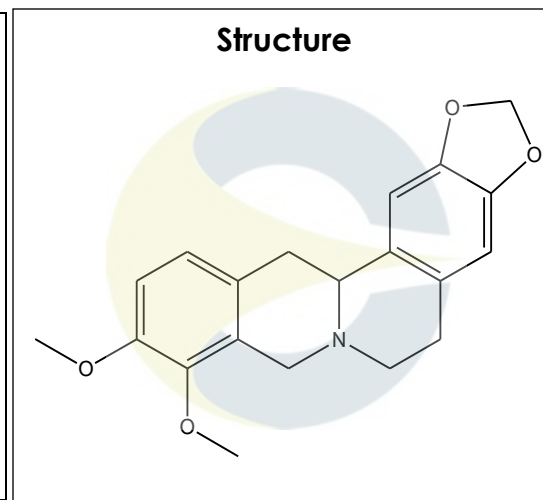


Certificate of Analysis

For Laboratory Use Only

PRODUCT NAME	Tetrahydroberberine
PART NUMBER	00020155
STANDARD TYPE	Primary (P)
LOT NUMBER	00020155-941
REPORT NUMBER	CDXA-RSS-7584-01
SAMPLE NUMBER	CDXA-17-006881
DATE OF SAMPLE	05/31/2017
DATE OF RE-EVALUATION	04/26/2021
DATE OF REPORT	05/10/2021



CHEMICAL NAMES 9,10-Dimethoxy-2,3-(methylenedioxy)-berberine; (±)-Canadine; (±)-Tetrahydroberberine; Canadine; Xanthopuccine

CHEMICAL FORMULA C₂₀H₂₁NO₄

MOLECULAR WEIGHT (MW) 339.39

CHEMICAL FAMILY Alkaloids

CAS NUMBER [522-97-4]

EC#(EINECS) 208-338-2

RTECS NA

ANALYTICAL RESULTS

TEST	METHOD	SPECIFICATION	RESULT
Adjusted Purity	NA	≥ 85%	99.2%
HPLC	0.700.10.2.METH22	≥ 90%	99.3%
NMR	4.5.3-CD-4.0-000338	Conforms to structure	Conforms to structure
Mass Spectrum	99.1-CDXA-2.0-000126	Conforms	Conforms
Residual Solvent*	99.1-CD-9.0-000115	NA	CHCl ₃ - 0.1%
Water	0.700.12.37	NA	ND
Appearance	NA	NA	Yellow powder

*Testing performed at an ISO 17025 accredited subcontracted laboratory.

ADJUSTED PURITY: 99.2% IS BASED ON (100 - 0.1 SOLVENTS - 0.0 WATER) X 99.3% HPLC

STORAGE CONDITIONS

STORAGE -20 °C in a dry place.

EXPIRATION DATE 04/2026 under the above conditions.

