



**RETURN BIDS TO:  
RETOURNER LES SOUMISSIONS À:**

**Bid Receiving - PWGSC / Réception des  
soumissions - TPSGC**  
**11 Laurier St. / 11, rue Laurier**  
**Place du Portage, Phase III**  
**Core 0B2 / Noyau 0B2**  
**Gatineau, Québec K1A 0S5**  
**Bid Fax: (819) 997-9776**

**REQUEST FOR PROPOSAL  
DEMANDE DE PROPOSITION**

**Proposal To: Public Works and Government  
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services  
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

**Comments - Commentaires**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

Electrical & Electronics Products Division  
11 Laurier St./11, rue Laurier  
7B3, Place du Portage, Phase III  
Gatineau, Québec K1A 0S5

<b>Title - Sujet</b> Harmonic Filter Bank	
<b>Solicitation No. - N° de l'invitation</b> W7714-176252/A	<b>Date</b> 2017-02-21
<b>Client Reference No. - N° de référence du client</b> W7714-176252	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$\$HN-336-72520	
<b>File No. - N° de dossier</b> hn336.W7714-176252	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2017-03-13</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Eastern Standard Time EST
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Bisson, Phillipe	<b>Buyer Id - Id de l'acheteur</b> hn336
<b>Telephone No. - N° de téléphone</b> (873) 469-3345 ( )	<b>FAX No. - N° de FAX</b> ( ) -
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF NATIONAL DEFENCE BLDG 29 RECEIVING 3701 CARLING AVE OTTAWA Ontario K1A0Z4 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b> See Herein	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

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## **PART 1 - GENERAL INFORMATION**

### **1.1 Security Requirements**

There is no security requirement associated with the requirement.

### **1.2 Statement of Requirements**

The contractor must provide the goods in accordance with the technical requirements stated at Annex A – Statement of Requirements.

#### **1.2.1 Delivery Requirement**

Delivery is requested to be completed by March 30, 2018.

### **1.3 Debriefings**

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

### **1.4 Trade Agreements**

The requirement is subject to the provisions the Agreement on Internal Trade (AIT).

## PART 2 - BIDDER INSTRUCTIONS

### 2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/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.

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.

The [2003](#) (2016-04-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Subsection 5.4 of [2003](#), Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days

Insert: 90 days

#### 2.1.1 SACC Manual Clauses

SACC Reference	Section	Date
<a href="#">A9033T</a>	Financial Capability	2012-07-16
<a href="#">B1000T</a>	Condition of Material	2014-06-26

### 2.2 Submission of Bids

Bids must be submitted ONLY TO THE BID RECEIVING UNIT by the date, time and place indicated on page 1 of the bid solicitation. Do not send proposal directly to the Contracting Officer. Email proposal not accepted.

PWGSC Bids Receiving Unit  
11 Laurier Street  
Place du Portage, Phase 3, Core 0B2  
Gatineau, Québec, K1A 0S5  
Tel.: 819-956-3366  
Fax: 819-997-9776

### 2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

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## **2.4 Applicable Laws**

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

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

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## **PART 3 - BID PREPARATION INSTRUCTIONS**

### **3.1 Bid Preparation Instructions**

Canada requests that Bidders provide their bid in separately bound sections as follows:

Section I: Technical Bid (1 hard copy)  
Section II: Financial Bid (1 hard copy)  
Section III: Certifications (1 hard copy)

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

Canada requests that Bidders follow the format instructions described below in the preparation of their bid:

- (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (b) use a numbering system that corresponds to the bid solicitation.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, Bidders should:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

#### **Section I: Technical Bid**

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

#### **Section II: Financial Bid**

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Applicable Taxes must be shown separately.

#### **3.1.2 Pricing - Multi-Item Bid Solicitation**

Bidders must quote a price for every item in the bid solicitation in order to be evaluated. Bidders may withdraw their entire bid after bid closing but prior to contract award by advising in writing the Contracting Authority.

##### **3.1.2.1 Exchange Rate Fluctuation**

The requirement does not offer exchange rate fluctuation risk mitigation. Requests for exchange rate fluctuation risk mitigation will not be considered. All bids including such provision will render the bid non-responsive.

#### **Section III: Certifications**

Bidders must submit the certifications required under Part 5.

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**Section IV: Additional Information**

**3.1.3 Delivery Offered**

While delivery is requested as indicated above, the best delivery that could be offered is\_\_\_\_\_.

