

# United States Court of Appeals for the Federal Circuit

04-1249, -1295

NORTHPOINT TECHNOLOGY, LTD.,

Plaintiff-Appellant,

v.

MDS AMERICA, INC. and MDS INTERNATIONAL, S.A.R.L.,

Defendants-Cross Appellants.

Michael K. Kellogg, Kellogg, Huber, Hansen, Todd & Evans, PLLC, of Washington, DC, argued for plaintiff-appellant. With him on the brief were Richard H. Stern, J.Christopher Rozendaal, and Eugene M. Paige.

James H. Laughlin, Jr., Swidler Berlin Shereff Friedman, LLP, of Washington, DC, argued for defendants-cross appellants. With him on the brief were Edward A. Pennington, Robert C. Bertin, and Thomas S. Valente.

Appealed from: United States District Court for the Southern District of Florida

Judge James I. Cohn

# United States Court of Appeals for the Federal Circuit

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NORTHPOINT TECHNOLOGY, LTD.,

Plaintiff-Appellant,

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DECIDED: June 28, 2005

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Before SCHALL, BRYSON, and DYK, Circuit Judges.

Opinion for the court filed by Circuit Judge BRYSON. Concurring in part and dissenting in part opinion filed by Circuit Judge DYK.

BRYSON, Circuit Judge.

Northpoint Technology, Ltd., is the assignee of U.S. Patent No. 5,761,605 (“the ‘605 patent”), entitled “Apparatus and Method for Reusing Satellite Broadcast Spectrum for Terrestrially Broadcast Signals,” and U.S. Patent No. 6,169,878 (“the ‘878 patent”), entitled “Apparatus and Method for Transmitting Terrestrial Signals on a Common Frequency with Satellite Transmissions.” Northpoint asserted the ‘605 and ‘878 patents against MDS America, Inc. (“MDSA”) and MDS International, S.A.R.L. (“MDSI”) in an action filed in the United States District Court for the Southern District of Florida. Following a trial, a jury determined that MDSA had infringed claim 8 of the ‘605 patent and claims 1 and 7 of the ‘878 patent. The jury determined, however, that those three

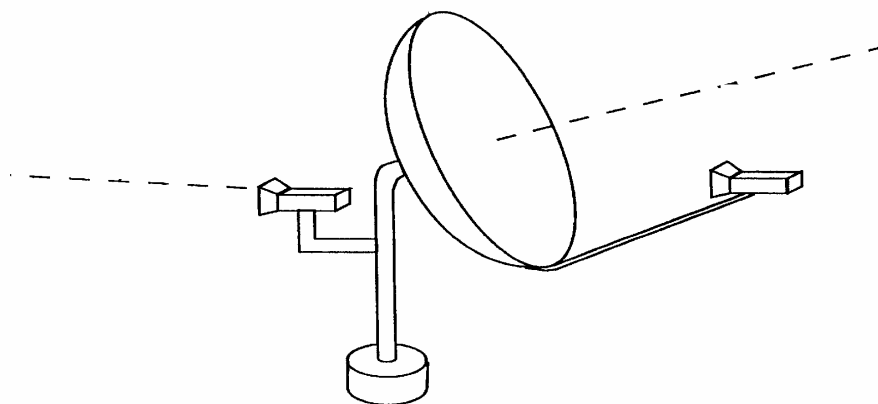
claims were invalid. The district court subsequently denied Northpoint's motion for judgment as a matter of law ("JMOL") that the three asserted claims were not invalid, and the court denied Northpoint's motion for a new trial. The district court entered judgment on the verdict. Northpoint appeals from the denial of its motion for JMOL regarding validity and the denial of a new trial. MDSA cross-appeals from the aspect of the judgment finding that it infringed claim 8 of the '605 patent and claims 1 and 7 of the '878 patent. MDSA and MDSI jointly cross-appeal, contending that the district court should have extended the judgment of invalidity to all the remaining claims of the two patents in suit. We affirm the judgment in all respects.

I

In the early 1980s, the Federal Communications Commission ("FCC") began allowing direct broadcast satellite service ("DBS") from satellites in geosynchronous orbit, using the frequency range from 12.2 to 12.7 Gigahertz, to provide audio and video programming to users. The FCC recognized that multiple satellites could transmit on the same frequencies if the satellites were spaced apart by at least nine degrees in longitude and if users employed highly directional antennas to receive the DBS signals. There are now multiple geosynchronous satellites transmitting service on the same frequencies to most geographical locations in the United States at any given time. Because of the directionality of the receiving antennas and the longitudinal separation of the satellites, a user can receive a signal from one satellite, and avoid interference from signals transmitted by other satellites, by pointing a directional antenna at the satellite that is transmitting the desired signal.

Most DBS satellites provide coverage to the entire continental United States. The satellites do not provide local television programming to most users, because each satellite can transmit only a limited number of channels, and the satellites therefore typically transmit only those channels that contain programming of national interest. As a result, most DBS users cannot receive local channels that include matters of local interest, such as local news, weather, and advertising.

Northpoint's invention claims to solve this problem by terrestrially broadcasting local programming on the same frequencies that are used by the DBS system in a manner that permits both signals to be received at the user location at the same time without interfering with each other. The concept underlying the invention is that the DBS satellites are in geosynchronous orbit above the equator and therefore transmit in a northerly direction to the North American continent. Accordingly, a directional antenna employed at a user location in the United States must be pointed south towards the satellite in order to receive the signal. Northpoint's preferred embodiment of the invention transmits terrestrial signals from north of the user's location to a second directional antenna at the user's location that is pointed northward towards the terrestrial transmitter, as depicted below.



