Report on the FCC and IC Testing of the APTIV Services Deutschland GmbH Vehicle Radar Model: SRR6PB2 In accordance with FCC 47 CFR Part 95, Subpart M

Prepared for: APTIV Services Deutschland GmbH Am Technologiepark 1 42119 Wuppertal, Germany

FCC ID: LTQSRR6PB2

COMMERCIAL-IN-CONFIDENCE

Date: 2023-01-30

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Martin Steindl	2023-01-30	Skindl Martin SIGN-10 753334
Authorised Signatory	Matthias Stumpe	2023-01-30	Juno SIGN-1D 753356

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules. **Engineering Statement:**

This measurement shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compilance with with FCC 47 CFR Part 95, Subpart M.

The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Martin Steindl	2023-01-30	Skinell Martin SIGN-10 753336
Laboratory Accreditation DAkkS Reg. No. D-PL-11321-11-02 DAkkS Reg. No. D-PL-11321-11-03			bry recognition tion No. BNetzA-CAB-16/21-15

Executive Statement:

A sample of this product was tested and found to be compilant with FCC 47 CFR Part 95, Subpart M : 2021

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Äußere Frühlingstraße 45 94315 Straubing Germany



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1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Revision	Description of changes	Date of Issue
0	First Issue	2022-12-13
1	Corrected indicated of detector on page 9	2023-01-30

Table 1: Report of Modifications

1.2 Introduction

Applicant	APTIV Services Deutschland GmbH Am Technologiepark 1 42119 Wuppertal, Germany
Manufacturer	APTIV Services Deutschland GmbH
Model Number(s)	SRR6PB2
FCC ID:	LTQSRR6PB2
Serial Number(s)	0002
Hardware Version(s)	B2
Software Version(s)	4.0.0
Number of Samples Tested	1
Test Specification(s) /	FCC 47 CFR Part 95 M : 2021
Issue / Date	
Test Plan/Issue/Date	N/A
Order Number	454163298
Date	2022-11-21
Date of Receipt of EUT	2022-11-18
Start of Test	2022-11-25
Finish of Test	2022-12-0
Name of Engineer(s)	M. Steindl, A. Fink
Related Document(s)	ANSI C63.10:2013



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 95, Subpart M is shown below.

Section	Specification	Test Description	Result
	Clause		
2.1	§ 95.3367 (a)	Radiated Average Power	Passed
2.2	§ 95.3367 (b)	Radiated Peak Power	Passed
2.3	§ 95.3379	Radiated Emissions	Passed
2.4	§ 95.3385	Bandwidth of Signal	Passed

Table 2: Results according to FCC 47 CFR Part 95, Subpart M



1.4 Product Information

1.4.1 Technical Description

The Device Under Test (DUT) is a 76 to 77 GHz vehicular radar. The device employs a dynamic chirp modulated transmit array. Multiple receive antennas are used to determine target angular resolution through digital beam forming. When installed on a vehicle, the device will operate when the vehicle is running.

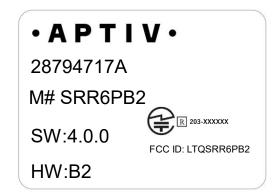
Frequency Band	76 – 81 GHz
Emission designator:	725MFXN
Supply Voltage: Supply Frequency:	12 V DC (0 Hz)

1.4.2 EUT Ports / Cables identification

Wiring harness 2 m DC supply and Data I/O No	Port	Max Cable Length speci- fied	Usage	Screened
	Wiring harness	2 m		No

Table 3

1.4.3 Label





1.5 Test Configuration

The applicant provided a test sample for stand alone operation.

1.6 Modes of Operation

The DUT transmitted continuously in the 76 to 77 GHz frequency band.

1.7 EUT Modifications Record

The table below details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
Radiated Average Power	M. Steindl
Radiated Peak Power	M. Steindl
Radiated Emissions	M. Steindl; A. Fink
Bandwidth of Signal	M. Steindl

Office Address: Äußere Frühlingstraße 45 94315 Straubing Germany



2 Test Details

2.1 Radiated Average Power

2.1.1 Specification Reference

FCC 47 CFR Part 95, Subpart M, Clause 95.3367 (a)

2.1.2 Equipment under Test and Modification State

SRR6PB2; S/N 0002; Modification State 0

2.1.3 Date of Test

2022-11-25

2.1.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	38 %

2.1.5 Specification Limits

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)

2.1.6 Test Method

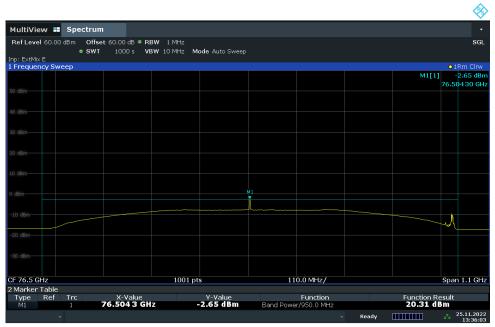
The test was performed according to ANSI C63.10, section 10.3.5 See section 2.3 of this test report for details.



