

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 15-21 Date when calibrated 11.02.2021 Page 1 of 2

Item calibrated Antenna QWH-QPRR00 # 2

Customer Bureau Veritas Consumer Products Services (Hong Kong) Limited,
Taoyuan Branch

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. 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 11.02.2021

Calibration Certificate

Certificate number **15-21**

Page 2 of 2

Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M1-11	Calibrator of power with wattmeter M3-22A	841202/ 037410	08 December 2021	3882-43	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
MG3694C	Signal generator	133805	11 September 2021	2726-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	23 September 2021	2742-42	DC Voltage
RCH3-72	Frequency meter	931200	18 September 2021	2822-43	Frequency
P6-133	Horn antenna	15005	23 September 2021	2374-43	Gain
P6-11B	Measuring horn antenna	08051	23 September 2021	2370-43	Gain

Calibration conditions

Temperature: 22.2 °C.
Humidity: 37.0 %.
Pressure: 100.2 kPa.

Calibration results are given in the measurement report # 15-21

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	33 – 55 GHz	Corresponds
2	Antenna Gain	22.5* dBi	Corresponds (Table 1)
3	Antenna Factor	41 dB/m	Corresponds (Table 1)

* – Expanded uncertainty of measurements 2.0 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

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MEASUREMENT REPORT # 15-21

February 11, 2021

Customer:	Bureau Veritas Consumer Products Services (Hong Kong) Limited, Taoyuan Branch
Item calibrated:	Antenna QWH-QPRR00 # 2
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	14.01.2021
Date of calibration:	From 14.01.2021 to 11.02.2021

MEASUREMENT CONDITIONS

Temperature: 22.2 °C	Humidity: 37 %	Pressure: 100.2 kPa
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MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M1-11	Calibrator of power with wattmeter M3-22A	841202/037410	08 December 2021	3882-43	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
MG3694C	Signal generator	133805	11 September 2021	2726-43	RF Power Frequency
V7-34	Universal voltmeter	0067787	23 September 2021	2742-42	DC Voltage
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MEASUREMENT RESULTS

Distance between tested and generating antenna 2.0 m.

Table 1

Frequency, GHz	33	44	55
Power density of electromagnetic field, W/m ²	0.035	0.042	0.057
Maximum level of measured power, dBm	-16.0	-15.9	-16.4
Gain, dBi	22.0	22.4	22.3
Expanded uncertainty, dB	2.0	2.0	2.0
Antenna Factor, dB/m	40.2	40.9	42.8

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. Bureau Veritas Consumer Products Services (Hong Kong) Limited, Taoyuan Branch
2. Calibration Laboratory of Microwave Measuring Equipment

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