

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC,

Petitioner

v.

BELDEN INC.,

Patent Owner

Case IPR2023-01062
Patent No. 6,750,095 B2

PETITIONER COMMSCOPE'S REPLY BRIEF

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EXHIBIT LIST

Exhibit No.	Exhibit Description
1001	U.S. Patent No. 6,570,095 (the “ ’095 patent ”)
1002	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Nov. 8, 2002 Notice of Allowance
1003	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Sept. 20, 2011 Action Closing Prosecution
1004	U.S. Patent No. 6,998,537 (the “ ’537 patent ”)
1005	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Nov. 2, 2004 Notice of Allowance
1006	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Sept. 20, 2011 Action Closing Prosecution
1007	Declaration of Kenneth Cornelison
1008	<i>Curriculum Vitae</i> of Kenneth Cornelison
1009	U.S. Patent No. 3,622,683 (“ Roberts ”)
1010	English language translation of German Patent No. 297,19,866 U1 (“ GmbH-866 ”), and attached Declaration of translator Anthea Heyes
1011	German Patent No. 297,19,866 U1 (untranslated original)
1012	English language translation of Japanese Patent Publication S43015470 (“ Yanagida ”), and attached Declaration of translator Anthea Heyes
1013	U.S. Patent No. 5,670,748 (“ Gingue ”)
1014	U.S. Patent No. 3,894,172 (“ Jachimowicz ”)
1015	U.S. Patent No. 4,755,629 (“ Beggs ”)
1016	<i>Electronic Wire & Cable - A User’s Guide: Performance and Selection</i> , Section 5: Multiconductor Cables, AT&T (1987)
1017	Whitham D. Reeve, <i>Subscriber Loop Signaling and Transmission Handbook – Digital</i> , IEEE Telecommunications Handbook Series (1995)
1018	Whitham D. Reeve, <i>Subscriber Loop Signaling and Transmission Handbook – Analog</i> , IEEE Telecommunications Handbook Series (1992)
1019	U.S. Patent No. 5,380,591

1020	U.S. Patent No. 1,727,972
1021	U.S. Patent No. 1,956,730
1022	U.S. Patent No. 3,803,340 (Jachimowicz-340)
1023	Canadian Patent Application No. 2,058,046
1024	U.S. Patent No. 4,262,164
1025	U.S. Patent Pub. No. 2006/0169478
1026	U.S. Patent No. 4,253,890
1027	U.S. Patent No. 5,283,390
1028	U.S. Patent No. 5,969,295
1029	G.F. Moore, <i>Electric Cable Handbook</i> , BICC Cables (3d. ed. 1997)
1030	<i>The New IEEE Standard Dictionary of Electrical and Electronics Terms</i> (5th ed. 1993)
1031	Neil Sclater and John Markus, <i>Electronics Dictionary</i> , McGraw-Hill (6th ed. 1997)
1032	S. Yonechi et al., <i>Application of Spacer Forming Technique to Communication Cables</i> , International Wire & Cable Symposium Proceedings (1980)
1033	U.S. Patent No. 7,179,999 (the “999 patent”)
1034	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Oct. 14, 2011 Action Closing Prosecution
1035	Alcatel Cable Systems Product Catalog
1036	U.S. Patent No. 5,789,711
1037	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: Oct. 22, 2001 Non-Final Office Action
1038	Excerpt of Prosecution History of U.S. Patent No. 6,570,095: April 3, 2002 Final Office Action
1039	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: March 3, 2004 Non-Final Office Action
1040	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Terminal Disclaimer
1041	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: May 18, 2004 Amendments
1042	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: June 17, 2004 Final Office Action

1043	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: September 20, 2004 Request for Continued Examination
1044	Excerpt of Prosecution History of U.S. Patent No. 6,998,537: Sept. 9, 2005 Amendment
1045	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceeding
1046	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceedings
1047	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,475 of U.S. Patent No. 7,179,999: Feb. 24, 2012 Decision Granting Petition to Terminate <i>Inter Partes</i> Reexamination Proceedings
1048	U.S. Patent No. 5,814,768
1049	U.S. Patent No. 6,037,546
1050	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095: Jan. 11, 2010 Third Party Requester's Comments to Patent Owner's Response
1051	Excerpt of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537: Jan. 22, 2010 Third Party Requester's Comments to Patent Owner's Response
1052	<i>Belden Techs. et al. v. Superior Essex Comm'cns LP et al.</i> , No. 08-63-SLR, Dkt. 215 (D. Del. Aug. 8, 2010) – Claim Construction Order
1053	<i>Belden Inc. v. CommScope, Inc. et al.</i> , No. 22-783-RGA, Dkt. 292 (D. Del. May 26, 2023) – Scheduling Order
1054	Declaration of Sylvia D. Hall-Ellis, PhD
1055	English Translation of Japanese Patent Publication No. S43-15470 used in prior reexamination of US 6,998,537
1056	Japanese Patent Publication No. S43-15470 (untranslated original)
1057	English language translation of German Patent No. 297,19,866 U1 used in prior reexamination of US 6,998,537
1058	Excerpts of <i>Inter Partes</i> Reexamination No. 95/000,476 of U.S. Patent No. 6,998,537
1059	Excerpts of <i>Inter Partes</i> Reexamination No. 95/000,474 of U.S. Patent No. 6,570,095
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1066	<i>Belden v. Superior Essex</i> , Excerpts from Jury Trial Transcript, Day 6, 9/14/2010
1067	Excerpts, German Technical Dictionary (Routledge), Volume One
1068	Excerpts, German-English Technical and Engineering Dictionary (DeVries and Herrmann), Second Ed.
1069	Exhibit 1069 from the deposition of Charles Eldering
1070	Transcript from the June 21, 2024 Deposition of Charles Eldering, Ph.D. in IPR2023-01061
1071	Transcript from the May 21, 2024 Deposition of Charles Eldering, Ph.D. in IPR2023-01056
1072	ANSI/ICEA Standard S-84-608-1994
1073	REA Specification for Filled Telephone Cables with Expanded Insulation, Federal Register Vol. 58, No. 96. 5/20/1993
1074	International Standard ISO/IEC 11801 (first edition corrected and reprinted 1995-07-15) (excerpt)
1075	Excerpt from the File History of US Patent No. 6,570,095
1076	<i>Belden v. Superior Essex</i> , Docket No. 226, Joint Statement of Facts
1077	<i>Belden v. Superior Essex</i> , Belden’s Supplemental Response to Interrogatories 6, 7, & 23
1079	TIA/EIA Standard 568-A (1995) – Commercial Building Telecommunications Cabling Standard
1081	Reply Declaration of Kenneth Cornelison Regarding IPR2023-01062
2001	Declaration of Dr. Charles A. Eldering in Support of Patent Owner Preliminary Response

2002	Definition of “twisted pair” from Webster’s New World Telecom Dictionary, 2008
2003	U.S. Patent No. 10,170,220
2004	Deposition Transcript of Kenneth Cornelison, March 6, 2024
2005	U.S. Patent No. 4,800,236
2006	U.S. Patent No. 4,340,771
2007	Supplemental Declaration of Dr. Charles A. Eldering in Support of Patent Owner Response

The Petition identified three alternative grounds of invalidity. Patent Owner (“PO”) does not persuasively or credibly distinguish any of them.

