August 19, 2021

CalAmp Wireless Networks CA
2200 Faraday Ave #220
Carlsbad, CA 92008

Dear Imad Rizk,

Enclosed is the Wireless test report for compliance testing of the CalAmp Wireless Networks CA, SC1205V, as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15 Subpart C for Intentional Radiators.

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. Please contact me if you have any questions regarding these results or if Eurofins E&E can be of further service to you.

Sincerely,

Rheine Nguyen

Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: WIRS113743-FCC247 (WiFi) Rev 1

A2LA ACCREDITED TESTING CERT #0591.02

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Eurofins Electrical and Electronic Testing NA, Inc. is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

Electromagnetic Compatibility Criteria Test Report

for the

CalAmp Wireless Networks CA
SC1205V

Tested under
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

Report: WIR113743-FCC247 (WiFi) Rev 1

Prepared For:

CalAmp Wireless Networks CA
2200 Faraday Ave #220
Carlsbad, CA 92008

Prepared By:
Eurofins Electrical and Electronic Testing NA, Inc.
3162 Belick St.
Santa Clara, CA 95054

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Electromagnetic Compatibility Criteria Test Report

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SC1205V

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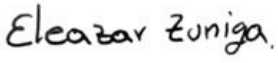
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

Arsalan Hasan
Project Engineer, Electromagnetic Compatibility Lab

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 15.247 under normal use and maintenance.



Eleazar Zuniga,
Director, Wireless Laboratory

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	August 16, 2021	Initial Issue
1	August 19, 2021	TCB Review Updates.

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Table of Contents

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I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the CalAmp Wireless Networks CA, SC1205V, with the requirements of Part 15, §15.247. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the SC1205V. CalAmp Wireless Networks CA should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the SC1205V, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.247, in accordance with CalAmp Wireless Networks CA, purchase order number 404965. All tests were conducted using measurement procedure ANSI C63.10-2013.

References	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	Antenna Requirement	Data valid from module FCC ID: 2AC7Z-ESPWROOM02D
Title 47 of the CFR, Part 15 §15.207(a)	Conducted Emissions Voltage	Not Applicable
Title 47 of the CFR, Part 15 §15.247(a)(2)	6dB Occupied Bandwidth	Data valid from module FCC ID: 2AC7Z-ESPWROOM02D
Title 47 of the CFR, Part 15 §15.247(b)	Peak Power Output	Data valid from module FCC ID: 2AC7Z-ESPWROOM02D
Title 47 of the CFR, Part 15 §15.247(c)	Spurious Emissions in Non-restricted Bands	Data valid from module FCC ID: 2AC7Z-ESPWROOM02D
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	Peak Power Spectral Density	Data valid from module FCC ID: 2AC7Z-ESPWROOM02D

Executive Summary of FCC Part 15.247 ComplianceTesting

II. Equipment Configuration

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by CalAmp Wireless Networks CA to perform testing on the SC1205V, under purchase order number 404965.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of CalAmp Wireless Networks CA, SC1205V.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	SC1205V	
Model(s) Covered:	SC1205V	
Filing Status:	Original	
EUT Specifications:	**Primary Power:** Voltage: 12 V AC or DC: DC Voltage Frequency: NA Number of Phases: 1 Current: 0.5 Amp	
	Type of Modulations:	OFDM
	Equipment Code:	DTS
	Technology	TX Frequency Range
	WiFi	2412 - 2462 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Duty Cycle for Testing:	100%	
Evaluated by:	Arsalan Hasan	
Date(s):	August 19, 2021	

EUT Summary Table

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B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
RSS-247	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 v05r02	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247

References

C. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 3162 Belick St., Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins Electrical and Electronic Testing NA, Inc.

Eurofins Electrical and Electronics Testing NA, Inc. is an ISO/IEC 17025 accredited site by A2LA, California #0591.02.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.24	2	95%
Radiated Emissions, (1 GHz – 6 GHz)	±3.92	2	95%
Conducted Emission Voltage	±2.44	2	95%
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Uncertainty Calculations Summary

E. Description of Test Sample

Name of EUT/Model:	SC1205V
Description of EUT and its intended use:	The EUT is an asset tracker.
Selected Operation Mode(s):	The EUT radio is control by external software via a laptop.
Rationale for the selection of the Operation Mode(s):	This is the preferred mode of controlling the radio.
Monitoring Method(s):	Signals are displayed on a spectrum analyzer.
Emissions Class Declaration:	Class A
Configuration(s):	NA
EUT Power Requirement	
Voltage:	12 VDC (Vehicle battery powered)
AC or DC:	DC
Voltage Frequency:	NA
Number of Phases:	NA
Current:	0.5 A
Physical Description	
EUT Arrangement:	Table Top
System with Multiple Chassis?	NA
Size (HxWxD - inches):	30mm x 80mm x 140mm
Weight (lbs):	0.5 lbs
Other Info	
EUT Software (internal to EUT):	Rev 1
Support Software (used by support PC to exercise EUT):	NA
Firmware:	Rev 1
Transmitter Parameters	
Description of your unit:	WiFi
Modulation Type:	OFDM
Number of Channels:	NA
Frequency range (MHz):	2412 MHz –2462 MHz
Antenna Type:	PCB Trace
Antenna Gain (dBi):	3.77 dBi
PMN:	NA
HVIN:	NA
FVIN:	NA
HMN:	NA
Data Rates:	NA
Expected Power Level:	24 dBm (Conducted)
Number of Antenna:	1

EUT List

Ref. ID	Slot #	Name/Description	Model Number	Part Number	Serial Number	Rev. #
1	NA	SC1205V	SC1205V	NA	NA	1

Ports and Cabling

Ref. Id	Port Name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
NA	Serial Port	Debug Cable	1	NA	NA	N	NA

Support Equipment

Ref. ID	Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
NA	Laptop	Dell	NA	NA

F. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

G. Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to CalAmp Wireless Networks CA upon completion of testing.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.209 Radiated Spurious Emissions Requirements

Test Requirements: **§15.247(d); §15.205:** Emissions outside the frequency band.

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905----------	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128----------	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775----------	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775----------	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218----------	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825----------	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225----------	123–138	2200–2300	14.47–14.5
8.291–8.294----------	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475----------	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293----------	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025----------	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725----------	322–335.4	3600–4400	([2])

Restricted Bands of Operation

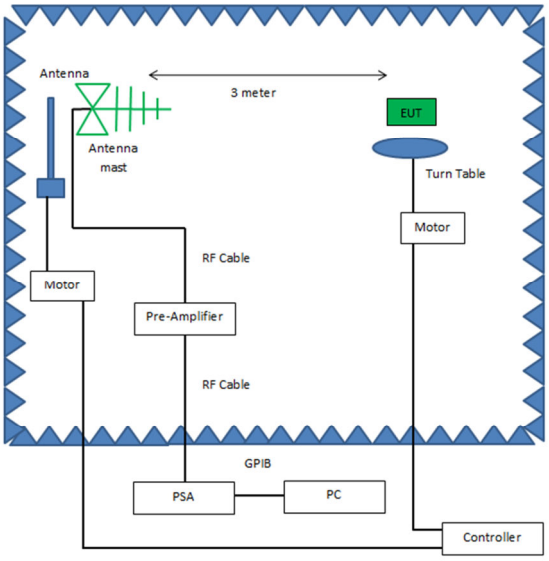
[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in table.

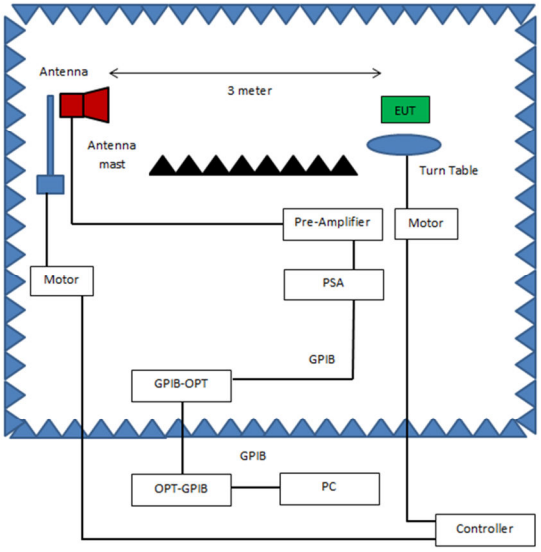
Frequency (MHz)	§ 15.209(a), Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.



