

Antenna Report

Report Number:

F231143E4

Equipment under Test (EUT):

**Liquiphant FTL43
Antenna**

Applicant:

Endress+Hauser SE+Co. KG

Manufacturer:

Endress+Hauser SE+Co. KG

References

[1] None (According customer requirements)

Tested and
written by

Signature

Reviewed and
approved by:

Signature

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1 Identification

1.1 Applicant

Name:	Endress+Hauser SE+Co. KG
Address:	Hauptstr. 1, 79689 Maulburg
Country:	Germany
Name for contact purposes:	Mr. Ralf REIMELT
Phone:	+49 76 22 28 – 18 90
eMail address:	ralf.reimelt@endress.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Endress+Hauser SE+Co. KG
Address:	Hauptstr. 1, 79689 Maulburg
Country:	Germany
Name for contact purposes:	Mr. Ralf REIMELT
Phone:	+49 76 22 28 – 18 90
eMail address:	ralf.reimelt@endress.com
Manufacturer represented during the test by the following person:	None

1.3 Test Laboratory

The tests were carried out by: **PHOENIX TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

1.4 AUT (Antenna under test)

Test object: *	Point level switch antenna
Model name: *	Liquiphant FTL43 antenna
FCC ID: *	LCGFTL4X
IC certification number: *	2519A-FTL4X
PMN: *	FTL43, FTL60
HVIN: *	FTL43-2
FVIN: *	NA

	EUT number	
	1 (radiated)	2 (conducted PCB)
Serial number: *	FTL43_RED_EUT1	Engineering sample
PCB identifier: *	Sensor board: 71603955 Mainboard: 71439136 Terminal Board: 71439136 Visualisation Board: 71599584	Visualisation Board: 71599584
Hardware version: *	01.00.00	01.00.00
Software version: *	01.00.00	S140 V7.2.0 (Soft device)

* Declared by the applicant

One EUT was used for all tests.

Note: PHOENIX TESTLAB GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

1.5 Technical Data of Equipment

General	
Frequency Range *	2402 MHz to 2480 MHz

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
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Equipment used for testing	
FTL 43	-

1.6 Dates

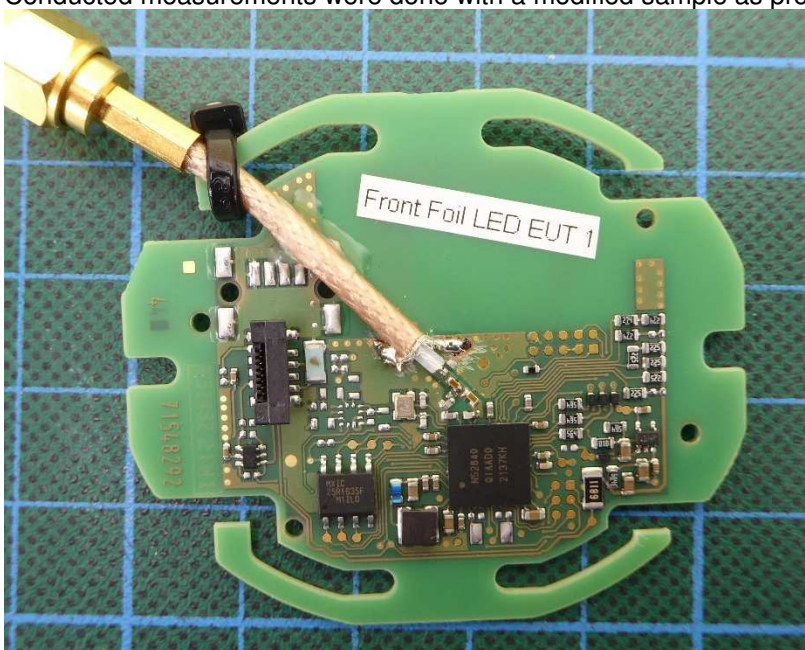
Date of receipt of test sample:	10.10.2023
Start of test:	03.06.2024
End of test:	03.06.2024

2 Operational States

During the antenna chart measurements, the antenna was supplied with a CW rf-signal generated by the EUT with a level as shown in the chapter below its antenna connector.

