

FCC ID: KR5A2C35029700

IC ID: 7812D-35029700

EMI - TEST REPORT

- FCC Part 15.231 -

**Test Report No. :** T35610-03-02HS

19. June 2013

Date of issue

Type / Model Name : A2C35029700, BMW FBD3 TRX 434 MHz**Product Description** : Remote Keyless Entry**Applicant** : Continental Automotive GmbH

Address : Osterhofner Str. 14

93055 REGENSBURG, GERMANY

Manufacturer : Continental Automotive GmbH

Address : Osterhofner Str. 14

93055 REGENSBURG, GERMANY

Licence holder : Continental Automotive GmbH

Address : Osterhofner Str. 14

93055 REGENSBURG, GERMANY

Test Result according to the standards listed in clause 1 test standards:**POSITIVE**

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (September, 2012)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2012)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.231	Periodic operation in the band 40.66-40.70 MHz and above 70 MHz

OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-4-2: 2003	Uncertainty in EMC measurement
CISPR 22: 2005 EN 55022: 2006	Information technology equipment

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2 SUMMARY

2.1 GENERAL REMARKS:

This EUT is a transceiver for keyless entry systems for vehicular use. The EUT is a device with integrated antenna. The user has no access on the output power setting of the device.

Operation frequency and channel plan

The EUT provide two operating channels

Channel	Frequency (MHz)
Ch1	433.200
Ch2	434.640

Antennas

The EUT has an integrated antenna only.

Transmit operating modes

- Polling mode (Standby)
- TX mode

2.2 Test result summary

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS Gen, 7.2.4.	Conducted limits	not applicable
15.231(b)	RSS210, A1.1.2	Field strength of the fundamental wave	passed
15.231(b)	RSS210, A1.1.2	Spurious emissions (magnetic field) 9 kHz – 30 MHz	passed
15.231(b)	RSS210, A1.1.2	Spurious emissions radiated (electric field)	passed
15.231(c)	-	Correction for pulse operation (duty cycle)	passed
15.215(c)	RSS-Gen, 7.2.6	Frequency tolerance	passed
15.231(a1)	RSS210, A1.1.1	Signal deactivation	passed
-	RSS210, A1.1.3	Emission bandwidth and OBW99	passed

The mentioned RSS Rule Parts in the above table are related to:

RSS Gen, Issue 3, December 2010

RSS 210, Issue 8, December 2010

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2.3 FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 7 March 2013

Testing concluded on : 23 April 2013

Checked by:

Tested by:

Klaus Gegenfurtner
Dipl.-Ing.(FH)
Manager: Radio Group

Hermann Smetana
Dipl.-Ing.(FH)
Radio Senior Expert

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3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT

External view:



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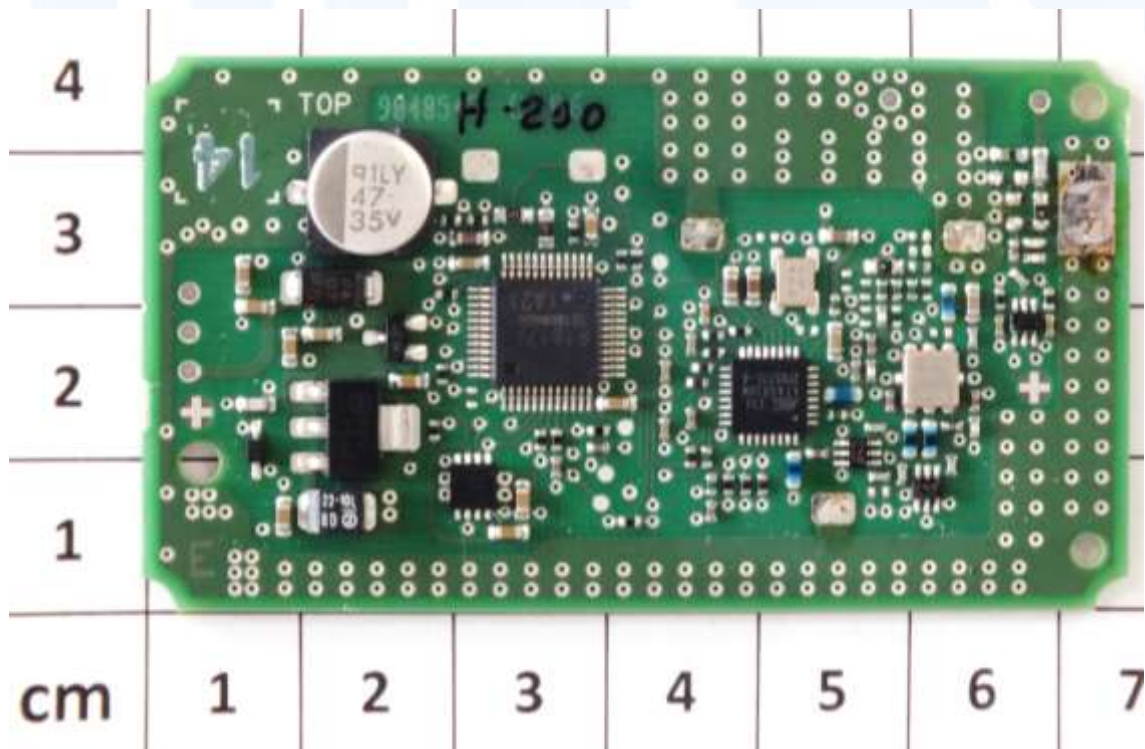
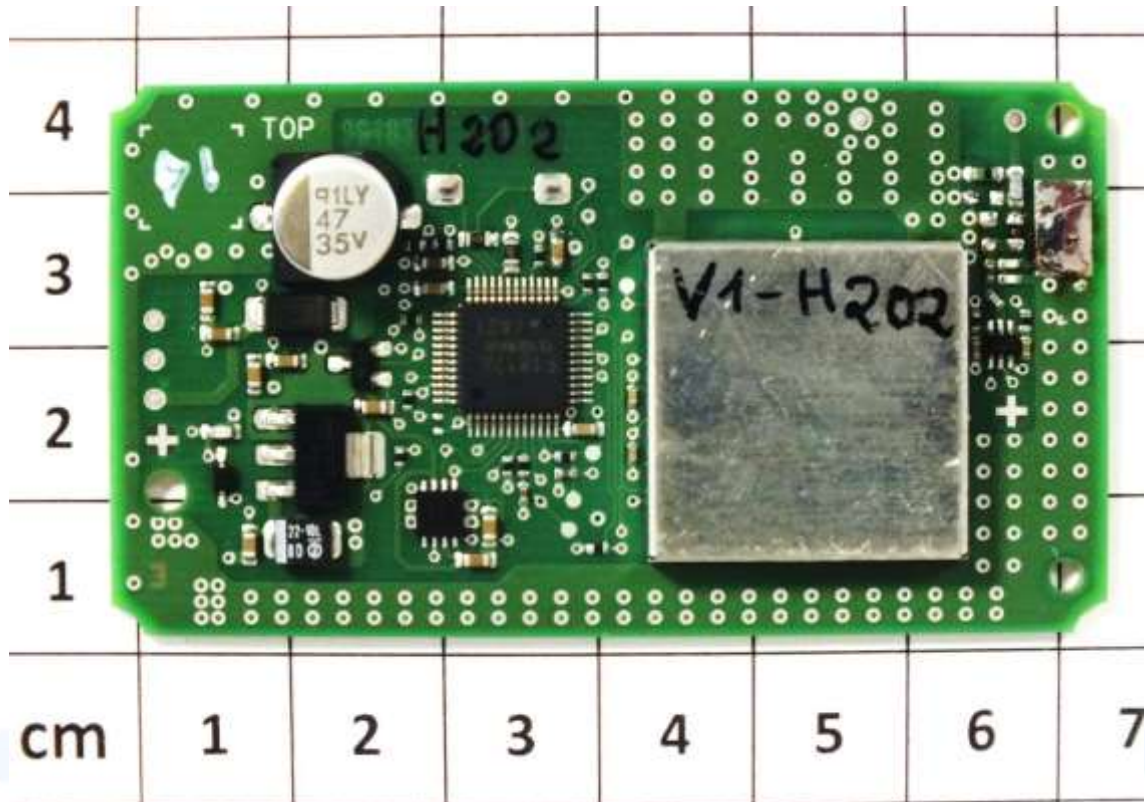


