HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

10/17/2023

Synergen Technology Labs
Sunil Konda
3131 McKinney Ave., Ste. 602
Dallas, TX 75204
USA

Dear Sunil Konda,

Enclosed is the EMC Wireless test report for compliance testing of the Halsa Smart Hub as tested to the requirements of FCC Part 15 Subpart C and RSS-247 Issue 3 for Intentional Radiators.

Thank you for using the services of Eurofins MET Labs. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS MET LABS

Nancy LaBrecque
Documentation Department

Reference: WIRA109927 – FCC15C

2.4GHz WiFi Test Report

for the

Halsa Smart Hub

Tested under
FCC Part 15 Subpart C and RSS-247 Issue 3
For Intentional Radiators

Bryan Taylor, Wireless Team Lead
Electromagnetic Compatibility Lab

Nancy LaBrecque
Documentation Department

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.

Matthew Hinojosa
EMC Manager, Austin Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	10/17/2023	Initial Issue.

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Halsa Smart Hub, with the requirements of FCC Part 15 Subpart C and RSS-247 Issue 3. Synergen Technology Labs should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Halsa Smart Hub, 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 FCC Part 15 Subpart C and RSS-247 Issue 3, in accordance with Synergen Technology Labs purchase order number 20092601. All tests were conducted using measurement procedures ANSI C63.4-2014 and ANSI C63.10-2013.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-247 Issue 2: 2017; RSS-GEN Issue 5: 2018	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	---	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN(8.8)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(2)	RSS-247 (5.2)	6dB Occupied Bandwidth	Compliant
---	RSS-GEN(6.7)	99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-247(5.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	RSS-247(5.2)	Peak Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-GEN (6.13), (8.9), & (8.10)	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-247(5.5)	RF Conducted Spurious Emissions Requirements	Compliant

Table 1. Executive Summary

II. Equipment Configuration

A. Overview

Eurofins MET Labs was contracted by Synergen Technology Labs to perform testing on the Halsa Smart Hub, under Synergen Technology Labs's purchase order number 20092601.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Halsa Smart Hub.

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

Model(s) Tested:	Halsa Smart Hub	
Model(s) Covered:	Halsa Smart Hub	
EUT Specifications:	Primary Power: 5VDC via 120VAC USB Wall Adapter	
	Type of Modulations:	802.11b, 802.11g, 802.11n (20MHz Channels), 802.11 (40MHz Channels)
	Equipment Code:	DTS
	Peak RF Output Power:	12.6dBm
	EUT Frequency Ranges:	2412-2462 MHz
	Antenna Gain (declared by Synergen Technology Labs)	3.5dBi
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Bryan Taylor	
Test Date(s):	6/13/2023 through 7/14/2023	

Table 2. EUT Summary Table

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, Issue 2, February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN, Issue 5, March 2019	General Requirements and Information for the Certification of Radio Apparatus
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

Table 3. References

C. Test Site

All testing was performed at Eurofins MET Labs, 13501 McCallen Pass, Austin, TX 78753. 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 MET Laboratories.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.97 dB	2	95%
RF Power Radiated Emissions	±2.95 dB	2	95%

Table 4. Uncertainty Calculations Summary

E. Description of Test Sample

Halsa Smart Hub device is the central point of the communication. Halsa Smart Hub handles and maintains the connection in between the Halsa Smart Sensor device via BLE and, with router via Wi-Fi. It is the point which make the local alerts based on the processed data. Halsa Smart Hub is always powered with connected power. This also acts as the charging dock for the Halsa Smart Sensor device. Halsa Smart hub contains the following features · Customizable Night Light; Customizable and Intelligent Sound Machine and Music; Touch sensor; Touch sensitive Quick Control for Presets; Audio Monitor · Two way communication from the App; Alexa/Google home integration · Environmental sensor for humidity and temperature; Easy snap on charging for the wearable · Vitals out of range Alarms/Alerts; Bluetooth low energy, Wi-Fi 2.4GHz · Connected power through USB wall adapter; Input: AC110-240V 50-60Hz 0.6A; Max Output: DC 5.0V-3.0A

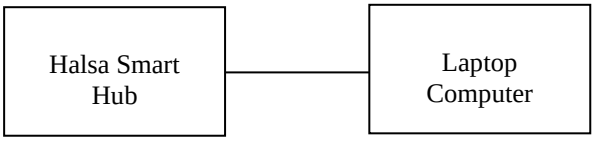


Figure 1. Block Diagram of Test Configuration

F. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. The laptop computer was used to send test commands to force the transmitters to operate in the appropriate test mode.

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Name / Description	Manufacturer	Model Number	Customer Supplied Calibration Data
Power Adapter	DongguanXie Yang Electronics Co. LTD.	XY-0029	None

Table 5. Support Equipment

H. Ports and Cabling Information

Port Name	Qty	Length as tested (m)	Shielded? (Y/N)	Termination Box ID & Port Name
DC Power	1	1m	Yes	USB Wall Adapter

Table 6. Ports and Cabling Information

I. Mode of Operation

The support laptop provided a direct means of controlling transmitter parameters. Unless otherwise stated or shown, all tests were performed at worst-case modulation and data rates on the following channels.

Transmit Band	Operating Mode	Worst Case Transmission Bandwidth	Channel Numbers Tested	Channel Frequencies Tested
2400 – 2483.5MHz	802.11b	20MHz	1 / 6 / 11	2412MHz / 2437MHz / 2462MHz
	802.11g	20MHz	1 / 6 / 11	2412MHz / 2437MHz / 2462MHz
	802.11n	20MHz	1 / 6 / 11	2412MHz / 2437MHz / 2462MHz
	802.11n (40)	40MHz	3 / 6 / 9	2422MHz / 2437MHz / 2452MHz

Table 7. Test Channels Utilized

J. Method of Monitoring EUT Operation

A spectrum analyzer was used to confirm proper transmitter operation.

K. 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.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Synergen Technology Labs upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant the criteria of §15.203. The TX antenna is not accessible by the end user.

Test Engineer(s): Bryan Taylor

Test Date(s): 6/28/2023

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 - 56	56 - 46
0.5-5	56	46
5-30	60	50

Table 8. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a 0.8 m-high wooden table. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2014 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed using a 50 Ω/50 μH LISN as the input transducer to an EMI receiver. For the purpose of this testing, the transmitter was turned on.

Test Results: The EUT was compliant with this requirement.

Test Engineer(s): An Dang

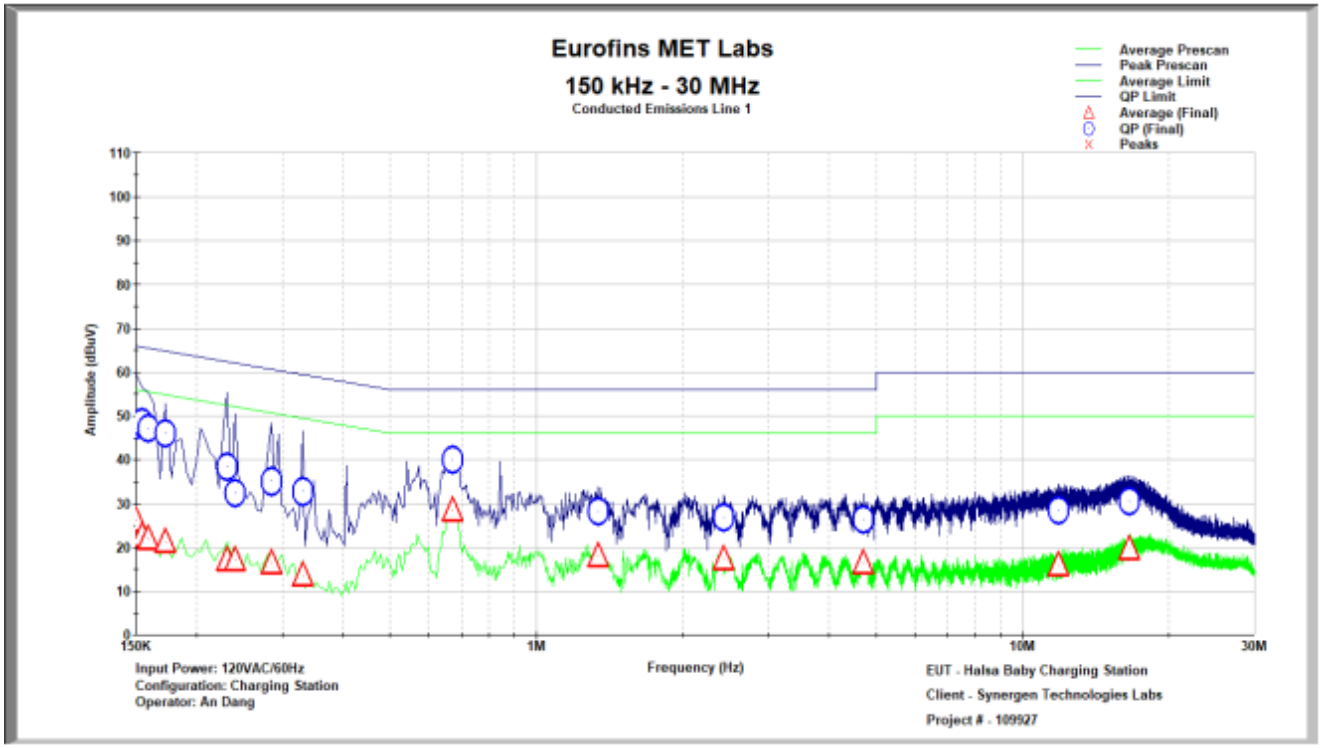
Test Date(s): 6/13/2023

15.207(a) Conducted Emissions Test Results

Measurement Location	Measurement	Limit	Result
Bonding measurement from LISN ground to ground plane	0.81	< 2.5 mΩ	Pass

Freq (MHz)	QP (dBµV)	QP Lim (dBµV)	QP Margin (dB)	Avg (dBµV)	Avg Lim (dBµV)	Avg Margin (dB)	Result
0.150	47.887	66.00	18.113	26.129	56.00	29.871	**Pass**
0.155	48.597	65.87	17.275	22.600	55.87	33.272	**Pass**
0.159	47.241	65.74	18.502	21.910	55.74	33.833	**Pass**
0.173	46.019	65.36	19.338	21.420	55.36	33.937	**Pass**
0.231	38.445	63.69	25.241	17.152	53.69	36.534	**Pass**
0.240	32.414	63.43	31.014	17.233	53.43	36.195	**Pass**
0.285	35.217	62.14	26.925	16.426	52.14	35.717	**Pass**
0.330	32.863	60.86	27.994	13.621	50.86	37.236	**Pass**
0.672	40.106	56.00	15.894	28.534	46.00	17.466	**Pass**
1.338	28.145	56.00	27.855	18.078	46.00	27.922	**Pass**
2.432	26.929	56.00	29.071	17.332	46.00	28.668	**Pass**
4.701	26.354	56.00	29.646	16.330	46.00	29.670	**Pass**
11.850	28.439	60.00	31.561	16.012	50.00	33.988	**Pass**
16.533	30.643	60.00	29.357	19.724	50.00	30.276	**Pass**

