# System Overview

rainbow CT

# System Overview

## 1. Comparative Matrix

| | Modalities | | | | Detector | Install Option | | | Onsite Upgrade |
|---|---|---|---|---|---|---|---|---|---|
| | CBCT | Panoramic | Cephalometric | Stitching | Number of | Floor Stand | Floor Mount | Wall Mount | Cephalometric |
| 2-in-1 | O | O | X | O | 1 | O | X | X | X |
| 3-in-1 | O | O | O | O | 2 | | | | |

## 2. Reading Serial Number

① ② ③ ④ ⑤ ⑥

**L DD DX D NN YY**

[Sample] L20DXD0221

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

① Month (A~L) – A: January
② Production Date
③ Model Code (DX: rainbow CT / BC: bright CT)
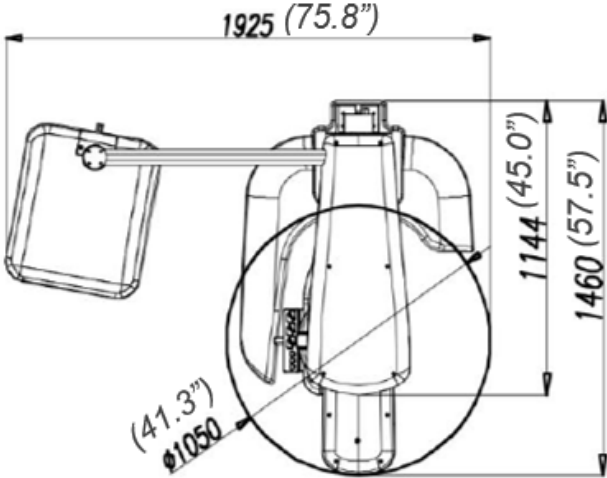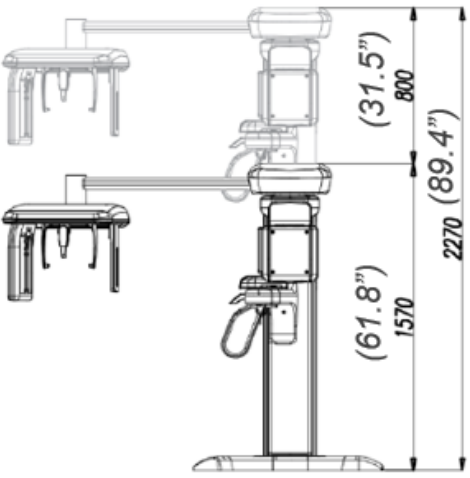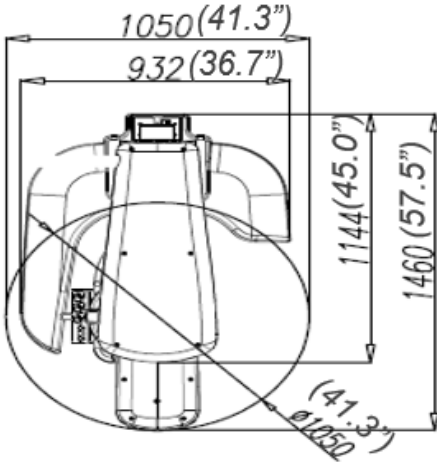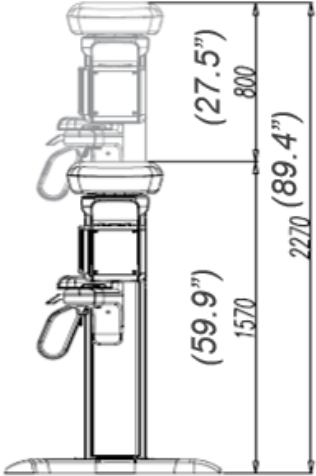④ Dentium
⑤ Production number
⑥ Year of production

# Cont'd..

## 3. General View

| # | Part Name | Description |
|---|-----------|-------------|
| ① | Vertical | FDD (Focal spot to Detector Distance) |
| ② | Rotator | * CT, Pan: 600mm (23.6") <br> * Ceph: 1,745mm (68.7") |
| ③ | Detector (CT+Pan) | CMOS |
| ④ | Tube Tank | * Tube Voltage: 60 ~ 100kV ± 3% <br> * Tube Current: 4 ~ 12mA ± 3% |
| ⑤ | Chin Rest | Automatic (Open-Close) |
| ⑥ | Control Panel | Manual |
| ⑦ | Lift Column | Min. 1,570mm (61.8") / Max. 2,270mm (89.3") |
| ⑧ | Main Base | Floor-stand Only |
| ⑨ | Ceph Arm | - |
| ⑩ | Status LED | Standby (Green), Ready (Blue), Orange (Exposure) |
| ⑪ | Secondary Collimator | - |
| ⑫ | Detector (Ceph) | CdTe CMOS |
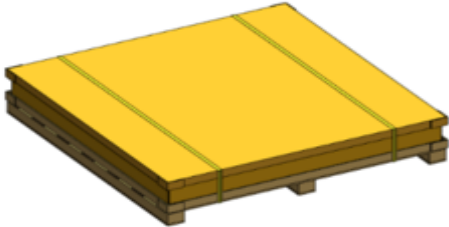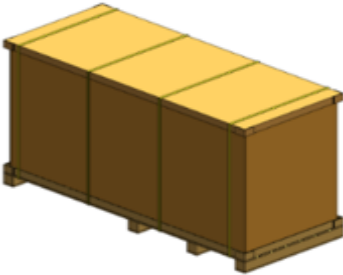
# Cont'd..

## 4. Dimensions

| | Dimension (W x D x H) | Option | Figure |
|---|---|---|---|
| W/ Ceph | 1,925 x 1,460 x 2,270mm (75.8 x 57.5 x 89.4") | 3-in-1 |  |
| W/O Ceph | 1,050 x 1,460 x 2,270mm (41.3 x 57.5 x 89.4") | 2-in-1 |  |

# Cont'd..

## 5. Crates

| | Dimension (W x D x H) | Contents | Net weight | Gross weight | Figure |
|---|---|---|---|---|---|
| Box 1 | 1,260 x 1,130 x 395mm (49.6 x 44.5 x 15.5") | Main Base | 44kg (97.0lbs) | 60kg (132.3lbs) |  |
| Box 2 | 1,760 x 720 x 1,408mm (69.3 x 28.3 x 55.4") | Main Body Workstation Others | 165kg (363.8lbs) | 230kg (507.1lbs) |  |
| Box 3 | 1,650 x 910 x 910mm (65.0 x 35.8 x 35.8") | Cephalometric Accessories | 35kg (77.2lbs) | 60kg (132.3lbs) |  |
| TOTAL | | | 244kg (538.0lbs) | 350kg (771.6lbs) | - |

# Cont'd..

## 6. Workstation

| | Specification |
|---|---|
| Manufacturer | HP |
| Model | Z4 G4 Workstation |
| CPU | Intel Xeon W-2223 |
| RAM | 16 GB DDR4-2933 Reg ECC RAM |
| HDD | 1TB 3.5 inch HDD |
| Graphic card | nvidia GeForce RTX-3050 8GB |
| Ethernet | Intel I210 T1 LAN Card / Serial Port |
| CD/DVD Drive | 9.5mm DVD-Writer 1st ODD |
| OS | Windows 10 Professional |
| Figure |  |

**+**

| | Specification |
|---|---|
| Manufacturer | HP |
| Model | EliteDisplay E22 G5 |
| Display size | 21.5-in |
| Native resolution | FHD 1920 x 1080 (16:9) |
| Viewing angle | 178° |
| Figure |  |