According to Northpoint, the terrestrial signal will not interfere with the DBS signal or vice versa because the terrestrial signal will be transmitted in a specific azimuth spaced away from the DBS satellite-to-user azimuth. Northpoint claims that in such a case, the signal received by each antenna at the user location will be outside the “directional reception range” of the other antenna. Claim 8 of the '605 patent provides as follows:

A method for simultaneously providing local originating signals on a common frequency with direct broadcast satellite signals transmitted from a satellite, where the satellite is a first satellite location in geosynchronous orbit about the earth, the method comprising the steps of:

(a) at a user location, receiving direct broadcast satellite signals at a first frequency with a first antenna adapted to receive signals at the first frequency only within a first directional reception range as measured from a centerline of the first antenna;

(b) transmitting terrestrial signals at the first frequency and in a terrestrial azimuth range from a terrestrial transmitter, the terrestrial azimuth range being outside of the directional reception range of the first antenna positioned to receive direct broadcast satellite signals from the satellite; and

(c) at the user location, remote from the terrestrial transmitter, receiving the terrestrial signals with a second antenna adapted for receiving signals at the first frequency only within a second directional reception range as measured from a centerline of the second antenna, the second antenna being aligned so that the direct broadcast satellite signals transmitted by the satellite are not transmitted within the directional reception range of the second antenna.

Claim 1 of the '878 patent recites the apparatus for transmitting the satellite and terrestrial signals, as follows:

An apparatus for simultaneously transmitting terrestrial signals on a common frequency with satellite signals transmitted from a satellite, the satellite transmitting satellite signals at a first frequency to a user location for reception only within a satellite directional reception range about the user location, the apparatus comprising:

(a) a directional terrestrial transmitter for transmitting terrestrial signals at the first frequency in a limited azimuth range around the location of the terrestrial transmitter, the terrestrial transmitter being located with respect to the user location such that the terrestrial transmitter transmits to

the user location along a route which is outside of the satellite directional reception range.

Claim 7 of the '878 is the corresponding method claim to claim 1:

A method for simultaneously providing terrestrial signals on a common frequency with satellite signals transmitted from a satellite, where the satellite is transmitting at a first frequency along a satellite transmission axis extending from the satellite to a terrestrial user location, the method comprising the step of:

(a) transmitting terrestrial signals at a first frequency in a limited azimuth range from a terrestrial transmitter, the terrestrial transmitter being located with respect to the user location so as to transmit to the user location along a transmission route which is outside of a satellite directional reception range about the user location, wherein the satellite directional reception range comprises a limited directional range substantially centered on the satellite transmission axis.

In 1999 Northpoint and two other companies applied to the FCC for permission to provide terrestrial Multichannel Video Distribution and Data Service ("MVDDS") in the DBS frequency range of 12.2 to 12.7 GHz. Congress authorized the FCC to select an independent engineering firm to determine whether terrestrial and satellite use of the same bandwidth was feasible without causing interference. The FCC hired the Mitre Corporation, a not-for-profit engineering company that studies engineering issues for the government, to make that determination. Mitre's analysis concluded that "MVDDS sharing for the 12.2–12.7 GHz band currently reserved for DBS poses a significant threat to DBS operation in many realistic operational situations." However, Mitre also concluded that a "wide variety of mitigation techniques . . . if properly applied under appropriate circumstances" could possibly reduce or eliminate interference, but that bandsharing appeared to be feasible "if and only if suitable mitigatory measures" were used.

In 2002 the FCC adopted rules based on Mitre's analysis to allow terrestrial MVDDS in the DBS frequency range of 12.2 to 12.7 Gigahertz. MDSA applied to the FCC for an experimental license to test and prove its MVDDS system. The FCC granted the license, and MDSA arranged for a third party to perform tests in Florida using equipment furnished by MDSI. Northpoint became aware of the test in Florida and warned MDSA that performing the test would infringe its patents. After the conclusion of the Florida tests, Northpoint brought this action, asserting that MDSA and MDSI had infringed Northpoint's patents. In the Joint Pretrial Stipulation, Northpoint limited the asserted claims to claim 8 of the '605 patent and claims 1 and 7 of the '878 patent. After Northpoint presented its infringement case, the defendants moved for JMOL of noninfringement of the unasserted claims in the '605 and '878 patents. The district court denied that motion. After the defendants finished presenting their case, the jury found that MDSA did, and MDSI did not, infringe the three asserted claims. The jury also found, however, that each of those claims was invalid as anticipated, obvious, not enabled, and indefinite. Following the denial of post-trial JMOL motions, the district court entered final judgment, from which the parties filed the instant appeal and cross-appeal.

## II

We agree with the district court that substantial evidence supports the jury's verdict that the asserted claims were invalid based on anticipation. We also agree that substantial evidence supports the jury's verdict on enablement and that the district court therefore correctly entered judgment that the claims were invalid for lack of enablement. Because we uphold the judgment as to invalidity on those grounds, it is not necessary

for us to reach the issues of obviousness and indefiniteness. We also do not reach the cross-appeal with respect to claim construction. We agree that the district court correctly denied Northpoint's motion for a new trial, and we also agree that the district court correctly denied the defendants' motion for JMOL of invalidity with respect to all the unasserted claims of the '605 and '878 patents.

A

The defendants assert that four prior art references introduced at trial anticipate each asserted claim of the '605 and '878 patents. The evidence showed that each of those references teaches the importance of proper pointing of antennas to avoid interference between satellite and terrestrial systems broadcasting on the same frequency. The strongest of the four references is a paper entitled "Sharing the UHF Between Space and Terrestrial Services," written by John Hult and published in 1970, more than 25 years before the priority date of the '605 and '878 patents. Northpoint argued that the 1970 Hult reference did not anticipate the asserted claims of the '605 and '878 patents because it failed to disclose the "directional reception range" limitation in all three claims.

The district court construed the term "directional reception range" to refer to "[a] three-dimensional space about the centerline of a receiving antenna within which a usable signal can be received, a usable signal being a signal from which the information carried by it can be extracted." Thus, for a transmitted signal to be received inside the directional reception range of an antenna, as the court construed that term, the receiving antenna must be able to extract the information carried by the signal.



Northpoint did not challenge the district court's construction of the term "directional reception range" at trial, and we adopt the district court's construction of that term.

