

Application Cover Letter

Dear Sirs,

On behalf of Siklu Communications Ltd., I would like to apply for an UMSUG code for the **EH-600TT**.

This is a wireless communication device (radio transmitter/receiver) designed for deployment on street works (e.g., lamp posts). It is intended to extend the reach of data networks, where fibre is not available, and provides wireless connectivity to data-hungry devices, such as CCTV security cameras, WiFi access points, mobile base stations, etc.

The EH-600TT is a newer model for an older device, for which we already have an UMSUG code (882 0033 000 100). This newer model has better (reduced) power consumption.

The EH-600TT is marketed in the UK under different names, including: EH-600T, EH-600TX, EH-700TX, EH-710T, and EH-710TX. All these variants have identical form factor and power consumption.

The EH-600TT is powered using PoE (powered over Ethernet), which provides 48VDC over a standard twisted-pair cable, such as CAT-5E or CAT-6. To this end, we supply (in addition to the radio) an AC PoE injector which converts the mains voltage into DC, and injects it onto the twisted-pair cable. This injector (PD-ACDC60G by Microsemi) was used when performing the below measurements, and its own (self) power consumption is therefore also included in the provided results.

In the following pages, please find:

- 1) Completed application form
- 2) Photos of the equipment
- 3) Power consumption measurement certificates for 6 samples, identified by a unique serial number.
- 4) ISO17025 accreditation certificate by A2LA for the test lab used: Gefen Electronics.

Here is a summary of the 6 certificates which follow:

Voltage	Parameter	Siklu EH-600TT Radio Transceiver						Measurement Uncertainty
		S/N T.BJF6BH02AB	S/N T.BJF6BH0343	S/N T.BJF6BH03B0	S/N T.BJF6BH030D	S/N T.BJF6BH0299	S/N T.BJF69801E7	
210	Watts	19.58	19.50	19.79	19.62	19.69	19.83	0.57 W
	VA	32.60	32.94	33.46	32.89	33.00	33.33	0.57 VA
220	Watts	19.67	19.59	19.84	19.56	19.80	19.92	0.57 W
	VA	33.66	33.27	33.73	33.55	33.51	33.24	0.57 VA
230	Watts	19.63	19.57	19.91	19.63	19.91	19.98	0.57 W
	VA	33.65	33.16	34.06	33.62	34.07	34.28	0.57 VA
240	Watts	19.68	19.58	19.76	19.63	19.80	19.95	0.57 W
	VA	34.11	33.38	34.24	33.66	34.13	33.94	0.57 VA
250	Watts	19.98	19.65	19.95	19.44	19.91	19.64	0.57 W
	VA	34.57	34.52	35.28	34.80	35.04	34.51	0.57 VA

Thank you,

Sincerely,

Daniel Ephraty
 Director Sales Engineering
 Siklu Communications
daniel.e@siklu.com
 07939 748424.



UMS Charge Code Form – Signals and Miscellaneous

ALL APPLICATIONS ARE SUBJECT TO INDUSTRY APPROVAL. IF AN APPLICATION IS LARGE OR CONTENTIOUS, THE APPROVAL PROCESS IS ALSO LIKELY TO TAKE LONGER.

Company Name: Siklu Communications

Contact Name: Daniel Ephraty

Contact Telephone Number: 07939 7484724

Email Address: daniel.e@siklu.com

Please complete all of the questions below using the Guidance Notes supplied as a separate attachment. All fields are mandatory.

Your Test Data and Supporting Evidence

***Please place a cross against all completed steps and attach relevant documents to your email.**

1	Has your equipment been tested by an ISO 17025 accredited test house?	Y
2	Have you included evidence of the test house's accreditation?	Y
3	Have you included test data for your equipment that meets the requirements outlined in the Guidance Notes below?	Y
4	Have you included a product specification and a photo of your equipment?	Y

