

**DDR4 2133 Qualified Vendors List (QVL)**

| Vendors       | Part No.                       | Size           | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|---------------|--------------------------------|----------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|               |                                |                |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| SAMSUNG       | M378A5143DB0--CPB              | 4G             | SS    | SEC 428    | K4A4G085WD        | 13-13-13-33 | 1.5V    | •                              | •      | •      |
| SAMSUNG       | M378A1G43DB0--CPB              | 8G             | DS    | SEC 428    | K4A4G085WD        | 13-13-13-33 | 1.5V    | •                              | •      | •      |
| G.SKILL       | F4-2133C15Q-32GRK              | 8G             | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| GLOWAY        | PC4-17000                      | 4G             | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| KINGSTON      | HX421C13PBK4/16                | 4G             | SS    | N/A        | Heat-Sink Package |             | 1.2V    | •                              | •      | •      |
| KINGSTON      | HX421C14FB/8                   | 8G             | DS    | N/A        | Heat-Sink Package | 14-14-14-35 | 1.2V    | •                              | •      | •      |
| KINGSTON      | HX421C14FBK4/32                | 8G             | DS    | N/A        | Heat-Sink Package |             | 1.2V    | •                              | •      | •      |
| PANRAM        | PUD42133C138G4NJW              | 8G             | DS    | N/A        | Heat-Sink Package | 13-13-13-35 | 1.2V    | •                              | •      | •      |
| PANRAM        | PUD42133C134G4NJW              | 4G             | SS    | N/A        | Heat-Sink Package | 13-13-13-35 | 1.2V    | •                              | •      | •      |
| CORSAIR       | CMK16GX4M4A2133C15             | 4G             | SS    | N/A        | Heat-Sink Package | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| CORSAIR       | CMV4GX4M1A2133C15              | 4G             | SS    | N/A        | 4GA72Z9RGR        | 13-13-34-33 | 1.5V    | •                              | •      | •      |
| CORSAIR       | CMV8GX4M1A2133C15              | 8G             | DS    | SEC 446    | K4A4G085WD        | 13-13-13-33 | 1.5V    | •                              | •      | •      |
| CRUCIAL       | MTA8ATF51264AZ-2G1A1           | 4G             | SS    | MICRON     | 4QA77D9RCQ        | 13-13-13-33 | 1.2V    | •                              | •      | •      |
| TEAM          | TED44GM2133C15BK               | 4G             | DS    | SEC 443    | K4A4G085WD        | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| TEAM          | TED48GM2133C15BK               | 8G             | SS    | SEC        | K4A4G085WD        | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| APACER        | 78.C1GM3.AF10B                 | 8G             | DS    | SK HYNIX   | H5AN4G8NMFRR      | 14-14-14-33 | 1.5V    | •                              | •      | •      |
| APACER        | AU04GGB13CDBGC                 | 4G             | SS    | SK HYNIX   | H5AN4G8NMFRR      | 14-14-14-33 | 1.5V    | •                              | •      | •      |
| TEKISAM       | T4U2133B8G15-SAD               | 8G             | DS    | SEC 446    | K4A4G085WD        |             |         | •                              | •      | •      |
| G.SKILL       | F4-2133C15Q-16GRB              | 4G             | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| ADATA         | AD4U2133W4G15-B                | 4GB            | SS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | -       | •                              | •      | •      |
| ADATA         | AD4U2133W8G15                  | 8GB            | DS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Apacer        | 78.B1GM3.AF00B                 | 4GB            | SS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Apacer        | 78.C1GM3.AF10B                 | 8GB            | DS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| AVEXIR        | AVD4U21331504G-4M              | 4GB            | SS    | AVEXIR     | 512X8DDR4         | 15-15-15-35 | 1.2     | •                              | •      | •      |
| CENTURY       | CD8G-D4U2133                   | 8GB            | DS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | -       | •                              | •      | •      |
| CENTURY       | CK8GX4-D4U2133                 | 32GB(4x8GB)    | DS    | SK hynix   | H5AN4G8NMFRTFC    | 15-15-15-35 | 1.2     | •                              | •      | •      |
| CORSAIR       | CMD16GX4M4B2133C10(Ver3.20)    | 16GB ( 4x 4GB  | SS    | -          | -                 | 10-12-12-31 | 1.35    | •                              | •      | •      |
| CORSAIR       | CMK16GX4M4A2133C13(Ver4.23)(XM | 16GB ( 4x 4GB  | SS    | -          | -                 | 13-15-15-28 | 1.2     | •                              | •      | •      |
| CORSAIR       | CMK32GX4M4A2133C13(Ver4.23)(XM | 32GB ( 4x 8GB  | DS    | -          | -                 | 13-15-15-28 | 1.2     | •                              | •      | •      |
| CORSAIR       | CMK64GX4M8A2133C13(Ver4.23)(XM | 64GB ( 8x 8GB  | DS    | -          | -                 | 13-15-15-28 | 1.2     | •                              | •      | •      |
| CORSAIR       | CMV4GX4M1A2133C15              | 4GB            | SS    | -          | -                 | 15-15-15-36 | 1.2     | •                              | •      | •      |
| CORSAIR       | CMV8GX4M1A2133C15              | 8GB            | DS    | -          | -                 | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Crucial       | CT4G4DF8213.8FA1               | 4GB            | SS    | Micron     | D9RGQ             | 15-15-15-37 | 1.2     | •                              | •      | •      |
| Crucial       | CT4G4DF8213.8FA2               | 4GB            | SS    | Micron     | D9RGQ             | 2133-15-15- | 1.2     | •                              | •      | •      |
| Crucial       | CT8G4DF8213.16FA1              | 8GB            | DS    | Micron     | D9RGQ             | 15-15-15-37 | 1.2     | •                              | •      | •      |
| Crucial       | CT8G4DF8213.16FA2              | 8GB            | DS    | Micron     | D9RGQ             | 2133-15-15- | 1.2     | •                              | •      | •      |
| Crucial       | CT8G4DF8213.C16FAR11           | 8GB            | DS    | Micron     | C9BDH             | 15-15-15-36 | 1.2     | •                              | •      | •      |
