

# Calibration Certificate

Certificate number **102-17**

Page 2 of 2

Calibration is performed by using

1. Wattmeter M 568
2. Wattmeter M 546
3. Signal generator G4-186
4. Signal generator G4-161
5. Voltmeter V7-34
6. Frequency meter RCH3-72
7. Horn antenna P6-134

Calibration conditions

Temperature 22.9 °C  
Humidity 44.5 %  
Pressure 98.4 kPa

**Calibration results are given in the Measuring report # 102-17.**

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	50 – 75 GHz	Corresponds
2	Waveguide Interface	WR-15	Corresponds
3	Gain	24.0 dBi	Corresponds (Table 1)
4	Antenna Factor	44.1 dB/m	Corresponds (Table 1)

**Signature of the person who has performed calibration**



**M. Kasperovich/ Engineer**

Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 102-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Standard gain horn antenna M15RH
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 22.9 °C	Humidity: 44.5 %	Pressure: 98.4 kPa
----------------------	------------------	--------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 568	164
2	Wattmeter M 546	163
3	Signal generator G4-186	5
4	Signal generator G4-161	3
5	Voltmeter V7-34	0067787
6	Frequency meter RCH3-72	931200
7	Horn antenna P6-134	14002

## MEASURING RESULTS

Distance between tested and generating antenna 0.6 m.

Table 1

Frequency, GHz	50	55	65	75
Input Power, mW	10.0	10.0	10.0	10.0
Power density of electromagnetic field, W/m <sup>2</sup>	0.430	0.503	0.627	0.800
Maximum level of measured power, μW	0.283	0.288	0.269	0.263
<b>Gain, dB</b>	23.6	23.7	24.0	24.1
Antenna factor, dB/m	40.6	41.2	42.5	43.6
Expanded uncertainty, dB	2.1	2.2	2.2	2.2

Engineer

M. Kasperovich

Quality Manager

A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 103-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item**

**calibrated** Mixer M15HWD # 110215-1 + Standard gain horn antenna M15RH

Description of measurement standard / measuring instrument / identification

**Customer**

Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of  
calibration**

GOST 20271.1, MK KL 8.2-16

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager Date of issue 10/17/2017

Name and position

# Calibration Certificate

Certificate number **103-17**

Page 2 of 2

Calibration is performed by using

1. Wattmeter M 568
2. Wattmeter M 546
3. Signal generator G4-186
4. Signal generator G4-161
5. Voltmeter V7-34
6. Frequency meter RCH3-72
7. Horn antenna P6-134
8. Spectrum analyzer E4407B
9. Diplexer DPL26

Calibration conditions

Temperature 22.9 °C  
Humidity 44.5 %  
Pressure 98.4 kPa

Calibration results are given in the Measuring report # 103-17.

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	50 – 75 GHz	Corresponds
2	Waveguide Interface	WR-15	Corresponds
3	LO Input	+12 – +17 dBm	Corresponds
4	IF Frequency Range	321 – 2400 MHz	Corresponds
5	Mixer Bias	+4.05 mA	Corresponds
6	Conversion Loss	< 37 dB	Corresponds (Table 1)
7	System LO/IF Interface	SMA (f)	Corresponds

Signature of the person who has performed calibration



M. Kasperovich/ Engineer  
Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**  
Accreditation certificate  
No. BY/112 02.5.0.0065  
Address: 6, P. Brovki str., Minsk  
220027, Belarus  
Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 103-17**  
October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Mixer M15HWD # 110215-1 + standard gain horn antenna M15RH
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 22.9 °C	Humidity: 44.5 %	Pressure: 98.4 kPa
----------------------	------------------	--------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 568	164
2	Wattmeter M 546	163
3	Signal generator G4-186	5
4	Signal generator G4-161	3
5	Voltmeter V7-34	0067787
6	Frequency meter RCH3-72	931200
7	Horn antenna P6-134	14002
8	Spectrum analyzer E4407B	MY45110807
9	Diplexer DPL26	01

## MEASURING RESULTS

IF Frequency 321.4 MHz  $\pm$  5 MHz;

Mixer Bias +4.05 mA;

LO Input Power 14.5 to 16 dBm (2.9 to 7.1 GHz).

LO Insertion Loss of Diplexer 0.7 dB.

Distance between tested and generating antenna 0.6 m.

Table 1

Frequency, GHz	50	55	65	75
Input RF power, mW	0.36	0.36	0.38	0.36
Power density of electromagnetic field, W/m <sup>2</sup>	0.014	0.018	0.024	0.029
Measured Level, dBm	-51.7	-52.4	-55.1	-57.4
Power received by antenna, dBm	-20.2	-19.8	-19.9	-20.2
<b>Conversion Loss, dB</b>	31.5	32.6	35.2	37.2
Expanded uncertainty, dB	2.8	2.9	2.8	2.8

Engineer

 M. Kasperovich

Quality Manager

 A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate  
No.

