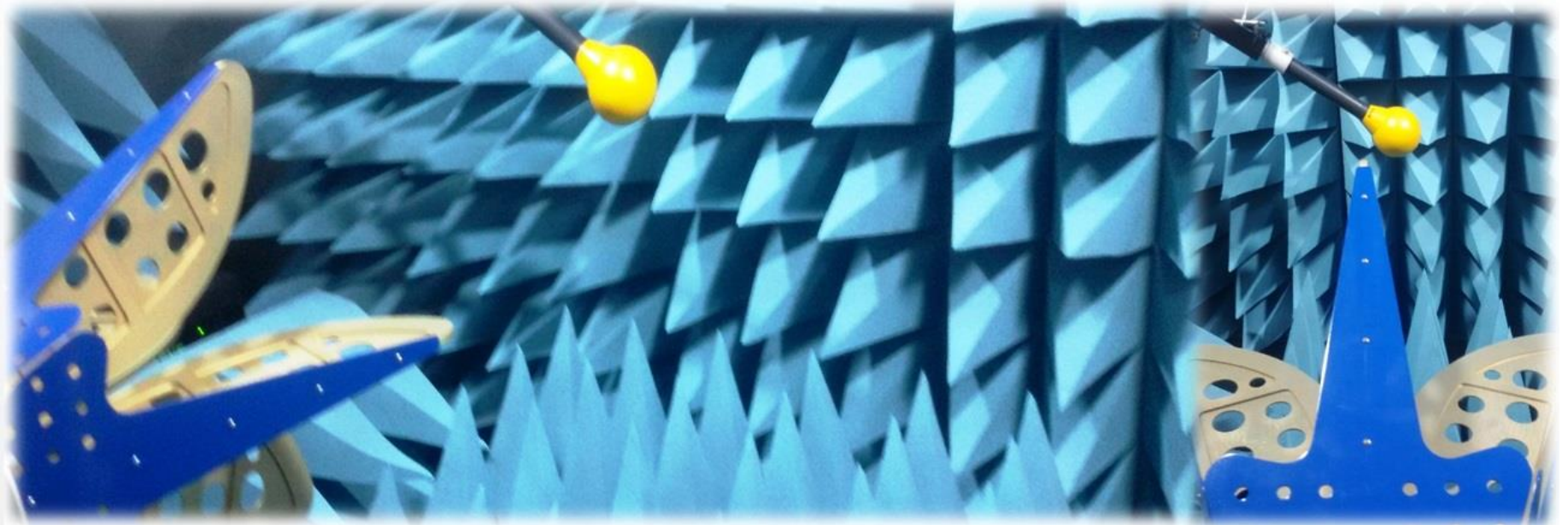


Calibration of Radiation hazard Meters

Nitin Jain / Bharat Jain



Outline

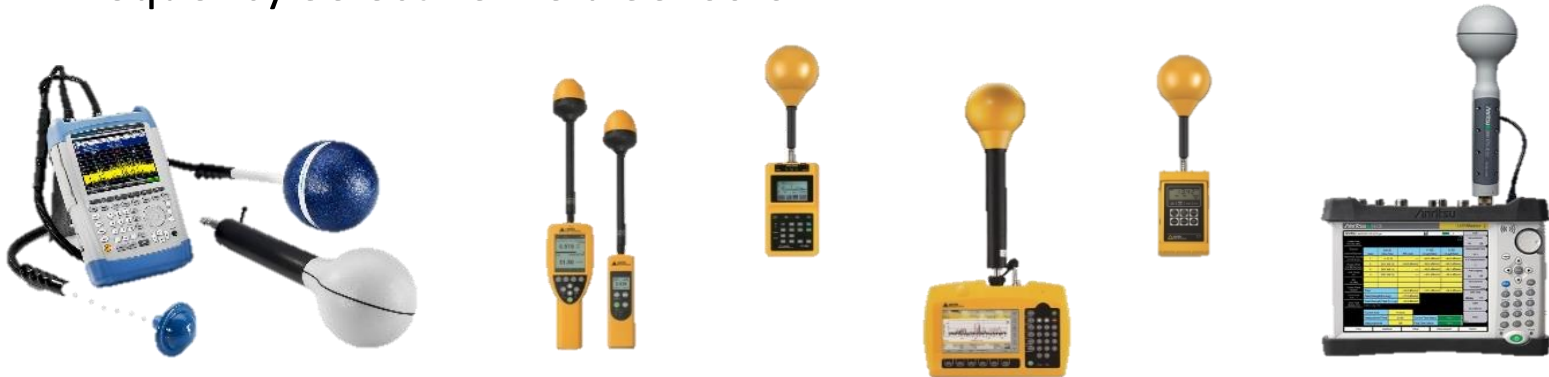
- Introduction
- Devices Calibrated
- Calibration Method / Process
- Measured Properties of Field Strength Probes
- Calibration Certificate (As per ISO 17025)
- Logistics
- Conclusion

