

Prüfbericht-Nr.: <i>Test report no.:</i>	DE25L8XE 002	Auftrags-Nr.: <i>Order no.:</i>	1184687 110	Seite 1 von 32 Page 1 of 32
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	Tim Jessat	Auftragsdatum: <i>Order date:</i>	2025-01-27	
Auftraggeber: <i>Client:</i>	STORZ MEDICAL AG, Lohstampfestr. 8, 8274 Tägerwilen, Schweiz			
Prüfgegenstand: <i>Test item:</i>	Applied part for Radial Shock Wave device			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	Handpiece R-SW (Endurance) including RFID			
Auftrags-Inhalt: <i>Order content:</i>	Prüfung der Funkparameter nach FCC & ISCED <i>Test of radio parameters acc. to FCC & ISCED</i>			
Prüfgrundlage: <i>Test specification:</i>	Vollprüfung / Complete test FCC CFR 47 Part 15 Subpart C- §15.225 ISCED RSS-210 Issue 11			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2025-04-11	For reasons of confidentiality, no photos of the EUT are included in this report. For EUT and test setup photos please see the Photo Documentation to this report Number.		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003964660-001; A004170318-001			
Prüfzeitraum: <i>Testing period:</i>	2025-04-09 - 2026-05-21			
Ort der Prüfung: <i>Place of testing:</i>	Nürnberg Nuremberg			
Prüflaboratorium: <i>Testing laboratory:</i>	Wireless Labor Wireless Test Lab			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	22.05.2026 	genehmigt von: <i>authorized by:</i>	22.05.2026 	
Datum: <i>Date:</i>	Signiert von: Primoz Erzen	Ausstellungsdatum: <i>Issue date:</i>	Signiert von: Matthias Kraeutlein	
Stellung / Position:	Sachverständige(r)/Expert	Stellung / Position:	Sachverständige(r)/Expert	
Sonstiges / <i>Other:</i>	CERTIFICATION TEST REPORT for RFID 13.56MHz FCC ID: 2BTGO-37700 and IC: 35173-37700			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Anmerkungen Remarks

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

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Produktbeschreibung
Product description

1	Test item	Applied part for Radial Shock Wave device
2	Typ-No.	Handpiece R-SW (Endurance) including RFID
3	Test sample obtaining	☒ Sampling by customer ☐ Sampling by TÜV Rheinland Group ☐ others:
4	Serial-No.	A003964660-001 (rad. sample): 37700.00015 A004170318-001 (RFID-Antenna terminated): 37700.00049
5	Supported radio technologies evaluated in this report	RFID 13.56MHz
6	Supported radio technologies not evaluated in this report	-
7	Description of EUT	Handpiece including RFID Reader and RFID Tag
8	Rated Voltage / Frequency	12V -24V DC provided by Host device
9	Antenna Type	☒ Integral antenna (designed as a fixed part of the EUT) ☐ Dedicated antenna (removable, obligation to be used) ☐ Permanent antenna connector
10	Antenna number of chains	1
11	Software / Firmware	RFID_Test, Standard software with all functions deactivated but RFID functionality
12	Hardware	37700_03
13	Provided Samples	A003964660-001; A004170318-001
14	Conducted measurements sample	A003964660-001 (rad. sample) with Test Fixture
15	Radiated measurements sample	A003964660-001 (rad. sample) A004170318-001 (rad. sample with RFID-Antenna terminated)
16	Companion Device used for radio connection with the EUT	EUT in normal operation Mode. No Companion Device was used.
17	Auxiliary equipment used to set up the EUT	-
18	Accessory Devices used together with the EUT	A004211584-001 (V-Actor Handpiece) Host device to power the EUT A003964660-003 12V-Battery with EUT-Connector
19	Temperature Range	-20 to 50 °C
20	Environment	Indoor

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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Bemerkungen/ Remarks	Ergebnis Result
FCC 15.203 [ISED RSS-Gen sec. 6.8]	Antenna Requirement		P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.215 (c)	20dB Bandwidth	No Limits apply to the occupied bandwidth (99%)	P ☒ F ☐ N/A ☐ N/T ☐
[ISED RSS-Gen sec. 6.7]	Occupied bandwidth (99%)		
FCC 15.225 (a)(b)(c) [ISED RSS-210 Annex B.6 (a) i-iii]	Fundamental Field Strength within the band 13.110-14.010 MHz		P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.225 (d) [ISED RSS-210 Annex B.6 (a) iv]	Radiated Spurious Emission outside of the 13.110-14.010 MHz band		P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.225 (e) [ISED RSS-210 Annex B.6 (b)]	Frequency Stability		P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.207 [ISED RSS-Gen sec. 8.8]	AC Power Conducted Emissions		P ☒ F ☐ N/A ☐ N/T ☐

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1 Registration

The measurement facilities for conducted and radiated disturbance measurements of the TÜV Rheinland LGA Products have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. Measurement data will be accepted in conjunction with applications for Certification under Parts 15 and 18 of the Commission's Rules.

FCC Registration Number: 939976

Bundesnetzagentur Registration Number: BNetzA-CAB-17/21-16

The measurement facilities are also recognized by Innovation, Science and Economic Development (ISED) Canada to test to Canadian radio equipment requirements.

Company Number: 11235A

CAB Identifier: DE0018

2 EUT Classification

2.1 Wireless technologies and frequencies supported by the EUT.

The named technologies are only those falling in the specification of the applied standard.

Technology	Frequency Range (TX)	TX Function	Supported by the EUT	Evaluated in this report
RFID	13.11 – 14.01 MHz (fc=13.56 MH)	SISO	☒	☒

SISO: Single Input Single Output

2.2 Standard specific classification of the EUT

2.2.1 Applied standards

FCC CFR 47 Part 15 Subpart C - §15.225

[ISED RSS-210:2024-06-25 Issue 11]

2.2.2 Test Methods and Guidance Documents

ANSI C63.10-2020 + Corrigendum 1-2023 + Amendment 1-2024

KDB 558074:04/19 D01 DTS Measurement Guidance v05r02

KDB 174176 D01:6/2015 Line Conducted FAQ v01r01

KDB 353028 D01:04/2022 Antennas Part 15 Transmitters v01r01

[ISED RSS-Gen:04/2018 Issue 5 Amendment 2 (Feb 2021)]

2.2.3 Type of equipment

Hand held Equipment

3 Test conditions and configurations

3.1 Normal environmental test conditions

Environmental condition	Parameter	Range during test
Temperature	[°C]	21-24
Relative humidity	[%]	20-60
Supply voltage	[V]	12

3.2 Equipment modifications

No modifications were found to be necessary to perform the tests or to achieve compliance.

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3.3 Antenna assemblies

No antenna connector is prepared so tests were done in radiated mode.

3.4 Test Modes

Mode description	Mode configuration
All Modes	No auxiliary equipment was connected to the EUT.
Mode 1: TX-Mode external Power supply	Normal operation. EUT is connected to Accessory device A003964660-003 12V-Battery with EUT-Connector. RFID always active.
Mode 2: TX-Mode (Host device)	Normal operation. EUT powered from host device. RFID always active.
Mode 3: TX-Mode terminated (Host device)	Normal operation. EUT powered from host device. RFID always active. RFID connected to dummy load. Additional Handpiece (V-ACTOR) connected to host device and with release button pressed to keep Host device active.
Mode 4: N/A	

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3.5 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 ETSI TR 100 028-1/-2 and ETSI TS 103 051 (radiated measurements) and is documented in the quality system acc. to ISO/IEC 17025:2017.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

The stated values are the expanded uncertainty values, the measured value lies within the assigned range of values with a probability of 95% ($k = 1.96$).

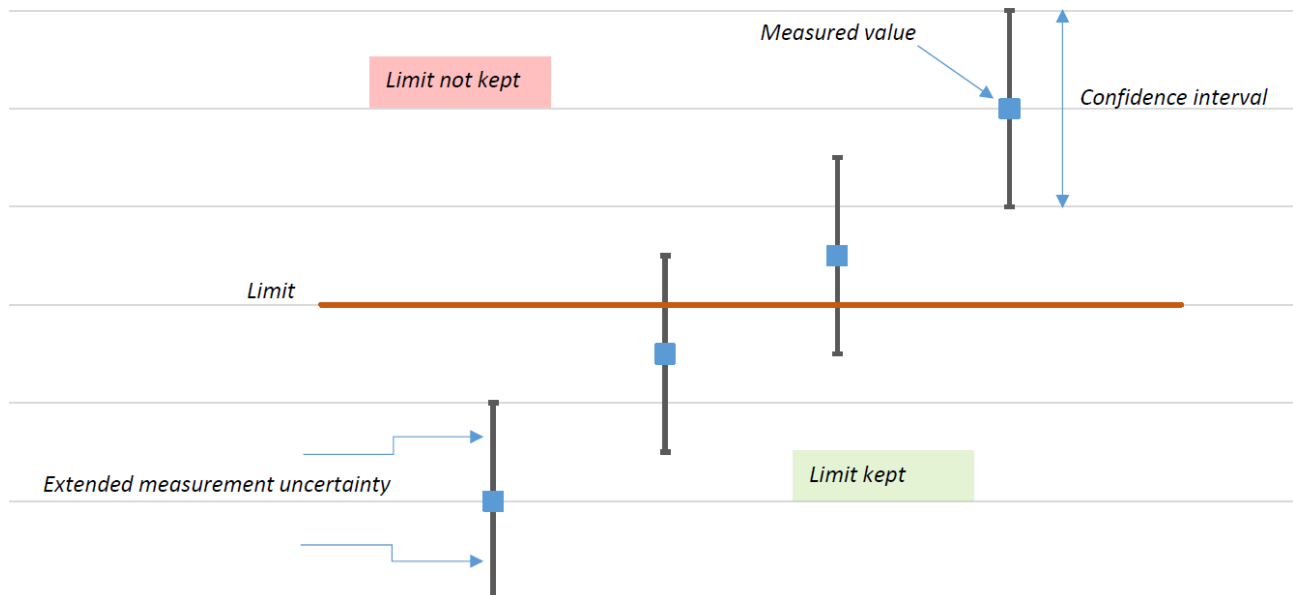
The manufacturer has the sole responsibility of continued compliance of the device.

