Signaling Protocols and Procedures for 6 GHz Band; Extensions to AFC System - Standard Power Device Interface Technical Specification

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Signaling Protocols and Procedures for 6 GHz Band; Extensions to AFC System - Standard Power Device Interface Technical Specification

1 Introduction

This document is the technical specification of extended signaling protocols and procedures for the interface between the AFC System and Standard Power Access Point (SPAP)/Fixed Client Device (FCD) (collectively referred to as "Standard Power Device" or "SPD") and between the AFC System and Proxy on behalf of one or more SPDs. As a prerequisite or foundation, any readers are encouraged to use this technical specification together with "AFC System to AFC Device Interface Technical Specification" produced by Wi-Fi Alliance (hereinafter called "the WFA SDI document") [n.1] and WINNF-TS-3007 [n.6]. As per WINNF-RC-3006 [n.7], support for the WFA SDI document is non-exclusive and the Wireless Innovation Forum (WInnForum) may endorse additional interfaces for application areas where the WFA SDI document is not an ideal match.

2 Scope

The scope of this technical specification is to specify the Wireless Innovation Forum (WInnForum) specific extensions to the AFC System – SPD Interface in accordance with "WFA SDI document" [n.1] and based on R3 requirements specified in WINNF-TS-1014 [n.2] and WINNF-TS-3007 [n.6]. The interface between the Proxy and SPD is outside the scope of this document.

The key words "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional" in this document are to be interpreted as described in RFC-2119 [n.3]. In addition, the key word "conditional" shall be interpreted to mean that the definition is an absolute requirement of this specification only if the stated condition is met.

3 References

3.1 Normative References

The following referenced documents are necessary for the application of the present document.

[n.1] AFC System to AFC Device Interface Specification v1.1, Wi-Fi Alliance, available at: https://www.wi-fi.org/file/afc-system-to-afc-device-interface-specification

[n.2] WINNF-TS-1014, "Functional Requirements for the 6GHz Band under Control of the AFC System", Wireless Innovation Forum

[n.3] RFC-2119, "Key words for use in RFCs to Indicate Requirement Levels", March 1997.

[n.4] VOID

[n.5] VOID

[n.6] WINNF-TS-3007, "Signaling Protocols and Procedures for 6 GHz Band; AFC System to Standard Power Device Interface Technical Specification", Wireless Innovation Forum

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[n.7] WINNF-RC-3006, "Endorsement of Wi-Fi Alliance AFC System to AFC Device Interface Specification", Wireless Innovation Forum

3.2 Informative References

The following referenced documents are not necessary for the application of the present document, but they assist the reader with regard to a particular subject area.

Not applicable for this version of this technical specification

4 Definitions and Abbreviations

4.1 Definitions

For the purposes of the present document, the definitions given in [n.1] and the following apply.

Feature Capability List: A list of Feature IDs representing all operationally supported features of an AFC System, a Standard Power Device (SPD).

Feature ID: A string identifying the name of a feature.

Operationally Supported Feature: A feature which is enabled for operational use.

NOTE: Any feature which is enabled for an AFC System by the AFC System Operator or which is enabled for a SPD by the device user is considered "operationally supported".

4.2 Abbreviations

For the purposes of the present document, the abbreviations given in [n.1] and the following apply.

FCD	Fixed Client Device
FID	Feature ID
SPAP	Standard Power Access Point
SPD	Standard Power Device

5 Architecture of AFC System – Standard Power Device Interface

5.1 Baseline Architecture

This section provides the interfaces related to the protocols that are defined in this technical specification. The figure below is a subset of the architecture described in [n.1].

