

ROYAL BANK OF CANADA  
Form 424B2  
January 02, 2018

RBC Capital Markets® Filed Pursuant to Rule 424(b)(2)  
Registration Statement No. 333-208507

Pricing Supplement  
Dated December 29,  
2017 \$1,665,000  
To the Product Issuer Callable Contingent Coupon Barrier Notes  
Prospectus Supplement Linked to the Lesser Performing of Two Exchange  
No. TP-1, the Prospectus Traded Funds, Due January 4, 2021  
Supplement and the Royal Bank of Canada  
Prospectus, Each Dated  
January 8, 2016

Royal Bank of Canada is offering Issuer Callable Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of the shares of two exchange traded funds (each, a “Reference Stock” and collectively, the “Reference Stocks”). The Notes offered are senior unsecured obligations of Royal Bank of Canada, will pay a quarterly Contingent Coupon at the rate and under the circumstances specified below, and will have the terms described in the documents described above, as supplemented or modified by this pricing supplement.

Reference Stocks	Initial Stock Prices	Coupon Barriers and Trigger Prices*
SPDR® S&P® Biotech ETF (“XBI”)	\$84.87	59.41, which is 70.00% of its Initial Stock Price
SPDR® S&P® 500 ETF Trust (“SPY”)	\$266.86	\$186.80, which is 70.00% of its Initial Stock Price

\* Rounded to two decimal places

The Notes do not guarantee any return of principal at maturity. Any payments on the Notes are subject to our credit risk.

Investing in the Notes involves a number of risks. See “Risk Factors” beginning on page PS-5 of the product prospectus supplement dated January 8, 2016, on page S-1 of the prospectus supplement dated January 8, 2016, and “Selected Risk Considerations” beginning on page P-7 of this pricing supplement.

The Notes will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Notes or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

Issuer:	Royal Bank of Canada	Stock Exchange Listing:	None
Trade Date:	December 29, 2017	Principal Amount:	\$1,000 per Note
Issue Date:	January 4, 2018	Maturity Date:	January 4, 2021
Observation Dates:	Quarterly, as set forth below.	Coupon Payment Dates:	Quarterly, as set forth below
Valuation Date:	December 29, 2020	Contingent Coupon Rate:	8.65% per annum
Contingent Coupon:	If the closing price of each Reference Stock is greater than or equal to its Coupon Barrier on the applicable Observation Date, we will pay the Contingent Coupon applicable to the corresponding Observation Date. You may not receive any Contingent Coupons during the term of the Notes.		

Payment at Maturity (if held to maturity): If the Notes are not previously called, we will pay you at maturity an amount based on the Final Stock Price of the Lesser Performing Reference Stock:

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For each \$1,000 in principal amount, \$1,000 plus the Contingent Coupon at maturity, unless the Final Stock Price of the Lesser Performing Reference Stock is less than its Trigger Price.

If the Final Stock Price of the Lesser Performing Reference Stock is less than its Trigger Price, then the investor will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:

$\$1,000 + (\$1,000 \times \text{Reference Stock Return of the Lesser Performing Reference Stock})$

Investors in the Notes could lose some or all of their principal amount if the Final Stock Price of the Lesser Performing Reference Stock is below its Trigger Price.

Lesser Performing Reference Stock:

The Reference Stock with the lowest Reference Stock Return.

Call Feature:

The Notes may be called at our discretion starting on July 3, 2019 or on any Coupon Payment Date thereafter, if we send prior written notice, as described below.

Call Settlement Dates:

The Coupon Payment Date corresponding to that Observation Date.

Final Stock Price:

For each Reference Stock, its closing price on the Valuation Date.

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	Per Note	Total
Price to public	100.00%	\$1,665,000.00
Underwriting discounts and commissions <sup>(1)</sup>	0.75%	\$12,487.50
Proceeds to Royal Bank of Canada	99.25%	\$1,652,512.50

The initial estimated value of the Notes as of the date of this pricing supplement is \$959.39 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Notes at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value in more detail below.

RBC Capital Markets, LLC, which we refer to as RBCCM, acting as agent for Royal Bank of Canada, received a commission of \$7.50 per \$1,000 in principal amount of the Notes and used a portion of that commission to allow selling concessions to other dealers of up to \$7.50 per \$1,000 in principal amount of the Notes. The other dealers may forgo, in their sole discretion, some or all of their selling concessions. See “Supplemental Plan of Distribution (Conflicts of Interest)” below.

RBC Capital Markets, LLC

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Issuer-Callable Contingent Coupon Barrier  
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Two Exchange Traded Funds,  
Due January 4, 2021  
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#### SUMMARY

The information in this “Summary” section is qualified by the more detailed information set forth in this pricing supplement, the product prospectus supplement, the prospectus supplement, and the prospectus.

**General:** This pricing supplement relates to an offering of Issuer Callable Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of the shares of two exchange traded funds (the “Reference Stocks”).

**Issuer:** Royal Bank of Canada (“Royal Bank”)

**Issue:** Senior Global Medium-Term Notes, Series G

**Trade Date:** December 29, 2017

**Issue Date:** January 4, 2018

**Term:** Three (3) years

**Denominations:** Minimum denomination of \$1,000, and integral multiples of \$1,000 thereafter.

**Designated Currency:** U.S. Dollars

We will pay you a Contingent Coupon during the term of the Notes, periodically in arrears on each Coupon Payment Date, under the conditions described below:

- If the closing price of each Reference Stock is greater than or equal to its Coupon Barrier on the applicable Observation Date, we will pay the Contingent Coupon applicable to that Observation Date.
- If the closing price of either of the Reference Stocks is less than its Coupon Barrier on the applicable Observation Date, we will not pay you the Contingent Coupon applicable to that Observation Date.

You may not receive a Contingent Coupon for one or more quarterly periods during the term of the Notes.

**Contingent Coupon Rate:** 8.65% per annum (2.1625% per quarter)

**Observation Dates:** Quarterly on March 29, 2018, June 29, 2018, September 28, 2018, December 31, 2018, March 29, 2019, June 28, 2019, September 30, 2019, December 30, 2019, March 30, 2020, June 29, 2020, September 29, 2020 and the Valuation Date.

