



## TEST REPORT

Test report no.: 1-6411-23-01-11\_TR1-R01



### Testing laboratory

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#### **Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12047-01-00

### Applicant

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### Manufacturer

#### **Continental Automotive Technologies GmbH**

Heinrich-Hertz-Str. 45

78052 Villingen-Schwenningen / GERMANY

### Test standard/s

ETSI EN 301 893 V2.1.1 5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

For further applied test standards please refer to section 3 of this test report.

### Test Item

**Kind of test item:** Connected Infotainment Box / ConneCtivity Unit

**Model name:** CIBCCU3

**Frequency:** 5150 MHz to 5250 MHz

**Technology tested:** WLAN

**Antenna:** Integrated antenna

**Power supply:** 12.0 V DC by external power supply

**Temperature range:** -30°C to +70°C

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### Test report authorized:



Marco Bertolino  
Supervisor Radio Services  
Radio Labs

### Test performed:



Andreas Curette  
Lab Manager  
Radio Labs

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## 2 General information

### 2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. cetecom advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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In no case this test report can be considered as a Letter of Approval.

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

Date of receipt of order:	2024-05-27
Date of receipt of test item:	2024-10-07
Start of test:*	2024-10-07
End of test:*	2025-04-04
Person(s) present during the test:	-/-

\*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

### 2.3 Test laboratories sub-contracted

None

## 3 Test standard/s

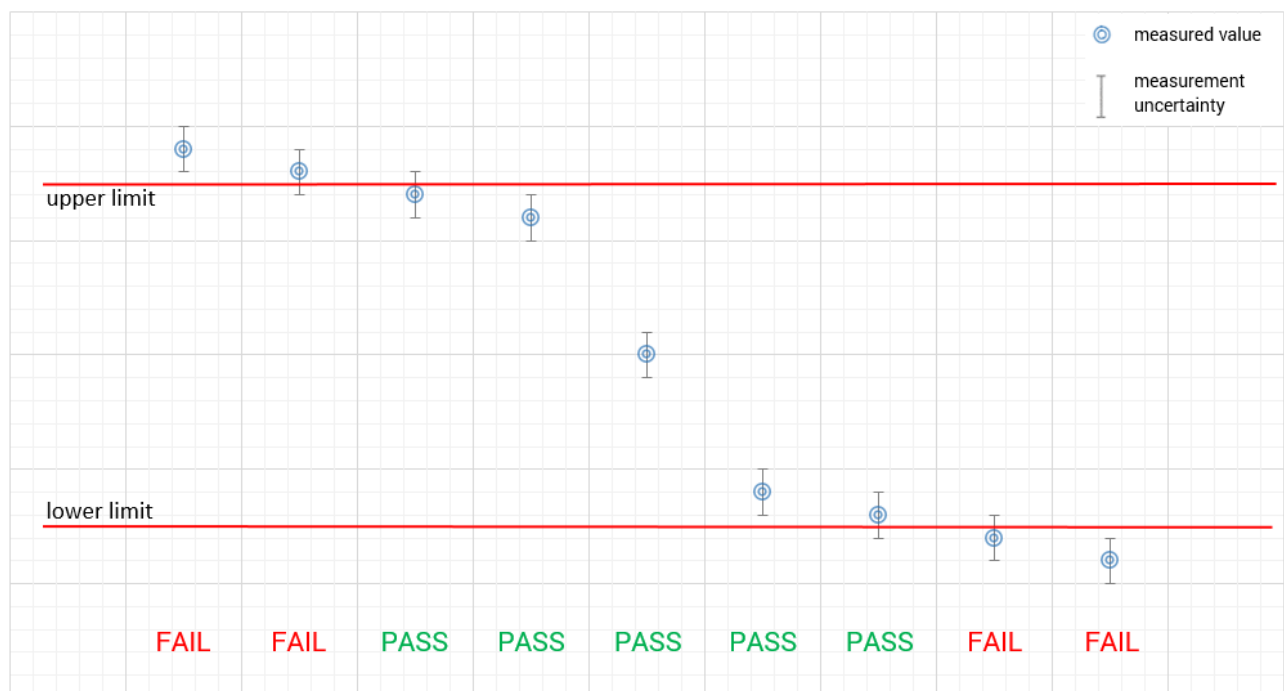
Test standard	Date	Description
ETSI EN 301 893 V2.1.1	2017-05	5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

#### 4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.

The measurement uncertainty is mentioned in this test report, see chapter 8, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."

measured value, measurement uncertainty, verdict



## 5 Test environment

Temperature	:	$T_{nom}$ $T_{max}$ $T_{min}$	+22 °C during room temperature tests Testing under extreme temperature conditions not performed. Testing under extreme temperature conditions not performed.
Relative humidity content	:		55 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	$V_{nom}$ $V_{max}$ $V_{min}$	12.0 V DC by external power supply Testing under extreme voltage conditions not required. Testing under extreme voltage conditions not required.

## 6 Test item

### 6.1 General description

Kind of test item	:	Connected Infotainment Box / ConneCtivity Unit
Model name:	:	CIBCCU3
S/N serial number	:	Rad. 24241640001000000 (Sample 1) Cond. 24322250002000000 (Sample 4)
Hardware status	:	AAA2426300400
Software status	:	SP32
Frequency band	:	5150 MHz to 5250 MHz
Type of radio transmission	:	OFDM
Use of frequency spectrum	:	
Type of modulation	:	BPSK, QPSK, 16 – QAM, 64 – QAM
Number of channels	:	4 (20 MHz) 2 (40 MHz) 1 (80 MHz)
Channel bandwidth (B)	:	20 MHz, 40 MHz, 80 MHz
Channel spacing	:	20 MHz
Receiver category	:	1
Antenna	:	Integrated antenna
Power supply	:	12.0 V DC by external power supply
Temperature range	:	-30°C to +70°C

