USB 2.0 Full Speed Certification Report

Customer:

Energy Micro AS
Sandakerveien 118,
P.O. Box 4633 Nydalen,
N-0405 Oslo,
Norway

Device:

EFM32 Giant Gecko

TID 40001381
USBD546

Supplier:
Testronic Labs Belgium nv.
Wetenschapspark 7
B-3590 Diepenbeek

TABLE OF CONTENT

1. CUSTOMER

Energy Micro AS
Sandakerveien 118,
P.O. Box 4633 Nydalen,
N-0405 Oslo,
Norway
Tel : + 47 23 00 98 00

2. SUPPLIED HARDWARE AND SOFTWARE

2.1. ASSETS

Description	Manufacturer	Model	Serial
Device Under Test	Energy Micro	EFM32 Giant Gecko	115000058
Backup Device	Energy Micro	EFM32 Giant Gecko	115000111

2.2. USED MEASUREMENT EQUIPMENT BY TESTRONIC LABS

Description	Manufacturer	Identity	Serial Nr
Pulse/Pattern generator	Agilent	81134A	MY42801040
Digital real-time oscilloscope	Agilent	DSA91304	MY50140172
Probe	Agilent	E2697A (10073C)	MY43005817
Probe	Agilent	E2697A (10073D)	MY50091034
Current probe	Tektronix	TCP202	B019512

2.3. TEST TOOLS

Description	Version
USB Electrical Analysis Tool "USBET20"	1.12
USB20CV	1.4.9.0
USB30CV	1.0.0.4

2.4. TEST PROCEDURES

Procedure		Version
Tools(USBET, USBCV)	http://www.usb.org/developers/tools/	
Updates	http://compliance.usb.org	
High Speed Device Electrical	http://www.usb.org/developers/compliance/Device_HS_Test.pdf	1.0
Low/Full Speed Test Procedure	http://www.usb.org/developers/USB-IFTestProc_1_3.pdf	1.3

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3. SUMMARY OF THE PERFORMED TESTS

ELECTRICAL LEGACY

Upstream Full Speed Signal Quality	passed
Device Inrush	passed
Device Back Voltage	passed