I. Claim Construction – “Twisted Pairs”

The Board preliminarily construed “twisted pair” as “a pair of insulated conductors that are twisted together.” Paper 10, 13. PO proposes a similar definition and adds “around one another to form a balanced transmission line.” Paper 19, 12. PO’s addition is unnecessary because it does not go to a controversy. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (Board need only construe claim terms to the extent necessary to resolve the controversy). The dispute is whether the conductors are “twisted together.” *E.g.*, Paper 19, 10, 12, 29, 31, 40, 41, 48 (PO repeatedly emphasizing “twisted together”); Ex-1081, ¶¶9-11. CommScope is not contending that if Roberts were to disclose “pairs” configured as PO contends (a single wire on each side of the shield in unbalanced transmission), such a configuration would be a twisted pair. Indeed, PO does not try to distinguish any prior art based on whether a pair of conductors—once twisted around one another—“form a balanced transmission line.” This makes sense because that was understood to be a benefit of twisted pairs. Ex-1016, 7 (pairs twisted “to decrease unbalanced mutual capacitance”); Ex-1017, 18 (“twist also helps keep the conductors of the pair balanced”).

II. Reply Arguments

A. The References Disclose Twisted Pairs as Claimed

1. GROUND 1: Roberts

PO's argument that Roberts merely teaches groups of straight-line individual conductors misreads Roberts.¹ Roberts plainly discloses a "conventional" telephone cable with "pairs" of insulated conductors that are twisted together for balanced transmission. Ex-1081, ¶¶12-13. Confirming that PO's reading is not credible: neither PO nor its expert disputed Roberts' disclosure of twisted pairs in another IPR before this same Panel. Ex-1070, 238:2-21; *see also* IPR2023-01056,

¹ PO's proffered expert—a professional patent consultant for the last 25 years (Ex-1070, 195:3-16)—has minimal industry experience with twisted pair data cables, and certainly not the 3-4 years' experience of a POSITA. *Compare* Ex-2001, ¶26 (PO's expert arguing no need for "direct industrial experience" with twisted pair cables) *with* Ex-1007, ¶13. He admitted he has never designed a twisted pair cable and none of his patents are specifically directed to the design of cable. Ex-1071, 16:13-17:4, 17:12-18:4. In contrast, CommScope's expert has 40 years' industry experience (much in designing, manufacturing, and testing of twisted pair cables) and invented in the same field. Ex-1007, ¶5; Ex-1008, 1-4; Ex-2003; Ex-1081, ¶25, ¶41.

Paper 1, 54-55.

**(a) Roberts Describes Conventional Telephone Cable
Having Twisted Pairs**

PO ignores that Roberts is directed to “[a] plurality of insulated electrical conductors (*pairs*)” of “an otherwise *conventional* telephone cable design” that are grouped into two compartments separated by plastic-coated metal shield. Ex-1009, Abstract (emphasis added); *see also* Ex-1081, ¶14. As CommScope’s expert explained, “use of twisted pairs in data communications cables *was conventional and common practice* [] at the time of the Roberts patent (1968)....” Ex-1007, ¶118 (citing references); *see also id.* ¶¶32-35. *PO’s expert did not dispute this.* And when deposed, PO’s expert admitted he did “not have an opinion on” and had not “investigat[ed]” whether twisted pair was the most common type of cable for telephone cabling (trunk, distribution, or exchange cables). Ex-1070, 27:17-28:3, 42:15-20. PO’s expert is either not an expert, or he was deliberately avoiding what everyone in the industry knows is true. Either way, his testimony is not credible.

Those in the industry knew that “conventional” telephone cables like those Roberts discusses use twisted pairs. Ex-1081, ¶15-16. Numerous publications confirm this (emphasis added to each):

- Ex-1023, 1:4-7 (“...each unit *conventionally* being a *twisted pair* of conductors...”);

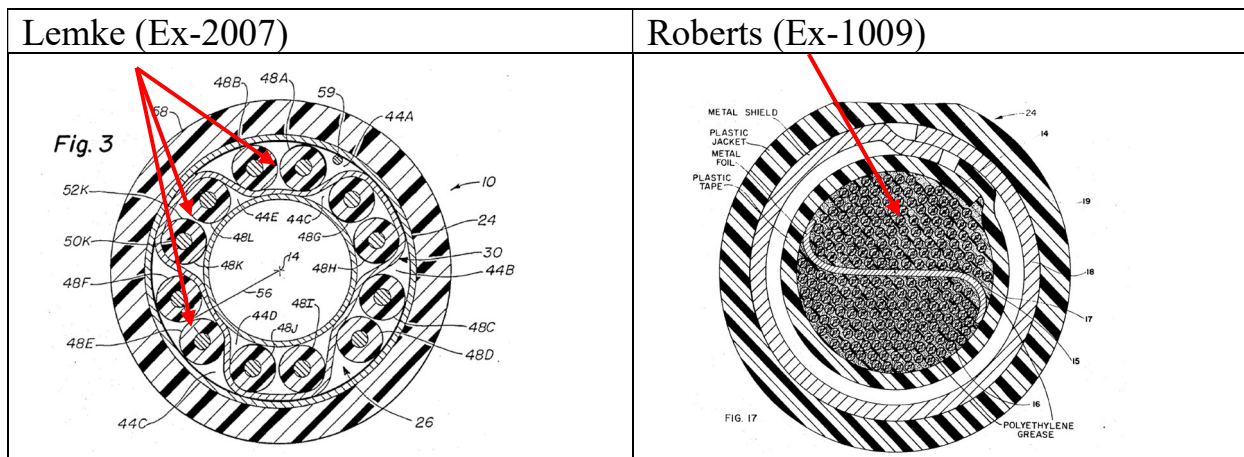
- Ex-1024, 4:18-23 (“FIG. 3 depicts *how a typical* telecommunication multipair cable 50 can be constructed...First, the insulated conductors 10 or 11 are *twisted into pairs*”);
- Ex-1019, 1:10-11 (“A *typical telephone cable* is constructed of *twisted pairs*”);
- Ex-1017, 11 (“*most commonly* used transmission media in present-day digital loop applications is *twisted pair metallic (copper) cable*”);
- Ex-1020, 2:55-59 (“A plurality of copper wires...*usually twisted together in pairs*”);
- Ex-1029, 33 Fig. 55.1 (“*twisted pair*” cable described as “*typical telephone cable* layout”).

In contrast, PO provides *no evidence* of “conventional” telephone cables without twisted pairs. In fact, industry standards for telephone cables like Roberts *required* twisted pairs. *E.g.*, Ex-1072, 10, 18; Ex-1073, 12-13; Ex-1081, ¶¶17-18.

PO contends that CommScope’s expert “admitted” that “pair” in the “data communications cable context” does not always necessarily refer to twisted pairs. Paper 19, 17. That is not the question. For *conventional* telephone cable designs like *Roberts*, CommScope’s expert has consistently explained that “pairs” referred

to twisted pairs. *E.g.*, Ex-1007, ¶¶33, 115, 118. All the evidence of record supports this. *E.g.*, Ex-1022, 1:7-16; Ex-1018, 3; Ex-1014, 1:6-8; Ex-1023, 2 (Abstract); Ex-1024, 1:34-36; Ex-1081, ¶¶19-20.

