

► TEST REPORT No KA-161-4-030

16.07.2014

Product: Remote system for oil pollution detection
Name and address of the applicant: Laser Diagnostic Instruments AS, 7 Valukoja street
11415 Tallinn Estonia
Country of the manufacturer: Estonia
Name and address of the manufacturer: Laser Diagnostic Instruments AS, 7 Valukoja street
11415 Tallinn Estonia
Rating and principal characteristics: IP68, 12 VDC
Normative references: EVS-EN 61010-1, EVS-EN 61000-6-2,
EVS-EN61000-6-3
Test method: EN 61000-4 series
Test scope: Tests are in accordance with user test program
Trade mark (if any):
Model/type reference: ROW-0-2300Exd
Additional information: Test Report - Appendix1

Product label

Product



Tested by: Peeter Konjuhhov
Expert

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Accredited L034

TESTS RESULTS

1 ENVIRONMENTAL CONDITIONS DURING TESTING

	EVS-EN 61010-1	Real
-	ambient temperature: 15 °C to 35 °C	21 °C ± 2 °C;
-	relative humidity: Not more than 75 % RH	40 % to 60 % RH
-	atmospheric pressure: 750 – 1060 mbr	1010 ± 5 mbr
-	mains supply voltage: 230 V ± 2 %;	230 V ± 2 %
-	mains frequency: 50 Hz ± 0,1 Hz	50 Hz ± 0,1 Hz

The electromagnetic environment of laboratory did not influence the test results

2 Accordance to EVS-EN 61010-1

2.1 Table

Test results

Normative document requirements	Clause	Conformity
1 Marking and documentation	5	
1.1 Identification a) the name or trade mark b) a model number, name or other means to identify the equipment	5.1.2	
1.2 Mains supply a) nature of supply b) the rated value(s) of the supply voltage(s) c) the maximum rated power d) equipment which the operator can set for different rated supply e) accessory main socket-outlets accepting standard ...	5.1.3	DC 12 V - - -
1.3 Fuses	5.1.4	<i>No fuses for operator</i>
1.4 Terminals, connections and operating devices	5.1.5	-
1.4.1 Terminals	5.1.5.1	<i>Indication No necessary</i>
1.4.2 Measuring circuit terminals	5.1.5.2	-
1.5 Switches and circuit-breakers	5.1.6	-

Normative document requirements	Clause	Conformity
1.6 Equipment protected by double insulation or reinforced insulation	5.1.7	-
1.7 Field-wiring terminal boxes	5.1.8	<i>Temperature enclosure not exceed 60 °C</i>
1.8 Warning marking	5.2	<i>No marking</i>
1.9 Documentation	5.4	<i>user manual</i>
1.9.1 General a) intended use of the equipment; b) technical specification; c) instructions for use; d) name and address of manufacturer or supplier; e) the information specified in 5.4.2 to 5.4.5; f) definition of the relevant measurement category g) for equipment marked with ...	5.4.1	<i>For oil pollution detection in user manual in user manual in user manual in user manual</i>
1.9.2 Equipment rating	5.4.2	<i>in user manual</i>
1.9.3 Equipment installation	5.4.3	<i>in user manual</i>
1.9.4 Equipment operation	5.4.4	<i>in user manual</i>
1.9.5 Equipment maintenance	5.4.5	<i>in user manual</i>
2 Protection against electric shock	6	<i>No hazardous live parts</i>
2.1 Determination of accessible parts	6.2	-
2.2 Protection in normal condition	6.4	
2.3 Protection in single fault condition	6.5	-
2.4 Connections to external circuits	6.6	-
2.5 Clearances and creepage distances	6.7	-
2.6 Procedure for dielectric strength tests	6.8	-
2.7 Constructional requirements ...	6.9	
2.8 Connection to mains supply source	6.10	-
2.9 disconnection from supply source	6.11	-

Normative document requirements	Clause	Conformity
3 Protection against mechanical hazards	7	
3.1 Moving parts	7.2	-
3.2 Wall monting	7.6	-
3.3 Expelled parts	7.7	-
4 Mechanical resistance to shock and impact	8	
4.1 Impact test	8.2.2	Pass
5 Protection against the spread of fire	9	
5.1 Constructional requirements	9.3.2	Pass
5.2 Limited enegy circuit	9.4	Pass
6 Equipment temperature limits	10	Pass

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EMC TESTS IN ACCORDANCE EN61326-1:2013 Table 2.

