# Requirements/Changes Based off Ultrasound Prototype Modifications to NBIA

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| Figure/Description | Requirements/Requested Change in Prototype | NBIA Team Decision |
| A | Write Image modality out (for all) along with abbreviation. OR just the full name.   1. **Write “ Ultrasound (US)” out under “Search Criteria: Image Modality(ies)”** |  |
| B | 1. **For “Number of Frames (US), Present 2 options:**  * **Single Frame** * **Mulit-frame (Cine Loop)**   **Pre condition: have Both checked by Default** |  |
| C | ~~Remove. If you have D topics, Ultrasound investigators will know if B-mode or Color or 3D volume or 3D rendered, etc. (This will simplify your classifications of the image)~~   1. **Ultrasound Image Mode: Present 2 Options:**  * **B-mode** * **With Color Doppler**   **Pre-condition: both checked by default** | ATF 11/28 notes: - Apologies, had 2 different reqs – please keep and modify as shown in 3. |
| D | * 2D Imaging * And you can couple items together (when Ultrasound Investigators are looking for images via NBIA, they will not need this level of detail for viewing); Group (0008,0008) values   Suggest:   1. **US Image Type:**  * **2D Imaging [ Assign 2D imaging and M-mode (0002) to this classification, Only show “2D Imaging” on the screen]** * **Color Doppler [Assign to this classification of “Color Doppler” - the values for Color M-mode (0020), CW Doppler, PW Doppler, Power but only show “Color Doppler” on the screen]** * **Contrast Ultrasound** * **3D Imaging** * **Tissue Characterization**   **Pre-condition/default settings: Have “2D Imaging” and “Color Doppler” checked** | ATF 11/28 notes: **there is M-mode with B-mode or M-mode with color**  basically I’m suggesting you pool together the associated “Color/Doppler” modes into one bucket: (0004, ..8, ..10,..20,0100, and add 0200- tissue characterization (which can be displayed in Color or Bmode, but let’s just bucket it to Color).   |  |  |  | | --- | --- | --- | | 0001 = 2D Imaging | 0002 = M-Mode | 0004 = CW Doppler | | 0008 = PW Doppler | 0010 = Color Doppler | 0020 = Color M-Mode | | 0040 = 3D Rendering | 0100 = Color Power Mode | 0200 = Tissue Characterization | |
| E | Contrast: Enhanced/Unenhanced. We already have this in D (so double asked).  Suggest:   1. **Contrast Studies Present** (check or not checked) Pre-condition: checked. |  |
| F | Use Image Type (0008,0008), Value 3:   1. **Use these values**   ABDOMINAL  BREAST  CHEST  ENDOCAVITARY  ENDORECTAL  ENDOVAGINAL  ~~EPICARDIAL~~  FETAL HEART  GYNECOLOGY  ~~INTRACARDIAC~~  INTRAOPERATIVE  INTRAVASCULAR  MUSCULOSKELETAL  NEONATAL HEAD  OBSTETRICAL  OPHTHALMIC  PEDIATRIC  PELVIC  RETROPERITONEAL  SCROTAL  SMALL PARTS  T~~EE~~  THYROID  TRANSCRANIAL  ~~TTE~~  US BIOPSY  VASCULAR  But Assign **CARDIAC** to (TEE, TTE, EPICARDIAL, INTRACARDIAC) |  |
| G | Not applicable to Ultrasound.   1. **Change to “Image Slice Thickness (non-Ultrasound)** |  |
| H | Need more examples for how ultrasound studies will be stored, but for now use default as it’s being used in NBIA for other modalities. |  |
| I | 1. **Please add “Number of Frames” in the Table for each DICOM Image.** |  |
| J | 1. **Change “View Series in Cine Mode” to “ View Cine Loop”** |  |
| K | 1. **Add “If viewing Ultrasound Cine Loop, note that it is not playing at acquired frame rate – please download to local computer and run with separate DICOM viewer.”** |  |

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# DICOM Tags Related Ultrasound Image Search (Comments on NBIA team notes):

