Prüfbericht-Nr.: *Test report no.*:	**CN25PB5Q 001**	**Auftrags-Nr.:** *Order no.*:	**178224841**	
Kunden-Referenz-Nr.: *Client reference no.*:	**2533689**	**Auftragsdatum:** *Order date:*	**2025.07.29**	
Auftraggeber: *Client*:	**SHANDONG RIPPA MACHINERY GROUP CO. , LTD.** The north of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, 272000 Shandong P.R. China			
Prüfgegenstand: *Test item*:	**Hydraulic Excavator**			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	**R57**			
Auftrags-Inhalt: *Order content*:	**EMC test**			
Prüfgrundlage: *Test specification*:	**[Emission] with reference to: EN ISO 13766-1:2018** **[Immunity] with reference to: EN ISO 13766-1:2018** *ISO 10605:2008* *IEC 61800-3:2004+A1, Clause A.3.2.2*			
Wareneingangsdatum: *Date of sample receipt*:	**2025.07.22**			
Prüfmuster-Nr.: *Test sample no:*	**SLP25060201**			
Prüfzeitraum: *Testing period*:	**Refer to test report**			
Ort der Prüfung: *Place of testing*:	**Jining**			
Prüflaboratorium: *Testing laboratory:*	**Refer to report**			
Prüfergebnis*: *Test result**:	**Pass**			

geprüft von: tested by:	X Rayho Liang Signed by: Rayho Liang	**genehmigt von:** *authorized by*:	X Hunter Yu Signed by: Hunter Yu
Datum: *Date:* 2025-08-05		**Ausstellungsdatum:** *Issue date:* 2025-08-05	
Stellung / Position:	Project Engineer/Rayho Liang	**Stellung** / Position:	Authorizer/Hunter Yu

Sonstiges / *Other*:

1. This EMC test report is issued according to client's requirements.
2. All test methods are confirmed with SHANDONG RIPPA MACHINERY GROUP CO. ,LTD. Immunity test procedure to electromagnetic radiation will be with reference to IEC 61800-3:2004+A1, Clause A.3.2.2. Therefore, all EMC tests were performed on model R57.

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*: Prüfmuster vollständig und unbeschädigt / *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* *Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Prüfbericht-Nr.: CN25PB5Q 001
Test report no.:

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.* *Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. *The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the “Zero Guard Band Rule” and “Simple Acceptance” in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.*

TEST SUMMARY

4.1 Broadband EMISSION IN THE FREQUENCY RANGE UP TO 30 MHZ
Result:
Passed

4.2 Narrow EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHZ
Result:
Passed

5.1 ELECTROSTATIC DISCHARGE
Result:
Passed

5.2 RADIO FREQUENCY ELECTROMAGNETIC FIELD
Result:
Passed

Contents

1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland / CCIC (Qingdao) Co., Ltd.
Address: 6F, No. 2Bldg., No. 175 Zhuzhou Rd., Qingdao 266101, P.R. China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

Tests on this test report are on-site EMC tests. Tests were performed at customer's premise located at " The north of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, 272000 Shandong, P.R. China".

Due to the tests were performed on-site, there were some deviations from the laboratory test; for details, please refer to relevant clause.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

No.	Equipment	Model	Inventory no.	Cal. due date
1.	EMI Test Receiver	ESR	1316.3003K03-101902-hF	2025.11.09
2.	ESD Generator	Dito	0301-44	2025.09.09
3.	Broadband Antenna	VULB9163	752	2025.11.18
4.	Multiband Transceiver	VX-6	n.a.	n.a.
5.	Cellular Telephone	Huawei P40	n.a.	n.a.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is a hydraulic excavator. For the further information, refer to the user's manual.

2.2 Ratings and System Details

Rated voltage	:	DC 12V
Engine power	:	35.5kW
Operating mass	:	5775kg
Protection class	:	III

2.3 Independent Operation Modes

The basic operation mode is "ON" and "OFF".
Refer to operation manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit diagram for further information.

2.5 Submitted Documents

User manual, circuit diagram, components list and rating label etc.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

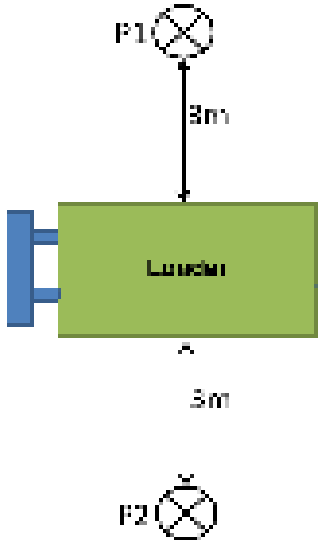
Refer to the related paragraph of this report.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.
EUT layout and antenna positions:



3.3 Test Operation and Test Software

Refer to the related paragraph of this report. No software was used.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

No special measure is employed to achieve the requirement.

4 Test Results E M I S S I O N

4.1 Broadband Emission in the Frequency Range above 30 MHz

Result:	**Passed**

Date of testing	:	14.07.2025
Test procedure	:	EN ISO 13766-1:2018
Frequency range	:	30 - 1000MHz
Limits	:	Quasi-peak limits (3m measurement distance): 30-75MHz, 44dBµV/m; 75-400MHz, 44 to 55 dBµV/m increasing with frequency; 400-1000MHz, 55dBµV/m
Margin requirement:	:	No less than 2dB
Kind of test site	:	On-site testing
Height of the receiving antenna	:	1.8m
Test distance	:	3m
Operation modes	:	Engine and all electronic systems on
Ambient conditions	:	Temperature: 20°C, relative humidity: 50%

The test was performed with the EUT in the operation modes as described above. Following are the measurement results for horizontal polarization and vertical polarization respectively. The measurement results may also include the contribution of the ambient interference; due to that the disturbance emanated from the EUT combined with the ambient interference did exceed the corresponding limit, no further investigation was made to discriminate whether the EUT or the ambient interference is the main contributor.
In the following figures, the symbols "♦" means quasi-peak values which were measured in final measurement.

