Test Report No.: *Prüfbericht-Nr.:*	**DE23RSSK 001**	**Order No.:** *Auftrags-Nr.:*	1140809_181	Page 1 of 68 *Seite 1 von 68*
Client Reference No.: *Kunden-Referenz-Nr.:*	—	**Order date:** *Auftragsdatum:*	2023-05-23	
Client: *Auftraggeber:*	FIOR and GENTZ GmbH, Dorette von Stern Strasse 5, Lueneburg 21337, Germany			
Test item: *Prüfgegenstand:*	Bluetooth Automatic Joint (Ankle & Knee) Controller			
Identification / Type No.: *Bezeichnung / Typ-Nr.:*	Radio Device: ET3860 Non-Radio Device: NEURO TRONIC, NEURO HiTRONIC and NEURO HiSWING R+			
Order content: *Auftrags-Inhalt:*	Test of electromagnetic compatibility EMC			
Test specification: *Prüfgrundlage:*	Complete test FCC Part 15 Subpart B section 15.107 FCC Part 15 Subpart B section 15.109 ANSI C63.4-2014 ICES-003 (Issue 7) section 3.2.1 ICES-003 (Issue 7) section 3.2.2			
Date of receipt: *Wareneingangsdatum:*	2023-11-09 2024-01-25			
Test sample No.: *Prüfmuster-Nr.:*	A003599211-005, -002, -003, -019; A003653283-001, -002, -003			
Testing period: *Prüfzeitraum:*	2024-02-02 to 2024-02-26			
Place of testing: *Ort der Prüfung:*	Nuremberg / Nürnberg			
Testing laboratory: *Prüflaboratorium:*	EMC laboratory / EMV Labor			
Test result*: *Prüfergebnis*:*	**PASS**			

tested by: *geprüft von:*	26.09.2024 X M. Huemmer Signiert von: Michael Huemmer	**authorized by:** *genehmigt von:*	01.10.2024 X P. Reusch Signiert von: Patrick Reusch
Date: *Datum:* 2024-10-01		**Issue Date:** Ausstelldatum: 2024-10-01	
Position / *Stellung*	Expert/Sachverständige(r)	Position / *Stellung*	Expert/Sachverständige(r)

Other / *Sonstiges*: —

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

* 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
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet

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Mail: service@de.tuv.com · Web: www.tuv.com

Remarks
Anmerkungen

1	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. *Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibierungsprogramms 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.*
2	As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following link: Introduction to Digital Signature *Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie über folgenden Link: Einführung in digitale Signaturen*
3	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. *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.*
4	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 115:2021, 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. *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 115:2021, 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*
5	If there is no accreditation notice on the report, the report has not been produced in the accredited area and is consequently not covered by the EA MLA. Regardless of this, the report has been prepared based on the general rules of the ISO/IEC 17000 series. Tests marked with "#" are not covered by the accreditation D-PL-14169-03-00. *Wenn auf dem Bericht kein Akkreditierungshinweis aufgebracht ist, wurde der Bericht nicht im akkreditierten Bereich erstellt und ist folglich auch nicht vom EA MLA abgedeckt. Unabhängig davon wurde der Bericht auf Basis der allgemeinen Regeln der ISO/IEC 17000er Reihe erstellt. Mit "#" gekennzeichnete Prüfungen sind nicht Bestandteil der Akkreditierung D-PL-14169-03-00.*

Product description

6	**Alternative models**	—
7	**Description**	Refer to the technical documentation and user manual.
8	**Serial number**	no information available / prototype
9	**Manufacturer**	same as applicant
10	**Ratings**	ET3860: 5V, 1A Power supply (according to labeling): Input: 100-240V; 50-60Hz Output: 5VDC; 1400mA
11	**Mounting position**	Other
12	**Equipment category**	Class B
13	**Protection class**	III - Safety extra-low voltage(ET3860) II - Double insulated (power supply)
14	**Hardware version**	V1.4.1
15	**Software version**	5.1.5 (For EMC testing a modified version was used to simulate the use case: Controler Box 5.0.0)
16	**Dimensions**	no information available / see pictures
17	**Weight**	no information available
18	**Comments**	—
19	**Test sample obtaining**	☒ by customer ☐ by TÜV Rheinland Group ☐ others:
20	**FCC ID: 2BH6Y-ET3860 & IC:32628-ET3860** Note: FCC/IC ID will not be labeled on non-radio devices & ID's applicable only to Radio part ET3860.	
21	**Remarks: -** NEURO TRONIC and NEURO HiSWING R+ are used for EMC measurement.	

See extern document [3]:
[3] External_product_description_photos_DE23RSSK 001

Clause	Requirements – Tests	Measuring results - Remarks	Result
22	**Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line** FCC Part 15 Subpart B section 15.107	Test protocol: 55 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 120V, 60Hz Operating mode: Charging Remarks: Ferrite Farnell 4156103 at ET3860 connection	P ☒ F ☐ N/A ☐ N/T ☐
23	**Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line** FCC Part 15 Subpart B section 15.107	Test protocol: 54 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 240V, 60Hz Operating mode: Charging Remarks: Ferrite Farnell 4156103 at ET3860 connection	P ☒ F ☐ N/A ☐ N/T ☐
24	**Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line** ICES-003 (Issue 7) section 3.2.1	Test protocol: 56 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 120V, 60Hz Operating mode: Charging Remarks: Ferrite Farnell 4156103 at ET3860 connection	P ☒ F ☐ N/A ☐ N/T ☐
25	**Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line** ICES-003 (Issue 7) section 3.2.2	Test protocol: 57 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 240V, 60Hz Operating mode: Charging Remarks: Ferrite Farnell 4156103 at ET3860 connection	P ☒ F ☐ N/A ☐ N/T ☐

Clause	Requirements – Tests	Measuring results - Remarks	Result

Limits

47 CFR FCC Part 15 Subpart B section §15.107

Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency [MHz]	Quasi-peak [dB(µV)]	Average [dB(µV)]
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

*Decreases linearly with the logarithm of the frequency.

For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency [MHz]	Quasi-peak [dB(µV)]	Average [dB(µV)]
0.15 – 0.5	79	66
0.5 – 30	73	60

ICES-003 section 3.2.1

Frequency [MHz]	Class A Quasi-peak [dBµV]	Class A Average [dBµV]	Class B Quasi-peak [dBµV]	Class B Average [dBµV]
0.15 – 0.5	79	66	66 to 56*	56 to 46*
0.5 – 5	73	60	56	46
5 – 30	73	60	60	50

*Decreases linearly with the logarithm of the frequency.

Method of measurement of conducted emission

Floor-standing equipment was placed on a non-conducting support (up to 15 cm) over the reference ground plane. Tabletop equipment was placed on a table at a height of 0.8 m above the reference ground plane. All equipment was minimum 0.4 m away from the conducting walls of a shielded room. The Artificial Mains Network (AMN) was placed 0.8 m away from the boundary of the unit under test and bonded to the ground reference plane. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. Supporting units were connected to other AMN if necessary. A pre-scan was made with peak and average-detector on all mains lines at the output of the AMN. The whole required frequency range was investigated for maximum conducted interferences. After data reduction, a final measurement of the highest emissions was made with quasi-peak and average detector with a measurement time of at least 1 s per single frequency.

Clause	Requirements – Tests	Measuring results - Remarks	Result
26	**Radiated Electric Emission (30 MHz - 1 GHz)** FCC Part 15 Subpart B section 15.109	Test protocol: 49 EUT: A003599211-005, -002, -003; A003653283-002 Supply voltage: Battery powered Operating mode: Battery operated Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
27	**Radiated Electric Emission (30 MHz - 1 GHz)** FCC Part 15 Subpart B section 15.109	Test protocol: 51 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 120 V, 60 Hz Operating mode: Charging Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
28	**Radiated Electric Emission (1 GHz - 2 GHz)** FCC Part 15 Subpart B section 15.109	Test protocol: 53 EUT: A003599211-005, -002, -003; A003653283-001 Supply voltage: Battery powered Operating mode: Battery operated Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
29	**Radiated Electric Emission (1 GHz - 2 GHz), charging mode** FCC Part 15 Subpart B section 15.109	Remarks: Max used operating frequency in charging mode < 108 MHz	P ☐ F ☐ N/A ☒ N/T ☐
30	**Radiated Electric Emission (30 MHz - 1 GHz)** FCC Part 15 Subpart B section 15.109	Test protocol: 52 EUT: A003599211-002; A003653283-003, -001 Supply voltage: Battery powered Operating mode: Battery operated Remarks: Test with alternative setup, just for information.	P ☒ F ☐ N/A ☐ N/T ☐

Clause	Requirements – Tests	Measuring results - Remarks	Result
31	**Radiated Electric Emission (30 MHz - 1 GHz)** ICES-003 (Issue 7) section 3.2.2	Test protocol: 59 EUT: A003599211-005, -002, -003; A003653283-002 Supply voltage: Battery powered Operating mode: Battery operated Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
32	**Radiated Electric Emission (30 MHz - 1 GHz)** ICES-003 (Issue 7) section 3.2.2	Test protocol: 58 EUT: A003599211-005, -002, -003, -019; A003653283-002 Supply voltage: 120 V, 60 Hz Operating mode: Charging Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
33	**Radiated Electric Emission (1 GHz - 2 GHz)** ICES-003 (Issue 7) section 3.2.2	Test protocol: 60 EUT: A003599211-005, -002, -003; A003653283-002 Supply voltage: Battery powered Operating mode: Battery operated Remarks: —	P ☒ F ☐ N/A ☐ N/T ☐
34	**Radiated Electric Emission (1 GHz - 2 GHz)** ICES-003 (Issue 7) section 3.2.2	Remarks: Max used operating frequency in charging mode < 108 MHz	P ☐ F ☐ N/A ☒ N/T ☐

Clause	Requirements – Tests	Measuring results - Remarks	Result

Limits

47 CFR FCC Part 15 Subpart B section §15.109
Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency [MHz]	Field strength (microvolts/meter)	Quasi-peak [dB(µV)/m]
30 – 88	100	40
88 – 216	150	43.5
216 – 960	200	46
Above 960	500	54

The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following, using measurement instrumentation employing a CISPR quasi-peak detector.

Frequency [MHz]	Field strength (microvolts/meter)	Quasi-peak [dB(µV)/m]
30 – 88	90	39.1
88 – 216	150	43.5
216 – 960	210	46.4
Above 960	300	49.5

Note: For frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function.
When average radiated emission measurements are specified, there also is a limit on the peak level of the radio frequency emissions which is 20 dB above the maximum permitted average emission limit. (see § 15.35 Measurement detector functions and bandwidths)

As an alternative to the radiated emission limits shown above, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22 (acc. §15.109 (g)).
The field strength of radiated emissions from Class B devices at a distance of 10 meters shall not exceed the following values:

Frequency [MHz]	Quasi-peak [dB(µV)/m]
30 – 230	30
230 - 1000	37

The field strength of radiated emissions from Class A devices at a distance of 10 meters shall not exceed the following values:

Frequency [MHz]	Quasi-peak [dB(µV)/m]
30 – 230	40
230 - 1000	47

ICES-003 section 3.2.2
Radiated emissions limits (30 MHz to 1 GHz)

Clause	Requirements – Tests	Measuring results - Remarks	Result

Frequency [MHz]	Class A (3 m) Quasi-peak [dB(µV)/m]	Class A (10 m) Quasi-peak [dB(µV)/m]	Class B (3 m) Quasi-peak [dB(µV)/m]	Class B (10 m) Quasi-peak [dB(µV)/m]
30 – 88	50.0	40.0	40.0	30.0
88 – 216	54.0	43.5	43.5	33.1
216 – 230	56.9	46.4	46.0	35.6
230 – 960	57.0	47.0	47.0	37.0
960 – 1000	60.0	49.5	54.0	43.5

Radiated emission limits at 3 m distance (at and above 1 GHz)

Frequency [GHz]	Class A Average [dB(µV)/m]	Class A Peak [dB(µV)/m]	Class B Average [dB(µV)/m]	Class B Peak [dB(µV)/m]
1 – F_M	60	80	54	74

The highest measurement frequency, F_M, in GHz, shall be determined as

Highest internal frequency (F_X)	Highest measurement frequency (F_M)
$F_X \leq 108$ MHz	1 GHz
108 MHz < $F_X \leq 500$ MHz	2 GHz
500 MHz < $F_X \leq 1$ GHz	5 GHz
$F_X > 1$ GHz	5 x F_X up to a maximum of 40 GHz

F_X is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test. These limit levels apply for a measurement distance of 3 m. If using a different measurement distance, the measured levels shall be extrapolated to the 3 m limit distance using a factor of 20 dB per decade of distance. The measurement distance shall place the measurement antenna in the far field of the ITE or digital apparatus under test.

Clause	Requirements – Tests	Measuring results - Remarks	Result

Method of measurement of radiated emission

Measurements were made in a 10-meter semi-anechoic chamber that complies to ANSI C63.4:2014. Floor-standing equipment was placed on a non-conducting support (0.1 ± 0.01) m over the reference ground plane. Tabletop equipment was placed on a table at a height of (0.8 ± 0.05) m above the reference ground plane. Preliminary measurements were performed with a receiver employing a peak detector at an antenna to EUT distance of 10 m or 3 m (as defined in the standard). The EUT was rotated in 45° steps for frequencies below 1 GHz and 22.5° steps for frequencies over 1GHz about its azimuth to determine the position of the highest emissions. The measurement antenna was adjusted between 1 m and 4 m above ground to find the maximum signal strength. These measurements were done and in both horizontal and vertical polarizations. After this, final measurements with a receiver employing a quasi-peak detector for frequencies below 1 GHz and with a peak and an average detector for frequencies above 1 GHz were performed by rotating the EUT by 360° and adjusting the receive antenna height from 1 m to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity. For frequencies over 1 GHz floor absorbers were used between antenna and EUT to fulfil the SVSWR requirements.
The whole required frequency range was investigated for maximum radiated interferences. After data reduction, a final measurement of the highest emissions was made with quasi-peak, peak and average detector with a measurement time of at least 1 s per single frequency.
The emission limits are calculated from the field strength limit of this section using this formula:

$$Emission\ level\ \left(\frac{dB\mu V}{m}\right) = 20\ log\ Emission\ level\ \left(\frac{\mu V}{m}\right)$$

When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade as per §15.31(f)(1). For this documentation a distance extrapolation factor was added to the limit that was calculated using this formula:

$$Emission\ limit_{new}\ \left(\frac{dB\mu V}{m}\right) = Emission\ limit_{old} + 20\ log\left(\frac{d_1}{d_2}\right)$$

Where
d_1: $old\ distance (e.g. 3\ m)$
d_2: $new\ distance\ (e.g. 10\ m)$

The field strength is calculated by adding the antenna factor and cable loss. The basic equation with a sample calculation is as follows:

$$E = U + AF + CA$$

Where
E: $Field\ strength$
U: $Receiver\ reading$
AF: $Antenna\ factor$
CA: $Cable\ loss$

For example:

Receiver reading U (dBµV)	Correction antenna factor AF + cable loss CA (dB)	Field strength E (dBµV/m)
15.9	15.8	31.7

ADDITIONAL DOCUMENTATION

35	**Accreditations & Endorsements**
36	**US Federal Communications Commission** TUV Rheinland LGA Products GmbH located at, Tillystraße 2, 90431 Nuremberg is recognized by the Bundesnetzagentur (Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway) as conformity assessment body.
37	**Applied basic standards**
	According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards: - Title 47 CFR FCC Part 15 Subpart B - ANSI C63.4-2014 (Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz) - ICES-003:2020 (Issue 7) (Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement) The test setup and test was done according to ANSI C63.4-2014.

