TEST REPORT

Title 47-Telecommunication

Chapter I - Federal Communications Commission
Subchapter A - General
Part 15 - Radio Frequency Devices
Subpart B - Unintentional Radiators

Report Reference No. ..... :	332205-3TRFFCC		
Tested by (name, function and signature) ..... :	P. Barbieri	(project handler)	
Approved by (name, function and signature) ..... :	G. Curioni	(verifier)	
Date of issue ..... :	2017-07-04		
Testing Laboratory ..... :	**Nemko Spa**		
Address ..... :	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy		
Testing location	Nemko Spa		
Address ..... :	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy		
Registration number:	481407		
Applicant's name ..... :	**ZADI Spa**		
Address ..... :	Via Carlo Marx, 138 – 41012 Carpi (MO) – Italy		
Test specification:			
Standard ..... :	FCC CFR 47 Part 15 Subpart B		
	§15.107 – Conducted emission		☐
	§15.109 – Radiated emission		☒
Test procedure ..... :	Nemko WM L0077, WM L0177 and WM L1002		
Test Report Form No. ..... :	FCCTRF		
TRF Originator ..... :	Nemko Spa		
Master TRF ..... :	2014-03		

Test item description ..... :	**Rider Recognition System (RRS) main unit**
Trade Mark ..... :	ZADI
Manufacturer ..... :	ZADI Spa
Address of manufacturer ..... :	Via Carlo Marx, 138 – 41012 Carpi (MO) – Italy
Model ..... :	XCB0307 with EL0359 LF antenna
Ratings ..... :	13.5 Vdc nominal (12Vdc lead-acid vehicular battery)

Test Report No. : 332205-3TRFFCC	2017-07-04 Date of issue

Short description of the EuT	Copy of marking plate
The EUT is the main unit for a Rider Recognition System (RRS), receiving at 433.92 MHz. Equipment Class = CYY Communications Receiver used w/Pt 15 Transmitter	Not provided

Number of tested samples:	2
Serial number:	2/9 and 6/9 (number assigned by Nemko Spa)
Internal operating frequency:	433.92 MHz
Class:	B
Device type:	Mounted inside a motorcycle
Accessories and detachable parts included:	The E.U.T. is composed by a single unit
Equipment Class	CYY Communications Receiver used w/Pt 15 Transmitter
Other options included:	--
Testing	
Date of receipt of test sample:	2017-06-26
Testing commenced on:	2017-06-27
Testing concluded on:	2017-07-04
Possible test case verdicts:	
test case does not apply to the test object:	N (Not applicable)
test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)

Symbols used in this test report

☒ The crossed square indicates that the listed condition or equipment is applicable for this report.

☐ The empty square indicates that the listed condition or equipment is not applicable for this report.

Throughout this report point is used as decimal separator.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

Verdict according to the standards listed at page 5:	**Pass**

PROJECT HISTORY		
Report number	**Modification to the report / comments**	**Date**
332205-3TRFFCC	First release	2017-07-04
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REMARKS		

PRODUCT VARIANTS		
Variant model	**Difference against the main model**	**Additional test performed**
XCB0305	Main unit with a connection cable (to LF antenna) length of 570 mm instead of 220 mm	All
EL0282	LF antenna identical to EL0359 with additional rubber gasket mounted on connector	None
REMARKS		

Contents

1 TEST STANDARDS

The tests were performed according to following standards and procedures.

NEMKO WM L0177: General routines for using instruments at Nemko

NEMKO WM L1002: Measurement Uncertainty - Policy and Statement

NEMKO WM L0077: General routines to perform EMC tests

FCC CFR 47 Part 15 Subpart B
Code of Federal Regulations – Title 47 – Part 15 Radio Frequency Devices – Subpart B Unintentional radiation

The main standard above contains references to other standards, which are listed below.

ANSI C63.4 (2014)
'Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz''

2 SUMMARY OF TEST RESULTS

FCC Part 15 Subpart B requirements			
Part	**Test description**	**Frequency range**	**Verdict**
§15.107	Conducted emission	150 kHz to 30 MHz	N (1)
§15.109	Radiated emission	30 MHz to 9000 MHz	P
GENERAL REMARKS			
(1) The EUT is supplied by a vehicle battery			

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage:	☐	230V/50 Hz / 1ϕ	☐	115V/60Hz / 1ϕ
	☐	400V/50 Hz 3PE	☐	400V/50 Hz 3NPE
	☐	12 VDC	☒	13.5 V DC

3.2 EuT operation modes

Mode	Description
1	Normal working with the radio modules in RX mode

3.3 EuT configuration modes

The EuT was configured to measure its highest possible radiation level. The test modes selected are according to EuT instruction manual.

Mode	Description
1	The EUT has been tested with the Main Unit (TX) supplied by an external DC power source and with the loop antenna connected by a 220 mm length cable. The Active Transponder (RX) was supplied by its internal battery. The CAN BUS line was connected to a CAN BUS simulator. The I/O TANK CAP line was connected to a tank cap. The DISABLE SIGNAL INPUT line was connected to the positive line of the power supply. The other lines were connected to a button and two led for simulate the normal working installation.

