



EUROFINS PRODUCT SERVICE GMBH



Testing Cert #1983.01

TEST- REPORT

Compliance Test Report

**FCC PART 15 SUBPART C
IC RSS 210 ISSUE 7**

**FCC ID: NBG10176
IC: 2694A-10176**

**Keyless Entry and Start System (Kessy) in motor vehicle
Electronic Control Unit (ECU)
5ZA 010 176-00**

TEST REPORT NUMBER: G0M20906-2410-C-1



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1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

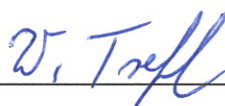
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Operator:

16.06.2009

W. Treffke



Date

Eurofins-Lab.

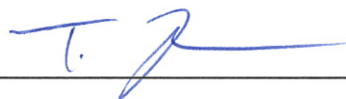
Name

Signature

Technical responsibility for area of testing:

16.06.2009

T. Jahn



Date

Eurofins

Name

Signature

1.2 Testing laboratory

EUROFINS PRODUCT SERVICE GMBH
Storkower Strasse 38c
D-15526 Reichenwalde b. Berlin
Germany
Telefon : +49 33631 888 00
Telefax : +49 33631 888 660

DAR ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-268/08

RECOGNIZED NOTIFIED BODY EMC
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

RECOGNIZED NOTIFIED BODY R&TTE
REGISTRATION NUMBER: BNetzA-bS-02/51-53

FCC FILED TEST LABORATORY
REG.-No. 96970

A2LA ACCREDITED TESTING LABORATORY
CERTIFICATE No. 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

INDUSTRY CANADA FILED TEST LABORATORY
REG. No. IC 3470

Test location, where different:

Name	: ./.
Street	: ./.
Town	: ./.
Country	: ./.
Telephone	: ./.
Fax	: ./.

1.3 Details of approval holder

Name	: Hella KGaA Hueck & Co.
Street	: Rixbecker Str. 75
Town	: 59552 Lippstadt
Country	: Germany
Telephone	: +49 2941 38 8392
Fax	: +49 2941 38 8427
Contact	: Herrn Heinz-Theo Holle
Telephone	: +49 2941 38 8392

1.4 Application details

Date of receipt of application	: 10.06.2009
Date of receipt of test item	: 10.06.2009
Date of test	: 15.06.2009 - 16.06.2009

1.5 Test item

Description of test item	: Keyless Entry and Start System (Kessy) in motor vehicle
Product Type	: Electronic Control Unit (ECU)
Model Number	: 5ZA 010 176-00
Serial number	: without

Technical data

Frequency range	: 125kHz +/- 875Hz
Tested frequencies	: F ₁ 125kHz
Antenna	: removable connected to device via RF Transmission line
Power supply	: 12VDC (battery)
Operating mode	: simplex
Modulation	: OOK

Manufacturer:
(if applicable)

Name : Hella KGaA Hueck & Co.
Street : Rixbecker Str. 75
Town : 59552 Lippstadt
Country : Germany

1.6 Test standards

Technical standard : **FCC PART 15 SUBPART C § 15.209
IC RSS 210 ISSUE 7**

2 Technical test**2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified in 2.4 were ascertained in the course of the tests performed.

**2.2 Test environment**

Temperature : 22 ... 26°C

Relative humidity content : 20 ... 75%

Air pressure : 86 ... 103kPa

Extreme conditions parameters:

V_{nom} : 12VDC

T_{nom} : 25°C

2.3 Test equipment utilized

Measurement Equipment List			
No.	Measurement device:	Type:	Manufacturer:
ETS 0178	Open area test side	10m	Eurofins Product Service
ETS 0291	Loop antenna	HFH2-Z2	Rohde & Schwarz
ETS 0383	Spectrum Analyzer	FSU26	Rohde & Schwarz