FCC designation number	DE0016
Bundesnetzagentur registration number	BNetzA-CAB-17/21-16

ADDITIONAL DOCUMENTATION

38 Equipment used during test

Equipment under test

Product type	Manufacturer	Model	Comments
Controller Bluetooth with lithium-polymer battery	same as applicant	ET3860	A003599211-005 and A003653283-003
Automatic System Knee Joint	same as applicant	NEURO TRONIC SK3855-L/TI	A003599211-002
Automatic System Ankle Joint	same as applicant	NEURO HiSWING R+	A003599211-003
Automatic System Ankle Joint	same as applicant	NEURO HiSWING 2 SH8205-LR/TI	A003599211-003
External USB-Power Supply	same as applicant	ET0780-01	A003599211-019 With LED indicator
Connecting cable Y	same as applicant	—	A003653283-002
Connecting cable direct	same as applicant	—	A003653283-001 used just for informative test

Auxiliary Equipment / Peripherals

Product type	Manufacturer	Model	Comments
Patient remote control Bluetooth for the patient with coin cell battery	same as applicant	ET3840-P	not part of EUT/already tested

39 Input/Output ports

Name	Type*	Max. length	Shielded	Comments
Enclosure	N/E	—	—	—
USB-C (for charging only)	DC	< 3m	YES	—

* AC = AC Power Port
DC = DC Power Port
N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

ADDITIONAL DOCUMENTATION

40 Internal operating frequencies

Frequency	Description
Max 128 MHz	According to customers document [2] Microprocessor clock frequency max 128 MHz (64 MHz in charging mode)

41 Operating modes

No.	Description
1	Battery operated (as described in customers document [1])
2	Charging (as described in customers document [1])

42 Special EMC measures

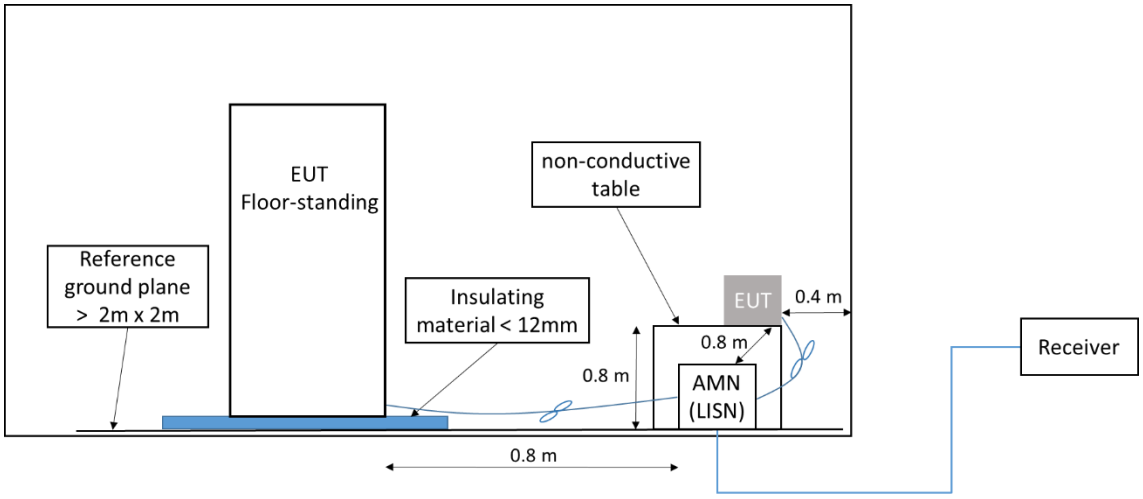
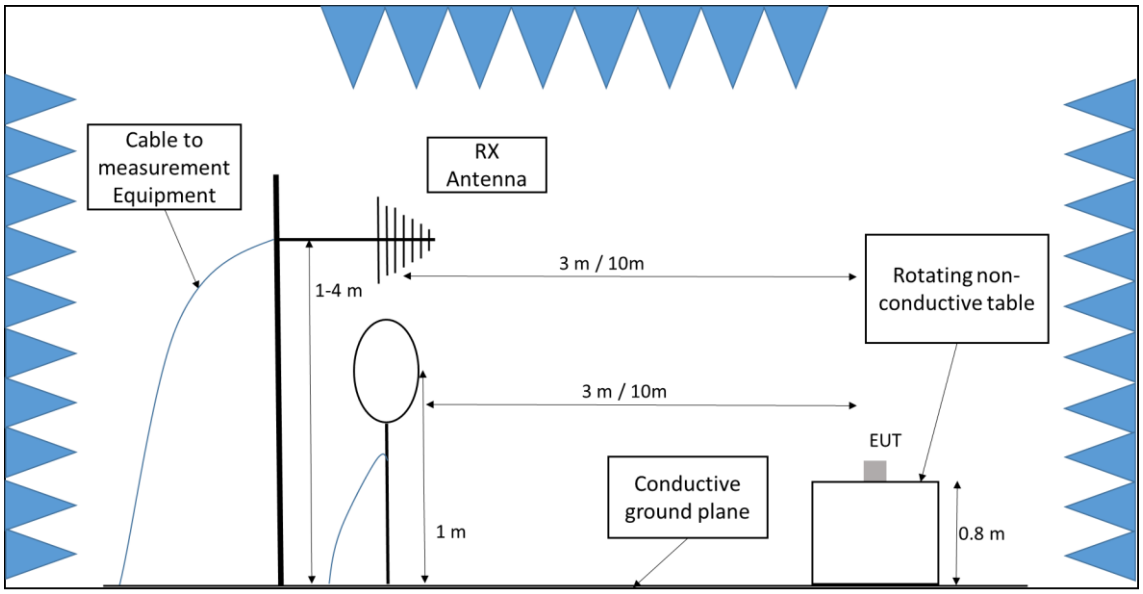
In order to pass the individual tests, the following changes were necessary:

Radiated disturbance 30M-1GHz
Ferrite Farnell 4156103 at ET3860 connection

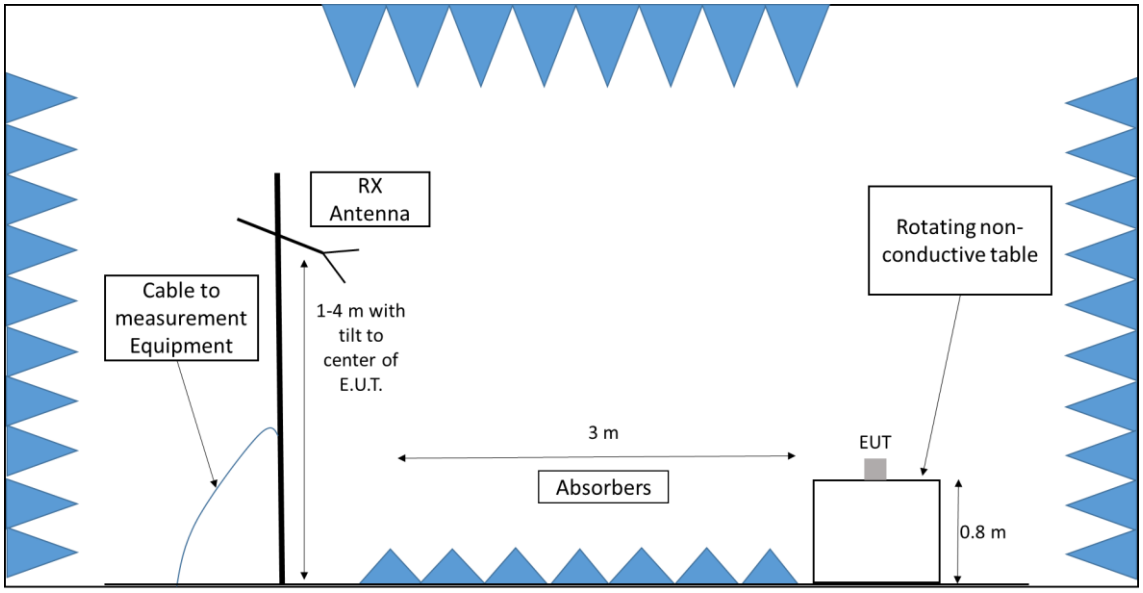
ADDITIONAL DOCUMENTATION

43	**EUT configuration**
	The test setup was made in accordance with mentioned EMC standards. Measurements and tests were executed under ”worst case” conditions. Typical EUT arrangements or operating modes were chosen or assumed which let suspect maximum emission or susceptibility (a so called ”unfavourable configuration”). Details of test setup or adjustments are (particularly) shown inside the photo documentation. As far as not mentioned otherwise these statements are valid for all following tests.
44	**Additional documentation**
	Customers documents: [1] “MEM_ET3860_testing_instructions-SH8-EN_A.docx” [2] “MEM_Electromagnetic_Compatibility_SH8-EN_A **Appendices to the test report:** [3] External_product_description_photos_DE23RSSK 001 [4] Externaltest_setup_photos_DE23RSSK 001

ADDITIONAL DOCUMENTATION

45	**Conducted emission (9kHz – 30 MHz) acc. ANSI C63.4**
	
46	**Field strength measurement (9 kHz – 30 MHz) with loop antenna** **Field strength measurement (30 MHz – 1000 MHz) with log-per antenna acc. ANSI C63.4**
	
47	**Field strength measurement (>1 GHz) horn antenna acc. ANSI C63.4**

ADDITIONAL DOCUMENTATION



48 Climatic conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.
The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

ADDITIONAL DOCUMENTATION

49 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the quality system acc. to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

The manufacturer has the sole responsibility of continued compliance of the device.

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Measurement procedure	**U_{Lab}**
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 9k-150kHz (CISPR Band A)	2.3 dB
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 150k-30MHz (CISPR Band B) with 150 ohm Delta LISN	3.3 dB
Measurement of conducted emissions at the power supply connection to LISN in the frequency range 150k-30MHz (CISPR Band B)	2.2 dB
Measurement of conducted emissions at the power supply connection to voltage probes in the frequency range 9k-30MHz (CISPR Band A and B)	2.0 dB
Measurement of conducted emissions at telecommunication connection to ISN in the frequency range 150k-30MHz (CISPR Band B) ISN CAT 5	3.3 dB
Measurement of conducted emissions at the telecommunication connection to ISN in the frequency range 150k-30MHz (CISPR Band B) ISN CAT 6 Shielded	2.6 dB
Measurement of conducted emissions at the telecommunications connection to current clamps in the frequency range 150k-30MHz (CISPR Band B)	2.2 dB
Measurement of interference power in the frequency range 30-300MHz (CISPR Band C)	2.9 dB
Measurement of interference power in the frequency range 30-300MHz (CISPR Band C) CDNE	2.6 dB
Measurement of magnetic emissions in the frequency range 9k-150kHz (CISPR Band A) with frame antenna HFH2 (small loop antenna)	1.6 dB
Measurement of magnetic emissions in the frequency range 9k-150kHz (CISPR Band A) with frame antenna HL562 (3-axis loop antenna)	1.6 dB
Measurement of the field strength in the frequency range 30-1000MHz (CISPR Band C and D) with 10m distance with VULB 9168 Vertical	4.5 dB
Measurement of the field strength in the frequency range 30-1000MHz (CISPR band C and D) with 10m distance with VULB 9168 Horizontal	4.4 dB
Measurement of the field strength in the frequency range 1-18GHz (CISPR Band E) with 3m distance with HL025 1-6GHz	5.0 dB
Measurement of the field strength in the frequency range 1-18GHz (CISPR Band E) with 3m distance with HL025 6-18GHz	5.3 dB

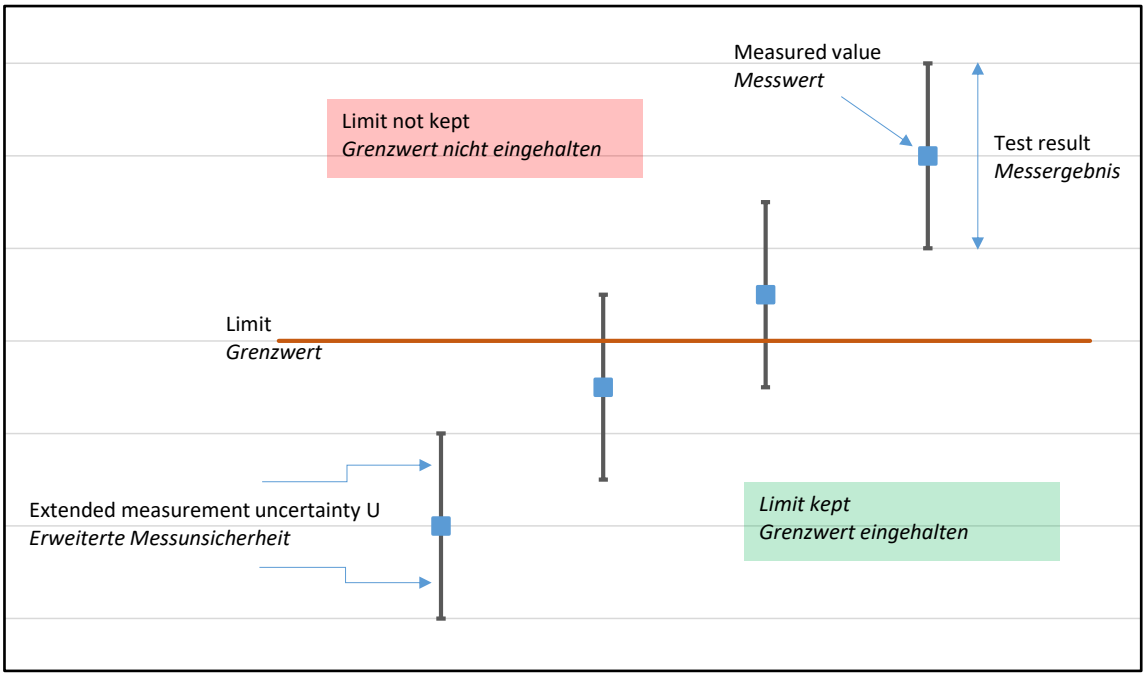
ADDITIONAL DOCUMENTATION

49 Statement of the measurement uncertainty

Measurement procedure	U_{Lab}
Limits for harmonic measurements ≤ 16A per conductor (Worst Case Estimation)	10.7%
Limits for voltage fluctuations and flicker ≤ 16A per conductor (Worst Case Estimation)	15.7%
Immunity to discharge of static electricity	18.1%
Immunity to high-frequency electromagnetic fields in the frequency range of 80-6000MHz calibration	1.2 dB
Immunity to high-frequency electromagnetic fields in the frequency range of 80-6000MHz level adjustment	2.6 dB
Immunity to fast transient disturbances	—
Immunity to surge voltages	—
Immunity to conducted electromagnetic fields in the frequency range of 0.150-30MHz Calibration CDN	1.4 dB
Immunity to conducted electromagnetic fields in the frequency range of 0.150-30MHz Level setting CDN	1.5 dB
Immunity to conducted electromagnetic fields in the frequency range of 0.150-30MHz Level adjustment EM coupling path	3.3 dB
Immunity to conducted electromagnetic fields in the frequency range of 0.150-30MHz Calibration Clamp	1.6 dB
Immunity to conducted electromagnetic fields in the frequency range of 0.150-30MHz Level adjustment Clamp	3.3 dB

ADDITIONAL DOCUMENTATION

50 Example for interpretation of measuring results



Measured value	Limit	Extended measurement uncertainty (k=2)	Test result
48.9 dBµV @ 16.5 MHz	50 dBµV	2.2 dB	46.7 dBµV – 51.1 dBµV

