Test Report
Electromagnetic Compatibility

Product	ALCEA GATEWAY
Name and address of the applicant	ASSA ABLOY Global Solutions Czech Republic s.r.o Chlumecká 3203, Horní Počernice, 198 00 PRAGUE, CZECH REPUBLIC
Name and address of the manufacturer	ASSA ABLOY Global Solutions Czech Republic s.r.o Chlumecká 3203, Horní Počernice, 198 00 PRAGUE, CZECH REPUBLIC
Model	ALCEA GATEWAY contains two models: - BGW/A1 - BGW/A2 See more details on page 3
Rating	BGW/A1: 6V DC CR-P2 battery powered BGW/A2: 12-24V DC
Trademark	ASSA ABLOY
Additional information	/
Tested according to	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7
Project number	PRJ0071874
Tested in period	2024-01-15 to 2024-01-17
Issue date	2025-01-10
Name and address of the testing laboratory	Nemko Scandinavia AS Philip Pedersens vei 11, 1366 Lysaker, Norway

An accredited technical test executed under the Norwegian accreditation scheme

Prepared by [Jørn Gustavsen]

Approved by [Roger Berget]

REPORT REVISIONS

Report Edition	Date	Project	Description
A	2024-02-29	PRJ0027408	First issued
B	2025-01-10	PRJ0071874	Change name of product to ALCEA GATEWAY

THIS REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATION(S) TESTED.

It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the authorities for any modifications made to the product, which result in non-compliance to the relevant regulations.

Opinions expressed within this report regarding general assessments and qualifications for PASS or FAIL to the standards limits and requirements, are not part of the current accreditation. Neither is opinions expressed regarding model variants covered by the testing performed in this report.

Deviations from, additions to, or exclusions from the test specifications are described in “Test Report Summary”.

This report was originally distributed electronically with digital signatures. For more information contact Nemko.

DESCRIPTION OF TESTED ITEM(S)

Product description ..... :	ALCEA GATEWAY contains to types, BGW/A1 (battery powered) and BGW/A2 (DC powered) It is a communication hub between Keyless locks and internet. Keyless locks can be monitored and controlled via BLE and the data is sent to Keyless platform via LTE.

Model/type ..... :	BGW/A2
Serial number ..... :	BGWA2DD2E00005
Operating voltage..... :	12-24V DC
Maximum power/current..... :	2A
Insulation class ..... :	III
Highest clock frequency ..... :	<108MHz
Hardware version ..... :	1.0.0
Software version ..... :	0.0.1

Model/type ..... :	BGW/A1
Serial number ..... :	BGWA1DD2E00007
Operating voltage..... :	6V DC battery powered
Maximum power/current..... :	2A
Insulation class ..... :	III
Highest clock frequency ..... :	<108MHz
Hardware version ..... :	1.0.0
Software version ..... :	0.0.1

Mounting position..... :	☐ Tabletop equipment ☒ Wall/ceiling mounted equipment ☐ Floor standing equipment ☐ Handheld equipment ☐ Rack mounted equipment ☐ Console equipment ☐ Other:

RF CHARACTERISTICS OF THE TRANSMITTER

Type	**LTE-M**	**BLE**
Frequency range	700-960, 1700-2200 MHz,	2.4GHz
Number of channels	B1-B5, B8, B13, B18-B20, B25-B28, B66, B85	ch0-ch39
Channel BW	LTE:1,4 MHz-20MHz	1 and 2 MHz
Rated output power	LTE:21 dBm	3 dBm
Receiver category	2	2
Classification	CAT1/CAT NB1	/
Operating modes	Transceiver	Transceiver
Types of modulation	QPSK, 16QAM, 64QAM	GFSK
Tunable bands	/	/
User frequency adjustment	/	/
Antenna type	External	External
Antenna gain	YECT002AA:3dBi alternative 2J6947B:5.1dBi	NT-2.4-LCW-SMA:2.1dBi
Antenna connection	SMA	SMA
Number of antennas	2	2
Antenna diversity/MIMO	/	/

ACCESSORIES USED DURING TEST

Description	Manufacturer	Type
PC	DELL	Latitude 5511
Keyless Lock with BLE	Abloy	340 SWP
AC-DC Power supply (For FCC Conducted Emissions)	Clas Ohlson	0055

INPUT/OUTPUT PORTS

Port name and description	Cable		
	Longer than 3m	Attached during test	Shielded
DC supply (Only BGW/A2)	☒	☒	☐
Signal port (Alarm loop NC (normally connected))	☒	☒	☐
Signal port (Alarm loop NO (normally closed))	☒	☒	☐
Signal port (Relay NO (normally open))	☒	☒	☐
USB-C (only for maintenance)	☐	☐	☐

This equipment has been tested with certain cable types and cable configurations. Any changes to these parameters when installed may influence the EMC properties of this equipment.

OPERATING MODES

OP no.	Description	Applied for testing	
		Emissions	Immunity
OP1	Connected with aux Keyless lock and with Keyless platform via LTE. Powerd by 24V DC	☒	☒
OP2	Connected with aux Keyless lock and with Keyless platform via LTE. Battery powerd by 6V DC	☒	☒

POWER SUPPLY CONDITIONS

The following nominal power supply conditions have been tested:

PC no.	Voltage	Frequency	Type	Ground terminal
PC1	24 V	☐ AC 50Hz / ☐ AC 60Hz / ☒ DC	☐ 3AC / ☐ 3ACN / ☐ PoE	☐ PE / ☐ GND / ☒ None

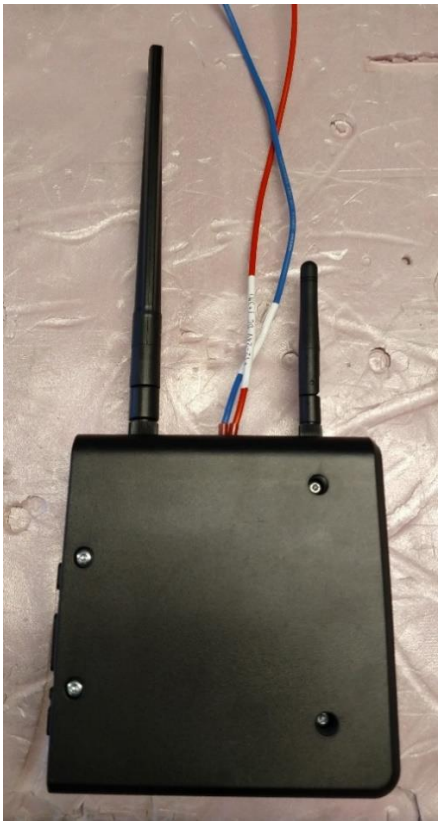
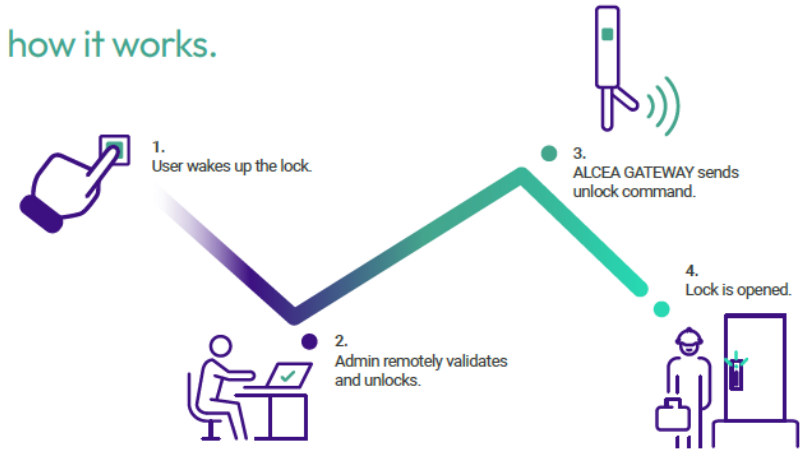
☐ The power supply voltage has been selected after a maximum disturbance investigation over the product's rated voltage range.
☐ Additional chassis grounding was applied.

OTHER INFORMATION

Modifications ..... :	None
Additional information ..... :	An AC-DC adapter not delivered by the client was used to demonstrate compliance with the FCC CFR 47 Subpart 15B conducted limits. The adapter is described in page 3.

PHOTOS AND DRAWINGS

Copy of marking label..... :

Photo of the test item ..... :	 
Drawing of test setup..... :	

TEST ENVIRONMENT

Test laboratory ..... :	☒ KJELLER (Instituttveien 6, N-2007 Kjeller, Norway) ☐ LYSAKER (Philip Pedersens vei 11, N-1366 Lysaker, Norway)
Laboratory accreditation ..... :	NORWEGIAN ACCREDITATION TEST 033 **Norsk Akkreditering – TEST 033** P06 – Electromagnetic Compatibility
Environmental conditions ..... :	The climatic conditions during the tests are within limits specified by the manufacturer for the operation of the product and the test equipment. The climatic conditions during tests are within the following limits: **Ambient temperature:** 15 – 35 °C **Relative humidity:** 25 – 75 %RH **Atmospheric pressure:** 86 – 106 kPa If explicitly required by the test standard, or the requirements are tighter than the above; the climatic conditions are recorded and documented separately in this test report.
Calibration ..... :	All instruments used in the tests of this test report are calibrated and traceable to national or international standards. Between calibrations test set-ups are controlled and verified on a regular basis by intermediate checks to ensure, with 95% confidence that the instruments remain within their calibrated levels. The instrumentation accuracy is within limits agreed by the IECEE/CTL and defined by Nemko.
Measurement uncertainties ..... :	Uncertainty in EMC emission measurements stated in this report are calculated from the standard measurement uncertainties multiplied by the coverage factor k=2. It was determined in accordance with CISPR 16-4-2. The true value is in the corresponding interval with a probability of 95%. Uncertainties for continuous immunity tests are calculated based on the same principles as for EMC emission uncertainties. For Harmonics and Flicker measurements the measurement uncertainty is calculated based on the same principles as for EMC emission uncertainties. Uncertainties for transient immunity are kept within the requirements of the relevant basic standard. *Further information about measurement uncertainties is provided on request.*
Decision rules ..... :	As specified by CISPR 16-4-2; if our measurement uncertainty U_{LAB} is less than or equal to U_{CISPR} , compliance is deemed to occur if no measured disturbance level exceeds the limit hence “PASS” is indicated, and non-compliance is deemed to occur if any measured disturbance level exceeds the limits hence “FAIL” is indicated. For continuous immunity tests, uncertainties are not considered when applying the calibrated test levels. Tests are performed at the test levels specified by the test standard. PASS and FAIL decisions are based on behaviour observations of the specimen. For transient immunity tests, uncertainties are not considered if the test equipment is kept within the requirements of the relevant basic standard. Tests are performed at the test levels specified by the test standard. PASS and FAIL decisions are based on behaviour observations of the specimen. For Harmonics and Flicker measurements the measurement uncertainty is considered, and measurements are marked if necessary. In doing so, the associated uncertainty of measurement has been considered. *Further information about decision rules is provided on request.*

EVALUATION OF PERFORMANCE

PERFORMANCE TESTS

Performance checks ..... :	Checking connectivity to Keyless lock and Keyless platform.
Performance tests ..... :	Checking connectivity to Keyless lock and Keyless platform.
Monitoring during tests ..... :	Checking connectivity to Keyless lock and Keyless platform and checking error logs after each tests.
Information: Performance check is a short functional test carried out during or after a technical test to confirm that the equipment operates. Performance test is a measurement, or a group of measurements carried out during and/or after a technical test to confirm that the equipment complies with selected parameters as defined in the equipment standard. Monitoring during tests describes which functions were monitored and how.	

GENERAL PERFORMANCE CRITERIA

For the specimen to pass each test, it shall meet the following general criteria:

During test	After test
Performance criterion A: Operate as intended. No loss of function. No unintentional responses.	**Performance criterion A:** Operate as intended. No loss of function. No degradation of performance. No loss of stored data or user programmable functions.
Performance criterion B: May be loss of function (one or more). No unintentional responses.	**Performance criterion B:** Operate as intended. Lost function(s) shall be self-recoverable. No degradation of performance. No loss of stored data or user programmable functions.
Performance criterion C: May be loss of function (one or more).	**Performance criterion C:** Lost function(s) shall be recoverable by the operator. Operate as intended after recovering. No degradation of performance.
Information: In the subsequent test sections of this report, the required and actual specimen performance during immunity testing is indicated by the nomenclatures as given by the table above (A, B or C).	

During continuous tests	During transient tests
Performance criterion CT: During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.	**Performance criterion TT:** After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Modification by the manufacturer: Not modified	**Modification by the manufacturer:** Not modified
Information: In the subsequent test sections of this report, the required and actual specimen performance during immunity testing is indicated by the nomenclatures as given by the table above (CT, TT).	

RECEIVER PERFORMANCE CRITERIA

For the specimen to pass each test, the receiver functions shall meet the following criteria:

During continuous tests	During transient tests
Performance criterion CR : During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.	**Performance criterion TR :** After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Modification by the manufacturer: Not modified	**Modification by the manufacturer:** Not modified
Information: In the subsequent test sections of this report, the required and actual specimen performance during immunity testing is indicated by the nomenclatures as given by the table above (CR or TR).	

