



RF - TEST REPORT

- Human Exposure -

Type / Model Name : BMW FBD5

Product Description : UWB+BLE CAN gateway for comfort access function in vehicles

Applicant : Aumovio Germany GmbH

Address : Siemensstraße 12
93055 REGENBURG, GERMANY

Manufacturer : Aumovio Germany GmbH

Address : Siemensstraße 12
93055 REGENBURG, GERMANY

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

POSITIVE

Test Report No. : **80286794-03 Rev_1**

24. July 2026

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-00



Deutsche
Akkreditierungsstelle
D-PL-12030-01-00

FCC ID: KR5FBD5MY23 IC: 7812D-FBD5MY23

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ATTACHMENT A as separate supplement

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 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310 Radiofrequency radiation exposure limits

Part 1, Subpart 2, Section 2.1091 Radiofrequency radiation exposure evaluation: **mobile devices**.

Part 1, Subpart 2, Section 2.1093 Radiofrequency radiation exposure evaluation: **portable devices**.

KDB 447498 D04 V01 RF Exposure procedures and equipment authorisation policies for mobile and portable devices.

ANSI C95.1: 2005 IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

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 samples. Sample configuration, start-up and operation is carried out by the customer or according to his/her instructions.

2.3 Photo documentation of the EUT – See ATTACHMENT A

2.4 Equipment type, category

BLE device, UWB device, portable equipment

2.5 Short description of the equipment under test (EUT)

The FBD5 is a wireless UWB and BLE transceiver with CAN gateway for comfort access function in vehicles. 2 FBD5 anchors are mounted under the headliner of a vehicle. UWB is used for ranging, BLE for data transfer and security features. 4 further anchors (FBD5s) are mounted at the outer body of a vehicle and provide UWB functionality for ranging purposes. The anchors are connected to a central control unit and paired with a smartphone or wearable ID tag. The FBD5 can also communicate among each other for an initialization procedure. After initialization and training procedure the distance between FBD5 and smartphone or ID tag is measured and the position in relation to the vehicle is determined. The vehicle is unlocked, locked or started in case the smartphone or ID tag is in a permitted area around or inside the vehicle.

Number of tested samples: 1
Serial number: GS141W
Firmware version: 50D2C100_ATIC234

2.6 Variants of the EUT

There are no variants.

2.7 Operation frequency and channel plan

The operating frequency bands are

- 3100 MHz to 10600 MHz (UWB)
- 2400 MHz to 2483.5 MHz BLE.

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2.8 Transmit operating modes

The transmit operation modes are

- for UWB: variable pulse position modulation (PPM) in combination with binary phase shift keying (BPSK).Data rate: 6.8 Mbit/s
- for BLE: GFSK modulation with data rates 500 kbps and 1 Mbps

2.9 Antennas

The following antennas shall be used with the EUT:

UWB

Number	Characteristic	Type	Plug	f-range (GHz)	Max. Gain (dBi)
1	Omni	PCB antenna	none	3.1 – 10.6	5.9
2	Omni	PCB antenna	none	3.1 – 10.6	5.4

BLE

Number	Characteristic	Type	Plug	f-range (GHz)	Max. Gain (dBi)
1	Omni	PCB antenna	none	2.4 - 2.4835	+ 3.3

2.10 Power supply system utilised

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

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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3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
KDB 447498, 7.1	RSS 102, 2.5.2	MPE	not applicable
KDB 447498, 4.3.1	RSS 102, 2.5.1	SAR exclusion consideration	passed
KDB 447498, 7.2	RSS102, 3.2	Co-location, Co-transmission	passed

The mentioned RSS Rule Parts in the above table are related to:
RSS 102, Issue 6, December 2023

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80286794-03	0	22 May 2026	Initial test report
80286794-03	1	24 July 2026	Headline: correction of FCC-ID/IC-ID Section 5.1.5: new BLE power values taken from test report 80286794-02 Rev_1 including new calculations in sections 5.2, 5.3, and 5.4 with correct BLE power values

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

3.2 Final assessment

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

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

Testing commenced on : 13 August 2025

Testing concluded on : 13 August 2025

Checked by:


Klaus
Gegenfurtner
2026.07.24
08:42:51 +02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:


I am the author
of this document
2026.07.24
07:10:58 +02'00'

Franz-Xaver Schrettenbrunner
Radio Team

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTILING
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 HUMAN EXPOSURE