ADDITIONAL DOCUMENTATION

Protocol of Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line **EUT:** A003599211-005, -002, -003, -019; A003653283-001	**55**

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.107
Test method	ANSI C63.4-2014
Supply voltage	120V, 60Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	none
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-02-02
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Conducted Voltage Emission

EUT: A003599211-005, -002, -003, -019; A003653283-001

55

Type	Manufacturer	Model	ID	Last calibration	Next calibration
LISN	Rohde & Schwarz	ESH2-Z5	2728096	2023-01-27	2026-01-27
Limitor	Rohde & Schwarz	ESH3-Z2	9017597	2022-08-25	2024-08-25
Receiver	Rohde & Schwarz	ESU 8	2728148	2023-11-27	2024-11-27
Commutation relay	MTS Systemtechnik	KRM4-5811-T-S1	2730174	---	---
Shielded room	TDK	SR 2	—	---	---

Test parameter of Conducted Voltage Emission on AC Supply line

EUT: A003599211-005, -002, -003, -019; A003653283-001

55

Subrange 1 (Phase 1, 150 kHz…30 MHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

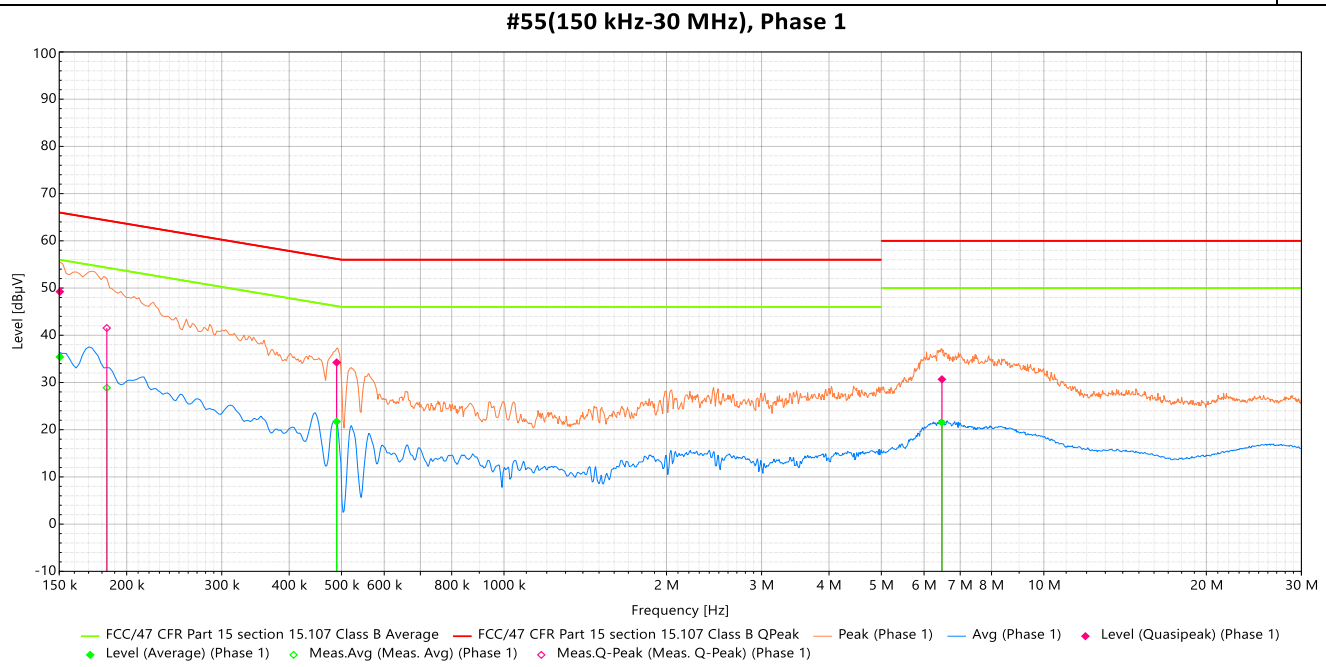
Subrange 2 (Neutral, 150 kHz…30 MHz)

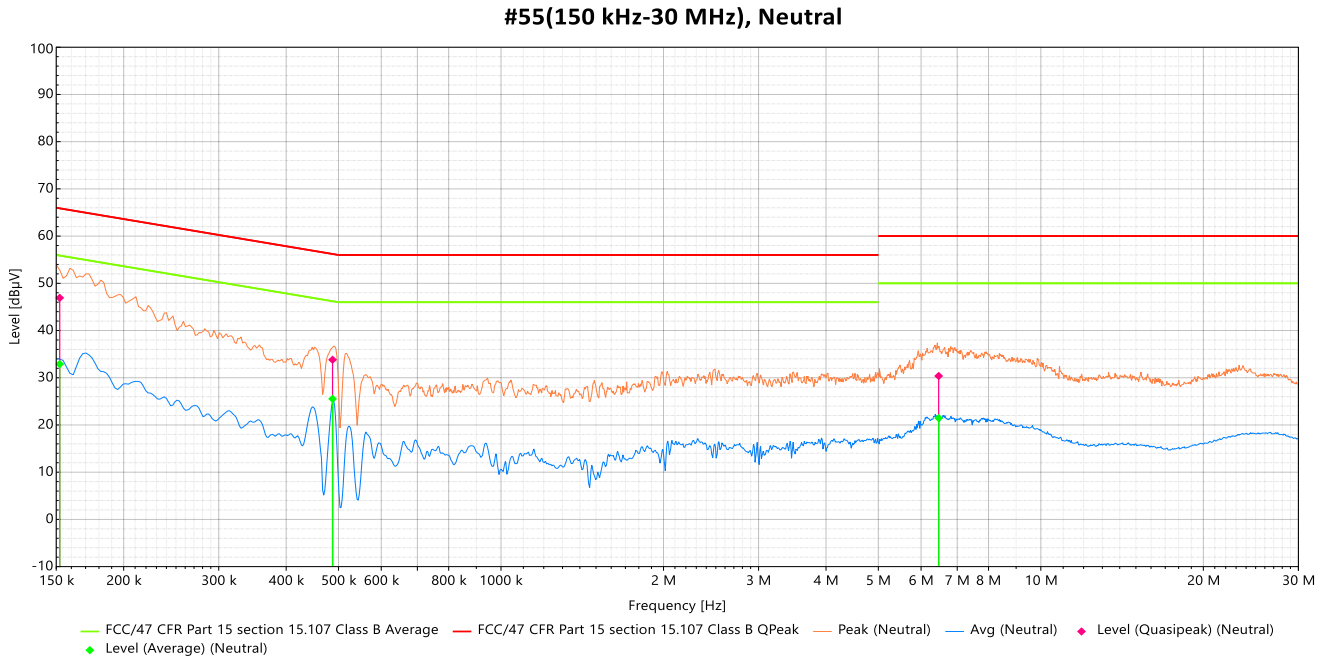
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

ADDITIONAL DOCUMENTATION

Chart of Conducted Voltage Emission on AC Supply line **55**

EUT: A003599211-005, -002, -003, -019; A003653283-001





ADDITIONAL DOCUMENTATION

Result of Conducted Voltage Emission on AC Supply line **55**

EUT: A003599211-005, -002, -003, -019; A003653283-001

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	Comments
6.468 M	30.4	60.0	-29.6	Neutral	10.3	9000.0	1.0	Pass
6.475 M	30.7	60.0	-29.3	Phase 1	10.3	9000.0	1.0	Pass
487.5 k	33.8	56.2	-22.4	Neutral	10.0	9000.0	1.0	Pass
489.75 k	34.2	56.2	-21.9	Phase 1	10.0	9000.0	1.0	Pass
152.25 k	46.9	65.9	-19.0	Neutral	10.0	9000.0	1.0	Pass
150 k	49.2	66.0	-16.8	Phase 1	10.0	9000.0	1.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
6.468 M	50.0	21.5	-28.5	Neutral	10.3	9 k	1.0	0.1	Pass
6.475 M	50.0	21.5	-28.5	Phase 1	10.3	9 k	1.0	0.1	Pass
489.75 k	46.2	21.7	-24.4	Phase 1	10.0	9 k	1.0	0.1	Pass
152.25 k	55.9	32.9	-23.0	Neutral	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	25.5	-20.7	Neutral	10.0	9 k	1.0	0.1	Pass
150 k	56.0	35.4	-20.6	Phase 1	10.0	9 k	1.0	0.1	Pass

Average

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
183.75 k	28.9	54.3	-25.4	10.0

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
183.75 k	41.5	64.3	-22.8	10.0

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line **EUT:** A003599211-005, -002, -003, -019; A003653283-001	**54**

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.107
Test method	ANSI C63.4-2014
Supply voltage	240V, 60Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	none
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-02-02
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Conducted Voltage Emission

54

EUT: A003599211-005, -002, -003, -019; A003653283-001

Type	Manufacturer	Model	ID	Last calibration	Next calibration
LISN	Rohde & Schwarz	ESH2-Z5	2728096	2023-01-27	2026-01-27
Limitor	Rohde & Schwarz	ESH3-Z2	9017597	2022-08-25	2024-08-25
Receiver	Rohde & Schwarz	ESU 8	2728148	2023-11-27	2024-11-27
Commutation relay	MTS Systemtechnik	KRM4-5811-T-S1	2730174	---	---
Shielded room	TDK	SR 2	—	---	---

Test parameter of Conducted Voltage Emission on AC Supply line

54

EUT: A003599211-005, -002, -003, -019; A003653283-001

Subrange 1 (Phase 1, 150 kHz…30 MHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

Subrange 2 (Neutral, 150 kHz…30 MHz)

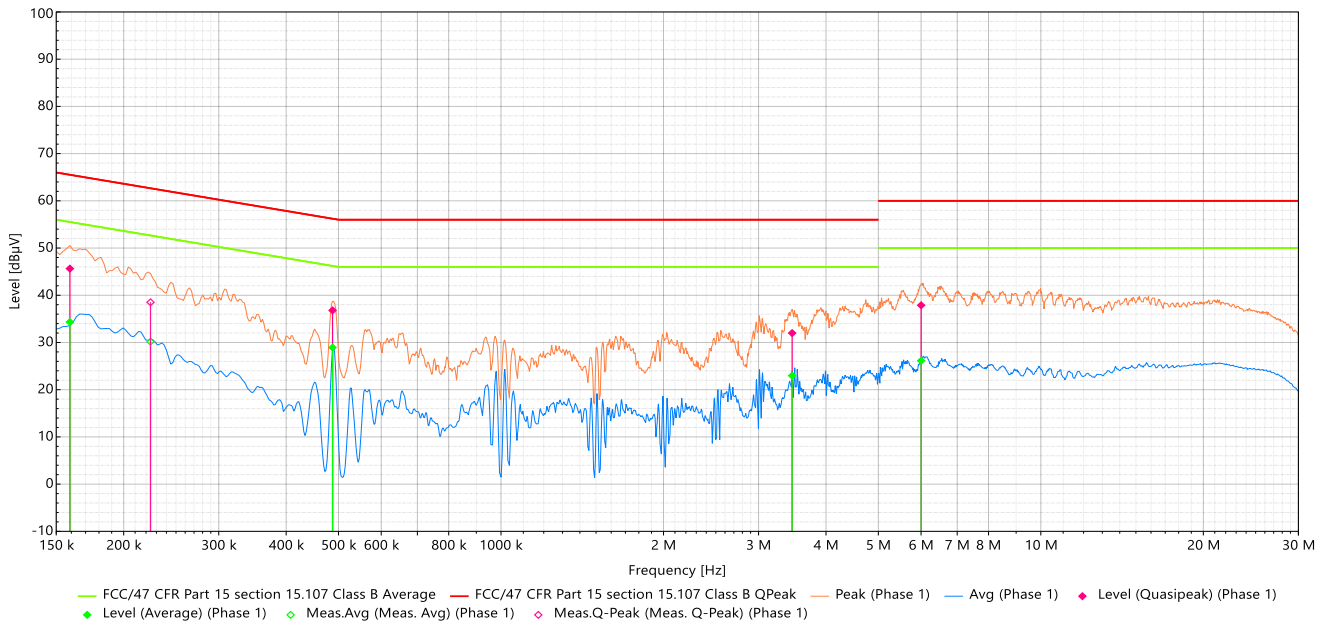
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

ADDITIONAL DOCUMENTATION

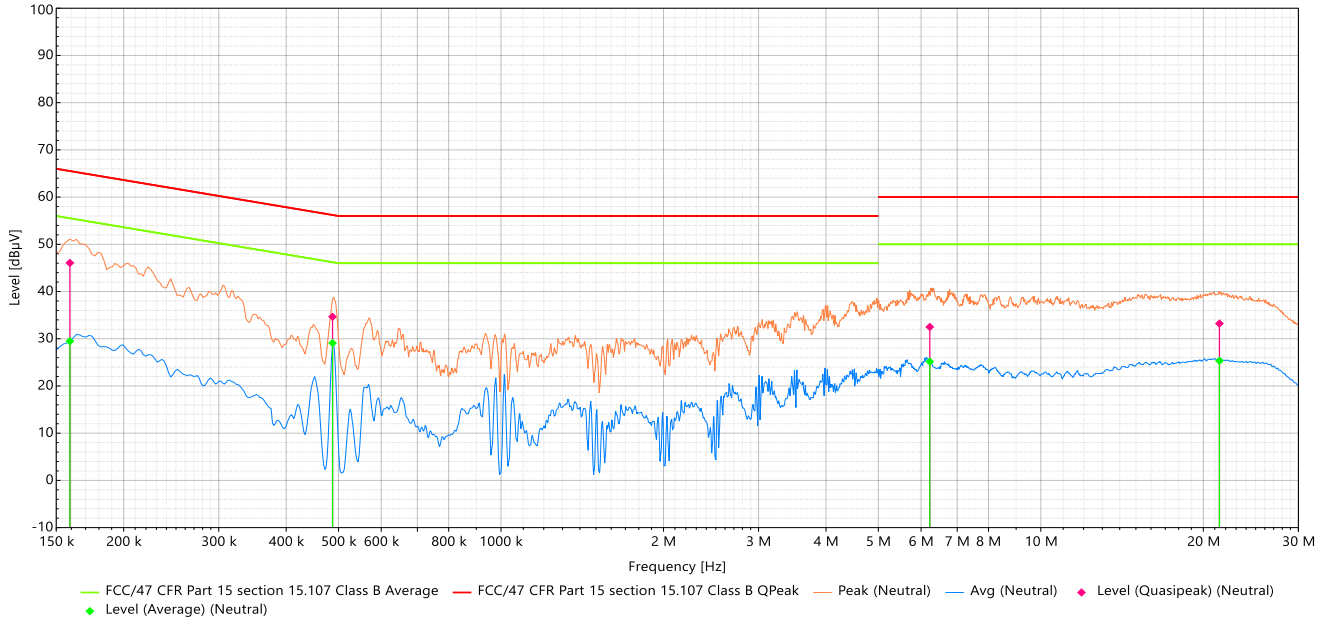
Chart of Conducted Voltage Emission on AC Supply line **54**

