KANTAR

Certification procedure for Watermarking Embedder SDK

User Guide

Product version: 8.0

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KANTAR

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1 Overview of the certification procedure

1.1   Certification aims

The watermarking technology is the basis of the TV audience measurement and then crucial for the audience measurement operator in charge of delivering the audience measurement figures. Kantar imposes a certification of any product integrating the Kantar watermarking technology for audience measurement to check that the watermark is correctly applied on the audio streams to be aired. A certification process shall be passed for EACH new version of the product integrating the Embedding SDK. To limit the extra workload related to this certification process, Kantar proposes a dedicated tool, the QC File Detector and a light paper procedure. The integrator of the watermarking SDK is then autonomous to perform the certification himself. This certification shall be registered to Kantar.

1.2   Certification criteria

The certification criteria check that watermarking SDK is correctly implemented in the third-party product or application. All criteria of the certification are detailed in a chapter of this document. The acceptance criteria are validated by delivering audio file, logs and information about integration of the product in a user manual**.**

Kantar support will help to confirm which criteria are applicable to a specific integration.

document version 2.0 **KANTAR MEDIA**	**Certification of embedder SDK integration**					
Company information		**Contact information**				
Name		First name				
Address		Last name				
		Position				
		Email				
Country		Phone				
Product information		**Kantarmedia embedder SDK information**				
Name		Name	NexTracker Snap File Embedder			
		OS	Linux X86			
Version		Version	7.0.2			
Fonctionality and Algorithm						
chapter	title	criteria	mandatory	OK	KO	NA
2.1	Algorithmic validation	3x files	YES	X		
2.2	Licenses management	doc	At least 1 type of license must be valid			
2.2.1	Off Line licenses: Authorization Code mode	doc	check Kantar Media agreement	X		
2.2.2	Off Line licenses: password mode	doc	check Kantar Media agreement			X
2.2.3	Offline time limited	doc	mandatory only if offline is available	X		
2.2.4	Offline time limited update	doc	mandatory only if offline is available	X		
2.2.5	Online	doc	check Kantar Media agreement			X
2.2.6	License request	doc	YES	X		
2.3	Watermarking configuration	doc	YES	X		
2.4.1	Application logs : available	doc	YES	X		
2.4.2	Application logs : complete	1x file	YES	X		
2.5	Watermarking logs	doc	File SDKs only			X
2.6	Watermarking Time synchronization	doc	Live SDKs only	X		
2.7	Watermarking delay	doc	Live SDKs only	X		
2.8	Watermarking start-stop impact	doc	Live SDKs only	X		
Kantar Media certification approval						
Date fo the certification:						
Remarks/restrictions:						
Name of the Approver:						

Example of Certification_Form_for_Embedding_SDK.xlsx completed

1.3   Certification registration and submission

The registration of the certification consists in sending the certification form fully completed, with audio file, logs, and third-party User Manual relating to watermarking feature.

In order to submit a certification or get support from Kantar during the certification please open a ticket using the certification request option in the watermarking support portal :
www.kantarmedia.com/watermarkinghelpdesk

The usage of a non-certified version is not authorized by Kantar.

2   Watermarking Certification Criteria

2.1   Watermarking algorithm validation

2.1.1   Prerequisites

Install the File QC Detector and get corresponding license from Kantar support.

Get the audio reference file: KantarOriginalForCertificationV7.0.wav

Especially for first time certification, it is safer to do the algorithm validation directly from the watermarking library output using function EnableRecord() before testing the product output. See **Appendix A Capture from library using EnableRecord() function** for more details.

2.1.2   Process

This part checks that the watermarking implementation is correctly integrated in the third part product or application.

This part must be performed by playing the Kantar audio reference file and capturing the video and the audio at the server output.

The audio is extracted from the recorded file and converted in a WAV file with all the audio tracks in PCM format at 48 kHz sampling frequency. The WAV file is passed through the File QC Detector.
If the main report status is KO, then it means that there is an issue in the video server and some treatments applied on the audio after the watermarking process may degrades the watermarking.
The issue must be identified and fixed by the integrator and retested using the File QC Detector.