Test	Value	Unit	Range
Frequency Error	$2.7 \cdot 10^{-8}$	Hz	-
Frequency Stability under low voltage conditions			
Time	$1.1 \cdot 10^{-9}$	s	-
Conducted Carrier Power	1.0	dB	9k-1GHz
Conducted Spurious Emissions (RX/TX)	1.7	dB	1GHz-6GHz
	2.8	dB	6GHz-40GHz
Occupied Bandwidth (OBW)	0.1	%	-
TX Power Spectral Density	4.2	mW	9kHz - 6GHz
	1.6	dB	9kHz - 6GHz
Dwell Time	$4.6 \cdot 10^{-7}$	Hz	-
Frequency Separation			-
Measurement of conducted emissions at the power supply connection to LISN	2.3	dB	9kHz – 150kHz
	2.2	dB	150kHz – 30MHz
Measurement of the field strength at distance 3m	1.6	dB	9k-150kHz
	4.5	dB	30-1000MHz
	5	dB	1-6GHz
	5.3	dB	6-40GHz
Temperature	0.8	K	-
Humidity	4	%	-
Voltage (AC/DC)	1.0	%	-

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Example:

Measured value	Limit	Extended measurement uncertainty ($k=1.96$)	Confidence interval (95%)
19 dBm @ 2.48GHz	20 dBm	1.7 dB	17.3 dBm – 20.7 dBm

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4 Test results in detail

4.1 Antenna Requirement

4.1.1 Requirements / Limits

FCC Part 15, Subpart C, §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

[RSS-Gen sec. 6.8:]

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

4.1.2 Test Results

The antenna connector is within the transmitter enclosure. Disassembly is not normally required. This is sufficient to demonstrate compliance with the antenna requirement in FCC Part 15, Subpart C, §15.203 (acc. KDB 353028 D01) and ISED RSS-Gen sec. 6.8.

4.1.1 Final test result (Antenna Requirement)

Final test result

Pass

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4.2 20 dB bandwidth and occupied bandwidth 99%

4.2.1 Requirements / Limits

FCC Part 15, Subpart C, §15.215

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2.2 Test Method

The 20 dB bandwidth was measured according to ANSI C63.10 clause 6.9.2

The Occupied bandwidth (99%) was measured according to [RSS-Gen sec 6.7]

4.2.3 Test Setup (20 dB bandwidth and occupied bandwidth 99%)

4.2.3.1 Conducted measurements

EUT		A003964660-001 (rad. sample) with Test Fixture near-field coupling method
Chamber details		Shielded room
Companion device		EUT in normal operation Mode. No Companion Device was used.
Operation mode		☒ 1: TX-Mode external Power supply ☐ 2: TX-Mode (Host device) ☐ 3: TX-Mode terminated (Host device) ☐ 4: N/A
Spectrum Analyzer	Centre Frequency	13.55 MHz (nominal EUT channel centre frequency)
	Resolution Bandwidth	FCC: 100Hz (1% to 5%; min 100Hz) ISED: 1 Hz (1% to 5% of the OBW)
	Video Bandwidth	FCC: 300 Hz (three times RBW) ISED: 3 Hz (three times RBW)
	Span	FCC: 2kHz (shall be between two times and five times the OBW) ISED: 500 Hz (shall be between two times and five times the OBW)
	Sweep time	5s
	Detector	Peak with max-hold
Further parameters		-
Test engineer		Dipl. Ing. Primoz Erzen

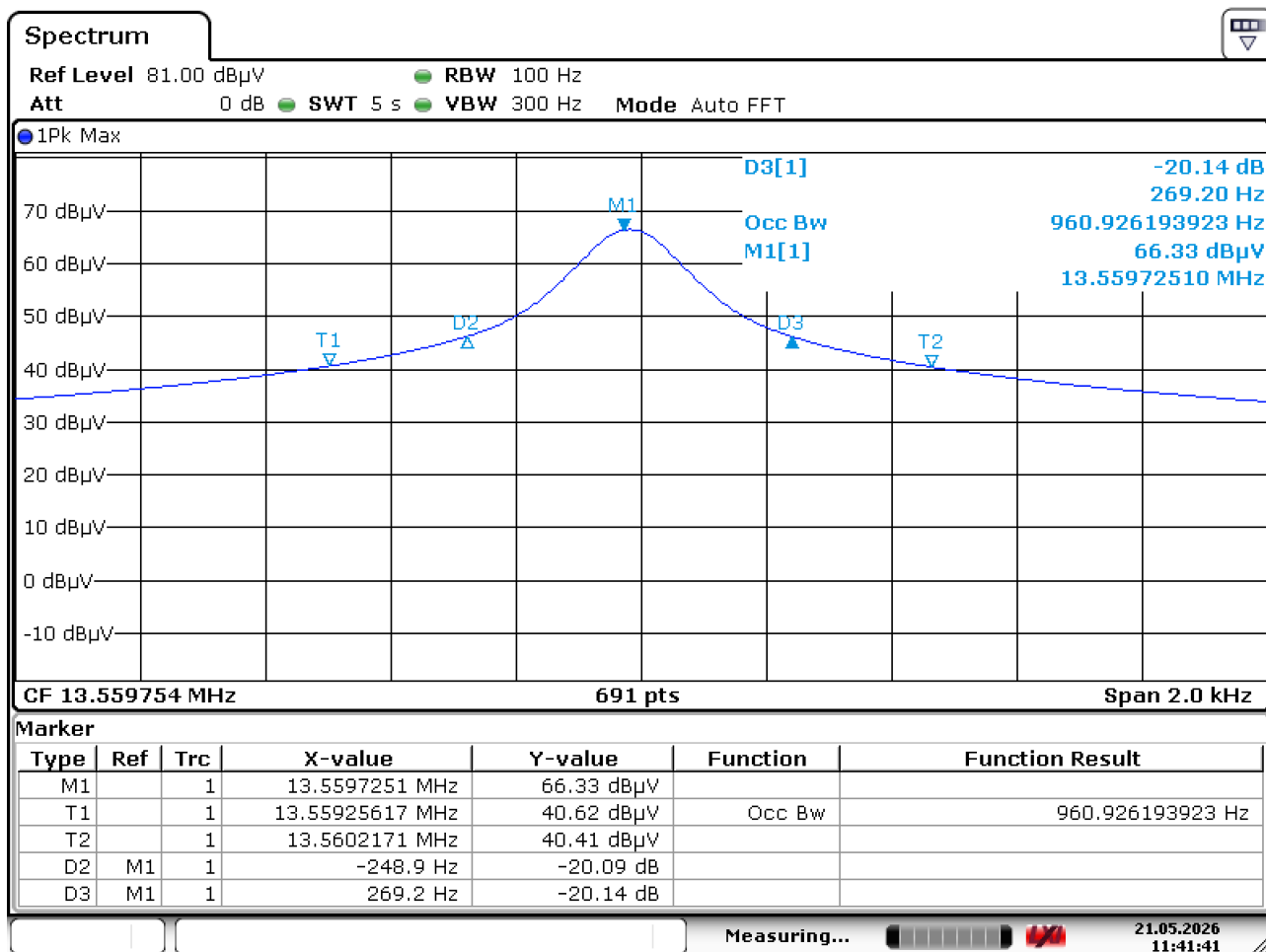
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4.2.4 Test Results (20 dB bandwidth and occupied bandwidth 99%)

