

|   |                     |                            |
|---|---------------------|----------------------------|
| 1 | Status              | Sep 2017 Voting Packet     |
| 2 | Date of Last Update | 2017/06/25                 |
| 3 | Person Assigned     | David Clunie               |
| 4 |                     | mailto:dclunie@dclunie.com |
| 5 | Submitter Name      | QIICR                      |
| 6 | Submission Date     | 2017/03/27                 |

|    |  |  |
|----|--|--|
| 7  | Correction Number CP-1705  |  |
| 8  | Log Summary: Add more texture measures   |  |
| 9  | Name of Standard   |  |
| 10 | PS3.16   |  |
| 11 | Rationale for Correction:  |  |
| 12 | More texture measures exist than are currently defined in the DICOM standard.  |  |
| 13 | A comprehensive and definitive summary is found in Zwanenburg A et al, Image biomarker standardisation initiative - feature  |  |
| 14 | definitions. arXiv:161207003. 2016 Dec 21; Available from: <a href="http://arxiv.org/abs/1612.07003">http://arxiv.org/abs/1612.07003</a> . The existing definitions are updated to |  |
| 15 | use this as the normative reference, missing concepts are added, and potential ambiguities of historical synonyms are described.   |  |
| 16 | Additional radiomic features, not all of which are "texture" features, will be added in future CPs.  |  |
| 17 | Correction Wording:  |  |

Amend DICOM PS3.16 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

## 2 Normative References

### 2.1 General

[IBSI Features v3] *arXiv*. Zwanenburg A, Leger S, Vallières M, and Löck S. 9 Mar 2017. arXiv:1612.07003v3. "Image biomarker standardisation initiative - feature definitions". <http://arxiv.org/abs/1612.07003> .

## CID 7467 Grey Level Co-occurrence Matrix Measurements

Type: Extensible  
Version: ~~20141110~~yyyymmdd

Table CID 7467. Grey Level Co-occurrence Matrix Measurements

| Coding Scheme Designator | Code Value        | Code Meaning  |
|--------------------------|-------------------|---|
| DCM                      | 126060            | <del>Joint</del> Entropy of GLCM                                |
| DCM                      | 126061            | <del>Energy</del> <u>Root Angular Second Moment</u> of GLCM     |
| DCM                      | 126062            | <del>Homogeneity</del> <u>Inverse Difference Moment</u> of GLCM |
| DCM                      | 126063            | Contrast of GLCM  |
| DCM                      | 126064            | Dissimilarity of GLCM   |
| DCM                      | 126065            | <del>ASM</del> <u>Angular Second Moment</u> of GLCM             |
| DCM                      | 126066            | Correlation of GLCM   |
| <del>DCM</del>           | <del>ddd001</del> | <u>Joint Maximum of GLCM</u>                                    |
| <del>DCM</del>           | <del>ddd002</del> | <u>Joint Average of GLCM</u>                                    |
| <del>DCM</del>           | <del>ddd003</del> | <u>Joint Variance of GLCM</u>                                   |
| <del>DCM</del>           | <del>ddd004</del> | <u>Difference Average of GLCM</u>                               |
| <del>DCM</del>           | <del>ddd005</del> | <u>Difference Variance of GLCM</u>                              |
| <del>DCM</del>           | <del>ddd006</del> | <u>Difference Entropy of GLCM</u>                               |
| <del>DCM</del>           | <del>ddd007</del> | <u>Sum Average of GLCM</u>                                      |
| <del>DCM</del>           | <del>ddd008</del> | <u>Sum Variance of GLCM</u>                                     |
| <del>DCM</del>           | <del>ddd009</del> | <u>Sum Entropy of GLCM</u>                                      |
| <del>DCM</del>           | <del>ddd010</del> | <u>Inverse Difference of GLCM</u>                               |
| <del>DCM</del>           | <del>ddd011</del> | <u>Inverse Difference Normalized of GLCM</u>                    |
| <del>DCM</del>           | <del>ddd012</del> | <u>Inverse Difference Moment Normalized of GLCM</u>             |
| <del>DCM</del>           | <del>ddd013</del> | <u>Inverse Variance of GLCM</u>                                 |
| <del>DCM</del>           | <del>ddd014</del> | <u>Autocorrelation of GLCM</u>                                  |
| <del>DCM</del>           | <del>ddd015</del> | <u>Cluster Tendency of GLCM</u>                                 |
| <del>DCM</del>           | <del>ddd016</del> | <u>Cluster Shade of GLCM</u>                                    |
| <del>DCM</del>           | <del>ddd017</del> | <u>Cluster Prominence of GLCM</u>                               |
| <del>DCM</del>           | <del>ddd018</del> | <u>First Measure of Information Correlation of GLCM</u>         |
| <del>DCM</del>           | <del>ddd019</del> | <u>Second Measure of Information Correlation of GLCM</u>        |