The following figure illustrates the watermarking algorithm validation in the final product:
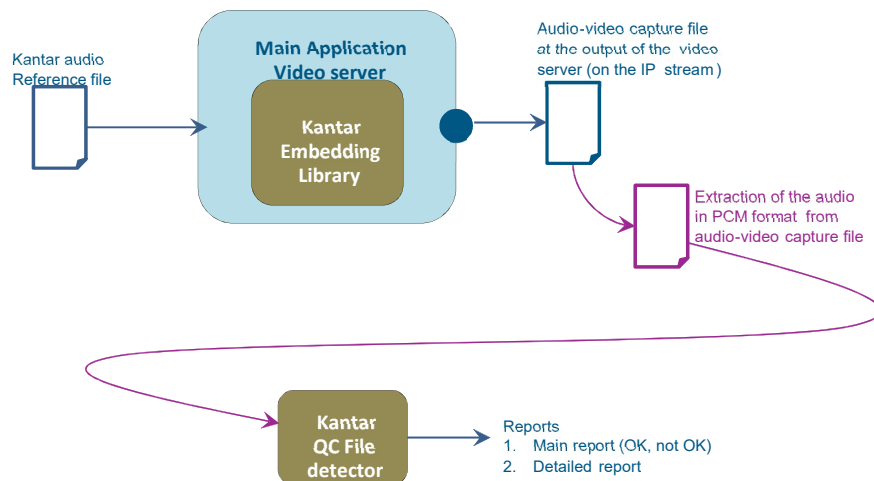
See Appendix 4 for more details.

2.1.3   Acceptance criteria:

The certification main report of File QC detector is OK.

Submit along with the certification:
- Capture file from the output of the final product used for certification.
- The 2 output logs, MainReport and DetailedReport generated by the File QC Detector.

2.2   Licenses management

Kantar provides several types of licenses to control the watermarking function in third party equipment. These licenses types are the following:

- Offline license based on Authorization code
- Offline license based on Password
- Online License

Moreover, offline license can be time limited.

The third part integrator must know what kind of license will be implemented in its application as the certification require to pass some acceptance. Before SDK integration and certification, types of licenses should be agreed with Kantar.

Acceptance criteria:
Indicate in the certification form which licenses are implemented in the product.

2.2.1   Offline licenses: Authorization Code mode

Prerequisites:
This part concerns File and Live SDK. The license type is Embedder SDK locked on authorisation code, contact Kantar support to receive a license.

Process:
This part checks that the offline license authorisation code mode is available.

Acceptance criteria:
The user manual describes how to retrieve the authorisation code of the platform and how to install the watermarking licenses, including screenshots.

2.2.2   Offline licenses: password mode

Prerequisites:
This part concerns File and Live SDK.
Upon specific agreement with Kantar, you have received a dedicated third part integrator password.
The license type is Embedder SKD locked on password, contact Kantar support to receive a license.

Process:
The password should be integrated to the implementation but invisible in the application. This part checks that offline license password mode is correctly implemented.

Acceptance criteria:
The license password isn't visible nor configurable in the application or product user interface.
The user manual describes how to install the watermarking licenses, including screenshots.

2.2.3   Offline time limited license

Prerequisites:

This part concerns the File and Live SDK.

This part concerns offline watermarking licenses password or Authorisation Code.

The license type is Embedder SDK license time limited, contact Kantar support to receive a license.

Process:

The SDK implementation must display the limitation date of the time limited license. If the license is not time limited, the application will display empty information in the limitation date field.

Acceptance criteria:

The user manual describes how to check the remaining time of the license, including screenshots.

2.2.4   Offline time limited license update

Prerequisites:

This part concerns only Live SDK.

This part concerns offline watermarking licenses password or Authorisation Code.

The license type is Embedder SDK license time limited, contact Kantar support to receive a license.

Process:

This part checks that offline time limited license update can be performed smoothly without restarting the watermarking application.

Acceptance criteria:

The user manual describes how to update a time limited license with minimum impact on the audio/video output and make sure that the new license is accepted.

2.2.5   Online licenses implementation

Prerequisites:

This part concerns the File and Live SDK.

There are no license files, in this case the watermarking is activated with online credentials, contact Kantar support to receive credentials.

Process:

The application allows to enter the online license credentials provided by Kantar from the application user interface.

Acceptance criteria:

The user manual describes how to configure the credential, including screenshots.

2.2.6   Watermarking license request

Prerequisites:

This part concerns File and Live SDK.

