

IP- CRC111418

Request for Proposal (RFP)

FOR THE PROVISION OF:

CROWDSOURCED RF SPECTRUM DATA

COMMUNICATION RESEARCH CENTRE

FOR THE

**DEPARTMENT OF INNOVATION, SCIENCE AND ECONOMIC
DEVELOPMENT CANADA**

Note: Please read this request for proposal carefully for further details on the requirements and bid submission instructions.

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PART 1 – GENERAL INFORMATION

1. Introduction

The bid solicitation and resulting contract document is divided into three parts plus appendices as follows:

- Part 1 General Information: includes submission instructions, clauses and conditions applicable to the bid solicitation, and information about the contract authority.
- Part 2 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, if applicable, and the basis of selection;
- Part 3 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

2. Submission of Bids

2.1 Instructions for Submitting a Proposal

Bidders must prepare their proposal in two (2) separately bound sections as follows:

SECTION 1 – TECHNICAL SUBMISSION (1 copy) (with no reference to price)

This section must include your response to the Mandatory Requirements as stated in Appendix C. To be considered responsive, a proposal should also respond to the Mandatory Requirements of this solicitation as Precedent to Contract award. The responses to the mandatory requirements should be included in Section 1 of their technical proposal.

SECTION 2 – FINANCIAL SUBMISSION (1 copy)

This section must include the duly completed and signed Bid and Acceptance Form provided in Appendix B of this RFP.

Note: Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

Your proposal may be submitted by the following delivery methods:

By e-mail: ic.crc-procurement.ic@canada.ca

Proposals must be submitted and received by November 29, 2019 on or before 2:00 p.m. Eastern Standard Time.

3. General Conditions and Clauses

The following terms and conditions will be part and parcel of this RFP and the resulting contract:

All clauses and conditions identified in the Contract are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) issued by Public Works and Government Services Canada (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>).

4. Enquiries – Solicitation Stage

To ensure the integrity of the competitive bid process, enquiries and other communications regarding the RFP, from the issue date of the solicitation up to the closing date, are to be directed ONLY to the Contracting Authority named below. Enquiries and other communications are NOT to be directed to any other government official(s). Failure to comply with this paragraph may (for that reason alone) result in the disqualification of the proposal. Enquiries must be IN WRITING. Enquiries must be received no less than five (5) working days prior to the RFP closing date to allow sufficient time to provide a response. Enquiries received after that time might not be answered prior to the RFP closing date.

5. Management of the Resulting Contract

Contracting Authority	Alternate Contracting Authority
Anne Nino Manager Procurement and Contracting Officer Communications Research Centre Canada Centre de recherches sur les communications Canada 3701 Carling Ave. 3701, avenue Carling PO Box 11490, Station H CP 11490, succursale H Building 2D, édifice 2D, room 136 Ottawa ON K2H 8S2 Ottawa (Ontario) K2H 8S2 (613) 998-1922 Anne.Nino@Canada.ca fax / téléc. (613) 991-4378 Web site / Site web : www.crc.ca Government of Canada Gouvernement du Canada	Gabrielle Pilon Procurement and Contracting Officer Communications Research Centre Canada Centre de recherches sur les communications Canada 3701 Carling Ave. 3701, avenue Carling PO Box 11490, Station H CP 11490, succursale H Building 2D, room 135 édifice 2D, salle 135 Ottawa ON K2H 8S2 Ottawa (Ontario) K2H 8S2 (613) 998-6424 gabrielle.pilon@canada.ca fax / téléc. (613) 991-4378 Site Web/Web site : www.crc.ca Government of Canada Gouvernement du Canada

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

PART 2 – EVALUATION PROCEDURES AND BASIS OF SELECTION

1. Evaluation Procedures

Proposals will be evaluated in two (2) separate steps as follows:

- a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the mandatory requirements;
- b) An evaluation team comprised of representatives of Innovation, Science and Economic Development Canada will evaluate the bid.