2.1.7 Test Results

Detector	EIRP (dBm)	Limit (dBm)
Average (peak value)	-2.64 dBm	50 dBm
Average (band function)	20.31 dBm	50 dBm

Table 5: RMS Power



13:36:04 25.11.2022

2.1.8 Test Location and Test Equipment

The test was carried out in fully anechoic room, No. 2

Instrument	ment Manufacturer		TE No	Calibra- tion Pe- riod (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSW43	54396	12	2023-04-30
Waveguide Mixer	Rohde & Schwarz	FS-Z90	25850	36	2023-03-28
Horn Antenna	Flann	26240-20	37898		

Table 6



2.2 Radiated Peak Power

2.2.1 Specification Reference

FCC 47 CFR Part 95, Subpart M, Clause 95.3367 (b)

2.2.2 Equipment under Test and Modification State

SRR6PB2; S/N 0002; Modification State 0

2.2.3 Date of Test

2022-11-25

2.2.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	38 %

2.2.5 Specification Limits

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 Resolution Bandwidth (RBW)

2.2.6 Test Method

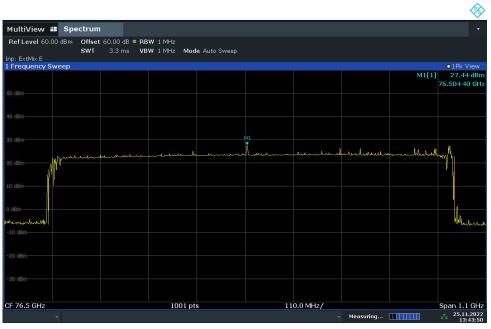
The test was performed according to ANSI C63.10, section 10.3.5 See section 2.3 of this test report for details.



2.2.7 Test Results

Detector	EIRP (dBm)	Limit (dBm)				
Peak	27.44 dBm	55 dBm				

Table 7: Peak Power



13:43:51 25.11.2022

2.2.8 Test Location and Test Equipment

The test was carried out in fully anechoic room, No. 2

Instrument	trument Manufacturer		TE No	Calibra- tion Pe- riod (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSW43	54396	12	2023-04-30
Waveguide Mixer	Rohde & Schwarz	FS-Z90	25850	36	2023-03-28
Horn Antenna	Flann	26240-20	37898		





2.3 Radiated Emissions

2.3.1 Specification Reference

FCC 47 CFR Part 95, Subpart M, Clause 95.3379

2.3.2 Equipment under Test and Modification State

SRR6PB2; S/N 0002; Modification State 0

2.3.3 Date of Test

2022-11-25 20 220-12-02

2.3.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	38 %



2.3.5 Specification Limits

	General radiated emission limits:								
Frequency Range	Test distance	Field s	trength	Field strength					
(MHz)	(m)	(m) (μA/m) (dBμA/m)		(μV/m)	(dBμV/m)				
0.009 - 0.49	300	6.37 / f	20*lg(6.37 / <i>f</i>)	2400 / f	20*lg(2400 / f)				
0.49 - 1.705	30	63.7 / f	20*lg(63.7 / f)	24000 / f	20*lg(24000 / f)				
1.705 - 30	30	0.08	20*lg(0.08 / f)	30	20*lg(30 / f)				
30 - 88	3			100	40				
88 – 216	3			150	43.5				
126 – 960	3			200	46				
960 - 40000	3			500	54				
Note 1: f in kHz		•		•					

Table 9 Radiated emission limits at or below 40 GHz

Frequency range	Spectral Density	EIRP	
40 – 200 GHz	600 pW/cm² at 3 m	-7.70 dBm	
200 – 231 GHz	1000 pW/cm² at 3 m	-5.49 dBm	

Table 10 Radiated emission limits above 40 GHz



2.3.6 Test Method

The test was performed according to ANSI C63.10, sections 11.11 and 11.12

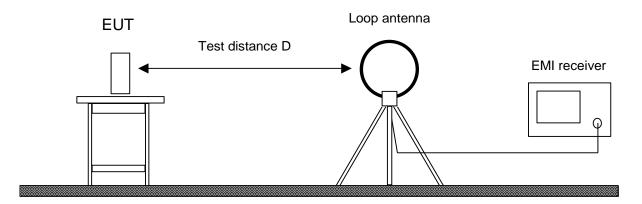
Prescans are performed in six positions of the EUT to get the full spectrum of emission caused by the EUT with the measuring antenna raised and lowered from 1 m to 4 m with vertical and horizontal polarisation to find the combination of table position, antenna height and antenna polarisation for the maximum emission levels.

Data reduction is applied to these results to select those levels having less margin than 10 dB or exceeding the limit using subranges and limited number of maximums.

Further maximisation for adjusting the maximum position is following.

Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

2.3.6.1 Frequency range 9 kHz – 30 MHz



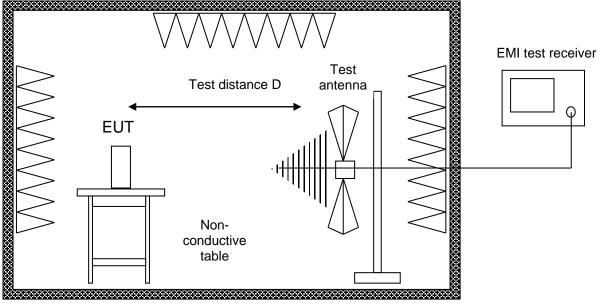
The EUT was placed on a non-conductive table, 0.8 m above the ground.

