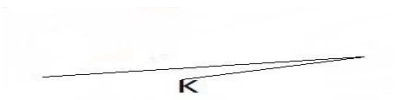
Medical Physics Department

1- Basic Info	
Type of Test	Acceptance Test
Date of Test	3/6/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	7
Hospital	King Fahd Hospital

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	PASS
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	PASS
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe
S/N	249585
Calibration Date	1/7/2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	STEPHANIX
Model	DR Vision Duo
S/N	129069-04
Year of Manufacturing	6/1/2018
Maximum kVp	150
Maximum mAs	500
Filtration mm	0.8 AL @ 75

Medical Physics Department

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	Yes	Yes	Yes
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there gonad Shields?	Yes		
3	Are there thyroid Shields?	Yes		
4	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	Yes		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

5- Kvp Accuracy & Reproducibility

BF					FF				
Kvp Accuracy			**Reproducibility**		**Kvp Accuracy**			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV	Kvp Set	Avg Kvp	Accuracy	STD	COV
60	59.533	-0.78%	1.172	0.020	60	58.400	-2.67%	0.100	0.002
70	69.433	-0.81%	1.250	0.018	70	67.833	-3.10%	0.115	0.002
80	79.333	-0.83%	1.422	0.018	80	78.233	-2.21%	0.058	0.001
90	89.633	-0.41%	1.290	0.014	90	89.100	-1.00%	0.100	0.001
100	99.767	-0.23%	1.464	0.015	100	99.600	-0.40%	0.100	0.001

Medical Physics Department

6- Exposure Timer Accuracy & Reproducibility									
BF					FF				
ms Accuracy			**Reproducibility**		**ms Accuracy**			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV	ms Set	Avg ms	Accuracy	STD	COV
25	24.533	-1.87%	0.058	0.002	25	24.400	-2.40%	0.000	0.000
50	49.800	-0.40%	0.100	0.002	50	49.600	-0.80%	0.000	0.000
100	99.833	-0.17%	0.058	0.001	100	NA	0.00%	NA	0.000
200	199.767	-0.12%	0.058	0.000	200	NA	0.00%	NA	0.000

7- mAs (Tube Output) Linearity								
BF				FF				
mAs (Tube output)			**Tube Linearity**	**mAs (Tube output)**			**Tube Linearity**	
mAs Set	Avg AK (mGy)	mGy/mAs	Result	mAs Set	Avg AK (mGy)	mGy/mAs	Result	
5	0.133	0.027	PASS	5	0.119	0.024	PASS	
10	0.268	0.027	PASS	10	0.256	0.026	PASS	
20	0.517	0.026	PASS	20	0.519	0.026	PASS	
40	1.013	0.025	PASS	40	1.031	0.026	PASS	
80	1.971	0.025	PASS	80	1.964	0.025	PASS	

8.1 AEC Cell Balance							
Cell Config.	Left	Center	Right	Left + Right	ALL	Mean	COV
mAs	0.4	0.4	0.4	0.4	0.4	0.4	0.000
Exp (mGy/s)	17.77	17	17.6	17.05	17	17.284	0.021
mGy/mAs	44.43	42.50	44.00	42.63	42.50	43.21	0.021

Medical Physics Department

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.4	0.4	0.4	0.000
Exp (mGy/s)	17	18	17	0.033
mGy/mAs	42.5	45	42.5	0.033

8.3 Cell Efficiency with Varying thicknesses			
PMMA Thickness	mAs	Kvp	Exp (mGy/s)
5	0.4	76	25.67
10	0.8	76.4	28.34
15	1.2	77	31.47
COV	0.500	0.007	0.102

8.4 AEC Cell Balance for Wall Bucky							
Cell Config.	Left	Center	Right	Left + Right	ALL	Mean	COV
mAs	0.16	0.16	0.16	0.16	0.16	0.16	0.000
Exp (mGy/s)	19.04	18.67	18.45	18.13	17.88	18.434	0.025
mGy/mAs	119.00	116.69	115.31	113.31	111.75	115.21	0.025

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.16	0.16	0.16	0.000
Exp (mGy/s)	18.11	17.85	18.85	0.028
mGy/mAs	113.19	111.56	117.81	0.028

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8.6 Cell Efficiency with Varying thicknesses for Wall Bucky			
PMMA Thickness	mAs	Kvp	Exp (mGy/s)
5	0.32	118.9	21.74
10	0.64	120	24
15	1.6	122	24.73
COV	0.781	0.013	0.066

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	22.8

10- Half Value Layer Measurement (mm Al @ 80 Kvp)	
BF	**FF**
7.5	7.3

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	-0.5
Sum as % SID	-0.50%
Sum of deviations (UP , Down)	0
Sum as % SID	0.00%
Result	PASS

12- Image Quality	
Low Contrast Detectability	7
Contrast Dynamic Range	17
Resolution (lp/mm)	2.8

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control	0.1	0.01	PASS
2	Location 2	Slide Door	0.1	0.01	PASS
3	Location 3	Wall A	0.1	0.01	PASS
4	Location 4	Wall B	0.1	0.01	PASS
5	Location 5	Small Door	0.1	0.01	PASS
6	Location 6	Wall C	0.1	0.01	PASS
7	Location 7			NA	NA

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	● Make FDD = 100 | mAs = 20 ● Results kV Accuracy is within accepted limits. ● kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % ● kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	● Make FDD = 100 | mAs = 10 | KV = 81 ● Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits ● Exposure Timer Reproducibility is within accepted limits. ● Criteria: Exposure Timer Accuracy (+/-) 5 % ● Exposure Timer Reproducibility less than 0.05

7	mAs (Tube Output) Linearity	● Make FDD = 100 |KV = 81 ● | X1 - X2| ≤ 0.10| X1 - X2|, where X1 and X2 are the average mGy/mAs values ● Ak means Air Kerma in mGy
8	Automatic Exposure Control Test	● Reproducibility is within (+/-) 5% ● Cell Balance within (+/-) 5% ● Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	● Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	● Make FDD = 100 | mAs = 20 | KV = 81 ● HVL ≥ 2.8 mm Al
11	Image Quality	● Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	● Should not be less than 100 mR/hr at 1m
13	Survey	● Make mA = 200 ● The effective dose per a week should not exceed the 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147]

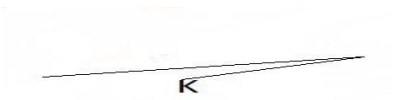
		• Workload = 1200 mA-min/week

Medical Physics Department

1- Basic Info	
Type of Test	Acceptance Test
Date of Test	4/11/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	8
Hospital	King Fahd Hospital

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	PASS
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	FAIL
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	Samsung
Model	GC85
S/N	17C218
Year of Manufacturing	5/29/2017
Maximum kVp	150
Maximum mAs	800
Filtration mm	1.4 at 75

Medical Physics Department

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	Yes	Yes	Yes
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there gonad Shields?	Yes		
3	Are there thyroid Shields?	Yes		
4	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	Yes		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

5- Kvp Accuracy & Reproducibility

BF					FF				
Kvp Accuracy			**Reproducibility**		**Kvp Accuracy**			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV	Kvp Set	Avg Kvp	Accuracy	STD	COV
60	59.767	-0.39%	0.058	0.001	60	59.500	-0.83%	0.000	0.000
70	69.200	-1.14%	0.000	0.000	70	69.267	-1.05%	0.058	0.001
80	79.433	-0.71%	0.058	0.001	80	79.367	-0.79%	0.058	0.001
90	89.500	-0.56%	0.000	0.000	90	89.500	-0.56%	0.100	0.001
100	99.600	-0.40%	0.000	0.000	100	99.800	-0.20%	0.000	0.000

Medical Physics Department

6- Exposure Timer Accuracy & Reproducibility										
BF					FF					
ms Accuracy			**Reproducibility**		**ms Accuracy**			**Reproducibility**		
ms Set	Avg ms	Accuracy	STD	COV	ms Set	Avg ms	Accuracy	STD	COV	
25	25.600	2.40%	0.000	0.000	25	0.000	0.00%	0.000	0.000	
50	50.400	0.80%	0.000	0.000	50	50.333	0.67%	0.058	0.001	
100	100.600	0.60%	0.000	0.000	100	100.600	0.60%	0.000	0.000	
200	200.633	0.32%	0.058	0.000	200	205.333	2.67%	0.577	0.003	

7- mAs (Tube Output) Linearity								
BF					FF			
mAs (Tube output)			**Tube Linearity**		**mAs (Tube output)**			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result		mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.277	0.055	PASS		5	0.295	0.059	PASS
10	0.567	0.057	PASS		10	0.57	0.057	PASS
20	1.15	0.058	PASS		20	1.161	0.058	NA
40	2.266	0.057	PASS		40		0.000	PASS
80	4.493	0.056	PASS		80		0.000	PASS

8.1 AEC Cell Balance							
Cell Config.	Left	Center	Right	Left + Right	ALL	Mean	COV
mAs	0.8	0.8	0.9	0.9	0.8	0.84	0.065
Exp (mGy/s)	19.5	19.13	19.25	20.6	20.3	19.756	0.033
mGy/mAs	24.38	23.91	21.39	22.89	25.38	23.59	0.064

Medical Physics Department

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.8	0.9	0.8	0.069
Exp (mGy/s)	21.6	20.7	19.45	0.052
mGy/mAs	27	23	24.3125	0.082