# Cont'd..

## 7. Software Package

| Category | Figure | Function |
|---|---|---|
| Software | rainbow 3D Viewer 1.1.0_rev1721<br>rainbowBackupRestore_1.0.35.3<br>rainbowDBServer_1.0.35.3<br>rainbowImageViewer_win7_package_1.0.35.3<br>rainbowCT_Ver 1.0.0 | * 3D Viewer: CBCT viewer<br>* BackupRestore: DB Table<br>* DBServer: PostgreSQL 9.5<br>* ImageViewer: 2D viewer (Main viewer)<br>* rainbowCT: Image acquisition |
| Firmware | rainbowCT_M1.0.1.2<br>rainbowCT_S1.0.0.4 | * M: Main board<br>* S: Sub board |
| Geometry | PanoramicGeometry_2.0.4.9_20201208 | All modalities |
| Engineering | rainbowCT_Ver.02.15 | Device test and update firmware |

# Cont'd..

## 8. System Configuration



| | Software Lists |
|---|---|
| C Drive | rainbow Image Viewer<br>rainbow 3D Viewer |

| | Capability | Software Lists |
|---|---|---|
| C Drive | Operation (HDD 1TB) | rainbow Image Viewer<br>rainbow 3D Viewer<br>rainbow DBServer |
| D Drive | Image storage (HDD 2TB) | X |

*RS232*

*Ethernet*

*LAN*

Internal

External
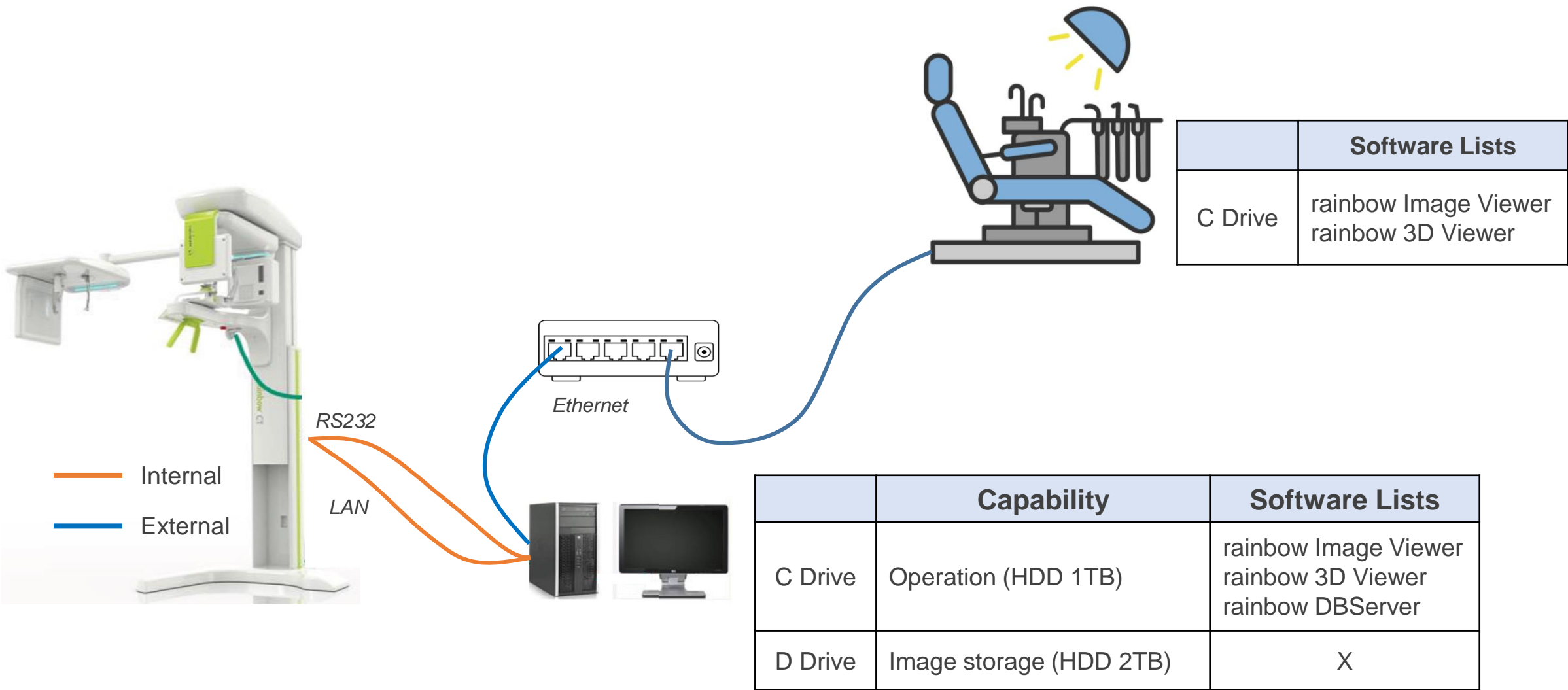
# Mechanical Specification

## 1. Image Magnification

| Modality | FOD(mm)* | FDD(mm)** | ODD(mm)*** | Magnification**** |
|---|---|---|---|---|
| CBCT | 393 | 600 | 207 | 1.53:1 |
| Panoramic | 443 | | 157 | 1.35:1 |
| Cephalometric | 1,525 | 1,745 | 220 | 1.14:1 |

\* FOD (Focal spot to Object Distance)

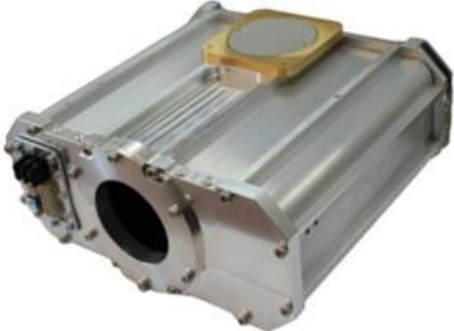\*\* FDD (Focal spot to Detector Distance)

\*\*\* ODD (Object to Detector Distance) = FDD-FOD

\*\*\*\* Magnification = FDD / FOD
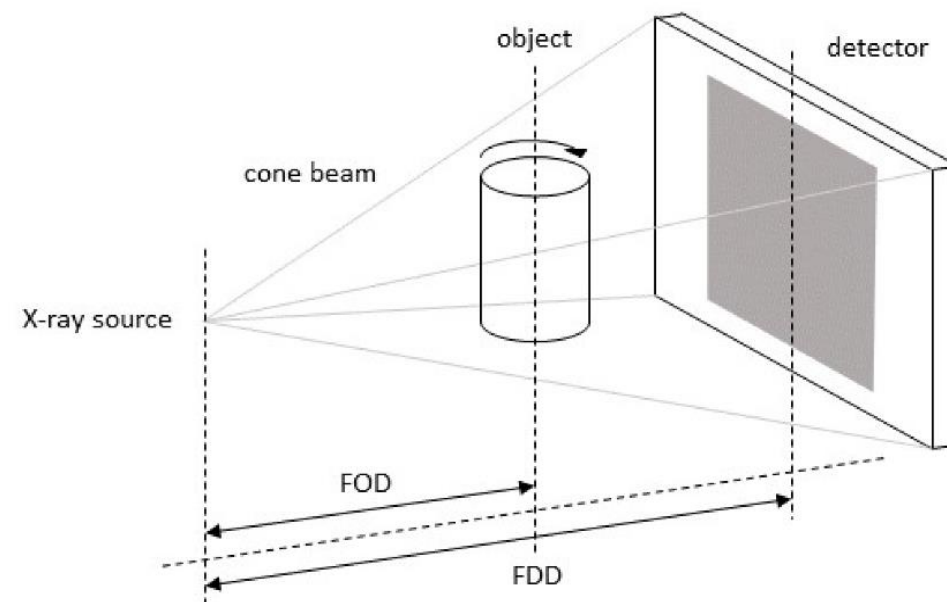
# Cont'd..