TEST REPORT SUMMARY

APPLIED STANDARDS

Standards	Titles
ETSI EN 301 489-01 V2.2.3	*Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements*
ETSI EN 301 489-17 V3.2.4	*Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data transmission systems*
ETSI EN 301 489-52 V1.2.1	*ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication User Equipment (UE) radio and ancillary equipment; Harmonised Standard for ElectroMagnetic Compatibility*
FCC CFR 47 Subpart 15B	*Digital devices - Unintentinal radiators, Class B Digital Device*
ISED Canada ICES-003, Issue 7	*Spectrum Management and Telecommunications Policy. Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus - Limits and Methods of Measurement (Issue 7, June 2020)*

TEST SUMMARY

Requirements – Tests	Reference standards	Verdict
Conducted Emissions	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7 CISPR 16-2-1:2017, Ed.3.1	PASS
Radiated Emissions (Below 1GHz)	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7 CISPR 16-2-3:2019, Ed.4.1	PASS
Radiated Emissions (Above 1GHz)	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7 CISPR 16-2-3:2019, Ed.4.1	PASS
Harmonic Current Emissions	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN IEC 61000-3-2:2021, Ed.5.1	N/A
Voltage Variations/Fluctuations/Flicker	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-3-3:2021, Ed.3.2	N/A
Electrostatic Discharge (ESD) Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-4-2:2009, Ed.2.0	PASS

Requirements – Tests	Reference standards	Verdict
Radiated RF Disturbance Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-4-3:2020, Ed.4.0	PASS
Electric Fast Transients Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-4-4:2012, Ed.3.0	PASS
Surge Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-4-5:2017, Ed.3.1	N/A[1]
Conducted RF Disturbance Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN 61000-4-6:2014, Ed.4.0	PASS
Voltage Dips and Interruptions Immunity	ETSI EN 301 489-01 V2.2.3 ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-52 V1.2.1 EN IEC 61000-4-11:2020, Ed.3.0	N/A

PASS : Tested and complied with the requirements
FAIL : Tested and failed the requirements
N/A : Test not relevant to this specimen (evaluated by the test laboratory)
– : Test not performed (instructed by the applicant)
* : An asterisk (*) placed after the verdict in the Result column indicates test items that are not within Nemko's scope of accreditation
# : A grid (#) placed after the verdict in the Result column indicates test items that are only partly covered by Nemko's scope of accreditation. Further information is detailed in the test section
[1] Applicable only to ports which, according to the manufacturer's specification, may connect directly to outdoor cables.

ABOUT REFERENCE STANDARDS AND TEST LEVELS

Product standards with dated references to basic standards may have been performed according to the newest edition of the basic standard. This may impact the compliance criteria or technical performance of the test, still this is adequate if the test is expected to confirm compliance to the intention of the product standard. The table above lists the actual editions of the basic standards which have been used during testing.

The choice of immunity test levels could be higher than those specified by the reference standards when we consider the nature of the specimen and its intended use or based on customer requests.

NOTES

None

Test Results

CONDUCTED EMISSIONS

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
The measurement was performed at the power supply terminal of the specimen. Nominal supply voltage was provided.
The specimen was energized and in normal operating mode during the measurement.

☐ The specimen and its cables were elevated 10 cm above a ground plane.
☐ The specimen and its cables were elevated 40 cm above a ground plane.
☒ The specimen and its cables were placed 40 cm from a vertical ground plane, 80 cm over ground plane.
☐ The specimen was mounted directly on, and bonded to a ground plane. Cables and auxiliary equipment were elevated by 1 cm

☒ The specimen was connected to an Artificial Mains Network (AMN) by its power supply cable, which was adjusted to 100cm length by folding.
☐ The specimen was connected to an Artificial Mains Network (AMN) by a 0.8 m shielded power supply cable directly connected to the AMN.

☐ Artificial Hand was applied to the specimen during test (for location see photos)

Conditions
☐ Frequency range was 9kHz – 30MHz.
☐ Frequency range was 10kHz – 30MHz.
☒ Frequency range was 150kHz – 30MHz.

The measuring bandwidth is 200Hz in the frequency range 9 kHz – 150 kHz. Measurement was made with a 100 Hz step size and 100 ms dwell time.
The measuring bandwidth is 9 kHz in the frequency range 150 kHz – 30 MHz. Measurement was made with a 4.5 kHz step size and 20 ms dwell time.

Measurement uncertainty: ± 3.7 dB (9 kHz – 150 kHz); ± 3.3 dB (150 kHz – 30 MHz)

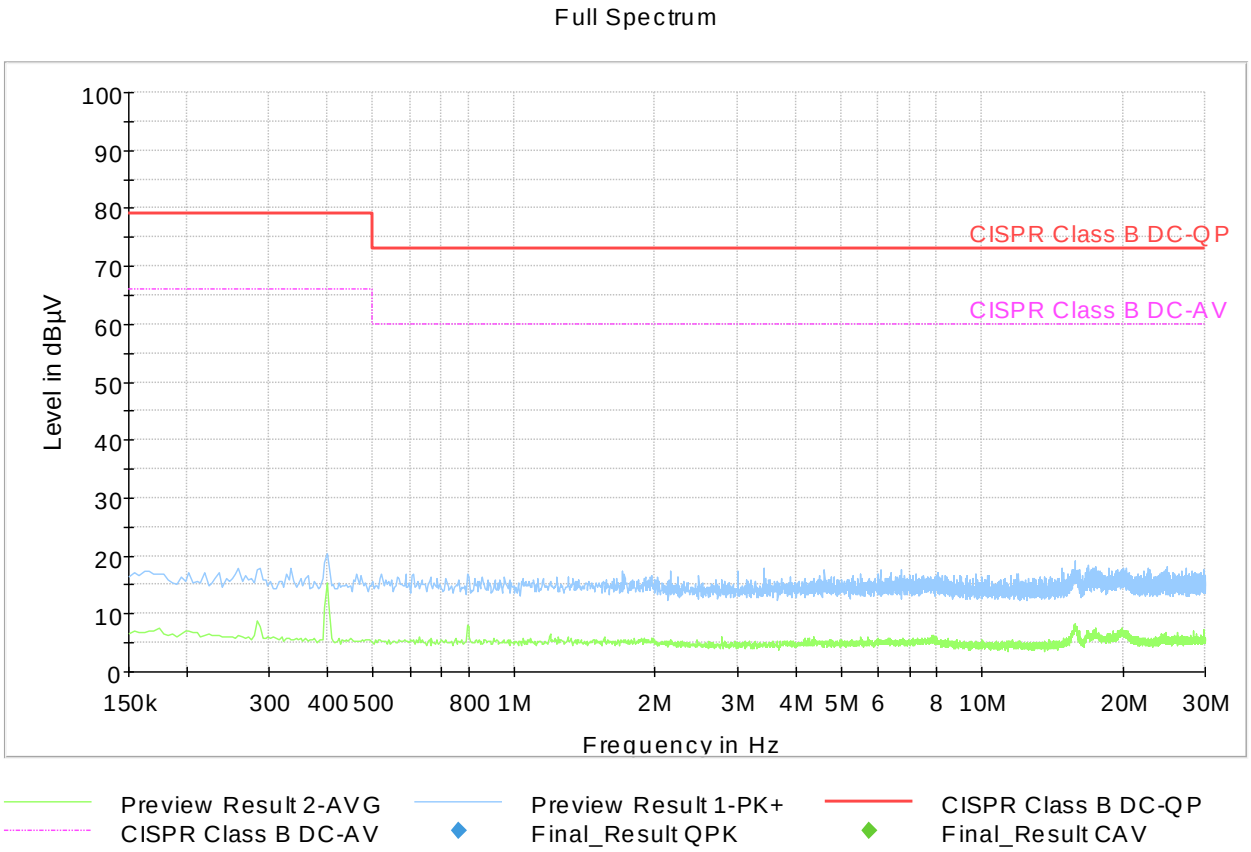
Instruments used during measurement

Instrument list: AMN: R&S / ENV216 (LR-1665) (11/2024)
EMI Receiver: R&S / ESCI 3 (N-4259) (12/2025)

Conformity

Verdict:	PASS
Test engineer:	Christian Borge

EMISSION SPECTRUM (24V DC CISPR)



MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
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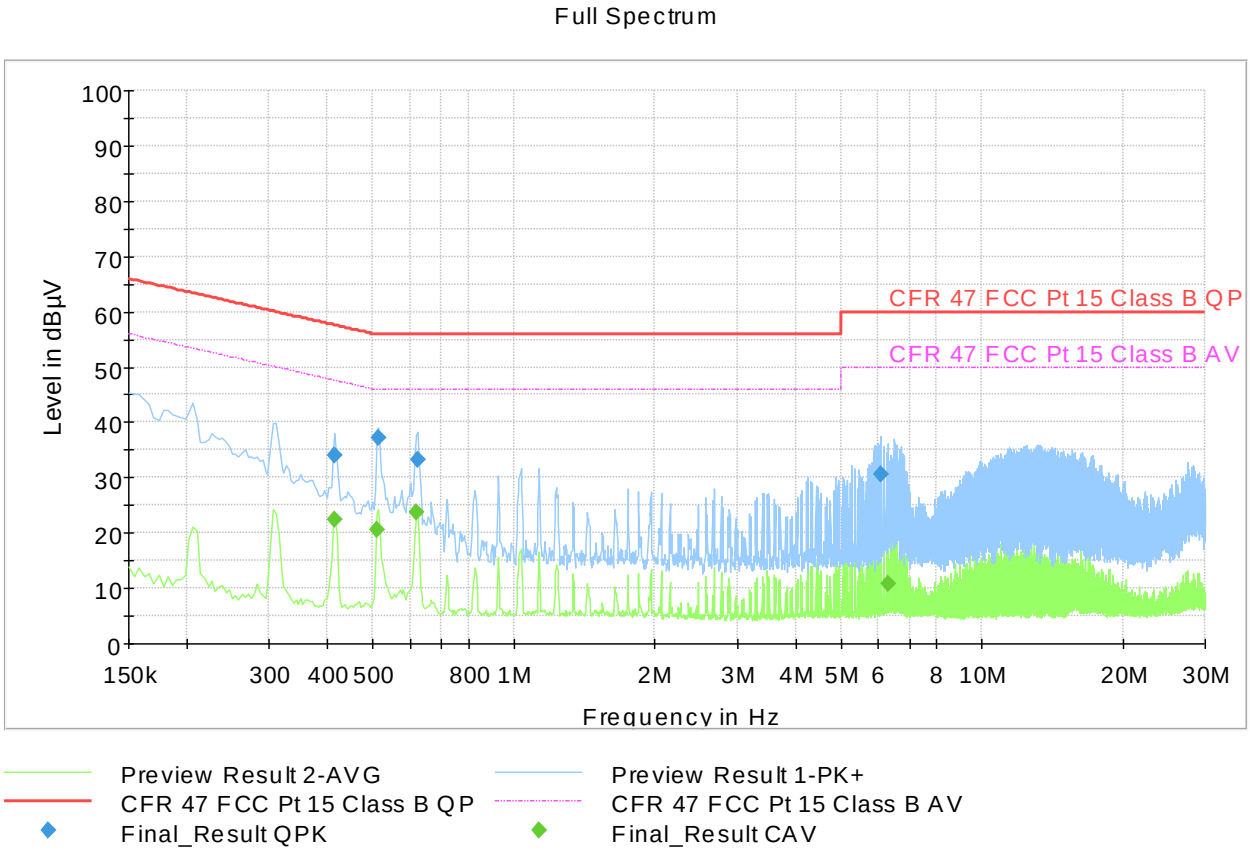
EMISSION SPECTRUM (120V AC FCC PART 15B)



MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.414000	34.00	---	57.57	23.57	15000.0	9.000	N	OFF	9.6
0.414000	---	22.40	47.57	25.17	15000.0	9.000	L1	OFF	9.6
0.510000	---	20.62	46.00	25.38	15000.0	9.000	N	OFF	9.6
0.514000	37.17	---	56.00	18.83	15000.0	9.000	L1	OFF	9.6
0.618000	---	23.84	46.00	22.16	15000.0	9.000	L1	OFF	9.6
0.622000	33.26	---	56.00	22.74	15000.0	9.000	N	OFF	9.6
6.098000	30.71	---	60.00	29.29	15000.0	9.000	L1	OFF	9.8
6.306000	---	10.81	50.00	39.19	15000.0	9.000	L1	OFF	9.8

RADIATED EMISSIONS (BELOW 1GHZ)

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
The measurements were performed in a semi-anechoic chamber (SAC). Nominal supply voltage was provided.
The specimen was energized and in normal operating mode during the measurement.

☐ The specimen and its cables were elevated 10 cm above the site ground plane and placed in the centre of the turntable.
☒ The specimen and its cables were placed on a table 80 cm above the site ground plane and placed in the centre of the turntable.
☐ Ferrite clamps type CMAD were applied to cables leaving the test volume.
☐ A CDNE was applied to the power supply cable.