Note: Innovation, Science and Economic Development Canada may choose to terminate the evaluation of any proposal upon the first finding of non-compliance with the mandatory requirements.

Innovation, Science and Economic Development Canada reserves the right at its sole discretion to request certification, proof, references, substantiation, or any other information to support and validate the criteria enumerated below. Should the certification, proof, references, substantiation and/or any other information be found unacceptable for any reason as solely determined by Innovation, Science and Economic Development Canada, no further consideration shall be given and the Bidder will be declared non-compliant.

2. Basis of Selection

The proposal that will be selected will have met all the mandatory requirements as laid in Appendix C of the RFP and is expected to meet , and will have the lowest

- a) overall lump sum cost (applicable taxes included).

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract (e.g. labor, materials, tools, equipment and rentals used to perform the work, local travel, travel time, delivery or shipping charges, profit and overhead costs, and any other expenses related to the performance of the work under any resulting contract including sales taxes, other taxes except HST).

Innovation, Science and Economic Development Canada in no way guarantees that a contract will be issued based on this bid process. Due to financial limitations, Innovation, Science and Economic Development Canada reserves the right to terminate this bid process at any time.

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws enforced in Ontario.

PART 3 – RESULTING CONTRACT CLAUSES

1. Statement of Work

The Contractor shall perform and complete the Work as per the statement of work at Appendix A. The Contractor will work off site.

2. Standard Clauses and Conditions

All conditions and clauses identified herein by title, number and date are set out in the [Standard Acquisition Clauses and Conditions](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (SACC) Manual (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>), issued by Public Works Government Services Canada (PWGSC).

Bidders who submit a bid agree to be bound by the instructions, clauses, and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

3. General Conditions

As per PART 1 - General Information, Item 3. - General Conditions and Clauses.

4. Contract Period

The proposed contract is from the date of contract award to March 29, 2019.

5. Contracting Authority

The Contracting Authority for this RFP and any resulting contract is Anne Nino.

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

6. Project Authority

(To be entered at contract award)

7. Contractor's Representative

(To be entered at contract award)

8. Basis of Payment – Limitation of Expenditure

The Bidder offers to Her Majesty the Queen in right of Canada to perform and complete the Work for the above named project in accordance with the Request for Proposal (RFP).

9. Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in the Province of Ontario and the relations between parties will be determined by these laws.

10. Priority of Documents

The documents listed below form part of and are incorporated into this Contract. If there is a discrepancy between the wording of one document and the wording of any other document, which appears on the list, the wording of the document, which first appears on the list, shall prevail over the wording of any document which subsequently appears on the list:

- a) The Contract document including appendices;
- b) General Conditions as per point #3;
- c) Appendix A, Statement of Work;
- d) The supplier proposal dated _____ (to be entered at contract award).

APPENDIX A – STATEMENT OF WORK

1.0 Purpose

The Communications Research Centre (CRC), a branch of the Spectrum and Telecommunications Sector (STS), Department of Innovation, Science and Economic Development Canada (ISED), has a requirement to obtain measurements of mobile phone Radio Frequency (RF) spectrum performance data from across Canada.

2.0 Title of Project

Crowdsourced RF Spectrum Data

3.0 Background

Spectrum Environment Awareness (SEA) is a CRC research program focused on the development and demonstration of techniques for monitoring how wireless spectrum is used in Canada. Wireless spectrum is a limited resource, the demand for which is rapidly increasing. The goal of this research program is to ensure that this limited resource is used effectively and efficiently.

With the widespread adoption of mobile applications and services, the demand for commercial mobile spectrum has been continuously growing. In the absence of spectrum usage or user performance data however, it is difficult for the regulators to quantify the spectrum needs of mobile operators, assess current and future licensing strategies, or tailor new bands for broadband mobile service. To address this knowledge gap, Communications Research Centre Canada (CRC) is researching novel data-driven spectrum management concepts in support of the government's regulatory mandate by leveraging crowdsourced mobile user performance data.

