Engineering Test Report No. 2102086-01		
Report Date	July 29, 2021	
Manufacturer Name	Amatis Controls	
Manufacturer Address	210 Aspen Airport Business Center Suite A Aspen, CO 81611	
Test Item	Wireless Light Switch, Model Nos. Switch-B and Switch-W	
Date Received	July 28, 2021	
Test Dates	July 28, 2021 and July 29, 2021	
Specifications	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 FCC “Code of Federal Regulations” Title 47, Part15, Subpart 15B Innovation, Science, and Economic Development Canada, RSS-247 Innovation, Science, and Economic Development Canada, RSS-GEN	
Test Facility	Elite Electronic Engineering, Inc. 1516 Centre Circle, Downers Grove, IL 60515	FCC Reg. Number: 269750 IC Reg. Number: 2987A CAB Identifier: US0107
Signature	MARK E. LONGINOTTI	
Tested by	Mark E. Longinotti	
Signature	Raymond J Klouda	
Approved by	Raymond J. Klouda, Registered Professional Engineer of Illinois – 44894	
PO Number	1029	

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

This report shall not be reproduced, except in full, without the written approval of Elite Electronic Engineering Inc.

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 and RSS-GEN test specifications. The data presented in this test report pertains to the EUT on the test date(s) specified. Any electrical or mechanical modifications made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification. This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

Table of Contents

1. Report Revision History 3
2. Introduction 4
2.1. Scope of Tests 4
2.2. Purpose 4
2.3. Identification of the EUT 4
3. Power Input 5
4. Grounding 5
5. Support Equipment 5
6. Interconnect Leads 5
7. Modifications Made to the EUT 5
8. Modes of Operation 5
9. Test Specifications 5
10. Test Plan 6
11. Deviation, Additions to, or Exclusions from Test Specifications 6
12. Laboratory Conditions 6
13. Summary 6
14. Sample Calculations 6
15. Statement of Conformity 7
16. Certification 7
17. Photographs of EUT 8
18. Equipment List 9
19. Block Diagram of Test Setup 10
20. Transmitter Conducted Emissions Test (AC Mains) 11
21. 6dB Bandwidth 18
22. Occupied Bandwidth (99%) 25
23. Maximum Peak Conducted Output Power 32
24. Effective Isotropic Radiated Power (EIRP) 39
25. Case Spurious Radiated Emissions 47
26. Band-Edge Compliance 122
27. Power Spectral Density 131
28. Scope of Accreditation 139

**This report shall not be reproduced, except in full,
without the written approval of Elite Electronic Engineering Inc.**

1. Report Revision History

Revision	Date	Description
–	5 AUG 2021	Initial Release of Engineering Test Report No. 2102086-01

2. Introduction

2.1. Scope of Tests

This document presents the results of a series of RF emissions tests that were performed on the Amatis Controls Wireless Light Switches (hereinafter referred to as the Equipment Under Test (EUT)). The EUTs were manufactured and submitted for testing by Amatis Controls located in Aspen, CO.

2.2. Purpose

The test series was performed to determine if the EUTs meet the RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part15, Subpart C, Sections 15.247 for a Digital Modulation intentional radiator operating within the 2400-2483.5MHz band.

The test series was also performed to determine if the EUTs meet the RF emission requirements of the Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-Gen and Innovation, Science, and Economic Development Canada Radio Standards Specification RSS-247 for a Digital Modulation intentional radiator operating within the 2400-2483.5MHz band.

Testing was performed in accordance with ANSI C63.10-2013.

2.3. Identification of the EUT

The EUTs were identified as follows:

EUT Identification	
Product Description	Wireless Light Switch
Model/Part No.	Switch-B
S/N	S/N: 801f12fffe6aedad S/N: 801f12fffe6ab779 (modified with a coaxial connection at the antenna port)
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400-2483.5MHz
Software/Firmware Version	FCC Firmware
Conducted Output Power	-6.33dBm
Antenna Type	2 each: Johanson Technology chip antenna, P/N: 2450AT18D0100 (the EUT could not transmit using both antennas simultaneously)
Manufacturer Supplied* Antenna Gain (dBi)	1.5
6dB Bandwidth	1.41MHz
Occupied Bandwidth (99% OBW)	2.43MHz
Product Description	Wireless Light Switch
Model/Part No.	Switch-W
S/N	801f12fffe6abd59
Device Type	Digitally Modulated Transmission Device
Band of Operation	2400-2483.5MHz
Software/Firmware Version	FCC Firmware
Antenna Type	2 each: Johanson Technology chip antenna, P/N: 2450AT18D0100 (the EUT could not transmit using both antennas simultaneously)
Manufacturer Supplied* Antenna Gain (dBi)	1.5

*- Antenna gain is supplied by the manufacturer and Elite is not responsible for the accuracy of the antenna gain.

The EUTs listed above were used throughout the test series.

3. Power Input

The Switch-B was powered with 3VDC from 2 internal CR2450 coin cell batteries.

The Switch-W was powered with 24VDC from an external source not provided by the manufacturer. For testing purposes, the 24VDC was provided by the output of a Philips AC/DC LED power supply, M/N: S020YM2400083. The power supply was powered with 120V, 60Hz power.

4. Grounding

The EUTs were not connected to ground.

5. Support Equipment

The EUTs were submitted for testing with no support equipment.

6. Interconnect Leads

No interconnect leads were used during the tests.

7. Modifications Made to the EUT

No modifications were made to the EUTs during the testing.

8. Modes of Operation

The EUTs and all peripheral equipment were energized. The unit was programmed to transmit in one of the following modes:

Model No.	Mode	Description
Switch-B	2405MHz	Power Setting = 1dBm
Switch-B	2425MHz	Power Setting = 1dBm
Switch-B	2480MHz	Power Setting = 4dBm
Switch-W	2405MHz	Power Setting = 1dBm
Switch-W	2425MHz	Power Setting = 1dBm
Switch-W	2480MHz	Power Setting = 2dBm

9. Test Specifications

The tests were performed to selected portions of, and in accordance with the following test specifications:

- Federal Communications Commission “Code of Federal Regulations”, Title 47, Part 15, Subpart C
- ANSI C63.4-2014, “American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz”
- ANSI C63.10-2013, “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”
- Federal Communications Commission Office of Engineering and Technology Laboratory Division, Guidance For Compliance Measurements On Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 April 2, 2019 KDB 558074 D01v05r02
- RSS-247 Issue 2, February 2017, “Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices”

- RSS-Gen Issue 5, March 2019, Amendment 1, February 2021, Amendment 2, Innovation, Science, and Economic Development Canada, “Spectrum Management and Telecommunications, Radio Standards Specification, General Requirements for Compliance of Radio Apparatus”

10. Test Plan

No test plan was provided. Instructions were provided by personnel from Amatis Controls and used in conjunction with the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247, Innovation, Science, and Economic Development Canada, RSS-247, and ANSI C63.4-2014 specifications.

11. Deviation, Additions to, or Exclusions from Test Specifications

There were no deviations, additions to, or exclusions from the test specifications during this test series.

12. Laboratory Conditions

Ambient Parameters	Value
Temperature	25°C
Relative Humidity	41%
Atmospheric Pressure	1017mb

13. Summary

The following EMC tests were performed and the results are shown below:

Test Description	Requirements	Test Methods	S/N	Results
Transmitter Conducted Emissions Test (AC Mains)	FCC 15B 15.207 ISED RSS-GEN	ANSI C63.10: 2013	801f12fffe6abd59	Conforms conform
6dB Bandwidth	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6ab779	Conforms
Occupied Bandwidth (99%)	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6ab779	Conforms
Maximum Peak Conducted Output Power	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6ab779	Conforms
Effective Isotropic Radiated Power (EIRP)	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6aedad 801f12fffe6abd59	Conforms
Duty Cycle Factor Measurements	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	---	Note 1
Case Spurious Radiated Emissions	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6aedad 801f12fffe6abd59	Conforms
Band-Edge Compliance	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6aedad 801f12fffe6abd59 801f12fffe6ab779	Conforms
Power Spectral Density	FCC 15C 15.247 ISED RSS-247	ANSI C63.10: 2013	801f12fffe6ab779	Conforms

Note 1: DUT transmitted with a 100% duty cycle.

14. Sample Calculations

For Powerline Conducted Emissions:

The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF).

Formula 1: VL (dBuV) = MTR (dBuV) + CF (dB).

For Radiated Emissions:

The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If an external preamplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

Formula 1: FS (dBuV/m) = MTR (dBuV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

To convert the Field Strength dBuV/m term to uV/m, the dBuV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in uV/m terms.

Formula 2: FS (uV/m) = AntiLog [(FS (dBuV/m))/20]

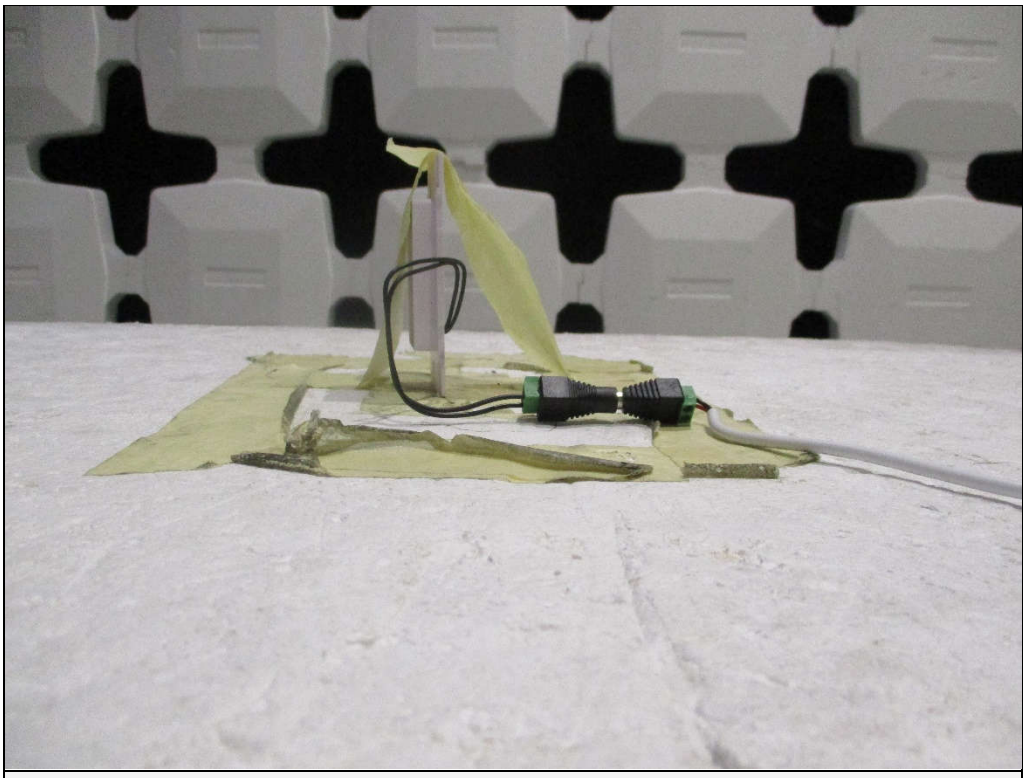
15. Statement of Conformity

The Amatis Controls Wireless Light Switch, Model Nos. Switch-B and Switch-W, did fully conform to the selected requirements of FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247.

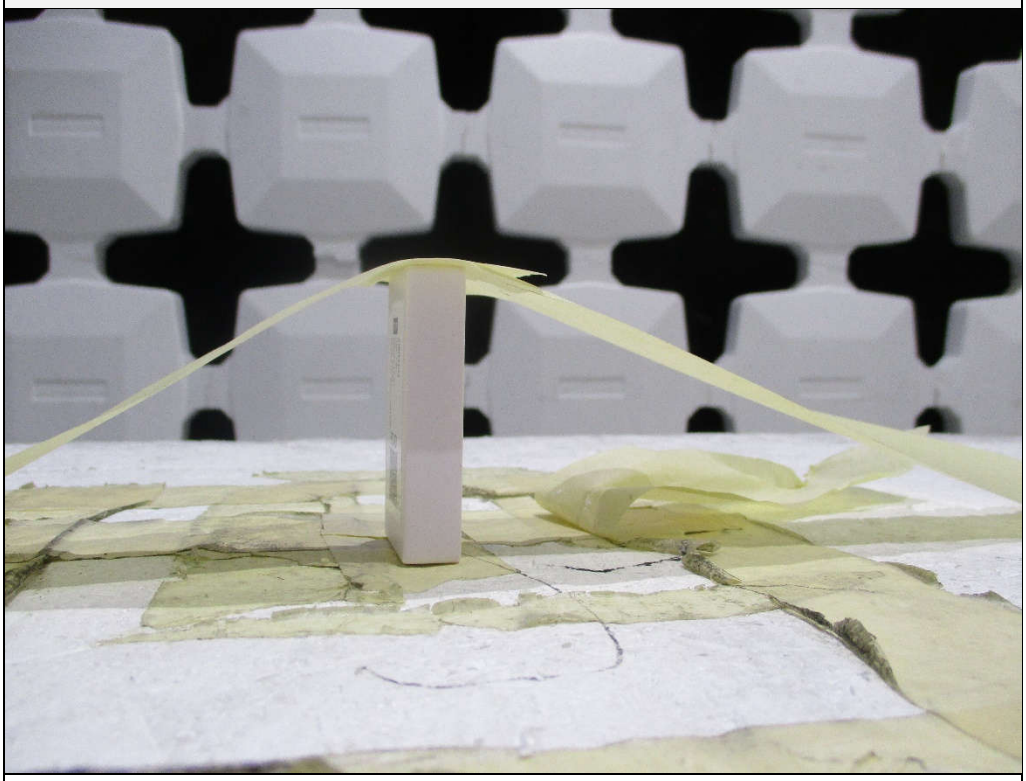
16. Certification

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C, Section 15.247 and Innovation, Science, and Economic Development Canada, RSS-247 test specifications. The data presented in this test report pertains to the EUTs on the test date specified. Any electrical or mechanical modifications made to the EUTs subsequent to the specified test date will serve to invalidate the data and void this certification.

17. Photographs of EUT



Switch-W



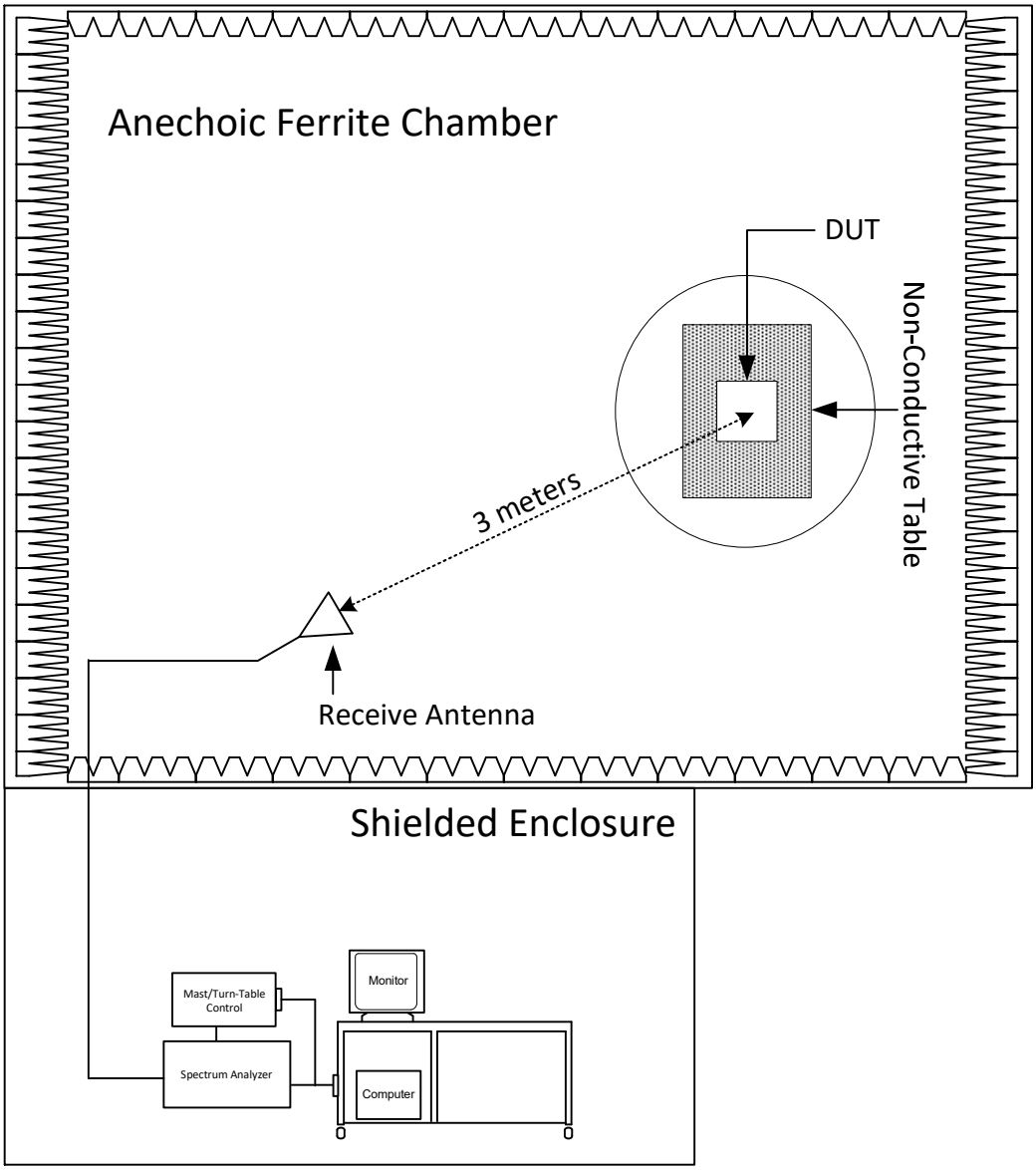
Switch-B

18. Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	9/24/2020	9/24/2021
APW14	PREAMPLIFIER	PLANAR	PE2-35-120-5R0-10-12-SFF	PL22671	1-20GHz	9/24/2020	9/24/2021
CDZ3	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA4	BILOG ANTENNA	TESEQ	6112D	46660	20-2000GHZ	10/5/2020	10/5/2021
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	4/7/2020	4/7/2022
PLF2	CISPR16 50UH LISN	ELITE	CISPR16/70A	002	.15-30MHz	4/7/2021	4/7/2022
PLF4	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	4/7/2021	4/7/2022
RBG2	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101591	2HZ-44GHZ	3/11/2021	3/11/2022
T1EM	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	CD6796	DC-18GHZ	3/19/2020	3/19/2022
T2DS	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS0916	DC-18GHZ	4/2/2020	4/2/2022
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XOB2	ADAPTER	HEWLETT PACKARD	K281C,012	09407	18-26.5GHZ	NOTE 1	
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000	001	4.8-20GHZ	9/6/2019	9/6/2021

N/A: Not Applicable I/O: Initial Only CNR: Calibration Not Required
NOTE 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

19. Block Diagram of Test Setup



Radiated Measurements Test Setup

20. Transmitter Conducted Emissions Test (AC Mains)

Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-W
Serial No	801f12fffe6abd59
Mode	Transmit at 2425MHz

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Type of Test Site	Semi-Anechoic
Test site used	Room 29
Note	None

Requirements

All radio frequency voltages on the power lines for any frequency or frequencies of an intentional radiator shall not exceed the limits in the following table:

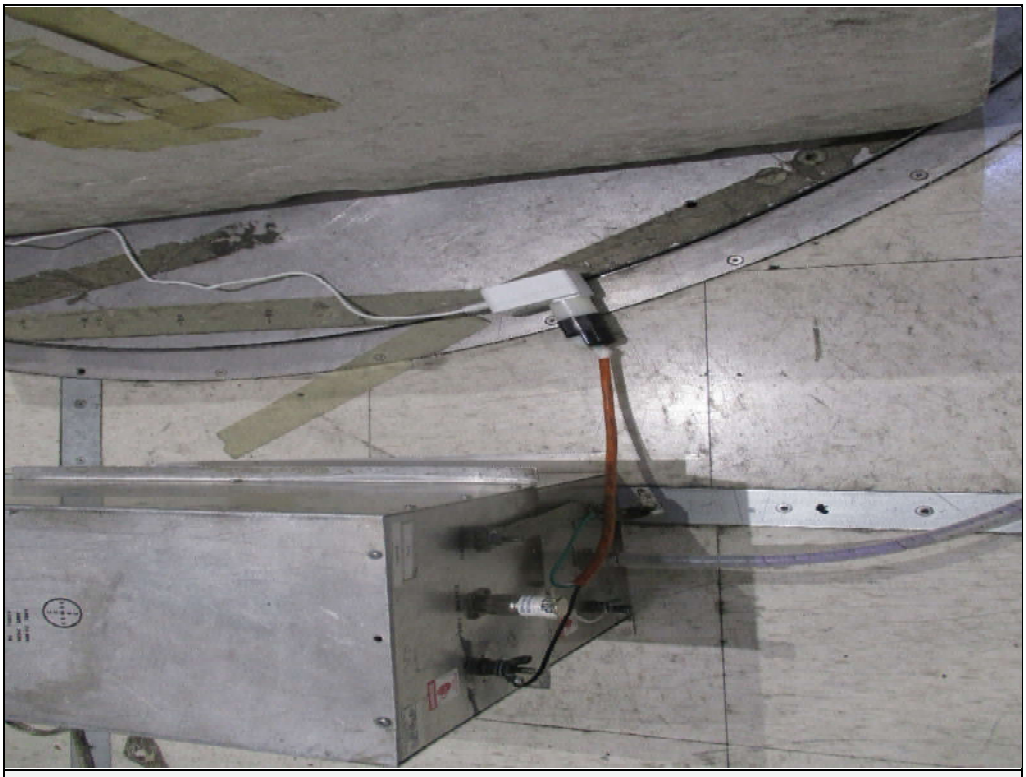
Frequency of Emission (MHz)	Conducted Limits (dBµV)	
	Quasi-peak	Average
0.15-05	66 to 56*	56-46*
0.5-5	56	46
5-30	60	50