3.4 Input/Output Ports

Port	Name	Type*	Cable Max. >3m	Cable Shielded	Description
0	Enclosure	N/E	—	—	—
1	Main connector	DC+I/O	☐	☐	Multi wires cable
2	Antenna connector	I/O	☐	☐	Two wires cable

*Note: Main connector pin out

Name:	Pin no. on connector:	Wire colour:
Permanent power supply (+30)	1	White / red
Ground	2	Brown
Reserved for future use	3	Tbd
Reserved for future use	4	Tbd
Lock-unlock-button (LUB)	5	Blue
Disable signal input (MCU_VSUP_ECM)	6	Green / red
Output LED signal	7	Red
Output T15	8	Orange
CAN H	9	Blue / black
CAN L	10	Blue / white
I/O tank cap power	11	Yellow / red
I/O tank cap signal input	12	Yellow / blue

AC = AC Power Port DC = DC Power Port N/E = Non-Electrical

I/O = Signal/Control Input or Output Port TP = Telecommunication Ports

3.5 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
AE	CAN to USB converter	National Instrument	P/N 194210D-D2L	—
AE	Notebook	HP	Compaq NC 6320	—
AE	Active transponder	ZADI	K0349-0	—

Note: * Use

EUT - Equipment Under Test

AE - Auxiliary/Associated Equipment (Not Subjected to Test)

SIM - Simulator (Not Subjected to Test)

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Nemko Spa
Via del Carroccio, 4
20853 Biassono (MB) - Italy

Tests site/benches are in accordance with applicable standard/s, and have been utilized by Nemko Spa testing engineer(s).

4.2 Environmental conditions

Unless different values are declared in the test case, following ambient conditions apply for the tests:

Ambient temperature: 18÷33 °C

Relative Humidity: 30÷60 %

Atmospheric pressure: 980÷1060 hPa

4.3 Test equipment used for the monitoring of the environmental conditions

Equipment	Manufacturer	Model	Serial N°
Thermohygrometer data loggers	Testo	175-H2	20012380/305
Thermohygrometer data loggers	Testo	175-H2	38203337/703
Baarometer	MSR	MSR145B	330080

4.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Hereafter the best measurement capability for Nemko Spa laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Disturbance 3m, 10m Chamber	Antenna distance 1m, 3m, 10m (30÷200) MHz	5.0 dB	(1)
	Antenna distance 1m, 3m, 10m (0.2÷6) GHz	5.2 dB	(1)
	Antenna distance 1m, 3m (6÷18) GHz	5.8 dB	(1)
	Antenna distance 1m, 3m (18÷40) GHz	7.2 dB	(1)
Conducted Disturbance	9 kHz ÷ 150 kHz with AMN	3.8 dB	(1)
	150 kHz ÷ 30 MHz with AMN	3.4 dB	(1)
	150 kHz ÷ 30 MHz with AAN	4.6 dB	(1)
	9 kHz ÷ 30 MHz with voltage probe	2.9 dB	(1)
	9 kHz ÷ 30 MHz with current probe	2.9 dB	(1)

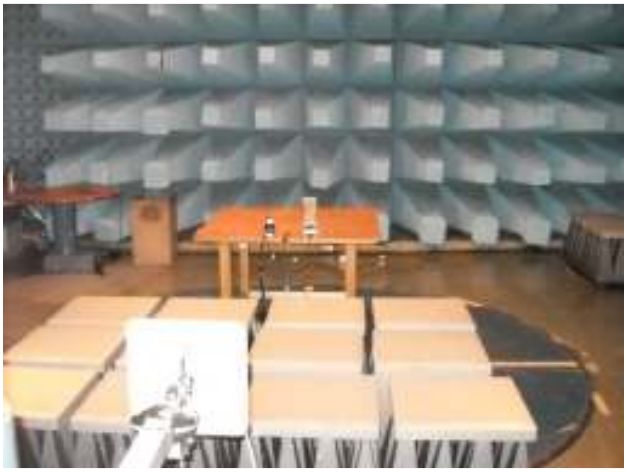
NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2 which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %;

5 TEST CONDITIONS AND RESULTS

5.1 Clause 15.109 – Radiated emissions

5.1.1 Photo documentation of the test set-up



5.1.2 Test method

Measurements were made on a semi anechoic chamber. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 or 10 meters with the receive antenna located at a fixed height (from 1 to 4 meter) in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

5.1.3 Limits for enclosure

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (µV/m)	Field strength (dBµV/m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0

The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission (MHz)	Field strength (µV/m)	Field strength (dBµV/m)
30–88	90	39.0
88–216	150	43.5
216–960	210	46.4
Above 960	300	49.5

5.1.4 Test result

Verdict:	☒ P ☐ F ☐ N
Frequency range:	30MHz - 5000MHz
Kind of test site:	Semi anechoic chamber
Measurement distance:	3 m

Remarks: for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown as follow:

If the intentional radiator operates at frequency upper than 1.705 MHz and lowers than 108 MHz the upper frequency of measurement range is 1000 MHz.

If the intentional radiator operates at frequency upper than 108 MHz and lowers than 500 MHz the upper frequency of measurement range is 2000 MHz.

If the intentional radiator operates at frequency upper than 500 MHz and lowers than 1000 MHz the upper frequency of measurement range is 5000 MHz.

If the intentional radiator operates at frequency above 1000 MHz the upper frequency of measurement range is 5th harmonic of the highest frequency or 40 GHz, whichever is lower.