8.3 Cell Efficiency with Varying thicknesses			
PMMA Thickness	mAs	Kvp	Exp (mGy/s)
5	0.3	78.9	52.13
10	0.8	86.7	71.47
15	1.9	91	84.44
COV	0.819	0.072	0.234

8.4 AEC Cell Balance for Wall Bucky							
Cell Config.	Left	Center	Right	Left + Right	ALL	Mean	COV
mAs	0.3	0.5	0.5	0.6	0.6	0.5	0.245
Exp (mGy/s)	23.76	21.24	21.55	21	21.69	21.848	0.050
mGy/mAs	79.20	42.48	43.10	35.00	36.15	47.19	0.387

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.6	0.6	0.6	0.000
Exp (mGy/s)	21.69	20.95	21.4	0.017
mGy/mAs	36.15	34.92	35.67	0.017

Medical Physics Department

8.6 Cell Efficiency with Varying thicknesses for Wall Bucky			
PMMA Thickness	mAs	Kvp	Exp (mGy/s)
5	0.4	90	24.5
10	0.8	93	28.45
15	1.8	94	33.7
COV	0.721	0.023	0.160

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	23

10- Half Value Layer Measurement (mm Al @ 80 Kvp)	
BF	**FF**
2.82	2.91

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	-0.3
Sum as % SID	-0.30%
Sum of deviations (UP , Down)	-0.5
Sum as % SID	-0.50%
Result	PASS

12- Image Quality	
Low Contrast Detectability	6
Contrast Dynamic Range	17
Resolution (lp/mm)	3.7

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control Room	0.1	0.01	PASS
2	Location 2	Slide Door	0.1	0.01	PASS
3	Location 3	Wall 1	0.1	0.01	PASS
4	Location 4	Wall 2	0.1	0.01	PASS
5	Location 5	Wall 3	0.1	0.01	PASS
6	Location 6	WC	0.1	0.01	PASS
7	Location 7	Wall 4	0.1	0.01	PASS

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	● Make FDD = 100 | mAs = 20 ● Results kV Accuracy is within accepted limits. ● kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % ● kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	● Make FDD = 100 | mAs = 10 | KV = 81 ● Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits ● Exposure Timer Reproducibility is within accepted limits. ● Criteria: Exposure Timer Accuracy (+/-) 5 % ● Exposure Timer Reproducibility less than 0.05

7	mAs (Tube Output) Linearity	● Make FDD = 100 |KV = 81 ● | X1 - X2| ≤ 0.10| X1 - X2|, where X1 and X2 are the average mGy/mAs values ● Ak means Air Kerma in mGy
8	Automatic Exposure Control Test	● Reproducibility is within (+/-) 5% ● Cell Balance within (+/-) 5% ● Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	● Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	● Make FDD = 100 | mAs = 20 | KV = 81 ● HVL ≥ 2.8 mm Al
11	Image Quality	● Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	● Should not be less than 100 mR/hr at 1m
13	Survey	● Make mA = 200 ● The effective dose per a week should not exceed the 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147]

		• Workload = 1200 mA-min/week

Medical Physics Department

1- Basic Info	
Type of Test	Annual Test
Date of Test	09/07/2019
City	Madinah
Department	Radiology
Unit	Fluoroscopy
Room	4
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy	PASS
6	Dose Rate	PASS
7	Image Quality	PASS
8	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	Siemens
Model	Fluoro DRF
S/N	2303
Year of Manufacturing	May 2012
Maximum kVp	150
Maximum mAs	500
Filtration mm	1 @ 70 kv

Medical Physics Department

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	No	No	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there gonad Shields?	Yes		
3	Are there thyroid Shields?	Yes		
4	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	No		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

1 - Kvp Accuracy & Dose Rate						
Mode	Magnification	Kvp Set	Kvp Measured	Kvp Accuracy	Dose Rate (mGy/min)	PMMA (cm)
Normal	0	71	69.5	2.11%	0.465	10
	1	73	71.5	2.05%	0.582	
	2	73	71.9	1.51%	0.7188	
	3	73	72.2	1.10%	1.1064	

2 - Thickness Tracking						
Mode	Magnification	Kvp Set	Kvp Measured	Kvp Accuracy	Dose Rate (mGy/min)	PMMA (cm)
Normal	0	73	72	1.37%	0.684	15
	1	73	72	1.37%	0.936	
	2	73	71.4	2.19%	1.14	
	3	73	72.1	1.23%	1.8	

Medical Physics Department

12- Image Quality	
Low Contrast Detectability	5
Contrast Dynamic Range	16
Resolution (lp/mm)	2

13- Radiation Survey

Number	Location	Location Name	Average Reading (uSv/hr)	Weekly Dose Rate (uSv/week)	Result
1	Location 1	Control Room	0.2	0.02	PASS
2	Location 2	Wall 1	0.5	0.05	PASS
3	Location 3	Wall 2	0.4	0.04	PASS
4	Location 4	Wall 3	0.4	0.04	PASS
5	Location 5	Door	0.4	0.04	PASS
6	Location 6	Slide Door	0.3	0.03	PASS
7	Location 7	Inside Door	0.1	0.01	PASS

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy	• Make FDD = 100 | • Results kV Accuracy is within accepted limits. • kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 %
6	Dose Rate	• Should be less than 35 mGy/min for all magnification modes (AAPM 70)
8	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC
Date of Test	5/27/2019
City	Madinah
Department	Radiology
Unit	CT
Room	ER
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	PASS
5	CT Dose Index Volume CTDI	PASS
6	CT Number Accuracy	PASS
7	Slice Thickness	PASS
8	Contrast to Noise Ratio	FAIL
9	Visibility of the Smallest Contrast Group	PASS
10	CT Number Uniformity	PASS
11	High Contrast Resolution	PASS
12	Survey	PASS

Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	GE
Model	BrightSpeed
S/N	SA107CT04
Year of Manufacturing	6/1/2018

4-Radiation Protection Assessment	
Check	Result
Is There warning light Box	Yes
Are There warning signs	Yes
Are There lead aprons and gonad shields	Yes

Medical Physics Department

5- CT Dose Index Volume CTDI Test					
Phantom	Set Kv	Set mAs	$CTDI_{100}$ (centre, mGy)	$CTDI_{100}$ Average (Peripheral, mGy)	CTDIvol (mGy)
Adult Head	120	280	1	1.8	1.53
Adult Body	120	280	3.34	3.3425	3.34
Pediatric Head	120	280	2.18	2.0825	2.12

6- CT Number Accuracy					
Materials	CT Number HU			Tolerance HU	Results
	Actual	Measured	Deviation		
Water	0	-5.13	-5.13	-7 to +7	TRUE
Polyethylene	-95	-99	-4	-107 to -87	TRUE
Bone	900	958	58	850 to 970	TRUE
Air	-1000	-981	19	-1005 to -970	TRUE
Acrylic	120	116	-4	-110 to +130	TRUE

7- Slice Thickness (ST mm)						
Set ST	Upper SL	Lower ST	Upper Dev	Lower Dev	Tolerance	Result
2.5	2.5	2.5	0	0	-+1.5 mm	TRUE

8- Contrast to Noise Ratio					
CT Number			CNR	Tolerance	Result
Center of Image	Inside 25 mm	STD 25 mm			
87.6	91.44	4.76	0.81	CNR >= 1	FALSE

Medical Physics Department

9- Visibility of the Smallest Contrast Group		
Size	Tolerance	Result
6 mm	6 mm	TRUE

10- CT Number Uniformity					
Location	CT Number (HU)		Deviation	Tolerance	Result
	Actual	Measured			
Center	0	-3.85	-3.85	-5 to +5	TRUE
Top		-3.3	-3.3		TRUE
Right		-3.65	-3.65		TRUE
Bottom		-2.3	-2.3		TRUE
Left		-3.4	-3.4		TRUE

11- High Contrast Resolution			
No.of group seen	Size (lp/mm)	Tolerance	Result
6	9	5 lp/mm	TRUE

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC
Date of Test	22/5/2019
City	Madinah
Department	Radiology
Unit	CT
Room	Basement
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	PASS
5	CT Dose Index Volume CTDI	PASS
6	CT Number Accuracy	PASS
7	Slice Thickness	PASS
8	Contrast to Noise Ratio	FAIL
9	Visibility of the Smallest Contrast Group	PASS
10	CT Number Uniformity	PASS
11	High Contrast Resolution	PASS
12	Survey	PASS

Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	GE
Model	Discovery
S/N	002397
Year of Manufacturing	6/1/2018

4-Radiation Protection Assessment	
Check	Result
Is There warning light Box	Yes
Are There warning signs	Yes
Are There lead aprons and gonad shields	Yes

Medical Physics Department

5- CT Dose Index Volume CTDI Test					
Phantom	Set Kv	Set mAs	$CTDI_{100}$ (centre, mGy)	$CTDI_{100}$ Average (Peripheral, mGy)	CTDIvol (mGy)
Adult Head	140	350	1.7	3.2025	2.70
Adult Body	140	350	4.52	4.9425	4.80
Pediatric Head	140	350	3.02	3.0725	3.06

6- CT Number Accuracy					
Materials	CT Number HU			Tolerance HU	Results
	Actual	Measured	Deviation		
Water	0	0.13	0.13	-7 to +7	TRUE
Polyethylene	-95	-88	7	-107 to -87	TRUE
Bone	900	884.5	-15.5	850 to 970	TRUE
Air	-1000	-972	28	-1005 to -970	TRUE
Acrylic	120	122.9	2.9	-110 to +130	TRUE

