



Test report No:
NIE: 63052RRF.001

Partial Test report

Reference Standard:
USA FCC Part 22
CANADA RSS-132

(*) Identification of item tested	Telematic Control Unit for giving to the user information of the bike and control the bike
(*) Trademark	ADVANCED AUTOMOTIVE ANTENNAS, S.L.
(*) Model and /or type reference	HD MY21 NA
Other identification of the product	HW version: HW3.1 SW version: MY21.6 FCC ID: 2AVOUTCU4GC4 IC ID: 25856TCU4GC4
(*) Features	Telephony (GPRS,WCDMA,LTE) , GNSS (GPS,GLONASS)
Applicant	ADVANCED AUTOMOTIVE ANTENNAS, S.L. Gran Vía De Carles III 98 Planta 5 08028, Barcelona
Test method requested, standard	USA FCC Part 22 (10-1-18 Edition). CANADA RSS-132 Issue 3, Jan. 2013. ANSI C63.26-2015. ANSI/TIA-603-E: 2016. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	José Carlos Luque RF Lab. Supervisor
Date of issue	2020-02-26
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of HD MY21 NA is a Telematic Control Unit for giving to the user information of the bike and control the bike.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
63052/001	Telematic Control Unit	HD MY21 NA	201949500221	2019/12/05
63098B/001	Laptop	SATELLITE L50-B-1L	I7E281509CSSKT4 07V022CEB	2019/12/02
63098B/004	AC/DC Adaptor	PA5177U-1ACA	--	2019/12/02
63098B/012	Harness	--	--	2019/12/02
63098B/015	Kvaser Leaf Light v2 device	--	013043	2019/12/02

Sample S/01 has undergone the following test(s): All RADIATED tests indicated in Appendix A.

Test sample description

Ports..... :	Port name and description	Cable				
		Specified length [m]	Attached during test	Shielded		
	N/A		☐	☐		
Supplementary information to the ports..... :	-					
Rated power supply	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	☐ AC:	☐	☐	☐	☐	☐
	☒ DC: 12 Vdc					
Rated Power	Not provided					
Internal operating frequencies	Not provided					
Other parameters	Not provided					
Firmware version.....	Not provided					
Hardware version	Not provided					
Dimensions in cm (L x W x D).....	Not provided					
Mounting position	☒ Other: Motorbike module					
Modules/parts.....	Module/parts of test item	Type			Manufacturer	
	-					

Accessories (not part of the test item)	Description	Type	Manufacturer
	-		
Documents as provided by the applicant	Description	File name	Issue date
	-		

⁽³⁾ Only for Medical Equipment

Identification of the client

ADVANCED AUTOMOTIVE ANTENNAS, S.L.
Gran Via De Carles III 98 Planta 5 08028, Barcelona.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-12-11
Date (finish)	2019-12-18

Document history

Report number	Date	Description
63052RRF.001	2020-02-26	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Ignacio Cabra, Miguel Ángel Torres, José Gabriel Pendón, and Nicolás Salguero.

Used instrumentation:

Radiated Measurements

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2. Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2019/05	2020/05
3. Log Periodic Antenna, SCHWARZBECK MESS-ELEKTRONIK USLP 9143	N.A.	N.A.
4. Shielded Room ETS LINDGREN S101	N.A.	N.A.
5. DC Power Supply, 30V, 5A KEYSIGHT TECHNOLOGIES U8002A	N.A.	N.A.
6. High Pass Filter 3 - 18 GHz TEMSTRON/TEMWELL ST-3GA2833-HS	2019/10	2020/10
7. High Pass Filter 1.1 - 8 GHz, WAINWRIGHT INSTRUMENTS WHK10-990-1100-8000-40SS	2019/11	2020/11
8. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2018/10	2020/10
9. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2018/02	2020/02
10. RF Pre-amplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2019/04	2020/04
11. Biconical/Log Antenna 30MHz - 6GHz ETS LINDGREN 3142E	2017/09	2020/09
12. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/01	2021/01
13. Digital Multimeter FLUKE 179	2019/06	2020/06
14. High Pass Filter 1000 MHz, WAINWRIGHT WHKS 1000-10SS	2019/06	2020/06
15. High Pass Filter 3 GHz, WAINWRIGHT WHKX10-2700-3000-18000-40SS	2019/06	2020/06
16. Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
17. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
18. RF Pre-amplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2019/04	2020/04
19. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
20. Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2017/04	2020/04

