

## 1 Subject

<b>Affected Products</b>	conga-TS370, conga-TS170, conga-TR4, conga-TR3
<b>Subject</b>	Comparison of conga-TS370, conga-TS170, conga-TR4 and conga-TR3 Benchmark Results
<b>Confidential/Public</b>	Confidential
<b>Date (yyyy.mm.dd)</b>	2018.09.17
<b>Author</b>	MTH

## 2 Affected Article Numbers

### 2.1 Product Data

Affected Number(s)	Product	CPU Variant
049000	conga-TS370/i7-8850H	Intel® Coffee Lake (8 <sup>th</sup> Gen Core™ Processor)
049001	conga-TS370/i5-8400H	
049002	conga-TS370/E-2176M	
049003	conga-TS370/i3-8100H	
045900	conga-TS170/i7-6820EQ	Intel® Skylake (6 <sup>th</sup> Gen Core™ Processor)
045902	conga-TS170/i5-6440EQ	
045904	conga-TS170/i3-6100E	
041600	conga-TR4/V1807B	AMD Great Horned Owl (V-Series SoC)
041601	conga-TR4/V1756B	
041602	conga-TR4/V1605B	
041603	conga-TR4/V1202B	
041300	conga-TR3/RX-421BD	AMD Merlin Falcon (Embedded R-Series SoC)

## 3 Information

The following benchmark results compare the product variants of the above listed Intel® Coffee lake (8<sup>th</sup> Gen Core™ processor), Intel® Skylake (6<sup>th</sup> Gen Core™ processor), AMD Great Horned Owl (V-Series SOC) and AMD Merlin Falcon (Embedded R-Series SOC) based COMs.

All benchmarks were performed on a 64-bit Windows 10 machine with the following modules:

- TS370 A.1 hardware and BxCOR114 BIOS
- TS170 B.0 hardware and BxSLR021 BIOS
- TR4 B.1 hardware and TR44R009 BIOS
- TR3 B.0 hardware and TR33R123 BIOS

The following DDR4 memory configuration was used for the benchmarks:

- 2x 16GB DDR4 2666

Some specifications of both the Intel® and AMD processors used for these benchmarks are listed in the table below:

SKU	#Cores/ Threads	Frequency Base / Turbo	Cache	TDP	Processor Graphic
TS370/i7-8850H	6/12	2.6GHz/4.3GHz	9MB	45W	Intel® UHD Graphics 630
TS370/i5-8400H	4/8	2.5GHz/4.2GHz	8MB	45W	Intel® UHD Graphics 630
TS370/E-2176M	6/12	2.7GHz/4.4GHz	12MB	45W	Intel® UHD Graphics P630
TS370/i3-8100H	4/4	3.0GHz/ n.a.	6MB	45W	Intel® UHD Graphics 630
TS170/i7-6820EQ	4/8	2.8 GHz / 3.5 GHz	8 MB	45W	Intel® HD Graphics 530
TS170/i5-6440EQ	4/4	2.7 GHz / 3.4 GHz	6 MB	45W	Intel® HD Graphics 530
TS170/i3-6100E	2/4	2.7 GHz / n.a.	3 MB	35W	Intel® HD Graphics 530
TR4/V1807B	4/8	3.35GHz/3.8GHz	2MB	54W	AMD Radeon Vega Graphics
TR4/V1756B	4/8	3.25GHz/3.6GHz	2MB	54W	AMD Radeon Vega Graphics
TR4/V1605B	4/8	2.0GHz/3.6GHz	2MB	25W	AMD Radeon Vega Graphics
TR4/V1202B	2/4	2.3GHz/3.2GHz	1MB	25W	AMD Radeon Vega Graphics
TR3/RX-421BD	4/4	2.1GHz/3.4GHz	2MB	35W	AMD Radeon R7 Graphics

