



WATERS Weekly FPY review (WW08 – 2019)

Agenda

- 1. Scope of review and Alert Level.**
- 2. Open issues for discussion / follow up**
- 3. First Pass Yield (eAlliance and BSM/QSM)**
 - **Weekly FPY trending.**
 - **Hard failures review.**
- 4. Others**
 - **AOB**

Scope of review and Alert Level

Description

1) Scope of review

- Last week data, to look out for 'surge' and 'new failures' for Hard Failures (or Faulty Component).
- 13 weeks rolling data to be reviewed, including past actions.
- 20 Dec: To review the Event Log of all failures of previous week.
- 20 Dec: To focus on last week failure during weekly review (For info)
- 14 Mar: To include In-Process FPY for review, starting WW12'18.

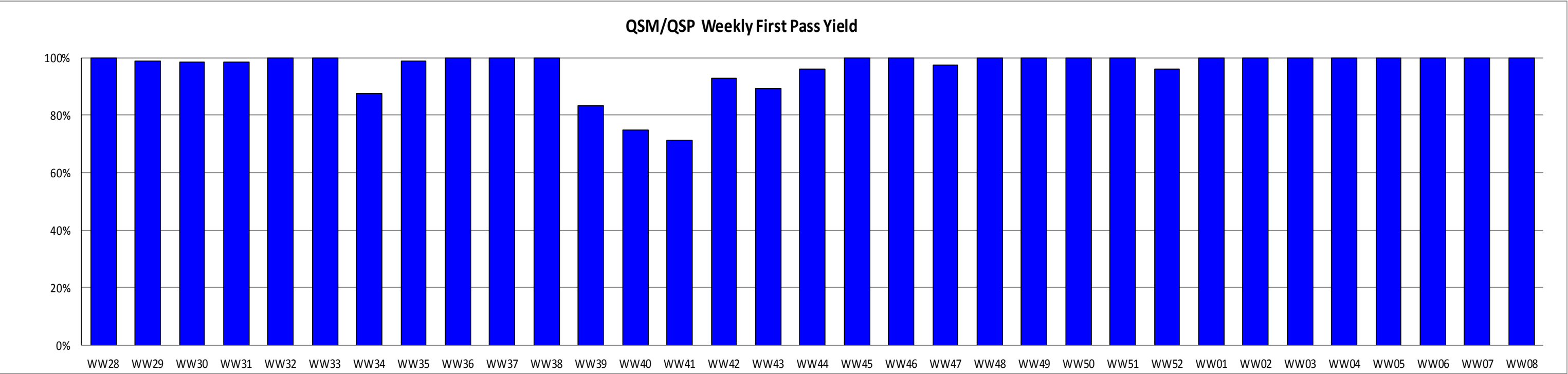
2) Alert Level

- If exceeds average failure plus one Standard Deviation.
- New failures – 3 pieces and above in the same week or continuous for 3 weeks.

Open issues for discussion / follow up

Description	Owner	To complete by	Status
<u>1) Failure Analysis for Alliance GPV (PN WAT270524)</u> 13Dec: 3pcs failures in WW47 and WW49, to peruse Failure Analysis reports from Parker 23Jan: Parker has requested for time to react as they are re-locating. 07 Feb: Flex can continue to peruse outstanding issues and push for RTV and FA. 01 Mar: Flex reported seeing 3 x QSM GPV (PN 279001810) failure in WW09'18. Flex already provided Tracker for the 2 x GPV PN, and the email included Edwin, Randy in the loop 14 Mar: to review the FA report urgently. Afternote- Flex compiled a power point on recent and outstanding FA and send on 27 Mar 2018. This report was also share during WW12 data review. 03 Apr: Parker proposed to forward any reporting of failures for returned product to Waters instead of Flex. 01 May: Latest advise from WPPL: PPM for triggering an investigation would be anything greater than 15,000. 08 May: Flex provided PPM, up to Apr 2018 usage. See next slide. 18 May: Parker asked to screen SN 142125 to 142174, shipped in Mar'18. 22 May: Flex responded already used up in early Apr'18. - PPM: May 18 = 12,700 PPM. Jun 18 = 12,295 PPM. Jul'18 = 14337 PPM. Aug'18=7075 PPM 28 Aug: TMD (Threadless Armature) implemented for Alliance for WAT270524 1st SN - 186269505 (H18SM7376A), and 186269506 (H18SM4478A) . 11 Sep: TMD (Threadless Armature) implemented for QSM and QSM Plus for 279001810 1st SN - 186015080 (H18QSP885A) and 186015018 (H18QSM607A) 25 Sep: To focus monitoring performance of Threadless armature GPV under TMD. 25 Sep: see next slide for PPM till 27 Sep 2018 for Threadless armature GPV. 02 Oct: Parker Oven Change S/N 146380 (WAT270524) and S/N 58188 (279001810) 23 Oct: the FPY for QSM, with respect to GPV failures are PPM, see next few slides. 15 Nov: Flex started using GPV with additional testing at Parker a few days ago. Close monitoring is on going. 11 Dec: Flex used up the 120u of Alliance GPV shipped from Milford. Result – 2u failed Final Test. 26 Feb: Flex to continue weekly reporting of GPV failures	Flex - CFT	on going	Open

Open issues for discussion / follow up – QSM yield (GPV failure)



	6-Jul	13-Jul	20-Jul	27-Jul	3-Aug	10-Aug	17-Aug	24-Aug	31-Aug	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW28	WW29	WW30	WW31	WW32	WW33	WW34	WW35	WW36	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	100%	99%	99%	99%	100%	100%	88%	99%	100%	100%	100%	83%	75%	71%	93%	89%	96%	100%	100%	98%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%	100%	
Total Units Tested	21	95	69	70	48	40	16	79	35	52	22	18	24	21	71	46	48	34	49	41	67	48	80	76	25	51	20	47	63	58	19	41	38
Total Units Passed	21	94	68	69	48	40	14	78	35	52	22	15	18	15	66	41	46	34	49	40	67	48	80	76	24	51	20	47	63	58	19	41	38
Hard Failures		1	1	1			2	1				3	6	6	5	5	2			1					1								

	6-Jul	13-Jul	20-Jul	27-Jul	3-Aug	10-Aug	17-Aug	24-Aug	31-Aug	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
Row Labels	28'18	29'18	30'18	31'18	32'18	33'18	34'18	35'18	36'18	37'18	38'18	39'18	40'18	41'18	42'18	43'18	44'18	45'18	46'18	47'18	48'18	49'18	50'18	51'18	52'18	01'19	02'19	03'19	04'19	05'19	06'19	07'19	08'19	Grand Total
279001810 (GPV) (Threadless Armature)												3	8	6	7	8	4			1					1									43
279001810 (GPV)		1	1	1			2	1																										12

Note: green highlight indicates Threadless Armature



Open issues for discussion / follow up

PPM for Alliance GPV (PN WAT270524, threadless armature) (Target: 15k PPM) – update till WW08’19

Month	186269505 and 186269506 Qty Build	Qty GPV Failure	% Failed	PPM	GPV SN	Instrument SN	Remarks	
18-31 Aug -18	183	2	1.09%	10,929	(1) 145527 (2) 145530	(1) H18SM4527A (2) H18SM4532A	(1) Inlet D no solvent flow (2) Inlet C no solvent flow	TMD (Threadless Armature) implemented for Alliance.
Sep-18	484	5	1.03%	10,331	(1) 146402 (2) 146424 (3) 146426 (4) 146599 (5) 146568	(1) J18SM4723A (2) J18SM4728A (3) J18SM4810A (4) J18SM7565A (5) J18SM4847A	(1) Wire came off during assy (2) Inlet B no solvent flow (3) Inlet B no solvent flow (4) Inlet A no solvent flow (5) Inlet B no solvent flow	
Oct-18	508	7	1.38%	13,780	(1) 146872 (2) 147137 (3) 145371 (4) 147362 (5) 147359 (6) 147265 (7) 147286	(1) K18SM7602A (2) K18SM4209A (3) K18SM4268A (4) K18SM4248A (5) K18SM4275A (6) K18SM4287A (7) K18SM4309A	(1) Inlet C no solvent flow (2) Inlet C no solvent flow (3) Inlet A no solvent flow (4) Inlet B no solvent flow (5) Inlet B no solvent flow (6) Inlet B no solvent flow (7) Inlet B no solvent flow	
Oct-18	22	1	4.55%	45,455	(1) 147449	(1) K18SM4384A	(1) Inlet B no solvent flow	remarks; 22pcs additional tested 1st received
Oct-18	24	0	0.00%	-	-	-	-	remarks: 56u shipped from Milford under TMD
Nov-18	32	3	9.38%	93,750	(1) 147223 (2) 147148 (3) 147220	(1) L18SM4414A (2) L18SM4411A (3) L18SM4409A	(1) Inlet B no solvent flow (2) Inlet B no solvent flow (3) Inlet B no solvent flow	remarks: 56u shipped from Milford under TMD
Nov 18	463	1	0.22%	2,160	(1) 148141	(1) L18SM4733A	(1) Inlet D no solvent flow	
Dec 18	120	2	1.67%	16,667	(1) 146845 (2) 146754	(1) M18SM7746A (2) M18SM4908A	(1) Inlet D no solvent flow (2) Inlet B no solvent flow	
Dec 18	413	3	0.73%	7,264	(1) 148261 (2) 148451 (3) 148580	(1) L18SM4869A (2) M18SM4061A (3) M18SM7902A	(1) Inlet B no solvent flow (2) Inlet C and D no solvent flow (3) Inlet D no solvent flow	
Jan 19	486	5	1.03%	10,288	(1) 148733 (2) 148844 (3) 148930 (4) 149129 (5) 149331	(1) M18SM4137A (2) M18SM4228A (3) A19SM4243A (4) A19SM4394A (5) A19SM4506A	(1) Inlet B and C reverse (2) Inlet D no solvent flow (3) Inlet B and C no solvent flow (4) Inlet C no solvent flow (5) Inlet B and C no solvent flow	
Feb 19 (WW06)	8	0	0.00%	-	-	-	-	
Feb 19 (WW07)	89	3	3.37%	33,708	(1) 149445 (2) 149530 (3) 149590	(1) A19SM4562A (2) A19SM4629A (3) B19SM4686A	(1) Inlet D no solvent flow (2) Inlet A no solvent flow (3) Inlet D no solvent flow	
Feb 19 (WW08)	135	0	0.00%	-	-	-	-	
NOTE 1 : On 18 Aug 2018, TMD010532(Threadless Armature) implemented for Alliance. • 1st GPV SN : 145274 • 1st SN for 186269505: H18SM7376A • 1st SN for 186269506: H18SM4478A								
NOTE 2 : On 30 Oct 2018, 56pcs under TMD 010576 V00 implemented • SN K18SM4365A to L18SM4417A								
NOTE 3a : Additional testing at Parker (1st 22u of GPV received from Parker) • SN K18SM4344A to K18SM4364A - for 22pcs with additional testing NOTE 3b: On 29 Oct 2018, started using the lot after CA implementation in Parker • 1st GPV SN : 147540 • 1st SN L18SM4418A								
NOTE 4 : On 30 Nov 2018, 120pcs under TMD 010576 V01 implemented • 1st SN for 186269505: L18SM7737A • 1st SN for 186269506: L18SM4887A								

Summary (up to WW08’19):
Additional testing – 13/1616u failed (0.80%)

Open issues for discussion / follow up

PPM for QSM GPV (PN 279001810, threadless armature) (Target: 15k PPM) – update till WW08’19

Month	Qty Build (Instrument)	Qty used (GPV)	Qty Failure	% Failed	PPM	GPV SN	Instrument SN	Remarks
27-31 Aug-18	32	64	0	0.00%	-	-	-	-
Sep-18	127	254	3	1.18%	11,811	(1) 58329 (2) 58232 (3) 58336	(1) J18QSM632A (2) J18QSM633A (3) J18QSM638A	(1) Test compositional accuracy & high pressure test (2) Test input B prime with MeOH (3) Test input D prime with MeOH
Oct-18	192	384	33	8.59%	85,938	(1) 58287 (2) 58203 (3) 58196 (4) 58282 (5) 58268 (6) 58192 (7) 58195 (8) 58200 (9) 58191 (10) 58190 (11) 58421 (12) 58395 (13) 58198 (14) 58410 (15) 58393 (16) 58400 (17) 58409 (18) 58433 (19) 58703 (20) 58685 (21) 58751 (22) 58394 (23) 58419 (24) 58237 (25) 58740 (26) 58669 (27) 58355	(1) J18QSM640A (2) K18QSM667A (3) K18QSM667A (4) J18QSM657A (5) K18QSM670A (6) J18QSM662A (7) J18QSM663A (8) J18QSM663A (9) J18QSM664A (10) K18QSM668A (11) K18QSP006A (12) K18QSP011A (13) K18QSP014A (14) K18QSP024A (15) K18QSP054A (16) K18QSP028A (17) K18QSP028A (18) K18QSP028A (19) K18QSP057A (20) K18QSM679A (21) K18QSP070A (22) K18QSP054A (23) K18QSP037A (24) K18QSP037A (25) K18QSP081A (26) K18QSP090A (27) K18QSP051A	(1) Compositional Accuracy test failed - AC 90%, AC 10% (2) Failed Test Input D Prime with MeOH (3) Compositional Accuracy test failed - BD 90% (4) Compositional Accuracy test failed - BD 90%, BD 10% (5) Channel D Prime fail - No flow (6) Compositional Accuracy test failed - BD 90%, BD 10% (7) Compositional Accuracy test failed - BD 10% (8) Compositional Accuracy test failed - BD 90%, AC 10% (9) Test input B prime with MeOH (10) Test input B prime with MeOH (11) Test compositional accuracy & high pressure test (12) Test input B prime with MeOH (13) Test input B prime with MeOH (14) Test input B prime with MeOH (15) Test Input B Prime with MeOH (16) Test Input D Prime with MeOH (17) Test Input B Prime with MeOH (18) Input C Prime with MeOH (19) Test Input B Prime with MeOH (20) Input Line A Prime with MeOH (21) Input Line B Prime with MeOH (22) Test Input D Prime with MeOH (23) Test Input B Prime with MeOH (24) Test Input D Prime with MeOH (25) Failed Compositional Accuracy and High Pressure Test (26) Test Input D Prime with MeOH (27) Test Input D Prime with MeOH
Oct-18	18	36	0	0.00%	-	-	-	-
Nov-18	191	382	1	0.26%	2,618	(1) 59484	(1) L18QSM722A	(1) Test Input A Prime with MeOH
Dec-18	229	458	1	0.22%	2,183	(1) 59987	(1) M18QSP393A	(1) Test input C prime with MeOH
Jan-19	239	478	0	0.00%	-	-	-	-
Feb-19 (WW06)	19	38	0	0.00%	-	-	-	-
Feb-19 (WW07)	41	82	0	0.00%	-	-	-	-
Feb-19 (WW08)	38	76	0	0.00%	-	-	-	-

NOTE 1 : On 27 Aug 2018, TMD010532 (Threadless Armature) implemented for QSM/QSM Plus.

