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**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N0906**

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| **Title** | **WD of ISO/IEC 23090-18 AMD 2 Point reliability indication and other improvements** |
| **Source** | **WG 03, MPEG Systems** |
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**9.x.x Signalling of confidence score region in ISOBMFF**

**9.x.x.1 General**

**9.x.x.2 G-PCC Confidence Score Region structure**

GPCCConfidenceScoreRegionStruct provides the confidence score of points within a given 3D spatial region.

**9.x.x.2.1 Syntax**

aligned(8) class GPCCConfidenceScoreRegionStruct() {

unsigned int(16) region\_id;

unsigned int(1) bounding\_box\_present\_flag;

unsigned int(1) dimensions\_included\_flag;

unsigned int(1) confidence\_score\_present\_flag;

unsigned int(5) reserved;

if(bounding\_box\_present\_flag)

GPCCBoundingBox bounding\_box(dimensions\_included\_flag);

if(confidence\_score\_present\_flag) {

unsigned int(8) confidence\_score;

}

}

**x.x.x.2.2 Semantics**

region\_id is an identifier for the confidence score region.

bounding\_box\_present\_flag indicates the presence of bounding box information. For sync samples in confidence score region metadata track this flag shall be set to 1. For non-sync samples in confidence score region metadata track, this flag shall be set to 1 when the position and/or dimensions of this confidence score region are updated with reference to the previous sync sample.

dimensions\_included\_flag indicates the presence of the bounding box with the scale field. For sync samples in confidence score region metadata sample, this flag shall be set to 1. For non-sync samples in confidence score region metadata sample, this flag shall only be set to 1 when the dimensions of this confidence score region are updated with reference to the previous sync sample. This flag may be set to 1 only if bounding\_box\_present\_flag is set to 1.

confidence\_score\_present\_flag indicates the presence of the confidence score for the confidence score region.

confidence\_score indicates the degree of confidence in unit of 1/255 in the range of 0 to 1 for the data in the confidence score region. A signaled value of 0 expresses a score of 0 which means the confidence in the data in the confidence score region is the lowest. A signaled value of 255 expresses a score of 1 which means the confidence in the data in the confidence score region is the highest. An application should take into account the confidence score when processing the data and deriving actions, results, interpretations, etc… When not present, the confidence score is unknown.

**9.x.x.3 G-PCC Confidence Score Information**

**9.x.x.3.1 Definition**

Box Types: 'gcsr'  
Container: GPCCSampleEntry ('gpe1', 'gpeg', 'gpc1', 'gpcg', 'gpeb', 'gpcb') or DynamicGPCCConfidenceScoreSampleEntry  
Mandatory: No  
Quantity: Zero or one

The GPCCConfidenceScoreInfoBox provides information of one or more confidence score regions.

When the GPCCConfidenceScoreInfoBox is present in the sample entry of either a G-PCC track carrying all G-PCC bitstream or a G-PCC tile base track, it indicates the static confidence score region information of G-PCC data carried in either the track or all G-PCC tile tracks, respectively.

**9.x.x.3.2 Syntax**

aligned(8) class GPCCConfidenceScoreInfoBox

extends FullBox('gcsr', version=0, 0) {

unsigned int(16) num\_regions;

for (int i=0; i < num\_regions; i++) {

GPCCConfidenceScoreRegionStruct region();

}

}

**9.x.x.3.3 Semantics**

num\_regions indicate the number of confidence score regions.

region provides the confidence score region.

**9.x.x.4 Sample entry**

**9.x.x.3.1 Syntax**

aligned(8) class GPCCConfidenceScoreConfigurationStruct() {

bit(7) reserved=0;

unsigned int(1) dynamic\_dimension\_flag;

}

aligned(8) class DynamicGPCCConfidenceScoreSampleEntry extends MetaDataSampleEntry('gcdc') {

GPCCConfidenceScoreInfoBox info\_box;

GPCCConfidenceScoreConfigurationStruct configuration;

}

**9.x.x.3.2 Semantics**

dynamic\_dimension\_flag equal to 0 specifies that the dimension of the 3D spatial region remains unchanged in all samples referring to this sample entry. dynamic\_dimension\_flag equal to 1 specifies that the dimension of the 3D spatial region is indicated in samples.

info\_box indicates one or more initial 3D spatial region with the associated confidence score of the G-PCC data.

configuration contains configuration related to the samples referring to this sample entry.