This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

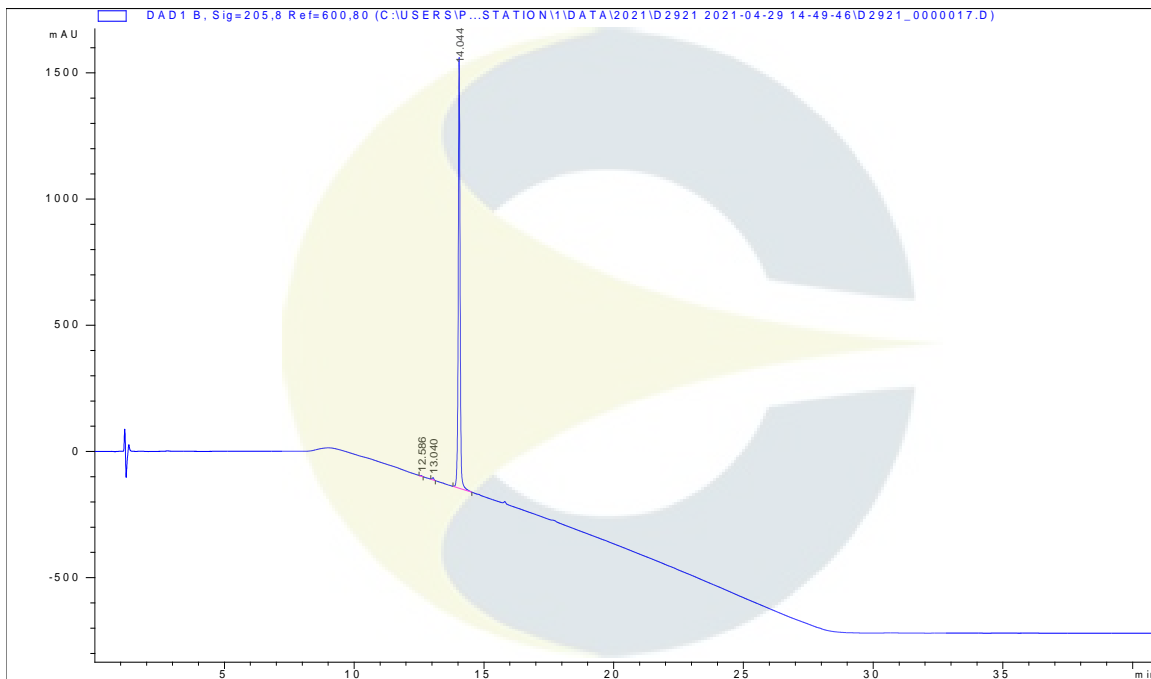
Certificate of Analysis

For Laboratory Use Only

ANALYTICAL CONDITIONS

INSTRUMENT	AGILENT 1260 HPLC UV-VIS (DAD); AGILENT 6510 QTOF
COLUMN	Phenomenex Luna C18(2) 150 x 2.00 mm, 5 µm particle size
MOBILE PHASE	A - 0.1% Trifluoroacetic acid in Ultrapure water, B - Acetonitrile; Isocratic 5% B for 5 minutes, then increasing to 95% B over 20 minutes. Hold at 95% B for 15 minutes.
COLUMN TEMP.	60 °C
FLOW RATE	0.4 mL/minute
INJECTION VOL.	0.2 µL
INJECTION CONC.	1.3 mg/mL in Methanol
DETECTION	205 ± 4 nm

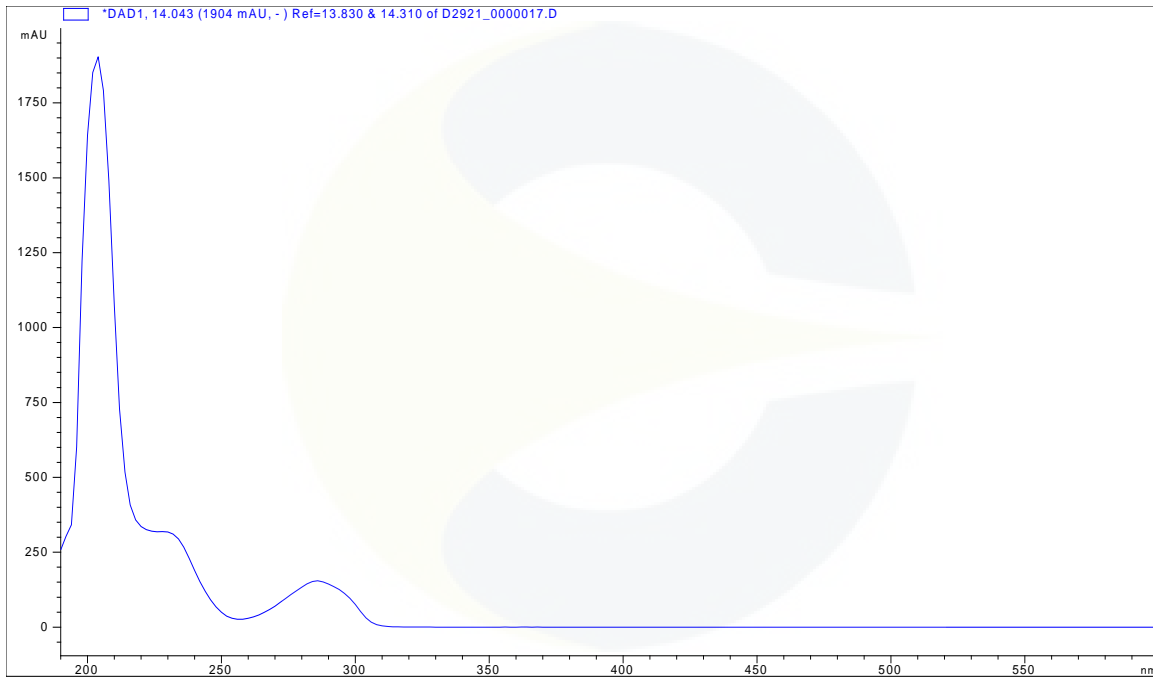
HPLC CHROMATOGRAM OF TETRAHYDROBERBERINE (CDXA-17-006881)