## **PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION**

**You are reminded that this solicitation requires the compliance and/or completion of requirements attached as an Annex and forming part of this document.**

### **4.1 Evaluation Procedures**

- a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### **4.1.1 Technical Evaluation**

All bids must be completed in full and provide all of the information requested in the bid solicitation to enable full and complete evaluation.

##### **4.1.1.1 Mandatory Technical Criteria**

The following Mandatory requirements must be submitted with the bid for evaluation

- Technical compliance herein;

#### **4.1.2 Financial Evaluation**

##### **4.1.2.1 Pricing Basis**

The bidder must quote firm unit prices in Canadian dollars, DDP Delivered Duty Paid (destination) Applicable Taxes extra, as applicable. Freight charges to destination and all applicable Custom duties and Excise taxes must be included.

### **4.2 Basis of Selection**

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 lowest evaluated price on an aggregate basis will be recommended for award of a contract.



## PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

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

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. 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.

### 5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

#### 5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the [Integrity and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide with its bid the required documentation, as applicable, to be given further consideration in the procurement process.

### 5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

#### 5.2.1 Integrity Provisions – Required Documentation

In accordance with the [Integrity and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

#### 5.2.2 General Environmental Criteria Certification

The Bidder must select and complete one of the following two certification statements.

- A) The Bidder certifies that the Bidder is registered or meets ISO 14001.

\_\_\_\_\_  
Bidders' Authorized Representative Signature

\_\_\_\_\_  
Date

or

- B) The Bidder certifies that the Bidder meets and will continue to meet throughout the duration of the contract, a minimum of four (4) out of six (6) criteria identified in the table below.

The Bidder must indicate which four (4) criteria, as a minimum, are met.

Green Practices within the Bidders' organization	Insert a checkmark for each criterion that is met
Promotes a paperless environment through directives, procedures and/or programs	

All documents are printed double sided and in black and white for day to day business activity unless otherwise specified by your client	
Paper used for day to day business activity has a minimum of 30% recycled content and has a sustainable forestry management certification	
Utilizes environmentally preferable inks and purchase remanufactured ink cartridges or ink cartridges that can be returned to the manufacturer for reuse and recycling for day to day business activity.	
Recycling bins for paper, newsprint, plastic and aluminum containers available and emptied regularly in accordance with local recycling program.	
A minimum of 50% of office equipment has an energy efficient certification.	

\_\_\_\_\_  
Bidders' Authorized Representative Signature

\_\_\_\_\_  
Date

### 5.2.3 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's website](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969) ([http://www.esdc.gc.ca/en/jobs/workplace/human\\_rights/employment\\_equity/federal\\_contractor\\_program.page?&\\_ga=1.229006812.1158694905.1413548969](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969)).

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

Canada will also have the right to terminate the Contract for default if a Contractor, or any member of the Contractor if the Contractor is a Joint Venture, appears on the "[FCP Limited Eligibility to Bid](#)" list during the period of the Contract.

The Bidder must provide the Contracting Authority with a completed Annex D [Federal Contractors Program for Employment Equity - Certification](#), before contract award. If the Bidder is a Joint Venture, the Bidder must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification, for each member of the Joint Venture.

## PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

### 6.1 Security Requirements

There is no security requirement applicable to this Contract.

### 6.2 Statement of Requirements

The contractor must provide the goods in accordance with the technical requirements stated at Annex A – Statement of Requirements.

#### 6.2.1 SACC Manual Clauses

SACC Reference	Section	Date
<a href="#">B1501C</a>	Electrical Equipment	2006-06-16
<a href="#">B7500C</a>	Excess Goods	2006-06-16

### 6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/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.

#### 6.3.1 General Conditions

[2010A](#) (2016-04-04), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

##### 6.3.1.1 SACC Manual Clauses

SACC Reference	Section	Date
<a href="#">C2800C</a>	Priority Rating	2013-01-28
<a href="#">C2801C</a>	Priority Rating - Canadian Contractors	2014-11-27

### 6.4 Term of Contract

#### 6.4.1 Delivery Date

All the deliverables must be received on or before \_\_\_\_\_.