Radiated emissions in the frequency 9 kHz – 30 MHz is measured within a semi-anechoic room with an active loop antenna with the measurement detector set to peak. In addition in the frequency range 9 kHz to 490 kHz also an average detector was used. The measurement bandwidth of the receiver was set to 300 Hz in the frequency range 9 kHz to 150 kHz and 10 kHz in the frequency range 150 kHz to 30 MHz. Prescans were performed in six positions of the EUT.

For final measurements the detector was set to CISPR quasi-peak and in addition to CISPR average in the frequency range 9 kHz to 490 kHz with a resolution bandwidth 200 Hz in the frequency range 9 kHz to 150 kHz and 9 kHz in the frequency range 150 kHz to 30 MHz. Final tests were performed immediately after a final frequency and zoom (for drifting disturbances) and maximum adjustment.



2.3.6.2 Frequency range 30 MHz – 1 GHz



Alternate test site (semi anechoic room)

The EUT was placed on a non-conductive table, 0.8 m above the ground plane

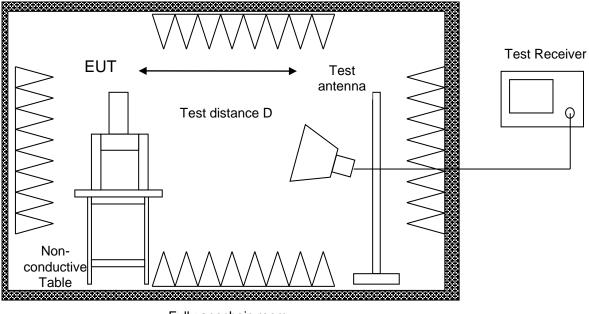
Radiated emissions in the frequency range 30 MHz - 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4. for alternative test sites. A linear polarised logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna") is used.

For prescan tests the test receiver is set to peak-detector with a bandwidth of 120 kHz.

With the measurement bandwidth of the test receiver set to 120 kHz CISPR quasi-peak detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.



2.3.6.3 Frequency range above 1 GHz



Fully anechoic room

The EUT was placed on a non-conductive table, 1.5 m above the ground plane

Radiated emission tests above 1 GHz are performed in a fully anechoic room with the S_{VSWR} requirements of ANSI C63.4. Measurements are performed both in the horizontal and vertical planes of polarisation using a test receiver with the detector function set to peak and average and the resolution bandwidth set to 1 MHz. Testing above 1 GHz is performed with horn antennas with the EUT in boresight of the antenna.

For prescan tests the test receiver is set to peak- and average-detector with a bandwidth of 1 MHz. With the measurement bandwidth of the test receiver set to 1 MHz and peak- and CISPR average-detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.



2.3.7 Test Results

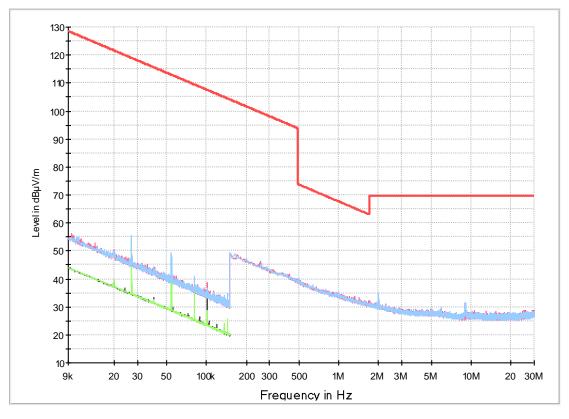
Limit applied	Test distance
95.3379(a)(1)	3 m
95.3379(a)(1)	1 m
95.3379(a)(2)	3 m
95.3379(a)(2)	1 m
95.3379(a)(2)	0.5 m
	95.3379(a)(1) 95.3379(a)(1) 95.3379(a)(2) 95.3379(a)(2)

Table 11

Sample calculation:

Final Value (dBµV/m) =

Reading Value (dBµV) + (Cable attenuation (dB) + Antenna Transducer (dB(1/m)))



Preview Result 2V-AVG

PreviewResult 1V-PK+

PreviewResult 2H-AVG

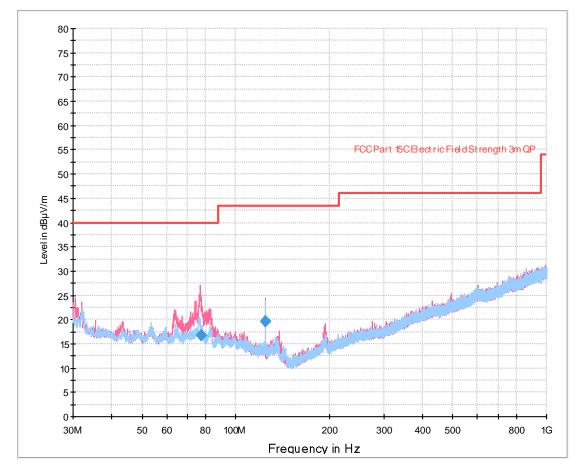
PreviewResult 1H-PK+

FCCPart 15CElect ric Field Strength 3m QP+AV(9k-30M)