4.0 Project Requirements / Objectives

CRC is seeking to establish a contract by which the SEA research program can increase the size and scope of its RF spectrum monitoring capabilities. As such, the CRC would like to augment the amount and geographical coverage of RF Spectrum data collected via crowdsourcing smartphone applications by buying this data from a commercial entity.

The total expenditures throughout the period of the resulting contract must not exceed \$100,000.00 projected expenditures (tax included).

5.0 Scope of Work

The main requirements for the crowdsourced smartphone radio spectrum data covered under this contract can be summarized as:

- Current and historical Canadian RF spectrum usage, availability, and performance data across common wireless protocols such as 2G, 3G, 4G LTE, and Wi-Fi.

5.1 Timing and Deliverables

The contractor must provide six months of RF spectrum usage, availability, and performance data (electronic format files) from September 1, 2018 to February 28, 2019, collected by crowdsourced smartphones from across Canada, meeting the following requirements:

- a. The contractor must provide RF spectrum data from at least 50,000 unique reporting RF spectrum data-collecting smartphones per month;
- b. The contractor must provide at least 30 million “Category A” samples per month of RF spectrum data from the RF spectrum data-collecting smartphones. Of these samples, at least 10 million must have valid RSRP and RSRQ field values;
- c. The contractor must provide at least 1 million “Category B” samples per month of RF spectrum data from the RF spectrum data-collecting smartphones. These must be separate from the “Category A” samples mentioned above; and
- d. The data provided by the contractor via the RF spectrum data-collecting smartphones must include, at a minimum, the data included in the mandatory data fields listed in Appendix E.

“Category A” samples must contain, at a minimum, all data fields contained in tables 1.1, 1.2, 1.3 and 1.4 in Appendix E.

“Category B” samples must contain, at a minimum, all data fields contained in tables 1.1, 1.2, 1.3, 1.4 and 1.5 in Appendix E.

6.0 Contract and Schedule Changes

The Project Authority is responsible for approving any modifications to the work schedule or to the technical content of the Work.

The Contractor will not implement any changes to the Work in the Contract before the Project Authority has authorized a Change Order. The Change Order will specify the nature of the change, the time frame in which it must be carried out and any additional cost associated to the change.

A copy of the approved Change Order will be provided to the Contractor and to the Project Authority by the Contracting Authority.

7.0 Invoicing and Estimates

Begin work only after receiving a work order or instruction issued by the CRC Project Authority. This work order or instruction, which shall be issued only after the CRC Project Authority and the Contractor have agreed on the cost of work, confirms that the CRC has approved the order. The Contractor must advise CRC Project Authority if the cost of the work will exceed the amount of the work order issued before continuing any work which exceeds the approved order. A revised work order will be issued confirming approval to proceed.

If such approval is not received in writing by the CRC Project Authority confirming the revised work order amount, CRC will not be responsible to pay any amount exceeding the initial cost of work.

8.0 Management of the Project – Roles and Responsibilities

8.1 Project Authority

The Project Authority (or assigned departmental representative) has overall responsibility for the progress of the project, including management, administration and coordination of the activities as set out in this document. The Project Authority (or assigned departmental representative) is responsible for all matters concerning the technical content of the Work under this requirement.

Any proposed changes to the Scope of Work are to be discussed with the Project Authority or his assigned departmental representative.

8.2 Contractor

The Contractor shall establish and maintain, throughout the duration of the contract, a team capable of effectively delivering the services described in this document and in keeping with the Project Schedule.

The Contractor shall deliver the work within the time frame and assigned budget in accordance with the approved plan agreed to by the Project Authority.