Radiated Emissions, Below 1GHz, Test Setup



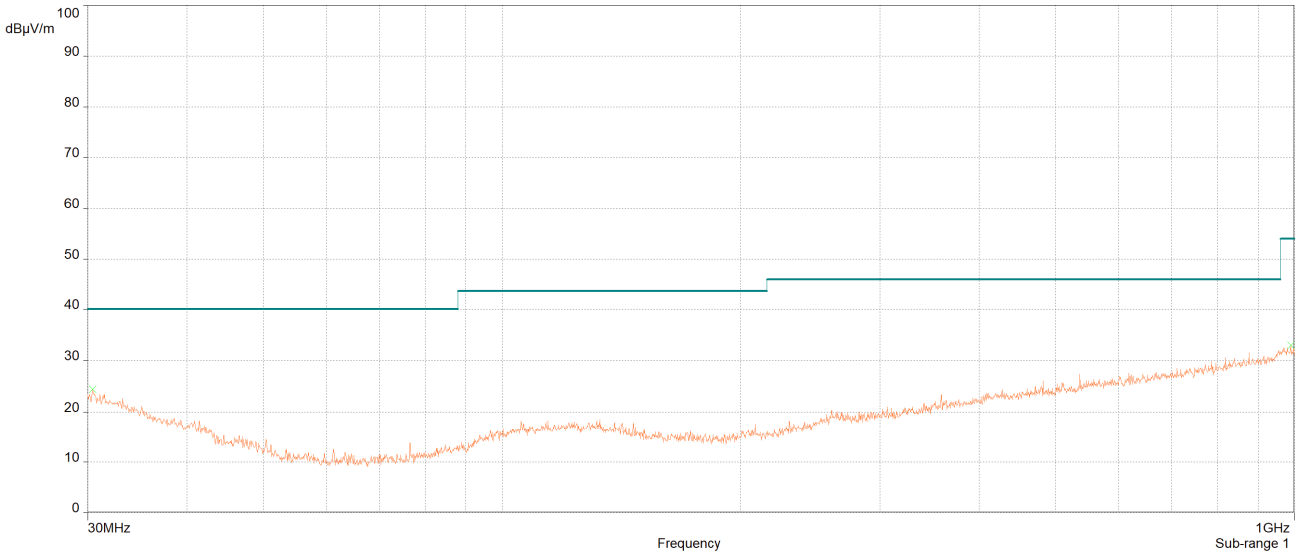
Radiated Emissions, Above 1GHz, Test Setup

Test Results: The EUT was tested is **compliant** with § 15.209 Radiated Spurious Emissions Requirements.

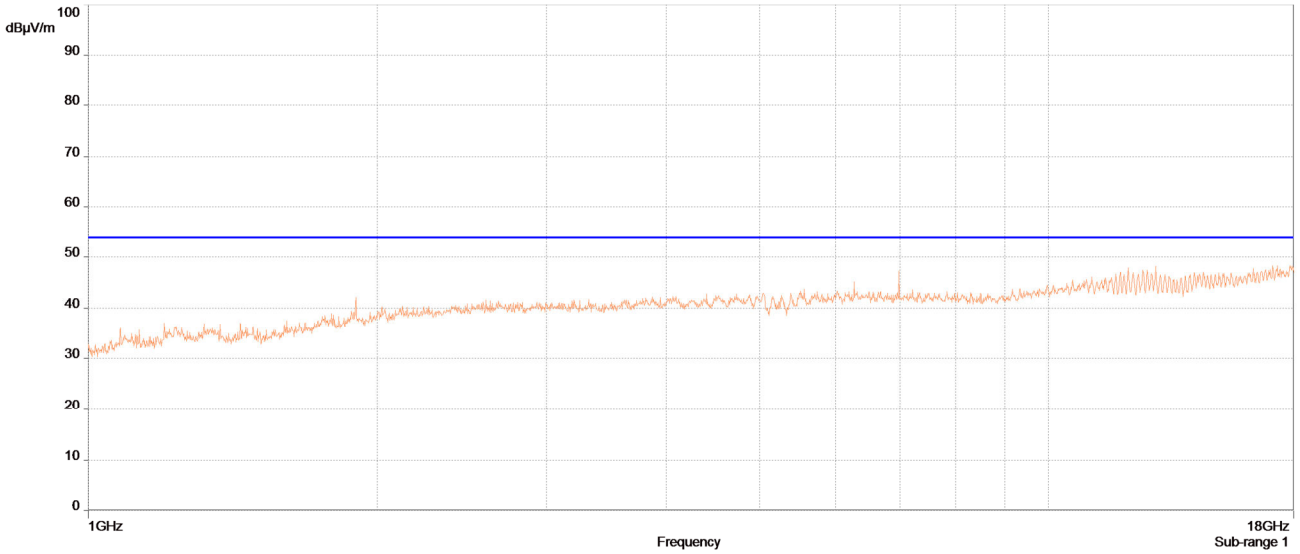
Test Engineer: Arsalan Hasan

Test Date: 08/11/2021

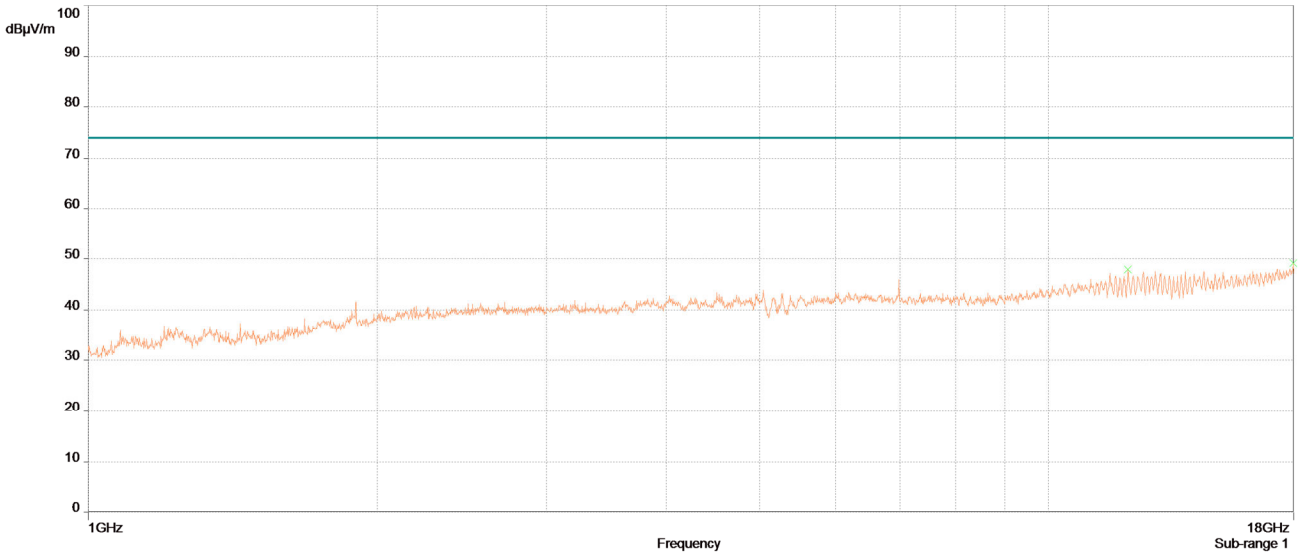
Test Data



Radiated Spurious Emissions, 30MHz-1GHz, Worst Case



Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, b mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, b mode, Peak

