Sub-Test Report* acc. to FCC Title 47 CFR Part 95 M
relating to
HELLA GmbH & Co. KGaA
RS6

Title 47 - Telecommunication
Part 95 - Personal Radio Services
Subpart M – The 76 – 81 GHz Band Radar Service
Measurement Procedure:
ANSI C63.26-2015

DAkkS Deutsche Akkreditierungsstelle D-PL-12053-01-03

*** The EUT has not been tested according to all relevant parts of the test specification. This report does not allow a conclusion about the conformity of the EUT.**

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MANUFACTURER	
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Manufacturer's grantee code	NBG
Manufacturer's address	Rixbecker Str. 75, 59552 Lippstadt, Germany
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TESTING LABORATORY	
Test engineer	Mr. Ralf Trepper
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RELEVANT STANDARD	
Title	**47 - Telecommunication**
Part	**95 – Personal Radio Services**
Subpart	**Subpart M – 76 – 81 GHz Band Radar Service**
Measurement procedure	**ANSI C63.26-2015**

EQUIPMENT UNDER TEST (EUT)	
Equipment category	Advanced Driver Assistance System
Trade name	HELLA
Type designation	**RS6**
Serial no.	---
Variants	---

Test result summary

The following table summarizes the results for the tested EUT corresponding with the essential requirements. Full testing may not be required. If partial testing was performed, this shall be indicated in the relevant column (N.t.[x], not tested, see clause 9) of the table below.

Clause	Rule Part	Requirements headline	Test result		
7.1	§ 15.203	Antenna requirement	**Pass**	~~Fail~~	~~N.t.*~~
7.2	§ 15.207	Conducted Limits	~~Pass~~	~~Fail~~	**N.t.**[1]
7.3	§95.3367	76 – 81 GHz Band Radar Service radiated power limits	**Pass**	~~Fail~~	~~N.t.*~~
7.4	§95.3379	Radiated emission limits, general requirements	**Pass**	~~Fail~~	~~N.t.*~~
7.5	§95.3379	Radiated emission limit above 40 GHz	**Pass**	~~Fail~~	~~N.t.*~~
7.6	§95.3379	Occupied Bandwidth	~~Pass~~	~~Fail~~	**N.t.**[2]
7.7	§95.3379	Frequency Tolerance	~~Pass~~	~~Fail~~	**N.t.**[2]
7.8	§95.3385	76 – 81 GHz Band Radar Service RF exposure evaluation	~~Pass~~	~~Fail~~	**N.t.**[2]

* As far as in this report statements on conformity are made, decision rules according to DIN EN ISO/IEC 17025:2018, 7.8.6 have been applied. For more information see clause 9.

The equipment passed all the performed tests	
☒ **Yes**	☐ **No**

Signature	TÜVNORD Digital unterschrieben von Shrestha Anup Datum: 2024.07.05 16:30:07 +02'00'	TÜVNORD Digital unterschrieben von Trepper Ralf Datum: 2024.07.05 16:52:30 +02'00'
Name	**Mr. Anup Shrestha**	**Mr. Ralf Trepper**
Designation	**RF Test engineer**	**Laboratory Manager**
Date of issue	**2024-06-28**	**2024-06-28**

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1 Revision History

Revision	Date of issue	Creator	Content of change
00	2024-06-24	A Shrestha	Initial release
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Table 0-1: Revision History

Note: If the document has been changed by revision number, all previous documents are no longer valid and must be destroyed.

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2 Introduction

This test report **is not an expert opinion** and consists of:

- Test result summary
- List of contents
- Introduction and further information
- Equipment application data
- Detailed test information
- List of measurement equipment with calibration validity
- Photographs and further test results (plots, graphs, etc.)

The tests were carried out in a representative assembly and in accordance with the test methods and/or requirements stated in:

Item	Applied Standard
Radio test	**FCC Title 47 CFR Part 95 Subpart M Section 95.3301 - 95.3385** Technical requirements for the radar systems operating in the 76 – 81 GHz band
Radio test	**ANSI C63.26-2015** American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

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3 Administrative Data

3.1 Testing laboratory

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Phone: +49 221 8888 950

Accredited by:

DAkkS Deutsche Akkreditierungsstelle GmbH
DAkkS accreditation number: D-PL-12053-01

3.2 Applicant´s details

Company name	: HELLA GmbH & Co. KGaA
Address	: Rixbecker Str. 75
	59552 Lippstadt
Country	: Germany
Contact person	: Mr. Dan Mihai Berinde
Telephone	: +40 372 88 3757
Fax	: ---
Email	: danmihai.berinde@forvia.com
Date of order	: 2024-02-02
Date of receipt	: 2024-02-07
Period of testing time	: 2024-06-13 – 2024-06-26

3.3 Manufacturer´s details

Manufacturer´s name	: (please see Applicant´s details)
Address	: (please see Applicant´s details)

4 Equipment under test (EUT)

4.1 EUT: short description

EUT Type designation	Type of equipment	Trademark	S/N Serial no.	HW Hardware status	SW Software status
RS6	Advanced Driver Assistance System	HELLA	---	H03	R.12.01

ITU emission class	FCC ID
	NBG01RS6

For issuing this report, the following product documentation was used:

Description	Date	Identifications
External photographs of the **E**quipment **U**nder **T**est (EUT)	2024-06-28	Annex no. 1
Internal photographs of the **E**quipment **U**nder **T**est (EUT)	2024-06-28	Annex no. 2
Channel occupancy / bandwidth	---	Annex no. 3
Label sample	2024-06-28	Annex no. 4
Functional description / User manual	2024-06-28	Annex no. 5
Test setup photos	2024-06-28	Annex no. 6
Block diagram	2024-06-28	Annex no. 7
Operational description	2024-06-28	Annex no. 8
Schematics	2024-06-28	Annex no. 9
Parts list	2024-06-28	Annex no. 10

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4.2 Additional Equipment: Short description

Additional Equipment	Type
---	---

4.3 EUT operating mode

EUT operating mode no.	Description of operating modes	Additional information
OP 1	Continuous FMCW Signal	---
OP 2	---	----
OP 3	----	--

4.4 Additional declaration and description of EUT

(Application´s declaration: ☐= not selected, ☒= selected)

<table>
<tr><td colspan="2">EUT</td><td colspan="2">☐ tabletop unit
☐ floor-standing
☐ wall-mounted
☐ base station
☒ built in
☐ mobile
☐ not defined</td><td>Typical use
☐ fixed use
☐ portable use
☒ vehicular use</td></tr>
<tr><td colspan="2">Operating frequency bands over which the equipment is intended to operate</td><td colspan="3">76 GHz – 81 GHz</td></tr>
<tr><td colspan="2">Generated or used frequencies</td><td colspan="3">40 MHz (Crystal)
76 GHz – 81 GHz (carrier)</td></tr>
<tr><td colspan="5">Power line</td></tr>
<tr><td>☐ AC</td><td>☐ L1, ☐ L2, ☐ L3, ☐ N, ☐ PE</td><td>--- V/ AC</td><td>☐ 50 Hz
☐ 60 Hz</td><td rowspan="2">EUT grounding:
☒ none
☐ with power supply
☐ additional</td></tr>
<tr><td>☒ DC</td><td colspan="3">13.2 V/ AC</td></tr>
<tr><td colspan="5">Ports</td></tr>
<tr><td>Port type</td><td colspan="2">Function</td><td>Shielding</td><td>Total cable length used during the test</td></tr>
<tr><td>DC Input</td><td colspan="2">Power supply</td><td>☐ screened
☒ unscreened</td><td></td></tr>
<tr><td></td><td colspan="2"></td><td>☐ screened
☐ unscreened</td><td></td></tr>
</table>

4.5 Modifications

Modification	☐ applicable ☒ not applicable
1	---
2	---

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5 Conclusions, observations and comments

The results of the tests as stated in this report are exclusively applicable to the EUT as identified in this report. TÜV NORD Hochfrequenztechnik GmbH & Co. KG cannot be held liable for properties of the EUT that have not been observed during these tests.

TÜV NORD Hochfrequenztechnik GmbH & Co. KG assumes the sample to comply with the requirements of FCC Title 47 CFR Part 15, for the respective test sector, if the test results turn out positive.

Comments: ---

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6 Operational descriptions

6.1 EUT details

The RS6 is an advanced driver assistant system, to warn the driver of the ego vehicle against potential collisions with other road users to the side, to the rear and to the front of the ego vehicle. The systems consists of two or more radar sensors units, which are mounted hidden behind outer plastic surfaces of a vehicle. Each unit communicates with a vehicle central processing unit via Ethernet.

6.2 EUT configuration

After powering up with a nominal voltage of 13.2V DC, the sensor is permanently set in one of the four different measurement modes and continuously repeating the radar cycle.

6.3 EUT measurement description

Radiated measurements

The EUT was tested in a typical fashion. During preliminary emission tests, the EUT was operated in the continuous measuring mode for worst-case emission mode investigation. Therefore, the final qualification testing was completed with the EUT operated in continuous measuring mode. All tests were performed with the EUT's typical voltage: 13.2 V DC.

To establish the maximum radiation, firstly, there have been viewed all orthogonal adjustments of the test samples, secondly the test ample have been rotated at all adjustments around the own axis between 0° and 360°, and thirdly, the antenna polarization between horizontal and vertical had been varied.

Radiated measurements from 9 kHz – 30 MHz, 30MHz – 1 GHz and above 1 GHz were performed using a small loop antenna, Linear polarized Logarithmic Periodic Broadband Antenna, stacked Logarithmic-Periodic Broadband Antenna for linear polarized and horn antennas respectively with a measuring distance of 3 m inside SAC.

Radiated measurements above 1 GHz is made by placing loose-laid RF absorber material on the ground plane.

Additionally, radiated emission measurements above 1 GHz are made using calibrated linearly polarized antennas, which may have a smaller beam width (main lobe) than do the antennas used for frequencies below 1 GHz. The measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal.

Environmental Conditions during the tests

Temperature: 20 - 26°C // Relative Humidity: 30 -45 % // Air Pressure: 1002 1014 hPa

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7.1 Antenna requirement

7.1.1 Regulation

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 so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

7.1.2 Result

Antenna Type	Antenna description	Frequency	Gain dBi	Number of Antennas
Integrated Tx Antenna	Waveguide slot antenna array	76 GHz – 81 GHz	20.5	3
Integrated Rx Antenna	Waveguide slot antenna array	76 GHz – 81 GHz	11.0	4

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos / test results are attached	☒ **Yes**	☐ **No**	Annexe no.:

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7.2 Conducted limits

7.2.1 Regulation

According to FCC §15.207 (a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Conducted Limits		
Frequency of Emission	**Quasi-Peak (QP)**	**Average (AV)**
MHz	**dBμV**	**dBμV**
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 -30	60	50
*Decreases with the logarithm of the frequency		

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

1) For carrier current system containing their fundamental emission within the frequency band 535–1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535–1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

7.2.2 Test procedures

The EUT and the additional equipment (if required) are connected to the main power through a line impedance stabilization network (LISN). The LISN must be appropriate to ANSI C63.10-2013.
Additional equipment must also be connected to a second LISN with the same specifications described in the above section (if required).

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7.2.3 Result

Test location and equipment

Test site	EMV Laboratory TÜV NORD Hochfrequenztechnik
Receiver	☐ 665
Additional equipment	☐ 272 ☐ 60 ☐ 71a ☐ 551 ☐ 672
Cable	☐ KISN2

Environmental conditions

Environmental conditions	Temperature [°C]	Air pressure [hPa]	Rel. humidity [%]

Measurement results

Conducted emissions - Tested with external AC PoE power supply

Measurement uncertainty < ± 2 dB
****The average limit is not met when using a quasi-peak detector, therefore measurement with the average detector is unnecessary.**

The equipment passed the performed tests	☐ **Yes**	☐ **No**	☒ **N.t.**[1]

Test setup photos / test results are attached	☐ **Yes**	☒ **No**	Annexe no.:

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7.3 76-81 GHz Band Radar Service radiated power limits

7.3.1 Regulation

According to FCC §95.3367, the fundamental radiated emission limits within the 76-81 GHz band are expressed in terms of Equivalent Isotropically Radiated Power (EIRP) and are as follows:

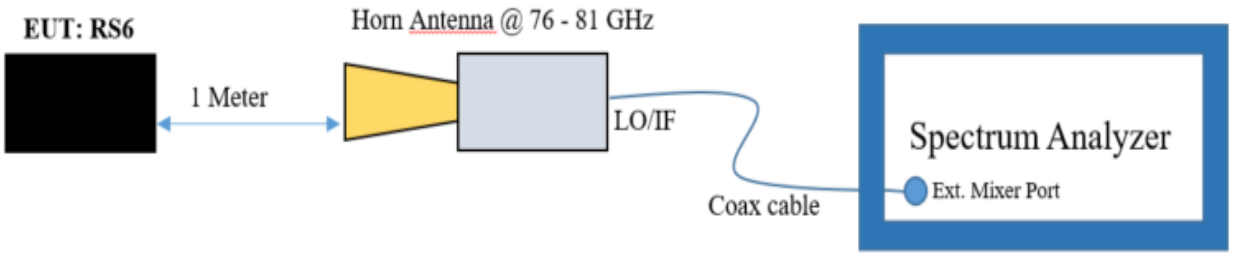
(a) The maximum power (EIRP) within the 76-81 GHz band shall not exceed 50 dBm based on measurements employing a power averaging detector with a 1 MHz Resolution Bandwidth (RBW).

(b) The maximum peak power (EIRP) within the 76-81 GHz band shall not exceed 55 dBm based on measurements employing a peak detector with a 1 MHz RBW.

7.3.2 Test procedure

Maximum measurement distance for the final radiated measurements above 40 GHz was determined according to ANSI C63.10-2013 section 9.8. To achieve maximum level of emission, maximizing procedure was applied according to ANSI C63.10-2013 section 9.8 where initially an exploratory search for emissions was carried out to determine the approximate direction at which each observed emission emanates from the EUT. Secondly, for each emission observed a final measurement was executed to find the final position, polarization, and orientation at which the maximum level of emission was observed. Measurement of the fundamental emission was done using a spectrum analyser according to the procedure ANSI C63.10-2013 section 9.10.

7.3.3 Test setup



7.3.4 Test Results

	Transmitter fundamental radiation (§95.3367) #Peak Power#				
EUT Mode	**Centre Frequency (GHz)**	**Detector**	**EIRP Peak Power (dBm)**	**EIRP Limit (dBm)**	**Margin (dB)**
CS11	76.5	PK	**31.1** @ 76.27 GHz	55.0	23.9
CS12	78.0	PK	**30.5** @ 77.57 GHz	55.0	24.5
	Measurement uncertainty: 60 GHz to 90 GHz: ± 6 dB				

	Transmitter fundamental radiation (§95.3367) #Average Power#				
EUT Mode	**Centre Frequency (GHz)**	**Detector**	**EIRP Average Power (dBm)**	**EIRP Limit (dBm)**	**Margin (dB)**
CS11	76.5	AV	**21.8** @ 76.5 GHz	50.0	28.2
CS12	78.0	AV	**20.9** @ 78.0 GHz	50.0	29.1
	Measurement uncertainty: 60 GHz to 90 GHz: ± 6 dB				

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☐ 667 ☐ 668 ☐ 669				
Receiver	☐ 665	☒ 666			
Antenna	☐ 23	☐ 406	☐ 442	☐ 454a	☒ 385
Additional equipment	☐ 562	☒ 28a	☒ 674		
Cable	☐ K189	☐ K193	☐ K195	☒ K164	

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.[x]**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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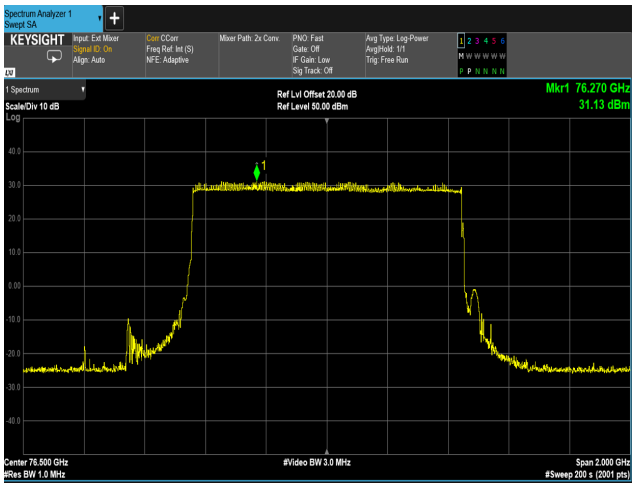
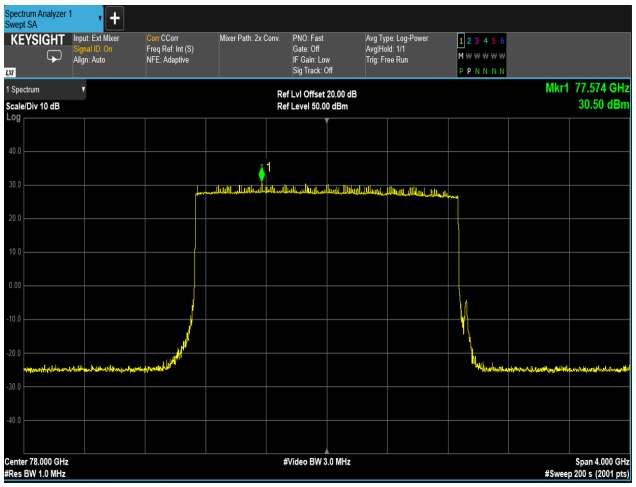
Measurement plots (Peak Power)

CS11

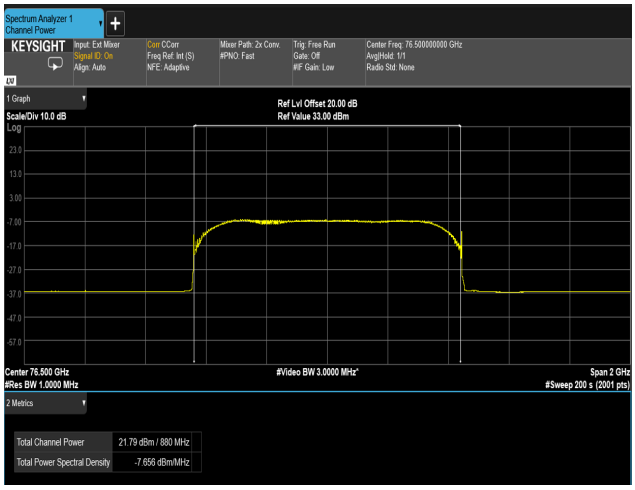


CS12

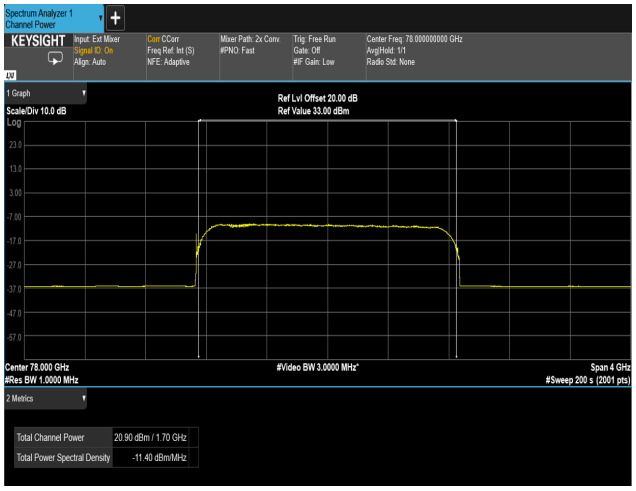


Measurement plots (Average Power)

CS11



CS12



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7.4 Radiated emission limits, general requirements

7.4.1 Regulation

According to FCC §95.3379 (a), the power density of any emissions outside the 76-81 GHz band shall consist solely of spurious emissions and shall not exceed the following:

(1) Radiated emissions below 40 GHz shall not exceed the field strength as shown in the following emissions table.