If the intentional radiator operates at or above 10 GHz and below 30 GHz to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

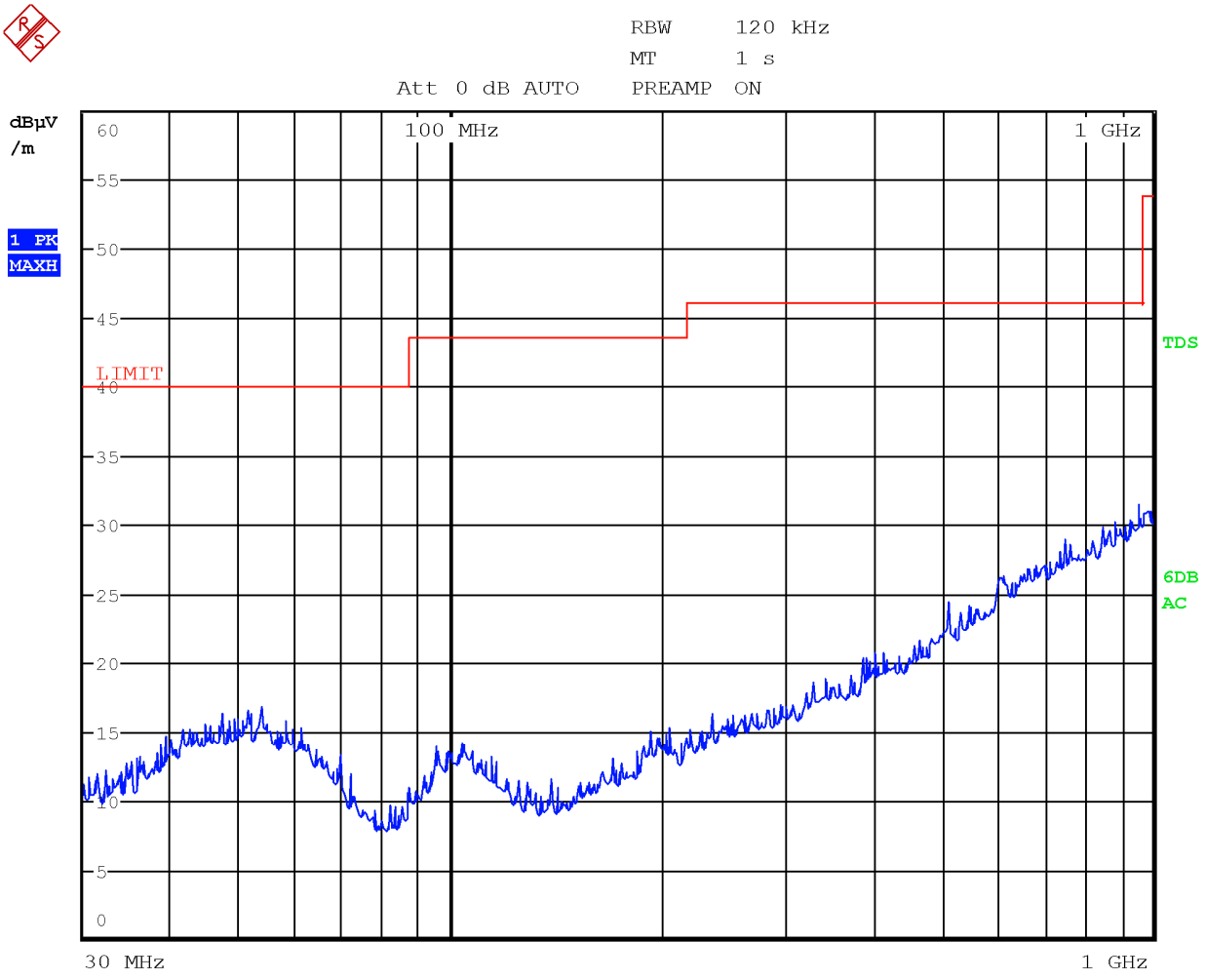
If the intentional radiator operates at or above 30 GHz to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