Antenna type = Hybrid bilog antenna
Antenna elevation = 100-400 cm above the ground reference plane.
Specimen rotation = 0-360º.

☒ Band-stop filter(s) was used to suppress the wanted RF transmission band to protect the measurement equipment.

Frequency range:	Measurement distance:
☐ 30-300MHz	☒ 3m (For FCC)
☒ 30-1000MHz	☐ 5m
☐ Other:	☒ 10m

Conditions
The measuring bandwidth is 120 kHz in the frequency range 30 MHz – 1000 MHz. Frequency sweeps with RBW = 120 kHz and VBW = 1 MHz was applied with a sweep time of 20 ms (step size resolution < 60 kHz).

Measurement uncertainty: ± 4.9 dB (3m distance in SAC10); ± 4.6 dB (3m distance in SAC3); ± 4.6 dB (10m distance in SAC10)

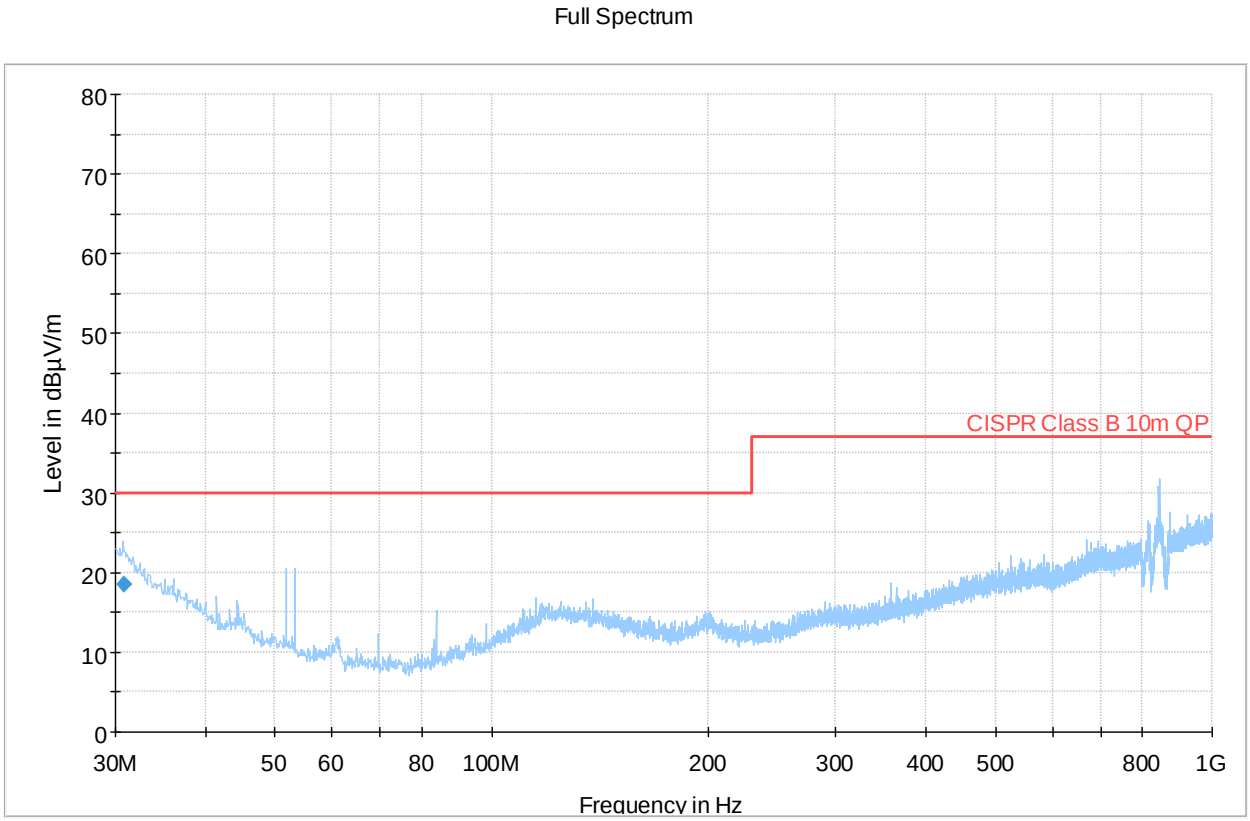
Instruments used during measurement

Instrument list:
Antenna, Hybrid: Schwarzbeck / VULB 9163 (LR-1616) (05/2025)
Antenna, Hybrid: Sunol / JB3 (N-4525) (04/2025)
EMI Receiver: R&S / ESU40 (LR-1639) (01/2025)
Preamplifier: Sonoma / 310N (LR-1686) (08/2024)
Filter, Band Reject: Wainwright Instruments GmbH / WRCGV8 (LR-1795) (N/A)

Conformity

Verdict:	PASS
Test engineer:	Christian Borge

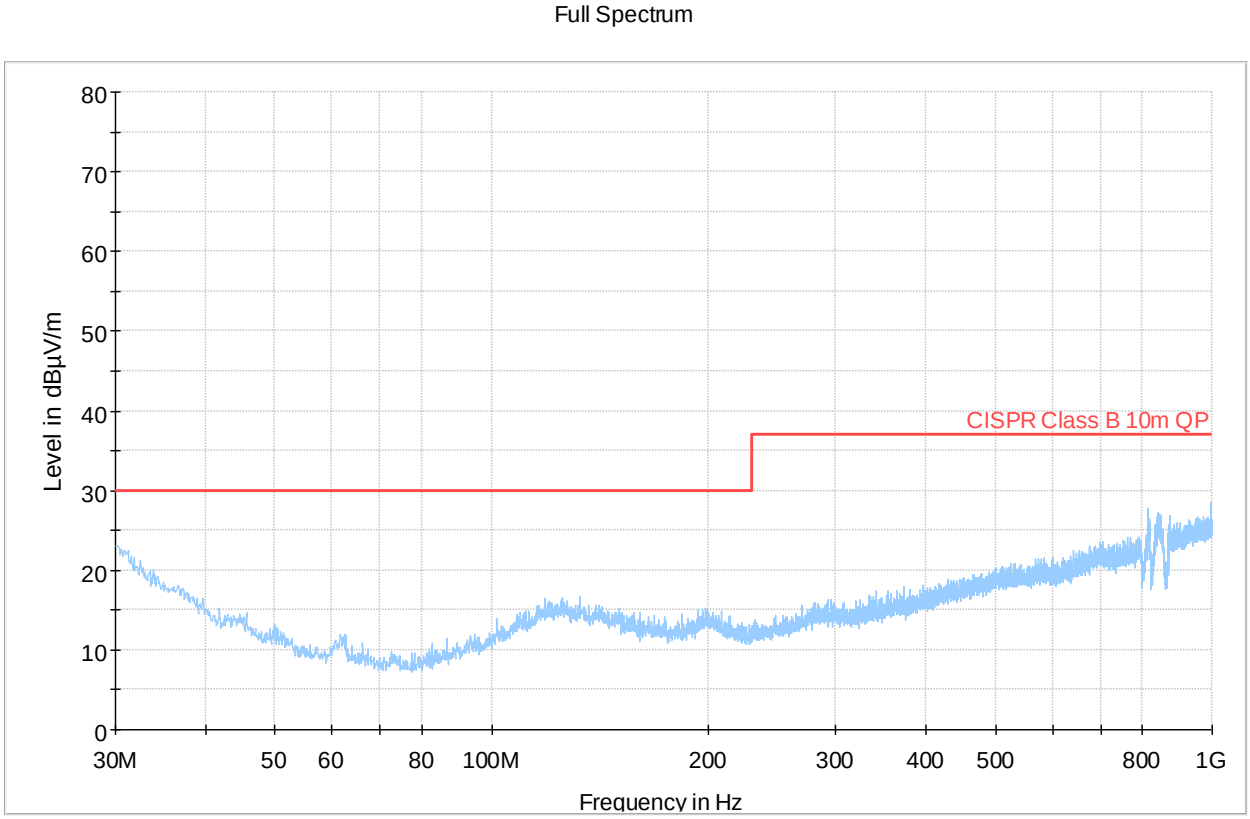
EMISSION SPECTRUM (BGW/A1 CISPR)



MEASUREMENTS DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.812630	18.55	30.00	11.45	15000.0	120.000	103.0	V	234.0	-4.8

EMISSION SPECTRUM (BGW/A2 CISPR)



MEASUREMENTS DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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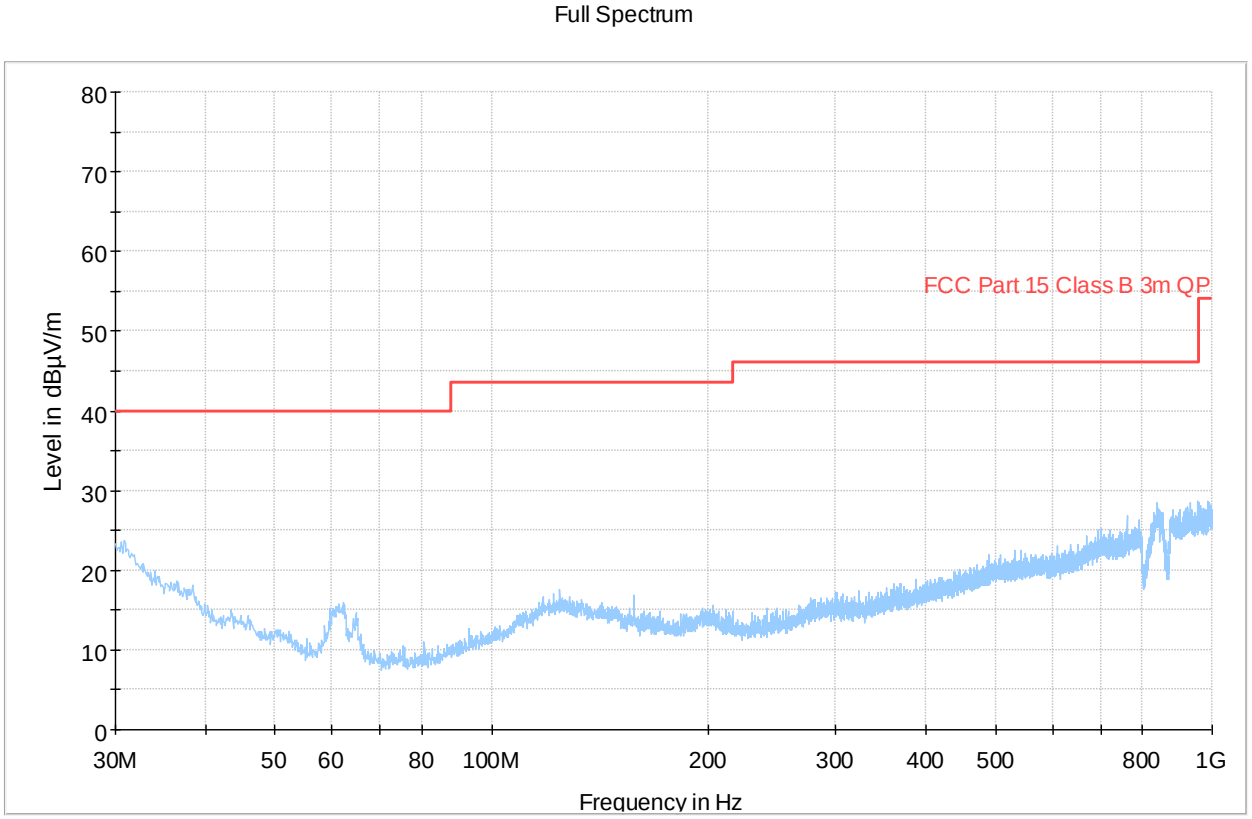
EMISSION SPECTRUM (BGW/A1 FCC PART 15B)



