

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

Assignment ID: PATI314514

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	SHORT-FORM PATENTS SECURITY AGREEMENT
CONVEYING PARTY DATA	
Name	Execution Date
Ribbon Communications Operating Company, Inc.	06/21/2024
RECEIVING PARTY DATA	
Company Name:	HPS Investment Partners, LLC, as Administrative Agent
Street Address:	40 West 57th Street, 33rd Floor
City:	New York
State/Country:	NEW YORK
Postal Code:	10019
PROPERTY NUMBERS Total: 67	
Property Type	Number
Application Number:	63079298
Application Number:	16817488
Application Number:	16817546
Application Number:	16817601
Application Number:	16850954
Application Number:	16787990
Application Number:	16785506
Application Number:	17023521
Application Number:	17014745
Application Number:	63167849
Application Number:	17357808
Application Number:	17482407
Application Number:	17510589
Application Number:	17573563
Application Number:	63347016
Application Number:	17848231
Application Number:	17884846
Application Number:	17882447
Application Number:	17120092
Application Number:	17960779

PATENT

Property Type	Number
Application Number:	63479797
Application Number:	17325866
Application Number:	17735791
Application Number:	63489524
Application Number:	63495708
Application Number:	18349664
Application Number:	18306779
PCT Number:	US2323731
PCT Number:	US2323725
Application Number:	18324854
Application Number:	18329370
Application Number:	18209363
Application Number:	18213371
Application Number:	18214991
Application Number:	18208737
Application Number:	18213999
Application Number:	18356054
Application Number:	18091898
Application Number:	63615256
Application Number:	63346989
Application Number:	18443408
Application Number:	12536537
Application Number:	13339629
Application Number:	12645009
Application Number:	13243418
Application Number:	12939690
Application Number:	12535081
Application Number:	12696378
Application Number:	14071009
Application Number:	13048378
Application Number:	13555787
Application Number:	13679458
Application Number:	13858473
Application Number:	14033578
Application Number:	12942913
Application Number:	12324672
Application Number:	12324675
Application Number:	12324671

Property Type	Number
Application Number:	12324611
Application Number:	13357435
Application Number:	13466748
Application Number:	12412273
Application Number:	13198290
Application Number:	13576310
Application Number:	13788364
Application Number:	13393153
Application Number:	14148528

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 2028357507

Email: jramos@milbank.com,dcip@milbank.com

Correspondent Name: Javier J. Ramos

Address Line 1: 1850 K Street, NW, Suite 1100

Address Line 4: Washington, DISTRICT OF COLUMBIA 20006

ATTORNEY DOCKET NUMBER:	34408.00141
NAME OF SUBMITTER:	JAVIER RAMOS
SIGNATURE:	JAVIER RAMOS
DATE SIGNED:	09/05/2024

Total Attachments: 15

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SHORT-FORM PATENTS SECURITY AGREEMENT

WHEREAS, RIBBON COMMUNICATIONS OPERATING COMPANY, INC. (the “Grantor”) has applied for letters patent and has been granted letters patents in the United States Patent and Trademark Office, and, in each case, is the owner of the patent applications and patents listed in the attached Schedule of Patents and Patent Applications associated therewith;

WHEREAS, the Grantor has contemporaneously with the execution of this Short-Form Patents Security Agreement entered into the Guarantee and Collateral Agreement dated as of June 21, 2024 (as modified from time to time, the “Security Agreement”), in which the Grantor has granted certain interests in favor of HPS Investment Partners, LLC, as administrative agent (the “Administrative Agent”) for the benefit of the Secured Parties (as defined in the Credit Agreement referenced therein); and

WHEREAS, pursuant to the Security Agreement, the Grantor has agreed with the Administrative Agent and the Secured Parties to execute this Short-Form Patents Security Agreement;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Grantor hereby grants to the Administrative Agent for the benefit of the Secured Parties, to the extent provided in the Security Agreement (the terms and conditions of which are hereby incorporated herein), a security interest in all of its right, title and interest in, to and under all the patents and patent applications whether now owned or at any time hereafter acquired, of the Grantor issued by, or for which applications have been filed with, the United States Patent and Trademark Office, including the patents and applications on the attached Schedule of Patents and Patent Applications, including all reissuances, continuations, continuations-in-part, and extensions thereof, as collateral security for the prompt and complete payment and performance when due of all the Secured Obligations (as defined in the Security Agreement). Notwithstanding the foregoing, in the event of any conflict between this Short-Form Patents Security Agreement and the Security Agreement, the Security Agreement shall control.