Process:

Please inform your customer how to get a Kantar license, the best is to integrate the following in your documentation:

> *In order to get a watermarking embedding license, please contact Kantar support at* www.kantarmedia.com/watermarkinghelpdesk *with following information:*
> - *Product name and version*
> - *Customer name*
> - *Country*
> - *If different, country of broadcast*
> - *Channel(s) to be watermarked*
> - *Customer internal name for the hardware platform*
> - *AuthorisationCode for each hardware or login contact for online solution.*

Acceptance criteria:

The user manual describes how to request a license from Kantar.

2.3   Watermarking configuration

Prerequisites:

This part concerns File and Live SDK.

Process:

This part checks that configuration, selection and start the watermarking feature is correctly implemented.

Acceptance criteria:

The user manual describes the configuration and starting of the watermarking features:
- Input or select *Channel Name*, this value can be up to 20 characters!
- File Duration and other metadata for File SDK
- include screenshots

2.4   Application logs

Prerequisites:

This part concerns the File and the Live SDK.

Process:

The Audio Watermarking Embedder SDK generates events with some text messages that must be recorded in the applicative log file of the third-party product. All messages must be recorded in the applicative log files. No event must be filtered by the third-party application.

2.4.1   Acceptance criteria: log available

The user manual describes how to find the event log.

2.4.2   Acceptance criteria: complete log

Because some messages will never be raised, the log file requested by Kantar must show at least the following messages raised in a nominal case:

- "Using channel name: XXXX"
- "Embedder Initialization starting …"
- "Start watermarking using ID XX (SNAP)"
- "Embedder Initialization finished"
- Audio embedder terminating. Start SNAP timecode:XX Last SNAP timecode:XX **[only for File Embedder SDK]**
- "Embedder unintialization starting"
- "Embedder unintialization finished"

Send some applicative logs of the integration showing at least the above messages.

2.5   Watermarking logs

Prerequisites:

This part concerns only File SDK.

Process:

The File Embedder SDK generates watermarking logs (.xml) for each job.

Acceptance criteria

The user manual describes how to find the watermarking log .xml.

2.6   Watermarking Time synchronization

Prerequisites:

This part concerns only Live SDK.

Process:

The time drift between the watermarking timestamp and the master clock of the playout center must never exceed a few seconds. As a consequence, the watermarking process clock must be regularly synchronized to the reference time thanks to ResynchronizeTimecode() function.

Thus, the ResynchronizeTimecode function must be called at least once a day and up to four times a day or if the difference between the equipment clock reference (UTC time) and the application clock exceeds ten seconds.

Acceptance criteria:

The user manual indicates the source and the frequency of the timecode resync.

2.7   Watermark delay

Prerequisites:

This part concerns only Live SDK.

Process:

The watermarking function induce process delay that will depend on each integration. Customers will need to know this delay to sync main/backup broadcast using different equipment or when the backup doesn't have watermark.

Acceptance criteria:

The user manual indicates the watermarking process delay.

2.8   Watermarking function start-stop impact

Prerequisites:

This part concerns only Live SDK.

Process:

The watermarking function will be installed on critical equipment used live 24/7. If maintenance is needed, operators should be aware of the necessary measure to avoid any live impact.

Acceptance criteria:

The user manual indicates the impact on the audio signal when the watermarking function is stopped or started and especially if such operation should be done on-air or off-air.

3   Certification submission

Only the versions of the products certified and registered by Kantar are authorized to be used in production for the audience measurement application.

To register your certification, please use our support portal: www.kantarmedia.com/watermarkinghelpdesk and follow the steps hereafter :

- Fill the Certification form provided by Kantar (refer to Excel document Certification_Form_for_Embedding_SDK.xlsx).
- Provide all audio file, logs and user manual necessary for the certification tests. If needed, Kantar support can provide a FTP to deliver the certification data if needed.
- Send the Certification form using the watermarking support portal www.kantarmedia.com/watermarkinghelpdesk

After checking all certification data, Kantar will send back the certification form approved.

4   Kantar Watermarking Algorithm Certification

The algorithm validation of the watermarking is done using an audio reference file, once this reference file is watermark Kantar File QC Detector should be use in Certification mode. The resulting certification report will validate watermarking quality of the integration.

