

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC.
Petitioner

v.

BELDEN INC.
Patent Owner

Case IPR _____
U.S. Patent No. 6,998,537
Issued: February 14, 2006
Filed: January 3, 2003

PETITION FOR *INTER PARTES* REVIEW OF U.S. PAT. NO. 6,998,537
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 41.100 ET SEQ.

Table of Contents

Petitioner’s Exhibit List	vi
I. INTRODUCTION	1
II. GROUNDS FOR STANDING	1
III. IDENTIFICATION OF THE CHALLENGE	2
A. Prior Art	2
B. Grounds	3
IV. THE ’537 PATENT	3
A. Technology Background	3
B. Overview of the ’537 Patent	7
C. Prosecution History	8
D. The Challenged Claims	10
E. Prior (Unfinished <i>Inter Partes</i> Reexamination and District of Delaware Litigation Between Patent Owner and Superior Essex (2008-2012))	11
V. LEVEL OF ORDINARY SKILL IN THE ART	14
VI. CLAIM CONSTRUCTION	15
1. Preamble - “An unshielded communications cable comprising” (independent claim 19)	15
2. “ <i>substantially flat</i> configurable dielectric separator” (independent claim 19)	17
3. “Configurable” separator (independent claim 19)	20

VII.	<u>GROUND 1: BEGGS AND JACHIMOWICZ RENDER CLAIM 19 OBVIOUS</u>	21
A.	Beggs (EX-1015).....	21
B.	Jachimowicz (EX-1014).....	22
C.	Independent Claim 19	23
1.	[19.pre] “An unshielded communications cable comprising:”	23
2.	[19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”	24
3.	[19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors;” [and] [19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”	24
4.	[19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”	32
VIII.	<u>GROUND 2: BEGGS AND JACHIMOWICZ, FURTHER IN VIEW OF GINGUE, RENDERS DEPENDENT CLAIMS 20 AND 22 OBVIOUS</u>	32
A.	Gingue (EX-1013).....	33
B.	Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant,	

	foamed polymer tape.”	34
C.	Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.” ...	37
IX.	GROUND 3: YANAGIDA AND JACHIMOWICZ RENDER CLAIMS 19-20, 22 OBVIOUS	38
A.	Yanagida (EX-1012)	38
B.	Independent Claim 19	39
1.	[19.pre] “An unshielded communications cable comprising:”	39
2.	[19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”	39
3.	[19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors;”	
	[and]	
	[19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”	40
4.	[19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”	44
X.	GROUND 4: YANAGIDA AND JACHIMOWICZ, FURTHER IN VIEW OF GINGUE, RENDERS DEPENDENT CLAIMS 20 AND 22 OBVIOUS	45
A.	Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.”	45

B.	Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.”	47
XI.	GROUND 5: GmbH-866, MODIFIED IN VIEW OF ROBERTS, GINGUE AND/OR JACHIMOWICZ RENDERS CLAIMS 19-20, 22 OBVIOUS.....	47
A.	Overview of the Combination	48
1.	GmbH-866 (EX-1010)	48
2.	Roberts (EX-1009)	49
3.	Foamed Polymer References—Gingue and Jachimowicz....	50
B.	Motivation to Combine/Modify and Reasonable Expectation of Success	51
1.	[19.pre] “An unshielded communications cable comprising:”	57
2.	[19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”	58
3.	[19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and”	59
4.	[19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”	61
5.	[19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”	62

C.	Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.”	63
D.	Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.”	64
XII.	PURPORTED SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS	64
XIII.	DISCRETIONARY DENIAL IS NOT APPROPRIATE	66
A.	Discretionary Denial Under 35 U.S.C. §325(d) is Not Warranted.....	66
B.	Discretionary Denial Under 35 U.S.C. §314(a) Is Not Warranted	68
XIV.	MANDATORY NOTICES	70
A.	Real Parties-in-Interest.....	70
B.	Lead and Back-Up Counsel.....	71
C.	Service Information.....	71
D.	Fees	71
	Claims Listing Appendix	72

PETITIONER’S 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, Ph.D.
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

I. INTRODUCTION

Over a decade ago, Belden Inc. (“Patent Owner”) asserted the ’537 patent against a third party. That third party responded with a request for *inter partes* reexamination. The Patent Office granted the reexamination request. During that reexamination, the examiner rejected claims 19-22 of the ’537 patent as obvious (which includes the claims now challenged by this Petition). But before the reexamination could reach finality, Belden settled its dispute with the third party and the reexamination was terminated. Thus, though claims 19-22 stood as rejected, they were not cancelled. Fast forward over a decade. The claims are now expired. However, Belden has recently decided to assert these same claims against CommScope.

The examiner was correct in concluding that 19 and its dependent claims are invalid. This Petition re-asserts the ground the prior reexamination examiner had adopted (Ground 5 here), as well as *additional* grounds also showing the claims are invalid. The Board should institute review and confirm that the challenged claims are invalid.

II. GROUNDS FOR STANDING

Petitioner certifies that the challenged claims of the ’537 patent are available for IPR and Petitioner is not barred or estopped from requesting IPR to challenge the claims on the grounds herein.

III. IDENTIFICATION OF THE CHALLENGE

A. Prior Art

The '537 patent was filed on January 3, 2003 and claims priority to Application No. 09/257,844, filed on February 25, 1999. The '537 patent has expired.

Below are the prior art references relied on in the Grounds set forth in this Petition:

- U.S. Patent No. 4,755,629 (**“Beggs,” EX-1015**), issued on July 5, 1988.
- Japanese Patent Publication S43-15470 (**“Yanagida,” EX-1012**), published on June 28, 1968.
- German Patent DE 297 19 866 U1 (**“GmbH-866,” EX-1010, EX-1011**), published on February 5, 1998.
- U.S. Patent No. 3,894,172 (**“Jachimowicz,” EX-1014**), issued on July 8, 1975.
- U.S. Patent No. 5,670,748 (**“Gingue,” EX-1013**), issued on September 23, 1987.
- U.S. Patent No. 3,622,683 (**“Roberts,” EX-1009**), issued on November 23, 1971.

All of the above are prior art under at least pre-AIA §§102(a)-(b).

B. Grounds¹

This petition shows that claims 19-20, 22 of the '537 patent are invalid in view of the grounds specified below.

	Claims	Basis for Unpatentability
Ground 1	Independent claim 19	Obvious in view of Beggs , further in view of Jachimowicz and the knowledge of a POSITA.
Ground 2	Dependent claims 20, 22	Ground 1, further in view of Gingue and the knowledge of a POSITA.
Ground 3	Independent claim 19	Obvious in view of Yanagida , further in view of Jachimowicz and the knowledge of a POSITA.
Ground 4	Dependent claims 20, 22	Ground 3, further in view of Gingue and the knowledge of a POSITA.
Ground 5	Claims 19-20, 22	Obvious in view of GmbH-866 , further in view of Roberts, Gingue, and/or Jachimowicz and the knowledge of a POSITA.

IV. THE '537 PATENT

A. Technology Background

The '537 Patent relates to communications cables, such as those used for telephone and data. EX-1004, Abstract; EX-1007, ¶31. Such communications

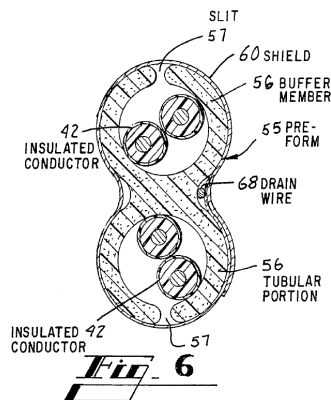
¹ Petitioner does not concede that any challenged claim meets grounds for patentability that cannot be raised during an IPR, including patentability requirements under Sections 101 and 112.

cables have long been typically constructed of multiple twisted pairs of insulated metal conductors (*e.g.*, twisted pairs of insulated copper wires). *E.g.*, EX-1019, 1:10-12; EX-1007, ¶¶31-33. Twisted pairs were (and are) commonly referred to as just “pairs”. EX-1007, ¶31.

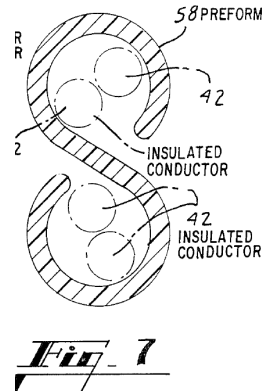
By 1999 (and long before), it was known that placing multiple twisted pairs into a single cable, as was often done, created various drawbacks. EX-1007, ¶¶34-36. One was crosstalk, where one twisted pair induced problematic currents and electromotive forces in another adjacent twisted pair. Roberts, 3:21-28; *see also* EX-1022, 1:7-10; EX-1007, ¶¶34-36. One known way to minimize crosstalk was to place a physical barrier or separator between twisted pairs in a cable. EX-1007, ¶¶37-38, ¶41. Some such separators contained a metal shield layer, while others consisted of dielectric material only. EX-1007, ¶¶38-39, ¶41. However, using a separator with a metal shielding layer increased transmission losses, due to capacitance between a twisted pair and the metal layer in the separator causing current leakage. *E.g.*, Beggs, 2:54-66, EX-1007, ¶45, ¶¶163-164. Such current leakage (and attendant transmission loss) was also known to occur where the separator did not contain a conductive layer, in which case the leakage was from a twisted pair on one side of the separator to a twisted pair on the other side. EX-1007, ¶45, ¶¶99-102. To reduce transmission losses, and also to further reduce crosstalk, it was known to improve pair isolation by (i) increasing

distance/separation between the twisted pairs and (ii) making the buffer between the pairs of a dielectric material that reduced the pair-to-pair or pair-to-conductive layer capacitance. *E.g.*, Beggs, 2:63-67, 3:42-50; EX-1023, 3:17-23; EX-1007, ¶45, ¶¶99-102, ¶¶163-164.

By 1999, the art contained many different examples of dielectric separators that separated twisted pairs in communications cables to minimize known crosstalk and transmission loss problems. EX-1007, ¶¶39-41. These included foamed “buffer” separators, such as discussed by the Beggs reference:

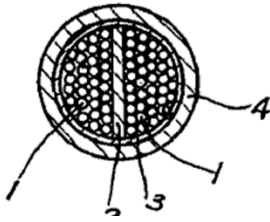
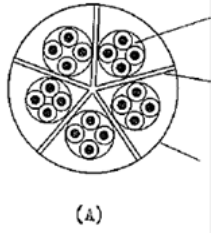
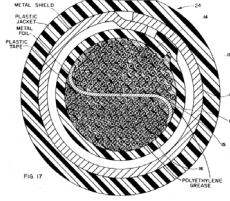
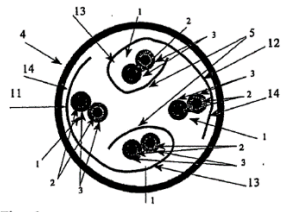
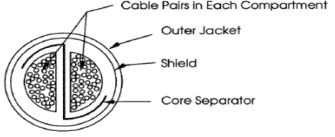
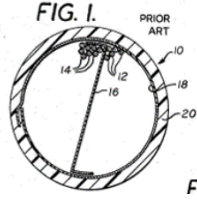


Buffer 55 of “expanded polyvinyl chloride plastic material” (Beggs, 6:1-3)



Alternative “S-shaped” buffer (Beggs, 6:9-14)

They also included various other separators, including plastic-only separators and separators comprising plastic-laminated metal tapes:

 Yanagida, Fig. 1 – plastic separator	 EX-1032, Fig. 3 – polyester tape separators
 Roberts, Fig. 17 – plastic-coated metal tape separator	 GmbH-866, Fig. 1 – plastic-coated metal tape separators
 EX-1017, Fig. 7-7 – core separator (See also EX-1018, Fig. 3-1)	 EX-1022, Fig. 1 – Z-screen separator

EX-1007, ¶¶39-41.

By 1999, it was also common knowledge that communications cables should be flame-retardant. *See, e.g.*, Gingue (generally); Beggs, 1:36-38 (“because the cable may be used in occupied building spaces, flame retardance also is important”); EX-1007, ¶¶44, 46.

The beneficial properties of foamed polymer as an isolating/protective layer in communications cables were well-known by 1999. EX-1007, ¶¶40-46. Such polymers had “favorable” electrical properties, such as very low dielectric constant

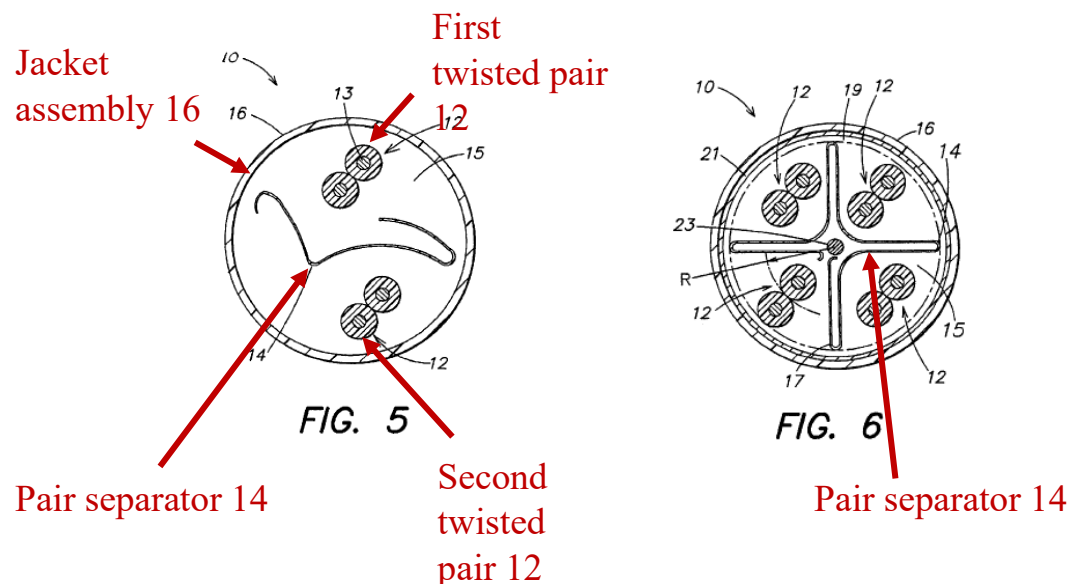
and low dissipation factor. *See, e.g.*, Gingue, 2:10-14; EX-1007, ¶¶43-44. The art taught that foaming a polymer (expanding it by adding air pockets) was known to both further “optimize the electrical characteristics (i.e., the dielectric constant and dissipation factor) of the material” and “decrease the amount of flammable material employed for a given volume of material.” Gingue, 4:5-9, 3:20-26; EX-1007, ¶¶44-46. Foamed polymers could then also be provided with a flame-retardant additive. Gingue, 4:37-48; EX-1007, ¶46. Thus, in communications cables **“a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.”** Gingue, 3:23-25 (emphasis added); *see also* Jachimowicz, 2:46-59 (teaching using a foamed polymer tape (such as foamed polyethylene backed by Mylar) to beneficially hold twisted pairs together and separate the pairs from a metal shield); GmbH-866, 3 (teaching a “foam-skin polyethylene” insulation for a cable conductor wire); EX-1007, ¶¶44-46.