**Coupon Payment Dates:** The Contingent Coupon, if applicable, will be paid quarterly on April 4, 2018, July 3, 2018, October 3, 2018, January 4, 2019, April 3, 2019, July 3, 2019, October 3, 2019, January 3, 2020, April 2, 2020, July 2, 2020, October 2, 2020 and the Maturity Date.

**Record Dates:** The record date for each Coupon Payment Date will be the date one business day prior to that scheduled Coupon Payment Date; provided, however, that any Contingent Coupon payable at maturity or upon a call will be payable to the person to whom the payment at maturity or upon the call, as the case may be, will be payable.

**Call Feature:** The Notes may be called at our discretion starting on July 3, 2019 or on any Coupon Payment Date thereafter, if we send written notice to the trustee at least three business days prior to that Coupon Payment Date.

**Payment if Called:** If the Notes are called, then, on the applicable Call Settlement Date, for each \$1,000 principal amount, you will receive \$1,000 plus the Contingent Coupon otherwise due on that Call Settlement Date.

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Call Settlement Dates: If the Notes are called on any Observation Date starting on July 3, 2019 or thereafter, the Call Settlement Date will be the Coupon Payment Date corresponding to that Observation Date.

Valuation Date: December 29, 2020

Maturity Date: January 4, 2021

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**Initial Stock Price:** For each Reference Stock, its closing price on the Trade Date, as specified on the cover page of this pricing supplement.

**Final Stock Price:** For each Reference Stock, its closing price on the Valuation Date.

**Trigger Price and Coupon Barrier:** For each Reference Stock, 70.00% of its Initial Stock Price, as specified on the cover page of this pricing supplement.

**Payment at Maturity (if not previously called and held to maturity):** If the Notes are not previously called, we will pay you at maturity an amount based on the Final Stock Price of the Lesser Performing Reference Stock:  
 • If the Final Stock Price of the Lesser Performing Reference Stock is greater than or equal to its Trigger Price, we will pay you a cash payment equal to the principal amount plus the Contingent Coupon otherwise due on the Maturity Date.  
 • If the Final Stock Price of the Lesser Performing Reference Stock is below its Trigger Price, you will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  
 $\$1,000 + (\$1,000 \times \text{Reference Stock Return of the Lesser Performing Reference Stock})$   
 The amount of cash that you receive will be less than your principal amount, if anything, resulting in a loss that is proportionate to the decline of the Lesser Performing Reference Stock from the Trade Date to the Valuation Date. Investors in the Notes will lose some or all of their principal amount if the Final Stock Price of the Lesser Performing Reference Stock is less than its Trigger Price.

**Stock Settlement:** Not applicable. Payments on the Notes will be made solely in cash.

**Reference Stock Return:** With respect to each Reference Stock:  

$$\frac{\text{Final Stock Price} - \text{Initial Stock Price}}{\text{Initial Stock Price}}$$

**Lesser Performing Reference Stock:** The Reference Stock with the lowest Reference Stock Return.

**Market Disruption Events:** The occurrence of a market disruption event (or a non-trading day) as to either of the Reference Stocks will result in the postponement of an Observation Date or the Valuation Date as to that Reference Stock, as described in the product prospectus supplement, but not to any non-affected Reference Stock.

**Calculation Agent:** RBC Capital Markets, LLC (“RBCCM”)

**U.S. Tax Treatment:** By purchasing a Note, each holder agrees (in the absence of a change in law, an administrative determination or a judicial ruling to the contrary) to treat the Notes as a callable pre-paid cash-settled contingent income-bearing derivative contract linked to the Reference Stocks for U.S. federal income tax purposes. However, the U.S. federal income tax consequences of your investment in the Notes are uncertain and the Internal Revenue Service could assert that the Notes should be taxed in a manner that is different from that described in the preceding sentence. Please see the section below, “Supplemental Discussion of U.S. Federal Income Tax Consequences,” and the discussion (including the opinion of our counsel Morrison & Foerster LLP) in the product prospectus supplement dated January 8, 2016 under

Secondary Market: “Supplemental Discussion of U.S. Federal Income Tax Consequences,” which apply to the Notes. RBCCM (or one of its affiliates), though not obligated to do so, may maintain a secondary market in the Notes after the Issue Date. The amount that you may receive upon sale of your Notes prior to maturity may be less than the principal amount.

Listing: The Notes will not be listed on any securities exchange.

Settlement: DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus dated January 8, 2016).

Terms Incorporated in the Master Note: All of the terms appearing above the item captioned “Secondary Market” on the cover page and pages P-2 and P-3 of this pricing supplement and the terms appearing under the caption “General Terms of the Notes” in the product prospectus supplement dated January 8, 2016, as modified by this pricing supplement.

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#### ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated January 8, 2016, as supplemented by the prospectus supplement dated January 8, 2016 and the product prospectus supplement dated January 8, 2016, relating to our Senior Global Medium-Term Notes, Series G, of which these Notes are a part. Capitalized terms used but not defined in this pricing supplement will have the meanings given to them in the product prospectus supplement. In the event of any conflict, this pricing supplement will control. The Notes vary from the terms described in the product prospectus supplement in several important ways. You should read this pricing supplement carefully.

This pricing supplement, together with the documents listed below, contains the terms of the Notes and supersedes all prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the prospectus supplement dated January 8, 2016 and in the product prospectus supplement dated January 8, 2016, as the Notes involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisors before you invest in the Notes. You may access these documents on the Securities and Exchange Commission (the “SEC”) website at [www.sec.gov](http://www.sec.gov) as follows (or if that address has changed, by reviewing our filings for the relevant date on the SEC website):

Prospectus dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008810/j18160424b3.htm>

Prospectus Supplement dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008811/p14150424b3.htm>

Product Prospectus Supplement dated January 8, 2016:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036116047446/form424b5.htm>

Our Central Index Key, or CIK, on the SEC website is 1000275. As used in this pricing supplement, “we,” “us,” or “our” refers to Royal Bank of Canada.