## CID ccc1 Grey Level Run Length Based Features

Type: Extensible

Version:                    yyyymmdd

Table CID ccc1. Grey Level Run Length Based Features

| <u>Coding Scheme Designator</u> | <u>Code Value</u> | <u>Code Meaning</u>                                |
|---------------------------------|-------------------|--|
| <u>DCM</u>                      | <u>ddd101</u>     | <u>Short Runs Emphasis</u>                         |
| <u>DCM</u>                      | <u>ddd102</u>     | <u>Long Runs Emphasis</u>                          |
| <u>DCM</u>                      | <u>ddd103</u>     | <u>Low Gray Level Run Emphasis</u>                 |
| <u>DCM</u>                      | <u>ddd104</u>     | <u>High Gray Level Run Emphasis</u>                |
| <u>DCM</u>                      | <u>ddd105</u>     | <u>Short Run Low Gray Level Emphasis</u>           |
| <u>DCM</u>                      | <u>ddd106</u>     | <u>Short Run High Gray Level Emphasis</u>          |
| <u>DCM</u>                      | <u>ddd107</u>     | <u>Long Run Low Gray Level Emphasis</u>            |
| <u>DCM</u>                      | <u>ddd108</u>     | <u>Long Run High Gray Level Emphasis</u>           |
| <u>DCM</u>                      | <u>ddd109</u>     | <u>Gray Level Nonuniformity in Runs</u>            |
| <u>DCM</u>                      | <u>ddd110</u>     | <u>Gray Level Nonuniformity in Runs Normalized</u> |
| <u>DCM</u>                      | <u>ddd111</u>     | <u>Run Length Nonuniformity</u>                    |
| <u>DCM</u>                      | <u>ddd112</u>     | <u>Run Length Nonuniformity Normalized</u>         |
| <u>DCM</u>                      | <u>ddd113</u>     | <u>Run Percentage</u>                              |
| <u>DCM</u>                      | <u>ddd114</u>     | <u>Grey Level Variance in Runs</u>                 |
| <u>DCM</u>                      | <u>ddd115</u>     | <u>Run Length Variance</u>                         |
| <u>DCM</u>                      | <u>ddd116</u>     | <u>Run Entropy</u>                                 |

CID ccc2 Grey Level Size Zone Based Features

Type:                    Extensible  
Version:                    yyyymmdd

Table CID ccc2. Grey Level Size Zone Based Features

| <u>Coding Scheme Designator</u> | <u>Code Value</u> | <u>Code Meaning</u>                                      |
|---------------------------------|-------------------|--|
| <u>DCM</u>                      | <u>ddd201</u>     | <u>Small Zone Emphasis</u>                               |
| <u>DCM</u>                      | <u>ddd202</u>     | <u>Large Zone Emphasis</u>                               |
| <u>DCM</u>                      | <u>ddd203</u>     | <u>Low Gray Level Zone Emphasis</u>                      |
| <u>DCM</u>                      | <u>ddd204</u>     | <u>High Gray Level Zone Emphasis</u>                     |
| <u>DCM</u>                      | <u>ddd205</u>     | <u>Small Zone Low Gray Level Emphasis</u>                |
| <u>DCM</u>                      | <u>ddd206</u>     | <u>Small Zone High Gray Level Emphasis</u>               |
| <u>DCM</u>                      | <u>ddd207</u>     | <u>Large Zone Low Gray Level Emphasis</u>                |
| <u>DCM</u>                      | <u>ddd208</u>     | <u>Large Zone High Gray Level Emphasis</u>               |
| <u>DCM</u>                      | <u>ddd209</u>     | <u>Grey Level Nonuniformity in Size Zones</u>            |
| <u>DCM</u>                      | <u>ddd210</u>     | <u>Grey Level Nonuniformity in Size Zones Normalized</u> |
| <u>DCM</u>                      | <u>ddd211</u>     | <u>Zone Size Nonuniformity</u>                           |
| <u>DCM</u>                      | <u>ddd212</u>     | <u>Zone Size Nonuniformity Normalized</u>                |
| <u>DCM</u>                      | <u>ddd213</u>     | <u>Zone Percentage</u>                                   |
| <u>DCM</u>                      | <u>ddd214</u>     | <u>Grey Level Variance in Zones</u>                      |
| <u>DCM</u>                      | <u>ddd215</u>     | <u>Zone Size Variance</u>                                |
| <u>DCM</u>                      | <u>ddd216</u>     | <u>Zone Size Entropy</u>                                 |