B. Overview of the '537 Patent

The '537 Patent describes a data communications cable with a plurality of twisted pairs and a pair separator 14 within a jacket assembly 16. EX-1004, Abstract, 4:28-41; EX-1007, ¶47. The pair separator 14 is “preferably a flame-retardant, low-dielectric constant, low-dissipation factor, foamed polymer tape.” EX-1004, 4:61-63; EX-1004, ¶47. The '537 patent teaches that the purported

invention “is not limited to the materials described” (EX-1004, 4:58-59) and teaches that the separator may include a conductor, such as aluminum (EX-1004, 6:30-35). EX-1007, ¶47.

The patent discloses various configurations for the pair separator. For example, Figure 5 discloses a pair separator 14 with grooves that separate but do not completely enclose the channel, while Figure 6 discloses a pair separator 14 that is a “flat configurable tape” that is “shaped” into a “plus”:



EX-1004, Figs. 5, 6, 5:48-51; EX-1007, ¶¶48-49.

C. Prosecution History

The Examiner initially rejected the originally filed claims as obvious in view of Boucino (US 5,969,295) and Simons (US 3,911,200), and also issued a double-patenting rejection in view of related patent US 6,570,095 (“’095 patent”). EX-

1039, 2-7. The applicant then filed terminal disclaimers, and added claims 21-24.² EX-1041, 4-5.

The examiner then rejected the claims as obvious in view of the same Boucino and Simons references. EX-1042, 3-5. For independent claim 21, the examiner explained that it would have been obvious to use foamed polymer for the dielectric in the separator because foamed polymer was known and used in the art as a low-dielectric constant material. EX-1042, 5. The examiner also rejected dependent claims 22-24 in view of the additional C&M Corporation reference teaching a foamed polymer. *Id.*, 5-6. The examiner also rejected the applicant's argument that the separator of Simons was not "substantially flat." *Id.*, 9. The applicant had argued that "although the separator of Simons et al. is formed as a tape laminate, the separator is not substantially flat when it is disposed inside the cable." *Id.* The examiner explained that even though the Simons separator is folded when placed inside the cable, it is formed of a tape laminate and therefore still is substantially flat—the examiner noted that the application itself specified that the claimed "substantially flat" separator was arranged (i.e., folded) within the cable jacket to form a plurality of grooves. *Id.*

² Claims 21-24 ultimately issued as claims 19-22.

In response the applicant amended independent claim 21 to recite a dielectric separator “that consists of non-conductive, dielectric materials,” and also added the word “unshielded” to the preamble. EX-1043, 7. The applicant distinguished Simons because it had a “shielding tape formed of a metal and plastic laminate” and therefore did not “consist of non-conductive, dielectric materials” as recited in claim 21. *Id.*, 10 (emphasis in original). As to dependent claims 22-24, the applicant further argued that the C&M reference did not cure the deficiencies of Boucino and Simons because the C&M reference also fails to disclose or suggest “an unshielded communications cable comprising . . . a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials,” *Id.*, 10-11(emphasis in the original).

On November 2, 2004, the patent was allowed. EX-1005.

D. The Challenged Claims

Claims 19-20 and 22 are challenged. The Claims Appendix lists the text of each of the claims and labels each element ([19.a], [19.b], etc.) for ease of reference. Claim 19 broadly claims a cable that includes a dielectric separator that “consists of” multiple dielectric materials, one of which is a foamed polymer. The dependent claims require that the separator “include[]” a foamed polymer tape that is flame retardant and low-dielectric constant material (claim 20) and that the separator “is a flame-retardant, foamed polymer tape” (claim 22).

E. Prior (Unfinished Inter Partes Reexamination and District of Delaware Litigation Between Patent Owner and Superior Essex (2008-2012):

From 2008-2012, Patent Owner was engaged in a patent infringement lawsuit against a company called Superior Essex, along with a parallel set of *inter partes* reexaminations.³ These disputes concerned patents that included the '537 patent, as well as two related patents—the '095 patent and US 7,179,999 ('999 patent). All three have similar limitations related to communications cables with a separator separating twisted pairs. Patent Owner settled its dispute in late 2011/early 2012, and all proceedings were terminated without reaching finality.

The (Unfinished) Reexaminations:

When the '537 patent reexamination was terminated, claims 19-22 stood rejected. The examiner found them obvious in view of the combination of “GmbH-866”, Roberts, and Gingue. EX-1006, 17-23; EX-1007, ¶53. Ground 5 of this Petition reasserts this combination.⁴ Regarding claim 19, the examiner

³ *Belden Techs., Inc. et al. v. Superior Essex Inc. et al.*, Civ. No. 08-063-SLR (D. Del. Jan. 29, 2008); Reexamination No. 95/000,476 ('537 patent); Reexamination No. 95/000,474 ('095 patent); Reexamination No. 95/000,475 ('999 patent).

⁴ This Petition adds Jachimowicz to the ground, as an optional new reference that teaches a foamed polymer tape consisting of two dielectric materials.

explained that GmbH-866 taught a separator disposed between twisted pairs (*id.*, 19-20), that the separator was “substantially flat” as that term was used in the ‘537 patent—i.e., the shape of the separator is “flat when supplied, not [necessarily] in a finished [cable] product” (*id.*, 17 (incorporating discussion of ground 5 at 10-11)), that it would have been obvious to modify the GmbH-866 separator to consist of a dielectric layer only (*id.*, 19-20, citing Roberts), and that it would have been obvious to modify the separator to include foamed polymer material as taught by Gingue (*id.*, 21). EX-1007, ¶53. The examiner also found dependent claims 20-22 obvious, explaining that Gingue taught the claimed flame-retardant and low-dielectric constant properties of foamed polymer material and it would have been obvious to use foamed polymer material having these known, beneficial properties. *Id.*, 22-23. EX-1007, ¶53.

The prior ’537 patent reexamination also included *anticipation* based on Beggs for claim 19, but no *obviousness* ground. At the time that reexamination was terminated, the examiner was not convinced that Beggs expressly disclosed a separator of foamed polymer. The examiner explained that while Beggs teaches the dual-tubular shaped preform 55 embodiment may comprise foamed polymer material, it does not *expressly* say that the immediately following alternative embodiment (‘S’-shaped preform 58) can also be made of foamed polymer. EX-1006, 29-30. On this basis, the examiner concluded Beggs did not anticipate claim

19. *Id.* Whether or not Beggs expressly discloses foamed polymer for the S-shaped buffer embodiment, Ground 1 of this Petition shows that certainly would be the obvious thing to do. EX-1007, ¶54.

The reexaminations also involved both (i) Gingue (foamed polymer) and (ii) evidence of purported secondary considerations. As to (i), both examiners did not think that the “foamed polymer” limitations provided a patentable distinction over the teachings of Gingue. EX-1006, 21-23 (’537 patent); EX-1003, 17-19 (’095 patent); EX-1034, 36-41 (’999 patent); EX-1007, ¶57. As to (ii) both examiners found that the purported secondary considerations evidence was not persuasive. EX-1006, 35; EX-1003, 54 (’095 patent), 1933-37; EX-1034, 84-92; EX-1007, ¶58.

As noted above, none of the reexaminations reached finality. In early 2012, following settlement of the district court litigation, they were terminated at the request of the Patent Owner.⁵ EX-1045; EX-1046; EX-1047; EX-1007, ¶59.

⁵ The parties to the district court action entered in a consent judgment and termination of the *inter partes* reexamination. The consent judgment did not involve CommScope (the Petitioner here) and did not reflect any final contested adjudication on the merits (rather, it was a condition precedent of the settlement).

District of Delaware Litigation:

The Belden-Superior Essex dispute included a 2010 district court trial, where one of the issues tried was whether Beggs *anticipated* claim 19 of the '537 (again, no obviousness evidence was presented), and whether GmbH-866 and Gingue rendered claim 19 obvious (this obviousness challenge did not consider Roberts or Jachimowicz). The jury returned a verdict finding no as to both issues. Shortly after that (and after receiving office actions in the co-pending reexaminations coming to various conclusions about the validity of claims), the parties settled the litigation.

V. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art of the '537 patent would have had a bachelor's degree in electrical engineering and a minimum of 3-4 years of industry experience in connection with designing, manufacturing, and testing of twisted-pair data cables. EX-1007, ¶12. An individual with a master's degree in electrical engineering would require less industry experience (e.g., 1-2 years). *Id.*

VI. CLAIM CONSTRUCTION⁶

This IPR applies the ordinary and customary meaning as would be understood by one of ordinary skill in the art in view of the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314–17 (Fed. Cir. 2005). For the purpose of this proceeding, Petitioner provides the below constructions. At this time, Petitioner does not believe it necessary for the Board to expressly construe any additional terms.

1. Preamble - “An unshielded communications cable comprising” (independent claim 19)

The preamble does not limit the claim. The words “an unshielded communications cable” merely state an intended purpose. The body of claim 19 recites a structurally complete cable. The preamble does not recite essential structure, is not relied on for antecedent basis for any claim element, and is not necessary to give life to the claim. *E.g., Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1367 (Fed. Cir. 2020) (affirming PTAB

⁶ Petitioner reserves all rights to raise claim construction arguments in any litigation concerning the ’537 or ’095 patent. For example, Patent Owner’s efforts to read claims on accused products may raise controversies that require construction of certain terms.

finding that preamble reciting “an internally illuminated textile footwear” was “merely an intended purpose that does not limit the claims”).

Petitioner acknowledges that the word “unshielded,” a word that does not appear in the ’537 patent specification, was added to the preamble as part of a set of claim amendments. EX-1043, 5; EX-1004. However, the same response amended the body of claim 19 to add the substantive limitation, specifying that separator “consists of non-conductive, dielectric materials.” EX-1043, 8. The Applicant explained that this substantive limitation was added to distinguish the “Simons” reference, which had a separator of “shielding tape formed of a metal and plastic laminate.” *Id.* (emphasis in original). In contrast, the Applicant did not assert clear (or any) reliance on the addition of the word “unshielded” to the preamble when distinguishing independent claim 19. Thus the amendment to the preamble does not breathe life into the claim. *E.g., Marrin v. Griffin*, 599 F.3d 1290, 1301 (Fed. Cir. 2010).

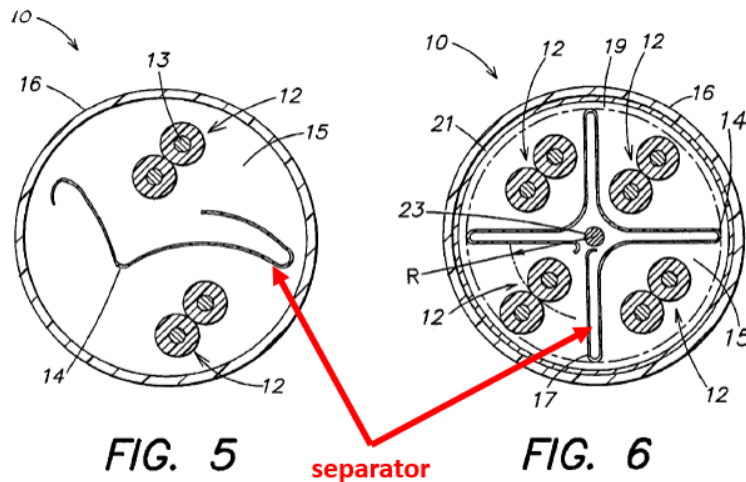
As to several dependent claims, the applicant did include a recitation of the preamble amendment, in addition to the substantive “consists of non-conductive, dielectric materials” amendment, when distinguishing the prior art. EX-1043, 8-9. However, the unexplained inclusion of a reference to the preamble language does not make the preamble limiting. In a similar situation, the Federal Circuit observed that “[n]otably, the amended application was silent as to why the term

‘replacement’ was added. There was no express statement in the amendment or elsewhere that the term ‘replacement’ was added to overcome the rejection by limiting the invention to replacement parts only.” *Textron Innovations Inc. v. Am. Eurocopter Corp.*, 498 F. App’x 23, 29 (Fed. Cir. 2012). Further confirming the preamble is not limiting: the dependent claims do not refer back to the as-amended preamble; they simply state “the communications cable as claimed in claim 19.” EX-1004, cls. 20-22.

**2. “*substantially flat configurable dielectric separator*”
(independent claim 19)**

The ordinary and customary meaning of a “substantially flat” separator in view of the intrinsic record is a separator that is a substantially flat member prior to being formed into the cable assembly; the term does not require that the separator be substantially flat (i.e., free of any bends or folds) in the finished cable. EX-1007, ¶65.