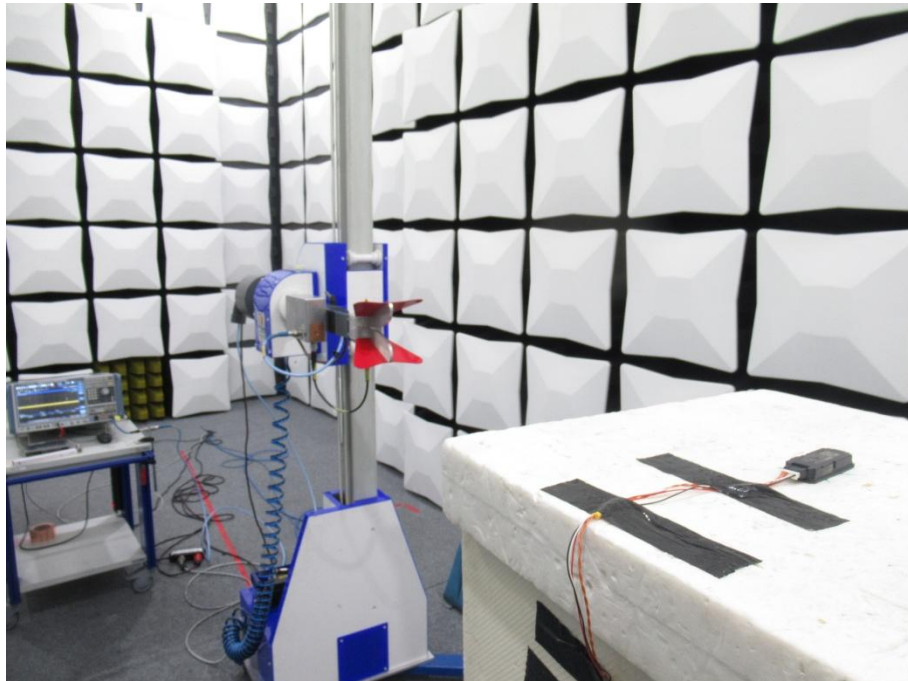
5.1 RF output power

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

5.1.1 Description of the test location (UWB only)

