

**Test Report acc. to
ARIB STD-T48
relating to
HELLA GmbH & Co. KGaA
RS7HRR**

Test report no. 26013670_Rev.01

Millimeter-Wave RADAR Equipment for Specified Low Power Radio Station

Test result summary

The tables summarize the results for the tested equipment corresponding with the 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) of the tables below.

Clause	ARIB STD/ Clause no.	Transmitter Parameters	Test verdict
6.1	T48/3.2 (1)	Antenna power	Pass
6.2	T48/3.2 (2)	Antenna power tolerance	Pass*
6.3	T48/3.2 (3)	Frequency tolerance	Pass
6.4	T48/3.2 (4)	Permissible value of occupied bandwidth	Pass
6.5	T48/3.2 (5)	Permissible levels of unwanted emission intensity	Pass
6.7	T48/3.5	Antenna Gain	Pass

Clause	ARIB STD/ Clause no.	Receiver Parameters	Test verdict
7.1	T48/3.3 (1)	Limit of collateral radiation	N.t. ³

Clause	ARIB STD/ Clause no.	Controller Parameters	Test verdict
8.1	T48/3.4 (1)	Interference prevention function	N.t. ⁴

* 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 7.1.

Additional information to the test report.

Remarks	Description
N.t. ¹	Not tested, because not applicable to the EUT
N.t. ²	Not tested, because not ordered
N.t. ³	Not tested, because the receiver is used in combination with a co-located transmitter
N.t. ⁴	Not tested, declared by the manufacturer

Reference(s) to this test report is the following
TÜV NORD Hochfrequenztechnik GmbH & Co. KG test report(s)

☐ Yes
Test report(s) no.:

☒ No

The equipment passed all the performed tests

☒ Yes

☐ No

Signature	 Digital unterscriben von Trepper Ralf Datum: 2026.04.29 08:46:35 +02'00'	 Digital unterscriben von Shrestha Anup Datum: 2026.04.24 16:37:48 +02'00'
	Tested by	Approved by
Name	Mr. Ralf Trepper	Mr. Anup Shrestha
Designation	Radio Test Engineer/ Laboratory Manager	Radio Test Engineer
Date of issue	2026-04-24	2026-04-24

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1 Table of contents

Revision	Date of issue	Creator	Content of change
00	2026-04-02	R. Trepper	Initial release
01	2026-04-24	A Shrestha	Correction of the revision number at the bottom-right corner of the test report's front page (Page 1)
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Table 1-1: Table of contents

Note: If the document has been changed by revision number, all previous documents are no longer valid and must be destroyed.

2 Introduction

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

- Test result summary
- List of contents
- Introduction and further information
- Performance assessment
- Detailed test information
- List of measurement equipment
- 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	ARIB STD-T48 Millimeter-Wave RADAR Equipment for Specified Low Power Radio Station

3 Administrative Data

3.1 Testing laboratory

TÜV NORD Hochfrequenztechnik GmbH & Co. KG

LESKANPARK, Building 10

Waltherstr. 49-51

51069 Cologne

Germany

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:	2026.01.05
Date of receipt:	2026.02.23
Period of testing time:	2026.03.17 - 2026.04.01
Internal project number:	He 26/022

3.3 Manufacturer's details

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

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

4 Equipment under test (EUT)

4.1 EUT: short description

EUT Type designation	RS7HRR
Type of equipment	Advanced Driver Assistance System
Trademark	HELLA
A/N Article no.	---
S/N Serial no.	1979905
HW Hardware status	A1
SW Software status	X5.4

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	FMCW normal operation	---
OP 2	---	---
OP 3	---	---

EUT : RS7HRR

ARIB STD-T48

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4.4 Additional declaration and description of EUT

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

EUT	☐ table top unit ☐ floor-standing ☐ wall-mounted ☒ build in	Typical use ☐ fixed use ☐ portable use ☒ vehicular use	Typical operating cycle of EUT ☐ ≤ 1 sec ☒ 50 ms
Place of use	☐ Residential, commercial and light industry ☐ Industrial environment ☐ Telecom centres only ☒ Vehicular use		
Highest frequency generated or used in the device or on which the device operates or tunes	☐ below 1.705 MHz ☐ 1.705 MHz – 108 MHz ☐ 108 MHz – 500 MHz ☐ 500 MHz – 1,000 MHz ☒ above 1,000 MHz		
Operating frequency bands over which the equipment is intended to operate	Crystal frequencies (25 MHz, 40 MHz, 50 MHz) Operating frequency band 76.0 GHz -77.0 GHz		
Environment(s) in which the equipment is intended to be used	-40°C - +85°C		
Power line			
☐ AC	☐ L1, ☐ L2, ☐ L3, ☐ N, ☐ PE	--- V/ AC	☐ 50 Hz ☐ 60 Hz
☒ DC	13.2 V/ DC		EUT grounding: ☒ none ☐ with power supply ☐ additional
Tested with:	11 V DC – 18 V DC		
Other ports			
Port type	Function	Shielding	Total cable length used during the test
Cable harness	DC supply / Ethernet-Interface / CAN-Interface	☒ screened ☒ unscreened	10m
---	---	☐ screened ☐ unscreened	---
---	---	☐ screened ☐ unscreened	---
---	---	☐ screened ☐ unscreened	---
---	---	☐ screened ☐ unscreened	---
Remarks:			

EUT : RS7HRR

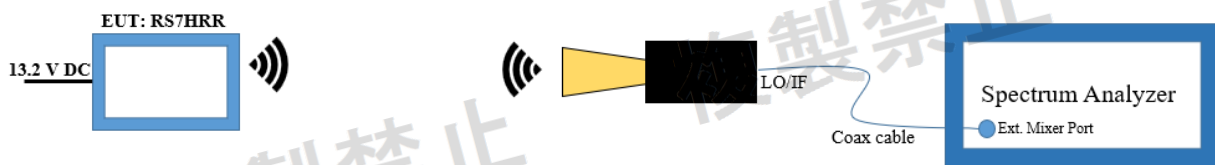
ARIB STD-T48

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4.5 Modifications

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

4.6 System Setup



Description of the function:

The EUT (RS7HRR) 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. It is powered by 13.2 V DC supply. As soon as the device is powered and initialized, it starts to operate as a normal FMCW RADAR.

The radiated Radar signal was measured using a free-space measurement setup as shown in the diagram above. The EUT emits the signal at 76.5 GHz through its integrated antennas. This radiated signal propagates through free space towards a receiving antenna connected to an external smart harmonic mixture and was analyzed at the spectrum analyzer.

4.6.1 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 sample 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 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.

5 Conclusions, Observations & Comments

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of TÜV NORD Hochfrequenztechnik GmbH & Co. KG.

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.

6 Transmitter Parameters

6.1 Antenna Power

The antenna power shall be 10 mW or less.

Result

Frequency (GHz)	Radiated power (dBm)	Antenna Gain (dBi)	Antenna power (dBm)	Limit (dBm)	Margin (dB)
76.167	36.35	28.0	8.35	10	1.65

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☒ 706 Semi Anechoic Chamber ☐ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☐ 668	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
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Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:
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6.2 Antenna power tolerance

The tolerance of the antenna power, which is the maximum permissible tolerance from designated or rated antenna power, shall be 50% in the upper limit and 70% in the lower limit.

