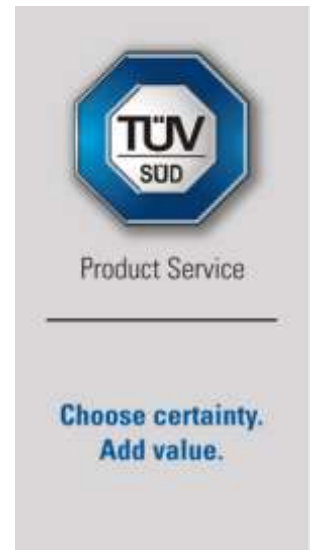




Product Service

Report on the FCC and IC Testing of the
Siemens AG
Simatic RF615R with antenna RF660A and
RF642A
In accordance with FCC 47 CFR Part 15C and
ISED RSS-GEN

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



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

COMMERCIAL-IN-CONFIDENCE

Date: 2020-02-03
Document Number: TR-72654-66388-01 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Matthias Stumpe	2020-02-03	 SIGN-ID 331933
Authorised Signatory	Martin Steindl	2020-02-03	 SIGN-ID 333541w

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	Matthias Stumpe	2020-02-03	 SIGN-ID 331934

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 compliant with FCC 47 CFR Part 15C and ISED RSS-GEN.



Contents

1 Report Summary3

1.1 Report Modification Record.....3

1.2 Introduction.....3

1.3 Brief Summary of Results4

1.4 Measurement Procedures.....5

1.5 Product Information6

1.6 Deviations from the Standard.....6

1.7 EUT Modification Record6

1.8 Test Location6

2 Test Details7

2.1 Radiated Emissions and Conducted emission.....7

3 Photographs 15

3.1 Equipment Under Test (EUT)..... 15

4 Test Equipment Information 17

4.1 General Test Equipment Used 17



DISCLAIMER AND COPYRIGHT
This non-binding report has been prepared by TÜV SÜD Product Service with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD Product Service. No part of this document may be reproduced without the prior written approval of TÜV SÜD Product Service. © 2020 TÜV SÜD Product Service.

ACCREDITATION
Our BNetzA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our BNetzA Accreditation. Results of tests not covered by our BNetzA Accreditation Schedule are marked NBA (Not BNetzA Accredited).



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	2020-02-03

Table 1

1.2 Introduction

Applicant	Siemens AG
Manufacturer	Siemens AG
Model Number(s)	Prototype
Serial Number(s)	Prototype
Hardware Version(s)	FS 02
Software Version(s)	---
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C
Test Plan/Issue/Date	---
Order Number	9704939264
Date	2019-07-30
Date of Receipt of EUT	2019-11-04
Start of Test	2019-12-17
Finish of Test	2020-02-03
Name of Engineer(s)	Matthias Stumpe, Patrick Müller
Related Document(s)	ANSI C63.10-2013-2014