Figure 1: Spectral diagrams and measurement results for 30-1000MHz, ambient noise, horizontal polarization, broadband

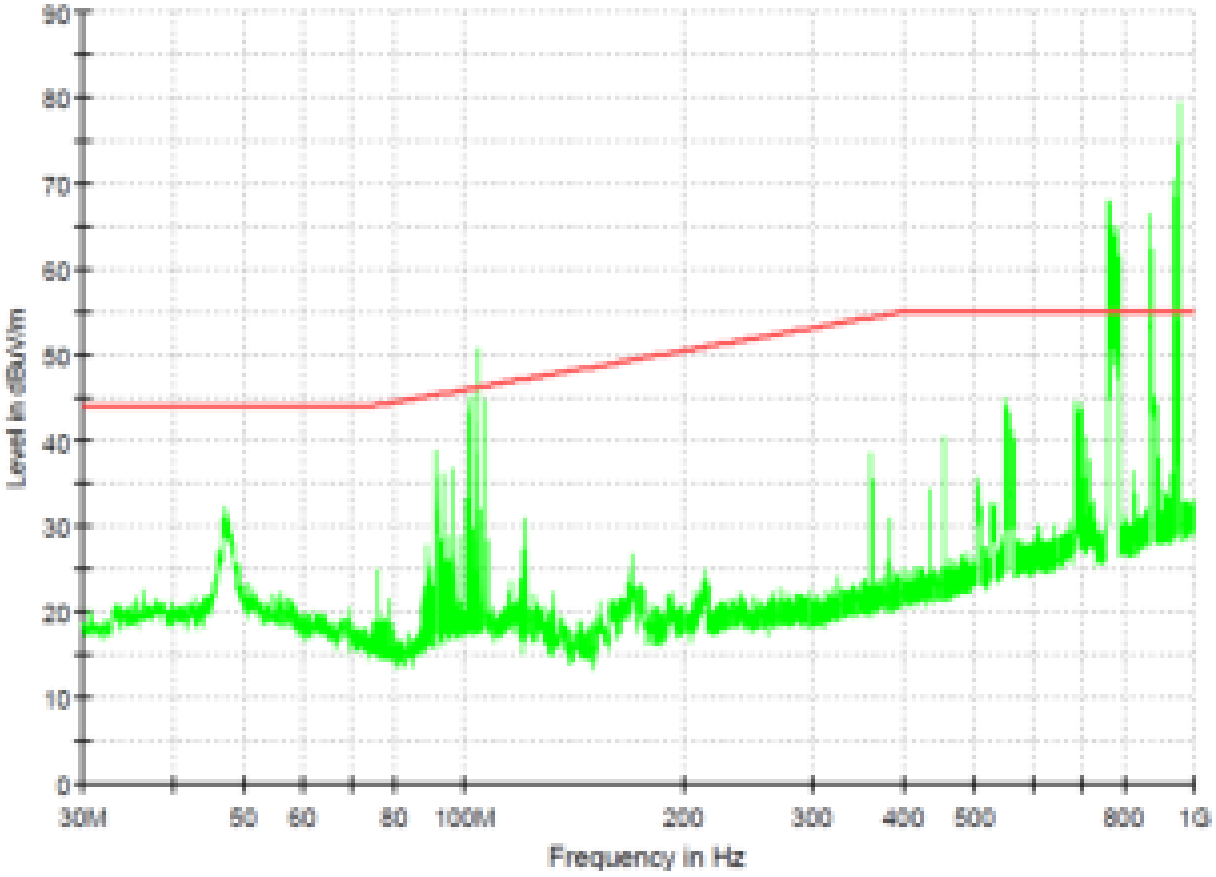


Figure 2: Spectral diagrams and measurement results for 30-1000MHz, ambient noise, vertical polarization, broadband

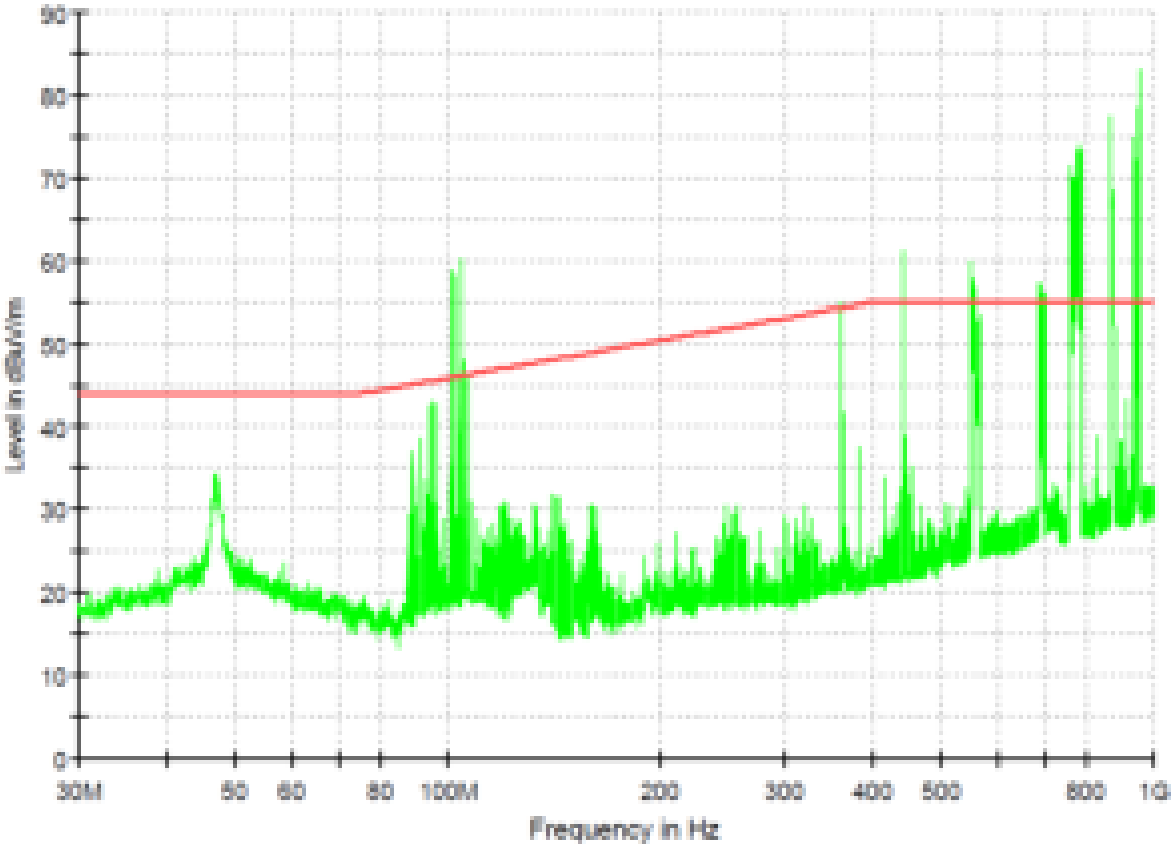
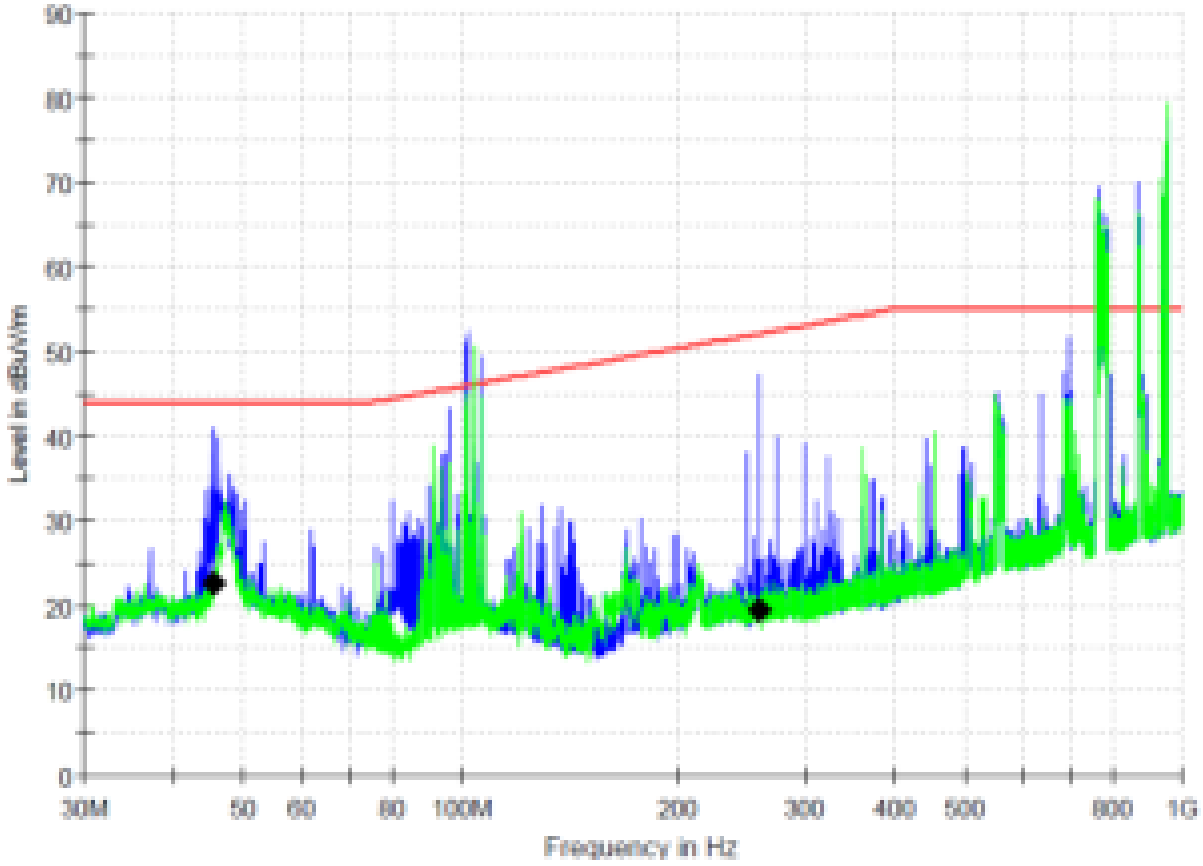