Table 9. Conducted Emissions, 15.207(a), Phase, Test Results



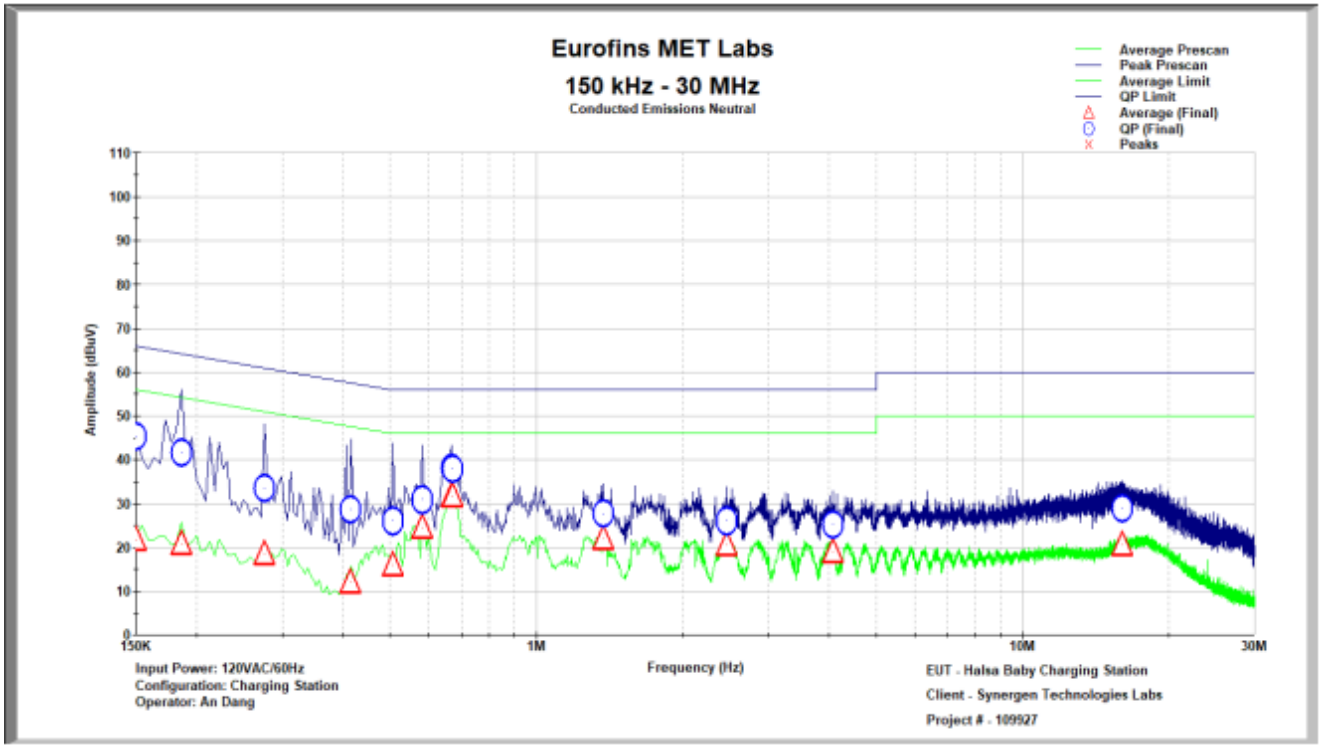
Conducted Emissions, 15.207(a), Phase

15.207(a) Conducted Emissions Test Results

Measurement Location	Measurement	Limit	Result
Bonding measurement from LISN ground to ground plane	0.81	< 2.5 mΩ	Pass

Freq (MHz)	QP (dBµV)	QP Lim (dBµV)	QP Margin (dB)	Avg (dBµV)	Avg Lim (dBµV)	Avg Margin (dB)	Result
0.150	45.341	66.00	20.659	21.836	56.00	34.164	**Pass**
0.186	41.625	64.97	23.347	20.731	54.97	34.241	**Pass**
0.276	33.524	62.40	28.876	18.508	52.40	33.892	**Pass**
0.415	28.677	58.43	29.751	11.982	48.43	36.447	**Pass**
0.506	26.113	56.00	29.887	15.940	46.00	30.060	**Pass**
0.582	31.124	56.00	24.876	24.516	46.00	21.484	**Pass**
0.668	38.121	56.00	17.879	31.637	46.00	14.363	**Pass**
0.672	37.958	56.00	18.042	31.704	46.00	14.296	**Pass**
1.370	27.670	56.00	28.330	22.072	46.00	23.928	**Pass**
2.459	26.173	56.00	29.827	20.625	46.00	25.375	**Pass**
4.076	25.229	56.00	30.771	18.963	46.00	27.037	**Pass**
15.989	28.835	60.00	31.165	20.596	50.00	29.404	**Pass**

Table 10. Conducted Emissions, 15.207(a), Neutral Line, Test Results



Conducted Emissions, 15.207(a), Neutral Line

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(2) 6 dB Bandwidth

Test Requirements: **§ 15.247(a)(2):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Procedure: The transmitter was on and transmitting at the highest output power. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately 1% of the total emission bandwidth, and the VBW > RBW. The 6 dB Bandwidth was measured and recorded. The measurements were performed on the low, mid and high channels.

Test Results The EUT was compliant with § 15.247 (a)(2).

The 6 dB Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Bryan Taylor

Test Date(s): 6/28/2023

Electromagnetic Compatibility Criteria for Intentional Radiators

RSS-GEN (6.7) 99% Bandwidth

Test Requirements: The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency rang between two points, one above and the other blow the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Test Procedure: The transmitter was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, and the VBW > RBW. The 99% Bandwidth was measured and recorded.

Test Results The 99% Bandwidth determined from the plots on the following pages.

Test Engineer(s): Bryan Taylor

Test Date(s): 6/28/2023

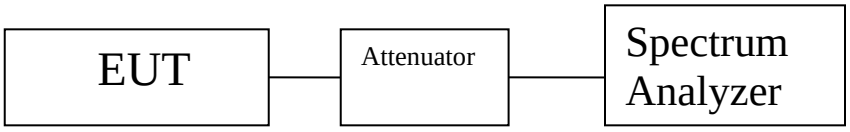


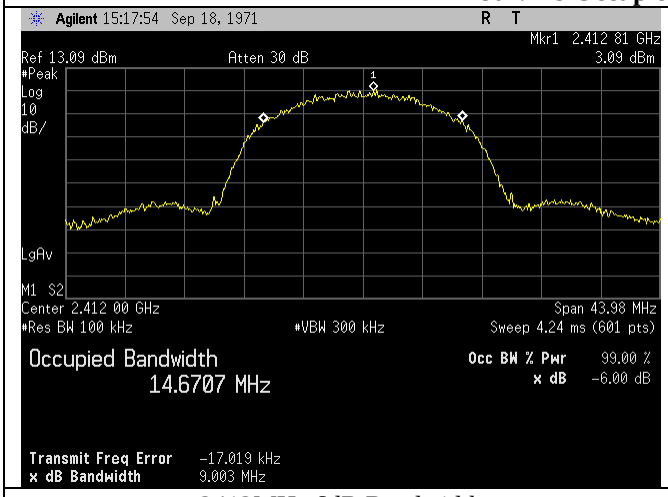
Figure 2. Block Diagram, Occupied Bandwidth Test Setup

Channel and Mode	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
WIFI_Low Ch_2412MHz_20MHz BW_b-mode	9.003	14.587
WIFI_Mid Ch_2437MHz_20MHz BW_b-mode	10.108	14.587
WIFI_High Ch_2462MHz_20MHz BW_b-mode	9.649	14.535
WIFI_Low Ch_2412MHz_20MHz BW_g-mode	15.221	16.602
WIFI_Mid Ch_2437MHz_20MHz BW_g-mode	14.179	19.411
WIFI_High Ch_2462MHz_20MHz BW_g-mode	15.152	16.488
WIFI_Low Ch_2412MHz_20MHz BW_n-mode	13.987	17.682
WIFI_Mid Ch_2437MHz_20MHz BW_n-mode	15.185	19.081
WIFI_High Ch_2462MHz_20MHz BW_n-mode	15.276	17.659
WIFI_Low Ch_2422MHz_40MHz BW_n-mode	35.184	36.002
WIFI_Mid Ch_2437MHz_40MHz BW_n-mode	33.962	39.792
WIFI_High Ch_2452MHz_40MHz BW_n-mode	35.340	35.881

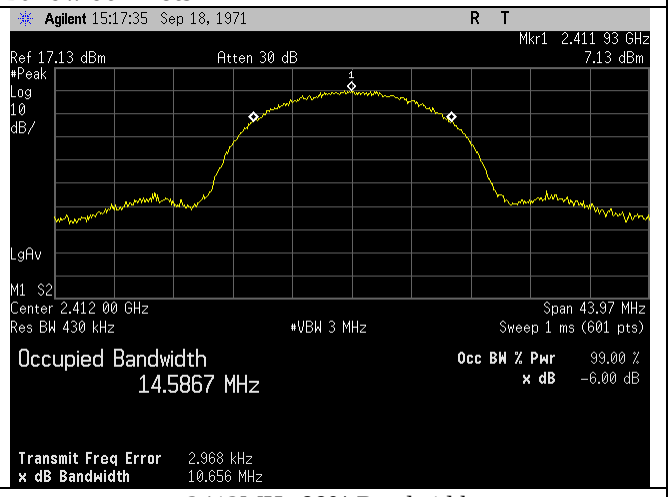
Table 11. 99% and 6 dB Occupied Bandwidth, Test Results