7- Slice Thickness (ST mm)						
Set ST	Upper SL	Lower ST	Upper Dev	Lower Dev	Tolerance	Result
2.5	2.5	2.5	0	0	-+1.5 mm	TRUE

8- Contrast to Noise Ratio					
CT Number			CNR	Tolerance	Result
Center of Image	Inside 25 mm	STD 25 mm			
95.8	99.6	4.22	0.90	CNR >= 1	FALSE

Medical Physics Department

9- Visibility of the Smallest Contrast Group		
Size	Tolerance	Result
5 mm	6 mm	TRUE

10- CT Number Uniformity					
Location	CT Number (HU)		Deviation	Tolerance	Result
	Actual	Measured			
Center	0	-1.5	-1.5	-5 to +5	TRUE
Top		-0.66	-0.66		TRUE
Right		-0.8	-0.8		TRUE
Bottom		-0.74	-0.74		TRUE
Left		-0.8	-0.8		TRUE

11- High Contrast Resolution			
No.of group seen	Size (lp/mm)	Tolerance	Result
7	10	5 lp/mm	TRUE

Medical Physics Department

1- Basic Info	
Type of Test	Annual Test
Date of Test	16-7-2019
City	Madinah
Department	Radiology
Unit	Mammography
Room	Screening
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	Pass
2	Equipment Information	Pass
3	Machine Information	Pass
4	Radiation Protection Assessment	Pass
5	kV Accuracy & Reproducibility	Pass
6	mAs Linearity Test	Pass
7	Mean Glandular Dose	Pass
8	Image Quality	Pass
9	Collimation Test	Pass
10	Survey	Pass

Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	HOLOGIC
Model	SELENIC DIMENSIONS
S/N	81401132055
Year of Manufacturing	January 2013
Maximum kVp	39
Maximum mAs	450
Filtration	Rh

Medical Physics Department

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	No	No	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there thyroid Shields?	Yes		
3	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	Yes		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

5- Kvp Accuracy & Reproducibility				
BF				
Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
25	25	0.00%	0	0.00
28	27.9	-0.36%	0.2	0.01
32	32.3	0.93%	0.3	0.01
38	39.9	4.76%	0.1	0.00

6- mAs (Tube Output) Linearity			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.19	0.038	PASS
10	0.375	0.0375	PASS
20	0.8	0.04	PASS
40	1.64	0.041	PASS

Medical Physics Department

7- Average Glandular Dose

Factor	PMMA thickness (mm)	Equivalent breast thickness (mm)	HVL (mm Al)							
			0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6
g-factor	45	53	0.13	0.155	0.177	0.198	0.22	0.254	0.272	0.295
c-factor	45	53	-	1.109	1.105	1.102	1.099	1.096	1.091	1.088
g-factor	50	60	0.112	0.135	0.154	0.172	0.192	0.214	0.236	0.261
c-factor	50	60	-	1.164	1.16	1.151	1.15	1.144	1.139	1.134

	Mo/Mo	Mo/Rh	W/Rh
s-factor	1	1.017	1..047

AGD = Dose x g x c x s	
AGD (mGy)	Result
0.46	PASS

8- Image Quality		
Test Name	Results	Status
No.of Fibers	4	Pass
No.of speck group	4	Pass
No.of masses	5	Pass

9- Collimation Test (24*29 cm)	
SID (cm)	70
Sum of deviations (Left , Right)	0
Sum as % SID	0%
Sum of deviations (UP , Down)	0
Sum as % SID	0%
Result	PASS

Medical Physics Department

10- Radiation Survey

Number	Location	Location Name	Average Reading (uSv/hr)	Weekly Dose Rate (uSv/week)	Result
1	Location 1	Control	0.1	0.01	PASS
2	Location 2	Door	0.1	0.01	PASS
3	Location 3			NA	NA
4	Location 4			NA	NA
5	Location 5			NA	NA
6	Location 6			NA	NA
7	Location 7			NA	NA

Medical Physics Department

N.O of Test	Name of Test	Criteria
5	kV Accuracy & Reproducibility	· Make FDD = 100 | mAs = 20 · Results kV Accuracy is within accepted limits. · kV Reproducibility is within accepted. · Criteria: kV Accuracy (+/-) 5 % · kV Reproducibility less than 0.05
6	mAs (Tube Output) Linearity	· Make FDD = 100 |KV = 81 · $\|X1 - X2\| \leq 0.10\|X1 - X2\|$, where X1 and X2 are the average mGy/mAs values · Ak means Air Kerma in mGy
7	Average Glandular Dose	· Should be less than 3 mGy
8	Collimation	· Collimation: within (+/-) 2% at 100 [CRF]
9	Image Quality	· Number of fibers should be more than or equal 4 · Number of speck groups should be more than or equal 3 · Number of masses should be more than or equal 3 ·

10	Survey	· Make mA = 200 · The effective dose per a week should not exceed the 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] · Workload = 1200 mA-min/week

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC Test
Date of Test	7/1/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	Female-OPD
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	FAIL
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment
AEC Not Applicable for some technical reasons , the heat unit reach 94% without shutdown to cooling the tube.

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	GE
Model	AL01C II
S/N	3893
Year of Manufacturing	2014
Maximum kVp	150
Maximum mAs	600
Filtration mm	2

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	No	No	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes

Medical Physics Department

Radiation Protection Tools		
1	Are there lead aprons?	Yes
2	Are there gonad Shields?	Yes
3	Are there thyroid Shields?	Yes
4	Are radiation protection tools in good condition?	Yes
Room & Machine		
1	Are doors working properly?	Yes
2	Is control panel working properly?	Yes
3	Is machine working properly?	Yes

5- Kvp Accuracy & Reproducibility

BF				
Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
60	59.933	-0.11%	0.115	0.002
70	69.667	-0.48%	0.577	0.008
80	79.433	-0.71%	0.451	0.006
90	89.433	-0.63%	0.513	0.006
100	99.400	-0.60%	0.346	0.003

6- Exposure Timer Accuracy & Reproducibility

BF				
ms Accuracy			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV
25	24.967	-0.13%	0.058	0.002
50	50.000	0.00%	0.000	0.000
100	99.933	-0.07%	0.058	0.001
200	198.867	-0.57%	0.153	0.001

Medical Physics Department

7- mAs (Tube Output) Linearity			
BF			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.31	0.062	PASS
10	0.62	0.062	PASS
20	1.22	0.061	PASS
40	2.43	0.061	PASS
80	4.87	0.061	PASS

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs				#DIV/0!
Exp (mGy/s)				#DIV/0!
mGy/mAs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs				#DIV/0!
Exp (mGy/s)				#DIV/0!
mGy/mAs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Medical Physics Department

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	26

10- Half Value Layer Measurement (mm Al @ 80 Kvp)
BF
3.44

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	0
Sum as % SID	0.00%
Sum of deviations (UP , Down)	0
Sum as % SID	0.00%
Result	PASS

12- Image Quality	
Low Contrast Detectability	6
Contrast Dynamic Range	11
Resolution (lp/mm)	1.4

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control	0.1	0.01	PASS
2	Location 2	Door	0.2	0.02	PASS
3	Location 3			NA	NA
4	Location 4			NA	NA
5	Location 5			NA	NA
6	Location 6			NA	NA
7	Location 7			NA	NA

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	• Make FDD = 100 | mAs = 20 • Results kV Accuracy is within accepted limits. • kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % • kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	• Make FDD = 100 | mAs = 10 | KV = 81 • Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits • Exposure Timer Reproducibility is within accepted limits. • Criteria: Exposure Timer Accuracy (+/-) 5 % • Exposure Timer Reproducibility less than 0.05

Medical Physics Department

7	mAs (Tube Output) Linearity	• Make FDD = 100 |KV = 81 • | X1 - X2| ≤ 0.10| X1 - X2|, where X1 and X2 are the average mGy/mAs values • Ak means Air Kerma in mGy
8	Automatic Exposure Control Test	• Reproducibility is within (+/-) 5% • Cell Balance within (+/-) 5% • Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	• Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	• Make FDD = 100 | mAs = 20 | KV = 81 • HVL ≥ 2.8 mm Al
11	Image Quality	• Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	• Should not be less than 100 mR/hr at 1m
13	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

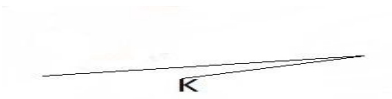
Medical Physics Department

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC Test
Date of Test	7/1/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	Male OPD
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	FAIL
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment
AEC Not Applicable for some technical reasons , the heat unit reach 94% without shutdown to cooling the tube.