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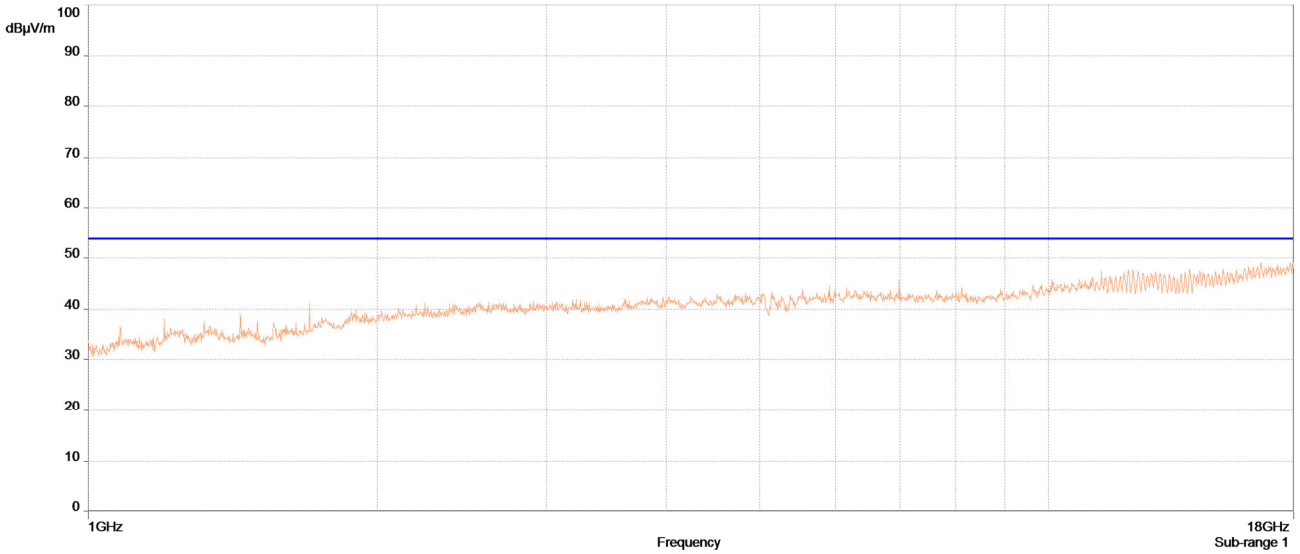
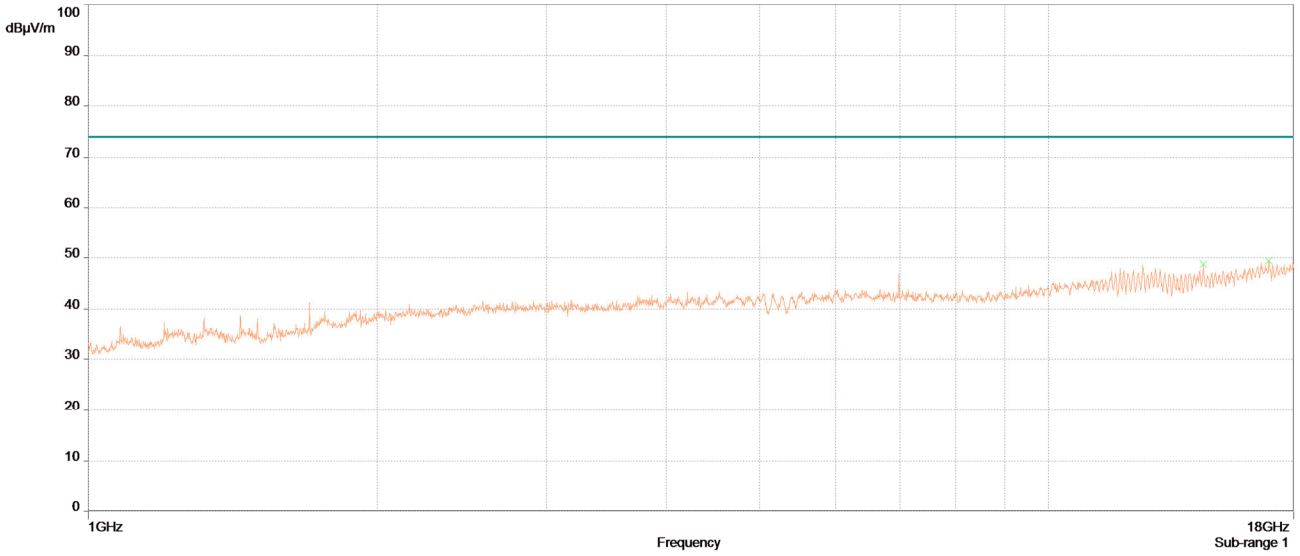
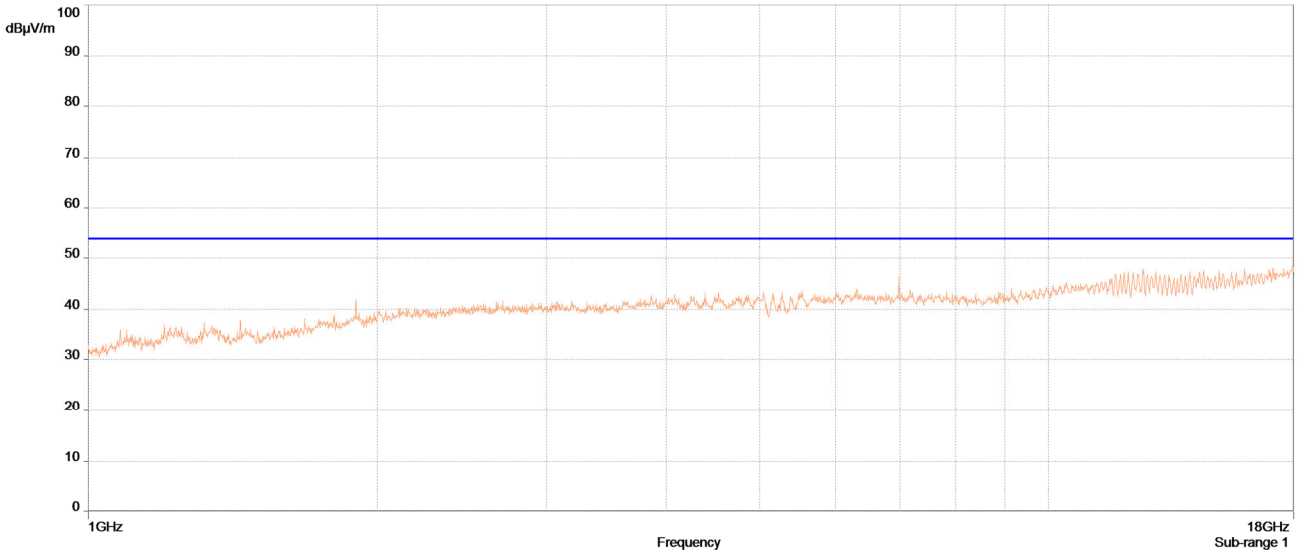


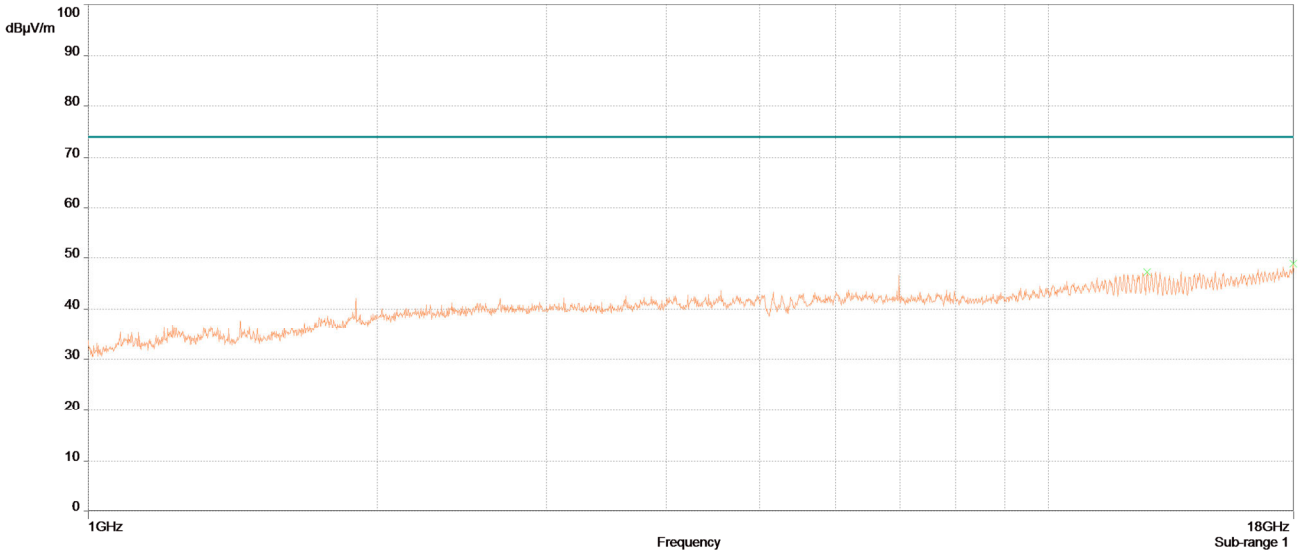
Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, b mode, Average