2.4 Test results

☒ 1st test

☐ test after modification

☐ production test

Test case	Subclause	Required	Test passed	Test failed
INFORMATIONAL TRANSMITTER PARAMETERS				
Occupied Bandwidth	IC RSS Gen. 4.6.1	☒		
TRANSMITTER PARAMETERS				
Radiated spurious emissions	FCC § 15.209 IC RSS 210 § 2.7	☒	☒	☐
POWER LINE PARAMETERS				
AC power line conducted emissions	FCC § 15.207 IC RSS Gen. 7.2.2	☐	☐	☐

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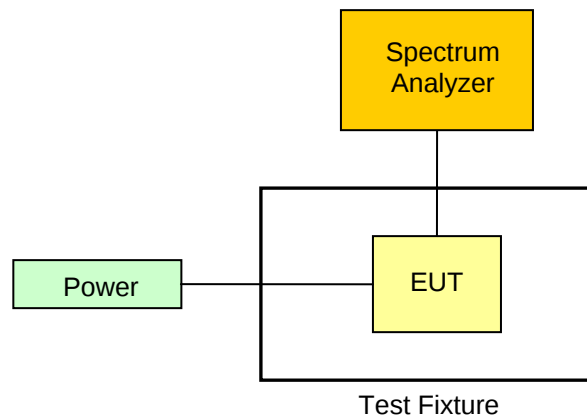
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3 Transmitter parameters

3.1 Occupied Bandwidth

The 99% emission bandwidth occupied by the modulated transmitted signal has to be reported as calculated or measured.

3.1.1 Measurement procedure



The eut is connected to a spectrum analyzer and set to transmission mode with maximum power under normal test conditions. The span of the analyzer is set wide enough to capture all significant emissions of the modulation spectrum. The resolutions bandwidth is set as close as possible to 1% of the selected span without being below 1%. The occupied bandwidth is then measured evaluated by an internal measurement procedure of the analyzer.

3.1.2 Results

Transmitter occupied bandwidth		
Measurement Conditions		
Nominal frequency :	125kHz	
Power occupation :	99%	
Lower edge frequency [kHz]	Upper edge frequency [kHz]	Occupied Bandwidth [kHz]
119.40	120.40	11.00
See attached diagram in Annex		
Verdict		PASS

3.2 Transmitter spurious emissions

The unwanted emissions of intentional operators have to comply with the field strength emission limits.

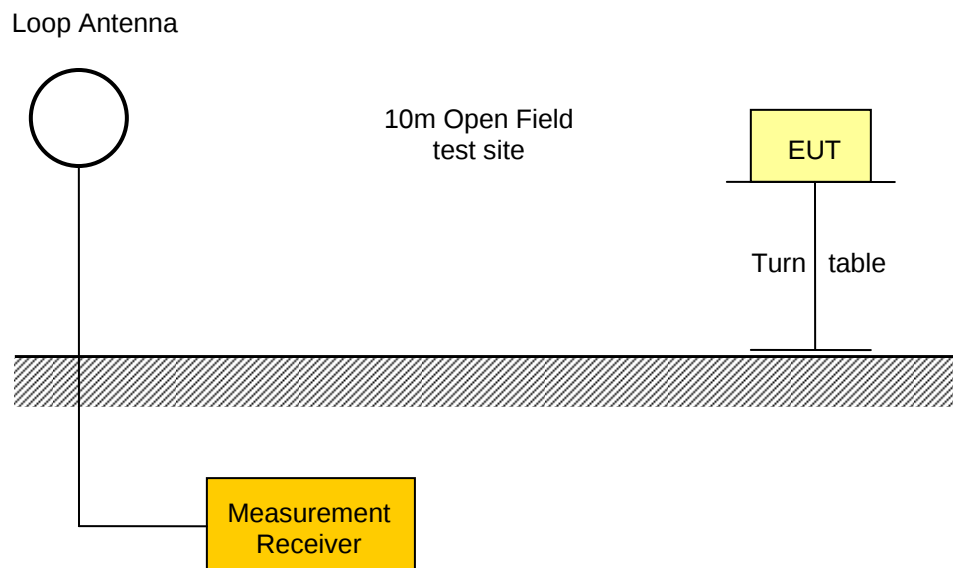
3.2.1 Limits

The following table lists all spurious emission limits in the frequency range of 9kHz to 30MHz.

