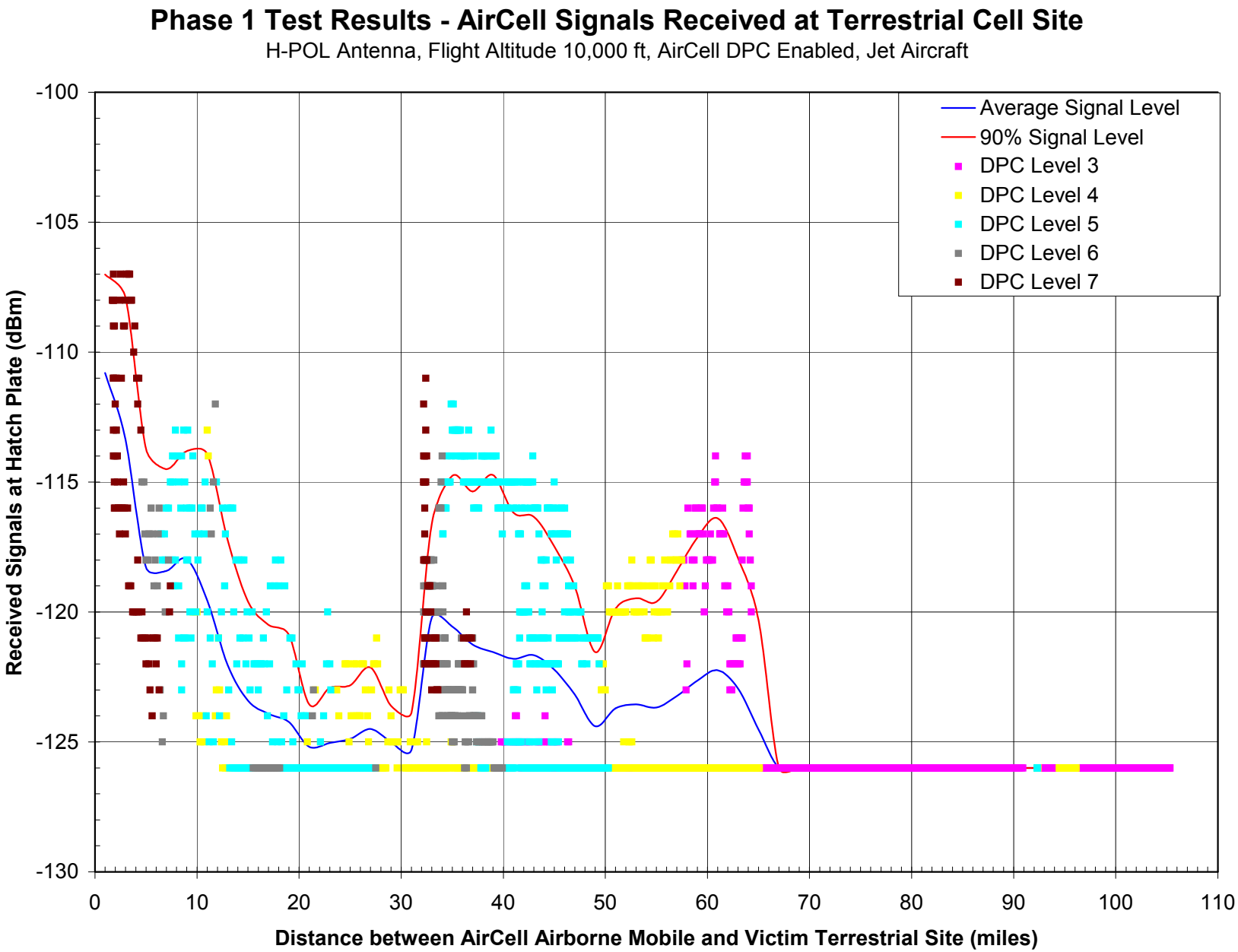


Figure 9.8-M Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 20,000', DPC Enabled

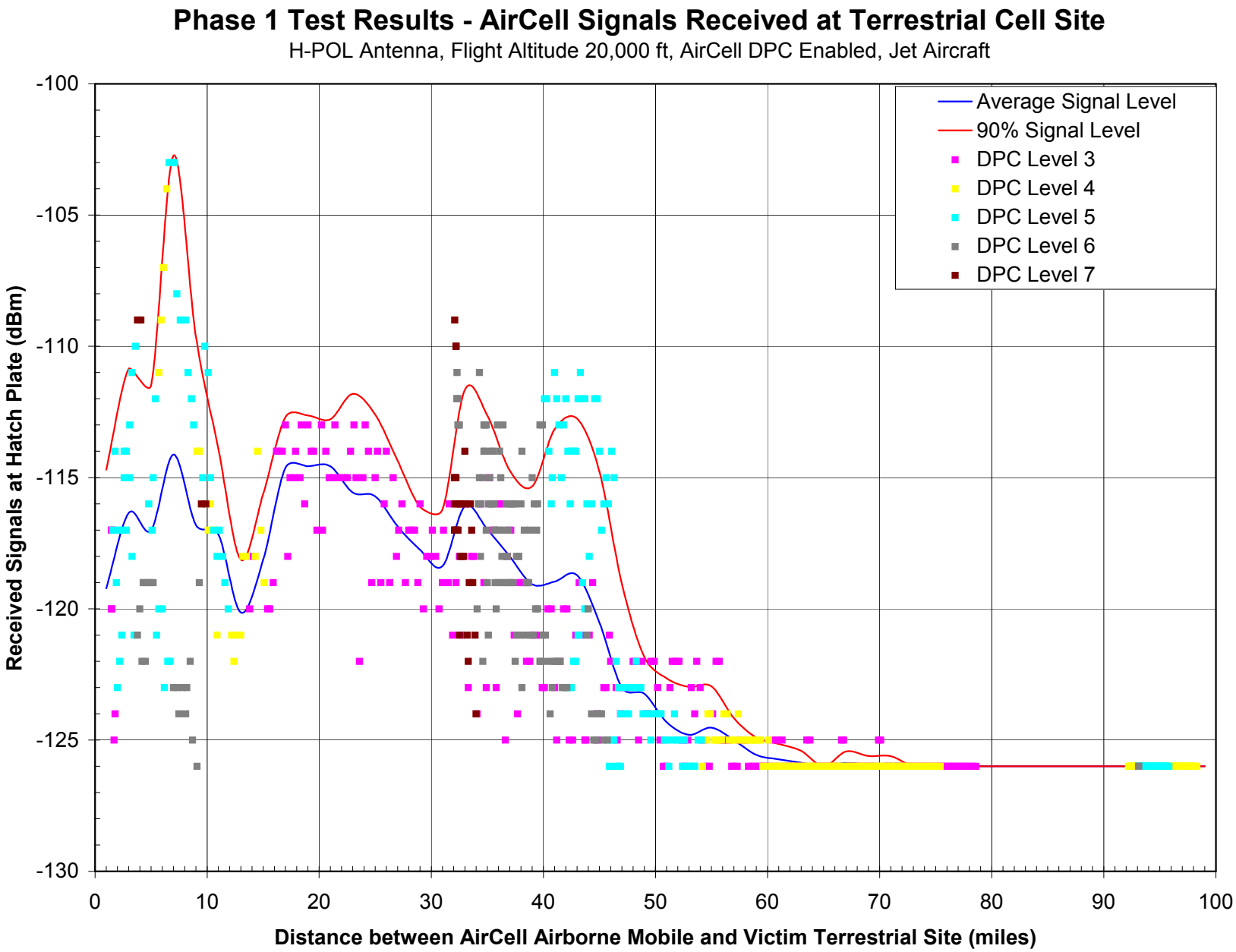


Figure 9.8-N Phase 1 Test Results, RSSI at Terrestrial Site: H-POL Antenna, Jet Aircraft @ 35,000', DPC Enabled

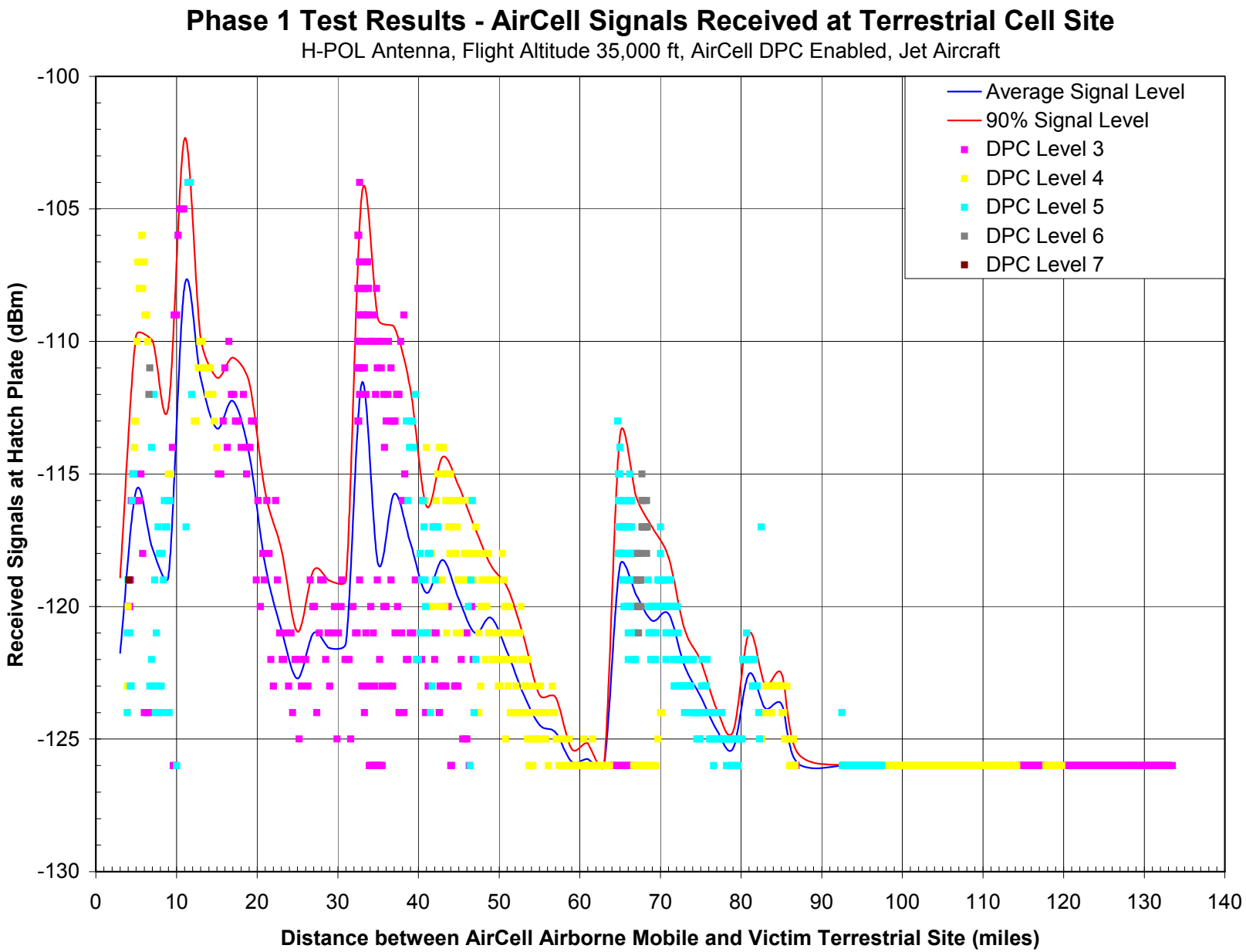


Figure 9.8-O Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Piston Aircraft @ 4,000', DPC Enabled

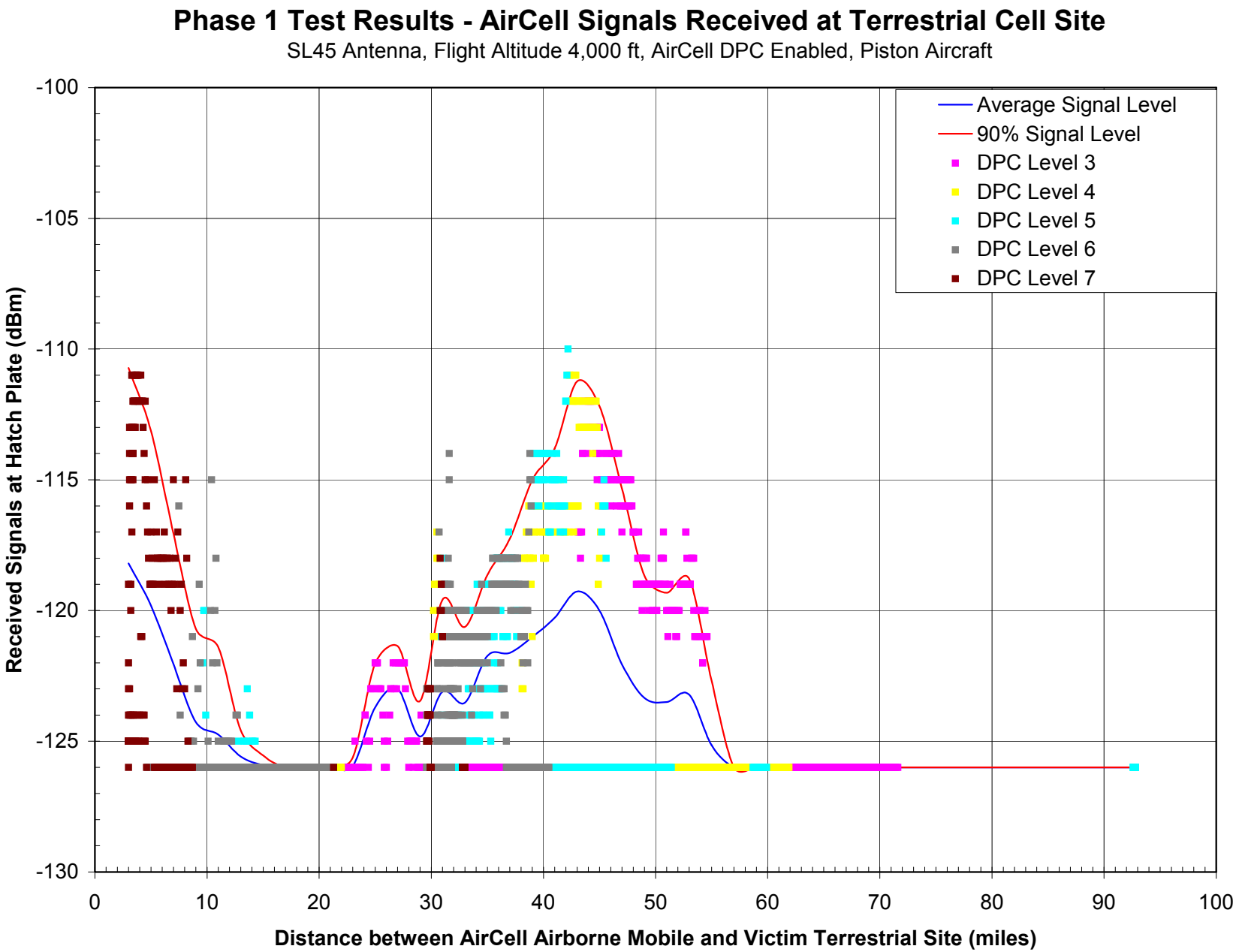


Figure 9.8-P Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Piston Aircraft @ 5,000', DPC Enabled

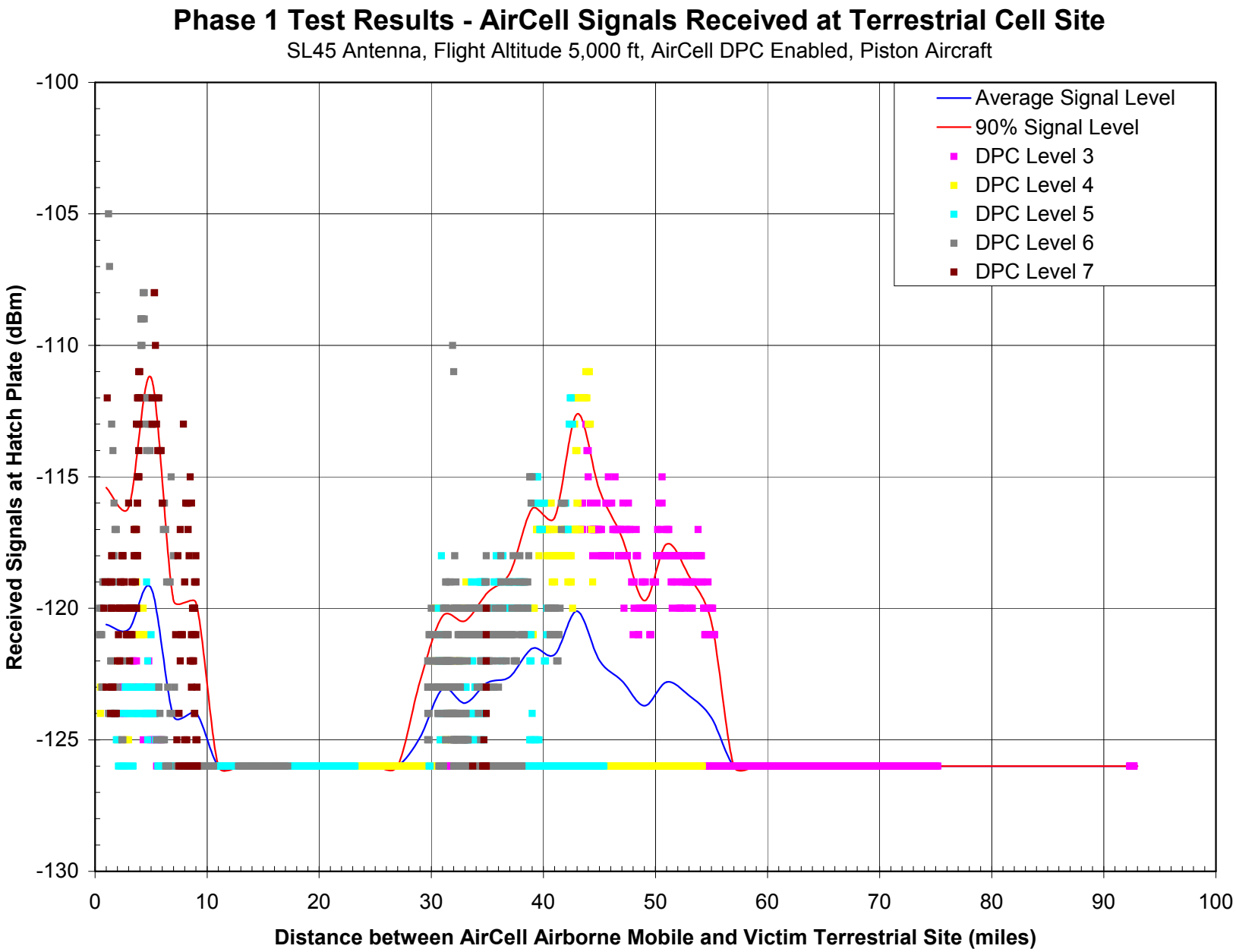


Figure 9.8-Q Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 10,000', DPC Enabled

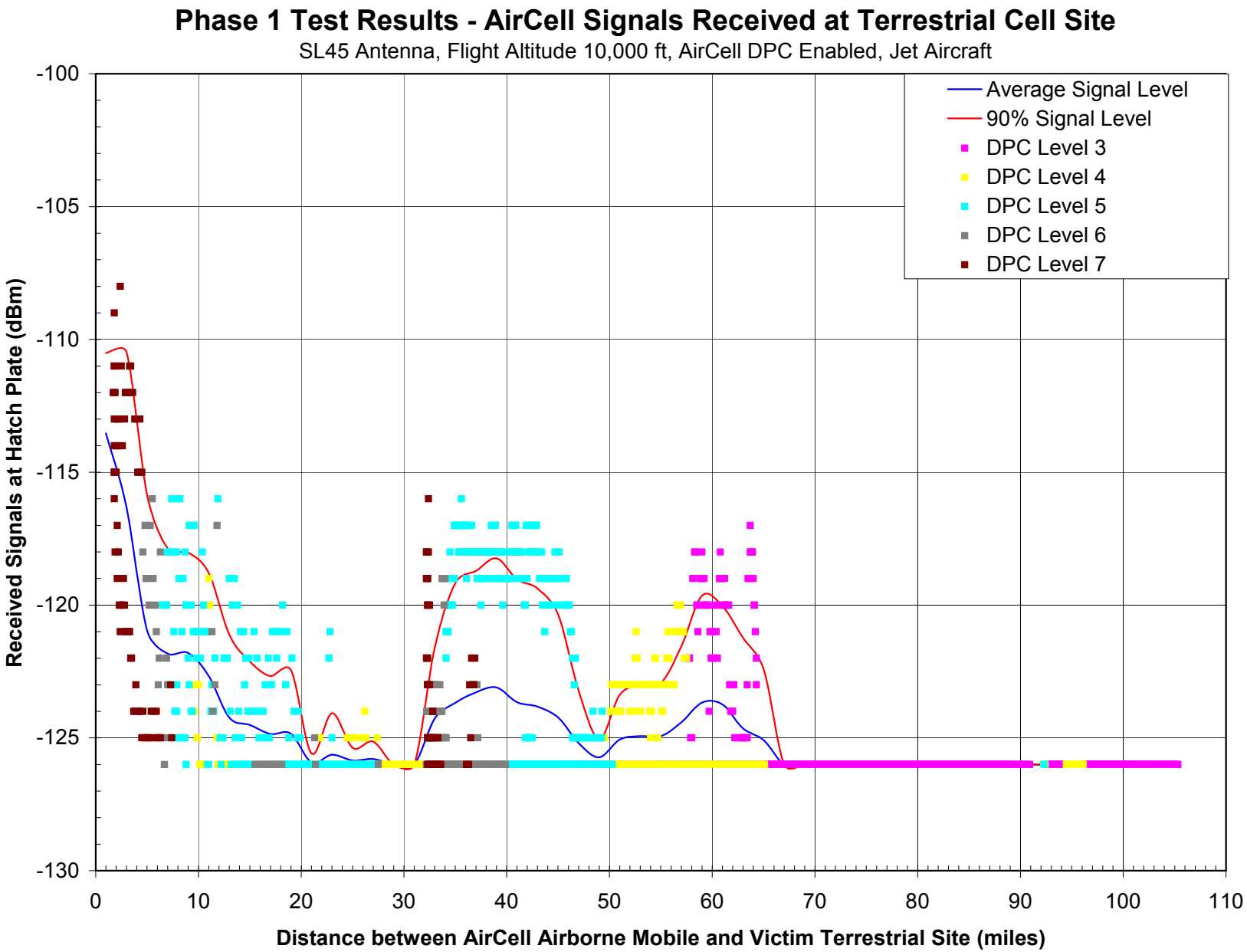


Figure 9.8-R Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 20,000', DPC Enabled

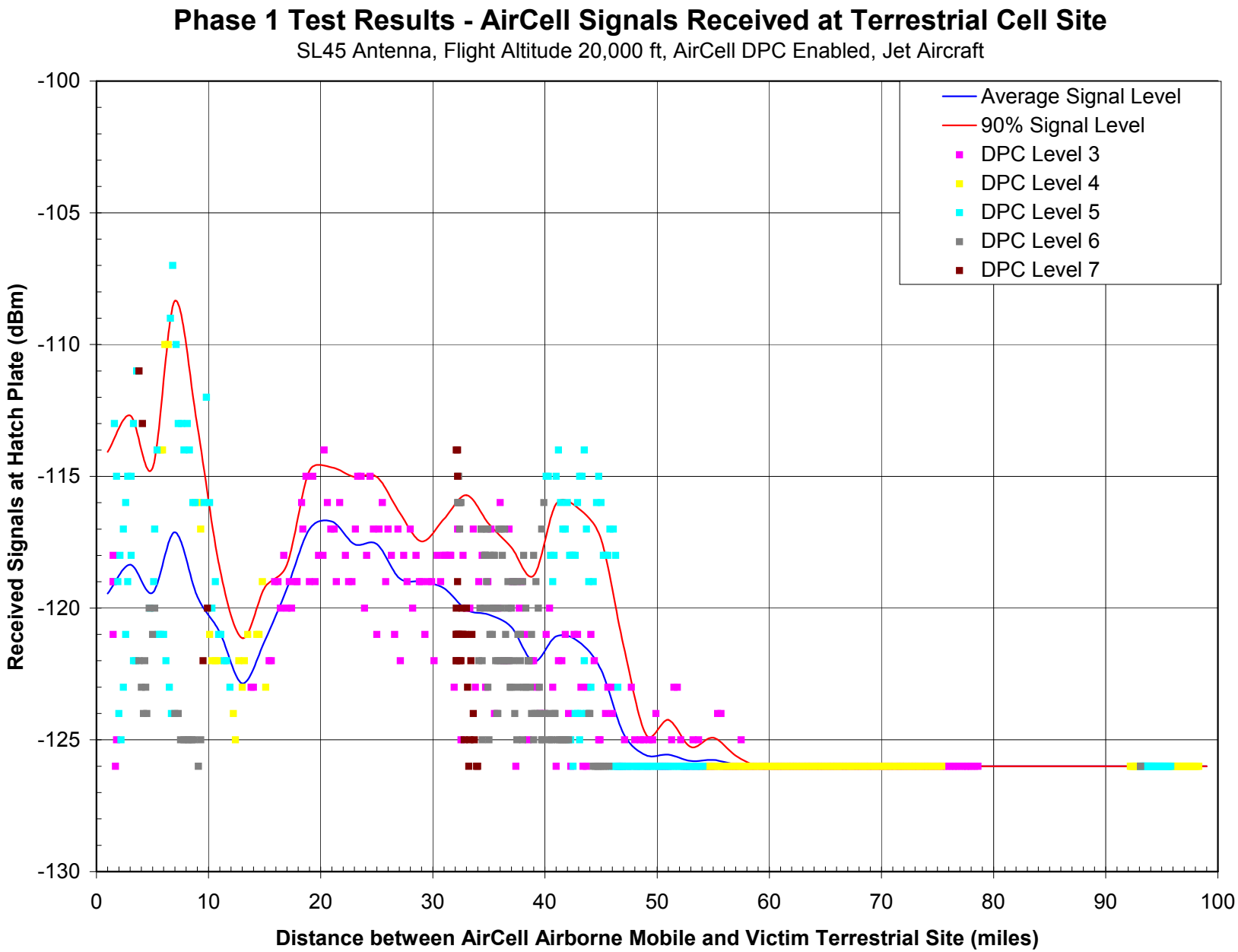


Figure 9.8-S Phase 1 Test Results, RSSI at Terrestrial Site: SL45 Antenna, Jet Aircraft @ 35,000', DPC Enabled

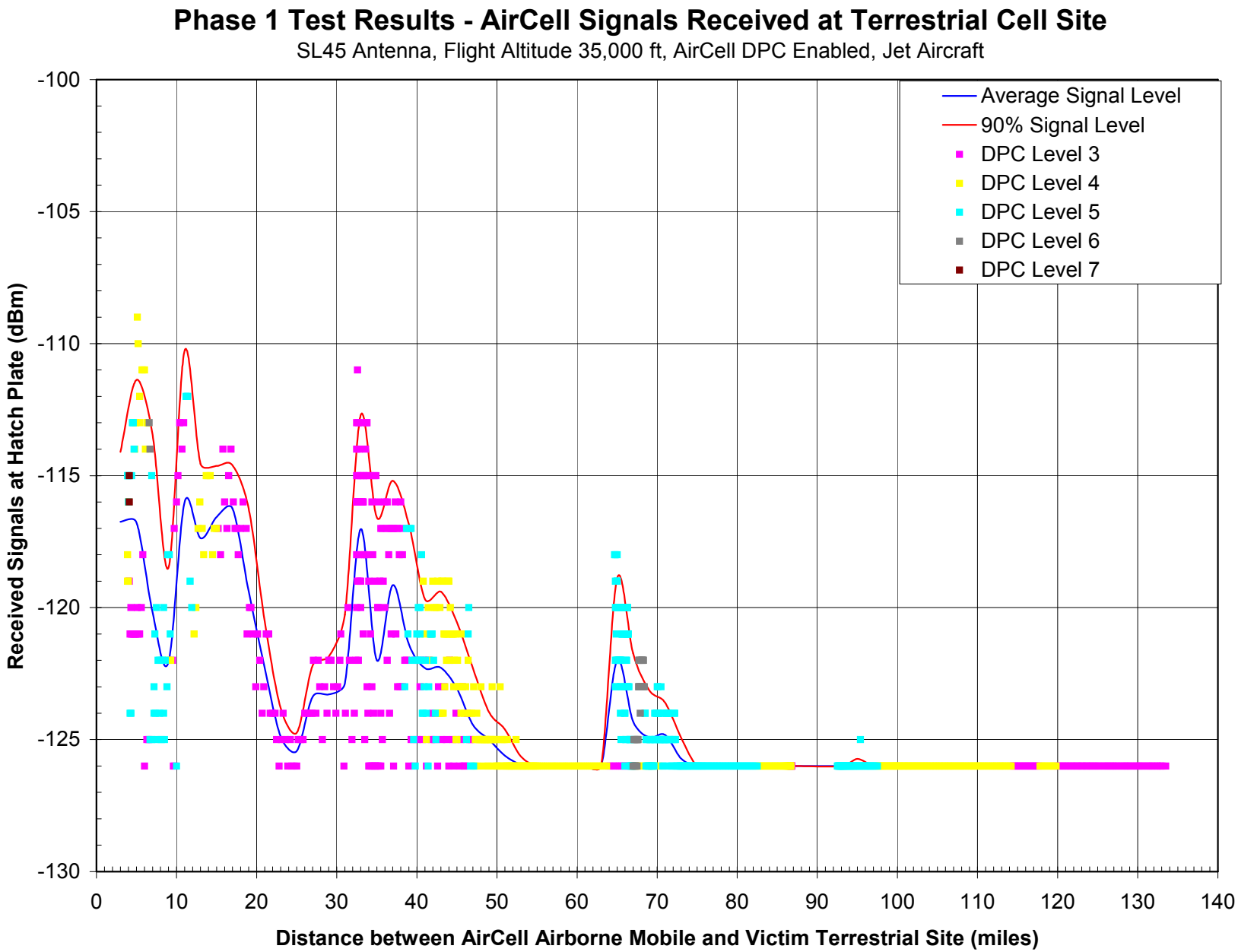


Figure 9.8-T Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Piston Aircraft @ 5,000', DPC Enabled

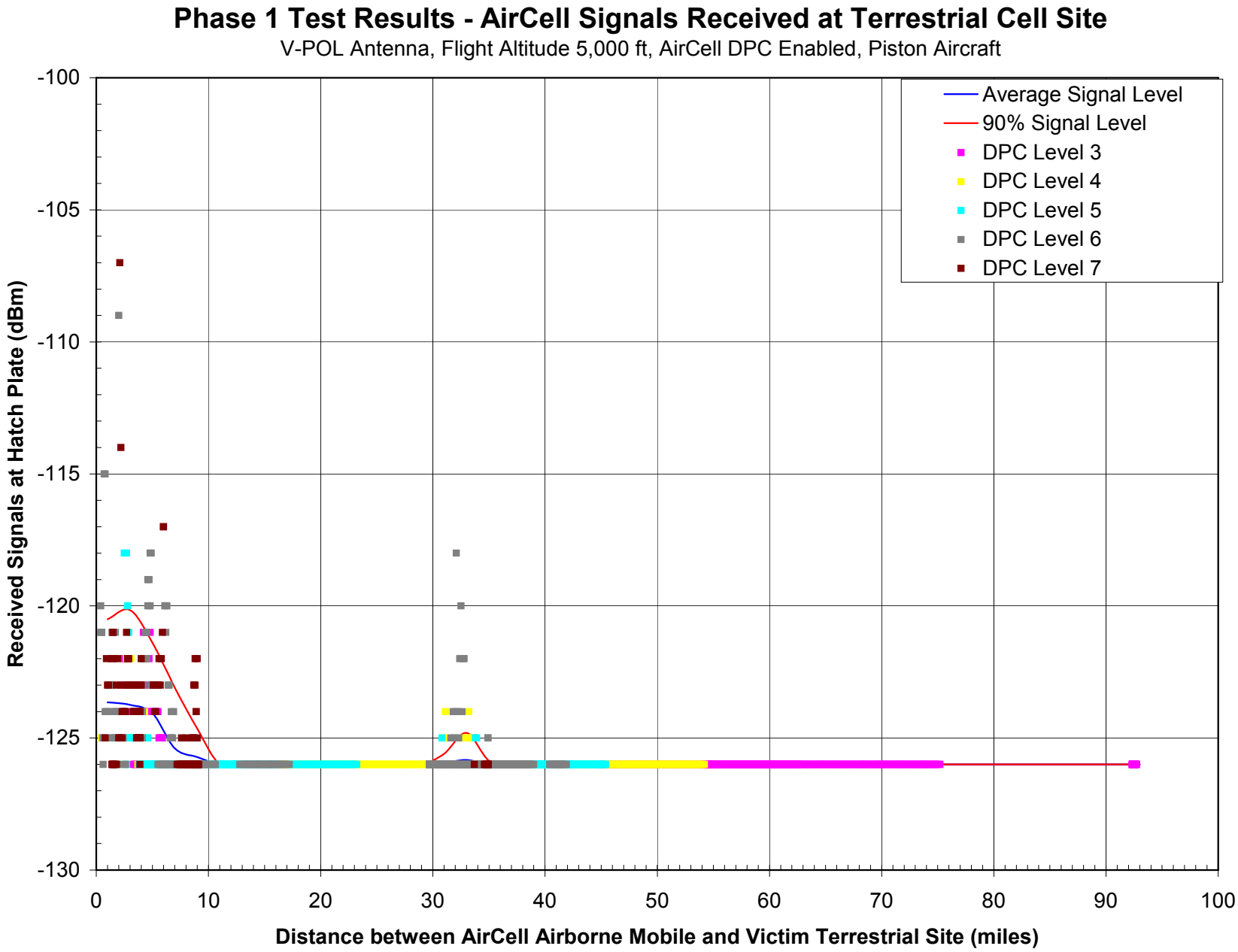


Figure 9.8-U Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Piston Aircraft @ 10,000', DPC Enabled