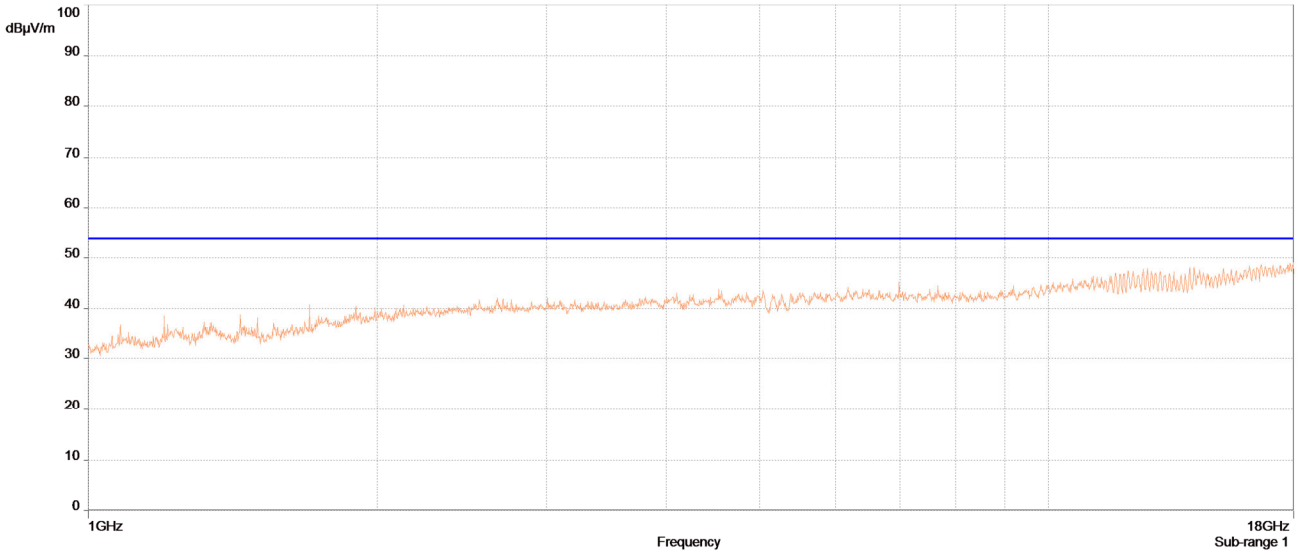
Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, b mode, Peak



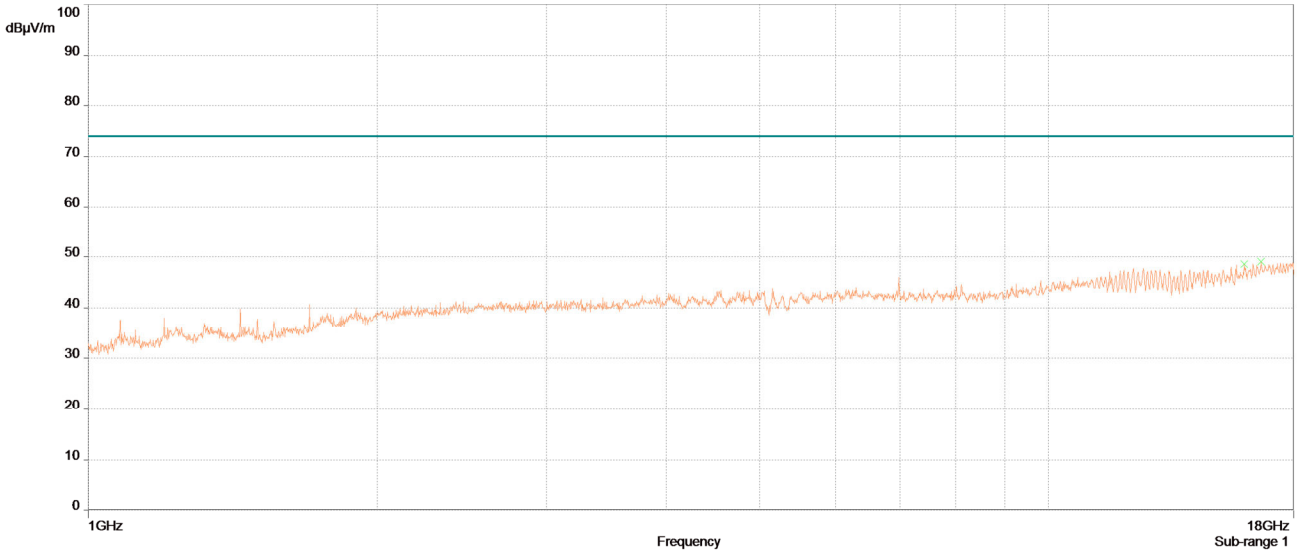
Radiated Spurious Emissions, 1GHz-18GHz, High Channel, b mode, Average



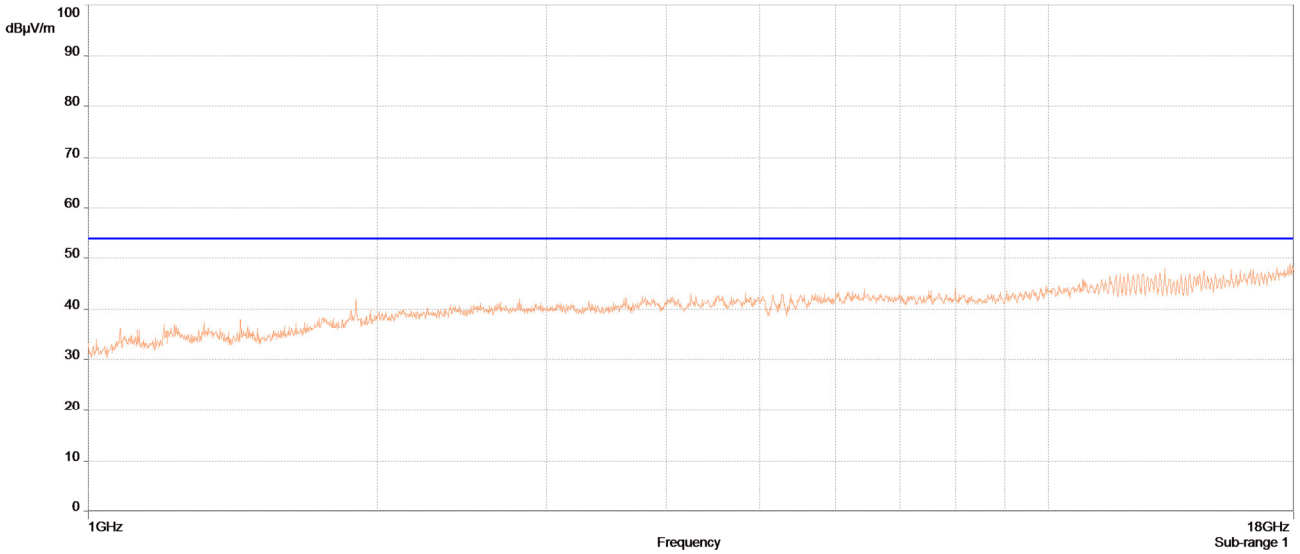
Radiated Spurious Emissions, 1GHz-18GHz, High Channel, b mode, Peak



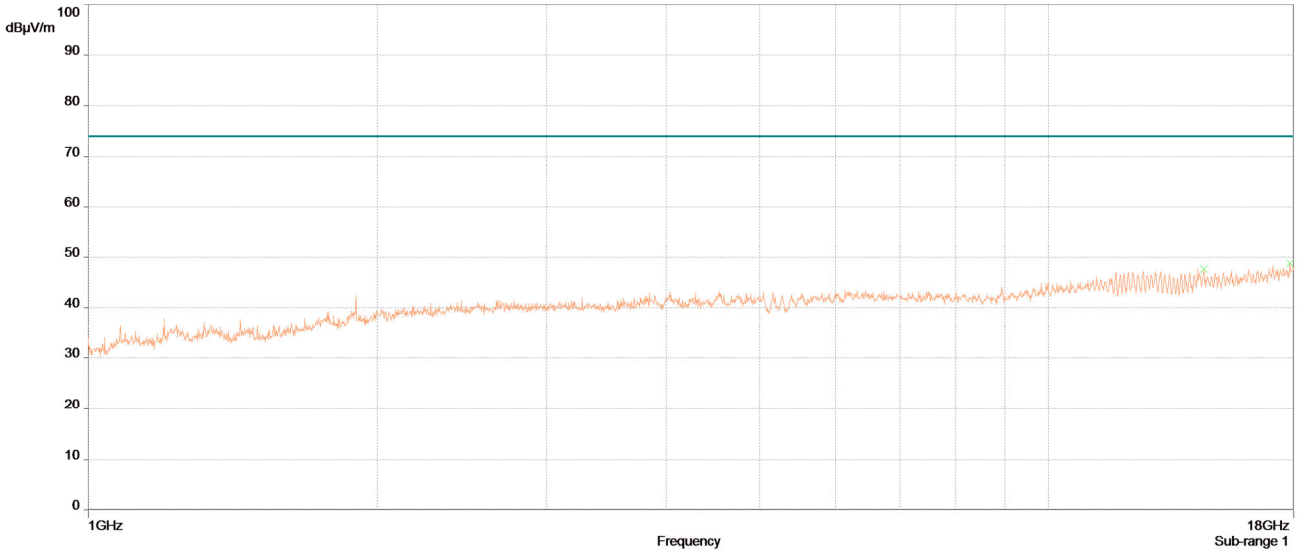
Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, g mode, Average