The only examples of untwisted “pairs” PO cites—“twinax” cable and the Lemke patent (Paper 19, 16-20)—are unlike Roberts’ telephone cable. Twinax is a specific type of data cable with only two wires (a single pair) surrounded by shielding. Ex-1081, ¶¶21-22. PO’s expert did not know what twinax was. Ex-1070, 97:18-99:6. Lemke discloses cable with each conductor/conductor pair is in its own individually shielded chamber. *E.g.*, Ex-2005, Abstract, Figs. 1-9, 5:55-62. This is also very different from Roberts:



Ex-1081, ¶23.

While straight (untwisted) pairs may have worked for certain applications where each pair was in an individually shielded chamber, a POSITA would have

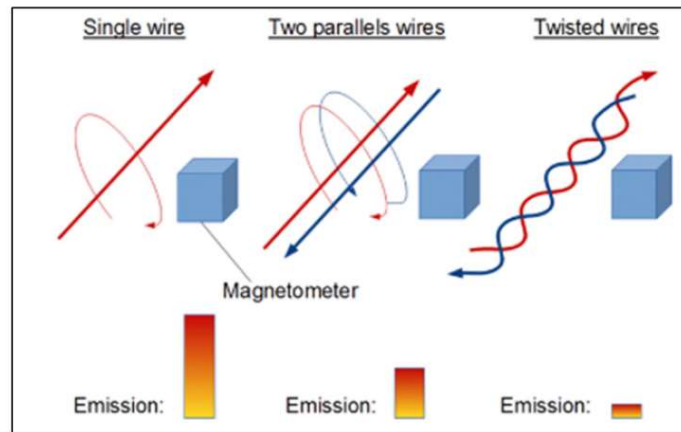
known they would not perform adequately in conventional telephone cable like Roberts that had large numbers of pairs bundled together without individual shielding. As explained further below, the crosstalk between the many adjacent unshielded conductors—if they were not twisted pairs—would have been unworkable. Ex-1081, ¶24.

(b) PO’s “Straight Line Conductors” Argument Does Not Make Sense

PO and its expert contend that Roberts’ “pairs” are “one straight-line conductor within conductor group (14) that is transmitting in one direction, and another straight-line conductor within conductor group (16) that is transmitting in the opposite direction.” Paper 19, 25-26; Ex-2007, ¶¶47, 51-52, 54, 159, 165. That is not a credible read of Roberts because it describes an *unconventional* design and would not have been expected to be viable. Ex-1081, ¶¶25, 35.

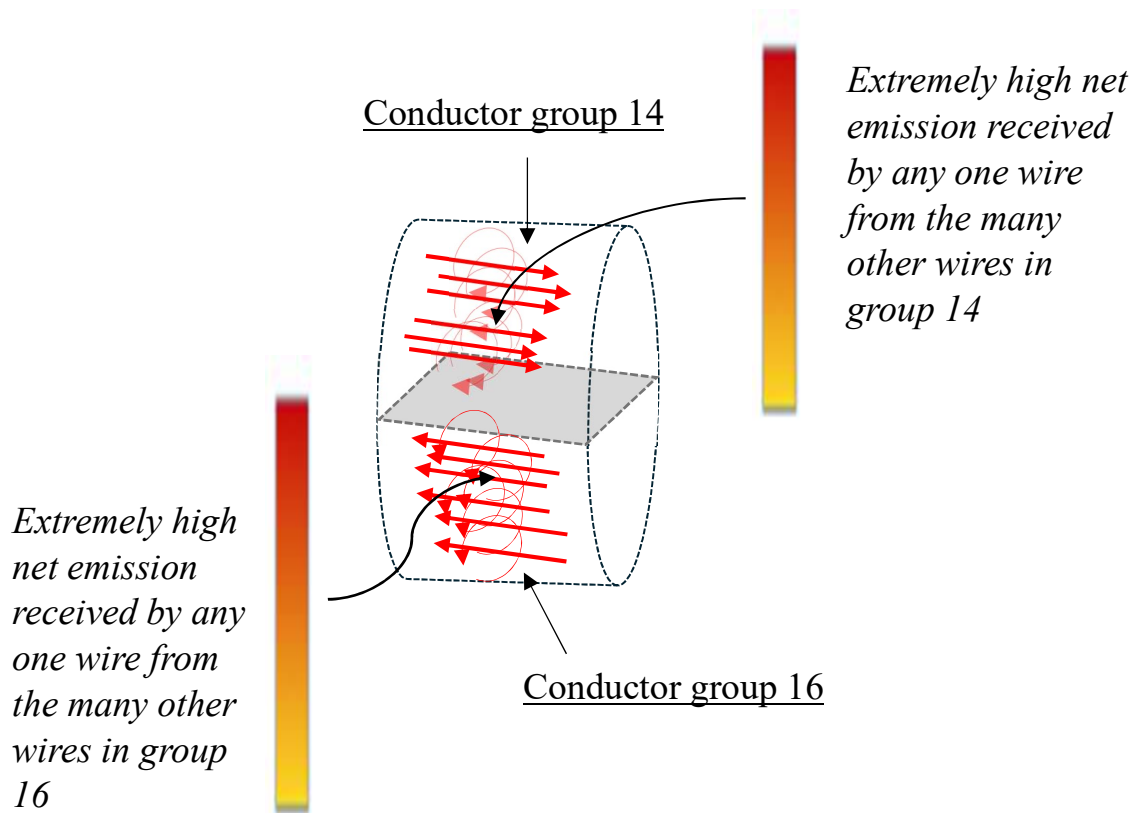
Cable constructed as PO argues would result in highly problematic unbalanced transmission. Unbalanced transmission both created extremely high net electromagnetic emission and was correspondingly highly susceptible to being disturbed by (other) electromagnetic emission. Ex-1081, ¶¶26-29. PO’s expert admitted that his view of Roberts corresponded to the high-emission “single wire” configuration in his below diagram, and that twisted pairs—by contrast—would both reduce emitted electromagnetic interference and reduce susceptibility to

incoming interference:



Ex-1070, 116:22-117:14 (referring to Ex-2007, ¶145), 47:19-48:2; *see also* Ex-2001, ¶¶46-47.

If Roberts had the purported single wire configuration (rather than twisted pairs), a POSITA would have expected unworkably high levels of crosstalk *between conductors within the same group*:



Ex-1081, ¶30. A POSITA also would have known that the excessive crosstalk would become even more problematic with length, making such a configuration particularly nonviable for Roberts' long-range cables. Ex-1081, ¶¶30-31; Ex-1009, 3:60-61 (telephone cables "of many miles in length"), Abstract ("greater spacing between repeaters"); *see also* Ex-1014, 1:24-29 ("far end crosstalk [is] cumulative with cable length"). Unsurprisingly, PO's expert admitted he had never seen a telephone cable configured as he argues Roberts is that extends for anywhere near that distance. Ex-1070, 142:13-21.