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	GE
Model	AL01C II
S/N	4468
Year of Manufacturing	2014
Maximum kVp	150
Maximum mAs	600
Filtration mm	2

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	Yes	Yes	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes

Medical Physics Department

Radiation Protection Tools		
1	Are there lead aprons?	Yes
2	Are there gonad Shields?	Yes
3	Are there thyroid Shields?	Yes
4	Are radiation protection tools in good condition?	Yes
Room & Machine		
1	Are doors working properly?	No
2	Is control panel working properly?	Yes
3	Is machine working properly?	Yes

5- Kvp Accuracy & Reproducibility

BF				
Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
60	60.100	0.17%	0.100	0.002
70	69.167	-1.19%	0.058	0.001
80	79.300	-0.88%	0.200	0.003
90	93.000	3.33%	0.100	0.001
100	99.000	-1.00%	0.000	0.000

6- Exposure Timer Accuracy & Reproducibility

BF				
ms Accuracy			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV
25	25.000	0.00%	0.000	0.000
50	49.900	-0.20%	0.000	0.000
100	100.000	0.00%	0.000	0.000
200	200.000	0.00%	0.000	0.000

Medical Physics Department

7- mAs (Tube Output) Linearity			
BF			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.28	0.056	PASS
10	0.56	0.056	PASS
20	1.14	0.057	PASS
40	2.28	0.057	PASS
80	4.5	0.056	PASS

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs				#DIV/0!
Exp (mGy/s)				#DIV/0!
mGy/mAs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs				#DIV/0!
Exp (mGy/s)				#DIV/0!
mGy/mAs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Medical Physics Department

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	18

10- Half Value Layer Measurement (mm Al @ 80 Kvp)
BF
3.48

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	0
Sum as % SID	0.00%
Sum of deviations (UP , Down)	0
Sum as % SID	0.00%
Result	PASS

12- Image Quality	
Low Contrast Detectability	6
Contrast Dynamic Range	12
Resolution (lp/mm)	1.6

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control	0.1	0.01	PASS
2	Location 2	Slide door	0.1	0.01	PASS
3	Location 3			NA	NA
4	Location 4			NA	NA
5	Location 5			NA	NA
6	Location 6			NA	NA
7	Location 7			NA	NA

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	• Make FDD = 100 | mAs = 20 • Results kV Accuracy is within accepted limits. • kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % • kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	• Make FDD = 100 | mAs = 10 | KV = 81 • Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits • Exposure Timer Reproducibility is within accepted limits. • Criteria: Exposure Timer Accuracy (+/-) 5 % • Exposure Timer Reproducibility less than 0.05

Medical Physics Department

7	mAs (Tube Output) Linearity	• Make FDD = 100 |KV = 81 • | X1 - X2| ≤ 0.10| X1 - X2|, where X1 and X2 are the average mGy/mAs values • Ak means Air Kerma in mGy
8	Automatic Exposure Control Test	• Reproducibility is within (+/-) 5% • Cell Balance within (+/-) 5% • Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	• Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	• Make FDD = 100 | mAs = 20 | KV = 81 • HVL ≥ 2.8 mm Al
11	Image Quality	• Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	• Should not be less than 100 mR/hr at 1m
13	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

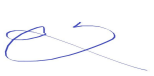
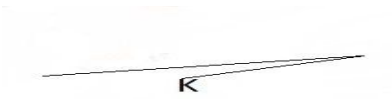
Medical Physics Department

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC Test
Date of Test	5/20/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	3
Hospital	King Fahd Hospital

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	PASS
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249527
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	Kudak
Model	Direct View7500
S/N	79203-M7
Year of Manufacturing	9/1/2008
Maximum kVp	150
Maximum mAs	500
Filtration mm	2 mm @ 70

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	No	No	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Yes

Medical Physics Department

Radiation Protection Tools		
1	Are there lead aprons?	Yes
2	Are there gonad Shields?	Yes
3	Are there thyroid Shields?	Yes
4	Are radiation protection tools in good condition?	Yes
Room & Machine		
1	Are doors working properly?	No
2	Is control panel working properly?	Yes
3	Is machine working properly?	Yes

5- Kvp Accuracy & Reproducibility

BF

Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
60	60.700	1.17%	0.200	0.003
70	69.867	-0.19%	0.153	0.002
80	80.000	0.00%	0.000	0.000
90	90.400	0.44%	0.100	0.001
100	101.400	1.40%	0.100	0.001

6- Exposure Timer Accuracy & Reproducibility

BF

ms Accuracy			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV
25	24.967	-0.13%	0.058	0.002
50	50.033	0.07%	0.058	0.001
100	100.067	0.07%	0.115	0.001
200	200.500	0.25%	0.100	0.000

Medical Physics Department

7- mAs (Tube Output) Linearity			
BF			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.106	0.021	PASS
10	0.21	0.021	PASS
20	0.419	0.021	PASS
40	0.845	0.021	PASS
80	1.698	0.021	PASS

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.2	0.2	0.2	0.000
Exp (mGy/s)	5.5	5.5	5.5	0.000
mGy/mAs	27.500	27.500	27.500	0.000

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.3	0.3	0.3	0.000
Exp (mGy/s)	19	19	19	0.000
mGy/mAs	63.33	63.33	63.33	0.000

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	56

Medical Physics Department

10- Half Value Layer Measurement (mm Al @ 80 Kvp)
BF
4.95

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	0.25
Sum as % SID	0.25%
Sum of deviations (UP , Down)	0.25
Sum as % SID	0.25%
Result	PASS

12- Image Quality	
Low Contrast Detectability	6
Contrast Dynamic Range	17
Resolution (lp/mm)	2.8

13- Radiation Survey

Number	Location	Location Name	Average Reading (uSv/hr)	Weekly Dose Rate (uSv/week)	Result
1	Location 1	Control	0.1	0.01	PASS
2	Location 2	Slide door		NA	NA
3	Location 3	Office	0.1	0.01	PASS
4	Location 4		0.1	0.01	PASS
5	Location 5			NA	NA
6	Location 6			NA	NA

Medical Physics Department

7	Location 7			NA	NA

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	● Make FDD = 100 | mAs = 20 ● Results kV Accuracy is within accepted limits. ● kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % ● kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	● Make FDD = 100 | mAs = 10 | KV = 81 ● Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits ● Exposure Timer Reproducibility is within accepted limits. ● Criteria: Exposure Timer Accuracy (+/-) 5 % ● Exposure Timer Reproducibility less than 0.05

Medical Physics Department

7	mAs (Tube Output) Linearity	• Make FDD = 100 |KV = 81 • | X1 - X2| ≤ 0.10| X1 - X2|, where X1 and X2 are the average mGy/mAs values • Ak means Air Kerma in mGy
8	Automatic Exposure Control Test	• Reproducibility is within (+/-) 5% • Cell Balance within (+/-) 5% • Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	• Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	• Make FDD = 100 | mAs = 20 | KV = 81 • HVL ≥ 2.8 mm Al
11	Image Quality	• Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	• Should not be less than 100 mR/hr at 1m
13	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

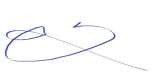
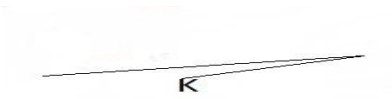
Medical Physics Department

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC Test
Date of Test	5/26/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	5
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	PASS
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	PASS
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	Carestream
Model	DRX EVOLUTION PLUSE
S/N	10160
Year of Manufacturing	5/1/2017
Maximum kVp	150
Maximum mAs	500
Filtration mm	2 at 75

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	Yes	Yes	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Ye

Medical Physics Department

				s
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there gonad Shields?	Yes		
3	Are there thyroid Shields?	Yes		
4	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	No		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

5- Kvp Accuracy & Reproducibility

BF

Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
60	59.667	-0.56%	0.058	0.001
70	69.233	-1.10%	0.058	0.001
80	79.433	-0.71%	0.115	0.001
90	90.000	0.00%	0.100	0.001
100	100.733	0.73%	0.208	0.002

6- Exposure Timer Accuracy & Reproducibility

BF

ms Accuracy			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV
25	25.100	0.40%	0.000	0.000
50	50.100	0.20%	0.000	0.000
100	100.100	0.10%	0.000	0.000
200	200.100	0.05%	0.000	0.000

Medical Physics Department

7- mAs (Tube Output) Linearity			
BF			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.2138	0.043	PASS
10	0.4261	0.043	PASS
20	0.8551	0.043	PASS
40	1.7	0.043	PASS
80	3.406	0.043	PASS

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.9	0.9	0.9	0.000
Exp (mGy/s)	7.415	7.371	7.265	0.010
mGy/mAs	8.239	8.190	8.072	0.010

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.4	0.4	0.4	0.000
Exp (mGy/s)	1.219	1.166	1.151	0.030
mGy/mAs	3.05	2.92	2.88	0.030

Medical Physics Department

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	0

10- Half Value Layer Measurement (mm Al @ 80 Kvp)
BF
4.1

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	-0.3
Sum as % SID	-0.30%
Sum of deviations (UP , Down)	0
Sum as % SID	0.00%
Result	PASS

12- Image Quality	
Low Contrast Detectability	6
Contrast Dynamic Range	12
Resolution (lp/mm)	3.1

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control Room	0.2	0.02	PASS
2	Location 2	Small Door	0.1	0.01	PASS
3	Location 3	Wall 1	0.1	0.01	PASS
4	Location 4	Slide Door	0.2	0.02	PASS
5	Location 5	Wall 2	0.1	0.01	PASS
6	Location 6	Wall 3	0.2	0.02	PASS
7	Location 7			NA	NA

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	• Make FDD = 100 | mAs = 20 • Results kV Accuracy is within accepted limits. • kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % • kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	• Make FDD = 100 | mAs = 10 | KV = 81 • Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits • Exposure Timer Reproducibility is within accepted limits. • Criteria: Exposure Timer Accuracy (+/-) 5 % • Exposure Timer Reproducibility less than 0.05
7	mAs (Tube Output) Linearity	• Make FDD = 100 |KV = 81 • $\| X1 - X2 \| \leq 0.10 \| X1 - X2 \|$, where X1 and X2 are the average mGy/mAs values • Ak means Air Kerma in mGy

