

# Maintenance Report

Mobile X-RAY System

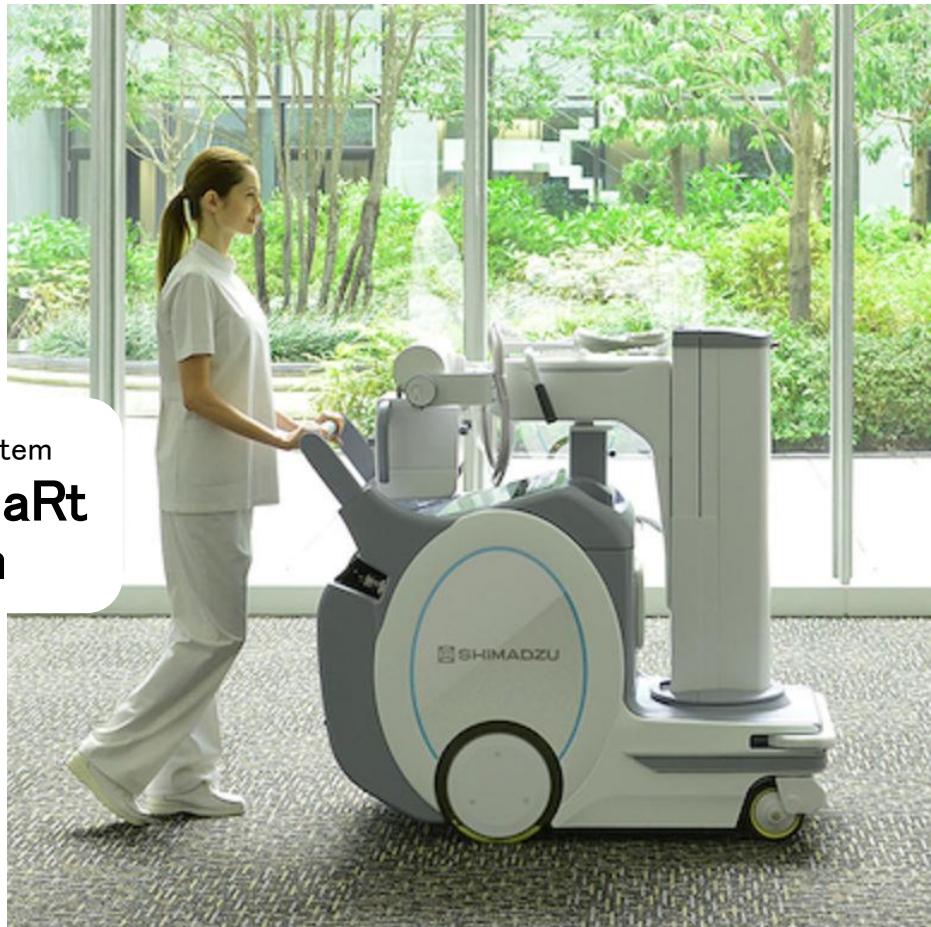
**MobileDaRt  
Evolution**



Medical Systems Division  
Shimadzu Corporation

# Maintenance Report

Mobile X-RAY System  
**MobileArt/DaRt**  
**Evolution**



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Shimadzu Corporation

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Mobile X-RAY System  
**MobileArt/DaRt**  
**Evolution**



Medical Systems Division  
Shimadzu Corporation

No. \_\_\_\_\_

Report Date (M/D/Y):

Name of Institution:

Seal or Signature

Address

Telephone Number

Name of Room

Safety Management Supervisor for Medical Equipment

This is a report on the maintenance procedures, which were completed as noted in this document.

Name of System <b>MobileDaRt Evolution</b>	System Component Described in the attached System Component List.
Management Registration No.	Installation Date (M/D/Y)
Inspection Date (M/D/Y)	Month of Next Inspection (M/Y)
Maintenance Engineers Name  Name	
Maintenance Company	Telephone Number

## [Inspection Results]

Inspection Date: \_\_\_\_\_ (M) \_\_\_\_\_ (D), \_\_\_\_\_ (Y) to \_\_\_\_\_ (M) \_\_\_\_\_ (D) \_\_\_\_\_ (Y)

Inspection Reporter: \_\_\_\_\_

Work Results:

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Replacement Parts:

Part Name	Part No.	Qty	Part Name	Part No.	Qty

Measuring Instruments Used:

Name of Measuring Instrument	Control No.	Name of Measuring Instrument	Control No.

