

Calibration Certificate

Certificate number **28-22**

Page 2 of 2

Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	07 December 2021	3879-43	RF Power
M 568	Reference power meter	164	24 March 2022	1/111-174-20	RF Power
G4-161	Signal generator	3	19 October 2022	76-21	RF Power
MG3694C	Signal generator	133805	07 October 2022	3138-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	19 November 2022	3363-42	DC Voltage

Calibration conditions

Temperature: 20.5 – 22.2 °C.

Humidity: 38 – 42 %/

Pressure: 99.5 – 100.1 kPa.

Calibration results are given in the measurement report # 28-22

#	Parameter	Specifications Required	Specifications Tested and Measured
1	Frequency Range	40 – 50 GHz	Corresponds
2	Cable Loss	3.5* dB	Corresponds (Table 1)

* – Expanded uncertainty of measurements 1.0 dB.

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Signature of the person who has performed calibration



/ Engineer

**Calibration Laboratory of
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 5.0065

Address: 6, P. Brovki str., Minsk

220013, Belarus

Phone/Fax: +375 17 2938496



Technical Manager

March 10, 2022

MEASUREMENT REPORT # 28-22

March 10, 2022

Customer:	Dekra Testing and Certification Co., Ltd. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan
Item calibrated:	RF cable SGH40-HC360-2.4M/2.4M-1M-202108-2
Method of calibration:	GOST 20271.1, MK KL 5.3-14
Number of samples:	One
Delivery date of the sample:	01.02.2022
Date of calibration:	From 01.02.2022 to 10.03.2022

MEASUREMENT CONDITIONS

Temperature: 20.5 – 22.2 °C	Humidity: 38 - 42 %	Pressure: 99.5 – 100.1 kPa
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MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	07 December 2021	3879-43	RF Power
M 568	Reference power meter	164	24 March 2022	1/111-174-20	RF Power
G4-161	Signal generator	3	19 October 2022	76-21	RF Power
MG3694C	Signal generator	133805	07 October 2022	3138-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	19 November 2022	3363-42	DC Voltage

MEASUREMENT RESULTS

Table 1

Frequency, GHz	Cable loss, dB	Expanded uncertainty, dB
40	3.3	1.0
41	3.3	1.0
42	3.5	1.0
43	3.6	1.0
44	3.5	1.0
45	3.6	1.0
46	3.7	1.0
47	3.7	1.0
48	3.7	1.0
49	3.8	1.0
50	3.9	1.0

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of $k=2$ for a normal distribution.

Engineer



This measurement report issued in duplicate and sent to:

1. Dekra Testing and Certification Co., Ltd.

No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan

2. Calibration Laboratory of Microwave Measuring Equipment

Duplication of Measurement report (complete or partial) must be authorized by the laboratory.

Calibration Laboratory of Microwave Measuring Equipment
of MWMLab



Calibration certificate

ISO 17025
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 5.0065 of 09.01.2015

Certificate number 29-22 Date when calibrated 10.03.2022 Page 1 of 2

Item calibrated RF cable SGH40-HC360-2.4M/2.4M-3.0M-202108-2

Customer Dekra Testing and Certification Co., Ltd.
No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County
31061, Taiwan

Method of calibration GOST 20271.1, MK KL 5.3-16

All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of RF. Gain measurements above 178 GHz are to confirm operation functionality and traceable only to MWMLab standards and OML. This certificate shall not be reproduced, except in full. Any publication extracts from the calibration certificate requires written permission of the issuing calibration laboratory of microwave measuring equipment.

Authorising
signature



/ Technical manager Date of issue 10.03.2022

Calibration Certificate

Certificate number **29-22**

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Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	07 December 2021	3879-43	RF Power
M 568	Reference power meter	164	24 March 2022	1/111-174-20	RF Power
G4-161	Signal generator	3	19 October 2022	76-21	RF Power
MG3694C	Signal generator	133805	07 October 2022	3138-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	19 November 2022	3363-42	DC Voltage

Calibration conditions

Temperature: 20.5 – 22.2 °C.

Humidity: 38 – 42 %/

Pressure: 99.5 – 100.1 kPa.

Calibration results are given in the measurement report # 29-22

#	Parameter	Specifications Required	Specifications Tested and Measured
1	Frequency Range	40 – 50 GHz	Corresponds
2	Cable Loss	10* dB	Corresponds (Table 1)

* – Expanded uncertainty of measurements 1.1 dB.

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of $k=2$ for a normal distribution.