Limit: $-70\% \leq P_{ANT} \leq +50\%$

Result

Antenna power tolerance	
Peak	
-58.7 %	
Average	
-31.6 %	

Peak

Maximum isotropic radiated power measured = M1 = 51.17 dBm e.i.r.p.
 Maximum antenna gain (declared by manufacturer) = M2 = 42 dBi (peak)
 Antenna power calculated (M1-M2) = 9.17 dBm = 8.26 mW
 Rated antenna power (declared by manufacturer) = 13.0 dBm = 20 mW (peak)
 -58.7 % lower than rated antenna power

Average

Average radiated channel power measured = M1 = 36.35 dBm e.i.r.p.
 Maximum antenna gain (declared by manufacturer) = M2 = 28 dBi (average)
 Antenna power calculated (M1-M2) = 8.35 dBm = 6.84 mW
 Rated antenna power (declared by manufacturer) = 10.0 dBm = 10.0 mW (average)
 -5.4 % lower than rated antenna power

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☒ 706 Semi Anechoic Chamber ☐ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☐ 668	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:

6.3 Frequency tolerance

The frequency tolerance, which is the maximum permissible departure by the centre frequency of the frequency band occupied by an emission from the assigned frequency, shall be within the designated frequency band indicated in the table below:

Table 2: Designated Frequency and Designated Frequency Band

Designated Frequency	Designated frequency band
60.5 GHz	60.0 GHz – 61.0 GHz
76.5 GHz	76.0 GHz – 77.0 GHz

Result

Test conditions	Frequency Tolerance			
$T_{nom} = +21^{\circ} C$	f_L (GHz) Measured	f_H (GHz) Measured	f_L (GHz) Limit	f_H (GHz) Limit
$V_{-10\%} = 11.0 V DC$	76.096023	76.991613	76.000000	77.000000
$V_{nom} = 13.2V DC$	76.096215	76.991314	76.000000	77.000000
$V_{+10\%} = 18.0 V DC$	76.096091	76.991751	76.000000	77.000000

Test conditions		Frequency Tolerance			
Extreme Temp. test at min. and max. DC Voltage		f_L (GHz) Measured	f_H (GHz) Measured	f_L (GHz) Limit	f_H (GHz) Limit
$T_{min} -40^{\circ} C$	$V_{min} 11 V DC$	76.096316	76.989251	76.000000	77.000000
	$V_{max} 18 V DC$	76.098433	76.989932	76.000000	77.000000
$T_{max} +85^{\circ} C$	$V_{min} 11 V DC$	76.099773	76.995026	76.000000	77.000000
	$V_{max} 18 V DC$	76.098427	76.993724	76.000000	77.000000

Test site	☐ 660 Semi Anechoic Chamber ☐ 706 Semi Anechoic Chamber ☒ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☒ 562	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 582	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
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Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:
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6.4 Permissible value of Occupied Bandwidth

Permissible value of the occupied bandwidth, which is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total mean power of a given emission, shall be less as specified in Table below:

Table 3: Permissible Value of Occupied Bandwidth

Radio Equipment for Specified Low Power Radio Station	Permissible Value of Occupied Bandwidth
Radio equipment using 60 – 61 GHz frequency band	500 MHz
Radio equipment using 76 – 77 GHz frequency band	1 GHz

Occupied Bandwidth (OCB)

Result

Freq. (GHz)	Lowest measured freq. (GHz)	Highest measured freq. (GHz)	Maximum OCB (GHz)	Limit (GHz)
76.500	76.096023	76.995026	0.899	≤ 1

Test site	☐ 660 Semi Anechoic Chamber ☐ 706 Semi Anechoic Chamber ☒ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☒ 562	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:

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6.4.1 Tolerance of OCB Bandwidth related to humidity conditioning and temperature

Result

Test conditions before humidity conditioning		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2 V DC	76.095497	76.988708
Test conditions after humidity conditioning		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2 V DC	76.095320	76.989305

Humidity conditioning parameters		
Test time min.	Humidity %	Temperature °C
10	95	35.0
25	95	35.0
40	94	35.1
55	94	35.0
70	95	35.0
85	95	35.0
100	94	35.0
115	95	35.0
130	96	35.0
145	95	35.1
160	94	35.0
175	94	35.0
190	95	35.0
205	95	35.0
220	95	35.0
235	95	35.0
240	95	35.0

Test site	☐ 660 Semi Anechoic Chamber ☐ 706 Semi Anechoic Chamber ☒ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☒ 562	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
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Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:
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Test conditions before temperature tests (- 20 °C)		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2V DC	76.095290	76.989203
Test conditions after temperature tests (- 20 °C)		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2 V DC	76.095171	76.989048

Test conditions before temperature tests (+ 60 °C)		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2V DC	76.095380	76.989128
Test conditions after temperature tests (+ 60 °C)		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2V DC	76.095004	76.989586

Test site	☐ 660 Semi Anechoic Chamber ☐ 706 Semi Anechoic Chamber ☒ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☐ 562	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
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Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:
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6.4.2 Tolerance of OCB Bandwidth related to vibration

Result

Test conditions before vibration		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2 V DC	76.095446	76.989505
Test conditions after vibration		lower measured freq. (GHz)	upper measured freq. (GHz)
T _{nom} +21°C	V _{nom} 13.2 V DC	76.097753	76.990329

Test site	☐ 660 Semi Anechoic Chamber ☐ 706 Semi Anechoic Chamber ☒ Radio laboratory					
Receiver	☐ 665	☒ 666	☐ 696			
Test equipment	☒ 385	☒ 674	☐ 28a	☐ 562	☐ 669	☐ 691
	☐ 442	☐ 462	☐ 562	☐ 28a	☐ 23	☐ 697
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K193	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

The equipment passed the performed tests	☒ Yes	☐ No	☐ N.t.*
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Test setup photos / test results are attached	☒ Yes	☐ No	Annexe no.:
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6.5 Permissible levels of unwanted emission intensity

The permissible levels for unwanted emission intensity shall be as indicated in Table below.

Frequency Range	Permissible Level of Unwanted emission Intensity
Out-of-Band	Peak power of 100 μ W or less in any arbitrary 1 MHz bandwidth
Spurious	Peak power of 50 μ W or less in any arbitrary 1 MHz bandwidth

By way of reference, the frequencies of the out-of-band and the spurious band for the designated frequencies from 76 GHz to 77 GHz are as indicated in Table below.

Frequency Range	Frequency Band
Out-of-Band	Higher than 72.5 GHz, lower than 76.0 GHz
	Higher than 77.0 GHz, lower than 80.5 GHz
Spurious	72.5 GHz and lower
	80.5 GHz and higher

6.5.1 Unwanted emission intensity in the spurious domain

Result

Test location and equipment in the frequency range (30 MHz – 160 GHz)

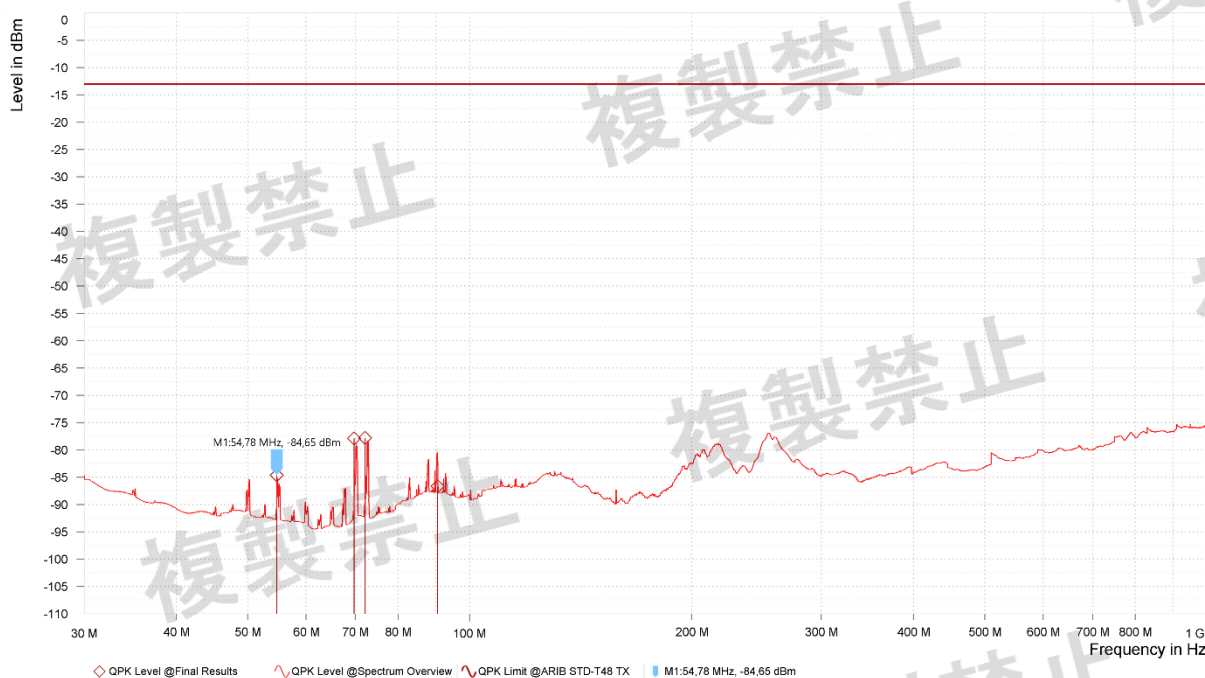
Test site	☐ 660 Semi Anechoic Chamber ☒ 706 Semi Anechoic Chamber ☐ Radio laboratory					
Receiver	☒ 502	☒ 666	☒ 696			
Test equipment	☒ 406	☒ 445a	☒ 442	☒ 384	☒ 385	☒ 547
	☒ 443	☒ 28a	☒ 673	☒ 674	☒ 545	☒ 546
	☒ 698	☒ 707	☒ 708	☒ 709	☒ 515	☒ 518
	☒ 560	☒ 223a	☒ 548			
Cable	☒ K164	☒ K163	☒ K215	☐ K59	☐ K51	☐ K176
	☒ K198	☒ K199	☒ K203	☒ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☒ ELEKTRA			

