Calibration Laboratory of Microwave Measuring Equipment of MWMLab

ISO 17025
ACCREDITED LABORATORY

Calibration certificate

Accreditation certificate No. **№ BY/112 5.0065** **of** **09.01.2015**

Certificate number **25-21** **Date when calibrated** **11.02.2021** **Page** 1 **of** 2

Item calibrated **Antenna RDH03.4 # 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**

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Calibration Certificate

Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M 514	Reference power meter	165	24 March 2022	1/111-176-20	RF Power
RG4-14	Signal generator	22	12 October 2021	22-20	RF Power
02	Frequency multiplier	02	11 January 2023	05-21	RF Power
03	Frequency multiplier	03	11 January 2023	06-21	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
P6-137	Measuring horn antenna	15001	23 September 2021	2373-43	Gain

Calibration conditions

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

Calibration results are given in the measurement report # 25-21

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	220 – 330 GHz	Corresponds
2	Antenna Gain	26.0* dBi	Corresponds (Table 1)
3	Antenna Factor	54 dB/m	Corresponds (Table 1)

* – Expanded uncertainty of measurements 2.5 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

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Technical Manager

February 11, 2021

MEASUREMENT REPORT # 25-21

February 11, 2021

Customer:	Bureau Veritas Consumer Products Services (Hong Kong) Limited, Taoyuan Branch
Item calibrated:	**Antenna RDH03.4 # 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

MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
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MEASUREMENT RESULTS

Distance between tested and generating antenna 0.5 m.

Table 1

Frequency, GHz	220	275	330
Power density of electromagnetic field, W/m^2	1.52	0.593	0.121
Maximum level of measured power, dBm	-13.7	-16.8	-16.4
Gain, dBi	23.7	25.6	26.1
Expanded uncertainty, dB	2.2	2.5	2.5
Antenna Factor, dB/m	53.4	53.4	54.5

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 _____