Intentional radiator- radiated emission limits		
Frequency	**Field Strength**	**Measurement distance**
MHz	**µV / m**	**m**
0.009-0.490	2400/F(kHz)	300
0.490-1.705	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

(i) In the emissions table in paragraph (a) (1) of this section, the tighter limit applies at the band edges.

(ii) The limits in the table in paragraph (a) (1) of this section are based on the frequency of the unwanted emissions and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(iii) The emissions limits shown in the table in paragraph (a)(1) of this section are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9.0-90.0 kHz, 110.0-490.0 kHz, and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector with a 1 MHz RBW.

7.4.2 Test procedure

The measurement of harmonic and spurious emissions at or below 40 GHz was performed in accordance with the standard test methods ANSI C63.10-2013 section 6.3 – 6.6 and section 9.13. The measurement above 40 GHz was carried out in accordance with the test procedure ANSI C63.10-2013 section 9.12. The measurements were done using a quasi-peak detector. For the frequencies above 1 GHz, all the radiated emission measurements were carried out using an average detector.

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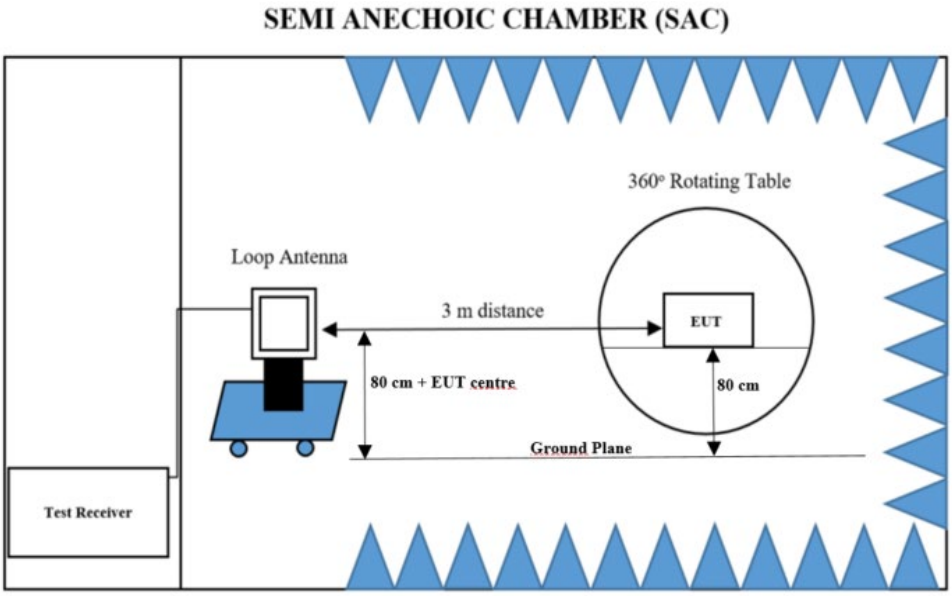
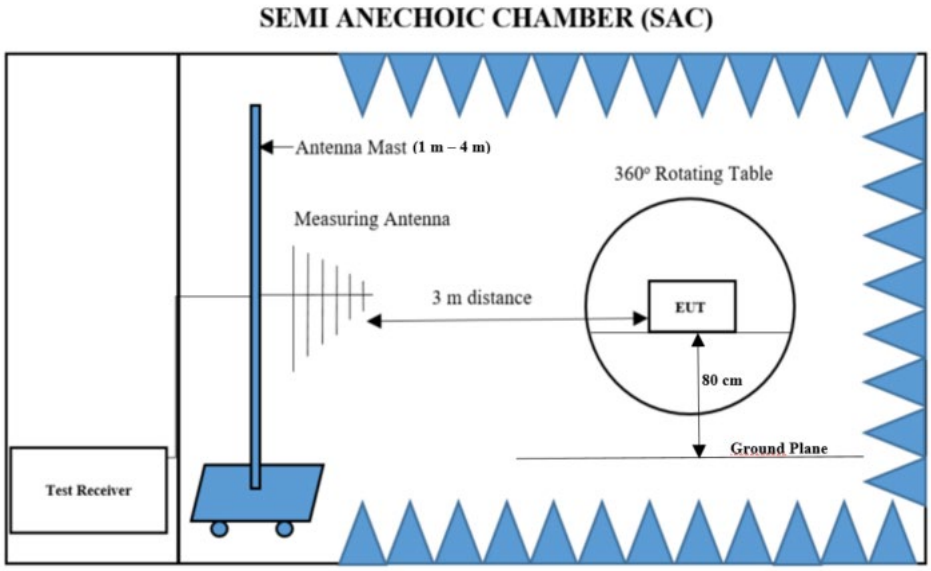
7.4.3 Test setup

Radiated measurements setup (9 kHz – 30 MHz)



Radiated measurements setup (30 MHz – 1 GHz)



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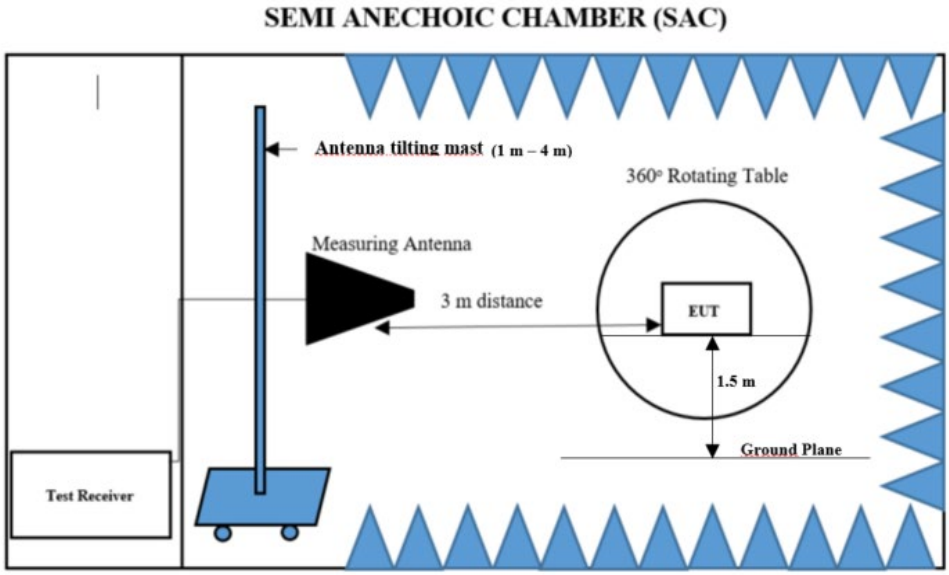
Radiated measurements setup (1 GHz – 40 GHz)



Radiated measurements from 9 kHz – 30 MHz, 30MHz – 1 GHz, 1 GHz – 18 GHz and 18 GHz – 40 GHz were performed using a small loop antenna, Linear polarized Logarithmic Periodic Broadband Antenna, stacked Logarithmic-Periodic Broadband Antenna for linear polarized and horn antenna respectively with a measuring distance of 3 m inside SAC as shown in the above test setup diagrams. Above 40 GHz, the measuring antenna is scanned around the entire perimeter of the EUT in both horizontal and vertical polarization, at the distance of 3.0 m from 40 GHz – 50 GHz, 1.0 m from 50 GHz – 75 GHz, 0.5 m from 75 GHz – 231 GHz.

The measurement procedure for harmonics and spurious emissions at or below 40 GHz is taken from ANSI C63.10-2013.

Radiated emissions test characteristics	
Frequency range	30 MHz - 40,000 MHz
Test distance	3 m*
Test instrumentation resolution bandwidth	120 kHz (30 MHz - 1,000 MHz)
	1 MHz (1000 MHz - 40,000 MHz)
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/horizontal

*According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

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7.4.4 Calculation of the field strength

The field strength is calculated by the following calculation:

Corrected Level = Receiver Level + Correction Factor (without the use of a pre-amplifier)

Corrected Level = Receiver Level + Correction Factor – Pre-amplifier (with the use of a pre-amplifier)

Receiver Level : Receiver reading without correction factors
Correction Factor : Antenna factor + cable loss

For example:
The receiver reading is 32.7 dBµV. The antenna factor for the measured frequency is +2.5 dB (1/m) and the cable factor for the measured frequency is 0.71 dB, giving a field strength of 35.91dBµV/m.
The 35.91dBµV/m value can be mathematically converted to its corresponding level in µV/m.

Level in µV/m = Common Antilogarithm (35.91/20) = 62.44

For test distance other than what is specified, but fulfilling the requirements of Section 15.31 (f) (1) the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements).

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7.4.5 Test Results

Test location and equipment

Test site	☐ 660 ☒ 706 Semi Anechoic Chamber				
	☒ 708	☒ 709	☒ 707		
Receiver	☒ 696	☐ 666	☐ 502		
Antenna	☐ 697	☒ 442	☒ 445a	☒ 406	☐ 515
	☐ 384	☐ 385			
Additional equipment	☐ 698	☐ 102a	☒ 226	☐ 401	☐ 506
	☐ Test fixture		☒ 223a	☒ 443	
Cable	☒ K205	☒ K203	☒ K198	☒ K199	☐ K94
	☒ K163	☒ K207			

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.[x]**

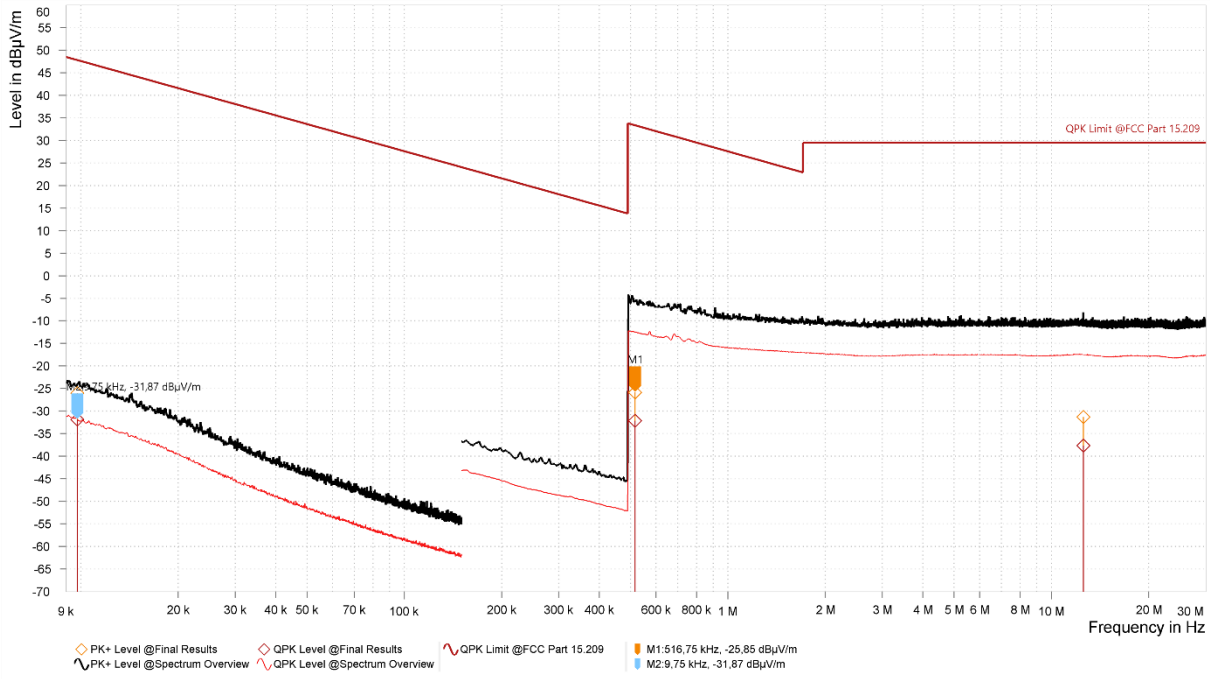
Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

Measurement results

CS11 @ 76.5 GHz

9 kHz – 30 MHz

Transmitter spurious radiation (Section 95.3379)								
Frequency [MHz]	**QPK Level [dBµV/m]**	**QPK Limit [dBµV/m]**	**QPK Margin [dB]**	**Correction [dB]**	**Polarization**	**Azimuth [deg]**	**Antenna Height [m]**	**Meas. BW [kHz]**
0.010	-31.87	47.81	79.68	-59.88	H	-10	1.50	0.200
0.517	-32.13	33.34	65.46	-19.70	H	30	1.50	0.200
12.559	-37.66	29.50	67.16	-19.90	H	145	1.50	0.200
Measurement uncertainty: ± 4 dB								



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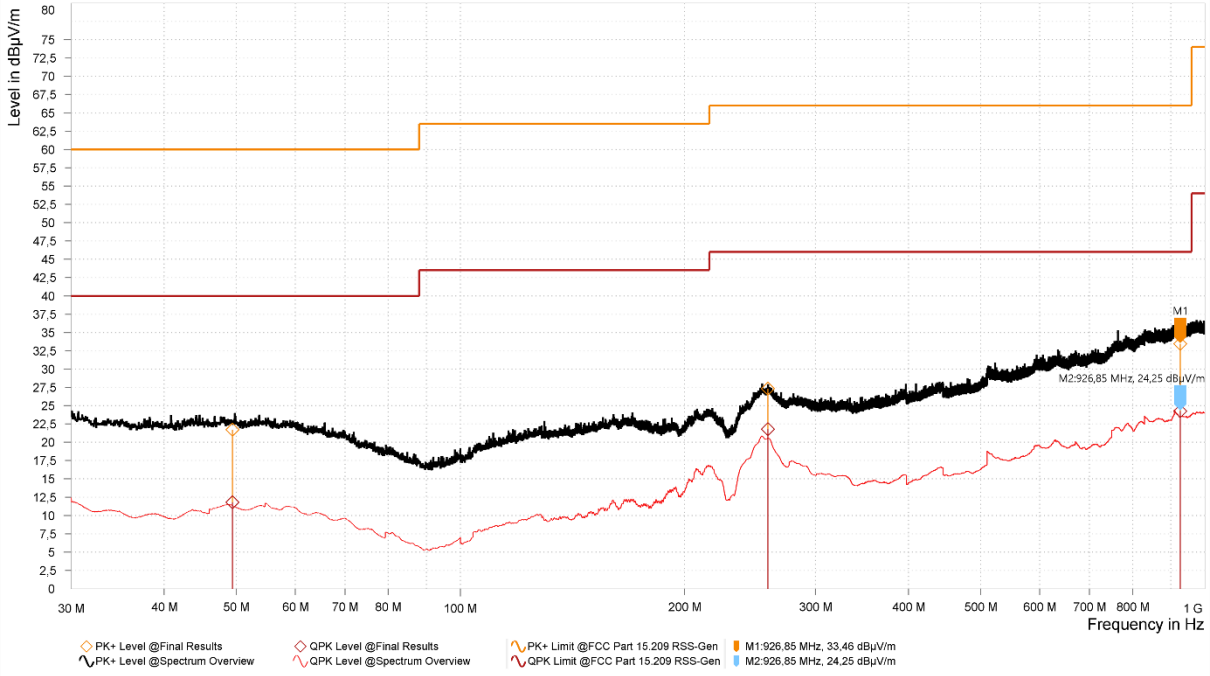
30 MHz – 1 GHz

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
49.410	11.82	40.00	28.18	21.73	60.00	38.27	18.38	H	-141	3.51	120.000	1.000
259.020	21.79	46.00	24.21	27.34	66.00	38.66	17.11	V	-23	1.10	120.000	1.000
926.850	24.25	46.00	21.75	33.46	66.00	32.54	30.16	V	159	2.38	120.000	1.000
Measurement uncertainty: ± 4 dB												