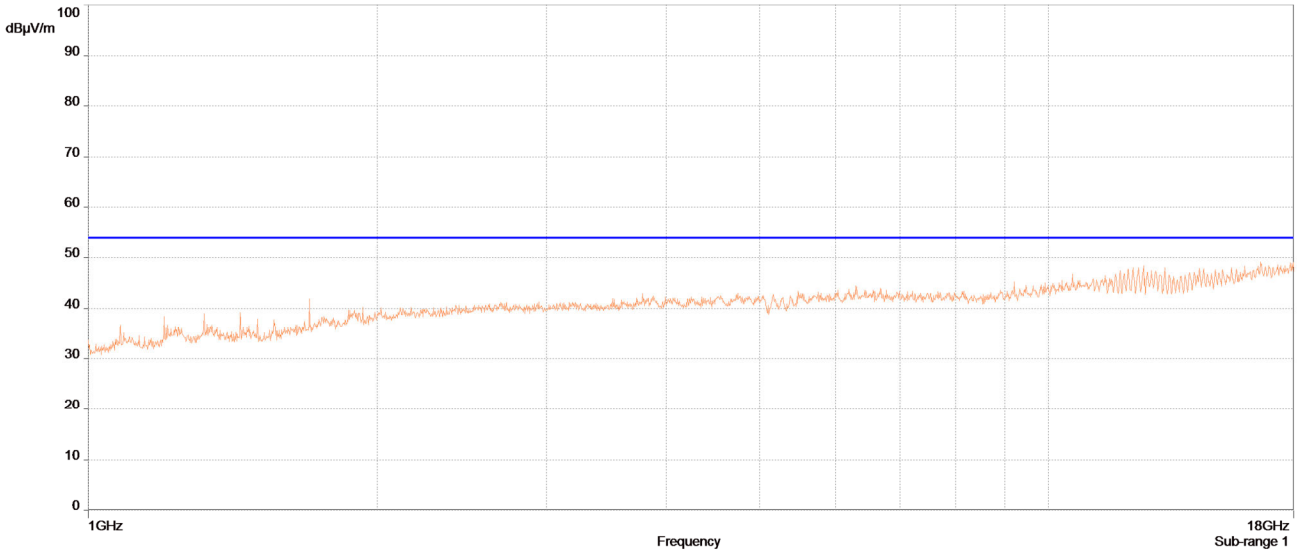
Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, g mode, Peak



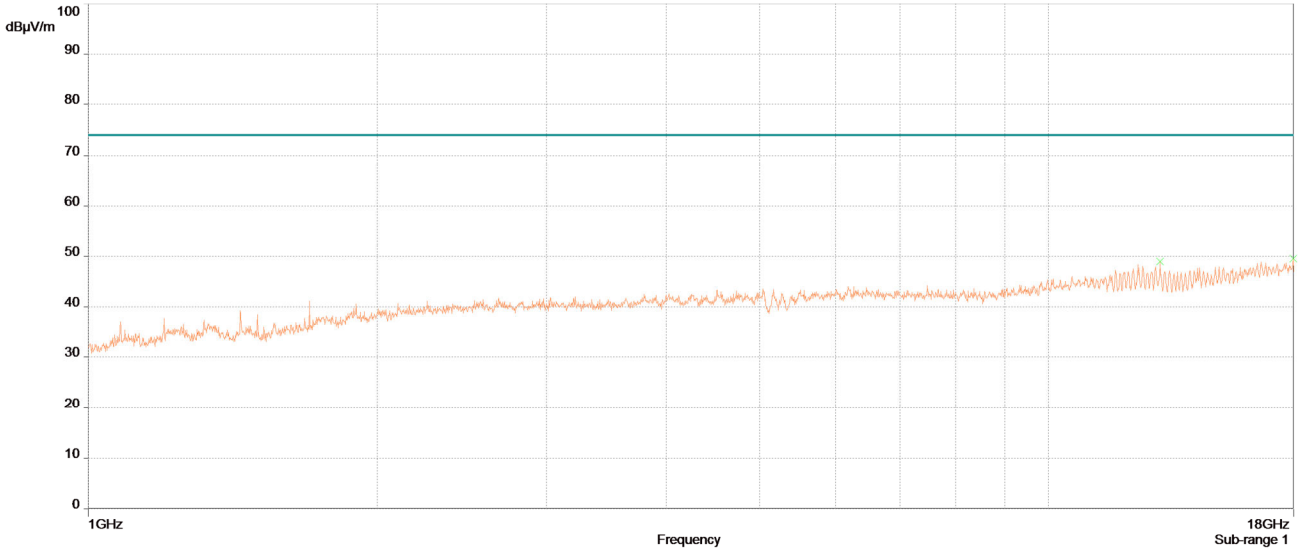
Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, g mode, Average



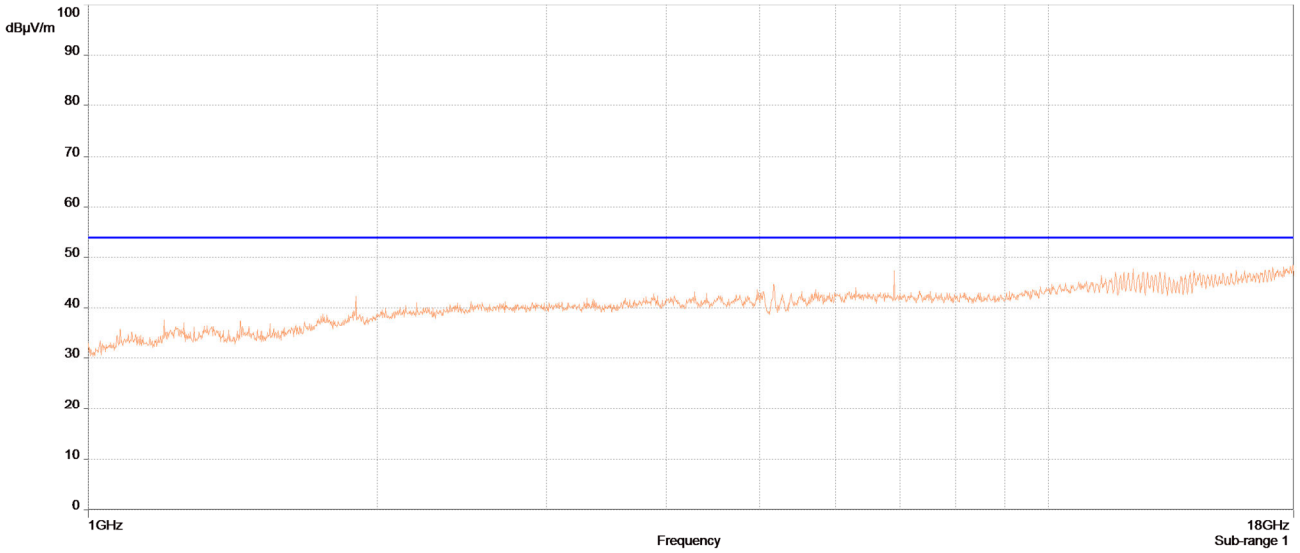
Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, g mode, Peak



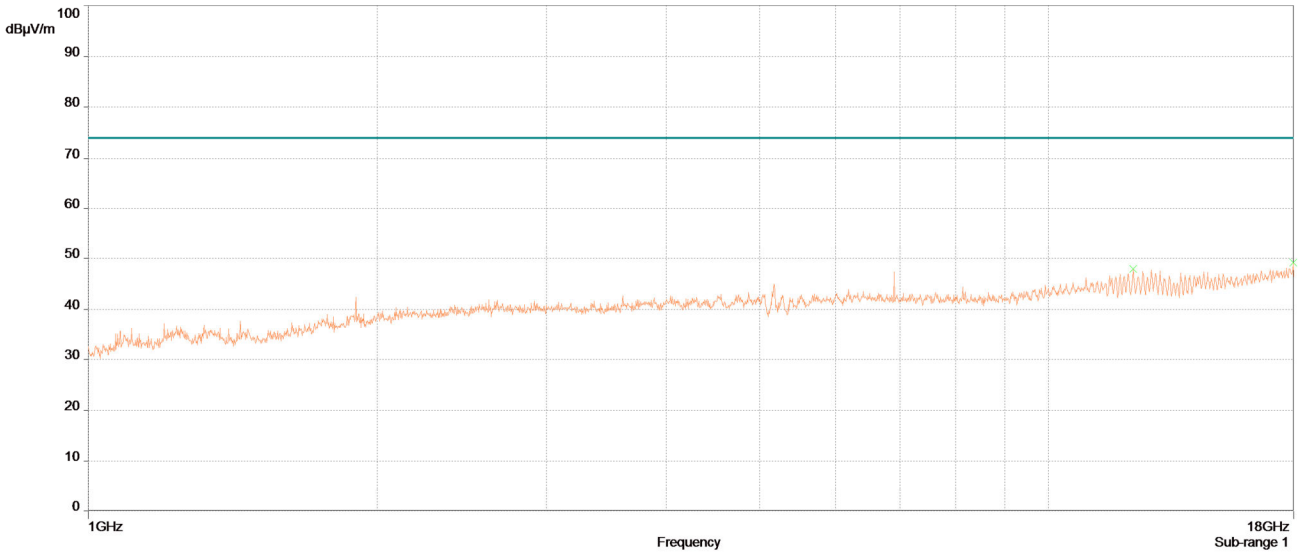
Radiated Spurious Emissions, 1GHz-18GHz, High Channel, g mode, Average