MEASUREMENTS DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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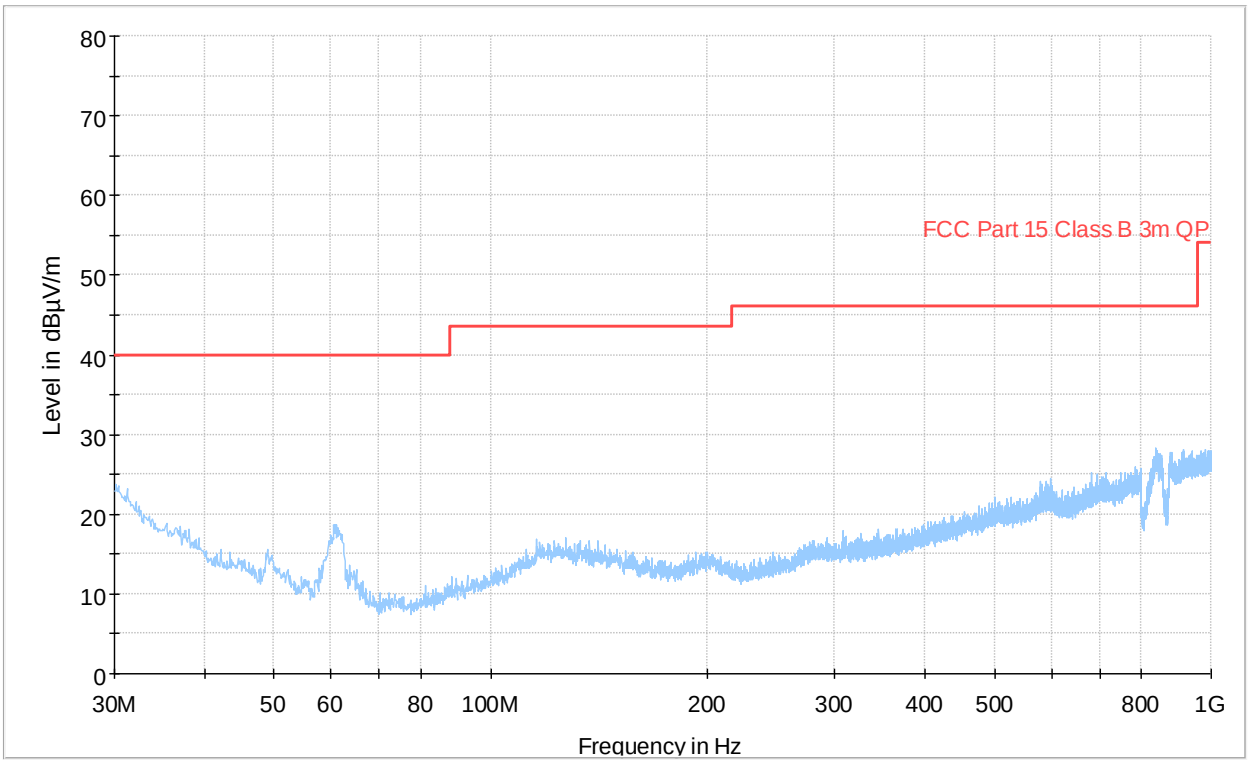
EMISSION SPECTRUM (BGW/A2 FCC PART 15B)

Full Spectrum



MEASUREMENTS DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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RADIATED EMISSIONS (ABOVE 1GHZ)

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
Nominal supply voltage was provided. The specimen was energized and in normal operating mode during the measurement.

☐ The specimen and its cables were elevated 10 cm above the floor and placed in the centre of the turntable.
☒ The specimen and its cables were placed on a table 80 cm above the floor and placed in the centre of the turntable.

Facility:
☒ 3m semi-anechoic chamber (SAC3) with extra floor absorbers* (calibrated volume: D=2.0m / H=2.0m).
☐ 10m semi-anechoic chamber (SAC10) with extra floor absorbers* (calibrated volume: D=1.5m / H=2.0m).
☐ 3m fully anechoic room (FAR3) (calibrated volume: D=1.2m / H=2.0m).

* The reference ground plane was covered with ferrite absorbers in the reflecting area between the specimen and the measuring antenna.

Measurement distance = ☒ 3m.
Antenna elevation = fixed at centre of specimen height.
Specimen rotation = 0-360º.
Measurements were performed with a double-ridged guide horn antenna.

☒ Band-stop filter(s) was used to suppress the wanted RF transmission band to protect the measurement equipment.

Frequency range:	Highest internal frequency of specimen:
☐ 1-2GHz	☒ Below 108MHz
☐ 1-5GHz	☐ Between 108MHz and 500MHz
☒ 1-6GHz	☐ Between 500MHz and 1000MHz
☐ 1-12GHz	☐ Above 1000MHz

The measuring bandwidth is 1 MHz in the above frequency range. Frequency sweeps with RBW = 1 MHz and VBW = 1 MHz was applied with a sweep time of 100 ms (proper segmentation of the frequency range was applied to obtain step size resolution < 500 kHz).

Measurement uncertainty: ± 5.1 dB

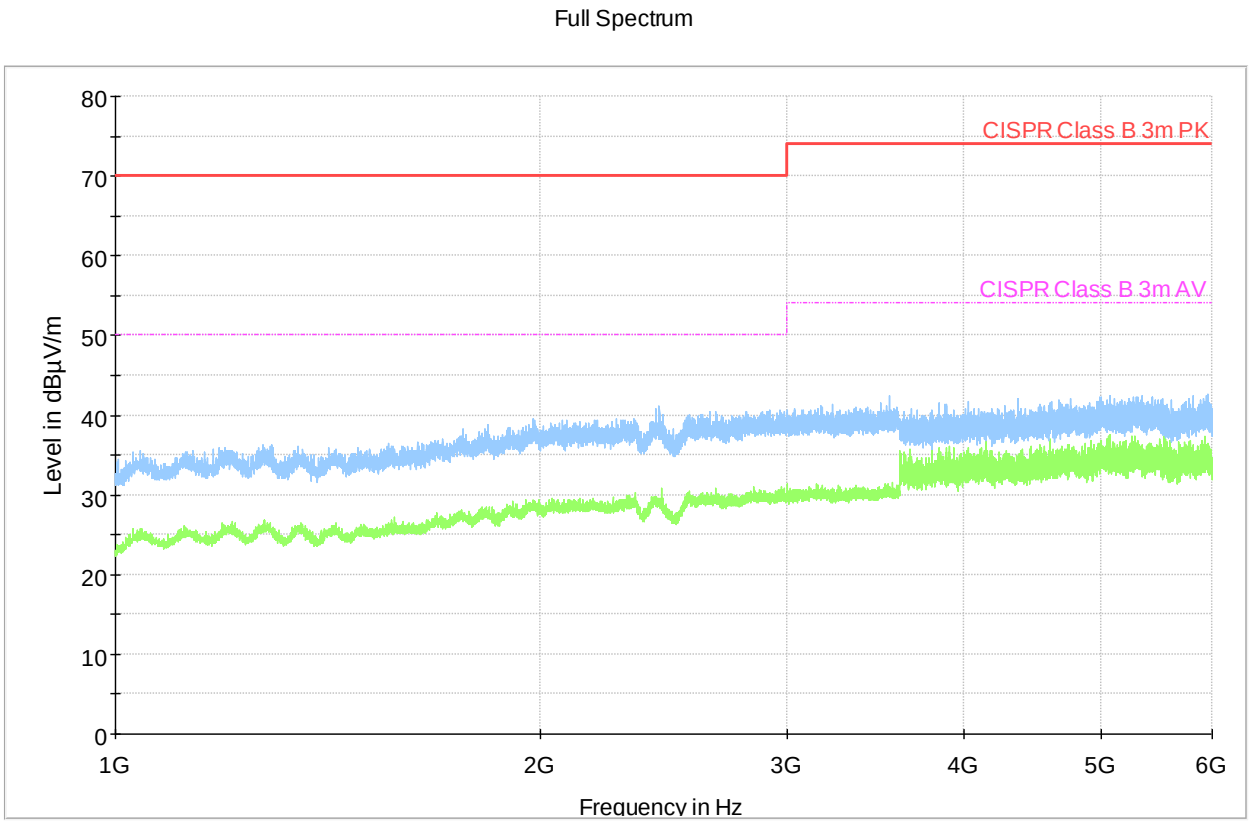
Instruments used during measurement

Instrument list:
Antenna, Horn: ETS / 3117 (LR-1717) (12/2027)
EMI Receiver: R&S / ESU40 (LR-1639) (01/2025)
Filter Notch: Microwave / N0324415 (LR-1760) (N/A)
Preamplifier: ETS / 3117-PA (LR-1757) (08/2024)

Conformity

Verdict:	PASS
Test engineer:	Christian Borge

EMISSION SPECTRUM (HORIZONTAL POLARIZATION) (BGW/A1 CISPR)



MEASUREMENTS DATA

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)
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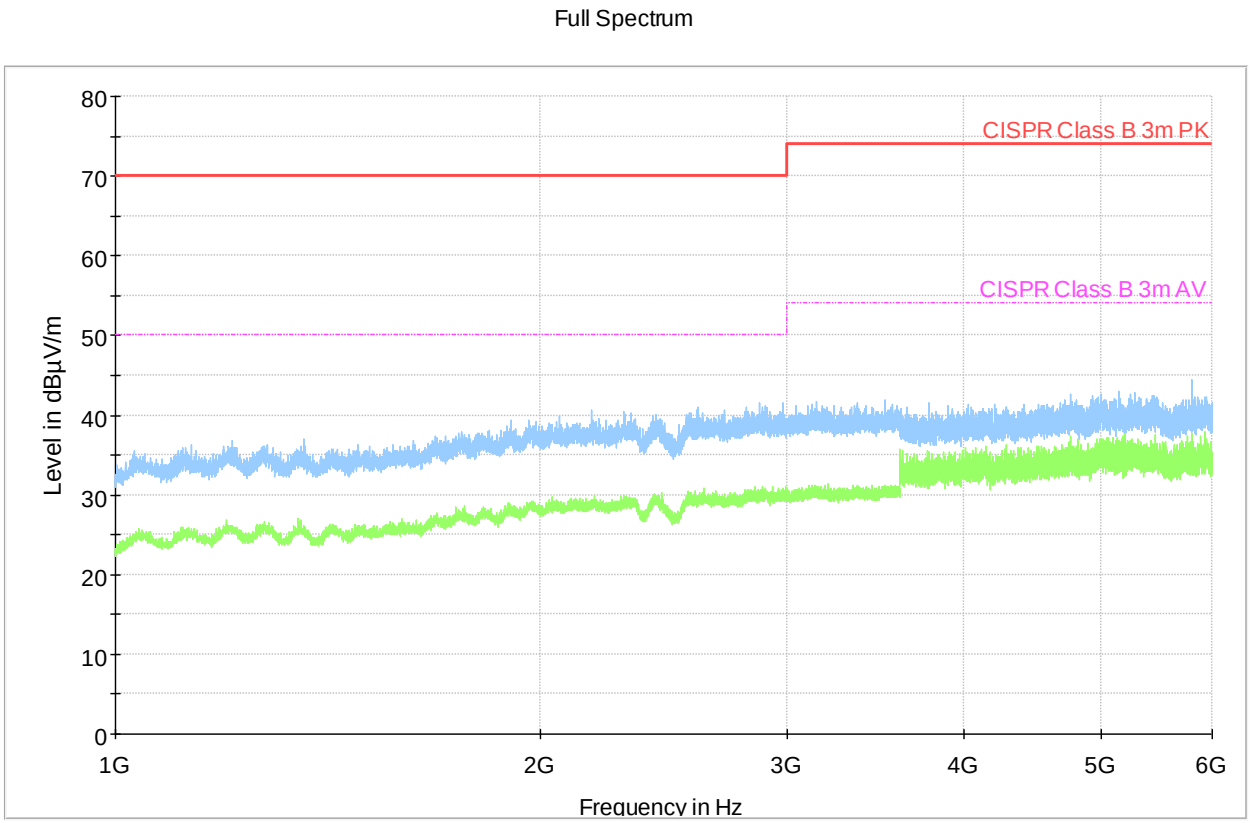
EMISSION SPECTRUM (VERTICAL POLARIZATION) (BGW/A1 CISPR)



MEASUREMENTS DATA

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)
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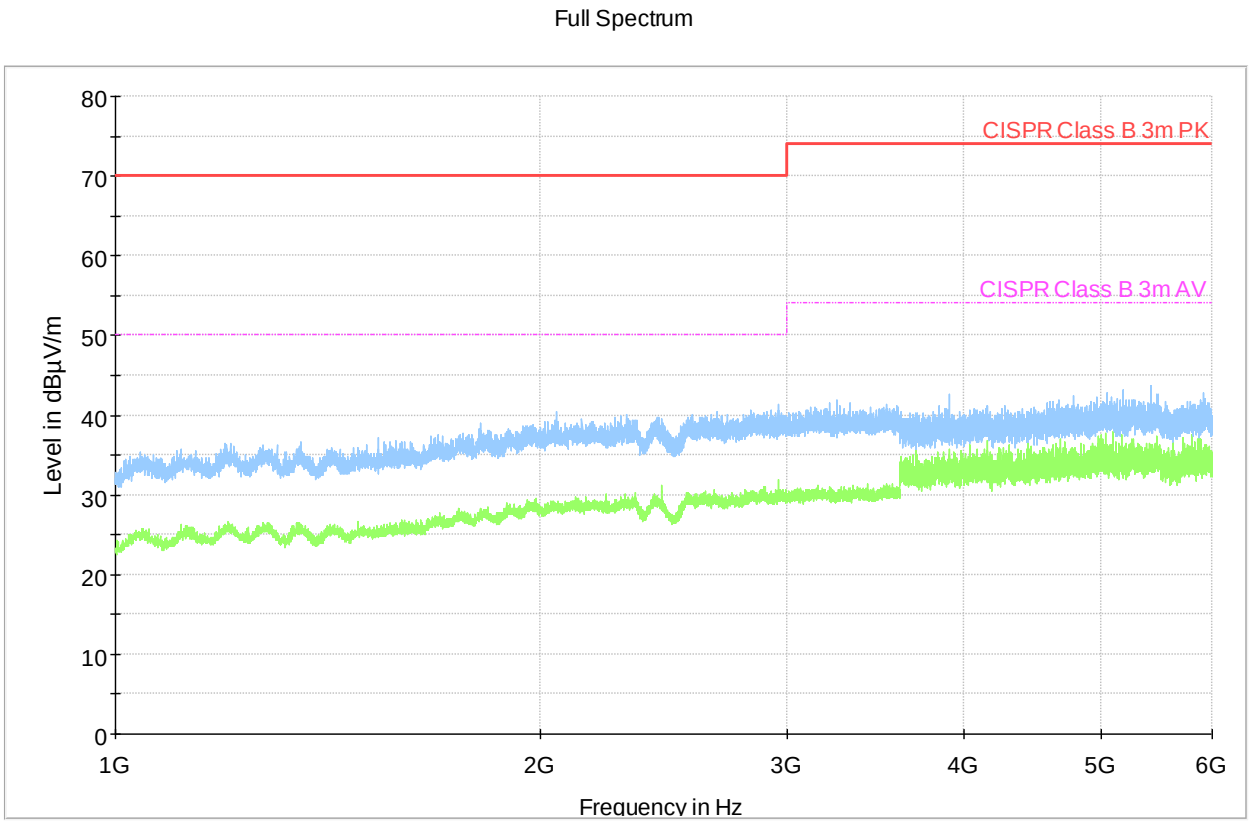
EMISSION SPECTRUM (HORIZONTAL POLARIZATION) (BGW/A2 CISPR)