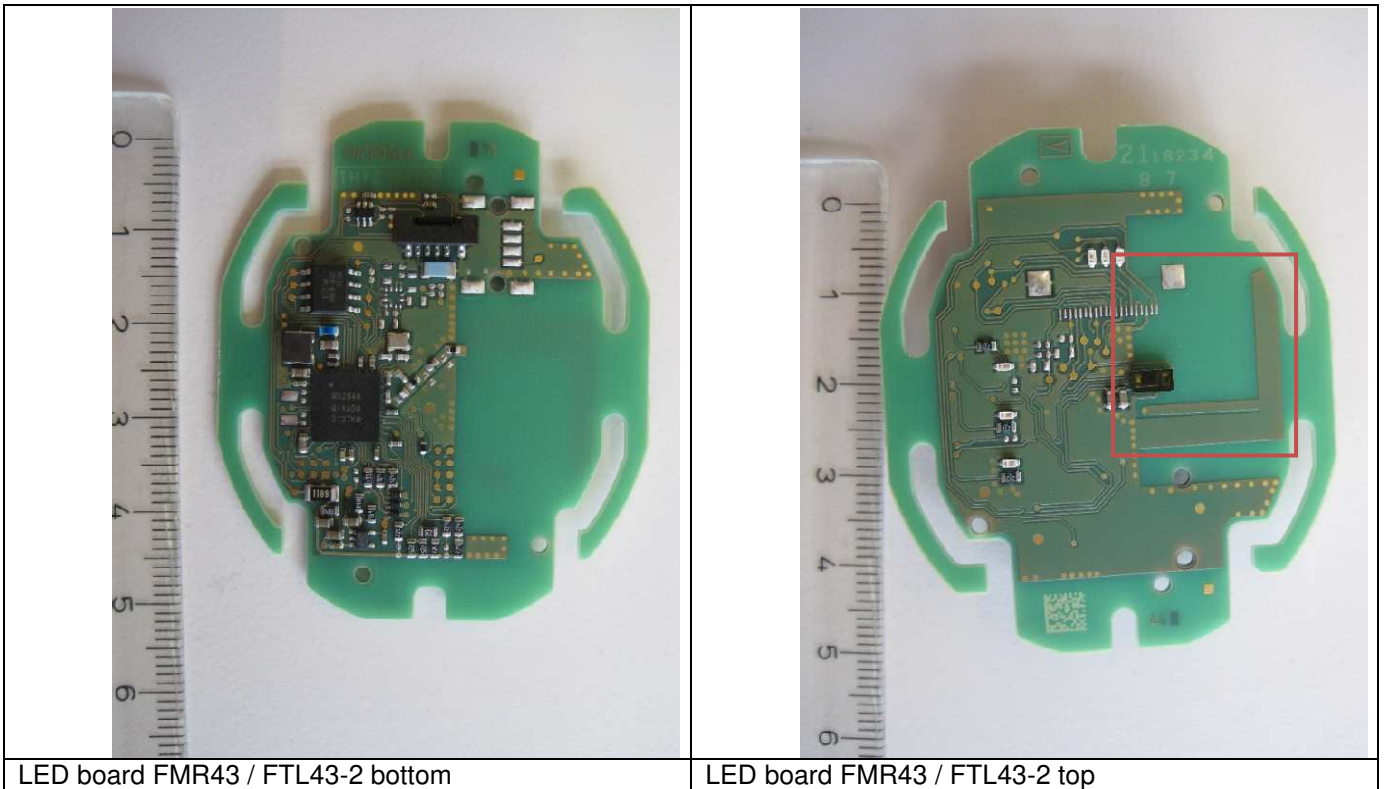
3 Additional Information

Conducted measurements were done with a modified sample as provided by the applicant.