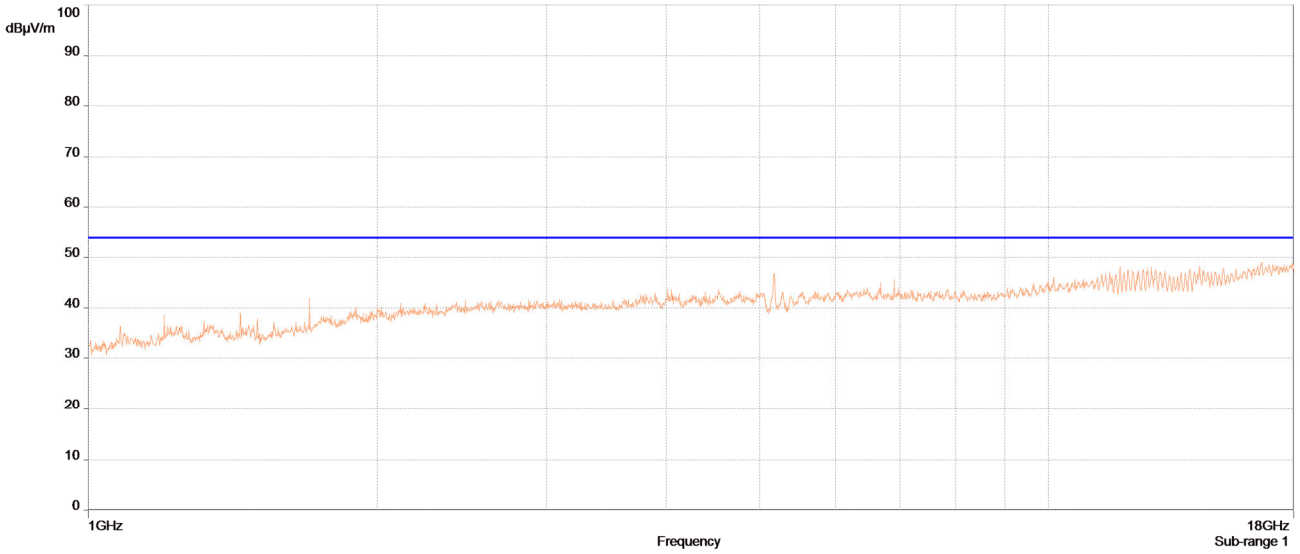
Radiated Spurious Emissions, 1GHz-18GHz, High Channel, g mode, Peak



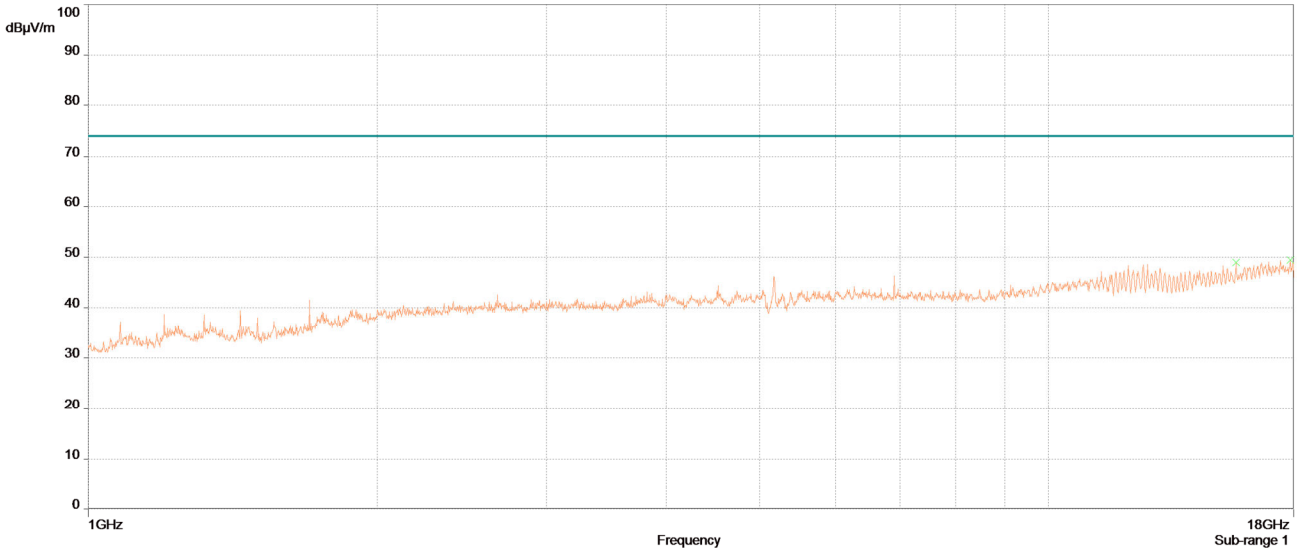
Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, n 20 mode, Average



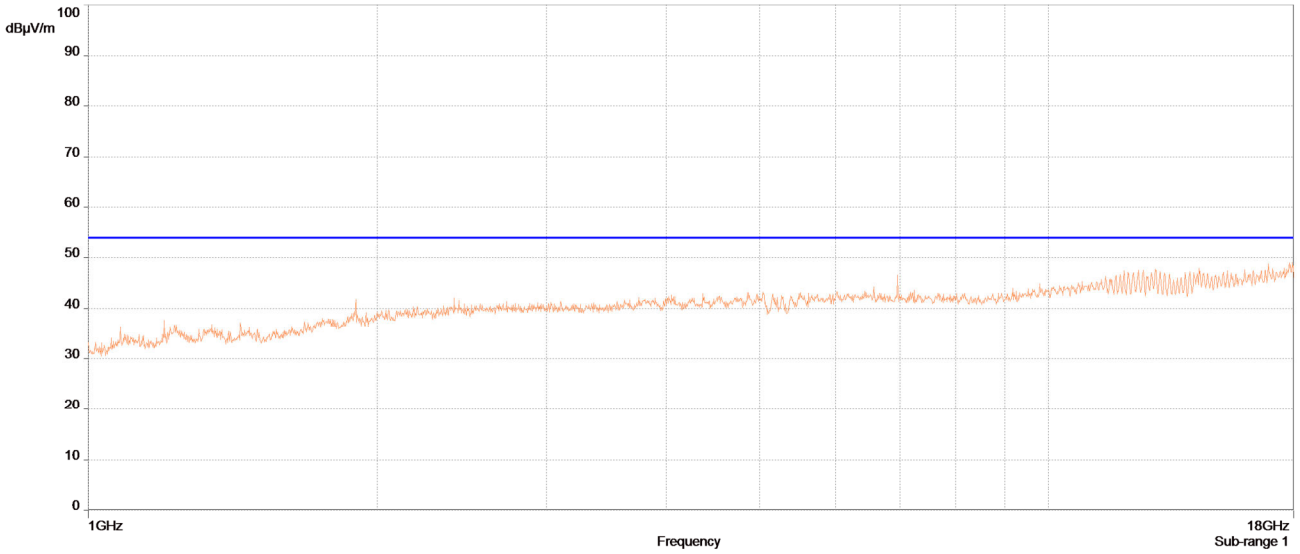
Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, n 20 mode, Peak