Procedures

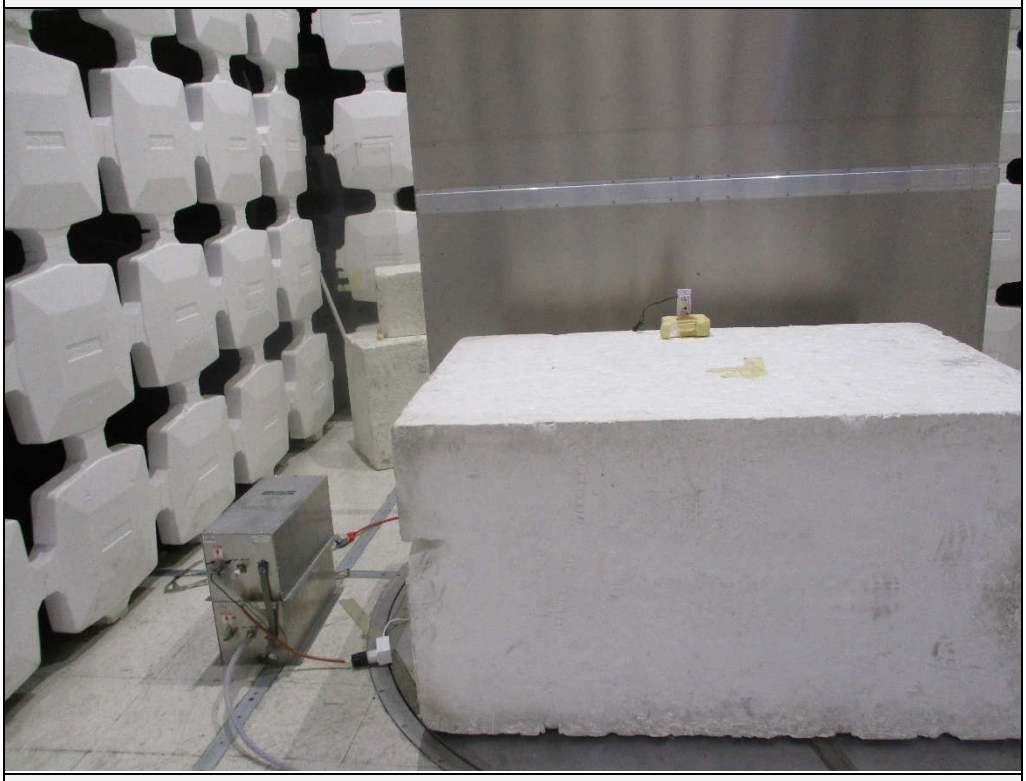
The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

1) The EUT was operated in the Transmit mode.
2) Measurements were first made on the 115V, 60Hz high line of the Philips AC/DC LED power supply, M/N: S020YM2400083, which was used to provide 24VDC to the Switch-W.
3) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.
4) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.
5) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 3dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.)
6) Steps (4) and (5) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits.
7) Steps (3) through (6) were repeated on the 115V, 60Hz return line of the Philips AC/DC LED power supply, M/N: S020YM2400083, which was used to provide 24VDC to the Switch-W.

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Conducted disturbance (mains port) (150 kHz – 30 MHz)	2.7



Test Setup for RF Conducted Emissions (AC Mains)



Test Setup for RF Conducted Emissions (AC Mains)

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Amatis
Model	:	Switch-W
DUT Revision	:	
Serial Number	:	801f12fffe6abd59
DUT Mode	:	Transmit at 2425MHz
Line Tested	:	115V, 60Hz High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-3
Notes	:	Tested with Philips AC/DC LED power supply M/N: S020YM2400083
Test Engineer	:	M. Longinotti
Limit	:	FCC 15.207
Test Date	:	Jul 29, 2021 03:46:12 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 3 dB margin below limit

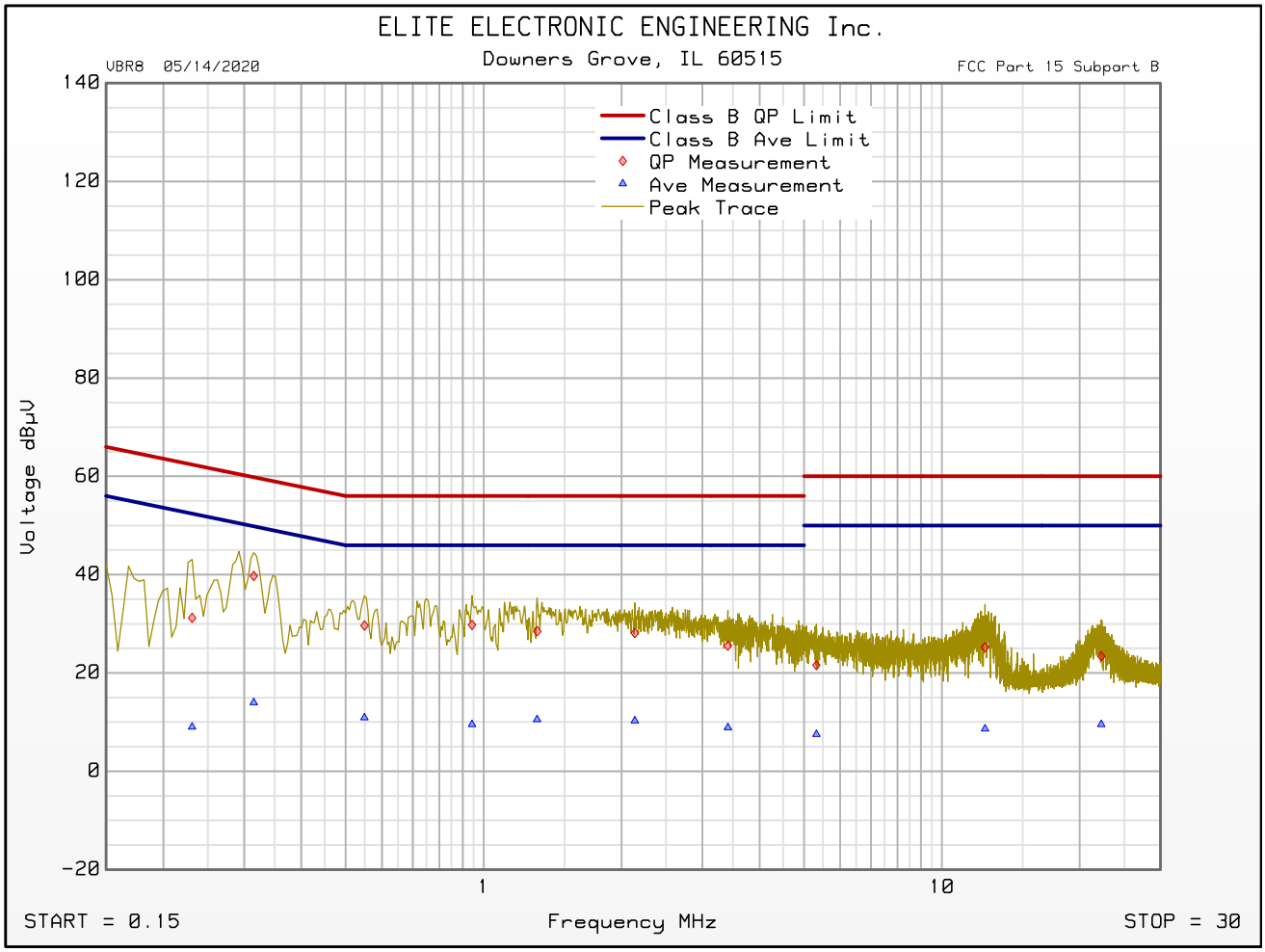
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.231	31.2	62.4		9.0	52.4	
0.315	39.7	59.8		14.0	49.8	
0.550	29.6	56.0		10.9	46.0	
0.943	29.8	56.0		9.5	46.0	
1.309	28.5	56.0		10.6	46.0	
2.138	28.1	56.0		10.3	46.0	
3.410	25.5	56.0		8.9	46.0	
5.324	21.6	60.0		7.5	50.0	
12.416	25.2	60.0		8.6	50.0	
22.267	23.4	60.0		9.5	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Amatis
Model	:	Switch-W
DUT Revision	:	
Serial Number	:	801f12fffe6abd59
DUT Mode	:	Transmit at 2425MHz
Line Tested	:	115V, 60Hz High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-3
Notes	:	Tested with Philips AC/DC LED power supply M/N: S020YM2400083
Test Engineer	:	M. Longinotti
Limit	:	FCC 15.207
Test Date	:	Jul 29, 2021 03:46:12 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart C Conducted Emissions Test

Significant Emissions Data

VBR8 05/14/2020

Manufacturer	:	Amatis
Model	:	Switch-W
DUT Revision	:	
Serial Number	:	801f12fffe6abd59
DUT Mode	:	Transmit at 2425MHz
Line Tested	:	115V, 60Hz Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-3
Notes	:	Tested with Philips AC/DC LED power supply M/N: S020YM2400083
Test Engineer	:	M. Longinotti
Limit	:	FCC 15.207
Test Date	:	Jul 29, 2021 03:51:02 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 3 dB margin below limit

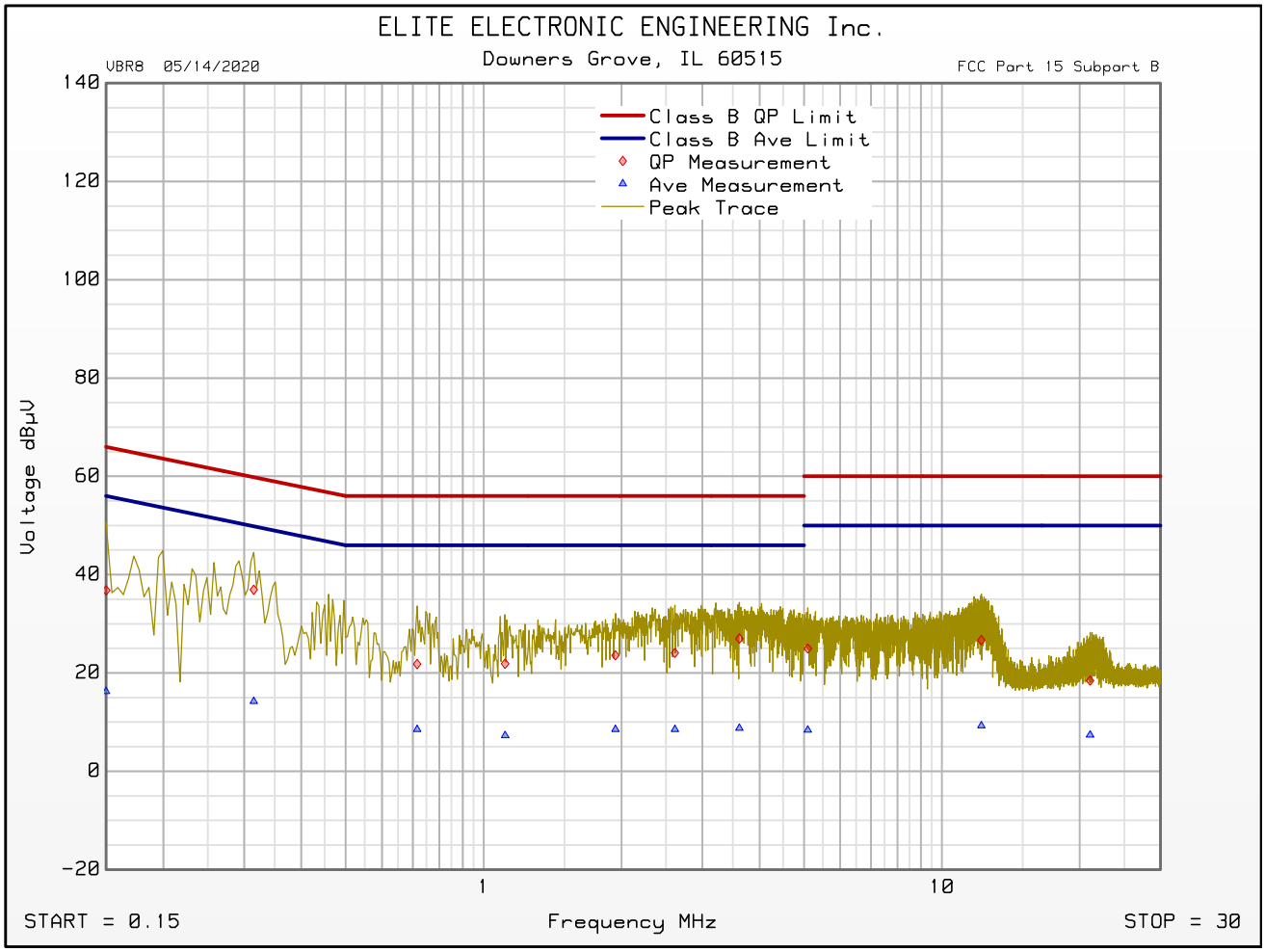
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.150	36.8	66.0		16.2	56.0	
0.315	36.9	59.8		14.2	49.8	
0.716	21.8	56.0		8.5	46.0	
1.114	21.9	56.0		7.2	46.0	
1.939	23.6	56.0		8.5	46.0	
2.615	24.1	56.0		8.5	46.0	
3.613	27.0	56.0		8.8	46.0	
5.099	25.0	60.0		8.4	50.0	
12.191	26.7	60.0		9.3	50.0	
21.052	18.4	60.0		7.4	50.0	

FCC Part 15 Subpart C Conducted Emissions Test

Cumulative Data

VBR8 05/14/2020

Manufacturer	:	Amatis
Model	:	Switch-W
DUT Revision	:	
Serial Number	:	801f12fffe6abd59
DUT Mode	:	Transmit at 2425MHz
Line Tested	:	115V, 60Hz Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-3
Notes	:	Tested with Philips AC/DC LED power supply M/N: S020YM2400083
Test Engineer	:	M. Longinotti
Limit	:	FCC 15.207
Test Date	:	Jul 29, 2021 03:51:02 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

21. 6dB Bandwidth

Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-B
Serial No	801f12fffe6ab779
Mode	Transmit

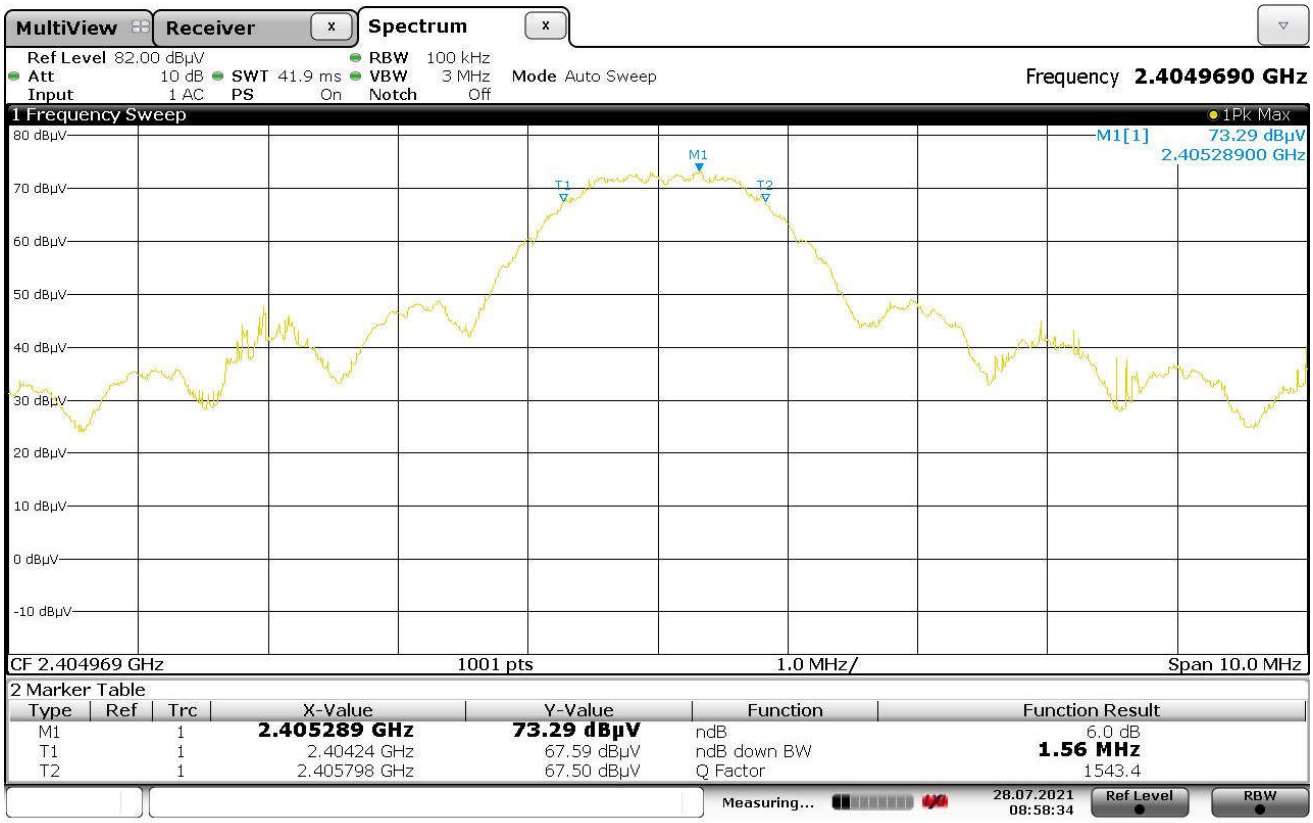
Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	N/A
Test site used	N/A
Type of Antennas Used	N/A
Notes	None

Requirements
Systems using digital modulation techniques shall have a minimum 6 dB bandwidth of 500 kHz

Procedures
The antenna port of the EUT was connected to the spectrum analyzer through 20dB of attenuation. The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. The resolution bandwidth (RBW) was set to 100kHz, the video bandwidth (VBW) was set to the same as or 3 times greater than the RBW, and the span was set to 3 times the RBW. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a 'screen dump' utility.

