



Product Service

Report on the FCC and IC Testing of the Siemens AG

Model: SIMATIC RF615R FCC


In accordance with FCC 47 CFR Part 15C and ISED RSS-GEN (partly)

Prepared for: Siemens AG
Gleiwitzer Str. 555
90475 Nürnberg
Germany

FCC ID: NXW-RF615R
IC: 267X-RF615R



COMMERCIAL-IN-CONFIDENCE

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Product Service

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Michael Ingerl	2021-01-22	 SIGN-ID 465428
Authorised Signatory	Markus Biberger	2021-01-22	 SIGN-ID 465949

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service 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 15C 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	Michael Ingerl	2021-01-22	 SIGN-ID 465429

Laboratory Accreditation Laboratory recognition Industry Canada test site registration
DAkkS Reg. No. D-PL-11321-11-02 Registration No. BNetzA-CAB-16/21-15 3050A-2

EXECUTIVE SUMMARY

A sample of this product was tested and found to be partly compliant with FCC 47 CFR Part 15C and ISED RSS-GEN.



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BNetzA-CAB-16/21-15

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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	2021-01-22

Table 1

1.2 Introduction

Applicant	Siemens AG
Manufacturer	Siemens AG
Model Number(s)	SIMATIC RF615R FCC
Serial Number(s)	MO000968
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C
Test Plan/Issue/Date	---
Order Number	9705786776
Date of Receipt of EUT	2021-01-14
Start of Test	2021-01-15
Finish of Test	2021-01-22
Name of Engineer(s)	Michael Ingerl
Related Document(s)	ANSI C63.10-2013-2014



1.3 Brief Summary of Results

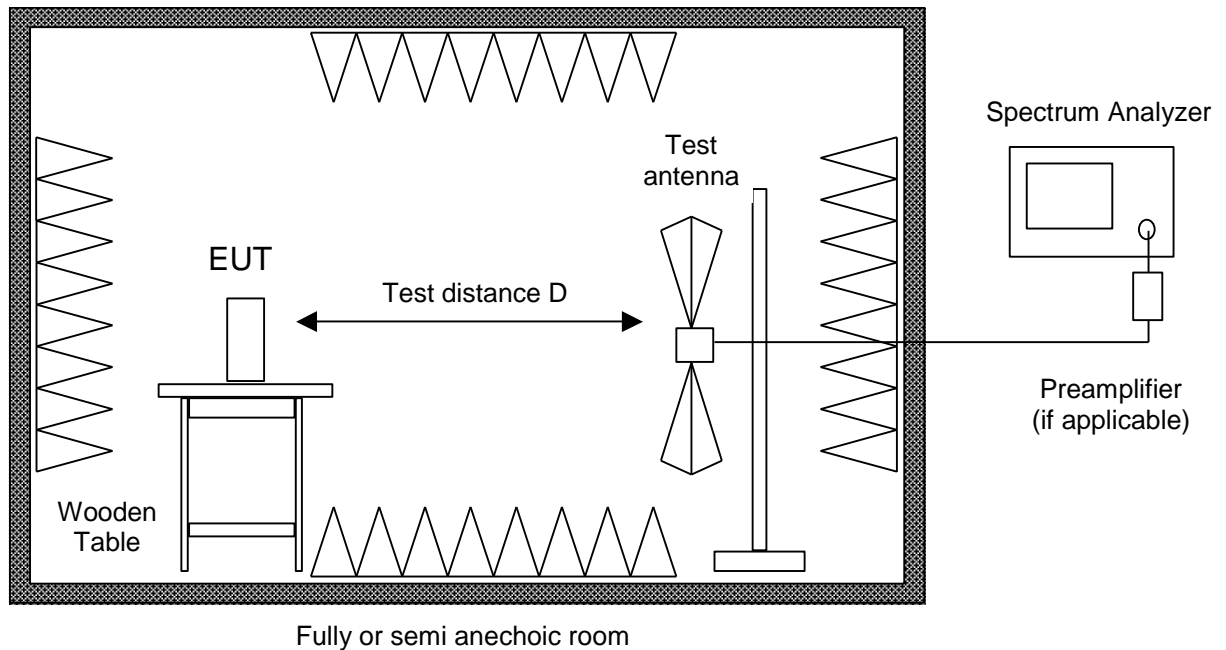
A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and ISED RSS-GEN is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 24 V DC power supply - Transmitting continuously				
2.1	15.209, 4.3 and 6.13	Field Strength of any Emission	Pass	ANSI C63.10-2013
2.2	15.247	Maximum peak conducted output power	Pass	ANSI C63.10-2013
2.3	15.205, 4.1 and 8.10	Restricted Band Edges	Pass	ANSI C63.10-2013