5.1.5 Test equipment used

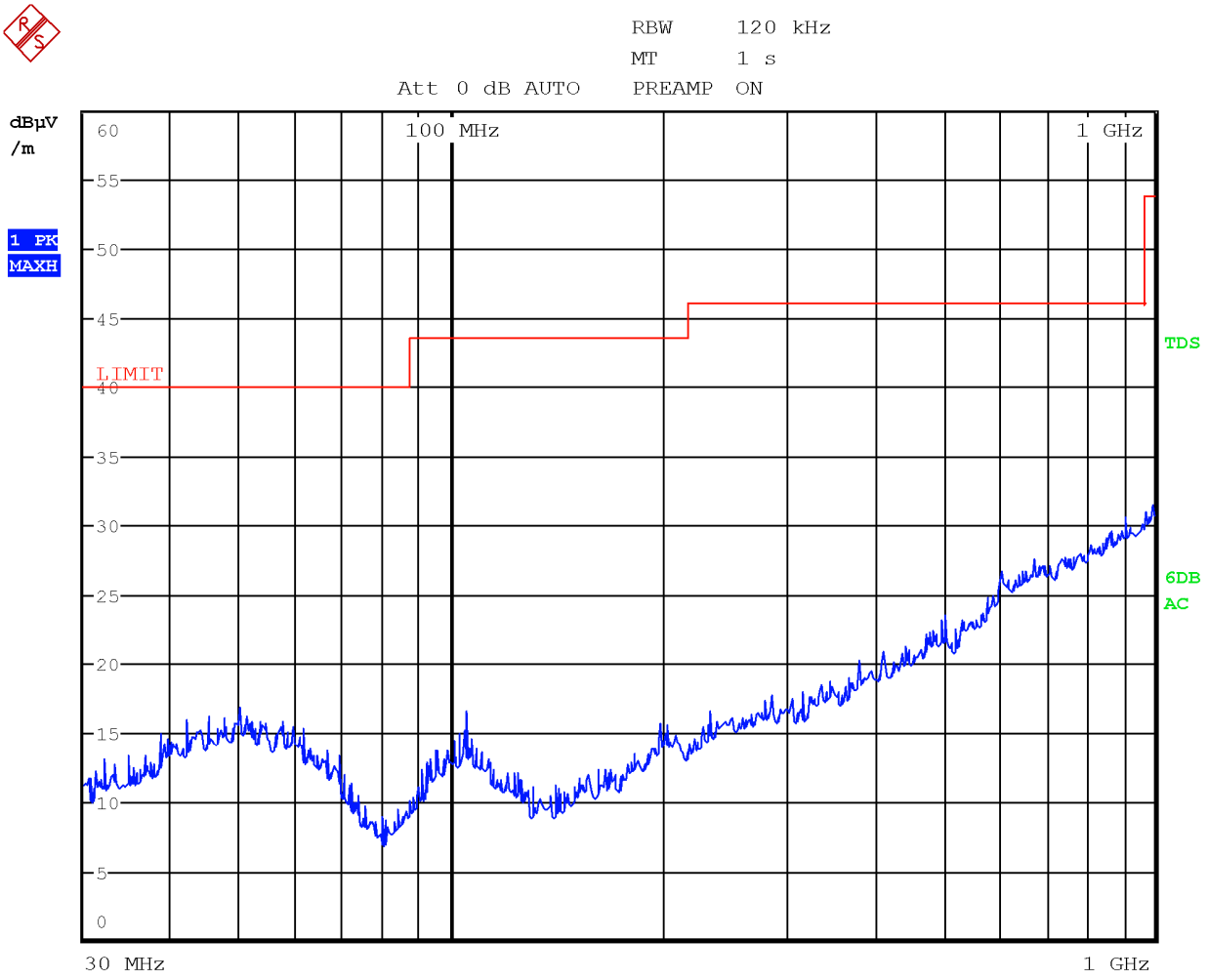
Equipment	Manufacturer	Model	Serial N°
Trilog Broadband Antenna 25 ÷ 8000 MHz	Schwarzbeck	VULB 9162	9162-025
Bilog antenna 1 ÷ 18 GHz	Schwarzbeck	STLP 9148-123	123
Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202
Turn-table	R&S	HCT	835 803/03
Antenna mast	R&S	HCM	836 529/05
Controller	R&S	HCC	836 620/7
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530
Shielded room	Siemens	10m control room	1947

5.1.6 Test protocol

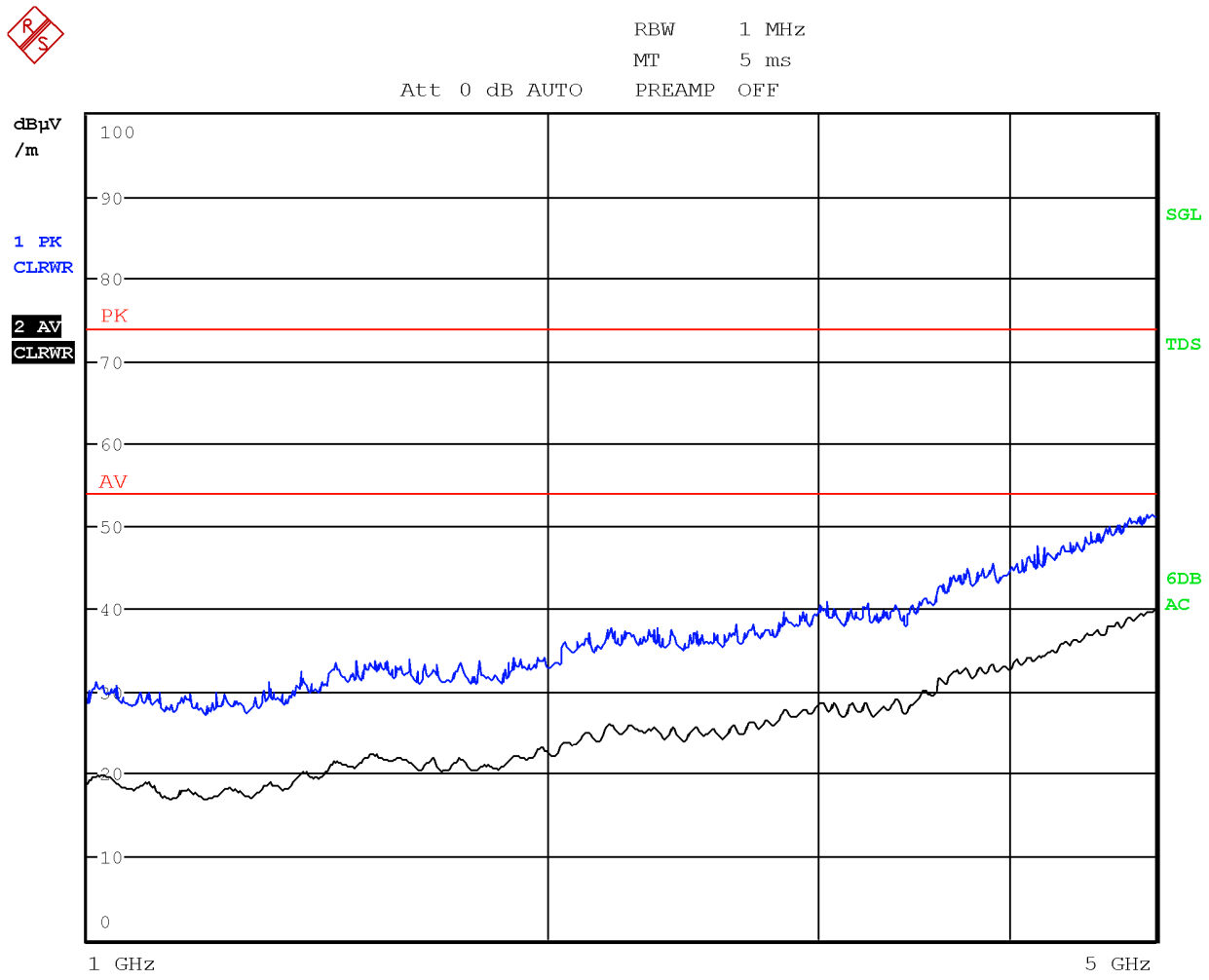
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 220 mm cable