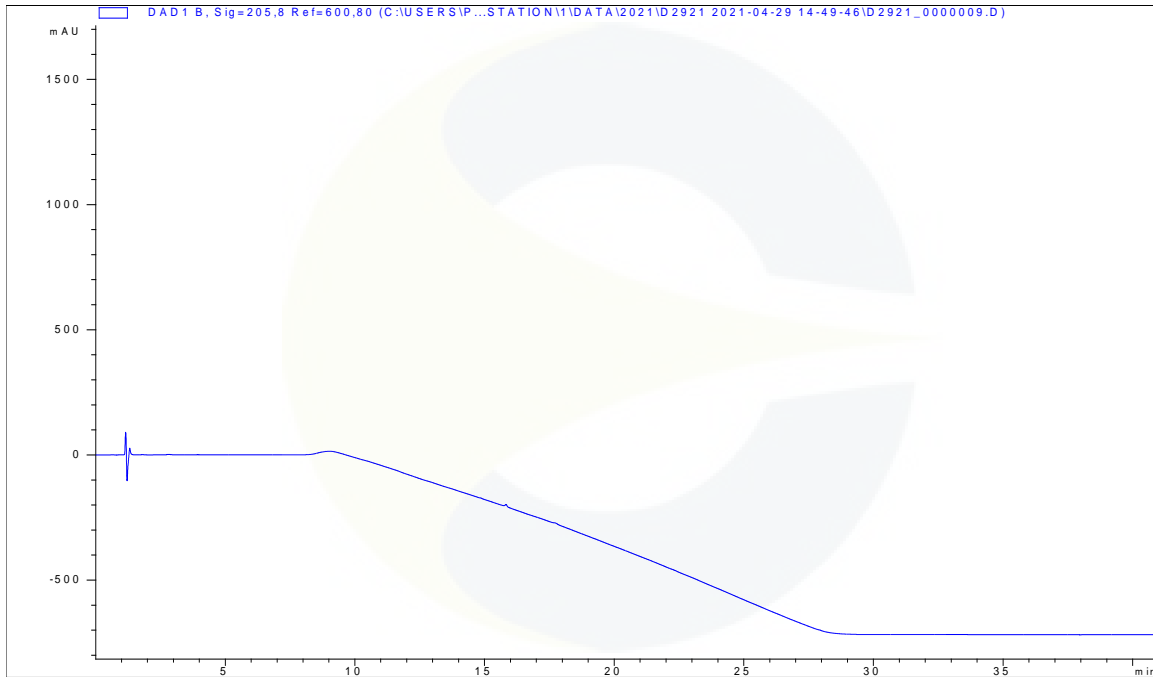
This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis For Laboratory Use Only