Your Product

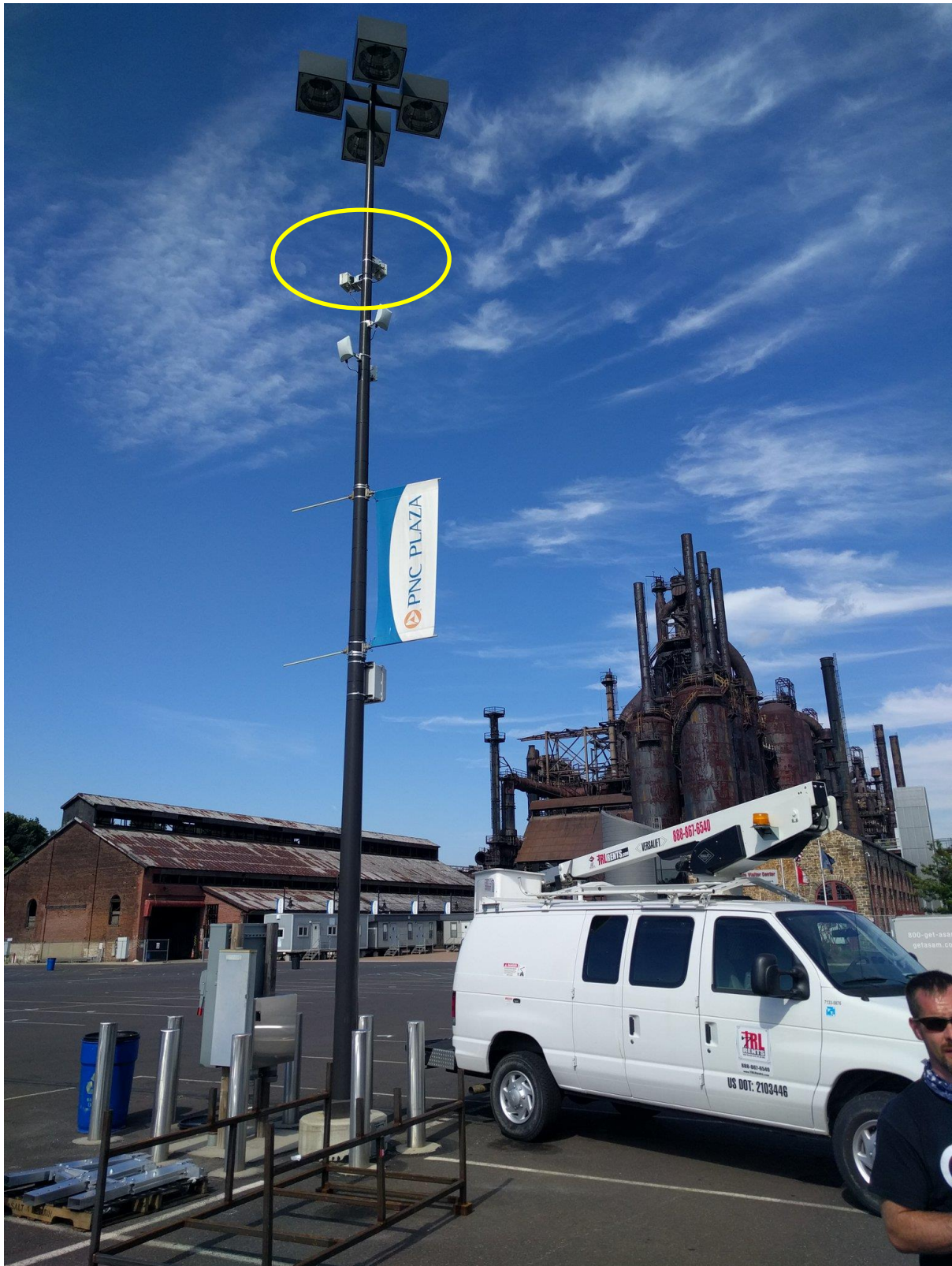
		Details
5	What type of equipment are you submitting an application for?	Miscellaneous code: 846 (Radio Transmitter)
6	What is the nominal wattage of your equipment?	Please refer to test data
7	How does the equipment operate?	The equipment is intended to operate continuously, and at a constant power consumption
8	What is the product's name or model number?	Generic product name: EH-600TT (Also marketed under the following names: EH-600T, EH-600TX, EH-700TX, EH-710T, EH-710TX)
9	Is your company the manufacturer of this product?	Yes

