



中国认可  
国际互认  
检测  
TESTING  
CNAS L11527

Project No.: ZKT-2503103973E-3  
Page 1 of 32

# TEST REPORT

**Report Number**..... : **ZKT-2503103973E-3**

**Date of Test**..... : Mar. 10, 2025 to Mar. 25, 2025

**Date of issue**..... : Mar. 25, 2025

**Total number of pages**..... : 32

**Test Result** ..... : PASS

**Testing Laboratory**..... : **Shenzhen ZKT Technology Co., Ltd.**

**Address** ..... : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

**Applicant's name** ..... : **Leuze electronic GmbH + Co. KG**

**Address** ..... : In der Braike 1, 73277 Owen, Germany

**Manufacturer's name** ..... : **KRONOTECH Srl.**

**Address** ..... : Via Adriatica, 284, 33030 Basaldella di Campoformido (UD), Italy

## Test specification:

**Standard**..... : ETSI EN 300 330 V2.1.1 (2017-02)

**Test procedure**..... : /

**Non-standard test method** ..... : N/A

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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**Product name**..... : **Compact HF Reader M30 - IO-Link**

**Trademark** ..... : N/A

**Model/Type reference**..... : RDH 142 00 M30

**Ratings**..... : Nominal 24 Vdc, range 18 ... 36Vdc



**Testing procedure and testing location:**

**Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.**

**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community  
Industrial Avenue, Fuhai Street, Bao'an District,  
Shenzhen, China**

**Tested by (name + signature).....: Jim Liu**

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1. Version

Report No.	Issue Date	Description	Approved
ZKT-2503103973E-3	Mar. 25, 2025	Original	Valid



## 2. SUMMARY OF TEST RESULTS

The Product has been tested according to the following specifications:

EN 300 330 V2.1.1		
Clause	Test Item	Results
<b>TRANSMITTER PARAMETERS</b>		
4.3.1	Permitted range of operating frequencies	Pass
4.3.2	Operating frequency ranges	Pass
4.3.3	Modulation bandwidth	Pass
4.3.4	Transmitter H-field requirements	Pass
4.3.5	Transmitter RF carrier current	N/A
4.3.6	Transmitter radiated E-field	N/A
4.3.7	Transmitter conducted spurious emissions	N/A
4.3.8& 4.3.9	Transmitter radiated spurious domain emission limits < 30 MHz emission limits > 30 MHz	Pass
4.3.10	Transmitter Frequency stability	N/A
<b>RECEIVER PARAMETERS</b>		
4.4.2	Receiver spurious emissions	N/A
4.4.3	Adjacent channel selectivity	N/A
4.4.4	Receiver blocking or desensitization	N/A

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



### 3. MEASUREMENT

#### 3.1. TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.  
Add.: ZKT Building & 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

#### 3.2. MAXIMUM MEASUREMENT UNCERTAINTY

The interpretation of the results recorded in the test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit shall be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty for the measurement of each parameter shall be separately included in the test report;
- the value of the measurement uncertainty shall be, for each measurement, equal to or less than the figures given below:

Items	Uncertainty
RF Frequency	$\pm 1 \times 10^{-7}$
RF Power, Conducted	$\pm 1\text{dB}$
RF power, radiated	$\pm 6\text{dB}$
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5 \%$ .

For the test methods, according to the EN 300 330 V2.1.1 the uncertainty figures shall be calculated according to the methods described in the ETSI TR 100 028 [i.14] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

The measurement uncertainties given above are based on such expansion factors.

The particular expansion factor used for the evaluation of the measurement uncertainty shall be stated.



#### 4. GENERAL INFORMATION

##### 4.1. GENERAL DESCRIPTION OF EUT

Equipment	Compact HF Reader M30 - IO-Link	
Trade Mark	N/A	
Model Name.	RDH 142 00 M30	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is Compact HF Reader M30 - IO-Link	
	Operation Frequency:	13.56 MHz
	Number Of Channel	1CH
	Technologies	<input checked="" type="checkbox"/> tagging systems <input type="checkbox"/> systems in the 27 MHz range <input type="checkbox"/> all others
	Product Class <sup>Note 3</sup>	Class 1
	Antenna Designation:	LOOP Antenna
	Antenna Gain	0dBi
Adapter	N/A	
Power	Nominal 24 Vdc, range 18 ... 36Vdc	
I/O Ports	Refer to users manual	
Hardware Version	H1.0	
Software Version	S1.0	

- NOTE:
1. The EUT belong to subclass 56 non-specific use devices.
  2. All the tests were performed at 3m test sites.
  3. The description of product classes please see the ETSI EN 300 330 V2.1.1 Annex B Table B.1.
  4. For more information, please refer to User's Manual.





#### 4.2. TEST CONDITIONS

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	0°C ~ 35°C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	DC 24V	DC 4.5V – DC 5.5V Note: (2)

Note:

The EUT belongs to Category III (Equipment for normal indoor use).

For tests at extreme temperatures, measurements shall be made at the upper and lower temperatures of one of the following ranges:

- Category I (General): -20 °C to +55 °C.
- Category II (Portable): -10 °C to +55 °C.
- Category III (Equipment for normal indoor use): 0 °C to +35 °C.

NOTE: The term "Equipment for normal indoor use" is taken to mean the minimum indoor temperature  $\geq 5^{\circ}\text{C}$ .

For special applications, the manufacturer can specify wider temperature ranges than given as a minimum above. This shall be reflected in manufacturer's product literature.

The High Voltage 4.1V and Low Voltage 3.3V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

#### 4.3. DESCRIPTION OF TEST CONDITIONS

**E-1  
EUT**



#### 4.4. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Compact HF Reader M30 - IO-Link	N/A	RDH 142 00 M30	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



#### 4.5. EQUIPMENTS LIST FOR ALL TEST ITEMS

##### RF Conducted Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 29, 2024	Sep. 28, 2025
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 30, 2024	Sep. 29, 2025
3	Test Cable	N/A	RF-01	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
4	Test Cable	N/A	RF-02	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
5	Test Cable	N/A	RF-03	N/A	N/A	Sep. 30, 2024	Sep. 29, 2025
6	ESG Signal Generator	Agilent	E4421B	GB40051203	B.03.84	Sep. 29, 2024	Sep. 28, 2025
7	Signal Generator	Agilent	N5182A	MY47420215	A.01.87	Sep. 29, 2024	Sep. 28, 2025
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344/M-17 52	N/A	Sep. 29, 2024	Sep. 28, 2025
9	Van der Hoofden measuring head	Schwarzbeck Mess-elektronik	VDHH 9502	9502-039	N/A	Sep. 30, 2024	Sep. 29, 2025
10	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Sep. 30, 2024	Sep. 29, 2025
11	MWRF Power Meter Test system	MW	MW100-RF CB	10371	N/A	Sep. 29, 2024	Sep. 28, 2025
12	Power Meter	KEYSIGHT	N1912AP	926431	A.05.00	Sep. 29, 2024	Sep. 28, 2025
13	D.C. Power Supply	LongWei	TPR-6405 D	GQ7516	N/A	Sep. 29, 2024	Sep. 28, 2025
14	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