8.3 Coordination with CRC

Upon contract award, the Contractor shall:

- a. Carry out services in accordance with this RFP, with directions given by the Project Authority.
- b. Correspond only with the Project Authority at the times and in the manner dictated by the Project Authority. The Contractor shall not communicate with the client department unless so authorized in writing by the Project Authority.
- c. Advise the Project Authority of any changes that may affect schedule or budget or are inconsistent with instructions or written approvals previously given. The Contractor shall detail the extent and reasons for the changes and obtain written approval before proceeding.

9.0 Security

There are no security requirements associated with this requirement.

10.0 Basis for Ownership of Intellectual Property

4006 07 (2008-05-12) License to Intellectual Property Rights to Canada's Information

1. Any information supplied by Canada to the Contractor for the performance of the Work remains the property of Canada. The Contractor must use Canada's Information only to perform the Contract.
2. If the Contractor wants to use any information owned by Canada for the commercial exploitation or further development of the Foreground Information, the Contractor must obtain a license from the department or agency for which the Contract is performed. In its request for a license to that department or agency, the Contractor must explain why the license is required and how the Contractor intends to use the information. If the department or agency agrees to grant a license, conditions will be negotiated between the Contractor and that department or agency and may include the payment of a compensation to Canada.

APPENDIX B – BID AND ACCEPTANCE FORM

Project Title: Crowdsourced RF Spectrum Data

Note: Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

1. Name and Address of the Bidder

Name:
Address:
Telephone:
Fax:
PBN (if applicable):
GST/HST Registration Number:

2. Contact Person for the Purpose of the Proposal (An Authorized Representative of the Bidder)

Name:
Title:
Telephone:
Fax:
Cell:
Email address:

3. Offer

The Bidder offers to Her Majesty the Queen in right of Canada to perform and complete the Work for the above-named project in accordance with the Request for Proposal (RFP) for the Total Lump Sum Cost quoted hereunder.

3.1 Basis of Payment

Bidders must specify below the all-inclusive Lump Sum Cost for the performance of the work under any resulting contract. It is requested that bidders also specify below the applicable HST amount and the Total Lump Sum Cost.

All-inclusive Lump Sum Cost: \$ _____
Applicable HST Amount: \$ _____
TOTAL LUMP SUM COST: \$ _____

For greater certainty, the Bidder agrees that the Total Lump Sum Cost quoted above is inclusive of all costs (e.g. labor, tools, equipment and rentals used to perform the work, local travel, travel time, delivery or shipping charges, photographs, profit and overhead costs, and any other expenses related to the performance of the work under any resulting contract including sales taxes, other taxes except HST)

4. Method of Payment – Resulting Contract

Monthly invoices will be submitted for payment based on value of work done contingent upon Innovation, Science and Economic Development Canada's satisfaction with the Work subject to the Project Authority's approval.

5. Insufficient Funding

In the event that the lowest compliant bid exceeds the amount of funding allocated to the Work, Innovation, Science and Economic Development Canada in its sole discretion may:

- a. cancel the solicitation; or
- b. obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid; and/or
- c. Negotiate a reduction in the bid price and/or scope of work of not more than 25% with the Bidder submitting the lowest compliant bid. Should an agreement satisfactory to Innovation, Science and Economic Development Canada not be reached, Innovation, Science and Economic Development Canada shall exercise option (a) or (b).

6. Bid Validity Period

It is understood that your proposal will remain open for acceptance for a period of not less than sixty (60) days from the closing date of the RFP.

7. Acceptance and Resulting Contract

Upon acceptance of the Bidder's offer by Canada, a Contract shall be awarded to the Contractor. The resulting Contract shall constitute the entire and only agreement between the Parties and supersedes all previous negotiations, communications and other agreements, whether written or oral, unless they are incorporated by reference into the Contract.

8. Period of the Resulting Contract

The proposed contract is from the date of contract award to March 29, 2019.

