

CERTIFICATE OF CALIBRATION

Number **NE25/03017**

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LabCal - Wavecontrol

Radio-electric Calibration Laboratory
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WAVECONTROL

ITEM	EM Field Meter + Isotropic EM Field Probe
BRAND	Wavecontrol
MODEL	Meter: SMP2 Probe: WPF60
IDENTIFICATION	Meter: 22SN1914 Probe: 22WP230188
APPLICANT	Bureau Veritas Consumer Products Services (Hong Kong) No. 19, Huaya 2nd Rd., Guishan Dist., Taoyuan City 33383, Taiwan 33383 Taoyuan City (Taiwan)
DATE/S OF CALIBRATION	18/06/2025

Authorized Signatories

Date of issue: 19/06/2025



David Guayerbas
Laboratory Technician

Signature Not
Verified
Digitally signed by
ALEJANDRO CLAYSA
MORENO
Date: 2025.06.25
08:14:33 CEST
Reason: Wavecontrol
Location: Barcelona

Laboratory Director

This certificate has been issued by digital signature, any print of it will be considered a copy.

Measurement:

The calibration of field strength monitors involves the generation of a known linearly polarised electromagnetic field, approximating to a plane wave, into which the probe or sensor is placed.

The probe is positioned on a low reflectivity mount inside a microwave anechoic chamber on the bore sight of a linearly polarised horn antenna. The probe under test is always perpendicular to the direction of propagation and parallel to the electric field.

The follow parameter is obtained:

Correction factor (CF)

For each measurement, the input power to the test facility is adjusted so that the actual field strength is set to a specific value. The field strength indicated by the probe under calibration is then read and the correction factor calculated using the following definition:

$$CF = \frac{\text{Actual Field Strength}}{\text{Indicated Field Strength}} \quad CF^2 = \frac{\text{Actual Power Density}}{\text{Indicated Power Density}}$$

The indicated field strength must be multiplied by the appropriate correction factor to give the actual field strength.

Reference standards:

IEEE Std 1309:2013 “Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 kHz to 40 GHz”.

Uncertainties:

The uncertainty of calibration for this device at the calibrated frequency is as follows:

60 – 90 GHz: ± 4.2 dB

The measurement uncertainties above apply only when the probe is supported in a low reflectivity mount. The user should be aware of the effects of reflections from nearby objects, including human body, and should allow additional measurement uncertainties accordingly.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with the EA-4/02 M document.

Environmental conditions:

Humidity	Temperature
(50 ± 20) % rH	(23 ± 2) °C

The uncertainties refer to the measured devices only. They relate to the on-the-day values and make no allowance for drift or operation under other environmental conditions.

Procedure:

PC-1206 – Calibration of electric field probes in the range 800 MHz – 40 GHz

This method follows the *Standard probe method*. A reference probe is used to measure and calibrate the field used for calibrating the probe under calibration.

Calibration engineer: David Guayerbas

Calibration set-up:

Position 1: Display of the meter facing to direction of propagation

Position 2: Probe rotated 90° from Position 1

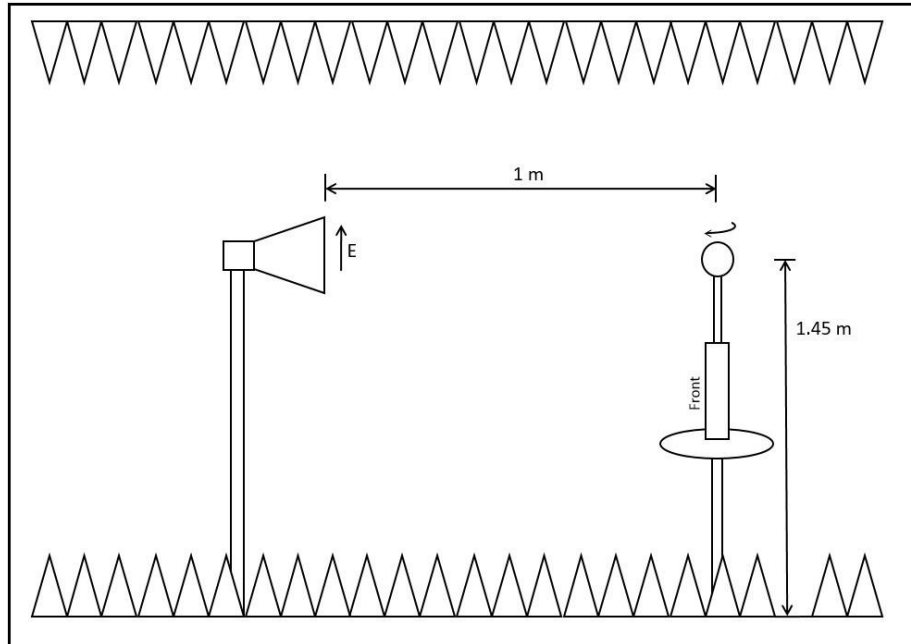


Figure 1: Calibration set-up in the anechoic chamber

Results:

The correction factors (CF) for each position and the average correction factor are given. This average correction factor must be applied to the measured value for the total field.

The average correction factor is the arithmetic mean of the correction factors for the two positions.

The correction factors given below must be multiplied by the measured value for the field in order to obtain the actual field value:

Frequency response						
Freq. (MHz)	Actual Field (V/m)	Measured Field (V/m)		CF		
		Position 1	Position 2	Position 1	Position 2	Mean
60000	21.31	10.96	11.90	1.94	1.79	1.87