Northpoint argues that the Hult reference does not anticipate the asserted claims because nothing in Hult requires that the satellite receiving antenna and the terrestrial receiving antenna physically point in different directions. For that reason, Northpoint contends, Hult discloses a system in which the satellite and terrestrial signals are not transmitted outside of the "directional reception range" of the terrestrial and satellite receiving antennas.

Northpoint's argument is based on a misinterpretation of the trial court's construction of the term "directional reception range." Northpoint interprets that term to be limited to an area at which a receiving antenna is physically aimed. In fact, however, the district court did not construe the term "directional reception range" so narrowly, nor did the evidence support such a narrow construction. Rather, the court's construction defined the term "directional reception range" with reference to the three-dimensional space in which the antenna could receive a usable signal, and not solely with reference to the physical positioning of the antenna.

Although the court's construction referred to the "centerline" of the receiving antenna, neither the court's construction nor the evidence at trial suggested that the "centerline" of the antenna was a physical feature of the antenna divorced from the area from which the antenna could receive a usable signal. The common specification of the '605 and '878 patents describes the "centerline" in terms of the antenna's maximum directional reception range, see '605 patent, col. 4, ll. 24-30, and Northpoint's expert testified that the antenna's centerline is the "center of the beam pointing towards the

satellite.” Moreover, he explained that the centerline of the beam is not necessarily the same as the physical, or “geometric center” of the receiving device, such as a parabolic dish antenna.

Northpoint’s argument, in essence, is that the adaptive array antennas disclosed in Hult are not directional and that they “operate in fundamentally different ways” from the antennas of the patented invention because they reject and ignore the unwanted satellite signal, while the claimed invention depends on preventing overlap of the directional reception range of the terrestrial and satellite receivers by pointing the antennas in opposite directions. However, nothing in the asserted claims requires that the receiving antennas be physically pointed at the sources of the satellite and terrestrial signals. Claim 8 of the ’605 patent merely requires that the two antennas be “adapted” to receive signals within a first and second directional reception range, and that the first be “positioned” to receive DBS signals from the satellite, while the second is “aligned” so that the DBS signals are not within that antenna’s directional reception range. The apparatus and method claims of the ’878 patent merely require a directional terrestrial transmitter to transmit along a route that is outside the directional reception range of the satellite transmissions.

The defendants’ expert, Philip Rubin, explained to the jury that an antenna’s directionality is based on many factors, including the shape of the reflective dish, in the case of dish-type antennas. When asked, “[n]ow, the directionality comes from the dish itself, doesn’t it,” Mr. Rubin answered, “[f]rom the shape, from the shape of the dish.” He stated that while he used dish-type antennas to explain how antennas work, because most people are familiar with dish antennas, there are many other types of

directional antennas in use. He then explained that antennas have varying levels of gain in different directions and that signals arriving from directions with higher levels of gain are detected, while signals arriving from outside those directions are not. He also explained that although an antenna may not be physically pointed at an angle to be aligned with a satellite, it is within the directional reception range of the satellite transmission if the direction of greatest gain is aligned with the satellite transmission angle. Finally, he explained that the adaptive array antenna used in Hult was “as much of a direction[al] antenna as any antenna I’ve ever known,” and that “you could create devices which change the beam without moving [the antenna].”

Northpoint’s expert, Dr. Edward Miller, agreed that an adaptive array antenna is directional. He stated that “through a complex process such as the computer control of the amplitude and phase, such an adaptive array can be made to have a gain in a limited range of directions.” He further elaborated on how the reception range in an adaptive array antenna was created by pointing the antenna in the desired direction while electronically creating nulls in the directions of unwanted signals. He explained that nonadaptive antennas have fixed directions of maximum and minimum gain based on their physical characteristics.

Far from teaching away from the claims of the ’605 and ’878 patents, as Northpoint argues, the Hult reference describes an antenna in which the directional reception range is generated by creating areas of high gain in certain directions from the antenna and areas of little or no gain in other directions. The terrestrial signal in Hult is outside the directional reception range of the satellite receiver because there is a null in the gain of the satellite receiving antenna in the direction of the terrestrial transmitter,

which prevents the satellite antenna and receiver from receiving a signal from the terrestrial transmitter from which usable information can be extracted. When asked if steering nulls in the direction of an interfering signal meant that the receiving antenna was being configured so that it would not receive those signals, Dr. Miller answered that it did.

The electronically created null in an adaptive array antenna acts exactly like a null in a dish-type antenna that is the product of the antenna's shape. In both cases, an interfering signal may reach the antenna from a particular direction, but the antenna has no gain in that direction and hence does not receive a usable signal from which information can be extracted (or interference created). As both experts explained, the signal reaches the antenna, but the gain in the direction of the signal is so low that the signal cannot be received and processed. For that reason, the Hult reference and the expert testimony regarding it made clear that the unwanted signal in Hult is outside the directional reception range of the antenna as that term is used in the '605 and '878 patents. Accordingly, there was substantial evidence from which a jury could find that the Hult reference taught the separate "directional reception ranges" recited by Northpoint's patents and therefore anticipated the asserted claims.

The dissent contends that "there can be no serious contention that the adaptive array antennas of Hult do not limit the 'directional reception range' using physical pointing." As Mr. Rubin's testimony makes clear, however, Hult discloses the avoidance of interference not only by steering nulls using adaptive array techniques, but also by directional pointing of the antennas. Mr. Rubin explained that Hult discloses that if a satellite "is more than 15 degrees above the horizon, all the interfered-with receivers

could easily be remedied by small changes in antenna pointing.” In the same passage, Hult refers to “the directional discrimination obtained” with the terrestrial television receiving antennas, resulting in most of those antennas not having unacceptable “antenna gains in the direction of the satellite.” Thus, while Hult concentrates on the benefits to be obtained from the use of adaptive arrays, the evidence at trial made clear that it also discloses the use of physical pointing of directional antennas to reduce interference in the context of a dual satellite-terrestrial transmitting system.