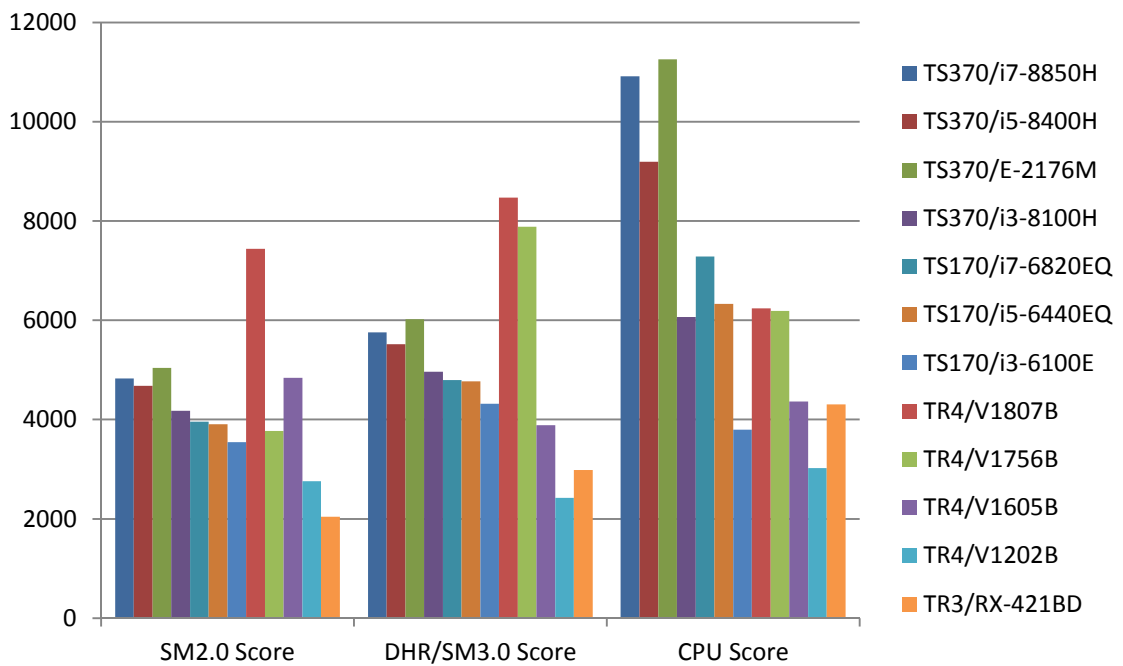
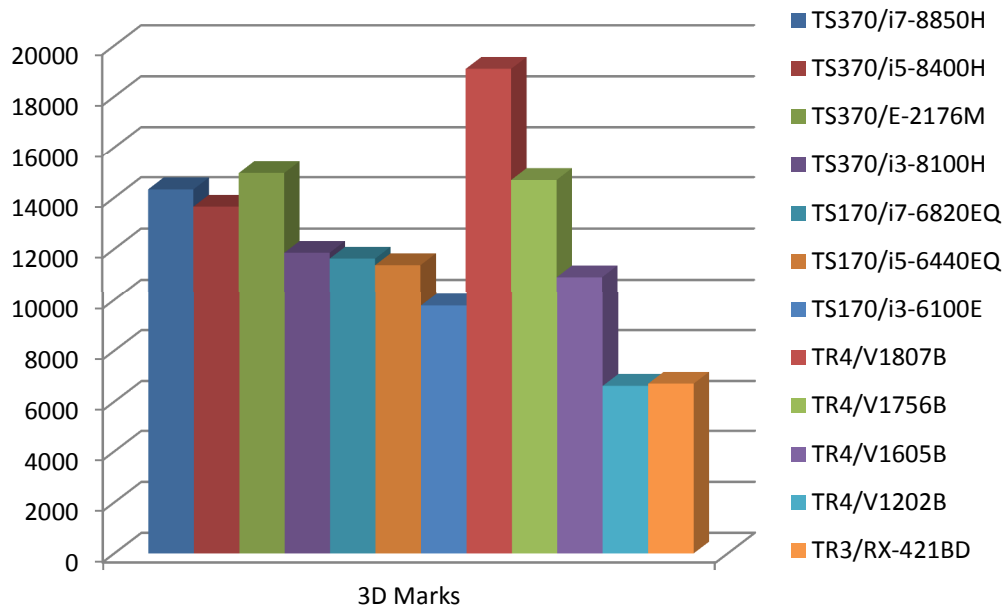


