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LAB N° 0168

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

TEST REPORT nr. R18229701

Federal Communication Commission (FCC)

Test item

Description .....: TRANSCEIVER UNIT

Trademark .....: AUTEC

Model/Type .....: Model DJB Type NJ235

FCC ID .....: OQA-DJBNJ235

Test Specification

Standard.....: KDB 447498 D01 General RF Exposure Guidance v06

Client's name .....: AUTEC S.r.l.

Address .....: Via Pomaroli, 65 – 36030 Caldogno (VI) – ITALY

Manufacturer's name : Same as client

Address .....: --

Report

Tested by .....: G. Gandini .....

Approved by .....: R. Beghetto – *Laboratory Manager* .....

Date of issue .....: 13.11.18

Contents.....: 15 pages

This test report shall not be reproduced except in full without the written approval of CMC.
The test results presented in this report relate only to the item tested.

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1. Summary

Standard:

KDB 447498 D01 General RF Exposure Guidance v06

Test specifications	*Environmental Phenomena*	*Tests sequence*	*Result*
KDB 447498 D01 cl. 4	RF Exposure Analysis	1	Complies

The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification

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2. Description of Equipment under test (EUT)

Power supply ..... :	7,2 Vdc from battery
Type of equipment ..... :	☑ Transmitter Unit
	☑ Receiver Unit
Type of station ..... :	❑ Fixed station
	❑ Portable station
	☑ Mobile station
Frequency band ..... :	902 – 928 MHz
Nominal frequencies ..... :	F_L: 915,05 MHz F_M: 921,40 MHz F_H: 927,80 MHz
Pseudo randomly ordered list of hopping frequencies ..... :	See document djb_nj235_operational_description-rev0

2.1 Test Site

Company ..... :	CMC Centro Misure Compatibilità S.r.l.
Address ..... :	Via della Fisica, 20
	36016 Thiene (VI) – ITALY
Test site facility's FCC registration number ..... :	182474

3. Testing and sampling

Date of receipt of test item ..... :	11.04.18
Testing start date ..... :	15.10.18
Testing end date ..... :	15.10.18
Samples tested nr. ..... :	1
Sampling procedure. ..... :	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion
Internal identification ..... :	adhesive label with the product number P180453

4. Operative conditions

EUT exercising ..... :	EUT in continuous transmission at maximum power

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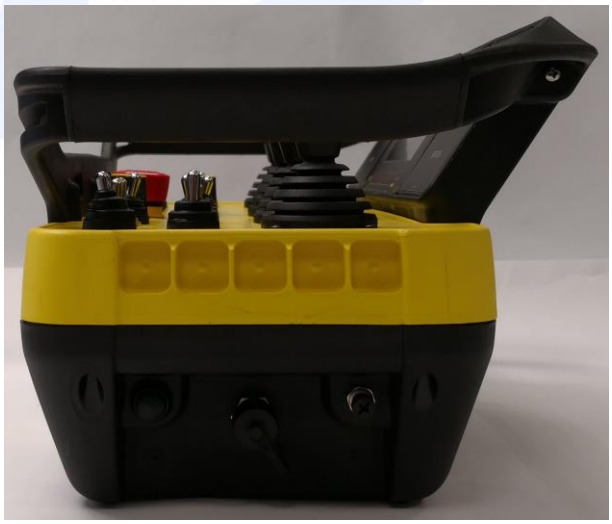
5. Photograph(s) of EUT