## 2. X-ray Generator

| Item | | Specification | Figure |
|---|---|---|---|
| Input power | | 110~240V, 50/60Hz | - |
| Rated output power | | 2.0-2.2 kVA | |
| High Voltage Generator | kVp | 60 ~ 100 kVp ± 3% (1kV step) |  |
| | mA | 4 ~ 12 mA ± 3% (0.1mA step) | |
| Tube | Manufacturer | POSKOM |  |
| | Insert | Toshiba | |
| | Focal spot | 0.5mm | |
| | Target Angle | 12 ° | |
| | Anode heat content | 30 KJ | |
| | Inherent filtration | 1.0mm Al | |

# Cont'd..

## 3. Detector

| | Panoramic | CBCT | Cephalometric |
|---|---|---|---|
| Type | CMOS | | CdTe CMOS |
| Model | C12820DK-40 | | C10502D-43 |
| Pixel size | 120μm x 120μm | 240μm x240μm | 100μm x 100μm |
| Active area | — | | 290mm x 6mm |
| Figure |  | |  |

# Cont'd..

## 4. Electrical Spec.

| | Description |
|---|---|
| Power supply voltage | 110-230 V |
| Frequency | 50 / 60Hz |
| Power rating | 2.2 kVA Max. |

$C\epsilon$ 0543

CE symbol grants the product compliance to the European Directive for Medical Devices 93/42/EEC as amended by 2007/47/EC as a class IIb device.

This product is designed and manufactured to meet the following standards:

 * IEC/EN/UL 60601-1, IEC/EN 60601-1-1, IEC/EN 60601-1-2, IEC/EN 60601-1-3, IEC/EN 60601-2-7, IEC/EN 60601-2-28, IEC/EN 60601-2-32, IEC/EN 60601-2-44

 * ISO 9001, ISO 13485

# Panoramic

## System Default

| Scan Type | | System Default |
|---|---|---|
| Patient size | Male | 79kVp / 10mA |
| | Female | 78kVp / 10mA |
| | Pediatric | 71kVp / 10mA |
| Scan time | - | 19 s |
| Protocol | - | Standard |
| Pixel size | - | 0.12mm |

## Examination Programs and Scan Time

| Protocol | Patient size | Scan Time(S) | Exposure |
|---|---|---|---|
| Standard | Male | 19 | 79kVp / 10mA |
| | Female | | 78kVp / 10mA |
| | Pediatric | 16.5 | 71kVp / 10mA |
| Incisor | Male | 8 | 79kVp / 10mA |
| | Female | | 78kVp / 10mA |
| | Pediatric | 7 | 71kVp / 10mA |
| Bitewing | Male | 15 | 79kVp / 10mA |
| | Female | | 78kVp / 10mA |
| | Pediatric | 13 | 71kVp / 10mA |
| Sinus | Male | 12 | 90kVp / 10mA |
| | Female | | 83kVp / 10mA |
| | Pediatric | | 75kVp / 10mA |
| TMJ | Male | 9 | 79kVp / 10mA |
| | Female | | 78kVp / 10mA |
| | Pediatric | 8.5 | 71kVp / 10mA |
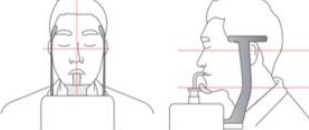
# Panoramic

## 1. Standard Mode
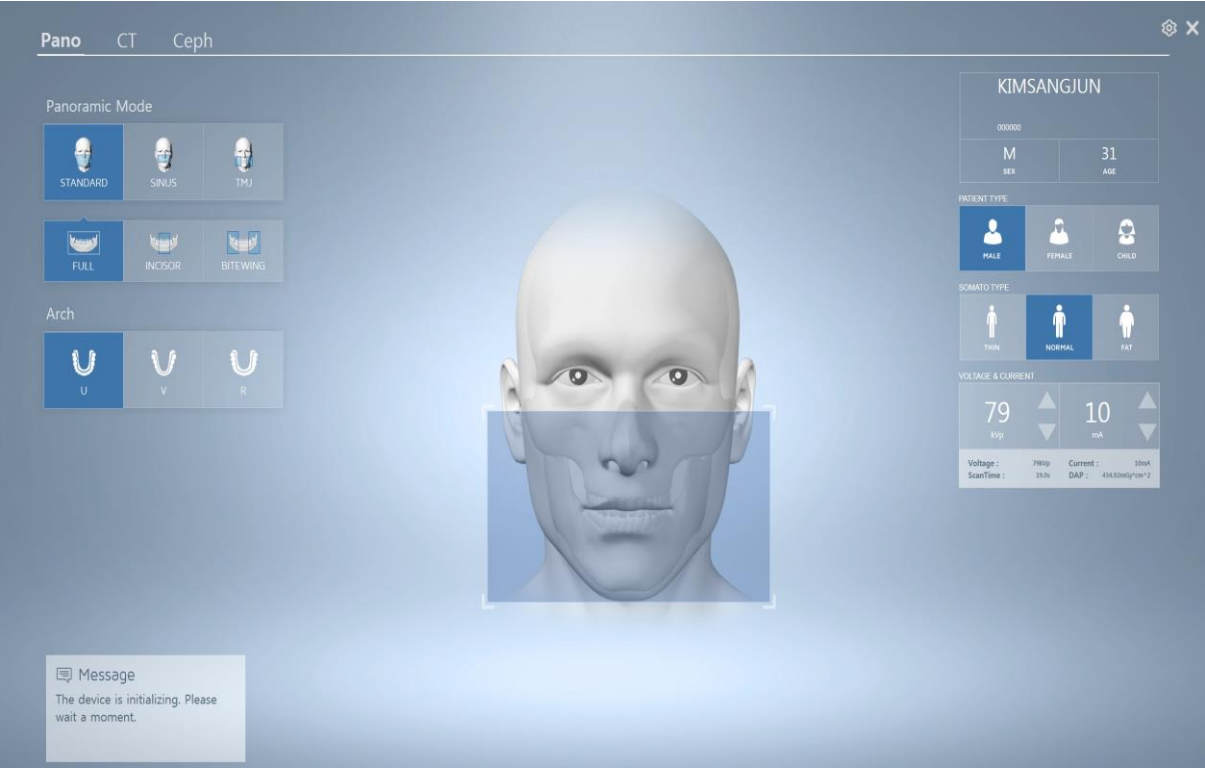


- **Features**
- Preset: Full, Incisor, Bitewing



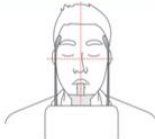| | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard | | | |
| Edentulous | | | NA |

# Cont'd..

## 2. Sinus Mode





- ▪ **Features**
- N/A
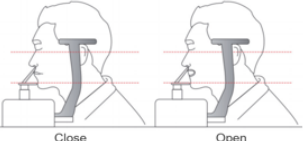
| | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard | | | |
| Edentulous | | | NA |