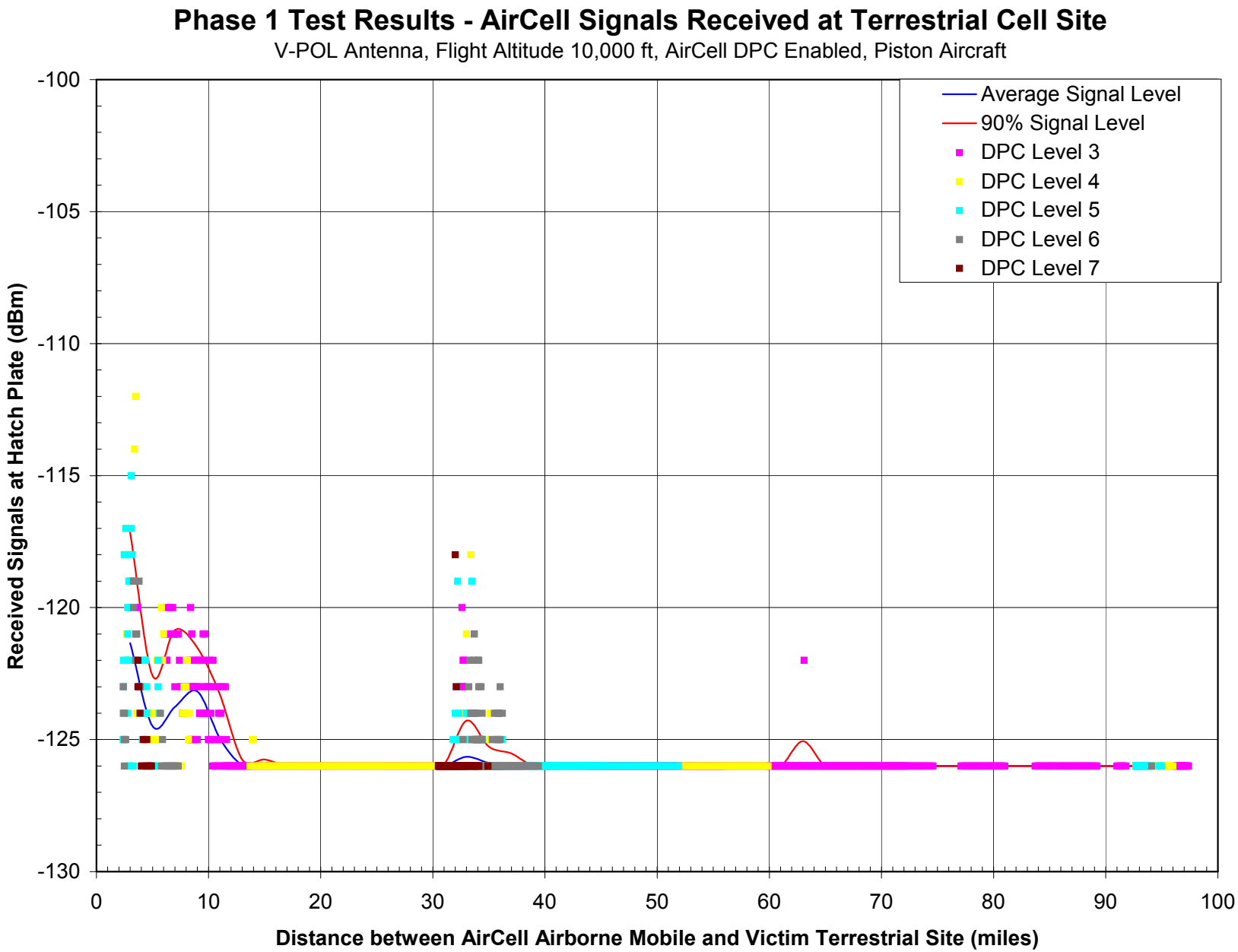


Figure 9.8-V Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 10,000', DPC Enabled

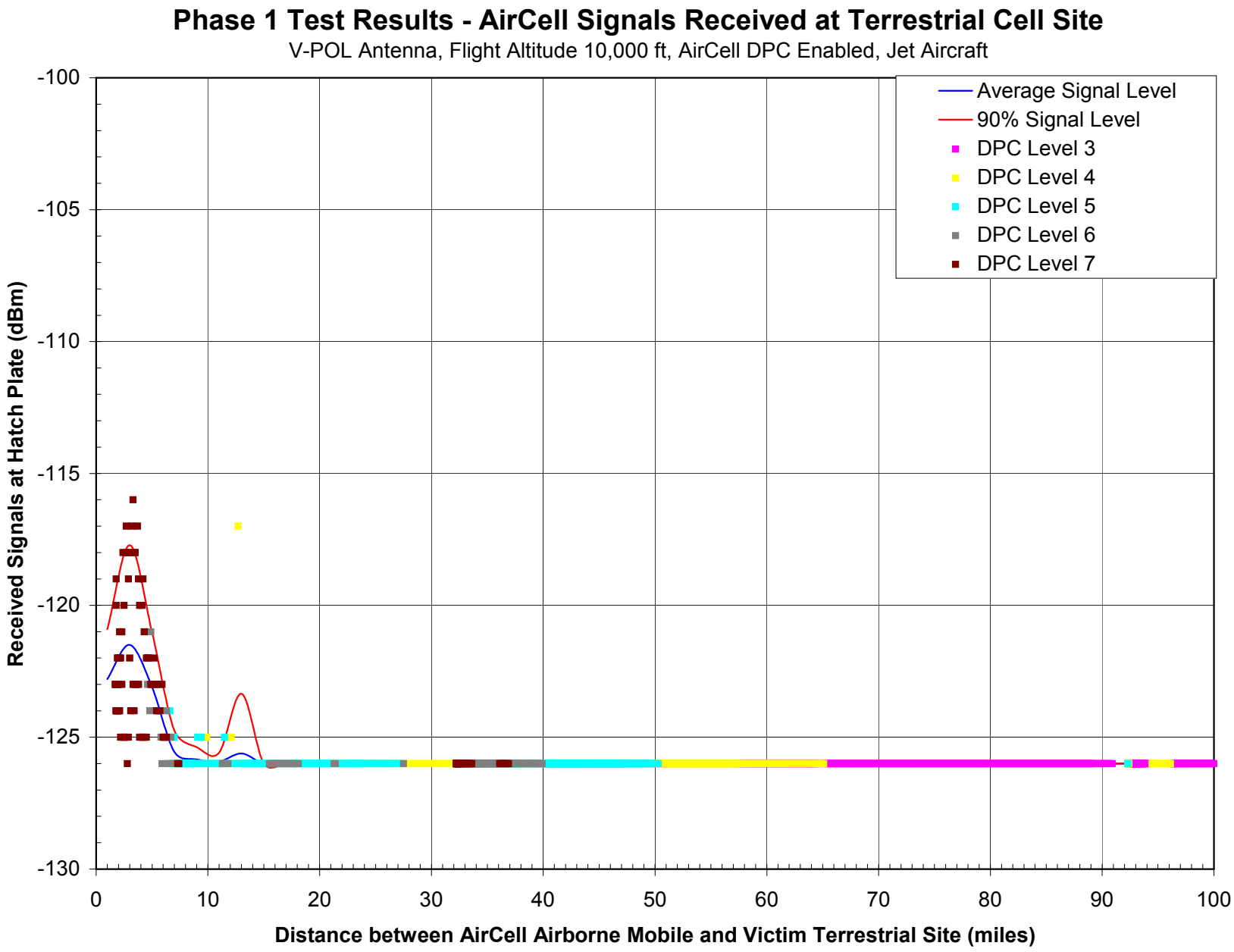


Figure 9.8-W Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 20,000', DPC Enabled

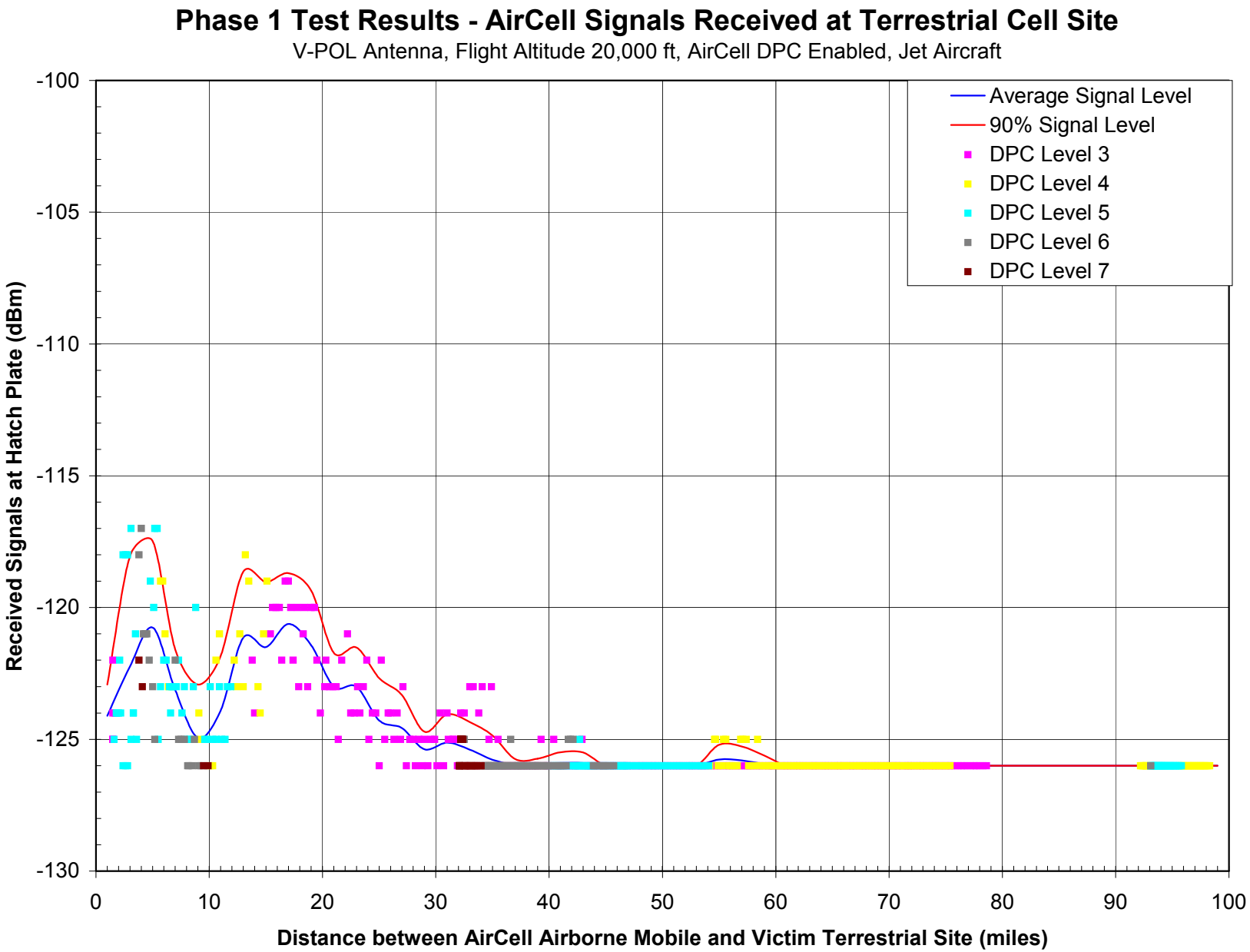


Figure 9.8-X Phase 1 Test Results, RSSI at Terrestrial Site: V-POL Antenna, Jet Aircraft @ 35,000', DPC Enabled

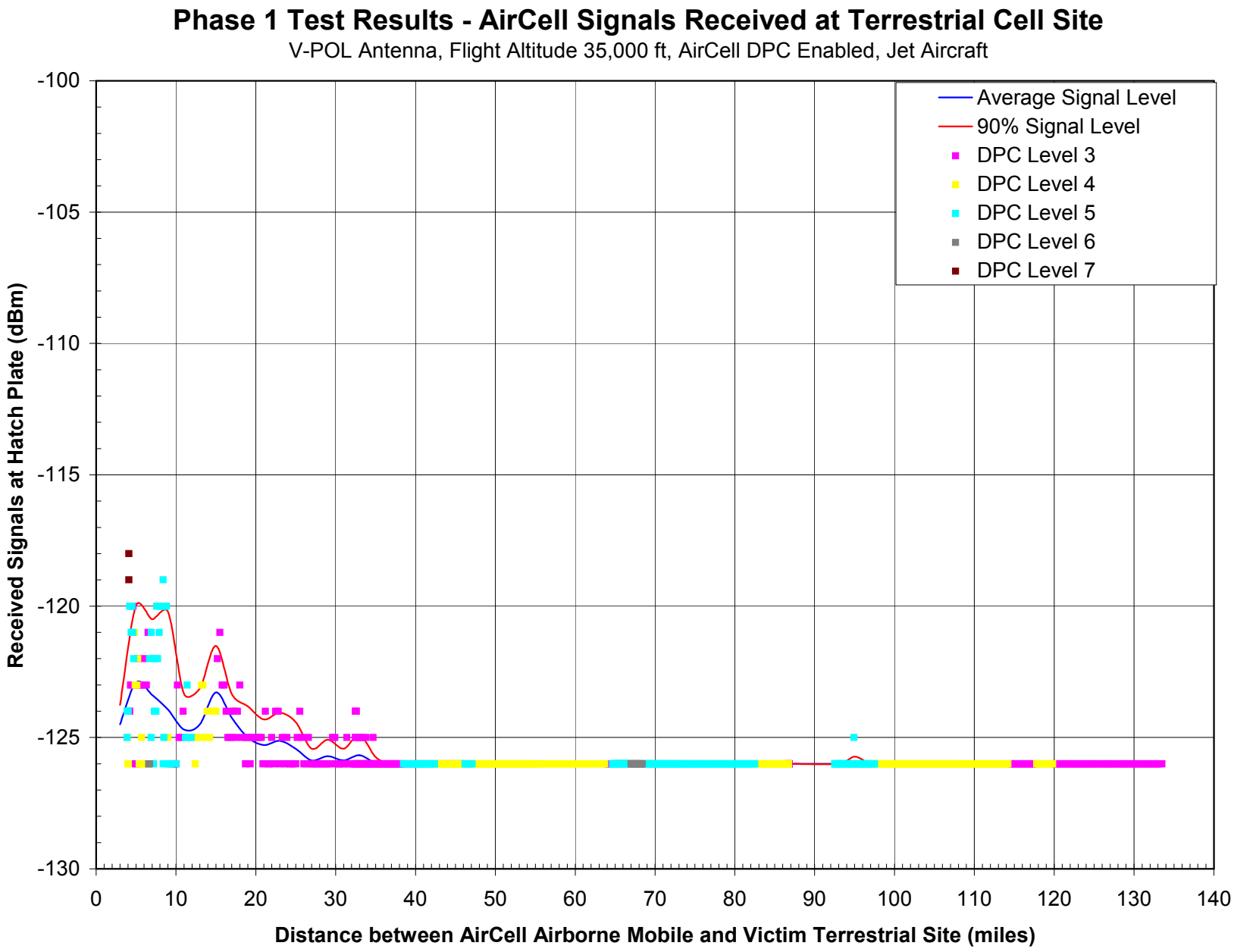


Figure 9.8-Y Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Piston Aircraft @ 5,000', DPC Enabled

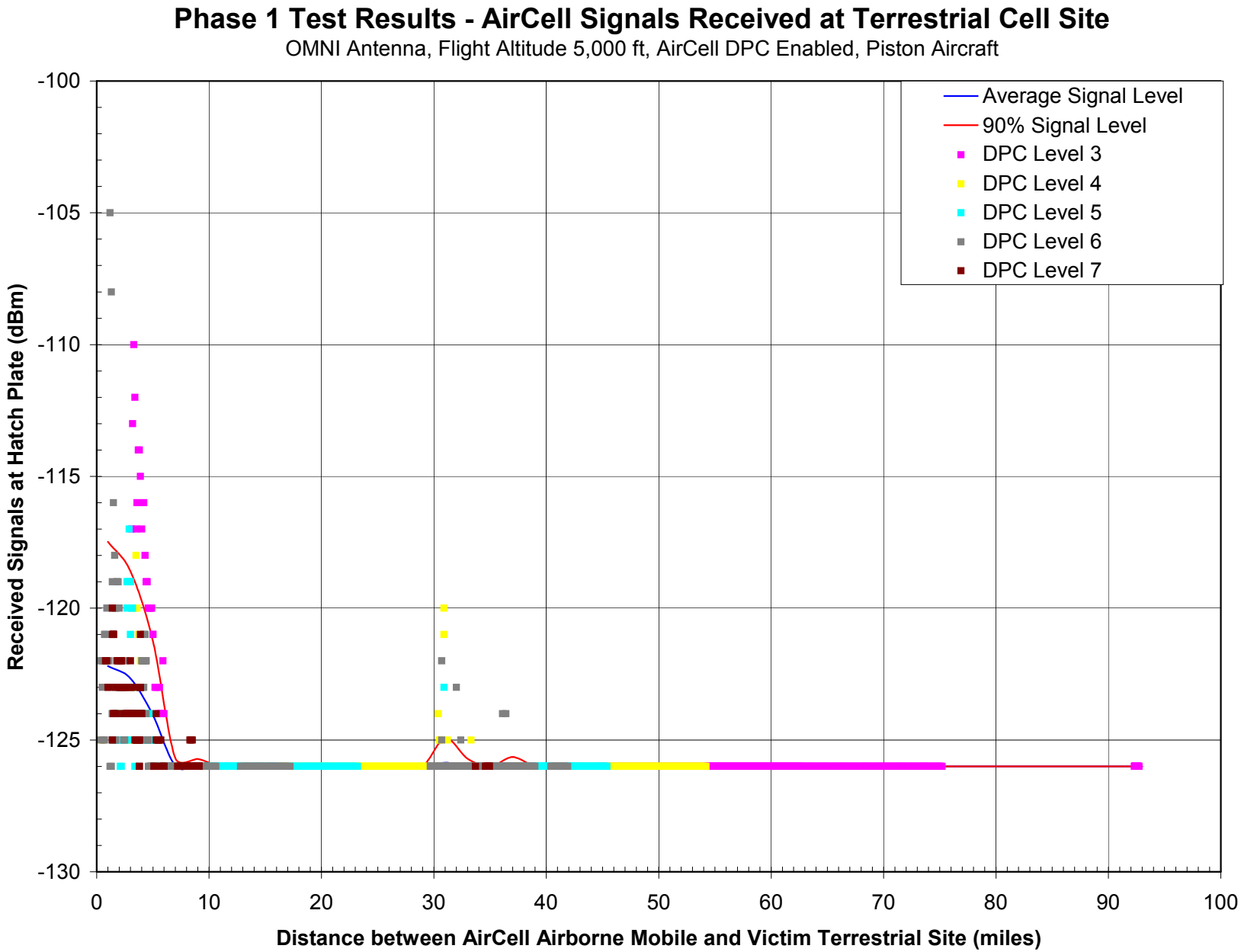


Figure 9.8-Z Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Piston Aircraft @ 10,000', DPC Enabled

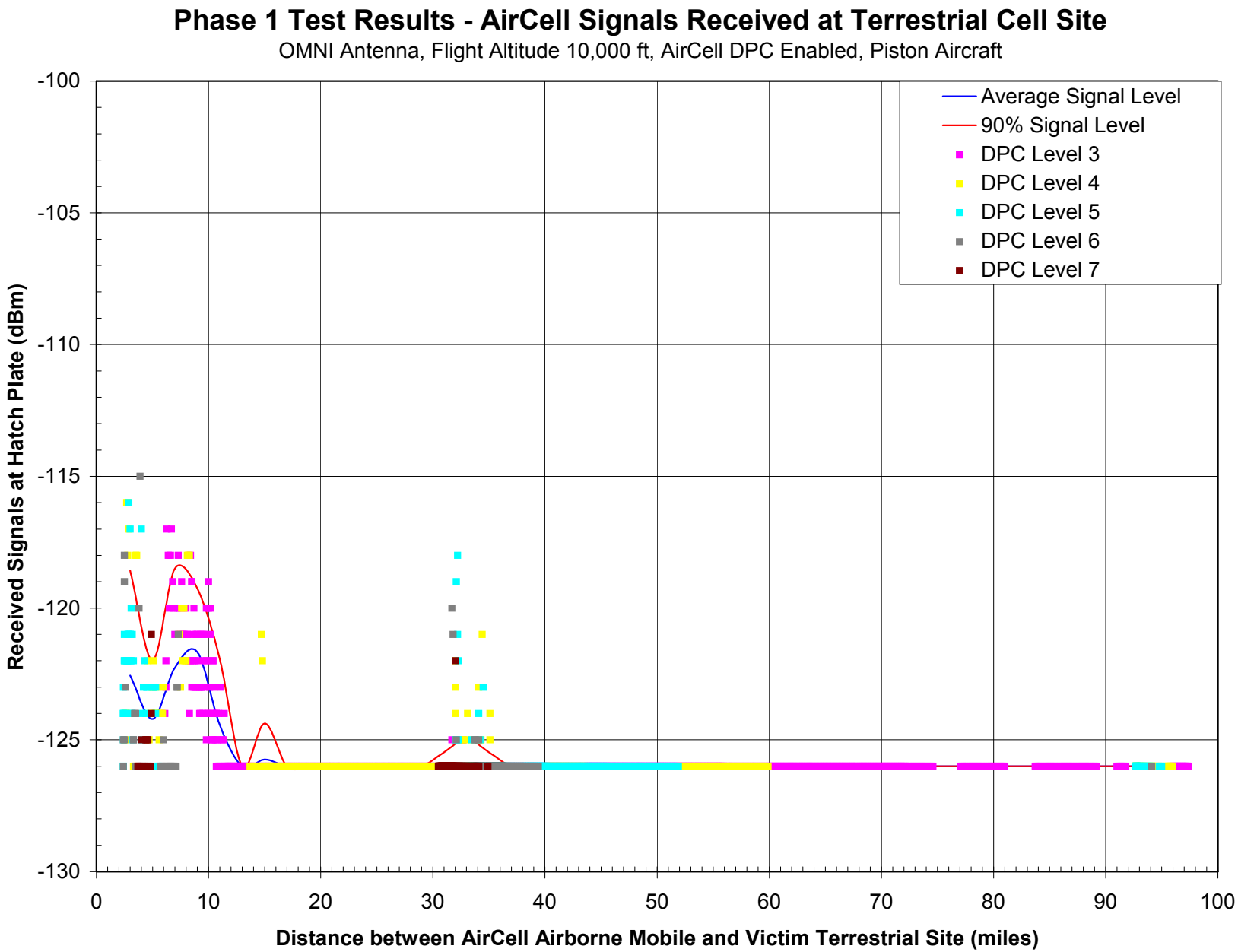


Figure 9.8-AA Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 10,000', DPC Enabled

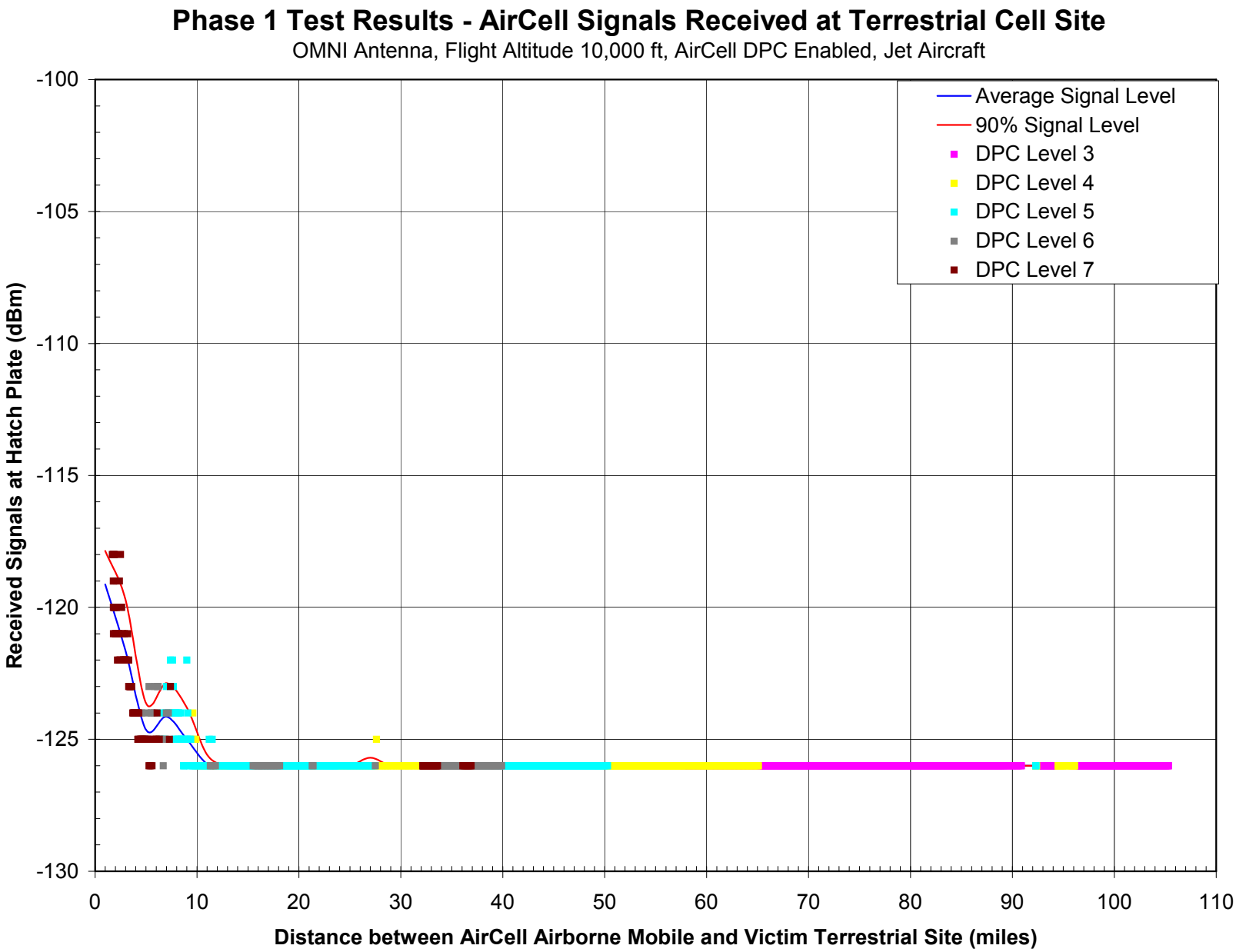


Figure 9.8-BB Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 20,000', DPC Enabled

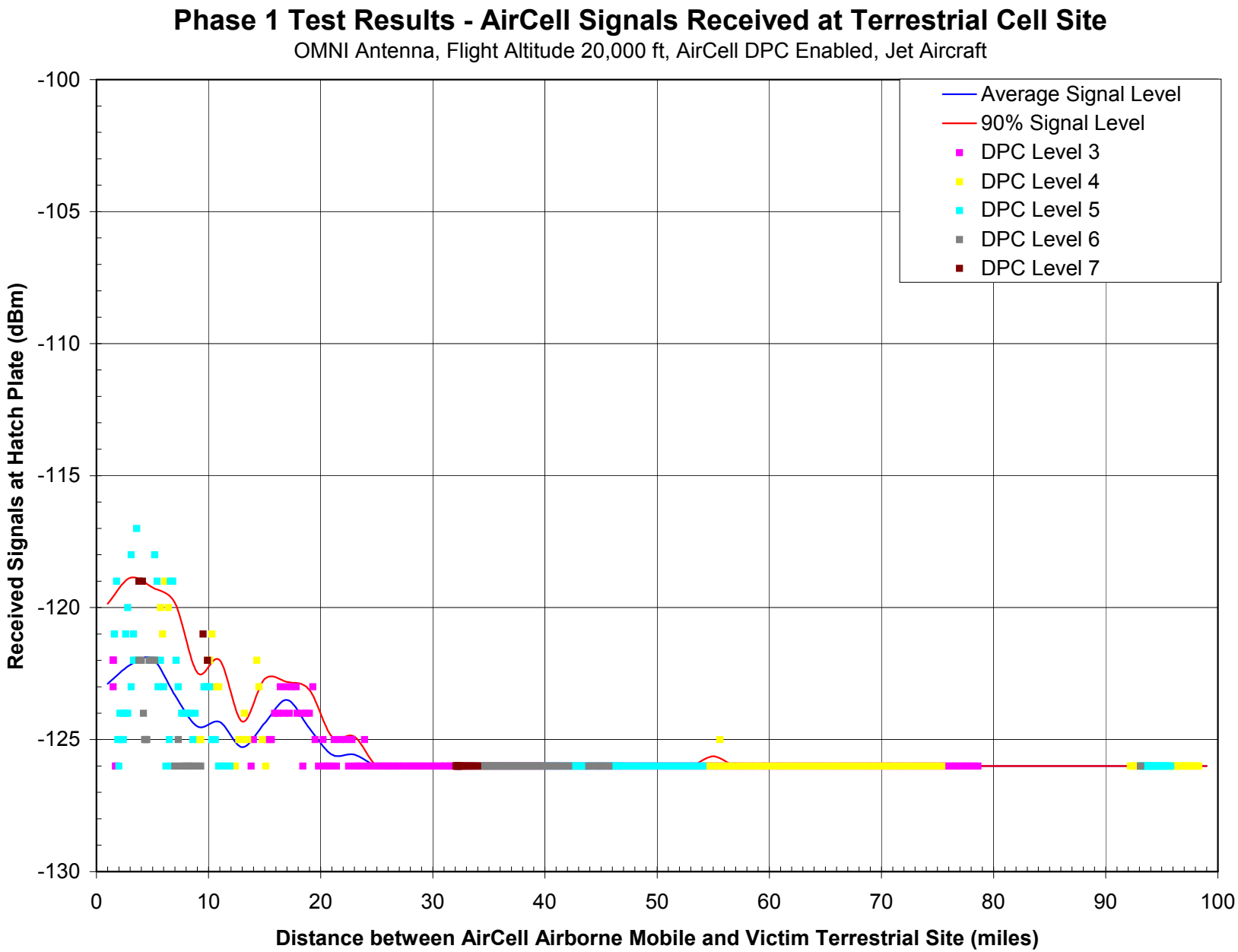
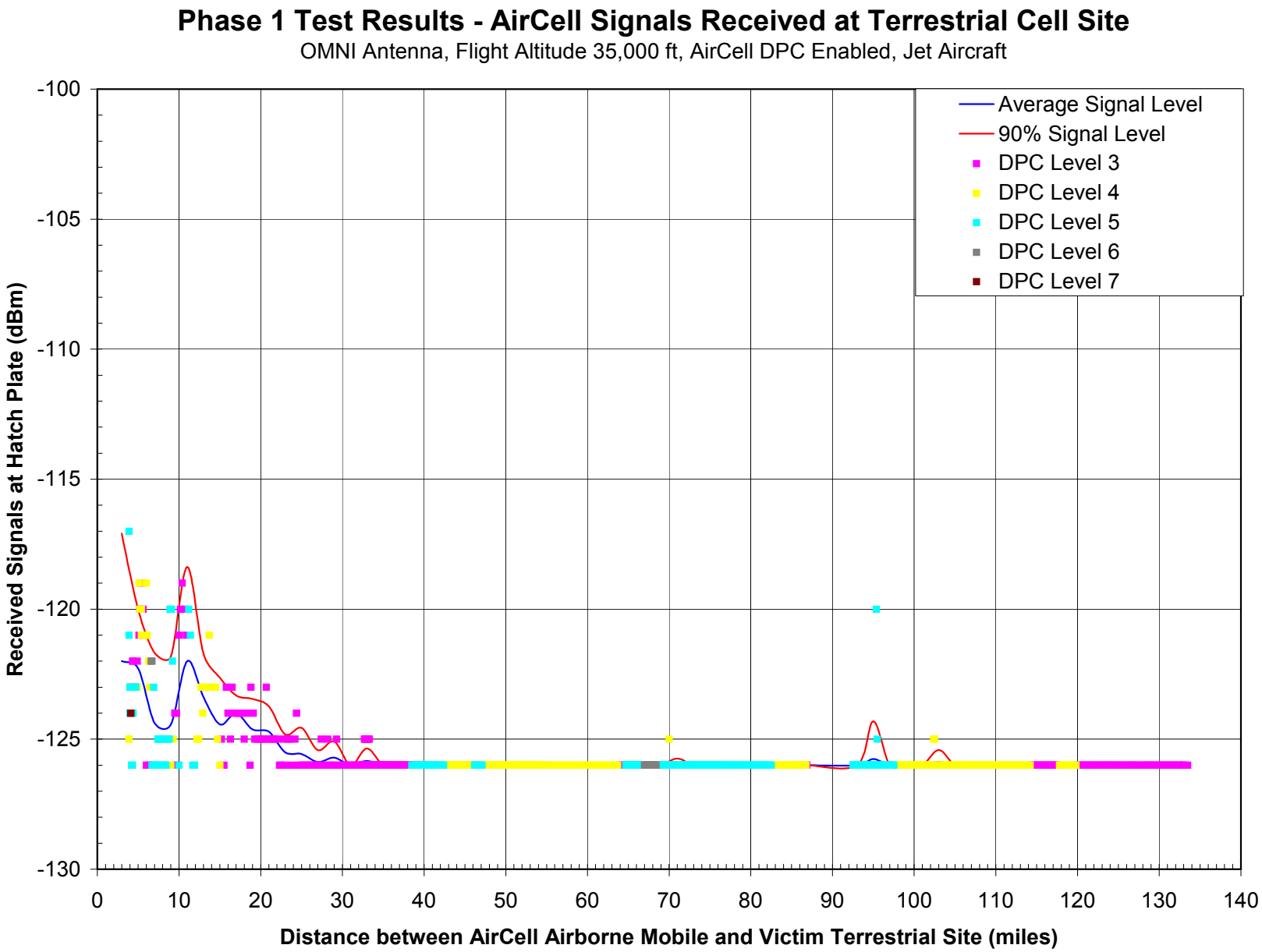


Figure 9.8-CC Phase 1 Test Results, RSSI at Terrestrial Site: OMNI Antenna, Jet Aircraft @ 35,000', DPC Enabled



9.9 Phase 2 Test Results – Terrestrial Cell Site Noise Floor & Customer Signal Levels

The following two pages contain the noise floor measurements of the terrestrial AMPS and TDMA suburban test cell sites, used in Phase 2 tests under the AirCell Compatibility Test Plan. In addition, this section contains two graphs of the terrestrial AMPS & TDMA received signal levels from typical customers for a 24-hour period, and the drive route used in Phase 2 tests. The terrestrial cell site's operating noise floor level and customer signal levels were measured over a 24-hour period, as recorded by the Lucent Power Level Measurement (PLM) function. The PLM function records the noise floor measurements on an idle radio channel with the cell site receiver, and the customer signal measurements with an active voice channel, in-use by a customer. The terrestrial cell site's received signal levels for the drive route used in Phase 2 tests, were measured for the base line test with no injected interference, by the Lucent RF Call Trace function. The RF Call Trace function records the signal levels of the desired mobile on the voice channel in-use, with the cell site receiver. The RF Call Trace measurements were processed and converted to similar bin resolution & formats used by PLM data for comparisons.