### 6.5 Authorities

#### 6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

##### Phillipe Bisson – Supply Officer

Public Works and Government Services Canada - Acquisitions Branch  
Logistics, Electrical, Fuel and Transportation Directorate - "HN" Division  
7B3, Place du Portage, Phase III, 11 Laurier Street, Gatineau, QC, K1A 0S5  
Telephone: (873) 469-3345  
E-mail address: [Phillipe.bisson@pwgsc-tpsgc.gc.ca](mailto:Phillipe.bisson@pwgsc-tpsgc.gc.ca)

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.

#### 6.5.2 Project Authority

The Project Authority for the Contract is: (will be inserted at contract)

Name:

Title:

Telephone: (xxx) xxx-xxxx Facsimile: (xxx) xxx-xxxx

E-mail:

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority; however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

#### 6.5.3 Contractor's Representative

Name and telephone number of the person responsible for: (will be inserted at contract)

##### General enquiries

Name: \_\_\_\_\_

Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

Facsimile: \_\_\_\_\_

##### Delivery follow-up

Name: \_\_\_\_\_

Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

Facsimile: \_\_\_\_\_

### 6.6 Payment

#### 6.6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm unit prices, as specified in Annex C - Pricing for a cost of \$ \_\_\_\_\_. Customs duties are included and Applicable Taxes are extra.

#### 6.6.2 Limitation of Price

SACC Manual clause C6000C (2011-05-16) Limitation of Price

#### 6.6.3 Multiple Payments

SACC Manual clause H1001C (2008-05-12) Multiple Payments

#### 6.6.4 SACC Manual Clauses

SACC Reference	Section	Date
<u>G1005C</u>	Insurance	2016-01-28

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## 6.7 Invoicing Instructions

1. The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.
2. Invoices must be distributed as follows:
  - (a) The original and one (1) copy must be forwarded to the following address for certification and payment:
    - Dept. of National Defence  
Defence R&D Canada Ottawa  
Building 5B  
3701 Carling Ave., Ottawa ON, K1A 0Z4  
Canada
  - (b) One (1) copy must be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.  
Department of Public Works and Government Services - "HN" Division  
7B3 Place du Portage, Phase III, 11 Laurier Street, Gatineau, QC, K1A 0S5  
Attention: Phillipe Bisson Station-70

## 6.8 Certifications

### 6.8.1 Compliance

The continuous compliance with the certifications provided by the Contractor in its bid and the ongoing cooperation in providing additional information are conditions of the Contract. Certifications are subject to verification by Canada during the entire period of the Contract. If the Contractor does not comply with any certification, fails to provide the additional information, or if it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

### 6.8.2 Federal Contractors Program for Employment Equity - Default by the Contractor

The Contractor understands and agrees that, when an Agreement to Implement Employment Equity (AIEE) exists between the Contractor and Employment and Social Development Canada (ESDC)-Labour, the AIEE must remain valid during the entire period of the Contract. If the AIEE becomes invalid, the name of the Contractor will be added to the "[FCP Limited Eligibility to Bid](#)" list. The imposition of such a sanction by ESDC will constitute the Contractor in default as per the terms of the Contract.

## 6.9 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in \_\_\_\_\_

## 6.10 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the general conditions 2010A (2016-04-04);
- (c) Annex A - Statement of Requirements;
- (d) Annex B – Technical Information Questionnaire (TIQ);
- (e) Annex C – Pricing;
- (f) Annex D – Federal Contractors Program for Employment Equity – Certification
- (g) the Contractor's bid dated \_\_\_\_\_, as clarified on \_\_\_\_\_, as amended on \_\_\_\_\_

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#### 6.11 Defence Contract

SACC Manual clause [A9006C](#) (2012-07-16) Defence Contract

#### 6.12 SACC Manual Clauses

SACC Reference	Section	Date
<a href="#">D5545C</a>	ISO 9001:2008 - Quality Management Systems - Requirements (Quality Assurance Code C)	2010-08-16

#### 6.13 SACC Manual Clauses (Delivery)

SACC Reference	Section	Date
<a href="#">D6010C</a>	Palletization	2007-11-30
<a href="#">D2025C</a>	Wood Packaging Materials	2013-11-06
<a href="#">D9002C</a>	Incomplete Assemblies	2007-11-30

#### 6.14 Shipping Instructions - Delivery at Destination

Goods must be consigned to the destination specified in the Contract and delivered:

**For all items:**

Delivered Duty Paid (DDP) to "DRDC-Ottawa, Building 29, 3701 Carling Ave, Ottawa ON, K1A 0Z4, Canada" Inco terms 2000 for shipments from a commercial contractor.