| G.SKILL       | F4-2133C15Q-16GRR              | 16GB ( 4x 4GB  | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| G.SKILL       | F4-2133C15Q-32GRR              | 32GB ( 4x 8GB  | DS    | -          | -                 | 15-15-15-35 | -       | •                              | •      | •      |
| Gell          | GPR416GB2133C15QC              | 16GB (4x4GB    | SS    | -          | -                 | 2133-15-15- | 1.2     | •                              | •      | •      |
| Kingston      | KVR21N15D8/8                   | 8GB            | DS    | SK hynix   | H5AN4G8NMFRTFC    | 15-15-15-37 | 1.2     | •                              | •      | •      |
| Kingston      | KVR21N15S8/4                   | 4GB            | SS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-37 | 1.2     | •                              | •      | •      |
| KLEVV         | KM4C4GX4N-2133-15-15-15-35-0   | 4GB            | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV         | KM4C4GX4N-2133-15-15-15-35-1   | 4GB            | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV         | KM4C8GX4N-2133-15-15-15-35-0   | 8GB            | DS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV         | KM4C8GX4N-2133-15-15-15-35-1   | 8GB            | DS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| Micron        | MTA16ATF1G64AZ-2G1A2           | 8GB            | DS    | Micron     | D9RG0             | 2133-15-15- | -       | •                              | •      | •      |
| Micron        | MTA8ATF51264AZ-2G1A2           | 4GB            | SS    | Micron     | D9RG0             | 2133-15-15- | -       | •                              | •      | •      |
| Panram        | PUD42133C154G2VS               | 8GB ( 2x 4GB ) | SS    | SK Hynix   | H5AN4GBNMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| panram        | PUD42133C154GNJK               | 4GB            | SS    | -          | -                 | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Panram        | PUD42133C158G2VS               | 16GB ( 2x 8GB  | DS    | SK Hynix   | H5AN4GBNMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Samsung       | M378A1G43DB0-CPB               | 8GB            | DS    | Samsung    | K4A4G085WD        | 15-15-15-36 | -       | •                              | •      | •      |
| Samsung       | M378A5143DB0-CPB               | 4GB            | SS    | Samsung    | K4A4G085WD        | 15-15-15-36 | -       | •                              | •      | •      |
| SanMax        | SMD-4G28HP-21P                 | 4GB            | SS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-37 | -       | •                              | •      | •      |
| SanMax        | SMD-8G28HP-21P                 | 8GB            | DS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-37 | -       | •                              | •      | •      |
| Silicon Power | SP004GBLFU213N01               | 4GB            | SS    | Samsung    | K4A4G085WD        | 15-15-15-37 | -       | •                              | •      | •      |
| Silicon Power | SP008GBLFU213N01               | 8GB            | DS    | Samsung    | K4A4G085WD        | 15-15-15-37 | -       | •                              | •      | •      |
| SK Hynix      | HMA82GU6MFR8N-TF               | 16GB           | DS    | SK Hynix   | H5AN8G8NMFRTFC    | 15-15-15-36 | -       | •                              | •      | •      |
| SUPER         | FBU2B008GM                     | 8GB            | DS    | Micron     | D9RGQ             | 15-15-15-36 | 1.2     | •                              | •      | •      |
| Team          | TED44GM2133C15ABK              | 4GB            | SS    | SK Hynix   | H5AN4G8NMFRTFC    | 15-15-15-36 | 1.2     | •                              | •      | •      |
| UMAX          | 84G44G93MC-21OMCALGF15         | 4GB            | SS    | Micron     | D9RGQ             | 15-15-15-36 | -       | •                              | •      | •      |
| UMAX          | 84G48G93MC-21OMCNGNF15         | 8GB            | DS    | Micron     | D9RGQ             | 15-15-15-36 | -       | •                              | •      | •      |
| KINGSTON      | KVR21N15S8/4                   | 4G             | SS    | SK HYNIX   | H5AN4G8NMFRR      |             | 1.2V    | •                              | •      | •      |
| KINGSTON      | KVR21N15D8/8                   | 8G             | DS    | SK HYNIX   | H5AN4G8NMFRR      |             | 1.2V    | •                              | •      | •      |
| KINGSTON      | HX421C14FB/8                   | 8G             | DS    | N/A        | Heat-Sink Package |             | 1.2V    | •                              | •      | •      |
| CENTURY       | PX4-17000                      | 8G             | DS    | SK HYNIX   | H5AN4G8NMFRR      |             |         | •                              | •      | •      |
| APACER        | AHU08GGB13CGT7G                | 8G             | DS    | N/A        | N/A               |             |         | •                              | •      | •      |
| KINGSTON      | HX421C13SBK4/16                | 16GB ( 4x 4G)  | SS    | N/A        | Heat-Sink Package | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| KINGSTON      | KVR21N15D8/8                   | 8G             | DS    | SK HYNIX   | H5AN4G8NAFR       | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| GALAXY        | GAM4DBLBM2133D15IE041C         | 4G             | DS    | N/A        | Heat-Sink Package | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| GALAXY        | GAM4DBLBM213315IE081C          | 8G             | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| AMD           | R748G2133U2S                   | 4G             | DS    | N/A        | Heat-Sink Package | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| TEAM          | T4D4C10S61163                  |                | DS    | SEC 446    | K4A4G085WD        | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| TEAM          | TED48GM2133C15BK               |                | DS    | SK HYNIX   | H5AN4G8NMFRR      | 15-15-15-36 | 1.2V    | •                              | •      | •      |
| CUSO          | PC4-17000                      |                | SS    | CUSO       | 512X8DDR4         | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| ADATA         | AD4U2133W8G15-B                | 128GB( 16x     | DS    | SK HYNIX   | H5AN4G8NAFR       |             |         | •                              | •      | •      |