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#### HYPOTHETICAL EXAMPLES

The table set out below is included for illustration purposes only. The table illustrates the Payment at Maturity of the Notes (including the final Contingent Coupon, if payable) for a hypothetical range of performance for the Lesser Performing Reference Stock, assuming the following terms and that the Notes are not called prior to maturity:

Hypothetical Initial Stock Price:	\$100.00*
Hypothetical Trigger Price and Coupon Barrier:	\$70.00, which is 70.00% of the hypothetical Initial Stock Price
Contingent Coupon Rate:	8.65% per annum (or 2.1625% per quarter)
Contingent Coupon Amount:	\$21.625 per quarter
Observation Dates:	Quarterly
Principal Amount:	\$1,000 per Note

\* The hypothetical Initial Stock Price of \$100 used in the examples below has been chosen for illustrative purposes only and does not represent the actual Initial Stock Price of any Reference Stock. The actual Initial Stock Price for each Reference Stock is set forth on the cover page of this pricing supplement. We make no representation or warranty as to which of the Reference Stocks will be the Lesser Performing Reference Stock. It is possible that the Final Stock Price of each Reference Stock will be less than its Initial Stock Price.

Hypothetical Final Stock Prices are shown in the first column on the left. The second column shows the Payment at Maturity for a range of Final Stock Prices on the Valuation Date. The third column shows the amount of cash to be paid on the Notes per \$1,000 in principal amount. If the Notes are called prior to maturity, the hypothetical examples below will not be relevant, and you will receive on the applicable Coupon Payment Date, for each \$1,000 principal amount, \$1,000 plus the Contingent Coupon otherwise due on the Notes.

Hypothetical Final Stock Price of the Lesser Performing Reference Stock	Payment at Maturity as Percentage of Principal Amount	Cash Payment Amount per \$1,000 in Principal Amount
\$150.00	102.1625%*	\$1,021.625*
\$140.00	102.1625%*	\$1,021.625*
\$125.00	102.1625%*	\$1,021.625*
\$120.00	102.1625%*	\$1,021.625*
\$110.00	102.1625%*	\$1,021.625*
\$100.00	102.1625%*	\$1,021.625*
\$90.00	102.1625%*	\$1,021.625*
\$80.00	102.1625%*	\$1,021.625*
\$70.00	102.1625%*	\$1,021.625*
\$69.99	69.99%	\$699.90
\$60.00	60.00%	\$600.00
\$50.00	50.00%	\$500.00
\$40.00	40.00%	\$400.00



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\$30.00	30.00%	\$300.00
\$20.00	20.00%	\$200.00
\$10.00	10.00%	\$100.00
\$0.00	0%	\$0.00

\*Including the final Contingent Coupon, if payable.

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#### Hypothetical Examples of Amounts Payable at Maturity

The following hypothetical examples illustrate how the payments at maturity set forth in the table above are calculated, assuming the Notes have not been called.

Example 1: The price of the Lesser Performing Reference Stock increases by 25% from the Initial Stock Price of \$100.00 to its Final Stock Price of \$125.00. Because the Final Stock Price of the Lesser Performing Reference Stock is greater than its Trigger Price and Coupon Barrier of \$70.00, the investor receives at maturity, in addition to the final Contingent Coupon of \$21.625 otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 25% appreciation in the price of the Lesser Performing Reference Stock.

Example 2: The price of the Lesser Performing Reference Stock decreases by 10% from the Initial Stock Price of \$100.00 to its Final Stock Price of \$90.00. Because the Final Stock Price of the Lesser Performing Reference Stock is greater than its Trigger Price and Coupon Barrier of \$70.00, the investor receives at maturity, in addition to the final Contingent Coupon of \$21.625 otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 10% decline in the price of the Lesser Performing Reference Stock.

Example 3: The price of the Lesser Performing Reference Stock is \$50.00 on the Valuation Date, which is less than its Trigger Price and Coupon Barrier of \$70.00. Because the Final Stock Price of the Lesser Performing Reference Stock is less than its Trigger Price and Coupon Barrier of \$70.00, the final Contingent Coupon will not be payable on the Maturity Date, and we will pay only \$500.00 for each \$1,000 in the principal amount of the Notes, calculated as follows:

Principal Amount + (Principal Amount x Reference Stock Return of the Lesser Performing Reference Stock)  
= \$1,000 + (\$1,000 x -50.00%) = \$1,000 - \$500.00 = \$500.00

\* \* \*

The Payments at Maturity shown above are entirely hypothetical; they are based on prices of the Reference Stocks that may not be achieved on the Valuation Date and on assumptions that may prove to be erroneous. The actual market value of your Notes on the Maturity Date or at any other time, including any time you may wish to sell your Notes, may bear little relation to the hypothetical Payments at Maturity shown above, and those amounts should not be viewed as an indication of the financial return on an investment in the Notes or on an investment in the securities included in any Reference Stock.

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#### SELECTED RISK CONSIDERATIONS

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the Reference Stocks. These risks are explained in more detail in the section “Risk Factors” in the product prospectus supplement. In addition to the risks described in the prospectus supplement and the product prospectus supplement, you should consider the following:

**Principal at Risk** — Investors in the Notes could lose all or a substantial portion of their principal amount if there is a decline in the trading price of the Lesser Performing Reference Stock between the Trade Date and the Valuation Date. If the Notes are not called and the Final Stock Price of the Lesser Performing Reference Stock on the Valuation Date is less than its Trigger Price, the amount of cash that you receive at maturity will represent a loss of your principal that is proportionate to the decline in the closing price of the Lesser Performing Reference Stock from the Trade Date to the Valuation Date. Any Contingent Coupons received on the Notes prior to the Maturity Date may not be sufficient to compensate for any such loss.

**The Notes Are Subject to an Issuer Call** — We may call the Notes at our discretion on any Coupon Payment Date beginning in July 2019. If the Notes are called, then, on the applicable Call Settlement Date, for each \$1,000 in principal amount, you will receive \$1,000 plus the Contingent Coupon otherwise due on the applicable Call Settlement Date. You will not receive any Contingent Coupons after the Call Settlement Date. You may be unable to reinvest your proceeds from the call in an investment with a return that is as high as the return on the Notes would have been if they had not been called. We are more likely to call the Notes if we anticipate that the yield on the Notes will exceed that payable on our conventional debt securities.