4.1   Prerequisites

Latest Versions for the certification:

- File QC Detector V8.0
- *KantarOriginalForCertification_v7.0.wav*

Here are the different prerequisites before passing the certification procedure:
- First, you need to have integrated the SDK in the product or application.
- Get the "File QC Detector" software and the according Kantar license by asking them to the Kantar support team (www.kantarmedia.com/watermarkinghelpdesk). Please refer to the User Guide of the "File QC Detector" to install it properly.
- Get the reference file by asking them to the Kantar support team (www.kantarmedia.com/watermarkinghelpdesk):
  - Input reference wav file to be recorded after embedding (original 12 minutes 10.24 seconds wav file, stereo, 16bits PCM, 48 kHz): *KantarOriginalForCertification_v7.0.wav*.
- The embedding should be performed using watermark ID 1 (in SNAP technology it is set in the license.aud file provided by Kantar for the certification, in INK technology it should be set in embedding parameters)

4.2   Audio capture

Especially for first time certification, it is safer to do the algorithm validation directly from the watermarking library output using function EnableRecord() before testing the product output.

Nevertheless, the final File QC Detector certification must be done using Capture from the output of the final product.

Capture from library using EnableRecord() function

The following figure illustrates the verification of the Watermarking Embedding SDK, this audio capture is optional for certification.
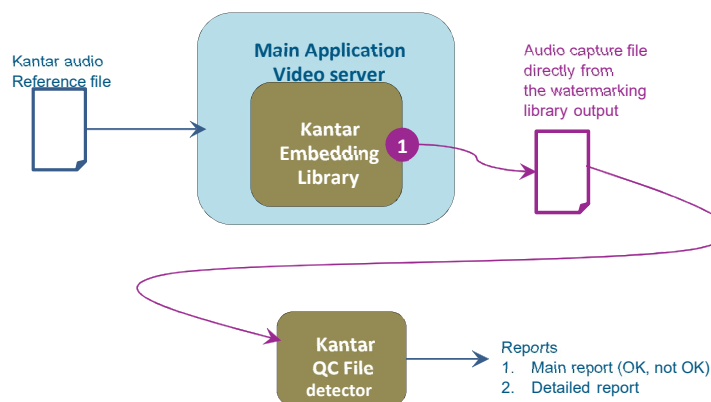

Here are the different steps:

- Integrate the recording function (EnableRecord() method of embedder SDK) in your product.
- Check that you do not call ResynchronizeTimecode() method during all the recording. [only for Live Embedder SDK]
- Launch your product with recording enabled (at 48 kHz).
- Play the Input reference wav file downloaded earlier.
- Stop the recording and save the output generated wav file.

   Capture from the output of the final product

The following figure illustrates the verification of the watermarking function in the final product:
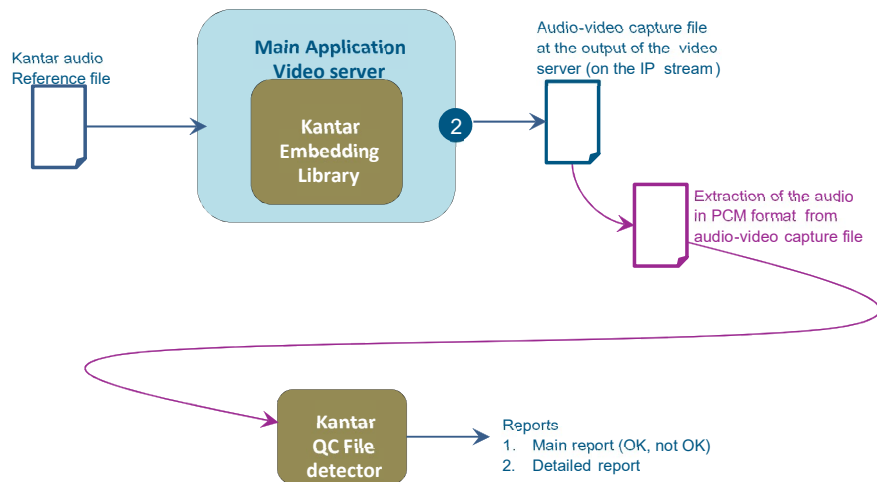

4.3   Editing the audio capture

The captured watermarked audio file may be longer than the original 12 minutes 10.24 seconds duration of the audio reference file. To run the certification, the start and the end of the file must match those of the reference file, else certification will fail.

