



Informe de ensayo nº:
Test report No:

NIE: 46347REM.002A2

Partial Test Report (Modification 2)

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition);
ICES-003 ISSUE 5 (2012)

Identification of item tested.....:	Radio frequency transmitter-receiver used in vehicle car access systems
Trademark	Continental
Model and /or type reference	HFM_CMFB_01
Other identification of the product	S/N: Prototype
Final HW version	Not provided data
Final SW version	Not provided data
FCC ID	KR5HFMCMFB01
IC	7812D-HFMCMFB01
Features	Remote functions for vehicle access, Hand free functions for vehicle access and engine start, Immobilizer, LF (125 kHz) antennae management.
Manufacturer	Continental Automotive GmbH Siemensstraße 12, 93055 Regensburg, Germany.
Test method requested, standard.....:	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)
Summary	IN COMPLIANCE
Approved by (name / position & signature).....:	Francisco Cañas Regulatory Director
Date of issue.....:	2015-12-10
Report template No.....:	FDT11_17

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Competences and guarantees

AT4 wireless 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.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless 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 AT4 wireless at the time of performance of the test.

AT4 wireless 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.

The results presented in this Test Report apply only to the particular item under test established in this document.

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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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the AT4 wireless internal document PODT000.

Usage of samples

Samples under test have been selected by: the Client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial number	Reception date
46347B/001	Radio frequency transmitter-receiver used in vehicle car access systems	HFM_CMFB_01	Prototype	2015-11-06

Test sample description

The product includes 125 kHz LF transmitter and a 433.92 MHz RF receiver. It drives 5 external dedicated antennae for the 125 kHz transmission. Two are located in the doors trims, one in the bumper and two within the vehicle cockpit.

Identification of the client

Continental Automotive GmbH
Siemensstraße 12, 93055 Regensburg, Germany.

Testing period

The performed test started on 2015-10-23 and finished on the same day.

The tests have been performed at AT4 wireless.

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. = 80 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

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

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Site VSWR	< ±6 dB at 3m distance between item under test and receiver antenna, (1 GHz to 18 GHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 18 GHz).

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 46341REM.002A1 related with the same samples, in the next clauses and sub-clauses:

By client requirement it was removed the appendix B with the sample and setup photographs from the test report.

This modification test report cancels and replaces the test report 46341REM.002A1.

Remarks and comments

The tests have been performed by the technical personnel: Antonio Jurado.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,37$ dB for quasi-peak measurements, $I = \pm 4,28$ dB for peak measurements ($k = 2$).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 26GHz is $I = \pm 2,62$ dB for peaks and average measurements ($k = 2$).

Testing verdicts (Legend)

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

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1999	EMI Receptor	ROHDE & SCHWARZ	ESIB 26	2015-06-16	2017-06-16
2932	Bilog Hybrid Antenna	SUNOL	JB6	2014-05-11	2017-05-11
4612	Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	2013-12-29	2016-12-29
4658	RF Amplifier	SCHWARZBECK	BBV9743	2015-03-19	2016-03-19
1975	RF Amplifier	MITEQ	JS4	2014-05-22	2016-05-22
3783	RF Amplifier	BONN ELEKTRONIK	BLMA 0118-3A	2015-05-15	2016-05-15

Appendix A – Test result

CONTENT

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Continuous transmitting signal (125Khz). Power Supply: 12.8 ± 0.2 Vdc. * 433MHz receptor is in Idle mode.