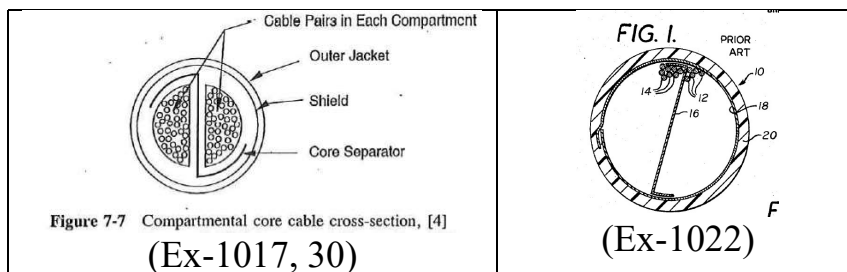
It is undisputed that both electromagnetic emission and corresponding susceptibility to incoming interference was far lower for twisted pairs. Ex-1081,

¶¶27-29; Ex-2007, ¶145. A POSITA would have known that this is precisely why “pairs” of wires in “conventional” telephone cables like Roberts were *twisted* pairs. Ex-1081, ¶32; Ex-1016, 7 (“reasons for twisting pairs...are to minimize or eliminate crosstalk”); Ex-1017, 18; Ex-1081, ¶¶34-36. Consistent with this, ***PO did not provide any evidence*** of conventional telephone cables transmitting in unbalanced mode, and PO’s expert admitted he was unaware of any such cables. Ex-1070, 124:21-126:11, 22:14-23:5.

PO’s expert asserted for the first time at his deposition that Roberts somehow relies on “appropriate signal to noise and launched power” to ensure within-group crosstalk is “at acceptable levels.” Ex-1070, 157:8-158:9. But Roberts does not disclose this, and PO’s expert provided no basis for this assertion in his declarations. Ex-1081, ¶33.

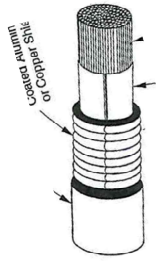
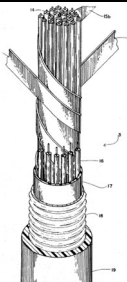
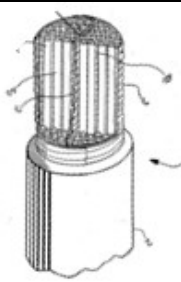
The logical read (and the one supported by the evidence) is that Roberts discloses shielding a group of *twisted* pairs transmitting in one direction from a group of *twisted* pairs transmitting in the other direction. Ex-1081, ¶¶34-37; *see also Acoustic Tech., Inc. v. Itron Networked Sols., Inc.*, 949 F.3d 1366, 1373 (Fed. Cir. 2020) (“In an anticipation analysis, the dispositive question is [what] a skilled artisan would ‘reasonably understand or infer’ from a prior art reference....Expert testimony may shed light on what a skilled artisan would reasonably understand or infer”). Indeed, by the 1990s this “compartmental” configuration had become

commonplace for telephone cables that—like Roberts—also carried digital data:



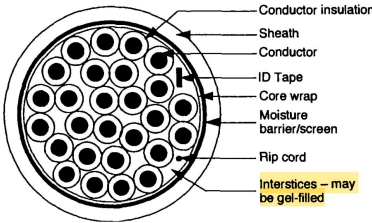
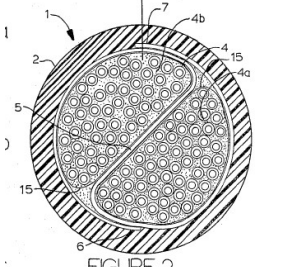
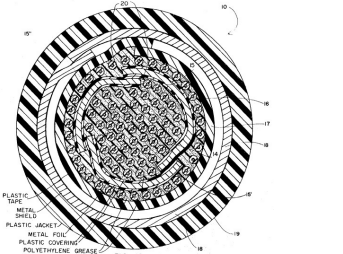
Ex-1081, ¶37; Ex-1017, 30, 35, Fig. 7-7; Ex-1022, 1:5-48, Fig. 1.

PO also argues that Roberts’ figures show straight-line conductors, and also cites Watts (Ex-2006).² Paper 19, 21-25. However, it is not surprising that pair twisting is not visible because the twist lengths of such cables was quite long. Ex-1081, ¶¶38-39; *see also, e.g.*, Ex-1014, 1:32-34. Indeed, pair twisting is not visually apparent in industry literature:

			
Ex-1035, 13 (telecommunications exchange cable with “TWISTED PAIRS”)	Ex-1017, 24 (“Twisted pair cable construction[.]”)	Roberts, Fig. 3 (Ex-1009)	Watts, Fig. 1 (Ex-2006)

² Watts references Roberts, but it discusses only Roberts’ shielding and armor. *See* Ex-2006, 1:47-2:2.

Ex-1081, ¶39. PO argues that Roberts and Watts show grease-filled “spaces” between conductors. Paper 19, 22-25. This also does not indicate untwisted pairs—prior art depicting twisted pairs has similar figures:

“Twisted Pair” cable	Watts	Roberts
<i>Twisted Pair Telecommunication Cables</i>  Fig. 55.1 Typical telephone cable layout Ex-1029, 33 (highlighting added)	 FIGURE 2 Ex-2006, Fig. 2	 FIG. 10 Ex-1009, Fig. 10

Ex-1081, ¶40.

PO also contends that Roberts’ description of “holes (33) through which *twisted* electrical conductors (14) and (16) pass” does not indicate twisted pairs because CommScope’s expert “admitted” it does not relate to the *formation* of twisted pairs. Paper 19, 26-27. PO misses the point. No one argued the dieplates *form* the twisted pairs. Rather, each strand pulled through the holes “*is* a twisted pair.” Ex-1007, ¶116. And the undisputed evidence shows conventional telephone cables were commonly made this way. Ex-1007, ¶116 (citing Ex-1016, 9); Ex-1081, ¶41. PO’s argument likely reflects PO’s expert’s lack of industry experience. Ex-1070, 191:2-18, 193:9-20 (admitting he has never seen cabling machines like shown at Ex-1016, 9-10 or observed manufacturing of twisted pair cable).

2. GROUND 3: GmbH-866

PO's only argument is that GmbH-866 does not "necessarily" disclose twisted pairs. Paper 19, 41-49. However, the Petition showed GmbH-866 *expressly* discloses³ "pairs" of "stranded" conductors or wires (i.e., twisted pairs) in at least three places. Petition, 43 (citing Ex-1010, 2, 3, 4); Ex-1007, ¶¶96, 174-178; Ex-1081, ¶¶42-43.

PO's arguments are also not supported or credible. PO itself previously took the position that GmbH-866 *does* disclose twisted pairs as claimed; and its expert ignores the context of GmbH-866; and German-English dictionaries confirm the translator's correct and consistent use of "stranded" in the twisted sense.

(a) PO Previously Admitted GmbH-866 Does Disclose Twisted Pairs

In a prior district court lawsuit, PO filed a pretrial "Joint Statement of Admitted Facts" stipulating that GmbH-866 disclosed twisted pairs as claimed:

³ PO incorrectly tries to frame the issue as only inherency. Paper 19, 41-42.