Inspection Date: \_\_\_\_\_ (M) \_\_\_\_\_ (D), \_\_\_\_\_ (Y) to \_\_\_\_\_ (M) \_\_\_\_\_ (D) \_\_\_\_\_ (Y)

Inspection Reporter: \_\_\_\_\_

Work Results:

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Replacement Parts:

Part Name	Part No.	Qty	Part Name	Part No.	Qty

Measuring Instruments Used:

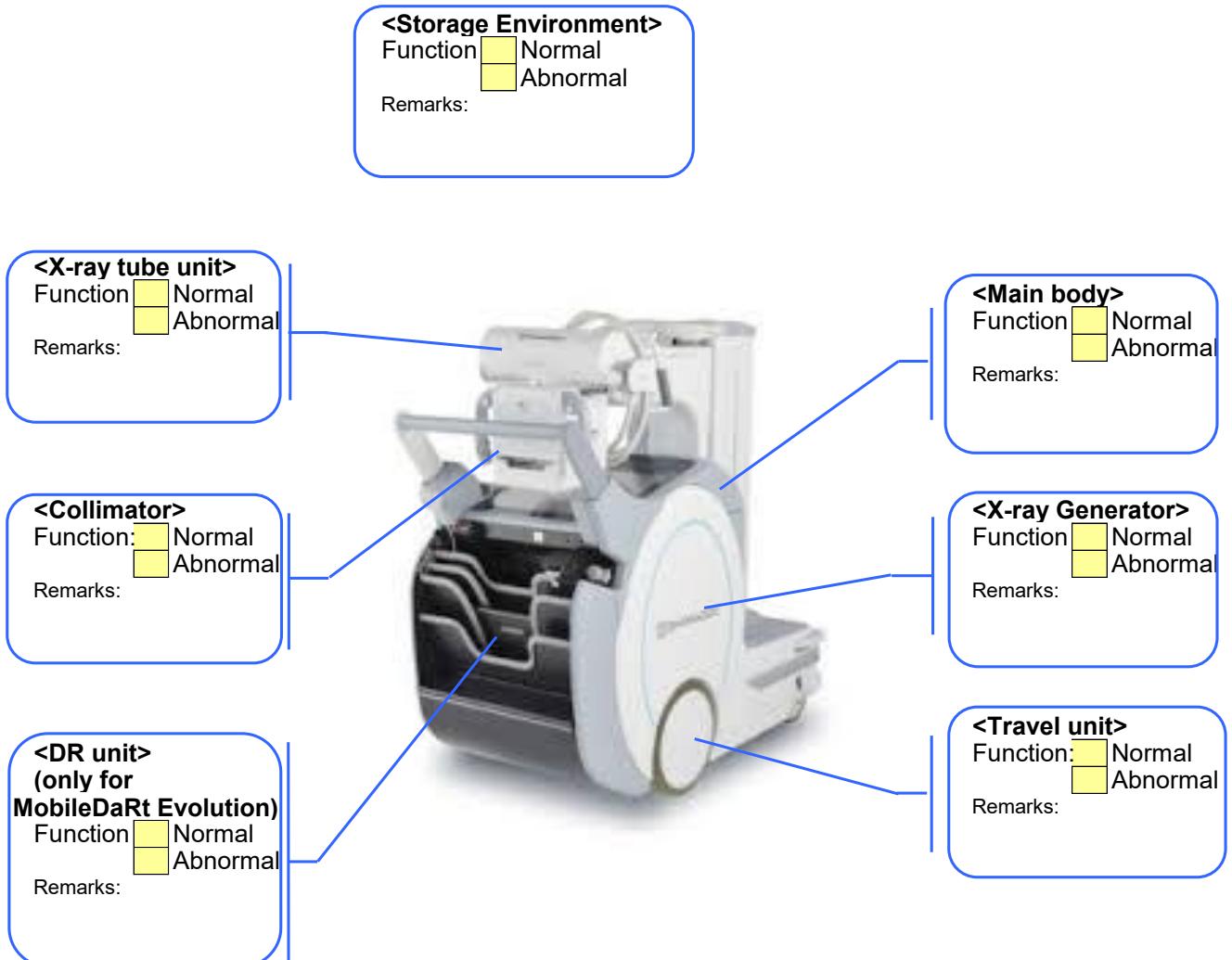
Name of Measuring Instrument	Control No.	Name of Measuring Instrument	Control No.