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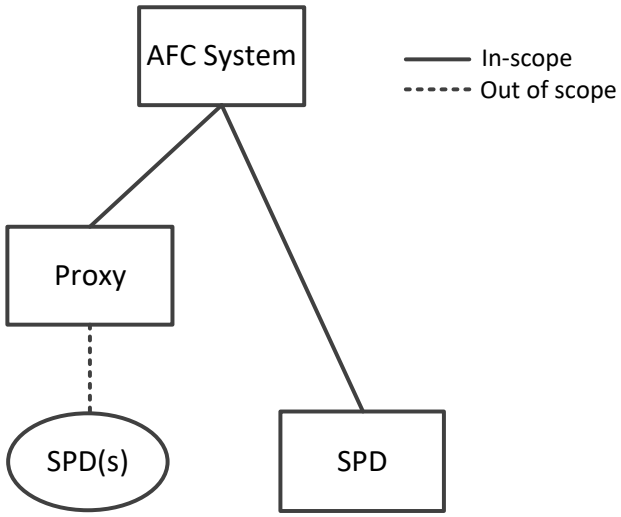

Figure 1: Protocol Interface

6 WInnForum Mandatory and Optional Features

6.1 WInnForum-Specific *VendorExtension* Object (Mandatory)

6.1.1 General

This section defines WInnForum-specific *VendorExtension* object.

6.1.2 Details

6.1.2.1 WInnForum-specific *VendorExtension* Object Definition

In the WFA SDI document [n.1], *VendorExtension* object is specified to include two fields: *extensionId* (data type: string) and *parameters* (data type: any).

For support of WInnForum-specific extensions, the value of *extensionId* field shall be "WINNF_SPECIFIC_EXTENSION", and the data type of *parameters* field shall be object: *WinnForumExtension* as specified in section 8 of this technical specification.

6.1.2.2 Exchange of WInnForum-specific *VendorExtension* Object

WInnForum-specific *VendorExtension* Object is exchanged as part of *vendorExtension* field (data type: array of object: *VendorExtension*) specified in the WFA SDI document between the AFC System and the SPD.

An AFC System may exchange WInnForum-specific *VendorExtension* Object with only the SPDs which have included the *VendorExtensionObject* in a request provided it to the AFC System at least once.

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6.2 Feature Capability Exchange

6.2.1 General

This section defines Feature Capability Exchange which allows selective implementations of features by an AFC System and SPD based on industry interests and/or use cases and facilitates interworking between the AFC System and the SPD for their use of the features.

Feature Capability Exchange is specified to facilitate the exchange of Feature Capability List and, if any, the associated feature-specific dataset between an AFC System and a SPD.

6.2.2 Details

6.2.2.1 Basic Principles

The following basic principles shall apply:

(i) Feature Capability Exchange shall be performed through Available Spectrum Inquiry messages or Feature Capability Exchange procedure by using a *WinnForumExtension* object which includes the *featureCapability* parameter (data type: object: *FeatureCapability*), as specified in sections 6.2.2.2 and 6.2.2.3.

(ii) For WInnForum-specific features requiring Feature Capability Exchange, their FIDs specified in this document shall be used. These are prefixed with "WF_". For 3rd party proprietary features, their FIDs should not be prefixed with "WF_".

(iii) The Feature Capability List, which is included in the *FeatureCapability* object, may be an empty list if only feature-independent extensions are operationally supported without operationally supporting any WInnForum-specific feature or 3rd party proprietary features.

(iv) If the Feature Capability List received from the sender includes FIDs that are not operationally supported by the recipient, the recipient shall ignore FIDs that are not operationally supported by itself.

(v) If the feature-specific dataset is defined for operationally supported feature(s), the associated feature-specific dataset shall be included in the *featureCapability* parameter.

(vi) The recipient shall supersede any previous Feature Capability List and the associated feature-specific data received from the sender.

(vii) Upon successful completion of Feature Capability Exchange, the AFC System and the SPD shall understand the common FIDs that are operationally supported by both parties and shall operate with the common Operationally Supported Features.

6.2.2.2 Feature Capability Exchange in Available Spectrum Inquiry Messages (Mandatory)

The *vendorExtension* field in the *AvailableSpectrumInquiryRequest* and the *AvailableSpectrumInquiryResponse* objects specified in the WFA SDI document [n.1] may be used to perform Feature Capability Exchange.

If an AFC System receives one or more *AvailableSpectrumInquiryRequest* objects that contain the *featureCapability* parameter of a SPD within the WInnForum-specific *VendorExtension* object, the AFC System shall generate its *featureCapability* parameter in accordance with the

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basic principles (ii)-to-(vi) specified in the section 6.2.2.1 and shall include it in the corresponding *AvailableSpectrumInquiryResponse* object(s).