UV SPECTRUM AT RT = 14.0 MINUTES



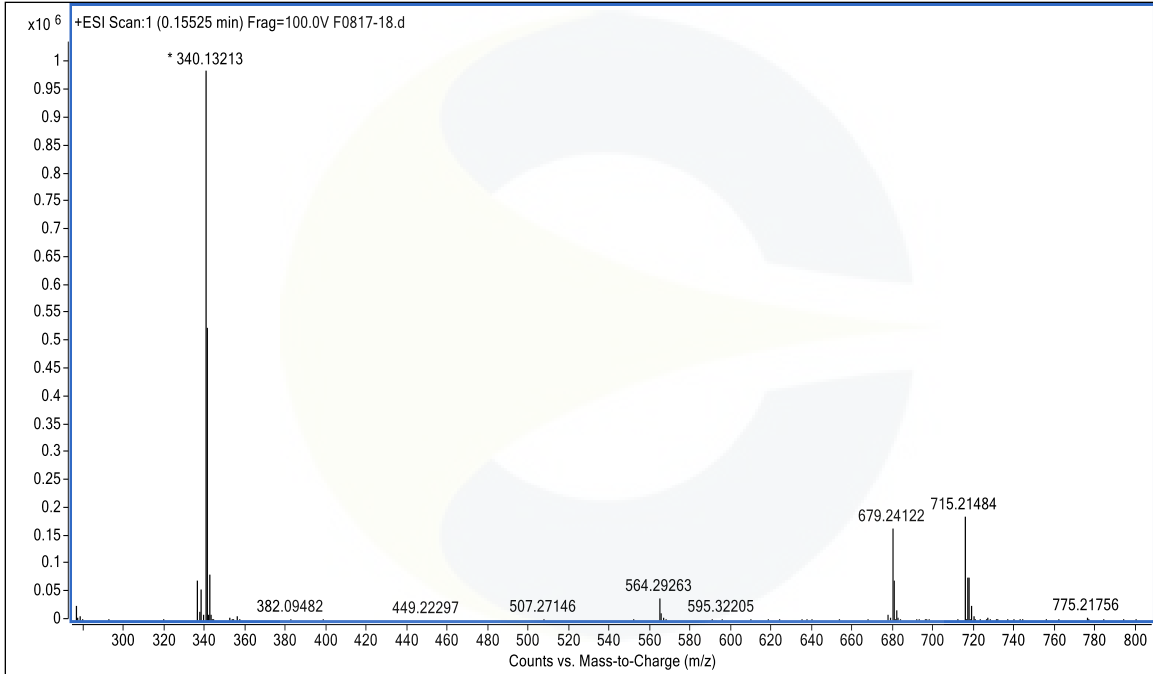
HPLC CHROMATOGRAM OF DILUENT BLANK



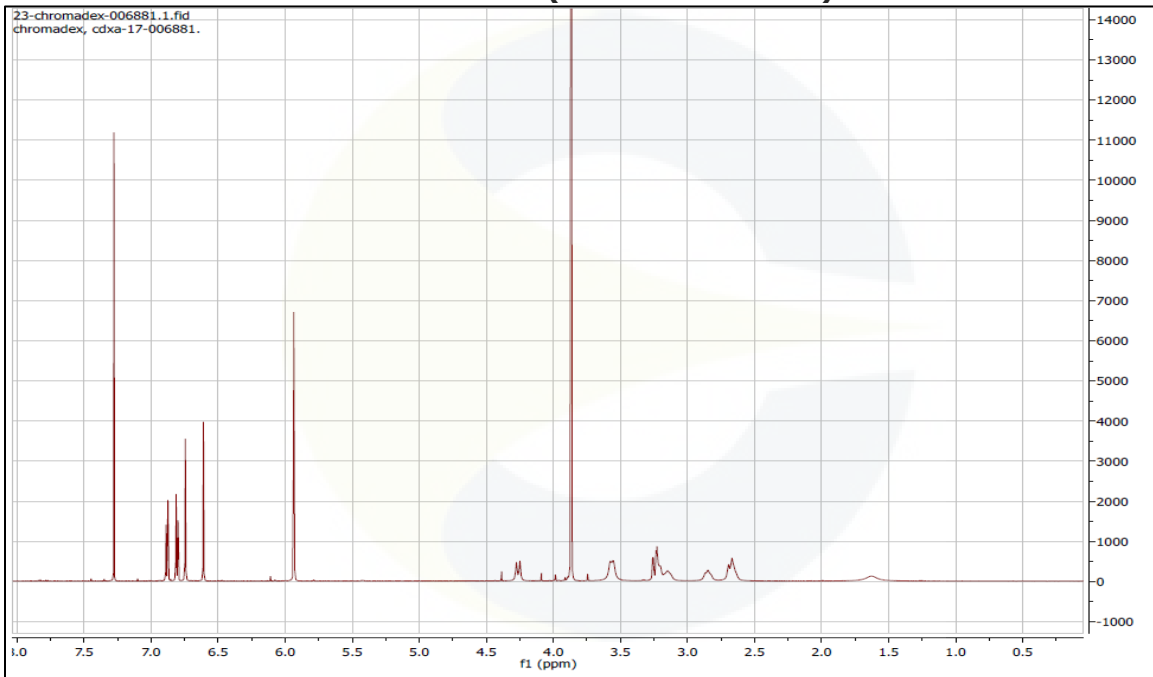
This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis For Laboratory Use Only