## CID 7468 Texture Measurements

Type: Extensible  
Version: 20141110yyymmdd

Table CID 7468. Texture Measurements

| Coding Scheme Designator   | Code Value | Code Meaning      |
|--|------------|-------------------|
| <i>Include CID 7467 "Grey Level Co-occurrence Matrix Measurements"</i> |            |                   |
| <b><u>Include CID ccc1 "Grey Level Run Length Based Features"</u></b>  |            |                   |
| <b><u>Include CID ccc2 "Grey Level Size Zone Based Features"</u></b>   |            |                   |
| DCM  | 126050     | Fractal Dimension |

Amend DICOM PS3.16 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

## D DICOM Controlled Terminology Definitions (Normative)

Table D-1. DICOM Controlled Terminology Definitions

| Code Value | Code Meaning   | Definition  | Notes   |
|------------|--|---|---|
| 126050     | Fractal Dimension  | A statistical index of complexity comparing how detail in a fractal pattern changes with the scale at which it is measured; a ratio of the change in detail to the change in scale.   |   |
| 126060     | <del>Joint</del> Entropy of GLCM                                       | The zero order entropy of a Gray Level Co-occurrence Matrix (GLCM). A measure of disorder. <b><u>Abbreviated ENT.</u></b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3].                              |   |
| 126061     | <del>Energy</del> <b><u>Root Angular Second Moment</u></b> of GLCM     | The <del>energy (uniformity)</del> (square root of the Angular Second Moment (ASM)) of a Gray Level Co-occurrence Matrix (GLCM). A measure of orderliness.<br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> .               | <b><u>Sometimes referred to as "energy", "uniformity" or "uniformity of energy" but then potentially confused with ASM. Not defined in [IBSI Features v3].</u></b>                              |
| 126062     | <del>Homogeneity</del> <b><u>Inverse Difference Moment</u></b> of GLCM | The Inverse Difference Moment ( <del>homogeneity</del> ) of a Gray Level Co-occurrence Matrix (GLCM). <b><u>Abbreviated IDM.</u></b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3].                   | <b><u>Other concepts are sometimes referred to as "homogeneity", e.g., the "inverse difference", which is calculated from the absolute value of differences rather than square of them.</u></b> |
| 126063     | Contrast of GLCM   | The sum of squares <del>variance</del> of a Gray Level Co-occurrence Matrix (GLCM). <b><u>A measure of grey level variations. Abbreviated CON.</u></b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3]. | <b><u>Distinct from "joint (sum of squares) variance" and "dissimilarity".</u></b>  |
| 126064     | Dissimilarity of GLCM  | The dissimilarity of a Gray Level Co-occurrence Matrix (GLCM). <b><u>Abbreviated DIS.</u></b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3].  | <b><u>Distinct from "contrast", which uses square rather than absolute value of difference.</u></b>   |