№ BY/112 02.5.0.0065

of

09.01.2015

Certificate number 89-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item**

**calibrated**

Mixer M10HWD # 110215-1

Description of measurement standard / measuring instrument / identification

**Customer**

Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of  
calibration**

GOST 20271.1, MK KL 8.2-16

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager

Name and position

**Date of issue** 10/17/2017



# Calibration Certificate

Certificate number 89-17

Page 2 of 2

Calibration is performed by using

1. Wattmeter M 534
2. Wattmeter M 546
3. Spectrum analyzer E4407B
4. Signal generator RG4-14
5. Signal generator G4-186
6. Voltmeter V7-34
7. Frequency meter RCH3-72
8. Diplexer DPL26

Calibration conditions

Temperature 22.2 °C  
Humidity 48.1 %  
Pressure 98.8 kPa

Calibration results are given in the Measuring report # 89-17

#	Parameter	Specifications required	Specifications tested and measured
1	System Operating Frequency	75 – 110 GHz	Corresponds
2	LO Input	+12 – +17 dBm	Corresponds
3	IF Frequency Range	321 – 2400 MHz	Corresponds
4	Mixer Bias	+5.57 mA	Corresponds
5	System Waveguide Interface	WR-10	Corresponds
6	Conversion Loss	<46 dB	Corresponds (Table 1)
7	System LO/IF Interface	SMA (f)	Corresponds
8	Typical RF Power to Avoid Compression	-20 dBm (10 μW)	Corresponds

Signature of the person who has performed calibration



M. Kasperovich/ Engineer

Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



M. Svirid

October 17, 2017

**MEASURING REPORT # 89-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Mixer M10HWD # 110215-1
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 22.2 °C	Humidity: 48.1 %	Pressure: 98.8 kPa
----------------------	------------------	--------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 534	161
2	Wattmeter M 546	163
3	Spectrum analyzer E4407B	MY45110807
4	Signal generator RG4-14	22
5	Signal generator G4-186	5
6	Voltmeter V7-34	0067787
7	Frequency meter RCH3-72	931200
8	Diplexer DPL26	01

## MEASURING RESULTS

IF Frequency 321.4 MHz  $\pm$  5 MHz;

Mixer Bias +5.57 mA;


LO Input Power 14.5 to 16 dBm (2.9 to 7.1 GHz).

LO Insertion Loss of Diplexer 0.7 dB.


Table 1

Frequency, GHz	75	92.5	110
Input RF Power, dBm	-20.00	-20.00	-20.00
Measured Value, dBm	-63.3	-61.0	-62.8
<b>Conversion Loss, dB</b>	<b>43.3</b>	<b>41.0</b>	<b>42.8</b>
Expanded uncertainty, dB	3.0	2.8	2.9

Engineer

 M. Kasperovich

Quality Manager

 A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 90-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item  
calibrated**

**Standard gain horn antenna M10RH**

Description of measurement standard / measuring instrument / identification

**Customer**

Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of  
calibration**

**GOST 20271.1, MK KL 8.2-16**

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



**M. Svirid/ Technical manager**  
Name and position

**Date of issue 10/17/2017**

# Calibration Certificate

Certificate number 90-17

Page 2 of 2

Calibration is performed by using

1. Wattmeter M 534
2. Wattmeter M 546
3. Horn antenna P6-31A
4. Signal generator G4-186
5. Signal generator RG4-14
6. Voltmeter V7-34
7. Frequency meter RCH3-72

Calibration conditions

Temperature 22.2 °C  
Humidity 48.1 %  
Pressure 98.8 kPa

Calibration results are given in the Measuring report # 90-17

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	75 – 110 GHz	Corresponds
2	Waveguide Interface	WR-10	Corresponds
3	Gain	24.2 dBi	Corresponds (Table 1)
4	Antenna Factor	45.4 dB/m	Corresponds (Table 1)

Signature of the person who has performed calibration



M. Kasperovich/ Engineer  
Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 90-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Standard gain horn antenna M10RH
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 22.2 °C	Humidity: 48.1 %	Pressure: 98.8 kPa
----------------------	------------------	--------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 534	161
2	Wattmeter M 546	163
3	Signal generator G4-186	5
4	Signal generator RG4-14	22
5	Voltmeter V7-34	0067787
6	Frequency meter RCH3-72	931200
7	Horn antenna P6-31A	35864

## MEASURING RESULTS

Distance between tested and generating antenna 0.5 m.