Test location: Fully Anechoic Room FAR1

5.1.2 Photo documentation of the test set-up (UWB only)

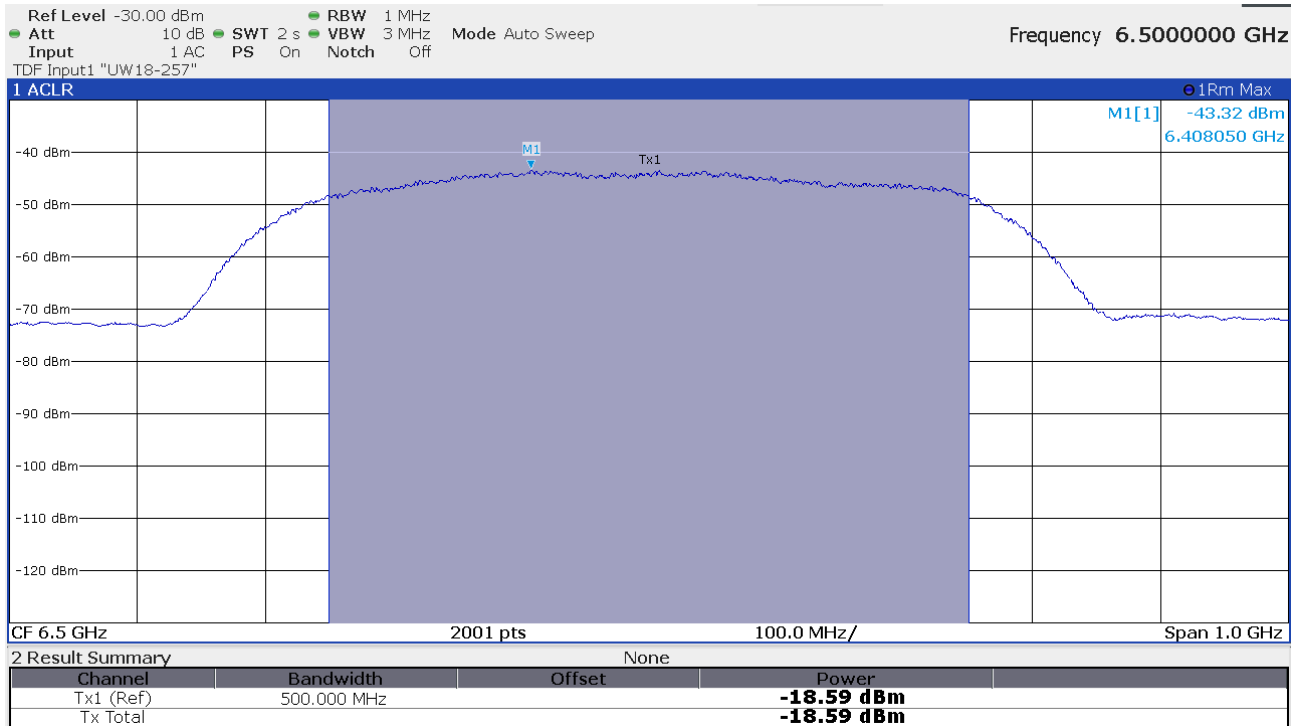
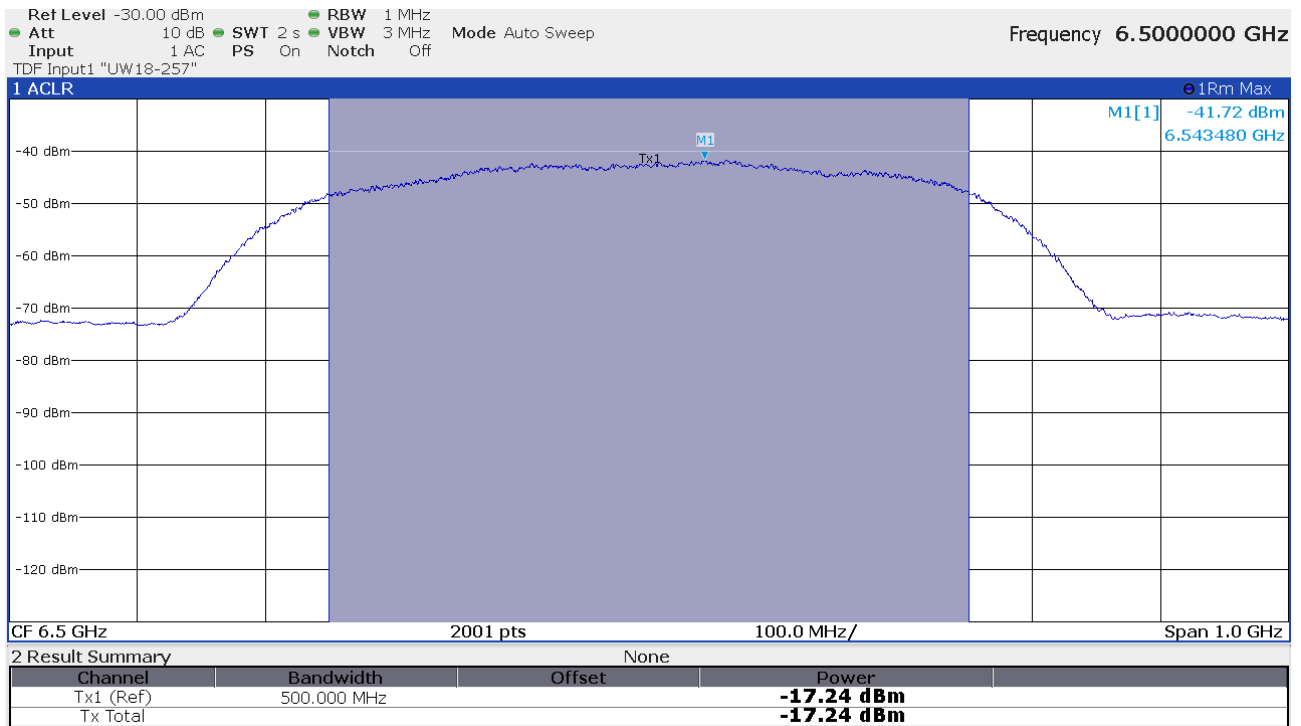