## 5. TRANSMITTER PARAMETERS

### 5.1 PERMITTED RANGE OF OPERATING FREQUENCIES

#### 5.1.1 APPLICABILITY& LIMITS

**Table 1: Short Range Devices within the 9 kHz to 30 MHz permitted frequency bands**

	Frequency Bands/frequencies	Applications
Transmit and Receive	9 kHz to 90 kHz	Inductive devices, Generic use
Transmit and Receive	90 kHz to 119 kHz	Inductive devices, Generic use
Transmit and Receive	119 kHz to 140 kHz	Inductive devices, Generic use
Transmit and Receive	140 kHz to 148,5 kHz	Inductive devices, Generic use
Transmit and Receive	148,5 kHz to 5 MHz	Inductive devices, Generic use
Transmit and Receive	400 kHz to 600 kHz	RFID only
Transmit and Receive	5 MHz to 30 MHz	Inductive devices, Generic use
Transmit and Receive	3 155 kHz to 3 400 kHz	Inductive devices, Generic use
Transmit and Receive	984 kHz to 7 484 kHz (Note 3, Centre frequency is 4 234 kHz)	Inductive devices, Railway applications
Transmit and Receive	4 516 kHz	Inductive devices, Railway applications
Transmit and Receive	6 765 kHz to 6 795 kHz	Inductive devices, Generic use
Transmit and Receive	7 400 kHz to 8 800 kHz	Inductive devices, Generic use
Transmit and Receive	10 200 kHz to 11,000 MHz	Inductive devices, Generic use
Transmit and Receive	11,810 MHz to 15,310 MHz (Centre frequency is 13,56 MHz)	RFID only
Transmit and Receive	12,5 MHz to 20 MHz	Inductive devices, Wireless healthcare
Transmit and Receive	13,553 MHz to 13,567 MHz	Inductive devices, Generic use
Transmit and Receive	26,957 MHz to 27,283 MHz	Inductive devices, Generic use
Transmit and Receive	27,090 MHz to 27,100 MHz	Inductive devices, Railway applications
NOTE 1: In addition, it should be noted that other frequency bands may be available in a country within the frequency range 9 kHz to 30 MHz.		
NOTE 2: On non-harmonised parameters, national administrations may impose certain conditions such as the type of modulation, frequency, channel/frequency separations, maximum transmitter radiated power, duty cycle, and the inclusion of an automatic transmitter shut-off facility, as a condition for the issue of an Individual Rights for use of spectrum or General Authorization, or as a condition for use under "licence exemption" as it is in most cases for Short Range Devices.		
NOTE 3: Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.		

**Table 5**

State	Frequency 9 kHz ≤ f < 10 MHz	Frequency 10 MHz ≤ f < 30 MHz
Operating	27 dBμA/m at 9 kHz descending 3 dB/oct	-3,5 dBμA/m
Standby	5,5 dBμA/m at 9 kHz descending 3 dB/oct	-25 dBμA/m

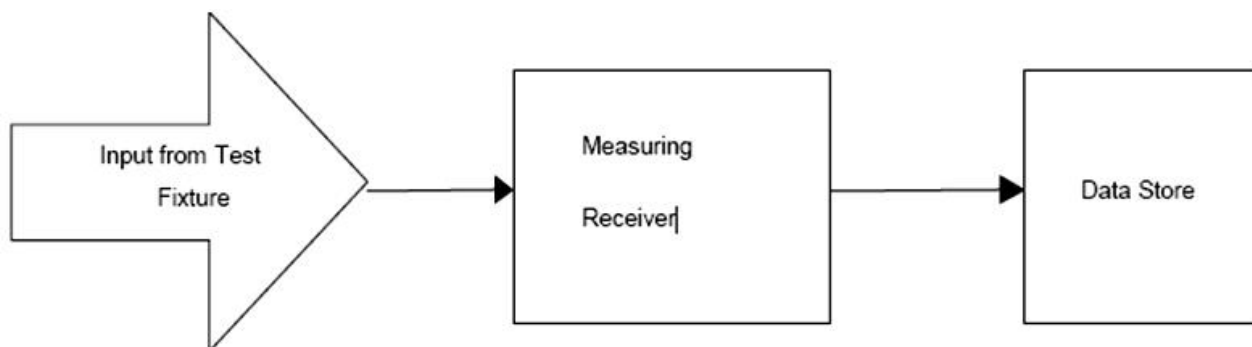
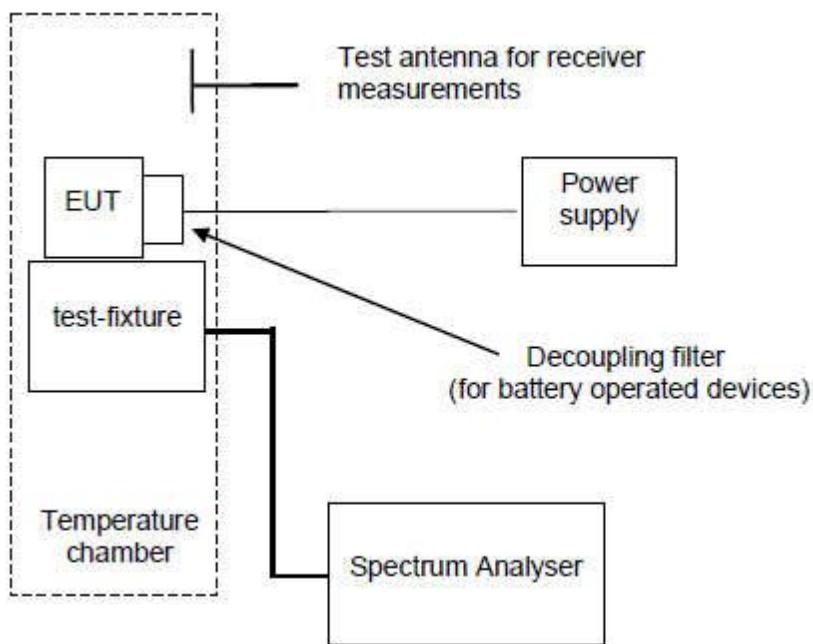
#### 5.1.2 CONFORMANCE

The permitted range of operating frequencies used by the EUT shall be declared by the manufacturer. The operating frequency range(s) will be tested considered under in the test item Operating frequency ranges.





### 5.1.3 TEST SETUP



**Test set-up for measuring the operating frequency range**

### Receiver Setup

Frequency: (f)	Detector type	Measurement receiver bandwidth	Spectrum analyser bandwidth
$9\text{ kHz} \leq f < 150\text{ kHz}$	Quasi Peak	200 Hz	300 Hz
$150\text{ kHz} \leq f < 30\text{ MHz}$	Quasi Peak	9 kHz	10 KHz
$30\text{ MHz} \leq f \leq 1\,000\text{ MHz}$	Quasi Peak	120 kHz	100 kHz

NOTE: For the measurement of the ranges  $6,765\text{ MHz} \leq f \leq 6,795\text{ MHz}$  and  $11,810\text{ MHz} \leq f \leq 15,310\text{ MHz}$ , the measurement bandwidth has to be 200 Hz respectively 300 Hz.

### 5.1.4 RESULT

Items	Notes	Result
Operational Frequency bands	13,553 MHz to 13,567 MHz	Compliance
Nominal Operating Frequency or Frequencies	13.56MHz <sup>Note 1</sup>	

Note 1: The operating frequency used by this EUT is declared by the manufacturer.



## 5.2 OPERATING FREQUENCY RANGES

### 5.2.1 APPLICABILITY& DESCRIPTION

This applies to all EUT.

The operating frequency range (OFR) is the frequency range over which the EUT is transmitting. The operating frequency range of the EUT is determined by the lowest ( $f_L$ ) and highest frequency ( $f_H$ ) as occupied by the power envelope.  
With the centre frequency of the OFR as:  $f_c = (f_H + f_L)/2$ .  
An EUT could have more than one operating frequency range.

### 5.2.2 LIMITS

The operating frequency ranges for intentional emissions shall be entirely within the frequency bands in table 1 in EN 300 330 V2.1.1.

### 5.2.3 TEST PROCEDURE

The measurement antenna shall be placed at one point of the setup up. Alternatively, a current probe could be used.

A spectrum analyser with the following settings is used as measuring receiver in the test set-up:

- Start frequency: lower than the lower edge of the permitted frequency range.
- Stop frequency: higher than the upper edge of the permitted frequency range.
- Resolution Bandwidth: see table 11.