Photo of EH-600TT



A typical installation of the EH-600TT on top of a lamp post

(This photo shows two radios, each pointing in a different direction)



Certificate of Calibration No 6/4383

Customer: Siklu
Address: 43 Hasivim st., 2nd Floor, Petah Tikva 49517 Israel
Manufacturer: Siklu
Model: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial No: T.BJF6BH02AB
Asset No: T.BJF6BH02AB
Cal Due Date: 15/03/2018 (required by Customer)

Calibration date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 21.9 +/-1°C
Rel. Humidity: 44.4+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor $k=2$ unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.

Limitations/ Remarks: Calibrated with Power Supply Model : PD-ACDC60G/AC S/N C15366231000002571

Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 

The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4383

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF6BH02AB
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
 Metrology Laboratory
 30 Hasivim str, Petach Tikva, Israel
Temperature: 21.9 +/-1°C
Rel. Humidity: 44.4+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau
 performed by
 64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	210.31	W	19.578	0.57
VA	210	210.20	VA	32.600	0.57
Watts	220	219.66	W	19.667	0.57
VA	220	220.04	VA	33.658	0.57
Watts	230	230.34	W	19.629	0.57
VA	230	230.32	VA	33.645	0.57
Watts	240	239.92	W	19.676	0.57
VA	240	240.00	VA	34.111	0.57
Watts	250	250.4	W	19.980	0.57
VA	250	250.2	VA	34.570	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.

Certificate of Calibration No 6/4384

Customer: Siklu	
Address: 43 Hasivim st., 2nd Floor, Petah Tikva 49517 Israel	
Manufacturer: Siklu	Calibration date: 15/03/2017
Model: EH-600TX-ODU-PoE	Calibration site: GES Ltd
Description: ODU with Int Antenna	Metrology Laboratory
Serial No: T.BJF6BH03B0	30 Hasivim str, Petach Tikva, Israel
Asset No: T.BJF6BH03B0	Temperature: 22 +/-1°C
Cal Due Date: 15/03/2018 (required by Customer)	Rel. Humidity: 43.1+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor k=2 unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.

Limitations/ Remarks: Calibrated with Power Supply Model : PD-CDC60G/AC S/N C15366231000002572

Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 

The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4384

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF6BH03B0
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 22 +/-1°C
Rel. Humidity: 43.1+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau performed by
64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	210.42	W	19.785	0.57
VA	210	210.42	VA	33.456	0.57
Watts	220	220.45	W	19.838	0.57
VA	220	220.45	VA	33.729	0.57
Watts	230	230.10	W	19.913	0.57
VA	230	230.10	VA	34.055	0.57
Watts	240	239.44	W	19.757	0.57
VA	240	239.44	VA	34.240	0.57
Watts	250	250.23	W	19.946	0.57
VA	250	250.23	VA	35.283	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.

Certificate of Calibration No 6/4385

Customer: Siklu	
Address: 43 Hasivim st., 2nd Floor, Petah Tikva 49517 Israel	
Manufacturer: Siklu	Calibration date: 15/03/2017
Model: EH-600TX-ODU-PoE	Calibration site: GES Ltd
Description: ODU with Int Antenna	Metrology Laboratory
Serial No: T.BJF6BH030D	30 Hasivim str, Petach Tikva, Israel
Asset No: T.BJF6BH030D	Temperature: 22.1 +/-1°C
Cal Due Date: 15/03/2018 (required by Customer)	Rel. Humidity: 42.4+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor k=2 unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.

Limitations/ Remarks: Calibrated with Power Supply Model : PD-CDC60G/AC S/N C15366231000002536

Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 



The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4385

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF6BH030D
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 22.1 +/-1°C
Rel. Humidity: 42.4+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau
performed by
64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	209.49	W	19.620	0.57
VA	210	209.49	VA	32.890	0.57
Watts	220	220.74	W	19.561	0.57
VA	220	220.74	VA	33.553	0.57
Watts	230	230.30	W	19.633	0.57
VA	230	230.30	VA	33.623	0.57
Watts	240	240.42	W	19.625	0.57
VA	240	240.42	VA	33.658	0.57
Watts	250	250.34	W	19.441	0.57
VA	250	2350.34	VA	34.797	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.