4.2.4.1 20 dB Bandwidth with Tag



Date: 21.MAY.2026 11:41:41

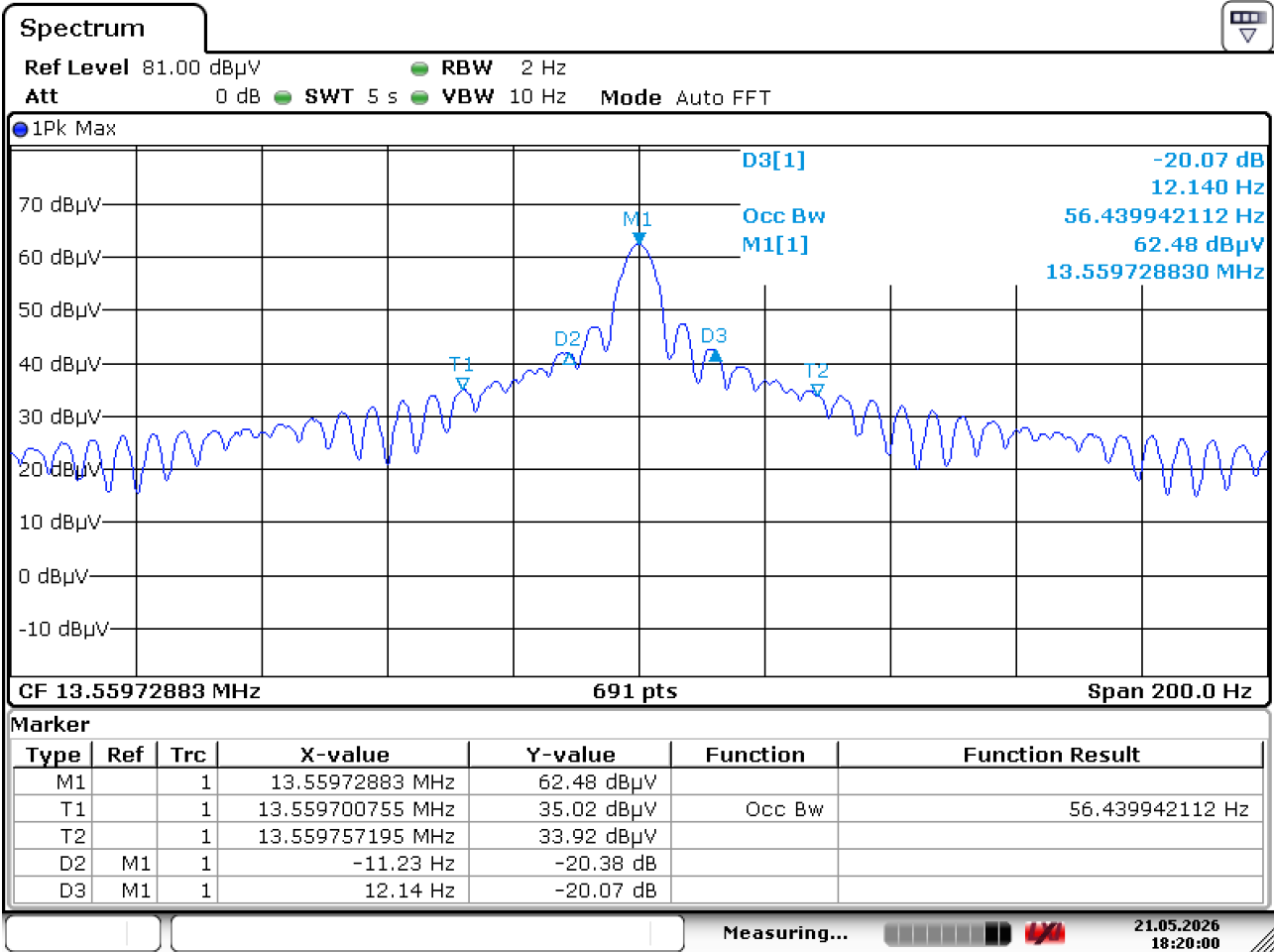
Frequency [MHz]	20 dB Bandwidth [Hz]	Lower Edge		Upper Edge		RBW [Hz]		Span [Hz]		Test Result
		[MHz]	Limit [MHz]	[MHz]	Limit [MHz]	min	max	min	max	
13.56	518.1	13.56	13.11	13.56	14.01	100	100	1036.2	2590.5	P

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4.2.4.2 Occupied bandwidth 99% with Tag



Date: 21.MAY.2026 18:20:01

Frequency [MHz]	Bandwidth 99% [Hz])	RBW min [Hz]	RBW max [Hz]	Span min [Hz]	Span max [Hz]
13.56	56.44	0.56	2.82	112.88	282.2

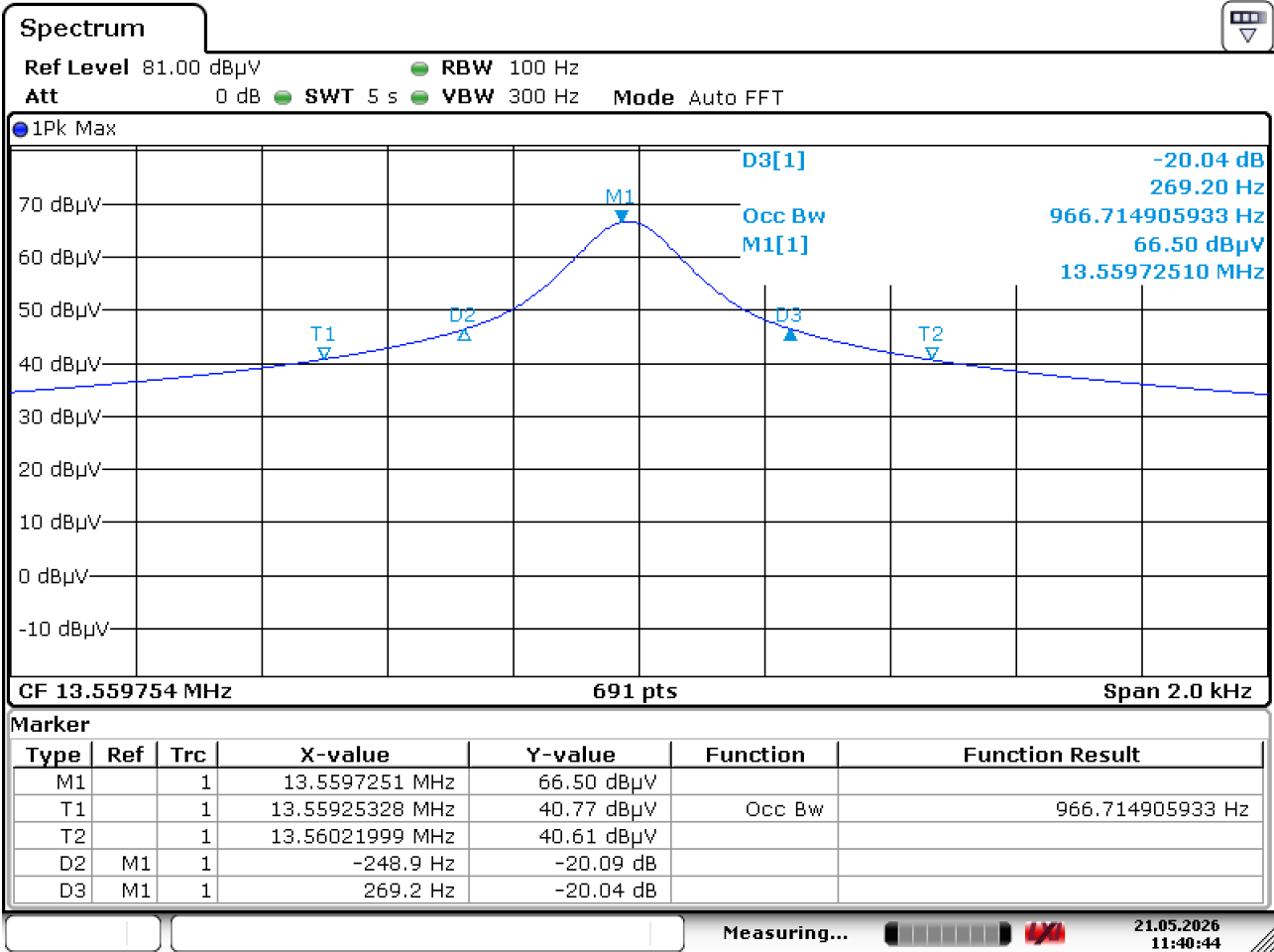
No Limits apply to the occupied bandwidth 99%

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4.2.4.3 20 dB Bandwidth without Tag



Date: 21.MAY.2026 11:40:45

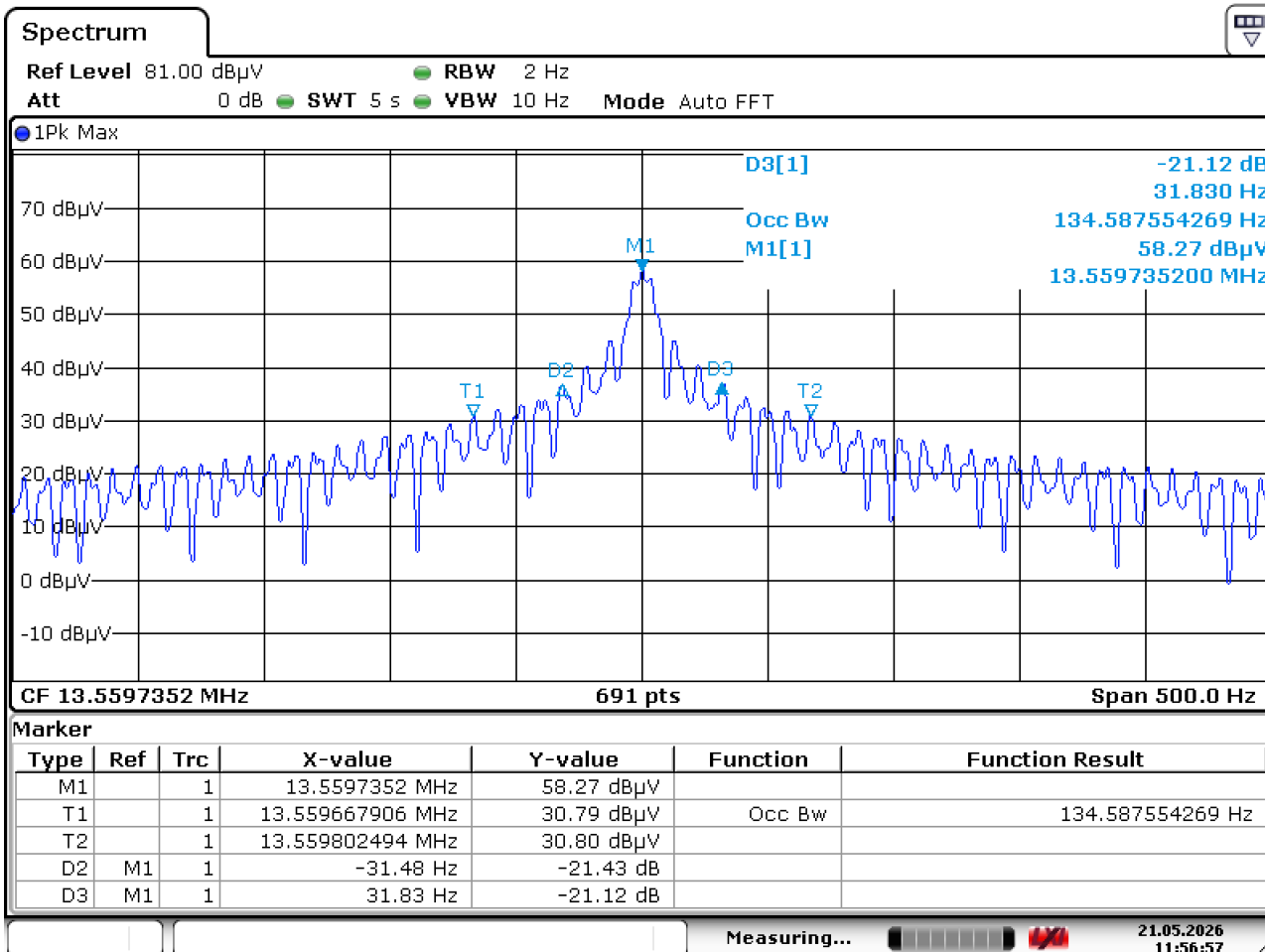
Frequency [MHz]	20 dB Bandwidth [Hz]	Lower Edge		Upper Edge		RBW [Hz]		Span [Hz]		Test Result
		[MHz]	Limit [MHz]	[MHz]	Limit [MHz]	min	max	min	max	
13.56	518.1	13.56	13.11	13.56	14.01	100	100	1036.2	2590.5	P