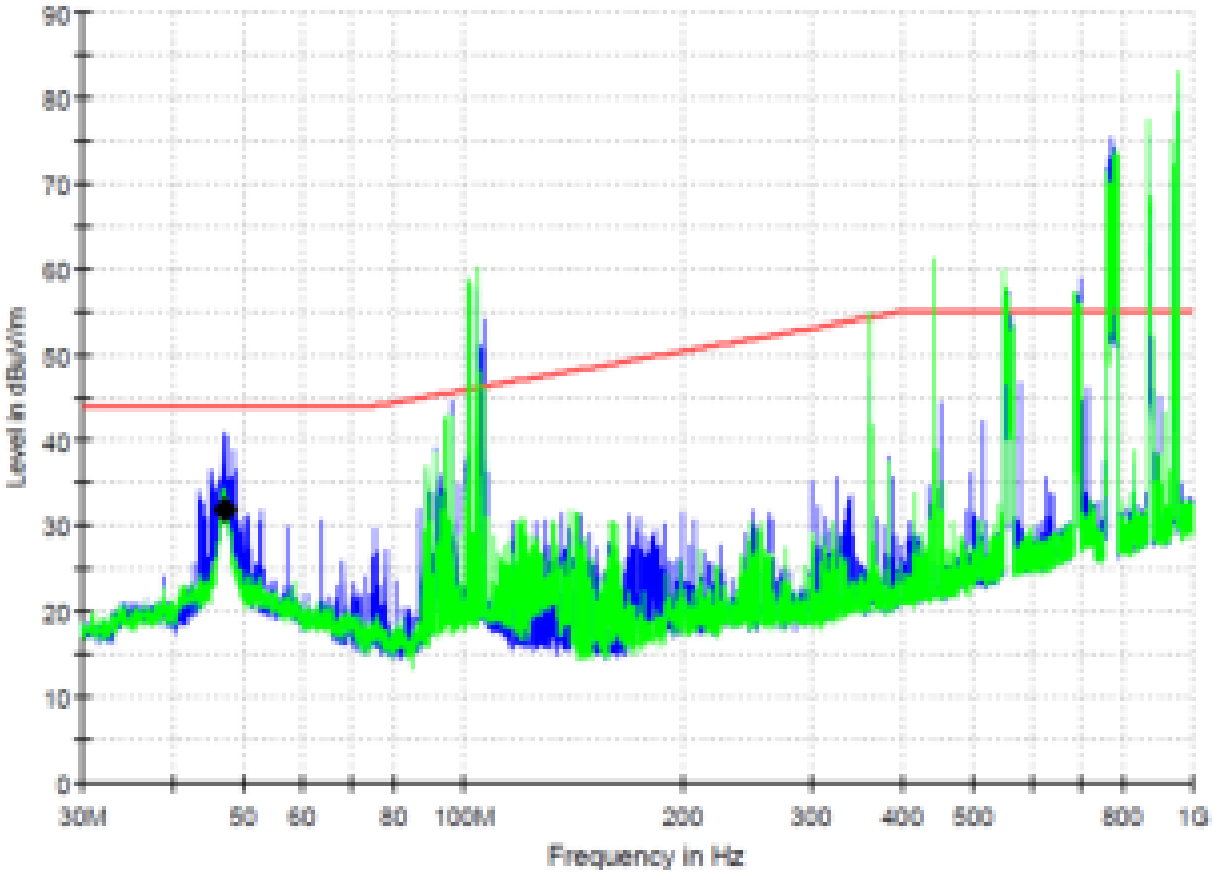
Figure 3: Spectral diagrams and measurement results for 30-1000MHz, Horizontal polarization, P1



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBuV/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
45.200000	22.7	21.3	44.0
259.840000	19.4	32.8	52.2