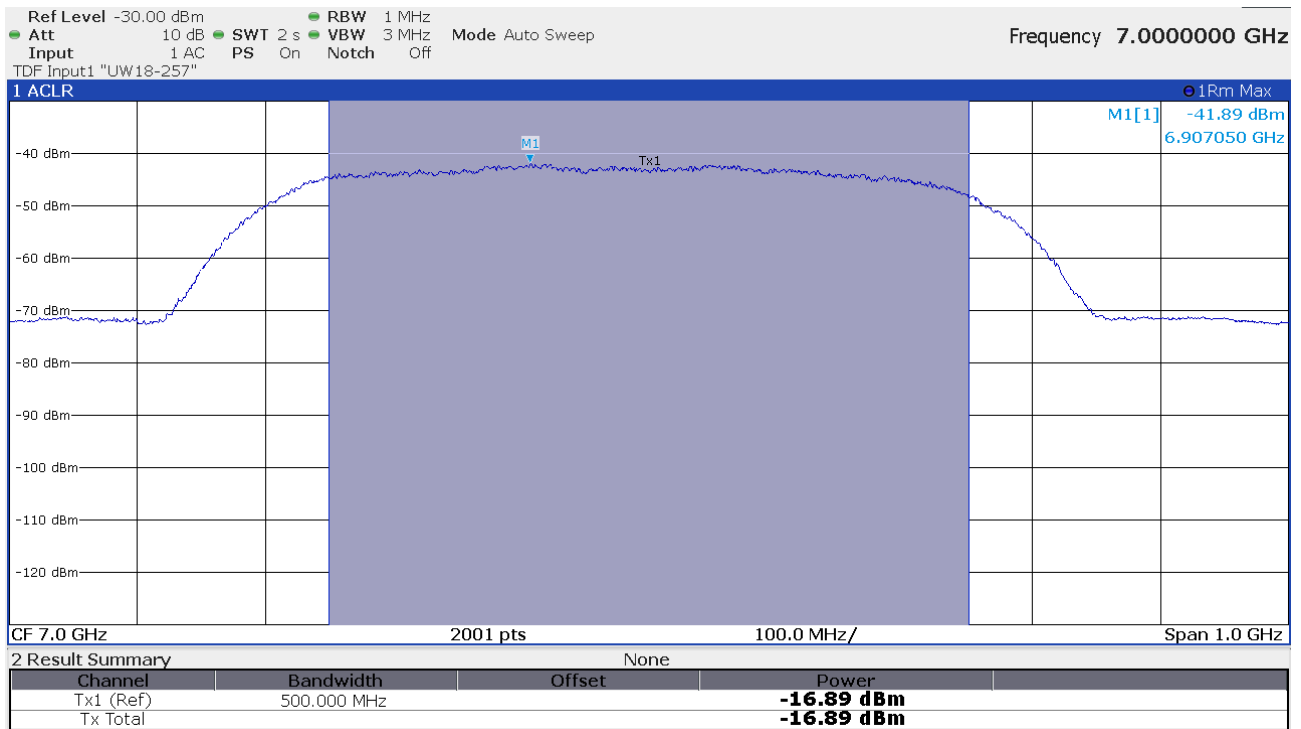
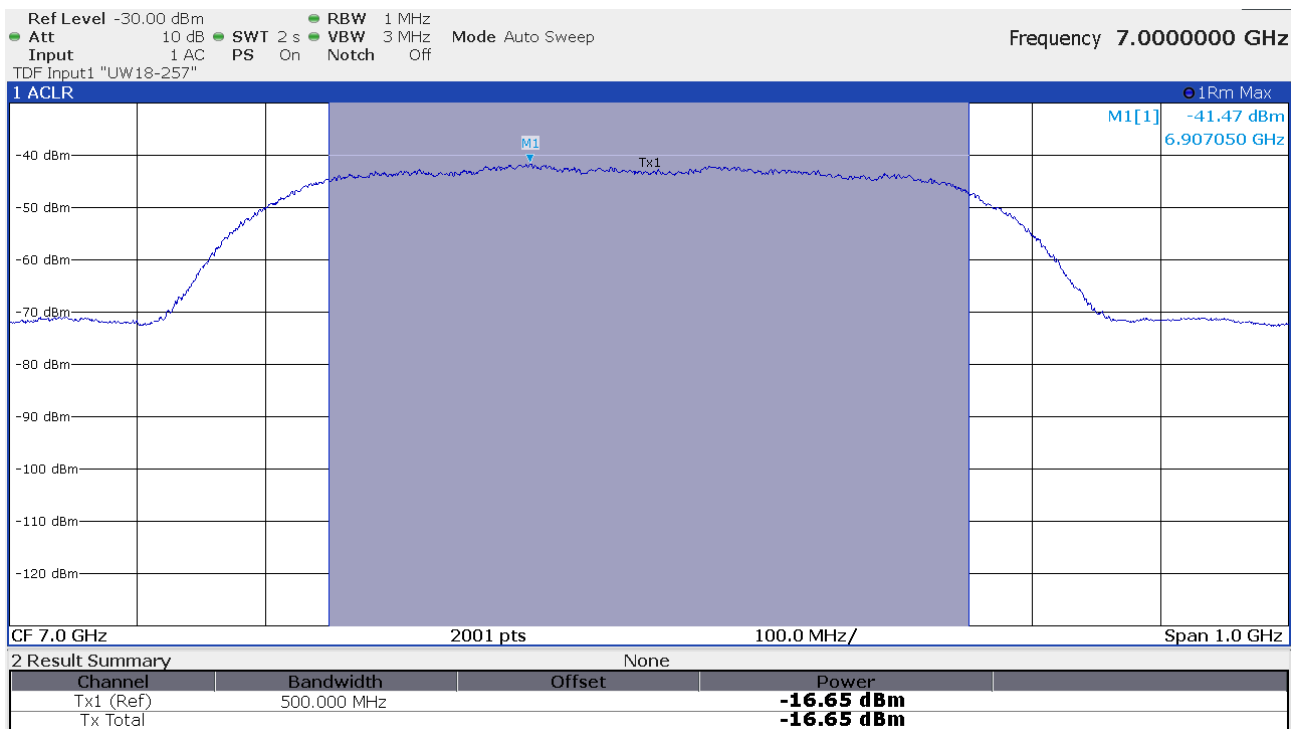
5.1.3 Description of the measurement (UWB only)