This is consistent with the specification. The specification describes the separator 14 as “a flat configurable tape” that is “is supplied as a flat extruded tape” in the preferred embodiment. EX-1004, 5:59-61; EX-1007, ¶¶65-67. The specification then explains that the pair separator 14 (a “flat configurable tape”) is arranged in various shapes in the final assembled cable to separate twisted pairs:



EX-1004, Figs. 5, 6 (Annotated); EX-1007, ¶¶65-67. In Figure 5 the pair separator 14 “is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator” EX-1004, 4:37-41; EX-1007, ¶¶67. In Figure 6, “the *pair separator 14 is a flat configurable tape . . . that is *shaped to have the illustrated profile*” EX-1004, 5:48-50 (emphasis added); EX-1007, ¶¶67. This is the only context in which the specification uses the word “flat” as applied to the pair separator 14 (whether prior to assembling or after assembling in the cable). EX-1007, ¶¶67.*

The above construction is also the only one that is consistent with the claims. EX-1007, ¶¶67. For example, claims of the ‘537 patent recite the “substantially flat” configurable separator is “arranged” into various shapes in the final assembled cable: “arranged to have no more than one concave surface” (dependent claim 2), “arranged . . . to provide at least two grooves” (dependent claim 3), “has a concave shape” (claim 17). EX-1004; EX-1007, ¶¶67. Similarly,

claims 27 and 33 of the related '095 patent each requires that the dielectric pair separator is both “substantially flat” and is “arranged within the jacket to form at least two grooves”. EX-1001; EX-1007, ¶67.

In addition, during prosecution the applicant amended claim 1, which originally recited a “substantially flat configurable dielectric separator disposed between the plurality of twisted pairs,” to *add* a limitation (to distinguish the art) that the “substantially flat” separator must be “arranged . . . so as to be substantially flat ***in a radial cross-section taken through the finished communications cable.***” EX-1044, 3 (emphasis added); EX-1007, ¶67. This confirms, again, that the “substantially flat dielectric separator” limitation *alone* does not require it to be substantially flat in a cross section taken through the final assembled cable. EX-1007, ¶¶65-67.

Both the Patent Office and the district court have agreed with Petitioner’s construction. EX-1007, ¶¶68-69. During the reexamination, the examiner found that the term “substantially flat” referred to the shape of the separator element as supplied, not necessarily in the cross-section of the finished cable. EX-1006, 10-11 (citing, *inter alia*, EX-1004, Figs 4, 5, 3:51-52); EX-1007, ¶68. The district court similarly construed “substantially flat” as: “thin and substantially uniform in thickness.” EX-1052, 3-4; EX-1007, ¶69. The district court noted that claim 27 of the '095 patent recited taking a “substantially flat configurable dielectric separator”

and “arranging it to form at least two grooves,” which meant that “substantially flat” cannot mean that the separator must have an overall profile that is substantially straight *after* arranging it. EX-1052, 3-4.

Finally, there is no support in the specification for a substantially flat configurable dielectric separator to mean that it must be substantially flat in a radial cross-section of the finished cable. The specification talks *only* about taking a separator that is initially flat and then folding it in various ways to create grooves/channels in the finished cable. *E.g.*, EX-1004, 4:37-41, Figs. 5, 6. There is no embodiment where the separator remains flat in a radial cross-section of the finished cable. *See, e.g.*, EX-1004, Figs. 5-11, 13.

3. “Configurable” separator (independent claim 19)

The ordinary and customary meaning of a “configurable” separator in view of the intrinsic record is: flexible enough to be formed or shaped in the course of making the cable. EX-1007, ¶70. This is consistent with the district court’s prior construction. EX-1052, 1-2; EX-1007, ¶¶70-74. “Configurable,” as used in the ’537 patent, does not require that the separator be reconfigurable or continue to remain “configurable” once in the finished cable assembly. *E.g.*, EX-1004, 5:48-51 (“a flat configurable tape...that is shaped to have the illustrated profile....”), 4:37-41, 8:28-38, Figs. 4-6, 12, cls. claims 2, 3 (claiming a “substantially flat” separator that is arranged to form “grooves”); EX-1034, 111-13; EX-1007, ¶¶70-74.

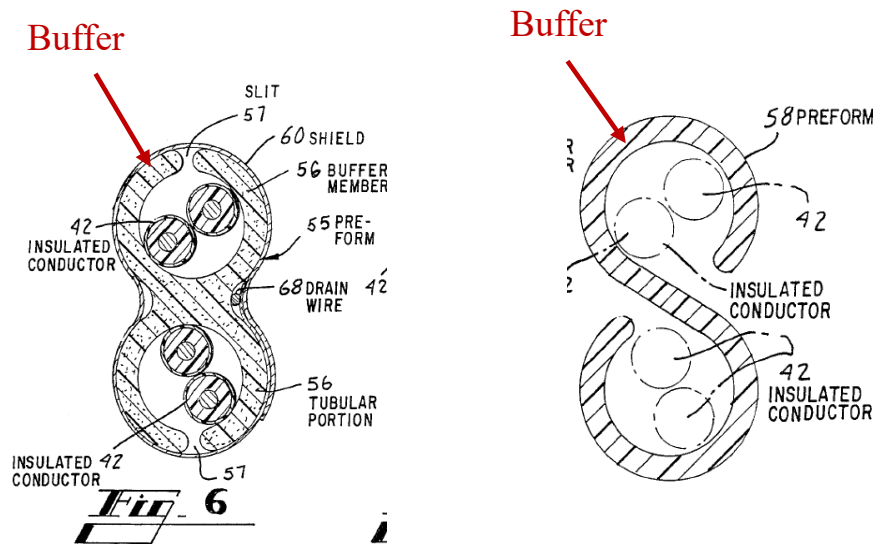
VII. GROUND 1: BEGGS AND JACHIMOWICZ RENDER CLAIM 19 OBVIOUS

Beggs discloses almost every element of independent claim 19. EX-1007, ¶¶75-110. Beggs does not expressly say that the separator consists of *multiple* “dielectric materials,” as claimed. However such a separator would have been immediately obvious, at least in view of Jachimowicz (teaching a communications cable having a plastic film-backed foamed polymer tape). EX-1007, ¶¶86-107, 110.

A. Beggs (EX-1015)

Beggs teaches a cable “capable of high rate transmission of data streams” and “comprises a plurality of . . . twisted pair[s] of individually insulated conductors.” Beggs, 3:34-42; *see also* Beggs, 5:33-35 (“plurality of twisted pairs 43-43”), Abstract, 1:9-12; EX-1007, ¶76.

Beggs teaches a “buffer” system between the twisted pairs. EX-1007, ¶77. The “buffer” can be a “preform” taking a dual tubular shape (Fig. 6) or ‘S’ shape (Fig. 7), and the S-shaped buffer “may be replaced with a tape which is made of dielectric material”:



Beggs, 5:64-6:11, 6:52-56; EX-1007, ¶77. The preform buffer 55 may be comprised of “expanded polyvinyl chloride plastic material.” Beggs, 6:1-3, 5:60-63 (same); EX-1007, ¶78. Beggs also generally claims a “buffer system” that is comprised of “cellular” (i.e. foamed) PVC. Beggs, cls. 1, 19; EX-1007, ¶78.

While Beggs’ preferred embodiment has a metal shield inside the cable jacket, Beggs teaches that “it is also within the scope of this invention to enclose the buffer system with a jacket only . . . should a shield not be needed . . .” Beggs at 8:19-21; EX-1007, ¶79.

B. Jachimowicz (EX-1014)

Jachimowicz teaches an example of a data communications cable that uses a two-dielectric material foamed polymer tape. EX-1007, ¶81. Jachimowicz explains that “a tape made of foamed thermoplastic supported by a film such as Mylar or polypropylene or other material” may be applied over the twisted pairs to hold

them together and prevent lay distortion. *Id.* at 2:46-58 (emphasis added); EX-1007, ¶81. Such a two-material foamed polymer “tape” would be understood to be substantially flat and configurable, and is illustrated below (side profile view):

Film of Mylar,
polypropylene, or other
material

Foamed thermoplastic
(foamed polymer)



EX-1007, ¶81. Jachimowicz teaches that the foamed polymer may be “foamed polyethylene 20.” Jachimowicz at 2:48-50; EX-1007, ¶81, ¶93. Solid (non-foamed) polyethylene was a material known to have a “very low dielectric constant”, and foaming a polymer (i.e. adding air) resulted in an even lower dielectric constant. *E.g.*, Gingue, 2:10-14, 3:20-23; EX-1007, ¶81.

C. Independent Claim 19

1. [19.pre] “An unshielded communications cable comprising:”

The preamble of claim 19 is not limiting. Even if it were, Beggs discloses an unshielded communications cable. EX-1007, ¶82. Beggs teaches a cable “capable of high rate transmission of data streams”. Beggs at 3:34-42; *see also id.* at Abstract, 1:9-12; EX-1007, ¶82. Beggs also teaches that “it is also within the scope of this invention to enclose the buffer system with a jacket only . . . should a

shield not be needed”. Beggs at 8:19-21; *see also id.* Fig. 9B, Fig. 7, cl. 1; EX-1007, ¶82.

2. [19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”

Beggs teaches this. *E.g.*, Beggs at 3:34-42 (a cable that “comprises a plurality of . . . twisted pair[s] of individually insulated conductors”), 5:33-35 (“plurality of twisted pairs 43-43”), cl. 1, Figs. 1, 9A, 9B; EX-1007, ¶¶84-85.

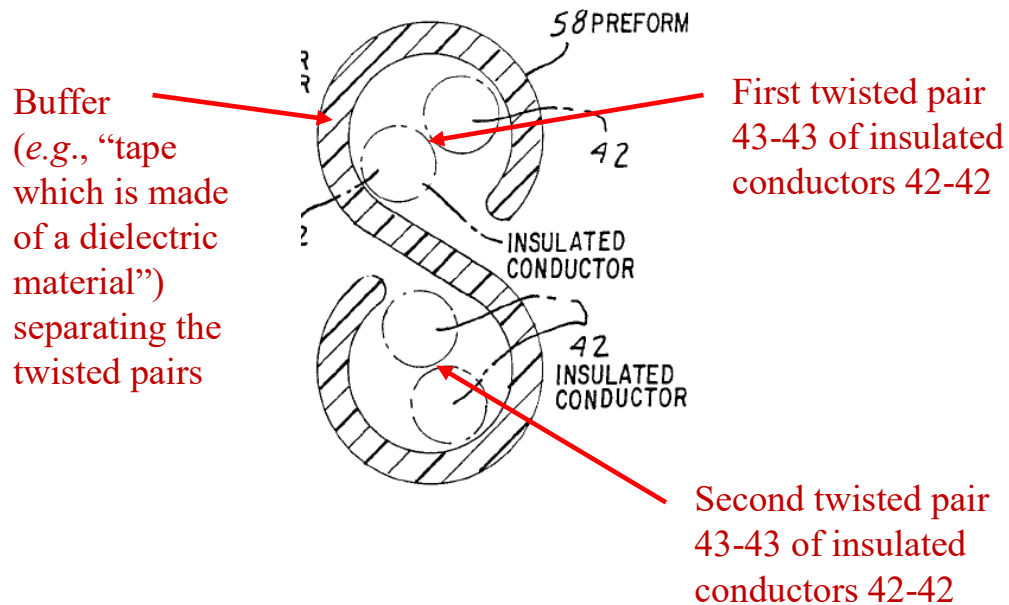
3. [19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors;”

[and]

[19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”

The obvious combination of Beggs and Jachimowicz teaches elements [19.b] and [19.d.]. EX-1007, ¶¶86-107.

Beggs teaches an embodiment where the S-shaped “buffer” in Fig. 7 is “replaced with a tape which is made of a dielectric material”:



Beggs, Fig. 7 and 6:9-14, 6:52-56; *see also id.* cl. 1 (“buffer system which comprises a dielectric material”), 5:33-35; EX-1007, ¶¶87, 77. This embodiment discloses nearly all the limitations of elements [19.b] and [19.d]. EX-1007, ¶¶86-107.

The “buffer” tape taught by Beggs at Figure 7 is disposed between the twisted pairs and *separates* one pair from the other, as Figure 7 shows. EX-1007, ¶88. The buffer tape is also a *substantially flat* and *configurable* dielectric separator. EX-1007, ¶88. As explained above, the term “substantially flat” separator requires only a separator that is initially a substantially flat member prior to being formed into the cable; the term does not require that the separator be substantially flat in the finished cable. §V.2, *supra*. A POSITA would understand that the “tape” disclosed by Beggs (as an option for forming the buffer shown in

FIG. 7) would be configurable and would be configured—as Beggs teaches—into the ‘S’-shaped buffer shown at Figure 7. Beggs, 6:52-56; EX-1007, ¶88. Beggs explains that the tape is “wrapped” about each of the conductor pairs, further confirming it is “configurable.” Beggs, 6:52-56; EX-1007, ¶88.

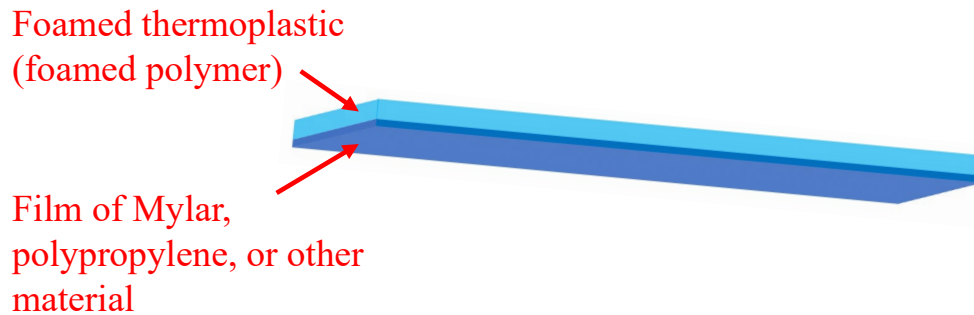
Beggs’ tape made of a “dielectric” material is also *non-conductive*, as it does not include any metal, and polymer dielectrics are generally understood to be non-conductive. EX-1007, ¶¶89-90, ¶¶43-45. For example, the “expanded” PVC Beggs teaches as a material suitable for the buffer (Beggs, 6:1-3) was understood to be non-conductive. EX-1007, ¶89.