Internal view:



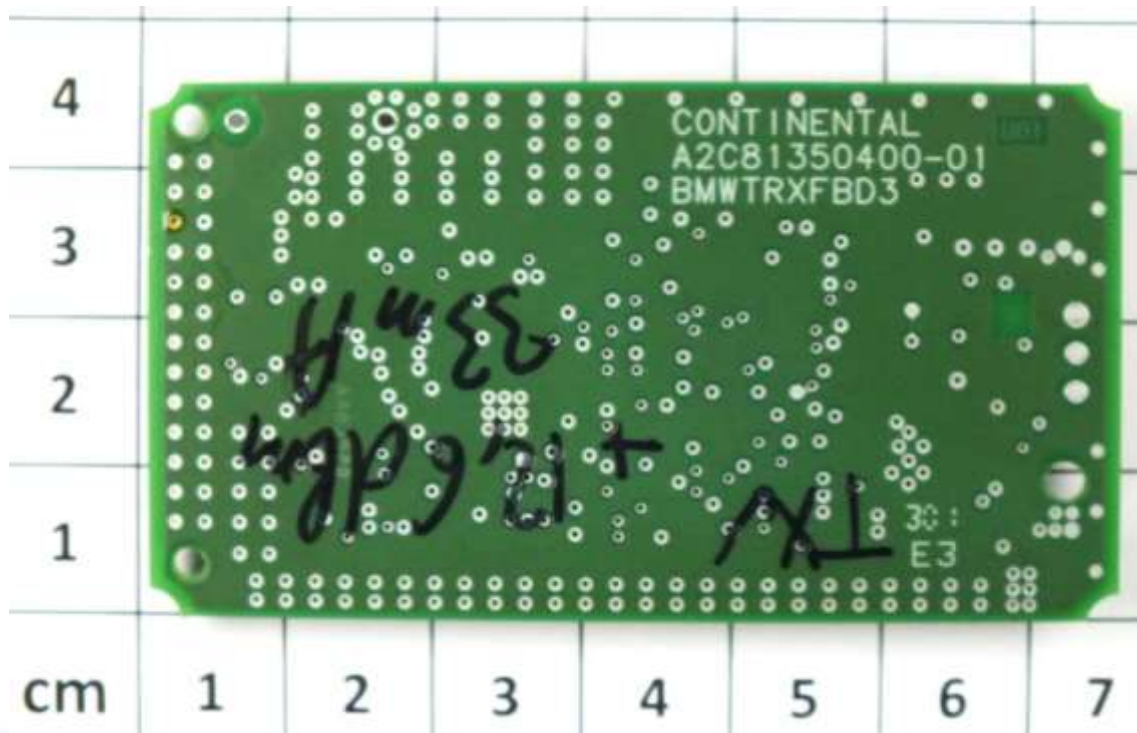
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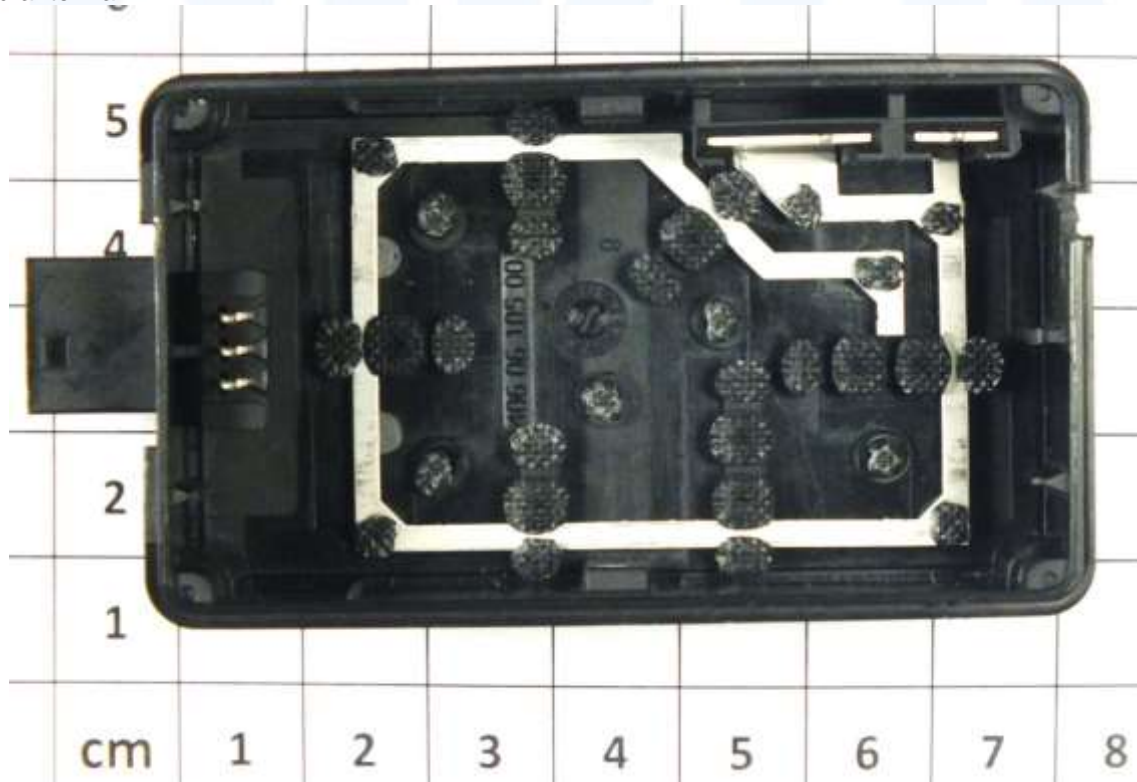