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

FCC PART 22 / RSS-132 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 22.913 / RSS-132 5.4: RF output power	N/M	(2)
FCC 2.1047 / RSS-132 5.2: Modulation characteristics	N/M	(2)
FCC 22.355 / RSS-132 5.3: Frequency stability	N/M	(2)
FCC 2.1049: Occupied Bandwidth	N/M	(2)
FCC 22.917 / RSS-132 5.5: Spurious emissions at antenna terminals	N/M	(2)
FCC 22.917 / RSS-132 5.5: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u> (1) HSDPA modulation mode has not been tested to prove USA FCC Part 22 compliance because it is an improved mode of operation only for Downlink (UE reception), but using the normal WCDMA mode for UL (Up Link, UE transmission). Therefore HSDPA has no associated a Power class or modulation scheme different than WCDMA mode for the UL transmission. Taking into account the above comments, testing in HSDPA modulation mode is redundant for FCC Part 22 as it is the same as WCDMA mode as long as UE transmission is concerned. WCDMA modulation mode has been tested as indicated on the present test report. (2) Test not requested.		

Appendix A: Test results for FCC PART 22 / RSS-132

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TEST CONDITIONS

POWER SUPPLY:

Vn: 12 Vdc

Type of Power Supply: Battery of the vehicle.

The subscripts 'n', 'min' and 'max' indicate voltage test conditions (nominal, minimum and maximum respectively), as declared by the applicant.

ANTENNA:

LOW Bands	GAIN	ANTENNA TYPE
2G Band 850 MHz	+0.8 dBi	Internal (printed monopole antenna)
3G Band V	+0.8 dBi	Internal (printed monopole antenna)
LTE Band 5	+0.8 dBi	Internal (printed monopole antenna)

TEST FREQUENCIES:

2G Band 850 MHz:

GPRS and EDGE MODULATIONS:

Lowest Channel (128): 824.2 MHz
Middle Channel (190): 836.6 MHz
Highest Channel (251): 848.8 MHz

3G Band V:

WCDMA and HSUPA MODULATIONS:

Lowest Channel (4132): 826.4 MHz
Middle Channel (4182): 836.4 MHz
Highest Channel (4233): 846.6 MHz

LTE Band 5. QPSK AND 16QAM MODULATIONS:

	Channel (Frequency)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Lowest	20407 (824.7 MHz)	20415 (825.5 MHz)	20425 (826.5 MHz)	20450 (829 MHz)
Middle	20525 (836.5 MHz)	20525 (836.5 MHz)	20525 (836.5 MHz)	20525 (836.5 MHz)
Highest	20643 (848.3 MHz)	20635 (847.5 MHz)	20625 (846.5 MHz)	20600 (844 MHz)

FCC 22.917 / RSS-132 5.5: Radiated emissions

SPECIFICATION:

FCC §22.917: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

RSS-132 5.5: The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB. P in watts.

METHOD:

The measurement was performed with the EUT inside an anechoic chamber.

The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum field strength (dBμV/m) is measured and recorded.

The maximum field strength (dBμV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m. $D = 3 \text{ m}$

Measurement Limit:

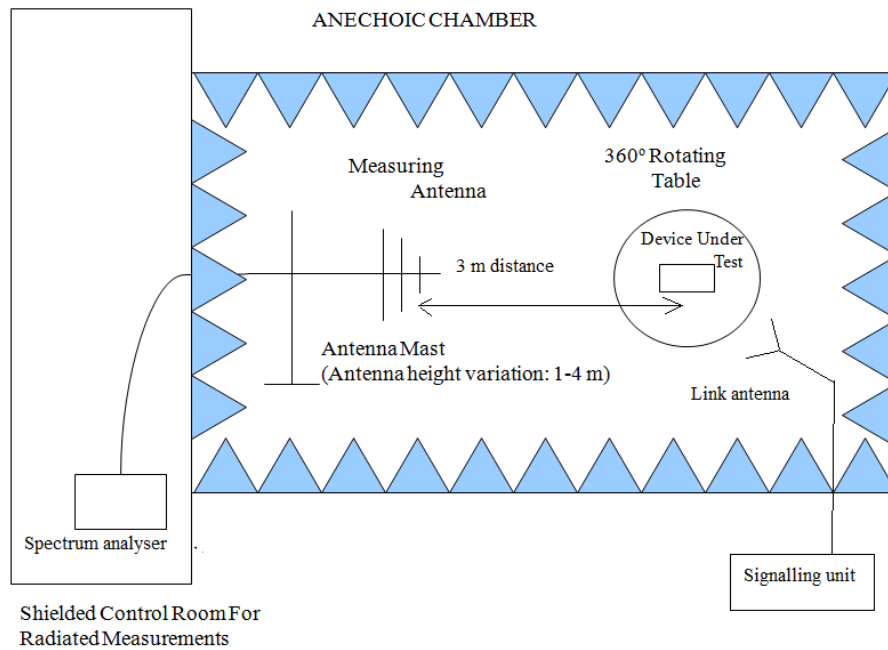
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB. P in watts.