Table 2

1.4 Measurement Procedures

Radiated emissions in a fully or semi anechoic room



Radiated emission in fully or semi anechoic room is measured in the frequency range from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33.

Measurements are made in both the horizontal and vertical planes of polarization using a EMI test receiver with the detector function set to peak and resolution as well as video bandwidth set to 100 kHz (below 1 GHz) or 1 MHz (above 1 GHz).

Testing up to 1 GHz is performed with a linear polarized logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna"). For testing above 1 GHz horn antennas are used.

All tests below 8 GHz are performed at a test distance D of 3 meters. For higher frequencies the test distance may be reduced (e.g. to 1 meter) due to the sensitivity of the measuring instrument(s) and the test results are calculated according to CFR 47 Part 15 section 15.31(f)(1) using an extrapolation factor of 20 dB/decade. If required, preamplifiers are used for the whole frequency range. Special care is taken to avoid overload, using appropriate attenuators and filters, if necessary.

If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.

Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.

During testing the EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

For final testing below 1 GHz a semi anechoic room complying with the NSA requirements of ANSI C63.10-2013 for alternative test sites is used. If prescans are recorded in fully anechoic room they are indicated appropriately.



1.5 Product Information

1.5.1 Technical Description

Equipment characteristics	
Type designation:	SIMATIC RF615R FCC
Type of equipment:	Radio Equipment
Application ¹ :	Radio Frequency Identification Application
Equipment class:	Equipment for fixed use
Kind of equipment	Transceiver
Operating Frequency:	902.75 – 927.25 MHz
Channel spacing:	Wideband
Antenna Gain:	SIMATIC RF642A: 6 dB SIMATIC RF660A: 6 dB
Power supply:	DC supplied Nominal: 24 V Nominal frequency: DC

1.6 Deviations from the Standard

NA



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
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing Test Laboratory.

Test Name	Name of Engineer(s)
Configuration and Mode: 24 V DC power supply - Transmitting continuously	
Radiated Emissions	Michael Ingerl
Maximum peak conducted output power	Michael Ingerl
Restricted Band Edges	Michael Ingerl

Table 4

Office Address:
Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Field Strength of any Emission

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15 and ISED RSS-GEN.