### 6.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report:

1-6411-23-01-01\_TR1-A101-R01  
1-6411-23-01-01\_TR1-A102-R01  
1-6411-23-01-01\_TR1-A103-R01

## 7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

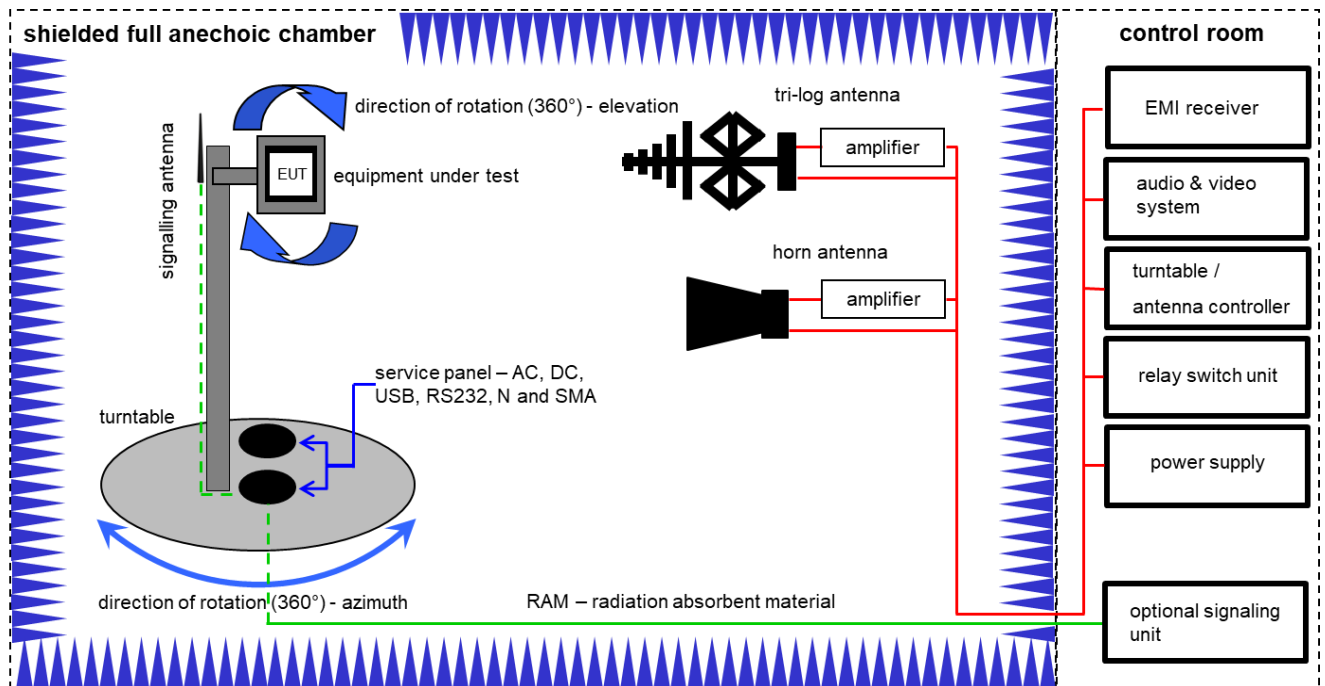
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

### Agenda: Kind of Calibration

k/cal	calibration / calibrated	EK	limited calibration
Ne/cnn	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
Ev/chk	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlk!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress
cpu	check prior usage		

## 7.1 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter

$$OP = AV + D - G + CA$$

(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

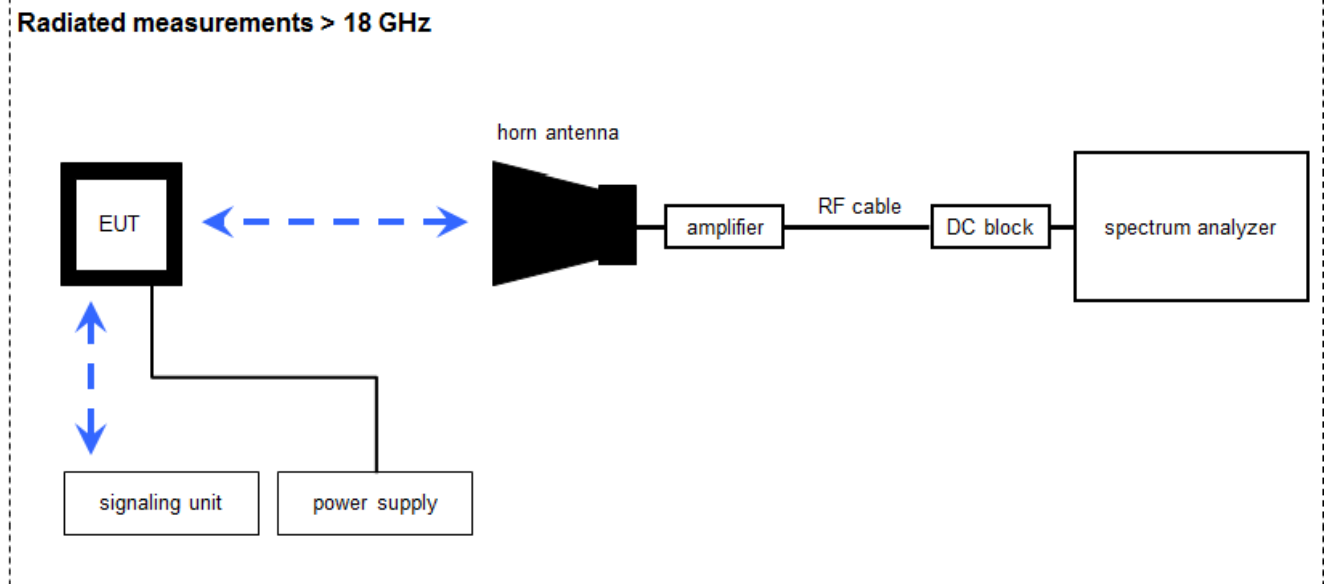
### Example calculation:

$$OP \text{ [dBm]} = -65.0 \text{ [dBm]} + 50 \text{ [dB]} - 20 \text{ [dBi]} + 5 \text{ [dB]} = -30 \text{ [dBm]} \text{ (1 } \mu\text{W)}$$

### Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	10.10.2023	31.10.2025
2	A, B	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	01029	300005379	vIKI!	09.10.2023	31.10.2025
3	A, B	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
4	A, B	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
5	A	High Pass Filter	VHF-3500+	Mini Circuits	-/-	400000193	ne	-/-	-/-
6	A, B	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	19	300003790	ne	-/-	-/-
7	A, B	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
8	A, B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
9	A, B	NEXIO EMV-Software	BAT EMC V2022.0.32.0	Nexio	-/-	300004682	ne	-/-	-/-
10	A, B	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011572	300005241	ev	-/-	-/-
11	A, B	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	11.12.2023	31.12.2024
12	A, B	Power Supply	HMP2020	Rohde & Schwarz	120579	300006406	k	10.12.2024	10.12.2025
								02.05.2023	31.05.2025
13	A	Band Reject Filter	Band Reject Filter WRCJV12-5120-5150-5350-5380-40SS	Wainwright Instruments GmbH / Andechs	8	40403	cpu	-/-	-/-

## 7.2 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

FS = UR + CA + AF

(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

Example calculation:

FS [dB $\mu$ V/m] = 40.0 [dB $\mu$ V/m] + (-60.1) [dB] + 36.74 [dB/m] = 16.64 [dB $\mu$ V/m] (6.79  $\mu$ V/m)

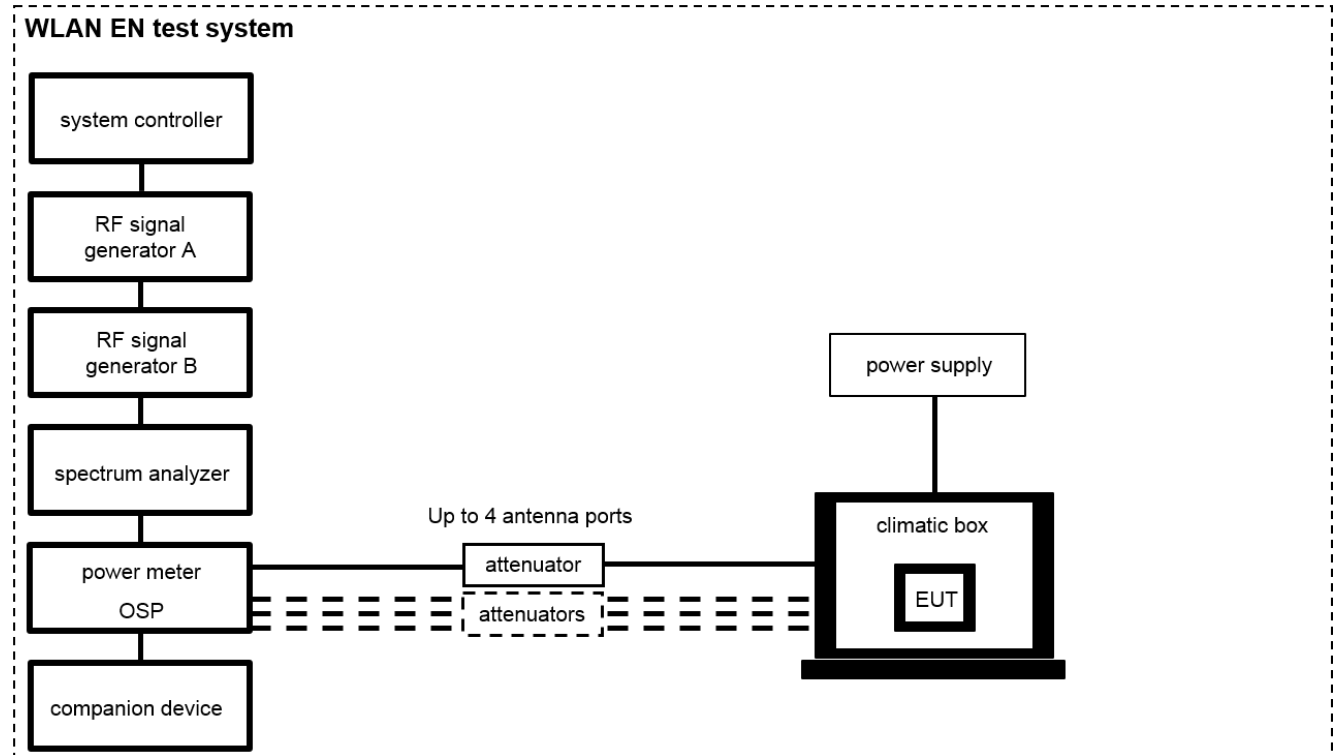
**Equipment table:**

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Signal analyzer	Signal analyzer FSV40	Rohde & Schwarz Messgerätebau GmbH / Memmingen	101042	40292	cal	09.12.2024	09.12.2025
2	A	RF-Cable	RF-Cable ST18/SMAM/SMAM /72	Huber & Suhner GmbH / Unterhaching	Batch no. 699714	40389	cpu	-/-	-/-
3	A	DC-Blocker 0.1-40 GHz	DC-Blocker 0.1-40 GHz 8141A	MEC Import: Inmet	-/-	40390	cpu	-/-	-/-
4	A	Broadband LNA 18-50 GHz	Broadband LNA 18-50 GHz CBL18503070PN	MEC Import: CERNEX	25240	40073	chk	22.04.2024	22.04.2026
5	A	Std. Gain Horn Antenna 18.0-26.5 GHz	Std. Gain Horn Antenna 18.0-26.5 GHz 638	Narda Microwave	8205	40085	cal	24.01.2024	31.01.2026



### 7.3 Conducted measurements WLAN EN test system

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the companion device, the other one is connected to the spectrum analyzer. The losses for all signal paths are first checked within a calibration. The measurement readings on the signaling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signaling unit and the spectrum analyzer are impedance matched on 50 Ohm.



#### Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	EMC-Software TS8997	WMS32 V12.00; K971, -K972, -K973, -K975	Rohde & Schwarz	101467,100770, 100766,-842	300004834	ne	-/-	-/-
2	A	RF-Cable WLAN-Tester Port 1	ST18/SMAm/SMAm /48	Huber & Suhner	Batch no. 1273777	400001249	ev	-/-	-/-
3	A	Open Switch and Control Unit and Power Sensors	OSP120 incl. B157 W8 Plus	Rohde & Schwarz	101115, 100837	300006329	k	13.12.2023 04.12.2024	31.12.2024 04.12.2025
4	A	Rack mounted PC	Precision 3930 Rack-Workstation i5-9500 CTO	Dell	J15D873	300006115	ne	-/-	-/-

## 8 Measurement uncertainty

Measurement uncertainty	
Test case	Uncertainty
Antenna gain	$\pm 3$ dB
Carrier frequencies	$\pm 5$ ppm
Occupied BW (20MHz Ref BW)	2.24 E+05 Hz
RF output power and transmit power control (TPC, conducted)	$\pm 0.349$ dB
Power Timing (HW Timing Error)	$< 500$ ns
Power density	$\pm 0.22$ dB
Transmitter unwanted emissions ( $< 7$ GHz)	$\pm 1.65$ dB
Transmitter unwanted emissions ( $> 7$ GHz)	$\pm 2.59$ dB
Transmitter unwanted emissions outside the 5 GHz RLAN bands (radiated)	$\pm 3$ dB (30 MHz to 1 GHz) $\pm 3.7$ dB (1 GHz to 12.75 GHz) $\pm 4.5$ dB (above 12.75 GHz)
Transmitter unwanted emissions within the 5 GHz RLAN bands (conducted)	$\pm 1.65$ dB
Adaptivity	$\pm 1$ dB
Receiver spurious emissions (conducted)	$\pm 1.39$ dB ( $< 7$ GHz) $\pm 2.59$ dB ( $> 7$ GHz)
Receiver spurious emissions (radiated)	$\pm 3$ dB (30 MHz to 1 GHz) $\pm 3.7$ dB (1 GHz to 12.75 GHz) $\pm 4.5$ dB (above 12.75 GHz)
Frequency accuracy (radar burst)	6 Hz
Level accuracy (radar burst)	$\pm 0.8$ dB
Level accuracy (Blocking Signal)	$\pm 1.24$ dB
Level accuracy (Wanted Signal)	$\pm 1.06$ dB

## 9 Summary of measurement results

<input type="checkbox"/>	No deviations from the technical specifications were ascertained
<input type="checkbox"/>	There were deviations from the technical specifications ascertained
<input checked="" type="checkbox"/>	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC identifier	Description	Verdict	Date	Remark
RF testing	ETSI EN 301 893 V2.1.48 (2022-06)	See table!	2025-05-26	Reduced test plan according customer specifications.

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	C	NC	NA	NP	Remark
-/-	antenna gain	nominal	nominal	OFDM	-/-				Declared by Manufacturer
-/-	power verification (conducted)	nominal	nominal	OFDM	-/-				Declared by Manufacturer
5.4.2	carrier frequencies	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
		low	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
		high	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.3	occupied channel bandwidth	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.4	RF output power & transmit power control	nominal	nominal	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
		low	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
		high	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.4	power density	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.5	transmit unwanted emissions outside transmitter's operating bands	nominal	nominal	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
5.4.6	transmit unwanted emissions within transmitter's operating bands	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.7	receiver spurious emissions	nominal	nominal	RX / idle - mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
5.4.8	dynamic frequency selection (DFS)	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-/-
5.4.9	adaptivity (channel access mechanism)	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.10	Receiver blocking	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
5.4.11	Adjacent channel selectivity	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*1
5.4.12	User Access Restrictions	nominal	nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-

### Note:

C Compliant

NC Not compliant

\*1 See manufacturers declaration

NA Not applicable

NP Not performed

## 10 Additional comments

Reference documents: CIB-CCU3\_Measurements\_C0 sample\_Information for homologation.pptx  
CIBCCU3\_Homologation instructions.pdf

Special test descriptions: None

Configuration descriptions: Settings used for measurements:

Test mode:	Data rate:	Power setting lower sub band
a-mode	6 Mbit/s	6
nHT20-mode	MCS0	6
nHT40-mode	MCS0	6
ac80-mode	MCS0	6

- EUT selection:
- ☐ Only one device available
  - ☐ Devices selected by the customer
  - ☒ Devices selected by the laboratory (Randomly)

Provided channels:

Channels with 20 MHz channel bandwidth:

Lower sub-band (5150 MHz to 5350 MHz) Channel number & Center frequency								
Channel	<b>36</b>	40	44	<b>48</b>	52	56	60	64
f <sub>c</sub> / MHz	<b>5180</b>	5200	5220	<b>5240</b>	5260	5280	5300	5320

Channels with 40 MHz channel bandwidth:

Lower sub-band (5150 MHz to 5350 MHz) Channel number & Center frequency				
Channel	<b>38</b>	<b>46</b>	54	62
f <sub>c</sub> / MHz	<b>5190</b>	<b>5230</b>	5270	5310

Channels with 80 MHz channel bandwidth:

Lower sub-band (5150 MHz to 5350 MHz) Channel number & Center frequency		
Channel	<b>42</b>	58
f <sub>c</sub> / MHz	<b>5210</b>	5290

Note: The channels used for the tests were marked in bold in the list.

Measurement table according to EN 301 893		Test frequencies / MHz		
		Lower sub-band		Higher sub-band
Test	Clause	5150 to 5250	5250 to 5350	5470 to 5725
Center frequencies	5.4.2	C7 (see note 1)		C8 (see note 1)
Occupied Channel Bandwidth	5.4.3	C7		C8
Power, Power Density	5.4.4	C1	C2	C3, C4
Transmitter unwanted emissions outside the 5 GHz RLAN bands	5.4.5	C7 (see note 1)		C8 (see note 1)
Transmitter unwanted emissions within the 5 GHz RLAN bands	5.4.6	C1	C2	C3, C4
Receiver spurious emissions	5.4.7	C7 (see note 1)		C8 (see note 1)
Transmit Power Control (TPC)	5.4.4	n.a. (see note 2)	C2 (see note 1)	C3, C4 (see note 1)
Dynamic Frequency Selection (DFS)	5.4.8	n.a. (see note 2)	C5	C6 (see note 3)
Adaptivity	5.4.9	C9		
Receiver Blocking	5.4.10	C7		C8
C1, C3:	The lowest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.			
C2, C4:	The highest declared channel for every declared nominal channel bandwidth within this band. For the power density testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth.			
C5, C6:	One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth.			
C7, C8:	One channel out of the declared channels for this sub-band. For <i>Occupied Channel Bandwidth</i> , testing shall be repeated for every declared <i>Nominal Channel Bandwidth</i> within this sub-band.			
C9	One channel (in case of single-channel testing) or a group of channels (in case of multi-channel testing) out of the declared channels.			
NOTE 1	In case of more than one channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans.			
NOTE 2	Testing is not required for nominal channel bandwidths that fall completely within the frequency range 5 150 MHz to 5250 MHz.			
NOTE 3	Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5 600 MHz to 5 650 MHz band, the tests for the Channel Availability Check (and where implemented, for the Off-Channel CAC) shall be performed on one of these channels in addition to a channel within the band 5 470 MHz to 5 600 MHz or within the band 5 650 MHz to 5 725 MHz.			