### Note

***Turbo mode was enabled on variants that support it.***

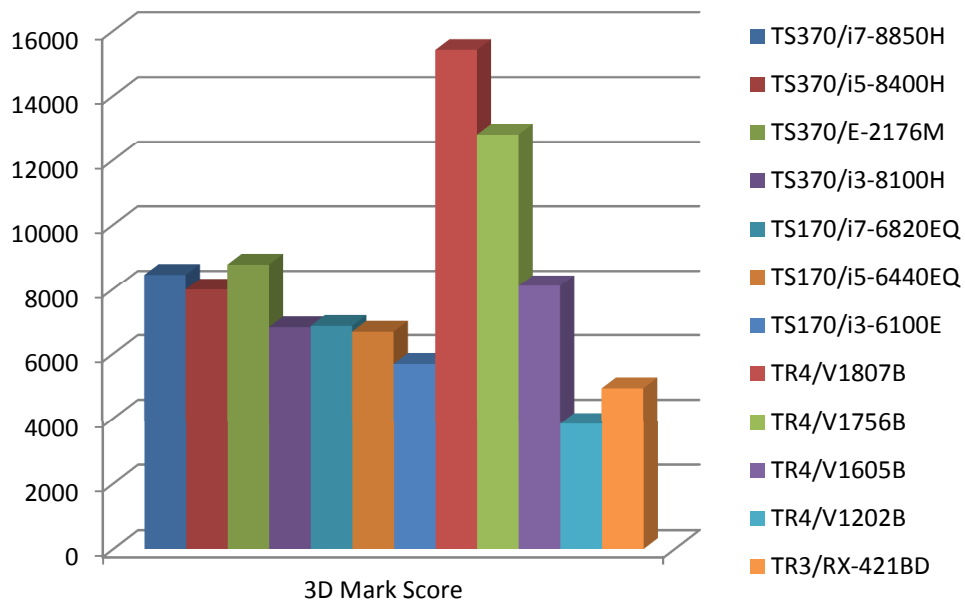
## 3.1 3D Mark06

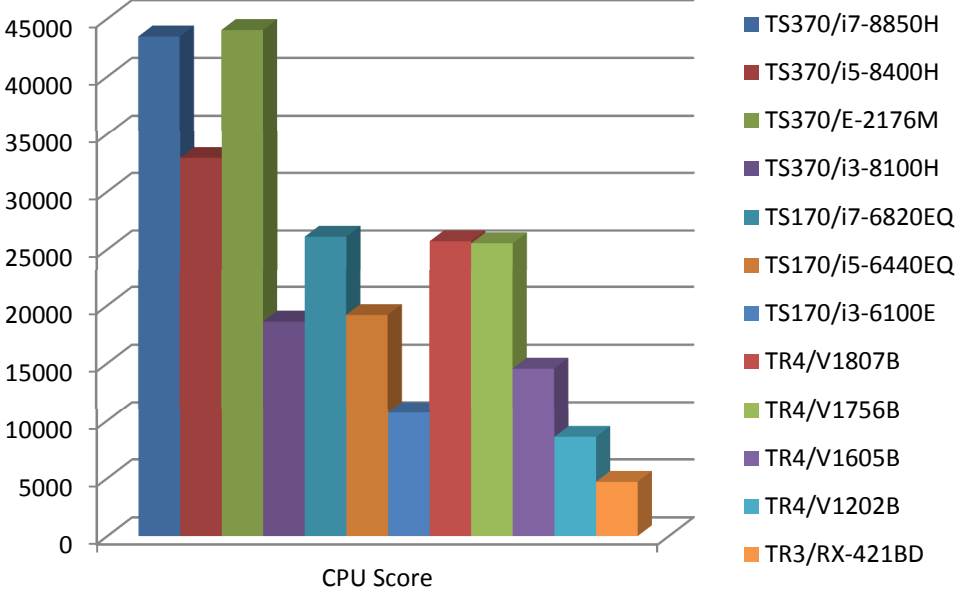
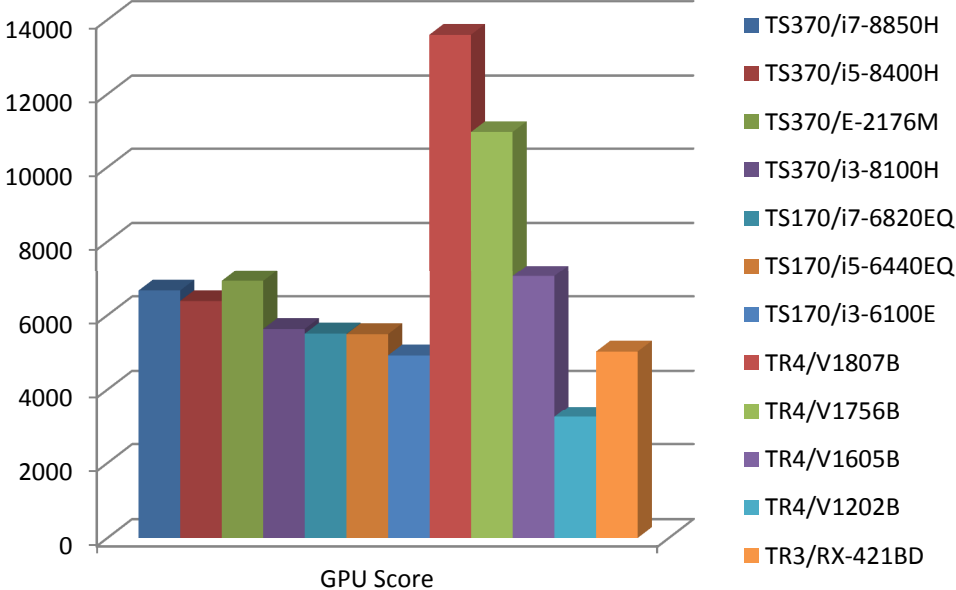
	TS370/i7-8850H	TS370/i5-8400H	TS370/E-2176M	TS370/i3-8100H
	049000	049001	049002	049003
3D Marks	14330	13660	14969	11863
SM2.0 Score	4825	4682	5041	4179
HDR/SM3.0 Score	5753	5517	6020	4961
CPU Score	10912	9194	11257	6064
	TS170/i7-6820EQ	TS170/i5-6440EQ	TS170/i3-6100E	TR4/V1807B
	045900	045902	045904	041600
3D Marks	11634	11377	9778	19099
SM2.0 Score	3957	3904	3545	7438
HDR/SM3.0 Score	4793	4767	4319	8473
CPU Score	7287	6332	3799	6237
	TR4/V1756B	TR4/V1605B	TR4/V1202B	TR3/RX-421BD
	041601	041602	041603	041300
3D Marks	14698	10906	6620	6707
SM2.0 Score	3769	4843	2757	2044
HDR/SM3.0 Score	7886	3883	2425	2986
CPU Score	6191	4360	3025	4307



