



Test report No:
NIE: 63052RRF.002

Partial Test report

Reference Standard:
USA FCC Part 24
CANADA RSS-133

(*) 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 24 (10-1-18 Edition). CANADA RSS-133 Issue 6, Jan. 2018. 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.

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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.

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General conditions

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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 results.

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 Vía 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.002	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, Veronica García, 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. DC Power Supply, 30V, 5A KEYSIGHT TECHNOLOGIES U8002A	N.A.	N.A.
5. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2018/10	2020/10
6. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2018/02	2020/02
7. RF Pre-amplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2019/04	2020/04
8. Biconical/Log Antenna 30MHz - 6GHz ETS LINDGREN 3142E	2017/09	2020/09
9. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/01	2021/01
10. Digital Multimeter FLUKE 179	2019/06	2020/06
11. Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
12. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
13. RF Pre-amplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2019/04	2020/04
14. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
15. Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2017/04	2020/04
16. Broadband Horn Antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07
17. RF Pre-amplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/02	2020/08
18. Low Noise Amplifier G>30dB, 18 - 40 GHz BONN ELEKTRONIK BLMA 1840-1M	2018/02	2020/02
19. Pre-Amplifier G>40dB 10MHz-6GHz, BONN ELEKTRONIK, BLNA 0160-01N	2019/02	2020/02

Testing verdicts

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

Summary

FCC PART 24 / RSS-133 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 24.232 / RSS-133 6.4: RF output power	N/M	(2)
FCC 2.1047 / RSS-133 6.2: Modulation characteristics	N/M	(2)
FCC 24.235 / RSS-133 6.3: Frequency stability	N/M	(2)
FCC 2.1049: Occupied Bandwidth	N/M	(2)
FCC 24.238 / RSS-133 6.5: Spurious emissions at antenna terminals	N/M	(2)
FCC 24.238 / RSS-133 6.5: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u> (1) HSDPA modulation mode has not been tested to prove USA FCC Part 24 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 24 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 24 / RSS-133

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TEST CONDITIONS

POWER SUPPLY (V):

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:

MIDDLE Bands	GAIN	ANTENNA TYPE
2G Band 1900 MHz	+1.6 dBi	Internal (printed monopole antenna)
3G Band II	+1.6 dBi	Internal (printed monopole antenna)
LTE Band 2	+1.6 dBi	Internal (printed monopole antenna)

TEST FREQUENCIES:

2G Band 1900 MHz:

GPRS and EDGE MODULATIONS:

Lowest Channel (512): 1850.2 MHz
Middle Channel (661): 1880 MHz
Highest Channel (810): 1909.8 MHz

3G Band II:

WCDMA and HSUPA MODULATIONS:

Lowest Channel (9262): 1852.4 MHz
Middle Channel (9400): 1880.0 MHz
Highest Channel (9538): 1907.6 MHz

LTE Band 2. QPSK AND 16QAM MODULATIONS:

	Channel (Frequency)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	18607 (1850.7 MHz)	18615 (1851.5 MHz)	18625 (1852.5 MHz)	18650 (1855 MHz)	18675 (1857.5 MHz)	18700 (1860 MHz)
Middle	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)
Highest	19193 (1909.3 MHz)	19185 (1908.5 MHz)	19175 (1907.5 MHz)	19150 (1905 MHz)	19125 (1902.5 MHz)	19100 (1900 MHz)

Radiated emissions

SPECIFICATION:

FCC § 24.238 / RSS-133 Clause 6.5: 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 m

Measurement Limit:

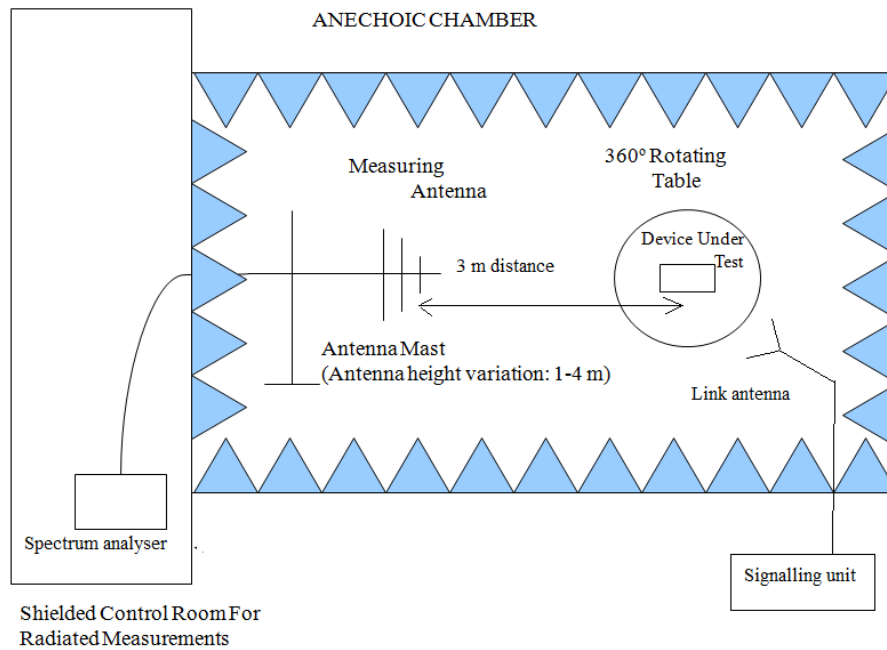
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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

