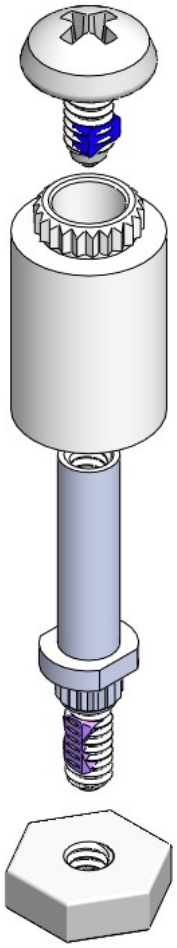
Project Number: Design Qualification Test Report	Tracking Code: CR-960603_Report_Rev_1
Requested by: Cesar Wang	Date: 10/19/2023
Part #: GPSOM-0700-01-01	Tech: Keney Chen
Part description: GPSOM	
Test Start: 8/12/2023	Test Completed: 9/25/2023



DESIGN QUALIFICATION TEST REPORT

GPSOM-0700-01-01

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
10/18/2023	**1**	**Initial Issue**	**KC**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
4) The automated procedure is used with aqueous compatible soldering materials.
5) Any additional preparation will be noted in the individual test sequences.
6) Solder Information: Not Applicable
7) Samtec Test PCBs used: PCB-113310-TST/PCB-113072-TST

FLOWCHARTS

Pull Out Force

Note: Pull out force will be tested using three separate PCB options, the differences being the diameter of the holes for the GPSOM assemblies.

Group 1
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.30mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 3.30mm diameter holes.*

Group 2
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.22mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 3.22mm diameter holes.*

Group 3
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.38mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 3.38mm diameter holes.*

Group 4
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
2.00mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 2.00mm diameter holes.*

Group 5
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
1.95mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 1.95mm diameter holes.*

Group 6
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
2.05mm Diameter PCB

Step	Description
1.	Pull Out Force *Note: Testing was performed using a .062 thick PCB with 2.05mm diameter holes.*

FLOWCHARTS Continued

Torque

Note: Torque will be tested using three separate PCB options, the differences being the diameter of the holes for the GPSOM assemblies. Apply torque to the standoff until the standoff spins freely in the PCB NPTH. Record max torque.

Group 1
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.3mm Diameter PCB

Step	Description
1.	Torque Force *Note: Tetsing was performed using a .062 thick PCB with 3.30mm diameter holes.*

Group 2
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.38mm Diameter PCB

Step	Description
1.	Torque Force *Note: Testing was performed using a .062 thick PCB with 3.38mm diameter holes.*

Group 3
GPSOM-T-0700-01-01
PCB BOARD
4 Assemblies
3.22mm Diameter PCB

Step	Description
1.	Torque Force *Note: Testing was performed using a .062 thick PCB with 3.22mm diameter holes.*

Group 4
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
2.00mm Diameter PCB

Step	Description
1.	Torque Force *Note: Testing was performed using a .062 thick PCB with 2.00mm diameter holes.*

Group 5
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
1.95mm Diameter PCB

Step	Description
1.	Torque Force *Note: Testing was performed using a .062 thick PCB with 1.95mm diameter holes.*

Group 6
GPSOM-B-0700-02-01
PCB BOARD
4 Assemblies
2.05mm Diameter PCB

Step	Description
1.	Torque Force *Note: Testing was performed using a .062 thick PCB with 2.05mm diameter holes.*

FLOWCHARTS Continued

Screw/unscrew Cycles

Note: To be tested with PCB assembly. GPSOM-B and nut to be fixed on bottom PCB and GSPOM-T to be fixed on top PCB. Assembling both boards then to do screw/unscrew cycles to simulate real application.

Group 1		Group 2	
GPSOM-0700-01-01		GPSOM-0700-01-01	
2 Assemblies		2 Assemblies	
Max. Hole PCB_0.118" Board Thickness		Min. Hole PCB_0.118" Board Thickness	
Note: To be tested with Max. hole PCB. DIA. 3.38mm for GPSOM-T and DIA. 2.05mm for GPSOM-B. Applying with 3.5 in-lbs for screw torque. Inspect the threads after each 25 cycles.		*Note: To be tested with Min. hole PCB. DIA. 3.22mm for GPSOM-T and DIA. 1.95mm for GPSOM-B. Applying with 3.5 in-lbs for screw torque. Inspect the threads after each 25 cycles*	
Step	**Description**	**Step**	**Description**
1.	Visual Inspection	1.	Visual Inspection
2.	Cycles Quantity = 25 Cycles	2.	Cycles Quantity = 25 Cycles
3.	Visual Inspection	3.	Visual Inspection
4.	Cycles Quantity = 25 Cycles	4.	Cycles Quantity = 25 Cycles
5.	Visual Inspection	5.	Visual Inspection
6.	Cycles Quantity = 25 Cycles	6.	Cycles Quantity = 25 Cycles
7.	Visual Inspection	7.	Visual Inspection
8.	Cycles Quantity = 25 Cycles	8.	Cycles Quantity = 25 Cycles
9.	Visual Inspection	9.	Visual Inspection
10.	Visual Inspection		