Final_Result QPK

Final_Result CAV

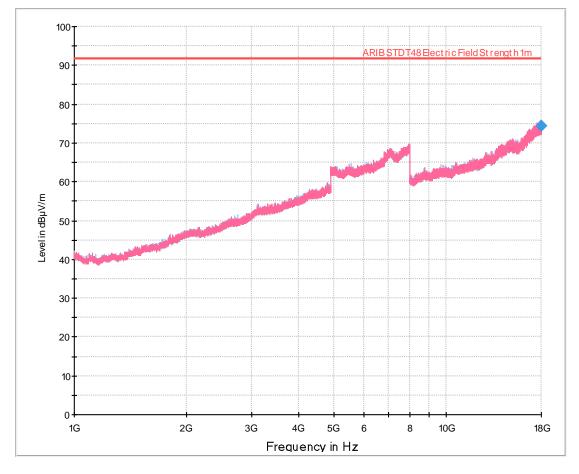




PreviewResult 1V-PK+ FCCPart 15CElectricFieldStrength3mQP PreviewResult 1H-PK+ Final_Result QPK

Frequency	Qua-	Limit	Mar-	Meas.	Band-	Height	Pol	Azi-	Corr.
	siPeak		gin	Time	width			muth	
MHz	dBµV/m	dBµV/m	dB	ms	kHz	ст		deg	dB/m
77.760000	16.74	40.00	23.26	1000	120	303.0	V	-63.0	13.2
125.010000	19.56	43.50	23.94	1000	120	127.0	V	20.0	10.5

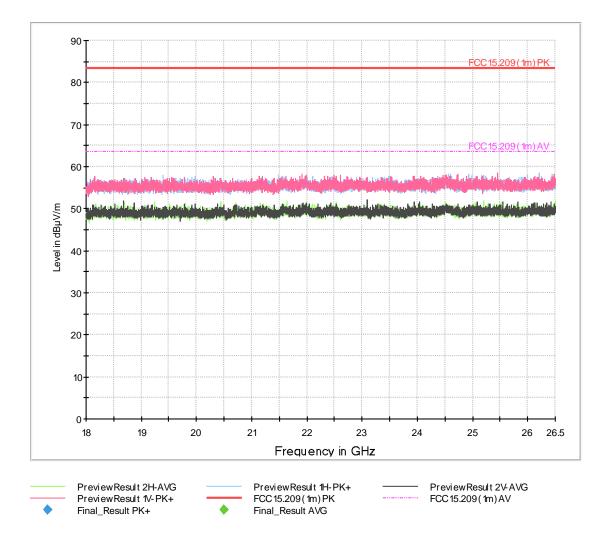




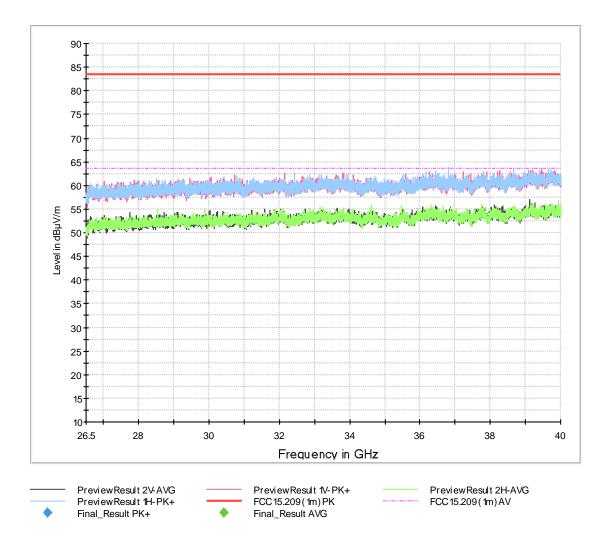
PreviewResult 1H-PK+ ARIB STD T48 Elect ric Field St rengt h 1m

Frequency	Max-	CAver-	Limit	Mar-	Meas.	Band-	Height	Pol	Azi-	Corr.
	Peak	age		gin	Time	width			muth	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	ст		deg	dB
17995.750000	74.48	0.00	83.50	9.02	1000	1000	132.0	Н	-82.0	59.1
17995.750000	0.00	60.98	63.50	2.52	1000	1000	132.0	Н	-82.0	59.1