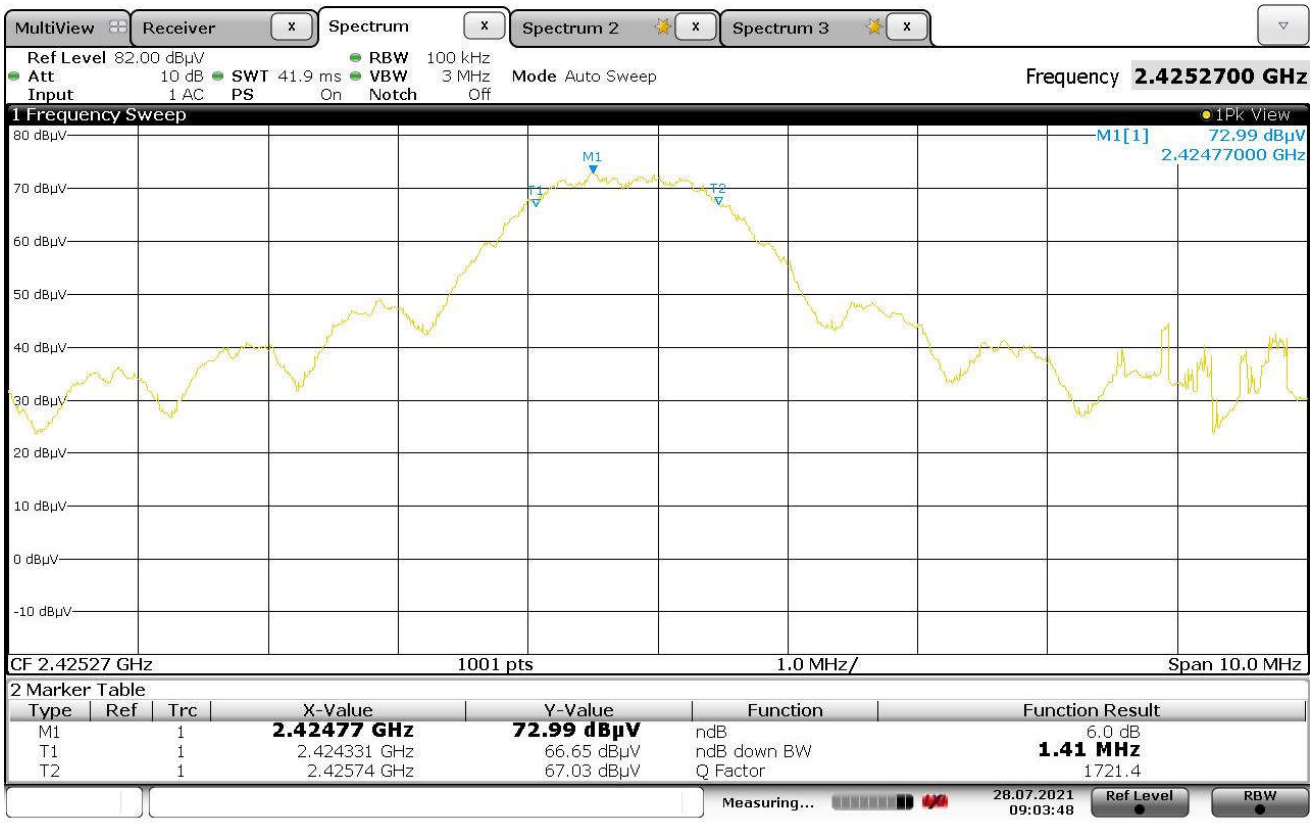
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	6dB BW = 1.56MHz
Notes	Antenna Port 1



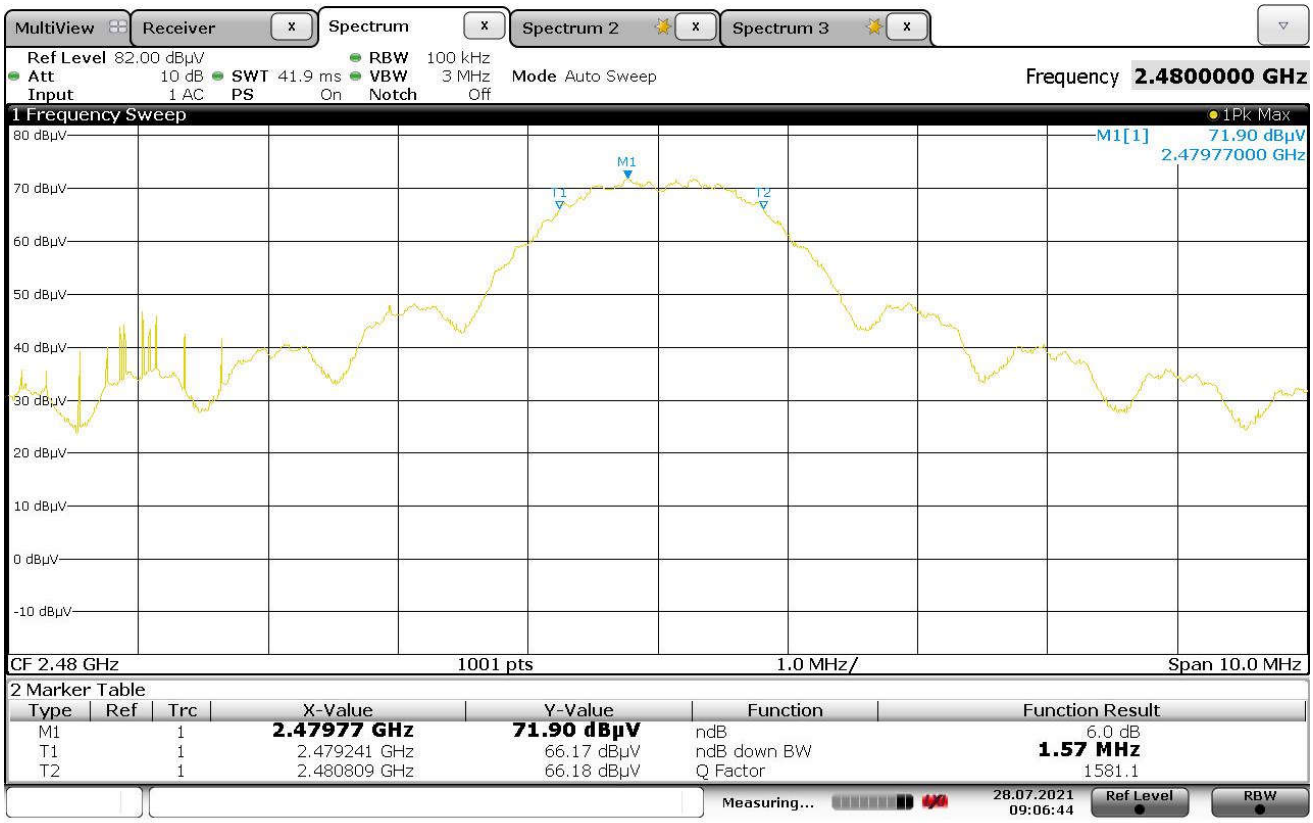
Date: 28.JUL.2021 08:58:35

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	6dB BW = 1.41MHz
Notes	Antenna Port 1



Date: 28.JUL.2021 09:03:48

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	6dB BW = 1.57MHz
Notes	Antenna Port 1

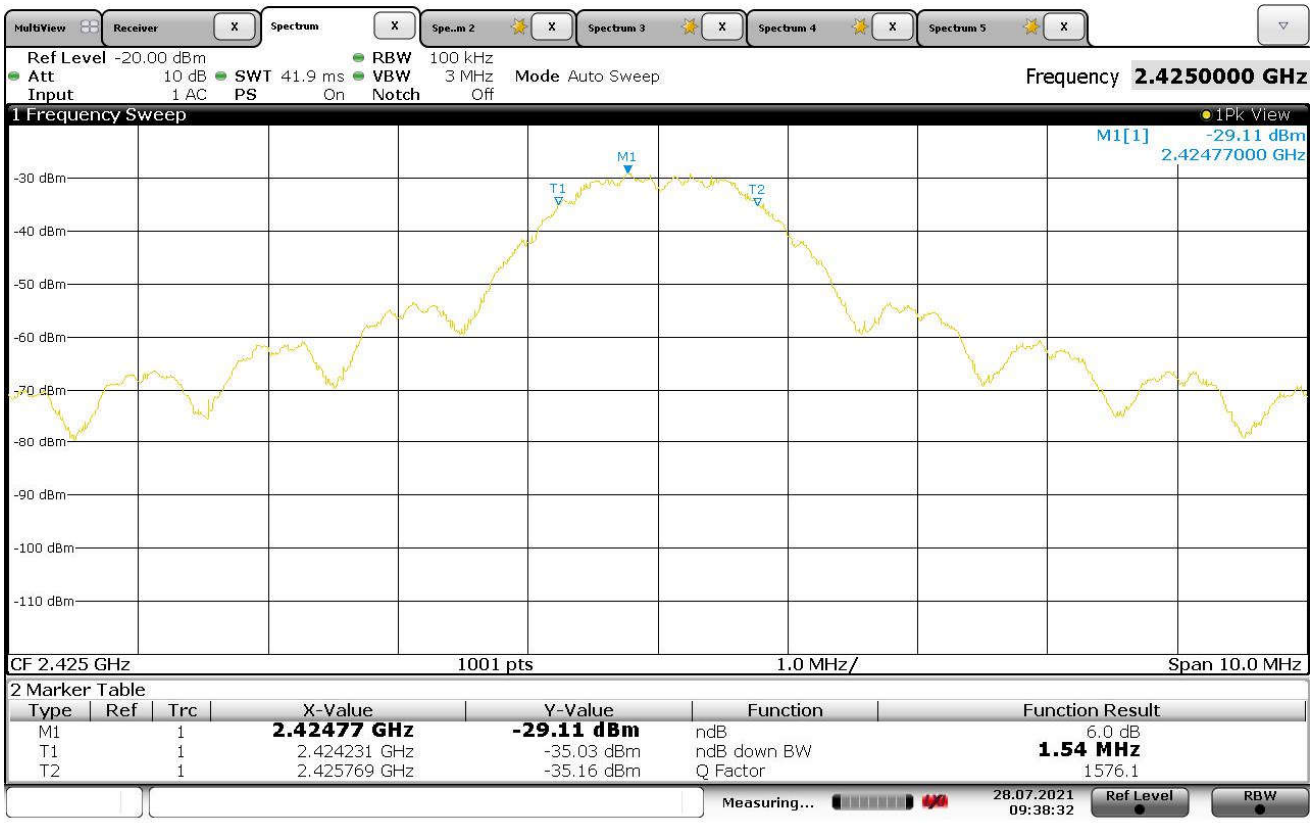


Date: 28.JUL.2021 09:06:44

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	6dB BW = 1.46MHz
Notes	Antenna Port 2

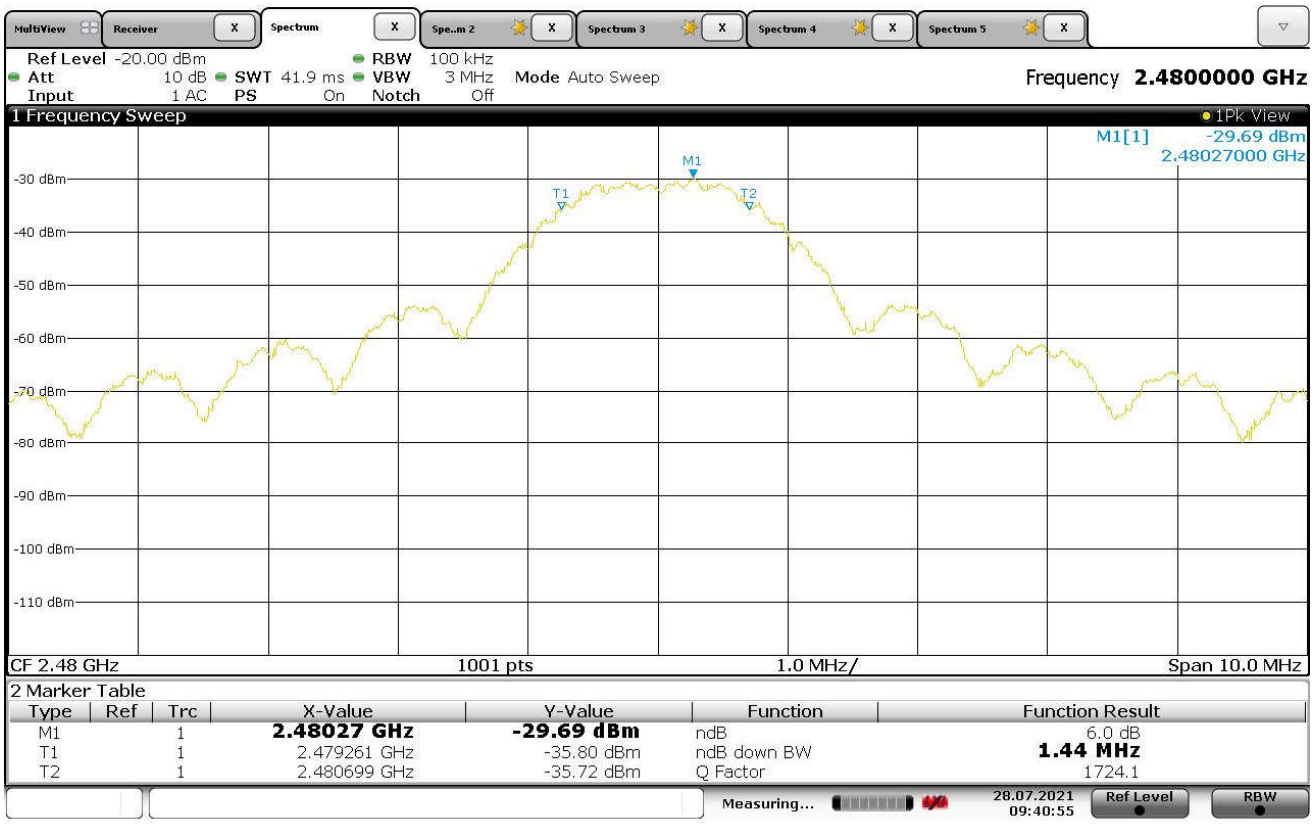
Date: 28.JUL.2021 09:34:19

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	6dB BW = 1.54MHz
Notes	Antenna Port 2



Date: 28.JUL.2021 09:38:32

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	6dB BW = 1.44MHz
Notes	Antenna Port 2



Date: 28.JUL.2021 09:40:55

22. Occupied Bandwidth (99%)

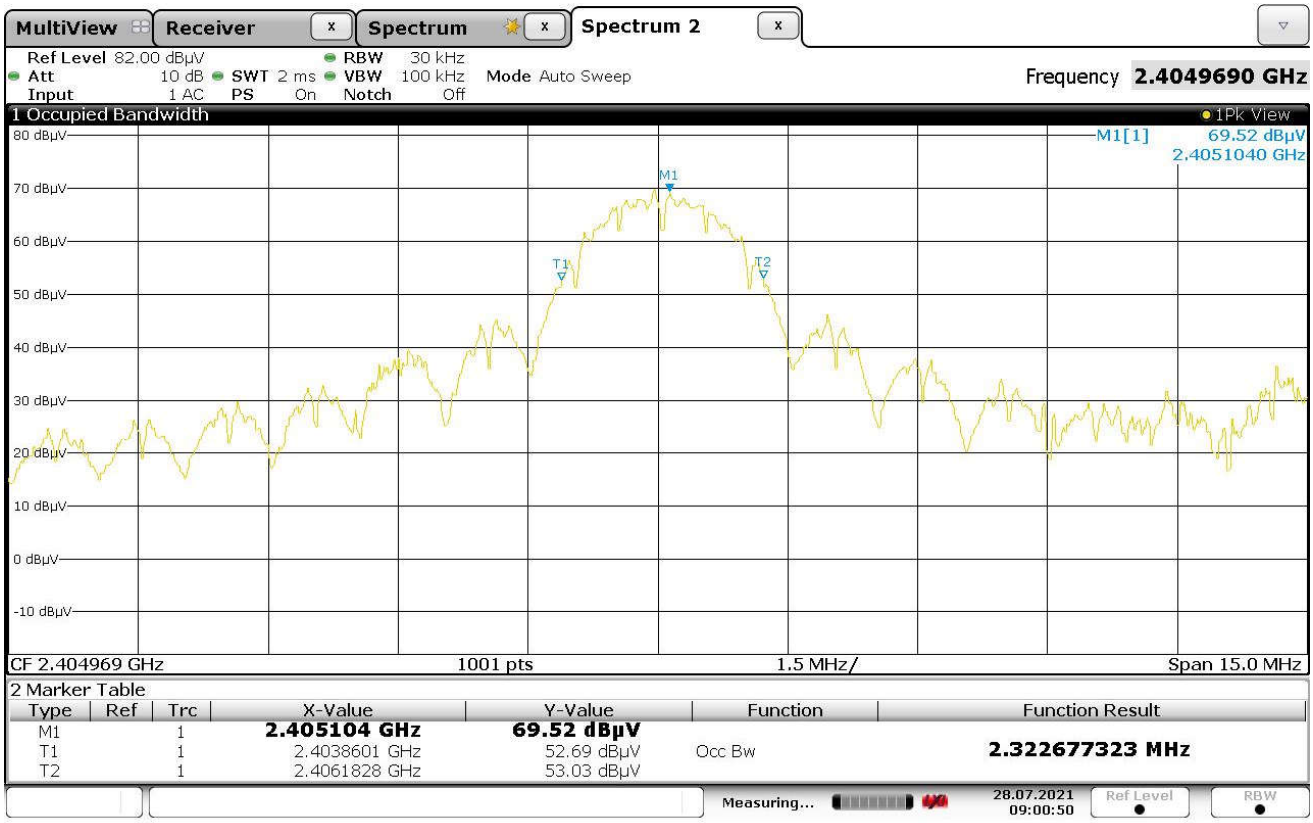
Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-B
Serial No	801f12fffe6ab779
Mode	Transmit

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	N/A
Test site used	N/A
Type of Antennas Used	N/A
Notes	None

Procedures
The antenna port of the EUT was connected to the spectrum analyzer through 20dB of attenuation. The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. The resolution bandwidth (RBW) was set to 1% to 5% of the actual occupied bandwidth, the video bandwidth (VBW) was set 3 times greater than the RBW, and the span was set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a 'screen dump' utility.

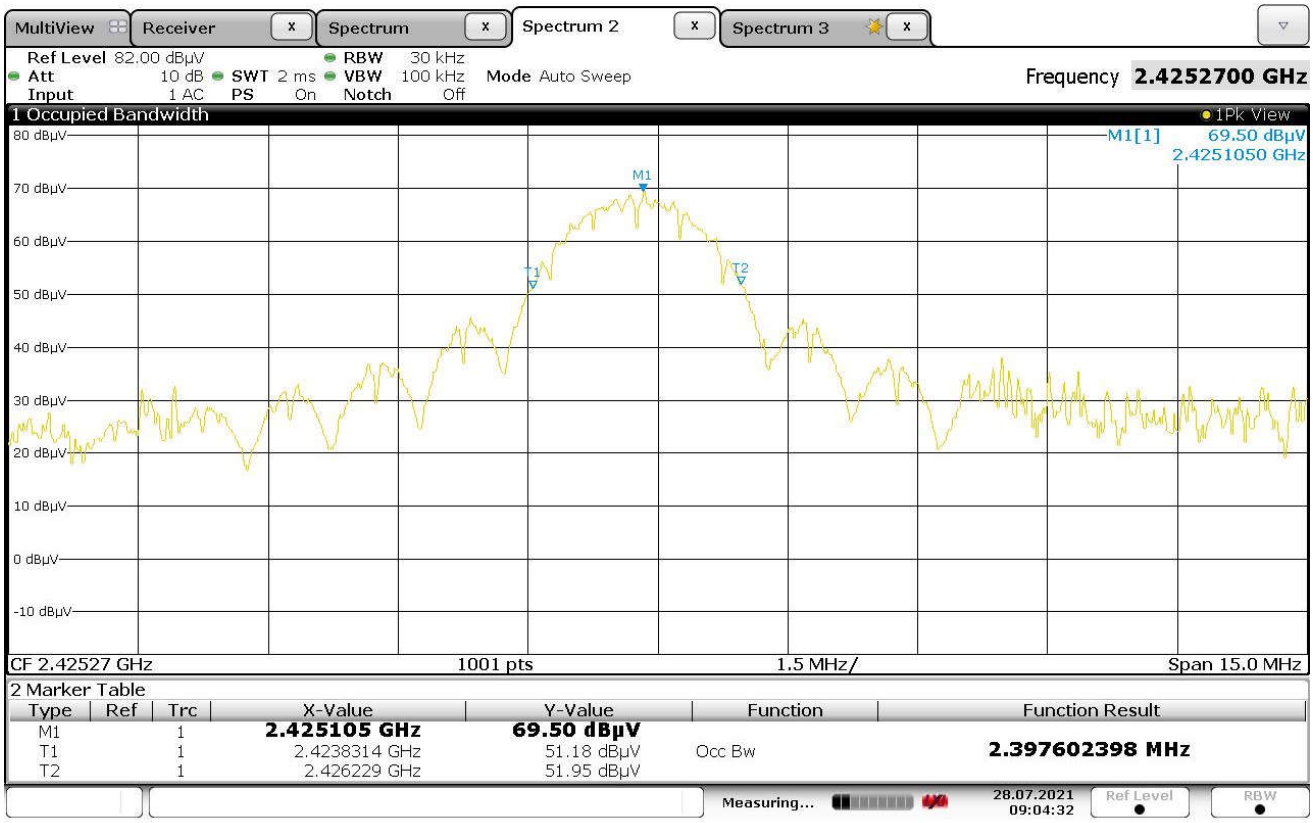
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	OBW = 2.32MHz
Notes	Antenna Port 1



