

Item	Potential Failure	Indications	Mitigations
KIM software connection	KIM cannot read acquired KV images at the beginning of treatment	kV images do not show up when kV is Beamed ON	0) BEAM OFF; (1) Close current KIM session; (2) remode up the patient and try again; (3) Check that the acquired images were written in the correct folder and the folder has sufficient space.
KIM software connection	KIM ceases to read incoming kV images	Displayed KV images in KIM stop getting updated when gantry rotates	Check that the acquired images were written in the correct folder and has sufficient space.
KIM software	KIM crashes during pre treatment CBCT/during treatment	KIM freezes and/or Windows error message box appears	0) BEAM OFF; (1) Close current KIM session; (2) Restart KIM software
KIM software	Initial segmentation error	Red crosses are not on one or more markers	(0) BEAM OFF (1) Ctrl+Click all markers to manually segment them; (2) Acquire kV for 1s to ensure that red crosses stick to markers; If (2) is successful, (3) Proceed as normal. If (2) is not successful, repeat (1)-(2) three more times. After the third time, (4) abort current KIM section; (5) start a new KIM section; (6) make sure to select the correct patient file; (7) restart pre-treatment arc/CBCT
KIM software	In treatment segmentation error	KIM lost one or more markers completely for more than 2 seconds	Same as above + If markers are not visible, check kV settings in the OBI are the correct settings.

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Patient centroid file	Actual markers and planned markers far apart	Red crosses are not on one or more markers, markers far away from green boxes	(0) BEAM OFF; (1) Check correct patient file loaded by checking patient MRN, First Name and Last Name on KIM; (2) if correct patient file loaded, Ctrl+Click to manually segment markers. If (2) does not stick after (THREE) attempts, perform kV-kV match to check for possible large rotation and correct rotation if applicable. (3) proceed by restarting KIM again
KIM software	One or more markers moves out of field of view	One or more markers are not within KIM display	(0) BEAM OFF; (1) Close current KIM session; (2) open KIM settings form and check the field of view is the same as the field of view set in OBI; (3) correct KIM FOV is applicable; (4) increase the FOV in both system to proceed, in consultation with in-charge Physicists and Oncologists.
Couch Position	Couch positions in KIM and linac do not match	Human error in entering couch position at the beginning of treatment	0) BEAM OFF; (1) Close current KIM session; (2) Start a new KIM session; (3) Enter correct couch positions
Couch shift	Different couch shift values between KIM and kV-kV match	Patient anatomy continue to change since the last KIM position	1) Manually enter the kV-kV matching positions into KIM; (2) Apply the couch shift according to kV-kV match; (3) Add an On-Demand kV imaging module to the current arc; (4) Mode up the arc, move Gantry to the last treatment position; (5) mode up the On-Demand kV; (6) Start Image Acquisition; (7) From KIM, check that the new couch position puts the liver back within Gating Limit, and that KIM can segment the markers correctly.

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KIM software	MV scatter interferes and generates noise in the kV image	Red crosses jump around the markers.	(0) Hold the MV beam and make sure the markers are within the tolerance (1) Occasionally hold the MV beam and treat (2) If (1) does not work, try reducing the dose rate.
KIM software	KIM could be confused between markers and surgical clips	Red crosses jump around the markers.	Try to avoid performing KIM learning in this part