Table 11

Frequency: (f)	Detector type	Measurement receiver bandwidth	Spectrum analyser bandwidth
$9 \text{ kHz} \leq f < 150 \text{ kHz}$	Quasi Peak	200 Hz	300 Hz
$150 \text{ kHz} \leq f < 30 \text{ MHz}$	Quasi Peak	9 kHz	10 KHz
$30 \text{ MHz} \leq f \leq 1\,000 \text{ MHz}$	Quasi Peak	120 kHz	100 kHz
NOTE: For the measurement of the ranges $6,765 \text{ MHz} \leq f \leq 6,795 \text{ MHz}$ and $11,810 \text{ MHz} \leq f \leq 15,310 \text{ MHz}$ , the measurement bandwidth has to be 200 Hz respectively 300 Hz.			

- Video Bandwidth:  $\geq$  Resolution Bandwidth.
- Detector mode: RMS.
- Display mode: Maxhold.

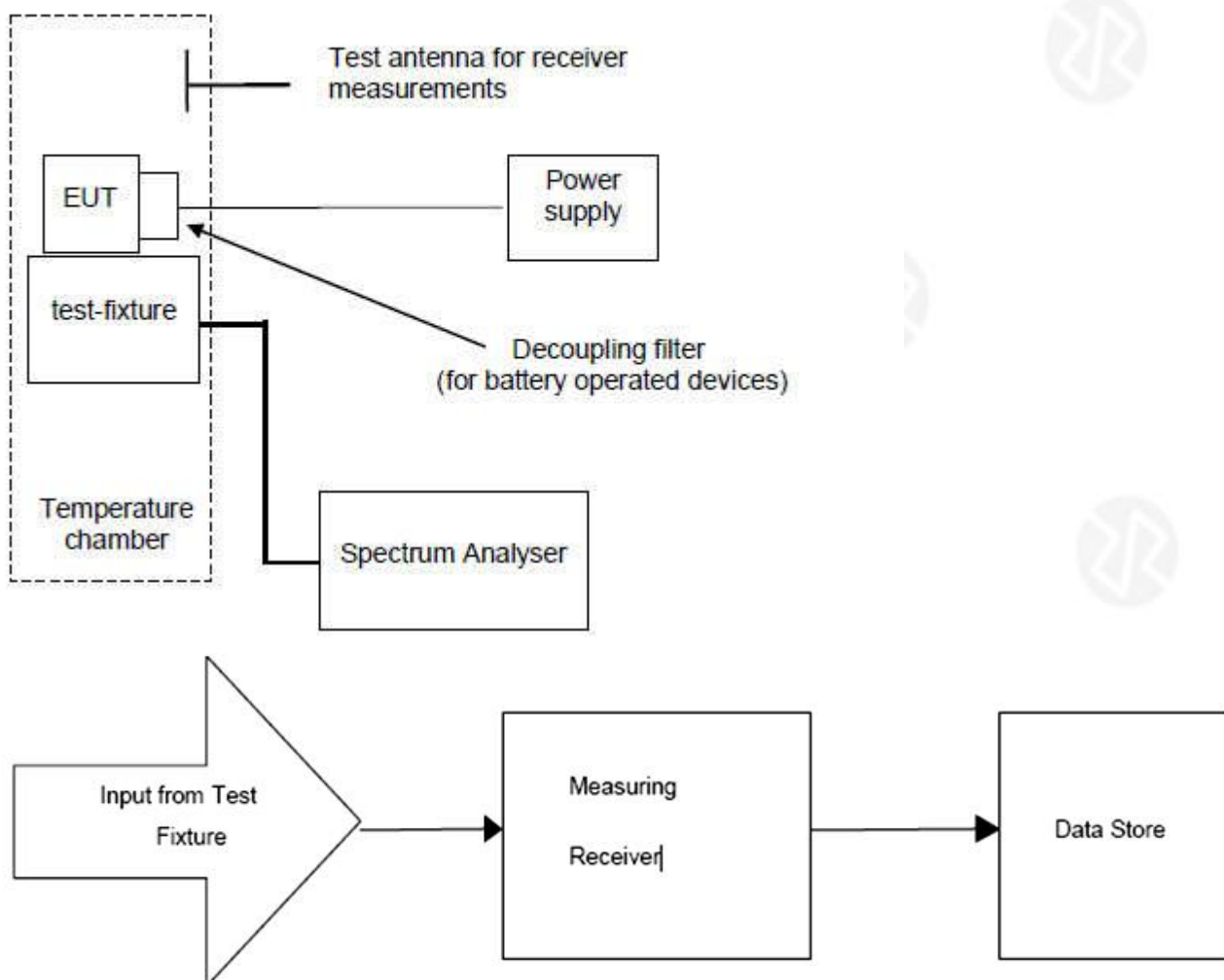
The 99 % OBW function shall be used to determine the operating frequency range:

- $f_H$  is determined.  $f_H$  is the frequency of the upper marker resulting from the OFR.
- $f_L$  is determined.  $f_L$  is the frequency of the lower marker resulting from the OFR.
- $f_c$  is the centre frequency.

Alternatively, the recorded results from the H-field measurement described in clause 6.2.4 may be used.



## 5.2.4 TEST SETUP



**Test set-up for measuring the operating frequency range**

The EUT was programmed to be in continuously transmitting mode.



## 5.2.5 TEST RESULTS

EUT :	Compact HF Reader M30 - IO-Link	Model Name :	RDH 142 00 M30
Temperature :	26°C	Relative Humidity	60 %
Pressure :	1012 hPa	Test Voltage :	DC 24V
Test Mode :	TX		

CHANNEL	99%OCCUPIED BANDWIDTH (kHz)	Measured frequencies			Limit	PASS /FAIL
		F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	F <sub>C</sub> (MHz)		
13.56MHz	0.653	13.56032	13.56021	13.56021	F <sub>L</sub> >13.556MHz and F <sub>H</sub> <13.567 MHz	PASS

Extreme condition				Frequency range ( MHz )	
				F <sub>L</sub>	F <sub>H</sub>
T min (°C)	-10.00	V max (V)	5	13.56012	13.56047
		V nom (V)	5.5	13.56011	13.56047
		V min (V)	4.5	13.56014	13.56053
T max (°C)	55.00	V max (V)	5	13.56013	13.56048
		V nom (V)	5.5	13.56013	13.56046
		V min (V)	4.5	13.56011	13.56047
Min. f <sub>L</sub> / Max. f <sub>H</sub> Band Edges				13.56011	13.56053
Indoor Use Limits				F <sub>L</sub> > 13.556 MHz	F <sub>L</sub> < 13.567 MHz
Result				Complies	





### 5.3 TRANSMITTER CARRIER OUTPUT LEVELS (H-FIELD (RADIATED))

#### 5.3.1 APPLICABILITY& DESCRIPTION

The Transmitter H-field requirements only applies for equipment under product class 1 and class 2 as defined in EN 300 330 clause 6.1.2 and clause B.2.

In the case of a transmitter with an integral or dedicated antenna, the radiated H-field is defined in the direction of maximum field strength under specified conditions of measurement.