Certificate of Calibration No 6/4386

Customer: Siklu
Address: 43 Hasivim st., 2nd Floor, Petah Tikva 49517 Israel
Manufacturer: Siklu
Model: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial No: T.BJF6BH0299
Asset No: T.BJF6BH0299
Cal Due Date: 15/03/2018 (required by Customer)

Calibration date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 22.1 +/-1°C
Rel. Humidity: 42.2+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor $k=2$ unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.


Limitations/ Remarks: Calibrated with Power Supply Model : PD-ACDC60G/AC S/N C16056231000000434

Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 

The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4386

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF6BH0299
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
 Metrology Laboratory
 30 Hasivim str, Petach Tikva, Israel
Temperature: 22.1 +/-1°C
Rel. Humidity: 42.2+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau
 performed by
 64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	210.21	W	19.686	0.57
VA	210	210.21	VA	33.003	0.57
Watts	220	220.44	W	19.802	0.57
VA	220	220.44	VA	33.508	0.57
Watts	230	230.17	W	19.905	0.57
VA	230	230.17	VA	34.066	0.57
Watts	240	240.33	W	19.803	0.57
VA	240	240.33	VA	34.127	0.57
Watts	250	250.27	W	19.911	0.57
VA	250	250.27	VA	35.038	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.

Certificate of Calibration No 6/4388

Customer: Siklu	
Address: 43 Hasivim st., 2nd Floor, Petach Tikva 49517 Israel	
Manufacturer: Siklu	Calibration date: 15/03/2017
Model: EH-600TX-ODU-PoE	Calibration site: GES Ltd
Description: ODU with Int Antenna	Metrology Laboratory
Serial No: T.BJF6BH0343	30 Hasivim str, Petach Tikva, Israel
Asset No: T.BJF6BH0343	Temperature: 22 +/-1°C
Cal Due Date: 15/03/2018 (required by Customer)	Rel. Humidity: 43.3+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor $k=2$ unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.

Limitations/ Remarks: Calibrated with Power Supply Model : PD-ACDC60G/AC S/N C16056231000000445

Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 



The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4388

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF6BH0343
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 22 +/-1°C
Rel. Humidity: 43.3+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau performed by
64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	209.82	W	19.502	0.57
VA	210	209.66	VA	32.944	0.57
Watts	220	220.0	W	19.594	0.57
VA	220	220.3	VA	33.267	0.57
Watts	230	230.4	W	19.569	0.57
VA	230	230.4	VA	33.162	0.57
Watts	240	240.16	W	19.575	0.57
VA	240	240.16	VA	33.382	0.57
Watts	250	250.17	W	19.650	0.57
VA	250	250.17	VA	34.524	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.

Certificate of Calibration No 6/4387

Customer: Siklu	
Address: 43 Hasivim st., 2nd Floor, Petah Tikva 49517 Israel	
Manufacturer: Siklu	Calibration date: 15/03/2017
Model: EH-600TX-ODU-PoE	Calibration site: GES Ltd
Description: ODU with Int Antenna	Metrology Laboratory
Serial No: T.BJF69801E7	30 Hasivim str, Petach Tikva, Israel
Asset No: T.BJF69801E7	Temperature: 22.2 +/-1°C
Cal Due Date: 15/03/2018 (required by Customer)	Rel. Humidity: 41.5+/-3% Rh

We declare that this calibration made using laboratory reference standards traceable to national and international reference standards.

Measurement Standards used in this calibration:

Model	Description	Number	Due Date
AVPower PA2200A	Power Analyzer	8695	28/06/17
QualiTech "QualiTest"	Software	9009	-

The uncertainties in this document are for a confidence probability of about 95% a coverage factor k=2 unless otherwise stated.

The calibration was performed accordance to procedure(s): GES-22-10-16

Short description:

- With according to procedure stipulated by manufacturer for Performance verification.