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Integrated antenna:



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3.2 Power supply system utilised

Power supply voltage V_{nom} : 12 VDC (Car application)

3.3 Short description of the Equipment under Test (EUT)

The EUT is a transceiver module which handles Comfort Access (CA), Remote Keyless Entry (RKE) and other remote functions. The EUT receives and controls the signals and work as wireless gateway between transmitter and central electronic module in the vehicle.

Number of tested samples: 1 radiated sample for emission measurements, 1 conducted sample
Serial number: 2018915346, 2018915348

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- TX continuous, unmodulated

- TX continuous, modulated

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- _____ Model : _____

- _____ Model : _____

- _____ Model : _____

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production process of devices may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for the specific test. The manufacturer has the sole responsibility of continued compliance of the EUT.

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4.1 Measurement protocol for FCC and IC

4.1.1 GENERAL INFORMATION

4.1.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The open area test site is listed under the Canadian Test-Sites File-No:

IC 3009A-1

In compliance with RSS 210 testing for RSS compliance may be achieved by following the procedures set out in ANSI C63.4, ANSI C63.10 and applying the CISPR 22 limits.

4.1.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left without termination. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.1.1.3 Details of test procedures

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4, ANSI C63.10 and applying the CISPR 22 limits.

4.2 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed to locate at which position and at what setting of the EUT produce the maximum of the emissions. For the further measurement the EUT is set onto a metal plate for better radiation and in X position where possible.

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5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: NONE

Remarks: Not applicable, the EUT is a vehicular use.

5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part CPR 2.

5.2.1 Description of the test location

Test location: OATS 1
Test distance: 3 m

5.2.2 Photo documentation of the test set-up



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5.2.1 Applicable standard

According to FCC Part 15C, Section 15.231(b):

The field strength of emissions from intentional radiators shall not exceed the field strength limits in the table.

5.2.2 Description of Measurement

The radiated field strength of the fundamental wave from the EUT is measured using a tuned EMI-receiver. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8.3. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

EMI test receiver settings:

30 MHz – 1000 MHz: RBW: 120 kHz

5.2.3 Test result

Frequency	Level Pk	Bandwidth	Duty cycle factor	Level AV	Limit AV	Margin
(MHz)	(dBµV/m)	(kHz)	(dB)	dB(µV/m)	dB(µV/m)	(dB)
433.20	98.5	120	-20.0	78.5	80.8	-2.3
434.68	99.9	120	-20.0	79.9	80.9	-1.0

Limit according to FCC Section 15.231(b):

Frequency (MHz)	Field strength of fundamental @ 3m	
	(µV/m)	dB(µV/m)
40.66 – 40.70	2250	67
70 - 130	1250	62
130 - 174	1250 to 3750*	62 to 71.4*
174 - 260	3750	71.4
260 - 470	3750 to 12500*	71.4 to 81.9*
Above 470	12500	81.9

*Linear interpolation

The requirements are **FULFILLED**.

Remarks:

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5.3 Spurious emissions (magnetic field) 9 kHz – 30 MHz

For test instruments and accessories used see section 6 Part SER 1.

5.3.1 Description of the test location

Test location: OATS 1
Test distance: 3 m

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the field strength limits for spurious emissions in the table.