Maximum Torque To Cause Break

Note: To be tested with PCB assembly. GPSOM-B and nut to be fixed on bottom PCB and GSPOM-T to be fixed on top PCB. Assembling both boards then to applying torque to screw until break.

Group 1		Group 2	
GPSOM-0700-01-01		GPSOM-0700-01-01	
18 Assemblies		18 Assemblies	
Thin Board Thickness_0.062"		Thick Board Thickness_0.118"	
Note: Applying the torque to GPSOM assy until GPSOM-B component is broken by screw. Record the maximum torque.		*Note: Applying the torque to GPSOM assy until GPSOM-B component is broken by screw. Record the maximum torque.*	
Step	**Description**	**Step**	**Description**
1.	1 - Visual Inspection	1.	1 - Visual Inspection
2.	Applying Torque To Screw *Note: Applying the torque until GPSOM-B is broken by screw.*	2.	Applying Torque To Screw *Note: Applying the torque until GPSOM-B is broken by screw.*
3.	Record The Torque Number To Cause Break	3.	Record The Torque Number To Cause Break

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

Pull Out Force:

Record maximum force observed when removing standoff from PCB via push/pull testing.

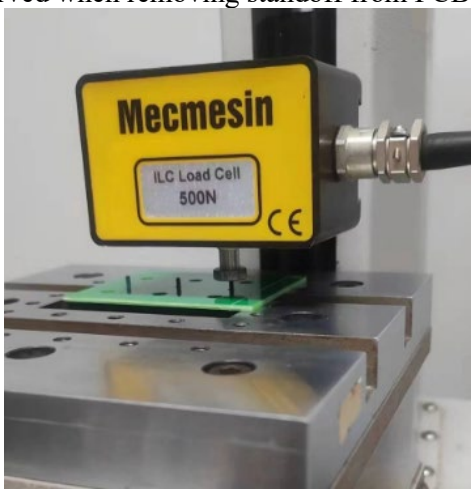


Fig. 1

Torque Force:

Record maximum torque observed when removing standoff from PCB via torque testing. Torque to be applied until standoff spins freely in non-plated thru hole.

Fig. 2

Screw/unscrew Cycles:

1) To be tested with PCB assembly. GPSOM-B and nut to be fixed on bottom PCB and GSPOM-T to be fixed on top PCB. Assemblying both boards then to do screw/unscrew cycles to simulate real application.

Maximum Torque To Cause Break:

1) To be tested with PCB assembly. GPSOM-B and nut to be fixed on bottom PCB and GSPOM-T to be fixed on top PCB. Assemblying both boards then to applying torque to screw until break(Applying the torque to GPSOM assy until GPSOM-B component is broken by screw. Record the maximum torque).