EUT: A003599211-005, -002, -003, -019; A003653283-001

#54(150 kHz-30 MHz), Phase 1



#54(150 kHz-30 MHz), Neutral



ADDITIONAL DOCUMENTATION

Result of Conducted Voltage Emission on AC Supply line

54

EUT: A003599211-005, -002, -003, -019; A003653283-001

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	Comments
6.227 M	32.5	60.0	-27.5	Neutral	10.2	9000.0	1.0	Pass
21.422 M	33.2	60.0	-26.8	Neutral	10.8	9000.0	1.0	Pass
3.462 M	32.0	56.0	-24.0	Phase 1	10.1	9000.0	1.0	Pass
6.002 M	37.9	60.0	-22.1	Phase 1	10.2	9000.0	1.0	Pass
487.5 k	34.7	56.2	-21.5	Neutral	10.0	9000.0	1.0	Pass
159 k	45.6	65.5	-19.9	Phase 1	10.0	9000.0	1.0	Pass
159 k	46.1	65.5	-19.5	Neutral	10.0	9000.0	1.0	Pass
487.5 k	36.8	56.2	-19.4	Phase 1	10.0	9000.0	1.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
159 k	55.5	29.5	-26.0	Neutral	10.0	9 k	1.0	0.1	Pass
6.227 M	50.0	25.2	-24.8	Neutral	10.2	9 k	1.0	0.1	Pass
21.422 M	50.0	25.3	-24.7	Neutral	10.8	9 k	1.0	0.1	Pass
6.002 M	50.0	26.1	-23.9	Phase 1	10.2	9 k	1.0	0.1	Pass
3.462 M	46.0	23.0	-23.0	Phase 1	10.1	9 k	1.0	0.1	Pass
159 k	55.5	34.3	-21.2	Phase 1	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	28.9	-17.3	Phase 1	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	29.1	-17.1	Neutral	10.0	9 k	1.0	0.1	Pass

Average

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
224.25 k	30.2	52.7	-22.5	10.0

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
224.25 k	38.5	62.7	-24.1	10.0

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line **EUT:** A003599211-005, -002, -003, -019; A003653283-001	**56**

Verdict	**PASS**
Applied Standard	ICES-003 (Issue 7) section 3.2.1
Test method	---
Supply voltage	120V, 60Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	none
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-02-02
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Conducted Voltage Emission

56

EUT: A003599211-005, -002, -003, -019; A003653283-001

Type	Manufacturer	Model	ID	Last calibration	Next calibration
LISN	Rohde & Schwarz	ESH2-Z5	2728096	2023-01-27	2026-01-27
Limitor	Rohde & Schwarz	ESH3-Z2	9017597	2022-08-25	2024-08-25
Receiver	Rohde & Schwarz	ESU 8	2728148	2023-11-27	2024-11-27
Commutation relay	MTS Systemtechnik	KRM4-5811-T-S1	2730174	---	---
Shielded room	TDK	SR 2	—	---	---

Test parameter of Conducted Voltage Emission on AC Supply line

56

EUT: A003599211-005, -002, -003, -019; A003653283-001

Subrange 1 (Phase 1, 150 kHz…30 MHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

Subrange 2 (Neutral, 150 kHz…30 MHz)

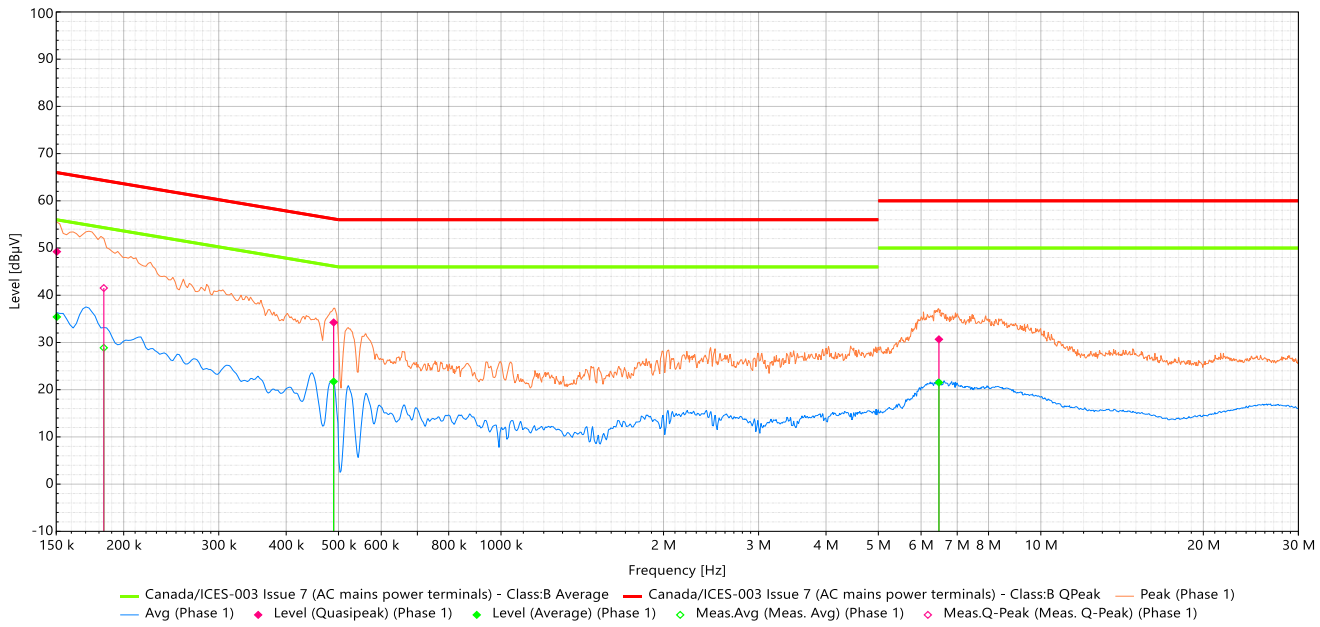
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

ADDITIONAL DOCUMENTATION

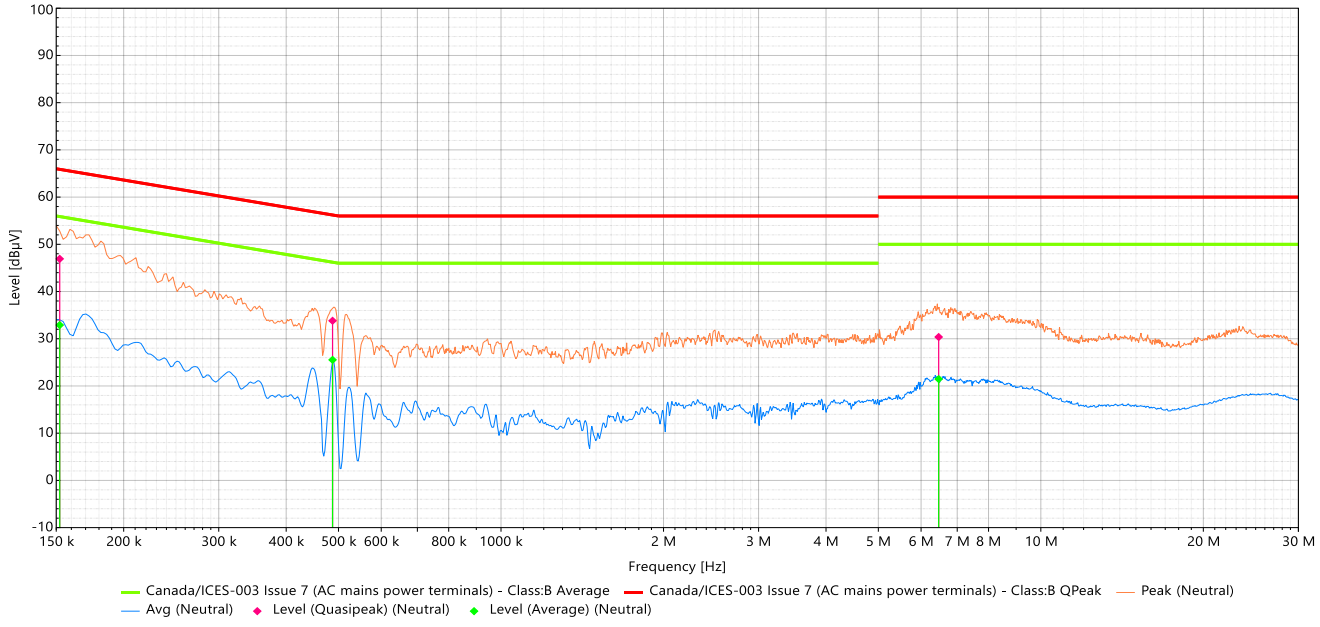
Chart of Conducted Voltage Emission on AC Supply line **56**

EUT: A003599211-005, -002, -003, -019; A003653283-001

#56(150 kHz-30 MHz), Phase 1



#56(150 kHz-30 MHz), Neutral



ADDITIONAL DOCUMENTATION

Result of Conducted Voltage Emission on AC Supply line **56**

EUT: A003599211-005, -002, -003, -019; A003653283-001

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	Comments
6.468 M	30.4	60.0	-29.6	Neutral	10.3	9000.0	1.0	Pass
6.475 M	30.7	60.0	-29.3	Phase 1	10.3	9000.0	1.0	Pass
487.5 k	33.8	56.2	-22.4	Neutral	10.0	9000.0	1.0	Pass
489.75 k	34.2	56.2	-21.9	Phase 1	10.0	9000.0	1.0	Pass
152.25 k	46.9	65.9	-19.0	Neutral	10.0	9000.0	1.0	Pass
150 k	49.2	66.0	-16.8	Phase 1	10.0	9000.0	1.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
6.468 M	50.0	21.5	-28.5	Neutral	10.3	9 k	1.0	0.1	Pass
6.475 M	50.0	21.5	-28.5	Phase 1	10.3	9 k	1.0	0.1	Pass
489.75 k	46.2	21.7	-24.4	Phase 1	10.0	9 k	1.0	0.1	Pass
152.25 k	55.9	32.9	-23.0	Neutral	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	25.5	-20.7	Neutral	10.0	9 k	1.0	0.1	Pass
150 k	56.0	35.4	-20.6	Phase 1	10.0	9 k	1.0	0.1	Pass

Average

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
183.75 k	28.9	54.3	-25.4	10.0

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
183.75 k	41.5	64.3	-22.8	10.0

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line **EUT:** A003599211-005, -002, -003, -019; A003653283-001	**57**

Verdict	**PASS**
Applied Standard	ICES-003 (Issue 7) section 3.2.2
Test method	---
Supply voltage	240V, 60Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	none
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-02-02
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Conducted Voltage Emission

57

EUT: A003599211-005, -002, -003, -019; A003653283-001

Type	Manufacturer	Model	ID	Last calibration	Next calibration
LISN	Rohde & Schwarz	ESH2-Z5	2728096	2023-01-27	2026-01-27
Limitor	Rohde & Schwarz	ESH3-Z2	9017597	2022-08-25	2024-08-25
Receiver	Rohde & Schwarz	ESU 8	2728148	2023-11-27	2024-11-27
Commutation relay	MTS Systemtechnik	KRM4-5811-T-S1	2730174	---	---
Shielded room	TDK	SR 2	—	---	---

Test parameter of Conducted Voltage Emission on AC Supply line

57

EUT: A003599211-005, -002, -003, -019; A003653283-001

Subrange 1 (Phase 1, 150 kHz…30 MHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

Subrange 2 (Neutral, 150 kHz…30 MHz)

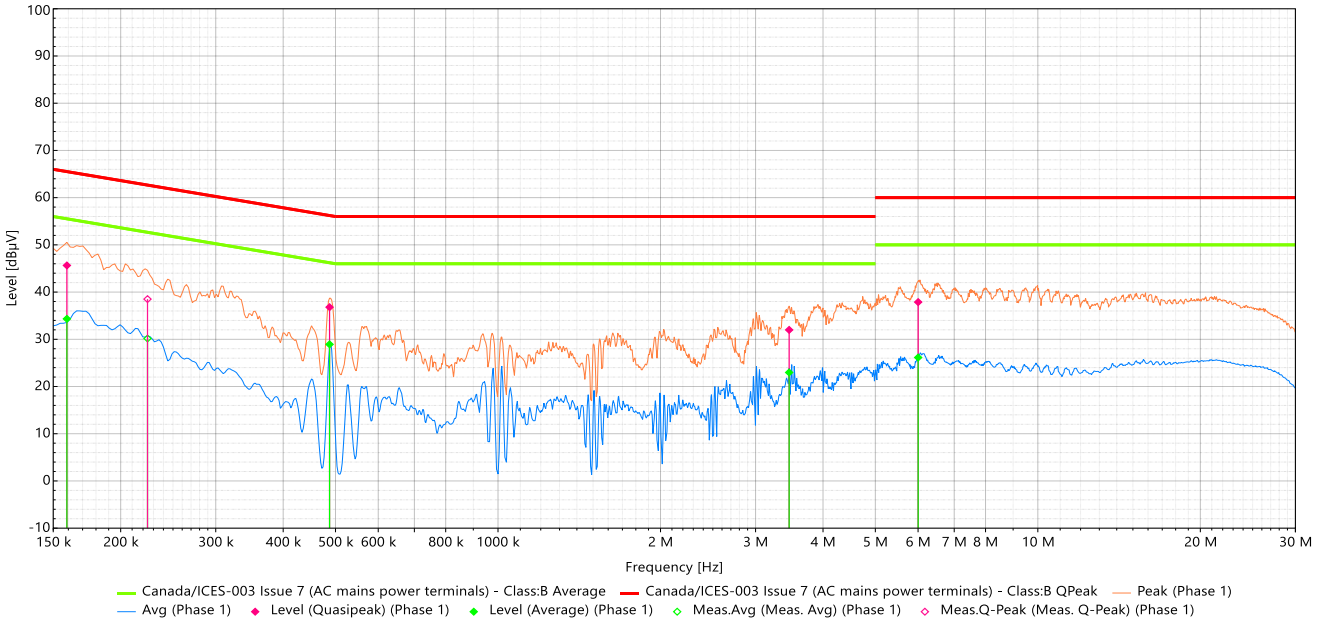
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	9 kHz/ Auto	OFF	OFF	OFF/	ON	Auto	6dB	2.25 kHz	100 ms

ADDITIONAL DOCUMENTATION

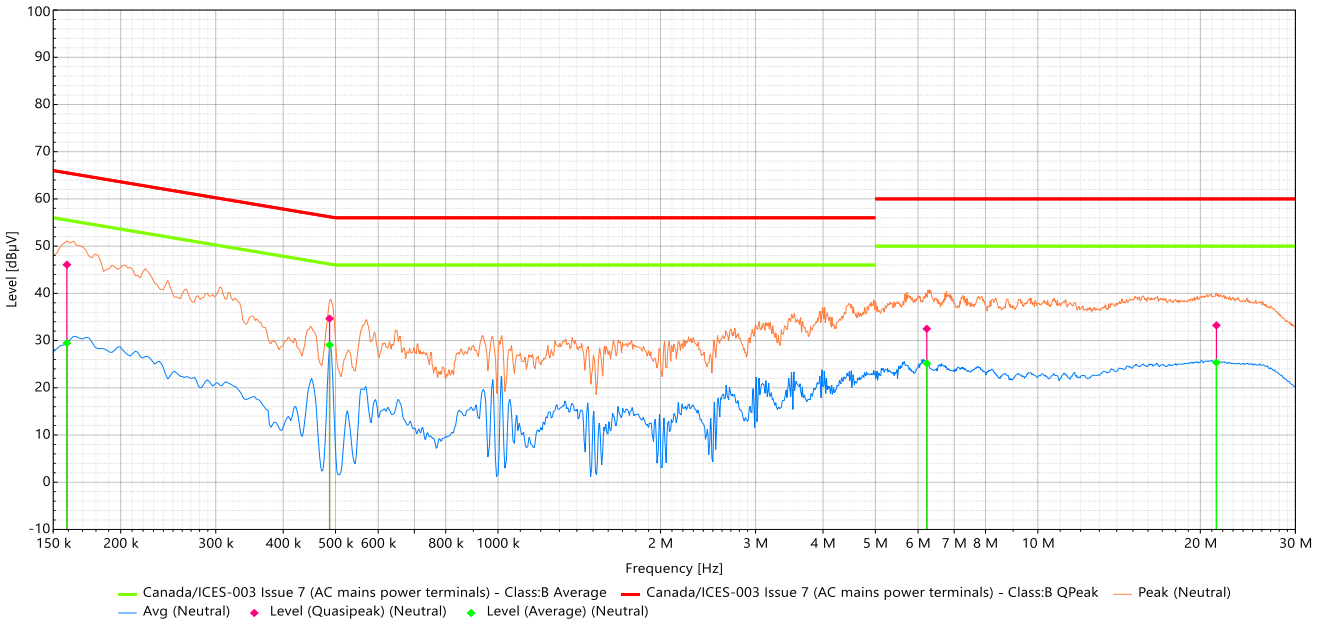
Chart of Conducted Voltage Emission (150 kHz - 30 MHz) on AC Supply line
EUT: A003599211-005, -002, -003, -019; A003653283-001 (—)
Operating mode: Charging
EMC measures: none
Remark: Ferrite Farnell 4156103 at ET3860 connection