# Cont'd..

## 3. TMJ Mode
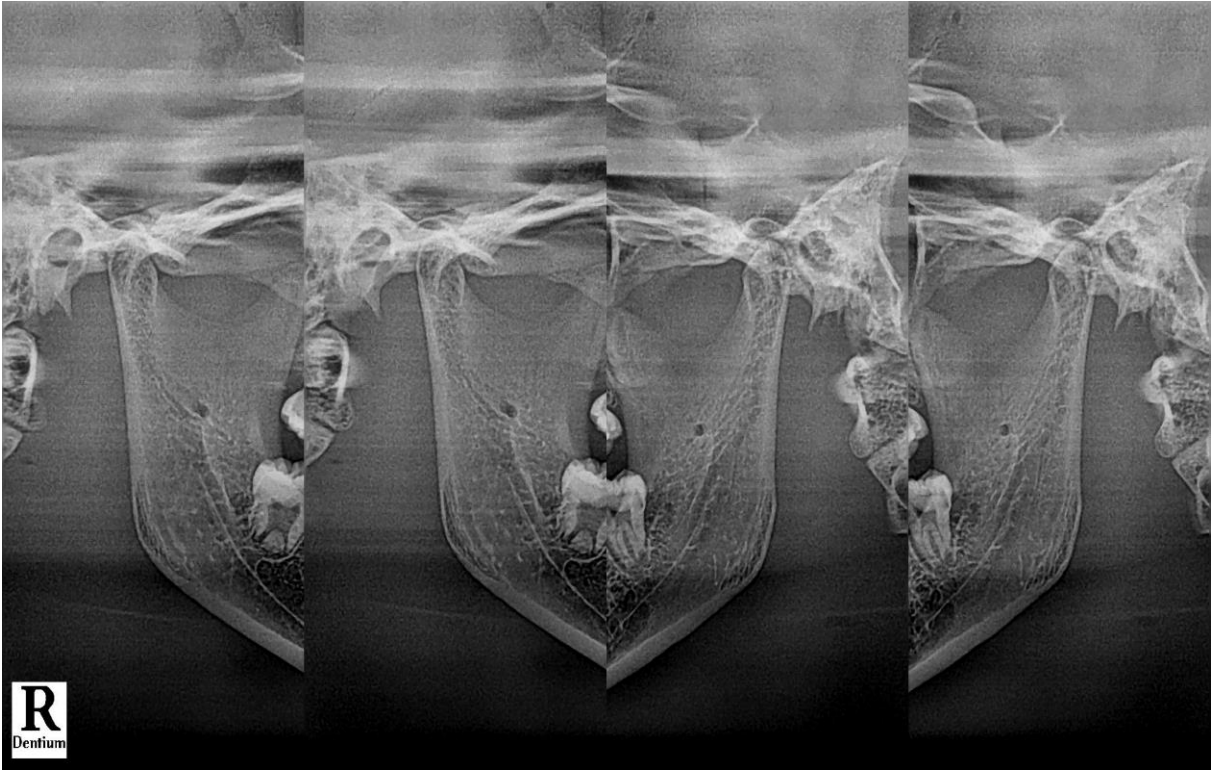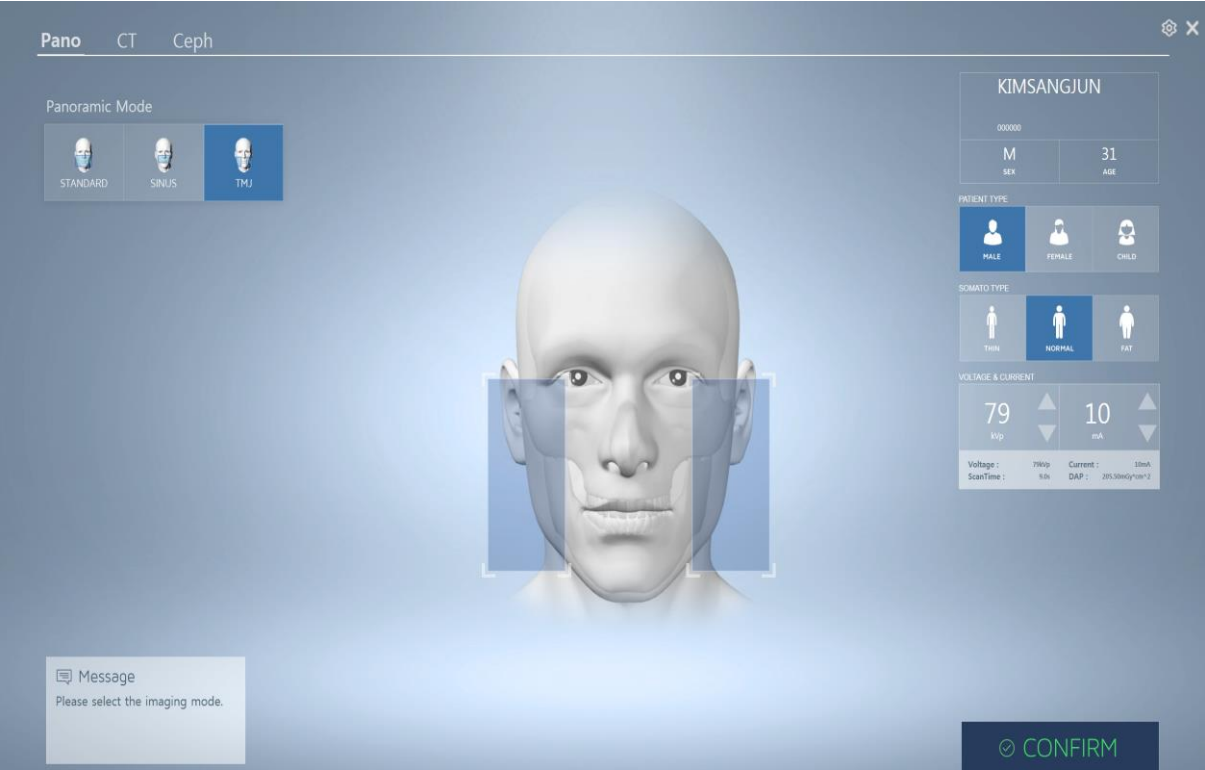


- **Features**
- N/A

| | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard | | X | |

# CBCT

## System Default

| Scan Type | | System Default | Voxel Size (um) | |
|---|---|---|---|---|
| | | | Fast Normal | High Res. |
| Patient size | Male | 94kVp / 8mA | 300um | **200um** |
| | Female | | | |
| | Pediatric | 94kVp / 7mA | | |
| Scan time | - | 20 s | | |
| Protocol | - | Standard | | |
| Pixel size | - | 0.24 mm | | |

## Examination Programs and Scan Time

| Mode | Protocol | Voxel (um) | F.O.V (cm) | Scan time (Sec) |
|---|---|---|---|---|
| Normal | Local | | **5x5** | 20 |
| | Fast | 300 | **16x10** | 10 |
| | Standard | | | 20 |
| | High Res. | 200 | | |
| Stitching | Fast | 300 | **16x18** | 20 |
| | Standard | | | 40 |
| | High Res. | | | |