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5.3.4 Description of Measurement

The magnetic field strength of spurious emission from the EUT is measured in an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8.3. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

According to Section 15.31 (f) (2): The measurement below 30 MHz is performed at a distance of 3 m. The results are extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor of 40 dB/decade.

Setting of the EMI-receiver:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

5.3.5 Test result

Frequency (MHz)	Level QPK (dB(µV))	Ant correct. (dB/m)	Distance corr. (dB)	Corr. Level (dB(µV/m))	Limit QPK (dB(µV/m))	Margin (dB)
0.095	37.2	20.0	-80.0	-22.8	28.1	-50.9
1.0	23.7	20.0	-40.0	3.7	27.6	-23.9

Note: The level above means the noise level in the band. No emission could be detected.

Limit according to FCC Part 15C Section 15.209(a):

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(µV/m)	dB(µV/m)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

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5.4 Spurious emissions radiated (electric field)

For test instruments and accessories used see section 6 Part SER 2, SER 3.

5.4.1 Description of the test location

Test location: OATS 1
Test location: Anechoic chamber 2

Test distance: 3 m

5.4.2 Photo documentation of the test set-up



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5.4.3 Applicable standard

According to FCC Part 15C, Section 15.231(b), Section 15.209(a) and Section 15.205(a):
The emissions from intentional radiators shall not exceed the effective field strength limits.

5.4.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.4, Item 8.3. If the emission level of the EUT in peak mode complies with the average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average mode again and reported.

Instrument settings:

30 MHz – 1000 MHz: RBW: 120 kHz

1000 MHz – 4500 MHz: RBW: 1 MHz

5.4.5 Test result f < 1 GHz

Channel 1:

Frequency (MHz)	Bandwidth (kHz)	Level PK dB(µV/m)	Level AV dB(µV/m)	Limit PK dB(µV/m)	PK Margin (dB)	Limit AV dB(µV/m)
866.42	120	34.8	-	80.8	-46.0	60.8

Channel 2:

Frequency (MHz)	Bandwidth (kHz)	Level PK dB(µV/m)	Level AV dB(µV/m)	Limit PK dB(µV/m)	PK Margin (dB)	Limit AV dB(µV/m)
869.3	120	34.6	-	80.8	-46.2	60.8

5.4.6 Test result f > 1 GHz

Channel 1:

Frequency (MHz)	Bandwidth (kHz)	Level PK dB(µV/m)	Level AV dB(µV/m)	Limit PK dB(µV/m)	PK Margin (dB)	Limit AV dB(µV/m)
1294	1000	55.4	-	80.8	-25.4	60.8
3037	1000	47.4	-	80.8	-33.4	60.8
3471	1000	46.7	-	80.8	-34.1	60.8
3688	1000	40.3	-	80.8	-40.5	60.8

Channel 2:

Frequency (MHz)	Bandwidth (kHz)	Level PK dB(µV/m)	Level AV dB(µV/m)	Limit PK dB(µV/m)	PK Margin (dB)	Limit AV dB(µV/m)
1301	1000	55.7		74.0	-18.3	54.0
1595	1000	53.2	-	74.0	-20.8	54.0
1707	1000	47.7	-	74.0	-26.3	54.0
2659	1000	48.1	-	74.0	-25.9	54.0
3044	1000	47.5	-	80.9	-33.4	60.9
3478	1000	47.1	-	80.9	-33.8	60.9

The frequency 1301 MHz means a harmonic of the carrier. Therefore the duty cycle correction of the carrier is applied.

AV-calculation:

Frequency (MHz)	Level Pk dB(µV/m)	Bandwidth (kHz)	Duty cycle factor (dB)	Level AV dB(µV/m)	Limit AV dB(µV/m)	Margin (dB)
1301	55.7	1000	-20.0	35.7	54.0	-18.3

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Limit according to FCC Section 15.231(b), Section 15.209(a) and Section 15.205(a):

Frequency (MHz)	Field strength of spurious emissions @ 3m		Effective limit for 433 MHz	
	($\mu\text{V}/\text{m}$)	$\text{dB}(\mu\text{V}/\text{m})$	($\mu\text{V}/\text{m}$)	$\text{dB}(\mu\text{V}/\text{m})$
40.66 – 40.70	225	47		
70 - 130	125	42		
130 - 174	125 to 375*	42 to 51.4*		
174 - 260	375	51,4		
260 - 470	375 to 1250*	51.4 to 61.9*	1097	60.8
Above 470	1250	61.9		

*Linear interpolation

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in the table above or to the general limits shown in the table below according to § 15.209, whichever limit permits a higher field strength.

Frequency (MHz)	15.209 Limits ($\mu\text{V}/\text{m}$)	15.209 Limits $\text{dB}(\mu\text{V}/\text{m})$
30 - 88	100	40
88 - 216	150	43,5
216 - 960	200	46
Above 960	500	54

Additionally there is a limit according to §15.35(b) on the radio frequency emissions, as measured with a peak detector, corresponding to 20 dB above the maximum permitted average limits.

Restricted bands of operation according to FCC Part 15C, Section 15.205(a):

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209.

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

The requirements are **FULFILLED**.

Remarks: The measurement is performed up to the 10th harmonic. All emissions lower than 20 dB below the limit needs not to be reported.

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5.5 Correction for pulse operation (duty cycle)

For test instruments and accessories used see section 6 Part DC.

5.5.1 Description of the test location

Test location: AREA4

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15C, Section 15.35(c):

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.5.4 Description of Measurement

The duty cycle is measured using stimulus signal from a car key as used in the real application.