Tranmitter spurious emission limits				
Tx-state	Frequency range [MHz]	Limit 3m [$\mu\text{V/m}$]	Calculated Limit 3m [$\text{dB}\mu\text{V/m}$]	Measurement Distance [m]
Operational	0.009 – 0.490	2400/F[kHz]	48.5 – 13.8	300
	0.490 – 1.705	2400/F[kHz]	33.8 - 23	30
	1.705 – 30.0	30	30	30
	30 – 88	100	100	3
	88 – 216	150	150	3
	216 – 960	200	200	3
	> 960	500	500	3

3.2.2 Measurement procedure

The spurious emission measurement is performed on a 10m open area test site.



The eut is placed on a non-metallic table. Any emission is received by a loop antenna and measured via a measurement receiver connected to the loop antenna. To obtain the maximum emission the eut is rortated through 360°.

Due to practical reasons the spurious emission level check is first performed with a peak detector and the quasi-peak and average limits.

If any emission is detected that gets close to the emission limit the detector is changed and the quasi-peak or average detector is used. Which detector is used is determined by the emission frequency. If pulsed transmission is used, averaging over the pulse train is used.

The measurement values are also corrected to obtain the field strength values at the defined measurement distances of the emission limits.

The measurement is performed over the frequency range of 9kHz to 30MHz.

3.2.3 Results

Transmitter spurious Emissions					
Measurement Conditions					
Nominal frequency :		125kHz			
Modulated :		☒ Yes ☐ No			
Pulsed :		☒ Yes ☐ No			
Emission Frequency [kHz]	Measured Field Strength * [dBμV/m]	Limit Measurement Distance [m]	Detector	Limit [dBμV/m]	Margin [dB]
125	3.1	300	Peak	25.7	22.6
250	-26.8	300	Peak	19.6	46.4
375	-28.5	300	Peak	16.1	44.6
500	10.1	30	Peak	33.6	23.5
625	3.4	30	Peak	31.7	28.3
See attached diagrams in Annex					
Verdict				PASS	

* **Note** : The measured field strength values are corrected to reflect the field strength values at the measurement distance stated in the table.

