

Akkreditiertes Prüflaboratorium

**DAR-Registriernummer:
TTI-P-G 166/98-00 vom 18.09.98**

**Test report no.: 2_0576-A/98
47 CFR Rule 15.253 / USA
A.D.C. automotive radar system**

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- 1 General information**
 - 1.1 Notes**

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

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1.2 Testing laboratory

CETECOM ICT Services GmbH

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Accredited testing laboratory

DAR-registration number : TTI-P-G166/98-00 vom 18.09.98

1.3 Details of applicant

Name : A.D.C. GmbH Automotive Distance Control Systems

Street : heuriedweg 14

City : 88131 Lindau

Country : Germany

Telephone : +49(0)8382 969 911

Telefax : +49(0)8382 969 919

Contact : Mr. Adomat

Telephone : +49(0)8382 969 911

1.4 Application details

Date of receipt of application : 07.10.98

Date of receipt of test item : 20.10.98

Date of test : 22.10.98

1.5 Test item

Type of equipment : forward-looking vehicle-mounted field disturbance sensor

Type designation : **A.D.C. automotive radar system**

Manufacturer : A.D.C. / Macom USA

Street :

City :

Country :

Serial number : Sensor:P/N AU-0001-CO1 Ser.no. 024; Controler: C-Muster 3-246

Additional informations: :

Frequency : 76,58 GHz / 52MOPON Channel separation: -

Number of channels : 1

Antenna : integral antenna

Power supply : 12V DC

1.6 Test standards: 47 CFR Rule 15.253

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.

Technical responsibility for area of testing :

07.12.98	RSC 8411	Berg
Date	Section	Name


Signature

Technical responsibility for area of testing :

07.12.98	RSC8414	Ames
Date	Section	Name


Signature

2.2 Testreport

TEST REPORT

Testreport no. : 2_0576-A/98

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§ 15.253(b) (2)	Radiated emission	7
§ 15.253(c) (2)	Emissions outside the operating band	8
§ 15.253(c) (4)	Radiated emission below 40 GHz	9
§ 15.253(d)	Field Strength of Spurious Emissions	9
§ 15.253(e)	Fequency Stability	10
	Test equipment listing	11
	Photographs of the equipment	13

Equipment under test : A.D.C. automotive radar system

Ambient temperature : 23°C

Relative humidity : 54%

RADIATED EMISSION

SUBCLAUSE § 15.253(b)

TEST CONDITIONS		POWER DENSITY		
Frequency (GHz)		76,58		
T _{nom} (20)°C	V _{nom} (12)V	7.87nW/cm ²		
Maximum deviation from output power under extreme test conditions (dBc)		1.6		
Measurement uncertainty		±3dB		

LIMIT

SUBCLAUSE § 15.253(b)

Type of equipment	POWER DENSITY
forward-looking vehicle-mounted field disturbance sensor	60µW/cm ² at 3m

Equipment under test : A.D.C. automotive radar system

Ambient temperature : 23°C

Relative humidity : 54%

EMISSIONS OUTSIDE THE OPERATING BAND

SUBCLAUSE § 15.253 (c)(2)

TEST CONDITIONS		POWER DENSITY		
Frequency (GHz)		76,58		
T _{nom} (20)°C	V _{nom} (12)V	< 30 pW/cm ²		
Measurement uncertainty		± 3 dB		

LIMIT

SUBCLAUSE §§ 15.253 (c)(2)

Type of equipment	POWER DENSITY
forward-looking vehicle-mounted field disturbance sensor	600 pW/cm ² at 3m

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : A.D.C. automotive radar system

Ambient temperature : 23°C

Relative humidity : 54%

**FIELD STRENGTH OF SPURIOUS EMISSIONS SUBCLAUSE § 15.253(c)/(d) (4)
(RADIATED EMISSIONS BELOW 40 GHz)**

Measurement distance see table

SPURIOUS EMISSIONS LEVEL ($\mu\text{V/m}$)								
76,58 GHz								
f (MHz)	Detector	Level ($\mu\text{V/m}$)	f (MHz)	Detector	Level ($\mu\text{V/m}$)	f (MHz)	Detector	Level ($\mu\text{V/m}$)
no	peak's	found						
Measurement uncertainty			$\pm 3\text{dB}$					

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

17 - 24 ; 52 - 54

Equipment under test : A.D.C. automotive radar system

Ambient temperature : 23°C

Relative humidity : 54%

TRANSMITTER FREQUENCY STABILITY vs. TEMPERATURE AND BATTERY VOLTAGE
SUBCLAUSE § 15.253 (e)

Power level at which the measurement has been performed: 7,87 nW/cm²

TEST CONDITIONS		FREQUENCY ERROR (kHz)
Frequency (GHz)		76.58
Temperature (°C)	Voltage (V)	Frequency (GHz)
+50°C	10.2V	76.5625
	12.0V	76.5642
	13.8V	76.5700
+40°C	10.2V	76.5858
	12.0V	76.5858
	13.8V	76.5833
+30°C	10.2V	79.5983
	12.0V	76.6117
	13.8V	76.6092
+20°C	10.2V	76.6367
	12.0V	76.6375
	13.8V	76.6392
+10°C	10.2V	76.6692
	12.0V	76.6692
	13.8V	76.6692
0°C	10.2V	76.7123
	12.0V	76.7120
	13.8V	76.7183
-10°C	10.2V	76.7580
	12.0V	76.7533
	13.8V	76.7363
-20°C	10.2V	76.8087
	12.0V	76.8087
	13.8V	76.8079
Maximum freq. error (MHz)		+228,7
Measurement uncertainty		±1x10 ⁻⁷

Limit

SUBCLAUSE § 15.253 (e)

Fundamental must be contained within the specified frequency band 76 – 77 GHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Reciever	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

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No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Spectrum Analyzer	8562A	Hewlett Packard	2809A02682
53	Harmonic Mixer	11970W	Hewlett Packard	2521A00470
54	Standart Gain Horn	W27	Flenn	-
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