The Lucent PLM measurements are collected into "bins" that are 3.125 dB in width. The reference value of each bin is the center value of the bin, and is represented by the x-axis value on the graphs. With this bin size and reference, each bin includes measured data that is 1.562 dB above and below the reference value. For example, the measured data contained within the 1st bin, at the –128.6 dBm level, includes data that is greater than –130.2 dBm and less than –127.0 dBm.

The PLM graphs contain the Individual Probability and Cumulative Probability distributions. The Individual Probability is the probability of occurrence of an individual bin or data point. The reference value of this data is represented by the average value of the bin, which is the center of the bin. The Cumulative Probability is the probability of occurrence of the individual bin, plus the accumulation of all prior bins starting from the minimum value on the x-axis. The reference value of this data is represented by the upper value of the bin, since all the data within the bin is included. The upper value of the bin is 1.562 dB above the center value of the bin.

The median operating noise floor level for the terrestrial AMPS and TDMA cell sites used in Phase 2 tests, is depicted as –127 dBm, in the PLM graphs on the following two pages. The median noise floor level is indicated with the Cumulative Probability data series on the PLM graphs, and is referenced to the upper value of the PLM bin. The upper value of these bins are equal to –127 dBm, which is derived from the center bin value of –128.6 dBm, plus half the bin width, or 1.562 dB.

In addition, other noise floor measurements were conducted at eighteen other terrestrial AMPS cell sites, within the market types: rural, suburban, urban, and dense urban. In these results, thirteen of the eighteen cell sites exhibited similar results, with median

noise floor measurements at the –127 dBm level. These results are provided in the AMPS Noise Floor Study, in Appendix Section 9.17.

In the graphs containing the Terrestrial Customer and Drive Route RSSI Levels, it is observed that the drive route signal levels closely match and represent the customer signal levels for the suburban terrestrial test cell site used in Phase 2 tests.[59] In addition, it is observed that terrestrial customers are served at the signal level of –100 dBm and below, over a substantial period of time. For the TDMA terrestrial system, this represents approximately 60% of the cellular traffic, and for the AMPS terrestrial system it represents approximately 45% of the cellular traffic. In addition, with an operating noise floor of –127 dBm for the terrestrial test site, signals received at –110 dBm and above will achieve the required C/I performance threshold for "toll quality" telephone calls.

[59] However, it is also observed in the graphs, at the lowest received signal levels for the terrestrial test sites, the drive route signal levels do not match the lowest customer signal levels. The lowest terrestrial customer signal levels are assumed to be used in-buildings with substantial building penetration losses and are not modeled in Phase 2 tests.

Figure 9.9-A Phase 2 Test Results: AMPS Terrestrial Cell Site Noise Floor Measurements

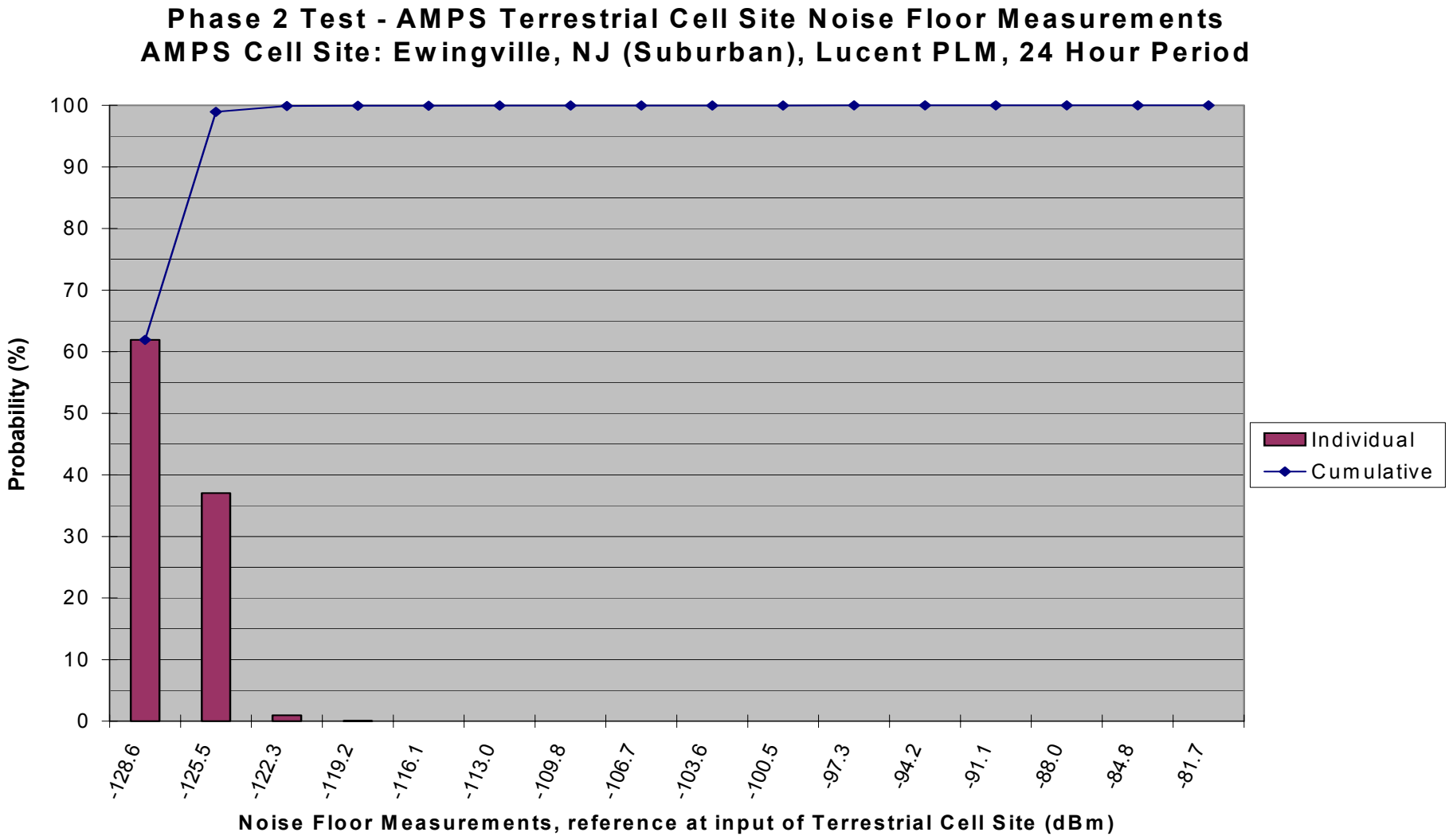


Figure 9.9-B Phase 2 Test Results: TDMA Terrestrial Cell Site Noise Floor Measurements

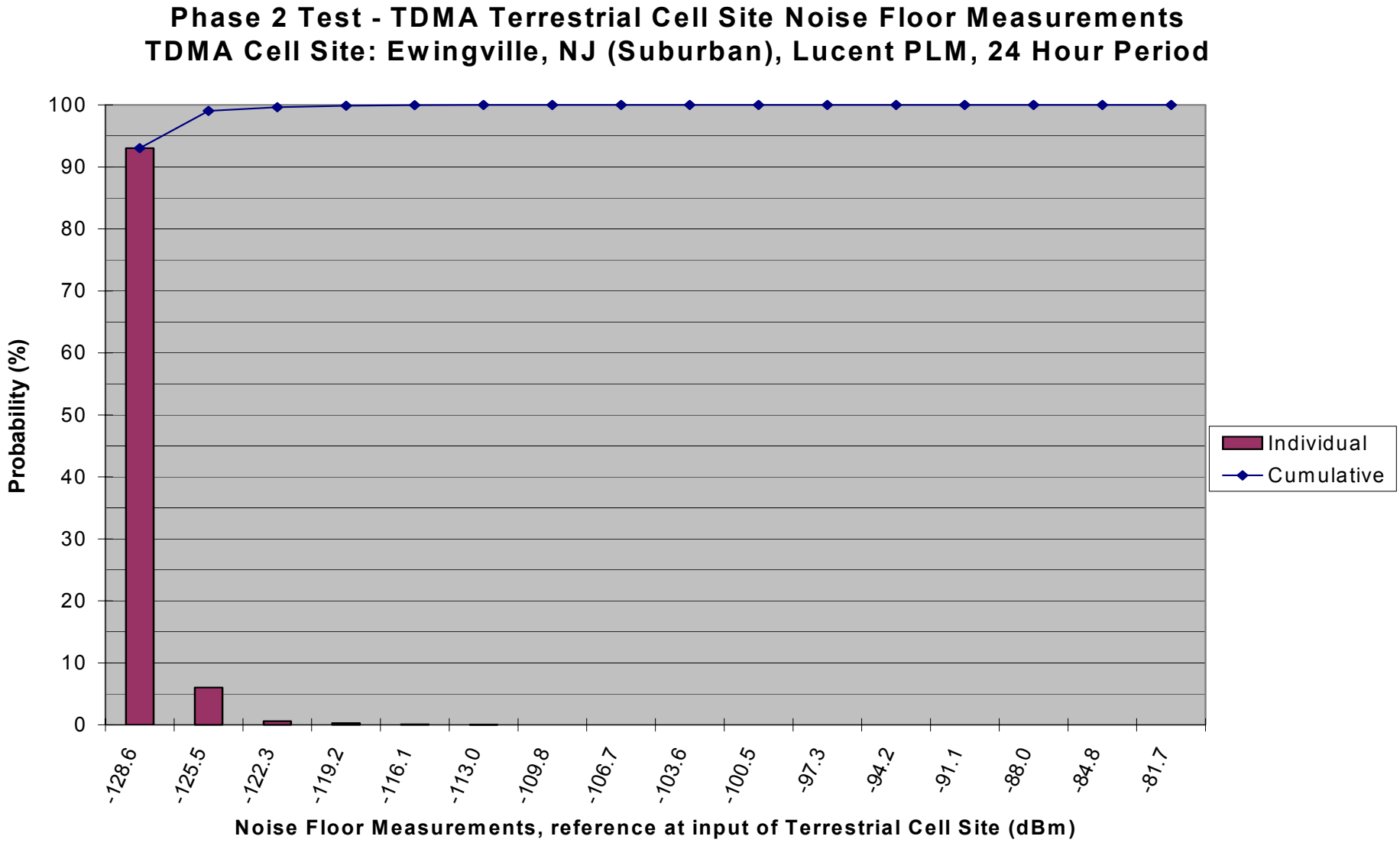


Figure 9.9-C Phase 2 Test Results: AMPS Terrestrial Customer and Drive Route RSSI Levels

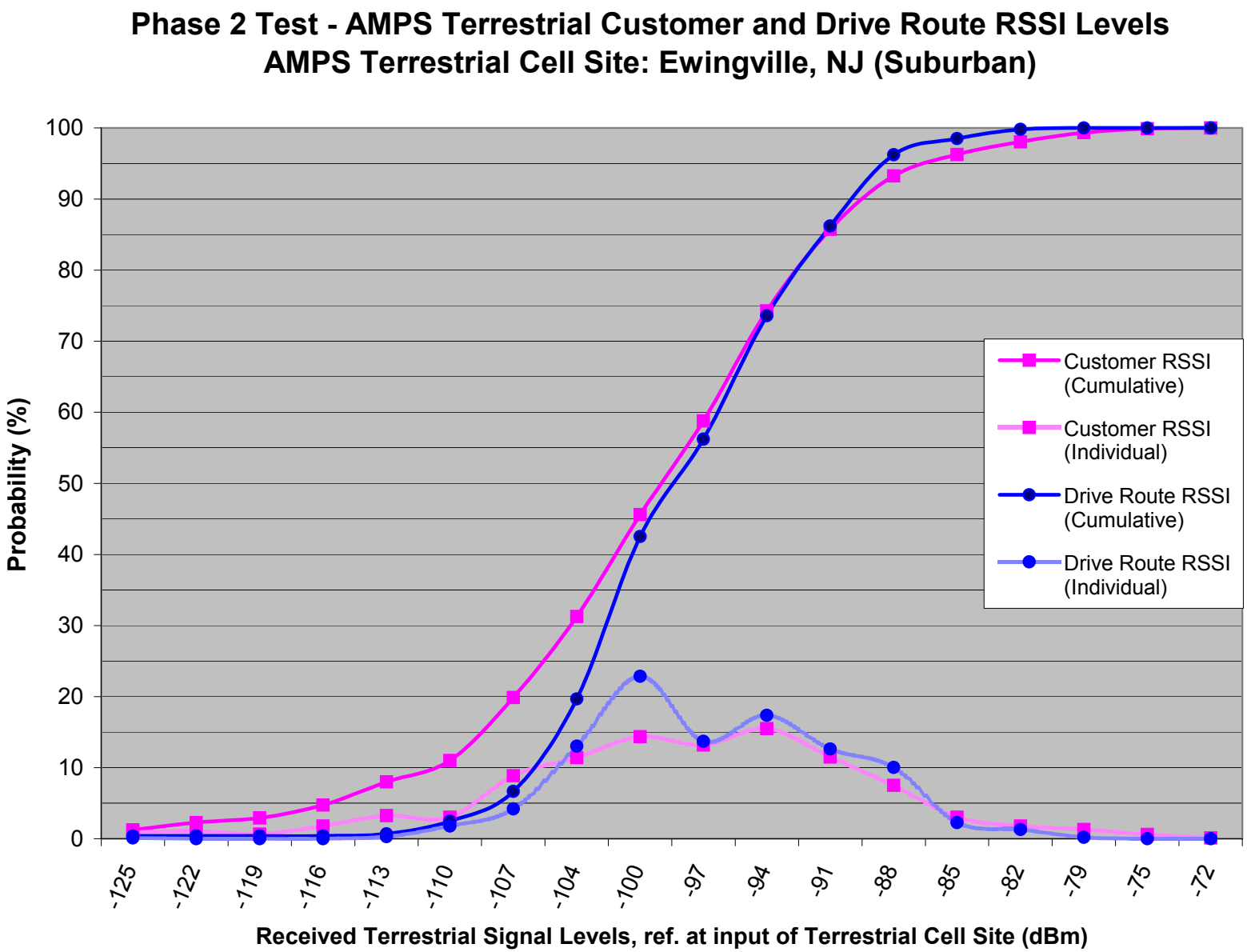
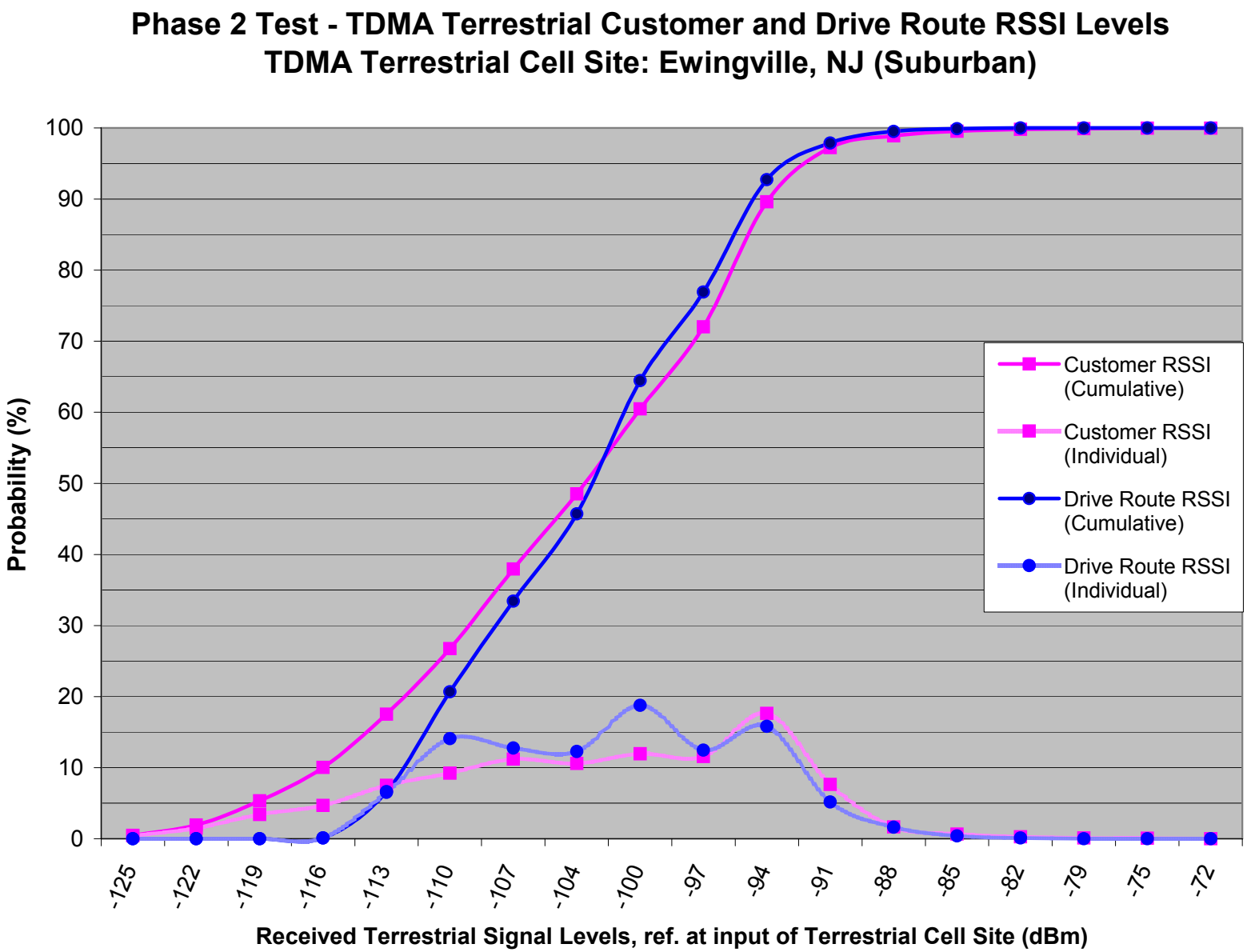


Figure 9.9-D Phase 2 Test Results: TDMA Terrestrial Customer and Drive Route RSSI Levels



9.10 Phase 2 Test Results – CDMA Tests with 1 Injected Signal on Carrier

Figure 9.10-A Phase 2 Test Results: CDMA Mobile Transmit Power, 1 Injected Signal on Carrier

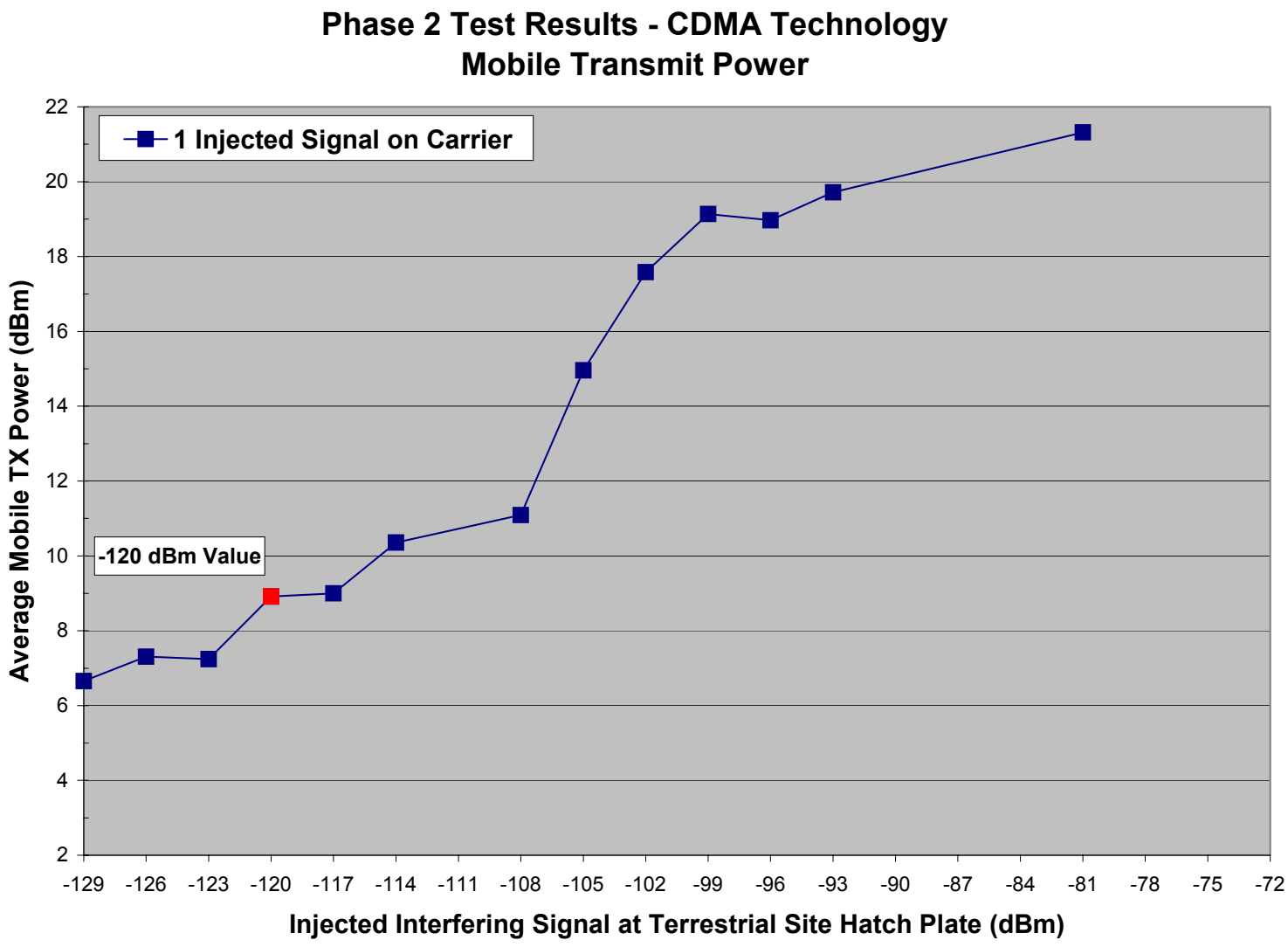


Figure 9.10-B Phase 2 Test Results: CDMA Blocks, Drops, and Overflow, 1 Injected Signal on Carrier

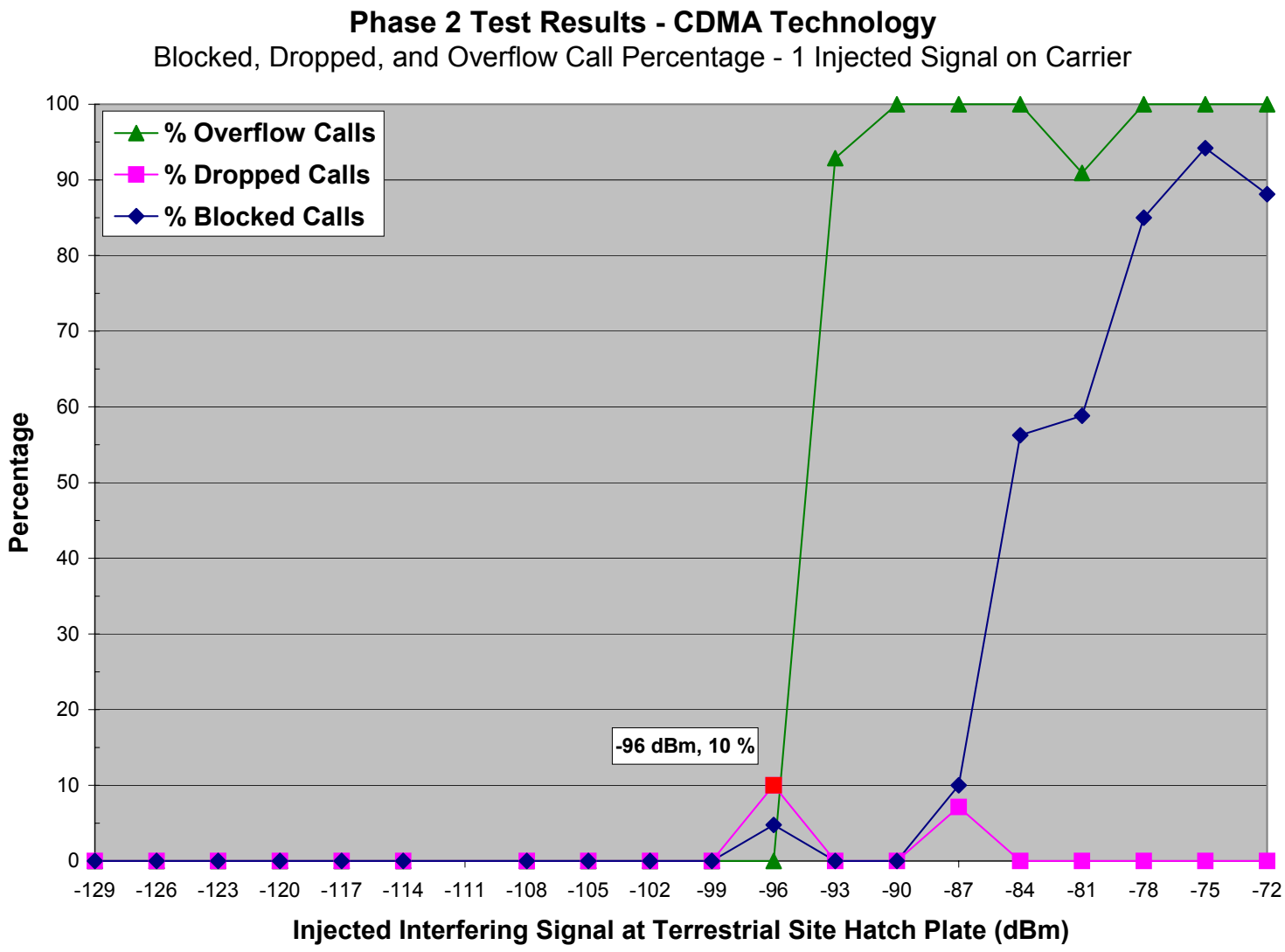


Figure 9.10-C Phase 2 Test Results: CDMA Minutes of Use, 1 Injected Signal on Carrier