**DDR4 2400 Qualified Vendors List (QVL)**

| Vendors  | Part No.           | Size | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------|--------------------|------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|          |                    |      |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| ADATA    | AX4U2400W8G16-DRZ  | 8G   | DS    | N/A        | Heat-Sink Package | 16-16-16    | 1.2V    | •                              | •      | •      |
| G.SKILL  | F4-2400C15Q-32GRB  | 8G   | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| PATRIOT  | PX416G2400C5QK     | 4G   | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| GLOWAY   | PC4-19200          | 4G   | SS    | GLOWAY     | 512X8DDR4         | 16-16-16-35 | 1.2V    | •                              | •      | •      |
| TEAM     | TED44GM2400C16BK   | 4G   | SS    | SEC 437    | K4A4G085WD        | 16-16-16-39 | 1.2V    | •                              | •      | •      |
| TEAM     | TED48GM2400C16BK   | 8G   | DS    | SEC 443    | K4A4G085WD        | V           | 1.2V    | •                              | •      | •      |
| PANRAM   | PUD42400C154G4NJW  | 4G   | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| PANRAM   | PUD42400C158G4NJW  | 8G   | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2400C14 | 8G   | DS    | N/A        | Heat-Sink Package | 14-16-16-31 | 1.2V    | •                              | •      | •      |
| CRUCIAL  | BL54K4G4D240FSA    | 4G   | SS    | N/A        | Heat-Sink Package | 16-16-16-39 | 1.2V    | •                              | •      | •      |
| ADATA    | AX4U2400W4G16-DRZ  | 4G   | SS    | N/A        | Heat-Sink Package | 16-16-16    | 1.2V    | •                              | •      | •      |
| GEIL     | GPR416GB2400C15QC  | 4G   | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| MUSHKIN  | 997199F            | 8G   | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| KINGSTON | HX424C15FBK4/32    | 8G   | DS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| KINGSTON | HX424C15FBK4/16    | 4G   | SS    | N/A        | Heat-Sink Package |             | 1.2V    | •                              | •      | •      |
| APACER   | 78.C1GMA.AF30B     | 8G   | DS    | SK HYNIX   | H5AN4G8NMFRR      | 16-16-16-36 | 1.2V    | •                              | •      | •      |
| APACER   | 78.B1GMA.AF20B     | 4G   | SS    | SK HYNIX   | H5AN4G8NMFRR      | 16-16-16-36 | 1.2V    | •                              | •      | •      |