2.1.2 Equipment Under Test and Modification State

SIMATIC RF615R FCC - S/N: MO00096 - Modification State 0

2.1.3 Date of Test

2021-01-15

2.1.4 Test Method

ANSI C63.10-2013, Clause 6.2 and 6.3

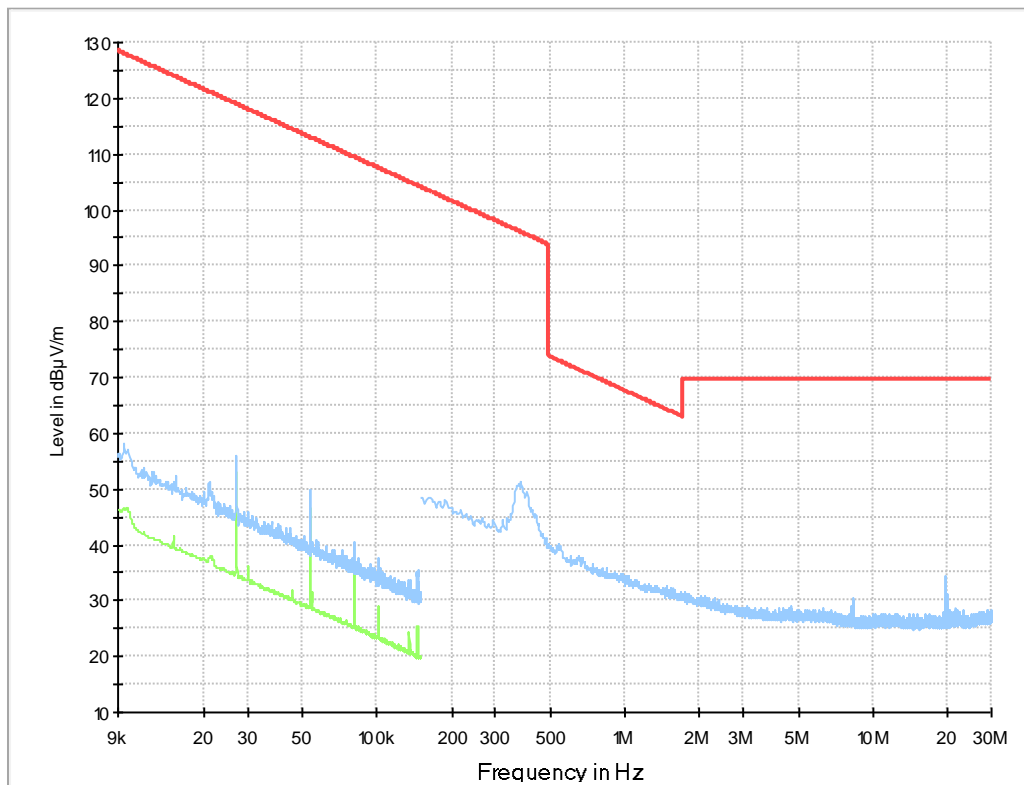
2.1.5 Environmental Conditions

Ambient Temperature	20.0 °C
Relative Humidity	39.0 %

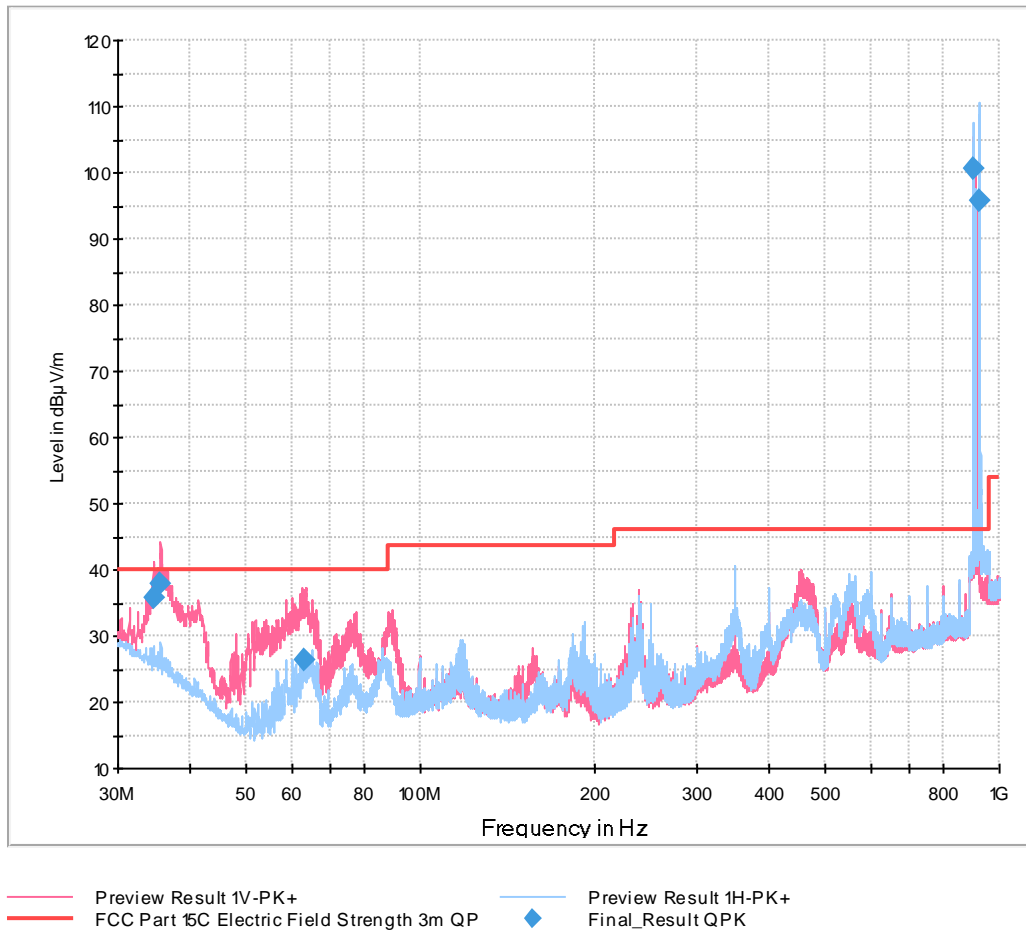


2.1.6 Test Results

SIMATIC RF615R with antenna RF642A



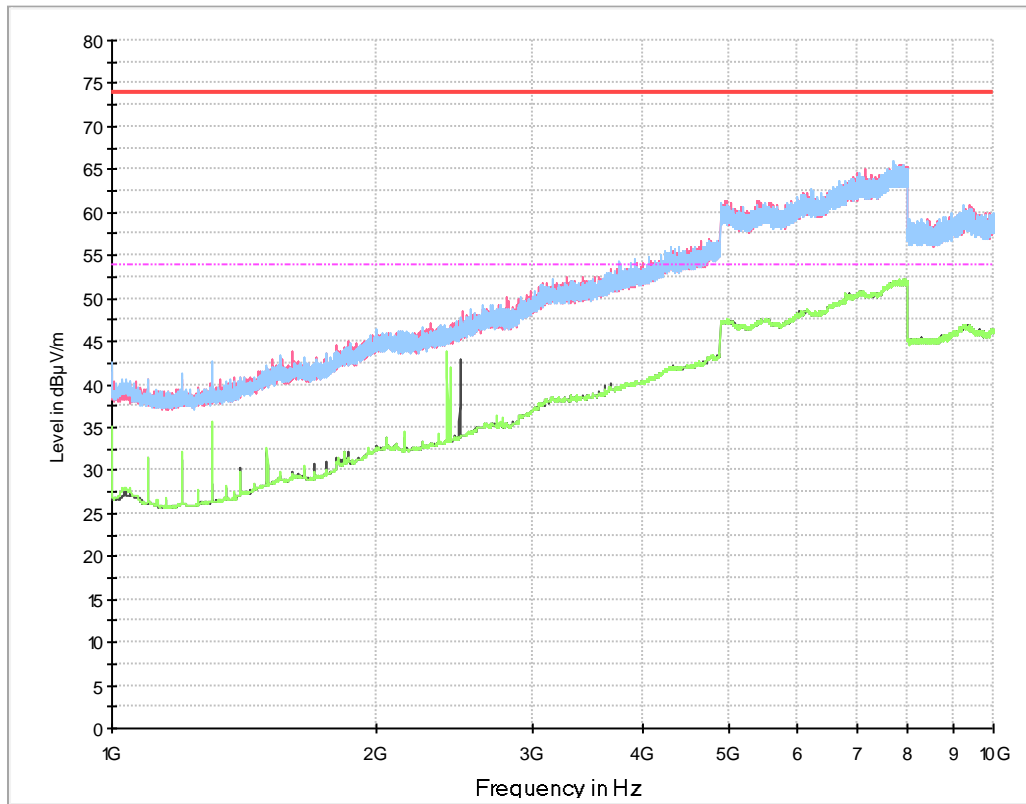
- Preview Result 2H-AVG
- Preview Result 1H-PK+
- FCC Part 15C Electric Field Strength 3m QP+AV (9k-30M)
- ◆ Final_Result QPK
- ◆ Final_Result CAV



Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
34.550000	35.74	40.00	4.26	1000.0	120.000	125.0	V	184.0	22.9
35.580000	37.93	40.00	2.07	1000.0	120.000	138.0	V	180.0	22.9
62.760000	26.34	40.00	13.66	1000.0	120.000	169.0	V	196.0	13.5
903.990000	100.74	#1	#1	1000.0	120.000	125.0	V	-25.0	29.0
925.560000	95.79	#1	#1	1000.0	120.000	149.0	H	109.0	29.1