By using the *featureCapabilityExchangeTrigger* parameter, an AFC System may instruct the SPD to initiate Feature Capability Exchange procedure. Upon instructed by the AFC System, the SPD or the Proxy may initiate Feature Capability Exchange procedure as specified in this section (6.2.2.2) or section 6.2.2.3.

Upon successful completion of Feature Capability Exchange, the AFC System and the SPD shall operate with features corresponding to the common Features IDs in the exchanged Feature Capability Lists (see also the basic principle (vii) specified in the section 6.2.2.1).

6.2.2.3 Feature Capability Exchange Procedure (Optional)

Feature Capability Exchange procedure is a procedure to exchange its latest Feature Capability List and the associated feature-specific dataset.

Figure 2 shows message flow diagram of Feature Capability Exchange procedure.

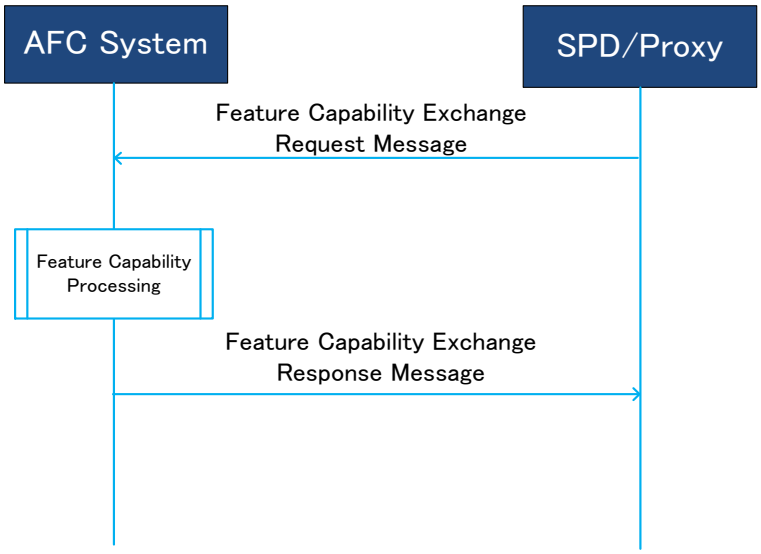

Figure 2: Message flow diagram of Feature Capability Exchange Procedure

This procedure consists of three steps:

- Feature Capability Exchange Request Message from SPD/Proxy to AFC System
- Feature capability processing at AFC System
- Feature Capability Exchange Response Message from AFC System to SPD/Proxy

6.2.2.3.1 Feature Capability Exchange Request Message

The Feature Capability Exchange Request Message is represented by a *FeatureCapabilityExchangeRequestMessage* object that is specified to include the *featureCapabilityExchangeRequest* parameter. The *featureCapabilityExchangeRequest* parameter contains one or more *FeatureCapabilityExchangeRequest* objects, each of which represents a Feature Capability Exchange request of a SPD.

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Each *FeatureCapabilityExchangeRequest* object shall be created in accordance with the basic principles (ii)-to-(vi) specified in the section 6.2.2.1.

6.2.2.3.2 Feature Capability Processing

During the feature capability processing, the AFC System shall generate the *FeatureCapabilityExchangeResponse* object(s) for each SPD included in the Feature Capability Exchange Request Message in accordance with the basic principles (ii)-to-(vi) specified in the section 6.2.2.1.

6.2.2.3.3 Feature Capability Exchange Response Message

After the feature capability processing, the AFC System shall return the Feature Capability Exchange Response Message that includes the *FeatureCapabilityExchangeResponse* object(s) generated during the feature capability processing.

Upon successful completion of Feature Capability Exchange Procedure, the AFC System and the SPD shall operate with features corresponding to the common Features IDs in the exchanged Feature Capability Lists (see also the basic principle (vii) specified in the section 6.2.2.1).

6.3 Deprecated

7 Extensions to Message Encoding and Transport

7.1 AFC System URL

For all WInnForum-specific AFC System – SPD/Proxy messages specified in this document, the following AFC System URL format shall apply.