**You May Not Receive Any Contingent Coupons** — We will not necessarily make any coupon payments on the Notes. If the closing price of either of the Reference Stocks on an Observation Date is less than its Coupon Barrier, we will not pay you the Contingent Coupon applicable to that Observation Date. If the closing price of either of the Reference Stocks is less than its Coupon Barrier on each of the Observation Dates and on the Valuation Date, we will not pay you any Contingent Coupons during the term of, and you will not receive a positive return on your Notes. Generally, this non-payment of the Contingent Coupon coincides with a period of greater risk of principal loss on your Notes. Accordingly, if we do not pay the Contingent Coupon on the Maturity Date, you will also incur a loss of principal, because the Final Stock Price of the Lesser Performing Reference Stock will be less than its Trigger Price. **The Notes Are Linked to the Lesser Performing Reference Stock, Even if the Other Reference Stock Performs Better** — If either of the Reference Stocks has a Final Stock Price that is less than its Trigger Price, your return will be linked to the lesser performing of the two Reference Stocks. Even if the Final Stock Price of the other Reference Stock has increased compared to its Initial Stock Price, or has experienced a decrease that is less than that of the Lesser Performing Reference Stock, your return will only be determined by reference to the performance of the Lesser Performing Reference Stock, regardless of the performance of the other Reference Stock.

**Your Payment on the Notes Will Be Determined by Reference to Each Reference Stock Individually, Not to a Basket, and the Payment at Maturity Will Be Based on the Performance of the Lesser Performing Reference Stock** — The Payment at Maturity will be determined only by reference to the performance of the Lesser Performing Reference Stock, regardless of the performance of the other Reference Stock. The Notes are not linked to a weighted basket, in which the risk may be mitigated and diversified among each of the basket components. For example, in the case of notes linked to a weighted basket, the return would depend on the weighted aggregate performance of the basket components reflected as the basket return. As a result, the depreciation of one basket component could be mitigated by the appreciation of the other basket component, as scaled by the weighting of that basket component. However, in the case of the Notes, the individual performance of each of the Reference Stocks would not be

combined, and the depreciation of one Reference Stock would not be mitigated by any appreciation of the other Reference Stock. Instead, your return will depend solely on the Final Stock Price of the Lesser Performing Reference Stock.

**The Call Feature and the Contingent Coupon Feature Limit Your Potential Return** — The return potential of the Notes is limited to the pre-specified Contingent Coupon Rate, regardless of the appreciation of the Reference Stocks. In addition, the total return on the Notes will vary based on the number of Observation Dates on which the Contingent Coupon becomes payable prior to maturity or an issuer call. Further, if the Notes are called due to the Call Feature, you

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will not receive any Contingent Coupons or any other payment in respect of any Observation Dates after the applicable Call Settlement Date. Since the Notes could be called as early as July 2019, the total return on the Notes could be limited to 18 months. If the Notes are not called, you may be subject to the full downside performance of the Lesser Performing Reference Stock even though your potential return is limited to the Contingent Coupon Rate. As a result, the return on an investment in the Notes could be less than the return on a direct investment in the Reference Stocks.

**Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — The return that you will receive on the Notes, which could be negative, may be less than the return you could earn on other investments. Even if your return is positive, your return may be less than the return you would earn if you bought a conventional senior interest bearing debt security of Royal Bank.

**Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes** — The Notes are our senior unsecured debt securities. As a result, your receipt of any Contingent Coupons, if payable, and the amount due on any relevant payment date is dependent upon our ability to repay its obligations on the applicable payment dates. This will be the case even if the prices of the Reference Stocks increase after the Trade Date. No assurance can be given as to what our financial condition will be during the term of the Notes.

**There May Not Be an Active Trading Market for the Notes-Sales in the Secondary Market May Result in Significant Losses** — There may be little or no secondary market for the Notes. The Notes will not be listed on any securities exchange. RBCCM and our other affiliates may make a market for the Notes; however, they are not required to do so. RBCCM or any other affiliate of ours may stop any market-making activities at any time. Even if a secondary market for the Notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your Notes in any secondary market could be substantial.

**The Initial Estimated Value of the Notes Is Less than the Price to the Public** — The initial estimated value set forth on the cover page of this pricing supplement does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the Notes in any secondary market (if any exists) at any time. If you attempt to sell the Notes prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the prices of the Reference Stocks, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and the estimated costs relating to our hedging of the Notes. These factors, together with various credit, market and economic factors over the term of the Notes, are expected to reduce the price at which you may be able to sell the Notes in any secondary market and will affect the value of the Notes in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Notes prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the underwriting discount and the hedging costs relating to the Notes. In addition to bid-ask spreads, the value of the Notes determined by RBCCM for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the Notes and determine the initial estimated value. As a result, the secondary price will be less than if the internal funding rate was used. The Notes are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Notes to maturity.

**The Initial Estimated Value of the Notes on the Cover Page of this Pricing Supplement Is an Estimate Only, Calculated as of the Time the Terms of the Notes Were Set** — The initial estimated value of the Notes is based on the value of our obligation to make the payments on the Notes, together with the mid-market value of the derivative

embedded in the terms of the Notes. See “Structuring the Notes” below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Notes. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Notes or similar securities at a price that is significantly different than we do. The value of the Notes at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Notes in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Notes.

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**Market Disruption Events and Adjustments** — The payment at maturity, each Observation Date and the Valuation Date are subject to adjustment as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see “General Terms of the Notes—Market Disruption Events” in the product prospectus supplement.

**Our Business Activities May Create Conflicts of Interest** — We and our affiliates expect to engage in trading activities related to the securities included in or represented by the Reference Stocks that are not for the account of holders of the Notes or on their behalf. These trading activities may present a conflict between the holders’ interests in the Notes and the interests we and our affiliates will have in their proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for their customers and in accounts under their management. These trading activities, if they influence the share price or prices, as applicable, of the Reference Stocks, could be adverse to the interests of the holders of the Notes. We and one or more of our affiliates may, at present or in the future, engage in business with the securities included in or represented by the Reference Stocks, including making loans to or providing advisory services. These services could include investment banking and merger and acquisition advisory services. These activities may present a conflict between our or one or more of our affiliates’ obligations and your interests as a holder of the Notes. Moreover, we, and our affiliates may have published, and in the future expect to publish, research reports with respect to the Reference Stocks or securities included in or represented by the Reference Stocks. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding the Notes. Any of these activities by us or one or more of our affiliates may affect the share price or prices, as applicable, of the Reference Stocks, and, therefore, the market value of the Notes.