It is required to edit the captured audio file to cut out the audio samples at the beginning and the end of the file that are not present in the original reference file. You can use an audio editing software like Audacity to do this. Detailed cutting procedure follows:

The original content starts with a 6 kHz sine to easily identify first useful samples.
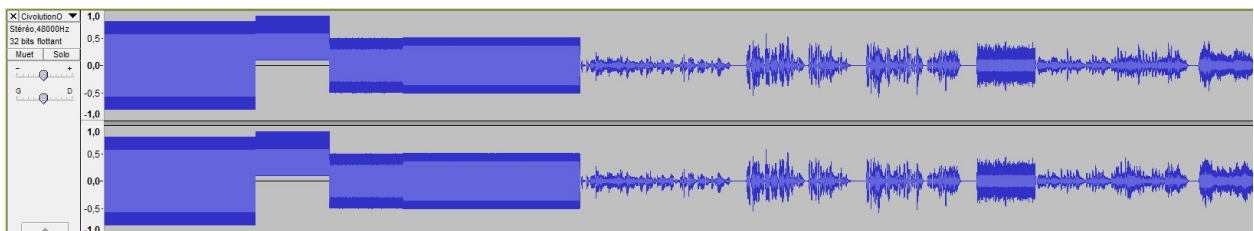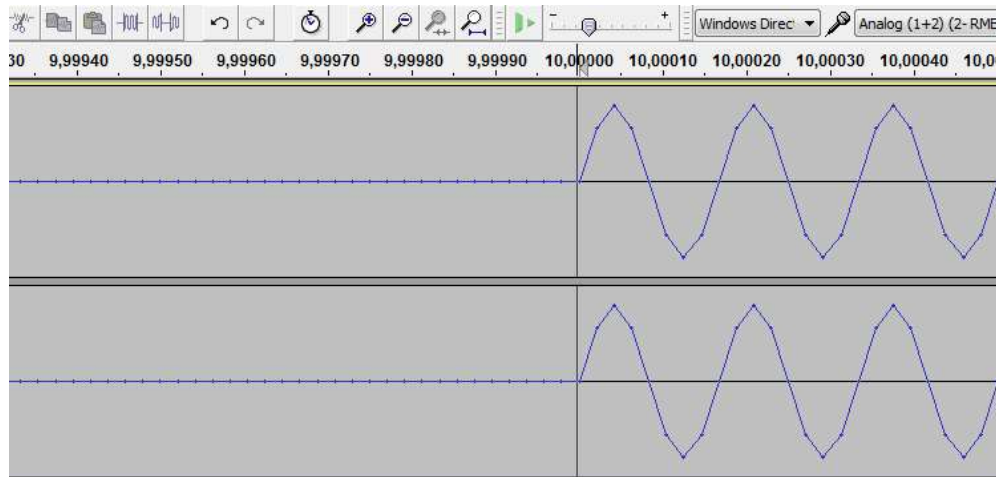

Here is as an example on how to proceed using Audacity 2.0.5, a free open source digital audio editor, available for multiple operating systems.
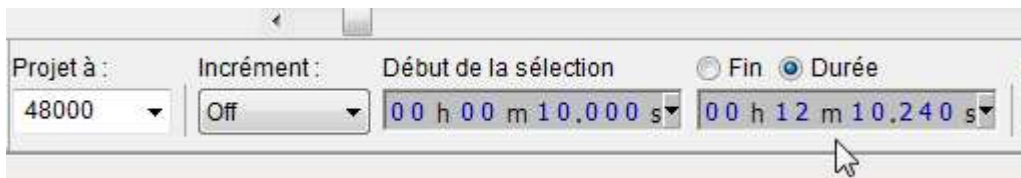
- Verify in the bottom left that the project rate is 48 kHz. If not, set it to 48 kHz.
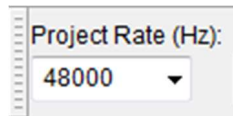

- Open your initial capture and zoom in to the beginning of the Kantar file that corresponds to a 6 kHz sine pattern, until you see waveform points.

- With the selection tool , select the beginning of the non silent signal.