And additional procedure(s) for ISO 17025: GES-42-50-396


Short description:

- The tested device is connected to a standard devices as defined by the software, which then takes measurements and does all the needed calculations.

Limitations/ Remarks: Calibrated with Power Supply Model : PD-ACDC60G/AC S/N C16056231000000402

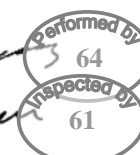
Note: ISO 17025 Certificate

Measurement performed by: Alex Landau
Calibration Engineer

Signature: 

Certificate inspected by: Arcady Gefen
CEO

Signature: 



The results apply only to the specific calibrated equipment that had undergone calibration at the time of calibration.

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CALIBRATION REPORT No 6/4387

Manufacturer: Siklu
Model Number: EH-600TX-ODU-PoE
Description: ODU with Int Antenna
Serial Number: T.BJF69801E7
Asset Number: -
Owner: Siklu

Test date: 15/03/2017
Calibration site: GES Ltd
Metrology Laboratory
30 Hasivim str, Petach Tikva, Israel
Temperature: 22.2 +/-1°C
Rel. Humidity: 41.5+/-3% Rh

Measurement performed by: Alex Landau

Alex Landau
performed by
64

The uncertainties in this document are for a confidence probability of about 95% and a coverage factor k=2 unless otherwise stated. The Calibration Application: QT10041.

CALIBRATION RESULTS:

Test No 1 from 1 Electrical Power consumption

Parameter	Test Voltage	Applied Voltage	Units	Measured Value	Exp. Uncert.
Watts	210	210.92	W	19.831	0.57
VA	210	210.92	VA	33.326	0.57
Watts	220	220.10	W	19.917	0.57
VA	220	220.10	VA	33.235	0.57
Watts	230	230.06	W	19.976	0.57
VA	230	230.06	VA	34.279	0.57
Watts	240	240.67	W	19.945	0.57
VA	240	240.67	VA	33.935	0.57
Watts	250	250.08	W	19.636	0.57
VA	250	250.08	VA	34.512	0.57

Note:

Pass -the result complies with the specification reduced by the uncertainty value.
Fail -the result does not comply with the specification expanded with the uncertainty value.
Border -the result is inside the specification by a margin less then the uncertainty value.
Border! -the result is outside the specification by a margin less then the uncertainty value.



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

GEFEN ELECTRONIC SERVICES LTD
30 Hasivim Street
Petah-Tikva 039266044
Israel
Arcady Gefen Phone: 97239266044

CALIBRATION

Valid To: June 30, 2017

Certificate Number: 3537.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
DC Voltage – Generate ³	2.2 µV to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V	12 µV/V + 0.9 µV 8.7 µV/V + 1.5 µV 8.6 µV/V + 5.2 µV 8.6 µV/V + 8.2 µV 11 µV/V + 110 µV 12 µV/V + 580 µV	Fluke 5700A
DC High Voltage – Measure ³	500 V 1000 V 1500 V 3000 V 6000 V	0.6 V 1.0 V 1.2 V 16 V 18 V	Viltrek 4600
DC Current – Generate ³	(0.02 to 220) µA 220 µA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (2 to 10) A	0.17 % + 9.3 nA 75 µA/A + 9.3 nA 75 µA/A + 93 nA 85 µA/A + 0.92 µA 0.014 % + 29 µA 0.024 % + 58 µA/A	Fluke 5700A Datron 4800 w/ Datron 4600 transconductance amplifier

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Generate (cont)			
(22 to 220) V	(20 to 40) Hz 40 Hz to 20 kHz (20 to 100) kHz	0.02 % + 2.9 mV 0.013 % + 0.9 mV 0.1 % + 9.2 mV	Fluke 5700A
(220 to 1100) V	(15 to 50) Hz 50 Hz to 1 kHz	0.05 % + 19 mV 0.014 % + 4 mV	
AC Current – Generate			
(0.1 to 220) µA	40 Hz to 1 kHz (1 to 10) kHz	0.039 % + 19 nA 0.19 % + 92 nA	Fluke 5700A
220 µA to 2.2 mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 40 nA 0.19 % + 1.0 µA	
(2.2 to 22) mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 0.4 µA 0.19 % + 9.3 µA	
(22 to 220) mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 4.0 µA 0.19 % + 9.2 µA	
220 mA to 2.2 A	40 Hz to 1 kHz (1 to 10) kHz	0.089 % + 92 µA 1.0 % + 190 µA	
(2 to 10) A	10 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 20) kHz	0.045 % + 1.4 mA 0.1 % + 1.8 mA 0.25 % + 6.9 mA 0.86 % + 39 mA	Datron 4800 w/ Datron 4600 transconductance amplifier

