



TEST REPORT

- FCC Part 15.255, RSS-210 -

Type / Model Name : CMR01

Product Description : 60 GHz Cabin Monitoring Radar (CMR)

Applicant : FICOSA AUTOMOTIVE, S.L.U.

Address : P.I. Can Mitjans s/n

E08232 VILADECALLS (BARCELONA)

Manufacturer : FICOSA AUTOMOTIVE, S.L.U.

Address : P.I. Can Mitjans s/n

E08232 VILADECALLS (BARCELONA)

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

POSITIVE

Test Report No.: **80299866-00 Rev_0**

15. July 2026

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-00



Deutsche
Akkreditierungsstelle
D-PL-12030-01-00

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations (July 2026)

Part 15, Subpart A	General
Part 15, Subpart C, Section 15.255	Operation within the band 57-71 GHz.
ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024	Testing Unlicensed Wireless Devices
KDB 364244 D01 V01	Meas 15.255 Radars

ISED Canada Rules and Regulations

RSS-Gen, Issue 5 + Amendment 1 + 2	General Requirements for Compliance of Radio Apparatus
RSS-210, Issue 11	Licence-Exempt Radio Apparatus: Category I Equipment
ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024	Testing Unlicensed Wireless Devices
KDB 364244 D01 V01	Meas 15.255 Radars

2 TEST RESULT SUMMARY

Operating in the 57.0 – 61.56 GHz band:

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS-Gen 8.8	AC power line conducted emissions	Not applicable *
15.255(c)(2)(iii)	RSS-210 J.3.2.b.ii	EIRP	FULFILLED
15.255(d) 15.209(a)	RSS-210 J.4 RSS-Gen 8.9	Spurious emissions	FULFILLED
15.255(c)(2)	RSS-210 J.3.2	Peak conducted output power	not applicable **
15.255(e)(2)	RSS-210 J.3.3.d	Emission bandwidth	not applicable ***
***	RSS-Gen, 6.7	99% bandwidth	FULFILLED
15.255(f)	RSS-210 J.6	Frequency stability	FULFILLED
15.203	-	Antenna requirement	FULFILLED

* AC power line conducted emission not applicable because EUT has no AC port.

** Conducted power limit not applicable, as EUT fulfils FCC §15.255(c)(2)(ii) / RSS-210 J.3.2.b.ii

*** Emission bandwidth is not applicable, as EUT fulfils FCC §15.255(c)(2)(ii) / RSS-210 J.3.2.b.ii

**** Tests performed according to General Measurement Guidance of TCB Workshop Part 15.255 Rules Amendment, October 25, 2023

2.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80299866-00	0	15 July 2026	Initial test report

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

2.2 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 : 21 May 2026

Testing concluded on : 07 July 2026

Checked by:


Klaus
Gegenfurtner
2026.07.15
15:25:25 +02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:


Christopher
Thaller
2026.07.15
14:01:27 +02'00'

Christopher Thaller
Radio Team

3 EQUIPMENT UNDER TEST

3.1 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.

3.2 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.

3.3 General remarks

Equipment type: The EUT qualifies under **FCC §15.255(c)(2)(ii)** and **RSS-210 J.3.2.b.ii** as a field disturbance sensor.

3.4 Photo documentation / Test plots

All test plot photographs, including external and internal photographs of the EUT as well as test setup photographs, are provided as separate attachments.

3.5 Short description of the equipment under test (EUT)

The EUT is a Cabin Monitoring Radar (CMR) to be integrated in vehicles as built-in component. It is working in the frequency band of 57.0 GHz to 61.56 GHz using FMCW.

FCC ID: 2BGVO1CMR0624
IC ID: 32505-1CMR0624
HVIN: H31

Sample #1	
Serial number	113100042
Software	0300
Hardware	31
Equipment type	The EUT qualifies under FCC §15.255(c)(2)(ii) and RSS-210 J.3.2.b.ii as a field disturbance sensor.
Power supply	13.5 V _{DC}

Sample #2	
Serial number	113100027
Software	0300
Firmware	31
Equipment type	The EUT qualifies under FCC §15.255(c)(2)(ii) and RSS-210 J.3.2.b.ii as a field disturbance sensor.
Power supply	13.5 V _{DC}

Sample #3	
Serial number	154100164
Software	0300
Firmware	31
Equipment type	The EUT qualifies under FCC §15.255(c)(2)(ii) and RSS-210 J.3.2.b.ii as a field disturbance sensor.
Power supply	13.5 V _{DC}

3.6 EUT operation mode

There is no special operation mode needed.

3.7 Variants of the EUT

There are no variants of the EUT.

3.8 Antenna

The EUT has a 4x4 printed antenna array (4 TX and 4 RX).

3.9 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

Equipment	Model / Details
Cable harness	Custom-built
CAN-FD data logger	Kvaser USBcan Pro 2xHS v2
Laptop	Lenovo
Lab power supply	Hameg, HM8143

3.10 Operation frequency

Operating frequency range: 57.5 GHz to 61.5 GHz

3.11 Transmit operating modes

Radar mode 4 GHz OBW, FMCW

3.12 Determination of worst case conditions for final measurement

Exploratory measurements have been made in all three orthogonal axes and the settings of the EUT are changed to locate at which position and at what setting the EUT produces the maximum of the emissions. For the further measurement, the EUT is set in H-position while the receiving antenna is in horizontal polarisation.

As worst case, the following channels and test modes are selected for the final test:

Operating frequency range (GHz)	Power setting	Modulation	Modulation type	BW (GHz)
57.0 – 61.56	P _{def}	digital	FMCW	4

Note 1: P_{def} = default power level with maximum power setting.

Note 2: For final testing the normal FMCW modulation was selected. Other test modes (e.g. CW mode) were only for pre-scan purposes, e.g. evaluating artefacts from the harmonic mixers.

3.12.1 Test jig

No test jig is used.

3.12.2 Test software

For radar test modes, Test Software provided by the customer is used.

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTLING
GERMANY**

4.2 Statement regarding the usage of logos in test reports

The accreditation and notification body logos displayed in this test report are only valid for standards listed in the accreditation or notification scope of CSA Group Bayern GmbH.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 20 - 30 °C

Humidity: 20 – 75 %

Atmospheric pressure: 86 – 106 kPa

4.4 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 acc. to CISPR 16-4-2: 2011 + A1: 2014 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. 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.

4.5 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.

4.6 Measurement protocol for FCC and ISCED

4.6.1 General information

CSA Group Bayern GmbH is recognized as wireless testing laboratory under the CAB identifier:

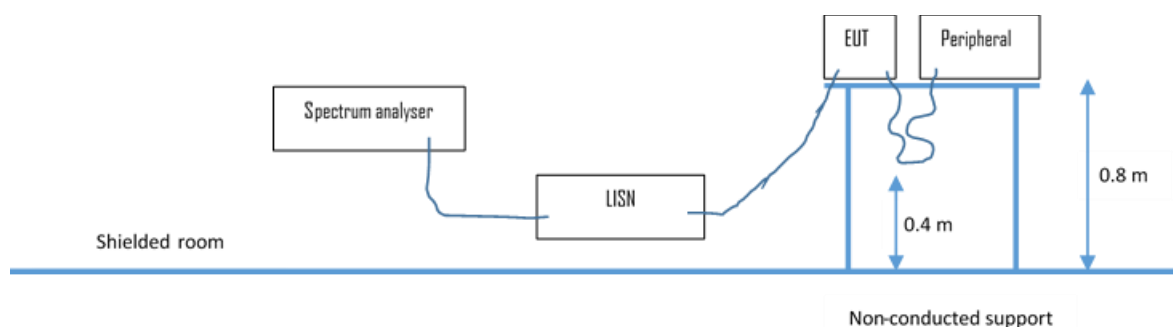
FCC: DE 0011
ISED: DE0009

The test methods used comply with ANSI C63.10 - "Testing Unlicensed Wireless Devices".