## B

The defendants’ theory of lack of enablement was that the patents do not disclose “a way to provide an antenna that cannot receive signals from unwanted directions” in order to meet the “directional reception range” limitation of each claim. Mr. Rubin testified that the DBS satellite receiving antenna could receive signals in directions away from where the antenna was pointed. The need to avoid interference from those signals, he testified, was the reason that the power level of the terrestrial transmission and the mitigation techniques described in the Mitre report were so important. As he described the problem, if the signal power was too high, the terrestrial signal could be received by the satellite receiving antenna even though the satellite receiving antenna was pointed away from the terrestrial transmitter. Northpoint’s expert agreed that DBS antennas operate in that manner.

Dr. Bahman Badipour, who conducted the allegedly infringing tests in Florida, testified that it was important to maintain the correct flux density (electromagnetic power) measurements at the level identified by the Mitre report. Dr. Badipour also testified that when he conducted the tests he offset the carrier frequency of the

terrestrial signal by more than six Megahertz from the DBS carrier frequency in order to further reduce interference between the two signals. The defendants did not assert that antennas with a directional reception range do not exist; rather, they asserted that Northpoint did not disclose enough in the patent to enable one of ordinary skill in the art to implement an antenna that would have a directional reception range as recited in the claims.

Northpoint argues that the record contains no evidence that undue experimentation would be necessary to practice the invention based on the disclosure in the patents. We agree with the district court, however, that the evidence at trial, including evidence of undue experimentation, was sufficient to sustain the jury's verdict on enablement. One of the inventors of the '605 and '878 patents, Carmen Tawil, admitted that numerous parameter values and interference mitigation techniques were used in the first test of Northpoint's technology. Northpoint submitted a report of its first test to the FCC with an attached appendix listing the techniques it used to avoid interference. The appendix stated that Northpoint mitigated interference by using several techniques including directional transmission, transmit antenna discrimination in the vertical plane, beam tilting, and maximum height antenna placement. Ms. Tawil admitted that none of those techniques were described or disclosed in the two patents, but she insisted that one of skill in the art would know to apply them.

Ms. Tawil testified that Northpoint's report to the FCC included specific values used for the following parameters: polarization, antenna gain, transmit power, effective isotropic radiated power, the transmit height above average terrain, the transmit height above ground level, transmitter tilt above horizontal, required signal strength at edge of

cell, cell size, receiving antenna gain, and thermal noise floor. Although none of those parameters were discussed in the '605 and '878 patents, Ms. Tawil stated that a person of skill in the art would have known all of those values without undue experimentation when implementing the Northpoint technology. Ms. Tawil's testimony on that point, however, was contradicted by Mr. Rubin, who testified that the claimed system would work only if the terrestrial signal was transmitted at a particular power level that would depend on experimentation based on all of those parameters. Ms. Tawil's testimony on enablement is also contradicted by the conclusions from the Mitre report, which detailed a very comprehensive experiment to test Northpoint's technology. One of the conclusions from the Mitre report was that there were three categories of techniques that could be used to reduce interference, one being the selection of operational parameters for: (1) lowering transmitter power; (2) using a frequency offset between the terrestrial and DBS carriers; (3) increasing the terrestrial transmitting antenna height; (4) adjusting the elevation tilt of the terrestrial transmitting antenna; and (5) pointing the terrestrial transmitting antennas away from the satellites. Ms. Tawil testified that she provided Mitre with the testing parameters as well as the mitigation techniques Northpoint used in its test. Nonetheless, even using those parameters and techniques, Mitre still found that the terrestrial signal interfered with the DBS signal, or that the signals were inside the directional reception range of each receiver. Only after Mitre performed additional experimentation and applied additional parameters and techniques was it able to deliver the terrestrial signal outside the directional reception range of the satellite receiving antenna, as required by the asserted claims.

Although Northpoint argues that the evidence showed that one could implement the invention using a standard satellite dish purchased from Radio Shack, Dr. Miller's testimony does not support that assertion, and the jury heard other evidence indicating that implementing the invention was not so straightforward. Thus, Dr. Badipour testified about the amount of testing he performed. He explained that he first went to France to test the defendants' equipment parameters, that he read the Mitre report and reports from DBS providers, and that he incorporated the results from his initial equipment testing and the interference mitigation techniques from Mitre's experimentation into a test plan to submit to the FCC. Once he developed the FCC test plan, he further tested the equipment in Virginia before taking the equipment to Florida. Based on that evidence, the jury could properly conclude that the techniques for avoiding interference were not so plain to a person of skill in the art so as to obviate the need for any enabling disclosure in the patent.

Finally, Northpoint contends that Mr. Rubin testified that antennas with directional reception range have been available since the 1940's. What Mr. Rubin actually stated was that directional antennas had been available for many years. The defendants' point, however, was not that the patents failed to enable directional antennas, but that they did not enable one of skill in the art to create the directional reception range necessary to avoid interfering signals. In light of our review of the evidence at trial, we agree with the district court that the jury's finding of lack of enablement was supported by substantial evidence. The district court therefore correctly entered judgment that the asserted claims were invalid for lack of enablement.



The dissent contends that the evidence at trial was not sufficient to show that “undue experimentation” would be required to make the patented invention function as it was claimed to do. While determining whether the required amount of experimentation is “undue” is an inherently imprecise undertaking, the jury was properly instructed as to its task, and it reached a reasonable conclusion. The evidence, including the testimony of experts about the nature of the experimentation conducted by the defendants and others, was sufficient to show that elaborate measures, not described or even adumbrated by the patent, were required to make the claimed invention effective. See Enzo Biochem, Inc. v. Calgene, Inc., 188 F.3d 1362, 1374-75 (Fed. Cir. 1999) (no enablement when “the teachings set forth in the specifications provide no more than a ‘plan’ or ‘invitation’ for those of skill in the art to experiment”). To be sure, no witness testified in haec verba that the experimentation was “undue.” But we know of no principle that requires that a witness testify as to that legal conclusion, as long as the factual showing is sufficient to justify the jury’s conclusion on the highly factual issue of whether, under all the circumstances, more than routine experimentation was needed to make the invention work. See PPG Indus., Inc. v. Guardian Indus. Corp., 75 F.3d 1558, 1564 (Fed. Cir. 1966). Because that requirement was amply satisfied in this case, the district court properly denied Northpoint’s motion for judgment as a matter of law on the enablement issue.