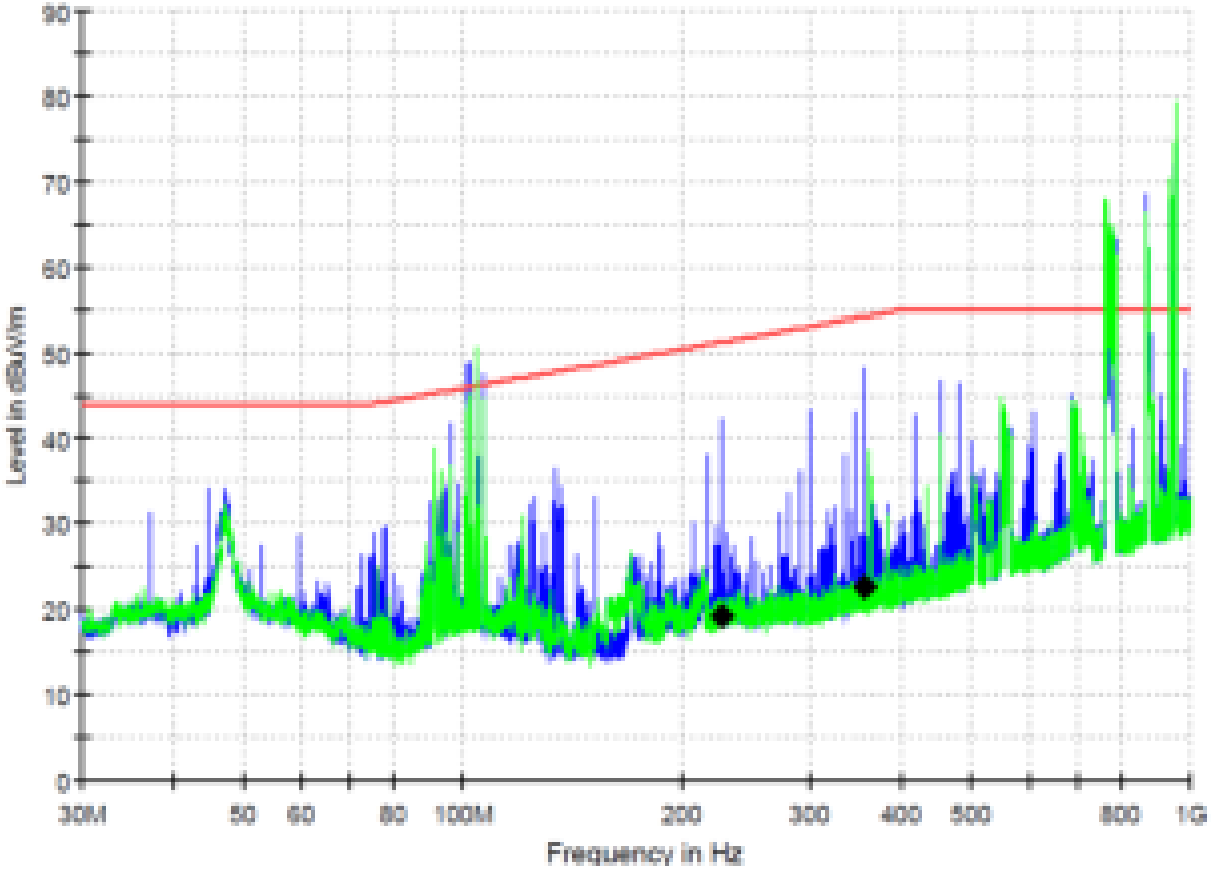
Figure 4: Spectral diagrams and measurement results for 30-1000MHz, Vertical polarization, P1



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBuV/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
46.920000	31.7	12.3	44.0

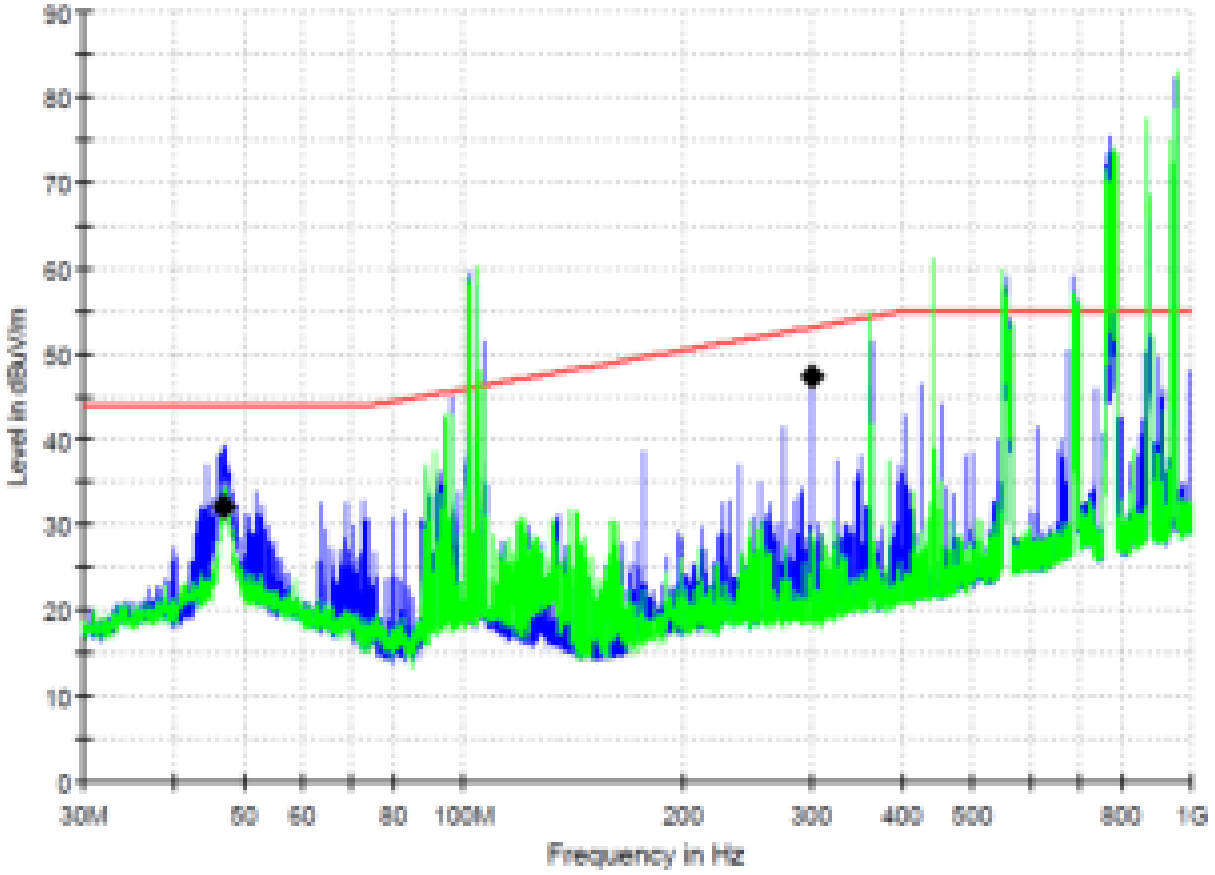
Figure 5: Spectral diagrams and measurement results for 30-1000MHz, Horizontal polarization, P2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBuV/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
227.280000	19.1	32.2	51.3
355.280000	22.6	31.6	54.2