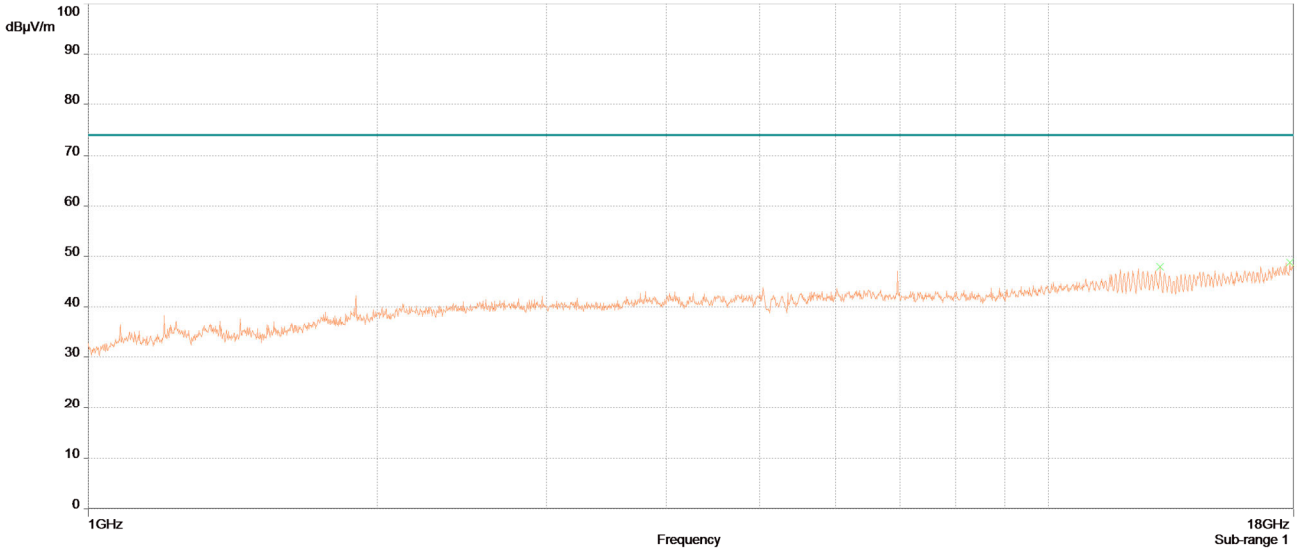
Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, n 20 mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, n 20 mode, Peak



Radiated Spurious Emissions, 1GHz-18GHz, High Channel, n 20 mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, High Channel, n 20 mode, Peak

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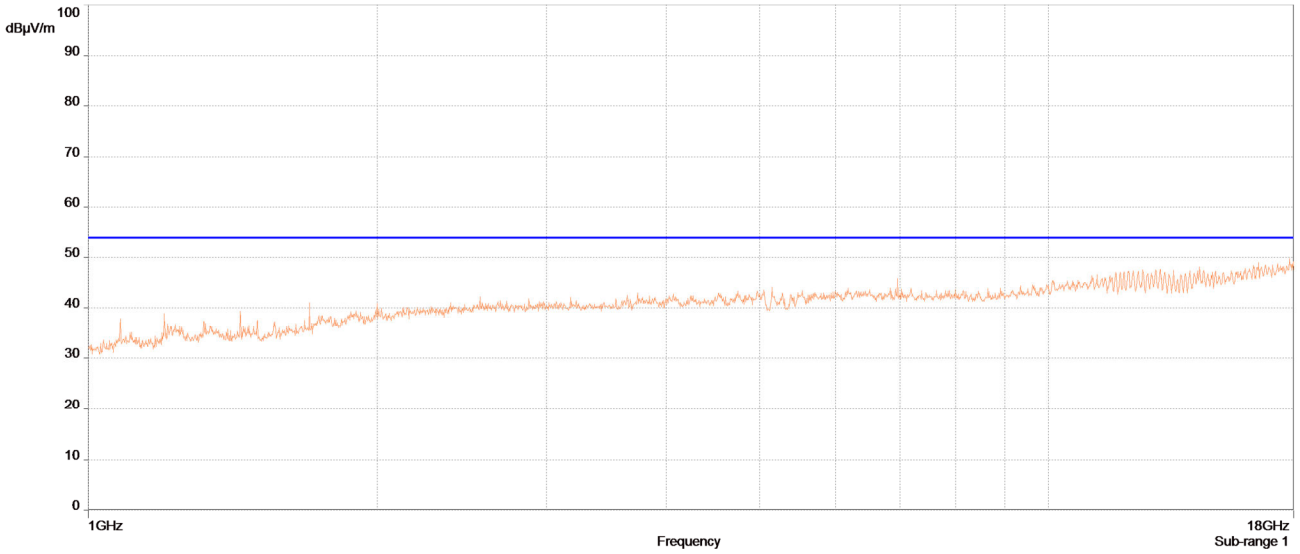
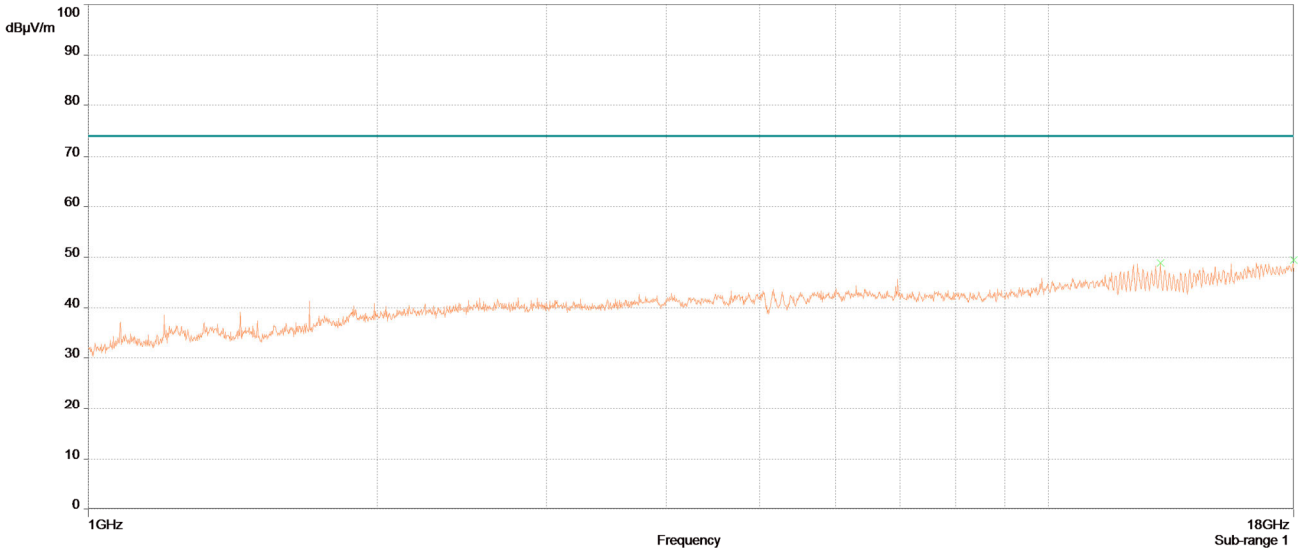


Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, n 40 mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, Low Channel, n 40 mode, Peak

