

Prüfbericht-Nr.: Test report no.:	CN24XN7M 001	Auftrags-Nr.: Order no.:	180273092	Seite 1 von 15 Page 1 of 15
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2023.10.10	
Auftraggeber: Client:	SUNTEK-GROUP, INC 4648 Troy Ct Riverside, CA 92509 United States			
Prüfgegenstand: Test item:	Robotic Lawn Mower			
Bezeichnung / Typ-Nr.: Identification / Type no.:	uRM1060, uRM1060.x, uRM1100, uRM1100.x (x=0-9, u=A-Z)			
Auftrags-Inhalt: Order content:	TÜV Rheinland – FCC Service			
Prüfgrundlage: Test specification:	FCC 47 CFR Part 15.215			
Wareneingangsdatum: Date of sample receipt:	2024.02.20	Refer to Photo Documentation		
Prüfmuster-Nr.: Test sample no.:	A003613463-001			
Prüfzeitraum: Testing period:	2024.02.28 - 2024.03.08			
Ort der Prüfung: Place of testing:	Refer to section 1.1			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	genehmigt von: authorized by:			
Datum: Date:	2024.12.31	Ausstelldatum: Issue date:	2024.12.31	
Stellung / Position:	Keda Zhou/PE	Stellung / Position:	Chonghai Liang/Authorizer	
Sonstiges / Other:	FCC ID: 2BDQH-SRM001 Series 1060 and 1100 are the same except for battery capacity, so all the tests were performed on model SRM1100.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
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. This test report only relates to the a. m. 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.				

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Anmerkungen Remarks

- | | |
|---|--|
| 1 | <p>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.</p> <p><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></p> |
| 2 | <p>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 auf folgender Webseite: go.tuv.com/digital-signature</p> <p><i>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 website: go.tuv.com/digital-signature</i></p> |
| 3 | <p>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.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described 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.</i></p> |
| 4 | <p>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 115:2021, 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 bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><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 115:2021, 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.</i></p> |

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Test Summary

4.1.1 ANTENNA REQUIREMENT

Result:

Pass

4.1.2 20dB BANDWIDTH MEASUREMENT

Result:

Pass

4.1.3 RADIATED EMISSIONS

Result:

Pass

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1. Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland /CCIC (Ningbo) Co., Ltd.

1st Floor, Building 11, Scholar Innovation Park, No.1188 Zhongguan Road, Zhenhai District, Ningbo 315200 P.R. China

FCC Designation Number: CN1237

FCC Test Firm Registration Number: 647754

The used test equipment is in accordance with CISPR 16-1 series standards.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment, Laboratory

Kind of Equipment	Type	Serial No.	Last cal. date	Cal. due date
EMI test receiver	ESR7	101929	2023.10.30	2024.10.29
Spectrum analyzer	FSV40	101412	2023.10.30	2024.10.29
Loop Antenna	FMZB 1519B	00241	2022.09.02	2025.09.01
Bilog Antenna	CBL6112D	49033	2024.03.17	2027.03.16

1.3 Uncertainty of Measurement

Table 2: Measurement Uncertainty

Test Item	Expanded Measurement Uncertainty (k=2)
Conducted Emission (9-150kHz)	3.70dB
Conducted Emission (150k-30MHz)	3.30dB
Radiated Emission (30-1000MHz)	4.39dB
Radiated Emission (1-18GHz)	4.67dB

2. General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is a Robotic Lawn Mower operating at 120 – 150 KHz.

For more detail information, refer to the user's manual.

2.2 Ratings and System Details

Table 3: General Description of EUT

General Description of EUT	
Charging Voltage:	DC 20.5V
Internal battery Voltage:	DC 18V
Protection Class:	Class III
Technical Specification of RFID	
Operating Frequency band:	120 – 150 KHz
Antenna Type:	Coil Antenna
Antenna Gain:	0dBi

2.3 Independent Operation Modes

There are some modes:

Mode A: Transmitting

Mode B: Standby

Refer to the user's manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram for further information.

2.5 Submitted Documents

Circuit diagram, Schematics, PCB Layout, Label, User Manual etc.

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

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

3.2 Test Operation and Test Software

All testing were performed according to the procedures in ANSI C63.10: 2020.