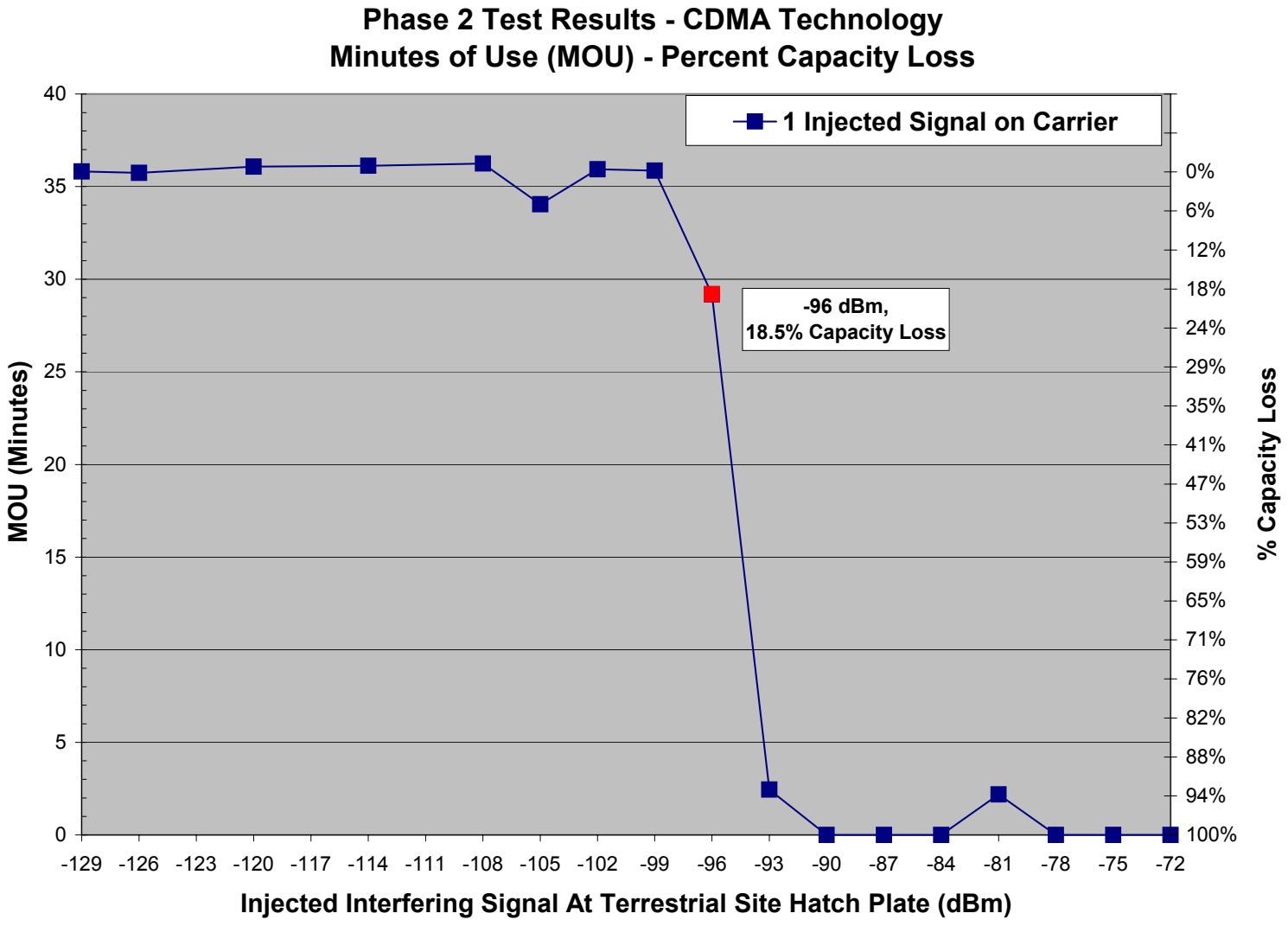


Figure 9.10-D Phase 2 Test Results: CDMA EbNo, 1 Injected Signal on Carrier

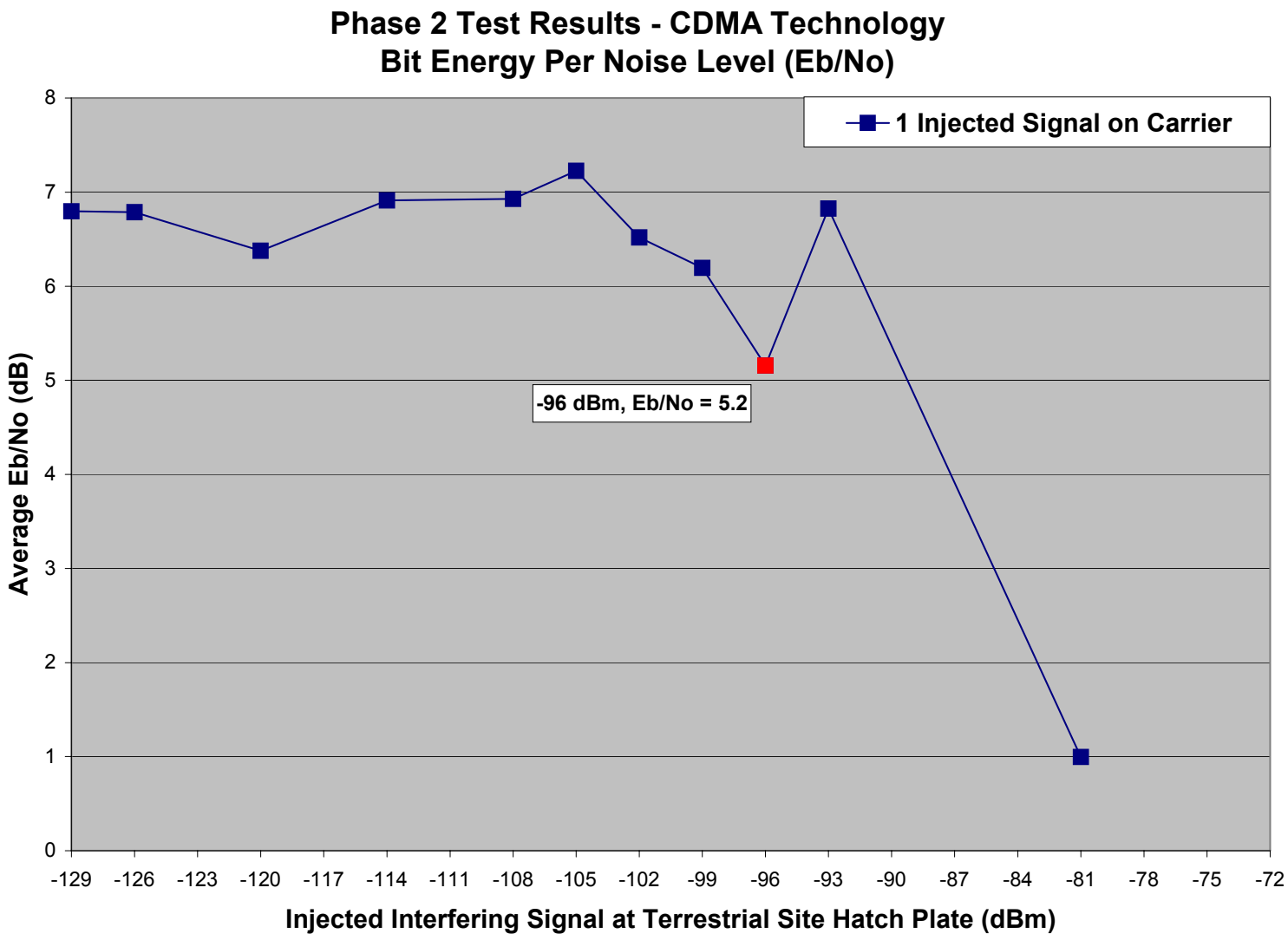


Figure 9.10-E Phase 2 Test Results: CDMA Stationary Test B, Number of Calls, 1 Injected Signal on Carrier

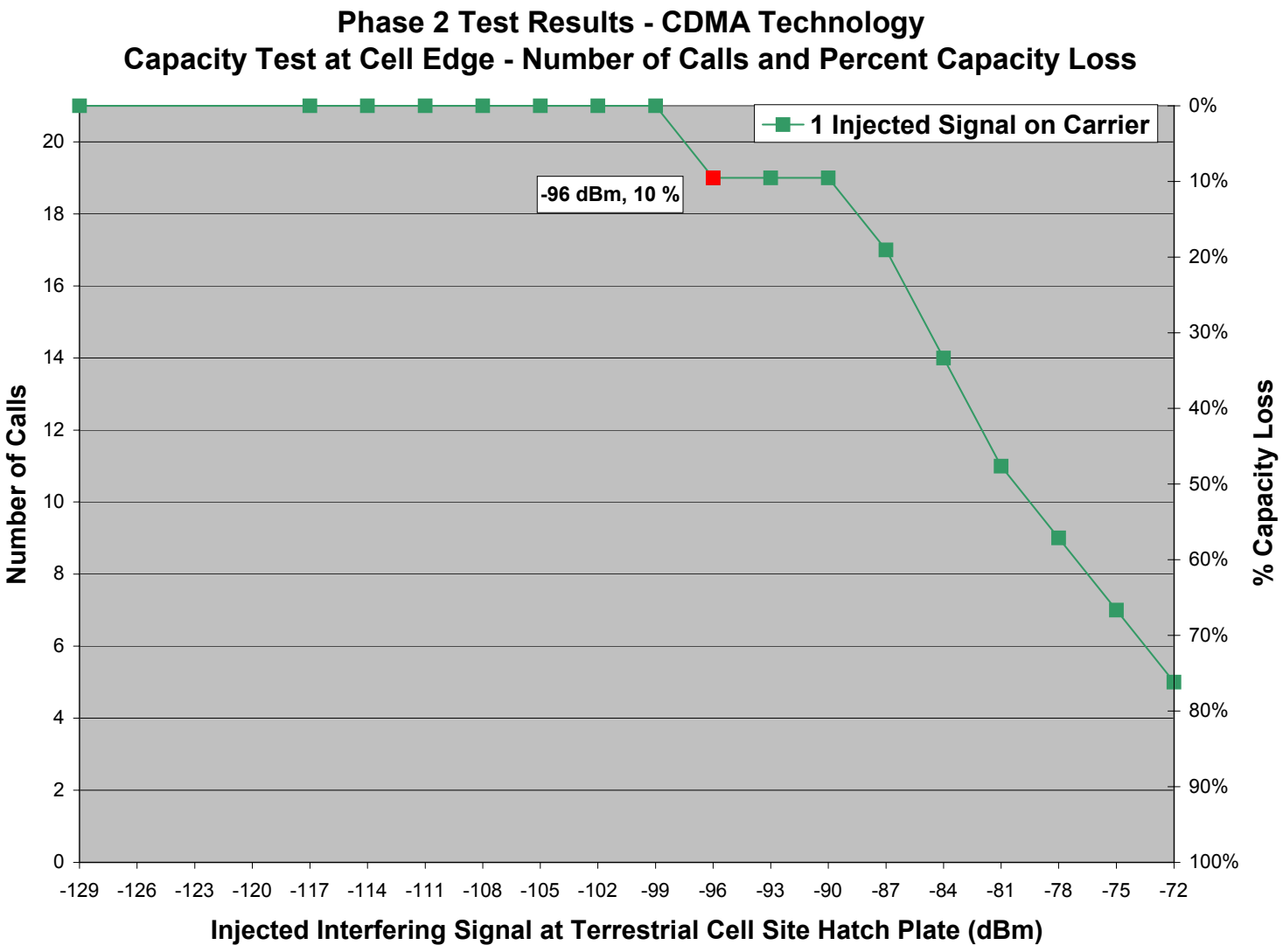
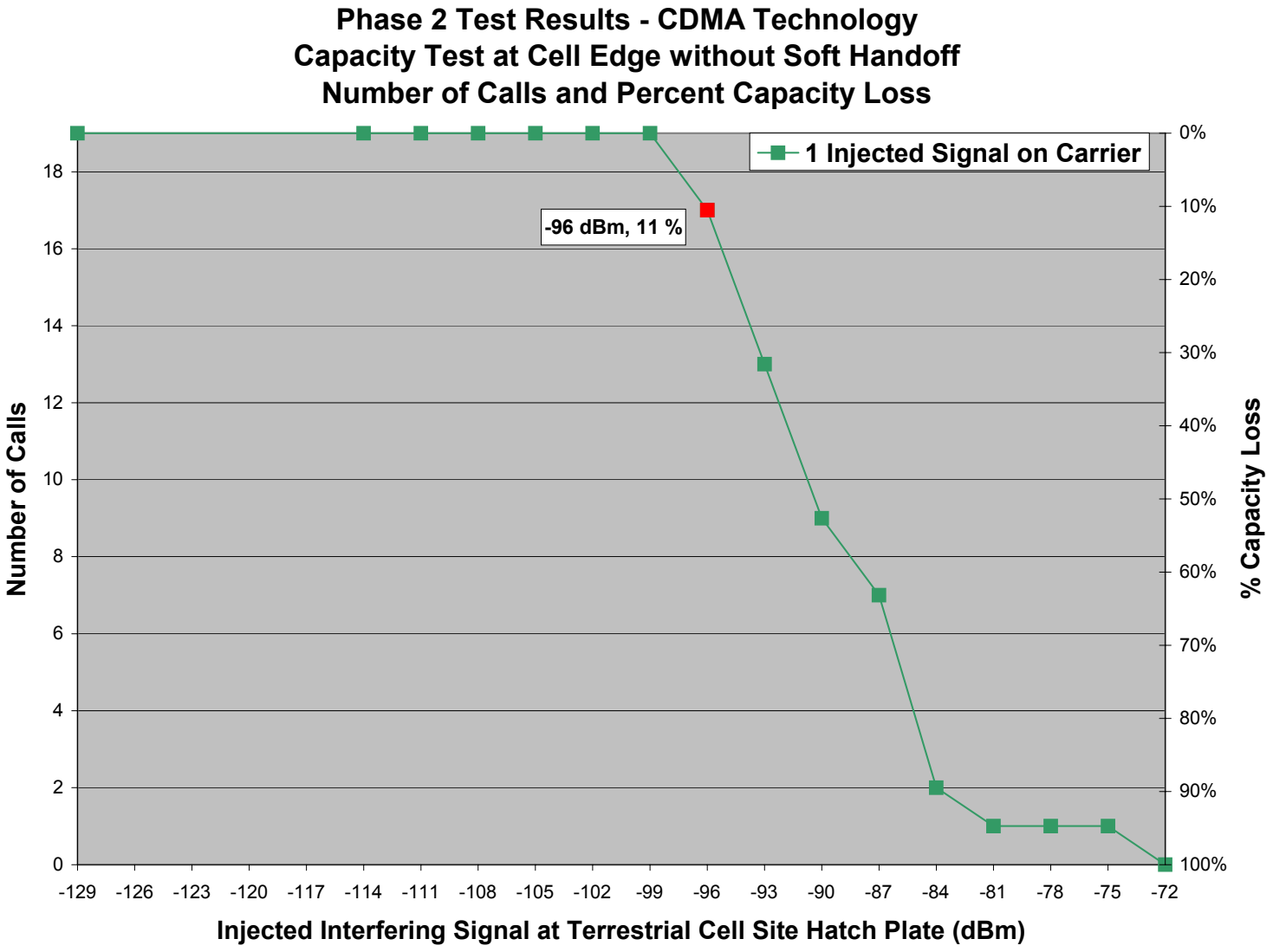


Figure 9.10-F Phase 2 Test Results: CDMA Stationary Test C, Number of Calls, 1 Injected Signal on Carrier



9.11 Phase 2 Test Results – CDMA Tests with 2 Injected Signals on Carrier

Figure 9.11-A Phase 2 Test Results: CDMA Mobile Transmit Power, 2 Injected Signals on Carrier

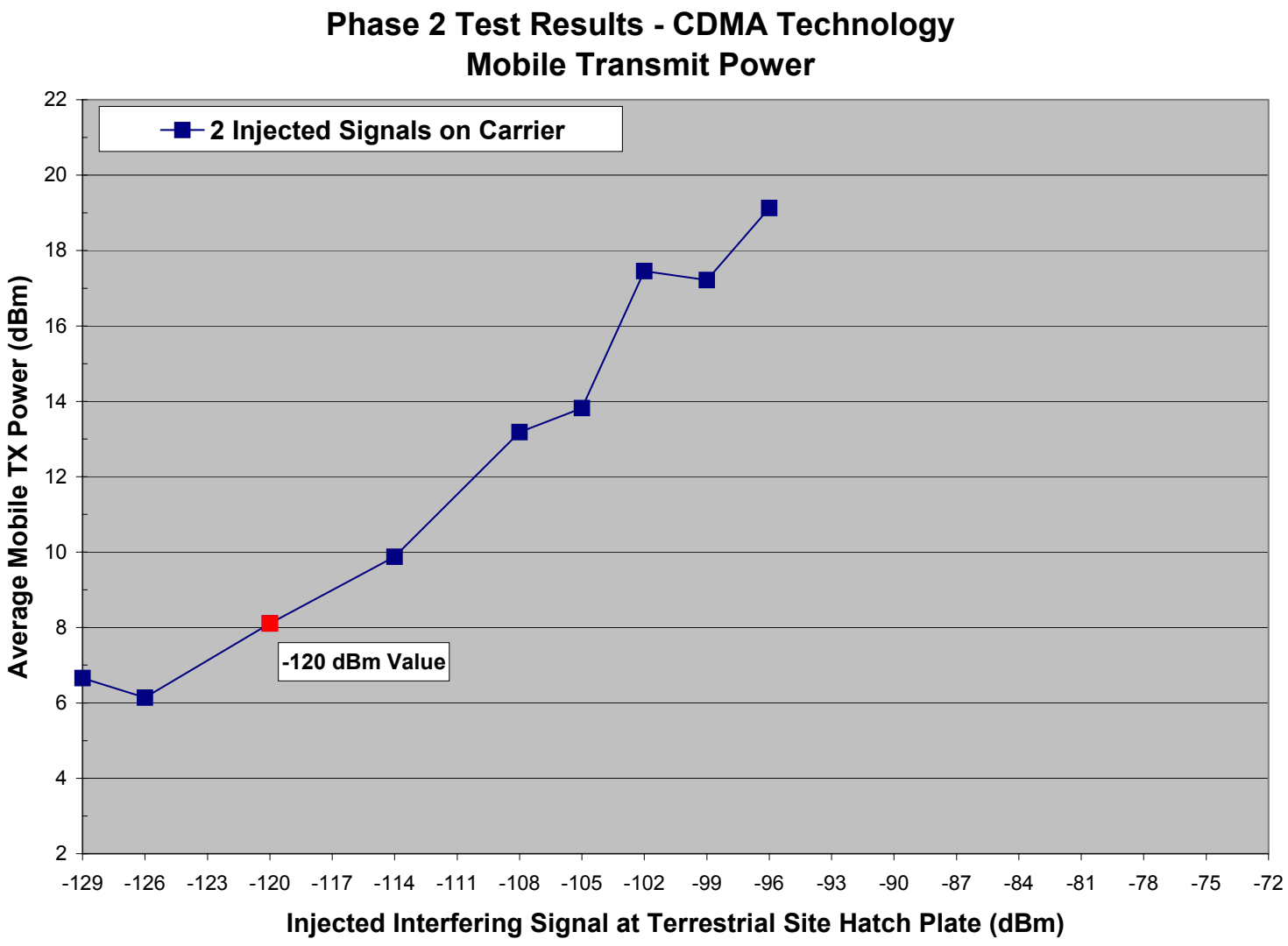


Figure 9.11-B Phase 2 Test Results: CDMA Blocks, Drops, and Overflow, 2 Injected Signals on Carrier

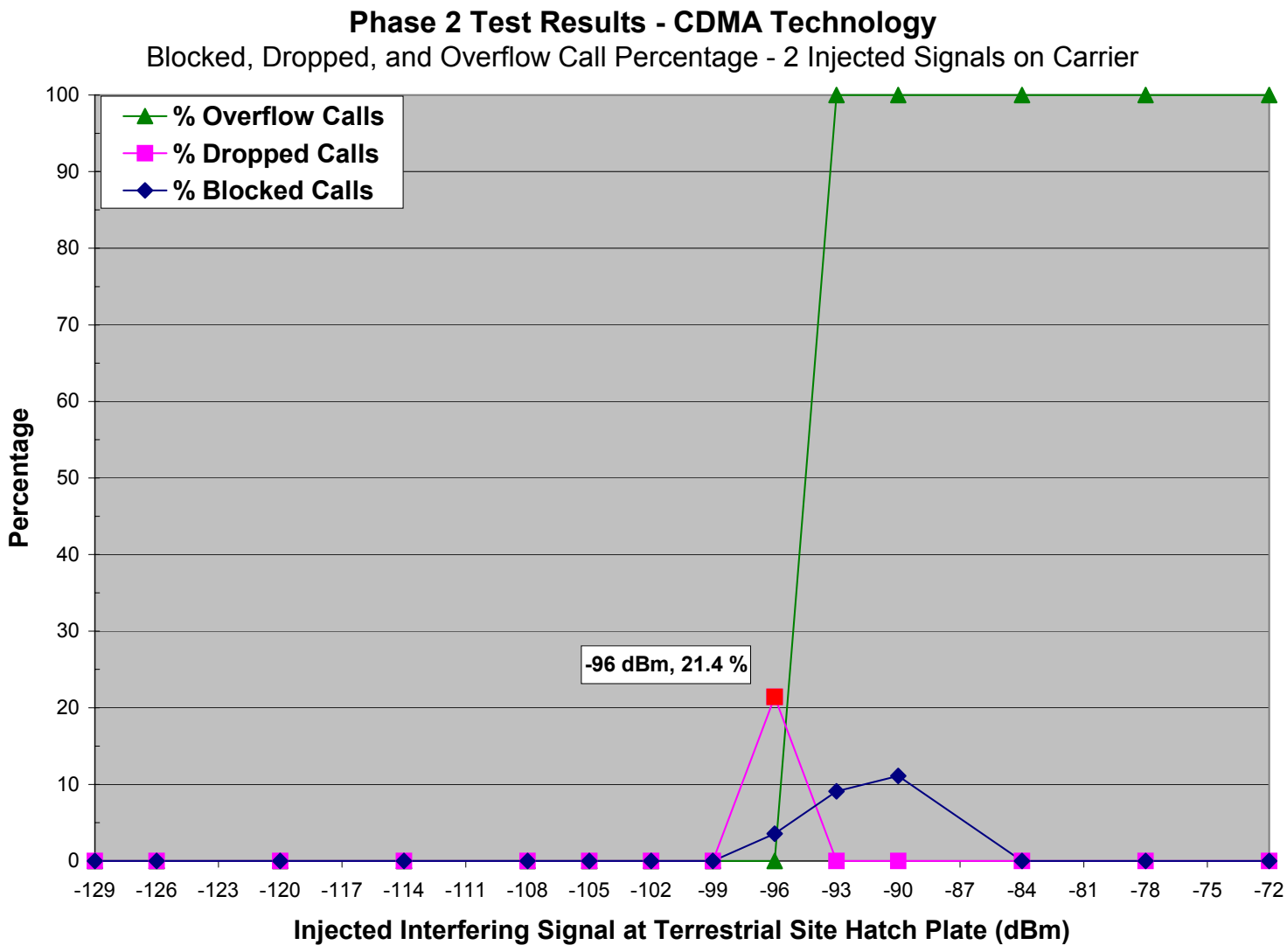


Figure 9.11-C Phase 2 Test Results: CDMA Minutes of Use, 2 Injected Signals on Carrier

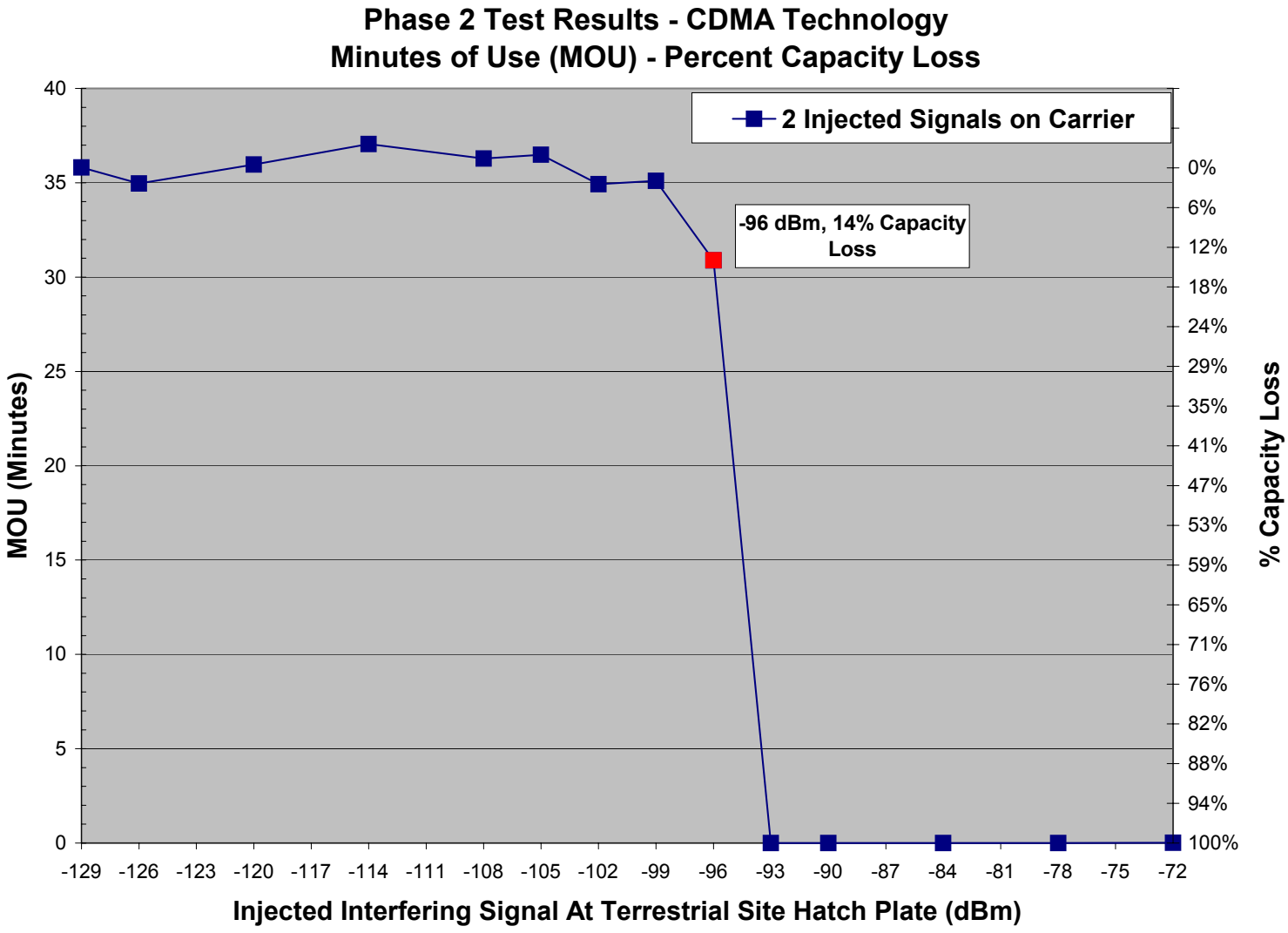


Figure 9.11-D Phase 2 Test Results: CDMA EbNo, 2 Injected Signals on Carrier

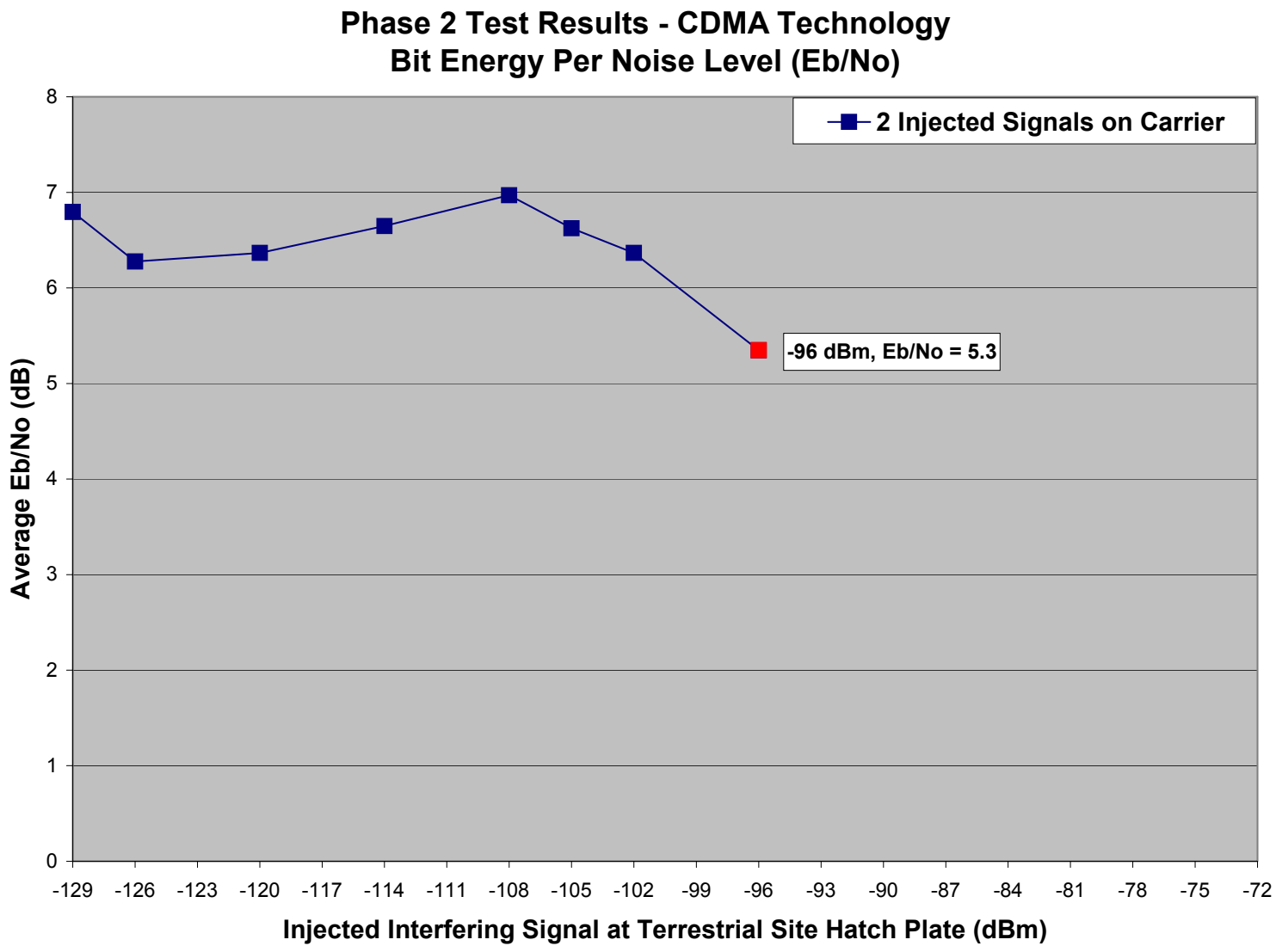


Figure 9.11-E Phase 2 Test Results: CDMA Stationary Test B, Number of Calls, 2 Injected Signals on Carrier

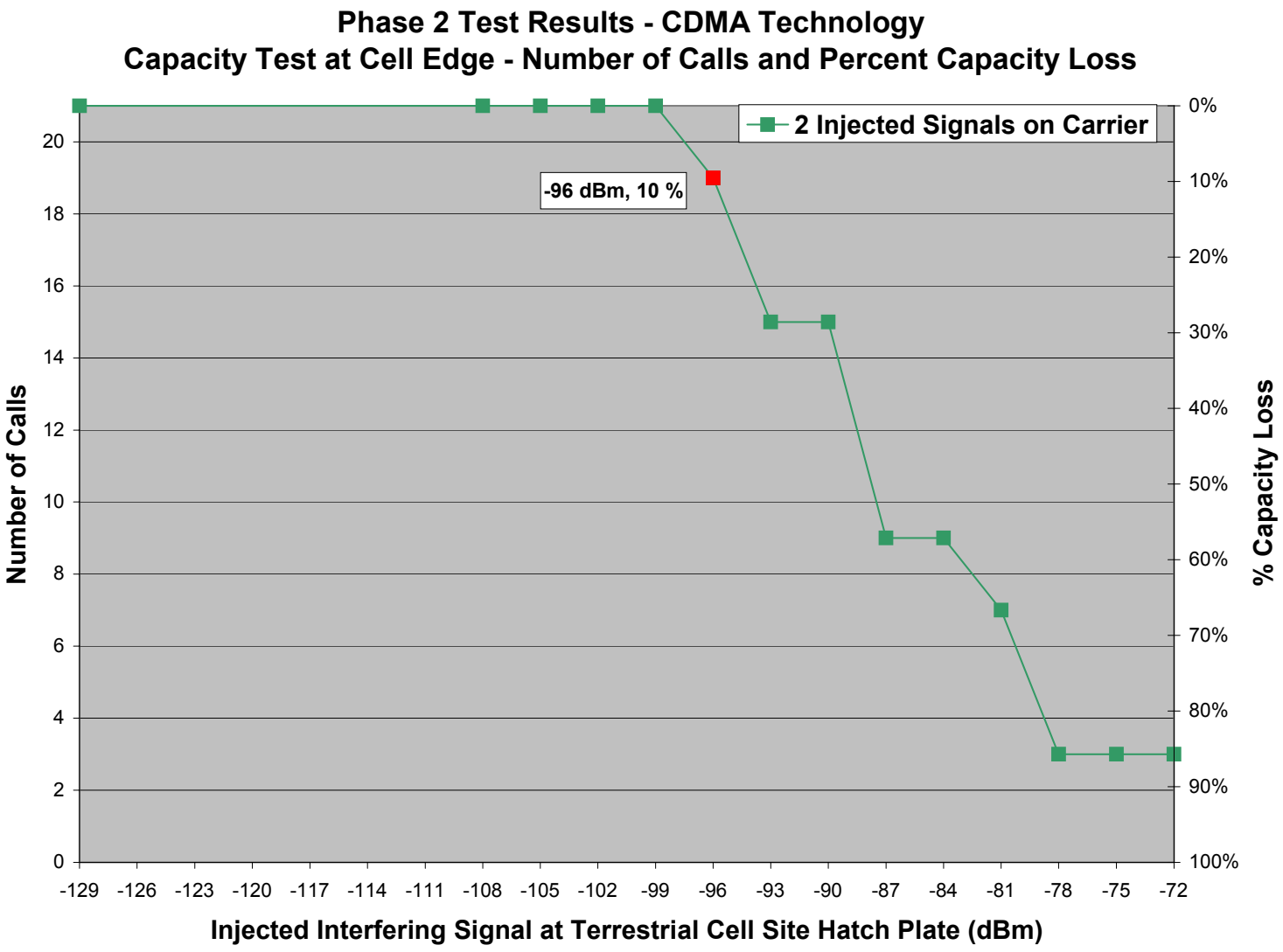
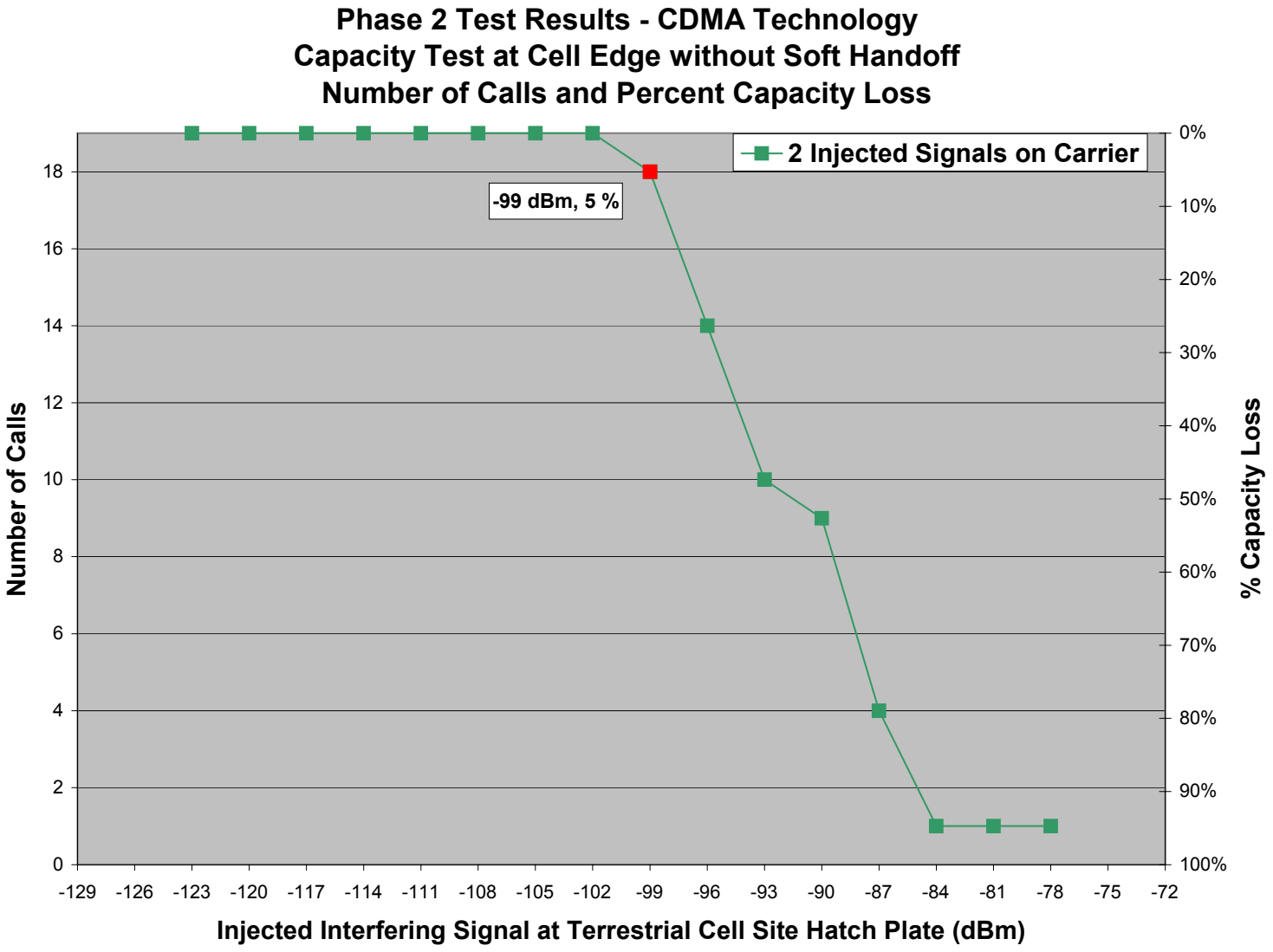