Beggs also teaches that the buffer be comprised of a *foamed polymer* (claim element [19.d]). Beggs, 6:1-3 (“The preform [buffer] may be comprised of a solid *or expanded polyvinyl chloride plastic material*”), cl. 19 (claiming a buffer system “comprised of a *cellular polyvinyl chloride material*”), 5:60-63; EX-1007, ¶91. A POSITA would have known that “expanded” PVC and “cellular” PVC refer to foamed polymers. EX-1007, ¶91. Further, there is nothing in Beggs that limits its teaching that the buffer of the dual-tubular embodiment in FIG. 6 (preform 55) can be comprised of foamed polymer. *Id.* Rather, Beggs would indicate to a POSITA that any of the disclosed buffer embodiments, including the ‘S’ shaped “preform 58” and the embodiment where “S-shaped preform 58 [is] replaced with a tape”, can be comprised of foamed polymer, just like the dual-tubular preform 55

embodiment. *Id.* This is further confirmed by claim 19 of Beggs, which claims a buffer system comprised of “cellular” (i.e. foamed) PVC, and does not limit the buffer to any particular disclosed buffer shape (or even to a “preform” buffer). Beggs, cl. 19; EX-1007, ¶91.

Even if Beggs did not expressly disclose that the S-shaped separator of FIG. 7 “*includes a foamed polymer*” as claimed by [19.d], it would have been obvious to make the S-shaped tape buffer embodiment from foamed polymer. EX-1007, ¶92, ¶¶86-107. An S-shaped tape buffer comprised of foamed polymer would provide the same beneficial functions, in the same way, as the foamed polymer buffer preform 55. EX-1007, ¶92. Moreover, the combination of Beggs and Jachimowicz’s plastic-backed foamed polymer tape also discloses this limitation. EX-1007, ¶92, 107.

Beggs does not expressly teach that the dielectric separator that includes a foamed polymer is comprised of multiple dielectric “materials,” as recited by [19.b]. Jachimowicz teaches a dielectric foamed polymer tape that “consists of” multiple (e.g., two) “*non-conductive, dielectric materials*”: a “tape made of foamed thermoplastic supported by a film such as Mylar or polypropylene, or other material”:



Jachimowicz at 2:46-59 and Figs. 1, 2; EX-1007, ¶¶93, ¶81. Jachimowicz’s foamed polymer tape consists of *non-conductive* materials because it is all polymers—there are no metal layers in the tape. EX-1007, ¶¶94, ¶¶43-45, ¶81. The polymers used in Jachimowicz’s tape were known to be non-conductive materials. EX-1007, ¶¶94, ¶¶43-45, ¶81. The tape consists of *dielectric* materials, because each of the two materials were known to be dielectrics (the plastic film and the foamed polymer). EX-1007, ¶¶95, ¶¶43-45, ¶81; Gingue, 2:10-14 (“polyethylene . . . [has a] very low dielectric constant”). The foamed polymer tape disclosed by Jachimowicz is also *substantially flat* and *configurable*. EX-1007, ¶¶93, ¶81. It was commonly understood that a “tape” of insulating material, such as a Mylar-backed foamed polymer tape described by Jachimowicz, was both flat and configurable, due to it being a “tape” capable of being “appl[ied]” to hold twisted pairs together. EX-1007, ¶¶93, ¶81; Jachimowicz, 2:50-53. The obvious combination of Beggs, which teaches a dielectric buffer between twisted pairs that can be foamed polymer and can be a dielectric tape, with Jachimowicz, which teaches a plastic film-backed

dielectric foamed polymer tape, would result in a “*substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials*,” as claimed. EX-1007, ¶¶96, ¶81, ¶93, ¶107.

A POSITA would have been motivated, with a reasonable expectation of success, to use a plastic film-backed foamed polymer tape (such as that taught by Jachimowicz) as the dielectric tape buffer in Beggs for at least five reasons. EX-1007, ¶¶96-104, ¶107. **First**, Beggs itself teaches that the buffer can be a foamed polymer and can be a dielectric tape. Beggs, 6:1-3 (“[T]he preform may be comprised of a solid or expanded polyvinyl chloride plastic material.”), 6:52-56 (“S-shaped preform 58 in Fig. 7 may be replaced with a tape”); *see also id.* at cl. 19 (the buffer is a “cellular polyvinyl chloride material”); EX-1007, ¶97, ¶¶77-78.

Second, providing a plastic film backing on a foamed polymer tape (as taught by Jachimowicz) was known to improve the mechanical characteristics of the foamed polymer layer. EX-1007, ¶98. These enhanced mechanical properties of the plastic-backed foamed tape were known to be particularly important in communications cable applications, where the cable (and thus the foamed polymer layer) was commonly subject to movement, stress, and strain, particularly during cable assembly. *Id.*

Third, a POSITA would have been motivated to use a plastic-backed foamed polymer tape instead of a non-foamed tape to improve the electrical

performance of the cable by reducing capacitance between twisted pairs, thereby reducing current leakage and the associated transmission losses within the cable. EX-1007, ¶¶99-102, ¶45. A POSITA would have known that using a foamed (as opposed to a non-foamed) polymer tape would lower the capacitance in Beggs' cable in two ways: (i) it would lower the effective dielectric constant of the material between the twisted pairs on either side of the separator (due to the foamed tape having a lower dielectric constant than the non-foamed tape), and (ii) maintaining the distance between those twisted pairs similar to what Beggs teaches for the foamed buffer (due to the increased thickness of the foamed tape compared to non-foamed tape). EX-1007, ¶¶100-102, ¶45; Beggs, 6:11-14 ("thickness of each portion of the preform is equal at least to the radius" of the conductor), Figs. 6-7; Gingue, 3:20-23. It was known in the art that two ways to effectively reduce capacitance (and thereby reduce current leakage and transmission losses) were to lower the dielectric constant of the material between conductors and to increase the distance (or maintain an increased distance) between conductors. EX-1007, ¶¶99-102, ¶45.

Fourth, using a plastic-backed foamed polymer tape instead of a non-foamed tape would have predictably further decreased crosstalk between the twisted pairs on opposite sides of the separator, by maintaining at least the distance between twisted pairs that Beggs teaches for the foamed buffer. *See* Beggs, 6:11-

14, Figs. 6-7; EX-1007, ¶103, ¶41. It was known in the art that increasing and then maintaining the distance between adjacent twisted pairs effectively reduced crosstalk between them. EX-1007, ¶103, ¶38, ¶41; *see also*, e.g., EX-1023, 3:17-24 (“The spacing of the pairs minimizes cross-talk between the pairs . . . “); Beggs, 7:58-61 (“The portions of the buffer system maintain the conductor pairs spaced apart which improves crosstalk performance”).

Fifth, foamed polymer would have been expected to predictably have less of a negative effect on the flame resistance of the cable than non-foamed polymer. EX-1007, ¶104. This is because foaming “decreases the amount of flammable material employed for a given volume of material.” Gingue, 3:20-26; EX-1007, ¶104, ¶46. Thus, the substitution of Jachimowicz’s plastic-backed foamed polymer tape for a non-foamed tape would result in less flammable material within the cable, thus improving the overall flame resistance of the cable. EX-1007, ¶104, ¶46. Beggs itself emphasized that “flame retardance . . . is important” to a POSITA. Beggs, 1:36-37; EX-1007, ¶104, ¶75.

A POSITA would have had a reasonable expectation of success in using a foamed polymer tape such as that taught by Jachimowicz as the dielectric tape buffer of Beggs because doing so would have been straightforward and would not have required any skill beyond routine engineering. EX-1007, ¶105, ¶107. Beggs *itself* teaches that the separator can be a foamed polymer (6:1-3, cl. 19) and can be

in tape form (6:52-56). EX-1007, ¶¶105, ¶¶77-78. Thus there was substantial—in fact complete—overlap in the technology, and therefore a POSITA would have expected predictable results by combining the teachings. EX-1007, ¶¶105. POSITA would have easily expected to be able to use the plastic film-backed foamed polymer tape of Jachimowicz in exactly the same way that Beggs teaches using the foamed buffer and dielectric buffer tape. EX-1007, ¶¶105-106, ¶¶77-78. Therefore a POSITA would have expected to be able to do this known cable assembly technique. EX-1007, ¶¶105-106. Further, a POSITA would have expected the foamed polymer tape of Jachimowicz, with its very low dielectric constant, to work as the “buffer” in Beggs in the same way that Beggs teaches the foamed buffer of Figure 6 working—as an effective insulator and spacer. EX-1007, ¶106; *see* Beggs, 5:64-6:14; Jachimowicz, 2:46-54.

4. [19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”

Beggs teaches this. *E.g.*, Beggs at 8:7-12 (“In a preferred embodiment, the cable 20 is provided with an outer jacket 80 . . . which comprises a polyvinyl chloride material”); *see also id.* at 8:19-21; EX-1007, ¶108, ¶79.

VIII. GROUND 2: BEGGS AND JACHIMOWICZ, FURTHER IN VIEW OF GINGUE, RENDERS DEPENDENT CLAIMS 20 AND 22 OBVIOUS

Dependent claims 20 and 22 specifically require foamed polymer “*tape*” that is “*flame-retardant*” and/or “*low-dielectric constant.*” Gingue teaches that

foamed polymer, including the specific foamed polymer used by Jachimowicz, has these properties. EX-1007, ¶¶111-125.

A. Gingue (EX-1013)

Gingue discloses a composite insulation for data transmission cables that includes a layer of “foamed polymeric material.” Gingue at Abstract, 1:8-10, 5:18-22; EX-1007, ¶111. Gingue teaches that electrical cables for voice and data transmission should be flame-resistant while exhibiting favorable electrical properties, which include materials with a “low dielectric constant.” Gingue, 2:1-13; EX-1007, ¶112. Gingue further explains that foaming an insulating material was generally understood to improve both its electrical performance and flame retardance:

In general, the *electrical performance of an insulating material is enhanced by foaming or expanding the corresponding solid material. Foaming also decreases the amount of flammable material employed* for a given volume of material. Accordingly, a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.

Gingue, 3:20-26 (emphasis added); EX-1007, ¶112.

Accordingly, Gingue discloses a cable material with an inner layer of a “foamed polymeric material” and an outer “skin”. Gingue, 4:22-26, 5:48-51; EX-

1007, ¶113. The foamed polymeric inner layer “optimizes the electrical characteristics (i.e., the dielectric constant and dissipation factor) of the material....”. Gingue, 4:5-9; EX-1007, ¶113. In the preferred embodiment, the foamed polymeric layer is “foamed polyethylene or foamed polypropylene” and also includes an additive that renders the layer flame retardant and smoke suppressant. Gingue, 4:32-39; EX-1007, ¶113.

B. Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.”

Claim 20 adds the requirement that the separator include a foamed polymer tape with *flame-retardant* and *low-dielectric constant* properties. EX-1007, ¶114. These were well-known and desirable properties of foamed polymer, and it would have been obvious to provide the foamed polymer separator tape of the Ground 1 Beggs/Jachimowicz combination with these properties, in further view of the teachings of Gingue. EX-1007, ¶114, ¶¶43-46, ¶¶111-113.

Gingue teaches the *flame-retardant* properties of foamed polymer. EX-1007, ¶115, ¶ “Foaming [the polymer material] decreases the amount of flammable material employed for a given volume of material.” Gingue, 3:20-26. Gingue also teaches using an additive that renders the foamed polymer “flame retardant and smoke suppressant.” Gingue, 4:32-44; *see also id.* Table 1; EX-1007, ¶115, ¶¶111-113. Gingue also teaches generally the importance of flame retardancy and smoke

suppression in communications cables. Gingue, Abstract; *see also id.*, 2:1-4 (cables for voice and data transmission “should exhibit low smoke evolution, low flame spread”); EX-1007, ¶115, ¶¶111-113.

Gingue and Jachimowicz each disclose using foamed polymers having *low dielectric constant*. EX-1007, ¶116, ¶81, ¶¶112-113. Jachimowicz teaches using “foamed polyethylene” for its foamed polymer tape (Jachimowicz, 2:50-54), a material that Gingue teaches is a “preferred” foamed material (Gingue, 4:32-34). EX-1007, ¶116. Gingue teaches even non-foamed polyethylene has a “**very low dielectric constant** and low dissipation factor.” Gingue, 2:10-14 (emphasis added); *see also id.* 4:1-9, 6:36-40; EX-1007, ¶116, ¶43. Foaming a solid polymer (i.e. adding air to it) was known to provide an even lower dielectric constant: “in general, the electrical performance of an insulating material is enhanced by foaming or expanding the corresponding solid material.” Gingue, 3:20-26; EX-1007, ¶116, ¶44. Thus the foamed polyethylene tape of Jachimowicz would have a very low dielectric constant. EX-1007, ¶116, ¶¶43-44. Providing the flame-retardant and low-dielectric constant properties taught by Gingue in a foamed polymer tape like Jachimowicz would not have been expected to be materially affected or impeded by the plastic film backing on the tape (the Mylar, polypropylene or other film). EX-1007, ¶116. It was known that such a thin plastic backing would not significantly affect the flame-resistant or dielectric properties of

the foam, and film materials such as Mylar or polypropylene were reasonably flame-resistant and low-dielectric themselves. EX-1007, ¶116, ¶43, ¶81; Gingue, 2:10-14 (polypropylene has “very low dielectric constant”).