Occupied Bandwidth Test Results

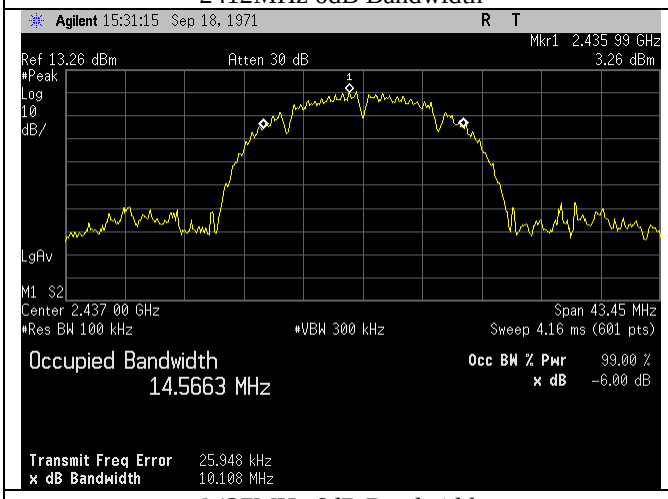
802.11b Occupied Bandwidth Plots



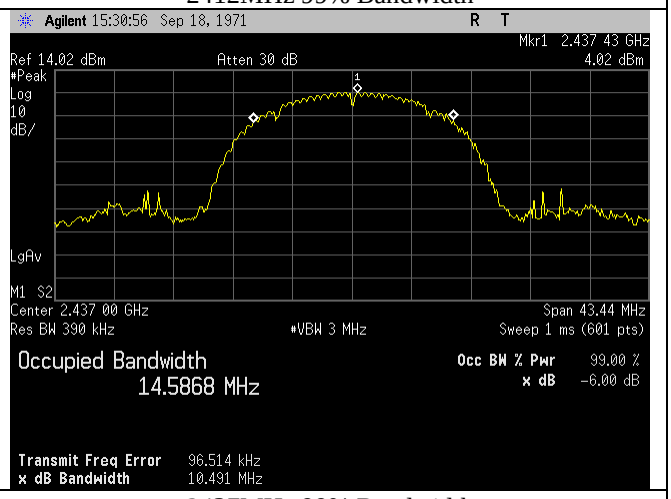
2412MHz 6dB Bandwidth



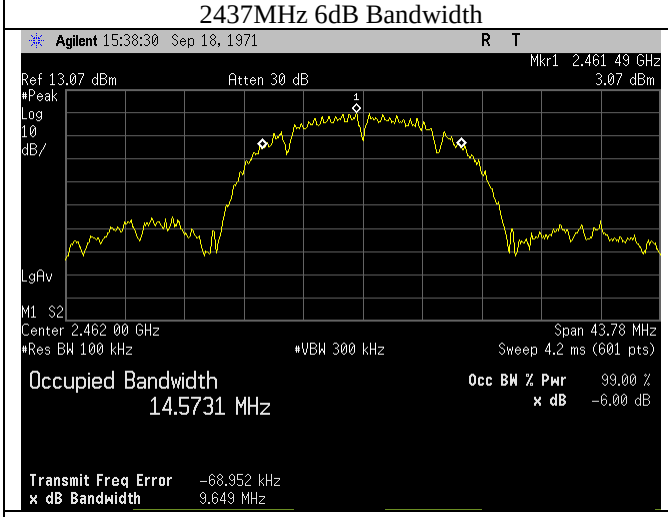
2412MHz 99% Bandwidth



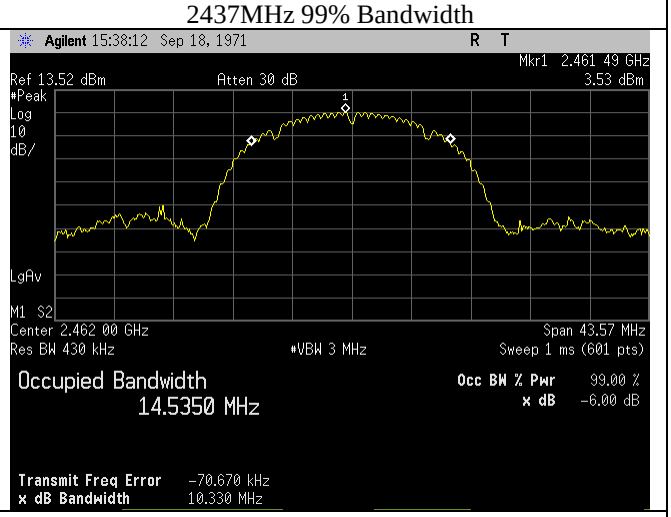
2437MHz 6dB Bandwidth



2437MHz 99% Bandwidth

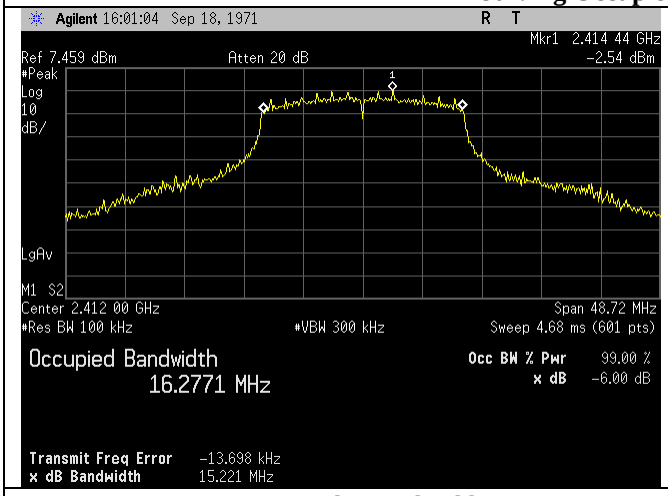


2462MHz 6dB Bandwidth

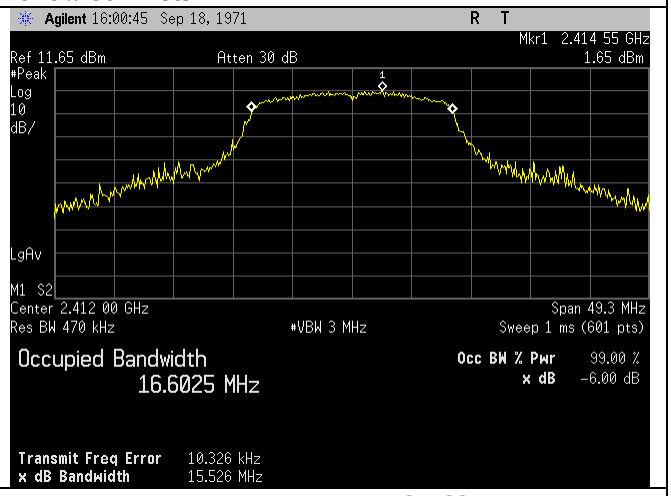


2462MHz 99% Bandwidth

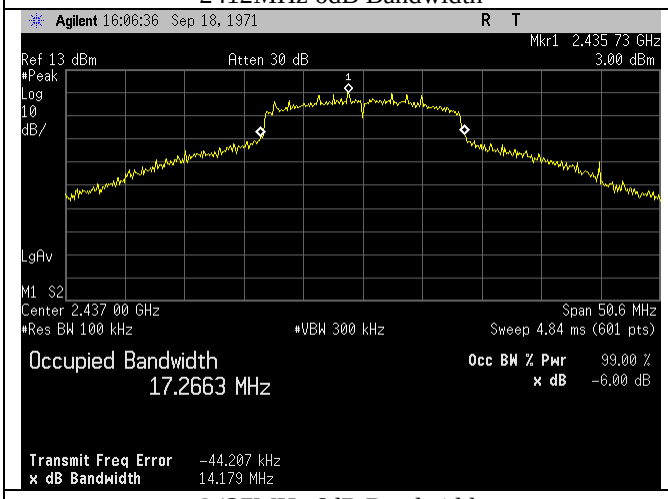
802.11g Occupied Bandwidth Plots



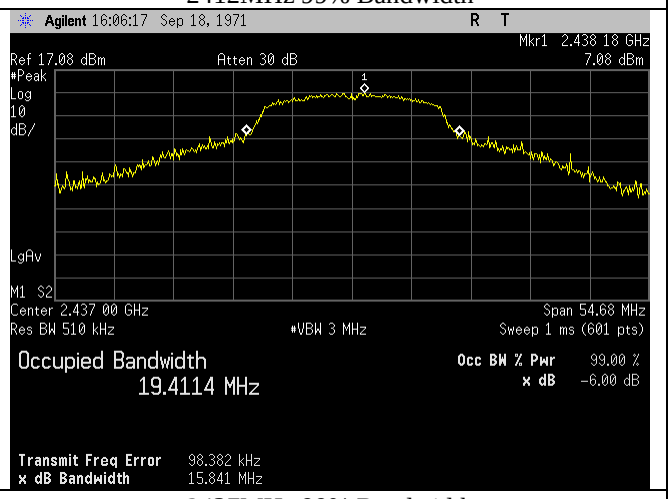
2412MHz 6dB Bandwidth



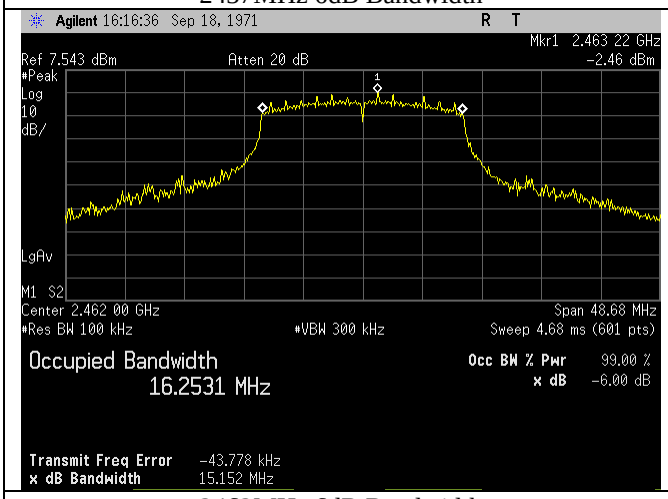
2412MHz 99% Bandwidth



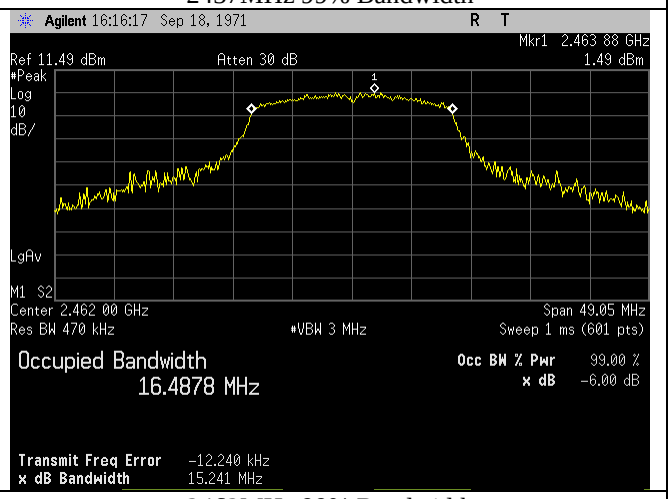
2437MHz 6dB Bandwidth



2437MHz 99% Bandwidth

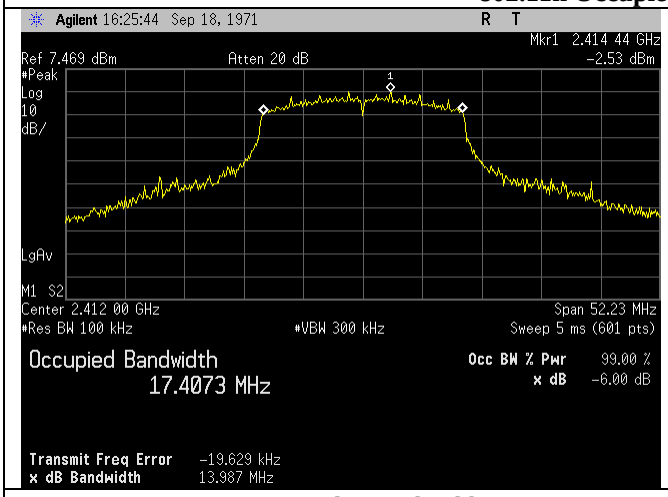


2462MHz 6dB Bandwidth

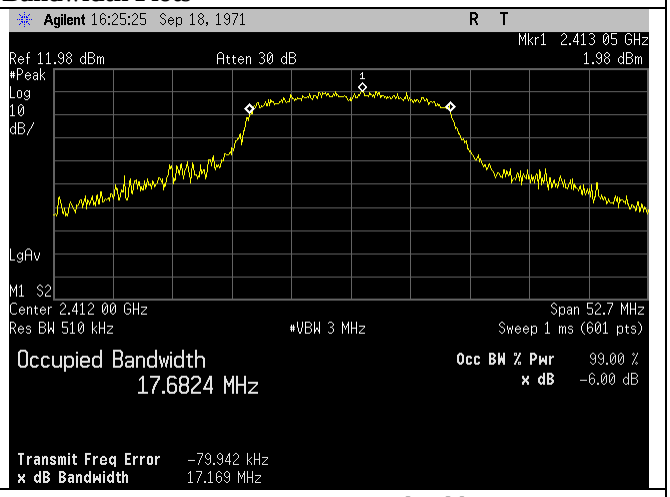


2462MHz 99% Bandwidth

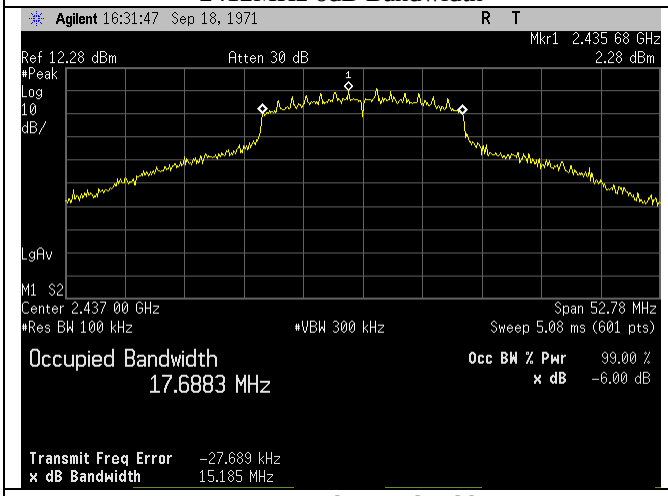
802.11n Occupied Bandwidth Plots



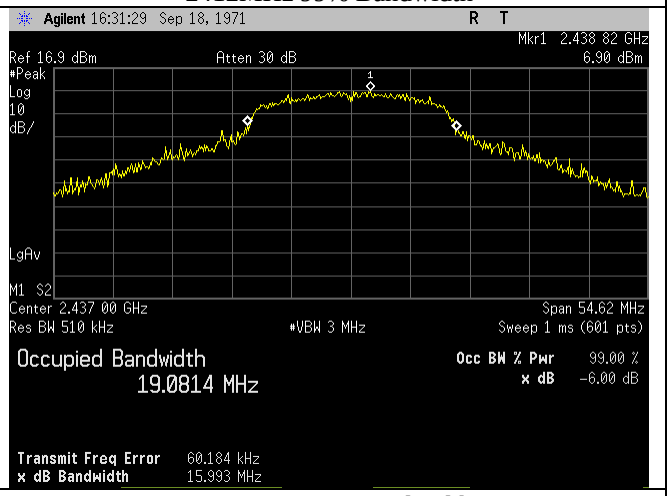
2412MHz 6dB Bandwidth



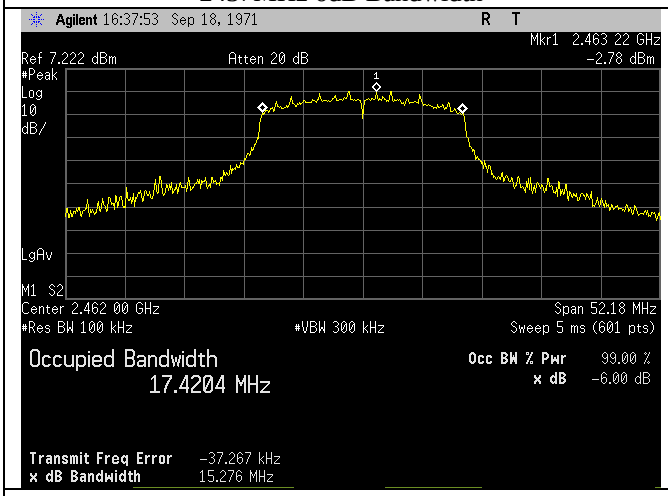
2412MHz 99% Bandwidth



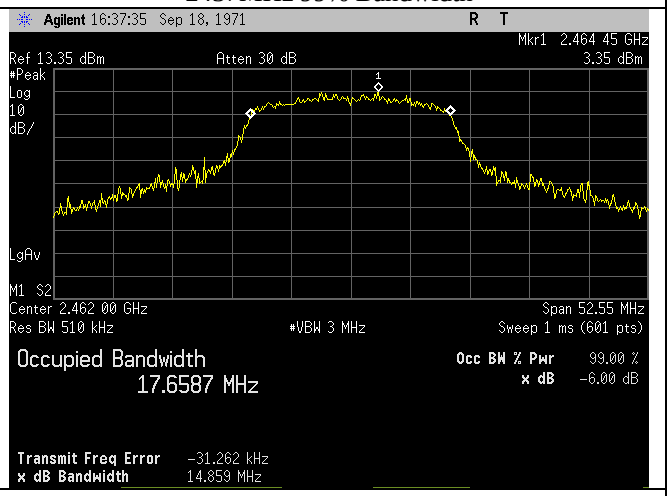
2437MHz 6dB Bandwidth



2437MHz 99% Bandwidth

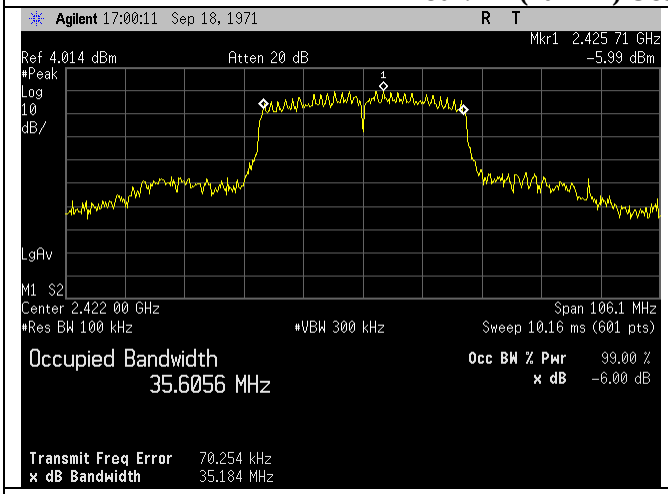


2462MHz 6dB Bandwidth