**Owning the Notes Is Not the Same as Owning the Securities Represented by the Reference Stocks** — The return on your Notes is unlikely to reflect the return you would realize if you actually owned shares of the Reference Stocks or the securities represented by the Reference Stocks. For instance, you will not receive or be entitled to receive any dividend payments or other distributions on these securities during the term of your Notes. As an owner of the Notes, you will not have voting rights or any other rights that holders of these securities may have. Furthermore, the Reference Stocks may appreciate substantially during the term of the Notes, while your potential return will be limited to the applicable Contingent Coupon payments.

**You Must Rely on Your Own Evaluation of the Merits of an Investment Linked to the Reference Stocks** — In the ordinary course of their business, our affiliates may have expressed views on expected movement in the Reference Stocks or the equity securities that they represent, and may do so in the future. These views or reports may be communicated to our clients and clients of our affiliates. However, these views are subject to change from time to time. Moreover, other professionals who transact business in markets relating to any Reference Stock may at any time have significantly different views from those of our affiliates. For these reasons, you are encouraged to derive information concerning the Reference Stocks from multiple sources, and you should not rely solely on views expressed by our affiliates.

**Each Reference Stock and its Underlying Index Are Different** — The performance of each Reference Stock may not exactly replicate the performance of its underlying index, because each Reference Stock will reflect transaction costs and fees that are not included in the calculation of its underlying index. It is also possible that the performance of the each Reference Stock may not fully replicate or may in certain circumstances diverge significantly from the performance of its underlying index due to the temporary unavailability of certain securities in the secondary market, the performance of any derivative instruments contained in such Reference Stock or due to other circumstances. Each Reference Stock may use futures contracts, options, swap agreements, currency forwards and repurchase agreements

in seeking performance that corresponds to its underlying index and in managing cash flows. During periods of market volatility, securities underlying each Reference Stock may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of a Reference Stock and the liquidity of a Reference Stock may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of a Reference Stock. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of a Reference Stock. As a result, under these circumstances, the market value of shares of such Reference Stock may vary substantially from the net asset value per share of such Reference Stock. For all of the foregoing reasons, the

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performance of each Reference Stock may not correlate with the performance of its underlying index as well as the net asset value per share of such Reference Stock, which could materially and adversely affect the value of the Notes in the secondary market and/or reduce your payment at maturity.

**Management Risk** — The Reference Stocks are not managed according to traditional methods of “active” investment management, which involve the buying and selling of securities based on economic, financial and market analysis and investment judgment. Instead, each Reference Stock, utilizing a “passive” or indexing investment approach, attempts to approximate the investment performance of its underlying index by investing in a portfolio of securities that generally replicate its underlying index. Therefore, unless a specific security is removed from its underlying index, the Reference Stock generally would not sell a security because the security’s issuer was in financial trouble. In addition, each Reference Stock is subject to the risk that the investment strategy of its investment advisor may not produce the intended results.

**The Policies of the Reference Stocks’ Investment Adviser Could Affect the Amount Payable on the Notes and Their Market Value** — The policies of the Reference Stocks’ investment adviser concerning the management of the Reference Stocks, additions, deletions or substitutions of the securities held by the Reference Stocks could affect the market price of shares of the Reference Stocks and, therefore, the amount payable on the Notes on the maturity date and the market value of the Notes before that date. The amount payable on the Notes and their market value could also be affected if the Reference Stocks’ investment adviser changes these policies, for example, by changing the manner in which it manages the Reference Stocks, or if the Reference Stocks’ investment adviser discontinues or suspends maintenance of the Reference Stocks, in which case it may become difficult to determine the market value of the Notes. The Reference Stocks’ investment advisers have no connection to the offering of the Notes and have no obligations to you as an investor in the Notes in making its decisions regarding the Reference Stocks.

**Changes that Affect Each Underlying Index Will Affect the Market Value of the Notes and the Payments on the Notes** — The policies of the applicable index sponsor for each underlying index, concerning the calculation of each underlying index, additions, deletions or substitutions of the components of each underlying index and the manner in which changes affecting those components, such as stock dividends, reorganizations or mergers, may be reflected in each underlying index and, therefore, could affect the share price of the Reference Stocks, the amounts payable on the Notes, and the market value of the Notes prior to maturity. The amount payable on the Notes and their market value could also be affected if the relevant sponsors change these policies, for example, by changing the manner in which it calculates the applicable index, or if such sponsor discontinues or suspends the calculation or publication of an index.

**The Securities Composing the Underlying Index of the XBI Are Concentrated in One Sector** — All of the securities included in the XBI are issued by companies in a single sector, namely, biotechnology. As a result, the securities that will determine the performance of this Reference Stock and the level of its underlying index, which this Reference Stock seeks to replicate, are concentrated in one sector. Although an investment in the Notes will not give holders any ownership or other direct interests in the securities composing an underlying index, the return on an investment in the Notes will be subject to certain risks associated with a direct equity investment in companies in this market sector. Accordingly, by investing in the Notes, you will not necessarily benefit from the diversification which could result from an investment linked to companies that operate in multiple sectors.

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#### INFORMATION REGARDING THE REFERENCE STOCKS

Information provided to or filed with the SEC by the Reference Stocks under the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers (i) 333-57793 and 811-08839 for the XBI and (ii) 033-46080 and 811-06125 for the SPY through the SEC's website at <http://www.sec.gov>. In addition, information may be obtained from other sources including, but not limited to, press releases, newspaper articles and other publicly disseminated documents. We have not participated in the preparation of, or verified, such publicly available information. None of the forgoing documents or filings are incorporated by reference in, and should not be considered part of, this document.

The following information regarding the Reference Stocks is derived from publicly available information.

We have not independently verified the accuracy or completeness of reports filed by the Reference Stocks with the SEC, information published by them on their websites or in any other format, information about them obtained from any other source or the information provided below.

The Notes are not sponsored, endorsed, sold or promoted by the applicable investment adviser. The investment adviser makes no representations or warranties to the owners of the Notes or any member of the public regarding the advisability of investing in the Notes. The investment adviser has no obligation or liability in connection with the operation, marketing, trading or sale of the Notes.

We obtained the information regarding the historical performance of each Reference Stock set forth below from Bloomberg Financial Markets.

The SPDR® S&P® Biotech ETF (“XBI”)

The XBI seeks to provide investment results that correspond generally to the price and yield performance, before fees and expenses, of the S&P® Biotechnology Select Industry® Index (the “underlying index”). The underlying index represents the biotechnology sub-industry portion of the Standard & Poor's (“S&P”) Total Market Index (“S&P TMI”), an index that measures the performance of the U.S. equity market. The XBI is composed of companies that are in the biotechnology sector. The XBI trades on NYSE Arca under the ticker symbol “XBI.”