## C

Northpoint contends that we should grant a new trial on two theories. First, Northpoint claims that the evidence of invalidity was so weak that the district court should have granted Northpoint’s motion for a new trial because the verdict was against

the clear weight of the evidence. Because the right to a new trial is a procedural issue not unique to patent law, the applicable law is the law of the regional circuit to which an appeal would lie in a non-patent case. EMI Group N. Am., Inc. v. Cypress Semiconductor Corp., 268 F.3d 1342, 1347 (Fed. Cir. 2001). In this case, that court is in the Eleventh Circuit. The test applied in the Eleventh Circuit to an appeal from the denial of a new trial motion is whether the trial court abused its discretion in concluding that the verdict was not against the clear weight of the evidence. See Cleveland v. Home Shopping Network, Inc., 369 F.3d 1189, 1196 (11th Cir. 2004); Lipphardt v. Durango Steakhouse of Brandon, Inc., 267 F.3d 1183, 1186 (11th Cir. 2001). In light of the evidence on anticipation and enablement discussed above, we hold that the district court did not abuse its discretion in concluding that the verdict was not against the clear weight of the evidence. We therefore uphold the denial of a new trial on that ground.

Northpoint next argues that it should be granted a new trial because, if alternative theories of liability are asserted together in one jury instruction, “a new trial is to be granted if any one of the alternatives is unsupported by substantial evidence.” Cronin v. Wash. Nat’l Ins. Co., 980 F.2d 663, 669 n.7 (11th Cir. 1993); see also Carroll Kenworth Truck Sales, Inc. v. Kenworth Truck Co., 781 F.2d 1520, 1529 (11th Cir. 1986); King v. Ford Motor Co., 597 F.2d 436, 439 (5th Cir. 1979). Northpoint argues that it is entitled to a new trial on that theory because the jury decided the issues of invalidity on “several alternative legal theories, at least one of which in each case is defective.” In particular, Northpoint notes that the defendants argued anticipation based on five different prior art references; Northpoint suggests that each of those references represents a separate

legal theory of anticipation, and that a failure of proof with regard to any one of the five requires the grant of a new trial.

We disagree with Northpoint's characterization of the anticipation issue at trial. The cases on which it relies involve separate legal theories of recovery, where at least one of the theories is legally flawed. By contrast, the five prior art references offered to prove anticipation in this case did not represent separate legal theories, but instead simply provided separate factual bases for the jury to consider with regard to the single legal theory of anticipation.

As a general matter, it is not necessary for every possible factual basis for liability to be independently sufficient in order for the evidence to be sufficient to support a jury verdict. A failure of proof with respect to any single item of evidence does not justify a grant of either JMOL or a new trial; even if some of the proposed factual grounds for liability are not legally sufficient to support a verdict, that is not fatal, because the critical question is whether the evidence, taken as a whole, was sufficient to support the jury's verdict. In Griffin v. United States, 502 U.S. 46 (1991), the Supreme Court explained in the context of a criminal case the rationale behind the distinction between an invalid legal theory of liability and an insufficient factual ground for decision:

When, therefore, jurors have been left the option of relying upon a legally inadequate theory, there is no reason to think that their own intelligence and expertise will save them from that error. Quite the opposite is true, however, when they have been left the option of relying upon a factually inadequate theory, since jurors are well equipped to analyze the evidence . . . .

502 U.S. at 59 (emphasis in original); see also Walther v. Lone Star Gas Co., 952 F.2d 119, 126 (5th Cir. 1992) (“we will not reverse a verdict simply because the jury might have decided on a ground that was supported by insufficient evidence”); Sandberg v.

Va. Bankshares, Inc., 891 F.2d 1112, 1122 (4th Cir. 1989) (“the submission of both correct and incorrect factual bases supporting a single theory of recovery is not grounds for reversal”), rev’d on other grounds, 501 U.S. 1081 (1991); McCord v. Maguire, 873 F.2d 1271 (9th Cir. 1989) (“When a general verdict may have rested on factual allegations unsupported by substantial evidence, we will uphold the verdict if the evidence is sufficient with respect to any of the allegations.”); Baumler v. State Farm Mut. Auto. Ins., 493 F.2d 130, 134 (9th Cir. 1974) (“where there are two alternative factual theories which might support the verdict, the verdict will be upheld if there is sufficient evidence to support either theory”).

In the context of this case, the question is whether the evidence as a whole was sufficient to enable a reasonable jury to conclude, by clear and convincing evidence, that the asserted claims of the '605 and '878 patents were anticipated. The inadequacy of any particular item of evidence to establish anticipation, such as the failure of any particular reference to contain all the limitations of the asserted claims, would not undermine the verdict as a legal matter. In this case, the evidence with respect to at least one of the prior art references was sufficient to prove anticipation of the asserted claims. Accordingly, we uphold the district court's order denying Northpoint's motion for a new trial on the issue of invalidity.

#### D

In their cross-appeal, the defendants argue that they are entitled to have the judgment of invalidity as to the three asserted claims extended to all the remaining claims in the '605 and '878 patents. We disagree. In the pretrial stipulation, the plaintiffs asserted infringement only as to claim 8 of the '605 patent and claims 1 and 7

of the '878 patent, and the defendants asserted invalidity only as to those three claims. At trial, the parties introduced evidence of infringement and invalidity only as to those three claims, and the jury's verdict was limited to those claims. In accordance with the jury's verdict, the court entered judgment of invalidity only as to the three asserted claims. The defendants now contend that, based on comments made by Northpoint's attorney at the close of the plaintiff's case, the other claims of the '605 and '878 patents should be held invalid in light of the jury's verdict as to the three litigated claims.