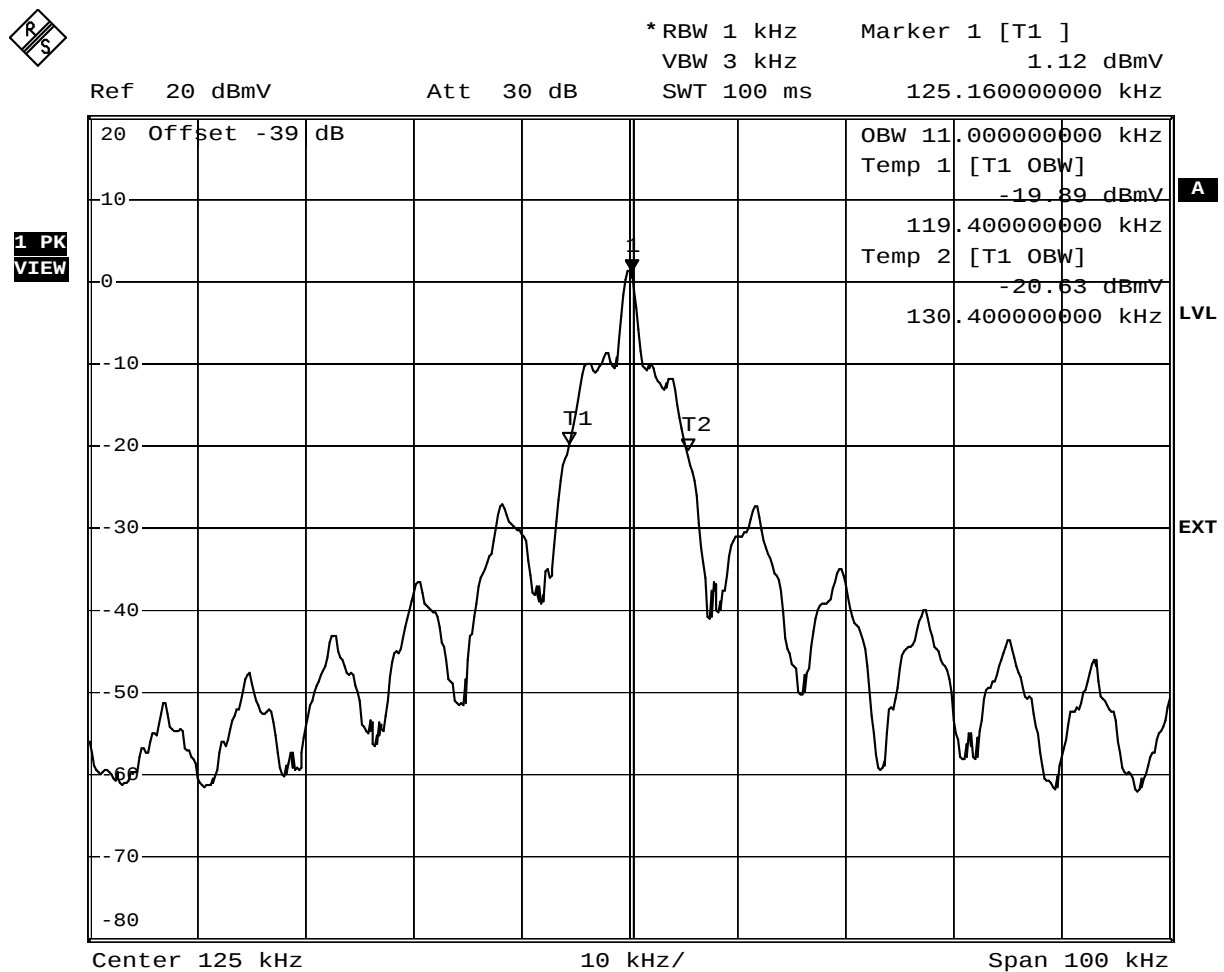
Annex B Transmitter Occupied Bandwidth

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STORKOWER STR. 38C, D-15526 REICHENWALDE B. BERLIN

FCC part 15 Subpart C
Peak output power

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Peak output power
Comment 2	125 KHz
Comment 3	