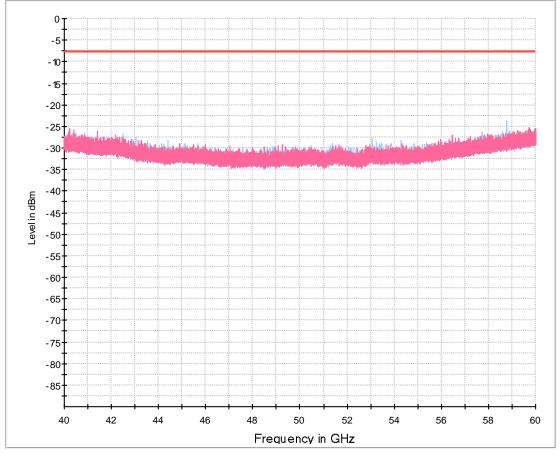






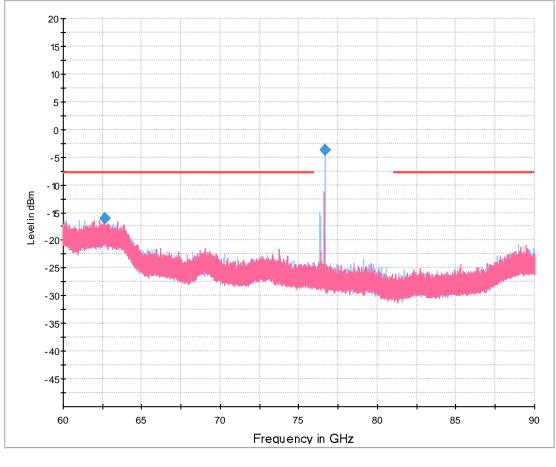






Preview Result 1H-RMS FCC95.3379(2) dBm Preview Result 1V- RMS
 Final_Result RMS

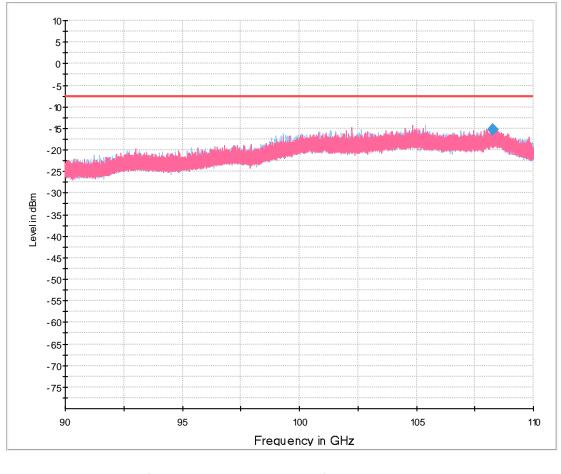




PreviewResult 1H-RMS FCC95.3379(2) dBm

Frequency	RMS	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	kHz	ст		deg	dB
62654.000000	-16.00	-7.70	8.30	1000	150.0	V	73.0	-47
76645.000000	-3.67			1000	150.0	Н	186.0	-47

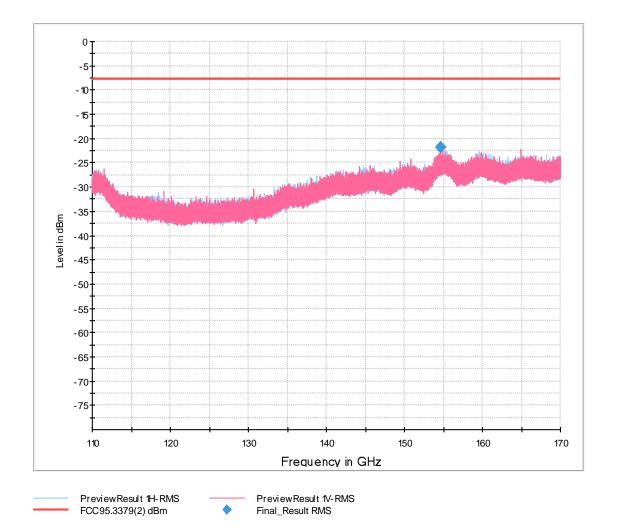




PreviewResult 1H-RMS FCC95.3379(2) dBm PreviewResult 1V-RMS Final_Result RMS

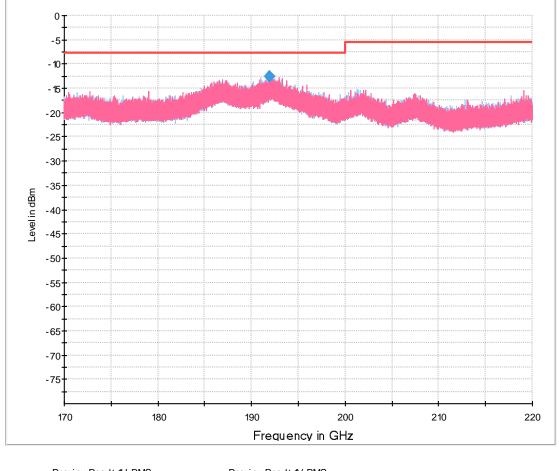
Frequency	RMS	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	kHz	ст		deg	dB
108275.500000	-15.21	-7.71	7.51	1000	150.0	Н	232.0	-45





Frequency	RMS	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	kHz	cm		deg	dB
154638.500000	-21.85	-7.71	14.14	1000	150.0	V	153.0	-55

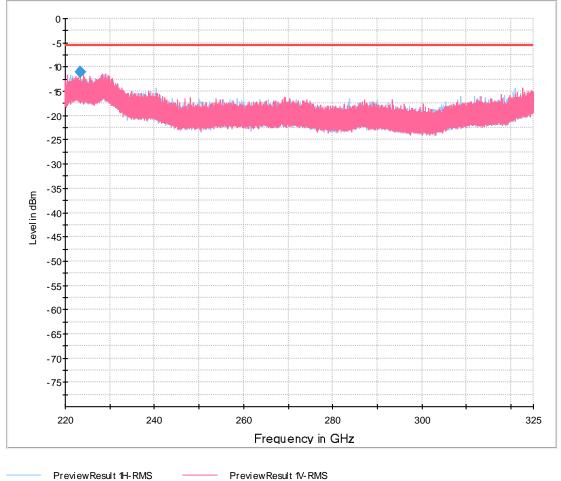




PreviewResult 1H-RMS FCC95.3379(2) dBm PreviewResult 1V-RMS Final_Result RMS

Frequency	RMS	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	kHz	cm		deg	dB
191952.000000	-12.54	-7.71	4.84	1000.000	150.0	V	280.0	-50





Preview Result 1V-RMS Final_Result RMS ۵

Frequency	RMS	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBm	dBm	dB	kHz	ст		deg	dB
223375.225000	-11.00	-5.49	5.51	1000	150.0	V	19.0	-52