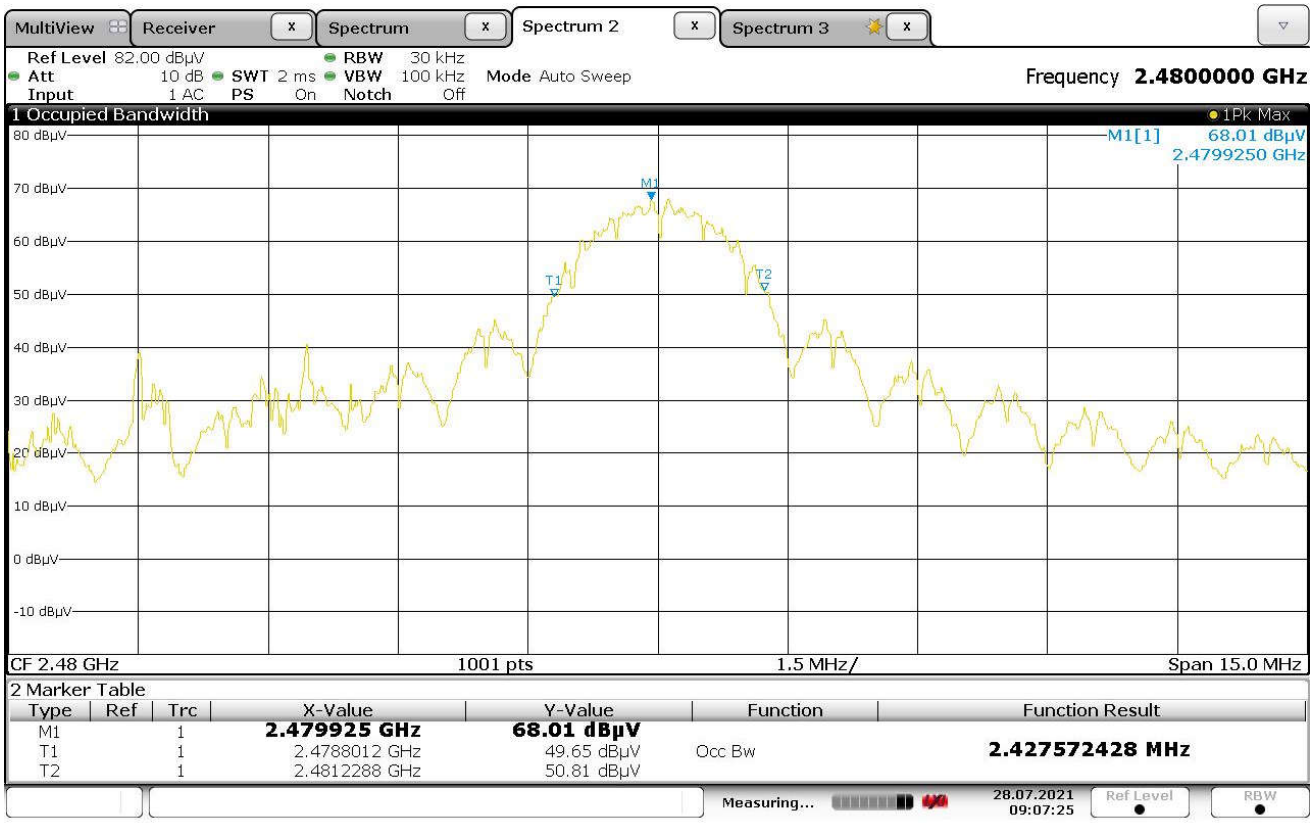
Date: 28.JUL.2021 09:00:50

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	OBW = 2.4MHz
Notes	Antenna Port 1



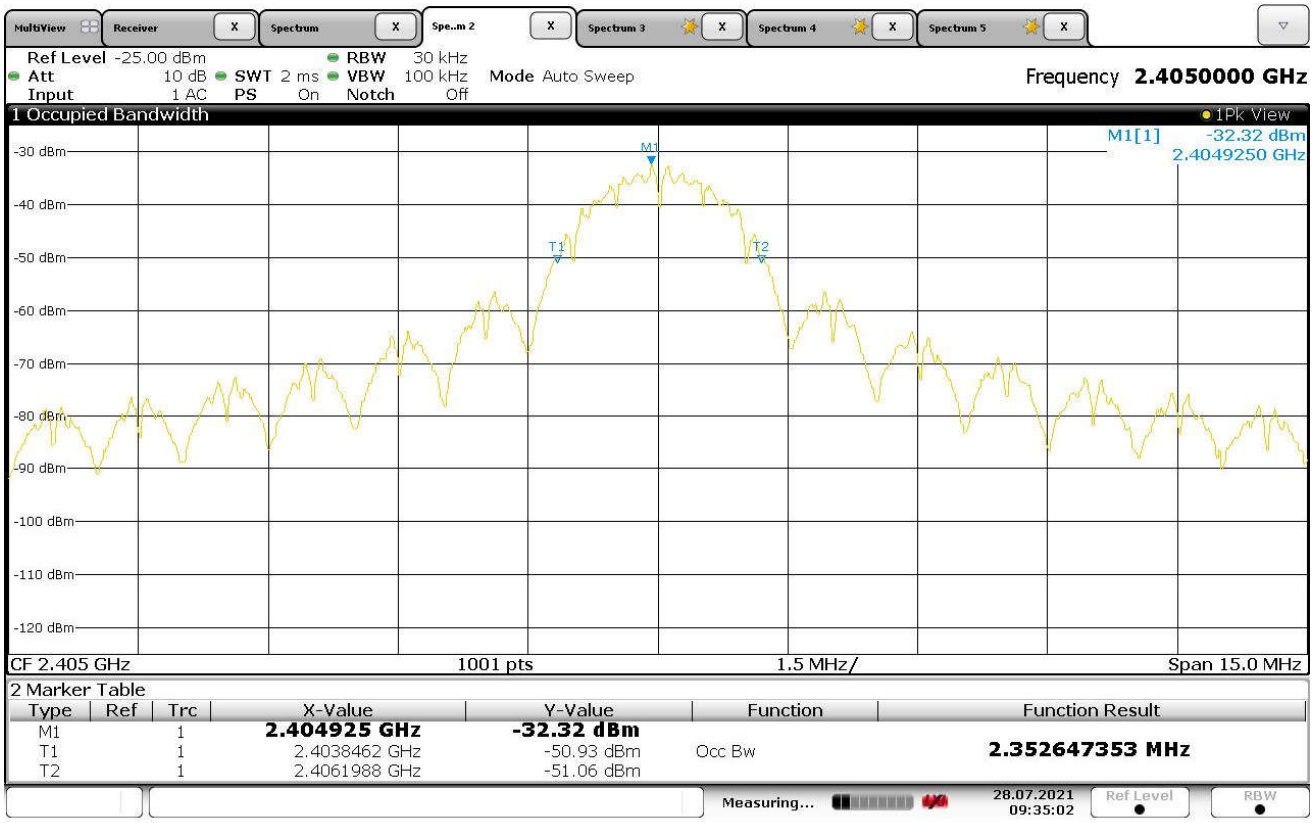
Date: 28.JUL.2021 09:04:32

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	OBW = 2.43MHz
Notes	Antenna Port 1



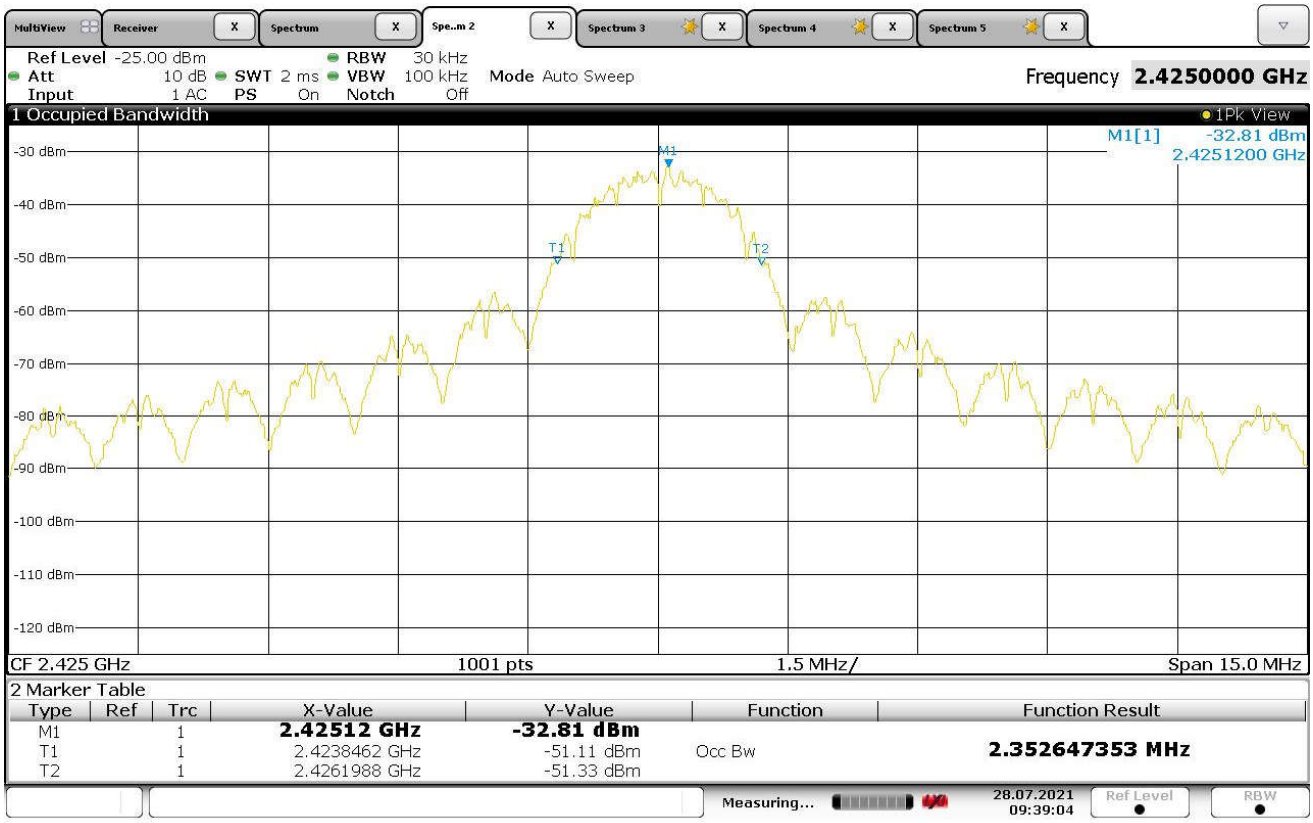
Date: 28.JUL.2021 09:07:24

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	OBW = 2.35MHz
Notes	Antenna Port 2



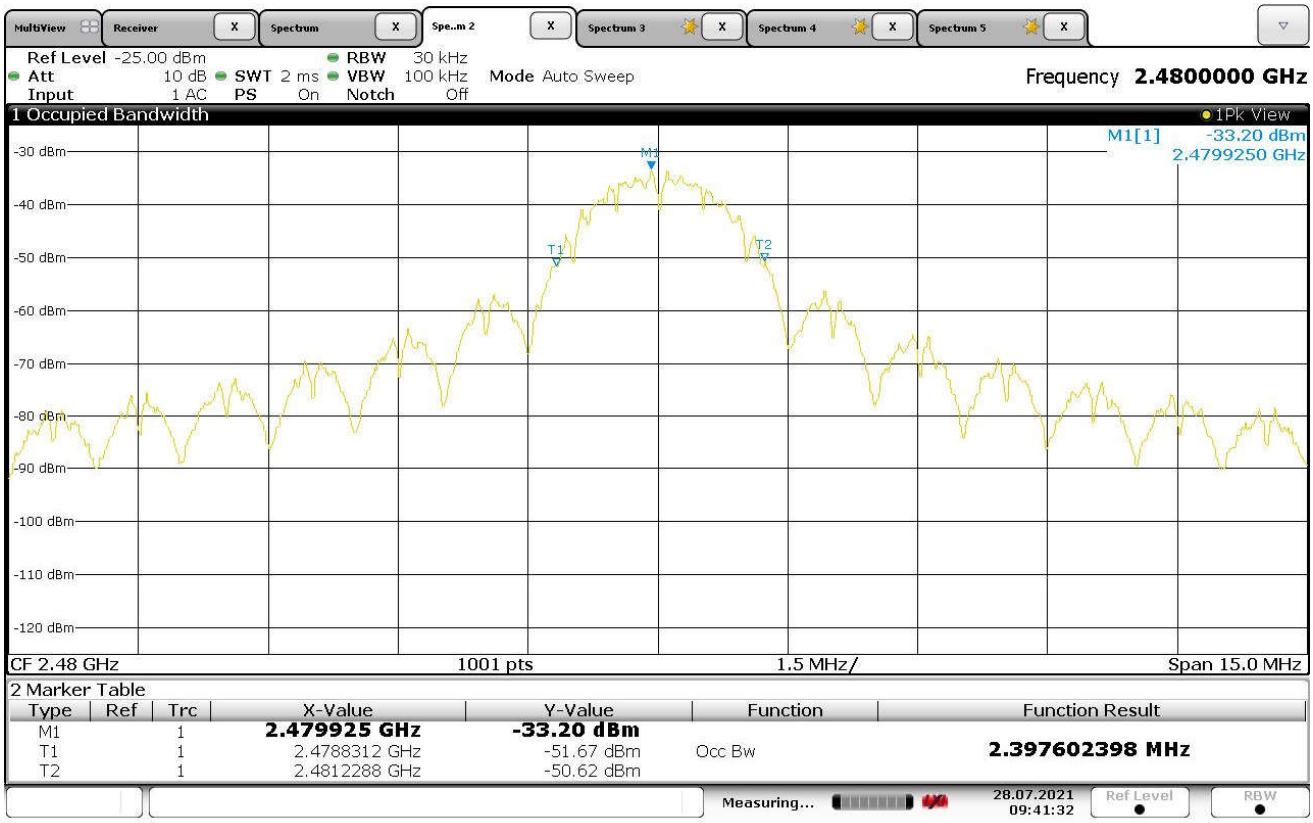
Date: 28.JUL.2021 09:35:03

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	OBW = 2.35MHz
Notes	Antenna Port 2



Date: 28.JUL.2021 09:39:04

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	OBW = 2.4MHz
Notes	Antenna Port 2



Date: 28.JUL.2021 09:41:32

23. Maximum Peak Conducted Output Power

Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-B
Serial No	801f12fffe6ab779
Mode	Transmit

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Antenna Conducted
Type of Test Site	N/A
Test site used	N/A
Notes	None

Requirements
The output power shall not exceed 1W (30dBm).

Procedures
The antenna port of the EUT was connected to the spectrum analyzer through 20dB of attenuation. The EUT was set to transmit separately at the low, middle, and high channels. The resolution bandwidth (RBW) was set to greater than the 6dB bandwidth. The span was set to greater than 3 times the RBW. The 'Max-Hold' function was engaged. The maximum meter reading was recorded. The peak power output was calculated for the low, middle and high channels.

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	Output Power = 0.02mW (-16.51dBm)
Notes	Antenna Port 1

Date: 29.JUL.2021 16:16:55

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	Output Power = 0.02mW (-16.58dBm)
Notes	Antenna Port 1

Date: 29.JUL.2021 16:14:10

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480Mhz
Parameters	Output Power = 0.095mW (-10.21dBm)
Notes	Antenna Port 1

Date: 28.JUL.2021 09:28:49

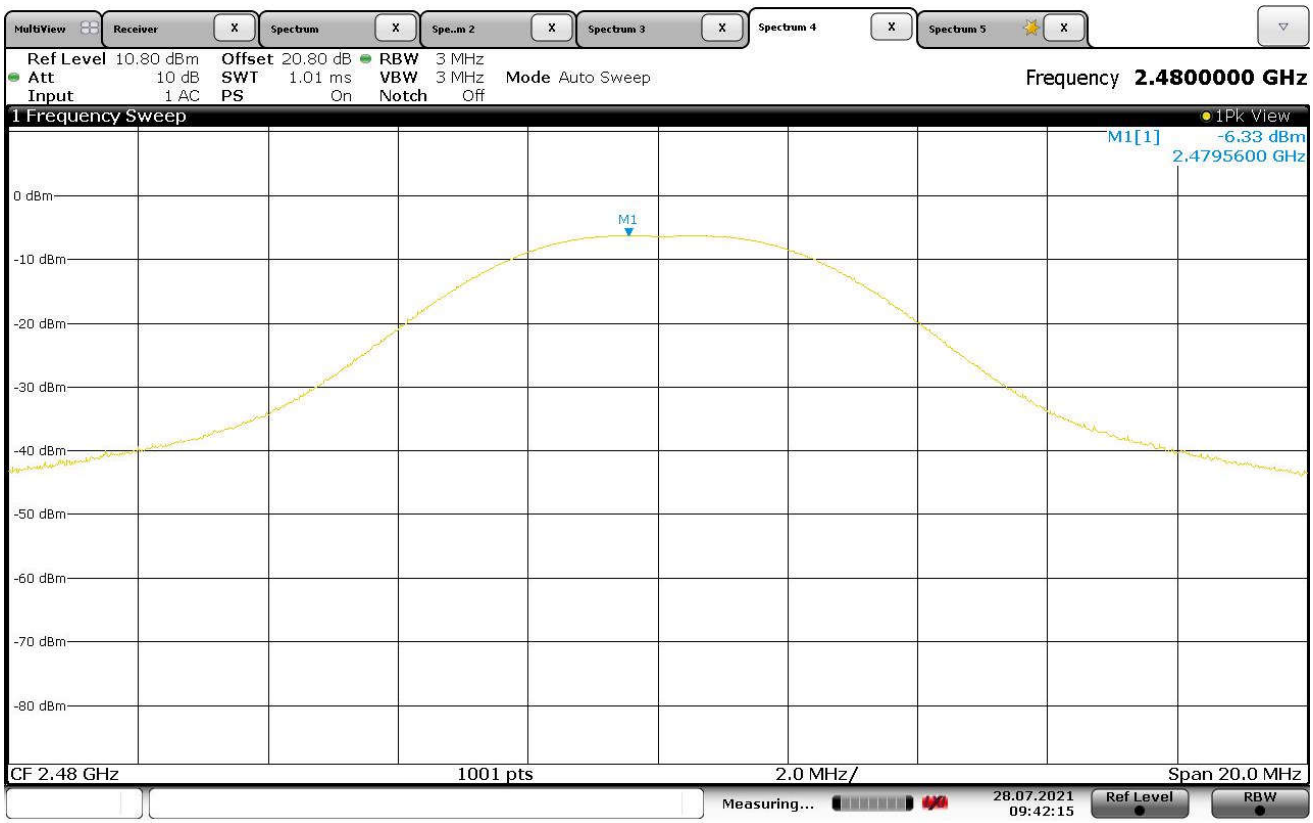
Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	Output Power = 0.05mW (-12.66dBm)
Notes	Antenna Port 2

Date: 29.JUL.2021 16:00:39

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	Output Power = 0.05mW (-12.79dBm)
Notes	Antenna Port 2

Date: 29.JUL.2021 16:06:30

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6ab779
Mode	Transmit
Carrier Frequency	2480Mhz
Parameters	Output Power = 0.23mW (-6.33dBm)
Notes	Antenna Port 2



Date: 28.JUL.2021 09:42:16

24. Effective Isotropic Radiated Power (EIRP)

Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-B and Switch-W
Serial No	801f12fffe6aedad and 801f12fffe6abd59
Mode	Transmit

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic Chamber
Test site used	Room 29
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent)
Notes	None

Requirements
FOR A DTS The EIRP shall not exceed 4W (36dBm).

Procedures
FOR DTS SYSTEMS The EUT was placed on the non-conductive stand and set to transmit. A double ridged waveguide antenna was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded. The peak power output was measured for the low, middle and high channels. The equivalent isotropic radiated power was determined using equation (17) of ANSI C63.10.