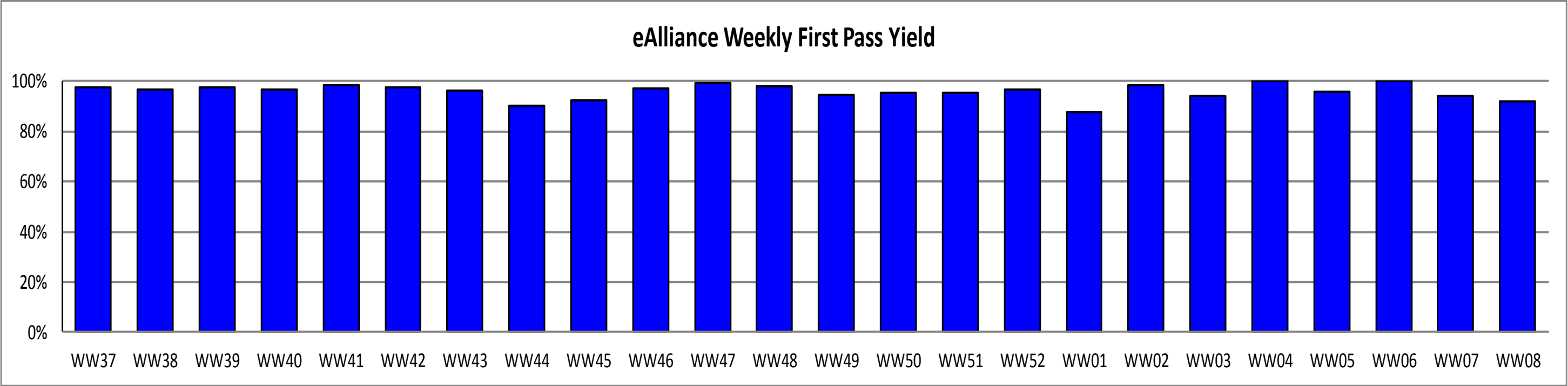
- 1st GPV SN : 57688
- 1st SN for 186015018 : H18QSM607A
- 1st SN for 186015080 : H18QSP885A

NOTE 2 : On 30 Oct 2018, phased in GPV with additional testing at Parker

- 1st GPV SN : 58999
- 1st SN for 186015080 : K18QSP146A

Summary (up to WW08’19):
Additional testing – 2/1550u failed (0.13%)

Weekly First Pass Yield



	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	98%	97%	98%	97%	98%	98%	96%	90%	93%	97%	99%	98%	95%	95%	95%	97%	88%	98%	94%	100%	96%	100%	94%	92%
Total Units Tested	125	127	128	123	129	90	57	132	108	146	120	145	149	133	153	98	91	131	67	58	139	8	89	135
Total Units Passed	122	123	125	119	127	88	55	119	100	142	119	142	141	127	146	95	80	129	63	58	133	8	84	124
Hard Failures	3	4	3	4	2	2	2	13	8	4	1	3	8	6	7	3	11	2	4		6		5	11

Weekly First Pass Yield

Alert Level crossed

	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
Row Labels	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08	AL
WAT270524 (GPV) (Non TMD)																									3
WAT270524 (GPV) (Threadless armature)	2	1	2	1			2	5	3			1	3		1	1	2	1	1		1		3		3
210000411 (CPU PCBA)	1	1			1	1		7	2					1	1		2		2		1			3	2
210000429 (Optical Sensor PCBA)																								2	2
WAT073109 (Syringe)		1													1						1			2	2
WAT270172 (Transducer)																	2							1	2
WAT271816 (Tubing)																								1	2
210000416 (Fluidics PCBA)				2					2	2					1	1								1	2
210000444 (H/C PCBA)												2												1	2
279001055 (Vacuum pump)				1	1								1		1								1		2
210000425 (Pump tray PCBA)						1		1	1												1		1		5
WAT221-02 (V3)																					1				2
279003850 (V4)														1							1				2
289001192 (H/C Engine)										1				1			4		1						2

Part Number	Supplier	Q1	Q2	Q3	Q4	Remarks
210000444 (H/C PCBA)	Flex Senai					Supplier change process to manual soldering. No failure reported. Closed
WAT270524 (GPV) (Non TMD)	Parker					Parker phased in Threadless armature on 18 Aug 2018 (TMD).. Fail parts - pending FA from Supplier.
Keypoint tubings	Keypoint					Supplier using 108psi staking issue. No failure reported. Closed.
WAT073109 (Syringe)	MK Fluidic					WW26 to WW34 – no failure. Fail parts - pending FA from Supplier.
WAT270172 (Transducer)	DJ Instrument					WW28 to Ww38 – no failure. Fail parts - pending FA from Supplier.
279003915 (Injector sub assy)	-					WW27 onwards – stopped to replace Injector sub assy for carry over test
210000411 (CPU, PCBA						

Weekly First Pass Yield

GPV

Current: WW08'19

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																									
Reported Date: Feb 2019 Instrument Part Number: 186269505, 186269506 Affected Qty: <table><tr><th>WW</th><th>Failure</th><th>GPV SN</th></tr><tr><td>07</td><td>3</td><td>(1) 149445 (2) 149530 (3) 149590</td></tr><tr><td>08</td><td>0</td><td>-</td></tr></table> Problem: refer to table on right Date of Manufactured: Feb 2019 Reported site: Flex Kallang	WW	Failure	GPV SN	07	3	(1) 149445 (2) 149530 (3) 149590	08	0	-	<u>Investigation:</u> Technician visual checked all Connections – no visual issue. <u>Containment Actions:</u> Technician replaced GPV (PN:WAT270524, threadless armature under TMD) with new one. Retest Instrument – passed. Defective part transferred to Non Conformance Area <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>31 Jan 2019 (A19SM4562A)</td><td>Inlet D no solvent flow</td><td>SN 149445</td><td>On 07 Feb, Offline verified using KGU S/N : A19SM4614A. Result Failed. Inlet D no solvent flow during solvent inlet plumbing verification. Verified by TE Shamsul</td></tr><tr><td>11 Feb 2019 (A19SM4629A)</td><td>Inlet A no solvent flow</td><td>SN 149530</td><td>On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David</td></tr><tr><td>14 Feb 2019 (B19SM4686A)</td><td>Inlet D no solvent flow</td><td>SN 149590</td><td>On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David</td></tr></table> GPV Supplier : Parker <u>Root Cause</u> Pend FA from supplier	Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	31 Jan 2019 (A19SM4562A)	Inlet D no solvent flow	SN 149445	On 07 Feb, Offline verified using KGU S/N : A19SM4614A. Result Failed. Inlet D no solvent flow during solvent inlet plumbing verification. Verified by TE Shamsul	11 Feb 2019 (A19SM4629A)	Inlet A no solvent flow	SN 149530	On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David	14 Feb 2019 (B19SM4686A)	Inlet D no solvent flow	SN 149590	On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David	<u>Corrective Action:</u> Flex Kallang: NA Supplier: TBA
WW	Failure	GPV SN																									
07	3	(1) 149445 (2) 149530 (3) 149590																									
08	0	-																									
Date Detected/ Instrument SN	Fail Code	GPV SN	Verification																								
31 Jan 2019 (A19SM4562A)	Inlet D no solvent flow	SN 149445	On 07 Feb, Offline verified using KGU S/N : A19SM4614A. Result Failed. Inlet D no solvent flow during solvent inlet plumbing verification. Verified by TE Shamsul																								
11 Feb 2019 (A19SM4629A)	Inlet A no solvent flow	SN 149530	On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David																								
14 Feb 2019 (B19SM4686A)	Inlet D no solvent flow	SN 149590	On 16 Feb, Offline verified using KGU S/N : B19SM4744A. Result Failed. No Solvent Flow On Valve “A”. Verified by TE David																								

Weekly First Pass Yield

GPV

WW06'19 and previous

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																																											
Reported Date: Dec 2018, Jan 2019 Instrument Part Number: 186269505, 186269506 Affected Qty: <table><tr><th>W</th><th>Fail</th><th>GPV SN</th></tr><tr><th>W</th><th>ure</th><th></th></tr><tr><td>51</td><td>1</td><td>(1) 148451</td></tr><tr><td>52</td><td>1</td><td>(1) 148580</td></tr><tr><td>01</td><td>2</td><td>(1) 148733 (2) 148844</td></tr><tr><td>02</td><td>1</td><td>(1) 148930</td></tr><tr><td>03</td><td>1</td><td>(1) 149129</td></tr><tr><td>05</td><td>1</td><td>(1) 149331</td></tr><tr><td>06</td><td>0</td><td>Na</td></tr></table> Problem: refer to table on right Date of Manufactured: Nov2018 Reported site: Flex Kallang	W	Fail	GPV SN	W	ure		51	1	(1) 148451	52	1	(1) 148580	01	2	(1) 148733 (2) 148844	02	1	(1) 148930	03	1	(1) 149129	05	1	(1) 149331	06	0	Na	Investigation: Technician visual checked all Connections – no visual issue. Containment Actions: Technician replaced GPV (PN:WAT270524, threadless armature under TMD) with new one. Retest Instrument – passed. Defective part transferred to Non Conformance Area <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>14 Dec 2018 (M18SM4061A)</td><td>Inlet C and D no solvent flow</td><td>SN 148451</td><td>On 14 Dec, Offline verification result failed. Finding: Same failure encountered. Verified by TE David</td></tr><tr><td>22 Dec 2018 (M18SM7902A)</td><td>Inlet D no solvent flow</td><td>SN 148580</td><td>On 27 Dec, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David</td></tr><tr><td>27 Dec 2018 (M18SM4137A)</td><td>Inlet B and C reverse</td><td>SN 148733</td><td>On 27 Dec, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David</td></tr><tr><td>31 Dec 2018 (M18SM4228A)</td><td>Inlet D no solvent flow</td><td>SN 148844</td><td>On 05 Jan, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David</td></tr><tr><td>03 Jan 2019 (A19SM4243A)</td><td>Inlet B and C No Solvent Flow</td><td>SN 148930</td><td>On 05 Jan, Offline verification result failed. Finding: No Solvent flow on channel “B” and “C” during Solvent Inlet Plumbing Verification. Verified by TE David</td></tr><tr><td>14 Jan 2019 (A19SM4394A)</td><td>Inlet C no solvent flow</td><td>(1) 149129</td><td>On 17 Jan, Offline verification using result failed. Finding: Verify using KGU S/N : A19SM7970A. Result Failed. No Solvent Flow on Inlet “C” during Inlet Plumbing Verification Verified by TE David</td></tr><tr><td>28 Jan 2019 (A19SM4506A)</td><td>Inlet B and C no solvent flow</td><td>(1) 149331</td><td>On 07 Feb, Offline verification using KGU S/N : A19SM4614A. Result Failed. Inlet B and C no solvent flow during solvent inlet plumbing verification. Verified by TE Shamsul</td></tr></table> GPV Supplier : Parker	Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	14 Dec 2018 (M18SM4061A)	Inlet C and D no solvent flow	SN 148451	On 14 Dec, Offline verification result failed. Finding: Same failure encountered. Verified by TE David	22 Dec 2018 (M18SM7902A)	Inlet D no solvent flow	SN 148580	On 27 Dec, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David	27 Dec 2018 (M18SM4137A)	Inlet B and C reverse	SN 148733	On 27 Dec, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David	31 Dec 2018 (M18SM4228A)	Inlet D no solvent flow	SN 148844	On 05 Jan, Offline verification result failed. Finding: No solvent flow on channel “D”. Verified by TE David	03 Jan 2019 (A19SM4243A)	Inlet B and C No Solvent Flow	SN 148930	On 05 Jan, Offline verification result failed. Finding: No Solvent flow on channel “B” and “C” during Solvent Inlet Plumbing Verification. Verified by TE David	14 Jan 2019 (A19SM4394A)	Inlet C no solvent flow	(1) 149129	On 17 Jan, Offline verification using result failed. Finding: Verify using KGU S/N : A19SM7970A. Result Failed. No Solvent Flow on Inlet “C” during Inlet Plumbing Verification Verified by TE David	28 Jan 2019 (A19SM4506A)	Inlet B and C no solvent flow	(1) 149331	On 07 Feb, Offline verification using KGU S/N : A19SM4614A. Result Failed. Inlet B and C no solvent flow during solvent inlet plumbing verification. Verified by TE Shamsul	Corrective Action: Flex Kallang: NA Supplier: TBA
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Weekly First Pass Yield