## 11 Additional EUT parameter

- Test mode:
- ☐ Iperf was used to ping another device with the largest support packet size (Adaptivity, Blocking)
  - ☒ Test mode available  
Special software is used.  
EUT is transmitting pseudo random data by itself
- Modulation types:
- ☒ Wide Band Modulation (OFDM)
  - ☐ Proprietary RF system
- Antennas and transmit operating modes:
- ☒ Operating mode 1 (single antenna)
    - *Equipment with 1 antenna,*
    - *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
    - *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*
  - ☐ Operating mode 2 (multiple antennas, no beamforming)
    - *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*
  - ☐ Operating mode 3 (multiple antennas, with beamforming)
    - *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.  
In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.*
- DFS:
- ☐ Master devices with radar detection
  - ☐ Client devices with radar detection
  - ☒ Client devices without radar detection

- Transmit Power Control (TPC): ☒ Yes  
☐ No
- Adaptive equipment: ☒ Yes  
☐ Yes (but can be disabled)  
☐ No
- User Access Restrictions (4.2.9): ☒ The equipment should not allow the user to change the country of operation and/or the operating frequency band if that results in the equipment no longer being compliant with the DFS requirements.  
☒ The equipment should not accept software and/or firmware which results in the equipment no longer being compliant with the DFS requirements, e.g.:  
software and/or firmware provided by the manufacturer but intended for other regulatory regimes;  
- modified software and/or firmware where the software and/or firmware is available as open source code;  
- previous versions of the software and/or firmware (downgrade)
- Geo-location capability (4.2.10): ☒ No geo-location capability provided  
☐ Geo-location capability provided by not accessible to the user (customer declaration)

## 12 Transmitter test results

### 12.1 Antenna gain

Maximum antenna gain: 5.2 dBi (as declared by the manufacturer)

**Result:**

OFDM	Antenna gain	
Channel & Sub band	Lower sub band	
	Lowest channel - 5180 MHz	Highest channel - 5240 MHz
declared antenna gain	5.2	



## 12.2 RF output power and transmit power control (TPC)

### Description:

The RF output power is the mean equivalent isotropically radiated power (EIRP) during a transmission burst.

### Measurement:

Measurement parameters
The measurement was performed with the R&S measurement system TS8997 in combination with a FSV spectrum analyser and the EMC32 software package.
Measurement uncertainty: See sub clause 8
Test setup: chapter 7.3 - A

### Limits:

#### Mean E.I.R.P. limits for RF output power at the highest power level:

Frequency range (MHz)	Mean EIRP (dBm)	
	with TPC	without TPC
5 150 to 5 350	23	20 / 23 (see note 1)
5 470 to 5 725	30 (see note 2)	27 (see note 2)
5 725 to 5 850	23	20
NOTE 1:	The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 23 dBm.	
NOTE 2:	Slave devices without a Radar Interface Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.	

#### Mean E.I.R.P. limits for RF output power at the lowest power level:

Frequency range (MHz)	Mean EIRP (dBm)
5 250 to 5 350	17
5 470 to 5 725	24 (see note)
5 725 to 5 850	17
NOTE:	Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

**Results:**

OFDM / a – mode

Test conditions			Mean EIRP [dBm]					
			5180 MHz	5240 MHz	5500 MHz	5700 MHz	5745 MHz	5825 MHz
T <sub>nom</sub>	V <sub>nom</sub>	low TPC	-/-	-/-				
		high TPC	13.1	13.9				

OFDM / n &amp; ac HT20 – mode

Test conditions			Mean EIRP [dBm]					
			5180 MHz	5240 MHz	5500 MHz	5700 MHz	5745 MHz	5825 MHz
T <sub>nom</sub>	V <sub>nom</sub>	-/-	-/-	-/-				
		high TPC	12.9	13.7				

OFDM / n &amp; ac HT40 – mode

Test conditions			Mean EIRP [dBm]					
			5190 MHz	5230 MHz	5510 MHz	5670 MHz	5755 MHz	5795 MHz
T <sub>nom</sub>	V <sub>nom</sub>	low TPC	-/-	-/-				
		high TPC	12.8	13.7				

OFDM / ac VHT80 – mode

Test conditions			Mean EIRP [dBm]			
			5210 MHz	5290 MHz	5530 MHz	5610 MHz
T <sub>nom</sub>	V <sub>nom</sub>	low TPC	-/-			
		high TPC	12.8			

### 12.3 Transmitter unwanted emissions outside the 5 GHz RLAN bands (radiated)

#### Measurement:

The spurious emission measurement is used to detect spurious emissions from the equipment under test. The measurement is performed according to the EN specification 5.4.5.2.2.

Measurement parameters	Pre-scan < 1 GHz / ≥ 1 GHz
Detector:	Peak
Sweep points:	≥9970 / ≥25000
Resolution bandwidth:	100 kHz / 1 MHz
Video bandwidth:	300 kHz / 3 MHz
Sweep time:	1s / 100 MHz
Trace mode:	Max Hold
Measurement uncertainty:	See sub clause 8

Measurement parameters	Identified emissions < 1 GHz / ≥ 1 GHz
Detector:	RMS
Sweep points:	5000
Resolution bandwidth:	100 kHz / 1 MHz
Video bandwidth:	300 kHz / 3 MHz
Span:	Zero Span
Trace mode:	Clear / Write
Measurement uncertainty:	See sub clause 8
Test setup:	chapter 7.1 A & 7.2 A

Measured Modulation: ☒ a – mode ☐ n HT 20 – mode ☒ n HT 40 – mode ☒ ac VHT 80 – mode

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

#### Limits:

Frequency range [MHz]	Limit [dBm]	Bandwidth
30 to 47	-36	100 kHz
47 to 74	-54	100 kHz
74 to 87.5	-36	100 kHz
87.5 to 118	-54	100 kHz
118 to 174	-36	100 kHz
174 to 230	-54	100 kHz
230 to 470	-36	100 kHz
470 to 862	-54	100 kHz
862 to 1 000	-36	100 kHz
1 000 to 5 150	-30	1 MHz
5 350 to 5 470	-30	1 MHz
5 725 to 26 000	-30	1 MHz

**Results:** OFDM / a – mode

Spurious emissions level							
Lowest channel 5180 MHz				Highest channel 5700 MHz			
f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]	f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]
All emissions > 6dB below limit.				All emissions > 6dB below limit.			