#### 5.3.2 LIMITS

**Table 2: H-field limits at 10 m**

Frequency range (MHz)	H-field strength limit ( $H_f$ ) dB $\mu$ A/m at 10 m or specified in mW e.r.p.
$0,009 \leq f < 0,090$	72 descending 3 dB/oct above 0,03 MHz or according to note 1 (see note 5)
$0,09 \leq f < 0,119$	42
$0,119 \leq f < 0,135$	66 descending 3 dB/oct above 0,119 MHz or according to note 1 (see notes 3 and 5)
$0,135 \leq f < 0,140$	42
$0,140 \leq f < 0,1485$	37,7
$0,1485 \leq f < 30$	-5 (see note 4)
$0,315 \leq f < 0,600$	-5
$3,155 \leq f < 3,400$	13,5
4,234	9 (see note 9)
4,516	7
$7,400 \leq f < 8,800$	9
$10,2 \leq f < 11,00$	9
$12,5 \leq f \leq 20$	-7
$6,765 \leq f \leq 6,795$	42 (see notes 3 and 7)
$26,957 \leq f \leq 27,283$	42 (see note 3)
$13,410 \leq f \leq 13,553$ , $13,567 \leq f \leq 13,710$	9 (see note 6)
$13,110 \leq f \leq 13,410$ , $13,710 \leq f \leq 14,010$	-3,5 (see note 6)
$12,660 \leq f \leq 13,110$ , $14,010 \leq f \leq 14,460$	-10 (see note 6)
$11,810 \leq f \leq 12,660$ , $14,460 \leq f \leq 15,310$	-16 (see note 6)
$13,460 \leq f \leq 13,553$ , $13,567 \leq f \leq 13,660$	27 (see note 6)
$13,360 \leq f \leq 13,460$ , $13,660 \leq f \leq 13,760$	Linear transition from 27 to -3,5 (see note 6)
$13,110 \leq f \leq 13,360$ , $13,760 \leq f \leq 14,010$	-3,5 (see note 6)
$12,660 \leq f \leq 13,110$ , $14,010 \leq f \leq 14,460$	-5 (see note 6)
$13,553 \leq f \leq 13,567$	42 (see note 3) or 60 (see notes 2 and 3)
27,095	42

The H-field limit in dB $\mu$ A/m at 3 m,  $H_{3m}$ , is determined by the following equation:

$$H_{3m} = H_{10m} + C3 \text{ (F.2)}$$

Where:  $H_{10m}$  is the H-field limit in dB $\mu$ A/m at 10 m distance according to the present document; and C3 is a conversion factor in dB determined from figure F.2.

The limit at 10 m ( $H_{10m}$ ) is 60 dB $\mu$ A/m.

For 13.56MHz: Owing to the frequency EUT is 13.56MHz, so the C3 approach to 23dB.

Then the limit at 3m ( $H_{3m}$ ) =  $H_{10m} + C3 = 60 + 23 = 83$  dB $\mu$ A/m.

The H Field Strength shall not exceed the values 83 dB $\mu$ A/m 3m Distance under normal test conditions.

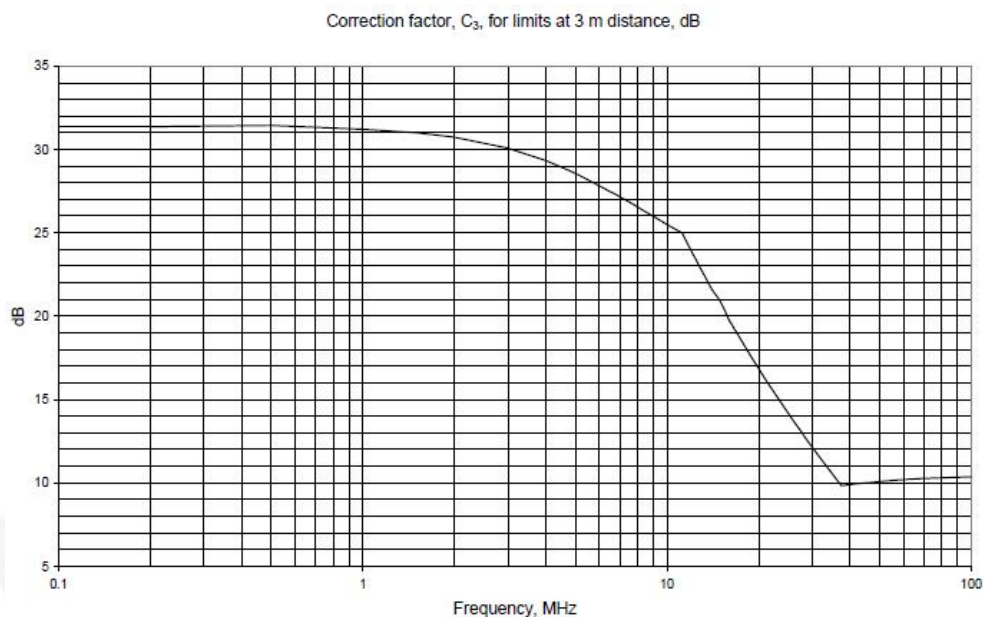


Figure H.2: Conversion factor  $C_3$  versus frequency

### 5.3.3 TEST PROCEDURE

The measurements of the transmitter radiated H-field shall be made on an open field test site as specified in clause C.1.3. Any measured values shall be at least 6 dB above the ambient noise level.

The H-field produced by the equipment shall be measured at standard distance of 10 m. Where this is not practical, e.g. due to physical size of the equipment including the antenna or with use of special field cancelling antenna, then other distances may be used. When another distance is used, the distance used and the field strength value measured shall be stated in the test report. In this case, the measured value at actual test distance shall be extrapolated to 10 m according to EN 300 330 annex H and these calculations shall be stated in the test report.

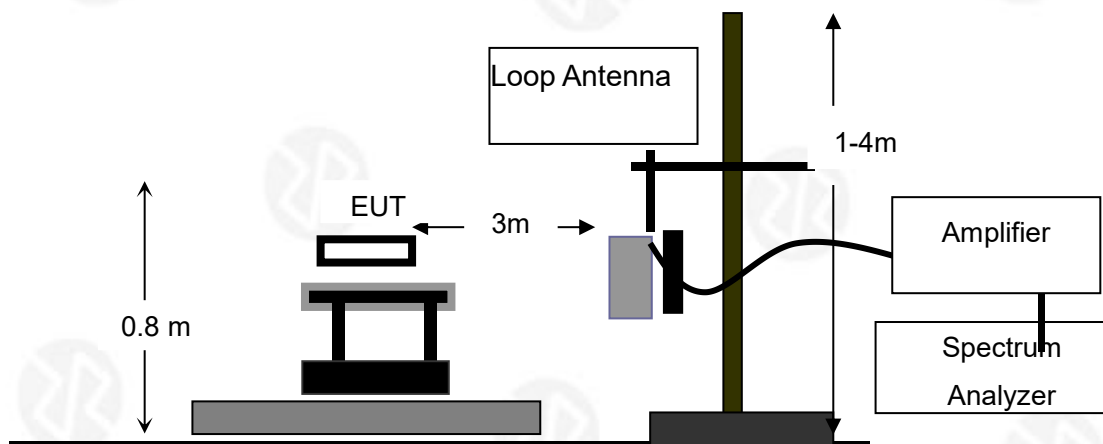
The H-field is measured with a shielded loop antenna connected to a measurement receiver. The measuring bandwidth and detector type of the measurement receiver shall be in accordance with EN 300 330 clause 5.12.

The equipment under test shall operate where possible, with modulation. Where this is not possible, it shall be stated in the test report. For transmitters using a continuous wideband swept carrier, the measurement shall be made with the sweep off. When it is not possible to turn the sweep off the measurements shall be made with the sweep on and this shall be stated in the test report.

For measuring equipment calibrated in dB $\mu$ V/m, the reading should be reduced by 51,5 dB to be converted to dB $\mu$ A/m.



### 5.3.4 TEST SETUP



### 5.3.5 TEST RESULTS

EUT :	Compact HF Reader M30 - IO-Link	Model Name :	RDH 142 00 M30
Temperature :	26°C	Relative Humidity :	60 %
Pressure :	1012 hPa	Test Voltage :	DC 24V (Normal)
Test Mode :	TX		

Test conditions		Polarization	Result (MHz)	Measurement (3m) dBuA/m	Limit (dBuA/m)	Result
Temp (°C)	Volt (V DC)					
Normal (25)	V <sub>norm</sub> :	X	13.56	81.21	83	Pass
		Y	13.56	81.52	83	Pass
		Z	13.56	81.11	83	Pass

Remark: The distance is 3m between EUT and antenna.