FCC95.3379(2) dBm



2.3.8 Test Location and Test Equipment

The test was carried out in semi anechoic room, No. 11 and fully anechoic room, No. 2

Instrument	Manufacturer	Туре No	TE No	Calibra- tion Pe- riod (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2023-04-30
Signal and Spectrum Analyzer	Rohde & Schwarz	FSW43	54396	12	2023-04-30
Waveguide Mixer	Rohde & Schwarz	FS-Z60	25949	36	2023-02-28
Waveguide Mixer	Rohde & Schwarz	FS-Z90	25850	36	2023-02-28
Waveguide Mixer	Rohde & Schwarz	FS-Z110	25851	36	2023-02-28
Waveguide Mixer	Rohde & Schwarz	FS-Z170	22553	36	2023-02-28
Waveguide Mixer	Rohde & Schwarz	FS-Z220	36954	36	2023-02-28
Waveguide Mixer	Rohde & Schwarz	FS-Z325	36955	36	2023-02-28
Loop antenna	Schwarzbeck	FMZB 1519 B	44334	36	2023-01-30
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	19918	36	2025-10-31
Double ridged horn antenna	Rohde & Schwarz	HF907	40089	24	2024-10-31
Horn antenna					
Horn antenna					
Horn antenna	Flann	24240-20	19946		
Horn antenna	Flann	26240-20	27898		
Horn antenna	Flann	27240-20	27899		
Horn antenna	ELVA-1	SGPH-D	58442		
Horn antenna	Flann	30240-20	37863		
Horn antenna	Flann	32240-20	37864		

Table 12



2.4 Bandwidth of Signal

2.4.1 Specification Reference

FCC 47 CFR Part 15 E, Clause 15.503(d)

2.4.2 Equipment under Test and Modification State

SRR6PB2; S/N 0002; Modification State 0

2.4.3 Date of Test

2022-12-01

2.4.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	37 %

2.4.5 Specification Limits

Fundamental emissions must be contained within the frequency band 76 – 81 GHz during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +55 degrees Celsius with an input voltage variation of 85 % to 115 % of rated input voltage.

2.4.6 Test Method

The test was performed according to ANSI C63.10, clauses 6.9 and 10.1 See section 2.3 of this test report for details.



2.4.7 Test Results

On all tested voltages and temperatures, the Occupied Bandwidth (99 %) was within the frequency range 76 to 77 GHz and so, within the designated frequency band. See plots for details:

Spectrum						
Ref Level -	22.00 dBr		RBW 1 MHz			
		SWT 4.8 ms	BW 10 MHz	Mode Auto Swee	р	
ExtMix E						
●1Rm View						
			N11	M3[1]		_{T2} 50.67 dBm
-30 dBm			<u> </u>			76.978245 GHz
10.10	T1	and the		Occ Bw	La contractore	912.239 00167 MHz
-40 dBm	1 Hallman	Stand and a stand of the state	with the ender the second second		~~~,\.J≜,I_L(_¥(€)¥™-II±L√L(€),»,«	بارار 129.64 dBm 76 <mark>19</mark> 86000 GHz
-50 dBm						70 A00000 GH2
-50 0011						
-60 dBm						
-70 dBm	Mg					
						1
-80 dBin-	0					Pojstovijestvidesta
00.40-0						
-90 dBm						
-100 dBm						
100 0.0.						
-110 dBm						
F1						F2
- Ē						
CF 76.5 GHz	2		1201 p	ots		Span 1.2 GHz
Marker						
Type Ref		X-value	Y-value	Function	Fun	ction Result
M1 T1	1	76.506 GHz 76.060366 GHz	-29.64 dBm -40.21 dBm			912.239800167 MHz
T2	1	76.972606 GHz	-40.21 dBm -30.98 dBm			A15'53A800101 WHS
M2	1	76.0512 GHz	-74.44 dBm			
M3	1	76.978245 GHz	-50.67 dBm			
<u></u>				1		U

Date: 1.DEC.2022 10:06:41

-20 °C, 12 V

Spectru	im)								
Ref Lev	el -22.00	dBm		RBW 1 MHz					
		SWT	4.8 ms	VBW 10 MHz	Mode Auto	Sweep)		
ExtMix E									
1Rm Vie	W								
					M1	[1]			129.14 dBm
-30 dBm-					1				766600 GHz
				e el le mue	00	сBw	halles flater and the state	911.240	32806 MHz
-40 dBm-	The	alach with which with	at a large the l	Marth Jur al Martin and and Martine	Aduberthistory 2019	զեւցեւլ	hillelledgebucher		54.62 dBm
								76.	.053200 GHz
-50 dBm-									1
-60 dBm-									
	1								14
-70 dBm-									J
later Marcolale	and the second se								Maulina
-80 d8m-									
-90 dBm-									
-100 dBm									
-100 aBm									
110 40									
-110 dBm									F2
F	1								
CF 76.5	GHz			1201	pts			Sr	an 1.2 GHz
1arker					•				
Type I	Ref Trc	X-val	ue l	Y-value	Funct	ion	Fur	ction Resu	lt
M1	1		9666 GHz	-29.14 dE					
T1	1	76.062	2365 GHz	-44.24 dB	m Oc	c Bw		911.240	632806 MHz
T2	1	76.973	3605 GHz	-30.61 dB	m				
M2	1	76.0	0532 GHz	-54.62 dB	m				
MЗ	1	76.983	3241 GHz	-53.73 dB	m				