Figure 6: Spectral diagrams and measurement results for 30-1000MHz, Vertical polarization, P2



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBuV/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
46.800000	32.2	11.8	44.0
300.000000	47.4	5.7	53.1

4.2 Narrowband Emission in the Frequency Range above 30 MHz

Result:	**Passed**

Date of testing	:	15.07.2025
Test procedure	:	EN ISO 13766-1:2018
Frequency range	:	30 - 1000MHz
Limits	:	Limits (3m measurement distance): 30-75MHz,34dBµV/m; 75-400MHz, 34 to 45 dBµV/m increasing with frequency; 400-1000MHz, 45dBµV/m
Margin requirement:	:	No less than 2dB
Kind of test site	:	On-site testing
Height of the receiving antenna	:	1.8m
Test distance	:	3m
Operation modes	:	Engine off; All other electronic systems on.
Ambient conditions	:	Temperature: 20°C, relative humidity: 50%

The test was performed with the EUT in the operation modes as described above. Following are the measurement results for horizontal polarization and vertical polarization respectively. The measurement results may also include the contribution of the ambient interference; due to that the disturbance emanated from the EUT combined with the ambient interference did exceed the corresponding limit, no further investigation was made to discriminate whether the EUT or the ambient interference is the main contributor.
In the following figures, the symbols "♦" means average values which were measured in final measurement.

Figure 7: Spectral diagrams and measurement results for 30-1000MHz, ambient noise, horizontal polarization, narrowband

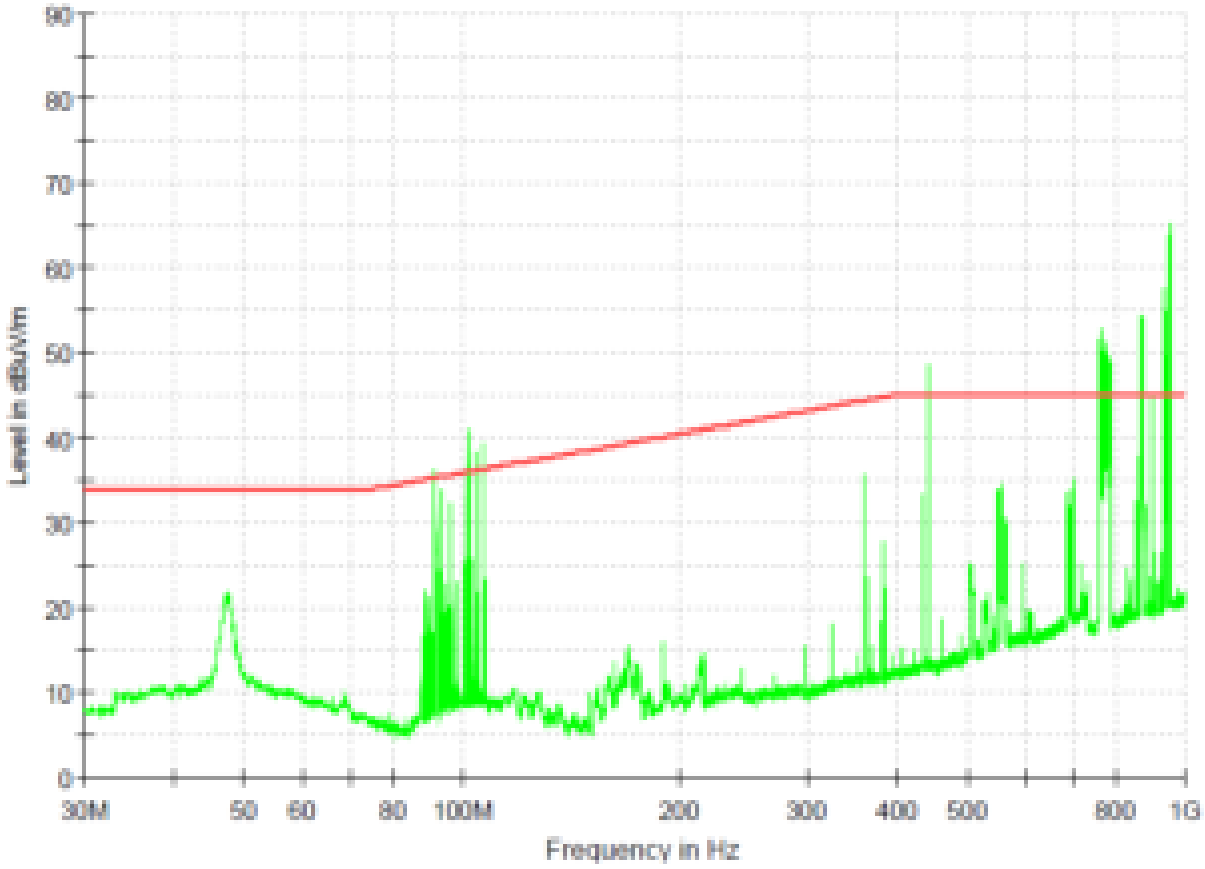


Figure 8: Spectral diagrams and measurement results for 30-1000MHz, ambient noise, vertical polarization, narrowband