## STATEMENT OF REQUIREMENT

### PURCHASE REQUEST TOOL TRACKING NUMBER: 2016-09436

#### 1. TITLE

HARMONIC FILTER BANK

#### 2. BACKGROUND

The Radar Sensing and Exploitation (RSE) section at the DRDC - Ottawa Research Centre has a requirement for harmonic filter banks (HFBs) in support of the Over the Horizon Radar (OTHR) project. The harmonic filter banks will be used in the radar transmitter to attenuate harmonics of the transmit signal to a sufficient degree such that the transmission emission mask specifications are met. Due to the fact that centre frequency of the transmit signal can span several octaves, the filter bank will consist of four distinct filter states, each covering a sub-frequency band. The filter bank will be switched between these different filter paths depending on the transmit frequency.

#### 3. ACRONYMS

DRDC	Defence Research and Development Canada
HF	High Frequency
HFB	Harmonic Filter Bank
MHz	Megahertz
SOR	Statement of Requirement
S-Parameters	Scattering Parameters
TA	Technical Authority
Tx	Transmitter
VSWR	Voltage Standing Wave Ratio

#### 4. DEFINITIONS

**Insertion Loss** is the loss in signal power resulting from the insertion of a device under test (DUT) in a transmission line. It is related to the S-parameters of the DUT by the following formula:

$$\text{Insertion Loss} = -20\log_{10}(|S_{21}|), \text{ dB}$$

Port 2 refers to the output port and port 1 is the input port.

**Return Loss** is the ratio of the incident to reflected power at a DUT port when all other ports of the DUT are terminated in a matched load. The input and output return losses are related to the S-parameters of the DUT by the following formulas:

$$\text{Input Return Loss} = -20\log_{10}(|S_{11}|), \text{ dB}$$

$$\text{Output Return Loss} = -20\log_{10}(|S_{22}|), \text{ dB}$$

Port 1 is the input port and port 2 is the output port.

#### 5. APPLICABLE DOCUMENTS & REFERENCES

## STATEMENT OF REQUIREMENT

None

### 6. REQUIREMENTS

#### 6.1 HARMONIC FILTER BANK, (HFB)

**Required quantity: 144**

The Contractor must provide the requirement with the following specifications:

Specifications	Value
<b>System Requirements</b>	
Frequency Range	The HFB must be capable of selecting and filtering a sub-band of HF signals in the range of 3 MHz to 21 MHz.
Frequency Bands	There must be 4 distinct sub-bands, or “states” to which the HFB can be switched with the following passband frequencies: <ul style="list-style-type: none"><li>i. DC to 4.91 MHz,</li><li>ii. DC to 7.88 MHz,</li><li>iii. DC to 12.74 MHz, and</li><li>iv. DC to 20.7 MHz</li></ul>
Inputs/Outputs	The HFB must have one input from the HF source and one output to the HF load. The HFB impedances must be 50 ohms. The HFB will function with a load reflection coefficient of any phase, and any magnitude up to one.
Remote Control and Monitor	The harmonic filter bank must have the capability to be controlled and monitored remotely via an Ethernet LAN interface. The HFBs must be networkable such that up to 128 individual HFBs can be uniquely controlled and monitored by a remote user. The remote user must have the ability to perform all of the following : <ul style="list-style-type: none"><li>i. Switch up to 128 HFBs to any one of the 4 filter states by sending an appropriate command. All 128 HFBs will be set to the same state.</li><li>ii. Monitor which state each of the HFBs (up to 128) is currently set to.</li></ul>
Software	The contractor must provide software with a graphical user interface (GUI) which is compatible with Microsoft Windows 7. The GUI must allow the user to do all of the following: <ul style="list-style-type: none"><li>i. Switch up to 128 individual HFBs to any of the 4 filters states. All 128 HFB units will be set to the same state.</li><li>ii. Monitor which state each specific HFB (up to 128) is currently set to.</li></ul>
Driver	A C/C++ or Matlab compatible software driver must be provided. The driver must provide the functionality to control and monitor the status of the HFBs as described in specification “Remote Control and Monitor” above.
Manual Control and Monitor	The HFB must have the capability to: <ul style="list-style-type: none"><li>i. be manually switched to any of the 4 states using front-panel controls and</li><li>ii. indicate which filter state is currently selected through front-panel indicators.</li></ul>
Size	The filter bank assembly must fit in a standard 19-inch rack, and have a maximum height less than or equal to 3 rack units (RU).
Front Panel	The filter bank assembly must include a front panel containing at least all of