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30 MHz – 1 GHz



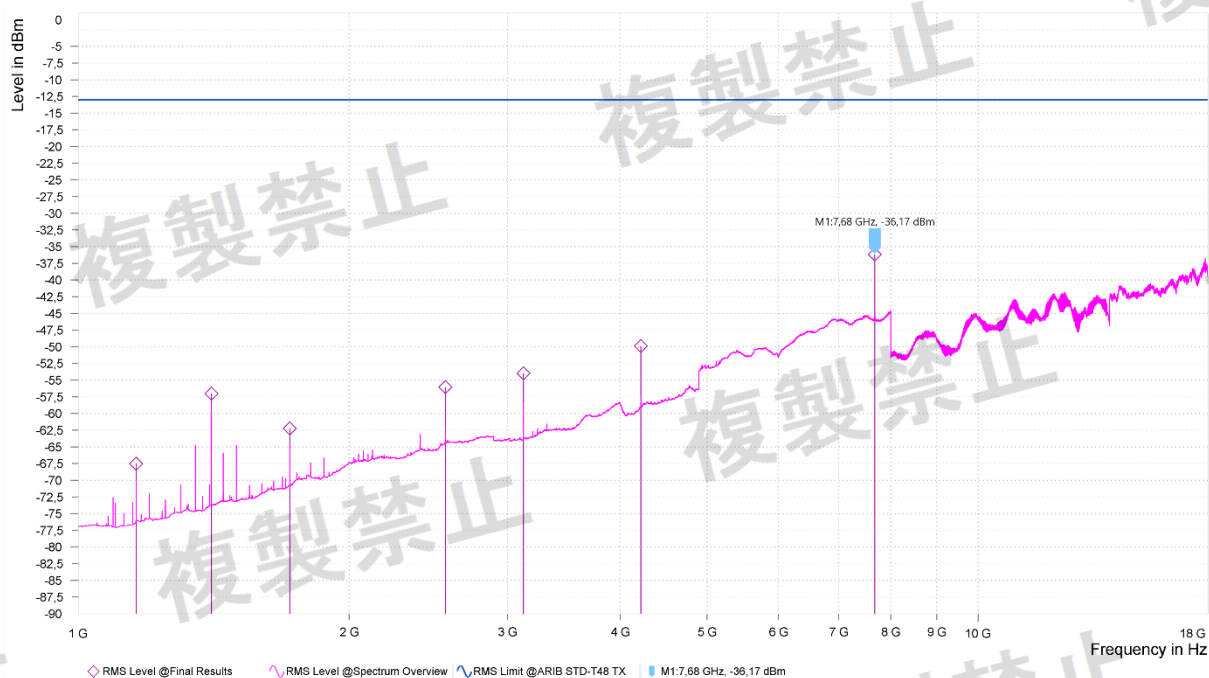
Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Corr. [dB]	Pol.	Azimuth [deg]	Ant. Height [m]	Meas. BW [kHz]
54.780	-84.65	-13.00	71.65	21.58	H	-45	3.76	120.000
69.690	-77.90	-13.00	64.90	21.61	V	134	1.00	120.000
72.150	-77.79	-13.00	64.79	22.26	V	152	1.00	120.000
90.480	-86.66	-13.00	73.66	26.80	V	-165	1.36	120.000

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1 GHz – 18 GHz



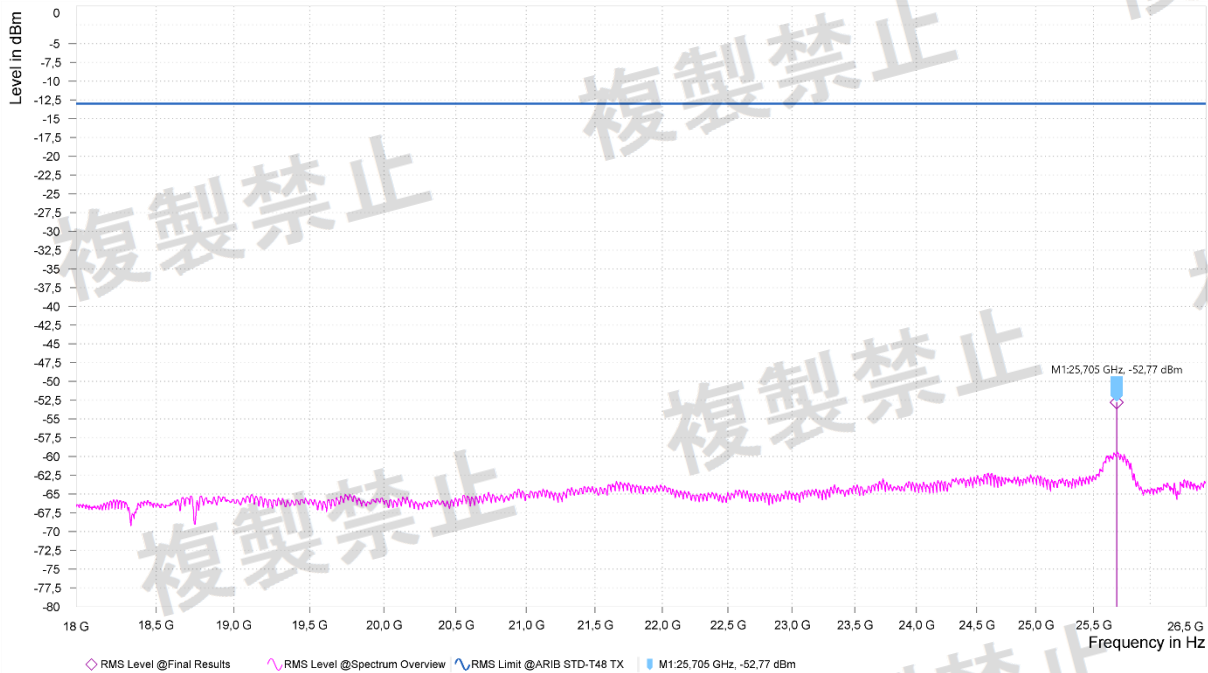
Frequency [MHz]	AV Level [dBm]	AV+ Limit [dBm]	AV+ Margin [dB]	Corr. [dB]	Pol.	Azimuth [deg]	Ant. Height [m]	Meas. BW [kHz]
1,159.975	-67.52	-13.00	54.52	38.69	H	-45	2.84	1,000.000
1,406.225	-57.02	-13.00	44.02	40.79	H	-59	3.27	1,000.000
1,718.725	-62.25	-13.00	49.25	43.65	H	136	2.01	1,000.000
2,559.950	-56.04	-13.00	43.04	48.22	H	140	1.84	1,000.000
3,124.975	-54.00	-13.00	41.00	49.27	V	2	1.66	1,000.000
4,218.700	-49.91	-13.00	36.91	53.46	V	22	1.66	1,000.000
7,679.925	-36.17	-13.00	23.17	60.99	H	131	1.13	1,000.000