**Results:** OFDM / n HT40 – mode,

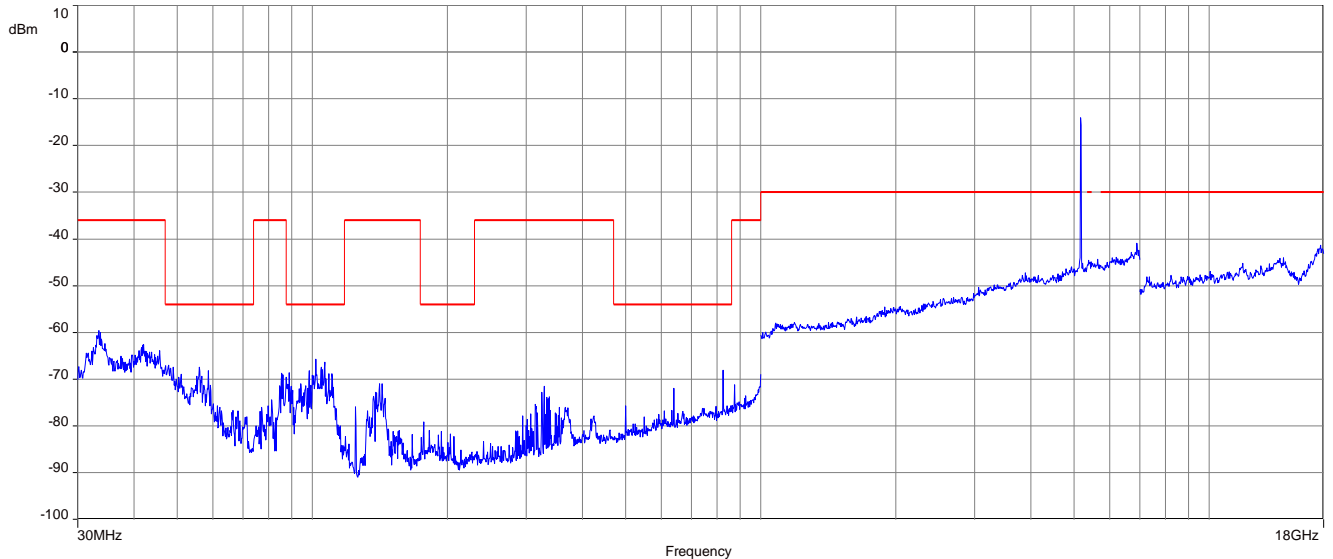
Spurious emissions level							
Lowest channel 5190 MHz				Highest channel 5670 MHz			
f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]	f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]
All emissions > 6dB below limit.				All emissions > 6dB below limit.			

**Results:** OFDM / ac VHT80 – mode

Spurious emissions level							
Lowest channel 5210 MHz				Highest channel 5610 MHz			
f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]	f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]
6947	-41.9	-30.0	11.9				
All emissions > 6dB below limit.				All emissions > 6dB below limit.			

**Plot:** OFDM / a – mode up to 18 GHz

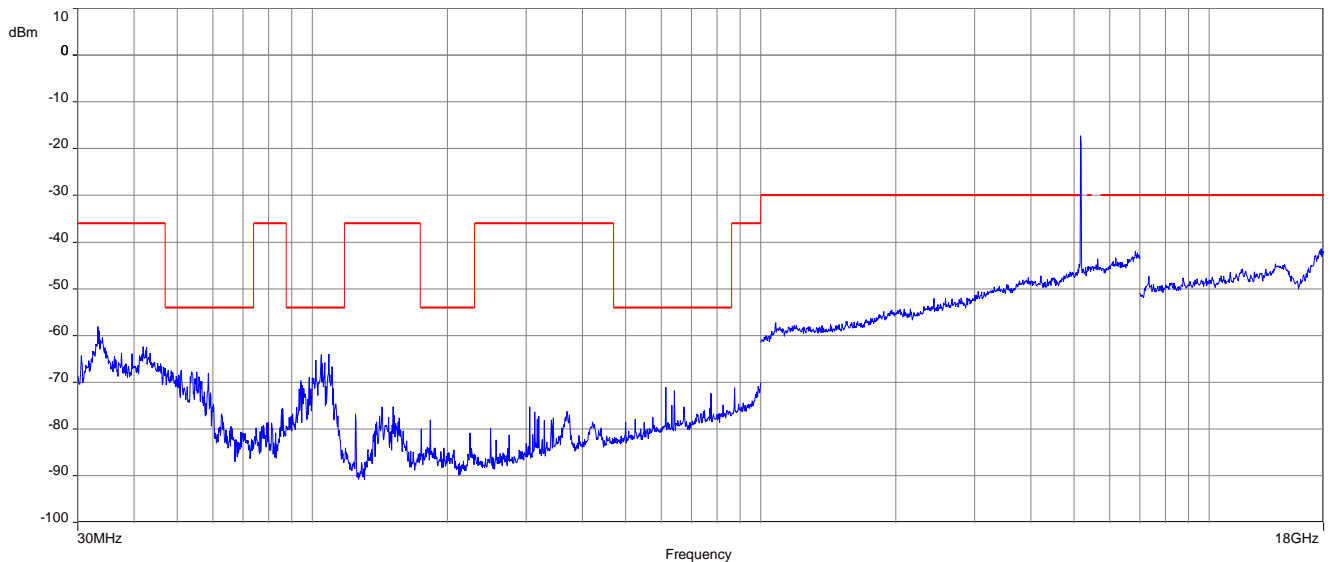
**Plot 1:** Lowest channel – 5180 MHz (lower sub band), 30 MHz to 18 GHz



NOTE: The carrier signal is notched with a band rejection filter.