Test Software EMC32 V10.30 was used in the radiated emission test.

More details refer to the related paragraph of this report.

3.3 Special Accessories and Auxiliary Equipment

None.

3.4 Countermeasures to Achieve ERM Compliance

The test sample which has been tested contained the noise suppression parts as described in the Circuit Diagram. No additional measures were employed to achieve compliance.

3.5 Test set-up

Diagram of Measurement Configuration for Radiation Test (9KHz-30MHz)

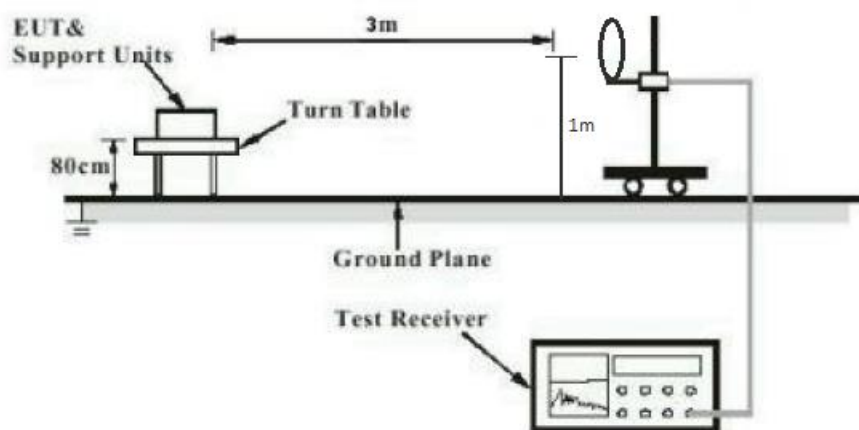


Diagram of Measurement Configuration for Radiation Test (30MHz-1GHz)

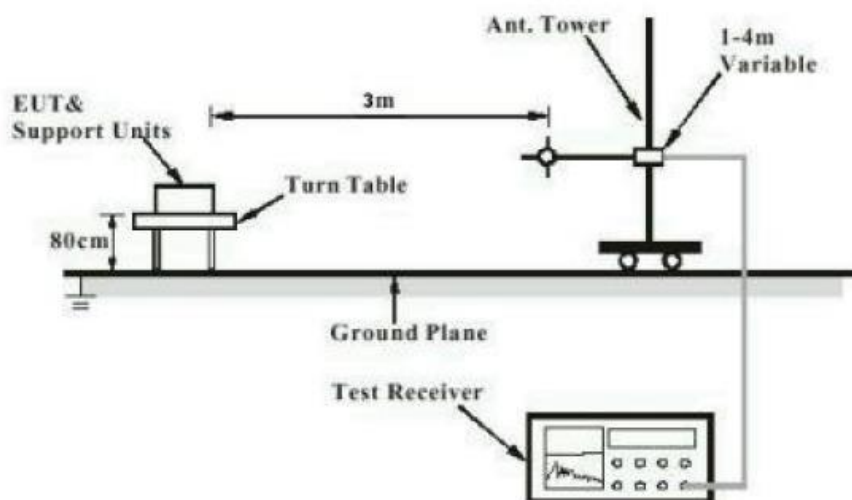
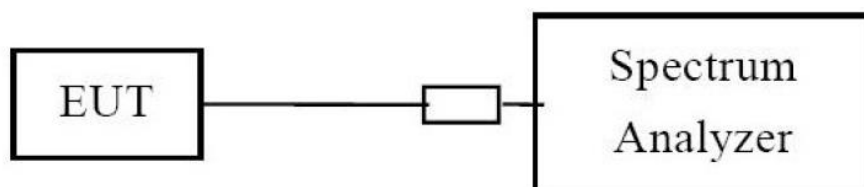


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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4. Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

Result:

Pass

Test Specification
Test standard : FCC 47 CFR Part 15.203

The EUT has an internal coil antenna, which permanently attached and no consideration of replacement. Therefore, the EUT is considered sufficient to comply with the provision.