| Code Value    | Code Meaning                                      | Definition  | Notes   |
|---------------|---|---|---|
| 126065        | <b>ASM Angular Second Moment</b> of GLCM          | The Angular Second Moment of a Gray Level Co-occurrence Matrix (GLCM). <b>Abbreviated ASM</b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3].  | <b>Sometimes referred to as "energy", "uniformity" or "uniformity of energy" but then potentially confused with square root of ASM.</b> |
| 126066        | Correlation of GLCM                               | A measure of the linear dependency of grey levels on those of neighbouring pixels of a Gray Level Co-occurrence Matrix (GLCM). <b>Abbreviated COR.</b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/equations.htm">http://www.fp.ucalgary.ca/mhallbey/equations.htm</a> [IBSI Features v3]. | <b>Correlation is NaN for a constant image.</b>   |
| 126067        | Gray Level Co-occurrence Matrix <del>(GLCM)</del> | A tabulation of how often different combinations of pixel values (grey levels) occur in an image. <b>Abbreviated GLCM.</b><br><br>See <a href="http://www.fp.ucalgary.ca/mhallbey/the_glcm.htm">http://www.fp.ucalgary.ca/mhallbey/the_glcm.htm</a> [IBSI Features v3].                               |   |
| <b>ddd801</b> | <b>Grey Level Run Length Matrix</b>               | <b>The tabulation of grey level run lengths in a particular direction in an image. Abbreviated GLRLM.</b><br><br><b>See [IBSI Features v3].</b>   |   |
| <b>ddd802</b> | <b>Grey Level Size Zone Matrix</b>                | <b>A tabulation of counts of the number of groups of connected voxels with a specific discretized grey level value and size. Abbreviated GLSZM.</b><br><br><b>See [IBSI Features v3].</b>   |   |
| <b>ddd001</b> | <b>Joint Maximum of GLCM</b>                      | <b>The probability corresponding to the most common grey level co-occurrence in the GLCM. Abbreviated MAX.</b><br><br><b>See [IBSI Features v3].</b>  |   |
| <b>ddd002</b> | <b>Joint Average of GLCM</b>                      | <b>The grey level weighted sum of joint probabilities of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>  |   |
| <b>ddd003</b> | <b>Joint Variance of GLCM</b>                     | <b>The sum of squares of the difference from the joint average of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>   |   |
| <b>ddd004</b> | <b>Difference Average of GLCM</b>                 | <b>The average for the diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>  |   |
| <b>ddd005</b> | <b>Difference Variance of GLCM</b>                | <b>The variance for the diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>   |   |
| <b>ddd006</b> | <b>Difference Entropy of GLCM</b>                 | <b>The entropy for the diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>  |   |
| <b>ddd007</b> | <b>Sum Average of GLCM</b>                        | <b>The average for the cross-diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</b><br><br><b>See [IBSI Features v3].</b>  |   |

| Code Value    | Code Meaning  | Definition  | Notes  |
|---------------|---|---|--|
| <u>ddd008</u> | <u>Sum Variance of GLCM</u>                             | <u>The variance for the cross-diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u> |  |
| <u>ddd009</u> | <u>Sum Entropy of GLCM</u>                              | <u>The entropy for the cross-diagonal probabilities of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd010</u> | <u>Inverse Difference of GLCM</u>                       | <u>The inverse difference of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                            | <u>Sometimes referred to as "homogeneity" but that term is historically used to refer to the "inverse difference moment", which is calculated from the square of differences rather than absolute value of them.</u> |
| <u>ddd011</u> | <u>Inverse Difference Normalized of GLCM</u>            | <u>The normalized inverse difference of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                 | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u>   |
| <u>ddd012</u> | <u>Inverse Difference Moment Normalized of GLCM</u>     | <u>The normalized inverse difference moment of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>          | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u>   |
| <u>ddd013</u> | <u>Inverse Variance of GLCM</u>                         | <u>The inverse variance of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                              |  |
| <u>ddd014</u> | <u>Autocorrelation of GLCM</u>                          | <u>The autocorrelation of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                               |  |
| <u>ddd015</u> | <u>Cluster Tendency of GLCM</u>                         | <u>The cluster tendency of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                              |  |
| <u>ddd016</u> | <u>Cluster Shade of GLCM</u>                            | <u>The cluster shade of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                                 |  |
| <u>ddd017</u> | <u>Cluster Prominence of GLCM</u>                       | <u>The cluster prominence of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>                            |  |
| <u>ddd018</u> | <u>First Measure of Information Correlation of GLCM</u> | <u>The first measure of information correlation of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>      |  |

