

## Case Study 2

Outlier for 4 measurements in EMC conducted emissions program.

**History:** The lab is a CTF3, relatively new to the CB scheme.

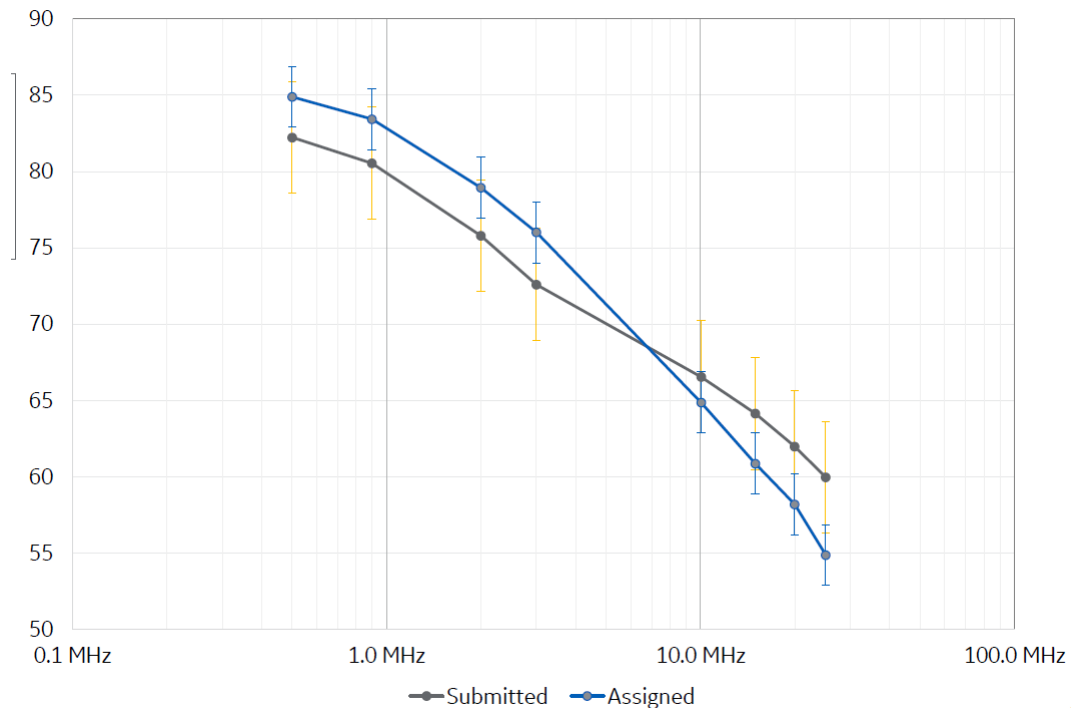
Laboratory has participated in 2 programs during 2018, none before.

They received outliers in Creepage and Clearance, having stated they only engaged in the program because they were forced to do so by the NCB. This did not imply they did not perform creepage and clearance tests. Resolved by providing a formal training program structure for creepage and clearance work.

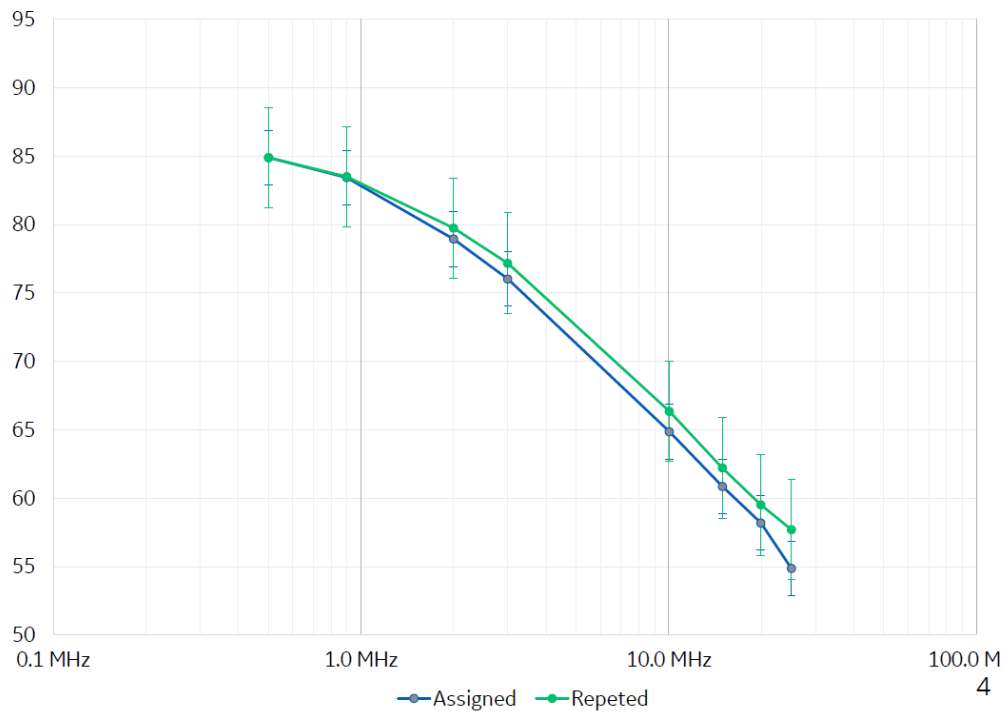
For 17e40, the lab had good results for all frequencies except 25 MHz.