The duty cycle factor (dB) is calculated applying the following formula:

$$KE = 20 \log ((t_{iB} * p) / T_w);$$

<i>KE</i> :	pulse operation correction factor	(dB)
<i>t_{iw}</i>	pulse duration for one complete pulse track	(ms)
<i>t_{iB}</i>	pulse duration for one pulse	(ms)
<i>T_w</i>	a period of the pulse track	(ms)
<i>p</i>	number of pulses in one train	

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5.6 Emission bandwidth and OBW99

For test instruments and accessories used see section 6 Part MB.

5.6.1 Description of the test location

Test location: AREA4

5.6.2 Photo documentation of the test set-up



5.6.3 Applicable standard

According to FCC Part 15C, Section 15.231(c):
The bandwidth of the emission shall not exceed the effective limits.

5.6.4 Description of Measurement

The measurement is performed conducted using a spectrum analyser. The analyser span is set wide enough to capture the most of the power envelope of the signal. The function "20-dB-down" (OBW 99%) is used to determine the BW.

Analyser settings:

Span: 100 kHz,	RBW: 1 kHz	VBW: 3 kHz	Detector: peak;
For RSS:			
Span: 100 kHz,	RBW: 300 Hz	VBW: 1 kHz	Detector: sample;

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5.6.5 Test result

Centre f (MHz)	20dB bandwidth f_1	20dB bandwidth f_2	Measured EBW (MHz)	Limit ($f \cdot 0.0025$)(MHz)
433.199469	433.167375	433.231563	0.064188	1.082999
434.638538	434.606550	434.670525	0.063975	1.086596

Centre f (MHz)	99% bandwidth f_1	99% bandwidth f_2	Measured OBW (MHz)	Limit ($f \cdot 0.0025$)(MHz)
433.199400	433.183100	433.215700	0.032600	1.082999
434.638531	434.62225	434.654813	0.032562	1.086596

Limit according to FCC Part 15C Section 15.231(c):

Frequency (MHz)	20 dB BW limit dependent of the carrier (%)
70 – 900	0.25
above 900	0.50

The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

The requirements are **FULFILLED**.

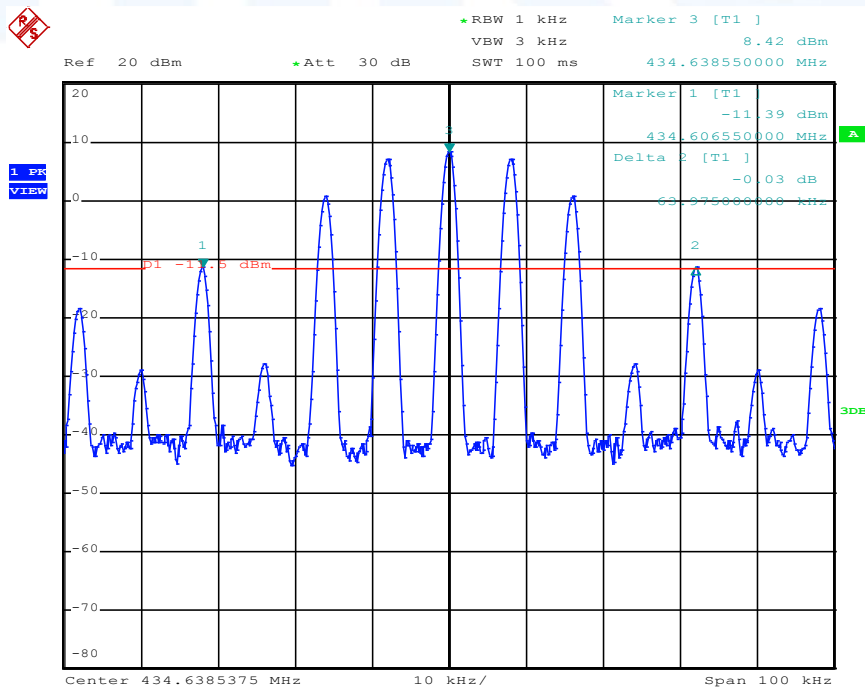
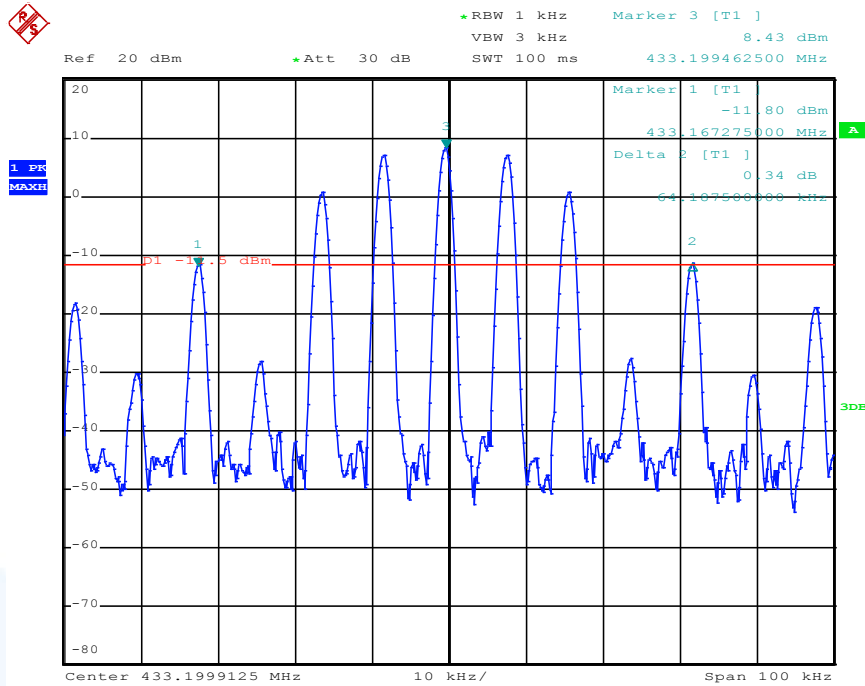
Remarks: For detailed results, please see the test protocol below. OBW for RSS requirement only.