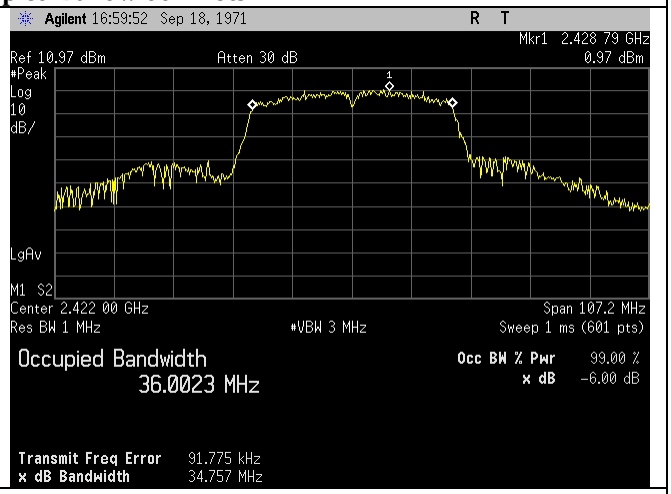


2462MHz 99% Bandwidth

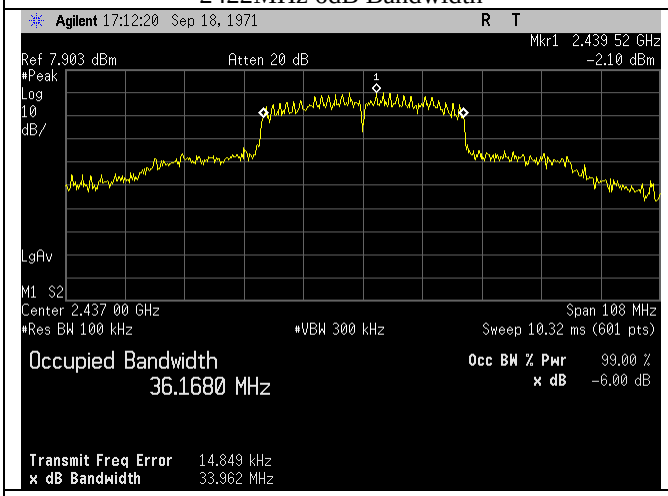
802.11n (40MHz) Occupied Bandwidth Plots



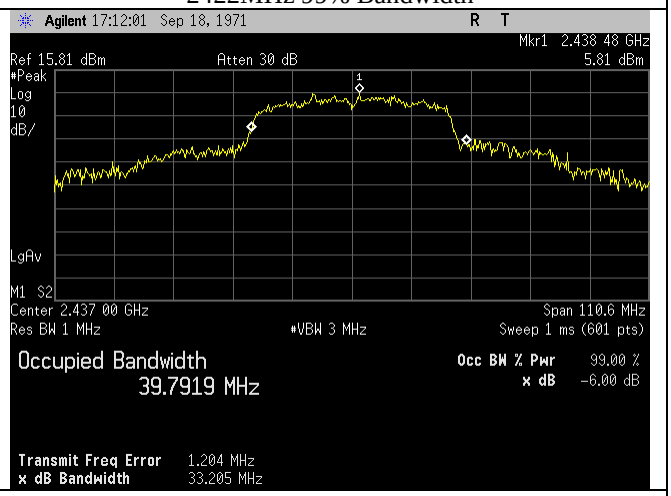
2422MHz 6dB Bandwidth



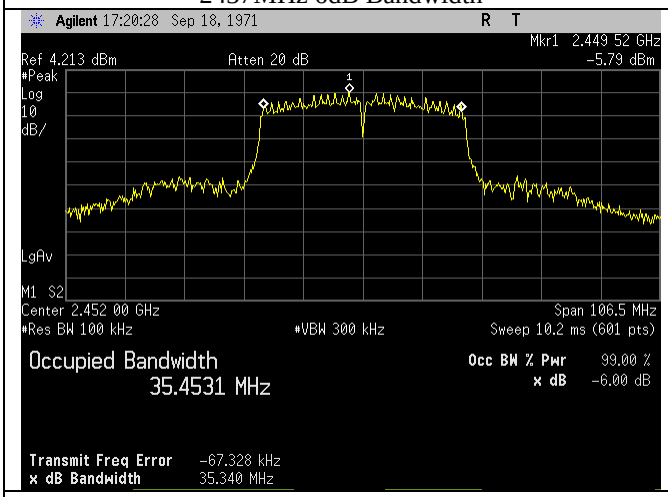
2422MHz 99% Bandwidth



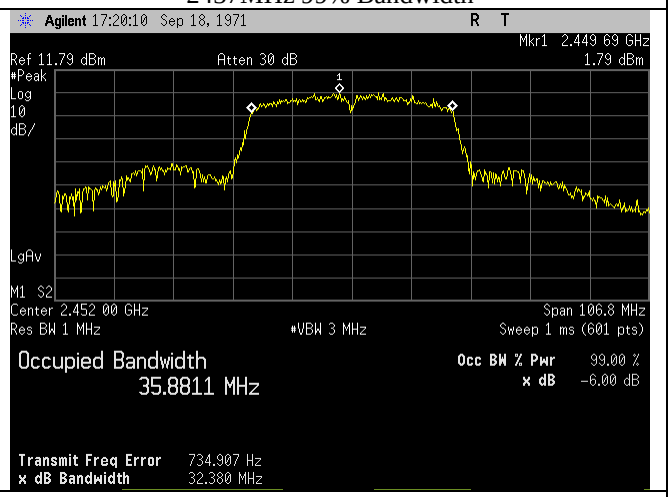
2437MHz 6dB Bandwidth



2437MHz 99% Bandwidth



2452MHz 6dB Bandwidth



2452MHz 99% Bandwidth

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Conducted Output Power

Test Requirements: **§15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400–2483.5	1.000
5725– 5850	1.000

Table 12. Output Power Requirements from §15.247(b)

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the Table 12, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band and using a point to point application may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Fixed, point-to-point operation excludes the use of point-to-multipoint systems, Omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The analyzer reference level was offset by cable loss connecting to the test sample. The peak power was measured at the low, mid and high channels of each band at the maximum power level.

Test Results: The EUT was compliant with the Peak Power Output limits of **§15.247(b)**.