4.6.2 Details of test procedures

4.6.2.1 Conducted emission

Test setup according ANSI C63.10



The final level, expressed in dB μ V, is arrived at by taking the reading directly from the Spectrum analyser. This level is compared to the limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

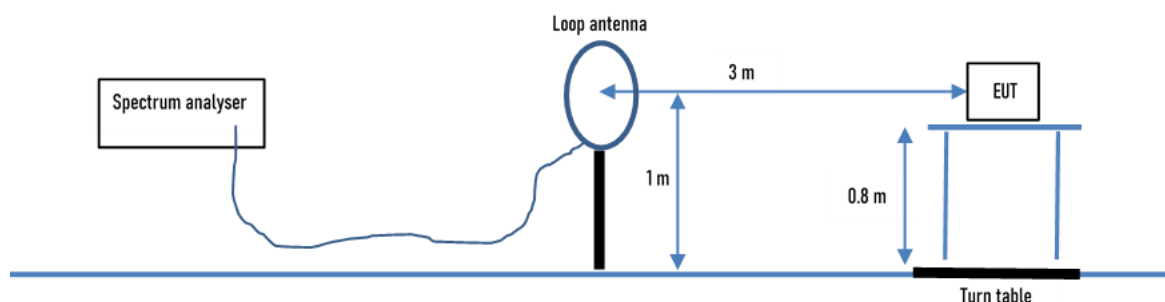
$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω / 50 μ H (CISPR 16) characteristics. The receiver is protected by means of an impedance matched pulse limiter connected directly to the RF input. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission is re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.6.2.2 Radiated emission

4.6.2.2.1 Anechoic chamber test site (9 kHz - 30 MHz):

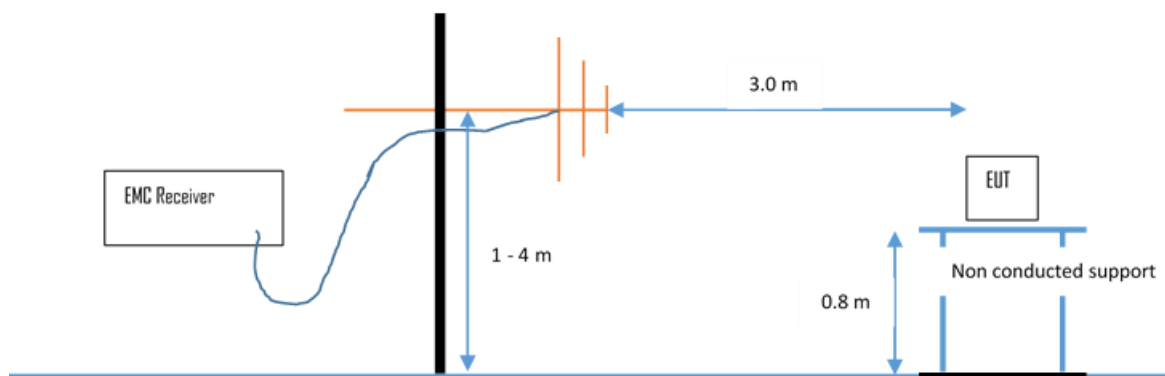
Test setup according ANSI C63.10



Emissions from the EUT are measured in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a calibrated loop antenna. Table top equipment is placed on a non-conducting table 80 centimetres above the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The loop antenna is positioned 3, 10 or 30 metres from the EUT, aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal. To locate maximum emissions from the test sample, for each measurement antenna alignment, the EUT is rotated through 0° to 360° on a turntable.

4.6.2.2.2 Anechoic chamber (30 MHz - 1 GHz):

Test setup according ANSI C63.10.



Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Tabletop equipment is placed on a non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees. The final level in dBµV/m is calculated by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (dB). The FCC limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

The resolution bandwidth setting:

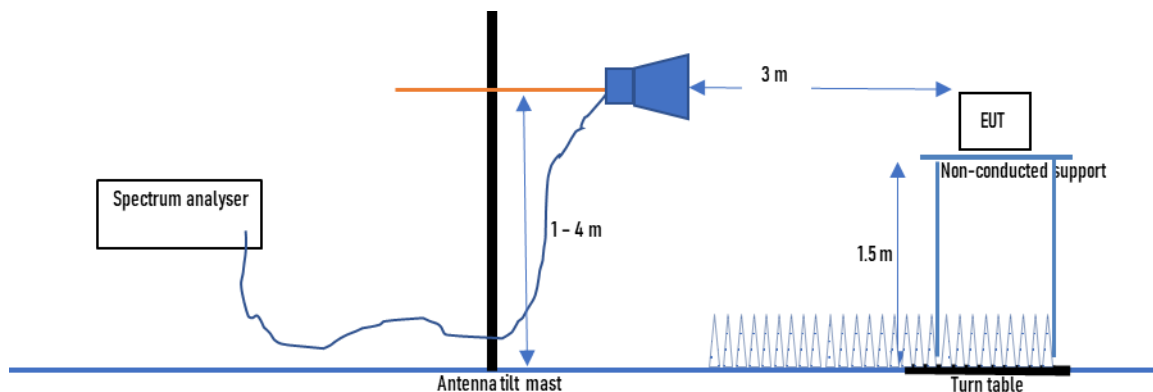
30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	-	Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

4.6.2.2.3 Anechoic chamber (1000 MHz – 18000 MHz)

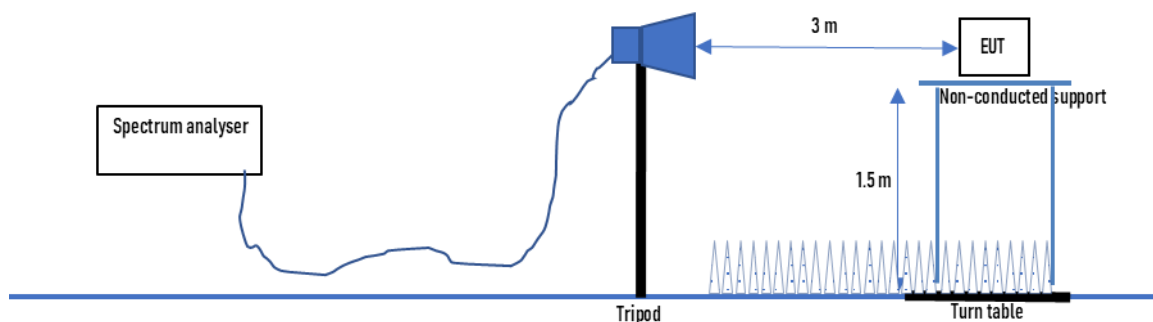
Test setup according ANSI C63.10.



Radiated emissions from the EUT are measured in the frequency range 1 GHz up to 18 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements.

4.6.2.2.4 Anechoic chamber (18 GHz – 40 GHz)

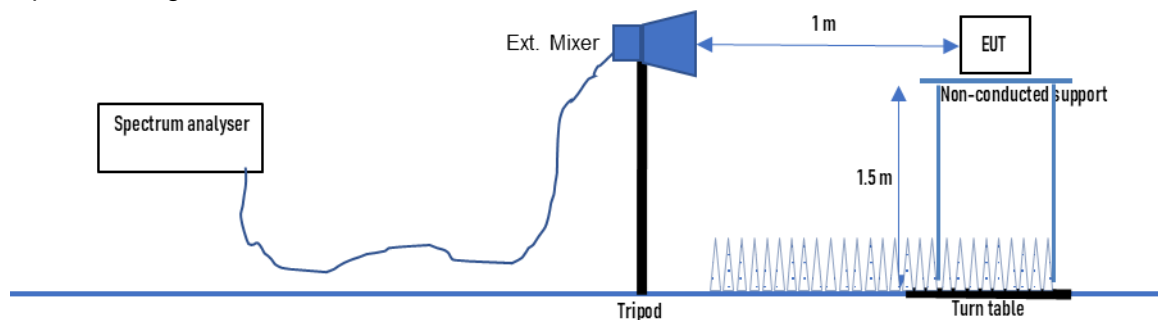
Test setup according ANSI C63.10.



Emissions from the EUT are measured in the frequency range 18 GHz up to 40 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty. The limits are adopted.

4.6.2.2.5 Anechoic chamber (40 GHz – 200 GHz)

Test setup according to ANSI C63.10.



Emissions from the EUT are measured in the frequency range 40 GHz up to 200 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and external mixer with standard gain horn. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the center, forming a bundle 30 cm to 40 cm long. Measurements are made in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty. The limits are adopted.

5 TEST CONDITIONS AND RESULTS

5.1 OBW

For test instruments and accessories used see section 6 Part **MB**.

5.1.1 Description of the test location

Test location: Anechoic chamber FAR1
Test distance: 0.67 m

5.1.2 Photo documentation of the test set-up

See Attachment C for detailed photo documentation of the test set-up.

5.1.3 Applicable standard

According to General Measurement Guidance of TCB Workshop Part 15.255 Rules Amendment, October 25, 2023: If applying under §15.255(c)(2)(ii) for operation over 57.0-61.56 GHz – Show that transmitter OBW is contained within 57.0-61.56 GHz band segment.

According to RSS-Gen 6.7:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

5.1.4 Description of Measurement

According to ANSI C63.10 Clause 9.4:

The following procedure shall be used for measuring 99% power bandwidth: Use the following spectrum analyzer settings:

- 1) Span equal to approximately 1.5 times the OBW, centered on the carrier frequency
- 2) RBW, prefer 1% to 5% of OBW, or a minimum of 1 MHz if this is not possible due to a large OBW
- 3) VBW approximately $3 \times$ RBW
- 4) Set the reference level of the instrument as required to reduce the chance of the signal amplitude exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.1.6.
- 5) Sweep = No faster than coupled (auto) time.
- 6) Detector function = peak.
- 7) Trace = max-hold.

