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COBHAM Application Note - Using Key and Tag Licensing With Cobham Wireless Analysis Libraries

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Introduction 3

Intended Audience 3

What is Key and Tag Licensing? 3

Who Is Affected? 3

Existing PXI 3000 Customers 4

Generating Key and Tag 4

Customers Using National Instruments HW 4

Generating Key and Tag 4

Analyzing IQ with Key and Tag 5

Supported Software 6

Example Code 6

Introduction

This Application Note describes the how to use Cobham Wireless analysis libraries with the newly released Key and Tag licensing feature.

Intended Audience

This Application Note is aimed at customers or Cobham Application Engineers who are writing software against Cobham Wireless Analysis libraries.

What is Key and Tag Licensing?

Cobham wireless analysis libraries take an IQ vector and perform a series of measurements. Typically the IQ is taken from a PXI 3000 PXI digitizer and customers were charged for a measurement suite which contained a PXI Studio Plugin, a measurement library and the analysis library.

An option was then assigned to the PXI digitizer to indicate the option had been purchased. PXI Studio and the measurement library checked for the existence of the HW option before performing a measurement with the analysis library.

To protect against someone capturing IQ on their own digitizer and processing the IQ on Cobham analysis library for free Key and Tag licensing has been introduced.

Key and Tag are two values which are required in addition to the IQ when performing an analysis measurement. Key and Tag values are only correctly generated when the required option has been purchased. A new Key and Tag value is created every capture.

Who Is Affected?

Any customer who is writing software directly against the analysis library will be required to make minor software changes when they download and install the latest analysis libraries. This application note will describe in detail the changes required.

Existing PXI 3000 Customers

Existing customers who manually capture data from a Cobham Wireless Digitizer and process it on Cobham Wireless Analysis libraries will require to make a number of minor software changes to accommodate the new analysis library(s).

Generating Key and Tag

When using a PXI 3000 digitizer a call to "`afDigitizerDll_Capture_IQ_CaptMem(…)`" or "`afDigitizerDll_Capture_IQ_GetCaptMemFromOffset(…)`" would fetch the IQ samples from the digitizer. To get IQ with Key and Tag information a new call to "`afDigitizerDll_Capture_IQ_CaptMemWithKey(…)`" or "`afDigitizerDll_Capture_IQ_GetCaptMemFromOffsetWithKey`" is now required. This will return a double representing key and a double representing tag in addition to the IQ samples.

C/C++ Example

```
double* Key;
double* Tag;

// Fetch back the whole IQ in one chunk but with the tag and key.
errorCode = afDigitizerDll_Capture_IQ_CaptMemWithKey(Vsa,
                                                     NumberOfSamples,
                                                     iBuffer,
                                                     qBuffer,
                                                     Tag, Key );
ErrorCheckVSA(Vsa,errorCode);
```

Figure 1 – Getting Key and Tag from an IQ Capture C/C++

Customers Using National Instruments HW

Customers who are using a National Instruments Vector Signal Transceiver (VST) to capture IQ data will need to start making calls to the "afVstWrapper.dll" which is part of the "VST Licensing and Support tool". More information on the "VST Licensing and Support tool" can be found in the application Note "*COBHAM Application Note – Using NI VST modules with COBHAM Analysis Software*" which can be downloaded from the Cobham Wireless Website: http://cobhamwireless.com/wp-content/uploads/Using-the-VST-with-COBHAM-Software.pdf

Generating Key and Tag

To get IQ data after a capture using a VST a call to "`niRFSA_FetchIQSingleRecordComplexF32(...)`" is used. To get the IQ data with the key and tag information this needs modified to use "`afVstWrapper_RFSA_FetchIQSingleRecordComplexF32`". This will return a double representing key and a double representing tag in addition to the IQ samples.

C/C++ Example

```
double* Key;
double* Tag;

status = afVstWrapper_RFSA_FetchIQSingleRecordComplexF32(vsa,
                                                         VI_NULL,
                                                         0,
                                                         -1,
                                                         timeout,
                                                         capturedIQ,
                                                         &captureInfo,
                                                         Tag,Key);
ErrorCheckVSA(Vsa,errorCode);
```

Figure 2 – Getting Key and Tag from an IQ Capture C/C++

Analyzing IQ with Key and Tag

Once the key and tag information has been returned the analysis is hardware agnostic. Each library supporting Key and Tag licensing will have a new method to "`af<Format>Dll_AnalyseIQ(…)`" which is used just like the previous analyze method but in addition to passing in the IQ the Key and Tag will now be passed. Analysis will only take place if the IQ was captured on a digitizer that was correctly licensed. The option will either exist in the "VST License Manager" for NI HW or on the PXI 3000 digitizer itself for Cobham HW. An example of processing a WLAN 802.11 AC signal can be seen in Figure 3.

C/C++ Example

```
// Perform the analysis using Key and Tag
status = afWlanDll_AnalyseIQ(wlanObj, measurements, iBuffer,
                                                    qBuffer,
                                                    NumSamples,
                                                    0,
                                                    NumSamples,
                                                    Tag,Key);
ErrorCheckWLAN(wlanObj,status);
```

Figure 3 – Analyzing an 802.11AC signal using Key and Tag Licensing

Supported Software

Key and Tag licensing has been present for some time for WLAN 802.11AC analysis but is now being introduced for all analysis libraries. A full list of option, Analysis library and the minimum version supporting Key and Tag licensing can be seen in

Option	Description	Comments	Measurement Suite Minimum Version
100	GSM/EDGE		4.10.0
101	UMTS Up-link		4.9.0
102	c2K/EV-DO reverse link		3.4.0
103	WLAN 802.11a,b,g,n,p		3.14.0
104	WiMAX OFDMA		3.3.0
105	DECT		TBD
106	Bluetooth BR/EDR/LE		2.5.0
107	LTE FDD uplink		2.11.0
108	LTE TDD uplink		2.6.0
109	TD-SCDMA		2.5.0
110	UMTS Downlink		1.4.0
111	Generic FM, FSK, PSK, QAM		2.5.0
113	WLAN 802.11ac*	Requires option 103	TBD
115	WLAN BRCM MCS10/11 1024 QAM	Requires option 113	3.14.0
117	LTE FDD & TDD downlink		1.3.0

Table 1 - List of Analysis Library and the Minimum Version Supporting Key and Tag Licensing

Example Code

To accompany this application note two examples has been written:

Example 8 – Playing out an IQCreator 802.11AC 40 MHz waveform out of a 3025(x) and capturing IQ using a free run trigger on a 3035(x) and performing an analysis using key and Tag licensing with the Cobham WLAN Analysis library.

Example 9 – Playing out an IQCreator 802.11AC 40 MHz waveform out of the RFSG and capturing IQ using a software defined trigger and performing an analysis using key and tag licensing with the Cobham WLAN Analysis library.