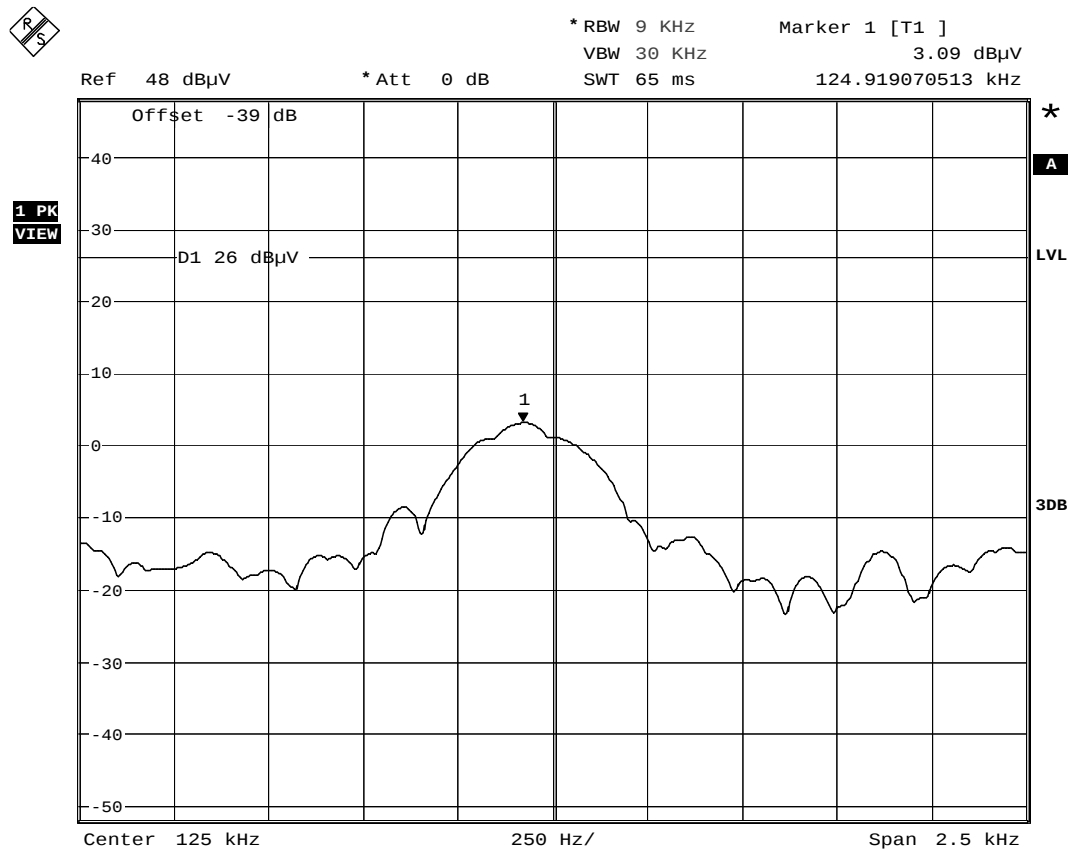
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Measurement diagram

Annex C Transmitter Spurious Emissions

FCC part 15 Subpart C Peak output power

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Peak output power
Comment 2	Tx 125 KHz
Comment 3	Open area test side, 10m, antenna HFH2-Z2



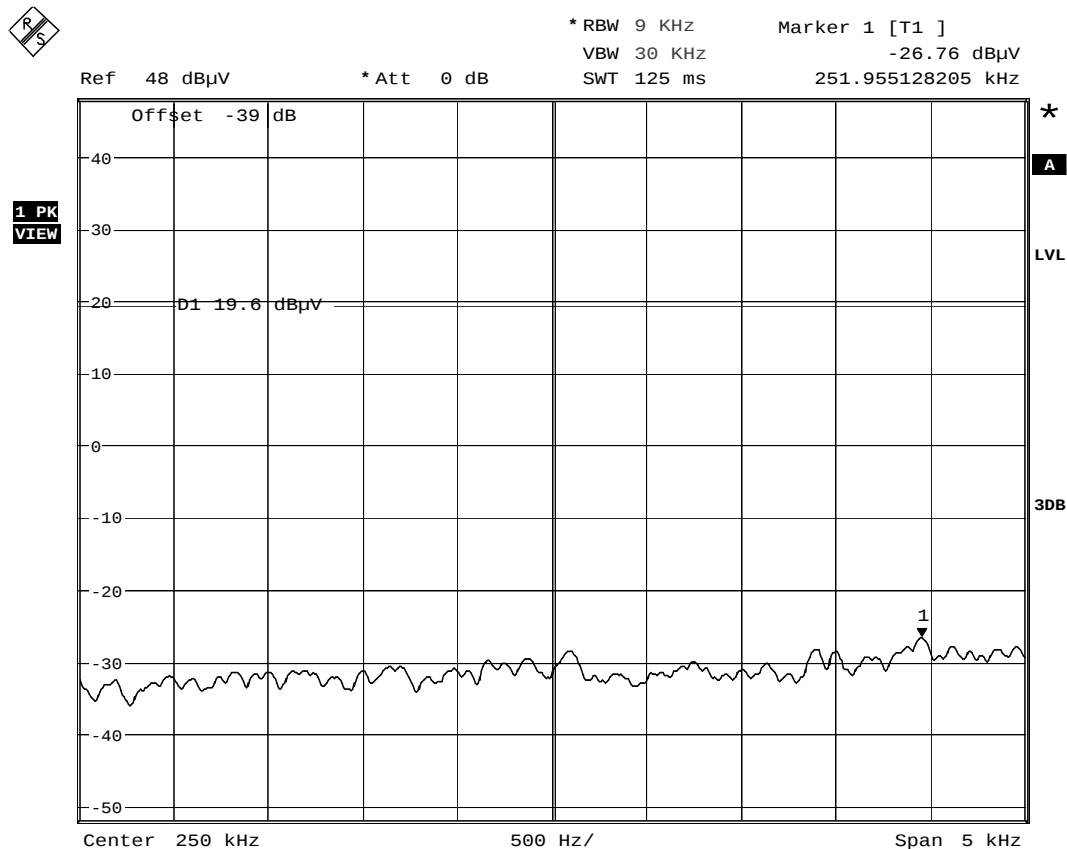
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Measurement diagram