Medical Physics Department

8	Automatic Exposure Control Test	• Reproducibility is within (+/-) 5% • Cell Balance within (+/-) 5% • Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	• Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	• Make FDD = 100 | mAs = 20 | KV = 81 • HVL ≥ 2.8 mm Al
11	Image Quality	• Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	• Should not be less than 100 mR/hr at 1m
13	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

Medical Physics Department

1- Basic Info	
Type of Test	Annual QC Test
Date of Test	5/28/2019
City	Madinah
Department	Radiology
Unit	General X-Ray
Room	6
Hospital	KFHM

Result

Number	Test Points	Result
1	Basic Information	PASS
2	Equipment Information	PASS
3	Machine Information	PASS
4	Radiation Protection Assessment	FAIL
5	kV Accuracy & Reproducibility	PASS
6	Exposure timer Accuracy & Reproducibility	FAIL
7	mAs Linearity & Reproducibility	PASS
8	Automatic Exposure Control Reproducibility Test	PASS
9	X-Ray Tube Leakage	PASS
10	Half Value Layer Measurement	PASS
11	Collimation Test	PASS
12	Image Quality	PASS
13	Survey	PASS

	
Medical Physicist, Mukhtar Al-Ansari	Medical physicist, Khaled Al-Radadi

Medical Physics Department

Comment

2- Equipment Information	
Equipment Information	
Company Name	RaySafe X2
S/N	249585
Calibration Date	03 - 01 - 2019
Next Due Date	1/1/2020

3- Machine Information	
Machine Information	
Company Name	Carestream
Model	DRX EVOLUTION PLUSE
S/N	10160
Year of Manufacturing	5/1/2017
Maximum kVp	150
Maximum mAs	500
Filtration mm	2 at 75

4- Radiation Protection Assessment				
Sign				
1	Is there warning sign light box (Arabic – English - Connected)?	No	No	No
2	Is there radiation caution sign (Arabic – English – paperless)?	Yes	Yes	Yes
3	Is there pregnant caution sign (Arabic – English – paperless)?	Yes	Yes	Ye

Medical Physics Department

				s
Radiation Protection Tools				
1	Are there lead aprons?	Yes		
2	Are there gonad Shields?	Yes		
3	Are there thyroid Shields?	Yes		
4	Are radiation protection tools in good condition?	Yes		
Room & Machine				
1	Are doors working properly?	No		
2	Is control panel working properly?	Yes		
3	Is machine working properly?	Yes		

5- Kvp Accuracy & Reproducibility

BF				
Kvp Accuracy			**Reproducibility**	
Kvp Set	Avg Kvp	Accuracy	STD	COV
60	59.700	-0.50%	0.000	0.000
70	68.867	-1.62%	0.058	0.001
80	79.233	-0.96%	0.058	0.001
90	89.500	-0.56%	0.100	0.001
100	99.067	-0.93%	0.153	0.002

6- Exposure Timer Accuracy & Reproducibility

BF				
ms Accuracy			**Reproducibility**	
ms Set	Avg ms	Accuracy	STD	COV
25	22.500	-10.00%	0.100	0.004
50	47.867	-4.27%	0.058	0.001
100	95.767	-4.23%	0.115	0.001
200	192.167	-3.92%	0.058	0.000

Medical Physics Department

7- mAs (Tube Output) Linearity			
BF			
mAs (Tube output)			**Tube Linearity**
mAs Set	Avg AK (mGy)	mGy/mAs	Result
5	0.281	0.056	PASS
10	0.5726	0.057	PASS
20	1.156	0.058	PASS
40	2.32	0.058	PASS
80	4.653	0.058	PASS

8.2 AEC Reproducibility				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.5	0.5	0.5	0.000
Exp (mGy/s)	11.16	10.89	11.06	0.012
mGy/mAs	22.320	21.780	22.120	0.012

8.5 AEC Reproducibility for Wall Bucky				
Parameters	Reading 1	Reading 2	Reading 3	COV
mAs	0.4	0.4	0.4	0.000
Exp (mGy/s)	3.62	3.431	3.666	0.035
mGy/mAs	9.05	8.58	9.17	0.035

Medical Physics Department

9- X-Ray Tube Leakage (@ 1m (mR/hr))	
Average Reading	0

10- Half Value Layer Measurement (mm Al @ 80 Kvp)
BF
3.7

11- Collimation Test	
SID (cm)	100
Sum of deviations (Left , Right)	0
Sum as % SID	0.00%
Sum of deviations (UP , Down)	0
Sum as % SID	0.00%
Result	PASS

12- Image Quality	
Low Contrast Detectability	5
Contrast Dynamic Range	13
Resolution (lp/mm)	3.1

Medical Physics Department

13- Radiation Survey					
Number	**Location**	**Location Name**	**Average Reading (uSv/hr)**	**Weekly Dose Rate (uSv/week)**	**Result**
1	Location 1	Control Room	0.1	0.01	PASS
2	Location 2	Slide door	0.1	0.01	PASS
3	Location 3	Small Door	0.2	0.02	PASS
4	Location 4			NA	NA
5	Location 5			NA	NA
6	Location 6			NA	NA
7	Location 7			NA	NA

Medical Physics Department

Criteria & Notes

N.O of Test	Name of Test	Criteria & Notes
5	kV Accuracy & Reproducibility	• Make FDD = 100 | mAs = 20 • Results kV Accuracy is within accepted limits. • kV Reproducibility is within accepted Criteria: kV Accuracy (+/-) 5 % • kV Reproducibility less than 0.05
6	Exposure Timer Accuracy & Reproducibility	• Make FDD = 100 | mAs = 10 | KV = 81 • Results: Exposure Timer Accuracy is Exposure Timer Accuracy is within accepted limits • Exposure Timer Reproducibility is within accepted limits. • Criteria: Exposure Timer Accuracy (+/-) 5 % • Exposure Timer Reproducibility less than 0.05
7	mAs (Tube Output) Linearity	• Make FDD = 100 |KV = 81 • $\| X1 - X2 \| \leq 0.10 \| X1 - X2 \|$, where X1 and X2 are the average mGy/mAs values • Ak means Air Kerma in mGy

Medical Physics Department

8	Automatic Exposure Control Test	• Reproducibility is within (+/-) 5% • Cell Balance within (+/-) 5% • Cell Efficiency with thickness change between 20% - 50% AAPM 14
9	Maximum Tube Output	• Tube leakage should be less than 100 mR/hr at 1m.0
10	Half Value Layer Measurement	• Make FDD = 100 | mAs = 20 | KV = 81 • HVL ≥ 2.8 mm Al
11	Image Quality	• Collimation: within (+/-) 2% at 100 [CRF]
12	Tube Leakage	• Should not be less than 100 mR/hr at 1m
13	Survey	• Make mA = 200 • The effective dose per week should not exceed 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCPR, 147] • Workload = 1200 mA-min/week

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Interventional Radiology

Date of Survey:	12/08/2018
City:	Medina
Department:	Radiology
Unit:	Interventional
Room:	Suite up
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	○ PASS	● FAIL
3	kVp Accuracy	● PASS	○ FAIL
4	Fluoroscopic Dose Rate	● PASS	○ FAIL
5	Automatic Exposure Control Tracking	● PASS	○ FAIL
6	Half Value Layer	● PASS	○ FAIL
7	Image Quality	● PASS	○ FAIL
8	Survey	● PASS	○ FAIL

Comment:
Slide door does not work well, there is no warning sign light box

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors X2

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Machine Info

Company	Model	Serial No.
Siemens	Artiszee	153137

Radiation Protection Assessment

1st Room Inspection and Environment		Status
1	There is warning lights over the main doors on the outside of the room	NO
2	Doors and jambs are lead-lined including door-hand	YES
3	There is appropriate warning signs on doors (x-ray, pregnancy and Arabic translation)	YES
4	There are lead aprons, gonad shields & gloves	YES
5	Primary beam is not directed against occupied or partially occupied unprotected areas	YES
2nd x-ray Control Panel		
1	There is visible light on 'prepare' and 'expose'	YES
2	If more than one tube is used from the panel, the tube selector switches should be labeled	N/A
3	Panel indicators are functioning correctly	YES
4	Control buttons are functioning correctly	YES
5	The radiographer has a clear view of the table and chest stand from the panel	YES
6	Tube overload protection circuit is working properly	YES
3rd Protective Equipment		
1	Protective clothes and devices are in good condition	YES
2	Protective clothes are at least 0.25 mm Pb equivalent	YES
3	Protective clothes are checked annually	YES
4	Inspection records are kept of these inspections	N/A
5	'Local Rules for Radiographers' sheet is available	N/A
4th Physical Inspection		
1	Focal spot indicator is present	YES
2	Source to image Distance Indicator Present	YES
3	Source to image Distance Indicator Accurate	YES
4	If filters can be removed there should be a visible indicator of filter absence	YES
5	Tube perpendicularity indicator is present	YES
6	Tube angulation indicator is present	YES
7	Locking devices are effective.	YES
8	The light beam is switched off automatically	YES
9	The diaphragm can be closed completely.	YES
10	Tubeheads and supports are smooth and easy to use	YES
11	Table Bucky Cassette lock holds cassette firmly	N/A
12	Table Bucky lock is functioning properly	YES
13	Stand Bucky cassette lock holds cassette firmly	N/A
14	Stand Bucky is functioning properly.	YES
15	Cable coverings are intact	YES
16	AEC detector positions are clearly marked and visible	YES