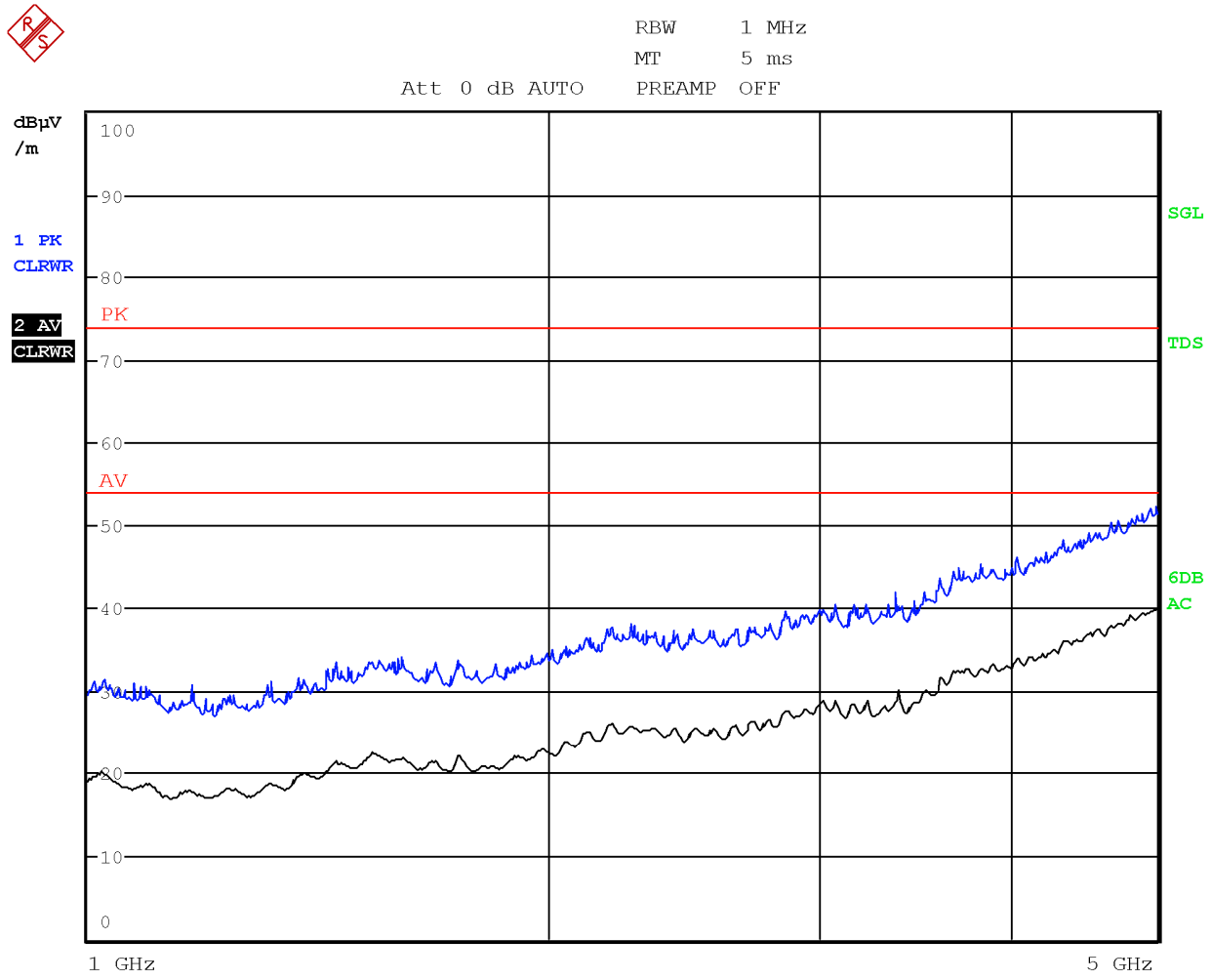
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 220 mm cable