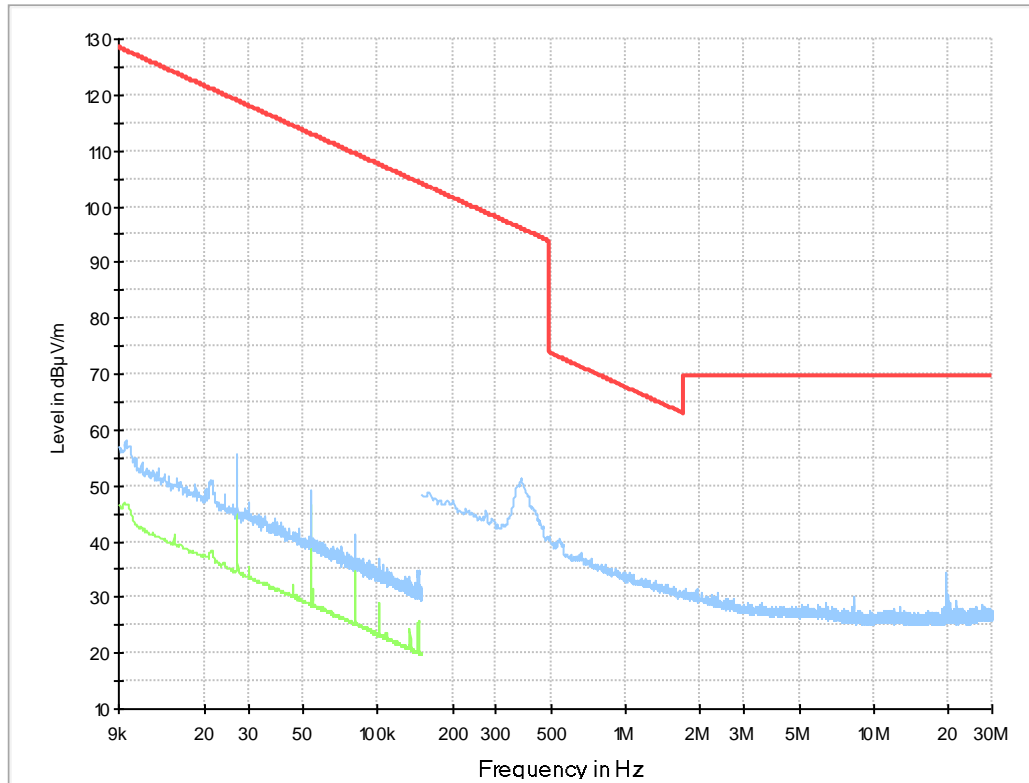
#1 – Intentional Radiator



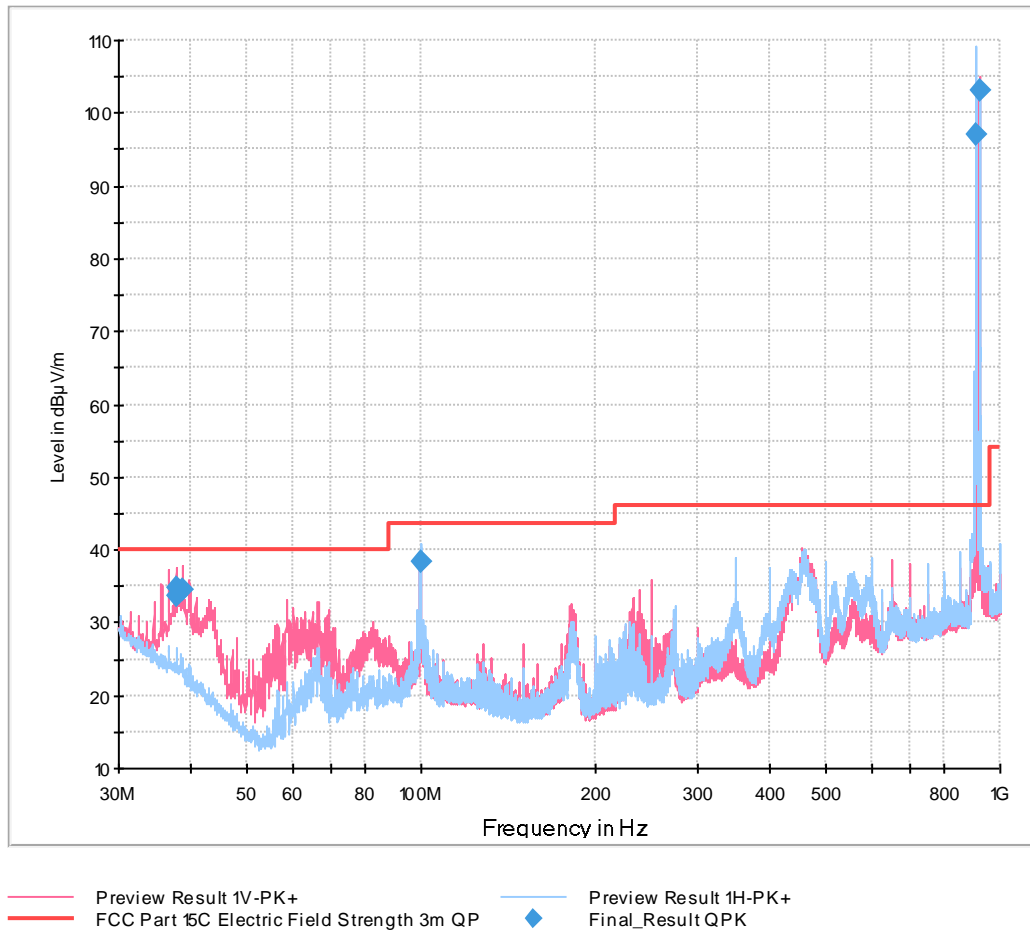
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC Part 15C Electric Field Strength 3m PK
- Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC Part 15C Electric Field Strength 3m AV
- Final_Result CAV