Product Service

1.3 Brief Summary of Results

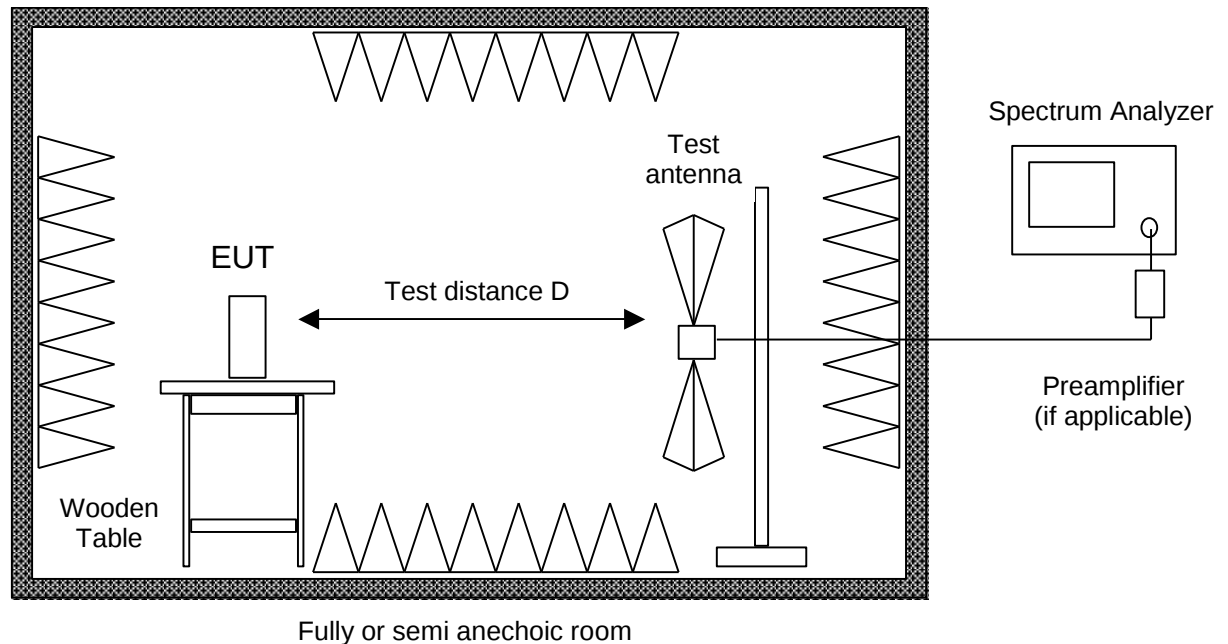
A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and ISED RSS-GEN is shown below.

Secti on	Specification Clause	Test Description	Resul t	Comments/Base Standard
Configuration and Mode: Simatic RF615R connected with antenna RF660A and RF642A				
2.1	15.209 and 15.207	Radiated Emission and conducted emission	Pass	ANSI C63.10-2013, 6.2, 6.3

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

Frequency range. 902 – 928 MHz

1.5.1 Technical Description

The SIMATIC RF615 are suitable for reading and writing tasks in the UHF range and very long ranges up to 8m.
The readers are especially well-suited for use in production environments where a high protection class and integration into SIMATIC controllers are required. These readers also come with an extensive toolset for commissioning and diagnostics.

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: 120 V AC / 60 Hz Powered	
Radiated Emissions	Matthias Stumpe, Patrick Müller
Conducted emission	Matthias Stumpe, Patrick Müller

Table 4

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Radiated Emissions and Conducted emission

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.209 and Clause 15.207 and ISED RSS-GEN.