Table 1

Frequency, GHz	75	92.5	110
Input power, mW	5.0	5.0	5.0
Power density of electromagnetic field, W/m <sup>2</sup>	0.499	0.747	0.940
Maximum level of measured power, μW	144	147	140
<b>Gain, dB</b>	23.6	23.7	24.0
Antenna factor, dB/m	44.2	45.9	47.1
Expanded uncertainty, dB	1.8	1.9	1.9

Engineer  M. Kasperovich

Quality Manager  A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 91-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item calibrated** Mixer M10HWD # 110215-1 + standard gain horn antenna M10RH  
Description of measurement standard / measuring instrument / identification

**Customer** Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.  
Name of the customer, address

**Method of calibration** GOST 20271.1, MK KL 8.2-16  
Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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



M. Svirid/ Technical manager  
Name and position

Date of issue 10/17/2017



# Calibration Certificate

Certificate number **91-17**

Page 2 of 2

Calibration is performed by using

1. Wattmeter M 534
2. Wattmeter M 546
3. Horn antenna P6-31A
4. Signal generator RG4-14
5. Signal generator G4-186
6. Voltmeter V7-34
7. Frequency meter RCH3-72
8. Spectrum analyzer E4407B
9. Diplexer DPL26

Calibration conditions

Temperature 22.2 °C  
Humidity 48.1 %  
Pressure 98.8 kPa

**Calibration results are given in the Measuring report # 91-17.**

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	75 – 110 GHz	Corresponds
2	Waveguide Interface	WR-10	Corresponds
3	LO Input	+12 – +17 dBm	Corresponds
4	IF Frequency Range	321 – 2400 MHz	Corresponds
5	Mixer Bias	+5.57 mA	Corresponds
6	Conversion Loss	< 46 dB	Corresponds (Table 1)
7	System LO/IF Interface	SMA (f)	Corresponds

**Signature of the person who has performed calibration**



**M. Kasperovich/ Engineer**

Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 91-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Mixer M10HWD # 110215-1 + standard gain horn antenna M10RH
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 22.2 °C	Humidity: 48.1 %	Pressure: 98.8 kPa
----------------------	------------------	--------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 534	161
2	Wattmeter M 546	163
3	Horn antenna P6-31A	35864
4	Signal generator RG4-14	22
5	Signal generator G4-186	5
6	Voltmeter V7-34	0067787
7	Frequency meter RCH3-72	931200
8	Spectrum analyzer E4407B	MY45110807
9	Diplexer DPL26	01

## MEASURING RESULTS

IF Frequency 321.4 MHz  $\pm$  5 MHz;  
 Mixer Bias +5.57 mA;  
 LO Input Power 14.5 to 16 dBm (2.9 to 7.1 GHz).  
 LO Insertion Loss of Diplexer 0.7 dB.

Distance between tested and generating antenna 0.5 m.

Table 1

Frequency, GHz	75	92.5	110
Input RF power, mW	0.34	0.35	0.37
Power density of electromagnetic field, W/m <sup>2</sup>	0.167	0.209	0.386
Measured Level, dBm	-63.4	-61.0	-62.8
Power received by antenna, dBm	-20.0	-19.8	-19.9
Conversion Loss, dB	43.4	41.2	42.9
Expanded uncertainty, dB	3.2	3.1	3.1

Engineer  M. Kasperovich

Quality Manager  A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 115-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item calibrated** Signal Generator Extension Module SGX 050  
E8257DV15 # US54250106

Description of measurement standard / measuring instrument / identification

**Customer** Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of calibration** GOST 20271.1, MK KL 05.3-2014

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager  
Name and position

**Date of issue** 10/17/2017

**Calibration is performed by using**

- 1 Wattmeter M 568
- 2 Wattmeter M 546
- 3 Voltmeter V7-34
- 4 Frequency meter RCH3-72
- 5 Signal generator MG3694C
- 6 Attenuator D3-37
- 7 Attenuator D3-38

**Calibration conditions**

Temperature: 21.9 °C.  
 Humidity: 42.0 %.  
 Pressure: 100.1 kPa.