GPV

WW49'18 and previous

Problem Statement			Investigation/ Possible Root Cause				Corrective Action/ Improvement																																												
Reported Date: Nov, Dec 2018 Instrument Part Number: 186269505, 186269506 Affected Qty: <table><tr><th>W W</th><th>Failur e</th><th>GPV SH</th></tr><tr><td>45</td><td>3</td><td>(1) 147223 (2) 147148 (3) 147220 Note: above 3u were part of the 56u shipped from Milford under TMD</td></tr><tr><td>48</td><td>1</td><td>(1) 148141</td></tr><tr><td>49</td><td>2</td><td>(1) 148261 (2) 146845 (3) 146754 NOTE: above 2u under 120u shipped from Milford under TMD</td></tr></table> Problem: refer to table on right Date of Manufactured: Nov2018 Reported site: Flex Kallang			W W	Failur e	GPV SH	45	3	(1) 147223 (2) 147148 (3) 147220 Note: above 3u were part of the 56u shipped from Milford under TMD	48	1	(1) 148141	49	2	(1) 148261 (2) 146845 (3) 146754 NOTE: above 2u under 120u shipped from Milford under TMD	Investigation: Technician visual checked all Connections – no visual issue. Containment Actions: Technician replaced GPV (PN:WAT270524, threadless armature under TMD) with new one. Retest Instrument – passed. Defective part transferred to Non Conformance Area <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>01 Nov 2018 (L18SM4414A)</td><td>Inlet B no solvent flow</td><td>SN 147223</td><td>On 02 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul</td></tr><tr><td>01 Nov 2018 (L18SM4411A)</td><td>Inlet B no solvent flow</td><td>SN 147148</td><td>On 02 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul</td></tr><tr><td>07 Nov 2018 (L18SM4409A)</td><td>Inlet B no solvent flow</td><td>SN 147220</td><td>On 08 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul</td></tr><tr><td>27 Nov 2018 (L18SM4733A)</td><td>Inlet D no solvent flow</td><td>SN 148141</td><td>On 27 Nov, Offline verified using KGU S/N : L18SM4787A, result Failed. Findings: Same failure encountered. Verified by: TE David</td></tr><tr><td>04 Dec 2018 (L18SM4869A)</td><td>Inlet B no solvent flow</td><td>SN 148261</td><td>On 06 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve B Verified by: TE David</td></tr><tr><td>04 Dec 2018 (M18SM7746A)</td><td>Inlet D no solvent flow</td><td>SN 146845</td><td>On 06 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve D Verified by: TE David</td></tr><tr><td>04 Dec 2018 (M18SM4908A)</td><td>Inlet B no solvent flow</td><td>SN146754</td><td>On 10 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve B Verified by: TE David</td></tr></table> GPV Supplier : Parker Root Cause Pend FA from supplier				Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	01 Nov 2018 (L18SM4414A)	Inlet B no solvent flow	SN 147223	On 02 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul	01 Nov 2018 (L18SM4411A)	Inlet B no solvent flow	SN 147148	On 02 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul	07 Nov 2018 (L18SM4409A)	Inlet B no solvent flow	SN 147220	On 08 Nov, Offline verification using result failed. Finding: No nitrogen purging out from Inlet B during nitrogen purge Verified by TE Shamsul	27 Nov 2018 (L18SM4733A)	Inlet D no solvent flow	SN 148141	On 27 Nov, Offline verified using KGU S/N : L18SM4787A, result Failed. Findings: Same failure encountered. Verified by: TE David	04 Dec 2018 (L18SM4869A)	Inlet B no solvent flow	SN 148261	On 06 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve B Verified by: TE David	04 Dec 2018 (M18SM7746A)	Inlet D no solvent flow	SN 146845	On 06 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve D Verified by: TE David	04 Dec 2018 (M18SM4908A)	Inlet B no solvent flow	SN146754	On 10 Dec, Offline verified using KGU S/N M18SM4951A., result Failed. Findings: No Solvent Flow on Valve B Verified by: TE David	Corrective Action: Flex Kallang: NA Supplier: TBA
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Weekly First Pass Yield

GPV

Previous : WW44'18

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																		
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25 Oct 2018 (K18SM4268A)	Inlet A no solvent flow	SN 145371	On 26 Oct, Offline verification using result failed. Findings: Same failure encountered. Verified by TE David																																	
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Weekly First Pass Yield

GPV

WW43'18 to previous

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Containment Actions: Technician replaced GPV (PN:WAT270524, threadless armature under TMD) with new one. Retest Instrument – passed. Defective part transferred to Non Conformance Area <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>27 Aug 2018 (H18SM4527A)</td><td>Inlet D no solvent flow during Solvent inlet Plumbing Verification.</td><td>SN 145527</td><td>On 05 Sept, Offline verification using KGU J18SM7496A, result failed. Findings: Same failure encountered. Verified by TE David</td></tr><tr><td>27 Aug 2018 (H18SM4532A)</td><td>Inlet C no solvent flow during Solvent inlet Plumbing Verification</td><td>SN 145530</td><td>On 05 Sept, Offline verification using KGU J18SM7496A, result failed. Findings: Same failure encountered. Verified by TE David</td></tr><tr><td>11 Sep 2018 (J18SM4723A)</td><td>Wire came off during assy</td><td>SN 146402</td><td>NA</td></tr><tr><td>11 Sep 2018 (J18SM4728A)</td><td>Inlet B failed during Solvent Inlet Plumbing</td><td>SN 146424</td><td>On 18 Sep, Offline verified using KGU S/N : J18SM7515A, result failed. Findings : No Solvent flow on channel "B" Verified by TE David</td></tr><tr><td>14 Sep 2018 (J18SM4810A)</td><td>Inlet B no solvent flow during Solvent Inlet Plumbing</td><td>SN 146426</td><td>On 20 Sep, Offline verified using KGU S/N : J18SM7569A, result failed. Findings : Same failure encountered. Verified by TE David</td></tr><tr><td>20 Sep 2018 (J18SM7565A)</td><td>Inlet A no solvent flow during Solvent Inlet Plumbing</td><td>SN 146599</td><td>On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David</td></tr><tr><td>21 Sep 2018 (J18SM4847)</td><td>Inlet B no solvent flow during Solvent Inlet Plumbing</td><td>SN 146568</td><td>On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David</td></tr><tr><td>03 Oct 2018 (K18SM7602A)</td><td>Solvent C no water flow during Solvent Inlet Plumbing Verification</td><td>SN 146872</td><td>On 04 Oct, Offline verified using KGU S/N : K18SM4019A. result failed. Findings: Same failure encountered. Verified by TE David</td></tr><tr><td>23 Oct 2018 (K18SM4209A)</td><td>Inlet C no solvent flow during Solvent Inlet Plumbing Verification</td><td>SN 147137</td><td>On 23 Oct, Offline verified failed, Findings : No air blowing out of Inlet C during Nitrogen purge.. Verified by TE Shamsul</td></tr></table> Root Cause Pend FA from supplier	Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	27 Aug 2018 (H18SM4527A)	Inlet D no solvent flow during Solvent inlet Plumbing Verification.	SN 145527	On 05 Sept, Offline verification using KGU J18SM7496A, result failed. Findings: Same failure encountered. Verified by TE David	27 Aug 2018 (H18SM4532A)	Inlet C no solvent flow during Solvent inlet Plumbing Verification	SN 145530	On 05 Sept, Offline verification using KGU J18SM7496A, result failed. Findings: Same failure encountered. Verified by TE David	11 Sep 2018 (J18SM4723A)	Wire came off during assy	SN 146402	NA	11 Sep 2018 (J18SM4728A)	Inlet B failed during Solvent Inlet Plumbing	SN 146424	On 18 Sep, Offline verified using KGU S/N : J18SM7515A, result failed. Findings : No Solvent flow on channel "B" Verified by TE David	14 Sep 2018 (J18SM4810A)	Inlet B no solvent flow during Solvent Inlet Plumbing	SN 146426	On 20 Sep, Offline verified using KGU S/N : J18SM7569A, result failed. Findings : Same failure encountered. Verified by TE David	20 Sep 2018 (J18SM7565A)	Inlet A no solvent flow during Solvent Inlet Plumbing	SN 146599	On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David	21 Sep 2018 (J18SM4847)	Inlet B no solvent flow during Solvent Inlet Plumbing	SN 146568	On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David	03 Oct 2018 (K18SM7602A)	Solvent C no water flow during Solvent Inlet Plumbing Verification	SN 146872	On 04 Oct, Offline verified using KGU S/N : K18SM4019A. result failed. Findings: Same failure encountered. Verified by TE David	23 Oct 2018 (K18SM4209A)	Inlet C no solvent flow during Solvent Inlet Plumbing Verification	SN 147137	On 23 Oct, Offline verified failed, Findings : No air blowing out of Inlet C during Nitrogen purge.. Verified by TE Shamsul	Corrective Action: Flex Kallang: NA Supplier: TBA
WW	Failure	GPV SN																																																																						
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27 Aug 2018 (H18SM4532A)	Inlet C no solvent flow during Solvent inlet Plumbing Verification	SN 145530	On 05 Sept, Offline verification using KGU J18SM7496A, result failed. Findings: Same failure encountered. Verified by TE David																																																																					
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11 Sep 2018 (J18SM4728A)	Inlet B failed during Solvent Inlet Plumbing	SN 146424	On 18 Sep, Offline verified using KGU S/N : J18SM7515A, result failed. Findings : No Solvent flow on channel "B" Verified by TE David																																																																					
14 Sep 2018 (J18SM4810A)	Inlet B no solvent flow during Solvent Inlet Plumbing	SN 146426	On 20 Sep, Offline verified using KGU S/N : J18SM7569A, result failed. Findings : Same failure encountered. Verified by TE David																																																																					
20 Sep 2018 (J18SM7565A)	Inlet A no solvent flow during Solvent Inlet Plumbing	SN 146599	On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David																																																																					
21 Sep 2018 (J18SM4847)	Inlet B no solvent flow during Solvent Inlet Plumbing	SN 146568	On 24 Sep, Offline verified using KGU S/N : J18SM4880A, result failed. Findings : Same failure encountered. Verified by TE David																																																																					
03 Oct 2018 (K18SM7602A)	Solvent C no water flow during Solvent Inlet Plumbing Verification	SN 146872	On 04 Oct, Offline verified using KGU S/N : K18SM4019A. result failed. Findings: Same failure encountered. Verified by TE David																																																																					
23 Oct 2018 (K18SM4209A)	Inlet C no solvent flow during Solvent Inlet Plumbing Verification	SN 147137	On 23 Oct, Offline verified failed, Findings : No air blowing out of Inlet C during Nitrogen purge.. Verified by TE Shamsul																																																																					

Weekly First Pass Yield

Current : WW08'19

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																												
Reported Date: Feb 2019 Instrument Part Number & Instrument SN: see Containment Action Affected Qty: see below Problem: <table><tr><th>WW</th><th>Failure</th><th>Qty</th></tr><tr><td rowspan="2">08</td><td>Display related failure</td><td>2</td></tr><tr><td>Transducer failed 0.004V</td><td>1</td></tr></table> Date of Manufactured: Feb 2019 Reported site: Flex Kallang	WW	Failure	Qty	08	Display related failure	2	Transducer failed 0.004V	1	<u>Off Line verification at Flex Kallang</u> <table><tr><td>WW</td><td>Instrument SN (Model: 186269506)</td><td>210000411 PCBA Serial Number</td><td>Kallang Failure</td><td>Off line verification</td></tr><tr><td>08</td><td>A19SM4617A</td><td>110119282M</td><td>Display Distorted during System Initialization</td><td>Result Failed. Display hangs.</td></tr><tr><td>08</td><td>A19SM4619A</td><td>110119352M</td><td>Transducer failed 0.004V during Rear Panel Test</td><td>Result Failed. Error message: System transducer range (0.08)</td></tr><tr><td>08</td><td>A19SM4631A</td><td>110119222M</td><td>Display Distorted during System Initialization</td><td>Result Failed. Display hangs.</td></tr></table> <u>Root Cause</u> The Instrument failure is due to PCBA 210000411. PCBA to be send Senai for Failure Analysis.	WW	Instrument SN (Model: 186269506)	210000411 PCBA Serial Number	Kallang Failure	Off line verification	08	A19SM4617A	110119282M	Display Distorted during System Initialization	Result Failed. Display hangs.	08	A19SM4619A	110119352M	Transducer failed 0.004V during Rear Panel Test	Result Failed. Error message: System transducer range (0.08)	08	A19SM4631A	110119222M	Display Distorted during System Initialization	Result Failed. Display hangs.	<u>Containment Action:</u> NA. <u>Corrective Action:</u> NA
WW	Failure	Qty																												
08	Display related failure	2																												
	Transducer failed 0.004V	1																												
WW	Instrument SN (Model: 186269506)	210000411 PCBA Serial Number	Kallang Failure	Off line verification																										
08	A19SM4617A	110119282M	Display Distorted during System Initialization	Result Failed. Display hangs.																										
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08	A19SM4631A	110119222M	Display Distorted during System Initialization	Result Failed. Display hangs.																										