The XBI utilizes a “replication” investment approach in attempting to track the performance of the underlying index. The XBI typically invests in substantially all of the securities which comprise the underlying index in approximately the same proportions as the underlying index. The XBI will normally invest at least 80% of its total assets in the common stocks that comprise the underlying index.

The S&P® Biotechnology Select Industry® Index

The underlying index is an equal-weighted index that is designed to measure the performance of the biotechnology sub-industry portion of the S&P TMI. The S&P TMI includes all U.S. common equities listed on the New York Stock Exchange (the “NYSE”) (including NYSE Arca), the NYSE MKT, the Nasdaq Global Select Market, and the Nasdaq Capital Market. Each of the component stocks in the underlying index is a constituent company within the biotechnology sub-industry portion of the S&P TMI.

To be eligible for inclusion in the underlying index, companies must be in the S&P TMI and must be included in the relevant Global Industry Classification Standard (“GICS”) sub-industry. The GICS was developed to establish a global standard for categorizing companies into sectors and industries. In addition to the above, companies must satisfy one of the two following combined size and liquidity criteria:

- float-adjusted market capitalization above US\$500 million and float-adjusted liquidity ratio above 90%; or
- float-adjusted market capitalization above US\$400 million and float-adjusted liquidity ratio above 150%.

All U.S. companies satisfying these requirements are included in the underlying index. The total number of companies in the underlying index should be at least 35. If there are fewer than 35 stocks, stocks from a supplementary list of highly correlated sub-industries that meet the market capitalization and liquidity thresholds above are included in order of their float-adjusted market capitalization to reach 35 constituents. Minimum market capitalization requirements may be relaxed to ensure there are at least 22 companies in the underlying index as of each rebalancing effective date.

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Eligibility factors include:

**Market Capitalization:** Float-adjusted market capitalization should be at least US\$400 million for inclusion in the underlying index. Existing index components must have a float-adjusted market capitalization of US\$300 million to remain in the underlying index at each rebalancing.

**Liquidity:** The liquidity measurement used is a liquidity ratio, defined as dollar value traded over the previous 12-months divided by the float-adjusted market capitalization as of the underlying index rebalancing reference date. Stocks having a float-adjusted market capitalization above US\$500 million must have a liquidity ratio greater than 90% to be eligible for addition to the underlying index. Stocks having a float-adjusted market capitalization between US\$400 and US\$500 million must have a liquidity ratio greater than 150% to be eligible for addition to the underlying index. Existing index constituents must have a liquidity ratio greater than 50% to remain in the underlying index at the quarterly rebalancing. The length of time to evaluate liquidity is reduced to the available trading period for IPOs or spin-offs that do not have 12 months of trading history.

**Takeover Restrictions:** At the discretion of S&P, constituents with shareholder ownership restrictions defined in company bylaws may be deemed ineligible for inclusion in the underlying index. Ownership restrictions preventing entities from replicating the index weight of a company may be excluded from the eligible universe or removed from the underlying index.

**Turnover:** S&P believes turnover in index membership should be avoided when possible. At times, a company may appear to temporarily violate one or more of the addition criteria. However, the addition criteria are for addition to the underlying index, not for continued membership. As a result, an index constituent that appears to violate the criteria for addition to the underlying index will not be deleted unless ongoing conditions warrant a change in the composition of the underlying index.

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The SPDR® S&P 500® ETF Trust (“SPY”)

The shares of the SPDR® S&P 500® ETF trade on the NYSE Arca under the symbol “SPY.” The SPY’s investment adviser is BlackRock Fund Advisors.

The SPY seeks to provide investment results that correspond generally to the price and yield performance, before fees and expenses, of the S&P 500® Index (the “SPX Index”). To maintain the correspondence between the composition and weightings of stocks held by the SPY and component stocks of the SPX Index, the SPY adjusts its holdings from time to time to conform to periodic changes in the identity and/or relative weightings of the index securities.

The SPY utilizes a “passive” or “indexing” investment approach in attempting to track the performance of the SPX Index. The SPY seeks to invest in substantially all of the securities that comprise the SPX Index. The SPY typically earns income from dividends from securities that it holds. These amounts, net of expenses and taxes (if applicable), are passed along to the SPY’s shareholders as “ordinary income.” In addition, the SPY realizes capital gains or losses whenever it sells securities. Net long-term capital gains are distributed to shareholders as “capital gain distributions.”

S&P 500® Index (“SPX”)

The SPX is intended to provide an indication of the pattern of common stock price movement. The calculation of the level of the SPX is based on the relative value of the aggregate market value of the common stocks of 500 companies as of a particular time compared to the aggregate average market value of the common stocks of 500 similar companies during the base period of the years 1941 through 1943.

S&P calculates the SPX by reference to the prices of the constituent stocks of the SPX without taking account of the value of dividends paid on those stocks. Effective with the September 2015 rebalance, consolidated share class lines will no longer be included in the SPX. Each share class line will be subject to public float and liquidity criteria individually, but the company’s total market capitalization will be used to evaluate each share class line. This may result in one listed share class line of a company being included in the SPX while a second listed share class line of the same company is excluded.

Computation of the SPX

While S&P currently employs the following methodology to calculate the SPX, no assurance can be given that S&P will not modify or change this methodology in a manner that may affect the Payment at Maturity.

Historically, the market value of any component stock of the SPX was calculated as the product of the market price per share and the number of then outstanding shares of such component stock. In March 2005, S&P began shifting the SPX halfway from a market capitalization weighted formula to a float-adjusted formula, before moving the SPX to full float adjustment on September 16, 2005. S&P’s criteria for selecting stocks for the SPX did not change with the shift to float adjustment. However, the adjustment affects each company’s weight in the SPX.

Under float adjustment, the share counts used in calculating the SPX reflect only those shares that are available to investors, not all of a company’s outstanding shares. Float adjustment excludes shares that are closely held by control groups, other publicly traded companies or government agencies.