57
Hümmer
2024-02-02

#57(150 kHz-30 MHz), Phase 1



#57(150 kHz-30 MHz), Neutral



ADDITIONAL DOCUMENTATION

Result of Conducted Voltage Emission on AC Supply line

57

EUT: A003599211-005, -002, -003, -019; A003653283-001

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	Comments
6.227 M	32.5	60.0	-27.5	Neutral	10.2	9000.0	1.0	Pass
21.422 M	33.2	60.0	-26.8	Neutral	10.8	9000.0	1.0	Pass
3.462 M	32.0	56.0	-24.0	Phase 1	10.1	9000.0	1.0	Pass
6.002 M	37.9	60.0	-22.1	Phase 1	10.2	9000.0	1.0	Pass
487.5 k	34.7	56.2	-21.5	Neutral	10.0	9000.0	1.0	Pass
159 k	45.6	65.5	-19.9	Phase 1	10.0	9000.0	1.0	Pass
159 k	46.1	65.5	-19.5	Neutral	10.0	9000.0	1.0	Pass
487.5 k	36.8	56.2	-19.4	Phase 1	10.0	9000.0	1.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV)	Margin (dB)	Pos	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
159 k	55.5	29.5	-26.0	Neutral	10.0	9 k	1.0	0.1	Pass
6.227 M	50.0	25.2	-24.8	Neutral	10.2	9 k	1.0	0.1	Pass
21.422 M	50.0	25.3	-24.7	Neutral	10.8	9 k	1.0	0.1	Pass
6.002 M	50.0	26.1	-23.9	Phase 1	10.2	9 k	1.0	0.1	Pass
3.462 M	46.0	23.0	-23.0	Phase 1	10.1	9 k	1.0	0.1	Pass
159 k	55.5	34.3	-21.2	Phase 1	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	28.9	-17.3	Phase 1	10.0	9 k	1.0	0.1	Pass
487.5 k	46.2	29.1	-17.1	Neutral	10.0	9 k	1.0	0.1	Pass

Average

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
224.25 k	30.2	52.7	-22.5	10.0

QuasiPeak

Frequency (Hz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Correction (dB)
224.25 k	38.5	62.7	-24.1	10.0

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (30 MHz - 1 GHz) **EUT:** A003599211-005, -002, -003; A003653283-002	**49**

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.109
Test method	ANSI C63.4-2014
Supply voltage	Battery powered
Operating mode	Battery operated
Test setup	according to standard (see picture)
EMC measures	Ferrite Farnell 4156103 at ET3860 connection
Remarks	—
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

EUT: A003599211-005, -002, -003; A003653283-002

49

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Antenna mast	INN-CO	CO3000	2732515	---	---
Turntable	INN-CO	CO3000	2732515	---	---
Receiver	Rohde & Schwarz	ESU 26	2723865	2023-10-04	2024-10-04
Commutation relay	MTS Systemtechnik	KRM4-5811-T-12.4GHz	9000983	---	---
Preamplifier	—	—	—	---	---
Anechoic chamber	TDK	SAC 10 (NSA 30-1000MHz)	2728861	2022-08-23	2025-08-23
Antenna	Schwarzbeck	VULB 9168	2728915	2023-01-11	2026-01-11

Test parameter of Radiated Electric Emission

EUT: A003599211-005, -002, -003; A003653283-002

49

Subrange 1 (Vertical, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

Subrange 2 (Horizontal, 30 MHz…1 GHz)

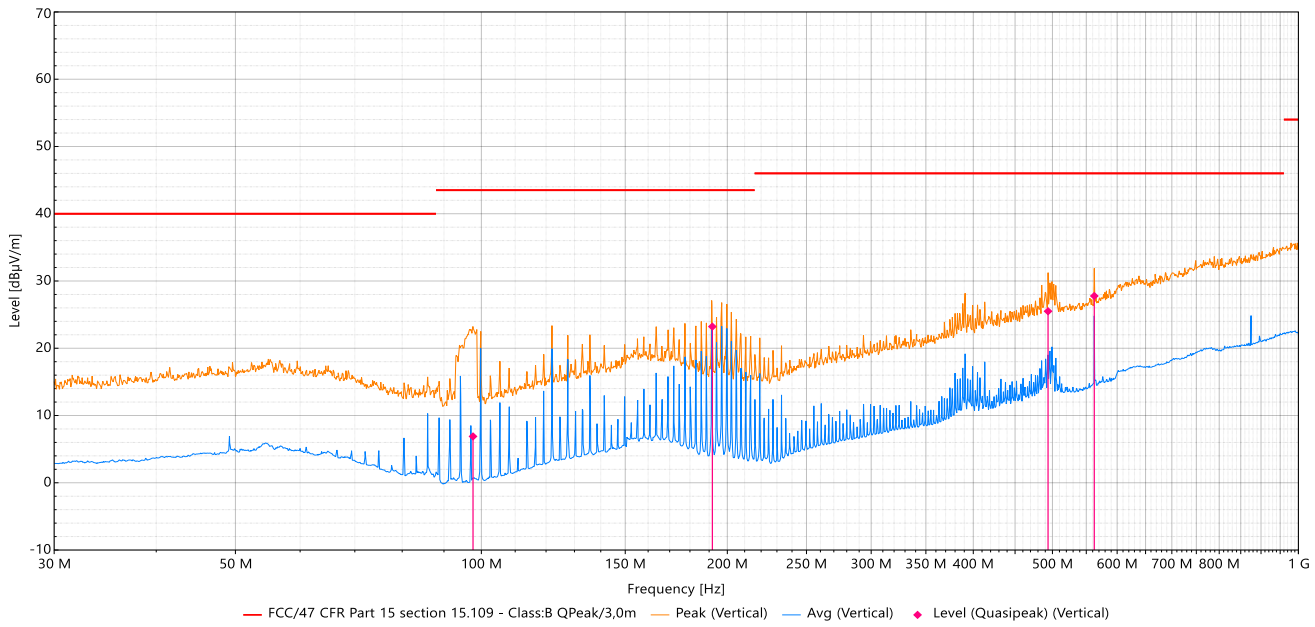
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

ADDITIONAL DOCUMENTATION

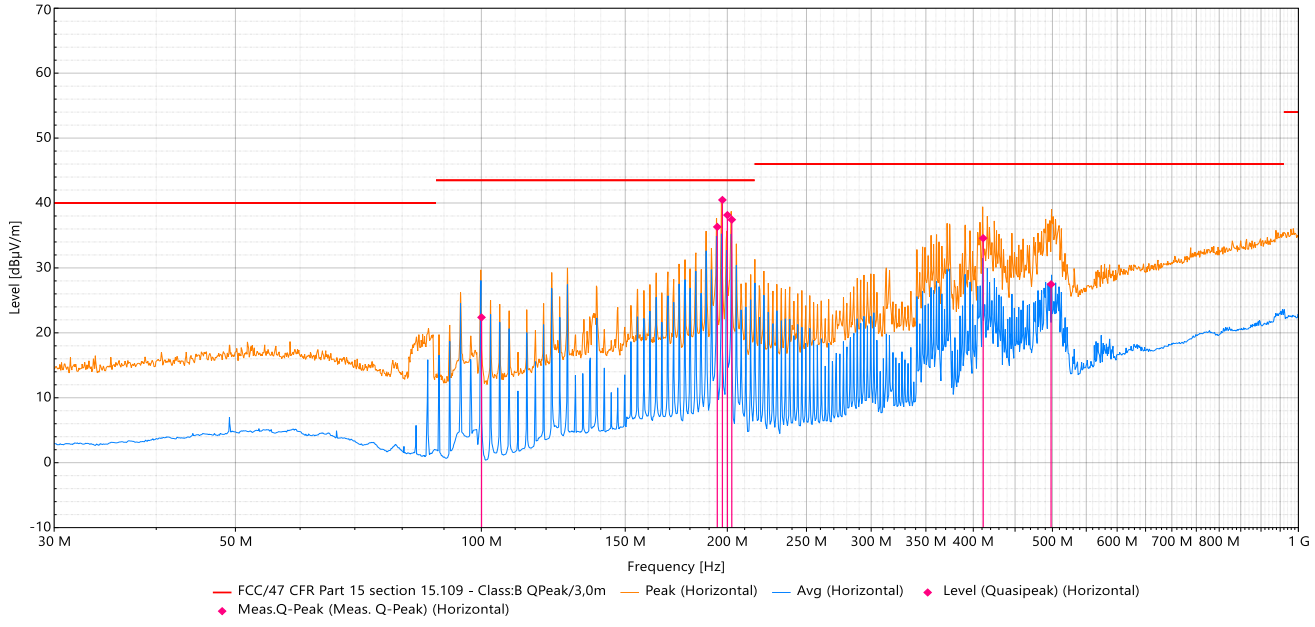
Chart of Radiated Electric Emission **49**

EUT: A003599211-005, -002, -003; A003653283-002

#49(30 MHz-1 GHz), Vertical



#49(30 MHz-1 GHz), Horizontal



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **49**

EUT: A003599211-005, -002, -003; A003653283-002

QuasiPeak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	Comments
97.674 M	6.9	43.5	-36.6	V	341.3	2.00	9.2	120000.0	1.0	Pass
100.045 M	22.4	43.5	-21.1	H	160.0	1.89	9.6	120000.0	1.0	Pass
493.843 M	25.5	46.0	-20.5	V	321.9	2.36	19.9	120000.0	1.0	Pass
191.746 M	23.2	43.5	-20.3	V	319.2	2.10	11.4	120000.0	1.0	Pass
498.043 M	27.5	46.0	-18.5	H	10.1	1.00	20.0	120000.0	1.0	Pass
562.565 M	27.8	46.0	-18.2	V	178.7	1.27	21.4	120000.0	1.0	Pass
411.329 M	34.6	46.0	-11.4	H	263.4	1.00	18.2	120000.0	1.0	Pass
194.428 M	36.3	43.5	-7.2	H	9.7	2.00	11.1	120000.0	1.0	Pass
200.058 M	38.1	43.5	-5.4	H	356.3	1.54	11.0	120000.0	1.0	Pass
197.255 M	40.5	43.5	-3.0	H	3.1	1.88	10.9	120000.0	1.0	Pass

QuasiPeak

Frequency (Hz)	Limit	Level (dBµV/m)	Margin (dB)	Polarization	Angle(°)	Height (m)	Correction (dB)
202.527 M	43.5	37.4	-6.1	H	219.5	2.01	11.1

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (30 MHz - 1 GHz) **EUT:** A003599211-005, -002, -003, -019; A003653283-002	**51**

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.109
Test method	ANSI C63.4-2014
Supply voltage	120 V, 60 Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	Ferrite Farnell 4156103 at ET3860 connection
Remarks	—
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

51

EUT: A003599211-005, -002, -003, -019; A003653283-002

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Antenna mast	INN-CO	CO3000	2732515	---	---
Turntable	INN-CO	CO3000	2732515	---	---
Receiver	Rohde & Schwarz	ESU 26	2723865	2023-10-04	2024-10-04
Commutation relay	MTS Systemtechnik	KRM4-5811-T-12.4GHz	9000983	---	---
Preamplifier	—	—	—	---	---
Anechoic chamber	TDK	SAC 10 (NSA 30-1000MHz)	2728861	2022-08-23	2025-08-23
Antenna	Schwarzbeck	VULB 9168	2728915	2023-01-11	2026-01-11

Test parameter of Radiated Electric Emission

51

EUT: A003599211-005, -002, -003, -019; A003653283-001

Subrange 1 (Vertical, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

Subrange 2 (Horizontal, 30 MHz…1 GHz)

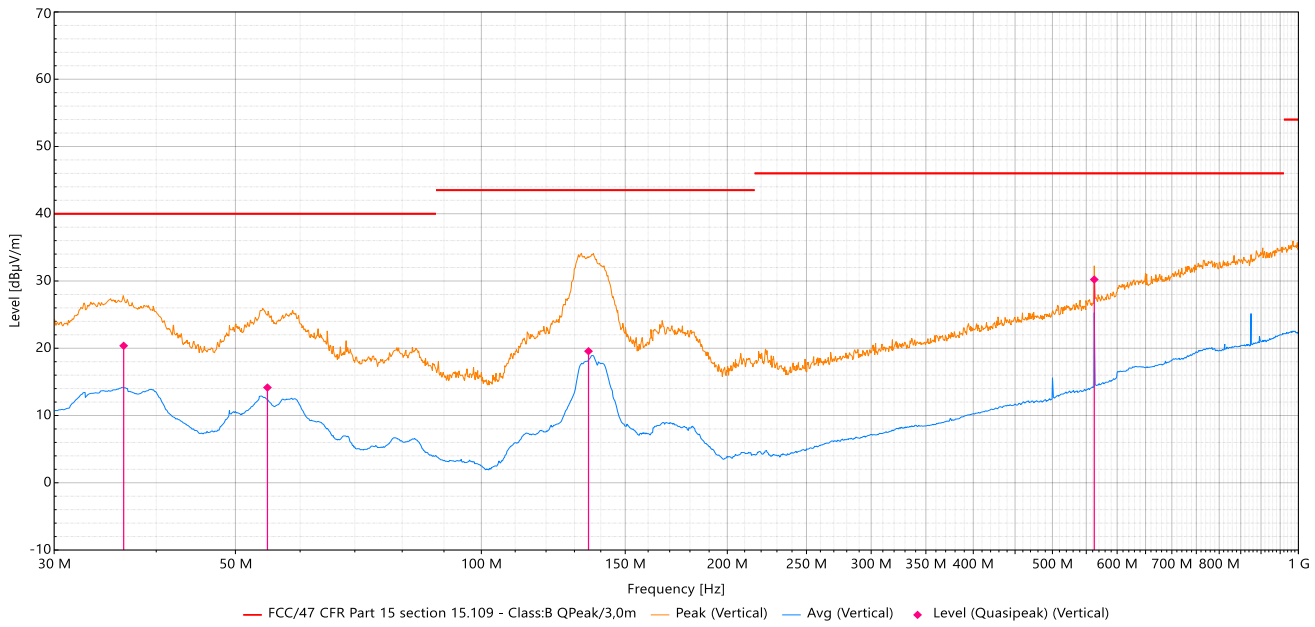
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

