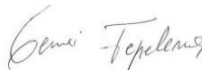
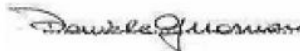


TEST REPORT Title 47-Telecommunication Chapter I - Federal Communications Commission Subchapter A - General Part 15 - Radio Frequency Devices Subpart B - Unintentional Radiators	
Report Reference No. 376650-8TRFFCC	
Tested by (name, function and signature)	G. Tepelena (project handler) 
Approved by (name, function and signature)	D. Guarnone (verifier) 
Date of issue 2019-08-09	
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	
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Test item description Keyless Ride System Main Unit	
Trade Mark	 BMW
Manufacturer ZADI Spa	
Address of manufacturer Via Carlo Marx, 138 – 41012 Carpi (MO) – Italy	
Model ZB001	
Ratings 13.5 Vdc nominal (12Vdc lead-acid vehicular battery)	

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The test report merely corresponds to the tested sample.

The phase of sampling / collection of equipment under test is carried out by the customer.

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test Report No. :	376650-8TRFWL	2019-08-09
		Date of issue

Short description of the EuT	Copy of marking plate
The EUT is the main unit for a Keyless Rider System receiving at 433.92 MHz. Equipment Class = CYY Communications Receiver used w/Pt 15 Transmitter	See page 18
Number of tested samples:	2
Serial number:	2/10 and 6/10 (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:	2019-07-26
Testing commenced on:	2019-07-29
Testing concluded on:	2017-08-09
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
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PROJECT HISTORY		
Report number	Modification to the report / comments	Date
376650-8TRFWL	First release	2019-08-09
--	--	--
--	--	--
--	--	--
REMARKS		

PRODUCT VARIANTS		
Variant model	Difference against the main model	Additional test performed
--	--	--
--	--	--
REMARKS		

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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 / 1 ϕ	☐	115V/60Hz / 1 ϕ
	☐	400V/50 Hz 3PE	☐	400V/50 Hz 3NPE
	☐	12 VDC	☒	13.5 V DC

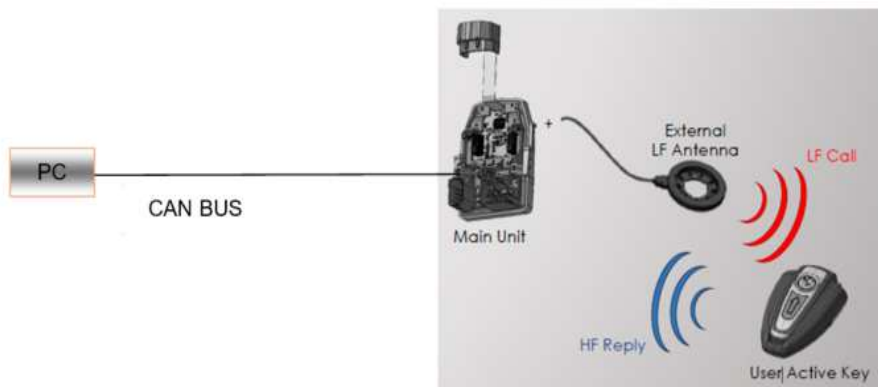
3.2 EuT operation modes

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. The Active Transponder (RX) was supplied by its internal battery. The CAN BUS line was connected to a CAN BUS Simulator. The Wake Up Line connected to +13.5Vdc. The I/O TANK CAP line disabled. The other lines were connected to a Button and one led for simulate the normal working installation. The recognition of Transponder every 500ms takes place through Software application.



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
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	Laptop + software Can Analyser	Compaq	Compaq 615	Monitor system
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°	Due date
Thermohygrometer data loggers	Testo	175-H2	20012380/305	2020-12
Thermohygrometer data loggers	Testo	175-H2	38203337/703	2020-12
Baarometer	MSR	MSR145B	330080	2020-04

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)

