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Test Report

Report Number:

F153662E4

Equipment under Test (EUT):

AIS search and rescue transmitter
SEAANGEL SA15 AIS FLARE

Applicant:

FT-TEC-Electronics GmbH

Manufacturer:

FT-TEC-Electronics GmbH

DAkkS Deutsche Akkreditierungsstelle
D-PL-17186-01-01
D-PL-17186-01-02
D-PL-17186-01-03

References

[1] **IEC 62479:2010, modified**: Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

Compliance statement

The EUT is in compliance to the European Council Recommendation 1999/519/EC. The complete assessment is presented in the following.

	Name	Signature	Date
Test engineer:	Thomas KÜHN		29.02.2016
Authorized reviewer:	Bernd STEINER		29.02.2016

This test report is only valid in its original form.

The test results herein refer only to the tested sample. PHOENIX TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TESTLAB Logo and the TEST REPORT NUMBER.

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1 Identification

1.1 Applicant

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Applicant represented during the test by the following person:	Mr. Klaus RUPP

1.2 Manufacturer

Name:	FT-TEC Electronics GmbH
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Manufacturer represented during the test by the following person:	Mr. Klaus RUPP

1.3 Test laboratory

The tests were carried out at: **PHOENIX TESTLAB GmbH**
Königswinkel 10
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Germany

accredited by DGA Deutsche Akkreditierungsstelle GmbH (DAkkS) in compliance with DIN EN ISO/IEC 17025 under Reg. No. D-PL-17186-01-02.

1.4 EUT (Equipment Under Test)

Type: *	AIS Search and Rescue Transmitter (AIS-SART)					
Type designation: *	SEAANGEL SA15 AIS FLARE					
Serial No.:	None (Prototype)					
Power amplifier difference: *	P_d = 0 dB					
Alignment range: *	161.975 to 162.025 MHz					
Switching range: *	161.975 to 162.025 MHz					
Channel separation:	50 kHz (channel bandwidth: 25 kHz)					
Rated RF output power:	1.0 W / 30 dBm					
Supply Voltage:	U_{nom}=	3.0 V DC	U_{min}=	2.5 V DC	U_{max}=	3.3 V DC
Printed circuit designation: *	5400023A01					
Software version: *	SA15V1.3					
Hardware version: *	V01					

* declared by the applicant.

Ports/Connectors

Identification	Connector		Length
	EUT	Ancillary	
-	-	-	-
-	No external lines are connectable to the EUT		-
-			-
-			-
-	-	-	-
-	-	-	-

2 REFERENCE LEVELS

Reference levels of exposure are provided for the purpose of comparison with values of measured quantities. Respect of all recommended reference levels will ensure respect of basic restrictions.
If the quantities of measured values are greater than the reference levels, it does not necessarily follow that the basic restrictions have been exceeded. In this case, an assessment should be made as to whether exposure levels are below the basic restrictions.

The reference levels for limiting exposure are obtained from the basic restrictions for the condition of maximum coupling of the field to the exposed individual, thereby providing maximum protection. A summary of the reference levels is given in Tables 2 and 3. The reference levels are generally intended to be spatially averaged values over the dimension of the body of the exposed individual, but with the important proviso that the localised basic restrictions on exposure are not exceeded.
In certain situations where the exposure is highly localised, such as with hand-held telephones and the human head, the use of reference levels is not appropriate. In such cases respect of the localised basic restriction should be assessed directly.

Field levels: Table 2

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (µT)	Equivalent plane wave power density S eq (W/m ^{2})
0-1 Hz	-	$3,2*10^4$	$4*10^4$	-
1-8 Hz	10000	$3,2*10^4/f^{1/2}$	$4*10^4/f^{1/2}$	-
8 - 25 Hz	10000	4000/f	5000/f	-
0,0025 – 0,8 kHz	250/f	4/f	5/f	-
0,8 - 3 kHz	250/f	5	6,25	-
3 - 150 kHz	87	5	6,25	-
0,15 - 1 MHz	87	0,73/f	0,92/f	-
1 - 10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	-
10 - 400 MHz	28	0,073	0,095	2
400 - 2.000 MHz	$1,375*f^{1/2}$	$0,0037*f^{1/2}$	$0,0046*f^{1/2}$	f/200
2 - 300 GHz	61	0,16	0,2	10

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S eq , E 2 , H 2 , and B 2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S eq , E 2 , H 2 , and B 2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

3 Power assessment

3.1 Calculation for the AIS SART

The above-mentioned device operates in the frequency range 10 MHz to 400 MHz.

Basis for the following declaration is the maximum radiated power of 1.32 Watt as documented under PHOENIX TESTLAB GmbH test report reference F153662E1.

In accordance to the requirements for an AIS SART under IEC 61097-14 the EUT transmits 8 messages per minute this is equal to 48 messages in 6 minutes. One message takes 26.667 ms, so the total transmission time is 213.336 ms per minute or 1.28 s per 6 minutes. This is equal to a duty cycle of 0.36 %.

P: 1.32 W
D: Duty cycle: 0.36 % = 0.0036

With this duty cycle the averaged output power is calculated as follows:

$$P_{AV} = P \cdot D \quad \Rightarrow \quad \underline{\underline{P}} = 1.32\,W \cdot 0.0036 \quad = \quad \underline{\underline{4.7\,mW}}$$

As the calculation above has shown the SEAANGEL SA15 AIS FLARE generates a RF power below 20 mW and it can be regarded that it produces SAR-values below the basic limit of 2 W/kg for all intended operation conditions (in accordance to Annex A.2 of the EN 62479).

4 Report history

Report Number	Date	Comment
F153662E4	29.02.2016	Document created
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