## STATEMENT OF REQUIREMENT

	<p>the following:</p> <ul style="list-style-type: none"> <li>i. A power switch,</li> <li>ii. an indicator clearly identifying the selected filter state,</li> <li>iii. a mode selector switch to allow the user to select between remote and local control of the filter bank and</li> <li>iv. a switch to manually select any one of the four filter states</li> </ul>
Real Panel	<p>All cable connections for the HFB must be located on the rear panel. The rear panel must have all of the following:</p> <ul style="list-style-type: none"> <li>i. HF input port,</li> <li>ii. HF output port,</li> <li>iii. Electrical power, and</li> <li>iv. An Ethernet LAN RJ-45 port</li> </ul>
Clearance	The HFB must not require any space clearance above and must not require any space clearance below in order to meet its operational requirements.
Connectors	The HF input and HF output connectors must be of type N female.
Power Requirements	<p>The power requirements for the filter bank must meet all the following criteria:</p> <ul style="list-style-type: none"> <li>i. The primary power must be less than or equal to 150 W, single phase alternating current,</li> <li>ii. the voltage must be greater than or equal to 180 V and less than or equal to 240 V,</li> <li>iii. and the frequency must be greater than or equal to 50 Hz and less than or equal to 60 Hz</li> </ul>
Warranty	The contractor must provide a full warranty for the HFBs covering the period of at least 1 year from the date of delivery. All parts and labor necessary to return the HFB back to a state where it meets all performance specifications stated in section 6.1 must be included.
<b>Harmonic Filter States</b>	
Number of States	There will be a minimum of 4 filter states and only one state must be active at any one time.
Filter State Response	The frequency response of the filter states will be of a low-pass type
Operating Life	The filter bank must operate within specification for up to at least 1 million transitions between filter states.
Default State	The default condition of the filter bank must be latched to any one of the four states.
Response Time	The time interval between initiating a remote state selection request command and stable operation in the selected state must not exceed 30 milliseconds.
<b>Performance of Each Harmonic Filter State</b>	
Filter State 1	<p>Filter state 1 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 4.91 MHz which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 6.00 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 4.91 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 6.00 MHz to 9.00 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 9.00 MHz to 300 MHz must be greater than or equal to 60 dB</li> </ul>

## STATEMENT OF REQUIREMENT

	iv. Input and output return losses must be greater than or equal to 14 dB from dc up to 4.91 MHz. This corresponds to a Voltage Standing Wave Ratio (VSWR) of less than or equal to 1.5:1.
Filter State 2	<p>Filter state 2 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 7.88 MHz which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 9.62 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 7.88 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 9.62 MHz to 14.43 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 14.43 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 7.88 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>
Filter State 3	<p>Filter state 3 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 12.74 MHz, which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 15.56 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 12.74 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 15.56 MHz to 23.34 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 23.34 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 12.74 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>
Filter State 4	<p>Filter state 4 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 20.70 MHz which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 25.28 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 20.70 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 25.28 MHz to 37.92 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 37.92 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 20.70 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>
<b>Environmental Requirements</b>	
Temperature	The filter bank must meet all of the performance specifications listed in this table when operating at an ambient temperature of greater than or equal to -20° Celsius and less than or equal to 40° Celsius

## STATEMENT OF REQUIREMENT

Humidity	The filter bank must meet all of the performance specifications listed in this table when operating in conditions greater than or equal 0% and less than or equal to 95% relative humidity.
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### 6.2 ACCESSORIES

The Contractor must provide the following accessories for requirement 5.1:

Description	Required quantity
User's manual in English. A printed copy or an electronic copy in pdf format is acceptable.	<b>1</b>
Power Cord	<b>144</b>
Software for the Harmonic Filter Bank on a CD or DVD	<b>1</b>

**\*\* ACCESSORIES MUST BE PROVIDED AT TIME OF DELIVERY OF ITEM 001**

### 6.3 MEASURED PERFORMANCE

The contractor must provide the following measured results for all 144 HFB units:

Description	Required quantity
Insertion Loss, Input Return Loss, and Output Return Loss graphs from 3 MHz to 300 MHz for all 4 filter states of the harmonic filter bank in dB. The graphs must clearly show that the performance specifications for Insertion Loss, Input Return Loss and Output Return Loss as indicated in section 6.1 are met. This measurement must be performed, with an input signal swept across the passband of each filter state, at the rated input power of 1,000 W and simultaneously 250 W in the stopband of each filter state. The passband and stopband frequencies are clearly defined in section 6.1 for each filter state.	<b>Measurements for all 144 HFB units must be provided at time of delivery.</b>

## 7. DELIVERABLES

Item #	Requirement Reference	Description of the Deliverables	Quantity and Format
<b>001</b>	6.1	Harmonic Filter Bank as described in 6.1 - Must be supplied with the Measured Performance as described at Section 6.3 See below for requested delivery date.	72
<b>002</b>	6.1	Harmonic Filter Bank as described in 6.1 - Must be supplied with the Measured Performance as described at Section 6.3 See below for requested delivery date.	72
<b>003</b>	6.2	Accessories as described in 6.2 - Manual and Software CD/DVD must be provided with Item 001. - Power cords must be delivered with the units of item 001 and item 002. See below for requested delivery date.	1 Manual, 144 Power Cords, 1 Software CD/DVD

## STATEMENT OF REQUIREMENT

### 8. DATE OF DELIVERY

Item #	Delivery date
001	Delivery is requested by September 29, 2017 or before.
002	Delivery is requested by March 30, 2018 or before.
003	Delivery is requested by September 29, 2017 or before. (Please note: 72 Power cords may be delivered on March 30, 2018 with item 002).

### 9. LANGUAGE OF WORK

English

### 10. DELIVERY LOCATION

Defence Research and Development Canada – Ottawa Research Centre  
Building 29  
3701 Carling Avenue  
Ottawa, ON  
K1A 0Z4  
Canada

## ANNEX B : TECHNICAL INFORMATION QUESTIONNAIRE (TIQ)

**PURCHASE REQUEST TOOL TRACKING NUMBER: 2016-09436**

### 1. MANDATORY EVALUATION CRITERIA

In their proposals, bidders must demonstrate they meet the following mandatory criteria. Failure to meet any of the mandatory criteria will render the bid non-compliant and it will be given no further consideration.

	CRITERIA	MET	NOT MET
<b>M1.</b>	Frequency Range - 3 MHz to 21 MHz with sub bands of: i. DC to 4.91 MHz, ii. DC to 7.88 MHz, iii. DC to 12.74 MHz, and iv. DC to 20.7 MHz, With only one state active at any one time and a default state upon startup.		
<b>M2.</b>	Inputs/Outputs impedances of 50 ohms. The Harmonic Filter Bank (HFB) must function with a load reflection coefficient of any phase, and any magnitude up to one.		
<b>M3.</b>	Control and Monitor - The harmonic filter bank must have the capability to be controlled and monitored remotely as well as manually		
<b>M4.</b>	Size - The filter bank assembly must fit in a standard 19-inch rack, and have a maximum height less than or equal to 3 rack units (RU). The HFB must not require any space clearance above and must not require any space clearance below in order to meet its operational requirements.		
<b>M5.</b>	Power Requirements - The primary power must be less than or equal to 150 W, single phase alternating current, the voltage must be greater than or equal to 180 V and less than or equal to 240 V, and the frequency must be greater than or equal to 50 Hz and less than or equal to 60 Hz		
<b>M6.</b>	Warranty - The contractor must provide a full warranty for the HFBs covering the period of at least 1 year from the date of delivery		
<b>M7.</b>	Response Time - The time interval between initiating a remote state selection request command and stable operation in the selected state must not exceed 30 milliseconds.		
<b>M8.</b>	Front Panel - The filter bank assembly must include a front panel containing at least all of the following: i. A power switch, ii. an indicator clearly identifying the selected filter state, iii. a mode selector switch to allow the user to select between remote and local control of the filter bank and a switch to manually select any one of the four filter states		
<b>M9.</b>	Rear Panel - All cable connections for the HFB must be located on the rear panel. The rear panel must have all of the following: i. HF input port, ii. HF output port, iii. Electrical power, and iv. An Ethernet LAN RJ-45 port		