Figure 9.11-F Phase 2 Test Results: CDMA Stationary Test C, Number of Calls, 2 Injected Signals on Carrier



9.12 Phase 2 Test Results – CDMA Tests at 3 dB Loading, 1 Injected Signal on Carrier

Figure 9.12-A Phase 2 Test Results: CDMA Mobile Transmit Power, 1 Injected Signal on Carrier, 3 dB Loading

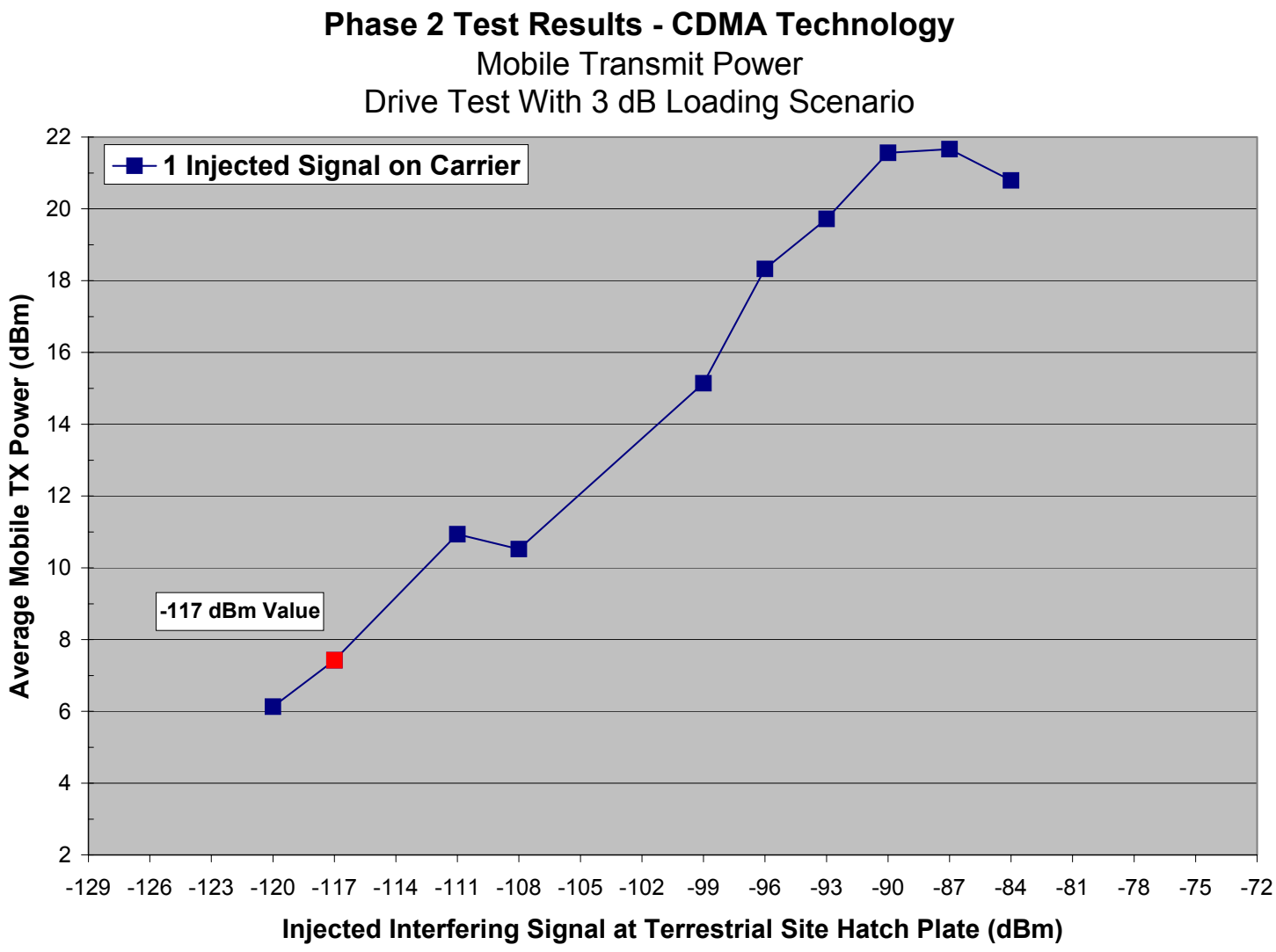


Figure 9.12-B Phase 2 Test Results: CDMA Blocks, Drops, and Overflow, 1 Injected Signal on Carrier, 3 dB Loading

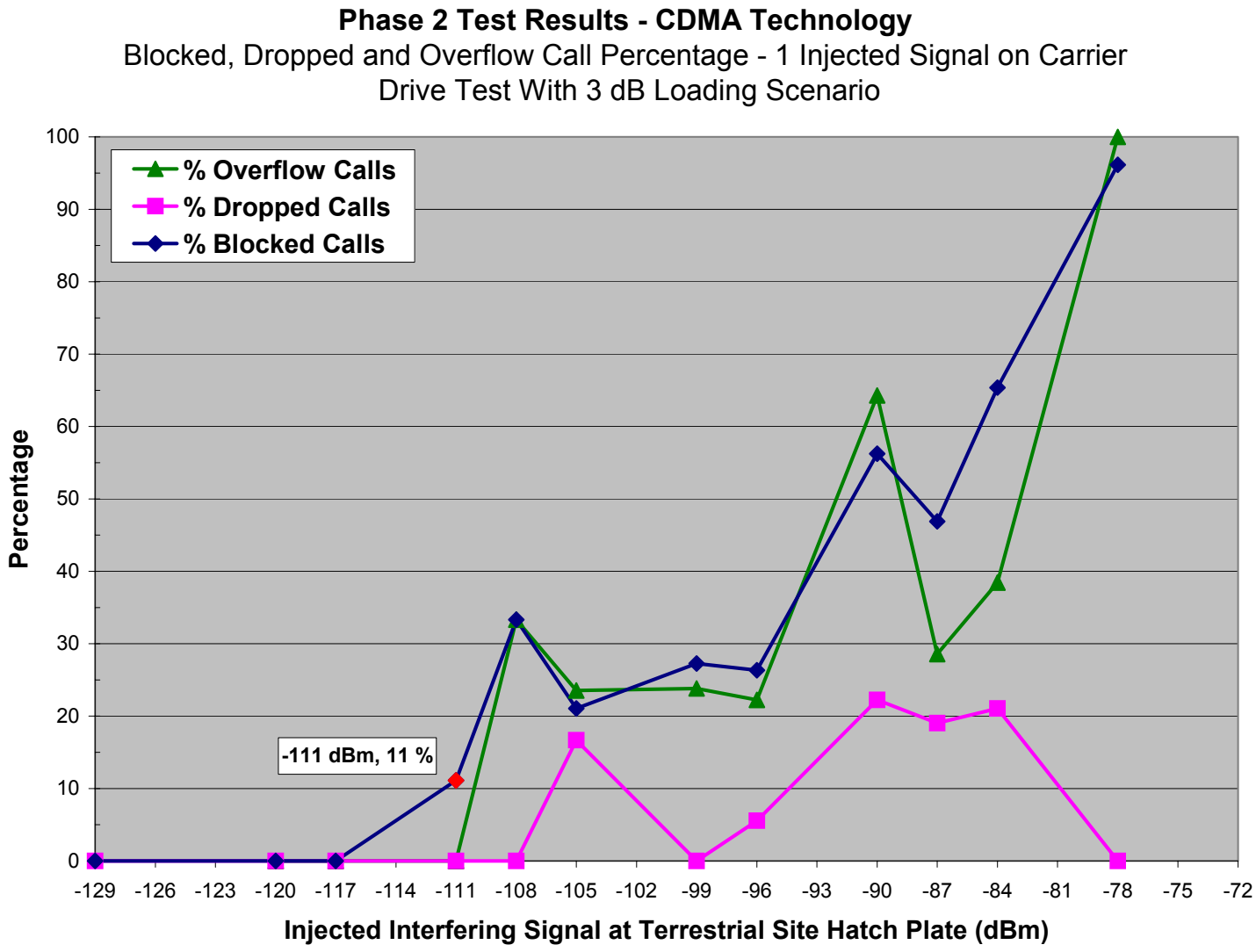


Figure 9.12-C Phase 2 Test Results: CDMA Minutes of Use, 1 Injected Signal on Carrier, 3 dB Loading

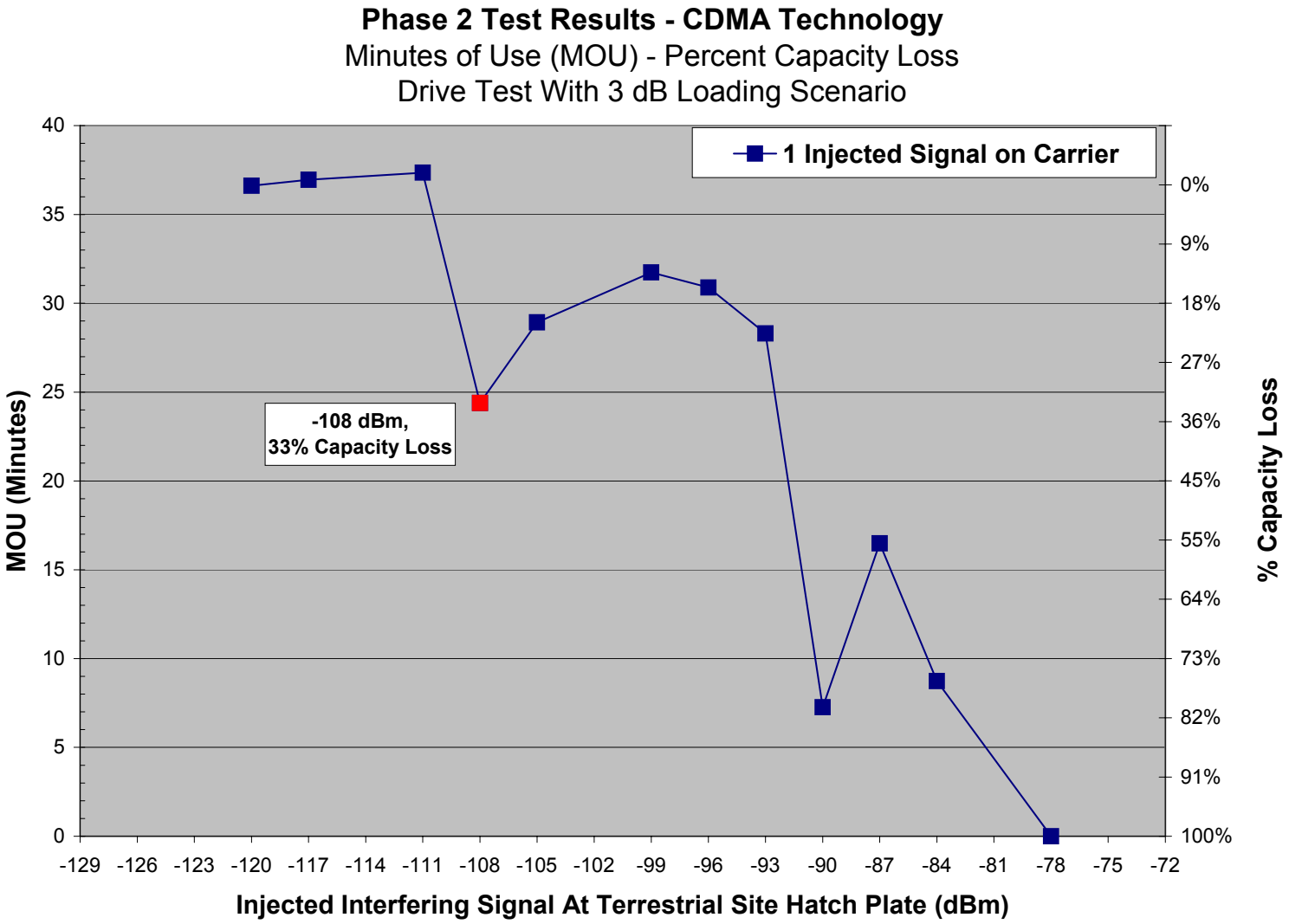


Figure 9.12-D Phase 2 Test Results: CDMA EbNo, 1 Injected Signal on Carrier, 3 dB Loading

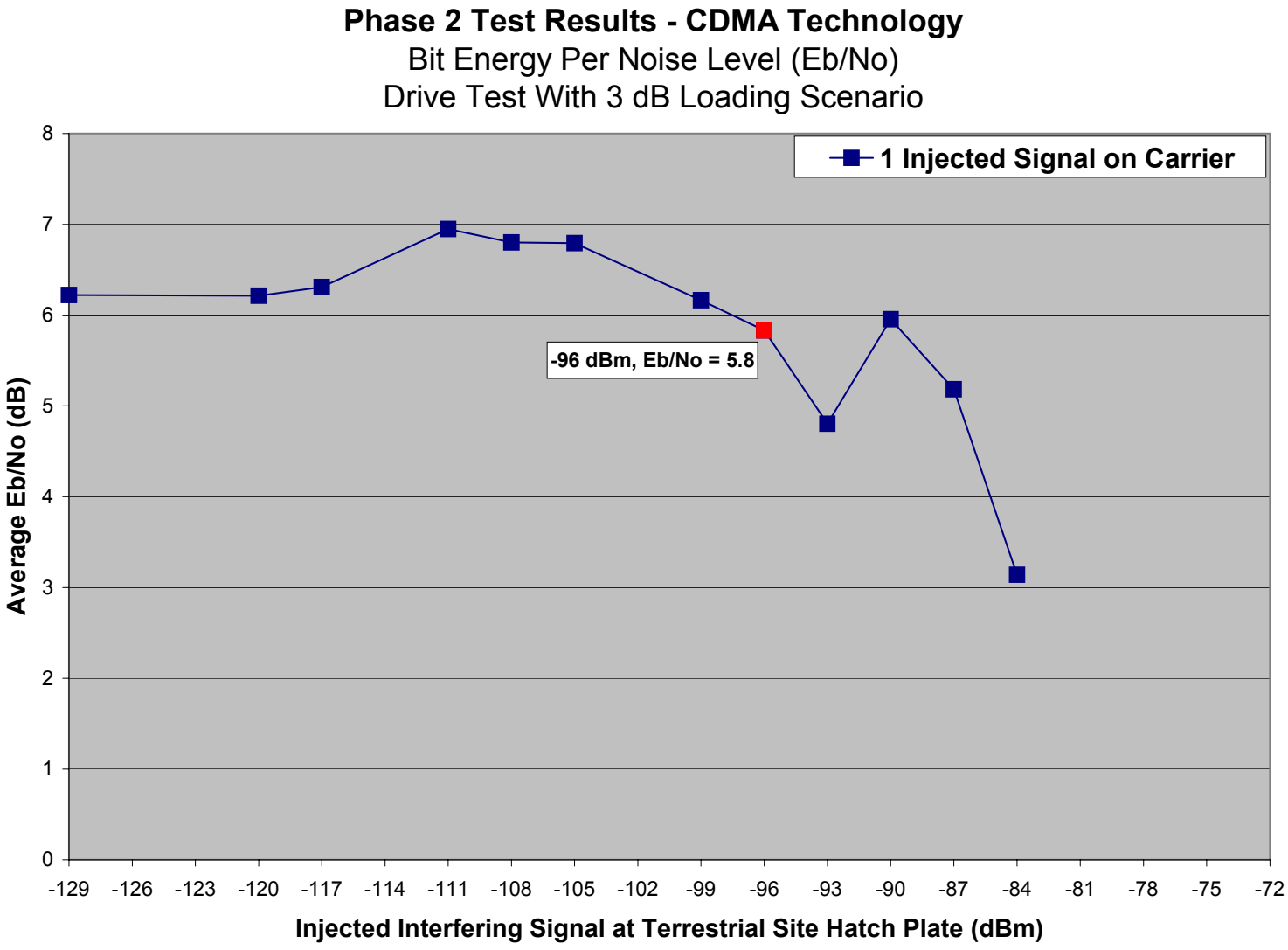
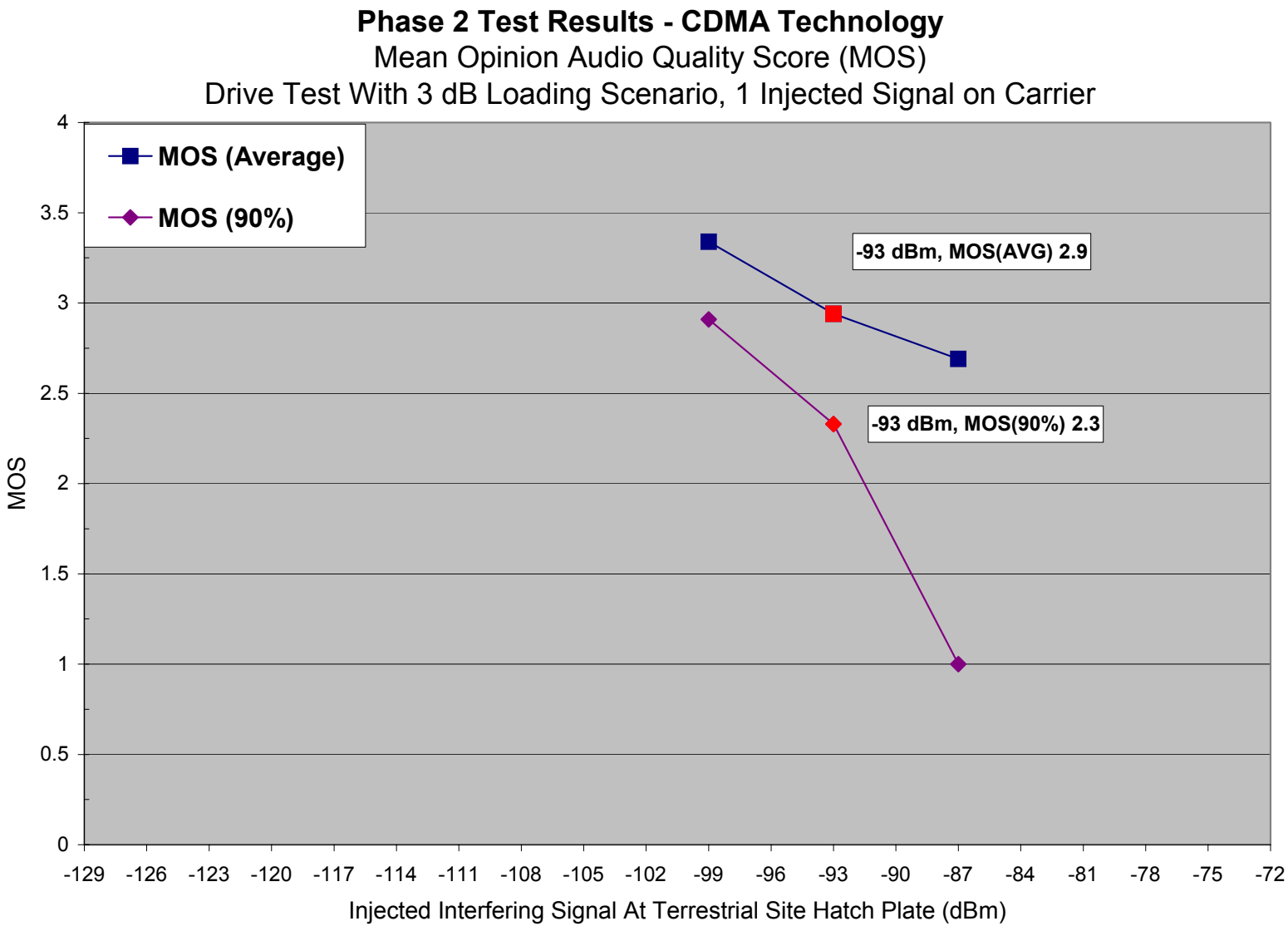


Figure 9.12-E Phase 2 Test Results: CDMA Mean Opinion Audio Quality Score, 1 Injected Signal on Carrier, 3 dB Loading



9.13 Phase 2 Test Results – CDMA Tests with 1 Injected Signal on Guard Band

Figure 9.13-A Phase 2 Test Results: CDMA Mobile Transmit Power, 1 Injected Signal on Guard Band

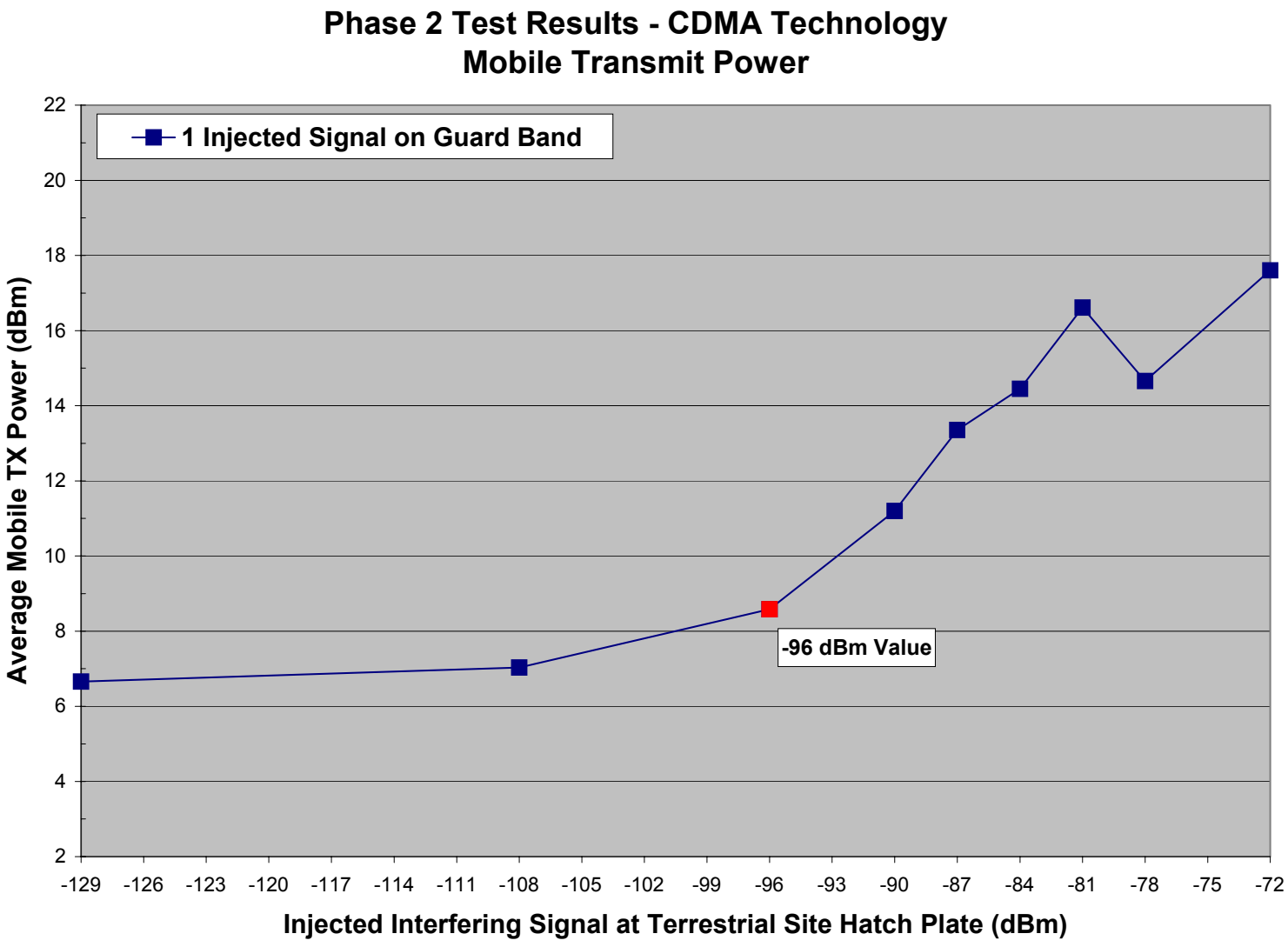


Figure 9.13-B Phase 2 Test Results: CDMA Blocks, Drops, and Overflow, 1 Injected Signal on Guard Band

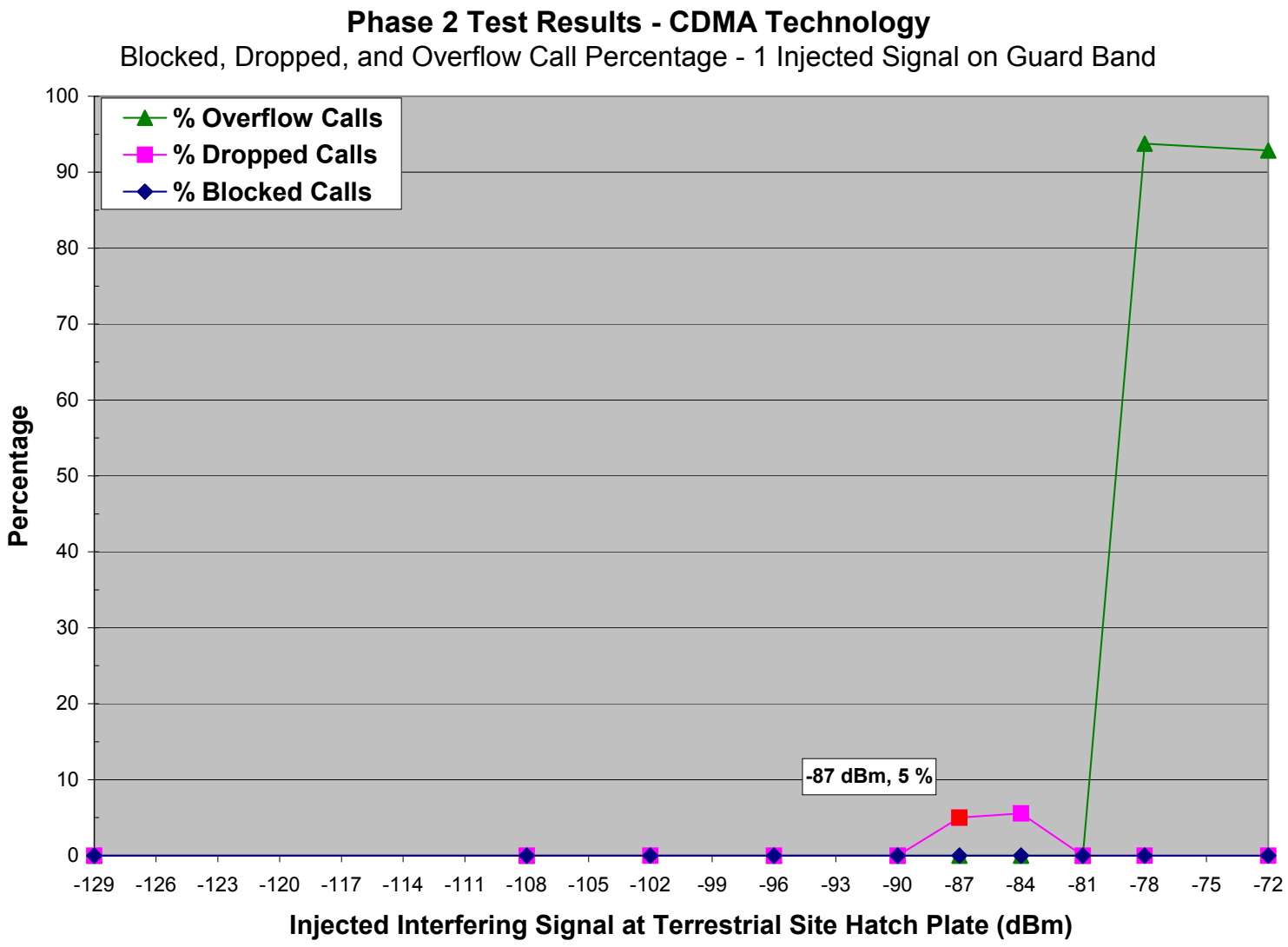


Figure 9.13-C Phase 2 Test Results: CDMA EbNo, 1 Injected Signal on Guard Band

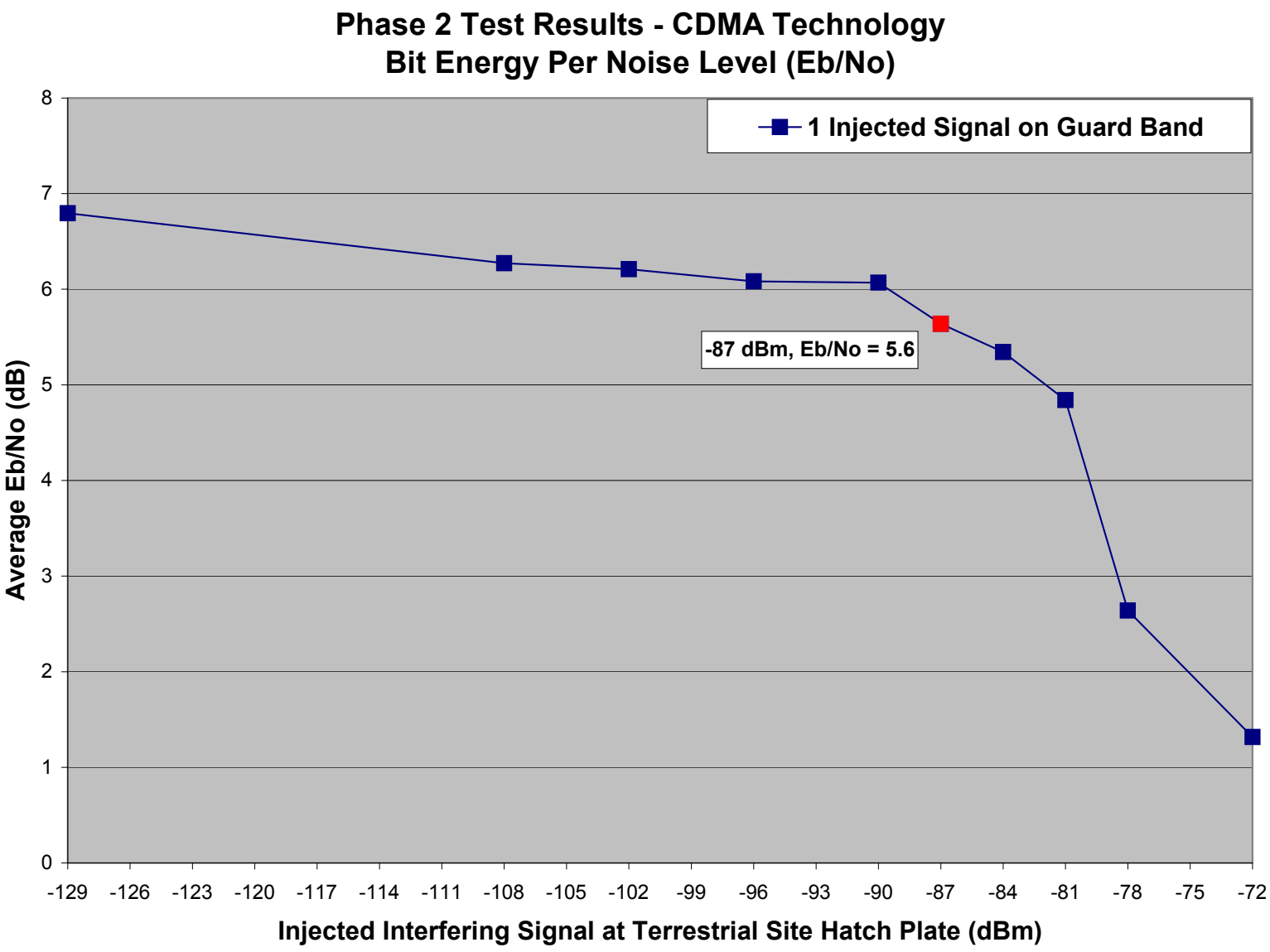


Figure 9.13-D Phase 2 Test Results: CDMA Stationary Test A, Mobile Transmit Power, 1 Injected Signal on Guard Band