In STATUS Choose between (Yes, No and not available-N/A)

kVp Accuracy & Dose Rate

Mode	Magnification	Kvp set	Kvp measured	Kvp Accuracy	Dose Rate (mGy/min)	mA	PMMA thick	Dose Rate (R/min)
low -	0	67.7	70.6	-4%	0.67	13.8	0	5.94
	1	68	70.5	-4%	0.67	14		5.96
	2	72.2	75.7	-5%	0.98	13.8		8.75
	3	65.9	67.9	-3%	0.49	13.9		4.40
	4	72.3	76	-5%	0.93	13.8		8.31
	5	74.5	76.3	-2%	2.53	40		22.52
Mid =	0	60.6	60.9	0%	0.70	13.9	0	6.26
	1	60.7	60.3	1%	0.68	14		6.01
	2	64.4	64.1	0%	1.00	13.9		8.91
	3	65	65.5	-1%	1.12	14.8		9.96
	4	65	64.8	0%	1.65	26.7		14.69
	5	65	65.1	0%	2.50	43.3		22.28
High +	0	57.6	56.9	1%	1.58	14	0	14.09
	1	57.5	56.8	1%	1.55	14		13.80
	2	61.1	60.1	2%	2.06	13.9		18.29
	3	62.8	61.7	2%	2.37	13.8		21.11
	4	66.4	65.3	2%	3.30	15.3		29.34
	5	66.4	64.9	2%	4.97	28.7		44.24
DSA2	0	58.5	59.2	-1%	3.84	387.9	0	34.21
DSA4		58.5	59	-1%	7.91	366		70.38

NOTES:

Results: Accepted.

Criteria: kVp Accuracy ±5 %

Results: Accepted Values.

Dose Rate Criteria: 9 – 35 mGy/min.

Automatic Exposure Control (AEC) Tracking (PMMA)

Mode	Magnification	Kvp set	Kvp measured	Kvp Accuracy	Dose Rate (mGy/min)	mA	PMMA thick	Dose Rate (R/min)
low -	0	74.5	78.7	-6%	6.13	93.2	12.5	54.57
	1	74.5	79.2	-6%	6.11	92.4		54.36
	2	74.5	77.9	-5%	9.25	94.5		82.34
	3	74.5	77.5	-4%	12.01	95.5		106.85
	4	74.5	77.3	-4%	18.60	122.9		165.54
	5	77	78.4	-2%	31.70	97.5		282.11
Mid =	0	65	65.7	-1%	9.41	95.6	12.5	83.78
	1	65	65.6	-1%	9.56	95.7		85.07
	2	65	65.1	0%	14.91	99.7		132.70
	3	65	65	0%	19.12	135.3		170.19
	4	68.4	67.6	1%	34.96	95.9		311.16
	5	68.4	67.7	1%	54.13	128.4		481.72
High +	0	66.4	66	1%	18.78	93.1	12.5	167.14
	1	66.4	65.9	1%	18.88	93.4		168.05
	2	66.4	65.8	1%	27.91	95.9		248.42
	3	66.4	65.8	1%	38.71	97.5		344.54
	4	66.4	65.7	1%	57.07	148.1		507.89
	5	68.3	67.3	1%	98.28	158.3		874.69
DSA1	0	65.4	63.5	3%	82.56	412	12.5	734.78
DSA2		63.8	63.2	1%	92.58	368		823.96
DSA4		65.4	64.7	1%	178.80	332.6		1591.32

NOTES:

Results : Accepted.

Criteria : kVp Accuracy ±5 %

Results: Accepted Values.

Dose Rate Criteria: 9 – 35 mGy/min.

Half Value Layer

FDD = 100 cm kVp = 80 mAs = 20 Focus = BF

Result: 7.5 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

Low Contrast :

4

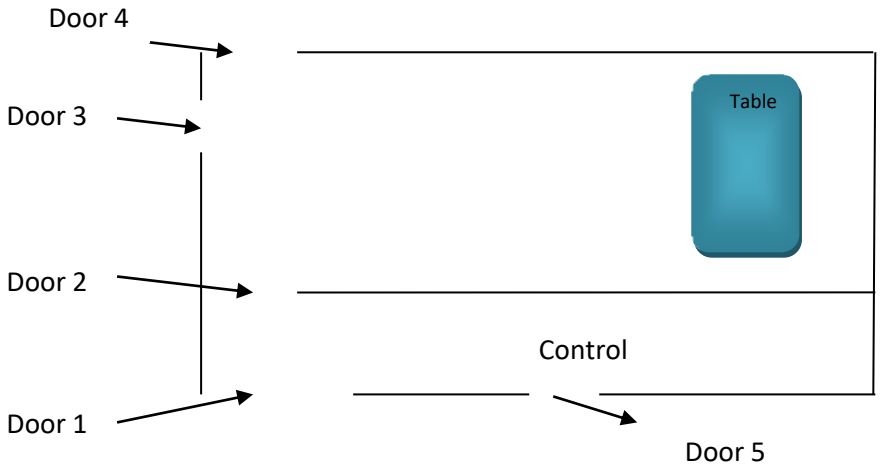
High Contrast :

14 Steps

Resolution:

1.8

Survey



Number	Location	Reading (µSv/h)				Dose Accumulated (µSv/week)	Evaluation
		1	2	3	Average		
1	Control	3.14	5.13	8.32	5.54	0.554	Pass
2	Door 1	0.14	0.11	0.11	0.12	0.012	Pass
3	Door 3	0.09	0.08	0.07	0.08	0.008	Pass
	Dose Accumulated: Work Load*Dose/60*MA **Accepted Dose:** Controlled Area 120 µSv/week and Uncontrolled Area 20 µSv/week						

The effective dose per a week should not exceed the 0.4 mSv for controlled areas and 0.02 mSv for uncontrolled areas [NCRP, 147].

W= 1200 mA-min/week

$$\text{Dose Accumulated (µSv/week)} = \frac{\text{Work load(mA- min)/week *Dose (µSv/h)}}{\text{60*mA}}$$

Meter Type Radiation Survey:	Ludlum
Serial Number :	23013984
Last Calibration :	13/Mar/2017

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Mobile X-Ray

Date of Survey:	01/08/2018
City:	Medina
Department:	Radiology
Unit:	General X-Ray
Room:	Mobile X-Ray 1
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	● PASS	○ FAIL
3	kVp Accuracy & Reproducibility	● PASS	○ FAIL
4	mAs Linearity	● PASS	○ FAIL
5	Half Value Layer Measurement	● PASS	○ FAIL
6	Image Quality	● PASS	○ FAIL

Comment:
All Tests are accepted.

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors Xi

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Machine Info:

Company	Model	S. N
FUJIFILM	FDRGO	012135

kVp Accuracy & Reproducibility

FDD = 100 cm mAs = 20 Focus = BF

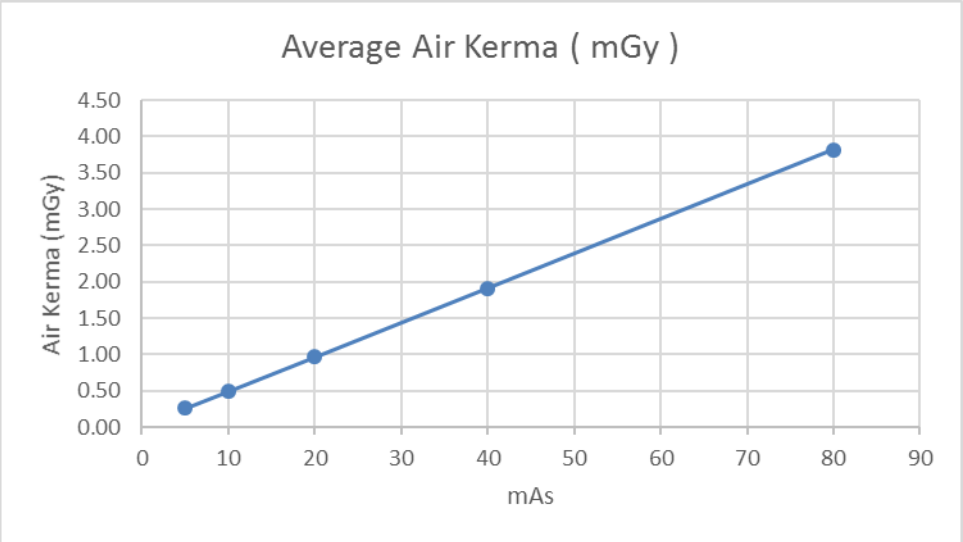
Kvp Accuracy		Reproducibility		
Set Kvp	Average measured Kvp	Accuracy (%)	STD	Coefficient of Variation
60	59.8	0.33%	0.14	0.00
70	69.7	0.43%	0.21	0.00
80	79.9	0.12%	0.07	0.00
90	90	0.00%	0.00	0.00
100	99.7	0.30%	0.21	0.00
110	110.2	-0.18%	0.14	0.00