Introduction

- Joint Venture b/w BNN Communication India and SPEAG Switzerland.
- Accredited for SAR Measurement for Mobile Phones since 2013.
- Recently accredited for calibration of EMF Field Hazard Meters.
- Ultra-Modern facility using 6 Axis Robot for handling the DUT.
- Only facility of its type in INDIA
- Calibration Mandatory as per TEC Gr/TX/GR/EMI-001/02 Sep 2011:
 - “ Calibration by OEM or an Accredited Lab”
- Lab located at New Delhi NCR.

Devices Calibrated

- Handheld Radiation Hazard Probes and associated meters
- Single and multi-axis electric field strength sensors
- Personal Protection Monitors
- Shaped Response Probes
- Frequency Selective Field Sensors



Calibration Process / Methods

- IEEE 1309 – 2013 Probe Calibration Standard : IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes (Excluding Antennas) from 9 KHz to 40 GHz

Table 2—Three calibration methods

Method	Description
A	Calibration using the transfer standard (i.e., a field sensor or probe similar to the one being calibrated), which has traceability to a national standards laboratory (see 8.2). The transfer standard is used to measure and calibrate the field used for calibrating the field sensor or probe under calibration.
B	Calibration using calculated field strengths. The probe under calibration is placed in a reference field calculated based on the geometry of the field generator and the field generator measured input parameters (see Clause 5).
C	Calibration using a primary standard (i.e., reference) sensor, which contains no active or passive electronic devices, with a response that is mathematically calculable from the shape, size, and Maxwell's equations and, therefore, has its calibration traceable to a national standards laboratory, based on international standards for length and other appropriate physical quantities (see IEC Draft 61000-4-33 [B51] and Sower [B116]). A primary standard sensor is used to determine the field strength that is used to calibrate a probe under calibration.



Measured Properties of Probes

- Frequency Response (300 MHz – 3 GHz)
- Amplitude Response / Linearity (5 V/m – 20 V/m)
- Axial Isotropy (Ellipse Ratio)
- Individual Calibration of X, Y and Z axis
- Modulation Response (optional)



Calibration Certificate (As Per ISO 17025)

Contains:

- Electric Field Cal Factors @ different frequencies
- Measurement Uncertainty.
- Calibration Procedure
- Metrological Traceability.
- Result Interpretation (Pass / Fail)

BNN SPEAG Test & Calibration Lab India Pvt. Ltd.
11/11 Sector 11, Rajendra Nagar, Sahibabad-201005, India
Tel: +91-120-4281067, Fax: 91-120-9562656
www.bnnSpeag.com

BnnSPEAG TEST & CALIBRATION LABS

Calibration Certificate

BNN SPEAG Test & Calibration Lab, India Pvt. Ltd. hereby certifies that the object referred to in this certificate has been calibrated by qualified personnel using BNN SPEAG's approved procedure.

OBJECT	Probe BF 0391, E-Field	Broadband Field Meter NRM-550
Manufacturer	Narda Safety Test Solutions GmbH	
Part No. (P/N)	2402/01B	2401/01B
Serial No. (S/N)	D-6605	E-0700

Customer: **BNN Communication Engineers, Sahibabad**

Calibration Date: **June 02-03, 2016**

Result Assessment: **PASS**

Ambient Conditions: **Temperature: 18°C to 25°C
Humidity: 30 to 70%**

Parameters Calibrated / Calibration Procedure Used: **Electric Field (V/m)/ IEEE 1309-2013.**

Issue Date: **June 03, 2016**

Calibrated By: **Gunesh Gunjan
Lab Supervisor**

Approved By: **Bharat K. Jain
(Authorized Signatory)**

Certificate No: **T-2510**

The Calibration Certificate may not be reproduced or re-size in full or in part without the permission of the issuing laboratory. Calibration Certificate without signature is not valid.

Certificate No. CS-18/024

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Commercials

- Attractive and Competitive pricing.
- 3 Days lead time + 5 day TAT as standard.
- Special arrangement for urgent (Tatkal) calibration.
- Deposit and collection of DUT under customers own arrangement (by hand / through courier services).

Conclusion

- Ultra-Modern calibration facility using Robot.
- Calibration as per international standards.
- Accredited calibration facility for EMF hazard meters.
- Low turn around time (in days against months from OEM).
- Attractive and Competitive Pricing

THANKS