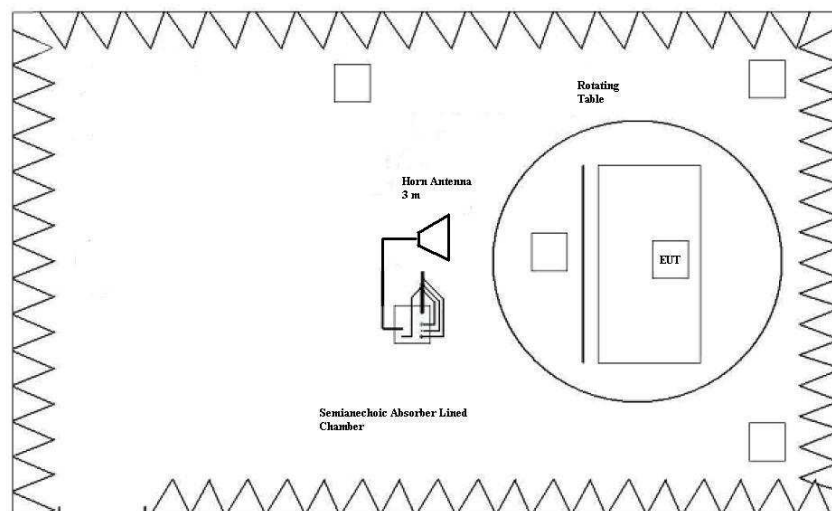
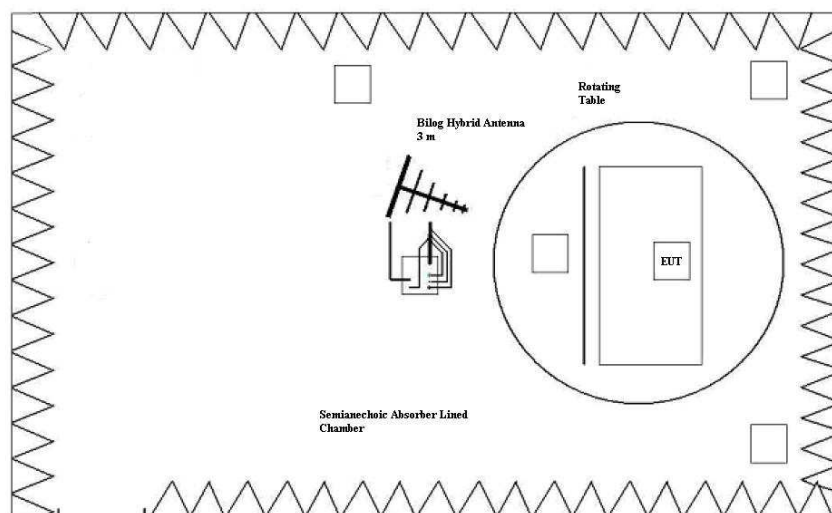
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)

Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15.109, Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009 in the frequency range 30 MHz to 26 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	QP Limit for 3 m ($\mu\text{V/m}$)	QP Limit for 3 m ($\text{dB}\mu\text{V/m}$)
30 to 88	100	40
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98
Above 1000	Limit for 3m AVG	Limit for 3m PK
	53.98 $\text{dB}\mu\text{V/m}$	73.98 $\text{dB}\mu\text{V/m}$



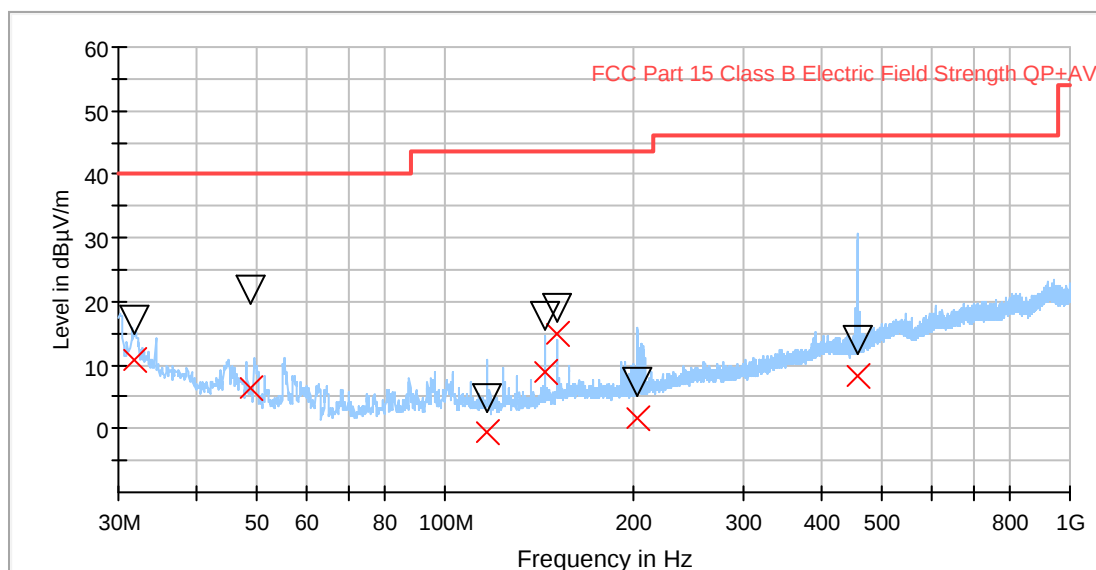
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode;