ADDITIONAL DOCUMENTATION

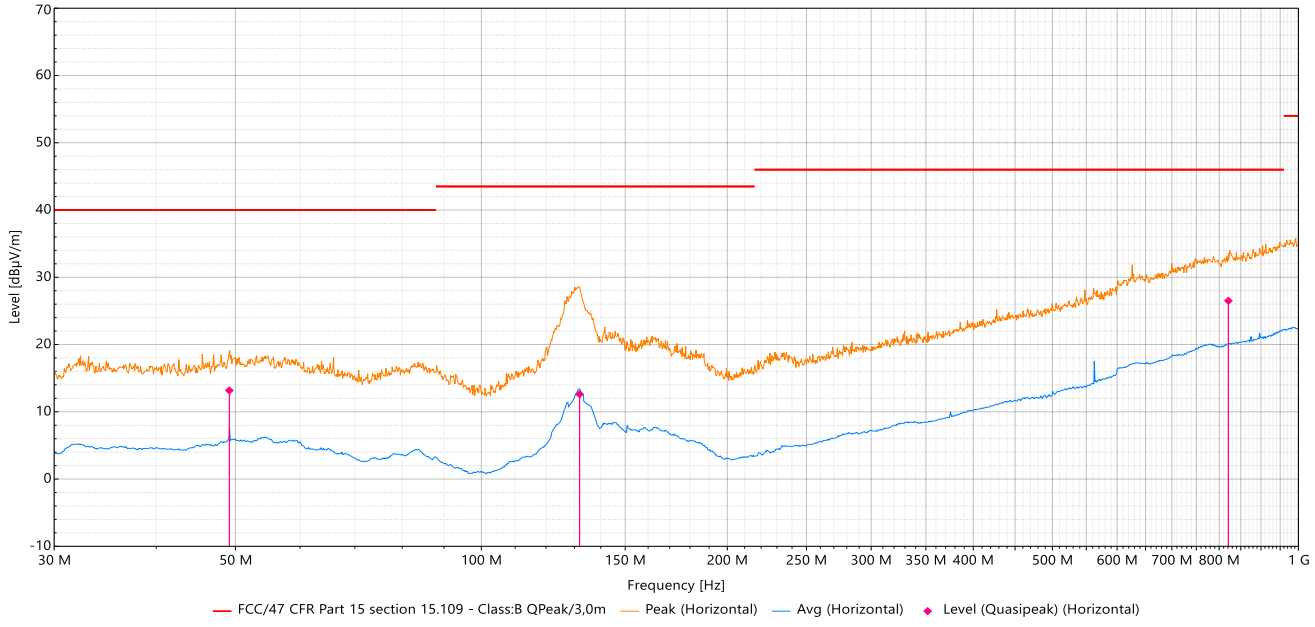
Chart of Radiated Electric Emission **51**

EUT: A003599211-005, -002, -003, -019; A003653283-002

#51(30 MHz-1 GHz), Vertical



#51(30 MHz-1 GHz), Horizontal



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **51**

EUT: A003599211-005, -002, -003, -019; A003653283-002

QuasiPeak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	Comments
131.889 M	12.6	43.5	-30.9	H	0.4	2.00	13.2	120000.0	1.0	Pass
49.158 M	13.2	40.0	-26.8	H	0.4	2.00	14.5	120000.0	1.0	Pass
54.723 M	14.2	40.0	-25.8	V	179.6	1.00	14.3	120000.0	1.0	Pass
135.251 M	19.6	43.5	-23.9	V	234.4	1.20	13.4	120000.0	1.0	Pass
36.493 M	20.4	40.0	-19.6	V	1.6	1.27	13.3	120000.0	1.0	Pass
820.967 M	26.5	46.0	-19.5	H	269.5	1.00	25.8	120000.0	1.0	Pass
562.566 M	30.2	46.0	-15.8	V	179.6	1.00	21.4	120000.0	1.0	Pass

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (1 GHz - 2 GHz) **EUT:** A003599211-005, -002, -003; A003653283-002	53

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.109
Test method	ANSI C63.4-2014
Supply voltage	Battery powered
Operating mode	Battery operated
Test setup	according to standard (see picture)
EMC measures	Ferrite Farnell 4156103 at ET3860 connection
Remarks	—
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

53

EUT: A003599211-005, -002, -003; A003653283-002

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Preamplifier	Schwarzbeck	BBV 9718	2731378	2022-11-04	2024-11-04
Turntable	INN-CO	CO3000	2732515	---	---
Antenna	EMCO	ETS 3115	2826432	2022-01-12	2025-01-12
Receiver	Rohde & Schwarz	ESI 40	2728600	2022-10-14	2024-10-14
Attenuator	Keines / None	Keines / None	—	---	---
Antenna mast	Maturo	NCD	2733253	---	---
Anechoic chamber	TDK	SAC 10 (SVSWR 1-40GHz)	2766607	2023-08-04	2025-08-04

Test parameter of Radiated Electric Emission

53

EUT: A003599211-005, -002, -003; A003653283-001

Subrange 1 (Horizontal, 1 GHz…2 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	1 MHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	500 kHz	5 ms

Subrange 2 (Vertical, 1 GHz…2 GHz)

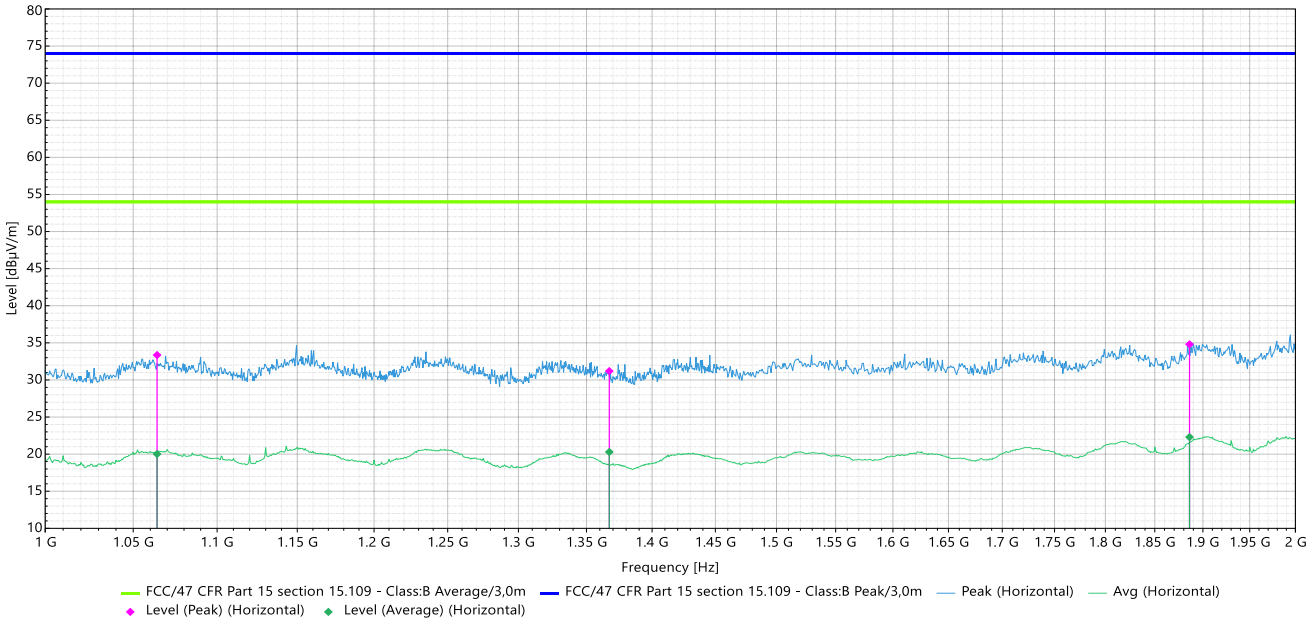
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	1 MHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	500 kHz	5 ms

ADDITIONAL DOCUMENTATION

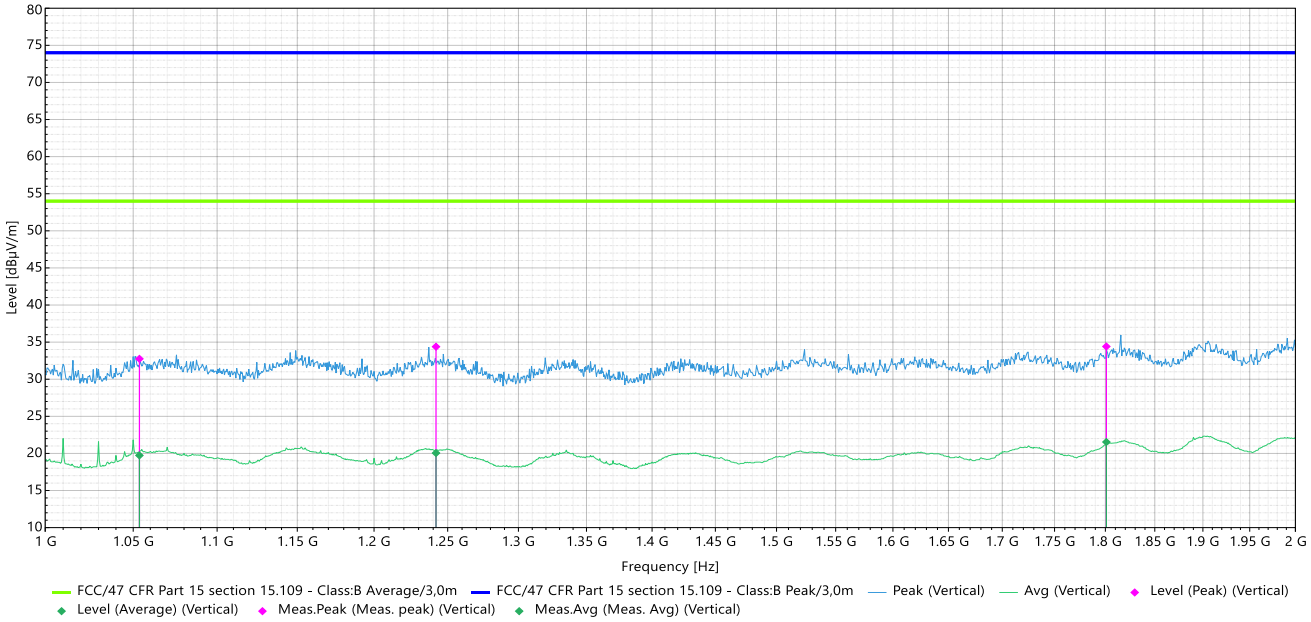
Chart of Radiated Electric Emission **53**

EUT: A003599211-005, -002, -003; A003653283-002

#53(1 GHz-2 GHz), Horizontal



#53(1 GHz-2 GHz), Vertical



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission 53

EUT: A003599211-005, -002, -003; A003653283-002

Peak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
1.367 G	31.2	74.0	-42.8	H	191.3	1.00	-6.6	1 M	1.0	0.0	Pass
1.054 G	32.8	74.0	-41.2	V	102.2	1.00	-7.9	1 M	1.0	0.0	Pass
1.064 G	33.3	74.0	-40.7	H	221.0	1.41	-7.8	1 M	1.0	0.0	Pass
1.242 G	34.4	74.0	-39.6	V	264.0	1.00	-6.5	1 M	1.0	0.0	Pass
1.886 G	34.8	74.0	-39.2	H	209.2	1.00	-3.7	1 M	1.0	0.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV/m)	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
1.054 G	54.0	19.7	-34.3	V	102.2	1.00	-7.9	1 M	1.0	0.0	Pass
1.064 G	54.0	20.0	-34.0	H	221.0	1.41	-7.8	1 M	1.0	0.0	Pass
1.242 G	54.0	20.0	-34.0	V	264.0	1.00	-6.5	1 M	1.0	0.0	Pass
1.367 G	54.0	20.3	-33.7	H	191.3	1.00	-6.6	1 M	1.0	0.0	Pass
1.886 G	54.0	22.3	-31.7	H	209.2	1.00	-3.7	1 M	1.0	0.0	Pass

Peak

Frequency (Hz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Polarization	Angle(°)	Height (m)	Correction (dB)
1.801 G	34.4	74.0	-39.6	V	60.0	1.00	-4.5

Average

Frequency (Hz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Polarization	Azimuth (°)	Height (m)	Correction (dB)
1.801 G	21.5	54.0	-32.5	V	60.0	1.00	-4.5

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (30 MHz - 1 GHz) **EUT:** A003599211-002; A003653283-003, -001	**52**

Verdict	**PASS**
Applied Standard	FCC Part 15 Subpart B section 15.109
Test method	ANSI C63.4-2014
Supply voltage	Battery powered
Operating mode	Battery operated
Test setup	according to standard (see picture)
EMC measures	—
Remarks	Test just for information
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

52

EUT: A003599211-002; A003653283-003, -001

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Antenna mast	INN-CO	CO3000	2732515	---	---
Turntable	INN-CO	CO3000	2732515	---	---
Receiver	Rohde & Schwarz	ESU 26	2723865	2023-10-04	2024-10-04
Commutation relay	MTS Systemtechnik	KRM4-5811-T-12.4GHz	9000983	---	---
Preamplifier	—	—	—	---	---
Anechoic chamber	TDK	SAC 10 (NSA 30-1000MHz)	2728861	2022-08-23	2025-08-23
Antenna	Schwarzbeck	VULB 9168	2728915	2023-01-11	2026-01-11

Test parameter of Radiated Electric Emission

52

EUT: A003599211-002; A003653283-003, -001

Subrange 1 (Vertical, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

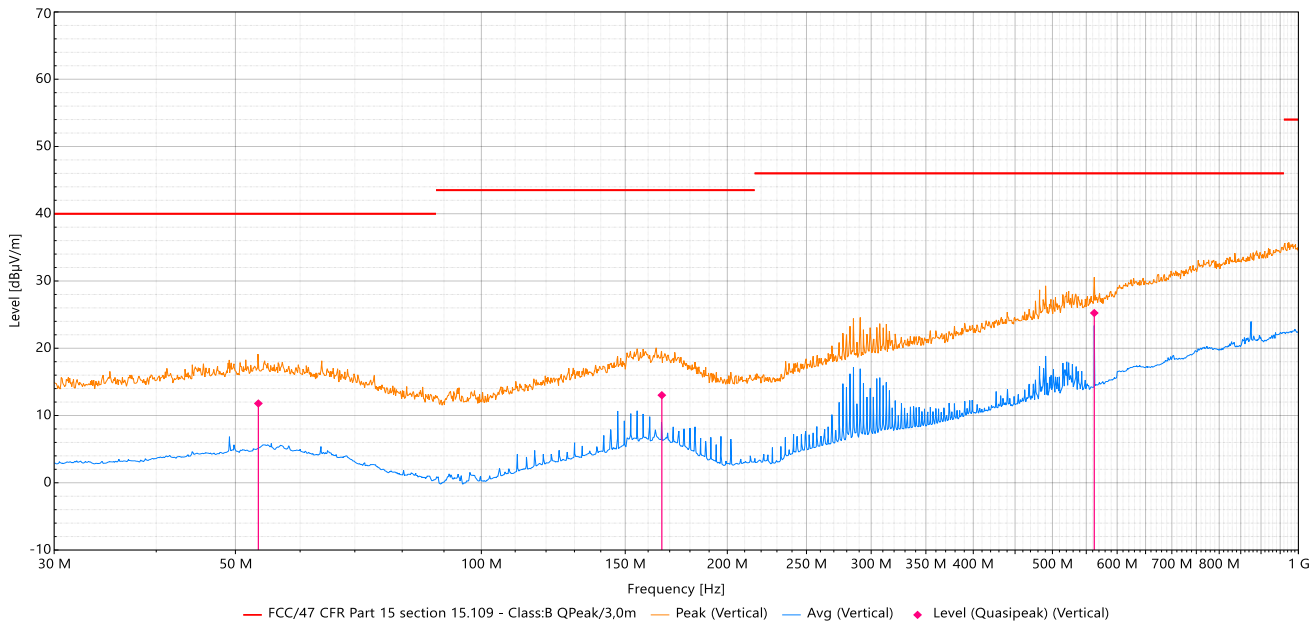
Subrange 2 (Horizontal, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