## 3.2 3D Mark Vantage (Performance)

	TS370/i7-8850H 049000	TS370/i5-8400H 049001	TS370/E-2176M 049002	TS370/i3-8100H 049003
3D Mark Score	8456	7997	8777	6827
GPU Score	6666	6385	6928	5636
CPU Score	43490	32925	44050	18629
	TS170/i7-6820EQ 045900	TS170/i5-6440EQ 045902	TS170/i3-6100E 045904	TR4/V1807B 041600
3D Mark Score	6862	6687	5692	15419
GPU Score	5508	5494	4923	13604
CPU Score	26115	19205	10702	25713
	TR4/V1756B 041601	TR4/V1605B 041602	TR4/V1202B 041603	TR3/RX-421BD 041300
3D Mark Score	12812	8105	3840	4940
GPU Score	10987	7062	3242	5025
CPU Score	25537	14559	8582	4700





## 3.3 Sisoftware Sandra Lite 2018

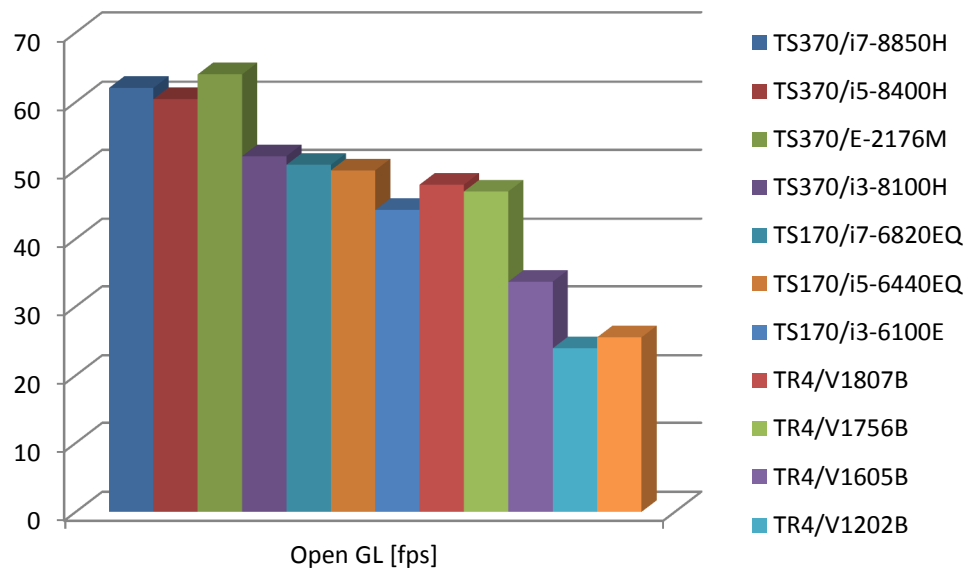
	TS370/i7-8850H	TS370/i5-8400H	TS370/E-2176M	TS370/i3-8100H
	049000	049001	049002	049003
Processor Arithmetic [GOPS]	155	115.69	153.26	71.47
Processor Multi-Media [Mpixl/s]	462	340.82	457.77	213.27
Cryptography [GB/s]	10.22	9.07	10.16	7.13
.NET Arithmetic [GOPS]	50.7	38.58	50	24.65
.NET Multi- Media [Mpixl/s]	97.81	71.37	90	36.59
Memory Bandwidth [GB/s]	30.2	31.13	30.28	31.18
Cache & Memory Latency[ns]	29.7	29.3	30.2	29.7
GP Processing [Mpixl/s]	271	258.56	283.35	224.72
GP Financial Analysis [kOPT/s]	28.6	27.26	29.9	24.33
GP Cryptography [GB/s]	1.78	1.7	1.83	1.52