- Then in the bottom, put 12m 10.24 for the length

- Verify that it corresponds to the end of the pattern. If not and the difference is too large, it's probably due to an issue during the capture, loss of samples, or resampling. Few samples of difference are nevertheless not an issue.
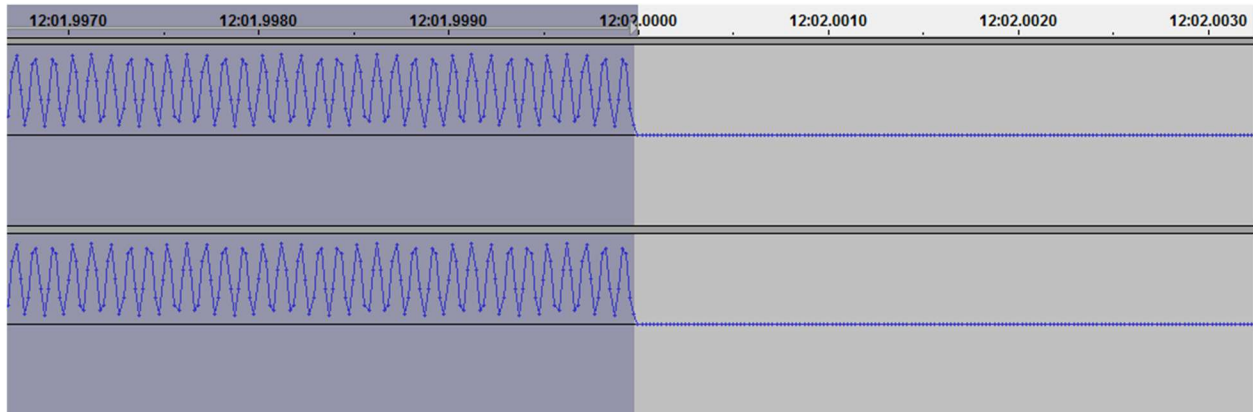
- Save the selection using "File>ExportSelection". Choose WAV (Microsoft) signed 16 bit PCM type and set a name.

Your file is now ready to use it in the QC file detector.

4.4   Run the File QC detector

Command line

Run the File QC Detector in Certification mode:

Windows:
ACRFileDetectorCLI.exe --techno SNAP -i CaptureWM.wav –certificationMode 1
Linux:
./ACRFileDetectorCLI.exe --techno SNAP -i CaptureWM.wav –certificationMode 1

Options

--techno: Defines the technology used for watermarking, only SNAP and INK are available for certification
--certificationMode: when set to 1, it proceeds to embedder certification and generates reports

4.5   Check the generated report

4.5.1   Introduction

The output of the File QC Detector will be:
- A main report (human readable file): xxxx_MainReport_date_time.txt
- A detailed report (encrypted file): xxxx_DetailedReport_date_time.txt

Where   the   "xxxx"   prefix   stands   for   the   detector   input   file   name   (ex: CaptureWM_MainReport_20140807_18h19m15s.txt)

Main report contains all high level information's related to certification. It allows to check the certification result and in case of failure, to have a first indication of the issue.

4.5.2   Main report explanation

Main report explanation:
- Lines 1 to 4 give input information's.

- Line 6 is the certification result, with a value in line 7 to check the line 6 result.
- Lines 9 to 11 are related to the timestamp.
- Lines 13 to 19 give detailed information's about certification.
- Lines 21 to 28 give detections information's

### 4.5.3   Main report success

Here is an example of main report success:

Line	Main report	
1	Detector version	: 8.0.137630 - Jun 6 2019 12:59:42
2	Watermarked Audio filename	: C:\Temp\KantarOriginalForCertificationWM.wav
3	Certification mode	: sdk
4		
5	Certified	: YES
6	Level	: OK
7	Check code	: 39457783145669
8		
9	Timestamp incremented	: OK
10	First timestamp	: 8.19
11	Last timestamp	: 712.70
12		
13	Payload	: OK
14	Spectrum - Global	: OK
15	No phase inversion	: OK
16	Temporal continuity	: OK
17	Spectrum - Local	: OK
18	No jitter	: OK
19		
20	# events	: 179 (Reference = 179)
21	# WMK events	: 088 (Reference = 088)
22	# TST events	: 087 (Reference = 087)
23	# NMQ events	: 002 (Reference = 002)
24	# IND events	: 000 (Reference = 000)
25	WMK&TST confidence	: 99.43 (Reference = 99.42)
26	# detailed detections	: 1056 (Reference = 1056)
27	Confidence	: 56.34 (Reference = 56.34)

If the certification process passed you shall have:
- sdk on line 3.
- YES on line 5.
- OK on line 6
You may have WARNING on line 6.