FORMAT: `$BASE_URL/vendorExtensions/winnf/$WINNF_METHOD`

- `$BASE_URL`: Base URL of the AFC System (see details in the WFA SDI document [n.1])
- `vendorExtensions`: Baseline AFC System method for Standalone Vendor-Specific Extension messages (see details in the WFA SDI document [n.1]).
- `winnf`: The URL path to identify the subsequent path corresponds to a WInnForum-specific AFC System method
- `$WINNF_METHOD`: WInnForum-specific AFC System method. See section 7.2.

7.2 AFC System Method Name

Applicable AFC System methods are listed in Table 1.

Table 1: WInnForum-specific AFC System methods

$WINNF_METHOD	**Request message**	**Response message**
`featureCapabilityExchange`	Feature Capability Exchange Request Message	Feature Capability Exchange Response Message

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8 Extension Parameters

8.1 General

8.1.1 Table Format for Extension Parameters

Parameters concerning the extensions specified in section 6 are described with the following table format:

Table 2: Table Format for Extension Parameters

Parameter	R/O/C	Parameter Information
NAME: [Name of extension parameter] **DATA TYPE**: [One of JSON Data Types specified in section 8.1.1.2] **FEATURE ID**: [Feature ID(s) or "*Mandatory*"]	[Required/Optional/ Conditional]	[Description of the parameter]

8.1.1.1 Parameter Name

The label "**NAME**" represents the name of a parameter. The name is used as a field name of JSON object and is case-sensitive.

8.1.1.2 JSON Data Type

The label "**DATA TYPE**" represents one of the primitive JSON data types; string, number, boolean, object or array of such primitive data type. If the data type of a parameter is an object, a name for the object is given and a separate table describes parameters within the object. If an object is defined in another document, definition of the object is left to such document and the citation is put in the column of **Parameter Information**.

8.1.1.3 Feature ID

The label "**FEATURE ID**" describes in which specific feature(s) this parameter is used. The values used for this label are WInnForum-defined FID(s) or "*Mandatory*", where "*Mandatory*" means that the parameter does not depend on any specific feature (i.e. feature-independent extension) and shall be operationally supported.

8.1.1.4 Parameter Inclusion Criteria (R/O/C)

The column "R/O/C" indicates parameter inclusion criteria for each parameter. The definitions of applicable indicators are as follows:

"Required": The parameter shall always be included in the object.

"Optional": The parameter may be included in the object.

"Conditional": The parameter shall be included in the object if the specified conditions are satisfied.

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8.2 Extension Parameters: WInnForum-Specific *VendorExtension* Object

8.2.1 WInnForum-Specific VendorExtension Object Definition

Table 3: WInnForum-Specific *VendorExtension* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *extensionId* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	The value of this parameter shall be "WINNF_SPECIFIC_EXTENSION".
NAME: *parameters* **DATA TYPE**: object: *WinnForumExtension* **FEATURE ID**: *Mandatory*	Required	This JSON object contains a set of information concerning WInnForum-specific features.

8.2.2 WinnForumExtension Object Definition

Table 4: *WinnForumExtension* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *version* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Conditional	This parameter presents the version number of the protocol extension. The value shall be "*x*.*y*", where *x* refers to the major version number of this document and *y* refers to technical revision number of this document. This parameter shall be included only if the *WinnForumExtension* object is used for the *vendorExtension* field of Available Spectrum Inquiry messages. EXAMPLE: The value is "1.1" if the version number is "V1.1.*z*" (*z* refers to editorial revision number).
NAME: *featureCapability* **DATA TYPE**: object: *FeatureCapability* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the JSON object that contains a set of information concerning feature capability of an AFC System, a SPD. This parameter shall be included if the *WinnForumExtension* Object is used for Feature Capability Exchange as specified in section 6.2 of this document.
NAME: *featureCapabilityExchangeTrigger* **DATA TYPE**: boolean **FEATURE ID**: *Mandatory*	Optional	This parameter may be used by only the AFC System to instruct the SPD to initiate Feature Capability Exchange. If the value is set to true, the SPD may initiate Feature Capability Exchangeas specified in section 6.2.2.2 or 6.2.2.3.

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Parameter	R/O/C	Parameter Information
NAME: *winnForumResponse* **DATA TYPE**: object: *WInnForumResponse* **FEATURE ID**: *Mandatory*	Conditional	This parameter contains information about errors in the *WinnForumExtension* object provided by the SPD through Available Spectrum Inquiry Request. This parameter shall be included only if the AFC System includes the *WinnForumExtension* object in the *vendorExtension* field of the *AvailableSpectrumInquiryResponse* object.