3. IMMUNITY TO ELECTROSTATIC DISCHARGE, EN 61000-4-2

3.1 Air discharge

3.1.1 Test set-up

The EUT was placed on a non-metallic support 0,8 m above a reference ground plane in accordance of Fig. 5 EN 61000-4-2 and was put into operation according to the specified operating mode. Horizontal reference ground plane 1,0 m × 1,25 m.

3.1.2 Test equipment

Equipment	Manufacturer	Type
Test generator:	Schaffner	NSG 432
Test finger and coupler:	Schaffner	option NSG 432

3.1.3 Test conditions

Test level:	8,0 kV air discharge
Position	Parts of enclosures
Repetition ratio:	10 discharges per s
Application:	10 single contact discharges 0,1 m from EUT
Duration of each test:	2 s

3.1.4 Test results

Test No	EUT part	Criterion	Comment
1	Enclosure of equipment	A	Normal operation. Pass

3.2 Contact discharge

3.2.1 Test conditions

Test level:	4,0 kV Contact discharge
Position:	Indirect to coupling plane direct to enclosure
Repetition ratio:	10 discharges per s
Application:	10 single contact discharges 0,1 m from EUT
Duration of each test:	2 s

3.2.2 Test equipment

Equipment	Manufacturer	Type
Test generator:	Schaffner	NSG 432
Contact discharge adapter $R_V = 0 \Omega$:	Schaffner	402-664D

3.2.3 Test results

Test No	EUT	Criterion	Comment
1	Enclosure of equipment	A	Normal operation. Pass

4 IMMUNITY TO RADIATED RF EM FIELD, EN 61000-4-3

4.1 Test set-up

The EUT was placed into 3 m FAR on a non-metallic support 0,8 m above a reference ground plane in accordance of Fig. 6 EN 61000-4-3 and was put into operation according to the specified operating mode. Field strength control by isotropic antenna Schaffner EMC 20. Distance from antenna top to EUT - 3 m.

4.2 Test equipment

Equipment	Manufacturer	Type
Amplifier and test generator:	Bonn Elektronik R&S	BSA 1501-10 SML 01
Antenna	Schaffner	CBL 6111D
EM field monitoring device	Schaffner	EMC 20

4.3 Test conditions

Test level:	10 V/m	f res sweep 80 – 1 000 MHz, 1MHz step
AM modulation:	1 kHz, 80 %	
Application:	Antenna vertical and horizontal polarization	
Duration of each step:	26 min	
Ports for test:	All ports, cables and enclosure	

4.4 Test results

Test No	Port/Cable	Criterion	Comment
1	All ports, cables and enclosure	A	Normal operation. Pass

5. IMMUNITY TO POWER FREQUENCY MAGNETIC FIELD EN-61000-4-8

5.1 Test set-up

5.2 Test equipment

Equipment	Manufacturer	Type
Generator	Shaffner	NSG 1003
Immersion coil	TKK	Ø 1 m 400 turns

5.3 Test conditions

Test level:	30 A/m	50 Hz
Duration	5 s	
Ports for test:	All ports, cables and enclosure	

5.4 Test results

Test No	Port/Cable	Criterion	Comment
1	All ports, cables and enclosure	A	Normal operation. Pass

6. ELECTRICAL BURST IMMUNITY TEST, EN 61000-4-4

DC power port

6.1 Test set-up

The EUT was placed on a non-metallic support 0,1 m above a reference ground plane in accordance of Fig. 9 from EVS-EN 61000-4-4 and was put into operation according to the specified operating mode. CDN for AC input port PNW 2225.

6.2 Test conditions

Test level:	0,25 kV – line to line
Repetition ratio:	5 kHz
Application:	15 ms (75 spikes) burst every 300 ms
Polarity:	Alternative (\pm)
Duration of each test:	720 s for operating mode and 480 s for none operating mode

6.3 Test equipment

Equipment	Manufacturer	Type
Test generator including CDN:	Schaffner	NSG 2050 PNW 2225

6.4 Test results

Test No	MODE	Criterion	Comment
1	line to line	A	Normal operation. Pass

7. SURGE IMMUNITY TEST, EN61000-4-5

DC input power port

7.1 Test set-up

The EUT was placed on a non-metallic support 0,8 m above a reference ground plane in accordance of Fig. 7 EN 61000-4-5 and was put into operation according to the specified operating mode.