Spectrum analyser settings for OBW:

RBW: 50 MHz, VBW: 80 MHz, Detector: Max peak, Sweep time: auto, Span: 5.8 GHz

5.1.5 Test result

99 % Bandwidth				
Frequency band	Centre frequency	T ₁	T ₂	Measured OBW
(GHz)	(GHz)	(GHz)	(GHz)	(GHz)
57.0 - 61.56	59.551	57.602	61.501	3.899

Limit according to General Measurement Guidance of TCB Workshop Part 15.255 Rules Amendment, October 25, 2023:

Frequency band
≥ 57 – ≤ 61.56 GHz

The requirements are **FULFILLED**.

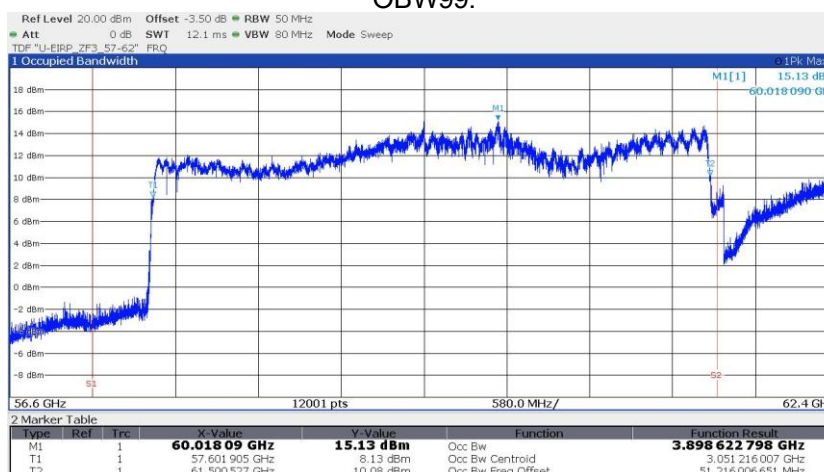
Remarks: For detailed test results please refer to following test protocols.

The OBW is contained within the 57-61.56 GHz band segment.

Measurement procedure for PK EIRP: To avoid overlap of wanted signal with unwanted signal (image), LO of external mixer is tuned to appropriate frequency to obtain higher ZF. VBW reduced due to high dynamic for higher ZF. For test instruments see section 6, part **MB**.

5.1.6 Test protocols

OBW99:



5.2 EIRP and transmitter off-times

For test instruments and accessories used see section 6 Part **MB, DC**.

5.2.1 Description of the test location

Test location: Anechoic chamber FAR1
Test distance: 1 m

5.2.2 Photo documentation of the test set-up

See Attachment C for detailed photo documentation of the test set-up.

5.2.3 Applicable standard

According to FCC Part 15C, Section 15.255(c)(2)(ii):

The peak EIRP shall not exceed 20 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds when operated outdoors:

- 1) As part of a temporary or permanently fixed application; or
- 2) When being used in vehicular applications to perform specific tasks of moving something or someone, except for in-cabin applications;

According to RSS-210 J.3.2.b.ii:

FDS operating in the 57.0-64.0 GHz band shall comply with one of the following limits, depending on the operating condition of the device: or devices employed for outdoor operation (temporary or permanently fixed application) or vehicular uses (excluding in-cabin applications and operations), the peak e.i.r.p. shall not exceed 20 dBm and the sum of continuous transmitter off-times of at least 2 ms shall equal at least 16.5 ms within any contiguous interval of 33 ms.

5.2.4 Description of Measurement

The radiated emission of the fundamental wave from the EUT is measured using a spectrum analyser and appropriate linear polarized antennas. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.10, Item 9.8. The EUT is measured in TX modulated (FMCW) under normal conditions following the procedures in 4.1.5.2.8 and Annex L.

Analyser settings:

RBW: 30 MHz VBW: 80 MHz Detector: PK Trace. Max hold

5.2.5 Test result

The peak power results are corrected by the FMCW desensitization factor:

$$\alpha = \frac{1}{\left(1 + \left[\left(\frac{2 \times \ln(2)}{\pi}\right)^2 \times \left(\frac{BW_{\text{Chirp}}}{T_{\text{Chirp}} \times RBW^2}\right)^2\right]\right)^{0.25}} \quad (\text{L.1})$$

where

α is the reduction in amplitude
 BW_{Chirp} is the FMCW Chirp Bandwidth
 T_{Chirp} is the FMCW Chirp Time
 B is the 3 dB IF Bandwidth = RBW

FMCW desensitization factor = $20 \cdot \log(\alpha)$

BW_{Chirp} (GHz)	T_{Chirp} (ms)	B (MHz)	α	FMCW desensitization factor (dB)
3.899	0.045	30	0.9995	-0.0039

Measured EIRP:

Operating frequency range (GHz)	Power setting	Level PK (dBm)	Desensitiz. factor (dB)	True PK level (dBm)	Limit PK (dBm)	Margin PK (dB)
57.0 - 61.56	Pdef	12.5	-0.004	12.5	20.0	-7.5

Transmitter off-times:

Observation interval (ms)	Sum of transmitter on-times (ms)	Sum of transmitter off-times (ms)	Limit transmitter off-times (ms)
33	3.15	29.85	≥ 16.5

Measured duration of the interval between the first and last chirp peaks of the burst with 80 MHz RBW: 344.6 μ s
 This value represents the duration of 7 out of 8 chirps.

Burst duration: 344.6 μ s * 8/7 = 393.8 μ s

8 periods within 33ms: 0.3938ms * 8 = 3.15ms

According to FCC Part 15C, Section 15.255(c)(2)(ii):

The peak EIRP shall not exceed 20 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds.

According to RSS-210 J.3.2.b.ii:

The peak e.i.r.p. shall not exceed 20 dBm and the sum of continuous transmitter off-times of at least 2 ms shall equal at least 16.5 ms within any contiguous interval of 33 ms.

The requirements are **FULFILLED**.

Remarks:

For detailed test results please refer to following test protocols.

Chirp time and transmitter off-times: For test instruments and accessories used see section 6

Part **DC**.

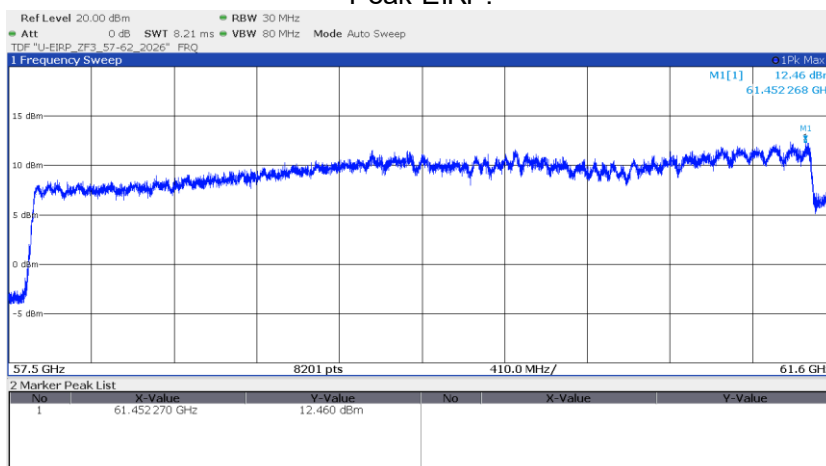
Measurement procedure for PK EIRP: To avoid overlap of wanted signal with unwanted signal

(image), LO of external mixer is tuned to appropriate frequency to obtain higher ZF. VBW

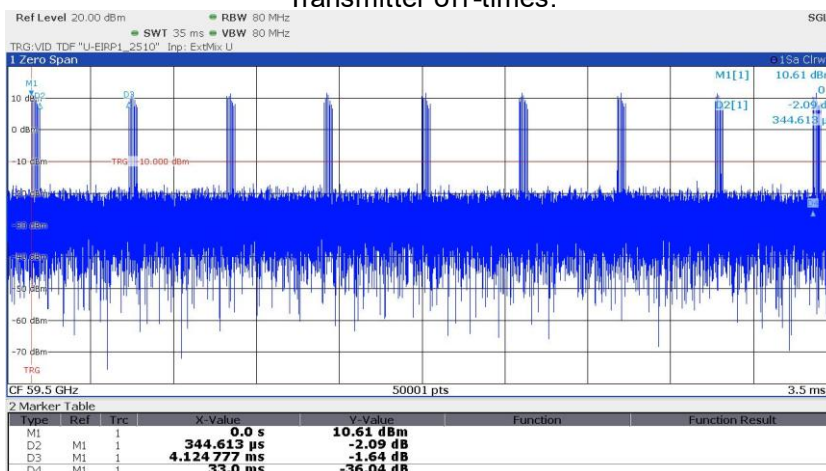
reduced due to high dynamic for higher ZF. For test instruments see section 6, part **MB**.

5.2.6 Test protocols

Peak EIRP:



Transmitter off-times:



5.3 Spurious emissions

For test instruments and accessories used see section 6 Part **SER1, SER 2, SER 3**.

5.3.1 Description of the test location

Test location: Anechoic chamber SAC2
Test distance: 3 m

Test location: Anechoic chamber FAR1
Test distance: 3 m (1 GHz – 18 GHz)
Test distance: 1 m (18 GHz – 200 GHz)

5.3.2 Photo documentation of the test set-up

See Attachment C for detailed photo documentation of the test set-up.