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site)	3.3

(18 GHz – 26.5 GHz)	
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	EIRP = 0.05mW (-12.8dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2405.00	H	40.5	2.6	32.7	0.0	75.8	-19.5	36.0	-55.5
2405.00	V	47.2	2.6	32.7	0.0	82.5	-12.8	36.0	-48.8

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	EIRP = 0.03mW (-14.6dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2425.00	H	38.0	2.6	32.8	0.0	73.4	-21.9	36.0	-57.9
2425.00	V	45.3	2.6	32.8	0.0	80.7	-14.6	36.0	-50.6

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	EIRP = 0.45mW (-3.5dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2480.00	H	50.1	2.7	33.1	0.0	85.8	-9.5	36.0	-45.5
2480.00	V	56.1	2.7	33.1	0.0	91.8	-3.5	36.0	-39.5

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

Test Details	
Manufacturer	Amatis Controls
Model	Switch-W
S/N	801f12fffe6abd59
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	EIRP = 0.13mW (-8.9dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2405.00	H	46.0	2.6	32.7	0.0	81.3	-14.0	36.0	-50.0
2405.00	V	51.1	2.6	32.7	0.0	86.4	-8.9	36.0	-44.9

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

Test Details	
Manufacturer	Amatis Controls
Model	Switch-W
S/N	801f12fffe6abd59
Mode	Transmit
Carrier Frequency	2425MHz
Parameters	EIRP = 0.13mW (-8.6dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2425.00	H	42.7	2.6	32.8	0.0	78.1	-17.2	36.0	-53.2
2425.00	V	51.3	2.6	32.8	0.0	86.7	-8.6	36.0	-44.6

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

Test Details	
Manufacturer	Amatis Controls
Model	Switch-W
S/N	801f12fffe6abd59
Mode	Transmit
Carrier Frequency	2480MHz
Parameters	EIRP = 0.22mW (-6.6dBm)
Notes	Antenna Port 2

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	EIRP (dBm)	Limit (dBm)	Margin (dBm)
2480.00	H	45.1	2.7	33.1	0.0	80.8	-14.5	36.0	-50.5
2480.00	V	53.0	2.7	33.1	0.0	88.7	-6.6	36.0	-42.6

Peak EIRP (dBm) = Peak Field Strength (dBuV/m) – 95.3

25. Case Spurious Radiated Emissions

Test Information	
Manufacturer	Amatis Controls
Product	Wireless Light Switch
Model	Switch-B and Switch-W
Serial No	801f12fffe6aedad and 801f12fffe6abd59
Mode	Transmit

Test Setup Details	
Setup Format	Tabletop
Height of Support	N/A
Measurement Method	Radiated
Type of Test Site	Semi-Anechoic
Test site used	Room 29
Type of Antennas Used	Below 1GHz: Bilog (or equivalent) Above 1GHz: Double-ridged waveguide (or equivalent) NA
Notes	The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst-case emissions was utilized.

Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Procedures
Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads. Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 25GHz was investigated using a peak detector function. The final emission tests were then manually performed over the frequency range of 30MHz to 25GHz. 1) For all harmonics not in the restricted bands, the following procedure was used: a) The field strength of the fundamental was measured using a double ridged waveguide antenna. The

waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on an 1.5m high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

b) The field strengths of all of the harmonics not in the restricted band were then measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a 1.5 m high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:

i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.

ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.

d) All harmonics not in the restricted bands must be at least 20dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.

2) For all emissions in the restricted bands, the following procedure was used:

a) The field strengths of all emissions below 1 GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on an 80cm high non-conductive stand. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

b) The field strengths of all emissions above 1 GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. The EUT was placed on a 1.5m high non-conductive stand. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.

c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:

i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.

ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

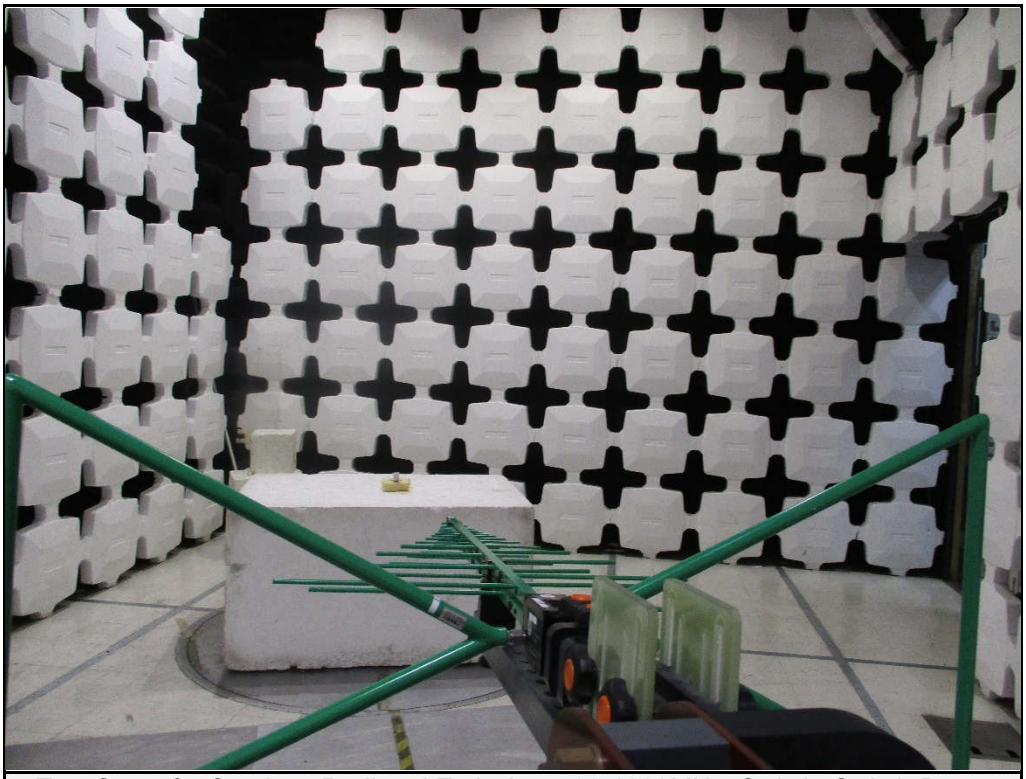
iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.

d) For all radiated emissions measurements below 1 GHz, if the peak reading is below the limits listed in 15.209(a), no further measurements are required. If however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.

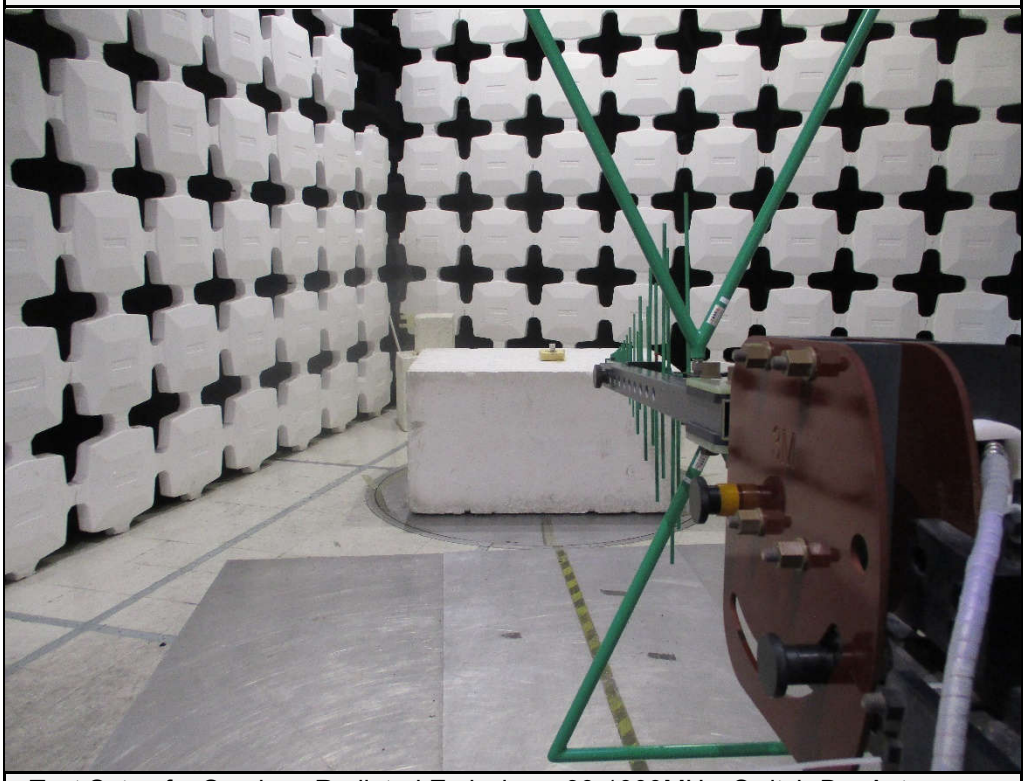
e) For all radiated emissions measurements above 1 GHz, the peak readings must comply with the 15.35(b) limits. 15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency

emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits specified in 15.209(a).

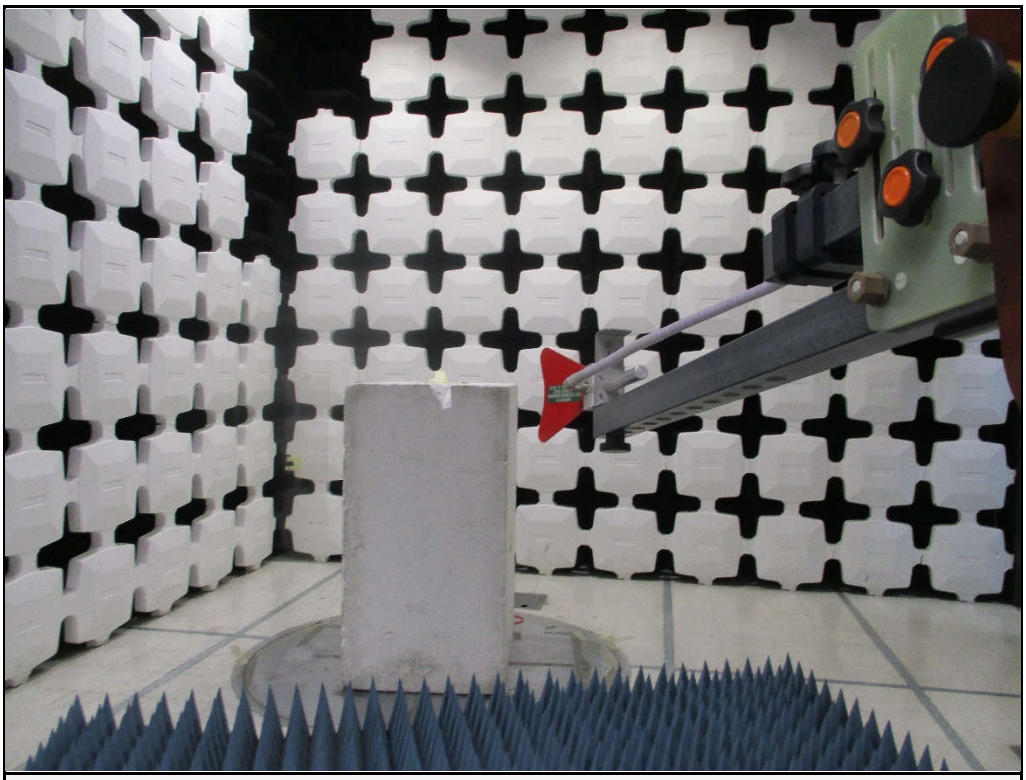
f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.



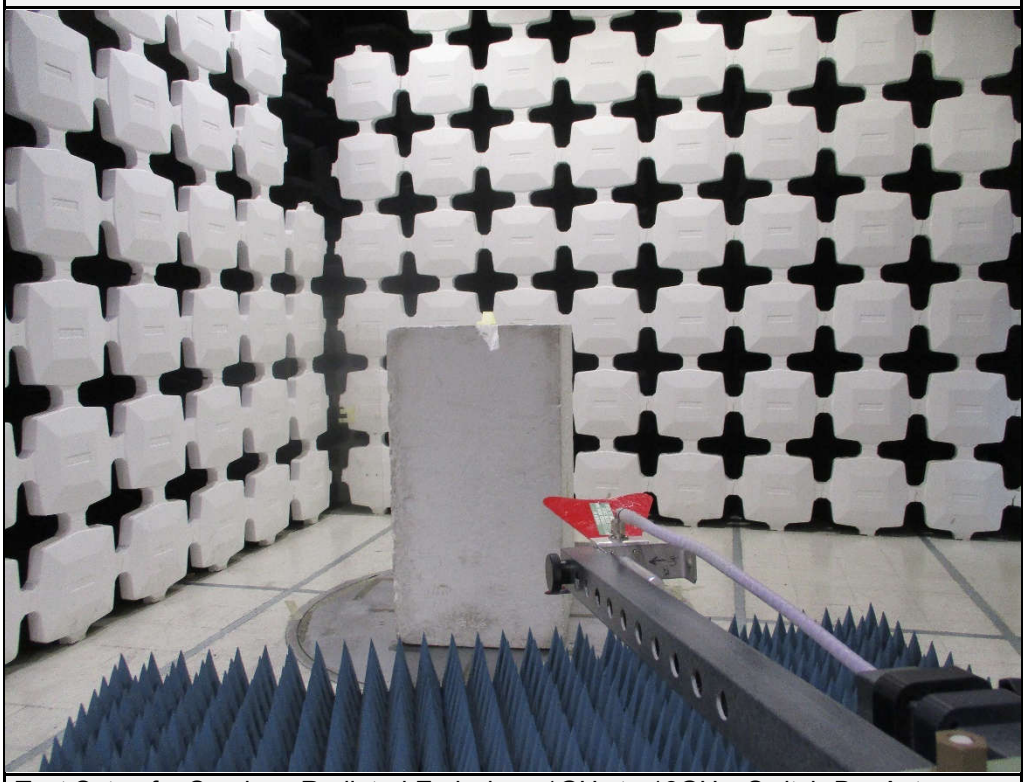
Test Setup for Spurious Radiated Emissions, 30-1000MHz, Switch, Switch-B – Antenna Polarization Horizontal



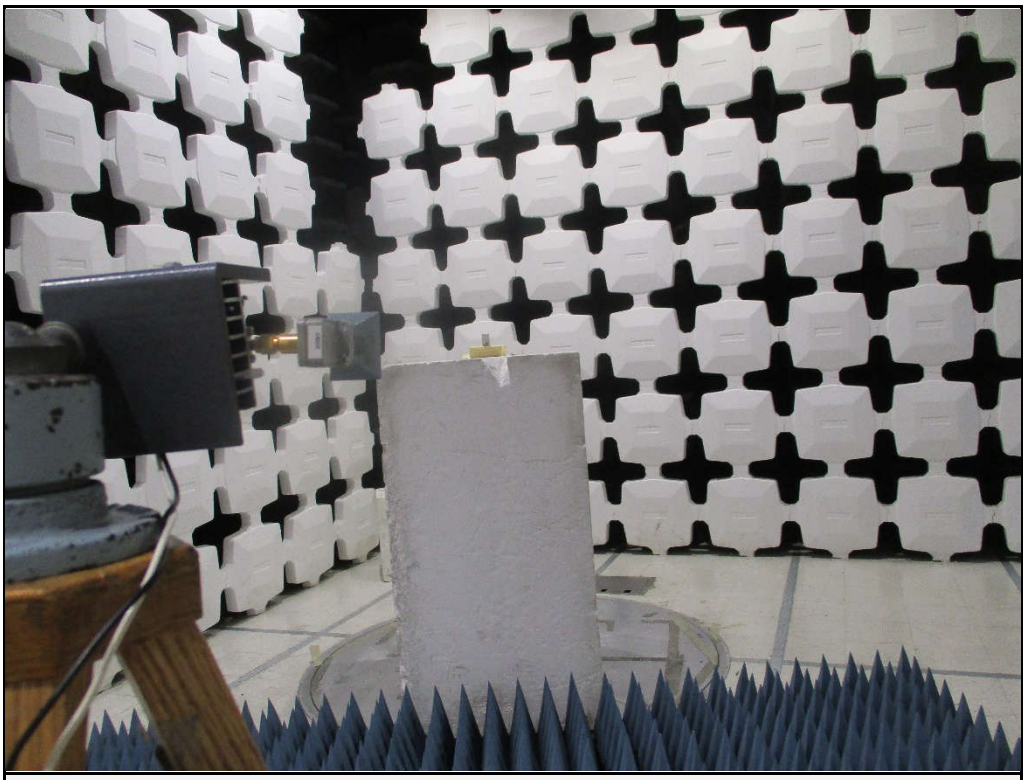
Test Setup for Spurious Radiated Emissions, 30-1000MHz, Switch-B – Antenna Polarization Vertical



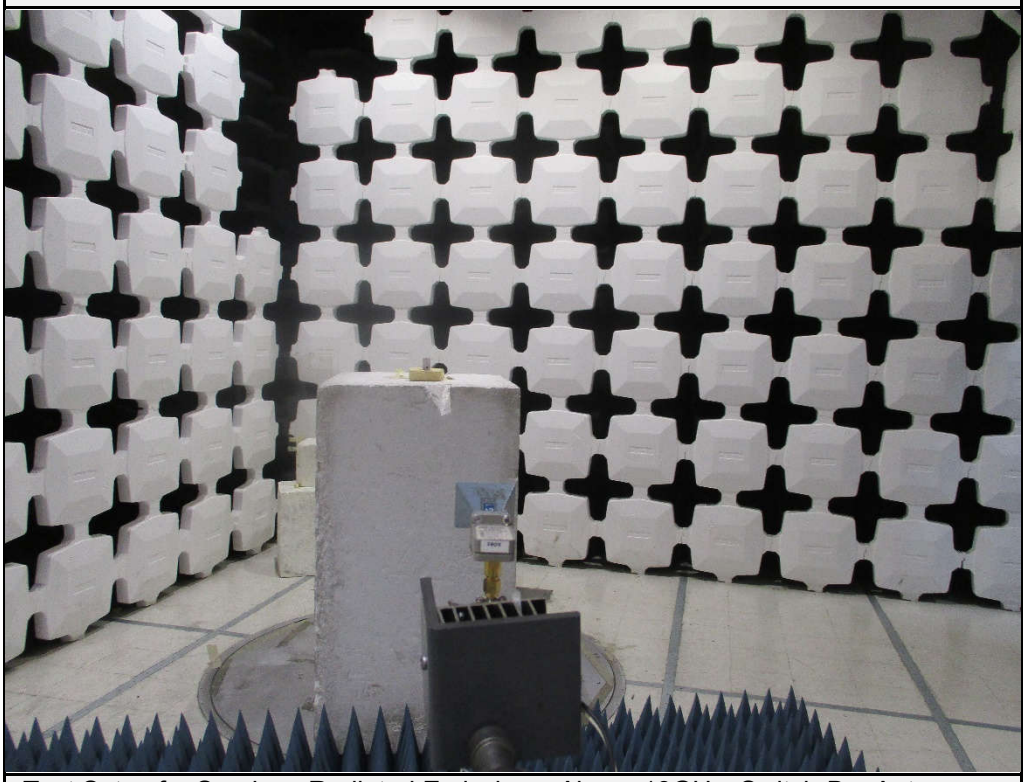
Test Setup for Spurious Radiated Emissions, 1GHz to 18GHz, Switch-B – Antenna Polarization Horizontal



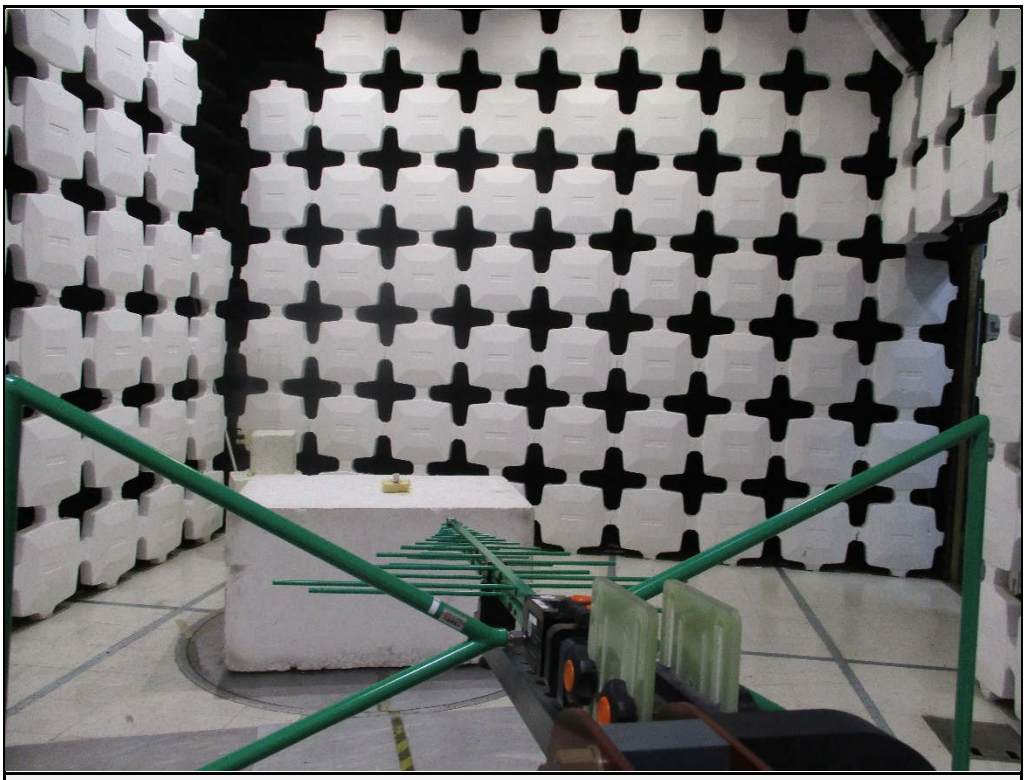
Test Setup for Spurious Radiated Emissions,1GHz to 18GHz, Switch-B – Antenna Polarization Vertical