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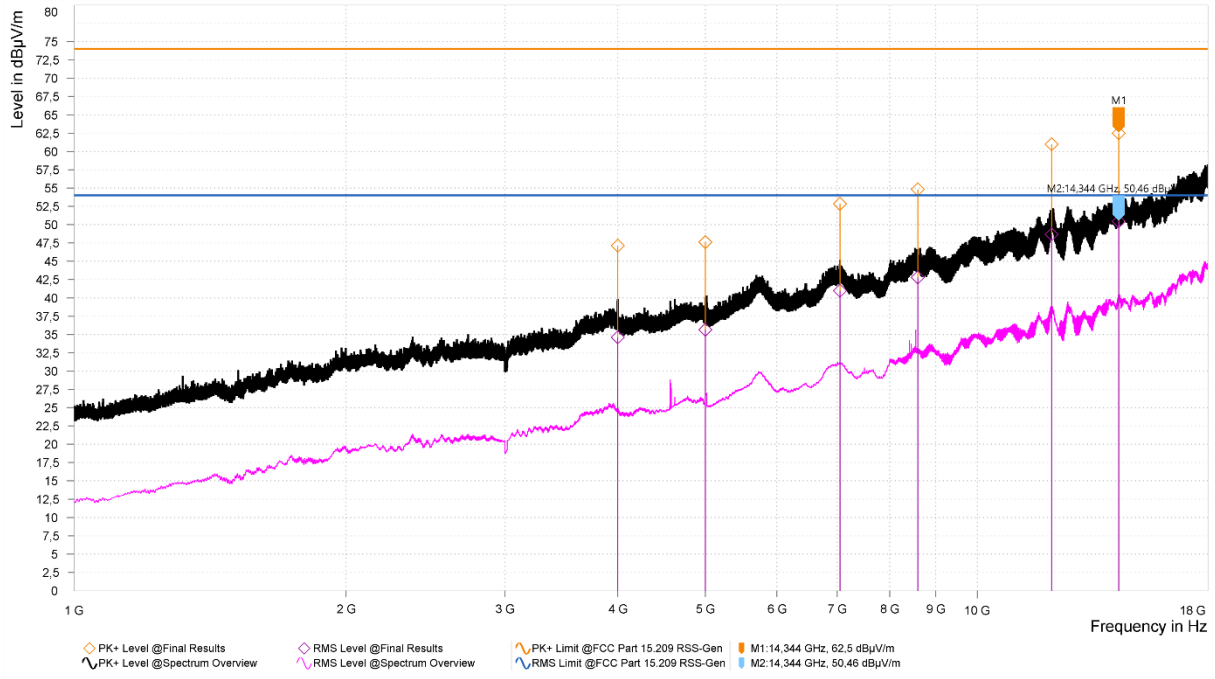
1 GHz – 18 GHz

Frequency [MHz]	RMS Level [dBµV/m]	RMS Limit [dBµV/m]	RMS Margin [dB]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
3,998.625	34.62	54.00	19.38	47.15	74.00	26.85	8.99	V	89	2.30	1000	1.000
5,000.125	35.66	54.00	18.34	47.63	74.00	26.37	10.44	V	-78	2.49	1000	1.000
7,047.100	40.96	54.00	13.04	52.83	74.00	21.17	17.50	H	-1	2.81	1000	1.000
8,595.775	42.79	54.00	11.21	54.82	74.00	19.18	19.57	H	-94	1.90	1000	1.000
12,091.100	48.67	54.00	5.33	60.99	74.00	13.01	25.91	H	65	3.52	1000	1.000
14,344.250	50.46	54.00	3.54	62.50	74.00	11.50	27.52	V	-90	4.00	1000	1.000
Measurement uncertainty: ± 4 dB												



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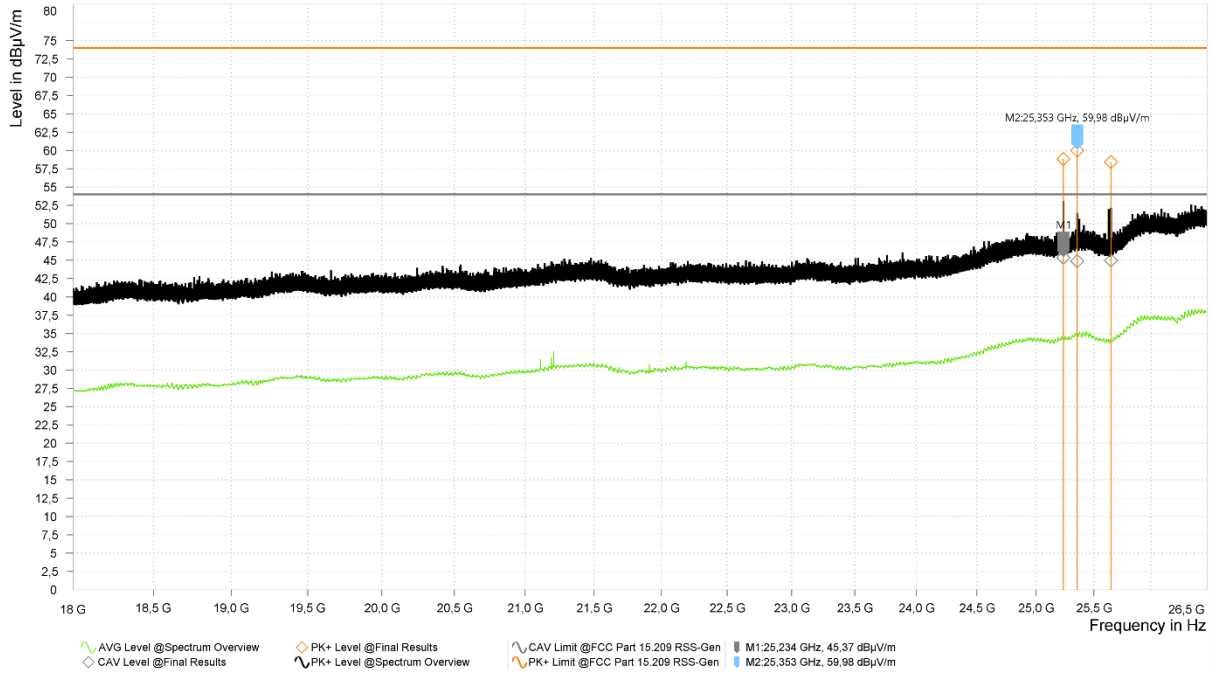
18 GHz – 26.5 GHz

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	CAV Level [dBµV/m]	CAV Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
25,234.050	58.81	74.00	15.19	45.37	54.00	8.63	24.15	V	-6	1.19	1000	1.000
25,353.290	59.98	74.00	14.02	44.88	54.00	9.12	24.32	V	-6	1.18	1000	1.000
25,648.150	58.42	74.00	15.58	44.98	54.00	9.02	24.68	H	-16	1.42	1000	1.000
Measurement uncertainty: ± 4 dB												



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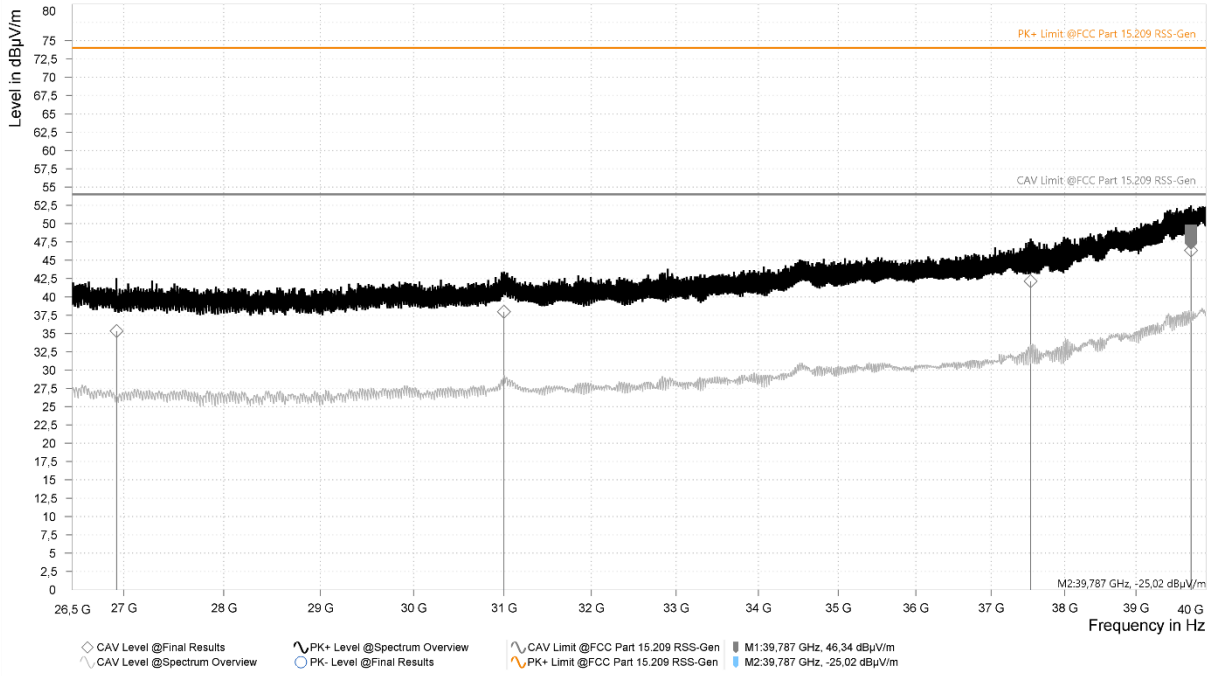
26.5 GHz – 40 GHz

Frequency [MHz]	PK- Level [dBµV/m]	CAV Level [dBµV/m]	CAV Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
26,931.040	-44.66	35.34	54.00	18.66	25.67	H	111	1.00	1000	1.000
31,000.600	-31.08	37.98	54.00	16.02	28.44	V	-30	1.45	1000	1.000
37,535.320	-41.88	42.14	54.00	11.86	34.64	H	-147	2.06	1000	1.000
39,787.170	-25.02	46.34	54.00	7.66	41.93	H	-165	1.46	1000	1.000
Measurement uncertainty: ± 5.7 dB										



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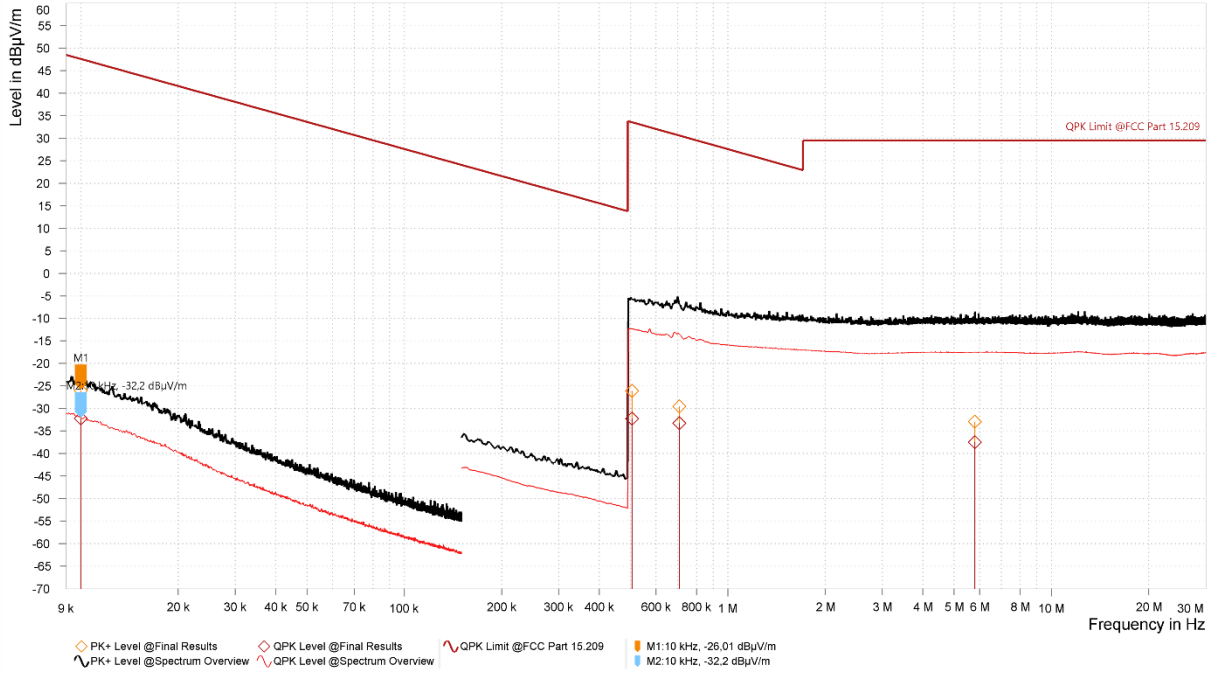
CS12 @ 78.0 GHz

9 kHz – 30 MHz

Transmitter spurious radiation (Section 95.3379)								
Frequency [MHz]	**QPK Level [dBµV/m]**	**QPK Limit [dBµV/m]**	**QPK Margin [dB]**	**Correction [dB]**	**Polarization**	**Azimuth [deg]**	**Antenna Height [m]**	**Meas. BW [kHz]**
0.010	-32.20	47.59	79.79	-59.80	H	120	1.50	0.200
0.506	-32.27	33.53	65.79	-19.70	H	105	1.50	0.200
0.708	-33.26	30.58	63.84	-19.70	H	45	1.50	0.200
5.795	-37.49	29.50	66.99	-19.80	H	106	1.50	0.200
Measurement uncertainty: ± 4 dB								



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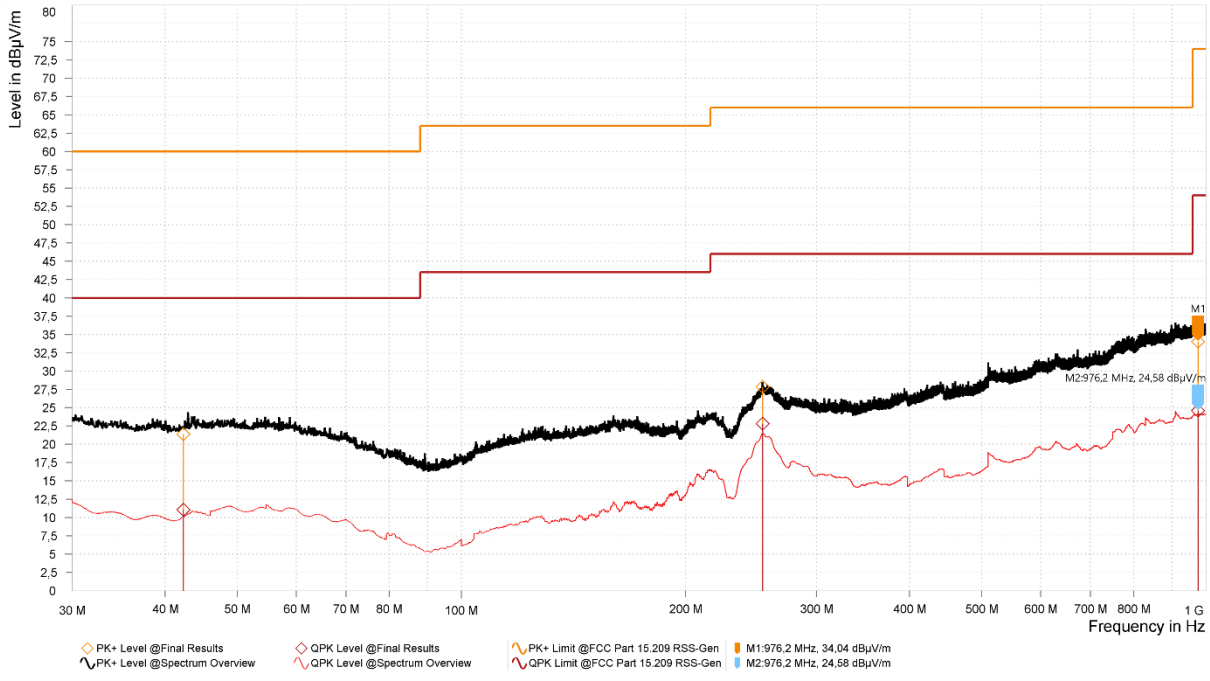
30 MHz – 1 GHz

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
42.330	11.06	40.00	28.94	21.37	60.00	38.63	18.06	V	-3	1.36	120.000	1.000
254.010	22.80	46.00	23.20	27.86	66.00	38.14	16.84	V	-3	1.10	120.000	1.000
976.200	24.58	54.00	29.42	34.04	74.00	39.96	30.80	V	-83	2.51	120.000	1.000
Measurement uncertainty: ± 4 dB												