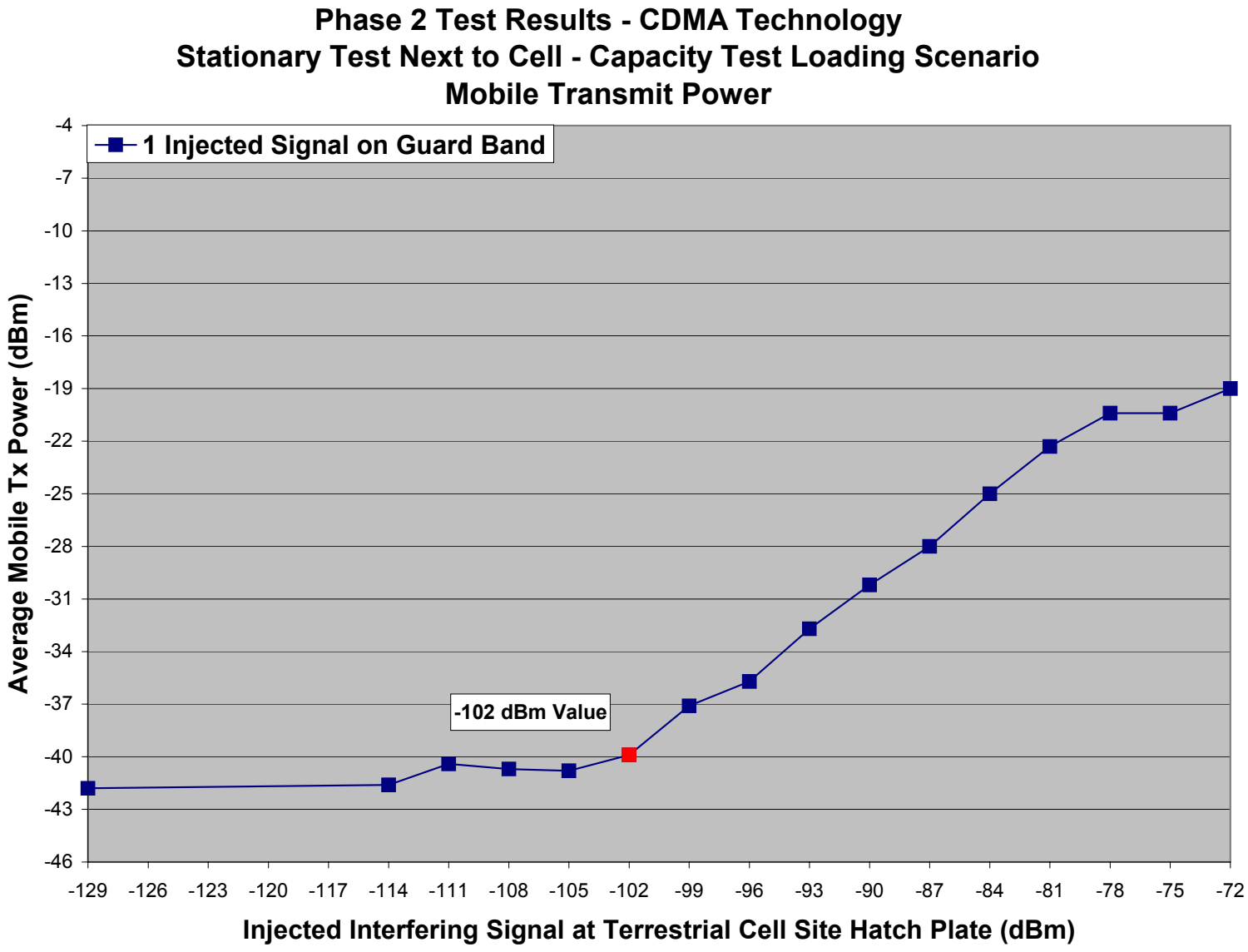


Figure 9.13-E Phase 2 Test Results: CDMA Stationary Test B, Number of Calls, 1 Injected Signal on Guard Band

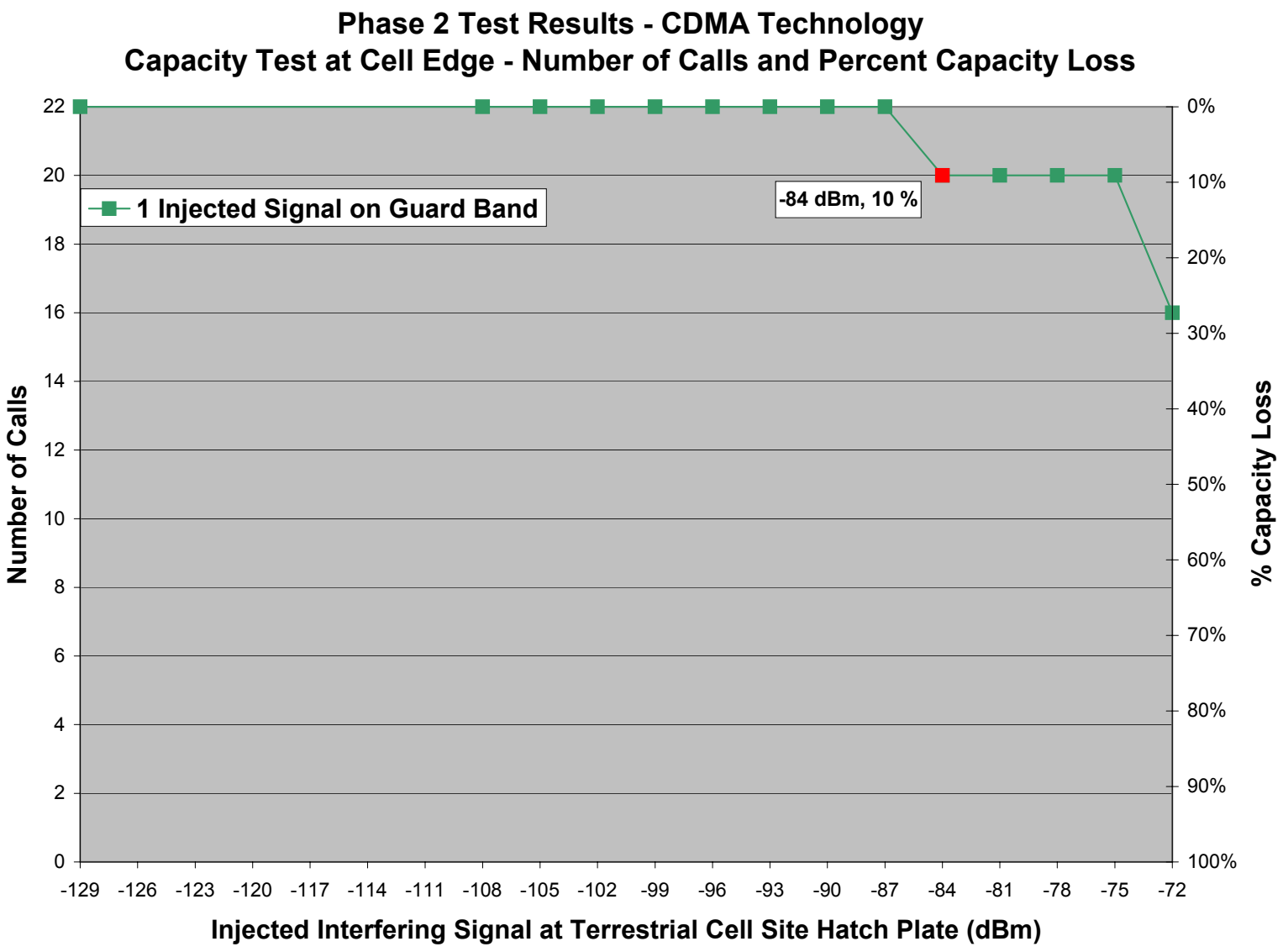
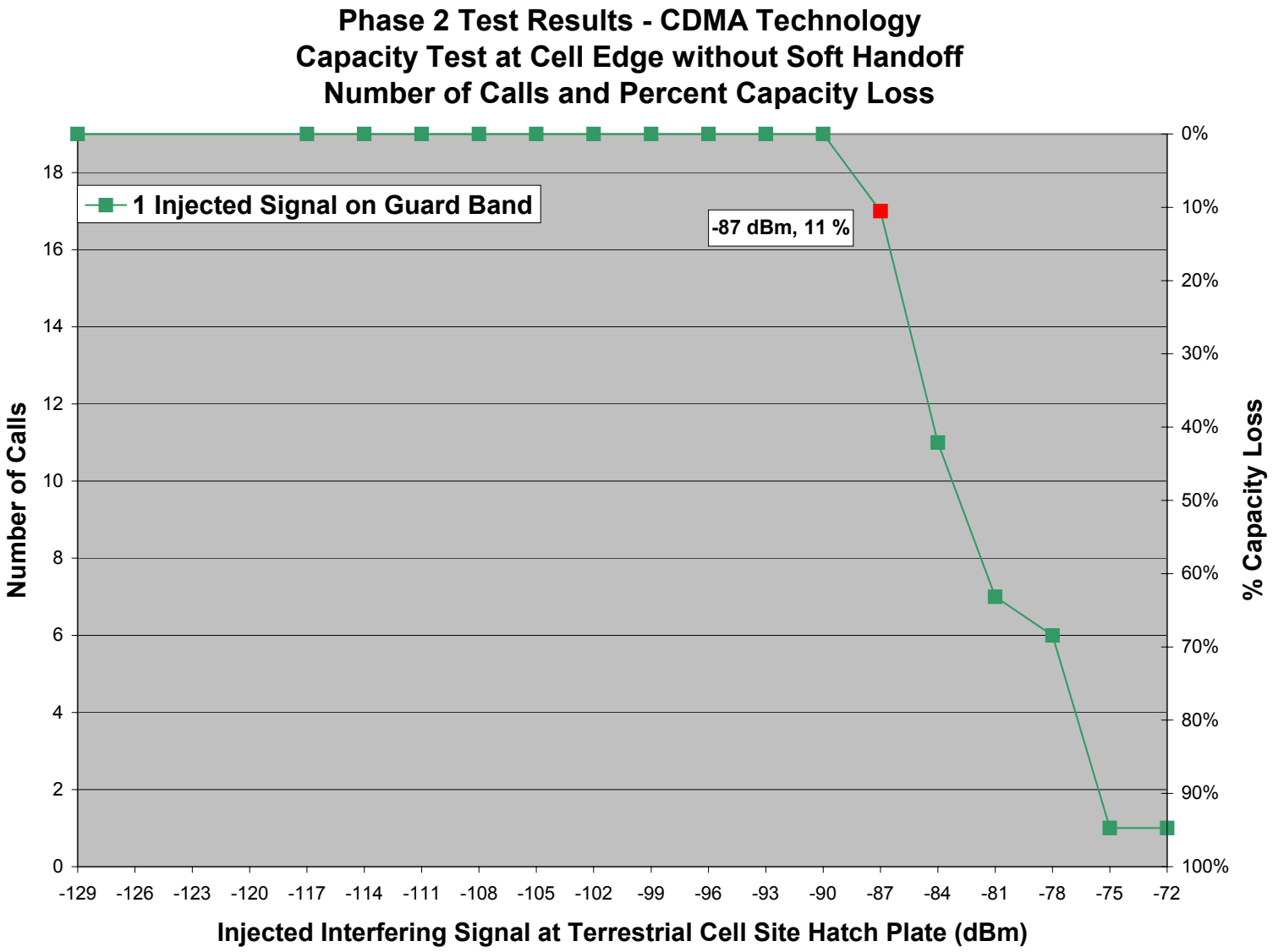


Figure 9.13-F Phase 2 Test Results: CDMA Stationary Test C, Number of Calls, 1 Injected Signal on Guard Band



9.14 Phase 2 Test Results – CDMA Tests with 2 Injected Signals on Guard Band

Figure 9.14-A Phase 2 Test Results: CDMA Mobile Transmit Power, 2 Injected Signals on Guard Band

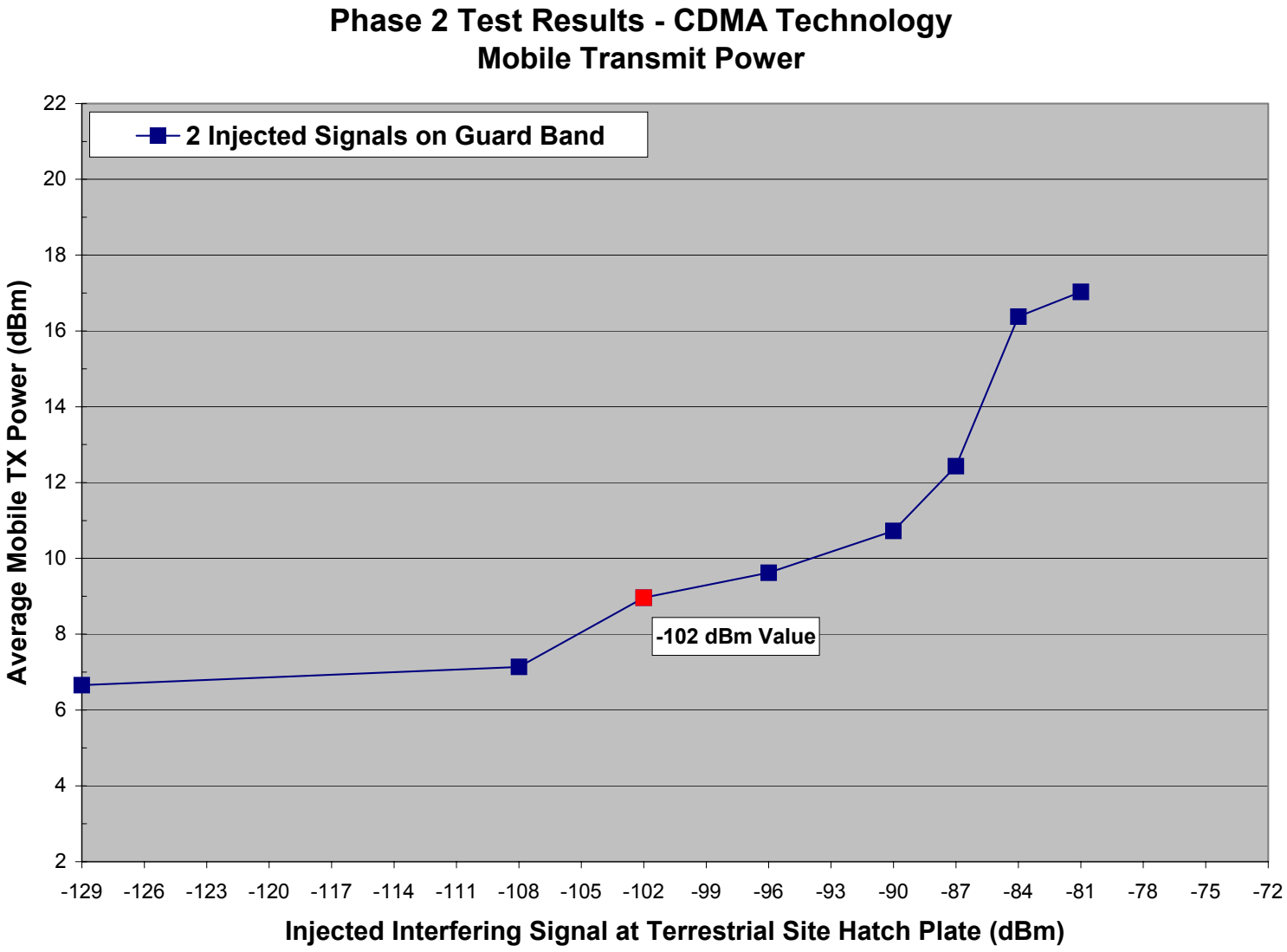


Figure 9.14-B Phase 2 Test Results: CDMA Stationary Test A, Mobile Transmit Power, 2 Injected Signals on Guard Band

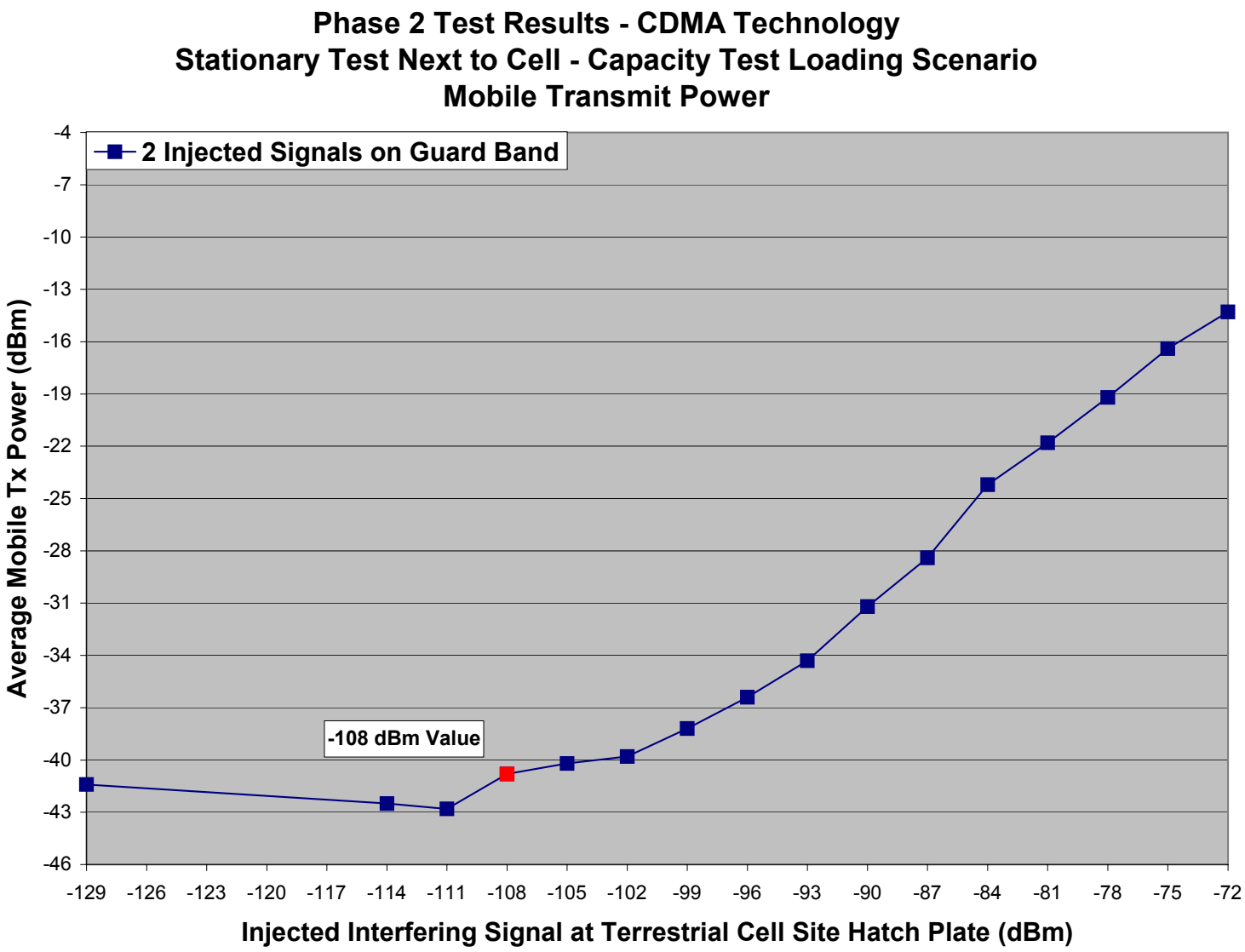
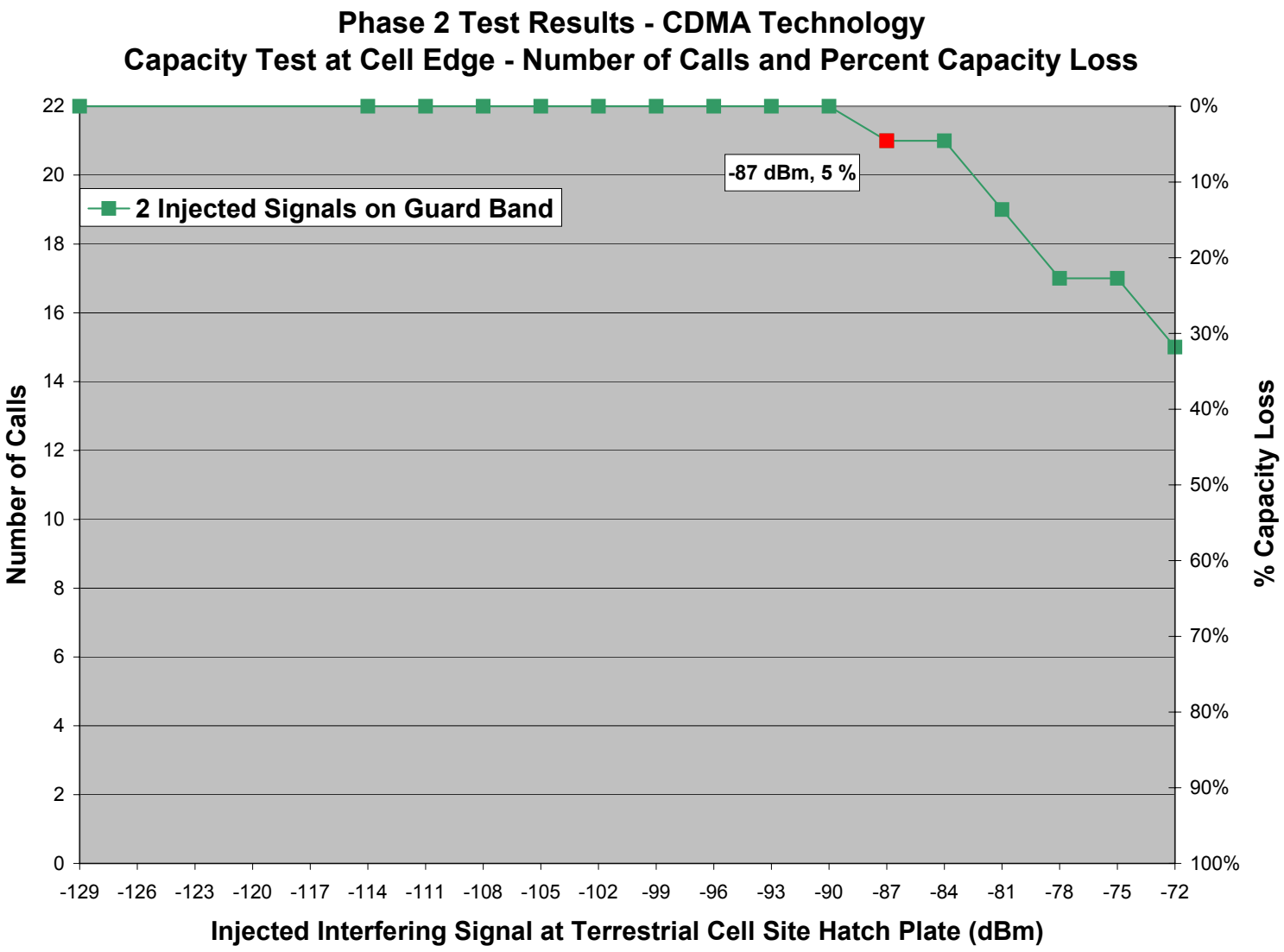


Figure 9.14-C Phase 2 Test Results: CDMA Stationary Test B, Number of Calls, 2 Injected Signals on Guard Band



9.15 Regional & National Air Traffic, Pathways and Airports

Figure 9.15-A Regional FAA Air Traffic Pathways: NY & NJ Area, Existing North Flow

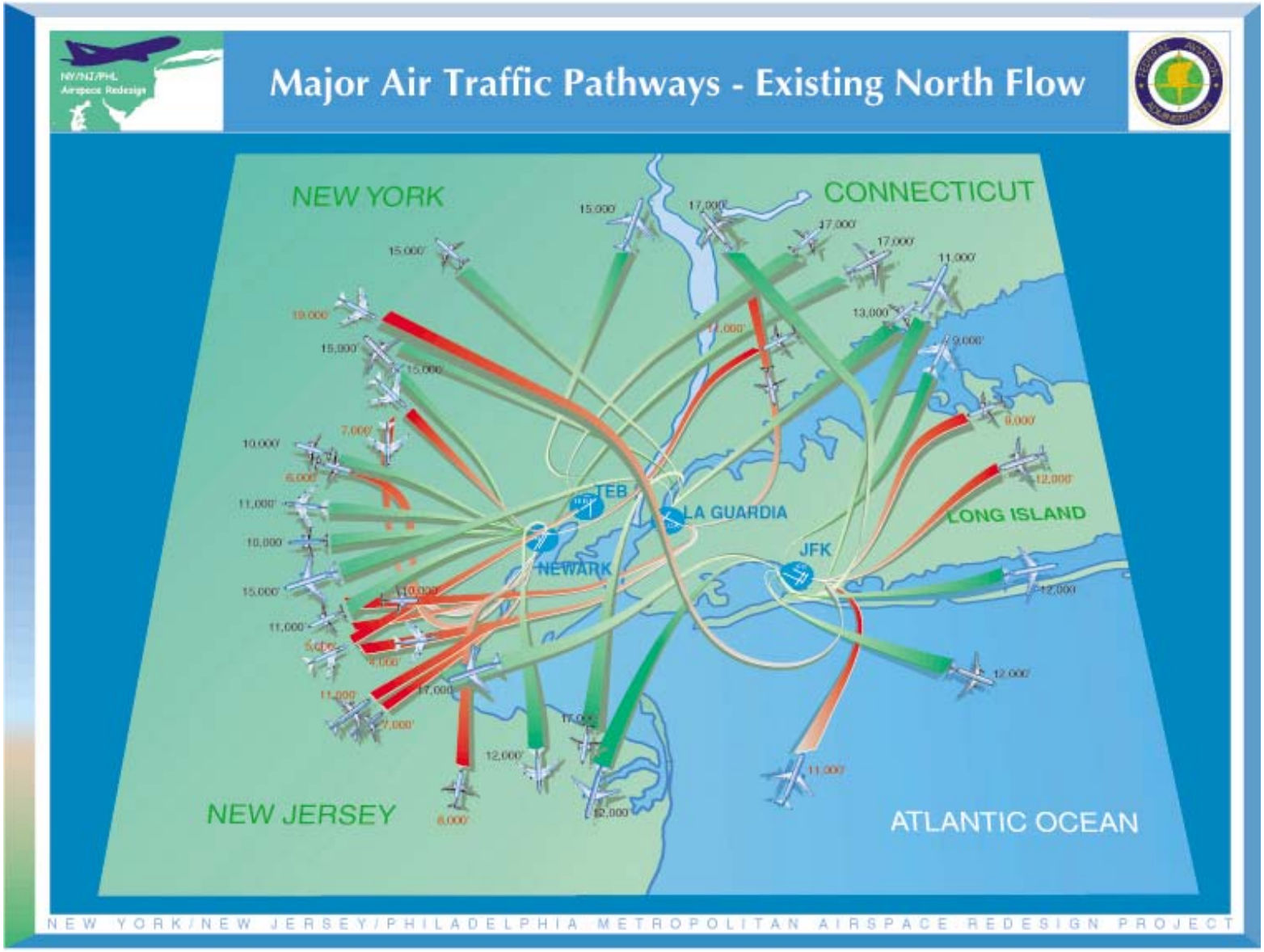


Figure 9.15-B Regional FAA Air Traffic Pathways: Philadelphia, PA Area, Existing East Flow