NOTES:
Results kVp Accuracy is within accepted limits.
kVp Reproducibility is within accepted.
Criteria : kVp Accuracy (+/-) 5 %
kVpReproducibilityless than 0.05

mAs (Tube Output) Linearity

FDD = 100 cm kVp = 80 Focus = BF

mAs (Tube Output) Linearity		
Set mAs	Average Air Kerma (mGy)	mGy / mAs
5	0.26	0.05
10	0.49	0.05
20	0.97	0.05
40	1.91	0.05
80	3.82	0.05



X-ray Tube Linearity Test		
| X1 - X2|	0.1 x |X1+X2|	Result
0.00	0.01	PASS
0.00	0.05	PASS
0.00	0.01	PASS
0.01	0.04	PASS

NOTES:
Results: PASSED.
$|X1 - X2| \leq 0.10|X1 - X2|$, where X1 and X2 are the average mGy/mAs values

Half Value Layer Measurement

FDD = 100 cm kVp = 80 mAs = 20 Focus = BF

Result: 3.8 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

1 .Collimation :

SID	100 cm
Field size	18x24
Left	**0.250**
Right	**0.000**
Sum of deviations	**0.250**
Sum as % SID	**0.250**
Up	**0.250**
Down	**0.000**
Sum of deviations	**0.250**
Sum as % SID	**0.25**
Status	**Pass**

Results: The test is (FFD = 100 cm)

Criteria: The x-ray field and light filed borders to agree within (+/-) 2 % at 100

Reference: Code of Federal Regulations (CFR)

2 . Low Contrast :

6 (Good)

3 . High Contrast :

14 Steps

4 .Resolution:

3,1 lp/mm

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Mobile X-Ray

Date of Survey:	02/08/2018
City:	Medina
Department:	Radiology
Unit:	General X-Ray
Room:	Mobile X-Ray 2
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	● PASS	○ FAIL
3	kVp Accuracy & Reproducibility	● PASS	○ FAIL
4	mAs Linearity	● PASS	○ FAIL
5	Half Value Layer Measurement	● PASS	○ FAIL
6	Image Quality	● PASS	○ FAIL

Comment:
All Tests are accepted.

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors Xi

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Name of Machine:

Company	Model	S.N
FUJIFILM	FDRGO	012137

kVp Accuracy & Reproducibility

FDD = 100 cm mAs = 20 Focus = BF

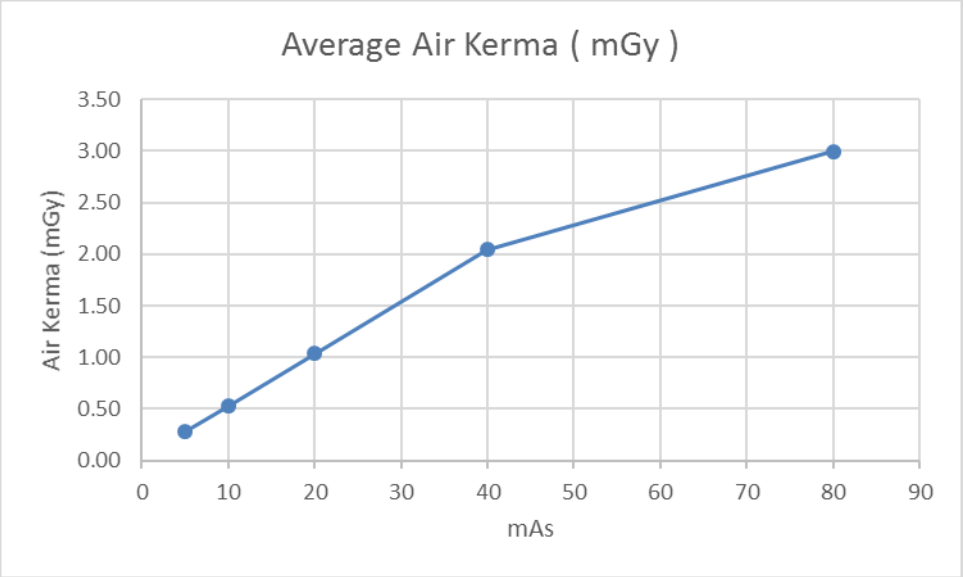
Kvp Accuracy		Reproducibility		
Set Kvp	Average measured Kvp	Accuracy (%)	STD	Coefficient of Variation
60	59.8	0.33%	0.14	0.00
70	69.6	0.57%	0.28	0.00
80	79.5	0.63%	0.35	0.00
90	89.6	0.44%	0.28	0.00
100	100.5	-0.50%	0.35	0.00
110	110.4	-0.36%	0.28	0.00

NOTES:
Results kVp Accuracy is within accepted limits.
kVp Reproducibility is within accepted.
Criteria : kVp Accuracy (+/-) 5 %
kVpReproducibilityless than 0.05

mAs (Tube Output) Linearity

FDD = 100 cm kVp = 80 Focus = BF

mAs (Tube Output) Linearity		
Set mAs	Average Air Kerma (mGy)	mGy / mAs
5	0.28	0.06
10	0.53	0.05
20	1.03	0.05
40	2.05	0.05
80	3.00	0.04



X-ray Tube Linearity Test		
| X1 - X2|	.1 x |X1+X	Result
0.00	0.01	PASS
0.00	0.06	PASS
0.00	0.01	PASS
0.01	0.04	PASS

NOTES:
Results: PASSED.
$|X1 - X2| \leq 0.10|X1 - X2|$, where X1 and X2 are the average mGy/mAs values

Half Value Layer Measurement

FDD = 100 cm kVp = 80 mAs = 20 Focus = BF

Result: 3.54 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

1 .Collimation :

SID	100 cm
Field size	18x24
Left	**0.500**
Right	**0.000**
Sum of deviations	**0.500**
Sum as % SID	**0.500**
Up	**0.250**
Down	**0.000**
Sum of deviations	**0.250**
Sum as % SID	**0.25**
Status	**Pass**

Results: The test is (FFD = 100 cm)

Criteria: The x-ray field and light filed borders to agree within (+/-) 2 % at 100

Reference: Code of Federal Regulations (CFR)

2 . Low Contrast :

6 (Good)

3 . High Contrast :

14 Steps

4 .Resolution:

3,7 lp/mm

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Mobile X-Ray

Date of Survey:	03/08/2018
City:	Medina
Department:	Radiology
Unit:	General X-Ray
Room:	Mobile X-Ray 3
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	● PASS	○ FAIL
3	kVp Accuracy & Reproducibility	● PASS	○ FAIL
4	mAs Linearity	● PASS	○ FAIL
5	Half Value Layer Measurement	● PASS	○ FAIL
6	Image Quality	● PASS	○ FAIL

Comment:
All Tests are accepted.

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors Xi

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Machine Info

Company	Model	S.N
FUJIFILM	FDRGO	012138

kVp Accuracy & Reproducibility

FDD = 100 cm mAs = 20

Focus = BF

Kvp Accuracy		Reproducibility		
Set Kvp	Average measured Kvp	Accuracy (%)	STD	Coefficient of Variation
60	59.9	0.17%	0.07	0.00
70	69.8	0.29%	0.14	0.00
80	79.9	0.12%	0.07	0.00
90	89.8	0.22%	0.14	0.00
100	99.9	0.10%	0.07	0.00
110	110.1	-0.09%	0.07	0.00

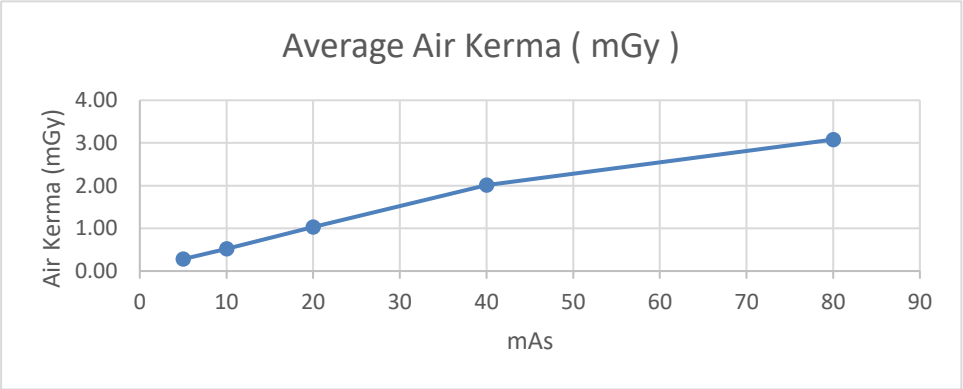
NOTES:
Results kVp Accuracy is within accepted limits.
kVp Reproducibility is within accepted.
Criteria : kVp Accuracy (+/-) 5 %
kVpReproducibilityless than 0.05

mAs (Tube Output) Linearity

FDD = 100 cm kVp = 80

Focus = BF

Set mAs	Average Air Kerma (mGy)	mGy / mAs
5	0.28	0.06
10	0.52	0.05
20	1.03	0.05
40	2.01	0.05
80	3.08	0.04



X-ray Tube Linearity Test		
| X1 - X2|	0.1 x |X1+X2|	Result
0.00	0.01	PASS
0.00	0.06	PASS
0.00	0.01	PASS
0.01	0.04	PASS

NOTES:
Results: PASSED.
$|X1 - X2| \leq 0.10|X1 - X2|$, where X1 and X2 are the average mGy/mAs values

Half Value Layer Measurement

FDD = 100 cm kVp = 80 mAs = 20
Focus = BF

Result: 3.56 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

1 .Collimation :

FFD	FOV	Result	Evaluation
100 cm	20*20	19.8*20	Pass

Results: The test is (FFD = 100 cm)

Criteria: The x-ray field and light filed borders to agree within (+/-) 2 % at 100

Reference: Code of Federal Regulations (CFR)

2 . Low Contrast:

6 (Good)

3 . High Contrast:

15 Steps (High Contrast)

4 .Resolution:

3,1

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Mobile X-Ray

Date of Survey:	07/08/2018
City:	Medina
Department:	Radiology
Unit:	General X-Ray
Room:	Mobile X-Ray 4
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	● PASS	○ FAIL
3	kVp Accuracy & Reproducibility	● PASS	○ FAIL
4	mAs Linearity	● PASS	○ FAIL
5	Half Value Layer Measurement	● PASS	○ FAIL
6	Image Quality	● PASS	○ FAIL

Comment:
All Tests are accepted.