DEVICE FRAMEWORK USBCV

USB20CV Chapter 9	passed
USB20CV HID	passed
USB30CV	passed

DEVICE POWER MEASUREMENTS

Power Measurements	passed

DEVICE GOLDEN TREE
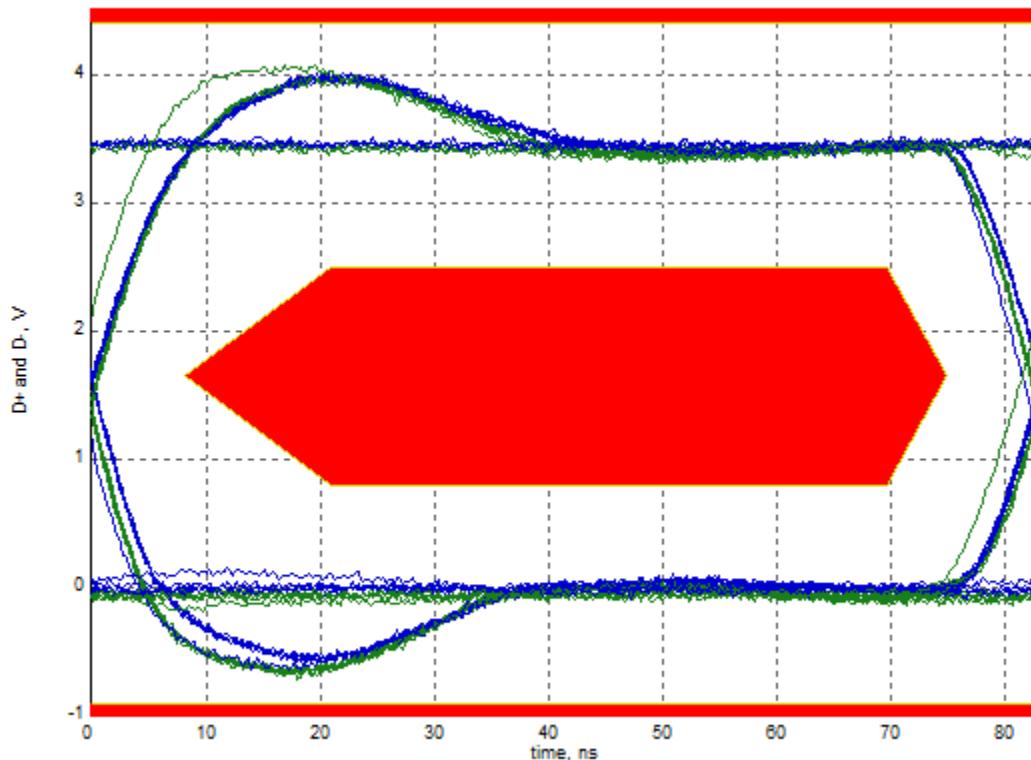
|	
Interoperability	passed
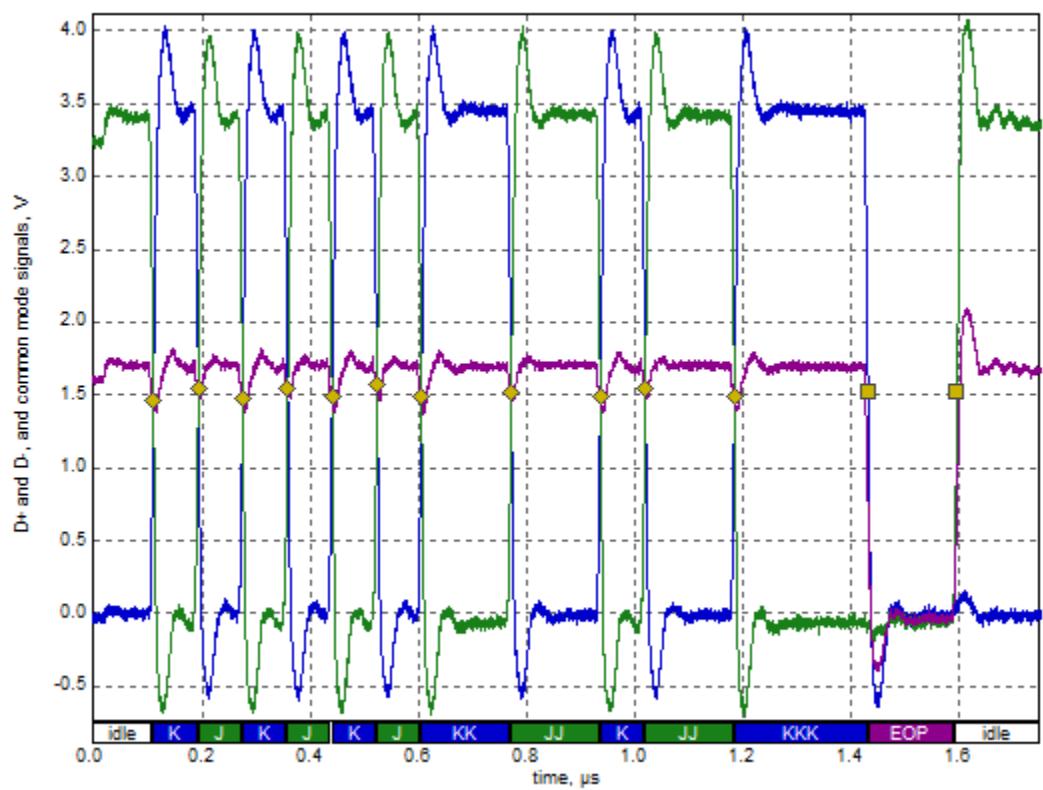
3.1. ELECTRICAL LEGACY

3.1.1. UPSTREAM FULL SPEED SIGNAL QUALITY

The Energy Micro AS EFM32 Giant Gecko passed the Full Speed Upstream Signal Quality test.