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5.6.6 Test protocol

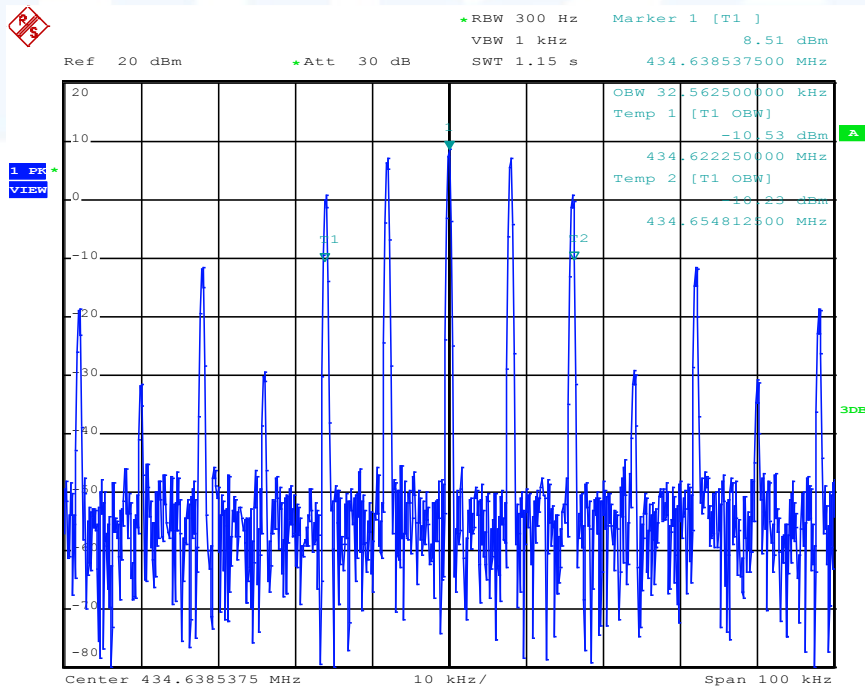
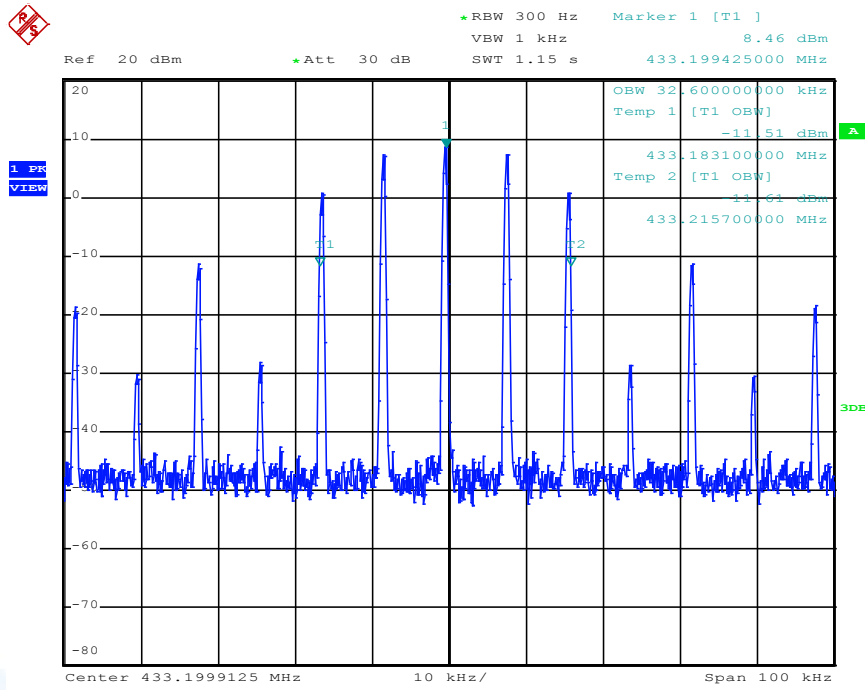
20 dB Emission bandwidth
FCC Part 15C, Section 15.231(c)



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OBW bandwidth for RSS



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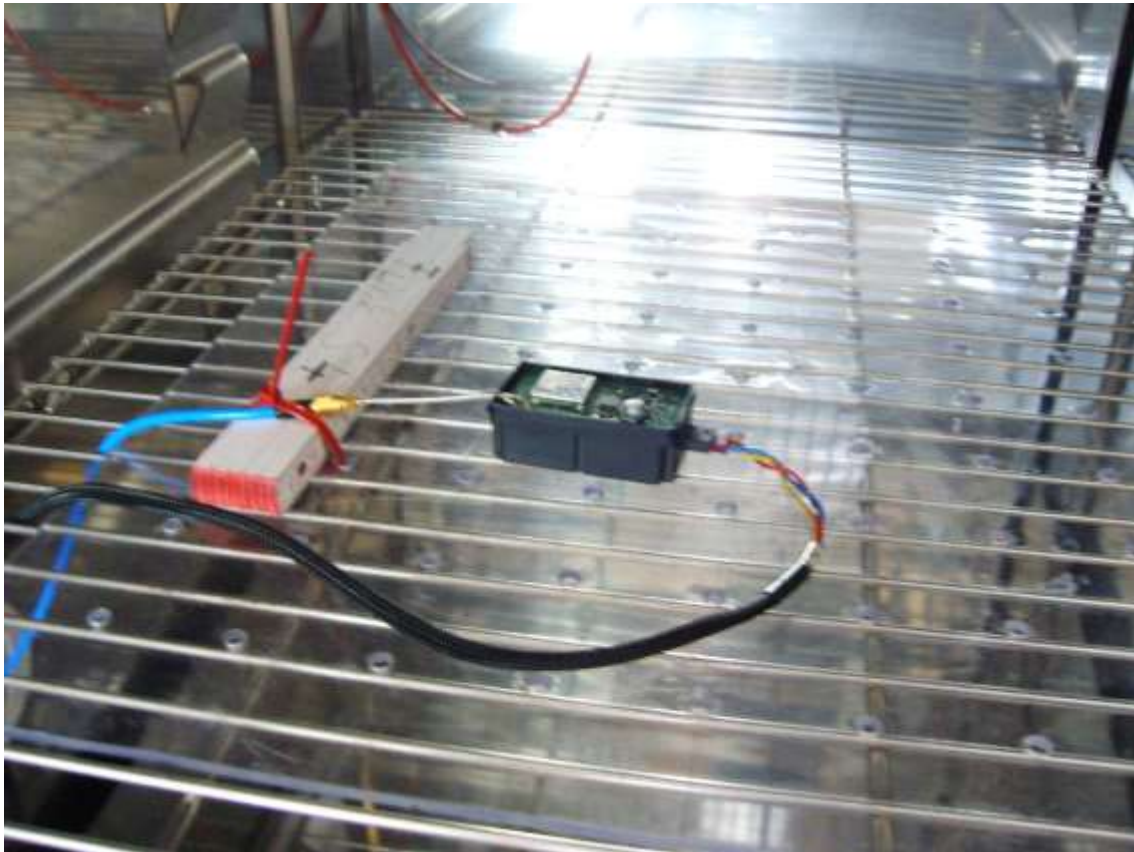
5.7 Frequency tolerance