Date: 1.DEC.2022 10:35:15

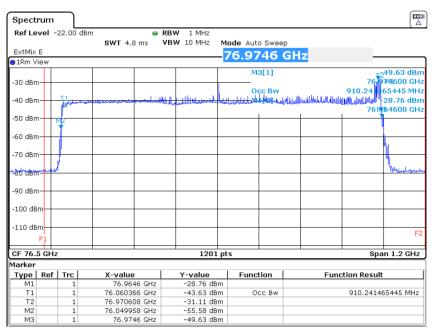
-10 °C, 12 V



Spectrum										
Ref Level -:	22.00 dBm		👄 RBW							
		SWT 4.8 ms	VBW	10 MHz		Auto Swee				
ExtMix E					-76	.97724	459	3902	GHz -	
UTKIII VIEW						M3[1]			N	460.00 dBm
-30 dBm										77246 GHz
00 00.0					1	Ocq Bw				00167 MHz
-40 dBm	T1	In the second		-	aled to the		يالاه سا	استابتها اس	in the first Asternation	28.85 dBm
	100								76.	971600 GHz
-50 dBm	v12									
	₹								1	мв
-60 dBm										1
-70 dBm										
	Í									"Un
	-									- All hour and the
00.40										
-90 dBm										
-100 dBm										
-100 0600										
-110 dBm										
F1										F2
FI										
CF 76.5 GHz		-		1201	pts				Sp	an 1.2 GHz
Marker										
Type Ref	Trc	X-value		Y-value	F	unction		Fund	ction Resu	lt
M1	1	76.9716 GH	lz	-28.85 dB	m					
T1	1	76.061366 GH		-42.14 dB		Occ Bw			912.2398	300167 MHz
T2	1	76.973605 GH		-32.19 dB						
M2	1	76.050958 GH		-55.52 dB						
M3	1	76.977246 Gł	lz	-60.00 dB	m					

Date: 1.DEC.2022 10:59:40

0 °C, 12 V



Date: 1.DEC.2022 11:29:59

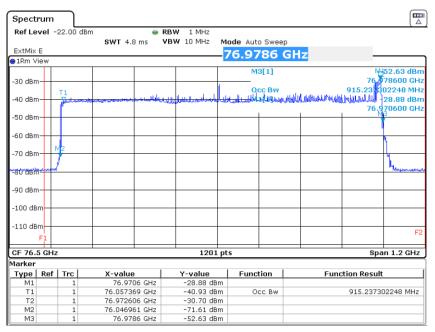
10 °C, 12 V



Spectrum								
Ref Level -	22.00 dBn	n 👄 SWT 4.8 ms	RBW 1 MHz VBW 10 MHz	Mode Aut	o Swee	p		
ExtMix E				-76.98	306	GHz	_	
⊖1Rm View								
-30 dBm				M	3[1]			155.07 dBm 180600 GHz
-30 UBIII				0	CC BW			98085 MHz
-40 dBm	T1	a ha fa fa fa a sha fa fa a sha fa	and the second s			الملسا وتقسط معمد إندهما أزرار		
	Philade and a						76	70600 GHz
-50 dBm							-	3
								۲ I
-60 dBm								1 .
-70 dBm	vi <mark>z</mark>							
	ľ							
1280 BBH	Ŵ				<u> </u>			Marshamo
-90 dBm								
-100 dBm								
-100 UBIII								
-110 dBm								
F1								F2
CF 76.5 GHz	:		1201	. pts			Sp	an 1.2 GHz
Marker								
	Trc	X-value	Y-value	Func	tion	Fur	nction Resul	t
M1	1	76.9706 GHz	-29.29 dB					
T1 T2	1	76.062365 GHz 76.971607 GHz	-42.41 dB -33.67 dB		cc Bw		909.2422	98085 MHz
M2	1	76.04796 GHz	-73.13 dB					
M3	1	76,9806 GHz	-73.13 dB					

Date: 1.DEC.2022 12:17:55

20 °C, 10 V



Date: 1.DEC.2022 12:16:20

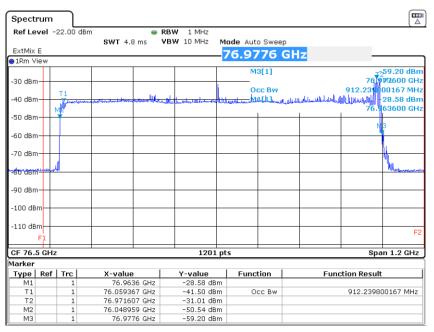
20 °C, 12 V



Spectrum								
Ref Level -	22.00 dBn	n 😑	RBW 1 MHz					
		SWT 4.8 ms	VBW 10 MHz	Mode Auto St	weep			
ExtMix E				76.981	6 GH	z	_	
●1Rm View								
				M3[1]			±68.42 dBm
-30 dBm								981600 GHz
	Т1		u	Occ E	SW	and have a	913.238	67527 MHz
-40 dBm	And and a second	and the second	hel i galdenia di bili	hald and and a star star starting and	لماتين ليابت شال			29.92 dBm 64600 GHz
-50 dBm							70.5	904000 GHZ
-30 0.0111								
-60 dBm	12							
							1	MR I
-70 dBm	<u> </u>							N
	1							η
-80'08'm****								Manhanana
-90 dBm								
-100 dBm								
-100 dBm								
-110 dBm								
F1								F2
FI								
CF 76.5 GHz		· · ·	1201	pts			Sp	an 1.2 GHz
Marker								
Type Ref	Trc	X-value	Y-value	Function	n	Fun	ction Resul	t 🛛
M1	1	76.9646 GHz	-29.92 dB					
T1	1	76.059367 GHz	-42.65 dB		3w		913.2389	67527 MHz
T2	1	76.972606 GHz	-37.05 dB					
M2	1	76.04796 GHz	-61.62 dB					
МЗ	1	76.9816 GHz	-68.42 dB	m				