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors Xi

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Name of Machine:

Company	Model	S. N
FUJIFILM	FDRGO	012139

kVp Accuracy & Reproducibility

FDD = 100 cm mAs = 20

Focus = BF

Kvp Accuracy		Reproducibility		
Set Kvp	Average measured Kvp	Accuracy (%)	STD	Coefficient of Variation
60	59.8	0.33%	0.14	0.00
70	68.9	1.57%	0.78	0.01
80	79.1	1.13%	0.64	0.01
90	89	1.11%	0.71	0.01
100	99.5	0.50%	0.35	0.00
110	109.8	0.18%	0.14	0.00

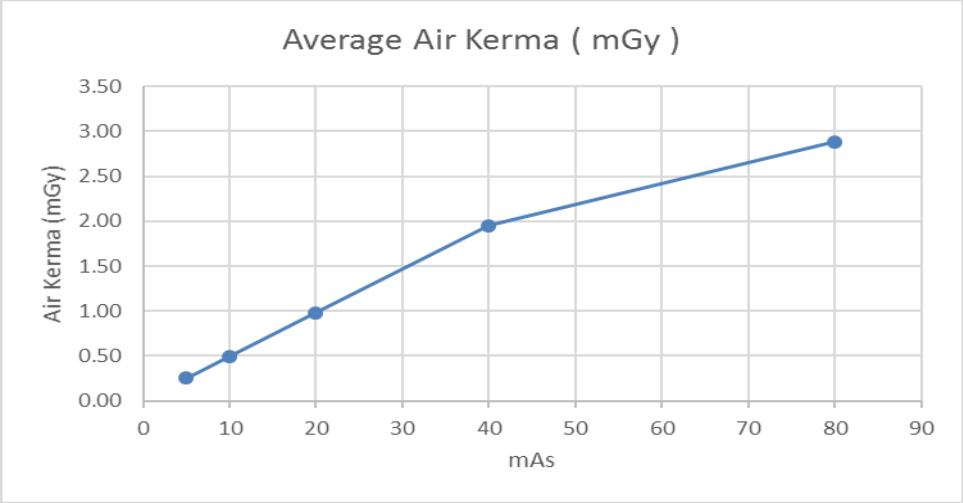
NOTES:
Results kVp Accuracy is within accepted limits.
kVp Reproducibility is within accepted.
Criteria : kVp Accuracy (+/-) 5 %
kVpReproducibilityless than 0.05

mAs (Tube Output) Linearity

FDD = 100 cm kVp = 80

Focus = BF

mAs (Tube Output) Linearity		
Set mAs	Average Air Kerma (mGy)	mGy / mAs
5	0.26	0.05
10	0.50	0.05
20	0.98	0.05
40	1.95	0.05
80	2.88	0.04



X-ray Tube Linearity Test		
| X1 - X2|	0.1 x |X1+X2|	Result
0.00	0.01	PASS
0.00	0.05	PASS
0.00	0.01	PASS
0.01	0.04	PASS

NOTES:
Results: PASSED.
$|X1 - X2| \leq 0.10|X1 - X2|$, where X1 and X2 are the average mGy/mAs values

Half Value Layer Measurement

FDD = 100 cm kVp = 80 mAs = 20
Focus = BF

Result: 3.8 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

1 .Collimation :

SID	100 cm
Field size	18x24
Left	**0.500**
Right	**0.000**
Sum of deviations	**0.500**
Sum as % SID	**0.500**
Up	**0.250**
Down	**0.000**
Sum of deviations	**0.250**
Sum as % SID	**0.25**
Status	**Pass**

Results: The test is (FFD = 100 cm)

Criteria: The x-ray field and light filed borders to agree within (+/-) 2 % at 100

Reference: Code of Federal Regulations (CFR)

2 . Low Contrast :

7 (Good)

3 . High Contrast :

13 Steps

4 .Resolution:

3,1 lp/mm

Kingdom of Saudi Arabia
Ministry of Health
Radiology and Applied Services Administration

Final Report of Acceptance Test for Mobile X-Ray

Date of Survey:	08/08/2018
City:	Medina
Department:	Radiology
Unit:	General X-Ray
Room:	Mobile X-Ray 5
Hospital:	King Fahd Hospital

1	General information	● PASS	○ FAIL
2	Radiation Protection	● PASS	○ FAIL
3	kVp Accuracy & Reproducibility	● PASS	○ FAIL
4	mAs Linearity	● PASS	○ FAIL
5	Half Value Layer Measurement	● PASS	○ FAIL
6	Image Quality	● PASS	○ FAIL

Comment:
All Tests are accepted.

Surveyor	Khaled Al-Raddadi	Medical Physicist	
	Mukhtar Alansari		

General information

Equipment Test Unfors Xi

S/N	249527
Calibration Date:	20/11/2017
Next Due Date:	20/11/2018

Machine Info

Company	Model	S. N
FUJIFILM	FDRGO	012140

kVp Accuracy & Reproducibility

FDD = 100 cm mAs = 20 Focus = BF

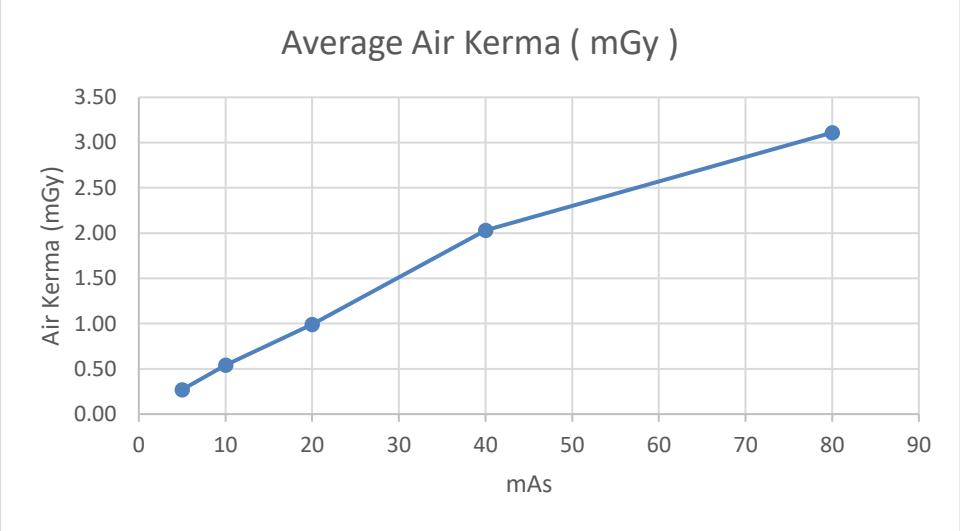
Kvp Accuracy		Reproducibility		
Set Kvp	Average measured Kvp	Accuracy (%)	STD	Coefficient of Variation
60	59.6	0.67%	0.28	0.00
70	68.8	1.71%	0.85	0.01
80	78.7	1.63%	0.92	0.01
90	88.5	1.67%	1.06	0.01
100	98.3	1.70%	1.20	0.01
110	108.4	1.45%	1.13	0.01

NOTES:
Results kVp Accuracy is within accepted limits.
kVp Reproducibility is within accepted.
Criteria : kVp Accuracy (+/-) 5 %
kVpReproducibilityless than 0.05

mAs (Tube Output) Linearity

FDD = 100 cm kVp = 80 Focus = BF

Set mAs	Average Air Kerma (mGy)	mGy / mAs
5	0.27	0.05
10	0.54	0.05
20	0.99	0.05
40	2.03	0.05
80	3.11	0.04



X-ray Tube Linearity Test		
| X1 - X2|	0.1 x |X1+X2|	Result
0.00	0.01	PASS
0.00	0.05	PASS
0.00	0.01	PASS
0.01	0.04	PASS

NOTES:
Results: PASSED.
$|X1 - X2| \leq 0.10|X1 - X2|$, where X1 and X2 are the average mGy/mAs values

Half Value Layer Measurement

FDD = 100 cm kVp = 80 mAs = 20 Focus = BF

Result: 3.8 mm Al

Criteria: HVL ≥ 2.8 mm Al

Image Quality

1 .Collimation :

FFD	FOV	Result	Evaluation
100 cm	20*20	19.9*19.8	Pass

Results: The test is (FFD = 100 cm)

Criteria: The x-ray field and light filed borders to agree within (+/-) 2 % at 100

Reference: Code of Federal Regulations (CFR)

2 . Low Contrast :

7 (Good)

3 . High Contrast :

16 Steps (High Contrast)

4 .Resolution:

3,7 (Good)