# CBCT

## 1. Local Mode (FOV: 5x5cm)
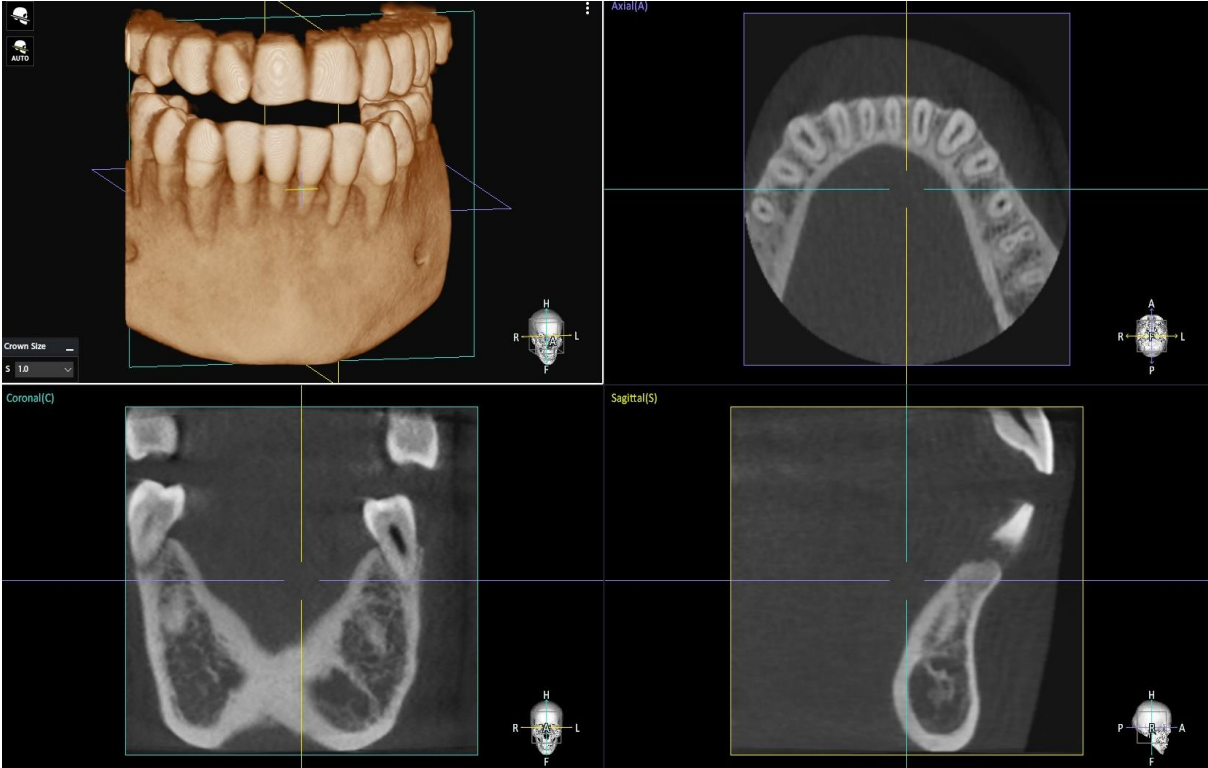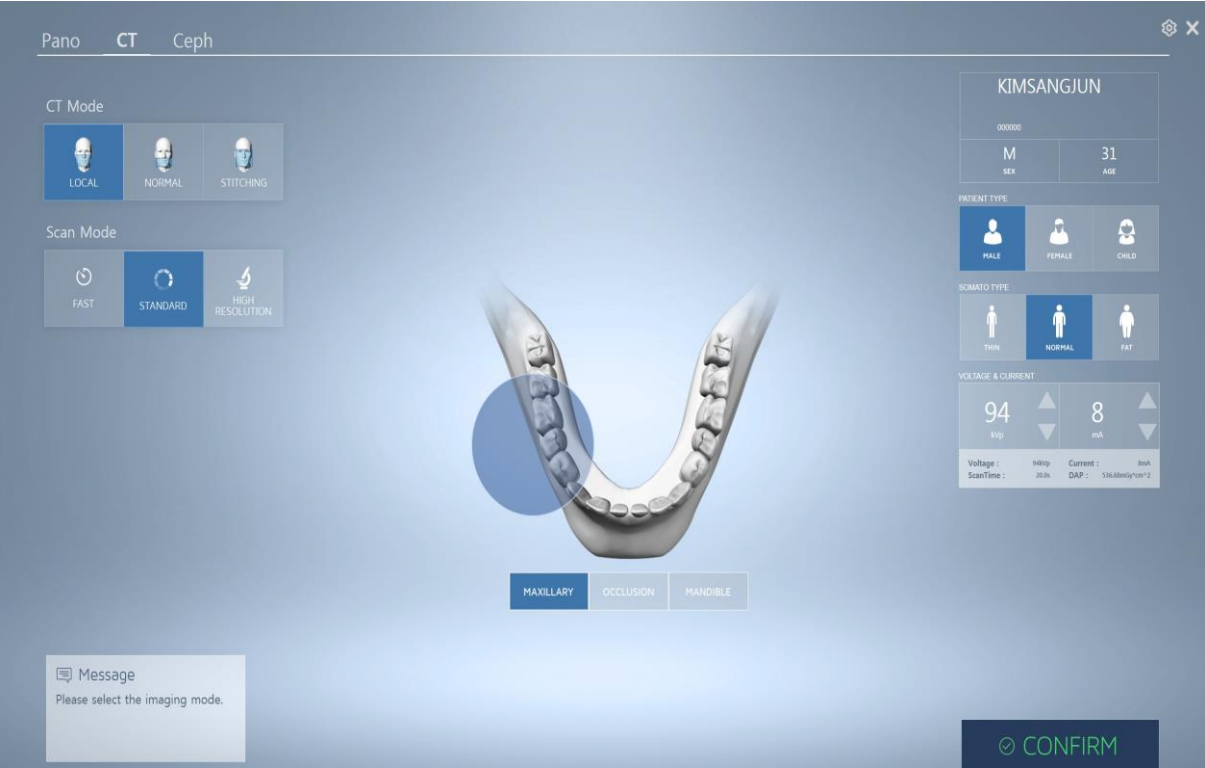


- **Features**

1) Selection: Maxillary, Occlusion, Mandible
2) Region: Single tooth
3) Clinical Implication: Single implant, Endo, Perio