Weekly First Pass Yield

WW45'18 and previous

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																																		
Reported Date: 25 Oct 2018 Instrument Part Number & Instrument SN: see Containment Action Affected Qty: see below Problem: <table><tr><th>WW</th><th>Failure</th><th>Qty</th></tr><tr><td>44</td><td>Error In VRTX task Main : DSP put Word TMO during Rear Panel Test</td><td>7</td></tr><tr><td>45</td><td>Error In VRTX task Main : DSP put Word TMO during Rear Panel Test</td><td>1</td></tr><tr><td></td><td>Events In Failed during Rear Panel Test</td><td>1</td></tr></table> Note: from 46’18 to 08’19 (15 weeks), Flex Kallang did not encounter anymore “Error In VRTX task Main : DSP put Word TMO during Rear Panel Test” Date of Manufactured: Oct 2018 Reported site: Flex Kallang	WW	Failure	Qty	44	Error In VRTX task Main : DSP put Word TMO during Rear Panel Test	7	45	Error In VRTX task Main : DSP put Word TMO during Rear Panel Test	1		Events In Failed during Rear Panel Test	1	Off Line verification at Flex Kallang <table><tr><td>WW</td><td>Instrument SN (Model: 186269506)</td><td>210000411 PCBA Serial Number</td><td>Kallang Failure</td><td>Off line verification</td></tr><tr><td>44</td><td>K18SM4247A</td><td>031018054M</td><td rowspan="8">Error In VRTX task Main : DSP put Word TMO during Rear Panel Test</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4288A</td><td>031018130M</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4247A</td><td>031018129M</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4236A</td><td>031018084M</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4342A</td><td>031018053M</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4343A</td><td>031018107M</td><td>Failed</td></tr><tr><td>44</td><td>K18SM4329A</td><td>031018056M</td><td>Failed</td></tr><tr><td>45</td><td>L18SM4420A</td><td>031018040M</td><td>Failed</td></tr></table> Root Cause (Summary) U66 corrupted. See prelim reports from Senai. No similar “Error In VRTX task Main : DSP put Word TMO during Rear Panel Test” for 15 weeks (WW46’18 to WW08’19).(Qty: >1600u tested) Flex Senai discussion with IC supplier and Flex Senai Additional Power Up frequency measurement from 07 Nov onwards, Flex Senai still unable to pin-point the actual root cause. Flex Kallang will continue monitoring the line performance daily / weekly. The additional Power up test at Flex Senai will also stop. To close this issue as an ‘isolated case’.	WW	Instrument SN (Model: 186269506)	210000411 PCBA Serial Number	Kallang Failure	Off line verification	44	K18SM4247A	031018054M	Error In VRTX task Main : DSP put Word TMO during Rear Panel Test	Failed	44	K18SM4288A	031018130M	Failed	44	K18SM4247A	031018129M	Failed	44	K18SM4236A	031018084M	Failed	44	K18SM4342A	031018053M	Failed	44	K18SM4343A	031018107M	Failed	44	K18SM4329A	031018056M	Failed	45	L18SM4420A	031018040M	Failed	Containment Action: NA Corrective Action: NA
WW	Failure	Qty																																																		
44	Error In VRTX task Main : DSP put Word TMO during Rear Panel Test	7																																																		
45	Error In VRTX task Main : DSP put Word TMO during Rear Panel Test	1																																																		
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44	K18SM4342A	031018053M		Failed																																																
44	K18SM4343A	031018107M		Failed																																																
44	K18SM4329A	031018056M		Failed																																																
45	L18SM4420A	031018040M		Failed																																																



RMA UNIT ANALYSIS
WAT-210000411-C

Problem Summary

Received feedback from Flex KP detected high failure due to PCBA 210000411 defective with similar reject error Code “Error In VRTX Main : DSP put Word TMO”. On the 25th October 2018

NC Number	KP Failure	Serial Number
NCMR-SKW-00005262	Error In VRTX Main : DSP put Word TMO	031018107M
NCMR-SKW-00005159	Error In VRTX Main : DSP put Word TMO	031018054M
NCMR-SKW-00005263	Error In VRTX Main : DSP put Word TMO	031018056M
NCMR-SKW-00005101	Error In VRTX Main : DSP put Word TMO	031018084M
NCMR-SKW-00005264	Error In VRTX Main : DSP put Word TMO	031018130M
NCMR-SKW-00005268	Error In VRTX Main : DSP put Word TMO	031018053M
NCMR-SKW00005191	Error In VRTX Main : DSP put Word TMO	031018129M

Analysis Steps

Steps:

Step1:Check for rework history



Step2:Visual Inspection – No abnormality found.

Step3:Verify FCT -Communication error



Step4:Debug-Failed U66 Clk Out at Pin 4, 5 and 6

Step5:Remove U66 and re-programmed at off-line programming station and mount back on board.

Step6:Re-test at ICT – Passed.

Step7:Re-test at FCT – Passed.

Analysis Summary

Serial Number	ICT Before Return	FCT Before Return	FCT After Return	Debug Finding	U66 (Re-programmed) Re-ICT	U66(Re-programmed) Re-FCT	RMA Flow
031018107M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested: 07/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Shipped back to KP 01 Feb. Result: Pass
031018054M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:11/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Shipped back to KP 01 Feb. Result: Pending
031018056M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:11/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Shipped back to KP 01 Feb. Result: Pass
031018084M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:11/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Lifted pad. Scrap
031018130M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:05/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Shipped back to KP 01 Feb. Result: Pending
031018053M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:11/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Lifted pad. Scrap
031018129M	Tested:13th Oct 2018 Result: Passed	Tested:13th Oct 2018 Result: Passed	Tested:05/Nov Result: Failed (Communication error)	Failed U66 Clk Out at Pin 4, 5 and 6	Pass	Pass	Shipped back to KP 01 Feb. Result: Pass

Simulation and Findings

U66 – ICS343M Pin out	U66 - Programmable	Good PCBA (171016008M)	031018053M		031018056M		031018130M		031018054M	031018129M
	Frequency Spec		Meas. (KP)	After U66 Re- prog	Meas. (KP)	After U66 Re- prog	Meas. (KP)	After U66 Re- prog	Re-mount U66 Blank Part	After U66 Re- prog
Pin 4 (Clk out1)	24MHz	23.92	11.19	23.86	11.16	23.95	11.19	24.07	Fluctuating	23.92
Pin 5 (Clk out 3)	20Mhz	19.92	47.61	19.98	50	20.02	50.5	19.97	24.2	19.92
Pin 6 (Clk out 2)	20Mhz	20.08	25	19.95	25	20.00	25	20.07	25	20.08

1. Base from the simulation done, observed that the failed unit’s U66 Clk-out frequency measurement out from the specification.
2. Further evaluation found that the Frequency measurement for the return failed unit and Frequency measurement for the blank U66 part mounted unit are not same. Refer to the yellow highlighted column in the above table.
3. After re-program the U66, the Frequency measurement within specification. Refer to the green highlighted column in the above table.
4. Suspecting the program in the U66, has been corrupted.
5. The component was not send for FA, since after re-program the unit can passed Senai FCT. Meaning raw component level is not defective.

Containment Action

1. Using the current FCT fixture to power up the PCBA and measure the frequency using oscilloscope on U66 Clk out (Pin 4, 5 and 6) after FCT Pass 100% and record the results. (Implementation date: 7th Nov 2018)



Adobe Acrobat
Document

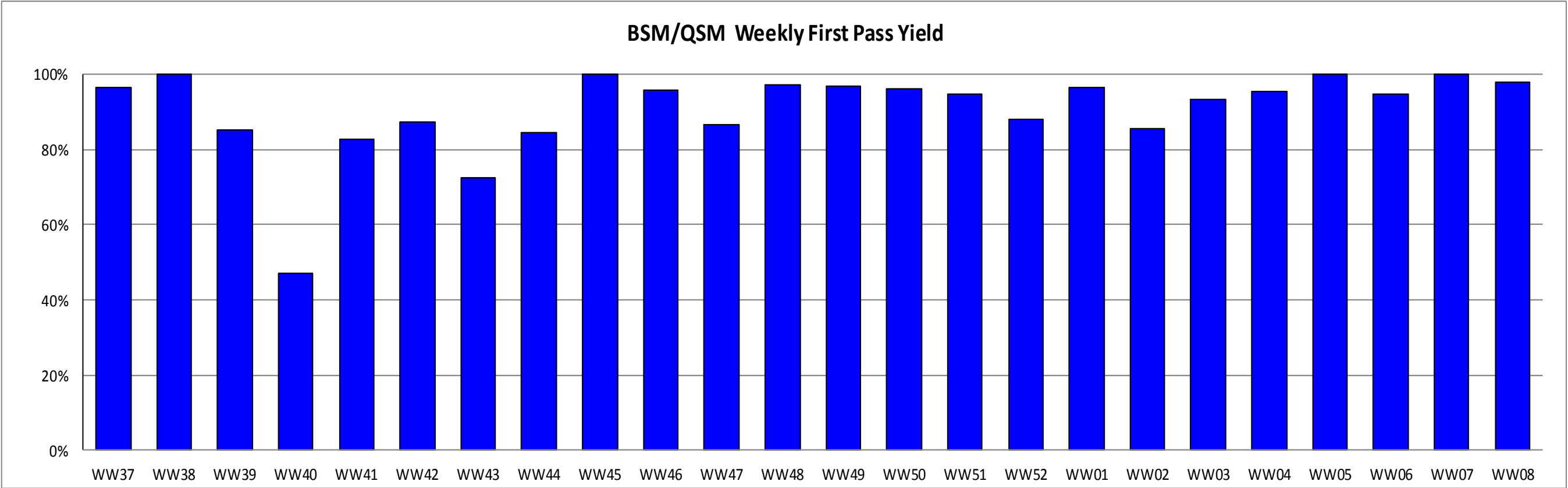
2. To develop off-line power up frequency measurement of U66 Clk out (Pin 4, 5 and 6) after FCT Pass with power supply from KP for 3 consecutive lot due to the FCT tester is sharing with other model as well. (Target: 4th Dec 2018)
3. 5pcs of pass unit sent to KP for further verification. (1st Feb 2019), 2 pcs of lifted pad unit will be scrap.
4. 3 months monitoring with 100% frequency check and KP record, no repeat issue. Propose to remove frequency check at Senai and continue monitor.

Weekly First Pass Yield

WW03'19 and previous

Problem Statement			Investigation/ Possible Root Cause		Corrective Action/ Improvement																												
Reported Date: 29, 31 Dec 2018, Jan 2019 Instrument Part Number & Instrument SN: see Containment Action Affected Qty: see below Problem: <table><tr><th>WW</th><th>Failure</th><th>Qty</th></tr><tr><td>01</td><td>Sample temperature H/W fault (3) failed during Heater cooler test</td><td>4</td></tr></table> Date of Manufactured: Dec 2018 Reported site: Flex Kallang			WW	Failure	Qty	01	Sample temperature H/W fault (3) failed during Heater cooler test	4	Off Line verification at Flex Kallang <table><tr><th>WW</th><th>Instrument SN (Model: 186269506)</th><th>289001192 Serial Number</th><th>Kallang Failure</th><th>Off line verification</th></tr><tr><td>01</td><td>M18SM4211A</td><td>L216L51399</td><td rowspan="4">Sample temperature H/W fault (3) failed during Heater cooler test</td><td>On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul</td></tr><tr><td>01</td><td>M18SM4170A</td><td>L207L51137</td><td>On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul</td></tr><tr><td>01</td><td>M18SM4183A</td><td>L216L51415</td><td>On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul</td></tr><tr><td>01</td><td>M18SM4230A</td><td>L215L51320</td><td>On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul</td></tr></table> ASSY, ENGINE, HEATER/COOLER Supplier : LAIRD TECHNOLOGIES Root Cause It is confirmed that the Defective part has caused the Instrument to fail Final Test as per stated in the Problem Statement.		WW	Instrument SN (Model: 186269506)	289001192 Serial Number	Kallang Failure	Off line verification	01	M18SM4211A	L216L51399	Sample temperature H/W fault (3) failed during Heater cooler test	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul	01	M18SM4170A	L207L51137	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul	01	M18SM4183A	L216L51415	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul	01	M18SM4230A	L215L51320	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul	Containment Action: Supplier: Supplier received in HK warehouse, in transit to Shenzen factory, delayed due to custom clearance. Corrective Action: TBA
			WW	Failure	Qty																												
			01	Sample temperature H/W fault (3) failed during Heater cooler test	4																												
			WW	Instrument SN (Model: 186269506)	289001192 Serial Number	Kallang Failure	Off line verification																										
			01	M18SM4211A	L216L51399	Sample temperature H/W fault (3) failed during Heater cooler test	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul																										
01	M18SM4170A	L207L51137	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul																														
01	M18SM4183A	L216L51415	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul																														
01	M18SM4230A	L215L51320	On 31 Dec, Offline verified using KGU SN M18SM4222A, result failed. Same failure encountered Verified by TE Shamsul																														

Weekly First Pass Yield



	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	96%	100%	85%	47%	83%	87%	72%	85%	100%	96%	87%	97%	97%	96%	95%	88%	96%	85%	93%	96%	100%	95%	100%	98%
Total Units Tested	56	22	27	17	58	71	58	52	34	49	52	67	61	80	76	25	57	41	60	68	58	19	41	47
Total Units Passed	54	22	23	8	48	62	42	44	34	47	45	65	59	77	72	22	55	35	56	65	58	18	41	46
Hard Failures	2		4	9	10	9	16	8		2	7	2	2	3	4	3	2	6	4	3		1		1

Weekly First Pass Yield (BSM / QSM family)

 Alert Level crossed

		7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
	Row Labels	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08	AL
1	279001056 (PUMP Degasser)				1							2				1				1					1	2
2	WAT270594 (SOLENOID)								1						1								1			2
3	289001940 (Check Valve)					1		2				2			2		2		1		1					2
4	210000422 (PCBA PUMP)											1		1					2		2					2
5	289003207 (Assy Cartridge)							2					1			1		1		1						2
6	279002268 (Power Supply)															1		1		1						2
7	210000520 (PCBA CPU)															1				1						2
8	279001490 (ASSEMBLY, REDUCED HEIGHT I2V)																		1							2
9	430002389 (TUBE Assy, GPV TO MIXER)							1											1							2
10	430002388 (ASSY, TUBE, GPV-C TO MIXER)							1	1										1							2
11	279001810 (GPV) (Non TMD)																									2
12	279001810 (GPV) (Threadless armature)			3	8	6	7	8	4			1					1									2

Part Number	Supplier	Q1	Q2	Q3	Q4	Remarks
210000520 (PCBA, CPU)	CEI					Common PCBA and crossed trigger limit in Detector models, Under monitoring
279001810 (GPV non TMD)	Parker					Parker phased in Threadless armature on 27 Aug 2018 (TMD). Fail parts - pending FA from Supplier.