## [System Component List]

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## System Record:

## Outline of system inspection result



## Outline of system inspection result

### <Storage Environment>

Function  Normal  
 Abnormal

Remarks:

### <X-ray tube unit>

Function  Normal  
 Abnormal

Remarks:

### <Main body>

Function  Normal  
 Abnormal

Remarks:

### <Collimator>

Function  Normal  
 Abnormal

Remarks:

### <X-ray Generator>

Function  Normal  
 Abnormal

Remarks:

### <DR unit> (only for MobileDaRt Evolution)

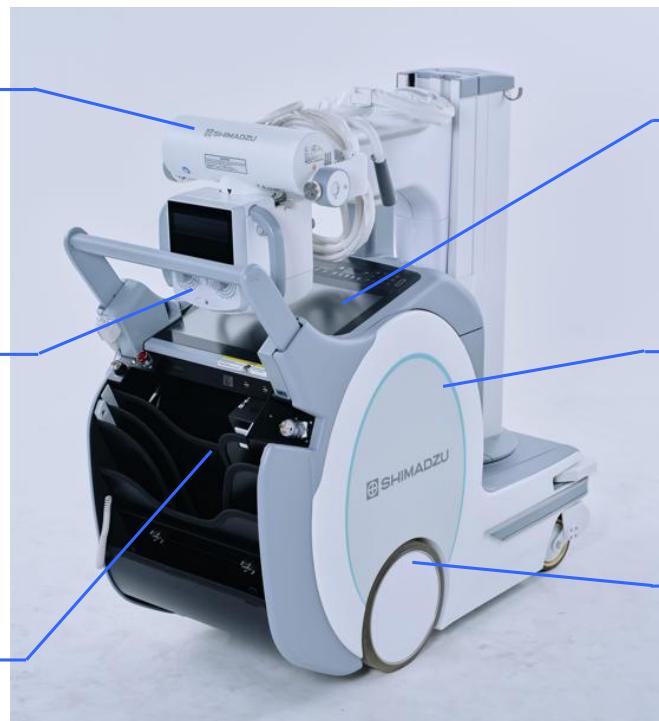
Function  Normal  
 Abnormal

Remarks:

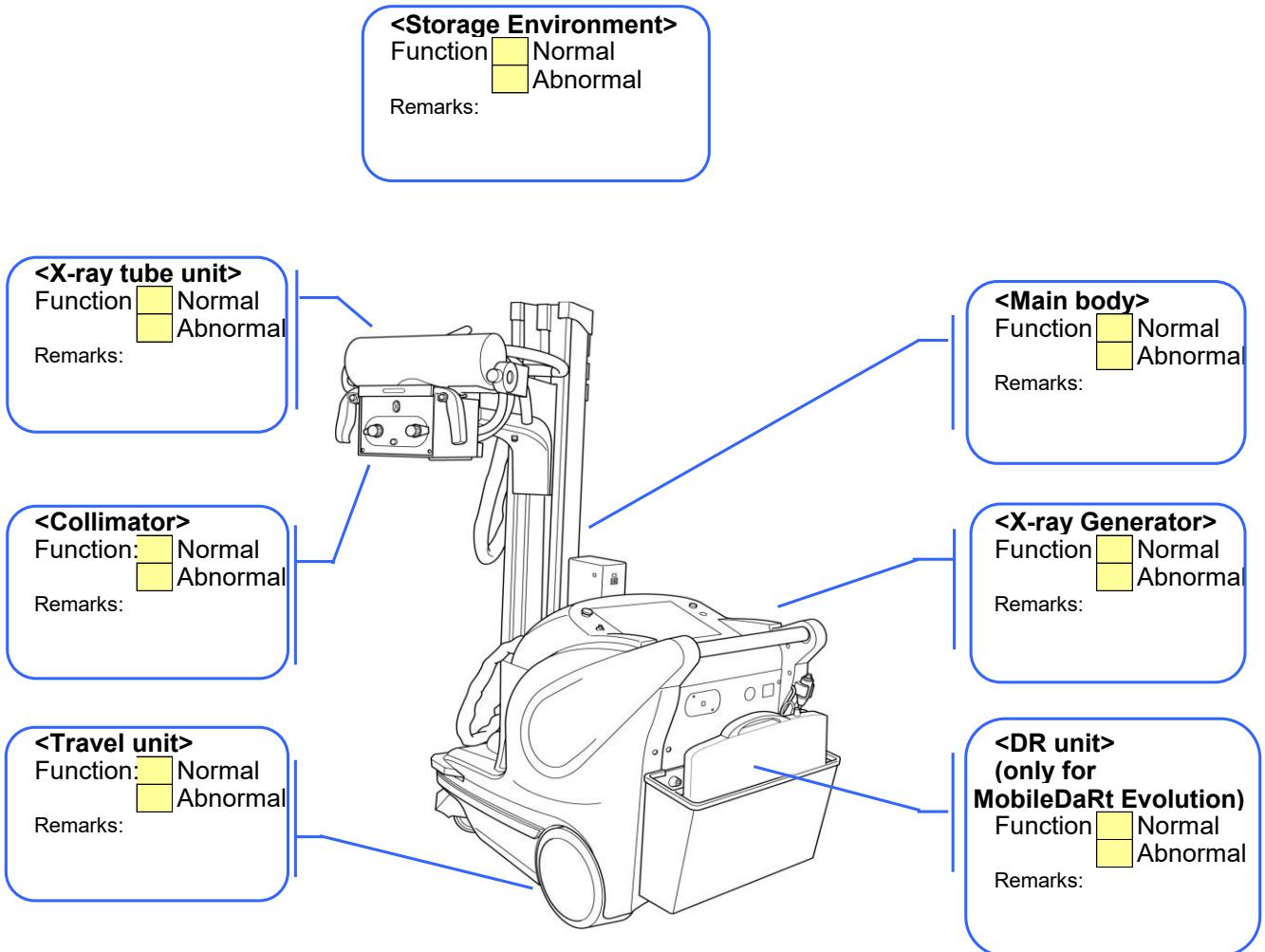
### <Travel unit>

Function  Normal  
 Abnormal

Remarks:



## Outline of system inspection result



**【Inspection Report】**

No	Inspection Item	Safety	Inspection Details						Result
<b>1. Checking installation environment</b>									
(1)	Temperature and humidity	—	Storage place	Temperature: -10~40°C			°C		N
				Relative humidity: 30~60%			%		
(2)	Power supply voltage	—		Power supply voltage ±10%		V			N
(3)	Grounding wire connection	○	Status of the grounding wire						N
<b>2. Checking instrument usage conditions</b>									
(1)	External appearance	-	External appearance, fastening status, and cable connection status of each unit						M
(2)	Nameplates	○	Appearance of caution and warning nameplates on each unit						N
(3)	Instrument cleaning	—	Clean it with a cleaner.						N
(4)	Cable connection condition	—	Check the connection of each cable terminal/connector.						N
(5)	Checking cable condition	—	Check each cable state (whether rubbing, twisting, pulling, and others exist or not)						N
(6)	FPD condition	○	Check the connection/state of the FPD box, sensor (FPD), and sensor cables						N
(7)	Mechanical parts fixture	○	Check the mounting condition of each mechanical part.						M

Remarks

[Explanation about marks used in the Inspection Result column]

- C** : **Checked** : Visual inspection or operation check has been performed. Measurement values have been confirmed to be within the standards.
- M** : **Maintenance work performed** : Fixing parts have been re-tightened, lubrication and cleaning have been performed, and parts have been replaced.
- A** : **Adjusted** : Settings have been changed and adjustment has been performed.
- : **Not applicable** : There is no equipment subject to inspection or the item is not applicable.
- N** : **Special note** : Detailed information is described in the Remarks section.
- NA : Items not subject to inspection due to the inspection cycle

Safety Item: Inspection items related to safety are marked with a circle.