For test instruments and accessories used see section 6 Part FE.

5.7.1 Description of the test location

Test location: AREA4

5.7.2 Photo documentation of the test set-up



5.7.3 Applicable standard

According to FCC Part 15C, Section 15.215(c):

If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.7.4 Description of Measurement

The frequency tolerance is measured with the spectrum analyser. The sweep points are set to maximum for higher the frequency resolution or the function "frequency counter" is used. The signal is unmodulated; the marker of the analyser is set to maximum amplitude at normal temperature, the frequency was recorded. Then the maximum supply voltage is set and the marker of the analyser is set to maximum amplitude. This procedure is done again for the minimum supply voltage. The EUT was now driven at normal supply voltage but in the climatic chamber to range the temperature from -20 °C to +50 °C in steps of 10 degrees. The drifting carrier is measured by setting the marker at the analyser.

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5.7.5 Test result

Test conditions		Test result
		Frequency (MHz)
$T_{min} (-40)^{\circ}\text{C}$	V_{nom}	433.205521
$T (-30)^{\circ}\text{C}$	V_{nom}	433.206541
$T (-20)^{\circ}\text{C}$	V_{nom}	433.207386
$T (-10)^{\circ}\text{C}$	V_{nom}	433.209636
$T (0)^{\circ}\text{C}$	V_{nom}	433.209901
$T (10)^{\circ}\text{C}$	V_{nom}	433.209508
$T_{nom} (20)^{\circ}\text{C}$	$V_{min} (8.0\text{ V})$	433.207078
$T_{nom} (20)^{\circ}\text{C}$	$V_{nom} (12\text{ V})$	433.207163
$T_{nom} (20)^{\circ}\text{C}$	$V_{max} (16.0\text{ V})$	433.207256
$T (30)^{\circ}\text{C}$	V_{nom}	433.206636
$T (40)^{\circ}\text{C}$	V_{nom}	433.206236
$T (50)^{\circ}\text{C}$	V_{nom}	433.204528
$T (60)^{\circ}\text{C}$	V_{nom}	433.203856
$T (70)^{\circ}\text{C}$	V_{nom}	433.203245
$T_{max} (85)^{\circ}\text{C}$	V_{nom}	433.203111

Carrier frequency f_c 433.207163 MHz
 Max tolerance no limit

Highest frequency f_h 433.209901 MHz
 Lowest frequency f_l 433.203111 MHz

Negative tolerance $f_l - f_c$ -4.052 kHz
 Positive tolerance $f_h - f_c$ 2.738 kHz

Limit according to FCC Part 15C, Section 15.215(c):

If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

The requirements are **FULFILLED**.

Remarks: The manufacturer requirement is a temperature range -40°C to +85°C. In FCC Part 15.231 no frequency drift limit is defined. The 80% limit of the band is not applicable, no band is defined.

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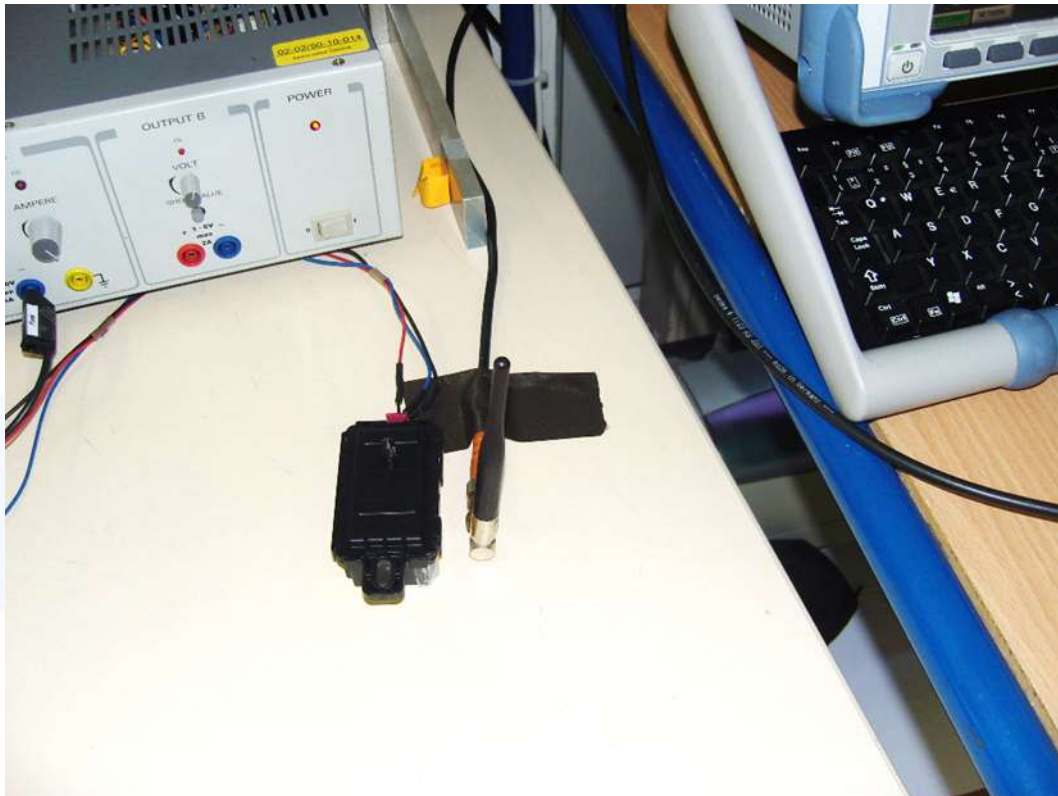
5.8 Signal deactivation