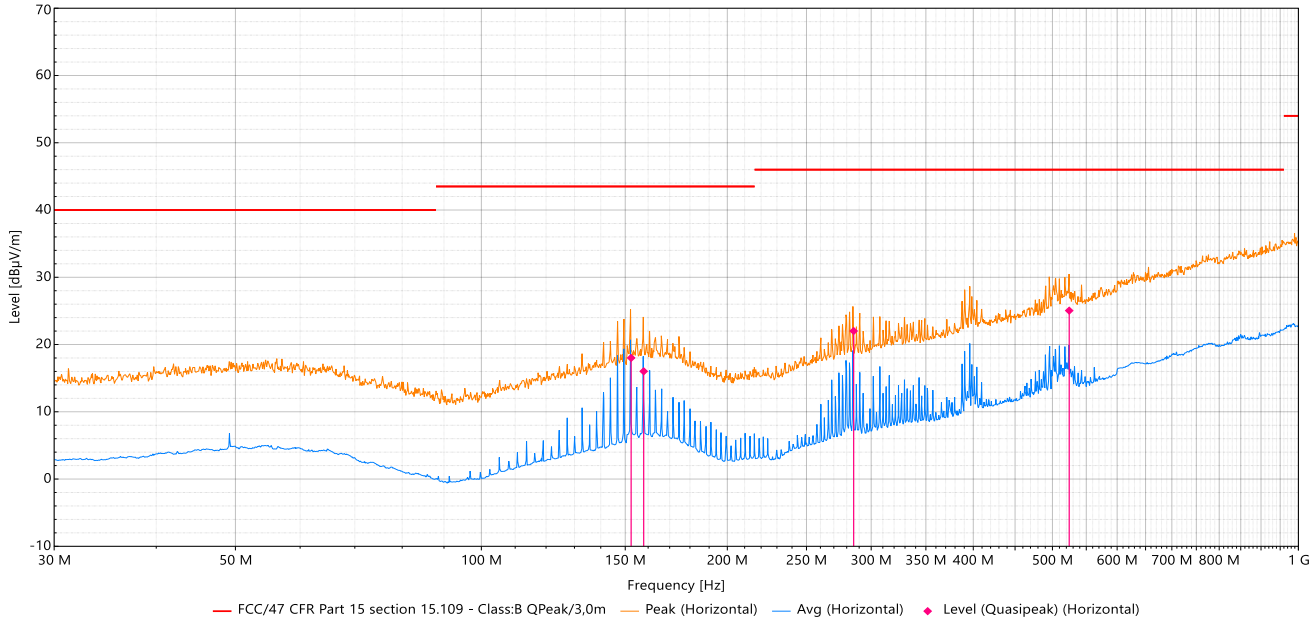
ADDITIONAL DOCUMENTATION

Chart of Radiated Electric Emission **52**
EUT: A003599211-002; A003653283-003, -001

#52(30 MHz-1 GHz), Vertical



#52(30 MHz-1 GHz), Horizontal



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **52**

EUT: A003599211-002; A003653283-003, -001

QuasiPeak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	Comments
166.299 M	13.0	43.5	-30.5	V	98.8	1.95	14.2	120000.0	1.0	Pass
53.341 M	11.8	40.0	-28.2	V	98.2	1.00	14.4	120000.0	1.0	Pass
158.01 M	16.0	43.5	-27.5	H	39.5	3.22	14.4	120000.0	1.0	Pass
152.518 M	18.0	43.5	-25.5	H	16.8	2.14	14.4	120000.0	1.0	Pass
285.541 M	22.0	46.0	-24.0	H	37.9	1.34	14.9	120000.0	1.0	Pass
524.188 M	25.0	46.0	-21.0	H	314.8	1.94	20.8	120000.0	1.0	Pass
562.565 M	25.2	46.0	-20.8	V	158.6	1.60	21.4	120000.0	1.0	Pass

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.

$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (30 MHz - 1 GHz) **EUT:** A003599211-005, -002, -003; A003653283-002	**59**

Verdict	**PASS**
Applied Standard	ICES-003 (Issue 7) section 3.2.2
Test method	—
Supply voltage	Battery powered
Operating mode	Battery operated
Test setup	according to standard (see picture)
EMC measures	Ferrite Farnell 4156103 at ET3860 connection
Remarks	—
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

59

EUT: A003599211-005, -002, -003; A003653283-002

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Antenna mast	INN-CO	CO3000	2732515	---	---
Turntable	INN-CO	CO3000	2732515	---	---
Receiver	Rohde & Schwarz	ESU 26	2723865	2023-10-04	2024-10-04
Commutation relay	MTS Systemtechnik	KRM4-5811-T-12.4GHz	9000983	---	---
Preamplifier	—	—	—	---	---
Anechoic chamber	TDK	SAC 10 (NSA 30-1000MHz)	2728861	2022-08-23	2025-08-23
Antenna	Schwarzbeck	VULB 9168	2728915	2023-01-11	2026-01-11

Test parameter of Radiated Electric Emission

59

EUT: A003599211-005, -002, -003; A003653283-002

Subrange 1 (Vertical, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

Subrange 2 (Horizontal, 30 MHz…1 GHz)

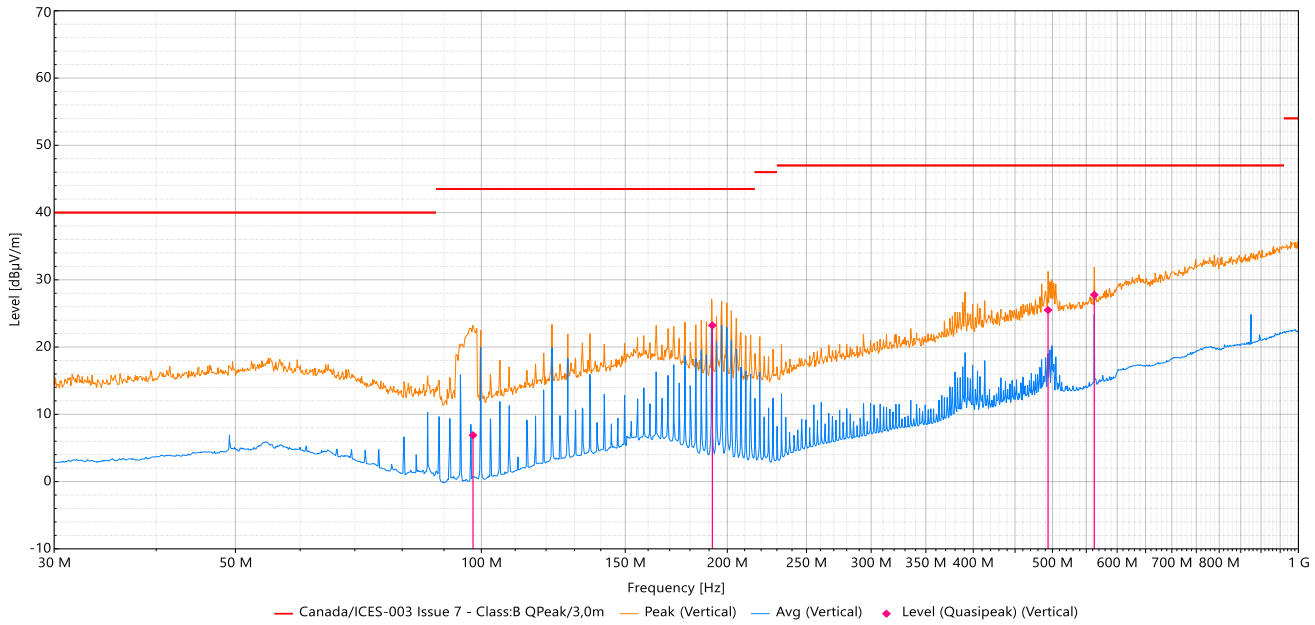
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

ADDITIONAL DOCUMENTATION

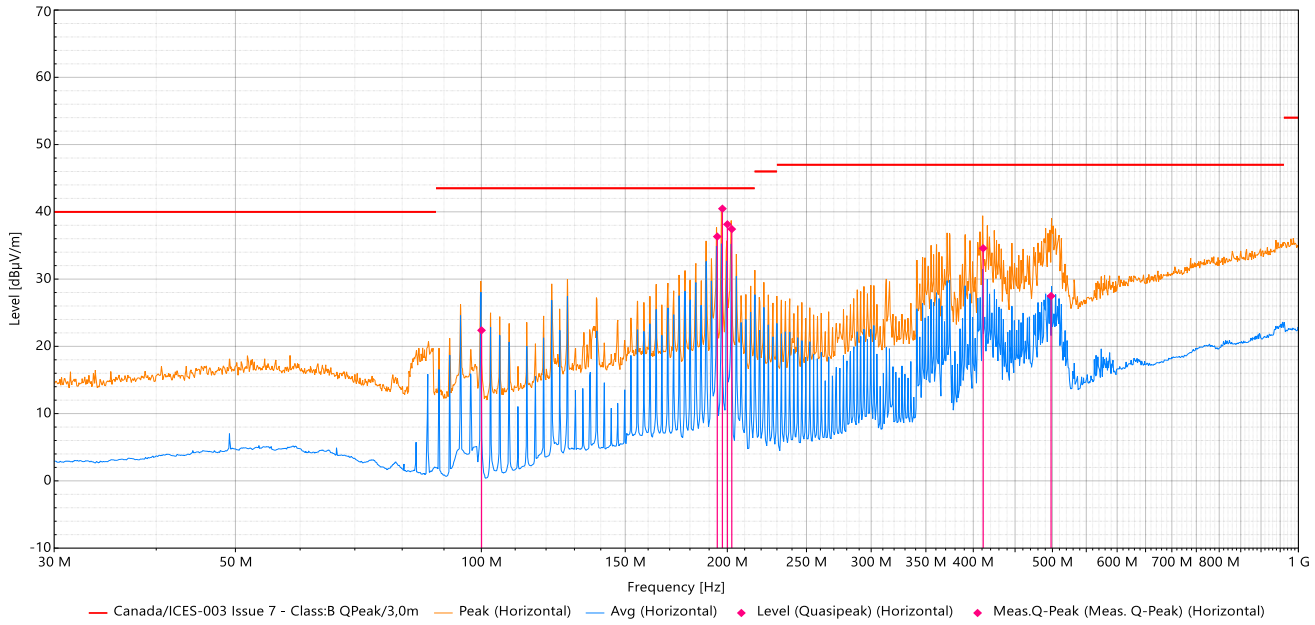
Chart of Radiated Electric Emission (30 MHz - 1 GHz)
EUT: A003599211-005, -002, -003; A003653283-002
Operating mode: Battery operated
EMC measures: Ferrite Farnell 4156103 at ET3860 connection
Remark: —

59
Hümmer
2024-01-26

#59(30 MHz-1 GHz), Vertical



#59(30 MHz-1 GHz), Horizontal



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **59**

EUT: A003599211-005, -002, -003; A003653283-002

QuasiPeak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	Comments
97.674 M	6.9	43.5	-36.6	V	341.3	2.00	9.2	120000.0	1.0	Pass
100.045 M	22.4	43.5	-21.1	H	160.0	1.89	9.6	120000.0	1.0	Pass
191.746 M	23.2	43.5	-20.3	V	319.2	2.10	11.4	120000.0	1.0	Pass
493.843 M	25.5	47.0	-19.5	V	321.9	2.36	19.9	120000.0	1.0	Pass
498.043 M	27.5	47.0	-17.5	H	10.1	1.00	20.0	120000.0	1.0	Pass
562.565 M	27.8	47.0	-17.2	V	178.7	1.27	21.4	120000.0	1.0	Pass
411.329 M	34.6	47.0	-10.4	H	263.4	1.00	18.2	120000.0	1.0	Pass
194.428 M	36.3	43.5	-7.2	H	9.7	2.00	11.1	120000.0	1.0	Pass
200.058 M	38.1	43.5	-5.4	H	356.3	1.54	11.0	120000.0	1.0	Pass
197.255 M	40.5	43.5	-3.0	H	3.1	1.88	10.9	120000.0	1.0	Pass

QuasiPeak

Frequency (Hz)	Limit	Level (dBµV/m)	Margin (dB)	Polarization	Angle(°)	Height (m)	Correction (dB)
202.527 M	43.5	37.4	-6.1	H	219.5	2.01	11.1

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (30 MHz - 1 GHz) **EUT:** A003599211-005, -002, -003, -019; A003653283-002	**58**

Verdict	**PASS**
Applied Standard	ICES-003 (Issue 7) section 3.2.2
Test method	—
Supply voltage	120 V, 60 Hz
Operating mode	Charging
Test setup	according to standard (see picture)
EMC measures	—
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

58

EUT: A003599211-005, -002, -003, -019; A003653283-002

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Antenna mast	INN-CO	CO3000	2732515	---	---
Turntable	INN-CO	CO3000	2732515	---	---
Receiver	Rohde & Schwarz	ESU 26	2723865	2023-10-04	2024-10-04
Commutation relay	MTS Systemtechnik	KRM4-5811-T-12.4GHz	9000983	---	---
Preamplifier	—	—	—	---	---
Anechoic chamber	TDK	SAC 10 (NSA 30-1000MHz)	2728861	2022-08-23	2025-08-23
Antenna	Schwarzbeck	VULB 9168	2728915	2023-01-11	2026-01-11

Test parameter of Radiated Electric Emission

58

EUT: A003599211-005, -002, -003, -019; A003653283-002

Subrange 1 (Vertical, 30 MHz…1 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

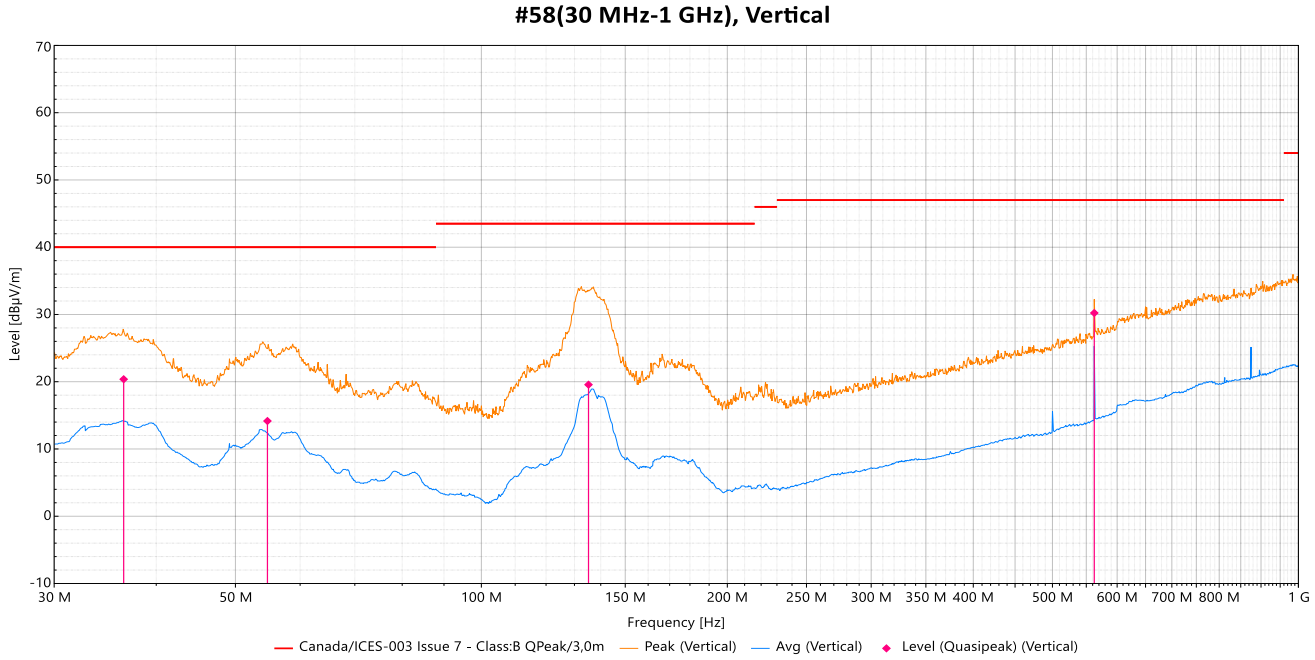
Subrange 2 (Horizontal, 30 MHz…1 GHz)