NOTE: This table will be extended once new feature is defined in this document.

8.2.3 FeatureCapability Object Definition

Table 5: *FeatureCapability* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *afcSystemFeatureCapabilityList* **DATA TYPE**: array of string **FEATURE ID**: *Mandatory*	Conditional	This parameter is the Feature Capability List of the AFC System. This parameter shall be included only if the *FeatureCapability* object represents the feature capability information of the AFC System.
NAME: *afcSystemFeatureInfo* **DATA TYPE**: array of object: *FeatureInfo* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the feature-specific information of the AFC System. This parameter shall be included only if the *FeatureCapability* object represents the feature capability information of the AFC System and the feature-specific dataset is specified for one or more FIDs in the *afcSystemFeatureCapabilityList*.
NAME: *deviceFeatureCapabilityList* **DATA TYPE**: array of string **FEATURE ID**: *Mandatory*	Conditional	This parameter is the Feature Capability List of the SPD. This parameter shall be included only if the *FeatureCapability* object represents the feature capability information of the SPD.
NAME: *deviceFeatureInfo* **DATA TYPE**: array of object: *FeatureInfo* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the feature-specific information of the SPD. This parameter shall be included only if the *FeatureCapability* object represents the feature capability information of the SPD and the feature-specific dataset is specified for one or more FIDs in the *deviceFeatureCapabilityList*.

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8.2.4 FeatureInfo Object Definition

Table 6: *FeatureInfo* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *featureId* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	This parameter is the Feature ID. The value of this parameter shall follow the basic principle (ii) specified in section 6.2.2.
NAME: *deviceFeatureData* **DATA TYPE**: object: *DeviceFeatureData* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the feature-specific dataset of the SPD associated with the feature represented by the *featureId* parameter. This parameter shall be included only if the SPD provides the *FeatureInfo* object.
NAME: *afcSystemFeatureData* **DATA TYPE**: object: *AfcSystemFeatureData* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the feature-specific dataset of the AFC System associated with the feature represented by the *featureId* parameter. This parameter shall be included only if the AFC System provides the *FeatureInfo* object.

8.2.5 DeviceFeatureData Object Definition

Table 7: *DeviceFeatureData* Object Definition

Parameter	R/O/C	Parameter Information
This feature specific object is to be defined in the future versions of this document.		

8.2.6 AfcSystemFeatureData Object Definition

Table 8: *AfcSystemFeatureData* Object Definition

Parameter	R/O/C	Parameter Information
This feature specific object is to be defined in the future versions of this document.		

8.2.7 WInnForumResponse Object Definition

Table 9: *WInnForumResponse* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *winnForumResponseCode* **DATA TYPE**: number **FEATURE ID**: *Mandatory*	Required	This parameter indicates the type of the response by the AFC System. The value shall be integer and acceptable values are defined in Table 14.
NAME: *winnForumResponseMessage* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Optional	This parameter represents the short description related to the response indicated by *winnForumResponseCode* value.

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Parameter	R/O/C	Parameter Information
NAME: *winnForumResponseData* **DATA TYPE**: number **FEATURE ID**: array of string	Optional	This parameter contains supplemental information that can help resolving errors indicated by *winnForumResponseCode* value.

8.3 Feature Capability Exchange Request Message

Table 10: *FeatureCapabilityExchangeRequestMessage* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *featureCapabilityExchangeRequest* **DATA TYPE**: array of object: *FeatureCapabilityExchangeRequest* **FEATURE ID**: *Mandatory*	Required	This parameter is an array of *FeatureCapabilityExchangeRequest* objects. Each *FeatureCapabilityExchangeRequest* object represents a feature capability exchange request from a SPD.