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

FCC part 15 Subpart C
Section 15.209 Radiated emissions limits, general requirements

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Radiated emissions limits
Comment 2	2'nd harmonic 250KHz
Comment 3	Open area test side, 10m, antenna HFH2-Z2



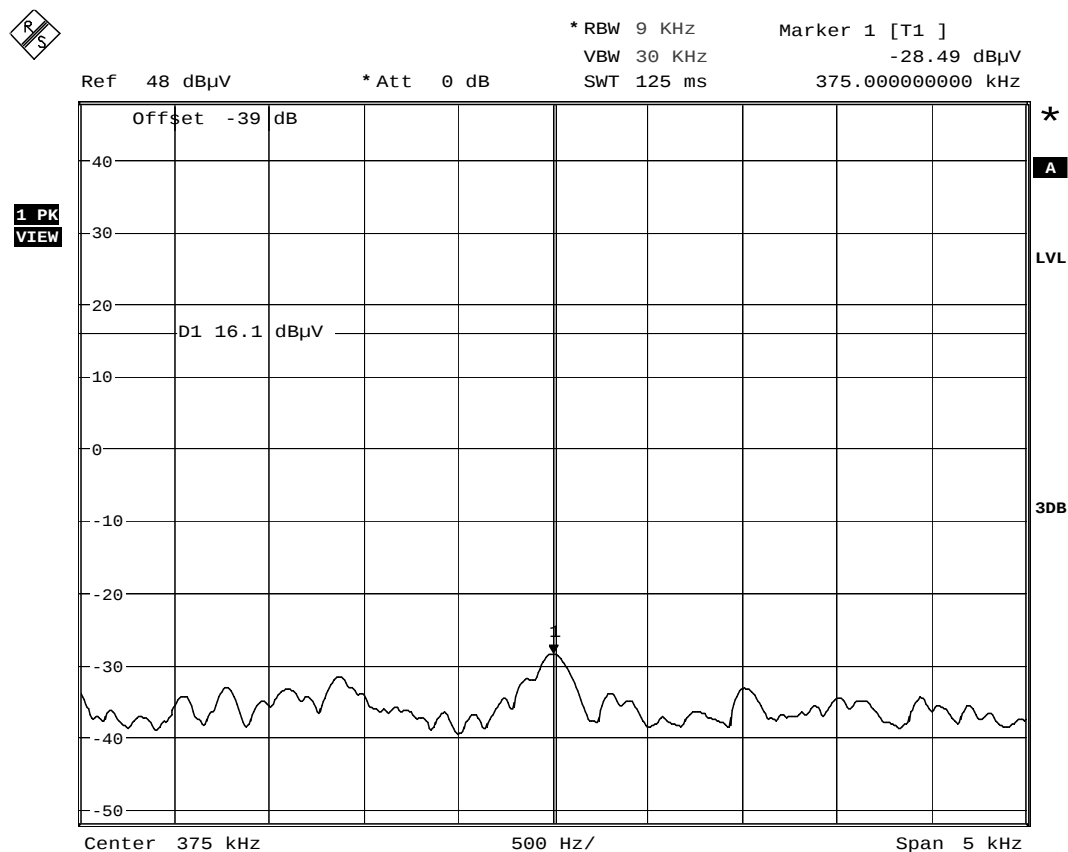
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Measurement diagram