Weekly First Pass Yield

GPV

WW52'18 and previous

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																																	
Reported Date: Oct 2018 Instrument Part Number: 186015080 Affected Qty: See below <table><thead><tr><th>WW</th><th>No of GPV Failed</th><th>Confirmed Failed GPV SN</th></tr></thead><tbody><tr><td>44</td><td>4</td><td>(1) 58594 (2) 58430 (3) 58241 (4) 58549</td></tr><tr><td>45</td><td>0</td><td>na</td></tr><tr><td>46</td><td>0</td><td>na</td></tr><tr><td>47</td><td>1</td><td>(1) 59484</td></tr><tr><td>48</td><td>0</td><td>na</td></tr><tr><td>49</td><td>0</td><td>na</td></tr><tr><td>50</td><td>0</td><td>Na</td></tr><tr><td>51</td><td>0</td><td>Na</td></tr><tr><td>52</td><td>1</td><td>(1) 59987</td></tr><tr><td>01-08'19</td><td>0</td><td>Na</td></tr></tbody></table> Reported site: Flex Kallang	WW	No of GPV Failed	Confirmed Failed GPV SN	44	4	(1) 58594 (2) 58430 (3) 58241 (4) 58549	45	0	na	46	0	na	47	1	(1) 59484	48	0	na	49	0	na	50	0	Na	51	0	Na	52	1	(1) 59987	01-08'19	0	Na	Investigation: Technician visual checked all Connections – no visual issue. Action Taken: Technician replaced GPV (PN:279001810, threadless armature under TMD) with new one and retested the Instrument passed. Defective part transferred to Non Conformance Area for further verification <table><thead><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr></thead><tbody><tr><td>Week 44 (1) K18QSP039A (2) K18QSP039A (3) K18QSP039A (4) K18QSP120A</td><td>(1) Test Input B Prime with MeOH (2) Test input A Prime with MeOH (3) Test Input B Prime with MeOH (4) Test Input A Prime with MeOH</td><td>(1) 58594 (2) 58430 (3) 58241 (4) 58549</td><td>(1) Test Input B Prime with MeOH. Verify by TE David Kee (2) Test Input A Prime with MeOH. Verify by TE David Kee (3) Test Input B Prime with MeOH. Verify by TE David Kee (4) Test Input A Prime with MeOH. Verify by TE David Kee</td></tr><tr><td>WW47 (1) L18QSM722A</td><td>(1) Test input A Prime with MeOH</td><td>(1) 59484</td><td>(1) Test Input A Prime with MeOH. Verify by TE David Kee</td></tr><tr><td>WW52 (1) M18QSP393A</td><td>(1) Test input C prime with MeOH</td><td>(1) 59987</td><td>(1) No flow on line C Test Input C Prime with MeOH. Verify by TE David Kee</td></tr></tbody></table> Root Cause: Pending FA from supplier(Parker)	Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	Week 44 (1) K18QSP039A (2) K18QSP039A (3) K18QSP039A (4) K18QSP120A	(1) Test Input B Prime with MeOH (2) Test input A Prime with MeOH (3) Test Input B Prime with MeOH (4) Test Input A Prime with MeOH	(1) 58594 (2) 58430 (3) 58241 (4) 58549	(1) Test Input B Prime with MeOH. Verify by TE David Kee (2) Test Input A Prime with MeOH. Verify by TE David Kee (3) Test Input B Prime with MeOH. Verify by TE David Kee (4) Test Input A Prime with MeOH. Verify by TE David Kee	WW47 (1) L18QSM722A	(1) Test input A Prime with MeOH	(1) 59484	(1) Test Input A Prime with MeOH. Verify by TE David Kee	WW52 (1) M18QSP393A	(1) Test input C prime with MeOH	(1) 59987	(1) No flow on line C Test Input C Prime with MeOH. Verify by TE David Kee	Corrective Action: Flex Kallang: NA Supplier: TBA
WW	No of GPV Failed	Confirmed Failed GPV SN																																																	
44	4	(1) 58594 (2) 58430 (3) 58241 (4) 58549																																																	
45	0	na																																																	
46	0	na																																																	
47	1	(1) 59484																																																	
48	0	na																																																	
49	0	na																																																	
50	0	Na																																																	
51	0	Na																																																	
52	1	(1) 59987																																																	
01-08'19	0	Na																																																	
Date Detected/ Instrument SN	Fail Code	GPV SN	Verification																																																
Week 44 (1) K18QSP039A (2) K18QSP039A (3) K18QSP039A (4) K18QSP120A	(1) Test Input B Prime with MeOH (2) Test input A Prime with MeOH (3) Test Input B Prime with MeOH (4) Test Input A Prime with MeOH	(1) 58594 (2) 58430 (3) 58241 (4) 58549	(1) Test Input B Prime with MeOH. Verify by TE David Kee (2) Test Input A Prime with MeOH. Verify by TE David Kee (3) Test Input B Prime with MeOH. Verify by TE David Kee (4) Test Input A Prime with MeOH. Verify by TE David Kee																																																
WW47 (1) L18QSM722A	(1) Test input A Prime with MeOH	(1) 59484	(1) Test Input A Prime with MeOH. Verify by TE David Kee																																																
WW52 (1) M18QSP393A	(1) Test input C prime with MeOH	(1) 59987	(1) No flow on line C Test Input C Prime with MeOH. Verify by TE David Kee																																																

Weekly First Pass Yield

GPV

W42'18 to WW43'18

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																					
Reported Date: 19, 24 Sep 2018 & 01 Oct 2018 Instrument Part Number: 186015018 Affected Qty: See below <table><tr><th>W W</th><th>No of GPV failed</th><th>Confirmed Failed GPV SN</th></tr><tr><td>42</td><td>7</td><td>58393 58400 58409 58433 58703 58685 58751</td></tr><tr><td>43</td><td>8</td><td>(1) 58394 (2) 58419 (3) 58237 (4) 58740 (5) 58669 (6) 58355 (7) 58361 (8) 58715</td></tr></table> Reported site: Flex Kallang	W W	No of GPV failed	Confirmed Failed GPV SN	42	7	58393 58400 58409 58433 58703 58685 58751	43	8	(1) 58394 (2) 58419 (3) 58237 (4) 58740 (5) 58669 (6) 58355 (7) 58361 (8) 58715	Investigation: Technician visual checked all Connections – no visual issue. Action Taken: Technician replaced GPV (PN:279001810, threadless armature under TMD) with new one and retested the Instrument passed. Defective part transferred to Non Conformance Area for further verification <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>Week 42 K18QSP054A K18QSP028A K18QSP028A K18QSP028A K18QSP057A K18QSM679A K18QSP070A</td><td>Test Input B Prime with MeOH Test Input D Prime with MeOH Test Input B Prime with MeOH Input C Prime with MeOH Test Input B Prime with MeOH Input Line A Prime with MeOH Input Line B Prime with MeOH</td><td>58393 58400 58409 58433 58703 58685 58751</td><td>Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input D Prime with MeOH. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Compositional and High Pressure Test BD 90. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input A Prime with MeOH. Verify by TE David Kee Failed Test Input B Prime with MeOH. Verify by TE David Kee</td></tr><tr><td>Week 43 (1) K18QSP054A (2) K18QSP037A (3) K18QSP037A (4) K18QSP081A (5) K18QSP090A (6) K18QSP051A (7) K18QSP102A (8) K18QSP102A</td><td>(1) Test Input D Prime with MeOH (2) Test Input B Prime with MeOH (3) Test Input D Prime with MeOH (4) Failed Compositional Accuracy and High Pressure Test (5) Test Input D Prime with MeOH (6) Test Input D Prime with MeOH (7) Test Input B Prime with MeOH (8) Failed Compositional Accuracy and High Pressure Test</td><td>(1) 58394 (2) 58419 (3) 58237 (4) 58740 (5) 58669 (6) 58355 (7) 58361 (8) 58715</td><td>(1) Failed test Input D Prime with MeOH, Verify by TE David Kee (2) Failed test Input B Prime with MeOH, Verify by TE David Kee (3) Failed test Input D Prime with MeOH, Verify by TE David Kee (4) Fail Test Input D Prime with MeOH. Verify by TE David (5) Failed Test Input B Prime with MeOH. Verify by TE David (6) Fail Test Input B Prime with MeOH. Verify by TE David (7) Test Input B Prime with MeOH failed. Verify by TE David (8) Compositional Accuracy Test failed - BD 90%. Verify by TE David</td></tr></table> Root Cause: Pending FA from supplier(Parker)	Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	Week 42 K18QSP054A K18QSP028A K18QSP028A K18QSP028A K18QSP057A K18QSM679A K18QSP070A	Test Input B Prime with MeOH Test Input D Prime with MeOH Test Input B Prime with MeOH Input C Prime with MeOH Test Input B Prime with MeOH Input Line A Prime with MeOH Input Line B Prime with MeOH	58393 58400 58409 58433 58703 58685 58751	Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input D Prime with MeOH. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Compositional and High Pressure Test BD 90. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input A Prime with MeOH. Verify by TE David Kee Failed Test Input B Prime with MeOH. Verify by TE David Kee	Week 43 (1) K18QSP054A (2) K18QSP037A (3) K18QSP037A (4) K18QSP081A (5) K18QSP090A (6) K18QSP051A (7) K18QSP102A (8) K18QSP102A	(1) Test Input D Prime with MeOH (2) Test Input B Prime with MeOH (3) Test Input D Prime with MeOH (4) Failed Compositional Accuracy and High Pressure Test (5) Test Input D Prime with MeOH (6) Test Input D Prime with MeOH (7) Test Input B Prime with MeOH (8) Failed Compositional Accuracy and High Pressure Test	(1) 58394 (2) 58419 (3) 58237 (4) 58740 (5) 58669 (6) 58355 (7) 58361 (8) 58715	(1) Failed test Input D Prime with MeOH, Verify by TE David Kee (2) Failed test Input B Prime with MeOH, Verify by TE David Kee (3) Failed test Input D Prime with MeOH, Verify by TE David Kee (4) Fail Test Input D Prime with MeOH. Verify by TE David (5) Failed Test Input B Prime with MeOH. Verify by TE David (6) Fail Test Input B Prime with MeOH. Verify by TE David (7) Test Input B Prime with MeOH failed. Verify by TE David (8) Compositional Accuracy Test failed - BD 90%. Verify by TE David	Corrective Action: Flex Kallang: NA Supplier: TBA
W W	No of GPV failed	Confirmed Failed GPV SN																					
42	7	58393 58400 58409 58433 58703 58685 58751																					
43	8	(1) 58394 (2) 58419 (3) 58237 (4) 58740 (5) 58669 (6) 58355 (7) 58361 (8) 58715																					
Date Detected/ Instrument SN	Fail Code	GPV SN	Verification																				
Week 42 K18QSP054A K18QSP028A K18QSP028A K18QSP028A K18QSP057A K18QSM679A K18QSP070A	Test Input B Prime with MeOH Test Input D Prime with MeOH Test Input B Prime with MeOH Input C Prime with MeOH Test Input B Prime with MeOH Input Line A Prime with MeOH Input Line B Prime with MeOH	58393 58400 58409 58433 58703 58685 58751	Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input D Prime with MeOH. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Compositional and High Pressure Test BD 90. Verify by TE David Kee Fail Test Input B Prime with MeOH. Verify by TE David Kee Failed Test Input A Prime with MeOH. Verify by TE David Kee Failed Test Input B Prime with MeOH. Verify by TE David Kee																				
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Weekly First Pass Yield