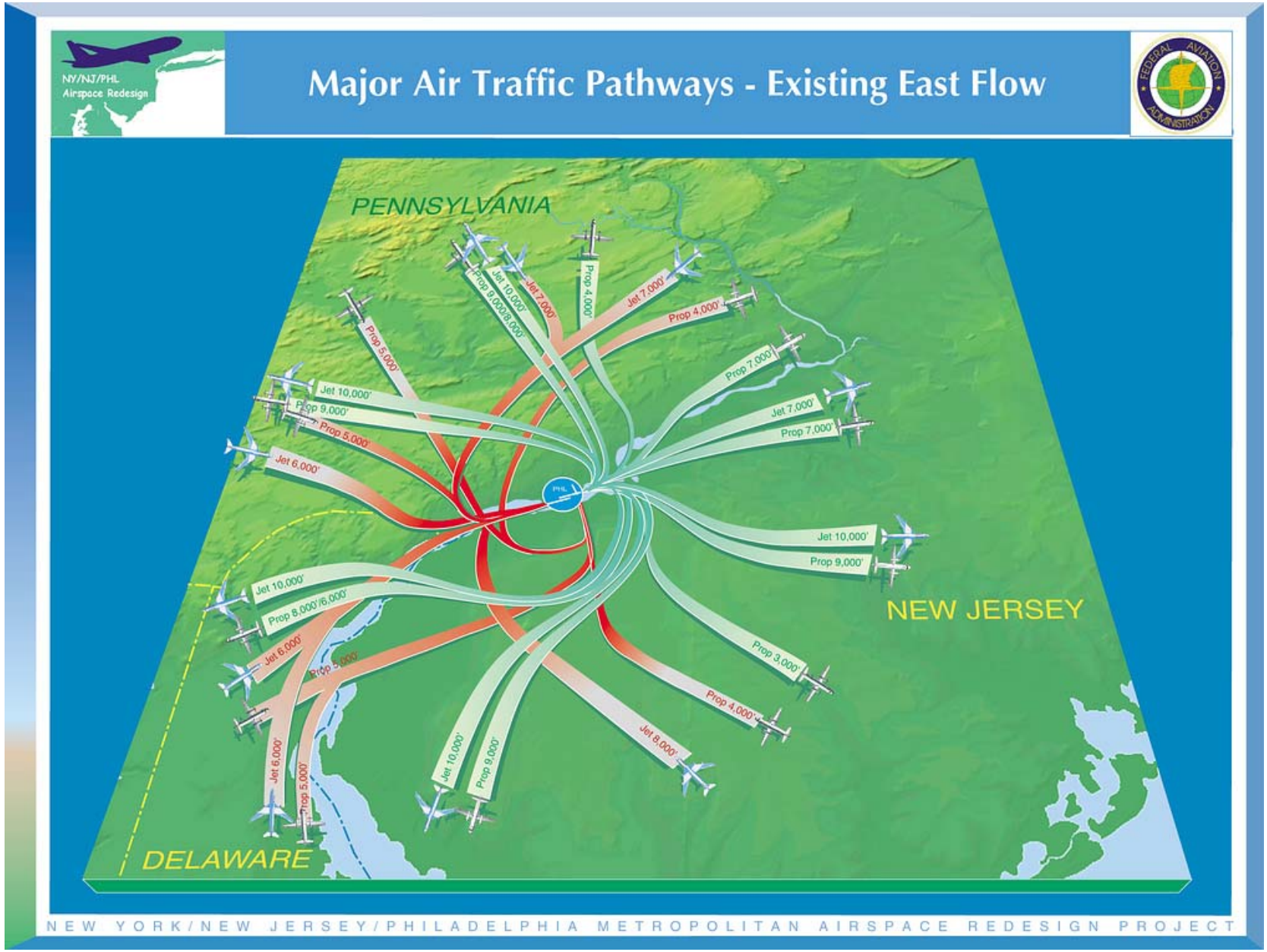


Figure 9.15-C Regional Airspace & Airports: NY, NJ & Philadelphia Area

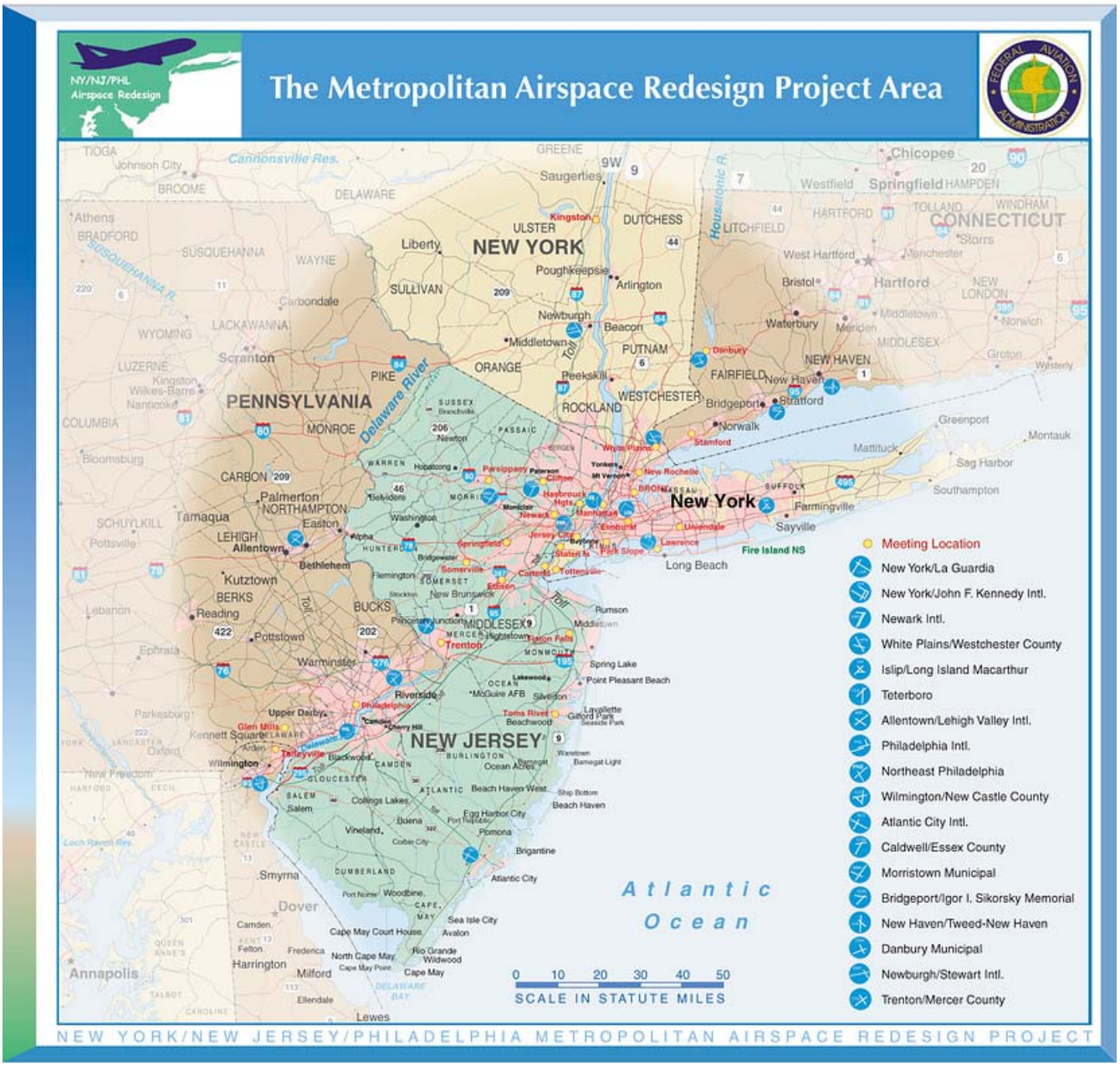


Figure 9.15-D National Air Traffic Data – Flights to Los Angeles

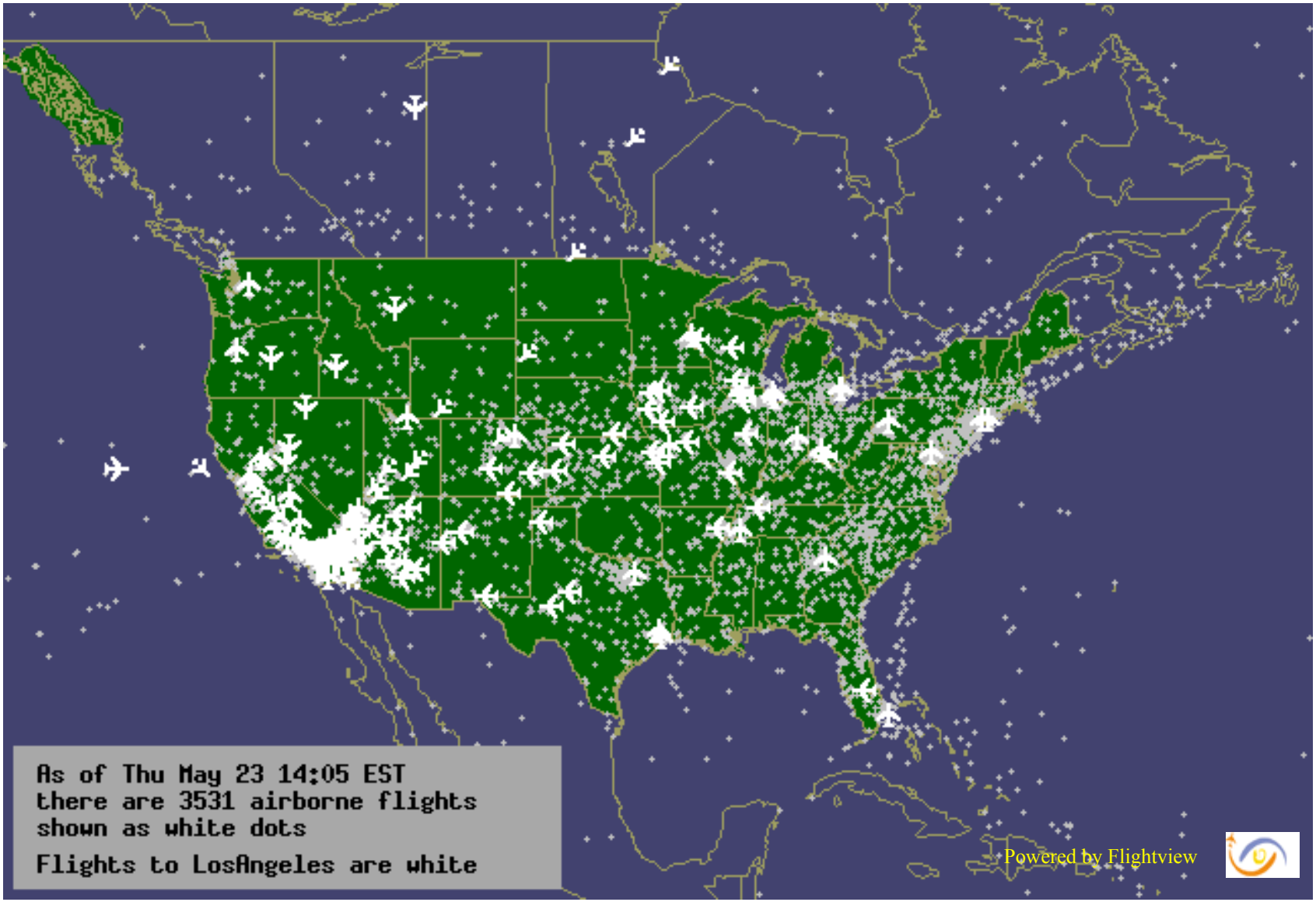


Figure 9.15-E National Air Traffic Data – Flights to Philadelphia

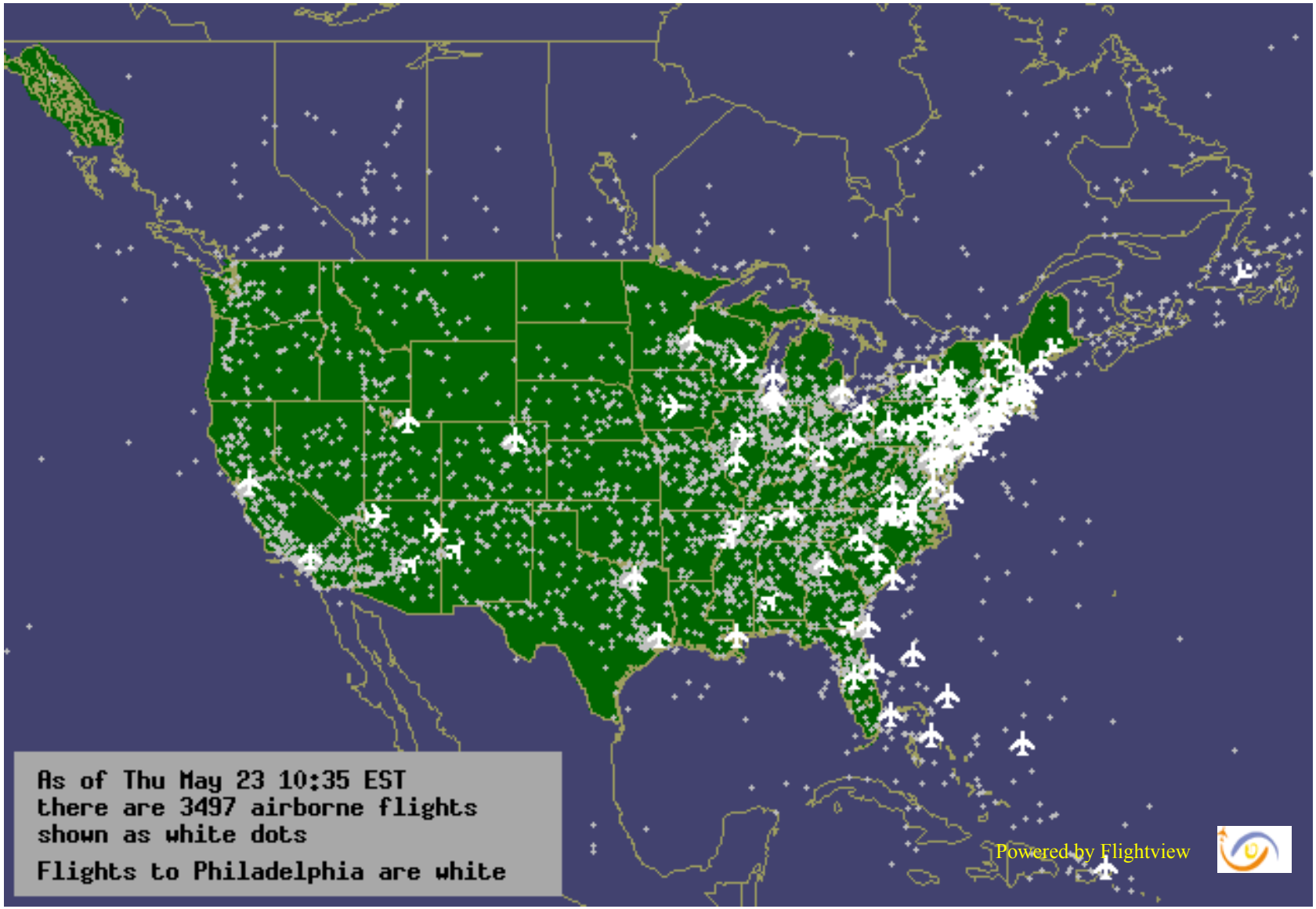


Figure 9.15-F National Air Traffic Data – Flights to Dulles (Washington)

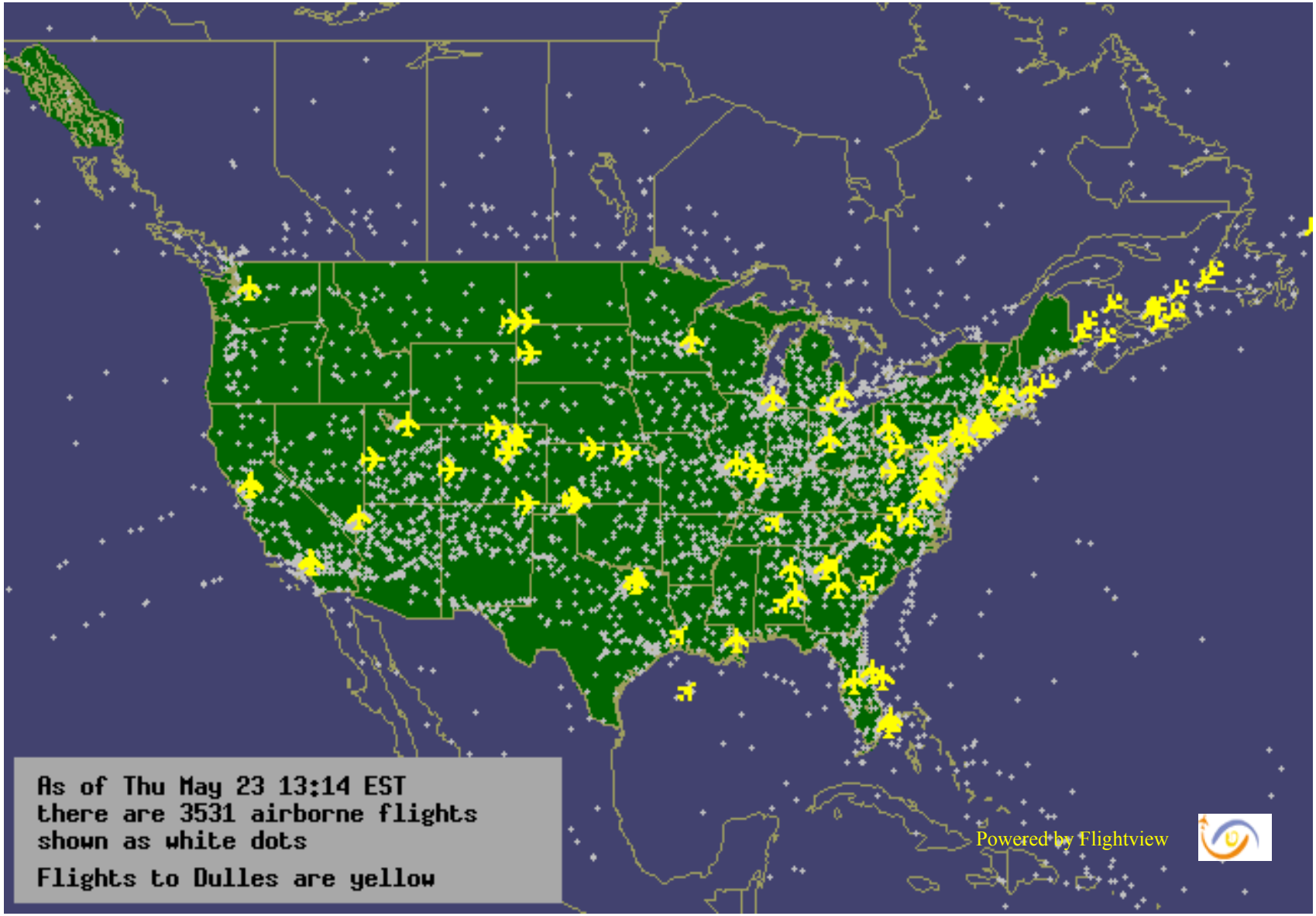


Figure 9.15-G National Air Traffic Data – Flights to JFK (NY)

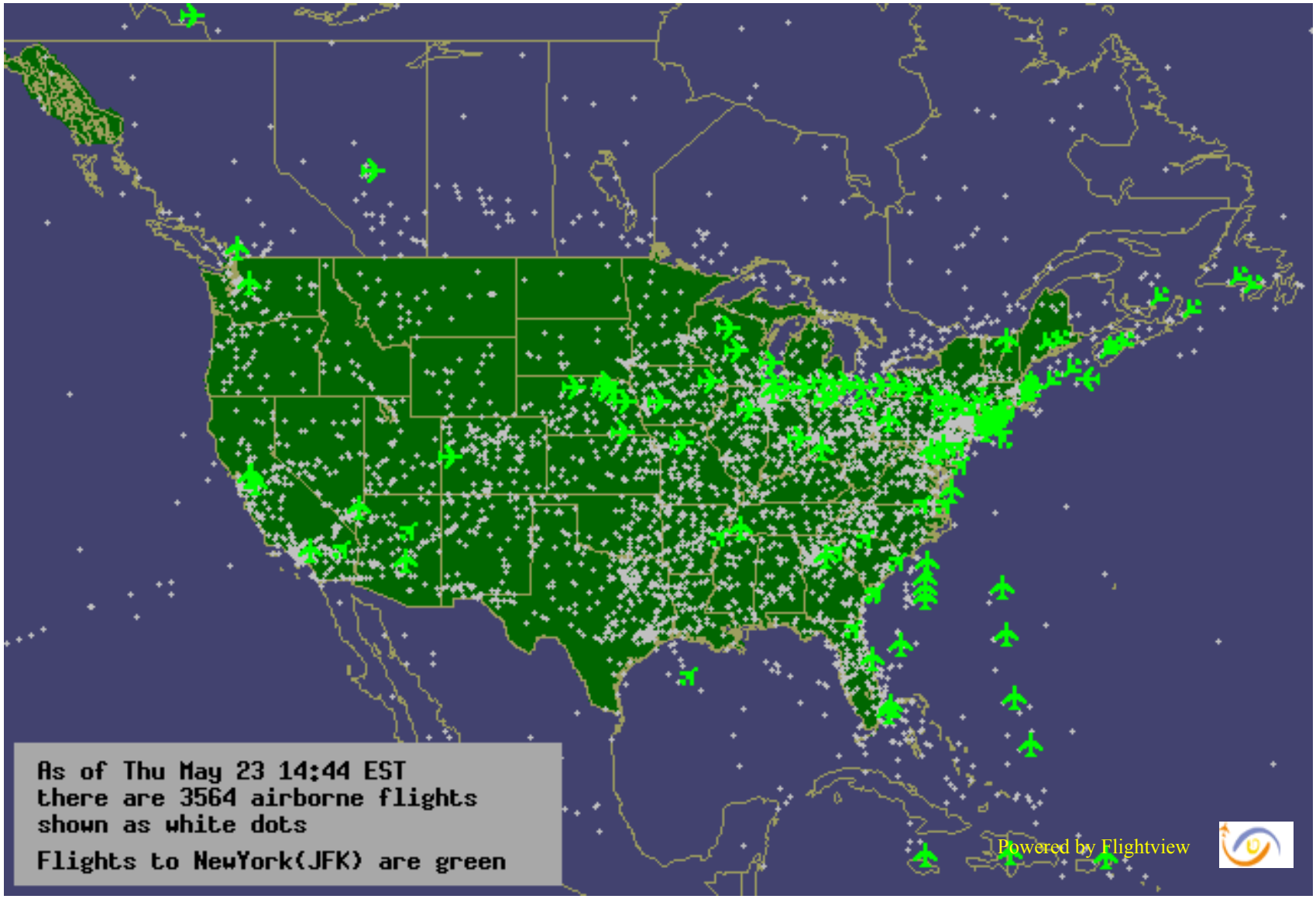


Figure 9.15-H National Air Traffic Data – Flights to San Francisco

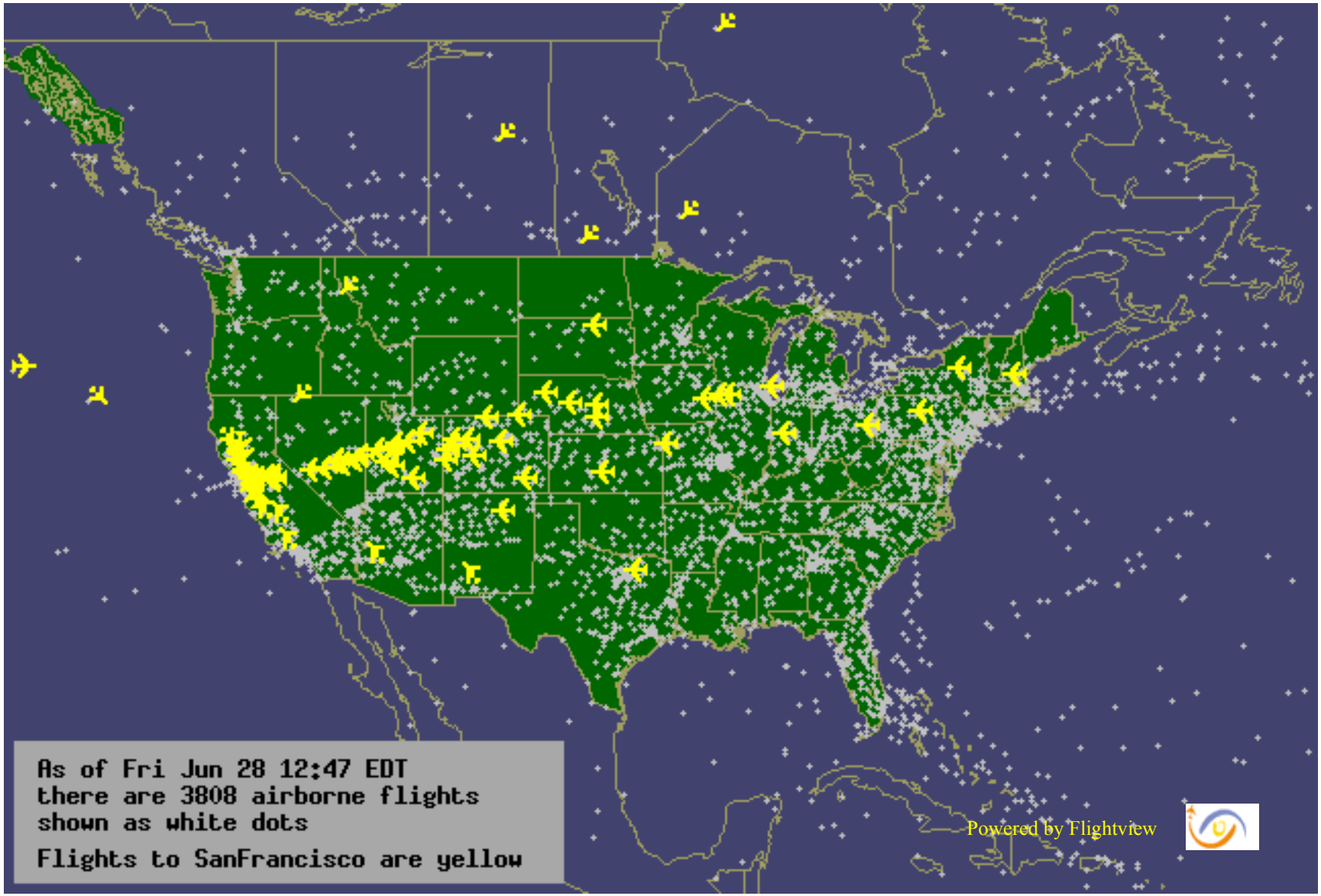
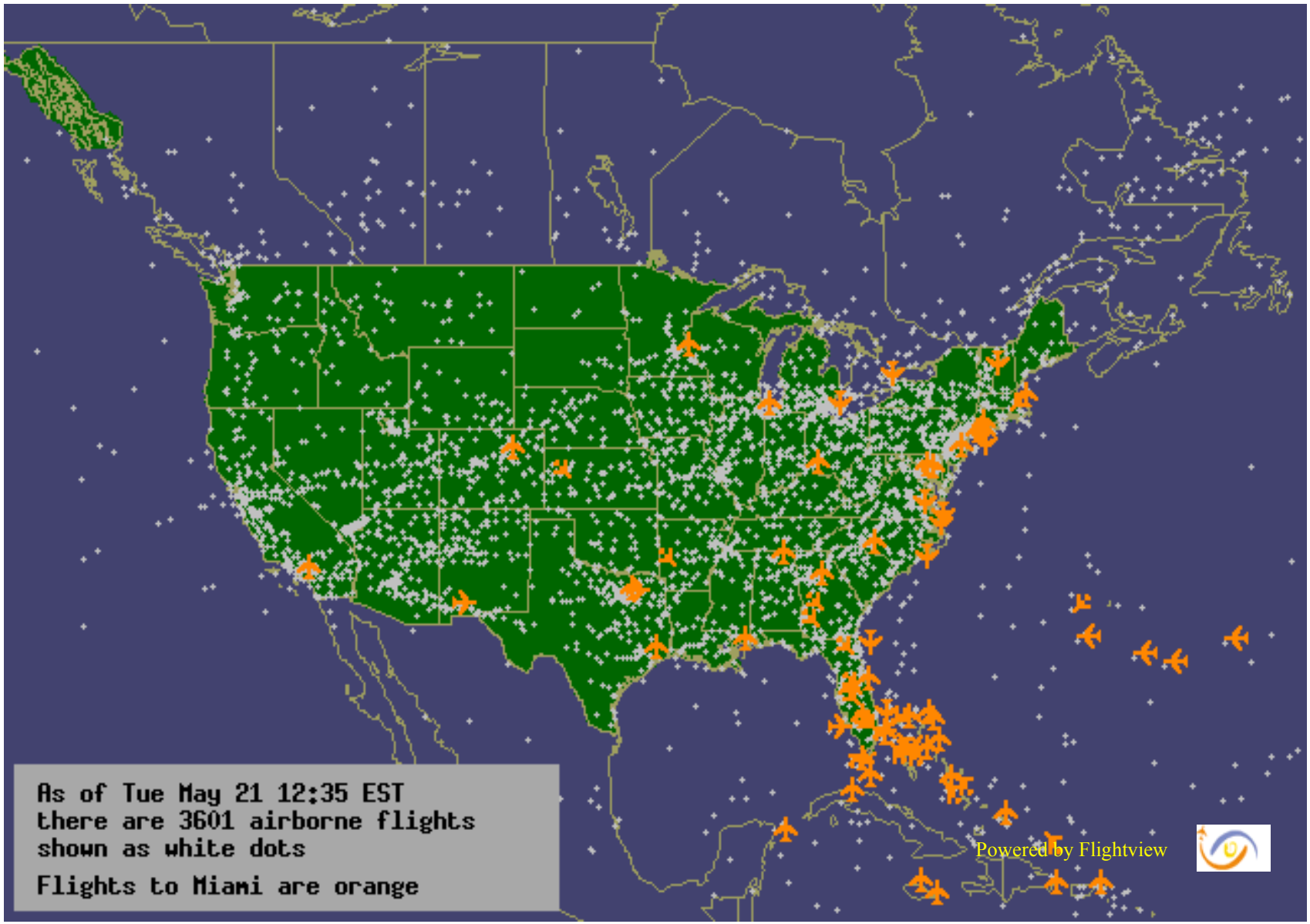


Figure 9.15-I National Air Traffic Data – Flights to Miami



9.16 Case Study Flight Profile and Affected Terrestrial Cell Sites

Table 9.16-A Data Sheet Analysis: Affected Terrestrial Cell Sites, H-POL Antenna, Jet Aircraft

Affected Terrestrial Cell Sites along flight path DC to NJ, for H-POL Terrestrial Antenna, Jet Aircraft

Flight Waypoint #	Airplane Altitude (ft, AMSL)	Airplane Distance (mi) Fm Dulles	Airplane Distance (mi) Fm Teterboro	AirCell Serving Site [5]	Distance Fm AirCell Serving Site	AirCell [3] Mobile DPC Level	dB Offset [2] for RSSI	Distance (mi) [1] to Terrestrial Site Average	Distance (mi) [1] to Terrestrial Site 90%	Average RSSI # of Affected Terrestrial Sites [4] Total	Average RSSI # of Affected Terrestrial Sites [4] 1/7 Total	90% RSSI # of Affected Terrestrial Sites [4] Total	90% RSSI # of Affected Terrestrial Sites [4] 1/7 Total
1	2,000	5	219	WV	50	4	-8	20	40	184	26	328	47
2	5,000	12.5	211.5	WV	55	3	-4	42	45	398	57	420	60
3	10,000	25	199	WV	63	3.25	-5	40	42	420	60	428	61
4	19,000	57	167	WV	82	3	-4	54	56	470	67	487	70
5	19,000	79	145	DE	71	3.5	-6	52	56	290	41	340	49
6	19,000	123	101	DE or NJ	80	3	-4	54	56	382	55	394	56
7	19,000	151	73	NJ	51	4	-8	38	55	311	44	498	71
8	10,000	181	43	NJ	31	4	-8	28	42	180	26	485	69
9	5,000	199	25	NJ	27	3	-4	42	45	736	105	784	112
10	2,000	215	9	NJ	32	5.75	-15	6	20	28	4	447	64
				Average =	54.2	3.7	-6.6	37.6	45.7	340	49	461	66
				Std. Dev.=	20.0	0.9	3.4	15.6	11.2	193	28	128	18
									Total Affected Terrestrial Cell sites [4]:	**1551**	**222**	**1608**	**230**

Notes for Table (above):

1. The data sheet above represents the number and distances to the affected terrestrial cell sites for the the Phase 1 Flight Test Results. An Interference Analysis Point (IAP) of -114 dBm for AMPS, TDMA & CDMA technologies is used to determine the approximate distance for consistent AirCell Signal Levels. These are the distances from the Airplane to the terrestrial cell site, using the IAP as a threshold, the pathloss (AirCell signal strength) from the DPC Disabled Flight Tests, and the average AirCell Mobile DPC level from DPC Enabled flight tests. The Average and 90% RSSI Levels, from the DPC Disabled flight tests graphs for the specified flight altitudes and airplanes, are used to determine the distances to the signal level crossing. A RSSI "dB Offset" for AirCell mobile Tx Power is observed from the DPC Enabled flight test results. The resultant distances are the radius' of the circles for the Flight Map Exhibit, with Affected Terrestrial Cell Sites.

2. This analysis uses the "average" AirCell mobile DPC level, as observed for the "Average DPC Levels" line from the DPC Enabled flight test results. These AirCell mobile DPC levels are observed for the specified flight altitudes, airplanes and distances from the AirCell Marlboro, NJ site.

3. This analysis uses a "dB Offset for RSSI", which is assessed from the "Average DPC Levels" from flight tests with DPC Enabled. For this analysis, this dB value is used to lower the AirCell signals levels received at the terrestrial site, from the Phase 1 Flight Test Results for the DPC Disabled Flight Tests.

4. The Total # of Affected Terrestrial Sites are computed from the "airplane to terrestrial cell" Distances, for the Average or 90% Signal Levels, as listed above. The Total and 1/7 Total data is computed from the cell sites on Flight Map Exhibit with Affected Terrestrial Cell Sites. The "Total Affected Terrestrial Cell sites" are unique, which have the duplicated cell sites removed from the individual waypoint counts for the overlapping circles.

5. This analysis uses the closest AirCell site as the serving AirCell site for each waypoints above, which assumes that the AirCell airborne mobile will be at a more conservative DPC level, which is at lower power.

Table 9.16-B Data Sheet Analysis: Affected Terrestrial Cell Sites, OMNI Antenna, Jet Aircraft

Affected Terrestrial Cell Sites along flight path DC to NJ, for Omni Terrestrial Antenna, Jet Aircraft

Flight Waypoint #	Airplane Altitude (ft, AMSL)	Airplane Distance (mi) Fm Dulles	Airplane Distance (mi) Fm Teterboro	AirCell Serving Site [5]	Distance Fm AirCell Serving Site	AirCell [2] Mobile DPC Level	dB Offset [3] for RSSI	Distance (mi) [1] to Terrestrial Site Average	Distance (mi) [1] to Terrestrial Site 90%	Average RSSI # of Affected Terrestrial Sites [4] Total	Average RSSI # of Affected Terrestrial Sites [4] 1/7 Total	90% RSSI # of Affected Terrestrial Sites [4] Total	90% RSSI # of Affected Terrestrial Sites [4] 1/7 Total
1	2,000	5	219	WV	50	4	-8	4	6	10	1	16	2
2	5,000	12.5	211.5	WV	55	3	-4	6	11	30	4	90	13
3	10,000	25	199	WV	63	3.25	-5	4	5	13	2	17	2
4	19,000	57	167	WV	82	3	-4	6	10	20	3	47	7
5	19,000	79	145	DE	71	3.5	-6	4	7	2	0	5	1
6	19,000	123	101	DE or NJ	80	3	-4	6	10	7	1	17	2
7	19,000	151	73	NJ	51	4	-8	0	5	0	0	5	1
8	10,000	181	43	NJ	31	4	-8	0	4	0	0	4	1
9	5,000	199	25	NJ	27	3	-4	6	11	15	2	63	9
10	2,000	215	9	NJ	32	5.75	-15	2	5	3	0	19	3
				Average =	54.2	3.7	-6.6	3.8	7.4	10	1	28	4
				Std. Dev.=	20.0	0.9	3.4	2.4	2.8	10	1	29	4
									Total Affected Terrestrial Cell sites [4]:	**203**	**29**	**369**	**53**

Notes for Table (above):

1. The data sheet above represents the number and distances to the affected terrestrial cell sites for the the Phase 1 Flight Test Results. An Interference Analysis Point (IAP) of -114 dBm for AMPS, TDMA & CDMA technologies is used to determine the approximate distance for consistent AirCell Signal Levels. These are the distances from the Airplane to the terrestrial cell site, using the IAP as a threshold, the pathloss (AirCell signal strength) from the DPC Disabled Flight Tests, and the average AirCell Mobile DPC level from DPC Enabled flight tests. The Average and 90% RSSI Levels, from the DPC Disabled flight tests graphs for the specified flight altitudes and airplanes, are used to determine the distances to the signal level crossing. A RSSI "dB Offset" for AirCell mobile Tx Power is observed from the DPC Enabled flight test results. The resultant distances are the radius' of the circles for the Flight Map Exhibit, with Affected Terrestrial Cell Sites.