	TS170/i7-6820EQ	TS170/i5-6440EQ	TS170/i3-6100E	TR4/V1807B
	045900	045902	045904	041600
Processor Arithmetic [GOPS]	96	74.22	40.44	100.56
Processor Multi-Media [Mpixl/s]	300.7	221	130.51	223.72
Cryptography [GB/s]	7.63	7.27	3.35	10.28
.NET Arithmetic [GOPS]	31.12	25.55	13.65	34.42
.NET Multi- Media [Mpixl/s]	60.37	37	26.81	56
Memory Bandwidth [GB/s]	25.54	25.32	25.46	28.25
Cache & Memory Latency[ns]	33.9	35	34.9	101.8
GP Processing [Mpixl/s]	231.16	231.25	210.36	685.83
GP Financial Analysis [kOPT/s]	24.08	24.07	22.36	46.88
GP Cryptography [GB/s]	1.54	1.54	1.43	9.14
	TR4/V1756B	TR4/V1605B	TR4/V1202B	TR3/RX-421BD
	041601	041602	041603	041300
Processor Arithmetic [GOPS]	99.31	73	38.14	16.86
Processor Multi-Media [Mpixl/s]	216.77	137.76	78.12	33.78
Cryptography [GB/s]	10.14	6.57	5	1.12
.NET Arithmetic [GOPS]	35	25.64	16.2	6.53

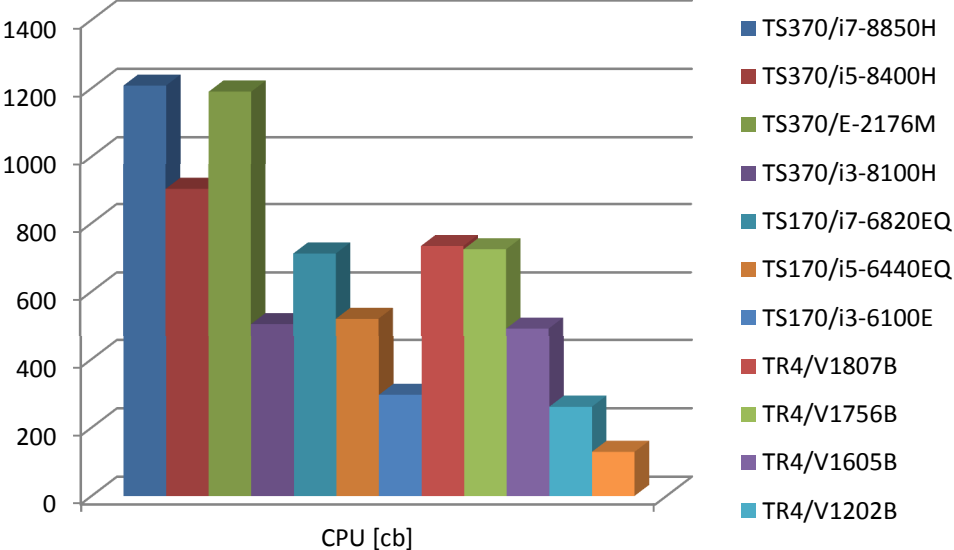
<b>.NET Multi- Media [Mpixl/s]</b>	54.47	32.18	19.22	9.41
<b>Memory Bandwidth [GB/s]</b>	28.52	28.16	27.45	8.07
<b>Cache &amp; Memory Latency[ns]</b>	102.3	102.4	103.3	121.6
<b>GP Processing [Mpixl/s]</b>	439.31	303.32	119.2	767.85
<b>GP Financial Analysis [kOPT/s]</b>	28.92	22	7.9	113.58
<b>GP Cryptography [GB/s]</b>	6.42	4.75	1.62	6.29