7.2 Test equipment

Equipment	Manufacturer	Type
Test generator including CDN:	Schaffner	NSG 2050 PNW 2055

7.3 Test conditions

Test level:	0.25 kV for Line to Line;
Impedance:	12 Ω
Application:	5 pulses pos + 5 pulses neg, synchronous
Phase angles:	0
Number of cycles	5
Duration of each test:	240 s

Test results

Test No	MODE	Criterion	Comment
1	Line to line	A	Normal operation. Pass

8. IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO - FREQUENCY FIELD, EN61000-4-6

Test set-up

The EUT was placed on a non-metallic support 0,1 m above a reference ground plane in accordance of Fig. 6 EN 61000-4-6 and was put into operation according to the specified operating mode. Injection clamp 0,2 m from EUT. Monitoring probe between EUT and injection clamp.

Test equipment

Equipment	Manufacturer	Type
Test generator with injection clamp:	Schaffner	NSG 420
Monitoring current probe	Schaffner	SMZ11
Injection clamp	Teseq	KEMZ801
Test receiver	R&S	ESPI3

Test conditions

Test level:	3 V _{rms} , 150 kHz to 80 MHz
AM modulation:	80 % 1 kHz
Application:	150 Ω
Mode	Common mode (1 – 3 turns)

Test results

Test No	Port/Cable	Criterion	Comment
1	DC power port	A	Normal operation. Pass

9. EMISSIONS

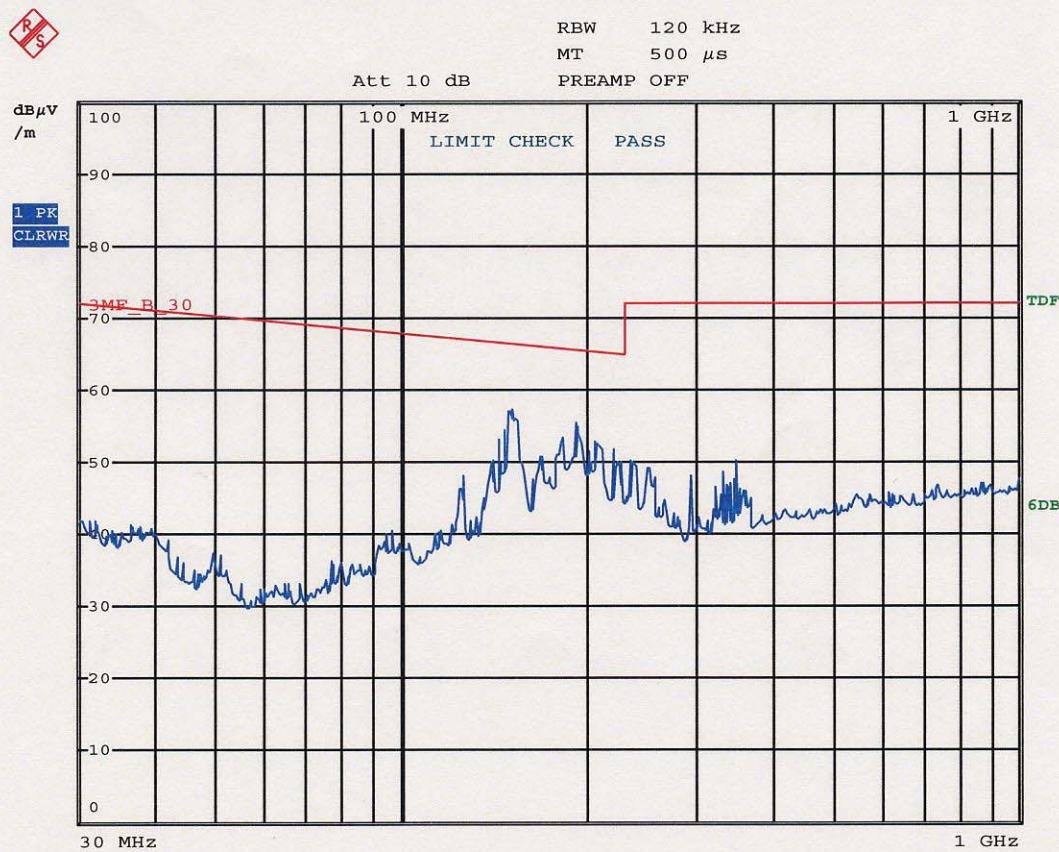
9.1 Test set-up for radiated emissions at range 30 MHz to 1 GHz

The EUT was placed into FAR on a non-metallic support so that the boundary of EUT was more than 1.2 m distance from closed surface and distance from receive antenna reference point 3 m \pm 3 cm. The validation of FAR by antenna high 1.5 m with \pm 4 dB deviation estimated that the E-field in 3 m distance 5 dB higher than 10 m OATS. For measurements at 3 m distance with preamp 30 dB.