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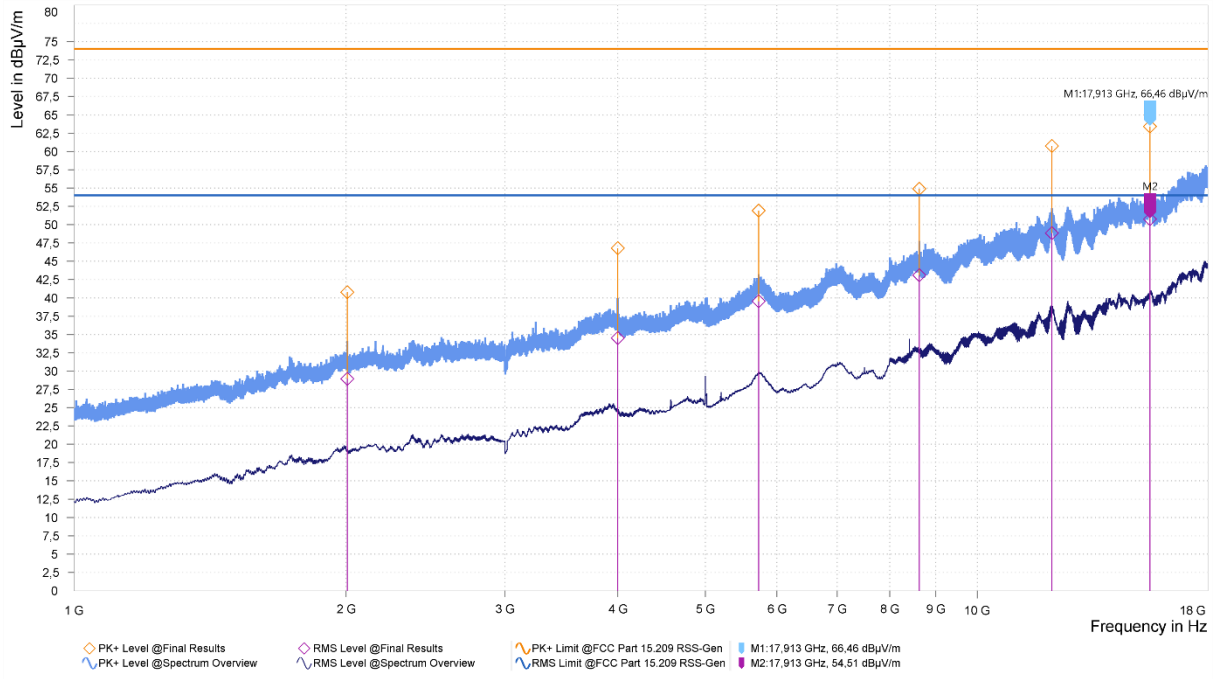
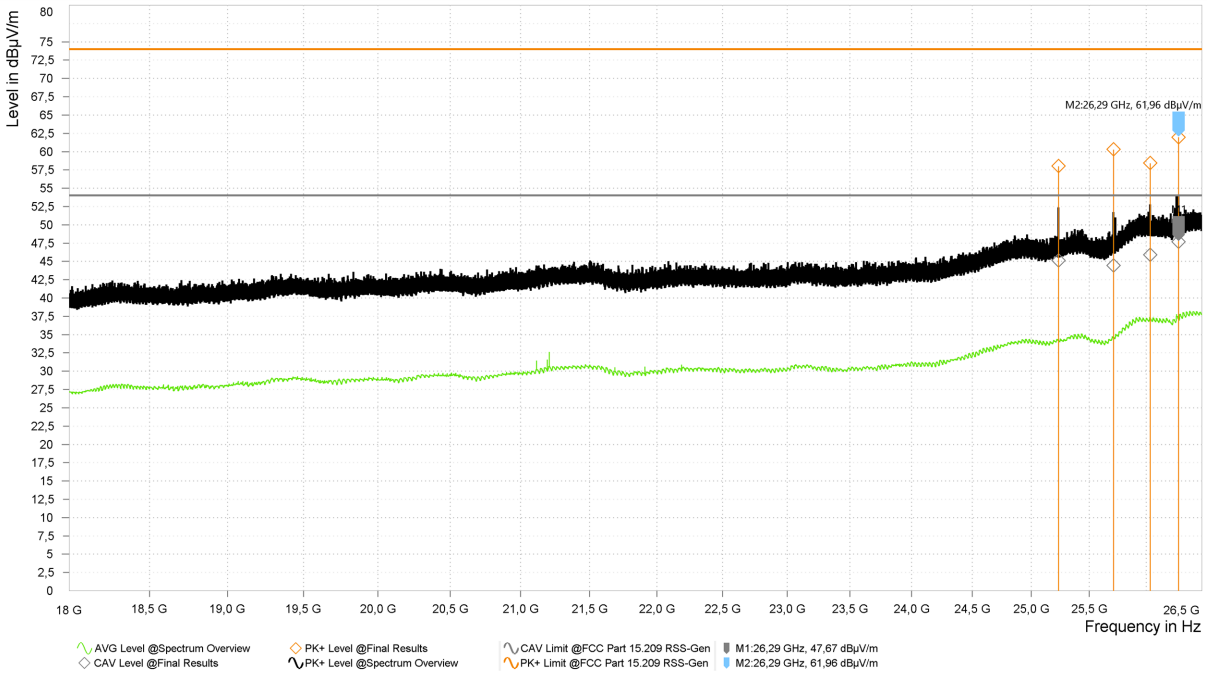
1 GHz – 18 GHz

Frequency [MHz]	RMS Level [dBµV/m]	RMS Limit [dBµV/m]	RMS Margin [dB]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
2,006.875	28.94	54.00	25.06	40.78	74.00	33.22	1.91	H	-60	2.60	1000	1.000
3,998.400	34.51	54.00	19.49	46.80	74.00	27.20	8.99	V	-49	2.30	1000	1.000
5,727.550	39.55	54.00	14.45	51.92	74.00	22.08	15.40	V	24	2.29	1000	1.000
8,627.925	43.10	54.00	10.90	54.90	74.00	19.10	19.42	V	-16	3.93	1000	1.000
12,098.250	48.84	54.00	5.16	60.73	74.00	13.27	25.98	H	43	2.20	1000	1.000
15,531.750	50.77	54.00	3.23	63.41	74.00	10.59	27.76	H	155	1.95	1000	1.000
Measurement uncertainty: ± 4 dB												



18 GHz – 26.5 GHz

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	CAV Level [dBµV/m]	CAV Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
25,233.875	58.00	74.00	16.00	45.10	54.00	8.90	24.15	V	-1	1.19	1000	1.000
25,711.425	60.29	74.00	13.71	44.42	54.00	9.58	24.88	V	48	1.43	1000	1.000
26,037.300	58.42	74.00	15.58	45.89	54.00	8.11	26.14	V	86	1.96	1000	1.000
26,289.650	61.96	74.00	12.04	47.67	54.00	6.33	27.23	V	58	1.19	1000	1.000
Measurement uncertainty: ± 4 dB												



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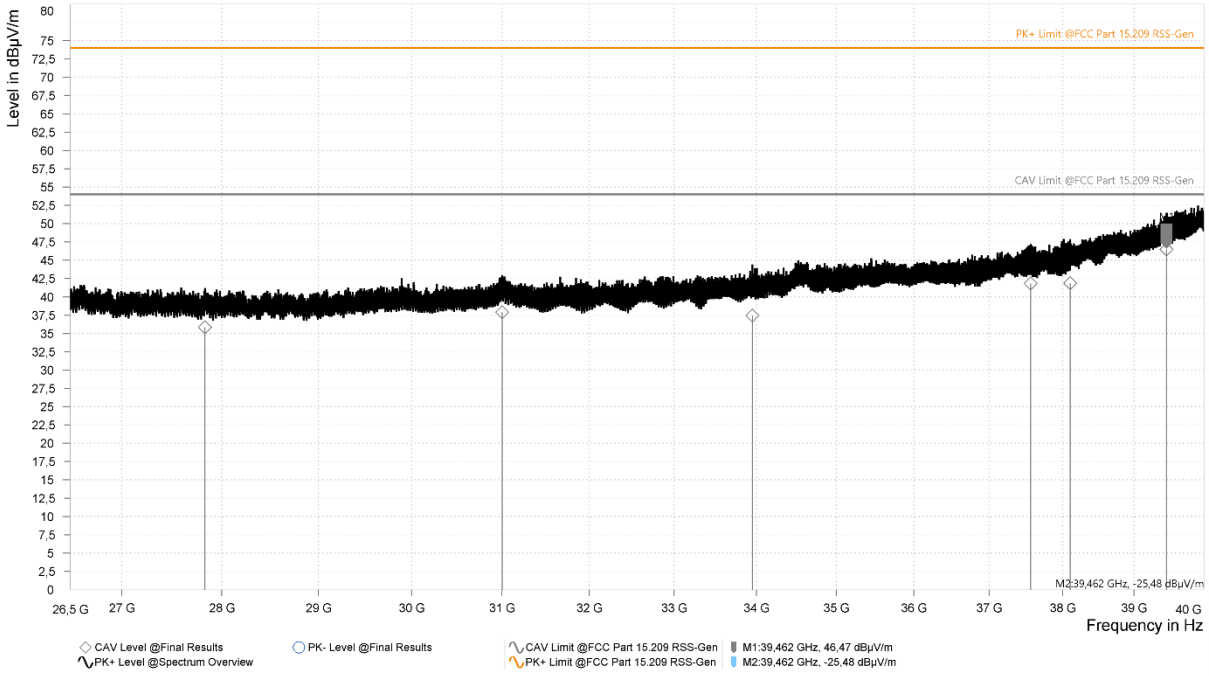
26.5 GHz – 40 GHz

Frequency [GHz]	PK- Level [dBµV/m]	CAV Level [dBµV/m]	CAV Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
27,830.230	-35.59	35.83	54.00	18.17	25.06	H	-115	1.87	1000	1.000
31,001.830	-36.10	37.88	54.00	16.12	28.43	H	46	2.36	1000	1.000
33,952.650	-34.17	37.44	54.00	16.56	30.27	V	-117	2.29	1000	1.000
37,561.750	-36.92	41.84	54.00	12.16	34.68	H	-53	1.92	1000	1.000
38,103.930	-32.24	41.86	54.00	12.14	35.71	V	-114	1.81	1000	1.000
39,461.830	-25.48	46.47	54.00	7.53	40.86	H	0	1.93	1000	1.000
Measurement uncertainty: ± 5.7 dB										



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7.5 Radiated emission limit above 40 GHz

7.5.1 Regulation

According to FCC §95.3379 (a)

(2) The power density of radiated emissions outside the 76-81 GHz band above 40.0 GHz shall not exceed the following, based on measurements employing an average detector with a 1 MHz RBW:

(i) For radiated emissions outside the 76-81 GHz band between 40 GHz and 200 GHz from field disturbance sensors and radar systems operating in the 76-81 GHz band: 600 pW/cm2 at a distance of 3 meters from the exterior surface of the radiating structure.

(ii) For radiated emissions above 200 GHz from field disturbance sensors and radar systems operating in the 76-81 GHz band: 1000 pW/cm2 at a distance of 3 meters from the exterior surface of the radiating structure.

(3) For field disturbance sensors and radar systems operating in the 76-81 GHz band, the spectrum shall be investigated up to 231.0 GHz.

7.5.2 Test procedure

The measurement of harmonic and spurious emissions above 40 GHz was performed in accordance with the standard test methods ANSI C63.10-2013 sections 9.8, 9.9 and 9.12. For the frequencies above 1 GHz, all the radiated emission measurements were carried out using an average detector.

The measurement procedure for harmonics and spurious emissions above 40 GHz is taken from ANSI C63.10-2013.

Radiated emissions test characteristics	
Frequency range	9 kHz - 231,000 MHz
Test distance	10m, 3 m*
Test instrumentation resolution bandwidth	9 kHz (20 kHz – 30 MHz)
	120 kHz (30 MHz – 1.000 MHz)
	1 MHz (1000 MHz – 231.000 MHz)
Receive antenna height	1 m (20 kHz – 30 MHz)
Receive antenna polarization	0° - 90° (20 kHz – 30 MHz)
Receive antenna scan height	1 m - 4 m (30 MHz - 18,000 MHz) 1 m – 2.5 m (18,000 MHz – 40.000 MHz) 1 m – 1.5 m (40,000 MHz – 231.000 MHz)
Receive antenna polarization	vertical/horizontal (Above 30 MHz)

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*According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

7.5.3 Equations to calculate power density

Convert the EIRP in dBm to the EIRP in watts using Equation

$$EIRP_{Linear} = \mathbf{10}^{[(\boldsymbol{EIRP_{Log}} - \mathbf{30})/\mathbf{10}]}$$

Where:

EIRP Linear is the equivalent isotropically radiated power, in watts
EIRP Log is the equivalent isotropically radiated power, in dBm

Calculate the power density at the distance specified by the limit from the EIRP in watts using Equation:

$$\boldsymbol{PD} = \frac{\boldsymbol{EIRP_{Linear}}}{\mathbf{4\pi d^2}} \qquad (1)$$

Where,

PD	is the power density at the distance specified by the limit, in W/m^2
$EIRP_{Linear}$	is the equivalent isotropically radiated power, in watts
D	is the distance at which the power density limit is specified, in m

According to FCC §95.3379 (2) (i), the radiated emission limit outside the 76 - 81 GHz band between 40 GHz and 200 GHz is 600 pW/cm^2 at a distance of 3 meters from the exterior surface of the radiating structure. As per above equation (1)

$\boldsymbol{EIRP_{Linear}} = \boldsymbol{PD} * \mathbf{4\pi d^2}$ = **0.000006 * 4* π * 9 = 0.0006786 W**
$\boldsymbol{EIRP_{dBm}} = \mathbf{-1.69}$

According to FCC §95.3379 (2) (ii), the radiated emission limit outside the 76 - 81 GHz band above 200 GHz is 1000 pW/cm^2 at a distance of 3 meters from the exterior surface of the radiating structure. As per above equation (1)

$\boldsymbol{EIRP_{Linear}} = \boldsymbol{PD} * \mathbf{4\pi d^2}$ = **0.00001 * 4* π * 9 = 0.001131 W**
$\boldsymbol{EIRP_{dBm}} = \mathbf{0.53}$

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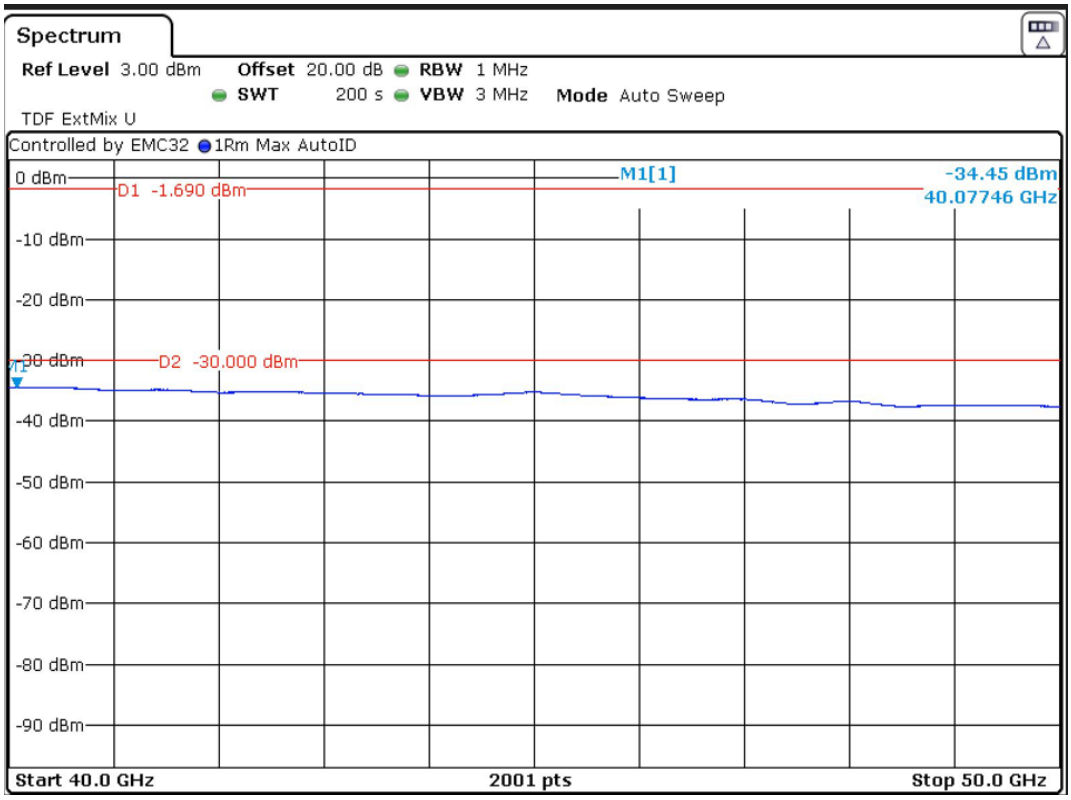
7.5.4 Test Results

CS11 @ 76.5 GHz

40 GHz – 50 GHz

Transmitter spurious radiation (Section 95.3379)								
Frequency (MHz)	Avg. Peak (dBuV/m)	Limit dBm	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
**	---	-1.69	---	---	---	---	---	---
Measurement uncertainty: ± 5.7 dB								
** No emissions detected!								



Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☒ 668 ☒ 669			
Receiver	☐ 665	☐ 666	☒ 502	
Antenna	☐ 406	☒ 442	☐ 454a	☒ 518
Additional equipment	☒ 515			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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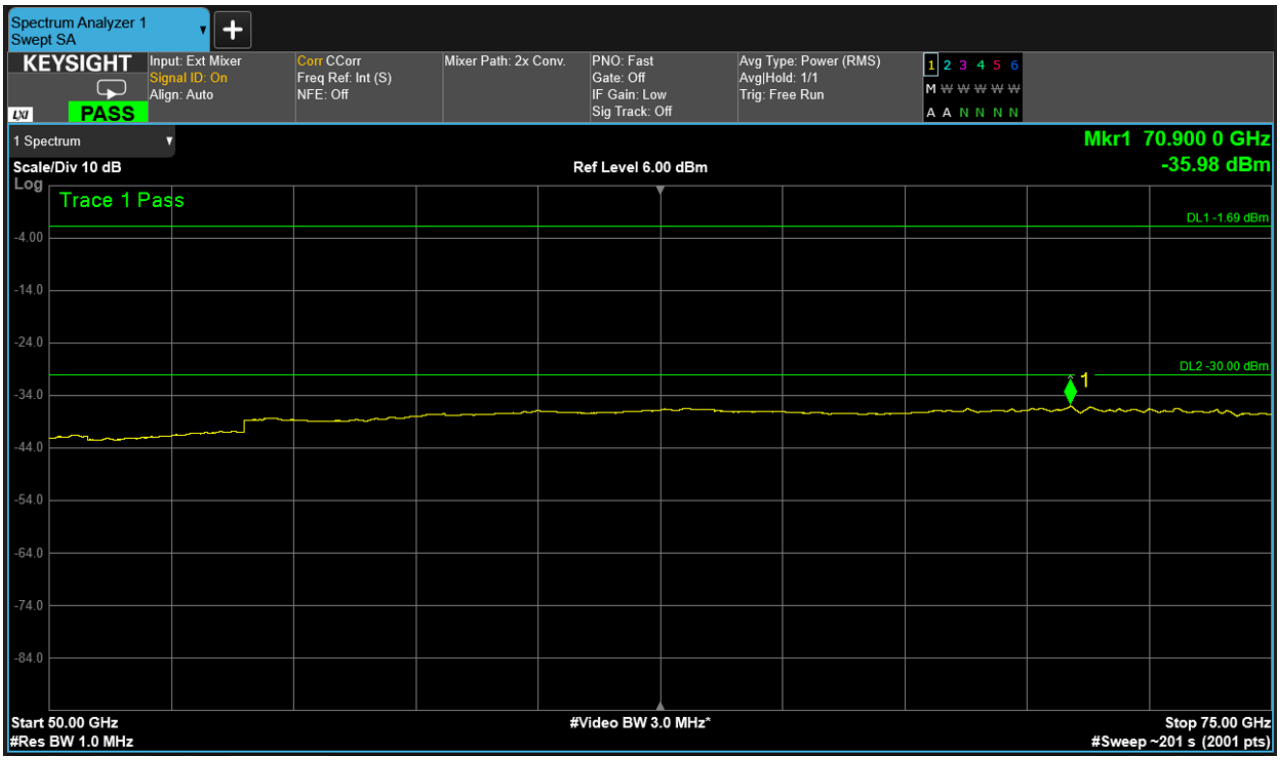
50 GHz – 75 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669
Receiver	☐ 665 ☒ 666 ☐ 502
Antenna	☐ 406 ☐ 442 ☐ 454a ☒ 384
Additional equipment	☒ 673
Cable	☐ K189 ☐ K193 ☐ K195 ☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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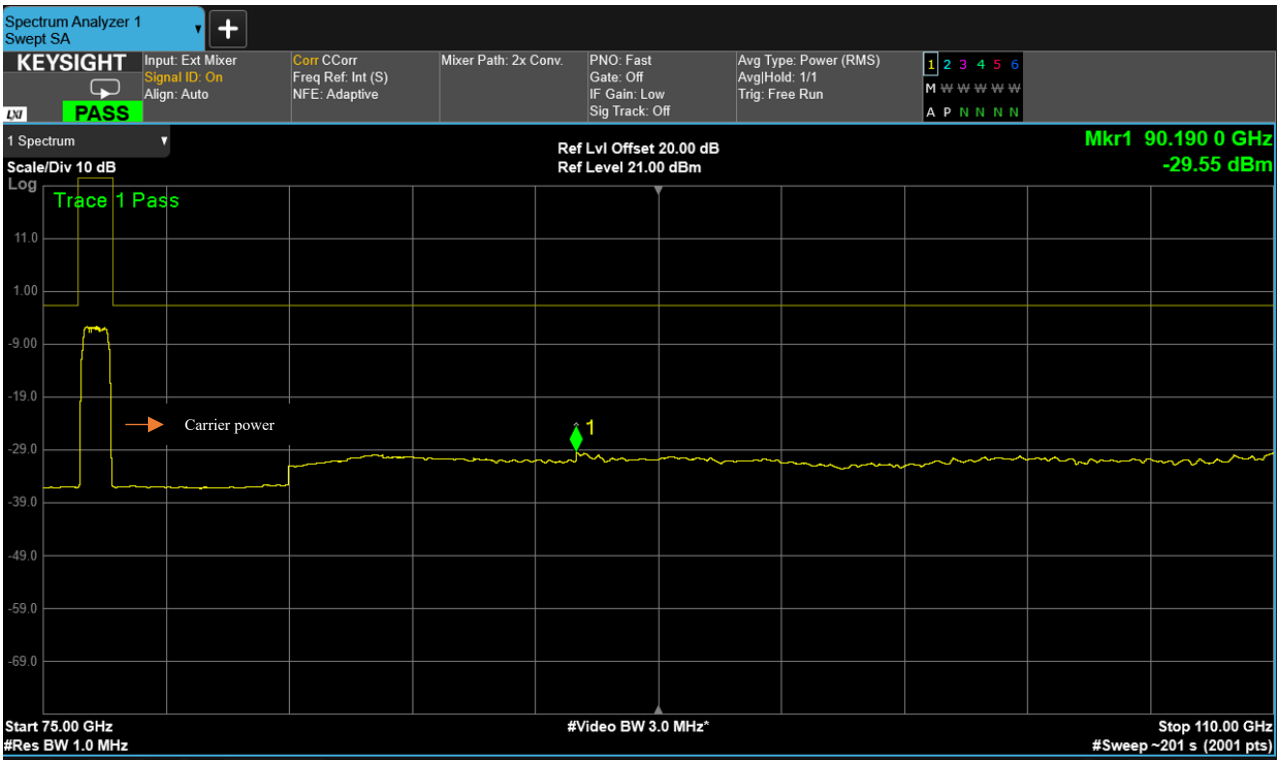
75 GHz – 110 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669
Receiver	☐ 665 ☒ 666 ☐ 502
Antenna	☐ 406 ☐ 442 ☐ 454a ☒ 385
Additional equipment	☒ 674
Cable	☐ K189 ☐ K193 ☐ K195 ☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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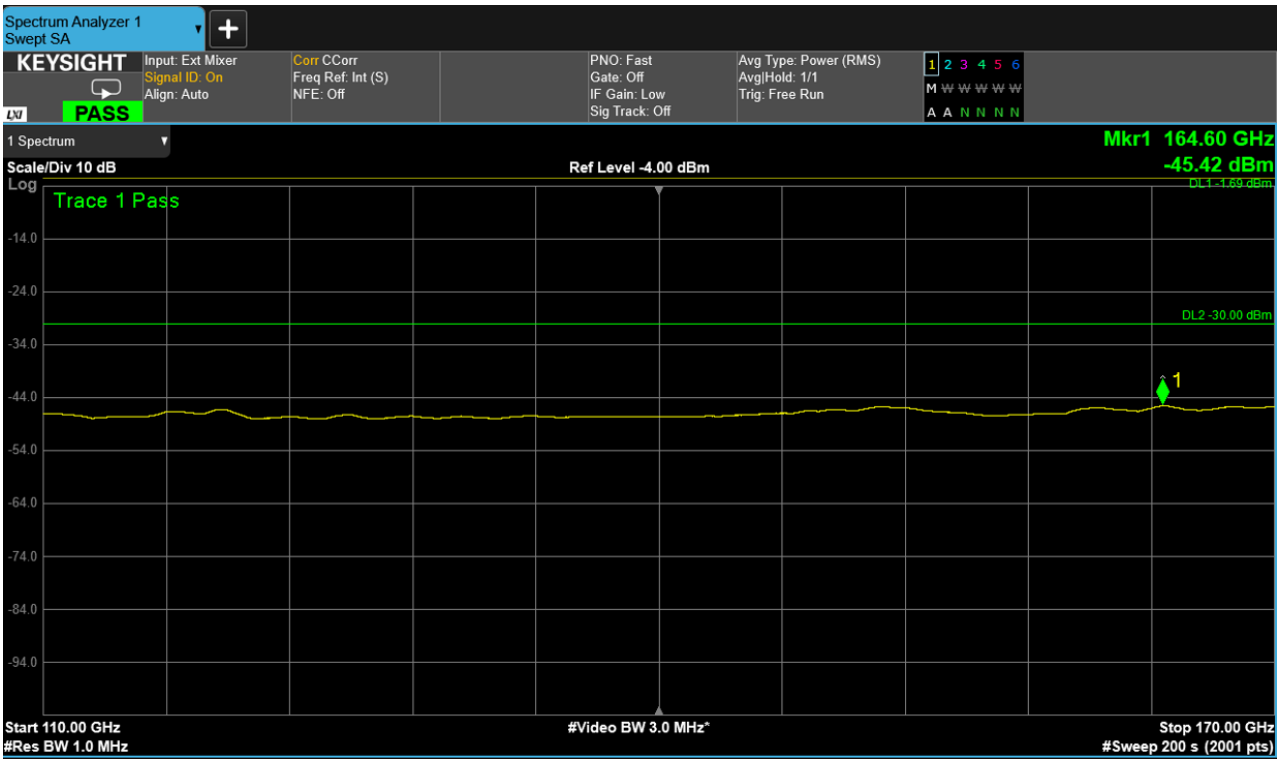
110 GHz – 170 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 687
Additional equipment	☒ 675			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	**☒ Yes**	**☐ No**	**☐ N.t.x**

Test setup photos	**☒ Yes**	**☐ No**	**Annex no. 6**

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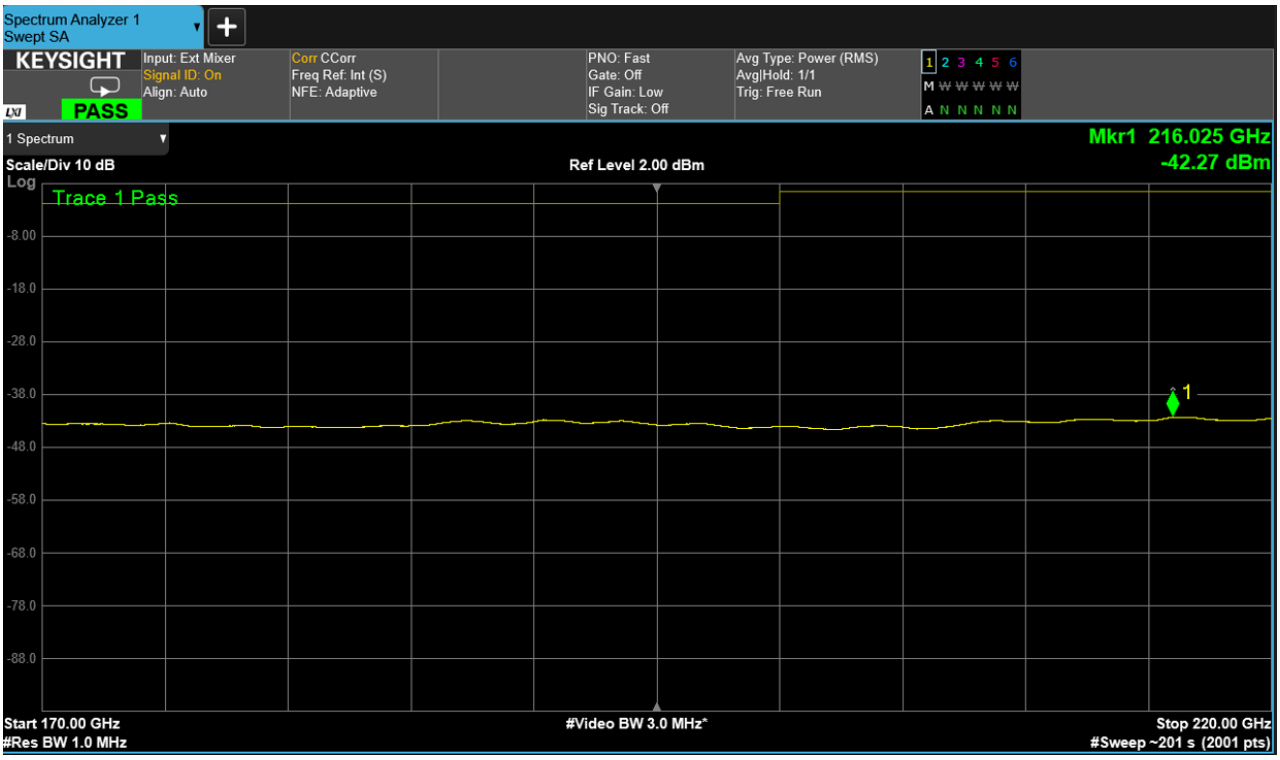
170 GHz – 220 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
170 -200	**	---	---	---	---	---	---	-1.69	---
200 -220	**	---	---	---	---	---	---	0.53	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 688
Additional equipment	☒ 677			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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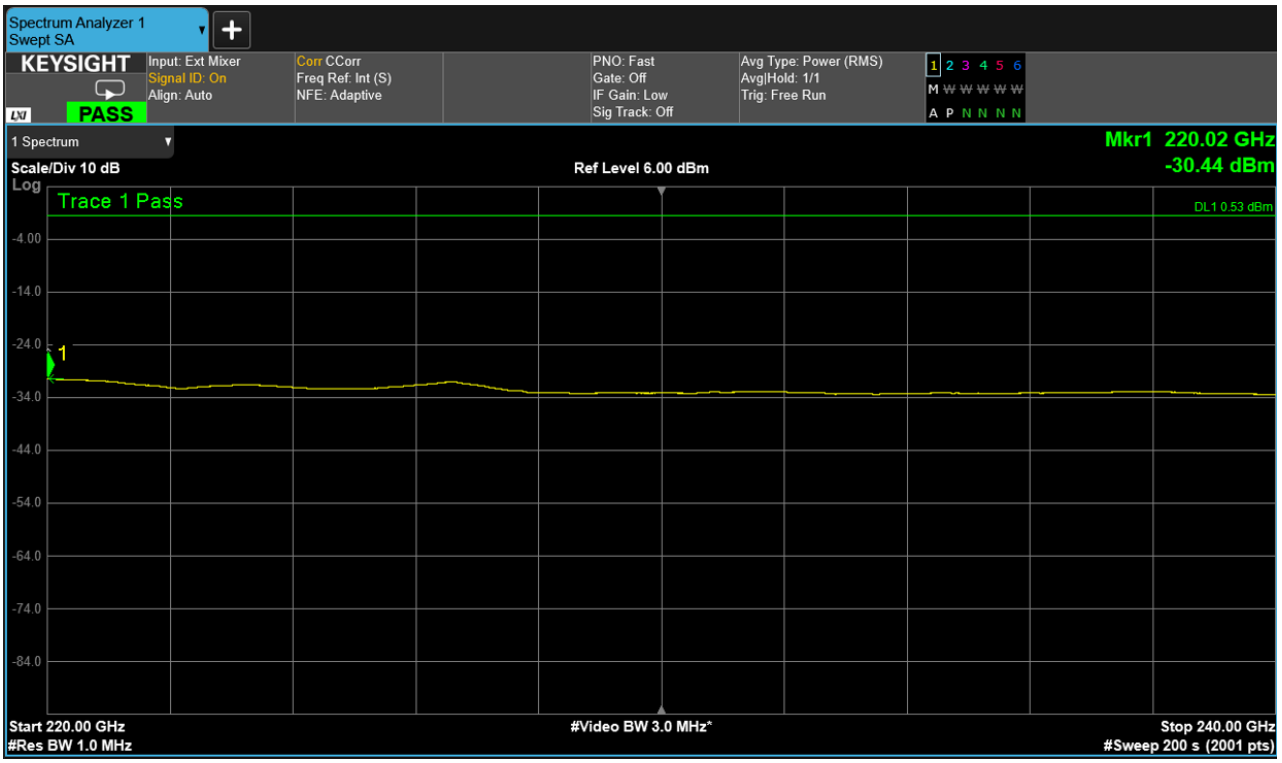
220 GHz – 240 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	0.53	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 689
Additional equipment	☒ 679			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	**☒ Yes**	**☐ No**	**☐ N.t.x**

Test setup photos	**☒ Yes**	**☐ No**	**Annex no. 6**

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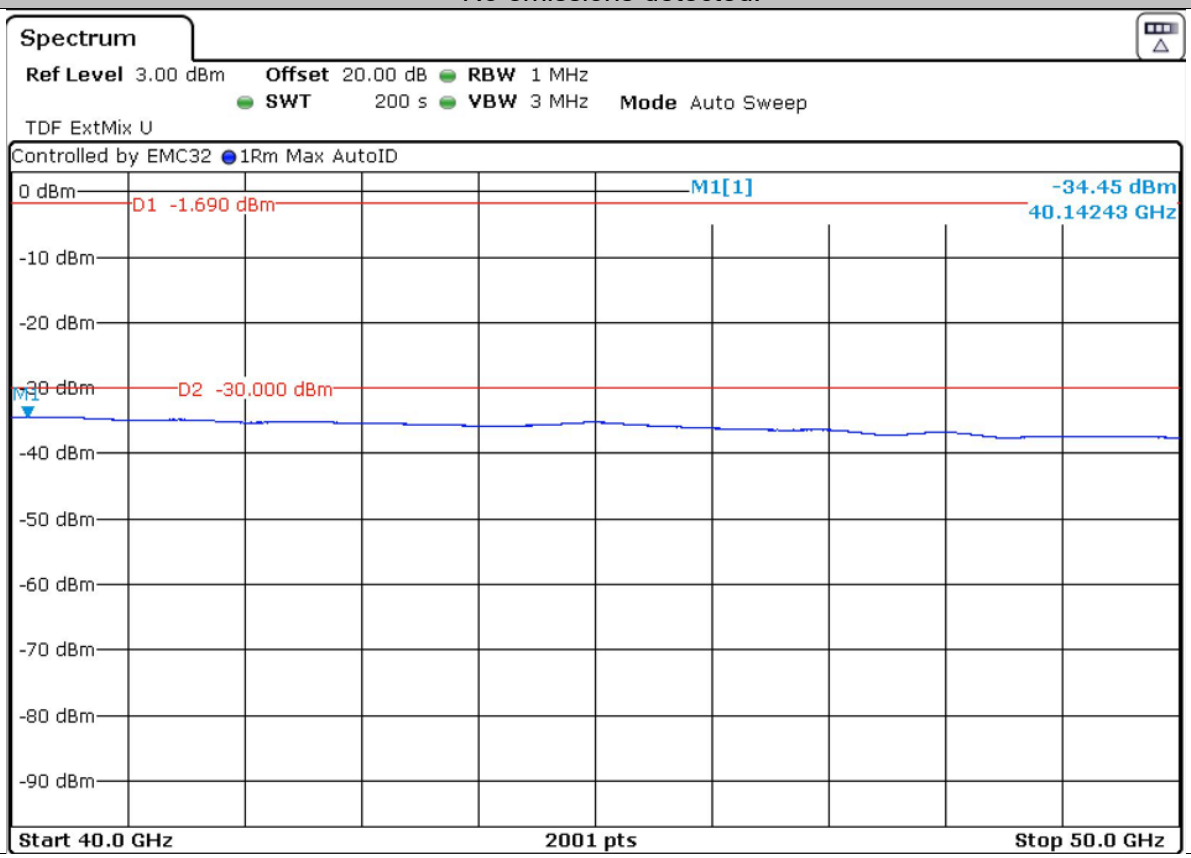
CS12 @ 78.0 GHz

40 GHz – 50 GHz

Transmitter spurious radiation (Section 95.3379)								
Frequency (MHz)	**Avg. Peak (dBuV/m)**	**Limit dBm**	**Margin (dB)**	**Meas. Time (ms)**	**Bandwidth (kHz)**	**Height (cm)**	**Pol**	**Azimuth (deg)**
**	---	-1.69	---	---	---	---	---	---
Measurement uncertainty: ± 5.7 dB								
** No emissions detected!								



Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☒ 668 ☒ 669			
Receiver	☐ 665	☐ 666	☒ 502	
Antenna	☐ 406	☒ 442	☐ 454a	☒ 518
Additional equipment	☒ 515			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	**☒ Yes**	**☐ No**	**☐ N.t.x**

Test setup photos	**☒ Yes**	**☐ No**	**Annex no. 6**

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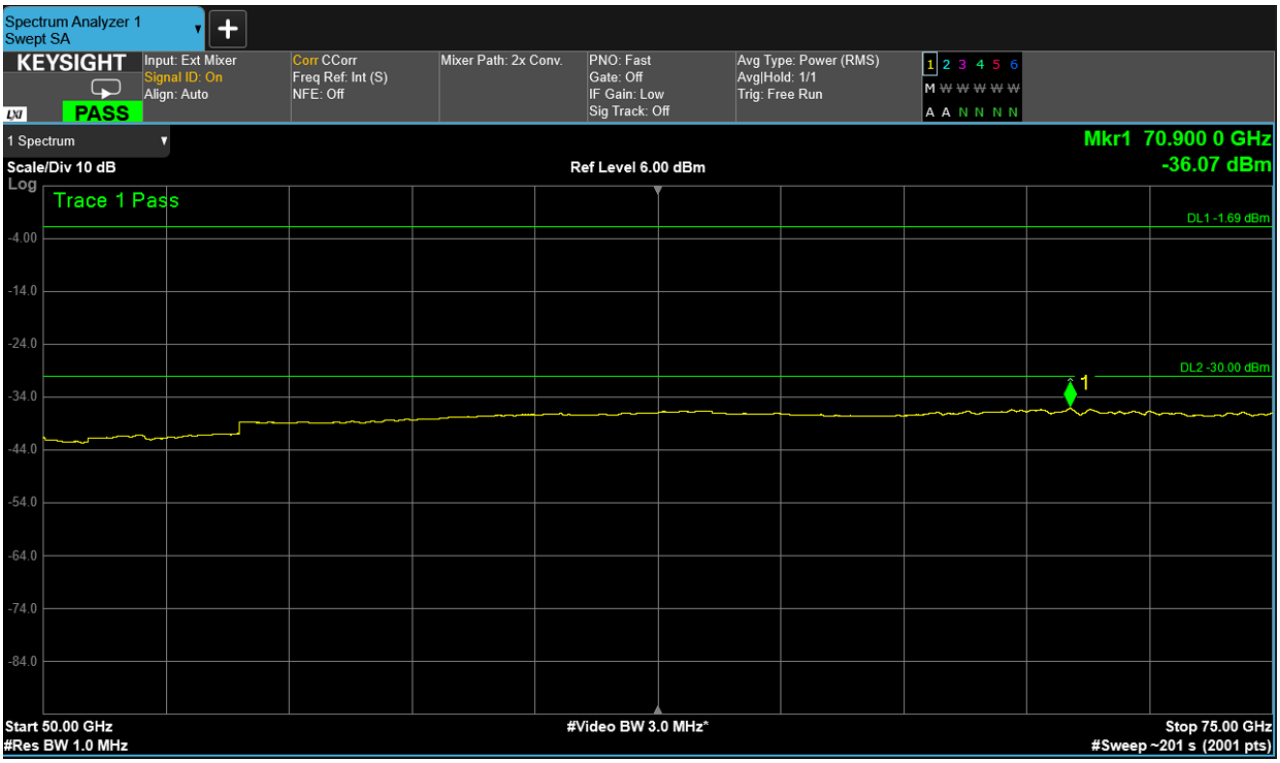
50 GHz – 75 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669
Receiver	☐ 665 ☒ 666 ☐ 502
Antenna	☐ 406 ☐ 442 ☐ 454a ☒ 384
Additional equipment	☒ 673
Cable	☐ K189 ☐ K193 ☐ K195 ☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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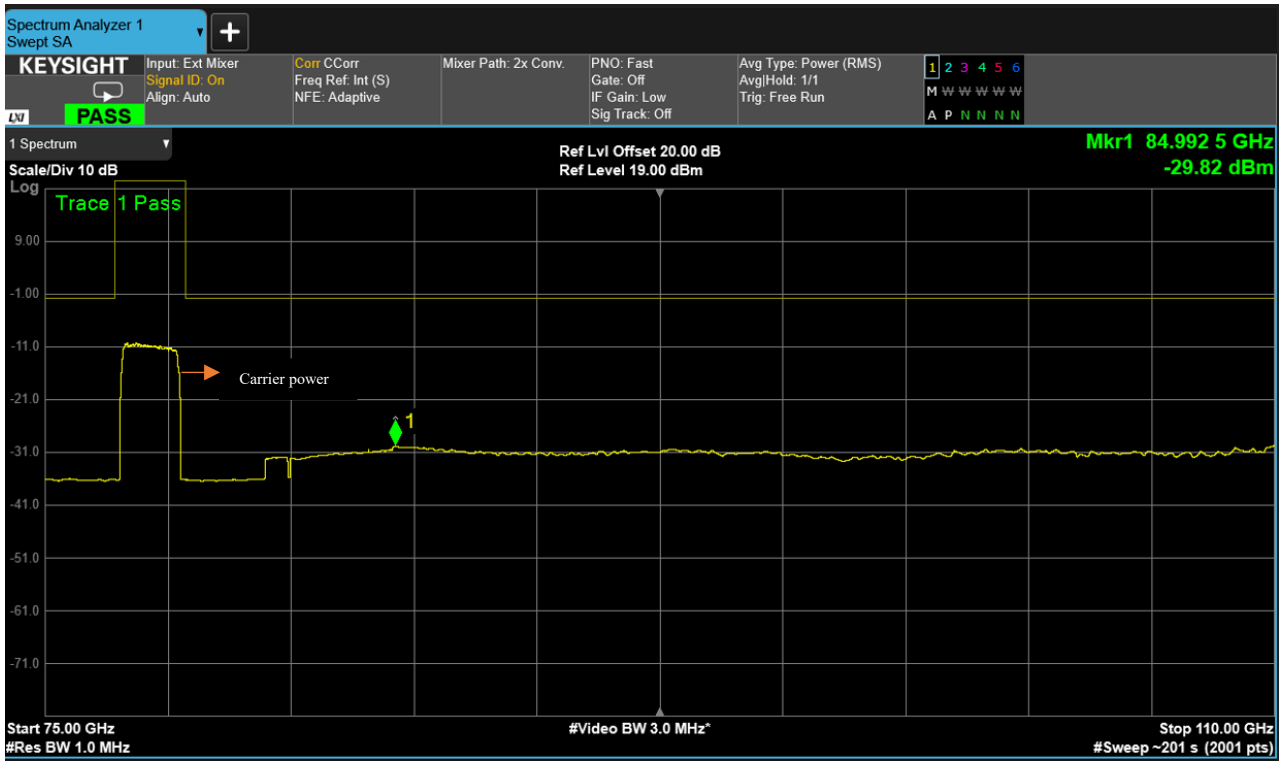
75 GHz – 110 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 385
Additional equipment	☒ 674			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	**☒ Yes**	**☐ No**	**☐ N.t.x**

Test setup photos	**☒ Yes**	**☐ No**	**Annex no. 6**

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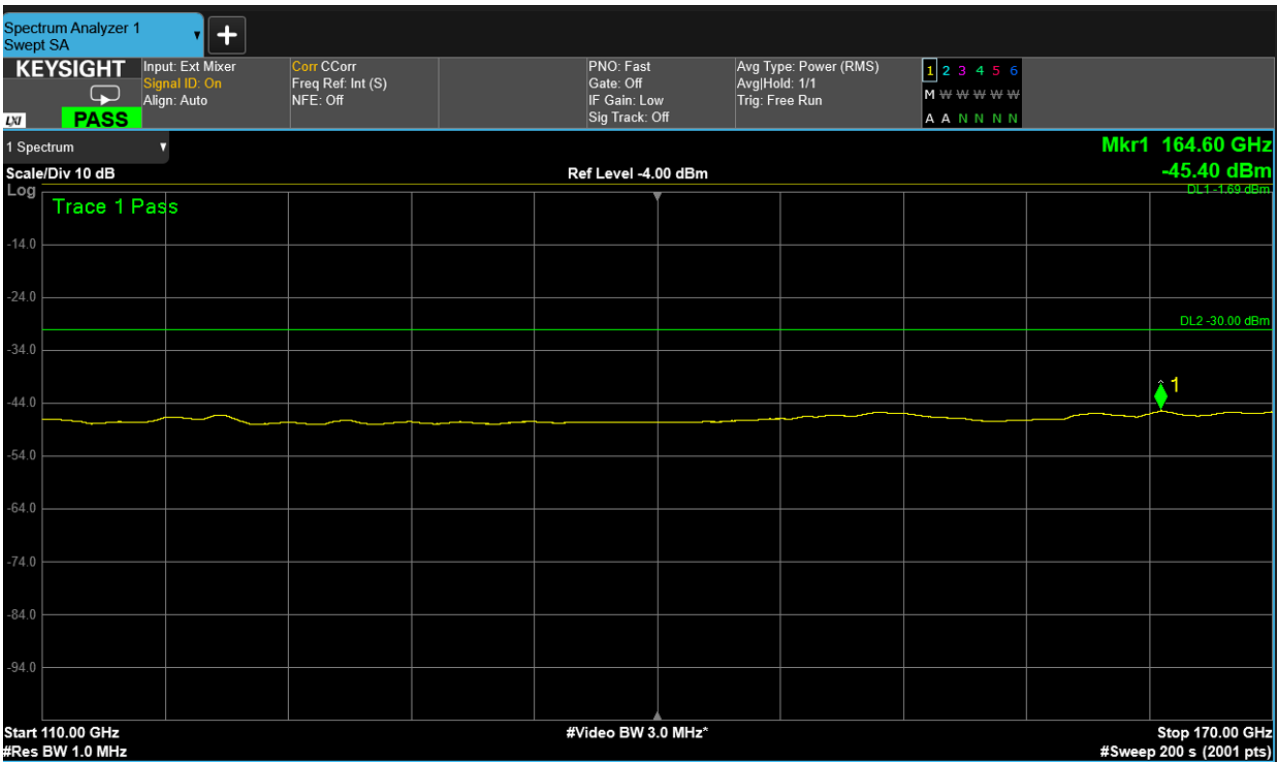
110 GHz – 170 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	-1.69	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 687
Additional equipment	☒ 675			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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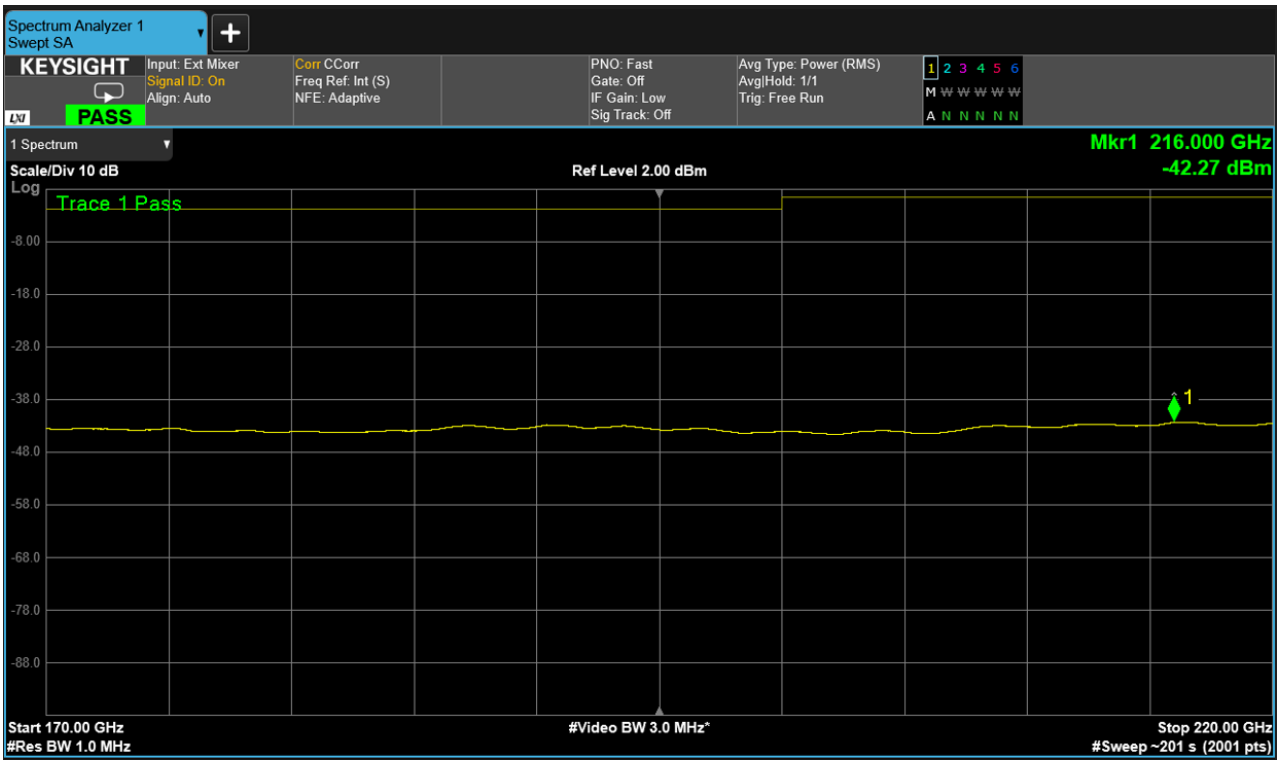
170 GHz – 220 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
170 -200	**	---	---	---	---	---	---	-1.69	---
200 -220	**	---	---	---	---	---	---	0.53	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 688
Additional equipment	☒ 677			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	☒ **Yes**	☐ **No**	☐ **N.t.x**

Test setup photos	☒ **Yes**	☐ **No**	**Annex no. 6**

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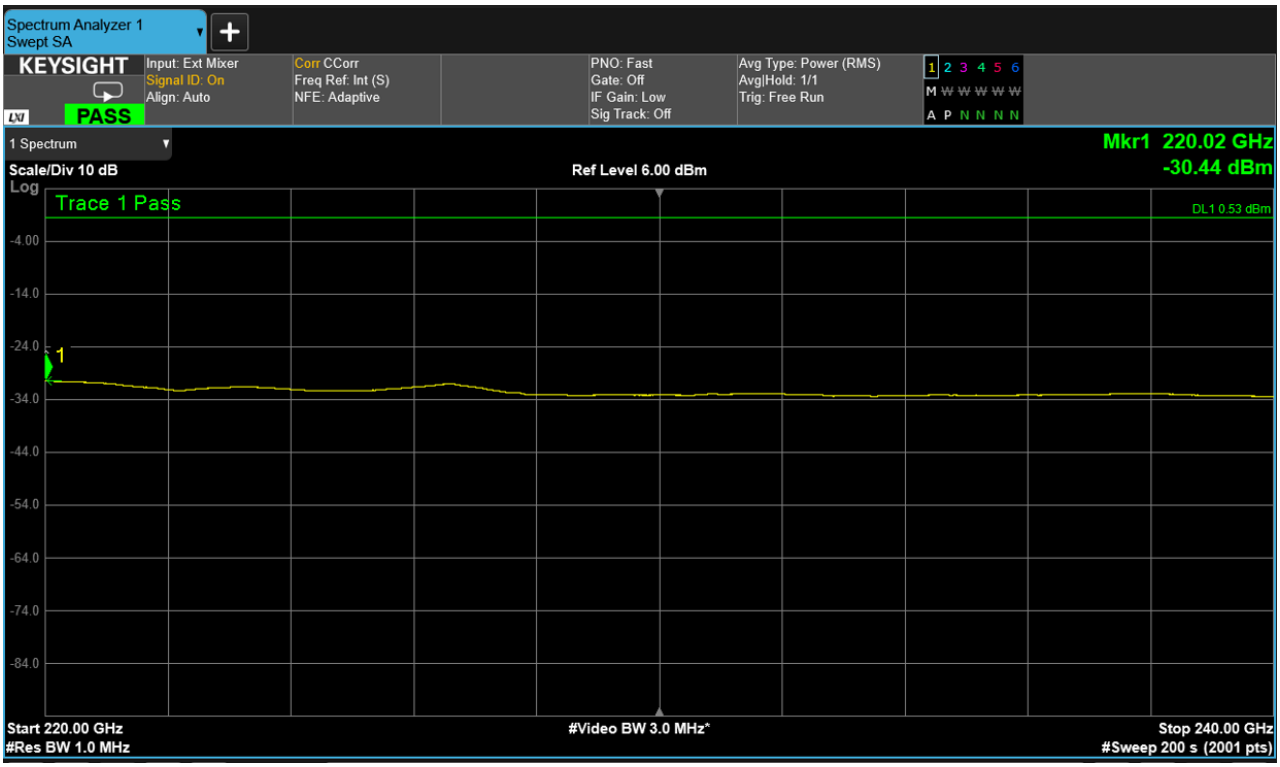
220 GHz – 240 GHz

Transmitter spurious radiation (Section 95.3379)									
Frequency	**Av erage Detector**	**BW**	**RL**	**FSPL**	**G**	**CL**	**EIRP**	**Limit**	**Margin**
GHz	**Type**	**kHz**	**dBm**	**dB**	**dBi**	**dB**	**dBm**	**dBm**	**dB**
**	---	---	---	---	---	---	---	0.53	---



Measurement uncertainty: ± 6.8 dB

**** No emissions detected!**

Test location and equipment

Test site	☒ 660 Semi Anechoic Chamber ☒ 667 ☐ 668 ☒ 669			
Receiver	☐ 665	☒ 666	☐ 502	
Antenna	☐ 406	☐ 442	☐ 454a	☒ 689
Additional equipment	☒ 679			
Cable	☐ K189	☐ K193	☐ K195	☒ K164

The equipment passed the performed tests	**☒ Yes**	**☐ No**	**☐ N.t.x**

Test setup photos	**☒ Yes**	**☐ No**	**Annex no. 6**

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7.6 Occupied Bandwidth

7.6.1 Regulation

According to FCC § 95.3379 (b) 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 °C with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

.