16. It is not contested that German Patent DE 297 19 866 (the '866 Patent) discloses the following limitations of Claim 27 of the '095 Patent:

- a. "a data communications cable"
- b. "a first twisted pair of insulated conductors"
- c. "a second twisted pair of insulated conductors"
- d. "a configurable dielectric pair separator that separates the first and second twisted pairs of insulated conductors"
- e. "the configurable dielectric pair separator being substantially flat"
- f. "a jacket enclosing the first and second twisted pairs of insulated conductors and the dielectric pair separator"
- g. "wherein the configurable dielectric pair separator is arranged within the jacket to form at least two grooves"

Ex-1076, p.6 ¶16 (highlighting added); *id.* p.7 ¶18 (claim 31).⁴ PO restated this in discovery responses, dispositive motion practice, and during trial. *E.g.*, Ex-1077, 31; Ex-1061, 11; Ex-1063, 1360:19-20. PO also took this position during a prior *inter partes* reexamination. Ex-1058, 69; Ex-1059, 21, 33.

⁴ PO also entered a formal "stipulation" into evidence ("JTX-397") that presumably included this agreement, but PO is "unable to locate" JTX-397. Paper 22, 2 n.1; *see also* Ex-1063, 1308:1-15, 1331:18-1332:11; Ex-1066, 1268:24-1269:2, 1142:1-12.

PO's argument now that GmbH-866 does not disclose twisted pairs is not credible. PO's Response did not address these prior inconsistent positions. Further, the Board could find PO judicially estopped from now taking the opposite position.

In briefing opposing CommScope's Motion to Compel, PO attempted to duck this inconsistency by contending CommScope filed a new translation. This is unavailing. First, the foreign language GmbH-866 is the reference asserted, not any particular translation of it. *See* Paper 26, 3. And PO used the prior translation (Ex-1057) without objection. Second, the two differences PO identified are immaterial. *See* Paper 22, 3-4. Regarding "isolated" versus "insulated": a POSITA would have understood "isolated" referred to conductors that are insulated (and thus electrically isolated) from each other. Ex-1081, ¶51; *see also* Ex-1067, 4; Ex-1068, 4. Regarding "pairs" versus "pair": this is a red herring. Nearly the same phrase appears in at least four other places where *both* translations use "pairs":

Ex-1010, 3	range of from approximately 0.15 to 0.7 mm. The stranding of the pairs 1 can consist in what is known as a helix stranding or in an SZ stranding (alternating, right-left stranding). In the case of an SZ stranding of the pairs, preferably, the spacing of the reversal points of the stranding
Ex-1057, 4	The stranding of pair 1 can consist of a so-called helix stranding or an SZ stranding (alternating right-left stranding). With an SZ stranding of the pairs, preferably the distance of the turnaround point of the
Ex-1010, 5	17, 18 are applied together with the stranding or the conductor pairs 1 and/or the longitudinally extending deformation of the conductor pairs 1. In particular, in the case of the stranding of the conductor pairs in the
Ex-1057, 7	manufactured so that the partial shieldings 11, 12 or 17, 18 can be applied together with the stranding of conductor pairs 1 and/or longitudinal reshaping of the conductor pairs 1. Especially with stranding of the conductor pairs in the SZ stranding procedure, the existing laying

Ex-1010, 8	11. Data transfer cable according to one or more of claims 1 to 10, characterized in that the conductor pairs (1) are stranded in a helical or SZ-like manner.
Ex-1057, 10	11. Data transmission cable according to one or more of claims 1 to 10, characterized in that the conductor pairs (1) are stranded to form helixes or are SZ-like.

GmbH-866 discloses twisted pairs as claimed, and PO previously admitted this fact. GmbH-866 invalidates claims 27-29.⁵

(b) PO's Expert's Arguments About "Stranded" Are Conclusory and Ignore the Context

PO *does not dispute* that GmbH-866 uses the word stranding/stranded to mean twisted in almost every instance. *E.g.*, Ex-1010, 3 ("stranding of the pairs 1 can consist in what is known as helix stranding or in an SZ stranding"), 4 ("two pairs of stranded conductors"), 5, 8; *see also* Ex-1081, ¶46. PO's expert argues that in two particular sentences, though, GmbH-866 suddenly uses "stranded" to mean something different. But he provides no reasoning, other than the word "stranded" could have a different meaning. This is not credible. Read in context, GmbH-866

⁵ Even if phrases such as "pairs (1) are stranded in a helical...manner" referred to *creating* twisted pairs (rather than twisting them about a central axis), the claims are still invalid. The Petition showed that the "twisted about a common central axis" limitation was obvious, and PO did not dispute this. Petition, 61-64 (Ground 6).

uses “stranded” consistently in the twisted sense. Ex-1081, ¶¶44-46, 49-50.

PO’s expert also provides contradictory arguments relating to the two sentences describing “pairs” of “stranded...conductors or wires”:

four pairs of two **stranded isolated copper** *conductors or wires...*

four pairs 1, each consisting of two **isolated, stranded copper** *conductors 2 or wires...*

Ex-1010, 2, 3 (emphasis added). On one hand PO’s expert argued that “stranded” modifies *only* “conductors” and not “wires.” Ex-2001, ¶80 (“conductor pairs [are] either stranded copper conductors or solid wires”). On the other hand he seemingly argued that “isolated” modifies *both* “conductors” and “wires.” Ex-2001, ¶83 (arguing “isolated” “teaches away” from the pair being “intertwined”).⁶ These arguments are inconsistent and not credible. Normal sentence structure indicates “stranded,” “isolated,” and “copper” all modify each of the “conductors or wires” options that follow. Ex-1081, ¶¶47-48. Moreover, this is additional evidence that “stranded” means twisted, just as it does everywhere else in GmbH-866. If “stranded” in these two sentences instead meant multi-filament wire, then stranded

⁶ PO’s expert repeatedly refused to clarify his understanding of what “isolated” modified. Ex-1070, 172:16-188:9.

“conductors or wires” would have been nonsensically redundant. *Id.*

PO attempts to leverage CommScope’s expert’s acknowledgement that “stranded” in certain contexts can mean multifilament wire. *See* Paper 19, 42. However, CommScope’s expert explained that “you have to understand the context,” and in the context of GmbH-866 “it is clear” that “pairs” of “stranded” conductors or wires means *twisted* pairs. Ex-2004, 214:1-16. He also explained that he had never seen a four-pair data cable of the type disclosed by GmbH-866 that did not use twisted pairs. Ex-2004, 215:15-216:7. PO’s expert *did not dispute this*. It would be implausible to a POSITA to read GmbH-866 as excluding cables with twisted pairs. Ex-1081, ¶¶49-50. Indeed, common industry standards *required* twisted pairs for four-pair data cables in the transfer speed range disclosed by GmbH-866. Ex-1081, ¶49; *see also* Ex-1074 and Ex-1079.

GmbH-866 also explains that the “pairs” are “*stranded* conductors” in a third disclosure:

[I]t is possible not only...for four pairs 1 to be provided,
but rather... the invention can also comprise just two
pairs of stranded conductors.