8.3.1 FeatureCapabilityExchangeRequest Object Definition

Table 11: *FeatureCapabilityExchangeRequest* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *version* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	This parameter presents the version of the protocol extension. The value shall be "*x*.*y*", where *x* refers to the major version number of this document and *y* refers to technical revision number of this document. EXAMPLE: The value is "1.1" if the version number is "V1.1.*z*" (*z* refers to editorial revision number).
NAME: *requestId* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	This parameter is unique identifier of the *FeatureCapabilityExchangeRequest* object assigned by the device user. The value of this parameter shall not conflict with the *requestId* parameters of other *FeatureCapabilityExchangeRequest* objects in the same array (i.e., *featureCapabilityExchangeRequest*).
NAME: *fccId* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	This parameter is the FCC ID of the model of the SPD.
NAME: *serialNumber* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Required	This parameter is the device serial number of the SPD.

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Parameter	R/O/C	Parameter Information
NAME: *deviceFeatureCapability* **DATA TYPE**: object: *StandaloneVendorExtension* **FEATURE ID**: *Mandatory*	Required	This parameter is the JSON object that contains Feature Capability information of the SPD. The *vendorExtensions* field in this object shall include at least one WInnForum-specific *VendorExtension* object for feature capability information (see also sections 8.2.1 and 8.2.2). NOTE: The definition of *StandaloneVendorExtension* object is found in the WFA SDI document [n.1].

8.4 Feature Capability Exchange Response Message

Table 12: *FeatureCapabilityExchangeResponseMessage* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *featureCapabilityExchangeResponse* **DATA TYPE**: array of object: *FeatureCapabilityExchangeResponse* **FEATURE ID**: *Mandatory*	Required	This parameter is an array of *FeatureCapabilityExchangeResponse* objects. Each *FeatureCapabilityExchangeResponse* object represents a feature capability exchange request from a SPD.

8.4.1 FeatureCapabilityExchangeResponse Object Definition

Table 13: *FeatureCapabilityExchangeResponse* Object Definition

Parameter	R/O/C	Parameter Information
NAME: *requestId* **DATA TYPE**: string **FEATURE ID**: *Mandatory*	Conditional	This parameter represents to which *FeatureCapabilityExchangeRequest* object the *FeatureCapabilityExchangeResponse* object corresponds. This parameter shall be included only if the *requestId* parameter was included in the corresponding *FeatureCapabilityExchangeRequest* object. The value of this parameter shall be the value of the *requestId* parameter of the corresponding *FeatureCapabilityExchangeRequest* object.

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Parameter	R/O/C	Parameter Information
NAME: *afcSystemFeatureCapability* **DATA TYPE**: object: *StandaloneVendorExtension* **FEATURE ID**: *Mandatory*	Conditional	This parameter is the JSON object that contains Feature Capability information of the AFC System. This parameter shall be included only if the *responseCode* parameter within the *response* parameter indicates 0 (SUCCESS). The *vendorExtensions* field in this object shall include at least one WInnForum-specific *VendorExtension* object for feature capability information (see also sections 8.2.1 and 8.2.2). NOTE: The definition of *StandaloneVendorExtension* object is found in the WFA SDI document [n.1].
NAME: *winnForumResponse* **DATA TYPE**: object: *WinnForumResponse* **FEATURE ID**: *Mandatory*	Required	This parameter contains information on the outcome of the Feature Capability Exchange procedure.

8.5 WInnForum-Specific Response Codes and Data

In the *WinnForumResponse* object of a response message, the AFC System shall include a *winnForumResponseCode* parameter to inform the SPD of the status of the corresponding request. The values of *winnForumResponseCode* parameter are grouped into the following categories and defined in the following table. The name associated with each *winnForumResponseCode* parameter is not included in the *WinnForumResponse* object.

0: Success

100 – 199: general errors

200 – 299: error events specific to Feature Capability Exchange procedure

Table 14: WInnForum-Specific Response Code Definitions

WInnForum-Specific Response Codes	Description
VALUE: 0 **NAME**: SUCCESS	All the parameters of the WInnForum-specific protocol extension were successfully processed by the AFC System.
VALUE: 100 **NAME**: VERSION	The version of the WInnForum-specific protocol extension used by the SPD is not supported by the AFC System.
VALUE: 101 **NAME**: *Reserved*	*Reserved for future version of this document.*