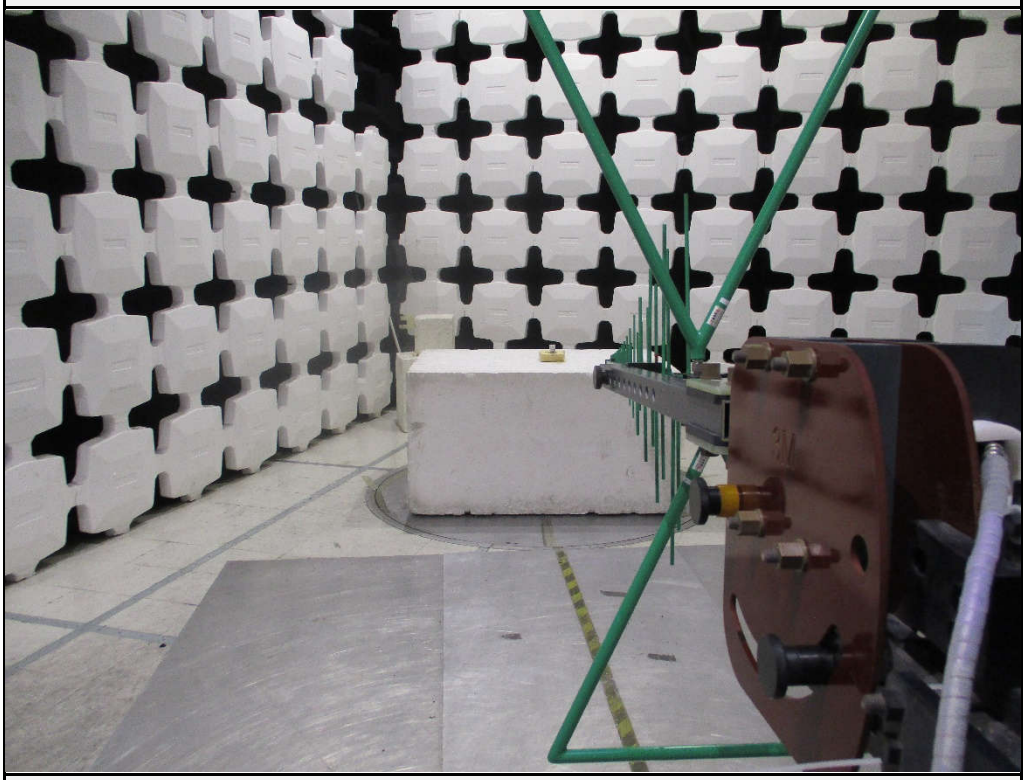
Test Setup for Spurious Radiated Emissions, Above 18GHz, Switch-B – Antenna Polarization Horizontal



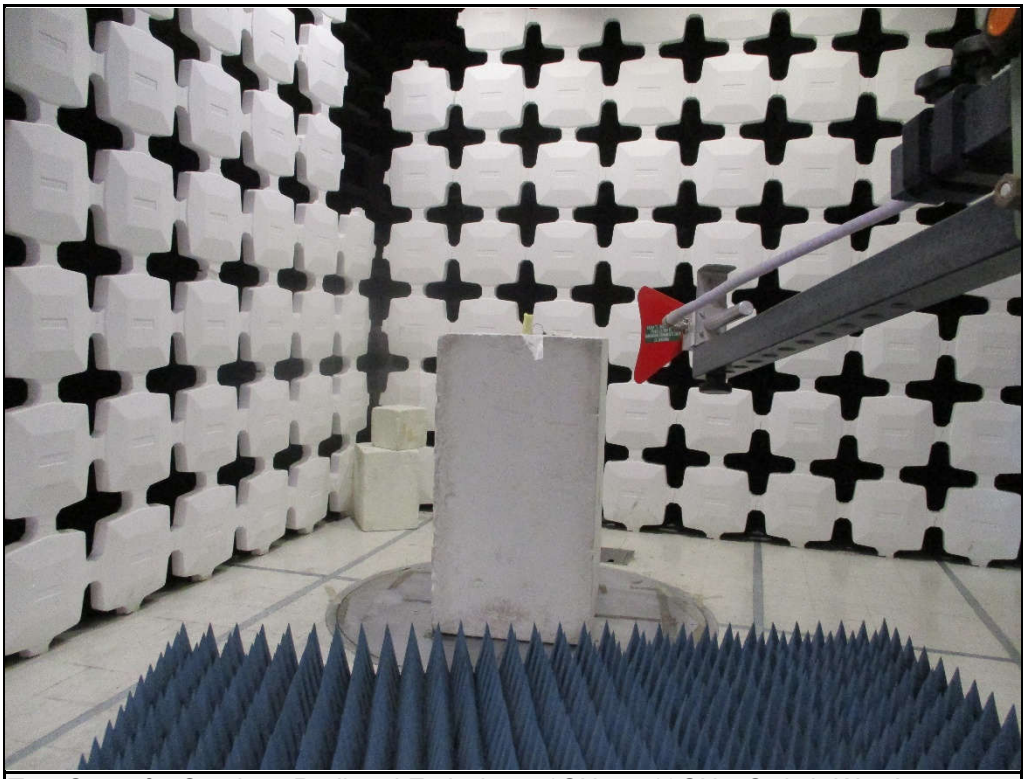
Test Setup for Spurious Radiated Emissions, Above 18GHz, Switch-B – Antenna Polarization Vertical



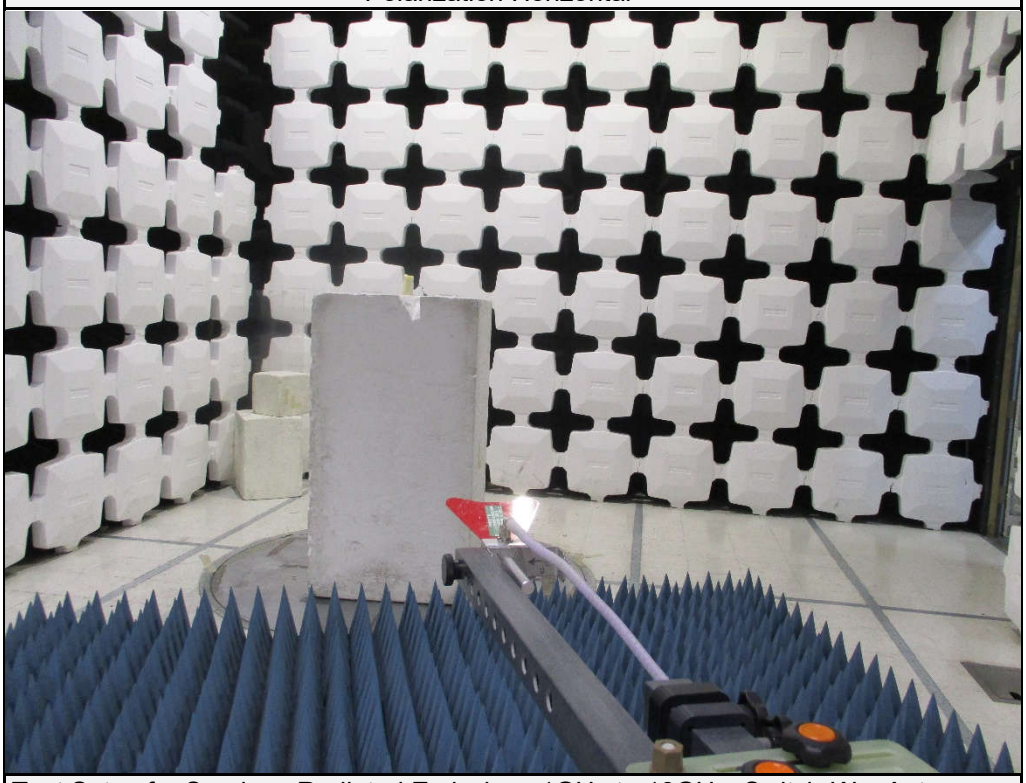
Test Setup for Spurious Radiated Emissions, 30-1000MHz, Switch-W – Antenna Polarization Horizontal



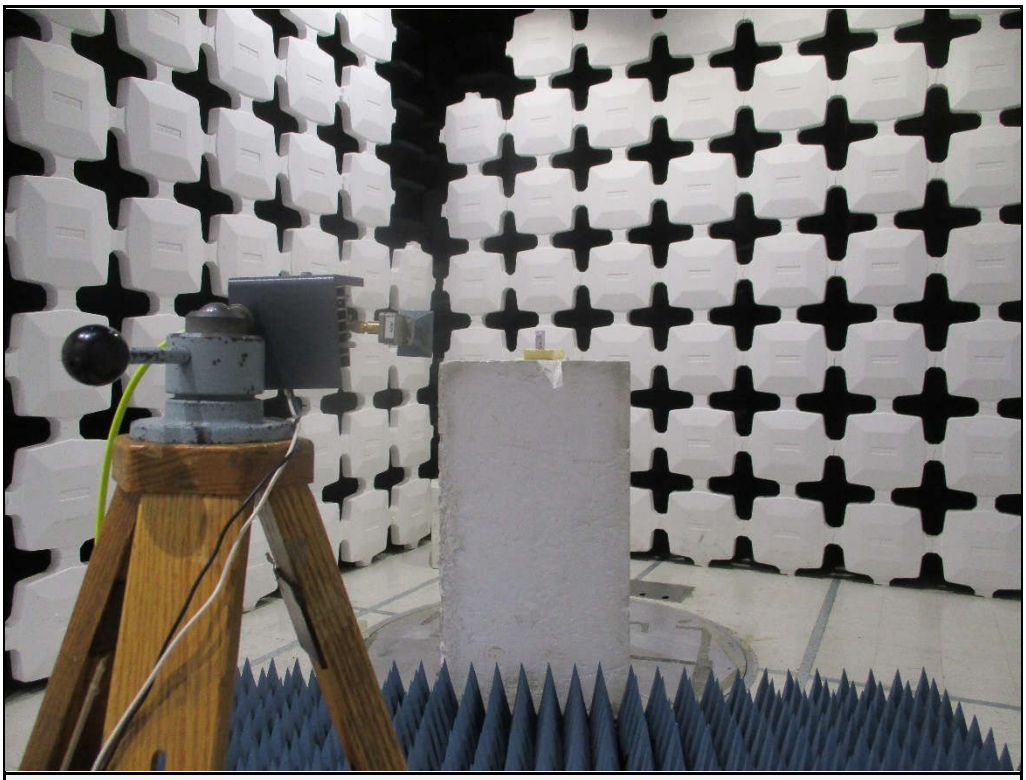
Test Setup for Spurious Radiated Emissions, 30-1000MHz, Switch-W – Antenna Polarization Vertical



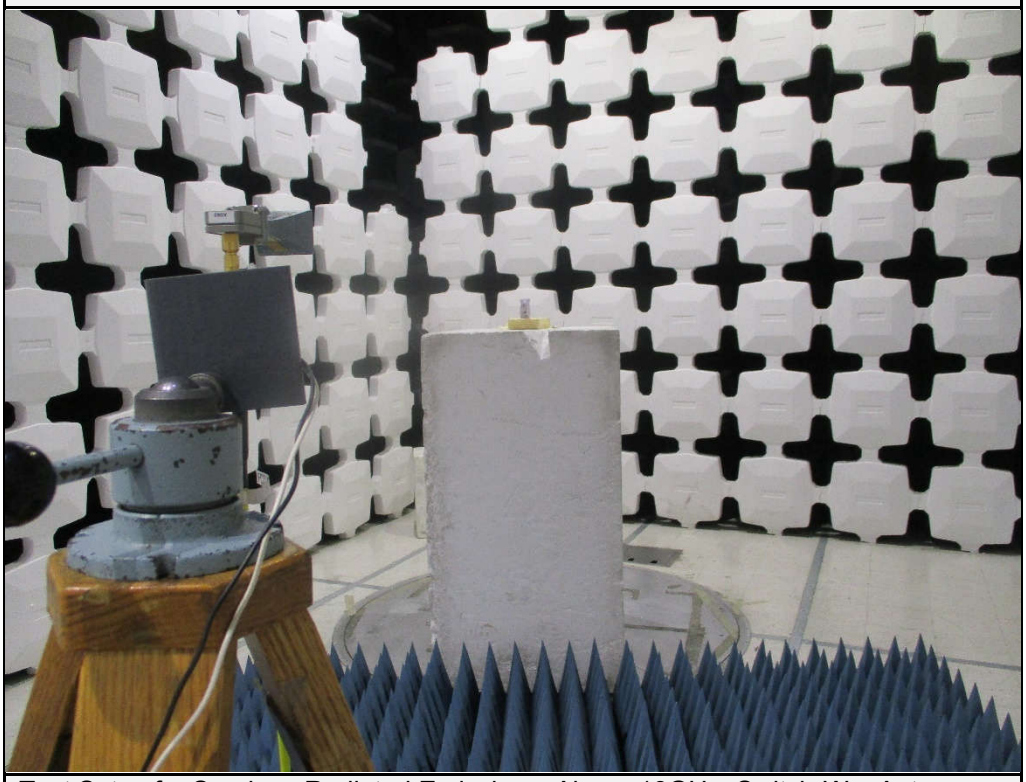
Test Setup for Spurious Radiated Emissions, 1GHz to 18GHz, Switch-W – Antenna Polarization Horizontal



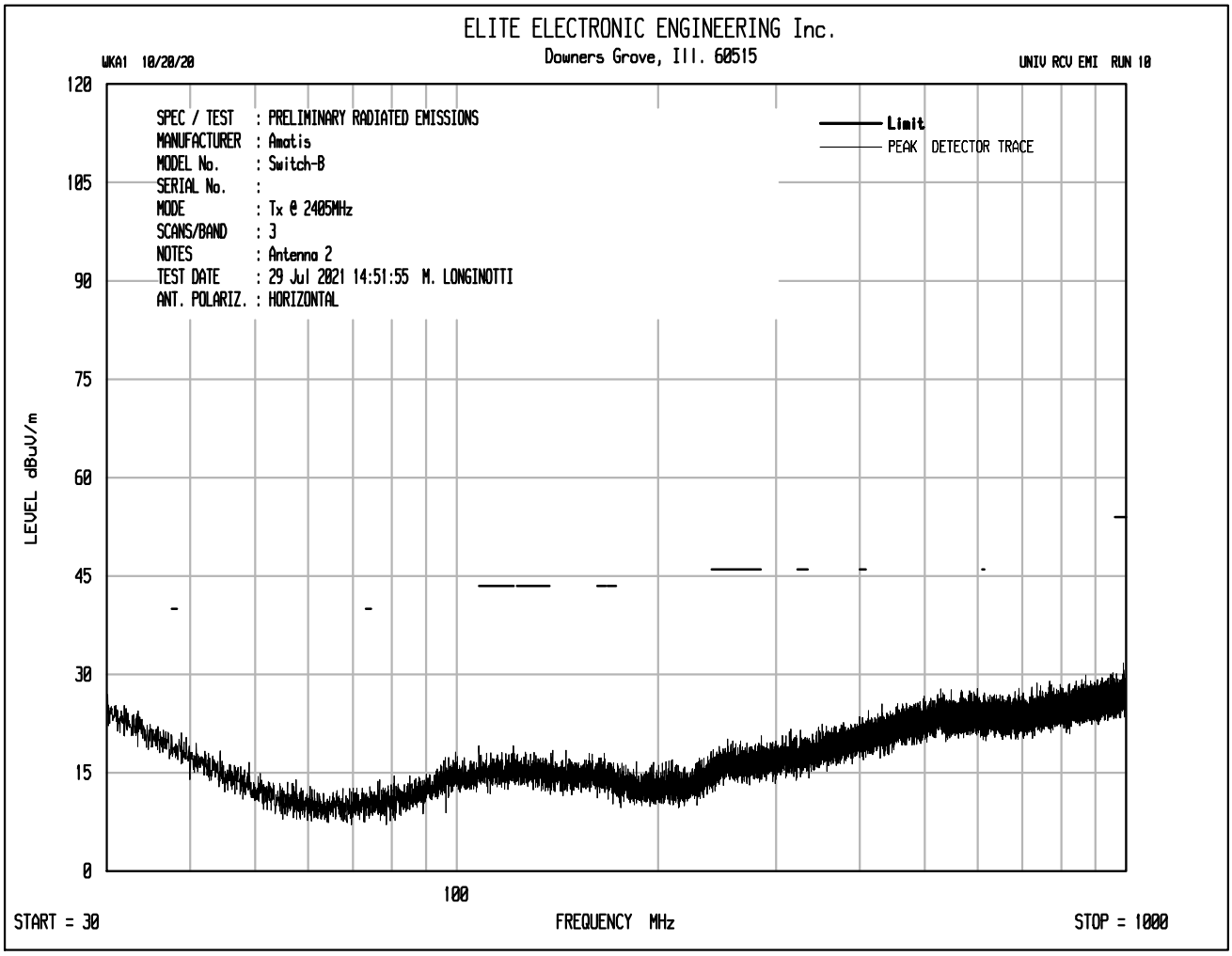
Test Setup for Spurious Radiated Emissions,1GHz to 18GHz, Switch-W – Antenna Polarization Vertical