We have examined the attorney's comments and conclude that those comments do not provide a basis for holding the unasserted claims of the '605 and '878 patents invalid. In the colloquy to which the defendants refer, Northpoint's attorney stated, in response to a Rule 50 motion to hold the other claims not infringed, that "the outcome should be determined by the claims we presented." The attorney expressed his understanding that the parties had agreed that "we would present representative claims instead of every claim in the patent . . . and then the outcome as to those patents, all claims, would be dictated by the outcome on the three [claims] we presented." The attorney explained that "those claims will dictate the outcome as to the complaint," because any further action on the unasserted claims would be barred by res judicata.

The defendants now contend that the effect of the attorney's statements at the time of the defendants' Rule 50 motion on infringement was to concede that any verdict on invalidity would apply to all the unasserted claims of the two patents in suit. We do not interpret Northpoint's attorney's comments in that manner. Northpoint's attorney was focused on the issue of infringement and indicated that a Rule 50 judgment of noninfringement on those claims would not be appropriate, but that because of res

judicata principles there was no risk that those claims would be asserted against the defendants in a subsequent action. Northpoint's attorney did not address the issue of invalidity, and neither the judge nor counsel for the defendants raised the issue of invalidity at that time. Instead, the trial proceeded in accordance with the pretrial stipulation, with the defendants putting on evidence as to the invalidity of the three claims at issue. The defendants did not offer evidence as to the invalidity of any other claims of the two patents in suit, and the court accordingly did not enter a judgment as to those other claims. We do not regard Northpoint's attorney as having done or said anything that would require the district court to enter a judgment of invalidity as to the unasserted claims. In fact, to the extent that those claims were ever asserted, the court appears to have treated them as having been dismissed. Accordingly, the court's judgment of invalidity was properly limited to the three claims asserted at trial.

Each party shall bear its own costs for this appeal.

AFFIRMED.

# United States Court of Appeals for the Federal Circuit

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Defendants-Cross Appellants.

DYK, Circuit Judge, concurring in part and dissenting in part.

The majority today invalidates claims of two significant patents in my view utilizing a plainly incorrect claim construction. It upholds a jury verdict of anticipation that, under a proper claim construction, has no record support in expert testimony, much less the clear and convincing evidence necessary to invalidate the patent claims at issue.<sup>1</sup> The majority also finds lack of enablement in the absence of expert testimony that the experimentation required was excessive or not routine. I respectfully dissent.<sup>2</sup>

I

First, I disagree with the majority's conclusion that the Hult reference anticipates claim 8 of the '605 patent and claims 1 and 7 of the '878 patent.

There is no question but that Northpoint's invention constitutes a significant contribution to the communications art. The Federal Communications Commission

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<sup>1</sup> Claim 8 of U.S. Patent No. 5,761,605 (the "'605 patent") and claims 1 and 7 of U.S. Patent No. 6,169,878 (the "'878 patent").

(“FCC”) found that “Northpoint has presented a creative mechanism by which to receive greater use of a limited amount of spectrum, thus fostering spectrum efficiency.” (J.A. at 3405.) In a joint statement, former FCC Chairman Michael Powell and Commissioner Kathleen Q. Abernathy specifically noted that

Northpoint arrived at the Commission many years ago with a proposal for a new and innovative way to share the DBS spectrum. Today, thanks in large part to its fine work and diligence, that service will go forward. . . . There is little question that had it not been for Northpoint, the MVDDS service would not be ready to move forward today.

(J.A. at 1012.)

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<sup>2</sup> I join part II(D) of the majority opinion, which holds that the district court properly limited its holding of invalidity to the three asserted claims.



This invention is recited in the patent claims at issue.<sup>3</sup> They describe an

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<sup>3</sup> Claim 8 of the '605 patent reads:

8. A method for simultaneously providing local originating signals on a common frequency with direct broadcast satellite signals transmitted from a satellite, where the satellite is in a first satellite location in geosynchronous orbit about the earth, the method comprising the steps of:
- (a) at a user location, receiving direct broadcast satellite signals at a first frequency with a first antenna adapted to receive signals at the first frequency only within a first directional reception range as measured from a centerline of the first antenna;
  - (b) transmitting terrestrial signals at the first frequency and in a terrestrial azimuth range from a terrestrial transmitter, the terrestrial azimuth range being outside of the directional reception range of the first antenna positioned to receive direct broadcast satellite signals from the satellite; and
  - (c) at the user location, remote from the terrestrial transmitter, receiving the terrestrial signals with a second antenna adapted for receiving signals at the first frequency only within a second directional reception range as measured from a centerline of the second antenna, the second antenna being aligned so that the direct broadcast satellite signals transmitted by the satellite are not transmitted within the directional reception range of the second antenna.

'605 patent, cols. 6-8 (emphases added). Claims 1 and 7 of the '878 patent state:

1. An apparatus for simultaneously transmitting terrestrial signals on a common frequency with satellite signals transmitted from a satellite, the satellite transmitting satellite signals at a first frequency to a user location for reception only within a satellite directional reception range about the user location, the apparatus comprising:
- (a) a directional terrestrial transmitter for transmitting terrestrial signals at the first frequency in a limited azimuth range around the location of the terrestrial transmitter, the terrestrial transmitter being located with respect to the user location such that the terrestrial transmitter transmits to the user location along a route which is outside the satellite directional reception range.

... ..

7. A method for simultaneously providing terrestrial signals on a common frequency with satellite signals transmitted from a satellite, where the satellite is transmitting at a first frequency along a satellite transmission axis extending from the satellite to a terrestrial user location, the method comprising the step of:

apparatus and method for reuse of the direct broadcast satellite (“DBS”) spectrum between satellite and terrestrial services. In the preferred embodiment, spectrum reuse is accomplished by the use of two directional antennas. One antenna is pointed south to receive DBS signals, while a second antenna is pointed north to receive terrestrially broadcast signals. Interference between the signals is avoided because the antennas are constructed to receive a useable signal only within a narrow range, and pointed such that undesired signals arrive at each antenna outside of that range.