9.1.1 Test equipment

Equipment	Manufacturer	Type
Antenna:	Schaffner	CBL6112D
Test receiver:	R&S	ESPI 3
FAR:	Rainford EMC	Smart shield 3 m FAR

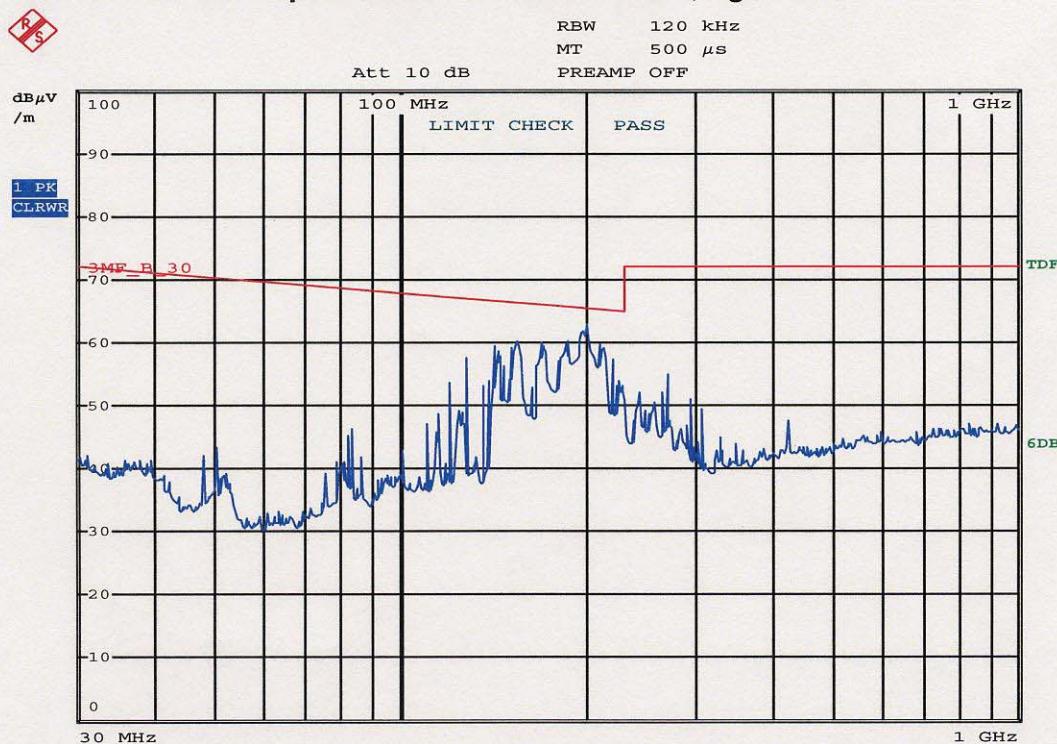
9.2.1 Antenna horizontal polarizatsion emission levels , front side



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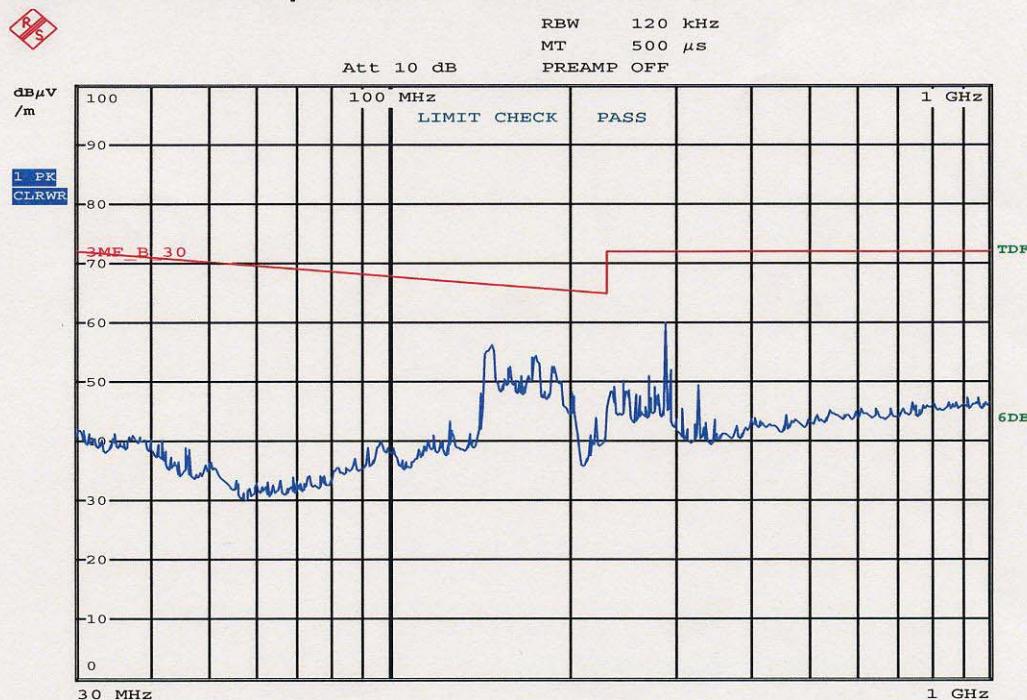
Note : Limits from EN61000-6-3 Tab. 1 cl. 1.2 with +30 dB preamp