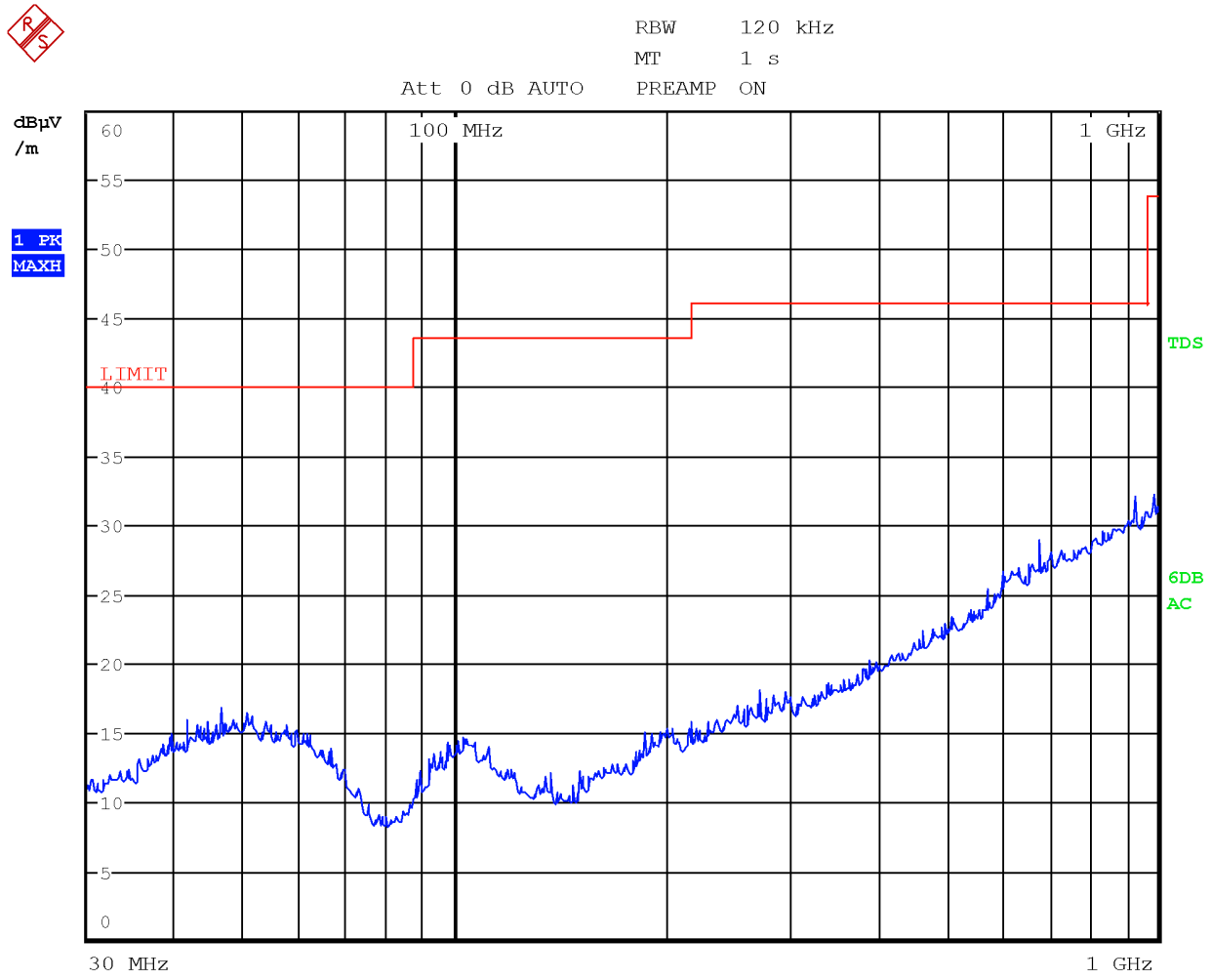
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 220 mm cable