The claimed anticipating reference (Hult) disclosed a method of sharing the UHF spectrum between space and terrestrial services by using adaptive array antennas for receiving satellite signals that “cancel[] out” the unwanted signal. (J.A. at 1931.) The question with respect to the Hult reference is whether it disclosed the “directional reception range” limitation. The district court construed “directional reception range” in the ’605 and ’878 patents as follows (and so instructed the jury):

A three-dimensional space about the centerline of a receiving antenna within which a usable signal can be received, a useable signal being a signal from which the information carried by it can be extracted.

Northpoint Tech. v. MDS Am., Inc., No. 01-CIV-14207, slip op. at 5 (S.D. Fla. Oct. 17, 2003) (emphasis added). Neither party objected to the claim construction or to the jury instruction. Neither party challenges the claim construction of “directional reception

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- (a) transmitting terrestrial signals at the first frequency in a limited azimuth range from a terrestrial transmitter, the terrestrial transmitter being located with respect to the user location so as to transmit to the user location along a transmission route which is outside of a satellite directional reception range about the user location, wherein the satellite directional reception range comprises a limited directional range substantially centered on the satellite transmission axis.

range” on appeal, and the majority adopts the district court’s construction. Ante at 7-8. That claim construction, referring to a “three-dimensional space about the centerline of a receiving antenna within which a usable signal can be received,” in my view clearly requires that the patented device achieve non-interference as a result of the geographic orientation of the two antennas so that each is outside the range of the unwanted signal due to the limitation of the antennas. The majority effectively rejects the district court’s claim construction and construes the claims so that geographic separation is unnecessary, and the claims are satisfied if the unwanted signal is not received through electronic canceling of the unwanted signal rather than physical pointing. Since such electronic canceling was achievable using the adaptive array antennas of Hult, the majority finds that the asserted claims of the patents are anticipated.

In my view the majority’s claim construction is untenable even if we were to disregard the district court’s construction. The majority states that “nothing in the asserted claims requires that the antennas be physically pointed at the sources of the satellite and terrestrial signals.” Ante at 9. I disagree because the claims require that the functionality of the receivers be geographically limited so that interference is avoided by the geographic orientation of the receivers. This is evident from the language of the claims themselves. For instance, claim 8 of the ’605 patent requires the directional reception range of the first antenna to be “measured from a centerline” and that that antenna be “positioned to receive” the signal. It also requires the second antenna to be “aligned” so that the unwanted signal is not received.

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<sup>1</sup>’878 patent, cols. 6-7 (emphases added).

The necessity for geographic separation is also made clear by numerous references in the specifications. Both patents state that “[t]he receiving antenna for DBS signals must, therefore, be limited to receiving signals in a directional range measuring plus or minus nine (9) degrees from a centerline of the antenna” and that “[i]n the single antenna arrangement, the antenna is movable between a position to receive DBS signals and another position to receive terrestrial signals.” ’605 patent, col. 1, ll. 41-44, 56-59; ’878 patent, col. 1, ll. 47-50, 62-65.<sup>4</sup> The specifications also state:

The object of the invention is accomplished by utilizing receiving antennas with a limited directional reception range and transmitting the terrestrial signals in a different range of directions than those in which the satellite signals are transmitted. . . . Both receiving antennas are adapted to receive signals only within a particular directional range. The range is measured from a centerline of the particular antenna.

’605 patent, col. 2, ll. 19-28; ’878 patent, col. 2, ll. 20-29.

There can be no serious contention that the adaptive array antennas of Hult do not limit the “directional reception range” using physical pointing. Hult teaches the use of adaptive array antennas “in a spectrum sharing or interference environment.” (J.A. at 4376.) An antenna array is an “assembly of antenna elements with dimensions, spacing, and illumination sequence such that the fields for the individual elements combine to produce a maximum intensity in a particular direction and minimum field

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<sup>4</sup> The patents make clear that the invention is not limited to a direction range of nine degrees. The specifications state:

Although current regulations require a spacing of no less than nine (9) degrees separation, the invention is not limited to this degree of separation. However, according to the invention, the effective reception range of each first antenna or satellite reception antenna must be less than or equal to the minimum satellite separation angle.

’605 patent, col. 3, ll. 61-67; ’878 patent, col. 3, l. 64-col. 4, l. 3.

intensities in other directions.” Info. Tech. Section, Gen. Servs. Admin., Telecommunications: Glossary of Telecommunications Terms A-16 (1997). A phased array (or adaptive array) accomplishes “beam steering without the mechanical and inertial problems of rotating” the entire antenna. John D. Kraus & Ronald J. Marhefka, Antennas for All Applications 572 (3d ed. 2002). “[A]n adaptive array can automatically steer its beam toward a desired signal while steering a null toward an undesired or interfering signal.” Id. Thus, an adaptive array antenna automatically excludes (or cancels) signals coming from a particular direction without a change in its geographic orientation. The disclosure of an adaptive array does not anticipate.

Finally, the majority points out that Hult discloses not only the use of adaptive array antennas but the use of conventional directional antennas pointed at the transmitting source and the making of “small changes in antenna pointing” to reduce interference. Ante at 12. The majority is correct that expert testimony here supports the view that Hult made such a disclosure. What is lacking is any expert testimony that the disclosures of Hult concerning the use of conventional directional antennas anticipate the three claims at issue here. The only testimony that directly addresses the issue of anticipation by Hult (and concludes that Hult anticipates) is Rubin’s cryptic and conclusory testimony concerning the Hult disclosure of adaptive arrays. Under these circumstances I conclude that the jury verdict of anticipation based on Hult cannot stand.<sup>5</sup>

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<sup>5</sup> The accused infringers here relied on four other prior art references to show anticipation. The majority focuses on the Hult reference only and does not suggest that the other references anticipate. The other references are even weaker than the Hult reference, and in my view none of the references can support a jury verdict of anticipation.