MASS SPECTRUM OF TETRAHYDROBERBERINE (CDXA-17-006881)

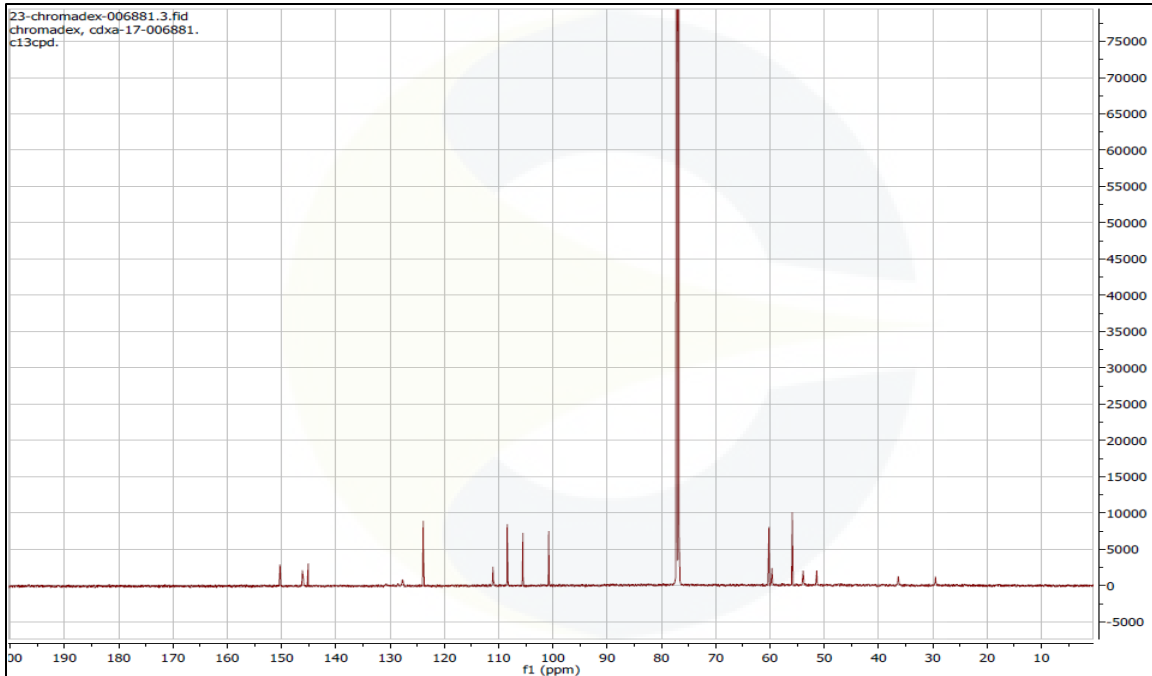


¹H-NMR SPECTRUM OF TETRAHYDROBERBERINE (CDXA-17-006881) IN CDCl₃

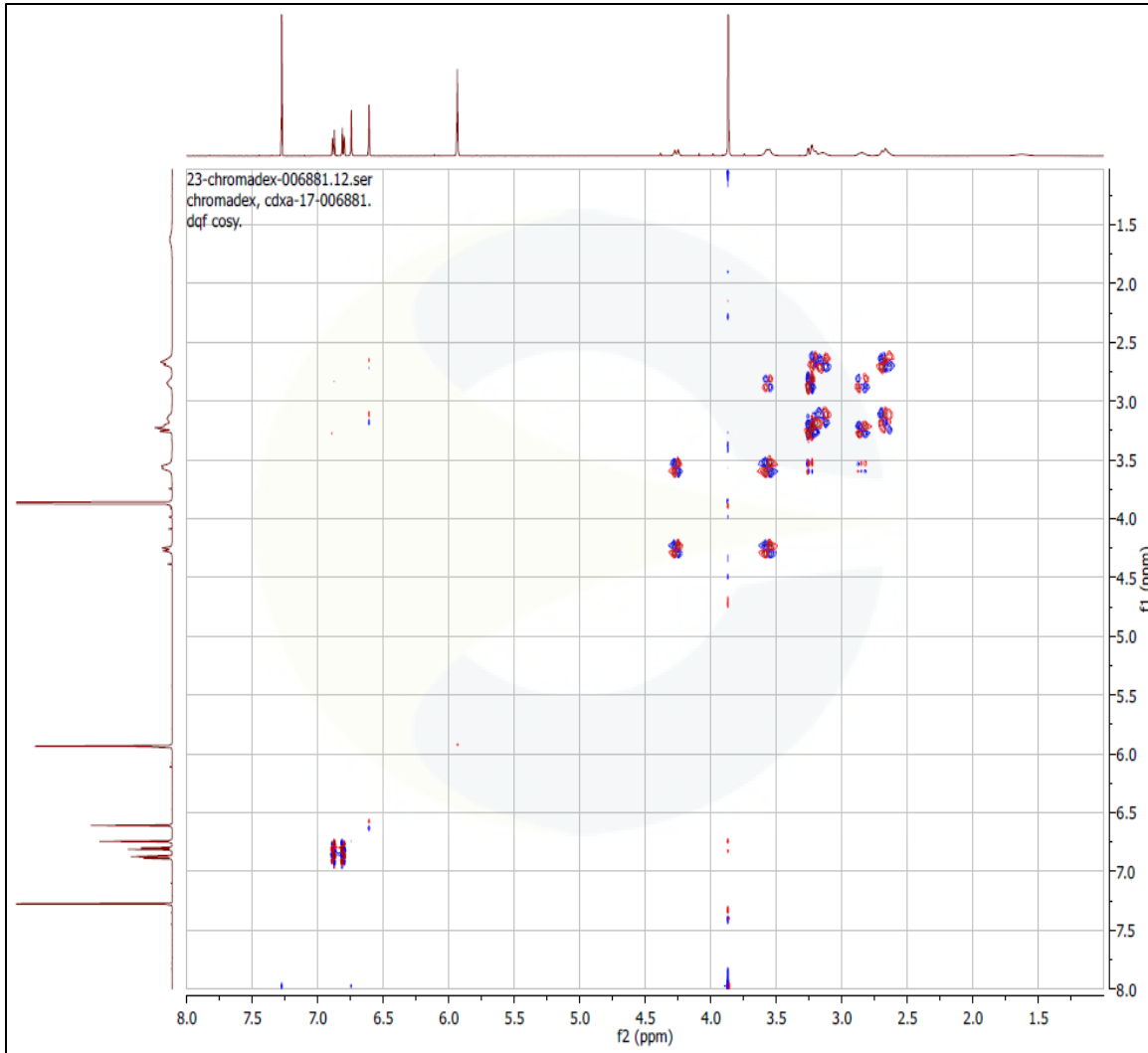


This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

¹³C-NMR SPECTRUM OF TETRAHYDROBERBERINE (CDXA-17-006881) IN CDCl₃



This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis
For Laboratory Use Only
COSY-NMR SPECTRUM OF TETRAHYDROBERBERINE (CDXA-17-006881) IN CDCl₃

REVISION HISTORY

<u>Revision History</u>	<u>Date of Revision</u>	<u>Document/Changes</u>
00	06/16/2017	New report
01	05/10/2021	Passed re-evaluation by HPLC, KF. Updated expiration date, analytical conditions, chromatograms, and results. Removed melting point.

This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.