Ex-1010, 4 (emphasis added). PO *agrees* that here “stranded” means twisted, but argues that it is just another reference to stranding (twisting) the pair units about the cable axis. Paper 19, 46-49. That conflicts with the plain reading of GmbH-

866. Ex-1081, ¶¶53-57. GmbH-866 describes the pairs as stranded “*conductors*.” Ex-1010, 2, 3, 4; Ex-1081, ¶¶54-55. Separately, GmbH-866 describes stranding the “*pairs*” about the cable’s central axis to form the overall cable core. Ex-1010, 3, 5, 8; Ex-1081, ¶¶54, 56. As the Petition showed, GmbH-866 teaches both types of stranding: the pairs each consist of two stranded (twisted) conductors, and the twisted pair units are also themselves stranded (twisted) about a common axis of the cable. Petition, 41-43, 47-49; Ex-1007, ¶¶174-178, 188-194.

PO contends that GmbH-866 “teaches away” from twisted pairs because it describes the pairs as consisting of “two isolated conductors in each case.” Paper 19, 44. This does not make any sense. Plainly, “isolated” conductors indicates that the conductors are electrically insulated from each other, not that they are physically separated or somehow individualized. Ex-1081, ¶51. All figures show insulated conductors 2 of each pair 1 touching or nearly touching (consistent with twisted pairs). Ex-1010, Figs. 1-5; Ex-1081, ¶51.

PO also cites GmbH’s description of the “effective diameter” of the copper conductor or wires and argues that a twisted pair is “not typically referred to as having a diameter.” Paper 19, 45-46. This argument is a confusing non-sequitur. GmbH-866 simply identifies the effective diameter of each of the copper conductors or wires” that comprise the twisted pair; no one is arguing that this somehow refers to the overall diameter of the twisted pair.

PO also confusingly contends that because GmbH-866 does not specifically teach that “insulation (3)” around each conductor is also twisted, that indicates the conductors/wires are not twisted. Paper 19, 46. This is nonsensical. A POSITA would not expect a separate reference to twisting the insulation, because the insulation is *part of* (adhered to) the conductor. Ex-1010, 3 (“copper conductors or wires preferably *have* an insulation 3”); Ex-1081, ¶52.

**(c) German-English Technical Dictionaries Confirm
Stranded Means Twisted in GmbH-866**

The table below shows how Ex-1010 translated the phrases describing twisted pairs:

“vier Paaren aus zwei verseilten isolierten Kupferleitern oder -litzen ” “four pairs of two stranded isolated copper conductors or wires ”
“vier Paare 1 aus jeweils zwei isolierten, verseilten Kupferleitern 2 oder -litzen auf” “four pairs 1, each consisting of two isolated, stranded copper conductors 2 or wires ”
“kann auch lediglich <i>zwei Paare</i> verseilter Leiter aufweisen” “can also comprise just <i>two pairs</i> of stranded conductors ”

Compare Ex-1011, 2, 4, 5 *with* Ex-1010, 2, 3, 4 (emphasis added). German-English technical dictionaries confirm what Ex-1010 says—that the translator was correctly using “stranded” (“verseilten”) consistently in the twisted sense, and that

“stranded” in the multi-filament sense is a different word (“litzen”):

“verseilten”	Ex-1068, 10, e.g.: • <i>Verseilen</i>: to twist, strand, cable • <i>Verseilt</i>: stranded (cable) • <i>Verseilter Draht</i>: twisted wire Ex-1067, 9, e.g.: • <i>Verseilen</i>: <Fertig> cabling • <i>Verseilmachine</i>: <Fertig> cabling machine
“leiten” or “litzen”	• <i>Leiter</i>: <Telekom> Conductor (Ex-1067, 9) • <i>Leiter</i>: conductor, (Ex-1068, 7) • <i>Litzendraht</i>: <Elektriz, Elektrotech> braided wire, stranded conductor (Ex-1067, 8) • <i>Litzendraht</i>: flexible, stranded wire; <i>Litzenseil</i>: rope made of strands (Ex-1068, 9)

While the conductive portion of each member of the pair can be either solid copper (“leiten”) or multi-filament wire (“litzen”), in either case the two insulated wires are twisted (“verseilten”) together.

3. GROUND 7⁷: Yanagita

PO now argues Yanagita does not disclose twisted pairs, even though PO *agreed* in prior proceedings that Yanagita does. Ex-1077, 48, 45, 115 (PO’s interrogatory response to invalidity contentions regarding ‘537 patent, affirmatively stating that Yanagita “discloses an alternately stranded cable

⁷ PO incorrectly addresses Yanagita as “Ground 2.” Paper 19, 31-40.

comprising stranded pairs” and not disputing the twisted pair elements). Moreover, the arguments PO now makes are unsupported.

PO first argues, wrongly, that Yanagita’s discussion of “pairs”/“stranded pairs” just refers to the prior art. Paper 19, 36-39. A POSITA would understand Yanagita to be describing the cables the inventive twisted plastic core can be applied to. Ex-1081, ¶58. Indeed, the stranded pairs discussion appears immediately under “Detailed Explanation of the Invention,” describing the types of “alternatingly stranded cable” the twisted plastic core is used with. Ex-1012, 1; *see also* Ex-1055, 1.⁸

PO then argues that Yanagita discloses *only* straight wires, and that the discussion of the option wherein the “insulated wires are twisted together” just refers to straight wires being laid along the twisted core. Paper 19, 31-36, 39-41. This is also wrong. Yanagita discloses that *each* element 1 that is laid along the twisted core can be *either* a single “insulated wire”/“insulated element wire” *or* “wherein insulated strands are twisted together”/“stranded groupings of such” (i.e.

⁸ PO “objects” to citing Ex-1055, but (i) the foreign language patent is the reference asserted, not any particular translation of it (*see* Paper 26, 3), (ii) PO used Ex-1055 in two prior proceedings without objection, and (iii) Ex-1055 is not inconsistent with Ex-1012.

twisted pairs or quads). Ex-1012, 1; Ex-1055, 1; Ex-1081, ¶¶59-62. This is evident to a POSITA from Ex-1012, and also corroborated by Ex-1055:

Ex-1012, 1	Ex-1055, 1
“1 is an insulated wire or that wherein insulated wires are twisted together, laid divided onto both sides of a core material 2” “<u>alternatingly twisted cable</u> wherein a large number of insulated wire strands, or that wherein the insulated wire strands are twisted together, are laid, <u>while twisting along the surfaces, ...</u>”	“reference numeral 1 constitutes an insulated element wire or stranded groupings of such; <u>these are divided and longitudinally run along both surfaces of core material 2</u>” “<u>alternatedly stranded cable...</u>; onto both surfaces of the core material, a plurality of either insulated element wire or else stranded groupings of such are vertically <u>run along the surfaces while being twisted</u>”

Ex-1081, ¶61; *see also* Ex-1012 and Ex-1055, claims 1, 2 (same).

If the bolded text just referred to the twisting due to straight wires being laid along the twisted core (as PO contends), it would be redundant of the other (underlined) twisting already described. Ex-1081, ¶¶59, 61.⁹ PO’s interpretation also completely ignores that Yanagita clearly describes multiple options for the

⁹ CommScope’s expert did not “admit” that Yanagita was unclear with respect to disclosing twisted pairs, as PO contends. Ex-1081, ¶63.

composition of each element “1”: element 1 can be *either* a single “insulated wire” *or* “insulated wires [that] are twisted together.” Ex-1081, ¶¶60-62. During deposition, PO’s expert argued that the “or” clauses (bolded in the table above) were just redundant. Ex-1070, 205:1-22. This is not credible. “Or” means “or,” and a POSITA would understand Yanagita to disclose twisted pairs as one option for the composition of each of wire units 1 that are laid along the twisting core. Ex-1081, ¶62; *see also id.* ¶¶60-61.