**【Inspection Report】**

No	Inspection Item	Safety	Inspection Details			Result
<b>3. X-ray Generator</b>						
(1)	Radiography circuit operation	—	Control circuits, operation switches, etc.			
(2)	Starter circuit operation	—	Control circuits, operation switches, etc			
(3)	X-ray tube protective circuit operation	—	Check that instrument operates normally.			
(4)	Tube voltage accuracy and reproducibility( $\pm 8\%$ )	—	Radiography:80kV, 8mAs(for 32kW system) 3.2mAs(for 12.5kW system)		Measure V TkV(Normal: 4V)	
		—	Radiography:100kV, 16mAs(for 32kW system) 12.5mAs(for 12.5kW system)		Measure V TkV(Normal: 5V)	
(5)	Tube current accuracy and reproducibility ( $\pm 10\%$ )	—	Radiography:80kV, 8mAs(400mA for 32kW system) 3.2mAs(160mA for 12.5kW		Measure V TmA (Normal: measure	
		—	Radiography:100kV, 16mAs(160mA for 32kW system) 12.5mAs(125mA for 12.5kW		Measure V TmA (Normal: 3.2V/2.5V)	
(6)	Radiography time accuracy and reproducibility( $\pm 10\%$ )	—	Radiography:80kV, 8mAs(20ms for 32kW system) 3.2mAs(20ms for 12.5kW system)		msec	
		—	Radiography:100kV, 16mAs(0.1s for 32kW system) 12.5mAs(0.1s for 12.5kW system)		msec	
(7)	High-voltage cables and bushings	—				
<b>4. X-ray tube unit</b>						
(1)	X-ray tube	—	Oil leaks, rotation noise or vibration			
(2)	High voltage cables and bushings	—	Check discharge marks, the amount of the grease and condition			
(3)	Low voltage cables	—	Check rubbing, twisting, and pulling.			

Remarks

No	Inspection Item	Safety	Inspection Details	Result
5. Main body				
(1)	Support arm vertical movement	—	Check the vertical operation.	
		<input type="radio"/>	Wire rope damage and attachment.	
		—	Check the brake.	
		<input type="radio"/>	Check the function of wire rope disconnection detection and error indication. (for only MX8 Version)	
		—	Check the function of arm up/down position detector ASSY.	
(2)	Support arm lateral movement	—	Check the lateral operation.	
		—	Chain damage and attachment.	
		—	Check the brake.	
		<input type="radio"/>	Check the tightness of rail and bearing mounting screws.	
(3)	Column rotation	—	Check the column rotation operation.	
		—	Check the brake.	
		<input type="radio"/>	Check the tightness of the column mounting screws.	
(4)	Tube rotation about arm	—	Check the operation force.	
		—	Check the brake.	
		<input type="radio"/>	Check the tightness of the tube support mounting screws	
(5)	Tube rotation about tube axis	—	Check the operation force.	
		—	Check the brake.	
		<input type="radio"/>	Check the tightness of the tube support mounting screws	
(6)	Arm catch operation	—	Check the arm fixing operation.	
		<input type="radio"/>	Check the tightness of the arm catch mounting screws.	
(7)	Operation switches and displays	<input type="radio"/>	Check the switch operation and displays.	
		—	Check the contact of terminals and connectors.	

Remarks

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No	Inspection Item	Safety	Inspection Details	Result
6. Travel unit				
(1)	Travel operation	<input type="radio"/>	Check the handle operation.	
		<input type="radio"/>	Check the inch-mover switches operation.	
		<input type="radio"/>	Check the brake.	
		<input type="radio"/>	Detector switch operation	
		<input type="radio"/>	Emergency stop switch operation	
		<input type="radio"/>	Check the tightness of the mounting screws for the travel-wheel and the caster.	
		<input type="radio"/>	Check the emergency brake release operation.	
		<input type="radio"/>	Check the looseness of the driveshaft of the motor.	
7. Collimator				
(1)	Open/close mechanism	<input type="radio"/>	Check abnormal noise, wire rope damage and attachment.	
		<input type="radio"/>	Check the damage and fixing of Front/Intermediate leaves.	
(2)	Dimensions of the effective irradiation field	<input type="radio"/>	Check the dimensions.	
(3)	Fixing of collimator	<input type="radio"/>	Check the tightness of the mounting screws.	
(4)	Rotation mechanism	<input type="radio"/>	Check abrasion of the rotary ring and collimator rotation operation.	
(5)	Second Monitor(MX9 only)	<input type="radio"/>	Check the function.	
8. Others				
(1)	Battery	<input type="radio"/>	Check the charging operation and the residual battery level display.	
(2)	Cassette box (for only MobileArt Evolution)	<input type="radio"/>	Check the cassette storage operation	
		<input type="radio"/>	Check the mounting of the cassette box.	
(3)	Cord reel	<input type="radio"/>	Check the cord storage operation.	
		<input type="radio"/>	Check the damage of the cable and plug.	
(4)	Infrared Remote controller	<input type="radio"/>	Check the communications operation.	
(5)	Dose Area Product Meter Dose Calculation Unit	<input type="radio"/>	Check the display and accuracy of area dose.	
(6)	Keyless entry	<input type="radio"/>	Check the keyless entry function.	
(7)	Wireless LAN	<input type="radio"/>	Check the communications operation.	
(8)	External monitor I/F	<input type="radio"/>	Check the function.	
(9)	Barcode reader	<input type="radio"/>	Check the function.	
(10)	Additional/Luminous hand switch	<input type="radio"/>	Check the function.	
(11)	Folding-type Protective Screen	<input type="radio"/>	Check the mounting, damage and opening/folding operation of Protective Screen.	
(12)	FPD Lock function	<input type="radio"/>	Check the function.	
(13)	Wireless hand switch	<input type="radio"/>	Check the function. (Radiography operation, lock function)	
(14)	Changing the Grip Bar Height	<input type="radio"/>	Check the handle up/down operation, holding force and the handle height detection switch.	
(15)	IC card authentication	<input type="radio"/>	Check the function.	
(16)	Protective Film	<input type="radio"/>	Check the condition.	
(17)	3D Camera(MX9 only)	<input type="radio"/>	Check the function.	
(18)	Cross Laser Marker(MX9 only)	<input type="radio"/>	Check the function.	