2.1.2 Equipment Under Test and Modification State

SIMATIC RF615 with Antenna RF660A FCC and RF642A FCC

2.1.3 Date of Test

2019-11-07 – 2020-01-29

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	52.0 %

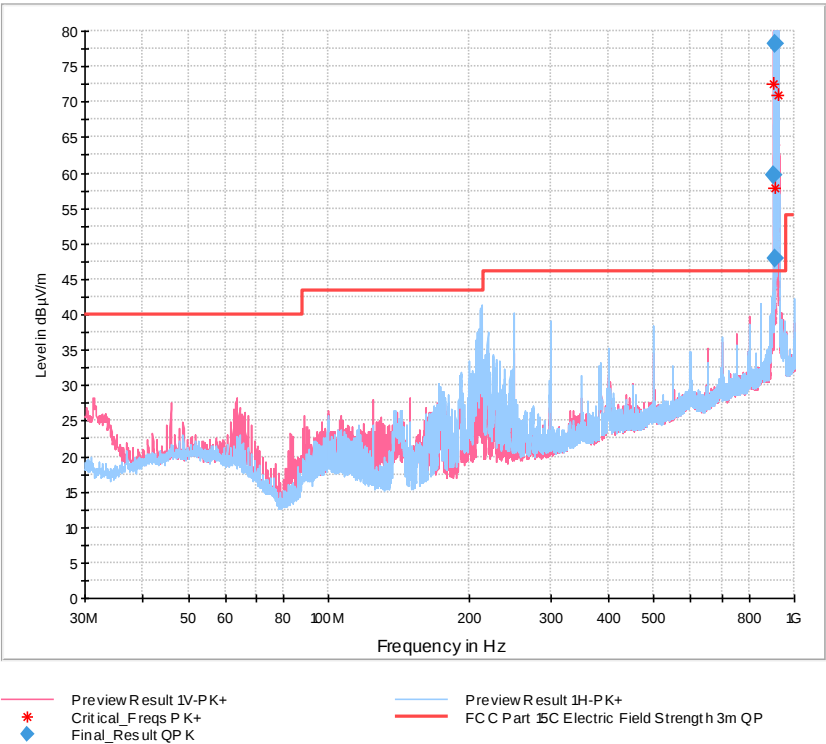


Product Service

2.1.6 Test Results

120V/60Hz AC powered

RF615R with antenna RF642A - Radiated emission: 30MHz-1GHz



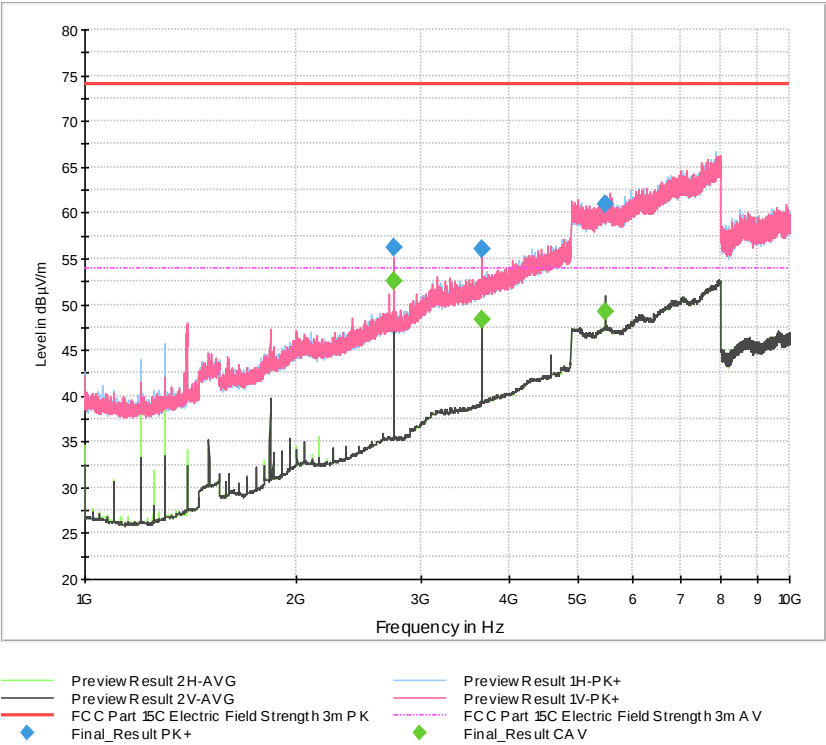
Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
903.960000	59.57	46.02	-13.55	1000.0	120.000	148.0	V	16.0	28.6
906.810000	48.02	46.02	-2.00	1000.0	120.000	383.0	H	-117.0	28.6
910.620000	78.18	46.02	-32.16	1000.0	120.000	237.0	H	100.0	28.6
923.670000	95.56	46.02	-49.54	1000.0	120.000	128.0	V	8.0	28.6

NA #1 – Intentional Radiation with Operating frequency band.