## 5.4 MODULATION BANDWIDTH

### 5.4.1 APPLICABILITY& DESCRIPTION

This applies to all EUT.

The modulation bandwidth contains all associated side bands above the following level:

- a) For carrier frequencies below 135 kHz:
  - 23 dB below the carrier, for RFID within the transmitter emission boundary of figure I.1, and for RFID and EAS systems within the transmitter mask of figures I.2, I.3 and I.4, see CISPR 16-1-4 [2] or the appropriate spurious limit as defined in EN 300 330 clauses 4.3.7, 4.3.8, 4.3.9.
- b) For carrier frequencies in the range 135 kHz to 30 MHz:
  - 15 dB below the carrier or the appropriate spurious limit as defined in EN 300 330 clauses 4.3.7, 4.3.8, 4.3.9.

### 5.4.2 LIMITS

The modulation bandwidth shall be within the assigned frequency band see table 1 or  $\pm 7,5\%$  of the carrier frequency whichever is the smallest. For RFID and EAS Systems, the modulation bandwidth shall be within the transmitter emission boundary of figures I.1, I.2, I.3 and I.4.

For further information, see CEPT/ERC/REC 70-03 [i.1] or ERC/ECC/CEPT Decisions as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.



For 13.56MHz:

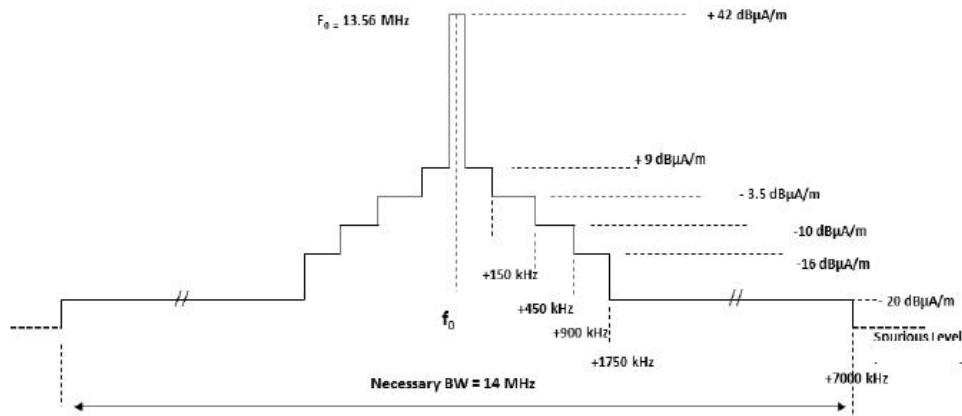


Figure I.3: Spectrum mask limit for wideband RFIDs (incl. NFC application) in the 13,56 MHz range

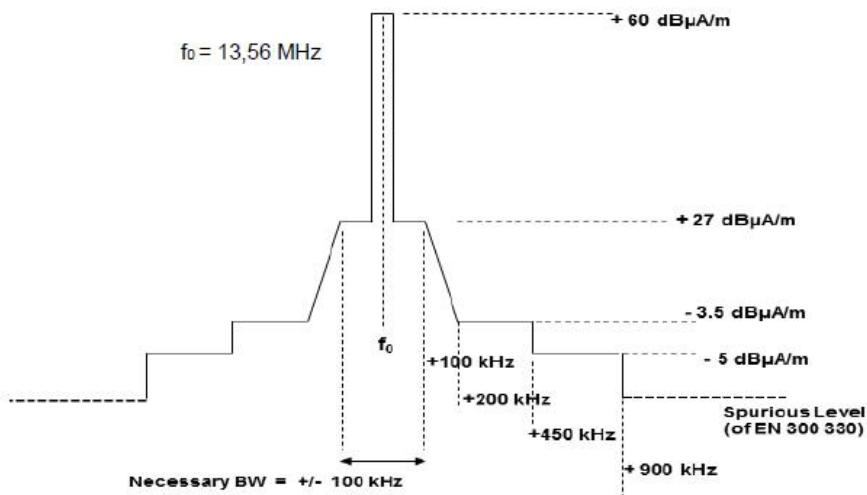


Figure I.4: Spectrum mask limit for narrowband RFIDs (incl. NFC application) in the 13,56 MHz range



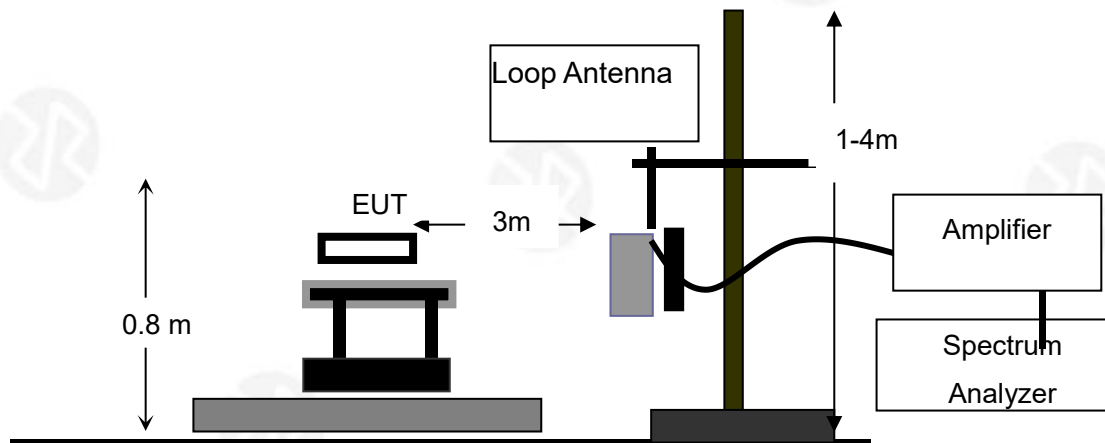
### 5.4.3 TEST PROCEDURE

The transmitter shall be connected to an artificial antenna or if the transmitter has an integral antenna, a test fixture shall be used (see clause 5.10). The RF output of the equipment shall be connected to a spectrum analyser via a 50  $\Omega$  variable attenuator.

The transmitter shall be operated at the nominal carrier power or field strength measured under normal test conditions in clause 4.3.4. The attenuator shall be adjusted to an appropriate level displayed at the spectrum analyser screen. The transmitter shall be modulated with standard test modulation (see clauses 5.8.1 and 5.8.2). If the equipment cannot be modulated externally, the internal modulation shall be used.

For transmitters using a continuous wideband swept carrier the measurement shall be made with the sweep on. The output of the transmitter, with or without test fixture, shall be measured by using a spectrum analyser with a resolution bandwidth appropriate to accept all major side bands. The power level calibration of the spectrum analyser shall then be related to the power level or field strength measured in clause 4.3.3. The calculation will be used to calculate the absolute level of the sideband power. The test laboratory shall ensure that the spectrum analyser's span is sufficiently wide enough to ensure that the carrier and all its major side bands are captured.