**Calibration results are given in the Measuring report # 115-17**

#	Parameter	Specifications required	Specifications tested and measured
1	RF Frequency Band	50 – 75 GHz	Corresponds
2	Multiplication Factor (Low / High)	4 / 2	Corresponds
3	Low Frequency RF Input	12.5 – 18.75 GHz	Corresponds
4	Low Freq. RF Input Power (Typical / Damage)	10 dBm ± 3dB / 16 dBm	Corresponds
5	High Frequency RF Input	25 – 37.5 GHz	Corresponds
6	High Freq. RF Input Power (Typical / Damage)	0 dBm ± 3dB / 6 dBm	Corresponds
7	Output Power (Typical / Minimum)	20 dBm / 17 dBm	Corresponds (Table 1)

**Signature of the person who has  
performed calibration**



**M. Kasperovich/ Engineer**

Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



M. Svirid

October 17, 2017

**MEASURING REPORT # 115-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Signal Generator Extension Module SGX 050 E8257DV15 # US54250106
Method of calibration:	GOST 20271.1, MK KL 05.3-2014
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 21.9 °C	Humidity: 42.0 %	Pressure: 100.1 kPa
----------------------	------------------	---------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 568	164
2	Wattmeter M 546	163
3	Voltmeter V7-34	0067787
4	Frequency meter RCH3-72	931200
5	Signal generator MG3694C	133805
6	Attenuator D3-37	2
7	Attenuator D3-38	8

## MEASURING RESULTS

Table 1

RF output frequency, GHz	50	55	65	75
RF input frequency, GHz	12.50	13.75	16.25	18.75
RF input power, dBm	10.0	10.0	10.0	10.0
<b>RF output power, dBm</b>	<b>20.33</b>	<b>19.41</b>	<b>22.10</b>	<b>20.28</b>
Expanded uncertainty, dB	0.68	0.68	0.68	0.68

Engineer  M. Kasperovich

Quality Manager  A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1,  
Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 116-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item calibrated** Signal Generator Extension Module SGX 051  
E8257DV10 # US53250009

Description of measurement standard / measuring instrument / identification

**Customer** Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of calibration** GOST 20271.1, MK KL 05.3-2014

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager  
Name and position

**Date of issue** 10/17/2017



**Calibration is performed by using**

- 1 Wattmeter M 534
- 2 Wattmeter M 546
- 3 Voltmeter V7-34
- 4 Frequency meter RCH3-72
- 5 Signal generator MG3694C
- 6 Attenuator D3-38
- 7 Attenuator AP-20

**Calibration conditions**

Temperature: 21.9 °C.  
 Humidity: 42.0 %.  
 Pressure: 100.1 kPa.

**Calibration results are given in the Measuring report # 116-17**

#	Parameter	Specifications required	Specifications tested and measured
1	RF Frequency Band	75 – 110 GHz	Corresponds
2	Multiplication Factor (Low / High)	6 / 3	Corresponds
3	Low Frequency RF Input	12.5 – 18.33 GHz	Corresponds
4	Low Freq. RF Input Power (Typical / Damage)	10 dBm ± 3dB / 16 dBm	Corresponds
5	High Frequency RF Input	25 – 36.67 GHz	Corresponds
6	High Freq. RF Input Power (Typical / Damage)	0 dBm ± 3dB / 6 dBm	Corresponds
7	Output Power (Typical / Minimum)	14 dBm / 10 dBm	Corresponds (Table 1)

**Signature of the person who has  
performed calibration**



**M. Kasperovich/ Engineer**  
Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk

220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



M. Svirid

October 17, 2017

**MEASURING REPORT # 116-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Signal Generator Extension Module SGX 051 E8257DV10 # US53250009
Method of calibration:	GOST 20271.1, MK KL 05.3-2014
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 21.9 °C	Humidity: 42.0 %	Pressure: 100.1 kPa
----------------------	------------------	---------------------

#	Measuring equipment	Serial number
1	Wattmeter M 534	161
2	Wattmeter M 546	163
3	Voltmeter V7-34	0067787
4	Frequency meter RCH3-72	931200
5	Signal generator MG3694C	133805
6	Attenuator D3-38	8
7	Attenuator AP-20	4

## MEASURING RESULTS


Table 1

RF output frequency, GHz	75	92.5	110
RF input frequency, GHz	12.50	15.42	18.33
RF input power, dBm	10.0	10.0	10.0
<b>RF output power, dBm</b>	<b>13.34</b>	<b>15.03</b>	<b>11.89</b>
Expanded uncertainty, dB	0.68	0.82	0.82

Engineer

 M. Kasperovich

Quality Manager

 A. Kostrikin

---

 This Measuring report issued in duplicate and sent to:

 1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1,  
 Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



# Certificate of Calibration

ISO/IEC 17025:2017 and ANSI/NCSL Z540.3-2006

Certificate Number 1-11804142756-1



AC-1498

**Model Number** E4417A  
**Manufacturer** Keysight Technologies Inc  
**Description** Power Meter - EPM-P series, dual channel  
**Serial Number** MY55276004  
**Date of Calibration** 17 Oct 2019  
**Procedure** STE-50114049-A.06.11  
**Temperature** (23 ± 5) °C  
**Humidity** (50 ± 30) %RH

**Customer**  
Bureau Veritas Consumer Products Services (HK)  
Ltd  
300 HSINCHU  
No 1, 1st Lixing Rd, East District  
Hsinchu Branch  
Taiwan

**Location of Calibration**  
Keysight Technologies Inc  
10090 Foothills Blvd.  
Roseville CA 95747-7102  
UNITED STATES

This certifies that the equipment has been calibrated using applicable Keysight Technologies procedures and in compliance with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3-2006. The quality management system is registered to ISO 9001:2015.