## 3.4 Cinebench Release 15.038

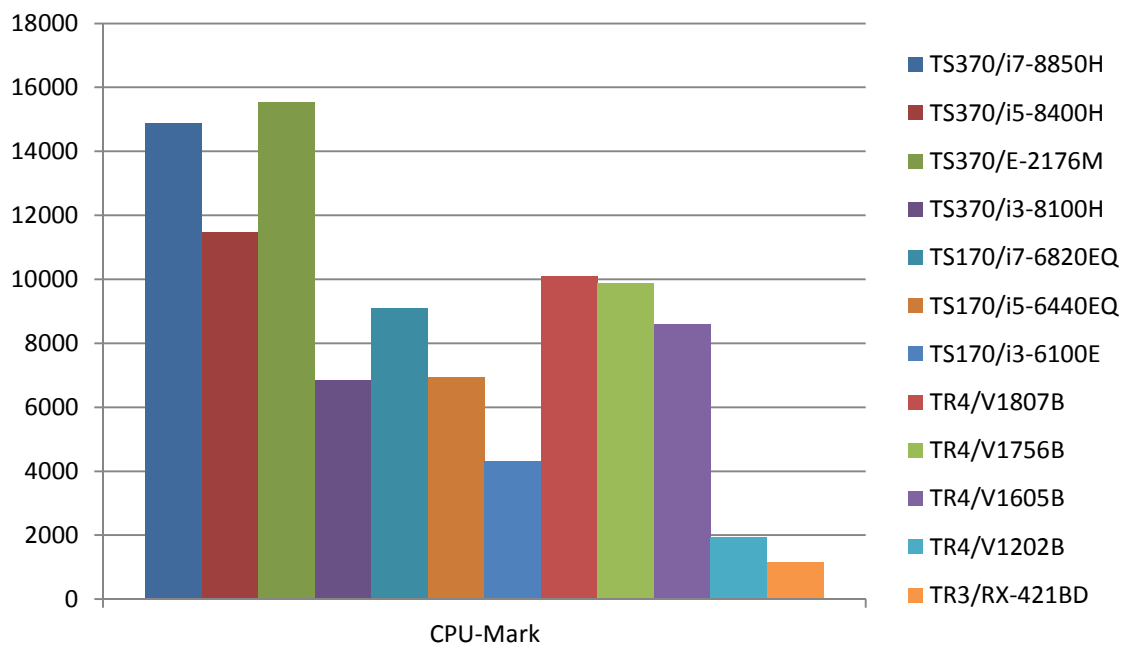
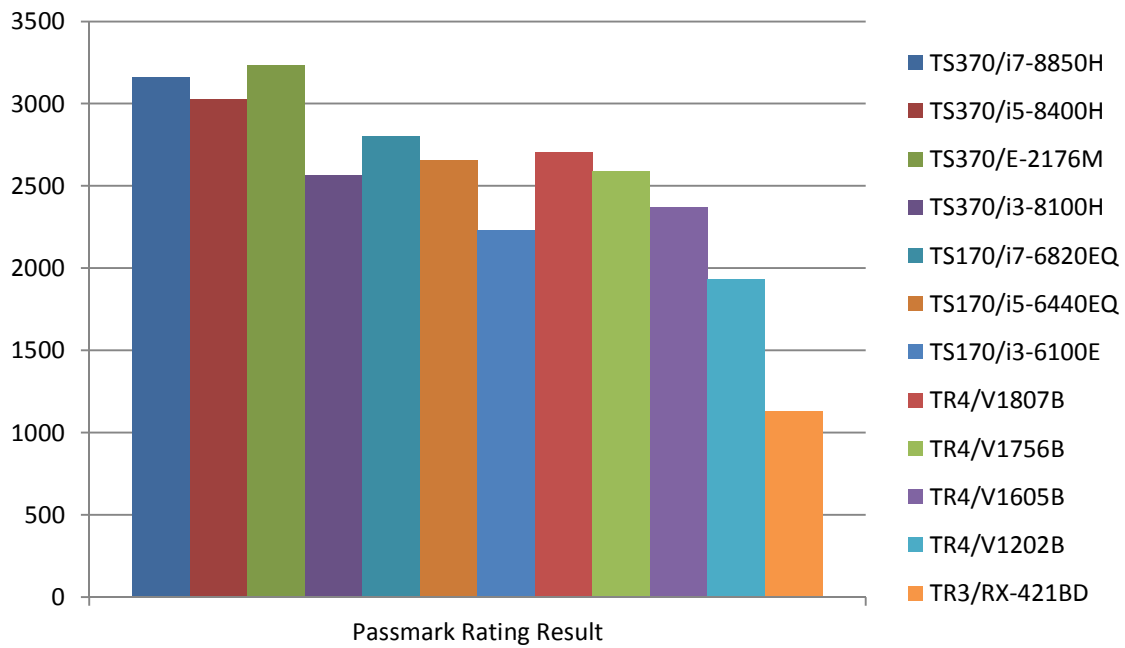
	TS370/i7-8850H	TS370/i5-8400H	TS370/E-2176M	TS370/i3-8100H
	<b>049000</b>	<b>049001</b>	<b>049002</b>	<b>049003</b>
Open GL [fps]	62.03	60.42	63.99	51.98
CPU [cb]	1208	901	1190	505
	TS170/i7-6820EQ	TS170/i5-6440EQ	TS170/i3-6100E	TR4/V1807B
	<b>045900</b>	<b>045902</b>	<b>045904</b>	<b>041600</b>
Open GL [fps]	50.74	49.95	44.2	47.87
CPU [cb]	712	521	296	734
	TR4/V1756B	TR4/V1605B	TR4/V1202B	TR3/RX-421BD
	<b>041601</b>	<b>041602</b>	<b>041603</b>	<b>041300</b>
Open GL [fps]	46.88	33.6	23.93	25.52
CPU [cb]	724	492	261	129