5.1 Photograph(s) of EUT



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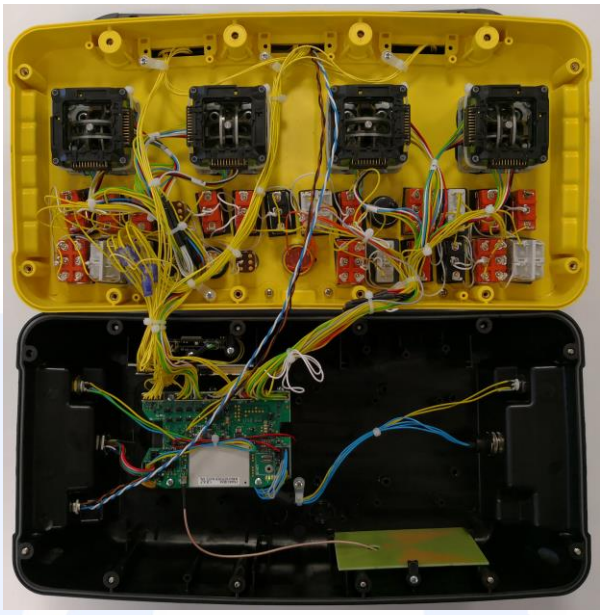

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6. Equipment list

Id. number	*Manufacturer*	*Model*	*Description*	*Serial number*	*Last calibration*	*Due date calibration*
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '18	January '19

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7. Measurement uncertainty

Test	Test Setup	Expanded uncertainty	Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_01	2,9 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30MHz	PE001_02	2,9 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30MHz	PE001_03	2,5 dB	1
Conducted emission CISPR 16 ISN 0,15-30MHz	PE001_04	4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_05	3,3 dB	1
Disturbance Power 30-300 MHz	PE002_01	3,6 dB	1
Radiated Emission LAS 0,15-30MHz	PE003_01	2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30MHz	PE004_01	4,0 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300MHz	PE004_02	3,9 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000MHz	PE004_03	3,8 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18GHz	PE004_04	4,2 dB	1
Human Exposure to electromagnetic fields	PE005_01	23,6 %	1
Harmonic current emissions test	PE006_01	10 mA + 2,6 %	1
Voltage fluctuation and flicker test	PE007_01	4,8 %	1
Radiated Immunity 80MHz-6GHz	PE102_XX	2,1 dB 0,82 V/m a 3V/m	1
Conducted Immunity 0,15-230MHz	PE105_XX	1,2 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,24 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,24 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,20 % 0,22 V a 10V	1

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Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,0 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_04	4,7 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_05	5,4 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

Test	Test Setup	Expanded uncertainty	Note
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Rev_18_02 date 31/10/2018			

Note 1:
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of K=2, providing a level of confidence of p = 95%

Note 2:
It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k = 2

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8. Reference documents

Reference no.	*Description*
KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES
FCC Rules and Regulation Title 47 part 15:2017	--
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 9.1 (Quality Manual)	Measurement uncertainty calculation

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9. Deviation from test specification

None

10. Test case verdicts

Test case does not apply to the test object ..... :	N.A.
Test item does meet the requirement ..... :	Complies
Test item does not meet the requirement ..... :	Does not comply
Test not performed ..... :	N.E.

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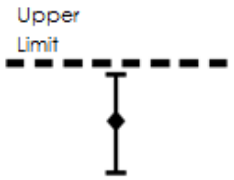
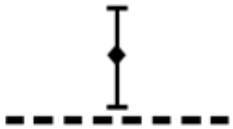
11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 9.1.

Judgement of compliance:

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirement.	The sample complies with the requirement.	The sample does not comply with the requirement.	The sample does not comply with the requirement.
The measurement results is within the specification limit when the measurement uncertainty is taken into account.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification.

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11.1 RF Exposure Analysis

Test set-up and execution

- KDB 447498 D01 cl. 4
- ANSI C63.10
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

Acceptance limits:

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following

[(max. power of channel, including tune-up tolerance, mW)/(min. separation distance, mm)]x(√f(GHz)) ≤ 3 for 1-g SAR and ≤ 7,5 for 10-g SAR

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MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

10-g Extremity SAR Test Exclusion Power Thresholds are 2,5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above.

Result

Transmission channel (MHz)	*Transmitting cycle duration (ms)*	*Transmission time (ms)*	*Graph*	*Duty cycle*
918,20	49,955	21,738	G18229701	0,44

Transmission channel (MHz)	*Conducted measured level (dBm)*	*Antenna gain (dBi)*	*Tolerance (dB)*	*Conducted power level (mW)*	*Maximum Output Conducted Average Power (mW)*
915,0706	17,43	2	1,1	112,98	49,71
921,4182	17,50	2	1,1	114,82	50,52
927,8186	17,57	2	1,1	117,90	51,88

Remarks: the measured level levels has been reported on Test Report nr. R18083101. The conducted power level is the conducted measured level including the antenna gain and the tolerance, converted in mW. The maximum output conducted average power is the conducted power level multiplied by the duty cycle value.