**Plot:** OFDM / n HT40 – mode up to 18 GHz

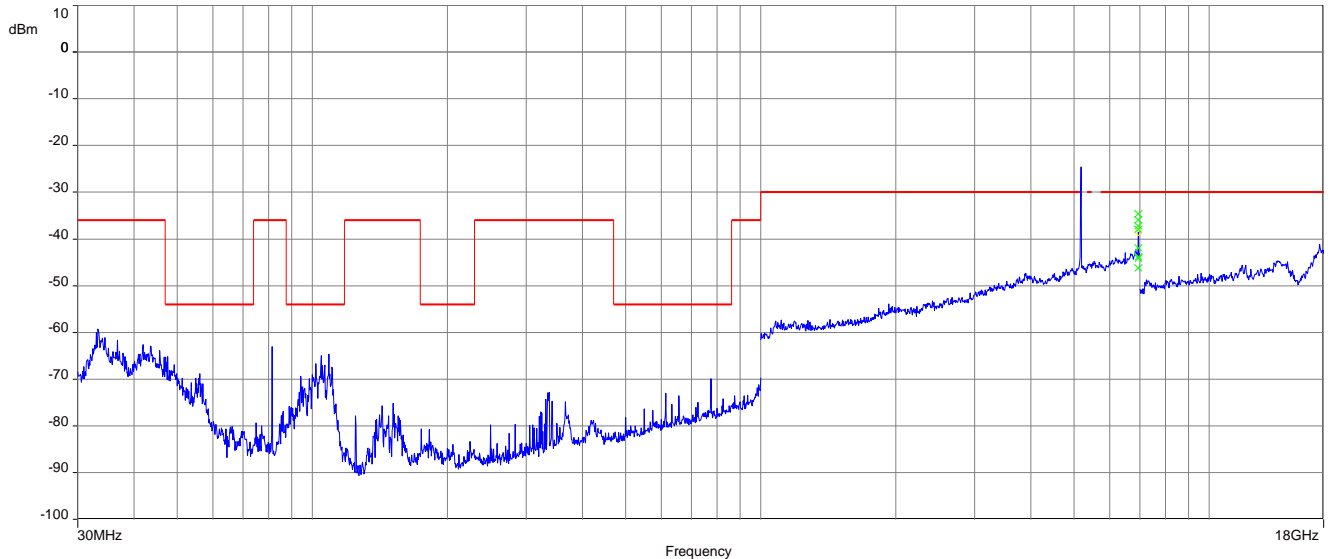
**Plot 1:** Lowest channel – 5190 MHz (lower sub band), 30 MHz to 18 GHz



NOTE: The carrier signal is notched with a band rejection filter.

**Plot:** OFDM / ac VHT80 – mode up to 18 GHz

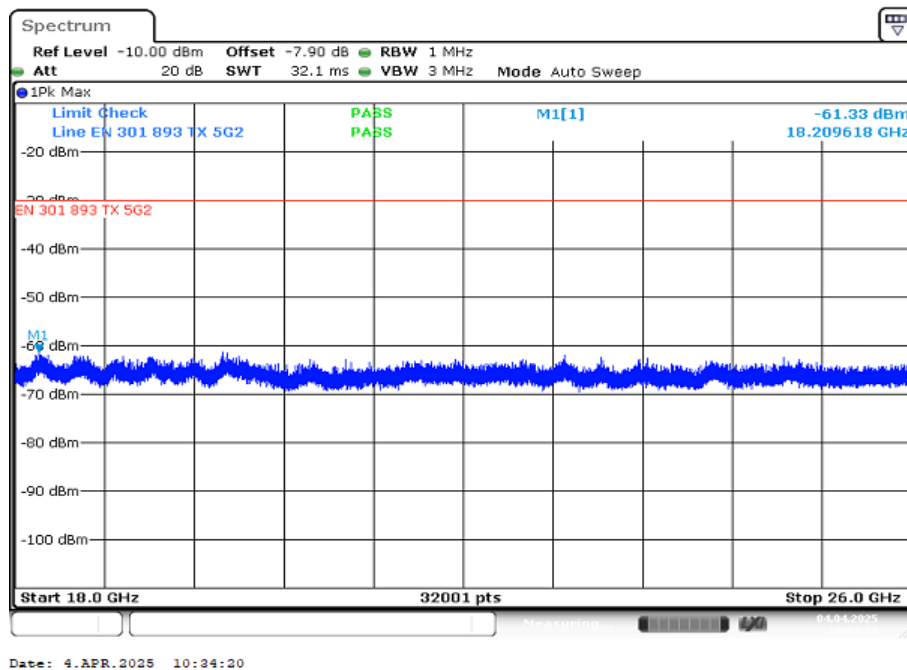
**Plot 1:** Lowest channel – 5210 MHz (lower sub band), 30 MHz to 18 GHz



NOTE: The carrier signal is notched with a band rejection filter.

**Plot:** OFDM 18 GHz to 26 GHz, valid for all modes

**Plot 1:** 18 GHz to 26 GHz



## 12.4 Receiver spurious emissions (radiated)

### Description:

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

### Measurement:

Measurement parameters	< 1 GHz / ≥ 1 GHz
Detector:	Peak / RMS (TDP)
Sweep time:	Auto
Resolution bandwidth:	100 kHz / 1 MHz
Video bandwidth:	300 kHz / 3 MHz
Trace mode:	Max Hold
Measurement uncertainty:	See sub clause 7
Test setup:	chapter 7.1 B & 7.2 A