### 5.4.4 TEST SETUP



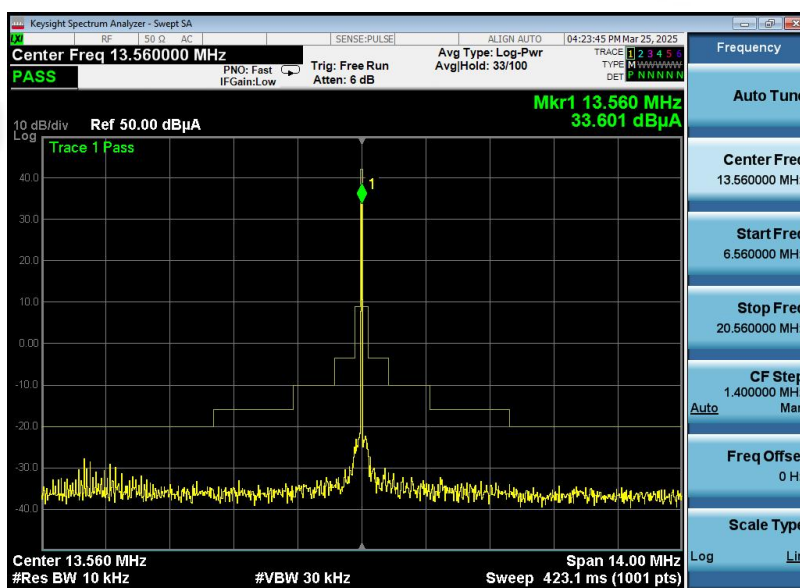




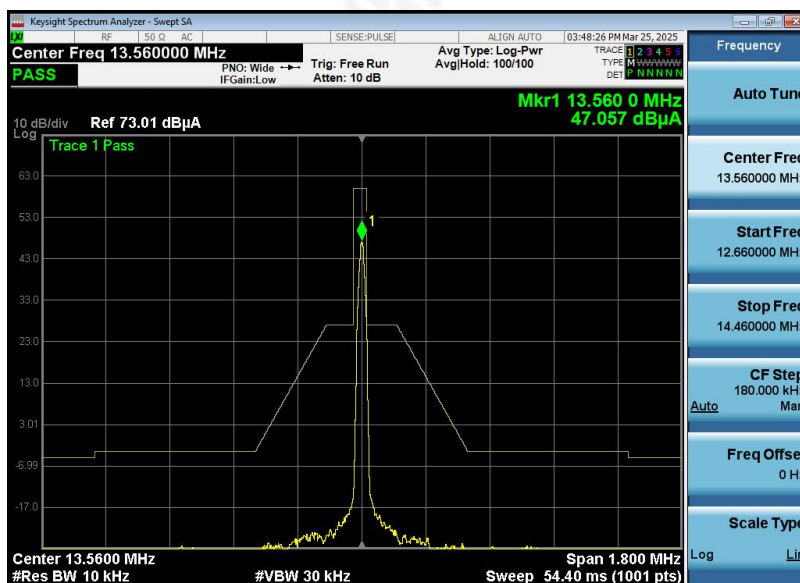
## 5.4.5 TEST RESULTS

EUT:	Compact HF Reader M30 - IO-Link	Model Name :	RDH 142 00 M30
Temperature :	26°C	Relative Humidity :	60 %
Pressure :	1012 hPa	Test Voltage :	DC 24V
Test Mode :	TX		

Test Normal Temperature	Test Normal Voltage	Test Press
25°C	DC 24V	101kPa



Test Normal Temperature	Test Normal Voltage	Test Press
25°C	DC 24V	101kPa





## 5.5 SPURIOUS DOMAIN EMISSION LIMITS

### 5.5.1 APPLICABILITY& DESCRIPTION

This applies to all EUT.

Spurious domain emission limits are limits on emissions at frequencies other than those of the carrier and sidebands associated with normal test modulation.

### 5.5.2 LIMITS

The radiated field strength of the spurious domain emissions below 30 MHz shall not exceed the generated H-field dB $\mu$ A/m at 10 m given in table 5& 6.

Table 5

State	Frequency 9 kHz $\leq$ f < 10 MHz	Frequency 10 MHz $\leq$ f < 30 MHz
Operating	27 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-3,5 dB $\mu$ A/m
Standby	5,5 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-25 dB $\mu$ A/m

$$3m(H_{3m}) = H_{10m} + C3 = H_{10m} + 23$$

Table 6

State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW	250 nW
Standby	2 nW	2 nW

### 5.5.3 TEST PROCEDURE

Transmitter radiated spurious domain emission limits < 30 MHz

The field strength shall be measured for frequencies below 30 MHz. The equipment under test shall be measured at a distance of 10 m on an outdoor test site. The test antenna shall be a calibrated shielded magnetic field antenna. The equipment under test and test antenna shall be arranged as stated in EN 300 330 clause C.1.

For Product Class 3 the transmitter antenna connector of the equipment under test shall be connected to an artificial antenna and the output connector terminated.

The equipment under test shall be switched on with normal modulation. The characteristics of the modulation signal used shall be stated on the test report. The measuring receiver shall be tuned over the frequency range 9 kHz to 30 MHz, except for the frequency band on which the transmitter is intended to operate.

At each frequency at which a relevant spurious signal is detected the equipment under test and the test antenna shall be rotated until maximum field strength is indicated on the measuring receiver.

This level shall be noted.

If the transmitter can be operated in the standby mode, then the measurements shall be repeated in the standby mode.

For measuring equipment calibrated in dB $\mu$ V/m, the reading should be reduced by 51,5 dB to be converted to dB $\mu$ A/m.

Transmitter radiated spurious domain emission limits > 30 MHz

For EN 300 330 classes 1, 2 and 4 an appropriate test site selected from EN 300 330 annex C shall be used.

The equipment shall be placed at the specified height on a non-conducting support and in the position closest to normal use as declared by the manufacturer.

The test antenna shall be oriented for vertical polarization. The output of the test antenna shall be connected to a measuring receiver.

The transmitter shall be switched on with normal modulation, and the measuring receiver shall be tuned over the frequency range 30 MHz to 1 000 MHz.





At each frequency at which a relevant spurious component is detected, the test antenna shall be raised and lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.

The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

The maximum signal level detected by the measuring receiver shall be noted

. The substitution antenna shall be oriented for vertical polarization and calibrated for the frequency of the spurious component detected.

The frequency of the calibrated signal generator shall be set to the frequency of the spurious component detected. The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.

The test antenna shall be raised and lowered through the specified range of heights to ensure that the maximum signal is received.

When a test site according to EN 300 330 clause C.1.1 is used, there is no need to vary the height of the antenna.

The input signal to the substitution antenna shall be adjusted until an equal or a known related level to that detected from the transmitter is obtained on the measuring receiver.

The input signal to the substitution antenna shall be recorded as a power level and corrected for any change of input attenuator setting of the measuring receiver.

The measure of the effective radiated power of the spurious components is the larger of the two power levels recorded for each spurious component at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

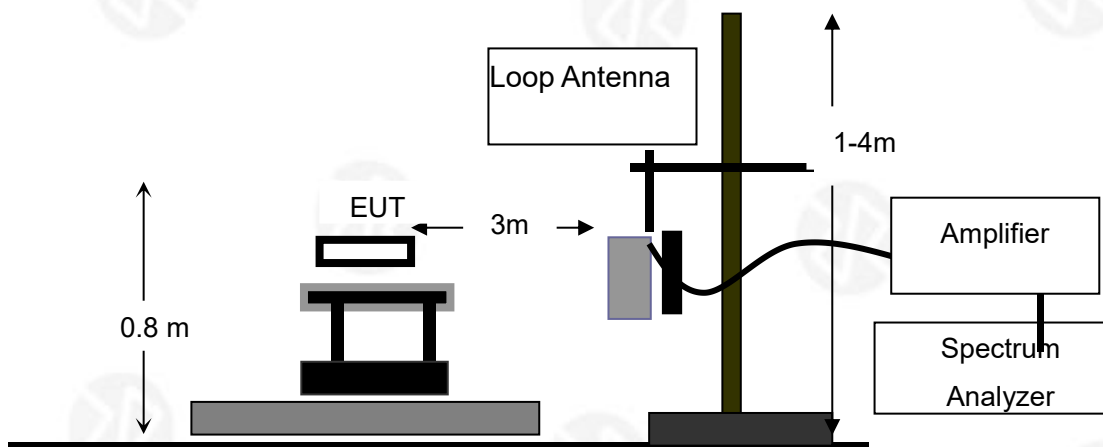
If an unmodulated carrier cannot be obtained then the measurements shall be made with the transmitter modulated by the normal test signal (see clause 5.8.2) in which case this fact shall be recorded in the test report.