MEASUREMENTS DATA

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)
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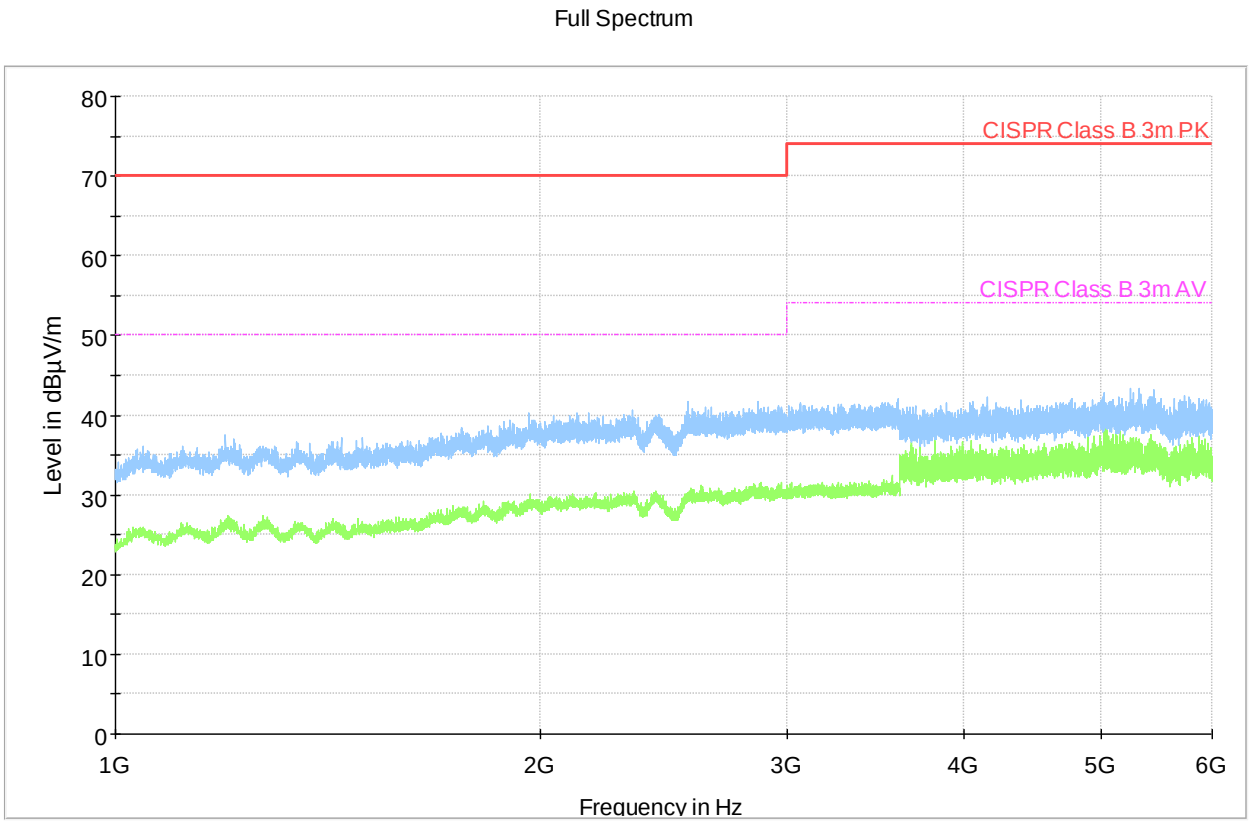
EMISSION SPECTRUM (VERTICAL POLARIZATION) (BGW/A2 CISPR)



MEASUREMENTS DATA

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)
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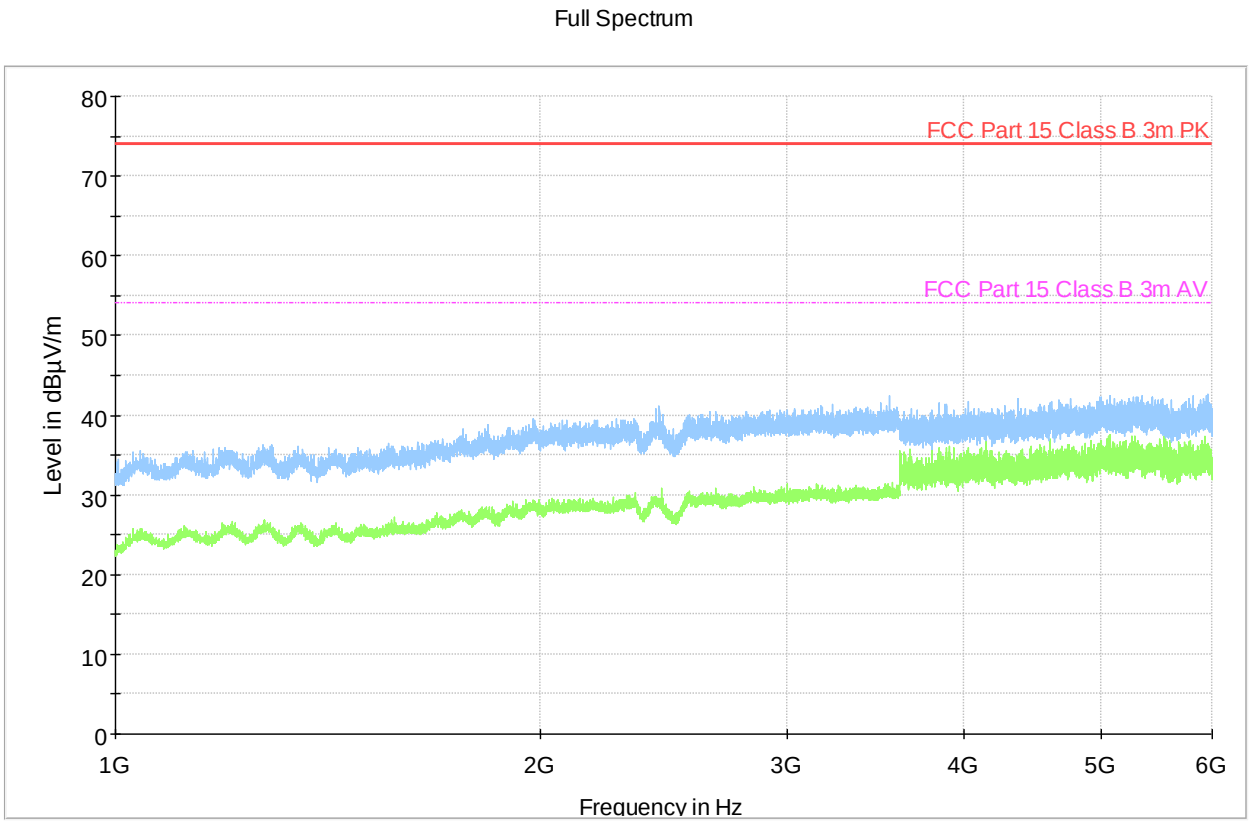
EMISSION SPECTRUM (HORIZONTAL POLARIZATION) (BGW/A1 FCC PART 15B)



MEASUREMENTS DATA

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)
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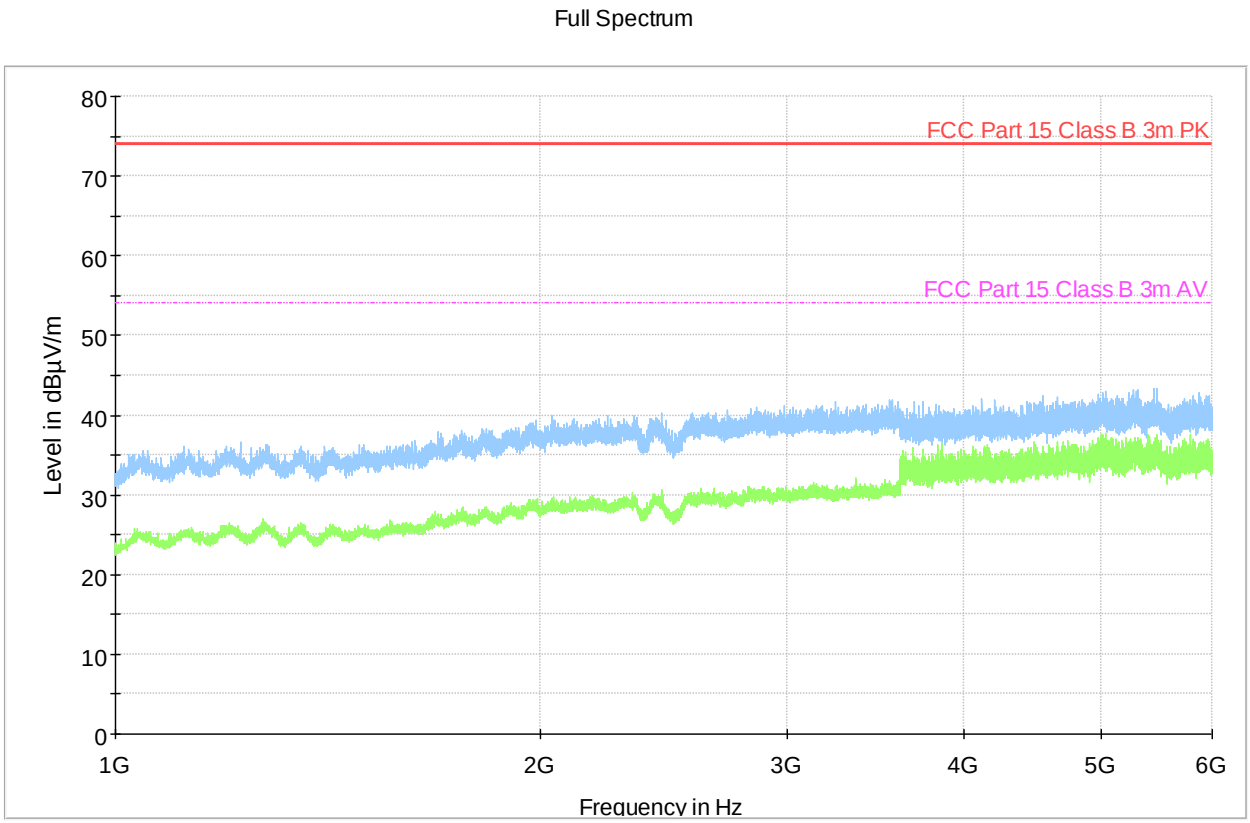
EMISSION SPECTRUM (VERTICAL POLARIZATION) (BGW/A1 FCC PART 15B)