9.2.2 Antenna horizontal polarization emission levels , right side

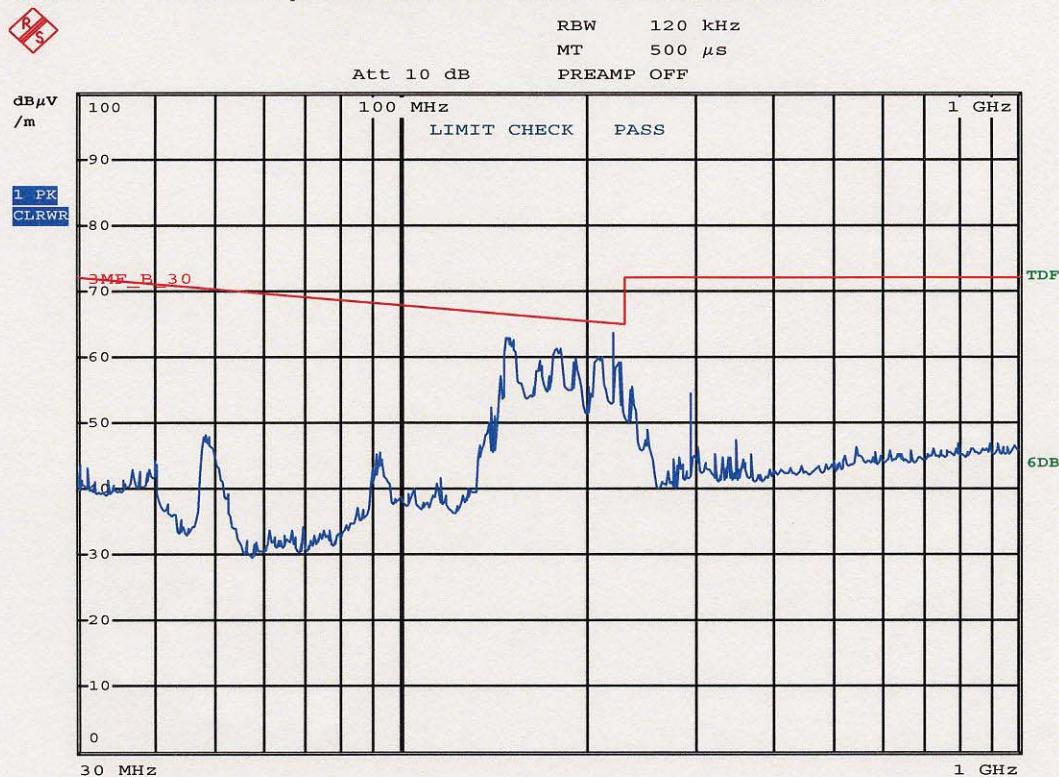


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9.2.3 Antenna horizontal polarization emission levels , back side