RF615R with antenna RF 642A - Radiated emission: 1-10GHz

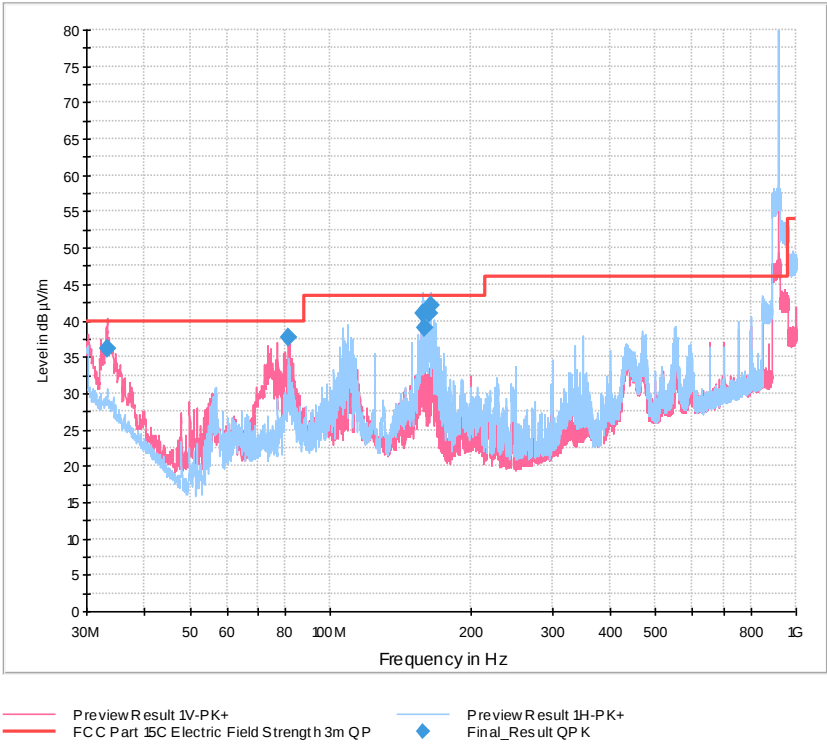


Final Results 1:

Frequency	MaxPeak	CAverage	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB/m
2745.750000	56.28	---	73.98	17.70	1000.0	1000.000	275.0	V	100.0	33.6
2745.750000	---	52.61	53.98	1.37	1000.0	1000.000	275.0	V	100.0	33.6
3661.000000	56.01	---	73.98	17.97	1000.0	1000.000	125.0	V	-116.0	37.0
3661.000000	---	48.25	53.98	5.73	1000.0	1000.000	125.0	V	-116.0	37.0
5491.750000	---	49.20	53.98	4.78	1000.0	1000.000	232.0	V	107.0	40.5
5491.750000	61.00	----	73.98	12.98	1000.0	1000.000	232.0	V	107.0	40.5



RF615R with antenna RF660A - Radiated emission: 30MHz-1GHz



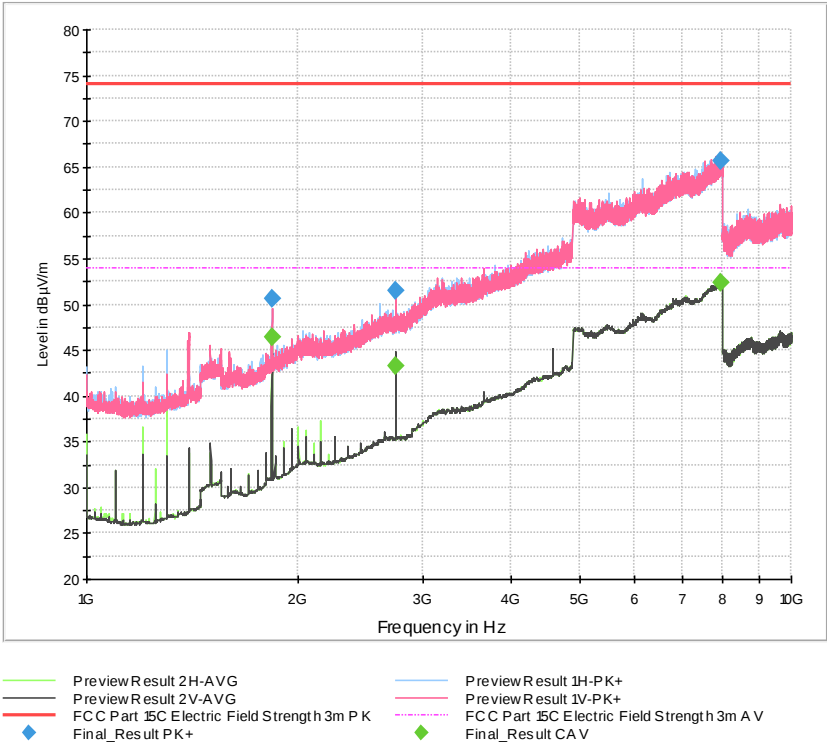
Final Results 1:

Frequency	QuasiPeak	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB/m
33.270000	36.18	40.00	3.82	1000.0	120.000	104.0	V	-122.0	24.1
81.210000	37.72	40.00	2.28	1000.0	120.000	107.0	V	37.0	16.3
158.400000	41.00	43.50	2.50	1000.0	120.000	195.0	H	59.0	16.2
159.630000	38.93	43.50	4.57	1000.0	120.000	244.0	H	57.0	16.2
162.810000	40.99	43.50	2.51	1000.0	120.000	246.0	H	49.0	16.4
163.950000	42.12	43.50	1.38	1000.0	120.000	225.0	H	47.0	16.5

NA #1 – Intentional Radiation with Operating frequency band.



RF615R with antenna RF660A - Radiated emission: 1-10GHz

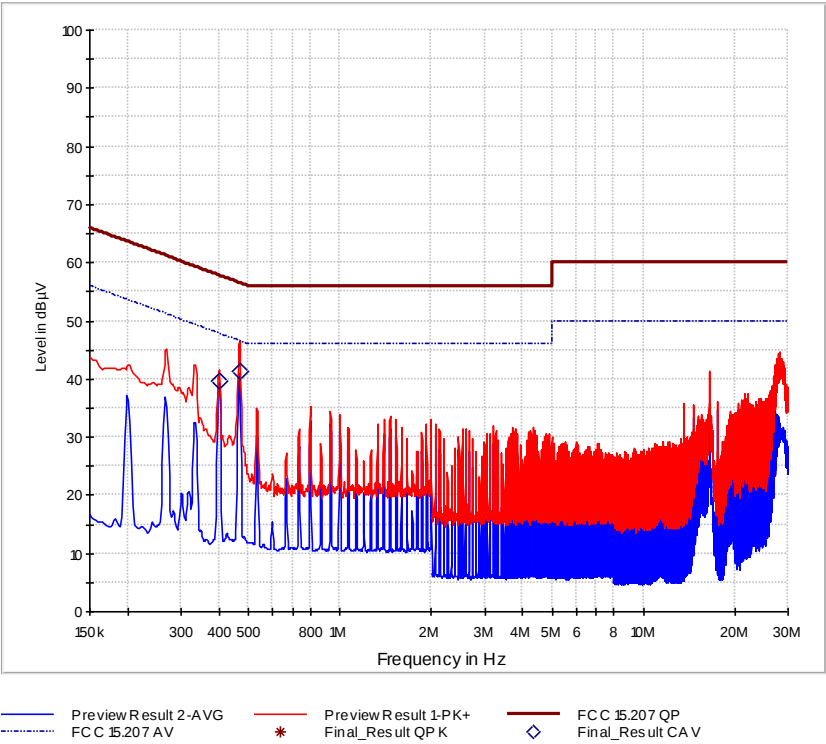


Final Results 1:

Frequency	MaxPeak	CAverage	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB/m
1830.500000	50.65	---	73.98	23.33	1000.0	1000.000	383.0	H	127.0	30.2
1830.500000	---	46.35	53.98	7.63	1000.0	1000.000	383.0	H	127.0	30.2
2745.500000	---	43.22	53.98	10.76	1000.0	1000.000	257.0	V	105.0	33.6
2745.500000	51.42	---	73.98	22.55	1000.0	1000.000	257.0	V	105.0	33.6
7946.750000	65.69	---	73.98	8.29	1000.0	1000.000	378.0	V	-161.0	43.4
7946.750000	---	52.31	53.98	1.67	1000.0	1000.000	378.0	V	-161.0	43.4