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4.2.4.4 Occupied bandwidth 99% without Tag



Date: 21.MAY.2026 11:56:58

Frequency [MHz]	Bandwidth 99% [Hz]	RBW min [Hz]	RBW max [Hz]	Span min [Hz]	Span max [Hz]
13.56	134	1.34	6.7	268	670

No Limits apply to the occupied bandwidth 99%

4.2.5 Final test result (20 dB bandwidth and occupied bandwidth 99%)

Final test result	Pass
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4.3 Radiated Emissions

4.3.1 Requirements / Limits

4.3.1.1 Fundamental Field Strength within the band 13.110-14.010 MHz

FCC Part 15, Subpart C, §15.225 (a-c); [RSS-210 Annex B6 (a) i-iii]

The field strength of any emission shall not exceed the following limits

Frequency [MHz]	Measurement distance [m]	Limit [$\mu\text{V/m}$]	Limit [$\text{dB}\mu\text{V/m}$]	Limits @ 3m [$\text{dB}\mu\text{V/m}$]
13.11-13.41	30	106	40.51	80.5@3m
13.41-13.553	30	334	50.47	90.5@3m
13.553 – 13.567	30	15848	84	124.0@3m
13.567-13.71	30	334	50.47	90.5@3m
13.71-14.01	30	106	40.51	80.5@3m

The limit values are corrected to the measurement distance with an inverse linear distance extrapolation factor (40 dB/decade) according to FCC 15.31 (f)(2); [RSS-Gen sec. 6.5].

4.3.1.2 Radiated Spurious Emissions outside of the 13.110-14.010 MHz band

FCC Part 15, Subpart C, §15.225 (d); [RSS-210 Annex B6 (a) iv]

The field strength of any emission appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209; [RSS-Gen sec. 8.9]

FCC Part 15, Subpart C, §15.209; [RSS-Gen sec. 8.9]; Radiated Emission Limits

Frequency [MHz]	Measurement distance [m]	Limit [$\mu\text{A/m}$]	Limit [$\mu\text{V/m}$]	Limit [$\text{dB}\mu\text{V/m}$]	Limit @3m [$\text{dB}\mu\text{V/m}$]	Detector
0.009 – 0.09	300	6.37/F	2400/F	48.5 ... 28.5	128.5 ... 108.5	AVG(Pk)
0.09 – 0.11	300	6.37/F	2400/F	28.5 ... 26.8	108.5 ... 106.8	QP
0.11 – 0.49	300	6.37/F	2400/F	26.8 ... 13.8	106.8 ... 93.8	AVG(Pk)
0.49 – 1.705	30	63.7/F	24000/F	33.8 ... 23.0	73.8 ... 63.0	QP
1.705 – 30	30	0.08	30	29.5	69.5	QP
30 – 88	3	-	100	40.0	40.0	QP
88 – 216	3	-	150	43.5	43.5	QP
216 – 960	3	-	200	46.0	46.0	QP
960 - 1000	3	-	500	54.0	54.0	QP
1000 - 40000	3	-	500	54.0	54.0	AVG(Pk)

F: Frequency in kHz

Used conversion factor [$\mu\text{A/m}$]->[$\mu\text{V/m}$]: Limit [$\mu\text{V/m}$] = Limit[$\mu\text{A/m}$] * 376.7Ohm

Used conversion factor [$\mu\text{V/m}$]->[$\text{dB}\mu\text{V/m}$]: Limit [$\text{dB}\mu\text{V/m}$] = 20 log (Limit [$\mu\text{V/m}$] / 1[$\mu\text{V/m}$])

FCC Part 15, Subpart C, §15.31 (f)(2); [RSS-Gen sec. 6.5]:

At frequencies below 30MHz, the limit values are corrected with an inverse linear distance extrapolation factor (40dB/decade).

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90kHz, 110–490kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing a linear average detector.

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FCC Part 15, Subpart C, §15.35(b); [RSS-Gen sec. 8.1]:

..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit...

FCC Part 15, Subpart A, §15.33 (a)(1); ANSI C63.10 clause 5.5; [RSS-Gen sec. 6.13.2]:

For an intentional radiator operating below 10 GHz, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.3.2 Test Method

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. Preliminary emission testing was performed inside the anechoic chamber. The measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT. The different measurement setups for each frequency range are shown below.

For the final testing, the placement of EUT and cables were the same as for preliminary testing. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, then the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked. For the measurements in the frequency range 30 MHz to 1 GHz for each measured frequency the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation.

For the measurements in the frequency ranges (90-110kHz, 490 kHz-1 GHz) quasi-peak detector was used, while average and peak detectors were used in other ranges.

Final testing was performed on an SVSWR compliant test site.

The final average electric field value (E_{final}) is calculated using the following equation:

$$E_{final} = RawRec + Corr.$$

While

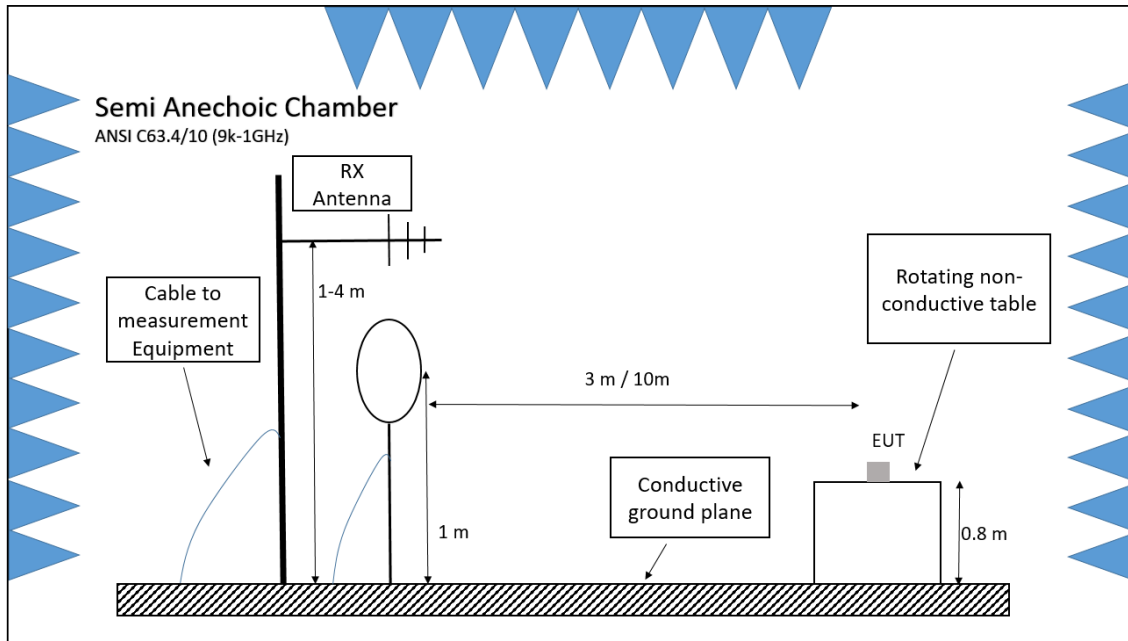
$$Corr. = Trd. Corr. + Sig Path + Preamp$$

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4.3.2.1 EUT positioning



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4.3.2.1.1 Measurement Setup 9kHz - 30MHz