7.6.2 Test procedure

Occupied Bandwidth (99 % Bandwidth) and 26 dB bandwidth were measured. The Occupied Bandwidth was measured directly from the spectrum analyzer's in-built measurement function with correct analyzer settings (RBW, VBW, detector, span and etc). For 6 dB Bandwidth, the measurement settings and procedure were carried out in accordance with the ANSI C63.10-2013 section 9.3. The bandwidth measurements were also performed in extreme environmental conditions.

7.6.3 Test Result

EUT Mode	Centre Frequency (GHz)	Measured 99% BW (MHz)	Measured 26dB BW (MHz)

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☐ 667 ☐ 668 ☐ 669			
Receiver	☐ 665	☐ 666		
Antenna	☐ 406	☐ 442	☐ 454a	☐ 385
Additional equipment	☐ 562	☐ 28a		
Cable	☐ K189	☐ K193	☐ K195	☐ K164

The equipment passed the performed tests	☐ **Yes**	☐ **No**	☒ **N.t.[2]**

Test setup photos	☐ **Yes**	☒ **No**	**Annex no.**

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7.7 Frequency Tolerance

7.7.1 Regulation

According to FCC § 95.3379 (b) 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 °C with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

7.7.2 Test Procedure

Frequency stability with respect to ambient temperature:

Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. If possible, a dummy load should be connected to the EUT, because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn the EUT on, and tune it to one of the number of frequencies required.

Couple the intentional radiator output to the measuring instrument by connecting an antenna to the measurement instrument with a suitable length of coaxial cable and placing the measurement antenna near the EUT (e.g., 15 cm away) or by connecting a dummy load to the measuring instrument through an attenuator, if necessary.

Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. Turn the EUT on, and couple its output to the measuring instrument by connecting an antenna to the measurement instrument with a suitable length of coaxial cable.

Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

Tune the EUT to any one of the number of frequencies specified. Turn the EUT off, and place it inside an environmental chamber if appropriate. Allow the chamber to stabilize at +20 °C before proceeding. Turn on the EUT, and record the operating frequency of the intentional radiator at startup and two, five, and ten minutes after startup. Turn the EUT off and allow it to cool to the ambient temperature, and then repeat this procedure for the number of the frequencies specified. Four measurements are made at each operating frequency.

Frequency stability with respect to input voltage:

Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. If possible, a dummy load should be connected to the EUT, because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn the EUT on, and tune it to one of the number of frequencies required.

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Couple the intentional radiator output to the measuring instrument by connecting an antenna to the measurement instrument with a suitable length of coaxial cable and placing the measurement antenna near the EUT (e.g., 15 cm away) or by connecting a dummy load to the measuring instrument through an attenuator, if necessary.

Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Turn the EUT off, and place it inside an Environmental temperature chamber. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.

Set the temperature control on the chamber to the highest specified EUT operating temperature, and allow the temperature inside the chamber to stabilize at the set temperature before starting frequency measurements.

While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup and two, five, and ten minutes after the EUT is energized. Four measurements in total are made.

Repeat the above procedure until the number of frequencies specified has been measured. After all measurements have been made at the highest specified temperature, turn the EUT off. Repeat the above measurement process for the EUT with the test chamber set at the lowest temperature specified by the regulatory or procuring agency. Measurements shall be made at the number of frequencies specified.

7.7.3 Test Setup

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☐ 667 ☐ 668 ☐ 669			
Receiver	☐ 665	☐ 666		
Antenna	☐ 406	☐ 442	☐ 454a	☐ 385
Additional equipment	☐ 562	☐ 28a		
Cable	☐ K189	☐ K193	☐ K195	☐ K164

The equipment passed the performed tests	☐ **Yes**	☐ **No**	☒ **N.t.**[2]

Test setup photos	☐ **Yes**	☒ **No**	**Annex no.**

7.7.3 Test Results

Test conditions	Frequency tolerance			
	Frequency (GHz)			
T_{nom} = ---° C	**f_L Measured**	**f_H Measured**	**f_L Limit**	**f_H Limit**
V_{min} = --- V DC	---	---	---	---
V_{nom} = --- V DC	---	---	---	---
V_{max} = --- V DC	---	---	---	---
Measurement uncertainty	± $5*10^{-8}$			

Test conditions	Frequency tolerance			
	Frequency Measured (GHz)			
V_{nom} = --- V DC	**f_L Measured**	**f_H Measured**	**f_L Limit**	**f_H Limit**
T_{min} -40 °C	---	---	**76.0**	**81.0**
T_{min} -30 °C	---	---	**76.0**	**81.0**
T_{min} -20 °C	---	---	**76.0**	**81.0**
T_{min} -10 °C	---	---	**76.0**	**81.0**
T_{min} 0 °C	---	---	**76.0**	**81.0**
T_{min} +10 °C	---	---	**76.0**	**81.0**
T_{min} +20 °C	---	---	**76.0**	**81.0**
T_{min} +30 °C	---	---	**76.0**	**81.0**
T_{min} +40 °C	---	---	**76.0**	**81.0**
T_{min} +50 °C	---	---	**76.0**	**81.0**
T_{min} +85 °C	---	---	**76.0**	**81.0**
Measurement uncertainty	±$5*10^{-8}$			

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7.8 76-81 GHz Band Radar Service RF exposure evaluation

7.8.1 Regulation

According to FCC §95.3385, regardless of the power density levels permitted under this subpart, devices operating under the provisions of this subpart are subject to the radiofrequency radiation exposure requirements specified in §§1.1307(b), 2.1091, and 2.1093 as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

7.8.2 Test result

MPE calculation to the FCC ID: NBG01RS6

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2 \quad \text{or} \quad S = EIRP/ (4\pi R^2)$$

Where:

S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the centre of radiation of the antenna (appropriate units e.g. cm)
EIRP = equivalent isotropically radiated power

Calculation:

EUT Mode	Centre Frequency	Operating Frequency	EIRP		Power density (S) @ 20 cm	
					Calculated	Limit
	GHz	GHz	dBm	mW	mW/ cm^2	
						1.0
						1.0

The equipment passed the performed tests	☐ Yes	☐ No	☒ N.t.[2]

Test setup photos	☐ Yes	☒ No	Annex no.

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8. Additional information to the test report

N.t.[1]	Not tested, because not applicable to the EUT
N.t.[2]	Not tested, because not ordered

9. List of test equipment

State Juni 12, 2024					
Marking	**Manufacturer**	**SW/Type/Serial-No.**	**Last Cal./Val.**	**Next Cal. /Val. (± 1 month)**	**No.**
1 Measuring Instruments					
Attenuator	Tektronix	011-0085-00	Mar 24	Mar 27	61
Attenuator	Radiall	---	Nov 22	Nov 25	62
Attenuator 3dB	Suhner	6803/17	Nov 22	Nov 25	137
Attenuator 3dB / 18 GHz	Suhner	3dB/18GHz	Nov 22	Nov 25	299
Attenuator 6dB / 18 GHz	Suhner	6dB/18GHz	Nov 22	Nov 25	344
Attenuator 20dB / 20GHz	Parzich	40AH-20	Nov 22	Nov 25	354
Attenuator 3dB / 12,4 GHz	Narda	TB 50902-1, S/N: 35005	Mar 24	Mar 27	183a
Attenuator 6dB / 12,4 GHz	Narda	TB 50902-2, S/N: 36328	Mar 24	Mar 27	183b
Attenuator 10dB / 12,4 GHz	Narda	S/N: 36500	Mar 24	Mar 27	183c
Attenuator 20dB / 12,4 GHz	Narda	8491A, S/N: 6218	Mar 24	Mar 27	183d
Terminator	KDI	T173CS	Nov 22	Nov 25	490
Variable transformer	RFT	LS 002	---	---	154a
Variable transformer	Schunt+Ben	---	---	---	155
Power sensor	Marconi	6914	Dec 22	Dec 24	258
Power sensor	Rohde & Schwarz	NRP18SN	Apr 24	Apr 26	651
3-Path Diode Power Sensor 10 MHz to 8 GHz	Rohde & Schwarz	NRP8S	Dec 22	Dec 24	663
3-Path Diode Power Sensor 10 MHz to 18 GHz	Rohde & Schwarz	NRP18S-20	Dec 22	Dec 24	664
Diode Power Sensor 100 kHz – 6 GHz	Rohde & Schwarz	NRV-Z5 S/N: 829562/008	Nov 22	Nov 24	390
Coaxial Directional Coupler	Narda	3003-20	Feb 24	Feb 27	370/342
Coaxial directional coupler	Mini Circuits	ZFDC-20-5	Jun 24	Jun 26	434
Coaxial directional coupler	Narda+Suhner	4246B-20	Sep 22	Sep 25	472/492
Coaxial directional coupler	Narda	3045C-10	Sep 22	Sep 25	110a
Coaxial directional coupler	Narda	3044B-10	Sep 22	Sep 25	21a
Coaxial directional coupler	Narda	3044B-30	Sep 22	Sep 25	327
Coaxial directional coupler	Narda	3022 / 50204	Sep 22	Sep 25	303
Coaxial High Pass Filter	Mini circuits	NHP-700	Jun 24	Jun 27	435
Coaxial High Pass Filter	Mini circuits	NHP-200	Jun 24	Jun 27	405
Coaxial High Pass Filter	Mini circuits	NHP-25+	Jun 24	Jun 27	455
High Pass Filter	Mini circuits	VHF-3500+	Sep 22	Sep 25	451
High Pass Filter	Mini circuits	VHF-1200+	Jun 24	Jun 27	452
High Pass Filter	Morita Tech	MT-SCHLC-500/T300-0/0	Mar 24	Mar 27	703
High Pass Filter	Morita Tech	MT-SCHPFF-1000-T855-0/0	Mar 24	Mar 27	704
High Pass Filter	Morita Tech	MT-SCHPF-2000/ T1720-0/0	Mar 24	Mar 27	705
Bandpass Filter	Schomandl	BN86871	Nov 21	Nov 24	66
Bandpass Filter	Schomandl	BN68673	Nov 21	Nov 24	67
Band Reduction Filter	Morita Tech	MT-SC12FVRC-5250/X200-0/0	Mar 24	Mar 27	701
Band Reduction Filter	Morita Tech	MT-SCBRF-5597.5/255-0/0	Mar 24	Mar 27	702
Low Pass Filter	Mini circuits	SLP550	Jun 24	Jun 27	273
Low Pass Filter	Mini circuits	SLP550	Jun 24	Jun 27	274
RF Current Probe 9 kHz – 30 MHz	Rohde & Schwarz	ESH2-Z1	Aug 21	Aug 24	42
Passive Test Probe – 9 kHz – 30 MHz	TÜV NORD	VDE 0876	Apr 21	Apr 24	45
Coaxial Fixed Attenuator DC – 1 GHz	Texscan	HFP50/10	Aug 23	Aug 26	60
8 Wire Impedance Stabilisation Network	Schwarzbeck	CAT5 8158	Jan 24	Jan 26	71a
T-Section - 50 W	Rohde & Schwarz	BN 42441/50	Nov 21	Nov 24	93
RF Current Injection Clamp 0.15 – 1GHz	Lüthi GmbH	EM 101	Jan 23	Jan 25	156
Absorbing Clamp MDS 30MHz – 1GHz	Lüthi GmbH	MDS-21	Jan 23	Jan 26	160

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Insertion Unit	Rohde & Schwarz	URV5-Z4	Jul 22	Jul 24	162
Coaxial RF Termination - 0 – 1000 MHz	Telewave Inc.	TWL 35	Nov 21	Nov 24	164
Coaxial RF Termination - 0 – 1000 MHz	Telewave Inc.	TWL 60	Nov 21	Nov 24	165
Fixed Attenuator - DC – 1.5GHz	Bird	Mod/ 8343-060	May 23	May 26	177
CDN up to 230 MHz	MEB	KEN-M 2 /M 3	Oct 22	Oct 24	262
Coupling Filter	HAEFELY	FP 16/3-1	Jan 23	Jan 25	366
Impulse limiter 10 dB	Rohde & Schwarz	ESH3 Z2	Jun 22	In calibration	272
Fixed Attenuator - DC – 18 GHz | 30 dB	MTS	---	Mar 24	Mar 26	276
Termination Resistor 50 W	Radiall	404011	Nov 21	Nov 24	309
Branching device (4x) 50W	Rohde & Schwarz	892228/20	Sep 22	Sep 25	320
Dummy-Load - 2 – 18 GHz	Narda	MODEL 367NF	Jan 23	Jan 26	343
DC Block Adapter - 0.045 – 26.5 GHz	Hewlett-Packard	11742A	Mar 24	Mar 27	356
RF Probe 0.02 – 1000 MHz	Rohde & Schwarz	URY-Z7	Aug 22	Aug 25	368
150W attenuator	Weinschel	49-20-33	Nov 22	Nov 25	374
Fixed Coaxial Attenuator - DC – 18 GHz	Weinschel	23-6-34	Mar 23	Mar 26	375
Attenuator 60 dB (10 MHz – 8 GHz)	---	---	Mar 23	Mar 26	376
Insertion Unit 100V | 100 kHz – 2 GHz	Rohde & Schwarz	URY-Z4	Jun 22	In calibration	417
Panoramic Adapter (Monitoring)	Schwarzbeck	PAN1550	---	---	429
DC-BLOCK - DC – 6.0 GHz |50 W	Mini Circuits	BLK-6-N+	Nov 21	Nov 24	462
DC-BLOCK – 0,1 GHz – 5.0 GHz	Microlab/FRX	HR-D18	Mar 24	Mar 27	90b
Terminating resistor 50Ω SMA	---	---	Jan 23	Jan 26	493
Terminating resistor 50Ω SMA	---	SC 60-601-0000-31	Jan 23	Jan 26	497
Fixed Attenuator –0 – 40 GHz	Anritsu	41KC-10	Jan 23	Jan 26	504
Fixed Attenuator – 0 – 40 GHz	Anritsu	41KC-10	Jan 23	Jan 26	505
Fixed Attenuator – 0 – 40 GHz	Anritsu	41KC-3	Jan 23	Jan 26	507
Electric Dummy Load	RA-NAV Lab.	DA-75U	---	---	526
Power Splitter / Combiner	Mini Circuits	ZESC-2-11	Nov 22	Nov 25	527
3 Way Power Splitter / Combiner	Mini Circuits	ZFSC-3-1	Mar 23	Mar 26	529
3 Way Power Splitter / Combiner	Mini Circuits	ZFSC-3-1	Mar 23	Mar 26	530
RF-Attenuator - 6 dB	Haefely	---	Mar 23	Mar 26	540
RF-Attenuator - 1– 120 MHz | 12 dB	Haefely	---	Mar 23	Mar 26	541
RF-Attenuator - 1– 120 MHz | 39 dB	Haefely	---	Mar 23	Mar 26	542
LISN 9kHz – 30 MHz	Schwarzbeck	NNLA 8120 (SN: 8120499A)	Oct 22	Oct 24	551
HV Probe P6013A	Tektronix	P6013A	Jul 22	Jul 24	559
VLISN 5µH	Schwarzbeck	8125-1944	Apr 24	Apr 26	585
VLISN 5µH	Schwarzbeck	8125-1945	Apr 24	Apr 26	586
20dB Attenuator, up to 18 GHz	Mini Circuit	BW-N20W5+	Nov 22	Nov 25	594
Step Attenuator - DC-18 GHz | 0 to 11 dB	Hewlett-Packard	8494B	Nov 22	Nov 25	604
Analyser Reference System	Spitzenberger & Spies	PAS 1000 SyCore + ARS 16/1	Cal before use	Cal before use	606a/b/c
Capacitive Coupling Clamp 5 kV	Schlöder	SFT 415	Jul 23	Jul 26	608
RF Probes for 50 Ω Receivers	Schwarzbeck	TK 9416	Jun 22	Jun 24	612
Current probe TRMS	BEHA APROB	CHB35	Nov 22	Nov 24	652
Semi Anechoic Chamber	COMTEST	SAC-3m	Apr 23	Apr 25	660
Maturo Turntable	Maturo	TT2.0SI (SN: TT2.05SI/817 SW: 1.0.0.4473)	---	---	667
Maturo Antenna Mast	Maturo	TAM4.5-E-10kg (SN: 10011/216/2588.01)	---	---	668
Maturo Controller	Maturo	FCU3.0/009/2588.01 (SN: 10014/2019)	---	---	669
EMC-Semi Anechoic Chamber (SAC)	Frankonia	SAC-5 Plus L-Dome Design	Jan 24	Jan 26	706
Frankonia Boresight Antenna Mast	Frankonia	FBM 1-4 SN: 0212	---	---	707
Frankonia Turntable	Frankonia	FTM 3-2 SN: FC06.1-2022-277	---	---	708
Frankonia Positioning Controller	Frankonia	FC06.1B SN: FC06.1-2022-277	---	---	709