Test Engineer(s): Bryan Taylor

Test Date(s): 6/28/2023

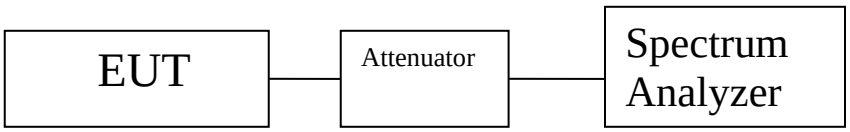


Figure 3. Peak Power Output Test Setup

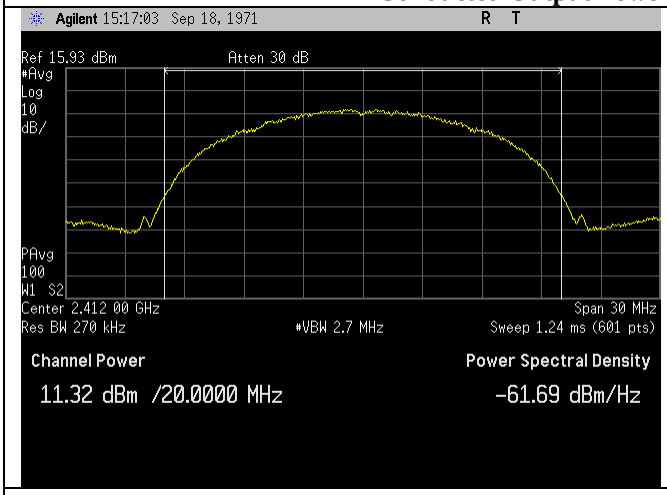
Conducted Output Test Results

Channel and Mode	Conducted Power (mW)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)
WIFI_Low Ch_2412MHz_20MHz BW_b-mode	13.56	11.32	30	18.68
WIFI_Mid Ch_2437MHz_20MHz BW_b-mode	18.20	12.60	30	17.40
WIFI_High Ch_2462MHz_20MHz BW_b-mode	15.94	12.03	30	17.97
WIFI_Low Ch_2412MHz_20MHz BW_g-mode	4.90	6.90	30	23.10
WIFI_Mid Ch_2437MHz_20MHz BW_g-mode	16.30	12.12	30	17.88
WIFI_High Ch_2462MHz_20MHz BW_g-mode	4.45	6.48	30	23.52
WIFI_Low Ch_2412MHz_20MHz BW_n-mode	4.67	6.69	30	23.31
WIFI_Mid Ch_2437MHz_20MHz BW_n-mode	13.08	11.17	30	18.83
WIFI_High Ch_2462MHz_20MHz BW_n-mode	4.61	6.63	30	23.37
WIFI_Low Ch_2422MHz_40MHz BW_n-mode	1.15	0.60	30	29.40
WIFI_Mid Ch_2437MHz_40MHz BW_n-mode	2.53	4.04	30	25.96
WIFI_High Ch_2452MHz_40MHz BW_n-mode	1.17	0.70	30	29.30

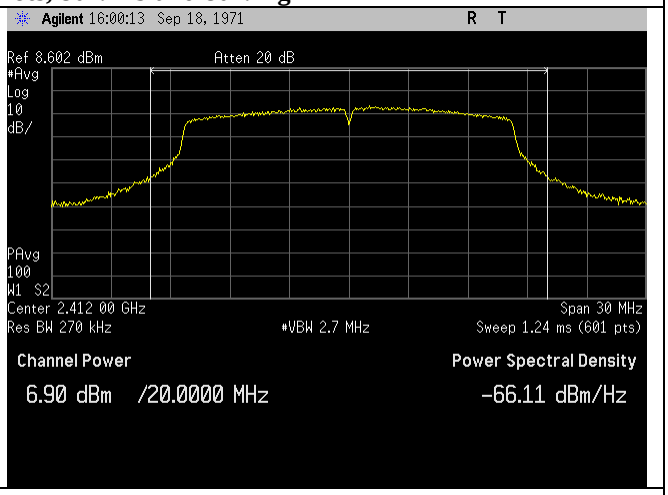
Table 13. Conducted Power Output, Test Results

Peak Power Output Test Results

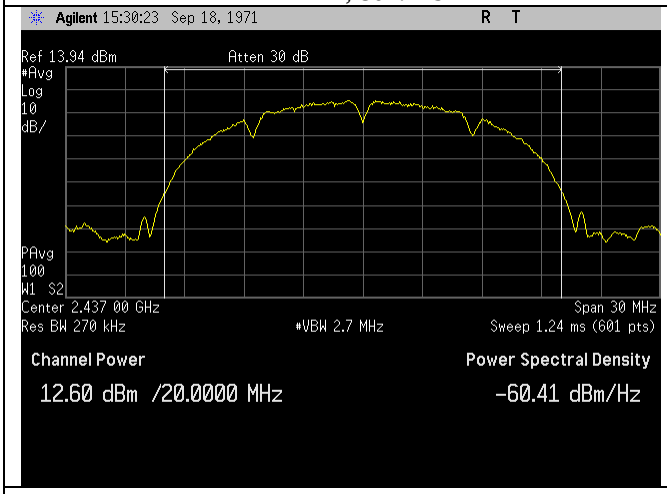
Conducted Output Power Plots, 802.11b and 802.11g



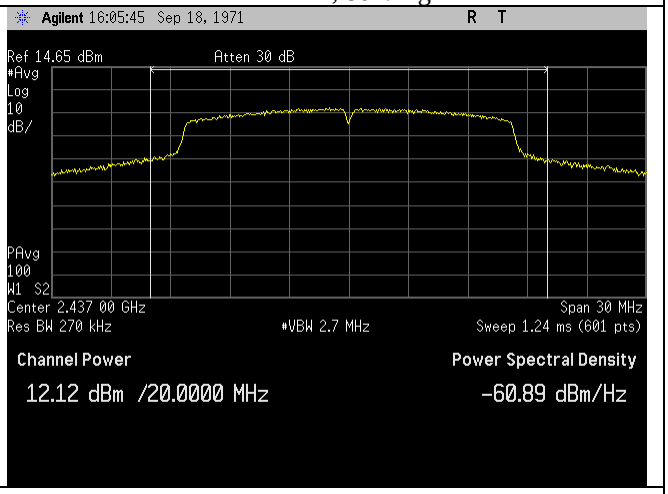
2412MHz, 802.11b



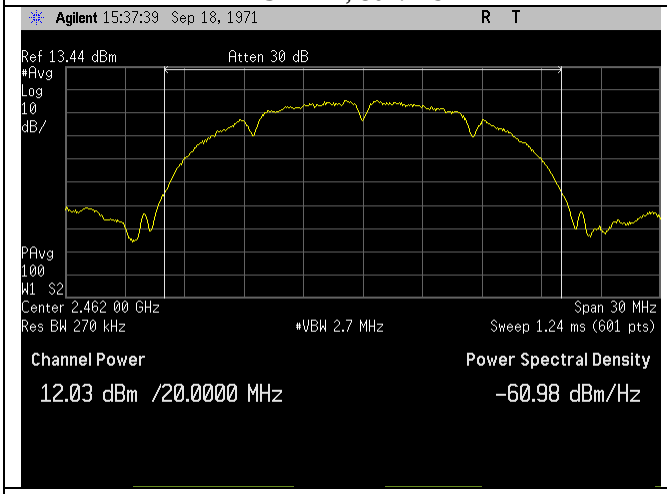
2412MHz, 802.11g



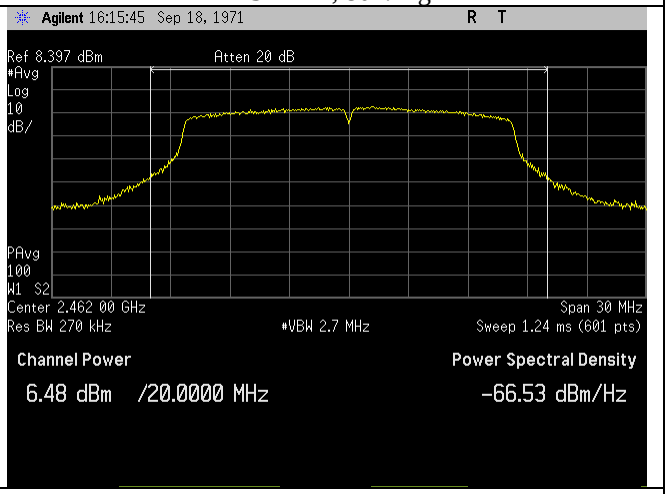
2437MHz, 802.11b



2437MHz, 802.11g

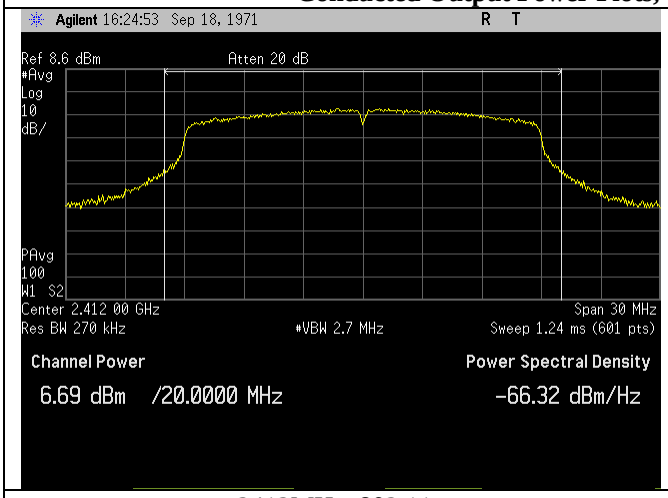


2462MHz, 802.11b

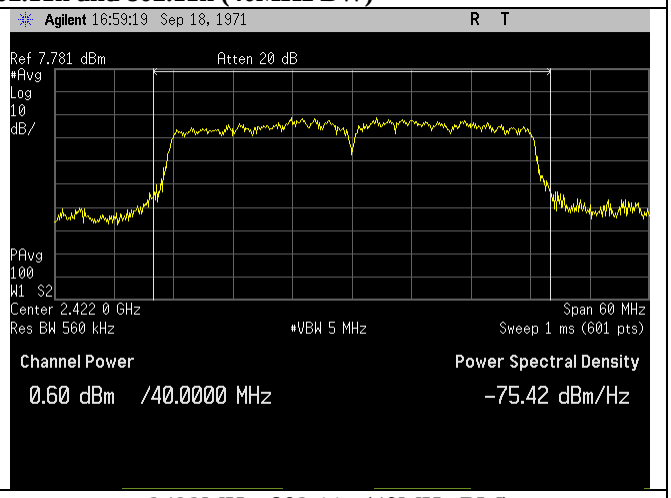


2462MHz, 802.11g

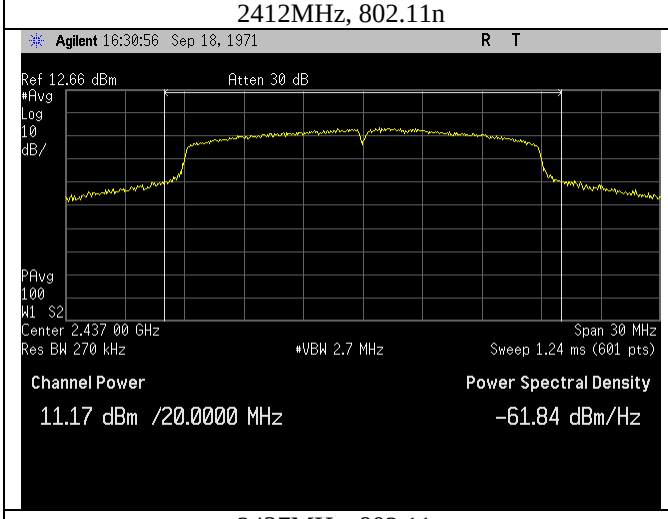
Conducted Output Power Plots, 802.11n and 802.11n (40MHz BW)