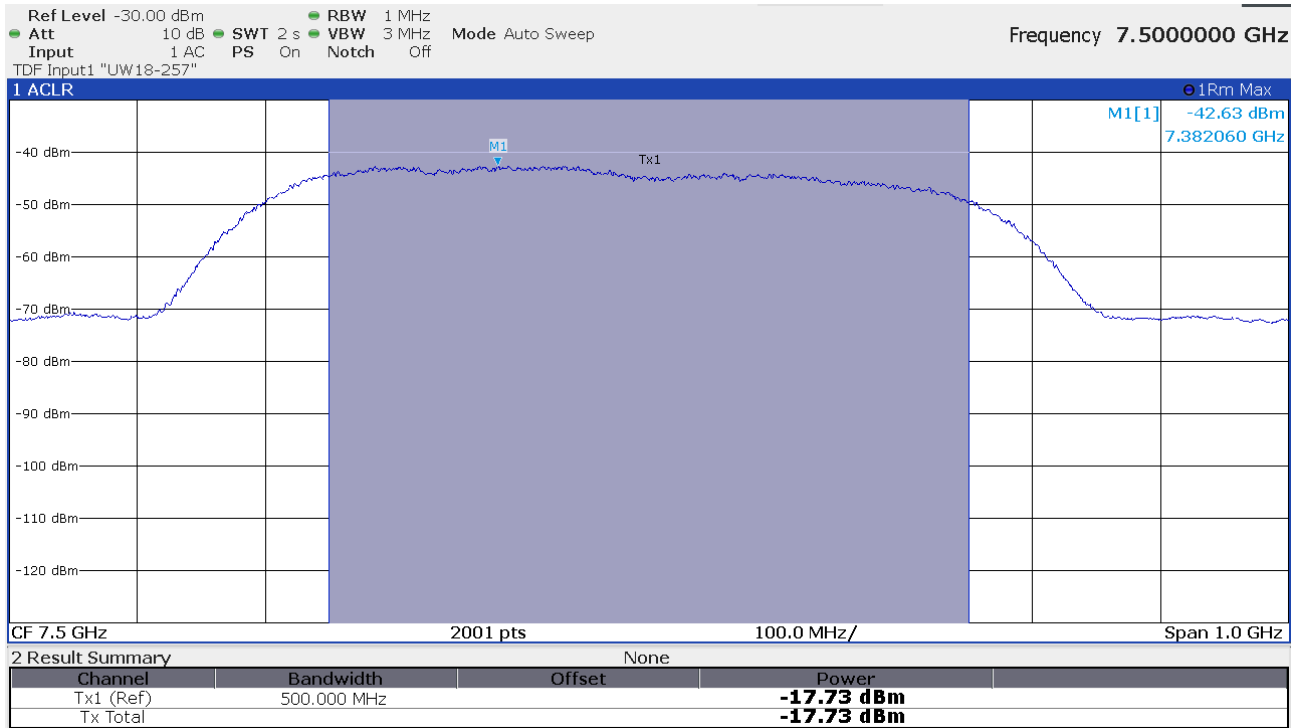
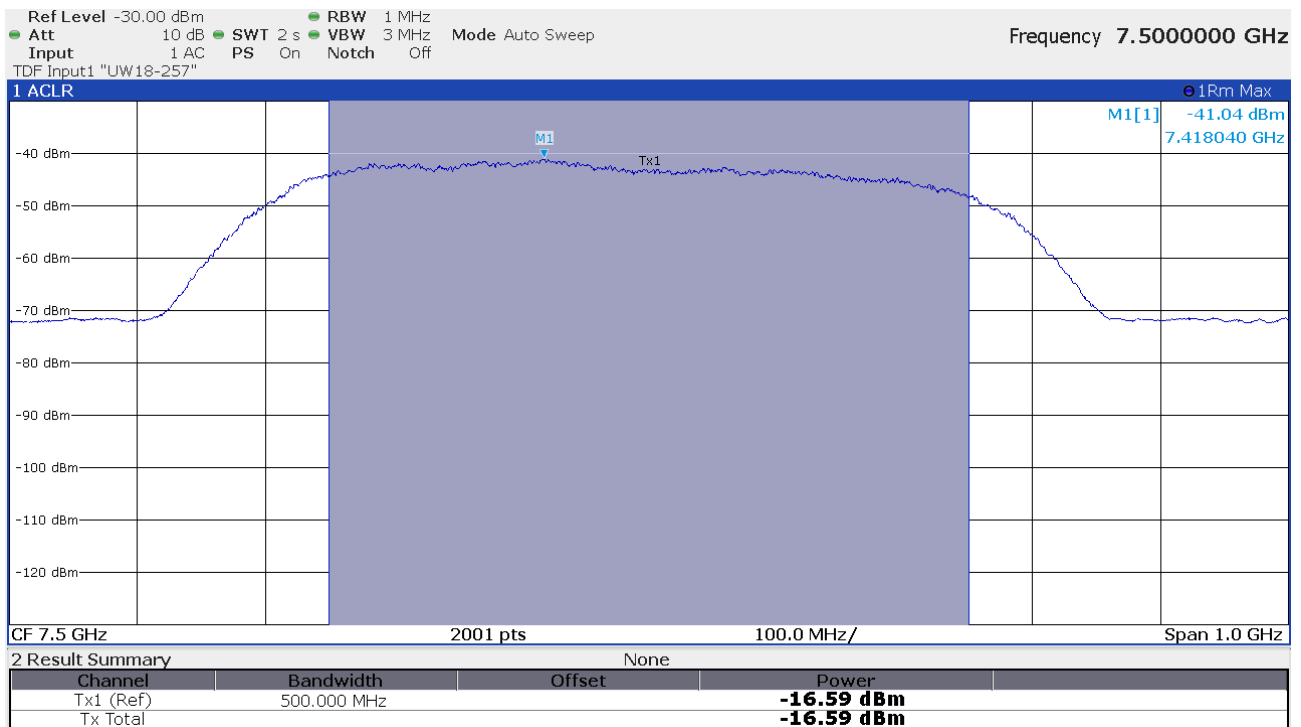
The output power is measured radiated with the channel power function of the spectrum analyser.