A POSITA would have been motivated to use foamed polymer tape having flame-retardant and low-dielectric constant properties taught by Gingue in the Beggs/Jachimowicz combination, to predictably improve the electrical and flame-retardant properties of the Beggs communication cable. EX-1007, ¶117, ¶121. Specifically, a POSITA would be motivated to use foam with such properties to, as Gingue teaches, achieve “a favorable balance of electrical properties and flame retardancy”. Gingue, 3:20-26; EX-1007, ¶117, ¶44, ¶46. Beggs itself confirms that it was known in the communications cable prior art that “flame retardance . . . is Important”. Beggs, 1:36-37; EX-1007, ¶117, ¶75.

A POSITA would have a reasonable expectation of success in doing this because of the substantial—in fact complete—overlap in the technology, and therefore a POSITA would have expected predictable results by combining the teachings. EX-1007, ¶¶118-120. Gingue teaches its “preferred” foamed polymer is “foamed polyethylene” (Gingue, 4:32-34); EX-1007, ¶118. Jachimowicz teaches that the foamed polymer portion of its tape can be the very same material—“foamed polyethylene” (Jachimowicz, 2:50-54); EX-1007, ¶118, ¶81. Further, as Gingue teaches, it was known how to create foamed polymers with flame-retardant

and low-dielectric constant properties, and such foamed polymers were already being used in communications cables. EX-1007, ¶¶118, ¶¶111-113, ¶44, ¶46. Based on the teaching of Gingue, a POSITA would have expected that the foamed tape taught by Jachimowicz would be flame retardant and have a low-dielectric constant, and would have reasonably expected to be able to use that foamed polymer with an additional flame retardant additive if additional flame retardance was desired (*see* Gingue, 4:37-56). EX-1007, ¶¶119, ¶44, ¶81. Further, Beggs, like Jachimowicz and Gingue, teaches a communications cable, and given the almost complete overlap in technology a POSITA would have reasonably expected using foamed material with the beneficial electrical and flame-retardant properties taught by Gingue and Jachimowicz to improve the Beggs cable in a similar way. EX-1007, ¶¶119.

In view of the teachings of Gingue and the knowledge in the art at the time, providing a non-conductive foamed tape separator that had flame-retardant and low-dielectric constant properties was known and required no more than routine skill. EX-1007, ¶¶118-120, ¶¶111-113, ¶81, ¶44, ¶46.

C. Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.”

Claim 22 adds the requirement that the separator is a *flame-retardant* foamed polymer tape. EX-1007, ¶123. It would have been obvious to provide the foamed

polymer separator tape of the Beggs/Jachimowicz combination with flame-retardant properties, in view of the teachings of Gingue, for the same reasons explained with respect to claim 20. EX-1007, ¶¶123-125, ¶¶114-122.

IX. GROUND 3: YANAGIDA AND JACHIMOWICZ RENDER CLAIMS 19-20, 22 OBVIOUS

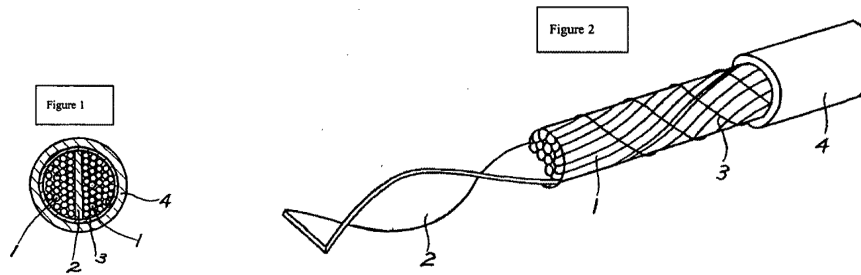
Yanagida also discloses most of independent claim 19, including twisted pairs in a cable jacket. EX-1007, ¶¶129-144. Yanagida does not disclose a separator that comprises multiple dielectric materials or that includes a foamed polymer. However such a separator would have been immediately obvious, at least in view of Jachimowicz. EX-1007, ¶144, ¶¶133-143.

A. Yanagida (EX-1012)

Yanagida relates to communications cables with alternately stranded cables. Yanagida, 1[col.1]. EX-1007, ¶126. Alternately stranded cables can include a plurality of “pairs” of stranded wires. Yanagida, 1[col.1]; *see also* EX-1055⁷, 1 (“stranded pairs”). “Stranded” meant “twisted” in the communications cable field. EX-1007, ¶126.

Yanagida teaches a cable formed with a “reciprocatingly twisted” core of plastic material 2 running through its center, and the twisted (“stranded”) pairs running along the surface of the twisted core material 2:

⁷ Yanagida English translation from related '537 patent reexamination file.



Yanagida, 1[col.1]; Figs. 1, 2; EX-1007, ¶127. The twisted core 2 that divides the groups of wires prevents the wires from unravelling even when tensile force is applied in the longitudinal direction (a common problem for alternately stranded cables). Yanagida, 1[col.1]; EX-1007, ¶127. A cable sheath 4 covers the assembly to complete the cable. *Id.*; EX-1007, ¶127.

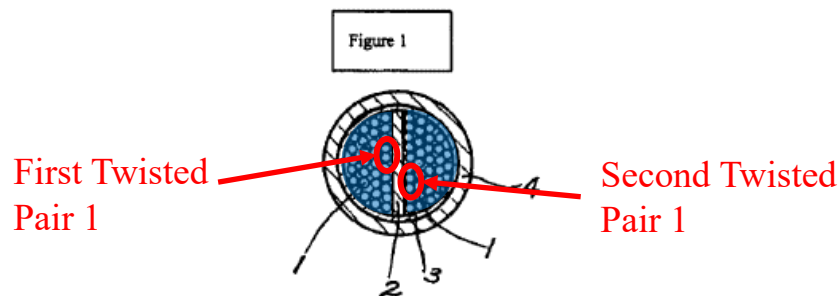
B. Independent Claim 19

1. [19.pre] “An unshielded communications cable comprising:”

The preamble of claim 19 is not limiting. Even if it were, Yanagida teaches this. EX-1007, ¶¶129-130. Yanagida teaches an invention for “communication cables.” Yanagida, 1[col.c1]. Yanagida further explains that its cable includes insulated wire elements 1, a plastic core material 2, pressing wrapping 3, and a cable sheath 4. Yanagida, 1[col.1], Fig. 2; EX-1007, ¶129. Yanagida does not teach any conductive layers that could be considered shielding. EX-1007, ¶129.

2. [19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”

Yanagida discloses this. EX-1007, ¶¶131-132. Yanagida describes a plurality of “strands of insulated wires or pairs thereof” that run along the surface of the core material. Yanagida, 1[col.1]; *see also id.* (element 1 can be where “insulated wires are twisted together”); EX-1055, 1 (“stranded pairs”). EX-1007, ¶131, ¶126. “Stranded” and “twisted” are used synonymously in the industry. EX-1007, ¶131, ¶126.



3. [19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors;”

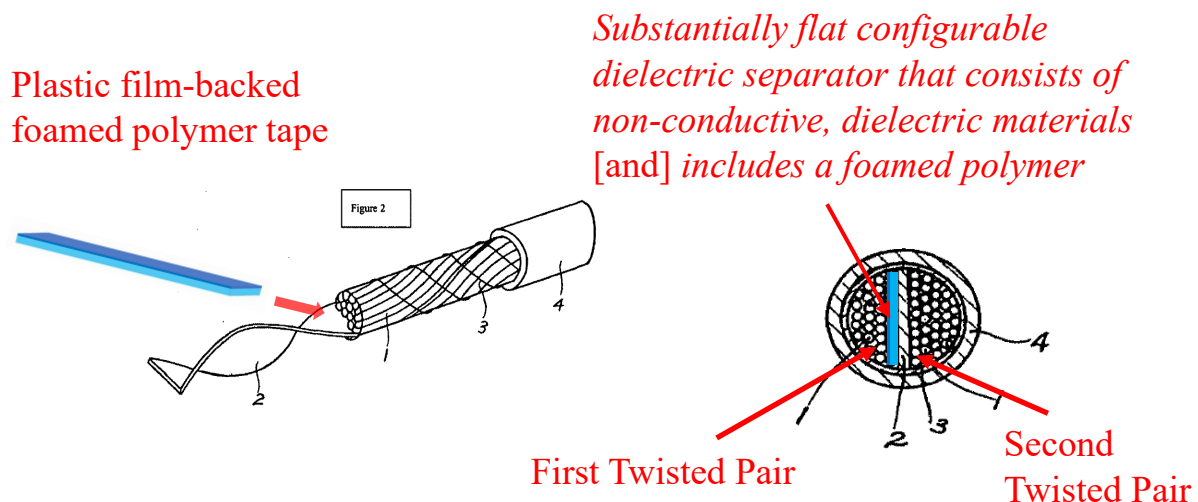
[and]

- [19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”

The obvious modification of Yanagida in view of Jachimowicz teaches these limitations. EX-1007, ¶¶133-142, ¶144

Jachimowicz teaches a dielectric foamed polymer tape that is *substantially flat* and *configurable* and “*consists of non-conductive, dielectric materials*” as

explained above. *Supra*, §§VIII.B, VIII.C.3; EX-1007, ¶81, ¶¶93-95, ¶134. For the reasons explained below, a POSITA would have been motivated, with a reasonable expectation of success, to add the plastic-backed foamed polymer tape taught by Jachimowicz between the core material 2 and at least one set of twisted pairs in Yanagida's cable assembly. EX-1007, ¶¶137-142. This obvious combination of Yanagida and Jachimowicz teaches elements [19.b] and [19.d]:



EX-1007, ¶137, ¶142.

A POSITA would have understood the plastic film-backed foamed polymer tape of Jachimowicz is also *configurable*. EX-1007, ¶¶136-137, ¶81, ¶93. A POSITA would understand that a foamed polymer tape backed by a film of Mylar or other plastic was configurable due to the known nature of its materials and would easily “configure” to follow the helical shape of Yanagida's core material 2.

Id. Further, Jachimowicz teaches such tapes can be shaped such as to hold together a bundle of twisted pairs. Jachimowicz at 2:50-53; EX-1007, ¶136, ¶81.

In the communications industry, there was market pressure to improve the electrical performance of cables. EX-1007, ¶138. A POSITA would have been motivated to make this combination, because it would have predictably improved the electrical performance of Yanagida's cable in two ways. EX-1007, ¶¶138-140.

First, the addition of a foamed polymer tape would have been expected to improve the electrical performance of the cable by reducing the capacitance between twisted pair (or group of pairs) on one side of Yanagida's core 2 and a twisted pair (or group of pairs) on the other side, thus reducing current leakage between them and reducing the transmission loss due to such leakage. EX-1007, ¶139, ¶45. It was known in the art that two ways to reduce capacitance (and thereby reduce current leakage and transmission losses) were to lower the dielectric constant of the material between conductors and to increase the distance between conductors. EX-1007, ¶139, ¶45. A POSITA would have been motivated to add a foamed polymer tape such as Jachimowicz's foamed polyethylene tape to Yanagida's core because it would have been expected to beneficially (i) lower the effective dielectric constant of the material between the twisted pairs on either side of the separator (due to the addition of the low-dielectric constant foamed

material), and (ii) increase the distance between those twisted pairs (due to the added thickness of the foamed (i.e. expanded) tape). EX-1007, ¶139, ¶45.

Second, the foamed polymer tape would have been expected to beneficially further lower crosstalk between twisted pairs on either side of the separator by increasing the distance maintained between the twisted pairs in the cable. EX-1007, ¶140, ¶38, ¶41. It was known in the art that increasing and then maintaining the distance between adjacent twisted pairs effectively reduced crosstalk between them. EX-1007, ¶140, ¶38, ¶41; *see also, e.g.*, EX-1023, 3:17-24 (“The spacing of the pairs minimizes cross-talk between the pairs . . . “); Beggs, 7:58-61 (“The portions of the buffer system maintain the conductor pairs spaced apart which improves crosstalk performance”).

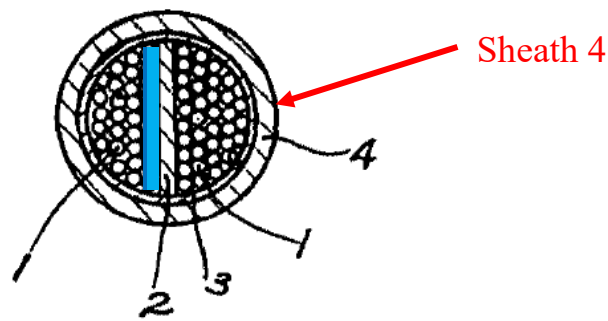
A POSITA would have had a reasonable expectation of success in using a plastic film-backed foamed polymer tape taught by Jachimowicz in the Yanagida communications cable because doing so would have been straightforward and would not have required any skill beyond routine engineering. EX-1007, ¶141. There was substantial overlap in the technology—both references teach cable assemblies with copper twisted pairs and plastic insulating materials—and therefore a POSITA would have expected predictable results by combining the teachings. EX-1007, ¶141; ¶81, ¶¶126-127. For example, a POSITA would have been able, using routine manufacturing techniques at the time, to add plastic-

backed foamed polymer tape in the cabling machine that was being used, and feed the foamed polymer tape in between at least one set of twisted pairs and the helical core. EX-1007, ¶141. A POSITA would have been able to easily feed the foamed polymer tape along a surface of the plastic core during assembly in a similar manner as Yanagida describes running the twisted pairs. EX-1007, ¶141; *see also* EX-1055, 1 (“...run along both surfaces of the core material”).

4. [19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”

The obvious modification of Yanagida in view of Jachimowicz teaches this limitation. EX-1007, ¶143-144.