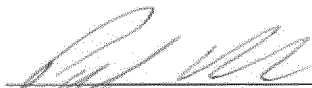
Date: June 21, 2024

[signature pages follow]

IN WITNESS WHEREOF, each of the undersigned has caused this Short-Form Patents Security Agreement to be duly executed and delivered as of the date first above written.

GRANTOR:

**RIBBON COMMUNICATIONS OPERATING
COMPANY, INC.**

By: 
Name: Patrick Macken
Title: Chief Executive Officer and President

ADMINISTRATIVE AGENT:

HPS INVESTMENT PARTNERS, LLC

By:



Name: Daniel Zevnik

Title: Managing Director

SCHEDULE OF
PATENTS AND PATENT APPLICATIONS

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
1.	Ribbon Communications Operating Company, Inc.	METHODS; APPARATUS AND SYSTEMS FOR BUILDING AND/OR IMPLEMENTING DETECTION SYSTEMS USING ARTIFICIAL INTELLIGENCE	63/079,298	9/16/2020		
2.	Ribbon Communications Operating Company, Inc.	KEY PERFORMANCE INDICATOR ANOMALY DETECTION IN TELEPHONY NETWORKS	16/817,488	3/12/2020	10,944,776	3/9/2021
3.	Ribbon Communications Operating Company, Inc.	METHODS; SYSTEMS AND APPARATUS FOR USING SESSION; DEVICE AND/OR USER SIGNATURES	16/817,546	3/12/2020	10,949,749	3/16/2021
4.	Ribbon Communications Operating Company, Inc.	METHODS; SYSTEMS AND APPARATUS FOR USING SESSION; DEVICE AND/OR USER SIGNATURES	16/817,601	3/12/2020	10,949,750 B2	3/16/2021
5.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR MIGRATING A NETWORK INTERFACE AND/OR IP ADDRESS FROM ONE POD TO ANOTHER POD IN A KUBERNETES SYSTEM	16/850,954	4/16/2020	11777790	10/3/2023
6.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR MINIMIZING AND/OR PREVENTING MESSAGE PROCESSING FAULTS	16/787,990	2/11/2020	11,240,097	2/1/2022