CRmmnn	Description	Result
CR0101RB	Range: 30 MHz - 1000 MHz.	P
CR0101RA_1_PH	Range: 1 MHz - 18 MHz.	P
CR0101RA_1_PV	Range: 1 MHz - 18 MHz.	P

Radiated Emission. CR0101RB

Project: 46347REM.002
Company: Continental
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Continuous transmitting signal (125 KHz). Power Supply: 12.8 +/- 0.2 VDC. * 433MHz receptor is in Idle mode.

Full Spectrum



— Preview Result 1-PK+
— FCC Part 15 Class B Electric Field Strength QP+AV
X QuasiPeak-QPK
V MaxPeak-PK+

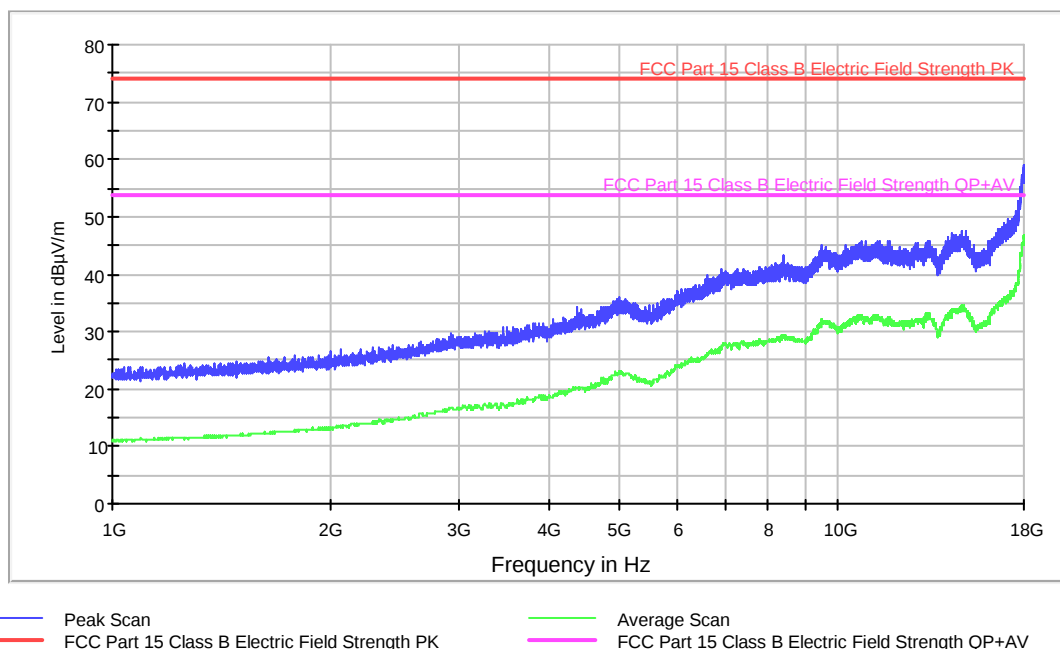
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
31.838961	10.80	17.23	40.00	29.20	119.0	V	223.0
48.971429	6.55	21.82	40.00	33.45	366.0	V	300.0
117.045455	-0.69	4.95	43.50	44.19	121.0	V	234.0
144.205195	8.97	17.66	43.50	34.53	175.0	V	0.0
151.174026	14.82	18.91	43.50	28.68	104.0	V	332.0
203.025974	1.58	7.34	43.50	41.92	217.0	H	24.0
457.931169	8.33	14.04	46.00	37.67	139.0	V	231.0