Using separation distance of 20 mm with the formula above results:

(51,88 mW / 20 mm) * √0,9278186 GHz = 2,50 ≤ 3

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 20 mm or more

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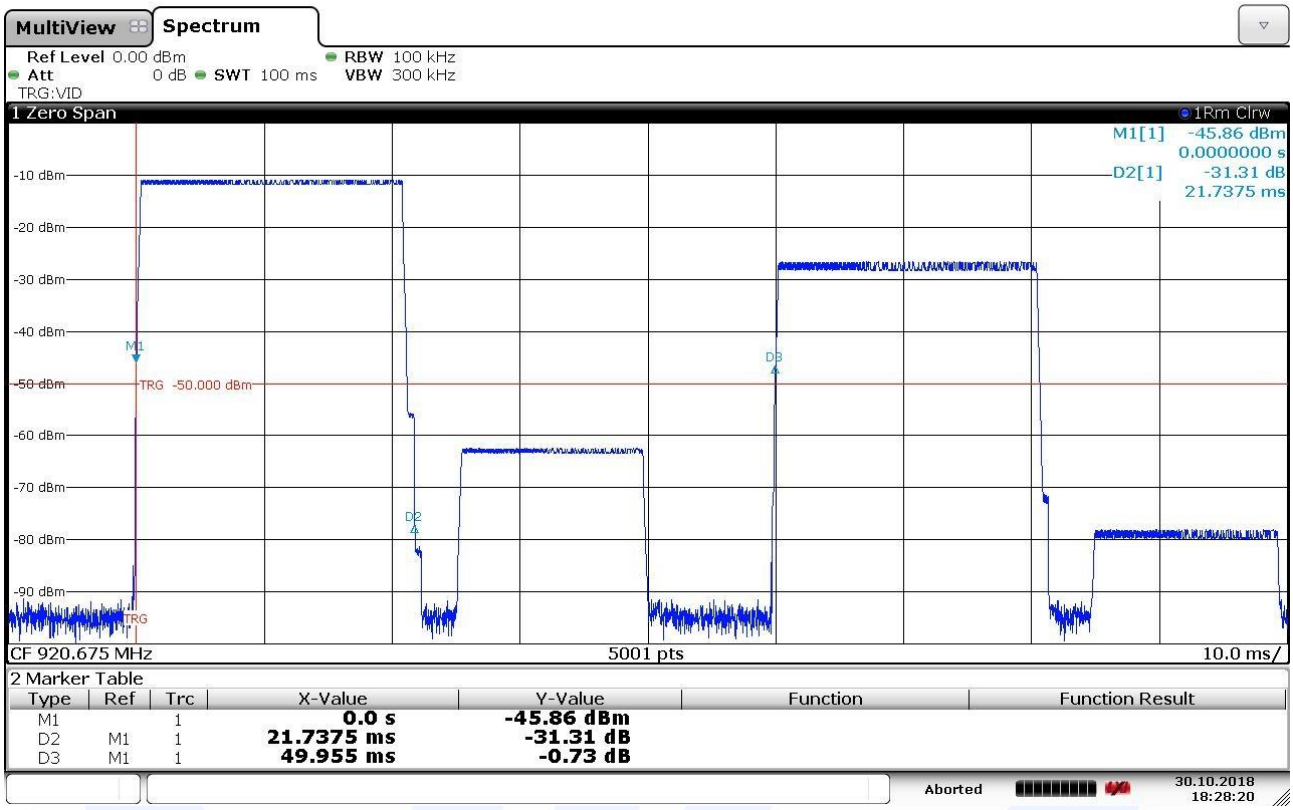
Graphs

Gandini 18229701



Result: The requirements are met