In case of WARNING in the certification report, please perform some extra checking.
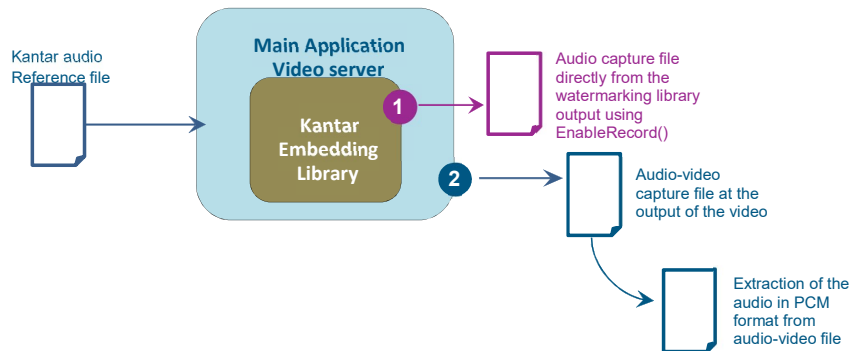
Certification WARNING on audio capture is from EnableRecord() function indicates a problem with library integration that must be corrected. Contact Kantar for support.

Certification WARNING on audio capture is from the output of the final product indicates that certification will need an extra verification from Kantar support. First check that the certification report from EnableRecord() capture is OK. Then send to Kantar the record and report for further analyses.

4.6   Troubleshooting

Example 1

Line	Main report	
1	Detector version	: 8.0.137630 - Jun 6 2019 12:59:42
2	Watermarked Audio filename	: CaptureWM.wav
3	Certification mode	: sdk
4	Certified	: NO
5	Error message	: Error decrypting reference
6		
7		

In this case, line 5 will indicates the issue. It could be:
- **Significant audio difference found compared to reference**: in this case please refer to paragraph "Precision of Capture".
- **No watermark found**: in this case, please check if the input wav file has been watermarked.
- **No timestamp found**: in this case please check that the timestamp was inserted.
- **Decrypting error**: in this case please check if you have administrators' rights in the execution folder.

Example 2

Line 13: Payload: KO

check the Wk ID with the File QC command line : AudioWatermarkFileDetectorCL.exe -i .\test.wav =>
Watermark found must be 1 if the license is correct.
If the Watermark Id is not "1", it is due to an incorrect watermark ID.
For INK technology relaunch the embedding process using the good ID. For SNAP technology the
license.aud file you are using does not contain the good ID: ask a new audience license to Kantar.

Example 3

Here is an example of main report failure during certification where "confidence" and "Phase inversion have
issues:

Line	Main report			
1	Detector version	: 8.0.137630 - Jun 6 2019 12:59:42		
2	Watermarked Audio filename	: CaptureWM.wav		
3	Certification mode	: sdk		
4				
5	Certified	: NO		
6	Level	: KO		
7	Check code	: 18248980710848		
8				
9	Timestamp incremented	: OK		
10	First timestamp	: 8.19		
11	Last timestamp	: 712.70		
12				
13	Payload	: OK		
14	Spectrum - Global	: OK		
15	No phase inversion	: KO		
16	Temporal continuity	: OK		
17	Spectrum-- Local	: OK		
18	Jitter	: OK		
19				
20	# events	: 176	(Reference = 176)	
21	# WMK events	: 088	(Reference = 088)	
22	# TST events	: 087	(Reference = 087)	
23	# NMQ events	: 001	(Reference = 001)	
24	# IND events	: 000	(Reference = 000)	
25	WMK&TST confidence	: 99.09	(Reference = 99.26)	

26	# detailed detections	: 1055	(Reference = 1055)
27	Confidence	: 55.16	(Reference = 55.32)
28			

In this case, you shall check which line(s) is/are in KO mode:
- If it is line 9, please check that timestamps are incremented as expected.
- If it is line 13, please check the payload inserted during embedding. It shall be payload 1.
- If it is line 14, please check the volume, the filter applied to the audio and if your input wav file is at 48 KHz.
- If it is line 15, please check if there is no phase inversion.
- If it is line 16, please check if there is no audio loss or timestamp frozen.
- If it is line 17, please check the volume, the filter applied to the audio and if your input wav file is at 48 KHz.
- If it is line 18, please check if there is jitter.

Try resolving the issue; if you do not manage to do it on your own please contact Kantar support.

A.　Technical Support by Kantar

To get technical assistance, check on the status of problems, or report new problems, contact Kantar Product Support via e-mail, phone, or fax. We welcome any suggestions, improvements and feedback concerning the present User Guide or software described herein.

A.1　Web technical support

www.kantarmedia.com/watermarkinghelpdesk

A.2　Phone support

<div align="center">

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