Date: 1.DEC.2022 12:19:42

20 °C, 14 V



Date: 1.DEC.2022 13:05:29

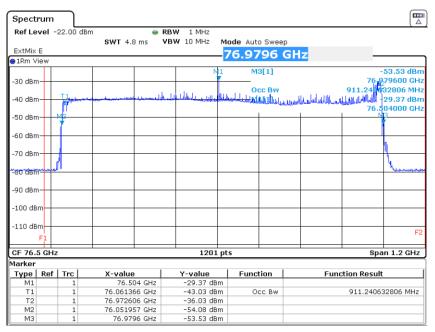
30 °C, 12 V



Spectrum							
Ref Level -:	22.00 dBm	-	RBW 1 MHz				
		SWT 4.8 ms	VBW 10 MHz	Mode Aut	o Swee	p	
ExtMix E				-76.96	506	GHz	
●1Rm View							
				M	1[1]		M1 ⁻ 31.14 dBm
-30 dBm					cc Bw		767960600 GHz 908.243130724 MHz
-40 dBm	T1					i tralici	908.243530724 MHZ
-40 UBIII	Marganetro	M-Py ^{ll} ippelaneses, and a quarter of a strategy of the	, and the second s	التعول المراسم المراجع	Kilded Jacob	hile and a second state of the second state of the second s	بلسياسيا بر 79.88 dBm 70.049958 GHz
-50 dBm							199900 0112
-60 dBm							
							MB,
-70 dBm							1
	2						
-80°08m							" house an interior
-90 dBm							
-100 dBm							
-100 0011							
-110 dBm							
F1							F2
CF 76.5 GHz			1201	pts			Span 1.2 GHz
Marker							
Type Ref	Trc	X-value	Y-value	Func	tion	Fun	ction Result
M1	1	76.9606 GHz	-31.14 dB				
T1	1	76.059367 GHz	-41.86 dB		cc Bw		908.243130724 MHz
T2	1	76.96761 GHz	-40.98 dB				
M2	1	76.049958 GHz	-79.88 dB				
МЗ	1	76.9786 GHz	-70.66 dB	m			

Date: 1.DEC.2022 13:18:30

40 °C, 12 V



Date: 1.DEC.2022 13:59:47

50 °C, 12 V



2.4.8 Test Location and Test Equipment

The test was carried out in unshielded radio laboratory

Instrument	Manufacturer	Туре No	TE No	Calibra- tion Pe- riod (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Waveguide Mixer	Rohde & Schwarz	FS-Z90	25850	36	2023-03-28
Horn Antenna	Flann	26240-20	37898		
Temperature test chamber	Feutron	KPK200-2	19868	24	2023-02-28



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Radio Interference Emission Testing Test Name	kp	Expanded Uncertainty
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to to CISPR16-4-2: 201 on a standard uncertainty multiplied by a coverage factor of $kp = 2$, pr of $p = 95.45\%$ Table 13 Measurement uncertainty based on CISP	roviding a level of	

Table 13 Measurement uncertainty based on CISPR 16-4-2



Radio Interference Emission Testing		
Test Name	kр	Expanded Uncertainty
Occupied Bandwdith	2	±5%
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	±5%
Power Spectral Density	2	± 3.0 dB
Radiated Power		
25 MHz – 6 GHz	1.96	6 ±4.4 dB
1 GHz – 18 GHz	1.96	6 ±4.7 dB
18 GHz – 40 GHz	1.96	6 ±4.9 dB
40 GHz – 325 GHz	1.96	6 ±6.1 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	±5%
Frequency	2	± 10 ⁻⁷
The expanded uncertainty reported according to to ETSI TF uncertainty multiplied by a coverage factor of $kp = 2$, provid		

Table 14 Measurement uncertainty based on ETSI TR 100 028

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: $2011 + A1 + A2 + Cor1 (U_{CISPR})$ and as specified in the test report below. This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.



Test Name	Expanded Uncertainty
Occupied Bandwidth	±5 %
Conducted Power	
9 kHz ≤ f < 30 MHz	±1.0 dB
30 MHz ≤ f < 1 GHz	±1.5 dB
1 GHz ≤ f ≤ 40 GHz	±2.5 dB
1 MS/s power sensor (2.4 / 5 GHz band)	±1.5 dB
Power Spectral Density	±3.0 dB
Radiated Power	
25 MHz – 26.5 GHz	±6.0 dB
26.5 GHz – 66 GHz	±8.0 dB
40 GHz – 325 GHz	±10.0 dB
Conducted Spurious Emissions	±3.0 dB
Radiated Field Strength 9 kHz – 40 GHz	±6.0 dB
Voltage	
DC	± 1.0 %
AC	± 2.0 %
Time (automatic)	±5%
Frequency	± 10 ⁻⁷

Table 15 Decision Rule: Maximum allowed measurement uncertainty