

Report on Radio Testing of the FLUKE CORPORATION

RotAlign Elite Laser
RotAlign Elite Sensor
ALI 54.911
ALI 54.901

In accordance with EN 300 328 (partly)

Prepared for: FLUKE CORPORATION
6920 Seaway Blvd,
Everett,
WA 98203 USA



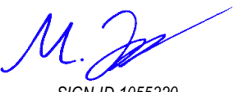
Product Service

Add value.
Inspire trust.

COMMERCIAL-IN-CONFIDENCE

Date: 2025-07-04

Document Number: TR-713371678-02 | Revision 0

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Michael Ingerl	2025-07-04	 SIGN-ID 1055320
Authorised Signatory	Matthias Stumpe	2025-07-04	 SIGN-ID 1055751

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Executive Statement:

A sample of this product was partly tested and found to be partly compliant with EN 300 328 V2.2.2 in the tested parts.



Deutsche
Akkreditierungsstelle
D-PL-11321-11-00

DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD Product Service with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD Product Service. No part of this document may be reproduced without the prior written approval of TÜV SÜD Product Service. © 2025 TÜV SÜD Product Service.

ACCREDITATION

Our DAkkS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our DAkkS Accreditation. Results of tests not covered by our DAkkS Accreditation Schedule are marked NDA (Not DAkkS Accredited).

Trade Register Munich
HRB 85742
VAT ID No. DE129484267
Information pursuant to Section 2(1)
DL-InfoV (Germany) at
www.tuvsud.com/imprint

Managing Directors:
Wolfgang Hübl (Sprecher / CEO)
Karl Meier
Patrick van Welij

Phone: +49 (0) 9421 5682-0
Fax: +49 (0) 9421 5682-199
www.tuvsud.com

TÜV SÜD Product Service GmbH
Äußere Frühlingsstraße 45
94315 Straubing
Germany



Content

1	Report Summary.....	2
1.1	Modification Report	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Product Information	4
1.5	Test Configuration	4
1.6	Modes of Operation.....	4
1.7	Deviations from Standard.....	5
1.8	EUT Modifications Record	5
1.9	Test Location	5
2	Test Details.....	6
2.1	Transmitter unwanted emissions in the spurious domain.....	6
2.2	RF Output Power	11
3	Test setup photos	14
4	Measurement Uncertainty	16



1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

<i>Revision</i>	<i>Description of changes</i>	<i>Date of Revision</i>
0	First Revision	2025-07-04

Table 1: Report of Modifications

1.2 Introduction

<i>Applicant</i>	FLUKE CORPORATION
<i>Manufacturer</i>	FLUKE CORPORATION
<i>Model Number(s)</i>	ALI 54.911 ALI 54.901
<i>Serial Number(s)</i>	ALI 54.911: 54911103, ALI 54.901: 54901108
<i>Hardware Version(s)</i>	1.00
<i>Software Version(s)</i>	ALI 54.911: L_1.0_43_emc_c87eed.elf ALI 54.901: SR_application_a0.0.1_b2.1_90_6593b6
<i>Number of Samples Tested</i>	2
<i>Test Specification(s) /</i>	EN 300 328 V2.2.2
<i>Issue / Date</i>	
<i>Test Plan/Issue/Date</i>	---
<i>Order Number</i>	PO 23420
<i>Date of Receipt of EUT</i>	2025-05-12
<i>Start of Test</i>	2025-05-16
<i>Finish of Test</i>	2025-05-16
<i>Name of Engineer(s)</i>	Michael Ingerl
<i>Related Document(s)</i>	---



Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out is shown below.

<i>Section</i>	<i>In Accordance with</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	EN 300 328 V2.2.2	4.3.2.9 5.4.9	Transmitter unwanted emissions in the spurious domain	Pass
2.2	EN 300 328 V2.2.2	4.3.2.2 5.4.2.2	RF Output Power	Pass

Table 2: Results



1.4 Product Information

1.4.1 General Technical Description

The test setup consisted of a sensor module and a laser module.

Bluetooth LE frequency band from 2400 MHz to 2483.5 MHz

Frequency Band: 3 b (2400 – 2483.5 MHz)

Supply Voltage: 3.6 V Battery

Supply Frequency: 0 Hz (DC)

1.5 Test Configuration

Configuration	Description
The laser module and the sensor module working together.	The EUT RotAlign Elite Laser, Model: ALI 54.911 and the EUT RotAlign Elite Sensor, Model: ALI 54.901 working together in measuring mode.

