भारत सरकार
परमाणु ऊर्जा नियामक परिषद्
विकिरण संरक्षा प्रभाग

GOVERNMENT OF INDIA
ATOMIC ENERGY REGULATORY BOARD
RADIOLOGICAL SAFETY DIVISION

Case File Number: PB-70287-RF-XR-001 **Issue Date:** 12/05/2021

Document Number: 21-LOP-619777 **Expiry Date:** 12/05/2026

REGISTRATION FOR OPERATION OF MEDICAL DIAGNOSTIC X-RAY EQUIPMENT

In exercise of powers conferred under Section 16 and 17 as applicable of Atomic Energy Act, 1962 read in conjunction with Rule (3) of the Atomic Energy (Radiation Protection) Rules {AE(RP)R}, 2004, the Atomic Energy Regulatory Board (AERB) hereby issues Registration in favour of DR. ANUPAM PHILLIP to operate the following diagnostic radiology equipment located at NURMAHAL ROAD, VPO BILGA JALANDHAR, PUNJAB-144036 for Medical Diagnosis purposes.

Type of Equipment	Manufacturer	Model	Equipment Id
C-Arm	ALLENGERS MEDICAL SYSTEMS LTD., India	Allengers Hf-49 Plus	G-XR-115172

The MEDICAL SUPERINTENDENT, BILGA GENERAL HOSPITAL, JALANDHAR and DR. ANUPAM PHILLIP are hereby identified as the Employer and licensee respectively, for the purpose of assigning the responsibilities specified in the Atomic Energy (Radiation Protection) Rules, 2004, in respect of radiation protection of workers, public and environment because of operation of the above equipment.

The Employer and Licensee are responsible for,

I. Ensuring compliance with the relevant provisions of the
   i. Atomic Energy Act, 1962
   ii. Atomic Energy (Radiation Protection) Rules, 2004;
   iii. AERB Safety Code (AERB/SC/Med-2), 2001, Amendment 2012, and the revisions thereof
   iv. All applicable Safety Codes, Guides issued by AERB for the above practice and regulatory documents issued by AERB from time to time.
   v. Directives issued by Competent Authority from time to time.

II. Ensuring compliance with terms and conditions stated overleaf.

Note:
This Registration is issued ONLY from the RADIATION SAFETY VIEW POINT. All other clearances shall be obtained from concerned state/central/local authorities as applicable.

Dr. P. K. Dash Sharma
Head, RSD

DR. ANUPAM PHILLIP, MEDICAL SUPERINTENDENT
BILGA GENERAL HOSPITAL
NURMAHAL ROAD, VPO BILGA
JALANDHAR, PUNJAB-144036

CC: MEDICAL SUPERINTENDENT, BILGA GENERAL HOSPITAL, JALANDHAR

Note: This document is also available at www.aerb.gov.in/elora

Government of India
Atomic Energy Regulatory Board
Radiological Safety Division
Niyamak Bhavan, Anushaktinagar, Mumbai-400094

(Periodic Quality Assurance shall be carried out at least once in two years and also after any repairs having radiation safety implications)

A. DETAILS OF THE DIAGNOSTIC X-RAY EQUIPMENT

1	Name of the Institution and City	Bilga General Hospital, Nurmahal Road, VPO, Bilga, Jalandhar, Punjab - 144036
2	Type of Equipment	C-Arm
3	Model Name	HF 49 - Plus
4	Serial Number	2k19030547 – DC
5	Name of the Manufacturer	M/s. Allengers Medical Systems Ltd, Chandigarh
6	Name(s) of Person(s) testing the equipment and Name of Supplier/Service Agency	Rishav Sharma B.N Medical Solutions – Ludhiana
7	Dates and Duration of the Tests	11-05-2021 2 hr
8	AERB Authorization Number	17-AFSXE-178007

NEXT QA DUE: 11-05-2023

B.N. MEDICAL SOLUTIONS LUDHIANA

Rishav Sharma.

SUMMARY OF RADIATION SAFETY PERFORMANCE TEST REPORT

Sr No	Parameter Used	Specified values	Measured values	Tolerance	Remarks
1	Correspondence between x-ray field and image reception area	NA			Not Applicable
2	Central Beam alignment	NA		< 1.5°	
3	Effective focal spot measurement FFD= 60 cm	NA		Tolerance: 1. + 0.5 f for f < 0.8 mm 2. + 0.4 f for 0.8 ≤ f ≤ 1.5 mm 3. + 0.3 f for f > 1.5 mm	
4	Accuracy of Operating Potential	Set kVp	Measured kV	± 5 kv	Pass
		60	56.18		
		70	65.65		
		80	75.19		
5	Accuracy of irradiation time	Set Time	% Error	≤ ± (10 %)	Not Applicable
		NA			
6	Total Filtration	kV	HVT	• For Less than 70 Min. Total Filtration 1.5 mm Al • For 70<kVp≤100 Min. Total Filtration 2.0 mm Al • For kVp> 100 Min. Total Filtration 2.5 mm Al	Pass
		80	3.60		
		T.F.	4.50		
7	mAs Linearity		0.030	Coefficient of Linearity <0.1	Pass
8	Reproducibility of radiation output	kV	COV	CoV < 0.05	Pass
		60	0.005		
		70	0.005		
9	Exposure Rate at Tabletop	Manual	1.824	Without AEC Mode: ≤ 5 cGy/min With AEC Mode: ≤ 10 cGy/min	Pass
			cGy/min		
10	Low contrast resolution		3	3.0 mm hole should be visible	Pass
			mm		
11	Spatial resolution		1.5	1.5 lp/mm should be visible	Pass
			lp/mm		
12	On –Position Radiation Leakage level from X-Ray tube housing measured at 90 kV 3 mA		0.005 mGy in 1 hr	< 1mGy in one hour Or ≤ 115 mR in hour	Pass

I hereby undertake that all the information provided above is correct and in accordance with the detailed Quality Assurance report enclosed herewith.