EUT : RS7HRR

ARIB STD-T48

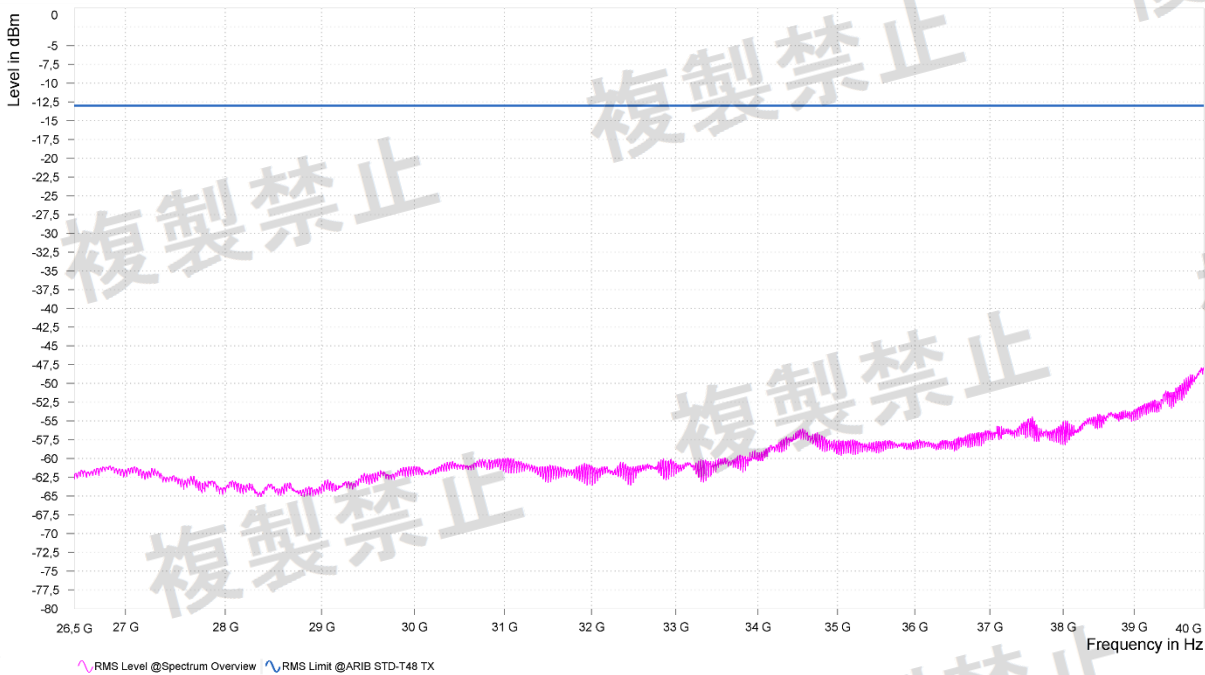
Date of issue: 2026-04-24

18 GHz – 26.5 GHz



Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Corr. [dB]	Pol.	Azimuth [deg]	Ant. Height [m]	Meas. BW [kHz]
25,704.700	-52.77	-13.00	39.77	40.92	H	146	3.12	1,000.000

26.5 GHz – 40 GHz



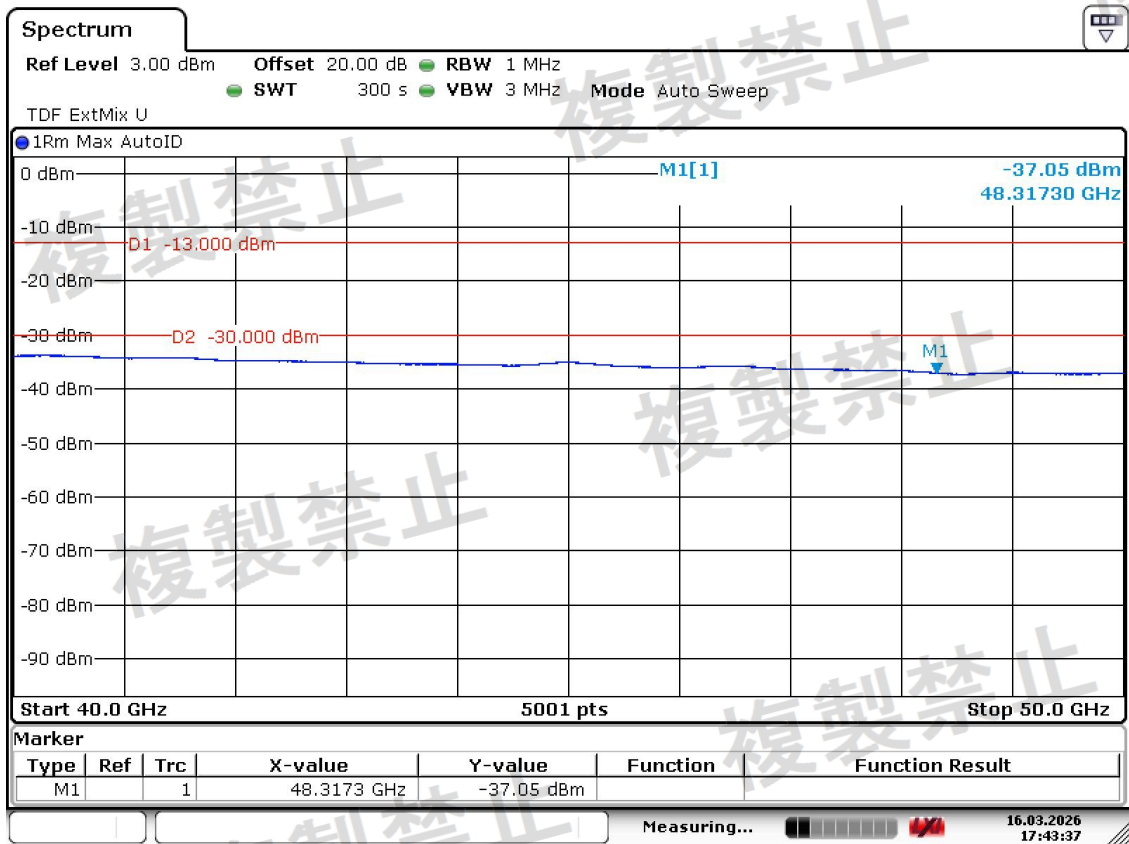
Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Corr. [dB]	Pol.	Azimuth [deg]	Ant. Height [m]	Meas. BW [kHz]
---	---	---	---	---	---	---	---	---

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

40 GHz – 50 GHz



Date: 16.MAR.2026 17:43:37

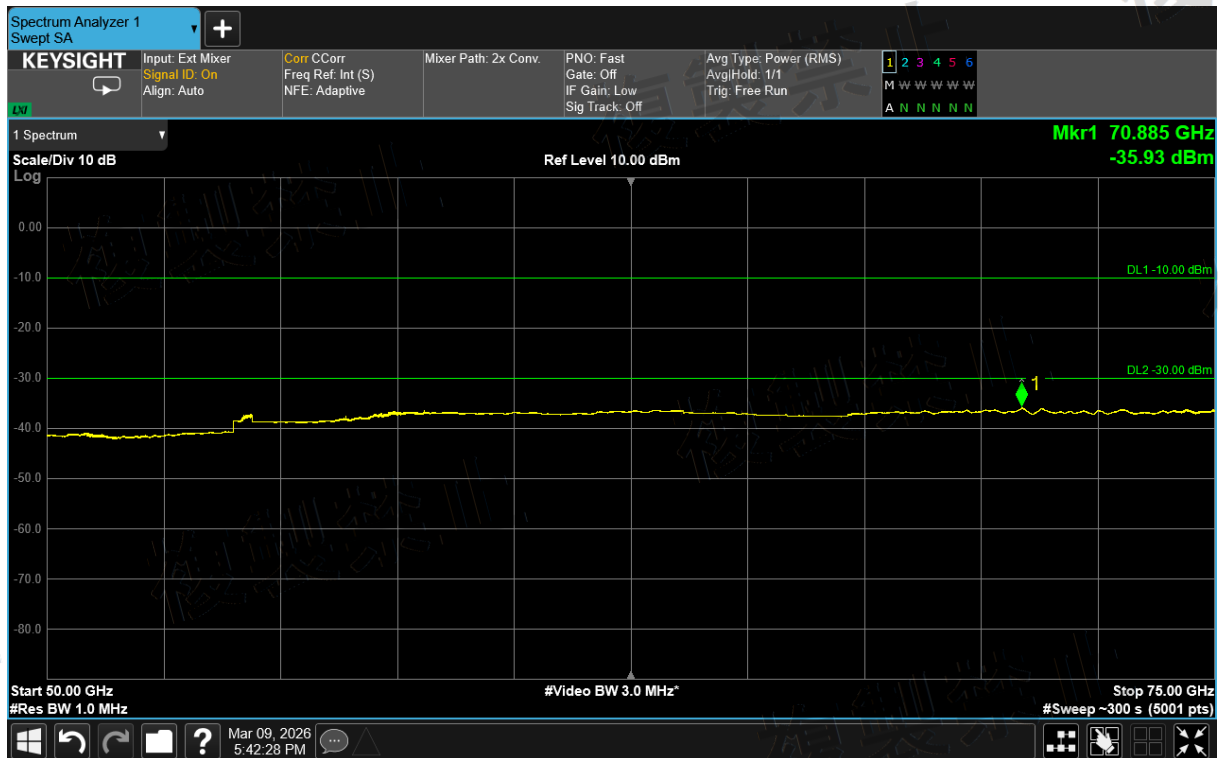
Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Corr. [dB]	Pol.	Azimuth [deg]	Ant. Height [m]	Meas. BW [kHz]
---	---	---	---	---	---	---	---	---