Signal Eye

Date and Common Mode Voltage

- eye passes
- EOP width: 165.69 ns
  EOP width passes
- Measured signaling rate: 12.0000 MHz
  signal rate passes
- Edge Monotonicity: 0 mV
  Monotonic Edge passes
- Crossover voltage range: 1.47 V to 1.57 V, mean crossover 1.51 V
  (first crossover at 1.47 V, 10 other differential crossovers checked)
  crossover voltages pass
- Consecutive jitter range: -380.248 ps to 401.046 ps, RMS jitter 335.628 ps
- Paired JK jitter range: -42.678 ps to 82.114 ps, RMS jitter 65.438 ps
- Paired KJ jitter range: -134.561 ps to 101.531 ps, RMS jitter 90.360 ps
  jitter passes
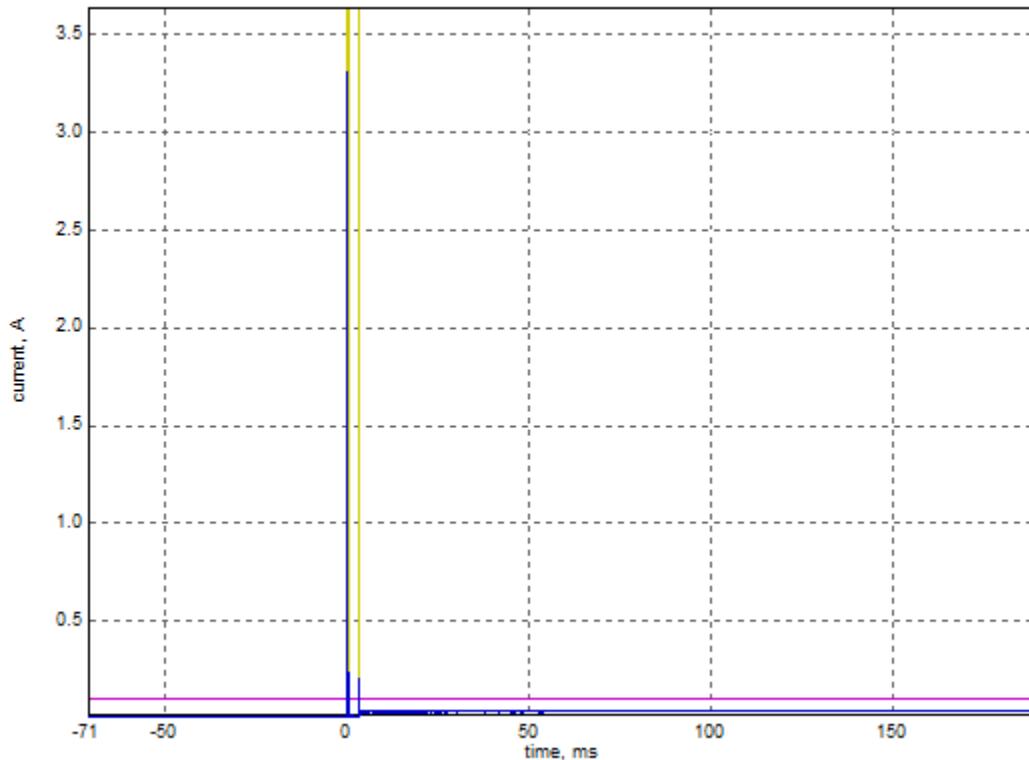
Additional Information

- Rising Edge Rate: 291.08 V/us (Equivalent risetime = 9.07 ns)
  (minimum 132.00 V/us, maximum 660.00 V/us)
- Falling Edge Rate: 325.07 V/us (Equivalent falltime = 8.12 ns)
  (minimum 132.00 V/us, maximum 660.00 V/us)
- Edge Rate Match: 11.03% (limit +/-10%)

3.1.2. DEVICE INRUSH CURRENT

The measured Inrush current of the Energy Micro AS EFM32 Giant Gecko is 27.59 µC. The USB spec allows up to 10µF to be hard started, which represents an allowed load of approximately 50 µC. With a measured load of 27.59 µC, the device passed the inrush current test.