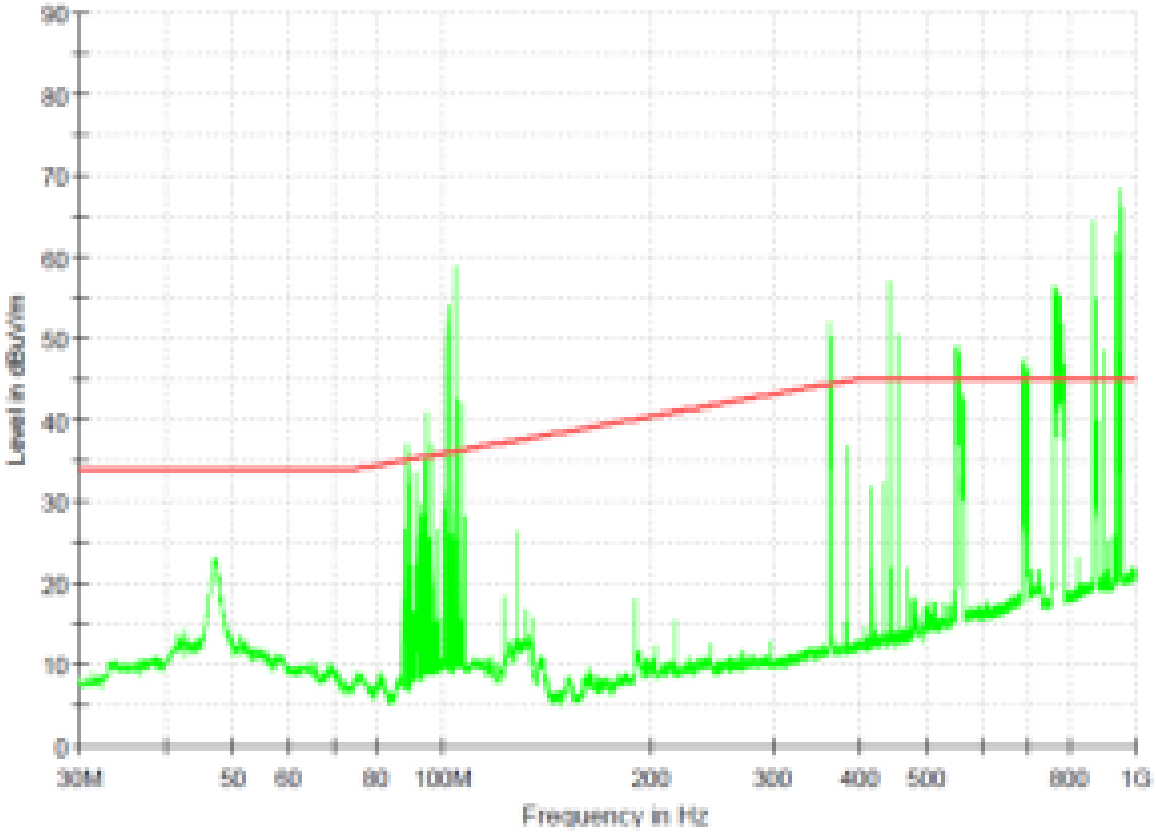
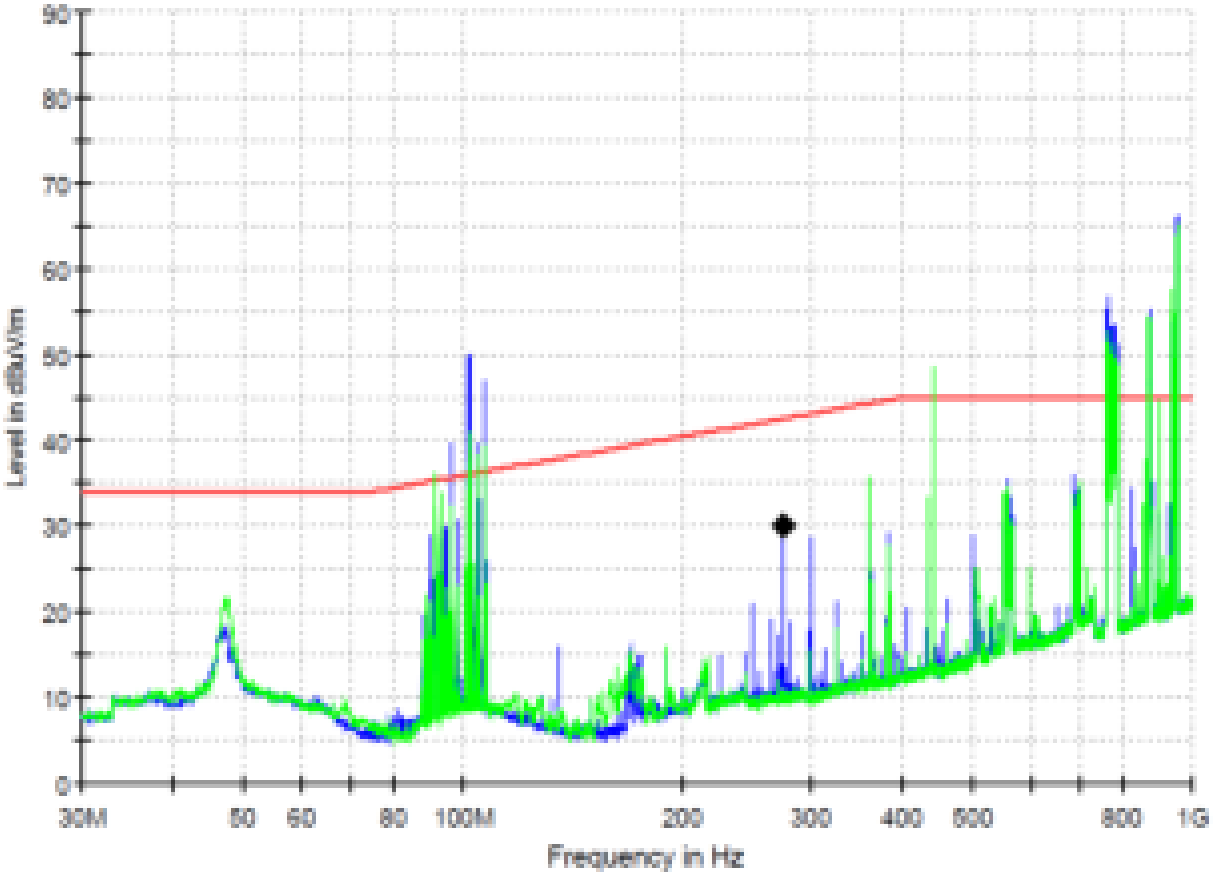