5.3.3 Applicable standard

According to FCC Part 15C, Section 15.255 (d):

- (1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.
- (2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.
- (3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm² at a distance of 3 meters.
- (4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

According to RSS-210 J.4:

The power of any emissions outside the band 57-71 GHz shall consist solely of spurious emissions and shall not exceed:

- a) the fundamental emission levels
- b) the general field strength limits specified in RSS-Gen for emissions below 40 GHz
- c) 90 pW/cm² at a distance of 3 m for emissions between 40 GHz and 200 GHz

5.3.4 Description of Measurement

The radiated emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.10, Item 9.10 and 9.11. In the frequency range above 1 GHz a spectrum analyser is used with appropriate linear polarized antennas. If the emission level in peak mode complies with the average limit testing is stopped and peak values will be reported, otherwise, the emission is measured in average mode again and reported. The EUT is measured in TX continuous mode under normal conditions.

Instrument settings:

9 kHz – 150 kHz: RBW: 200 Hz,	Detector: Quasi peak, Mes. Time: 1 s,
150 kHz – 30 MHz: RBW: 9 kHz,	Detector: Quasi peak, Mes. Time: 1 s,
30 MHz – 1 GHz: RBW: 120 MHz,	Detector: Quasi peak, Mes. Time: 1 s,
1 GHz – 40 GHz: RBW: 1 MHz, VBW: 3 MHz,	Detector: Max. peak, Trace: Max. hold, Sweep: Auto
40 GHz – 200 GHz: RBW: 1 MHz, VBW: 3 MHz,	Detector: RMS, Trace: Max. hold, Sweep: 1 s

5.3.5 Test result $f < 1 \text{ GHz}$

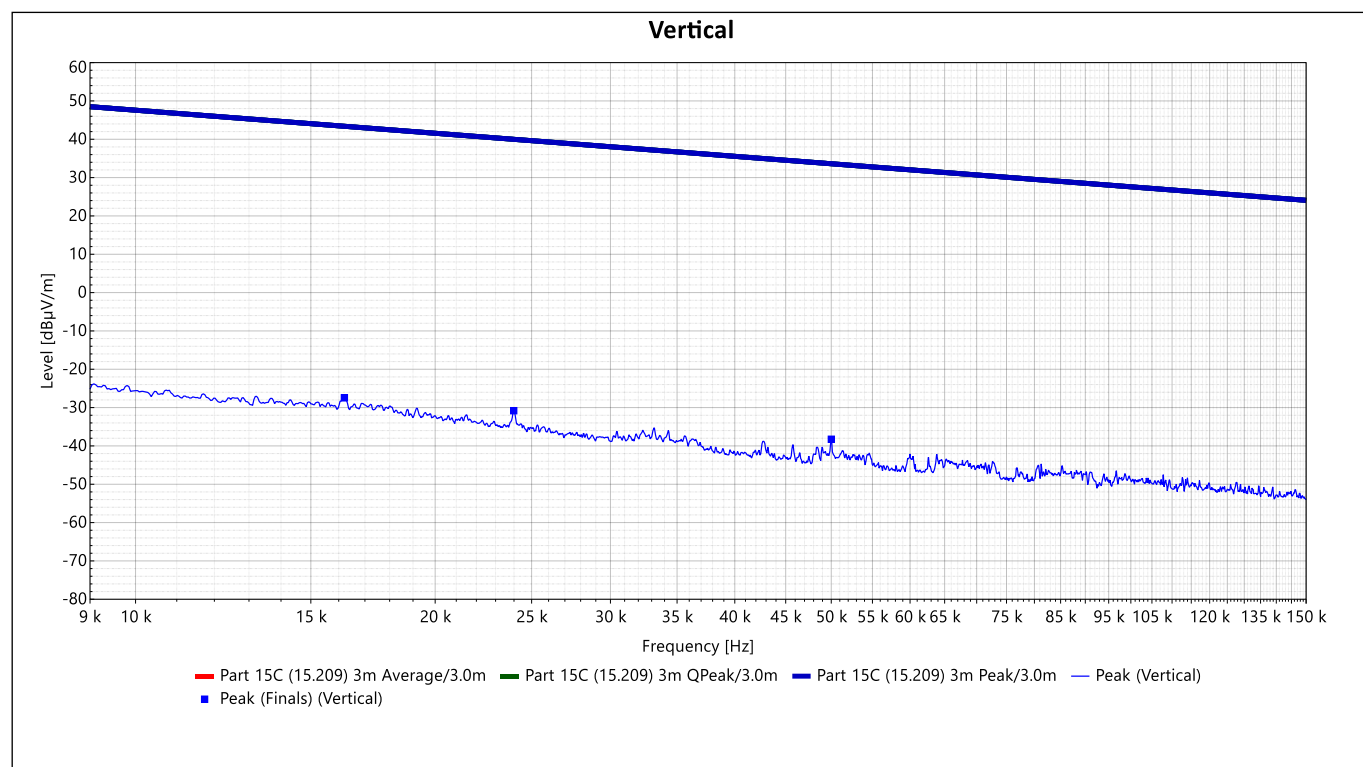
9 kHz – 30 MHz:

Position	Vertical		
Limit	FCC Funk/Part 15C (15.209) 3m		

Finals

Frequency (Hz)	Peak (dB μ V/m)	Margin	Limit (dB μ V/m)	angle	polarisation	RBW (Hz)	Correction (dB)
16.211 k	-27.45	-70.84	43.39	227	Vertical	200	-59.42
23.986 k	-30.81	-70.8	39.99	297	Vertical	200	-59.27
50.011 k	-38.27	-71.88	33.61	234	Vertical	200	-59.4

Graph

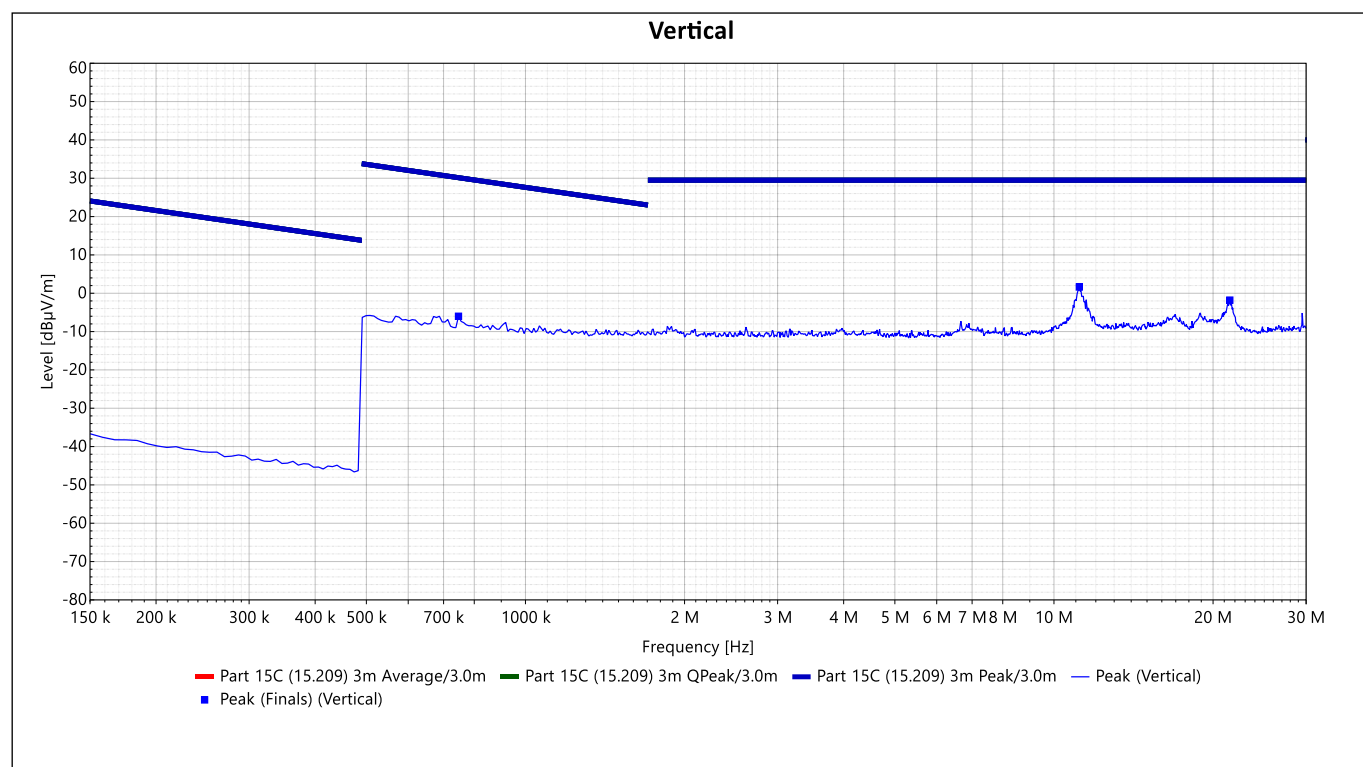


Position	Vertical		
Limit	FCC Funk/Part 15C (15.209) 3m		

Finals

Frequency (Hz)	Peak (dBµV/m)	Margin	Limit (dBµV/m)	angle	polarisation	RBW (Hz)	Correction (dB)
747 k	-6.01	-36.15	30.15	20	Vertical	9000	-19.52
11.169 M	1.64	-27.86	29.5	359	Vertical	9000	-19.48
21.514 M	-1.8	-31.3	29.5	359	Vertical	9000	-18.9