Inrush Current

3.2. DEVICE FRAMEWORK

The following tests were performed using the USB20CV & USB30CV test tool.

3.2.1. USB20CV CHAPTER 9

The Energy Micro AS EFM32 Giant Gecko passed the Chapter 9 test of USB20CV.

Description	Full Speed
Vendor ID	2544
Product ID	2
CFG's	1
Interfaces	1
USB Spec.	2.0
Max. Power	100 mA
Result	passed

3.2.2. USB20CV HID TEST

The Energy Micro AS EFM32 Giant Gecko passed the HID test of USB20CV and USB30CV.

3.2.3. USB30CV

The Energy Micro AS EFM32 Giant Gecko passed the USB30CV Chapter 9 and HID test on Renesas and Fresco Logic xHCI.

3.3. POWER MEASUREMENTS DEVICE MODE

3.3.1. WINDOWS 7 SP1 POWER MEASUREMENT

The Energy Micro AS EFM32 Giant Gecko passed the power measurement tests.

3.3.1.1. FULL SPEED MODE

Device State	Measurement	Status
Unconfigured State	26.50 mA	passed
Configured State	26.50 mA	passed
Operating State	26.50 mA	passed
Suspended State	531 µA	passed

3.4. BACK VOLTAGE

The Energy Micro AS EFM32 Giant Gecko passed the back voltage tests.

	DC Voltage Before Enumeration	DC Voltage After Enumeration and Removal
Vbus	0 mV	0 mV
D+	0 mV	0 mV
D-	0 mV	0 mV

3.5. GOLD TREE (INTEROPERABILITY)

For more information about the test guides used by Testronic Labs Belgium n.v., please see the procedure that can be found at http://compliance.usb.org.

3.5.1. WINDOWS 7 SP1 INTEROPERABILITY

The Energy Micro AS EFM32 Giant Gecko passed the interoperability tests.

Test No.	Test description	Result
1	Enumeration and driver installation test on EHCI	passed
2	Remove External Power Supply	n.a
3	DUT demonstrates correct using default drivers	passed
4	Update driver	n.a
5	Install Software	n.a
6	Demonstrates functionality with update driver and/or application	n.a
7	Interoperability (operates all the devices in Gold Tree)	passed
8	Hot Detach & Reattach	passed
9	Warm boot	passed
10	Inactive S1 Suspend (Remote wake-up test)	n.a
11	Inactive S1 Resume (Remote wake-up test)	n.a
12	Active S3 Suspend	passed
13	Active S3 Resume	passed
14	UHCI Root port test	passed
15	Active S4 Suspend(Hibernate)	passed
16	Active S4 Resume(Hibernate)	passed
17	Topology change UHCI	passed
18	Topology change OHCI	passed
19	Topology change XHCI	passed

4. OTHER TESTRONIC LABS SERVICES

Testronic Labs, Your hardware test centre.

Testronic Labs operates as an independent Belgian based test centre for the validation and release of multimedia peripheral equipment and interfaces.
Testronic Labs offers a wide range of testing activities and has become a professional test center for numerous companies all over the world, a test house known for its quality of testing and its dynamic approach.

Thanks to the independence of the test laboraties, Testronic Labs is ideally placed to offer an objective, third party opinion on overall quality of the products in development.

Currently, Testronic Labs experience is located in the following application areas:
Services:
- Alpha Testing
- Beta Testing
- Pre-WHQL Testing
- Compatibility Testing
- Functionality Testing
- Localisation Testing
- Spec Compliance
- Consultancy

Technologies:
- Optical Storage Drives
- Firewire IEEE1394 Certification
- PC, MAC systems and peripherals
- USB
- USB On-The-Go
- Serial-ATA
- Ethernet
- DLNA
- DVB
- PCI-Express
- HDMI, DVI
- Bluetooth
- WIFI
- ...

Tools:
- Ch8ck tool
- Traffic Lab

Please visit our web site at http://www.testroniclabs.com for detailed information regarding Testronic Labs testing services.