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
7.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR MINIMIZING AND/OR PREVENTING MESSAGE PROCESSING FAULTS	201941051509	12/19/2019		
8.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR DYNAMIC DETECTION AND/OR MITIGATION OF ANOMALIES	16/785,506	2/7/2020	11271960	3/8/2022
9.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS TO PRESERVE ORIGINAL ATTESTATION/SIGNATURE INFORMATION FOR DIVERTED CALLS	201941054108	12/27/2019		
10.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR EFFICIENT LOAD BALANCING AMONG MICROSERVICES AND/OR PROCESSING ENTITIES	17/023,521	9/17/2020	11,070,595	7/20/2021
11.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR DETERMINING BEST-QUALITY REALTIME-MEDIA PATH IN UNIFIED COMMUNICATIONS APPLICATIONS	17/014,745	9/8/2020	11736386	8/22/2023
12.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS, APPARATUS AND SYSTEMS FOR PROVIDING EFFICIENT AND SCALABLE MEDIA SERVICES	202141010261	3/11/2021		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
13.	Ribbon Communications Operating Company, Inc.	Method and Mechanism to Extend Applicability of Centralized Call verification Services	63/167,849	3/30/2021		
14.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR EFFICIENT LOAD BALANCING AMONG MICROSERVICES AND/OR PROCESSING ENTITIES	17/357,808	6/24/2021	11363075	6/14/2022
15.	Ribbon Communications Operating Company, Inc.	METHODS; APPARATUS AND SYSTEMS FOR CLOUD NATIVE APPLICATION MULTI-FACTOR LOAD BALANCING	17/482,407	9/22/2021	11729263	8/15/2023
16.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR CALL TRAFFIC ANOMALY MITIGATION	17/510,589	10/26/2021	11909912	2/20/2024
17.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR EFFICIENT FAILURE RECOVERY AND SCALING OF A COMMUNICATIONS SYSTEM	17/573,563	1/11/2022	11647072	5/9/2023
18.	Ribbon Communications Operating Company, Inc.	METHODS, SYSTEMS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS TRAINING DATA	63/347,016	5/30/2022		
19.	Ribbon Communications Operating Company, Inc.	METHODS, SYSTEMS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS TRAINING DATA	17/848,231	6/23/2022		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
20.	Ribbon Communications Operating Company, Inc.	Method and Mechanism for Handling Maintenance Events Without Service Impact in Public Cloud Deployments	202241039806	7/11/2022		
21.	Ribbon Communications Operating Company, Inc.	METHODS, DEVICES, AND SYSTEMS FOR PROVIDING DYNAMIC PROTECTION AGAINST AMPLIFICATION ATTACKS	17/884,846	8/10/2022		
22.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS MEDIA FINGERPRINTS	17/882,447	8/5/2022		
23.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR ADDING AND/OR PROVIDING STIR/SHAKEN DIVERSION INFORMATION	17/120,092	12/11/2020	11,496,307	11/8/2022
24.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR ADDING AND/OR PROVIDING STIR/SHAKEN DIVERSION INFORMATION	17/960,779	10/5/2022	11764963	9/19/2023
25.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR CALL TRAFFIC ANOMALY MITIGATION	3,179,127	10/18/2022		
26.	Ribbon Communications Operating Company, Inc.	COMMUNICATION NETWORK CONFIGURATION	63/479,797	1/13/2023		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
27.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS, APPARATUS AND SYSTEMS FOR PROVIDING EFFICIENT AND SCALABLE MEDIA SERVICES	17/325,866	5/20/2021	11706135	7/18/2023
28.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR EFFICIENT LOAD BALANCING AMONG MICROSERVICES AND/OR PROCESSING ENTITIES	17/735,791	5/3/2022	11595449	2/28/2023
29.	Ribbon Communications Operating Company, Inc.	COMMUNICATION NETWORK CONFIGURATION	63/489,524	3/10/2023		
30.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR CALL TRAFFIC ANOMALY MITIGATION	22201647.9	10/14/2022		
31.	Ribbon Communications Operating Company, Inc.	COMMUNICATION NETWORK CONFIGURATION	18/349,664	7/10/2023		
32.	Ribbon Communications Operating Company, Inc.	COMMUNICATION NETWORK CONFIGURATION	24162799.1	3/11/2024		
33.	Ribbon Communications Operating Company, Inc.	SPECTRAL DEFRAGMENTATION IN COMMUNICATION NETWORKS	63/495,708	4/12/2023		
34.	Ribbon Communications Operating Company, Inc.	PREPLAN ASSIGNMENT GENERATION	18/306,779	4/25/2023		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
35.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS MEDIA FINGERPRINTS	PCT/US23/23731	5/26/2023		
36.	Ribbon Communications Operating Company, Inc.	COMMUNICATION NETWORK CONFIGURATION	18/324,854	5/26/2023		
37.	Ribbon Communications Operating Company, Inc.	METHODS, SYSTEMS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS TRAINING DATA	PCT/US23/23725	5/26/2023		
38.	Ribbon Communications Operating Company, Inc.	OPTICAL COMMUNICATION NETWORK CONFIGURATION	18/329,370	6/5/2023		
39.	Ribbon Communications Operating Company, Inc.	OPTICAL COMMUNICATION NETWORK CONFIGURATION	23184569.4	7/11/2023		
40.	Ribbon Communications Operating Company, Inc.	METHODS, APPARATUS AND SYSTEMS FOR CLOUD NATIVE APPLICATION MULTI-FACTOR LOAD BALANCING	18/209,363	6/13/2023		
41.	Ribbon Communications Operating Company, Inc.	METHODS, SYSTEMS AND APPARATUS FOR HANDLING MAINTENANCE EVENTS IN PUBLIC CLOUD DEPLOYMENTS	18/213,371	6/23/2023		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
42.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR DETERMINING BEST-QUALITY REALTIME-MEDIA PATH IN UNIFIED COMMUNICATIONS APPLICATIONS	18/214,991	6/27/2023		
43.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS, APPARATUS AND SYSTEMS FOR PROVIDING EFFICIENT AND SCALABLE MEDIA SERVICES	18/208,737	6/12/2023		
44.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS TO PRESERVE ORIGINAL ATTESTATION/SIGNATURE INFORMATION FOR DIVERTED CALLS	18/213,999	6/26/2023		
45.	Ribbon Communications Operating Company, Inc.	CONNECTIVITY AWARE PATH FINDING	18/356,054	7/20/2023		
46.	Ribbon Communications Operating Company, Inc.	COMMUNICATIONS METHODS AND APPARATUS FOR DYNAMIC DETECTION AND/OR MITIGATION OF THREATS AND/OR ANOMALIES	18/091,898	12/30/2022	11,902,311	2/13/2024
47.	Ribbon Communications Operating Company, Inc.	Learning-based automated call flow testing	63/615,256	12/27/2023		
48.	Ribbon Communications Operating Company, Inc.	CONNECTIVITY AWARE PATH FINDING	24151983.4	1/15/2024		