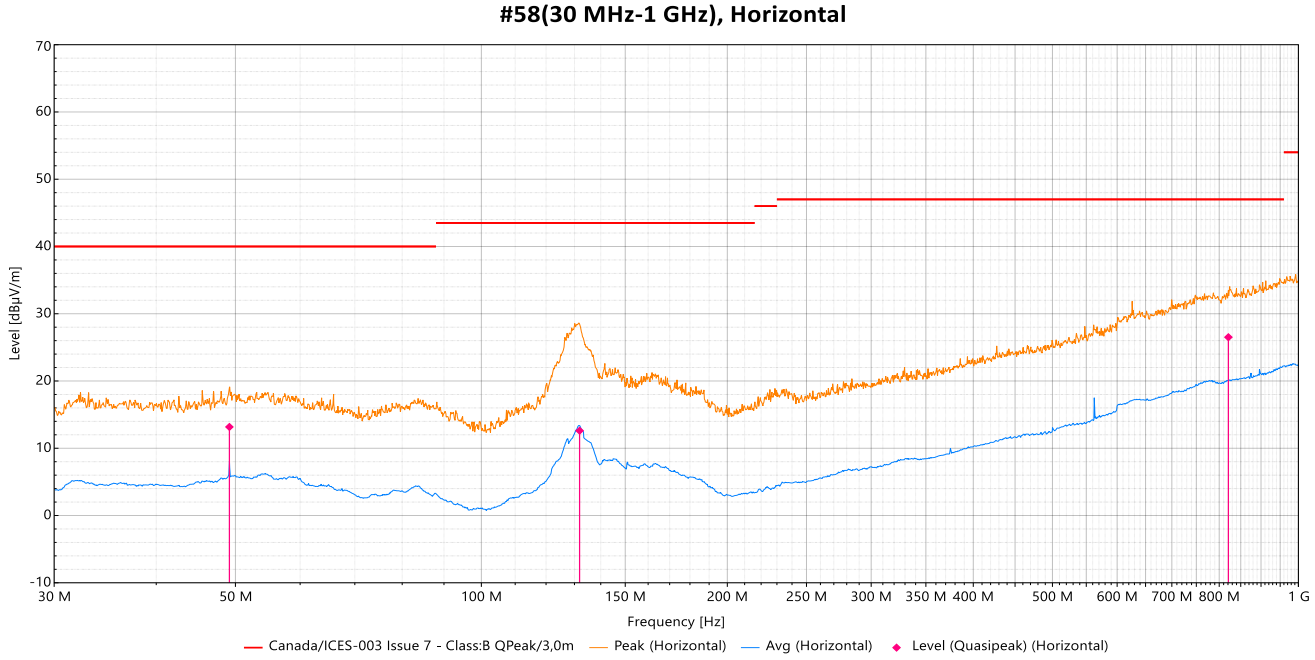
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	120 kHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	30 kHz	20 ms

ADDITIONAL DOCUMENTATION

Chart of Radiated Electric Emission (30 MHz - 1 GHz)
EUT: A003599211-005, -002, -003, -019; A003653283-002
Operating mode: Charging
EMC measures: —
Remark: Ferrite Farnell 4156103 at ET3860 connection

58
Hümmer
2024-01-26





ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **58**

EUT: A003599211-005, -002, -003, -019; A003653283-002

QuasiPeak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	Comments
131.889 M	12.6	43.5	-30.9	H	0.4	2.00	13.2	120000.0	1.0	Pass
49.158 M	13.2	40.0	-26.8	H	0.4	2.00	14.5	120000.0	1.0	Pass
54.723 M	14.2	40.0	-25.8	V	179.6	1.00	14.3	120000.0	1.0	Pass
135.251 M	19.6	43.5	-23.9	V	234.4	1.20	13.4	120000.0	1.0	Pass
36.493 M	20.4	40.0	-19.6	V	1.6	1.27	13.3	120000.0	1.0	Pass
820.967 M	26.5	47.0	-18.5	H	269.5	1.00	25.8	120000.0	1.0	Pass
562.566 M	30.2	47.0	-14.8	V	179.6	1.00	21.4	120000.0	1.0	Pass

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

ADDITIONAL DOCUMENTATION

Protocol of Radiated Electric Emission (1 GHz - 2 GHz) **EUT:** A003599211-005, -002, -003; A003653283-002	**60**

Verdict	**PASS**
Applied Standard	ICES-003 (Issue 7) section 3.2.2
Test method	—
Supply voltage	Battery powered
Operating mode	Battery operated
Test setup	according to standard (see picture)
EMC measures	—
Remarks	Ferrite Farnell 4156103 at ET3860 connection
Tested by	Hümmer
Test Software	BAT-EMC 2022.0.19.0
Test date	2024-01-26
Temperature	15 - 35 °C
Rel. Humidity	30 - 60 %
Atmospheric pressure	860 - 1060 hPa

ADDITIONAL DOCUMENTATION

Used test equipment for Radiated Electric Emission

60

EUT: A003599211-005, -002, -003; A003653283-002

Type	Manufacturer	Model	ID	Last calibration	Next calibration
Preamplifier	Schwarzbeck	BBV 9718	2731378	2022-11-04	2024-11-04
Turntable	INN-CO	CO3000	2732515	---	---
Antenna	EMCO	ETS 3115	2826432	2022-01-12	2025-01-12
Receiver	Rohde & Schwarz	ESI 40	2728600	2022-10-14	2024-10-14
Attenuator	Keines / None	Keines / None	—	---	---
Antenna mast	Maturo	NCD	2733253	---	---
Anechoic chamber	TDK	SAC 10 (SVSWR 1-40GHz)	2766607	2023-08-04	2025-08-04

Test parameter of Radiated Electric Emission

60

EUT: A003599211-005, -002, -003; A003653283-002

Subrange 1 (Horizontal, 1 GHz…2 GHz)

Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	1 MHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	500 kHz	5 ms

Subrange 2 (Vertical, 1 GHz…2 GHz)

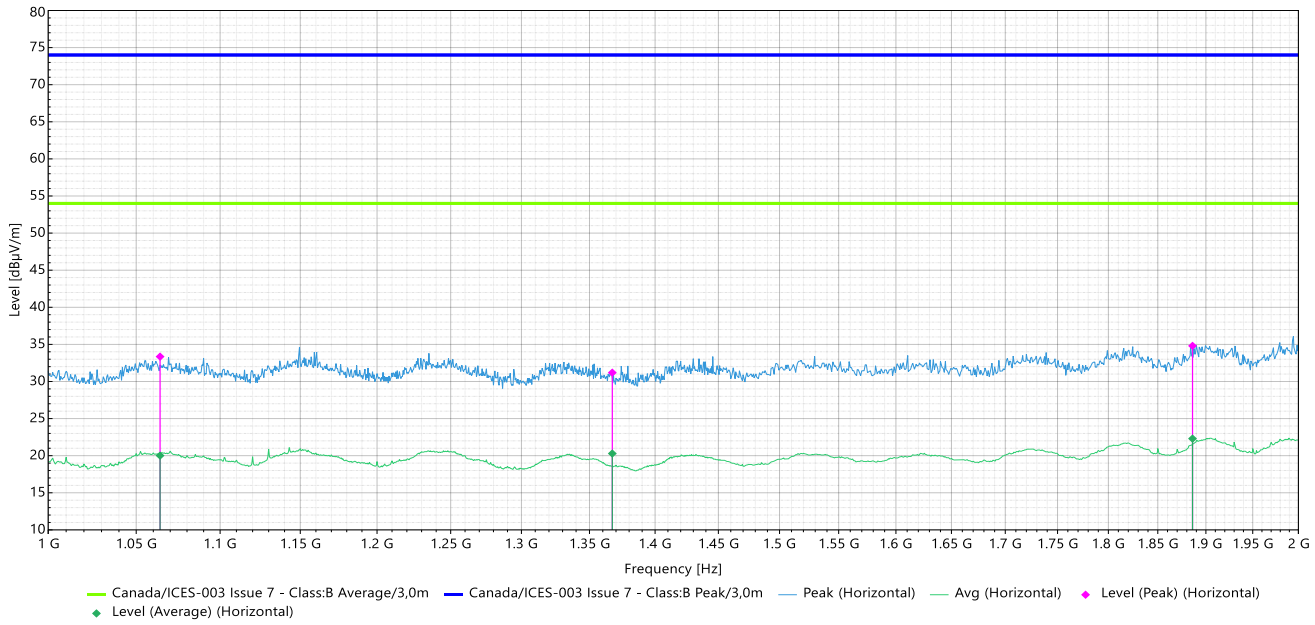
Reference Level	RBW/VBW	Preamp	LN-Preamp	Preselector/ Attenuation	Auto Ranging	Att.	Filter	Step	Sweep Time
80 dBµV	1 MHz/ Auto	ON	OFF	ON/0 dB	ON	Auto	6dB	500 kHz	5 ms

ADDITIONAL DOCUMENTATION

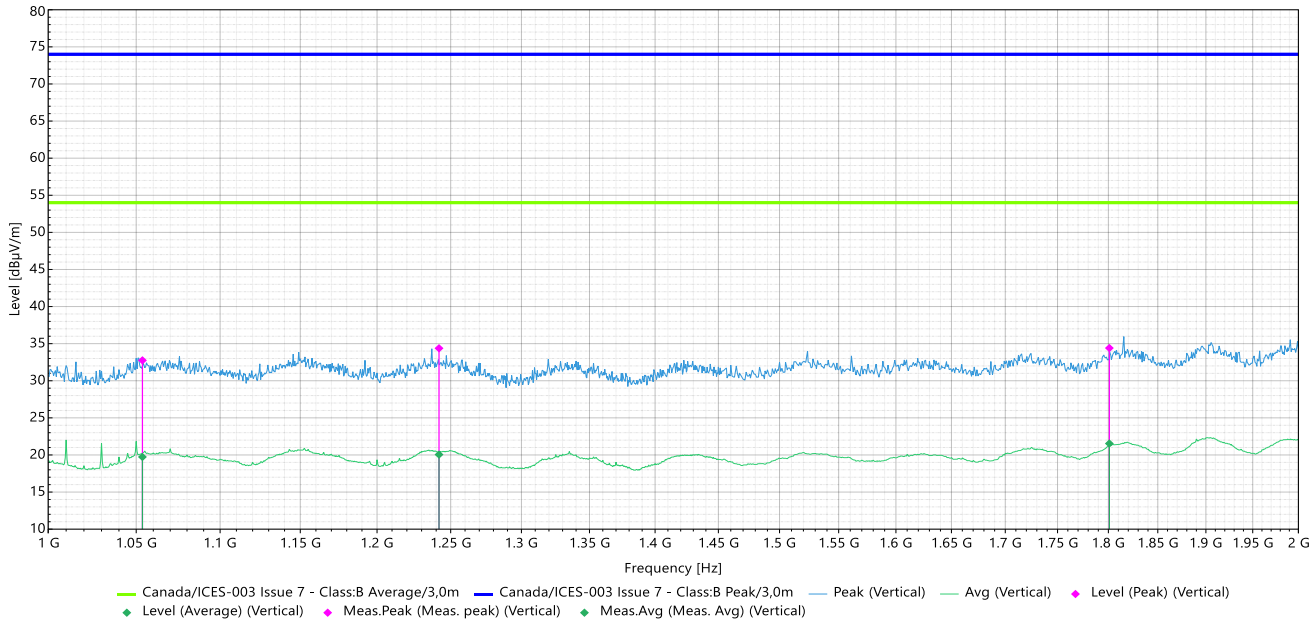
Chart of Radiated Electric Emission (1 GHz - 2 GHz)
EUT: A003599211-005, -002, -003; A003653283-002
Operating mode: Battery operated
EMC measures: —
Remark: Ferrite Farnell 4156103 at ET3860 connection.

60
Hümmer
2024-01-26

#60(1 GHz-2 GHz), Horizontal



#60(1 GHz-2 GHz), Vertical



ADDITIONAL DOCUMENTATION

Result of Radiated Electric Emission **60**

EUT: A003599211-005, -002, -003; A003653283-002

Peak

Frequency (Hz)	Level	Limit	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
1.367 G	31.2	74.0	-42.8	H	191.3	1.00	-6.6	1 M	1.0	0.0	Pass
1.054 G	32.8	74.0	-41.2	V	102.2	1.00	-7.9	1 M	1.0	0.0	Pass
1.064 G	33.3	74.0	-40.7	H	221.0	1.41	-7.8	1 M	1.0	0.0	Pass
1.242 G	34.4	74.0	-39.6	V	264.0	1.00	-6.5	1 M	1.0	0.0	Pass
1.886 G	34.8	74.0	-39.2	H	209.2	1.00	-3.7	1 M	1.0	0.0	Pass

Average

Frequency (Hz)	Limit	Level (dBµV/m)	Margin (dB)	Pos	Azimuth (°)	Height (m)	Correction (dB)	RBW (Hz)	M. time (s)	M. time (s)	Comments
1.054 G	54.0	19.7	-34.3	V	102.2	1.00	-7.9	1 M	1.0	0.0	Pass
1.064 G	54.0	20.0	-34.0	H	221.0	1.41	-7.8	1 M	1.0	0.0	Pass
1.242 G	54.0	20.0	-34.0	V	264.0	1.00	-6.5	1 M	1.0	0.0	Pass
1.367 G	54.0	20.3	-33.7	H	191.3	1.00	-6.6	1 M	1.0	0.0	Pass
1.886 G	54.0	22.3	-31.7	H	209.2	1.00	-3.7	1 M	1.0	0.0	Pass

Peak

Frequency (Hz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Polarization	Angle(°)	Height (m)	Correction (dB)
1.801 G	34.4	74.0	-39.6	V	60.0	1.00	-4.5

Average

Frequency (Hz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Polarization	Azimuth (°)	Height (m)	Correction (dB)
1.801 G	21.5	54.0	-32.5	V	60.0	1.00	-4.5

Measurement values which are more than 20 dB below the limit value were not detected or evaluated.
$Margin\ value = Measurement\ value - Limit\ value$

PHOTO DOCUMENTATION

See external document [4]:
External_test_setup_photos_ DE23RSSK 001

REVISION HISTORY

51 Change history

Rev. No.	List of changes	Date Author
001	First edition (DE23RSSK 001)	2024-09-24 Hümmer

TABLE OF CONTENTS
TABLE OF FIGURES

Table of Contents

TABLE OF CONTENTS
TABLE OF FIGURES

Table of figures

Es konnten keine Einträge für ein Abbildungsverzeichnis gefunden werden.

TABLE OF CONTENTS
TABLE OF FIGURES

End of test report