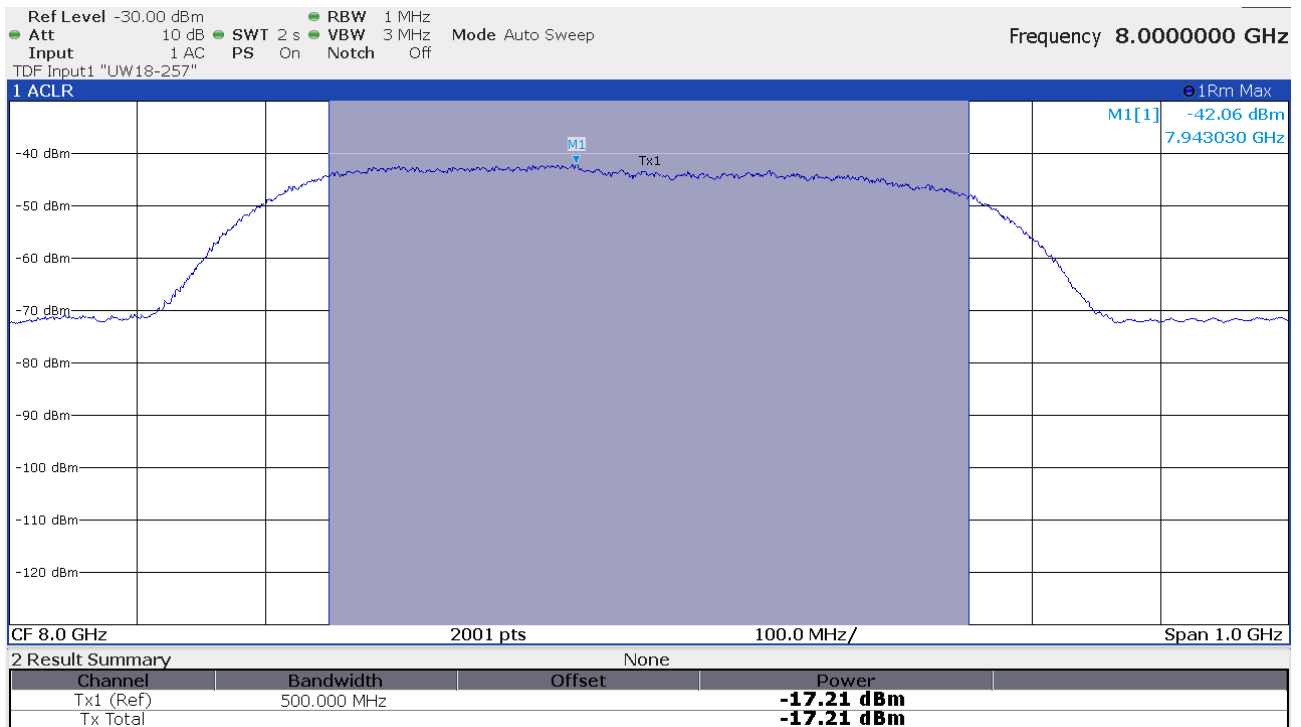
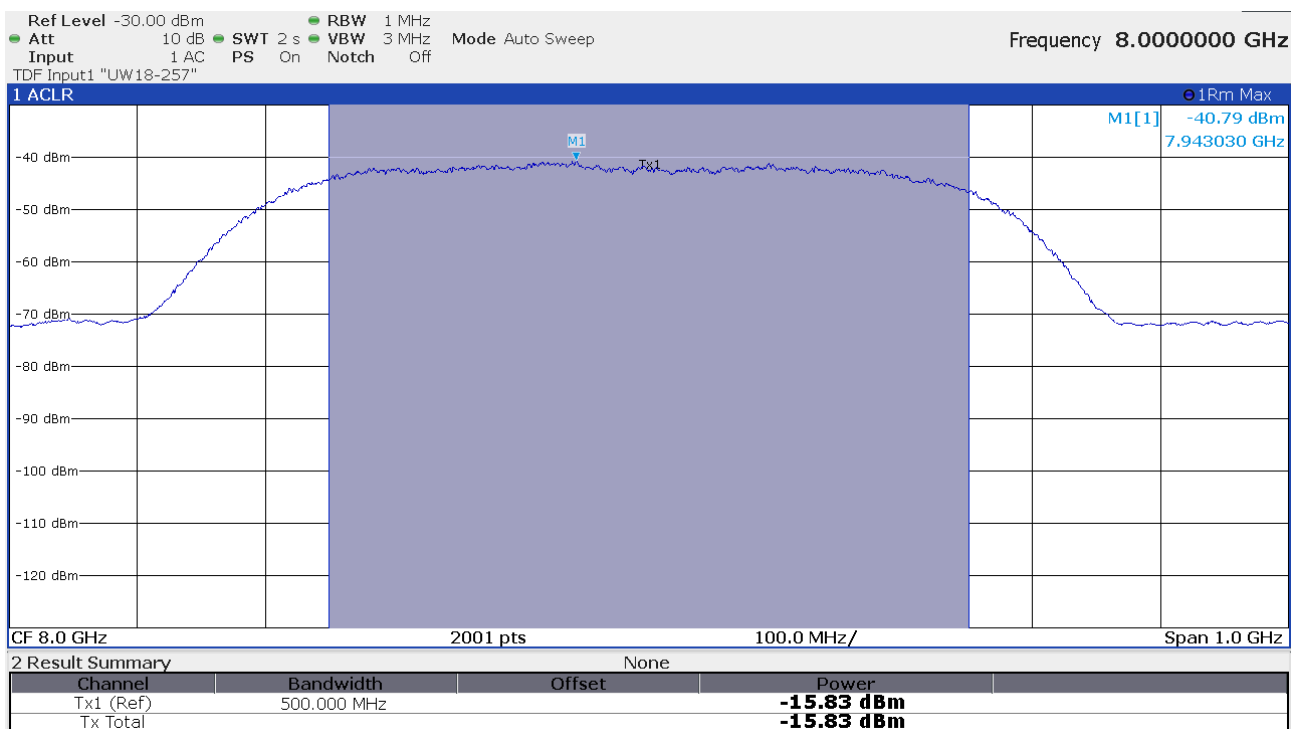
5.1.4 Test result (UWB only)