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
49.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR GENERATING AND/OR USING COMMUNICATIONS MEDIA FINGERPRINTS	63/346,989	5/30/2022		
50.	Ribbon Communications Operating Company, Inc.	METHODS AND APPARATUS FOR CALL TRAFFIC ANOMALY MITIGATION	18/443,408	2/16/2024		
51.	Ribbon Communications Operating Company, Inc.	CONTENT CACHING IN THE RADIO ACCESS NETWORK (RAN)	12/536,537	08/06/2009	8,111,630	2/7/2012
52.	Ribbon Communications Operating Company, Inc.	CONTENT CACHING IN THE RADIO ACCESS NETWORK (RAN)	13/339,629	12/29/2011	8,576,744	11/5/2013
53.	Ribbon Communications Operating Company, Inc.	TRANSPARENT INTERACTION WITH MULTI-LAYER PROTOCOLS VIA SELECTIVE BRIDGING AND PROXYING	12/645,009	12/22/2009	8,208,430	6/26/2012
54.	Ribbon Communications Operating Company, Inc.	DESTINATION LEARNING AND MOBILITY DETECTION IN TRANSIT NETWORK DEVICE IN LTE & UMTS RADIO ACCESS NETWORKS	13/243,418	09/23/2011	8,565,076	10/22/2013
55.	Ribbon Communications Operating Company, Inc.	SESSION HANDOVER IN MOBILE-	12/939,690	11/04/2010	8,451,800	5/28/2013

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
		NETWORK CONTENT-DELIVERY DEVICES				
56.	Ribbon Communications Operating Company, Inc.	CROSS-LAYER PIPELINING OPTIMIZATIONS FOR REDUCED ROUNDTrips AND IMPROVING QUALITY OF EXPERIENCE	12/535,081	08/04/2009	8,085,810	12/27/2011
57.	Ribbon Communications Operating Company, Inc.	APPLICATION, USAGE & RADIO LINK AWARE TRANSPORT NETWORK SCHEDULER	12/696,378	01/29/2010	8,717,890	5/6/2014
58.	Ribbon Communications Operating Company, Inc.	CONTENT CACHING IN THE RADIO ACCESS NETWORK (RAN)	14/071,009	11/04/2013	9,001,840	4/7/2015
59.	Ribbon Communications Operating Company, Inc.	Adaptive Chunked & Content Aware Pacing of Multi-Media Delivery over HTTP Transport & Network Controlled Bit Rate Selection (P09)	13/048,378	03/15/2011	9,043,467	5/26/2015
60.	Ribbon Communications Operating Company, Inc.	RAN Analytics, Control, And Tuning Via Multi- Protocol, Multi-Domain, And Multi- RAT Analysis (P17, P18) - SUL, KPIs, Export	13/555,787	07/23/2012	8,908,507	12/9/2014
61.	Ribbon Communications Operating Company, Inc.	Content & RAN Aware Network Selection in Multiple Wireless Access and Small- Cell Overlay Wireless Access Networks (P19)	13/679,458	11/16/2012	9,001,682	4/7/2015