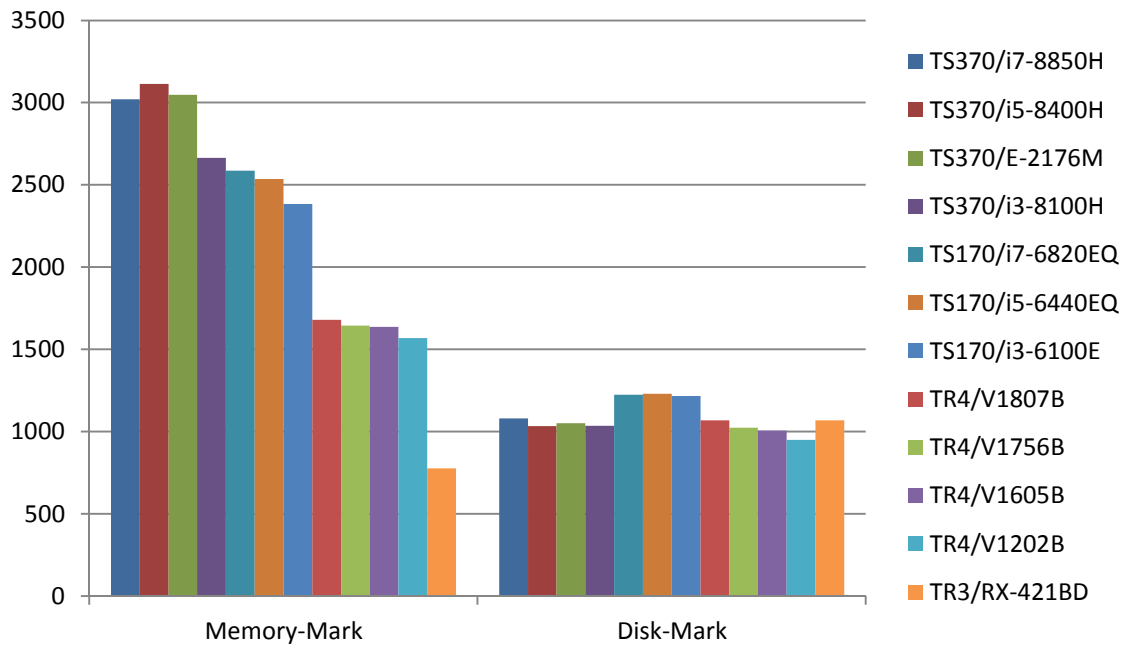
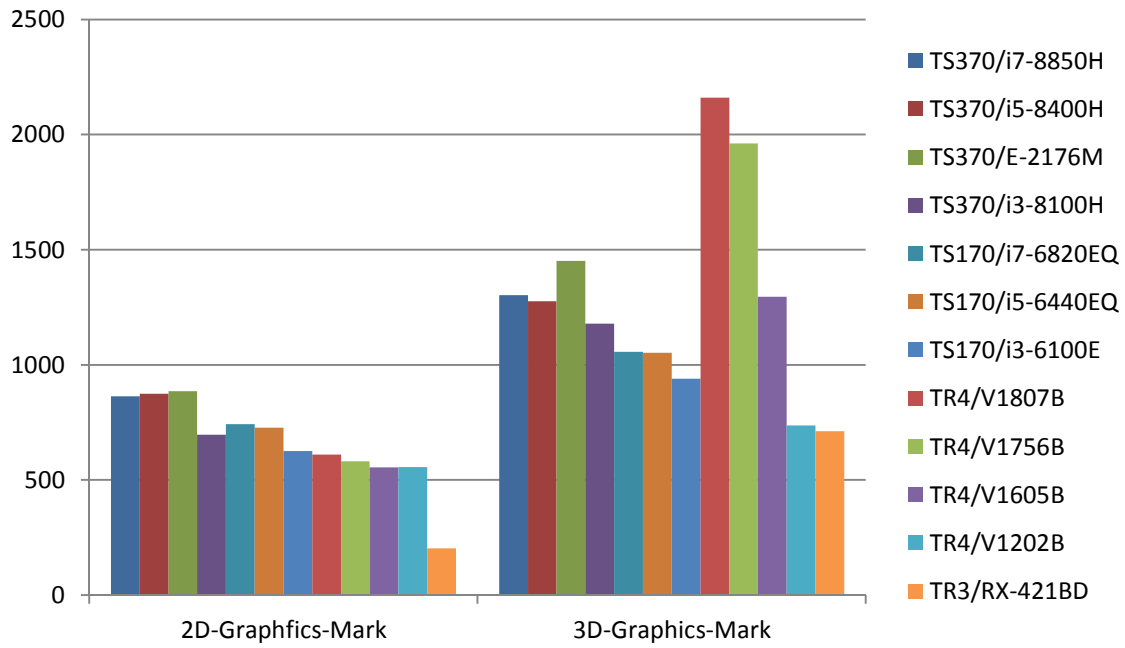