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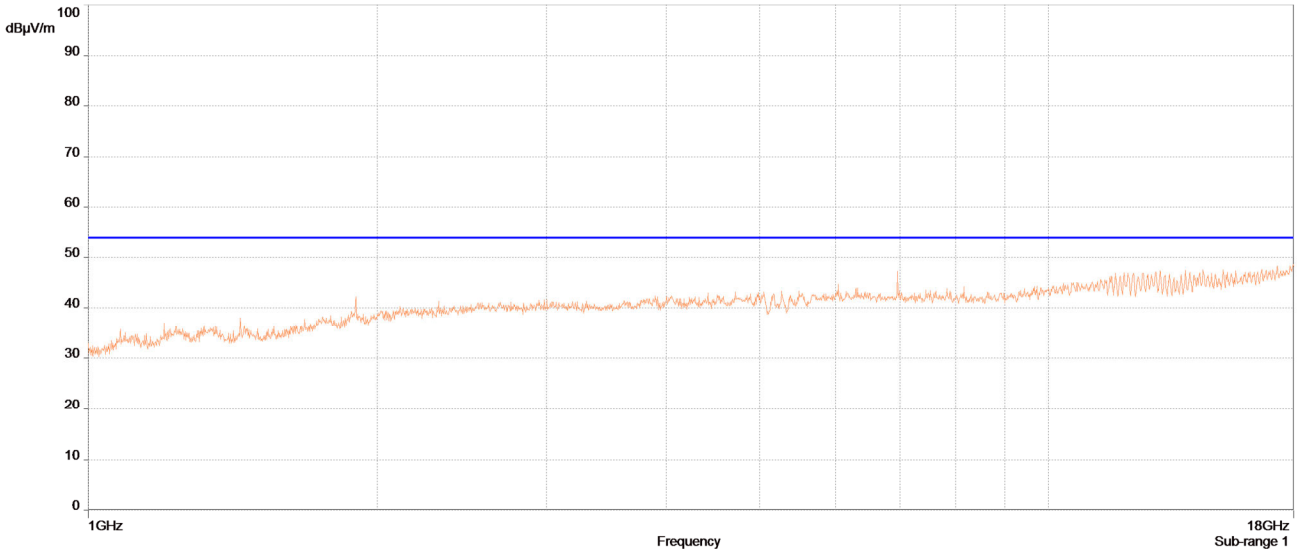
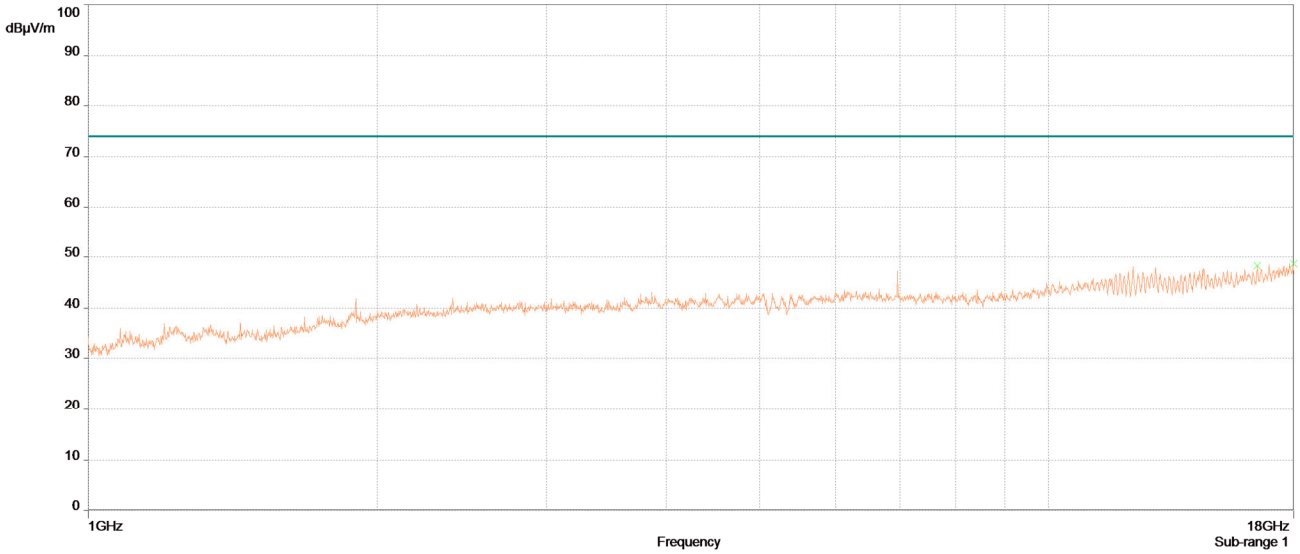


Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, n 40 mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, Mid Channel, n 40 mode, Peak

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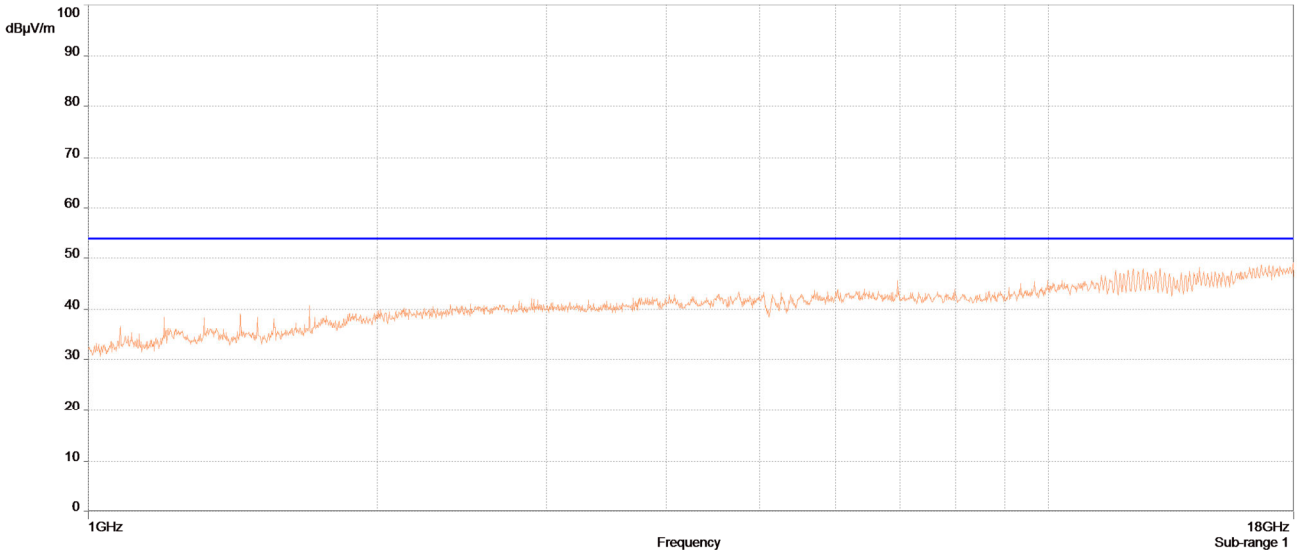
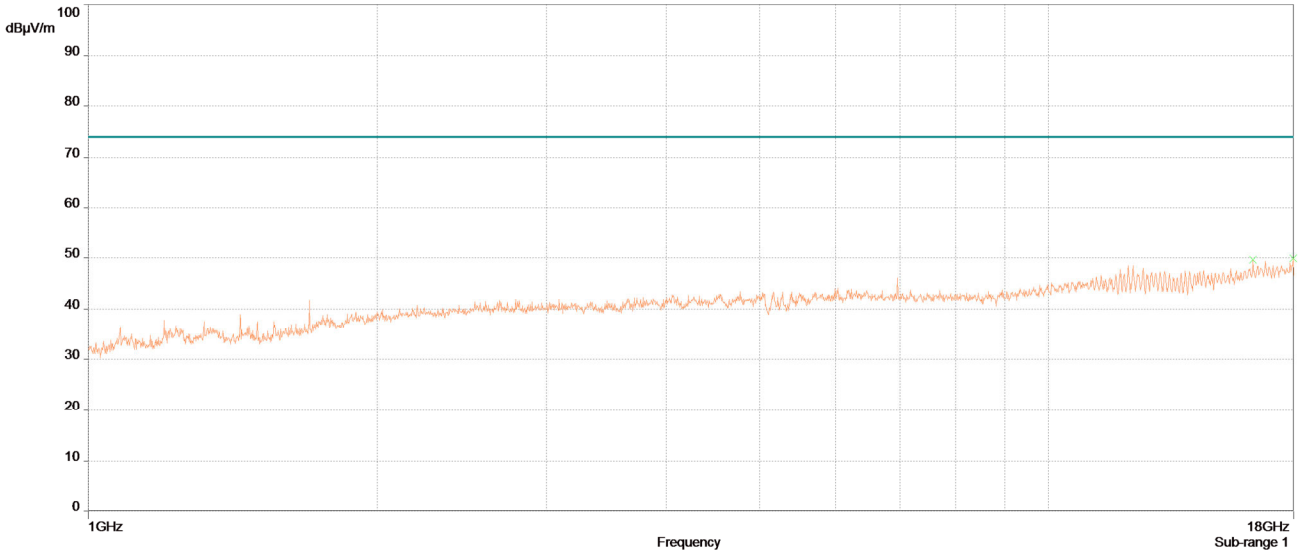


Radiated Spurious Emissions, 1GHz-18GHz, High Channel, n 40 mode, Average



Radiated Spurious Emissions, 1GHz-18GHz, High Channel, n 40 mode, Peak

IV. Test Equipment

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Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2399	TURNTABLE/MAST CONTROLLER	SUNOL SCIENCES	SC99V	SEE NOTE 1	SEE NOTE 1
1S2600	BILOG ANTENNA	TESEQ	CBL6112D	03/19/2021	03/19/2022
1S3826	DRG HORN ANTENNA	ETS-LINDGREN	3117	12/03/2020	12/03/2022
1S2003	PXA Signal Analyzer	Keysight	N9030B	09/15/2020	09/15/2021
1S2587	PRE AMPLIFIER	AML COMMUNICATIONS	AML0126L3801	SEE NOTE 1	SEE NOTE 1
1S2653	AMPLIFIER	SONOMA INSTRUMENT	310 N	SEE NOTE 1	SEE NOTE 1
1S2486	5 METER CHAMBER	PANASHIELD - ETS	5M	SEE NOTE 2	SEE NOTE 2

Note 1: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.
Note 2: Latest NSA and VSWR data available upon request.

Test Equipment List

End of Report