

Calibration Certificate

Certificate number **34-20**

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Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M 523	Reference power meter	162	24 March 2022	1/111-172-20	RF Power
M 514	Reference power meter	165	24 March 2022	1/111-176-20	RF Power
02	Frequency multiplier	02	23 January 2020	02-19	RF Power
RG4-14	Signal generator	22	10 July 2020	24-19	RF Power
V7-34	Universal voltmeter	0067787	27 September 2020	1994-42	DC Voltage
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-32	Measuring horn antenna	115671	23 September 2021	2369-43	Gain

Calibration conditions

Temperature: 22.5 °C.
Humidity: 43.0 %.
Pressure: 101.0 kPa.

Calibration results are given in the measurement report # 34-20

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	140 – 220 GHz	Corresponds
2	Antenna Gain	22.6* dBi	Corresponds (Table 1)
3	Antenna Factor	52.5 dB/m	Corresponds (Table 1)

* – Expanded uncertainty of measurements 3.0 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 # 34-20

July 10, 2020

Customer:	SPORTON INTERNATIONAL (SHENZHEN) INC. 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen, 518055, People's Republic of China
Item calibrated:	Antenna QWH-GPRR00 # 01
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	09.06.2020
Date of calibration:	From 09.06.2020 to 10.07.2020

MEASUREMENT CONDITIONS

Temperature: 22.5 °C	Humidity: 43 %	Pressure: 101.0 kPa
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MEASUREMENT EQUIPMENT

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MEASUREMENT RESULTS

Distance between the testing and generating antennas was 1 m at 140 GHz, 0.6 m at 180 GHz and 0.3 m at 220 GHz.

Table 1

Frequency, GHz	140	180	220
Power density of electromagnetic field, W/m ²	0.311	0.369	0.327
Maximum level of measured power, dBm	-17.1	-18.1	-20.2
Gain, dBi	22.3	22.8	22.9
Expanded uncertainty, dB	2.5	3.0	3.0
Antenna Factor, dB/m	50.8	52.5	54.2

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




Quality Manager