Conducted emission: 150k-30M L (Phase)

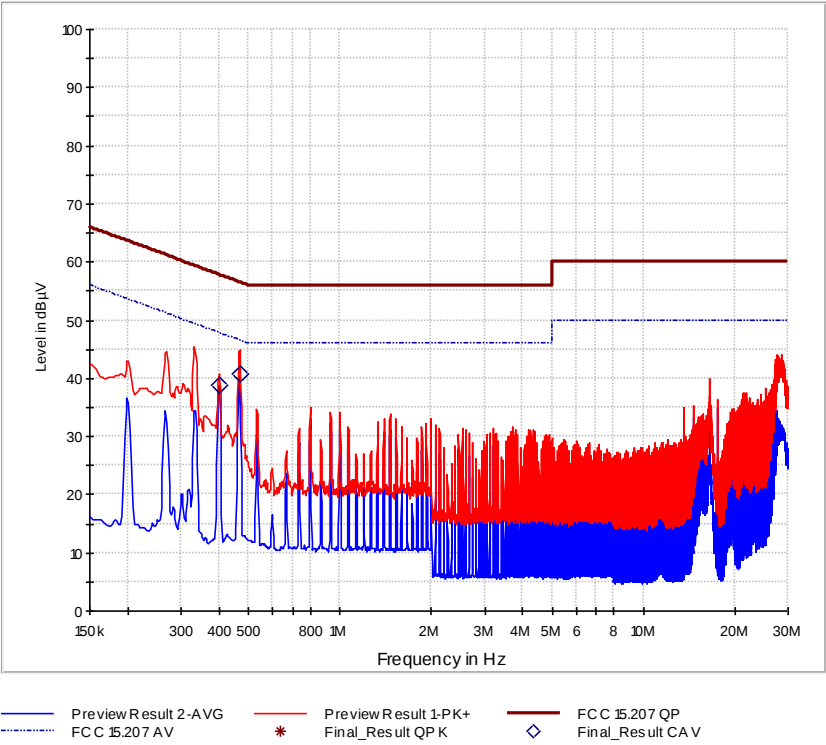


Final Results 1:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	Filter	Corr. dB
0.399750	---	39.63	47.86	8.22	1000.0	9.000	L1	ON	10.0
0.467250	---	41.21	46.56	5.35	1000.0	9.000	L1	ON	10.0



Conducted emission: 150k-30M N (Neutral)



Final Results 1:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	Filter	Corr. dB
0.399750	---	38.90	47.86	8.96	1000.0	9.000	N	ON	10.0
0.467250	---	40.66	46.56	5.90	1000.0	9.000	N	ON	10.0



2.1.7 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 11 and Shielded room - cabin no. 9.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	ESW44	39897	12	2020-02-29
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
EMI test receiver	Rohde & Schwarz	ESU8	19904	18	2020-01-31
V-Network	Rohde & Schwarz	ENV216	39910	12	2020-02-29
Shielded room no.9	Albatross	---	21083	---	---