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
62.	Ribbon Communications Operating Company, Inc.	Distributed RAN Information Collection, Consolidation & RAN Analytics (PP20)	13/858,473	04/08/2013	9,204,329	12/1/2015
63.	Ribbon Communications Operating Company, Inc.	DESTINATION LEARNING AND MOBILITY DETECTION IN TRANSIT NETWORK DEVICE IN LTE AND UMTS RADIO ACCESS NETWORKS	14/033,578	09/23/2013	9,204,474	12/1/2015
64.	Ribbon Communications Operating Company, Inc.	Burst Packet Scheduler for Improved RAN Efficiency in UMTS/HSPA Networks (P07)	12/942,913	11/09/2010	8,755,405	6/17/2014
65.	Ribbon Communications Operating Company, Inc.	System and Method for Collecting, Reporting and Analyzing data on application level activity and other user information in a mobile data network	12/324,672	11/26/2008	8,108,517	1/31/2012
66.	Ribbon Communications Operating Company, Inc.	Method and Apparatus for Real-Time collection of information about application level activity and other user information in a mobile data network	12/324,675	11/26/2008	8,935,381	1/13/2015
67.	Ribbon Communications Operating Company, Inc.	Method and Apparatus for Storing data on application-level activity and other user information to enable real-time multi-dimensional reporting about user of a mobile data network	12/324,671	11/26/2008	8,195,661	6/5/2012

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
68.	Ribbon Communications Operating Company, Inc.	Method and Apparatus for Real-Time multi-dimensional Reporting and analyzing data on application level activity and other user information in a mobile data network	12/324,611	11/26/2008	8,732,170	5/20/2014
69.	Ribbon Communications Operating Company, Inc.	System and Method for Collecting, Reporting and Analyzing data on application level activity and other user information in a mobile data network (Continuation Application)	13/357,435	01/24/2012	8,755,297	6/17/2014
70.	Ribbon Communications Operating Company, Inc.	Method and Apparatus for Storing data on application-level activity and other user information to enable real-time multi-dimensional reporting about user of a mobile data network (continuation)	13/466,748	05/08/2012	8,958,313	2/17/2015
71.	Ribbon Communications Operating Company, Inc.	SYSTEM AND METHOD FOR SHARING ANONYMOUS USER PROFILES WITH A THIRD PARTY	12/412,273	03/26/2009	8,775,391	7/8/2014
72.	Ribbon Communications Operating Company, Inc.	Method and Apparatus for Privacy Safe Actionable Analytics on Mobile data usage	13/198,290	08/04/2011	8,838,784	9/16/2014
73.	Ribbon Communications Operating Company, Inc.	Method and Apparatus pertaining to the assessment of mobile communications	13/576,310	07/31/2012	8,462,659	6/11/2013

	<u>Owner</u>	<u>Title</u>	<u>Application No.</u>	<u>Filing Date</u>	<u>Patent No.</u>	<u>Issue Date</u>
		network infrastructure latency through high-speed channels				
74.	Ribbon Communications Operating Company, Inc.	Method and Apparatus pertaining to the assessment of mobile communications network infrastructure latency through high-speed channels (continuation)	13/788,364	03/07/2013	8,605,597	12/10/2013
75.	Ribbon Communications Operating Company, Inc.	Determining an average effective data through-put as corresponds to a network served end user	13/393,153	03/22/2012	9,003,022	4/7/2015
76.	Ribbon Communications Operating Company, Inc.	Domain Name Resolution	14/148,528	01/06/2014	9,426,049	8/23/2016