Moreover, most communication cables at the time used twisted pairs or quads. Ex-1007, ¶64, ¶¶33-35 (citing additional evidence). It is implausible to read Yanagita as limiting its invention to *only* cables with straight wires. This is particularly true given that the evidence shows it was common to refer to twisted pairs simply as “pairs” (Ex-1081, ¶19) and a POSITA would have understood Yanagita’s reference to “pairs”/“stranded pairs” meant twisted pairs. Ex-1081, ¶64.

B. Roberts (GROUND 1) and Yanagita (GROUND 7) Also Anticipate Dependent Claim 29

PO’s argument that Roberts and Yanagita do not anticipate claim 29 (Paper 19, 49-50) relies on an overly narrow implicit construction. The prior district court construction of “grooves” that the Petition agreed to apply in this IPR is a broad construction. That construction says one *may* consider structure other than the separator when identifying “grooves,” but it does not say one *must*. Petition, 18 (grooves “are formed by” but “need not” be part of the separator).

The prosecution history confirms this. The Examiner objected to Claim 29 as lacking antecedent basis in the specification. The Applicant disagreed, directing the Examiner to Figures 5, 7, 9, and 10 and noting that “[t]hese grooves are not completely enclosed because the dielectric pair separator does not fold back upon itself to completely enclose the twisted pair 12 within the groove.” Ex-1075, 6-7.

In Roberts and Yanagita, the pair separator also does not fold back upon itself to completely enclose the twisted pair. *E.g.*, Ex-1009, Fig. 17, 10:49-57 (separator 15 “does not circumscribe any one group of insulated electrical conductors”); Ex-1012, Figs. 1-2. When considering whether the “grooves” form completely enclosed channels, the broad district court construction allows consideration of only the separator; it does not *require* consideration of other structure.¹⁰

¹⁰ Even if PO were right that the construction *requires* consideration of additional cable structure, it should only be that other structure recited in the claims (i.e., the “jacket,” within which the separator is arranged to form grooves). It cannot be disputed that in Roberts and Yanagita, the separator (Roberts (15) and Yanagita (2)) together with the jacket (Roberts “plastic jacket” 19 and Yanagita “cable sheath” 4) does not form completely enclosed channels around the conductors. Ex-1009, Fig.

C. GROUND 5: It Would Have Been Obvious to Use Twisted Pairs as Claimed in Roberts (Claims 27-33)

If Roberts somehow lacks “pairs” of conductors that are twisted pairs as claimed, it would have been an extremely obvious thing to do.

PO first argues that there would be no motivation to use twisted pairs because “Roberts already solved the problem of near-end crosstalk between groups” of conductors, and twisted pairs would not provide any “electrical benefit.” Paper 19, 57, 62-63. That is not correct. A POSITA would have known that there were multiple sources of problematic crosstalk: (i) between transmissions in opposite directions (particularly problematic at the near-end), and also (ii) between adjacent conductors even when transmitting in the same direction (problematic at the near and far end, but particularly at the far end). Ex-1007, ¶¶37-38; *see also* Ex-1081, ¶¶30-31, 34-36. As PO’s expert admitted Roberts’ shield would not have addressed—much less “solved”—the second source of problematic crosstalk (crosstalk between adjacent conductors within the same group). Ex-1070, 138:10-16; *see also* Ex-1081, ¶¶66-67, 68-70.

As explained above, if Roberts were configured as PO contends, the second

17; Ex-1012, Fig. 1. Roberts’ element (17) and Yanagita’s element (3) are between the cable jacket and the separator.

source of crosstalk (within-group crosstalk) would have been so high that a POSITA would not expect the cable to provide acceptable performance. *See supra* §II.A.1.b; Ex-1081, ¶¶68, ¶¶30-31. As the Petition explained, using twisted pairs would have been the obvious way to vastly improve the electrical performance of the cable, by lowering crosstalk and decreasing unbalanced mutual capacitance caused by adjacent conductors. Petition, 60; Ex-1007, ¶¶35, 236, 238 (citing evidence); Ex-1016, 7; Ex-1017, 18; *see also* Ex-1081, ¶¶68-70. PO's expert also admitted that replacing the purported individual wires of Roberts with twisted pairs would lead to a "containment of the fields" (i.e. reduce crosstalk on adjacent conductors) and would "decrease electromagnetic interference because it reduced the amount of emissions and also reduced susceptibility to external interference." Ex-1070, 147:11-148:8, 47:12-48:2. PO's lack-of-motivation argument because Roberts' shield already "solved" the crosstalk problem is simply wrong. Ex-1081, ¶¶34-36.

PO also argues that the "mechanical benefits" of ensuring the individual wires stay together during the cabling process is "antithetical" to the crosstalk solution of Roberts, and twisted pairs would "alter the principle of operation" of Roberts. Paper 19, 61-62, 64. This is not correct. Using twisted pairs would enable acceptable performance by reducing within-group crosstalk to workable levels while *maintaining* (and actually enhancing) the reductions in near-end (between-

group) crosstalk provided by Roberts' shield. Ex-1081, ¶71.

PO contends that using twisted pairs would double the number of wires, increase the amount of materials needed, and lower the flexibility of a cable. Paper 19, 64-66. However, twisted pairs were a known and ubiquitous solution, and the vastly improved electrical performance they provided would easily outweigh even a somewhat larger, less flexible cable. Ex-1081, ¶73. Moreover, Roberts was directed to cables that were often buried or hung on telephone poles and extended for long distances, where electrical performance was far more important than size/flexibility. Ex-1081, ¶74; Ex-1009, Abstract, 13:56-63, 3:60-61; Ex-1018, 4. PO argues that twisted pairs would “eviscerate” the “space-saving, economical cable” that Roberts already offers (Paper 19, 65), but PO does not show Roberts was seeking a “space-saving” cable. Roberts provided *electrical* benefits of reduced near-end crosstalk between groups of conductors to allow “greater spacing” between repeaters. Ex-1009, Abstract, 1:5-31. Twisted pairs would predictably maintain and enhance that benefit, while additionally bringing within-group crosstalk down to functional levels. Ex-1081, ¶75.

PO cites the Lemke patent as evidence of drawbacks of twisted pairs. But Lemke shows each conductor/conductor pair in an individually shielded compartment. *E.g.*, Ex-2005, Figs. 1-5. A POSITA would not have expected this to be a desirable or even feasible option for a high-pair count cable like Roberts. Ex-

1081, ¶76. The cost and manufacturing complexity would have been far greater than the same cable simply using conventional twisted pairs. *Id.*

PO also argues that using twisted pairs in Roberts would have “require[d] a far more complex cable termination solution.” Paper 19, 64-66. Again, not so. Twisted pairs would have brought Roberts in-line with standard telephone cables (which were designed for twisted pairs) and therefore *simplified* termination. Ex-1081, ¶77.