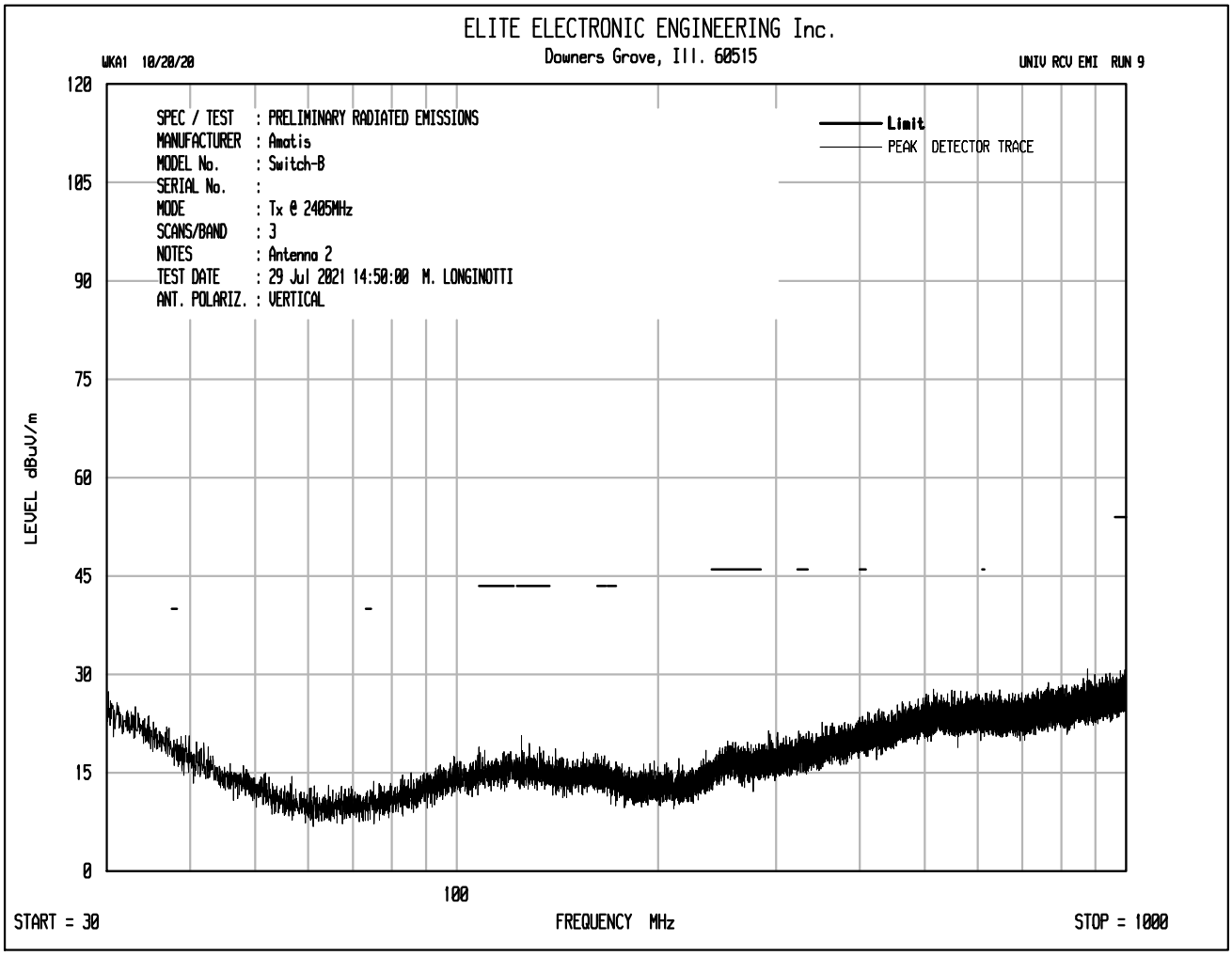


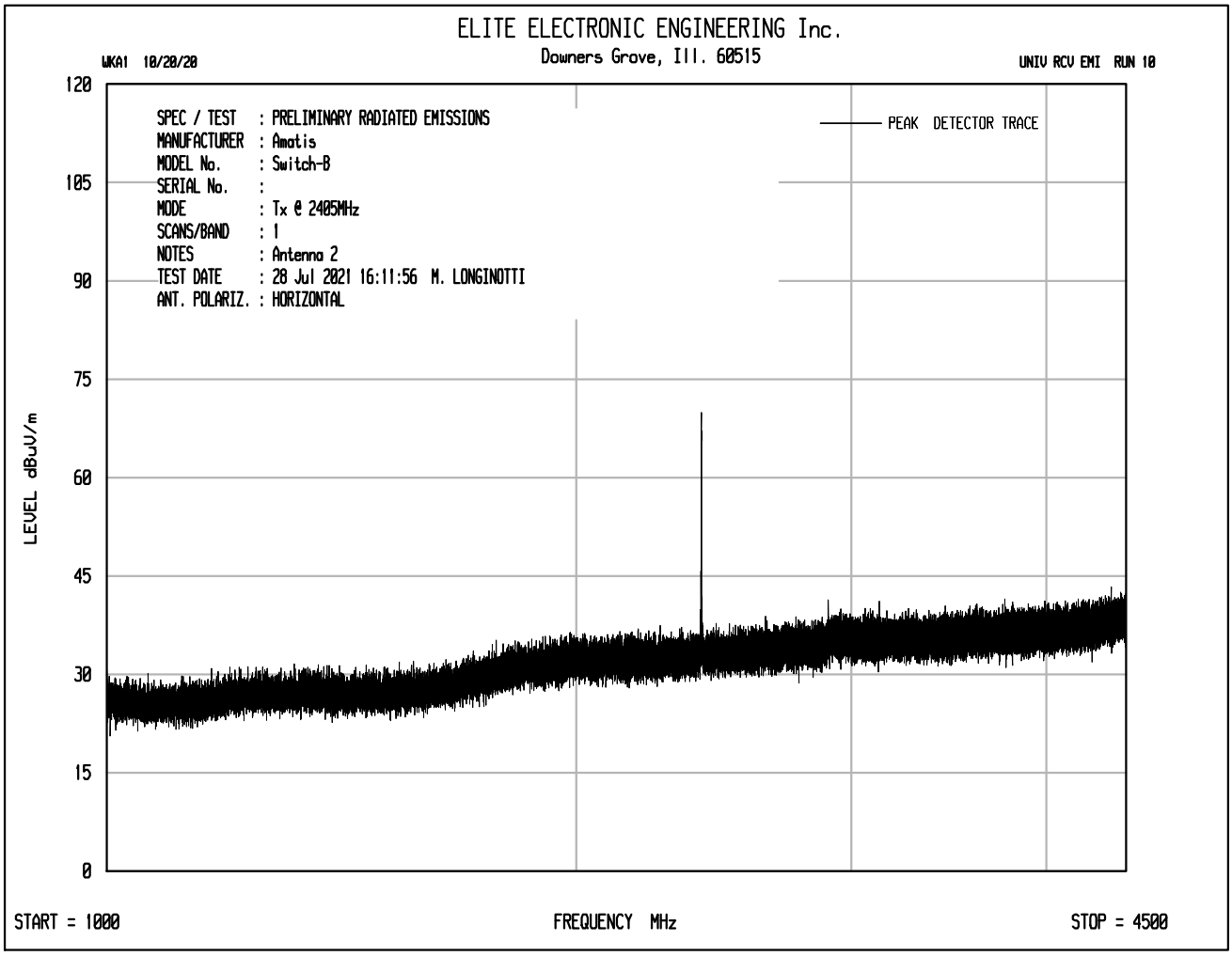
Test Setup for Spurious Radiated Emissions, Above 18GHz, Switch-W – Antenna Polarization Horizontal

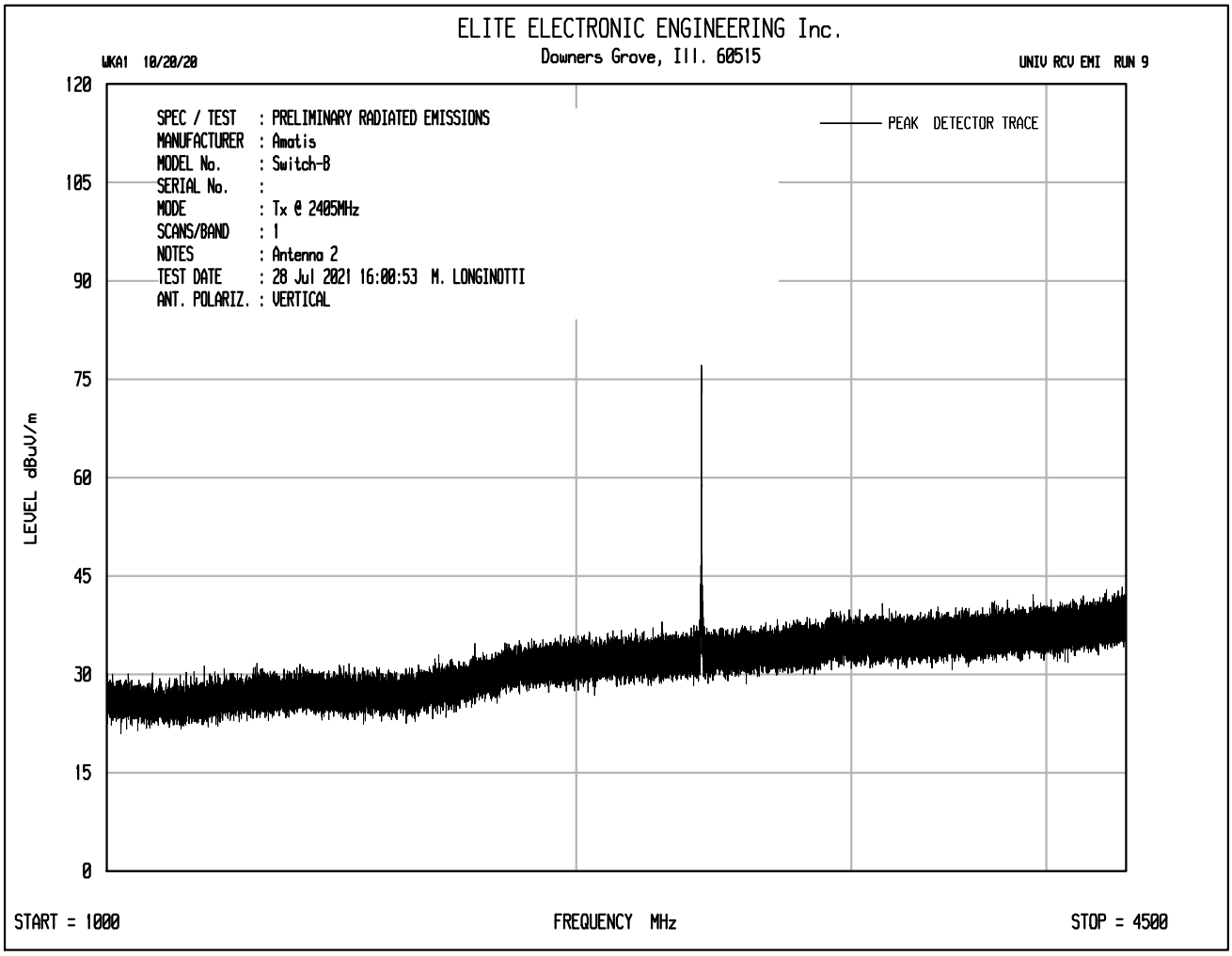


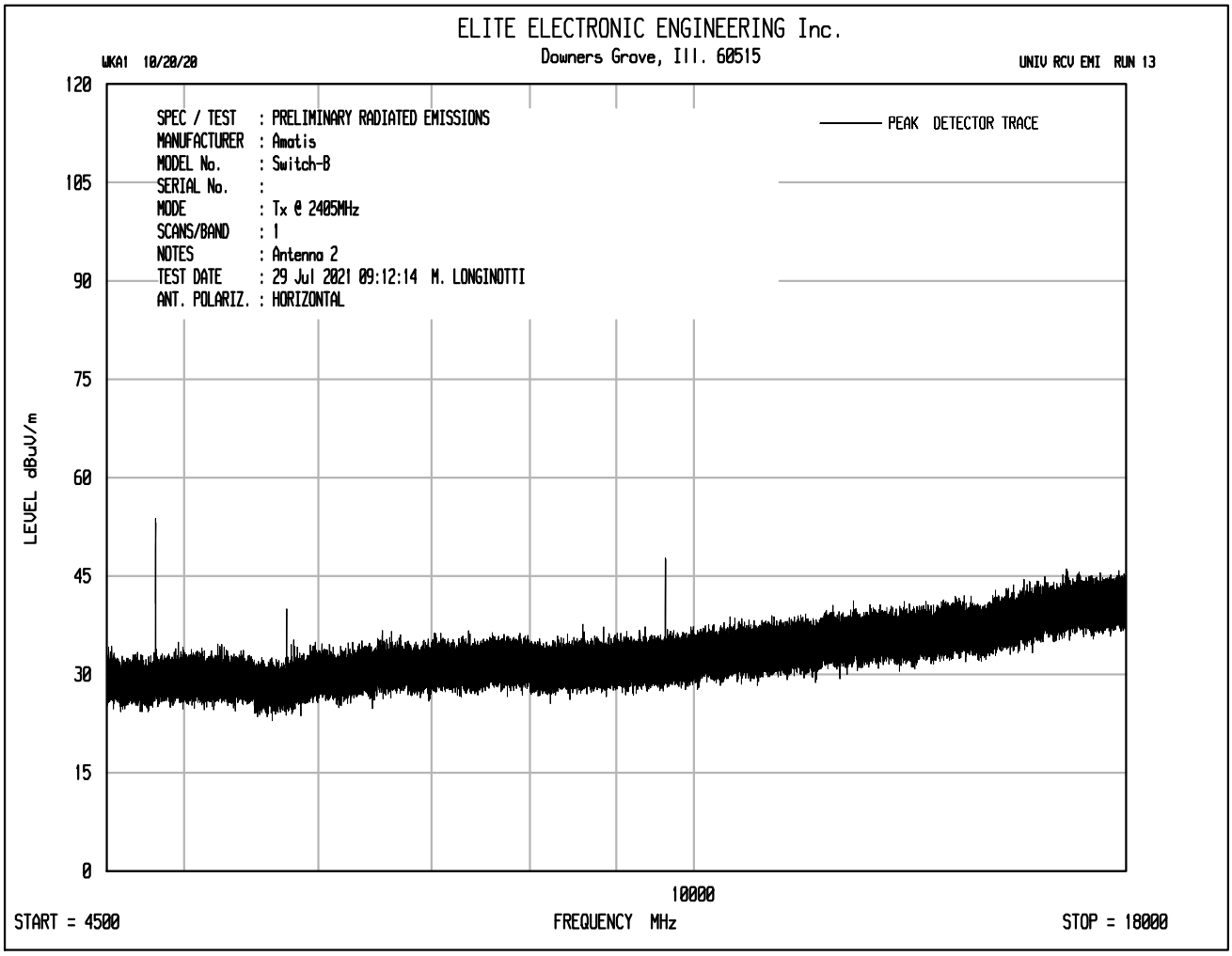
Test Setup for Spurious Radiated Emissions, Above 18GHz, Switch-W – Antenna Polarization Vertical

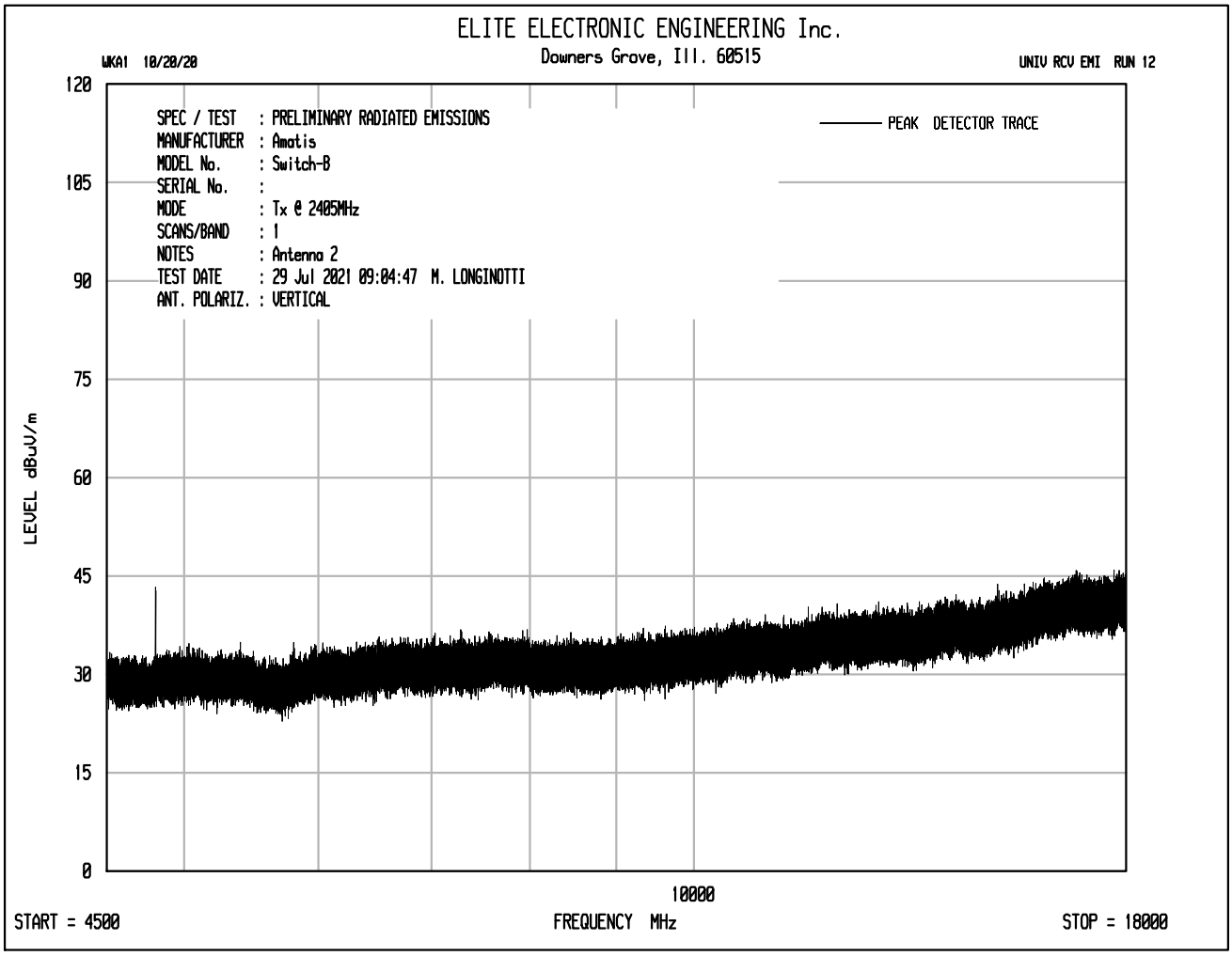

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 3
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 14:51:55 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

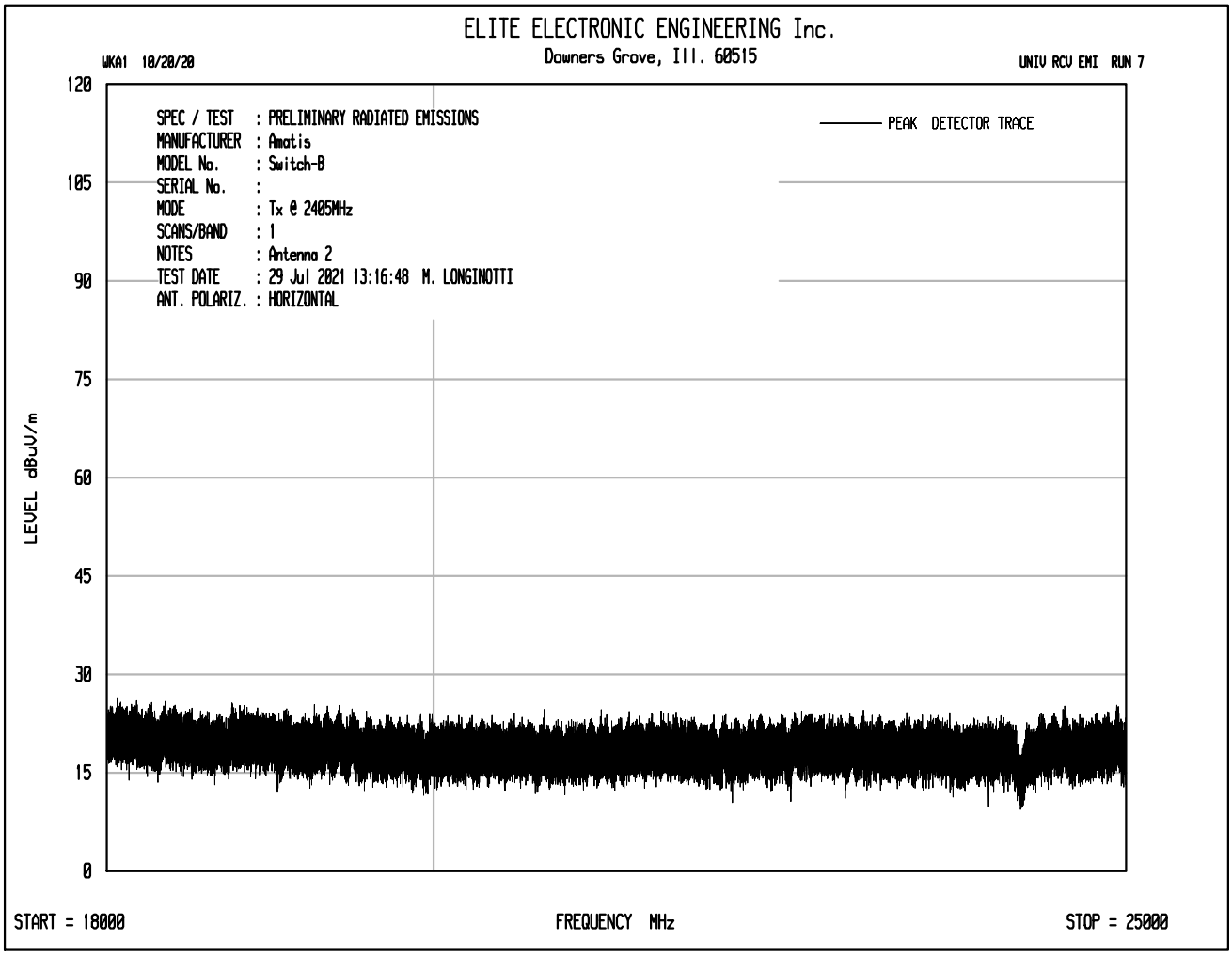

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 9
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 3
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 14:50:00 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