channel	antenna	EIRP (dBm)	EIRP (μW)
5	1	-18.6	13.8
5	2	-17.2	19.1
6	1	-16.9	20.4
6	2	-16.7	21.4
8	1	-17.7	17.0
8	2	-16.6	21.9
9	1	-17.2	19.1
9	2	-15.8	26.3

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Channel 5 antenna 1

Channel 5 antenna 2


FCC ID: KR5FBD5MY23 IC: 7812D-FBD5MY23
Channel 6 antenna 1

Channel 6 antenna 2


FCC ID: KR5FBD5MY23 IC: 7812D-FBD5MY23
Channel 8 antenna 1

Channel 8 antenna 2


FCC ID: KR5FBD5MY23 IC: 7812D-FBD5MY23
Channel 9 antenna 1

Channel 9 antenna 2


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The maximum radiated output power of the device is taken from the test report

80286794-02 Rev_1

of the accredited test laboratory CSA Group Bayern GmbH, Straubinger Strasse 100, 94447 Plattling, Germany.

Max. conducted output power:	2.8 dBm	1.9 mW
Antenna gain:	3.3 dB	
EIRP:	6.1 dBm	4.1 mW

Remarks: None.

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5.2 RF Exposure Test Exemptions for Single Source according to FCC regulations

5.2.1 Applicable standard

According to KDB 447498 D04 v1, clause 2.1.2 (1-mW Test Exemption)

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

According to KDB 447498 D04 v1, clause 2.1.3 (SAR-Based Exemption)

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions. Accordingly, a RF source is considered an RF exempt device if its available maximum timeaveraged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements and is detailed in Appendix C.

5.2.2 Conclusion according to FCC regulations

UWB

The EUTs maximum output power is **26.3 µW**. Therefore, the EUT qualifies for test exemption according to KDB 447498 (1-mW Test exemption).

BLE

The EUTs maximum output power is **4.1 mW**.

The distance from the radiating structures to the applicant is **at least 10 mm**.

The threshold limit for 2450 MHz at 10 mm is **10 mW**.

Therefore, the EUT qualifies for test exemption according to KDB 447498 (SAR-Based exemption).

The requirements are **FULFILLED**.

Remarks:

None.

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5.3 RF Exposure Test Exemptions for Single Source according to ISED regulations

5.3.1 Applicable standard

According to RSS-102 issue 6, clause 6.5 (IPD exemption limit)

A transmitter producing emissions in the 6GHz -30 GHz frequency range (i.e. where the occupied bandwidth (99% emission bandwidth) is fully contained within this range) is exempt from routine IPD evaluation if the output power (adjusted for tune-up tolerance) is less than or equal to 1 mW (0 dBm).

According to RSS-102 issue 6, clause 6.3 (SAR exemption limit)

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

5.3.2 Conclusion according to ISED regulations

UWB

The EUTs maximum output power is **26.3 μ W**. The EUT is a single source transmitter. According to RSS-220 test report 80286794au-01 of the accredited test laboratory CSA Group Bayern GmbH, Straubinger Strasse 100, 94447 Plattling, Germany, the 99% bandwidth of the transmitter is fully contained between 6 GHz and 30 GHz. Therefore, the EUT qualifies for test exemption according to RSS-102 (IPD exemption limit).

BLE

The EUTs maximum output power is **4.1 mW**.

The distance from the radiating structures to the applicant is **at least 10 mm**.

The threshold limit for 2450 MHz at 10 mm is **7 mW**.

Therefore, the EUT qualifies for test exemption according to RSS-102 (SAR exemption limit).

The requirements are **FULFILLED**.

Remarks: None.

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5.4 RF Exposure Test Exemptions for Multiple Source

The limits vary with frequency. Therefore, in mixed or broadband RF fields where several sources and frequencies are involved, the fraction of the recommended limit incurred within each frequency interval should be determined, and the sum of all fractional contributions should not exceed 1.0, or 100 % in terms of percentage.

5.4.1 Determination according to FCC

RF type	Exemption type	EIRP	Threshold limit	fraction
UWB	1-mW	26.3 μ W	1 mW	2.6 %
BLE	SAR	4.1 mW	10 mW	41.0 %
Sum of exposure ratios				43.6 %

The sum of exposure ratios 43.6 % is below the value of 1.

5.4.2 Determination according to ISED:

RF type	Exemption type	EIRP	Threshold limit	fraction
UWB	IPD	26.3 μ W	1 mW	2.6 %
BLE	SAR	4.1 mW	7 mW	58.6 %
Sum of exposure ratios				61.2 %

The sum of exposure ratios 61.2 % is below the value of 1.

The requirements are **FULFILLED**.

Remarks: None.

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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.
HE	ESW26	02-02/03-17-002	25/04/2026	25/04/2025		
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	3117	02-02/24-20-007	20/11/2025	20/11/2024		
	BAM 4.5-P	02-02/50-17-024				
	KK-SF106-2X11N-6,5M	02-02/50-18-016				
	0_5 Meter DC-18GHz	09-16/50-23-003				

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