Test Site	SAC (Semi Anechoic Chamber)
Receiving Antenna	Loop antenna (HFH 2)
Receiving Antenna Height	1m
Receiving Antenna Polarization	Parallel and perpendicular to the EUT (EUT without Loop antenna) According to ANSI C63.10 clause 6.4.6
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	22.5° during exploratory tests Linear during maximizations for final measurements
Receiver Configurations	Average and peak detectors (9-90kHz and 110-490kHz) Quasi Peak detector (90-110kHz and 490kHz-30MHz)
	RBW: 200Hz (9 - 150kHz) and 9 kHz (150kHz – 30MHz)
	Step Size: 50Hz (9-150kHz) and 2.25kHz (150k-30MHz)
	Sweep Time: 100ms (FFT) during exploratory tests Sweep Time: 1s for final measurements

4.3.2.1.2 Measurement Setup 30MHz - 1GHz

Test Site	Semi-anechoic chamber
Receiving Antenna	Hybrid Antenna VULB 9168
Receiving Antenna height	Varied (1m to 4m, step size 1m) during exploratory tests Linear during maximizations for final measurements
Receiving Antenna Polarization	Horizontal and Vertical
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	45° during exploratory tests Linear during maximizations for final measurements
Receiver Configurations	Average and peak detector
	RBW :120 kHz
	Step Size: 30kHz (30-1000MHz)
	Sweep Time: 20ms (FFT) during exploratory tests Sweep Time: 1s for final measurements

4.3.3 Test Setup

EUT	A003964660-001 (rad. sample)
Companion device	EUT in normal operation Mode. No Companion Device was used.
Operation mode	☒ 1: TX-Mode external Power supply ☐ 2: TX-Mode (Host device) ☐ 3: TX-Mode terminated (Host device) ☐ 4: N/A
Further parameters	-
Test engineer	Dipl. Ing. Primoz Erzen

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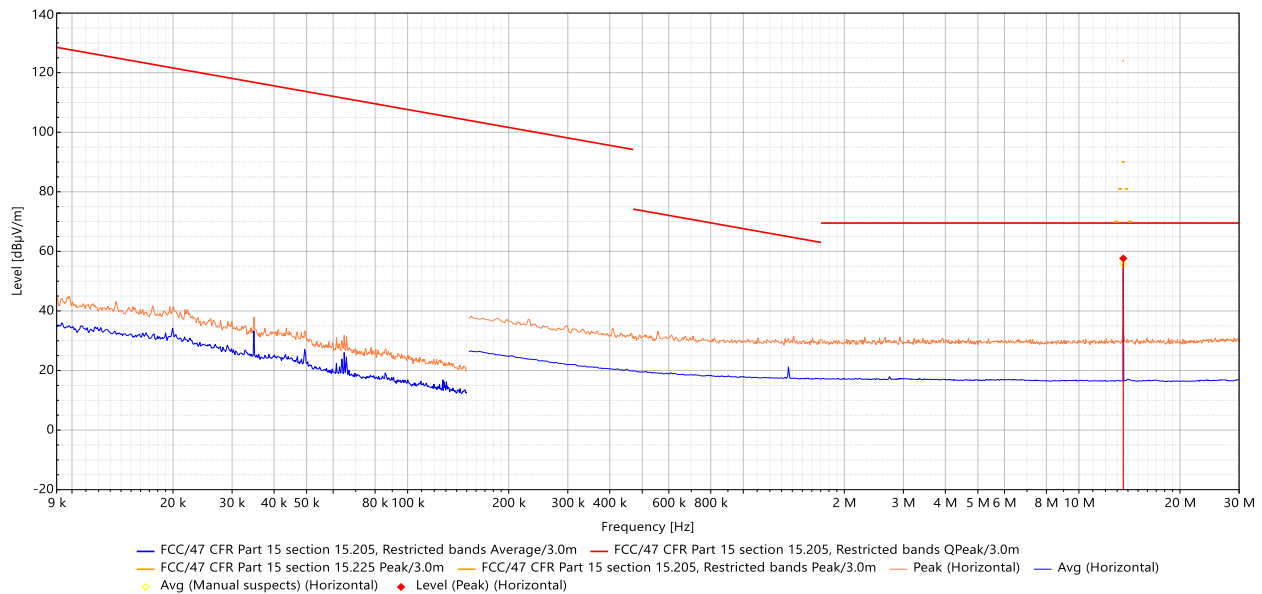
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4.3.4 Test results

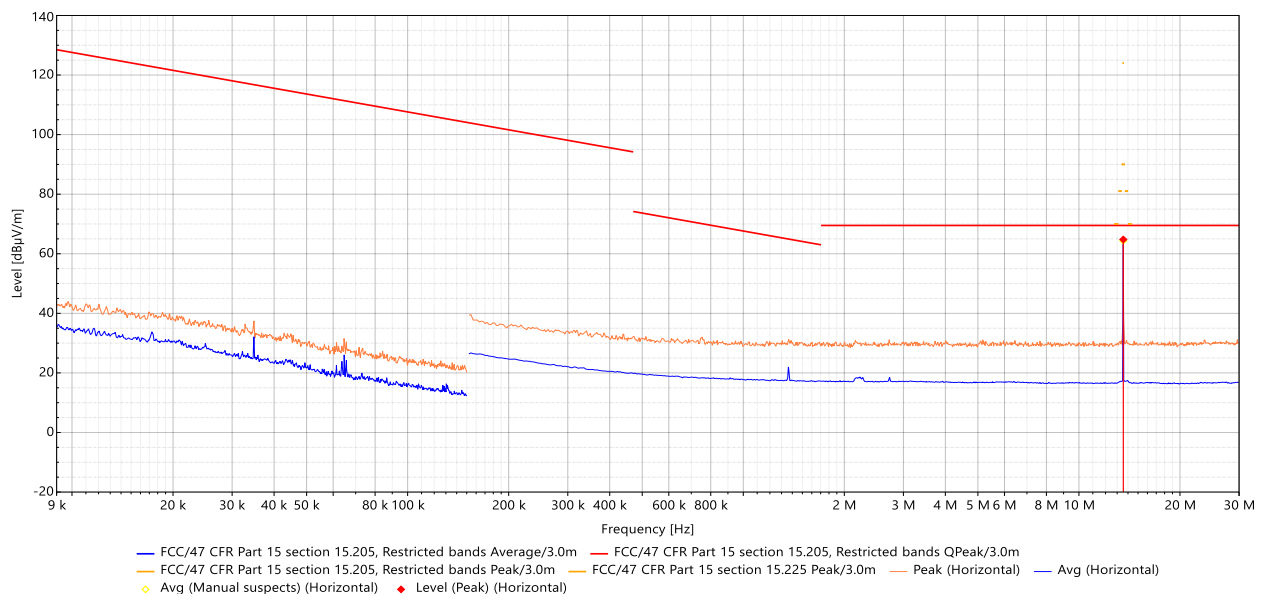
4.3.4.1 Radiated Emissions 9 kHz to 30 MHz with tag

4.3.4.1.1 Perpendicular Polarization



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (deg)	Corr. (dB)
13.56	57.6	124.0	-66.4	286.0	19.7

4.3.4.1.2 Parallel Polarization



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (deg)	Corr. (dB)
13.56	64.8	124.0	-59.2	15.7	19.7

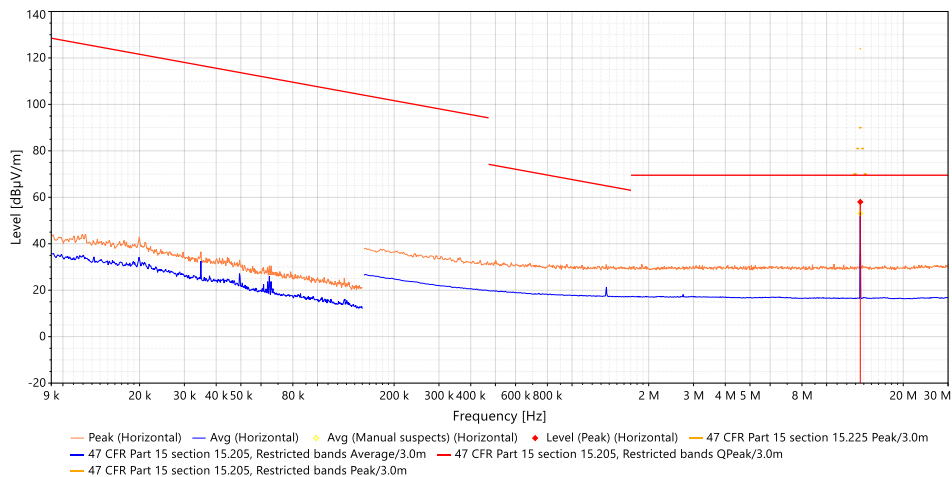
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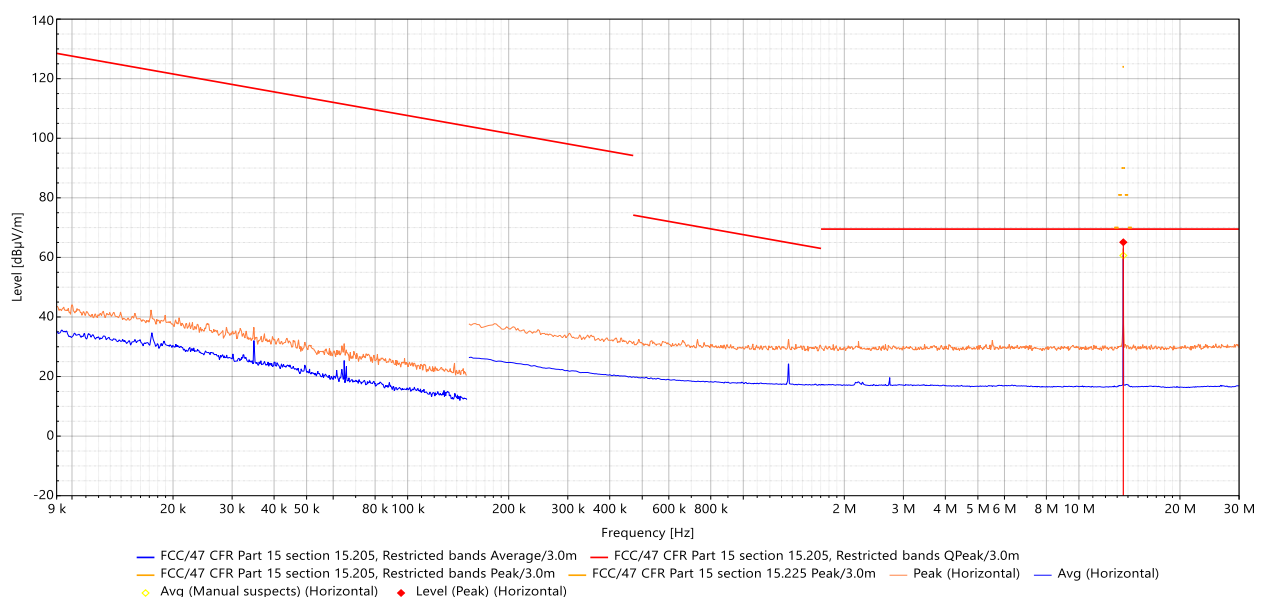
4.3.4.2 Radiated Emissions 9 kHz to 30 MHz without tag