MEASUREMENTS DATA

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)
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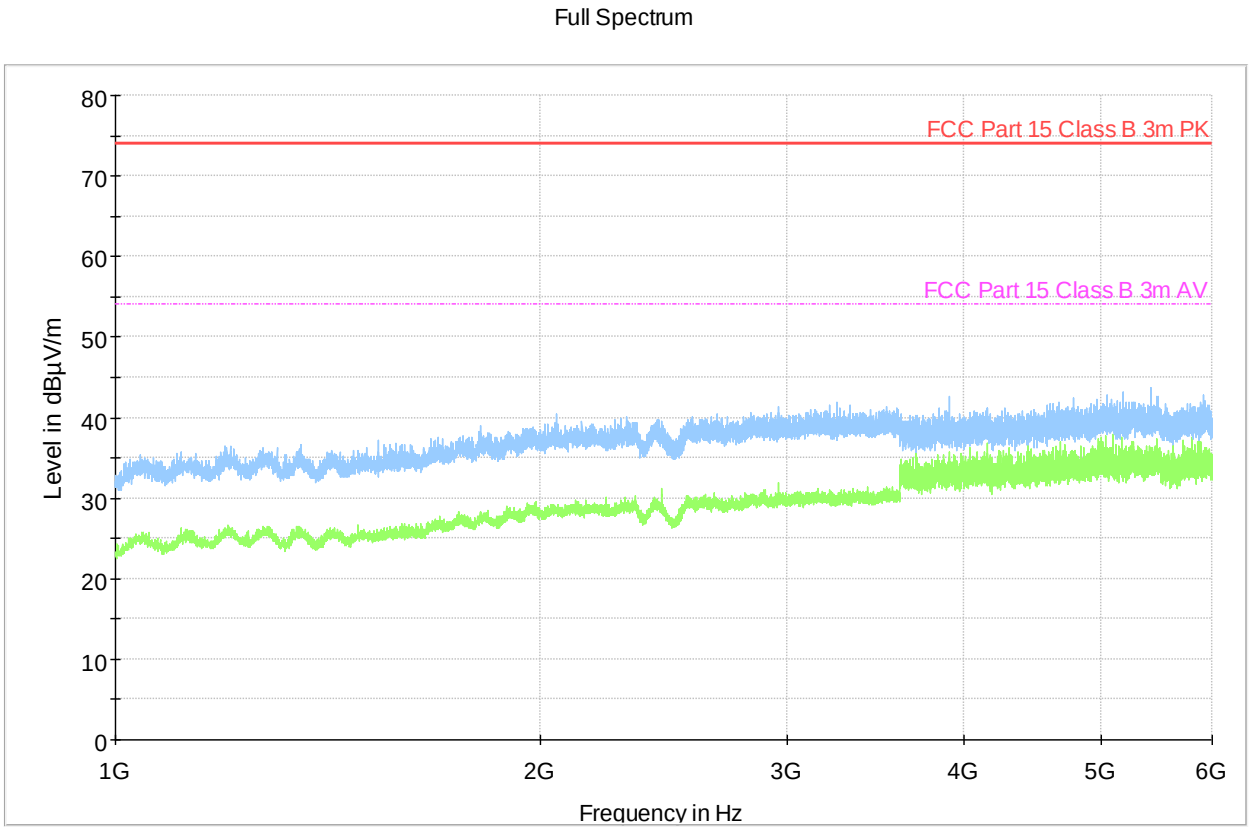
EMISSION SPECTRUM (HORIZONTAL POLARIZATION) (BGW/A2 FCC PART 15B)



MEASUREMENTS DATA

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)
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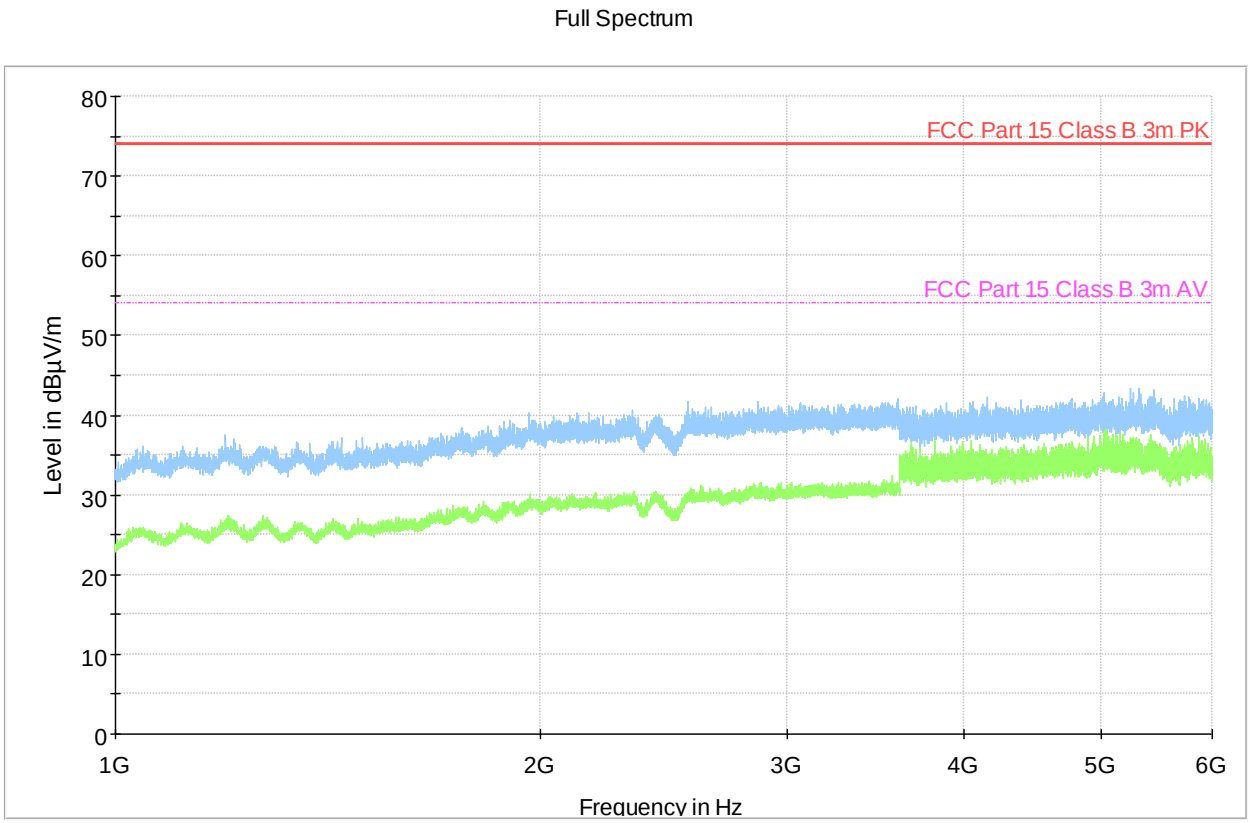
EMISSION SPECTRUM (VERTICAL POLARIZATION) (BGW/A2 FCC PART 15B)



MEASUREMENTS DATA

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)
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ELECTROSTATIC DISCHARGE (ESD) IMMUNITY

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
The specimen was energized and in normal operating condition.

☐ Floor standing equipment. Specimen was elevated 10 cm above the ground reference plane.
☒ Table top equipment. Specimen was placed on a test table 80 cm above the reference ground plane.
A horizontal coupling plane (HCP) of 160x80 cm was placed on the test table, just beneath the specimen, and connected to the reference plane via a cable with two 470kΩ resistors located one in each end of the cable. The specimen was separated from the HCP by a 0.5mm insulating support.

A vertical coupling plane (VCP) of 50x50 cm was placed 10 cm from the specimen exterior. This VCP is connected to the reference plane via a cable with two 470kΩ resistors located one in each end of the cable.

The ESD generator's reference ground was connected to the reference ground plane.

Procedure
☒ Indirect contact discharges were applied to the mid edge of the VCP.
☒ Indirect contact discharges were applied to the mid edge of the HCP.
☒ Direct contact discharges were applied to various selected test points of the specimen at conductive surfaces,
☒ Direct air discharges were applied to various selected test points of the specimen at non-conductive surfaces.

Discharges were applied at increasing levels to each test point.

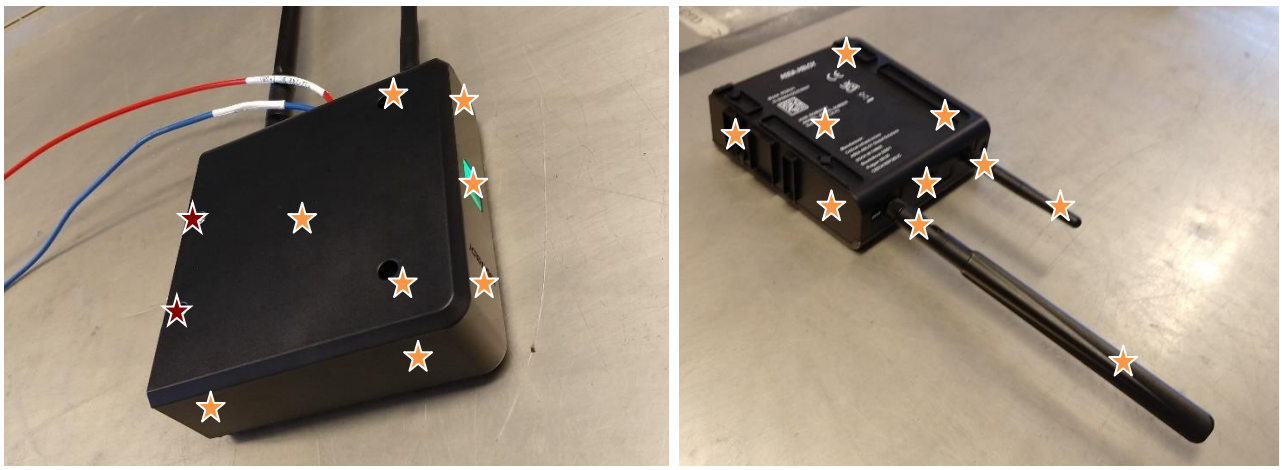
Uncertainty figures: Peak voltage: ± 10 %; Transient shape: ± 30 %

A functional test was performed before and after the exposure. The specimen was observed during exposure in order to detect unintended responses.

Instruments used during measurement
Instrument list: ESD Generator: EMTest / Dito (LR-1733) (02/2024)

		Conformity	
Temperature:	21.4 ºC	Verdict:	PASS
Humidity:	43.4 %RH	Test engineer:	Christian Borge
Atmos. pressure:	1002.8 hPA		

PHOTO OF SELECTED TEST POINTS



★ = Contact discharge points

★ = Air discharge points

DETAILED TEST LOG

Test Point	Applied Level [kV]	Discharge Type	Discharges per test level	Required Criteria	Complied Criteria	Result
Enclosure	±2, ±4, ±8	Air	ND	B	A	PASS
BLE antenna	±2, ±4, ±8	Air	10	B	A	PASS
LTE Antenna	±2, ±4, ±8	Air	ND	B	A	PASS
Screws	±2, ±4	Contact	10	B	A	PASS
HCP	±2, ±4	Contact	10	B	A	PASS
VCP	±2, ±4	Contact	10	B	A	PASS

Note: Both variants are testet with the same testpoints and the results are equal.
ND = No Discharge, indicates discharge attempts, which have given no actual observable discharge.

OBSERVATIONS

No malfunctions were recorded during or after the applied test(s).
Observations showed no unintended responses during test(s).

RADIATED RF DISTURBANCE IMMUNITY

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
The tests were performed at 3 meter antenna distance in an anechoic chamber.

☐ The specimen was placed on a Styrofoam support 10 cm above the floor.
☒ The specimen was placed on a Styrodur/styrofoam table 80 cm above the floor.

The specimen was placed within the calibrated volume, and the cables connected to the specimen was arranged so that 100 cm of each cable was exposed to the electromagnetic field.
Interconnecting cables specified ≤ 300 cm whose length exceeded 100 cm were bundled to achieve 100 cm length.
Interconnecting cables specified > 300 cm and other cables connected to the specimen are exposed for 100 cm, and the remaining cable length was decoupled with the use of ferrites.

Procedure
The specimen was exposed to the RF electromagnetic field generated by one or more antennas. The polarization of the field requires testing each side of the specimen twice, once with the antenna horizontally and again with the antenna vertically. The antenna height during test was 150 cm.

Exposed side of the specimen:
☒ 0º (front)
☒ 90º
☒ 180º (rear)
☒ 270º
☐ Top (handheld)
☐ Bottom (handheld)

Frequency sweep rate:
☒ 1% step with 3 sec dwell time
☐ $1.5x10^{-3}$ decades/sec (80 – 1000MHz)
☐ $0.5x10^{-3}$ decades/sec (1000 – 2000MHz)
☐ Other:

Frequency range:
☐ 80MHz – 1000MHz
☐ 1400MHz – 2000MHz
☐ 2000MHz – 2700MHz
☐ 80MHz – 2000MHz
☒ 80MHz – 6000MHz

Modulation:
☒ 80% AM @ 1000Hz
☐ 80% AM @ 400Hz
☐ 50% PM @ 217Hz

Uncertainty figures:
Field level: ± 2.4 dB

A functional test was performed before and after the exposure. The specimen was observed during exposure in order to detect unintended responses.

Instruments used during measurement

Instrument list:
Amplifier, GF: AR / 120S1G4M3 (LR-1595) (08/2024)
Amplifier, RF: R&S / BBA150 (LR-1805) (08/2024)
Antenna, Log-periodic: Schwarzbeck / STLP 9129 (LR-1801) (N/A)
Generator, RF: R&S / SMB100A (LR-1603) (01/2025)
Power Sensor: R&S / NRP8SN (LR-1803) (06/2025)
Power Sensor: R&S / NRP8SN (LR-1804) (06/2025)

Conformity

Verdict:	PASS
Test engineer:	Christian Borge

DETAILED TEST LOG

Frequency range [MHz]	Field strength [V/m]	Polarization	Required Criteria	Complied Criteria	Result
80 - 1000	3	HOR	A	A	PASS
80 - 1000	3	VER	A	A	PASS
1000 - 6000	3	HOR	A	A	PASS
1000 - 6000	3	VER	A	A	PASS

☐ Additional tests were performed at discrete spot frequencies with 3V/m test level. Spot frequencies which were tested: 80 MHz, 120 MHz, 160 MHz, 230 MHz, 434 MHz, 460 MHz, 600 MHz, 863 MHz, 900 MHz, 1800 MHz, 2600 MHz, 3500 MHz, and 5000 MHz

OBSERVATIONS

No malfunctions were recorded during or after the applied test(s).
Observations showed no unintended responses during test(s).