Test			Submitted Result	Submitted uncertainty	Assigned value	Assigned uncertainty	En-score	Assessment
L1 (brown wire) 50 kHz	500kHz(+/-3%)	Max. Voltage Average dB(μV)	82.23	3.67	84.89	2	-0.636	Pass
	900kHz(+/-3%)	Max. Voltage Average dB(μV)	80.54	3.67	83.43	2	-0.691	Pass
	2.0MHz(+/-3%)	Max. Voltage Average dB(μV)	75.79	3.67	78.94	2	-0.754	Pass
	3.0MHz(+/-3%)	Max. Voltage Average dB(μV)	72.59	3.67	76.02	2	-0.821	Pass
	10.0MHz(+/-3%)	Max. Voltage Average dB(μV)	66.54	3.67	64.86	2	0.402	Pass
	15.0MHz(+/-3%)	Max. Voltage Average dB(μV)	64.14	3.67	60.86	2	0.785	Pass
	20MHz(+/-3%)	Max. Voltage Average dB(μV)	61.98	3.67	58.19	2	0.907	Pass
	25MHz(+/-3%)	Max. Voltage Average dB(μV)	59.96	3.67	54.87	2	1.218	Fail
L2 (blue wire) 50 kHz	500kHz(+/-3%)	Max. Voltage Average dB(μV)	82.44	3.67	84.71	2	-0.543	Pass
	900kHz(+/-3%)	Max. Voltage Average dB(μV)	80.68	3.67	83.28	2	-0.622	Pass
	2.0MHz(+/-3%)	Max. Voltage Average dB(μV)	75.76	3.67	78.86	2	-0.742	Pass
	3.0MHz(+/-3%)	Max. Voltage Average dB(μV)	72.47	3.67	75.94	2	-0.830	Pass
	10.0MHz(+/-3%)	Max. Voltage Average dB(μV)	66.51	3.67	64.78	2	0.414	Pass
	15.0MHz(+/-3%)	Max. Voltage Average dB(μV)	64.13	3.67	60.69	2	0.823	Pass
	20MHz(+/-3%)	Max. Voltage Average dB(μV)	61.96	3.67	57.86	2	0.981	Pass
	25MHz(+/-3%)	Max. Voltage Average dB(μV)	59.94	3.67	54.3	2	1.349	Fail

The lab determined that results at the lower frequencies were underestimated, while those at the higher frequencies were over-estimated.



The laboratory repeated the tests with better results



### Originally submitted root cause

## 4. Root cause analysis

Laboratory submitted outlier results.



Why it was outlier?

**Because all measured values at 25MHz was cca. 5dB higher.**



Why it was higher?

**Because the pulse limiter has clipped the disturbance signal.**



Why the limiter has clipped the signal ?

**Because the signal reached the threshold of cut of the limiter.**



Why it was not noticed?

**Because all of the previously tested samples had much lower signal level .**



Why they had much lower signal?

**Because laboratory tested only compliance luminaires before.**

## Root cause found as Laboratory has **not enough practice in measuring of high energy level disturbance signals.**

### Proposed corrective actions

**Action 1:** Record the case in Quality Management System: Issue Corrective Action Request

**Responsible:** Laboratory Quality Leader

**Completed:** November 09, 2018 (CAR No.: xxxx)

**Action 2:** Consultation with NCB regarding missed points during proficiency test

**Responsible:** EMC laboratory Leader

**Completed:** December 07, 2018

**Action 3:** Perform an impact analysis for previous measurements.

**Responsible:** Laboratory Quality Leader

**Completed:** December 11, 2018

**Action 4:** Amend measurement procedure how to check saturation of the limiter before measurement.

**Responsible:** EMC laboratory Leader

**Deadline:** February 07, 2019

**Action 5:** Monitor the success of above actions by regular re-testing of a golden sample after each calibration.

**Responsible:** EMC laboratory Leader

**Deadline:** April 30, 2019

### IFM staff reply

The action was closed.

### Questions for workshop:

1. In your opinion, is “Laboratory has not enough practice in measuring of high energy level disturbance signals” a true articulation of the root cause?
  - a. Why? / Why not?
2. Will the proposed actions prevent future re-occurrence of similar issues?
3. Could you re-word the root cause to better articulate it?
4. Do you have any suggestions for future improvement?