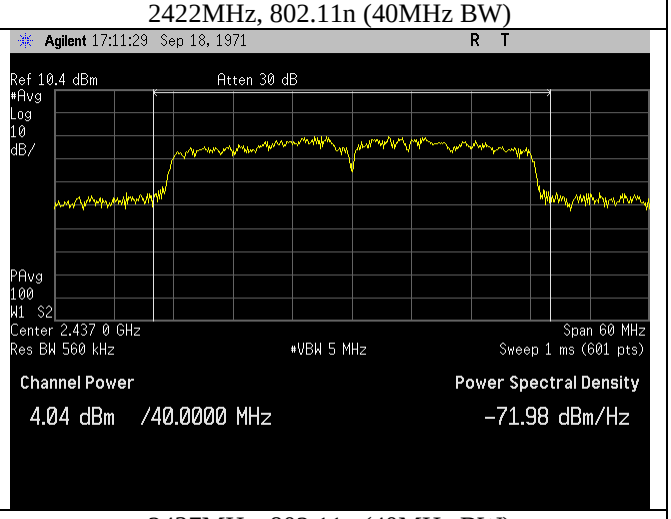
2412MHz, 802.11n



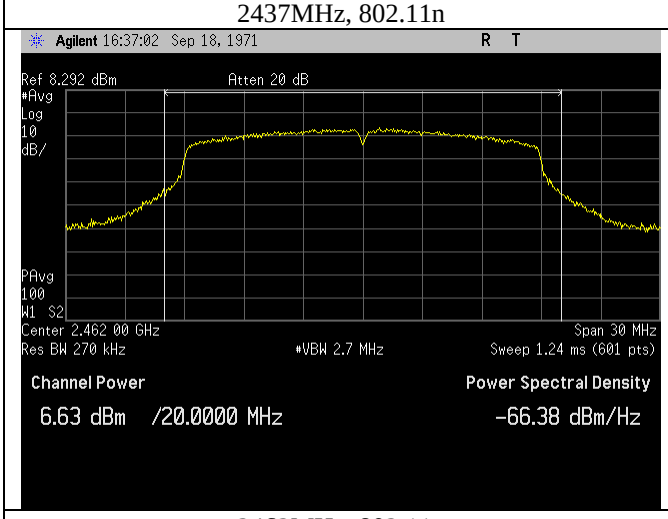
2422MHz, 802.11n (40MHz BW)



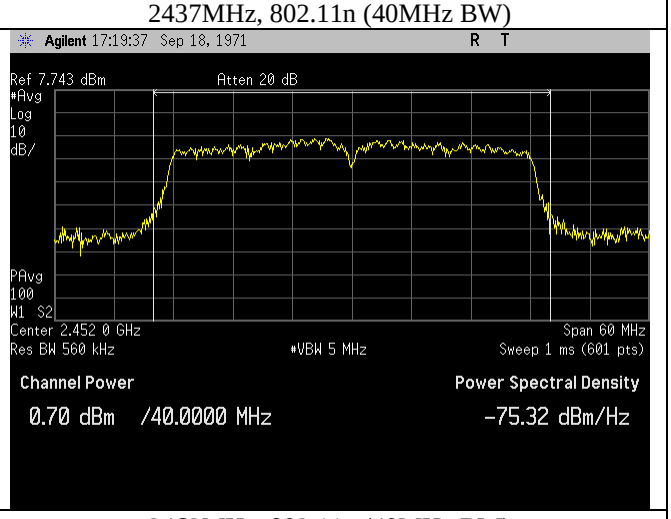
2437MHz, 802.11n



2437MHz, 802.11n (40MHz BW)



2462MHz, 802.11n



2462MHz, 802.11n (40MHz BW)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(e) Peak Power Spectral Density

Test Requirements: **§15.247(e):** For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. The RBW was set between 3kHz and 100 kHz. The VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels.

Test Results: The EUT was compliant with the peak power spectral density limits of **§ 15.247 (e)**.

The peak power spectral density was determined from plots on the following page(s).

Test Engineer: Bryan Taylor

Test Date: **6/28/2023**

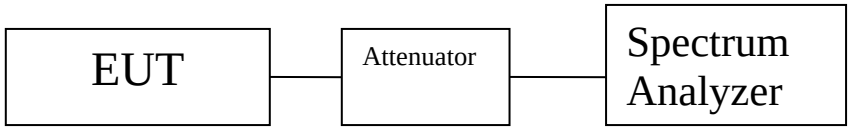


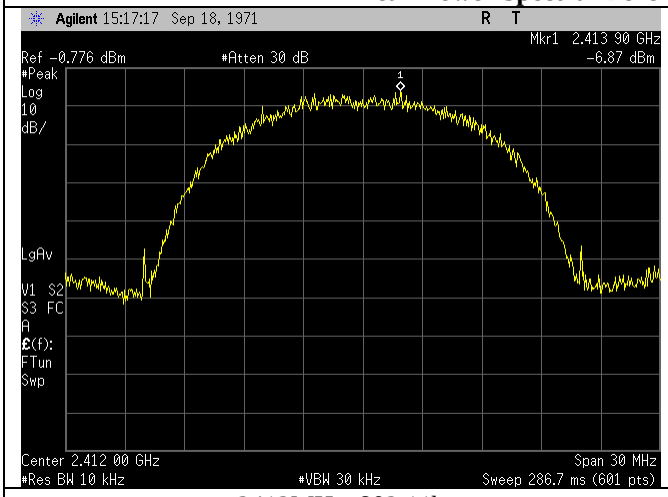
Figure 4. Block Diagram, Peak Power Spectral Density Test Setup

Channel and mode	Peak PSD (mW)	Peak PSD (dBm)	Limit (dBm)	Margin dB
WIFI_Low Ch_2412MHz_20MHz BW_b-mode	0.2057	-6.87	8	14.87
WIFI_Mid Ch_2437MHz_20MHz BW_b-mode	0.2686	-5.71	8	13.71
WIFI_High Ch_2462MHz_20MHz BW_b-mode	0.2852	-5.45	8	13.45
WIFI_Low Ch_2412MHz_20MHz BW_g-mode	0.0646	-11.89	8	19.89
WIFI_Mid Ch_2437MHz_20MHz BW_g-mode	0.2279	-6.42	8	14.42
WIFI_High Ch_2462MHz_20MHz BW_g-mode	0.0666	-11.77	8	19.77
WIFI_Low Ch_2412MHz_20MHz BW_n-mode	0.0567	-12.46	8	20.46
WIFI_Mid Ch_2437MHz_20MHz BW_n-mode	0.1500	-8.24	8	16.24
WIFI_High Ch_2462MHz_20MHz BW_n-mode	0.0600	-12.22	8	20.22
WIFI_Low Ch_2422MHz_40MHz BW_n-mode	0.0249	-16.04	8	24.04
WIFI_Mid Ch_2437MHz_40MHz BW_n-mode	0.0957	-10.19	8	18.19
WIFI_High Ch_2452MHz_40MHz BW_n-mode	0.0277	-15.57	8	23.57

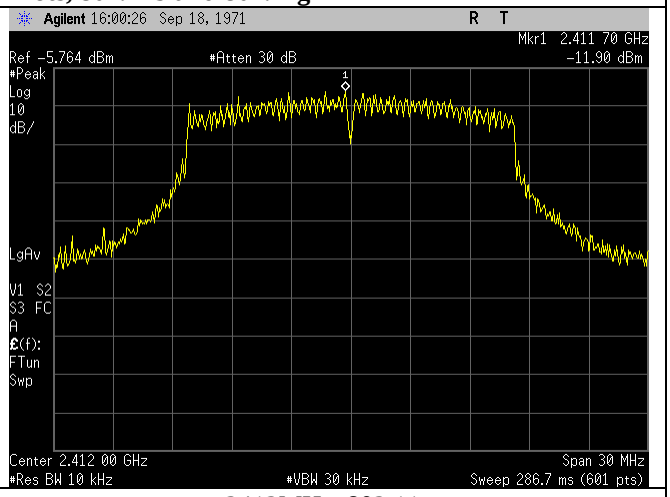
Table 14. Peak Power Spectral Density, Test Results

Peak Power Spectral Density

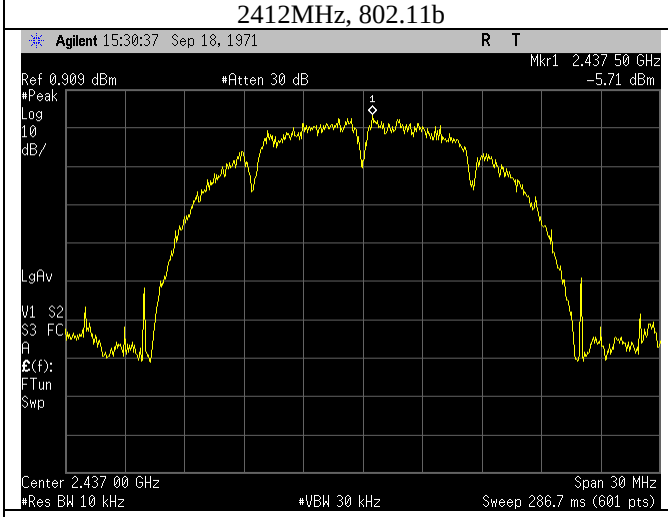
Peak Power Spectral Density Plots, 802.11b and 802.11g