|          |                               |               |    |         |                   |              |       |   |   |   |
|----------|-------------------------------|---------------|----|---------|-------------------|--------------|-------|---|---|---|
| G.SKILL  | F4-2400C14Q2-128GRK           | 16G           | DS | N/A     | Heat-Sink Package | 14-14-14-34  | 1.2V  | • | • | • |
| G.SKILL  | F4-2400C14Q-16GRK             | 4G            | SS | N/A     | Heat-Sink Package | 14-14-14-34  | 1.2V  | • | • | • |
| G.SKILL  | F4-2400C15Q-16GRR             | 4G            | SS | N/A     | Heat-Sink Package | 15-15-15-35  | 1.2V  | • | • | • |
| ADATA    | AX4U2400W4G16-QRZ(XMP)        | 32GB (4x 8GB) | SS | -       | -                 | 16-16-16-39  | 1.2   | • | • | • |
| ADATA    | AX4U2400W8G16-QRZ(XMP)        | 32GB (4x 8GB) | DS | -       | -                 | 16-16-16-39  | 1.2   | • | • | • |
| Apacer   | 78.B1GMS.4050B                | 4GB           | SS | Samsung | K4A4G085WD        | 17-17-17-39  | -     | • | • | • |
| Apacer   | 78.C1GMS.4010B                | 8GB           | DS | Samsung | K4A4G085WD        | 17-17-17-39  | -     | • | • | • |
| CORSAIR  | CMD16GX4M4A2400C14(Ver4.23)(X | 16GB (4x 4GB) | SS | -       | -                 | 14-16-16-31  | 1.2   | • | • | • |
| CORSAIR  | CMD32GX4M4A2400C14(Ver4.23)(X | 32GB (4x 8GB) | DS | -       | -                 | 14-16-16-31  | 1.2   | • | • | • |
| CORSAIR  | CMK16GX4M4A2400C14(Ver4.23)(X | 16GB (4x 4GB) | SS | -       | -                 | 14-16-16-31  | 1.2   | • | • | • |
| CORSAIR  | CMK32GX4M4A2400C14(Ver4.23)(X | 32GB (4x 8GB) | DS | -       | -                 | 14-16-16-31  | 1.2   | • | • | • |
| Crucial  | BLS4G4D240FSA.8FAD            | 4GB           | SS | -       | -                 | 16-16-16-40  | 1.2   | • | • | • |
| crucial  | BLS4G4D240FSA.8FAR(XMP)       | 4GB           | SS | -       | -                 | 16-16-16-40  | 1.2   | • | • | • |
| Crucial  | BLS8G4D240FSA.16FAD           | 8GB           | DS | -       | -                 | 16-16-16-40  | 1.2   | • | • | • |
| crucial  | BLS8G4D240FSA.16FAR(XMP)      | 8GB           | DS | -       | -                 | 16-16-16-40  | 1.2   | • | • | • |
| G.SKILL  | F4-2400C15Q-16GRR             | 16GB (4x 4GB) | SS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| G.SKILL  | F4-2400C15Q2-128GRK(XMP)      | 128GB (8x     | DS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| G.SKILL  | F4-2400C15Q-32GRR             | 32GB (4x 8GB) | DS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| Gell     | GLR464GB2400C14QC(XMP)        | 16GB (4x 4GB) | DS | -       | -                 | 14-14-14-35  | 1.2   | • | • | • |
| Gell     | GPR416GB2400C15QC(XMP)        | 16GB (4x 4GB) | SS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| Gell     | GPR432GB2400C15QC(XMP)        | 32GB (4x 8GB) | DS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| Kingston | HX424C12PB2K4/16              | 16GB (4x 4GB) | SS | -       | -                 | 12-13-13-35  | 1.2   | • | • | • |
| Panram   | PUD42400C154G4NJW             | 16GB (4x 4GB) | SS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| Panram   | PUD42400C158G4NJW             | 32GB (4x 8GB) | DS | -       | -                 | 15-15-15-35  | 1.2   | • | • | • |
| Team     | TED44GM2400C16BK              | 4GB           | SS | Samsung | K4A4G085WD        | 16-16-16-39  | 1.2   | • | • | • |
| V-color  | TD4G8C17-UH                   | 4GB           | SS | V-color | DW3J0460HM        | 15-15-15-36  | 1.2   | • | • | • |
| V-color  | TD8G16C17-UH                  | 8GB           | DS | V-color | A4G8H-24CS        | 17-17-17-39  | 1.2   | • | • | • |
| AVEXIR   | AVD4U2124001608G-4COR         | 8G            | DS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| AVEXIR   | AVD4U2124001604G-COB          | 4G            | SS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| TEAM     | TED48G2400C16BK               |               | DS | TEAM    | T4D5128HT-24      | 16-16-16-39  | 1.2V  | • | • | • |
| KINGSTON | HX424C12PBK4/32               |               | DS | N/A     | Heat-Sink Package |              | 1.35V | • | • | • |
| CUSO     | PC4-19200                     |               | SS | CUSO    | 512X8DDR4         | 16-16-16-35  | 1.2V  | • | • | • |
| G.SKILL  | F4-2400C15Q-32GRR             |               | DS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| CORSAIR  | CMD32GX4M4A2400C14            |               | DS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| MICRON   | MTA16ATF2G64AZ-2G3B1          |               | DS | MICRON  | 5WB47D9TBH        |              | 1.2V  | • | • | • |
| MICRON   | MTA8ATF1G64AZ-2G3B1           |               | SS | MICRON  | 5WB47D9TBH        | 17-17-17-39- | 1.2V  | • | • | • |
| KINGSTON | HX424C12SB2K4/16              | 16GB (4x 4G ) | SS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| KINGSTON | HX424C12SB2K4/32              | 32GB (4x 8G ) | DS | N/A     | Heat-Sink Package |              | 1.35V | • | • | • |
| KINGSTON | HX424C15FBK2/16               | 16GB (2x 8G ) | DS | N/A     | Heat-Sink Package |              | 1.2V  | • | • | • |
| GALAXY   | GAM4BXLBS240016JE164C         | 16GB (4x 4G ) | SS | N/A     | Heat-Sink Package | 16-16-16-36  | 1.2V  | • | • | • |
| APACER   | AH08GG2B24CDT5H               | 16GB (2x 8G ) | DS | N/A     | Heat-Sink Package | 16-16-16-36  |       | • | • | • |
| CORSAIR  | CMK8GX4M2A2400C14             | 8GB (2x 4G )  | SS | N/A     | Heat-Sink Package | 14-16-16-31  | 1.2V  | • | • | • |
| CORSAIR  | CMK16GX4M2A2400C14            | 16GB (2x 8G ) | DS | N/A     | Heat-Sink Package | 14-16-16-31  | 1.2V  | • | • | • |