Place: Bilga.

Date : 11/08/2021.

Name of the Service Engineer: Er. Rishav Sharma.

Name of the Supplier/ Service Agency: B.N Medical Solutions - Ludhiana

Signature:

BN MEDICAL SOLUTIONS
232, Block-A, Rishi Nagar, Civil Lines,
Near Kali Mata Mandir, Ludhiana-141001 (Pb.)
Tel. : 98887-14999, 0161-5001899
e-mail : bnmedicalsolutions@gmail.com

B. N. MEDICAL SOLUTIONS LUDHIANA

Rishav Sharma.

Signature of institution's representative:

Name of institution:

Seal/ Stamp of Institution:

BILGA GENERAL HOSPITAL
(Unit of C.M.O. H. Ludhiana)
V.P.O. Bilga, Nurmahal Road,
The.Phillaur, Distt. Jalandhar

 # Quality Assurance Tests Report shall be signed by Institution's Representative and duly stamped by the User's Institution

1. CONGRUENCE OF RADIATION & OPTICAL FIELD

Not Applicable

2. CENTRAL BEAM ALIGNMENT

Not Applicable

3. EFFECTIVE FOCAL SPOT MEASUREMENT

Not Applicable

4. ACCURACY OF OPERATING POTENTIAL & TOTAL FILTRATION

FFD (cm)	94

Applied kVp	Measured kVp			Average kVp	Deviation (kVp)
	mAs 20	mAs 45	mAs 80		
60	56.77	56.07	55.69	56.18	-3.82
70	65.93	65.16	65.85	65.65	-4.35
80	75.87	75.26	74.45	75.19	-4.81

Tolerance: For kVp = ± 5 kVp

Total filtration measured at 80 kV

TF = 4.50 mm of Al

HVT = 3.60 mm of Al

Remark
Pass

Tolerance for Total Filtration

1.5 mm Al for kV ≤ 70
2.0 mm Al for 70 < kV ≤ 100
2.5 mm Al for kV > 100

5. LINEARITY OF mAs LOADING STATION

Operating parameters : Distance : 94 cm, kV : 60

mAs Range	Out put in mGy			Average	mGy/mAs (X)
	1	2	3		
20	0.498	0.502	0.505	0.502	0.025
45	1.087	1.092	1.098	1.092	0.024
80	1.884	1.888	1.893	1.888	0.024

Coefficient of linearity = $\frac{Xmax - Xmin}{Xmax + Xmin}$ * 0.030

Tolerance: COL < 0.1

5. OUTPUT CONSISTANCY

FFD (cm)	94

Applied kVp	mAs	Output (mGy/s)					Average	COV	Remark
		1	2	3	4	5			
60	20	0.498	0.502	0.505	0.503	0.501	0.502	0.0052	Pass
70	20	0.750	0.755	0.759	0.756	0.752	0.754	0.0046	Pass

Tolerance : COV < 0.05

7. LOW CONTRAST SENSITIVITY

Diameter of smallest hole clearly resolved on monitor screen	3	mm or	0.117	inch
Recommended performace standard that must be resolved	3	mm or	0.117	inch

HIGH CONTRAST SENSITIVITY

Bar strip resolved on the monitor screen	1.5	lp/mm	
Recommended performance standard	1.5	lp/mm	must be resolved

9. EXPOSURE RATE AT TABLE TOP

Distance from focus to table (cm)	Mode	Applied kVp	Applied Ma	Exposure rate at table top cGy/min	Remark
50	Manual	80	3	1.824	Pass

Tolerance :

Without AEC Mode:	≤ 5 cGy/min
With AEC Mode:	≤ 10 cGy/min

Minimum focus to table top distance shall be 30 cm

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10. RADIATION LEAKAGE LEVELS FROM X-RAY TUBE HOUSING AT 1m FROM THE FOCUS

kVp =	90	mA =	3

Location (at 1m from focus)	Radiation Leakage Level (mR/hr)				
	Cathode	Anode	Right	Left	Top
Tube	0.2210	0.2540	0.3690	0.5980	0.1450
Collimator	0.1960	0.2280	0.3250	0.4190	0.0000

Work load = 180 mA-min in one hour

Maximum Leakage = $\frac{180 \text{ mA-min in one hour}}{60 \times 3 \text{ mA used for measurement}} \times \textbf{max}$ mR/hr

Maximum radiation leakage	mR in 1 hr	mGy in 1 hr	Result
Tube housing	0.598	0.0052456	Pass
Collimator	0.419	0.0036754	Pass

Acceptable Tolerance Limit : Leakage Radiation level at 1 metre from the focus should be
≤ 114 mR in one hour
or ≤ 1 mGy in one hour