Table 5

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable

3 Photographs

3.1 Equipment Under Test (EUT)

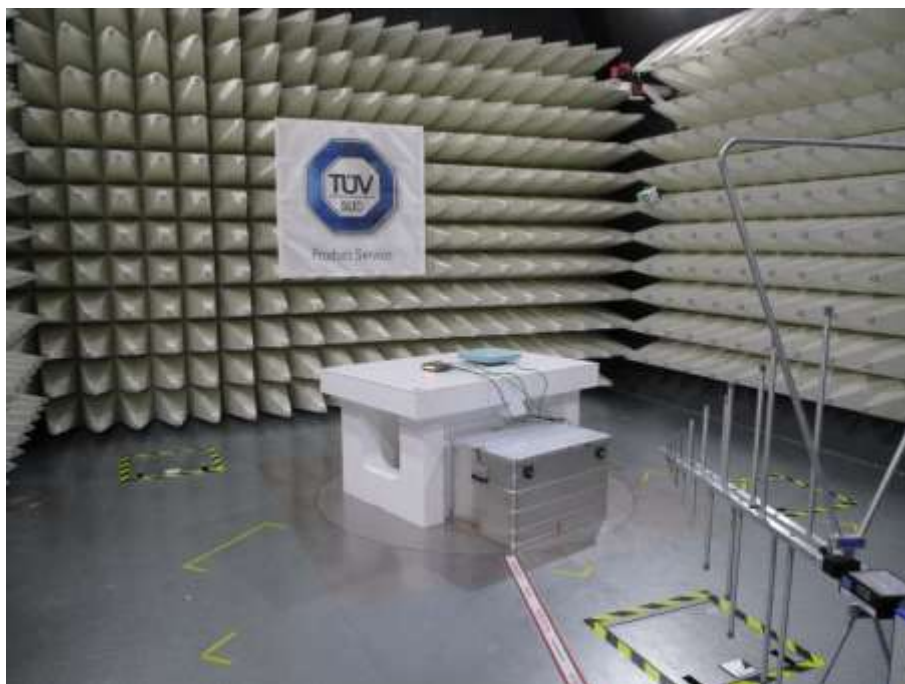


Figure 1 - Radiated emission 30MHz – 1GHz

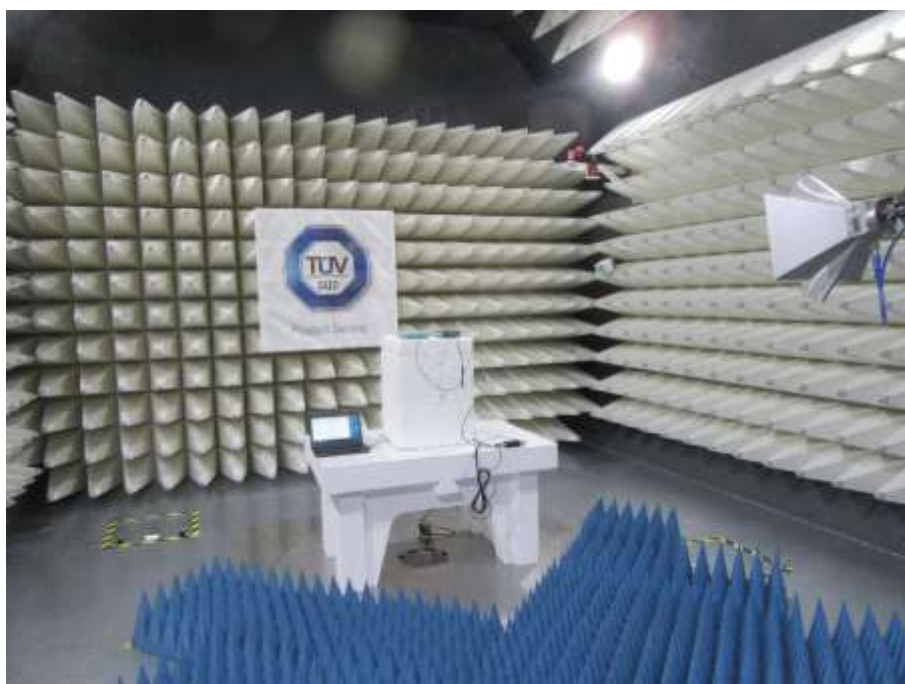


Figure 2 – Radiated emission 1 – 5 GHz



Figure 3 – Conducted emission



4 Test Equipment Information

4.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	ESW44	39897	12	2020-02-29
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
EMI test receiver	Rohde & Schwarz	ESU8	19904	18	2020-01-31
V-Network	Rohde & Schwarz	ENV216	39910	12	2020-02-29
Shielded room no.9	Albatross	---	21083	---	---

Table 6

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