SIMATIC RF615R with antenna RF660A



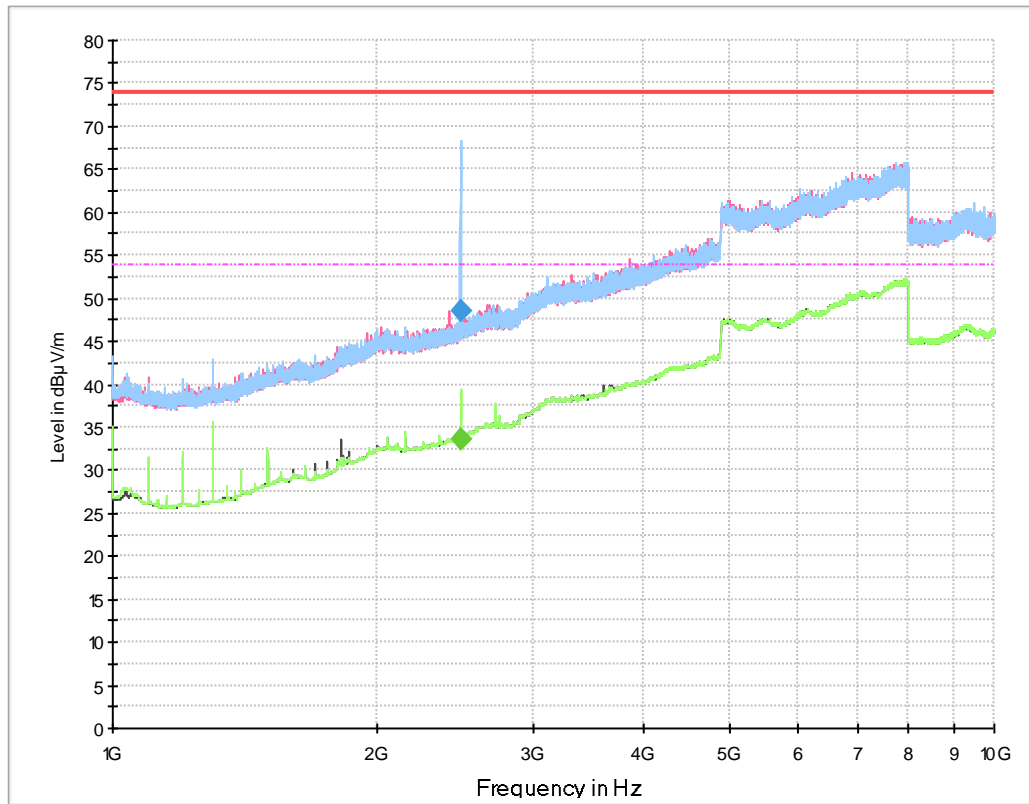
- Preview Result 2H-AVG
- Preview Result 1H-PK+
- FCC Part 15C Electric Field Strength 3m QP+AV (9k-30M)
- ◆ Final_Result QPK
- ◆ Final_Result CAV



Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
37.650000	33.75	40.00	6.25	1000.0	120.000	153.0	V	167.0	21.7
37.680000	34.88	40.00	5.12	1000.0	120.000	138.0	V	165.0	21.6
38.730000	34.48	40.00	5.52	1000.0	120.000	144.0	V	180.0	21.0
99.930000	38.46	43.50	5.04	1000.0	120.000	162.0	H	-80.0	17.5
906.990000	96.92	#1	#1	1000.0	120.000	162.0	V	105.0	29.1
920.010000	102.98	#1	#1	1000.0	120.000	160.0	H	-75.0	29.2

#1 – Intentional Radiator



- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC Part 15C Electric Field Strength 3m PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC Part 15C Electric Field Strength 3m AV
- ◆ Final_Result CAV

Final Results 1:

Frequency MHz	MaxPeak dBµV/m	CAverage dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
2479.750000	---	33.49	53.98	20.49	1000.0	1000.000	150.0	H	90.0	32.9
2479.750000	48.46	---	73.98	25.34	1000.0	1000.000	150.0	H	90.0	32.9



2.1.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	ESW44	39897	12	2021-03-31
ULTRALOG Antenna	Rohde & Schwarz	HL562E	39969	36	2022-11-30
Horn antenna	Rohde & Schwarz	HF907	100154	24	2021-07-31
Semi anechoic room No.11	Frankonia	---	42961	36	2022-08-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A

Table 5

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.2 Maximum peak conducted output power

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15 and ISED RSS-GEN.

2.2.2 Equipment Under Test and Modification State

SIMATIC RF615R FCC - S/N: MO00096 - Modification State 0

2.2.3 Date of Test

2021-01-22

2.2.4 Test Method

2.2.5 Environmental Conditions

Ambient Temperature	21.0 °C
Relative Humidity	36.0 %



2.2.6 Test Results

SIMATIC RF615R measured conducted

	902.75 MHz	915.25 MHz	927.25 MHz
Peak Power (dBm)	27.8	27.7	27.1
Limit (dBm)	30	30	30

2.2.7 Test Location and Test Equipment Used

This test was carried out in a non shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40 for TS8997	20219	24	2022-01-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	20248	24	2022-02-28
Testsystem 2,4 & 5 GHz Band	Rohde & Schwarz	TS8997	20251	24	2022-01-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2023-11-30
EMC measurement software	Rohde & Schwarz	EMC32 V10.50.00	44381	N/A	N/A

Table 6

TU - Traceability Unscheduled
 O/P Mon – Output Monitored using calibrated equipment
 N/A - Not Applicable



2.3 Restricted Band Edges

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.205, 4.1 and 8.10

2.3.2 Equipment Under Test and Modification State

SIMATIC RF615R FCC - S/N: MO00096 - Modification State 0

2.3.3 Date of Test

2021-01-15

2.3.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.13.1.

2.3.5 Environmental Conditions

Ambient Temperature	20.0 °C
Relative Humidity	39.0 %

2.3.6 Test Results

No restricted band in the range



2.3.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	ESW44	39897	12	2021-03-31
ULTRALOG Antenna	Rohde & Schwarz	HL562E	39969	36	2022-11-30
Horn antenna	Rohde & Schwarz	HF907	100154	24	2021-07-31
Semi anechoic room No.11	Frankonia	---	42961	36	2022-08-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A

Table 7

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	ESW44	39897	12	2021-03-31
ULTRALOG Antenna	Rohde & Schwarz	HL562E	39969	36	2022-11-30
Horn antenna	Rohde & Schwarz	HF907	100154	24	2021-07-31
Semi anechoic room No.11	Frankonia	---	42961	36	2022-08-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40 for TS8997	20219	24	2022-01-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	20248	24	2022-02-28
Testsystem 2,4 & 5 GHz Band	Rohde & Schwarz	TS8997	20251	24	2022-01-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2023-11-30
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.00	44381	N/A	N/A

Table 8

TU - Traceability Unscheduled
 O/P Mon – Output Monitored using calibrated equipment
 N/A - Not Applicable