9. Acknowledgement and Certifications of the Bidder

By submitting a proposal, the Bidder agrees, acknowledges and certifies that:

1. All statements and information specified in their proposal are accurate and factual, and we (the Bidder) are aware that Innovation, Science and Economic Development Canada reserves the right to verify any information provided in this regard and that untrue statements may result in the proposal being declared non-responsive. In the event that the Contractor does not comply with any statement or that it is determined that any statement made by the Contractor in its proposal is untrue, whether made knowingly or unknowingly, the Minister shall have the right, pursuant to the default provisions of the Contract, to terminate the Contract for default.
2. By submitting a formal proposal in response to this RFP, the Bidder's signature indicates acceptance of the terms and conditions applicable to this RFP and any resulting Contract. ISED reserves the right to reject any proposal including any condition proposed by the Bidder that would not be, in the opinion of the Contracting Authority, in Canada's interest.

10. Signature(s)

I declare that I have the authority to bind the Bidder for all applicable purposes under this Bid and Acceptance Form.

(Signature of the authorized representative)

(Print name and title)

(Print company name)

(Date)

APPENDIX C – MANDATORY REQUIREMENTS

Mandatory Requirements (Must be submitted at Proposal Closing Date and Time)

To be considered for responsive, a proposal must respond to the following mandatory requirements of this solicitation as Precedent to Contract award. The responses to the mandatory requirements below should be included in Section 1 of their technical proposal.

	YES	NO
Mandatory Requirements		
1. The interested supplier must prove that it has at least one (1) year of experience in collecting Canadian RF spectrum data using Android and iOS smartphone application(s);		
2. The interested supplier must prove that they can provide current and historical Canadian RF usage, availability, and performance data for 2G, 3G, 4G LTE, and Wi-Fi meeting the requirements below: <ul style="list-style-type: none"> a. The interested supplier must prove that they have had RF spectrum data-collecting software installed and running on at least 50,000 reporting smartphones across Canada in each of the previous three months; b. The interested supplier must prove that they can provide at least 30 million “Category A” samples per month of RF spectrum data from the RF spectrum data-collecting smartphones. Of these samples, at least 10 million must have valid RSRP and RSRQ field values. c. The interested supplier must prove that they can provide at least 1 million “Category B” samples per month of RF spectrum data from the RF spectrum data-collecting smartphones. d. The interested supplier must prove that the data collected by the RF spectrum data-collecting smartphones includes, at a minimum, the mandatory data fields listed in Appendix E. A sample report must be provided to prove this. 		

“Category A” samples must contain, at a minimum, all data fields contained in tables 1.1, 1.2, 1.3 and 1.4 in Appendix E.

“Category B” samples must contain, at a minimum, all data fields contained in tables 1.1, 1.2, 1.3, 1.4 and 1.5 in Appendix E.

APPENDIX D – ADDITIONAL INFORMATION

Bidders must provide the required additional information to be awarded a contract.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's information. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

1.0 Legal Entity and Corporate Name

1. The bidder hereby certifies that it is a (circle one):
 - a. sole proprietorship;
 - b. partnership; or
 - c. corporate entity.
2. It was registered or formed under the laws of _____
3. Controlling interest/ownership (name if applicable) of the organization is held in the country of _____
4. Any resulting Supply Arrangement or Contract may be executed under the following corporate full legal name and at the following place of business:

1.1 Attestation – Former Public Servant

Contracts with former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts with FPS, bidders must provide the information required below.

1.1.1 Definitions

For the purposes of this clause, "former public servant" is any former member of a department as defined in the *Financial Administration Act*, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a. an individual;
- b. an individual who has incorporated;
- c. a partnership made of former public servants; or
- d. A sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"Lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"Pension" means, a pension or annual allowance paid under the *Public Service Superannuation Act* (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the *Supplementary Retirement Benefits Act*, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the *Canadian Forces Superannuation Act*, R.S., 1985, c.C-17, the *Defence Services Pension Continuation Act*, 1970, c.D-3, the *Royal Canadian Mounted Police Pension Continuation Act*, 1970, c.R-10, and the *Royal Canadian Mounted Police Superannuation Act*, R.S., 1985, c.R-11, the *Members of Parliament Retiring Allowances Act*, R.S., 1985, c.M-5, and that portion of pension payable to the *Canada Pension Plan Act*, R.S., 1985, c.C-8.