4.3.4.2.1 Perpendicular Polarization



Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (deg)	Corr. (dB)
13.56	58.0	124.0	-66.0	295.5	19.7

4.3.4.2.2 Parallel Polarization



Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (deg)	Corr. (dB)
13.56	65.1	124.0	-58.9	15.5	19.7

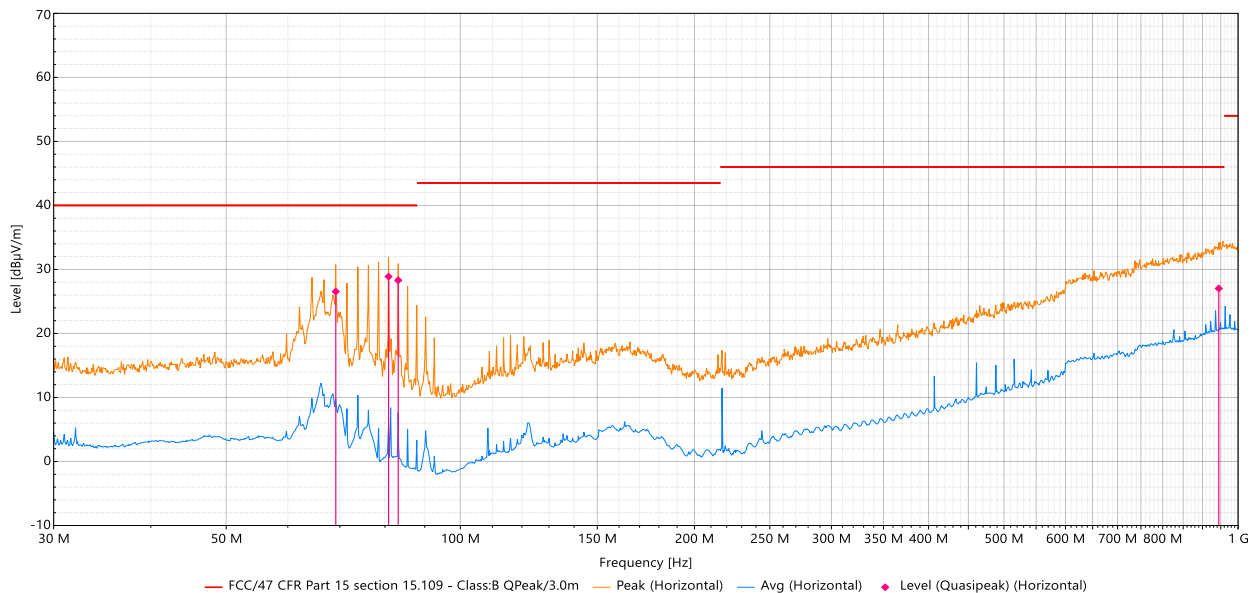
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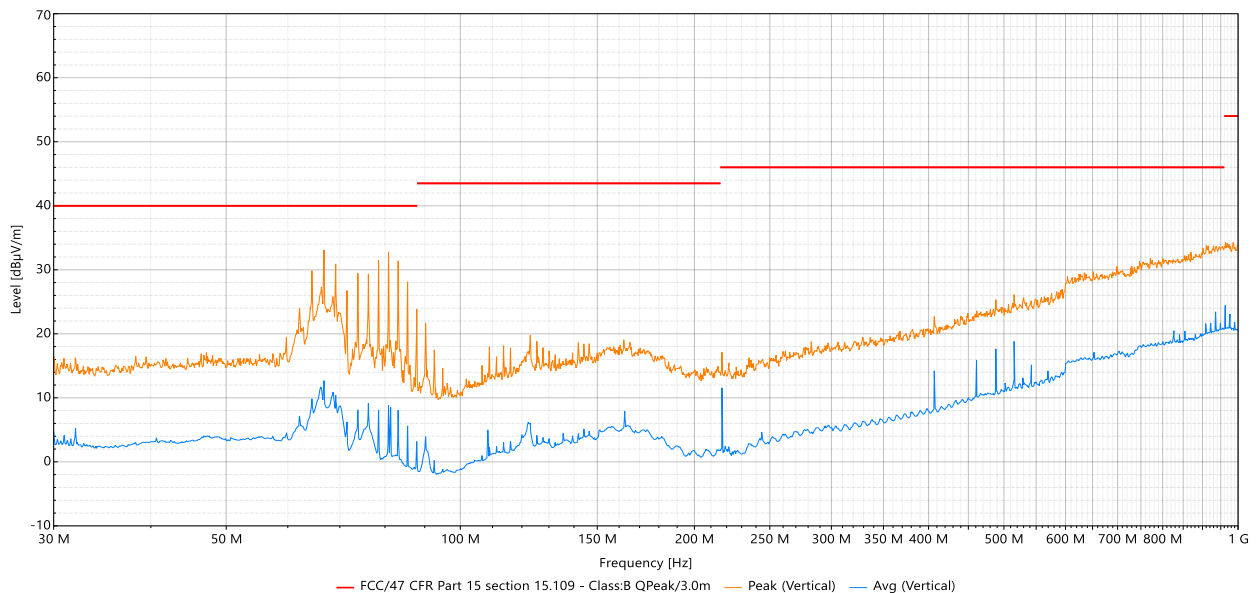
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4.3.4.3 Radiated Emissions 30 MHz to 1 GHz with tag

4.3.4.3.1 Horizontal Polarization



4.3.4.3.2 Vertical Polarization



4.3.4.3.3 Measurement Values

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Height (m)	Corr. (dB)
944.451	27.0	46.0	-19.0	H	283.8	1.85	27.0
69.159	26.6	40.0	-13.4	H	301.6	1.32	26.6
83.204	28.3	40.0	-11.7	H	307.9	2.89	28.3
80.862	28.9	40.0	-11.1	H	346.7	1.00	28.9