Yanagida discloses a sheath 4 (*jacket*) that encloses the stranded pairs (*plurality of twisted pairs of insulated conductors*) and the added plastic-backed foamed dielectric tape (*configurable dielectric separator*) running between the core material 2 and at least one group of twisted pairs 1. EX-1007, ¶143, ¶127. After the core material is formed and the stranded pairs are run along its surfaces, “the outer periphery [is] then covered with a cable sheath 4”. Yanagida, 1[col.1]; EX-1007, ¶143. This is shown in annotated Figure 1 below:



EX-1007, ¶143.

X. GROUND 4: YANAGIDA AND JACHIMOWICZ, FURTHER IN VIEW OF GINGUE, RENDERS DEPENDENT CLAIMS 20 AND 22 OBVIOUS

A. Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.”

Gingue teaches providing foamed polymer with *flame-retardant* and *low-dielectric constant* properties, including the specific exemplary foamed polymer Jachimowicz’s tape uses (“foamed polyethylene”), as explained above. *Supra*, §IX.A-B; EX-1007, ¶146, ¶¶111-113, ¶¶115-116; ¶81. It would have been obvious to provide the foamed polymer separator tape of the Ground 3 Yanagida/Jachimowicz combination with these properties, in view of the teachings of Gingue. EX-1007, ¶¶145-151.

A POSITA would have been motivated to use foamed polymer tape having flame-retardant and low-dielectric constant properties in the Yanagida/Jachimowicz combination, to predictably improve the electrical and

flame-retardant properties of the Yanagida communication cable. EX-1007, ¶147. Specifically, a POSITA would be motivated to use foam with such properties to, as Gingue teaches, achieve “a favorable balance of electrical properties and flame retardancy”. Gingue, 3:20-26 (emphasis added); EX-1007, ¶147, ¶¶111-113. Further, it was known in the communications cable prior art that “flame retardance . . . is important”. Beggs, 1:36-37; EX-1007, ¶147, ¶75.

A POSITA would have had a reasonable expectation of success in doing this because of the substantial overlap in the technology, and therefore a POSITA would have expected predictable results by combining the teachings. EX-1007, ¶148. Gingue teaches its “preferred” foamed polymer is “foamed polyethylene” (Gingue, 4:32-34), and Jachimowicz teaches that the foamed polymer portion of its tape can be the very same material—“foamed polyethylene” (Jachimowicz, 2:50-54). EX-1007, ¶148, ¶81, ¶113. Further, as Gingue teaches, it was known how to create foamed polymers with flame-retardant and low-dielectric constant properties, and such foamed polymers were already being used in communications cables. EX-1007, ¶148. Based on the teaching of Gingue, a POSITA would have expected that the foamed polyethylene tape taught by Jachimowicz would be low-dielectric constant, and would have reasonably expected to be able to use that foamed polymer with an additional flame retardant additive if additional flame retardance was desired (*see* Gingue, 4:37-56). EX-1007, ¶148, ¶81. Further,

Yanagida, like Jachimowicz and Gingue, teaches a communications cable, and given the almost complete overlap in technology a POSITA would have reasonably expected using foamed material with the beneficial electrical and flame-retardant properties taught by Gingue and Jachimowicz to improve the Yanagida cable in a similar way. Yanagida, 1 (invention directed to “communication cables”); EX-1007, ¶148, ¶81, ¶111, ¶127.

B. Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.”

Claim 22 adds the requirement that the separator is a flame-retardant foamed polymer tape. EX-1007, ¶152. It would have been obvious to provide the foamed polymer separator tape of the Yanagida/Jachimowicz combination with flame-retardant properties, in view of the teachings of Gingue, for the same reasons explained with respect to claim 20. EX-1007, ¶¶152-154; ¶¶145-151.

XI. GROUND 5: GmbH-866, MODIFIED IN VIEW OF ROBERTS, GINGUE AND/OR JACHIMOWICZ RENDERS CLAIMS 19-20, 22 OBVIOUS

Each of claims 19-20 and 22 is also obvious in view of GmbH-866, modified as taught by Roberts, Gingue, and/or Jachimowicz. EX-1007, ¶¶155-186. This is nearly the same ground that these same claims stood rejected in view of (GmbH-866, Roberts and Gingue) when the '537 reexamination procedure was terminated. EX-1006, 17; EX-1007, ¶53. The only difference is the

additional/alternative new Jachimowicz reference teaching a two-dielectric material foamed polymer tape. The Board should confirm the examiner's findings that claims 19-20 and 22 are invalid. EX-1007, ¶53.

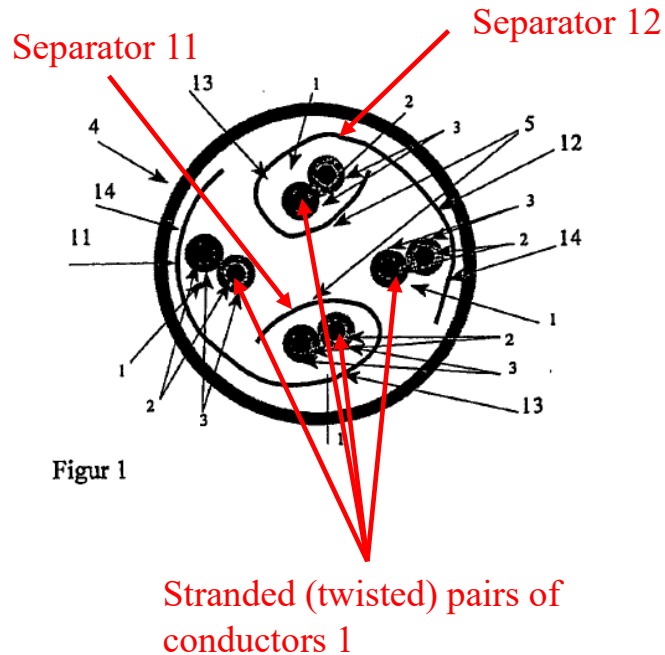
A. Overview of the Combination

1. GmbH-866 (EX-1010)

GmbH-866 teaches a “data transfer cable” with twisted, insulated conductor pairs that are “divided” from each other by preferably plastic-coated metal foil partial shieldings. GmbH-866, 3, 4; EX-1007, ¶155. This allows the creation of cables with “optimized transfer properties,” including “low crosstalk”, at a lowered manufacturing cost. GmbH-866, 2; EX-1007, ¶155.

Each conductor pair is stranded (twisted) together, forming a stranded pair. *E.g.*, GmbH-866, 2 (“Data transfer cables of this kind typically consist of four pairs of two stranded isolated copper conductors or wires”); EX-1007, ¶156. Each wire of these stranded pairs is preferably insulated with “an insulation 3 consisting of a thermoplastic polymer, in particular ... foam-skin polyethylene, skin-foam-skin polyethylene” GmbH-866, 2; EX-1007, ¶156. The partial shieldings 11, 12 preferably consist of metal foils that are “laminated with plastics material.” GmbH-866 at 5; EX-1007, ¶156. The plastic-coated partial shieldings 11, 12 are positioned to “divide[] the cable cross section into at least two shielding sectors.” GmbH-866 at 2, *see also* cl. 1; EX-1007, ¶156.

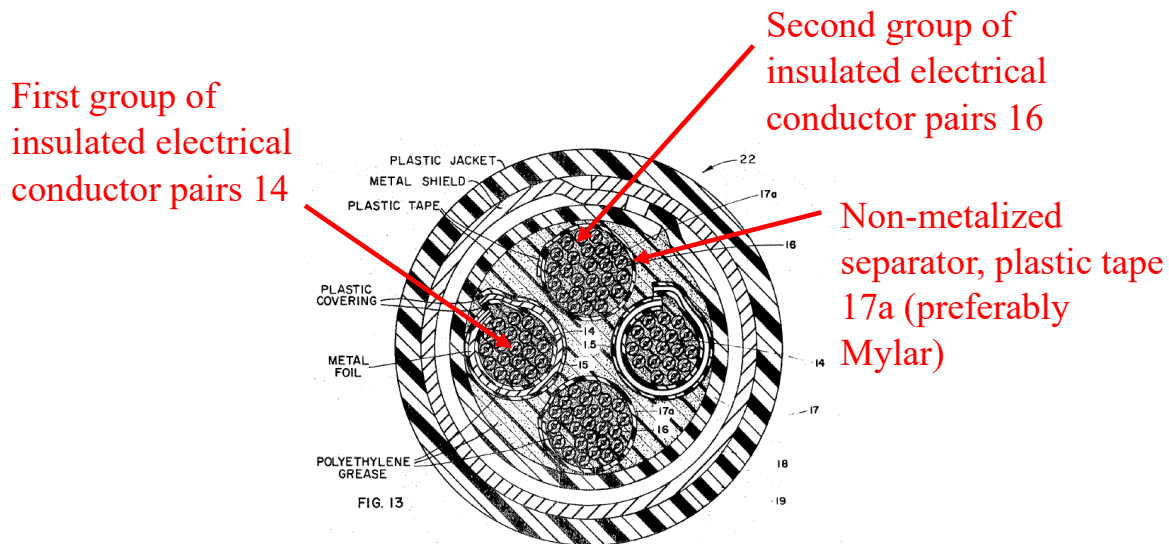
In Figure 1, two partial shields 11, 12 (i.e., separators) divide the cable into “four shielding sectors”:



GmbH-866, 4; EX-1007, ¶157. The cable also includes an outer cable sheath directly surrounding the twisted pairs and partial shieldings 11, 12. EX-1007, ¶157.

2. Roberts (EX-1009)

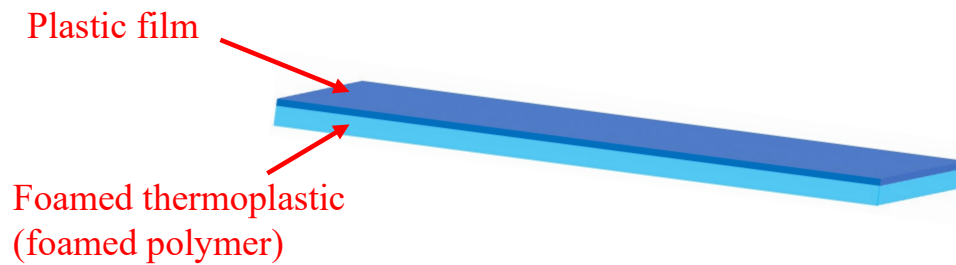
Roberts teaches a telephone cable that reduces crosstalk between electrical conductor pairs using various separators. Roberts, Abstract; 13:34-36; EX-1007, ¶158. Roberts teaches dividing conductor pairs into groups. EX-1007, ¶158. For example, the embodiment of Figure 13 has four groups of insulated conductors 14 and 16, separated from each other by either metalized or non-metallized separating members:



EX-1007, ¶158.

3. Foamed Polymer References—Gingue and Jachimowicz

Gingue and Jachimowicz, each teaching foamed polymer, are described in additional detail above. *Supra*, §§VIII.B, IX.A; EX-1007, ¶159, ¶81, ¶¶111-113, ¶¶115-116. In the ‘537 reexamination, the examiner found the “foamed polymer” limitation of claim 19 obvious in view of Gingue. EX-1006, 17-23; EX-1007, ¶53. Gingue teaches the known benefits of foamed polymer in communications cables, specifically that “a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.” Gingue, 3:20-26; EX-1007, ¶159, ¶¶111-113, ¶¶44-46. Jachimowicz, a reference not before the examiner during the prior reexamination, expressly teaches a foamed polymer tape that is substantially flat, configurable, and consists of two non-conductive, dielectric materials:



EX-1007, ¶159, ¶81, ¶93.

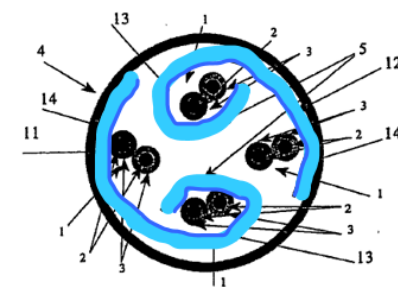
B. Motivation to Combine/Modify and Reasonable Expectation of Success

For several reasons, a POSITA would have been motivated, with a reasonable expectation of success, to replace the plastic-coated partial shieldings 11, 12 in GmbH-866 with a plastic-backed foamed polymer tape such as taught by Jachimowicz and illustrated conceptually below:

Plastic-backed foamed polymer tape:



Modification of GmbH-866:



Figur 1

EX-1007, ¶¶160-166.

First, Roberts teaches that separators can be either a plastic-coated metal separator (like partial shieldings 11, 12 in GmbH-866) or made solely of a

dielectric (i.e., Roberts' plastic tape 17a). EX-1007, ¶161. Figure 13 of Roberts has four groups of conductor pairs. EX-1007, ¶161, ¶158. The two groups having conductors 14 are separated from the other conductors by a screen 15 made up of plastic-coated metal foil tape, whereas the other two groups of conductors 16 are separated from other groups of conductors by a plastic tape 17a, that Roberts teaches is preferably Mylar tape. Roberts, 7:32-40, 7:44-46, 2:55-59, FIG. 13; EX-1007, ¶161, ¶158. Thus, a POSITA would understand, based on the teaching of Roberts that dielectric-only separators can be used to separate conductor pairs within a cable. EX-1007, ¶161.

Second, as the reexamination examiner found, there are a finite number of combinations of plastic and/or metal separators that can be used. EX-1007, ¶162; EX-1006, 20. Figures 5-8 of Roberts shows four different possible configurations (e.g., metal-only, two-layer design with one layer metal and the other plastic, and 2 three-layer designs with metal either sandwiched by plastic layers or completely enclosed/surrounded by plastic), and FIG. 13 (discussed above) shows a fifth arrangement in which the separator is made solely of plastic (i.e., dielectric-only separator)⁸. EX-1007, ¶162, ¶158. A POSITA would be motivated to try each of these limited options as a separator. *Id.*, see also *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a

⁸ There would also be the option of plastic sandwiched between two metal layers.

problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”).