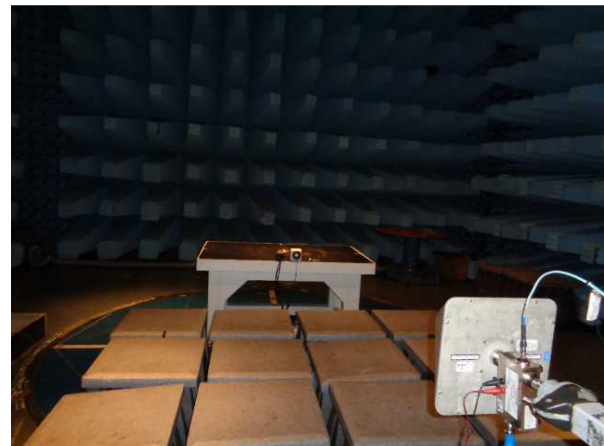
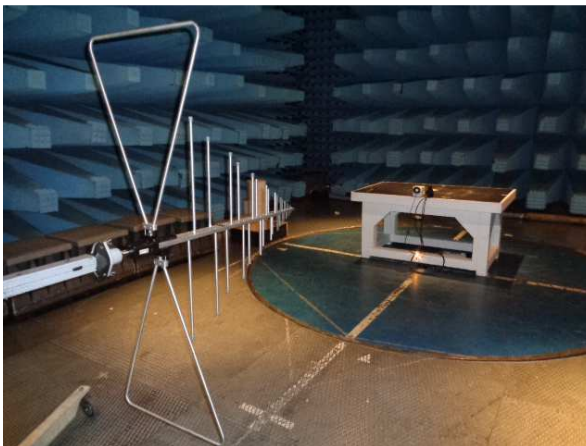
NOTES:

(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 ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)
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 ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)
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.	

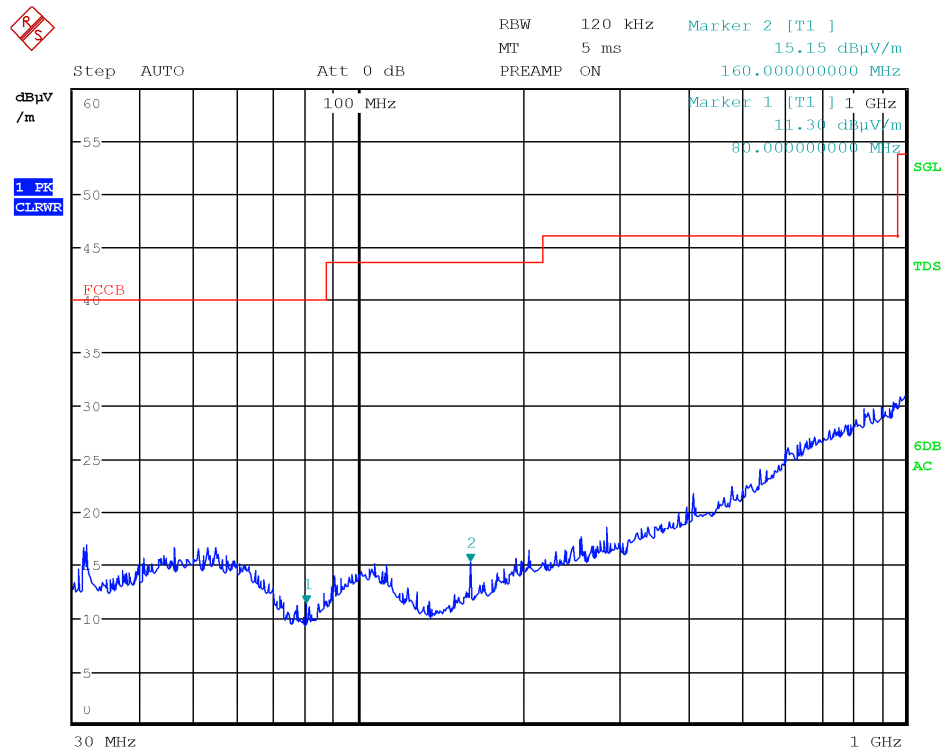
5.1.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°	Due date
Trilog Broadband Antenna 25 ÷ 8000 MHz	Schwarzbeck	VULB 9162	9162-025	2021-07
Bilog antenna 1 ÷ 18 GHz	Schwarzbeck	STLP 9148-123	123	2021-07
Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137	2020-08
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202	2020-05
Turn-table	R&S	HCT	835 803/03	NCR
Antenna mast	R&S	HCM	836 529/05	NCR
Controller	R&S	HCC	836 620/7	NCR
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	2021-09
Shielded room	Siemens	10m control room	1947	NCR

5.1.6 Test protocol

Antenna polarization: Horizontal
Operation mode: 1
Configuration mode: 1
Remarks:

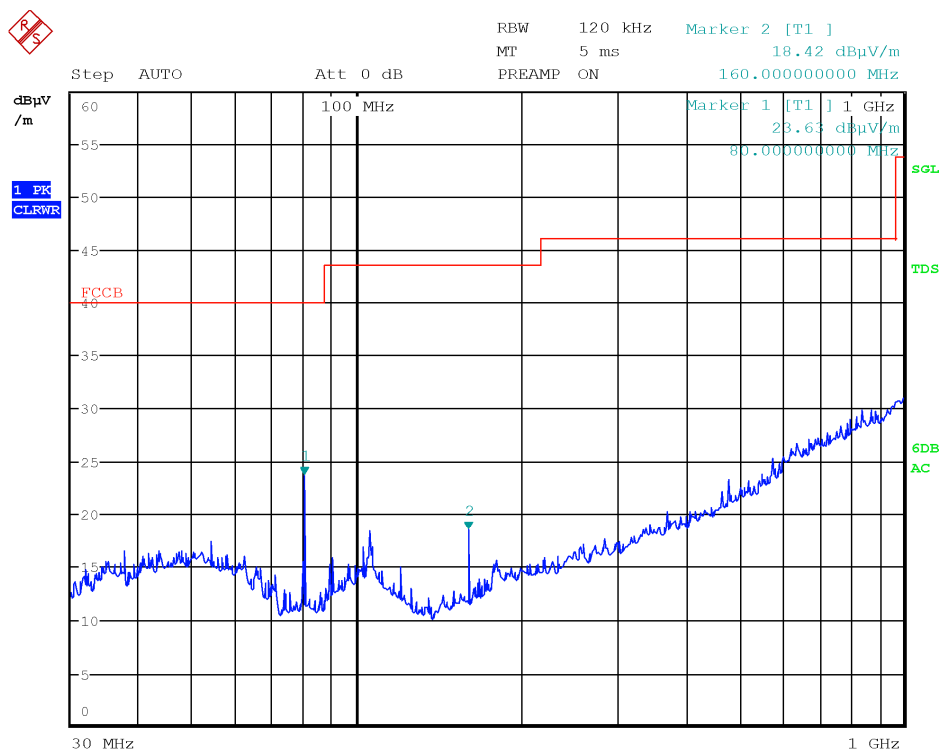
Verdict: Pass



Date: 29.JUL.2019 11:12:41

Antenna polarization: Vertical
Operation mode: 1
Configuration mode: 1
Remarks:

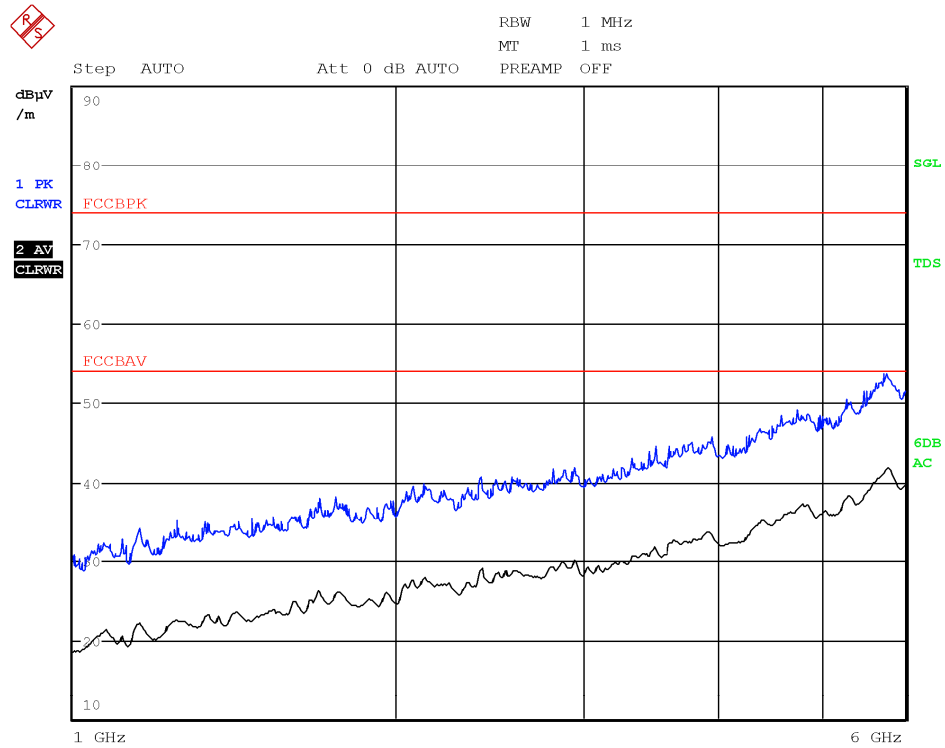
Verdict: Pass



Date: 29.JUL.2019 11:08:37

Antenna polarization: Horizontal
Operation mode: 1
Configuration mode: 1
Remarks:

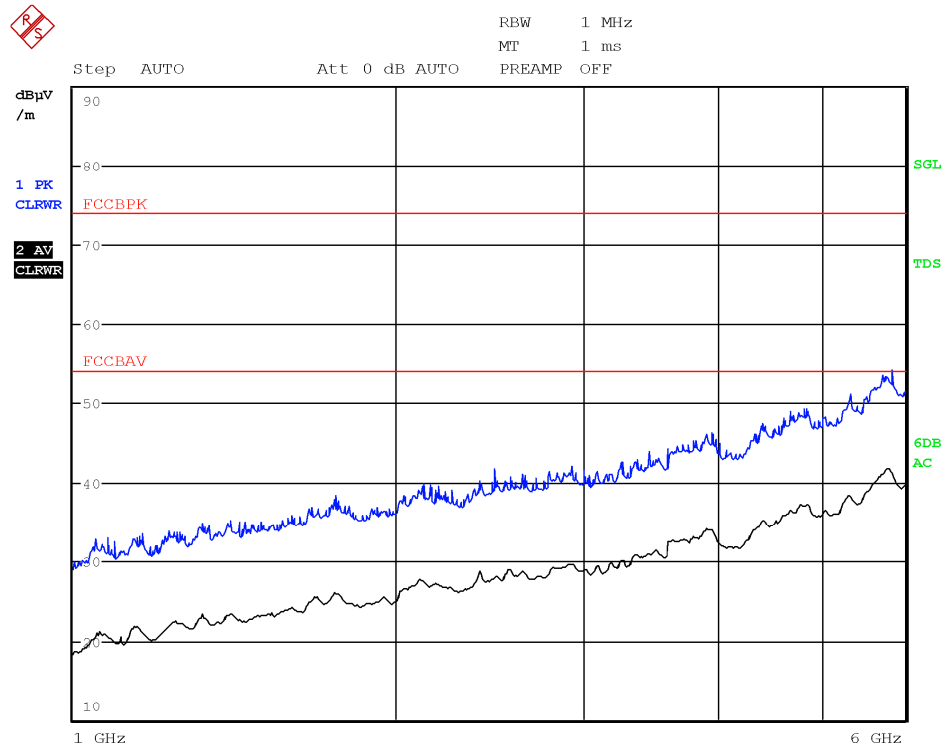
Verdict: Pass



Date: 1.AUG.2019 10:31:10

Antenna polarization: Vertical
Operation mode: 1
Configuration mode: 1
Remarks:

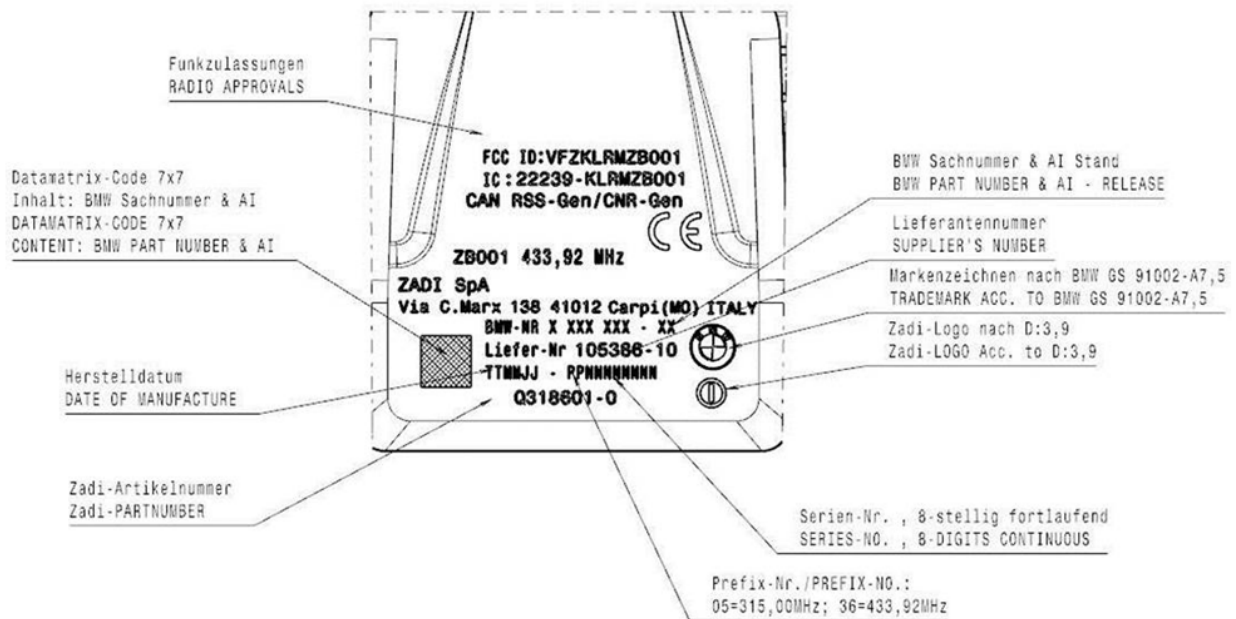
Verdict: Pass



Date: 1.AUG.2019 10:32:05

6 EUT PHOTOS





End of report