GPV

WW39'18 to WW41'18

Problem Statement			Investigation/ Possible Root Cause				Corrective Action/ Improvement																																				
Reported Date: 19, 24 Sep 2018 & 01 Oct 2018 Instrument Part Number: 186015018 Affected Qty: See below <table><tr><th>W W</th><th>No of GPV failed</th><th>Confirmed Failed GPV SN</th></tr><tr><td>39</td><td>3</td><td>SN 58329 SN 58232 SN 58336</td></tr><tr><td>40</td><td>8</td><td>SN 58287, SN 58203 SN 58196, SN 58282 SN 58268, SN 58192 SN 58195, SN 58200</td></tr><tr><td>41</td><td>6</td><td>(1) 58191, (2) 58190 (3) 58421, (4) 58395 (5) 58198. (6) 58410</td></tr></table> Reported site: Flex Kallang			W W	No of GPV failed	Confirmed Failed GPV SN	39	3	SN 58329 SN 58232 SN 58336	40	8	SN 58287, SN 58203 SN 58196, SN 58282 SN 58268, SN 58192 SN 58195, SN 58200	41	6	(1) 58191, (2) 58190 (3) 58421, (4) 58395 (5) 58198. (6) 58410	Investigation: Technician visual checked all Connections – no visual issue. Action Taken: Technician replaced GPV (PN:279001810, threadless armature under TMD) with new one and retested the Instrument passed. Defective part transferred to Non Conformance Area for further verification <table><tr><th>Date Detected/ Instrument SN</th><th>Fail Code</th><th>GPV SN</th><th>Verification</th></tr><tr><td>Week 39 (J18QSM632A)</td><td>Failed Compositional Accuracy and High Pressure Test</td><td>SN 58329</td><td>Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58329, re- verified in known good units (J18QSM668A) and confirmed fail. Witnessed by WPPL</td></tr><tr><td>Week 39 (J18QSM633A)</td><td>Failed Test Input B prime with MeOH. 1) Reading out of range is 60 2) Reading out of range is 58</td><td>SN 58232</td><td>Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58232) re- verified in known good units (J18QSM663A) and confirmed fail. Witnessed by WPPL</td></tr><tr><td>Week 39 (J18QSM638A)</td><td>Failed Test Input D Prime with MeOH. Good Spec 10PSI(Low) to 85PSI(High). Actual reading 0.4PSI</td><td>SN 58336</td><td>Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58336) re- verified in known good units (J18QSM669A) and confirmed fail. Witnessed by WPPL</td></tr><tr><td>Week 40 J18QSM640A K18QSM667A K18QSM667A J18QSM657A K18QSM670A J18QSM662A J18QSM663A J18QSM663A</td><td>1. Input line D prime with MEOH fail 2. Test composition accuracy BD 90% fail. 3. Test composition accuracy BD 10% fail</td><td>SN 58287 SN 58203 SN 58196 SN 58282 SN 58268 SN 58192 SN 58195 SN 58200</td><td>On 02 Oct, 3x GPV SN 58287, SN 58282 and SN 58268 verified by David and confirmed fail. On 03 Oct, 5x GPV (SN 58203,SN 58196,SN 58195,SN 58192 and SN 58200) re- verified in known good units (J18QSM663A, 662A,663A,004A and 663A) and confirmed fail. Witnessed by WPPL</td></tr><tr><td>Week 41 J18QSM664A K18QSM668A K18QSP006A K18QSP011A K18QSP014A K18QSP024A</td><td>(1) Test input B prime with MeOH (2) Test input B prime with MeOH (3) Test compositional accuracy & high pressure test (4) Test input B prime with MeOH (5) Test input B prime with MeOH (6) Test input B prime with MeOH</td><td>(1) 58191 (2) 58190 (3) 58421 (4) 58395 (5) 58198 (6) 58410</td><td>All offline verified and confirmed failed as per the fail code stated.</td></tr></table> Root Cause: Pending FA from supplier(Parker)				Date Detected/ Instrument SN	Fail Code	GPV SN	Verification	Week 39 (J18QSM632A)	Failed Compositional Accuracy and High Pressure Test	SN 58329	Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58329, re- verified in known good units (J18QSM668A) and confirmed fail. Witnessed by WPPL	Week 39 (J18QSM633A)	Failed Test Input B prime with MeOH. 1) Reading out of range is 60 2) Reading out of range is 58	SN 58232	Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58232) re- verified in known good units (J18QSM663A) and confirmed fail. Witnessed by WPPL	Week 39 (J18QSM638A)	Failed Test Input D Prime with MeOH. Good Spec 10PSI(Low) to 85PSI(High). Actual reading 0.4PSI	SN 58336	Offline verification, result failed. Findings: Same failure encountered. Verified by TE David On 03 Oct, GPV (SN 58336) re- verified in known good units (J18QSM669A) and confirmed fail. Witnessed by WPPL	Week 40 J18QSM640A K18QSM667A K18QSM667A J18QSM657A K18QSM670A J18QSM662A J18QSM663A J18QSM663A	1. Input line D prime with MEOH fail 2. Test composition accuracy BD 90% fail. 3. Test composition accuracy BD 10% fail	SN 58287 SN 58203 SN 58196 SN 58282 SN 58268 SN 58192 SN 58195 SN 58200	On 02 Oct, 3x GPV SN 58287, SN 58282 and SN 58268 verified by David and confirmed fail. On 03 Oct, 5x GPV (SN 58203,SN 58196,SN 58195,SN 58192 and SN 58200) re- verified in known good units (J18QSM663A, 662A,663A,004A and 663A) and confirmed fail. Witnessed by WPPL	Week 41 J18QSM664A K18QSM668A K18QSP006A K18QSP011A K18QSP014A K18QSP024A	(1) Test input B prime with MeOH (2) Test input B prime with MeOH (3) Test compositional accuracy & high pressure test (4) Test input B prime with MeOH (5) Test input B prime with MeOH (6) Test input B prime with MeOH	(1) 58191 (2) 58190 (3) 58421 (4) 58395 (5) 58198 (6) 58410	All offline verified and confirmed failed as per the fail code stated.	Corrective Action: Flex Kallang: NA Supplier: TBA
W W	No of GPV failed	Confirmed Failed GPV SN																																									
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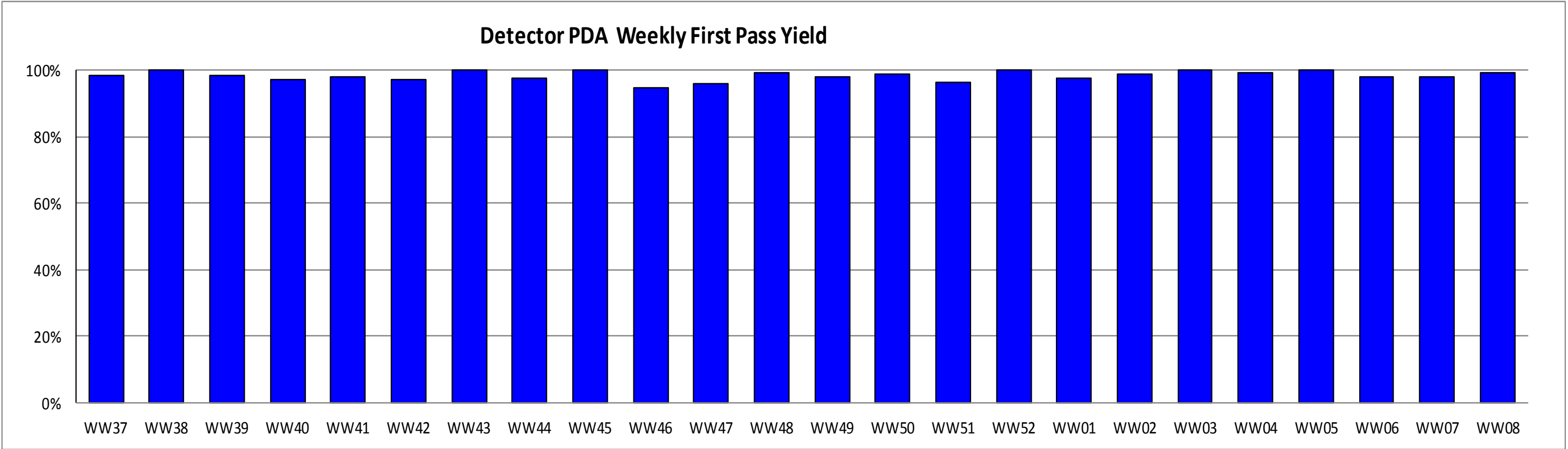
Weekly First Pass Yield

WW03'19 and previous

PCBA 210000520 – Tracker (PCBA failing in BSM/QSM family)

WW	Model PN	Instrument SN	210000520 PCBA SN	Fail Code	Off line verification	Failure Analysis / Actions
03'19	186015080 QSM Plus	A19QSP510A	291118428C	Continuous beep sound (Serial Port Error)	Result Passed. Instrument able to download firmware and fully initialize	NA
51	186015018 QSM	M18QSP343A	230618454C	Test Firmware Download Failed with continuous beep sound	Failed. Test Firmware Download Failed with continuous beep sound. (by Shamsul)	RMA# 27063 received on 22 Jan 19. Collection on 12 Feb 2019.
50	186015018 QSM	M18QSM801A	021118504C	Test Gradient Start Input Short Fail	Passed. Able to download firmware and fully initialize. (by David)	NA
49	186015080 QSM Plus	L18QSO327A	191018721C	Test loader download failed (serial port error) continuous beep.	Passed. Able to download firmware and fully initialize. (by David)	NA
31	186015080 QSM Plus	G18QSP768A	230618369C	Failed on power when test loader download continue with beep sound.	Failed. - Continue beep when power on, thus unable to download firmware (by David Kee)	RMA# 26493 provided. FA results NTF, pending for joint review.

Weekly First Pass Yield



	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	98%	100%	99%	97%	98%	97%	100%	98%	100%	95%	96%	99%	98%	99%	96%	100%	98%	99%	100%	99%	100%	98%	98%	99%
Total Units Tested	122	92	72	116	109	106	98	94	40	56	131	133	149	113	109	100	92	90	105	152	138	54	115	119
Total Units Passed	120	92	71	113	107	103	98	92	40	53	126	132	146	112	105	100	90	89	105	151	138	53	113	118
Total Units Failures (hard)	2		1	3	2	3		2		3	5	1	3	1	4		2	1		1		1	2	1

Weekly First Pass Yield

Alert Level crossed

Detector PDA

		7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
	Row Labels	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08	AL
1	210000404 (PCBA Pers)	1				1	1		1			1				1		1					1		1	2
3	210000415 (PCBA Pers)				1						2	3		2		2			1					2		2
2	279000852 (Power supply)															1		1			1					2
4	279001105 (lamp power supply)										1				1											2
5	210000520 (PCBA CPU)								1																	2
6	402000353 (lamp)	1		1			2							1												2
7	279001846 (cable)											1														2
8	441000992 (cable flow cell ID)												1													2
9	441000579 (cable power status led)					1																				2
10	402000351 (Lamp)				2																					2

Part Number	Supplier	Q1	Q2	Q3	Q4	Remarks
402000198 (Grating)	Horiba					Part issue. Grating RTV after supplier reported workmanship issue. Closed
210000520 (PCBA, CPU)	CEI					Common PCBA. Q1 and Q3 - consecutive weeks seeing failures. Under monitoring
279001846 (cable)	CMTI					4M reviewed by CMTI and Flex. No failure from WW31 to WW38. Closed

Weekly First Pass Yield

WW47'18 and previous

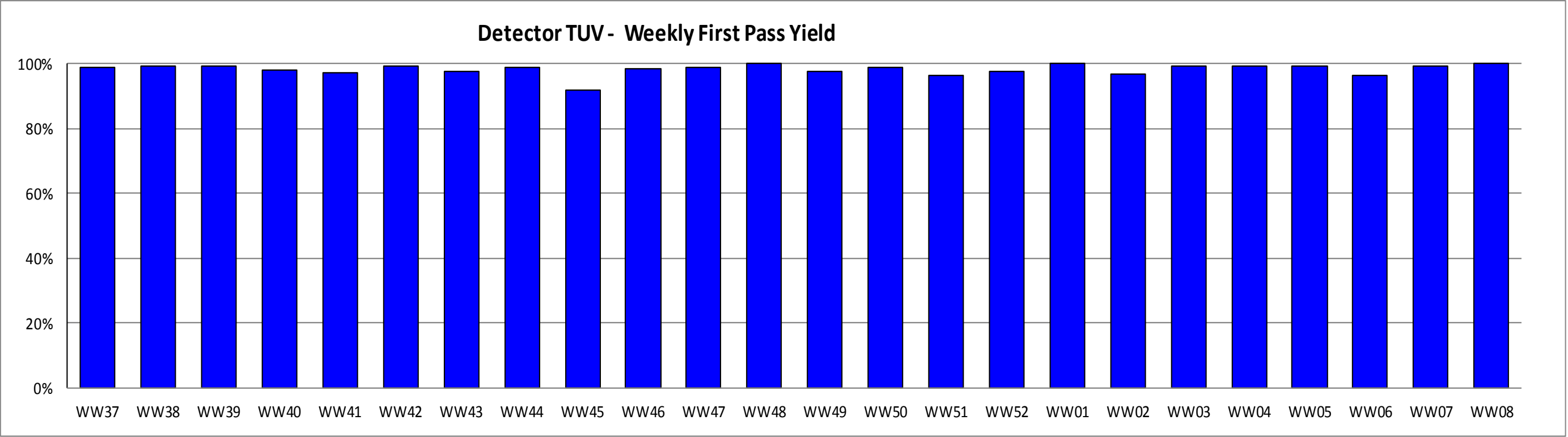
Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																																																											
Reported Date: 07, 09 Nov 2018 Instrument Part Number & Instrument SN: see Containment Action Affected Qty: see below Problem: <table><tr><th>WW</th><th>Failure</th><th>Qty</th></tr><tr><td>47</td><td>Shutter failed to home</td><td>1</td></tr><tr><td>47</td><td>Failed to calibrate</td><td>2</td></tr><tr><td>46</td><td>Shunt energy failure</td><td>1</td></tr><tr><td>46</td><td>Lamp power status indicator malfunction</td><td>1</td></tr></table> Date of Manufactured: Nov 2018 Reported site: Flex Kallang	WW	Failure	Qty	47	Shutter failed to home	1	47	Failed to calibrate	2	46	Shunt energy failure	1	46	Lamp power status indicator malfunction	1	<u>Off Line verification at Flex Kallang</u> <table><tr><th>WW</th><th>Instrument SN (Model: 186015032 and 186015033)</th><th>210000415 PCBA Serial Number</th><th>Kallang Failure</th><th>Off line verification</th></tr><tr><td>47</td><td>L18UPL375A</td><td>011018003M</td><td>Shutter failed to home</td><td>Failed.</td></tr><tr><td>47</td><td>L18UPL383A</td><td>251018274M</td><td>Failed to calibrate</td><td>Failed.</td></tr><tr><td>47</td><td>L18UPD901A</td><td>251018338M</td><td>Failed to calibrate</td><td>Failed.</td></tr><tr><td>46</td><td>L18UPL349A</td><td>251018336M</td><td>Shunt energy failure</td><td>Failed</td></tr><tr><td>46</td><td>L18UPL338A</td><td>121018002M</td><td>Lamp power status indicator malfunction</td><td>Failed</td></tr></table> <u>Root Cause</u> FA summary from Flex Senai: <table><tr><th>S/N</th><th>ICT</th><th>FCT</th><th>SENAI FINDINGS</th><th>Remark</th></tr><tr><td>A20-011018003M</td><td>PASS</td><td>PASS</td><td>NTF</td><td>ROBA07021906648MY</td></tr><tr><td>A20-251018274M</td><td>PASS</td><td>PASS</td><td>NTF</td><td>Status-FQA</td></tr><tr><td>A20-251018338M</td><td>PASS</td><td>PASS</td><td>NTF</td><td>ROBA07021906650MY</td></tr><tr><td>A20-251018336M</td><td>PASS</td><td>PASS</td><td>NTF</td><td>ROBA07021906650MY</td></tr><tr><td>A20-121018002M</td><td>PASS</td><td>PASS</td><td>NTF</td><td>ROBA25021906737MY</td></tr></table>	WW	Instrument SN (Model: 186015032 and 186015033)	210000415 PCBA Serial Number	Kallang Failure	Off line verification	47	L18UPL375A	011018003M	Shutter failed to home	Failed.	47	L18UPL383A	251018274M	Failed to calibrate	Failed.	47	L18UPD901A	251018338M	Failed to calibrate	Failed.	46	L18UPL349A	251018336M	Shunt energy failure	Failed	46	L18UPL338A	121018002M	Lamp power status indicator malfunction	Failed	S/N	ICT	FCT	SENAI FINDINGS	Remark	A20-011018003M	PASS	PASS	NTF	ROBA07021906648MY	A20-251018274M	PASS	PASS	NTF	Status-FQA	A20-251018338M	PASS	PASS	NTF	ROBA07021906650MY	A20-251018336M	PASS	PASS	NTF	ROBA07021906650MY	A20-121018002M	PASS	PASS	NTF	ROBA25021906737MY	<u>Containment Action:</u> Supplier: NA <u>Corrective Action:</u> NA Flex Senai will return the PCBA to Kallang for 2nd round of verification.
WW	Failure	Qty																																																																											
47	Shutter failed to home	1																																																																											
47	Failed to calibrate	2																																																																											
46	Shunt energy failure	1																																																																											
46	Lamp power status indicator malfunction	1																																																																											
WW	Instrument SN (Model: 186015032 and 186015033)	210000415 PCBA Serial Number	Kallang Failure	Off line verification																																																																									
47	L18UPL375A	011018003M	Shutter failed to home	Failed.																																																																									
47	L18UPL383A	251018274M	Failed to calibrate	Failed.																																																																									
47	L18UPD901A	251018338M	Failed to calibrate	Failed.																																																																									
46	L18UPL349A	251018336M	Shunt energy failure	Failed																																																																									
46	L18UPL338A	121018002M	Lamp power status indicator malfunction	Failed																																																																									
S/N	ICT	FCT	SENAI FINDINGS	Remark																																																																									
A20-011018003M	PASS	PASS	NTF	ROBA07021906648MY																																																																									
A20-251018274M	PASS	PASS	NTF	Status-FQA																																																																									
A20-251018338M	PASS	PASS	NTF	ROBA07021906650MY																																																																									
A20-251018336M	PASS	PASS	NTF	ROBA07021906650MY																																																																									
A20-121018002M	PASS	PASS	NTF	ROBA25021906737MY																																																																									