4 Antenna photographs

4.1 Internal photographs



LED board FMR43 / FTL43-2 bottom
Photos were provided by the applicant

LED board FMR43 / FTL43-2 top

5 Antenna Charts

5.1 Results (Max. Gain)

Antenna gain calculation				
		f_{low}	f_{mid}	f_{high}
Conducted output power [dBm]		6.5	6.6	6.8
Radiated EIRP [dBm EIRP]		6.2	4.2	3.7
Antenna Gain [dBi]		-0.3	-2.4	-3.1
Position		Position 3	Position 3	Position 3
Position of maximum gain	Azimuth	17	19	23
	Polarisation	V	V	V

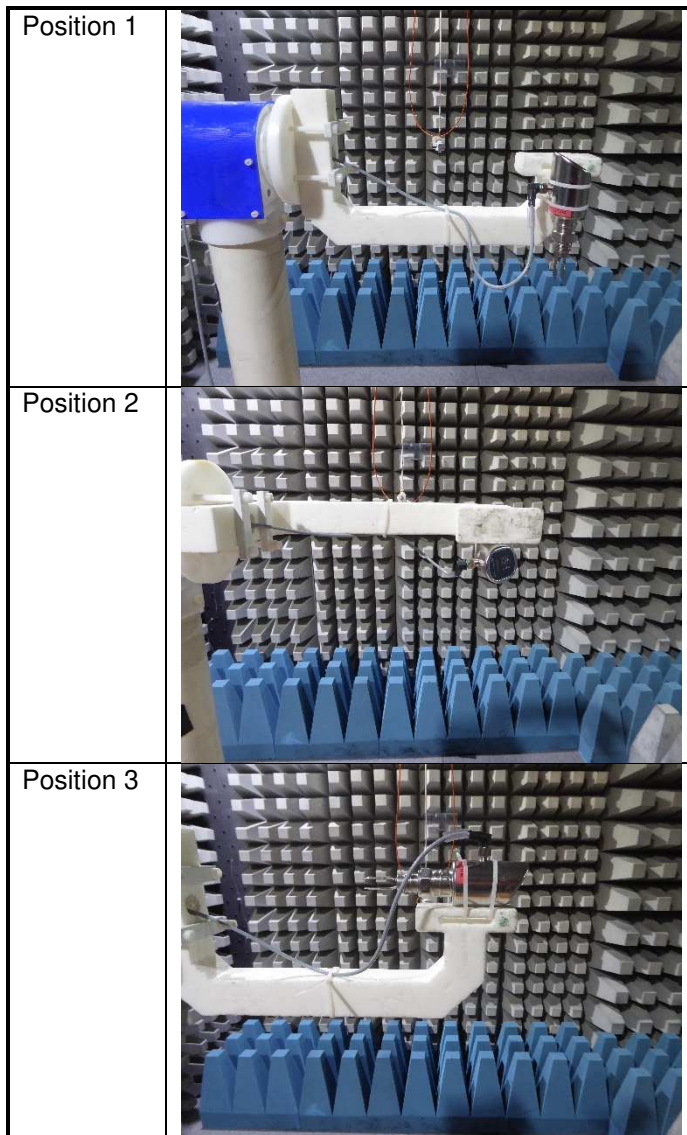
Conducted f_{low}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC 1 Bargraph	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4020000 GHz
	Max Peak 6.52 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
	Average 6.49 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
Conducted f_{mid}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC 1 Bargraph	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4400000 GHz
	Max Peak 6.66 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
	Average 6.64 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
Conducted f_{high}	Meas BW (6dB) 100 kHz Att 25 dB Input 1 AC 1 Bargraph	Meas Time 100 ms Notch PS Off On	Step TD Scan Automatic Preamp Off	Frequency 2.4800000 GHz
	Max Peak 6.78 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		
	Average 6.75 dBm	-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10		

Test equipment (please refer to chapter 7 for details)