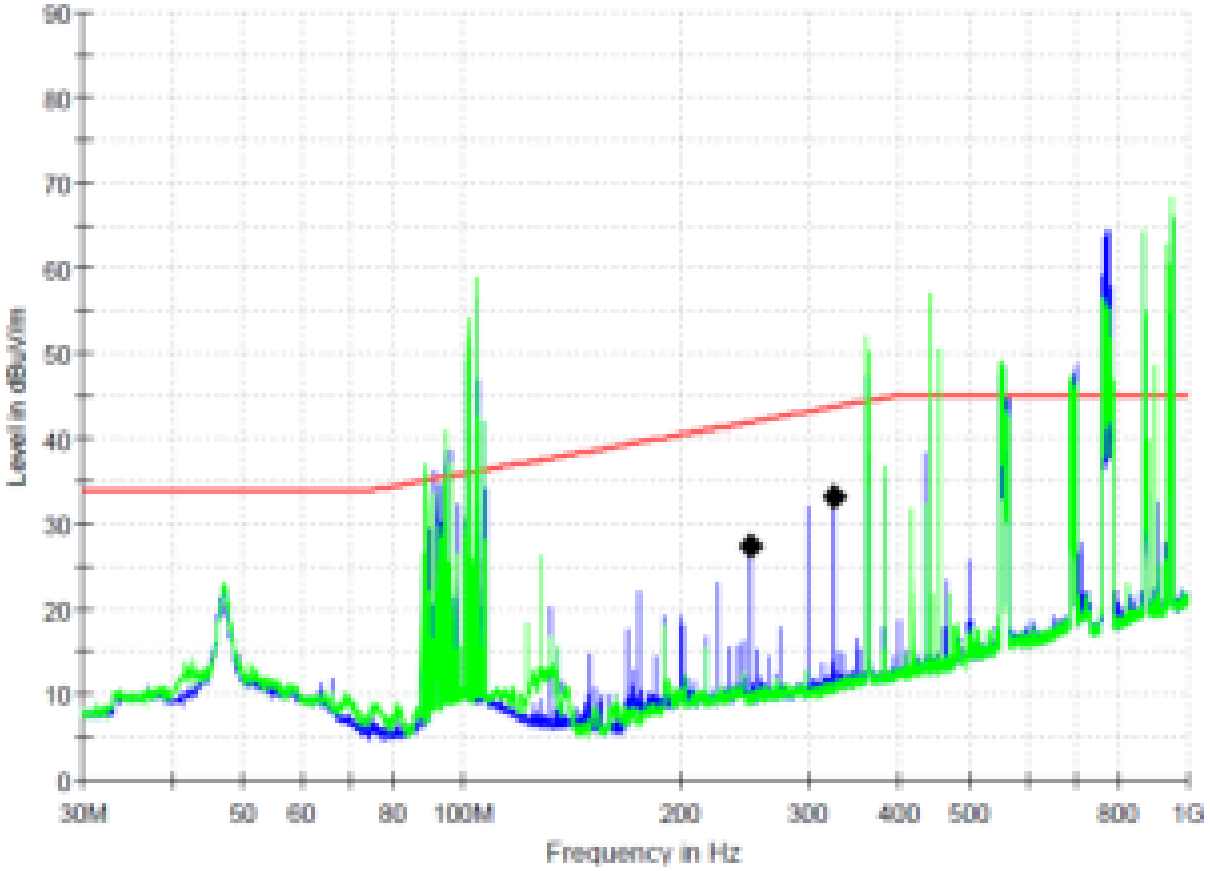
Figure 9: Spectral diagrams and measurement results for 30-1000MHz, Horizontal polarization, P1



Final average value measurement results:

Frequency (MHz)	CAverage (dBuV/m)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
275.000000	30.1	12.4	42.5

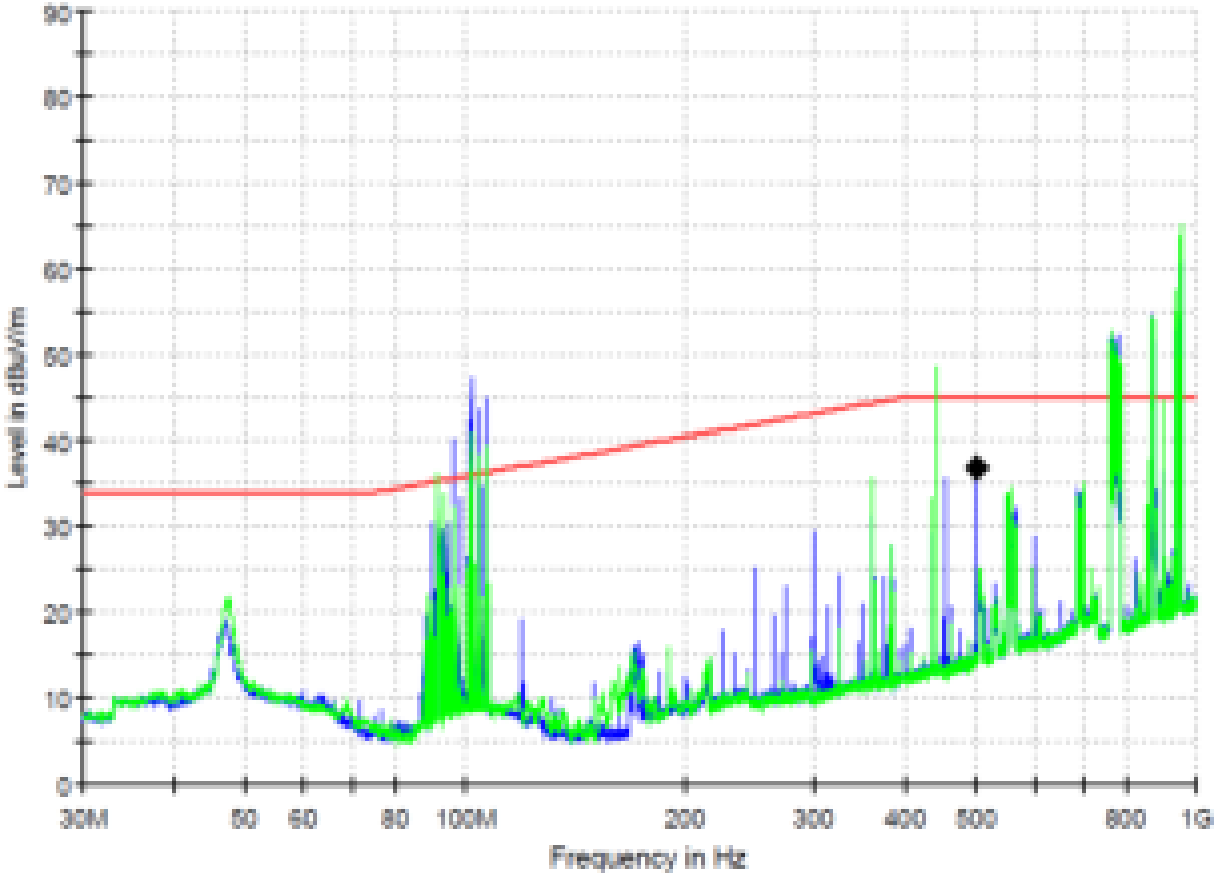
Figure 10: Spectral diagrams and measurement results for 30-1000MHz, Vertical polarization, P1



Final average value measurement results:

Frequency (MHz)	CAverage (dBuV/m)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
250.000000	27.5	14.4	41.9
325.000000	33.2	10.4	43.6