4.1.2 20dB Bandwidth Measurement

Result:
Pass
Test Specification

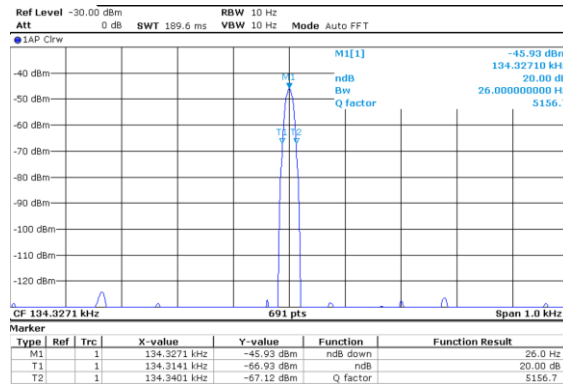
Test standard : FCC 47 CFR Part 15.215
 Basic standard : ANSI C63.10: 2020
 Limit : No limit
 Test suite : Shielded Room

Test Setup

Date of testing : 2024.02.07
 Input voltage : DC 18V
 Operational mode : A
 Temperature : 23°C
 Relative humidity : 56%
 Atmospheric pressure : 101.2 kPa

Table 4: Test result of 20dB Bandwidth

Test Mode	Frequency (KHz)	Bandwidth (Hz)	Limit	Verdict
A	134.3	26	N/A	Pass

Figure 1: The Measurement of 20dB Bandwidth
Mode A


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4.1.3 Radiated Emissions

Result:

Pass

Test Specification

Test standard : CFR47 FCC Part 15.209

Basic standard : ANSI C63.10: 2020

Limits : CFR47 FCC Part 15.205 (a)
CFR47 FCC Part 15.209 (a)

Test suite : 3m Semi Anechoic Room

Test Setup

Date of testing : 2024.02.07

Input voltage : DC 18V

Operational mode : A

Temperature : 23°C

Relative humidity : 56%

Atmospheric pressure : 101.2 kPa

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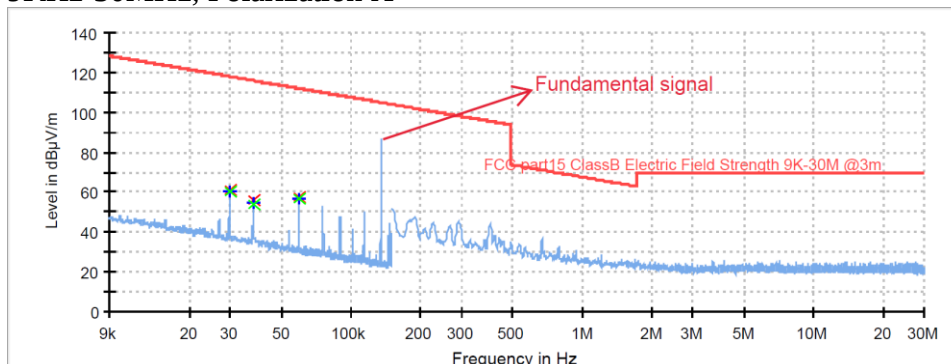
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Figure 2: Spectral Diagrams, Radiated Spurious Emission