#### As Received Conditions

The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.

#### Action Taken

- No corrective actions were necessary.

#### As Completed Conditions

The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.

#### Remarks or Special Requirements

This calibration report shall not be reproduced, except in full. The documented results relate to the equipment calibrated only.

The test limits stated in the report correspond to the published specifications of the equipment, at the points tested.

This calibration report may refer to equipment manufactured by HP, Agilent and Keysight as being manufactured by Keysight Technologies.

Keysight Technologies Inc  
10090 Foothills Blvd.  
Roseville CA 95747-7102  
UNITED STATES

Wes Fischbach Roseville Serv. Cntr. Mgr.

## Traceability Information

Technician ID Number 00920865

Measurements are traceable to the International System of Units (SI) via national metrology institutes ([www.keysight.com/find/NMI](http://www.keysight.com/find/NMI)) that are signatories to the CIPM Mutual Recognition Arrangement.

## Calibration Equipment Used

Model Number	Model Description	Equipment ID	Cal Due Date
11683A	Range calibrator (for EPM, EPM-P and VXI Power Meters)	11683A00544	3 Apr 2020
11708A	Attenuator - Precision, 30 dB .05 dB at 50 MHz	11708A52237	23 Jan 2020
3458A	Digital multimeter, 8.5 digit	3458A12256	21 Mar 2020
432A	Power Meter, Thermistor	432A12469	3 May 2020
478A	Coaxial Thermistor Mount, 10 MHz to 10 GHz	478A83661	5 Apr 2020
53132A	Universal Counter, 225 MHz, 12 digit/s, 150 ps. GPIB, RS232	53132A06810	23 Mar 2020
5520A	Multi-Product Calibrator	5520A55202	19 Apr 2020
E9321A	Peak and average Power Sensor, 50 MHz to 6 GHz, 300 kHz bandwidth	E9321A90244	27 Nov 2020

## Traceability Table

	Model	Model Description	Equipment ID	Certificate Number	Trace Value
W,R	11683A	Range calibrator (for EPM, EPM-P and VXI Power Meters)	11683A00544	1-11741625774-1-ANAB:AC-1498	DC Voltage Resistance
W,R	11708A	Attenuator - Precision, 30 dB .05 dB at 50 MHz	11708A52237	1-9600486667-2-ANAB:AC-1498	Attenuation Reflection Coefficient
W,R	3458A	Digital multimeter, 8.5 digit	3458A12256	1-10765533049-1-ANAB:AC-1498.03	DC Voltage Resistance
W,R	432A	Power Meter, Thermistor	432A12469	1-9672039996-1-ANAB:AC-1498	DC Voltage
W,R	478A	Coaxial Thermistor Mount, 10 MHz to 10 GHz	478A83661	1-9800505590-1-ANAB:AC-1498	RF Power
W,R	53132A	Universal Counter, 225 MHz, 12 digit/s, 150 ps. GPIB, RS232	53132A06810	1-9860720951-1-ANAB:AC-1498	Frequency
W,R	5520A	Multi-Product Calibrator	5520A55202	1-11080404022-1-ANAB:AC-1991	DC Voltage Frequency Resistance
W,R	E9321A	Peak and average Power Sensor, 50 MHz to 6 GHz, 300 kHz bandwidth	E9321A90244	1-11584577612-1-ANAB:AC-1498	RF Power

**Legend**

**W - Working Standard** The calibration equipment used for the calibration of the Model indicated on the first page of the Certificate of calibration.

**R - Reference Standard** The Reference Standard (Accredited or NMI-calibrated ETE) used to provide traceability to the SI-Units for the calibration parameters listed.