No	Inspection Item	Safety	Inspection Details	Result
9. FPD (in case of CXDI-50/55/60 series)				
(1)	Sensor (FPD)	—	Grid attachment and detection function	
		—	Check the sensor cable including the connector of CXDI-55/60 series.	
		—	Shock Sensor	
		—	Firmware/PLD Code Version	
		—	Confirmation of Sensor IP address	
(2)	Power box	—	Connector condition	
		—	Power switch function	
		—	POWER LED function	
		—	ERROR LED function	
(3)	Remote switch	—	Remote switch function	
		—	POWER LED function	
		—	ERROR LED function	
(4)	Control PC	—	Connector condition	
(5)	System Connection	—	Starting	
		—	Booting up of CXDI Software	
		—	Each status lamps function	
		—	Termination	
(6)	Calibration	—	Perform FPD calibration.	
(7)	Self Diagnosis	—	Perform Self Diagnosis to confirm normal function	
(8)	Image quality	—	Perform phantom radiography to confirm image quality	
(9)	Network test	—	Perform PING test for confirmation.	
(10)	PC related	—	PC dust	
		—	Confirmation of Event Viewer	
		—	Confirmation of System LOG and CPU3 LOG	
		—	Touch panel function	
		—	Date, time	
		—	CXDI Software Version	
		—	Back up of CCR Folder	

Remarks

No	Inspection Item	Safety	Inspection Details	Result
9. FPD (in case of CXDI-70/80/401/701/801/410/710/810 series)				
(1)	Wireless environment	—	Interference with other radio wave (external wave)	
		—	Operation/settings of the access point	
(2)	Battery	—	Battery charging function	
		—	Confirm the number of charging times. (maximum 300 times)	
(3)	Sensor (FPD)	—	Battery attachment	
		—	Sensor LED function (blue, green, blue-green)	
		—	Confirmation of Firmware/FPGA Version	
		—	Confirmation of Sensor IP address	
(4)	Sensor recognition	—	Infrared communication function	
(5)	Calibration	—	Perform FPD calibration.	
(6)	Self Diagnosis	—	Perform Self Diagnosis to confirm normal function.	
(7)	Performance Test	—	Perform Performance Test to confirm normal function	
(8)	System connection condition	—	Image Capture Computer function	
		—	Booting up of CXDI Control Software	
(9)	X-ray I/F Box (Mulyo Box)	—	Each connectors condition	
		—	Earth cable condition	
		—	Power cable, adapter condition	
		—	POWER LED function	
		—	Confirmation of IP address	
(10)	Wiring unit (Option)	—	Each connectors condition	
		—	POWER LED function	
		—	Status Indicator function	
		—	Sensor cable condition	
(11)	Image quality	—	Perform phantom radiography to confirm image quality	
(12)	PC related	—	Data storage (Collect by using Collection Tool.)	
		—	Date, time	
		—	CXDI Software Version	
		—	Check residual battery level display on the GUI.	
(13)	FPD docking mechanism	—	Confirmation that FPD can be charged by the FPD docking mechanism	
		—	Confirmation that the FPD docking mechanism is not damaged	
(14)	BiAA	—	Check the function.	
(15)	Smart DS1	—	Check the function.	
(16)	Smart Tube	—	Check the function.	