| Code Value    | Code Meaning   | Definition   | Notes  |
|---------------|--|--|--|
| <u>ddd019</u> | <u>Second Measure of Information Correlation of GLCM</u> | <u>The second measure of information correlation of a Gray Level Co-occurrence Matrix (GLCM).</u><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd101</u> | <u>Short Runs Emphasis</u>                               | <u>A measure of the distribution of short runs in a gray level run length matrix. Abbreviated SRE.</u><br><u>See [IBSI Features v3].</u>                                       |  |
| <u>ddd102</u> | <u>Long Runs Emphasis</u>                                | <u>A measure of the distribution of long runs in a gray level run length matrix. Abbreviated LRE.</u><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd103</u> | <u>Low Gray Level Run Emphasis</u>                       | <u>A measure of the distribution of low gray level values in a gray level run length matrix. Abbreviated LGRE.</u><br><u>See [IBSI Features v3].</u>                           |  |
| <u>ddd104</u> | <u>High Gray Level Run Emphasis</u>                      | <u>A measure of the distribution of high gray level values in a gray level run length matrix. Abbreviated HGRE.</u><br><u>See [IBSI Features v3].</u>                          |  |
| <u>ddd105</u> | <u>Short Run Low Gray Level Emphasis</u>                 | <u>A measure of the joint distribution of short runs and low gray level values in a gray level run length matrix. Abbreviated SRLGE.</u><br><u>See [IBSI Features v3].</u>     |  |
| <u>ddd106</u> | <u>Short Run High Gray Level Emphasis</u>                | <u>A measure of the joint distribution of short runs and high gray level values in a gray level run length matrix. Abbreviated SRHGE.</u><br><u>See [IBSI Features v3].</u>    |  |
| <u>ddd107</u> | <u>Long Run Low Gray Level Emphasis</u>                  | <u>A measure of the joint distribution of long runs and low gray level values in a gray level run length matrix. Abbreviated LRLGE.</u><br><u>See [IBSI Features v3].</u>      |  |
| <u>ddd108</u> | <u>Long Run High Gray Level Emphasis</u>                 | <u>A measure of the the joint distribution of long runs and high gray level values in a gray level run length matrix. Abbreviated LRHGE.</u><br><u>See [IBSI Features v3].</u> |  |
| <u>ddd109</u> | <u>Gray Level Nonuniformity in Runs</u>                  | <u>A measure of the similarity of gray level values throughout the image in a gray level run length matrix. Abbreviated GLNU.</u><br><u>See [IBSI Features v3].</u>            |  |
| <u>ddd110</u> | <u>Gray Level Nonuniformity in Runs Normalized</u>       | <u>A normalized measure of the similarity of gray level values throughout the image in a gray level run length matrix.</u><br><u>See [IBSI Features v3].</u>                   | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u> |