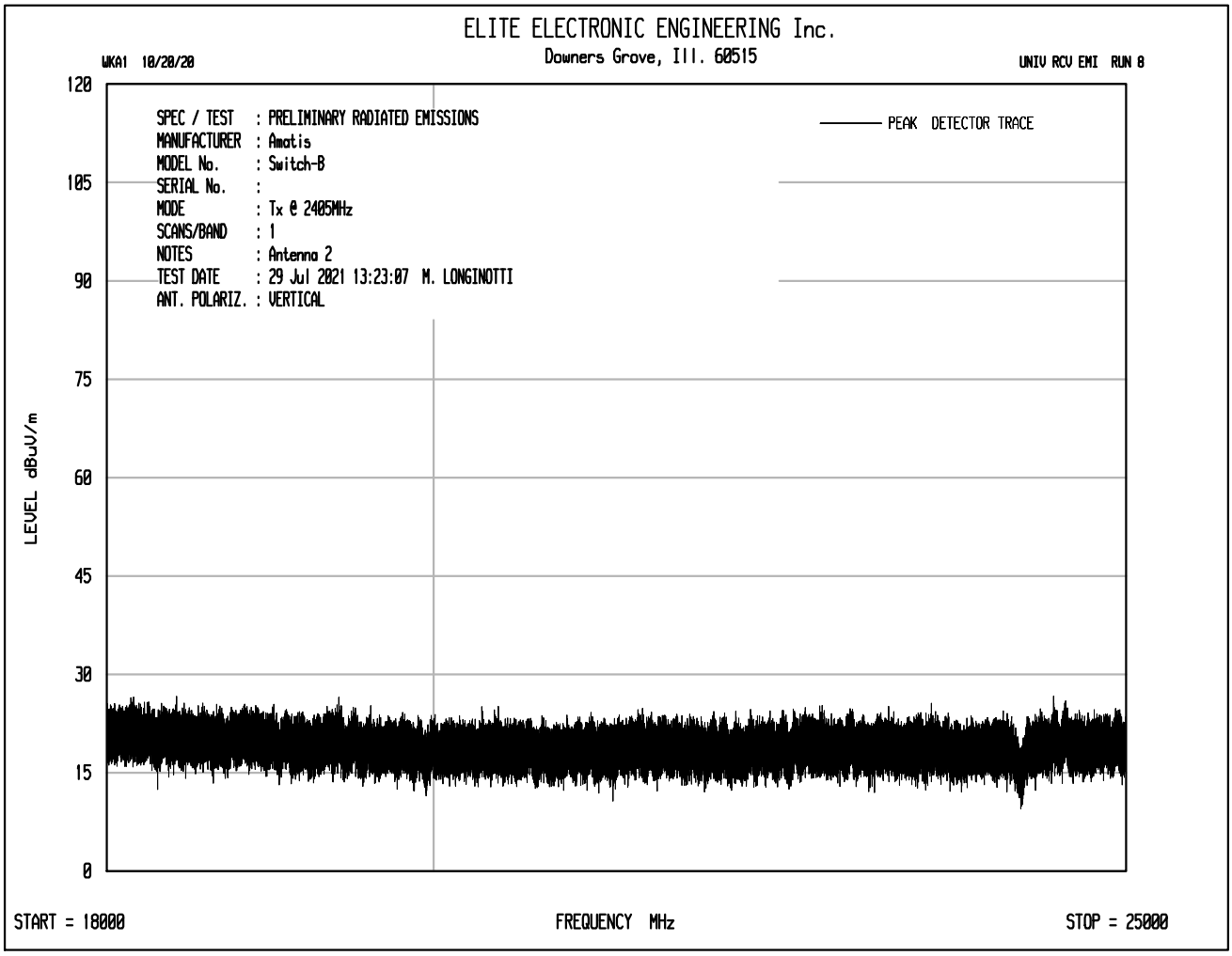

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 28 Jul 2021 16:11:56 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 9
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 28 Jul 2021 16:00:53 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 09:12:14 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 12
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 09:04:47 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 13:16:48 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2405MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 13:23:07 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	Antenna Port 2

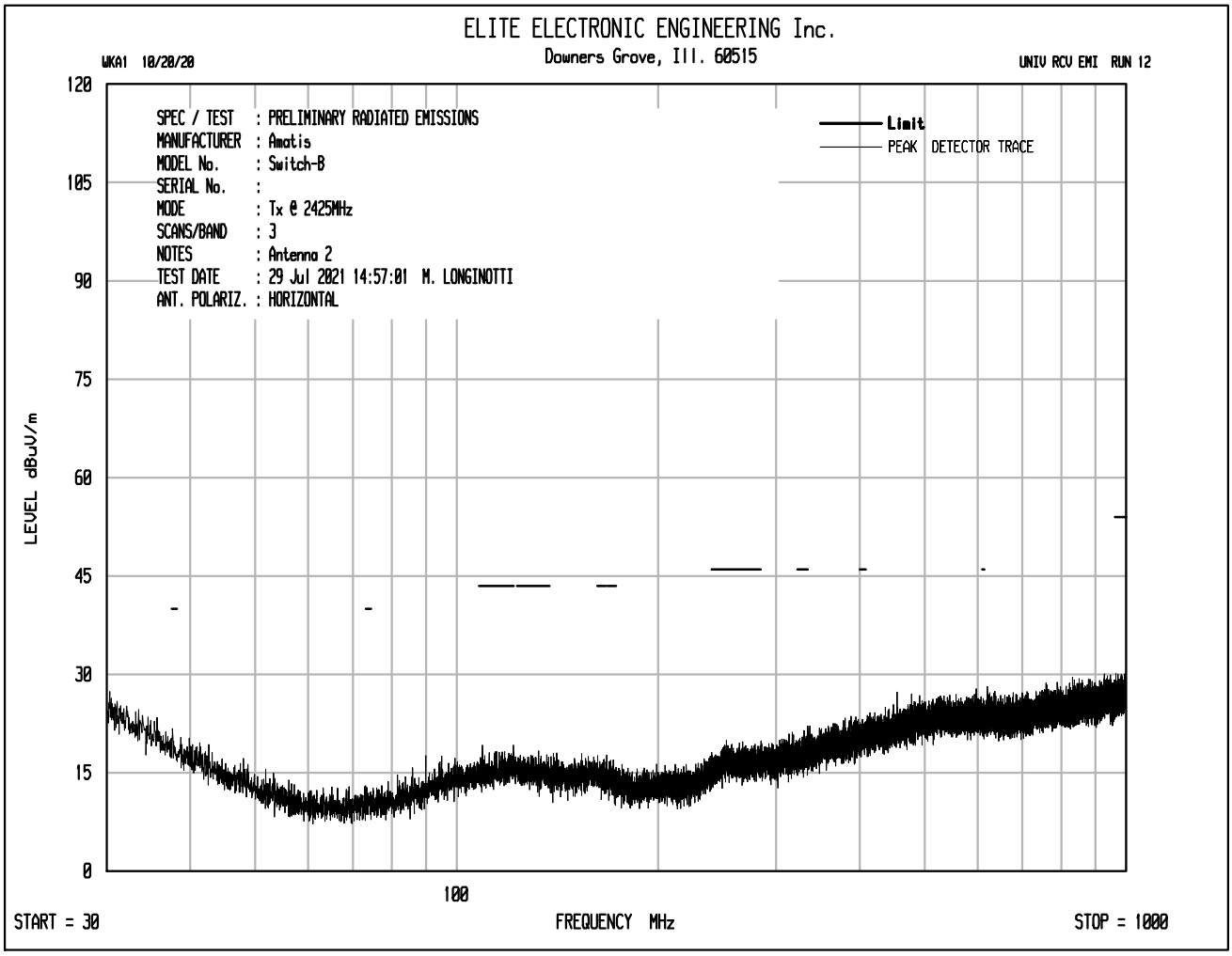
Frequency (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBµV/m at 3m	Peak Total µV/m at 3 m	Peak Limit µV/m at 3 m	Margin (dB)
4810.00	H	62.7		3.7	36.1	-39.7	62.8	1375.0	5000.0	-11.2
4810.00	V	53.9		3.7	36.1	-39.7	54.0	499.2	5000.0	-20.0
12025.00	H	48.2	Ambient	6.1	41.6	-39.0	56.8	695.3	5000.0	-17.1
12025.00	V	48.1	Ambient	6.1	41.6	-39.0	56.7	687.3	5000.0	-17.2
19240.00	H	29.6	Ambient	2.2	40.4	-28.2	44.0	158.1	5000.0	-30.0
19240.00	V	29.4	Ambient	2.2	40.4	-28.2	43.8	154.5	5000.0	-30.2

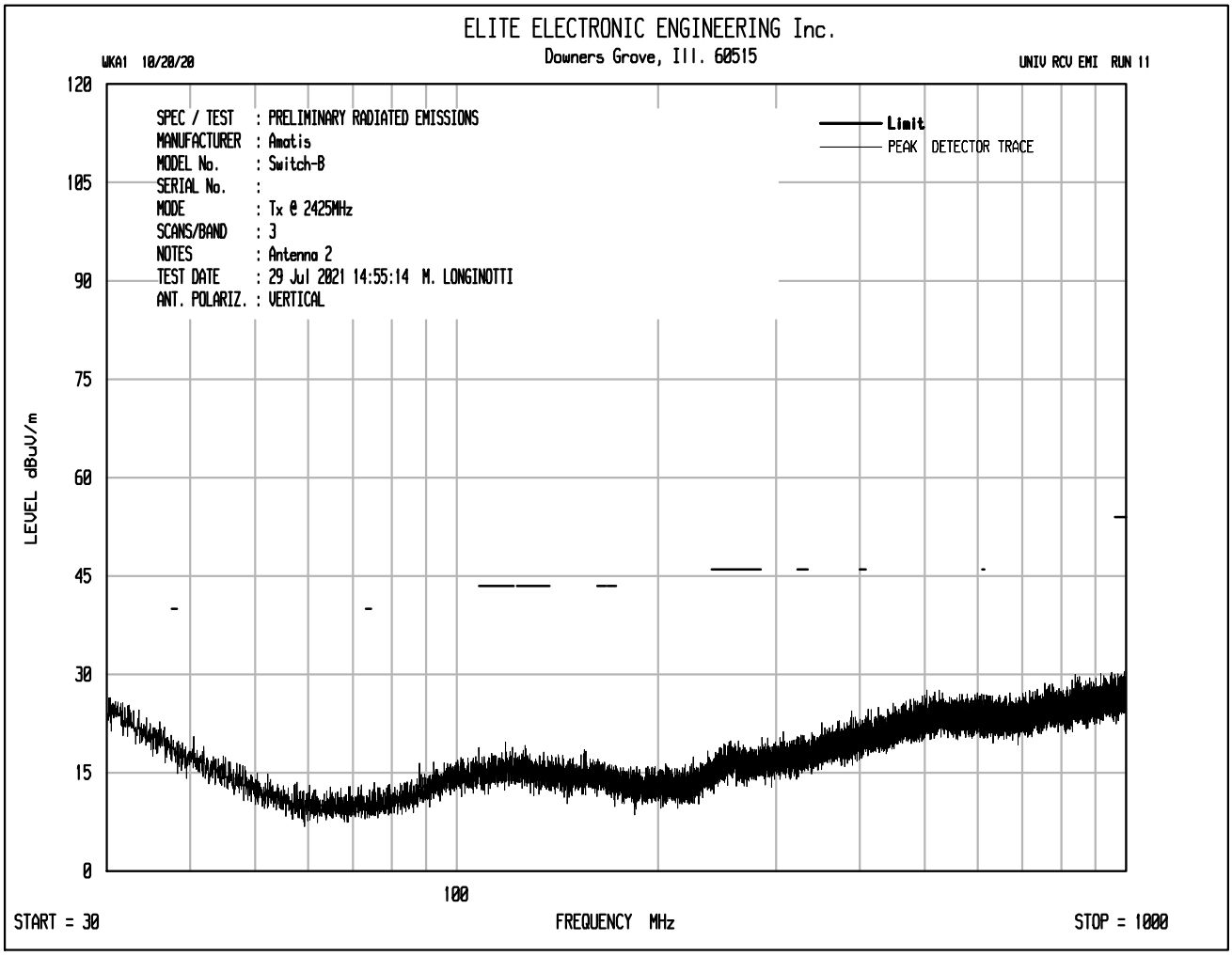
Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	Average Measurements in the Restricted Bands
Notes	Antenna Port 2

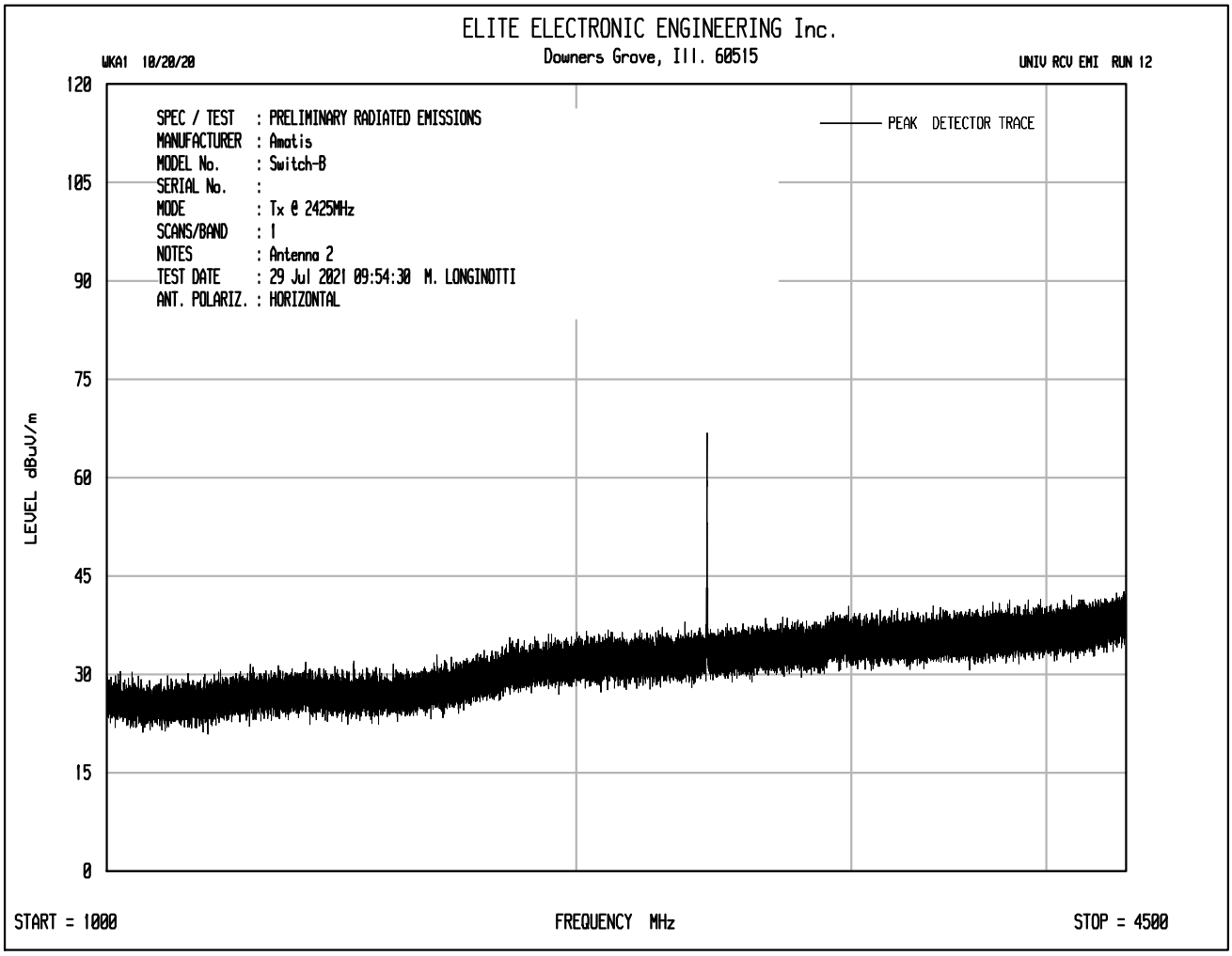
Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4810.00	H	53.8		3.7	36.1	-39.7	0.0	53.9	493.5	500.0	-0.1
4810.00	V	42.6		3.7	36.1	-39.7	0.0	42.7	135.9	500.0	-11.3
12025.00	H	32.9	Ambient	6.1	41.6	-39.0	0.0	41.5	119.4	500.0	-12.4
12025.00	V	32.9	Ambient	6.1	41.6	-39.0	0.0	41.5	119.4	500.0	-12.4
19240.00	H	15.1	Ambient	2.2	40.4	-28.2	0.0	29.5	29.8	500.0	-24.5
19240.00	V	15.1	Ambient	2.2	40.4	-28.2	0.0	29.5	29.8	500.0	-24.5

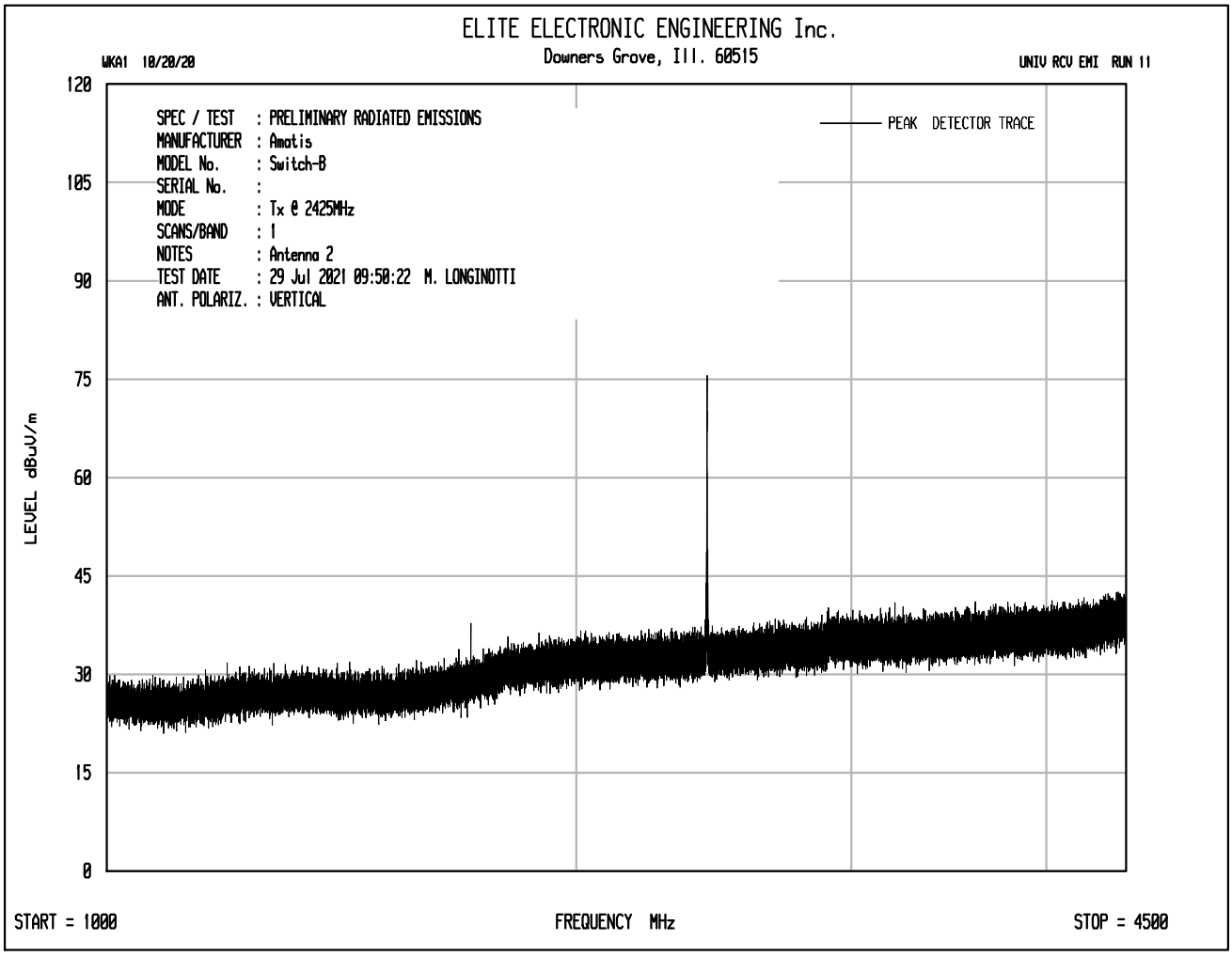
Test Details	
Manufacturer	Amatis Controls
Model	Switch-B
S/N	801f12fffe6aedad
Mode	Transmit
Carrier Frequency	2405MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	Antenna Port 2

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2405.00	H	37.7		2.6	32.7	0.0	73.0	4460.2		
2405.00	V	44.3		2.6	32.7	0.0	79.6	9535.7		
7215.00	H	48.7	Ambient	4.6	38.4	-39.7	52.1	402.0	953.6	-7.5
7215.00	V	48.7	Ambient	4.6	38.4	-39.7	52.1	402.0	953.6	-7.5
9620.00	H	49.2		5.2	39.2	-39.3	54.3	516.3	953.6	-5.3
9620.00	V	41.2		5.2	39.2	-39.3	46.3	205.6	953.6	-13.3
14430.00	H	38.0	Ambient	6.6	41.7	-38.6	47.8	244.6	953.6	-11.8
14430.00	V	37.9	Ambient	6.6	41.7	-38.6	47.7	241.8	953.6	-11.9
16835.00	H	38.1	Ambient	7.2	44.7	-37.4	52.6	426.5	953.6	-7.0
16835.00	V	37.1	Ambient	7.2	44.7	-37.4	51.6	380.1	953.6	-8.0
21645.00	H	19.5	Ambient	2.2	40.6	-28.6	33.7	48.7	953.6	-25.8
21645.00	V	19.4	Ambient	2.2	40.6	-28.6	33.6	48.1	953.6	-25.9
24050.00	H	18.9	Ambient	2.2	40.6	-29.3	32.5	42.0	953.6	-27.1
24050.00	V	19.2	Ambient	2.2	40.6	-29.3	32.8	43.5	953.6	-26.8


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 12
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2425MHz
SCANS/BAND : 3
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 14:57:01 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2425MHz
SCANS/BAND : 3
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 14:55:14 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 12
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2425MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 09:54:30 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/20
UNIV RCV EMI RUN 11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Amatis
MODEL No. : Switch-B
SERIAL No. :
MODE : Tx @ 2425MHz
SCANS/BAND : 1
NOTES : Antenna 2
TEST DATE : 29 Jul 2021 09:50:22 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500