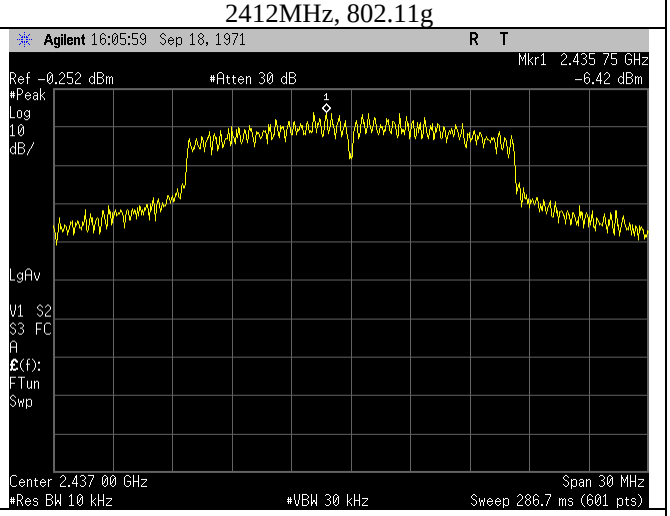
2412MHz, 802.11b



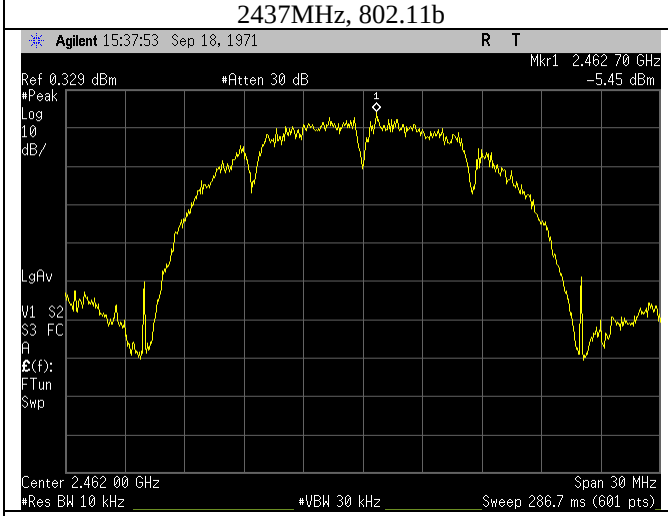
2412MHz, 802.11g



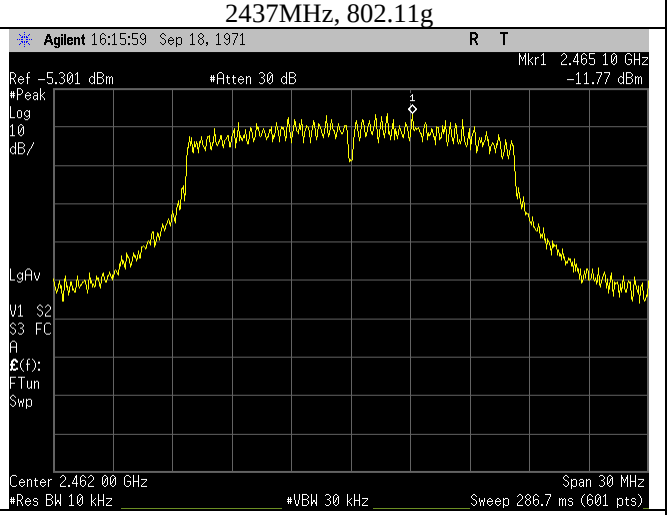
2437MHz, 802.11b



2437MHz, 802.11g

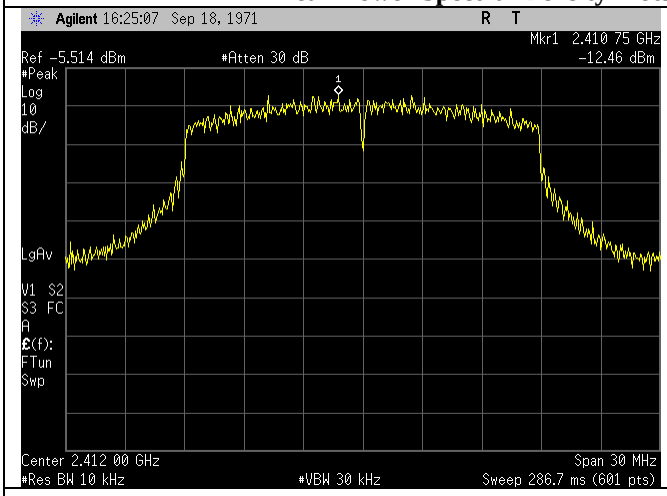


2462MHz, 802.11b

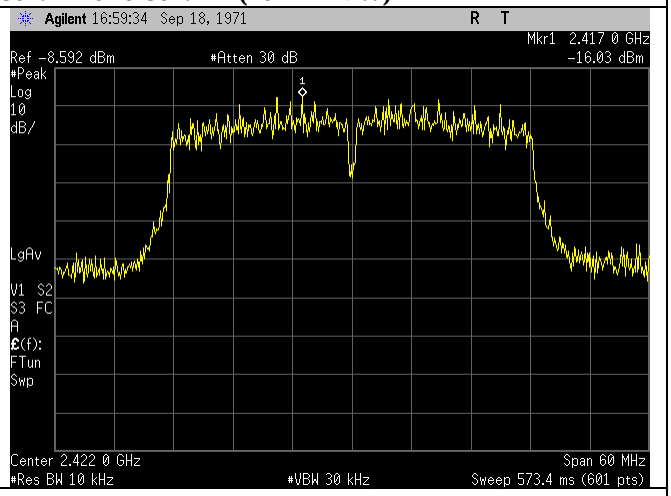


2462MHz, 802.11g

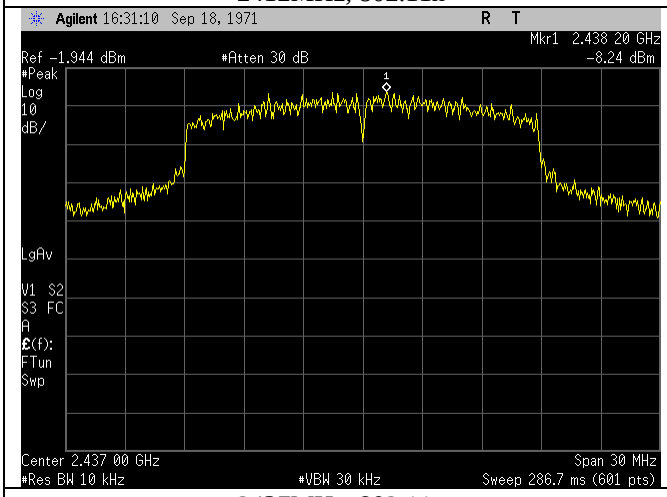
Peak Power Spectral Density Plots, 802.11n and 802.11n (40MHz BW)



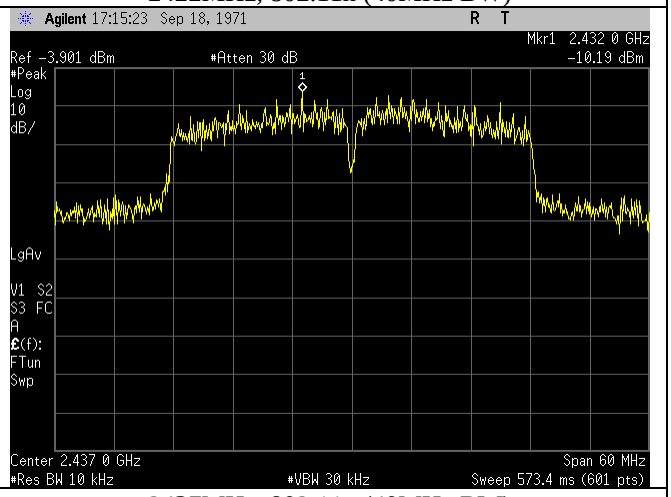
2412MHz, 802.11n



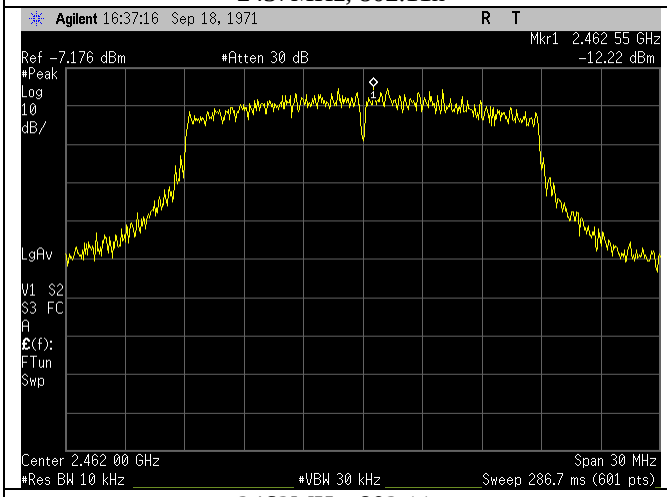
2422MHz, 802.11n (40MHz BW)



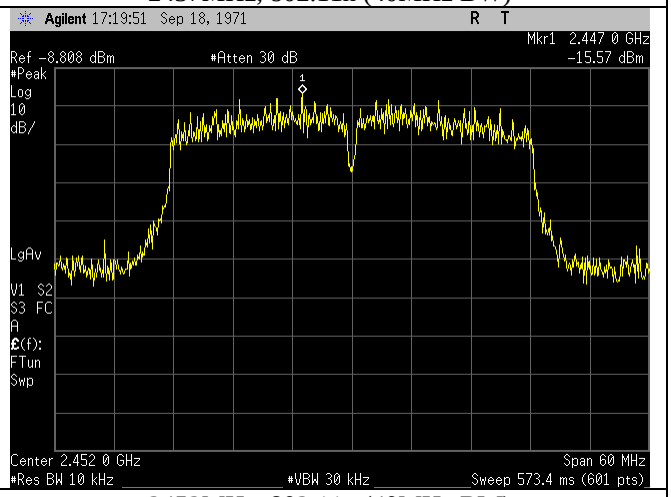
2437MHz, 802.11n



2437MHz, 802.11n (40MHz BW)



2462MHz, 802.11n



2452MHz, 802.11n (40MHz BW)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements

Test Requirement: **15.247(d)** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Procedure: For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. The RBW was set to 100 kHz. The VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels.

See following pages for detailed test results with RF Conducted Spurious Emissions.

Test Results: The EUT was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

Test Engineer(s): Bryan Taylor

Test Date(s): 6/28/2023

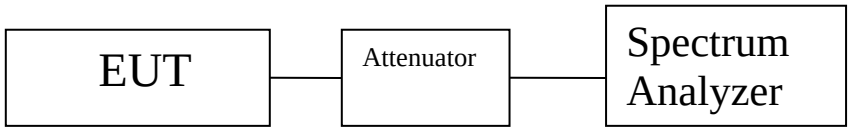
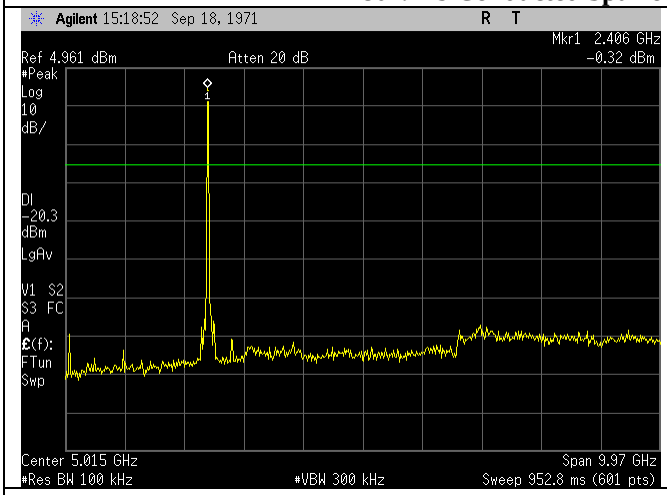


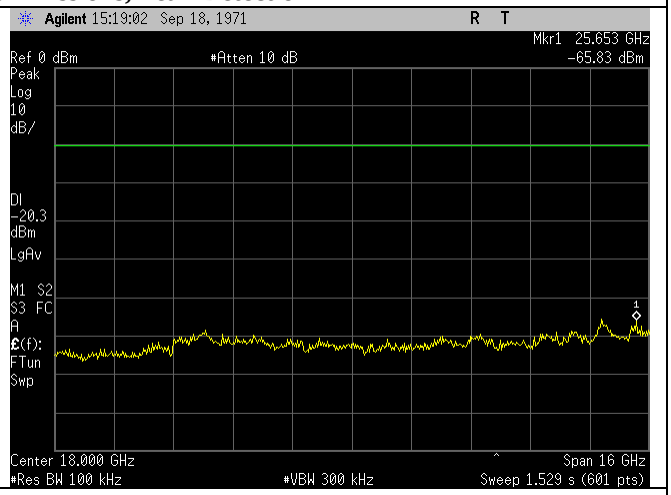
Figure 5. Block Diagram, Conducted Spurious Emissions Test Setup

Conducted Spurious Emissions Test Results

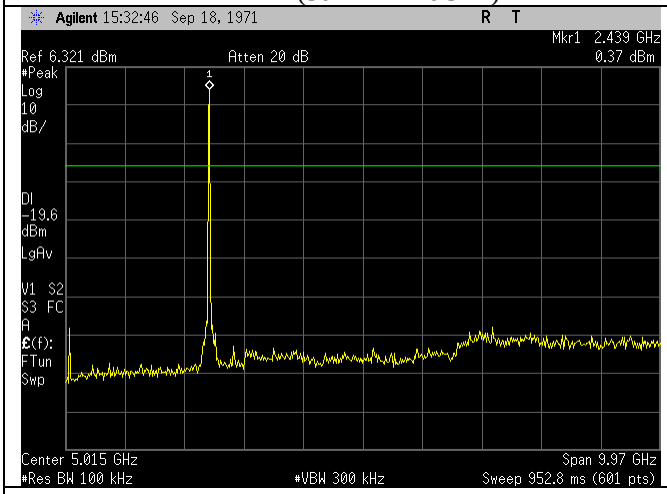
802.11b Conducted Spurious Emissions, Peak Detection



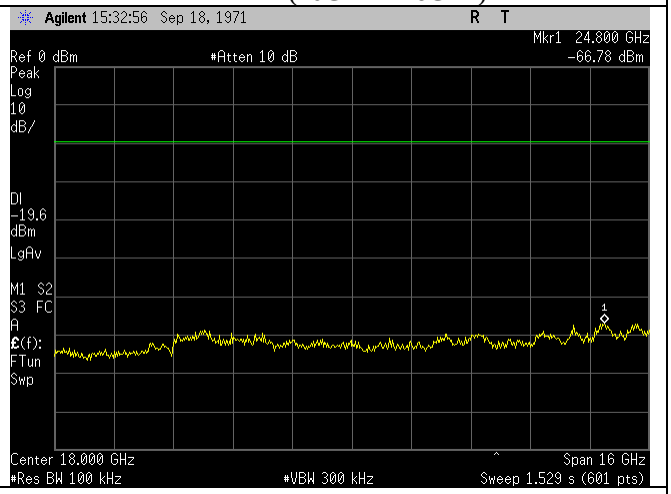
2412MHz (30MHz – 10GHz)