Graph



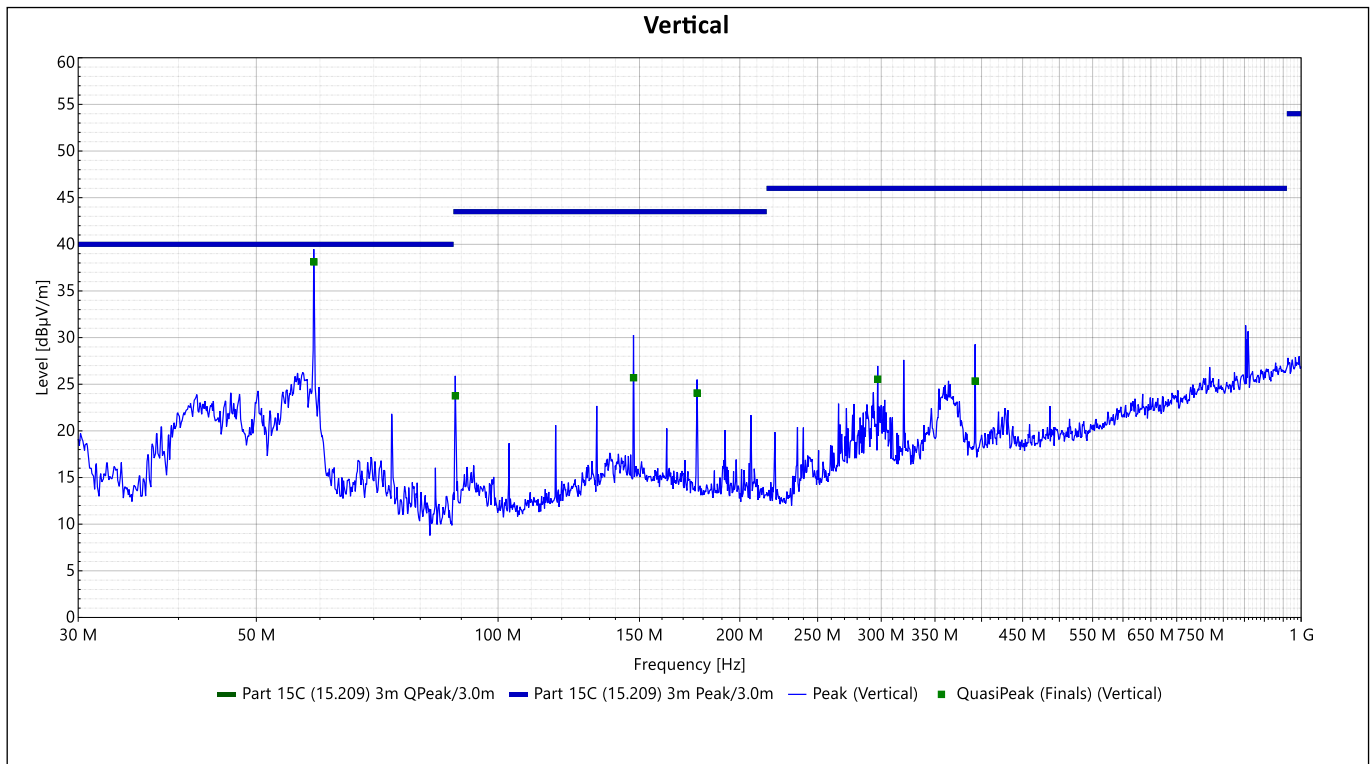
30 MHz – 1 GHz:

Position	Vertical		
Limit	FCC Funk/Part 15C (15.209) 3m		

Finals

Frequency (Hz)	QuasiPeak (dBµV/m)	QP Margin	QP Limit (dBµV/m)	angle	height	polarization	RBW (Hz)	Correction (dB)
58.975 M	38.11	-1.89	40	197	1	Vertical	120000	-10.97
88.475 M	23.76	-19.74	43.5	250	1.18	Vertical	120000	-15.32
147.469 M	25.7	-17.8	43.5	271	1	Vertical	120000	-8.56
176.96 M	24.06	-19.44	43.5	101	1.5	Vertical	120000	-9.92
296.979 M	25.54	-20.46	46	223	1.5	Vertical	120000	-8.98
392.72 M	25.35	-20.65	46	11	1	Vertical	120000	-6.06