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|  | Search Requirement | DICOM Tag | Tag Label | Permissible Values | Reference |
| 1 | Modality | 0008, 0060 | Modality | US |  |
| 2 | Number of Frames | 0028,0008 | Number of Frames | Positive integer | DICOM Correction Item  ftp://medical.nema.org/medical/**dicom**/final/cp985\_ft.doc |
| 3 | B-mode | (0028,0014) | Ultrasound Color Data  Present | This element indicates if any ultrasound  color data is present in an image.  00 = Ultrasound color data not present in  image  01 = Ultrasound color data is present in  image. | Supplement 5  Ultrasound Application Profile, IOD and  Transfer Syntax Extensions  ftp://medical.nema.org/medical/dicom/final/sup05\_ft.pdf |
| 4 | Color = Color Doppler (blood flow velocity) | (0008,0008) | Contrast/Bolus Agent | 0001 = 2D Imaging   |  |  |  | | --- | --- | --- | | 0010 = Color Doppler   |  |  | | --- | --- | | 0040 = 3D Rendering   |  | | --- | | 0004 = CW Doppler | | | | DICOM Correction Item  http://medical.nema.org/dicom/cp/CPack-28\_PDF/cp465\_lb.pdf |
| 5 | Contrast (this one might be user - -Contrast study)  **ATF: USE this one to determine if Ultrasound Contrast Present or not – classify as “Contrast”** | 0018,0010 | Contrast/Bolus Agent |  | http://www.dabsoft.ch/dicom/3/C.7.6.4/ |
| 6 | Spectral Doppler  **ATF: Just use #4 above, with Value 4.** | 0018,604E | Pixel Component Data Type | 0002H =Spectral doppler | DICOM Correction Item  ftp://medical.nema.org/medical/dicom/final/cp465\_ft2.pdf |
| 7 | 3D (3D Volume)  **ATF: This is the same as #4** |  |  | 0040 = 3D Rendering | DICOM Correction Item  <ftp://medical.nema.org/medical/dicom/final/cp465_ft2.pdf> |
| 8 | Power Doppler  **ATF: This is the same as #4** | (0008,0008) | Image Type | 0008 = PW Doppler | DICOM Correction Item  <http://medical.nema.org/dicom/cp/CPack-28_PDF/cp465_lb.pdf> |

**C.8.5.6.1.1 Image Type**

For US Images, Image Type [(0008,0008)](http://www.dabsoft.ch/dicom/6/6#%280008,0008%29) is specified to be Type 2. The Defined Terms for Value 3 are:

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| --- | --- | --- |
| ABDOMINAL | BREAST | CHEST |
| ENDOCAVITARY | ENDORECTAL | ENDOVAGINAL |
| EPICARDIAL | FETAL HEART | GYNECOLOGY |
| INTRACARDIAC | INTRAOPERATIVE | INTRAVASCULAR |
| MUSCULOSKELETAL | NEONATAL HEAD | OBSTETRICAL |
| OPHTHALMIC | PEDIATRIC | PELVIC |
| RETROPERITONEAL | SCROTAL | SMALL PARTS |
| TEE | THYROID | TRANSCRANIAL |
| TTE | US BIOPSY | VASCULAR |

Value 4 is constructed as a modality bit map to allow for a description of multi-modality displays. In using this bit map, the sum of the values of the various modalities will unambiguously determine the constituent modalities.

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| 0001 = 2D Imaging | 0002 = M-Mode | 0004 = CW Doppler |
| 0008 = PW Doppler | 0010 = Color Doppler | 0020 = Color M-Mode |
| 0040 = 3D Rendering | 0100 = Color Power Mode | 0200 = Tissue Characterization |

Notes: 1. All Values are hexadecimal encoded as a CS. See [PS 3.5](http://www.dabsoft.ch/dicom/5).

2. For example, Color Flow with CW spectral Doppler would have a value 4 = 0015. Note that no assumption should be made in Color Doppler or Color M-Mode regarding underlying B or M-Mode, respectively.

-- <http://www.dabsoft.ch/dicom/3/C.8.5/>