Radiated Emission. CR0101RA_1_PH

Project: 46347REM.002
 Company: CONTINENTAL
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Equipment transmitting signal continuously. (125 KHz).
 Power Supply: 12.8 +/- 0.2 VDC. Horizontal Polarization
 * 433MHz receptor is in Idle mode.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz)



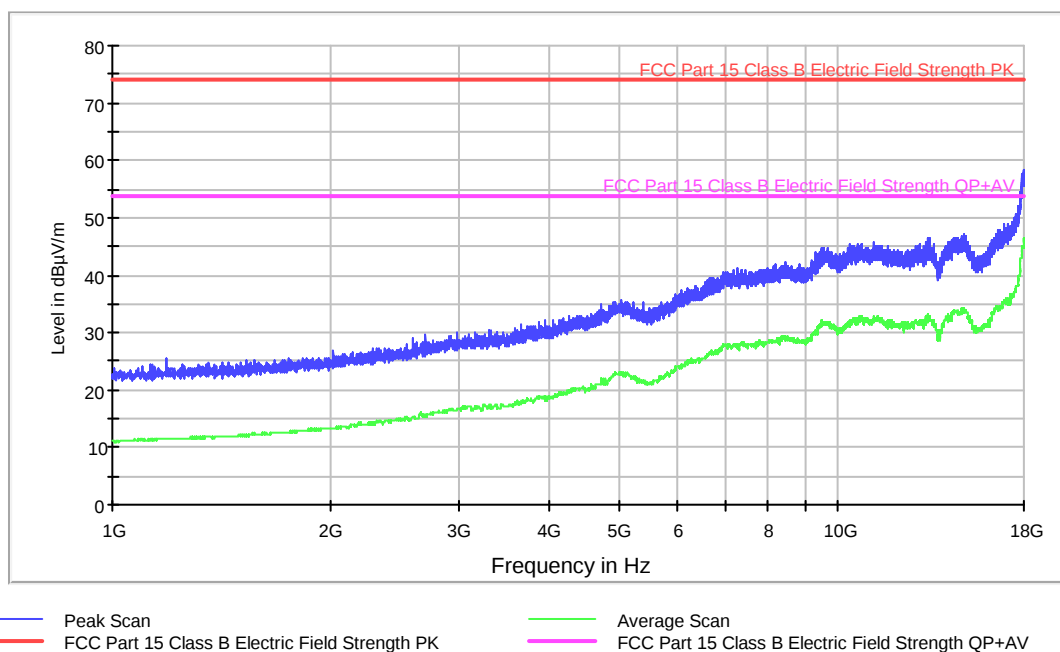
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1256.000000	24.5	11.3
1781.000000	25.8	12.7
2289.000000	27.3	14.2
3165.000000	29.7	17.0
4189.000000	32.4	19.5
4989.000000	36.0	22.9
6901.000000	40.9	27.0
9474.000000	44.9	31.8
11375.000000	45.9	32.4
17974.000000	59.2	46.7

Radiated Emission. CR0101RA_1_PV

Project: 46347REM.002
 Company: CONTINENTAL
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. Equipment transmitting signal continuously. (125 KHz).
 Power Supply: 12.8 +/- 0.2 VDC. Vertical Polarization
 * 433MHz receptor is in Idle mode.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz)



Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)
1186.000000	25.3	11.4
1747.000000	25.5	12.7
2333.000000	27.4	14.6
2990.000000	29.9	16.8
4176.000000	32.4	19.6
5019.000000	35.5	22.9
7247.000000	41.1	27.9
9492.000000	44.7	31.8
13267.000000	46.6	32.5
17980.000000	58.5	46.3