At P_o transmitting power. the specified minimum attenuation becomes $43+10\log(P_o)$. and the level in dBm relative P_o becomes:

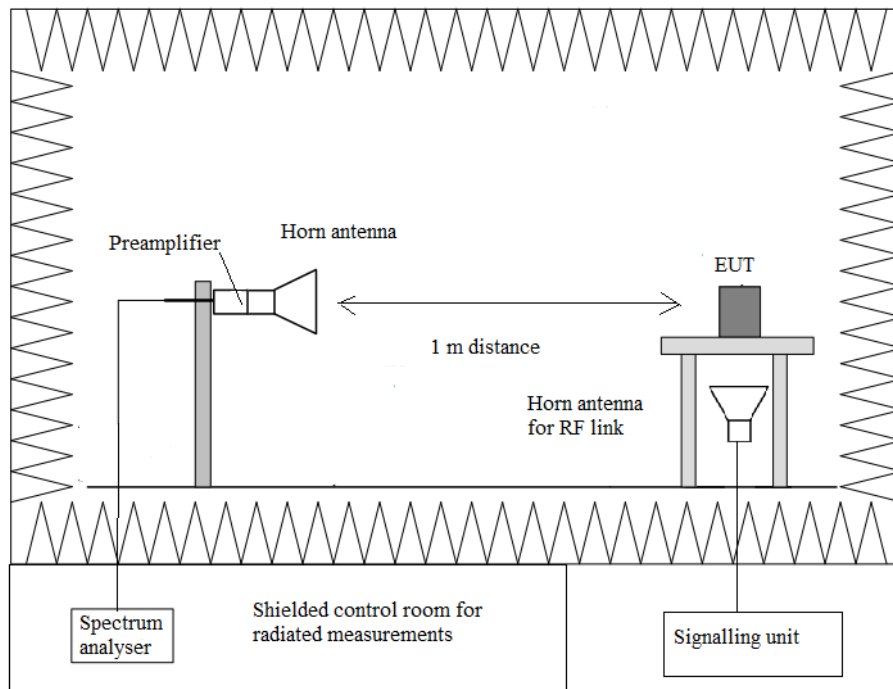
$$P_o (dBm) - [43 + 10 \log(P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

TEST SETUP:

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



RESULTS:

2G Band 850 MHz:

GPRS and EDGE Modulations:

A preliminary scan determined the GPRS modulation as the worst case. The following tables and plots show the results for GPRS modulation.

- Lowest Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

No spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

No spurious frequencies detected at less than 20 dB below the limit.

- Highest Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

No spurious frequencies detected at less than 20 dB below the limit.



<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF001_Graphics.7z >>

3G Band V:

WCDMA and HSUPA Modulation:

A preliminary scan determined the WCDMA modulation as the worst case. The following tables and plots show the results for WCDMA modulation.

- Lowest Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

No spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

Spurious frequencies detected at less than 20 dB below the limit:

- Highest Channel:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 10 GHz

Spurious frequencies detected at less than 20 dB below the limit:

<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF001_Graphics.7z >>

LTE Band 5:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=10 MHz, RB=1, Offset=0 as the worst case.

- Lowest Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Detector	E.I.R.P (dBm)	Polarization	Measurement Uncertainty (dB)
30.501	Peak	-29.28	V	<±3.81

Frequency range 1 - 8 GHz

No spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Detector	E.I.R.P (dBm)	Polarization	Measurement Uncertainty (dB)
30.437	Peak	-28.31	V	<±3.81

Frequency range 1 - 8 GHz

No spurious frequencies detected at less than 20 dB below the limit.

- Highest Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Detector	E.I.R.P (dBm)	Polarization	Measurement Uncertainty (dB)
30.954	Peak	-32.21	V	<±3.81

Frequency range 1 - 8 GHz

No spurious frequencies detected at less than 20 dB below the limit.

Verdict: PASS

<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF001_Graphics.7z >>