Weekly First Pass Yield

Previous : WW44'18 and earlier

WW	Model PN	Instrument SN	210000520 PCBA SN	Fail Code	Off line verification	Failure Analysis / Actions
44	186015033 PDA	K18UPL311A	180918685C	Fail to download firmware	Failed. Fail download Firmware. No visible of defective component (by Shamsul)	NTF. Report in review.
35	186299800 PDA	H18998073A	200718290C	Communication failure	Passed. Able to download firmware. On 186248900 model only. (By David Kee)	NA
34	186015033 PDA	H18UPL148A	090318079C	Communication Failure	Failed. (1) Able to detect instrument at Loader (2) Unable to download firmware due to continue beep (by David Kee)	RMA# 26597. Result NTF. On 08 Jan 2019 - Re-Verified Using KGU S/N : D1387E763A. Result failed. (Continuous beep with Fatal Error – Uninitialized Interrupt : Vector #24@Pcaddr0X36EE4 status 100 in ETC : RCV_Task RMA# 27146 to continue RTV to CEI
32	186002998 PDA	H18998930A	100718928C	Communication Failure	Failed - Unable to detect instrument at loader (by David Kee)	RMA# 26568. Result NTF. On 20 Dec 2018, re-verity using KGU S/N : D1387E763A. Result Failed (Unable to detect instrument at Loader). RMA# 27065 to continue RTV to CEI

Weekly First Pass Yield



	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	99%	99%	99%	98%	97%	99%	98%	99%	92%	99%	99%	100%	98%	99%	97%	98%	100%	97%	99%	99%	99%	96%	99%	100%
Total Units Tested	104	138	123	109	108	116	124	95	63	70	210	123	134	169	147	139	98	134	151	118	148	54	136	136
Total Units Passed	103	137	122	107	105	115	121	94	58	69	208	123	131	167	142	136	98	130	150	117	147	52	135	136
Total Units Failed (Hard)	1	1	1	2	3	1	3	1	5	1	2		3	2	5	3		4	1	1	1	2	1	

Weekly First Pass Yield (Detector – TUV)

Alert Level crossed

Row Labels	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	AL
	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08	
1279001098 (PCBA, PRE-AMP, TUV)														1									1		2
2279003675 (Power Supply)																						2			2
3210000414 (PCBA, PERSO, TUV)						1				1											1				2
4210000355 (PCBA, PERSO, 2489 TUV)	1			2			2				2		2		2				1	1					2
5210000520 (PCBA, CPU)					1		1											3							2
6279002842 (DISPLAY, LCD)									1									1							2
7279000852 (pwr supply)		1			1								1			2									2
8279001105 (Lamp Power Supply)					1			1							1	1									2
9279002660 (PCBA PRE-AMP 2489)									4						1										2
10279002643 (ASSY, LIMIT SENSOR GRATING)															1										2

Part Number	Supplier	Q1	Q2	Q3	Q4	Q1	Remarks
210000520 (PCBA, CPU)	CEI						Common PCBA. For PDA Detectors - Q1 and Q3 - consecutive weeks seeing failures. Under monitoring
279002660(PCBA PRE AMP 2489)	Flex Senai						

Weekly First Pass Yield

WW49'18 and previous

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																												
Reported Date: 24 Oct 2018 Instrument Part Number & Instrument SN: see Containment Action Affected Qty: see below Problem: <table><tr><th>WW</th><th>Failure</th><th>Qty</th></tr><tr><td>45</td><td>Dark Current</td><td>4</td></tr></table> From WW46’18 to WW08’19, no more similar failure for “Black Current”. Date of Manufactured: Oct 2018 Reported site: Flex Kallang	WW	Failure	Qty	45	Dark Current	4	<u>Off Line verification at Flex Kallang</u> <table><tr><td>WW</td><td>Instrument SN (Model: 186248900)</td><td>279002660 Preamp Serial Number</td><td>Kallang Failure</td><td>Off line verification</td></tr><tr><td rowspan="4">45</td><td>K1887E225A</td><td>170918488M</td><td>Dark Current.</td><td>Failed</td></tr><tr><td>K1887E266A</td><td>100918406M</td><td>Reference</td><td>Failed</td></tr><tr><td>K1887E278A</td><td>170918439M</td><td>Dark too high</td><td>Failed</td></tr><tr><td>K1887E288A</td><td>170918453M</td><td>16777215.00</td><td>Failed</td></tr></table> <u>Root Cause</u> Senai completed all 4 x RMA bds are failing for bad U2 and/or U3. Bad part FA sent. IC Supplier: Integrated Device Technology. Internal open, hot-spot was found, but the supplier not able to determine the cause. From WW46’18 to WW08’19, no more similar failure for “Dark Current”. To close this issue as an ‘isolated case’.	WW	Instrument SN (Model: 186248900)	279002660 Preamp Serial Number	Kallang Failure	Off line verification	45	K1887E225A	170918488M	Dark Current.	Failed	K1887E266A	100918406M	Reference	Failed	K1887E278A	170918439M	Dark too high	Failed	K1887E288A	170918453M	16777215.00	Failed	<u>Containment Action:</u> Supplier: NA <u>Corrective Action:</u> NA
WW	Failure	Qty																												
45	Dark Current	4																												
WW	Instrument SN (Model: 186248900)	279002660 Preamp Serial Number	Kallang Failure	Off line verification																										
45	K1887E225A	170918488M	Dark Current.	Failed																										
	K1887E266A	100918406M	Reference	Failed																										
	K1887E278A	170918439M	Dark too high	Failed																										
	K1887E288A	170918453M	16777215.00	Failed																										



RMA UNIT ANALYSIS

2790002660

CONFIDENTIAL

Problem Summary

Received feedback from Flex KP detected failure due to PCBA 279002660 defective with failure Dark Current

.

NC Number	KP Failure	Serial Number
NCMR-SKW-00005193	Dark Current	170918439M
NCMR-SKW-00005196	Dark Current	100918488M
NCMR-SKW-00005195	Dark Current	170918453M
NCMR-SKW-00005194	Dark Current	100918406M

Fresh Unit History Verification

NC Number	KP Failure	Serial Number	Prime		RMA			
					Before Debug		After Debug	
			ICT	FCT	Re-Test FCT	Re-Test ICT	Re-Test FCT	Re-Test ICT
NCMR-SKW-00005193	Dark Current	170918439M	Tested:25th Sept 2018 Result: Passed	Tested:25th Sept 2018 Result: Passed	Tested:16th Nov 18 Result: Failed	Tested:16th Nov 18 Result: Failed-U3	Tested:20th Oct 2018 Result: Passed	Tested:20th Oct 2018 Result: Passed
NCMR-SKW-00005196	Dark Current	100918488M	Tested:19th Sept 2018 Result: Passed	Tested:19th Sept 2018 Result: Passed	Tested:16th Nov 18 Result: Failed	Tested:16th Nov 18 Result: Failed-U2 & U3	Tested:20th Oct 2018 Result: Passed	Tested:20th Oct 2018 Result: Passed
NCMR-SKW-00005195	Dark Current	170918453M	Tested:25th Sept 2018 Result: Passed	Tested:25th Sept 2018 Result: Passed	Tested:26th Nov 18 Result: Failed	Tested:26th Nov 18 Result: Failed-U2	Tested:20th Oct 2018 Result: Passed	Tested:20th Oct 2018 Result: Passed
NCMR-SKW-00005194	Dark Current	100918406M	Tested:21st Sept 2018 Result: Passed	Tested:21st Sept 2018 Result: Passed	Tested:26th Nov 18 Result: Failed	Tested:26th Nov 18 Result: Failed-U2 & U3	Tested:20th Oct 2018 Result: Passed	Tested:20th Oct 2018 Result: Passed

Test Evidences



Conclusion

1. Initially the PCBA has been test at ICT and FCT passed at Flex Senai.
2. After return as RMA from Flex Senai, found the PCBA failed at ICT and FCT.
3. From ICT test failure, found that component failure at location U3-170918439M; U2 & U3-100918488M;U2-170918453M and U2 & U3-100918406M
4. Both U2 & U3 are from the same part number.
5. For further component level analysis, will send the failed component for FA to manufacturer.
6. Please refer to the next slide for the component level failure analysis report.

Supplier Failure Analysis

Below table is the summary from the FA report:

Samples	ATE	IV Curve	Objective Evidence	External Visual Inspection	X-ray	Objective Evidence	Acoustic Microscopy Inspection	liquid crystal thermography	Optical Image
SN1	Failed	abnormal I-V characteristics	Photograph 10,11 & 12 Request supplier to share a clear picture.	No package quality issues was observed	No anomalies on the wires and the wire layout did match the bonding diagram. The die attach fillet height was observed to be good.	Photograph 3 (Request supplier to share a clear picture not able to view the wire bond from top view)	lead and die paddle delamination observed	2 hot spot detected	No abnormalities found at the 2 hot spot.
SN2	Failed	No abnormal I-V characteristics	Request supplier to share evidence	No package quality issues was observed	No anomalies on the wires and the wire layout did match the bonding diagram. The die attach fillet height was observed to be good.	Photograph 5 (Request supplier to share a clear picture not able to view the wire bond from top view)	No delamination/Crack observed	N/A	N/A
SN3	Passed	abnormal I-V characteristics	Request supplier to share evidence	No package quality issues was observed	No anomalies on the wires and the wire layout did match the bonding diagram. The die attach fillet height was observed to be good.	Photograph 7 (Request supplier to share a clear picture not able to view the wire bond from top view)	lead, die paddle and die surface delamination observed	N/A	N/A

FA report



Supplier Failure Analysis

Senai Query (08/01/19):

- 1.Can they process further on the SN3 for the LCT and optical image?
- 2.Why ATE failed for SN1 & SN2?
- 3.What is causing the abnormal I-V characteristics for SN1 & SN3?

Reply from supplier (08/01/19):

They are not going to do further test as they make the below comments:

There will be some of possibilities , like ESD trapped charge , or particle issue or something else. I believed this is isolated case at customer side, they didn't receive lots of failures

Please advise if customer is facing high failure rate? If low failure, can we propose replacement on the fail unit instead? For the below reason:

- a)this is possible for ESD trapped charge (customer application induced) or particle as the possibilities
- b)For particle related, this is absolutely random issue with very low PPM incidence , this is 1st case for undetermined for this product family

Senai Query (08/01/19):

Does Renesas able to explain more on the below possible root cause:

- 1.Particle related issue.
- 2.ESD trapped charge.

Reply from supplier (09/01/19):

a)Particle related issue. This was particle possible removed during the chemical etching at opening the device. This is very low PPM incident for this issue, 1st time for this possible root cause

b)ESD trapped charge. This was due to possible charged at customer assembly process, it make device soft failed. Afterwards, it became discharged when it got connected . so the device was recovered .

Senai Query (09/01/19):

1. Please explain more on the below statement:

“This was due to possible charged at customer assembly process, it make device soft failed. Afterwards, it became discharged when it got connected . so the device was recovered.”

2. Help to provide the objective evidence and clear picture as per requested in the previous slide table.

Concall with supplier (22/02/19):

1. Supplier to update the items requested in table (red).
2. Supplier to add on more details in the FA report under conclusion (to recommend/suggest on the failure)
3. To update by week 09.