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Current probe 20 Hz – 100 MHz	Rohde & Schwarz	EZ-17 (0816.2063.03)	May 23	May 26	670
Coupling Decoupling Network	AMETEK	CDN ST08A	Oct 22	Oct 24	672
BONN HF Switch Matrix DC – 8 GHz	BONN Elektronik	BAS 0080-3	---	---	682
External Directional Coupler	BONN Elektronik	BDC 1060-40/500	Feb 24	Feb 26	683
BI-Directional Coax. Coup. 50-1000 MHz	Narda	3020A	Nov 24	Nov 26	141
Vertical coupling plate	TÜV NORD HFT	---	---	---	265
Measuring table	TÜV NORD HFT	---	---	---	106
Data line coupling network	EM Test AG	CNV 504/ 508	---	---	285
OSP230 BASE Unit 2HU with TS	OSP230	S/N: 102031	June 23 Factory cal.	June 25	698
2 Generators					
EFT/Burst Generator	Schlöder	SFT 1400	Sep 22	Sep 24	46a
ESD Generator	Schlöder	SESD 216	Feb 24	Feb 26	653
ESD Simulator	Schlöder	SESD200 S/N: 802653	Sep 23	Sep 25	112a
Signal Generator	Rohde & Schwarz	SMB100A SW 4.20.028.58	Sep 22	Sep 24	571
RF Generator	Rohde & Schwarz	SGT100A	Jun 22	In calibration	636
Signal Generator	Rohde & Schwarz	SMG	Jun 22	In calibration	136a
Signal Generator	Marconi	2042	Jul 22	Jul 24	6
Signal Generator	Marconi	2024	Jul 22	Jul 24	213
Puls Generator	EM Test	MPG 200	Apr 23	Apr 25	181
Surge Generator	H+H	MIG063 IN S-T	Jun 23	Jun 25	561
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500 S/N: 171332	Aug 22 Factory cal.	Aug 24	691
3. Antennas					
Active Loop Antenna 8.3 kHz – 30 MHz	Rohde & Schwarz	HFH2-Z2E S/N: 101171	May 23	May 25	697
Biconical Ant. 30-300 MHz	Schwarzbeck	VHA9103/BBA9106	May 22	In calibration	80/616
Biconical Ant. 20-300 MHz	Schwarzbeck	VHBB 9124 / BBA9106	Jan 23 Factory cal.	Jan 25	692
Biconical Ant. 20-300 MHz	Schwarzbeck	VHBB 9124 / BBA9106	Jan 23 Factory cal.	Jan 25	693
Biconical Antenna 9 kHz – 300 MHz	Schwarzbeck	EFS9218 / 9218-194	Jul 23	Jul 25	523
Double Ridged Horn	Schwarzbeck	BBHA9120C	Apr 24	Apr 26	169
Double Ridged Horn	Schwarzbeck	BBHA 9120A	May 20	In calibration	284
Tri-Log Broadband	Schwarzbeck	VULB9168	Jun 23	Jun 25	406
Broadband Horn 14-40 GHz	Schwarzbeck	BBHA9170	Apr 24	Apr 26	442
Log Per Antenna 0.7-20 GHz	Schwarzbeck	STLP9148	Jun 23	Jun 25	445a
Log Per Antenna 0.2 – 3.5 GHz	Schwarzbeck	VUSLP 9111B	Jan 23 Factory cal.	Jan 25	694
Log Per Antenna 0.2 – 3.5 GHz	Schwarzbeck	VUSLP 9111B	Jan 23 Factory cal.	Jan 25	695
Log Per Antenna 1 GHz – 18 GHz	Rohde & Schwarz	S/N 352886/009	Jun 23 (Val. only)	Jun 25	700
Bilog Ant.	CHASE	CBL6111	Cal. before use	Cal. before use	167
Spectrum analyser Mixer 220 – 325 GHz	Radiometer Physics	SAM325 / 20029	Oct 23	Oct 25	591
Dual Mode Potter Horn 220-325 GHz	Radiometer Physics	325-WR2	---	---	592
Dual Mode Potter Horn 75-110 GHz	Radiometer Physics	---	---	---	649
Gain Horn Antenna 50-75 GHz	Dorado	GH-15-20	---	---	511

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Standard Gain Horn 1.7 – 2.6 GHz	Narda	645	---	---	514
W-band active Sextupler with input drive amplifier	Spacek Labs Inc.	AW-6XW-0	---	---	221a
60 to 65 GHz active frequency quadrupler	Spacek Labs Inc.	A625-4XW-0	---	---	222a
Harmonic Mixer 40-60 GHz	Rohde & Schwarz	FS-Z60/ 100037	Oct 23	Oct 25	515
Gain Horn Antenna 40-60 GHz	Dorado	GH-19-20 / 070106	---	---	518
Spectrum analyser Mixer 90-140 GHz	Radiometer Physics	SAM140 / 20006	Oct 23	Oct 25	545
Dual Mode Potter Horn 90-140 GHz	Radiometer Physics	140-WR8	---	---	547
Spectrum analyser Mixer 140-220GHz	Radiometer Physics	SAM220 / 20002	Oct 23	Oct 25	546
Dual Mode Potter Horn 140-220 GHz	Radiometer Physics	220-WR5.1	---	---	548
Harmonic Mixer 60-90 GHz	Rohde & Schwarz	FS-Z90 / 100062	Oct 23	Oct 25	501
Dual Mode Potter Horn 60-90 GHz	Radiometer Physics	90-W12	---	---	549
Gain Horn 33-55 GHz	Dorado	040810	---	---	383
Gain Horn 50-75 GHz	Dorado	031003	---	---	384
Gain Horn 75-110 GHz	Dorado	040808	---	---	385
Standard Gain Ant. 26.5-40 GHz	Maury Microwave	U211C	---	---	532/628
Waveguide Harmonic Mixer 50 – 75 GHz	Keysight	M1971V	Mar 24	Mar 26	673
Waveguide Harmonic Mixer 75 – 110 GHz	Keysight	M1971W	Mar 24	Mar 26	674
Stacked Log.-Per. Antenna 70 MHz – 10 GHz	Schwarzbeck	STLP 9129	---	---	662
Spectrum/Signal Analyzer Extension Module 110 GHz – 170 GHz (WR-6.5)	Virginia Diodes, Inc.	SAX 637	Jun 22	Jun 24	675
Spectrum/Signal Analyzer Extension Module 140 GHz – 220 GHz (WR-5.1)	Virginia Diodes, Inc.	SAX 636	Jun 22	Jun 24	677
Spectrum/Signal Analyzer Extension Module 220 GHz – 330 GHz (WR-3.4)	Virginia Diodes, Inc.	SAX 635	Jun 22	Jun 24	679
Conical Gain Horn Ant. 110 GHz – 170 GHz [21 dBi]	Virginia Diodes, Inc.	Conical Antenna WR-6.5	---	---	687
Conical Gain Horn Ant. 140 GHz – 220 GHz [21 dBi]	Virginia Diodes, Inc.	Conical Antenna WR-5.1	---	---	688
Diagonal Gain Horn Ant. 220 GHz – 330 GHz [26 dBi]	Virginia Diodes, Inc.	Diagonal Antenna WR-3.4	---	---	689
4. Amplifier					
RF-Power Amplifier 250 kHz – 150 MHz	ENI	3100LA	---	---	123
RF pre-amplifier 100kHz-1.3GHz	HP	8447E	Sep 20	Sep 24	166a
Mitteq amplifier 26.5-40 GHz	Mitteq	---	Mar 24	Mar 26	223a
RF pre-amplifier 1-18GHz	Narda	---	Mar 24	Mar 26	345
Mitteq Amplifier 18-26GHz	Mitteq	---	Jun 23	Jun 26	433
Microwave amplifier 12-28GHz	Schwarzbeck	BBV9719	Mar 24	Mar 26	443
Microwave amplifier 0.5-18GHz	Schwarzbeck	BBV9718	Mar 24	Mar 26	444
RF-Power Amplifier 10kHz-1000 MHz	Poetschke	8100 (Band 1) BHED (Band 2) BHED (Band 3)	---	---	684
RF-Power Amplifier 800 MHz – 4,2 GHz	Amplifier Research	10S1G4	---	---	685
RF-Power Amplifier 4 GHz – 8 GHz	Amplifier Research	35S4G8A	---	---	686
RF-Power Amplifier 0.69 GHz – 6 GHz	Rohde & Schwarz	BBA150-D110/E60	---	---	690
5. Power supplies					
Programmable Power Supply	Fluke	PM 2813	---	---	28a
Power Supply	HP	---	---	---	125
Power Supply	Sorensen	LM 30-6	---	---	134a
Power Supply	HP	6034L	---	---	226
Regulated Power Supply	Farnell	AP60-50	---	---	408
Power Supply	EA	PSI 8080-40-DT	---	---	560
Power Supply	HP	6032A	---	---	644
6. Meters					
Microwave Frequency Counter	Hewlett-Packard	5351B	Jun 23	Jun 25	432

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Temperature test cabinet	Heraeus Vötsch	VMT04/35	---	---	102a
Temperature and Climate Test Chamber	Weiß Umwelttechnik, WKL 34/40	S.N.: 5667998 // SW: Simpac 1.4.4.0	Mar 24	Mar 26	562
Temperature test cabinet	Brabender	TTE 32/40 H	---	---	87
Web Sensor with PoE- temperature, humidiy / digital pressure gauage	COMET	T7610 S.N.: 24960098	Jan 24	Jan 26	711
Web Sensor with PoE- temperature, humidiy / digital pressure gauage	COMET	T7610 S.N.: 24960099	Jan 24	Jan 26	712
Digital-Hygro-Thermometer	Greisinger	GFTH95	Feb 23	Feb 25	57a
Volt & RF Power Meter	Rohde & Schwarz	URV35	Jun 22	Jun 25	161
Power Meter	Marconi	6960/ S.N: 1214	Dec 22	Dec 25	139a
Spectrum Analyzer - 9 kHz – 18 GHz	Rohde & Schwarz	FSL18	Cal. before use	Cal. before use	171a
Multimeter	Gossen Metrawatt	Metrahit pro	Jan 24	Jan 26	215a
Humidity/Temperature Measuring device	TESTO	Testo 625	Jan 24	Jan 26	259a
Volt & RF Power Meter	Rohde & Schwarz	URV35	Cal. before use	Cal. before use	271
Multimeter	Gossen Metrawatt	Metrahit 26S	Oct 22	Oct 24	313
Level and Power Meter - 9 kHz – 3 GHz	Rohde & Schwarz	URY	Apr 22	In calibration	307
Temperature test device	Ahlhorn	Almemo 2390-5 PT100	Apr 23	Apr 26	401/402
Digital-Vacuum-/Barometer	Greisinger	GDH12AN	Jan 22	Jan 25	558
Digital Storage Oscilloscope	Tektronix	TDS 2012C	Nov 22	Nov 24	568
Miniature Flat, Zero-Biased Schottky Detector –0.1– 18 GHz	Narda	4503A-03	Val. before use	Val. before use	613
Digital-Vacuum-/Barometer	Greisinger	GDH-200-14	Jan 24	Jan 27	632
Network Analyser 9 kHz -6 GHz	Rohde & Schwarz	ZVL6 (SN: 101268)	Sep 22	Sep 24	534
Signal Analyser 10 Hz – 30 GHz	Rohde & Schwarz	FSV 30 S/N: 100932	Oct 23	Oct 25	502
EMI Test receiver ESW26	Rohde & Schwarz	R&S ESW26 (SN: 101383/26 SW: R&S ESW2.10)	Jan 24	Jan 26	665
EMI Test Receiver ESW44	Rohde & Schwarz	R&S ESW44 SN: 103281	May 23	May 25	696
Signal analyser Keysight 50GHz	Keysight	UXA N9040B (SN: MY57213006 SW: A.27.02/2020 1.0)	Mar 24	Mar 26	666
7. test/control software					
EMC32	Rohde & Schwarz	V10.60.20	---	---	---
Maturo mcApp	Maturo	SW: V3.4.9.4537 (19.04.04)	---	---	---
SPS EMC	Spitzenberger & Spies	SW: V4.1.3	---	---	---
EMV-Soft	Schlöder GmbH	SW: V11.95	---	---	---
ISMISO	EM Test AG	SW: V3.63	---	---	---
ELEKTRA	Rohde & Schwarz	SW: V 5.01.0	---	---	---

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10. Cable list

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
3	N	0,5 - 8000	3	Cellflex
4	N	0,5 - 8000	3	Cellflex
12a	N	10 – 265000	6	Huber + Suhner
14a	BNC	10 – 1000	1.00	Telemeter
17a	APC3.5	10 – 26500	2.13	Huber + Suhner
18a	APC3.5	10 – 26500	2.13	Huber + Suhner
22	BNC	10 – 1000	1.50	---
27	BNC	10 – 1000	1.00	Fabrica Milanese Cond.
35	N	10 – 2000	1.10	Fujikura
40	BNC	---	0.50	Aircell
44	SMA	---	0.50	Huber + Suhner
45	SMA	10 – 18000	0.50	Huber + Suhner
48	SMA		0.50	Huber + Suhner
49	N	10 – 18000	1.00	Huber + Suhner
50	N	10 – 18000	1.00	Huber + Suhner
51	N	10 – 18000	1.00	Huber + Suhner
58	N	10 – 18000	2.00	Huber + Suhner
59	N	10 – 18000	1.00	Huber + Suhner
60	N	10 – 18000	2.00	Huber + Suhner
61	N	10 – 18000	1.00	Huber + Suhner
62	SMA	---	0.50	Huber + Suhner
63	SMA	10 – 18000	0.50	Huber + Suhner
64	SMA	10 – 18000	0.50	Huber + Suhner
65	APC3.5	10 – 26500	0.60	---
66	APC3.5	10 – 26500	0.60	---
67	APC3.5	10 – 26500	0.60	---
68	APC3.5	10 – 26500	0.60	---
76	SMA	10 – 30000	3.00	Gore
79	BNC/N	10 – 1000	5.00	---
80	SMA	---	0.25	Huber + Suhner
87	SMA	10 – 18000	0.15	Huber + Suhner
88	SMA	10 – 18000	0.15	Huber + Suhner
89	SMA	10 – 18000	0.15	Huber + Suhner
90	SMA	10 – 18000	0.15	Huber + Suhner
94	BNC	---	1.10	---
100	N	10 – 26500	6.00	Rosenberg
101	N	10 – 18000	2.90	Huber + Suhner
102	SMA	10 – 18000	2.00	Huber + Suhner
112	BNC	10 – 1000	0.50	---
114	SMA	10 – 18000	0.25	Huber + Suhner
116	SMA	10 – 18000	0.25	Huber + Suhner
119	N	10 – 20000	8.00	Jyebao
121	SMA	10 – 18000	1.50	Huber + Suhner
122	SMA	10 – 18000	2.00	Huber + Suhner
123	SMA	10 – 18000	2.00	Huber + Suhner
145	SMA	10 – 26500	8.00	Huber + Suhner
147	APC3.5	10 – 40000	1.50	Jyebao
148	APC3.5	10 – 40000	3.00	Jyebao
154	BNC	10 – 1000	1.00	---
158	SMA	10 – 26500	2.00	Huber + Suhner
161	SMA	10 – 18000	1.00	Huber + Suhner
162	APC3.5	10 – 26500	2.00	Huber + Suhner
163	APC3.5	10 - 26500	2.00	Huber + Suhner
164	APC3.5	10 – 26500	2.00	Huber + Suhner

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EUT: RS6 **FCC ID: NBG01RS6** **FCC Title 47 CFR Part 95 M** **Date of issue: 2024-06-28**

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
165	APC2.9	10 – 26500	2.00	Huber + Suhner
167	APC3.5	10 – 40000	1.00	Jyebao
168	APC3.5	10 – 40000	1.00	Jyebao
169	APC3.5	10 – 40000	1.00	Jyebao
170	APC3.5	10 – 40000	1.00	Jyebao
171	APC3.5	10 – 40000	1.00	Jyebao
172	SAM	---	0.90	Huber + Suhner
173	APC	10 – 26500	2.00	Huber + Suhner
174	APC	10 – 26500	---	Huber + Suhner
175	SMA	10 – 18000	0.40	Huber + Suhner
188	N	10 – 18000	5.00	Huber + Suhner
189	PC-PC	10 – 26500	6.00	Jyebao
190	PC-PC	10 – 26500	6.00	Jyebao
192	N-N	10 – 18000	3.0	Jyebao
193	N-N	10 – 18000	3.0	Jyebao
194	N-SMA	10 – 18000	2.0	Jyebao
195	N-SMA	10 – 18000	2.0	Jyebao
196	7/16-N	10 – 7000	5.0	TRU
197	N-7/16	10 – 7000	2.5	TRU
198	SMA – N	10 – 18000	1.5	Huber + Suhner
199	N-N	10 – 18000	2.5	Huber + Suhner
200	SMA – N	10 – 18000	1.5	Huber + Suhner
201	7/16 – 7/16	10 – 7000	3.0	RFS
202	N-N	10 – 18000	6,0	Huber + Suhner
203	N-N	10 – 18000	2.5	Huber + Suhner
204	N-N	10 – 18000	2.5	TRU
205	N-N	10 – 18000	7.0	Huber + Suhner
206	PC2.9 – PC2.9	10 – 40000	3.0	Huber + Suhner
207	PC2.9 – PC2.9	10 – 40000	7.0	Huber + Suhner
208	PC2.9 – PC2.9	10 – 40000	1,2	Teledyne Storm Microwave
209	PC2.9 – PC2.9	10 – 40000	1,2	Teledyne Storm Microwave
210	PC2.9 – PC2.9	10 – 40000	1,2	Teledyne Storm Microwave
211	---	10 – 40000	0,9	Junkosha
212	---	10 – 40000	0,9	Junkosha
213	BNC - BNC	0,1 - 4000	1	Huber + Suhner
214	BNC - BNC	0,1 - 4000	1	Huber + Suhner
215	BNC - BNC	0,1 - 4000	3	Huber + Suhner
216	BNC - BNC	0,1 - 4000	1	Agilent
217	BNC - BNC	0,1 - 2000	0,5	Sytronic
357	BNC - BNC	0,1 - 2000	1,5	---
EMV 1	BNC	---	2.00	Henn
EMV 2	BNC	10 – 1000	2.00	Henn
EMV 4	BNC	---	9.70	Henn
EMV 5	BNC	---	3.80	Henn
EMV 6	BNC/N	10 – 1000	5.00	Lüthi
EMV 7	BNC	10 – 1000	1.50	Henn
EMV 8	BNC	10 – 1500	1.70	Henn
EMV 9	BNC	10 – 1000	1.70	Henn
EMV 11	BNC	---	5.20	Hasselt
EMV 12	BNC	10 – 1000	2.40	Hasselt
EMV 13	BNC	10 – 1000	4.10	Hasselt
EMV 14	BNC	10 – 1000	2.50	Hasselt
EMV 15	BNC	---	0.90	Henn
EMV 16	Fischer	---	2.00	---
EMV 18a	Fischer	---	1.00	---
EMV 19a	Fischer	---	1.50	---
KISN2	BNC	10 – 2000	4.80	---

End of test report

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