| Code Value    | Code Meaning                               | Definition   | Notes  |
|---------------|--|--|--|
| <u>ddd111</u> | <u>Run Length Nonuniformity</u>            | <u>A measure of the the similarity of the length of runs throughout the image in a gray level run length matrix. Abbreviated RLNU.</u><br><br><u>See [IBSI Features v3].</u>               |  |
| <u>ddd112</u> | <u>Run Length Nonuniformity Normalized</u> | <u>A normalized measure of the the similarity of the length of runs throughout the image in a gray level run length matrix. Abbreviated RLNU.</u><br><br><u>See [IBSI Features v3].</u>    | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u> |
| <u>ddd113</u> | <u>Run Percentage</u>                      | <u>A measure of the homogeneity and distribution of runs of an image in a specific direction in a gray level run length matrix. Abbreviated RPC.</u><br><br><u>See [IBSI Features v3].</u> |  |
| <u>ddd114</u> | <u>Grey Level Variance in Runs</u>         | <u>The variance in runs for the grey levels in a gray level run length matrix.</u><br><br><u>See [IBSI Features v3].</u>   |  |
| <u>ddd115</u> | <u>Run Length Variance</u>                 | <u>The variance in runs for run lengths in a gray level run length matrix.</u><br><br><u>See [IBSI Features v3].</u>   |  |
| <u>ddd116</u> | <u>Run Entropy</u>                         | <u>The entropy of runs in a gray level run length matrix.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd201</u> | <u>Small Zone Emphasis</u>                 | <u>A feature that emphasizes small zones from a gray level size zone matrix. Abbreviated SZE.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd202</u> | <u>Large Zone Emphasis</u>                 | <u>A feature that emphasizes large zones from a gray level size zone matrix. Abbreviated LZE.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd203</u> | <u>Low Gray Level Zone Emphasis</u>        | <u>A feature that emphasizes low gray level zones from a gray level size zone matrix. Abbreviated LGZE.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd204</u> | <u>High Gray Level Zone Emphasis</u>       | <u>A feature that emphasizes high gray level zones from a gray level size zone matrix. Abbreviated LGZE.</u><br><br><u>See [IBSI Features v3].</u>   |  |
| <u>ddd205</u> | <u>Small Zone Low Gray Level Emphasis</u>  | <u>A feature that emphasizes small zone sizes and low grey levels from a gray level size zone matrix. Abbreviated SZLGE.</u><br><br><u>See [IBSI Features v3].</u>                         |  |
| <u>ddd206</u> | <u>Small Zone High Gray Level Emphasis</u> | <u>A feature that emphasizes small zone sizes and high grey levels from a gray level size zone matrix. Abbreviated SZHGE.</u><br><br><u>See [IBSI Features v3].</u>                        |  |



| Code Value    | Code Meaning   | Definition   | Notes  |
|---------------|--|--|--|
| <u>ddd207</u> | <u>Large Zone Low Gray Level Emphasis</u>                | <u>A feature that emphasizes large zone sizes and low grey levels from a gray level size zone matrix. Abbreviated LZLGE.</u><br><br><u>See [IBSI Features v3].</u>                               |  |
| <u>ddd208</u> | <u>Large Zone High Gray Level Emphasis</u>               | <u>A feature that emphasizes large zone sizes and high grey levels from a gray level size zone matrix. Abbreviated LZHGE.</u><br><br><u>See [IBSI Features v3].</u>                              |  |
| <u>ddd209</u> | <u>Grey Level Nonuniformity in Size Zones</u>            | <u>The distribution of zone counts over the grey values in a gray level size zone matrix. Abbreviated GLNU.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd210</u> | <u>Grey Level Nonuniformity in Size Zones Normalized</u> | <u>The normalized distribution of zone counts over the grey values in a gray level size zone matrix.</u><br><br><u>See [IBSI Features v3].</u>   | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u> |
| <u>ddd211</u> | <u>Zone Size Nonuniformity</u>                           | <u>The distribution of zone counts over the different zone sizes in a gray level size zone matrix. Abbreviated ZSNU.</u><br><br><u>See [IBSI Features v3].</u>                                   |  |
| <u>ddd212</u> | <u>Zone Size Nonuniformity Normalized</u>                | <u>The normalized distribution of zone counts over the different zone sizes in a gray level size zone matrix. Abbreviated ZSNU.</u><br><br><u>See [IBSI Features v3].</u>                        | <u>The US not UK spelling of "normalized" is used to be consistent with the DICOM convention, rather than the IBSI spelling.</u> |
| <u>ddd213</u> | <u>Zone Percentage</u>                                   | <u>The fraction of the number of realised zones relative to the maximum number of potential zones in a gray level size zone matrix. Abbreviated ZPERC.</u><br><br><u>See [IBSI Features v3].</u> |  |
| <u>ddd214</u> | <u>Grey Level Variance in Zones</u>                      | <u>The variance in the variance in zone counts for the grey levels in a gray level size zone matrix.</u><br><br><u>See [IBSI Features v3].</u>   |  |
| <u>ddd215</u> | <u>Zone Size Variance</u>                                | <u>The variance in zone counts for the different zone sizes in a gray level size zone matrix.</u><br><br><u>See [IBSI Features v3].</u>  |  |
| <u>ddd216</u> | <u>Zone Size Entropy</u>                                 | <u>The entropy of zone sizes in a gray level size zone matrix.</u><br><br><u>See [IBSI Features v3].</u>   |  |