2. This analysis uses the "average" AirCell mobile DPC level, as observed for the "Average DPC Levels" line from the DPC Enabled flight test results. These AirCell mobile DPC levels are observed for the specified flight altitudes, airplanes and distances from the AirCell Marlboro, NJ site.

3. This analysis uses a "dB Offset for RSSI", which is assessed from the "Average DPC Levels" from flight tests with DPC Enabled. For this analysis, this dB value is used to lower the AirCell signals levels received at the terrestrial site, from the Phase 1 Flight Test Results for the DPC Disabled Flight Tests.

4. The Total # of Affected Terrestrial Sites are computed from the "airplane to terrestrial cell" Distances, for the Average or 90% Signal Levels, as listed above. The Total and 1/7 Total data is computed from the cell sites on Flight Map Exhibit with Affected Terrestrial Cell Sites. The "Total Affected Terrestrial Cell sites" are unique, which have the duplicated cell sites removed from the individual waypoint counts for the overlapping circles.

5. This analysis uses the closest AirCell site as the serving AirCell site for each waypoints above, which assumes that the AirCell airborne mobile will be at a more conservative DPC level, which is at lower power.

Table 9.16-C Data Sheet Analysis: Affected Terrestrial Cell Sites, H-POL Antenna, Piston Aircraft

Affected Terrestrial Cell Sites along flight path DC to NJ, for H-POL Terrestial Antenna, Piston Aircraft

Flight Waypoint #	Airplane Altitude (ft, AMSL)	Airplane Distance (mi) Fm Dulles	Airplane Distance (mi) Fm Teterboro	AirCell Serving Site [5]	Distance Fm AirCell Serving Site	AirCell [3] Mobile DPC Level	dB Offset [2] for RSSI	Distance (mi) [1] to Terrestrial Site Average	Distance (mi) [1] to Terrestrial Site 90%	Average RSSI # of Affected Terrestrial Sites [4] Total	Average RSSI # of Affected Terrestrial Sites [4] 1/7 Total
1	2,000	5	219	WV	50	4	-8	20	40	171	24
2	5,000	12.5	211.5	WV	55	3	-4	42	45	397	57
3	7,000	18	206	WV	58	3	-4	42	45	416	59
4	7,000	46	178	WV	80	2	0	58	60	499	71
5	7,000	79	145	DE	71	3	-4	42	45	200	29
6	7,000	123	101	DE or NJ	80	3	-4	42	45	289	41
7	7,000	168	56	NJ	39	4.5	-10	20	42	72	10
8	7,000	184	40	NJ	29	5	-12	13	42	42	6
9	4,000	204	20	NJ	27	3	-4	42	45	761	109
10	2,000	215	9	NJ	32	5.75	-15	6	20	28	4
				Average =	52.1	3.6	-6.5	32.7	42.9	288	41
				Std. Dev.=	20.3	1.2	4.6	16.7	9.7	234	33
									Total Affected Terrestrial Cell sites [4]:	**1542**	**220**

Notes for Table (above):

1. The data sheet above represents the number and distances to the affected terrestrial cell sites for the the Phase 1 Flight Test Results. An Interference Analysis Point (IAP) of -114 dBm for AMPS, TDMA & CDMA technologies is used to determine the approximate distance for consistent AirCell Signal Levels. These are the distances from the Airplane to the terrestrial cell site, using the IAP as a threshold, the pathloss (AirCell signal strength) from the DPC Disabled Flight Tests, and the average AirCell Mobile DPC level from DPC Enabled flight tests. The Average and 90% RSSI Levels, from the DPC Disabled flight tests graphs for the specified flight altitudes and airplanes, are used to determine the distances to the signal level crossing. A RSSI "dB Offset" for AirCell mobile Tx Power is observed from the DPC Enabled flight test results. The resultant distances are the radius' of the circles for the Flight Map Exhibit, with Affected

2. This analysis uses the "average" AirCell mobile DPC level, as observed for the "Average DPC Levels" line from the DPC Enabled flight test results. These AirCell mobile DPC levels are observed for the specified flight altitudes, airplanes and distances from the AirCell Marlboro, NJ site.

3. This analysis uses a "dB Offset for RSSI", which is assessed from the "Average DPC Levels" from flight tests with DPC Enabled. For this analysis, this dB value is used to lower the AirCell signals levels received at the terrestrial site, from the Phase 1 Flight Test Results for the DPC Disabled Flight Tests.

4. The Total # of Affected Terrestrial Sites are computed from the "airplane to terrestrial cell" Distances, for the Average or 90% Signal Levels, as listed above. The Total and 1/7 Total data is computed from the cell sites on Flight Map Exhibit with Affected Terrestrial Cell Sites. The "Total Affected Terrestrial Cell sites" are unique, which have the duplicated cell sites removed from the individual waypoint counts for the overlapping circles.

5. This analysis uses the closest AirCell site as the serving AirCell site for each waypoints above, which assumes that the AirCell airborne mobile will be at a more conservative DPC level, which is at lower power.

Figure 9.16-A Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, H-POL Antenna, 90% Signal

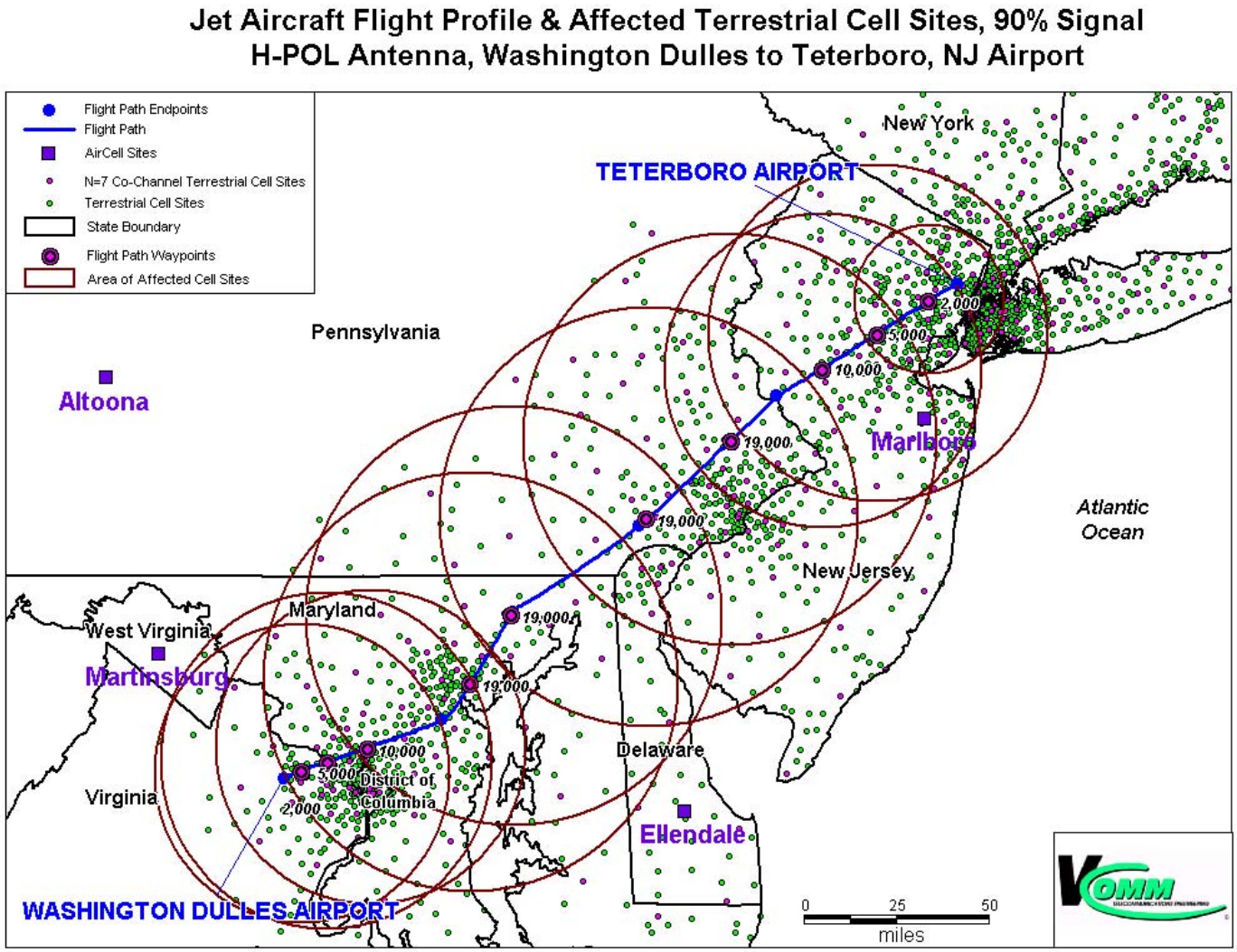


Figure 9.16-B Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, H-POL Antenna, Average Signal

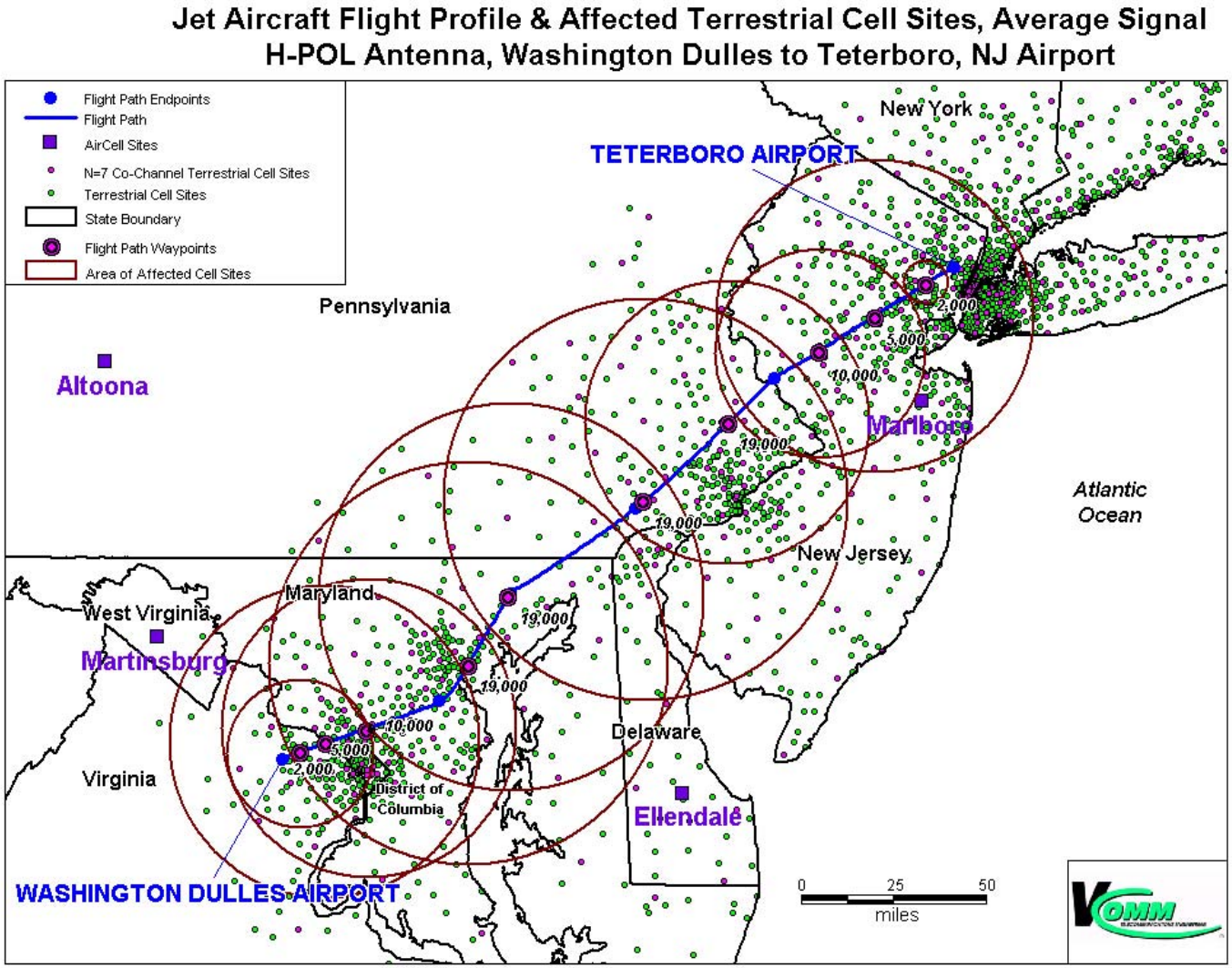


Figure 9.16-C Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, SL45 Antenna, Average Signal

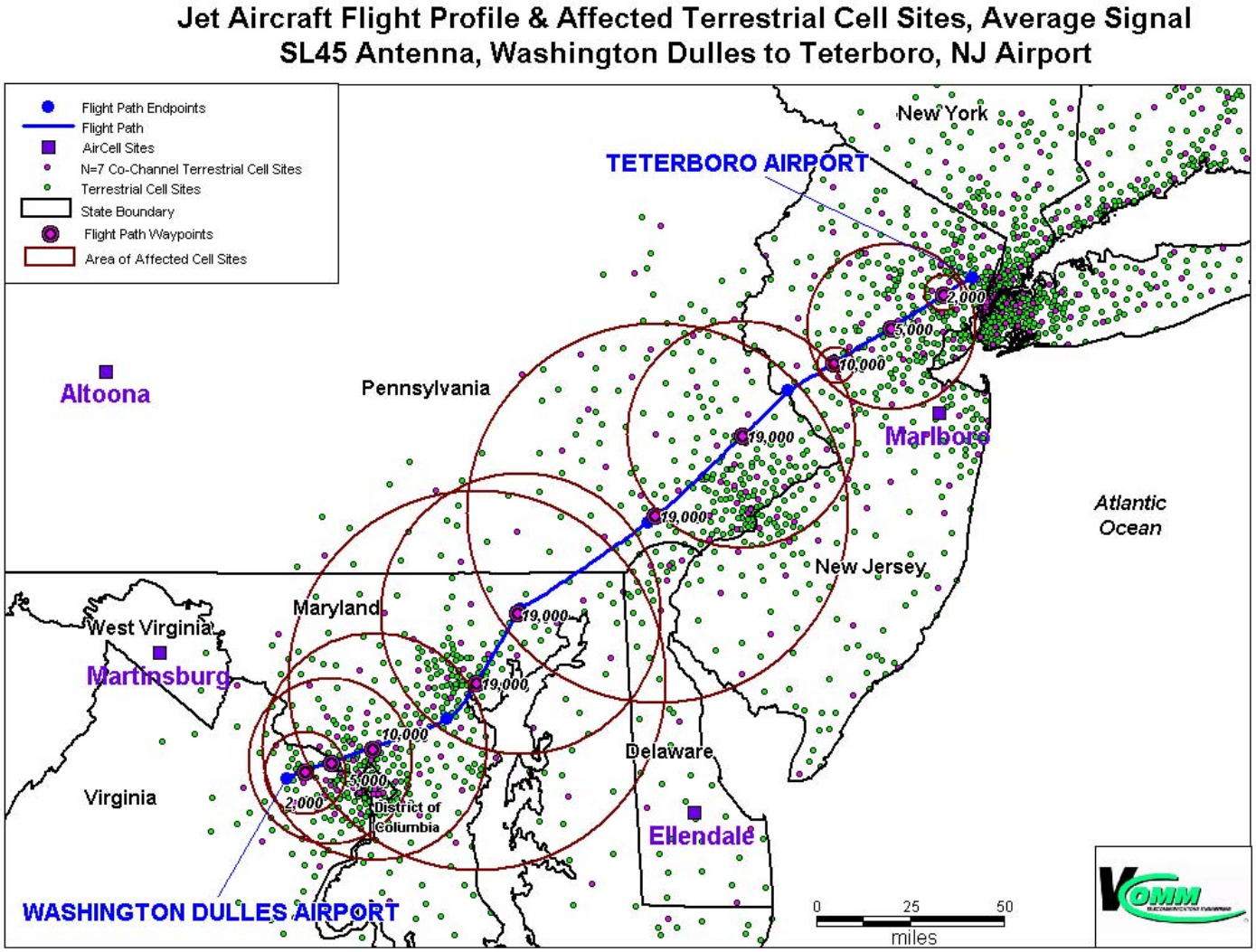


Figure 9.16-D Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, V-POL Antenna, Average Signal

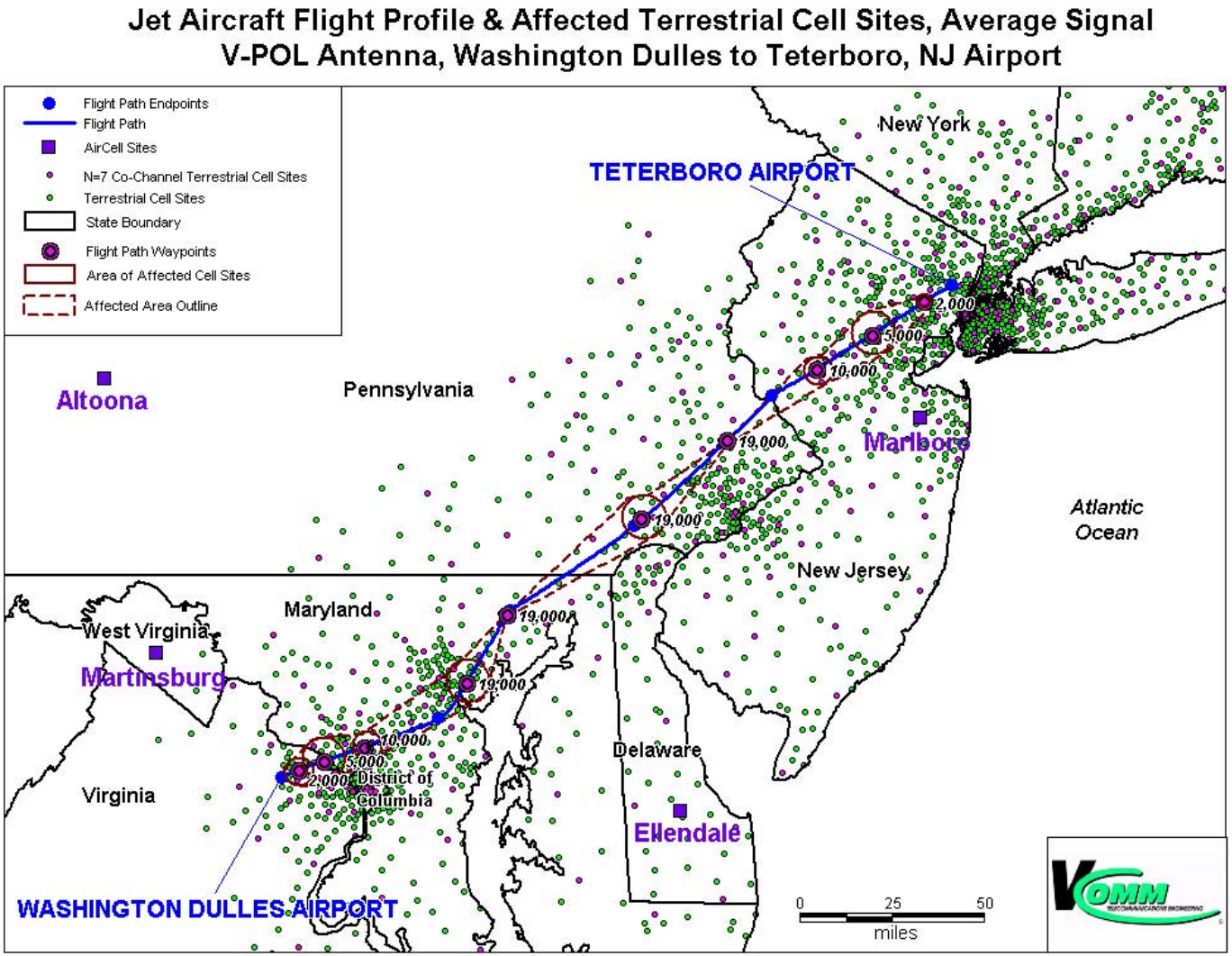


Figure 9.16-E Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, OMNI Antenna, Average Signal

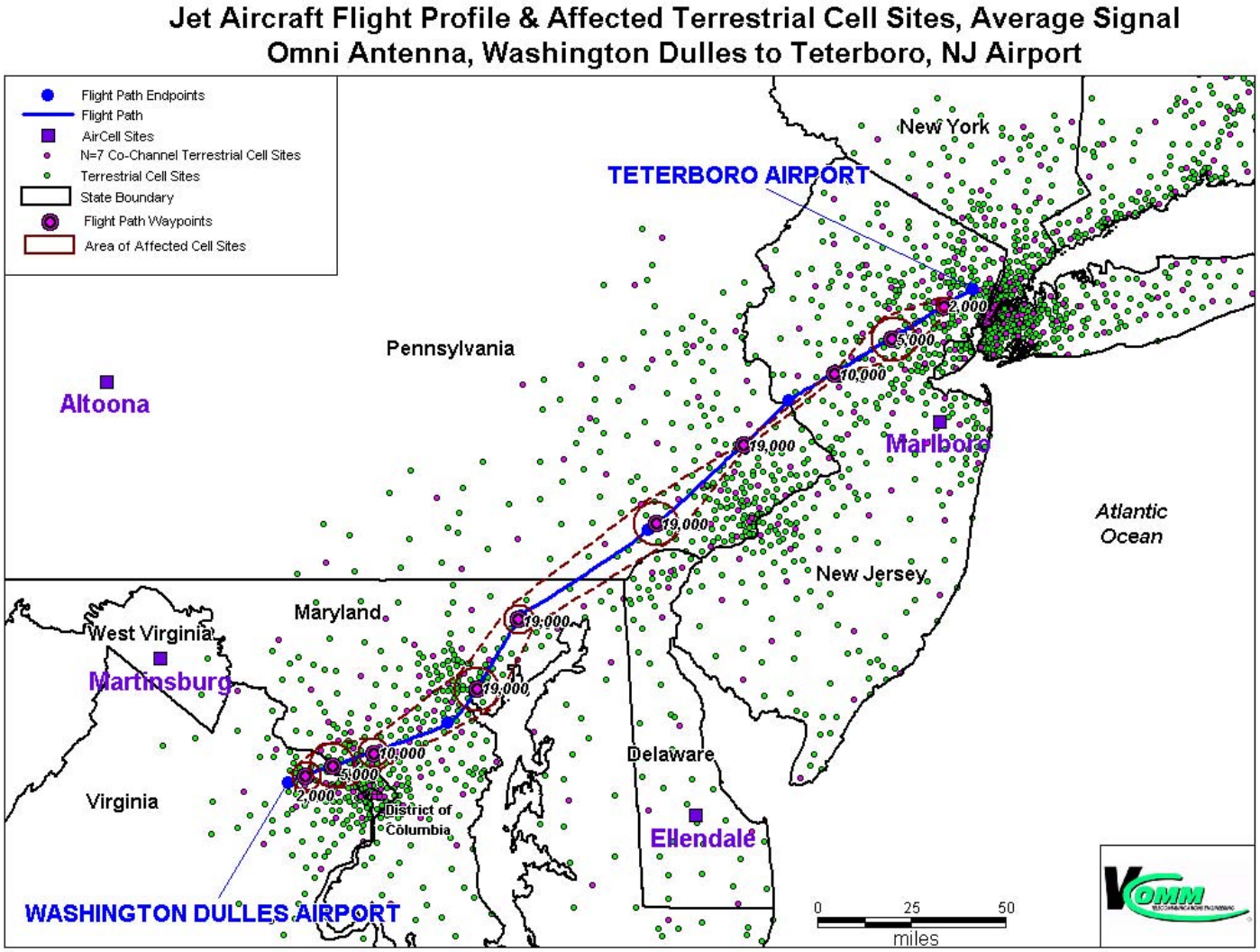


Figure 9.16-F Jet Aircraft Flight Profile & Affected Terrestrial Cell Sites, OMNI Antenna, 90% Signal

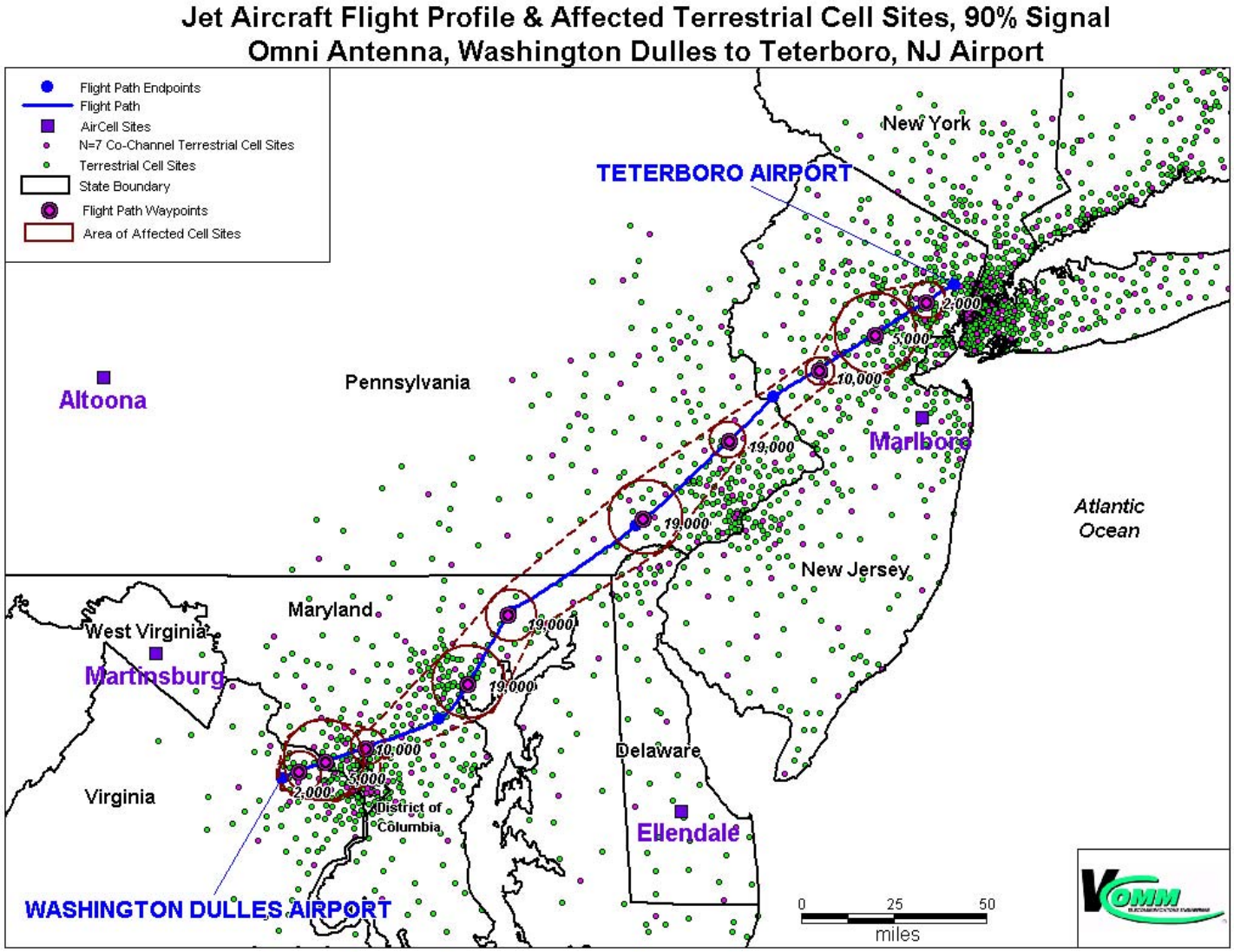
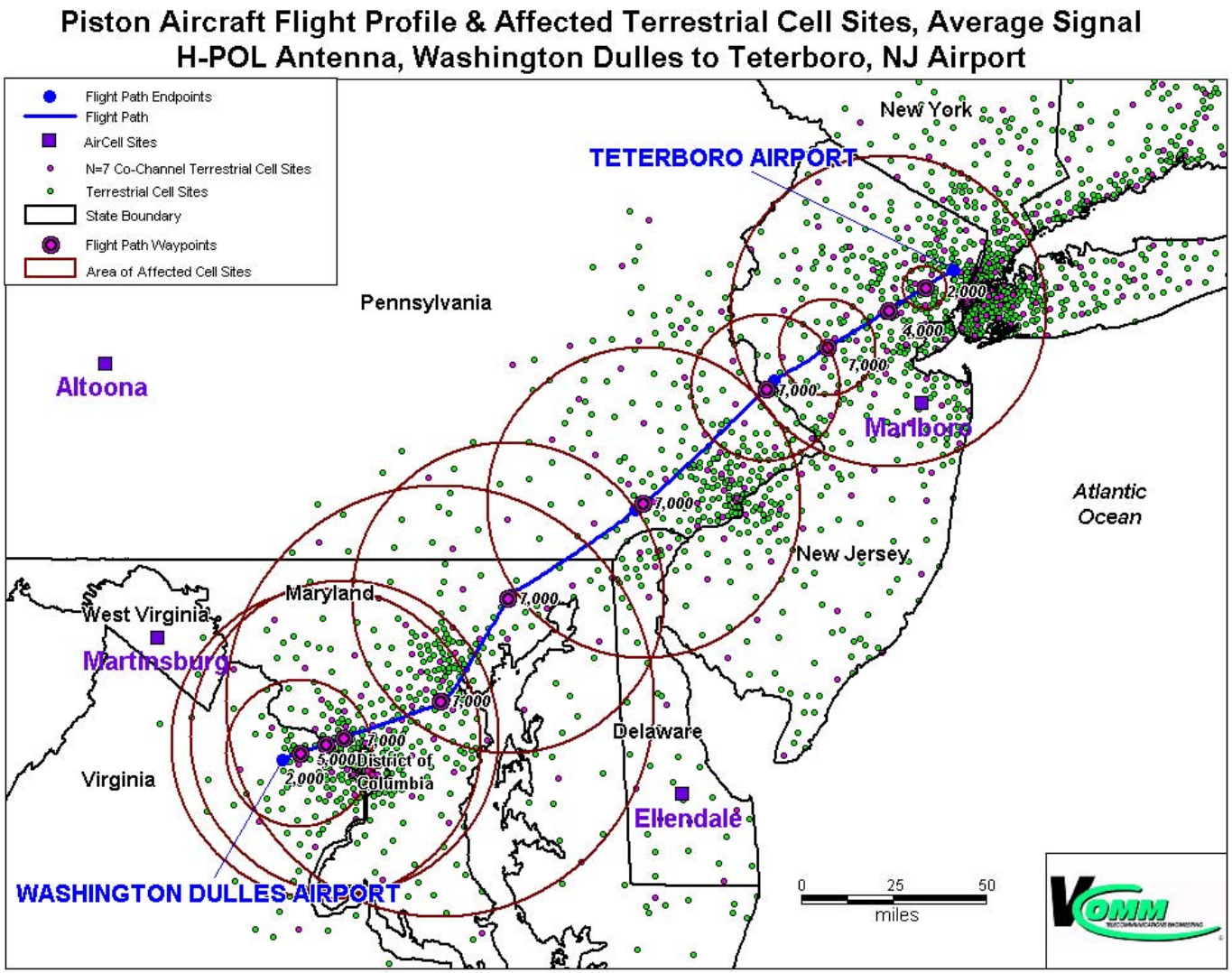



Figure 9.16-G Piston Aircraft Flight Profile & Affected Terrestrial Cell Sites, H-POL Antenna, Average Signal