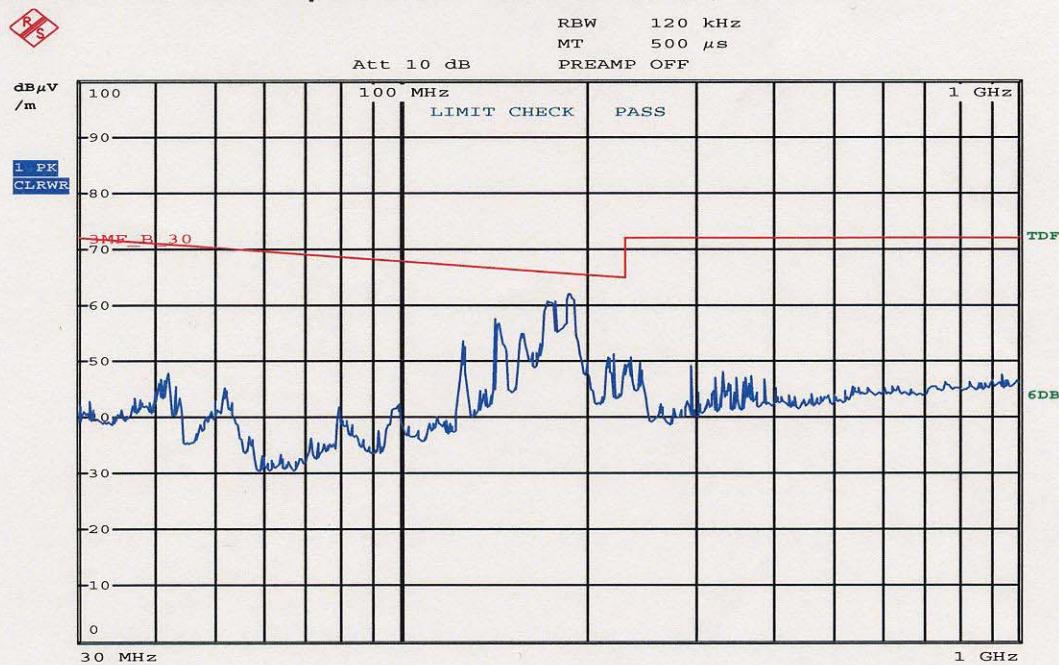


9.2.4 Antenna horizontal polarization emission levels , left side



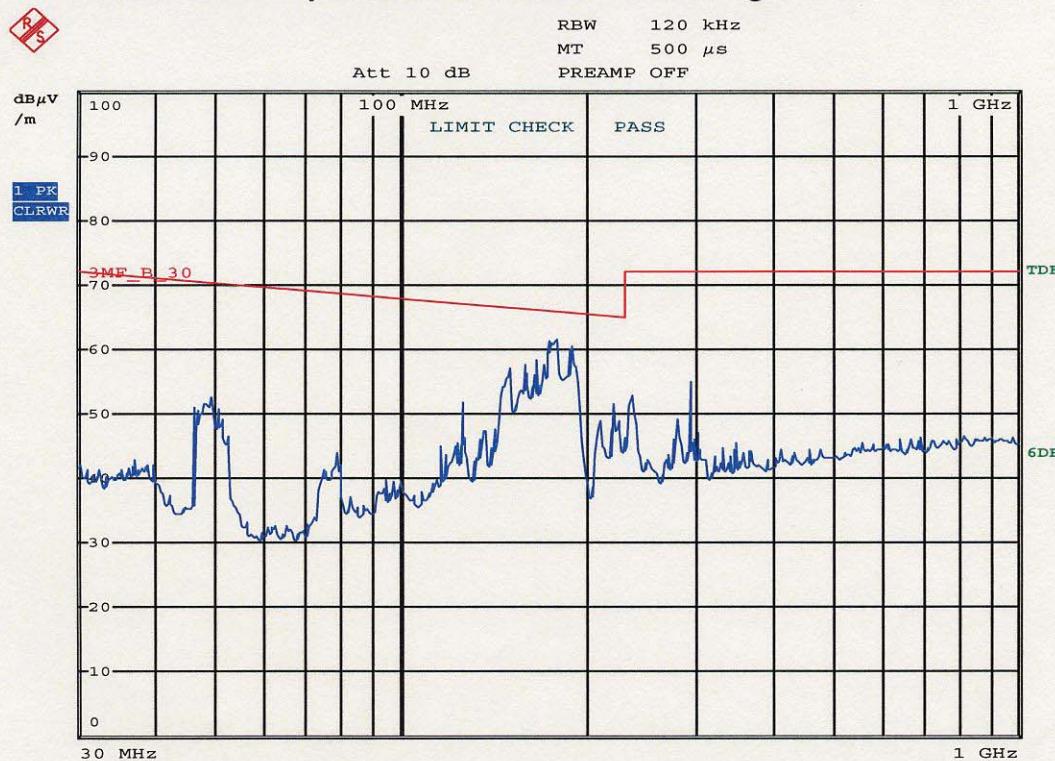
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9.3.1 Antenna vertical polarization emission levels , front side



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9.3.2 Antenna vertical polarization emission levels , right side



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