1.6 Modes of Operation

Mode	Description
Standard Meas mode	The EUT measured continuously. The EUT was in battery mode. Bluetooth connection was continuously active.



1.7 Deviations from Standard

1.8 EUT Modifications Record

The table below details modifications made to the EUT during the test program.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
RotAlign Elite Laser, Model: ALI 54.911, Serial Number: 54911103			
0	As supplied by the customer	Not Applicable	Not Applicable
RotAlign Elite Sensor, Model: ALI 54.901, Serial Number: 54901108			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.9 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
Configuration in accordance with modes of operation in section 1.5 and 1.6	
Transmitter unwanted emissions in the spurious domain	Michael Ingerl
RF output power	Michael Ingerl

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Transmitter unwanted emissions in the spurious domain

2.1.1 Specification Reference

EN 300 328 V2.2.2, clause 4.3.2.9,

2.1.2 Equipment under Test and Modification State

ALI 54.911, S/N: 54911103 and ALI 54.901, S/N: 54901108; Modification state 0

2.1.3 Date of Test

2025-05-16

2.1.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	36 %

2.1.5 Test Method

The test was performed according to:

EN 300 328 V2.2.2, clause 5.4.9



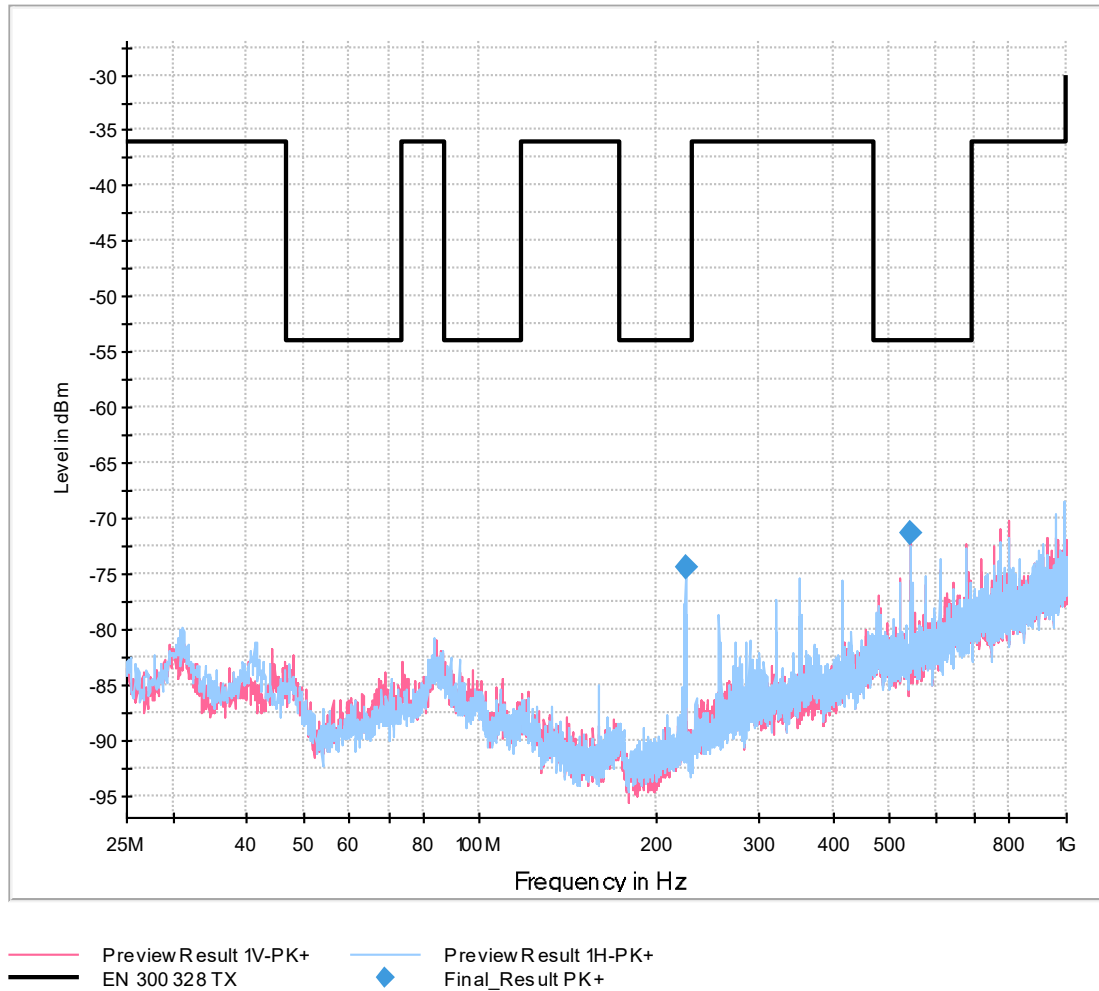
2.1.6 Specification Limits

EN 300 328, 4.3.2.9.3: Transmitter unwanted emissions in the spurious domain

<i>Frequency range(s)</i>	<i>Maximum power</i>	<i>Bandwidth</i>
30 MHz – 47 MHz; 74 MHz – 87.5 MHz; 118 MHz – 174 MHz; 230 MHz – 470 MHz; 694 MHz – 1 GHz	-36 dBm	100 kHz
47 MHz – 74 MHz; 87.5 MHz – 118 MHz; 174 MHz – 230 MHz; 470 MHz – 694 MHz	-54 dBm	
1 GHz – 12.75 GHz	-30 dBm	1 MHz



2.1.7 Test Results

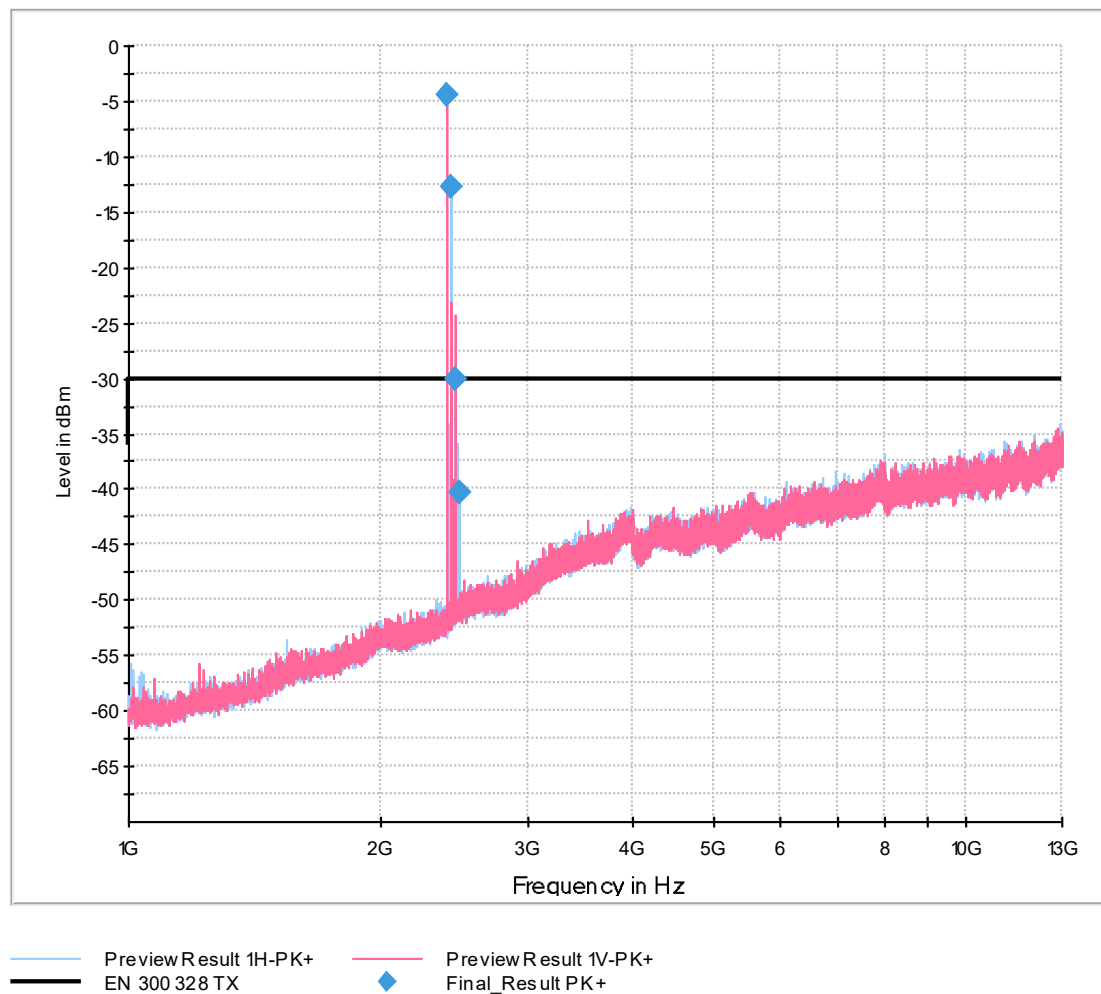


Final Results 1:

Frequency	MaxPeak	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	ms	kHz	cm		deg	dB
223.954167	-74.48	-54.00	20.48	2.5	100.000	150.0	H	347.0	-117.7
544.025000	-71.32	-54.00	17.32	2.5	100.000	150.0	V	191.0	-109.8



Product Service



Final Results 1:

Frequency MHz	MaxPeak dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
2401.882353	-4.41	#1	#1	1000.0	1000.000	150.0	V	265.0	-63.3
2425.882353	-12.81	#1	#1	1000.0	1000.000	150.0	H	209.0	-63.1
2458.705882	-30.13	#1	#1	1000.0	1000.000	150.0	H	0.0	-62.8
2477.058824	-40.24	#1	#1	1000.0	1000.000	150.0	H	0.0	-62.7

#1: Intentional radiation



2.1.8 Test Location and Test Equipment

The test was carried out in fully anechoic room No. 2

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyser	Rohde & Schwarz	FSW43	53496	12	2026-04-30
Fully anechoic room	Albatross	Cabin no. 2	19312	---	---
RF matrix	TÜV SÜD	Relax RF Matrix	19801	---	---
ULTRALOG Antenna	Rohde & Schwarz	HL562E	38401	36	2026-01-31
Double ridged horn antenna	Rohde & Schwarz	HF907	64145	24	2025-06-30
EMC measurement software	Rohde & Schwarz	EMC32 Emission K2 – V10.40.00	44375	---	---

Table 4



2.2 RF Output Power

2.2.1 Specification Reference

EN 300 328 V2.2.2, clause 4.3.2.2,

2.2.2 Equipment under Test and Modification State

ALI 54.911, S/N: 54911103 and ALI 54.901, S/N: 54901108; Modification state 0

2.2.3 Date of Test

2025-05-16

2.2.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	36 %

2.2.5 Test Method

The test was performed according to:

EN 300 328 V2.2.2, clause 5.4.2.2,

Note: Measurement was performed radiated with spectrum analyzer (RMS detector, 10 MHz RBW)

2.2.6 Specification Limits

EN 300 328, 4.3.2.2.3: RF output power:

The RF output power for non-FHSS equipment shall be equal or less than 20 dBm.
For non-adaptive non-FHSS equipment, where the manufacturer has declared an RF output power lower than 20 dBm e.i.r.p., the RF output power shall be equal or less than that declared value.
This limit shall apply for any combination of power level an intended antenna assembly.



Product Service

2.2.7 Test Results

Frequency (MHz)	Max. Burst e.i.r.p. (dBm)	Limit e.i.r.p. (dBm)	Test Result
2402	-2.01	20	Pass

Note: Measurement was performed radiated with spectrum analyzer (RMS detector, 10 MHz RBW)