If standby mode is available, the measurements shall be repeated in that mode.

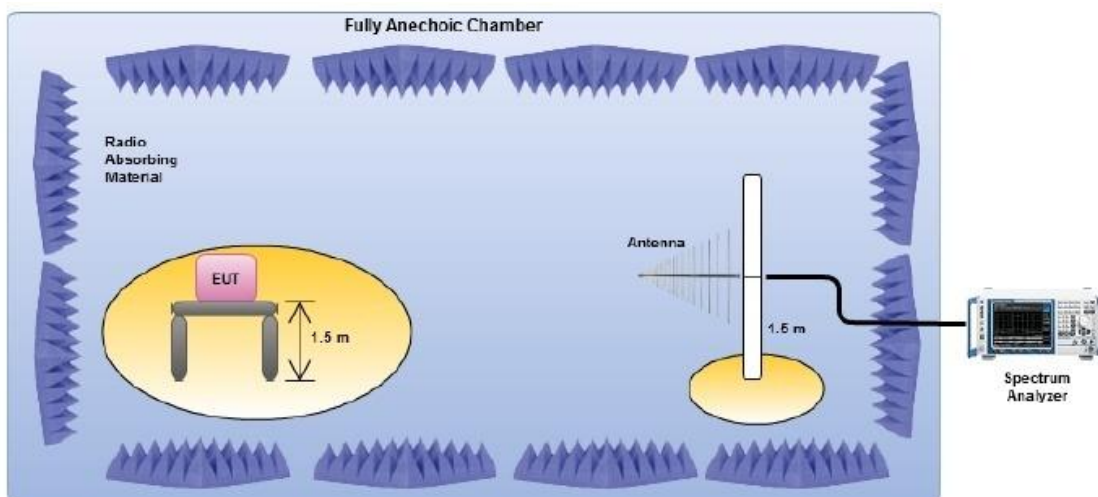


#### 5.5.4 TEST SETUP

##### FREQUENCY RANGE (9KHZ-30MHZ)



##### FREQUENCY RANGE (30MHZ~1GHZ)





## 5.5.5 TEST RESULTS

EUT :	Compact HF Reader M30 - IO-Link	Model Name :	RDH 142 00 M30
Temperature :	24 °C	Relative Humidity	54%
Pressure :	1010 hPa	Test Power :	DC 24V
Test Mode :	TX		

9 kHz to 30 MHz TX Mode				
Frequency (MHz)	Spurious Emission		3m Limit (dBuA/m)	Test Result
	polarization	Level(dBuA/m)		
0.0217	X	25.33	54.41	Pass
2.2742	X	21.32	33.58	
13.7696	X	13.13	19.50	
N/A: Not applicable, since the spurious emission of the EUT is too weak to be detected.(≤-80dBm)				

9 kHz to 30 MHz Standby Mode				
Frequency (MHz)	Spurious Emission		3m Limit (dBuA/m)	Test Result
	polarization	Level(dBuA/m)		
0.1025	X	0.25	26.32	Pass
2.9483	X	-18.43	10.55	
9.4815	X	-21.12	1.00	
N/A: Not applicable, since the spurious emission of the EUT is too weak to be detected.(≤-80dBm)				

Remark: The X polarization is the worst case.



ABOVE 30 MHz TEST RESULT

EUT :	Compact HF Reader M30 - IO-Link	Model Name :	RDH 142 00 M30
Temperature :	24 °C	Relative Humidity	54%
Pressure :	1010 hPa	Test Power :	DC 24V
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	44.9006	-100.87	13.79	-87.08	-36.00	-51.08	peak
V	153.7385	-96.75	11.16	-85.59	-36.00	-49.59	peak
V	178.1327	-91.90	12.71	-79.23	-54.00	-25.23	peak
V	281.0075	-100.58	14.09	-86.49	-36.00	-50.49	peak
V	848.0561	-99.50	25.68	-73.82	-36.00	-37.82	peak
H	51.3005	-100.96	13.29	-87.67	-54.00	-33.67	peak
H	87.7248	-101.38	11.68	-89.70	-54.00	-35.70	peak
H	196.5098	-100.83	13.75	-87.08	-54.00	-33.08	peak
H	306.7536	-97.33	13.73	-83.60	-36.00	-47.60	peak
H	731.9203	-100.15	22.33	-77.82	-54.00	-23.82	peak

**Remark:**

1. Absolute Level= Reading Level+ Factor, Margin= Limit- Absolute Level.



## 6. RECEIVER PARAMETERS

The required Receiver Conformance tests are defined in table 7.

**Table 7**

Technologies	Receiver spurious emission (clause 4.4.2)	Adjacent channel selectivity (clause 4.4.3)	Blocking or desensitization (clause 4.4.4)
tagging systems	yes	no (note 2)	no (note 1)
systems in the 27 MHz range	yes	Yes	yes
all others	yes	no (note 2)	yes
NOTE 1: Blocking or desensitization not needed because of the physical co-location of RX to TX in tagging systems where the RX and TX operate simultaneously. The TX signal is used for the RX baseband mixing. The TX signal at the RX input is about 90 dB above the receiver sensitivity or tagging signal level the receiver (see ETSI TR 103 059 [i.9], figure 8). Furthermore given the very short communication ranges for most applications (e.g. NFC, RFID), a given interference blocking signal will have to be about 90 dB higher as the transmitter signal at the transceiver antenna, which is unlikely to happen.			
NOTE 2: This requirement can only be required where a frequency plan with standard channel spacing is consistently used, for example in the 27 MHz band.			

### 6.1 RECEIVER SPURIOUS RADIATION

#### 6.1.1 APPLICABILITY& DESCRIPTION

These requirements does not apply to receivers used in combination with permanently co-located transmitters continuously transmitting. In these cases the receivers will be tested together with the transmitter in operating mode.

Spurious radiation from receivers are emissions radiated from the antenna, the chassis and case of the receiver. It is specified as the radiated power of a discrete signal.

#### 6.1.2 LIMITS

The spurious components below 30 MHz shall not exceed the generated H-field dB $\mu$ A/m values at 10 m according to table 8.

**Table 8: Receiver spurious radiation limits**

Frequency $9 \text{ kHz} \leq f < 10 \text{ MHz}$	Frequency $10 \text{ MHz} \leq f < 30 \text{ MHz}$
5,5 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-25 dB $\mu$ A/m

$$3m(H_{3m}) = H_{10m} + C3 = H_{10m} + 23$$

The spurious components above 30 MHz measured values shall not exceed 2 nW.

#### 6.1.3 TEST PROCEDURE

Please refer to clause 3.5.3.

#### 6.1.4 TEST SETUP

Please refer to clause 3.5.4.