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

50 GHz – 76 GHz



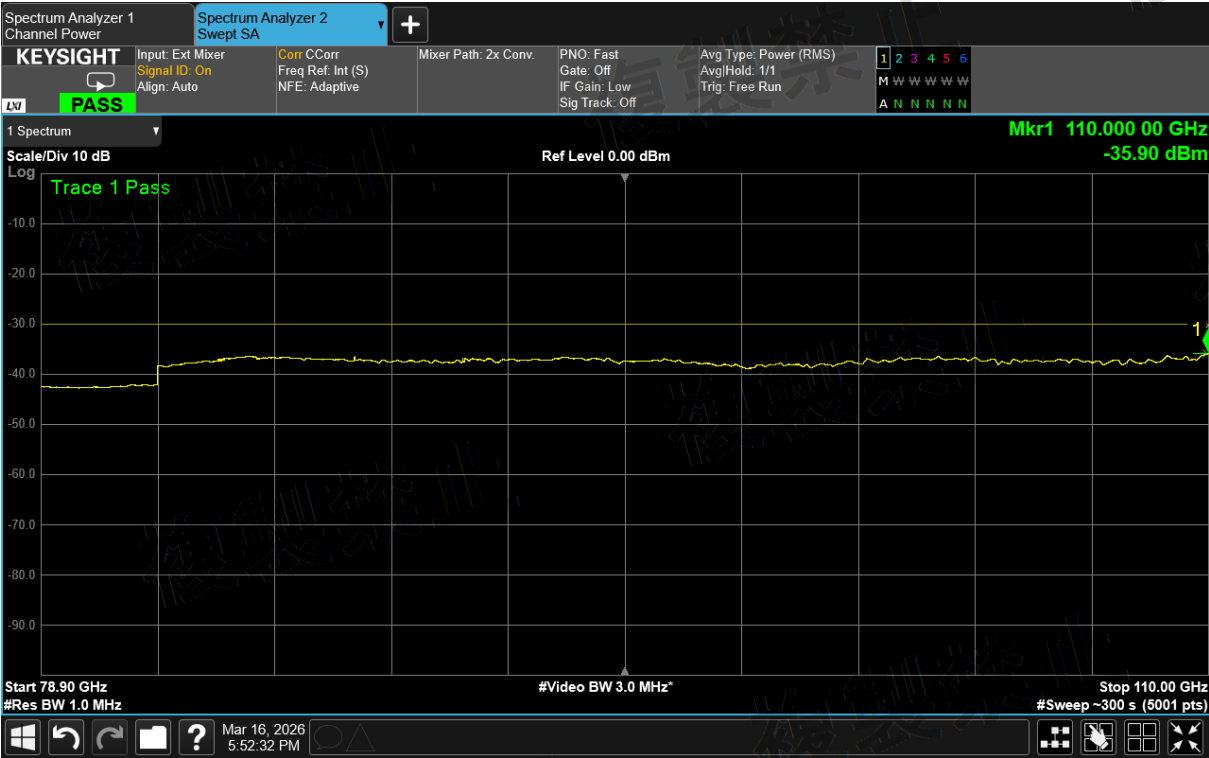
Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol V/H	Azimuth (deg)
**	---	-13.0	---	---	---	---	---	---
**No emissions detected!								
Measurement uncertainty: ± 5.7 dB								

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

77 GHz – 110 GHz



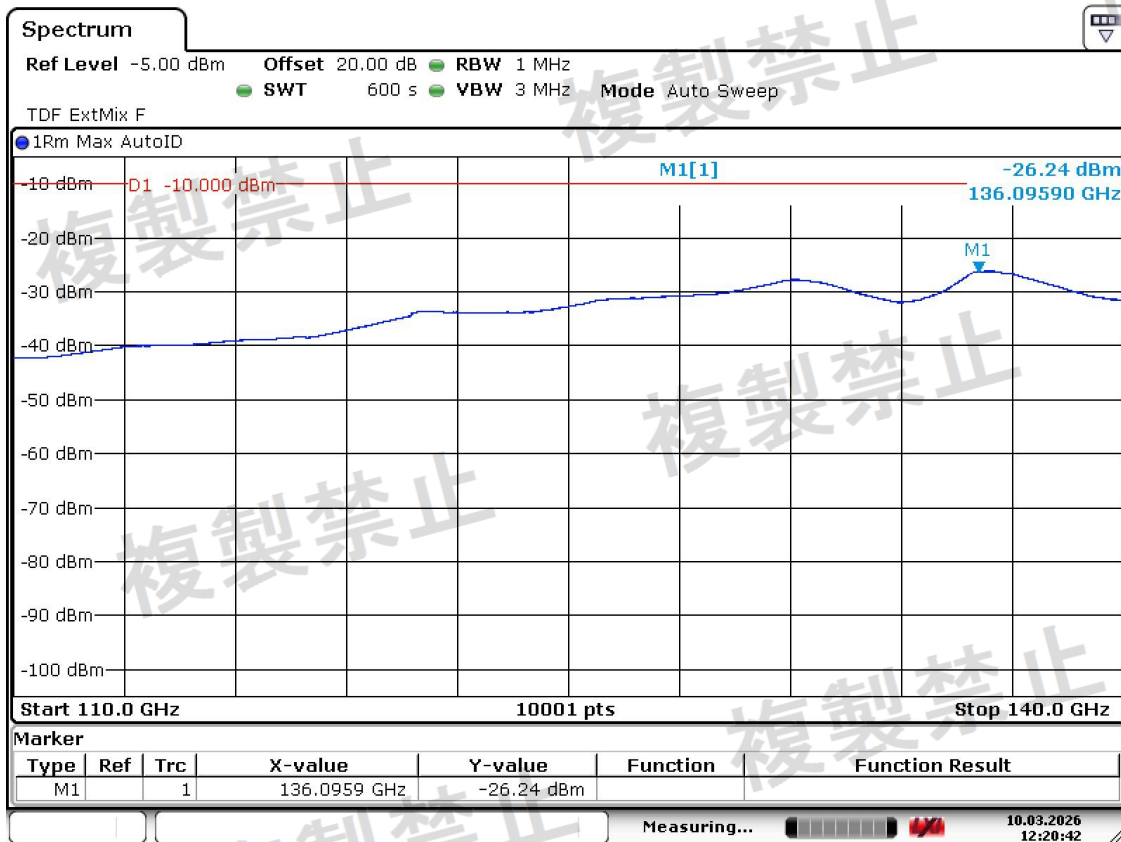
Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol V/H	Azimuth (deg)
**	---	-13.0	---	---	---	---	---	---
**No emissions detected!								
Measurement uncertainty: ± 5.7 dB								