ELECTRIC FAST TRANSIENTS IMMUNITY

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
Mains power was supplied to the specimen via the coupling network. The specimen was energized and in normal operating condition.

☒ The specimen and its cables were elevated 10 cm above the reference ground plane.
☐ Artificial hand was applied during test (for location see photos).

Procedure
Transients were applied at increasing levels to each single line at the AC or DC input port using a coupling network, and to relevant signal ports using a capacitive coupling clamp.

Duration:
☐ 1 minute
☐ 2 minutes
☒ 5 minutes

Repetition frequency:
☒ 5kHz
☐ 100kHz

Uncertainty figures:
Peak voltage: ± 10 %
Transient shape: ± 30 %

Only tested on BGW/A2. Loop ports are are confirmed to be identical as BGW/A1.

A functional test was performed before and after the exposure. The specimen was observed during exposure in order to detect unintended responses.

Instruments used during measurement

Instrument list: Coupling Clamp, EFT/B: Haefely / IP4A (LR-1638) (N/A)
Generator: EMTest / UCS 500 N7 (LR-1608) (06/2025)

Conformity

Verdict: PASS
Test engineer: Christian Borge

DETAILED TEST LOG

Port	Applied Level [kV]	Injection Method	Required Criteria	Complied Criteria	Result
DC Input Port (pos+neg)	±0.5kV	CDN	B	A	PASS
Signal Port (Alarm loop NC)	±0.5kV	CLAMP	B	A	PASS
Signal Port (Alarm loop NO)	±0.5kV	CLAMP	B	A	PASS
Signal Port (Relay NO)	±0.5kV	CLAMP	B	A	PASS

OBSERVATIONS

No malfunctions were recorded during or after the applied test(s).
Observations showed no unintended responses during test(s).

CONDUCTED RF DISTURBANCE IMMUNITY

TEST DESCRIPTION

Method
The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up
Mains power was supplied to the specimen via the coupling network. The specimen was energized and in normal operating condition.

☒ The specimen was elevated 10 cm above the reference ground plane.
☒ Cables were elevated 5 cm above the reference ground plane.
☐ Artificial hand was applied during test (for location see photos).

All specimen ports, which are not subject to testing, are furnished with decoupling networks to achieve RF isolation of the specimen during test. A return path was created according to the priority given in §7.2 of the reference standard.

Procedure
Disturbance was applied via a coupling/decoupling network (CDN) or an electromagnetic coupling clamp (EM Clamp) to each port separately.

Frequency range:	Modulation:	Frequency sweep rate:
☒ 150kHz – 80MHz	☒ 80% AM @ 1000Hz	☒ 1% step with 3 sec dwell time
☐ 150kHz – 230MHz	☐ 80% AM @ 400Hz	☐ $1.5x10^{-3}$ decades/sec
☐ Spot frequencies	☐ 50% PM @ 217Hz	☐ Other:

Measurement uncertainty: ± 1.7dB (CDN method); ± 3.2dB (EM Clamp method); ± 3.3dB (BCI method)

A functional test was performed before and after the exposure. The specimen was observed during exposure in order to detect unintended responses.

Instruments used during measurement

Instrument list:
Amplifier, RF: AR / 75A250 (N-3816) (N/A)
CDN: Schwarzbeck / CDN T4 4A (N-5037) (N/A)
Directional Coupler: AR / DC2600A (N-5045) (07/2024)
EM Clamp: FCC / F-2031-23mm (LR-1482) (N/A)
Generator, signal: R&S / SMB100A (LR-1649) (07/2025)
Power Sensor: R&S / NRP-Z92 (LR-1650) (10/2025)

Conformity

Verdict:	PASS
Test engineer:	Christian Borge

DETAILED TEST LOG

Tested Port	Injection Method	Return Path	Applied Level [Vrms]	Required Criteria	Complied Criteria	Result
DC Input Port	CDN-M2	Capacitive	3 Vrms	A	A	PASS
Signal Port (Alarm loop NC)	EM CLAMP	CDN-M2	3 Vrms	A	A	PASS
Signal Port (Alarm loop NO)	EM CLAMP	CDN-M2	3 Vrms	A	A	PASS
Signal Port (Relay NO)	EM CLAMP	CDN-M2	3 Vrms	A	A	PASS

OBSERVATIONS

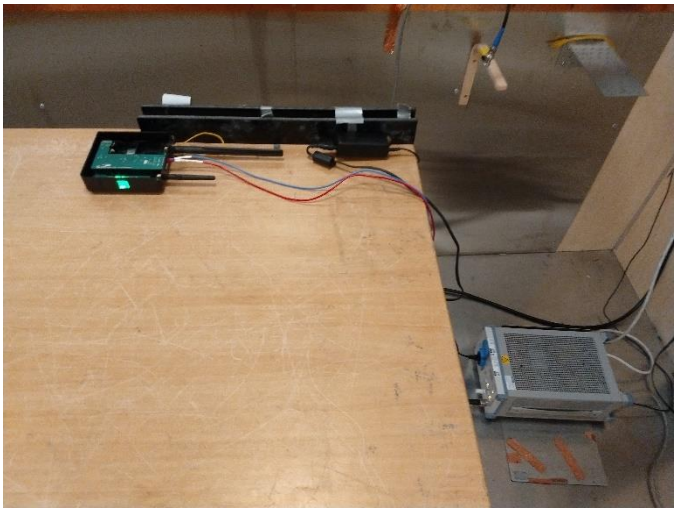
No malfunctions were recorded during or after the applied test(s).
Observations showed no unintended responses during test(s).

Annexes

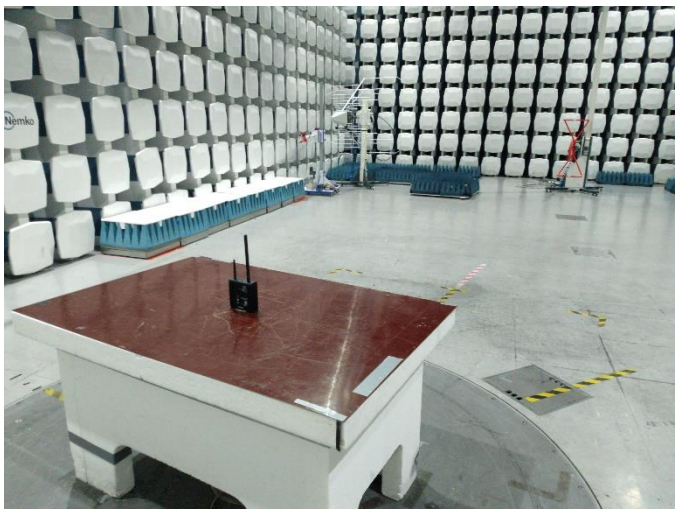
PHOTOS

Test set-up for EMC emissions measurements

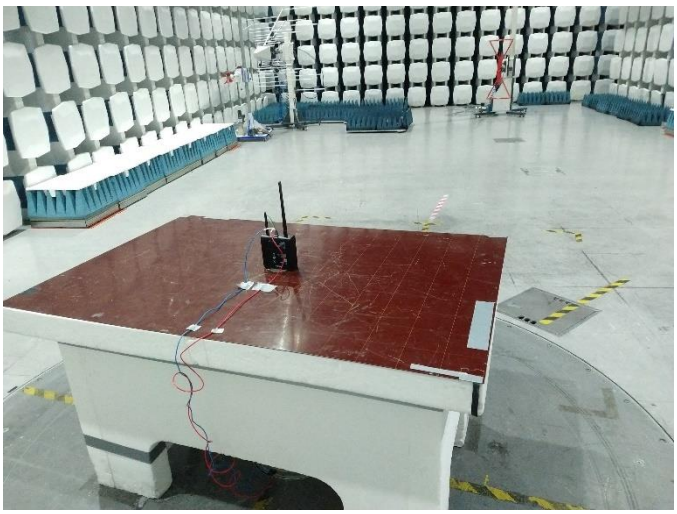
Conducted Emissions (DC)



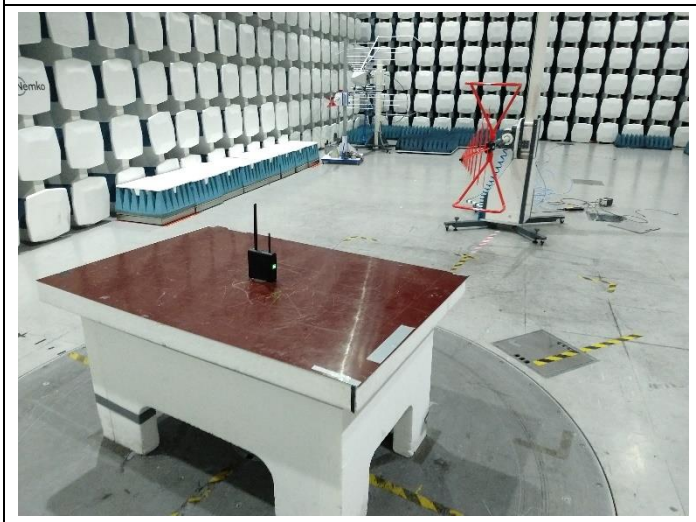
Conducted Emissions (FCC CFR 47 Subpart 15B)



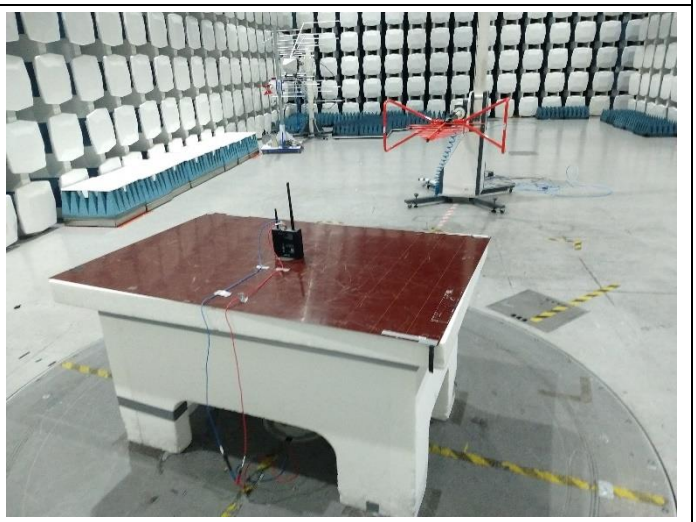
Radiated Emissions (Below 1GHz)



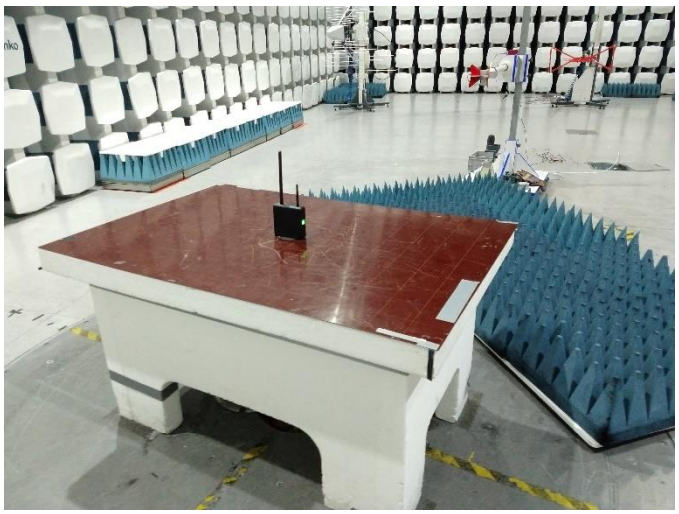
Radiated Emissions (Below 1GHz)



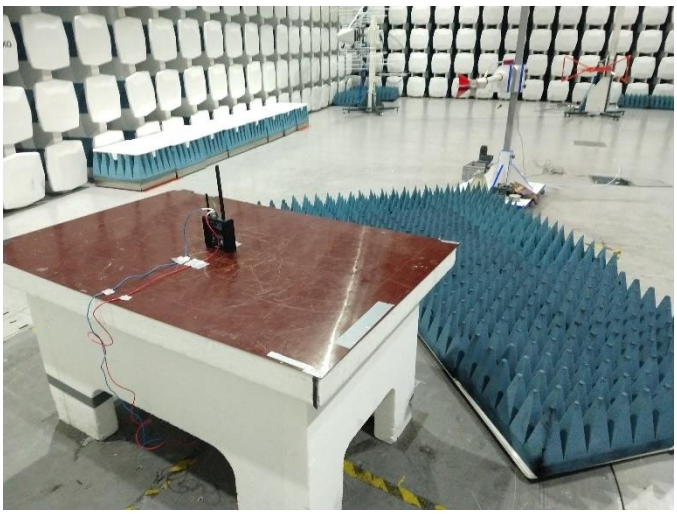
Radiated Emissions (Below 1GHz) (FCC CFR 47 Subpart 15B)