#### DDR4 2666 Qualified Vendors List (QVL)

| Vendors  | Part No.                       | Size          | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------|--------------------------------|---------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|          |                                |               |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| CORSAIR  | CMK16GX4M4A2666C16             | 4G            | SS    | N/A        | Heat-Sink Package | 16-16-18-35 | 1.2V    | •                              | •      | •      |
| CORSAIR  | CMD32GX4M4A2666C15(Ver5.29)    | 8G            | DS    | N/A        | Heat-Sink Package | 15-17-17-35 | 1.2V    | •                              | •      | •      |
| CORSAIR  | CMD128GX4M8A2666C15            | 16G           | DS    | N/A        | Heat-Sink Package | 15-18-18-35 | 1.2V    | •                              | •      | •      |
| G.SKILL  | F4-2666C15Q-16GRR              | 4G            | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| G.SKILL  | F4-2666C16Q2-64GRB             | 8G            | DS    | N/A        | Heat-Sink Package | 16-16-16-36 | 1.2V    | •                              | •      | •      |
| TEAM     | TCD48G2666C15ABK               | 8G            | DS    | SK HYNIX   | H5AN4G8NMFR       | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| TEAM     | TCD44G2666C15ABK               | 4G            | SS    | SEC 443    | K4A4G085WD        | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| MUSHKIN  | 997192F                        | 4G            | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.2V    | •                              | •      | •      |
| KINGSTON | HX426C13PBK4/32                | 8G            | DS    | N/A        | Heat-Sink Package | 13-14-14-39 | 1.35V   | •                              | •      | •      |
| KINGSTON | HX426C15FBK4/32                | 8G            | DS    | N/A        | Heat-Sink Package |             | 1.2V    | •                              | •      | •      |
| AVEXIR   | AVD4U26661504G-4CIR(XMP)       | 4GB           | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| AVEXIR   | AVD4U26661608G-4CIR(XMP)       | 32GB (8x 4GB) | DS    | -          | -                 | 16-16-16-36 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD128GX4M8A2666C15(Ver4.31)(X | 128GB (8x     | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M2A2666C15(Ver4.23)(X  | 16GB (2x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A2666C15(Ver4.23)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A2666C16(Ver4.23)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A2666C16(Ver5.29)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD32GX4M4A2666C15(Ver4.23)(X  | 32GB (4x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD32GX4M4A2666C16(Ver4.23)(X  | 32GB (4x 8GB) | DS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD64GX4M8A2666C15(Ver4.23)(X  | 64GB (8x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD8GX4M2A2666C15(Ver4.23)(X   | 8GB (2x 4GB ) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M2A2666C16(Ver5.29)(X  | 16GB (2x 8GB) | DS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2666C15(Ver4.23)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2666C15(Ver5.29)    | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2666C16(Ver4.23)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2666C16(Ver5.29)(X  | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK32GX4M2A2666C16(Ver4.31)(X  | 32GB (2x      | DS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2666C15(Ver4.23)(X  | 32GB (4x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2666C15(Ver5.29)(X  | 32GB (4x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2666C16(Ver5.29)(X  | 32GB (4x 8GB) | DS    | -          | -                 | 16-16-18-35 | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2666C16R(Ver4.23)(X | 32GB (4x 8GB) | DS    | -          | -                 | 16-18-18-35 | 1.2     | •                              | •      | •      |
| Crucial  | BLE4G4D26AFAE.8FAD (XMP)       | 8GB           | SS    | -          | -                 | 16-17-17-36 | 1.2     | •                              | •      | •      |
| Crucial  | BLE8G4D26AFAE.16FAD(XMP)       | 16GB          | DS    | -          | -                 | 16-17-17-36 | 1.2     | •                              | •      | •      |
| Crucial  | BLT4G4D26AFTA.8FADG(XMP)       | 4GB           | SS    | -          | -                 | 16-17-17-36 | 1.2     | •                              | •      | •      |
| Crucial  | BLT8G4D26AFTA.16FAD(XMP)       | 8GB           | DS    | -          | -                 | 16-17-17-36 | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2666C15Q-16GRR(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2666C15Q-32GRR(XMP)         | 32GB (4x 8GB) | DS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2666C16Q2-64GRB(XMP)        | 64GB (8x 8GB) | DS    | -          | -                 | 16-16-16-36 | 1.2     | •                              | •      | •      |
| Kingston | HX426C15FBK2/16(XMP)           | 16GB (2x 8GB) | DS    | -          | -                 | 15-15-17-35 | 1.2     | •                              | •      | •      |
| Kingston | HX426C15FBK4/16(XMP)           | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.2     | •                              | •      | •      |
| Kingston | HX426C15FBK4/32(XMP)           | 32GB (4x 8GB) | DS    | -          | -                 | 2666-15-15- | 1.2     | •                              | •      | •      |
| KLEVV    | KM4C4GX4N-2666-15-15-15-35-0   | 4GB           | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV    | KM4C4GX4N-2666-15-15-15-35-1   | 4GB           | SS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV    | KM4C8GX4N-2666-15-15-15-35-0   | 8GB           | DS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| KLEVV    | KM4C8GX4N-2666-15-15-15-35-    | 8GB           | DS    | -          | -                 | 15-15-15-35 | 1.2     | •                              | •      | •      |
| Team     | TCD44G2666C15ABK(XMP)          | 4GB           | SS    | Samsung    | K4A4G085WD        | 15-15-15-35 | 1.2     | •                              | •      | •      |
| Team     | TCD48G2666C15ABK(XMP)          | 32GB(4x 8GB)  | DS    | Team       | TCD48G2666C15ABK  | 15-15-15-35 | 1.2     | •                              | •      | •      |
| CRUCIAL  | BLE4G4D26AFAE.8FAD             | 8G            | SS    | N/A        | Heat-Sink Package | 16-16-17-36 | 1.2V    | •                              | •      | •      |
| CRUCIAL  | BLE8G4D26AFAE.16FAD            | 8G            | DS    | N/A        | Heat-Sink Package | 16-16-17-36 | 1.2V    | •                              | •      | •      |
| CRUCIAL  | BLT4G4D26AFTA.8FADG            | 4G            | SS    | N/A        | Heat-Sink Package | 16-17-17-36 | 1.2V    | •                              | •      | •      |
| CRUCIAL  | BLT8G4D26AFTA.16FAD            | 8G            | DS    | N/A        | Heat-Sink Package | 16-17-17-36 | 1.2V    | •                              | •      | •      |

|          |                       |              |    |      |                   |             |   |   |   |
|----------|-----------------------|--------------|----|------|-------------------|-------------|---|---|---|
| AVEXIR   | AVD4UZ126661504G-4COB | 4G           | SS | N/A  | Heat-Sink Package | 1.2V        | • | • | • |
| AVEXIR   | AVD4UZ126661508G-4COB | 8G           | DS | N/A  | Heat-Sink Package | 1.2V        | • | • | • |
| KLEVV    | IMA41GU6MFR8N-C FO    |              | DS | N/A  | Heat-Sink Package | 15-15-15    | • | • | • |
| KINGSTON | HX426C13SB2K4/32      | 32GB (4x 8G) | DS | N/A  | Heat-Sink Package | 15-15-15-36 | • | • | • |
| KINGSTON | HX426C13SB2K4/16      | 16GB (4x 4G) | SS | N/A  | Heat-Sink Package | 15-15-15-36 | • | • | • |
| TEAM     | TCD48G2666C15ABK      | 8G           | SS | TEAM | T4D10248HT-266    | 15-15-15-35 | • | • | • |

