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**APPENDICES**

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## Appendix 1

### Protocol Parameters for each CT scanner :

1 : **Siemens Sensation 16** scanner using the following technique parameters in **sequential mode\*** for head examination without contrast agent and **rotation time is 1.0 sec\*** :

| kV   | Effective mAs | Slice Collimation | Slice width | Feed/Scan |         |
|------|---------------|-------------------|-------------|-----------|---------|
| 100  | 100           | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
|      | 120           | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
|      | 150           | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
|      | 260           | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
|      | 320           | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
|      | 120*          | 100               | 0.75 mm     | 4.5mm     | 9.5 mm  |
|      |               |                   | 1.5 mm      | 9.0mm     | 19.0 mm |
| 120  |               | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
| 150  |               | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
| 260  |               | 0.75 mm           | 4.5mm       | 9.5 mm    |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |
| 320* |               | 0.75 mm*          | 4.5mm*      | 9.5 mm*   |         |
|      |               | 1.5 mm            | 9.0mm       | 19.0 mm   |         |

These are various protocol parameters that recommended to use for Siemens Sensation 16 by the Application Guide of CT machine (Siemens, Germany).

\* This is the routine protocol parameter that used for Siemens Sensation 16 at King Chulalongkorn Memorial Hospital.

2 : **Siemens Sensation 16** scanner using the following technique parameters in **spiral mode\*** for head examination without contrast agent and **rotation time is 0.75 sec\*** :

| kV   | Effective mAs | Slice Collimation | Slice width | Feed/Scan |        |
|------|---------------|-------------------|-------------|-----------|--------|
| 100  | 100           | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
|      | 120           | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
|      | 150           | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
|      | 260           | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
|      | 320           | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
|      | 120*          | 100               | 0.75 mm     | 4.0mm     | 5.1mm  |
|      |               |                   | 1.5 mm      | 8.0mm     | 13.7mm |
| 120  |               | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
| 150* |               | 0.75 mm*          | 4.0mm*      | 5.1mm*    |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
| 260  |               | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |
| 320  |               | 0.75 mm           | 4.0mm       | 5.1mm     |        |
|      |               | 1.5 mm            | 8.0mm       | 13.7mm    |        |

These are various protocol parameters that recommended to use for Siemens Sensation 16 by the Application Guide of CT machine (Siemens, Germany).

\* This is the routine protocol parameter that used for Siemens Sensation 16 at King Chulalongkorn Memorial Hospital.

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**3 : Siemens Sensation 4** scanner using the following technique parameters in **sequential mode\*** for head examination without contrast agent and **rotation time is 1.0 sec\*** :

| kV   | Effective mAs | Slice Collimation | Slice width | Feed/Scan |        |
|------|---------------|-------------------|-------------|-----------|--------|
| 100  | 100           | 4x1mm             | 4.0 mm      | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
|      | 120           | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
|      | 150           | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
|      | 260           | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
|      | 320           | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
|      | 120*          | 100               | 4x1mm       | 4.0mm     | 4.0mm  |
|      |               |                   | 2x8mm       | 8.0mm     | 16.0mm |
| 120  |               | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
| 150  |               | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
| 260* |               | 4x1mm*            | 4.0mm*      | 4.0mm*    |        |
|      |               | 2x8mm             | 8.0mm       | 16.0mm    |        |
| 320  |               | 4x1mm             | 4.0mm       | 4.0mm     |        |
|      |               | 2x8mmr.           | 8.0mm       | 16.0mm    |        |

These are various protocol parameters that recommended to use for Siemens Sensation 4 by the Application Guide of CT machine (Siemens, Germany).

\* This is the routine protocol parameter that used for Siemens Sensation 4 at King Chulalongkorn Memorial Hospital.

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**4 : Siemens Sensation 4** scanner using the following technique parameters in **spiral mode\*** for head examination without contrast agent **rotation time is 0.75 sec\*** :

| kV   | Effective mAs | Slice Collimation | Slice width | Feed/Scan |
|------|---------------|-------------------|-------------|-----------|
| 100  | 100           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 120           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 150           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 260           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
| 320  | 4x1mm         | 4.0mm             | 2.6mm       |           |
|      | 4x2.5mm       | 8.0mm             | 6.5mm       |           |
| 120* | 100           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 120           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 150*          | 4x1mm*            | 4.0mm*      | 2.6mm*    |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 260           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |
|      | 320           | 4x1mm             | 4.0mm       | 2.6mm     |
|      |               | 4x2.5mm           | 8.0mm       | 6.5mm     |

These are various protocol parameters that recommended to use for Siemens Sensation 4 by the Application Guide of CT machine (Siemens, Germany).

\* This is the routine protocol parameter that used for Siemens Sensation 4 at King Chulalongkorn Memorial Hospital.

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## Appendix 2

### Cases Report Form :

**CT Scanner : Siemens Sensation**

**Protocol parameters : kV**

**Effective mAs**

**Slice Collimation**

**Slice Width**

**Feed/Scan**

### I. For an PMMA Cylindrical phantom

| Position   | CTDI <sub>w</sub> (mGy) | D <sub>AVE</sub> (mGy) |
|------------|-------------------------|------------------------|
| Center     |                         |                        |
| 3 o'clock  |                         |                        |
| 6 o'clock  |                         |                        |
| 9 o'clock  |                         |                        |
| 12 o'clock |                         |                        |

### II. For check Image Quality and Patient Dose

1. Patient Radiation dose ( CTDI<sub>vol</sub>, mGy )

|                     |                   |       |
|---------------------|-------------------|-------|
| Protocol Parameters | kV                | ..... |
|                     | Effective mAs     | ..... |
|                     | slice collimation | ..... |
|                     | slice width       | ..... |
|                     | feed/scan         | ..... |



## VITAE

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