In September 2012, all shareholdings representing more than 5% of a stock’s outstanding shares, other than holdings by “block owners,” were removed from the float for purposes of calculating the SPX. Generally, these “control holders” will include officers and directors, private equity, venture capital and special equity firms, other publicly traded companies that hold shares for control, strategic partners, holders of restricted shares, ESOPs, employee and family trusts, foundations associated with the company, holders of unlisted share classes of stock, government entities at all levels (other than government retirement/pension funds) and any individual person who controls a 5% or greater stake in a company as reported in regulatory filings. However, holdings by block owners, such as depository banks, pension funds, mutual funds and ETF providers, 401(k) plans of the company, government retirement/pension funds,

investment funds of insurance companies, asset managers and investment funds, independent foundations and savings and investment plans, will ordinarily be considered part of the float.

Treasury stock, stock options equity participation units, warrants, preferred stock, convertible stock, and rights are not part of the float. Shares held in a trust to allow investors in countries outside the country of domicile, such as depository shares and Canadian exchangeable shares are normally part of the float unless those shares form a control block.

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For each stock, an investable weight factor (“IWF”) is calculated by dividing the available float shares by the total shares outstanding. Available float shares are defined as the total shares outstanding less shares held by control holders. This calculation is subject to a 5% minimum threshold for control blocks. For example, if a company’s officers and directors hold 3% of the company’s shares, and no other control group holds 5% of the company’s shares, S&P would assign that company an IWF of 1.00, as no control group meets the 5% threshold. However, if a company’s officers and directors hold 3% of the company’s shares and another control group holds 20% of the company’s shares, S&P would assign an IWF of 0.77, reflecting the fact that 23% of the company’s outstanding shares are considered to be held for control. As of July 31, 2017, companies with multiple share class lines are no longer eligible for inclusion in the SPX. Constituents of the SPX prior to July 31, 2017 with multiple share class lines will be grandfathered in and continue to be included in the SPX. If a constituent company of the SPX reorganizes into a multiple share class line structure, that company will remain in the SPX at the discretion of the S&P Index Committee in order to minimize turnover.

The SPX is calculated using a base-weighted aggregate methodology. The level of the SPX reflects the total market value of all 500 component stocks relative to the base period of the years 1941 through 1943. An indexed number is used to represent the results of this calculation in order to make the level easier to use and track over time. The actual total market value of the component stocks during the base period of the years 1941 through 1943 has been set to an indexed level of 10. This is often indicated by the notation 1941-43 = 10. In practice, the daily calculation of the SPX is computed by dividing the total market value of the component stocks by the “index divisor.” By itself, the index divisor is an arbitrary number. However, in the context of the calculation of the SPX, it serves as a link to the original base period level of the SPX. The index divisor keeps the SPX comparable over time and is the manipulation point for all adjustments to the SPX, which is index maintenance.

#### Index Maintenance

Index maintenance includes monitoring and completing the adjustments for company additions and deletions, share changes, stock splits, stock dividends, and stock price adjustments due to company restructuring or spinoffs. Some corporate actions, such as stock splits and stock dividends, require changes in the common shares outstanding and the stock prices of the companies in the SPX, and do not require index divisor adjustments.

To prevent the level of the SPX from changing due to corporate actions, corporate actions which affect the total market value of the SPX require an index divisor adjustment. By adjusting the index divisor for the change in market value, the level of the SPX remains constant and does not reflect the corporate actions of individual companies in the SPX. Index divisor adjustments are made after the close of trading and after the calculation of the SPX closing level. Changes in a company’s shares outstanding and IWF due to its acquisition of another public company are made as soon as reasonably possible. At S&P’s discretion, de minimis merger and acquisition share changes are accumulated and implemented with the quarterly share rebalancing.

All other changes of less than 5% are accumulated and made quarterly on the third Friday of March, June, September, and December.

Changes in a company’s total shares outstanding of 5% or more due to public offerings are made as soon as reasonably possible. Other changes of 5% or more (for example, due to tender offers, Dutch auctions, voluntary exchange offers, company stock repurchases, private placements, acquisitions of private companies or non-index companies that do not trade on a major exchange, redemptions, exercise of options, warrants, conversion of preferred stock, notes, debt, equity participations, at-the-market stock offerings or other recapitalizations) are made weekly, and are generally announced on Fridays for implementation after the close of trading the following Friday (one week later). If a 5% or more share change causes a company’s IWF to change by five percentage points or more, the IWF is updated at the

same time as the share change. IWF changes resulting from partial tender offers are considered on a case-by-case basis.

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#### HISTORICAL INFORMATION

The graphs below set forth the information relating to the historical performance of the Reference Stocks. In addition, below the graphs are tables setting forth the intra-day high, intra-day low and period-end closing prices of the Reference Stocks. The information provided in these tables is for the period from January 1, 2013 through December 29, 2017.

We obtained the information regarding the historical performance of the Reference Stocks in the graphs and tables below from Bloomberg Financial Markets.

We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets. The historical performance of any Reference Stock should not be taken as an indication of its future performance, and no assurance can be given as to the prices of the Reference Stocks at any time. We cannot give you assurance that the performance of the Reference Stocks will not result in the loss of all or part of your investment.

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#### Historical Information for SPDR® S&P® Biotech ETF (“XBI”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing prices of this Reference Stock. The information provided in the table is for the period from January 1, 2013 through December 29, 2017.

Period-Start Date	Period-End Date	High Intra-Day Price of this Reference Stock (\$)	Low Intra-Day Price of this Reference Stock (\$)	Period-End Closing Price of this Reference Stock (\$)
1/1/2013	3/31/2013	33.58	29.99	33.29
4/1/2013	6/30/2013	37.84	32.13	34.75
7/1/2013	9/30/2013	44.14	35.68	43.05
10/1/2013	12/31/2013	44.11	37.79	43.40
1/1/2014	3/31/2014	57.50	42.70	47.49
4/1/2014	6/30/2014	51.92	38.46	51.35
7/1/2014	9/30/2014	54.64	44.66	51.99
10/1/2014	12/31/2014	63.90	47.28	62.21
1/1/2015	3/31/2015	81.57	60.67	75.17
4/1/2015	6/30/2015	87.20	67.88	84.08
7/1/2015	9/30/2015	91.11	59.16	62.25
10/1/2015	12/31/2015	73.80	60.27	70.08
1/1/2016	3/31/2016	69.11	44.16	51.66
4/1/2016	6/30/2016	59.87	48.98	54.09
7/1/2016	9/30/2016	69.20	53.80	66.29
10/1/2016	12/31/2016	68.16	53.16	59.19
1/1/2017	3/31/2017	72.58	58.67	69.34
4/1/2017	6/30/2017	80.84	66.00	77.18
7/1/2017	9/30/2017	86.68	74.26	86.57
10/1/2017	12/29/2017	88.98	78.46	84.87

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

The graph below illustrates the performance of this Reference Stock from January 1, 2013 to December 29, 2017, reflecting its Initial Stock Price of \$84.87. The red line represents its Coupon Barrier and Trigger Price of \$59.41, which is equal to 70.00% of its Initial Stock Price, rounded to two decimal places.