### Limits:

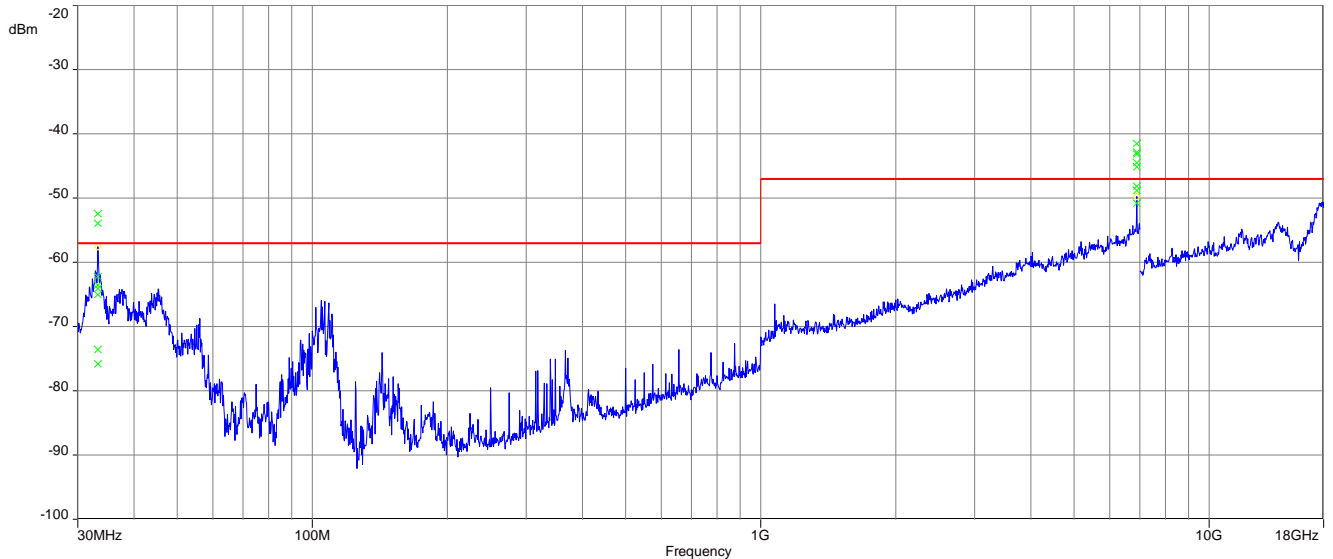
Frequency range	Limit	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 26 GHz	-47 dBm	1 MHz

### Results:

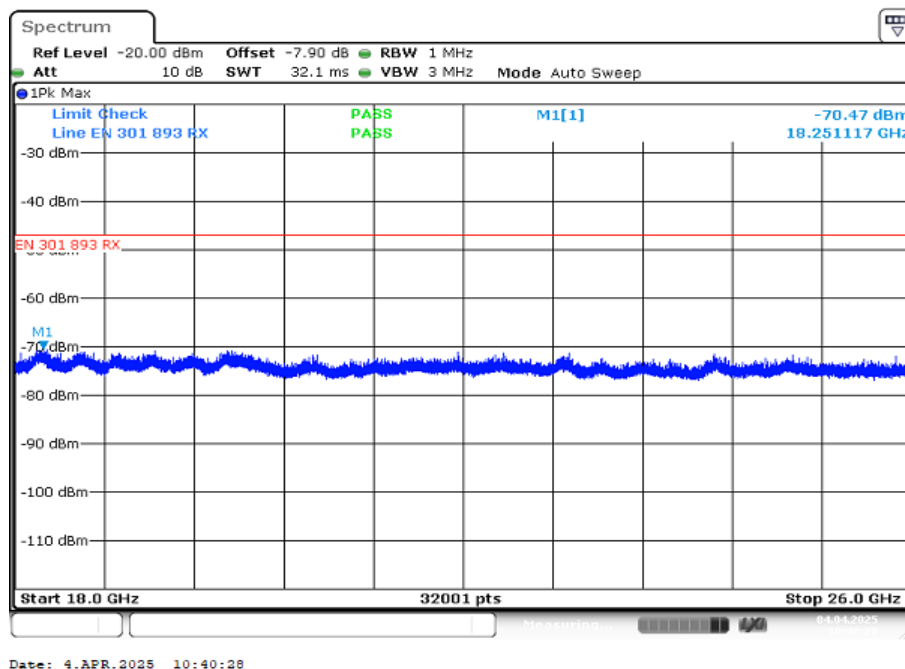
Spurious emissions level							
RX mode – lower sub-band				RX mode – higher sub-band			
f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]	f [MHz]	Level [dBm]	Limit [dBm]	Margin [dBm]
33	-64.1	-57.0	7.1				
6907	-47.1	-47.0	0.1				

**Plots:** RX / idle – mode (lower sub-band)

**Plot 1:** 30 MHz to 18 GHz, vertical & horizontal polarization



**Plot 2:** 18 GHz to 26 GHz, vertical & horizontal polarization





### 13 Glossary

<b>AVG</b>	Average
<b>C</b>	Compliant
<b>C/N<sub>0</sub></b>	Carrier to noise-density ratio, expressed in dB-Hz
<b>CAC</b>	Channel availability check
<b>CW</b>	Clean wave
<b>DC</b>	Duty cycle
<b>DFS</b>	Dynamic frequency selection
<b>DSSS</b>	Dynamic sequence spread spectrum
<b>DUT</b>	Device under test
<b>EN</b>	European Standard
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EMC</b>	Electromagnetic Compatibility
<b>EUT</b>	Equipment under test
<b>FCC</b>	Federal Communications Commission
<b>FCC ID</b>	Company Identifier at FCC
<b>FHSS</b>	Frequency hopping spread spectrum
<b>FVIN</b>	Firmware version identification number
<b>GNSS</b>	Global Navigation Satellite System
<b>GUE</b>	GNSS User Equipment
<b>HMN</b>	Host marketing name
<b>HVIN</b>	Hardware version identification number
<b>HW</b>	Hardware
<b>IC</b>	Industry Canada
<b>Inv. No.</b>	Inventory number
<b>MC</b>	Modulated carrier
<b>NA</b>	Not applicable
<b>NC</b>	Not compliant
<b>NOP</b>	Non occupancy period
<b>NP</b>	Not performed
<b>OBW</b>	Occupied bandwidth
<b>OC</b>	Operating channel
<b>OCW</b>	Operating channel bandwidth
<b>OFDM</b>	Orthogonal frequency division multiplexing
<b>OOB</b>	Out of band
<b>OP</b>	Occupancy period
<b>PER</b>	Packet error rate
<b>PMN</b>	Product marketing name
<b>PP</b>	Positive peak
<b>QP</b>	Quasi peak
<b>RLAN</b>	Radio local area network
<b>S/N or SN</b>	Serial number
<b>SW</b>	Software
<b>UUT</b>	Unit under test
<b>WLAN</b>	Wireless local area network

14 Document history

Version	Applied changes	Date of release
R01	Initial release	2025-05-26

##### END OF TEST REPORT #####