D. GROUND 2, 4, and 8: Claims 30-33 (Foamed Polymer Claims)

The foamed polymer claims stood rejected as obvious in view of Gingue in a prior reexamination when that proceeding was terminated by settlement. Petition, 8-9 (Ex-1003, 17-19). PO provides several arguments to try and save these claims, but none is persuasive.

First, PO argues adding Mylar or foamed polymers to a cable would increase flammability. Paper 19, 53. This is conclusory and unsupported. PO offers *no* supporting expert testimony. And CommScope’s expert merely testified that the materials may be flammable “to some extent.” Ex-2004, 129:20-130:21. PO’s conclusion that therefore foamed polymer would “increase [the cable’s] overall flammability” is leap not supported by the evidence. As the Petition showed, Gingue teaches both (i) that *for a given volume* of polymer, foaming decreases the amount of flammable material, and (ii) foamed polymer can have a flame-retardant

additive. Ex-1007, ¶¶213-214, 286; Ex-1081, ¶¶79-80. PO also ignores *additional* evidence confirming foamed polymer and Mylar-backed foamed tape was commonly used in communications cabling and had many known benefits. *E.g.*, Ex-1007, ¶¶141-152, 211-212, 281-285; Ex-1015, 2:62-64, 6:1-3; Ex-1014, 2:50-54.

Second, PO contends that Jachimowicz discloses a foamed polymer “jacket” that is not “substantially flat.” Paper 19, 67-68. The Petition did not rely on that embodiment, but rather Jachimowicz’s *alternative* “tape made of foamed thermoplastic.” Petition, 32, 33-34. PO also argues that a “jacket” needs to “be of sufficiently rigid composition” to “lock” pairs but cites no evidence. Paper 19, 68. This is unsupported. A POSITA would expect Jachimowicz’s foamed polymer *tape* embodiment to be more than sufficiently flexible to be wrapped around a twisted pair. Ex-1081, ¶82.

Third, PO argues that a POSITA would understand Jachimowicz’s foamed tape to have an “undulating surface” and therefore is not “substantially flat.” Paper 19, 69-71. PO is wrong. One, the “undulating surface” argument again relies on the wrong embodiment (the extruded jacket of Figure 1, rather than the “tape”). Ex-1081, ¶83; Ex-1014, 2:46-50. Two, CommScope’s expert explained that a POSITA would understand the tape *of Jachimowicz* is substantially flat, and that he was familiar with foamed tapes like that. Ex-2004, 103:1-104:16 (referencing Ex-1007

(IPR2023-01061) ¶93); Ex-1007, ¶¶144, 210, 280; Ex-1081, ¶84.¹¹ PO’s expert, by contrast, relies on misreading Figure 1 as showing the “tape” embodiment and was not familiar with foamed tapes used in communication cabling. *See* Ex-1070, 213:2-214:1.

PO’s “undulating surface” argument also relies on an implied but incorrect claim construction. Even if a tape did have an “undulating surface,” it would still be “substantially flat.” The claim recites “*substantially* flat,” not “flat” or “completely flat.” The specification confirms that even a “flat” tape need not be free of surface texture. “[P]air separator 14” is shown as ridged and described as a “flat configurable tape.” Ex-1001, Fig. 4, 6:12-13; Ex-1081, ¶85. A POSITA would have understood even a tape such as what PO’s drawing depicts (Paper 19, 70) is “substantially” flat. Ex-1081, ¶85.

PO’s contention that CommScope’s expert had an “erroneous understanding” of the tape function in Jachimowicz (Paper 19, 70-71) is also incorrect. CommScope’s expert correctly noted that Jachimowicz describes the pairs “held together in the bundle” by the foamed polymer tape. Ex-1014, 2:46-54; *see also id.* claim 7; Ex-1081, ¶86. Moreover, PO’s expert incorrectly attributes the

¹¹ At deposition, CommScope’s expert’s merely acknowledged that he did not know whether “all tapes” were substantially flat.

“locking” function to a purported ridged structure on the surface of the foam. Jachimowicz does not teach this and that is not what a POSITA would have understood. Ex-1081, ¶¶86-87.

Finally, PO implies Gingue is not relevant because it does not specifically discuss foam in *tape* form. *See* Paper 19, 67. PO is wrong. Gingue shows foamed polymer was a known data communication cable component with known benefits, and PO did not dispute this. Petition, 32-33; Ex-1007, ¶¶103-104. Those *same* advantages are the ones CommScope’s expert explained would motivate a POSITA to use a substantially flat foamed polymer tape as claimed. *Id.*; Ex-1081, ¶¶88-89.

The evidence shows the foamed polymer claims are obvious, just like the Examiner in the prior reexamination concluded.

Respectfully submitted,

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/s/Peter M. Kohlhepp

Timothy A. Lindquist (Reg. No. 40,701)

Dennis C. Bremer (Reg. No. 40,528)

Peter M. Kohlhepp (*Pro Hac Vice*)

Ryan D. Rypka (Reg. No. 79,451)

CARLSON CASPERS VANDENBURGH &
LINDQUIST, P.A.

225 South Sixth Street, Suite 4200

Minneapolis, MN 55402

Telephone: (612) 436-9600

Facsimile: (612) 436-9605

dbremer@carlsoncaspers.com

tlindquist@carlsoncaspers.com

pkohlhepp@carlsoncaspers.com

rrypka@carlsoncaspers.com

*Counsel for CommScope, CommScope
Technologies, LLC*

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Reply Brief totals 5,593 words per Microsoft Word's word count tool, which complies with the requirement of 5,600 words allowed under 37 C.F.R. § 42.24(c)(1).

Dated: July 9, 2024

/s/Peter M. Kohlhepp

Timothy A. Lindquist (Reg. No. 40,701)

Dennis C. Bremer (Reg. No. 40,528)

Peter M. Kohlhepp (*Pro Hac Vice*)

Ryan D. Rypka (Reg. No. 79,451)

CARLSON CASPERS VANDENBURGH &
LINDQUIST, P.A.

225 South Sixth Street, Suite 4200

Minneapolis, MN 55402

Telephone: (612) 436-9600

Facsimile: (612) 436-9605

dbremer@carlsoncaspers.com

tlindquist@carlsoncaspers.com

pkohlhepp@carlsoncaspers.com

rrypka@carlsoncaspers.com

*Counsel for Petitioner, CommScope
Technologies, LLC*

CERTIFICATION OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e) and the agreement of the parties, the undersigned certifies that on July 9, 2024, a true and correct copy of the foregoing Reply Brief was served via electronic mail upon the following:

Denis J. Sullivan (Ref. No. 47,980)
Thomas Hoehner (Reg. No. 73,474)
Pranav Katti (Reg. No. 78,713)
BARCLAY DAMON, LLP
Barclay Damon Tower
125 East Jefferson St.
Syracuse, NY 13202
Telephone: (315) 425-2700
dsullivan@barclaydamon.com
thoehner@barclaydamon.com
pkatti@barclaydamon.com

Cory C. Bell (Reg. No. 75,096)
FINNEGAN, HENDERSON, FARABOW,
GARRETT, & DUNNER LLP
2 Seaport Lane, 6th Floor
Boston, MA 02210-2001
Telephone: (617) 646-1641
cory.bell@finnegan.com

/Peter M. Kohlhepp/
Peter M. Kohlhepp