## 3.5 Passmark Performance Test 8.0

	TS370/i7-8850H	TS370/i5-8400H	TS370/E-2176M	TS370/i3-8100H
	049000	049001	049002	049003
<b>Passmark Rating Result</b>	3162.1	3025.1	3231.8	2565
<b>CPU-Mark</b>	14876.2	11452.2	15529.4	6834.4
<b>2D-Graphics-Mark</b>	863.7	874.6	885.6	696.9
<b>3D-Graphics-Mark</b>	1303.3	1276	1451.3	1178.8
<b>Memory-Mark</b>	3020.7	3113.4	3047.7	2663.4
<b>Disk-Mark</b>	1079.7	1033.9	1051.8	1034.8
	TS170/i7-6820EQ	TS170/i5-6440EQ	TS170/i3-6100E	TR4/V1807B
	045900	045902	045904	041600
<b>Passmark Rating Result</b>	2801.3	2655.2	2231.8	2704.9
<b>CPU-Mark</b>	9095.4	6949.2	4314	10094.7
<b>2D-Graphics-Mark</b>	743.2	727.7	625.6	609.9
<b>3D-Graphics-Mark</b>	1057.3	1052.7	940.4	2160
<b>Memory-Mark</b>	2586.8	2535	2383.6	1679.5
<b>Disk-Mark</b>	1223.9	1230.3	1215.9	1069.2
	TR4/V1756B	TR4/V1605B	TR4/V1202B	TR3/RX-421BD
	041601	041602	041603	041300
<b>Passmark Rating Result</b>	2589.8	2370.2	1933.7	1130.4
<b>CPU-Mark</b>	9861.4	8593.6	5154.8	2451
<b>2D-Graphics-Mark</b>	581.3	554.2	556	203.6
<b>3D-Graphics-Mark</b>	1962.1	1296.2	736.9	712.5
<b>Memory-Mark</b>	1644.6	1636.9	1569.4	777.2
<b>Disk-Mark</b>	1023.2	1007.1	950.6	1068.4





## Revision History

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Revision	Date (yyyy-mm-dd)	Author	Changes
1.0	2018-09-17	MTH	Initial release
1.1	2019-04-22	MTH	<ol style="list-style-type: none"><li>1. Added TS370/E-2176M and TS370/i3-8100H to comparison</li><li>2. Used BxCOR114 to test all TS370 variants</li></ol>