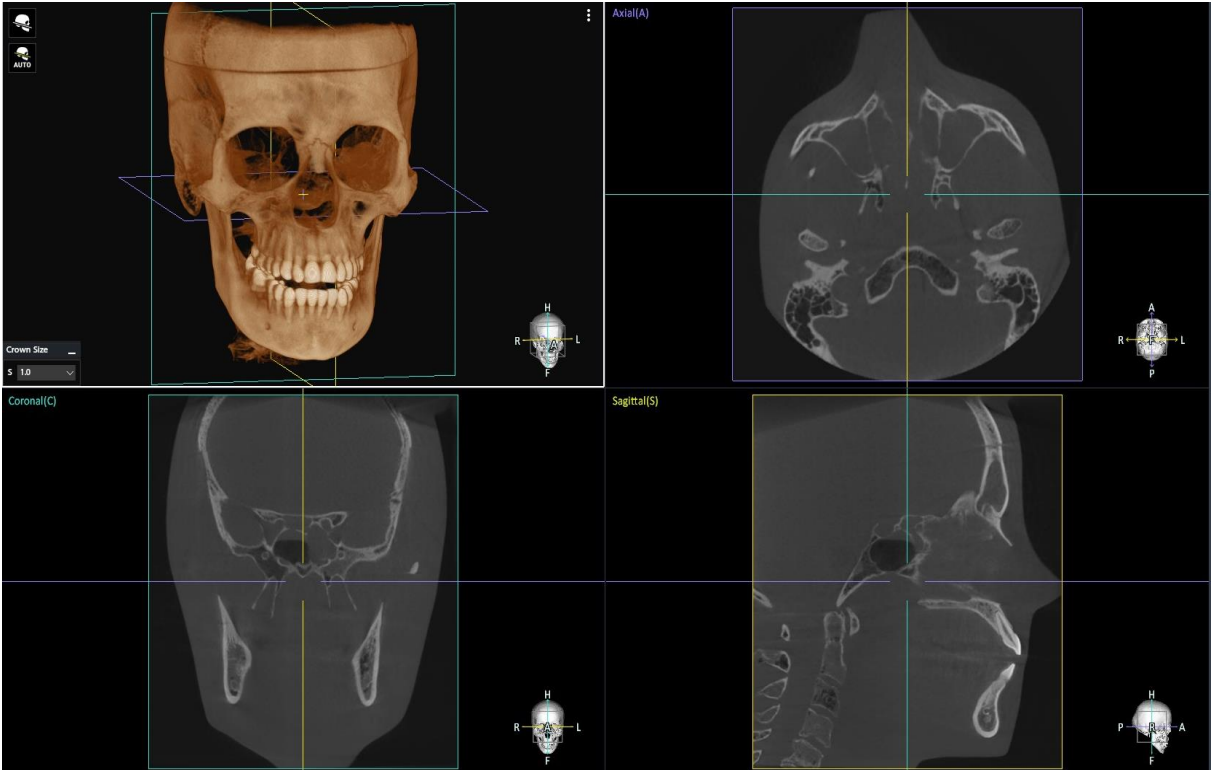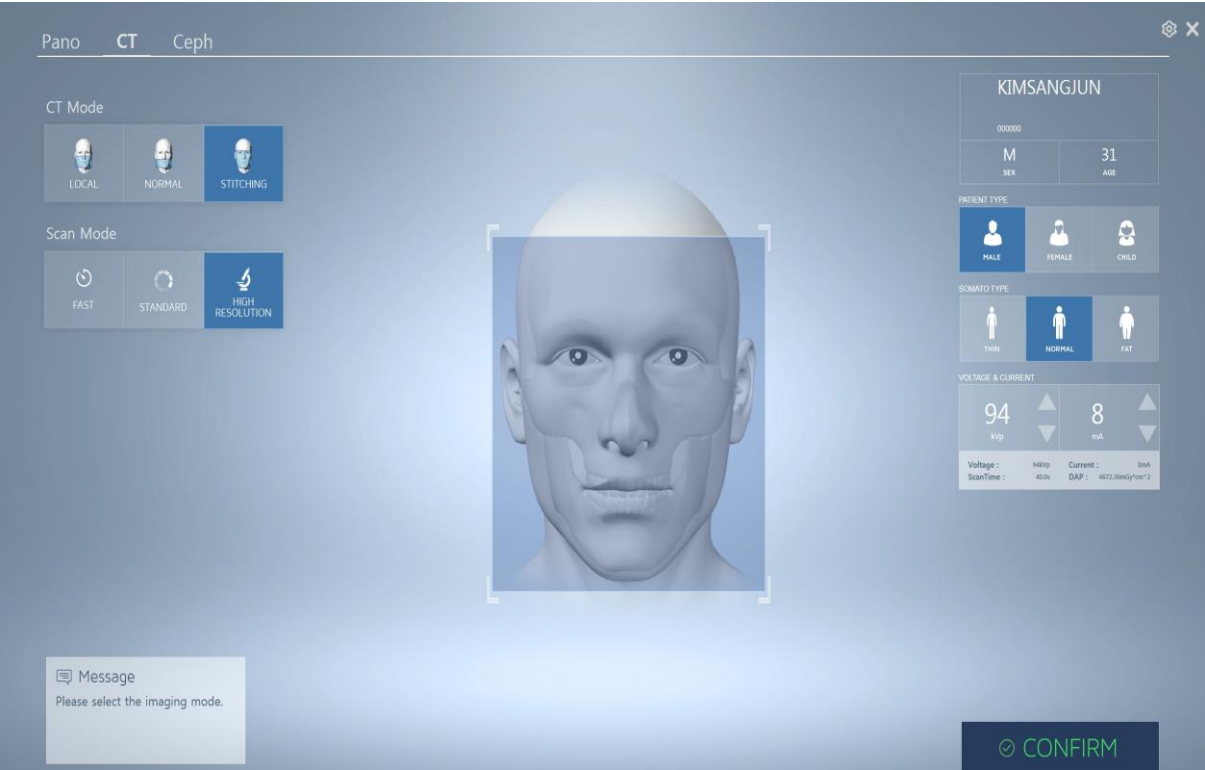| | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard | | | |
| Edentulous | | | NA |

# Cont'd..

## 2. Standard Mode (FOV: 16x10cm)
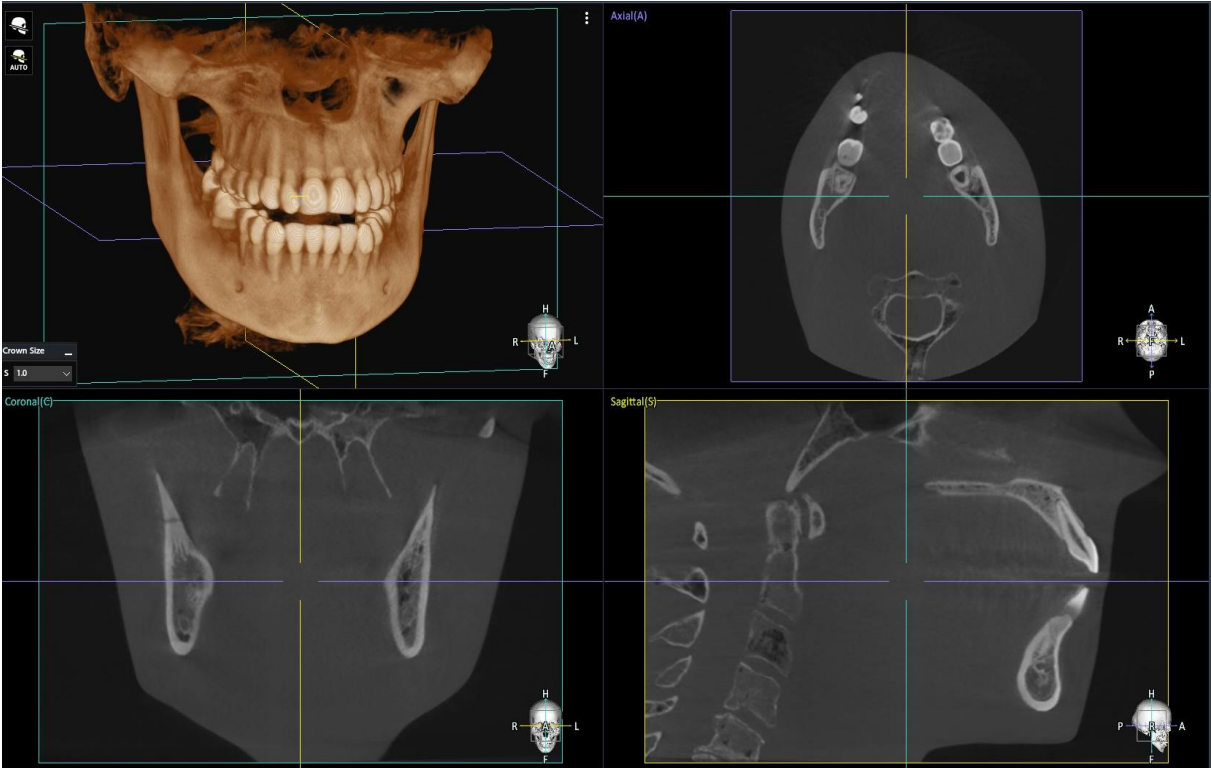


- ### Features

1) Selection: Maxillary, Mandible
2) Region: Dual arches back to the 3rd molars / Dual TMJs
3) Clinical implementation:
   - Surgical guides
   - Simultaneous TMJ diagnosis

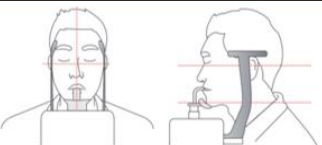| | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard | | | |
| Edentulous | | | NA |

# Cont'd..

## 3. Stitching Mode (FOV: 16x18cm)





- **Features**

1) 8.0cm higher FOV than Standard mode
2) Region: Dual arches back to the 3rd molars/sinus
3) Clinical implication : Maxillofacial diagnosis

|  | Chinrest | Bite | Patient position |
|---|---|---|---|
| Standard |  |  |  |
| Edentulous |  |  | NA |

# Cephalometric

## System Default

| Scan Type | | System Default |
|---|---|---|
| Patient size | Male | 95kVp / 10mA |
| | Female | 92kVp / 10mA |
| | Pediatric | 88kVp / 10mA |
| Scan time | - | 8 s |
| Protocol | - | Lateral (**Half**) |
| Pixel size | - | 0.10mm |

## Examination Programs and Scan Time

| Protocol | Patient size | Scan Time(S) | Exposure |
|---|---|---|---|
| Lateral (Half) | Male | 8 | 95kVp / 10mA |
| | Female | | 92kVp / 10mA |
| | Pediatric | | 88kVp / 10mA |
| Lateral (Full)* | Male | 19 | 95kVp / 10mA |
| | Female | | 92kVp / 10mA |
| | Pediatric | | 88kVp / 10mA |
| PA / AP | Male | | 95kVp / 10mA |
| | Female | | 92kVp / 10mA |
| | Pediatric | | 88kVp / 10mA |
| SMV | Male | 6 | 95kVp / 10mA |
| | Female | | 92kVp / 10mA |
| | Pediatric | | 88kVp / 10mA |
| Carpus | Male | | 95kVp / 10mA |
| | Female | | 92kVp / 10mA |
| | Pediatric | | 88kVp / 10mA |

\* Full scan mode (19 sec) can be activated upon a customer's request.