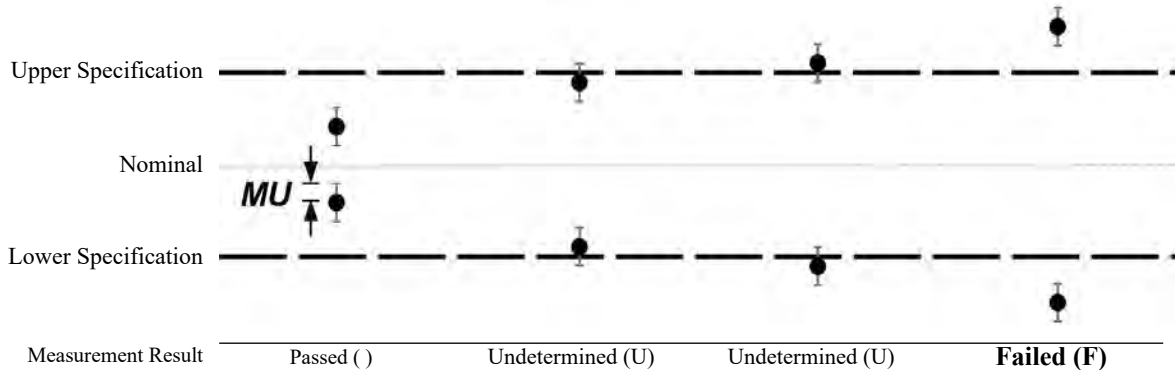
## Compliance with Specification

The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. If the expanded measurement uncertainty intervals centered about one or more measured values were both in as well as out of specification (upper or lower), it is not possible to state compliance or non-compliance based on a 95% coverage probability for the expanded measurement uncertainty.

An overall statement of compliance for all tests performed as received, and as completed (if any adjustments / repairs were performed) is included at the beginning of this report. Statements of compliance apply only to warranted specifications. When functional verification tests are performed, results are reported in the "Functional Test" section, and do not affect these statements of compliance. The status summaries relate to the tested item only. A final decision about whether the item's performance actually satisfies requirements of the user can only be made by the user.

### Measurement results are reported as:

- Passed ( ) - The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.
- Undetermined (U) - The expanded measurement uncertainty intervals about one or more measured values were in as well as out of specification. Consequently, neither compliance nor non-compliance with specification can be declared based on the stated coverage probability.
- Failed (F) - One or more measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about one or more measured values were entirely outside the specification.



( ) This result is indicated on the measurement report as a blank space in the column labeled "Status" or "Sts".  
 MU = 95% expanded measurement uncertainty.

### Acceptance Limit

The "Keysight Cal + Uncertainties + Guardbanding" service employs a guard band in the amount of the 95% expanded measurement uncertainty (MU). The resulting acceptance limit applied for Pass or Fail decisions, and for performing adjustments, is the difference of the specification and the guard band.

### Uncertainty of Measurement

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported expanded 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.

## Calibration Test Results Summary

Test Name	As Received Status
ZERO CHANNEL A	Passed
NORMAL INSTR. ACCURACY A	Passed
INSTR. ACCURACY A	Passed
SENSOR FUNCTION TEST A	Passed
ZERO CHANNEL B	Passed
NORMAL INSTR. ACCURACY B	Passed
INSTR. ACCURACY B	Passed
SENSOR FUNCTION TEST B	Passed
POWER REF LEVEL	Passed
TIME BASE TEST	Passed
OUTPUT SWR	Passed

## Functional Test Results Summary

The following functional test results are not part of an accredited delivery, even if they are part of an otherwise accredited calibration report.

The following tests document the functional verification of the instruments' non-warranted performance. Neither a statement of conformance or decision rule is used for a Functional Test, measurement uncertainties are only provided by exception. For a "Functional Test" the test results are reported as "As Expected" when showing expected performance and "Not As Expected" otherwise. "As Expected" results of individual test points are indicated in the measurement report by a blank space in the column labeled "Status" to allow easier recognition of any "Not As Expected" points. If a functional test result is reported as "Not As Expected", repair and/or adjustment is recommended. Test results reported as "Done" are possible if no limits are applied. For qualitative or quantitative "Functional Tests" the test results are not warranted, and no judgment is made. The "actual" measured results are helpful to users for some applications.

Test Name	As Received Status
SENSOR INTERFACE A	As Expected
SENSOR INTERFACE B	As Expected



Model E4417A Serial MY55276004  
 Options Tested

 Test Date 17 Oct 2019  
 Condition As Received

## ZERO CHANNEL A

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Zero Channel (A)	-76.40 nW	6.26 nW	76.40 nW	52 nW	

## NORMAL INSTR. ACCURACY A

**Passed**

<u>TEST CONDITIONS</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Normal Path Accuracy (A)	0.19 %	0.80 %	0.38 %	

## INSTR. ACCURACY A

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Applied input level					
3.1623 uW	3.0977 uW	3.1746 uW	3.2269 uW	0.045 uW	
10 uW	9.904 uW	9.994 uW	10.096 uW	0.044 uW	
31.6228 uW	31.428 uW	31.597 uW	31.819 uW	0.081 uW	
100 uW	99.49 uW	99.94 uW	100.51 uW	0.078 uW	
316.2278 uW	314.72 uW	316.07 uW	317.74 uW	0.58 uW	
1 mW	0.9954 mW	0.9995 mW	1.0047 mW	0.00060 mW	
3.1623 mW	3.1477 mW	3.1637 mW	3.1769 mW	0.0058 mW	
10 mW	9.954 mW	10.003 mW	10.046 mW	0.0075 mW	
31.6228 mW	31.477 mW	31.644 mW	31.769 mW	0.059 mW	
100 mW	99.54 mW	100.09 mW	100.46 mW	0.070 mW	