Parameter/Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
Oscilloscope ³ –			
DC Voltage Amplitude	± 1 mV to 190 V	0.029 % + 29 µV	Wavetek 9500; the percentages are related to the reference level. Active head Wavetek 9520
Leveled Sine Wave	50 kHz to 10 MHz	1.8 %	
Flatness	(50 to 550) MHz (relative to 50 kHz to 10 MHz)	2.3 %	
	(550.01 to 1000) MHz (relative to 50 kHz to 10 MHz)	4.9 %	
Time Marker			
Sine Wave	550 ps to 2 ns	0.001 %	
Square Wave	10 ns to 10 ms	0.001 %	

II. Electrical – RF/Microwave

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Power – Measure (-60 to 18) dBm	(10 to 50) MHz (50 to 100) MHz (100 to 500) MHz (500 to 1000) MHz (1 to 2) GHz (2 to 12.4) GHz (12.4 to 14) GHz (14 to 18) GHz	3.6 % 3.4 % 3.3 % 3.4 % 3.2 % 3.3 % 3.6 % 4.2 %	Anritsu ML2437 MA2474D

III. Optical Quantities

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Optical Time Domain Reflectometer – (OTDR): Distance	Up to 200 km	1.3 m/10 km range	FG-NS-OTDR-570 Fluke PM6681
Optical Spectrum Analyzer – Wavelength	(1480 to 1570) nm	0.9 parts in 10 ⁶ nm	Burleigh WA-7600
Optical Power – Absolute Power Measure, (1309, 1550) nm	(+2 to -50) dBm	4 % (0.17 dB)	ANDO AQ2735
Wavelength – Measure	(1270 to 1680) nm	0.9 parts in 10 ⁶ nm	Burleigh WA-7600

IV. Thermodynamics

Parameter/Equipment	Range	CMC ² (\pm)	Comments
Temperature – Measure ³	-10 °C to 300 °C	1.7 °C	Fluke Hydra 2625 w/ PT-100
Temperature – Uniformity Surveys ³	-60 °C to 125 °C	1.7 °C	Fluke Hydra 2625 w/ TC set
Relative Humidity – Measure ³	(5 to 95) % RH	3 % RH	Rotronic Hygropalm 3

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Frequency – Measure			
Time Base	10 MHz	5.4 parts in 10^{10}	SR FS 725 Rubidium frequency standard
Frequency	(0.001 to 100) Hz 100 Hz to 3 GHz	10 parts in 10^6 5.4 parts in 10^{10}	HP 53131A
	500 MHz to 26.5 GHz	5.4 parts in 10^{10}	HP 5351A
Frequency – Measuring Equipment	(0.001 to 100) Hz 100 Hz to 15 MHz 10 MHz to 20 GHz (1 to 26.5) GHz	10 parts in 10^6 5.4 parts in 10^{10} 5.4 parts in 10^{10} 5.4 parts in 10^{10}	HP 33120 HP 83712A HP 8340B
Jitter – Measure and Measuring Equipment	(0.05 to 20) UI	2 % for null point of Bessel Function, 4 % for other points	Agilent E4407B

¹ This laboratory offers commercial calibration service and field calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, the value is defined as the percentage of reading, unless otherwise noted.

⁵ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

GEFEN ELECTRONIC SERVICES LTD.

Petah-Tikva, ISRAEL

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets any additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 4th day of August, 2015.

A handwritten signature in black ink, reading 'Peter Mlynar'.

President & CEO
For the Accreditation Council
Certificate Number 3537.01
Valid to June 30, 2017

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.