1.1.2 Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes () No ()**

If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

- a. name of former public servant;
- b. Date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2012-2](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

1.1.3 Work Force Reduction Program

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of a work force reduction program? **Yes () No ()**

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;
- g. Number and amount (professional fees) of other contracts subject to the restrictions of a work force reduction program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

2.0 Attestation

By submitting a bid, the Bidder certifies that the information submitted by the Bidder in response to the above requirements is accurate and complete.

ATTESTATION SIGNATURE

We hereby certify compliance with the above noted certification requirements for:

- A. FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY – BID CERTIFICATION;
- B. LEGAL ENTITY AND CORPORATE NAME;
- C. CODE OF CONDUCT FOR PROCUREMENT;
- D. ATTESTATION – FORMER PUBLIC SERVANT.

SIGNATURE

Name and title of person authorized to sign on behalf of Bidder (Type or print)

Signature

Date

APPENDIX E – DATA PARAMETER REQUIREMENTS

1. Android & iOS Mandatory Data Fields

1.1 Device Information

Name	Description	Android	iOS
UID	Unique ID	Required	Required
Manufacturer	Device manufacturer	Required	Required
Manufacturer Market Name	Common (user-friendly) name of device manufacturer	If available	If available
Model	Device model	Required	Required
Model Market Name	Common (user-friendly) name of device model	If available	If available
Operating System	Name and version of the device operating system	Required	Required
Operating System Market Name	Common (user-friendly) name and version of the device operating system	If available	If available
Language	Preferred device language	Required	Required
Locale	Device locale country code (number, time, and currency formatting)	Required	Required
Screen Width	Device screen width in pixels	Required	Required
Screen Height	Device screen height in pixels	Required	Required
Total Storage	Total available storage of the device	Required	Required
Used Storage	Used storage of the device	Required	Required
Free Storage	Free storage of the device	Required	Required
Total Memory	Total available memory of the device	Required	Required
Used Memory	Used memory of the device	Required	Required
Free Memory	Free memory of the device	Required	Required
CPU Utilization	Current CPU utilization of the device	Required	Required
Battery Level	Battery level of the device	Required	Required
Battery State	State of the device battery (e.g. charging, unplugged)	Required	Required
System Uptime	Amount of time elapsed since the last boot of the device	Required	Required
Speed	Current speed of the device	Required	Required
Bearing	Current bearing of the device	Required	Required
Mobile Country Code	MCC of the current device SIM mobile base station	Required	Required
Mobile Network Code	MNC of the current device SIM mobile base station	Required	Required
Service Provider	Current device SIM service provider	Required	Required
Service Provider Market Name	Common (user-friendly) name of the current device SIM service provider	If available	If available
Code Version	Version of the custom code used to capture these data fields	Required	Required

1.2 Connection Information

Name	Description	Android	iOS
Start Time	UTC timestamp of the connection start time	Required	Required
End Time	UTC timestamp of the connection end time	Required	Required
Time Zone	Time zone of the device during connection	Required	Required
Connection Type	Type of current data connection (e.g. Wi-Fi, Commercial Mobile)	Required	Required
Mobile Technology	Commercial mobile technology of the current connection (e.g. GSM, CDMA)	Required	Required
Mobile Generation	Commercial mobile generation of the current connection (e.g. 2G, 3G, 4G)	Required	Required
Mobile Country Code	MCC of the connected mobile base station	Required	Required
Mobile Network Code	MNC of the connected mobile base station	Required	Required
Location Area Code	LAC of the connected mobile base station	Required	If available
Cell ID	Cell ID of the connected mobile base station	Required	If available
Service Provider	Connected mobile service provider	Required	Required
Service Provider Market Name	Common (user-friendly) name of the connected mobile service provider	If available	If available
Mobile Channel	Connected mobile EARFCN (or equivalent, depending on technology)	Required	If available
Base Station Identity Code	BSIC of the connected mobile base station (GSM)	Required	If available
Physical Cell ID	Physical cell ID of the connected mobile base station (LTE)	Required	If available
BSSID	BSSID of the connected Wi-Fi access point	Required	Required
SSID	SSID of the connected Wi-Fi access point	Required	Required
Wi-Fi Frequency	Wi-Fi frequency of the connected Wi-Fi access point	Required	If available

