Verification Protocol

VerP #	ref to TS #	test procedure (description of routine)	verification criterion	ref. # (i.e. test protocol, etc)	Domain (HW/SW/ME/ALL)
Application					
VerP1	TS2	Setup pen plotter on a stable surface. Then draw Nikolaus house 40 times.	40 Nikolaus house drawn	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
General Functions					
VerP2	TS5	Put the pen plotter into a box of 56x39x42 cm provided by Uni Lab.	Fits in box with lid closed	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
VerP3	TS9	Place the pen plotter assembly on a measuring scale with an accuracy of ± 1gm. Take 3 readings and find out their mean value.	Mean of three weight measurement is well below 3500gm	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
VerP4	TS11	Run the Pen Plotter continuously across the paper for 30 min.	Continuous drawing upto 30 min at a time.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
VerP5	TS12	Start stopwatch, activate plotter with button, run stopwatch concurrently. Stop timer after drawing completion. Take 3 readings and find out there mean value.	Average Time taken <50 seconds	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
VerP6	TS12	Move the Pen from point A (0,0) to Point B (100,100) 20 times and measure the error at Point B for each cycle .	Average error <= ± 0.25mm	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
VerP7	TS14	Start the pen plotter and take noise level measurement by sound level meter. Take 5 readings and find out their mean value.	Mean of three noise measurement is <=60 dBA	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW/ME
Module Motor Controller Electronics and Wiring					
VerP8	TS30	Confirm switch functionality, halt plotter movement when contacted by levers, preventing overtravel and ensuring accurate and safe plotting. Check 10 times.	Overtravel prevention, accurate and safe plotting.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
Module Base Plate					
VerP9	TS36	Align the plotter for accurate plotting within the maximum A4 size. Perform 10 test plot using an A4-sized drawing media.	Maximum size of drawing media = A4.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
Module Pen Holder / Carriage					
VerP10	TS45	Gather pens, position them and measure the diameter by Vernier caliper. Record the measurement results for each pen.	The diameter is less than 15mm	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ME
VerP11	TS47	Drawing media is positioned correctly, and maximum thickness of drawing media(wood base,etc) 3cm.	Maximum thickness of drawing media = 3cm.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW/ME
Module Coding, Control & User Interface					
VerP12	TS53	Power on, calibrate for accuracy (repeat 5 times), test emergency stop. Establish reliable starting point, align X and Y axis, move to specific point & check error.	Calibration (5 times), X and Y alignment, move to point, check error and usage of emergency stop.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	SW
VerP13	TS54	Check the OLED/LCD Display for real-time display of status of the machine.	Displays the real-time of operations ongoing for the XY Pen plotter.	Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	SW/HW

VerR #	ref. to VerP #	Test function (to be copied from verification protocol)	verification criterion, the target value	actual value	criterion passed/failed	remark	ref. # (i.e. test report, etc)	Domain (HW/SW/ME/ALL)
Application								
VerR1	VerP1	To draw Nikolaus haus until failure or more than 40 times.	40 drawings without error	All the 40 houses are drawn correctly.	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
General Functions								
VerR2	VerP2	To put the pen plotter into a box of 56x39x42 cm^3 provided by Uni Lab.	Fits in box with lid closed	Fits perfectly	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
VerR3	VerP3	To ensure that pen plotter assembly weighs less than 3.5 kgs.	Weight <= 3.5kg	2.8kg	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
VerR4	VerP4	Ensuring continuous run time of Pen Plotter across the paper for 30 min.	Continuous drawing upto 30 min at a time.	30 min	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
VerR5	VerP5	Drawing time to be maintained less than 50s.	Time taken< 50 seconds.	45 seconds	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ALL
VerR6	VerP6	Check the average error in movement across Point A to Point B after 20 cycles of operation.	Average error <= ± 0.25mm	Error <= ± 0.25 mm	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	
VerR7	VerP7	Start the pen plotter and take noise level measurement to find out their mean value.	Noise level should be less than 60 dBA	55dB	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW/ME
Module Motor Controller Electronics and Wiring								
VerR8	VerP8	Confirm switch functionality, halt plotter movement when contacted by levers, preventing overtravel and ensuring accurate and safe plotting. check 10 times.	Accurate functionality and safe plotting	All the switches work properly.	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
Module Base Plate								
VerR9	VerP9	Align the plotter for accurate plotting within the maximum A4 size. Perform 10 test plot using an A4-sized drawing media.	Drawing media size = A4.	A4	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW
Module Pen Holder / Carriage								
VerR10	VerP10	Maximum pen diameter used is less than or equal to 15mm	Diameter <=15mm	13mm	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	ME
VerR11	VerP11	Determine the max. Permissible Drawing media thickness	Maximum thickness of drawing media >= 5mm.	3cm	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW/ME
Module Coding, Control & User Interface								
VerR12	VerP12	Start, Calibrate (5x), Test Emergency Stop. Establish starting point, Align X and Y, Move to point, Check error.	Execute all the given tasks/functions.	All the functions were working properly.	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	SW
VerR13	VerP13	Check the real-time display of status of the machine for monitoring.	Ensure the display updates real-time status and working of emergency stop status, with clear visibility for effective monitoring.	Display shows the detailed status on OLED/LCD Display.	Passed		Team14 Doc# 004-MERO_XY_Pen_plotter_Verification.pdf	HW