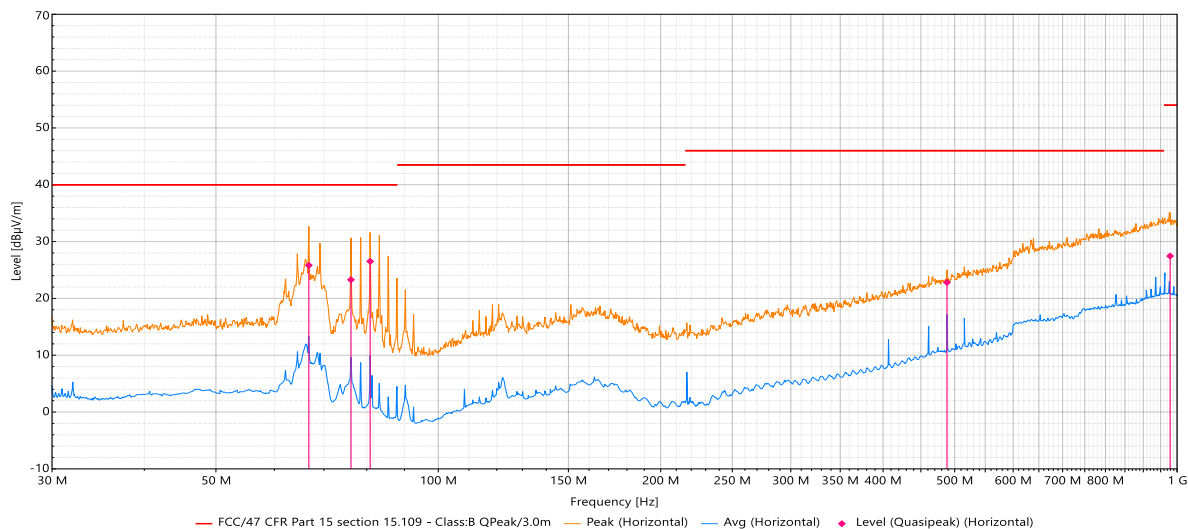
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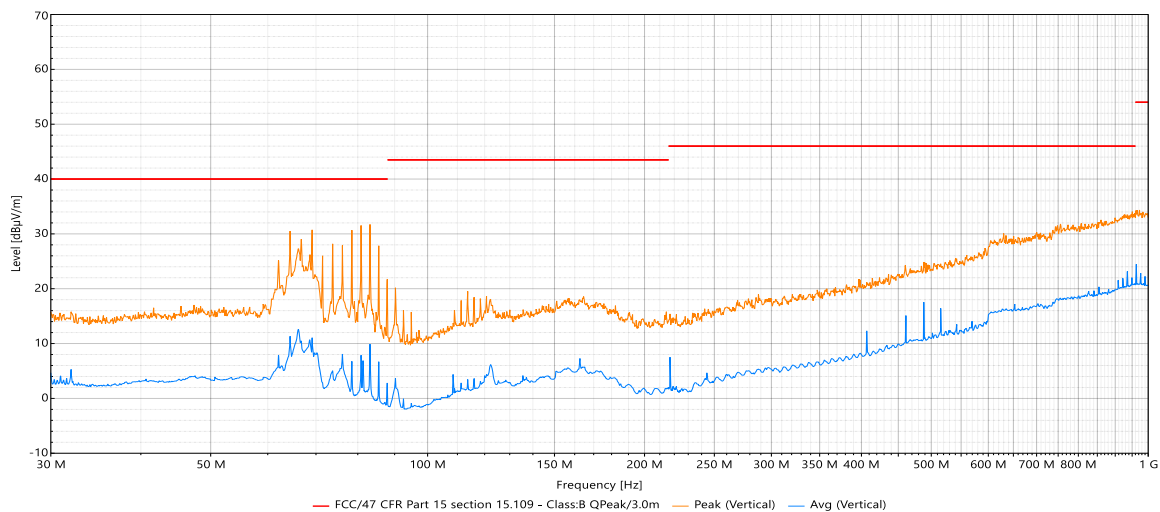
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4.3.4.4 Radiated Emissions 30 MHz to 1 GHz without tag

4.3.4.4.1 Horizontal Polarization



4.3.4.4.2 Vertical Polarization



4.3.4.4.3 Measurement Values

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Height (m)	Corr. (dB)
978.603 M	27.4	54.0	-26.6	H	39.6	1.75	28.8
488.151 M	22.8	46.0	-23.2	H	116.9	2.67	20.8
76.174 M	23.3	40.0	-16.7	H	234.8	1.31	11.8
66.795 M	25.8	40.0	-14.2	H	355.0	1.00	13.3
80.862 M	26.5	40.0	-13.5	H	23.6	2.70	10.5

4.3.5 Final test result

(Fundamental Field Strength within the band 13.110-14.010 MHz)
(Radiated Emissions outside of the 13.110-14.010 MHz band)

Final test result

Pass

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4.4 Frequency Stability

4.4.1 Requirements / Limits

FCC Part 15, Subpart C, §15.225 (e)

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage (for battery operated equipment, the tests shall be performed using a new battery), and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

ANSI C63.10 sec. 5.13

Where the device is intended to be powered from an external power adapter, the voltage variations shall be applied to the input of the adapter provided with the device at the time of sale. If the device is not marketed or sold with a specific adapter, then a typical power adapter shall be used.

For devices with wide range of rated supply voltage, test at 15% below the lowest and 15% above the highest declared nominal rated supply voltage.

For devices obtaining power from an input/output (I/O) port (USB, firewire, etc.), a test jig is necessary to apply voltage variation to the device from a support power supply, while maintaining the functionalities of the device.

[ISED RSS-210 Annex B.6 (b); ISED RSS-Gen sec. 6.11]

Frequency stability is a measure of frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage. The reference temperature for radio transmitters is $+20^{\circ}\text{C}$.

A hand-held device that is only capable of operating using internal batteries shall be tested at the battery's nominal voltage, and again at the battery's operating end-point voltage, which shall be specified by the equipment manufacturer.

4.4.2 Test Method

The EUT is not prepared with a dummy load so an antenna is connected to the spectrum analyser with a coaxial cable and is placed near the EUT in the middle of an environmental temperature chamber to couple the EUT output to the spectrum analyser.

Frequency stability with respect to ambient temperature

Nominal supply voltage was used. The environmental temperature chamber was first set to 50°C . After the temperature was stabilized the EUT was turned on and the frequency was measured four times, at start up, after 2 minutes, after 5 minutes, and after 10 minutes. Then the temperature was reduced by 10°C and the measurements were repeated in the same way until the minimum temperature is reached (-20°C).

Frequency stability when varying supply voltage

The frequency was measured four times, at start up, after 2 minutes, after 5 minutes, and after 10 minutes with the Supply voltages of 85% of the minimum supply voltage and 115% of the maximum supply voltage being used.

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4.4.3 Test Setup (Frequency Stability)

EUT	A003964660-001 (rad. sample) with Test Fixture
Environmental Cond.	Normal and Extreme
Chamber details	Shielded room
Companion device	EUT in normal operation Mode. No Companion Device was used.
Operation mode	☒ 1: TX-Mode external Power supply ☐ 2: TX-Mode (Host device) ☐ 3: TX-Mode terminated (Host device) ☐ 4: N/A
Further parameters	-
Test engineer	Dipl. Ing. Primoz Erzen

4.4.4 Test results (Frequency Stability)

Op. Freq. [MHz]	On startup		After 2 Minutes		After 5 Minutes		After 10 Minutes		Limit [%]
13.55975	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	0.01
Temp [°C]									Result
50	13.55975	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P
40	13.55975	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P
30	13.55975	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P
20	13.55975	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P
10	13.55980	0.000	13.55980	0.000	13.55980	0.000	13.55980	0.000	P
0	13.55980	0.000	13.55980	0.000	13.55980	0.000	13.55980	0.000	P
-10	13.55980	0.000	13.55980	0.000	13.55980	0.000	13.55980	0.000	P
-20	13.55975	0.000	13.55980	0.000	13.55980	0.000	13.55975	0.000	P
Voltage [V]	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	Frequency [MHz]	Drift [%]	Result
10.2	13.55980	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P
27.6	13.55980	0.000	13.55975	0.000	13.55975	0.000	13.55975	0.000	P

Nominal supply Voltage [V]: 12 (12-24)

4.4.5 Final test result (Frequency Stability)

Final test result	Pass
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4.5 AC Power Conducted Emission

4.5.1 Requirements / Limits

AC power-line conducted emission measurements shall be made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio-noise voltage that is conducted from all of the EUT current-carrying power input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network.

FCC Part 15, Subpart C, §15.207 (a); [ISED RSS-Gen sec. 8.8]

... for an intentional radiator 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 μ H/50 ohms line impedance stabilization network (LISN).

Conducted Emission Limits

Frequency [MHz]	Conducted Limit [dB μ V]	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

*Decreases with logarithm of the frequency

FCC Part 15, Subpart C, §15.207 (c)

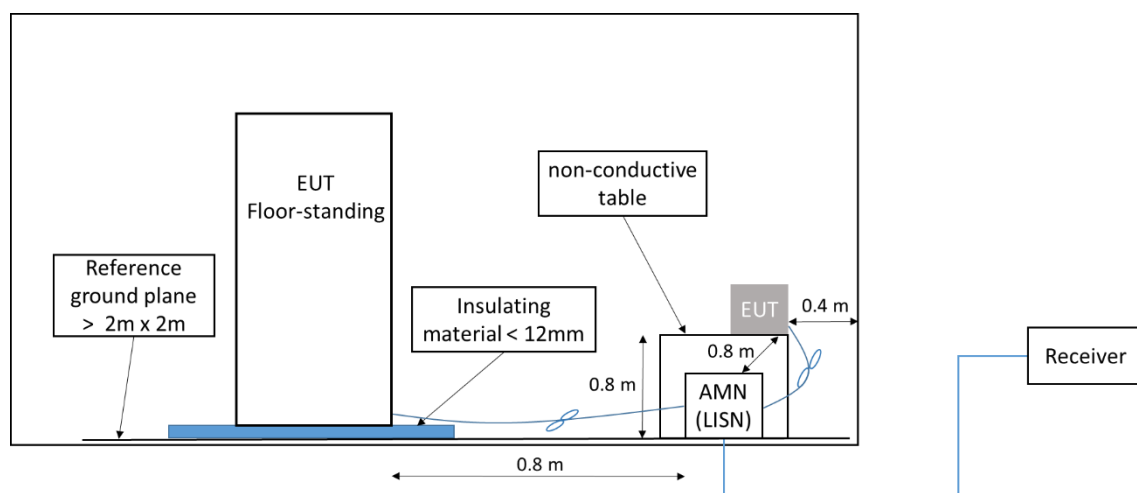
... Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

KDB174176 D01 Line Conducted FAQ v01r01; [ISED RSS-Gen sec. 8.8]

For a device operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna within the transmitter's fundamental emission band.

4.5.2 Test Method

The test setup was made according to ANSI C63.10 clauses 6.2.2 & 6.2.3 as shown in the photograph



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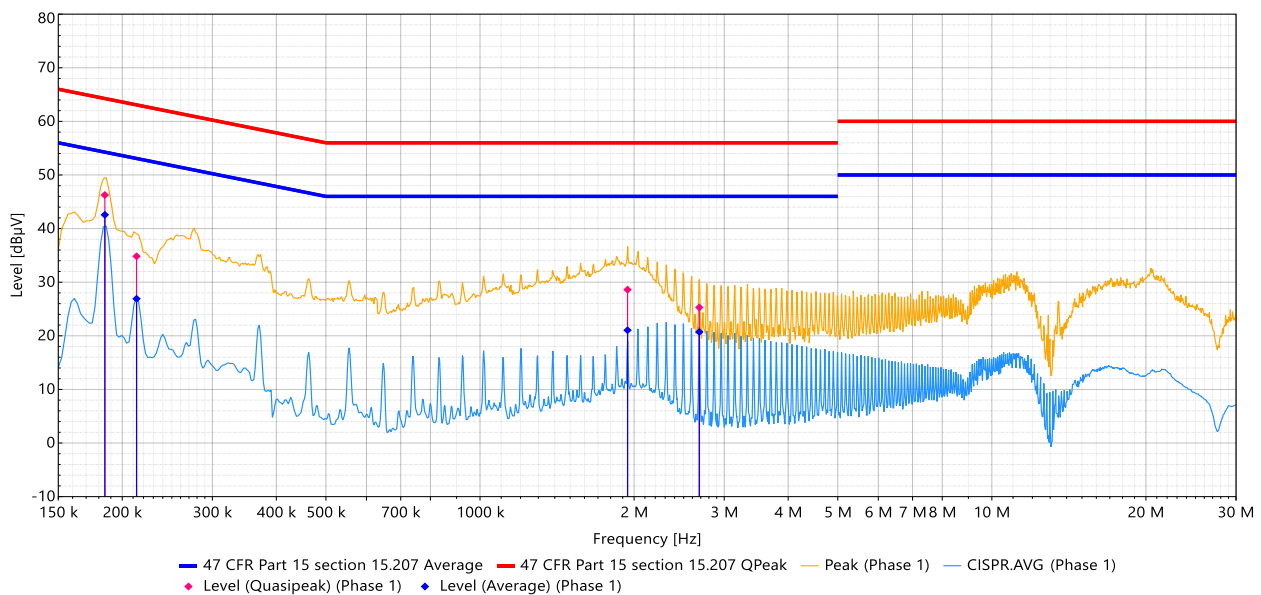
4.5.3 Test Setup (AC Power Conducted Emission)

EUT	A003964660-001 (rad. sample) A004170318-001 (sample with RFID-Antenna terminated)
Companion device	EUT in normal operation Mode. No Companion Device was used.
Operation mode	☐ 1: TX-Mode external Power supply ☐ 2: TX-Mode (Host device) ☒ 3: TX-Mode terminated (Host device) ☐ 4: N/A
Further parameters	EUT was tested with a suitable dummy load in lieu of the antenna according to KDB174176 D01 Line Conducted FAQ v01r01; [ISED RSS-Gen sec. 8.8]
Test engineer	Dipl. Ing. Primož Erzen

4.5.4 Test results (AC Power Conducted Emission)

4.5.4.1 Line: Phase 1; 120V / 60Hz; with Tag; TX-Mode terminated (Host device)

#1252(150 kHz-30 MHz), Phase 1



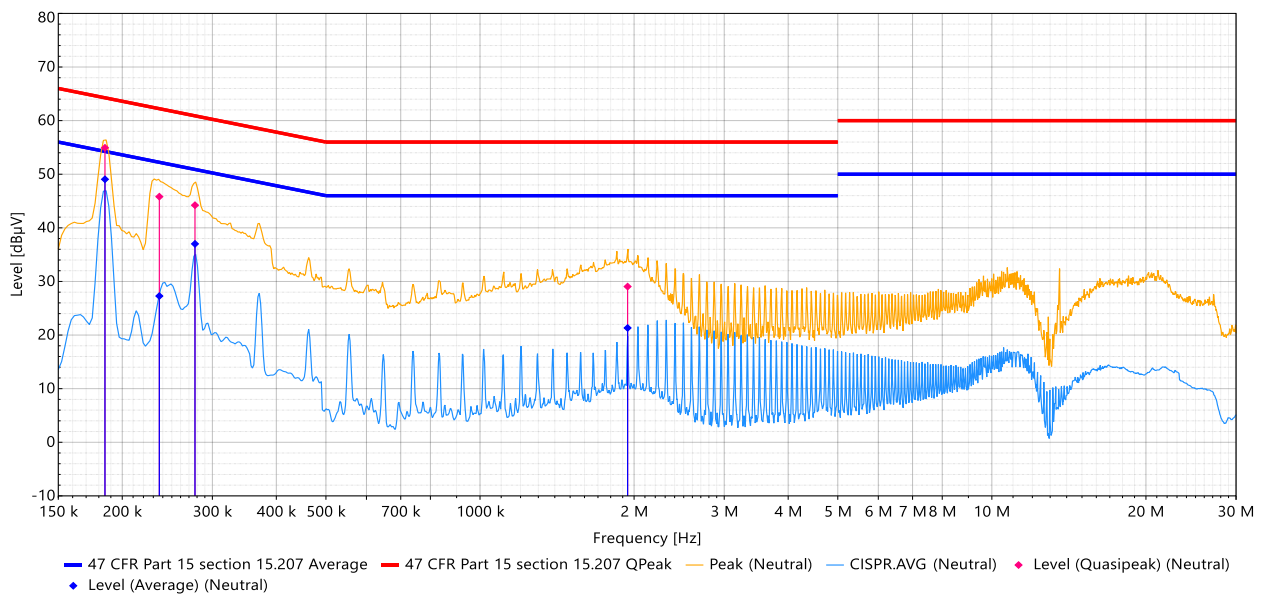
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4.5.4.2 Line: Neutral; 120V / AC; with Tag; TX-Mode terminated (Host device)

#1252(150 kHz-30 MHz), Neutral



4.5.4.3 Results TX-Mode terminated (Host device)

QuasiPeak

Frequency (Hz)	SR #	Level (dBμV)	Limit (dBμV)	Margin (dB)	Pos	Correction (dB)	M. time (s)	Comments
184.958 k	1	46.3	64.2	-17.9	Phase 1	10.0	1.0	Pass
185.038 k	2	54.9	64.2	-9.3	Neutral	10.0	1.0	Pass
213.304 k	1	34.8	63.1	-28.3	Phase 1	10.0	1.0	Pass
236.321 k	2	45.8	62.3	-16.4	Neutral	10.0	1.0	Pass
277.417 k	2	44.2	60.9	-16.6	Neutral	10.0	1.0	Pass
1.942 M	1	28.6	56.0	-27.4	Phase 1	10.0	1.0	Pass
1.943 M	2	29.0	56.0	-27.0	Neutral	10.0	1.0	Pass
2.682 M	1	25.3	56.0	-30.7	Phase 1	10.0	1.0	Pass

Average

Frequency (Hz)	SR #	Level (dBμV)	Limit (dBμV)	Margin (dB)	Pos	Correction (dB)	M. time (s)	Comments
184.958 k	1	42.6	54.2	-11.6	Phase 1	10.0	1.0	Pass
185.038 k	2	49.1	54.2	-5.2	Neutral	10.0	1.0	Pass
213.304 k	1	26.9	53.1	-26.2	Phase 1	10.0	1.0	Pass
236.321 k	2	27.3	52.3	-25.0	Neutral	10.0	1.0	Pass
277.417 k	2	37.0	50.9	-13.9	Neutral	10.0	1.0	Pass
1.942 M	1	21.0	46.0	-25.0	Phase 1	10.0	1.0	Pass
1.943 M	2	21.3	46.0	-24.7	Neutral	10.0	1.0	Pass
2.682 M	1	20.7	46.0	-25.3	Phase 1	10.0	1.0	Pass

4.5.5 Final test result (AC Power Conducted Emission)

Final test result

Pass

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5 Test Setup Photo

For reasons of confidentiality, no photos of the EUT are included in this report.
For EUT and test setup photos please see the Photo Documentation to this report Number.

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Zusatzdokumentation
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6 Application form

The following information was provided by the customer and form the basis for the execution of the tests and the assessment of conformity. The given information can affect the results of both.

No application form was provided.

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Liste der verwendeten Prüfmittel
List of used test equipment

7 Equipment List

7.1 Hardware

Prüfmittel Test equipment			Prüfmittel-Nr. / ID- Nr. Equipment-No. / ID- No.	Letzte Kalibrierung Last calibration	Nächste Kalibrierung Next calibration
TS897	Spectrum Analyzer: FSV-30	Rohde & Schwarz	9000268	16.07.2025	10.09.2027
	Temperature & Humidity Chamber: PL-3-KPH	Espec	2731999	11.02.2025	11.02.2028
	Semi-Anechoic Chamber	Siemens	9049495	03.09.2025	03.09.2027
	Receiver ESU 8	Rohde & Schwarz	2728844	19.08.2025	19.08.2027
	Antenna HFH 2 (Loop) 9kHz-30MHz	Rohde & Schwarz	2728893	05.08.2024	05.08.2027
	Antenna VULB 9168 30MHz – 1GHz	Schwarzbeck	2728136	05.10.2023	05.10.2026

*Equipment only verified and not calibrated

7.2 Software

Test Software	Developer	Version
BAT-EMC	NEXIO	2022.0.19.0

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Änderungsverzeichnis
Change history

8 Change history

Revision Number	List of revisions
001	Initial Release
002	Updated 20 dB bandwidth and occupied bandwidth 99% measurements
Note: Latest revision report will replace all previous reports.	

Ende des Prüfberichts
End of Test Report