## ANNEX B : TECHNICAL INFORMATION QUESTIONNAIRE (TIQ)

<b>M10.</b>	<p>Filter State 1 - Filter state 1 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 4.91 MHz which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 6.00 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 4.91 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 6.00 MHz to 9.00 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 9.00 MHz to 300 MHz must be greater than or equal to 60 dB</li> <li>iv. Input and output return losses must be greater than or equal to 14 dB from dc up to 4.91 MHz. This corresponds to a Voltage Standing Wave Ratio (VSWR) of less than or equal to 1.5:1.</li> </ul>		
<b>M11.</b>	<p>Filter State 2 - Filter state 2 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 7.88 MHz which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 9.62 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 7.88 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 9.62 MHz to 14.43 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 14.43 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 7.88 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>		
<b>M12.</b>	<p>Filter State 3 - Filter state 3 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 12.74 MHz, which is the passband for this filter state and simultaneously 250 W average power in the frequency range of 15.56 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 12.74 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 15.56 MHz to 23.34 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 23.34 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 12.74 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>		
<b>M13.</b>	<p>Filter State 4 - Filter state 4 must meet all of the following performance specifications when operating with signal levels up to 1,000 W average power in the frequency range of dc to 20.70 MHz which is the passband for this filter state and simultaneously 250 W average power</p>		

## ANNEX B : TECHNICAL INFORMATION QUESTIONNAIRE (TIQ)

	<p>in the frequency range of 25.28 MHz to 300 MHz which is the stopband for this filter state:</p> <ul style="list-style-type: none"> <li>i. Insertion loss from dc up to 20.70 MHz must be less than or equal to 0.5 dB.</li> <li>ii. Insertion loss from 25.28 MHz to 37.92 MHz must be greater than or equal to 35 dB.</li> <li>iii. Insertion loss from 37.92 MHz to 300 MHz must be greater than or equal to 60 dB.</li> <li>iv. Input and Output return losses must be greater than or equal to 14 dB from dc up to 20.70 MHz. This corresponds to a VSWR of less than or equal to 1.5:1.</li> </ul>		
<b>M14.</b>	<p>Measured Performance - Insertion Loss, Input Return Loss, and Output Return Loss graphs from 3 MHz to 300 MHz for all 4 filter states of the harmonic filter bank in dB. The graphs must clearly show that the performance specifications for Insertion Loss, Input Return Loss and Output Return Loss as indicated in the Statement of Requirements (SOR) are met. This measurement must be performed, with an input signal swept across the passband of each filter state, at the rated input power of 1,000 W and simultaneously 250 W in the stopband of each filter state. The passband and stopband frequencies are clearly defined in the SOR for each filter state. Measurements for all 144 HFB units must be provided at time of delivery.</p>		





## Annex D: FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY - CERTIFICATION

I, the Bidder, by submitting the present information to the Contracting Authority, certify that the information provided is true as of the date indicated below. The certifications provided to Canada are subject to verification at all times. I understand that Canada will declare a bid non-responsive, or will declare a contractor in default, if a certification is found to be untrue, whether during the bid evaluation period or during the contract period. Canada will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply with any request or requirement imposed by Canada may render the bid non-responsive or constitute a default under the Contract.

For further information on the Federal Contractors Program for Employment Equity visit [Employment and Social Development Canada \(ESDC\)-Labour's](#) website.

Date: \_\_\_\_\_(YYYY/MM/DD) (If left blank, the date will be deemed to be the bid solicitation closing date.)

Complete both A and B.

A. Check only one of the following:

- ☐ A1. The Bidder certifies having no work force in Canada.
- ☐ A2. The Bidder certifies being a public sector employer.
- ☐ A3. The Bidder certifies being a [federally regulated employer](#) being subject to the [Employment Equity Act](#).
- ☐ A4. The Bidder certifies having a combined work force in Canada of less than 100 permanent full-time and/or permanent part-time employees.

A5. The Bidder has a combined workforce in Canada of 100 or more employees; and

- ☐ A5.1. The Bidder certifies already having a valid and current [Agreement to Implement Employment Equity](#) (AIEE) in place with ESDC-Labour.

**OR**

- ☐ A5.2. The Bidder certifies having submitted the [Agreement to Implement Employment Equity](#) (LAB1168) to ESDC-Labour. As this is a condition to contract award, proceed to completing the form Agreement to Implement Employment Equity (LAB1168), duly signing it, and transmit it to ESDC-Labour.

B. Check only one of the following:

- ☐ B1. The Bidder is not a Joint Venture.

**OR**

- ☐ B2. The Bidder is a Joint Venture and each member of the Joint Venture must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification. (Refer to the Joint Venture section of the Standard Instructions)