## II

I suggest that the majority also errs in sustaining the jury's finding of lack of enablement because, again, the expert testimony is legally insufficient. The majority relies on four pieces of evidence to establish the quantity of experimentation required to practice the Northpoint patents: (1) Mr. Rubin's testimony regarding the importance of maintaining the correct power level of the terrestrial transmission; (2) Dr. Badipour's testimony regarding the experimentation performed leading up to and during MDS' infringing test in Florida; (3) Northpoint's report to the FCC detailing various interference mitigation techniques and Ms. Tawil's testimony regarding the report; and (4) the Mitre report. Ante at 12-15. Based upon this evidence, the majority concludes that the jury correctly found the quantity of experimentation undue, apparently primarily with respect to the required power level.<sup>6</sup>

The testimony on which the majority relies to sustain the verdict does no more than establish that experimentation was required to determine the required power level. Rubin's testimony plainly supports the assertion that power is very important, but it says nothing about whether or not undue experimentation was required to determine power.<sup>7</sup>

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<sup>6</sup> The majority lists a variety of other parameters required to practice the patents. Ante at 13-14. There is simply no testimony at all that undue experimentation was necessary with respect to these, and I understand the majority to rely primarily on the power level.

<sup>7</sup> Mr. Rubin testified:

Northpoint's proposal has no mention of power. That's the one ingredient that determines whether people can coexist or not coexist. Northpoint's patents is simply directional antennas. There's no power in it whatsoever. It's the power that everybody's being – transmitting that makes it work or not work. There's – in the Northpoint patents there is not one word, not one number about power.

Neither does the remainder of the evidence relied on by the majority address the question of undue experimentation. Dr. Badipour said nothing about what experimentation one of ordinary skill in the art might consider excessive or not routine, nor did Northpoint's FCC report. Ms. Tawil's testimony regarding the FCC report does not support a conclusion that the techniques described therein would constitute undue experimentation to one of skill in the art. The Mitre report is also silent on undue experimentation. The only testimony as to whether an expert would consider the experimentation required to be excessive or not routine was presented by Northpoint, and it supported the view that the amount of experimentation was not undue. Northpoint's expert, Dr. Miller, testified that the amount of experimentation was routine and not excessive.<sup>8</sup> Ms. Tawil, one of the inventors, also testified regarding the various

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(J.A. at 1976-77.) He further testified:

I would say power makes a big difference. That's what counts here, not anything else. The amount of power can destroy a broadcast receiver or it can allow it to operate. And there is nothing, nothing in the patent that says anything about power, nothing at all. The most critical factor is omitted.

(J.A. at 1990 (emphasis added).)

<sup>8</sup> Northpoint's expert, Dr. Edward F. Miller, testified:

Q Was there enough information in the specification of the patents to enable that person of ordinary skill in the art to make and use a system of the type that's described in the claims?

A Yes, I think after reading the claims, reading the patents, one of ordinary skill in the art would have been able to construct what's described in the patent

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Q Well, that process you've just described of setting the transmitter up to some reasonable maximum power and dialing it back down to find the power level that you wanted to use, is that something that takes a lot of specialized knowledge and experimentation to accomplish?

interference mitigation techniques documented in the Mitre report and stated that “[a]ll of those techniques a person would know who’s skilled in the art would be necessary in order to stay out of the directional reception range and not cause interference with the satellite receiver.” (J.A. at 1603.) Thus, MDS presented no evidence showing that the experimentation conducted on the Northpoint system was anything but routine, or would be considered undue by one of skill in the art.

Undue experimentation is a matter of law based on underlying fact. Johns Hopkins Univ. v. CellPro, Inc., 152 F.3d 1342, 1354 (Fed. Cir. 1998). Merely listing a quantity of experimentation is not sufficient to prove undue experimentation because “[t]he determination of what level of experimentation is ‘undue,’ so as to render a disclosure non-enabling, is made from the viewpoint of persons experienced in the field of the invention.” Elan Pharm., Inc. v. Mayo Found. for Med. Educ. & Research, 346 F.3d 1051, 1055 (Fed. Cir. 2003). Similarly, we have held that

routine experimentation does not constitute undue experimentation: The test [for undue experimentation] is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to practice a desired embodiment of the claimed invention.

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A No, not really. Basically, one could do it with one person at the transmitter to control the power, another at the receiver and a cellular phone link between them so that their communication could be established to say, yes, the signal is being received, and the person adjusting the power could turn the knob or whatever other mechanism there is for changing the power level.

(J.A. at 2017-19.)



Johns Hopkins, 152 F.3d at 1360 (quotations omitted) (brackets in original and emphasis added). Therefore, the evidence presented by MDS was legally insufficient to establish lack of enablement.

The majority asserts that there is no principle that requires that a witness testify as to whether experimentation was “undue.” Ante at 16. I agree that expert testimony need not use the word “undue” but it must do more than talk about the absolute quantity of experimentation. It must suggest that the amount of experimentation would be considered excessive or not routine by one of ordinary skill in the art. Enzo Biochem, Inc. v. Calgene, Inc., 188 F.3d 1362, 1371 (Fed. Cir. 1999) (reasonable amount of routine experimentation); Bruning v. Hirose, 161 F.3d 681, 686 (Fed. Cir. 1998) (excessive); In re Wands, 858 F.2d 731, 740 (Fed. Cir. 1988) (excessive); United States v. Telectronics, Inc., 857 F.2d 778, 785 (Fed. Cir. 1988) (excessive).

In my view the majority errs in sustaining the jury’s findings of anticipation and lack of enablement. I would hold Northpoint’s patents not invalid and infringed.<sup>9</sup>

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<sup>9</sup> The jury also found Northpoint’s patents obvious and indefinite. The majority did not reach these other issues. I would reverse the district court’s conclusions as to obviousness and indefiniteness.