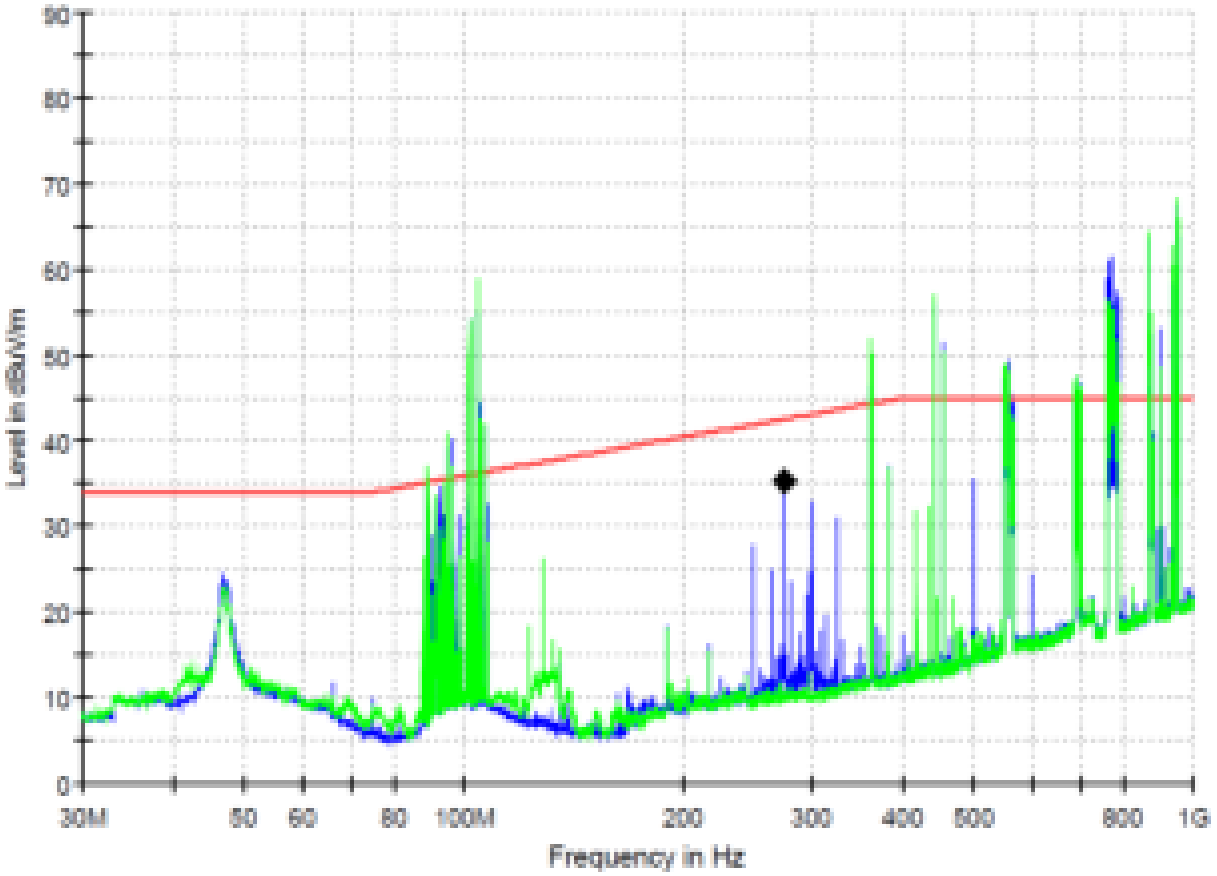
Figure 11: Spectral diagrams and measurement results for 30-1000MHz, Horizontal polarization, P2



Final average value measurement results:

Frequency (MHz)	CAverage (dBuV/m)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
500.000000	36.9	8.1	45.0

Figure 12: Spectral diagrams and measurement results for 30-1000MHz, Vertical polarization, P2



Final average value measurement results:

Frequency (MHz)	CAverage (dBuV/m)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
275.000000	35.2	7.3	42.5

5 Test Results I M M U N I T Y

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

According to EN ISO 13766-1:2018, Table 3:

Functional status	Description
A (I)	All functions of a device/system perform as designed during and after exposure to a disturbance.
B (II)	All functions of a device/system perform as designed during exposure; however, one or more of them may go beyond the specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain criterion A.
C (III)	One or more functions of a device/system do not perform as designed during exposure but returns automatically to normal operation after exposure is removed.
D (IV)	One or more functions of a device/system do not perform as designed during exposure and does not return to normal operation until exposure is removed and the device/system is reset by simple "operator/user" action.
E (V)	One or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

Date of testing: 15.07.2025

Site temperature : 34°C
Relative Humidity : 33%

5.1 Electrostatic Discharge

Result:	**Passed**

The immunity against electrostatic discharge was tested in accordance with EN ISO 13766-1:2018. Test setup and ESD-Generator are according to ISO 10605:2008 which is specified by EN ISO 13766-1:2018.

Charge voltage	:	±4.0kV, ±6.0kV (Contact Discharge) ±4.0kV, ±8.0kV (Air Discharge)
Generator capacitance	:	330 pF (inside of the machinery) 150 pF (outside of the machinery)
Polarity	:	positive / negative
Number of discharges	:	>10 at each point
Operation mode	:	Engine and all electronic systems on
Performance criteria	:	Class A(±4.0kV Contact and Air discharge) Class C(±6.0kV Contact discharge and ±8.0kV Air discharge)

Table 2: ESD, Positive / Negative Polarity

Position	Kind of Discharge	Result	Remarks
Display	Air discharge ±4kV and ±8kV	Passed	All function perform as designed during and after exposure to a disturbance
Metal enclosure	Contact discharge ±4kV and ±6kV	Passed	Ditto
Screws	Contact discharge ±4kV and ±6kV	Passed	Ditto
Emergency switch	Air discharge ±4kV and ±8kV	Passed	Ditto
LED lights	Air discharge ±4kV and ±8kV	Passed	Ditto

5.2 Radio Frequency Electromagnetic Field

Result:	**Passed**

According to clause A.3.2.2 of IEC 61800-3:2004+A1, the test was only performed at some discrete frequencies.

Performance criterion is described in clause 4.1.3 of EN ISO 13766-1:2018.
When a test specimen is subjected to the immunity requirements, operator controls and any automatic controls for the machinery and any attachments or machinery shall remain functional so as to provide continued control of the machinery. This also applies to secondary or shut-down systems which are intended to be operated when the primary control has failed.

Reference standards	:	IEC 61800-3:2004+A1, clause A3.2.2
Test level	:	30V/m
Frequency range	:	20M-2000MHz
Modulation	:	Pulse Modulation for 915MHz Frequency Modulation for other frequecies
Test frequencies	:	52MHz: ISM frequency 145MHz: business radio band 435MHz: ISM frequency 915MHz: GSM915
Operation mode	:	Engine and all electronic systems on
Performance ceriteria	:	Clause 4.1.3 of EN ISO 13766-1:2018

Table 3: Radiated Susceptibility, Field Strength 30V/m

Position	Observation	Remarks
Enclosure of EUT	Amateur radio transceiver	Passed
Enclosure of EUT	Mobile phone	Passed

6 Photographs of the Test Set-Up

Photograph 1: Set-up for radiated electromagnetic disturbances above 30MHz

Photograph 2: Set-up for immunity test of ESD

Photograph 3: Set-up for radio frequency electromagnetic field

7 List of Tables

8 List of Figures

9 List of Photographs