#### DDR4 2800 Qualified Vendors List (QVL)

| Vendors  | Part No.                        | Size          | SS/DS | Chip Brand | Chip NO.          | Timing        | Voltage | DIMM socket support (Optional) |        |        |
|----------|---------------------------------|---------------|-------|------------|-------------------|---------------|---------|--------------------------------|--------|--------|
|          |                                 |               |       |            |                   |               |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| CORSAIR  | CMK16GX4M4A2800C16              | 4G            | SS    | N/A        | Heat-Sink Package | 16-18-18-36   | 1.2V    | •                              | •      | •      |
| G.SKILL  | HX428C14PB2K4/16                | 4G            | SS    | N/A        | Heat-Sink Package |               | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-2800C6Q-16GRK                | 4G            | SS    | N/A        | Heat-Sink Package | 16-16-16-36   | 1.2V    | •                              | •      | •      |
| PATRIOT  | PX416G280C6QK                   | 4G            | SS    | N/A        | Heat-Sink Package | 16-18-18-36   | 1.2V    | •                              | •      | •      |
| PANRAM   | PUD42800C164G4NJW               | 4G            | SS    | N/A        | Heat-Sink Package | 16-18-18-36   | 1.25V   | •                              | •      | •      |
| MUSHKIN  | 994207F                         | 4G            | SS    | N/A        | Heat-Sink Package | 16-16-16-36   | 1.2V    | •                              | •      | •      |
| KINGSTON | HX428C14PBK/32                  | 8G            | DS    | N/A        | Heat-Sink Package | 14-15-15-39   | 1.35V   | •                              | •      | •      |
| ADATA    | AX4U2800316G16(XMP)             | 16GB          | DS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| ADATA    | AX4U2800W4G17(XMP)              | 32GB (8x 4GB) | DS    | -          | -                 | 17-17-17-36   | 1.2     | •                              | •      | •      |
| ADATA    | AX4U2800W8G17(XMP)              | 8GB           | DS    | -          | -                 | 15-15-15-36   | 1.2     | •                              | •      | •      |
| Apacer   | 78.BAGM8.AF20B(XMP)             | 4GB           | SS    | -          | -                 | 17-17-17-36   | -       | •                              | •      | •      |
| Apacer   | 78.CAGM8.AF30B(XMP)             | 8GB           | DS    | -          | -                 | 17-17-17-36   | -       | •                              | •      | •      |
| AVEXIR   | AVD4U28001504G-4CIR(XMP)        | 4GB           | SS    | -          | -                 | 15-15-15-35   | 1.35    | •                              | •      | •      |
| AVEXIR   | AVD4U28001608G-4CIR(XMP)        | 32GB (4x 8GB) | DS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A2800C16(Ver4.23)(XM  | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-36   | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A2800C16(Ver5.29)     | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-36   | 1.2     | •                              | •      | •      |
| CORSAIR  | CMD32GX4M4A2800C16(Ver5.29)(XM  | 32GB (4x 8GB) | DS    | -          | -                 | 18-18-18-36   | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2800C16(Ver4.23)(XM  | 16GB (4x 4GB) | SS    | -          | -                 | 16-16-18-36   | 1.2     | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4A2800C16(Ver5.29)     | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-36   | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2800C15Q2-64GRK(XMP)         | 64GB (8x 8GB) | DS    | -          | -                 | 15-16-16-35   | 1.25    | •                              | •      | •      |
| G.SKILL  | F4-2800C16Q-16GRR(XMP)          | 16GB (4x 4GB) | SS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2800C16Q-32GRK(XMP)          | 32GB (4x 8GB) | DS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| G.SKILL  | F4-2800C16Q-32GRR(XMP)          | 32GB (4x 8GB) | DS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| Gell     | GPR416GB2800C16QC(XMP)          | 16GB (4x 4GB) | SS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| Gell     | GPR432GB2800C16QC(XMP)          | 32GB (4x 8GB) | DS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| Kingston | HX428C14PBK4/16(XMP)            | 16GB (4x 4GB) | SS    | -          | -                 | 14-15-15-40-2 | 1.35    | •                              | •      | •      |
| KLEVV    | IMA451U6MFR8N-DG0(Ver1.05)(XMP) | 4GB           | SS    | -          | -                 | 16-16-16-36   | 1.2     | •                              | •      | •      |
| Panram   | PUD42800C164G4NJW(XMP)          | 16GB (4x 4GB) | SS    | -          | -                 | 16-18-18-36   | 1.25    | •                              | •      | •      |
| AVEXIR   | AVD4UZ128001604G-4COB           | 4G            | SS    | N/A        | Heat-Sink Package |               | 1.2V    | •                              | •      | •      |
| AVEXIR   | AVD4UZ128001608G-4COB           | 8G            | DS    | N/A        | Heat-Sink Package |               | 1.2V    | •                              | •      | •      |
| CORSAIR  | CMK32GX4M4A2800C16              | 32GB (4x 8G)  | DS    | N/A        | Heat-Sink Package | 16-18-18-36   | 1.2V    | •                              | •      | •      |
| KINGSTON | HX428C14SB2K4/32                | 32GB (4x 8G)  | DS    | N/A        | Heat-Sink Package | 15-15-15-36   | 1.35V   | •                              | •      | •      |
| KINGSTON | HX428C14SB2K4/16                | 16GB (4x 4G)  | SS    | N/A        | Heat-Sink Package | 15-15-15-36   | 1.35V   | •                              | •      | •      |