## SENSOR FUNCTION TEST A

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
30dB Atten Lower Range	-31.00 dBm	-30.00 dBm	-29.00 dBm	0.21 dB	
30dB Atten Upper Range	-31.00 dBm	-29.94 dBm	-29.00 dBm	0.21 dB	
Over Range Bit Detect		PASS			
0dBm on Upper Range	-1.000 dBm	0.001 dBm	1.000 dBm	0.022 dB	

## ZERO CHANNEL B

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Zero Channel (B)	-76.40 nW	-4.56 nW	76.40 nW	52 nW	

## NORMAL INSTR. ACCURACY B

**Passed**

<u>TEST CONDITIONS</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Normal Path Accuracy (B)	0.26 %	0.80 %	0.38 %	

## INSTR. ACCURACY B

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Applied input level					
3.1623 uW	3.0977 uW	3.1534 uW	3.2269 uW	0.045 uW	
10 uW	9.904 uW	9.982 uW	10.096 uW	0.044 uW	
31.6228 uW	31.428 uW	31.595 uW	31.819 uW	0.081 uW	
100 uW	99.49 uW	99.91 uW	100.51 uW	0.078 uW	
316.2278 uW	314.72 uW	316.03 uW	317.74 uW	0.58 uW	
1 mW	0.9954 mW	0.9995 mW	1.0047 mW	0.00060 mW	
3.1623 mW	3.1477 mW	3.1640 mW	3.1769 mW	0.0058 mW	
10 mW	9.954 mW	10.004 mW	10.046 mW	0.0075 mW	
31.6228 mW	31.477 mW	31.647 mW	31.769 mW	0.059 mW	
100 mW	99.54 mW	100.10 mW	100.46 mW	0.070 mW	

## SENSOR FUNCTION TEST B

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
30dB Atten Lower Range	-31.00 dBm	-30.00 dBm	-29.00 dBm	0.21 dB	
30dB Atten Upper Range	-31.00 dBm	-29.96 dBm	-29.00 dBm	0.21 dB	
Over Range Bit Detect		PASS			
0dBm on Upper Range	-1.000 dBm	0.000 dBm	1.000 dBm	0.022 dB	

## POWER REF LEVEL

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
POWER REF OUTPUT					
Power Reference level	0.991 mW	0.998 mW	1.009 mW	0.0034 mW	

## TIME BASE TEST

**Passed**

<u>TEST CONDITIONS</u>	<u>MINIMUM</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Time Base Frequency	9.9990 MHz	10.0000 MHz	10.0010 MHz	0.092 kHz	

Model E4417A    Serial MY55276004  
**Options Tested****Test Date** 17 Oct 2019  
**Condition** As Received

---

## OUTPUT SWR

**Passed**

<u>TEST CONDITIONS</u>	<u>MEASURED</u>	<u>MAXIMUM</u>	<u>UNCERT.</u>	<u>Status</u>
Power Ref Output SWR	1.014	1.060	0.028	

## SENSOR INTERFACE A

**As Expected**

<u>TEST CONDITIONS</u>	<u>RESULT</u>	<u>Status</u>
SENSOR DETECTION		
Channel A No Sensor	DONE	
Channel A Sensor present	DONE	

## SENSOR INTERFACE B

**As Expected**

<u>TEST CONDITIONS</u>	<u>RESULT</u>	<u>Status</u>
SENSOR DETECTION		
Channel B No Sensor	DONE	
Channel B Sensor present	DONE	



# Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 111-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item calibrated** Keysight E4417A Power Meter # MY55276004 +  
V8486A Power Sensor # MY55170003

Description of measurement standard / measuring instrument / identification

**Customer** Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of calibration** GOST 20271.1, MK KL 04.3-2014

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager Date of issue 10/17/2017

Name and position

**Calibration is performed by using**

- 1 Wattmeter M 568
- 2 Wattmeter M 546
- 3 Voltmeter V7-34
- 4 Frequency meter RCH3-72
- 5 Signal generator G4-186
- 6 Signal generator G4-161

**Calibration conditions**

Temperature: 21.9 °C.  
Humidity: 42.0 %.  
Pressure: 100.1 kPa.