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

FCC part 15 Subpart C
Section 15.209 Radiated emissions limits, general requirements

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Radiated emissions limits
Comment 2	3'nd harmonic 375KHz
Comment 3	Open area test side, 10m, antenna HFH2-Z2



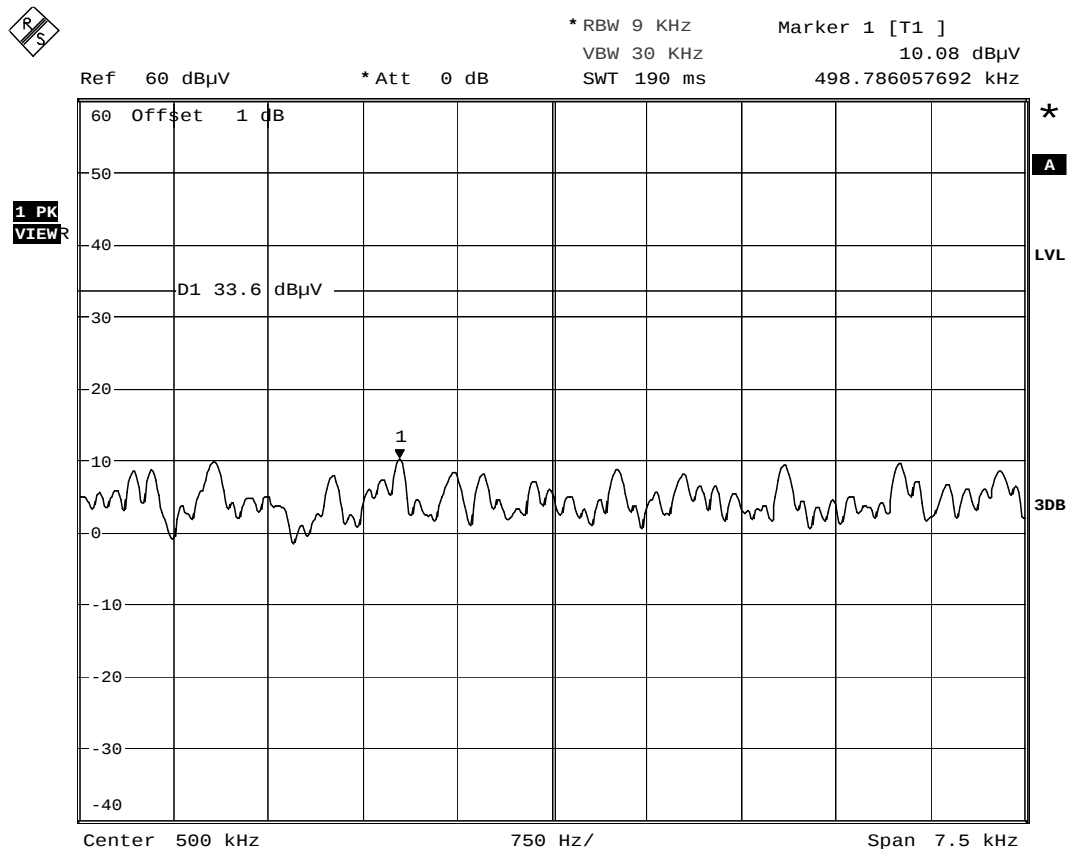
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Measurement diagram

