Homologation Report of timing device Digitech ChronoPrinter Master 3

based on FEI Criteria for Approval of Timing Systems (9 June 2016)

Report Number	FEI-TMR-DIG-CPM3_2017001	
Requested by	**DIGITECH S.r.l.** Mr Antonio Viaro via Stazione di Prosecco 29/D IT-34010 Sgonico (TS)	
Description of equipment	Multi sports timing device, internal printer with battery	
Type	ChronoPrinter MASTER 3	
Manufacturer	**DIGITECH**	
Serial Numbers	01011C4/0112	
Production Year	2016	
Date(s) of measures	29.05.2017 – 01.06.2017	
Date of report	06.06.2017	
Location(s) of measures	Bureau Officiel de Saint-Imier	
Rules	FEI Criteria for Approval of Timing Systems (9 June 2016)	
Results	**Passed**	
Signatures	Tests and report by Pascal Soltermann	Controlled by Andreas Wyss
Comments	The reference triggering is within +/- 1µs GPS time-scale absolute time, uncertainty and propagation delays are included. DUT Time-of-Day is synchronized electronically in Manual mode with 60S reference pulse. DUT GPS synchronization was inactive during the tests.	
Content: Report: 4 pages Appendices: none		

Equipment Description

Dimensions	:	360 x 270 x 100 mm
Weight	:	3000 gr.
Operating Temperature	:	-10°C to +60°C
Relative Humidity	:	10 to 90% without condensation
Power Supply	:	built-in NiMH battery, external AC adapter, 19VDC
Number of inputs	:	4, Start, Intermediate I, Intermediate II, Finish
Min. Pulse Duration	:	2ms
Serial Interface	:	3x RS232C asynchronous, 1x USB
Local Network	:	Ethernet Port and proprietary expansion ports
Calibration Accuracy	:	+/- 0.03 PPM
Temperature stability	:	+/- 1 PPM from -20°C to +70°C
Ageing	:	+/- 3 PPM per year
Firmware version	:	16-12-beta6

Abbreviations:

Ref. = Reference
P = PASS
F = FAIL
N/A = not applicable
N/C = not conducted (not measured or not checked)
DUT = Device under Test
GPS = Global Positioning System

Ref.	*Description*	*Comments*	*Result*
A.1	**Timer**		
A.1.1	The timer must be able to operate in Time-of-Day mode in hours, minutes, seconds and 1/1000 second or better	Resolution up to 1/10'000 second	**P**
A.1.2	All outputs of the time (e.g. printer, display and interface) must always have the same precision		**P**
A.1.3	The timer must work without power supply from the mains for at least 4 hours at 0°C with one impulse per minute		**P**
A.1.4	External synchronization must be possible		**P**
A.1.5	The timing device needs a minimum of four independent channels: START, STOP, Multi-Purposes and Judge's interference Button	4 Channels available: Start, Intermediate I, Intermediate II and Finish	**P**
A.1.6	The timer must meet the standards of the IEC (International Electronic Commission)	EN 60950:2006 EN 55022:2006 Class B EN 61000-6-1:2007 EN 61000-4-3: 3V/m ENV50204: 10V/m EN 61000-4-2: 4kV CD / 8kV AD EN 61000-4-4: 1kV AC / 0.5kV I/O EN 61000-4-5: 2kV C.mode 1kV D.mode EN 61000-4-6: 3Vemf C.mode	**P**
A.2	**Printer**		
A.2.1	Printing only through a computer is not allowed	Internal printer	**P**
A.2.2	The timer must have an internal (integrated) or directly attached external printer, The start and finish time in Time-of-Day must be printed directly and immediately through the timer's printer and stored in the timer's memory with a resolution of 1/100 second, It must be possible to download or reprint this data at a later stage.		**P**
A.2.3	The printer must print at least in a chronological order the time of day		**P**
A.2.4	For each printed Time-of-Day there must be an indication of the timing channel (start/finish/Judge button)	S, I, II, F # Symbol added if Manual sensing	**P**
A.2.5	If it is possible to correct the time in the timer, printed times must specify which input was used and if the time was manually corrected. A special character, e.g. an asterisk), must be used to indicate that manual intervention has been applied.	Corrected times are printed in bold text with surrounding brackets	**P**

Ref.	*Description*	*Comments*	*Result*
A.3	**Accuracy**		
A.3.1	With adjusted quartz frequency the time drift must be better than +/-1.0 PPM at 23°C	See A.3.4.1	**P**
A.3.2	Ageing of the quartz must be below +/-3.0 PPM per year	Specified at +/- 3 PPM per year	**P**
A.3.3	The delay of impulses as treated by each timer channel input may not exceed 1/100 second. If two channels are triggered at the same time their times must be within 1/100 second. The maximal jitter (delay dispersion) allowed between impulses is 1/1000 second.	Tested in Stopwatch mode, 1/10'000 second resolution, all within the same 1/10'000 second	**P**
A.3.4.1	Timer accuracy must be below +/-2.0 PPM at +23°C with an impulse every 10 minutes during 24 hours	Time drift after 24h at +23°C: +0.031 PPM (+2.7 ms)	**P**
A.3.4.2	Timer accuracy must be below +/-2.0 PPM with an impulse every 60 seconds for at least 4 hours at 0°C and +60°C	Time drift after 4h at 0°C: 0.000 PPM (0.0 ms) Time drift after 4h at +60°C: -0.215 PPM (-3.1 ms)	**P**