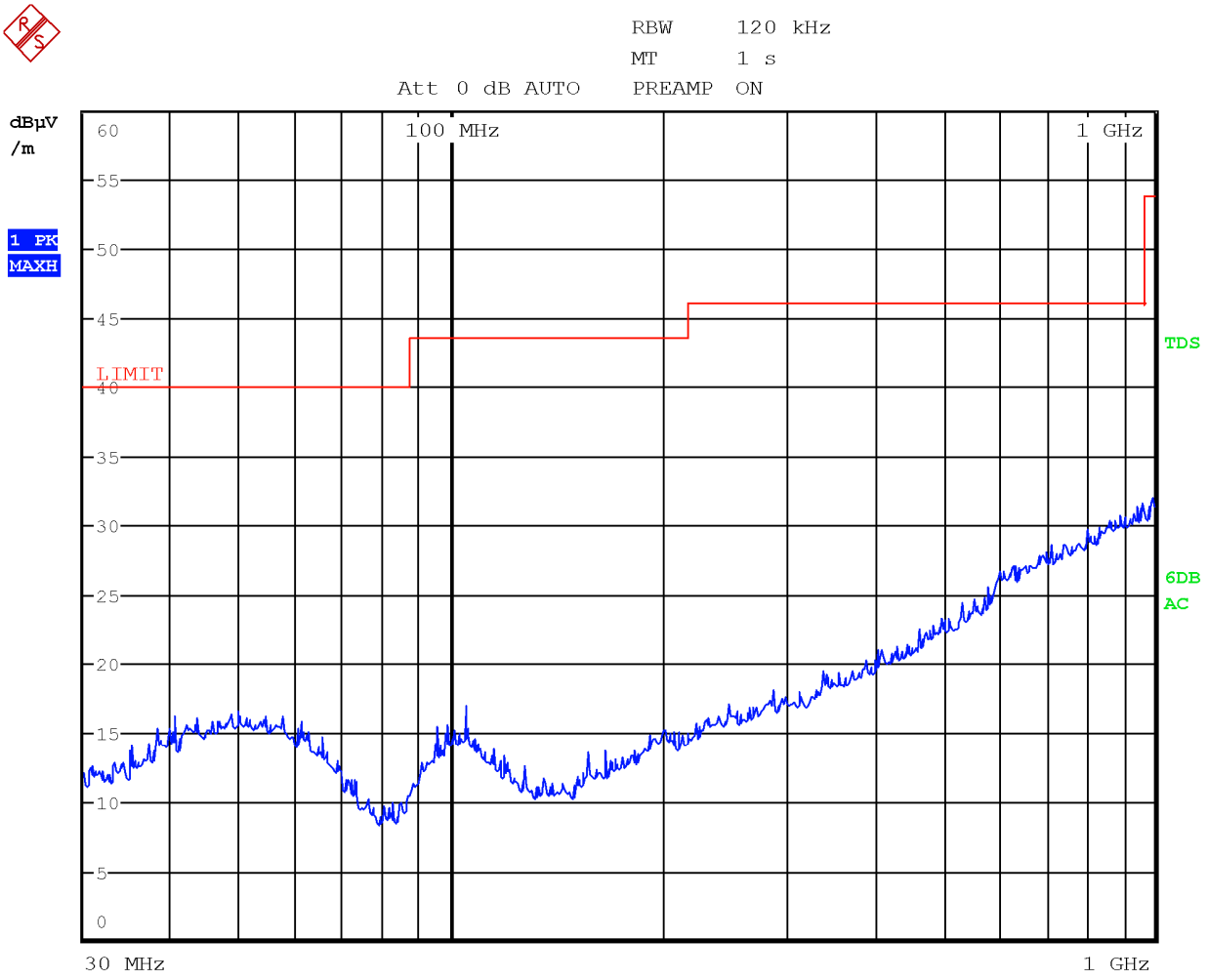
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 220 mm cable



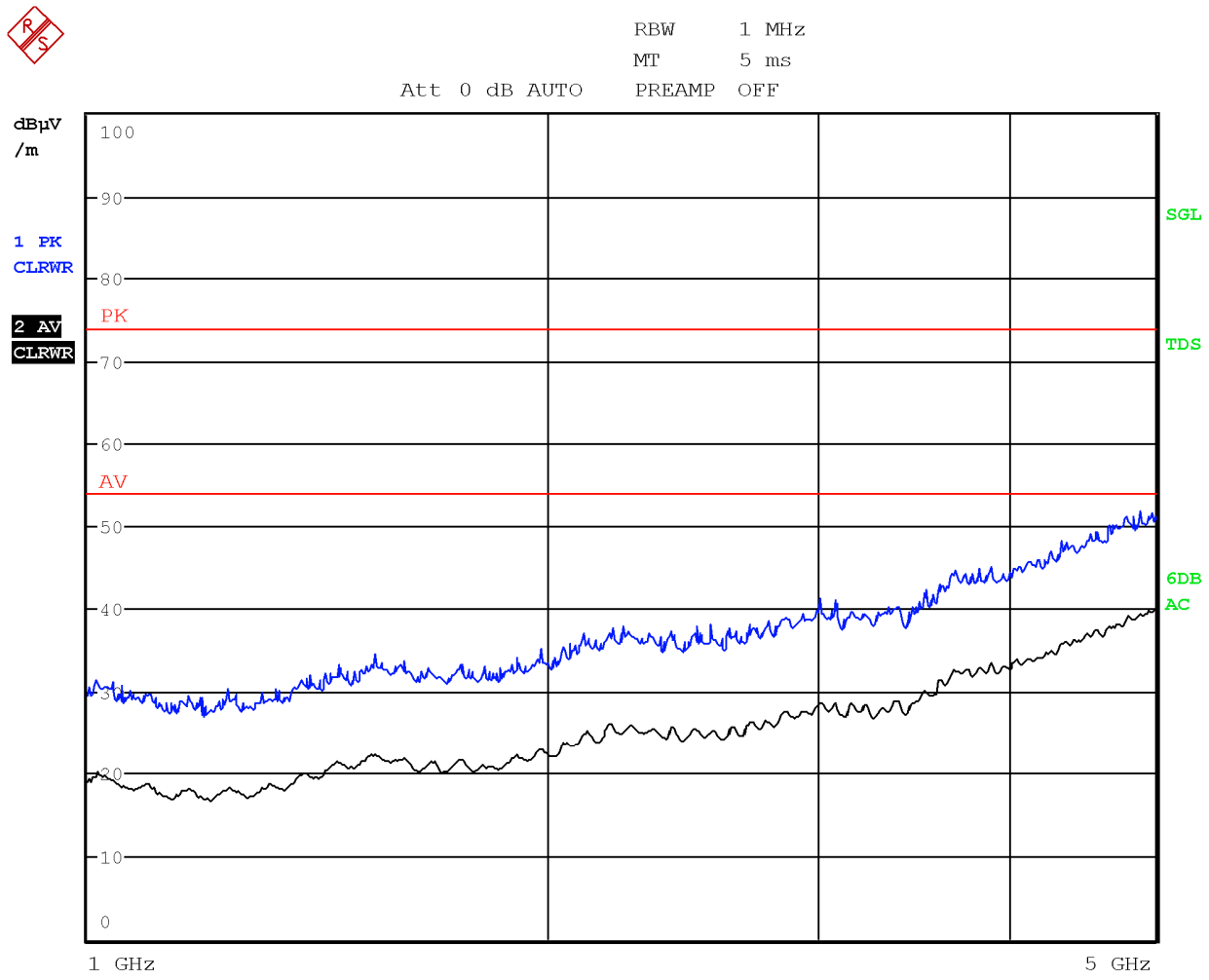
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 570 mm cable