Third, modifying GmbH-866’s laminated foil to be a foamed polymer tape, and in particular a mylar-backed foamed polymer tape, would have been expected to provide improved electrical performance. EX-1007, ¶¶163-164. Separators with a conductive layer were known to introduce capacitance into cables resulting in increased transmission losses due to current leakage between the twisted pairs and the conductive layer in the separator. EX-1007, ¶¶163-164, ¶45; *see also* Beggs, 2:54-60. Modifying the GmbH-866 cable to use a plastic film-backed foamed polymer tape separator (instead of the disclosed partial shieldings 11, 12) would have predictably reduced transmission loss-causing capacitance within the cable. EX-1007, ¶¶163-164. A POSITA would have expected capacitance to be reduced in three ways: (1) lowering the effective dielectric constant of the material (due to the addition of the foamed polymer tape having a very low dielectric constant); (2) increasing the distance between the twisted pairs (due to the greater thickness of the foamed tape compared to the GmbH-866 laminated foil); and (3) reduce the capacitance and current leakage between the separator and the other conductive elements by elimination of the conductive layer in the separator. EX-1007, ¶164, ¶45.

Fourth, a POSITA would be under market pressure to reduce the costs of manufacturing cable. EX-1007, ¶165; GmbH-866, 2 (“production costs can be reduced”). A POSITA would have known that using foamed polymer tape, rather than a metalized separator, would beneficially reduce the overall cost of the cable. EX-1007, ¶165; EX-1006, 20. For example, the foamed polymer tape would reduce the capacitance between cable components, allowing for more cost-effective cable construction. EX-1007, ¶165; Beggs, 2:54-66. Further, it was known at the time that customers in the United States preferred cables that were cheaper and/or had no metal shielding (which was somewhat different than preferences in Europe, for example). EX-1007, ¶165.

Fifth, using a foamed polymer tape (as opposed to tape that has non-foamed polymer) would have been expected to predictably improve the flame resistance of the GmbH-866 cable. *E.g.*, Gingue, 3:20-26 (“Foaming also decreases the amount of flammable material employed for a given volume of material”), 4:37-39; EX-1007, ¶166, ¶44, ¶46, ¶¶111-113. It was known that data communications cables should be flame resistant. *E.g.*, Gingue, 2:1-4; Beggs, 1:37-38; EX-1007, ¶166, ¶112, ¶75. As Gingue explained, “foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.” Gingue, 3:20-26; EX-1007, ¶166, ¶¶111-113.

A POSITA would have had a reasonable expectation of success in modifying the plastic-coated foil partial shieldings 11, 12 of GmbH-866 to be a plastic-backed foamed polymer tape (as disclosed in Jachimowicz), because doing so would have been straightforward and would not have required any skill beyond routine engineering. EX-1007, ¶¶167-172. For example, a POSITA would have expected to feed a flat foamed polymer tape (such as that taught by Jachimowicz) through the die of a standard cabling machine, to form the foamed polymer tape separator into the final cable assembly in the same way the plastic-laminated foil shield disclosed by GmbH-866 would be. EX-1007, ¶167. Further, there was substantial overlap in the technology—GmbH-866, Roberts, Jachimowicz and Gingue all concern communications cables using insulated copper wires. EX-1007, ¶167, ¶¶155-158, ¶81, ¶111. And each of GmbH-866, Jachimowicz, and Gingue disclose the use of foamed polymers within a data cable, and more specifically an arrangement in which the foamed polymer has a non-foamed backing (or skin). GmbH-866, 3; Jachimowicz, 2:51-53; EX-1007, ¶167, ¶158, ¶81, ¶113.

A POSITA also would have had a reasonable expectation that after replacing the metalized partial shieldings 11, 12 with a foamed polymer tape, the GmbH cable would still work for its intended purpose. EX-1007, ¶¶168-172. **First**, GmbH-866 itself shows a cable that does not have separator structure—much less a metalized separator—between two of the twisted pairs, and teaches that it works:

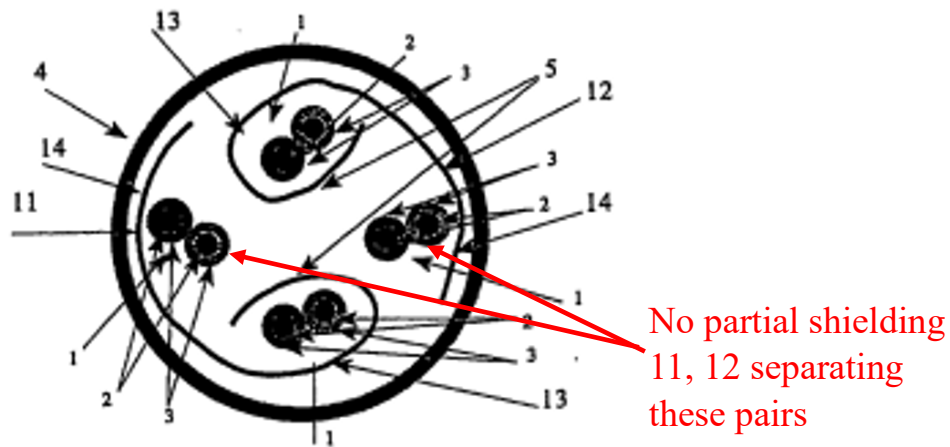


Figure 1

EX-1007, ¶169. **Second**, the prior art shows cables with dielectric-only separators or no separators at all already worked for the intended purposes of the GmbH-866 cable. EX-1007, ¶170. While the modification (replacing metalized partial shieldings 11, 12 with foamed polymer tape) may result in some loss of crosstalk protection, the GmbH-866 cable still would have been expected to perform as intended. *Id.* For example, Beggs teaches conductor pairs separated by a dielectric-only buffer (*e.g.*, Figs. 6-7), and explains that “crosstalk performance of the cable 20 is somewhat less than for multiple coaxial cables, or in cables having individually shielded pairs, **but it is acceptable** in a cable which meets stringent size requirements.” Beggs, 9:32-36 (emphasis added); *see also id.* 9:41-44; EX-1048, Figs. 1-2, 5-6 (twisted pair cables “in high speed data communications applications” with **no** separator between the pairs); EX-1036 at 4:5-16 (polymer-

only “star separator”); EX-1023 at 3:12-14 (“spacer member...formed from a dielectric material.”); EX-1049, Figs. 1-3, 3:52-56, 2:31-34 (“high-frequency communications cable” having four twisted pairs and no separator, electrical performance up to 100 MHz); EX-1007, ¶170. Thus, the prior art teaches that high-speed cables having twisted pairs either with no separator or with a dielectric-only separator work, including in the transfer range GmbH teaches. *See* GmbH-866, 2 (disclosing a transfer range, for example, “of from 1 to 100 MHz”); EX-1007, ¶170. **Third**, a POSITA would have expected that the plastic-backed foamed separator tape arranged such as shown in GmbH-866 would help maintain a minimum spacing between the pairs, further ensuring that any pair-to-pair crosstalk was within acceptable levels. EX-1007, ¶171, ¶38; *see also* EX-1023, 3:17-31; Beggs, 3:48-51, 7:52-62.

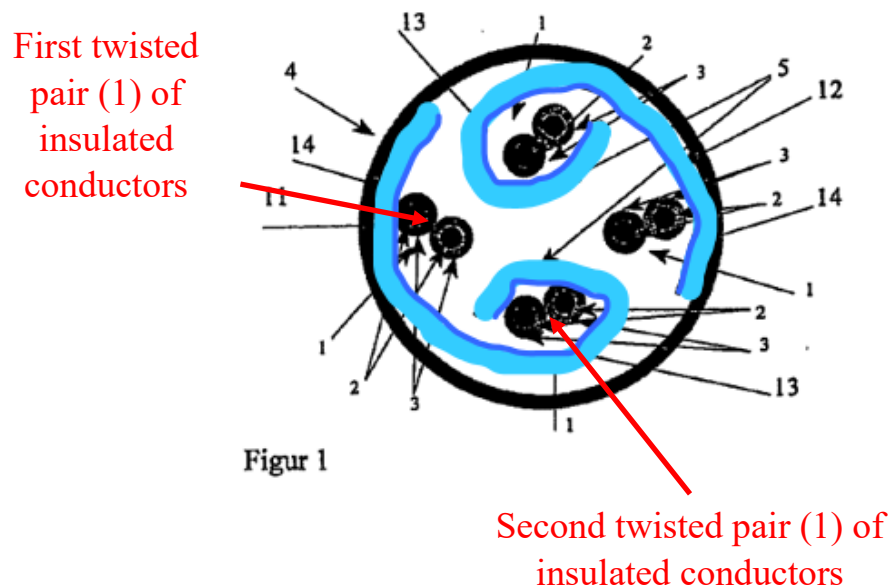
1. [19.pre] “An unshielded communications cable comprising:”

The preamble of claim 19 is not limiting. Even if it were, the obvious modification of GmbH-866 discussed above teaches this. EX-1007, ¶¶173-174. GmbH-866 teaches a “data transfer cable.” GmbH-866, 2; EX-1007, ¶173. A POSITA would understand this to be a communications cable. EX-1007, ¶173. As to unshielded, as discussed above, a POSITA would have been motivated to use a separator consisting of non-conductive dielectric materials in place of GmbH-866’s partial shieldings 11, 12. EX-1007, ¶173, ¶¶160-172. And GmbH-866 teaches a

preferred embodiment having an outer cable sheath 4 that “consists of conventional thermoplastic sheath materials.” GmbH-866, 4; EX-1007, ¶173, ¶157. For that embodiment, the obvious modification discussed above results in an unshielded cable. EX-1007, ¶¶173-174.

2. [19.a] “a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;”

GmbH-866 discloses this element. EX-1007, ¶¶175-176. “A data transfer cable . . . comprises four pairs 1, each consisting of *two* isolated, *stranded copper conductors 2 or wires.*” GmbH-866 at 3 (emphasis added):



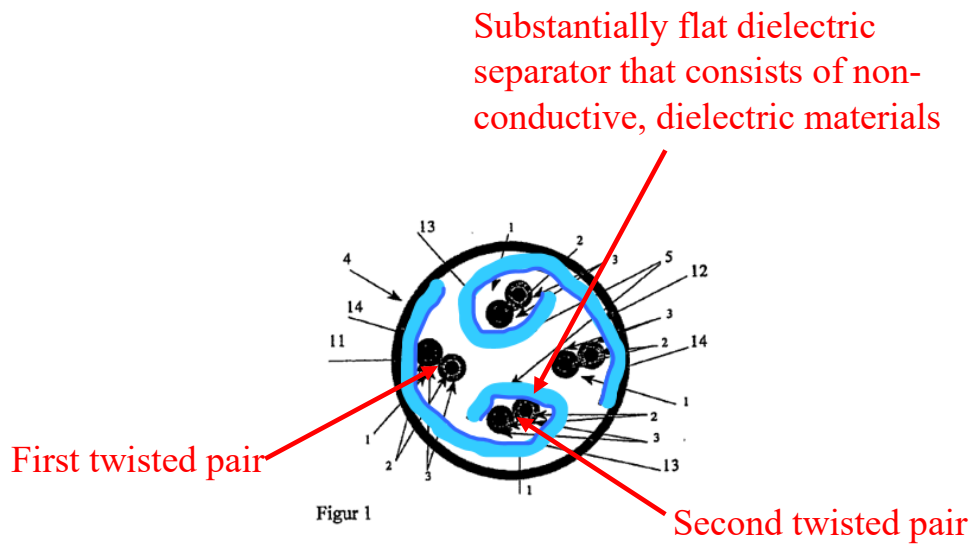
EX-1007, ¶175; ¶¶156-157. “Stranded” in this context means “twisted.” EX-1007, ¶175. The pairs are insulated conductors. GmbH-866, 3 (each pair consists of “two

isolated, stranded copper conductors or wires . . . [the] wires preferably have an *insulation* 3”) (emphasis added); EX-1007, ¶175, ¶156.

3. [19.b] “a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and”

The obvious modification of GmbH-866, in view of Roberts, Gingue and/or Jachimowicz, as explained above (§XII.C, *supra*), results in this element. EX-1007, ¶¶177-181.

A plastic film-backed foamed polymer tape as taught by Jachimowicz (*substantially flat configurable dielectric separator*), put into the GmbH-866 cable in place of partial shieldings 11, 12 would be disposed between the plurality of stranded (i.e., twisted) pairs 1 (*plurality of twisted pairs of conductors*) and be separating the first and second stranded pairs 1 (*first and second twisted pairs of insulated conductors*):

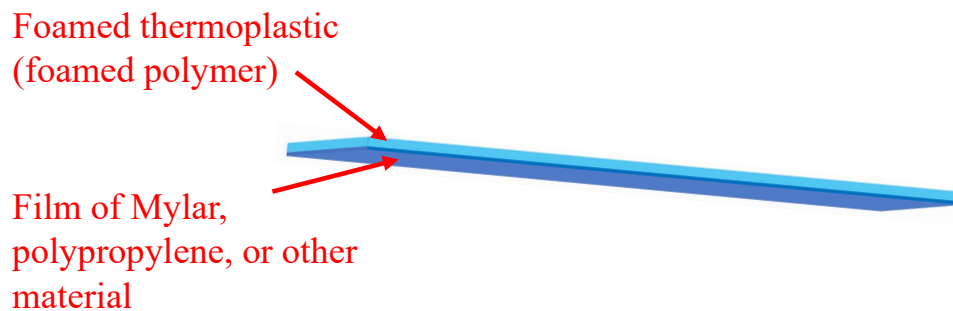


EX-1007, ¶177.