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WInnForum-Specific Response Codes	Description
VALUE: 102 **NAME**: MISSING_PARAM	One or more Required parameters or Conditional parameters that meet specified inclusion rule are missing from the *WinnForumExtension* object or WInnForum-specific request message. The *winnForumResponseData* parameter may carry names of the missing parameters.
VALUE: 103 **NAME**: INVALID_VALUE	One or more parameters included in the *WinnForumExtension* object or WInnForum-specific request message have invalid value. The *winnForumResponseData* parameter may carry parameter names which have invalid value.
VALUE: 104 **NAME:** *Reserved*	*Reserved for future version of this document.*
VALUE: 105 **NAME:** *Reserved*	*Reserved for future version of this document.*

In the *WinnForumResponse* object, the AFC System may optionally include supplemental data (e.g., using the *winnForumResponseData* parameter) to help the device with further investigation of the error. The following table describes the *winnForumResponseData* definitions to be included with some *winnForumResponseCode* values.

Table 15: *winnForumResponseData* Definitions

WInnForum-Specific Response Codes	Data Type of *winnForumResponseData*	Description of *winnForumResponseData*
VALUE: 0 **NAME**: SUCCESS	*n/a*	*n/a*
VALUE: 100 **NAME**: VERSION	array of string	Versions of WInnForum-specific protocol extension supported by the AFC System
VALUE: 101 **NAME**: *Reserved*	*n/a*	*n/a*
VALUE: 102 **NAME**: MISSING_PARAM	array of string	A list of missing parameter name(s)
VALUE: 103 **NAME**: INVALID_VALUE	array of string	A list of parameter name(s) with invalid value(s)
VALUE: 104 **NAME:** *Reserved*	*n/a*	*n/a*
VALUE: 105 **NAME:** *Reserved*	*n/a*	*n/a*

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Annex A (Normative): Deprecated

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Annex B (Informative): Examples of JSON Objects

B.1 Example of WInnForum-Specific *VendorExtension* object.

The following text is an example of JSON-encoded WInnForum-Specific *VendorExtension* object which includes feature capability information of an AFC System, where dummy FIDs (i.e., "WF_XYZ_FEATURE" and "WF_ABC_FEATURE") and the associated dummy feature-specific dataset (i.e., "xyzParam") are used for example purpose.

```
{
   "extensionId": "WINNF_SPECIFIC_EXTENSION",
   "parameters": {
      "version": "v1.0",
      "featureCapability": {
         "afcSystemFeatureCapabilityList": ["WF_XYZ_FEATURE", "WF_DEF_FEATURE"],
         "afcSystemFeatureInfo": [
            {
               "featureId": "WF_XYZ_FEATURE",
               "afcSystemFeatureData": {
                  "xyzParam": "ABCDEFG"
               }
            }
         ]
      }
   }
}
```

B.2 Example of Feature Capability Exchange Request message

The following text is an example of JSON-encoded Feature Capability Exchange Request message. If the SPAP (dummy FCC ID: "FCC-ID-XXXX", dummy serial number: "SN-SPAP-YYYY") has a capability to directly communicate with an AFC System, this message can be sent by the SPAP. If the SPAP (same dummy FCC ID and dummy serial number as above) does not have a capability to directly communicate with an AFC System, this message can be sent by a Proxy on behalf of such SPAP.

```
{
   "featureCapabilityExchangeRequest": [
      {
         "version": "1.0",
         "requestId": "AAAAA",
         "fccId": "FCC-ID-XXXX",
         "serialNumber": "SN-SPAP-YYYY",
         "deviceFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "deviceFeatureCapabilityList": ["WF_XYZ_FEATURE",
"WF_ABC_FEATURE"],
```

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```
                     "deviceFeatureInfo": [
                        {
                           "featureId": "WF_XYZ_FEATURE",
                           "deviceFeatureData": {
                              "xyzParam": "ABCDEFG"
                           }
                        }
                     ]
                  }
               }
            ]
         }
      }
   ]
}
```

The following text is an example of JSON-encoded Feature Capability Exchange Request message which is sent by the Proxy on behalf of two SPAPs (dummy FCC ID: "FCC-ID-XXXX", dummy Serial numbers: "SN-SPAP-YYYY" and "SN-SPAP-ZZZZ") to an AFC System.