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

FCC part 15 Subpart C
Section 15.209 Radiated emissions limits, general requirements

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Radiated emissions limits
Comment 2	4'nd harmonic 500KHz
Comment 3	Open area test side, 10m, antenna HFH2-Z2



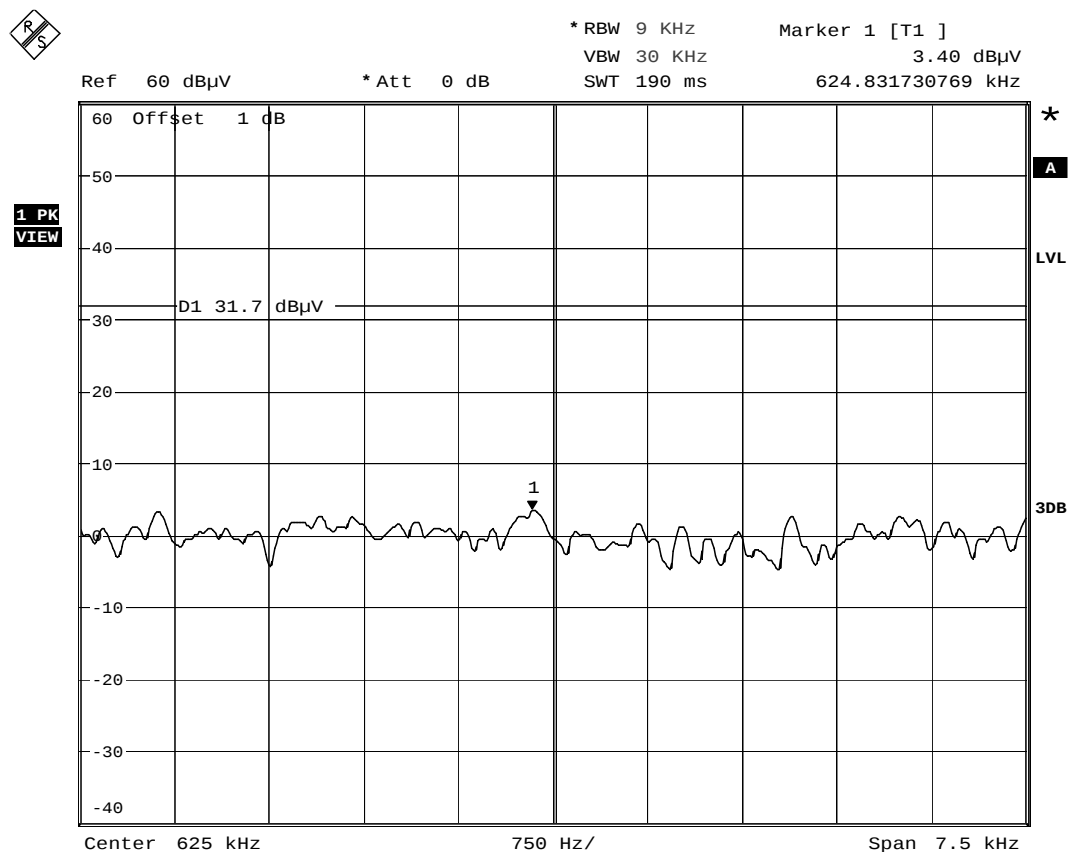
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Measurement diagram

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FCC part 15 Subpart C
Section 15.209 Radiated emissions limits, general requirements

EUT	Electronic Control Unit (ECU)
Model	5ZA 010 176-00
Approval Holder	Hella KGaA Hueck & Co.
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 209
Comment 1	Radiated emissions limits
Comment 2	5'nd harmonic 625 KHz
Comment 3	Open area test side, 10m, antenna HFH2-Z2



Date: 15. JUN. 2009 17:24:03

Measurement diagram

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany