

FCC and ISED Test Report

Sepura Limited
TETRA mobile radio, Model: SCG2221

In accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 90, ISED RSS-119 and ISED RSS-GEN (TETRA)

Prepared for: Sepura Limited
9000 Cambridge Research Park
Beach Drive
Waterbeach
Cambridge, CB25 9TL
United Kingdom



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FCC ID: XX6SCG2221X IC: 8739A-SCG2221X

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Document 75957883-06 Issue 03

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	11 January 2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements 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 compliance with FCC 47 CFR Part 2, FCC 47 CFR Part 90, ISED RSS-119 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Pier-Angelo Lorusso	15 August 2023	

FCC Accreditation

492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation

12669A Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 2, 2020, FCC 47 CFR Part 90, 2021, ISED RSS-119, Issue 12 (05-2015) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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ACCREDITATION

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Registered number: SC215164

TÜV SÜD Ltd is a
TÜV SÜD Group Company

Phone: +44 (0) 1489 558100
Fax: +44 (0) 1489 558101
www.tuvsud.com/en

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire PO15 5RL
United Kingdom



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1 Report Summary

1.1 Report Modification Record

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

Issue	Description of Change	Date of Issue
1	First Issue	07-July-2023
2	Retesting of Transmitter Masks and resulting in changes to sections 2.1.4: 2.2.3 ; 2.2.4 ; 2.2.5 ; 2.2.6 and 2.2.7.	15-August-2023
3	Removed the word "basic" from the PMN / Model name	11-January-2024

Table 1

1.2 Introduction

Applicant	Sepura Limited
Manufacturer	Sepura Limited
Model Number(s)	SCG2221
Serial Number(s)	1PR002250GPB2NA
Hardware Version(s)	PLX-8V015550-02 (Hardware Mod State 7)
Software Version(s)	1807 004 10138
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 2, 2020 FCC 47 CFR Part 90, 2021 ISED RSS-119: Issue 12 (05-2015) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	PLC-PO025039-1
Date	20-February-2023
Date of Receipt of EUT	24-March-2023
Start of Test	26-April-2023
Finish of Test	18-July-2023
Name of Engineer(s)	Pier-Angelo Lorusso
Related Document(s)	ANCI C63.26: 2015



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 90, ISED RSS-119 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 2	Part 90	RSS-119	RSS-GEN			
Configuration and Mode: 136 MHz to 174 MHz (ISED only)							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	
2.2	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
Configuration and Mode: 150 MHz to 174 MHz (FCC and ISED)							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	
2.2	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	

Table 2



A brief summary of the tests carried out in document 75956225-04 Issue 02. is shown below

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 2	Part 90	RSS-119	RSS-GEN			
Configuration and Mode: Tetra - 136 MHz to 174 MHz (ISED only)							
2.1			5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.2	-	-	5.5	6.7	Bandwidth Limitations	Pass	ANSI C63.26: 2015
2.3	-	-	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26: 2015
2.4	-	-	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
2.5	-	-	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
2.6	-	-	5.9	-	Transient Frequency Behaviour	Pass	
2.7	-	-	5.2	-	Types of Emissions	Pass	
Configuration and Mode: Tetra - 150 MHz to 174 MHz (FCC and ISED)							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.2	2.1049	90.209	5.5	6.7	Bandwidth Limitations	Pass	ANSI C63.26: 2015
2.3	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	ANSI C63.26: 2015
2.4	2.1053	90.210	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
2.5	2.1055	90.213	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
2.6	-	90.214	5.9	-	Transient Frequency Behaviour	Pass	
2.7	2.1047	90.207	5.2	-	Types of Emissions	Pass	



1.4 Application Form

Equipment Description

Technical Description: <i>(Please provide a brief description of the intended use of the equipment including the technologies the product supports)</i>		The SCG2221 is a TETRA mobile radio in the SCG22 series of radios, operating in the VHF band, with TETRA operating frequencies 136-174 MHz. The SCG2221 supports GNSS and a range of accessories and ancillary equipment. The SCG2221 may be installed in a vehicle or in a desk mount unit.	
Manufacturer:		Sepura Limited	
Model:		SCG2221	
Part Number:		SCG2221	
Hardware Version:		PLX-8V015550-02 (Hardware Mod State 7)	
Software Version:		1807 004 10138	
FCC ID of the product under test – see guidance here		XX6SCG2221X	
IC ID of the product under test – see guidance here		8739A-SCG2221X	
Device Category	Mobile <input checked="" type="checkbox"/>	Portable <input type="checkbox"/>	Fixed <input type="checkbox"/>
Equipment is fitted with an Audio Low Pass Filter		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

Table 3

Intentional Radiators

Technology	TETRA					
Frequency Range (MHz to MHz)	136-174					
Conducted Declared Output Power (dBm)	41.9					
Antenna Gain (dBi)	No antenna supplied.					
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	0.025					
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	$\pi/4$ DQPSK					
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	20K0DXW					
Bottom Frequency (MHz)	136					
Middle Frequency (MHz)	155					
Top Frequency (MHz)	174					

Table 4



Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	1610 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	32.768 kHz
Class A Digital Device (Use in commercial, industrial or business environment) <input checked="" type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input type="checkbox"/>	

Table 5

AC Power Source

AC supply frequency:		Hz
Voltage		V
Max current:		A
Single Phase <input type="checkbox"/> Three Phase <input checked="" type="checkbox"/>		

Table 6

DC Power Source

Nominal voltage:	13.6	V
Extreme upper voltage:	15.6	V
Extreme lower voltage:	10.8	V
Max current:	4	A

Table 7

Battery Power Source

Voltage:		V
End-point voltage:		V (Point at which the battery will terminate)
Alkaline <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input type="checkbox"/> *(Vehicle regulated)		
Other <input type="checkbox"/>	Please detail:	

Table 8

Charging

Can the EUT transmit whilst being charged Unit does not charge	Yes <input type="checkbox"/> No <input type="checkbox"/>
--	--

Table 9

Temperature

Minimum temperature:	-20	°C
Maximum temperature:	55	°C

Table 10



Cable Loss

Adapter Cable Loss (Conducted sample)	N/A	dB
--	-----	----

Table 11

Antenna Characteristics

Antenna connector <input checked="" type="checkbox"/>		State impedance	50	Ohm
Temporary antenna connector <input type="checkbox"/>		State impedance		Ohm
Integral antenna <input type="checkbox"/>	Type:		Gain	dBi
External antenna <input type="checkbox"/>	Type:		Gain	dBi

For external antenna only:
 Standard Antenna Jack ☐ If yes, describe how user is prohibited from changing antenna (if not professional installed):
 Equipment is only ever professionally installed ☒
 Non-standard Antenna Jack ☐
 All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.
 Antenna Gains are from
<https://www.panorama-antennas.com/site/Mobile-Radio/PMR-Antennas/AFQNT-VAR>

Table 12



Ancillaries (if applicable)

Manufacturer:	Panorama Antennas	Part Number:	AFQNT-H5
Model:	TETRA antenna	Country of Origin:	UK
Manufacturer:	Sepura	Part Number:	300-00063
Model:	GNSS Antenna	Country of Origin:	UK
Manufacturer:	Sepura	Part Number:	300-02012 rev001
Model:	Extended SCG Loudspeaker / IO USB Host lead	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-02010
Model:	SCG Power/ignition Lead	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00069
Model:	Mobile Remote Cable 5.0M	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00670
Model:	HBC Interface and Hands- free Box	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00079
Model:	Remote Microphone And Switch Set	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00292
Model:	Remote Microphone (Handsfree Kit) 3m	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-01801
Model:	Handset Based Console (HBC3)	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00062
Model:	Fist microphone	Country of Origin:	Unknown



Manufacturer:	Sepura	Part Number:	300-01808
Model:	SCC3 (colour console)	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-01961
Model:	CC VAC RSM (Long Cable)	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-00719
Model:	Loudspeaker	Country of Origin:	Unknown
Manufacturer:	Sepura	Part Number:	300-02009
Model:	USB Data/Programming Lead	Country of Origin:	UK
Manufacturer:	Sepura	Part Number:	300-02012
Model:	SCG Loudspeaker / IO USB Host lead	Country of Origin:	UK
Manufacturer:	Sepura	Part Number:	300-00784
Model:	AMPS attachments	Country of Origin:	UK
Manufacturer:	Sepura	Part Number:	300-00068
Model:	Mobile Remote Cable 3.0M	Country of Origin:	UK

Table 13

I hereby declare that the information supplied is correct and complete.

Name: Chris Beecham
Position held: Conformance Engineer
Date: 21 March 2023



1.5 Product Information

1.5.1 Technical Description

The SCG2221 is a TETRA mobile radio in the SCG22 series of radios, operating in the VHF band, with TETRA operating frequencies 136-174 MHz. The SCG2221 supports GNSS and a range of accessories and ancillary equipment.

The SCG2221 may be installed in a vehicle or in a desk mount unit.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification 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
Model: SCG2221, Serial Number: 1PR002250GPB2NA			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 136 MHz to 174 MHz (ISED only)		
Maximum Conducted Output Power	Pier-Angelo Lorusso	UKAS
Spurious Emissions at Antenna Terminals	Pier-Angelo Lorusso	UKAS
Configuration and Mode: 150 MHz to 174 MHz (FCC and ISED)		
Maximum Conducted Output Power	Pier-Angelo Lorusso	UKAS
Spurious Emissions at Antenna Terminals	Pier-Angelo Lorusso	UKAS

Table 15

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Maximum Conducted Output Power

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
FCC 47 CFR Part 90, Clause 90.205
ISED RSS-119, Clause 5.4
ISED RSS-GEN, Clause 6.12

2.1.2 Equipment Under Test and Modification State

SCG2221, S/N: 1PR002250GPB2NA - Modification State 0

2.1.3 Date of Test

26-April-2023 to 02-May-2023

2.1.4 Test Method

The test was applied in accordance with the test method requirements of FCC 47 CFR Part 90, Industry Canada RSS-119, and ISED RSS-GEN with reference to ANSI C63.26, clause 5.2.4.3.3.

The EUT was powered by the customer supplied AC/DC Power supply unit. The EUT was configured to transmit on maximum power of 40dBm (Burst mode) on the bottom, middle and top channels in burst mode. The EUT was connected to a spectrum analyser via a cable and 20 dB of attenuation. The path loss between the EUT and analyser was entered into the spectrum analyser as a reference level offset including the manufacturers declared maximum antenna gain. The Antenna provided by the customer, was a standard quarter wave, and the stated peak gain would be around 2 dBi when measured on a large ground plane. The loss of the 5m of CS23 used in the M8 will be less than 0.2dB/m, so the total peak gain (of the antenna kit) is around 1 dBi.

The RBW of the spectrum analyser was set to 30 kHz and the video bandwidth to 100 kHz with the trace set to max hold using a RMS detector and the result was recorded.

It was noted by the manufacturer that the test method given in 5.2.4.3.3 of ANSI C63.26 produces an average power measurement 1.9 dB above the nominal average power measurement when using a dedicated TETRA test set. Therefore, the nominal average power declared by the manufacturer has been increased from 40 to 41.9 dBm.

2.1.5 Environmental Conditions

Ambient Temperature	21.0 - 22.5 °C
Relative Humidity	34.0 - 42.1 %



2.1.6 Test Results

136 MHz to 174 MHz (ISED only)

Parameter	136 MHz	155 MHz	174 MHz
Conducted Output Power (dBm)	41.23	41.19	41.27
Declared Output Power (dBm)	41.9	41.9	41.9
Δ Output Power (dB)	-0.67	-0.71	-0.63
Antenna Gain (dBd)	-1.15	-1.15	-1.15
ERP (dBm)	40.08	40.04	40.12

Table 16 - ERP

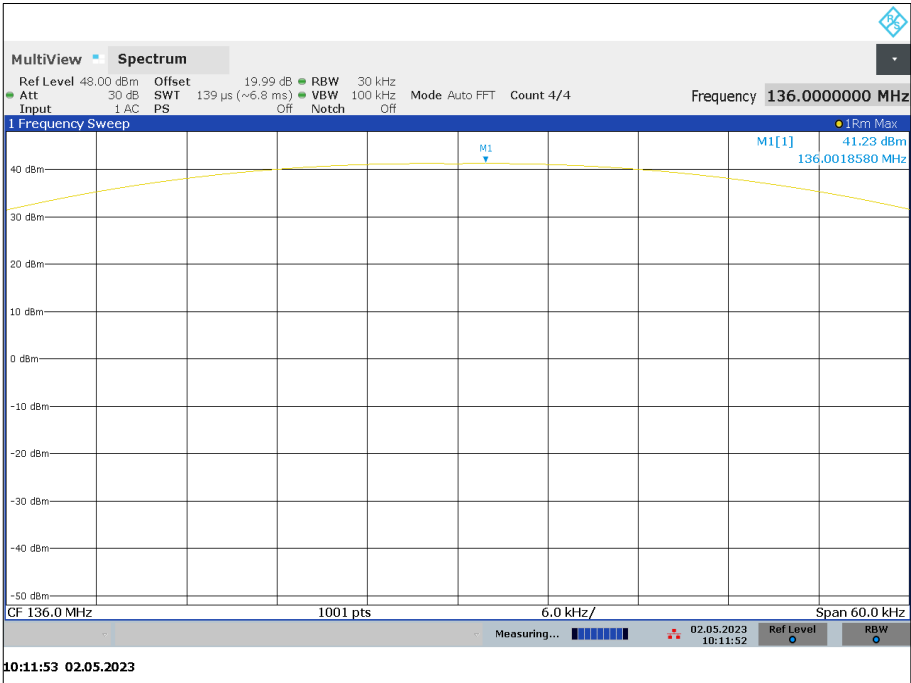


Figure 1 - 136 MHz

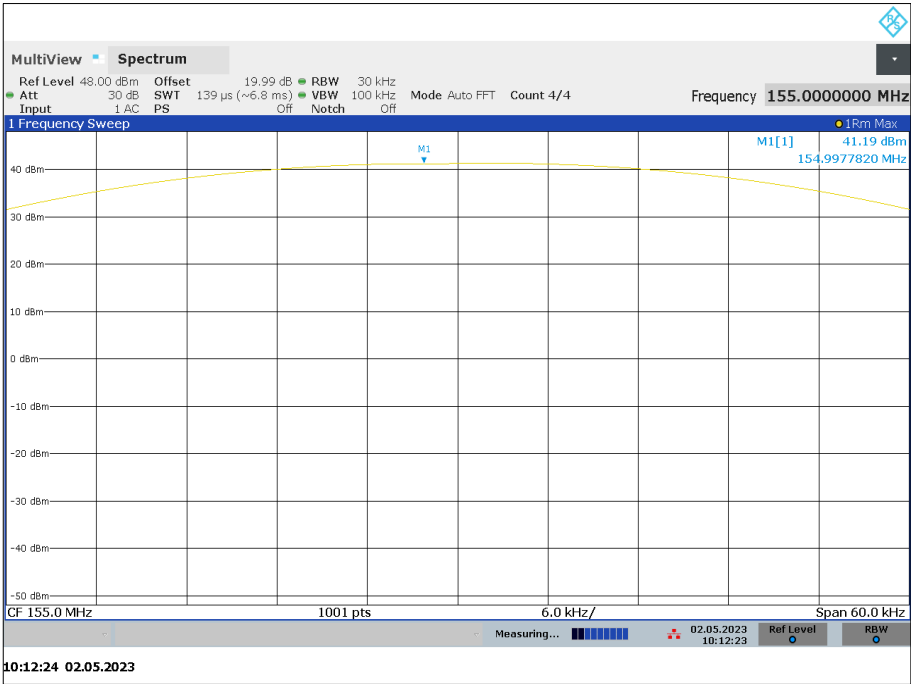


Figure 2 - 155 MHz

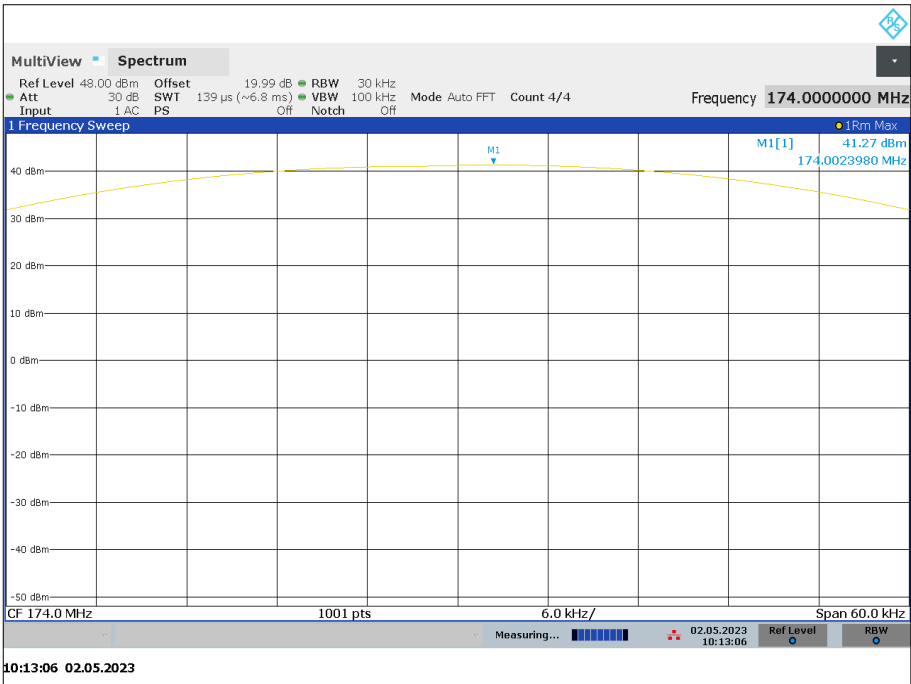


Figure 3 - 174 MHz



ISED RSS-119, Limit Clause 5.4

The output power shall be within ± 1 dB of the manufacturer's rated power listed in the equipment specifications.

Frequency (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41 to 28 and 29.7 to 50	300	30
72 to 76	No Limit	1
138 to 174	111100	60
217 to 217 and 219 to 220	See SRSP-512 for ERP limit	30*
220 to 222	110	50
406.1 to 430 and 450 to 470	See SRSP-511 for ERP limit	60
768 to 776 and 798 to 806	110	30 3 W ERP for portable equipment
806 to 821, 851 to 866, 821 to 824 and 866 to 869	110	30
896 to 901 and 935 to 940	110	60
929 to 930 and 931 to 932	110	30
928 to 929, 952 to 953, 932 to 932.5 and 941 to 941.5	110	30
932.5 to 935 ad 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 17 - ISED Limits for Transmitter Output Power



150 MHz to 174 MHz (FCC and ISED)

Parameter	150 MHz	160.000 MHz	174 MHz
Conducted Output Power (dBm)	41.16	41.11	41.28
Declared Output Power (dBm)	41.9	41.9	41.9
Δ Output Power (dB)	-0.74	-0.79	-0.62
Antenna Gain (dBd)	-1.15	-1.15	-1.15
ERP (dBm)	40.01	39.96	40.13

Table 18 - ERP

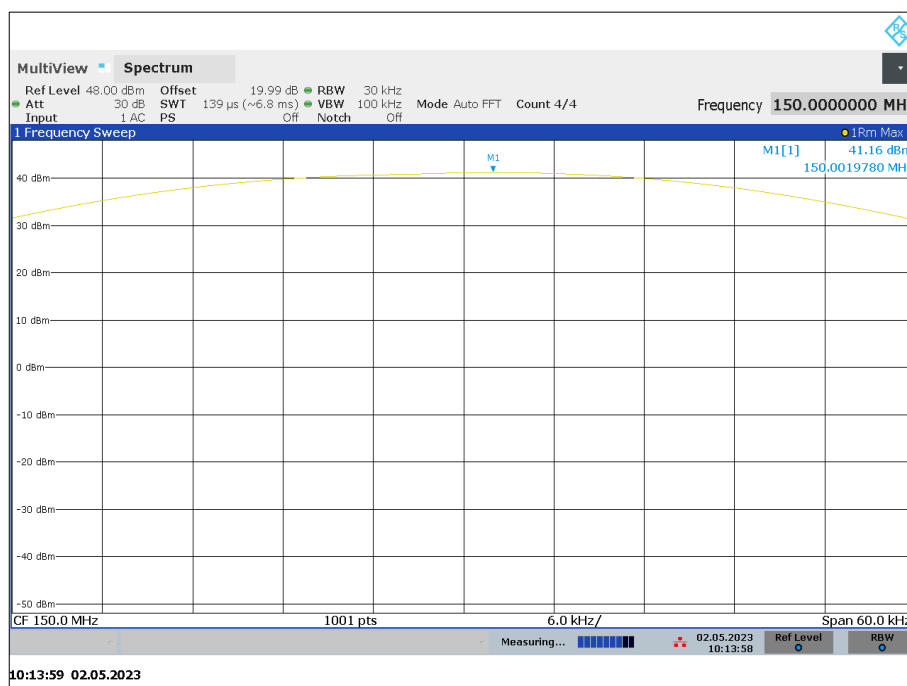


Figure 4 - 150 MHz

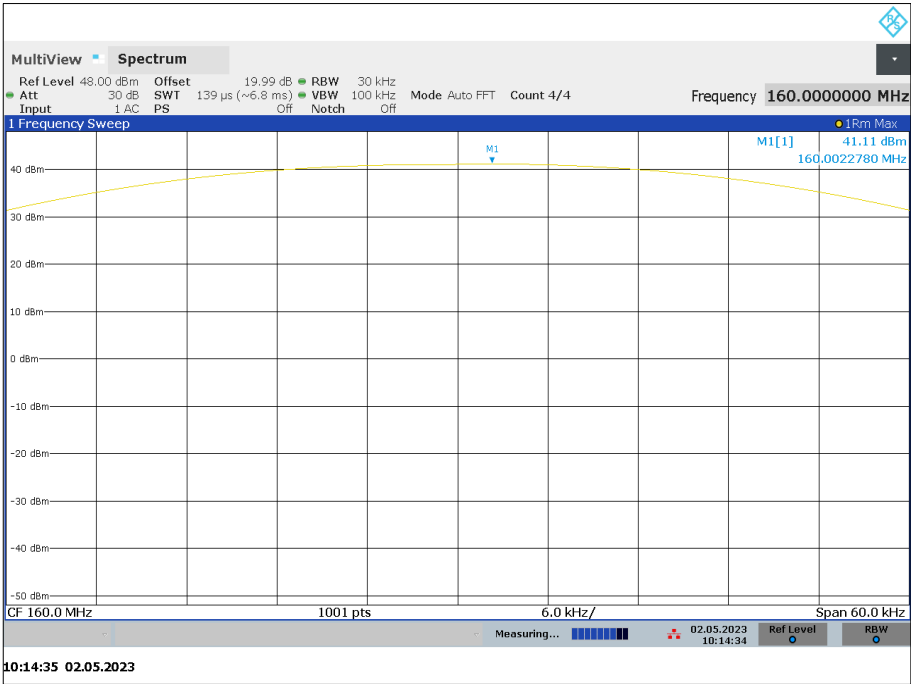


Figure 5 - 160.000 MHz

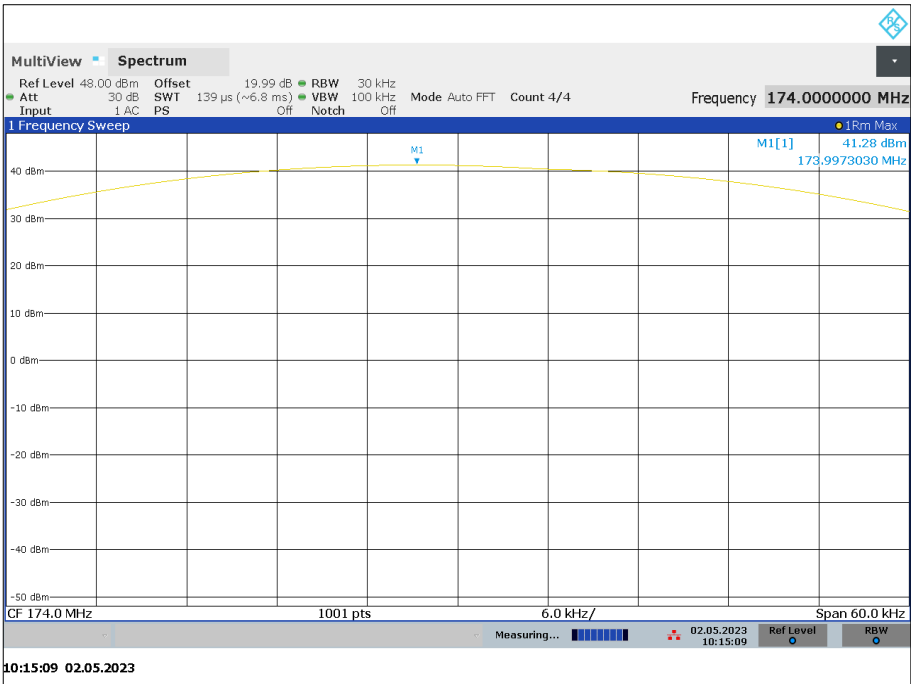


Figure 6 - 174 MHz



FCC 47 CFR Part 90, Limit Clause 90.205

Frequency (MHz)	Limit
< 25	1000 W
25 to 50	300 W
72 to 76	300 W
150 to 174	Refer to 90.205 (d) of the specification
217 to 220	Refer to 90.259 of the specification
220 to 222	Refer to 90.729 of the specification
421 to 430	Refer to 90.279 of the specification
450 to 470	Refer to 90.205 (h) of the specification
470 to 512	Refer to 90.307 and 90.309 of the specification
758 to 775 and 788 to 805	Refer to 90.541 and 90.542 of the specification
806 to 824, 851 to 869, 869 to 901 and 935 to 940	Refer to 90.635 of the specification
902 to 927.25	LMS systems operating pursuant to subpart M of the specification: 30 W
927.25 to 928	LMS equipment: 300 W
929 to 930	Refer to 90.494 of the specification
1427 to 1429.5 and 1429.5 to 1432	Refer to 90.259 of the specification
2450 to 2483.5	5 W
4940 to 4990	Refer to 90.1215 of the specification
5850 to 5925	Refer to subpart M of the specification
All other frequency bands	On a case-by-case basis

Table 19 - FCC Limits for Maximum ERP



ISED RSS-119, Limit Clause 5.4

The output power shall be within ± 1 dB of the manufacturer's rated power listed in the equipment specifications.

Frequency (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41 to 28 and 29.7 to 50	300	30
72 to 76	No Limit	1
138 to 174	111100	60
217 to 217 and 219 to 220	See SRSP-512 for ERP limit	30*
220 to 222	110	50
406.1 to 430 and 450 to 470	See SRSP-511 for ERP limit	60
768 to 776 and 798 to 806	110	30 3 W ERP for portable equipment
806 to 821, 851 to 866, 821 to 824 and 866 to 869	110	30
896 to 901 and 935 to 940	110	60
929 to 930 and 931 to 932	110	30
928 to 929, 952 to 953, 932 to 932.5 and 941 to 941.5	110	30
932.5 to 935 and 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 20 - ISED Limits for Transmitter Output Power



2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	A1	2138	12	28-Sep-2023
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	17-May-2023
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	5500	12	04-May-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5516	12	23-Oct-2023

Table 21



2.2 Spurious Emissions at Antenna Terminals

2.2.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 90, Clause 90.210
ISED RSS-119, Clause 5.8
ISED RSS-GEN, Clause 6.13

2.2.2 Equipment Under Test and Modification State

SCG2221, S/N: 1PR002250GPB2NA - Modification State 0

2.2.3 Date of Test

26-April-2023 to 18-July-2023

2.2.4 Test Method

For emissions where the frequency is removed less than 250 % of the authorised bandwidth measurements were performed conducted as follows:

The EUT was powered by the customer supplied AC/DC Power supply unit. The EUT was connected to a spectrum analyser via a cable and attenuator. The path loss between the EUT and analyser was entered into the spectrum analyser as a reference level offset. The reference level for the mask was established with an RBW approximately 2 or 3 times the emission bandwidth. The RBW was then reduced to at least 1 % of the emission bandwidth, with a VBW of 3 times RBW. The mask as per FCC 47 CFR Part 90.210 (b) and ISED RSS-119 Section 5.8.1 was applied.

For emissions where the frequency is removed more than 250 % of the authorized bandwidth measurements were performed for conducted as follows:

Conducted: The Calibration certificates were used to measure the path loss and the worst case was entered as a reference level offset in to the spectrum analyser. The EUT was connected to a spectrum analyser via an attenuator, filter and cable. Between 300 MHz and 2 GHz a 300 MHz high pass filter was used. The spectrum analyser was configured with an RBW of 1 kHz for 9kHz to 150kHz, 10kHz for 150kHz to 30MHz, 100kHz for 30 to 1MHz and 1 MHz for frequencies greater than 1 GHz with the trace set to max hold using a peak detector.

2.2.5 Environmental Conditions

Ambient Temperature	20.8 - 23.3 °C
Relative Humidity	34.0 - 48.3 %



2.2.6 Test Results

136 MHz to 174 MHz (ISED only)



Figure 7 - 136 MHz, Transmitter Mask

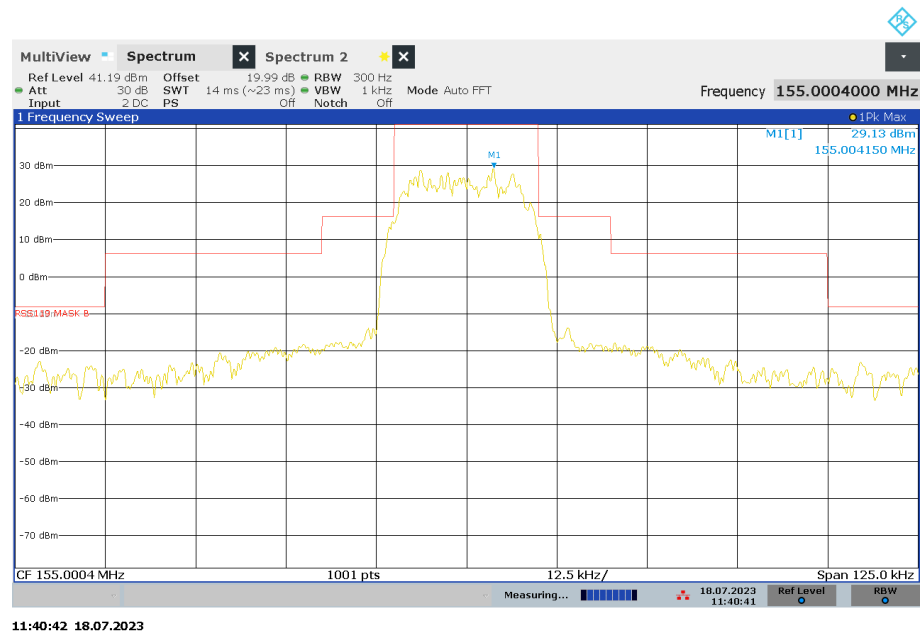


Figure 8 - 155 MHz, Transmitter Mask

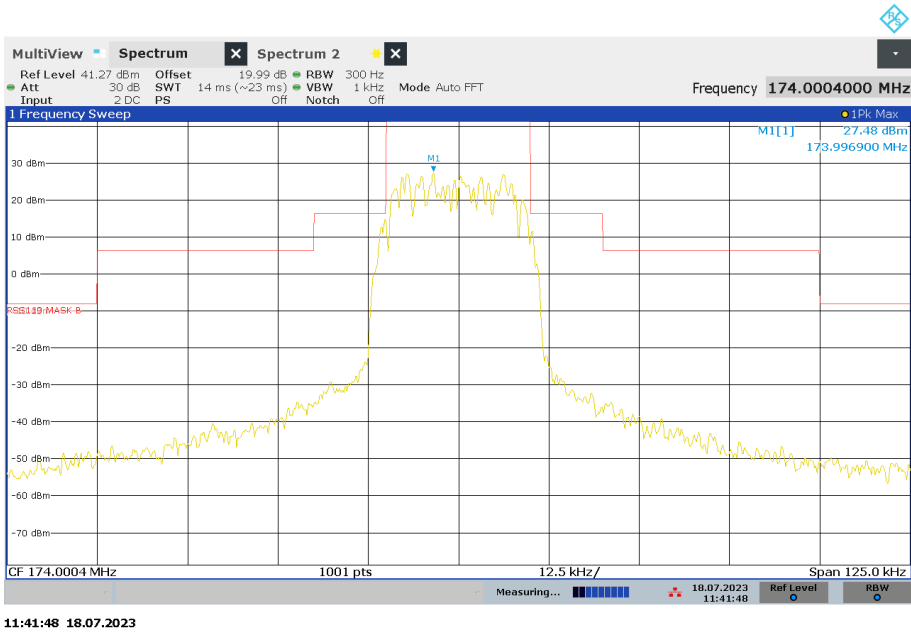


Figure 9 - 174 MHz, Transmitter Mask

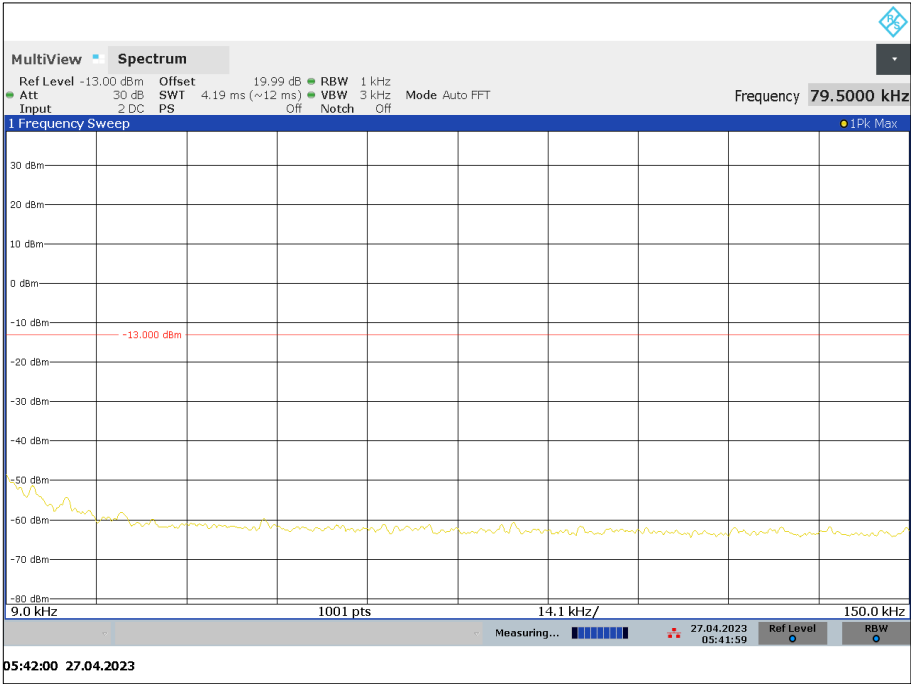


Figure 10 - 136 MHz, 9 kHz to 150 kHz

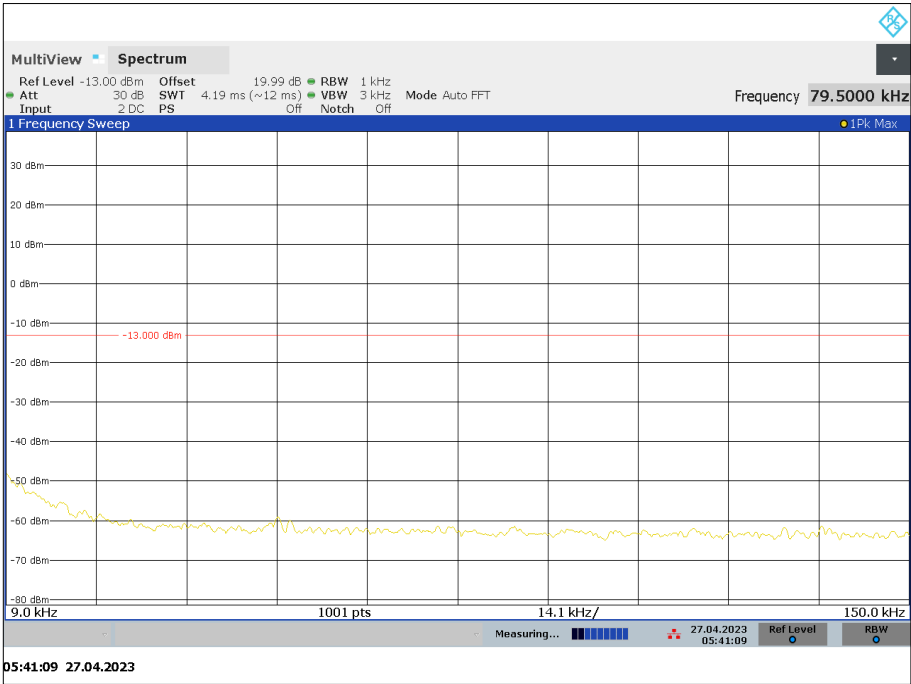


Figure 11 - 155 MHz, 9 kHz to 150 kHz

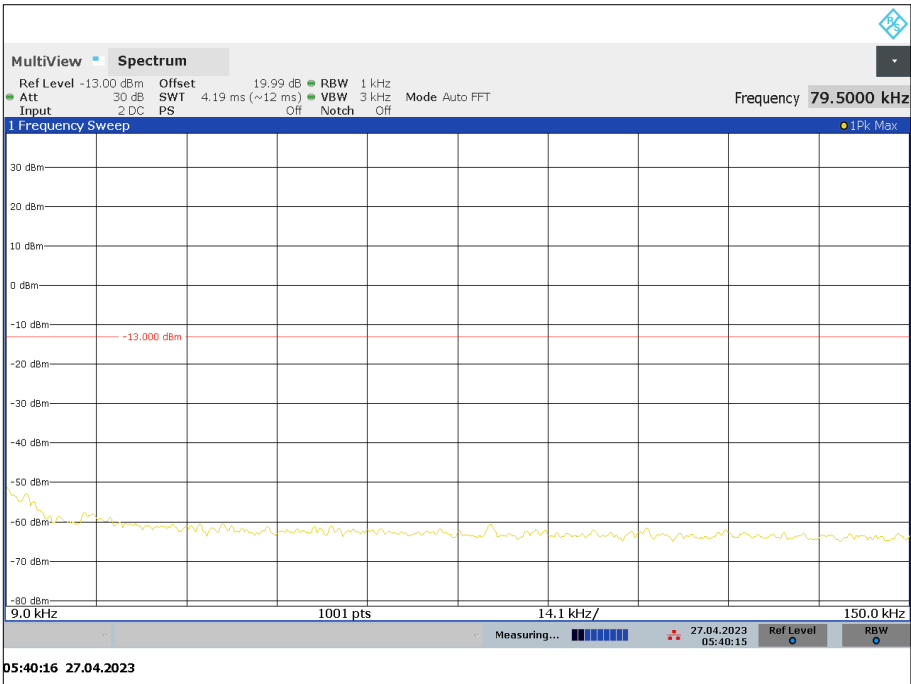


Figure 12 - 174 MHz - 9 kHz to 150 kHz

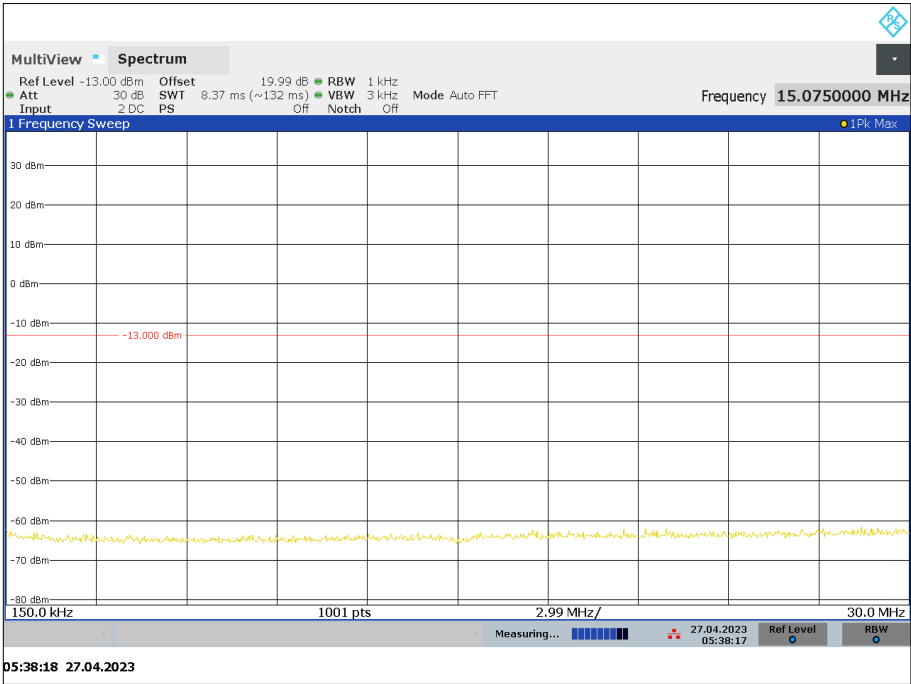


Figure 13 - 136 MHz, 150 kHz to 30 MHz

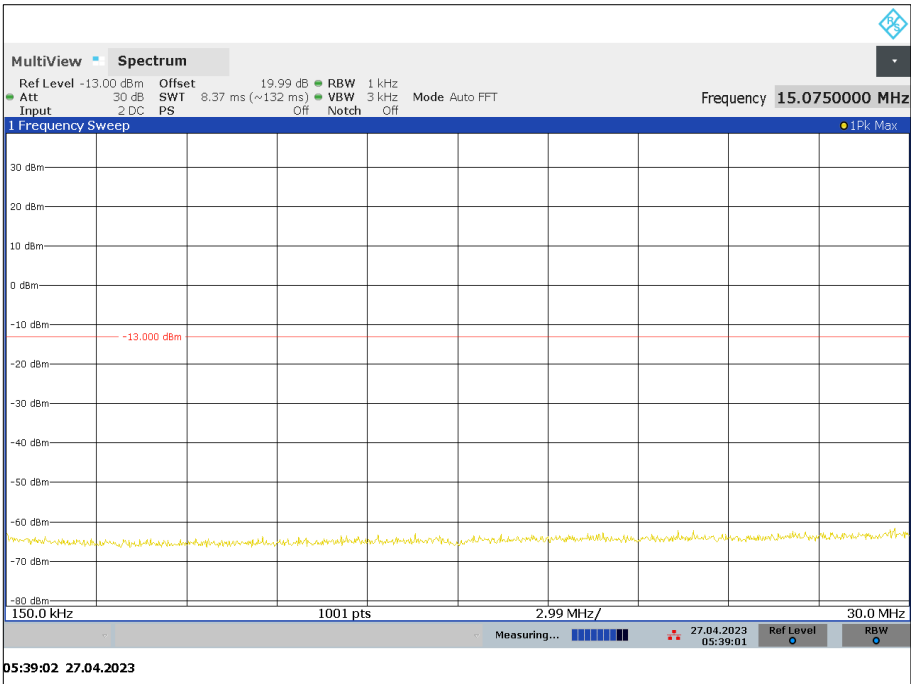


Figure 14 - 155 MHz, 150 kHz to 30 MHz

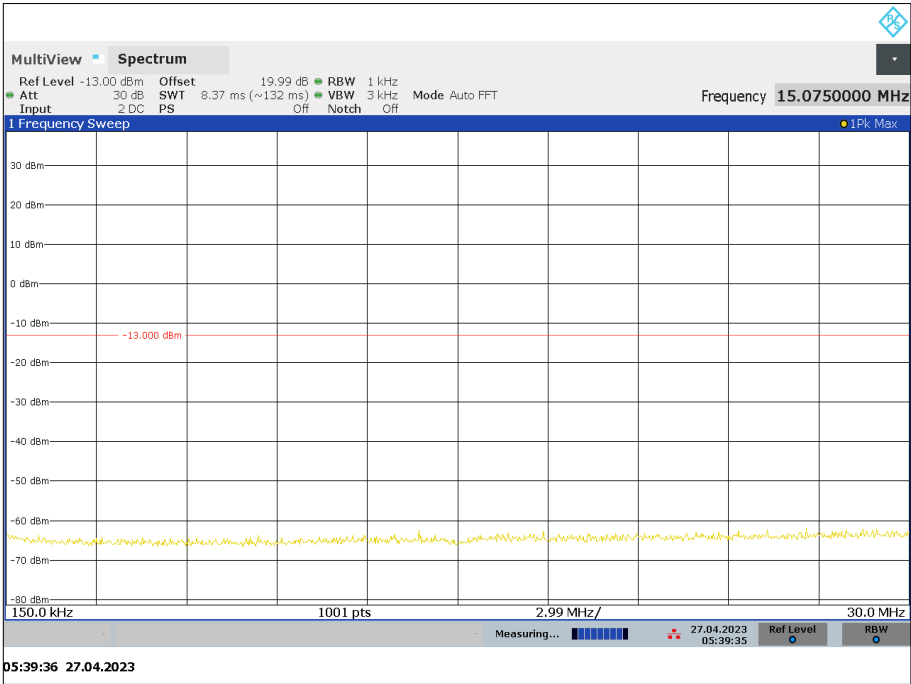


Figure 15 - 174 MHz - 150 kHz to 30 MHz

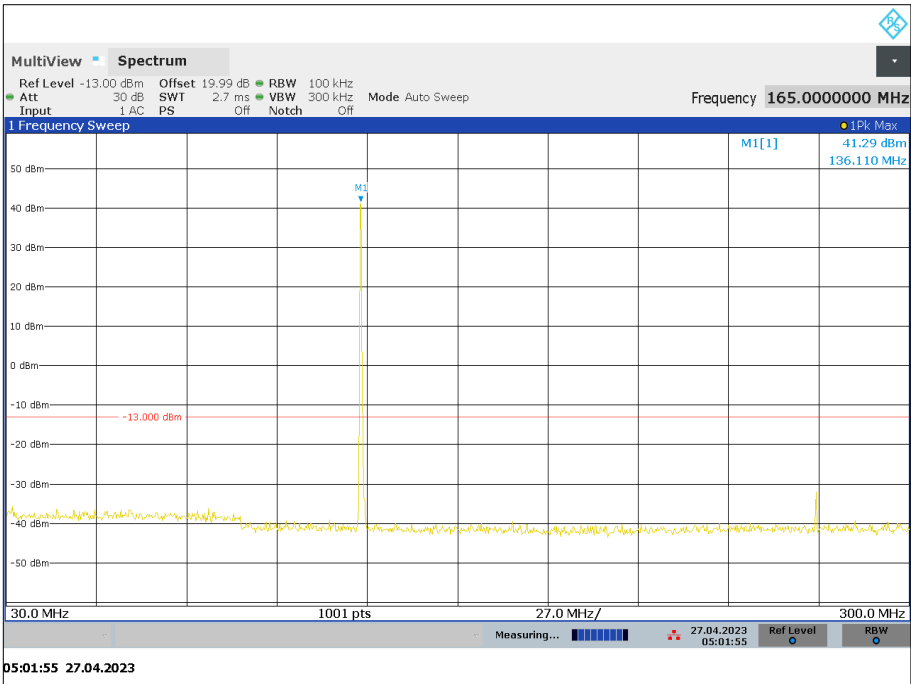


Figure 16 - 136 MHz, 30 MHz to 300 MHz

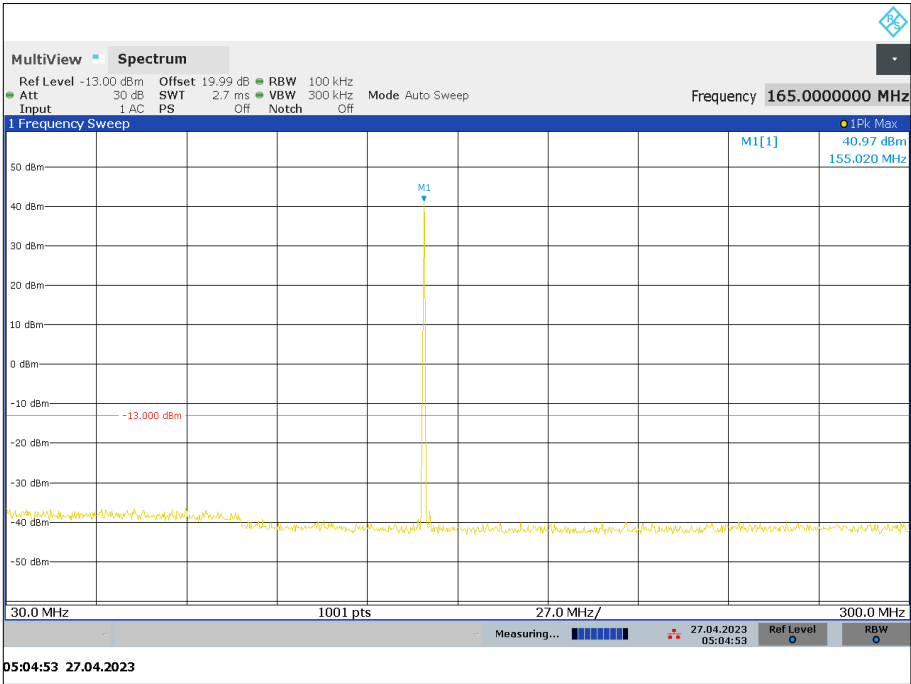


Figure 17 - 155 MHz, 30 MHz to 300 MHz

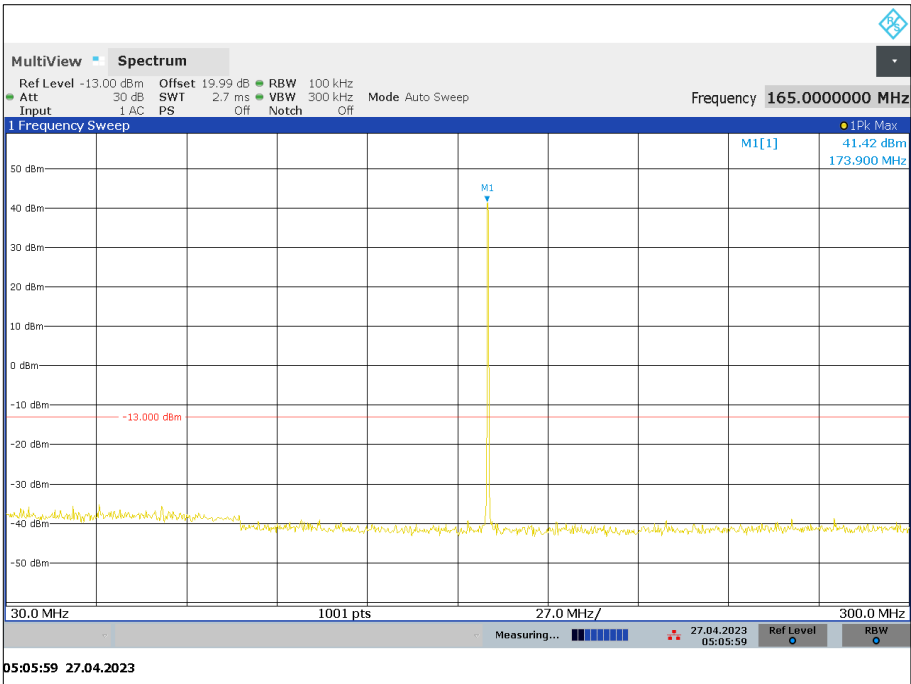


Figure 18 - 174 MHz - 30 MHz to 300 MHz

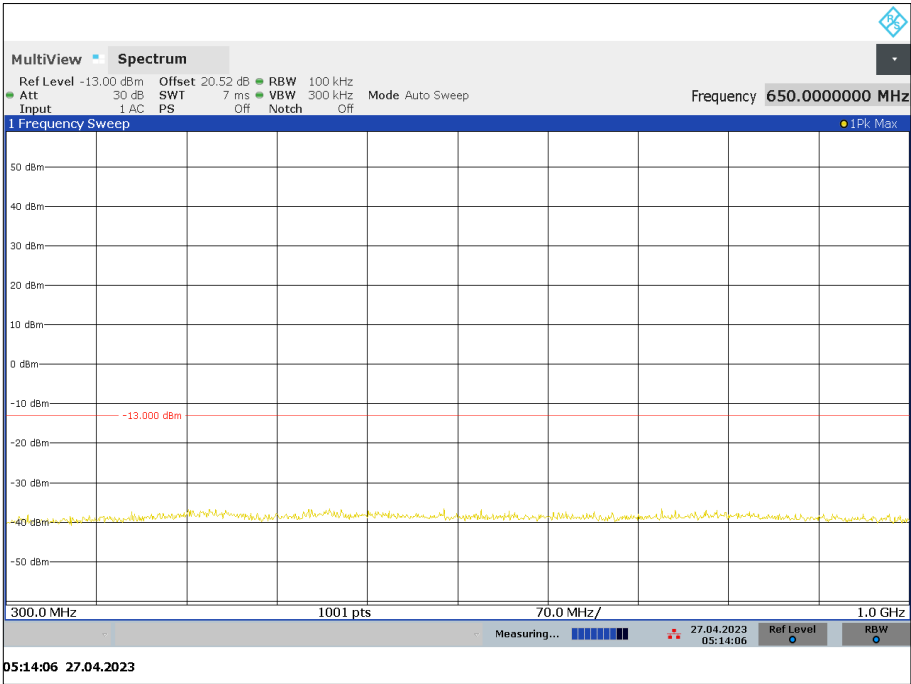


Figure 19 - 136 MHz, 300 MHz to 1 GHz

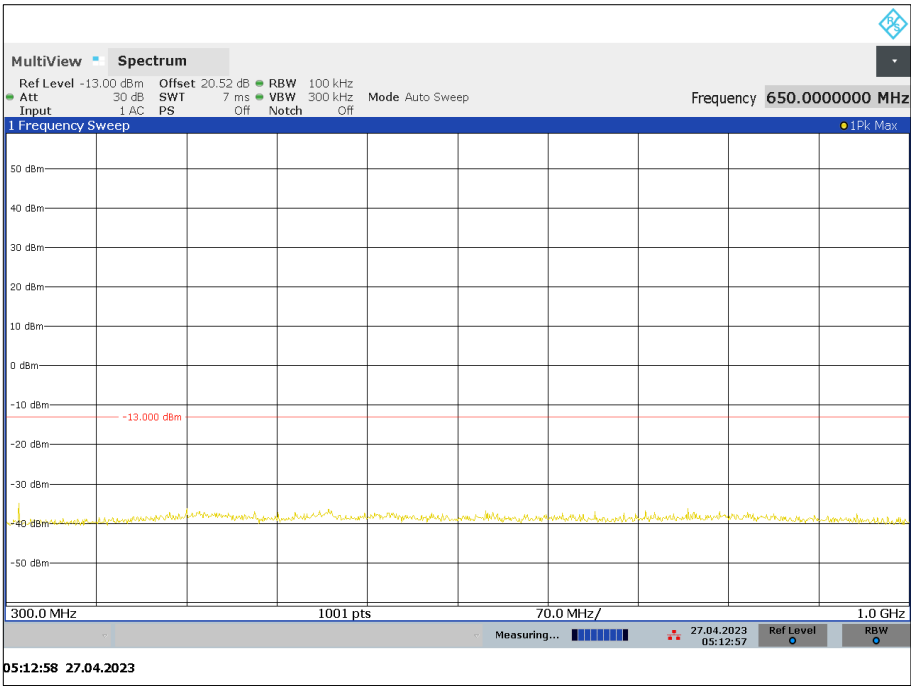


Figure 20 - 155 MHz, 300 MHz to 1 GHz

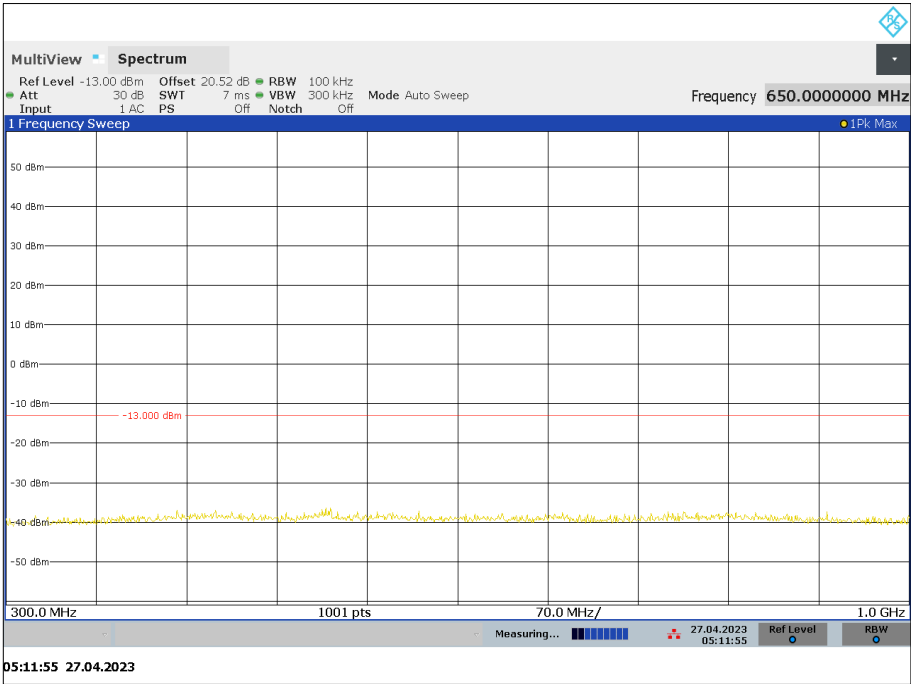


Figure 21 - 174 MHz - 300 MHz to 1 GHz

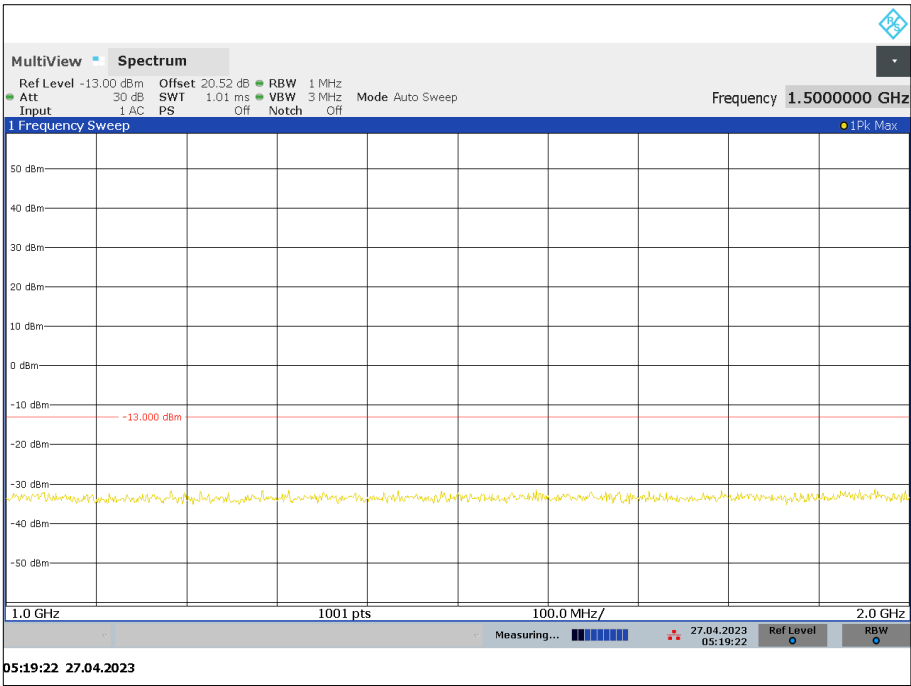


Figure 22 - 136 MHz, 1 GHz to 2 GHz

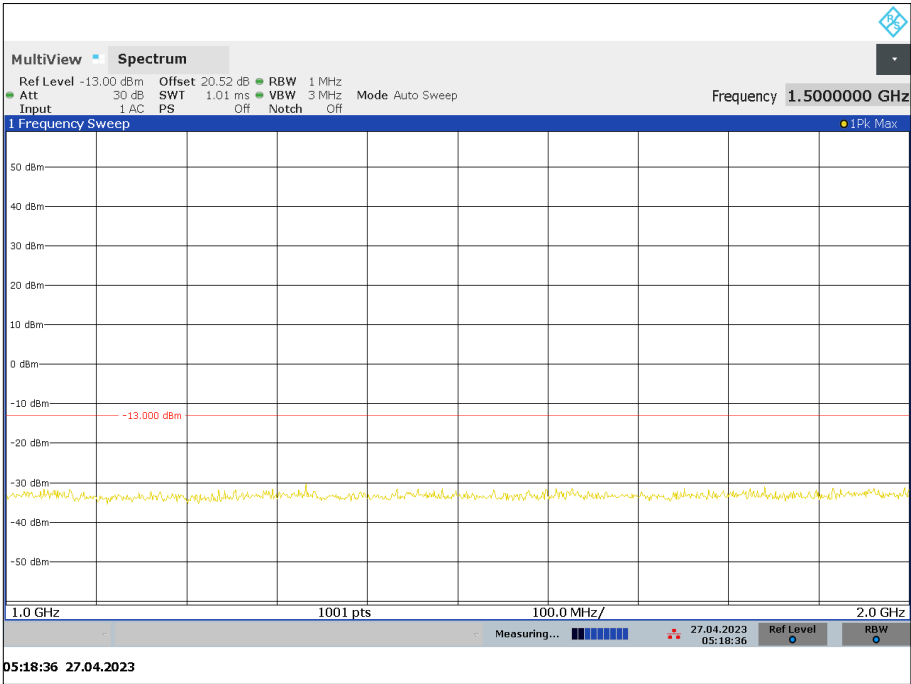


Figure 23 - 155 MHz, 1 GHz to 2 GHz

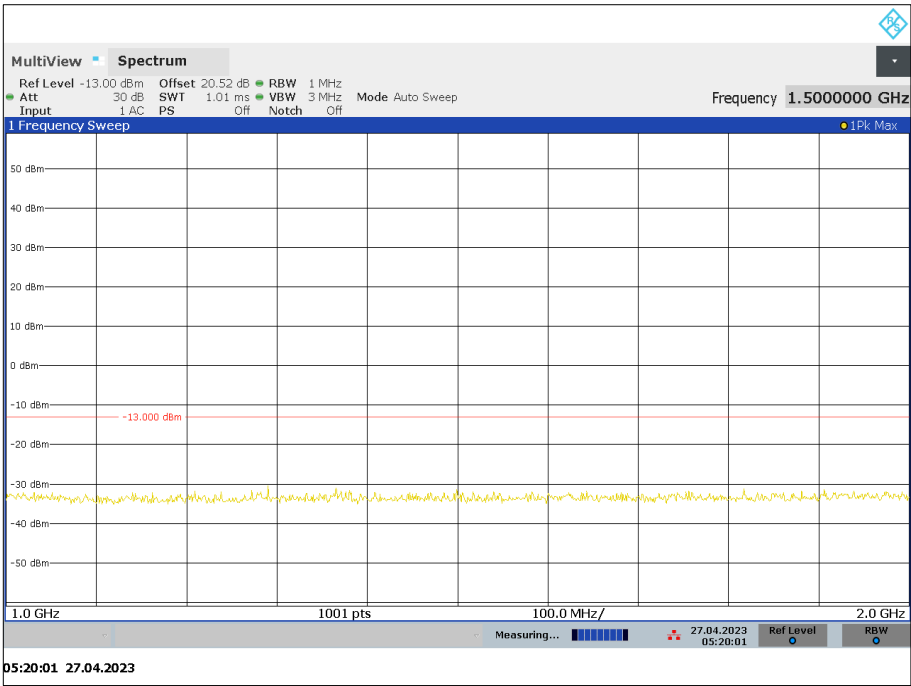


Figure 24 - 174 MHz - 1 GHz to 2 GHz



ISED RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per ISED RSS-119, clause 5.8.



150 MHz to 174 MHz (FCC and ISED)

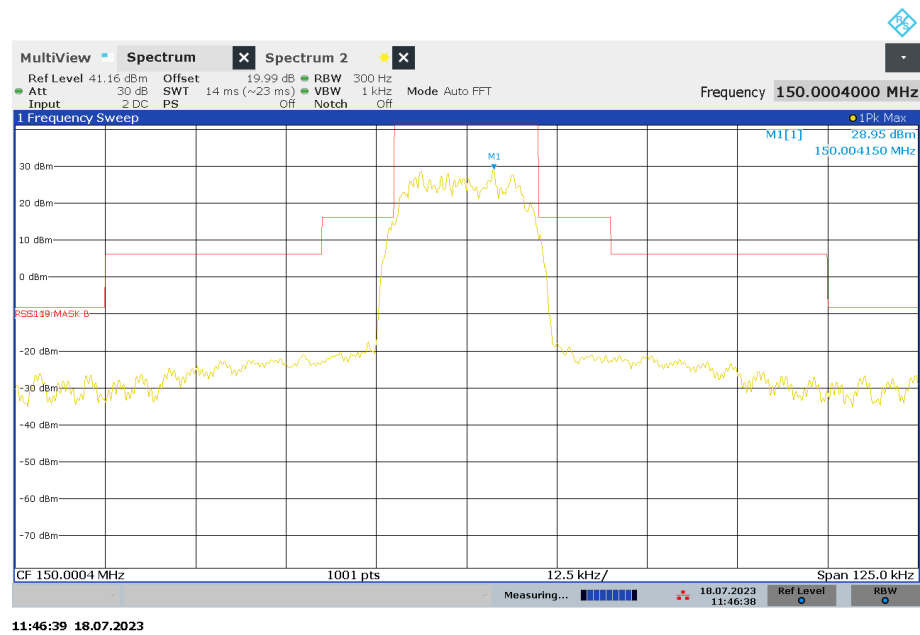


Figure 25 - 150 MHz, Transmitter Mask

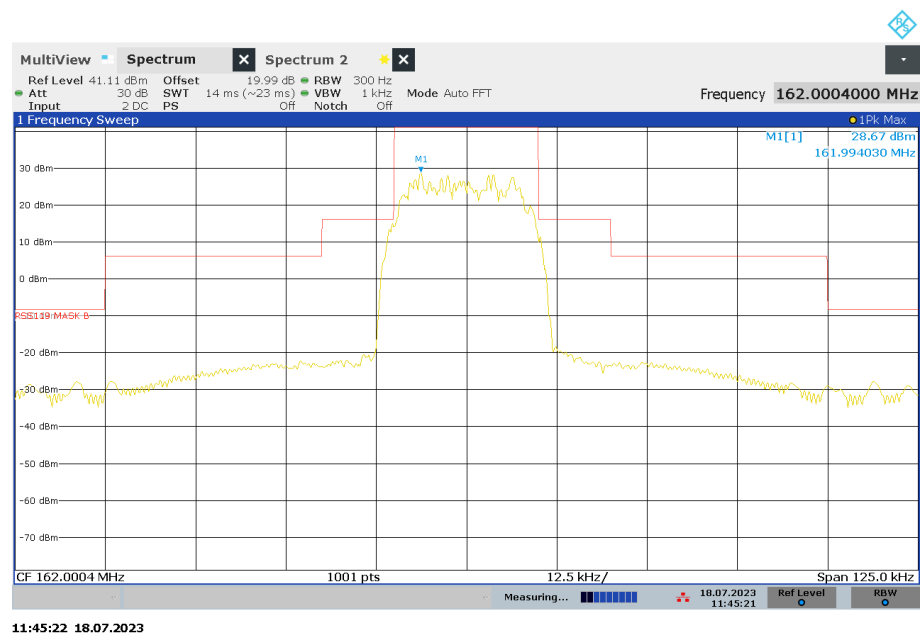


Figure 26 - 160.000 MHz, Transmitter Mask

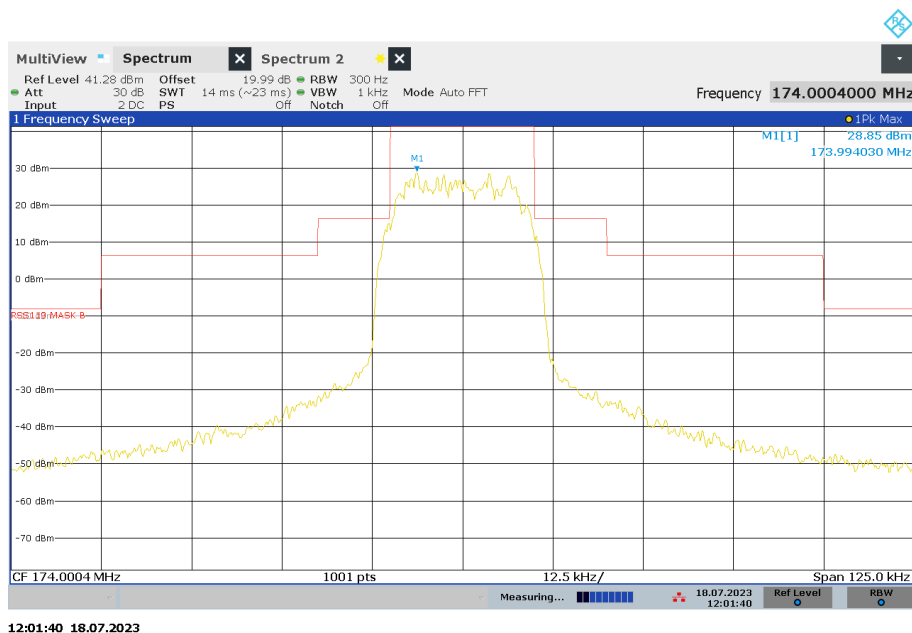


Figure 27 - 174 MHz, Transmitter Mask



Figure 28 - 150 MHz, 9 kHz to 150 kHz

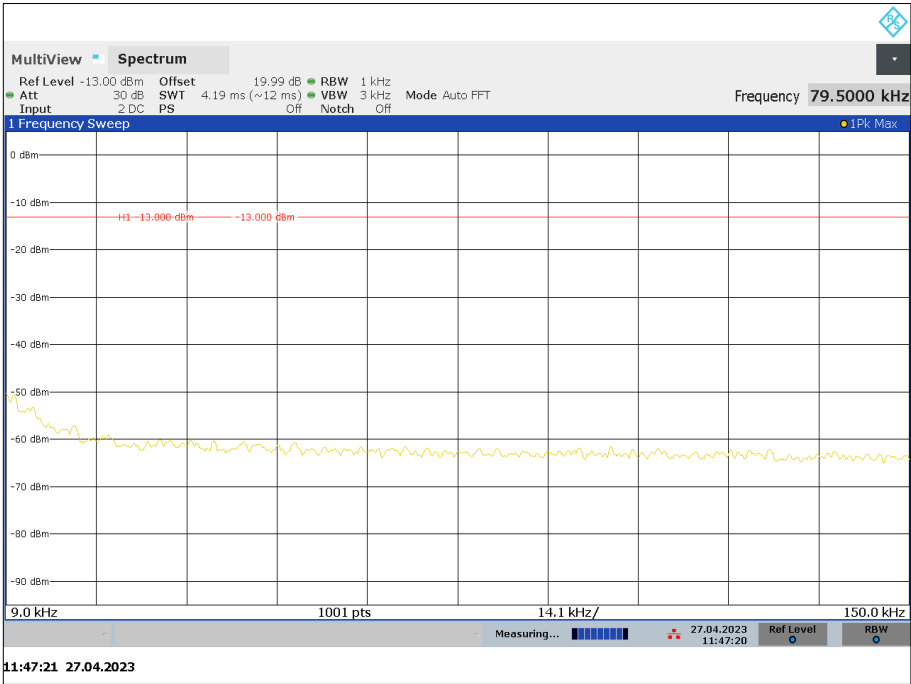


Figure 29 - 160.000 MHz, 9 kHz to 150 kHz

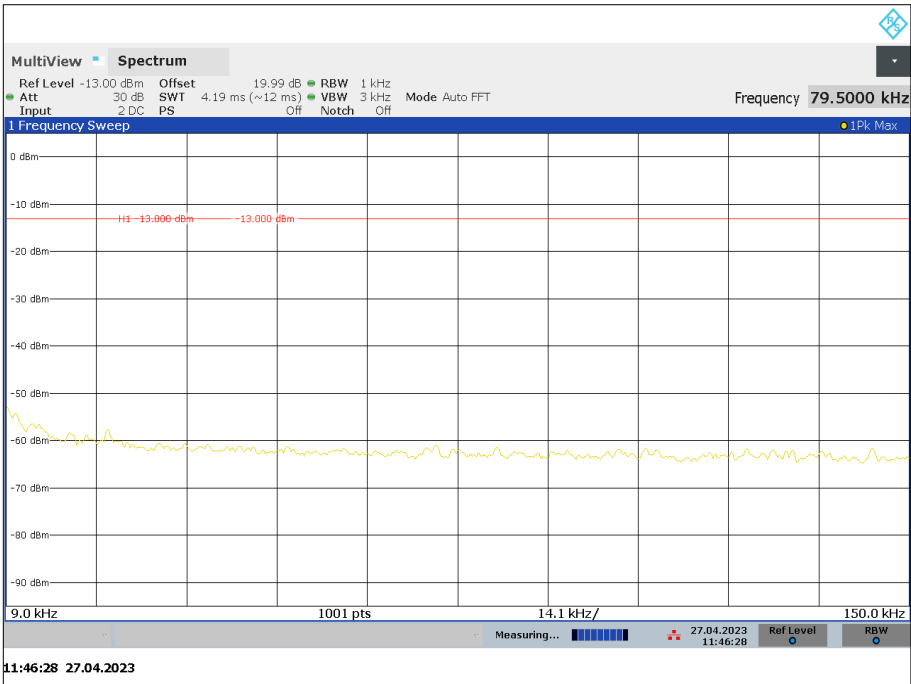


Figure 30 - 174 MHz - 9 kHz to 150 kHz

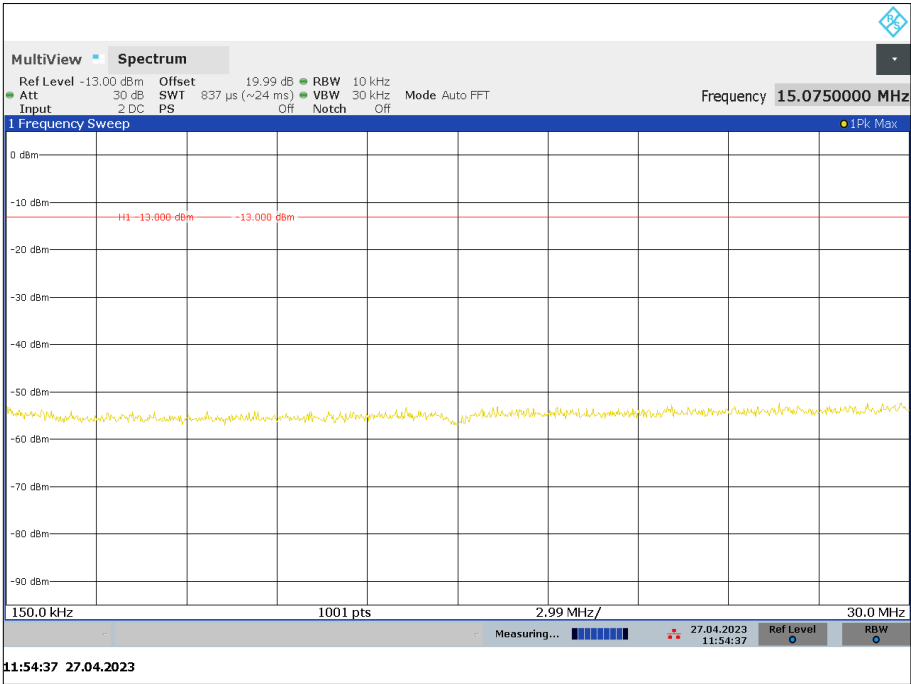


Figure 31 - 150 MHz, 150 kHz to 30 MHz

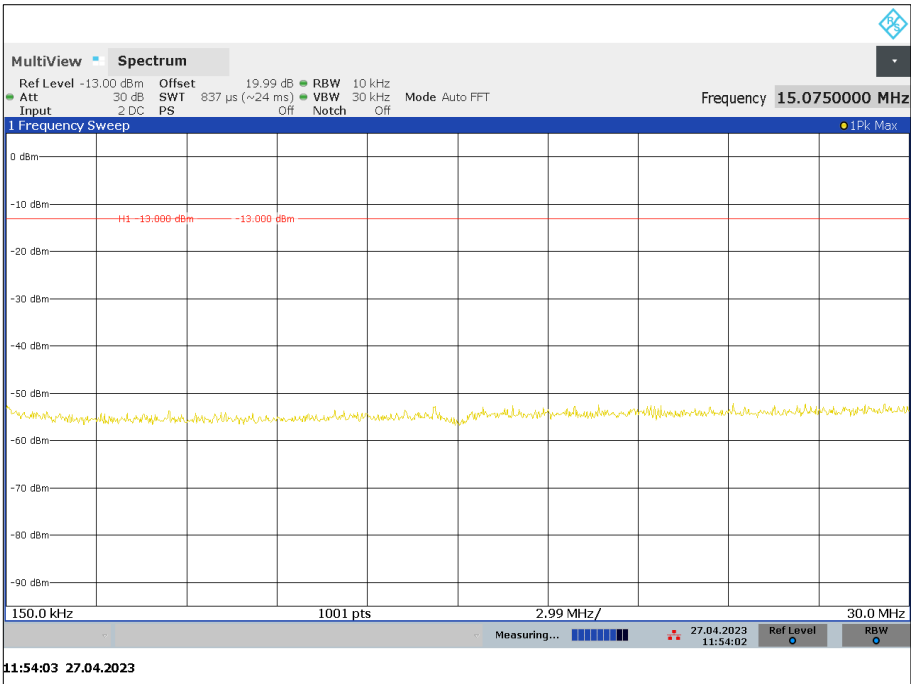
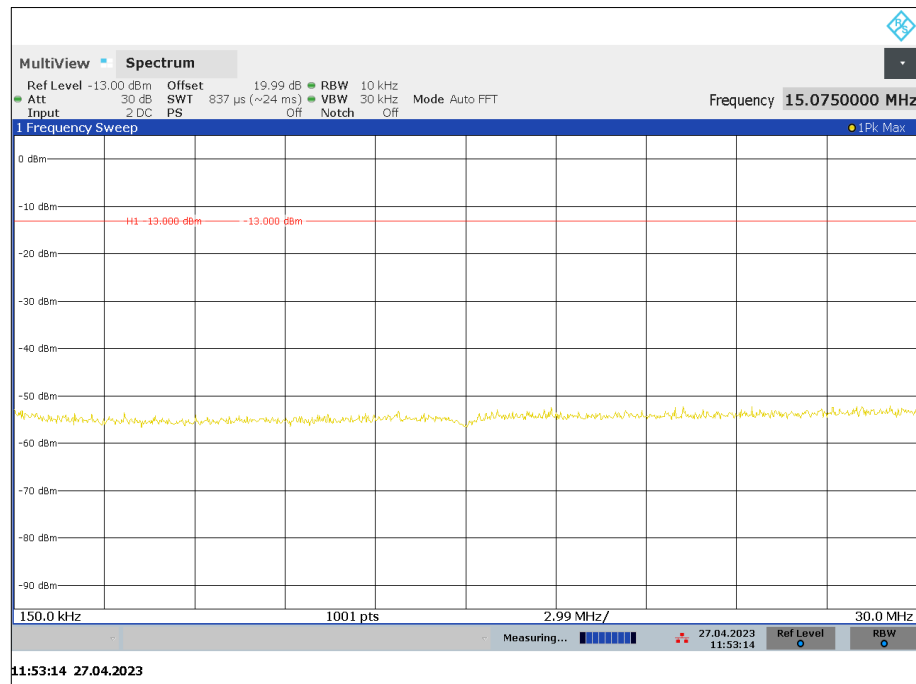


Figure 32 - 160.000 MHz, 150 kHz to 30 MHz



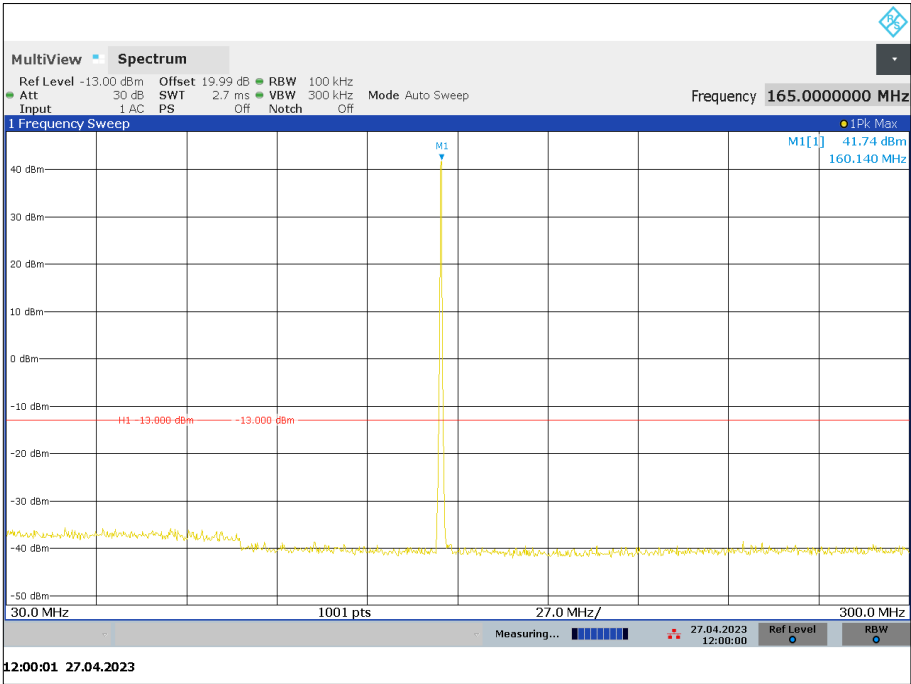


Figure 35 - 160.000 MHz, 30 MHz to 300 MHz

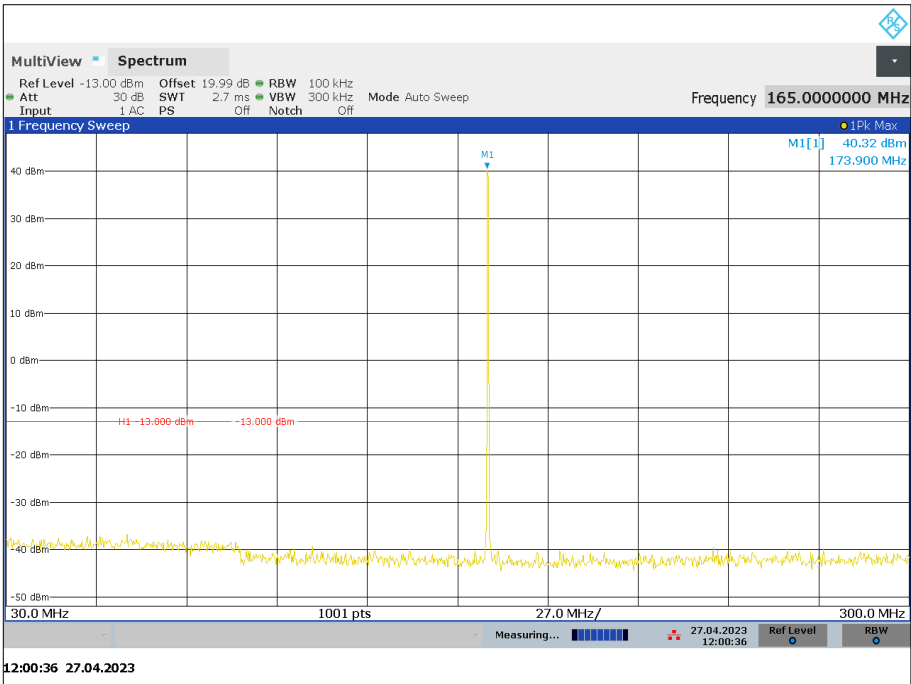


Figure 36 - 174 MHz - 30 MHz to 300 MHz

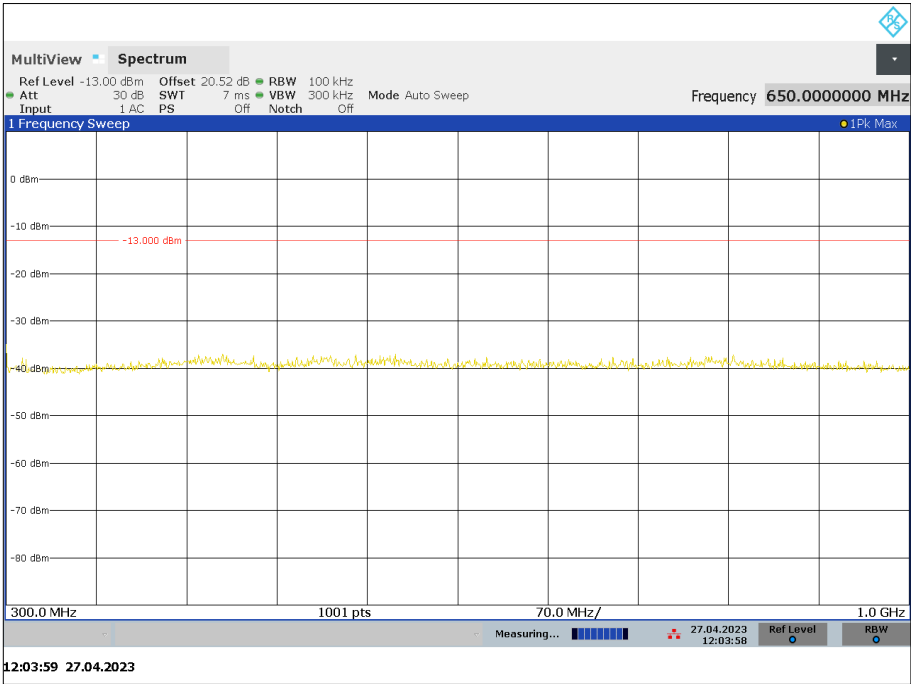


Figure 37 - 150 MHz, 300 MHz to 1 GHz

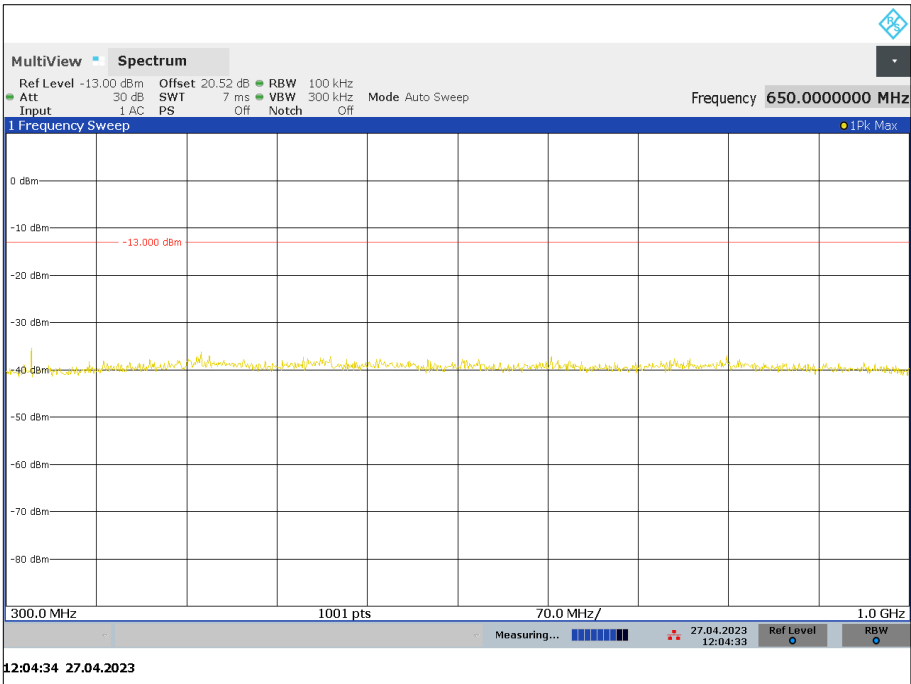


Figure 38 - 160.000 MHz, 300 MHz to 1 GHz

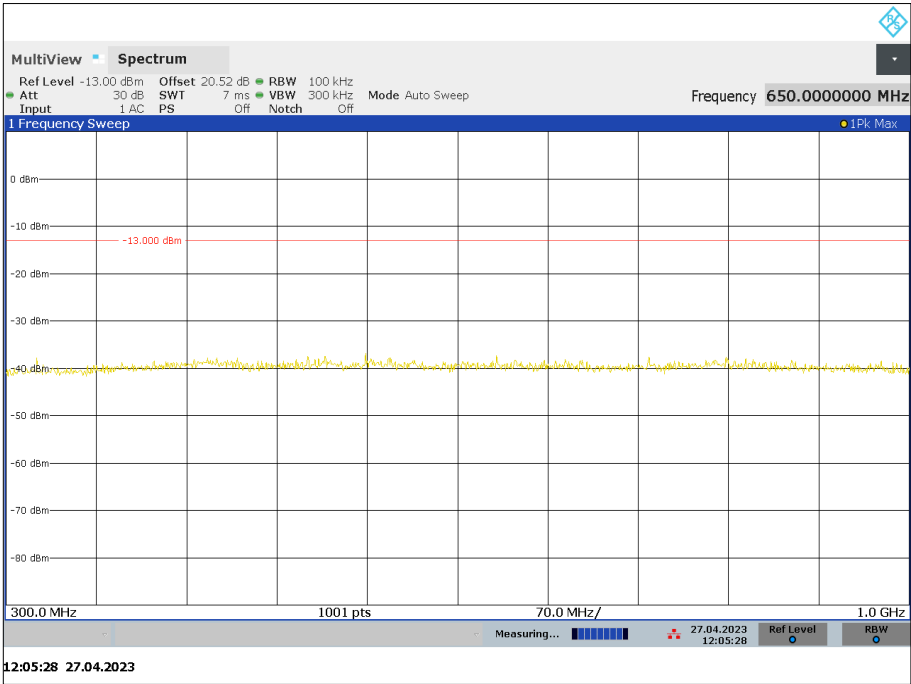


Figure 39 - 174 MHz - 300 MHz to 1 GHz

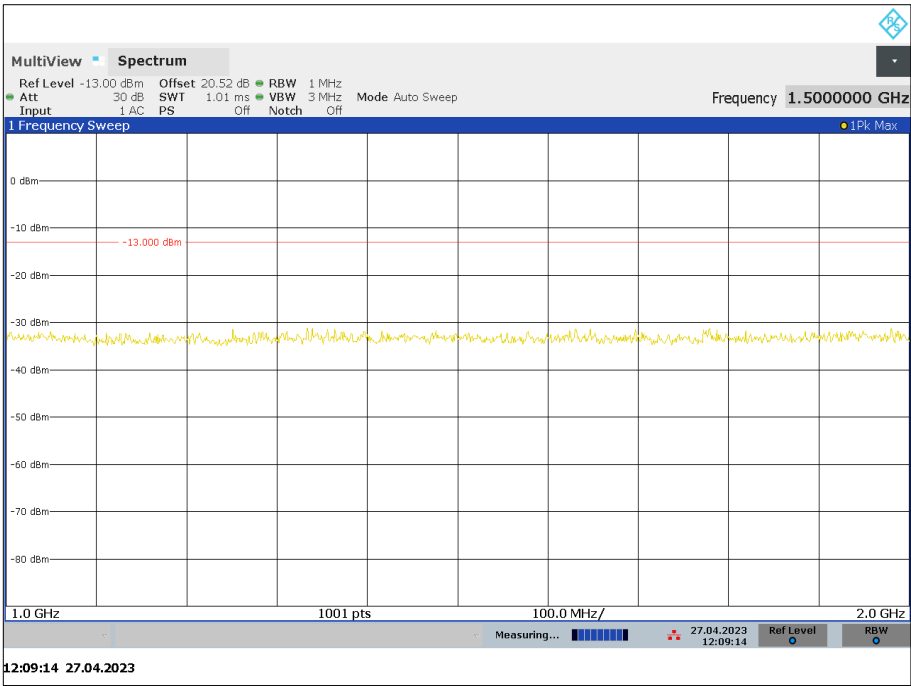


Figure 40 - 150 MHz, 1 GHz to 2 GHz

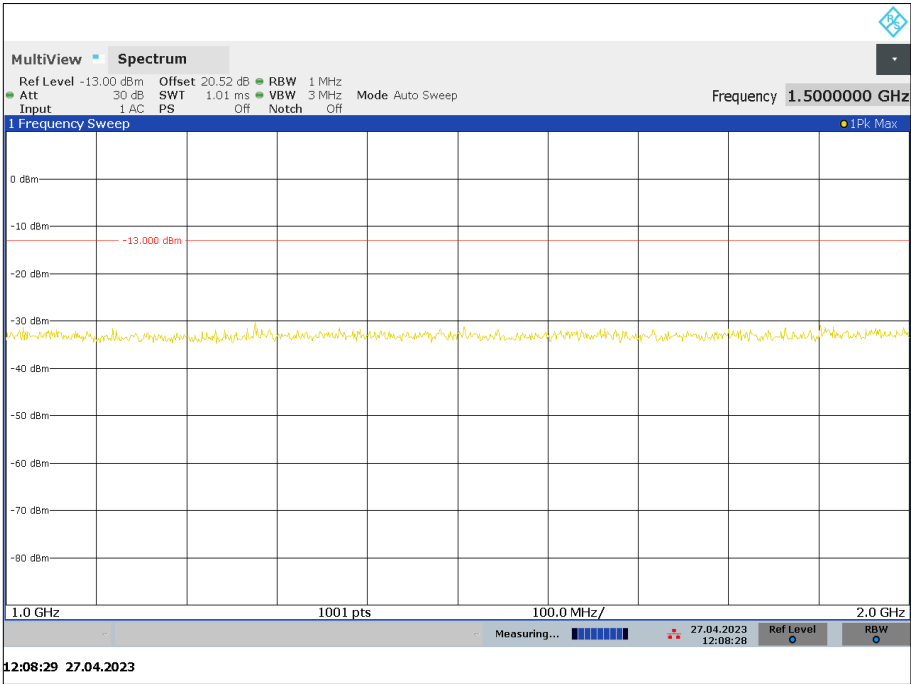


Figure 41 - 160.000 MHz, 1 GHz to 2 GHz

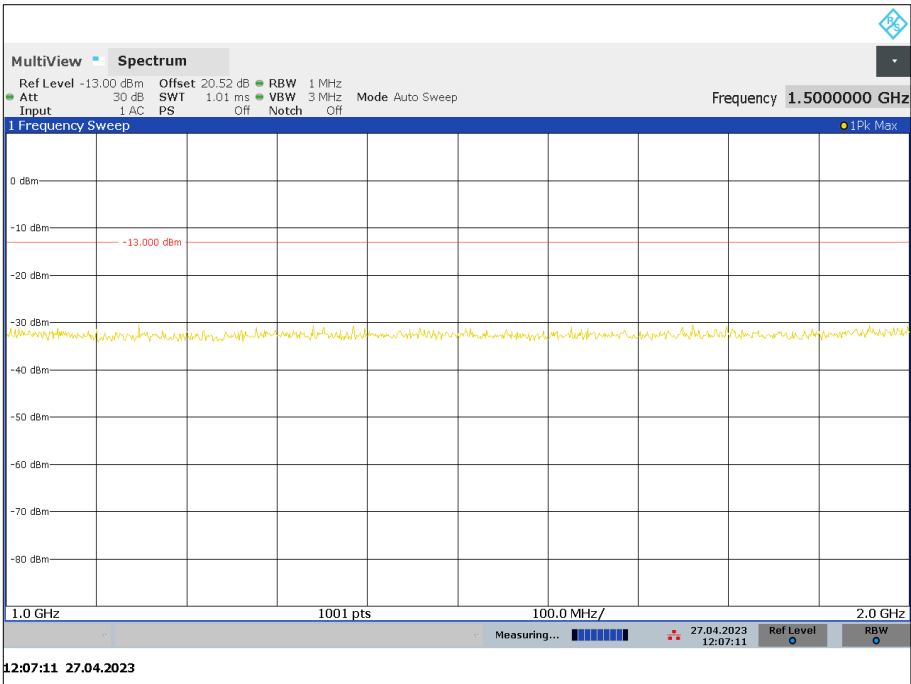


Figure 42 - 174 MHz - 1 GHz to 2 GHz



FCC 47 CFR Part 90, Limit Clause 90.210

The EUT shall comply with emission mask B as per FCC 47 CFR Part 90, clause 90.210.

ISED RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per ISED RSS-119, clause 5.8.

2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	A1	2138	12	28-Sep-2023
Hygrometer	PCE Instruments	OCE-THB-40	5470	12	20-Apr-2024
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	17-May-2023
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	09-Aug-2023
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	5500	12	04-May-2023
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	5500	12	21-May-2024
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5516	12	23-Oct-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	5513	12	14-Apr-2024
300 MHz High Pass Filter	Mini-Circuits	NHP-300	5532	12	22-May-2023
300 MHz High Pass Filter	Mini-Circuits	NHP-300	5532	12	26-May-2024

Table 22

3 Photographs

3.1 Test Setup Photographs



Figure 43 – Test Setup Photographs



4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Maximum Conducted Output Power	± 3.2 dB
Spurious Emissions at Antenna Terminals	± 3.45 dB

Table 23

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.