

Test Report No.: <i>Prüfbericht-Nr.:</i>	US23SVRN.002 Rev.: 02	Order No.: <i>Auftrags-Nr.:</i>	P01319202 234209890	Page 1 of 61 Seite 1 von 61
Client Reference No.: <i>Kunden-Referenz-Nr.:</i>	2218280	Order date: <i>Auftragsdatum:</i>	12/14/2023	
Client: <i>Auftraggeber:</i>	Hunter Douglas Window Fashions, Inc One Duette Way Broomfield CO, 80020			
Test item: <i>Prüfgegenstand:</i>	Powerview Gen3 Motor Control Board			
Identification/ Type No.: <i>Bezeichnung / Typ-Nr.</i>	1016000012			
Order content: <i>Auftrags-Inhalt:</i>	Radio Compliance Test Report			
Test specification: <i>Prüfgrundlage:</i>	FCC CFR 47 Part 15 Subpart C, Section 247:2024, RSS-247 Issue 3			
Date of sample receipt: <i>Wareneingangsdatum:</i>	1/15/2024	See Test Setup Exhibit		
Test sample No: <i>Prüfmuster-Nr.:</i>	0001			
Testing period: <i>Prüfzeitraum:</i>	1/18/2024- 1/22/2024			
Testing laboratory: <i>Prüflaboratorium:</i>	TUV Rheinland of North America 710 Resende Road, Building 199 Webster, NY 14580			
Test result*: <i>Prüfergebnis*:</i>	Pass			
tested by: Alexander Sowinski <i>geprüft von:</i>	authorized by: Isaac Aguilar <i>genehmigt von:</i>			
Date: 1/30/2024 <i>Datum:</i>	Issue Date: 1/30/2024 <i>Ausstellungsdatum:</i>			
Position / Stellung:	Expert	Position / Stellung:	Expert	
Others / <i>Sonstiges:</i>	FCC ID: UXUMOTG3A; IC ID 7316A-MOTG3A			
Condition of the test item at delivery: <i>Zustand des Prüfgegenstandes bei Anlieferung:</i>	Test sample complete and undamaged			
* 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				
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. <i>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>				

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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. <i>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>
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3	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>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>
4	The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA.
5	TÜV Rheinland testing laboratories apply the Zero Guard Band rule unless otherwise required by the accreditation, standard, or requested by the customer as part of the quotation. For the Zero Guard Band rule, the measurement uncertainty is not considered and will also not be declared in the test report. Should the measurement uncertainty be used to provide guard band, these values will be declared in the test report.
6	Radio Compliance Test Report. The above product was found to be Compliant to the above test standard(s).

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Product description
Produktbeschreibung

1	Product details: <i>Produktdetails:</i>	The 1016000012 is assembled into various motor assemblies and fabricated into Hunter Douglas window coverings that include a fabric member that is rolled around an aluminum tube, or stacked on itself without a tube. The DC brushed motor rotates the tube to deploy and retract the fabric. The system is powered by 12-18VDC via DC power supply or primary batteries.
2	Dimensions / Weight: <i>Maße / Gewicht:</i>	0.5 cm x 3 cm x 5 cm / 1 g
3	Operating elements: <i>Bedienelemente:</i>	Highest Clock 2.48GHz, contains Bluetooth. 18 VDC via batteries or AD/DC Adapter.
4	Equipment / Accessories: <i>Ausstattung / Zubehör:</i>	None.
5	Used materials: <i>Verwendete Materialien:</i>	NA
6	Other: <i>Sonstiges:</i>	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	Test sample obtaining: <i>Prüfmusterbereitstellung:</i>	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

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Revisions

Date mm/dd/yy	Name	Page Number of Change	Describe Change
01/23/2024	Rev.:01	N/A	Original Document
01/30/2024	Rev.:02	1	Updated Authorizer

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1 General Information

1.1 Scope

This report is intended to document the status of conformance based on the results of testing performed on the Powerview Gen3 Motor Control Board, Model Number: 1016000012, manufactured by Hunter Douglas Window Fashions, Inc. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components.

The EUT contains a Bluetooth (BLE) transmitter which can operate at both 1 MPBS and 2 MBPS. Both modes are tested and documented.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

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1.3 Summary of Test Results

Applicant:	Hunter Douglas Window Fashions, Inc One Duette Way Broomfield CO, 80020	Tel:	720-778-0205	Contact:	Mike Rockwood
		Fax:	--	e-mail:	mike.rockwood@hunterdouglas.com
Description:	Powerview Gen3 Motor Control Board	Test Voltage/Freq.:	18 VDC		
Model Number:	1016000012				
Serial Number:	0001	Test Engineer:	Alexander Sowinski		
Standards	Description	Severity Level or Limit		Criteria	Test Result
FCC CFR 47 Part 15 Subpart C, Section 247:2024, RSS-247 Issue 3 Product Family Standard Emissions	Requirements for intentional transmitters: Operation within the band 2400-2483.5 MHz	See Basic Standards Below		See Below	Complies
FCC CFR 47 Part 15.247 (b), RSS-247 5.4.d	Output Power	< 1 Watt (30 dBm)		Limit	Complies
FCC CFR 47 Part 15.247 (a.2), RSS-247 5.2.a, RSS-Gen 6.7	Occupied Bandwidth (6dB and 99%)	6dB OBW > 500 kHz 99% BW reported informatively		Limit	Complies
FCC CFR 47 Part 15.247 (e), RSS-247 5.2.b	Power Spectral Density	< 8 dBm / 3 kHz band		Limit	Complies
FCC CFR 47 Part 15.247 (d), RSS-247 5.5	Out of Band Emissions: Non-restricted Bands	All non-TX emissions < 20 dBr		Limit	Complies
FCC CFR 47 Part 15.205, RSS-Gen 8.10	Out of Band Emissions: Restricted Bands	Peak: < 74 dBuV/m @ 3m AVG: < 54 dBuV/m @ 3m		Limit	Complies
FCC CFR 47 Part 15.209, RSS-Gen 8.9	Transmitter Spurious Emissions	Class B 30 – 1000 MHz Class B 1 – 26.5 GHz		Limit	Complies
FCC CFR 47 Part 15.207, RSS-Gen 8.8	AC Conducted Emissions	Class B 150 – 30000 kHz		Limit	Complies

2 Laboratory Information

2.1 Accreditations & Endorsements

TUV Rheinland of North America located at, 710 Resende Road Webster, NY 14580 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 5253). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.1 ILAC/A2LA

This is a program which is administered under the auspices of A2LA accredited. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2017 (Certificate Number: 3331.08). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.2 VCCI

VCCI Accredited test lab. Registration numbers A-0404.

2.1.3 Industry Canada

(Registration No.: 482B-1) The 10 meter Semi-Anechoic chamber has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2014.

2.1.4 BSMI

Registration No.: SL2-IN-E-1159R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

2.1.5 Korea

(Designation No.: US0192). Recognized by National Radio Research Agency (RRA) as an accredited Conformity Assessment Body (CAB) under the terms for Korea Phase I of the APEC TEL.

2.2 Test Software

- 1) BAT-EMC V2022.19.0
- 2) TILE 7 version 7.1.3.24
- 3) Voltech PM 6000 Software IEC61000-3 for PM6000 Release 1.24.12
- 4) California Instruments AC power source CTS MXL/MXH 2 V2.14.0
- 5) Rohde & Schwarz EMI Measurement software EMC32 version 8.54.0
- 6) TEMA 3000 version 4.8.4
- 7) TILE version 3.4.k.28

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB μ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V} / \text{m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dB μ V/m)

$$25 \text{ dB}\mu\text{V/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dB}\mu\text{V/m}$$

2.3.2 Measurement Uncertainty Emissions

Per CISPR 16-4-2	Ulab	Ucisp
Radiated Disturbance @ 10m		
30 MHz – 1,000 MHz	4.57 dB	5.2 dB
Radiated Disturbance @ 3m		
1.0 GHz – 6.0 GHz	5.18 dB	5.2 dB
6.0 GHz – 18.0 GHz	5.48 dB	5.5 dB
18.0 GHz – 26.5 GHz	5.21 dB	
26.5 GHz – 40.0 GHz	4.99 dB	
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	2.62 dB	3.6 dB
Disturbance Power		
30 MHz – 300 MHz	3.88 dB	4.5 dB

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Measurement Uncertainty Emissions

The estimated combined standard uncertainty for radiated emissions measurements is ± 4.57 dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for radiated emissions measurements from 1 GHz to 6 GHz is ± 5.18 dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for radiated emissions measurements from 6 GHz to 18 GHz is ± 5.48 dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for conducted emissions measurements is ± 2.62 dB.	Per CISPR16-4-2 Method

Expanded measurement uncertainty numbers are shown in the tables above. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard ISO IEC 17025:2017. Equipment calibration records are kept on file at the test facility.

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2.5 Measurement Equipment Identification



Measurement Equipment List

Service Start Date 01/18/2024
Service End Date 01/22/2024

Deliverable/Report Number US23SVRN.001 Rev.01
AMEL ID P01319202AA

Client Hunter Douglas Window Fashions Inc
Product Powerview Gen 3 Motor Board
Comment

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Equip.	Description	Model	Manufacturer	Last Date MM/DD/YYYY	Due Date MM/DD/YYYY
G1701089	R&S EMI Receiver ESW44 101880	ESW44	Rohde & Schwarz	03/14/2023	03/14/2024
G1701368	ETS 3117 DRG Horn 109306	3117	ETS-Lindgren	09/12/2022	09/12/2024
G1701406	FCC LISN 9110 25 amp	FCC-LISN-50-25-2-25	Fischer Custom Communications	03/14/2023	03/14/2024
G1701451	Sunol JB3 Antenna	JB3	Sunol Sciences Corp.	09/01/2022	09/01/2024
G1701081	Fluke Multimeter 87 V 39760226	87 V	Fluke	03/16/2023	03/16/2024
G1701082	Temperature/Humidity/Barometer	68000-49	Control Company	04/19/2023	04/19/2025
G1701385	R&S EMI Receiver ESU40 100274	ESU40	Rohde & Schwarz	03/14/2023	03/14/2024

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3 Product Information

3.1 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report.

See Test Setup Exhibit

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4 Emissions

4.1 Output Power

This test measures the maximum equivalent isotropic radiated power of the EUT during a transmission.

4.1.1 Over View of Test

Results	Complies (as tested per this report)					Date	01/18/2024	
Standard	FCC CFR 47 Part 15.247 (b), RSS-247 5.4.d							
Product Model	1016000012				Serial#	0001		
Configuration	See test plan for details.							
Test Set-up	Tested in shielded room, EUT connected directly to Spectrum Analyzer							
EUT Powered By	18 VDC	Temp	23C	Humidity	43%	Pressure	1004 mbar	
Frequency Range	CH 0: 2400 MHz CH 40: 2440 MHz CH 80: 2480 MHz							
Perf. Criteria	< 1 Watt (30 dBm) (Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Alexander Sowinski		

4.1.2 Test Procedure

Maximum output power tests were performed using the procedures of FCC CFR 47 §15.247 (b) and/or ANSI C63.10 including methods for signal maximizations and EUT configuration. Sample was connected directly to spectrum analyzer and measurements were taken per the applicable standard(s). Data rates 1MBPS and 2 MBPS tested.

4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan for the output power test.

4.1.4 Final Test

All final output power measurements were below (in compliance) the limits.

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4.1.5 Final Data

Data Rate	Channel	Output Power	Limit	Margin
MBPS	MHz	dBm	dBm	dB
1	2400	8.23	30	-21.77
1	2440	8.19	30	-21.81
1	2480	7.96	30	-22.04
2	2400	8.21	30	-21.79
2	2440	8.21	30	-21.79
2	2480	7.97	30	-22.03

4.1.6 Final Plots

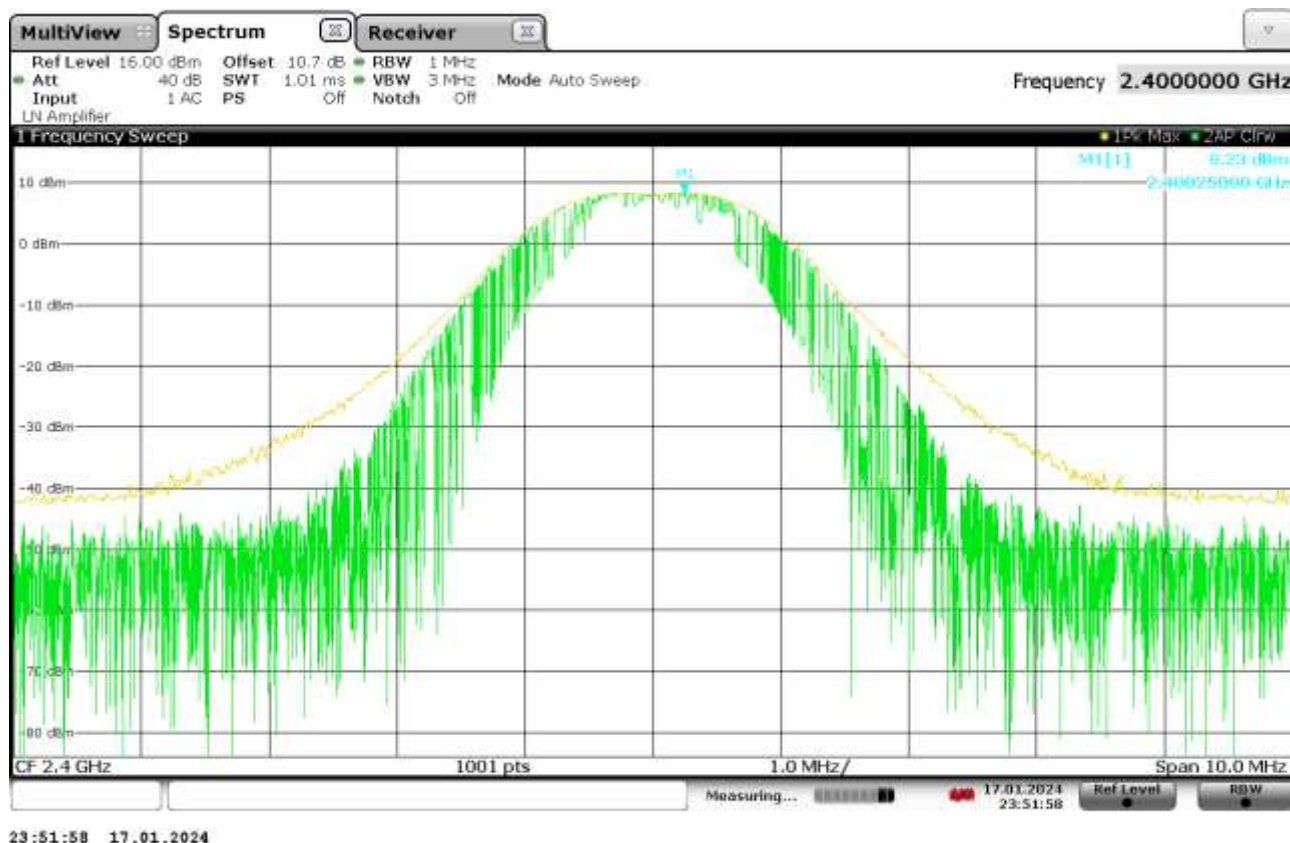


Figure 1 – Output Power CH 0, 1 MBPS

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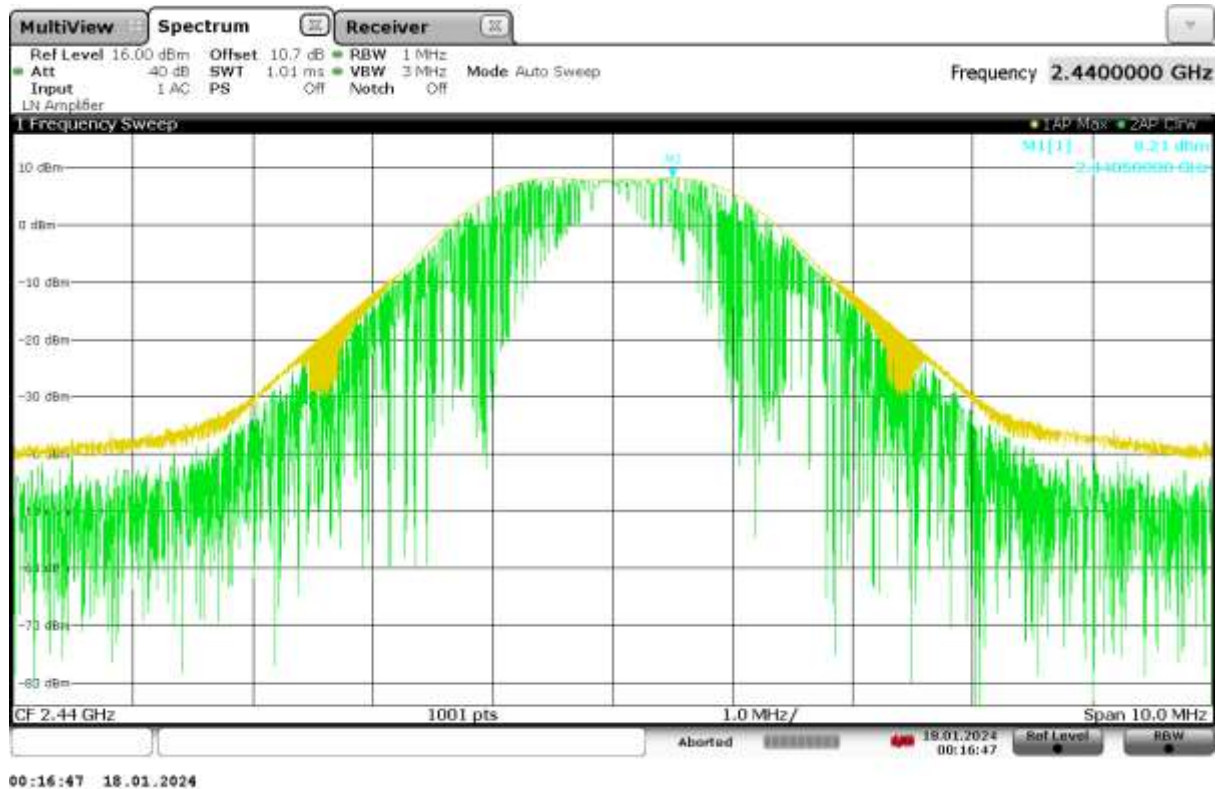


Figure 2 – Output Power CH 40, 2 MBPS

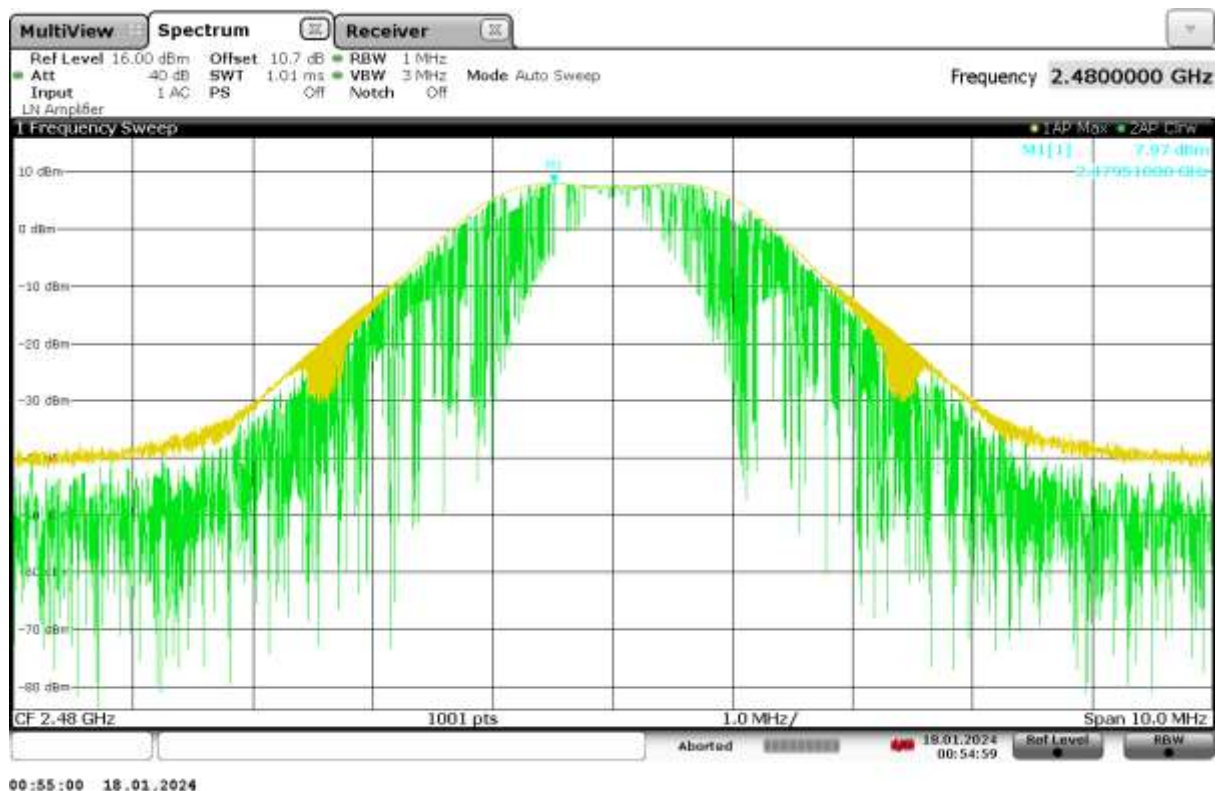


Figure 3 – Output Power CH 80, 2 MBPS

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4.2 Occupied Bandwidth (6dB and 99%)

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

4.2.1 Over View of Test

Results	Complies (as tested per this report)					Date	01/18/2024	
Standard	FCC CFR 47 Part 15.247 (a.2), RSS-247 5.2.a, RSS-Gen 6.7							
Product Model	1016000012				Serial#	0001		
Configuration	See test plan for details.							
Test Set-up	Tested in shielded room, EUT placed on table. See test plans for details.							
EUT Powered By	18 VDC	Temp	23°C	Humidity	43%	Pressure	1004 mbar	
Frequency Range	CH 0: 2400 MHz CH 40: 2440 MHz CH 80: 2480 MHz							
Perf. Criteria	OBW > 500 kHz (Below Limit)		Perf. Verification		Readings above minimum value			
Mod. to EUT	None		Test Performed By		Alexander Sowinski			

4.2.2 Test Procedure

Occupied bandwidth tests were performed using the procedures of FCC CFR 47 §15.247 (a.2) and/or ANSI C63.4 including methods for signal maximizations and EUT configuration. The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied. The 6dB bandwidth is defined the bandwidth of 6 dBr from highest transmitted level of the fundamental frequency.

4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the occupied bandwidth test.

4.2.4 Final Test

All final occupied bandwidth measurements were above (in compliance) the limits.

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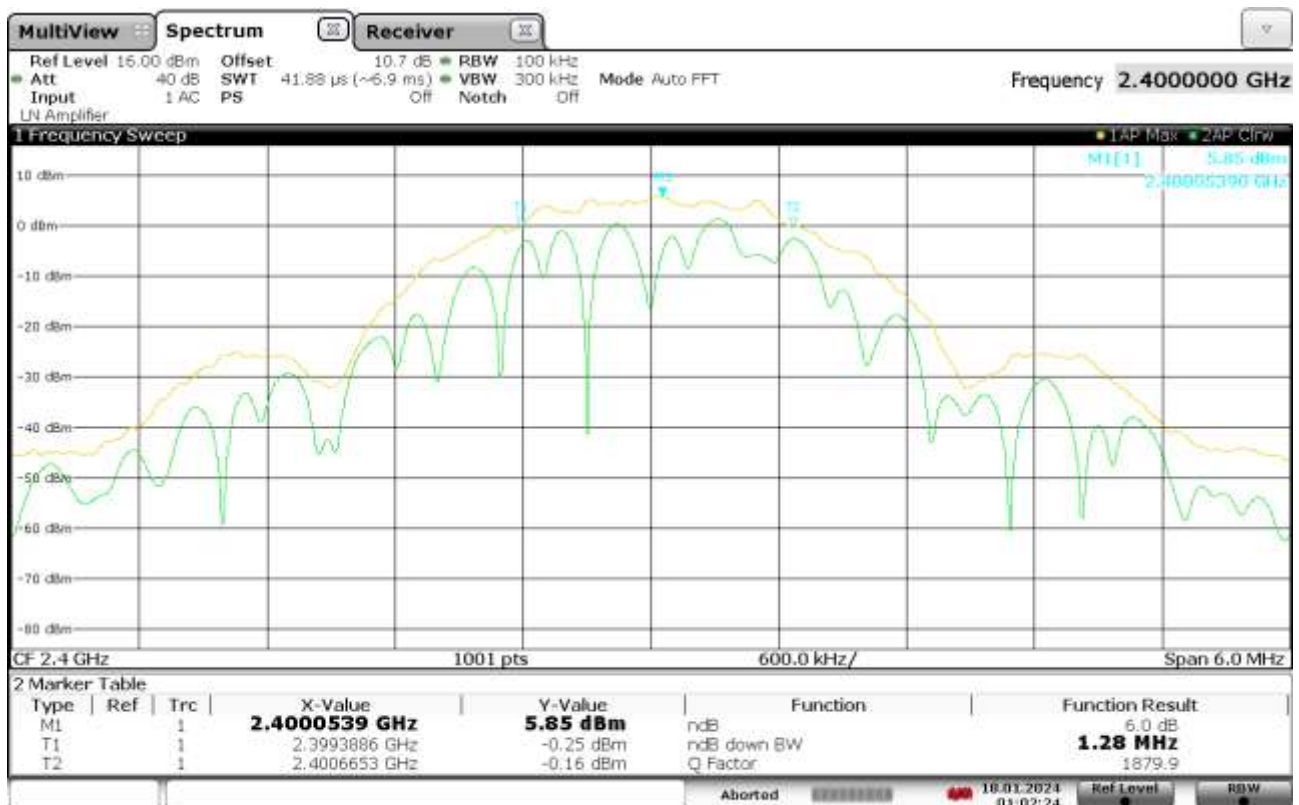
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4.2.5 Final Data

Data Rate	Channel	6dB	99%
MBPS	MHz	kHz	kHz
1	2400	785	1090.78
1	2440	803	1090.3
1	2480	803	1096.88
2	2400	1280	2079.04
2	2440	1440	2095.53
2	2480	1440	2106.76

4.2.6 Final Plots



01:02:24 18.01.2024

Figure 4 – 6dB BW, CH 0, 2 MBPS

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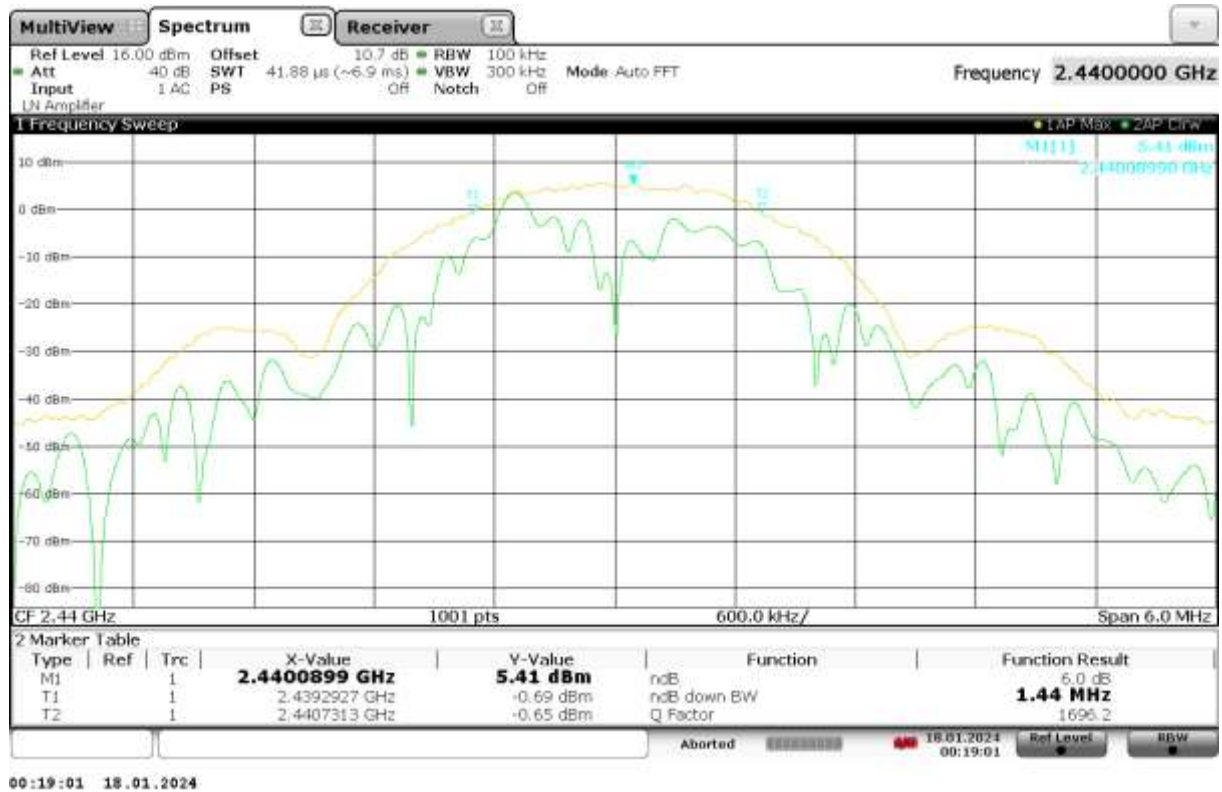


Figure 5 – 6dB BW, CH 40, 2 MBPS

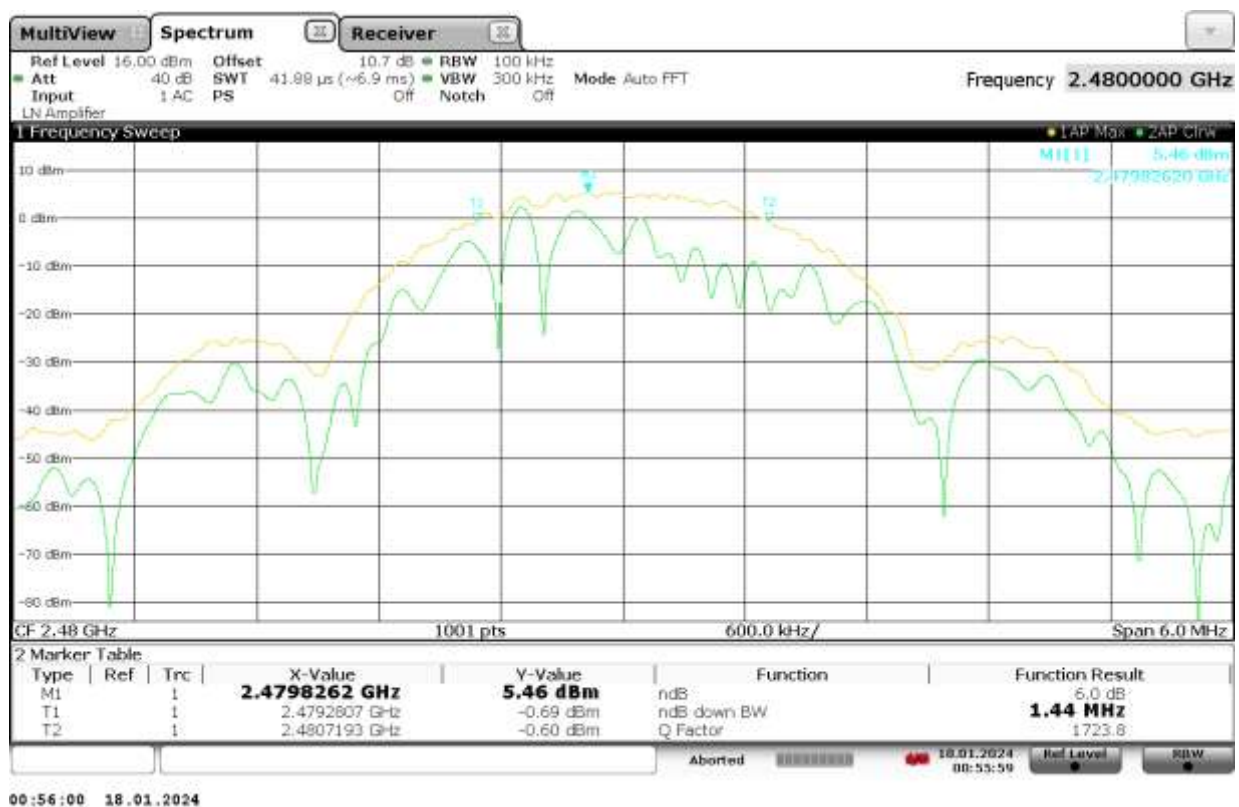


Figure 6 – 6dB BW, CH 80, 2 MBPS

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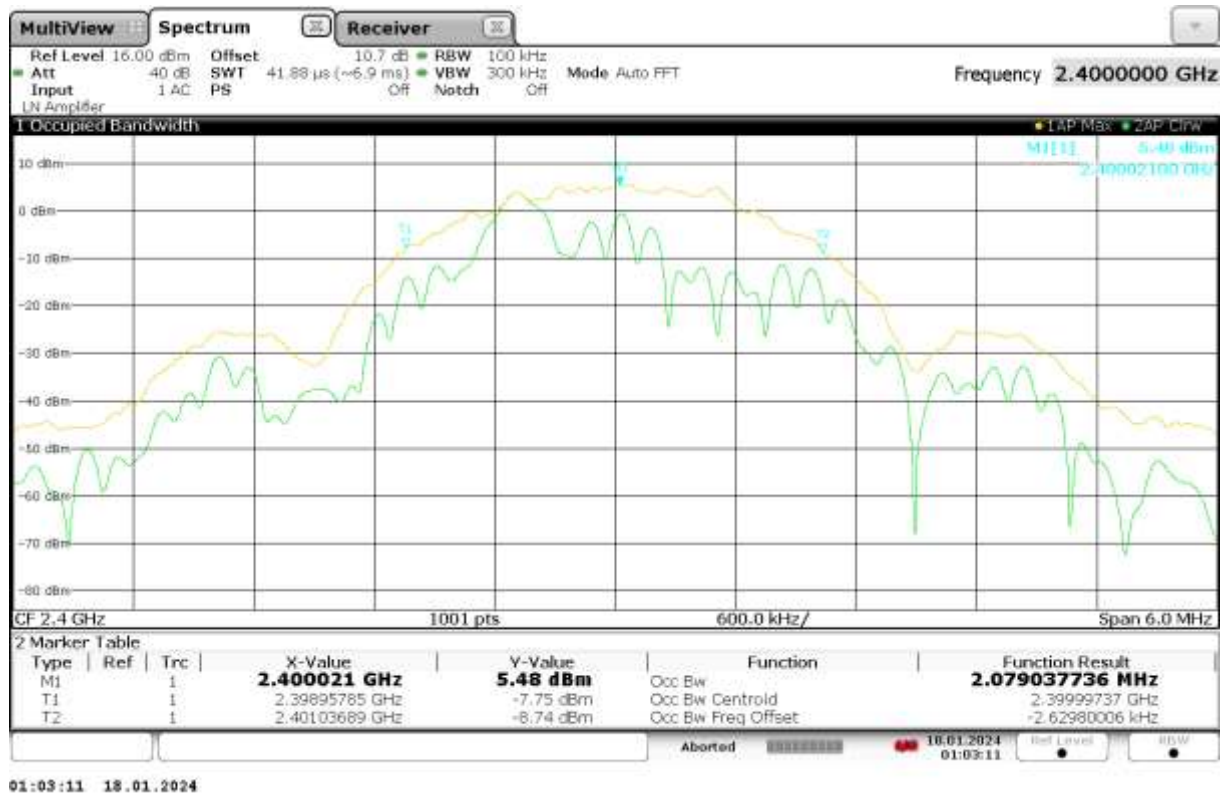


Figure 7 – 99% BW, CH 0, 2 MBPS

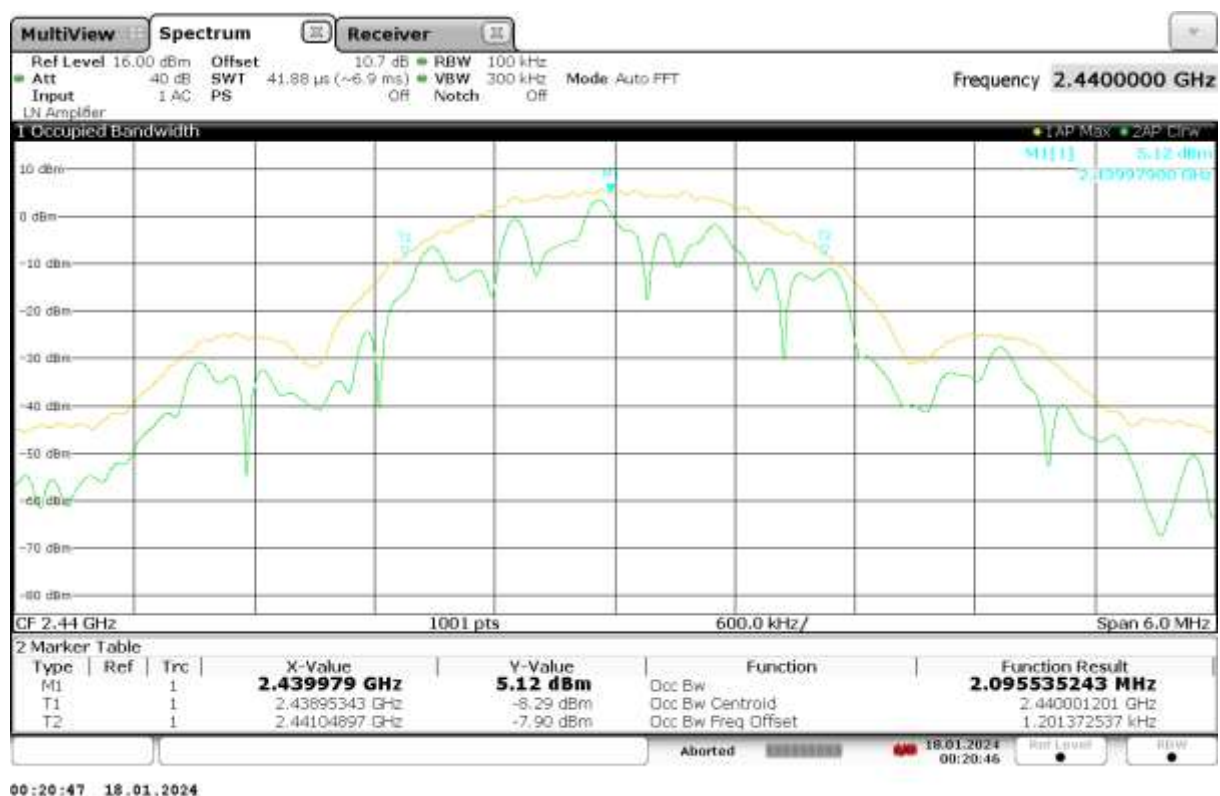


Figure 8 – 99% BW, CH 40, 2 MBPS

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Figure 9 – 99% BW, CH 80, 2 MBPS

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4.3 Power Spectral Density

This test evaluates the peak power spectral density of the EUT's transmitter across low, mid, and high channels.

4.3.1 Test Over View

Results	Complies (as tested per this report)					Date	01/18/2024	
Standard	FCC CFR 47 Part 15.247 (e), RSS-247 5.2.b							
Product Model	1016000012				Serial#	0001		
Configuration	See test plan for details.							
Test Set-up	Tested in shielded room, EUT placed on table. See test plan for details.							
EUT Powered By	18 VDC	Temp	23°C	Humidity	43%	Pressure	1004 mbar	
Frequency Range	CH 0: 2400 MHz CH 40: 2440 MHz CH 80: 2480 MHz							
Perf. Criteria	< 8 dBm / 3 kHz band (Below Limit)			Perf. Verification	Readings under Limit			
Mod to EUT	None			Test Performed By	Alexander Sowinski			

4.3.2 Test Procedure

Peak power spectral density was measured conducted via connecting a sample directly to the spectrum analyzer. Measurements were taken per FCC CFR §15.247 and ANSI C63.10.

4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the power spectral density test.

4.3.4 Final Test

The power spectral density of the EUT were below the limits specified in the standard.

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4.3.5 Final Data

Data Rate	Channel	PSD	Limit	Margin
MBPS	MHz	dBm	dBm	dB
1	2400	-5.08	8	-13.08
1	2440	-5.77	8	-13.77
1	2480	-6.4	8	-14.4
2	2400	-8.21	8	-16.21
2	2440	-7.88	8	-15.88
2	2480	-9.44	8	-17.44

4.3.6 Final Plots

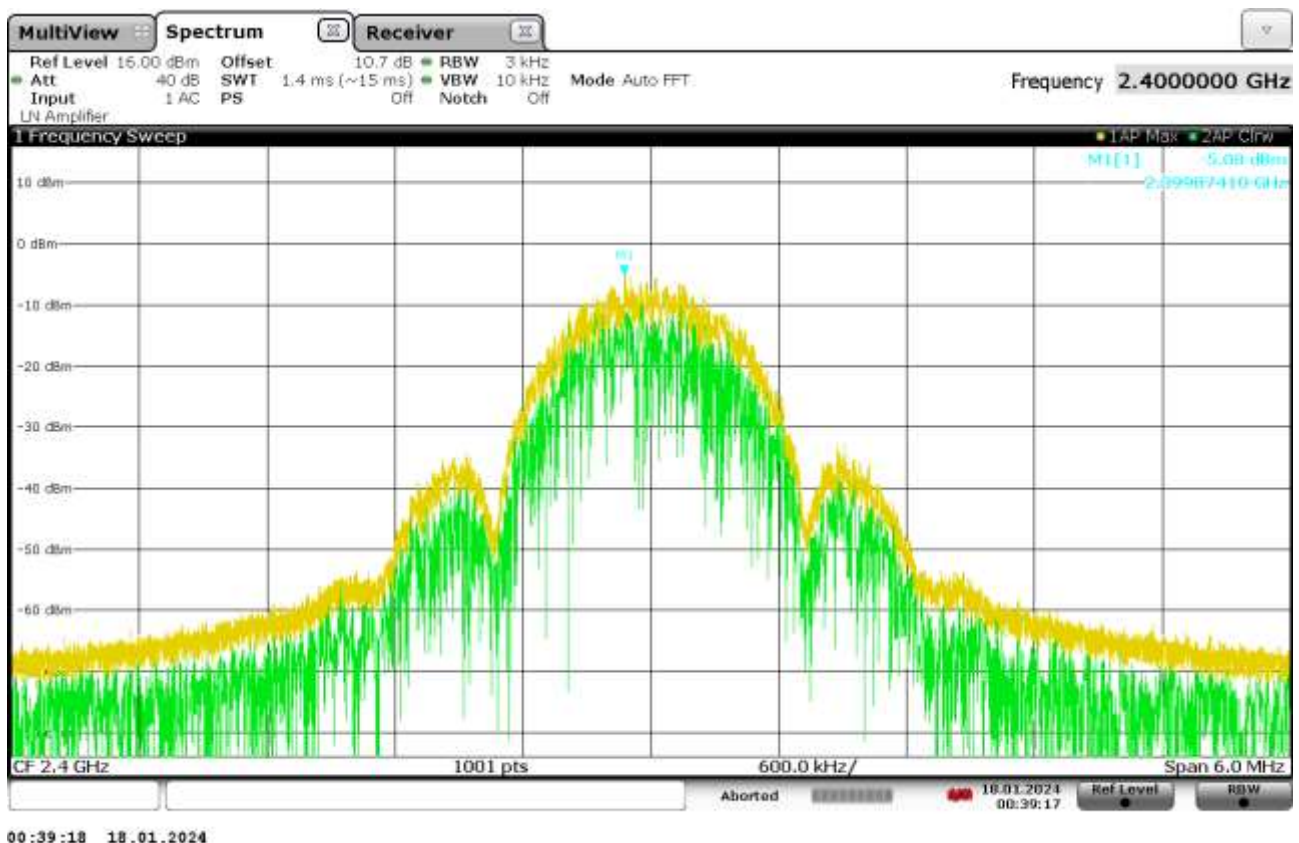


Figure 10 – PSD CH 0, 1 MBPS

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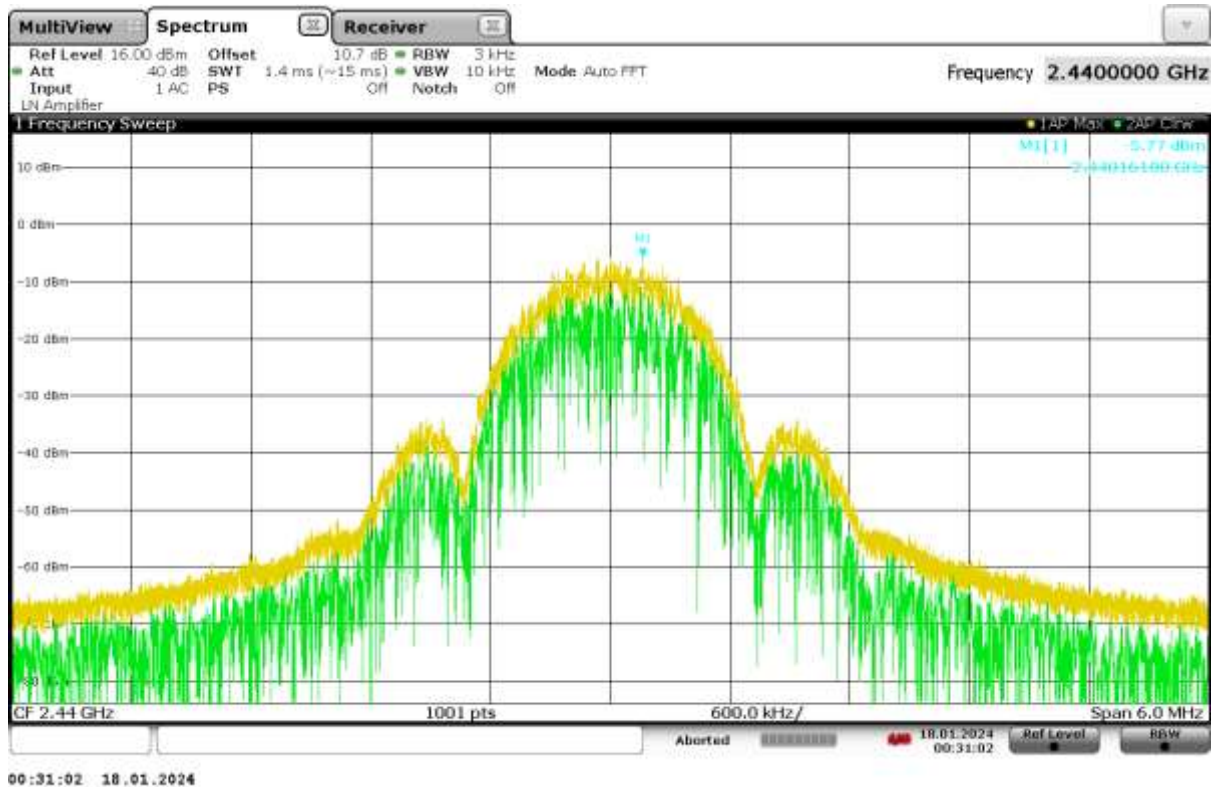


Figure 11 – PSD CH 40, 1 MBPS

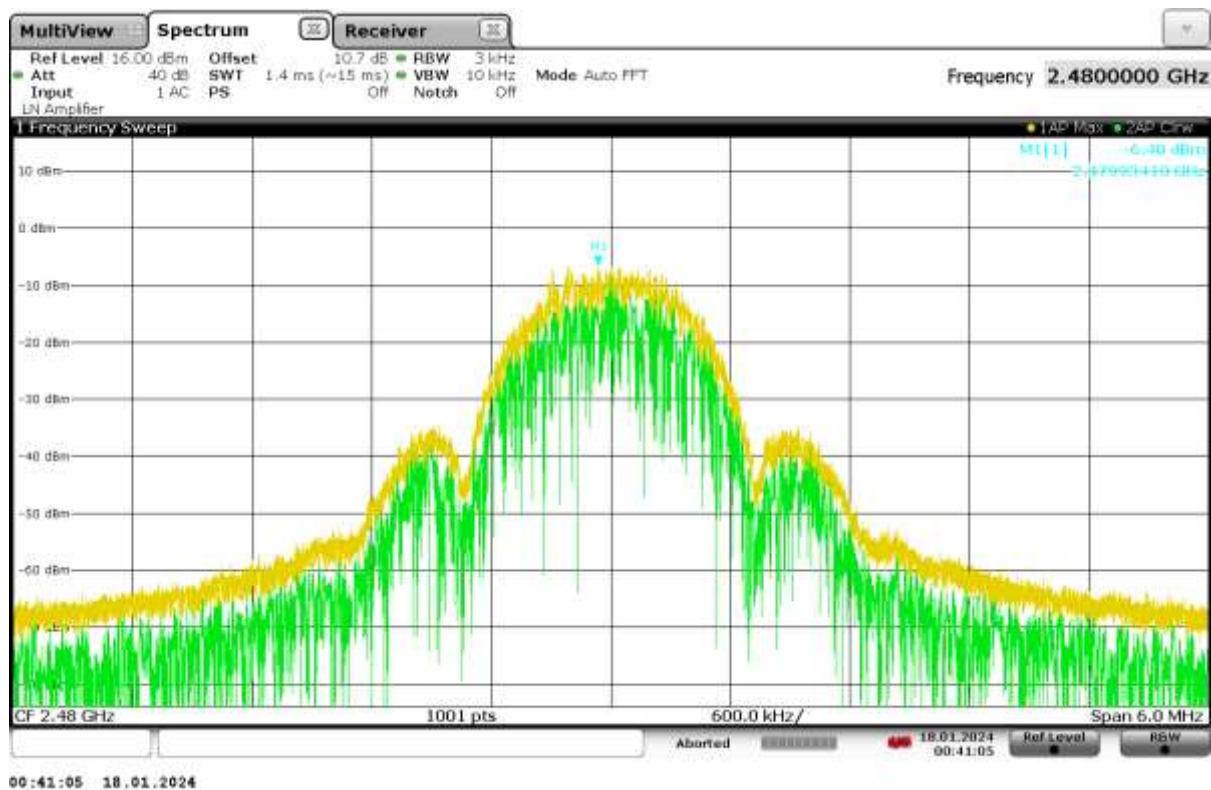


Figure 12 – PSD CH 80, 1 MBPS

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4.4 Out of Band Emissions – Non-Restricted Bands

This test evaluates the spurious emissions of the EUT in the out of band domain.

4.4.1 Test Over View

Results	Complies (as tested per this report)				Date	01/18/2024	
Standard	FCC CFR 47 Part 15.247 (d), RSS-247 5.5						
Product Model	1016000012			Serial#	0001		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room, EUT placed on table. See test plan for details						
EUT Powered By	18 VDC	Temp	23°C	Humidity	43%	Pressure	1004 mbar
Frequency Range	CH 0: 2400 MHz CH 40: 2440 MHz CH 80: 2480 MHz						
Perf. Criteria	All non-TX emissions < 20 dBr (Below Limit)		Perf. Verification		Readings under Limit		
Mod to EUT	None		Test Performed By		Alexander Sowinski		

4.4.2 Test Procedure

Non-restricted band OOB emissions were measured conducted via connecting a sample directly to the spectrum analyzer. Measurements were taken per FCC CFR §15.247 and ANSI C63.10.

4.4.3 Deviations

There were no deviations from the test methodology listed in the test plan for the OOB emissions test.

4.4.4 Final Test

The OOB emissions of the EUT were below the limits specified in the standard.

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4.4.5 Final Data

Data Rate	Channel	Worst Case Freq	Worst Case Level	Limit
MBPS	MHz	MHz	dBc	dBc
1	2400	2336.57	-50.12	-20
1	2440	7342	-51.29	-20
1	2480	7446	-47.29	-20
2	2400	2336.24	-49.95	-20
2	2440	7324	-52.25	-20
2	2480	7446	-46.89	-20

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4.4.6 Final Plots

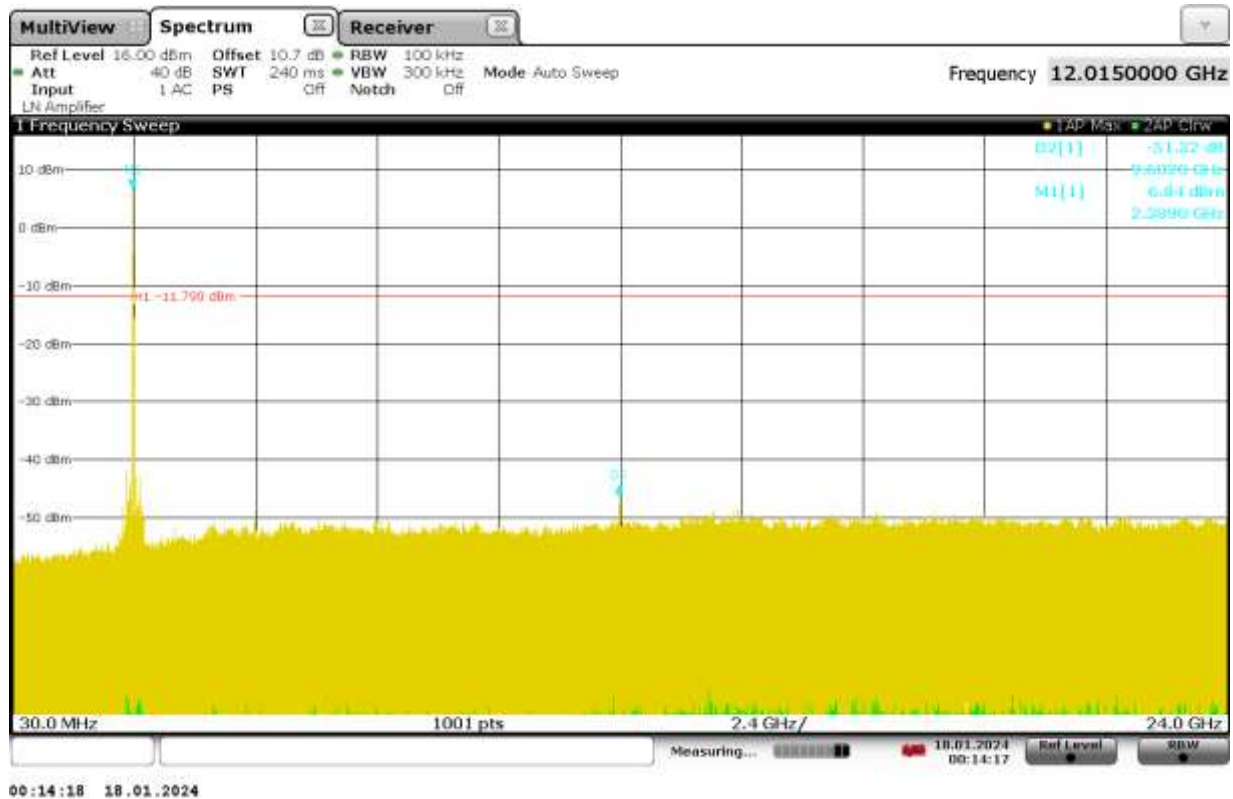


Figure 13 – CH 0, 2 MBPS

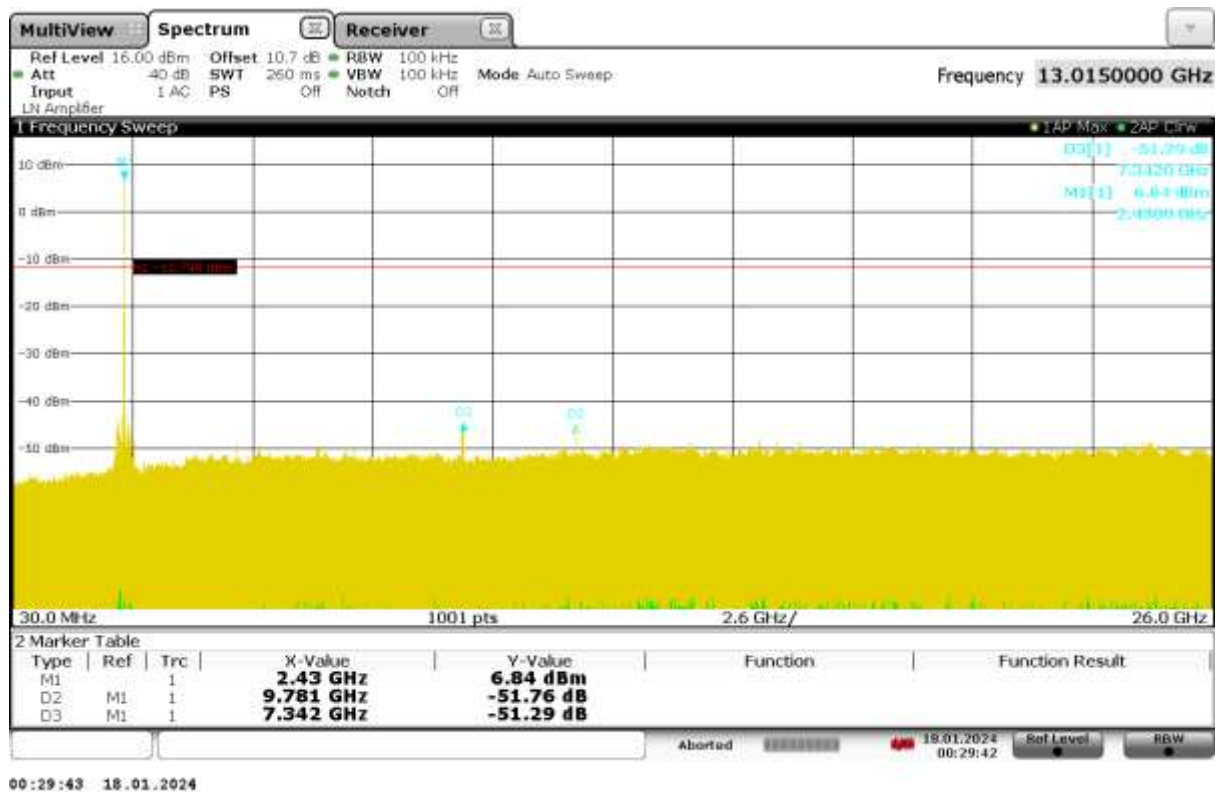


Figure 14 – CH 40, 1 MBPS

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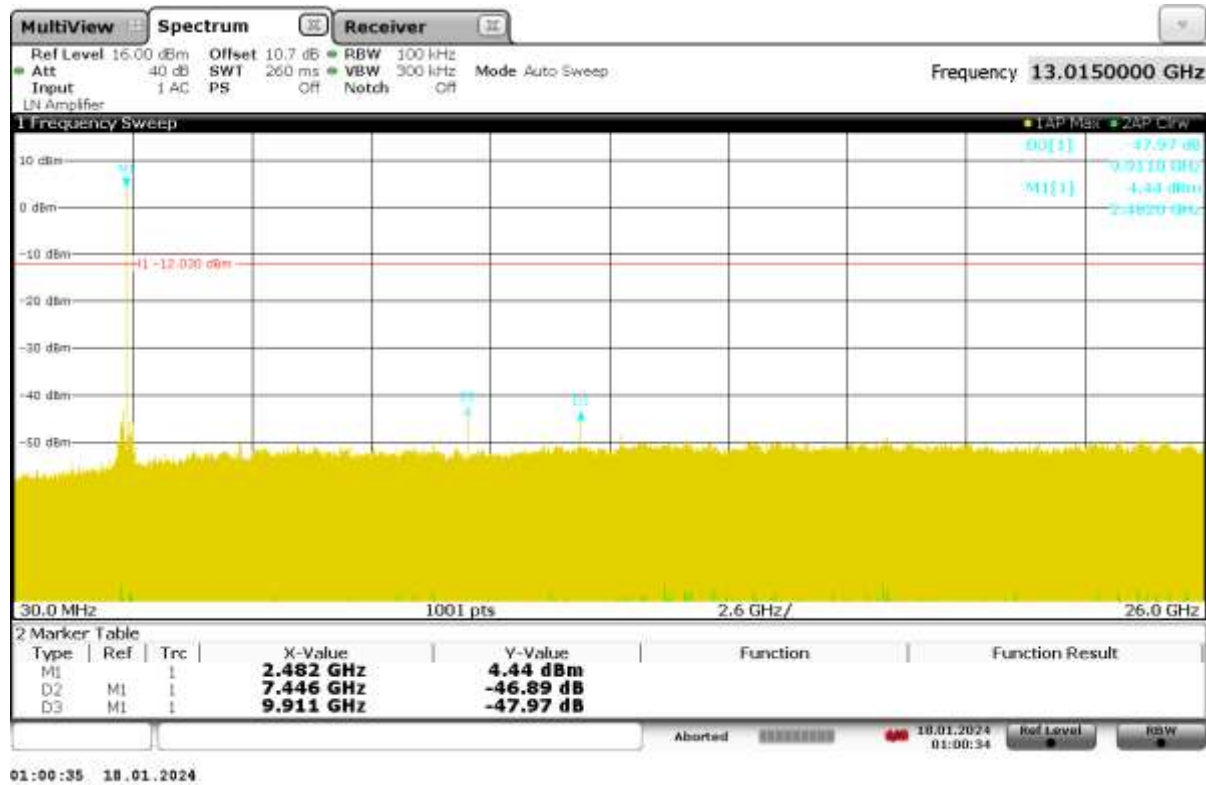


Figure 15 – CH 80, 2 MBPS

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4.5 Out of Band Emissions – Restricted Bands

This test evaluates the radiated spurious emissions that fall into the restricted bands of the out of band domain.

4.5.1 Test Over View

Results	Complies (as tested per this report)				Date	01/18/2024 – 01/22/2024	
Standard	FCC CFR 47 Part 15.205, RSS-Gen 8.10						
Product Model	1016000012			Serial#	0001		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room and semi-anechoic chamber, EUT placed on table. See test plan for details						
EUT Powered By	18 VDC	Temp	22°C	Humidity	41%	Pressure	1007 mbar
Frequency Range	CH 0: 2400 MHz CH 80: 2480 MHz						
Perf. Criteria	< 54 dBµV/m @ 3 m (AVG) < 74 dBµV/m @ 3 m (Peak)			Perf. Verification		Readings under Limit	
Mod to EUT	None			Test Performed By		Alexander Sowinski	

4.5.2 Test Procedure

Radiated measurements per ANSI C63.10-2013 Section 6.10.5 were used to measure the undesirable emission requirement in restricted bands. Peak points were found and Average was taken for each point found. The measurement was performed with modulation. This test was conducted on the upper and lower most channels in each mode on the EUT. The worst case measurement of each channel is recorded in this report. All channels were tested at highest power settings.

4.5.3 Deviations

There were no deviations from the test methodology listed in the test plan for the OOB Emissions test.

4.5.4 Final Test

The OOB emissions of the EUT were below the limit specified by the standard.

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4.5.5 Final Conducted Data

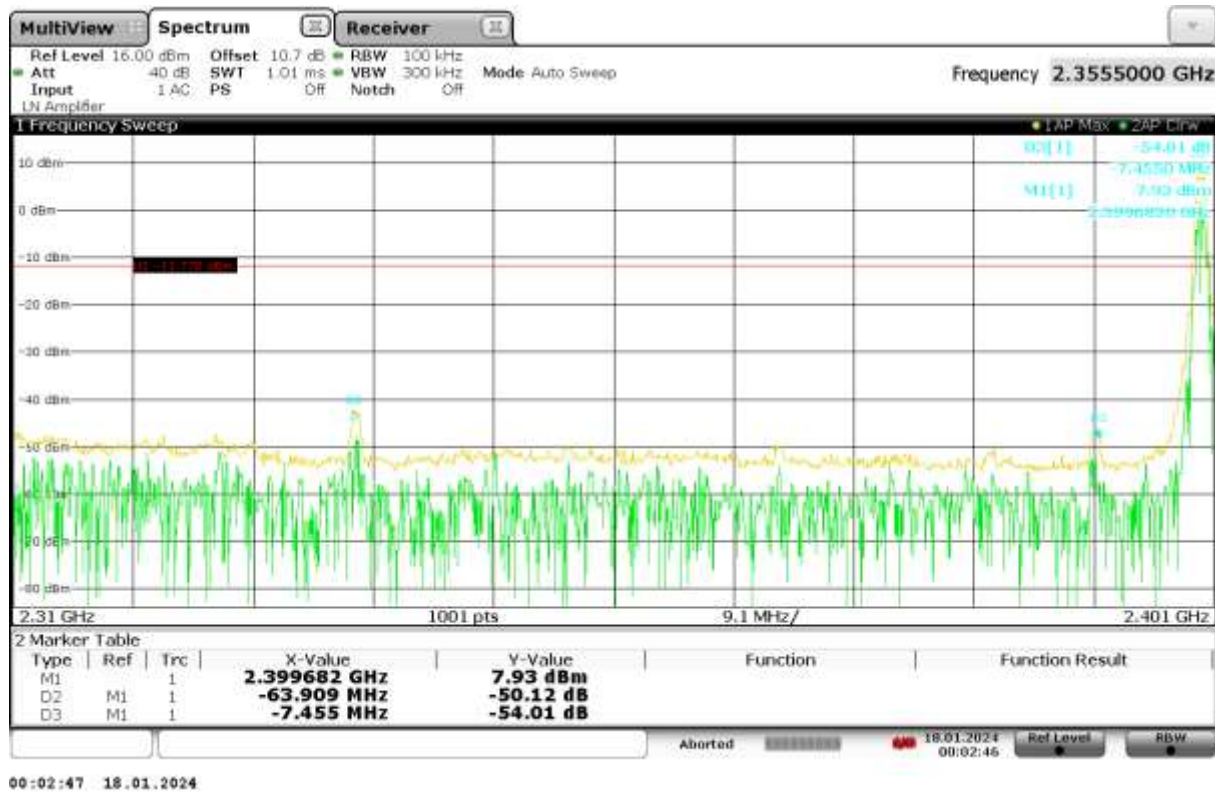


Figure 16 –Low Band Edge Conducted, CH 0, 1 MBPS

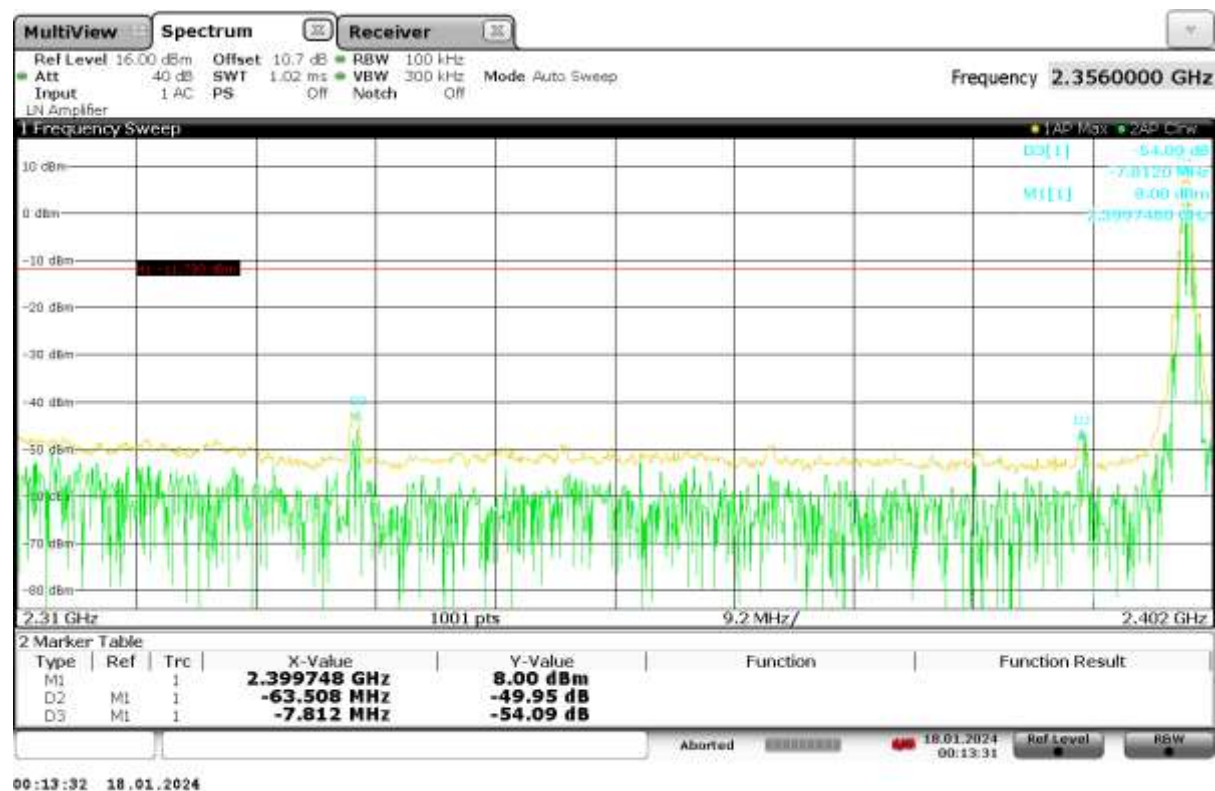


Figure 17 –Low Band Edge Conducted, CH 0, 2 MBPS

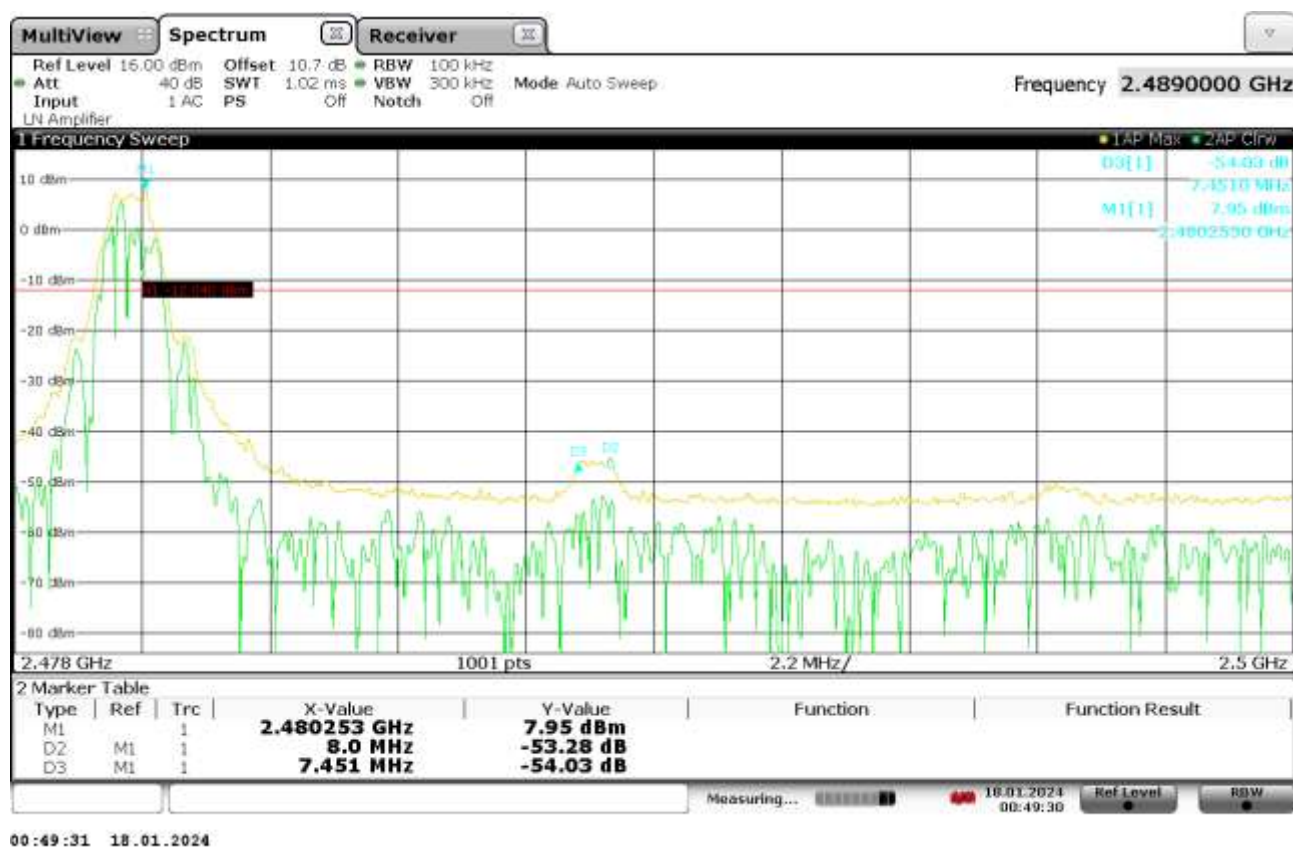


Figure 18 –High Band Edge Conducted, CH 80, 1 MBPS

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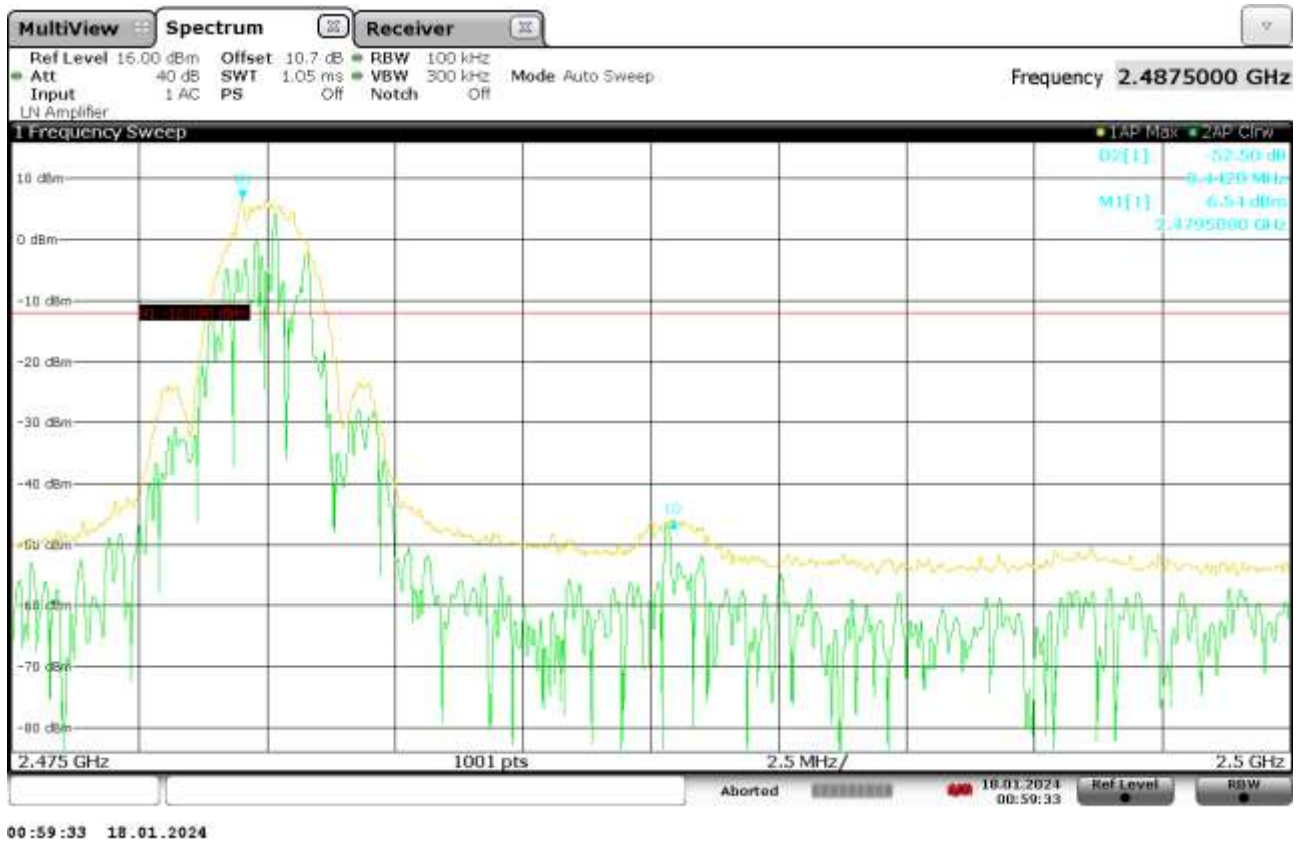


Figure 19 –High Band Edge Conducted, CH 80, 2 MBPS

4.5.6 Final Radiated Data

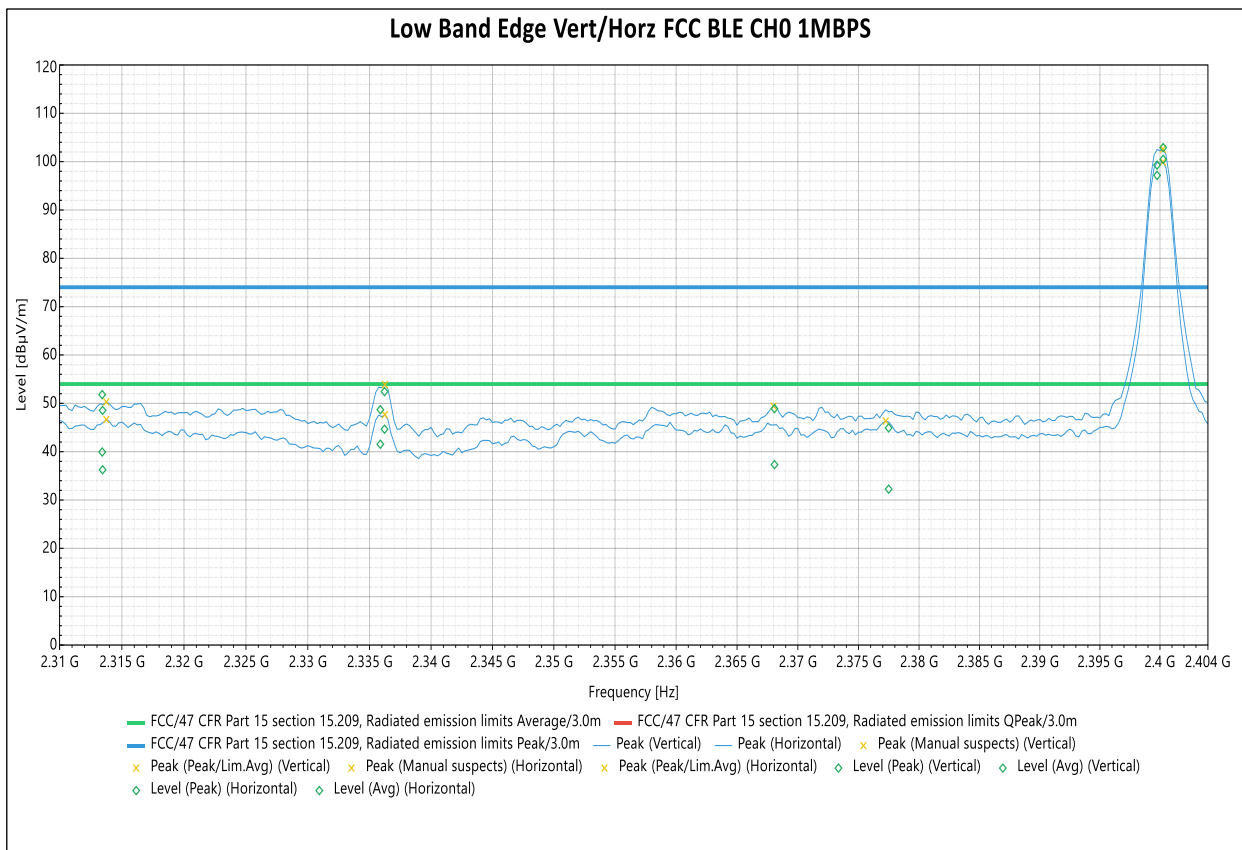


Figure 20 – Low Band Edge Radiated, CH 0, 1 MBPS

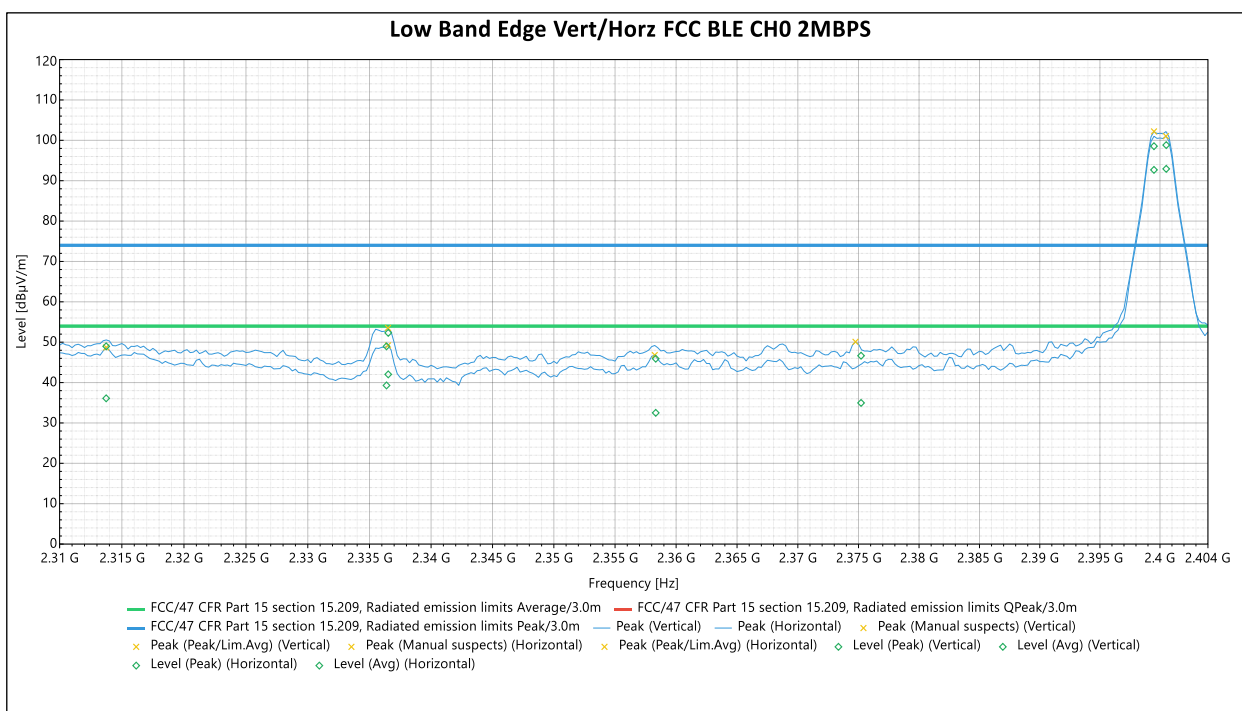


Figure 21 – Low Band Edge Radiated, CH 0, 2 MBPS

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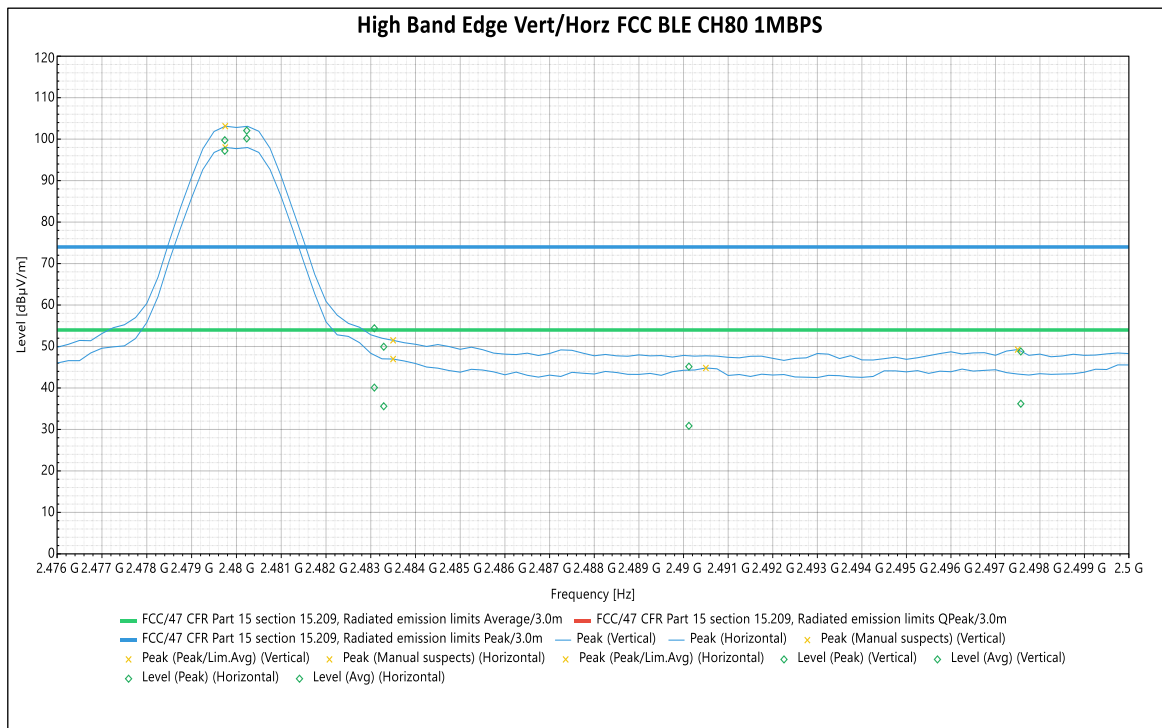


Figure 22 – High Band Edge Radiated, CH 80, 1 MBPS

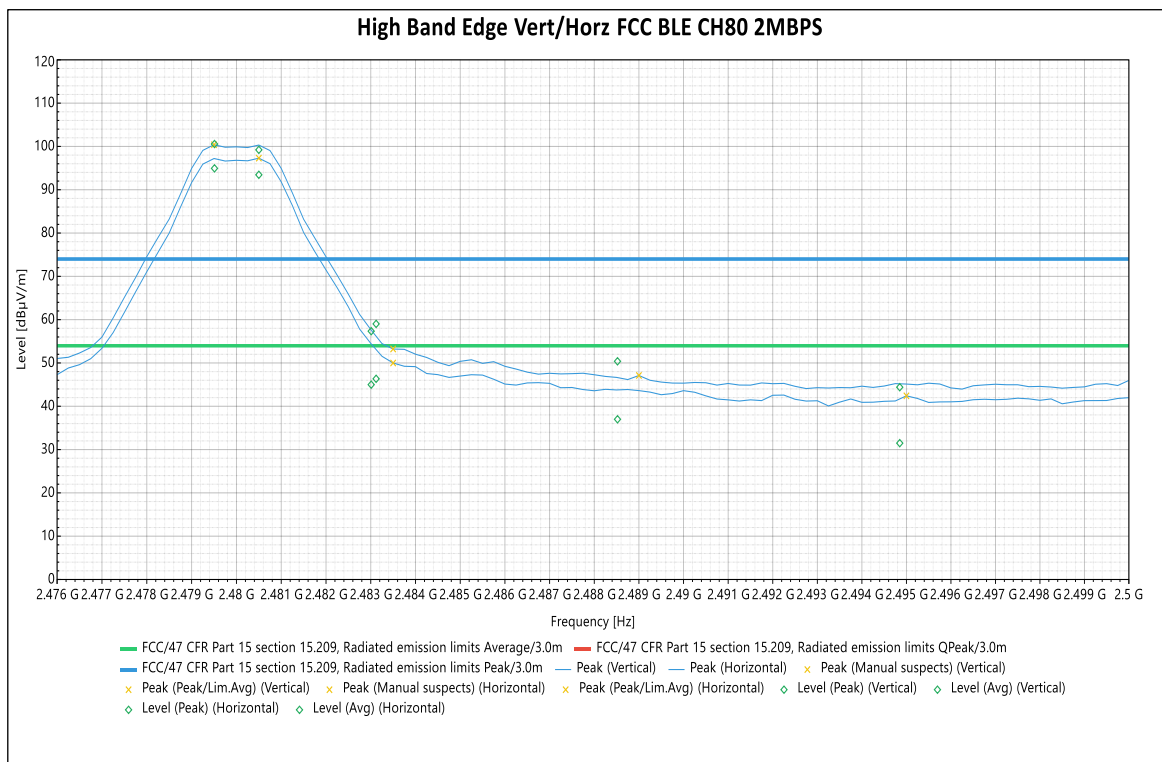


Figure 23 – High Band Edge Radiated, CH 80, 2 MBPS

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4.5.7 Final Tabulated Data

Low Band Edge CH 0, 1 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31345 GHz	1	48.537	74	-25.463	262	3.96	Vertical	15	1000000	0	-2.036
2.33588 GHz	1	48.693	74	-25.307	108	3.08	Vertical	15	1000000	0	-1.828
2.37749 GHz	1	44.916	74	-29.084	106	3.76	Vertical	15	1000000	0	-1.916
2.39976 GHz	1	99.29	74	25.29	99	3.68	Vertical	15	1000000	0	-2.022

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31345 GHz	1	36.262	53.98	-17.718	262	3.96	Vertical	15	1000000	0	-2.036
2.33588 GHz	1	41.538	53.98	-12.442	108	3.08	Vertical	15	1000000	0	-1.828
2.37749 GHz	1	32.249	53.98	-21.731	106	3.76	Vertical	15	1000000	0	-1.916
2.39976 GHz	1	97.156	53.98	43.176	99	3.68	Vertical	15	1000000	0	-2.022

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31342 GHz	2	51.808	74	-22.192	127	2.86	Horizontal	15	1000000	0	-2.036
2.33622 GHz	2	52.42	74	-21.58	352	3.89	Horizontal	15	1000000	0	-1.826
2.36808 GHz	2	48.909	74	-25.091	137	2	Horizontal	15	1000000	0	-1.916
2.40027 GHz	2	102.896	74	28.896	137	2.71	Horizontal	15	1000000	0	-2.02

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31342 GHz	2	39.93	53.98	-14.05	127	2.86	Horizontal	15	1000000	0	-2.036
2.33622 GHz	2	44.649	53.98	-9.331	352	3.89	Horizontal	15	1000000	0	-1.826
2.36808 GHz	2	37.319	53.98	-16.661	137	2	Horizontal	15	1000000	0	-1.916
2.40027 GHz	2	100.481	53.98	46.501	137	2.71	Horizontal	15	1000000	0	-2.02

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Low Band Edge CH 0, 2 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31374 GHz	1	48.982	74	-25.018	286	3.96	Vertical	15	1000000	0	-2.034
2.33638 GHz	1	48.975	74	-25.025	115	3.86	Vertical	15	1000000	0	-1.825
2.35833 GHz	1	45.912	74	-28.088	110	3.75	Vertical	15	1000000	0	-1.911
2.40052 GHz	1	98.82	74	24.82	108	4	Vertical	15	1000000	0	-2.016

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.31374 GHz	1	36.105	53.98	-17.875	286	3.96	Vertical	15	1000000	0	-2.034
2.33638 GHz	1	39.287	53.98	-14.693	115	3.86	Vertical	15	1000000	0	-1.825
2.35833 GHz	1	32.505	53.98	-21.475	110	3.75	Vertical	15	1000000	0	-1.911
2.40052 GHz	1	92.93	53.98	38.95	108	4	Vertical	15	1000000	0	-2.016

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.33652 GHz	2	52.31	74	-21.69	352	3.96	Horizontal	15	1000000	0	-1.824
2.37521 GHz	2	46.649	74	-27.351	176	3.88	Horizontal	15	1000000	0	-1.915
2.3995 GHz	2	98.547	74	24.547	129	2.71	Horizontal	15	1000000	0	-2.021

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.33652 GHz	2	42.028	53.98	-11.952	352	3.96	Horizontal	15	1000000	0	-1.824
2.37521 GHz	2	34.96	53.98	-19.02	176	3.88	Horizontal	15	1000000	0	-1.915
2.3995 GHz	2	92.683	53.98	38.703	129	2.71	Horizontal	15	1000000	0	-2.021

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High Band Edge CH 80, 1 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.47974 GHz	1	99.74	74	25.74	54	3.77	Vertical	15	1000000	0	-1.415
2.48329 GHz	1	49.944	74	-24.056	51	3.79	Vertical	15	1000000	0	-1.419
2.49012 GHz	1	45.136	74	-28.864	51	2.98	Vertical	15	1000000	0	-1.426

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.47974 GHz	1	97.183	53.98	43.203	54	3.77	Vertical	15	1000000	0	-1.415
2.48329 GHz	1	35.587	53.98	-18.393	51	3.79	Vertical	15	1000000	0	-1.419
2.49012 GHz	1	30.859	53.98	-23.121	51	2.98	Vertical	15	1000000	0	-1.426

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.48023 GHz	2	102.065	74	28.065	354	3.89	Horizontal	15	1000000	0	-1.414
2.48308 GHz	2	54.397	74	-19.603	131	2.86	Horizontal	15	1000000	0	-1.418
2.49757 GHz	2	48.799	74	-25.201	138	2.26	Horizontal	15	1000000	0	-1.319

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.48023 GHz	2	100.156	53.98	46.176	354	3.89	Horizontal	15	1000000	0	-1.414
2.48308 GHz	2	40.089	53.98	-13.891	131	2.86	Horizontal	15	1000000	0	-1.418
2.49757 GHz	2	36.2	53.98	-17.78	138	2.26	Horizontal	15	1000000	0	-1.319

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High Band Edge CH 80, 2 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.4805 GHz	1	99.207	74	25.207	54	3.75	Vertical	15	1000000	0	-1.415
2.48301 GHz	1	57.341	74	-16.659	54	3.79	Vertical	15	1000000	0	-1.418
2.49485 GHz	1	44.396	74	-29.604	50	3.65	Vertical	15	1000000	0	-1.358

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.4805 GHz	1	93.453	53.98	39.473	54	3.75	Vertical	15	1000000	0	-1.415
2.48301 GHz	1	44.995	53.98	-8.985	54	3.79	Vertical	15	1000000	0	-1.418
2.49485 GHz	1	31.478	53.98	-22.502	50	3.65	Vertical	15	1000000	0	-1.358

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.47951 GHz	2	100.557	74	26.557	322	3.52	Horizontal	15	1000000	0	-1.416
2.48312 GHz	2	59.019	74	-14.981	360	3.92	Horizontal	15	1000000	0	-1.418
2.48852 GHz	2	50.382	74	-23.618	355	3.91	Horizontal	15	1000000	0	-1.426

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.47951 GHz	2	94.938	53.98	40.958	322	3.52	Horizontal	15	1000000	0	-1.416
2.48312 GHz	2	46.339	53.98	-7.641	360	3.92	Horizontal	15	1000000	0	-1.418
2.48852 GHz	2	36.989	53.98	-16.991	355	3.91	Horizontal	15	1000000	0	-1.426

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4.6 Transmitter Spurious Emissions

This purpose of this test is to evaluate the radiated spurious emissions of the EUT.

4.6.1 Test Over View

Results	Complies (as tested per this report)				Date	01/18/2024 – 01/19/2024		
Standard	FCC CFR 47 Part 15.209, RSS-Gen 8.9							
Product Model	1016000012			Serial#	0001			
Configuration	See test plan for details.							
Test Set-up	Tested in 3m semi-anechoic chamber, EUT placed on table. See test plan for details							
EUT Powered By	18 VDC	Temp	24°C	Humidity	38%	Pressure	1007 mbar	
Frequency Range 1	30 – 1000 MHz		Level			Class B		
Frequency Range 2	1 – 26.5 GHz		Level			Class B		
Perf. Criteria	Class B (Below Limit)		Perf. Verification			See test plan		
Mod to EUT	None		Test Performed By			Alexander Sowinski		

4.6.2 Test Procedure

Testing was performed in accordance with FCC CFR §15.247 and ANSI C63.10. In the range below 1GHz, sample was place on the turntable at a height of 80 cm. In the range above 1GHz, the EUT was placed on the turntable at a height of 150 cm. Measurements were taken rotating the turntable between 0 and 360° and varying the antenna height between 100 and 400 cm. Worst case results were recorded and reported below. No spurious emissions were detected below 30MHz. Low channel 0 (@ 2400MHz), Mid channel 40 (@ 2440MHz), and High channel 80 (@ 2480MHz) were tested.

4.6.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Radiated Emissions test.

4.6.4 Final Test

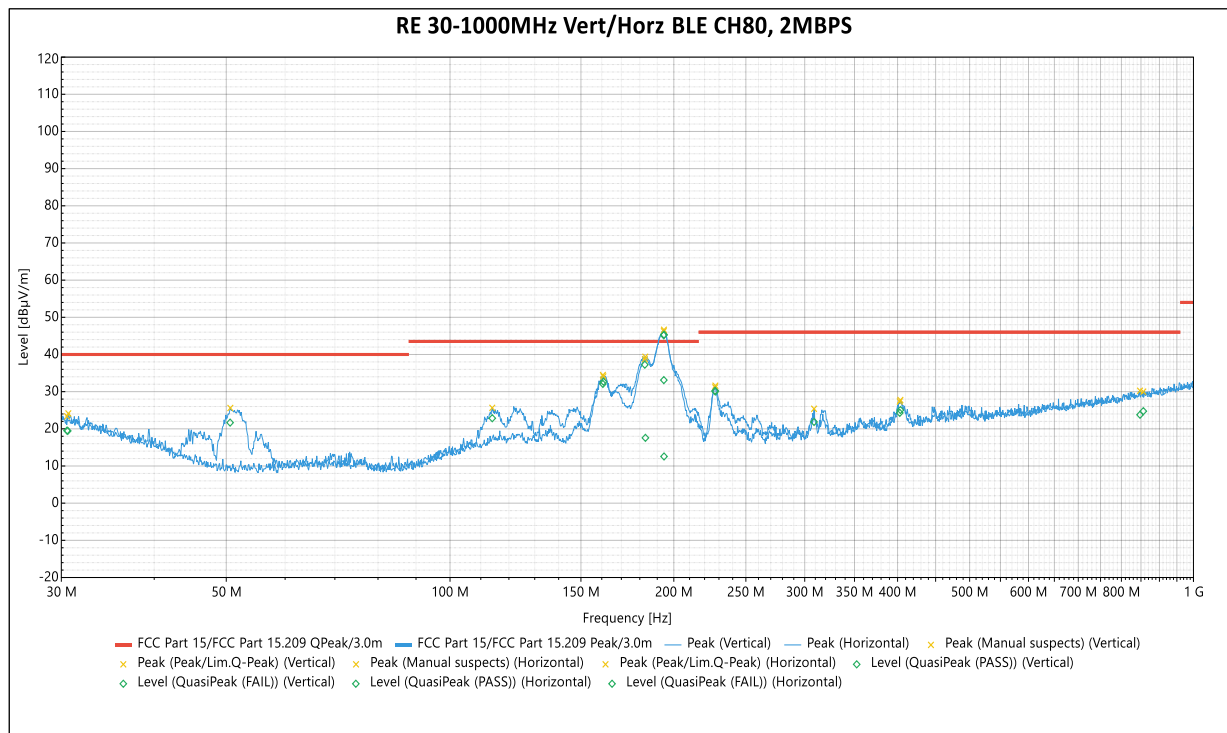
The transmitter spurious emissions were below the limits specified in the standard.

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4.6.5 Final Data



Note: Emission at 194 MHz was determined to originate from external AC/DC adapter and is not a product of the Bluetooth transmission. This emission is excluded from test results.

Figure 24 – 30 – 1000 MHz Vert/Horz. CH 80, 2 MBPS (Worst Case)

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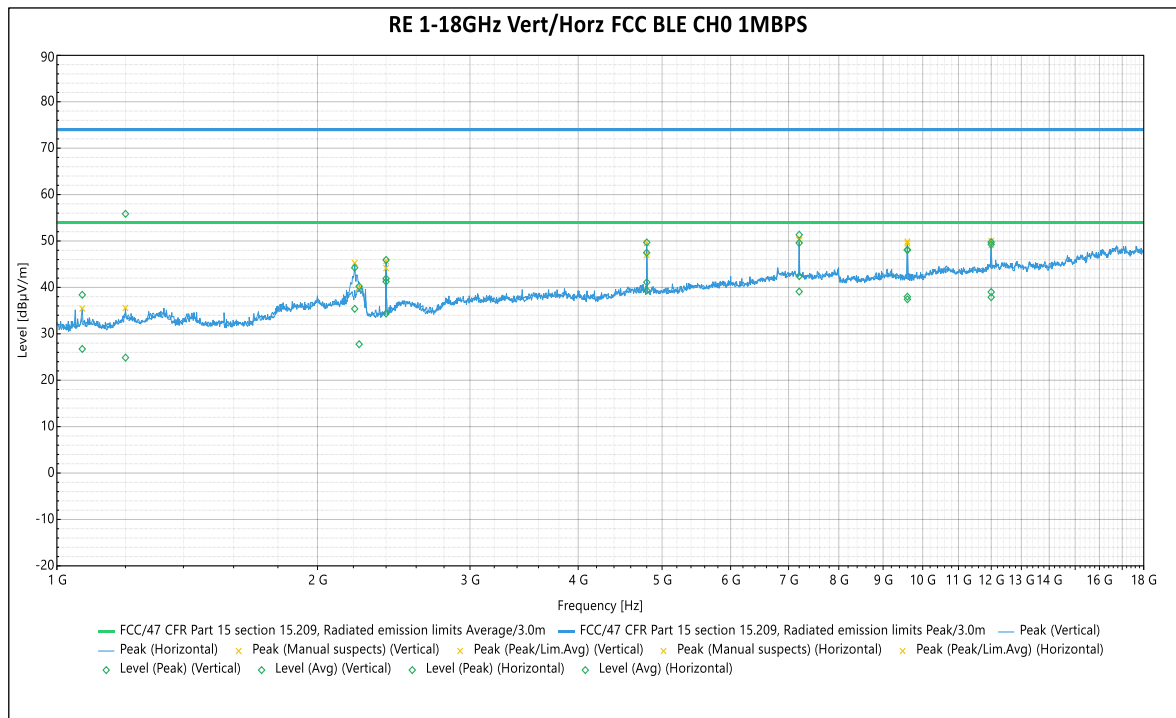


Figure 25 – 1 - 18 GHz Vert/Horz. CH 0, 1 MBPS

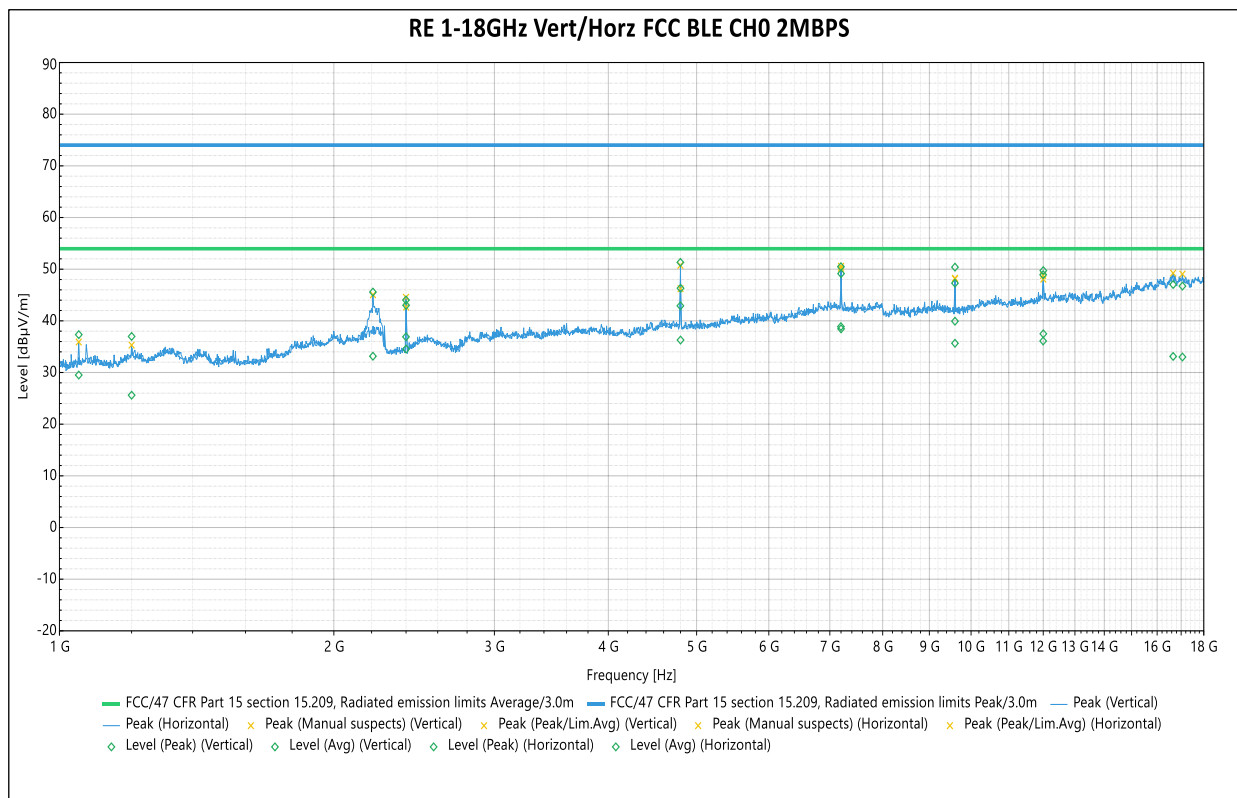


Figure 26 – 1 - 18 GHz Vert/Horz. CH 0, 2 MBPS

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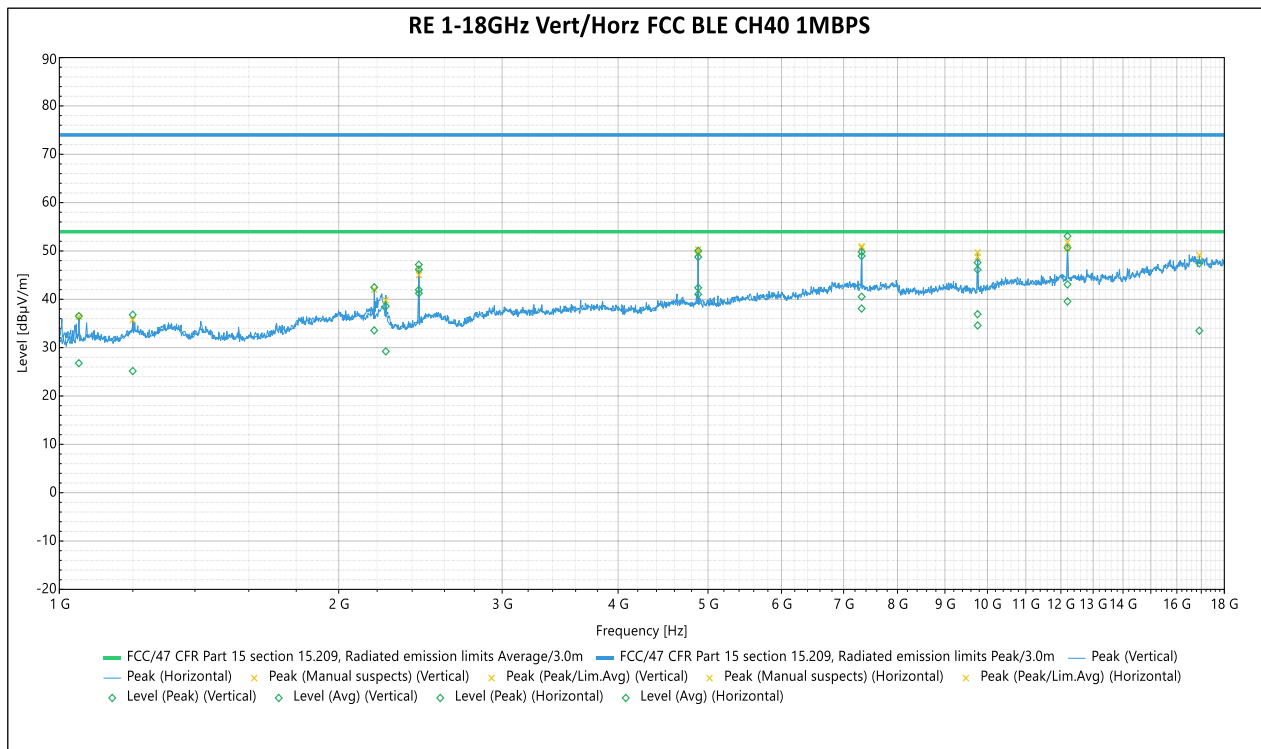


Figure 27 – 1 - 18 GHz Vert/Horz. CH 40, 1 MBPS

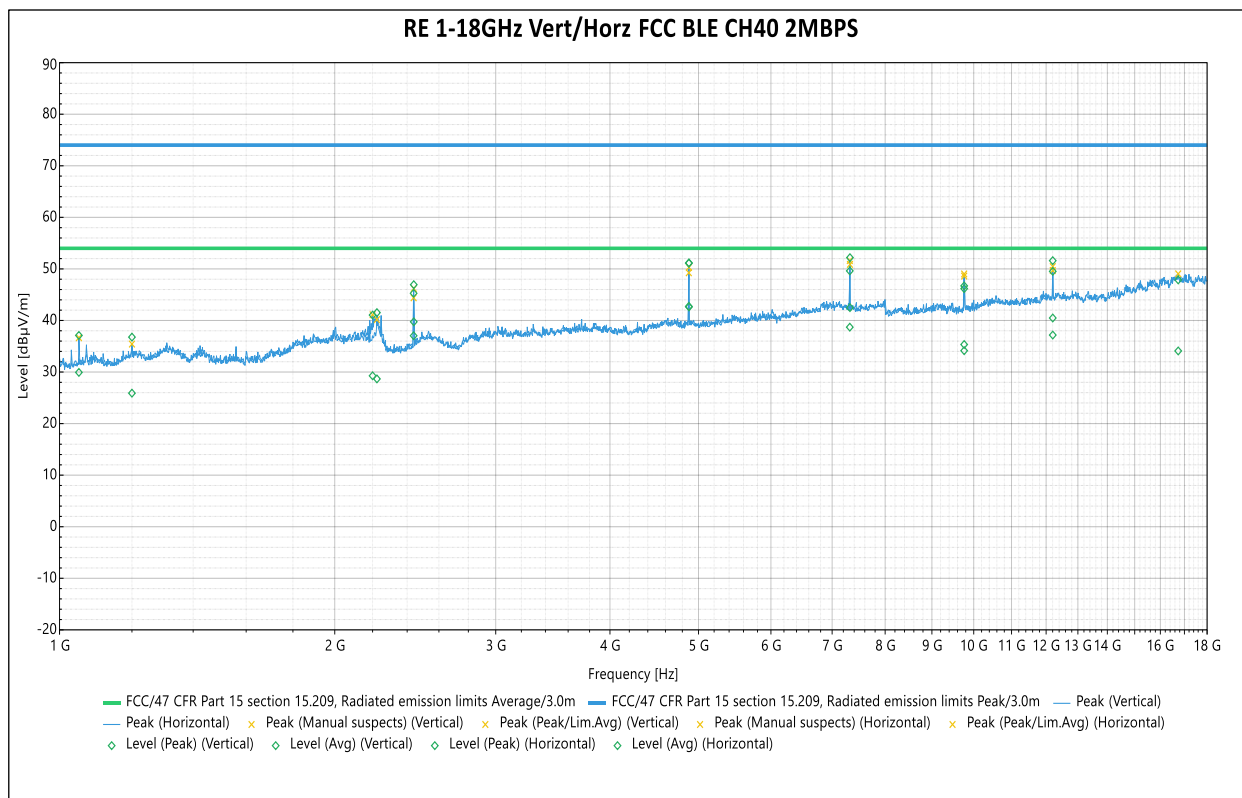


Figure 28 – 1 - 18 GHz Vert/Horz. CH 40, 2 MBPS

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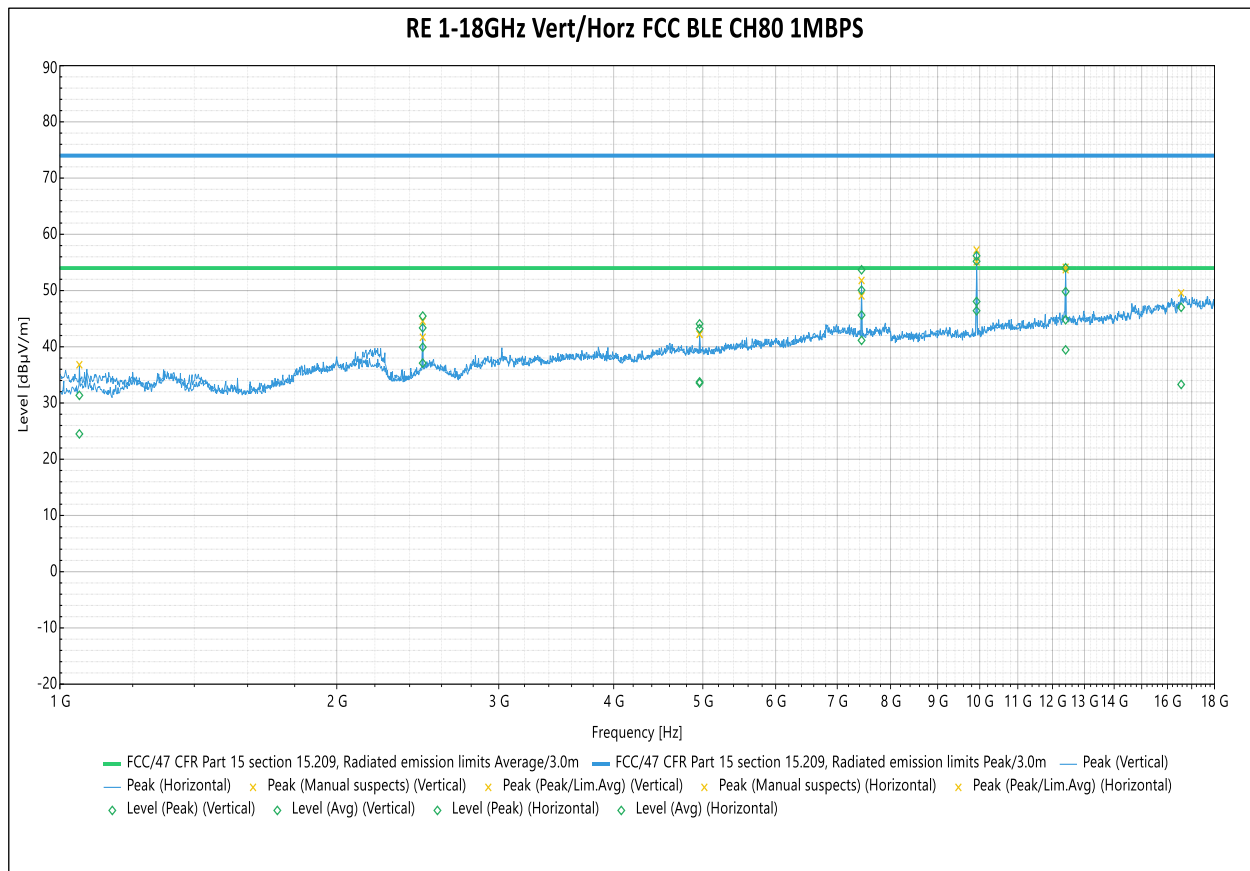


Figure 29 – 1 - 18 GHz Vert/Horz. CH 80, 1 MBPS

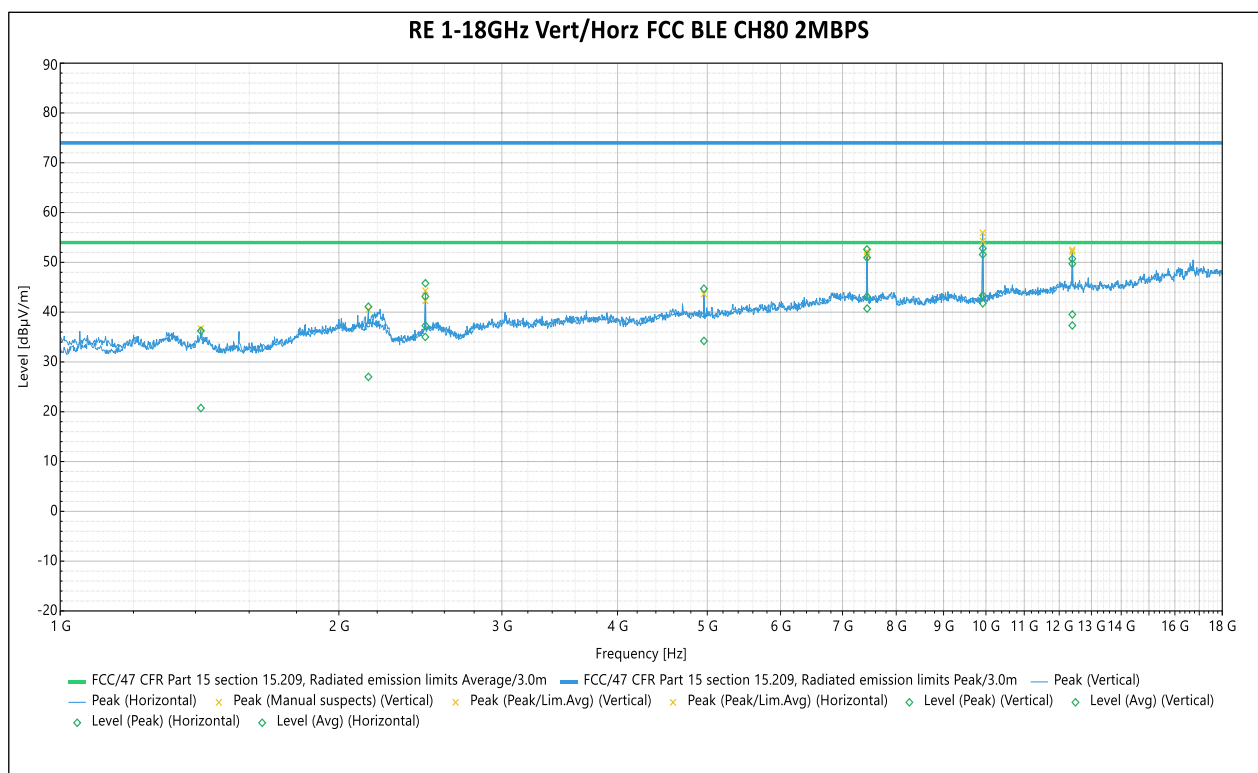


Figure 30 – 1 - 18 GHz Vert/Horz. CH 80, 2 MBPS

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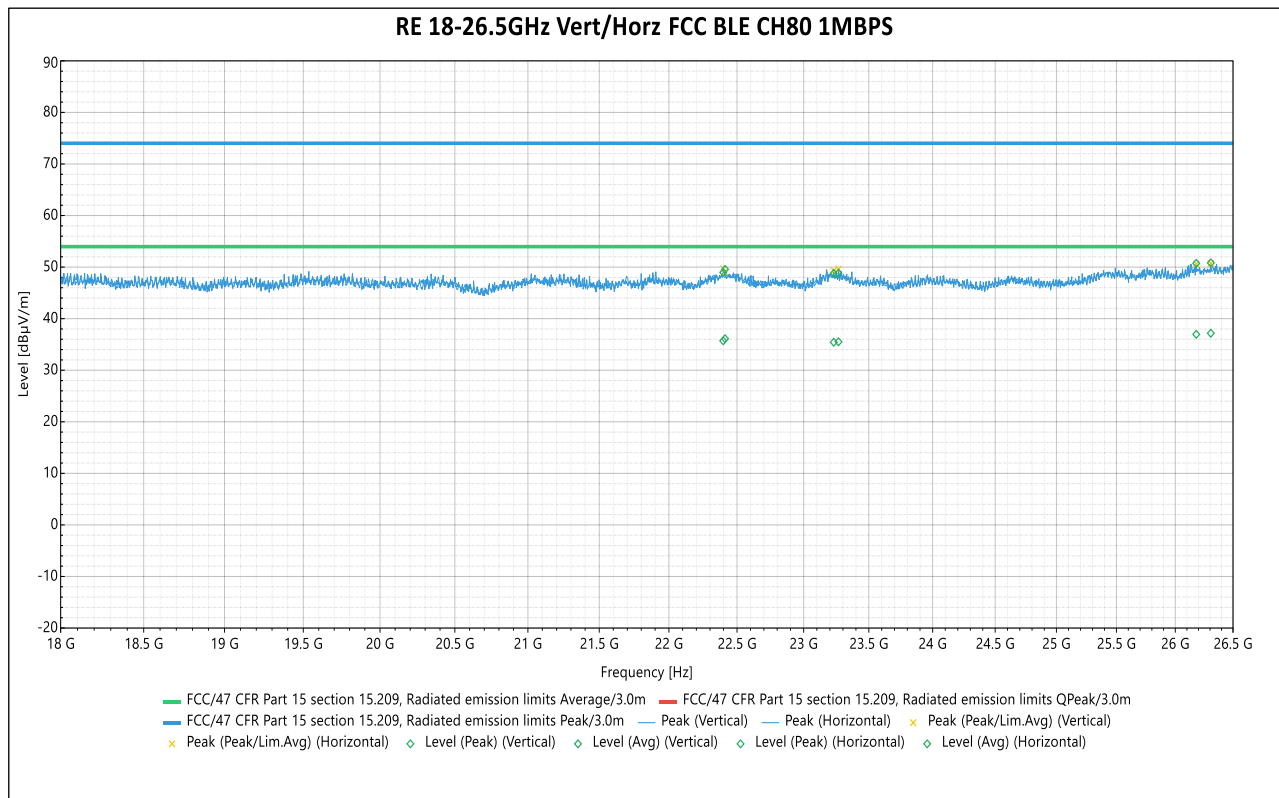


Figure 31 – 18 - 26.5 GHz Vert/Horz. CH 80, 1 MBPS (Worst Case)

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4.6.6 Final Tabulated Data

30 – 1000 MHz CH 80, 2 MBPS (Worst Case):

Final source: QuasiPeak (PASS)

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Comments	Correction (dB)
30.5364 MHz	1	19.518	40	-20.482	85	1	Vertical	15	120000	0		-0.828
50.605199 MHz	1	21.671	40	-18.329	290	1	Vertical	15	120000	0		-13.246
113.974799 MHz	1	22.85	43.5	-20.65	195	1	Vertical	15	120000	0		-5.826
160.548 MHz	1	32.085	43.5	-11.415	304	1	Vertical	15	120000	0		-6.004
183.1476 MHz	1	17.569	43.5	-25.931	4	1	Vertical	15	120000	0		-6.314
227.4084 MHz	1	30.045	46	-15.955	310	1	Vertical	15	120000	0		-5.882
308.794799 MHz	1	21.845	46	-24.155	308	1	Vertical	15	120000	0		-2.002
403.519199 MHz	1	25.053	46	-20.947	336	1	Vertical	15	120000	0		0.722
847.5516 MHz	1	23.784	46	-22.216	285	3	Vertical	15	120000	0		11.006

Final source: QuasiPeak (PASS)

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Comments	Correction (dB)
30.6036 MHz	2	19.444	40	-20.556	6	3	Horizontal	15	120000	0		-0.874
160.8492 MHz	2	32.673	43.5	-10.827	223	1.77	Horizontal	15	120000	0		-5.995
182.8188 MHz	2	37.255	43.5	-6.245	52	1.99	Horizontal	15	120000	0		-6.322
227.316 MHz	2	30.253	46	-15.747	237	1	Horizontal	15	120000	0		-5.884
402.701999 MHz	2	24.286	46	-21.714	270	1	Horizontal	15	120000	0		0.651
856.2372 MHz	2	24.752	46	-21.248	225	1	Horizontal	15	120000	0		11.182

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1 – 18 GHz CH 0, 1 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.069849999 GHz	1	38.397	74	-35.603	79	1	Vertical	15	1000000	0	-8.34
2.23421 GHz	1	40.207	74	-33.793	117	3.67	Vertical	15	1000000	0	-2.637
2.39987 GHz	1	41.237	74	-32.763	135	4	Vertical	15	1000000	0	-2.022
4.79957 GHz	1	47.469	74	-26.531	229	1	Vertical	15	1000000	0	2.187
7.20068 GHz	1	51.354	74	-22.646	17	3	Vertical	15	1000000	0	7.801
9.60104 GHz	1	48.028	74	-25.972	339	3.51	Vertical	15	1000000	0	9.617
11.99863 GHz	1	49.258	74	-24.742	120	3	Vertical	15	1000000	0	11.306

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.069849999 GHz	1	26.728	53.98	-27.252	79	1	Vertical	15	1000000	0	-8.34
2.23421 GHz	1	27.745	53.98	-26.235	117	3.67	Vertical	15	1000000	0	-2.637
2.39987 GHz	1	34.365	53.98	-19.615	135	4	Vertical	15	1000000	0	-2.022
4.79957 GHz	1	39.351	53.98	-14.629	229	1	Vertical	15	1000000	0	2.187
7.20068 GHz	1	42.426	53.98	-11.554	17	3	Vertical	15	1000000	0	7.801
9.60104 GHz	1	37.432	53.98	-16.548	339	3.51	Vertical	15	1000000	0	9.617
11.99863 GHz	1	37.882	53.98	-16.098	120	3	Vertical	15	1000000	0	11.306

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.200149999 GHz	2	55.851	74	-18.149	127	1	Horizontal	15	1000000	0	-6.698
2.20795 GHz	2	44.237	74	-29.763	134	2.7	Horizontal	15	1000000	0	-2.796
2.3998 GHz	2	45.911	74	-28.089	146	1	Horizontal	15	1000000	0	-2.022
4.80057 GHz	2	49.684	74	-24.316	270	3	Horizontal	15	1000000	0	2.188
7.20076 GHz	2	49.592	74	-24.408	231	3	Horizontal	15	1000000	0	7.8
9.60093 GHz	2	48.13	74	-25.87	19	3	Horizontal	15	1000000	0	9.617
11.99876 GHz	2	49.761	74	-24.239	207	3	Horizontal	15	1000000	0	11.307

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.200149999 GHz	2	24.865	53.98	-29.115	127	1	Horizontal	15	1000000	0	-6.698
2.20795 GHz	2	35.382	53.98	-18.598	134	2.7	Horizontal	15	1000000	0	-2.796
2.3998 GHz	2	41.901	53.98	-12.079	146	1	Horizontal	15	1000000	0	-2.022
4.80057 GHz	2	41.099	53.98	-12.881	270	3	Horizontal	15	1000000	0	2.188
7.20076 GHz	2	39.095	53.98	-14.885	231	3	Horizontal	15	1000000	0	7.8
9.60093 GHz	2	38.003	53.98	-15.977	19	3	Horizontal	15	1000000	0	9.617
11.99876 GHz	2	39.009	53.98	-14.971	207	3	Horizontal	15	1000000	0	11.307

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1 – 18 GHz CH 0, 2 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.050049999 GHz	1	37.334	74	-36.666	181	1	Vertical	15	1000000	0	-8.542
2.40043 GHz	1	43.014	74	-30.986	103	4	Vertical	15	1000000	0	-2.018
4.80102 GHz	1	46.306	74	-27.694	180	2	Vertical	15	1000000	0	2.19
7.20141 GHz	1	49.144	74	-24.856	8	3.53	Vertical	15	1000000	0	7.8
9.60199 GHz	1	50.392	74	-23.608	145	4	Vertical	15	1000000	0	9.619
12.00248 GHz	1	49.732	74	-24.268	109	3.52	Vertical	15	1000000	0	11.313
16.660409999 GHz	1	47.032	74	-26.968	360	2.91	Vertical	15	1000000	0	15.961

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.050049999 GHz	1	29.513	53.98	-24.467	181	1	Vertical	15	1000000	0	-8.542
2.40043 GHz	1	34.53	53.98	-19.45	103	4	Vertical	15	1000000	0	-2.018
4.80102 GHz	1	36.281	53.98	-17.699	180	2	Vertical	15	1000000	0	2.19
7.20141 GHz	1	38.451	53.98	-15.529	8	3.53	Vertical	15	1000000	0	7.8
9.60199 GHz	1	39.933	53.98	-14.047	145	4	Vertical	15	1000000	0	9.619
12.00248 GHz	1	37.495	53.98	-16.485	109	3.52	Vertical	15	1000000	0	11.313
16.660409999 GHz	1	33.109	53.98	-20.871	360	2.91	Vertical	15	1000000	0	15.961

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.200019999 GHz	2	36.978	74	-37.022	225	1	Horizontal	15	1000000	0	-6.7
2.20743 GHz	2	45.566	74	-28.434	125	2.7	Horizontal	15	1000000	0	-2.803
2.39963 GHz	2	44.025	74	-29.975	35	3.26	Horizontal	15	1000000	0	-2.022
4.79908 GHz	2	51.318	74	-22.682	277	4	Horizontal	15	1000000	0	2.188
7.19842 GHz	2	50.475	74	-23.525	253	3.95	Horizontal	15	1000000	0	7.799
9.60187 GHz	2	47.288	74	-26.712	24	3	Horizontal	15	1000000	0	9.618
11.99745 GHz	2	48.934	74	-25.066	26	3.53	Horizontal	15	1000000	0	11.301
17.055409999 GHz	2	46.727	74	-27.273	77	3.1	Horizontal	15	1000000	0	15.768

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.200019999 GHz	2	25.61	53.98	-28.37	225	1	Horizontal	15	1000000	0	-6.7
2.20743 GHz	2	33.15	53.98	-20.83	125	2.7	Horizontal	15	1000000	0	-2.803
2.39963 GHz	2	36.906	53.98	-17.074	35	3.26	Horizontal	15	1000000	0	-2.022
4.79908 GHz	2	42.905	53.98	-11.075	277	4	Horizontal	15	1000000	0	2.188
7.19842 GHz	2	38.881	53.98	-15.099	253	3.95	Horizontal	15	1000000	0	7.799
9.60187 GHz	2	35.661	53.98	-18.319	24	3	Horizontal	15	1000000	0	9.618
11.99745 GHz	2	36.099	53.98	-17.881	26	3.53	Horizontal	15	1000000	0	11.301
17.055409999 GHz	2	32.999	53.98	-20.981	77	3.1	Horizontal	15	1000000	0	15.768

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1 – 18 GHz CH 40, 1 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049609999 GHz	1	36.511	74	-37.489	339	1	Vertical	15	1000000	0	-8.544
2.24792 GHz	1	38.569	74	-35.431	77	3.96	Vertical	15	1000000	0	-2.638
2.44019 GHz	1	46.162	74	-27.838	279	4	Vertical	15	1000000	0	-1.803
4.87958 GHz	1	48.745	74	-25.255	28	3	Vertical	15	1000000	0	2.302
7.31928 GHz	1	49.807	74	-24.193	352	3.29	Vertical	15	1000000	0	7.841
9.75892 GHz	1	47.59	74	-26.41	242	2.53	Vertical	15	1000000	0	10.025
12.19858 GHz	1	50.651	74	-23.349	126	3	Vertical	15	1000000	0	11.557

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049609999 GHz	1	26.785	53.98	-27.195	339	1	Vertical	15	1000000	0	-8.544
2.24792 GHz	1	29.231	53.98	-24.749	77	3.96	Vertical	15	1000000	0	-2.638
2.44019 GHz	1	41.242	53.98	-12.738	279	4	Vertical	15	1000000	0	-1.803
4.87958 GHz	1	41.032	53.98	-12.948	28	3	Vertical	15	1000000	0	2.302
7.31928 GHz	1	40.535	53.98	-13.445	352	3.29	Vertical	15	1000000	0	7.841
9.75892 GHz	1	36.933	53.98	-17.047	242	2.53	Vertical	15	1000000	0	10.025
12.19858 GHz	1	39.561	53.98	-14.419	126	3	Vertical	15	1000000	0	11.557

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.199799999 GHz	2	36.811	74	-37.189	134	1	Horizontal	15	1000000	0	-6.703
2.18427 GHz	2	42.481	74	-31.519	139	3.07	Horizontal	15	1000000	0	-2.952
2.4397 GHz	2	47.161	74	-26.839	139	4	Horizontal	15	1000000	0	-1.804
4.87951 GHz	2	50.019	74	-23.981	128	1	Horizontal	15	1000000	0	2.302
7.31919 GHz	2	48.961	74	-25.039	273	3	Horizontal	15	1000000	0	7.841
9.76094 GHz	2	46.126	74	-27.874	10	3.53	Horizontal	15	1000000	0	10.026
12.1987 GHz	2	53.074	74	-20.926	209	3	Horizontal	15	1000000	0	11.557
16.918119999 GHz	2	47.445	74	-26.555	180	3	Horizontal	15	1000000	0	16.334

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.199799999 GHz	2	25.161	53.98	-28.819	134	1	Horizontal	15	1000000	0	-6.703
2.18427 GHz	2	33.566	53.98	-20.414	139	3.07	Horizontal	15	1000000	0	-2.952
2.4397 GHz	2	41.964	53.98	-12.016	139	4	Horizontal	15	1000000	0	-1.804
4.87951 GHz	2	42.388	53.98	-11.592	128	1	Horizontal	15	1000000	0	2.302
7.31919 GHz	2	38.091	53.98	-15.889	273	3	Horizontal	15	1000000	0	7.841
9.76094 GHz	2	34.588	53.98	-19.392	10	3.53	Horizontal	15	1000000	0	10.026
12.1987 GHz	2	43.067	53.98	-10.913	209	3	Horizontal	15	1000000	0	11.557
16.918119999 GHz	2	33.501	53.98	-20.479	180	3	Horizontal	15	1000000	0	16.334

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1 – 18 GHz CH 40, 2 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049899999 GHz	1	37.099	74	-36.901	90	1	Vertical	15	1000000	0	-8.542
2.22416 GHz	1	41.522	74	-32.478	94	3.67	Vertical	15	1000000	0	-2.66
2.43954 GHz	1	45.275	74	-28.725	279	4	Vertical	15	1000000	0	-1.805
4.881 GHz	1	51.139	74	-22.861	0	4	Vertical	15	1000000	0	2.302
7.32145 GHz	1	52.175	74	-21.825	319	3.53	Vertical	15	1000000	0	7.848
9.76205 GHz	1	46.171	74	-27.829	237	2.53	Vertical	15	1000000	0	10.026
12.20253 GHz	1	49.52	74	-24.48	123	3	Vertical	15	1000000	0	11.55
16.736999999 GHz	1	47.857	74	-26.143	5	3.53	Vertical	15	1000000	0	15.98

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049899999 GHz	1	29.93	53.98	-24.05	90	1	Vertical	15	1000000	0	-8.542
2.22416 GHz	1	28.674	53.98	-25.306	94	3.67	Vertical	15	1000000	0	-2.66
2.43954 GHz	1	37.036	53.98	-16.944	279	4	Vertical	15	1000000	0	-1.805
4.881 GHz	1	42.632	53.98	-11.348	0	4	Vertical	15	1000000	0	2.302
7.32145 GHz	1	42.491	53.98	-11.489	319	3.53	Vertical	15	1000000	0	7.848
9.76205 GHz	1	34.142	53.98	-19.838	237	2.53	Vertical	15	1000000	0	10.026
12.20253 GHz	1	37.175	53.98	-16.805	123	3	Vertical	15	1000000	0	11.55
16.736999999 GHz	1	34.091	53.98	-19.889	5	3.53	Vertical	15	1000000	0	15.98

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.199989999 GHz	2	36.773	74	-37.227	129	1	Horizontal	15	1000000	0	-6.7
2.19999 GHz	2	41.049	74	-32.951	139	2.7	Horizontal	15	1000000	0	-2.898
2.44044 GHz	2	46.94	74	-27.06	139	1	Horizontal	15	1000000	0	-1.803
4.87906 GHz	2	51.133	74	-22.867	214	3	Horizontal	15	1000000	0	2.302
7.31855 GHz	2	49.624	74	-24.376	350	3	Horizontal	15	1000000	0	7.839
9.7619 GHz	2	46.71	74	-27.29	22	3	Horizontal	15	1000000	0	10.026
12.2024 GHz	2	51.6	74	-22.4	43	2	Horizontal	15	1000000	0	11.55

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.199989999 GHz	2	25.898	53.98	-28.082	129	1	Horizontal	15	1000000	0	-6.7
2.19999 GHz	2	29.268	53.98	-24.712	139	2.7	Horizontal	15	1000000	0	-2.898
2.44044 GHz	2	39.741	53.98	-14.239	139	1	Horizontal	15	1000000	0	-1.803
4.87906 GHz	2	42.727	53.98	-11.253	214	3	Horizontal	15	1000000	0	2.302
7.31855 GHz	2	38.698	53.98	-15.282	350	3	Horizontal	15	1000000	0	7.839
9.7619 GHz	2	35.337	53.98	-18.643	22	3	Horizontal	15	1000000	0	10.026
12.2024 GHz	2	40.484	53.98	-13.496	43	2	Horizontal	15	1000000	0	11.55

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1 – 18 GHz CH 80, 1 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049979999 GHz	1	31.358	74	-42.642	327	1	Vertical	15	1000000	0	-8.542
2.47988 GHz	1	43.358	74	-30.642	240	4	Vertical	15	1000000	0	-1.415
4.95982 GHz	1	43.218	74	-30.782	270	1	Vertical	15	1000000	0	2.318
7.4393 GHz	1	53.695	74	-20.305	6	3	Vertical	15	1000000	0	7.969
9.9211 GHz	1	55.201	74	-18.799	62	3.67	Vertical	15	1000000	0	10.237
12.39881 GHz	1	49.8	74	-24.2	251	3.28	Vertical	15	1000000	0	11.771

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
1.049979999 GHz	1	24.497	53.98	-29.483	327	1	Vertical	15	1000000	0	-8.542
2.47988 GHz	1	37.09	53.98	-16.89	240	4	Vertical	15	1000000	0	-1.415
4.95982 GHz	1	33.745	53.98	-20.235	270	1	Vertical	15	1000000	0	2.318
7.4393 GHz	1	45.631	53.98	-8.349	6	3	Vertical	15	1000000	0	7.969
9.9211 GHz	1	46.409	53.98	-7.571	62	3.67	Vertical	15	1000000	0	10.237
12.39881 GHz	1	39.447	53.98	-14.533	251	3.28	Vertical	15	1000000	0	11.771

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.48022 GHz	2	45.455	74	-28.545	184	4	Horizontal	15	1000000	0	-1.414
4.95944 GHz	2	44.066	74	-29.934	46	1	Horizontal	15	1000000	0	2.317
7.43928 GHz	2	50.066	74	-23.934	240	3	Horizontal	15	1000000	0	7.969
9.921 GHz	2	56.181	74	-17.819	0	4	Horizontal	15	1000000	0	10.237
12.3987 GHz	2	54.036	74	-19.964	223	3	Horizontal	15	1000000	0	11.771
16.557789999 GHz	2	47.012	74	-26.988	2	4	Horizontal	15	1000000	0	15.898

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
2.48022 GHz	2	39.945	53.98	-14.035	184	4	Horizontal	15	1000000	0	-1.414
4.95944 GHz	2	33.56	53.98	-20.42	46	1	Horizontal	15	1000000	0	2.317
7.43928 GHz	2	41.138	53.98	-12.842	240	3	Horizontal	15	1000000	0	7.969
9.921 GHz	2	48.047	53.98	-5.933	0	4	Horizontal	15	1000000	0	10.237
12.3987 GHz	2	44.801	53.98	-9.179	223	3	Horizontal	15	1000000	0	11.771
16.557789999 GHz	2	33.301	53.98	-20.679	2	4	Horizontal	15	1000000	0	15.898

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1 – 18 GHz CH 80, 2 MBPS:

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
1.418969999 GHz	1	36.248	74	-37.752	31	2.06	Vertical	15	1000000	0	-6.402
2.47971 GHz	1	43.172	74	-30.828	238	3.96	Vertical	15	1000000	0	-1.415
7.4386 GHz	1	52.601	74	-21.399	0	4	Vertical	15	1000000	0	7.97
9.92196 GHz	1	52.802	74	-21.198	51	3	Vertical	15	1000000	0	10.238
12.39763 GHz	1	50.711	74	-23.289	38	2.91	Vertical	15	1000000	0	11.769

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
1.418969999 GHz	1	20.751	53.98	-33.229	31	2.06	Vertical	15	1000000	0	-6.402
2.47971 GHz	1	35.019	53.98	-18.961	238	3.96	Vertical	15	1000000	0	-1.415
7.4386 GHz	1	43.141	53.98	-10.839	0	4	Vertical	15	1000000	0	7.97
9.92196 GHz	1	43.36	53.98	-10.62	51	3	Vertical	15	1000000	0	10.238
12.39763 GHz	1	39.531	53.98	-14.449	38	2.91	Vertical	15	1000000	0	11.769

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.15253 GHz	2	41.091	74	-32.909	230	1	Horizontal	15	1000000	0	-2.834
2.4805 GHz	2	45.811	74	-28.189	0	3.95	Horizontal	15	1000000	0	-1.415
4.95907 GHz	2	44.714	74	-29.286	45	1	Horizontal	15	1000000	0	2.317
7.44153 GHz	2	50.938	74	-23.062	237	3	Horizontal	15	1000000	0	7.967
9.92203 GHz	2	51.566	74	-22.434	45	3.09	Horizontal	15	1000000	0	10.239
12.3974 GHz	2	49.714	74	-24.286	104	2.52	Horizontal	15	1000000	0	11.768

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas. Time (s)	Correction (dB)
2.15253 GHz	2	26.996	53.98	-26.984	230	1	Horizontal	15	1000000	0	-2.834
2.4805 GHz	2	37.3	53.98	-16.68	0	3.95	Horizontal	15	1000000	0	-1.415
4.95907 GHz	2	34.221	53.98	-19.759	45	1	Horizontal	15	1000000	0	2.317
7.44153 GHz	2	40.721	53.98	-13.259	237	3	Horizontal	15	1000000	0	7.967
9.92203 GHz	2	41.766	53.98	-12.214	45	3.09	Horizontal	15	1000000	0	10.239
12.3974 GHz	2	37.326	53.98	-16.654	104	2.52	Horizontal	15	1000000	0	11.768

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18 – 26.5 GHz CH 80, 1 MBPS (Worst Case):

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
22.411209999 GHz	1	49.564	74	-24.436	295	4	Vertical	15	1000000	0	19.636
23.265839999 GHz	1	48.822	74	-25.178	52	1.9	Vertical	15	1000000	0	19.166
26.180659999 GHz	1	50.729	74	-23.271	147	2.27	Vertical	15	1000000	0	22.438

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
22.411209999 GHz	1	36.11	53.98	-17.87	295	4	Vertical	15	1000000	0	19.636
23.265839999 GHz	1	35.506	53.98	-18.474	52	1.9	Vertical	15	1000000	0	19.166
26.180659999 GHz	1	36.958	53.98	-17.022	147	2.27	Vertical	15	1000000	0	22.438

Final source: Peak

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
22.397629999 GHz	2	48.974	74	-25.026	270	3	Horizontal	15	1000000	0	19.704
23.2295 GHz	2	48.795	74	-25.205	204	3.89	Horizontal	15	1000000	0	19.051
26.306559999 GHz	2	50.824	74	-23.176	138	3.67	Horizontal	15	1000000	0	22.578

Final source: Avg

Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Meas. Time (s)	RBW (Hz)	Meas.Time (s)	Correction (dB)
22.397629999 GHz	2	35.702	53.98	-18.278	270	3	Horizontal	15	1000000	0	19.704
23.2295 GHz	2	35.425	53.98	-18.555	204	3.89	Horizontal	15	1000000	0	19.051
26.306559999 GHz	2	37.171	53.98	-16.809	138	3.67	Horizontal	15	1000000	0	22.578

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4.7 AC Conducted Emissions

This test measures the spurious emissions transmitted back through the AC mains from the EUT.

4.7.1 Test Over View

Results	Complies (as tested per this report)				Date	01/22/2024	
Standard	FCC CFR 47 Part 15.207, RSS-Gen 8.8						
Product Model	1016000012			Serial#	0001		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room. See test plans for details.						
EUT Powered By	18 VDC	Temp	22°C	Humidity	41%	Pressure	1009 mbar
Frequency Range	150 – 30000 kHz						
Perf. Criteria	Class B (Below Limit)		Perf. Verification		Readings under Limit for L1 and Neutral		
Mod to EUT	None		Test Performed By		Alexander Sowinski		

4.7.2 Test Procedure

Conducted and emissions tests were performed using the procedures of FCC CFR 47 Part 15.207 and/or ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration. Further conducted emission tests were performed per the procedures stated in the other emissions standards listed in this report.

The frequency range from 150 kHz - 30 MHz was investigated for conducted emissions.

Conducted Emissions measurements were performed in the shielded room using procedures specified in the test plan and standard.

4.7.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emissions test.

4.7.4 Final Test

The final conducted emissions results were below (in compliance) with the limits of the standard.

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4.7.5 Final Plots

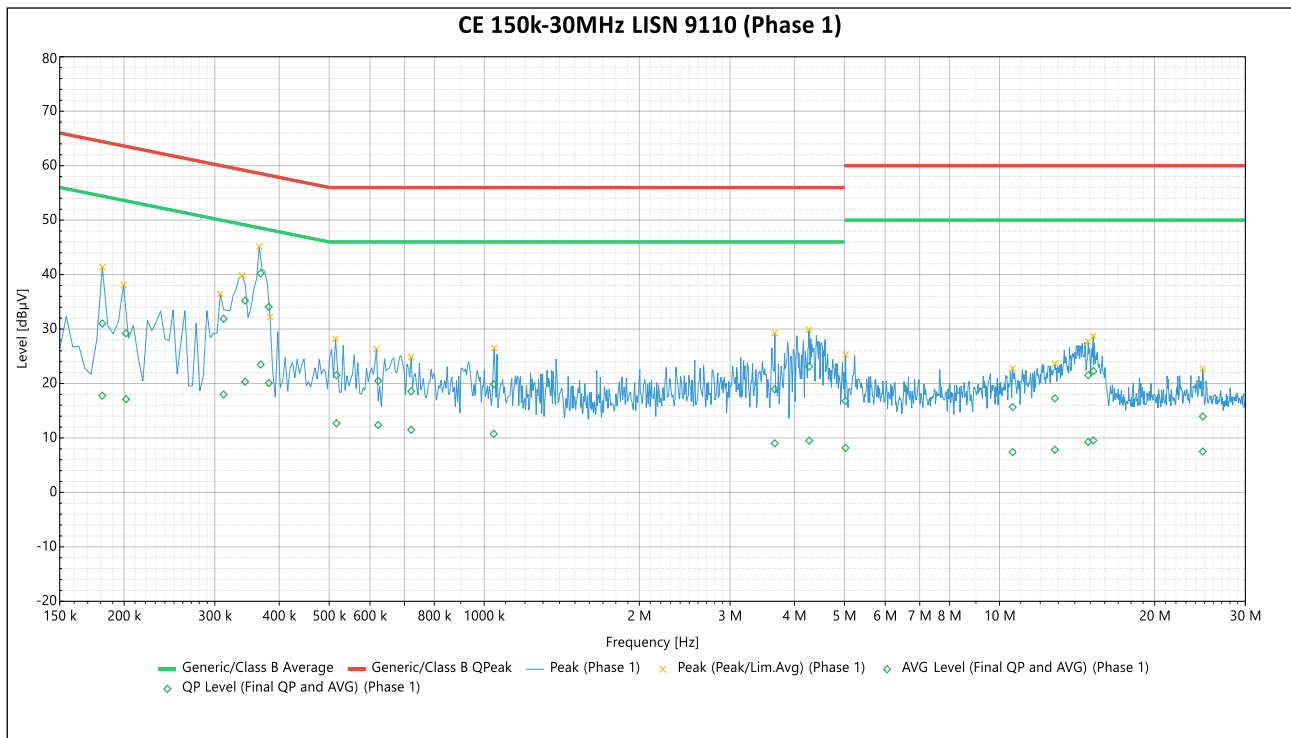


Figure 32 – AC Conducted Emissions (Line 1)

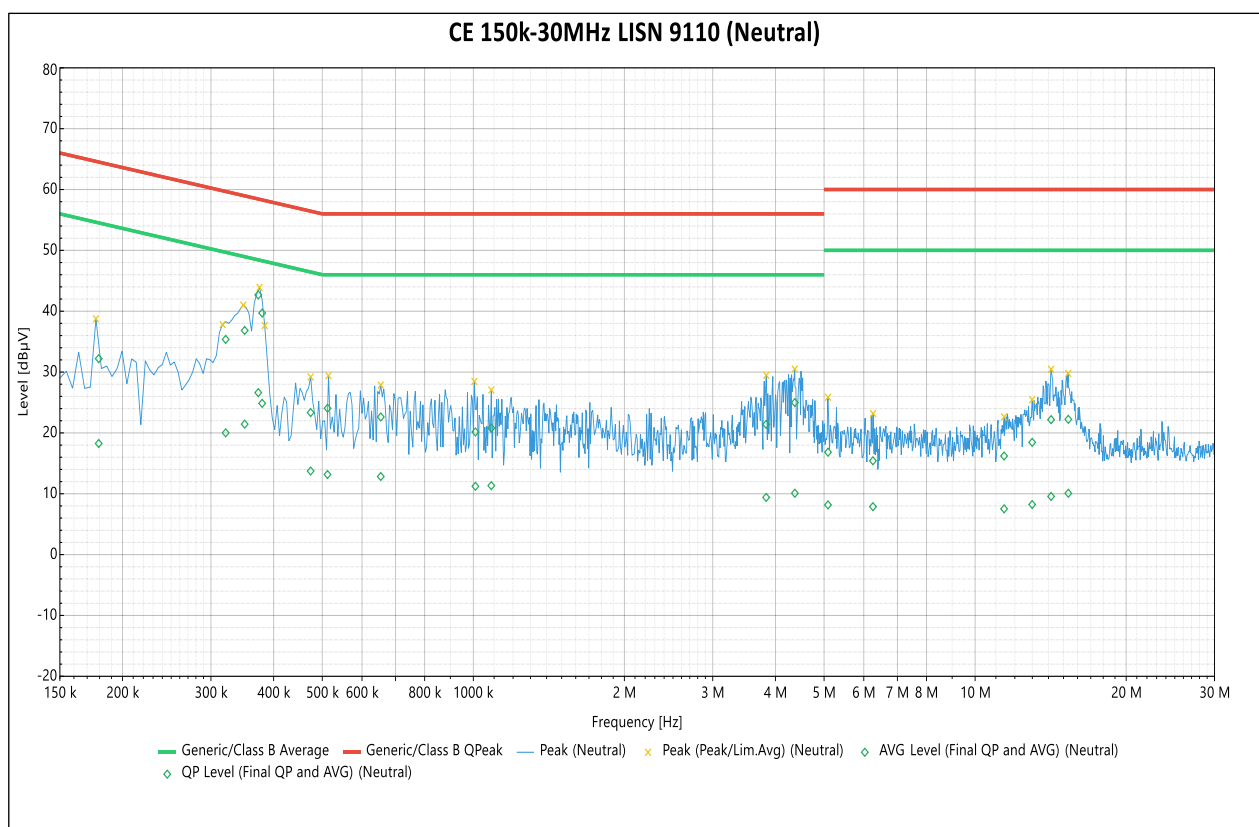


Figure 33 – AC Conducted Emissions (Neutral)

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4.7.6 Final Tabulated Data at 120V60Hz

Line:

Final source: Final QP and AVG

Frequency	SR #	AVG Level (dBµV)	QP Level (dBµV)	AVG Limit (dBµV)	QP Limit (dBµV)	AVG Margin (dB)	QPeak Margin (dB)	Line	RBW (Hz)	Meas.Time (s)	Comments	Correction (dB)
181.5 kHz	1	17.76	31.014	54.417	64.417	-36.657	-33.402	Phase 1	9000	0.001	Pass	12.471
201.749 kHz	1	17.111	29.22	53.631	63.631	-36.52	-34.411	Phase 1	9000	0.001	Pass	11.861
311.999 kHz	1	17.982	31.882	49.917	59.917	-31.935	-28.035	Phase 1	9000	0.001	Pass	10.842
343.499 kHz	1	20.331	35.227	49.118	59.118	-28.788	-23.892	Phase 1	9000	0.001	Pass	10.769
368.249 kHz	1	23.475	40.219	48.591	58.591	-25.116	-18.372	Phase 1	9000	0.001	Pass	10.716
381.75 kHz	1	20.099	34.073	48.192	58.192	-28.094	-24.119	Phase 1	9000	0.001	Pass	10.688
516.749 kHz	1	12.702	21.524	46	56	-33.298	-34.476	Phase 1	9000	0.001	Pass	10.577
622.5 kHz	1	12.374	20.489	46	56	-33.626	-35.511	Phase 1	9000	0.001	Pass	10.553
721.5 kHz	1	11.495	18.56	46	56	-34.505	-37.44	Phase 1	9000	0.001	Pass	10.538
1.04325 MHz	1	10.747	19.857	46	56	-35.253	-36.143	Phase 1	9000	0.001	Pass	10.537
3.662249 MHz	1	9.003	18.942	46	56	-36.997	-37.058	Phase 1	9000	0.001	Pass	10.646
4.272 MHz	1	9.496	23.115	46	56	-36.504	-32.885	Phase 1	9000	0.001	Pass	10.679
5.023499 MHz	1	8.172	16.814	50	60	-41.828	-43.186	Phase 1	9000	0.001	Pass	10.721
10.6035 MHz	1	7.393	15.658	50	60	-42.607	-44.342	Phase 1	9000	0.001	Pass	10.974
12.808499 MHz	1	7.827	17.273	50	60	-42.173	-42.727	Phase 1	9000	0.001	Pass	11.072
14.869499 MHz	1	9.269	21.535	50	60	-40.731	-38.465	Phase 1	9000	0.001	Pass	11.155
15.206999 MHz	1	9.55	22.288	50	60	-40.45	-37.712	Phase 1	9000	0.001	Pass	11.168
24.801 MHz	1	7.513	13.952	50	60	-42.487	-46.048	Phase 1	9000	0.001	Pass	11.626

Neutral:

Final source: Final QP and AVG

Frequency	SR #	AVG Level (dBµV)	QP Level (dBµV)	AVG Limit (dBµV)	QP Limit (dBµV)	AVG Margin (dB)	QPeak Margin (dB)	Line	RBW (Hz)	Meas.Time (s)	Comments	Correction (dB)
179.25 kHz	2	18.263	32.203	54.417	64.417	-36.153	-32.214	Neutral	9000	0.001	Pass	12.529
320.999 kHz	2	20.009	35.37	49.681	59.681	-29.672	-24.311	Neutral	9000	0.001	Pass	10.821
350.249 kHz	2	21.438	36.836	49.01	59.01	-27.572	-22.174	Neutral	9000	0.001	Pass	10.754
372.749 kHz	2	26.617	42.672	48.49	58.49	-21.872	-15.818	Neutral	9000	0.001	Pass	10.707
379.5 kHz	2	24.864	39.701	48.29	58.29	-23.426	-18.589	Neutral	9000	0.001	Pass	10.693
473.999 kHz	2	13.74	23.341	46.444	56.444	-32.704	-33.103	Neutral	9000	0.001	Pass	10.601
512.25 kHz	2	13.16	24.051	46	56	-32.84	-31.949	Neutral	9000	0.001	Pass	10.578
654 kHz	2	12.832	22.62	46	56	-33.168	-33.38	Neutral	9000	0.001	Pass	10.545
1.0095 MHz	2	11.233	20.155	46	56	-34.767	-35.845	Neutral	9000	0.001	Pass	10.539
1.086 MHz	2	11.328	20.786	46	56	-34.672	-35.214	Neutral	9000	0.001	Pass	10.535
3.833249 MHz	2	9.398	21.4	46	56	-36.602	-34.6	Neutral	9000	0.001	Pass	10.653
4.37325 MHz	2	10.077	24.986	46	56	-35.923	-31.014	Neutral	9000	0.001	Pass	10.686
5.091 MHz	2	8.173	16.832	50	60	-41.827	-43.168	Neutral	9000	0.001	Pass	10.725
6.2565 MHz	2	7.878	15.422	50	60	-42.122	-44.578	Neutral	9000	0.001	Pass	10.78
11.4225 MHz	2	7.518	16.215	50	60	-42.482	-43.785	Neutral	9000	0.001	Pass	11.011
12.992999 MHz	2	8.233	18.454	50	60	-41.767	-41.546	Neutral	9000	0.001	Pass	11.08
14.171999 MHz	2	9.56	22.177	50	60	-40.44	-37.823	Neutral	9000	0.001	Pass	11.127
15.335249 MHz	2	10.077	22.232	50	60	-39.923	-37.768	Neutral	9000	0.001	Pass	11.173

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Appendix A

5 Test Plan

This test report is intended to follow the test plan outlined herein unless otherwise stated. The test plan provides product information, reference standards, and testing details. The product information below came via client, product manual, product itself and or the internet. Test procedure information will reference standards or internal TUV Rheinland NA procedures.

5.1 General Information

Client	Hunter Douglas Window Fashions, Inc
Address 1	One Duette Way
Address 2	Broomfield CO, 80020
Contact Person	Mike Rockwood
Telephone	720-778-0205
Fax	--
e-mail	mike.rockwood@hunterdouglas.com

5.2 Model(s) Name

1016000012

5.3 Type of Product

Powerview Gen3 Motor Control Board

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5.4 Equipment Under Test (EUT) Description

The 1016000012 is assembled into various motor assemblies and fabricated into Hunter Douglas window coverings that include a fabric member that is rolled around an aluminum tube, or stacked on itself without a tube. The DC brushed motor rotates the tube to deploy and retract the fabric. The system is powered by 12-18VDC via DC power supply or primary batteries. This power is fed to a solid state H bridge to switch power to the DC brushed motor. Torque and speed are monitored and controlled with the use of hall sensors/ quadrature encoder and current measurement. The input power is dropped by a 3.3V switching power supply at 2MHz to feed power to the logic level components of the system.

User inputs to the system include a push button on the motor module, a TTL level serial port, and 2.4GHz RF signals. The RF protocol used is Bluetooth 5 (Low Energy) and is implemented with Nordic NRF52840 series SoC (system on chips).

5.5 Wireless

EUT Specifications	
Environment:	Indoor / Outdoor / Vehicular
Operating Temperature Range °C:	-20°C - 50°C
Multiple Feeds:	No
FCC ID:	UXUMOTG3A
IC ID:	7316A-MOTG3A
Product Marketing Name (PMN):	Powerview Gen3 Motor
Hardware Version Identification Number (HVIN):	1016000012
Firmware Version Identification Number (FVIN):	1.0.0
RF Software Version:	1.0.0
Operating Modes:	Bluetooth Low Energy (BLE)
Transmitter Frequency Band:	2400-2480 MHz
Power @ Operating Channel (dBm):	+8 dBm
Antenna Type	Dipole
Antenna Gain (dBi)	2.2 dBi
Modulation:	GFSK
Data Rate	1MBPS, 2MBPS
TX/RX Chain (s):	Single
Type of Equipment:	DTS
*All EUT specifications are provided by the manufacturer or the TUV direct customer Note: Information supplied by the customer and can affect the validity of results	

5.6 Testing Preparation

Connect Powerview Motor Board to power supply. Connect provided serial cable and configure TX properties via PC Terminal software (PuTTY).

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5.7 General Product Information

Size	H	0.5cm	W	3cm	L	5cm
Weight	1g		Fork-Lift Needed	No		
Notes						

5.8 Modifications

None.

5.9 EUT Electrical Power Information

5.9.1 Electrical Power Type

☐	AC	☒	DC	☐	Batteries	☐	Host -
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5.9.2 Electrical Power Information

Name	Type	Voltage		Frequency	Current	Notes
		min	max			
Amigo Class 2 Power Supply	AC	100	240	50/60	2A	Provides 18 VDC to Motor Board
Batteries (x12 AA)	DC	18	18	0Hz	2A	Via Battery Wand.
Notes						

5.10 EUT Modes of Operation during Testing

For radio testing, a low, mid, and high channel are tested. Low channel at setting "0" yields TX at 2400 MHz. Likewise, CH 40 yields TX at 2440 MHz and CH 80 yields TX at 2480 MHz.

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5.11 EUT Clock/Oscillator Frequencies

Please specify the maximum clock frequency used in the product – 2.480 GHz

In the table below, please specify other clock frequencies and sensitive operating frequencies in the product.

Clock Frequencies & Sensitive Frequencies
Crystals: 32 MHz, 32.768 MHz

5.12 Electrical Support Equipment

Type	Manufacturer	Model	Connected To
Laptop	Acer	G7	EUT Serial (Configuring TX Parameters)
USB/Serial Cable	Generic	Generic	Laptop, EUT.

5.13 Non - Electrical Support Equipment

Item	Notes
Gas	N/A
Water	
Air	

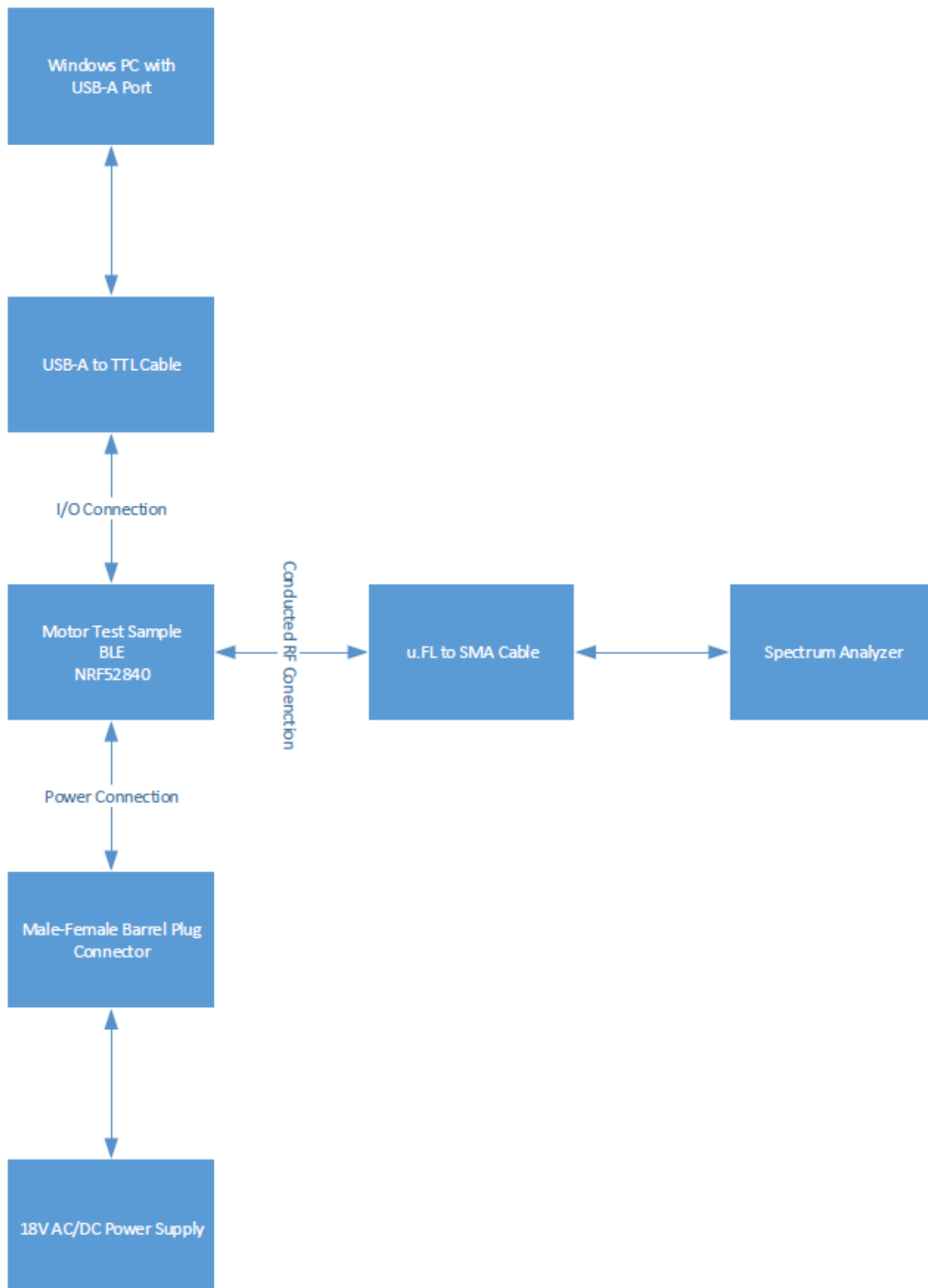
5.14 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Length	Shielded / Unshielded
Serial	TTL-232R-RPi	Top	40cm	Unshielded

5.15 EUT Configuration

Configuration	Description
Radio Operations	EUT is transmitting on either Low, Mid, or High Channel.
Notes	All configurations are the same except as noted above

5.16 Block Diagram



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--- Ende des Prüfberichts / End of Test Report ---