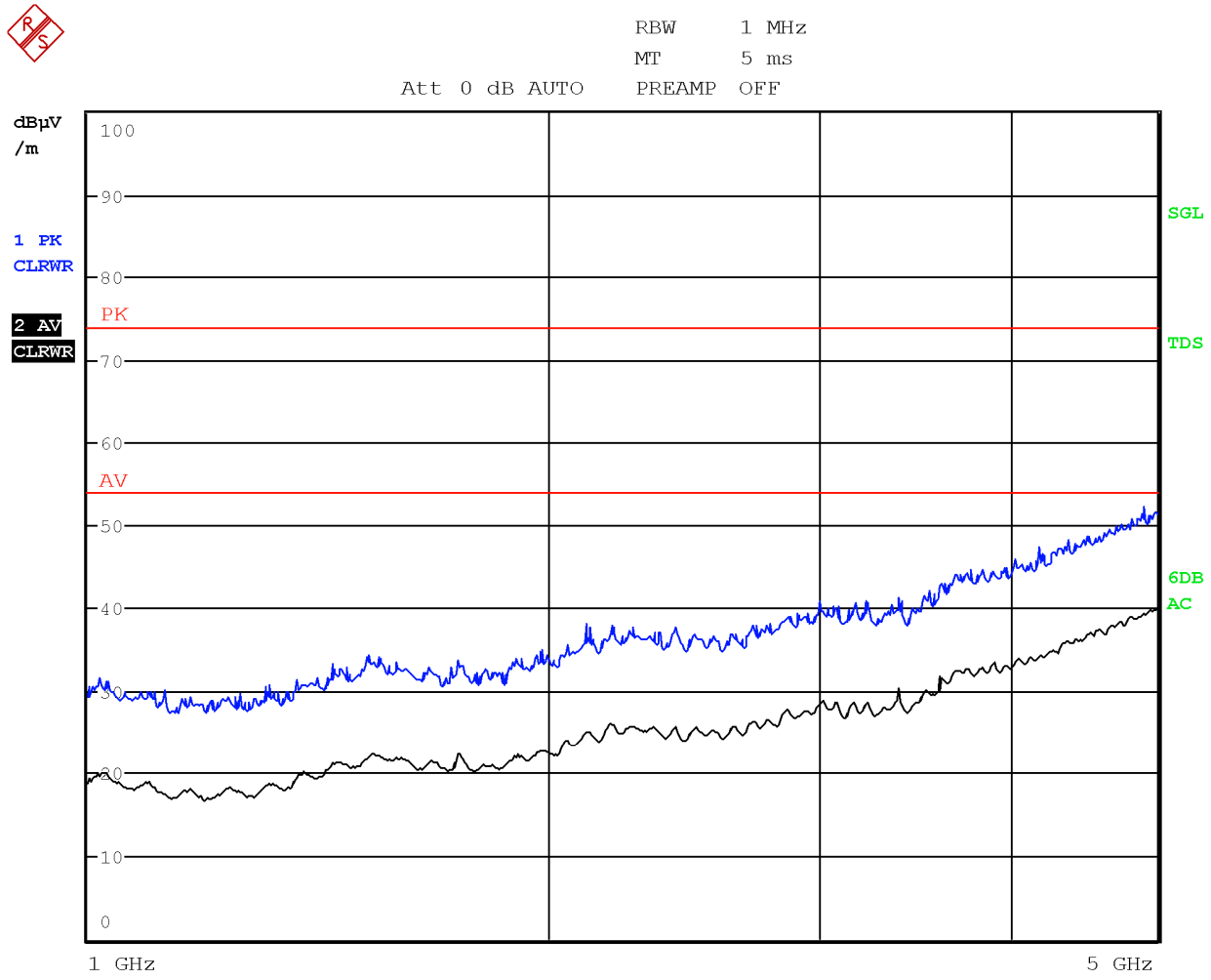
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 570 mm cable



Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 570 mm cable



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: EUT with 570 mm cable



6 EUT PHOTOS

End of report