

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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Mobile X-RAY System
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Evolution**



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Shimadzu Corporation

No. _____

<p style="text-align: center;">Report Date (M/D/Y):</p> <p>Name of Institution:</p> <p style="text-align: right;">Seal or Signature</p>	
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 MobileDaRt Evolution	System Component Described in the attached System Component List.
Management Registration No.	Installation Date <div style="text-align: right;">(M/D/Y)</div>
Inspection Date <div style="text-align: right;">(M/D/Y)</div>	Month of Next Inspection <div style="text-align: right;">(M/Y)</div>
<div style="margin-bottom: 10px;"> Maintenance Engineers Name </div> <div> Name </div>	
<div style="display: flex; justify-content: space-between;"> Maintenance Company Telephone Number </div>	

[Inspection Results]

Inspection Date: _____ (M) _____ (D), _____ (Y) to _____ (M) _____ (D) _____ (Y)

Inspection Reporter: _____

Work Results:

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:

Replacement Parts:

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

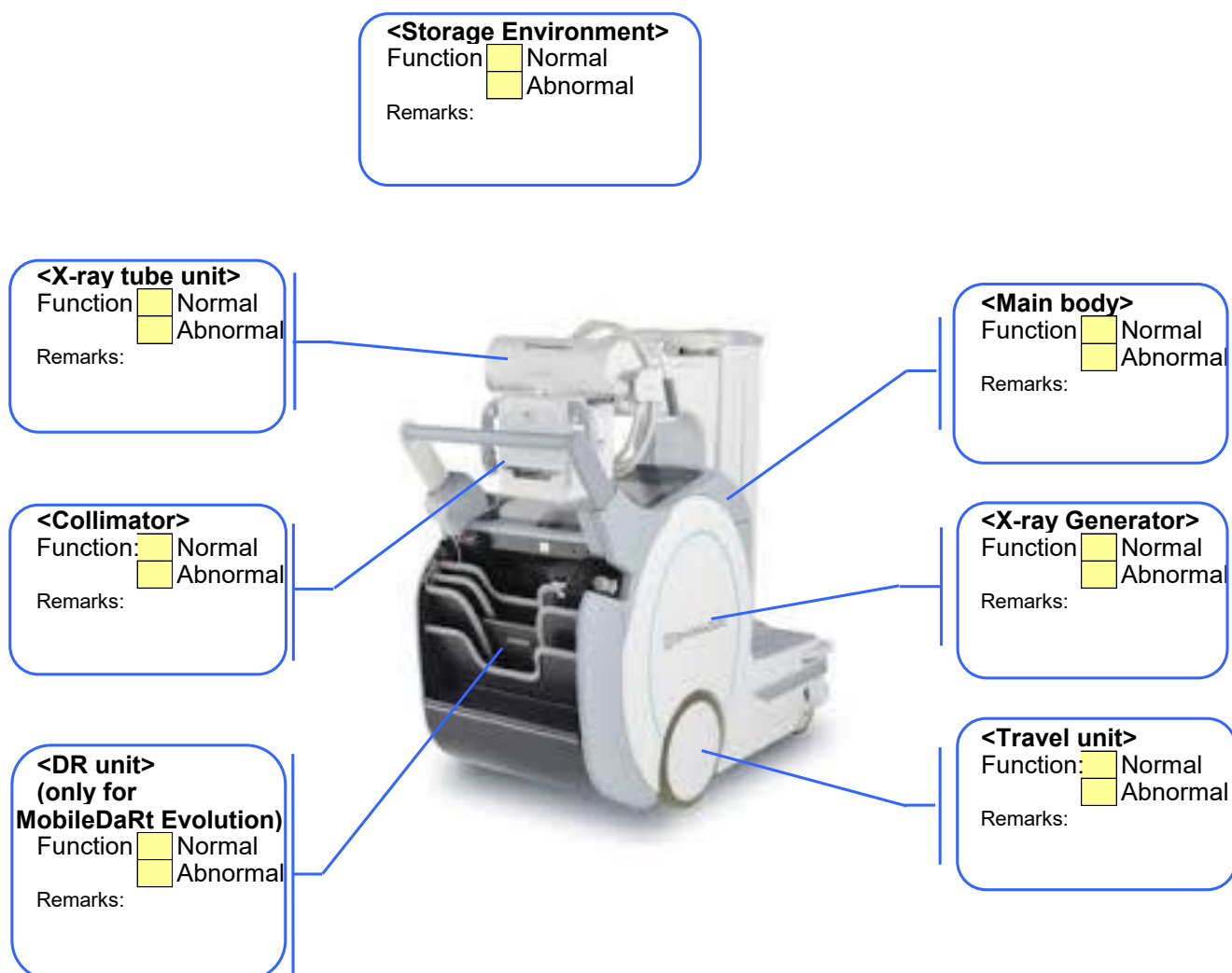
Measuring Instruments Used:

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

[illegible]

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:

<Collimator>

Function: ☐ Normal
☐ Abnormal

Remarks:

<DR unit> (only for MobileDaRt Evolution)

Function ☐ Normal
☐ Abnormal

Remarks:

<Main body>

Function ☐ Normal
☐ Abnormal

Remarks:

<X-ray Generator>

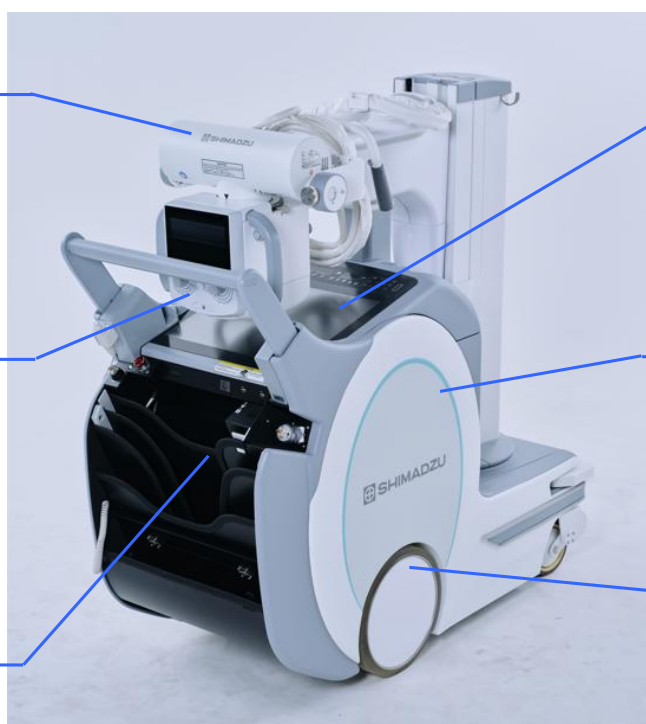
Function ☐ Normal
☐ Abnormal

Remarks:

<Travel unit>

Function: ☐ Normal
☐ Abnormal

Remarks:



Outline of system inspection result

<Storage Environment>

Function ☐ Normal
☐ Abnormal

Remarks:

<X-ray tube unit>

Function ☐ Normal
☐ Abnormal

Remarks:

<Collimator>

Function: ☐ Normal
☐ Abnormal

Remarks:

<Travel unit>

Function: ☐ Normal
☐ Abnormal

Remarks:

<Main body>

Function ☐ Normal
☐ Abnormal

Remarks:

<X-ray Generator>

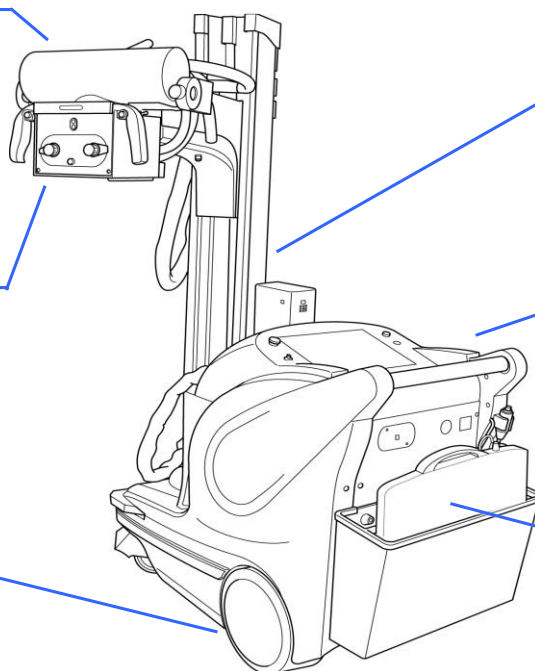
Function ☐ Normal
☐ Abnormal

Remarks:

<DR unit> (only for MobileDaRt Evolution)

Function ☐ Normal
☐ Abnormal

Remarks:



【Inspection Report】

No	Inspection Item	Safety	Inspection Details						Result
1. Checking installation environment									
(1)	Temperature and humidity	—	Storage place	Temperature: -10~40℃			℃		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
2. Checking instrument usage conditions									
(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
3. X-ray Generator							
(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(±8%)	—	Radiography:80kV, 8mAs(for 32kW system) 3.2mAs(for 12.5kW system)		V	Measure TkV (Normal: 4V)	
		—	Radiography:100kV, 16mAs(for 32kW system) 12.5mAs(for 12.5kW system)		V	Measure TkV (Normal: 5V)	
(5)	Tube current accuracy and reproducibility (±10%)	—	Radiography:80kV, 8mAs(400mA for 32kW system) 3.2mAs(160mA for 12.5kW system)		V	Measure TmA (Normal: 3.2V/2.5V)	
		—	Radiography:100kV, 16mAs(160mA for 32kW system) 12.5mAs(125mA for 12.5kW system)		V	Measure TmA (Normal: 3.2V/2.5V)	
(6)	Radiography time accuracy and reproducibility(±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	—					
4. X-ray tube unit							
(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.	
		○	Wire rope damage and attachment.	
		—	Check the brake.	
		○	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.	
		○	Check the tightness of rail and bearing mounting screws.	
(3)	Column rotation	—	Check the column rotation operation.	
		—	Check the brake.	
		○	Check the tightness of the column mounting screws.	
(4)	Tube rotation about arm	—	Check the operation force.	
		—	Check the brake.	
		○	Check the tightness of the tube support mounting screws	
(5)	Tube rotation about tube axis	—	Check the operation force.	
		—	Check the brake.	
		○	Check the tightness of the tube support mounting screws	
(6)	Arm catch operation	—	Check the arm fixing operation.	
		○	Check the tightness of the arm catch mounting screws.	
(7)	Operation switches and displays	○	Check the switch operation and displays.	
		—	Check the contact of terminals and connectors.	

Remarks

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

Remarks

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

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

No	Inspection Item	Safety	Inspection Details	Result
9. FPD(in case of VIVIX series(Vieworks))				
(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