```
{
   "featureCapabilityExchangeRequest": [
      {
         "version": "1.0",
         "requestId": "AAAAA",
         "fccId": "FCC-ID-XXXX",
         "serialNumber": "SN-SPAP-YYYY",
         "deviceFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "deviceFeatureCapabilityList": ["WF_XYZ_FEATURE",
"WF_ABC_FEATURE"],
                     "deviceFeatureInfo": [
                        {
                           "featureId": "WF_XYZ_FEATURE",
                           "deviceFeatureData": {
                              "xyzParam": "ABCDEFG"
                           }
                        }
                     ]
                  }
               }
            ]
         }
      },
      {
```

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```
         "version": "1.0",
         "requestId": "BBBBB",
         "fccId": "FCC-ID-XXXX",
         "serialNumber": "SN-SPAP-ZZZZ",
         "deviceFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "deviceFeatureCapabilityList": ["WF_ABC_FEATURE"],
                     "deviceFeatureInfo": [
                        {
                           "featureId": "WF_ABC_FEATURE",
                           "deviceFeatureData": {
                              "abcParam": "LMNOPQR"
                           }
                        }
                     ]
                  }
               }
            ]
         }
      }
   ]
}
```

B.3 Example of Feature Capability Exchange Response message

The following text is an example of JSON-encoded Feature Capability Exchange Response message which is sent by the AFC System in response to the Feature Capability Exchange Request message shown as the first example in the section A.2. In this example, the dummy feature "WF_XYZ_FEATURE" can be deemed the common Operationally Supported Feature between the AFC System and the SPAP.

```
{
   "featureCapabilityExchangeResponse": [
      {
         "requestId": "AAAAA",
         "afcSystemFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "afcSystemFeatureCapabilityList": ["WF_XYZ_FEATURE",
"WF_DEF_FEATURE"],
                     "afcSystemFeatureInfo": [
                        {
                           "featureId": "WF_XYZ_FEATURE",
```

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```
                        "afcSystemFeatureData": {
                           "xyzParam": "ABCDEFG"
                        }
                     }
                  ]
               }
            }
         ]
      },
      "winnForumResponse": {
         "winnForumResponseCode": 0
      }
   }
]
}
```


The following text is an example of JSON-encoded Feature Capability Exchange Response message which is sent by the AFC System in response to the Feature Capability Exchange Request message shown as the second example in the section A.2. In this example, the dummy feature "WF_XYZ_FEATURE" can be deemed the common Operationally Supported Feature between the AFC System and the first SPAP (i.e., dummy serial number is "SN-SPAP-YYYY") but no dummy feature can be deemed the common Operationally Supported Feature between the AFC System and the second SPAP (i.e., dummy serial number is "SN-SPAP-ZZZZ").


```
{
   "featureCapabilityExchangeResponse": [
      {
         "requestId": "AAAAA",
         "afcSystemFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "afcSystemFeatureCapabilityList": ["WF_XYZ_FEATURE",
"WF_DEF_FEATURE"],
                     "afcSystemFeatureInfo": [
                        {
                           "featureId": "WF_XYZ_FEATURE",
                           "afcSystemFeatureData": {
                              "xyzParam": "ABCDEFG"
                           }
                        }
                     ]
                  }
               }
            ]
         },
         "winnForumResponse": {
            "winnForumResponseCode": 0
```


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```
         }
      },
      {
         "requestId": "BBBBB",
         "afcSystemFeatureCapability": {
            "vendorExtensions": [
               {
                  "extensionId": "WINNF_SPECIFIC_EXTENSION",
                  "parameters": {
                     "featureCapability": {
                     "afcSystemFeatureCapabilityList": ["WF_XYZ_FEATURE",
"WF_DEF_FEATURE"],
                     "afcSystemFeatureInfo": [
                        {
                           "featureId": "WF_XYZ_FEATURE",
                           "afcSystemFeatureData": {
                              "xyzParam": "ABCDEFG"
                           }
                        }
                     ]
                  }
               }
            ]
         },
         "winnForumResponse": {
            "winnForumResponseCode": 0
         }
      }
   ]
}
```

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Annex C (Informative): Revision History

Document History		
V1.0.0	17 February, 2022	Initial Publication
V1.1.0	1 September, 2022	Implemented: ▪ WINNF-22-I-00037-r1 CR to TS-3005
V1.1.1	12 December 2022	Implemented WINNF-22-I-00143 TS-3005 Architecture Clarification

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