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

110 GHz – 140 GHz



Date: 10.MAR.2026 12:20:42

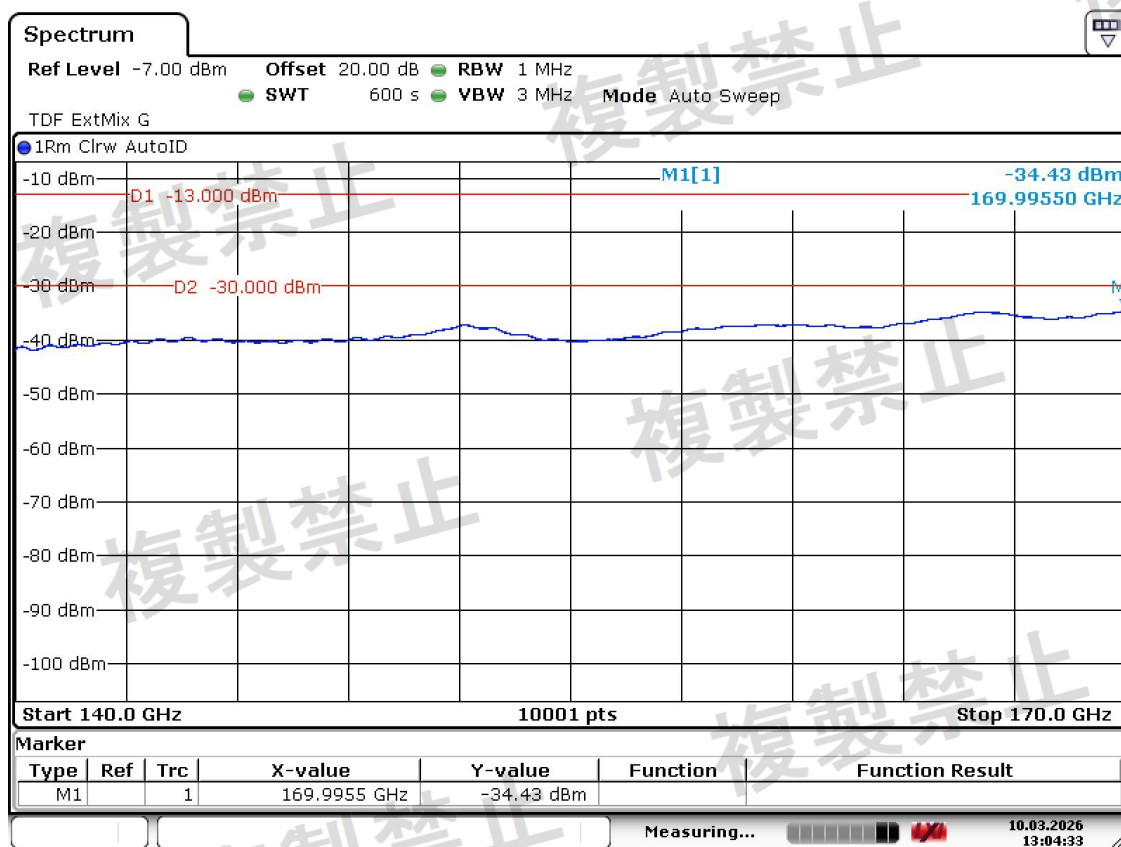
Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol V/H	Azimuth (deg)
**	---	-13.0	---	---	---	---	---	---
**No emissions detected!								
Measurement uncertainty: ± 5.7 dB								

EUT : RS7HRR

ARIB STD-T48

Date of issue: 2026-04-24

140 GHz – 170 GHz



Date: 10.MAR.2026 / 13:04:33

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol V/H	Azimuth (deg)
**	---	-13.0	---	---	---	---	---	---
**No emissions detected!								

The equipment passed the performed tests

☒ Yes☐ No☐ N.t.*

Test setup photos / test results are attached

☒ Yes☐ No

Annexe no.:

6.5.2 Unwanted emission intensity in the out-of-band domain

Frequency range	Res. Bandwidth (kHz)	Test frequency (GHz)	Maximum emission observed (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
72.5 GHz to 77.0 GHz	1000	**	---	-10	---
81.0 GHz to 85.5 GHz	1000	**	---	-10	---

**No emission detected!

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber ☒ 706 Semi Anechoic Chamber ☐ Radio laboratory					
Receiver	☐ 502	☒ 666	☐ 696			
Test equipment	☐ 406	☐ 445a	☐ 442	☐ 384	☒ 385	☐ 547
	☐ 548	☐ 28a	☐ 673	☒ 674	☐ 545	☐ 546
	☐ 698	☐ 707	☐ 708	☐ 709	☐ 385	☐ 689
Cable	☒ K164	☐ K163	☐ K194	☐ K59	☐ K51	☐ K176
	☐ K198	☐ K199	☐ K203	☐ K205	☐ K195	☐ K164
Test-Software	☐ EMC32		☐ ELEKTRA			