RESULTS

Pull Out Force

Group 1 GPSOM-T With 3.30mm Diameter Holes

- **Min ----------62.31 lbs**
- **Max----------69.58 lbs**

Group 2 GPSOM-T With 3.22mm Diameter Holes

- **Min ----------95.49 lbs**
- **Max---------- 105.42 lbs**

Group 3 GPSOM-T With 3.38mm Diameter Holes

- **Min ----------43.00 lbs**
- **Max----------47.25 lbs**

Group 4 GPSOM-B With 2.00mm Diameter Holes

- **Min ----------46.54 lbs**
- **Max----------50.31 lbs**

Group 5 GPSOM-B With 1.95mm Diameter Holes

- **Min ----------61.78 lbs**
- **Max----------70.70 lbs**

Group 6 GPSOM-B With 2.05mm Diameter Holes

- **Min ----------38.70 lbs**
- **Max----------41.01 lbs**

Torque

Group 1 GPSOM-T With 3.30mm Diameter Holes

- **Min ----------11.85 lbs-Inch**
- **Max----------12.80 lbs-Inch**

Group 2 GPSOM-T With 3.22mm Diameter Holes

- **Min ----------10.20 lbs-Inch**
- **Max----------12.00 lbs-Inch**

Group 3 GPSOM-T With 3.38mm Diameter Holes

- **Min ----------12.00 lbs-Inch**
- **Max----------13.00 lbs-Inch**

Group 4 GPSOM-B With 2.00mm Diameter Holes

- **Min ---------- 5.25 lbs-Inch**
- **Max---------- 6.00 lbs-Inch**

Group 5 GPSOM-B With 1.95mm Diameter Holes

- **Min ---------- 5.55 lbs-Inch**
- **Max---------- 6.35 lbs-Inch**

Group 6 GPSOM-B With 2.05mm Diameter Holes

- **Min ---------- 5.50 lbs-Inch**
- **Max---------- 5.80 lbs-Inch**

RESULTS Continued

Maximum Torque To Cause Break

Group 1 GPSOM-B With Thin Board

- **Min ---------- 5.00 lbs-Inch**
- **Max---------- 8.50 lbs-Inch**

Group 2 GPSOM-B With Thick Board

- **Min ---------- 5.80 lbs-Inch**
- **Max---------- 8.65 lbs-Inch**

Screw/Unscrew Cycles

Max. Hole PCB

Visual Inspection

- **Initial----------No detriment**
- **After 25Cycles----------No evidence of physical or chemical damage**
- **After 50Cycles----------No evidence of physical or chemical damage**
- **After 75Cycles----------No evidence of physical or chemical damage**
- **After 100Cycles---------- No evidence of physical or chemical damage**

Min. Hole PCB

Visual Inspection

- **Initial----------No detriment**
- **After 25Cycles----------No evidence of physical or chemical damage**
- **After 50Cycles----------No evidence of physical or chemical damage**
- **After 75Cycles----------No evidence of physical or chemical damage**
- **After 100Cycles---------- No evidence of physical or chemical damage**

DATA SUMMARIES

Pull Out Force

Group 1 GPSOM-T With 3.30mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**62.31**	**277.14**
Maximum	69.58	309.51
Average	66.32	295.00

Group 2 GPSOM-T With 3.22mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**95.49**	**424.75**
Maximum	105.42	468.91
Average	100.37	446.43

Group 3 GPSOM-T With 3.38mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**43.00**	**191.25**
Maximum	47.25	210.17
Average	45.38	201.84

Group 4 GPSOM-B With 2.00mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**46.54**	**207.01**
Maximum	50.31	223.77
Average	48.84	217.25

Group 5 GPSOM-B With 1.95mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**61.80**	**274.89**
Maximum	70.70	314.49
Average	65.12	289.66

Group 6 GPSOM-B With 2.05mm Diameter Holes

	Force (lbs)	Force (N)
Minimum	**38.70**	**172.13**
Maximum	41.01	182.42
Average	39.99	177.88

DATA SUMMARIES Continued

Torque

Group 1 GPSOM-T With 3.30mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**11.85**	**52.71**
Maximum	12.80	56.93
Average	12.29	54.65

Group 2 GPSOM-T With 3.22mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**10.20**	**45.37**
Maximum	12.00	53.38
Average	10.91	48.54

Group 3 GPSOM-T With 3.38mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**12.00**	**53.38**
Maximum	13.00	57.82
Average	12.50	55.60

Group 4 GPSOM-B With 2.00mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**5.25**	**23.35**
Maximum	6.00	26.69
Average	5.70	25.35

Group 5 GPSOM-B With 1.95mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**5.55**	**24.69**
Maximum	6.35	28.24
Average	5.93	26.35

Group 6 GPSOM-B With 2.05mm Diameter Holes

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**5.50**	**24.46**
Maximum	5.80	25.80
Average	5.65	25.13

DATA SUMMARIES Continued

Maximum Torque To Cause Break

Group 1 GPSOM-B With Thin Board

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**5.00**	**22.24**
Maximum	8.50	37.81
Average	6.88	30.58

Group 2 GPSOM-B With Thick Board

	Force (lbs-Inch)	Force (N-Inch)
Minimum	**5.80**	**25.80**
Maximum	8.65	38.48
Average	7.04	31.31

Screw/Unscrew Cycles

Sample #	Max. Hole PCB	
	1#	2#
Initial	No detriment	No detriment
25Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
50Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
75Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
100Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage

Sample #	Min. Hole PCB	
	1#	2#
Initial	No detriment	No detriment
25Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
50Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
75Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage
100Cycles	No evidence of physical or chemical damage	No evidence of physical or chemical damage

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 4/26/2023, Next Cal: 4/25/2024

Equipment #: DG-TQ-01
Description: Digital TQ Gage-1
Manufacturer: Mark-10 Corporation
Model: MTT03-50
Serial #: 3862898
Accuracy: Last Cal: 11/29/2022, Next Cal: 11/28/2023