Signature of the person who has performed calibration



/ Engineer

**Calibration Laboratory of
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 5.0065

Address: 6, P. Brovki str., Minsk
220013, Belarus

Phone/Fax: +375 17 2938496



MEASUREMENT REPORT # 29-22

March 10, 2022

Customer:	Dekra Testing and Certification Co., Ltd. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan
Item calibrated:	RF cable SGH40-HC360-2.4M/2.4M-3.0M-202108-2
Method of calibration:	GOST 20271.1, MK KL 5.3-14
Number of samples:	One
Delivery date of the sample:	01.02.2022
Date of calibration:	From 01.02.2022 to 10.03.2022

MEASUREMENT REPORT # 29-22

10.03.2022

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MEASUREMENT CONDITIONS

Temperature: 20.5 – 22.2 °C	Humidity: 38 - 42 %	Pressure: 99.5 – 100.1 kPa
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MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	07 December 2021	3879-43	RF Power
M 568	Reference power meter	164	24 March 2022	1/111-174-20	RF Power
G4-161	Signal generator	3	19 October 2022	76-21	RF Power
MG3694C	Signal generator	133805	07 October 2022	3138-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	19 November 2022	3363-42	DC Voltage

MEASUREMENT RESULTS

Table 1

Frequency, GHz	Cable loss, dB	Expanded uncertainty, dB
40	9.5	1.1
42	9.7	1.1
44	10.0	1.1
46	10.3	1.2
48	10.6	1.1
50	10.7	1.1

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of $k=2$ for a normal distribution.

Engineer



This measurement report issued in duplicate and sent to:

1. Dekra Testing and Certification Co., Ltd.

No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan

2. Calibration Laboratory of Microwave Measuring Equipment

Duplication of Measurement report (complete or partial) must be authorized by the laboratory.

Calibration Laboratory of Microwave Measuring Equipment
of MWMLab



Calibration certificate

ISO 17025
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 5.0065 of 09.01.2015

Certificate number 43-20 Date when calibrated 02.11.2020 Page 1 of 2

Item calibrated Spectrum Analyzer Extension Module SAX 156
US54250119 (power supply # 1517)

Customer DEKRA Testing and Certification Co., Ltd
No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan

Method of calibration GOST 20271.1, MK KL 8.2-16

All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of RF. Conversion loss measurements above 178 GHz are to confirm operation functionality and traceable only to MWMLab standards and OML. This certificate shall not be reproduced, except in full. Any publication extracts from the calibration certificate requires written permission of the issuing calibration laboratory of microwave measuring equipment.

Authorising
signature



/ Technical manager Date of issue 02.11.2020

Calibration Certificate

Certificate number **43-20**

Page 2 of 2

Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M 546	Reference power meter	163	24 March 2022	1/111-174-20	RF Power
M 568	Reference power meter	164	24 March 2022	1/111-175-20	RF Power
G4-161	Signal generator	3	12 October 2021	20-20	RF Power
G4-186	Signal generator	5	12 October 2021	21-20	RF Power
V7-34	Universal voltmeter	0067787	23 September 2021	2742-42	DC Voltage
RCH3-72	Frequency meter	931200	18 September 2021	2822-43	Frequency
MG3694C	Signal generator	133805	11 September 2021	2726-43	RF Power Frequency
E4407B	Spectrum analyzer	MY45110807	14 September 2021	2734-43	RF Power Frequency

Calibration conditions

Temperature: 22.0 °C.
Humidity: 42.0 %.
Pressure: 100.3 kPa.

Calibration results are given in the measurement report # 43-20

#	Parameter	Specifications required	Specifications tested and measured
1	RF Frequency Band	50 – 75 GHz	Corresponds
2	Multiplication Factor (Low / High)	12 / 6	Corresponds
3	Low Freq. LO Input Power (Typical / Damage)	10 dBm ± 3dB / 20 dBm	Corresponds
4	High Freq. LO Input Power (Typical / Damage)	0 dBm ± 3dB / 6 dBm	Corresponds
5	RF Power Limits: Compression / Damage	-10 / 0 dBm	Corresponds
6	Conversion loss RF to IF output (configuration "B")	-5.0 -7.5* dB	Corresponds (Table 1)
7	IF Output Standard Frequency Range	16 kHz – 2.5 GHz	Corresponds

* – Expanded uncertainty of measurements 1.5 dB (IF Frequency 400 MHz).

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Signature of the person who has performed calibration



/ Engineer

**Calibration Laboratory of
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 5.0065

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Technical Manager

November 02, 2020

MEASUREMENT REPORT # 43-20

November 02, 2020

Customer:	DEKRA Testing and Certification Co., Ltd No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan
Item calibrated:	Spectrum Analyzer Extension Module SAX 156 # US54250119 (power supply # 1517)
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09.10.2020
Date of calibration:	From 09.10.2020 to 02.11.2020