Graph

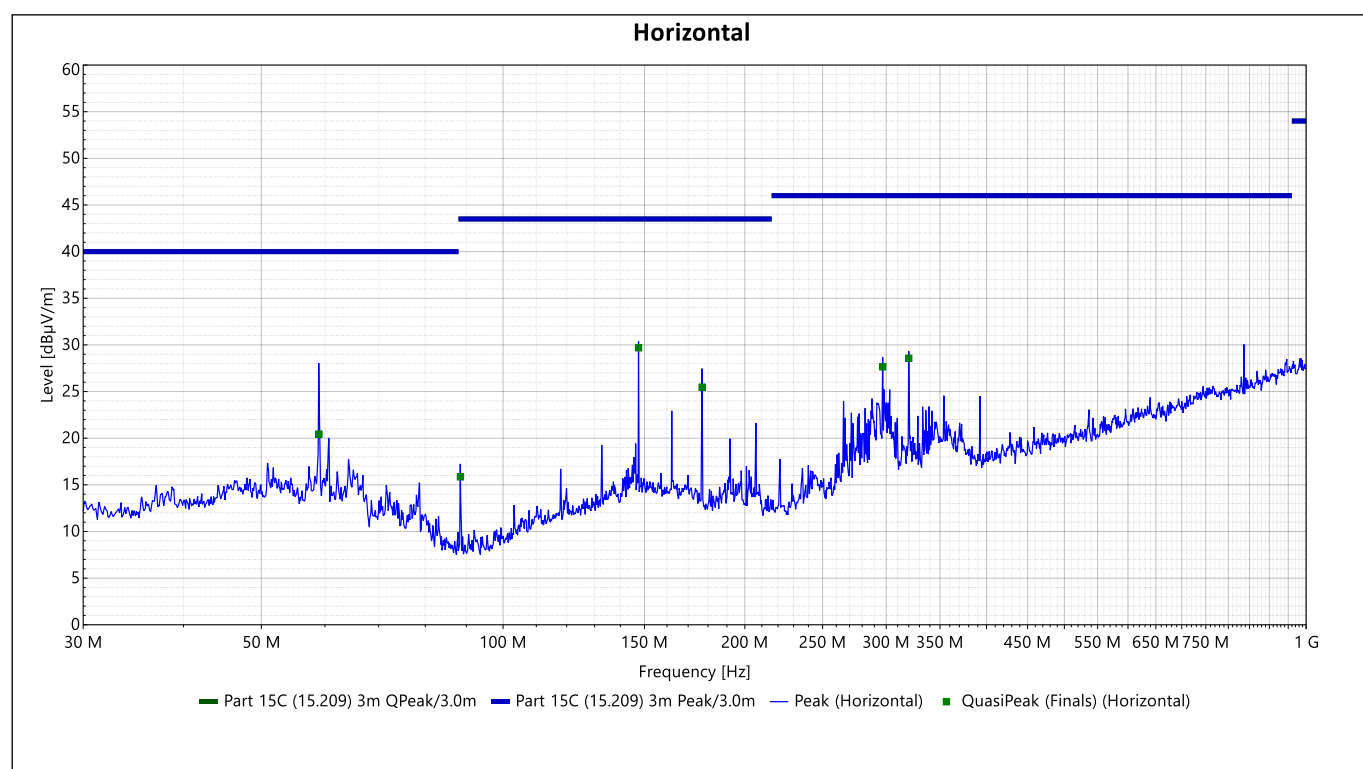


Position	Horizontal		
Limit	FCC Funk/Part 15C (15.209) 3m		

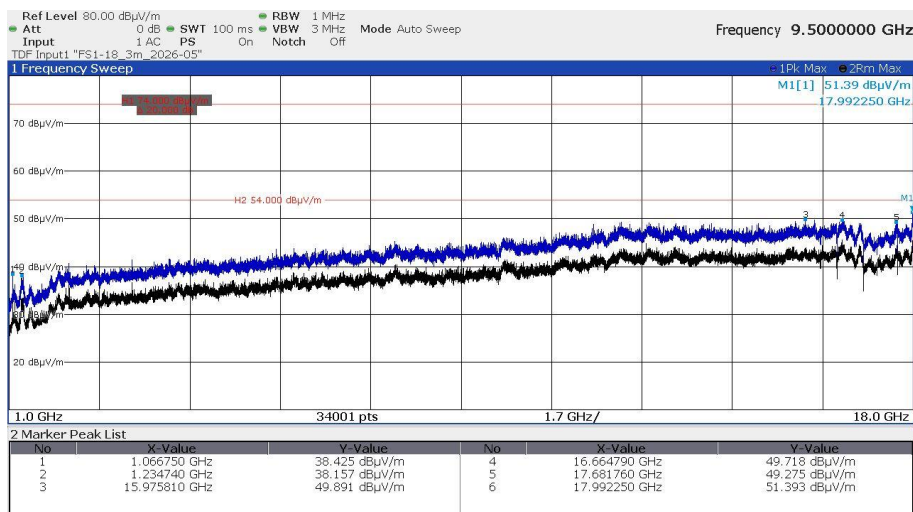
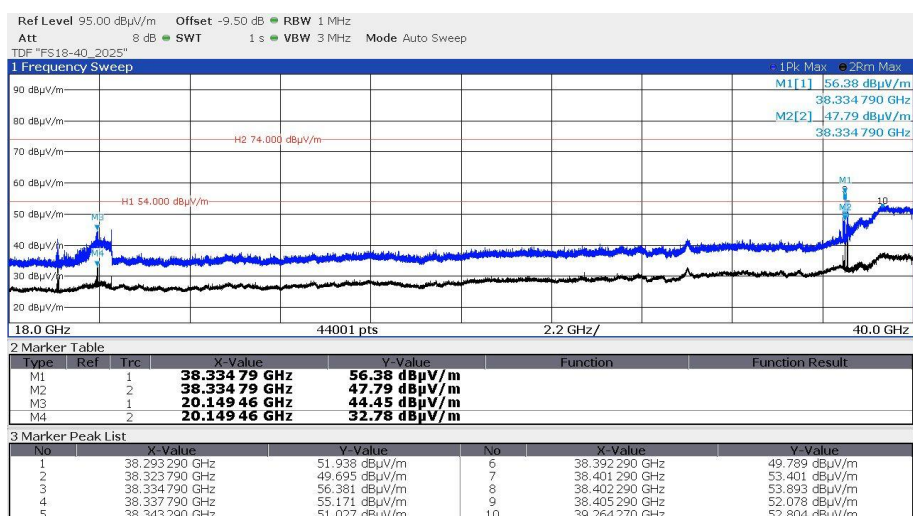
Finals

Frequency (Hz)	QuasiPeak (dBμV/m)	QP Margin	QP Limit (dBμV/m)	angle	height	polarization	RBW (Hz)	Correction (dB)
58.975 M	20.43	-19.57	40	124	3.59	Horizontal	120000	-10.07
88.491 M	15.86	-27.64	43.5	102	2	Horizontal	120000	-16
147.475 M	29.7	-13.8	43.5	90	2.09	Horizontal	120000	-9.55
176.96 M	25.46	-18.04	43.5	72	1.5	Horizontal	120000	-10.58
296.984 M	27.66	-18.34	46	90	1	Horizontal	120000	-8.46
319.997 M	28.56	-17.44	46	90	1	Horizontal	120000	-7.8

Graph



5.3.6 Test result 1 GHz < f < 40 GHz



5.3.7 Test result f > 40 GHz

Determination of the EIRP emission limit for f > 40 GHz:

For calculation of the limit the friis formula is used.

$$P_d = \frac{P_{out} * G}{4 * \pi * r^2}$$

$P_{out} * G = \text{EIRP}$;
Therefore

$$\text{EIRP} = P_d * 4 * \pi * r^2$$

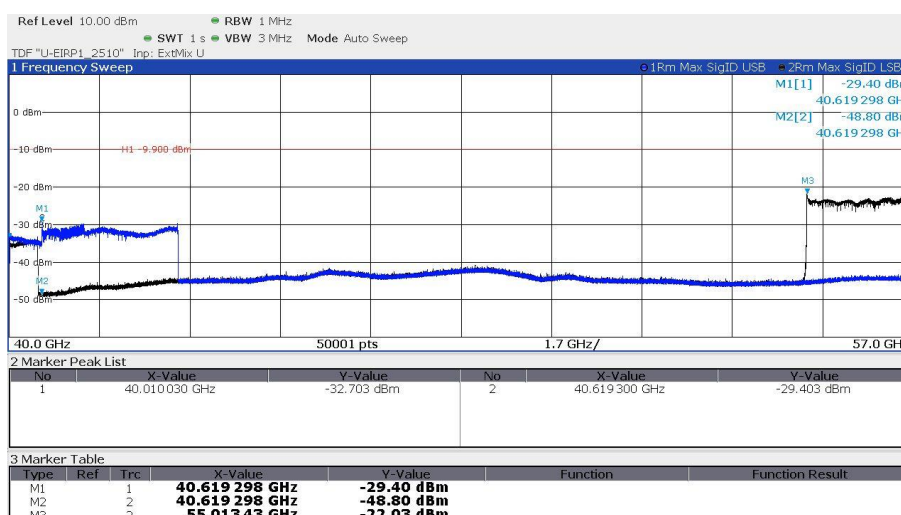
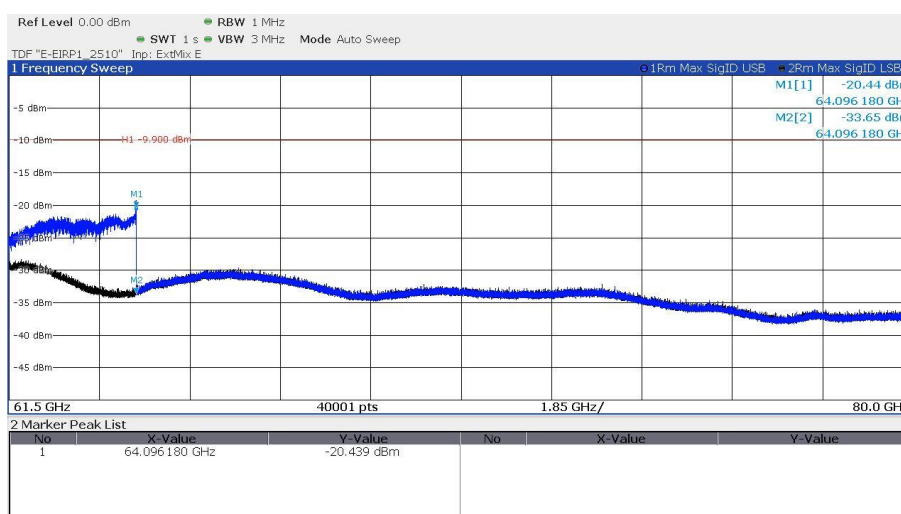
$$\text{EIRP} = -9.9 \text{ dBm}$$

where

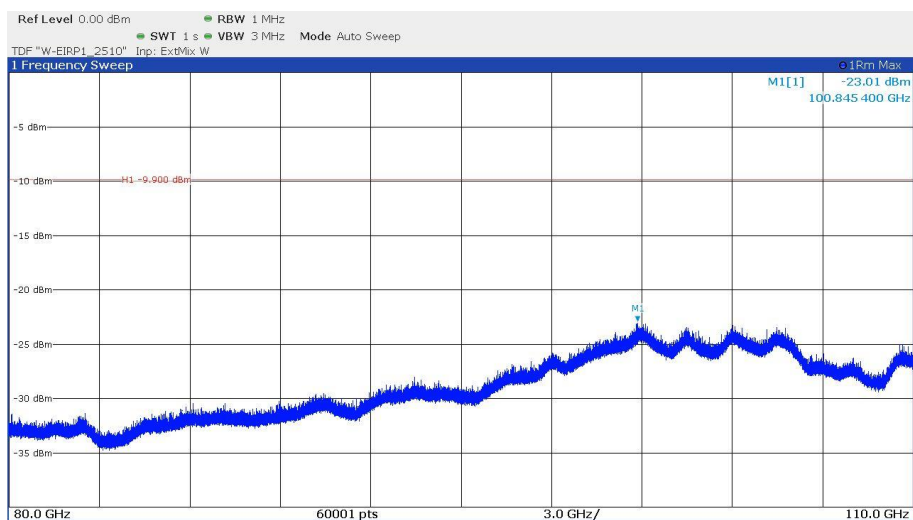
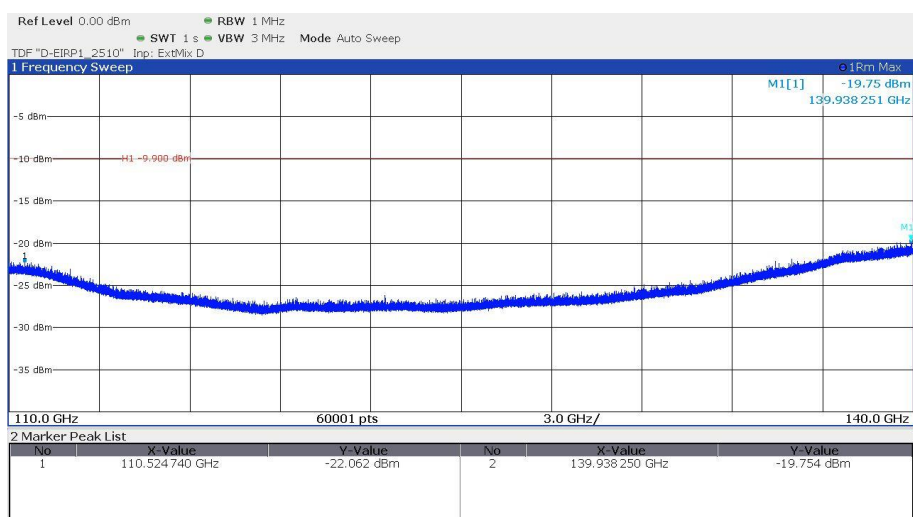
r is the measurement distance (3 m)