Remarks

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No	Inspection Item	Safety	Inspection Details	Result
9. FPD (in case of DR-ID series)				
(1)	Wireless environment	—	Interference with other radio wave (external wave)	
		—	Confirm function/channel settings of the access point.	
(2)	Battery	—	Battery charging function	
(3)	Sensor (FPD)	—	Battery attachment	
		—	Sensor LED function (blue, green, blue-green)	
		—	Confirmation of Firmware/FPGA Version	
		—	Confirmation of Sensor IP address for wireless and	
(4)	Calibration	—	Perform FPD calibration.	
(5)	System connection condition	—	Image Capture Computer function	
		—	Booting up of DR-ID Control Software	
(6)	DR-ID800IU	—	Each connectors condition	
		—	Earth cable condition	
		—	Power cable, adapter condition	
		—	POWER LED function	
		—	Confirmation of IP address	
(7)	SE Cable 7.5MT (Option)	—	Each connectors condition	
		—	Sensor cable condition	
(8)	Image quality	—	Perform phantom radiography to confirm image quality.	
(9)	PC related	—	Data storage (Collect by using Collection Tool.)	
		—	Date, time	
		—	DR-ID Software Version	
		—	Check residual battery level display on the GUI.	
(10)	FPD docking mechanism	—	Confirmation that FPD can be charged by the FPD	
		—	Confirmation that the FPD docking mechanism is not damaged	
(11)	X-ray Center Position Estimation Function	—	Check the function.	

Remarks

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No	Inspection Item	Safety	Inspection Details	Result
9. FPD (in case of AeroDR series)				
(1)	Wireless environment	—	Interference with other radio wave (external wave)	
		—	Operation/settings of the access point.	
(2)	Battery	—	Battery charging function	
(3)	Sensor (FPD)	—	Sensor LED function (blue, green, orange)	
		—	Confirmation of Sensor IP address for wireless and	
(4)	Calibration	—	Perform FPD calibration.	
(5)	System connection condition	—	Image Capture Computer function	
		—	Booting up of DR-200m(for MX8i)/CS-7(for MX8k) Software	
(6)	RF Unit2	—	Each connectors condition	
		—	Earth cable condition	
		—	Power cable, adapter condition	
		—	POWER LED function	
		—	Confirmation of IP address	
(7)	I/F Cable2 2MT	—	Each connectors condition	
		—	Sensor cable condition	
(8)	Image quality	—	Perform phantom radiography to confirm image quality	
(9)	PC related	—	Data storage (Collect by using Collection Tool.)	
		—	Date, time	
		—	Version of DR-200m(for MX8i)/CS-7(for MX8k) Software	
		—	Check residual battery level display on the GUI.	
(10)	Remote Desktop Option	—	Check remote desktop connection function.	
(11)	FPD docking mechanism	—	Confirmation that FPD can be charged by the FPD	
		—	Confirmation that the FPD docking mechanism is not damaged	

Remarks

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No	Inspection Item	Safety	Inspection Details	Result
9. FPD (in case of VIVIX series (Viewworks))				
(1)	Wireless environment	—	Interference with other radio wave (external wave)	
		—	Operation/settings of the access point.	
(2)	Battery	—	Battery charging function	
(3)	Sensor (FPD)	—	Sensor LED function (green, orange)	
		—	Confirmation of Sensor IP address for wireless and wired	
(4)	Calibration	—	Perform FPD calibration.	
(5)	System connection condition	—	Image Capture Computer function	
		—	Booting up of VXvue Software	
(6)	Image quality	—	Perform phantom radiography to confirm image quality.	
(7)	PC related	—	Data storage (Collect by using Collection Tool.)	
		—	Date, time	
		—	Version of VXvue Software	
		—	Check residual battery level display on the GUI.	
		—	Check DICOM Storage	
		—	Check DICOM MWL	
(8)	FPD docking mechanism	—	Confirmation that FPD can be charged by the FPD docking mechanism	
		—	Confirmation that the FPD docking mechanism is not damaged	
(15)	Smart DSI	—	Check the function.	
(16)	Smart Tube	—	Check the function.	

Remarks

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