#### DDR4 3000 Qualified Vendors List (QVL)

| Vendors  | Part No.                       | Size          | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------|--------------------------------|---------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|          |                                |               |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| KINGSTON | HX430C15PB2K4/16               | 4G            | SS    | N/A        | Heat-Sink Package |             | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-3000C15Q-16GRR              | 4G            | SS    | N/A        | Heat-Sink Package | 15-15-15-35 | 1.35V   | •                              | •      | •      |
| TEAM     | TCD48G3000C16ABK               | 8G            | DS    | TEAM       | T4D5128HT-30      | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| TEAM     | TCD44G3000C16ABK               | 4G            | SS    | TEAM       | T4D5128HT-30      | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| PANRAM   | PUD43000C154G4NJW              | 4G            | SS    | N/A        | Heat-Sink Package | 15-17-17-35 | 1.35V   | •                              | •      | •      |
| KINGSTON | HX430C15PBK4/32                | 8G            | DS    | N/A        | Heat-Sink Package | 15-16-16-39 | 1.35V   | •                              | •      | •      |
| Asint    | SLA404G08-EWWHM(XMP)           | 4GB           | SS    | SK Hynix   | H5AN4G8NMFRFC     | 3000-15-15- | 1.35    | •                              | •      | •      |
| Asint    | SLB404G08-EW1HM(XMP)           | 8GB           | DS    | -          | -                 | 16-18-18-44 | 1.35    | •                              | •      | •      |
| AVEXIR   | AVD4U30001504G-4CIR(XMP)       | 16GB (4x 4GB) | DS    | -          | -                 | 15-15-15-35 | 1.35    | •                              | •      | •      |
| AVEXIR   | AVD4U30001608G-4CIR(XMP)       | 32GB (4x 8GB) | DS    | -          | -                 | 16-18-18-36 | 1.35    | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4B3000C15(Ver5.29)(XM | 16GB (4x 4GB) | DS    | -          | -                 | 15-17-17-35 | 1.35    | •                              | •      | •      |
| CORSAIR  | CMD32GX4M4B3000C15(Ver4.23)(XM | 32GB (4x 8GB) | DS    | -          | -                 | 3000-15-17- | 1.35    | •                              | •      | •      |
| CORSAIR  | CMK16GX4M2B3000C15(Ver4.23)(XM | 16GB (2x 8GB) | DS    | -          | -                 | 15-17-17-35 | 1.35    | •                              | •      | •      |
| CORSAIR  | CMK16GX4M4B3000C15(Ver5.29)(XM | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.35    | •                              | •      | •      |
| G.SKILL  | F4-3000C15Q-16GRK(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 15-15-15-35 | 1.35    | •                              | •      | •      |
| G.SKILL  | F4-3000C15Q-16GRR(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 15-15-15-35 | 1.35    | •                              | •      | •      |
| G.SKILL  | F4-3000C15Q-16GRR(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 15-15-15-31 | 1.35    | •                              | •      | •      |
| Gell     | GLR416GB3000C16QC(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 16-16-16-36 | 1.35    | •                              | •      | •      |
| Gell     | GWV416GB3000C15DC(XMP)         | 16GB (2x 8GB) | DS    | GelL       | CG4L512G88BA093L  | 3000-15-17- | 1.35    | •                              | •      | •      |
| Kingston | HX430C15PB2K4/16(XMP)          | 16GB (4x 4GB) | SS    | -          | -                 | 15-16-16-39 | 1.35    | •                              | •      | •      |
| KLEVV    | IMA44GU48A30-GIIHMC(XMP)       | 4GB           | SS    | -          | -                 | 16-18-18-36 | 1.35    | •                              | •      | •      |
| panram   | PUD43000C154G4NJW(XMP)         | 16GB (4x 4GB) | SS    | -          | -                 | 15-17-17-35 | 1.35    | •                              | •      | •      |
| PATRIOT  | PV432G300C6QK-PE000378(XMP)    | 32GB (8x 4GB) | DS    | -          | -                 | 16-16-16-36 | 1.35    | •                              | •      | •      |
| Team     | TCD44G3000C16ABK(XMP)          | 4GB           | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35    | •                              | •      | •      |
| Team     | TCD48G3000C16ABK(XMP)          | 8GB(4x 8GB)   | DS    | Team       | T4D5128HT-30      | 16-16-16-36 | 1.35    | •                              | •      | •      |
| AVEXIR   | AVD4UZ130001604G-4COB          | 4G            | SS    | N/A        | Heat-Sink Package |             | 1.35V   | •                              | •      | •      |
| AVEXIR   | AVD4UZ130001608G-4COB          | 8G            | DS    | N/A        | Heat-Sink Package |             | 1.35V   | •                              | •      | •      |
| CORSAIR  | CMD32GX4M2B3000C15             | 32GB (2x 16G) | DS    | N/A        | Heat-Sink Package | 15-17-17-35 | 1.35V   | •                              | •      | •      |
| KLEVV    | IMA44GU48A30-GIIHMC            | 16GB (4x 4G)  | SS    | N/A        | Heat-Sink Package | 16-18-18    | 1.35V   | •                              | •      | •      |
| CORSAIR  | CMK16GX4M2B3000C15             | 16GB (2x 8G)  | DS    | N/A        | Heat-Sink Package | 15-17-17-35 | 1.35V   | •                              | •      | •      |
| KINGSTON | HX430C15SB2K4/16               | 16GB (4x 4G)  | SS    | N/A        | Heat-Sink Package | 15-15-15-36 | 1.35V   | •                              | •      | •      |