For test instruments and accessories used see section 6 Part MB.

5.8.1 Description of the test location

Test location: AREA4

5.8.2 Photo documentation of the test set-up



5.8.3 Applicable standard

According to FCC Part 15C, Section 15.231(a)(1):

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter not exceeding the defined on time limit.

5.8.4 Description of Measurement

The duration of transmission is measured with the spectrum analyser. The sweep points were set to maximum for higher the time resolution. The signal is modulated; the marker of the analyser is set to maximum amplitude at normal temperature and zero span. The analyser is set to single sweep and video triggered, the marker is set to the edges in order to measure the duration time and then recorded.

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5.8.5 Test result

Duration of transmission (ms)	Duration after releasing the button (ms)
8.575	75.0

Limit according to FCC Part 15C, Section 15.231(a):

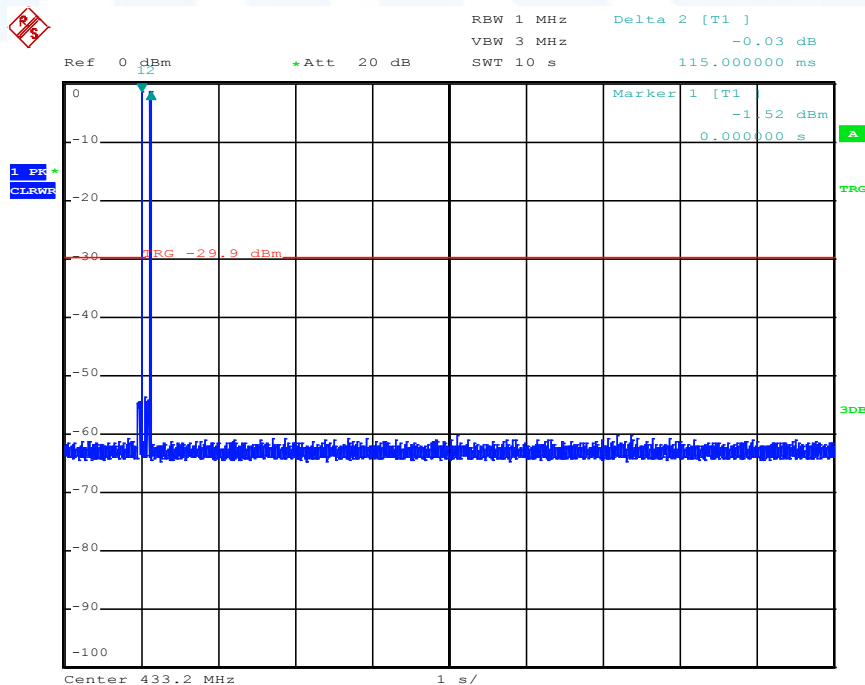
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released and a transmitter activated automatically shall cease transmission within 5 seconds after activation.

The requirements are **FULFILLED**.

Remarks: For detailed test results, please see the test protocol below.

5.8.6 Test protocol

Signal deactivation
FCC Part 15C, Section 15.231(a)



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6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
CPR 2	ESVS 30	02-02/03-05-006	26/06/2013	26/06/2012		
	VULB 9168	02-02/24-05-005	16/03/2013	16/03/2012	08/04/2013	08/10/2012
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
FE	FSP 30	02-02/11-05-001	18/10/2013	18/10/2012		
	WK-340/40	02-02/45-05-001	31/05/2013	31/05/2011	19/08/2013	19/02/2013
	6543A	02-02/50-05-157				
MB	FSP 30	02-02/11-05-001	18/10/2013	18/10/2012		
	6543A	02-02/50-05-157				
SER 1	FMZB 1516	01-02/24-01-018	14/02/2014	14/02/2013		
	ESCI	02-02/03-05-005	03/12/2013	03/12/2012		
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
SER 2	ESVS 30	02-02/03-05-006	26/06/2013	26/06/2012		
	VULB 9168	02-02/24-05-005	16/03/2013	16/03/2012	08/04/2013	08/10/2012
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
SER 3	FSP 40	02-02/11-11-001	18/09/2013	18/09/2012		
	AFS4-01000400-10-10P-4	02-02/17-05-003				
	AMF-4F-04001200-15-10P	02-02/17-05-004				
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	3117	02-02/24-05-009	18/12/2013	18/12/2012		
	Sucoflex N-1600-SMA	02-02/50-05-073				
	Sucoflex N-2000-SMA	02-02/50-05-075				