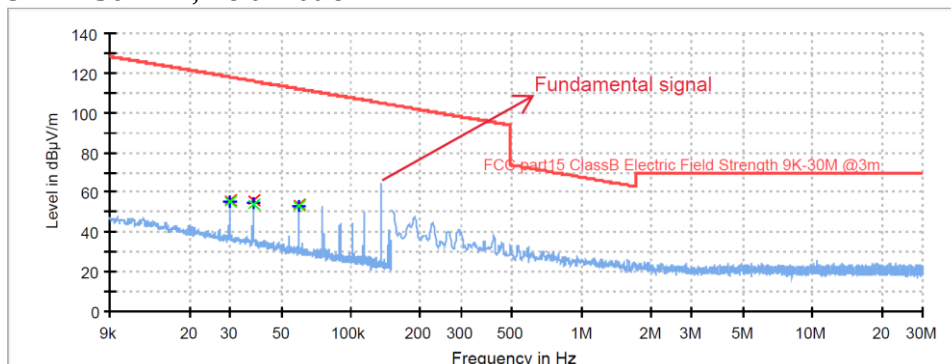
Mode A

9KHz-30MHz, Polarization X



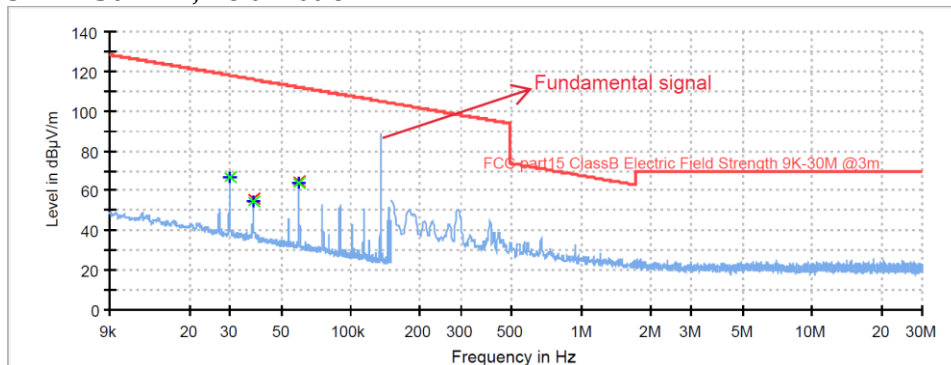
All emissions were greater than 20 dB below the limit

9KHz-30MHz, Polarization Y

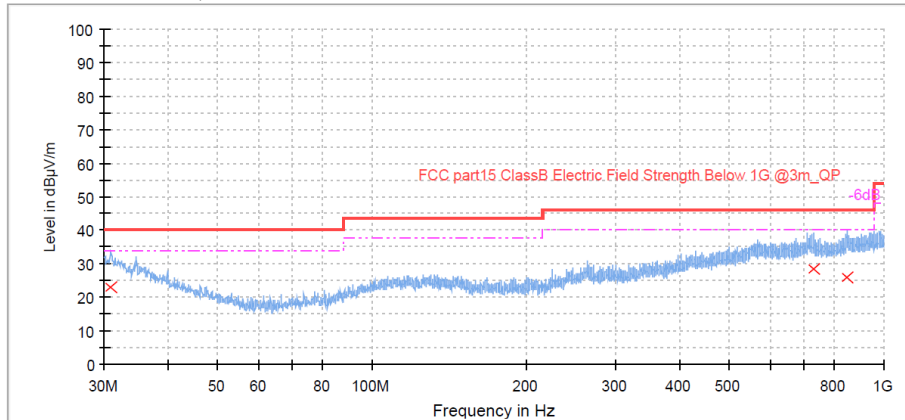


All emissions were greater than 20 dB below the limit

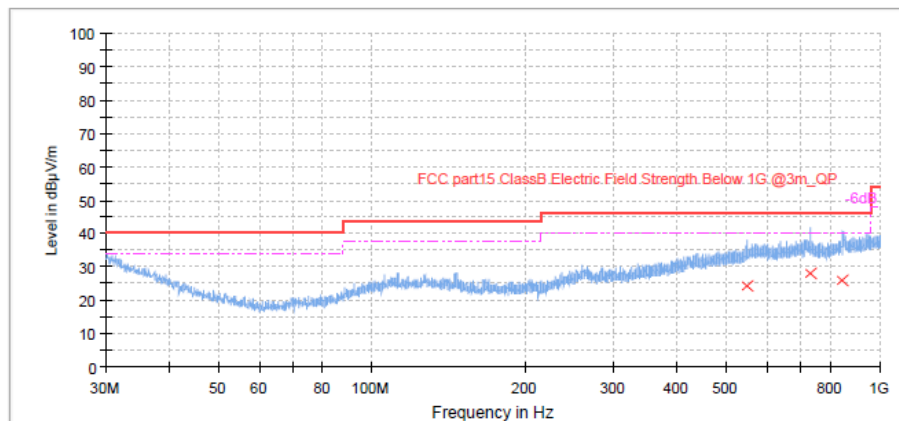
9KHz-30MHz, Polarization Z



All emissions were greater than 20 dB below the limit

Mode A
30MHz-1000MHz, Horizontal

Limit and Margin

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.920000	23.0	1000.0	120.000	150.0	H	0.0	25.4	17.0	40.0
728.880000	28.3	1000.0	120.000	150.0	H	0.0	28.0	17.8	46.0
845.820000	26.0	1000.0	120.000	150.0	H	0.0	29.3	20.0	46.0

30MHz-1000MHz, Vertical

Limit and Margin

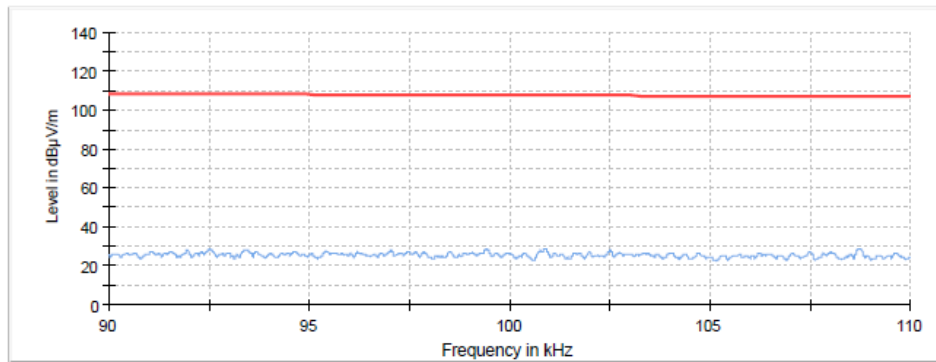
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
545.770000	24.3	1000.0	120.000	150.0	V	0.0	27.1	21.7	46.0
728.720000	28.2	1000.0	120.000	150.0	V	0.0	28.0	17.8	46.0
844.910000	26.1	1000.0	120.000	150.0	V	0.0	29.4	19.9	46.0

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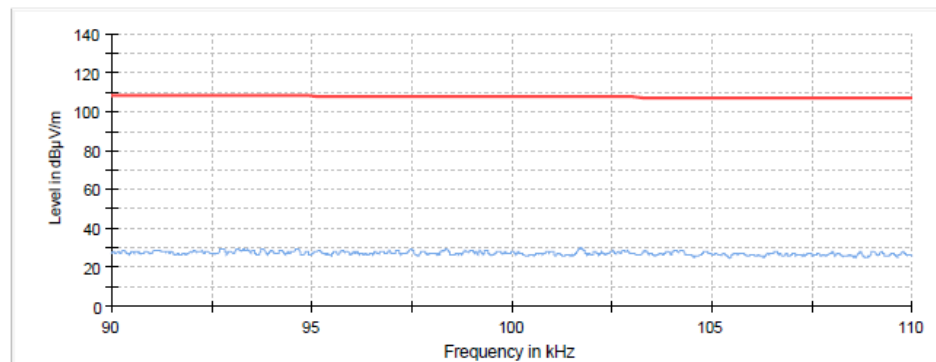
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Figure 3: Spectral Diagrams, Restricted bands

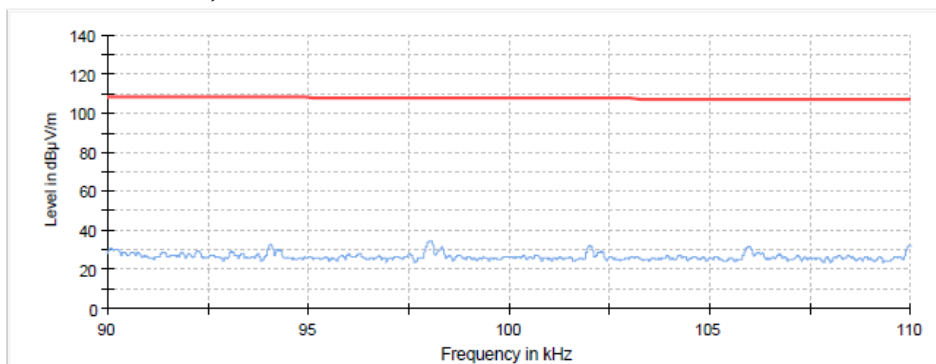
Mode A
90KHz-110KHz, Polarization X



90KHz-110KHz, Polarization Y



90KHz-110KHz, Polarization Z



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