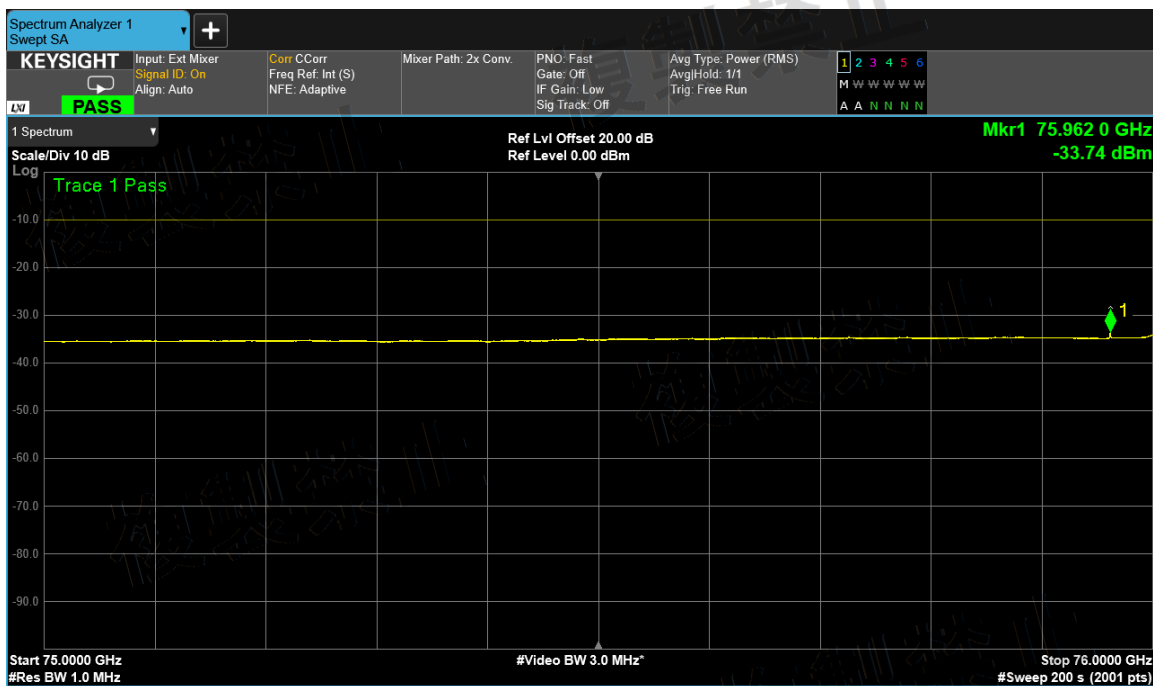
EUT : RS7HRR

ARIB STD-T48

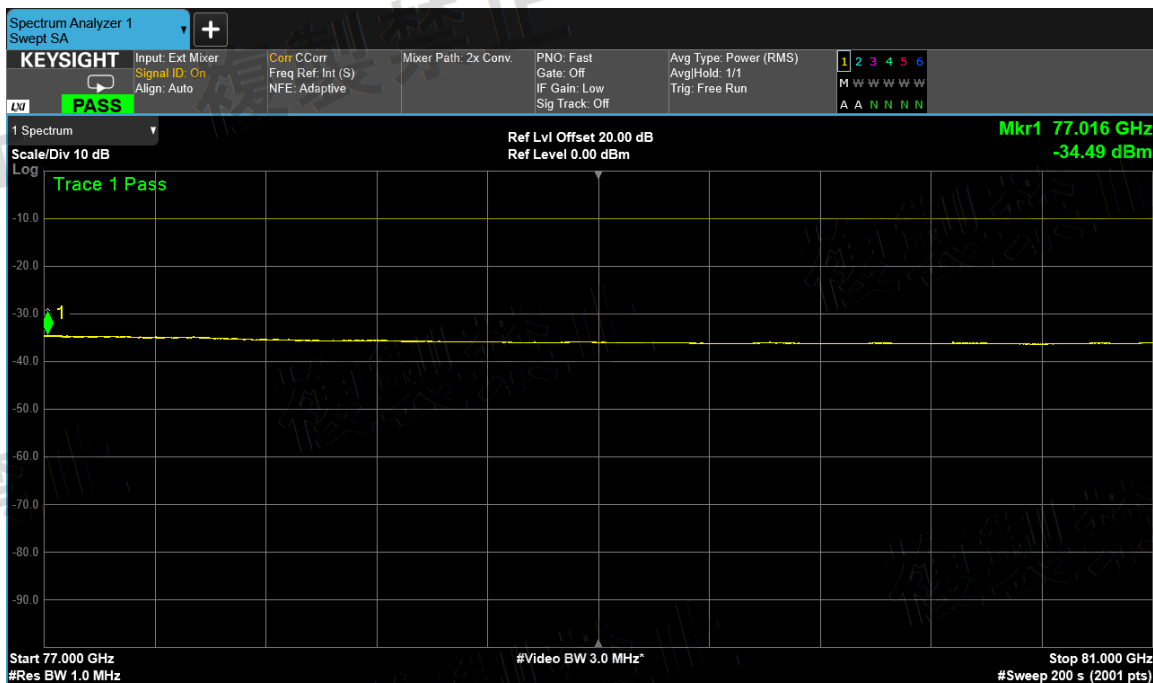
Date of issue: 2026-04-24

Measurement results

75 GHz – 76 GHz



77 GHz – 81 GHz



The equipment passed the performed tests

☒ Yes

☐ No

☐ N.t.*

Test setup photos / test results are attached

☒ Yes

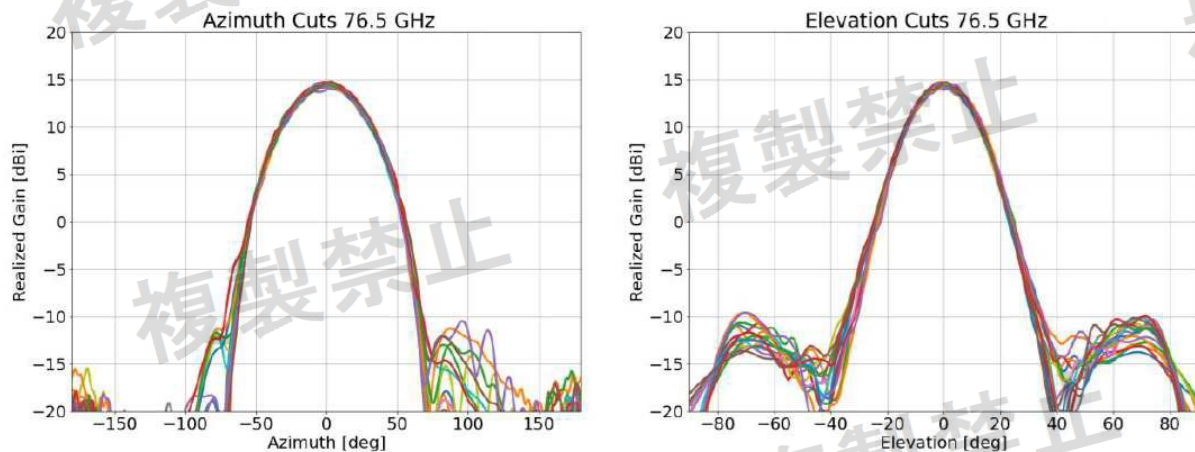
☐ No

Annexe no.:

6.6 Antenna Gain

The absolute gain of the transmission antenna shall be 35 dBi or less.

Antenna characteristics



**This antenna pattern diagram was provided by the manufacturer*

Effective antenna gain

Because of the simultaneous operation of all 24 transmitters with identical frequency, from outside of the radar sensor a single effective transmitter can be assumed with an effective gain of $14 \text{ dBi} + 20 \log(24) = \mathbf{42 \text{ dBi}}$ for peak power and of $14 \text{ dBi} + 10 \log(24) = \mathbf{28 \text{ dBi}}$ for average power.

**This antenna description and the calculation were provided by the manufacturer*

7 Receiver Parameters

7.1 Limit of collateral radiation

Limit
Equal to or less 100 µW

Collaterally radiated emissions										
f	BW	Noted receiver level	Test Dist.	Corr. factor	Coax. loss	Level Corr.	Limit	Margin	Pol.	Ant. height
MHz /GHz	kHz / Type of detector	dBm	m	dB	dB	dBm	dBm	dB	EUT / antenna	cm
			3				-10.0		H,V/H,V	100-400
			3				-10.0		H,V/H,V	100-400

* Bandwidth = the measuring receiver bandwidth

Remark: *1 all emissions lower than the noise level of the measurement instruments.

Remark: *2 maximum spurious emission intensities regarding the noise level.

Test location and equipment

Test site	☐ 660 Semi Anechoic Chamber				
	☐ 667	☐ 668	☐ 669		
Receiver	☐ 665	☐ 666	☐ 502		
Antenna	☐ 384	☐ 406	☐ 442	☐ 454a	
	☐ 687	☐ 688	☐ 689	☐ 385	
Additional equipment	☐ 515	☐ 28a	☐ 673	☐ 674	☐ 675
	☐ 677	☐ 679	☐ 223a		
Cable	☐ K189	☐ K193	☐ K195	☐ K164	

The equipment passed the performed tests	☐ Yes	☐ No	☒ N.t. ³
--	------------------------------	-----------------------------	---

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

8 Controller Parameters

8.1 Interference prevention function

The radio equipment shall have a function to distinguish its own transmitting signals from radio waves transmitted by other radio stations, by identifying their modulation methods or other characteristics.

**Declared by the manufacturer*

The equipment passed the performed tests	☐ Yes	☐ No	☒ N.t. ⁴
--	------------------------------	-----------------------------	---

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

9 Measurement Uncertainty

The total uncertainty of measurement is the result of the mathematically-statistically distribution of the individual measurement uncertainty (MU) of the used measurement equipment. It is supposed that all individual deviations accidentally but not inevitable normally distributed. The total deviation is supposed to be normally distributed (RSS=Root-Sum-of-the-squares deviation corresponds to a measurement uncertainty which will be not exceeded with a probability of 68 %). Measurement uncertainty Δ , which will be not exceeded with a probability of 95 %, is 2 x RSS. For the following measurements and tests are the values as from the laboratory given:

Clause	Title	Meas. Uncert.
6.2	Antenna power tolerance	± 6 dB
6.3	Frequency tolerance	$\pm 5 \cdot 10^{-8}$
6.4	Occupied Bandwidth	$\pm 5 \cdot 10^{-8}$
6.5	Radiated emissions below 40 GHz	± 4 dB
	Radiated emissions above 40 GHz	
	- 40 to 90 GHz:	± 6 dB
	- 90 and above	± 7 dB
7.1	Collateral radiated emissions below 40 GHz	± 4 dB
	Collateral radiated emissions above 40 GHz	
	- 40 to 90 GHz:	± 6 dB
	- 90 and above	± 7 dB

Table 9-1: Uncertainty of measurement

9.1 Decision rule

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. If the report does not state otherwise, procedure 1 according to IEC Guide 115 ed. 2.0 2021 (uncertainty of measurement calculated) has been applied on measurement and test procedures, which are the basis of this report.

10 List of test equipment

List of Calibrated Test Equipment

State (April 24, 2026)							
Marking	Manufacturer	Type/ Serial-No.	Device No.	Calibration Date	Calibration Due Date	Calibration Body	Calibration Method**
Tri-Log Broadband	Schwarzbeck	VULB9168	406	Aug 25	Aug 26	Seibersdorf	c
Broadband Horn 14-40 GHz	Schwarzbeck	BBHA9170	442	Apr 24	Apr 25	Seibersdorf	c
Log Per Antenna 0.7-20 GHz	Schwarzbeck	STLP9148	445a	Aug 25	Aug 26	Seibersdorf	c
Harmonic Mixer 40-60 GHz	Rohde & Schwarz	FS-Z60/ SN:100037	515	Jan 26	Jan 27	Rohde & Schwarz	c
Waveguide Harmonic Mixer 50 – 75 GHz	Keysight	M1971V	673	Mar 24	Mar 25	Keysight technologies	c
Waveguide Harmonic Mixer 75 – 110 GHz	Keysight	M1971W	674	Mar 24	Mar 25	Keysight technologies	c
Signal Analyser 10 Hz – 30 GHz	Rohde & Schwarz	FSV 30 S/N: 100932	502	Jan 26	Jan 27	Rohde & Schwarz	c
Harmonic Mixer 60-90 GHz	Rohde & Schwarz	FS-Z90/ SN:100062	501	Mar 26	Mar 27	Rohde & Schwarz	c
Harmonic Mixer 90-140 GHz	radiometer Physics	SAM-140 SN: 20006	545	Mar 26	Mar 27	Rohde & Schwarz	c
Harmonic Mixer 140-220 GHz	Rohde & Schwarz	SAM-220 SN: 020002	546	Mar 26	Mar 27	Rohde & Schwarz	c
EMI-Test receiver ESW26	Rohde & Schwarz	R&S ESW26 SN:101383/26	665	Mar 26	Mar 27	Rohde & Schwarz	c
EMI-Test Receiver ESW44	Rohde & Schwarz	R&S ESW44 SN: 103281	696	Jul 25	Jul 26	Rohde & Schwarz	c
Signal analyser Keysight 50GHz	Keysight	UXA N9040B (SN: MY57213006 SW: A.27.02/2020 1.0)	666	Mar 24	Mar 25	Keysight technologies	c
Network Analyser 9 kHz -6 GHz	Rohde & Schwarz	ZVL6/ SN: 101268	534	Nov 25	Nov 26	Rohde & Schwarz	c
Signal Generator	Rohde & Schwarz	SMB100A	571	Nov 25	Nov 26	Rohde & Schwarz	c
Temperature and Climate Test Chamber	Weiß Umwelttechnik, WKL 34/40	SN: 5667998	562	Mar 25	Mar 26	Weisstechnik	c