#### 6.1.5 TEST RESULTS

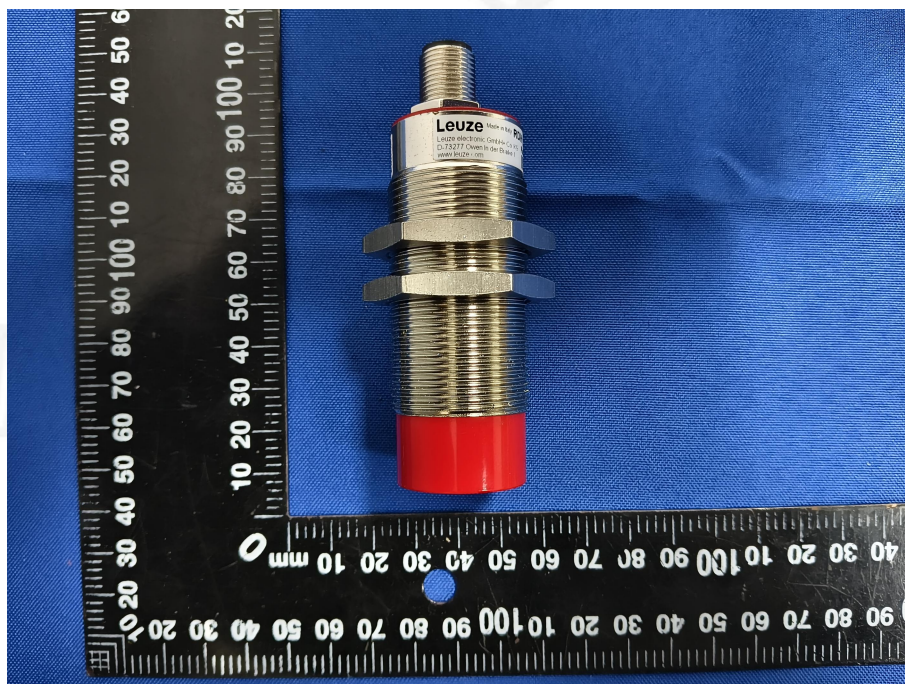
Note: The product didn't have receiver.



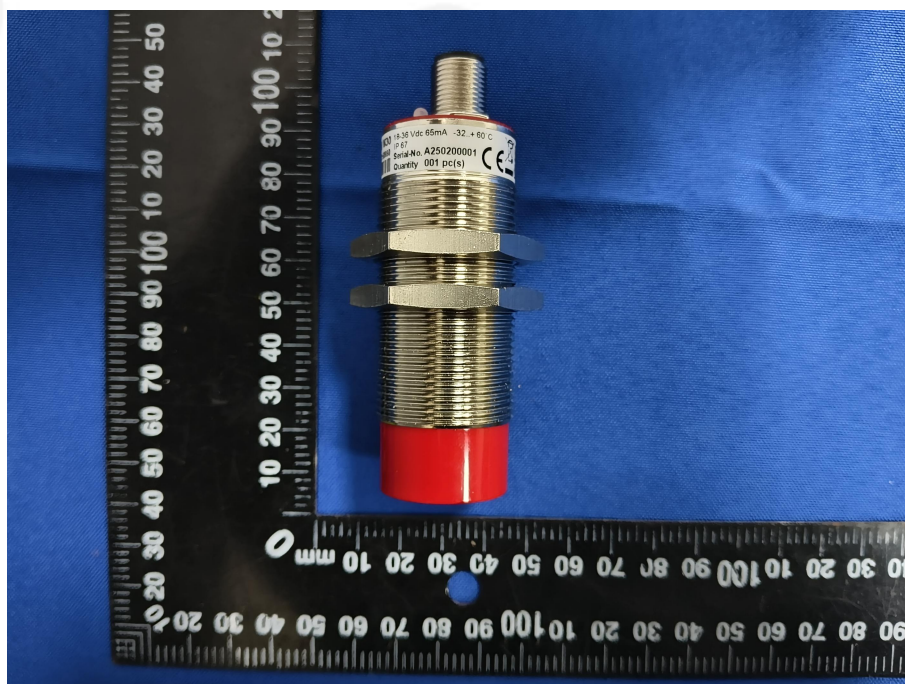


## 7. EUT Photographs

EUT Photo 1

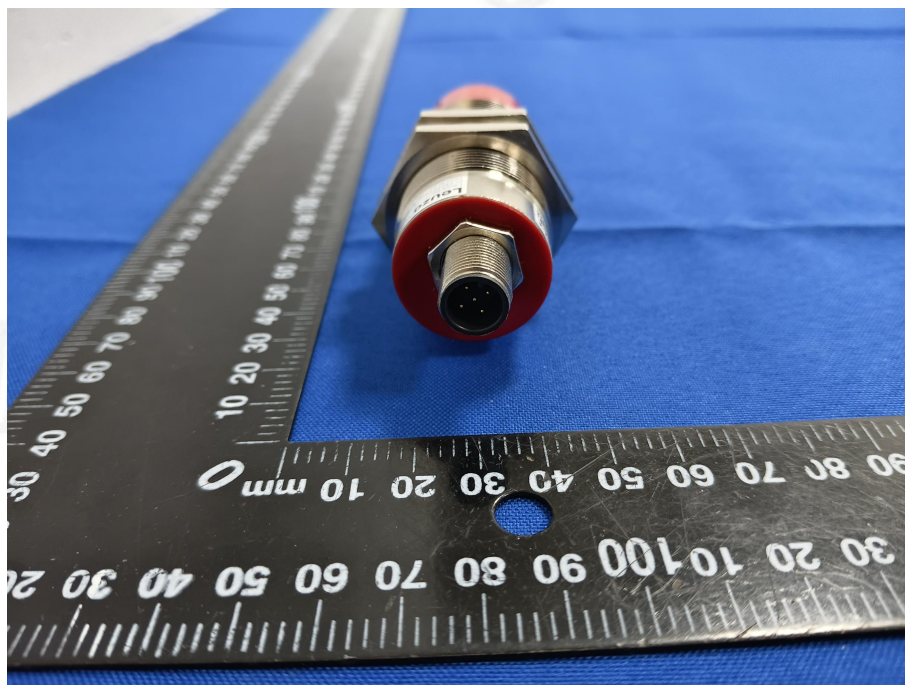


EUT Photo 2





EUT Photo 3

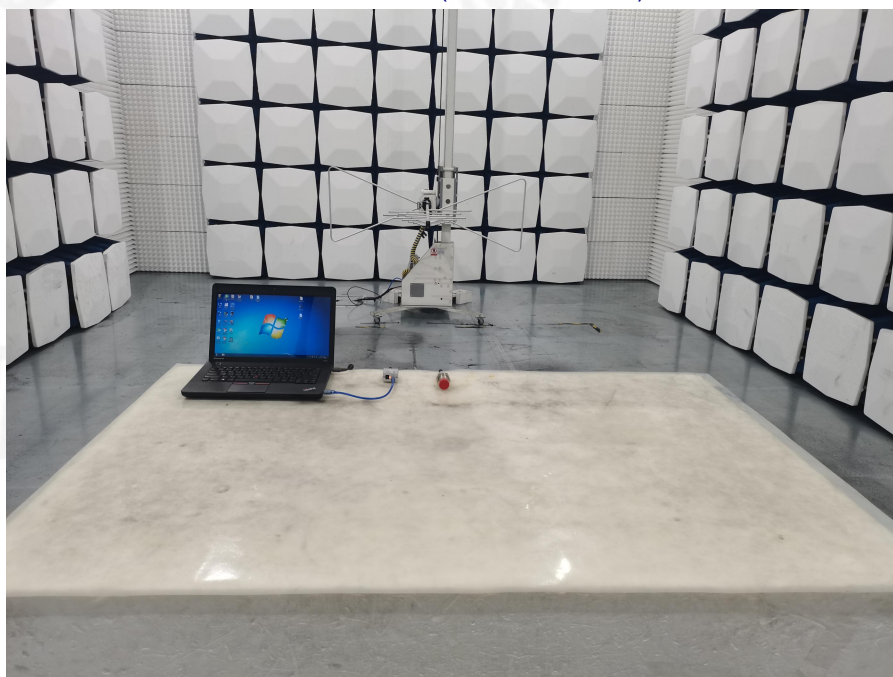






## 8. Test Setup Photo

Radiated Emission Test Setup  
30 MHz - 1GHz(Transmitter tests)



Radiated Emission Test Setup  
9kHz-30 MHz(Transmitter tests)



\*\*\*\*\* END OF REPORT \*\*\*\*\*