



RF - TEST REPORT

- Human Exposure -

Type / Model Name : DDA03

Product Description : Roof antenna with BLE

Applicant : Continental Advanced Antenna GmbH

Address : Römerring 1

31137 HILDESHEIM, GERMANY

Manufacturer : Continental Advanced Antenna GmbH

Address : Römerring 1

31137 HILDESHEIM, GERMANY

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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Test Report No. : <u>80240706-02 Rev_2</u>	<u>24. June 2025</u> Date of issue
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Deutsche
Akkreditierungsstelle
D-PL-12030-01-00

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ATTACHMENT A as separate supplement

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations

Part 1, Subpart I, Section 1.1310	Radiofrequency radiation exposure limits
Part 1, Subpart J, Section 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.
Part 1, Subpart J, Section 2.1093	Radiofrequency radiation exposure evaluation: portable devices.
KDB 447498 D01 V06	General RF Exposure Guidance

ISED Canada Rules and Regulations

RSS-102, Issue 6	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
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2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

2.3 Photo documentation of the EUT – See ATTACHMENT A

2.4 Equipment type

BLE device

2.5 Short description of the equipment under test (EUT)

The DDA03 are roof antennas for the mounting on a car roof. Besides the Bluetooth Low Energy transceiver the antenna contains passive antenna elements for the reception of mobile phone frequencies. Also an active antenna for GNSS and SDARS with LNA is part of the product.

Number of tested samples	:	1 (radiated sample)	1 (conducted sample)
Serial number	:	#4K0035503F	#4K0035503F
		Y9B###=3110241000082	Y9B###=3110241000081
SW-Number	:	BT-Stack 01.03.05	BT-Stack 01.03.05
HW-Number	:	03612595B02	03612595B02
FCC ID	:	2ACC7DDA03	
IC	:	11980A-DDA03	
HVIN	:	DDA03	

Items	Description
BT type	5.0 Low Energy
BT chipset type	NXP MKW35A512VFP4
Modulation	GFSK
Frequency range	2400 MHz to 2483.5 MHz
Channel numbers	40
Data rate (Mbps)	1
Power setting	Default (0)
Antenna type	PCB

2.6 Variants of the EUT

There are no variants of the EUT.

2.7 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

2.8 Transmit operating modes

The EUT allows the user to select the following modes:

- TX continuous modulated
- TX continuous unmodulated
- RX

2.9 Antennas

The following antennas shall be used with the EUT:

Number	Characteristic	Frequency band (GHz)	Gain (dBi)
1	Integrated monopole, circular	2.4 – 2.5	6 (max)

2.10 Power supply system utilised

Power supply voltage, V_{nom} : 12 V_{DC}

3 TEST RESULT SUMMARY

Operating in the 2400 MHz – 2483.5 MHz band:

FCC Rule Part	RSS Rule Part	Description	Result
KDB 447498, 7.1	RSS 102, 6.6	MPE	not applicable
KDB 447498, 4.3.1	RSS 102, 6.3	SAR exclusion consideration	passed
KDB 447498, 7.2	RSS 102, 8.2.4	Co-Location, Co-transmission	not applicable ¹

Note:

¹ EUT has only one transmitter.

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80240706-02	0	13 March 2025	Initial test report
80240706-02	1	22 May 2025	Calculations added
80240706-02	2	24 June 2025	SAR exclusion consideration

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

The equipment under test fulfils the requirements cited in clause 1 test standards.

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

Testing commenced on : 05 February 2025

Testing concluded on : 26 February 2025

Checked by:

Tested by:

Thomas Weise
Laboratory Manager

Christopher Thaller
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTLING
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. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).

Details can be found in the procedure CSA_B_V50_29.

5 TEST CONDITIONS AND RESULTS

5.1 RF output power

5.1.1 Test result

The output power of the device is taken from the power measurement in the test report 80240706-00 according to FCC 15.247 issued by CSA Group Bayern.

RSS-247 5.4 (d)							
Modulation	Channel	Frequency	Measured Conducted TX Power	Antenna gain	EIRP	EIRP Limit	Margin
		MHz	dBm	dBi	dBm	dBm	dB
DSSS	CH37	2402	-0.1	6.0	5.9	36.0	-30.1
	CH17	2440	-0.5	6.0	5.5	36.0	-30.5
	CH39	2480	0.9	6.0	6.9	36.0	-29.1

Remarks: As worst case the power values are not averaged over time.

6 HUMAN EXPOSURE

6.1 FCC - SAR test exclusion considerations

6.1.1 Applicable standard

According to RF exposure guidance:

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

6.1.2 Determination of the standalone SAR test exclusion threshold

The minimum separation distance results from the application of the EUT. This distance is assumed to be 20 mm from antenna to the user. The BLE antenna is in the middle of the roof antenna, this is more than 20 mm from the outside of the EUT.

The formula under 4.3.1 1) for 100 MHz to 6 GHz for standalone equipment is used:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})]^*[\sqrt{f(\text{GHz})}] \leq 3.0;$

The max conducted average power is according the equipment (BLE module):

Rated output power:	1.2 mW	0.9 dBm
Tune-up tolerance:	2.00 dB	
Maximum output power:	2.9 dBm	2.0 mW
Antenna gain max:	6 dBi	
Maximum EIRP:	8.9 dBm	7.8 mW
Minimum distance r:	20.0 mm	

Channel frequency (MHz)	A (mW)	Threshold level	Limit 1g	Limit 10g	Margin 1g	Margin 10g
2402	6.2	0.48	3.0	7.5	-2.5	-7.0
2440	5.7	0.45	3.0	7.5	-2.6	-7.1
2480	7.8	0.61	3.0	7.5	-2.4	-6.9

Conclusion: The Threshold level is much lower than the limit, SAR measurement is NOT necessary.

The requirements are **FULFILLED**.

Remarks: None.

6.2 RSS - SAR exemption

6.2.1 Applicable standard

According to RSS-102, item 6.3:

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance 4, 5

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤ 300	45	116	139	163	189
450	32	71	87	104	124
835	21	32	41	54	72
1900	6	10	18	33	57
2450	3	7	16	32	56
3500	2	6	15	29	50
5800	1	5	13	23	32

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤ 300	216	246	280	319	362
450	147	175	208	248	296
835	96	129	172	228	298
1900	92	138	194	257	323
2450	89	128	170	209	245
3500	72	94	114	134	158
5800	41	54	74	102	128

The exemption limits in table 11 Table 11 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 50 mm from a flat phantom, which provides a SAR value of approximately 0.4 W/kg for 1 g of tissue.

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 Table 11 are multiplied by a factor of 5.

6.2.2 Conclusion according RSS-102.

Rated output power:	1.2 mW	0.9 dBm
Tune-up tolerance:	2.00 dB	
Maximum output power:	2.9 dBm	2.0 mW
Antenna gain max:	6 dBi	
Maximum EIRP:	8.9 dBm	7.8 mW
Minimum distance r:	20.0 mm	

Maximum output power at 2450 MHz, **7.8 mW** is < 32 mW;

For the EUT is SAR measurement is NOT necessary

The requirements are **FULFILLED**.

Remarks: None.