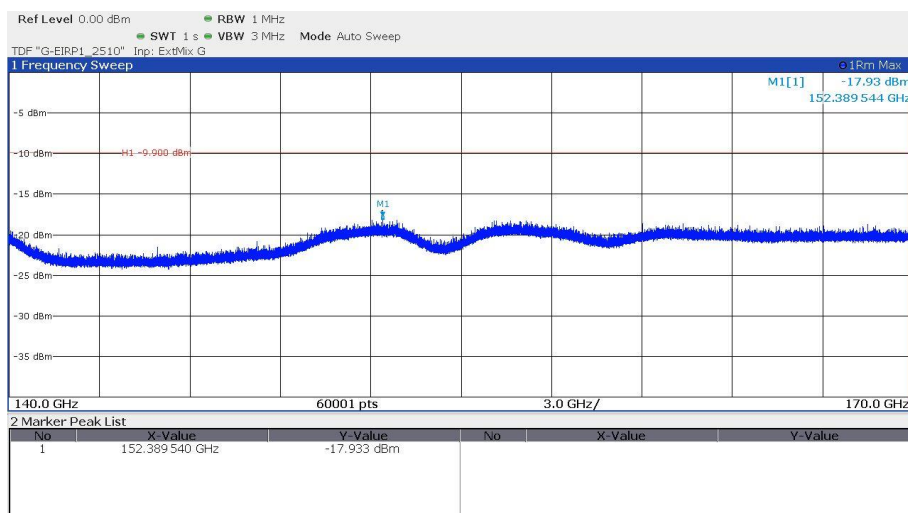
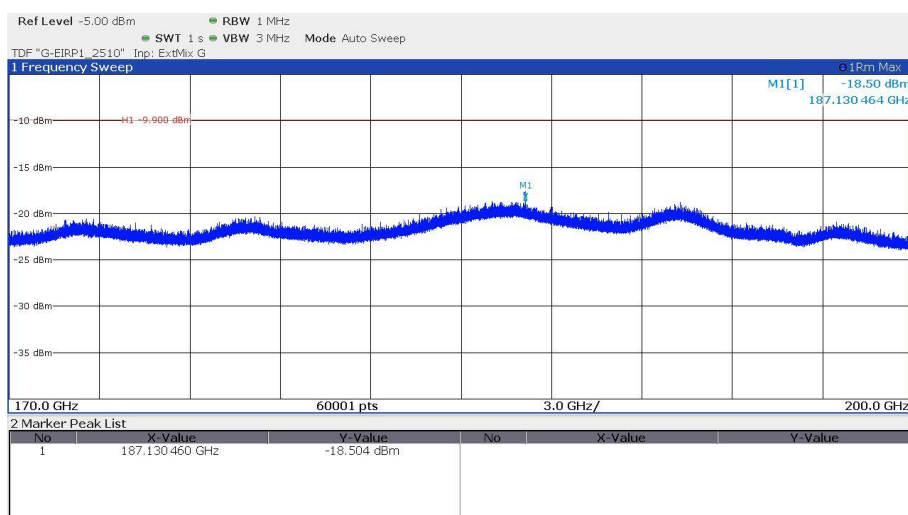
P_d is the emission density (90 pW/cm²)

Note: According to ANSI C63.10 4.1.5.2.8 and Annex L there is no FMCW desensitization for average detection.



Note: LSB shows no emissions from EUT are detected.





Average limit according to FCC Part 15C, Section 15.255(d):

- (1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.
- (2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.
- (3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm² at a distance of 3 meters.
- (4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

General radiated limit according to FCC Part 15C, Section 15.209:

Frequency (MHz)	15.209 Limits (μV/m)	Measurement distance (m)
0.009 - -0.49	2400/f(kHz)	300
0.49 - 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

Limit according to RSS-210 J.4:

The power of any emissions outside the band 57-71 GHz shall consist solely of spurious emissions and shall not exceed:

- a) the fundamental emission levels
- b) the general field strength limits specified in RSS-Gen for emissions below 40 GHz
- c) 90 pW/cm² at a distance of 3 m for emissions between 40 GHz and 200 GHz

General radiated limit according to RSS-Gen 8.9:

Frequency (MHz)	RSS-Gen Limits (μA/m)	Measurement distance (m)
0.009 - -0.49	63.7/f(kHz)	300
0.49 - 1.705	63.7/f(kHz)	30
1.705 - 30.0	0.08	30

Frequency (MHz)	RSS-Gen Limits (μV/m)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

The requirements are **FULFILLED**.

Remarks: The measurement was performed up to 200 GHz.

For frequencies < 40 GHz the general radiated limit has been applied.

5.4 Frequency stability

For test instruments and accessories used see section 6 Part **FE**.

5.4.1 Description of the test location

Test location: AREA4

5.4.2 Photo documentation of the test set-up

See Attachment C for detailed photo documentation of the test set-up.

5.4.3 Applicable standard

According to FCC Part 15C, Section 15.255(f):

Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

According to RSS-210 J.6:

Fundamental emissions shall be contained within the 57.0 - 61.56 GHz frequency band during all conditions of operation when tested at the temperature and voltage variations specified for the frequency stability measurement in RSS-Gen.

5.4.4 Description of Measurement

The frequency stability is measured with the spectrum analyser. The sweep points are set to maximum for higher the frequency resolution or the function "frequency counter" is used. The signal is unmodulated; the marker of the analyser is set to maximum amplitude at normal temperature, the frequency is recorded. Then the maximum supply voltage is set and the marker of the analyser is set to maximum amplitude. This procedure is done again for the minimum supply voltage. The EUT is now driven at normal supply voltage but in the climatic chamber to range the temperature from -40 °C to +85 °C in steps of 10 degrees. The drifting carrier is measured by setting the marker at the analyser.

5.4.5 Result

57.0 – 61.56 GHz frequency band:

Lowest frequency f_{low}	57.599659 GHz
Highest frequency f_{high}	61.502802 GHz

Test conditions		Test result	
		Frequency (GHz)	
		f_{low}	f_{high}
$T_{min} (-40)^{\circ}C$	V_{nom}	57.604180	61.502802
$T (-30)^{\circ}C$	V_{nom}	57.604095	61.502717
$T (-20)^{\circ}C$	V_{nom}	57.603853	61.502475
$T (-10)^{\circ}C$	V_{nom}	57.603476	61.502098
$T (0)^{\circ}C$	V_{nom}	57.603012	61.501634
$T (10)^{\circ}C$	V_{nom}	57.602481	61.501103
$T_{nom} (20)^{\circ}C$	V_{min}	57.601860	61.500482
$T_{nom} (20)^{\circ}C$	V_{nom}	57.601905	61.500527
$T_{nom} (20)^{\circ}C$	V_{max}	57.601856	61.500478
$T (30)^{\circ}C$	V_{nom}	57.601324	61.499946
$T (40)^{\circ}C$	V_{nom}	57.600772	61.499394
$T (50)^{\circ}C$	V_{nom}	57.600339	61.498961
$T (60)^{\circ}C$	V_{nom}	57.599958	61.498580
$T (70)^{\circ}C$	V_{nom}	57.599726	61.498348
$T (80)^{\circ}C$	V_{nom}	57.599659	61.498281
$T_{max} (85)^{\circ}C$	V_{nom}	57.599715	61.498337

Limit according to FCC Part 15C, Section 15.255(f):

Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to $+50$ degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

Limit according to RSS-Gen 6.11:

Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to $+50$ degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

The requirements are **FULFILLED**.

Remarks: The OBW99 is always inside of the operating frequency band.

EUT is considered operating over a temperature range of $-40^{\circ}C$ to $+85^{\circ}C$ and a supply voltage of

6.5 V to 18 V.

5.5 Antenna requirement

According to FCC Part 15C, Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

The EUT has an integrated antenna. No other antenna can be used with the device.

The supplied antenna meets the requirements of part 15.203.