Such tapes are *substantially flat*. EX-1007, ¶178, ¶81, ¶93. As explained above, the term “substantially flat” separator requires only a separator that is initially a substantially flat member prior to being formed into the cable; the term does not require that the separator be substantially flat in the finished cable. *Supra*, §V.2; EX-1007, ¶178. The partial shieldings 11, 12 taught by GmbH-866 are made out of aluminum foil laminated with plastic material with the thickness of the aluminum being between 20 and 60 µm. GmbH-866, 5; EX-1007, ¶178. A POSITA would recognize that such a material is substantially flat. EX-1007, ¶178. A POSITA would similarly conclude that plastic-backed foamed polymer tape, such as taught by Jachimowicz, is substantially flat. *Id*; see also ¶81, ¶93.

Foamed polymer tapes are also *configurable*. EX-1007, ¶179, ¶81. Such tapes would have been expected to easily be configured as shown in GmbH-866. *Id.* For example, such tapes can be shaped such as to hold together a bundle of conductor pairs. Jachimowicz, 2:50-53; EX-1007, ¶179, ¶81, ¶93.

The plastic film-backed foamed polymer tape disclosed by Jachimowicz would also *consist of non-conductive, dielectric materials*, as explained above. *Supra*, §§VIII.B, VIII.C.3:



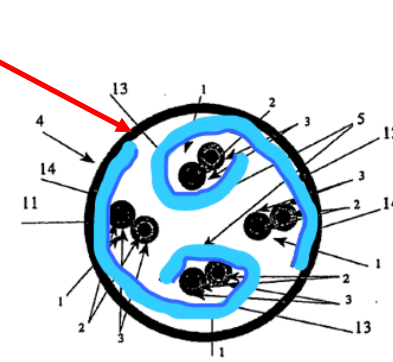
EX-1007, ¶180, ¶81.

4. [19.c] “a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;”

The obvious modification of GmbH-866 has this. EX-1007, ¶¶182-183. GmbH-866 teaches a cable sheath 4 (*jacket*) that encloses the conductor pairs and the partial shieldings. GmbH-866, 4; EX-1007, ¶182. Thus there is a jacket

enclosing the plurality of twisted pairs and the configurable dielectric separator in the obvious modification:

Cable sheath 4



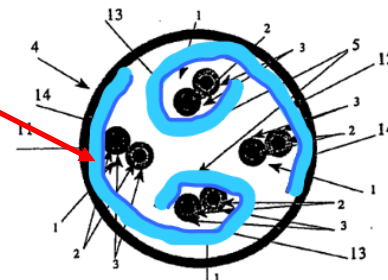
Figur 1

EX-1007, ¶182.

5. [19.d] “wherein the substantially flat configurable dielectric separator includes a foamed polymer.”

The obvious modification of GmbH-866, as explained above (§XI.D, *supra*), results in this element:

Substantially flat configurable dielectric separator that includes a foamed polymer



Figur 1

EX-1007, ¶184. Further, GmbH-866 itself discloses the use of a plastic-backed foamed polymer as an insulator, further confirming that it would have been

obvious to use a plastic-backed foamed polymer as the separator member. *See* GmbH-866, 3 (“cell polyethylene, foam-skin polyethylene, skin-foam-skin polyethylene”); EX-1007, ¶184.

C. Claim 20: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.”

Claim 20 adds the requirement that the separator has a *flame-retardant, low-dielectric constant* foamed polymer tape. EX-1007, ¶187. It would have been obvious to have the foamed polymer tape separator used in the modified GmbH-866 cable as explained in claim 19, to further be a *flame-retardant, low-dielectric constant* foamed polymer tape, in view of Gingue’s teachings. EX-1007, ¶187. As explained above, Gingue teaches flame-retardant, low-dielectric constant foamed polymers for use in communication cables, as well as the known benefits of foamed polymer with these properties when used in communications cables. *Supra*, §§IXA-B; EX-1007, ¶187; ¶¶111-113, ¶¶115-116. Further, it was known in the communications cable prior art that “flame retardance . . . is important”. Beggs, 1:36-37; EX-1007, ¶187; ¶75.

For the same reasons explained above with respect to claim 20 in Grounds 2 and 4, a POSITA would have been motivated, with a reasonable expectation of success, to use a *flame-retardant, low-dielectric constant* foamed polymer tape in place of the GmbH-866 partial shieldings 11, 12. *Supra*, §§IX.B, XI.A; EX-1007,

¶188, ¶¶118-120. In addition, GmbH-866, like Jachimowicz and Gingue, teaches a communications cable that can use foamed polymers for surrounding conductors (GmbH-866, 3), and given the almost complete overlap in technology a POSITA would have reasonably expected using foamed material with the beneficial electrical and flame-retardant properties taught by Gingue and Jachimowicz to predictably improve the GmbH-866 communications cable in a similar way. EX-1007, ¶188, ¶81, ¶¶111-113, ¶¶156-157.

D. Claim 22: “The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.”

Claim 22 adds the requirement that the separator is a *flame-retardant* foamed polymer tape. EX-1007, ¶191. It would have been obvious to have the foamed polymer tape separator used in the modified GmbH-866 cable as explained in claim 19, to further be a *flame-retardant* foamed polymer tape, in view of the teachings of Gingue, for the same reasons explained with respect to claim 20. EX-1007, ¶¶191-193, ¶¶187-190.

XII. PURPORTED SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS

In the earlier *inter partes* reexamination proceedings and District of Delaware lawsuit involving the '537 patent (as well as the '095 and '999 patents), Patent Owner had introduced secondary considerations evidence of

nonobviousness. This evidence is insufficient to avoid institution and insufficient to ultimately save the challenged claims.

Prior to termination, the examiners in all three *inter partes* reexaminations had found the purported secondary considerations evidence unpersuasive. In the '537 and '095 reexaminations, for example, the examiner found that the evidence provided by the patentee was “not ... persuasive” for reasons explained by the requester in its January 22, 2010 response, including that the patentee failed to establish nexus. EX-1006, 35; EX-1051, 32-36. The requester had explained—and the examiner agreed—that, for example, sales beginning in 2006 were due to a commercial real estate boom, not the claimed invention; the patent owner failed to present evidence supporting purported copying; and the evidence did not show unexpected results or industry skepticism. EX-1051, 32-36; *see also* EX-1050 at 35-39; EX-1034, 63-65, 67; EX-1007, ¶58. To the extent Patent Owner would introduce the same evidence in this proceeding, it would be unpersuasive for at least the same failure to establish nexus. *See also Liquidia Technologies Inc. v. United Therapeutics Corp.*, IPR2020-00770, Paper 14 at 8 (Mar. 30, 2020) (no obligation to even address secondary considerations in a petition where that evidence has previously been found unpersuasive).

XIII. DISCRETIONARY DENIAL IS NOT APPROPRIATE

A. Discretionary Denial Under 35 U.S.C. §325(d) is Not Warranted

The Board uses a two-part framework to analyze Section 325(d): (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of the first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). The *Becton, Dickinson* factors further guide this analysis. Here denial under Section 325(d) is not warranted for at least three reasons.

First, five of the six references relied on by this Petition were not cited or considered by the Examiner during original prosecution: Beggs, Yanagida, Jachimowicz, Gingue, and GmbH-866. Thus these references do not meet the first prong of *Advanced Bionics*—whether the same or substantially the same art was previously presented to the Office. While one reference—Roberts—appears on the face of the '537 patent, it was not cited or discussed by the examiner during prosecution and was not the basis of any rejection. Discretionary denial is not appropriate in this circumstance. *E.g., Scientific Design Co. v. Shell Oil Co.*, IPR2021-01537, Paper 7 at 24-25 (P.T.A.B. March 18, 2022) (“[t]he Examiner,

apart from initialing the asserted art in . . . IDS[s], did not indicate a substantive evaluation of the asserted art”).

Second, this Petition does not rely on art or arguments that are substantially the same as what was presented in original prosecution. Each of the lead references this Petition relies on (Beggs, Yanagida, and GmbH-866) discloses a separator member that is substantially flat and separates a twisted pair from another twisted pair, and two of the three (Beggs and Yanagida) teach a separator that is metal-free (and comprised of dielectric material). By contrast, the Boucino reference considered during prosecution had a solid plus-shaped separator (*not* substantially flat prior to being formed into the cable assembly), and the Simons reference had a metal-containing separator member. In addition, Jachimowicz—teaching use of a foamed polymer tape in a communications cable—was not considered during prosecution.

Third, the subsequent *inter partes* reexamination involving the ’537 patent does not provide any basis for a discretionary denial. That reexamination was terminated due to settlement, and when it was terminated claims 19-22 stood as *rejected* in view of a GmbH-866-based combination (Ground 5 of this Petition). *Becton* factor (c) is not met—the Office had rejected the challenged claims but never reached a final decision. The remaining *Becton* factors also weigh strongly against discretionary denial. At least Grounds 1 (Beggs-based obviousness for

independent claim 19) and Ground 2 (Yanagida-based obviousness in view of new reference Jachimowicz), were not before the Office during the reexamination and are not cumulative. Jachimowicz—teaching use of a foamed polymer tape—was not even presented during the reexamination.

Given that material art and arguments in this Petition have not previously been presented to or substantively considered and finally decided by the Office, and that the challenged claims stood as rejected in a later-terminated reexamination, there is no basis to deny institution under Section 325(d).

B. Discretionary Denial Under 35 U.S.C. §314(a) Is Not Warranted

Discretionary denial under §314(a) is not warranted.

First, the Petitioner has not presented multiple petitions challenging the claims of the '537 patent. Also, Petitioner was not a party to or related to the parties in the prior *inter partes* reexamination proceedings, and those prior proceedings were terminated before reaching any finality.

Second, while there is a parallel district court litigation in the District of Delaware (*Belden Inc. v. CommScope, Inc. et al.*, No. 22-783 (D. Del.), “Delaware case”), the *Fintiv* factors also do not favor denying institution.

One, trial is not scheduled in the district court case until October 20, 2025. EX-1053, 13 (¶16). This is nearly a year after a final written decision will have issued (approximately December 2024). Discretionary denial is not appropriate in

this circumstance. Two, Petitioner intends to move for a stay of the Litigation, and such motions are often granted in the District of Delaware. *Analog Devices, Inc. v. Xilinx, Inc.*, C.A. No. 1-19-cv-02225-RGA, D.I. 197 (Feb. 22, 2021) (granting stay post-institution); *Targus Int'l LLC v. Victorinox Swiss Army, Inc.*, C.A. No. 1-20-cv-00464-RGA, D.I. 199 (July 14, 2021) (granting stay post-institution).

Three, it is still early in the district court litigation. No claim construction opinions have been issued, no written discovery has occurred and no depositions have been taken, and no expert reports have been submitted, which weighs against a denial. *Apple Inc. v. Fintiv Inc.*, IPR2020-00019, Paper 11 at 10 (PTAB Mar. 20, 2020) (precedential). Under the current schedule, there will not even be a Markman hearing before a final written decision in this case. EX-1053.

Four, if this IPR is instituted, Petitioner intends to seek a stay with stipulation to not raise in district court any of the grounds raised in this Petition, which also weighs against a denial.

Five, “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents ***compelling evidence of unpatentability***.” PTO Director’s Memorandum at 2. Even if the other *Fintiv* factors weighed in favor of denying institution (they do not), this Petition presents “compelling” evidence of unpatentability. For example, the Beggs-based ground, if not outright anticipatory of claim 19, shows that the

claims are facially obvious. *See supra* §VII. The Board should institute and proceed to trial on the merits of this challenge.

XIV. MANDATORY NOTICES

A. Real Parties-in-Interest

CommScope Technologies LLC, CommScope, Inc. of North Carolina, CommScope, Inc., and CommScope Holding Company, Company, Inc. are the real parties-in-interest. Related Matters

The challenged patent, as well as three additional patents, were asserted against petitioner CommScope in a complaint in *Belden Inc. v. CommScope, Inc. et al.*, No. 1:22-cv-00783 (D. Del.), which was served on June 14, 2022. One of the additional patents, U.S. Patent No. 6,570,095, is related to (and in the same family as) the challenged patent. Petitioner is filing a separate Petition for Inter Partes Review that challenges several claims of U.S. Patent No. 6,570,095. Petitioner is also filing two other Petitions for *Inter Partes* Review that challenge claims of the other two patents asserted in the lawsuit.

Petitioner also identifies the following terminated proceedings: *Belden Techs., Inc. et al. v. Superior Essex Inc. et al.*, Civ. No. 08-063-SLR (D. Del.); Reexamination No. 95/000,476 ('537 patent); Reexamination No. 95/000,474 ('095 patent); Reexamination No. 95/000,475 ('999 patent).

To the best of Petitioner's knowledge the '537 patent has not been challenged in any IPR prior to this proceeding.

B. Lead and Back-Up Counsel

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C. Service Information

Please address all correspondence and service to all counsel listed above.

Petitioner consents to service by email at the email addresses listed.

D. Fees

Petitioner authorizes the Patent Office to charge Deposit Account No. 502880 for the fee set forth in 37 C.F.R. § 42.15(a) and any other required fees.

Dated: June 13, 2023

Respectfully submitted,
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Claims Listing Appendix

U.S. Patent No. 6,998,537

Independent claim 19

Dependent claims 20-22

Independent Claim 19	
[19.pre]	An unshielded communications cable comprising:
[19.a]	a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;
[19.b]	a substantially flat configurable dielectric separator that consists of non-conductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and
[19.c]	a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;
[19.d]	wherein the substantially flat configurable dielectric separator includes a foamed polymer.

Claim 20	
[20]	The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator includes a flame-retardant, low-dielectric constant, foamed polymer tape.

Claim 22	
[22]	The communications cable as claimed in claim 19, wherein the substantially flat configurable dielectric separator is a flame-retardant, foamed polymer tape.

CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 12,895 words per Microsoft Word's word count tool, which complies with requirement of 14,000 words allowed under 37 CFR § 42.24(a)(i).

Dated: June 13, 2023

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on June 13, 2023 a complete and entire copy of this PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 6,998,537 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42 and all supporting exhibits were provided by Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

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Dated: June 13, 2023

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