

Report on the FCC and IC Testing of the  
APTIV Services Deutschland GmbH  
Vehicle Radar  
Model: A3TRN  
In accordance with FCC 47 CFR Part 1,  
§1.1310 and Part 2, §2.1093 and RSS-210

Prepared for: APTIV Services Deutschland GmbH  
Am Technologiepark 1  
42119 Wuppertal, Germany

FCC ID: LTQA3TRN  
IC: 3659A-A3TRN



Product Service

Add value.  
Inspire trust.

## COMMERCIAL-IN-CONFIDENCE

Date: 2023-09-01

Document Number: TR-713297342-01 | Revision 1

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
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### Engineering Statement:

This measurement shown in this report were made in accordance with the procedures described on test pages.

All reported testing was carried out on a sample equipment to demonstrate limited compliance with with FCC 47 CFR Parts 1 and 2, and RSS-102.

The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Martin Steindl		<i>Steindl Martin</i> SIGN-ID 828055

Laboratory Accreditation

DAkkS Reg. No. D-PL-11321-11-02

DAkkS Reg. No. D-PL-11321-11-03

Laboratory recognition

Registration No. BNetzA-CAB-16/21-15

ISED Canada test site registration

3050A-2

### Executive Statement:

A sample of this product was tested and found to be compliant with FCC 47 CFR Parts 1, §1.1310 and Part 2, §2.1093 and ISED RSS-102, Issue 5 + Amendment 1 (February 2021)

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# 1 Report Summary

## 1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Revision	Description of changes	Date of Issue
0	First Issue	2023-07-06
1	Correction of cal-data	2023-09-01

Table 1: Report of Modifications

## 1.2 Introduction

Applicant	APTIV Services Deutschland GmbH Am Technologiepark 1 42119 Wuppertal, Germany
Manufacturer	APTIV Services Deutschland GmbH
Model Number(s)	A3TRN
FCC ID:	LTQA3TRN
Serial Number(s)	SN0006
Hardware Version(s)	B2
Software Version(s)	3.0.1
Number of Samples Tested	1
Test Specification(s) / Issue / Date	FCC 47 CFR Parts 1, §1.1030 and 2, §2.1093 RSS-102 Issue 5 (March 2015) + Amendment 1 (February 2021)
Test Plan/Issue/Date	N/A
Order Number	454234216
Date	2023-03-21
Date of Receipt of EUT	2023-06-02
Start of Test	2023-06-30
Finish of Test	2023-06-30
Name of Engineer(s)	M. Steindl
Related Document(s)	ANSI C63.10:2013



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### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 95, Subpart M is shown below.

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	§1.13010	RF Exposure Value	Passed

**Table 2: Results according to FCC 47 CFR Part 95, Subpart M**

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	2.51, 2.5.2, 3	RF Exposure Value	Passed

**Table 3: Results according to RSS-210**



## 1.4 Product Information

### 1.4.1 Technical Description

The Device Under Test (DUT) is a 76 to 77 GHz vehicular radar. The device employs a dynamic chirp modulated transmit array. Multiple receive antennas are used to determine target angular resolution through digital beam forming. When installed on a vehicle, the device will operate when the vehicle is running.

*Frequency Band* 76 – 81 GHz

*Emission designator:* 425MFXN

*Supply Voltage:* 12 V

*Supply Frequency:* DC (0 Hz)

### 1.4.2 EUT Ports / Cables identification

<i>Port</i>	<i>Max Cable Length specified</i>	<i>Usage</i>	<i>Screened</i>
Wiring harness	2 m	DC supply and Data I/O	No

**Table 4**



## 1.5 Test Configuration

The applicant provided a test sample for stand alone operation.

## 1.6 Modes of Operation

The DUT transmitted continuously in the 76 to 77 GHz frequency band.