# Cephalometric
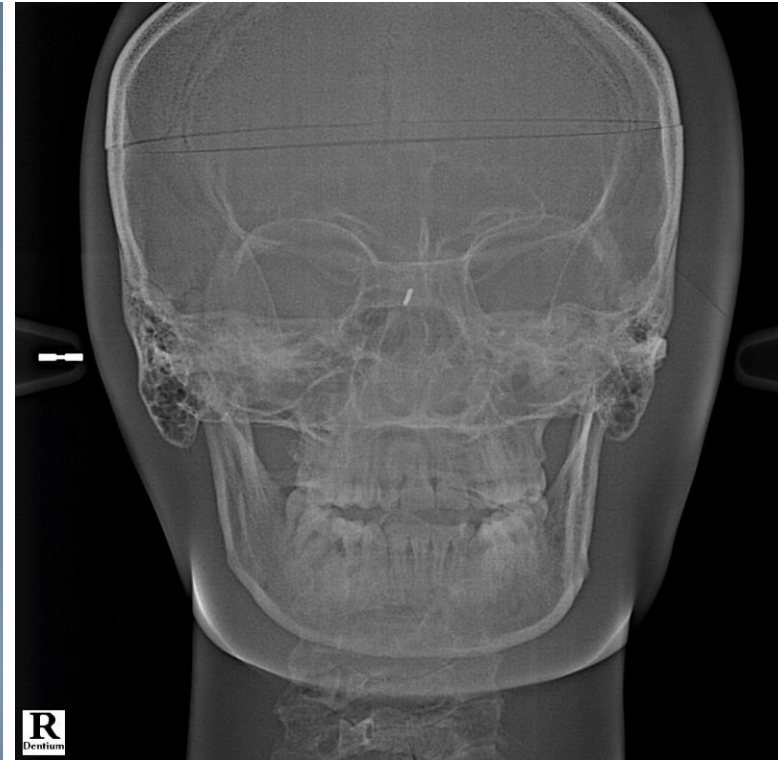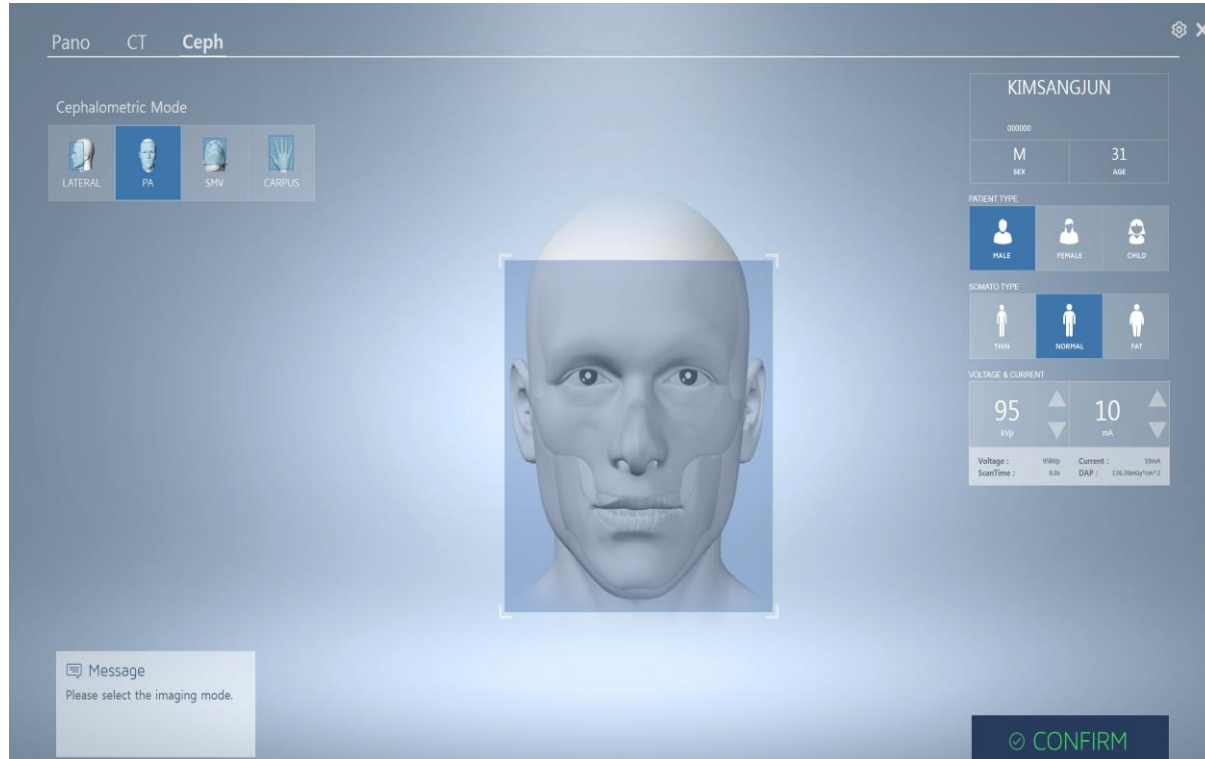
## 1. Lateral Mode (ROI: 24x29cm)
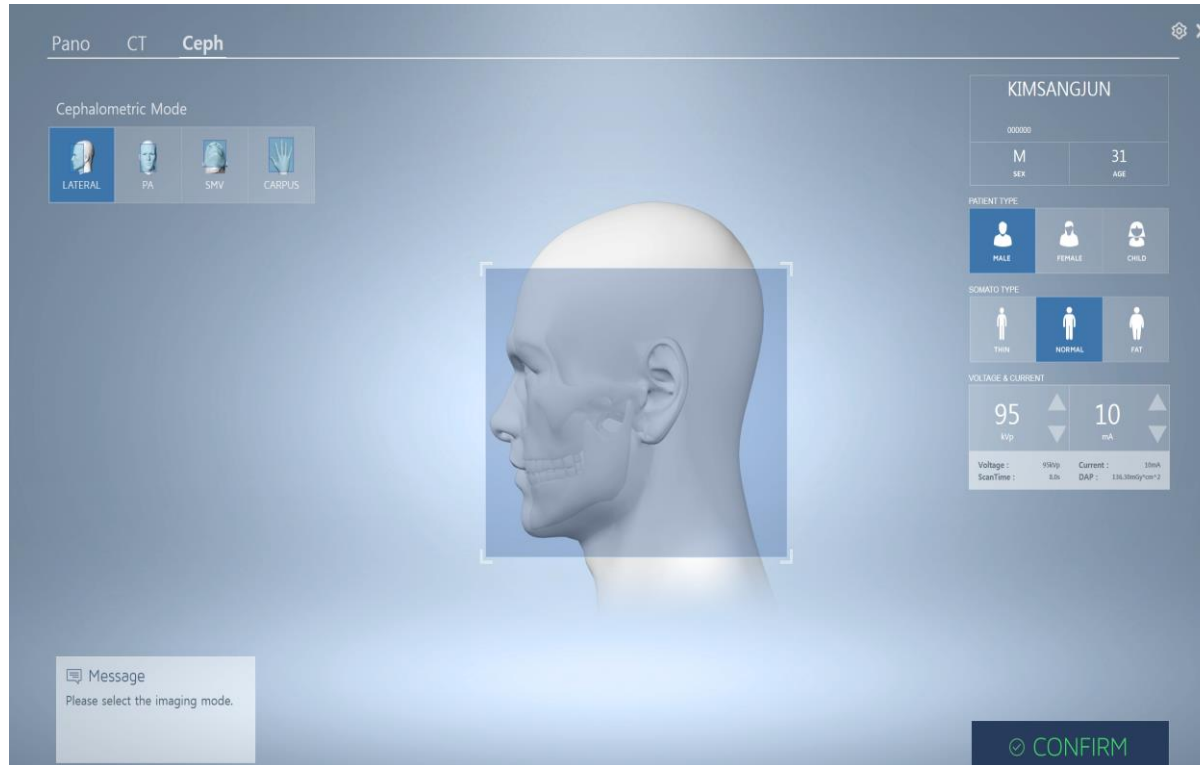