**9.x.x.4 Sample format**

**9.x.x.4.1 General**

A sample in the confidence score region timed metadata track shall be set as a sync sample or as a non-sync sample. At least one sync sample shall be present in the confidence score region timed-metadata track.

Sync samples in the confidence score region timed metadata shall carry the dimension for all G-PCC confidence score regions. In sync samples for all confidence score regions, the value of dimensions\_included\_flag and bounding\_box\_present\_flag shall be set to 1.

Non-sync samples in confidence score region timed metadata track shall signal only the updated confidence score regions information with reference to the confidence score regions information available in the nearest preceding sync sample. Non-sync samples shall signal only the confidence score regions whose position, dimensions, the added and cancelled confidence score regions with reference to the nearest sync sample.

For Non-sync samples in this timed metadata track, the value of canceled\_region\_flag shall be set to 1 when a confidence score region is cancelled with reference to the preceding sync sample. The value of dimensions\_included\_flag shall only be set to 1, when the dimensions of a confidence score region in the current sample is updated with reference to the preceding sync sample. The value of dimensions\_included\_flag shall be set to 0, when dynamic\_dimension\_flag in the referred sample entry equals to 0. The value of bounding\_box\_present\_flag shall only be set to 1, when the position and/or dimensions of a confidence score region in the current sample is updated with reference to the preceding sync sample.

**9.x.x.4.2 Sync samples**

**9.x.x.4.2.1 Syntax**

The sync sample syntax of this sample entry type 'gcdc' is specified as follows:

aligned(8) class ConfidenceScoreRegionSample() {

unsigned int(16) num\_regions;

for (i=1; i <= num\_regions; i++){

GPCCConfidenceScoreRegionStruct score\_region;

}

}

**9.x.x.4.2.2 Semantics**

num\_regions indicate the number of updated confidence score regions signalled in the sample. The confidence score regions whose dimensions are updated with reference to the previous sync sample are considered as updated regions. The confidence score regions that are cancelled in this sample with reference to the previous sync sample are also considered as updated regions.

score\_region provides the confidence score region when this sample is applied. The value of dimensions\_included\_flag and bounding\_box\_present\_flag shall be set to 1.

**9.x.x.4.3 Non-Sync samples**

**9.x.x.4.3.1 Syntax**

aligned(8) class ConfidenceScoreRegionSample() {

unsigned int(16) num\_regions;

for (i=1; i <= num\_regions; i++){

unsigned int(1) canceled\_region\_flag;

unsigned int(7) reserved;

if(!canceled\_region\_flag)

GPCCConfidenceScoreRegionStruct score\_region;

else

unsigned int(16) region\_id;

}

}

**9.x.x.4.3.2 Semantics**

num\_regions indicate the number of updated confidence score regions signalled in the sample. The confidence score regions whose dimensions are updated with reference to the previous sync sample are considered as updated regions. The confidence score regions that are cancelled in this sample with reference to the previous sync sample are also considered as updated regions.

canceled\_region\_flag indicates whether a confidence score region is cancelled or updated in the current sample with reference to the previous sync sample. Value 1 indicates confidence score regions is cancelled in this sample with reference to the previous sync sample. Value 0 indicates the confidence score region dimensions are updated with reference to the previous sync sample.

score\_region provides the confidence region data when this sample is applied. dimensions\_included\_flag value shall only be set to 1 when the dimensions of this confidence region are updated with reference to the previous sync sample. The value of dimensions\_included\_flag shall be set to 0, when dynamic\_dimension\_flag in the referred sample entry equals to 0. bounding\_box\_present\_flag shall only be set to 1 when the position and/or dimensions of this confidence region are updated with reference to the previous sync sample.

region\_id identifies a cancelled confidence region with reference to the previous sync sample.