## 1.7 EUT Modifications Record

The table below details modifications made to the EUT during the test programme.  
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5

## 1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
RF Exposure Value	M. Steindl

### Office Address:

Äußere Frühlingstraße 45  
94315 Straubing  
Germany



## 2 Test Details

### 2.1 RF Exposure Value

#### 2.1.1 Specification Reference

FCC 47 CFR Part 1, §1.1310  
RSS-102

#### 2.1.2 Equipment under Test and Modification State

SRR6PB2; S/N 0002; Modification State 0

#### 2.1.3 Date of Test

2023-06-30

#### 2.1.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

#### 2.1.5 Limits

##### FCC-Limit for general public acc. to §1.1310, Table 1 (ii)

<i>Frequency range</i>	<i>Power Density Limit</i>
1500 – 100000 MHz	1.0 mW/cm <sup>2</sup> = 10 W/m <sup>2</sup>

##### ISED-Limit for general public acc. RSS-102, Section4 Table 4)

<i>Frequency range</i>	<i>Power Density Limit</i>
1500 – 150000 MHz	10 W/m <sup>2</sup> = 1.0 mW/cm <sup>2</sup>

#### 2.1.6 Test Method

The test was performed in accordance with KDB 447498 D04 V01  
Average RF power test was performed according to ANSI C63.10, section 10.3.5  
The evaluation distance is 20 cm.

For further details please refer to test reports TR-713297342-00 and TR-713297342-01.



## 2.1.7 Test Results

Maximum EIRP:	Average: 17.45 dBm = 55.59 mW Peak: 21.62 dBm = 145.21 mW
Frequency:	76 – 77 GHz ( > 5800 MHz)
Minimum separation distance $r$ :	20 cm (declared by applicant)
Power Density $S = \frac{EIRP}{4\pi r^2}$ :	Average: 0.01106 mW/cm <sup>2</sup> Peak: 0.02889 mW/cm <sup>2</sup>
FCC Limit:	1.0 mW/cm <sup>2</sup>
ISED Limit:	1.0 mW/cm <sup>2</sup>

## 2.1.8 Test Location and Test Equipment

The test was carried out in fully anechoic room, No. 2

Instrument	Manufacturer	Type No	TE No	Calibra- tion Pe- riod (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSW43	54396	12	2024-04-30
Waveguide Mixer	Rohde & Schwarz	FS-Z90	25850	36	2026-05-31
Horn Antenna	Flann	26240-20	37898	*	

\*: No calibration required. Devices are checked before use.

**Table 6**





### 3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$ , providing a level of confidence of $p = 95.45\%$		

**Table 7 Measurement uncertainty based on CISPR 16-4-2**



<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
25 MHz – 6 GHz	1.96	±4.4 dB
1 GHz – 18 GHz	1.96	±4.7 dB
18 GHz – 40 GHz	1.96	±4.9 dB
40 GHz – 325 GHz	1.96	±6.1 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10 <sup>-7</sup>
The expanded uncertainty reported according to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

**Table 8 Measurement uncertainty based on ETSI TR 100 028**

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 ( $U_{CISPR}$ ) and as specified in the test report below. This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.



Test Name	Expanded Uncertainty
Occupied Bandwidth	±5 %
Conducted Power	
9 kHz ≤ f < 30 MHz	±1.0 dB
30 MHz ≤ f < 1 GHz	±1.5 dB
1 GHz ≤ f ≤ 40 GHz	±2.5 dB
1 MS/s power sensor (2.4 / 5 GHz band)	±1.5 dB
Power Spectral Density	±3.0 dB
Radiated Power	
25 MHz – 26.5 GHz	±6.0 dB
26.5 GHz – 66 GHz	±8.0 dB
40 GHz – 325 GHz	±10.0 dB
Conducted Spurious Emissions	±3.0 dB
Radiated Field Strength 9 kHz – 40 GHz	±6.0 dB
Voltage	
DC	± 1.0 %
AC	± 2.0 %
Time (automatic)	± 5 %
Frequency	± 10 <sup>-7</sup>

**Table 9 Decision Rule: Maximum allowed measurement uncertainty**