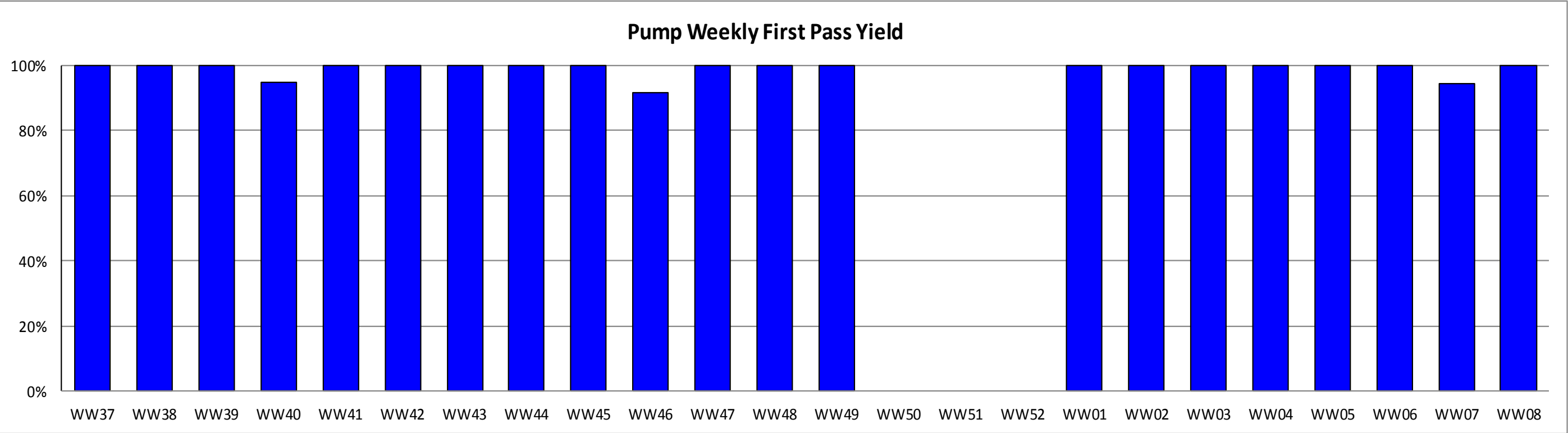
Weekly First Pass Yield

WW06'19 and previous

PCBA 210000520 – Tracker (PCBA failing in TUV family)

WW	Model PN / Family	Instrument SN	210000520 PCBA SN	Fail Code	Off line verification	Failure Analysis / Actions
43	186015031 TUV	K18TUV136A	230818137C	Fail to download Firmware	Failed. Unable to download firmware, continues beep when power ON. (by David Kee)	FA result NTF, pending approval to ship back.
41	186248900 TUV	K1887E055A	130818944C	Unable to communicate	Failed. (1) Unable to detect instrument at Loader. (2) Unable to detect instrument LAN. (by David Kee).	FA found lead lifted pin 1,3,5,7,9,11,13,15,17,19 at J2 location. Repaired and pending for approval to ship back.
35	186248900 TUV	H1887E613A	200718212C	Communication failure.	Failed. Fail Initialization (by David Kee)	RMA# 26595 provided. 03 Jan 2019, reported failed instrument SN A1987E253A, instrument failed to initialize. Offline verification using KGU S/N : D1387E763A result failed, same failure encountered.
34	186248900 TUV	H1887E524A	200718211C	Firmware loading failed.	Failed. Unable to detect instrument at loader (by David Kee)	RMA# 26596 provided. 03 Jan 2019, reported failed instrument SN A1987E252A, instrument failed to initialize. Offline verification using KGU S/N : D1387E763A result failed, same failure encountered.
31	186248900 TUV	G1887E301A	230618454C	Firmware loading failed.	Failed. Unable to download firmware due to fatal error. (by David Kee)	RMA# 26569 provided 18 Sept. Collection done on 24 Sept. Result NTF.
24	186017002 TUV	F18VTU253A	040518329C	Communication failure	Failed, Unable to detect instrument loader. (by David Kee)	Supplier responded FA with NTF result. Pending to return to Flex.
20	186248900 TUV	E1887E523A	221217506C	Fail to initialize.	Failed UUT fail to initialize. (by David Kee)	Supplier responded FA with NTF result. Pending to return to Flex.
16	186002487 TUV	D1887E243A	090318079C	Instrument fail to initialize	Failed. Continuous beep when powered ON, unable to download firmware manually. (by David Kee)	RMA 25919 received on 4 May 18. 30 May 18 board collected by supplier. FA sent on 04 July, board tested NTF. Pending to ship back to Flex. 25 Aug 2018: Flex Re verified using KGU s/n:D1387E763A - result Failed (Able to detect instrument t@ Loader but UUT continuous beep with error message "WinHttpRequestResponse Failed:12029" when trying to download firmware. On 03 Jan 2019 , reported failed on instrument SN A1987E254A, instrument failed to initialize. Offline verification using KGU S/N : D1387E763A result failed, Continuous beep with Fatal Error –Uninitialized Interrupt : Vector #24@Pcaddr0X36EE4 status 100 in ETC : RCV_Task

Weekly First Pass Yield



	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb
Problem Category	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08
First Pass Yield	100%	100%	100%	95%	100%	100%	100%	100%	100%	92%	100%	100%	100%	#DIV/0!	#DIV/0!	#DIV/0!	100%	100%	100%	100%	100%	100%	94%	100%
Total Units Tested	7	8	6	20	12	18	12	12	14	12	10	17	8				14	18	18	14	22	6	18	11
Total Units Passed	7	8	6	19	12	18	12	12	14	11	10	17	8				14	18	18	14	22	6	17	11
Total Units Failures (Hard)				1						1												1		

Weekly First Pass Yield

 Alert Level crossed

PUMP Family

		7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
Row Labels		37'18	38'18	39'18	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08	AL
1	210000562 (PCBA pump controller)										1													1		2
2	21000057520 (PCB)				1																					2
3	210000548 (PCBA pump rear panel)																									2
4	210000520 (PCBA CPU)																									2
5	279000138 (power supply)																									2
6	WAT207053 (PCBA pump controller)																									2

Weekly First Pass Yield (In process)

Part Number / Description	37'18	38'18	39'18	40'18	41'18	42'18	43'18	44'18	45'18	46'18	47'18	48'18	49'18	50'18	51'18	52'18	01'19	02'19	03'19	04'19	05'19	06'19	07'19	08'19	AL
	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov	9-Nov	16-Nov	23-Nov	30-Nov	7-Dec	14-Dec	21-Dec	28-Dec	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	
405001338 (Needle injector)	8	6	3	2	3	2		3	4		1	7	9	13	21	13	10	10	11	2	2	1	5		7
WAT271289 (MOTOR LINEAR ACTUAT)											1		1										2		2
210000429 (ASSY,PCB,DUAL,OPTICAL,SENSOR)			1	1							2		2					2		1	1			2	2
279001839 (ASSY,MOTOR,FILTER,WHEEL,DRIVE)	1												2		1								2		2
402000539 (PDA, 518 PIXEL, CMOS, SELECTIV)																							2		2
279002755 (GEAR MOTOR, FILTER FLAG, BRASS)															1					2			1		2
441000588 (ASSY, CABLE, THERMAL SWITCH)																							1		2
WAT270084 (ASSY CABLE CPU TO PUMP DRIVE)																					1				2
WAT270621 (ASSY CABLE CAROUSEL SENSORS)										1											1				2
WATH-279002643(ASSY, LIMIT SENSOR GRATING DR)																		1		1					2

Part Number	Supplier	Q1	Q2	Q3	Q4	Remarks
402000198 (Grating)	Horiba					Part issue. Grating RTV after supplier reported workmanship issue. Closed
Keypoint tubings	Keypoint					Supplier using 108psi staking issue. No failure reported. Closed.
289000144 (Check Valve)	Idex					Supplier provided CA. Now pending closure. WW30 to WW38 -- no failure reported. Closed.
405001338 (Needle Injector)	Waters					Fail parts RTV to supplier. Pending FA.

Weekly First Pass Yield (in process failure)

For Reference (Part number and it's supplier)

#	Part Number / Description	Supplier
1	405001338 (Needle injector)	WATERS
2	WAT271289 (MOTOR LINEAR ACTUAT)	HAYDON KERK MOTION SOLUTIONS INC
3	210000429 (ASSY,PCB,DUAL,OPTICAL,SENSOR)	Flex Senai
4	279001839 (ASSY,MOTOR,FILTER,WHEEL,DRIVE)	HAYDON KERK MOTION SOLUTIONS INC
5	402000539 (PDA, 518 PIXEL, CMOS, SELECTIV)	HAMAMATSU
6	279002755 (GEAR MOTOR, FILTER FLAG, BRASS)	HAYDON KERK MOTION SOLUTIONS INC
7	441000588 (ASSY, CABLE, THERMAL SWITCH)	CMTI
8	WAT270084 (ASSY CABLE CPU TO PUMP DRIVE)	CMTI
9	WAT270621 (ASSY CABLE CAROUSEL SENSORS)	CMTI
10	WATH-279002643(ASSY, LIMIT SENSOR GRATING DR)	CMTI

Weekly First Pass Yield (In process)

Current : WW07'19 and previous data

Problem Statement	Investigation/ Possible Root Cause	Corrective Action/ Improvement																																														
Part Number : WAT-405001338-B Description: NEEDLE,INJECTOR Problem: Fail decay test spec of < 270PSI. Failure: <table><tr><td>WW22 – 7</td><td>WW45 - 4</td></tr><tr><td>WW23 – 2</td><td>WW46 – 0</td></tr><tr><td>WW24 – 4</td><td>WW 47 - 1</td></tr><tr><td>WW25 – 3</td><td>WW48 - 7</td></tr><tr><td>WW26 – 3</td><td>WW49 - 9</td></tr><tr><td>WW27 - 4</td><td>WW50 - 13</td></tr><tr><td>WW28 – 7</td><td>WW51 - 21</td></tr><tr><td>WW29 – 11</td><td>WW52 - 13</td></tr><tr><td>WW30 – 10</td><td>WW01’19 - 10</td></tr><tr><td>WW31 – 15</td><td>WW02’19 - 10</td></tr><tr><td>WW32 – 13</td><td>WW03’19 - 11</td></tr><tr><td>WW33 – 5</td><td>WW04’19 - 2</td></tr><tr><td>WW34 – 5</td><td>WW05’19 - 2</td></tr><tr><td>WW35 – 4</td><td>WW06’19 - 1</td></tr><tr><td>WW36 – 19</td><td>WW07’19 - 5</td></tr><tr><td>WW37 – 8</td><td>WW08’19 - 0</td></tr><tr><td>WW38 - 6</td><td></td></tr><tr><td>WW39 – 3</td><td></td></tr><tr><td>WW40 – 2</td><td></td></tr><tr><td>WW41 – 3</td><td></td></tr><tr><td>WW42 – 2</td><td></td></tr><tr><td>WW43 – 0</td><td></td></tr><tr><td>WW44 - 3</td><td></td></tr></table> Date of Manufactured: May to Jul 2018 Reported site: Flex Kallang	WW22 – 7	WW45 - 4	WW23 – 2	WW46 – 0	WW24 – 4	WW 47 - 1	WW25 – 3	WW48 - 7	WW26 – 3	WW49 - 9	WW27 - 4	WW50 - 13	WW28 – 7	WW51 - 21	WW29 – 11	WW52 - 13	WW30 – 10	WW01’19 - 10	WW31 – 15	WW02’19 - 10	WW32 – 13	WW03’19 - 11	WW33 – 5	WW04’19 - 2	WW34 – 5	WW05’19 - 2	WW35 – 4	WW06’19 - 1	WW36 – 19	WW07’19 - 5	WW37 – 8	WW08’19 - 0	WW38 - 6		WW39 – 3		WW40 – 2		WW41 – 3		WW42 – 2		WW43 – 0		WW44 - 3		<u>Investigation:</u> Technician visual checked all Connections –no visual issue. <u>Containment Actions:</u> Technician replaced Needle (PN:405001338) – Injector Sub Assy Retest passed. Offline verification were verified to be failed. From WW44 onwards, additional info (leak at which area and visual inspection for scratches and pit will be done) Defective part transferred to Non Conformance Area Needle Supplier: Waters Tech <u>Root Cause:</u> It is confirmed that the Defective part has caused the Sub Assy Test as per stated in the Problem Statement.	<u>Corrective Action:</u> Flex Kallang: NA Supplier: TBA
WW22 – 7	WW45 - 4																																															
WW23 – 2	WW46 – 0																																															
WW24 – 4	WW 47 - 1																																															
WW25 – 3	WW48 - 7																																															
WW26 – 3	WW49 - 9																																															
WW27 - 4	WW50 - 13																																															
WW28 – 7	WW51 - 21																																															
WW29 – 11	WW52 - 13																																															
WW30 – 10	WW01’19 - 10																																															
WW31 – 15	WW02’19 - 10																																															
WW32 – 13	WW03’19 - 11																																															
WW33 – 5	WW04’19 - 2																																															
WW34 – 5	WW05’19 - 2																																															
WW35 – 4	WW06’19 - 1																																															
WW36 – 19	WW07’19 - 5																																															
WW37 – 8	WW08’19 - 0																																															
WW38 - 6																																																
WW39 – 3																																																
WW40 – 2																																																
WW41 – 3																																																
WW42 – 2																																																
WW43 – 0																																																
WW44 - 3																																																

Weekly First Pass Yield (In process)

Needle (PN 405001338) – failure by Month and Quarter (2017, 2018 and 2019)

Month	186269505 and 186269506 Qty Build	Qty Failure	% Failed	Quarter	Qty Build	Qty Failure	% Failed
Jan-17	394	10	2.54%	Q1'17	1118	28	2.50%
Feb-17	326	7	2.15%				
Mar-17	398	11	2.76%				
Apr-17	425	5	1.18%	Q2'17	1169	17	1.45%
May-17	342	9	2.63%				
Jun-17	402	3	0.75%				
Jul-17	482	1	0.21%	Q3'17	1206	18	1.49%
Aug-17	406	10	2.46%				
Sep-17	318	7	2.20%				
Oct-17	416	0	0.00%	Q4'17	1132	1	0.09%
Nov-17	340	0	0.00%				
Dec-17	376	1	0.27%				
Jan-18	462	2	0.43%	Q1'18	1223	8	0.65%
Feb-18	361	2	0.55%				
Mar-18	400	4	1.00%				
Apr-18	352	3	0.85%	Q2'18	1234	25	2.03%
May-18	394	10	2.54%				
Jun-18	488	12	2.46%				
Jul-18	558	47	8.42%	Q3'18	1466	110	7.50%
Aug-18	424	46	10.85%				
Sep-18	484	17	3.51%				
Oct-18	530	10	1.89%	Q4'18	1582	78	4.93%
Nov-18	519	12	2.31%				
Dec-18	533	56	10.51%				
Jan-19 (WW01)	91	10	10.99%	Q1'19	718	41	5.71%
Jan-19 (WW02)	131	10	7.63%				
Jan-19 (WW03)	67	11	16.42%				
Jan-19 (WW04)	58	2	3.45%				
Jan-19 (WW05)	139	2	1.44%				
Feb-19 (WW06)	8	1	12.50%				
Feb-19 (WW07)	89	5	5.62%				
Feb-19 (WW08)	135	0	0.00%				
Total Qty	10848	326		Total	10848	326	