Remarks: For antenna information please refer to section 3.8.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.
All listed measuring devices were calibrated at the time of use.

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
CPR 3	FSW43	Spectrum Analyser	Rohde & Schwarz München	02-02/11-15-001	04/05/2027	04/05/2026		
	FS-Z60	Harmonic Mixer 40-60 GHz	Radiometer Physics GmbH	02-02/11-18-001	04/05/2027	04/05/2026	04/05/2027	04/05/2026
	FSW43	Spectrum Analyser	Rohde & Schwarz München	02-02/11-21-001	09/09/2026	09/09/2025		
	QWH-UPRR00/WR-19/40-60 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-001				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-030				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-031				
DC	FS-Z60	Harmonic Mixer 40-60 GHz	Radiometer Physics GmbH	02-02/11-18-001	04/05/2027	04/05/2026	04/05/2027	04/05/2026
	QWH-UPRR00/WR-19/40-60 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-001				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-030				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-031				
FE	FS-Z60	Harmonic Mixer 40-60 GHz	Radiometer Physics GmbH	02-02/11-18-001	04/05/2027	04/05/2026	04/05/2027	04/05/2026
	QWH-UPRR00/WR-19/40-60 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-001				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-030				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-031				
MB	FS-Z60	Harmonic Mixer 40-60 GHz	Radiometer Physics GmbH	02-02/11-18-001	04/05/2027	04/05/2026	04/05/2027	04/05/2026
	QWH-UPRR00/WR-19/40-60 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-001				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-030				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-031				

SER 1	ESR 7	EMI Test Receiver	Rohde & Schwarz Memmingen	09-02/03-21-004	18/08/2026	18/08/2025		
	HFH2-Z2E	Active Loop Antenna	Rohde & Schwarz Memmingen	09-02/24-21-001	05/08/2026	05/08/2025		
	IN600	Bias Unit	Rohde & Schwarz Memmingen	09-02/50-21-015				
	KK-7.8F-2XNM_4.0M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-018				
	KK-7.8F-2XNM_4.5M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-023				
	KK-7.8F-2XNM_9.5M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-025				
	KK-SF118-2X11N-4.0M	RF Cable	Huber + Suhner	09-02/50-23-034				

SER 2	ESR 7	EMI Test Receiver	Rohde & Schwarz Memmingen	09-02/03-21-004	18/08/2026	18/08/2025		
	BBV 9743 B	Broadb. Ampl. 10MHz-6GHz	Schwarzbeck Mess-Elektronik	09-02/17-21-002	23/03/2027	23/03/2026		
	VULB9168	Trilog-Broadband	Schwarzbeck Mess-Elektronik	09-02/24-22-003	05/08/2026	05/08/2025	21/08/2026	21/08/2025
	SAC2 - NSA 3m	NSA ANSI C63.5	CSA Group Bayern GmbH	09-02/30-23-003			16/09/2026	16/09/2025
	KK-7.8F-2XNM_4.0M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-018				
	KK-7.8F-2XNM_4.5M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-023				
	KK-7.8F-2XNM_9.5M	Cable Assembly 7.8	Tactron Elektronik	09-02/50-21-025				
	50F-003 N 3dB	Attenuator 3dB	Tactron Elektronik	09-02/50-22-002				
	CDB-10K-18-50V-NMF-I	DC Blocker	Tactron Elektronik	09-02/50-22-031			11/05/2027	11/05/2026
	KK-SF526S-2X11N-10.0M	RF Cable	Tactron Elektronik	09-02/50-25-002				
	BAT-EMC 2026.0.4.1	Nexio Software	EMCO Elektronik GmbH	09-02/68-21-002				

SER 3	ESW26	EMI Test Receiver	Rohde & Schwarz München	02-02/03-17-002	19/05/2027	19/05/2026		
	FS-Z110	Harmonic Mixer 75-110 GHz	Rohde & Schwarz München	02-02/11-14-002	06/05/2027	06/05/2026	06/05/2027	06/05/2026
	FS-Z90	Harmonic Mixer 60-90 GHz	Rohde & Schwarz München	02-02/11-14-003	06/05/2027	06/05/2026	06/05/2027	06/05/2026
	FSW43	Spectrum Analyser	Rohde & Schwarz München	02-02/11-15-001	04/05/2027	04/05/2026		
	RPG FS-Z170	Harmonic Mixer 110-170 GHz	Radiometer Physics GmbH	02-02/11-17-001	08/05/2027	08/05/2026	08/05/2027	08/05/2026
	RPG FS-Z220	Harmonic Mixer 140-220GHz	Radiometer Physics GmbH	02-02/11-17-002	08/05/2027	08/05/2026	08/05/2027	08/05/2026
	FS-Z60	Harmonic Mixer 40-60 GHz	Radiometer Physics GmbH	02-02/11-18-001	04/05/2027	04/05/2026	04/05/2027	04/05/2026
	FSW43	Spectrum Analyser	Rohde & Schwarz München	02-02/11-21-001	09/09/2026	09/09/2025		
	AMF-6D-01002000-22-10P	RF Amplifier	MITEQ, Inc.	02-02/17-15-004				
	LNA-40-18004000-33-5P	Amplifier 18-40 GHz	MITEQ, Inc.	02-02/17-20-002				
	BBHA 9170	SHF-EHF Horn Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-015	06/03/2028	06/03/2025		
	QWH-UPRR00/WR-19/40-60 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-001				
	QWH-EPRR00/WR-12/60-90 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-004				
	QWH-WPRR00/WR-10/75-110 GHz	Horn Antenna	Quinstar Technology, Inc.	02-02/24-14-006				
	FH-SG-170/WR6/110-170	Gain Horn Antenna	Rohde & Schwarz München	02-02/24-17-002				
	05-HA25/WR5/140-220	Gain Horn Antenna	Tactron Elektronik	02-02/24-17-004				
	3117	Horn Antenna	ETS Lindgren	02-02/24-20-007	31/08/2026	17/11/2025		
	BAM 4.5-P	Antenna Mast	maturo GmbH	02-02/50-17-024				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-030				
	UFA210A (LU7-022-1000)	RF Cable	Rosenberger HF-Technik	02-02/50-17-031				
	KK-SF106-2X11N-6,5M	RF Cable	Huber + Suhner	02-02/50-18-016				
	0_5 Meter DC-18GHz	NMS111-GL200SC06_5	Tactron Elektronik	09-16/50-23-003				

7 Detailed measurement uncertainty

Note: The following table provides an overview of all uncertainties for CSA Group Bayern GmbH

Measurement	Ucisp [dB]	Ulab comb. + [dB]	Ulab comb. - [dB]	Ulab exp. + [dB]	Ulab exp. - [dB]
EMISSION					
Conducted disturbance at AC mains and other port power using a V-AMN (150 kHz to 30 MHz)	3.4 dB	1.48 dB	1.58 dB	2.96 dB	3.16 dB
Radiated disturbance (disturbance current in a Loop antenna 9 kHz to 30 MHz)	na	1.36 dB	1.39 dB	2.73 dB	2.78 dB
Radiated disturbance (electrical field strength in a SAC; 30 MHz – 1000 MHz; Hybrid antenna; 3 m or 10 m)	6.3 dB	2.08 dB	2.07 dB	4.17 dB	4.13 dB
Radiated disturbance (electrical field strength in a SAC / FAR; 1 GHz – 6 GHz)	5.2 dB	2.54 dB	1.87 dB	5.07 dB	3.73 dB
Radiated disturbance (electrical field strength in a SAC / FAR; 6 GHz – 18 GHz)	5.5 dB	2.70 dB	2.15 dB	5.40 dB	4.30 dB
Radiated disturbance (electrical field strength in a SAC / FAR ; 18 GHz – 40 GHz)	na	2.95 dB	2.78 dB	5.91 dB	5.55 dB
Radiated disturbance (electrical field strength in a FAR ; 40 GHz – 60 GHz)	na	2.49 dB	2.52 dB	5.00 dB	5.04 dB
Radiated disturbance (electrical field strength in a FAR ; 60 GHz – 90 GHz)	na	2.49 dB	2.52 dB	5.00 dB	5.04 dB
Radiated disturbance (electrical field strength in a FAR ; 75 GHz – 110 GHz)	na	2.49 dB	2.52 dB	5.00 dB	5.04 dB
Radiated disturbance (electrical field strength in a FAR ; 110 GHz – 170 GHz)	na	2.38 dB	2.41 dB	4.76 dB	4.82 dB
Radiated disturbance (electrical field strength in a FAR ; 140 GHz – 220 GHz)	na	3.31 dB	3.33 dB	6.62 dB	6.66 dB
6 dB / 20 dB / 26 dB / 99% bandwidth	na	2.5*10 ⁻⁷ %	2.5*10 ⁻⁷ %	4.9*10 ⁻⁶ %	4.9*10 ⁻⁶ %
Frequency stability	na	2.5*10 ⁻⁷ %	2.5*10 ⁻⁷ %	4.9*10 ⁻⁶ %	4.9*10 ⁻⁶ %

- End of test report -