- **Features**

1) Full scan mode (19 sec) can be activated upon a customer's request.
2) Purpose: Check the positional changes of the jaw bone and teeth before and after orthodontic treatment
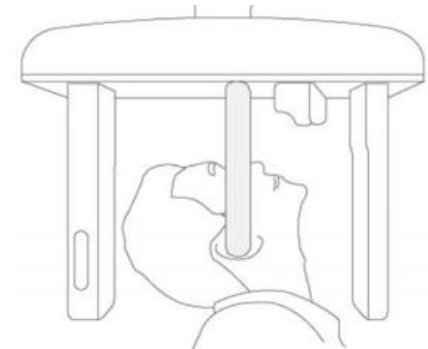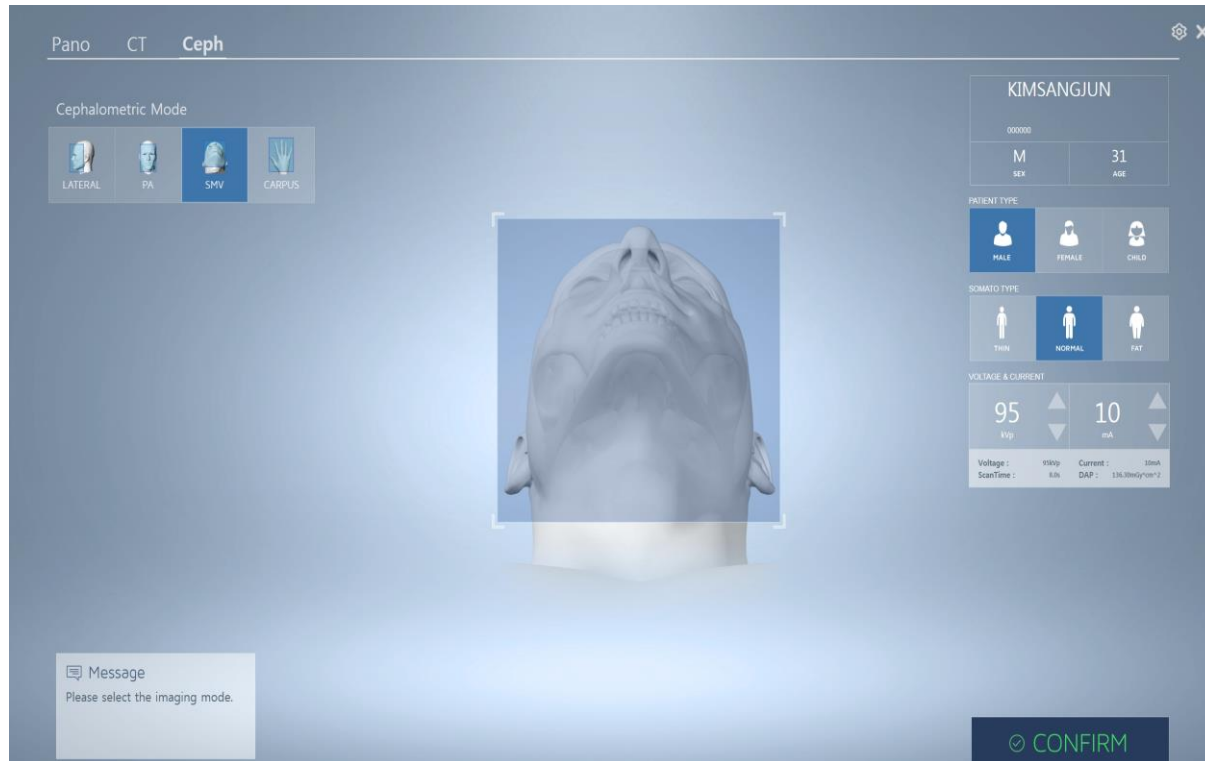
# Cont'd..

## 2. PA Mode (ROI: 24x29cm)



- **Features**

- Purpose: Capable of observing soft tissue contours, frontal sinus and nasal cavity
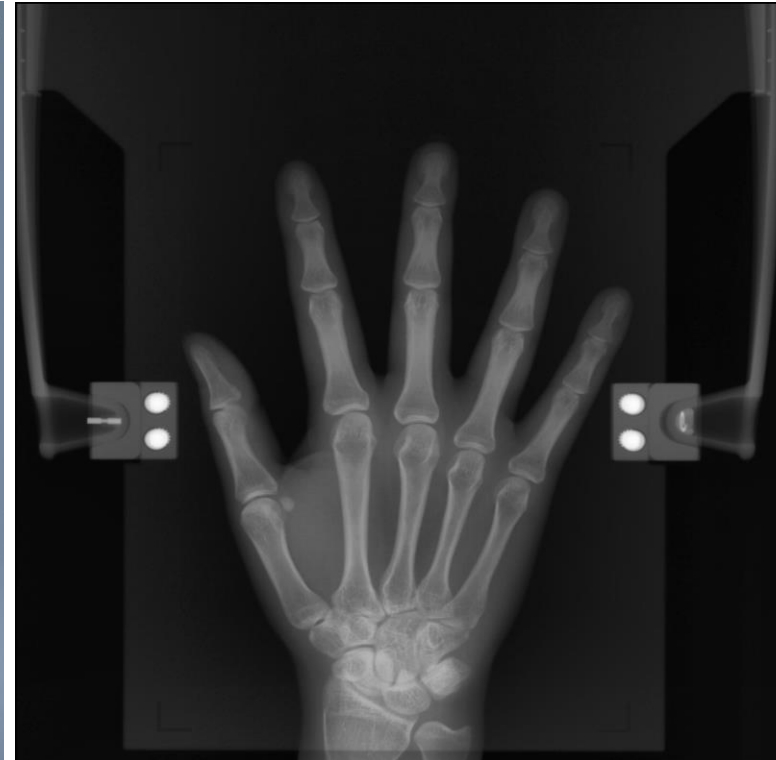
# Cont'd..

## 3. SMV Mode (ROI: 24x29cm)



- **Features**
- Purpose: Position of the mandibular condyle and observation of the base of the skull

# Cont'd..

## 4. Carpus Mode (ROI: 24x29cm)



- **Features**
- Purpose: Study changes in the skull or compare teeth by assessing bone age

# Thank you