#### DDR4 3200 Qualified Vendors List (QVL)

| Vendors  | Part No.            | Size        | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------|---------------------|-------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|          |                     |             |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| PANRAM   | PUD43200C164G4NJW   | 4G          | SS    | N/A        | Heat-Sink Package | 16-18-18-39 | 1.35V   | •                              | •      | •      |
| MUSHKIN  | 997202F             | 4G          | SS    | N/A        | Heat-Sink Package | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-3200C16Q-16GRR   | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-3200C16Q-16GRB   | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-3200C16Q-16GRK   | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| AVEXIR   | AVD4U32001604G-4BZ1 | 16GB(4GB*4) | SS    | SK hynix   | H5AN4G8NMFR       | 16-18-18-36 | 1.35V   | •                              | •      | •      |
| AVEXIR   | AVD4U32001604G-4CIR | 16GB(4GB*4) | SS    | -          | -                 | 16-18-18-36 | 1.35V   | •                              | •      | •      |
| CORSAIR  | CMD16GX4M4A3200C16  | 16GB(4GB*4) | SS    | -          | -                 | 16-18-18-36 | 1.35V   | •                              | •      | •      |
| GEIL     | GPR416GB3200C15QC   | 16GB(4GB*4) | SS    | -          | -                 | 15-15-15-35 | 1.35V   | •                              | •      | •      |
| Kingston | HX432C16PB2K4/16    | 16GB(4GB*4) | SS    | -          | -                 | 16-16-16-39 | 1.35V   | •                              | •      | •      |
| Panram   | PUD43200C164G4NJW   | 16GB(4GB*4) | SS    | -          | -                 | 16-18-18-39 | 1.35V   | •                              | •      | •      |
| G.SKILL  | F4-3200C16D-8GVKB   | 8GB (2x 4G) | SS    | N/A        | Heat-Sink Package | 16-18-18-38 | 1.35V   | •                              | •      | •      |

#### DDR4 3300 Qualified Vendors List (QVL)

| Vendors | Part No.           | Size        | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|---------|--------------------|-------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|         |                    |             |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| G.SKILL | F4-3300C16Q-16GRKD | 4G          | SS    | N/A        | Heat-Sink Package | 16-16-16-36 | 1.35V   | •                              | •      | •      |
| G.SKILL | F4-3300C16Q-16GRK  | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35V   | •                              | •      | •      |

|                |                    |             |    |         |            |             |       |   |   |
|----------------|--------------------|-------------|----|---------|------------|-------------|-------|---|---|
| <b>G.SKILL</b> | F4-3300C16D-8GTZ   | 8GB(4GB*2)  | SS | Samsung | K4A4G085WD | 16-18-18-38 | 1.35V | • | • |
| <b>CORSAIR</b> | CMD16GX4M4B3300C16 | 16GB(4GB*4) | SS | Samsung | K4A4G085WD | 16-18-18-36 | 1.35V | • | • |

#### DDR4 3333 Qualified Vendors List (QVL)

| Vendors        | Part No.                   | Size        | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------------|----------------------------|-------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|                |                            |             |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| <b>G.SKILL</b> | F4-3333C16Q-16GRKD         | 4G          | SS    | N/A        | Heat-Sink Package | 16-16-16-36 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3333C16D-8GTZ           | 8GB(4GB*2)  | SS    | Samsung    | K4A4G085WD        | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3333C16Q-16GRKD         | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-16-16-36 | 1.35V   | •                              | •      |        |
| <b>CORSAIR</b> | CMD16GX4M4B3333C16 ver4.23 | 16GB(4GB*4) | SS    | Samsung    | K4A4G085WD        | 16-18-18-36 | 1.35V   | •                              | •      |        |
| <b>A-DATA</b>  | AX4U3333W4G16              | 16GB(4GB*4) | SS    | SK hynix   | H5AN4G8NMFR       | 16-16-16-36 | 1.35V   | •                              | •      |        |

#### DDR4 3400 Qualified Vendors List (QVL)

| Vendors        | Part No.                     | Size         | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------------|------------------------------|--------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|                |                              |              |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| <b>GEIL</b>    | GLWR416GB3400C16AQC          | 4GB          | SS    | N/A        | Heat-Sink Package | 16-18-18-36 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3400C16Q-16GRBD           | 4G           | SS    | N/A        | Heat-Sink Package | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3400C16D-16GVK            | 16GB (4x 8G) | DS    | N/A        | Heat-Sink Package | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>CORSAIR</b> | CMD16GX4M4B3400C16 ver. 4.23 | 16GB(4GB*4)  | SS    | Samsung    | K4A4G085WD        | 16-18-18-38 | 1.35V   | •                              | •      |        |

#### DDR4 3466 Qualified Vendors List (QVL)

| Vendors        | Part No.          | Size       | SS/DS | Chip Brand | Chip NO.          | Timing      | Voltage | DIMM socket support (Optional) |        |        |
|----------------|-------------------|------------|-------|------------|-------------------|-------------|---------|--------------------------------|--------|--------|
|                |                   |            |       |            |                   |             |         | 1 DIMM                         | 2 DIMM | 4 DIMM |
| <b>G.SKILL</b> | F4-3466C16Q-16GVK | 4G         | SS    | N/A        | Heat-Sink Package | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3466C16D-8GRK  | 8GB(4GB*2) | SS    | Samsung    | K4A4G085WD        | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3466C16D-8GTZ  | 8GB(4GB*2) | SS    | Samsung    | K4A4G085WD        | 16-18-18-38 | 1.35V   | •                              | •      |        |
| <b>G.SKILL</b> | F4-3466C16D-8GVK  | 8GB(4GB*2) | SS    | Samsung    | K4A4G085WD        | 16-18-18-38 | 1.35V   | •                              | •      |        |

#### 4 DIMM Slots

- **1 DIMM:** Supports one module inserted in any slot as Single-channel memory configuration
- **2 DIMM:** Supports one pair of modules inserted into either the **blue** slots or the **black** slots as one pair of Dual-channel memory configuration
- **4 DIMM:** Supports 4 modules inserted into both the **blue** and **black** slots as two pairs of Dual-channel memory configuration

\*Supports Intel® Extreme Memory Profile (XMP)

\*The maximum memory frequency supported varies by processor

-When installing total memory of 4GB capacity or more, Windows 32-bit operation system may only recognize less than 3GB. Hence, a total installed memory of less than 3GB is recommended.

-It is recommended to install the memory modules from the slots for better overclocking capability.

-The default DIMM frequency depends on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.