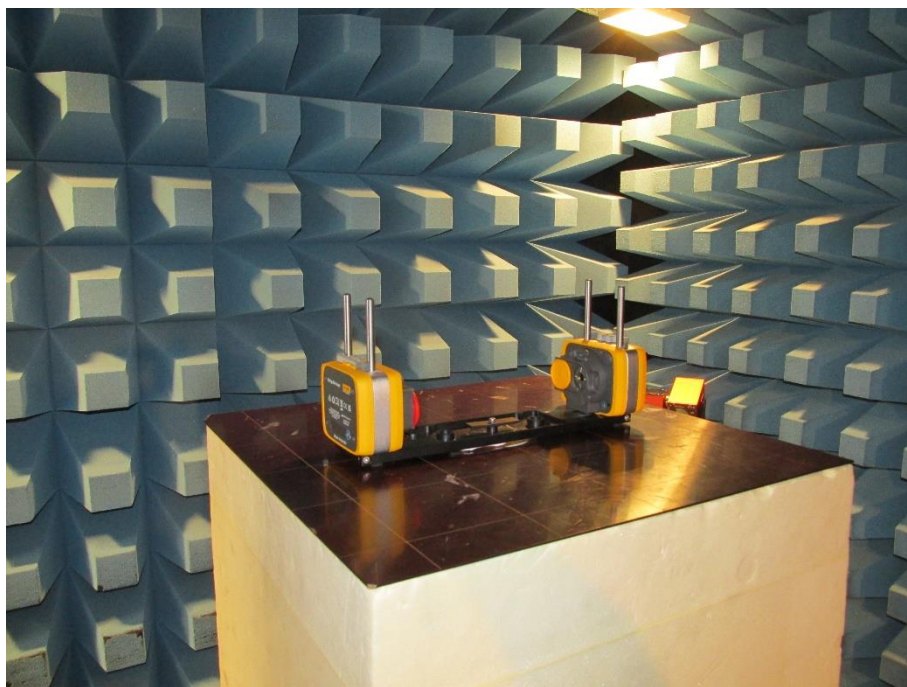
2.2.8 Test Location and Test Equipment

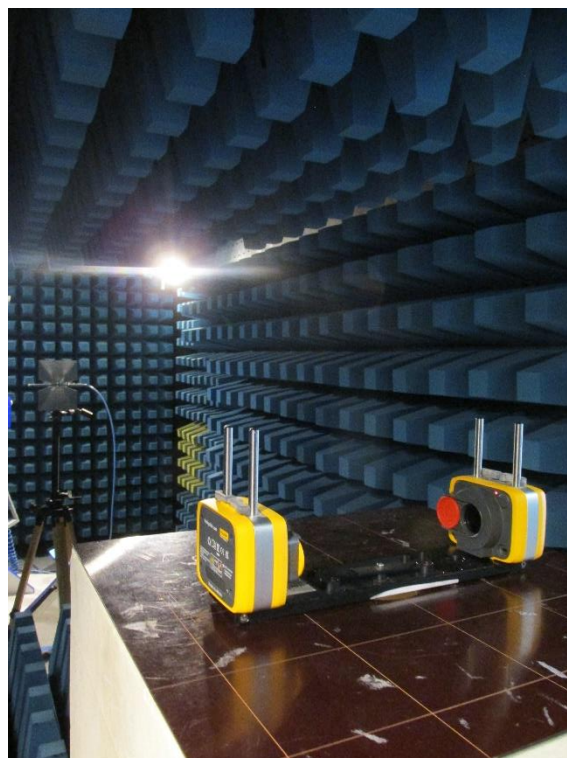
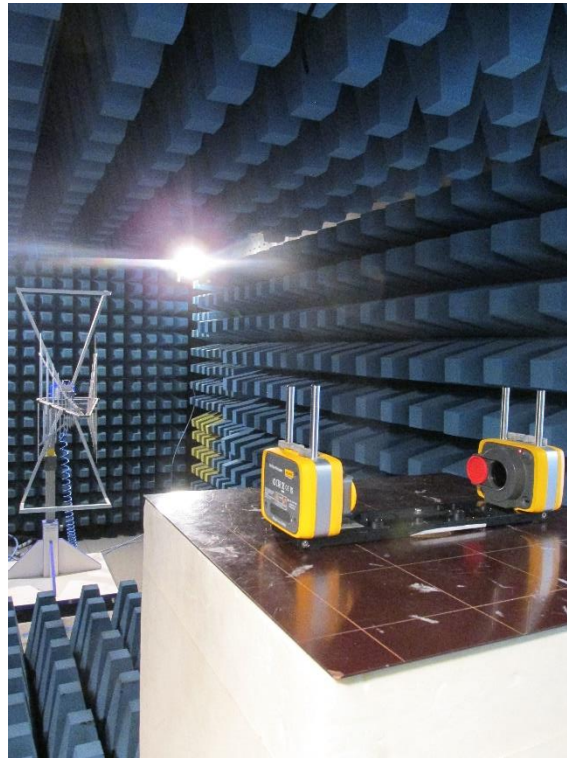
The test was carried out in fully anechoic room No. 2

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyser	Rohde & Schwarz	FSW43	53496	12	2026-04-30
Fully anechoic room	Albatross	Cabin no. 2	19312	---	---
RF matrix	TÜV SÜD	Relax RF Matrix	19801	---	---
Double ridged horn antenna	Rohde & Schwarz	HF907	64145	24	2025-06-30
EMC measurement software	Rohde & Schwarz	EMC32 Emission K2 – V10.40.00	44375	---	---

Table 5

3 Test setup photos







4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Field strength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$		

Table 6 Measurement uncertainty based on CISPR 16-4-2



<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
25 MHz – 6 GHz	1.96	±4.4 dB
1 GHz – 18 GHz	1.96	±4.7 dB
18 GHz – 40 GHz	1.96	±4.9 dB
40 GHz – 325 GHz	1.96	±6.1 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10 ⁻⁷
The expanded uncertainty reported according to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 7 Measurement uncertainty based on ETSI TR 100 028