Radiated Emissions (Below 1GHz) (FCC CFR 47 Subpart 15B)



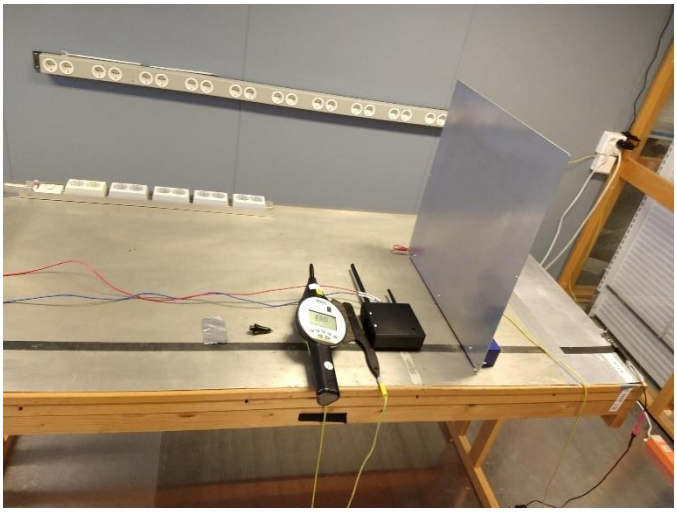
Radiated Emissions (Above 1GHz)



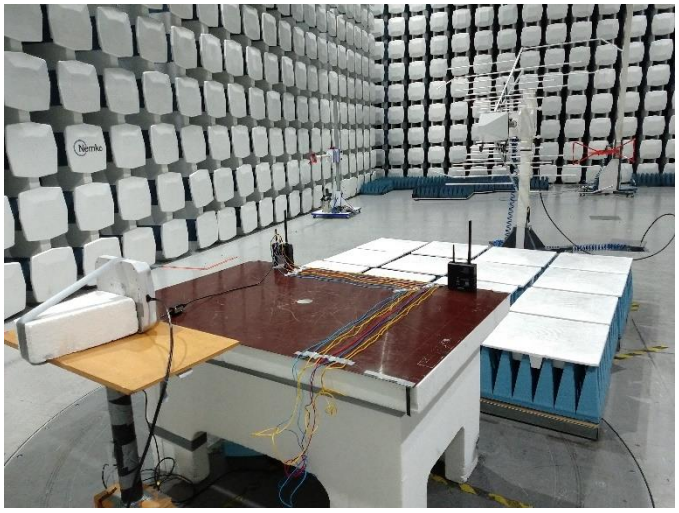
Radiated Emissions (Above 1GHz)

Test set-up for EMC immunity tests

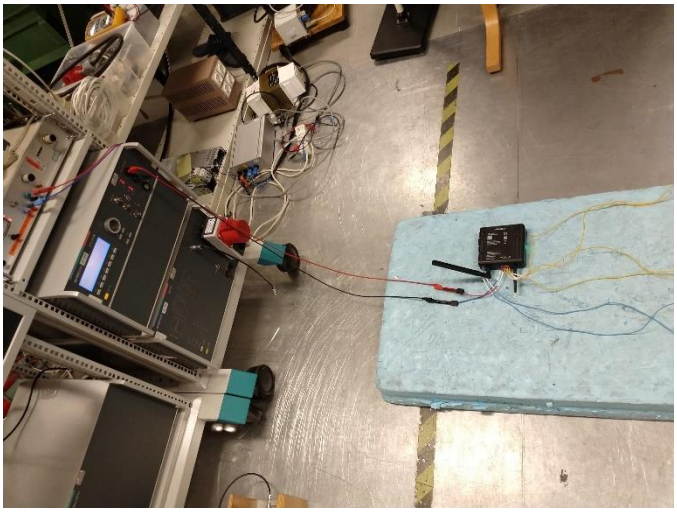
Electrostatic Discharge (ESD) Immunity



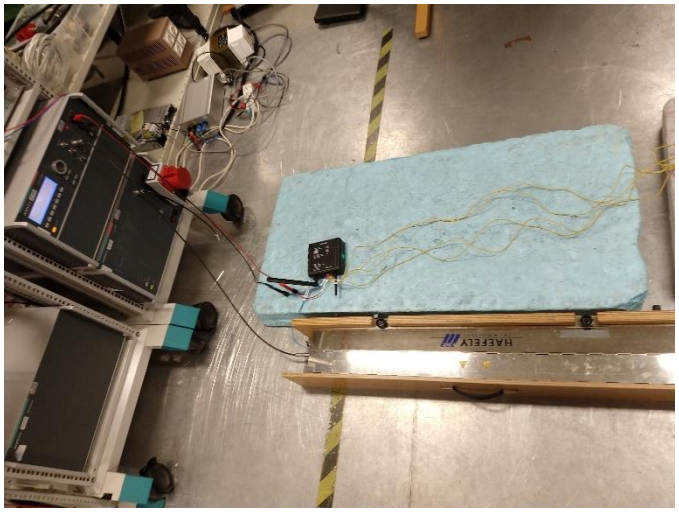
Electrostatic Discharge (ESD) Immunity



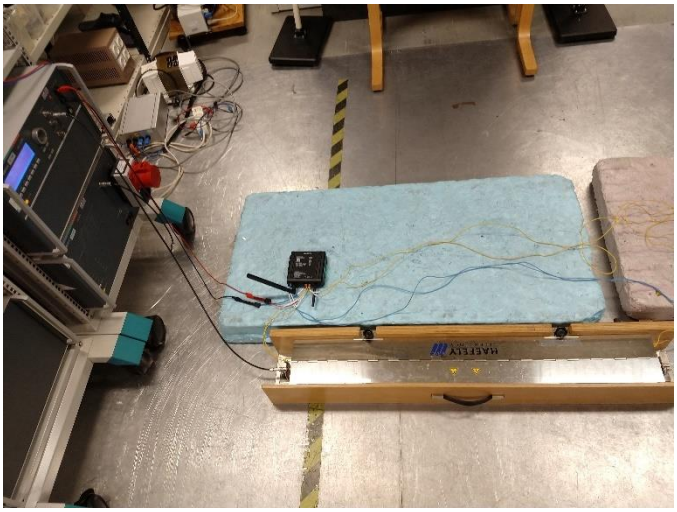
Radiated RF Disturbance Immunity



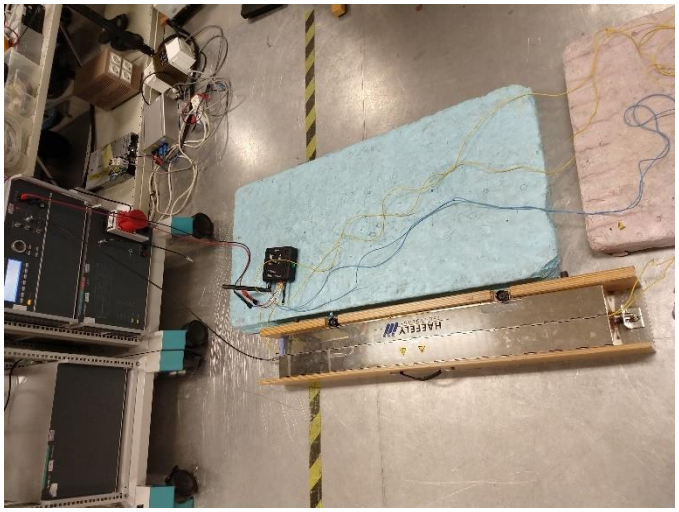
Electric Fast Transients Immunity



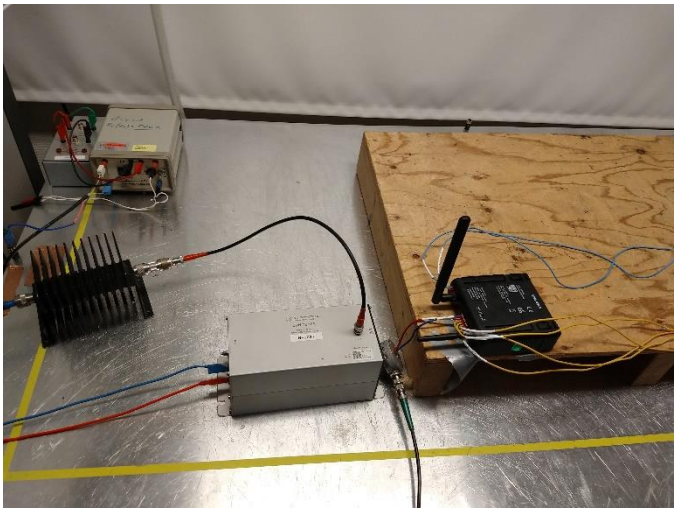
Electric Fast Transients Immunity (Alarm loop NO)



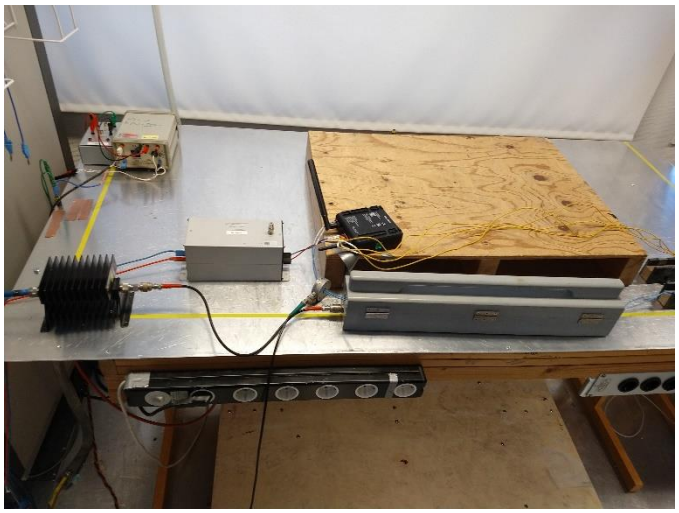
Electric Fast Transients Immunity (Alarm loop NC)



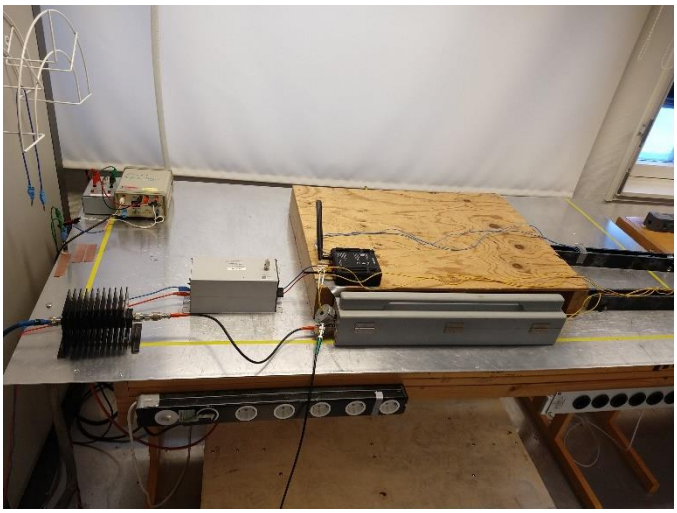
Electric Fast Transients Immunity (Relay NO)



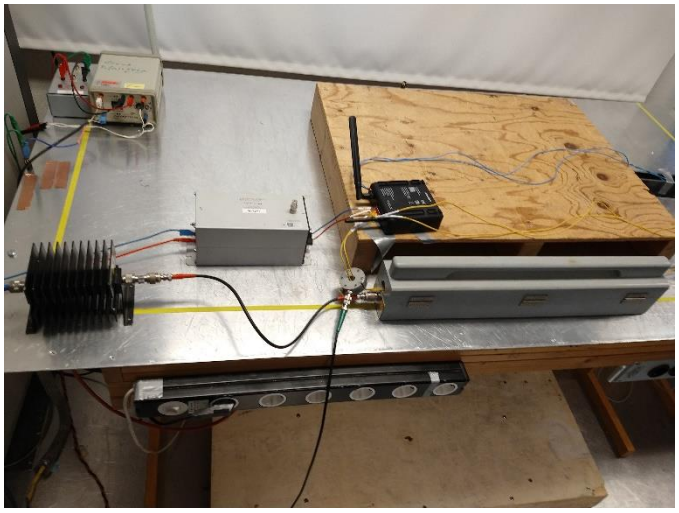
Conducted RF Disturbance Immunity



Conducted RF Disturbance Immunity (Alarm loop NO)



Conducted RF Disturbance Immunity (Alarm loop NC)



Conducted RF Disturbance Immunity (Relay NO)