**Calibration Method:

- Calibration conducted by the National Institute of Information and Communications Technology (NICT) (Hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
- Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)
- Calibration conducted by using measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c)

List of Test Equipment exemption from Calibration requirement

State (April 24, 2026)						
Marking	Manufacturer	Type/ Serial-No.	Device No.	Validation Date	Validation Due Date	Validation Method **
Semi Anechoic Chamber	COMTEST	SAC-3m	660	Mai 25	Mai 27	Internal
Maturo Turntable	Maturo	TT2.0SI (SN: TT2.05SI/817	667	---	---	NA
Maturo Antenna Mast	Maturo	TAM4.5-E-10kg (SN: 10011/216/2588.01)	668	---	---	NA
Maturo Controller	Maturo	FCU3.0/009/2588.01 (SN: 10014/2019)	669	---	---	NA
EMC-Semi Anechoic Chamber (SAC)	Frankonia	SAC-5 Plus L-Dome Design	706	Sep 24	Sep 26	Internal
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			
Gain Horn Antenna 40-60 GHz	Dorado	GH-19-20 / 070106	518	---	---	NA ⁶
Gain Horn 50-75 GHz	Dorado	031003	384	---	---	NA ⁶
Gain Horn 75-110 GHz	Dorado	040808	385	---	---	NA ⁶
Dual Mode Potter Horn 90-140 GHz	Radiometer Physics	140-WR8	547	---	---	NA ⁶
Dual Mode Potter Horn 140-220 GHz	Radiometer Physics	220-WR5.1	548	---	---	NA ⁶
Conical Gain Horn Ant. 110 GHz – 170 GHz [21 dBi]	Virginia Diodes, Inc.	Conical Antenna WR- 6.5	687	---	---	NA ⁶
Conical Gain Horn Ant. 140 GHz – 220 GHz [21 dBi]	Virginia Diodes, Inc.	Conical Antenna WR- 5.1	688	---	---	NA ⁶
Diagonal Gain Horn Ant. 220 GHz – 330 GHz [26 dBi]	Virginia Diodes, Inc.	Diagonal Antenna WR- 3.4	689	---	---	NA ⁶
Mitteq amplifier 26.5-40 GHz	Mitteq	---	223a	Apr 26	Apr 28	Internal
Microwave amplifier 12-28 GHz	Schwarzbeck	---	443	Apr 26	Apr 28	Internal
Programmable Power Supply	Fluke	PM 2813	28a	---	---	NA
Power Supply	EA	PSI 8080-40-DT	560	---	---	NA
EMC32	Rohde & Schwarz	V10.60.20	---	---	---	NA
ELEKTRA	Rohde & Schwarz	SW: V 5.01.0	---	---	---	NA
Maturo mcApp	Maturo	SW: V3.4.9.4537 (19.04.04)	---	---	---	NA

** Validation Method:

Internal – The device was only validated internally with the help of a Network Analyzer or Signal Generator and EMC Software.

NA (Not Applicable) – Measuring equipment not to be calibrated, only verified as they work passively or are exempt from calibration.

6 Standard-gain horn antennas have gain characteristics that are established by the physical dimensions and dimensional tolerances. Consequently, standard-gain horn antennas need not to be calibrated beyond the dimensional characteristics that are provided by the manufacturer, unless damaged is suspected, or if used at distances closer than $(2D^2)/\lambda$. This is also described in NRL Report 4433.

11 List of test cables

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer	Verification
3	N	0,5 - 8000	3	Cellflex	Internal
4	N	0,5 - 8000	3	Cellflex	Internal
12a	N	10 – 265000	6	Huber + Suhner	Internal
14a	BNC	10 – 1000	1.00	Telemeter	Internal
17a	APC3.5	10 – 26500	2.13	Huber + Suhner	Internal
18a	APC3.5	10 – 26500	2.13	Huber + Suhner	Internal
22	BNC	10 – 1000	1.50	---	Internal
27	BNC	10 – 1000	1.00	Fabrica Milanese Cond.	Internal
35	N	10 – 2000	1.10	Fujikura	Internal
40	BNC	---	0.50	Aircell	Internal
44	SMA	---	0.50	Huber + Suhner	Internal
45	SMA	10 – 18000	0.50	Huber + Suhner	Internal
48	SMA	---	0.50	Huber + Suhner	Internal
49	N	10 – 18000	1.00	Huber + Suhner	Internal
50	N	10 – 18000	1.00	Huber + Suhner	Internal
58	N	10 – 18000	2.00	Huber + Suhner	Internal
59	N	10 – 18000	1.00	Huber + Suhner	Internal
60	N	10 – 18000	2.00	Huber + Suhner	Internal
61	N	10 – 18000	1.00	Huber + Suhner	Internal
62	SMA	---	0.50	Huber + Suhner	Internal
63	SMA	10 – 18000	0.50	Huber + Suhner	Internal
64	SMA	10 – 18000	0.50	Huber + Suhner	Internal
65	APC3.5	10 – 26500	0.60	---	Internal
66	APC3.5	10 – 26500	0.60	---	Internal
67	APC3.5	10 – 26500	0.60	---	Internal
68	APC3.5	10 – 26500	0.60	---	Internal
76	SMA	10 – 30000	3.00	Gore	Internal
79	BNC/N	10 – 1000	5.00	---	Internal
80	SMA	---	0.25	Huber + Suhner	Internal
87	SMA	10 – 18000	0.15	Huber + Suhner	Internal
88	SMA	10 – 18000	0.15	Huber + Suhner	Internal
89	SMA	10 – 18000	0.15	Huber + Suhner	Internal
90	SMA	10 – 18000	0.15	Huber + Suhner	Internal
94	BNC	---	1.10	---	Internal
100	N	10 – 26500	6.00	Rosenberg	Internal
101	N	10 – 18000	2.90	Huber + Suhner	Internal
102	SMA	10 – 18000	2.00	Huber + Suhner	Internal
112	BNC	10 – 1000	0.50	---	Internal
114	SMA	10 – 18000	0.25	Huber + Suhner	Internal
116	SMA	10 – 18000	0.25	Huber + Suhner	Internal
119	N	10 – 20000	8.00	Jyebao	Internal
121	SMA	10 – 18000	1.50	Huber + Suhner	Internal
122	SMA	10 – 18000	2.00	Huber + Suhner	Internal
123	SMA	10 – 18000	2.00	Huber + Suhner	Internal
145	SMA	10 – 26500	8.00	Huber + Suhner	Internal
147	APC3.5	10 – 40000	1.50	Jyebao	Internal
148	APC3.5	10 – 40000	3.00	Jyebao	Internal
154	BNC	10 – 1000	1.00	---	Internal
158	SMA	10 – 26500	2.00	Huber + Suhner	Internal
161	SMA	10 – 18000	1.00	Huber + Suhner	Internal
162	APC3.5	10 – 26500	2.00	Huber + Suhner	Internal
163	APC3.5	10 – 26500	2.00	Huber + Suhner	Internal
164	APC3.5	10 – 26500	2.00	Huber + Suhner	Internal
165	APC2.9	10 – 26500	2.00	Huber + Suhner	Internal
167	APC3.5	10 – 40000	1.00	Jyebao	Internal
168	APC3.5	10 – 40000	1.00	Jyebao	Internal

Date of issue: 2026-04-24

Internal	Cabels were verified internally with the help of a Network Analyzer or Signal Generator and EMC Software				
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V1.25