1 - 11

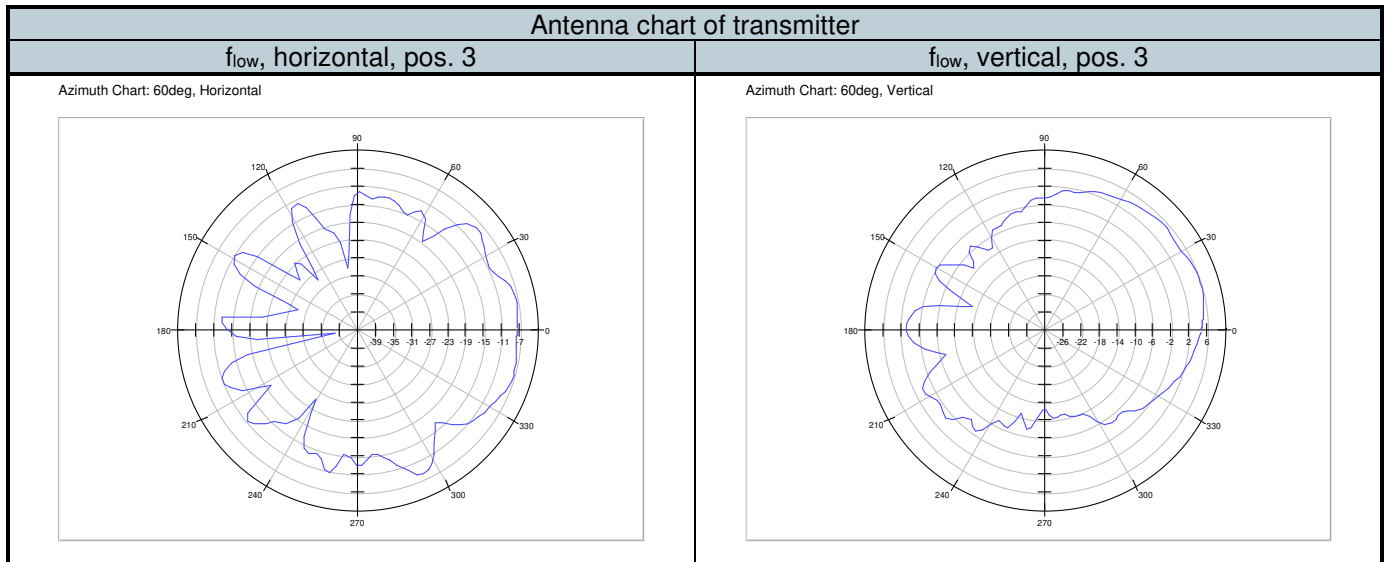
5.2 Antenna Diagrams EUT Position

5.2.1 Test Setup Photos

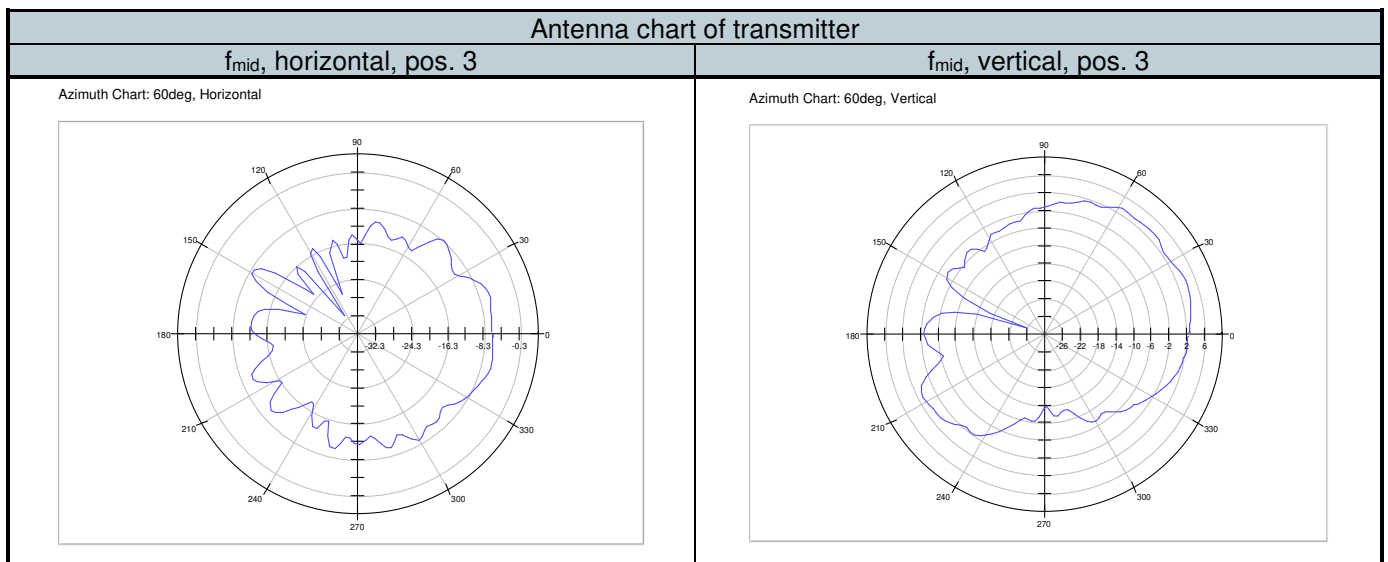


5.2.2 Azimuth charts of transmitter

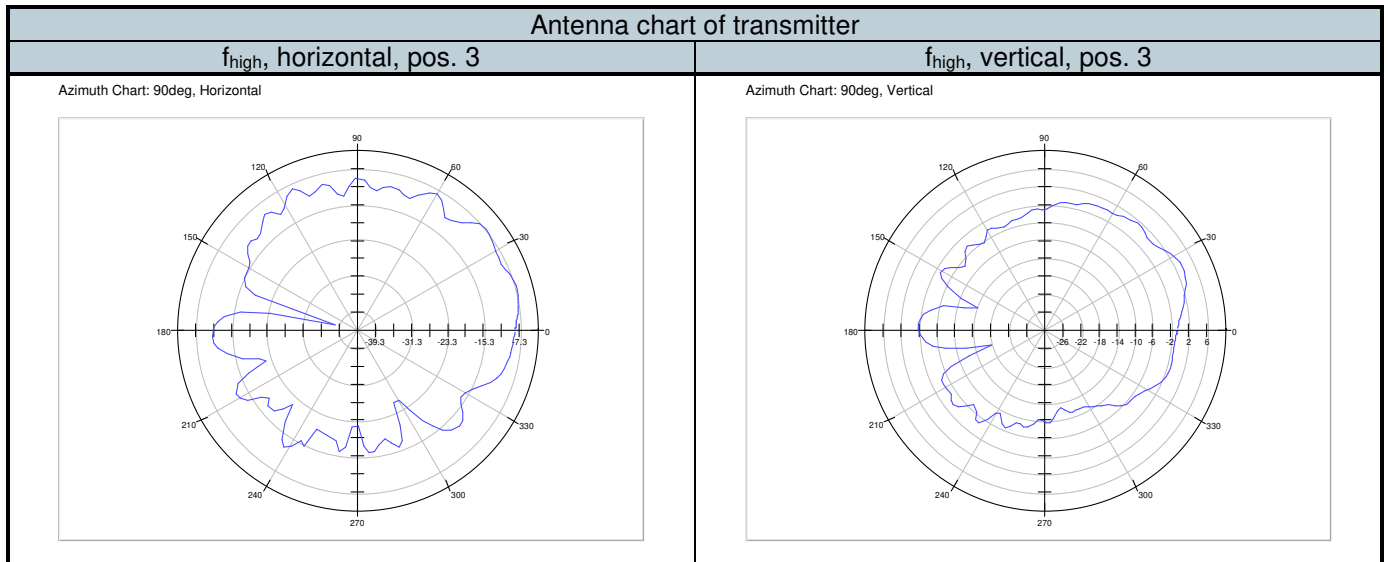
5.2.2.1 Frequency near bottom (f_{low}) Worst case



5.2.2.2 Frequency near middle (f_{mid}) Worst case



5.2.2.3 Frequency near top (f_{high})



6 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	Antenna (Horn)	3115	EMCO Elektronik GmbH	9609-4918	480183	Calibration not necessary	
2	RF cable	SF102/11SK/11S K 500.0	Huber+Suhner	521885/2	483401	Calibration not necessary	
3	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
4	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
5	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
6	Multiple Control Unit	MCU	Maturo GmbH	MCU/043/971107	480832	Calibration not necessary	
7	Positioners	TDF 1.5- 10Kg	Maturo	15920215	482034	Calibration not necessary	
8	Antenna (Horn)	3115	EMCO Elektronik GmbH	9609-4922	480184	14.11.2022	11.2025
9	CW Generator Microwave	83650L	Agilent	3844A00554	480333	27.02.2024	02.2026
10	Software	EMC32 V10.60.20	Rohde & Schwarz	---	483261	Calibration not necessary	

7 Report History

Report Number	Date	Comment
F231143E4	22.11.2024	Initial Test Report
-	-	-
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---end of test report ---