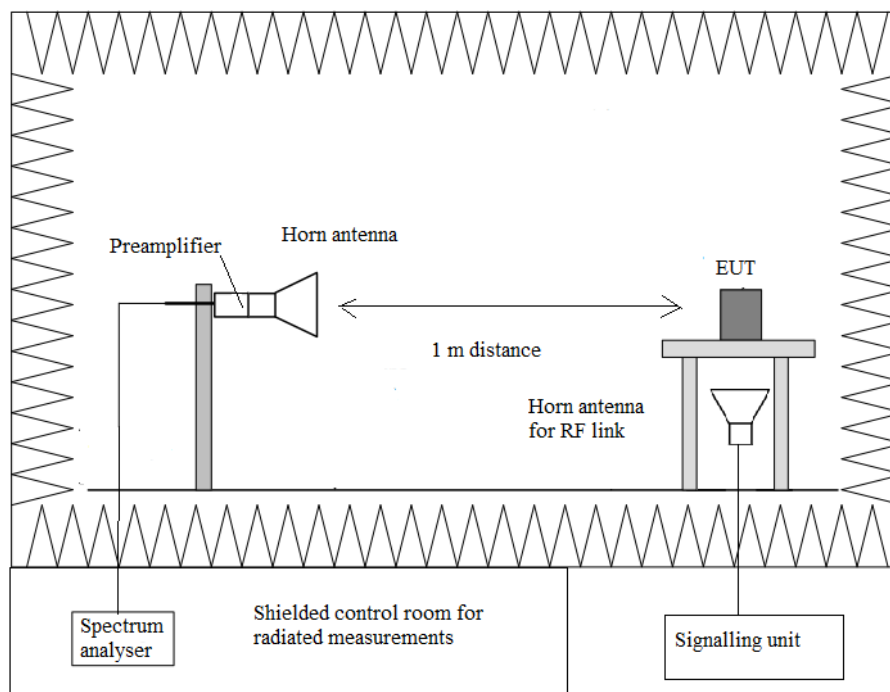
$$P_o (dBm) - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = - 13 \text{ dBm}$$

TEST SETUP:

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



RESULTS:

2G Band 1900 MHz:

GPRS AND EDGE MODULATION:

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 signals were found at less than 20 dB below the limit.

Frequency range 1 - 18 GHz.

No spurious signals were found at less than 20 dB below the limit.

Frequency range 18 - 20 GHz

No spurious signals were found at less than 20 dB below the limit.

- Middle Channel:

Frequency range 30 MHz-1000 MHz

No spurious signals were found at less than 20 dB below the limit.

Frequency range 1 - 18 GHz

No spurious signals were found at less than 20 dB below the limit.

Frequency range 18 - 20 GHz

No spurious signals were found at less than 20 dB below the limit.

- Highest Channel:

Frequency range 30 MHz - 1 GHz

No spurious signals were found at less than 20 dB below the limit.

Frequency range 1 - 18 GHz

No spurious signals were found at less than 20 dB below the limit.

Frequency range 18 - 20 GHz

No spurious signals were found at less than 20 dB below the limit.

Verdict: PASS

Measurement uncertainty (dB)	<±2.07 for f < 1GHz <±4.88 for f ≥ 1 GHz up to 18 GHz <±3.31 for f ≥ 18 GHz up to 26 GHz
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<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF002_Graphics.7z >>

3G Band II:

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 - 18 GHz

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

Note: On the range 1GHz to 3GHz, the peak above the limit is the carrier frequency. The other peak corresponds to the downlink signal.

Frequency range 18 - 20 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 - 18 GHz

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

Note: On the range 1GHz to 3GHz, the peak above the limit is the carrier frequency. The other peak corresponds to the downlink signal.

Frequency range 18 - 20 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 - 18 GHz

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

Note: On the range 1GHz to 3GHz, the peak above the limit is the carrier frequency. The other peak corresponds to the downlink signal.

Frequency range 18 - 20 GHz

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

Verdict: PASS

Measurement uncertainty (dB)	$\leq \pm 2.07$ for $f < 1\text{GHz}$ $\leq \pm 4.88$ for $f \geq 1\text{GHz}$ up to 18 GHz $\leq \pm 3.31$ for $f \geq 18\text{GHz}$ up to 20 GHz
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<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF002_Graphics.7z >>

LTE Band 2:

QPSK and 16QAM Modulations:

A preliminary scan determined the 16QAM modulation, BW=15 MHz, RB=1, Offset=0 as the worst case.

- Lowest Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 18 GHz

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

Frequency range 18 - 20 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 GHz-18 GHz

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

Frequency range 18 - 20 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 GHz-18 GHz.

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

Frequency range 18 - 20 GHz

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

Measurement uncertainty (dB)	$\leq \pm 2.07$ for $f < 1\text{GHz}$ $\leq \pm 4.88$ for $f \geq 1\text{GHz}$ up to 18 GHz $\leq \pm 3.31$ for $f \geq 18\text{GHz}$ up to 20 GHz
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Verdict: PASS

<< SEE GRAPHICS IN THE ATTACHED FILE: 63052RRF002_Graphics.7z >>