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#### Historical Information for the SPDR® S&P 500® ETF Trust (“SPY”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing prices of this Reference Stock. The information provided in the table is for the period from January 1, 2013 through December 29, 2017.

Period-Start Date	Period-End Date	High Intra-Day Price of this Reference Stock (\$)	Low Intra-Day Price of this Reference Stock (\$)	Period-End Closing Price of this Reference Stock (\$)
1/1/2013	3/31/2013	156.85	144.73	156.67
4/1/2013	6/30/2013	169.07	153.55	160.42
7/1/2013	9/30/2013	173.60	160.22	168.01
10/1/2013	12/31/2013	184.69	164.53	184.69
1/1/2014	3/31/2014	189.02	173.71	187.01
4/1/2014	6/30/2014	196.60	181.31	195.72
7/1/2014	9/30/2014	201.90	190.55	197.02
10/1/2014	12/31/2014	212.97	181.92	205.54
1/1/2015	3/31/2015	212.24	197.86	206.43
4/1/2015	6/30/2015	213.78	204.51	205.85
7/1/2015	9/30/2015	213.18	182.40	191.63
10/1/2015	12/31/2015	211.66	189.12	203.87
1/1/2016	3/31/2016	206.87	181.02	205.52
4/1/2016	6/30/2016	212.52	198.65	209.48
7/1/2016	9/30/2016	219.60	207.06	216.30
10/1/2016	12/31/2016	228.34	208.38	223.53
1/1/2017	3/31/2017	240.32	223.88	235.74
4/1/2017	6/30/2017	245.01	232.51	241.80
7/1/2017	9/30/2017	251.32	240.34	251.23
10/1/2017	12/29/2017	268.60	251.40	266.86

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

The graph below illustrates the performance of this Reference Stock from January 1, 2013 to December 29, 2017, reflecting its Initial Stock Price of \$266.86. The red line represents its Coupon Barrier and Trigger Price of \$186.80, which is equal to 70.00% of its Initial Stock Price, rounded to two decimal places.

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#### SUPPLEMENTAL DISCUSSION OF U.S. FEDERAL INCOME TAX CONSEQUENCES

The following disclosure supplements, and to the extent inconsistent supersedes, the discussion in the product prospectus supplement dated January 8, 2016 under “Supplemental Discussion of U.S. Federal Income Tax Consequences.”

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2019. Based on our determination that the Notes are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Notes. However, it is possible that the Notes could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Stocks or the Notes, and following such occurrence the Notes could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Stocks or the Notes should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Notes and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

#### SUPPLEMENTAL PLAN OF DISTRIBUTION (CONFLICTS OF INTEREST)

Delivery of the Notes will be made against payment for the Notes on January 4, 2018, which is the third (3<sup>rd</sup>) business day following the Trade Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated January 8, 2016. For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated January 8, 2016.

We will deliver the Notes on a date that is greater than two business days following the Trade Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes more than two business days prior to the original Issue Date will be required to specify alternative arrangements to prevent a failed settlement.

The value of the Notes shown on your account statement may be based on RBCCM’s estimate of the value of the Notes if RBCCM or another of our affiliates were to make a market in the Notes (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Notes in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately three months after the issue date of the Notes, the value of the Notes that may be shown on your account statement may be higher than RBCCM’s estimated value of the Notes at that time. This is because the estimated value of the Notes will not include the underwriting discount and our hedging costs and profits; however, the value of the Notes shown on your account statement during that period may initially be a higher amount, reflecting the addition of RBCCM’s underwriting discount and our estimated costs and profits from hedging the Notes. This excess is expected to decrease over time

until the end of this period. After this period, if RBCCM repurchases your Notes, it expects to do so at prices that reflect their estimated value.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.

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Issuer-Callable Contingent Coupon Barrier  
Notes Linked to the Lesser Performing of  
Two Exchange Traded Funds,  
Due January 4, 2021  
Royal Bank of Canada

#### STRUCTURING THE NOTES

The Notes are our debt securities, the return on which is linked to the performance of the Reference Stocks. As is the case for all of our debt securities, including our structured notes, the economic terms of the Notes reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Notes at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate, is a factor that reduced the initial estimated value of the Notes at the time their terms were set. Unlike the estimated value included in this pricing supplement, any value of the Notes determined for purposes of a secondary market transaction may be based on a different funding rate, which may result in a lower value for the Notes than if our initial internal funding rate were used.

In order to satisfy our payment obligations under the Notes, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our creditworthiness, interest rate movements, the volatility of the Reference Stocks, and the tenor of the Notes. The economic terms of the Notes and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduced the economic terms of the Notes to you. The initial offering price of the Notes also reflects the underwriting commission and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Selected Risk Considerations—The Initial Estimated Value of the Notes Is Less than the Price to the Public” above.

#### VALIDITY OF THE NOTES

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Notes has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Notes have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Notes will be validly issued and, to the extent validity of the Notes is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, and will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Notes or the Indenture which may be limited by applicable law; to insolvency and other laws of general application affecting creditors’ rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee’s authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated January 8, 2016, which has been filed as Exhibit 5.1 to Royal Bank’s Form 6-K filed with the SEC dated January 8, 2016.

In the opinion of Morrison & Foerster LLP, when the Notes have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Notes will be valid, binding and enforceable obligations of Royal Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency and similar laws affecting creditors’ rights generally, concepts of reasonableness and equitable principles of general applicability (including, without limitation, concepts of good faith, fair dealing and the lack of bad faith). This opinion is given as of the date hereof and is limited to the laws of the State of New York.

This opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated January 8, 2016, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated January 8, 2016.

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