**Calibration results are given in the Measuring report # 111-17**

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency Range	50 – 75 GHz	Corresponds
2	Range of Measured Power	1 $\mu$ W to 100 mW (–30 dBm to +20 dBm)	Corresponds
3	Accuracy	7.5 %	Corresponds (Table 1)

**Signature of the person who has performed calibration**



**M. Kasperovich/ Engineer**

Name and function

**Calibration Laboratory of  
 Microwave Measuring Equipment**  
 Accreditation certificate  
 No. BY/112 02.5.0.0065  
 Address: 6, P. Brovki str., Minsk  
 220027, Belarus  
 Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 111-17**  
 October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	<b>Keysight E4417A Power Meter # MY55276004 + V8486A Power Sensor # MY55170003</b>
Method of calibration:	GOST 20271.1, MK KL 04.3-2014
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 21.9 °C	Humidity: 42.0 %	Pressure: 100.1 kPa
----------------------	------------------	---------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 568	164
2	Wattmeter M 546	163
3	Voltmeter V7-34	0067787
4	Frequency meter RCH3-72	931200
5	Signal generator G4-186	5
6	Signal generator G4-161	3

## MEASURING RESULTS

Table 1

Frequency, GHz	50	55	65	75
Reference power, dBm	0.00	0.00	0.00	0.00
Measured power, dBm	-0.15	0.13	0.02	-0.12
Power measurement error, %	2.7	0.5	3.0	3.4
Expanded uncertainty, %	5.5	5.5	5.6	5.7

Engineer

M. Kasperovich

Quality Manager

A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1,  
Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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



## Calibration certificate

ISO 17025  
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 02.5.0.0065 of 09.01.2015

Certificate number 112-17 Date when calibrated 10/17/2017 Page 1 of 2

**Item calibrated** Keysight E4417A Power Meter # MY55276004 +  
W8486A Power Sensor # MY55230006

Description of measurement standard / measuring instrument / identification

**Customer** Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan,  
R.O.C.

Name of the customer, address

**Method of calibration** GOST 20271.1, MK KL 04.3-2014

Name of the method / identification

*All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of Ukraine. 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**



M. Svirid/ Technical manager

Name and position

**Date of issue** 10/17/2017



**Calibration is performed by using**

- 1 Wattmeter M 534
- 2 Wattmeter M 546
- 3 Voltmeter V7-34
- 4 Frequency meter RCH3-72
- 5 Signal generator G4-186
- 6 Signal generator RG4-14

**Calibration conditions**

Temperature: 21.9 °C.  
Humidity: 42.0 %.  
Pressure: 100.1 kPa.

**Calibration results are given in the Measuring report # 112-17**

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency Range	75 – 110 GHz	Corresponds
2	Range of Measured Power	1 $\mu$ W to 100 mW (–30 dBm to +20 dBm)	Corresponds
3	Calibration Factor (CF)	Data printed on the power sensor	Corresponds
4	Accuracy	15 %	Corresponds (Table 1)

**Signature of the person who has  
performed calibration**



**M. Kasperovich/ Engineer**  
Name and function

**Calibration Laboratory of  
Microwave Measuring Equipment**

Accreditation certificate

No. BY/112 02.5.0.0065

Address: 6, P. Brovki str., Minsk  
220027, Belarus

Phone/Fax: +375 17 2938496

Technical Manager



**MEASURING REPORT # 112-17**

October 17, 2017

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	<b>Keysight E4417A Power Meter # MY55276004 + W8486A Power Sensor # MY55230006</b>
Method of calibration:	GOST 20271.1, MK KL 04.3-2014
Number of samples:	One
Delivery date of the sample:	09/18/2017
Date of calibration:	From 09/18/2017 to 10/17/2017

## MEASURING CONDITIONS

Temperature: 21.9 °C	Humidity: 42.0 %	Pressure: 100.1 kPa
----------------------	------------------	---------------------

## MEASURING EQUIPMENT

#	Measuring equipment	Serial number
1	Wattmeter M 534	161
2	Wattmeter M 546	163
3	Voltmeter V7-34	0067787
4	Frequency meter RCH3-72	931200
5	Signal generator G4-186	5
6	Signal generator RG4-14	22

## MEASURING RESULTS

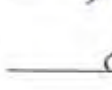
Table 1

Frequency, GHz	75.0	92.5	110.0
Reference power, dBm	0.00	0.00	0.00
Measured power, dBm	-0.08	-0.16	-0.26
Power measurement error, %	1.8	3.6	5.8
Expanded uncertainty, %	5.7	6.0	7.2

Engineer


 M. Kasperovich

Quality Manager


 A. Kostrikin

This Measuring report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1,  
Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.

2. Calibration Laboratory of Microwave Measuring Equipment

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