1.3 Location Information

Name	Description	Android	iOS
Latitude	Latitude of the device	Required	Required
Longitude	Longitude of the device	Required	Required
Altitude	Altitude of the device	Required	Required
Horizontal Accuracy	Accuracy of the device latitude and longitude	Required	Required
Vertical Accuracy	Accuracy of the device altitude	Required	Required
Country	Country of the device based on location	Required	Required
Region (State/Province)	Region of the device based on location (e.g. Ontario)	Required	Required
City	City of the device based on location	Required	Required

1.4 LTE Signal Information

Name	Description	Android	iOS
RSRP	RSRP of the LTE connection of the device	Required	If available
RSRQ	RSRQ of the LTE connection of the device	Required	If available
RSSNR	RSSNR of the LTE connection of the device	Required	If available
Channel Quality Indicator	CQI of the LTE connection of the device	Required	If available
Timing Advance	TA of the LTE connection of the device	Required	If available

1.5 Speed Test Information

Name	Description	Android	iOS
Timestamp	UTC timestamp of the measurement time	Required	Required
Upload Speed	Measured upload speed of the current wireless connection	Required	Required
Upload Size	Size of the file used in the upload test	Required	Required
Upload Server	Hostname and IP of the server used in the upload test	Required	Required
Download Speed	Measured download speed of the current wireless connection	Required	Required
Download Size	Size of the file used in the download test	Required	Required
Download Server	Hostname and IP of the server used in the download test	Required	Required
Latency	Measured latency of the current wireless connection	Required	Required
Jitter	Measured jitter of the current wireless connection	Required	Required
Packet Loss	Measured packet loss of the current wireless connection	Required	Required
Test Server	Hostname and IP of the server used in the test for latency, jitter, and packet loss	Required	Required
Link Speed	Wi-Fi link speed of the connected Wi-Fi access point (theoretical max).	Required	If available
Signal Strength	Wireless signal strength of the current wireless connection in dBm	Required	If available

2. Samples and Categories

A “sample” is a row of collected RF spectrum data that contains the data fields listed in section 1 of this appendix. A sample can be one of two categories: Category A or Category B.

A “Category A” sample must contain all of the data fields listed in sections 1.1, 1.2, 1.3, and 1.4 of this appendix.

A “Category B” sample must contain all of the data fields listed in sections 1.1, 1.2, 1.3, 1.4, and 1.5 of this appendix.

3. Additional Information

All of the data fields listed in section 1 of this appendix must meet the following requirements:

- a) the data field must be collected to the best of the contractor’s ability, barring any cases where the field is clearly not applicable, and
- b) the data field must match the corresponding description.

“To the best of the contractor’s ability” means that the contractor has taken proper measures to ensure the accuracy and validity of the data within Android / iOS limitations.

“Cases where the field is clearly not applicable” are samples in which the type of connection is incompatible with the data field (e.g. an LTE connection does not have a corresponding Wi-Fi frequency).

A “required” data field must be provided to CRC as a part of 5.1 Appendix A.

An “if available” data field can be provided to CRC as a part of 5.1 Appendix A.

Additional relevant data fields can be provided to CRC as a part of 5.1 Appendix A.