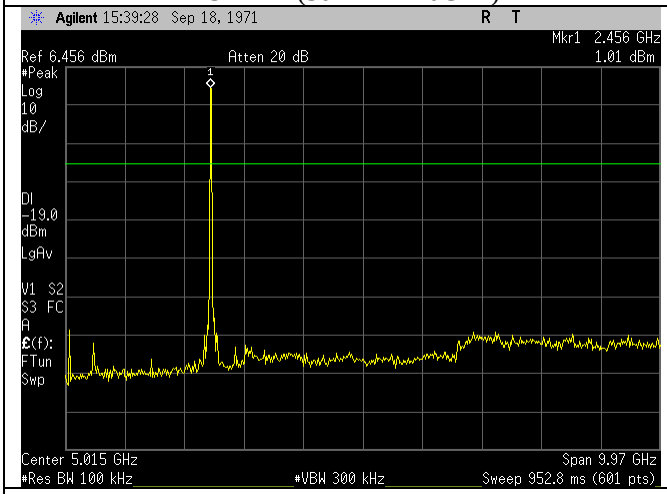
2412MHz (10GHz – 26GHz)



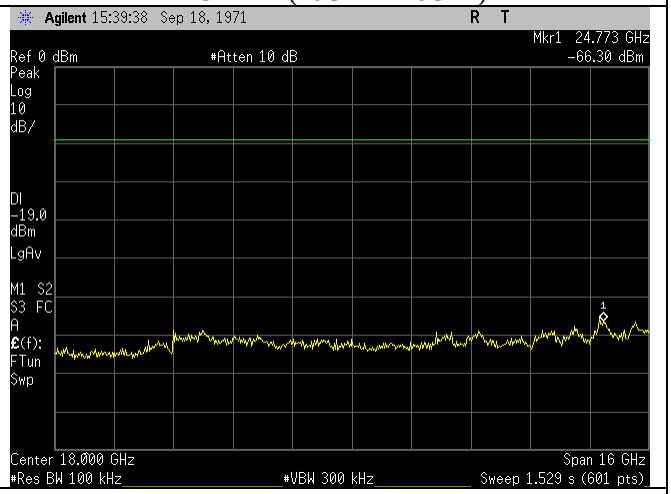
2437MHz (30MHz – 10GHz)



2437MHz (10GHz – 26GHz)

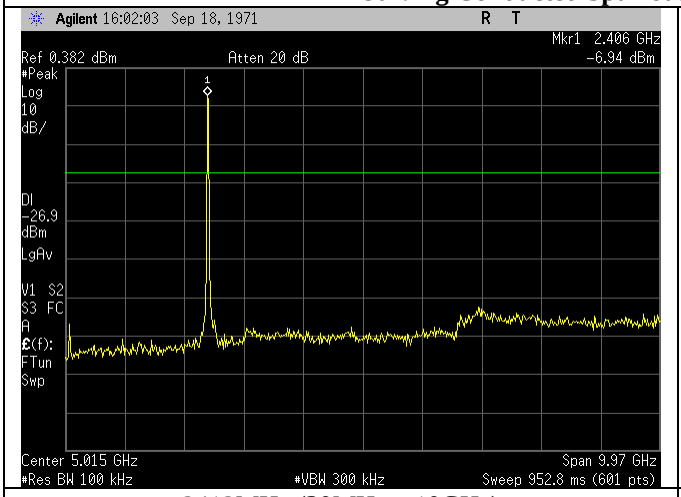


2462MHz (30MHz – 10GHz)

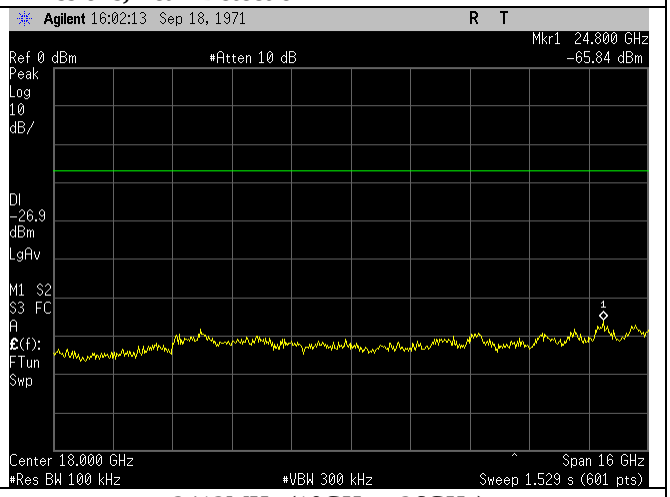


2462MHz (10GHz – 26GHz)

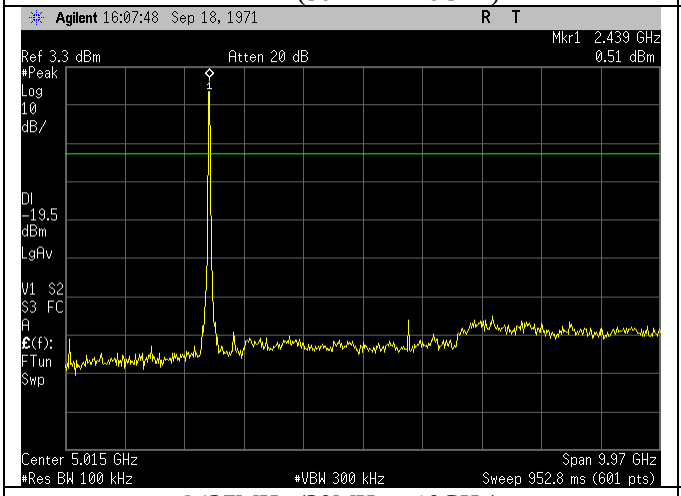
802.11g Conducted Spurious Emissions, Peak Detection



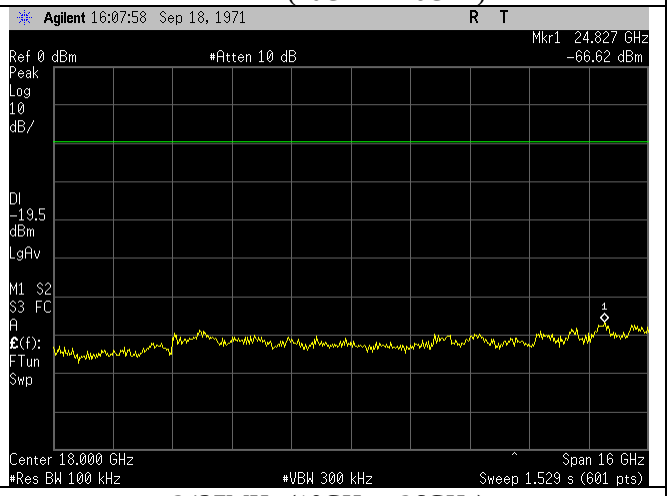
2412MHz (30MHz – 10GHz)



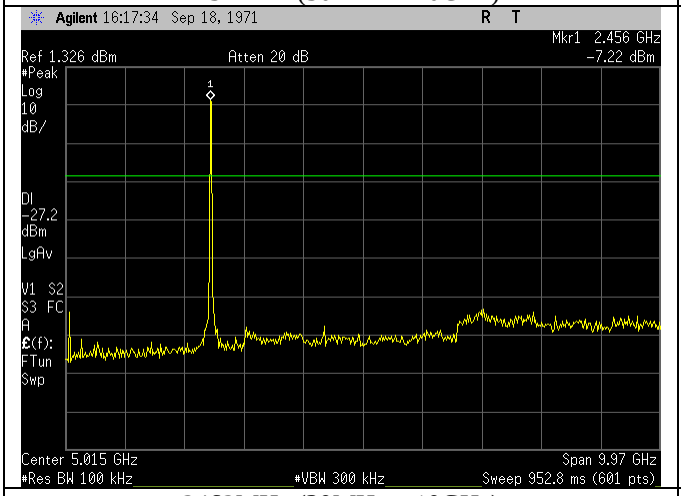
2412MHz (10GHz – 26GHz)



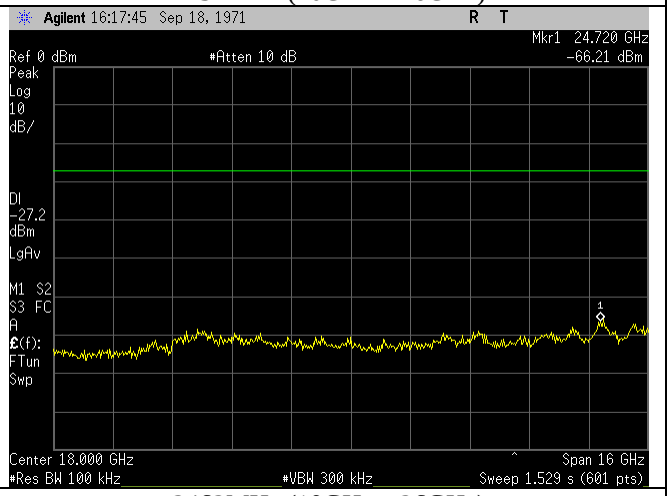
2437MHz (30MHz – 10GHz)



2437MHz (10GHz – 26GHz)

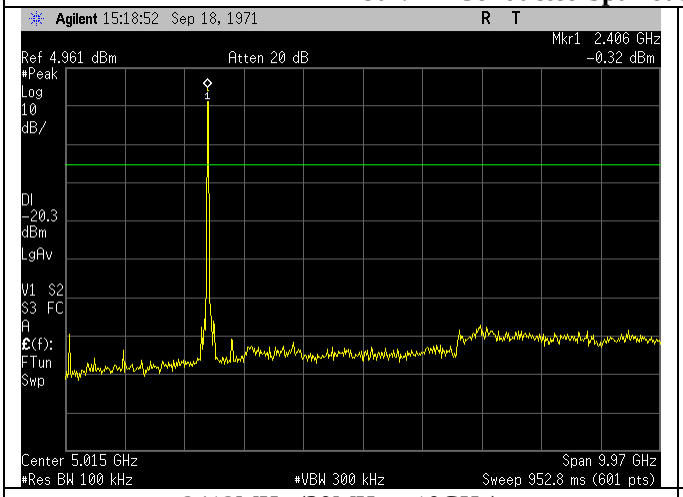


2462MHz (30MHz – 10GHz)

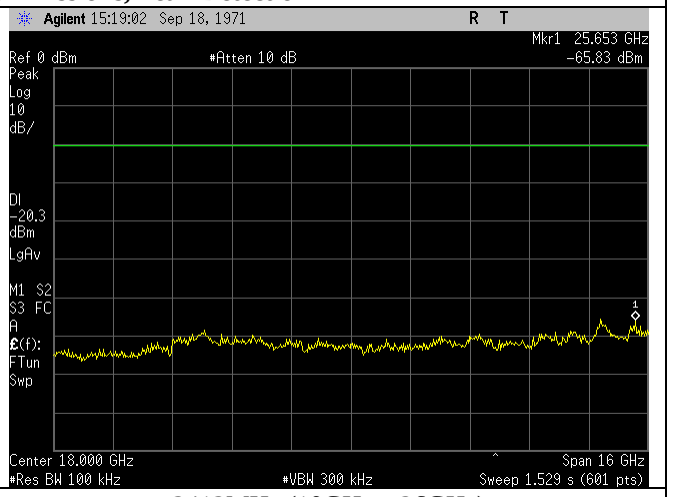


2462MHz (10GHz – 26GHz)

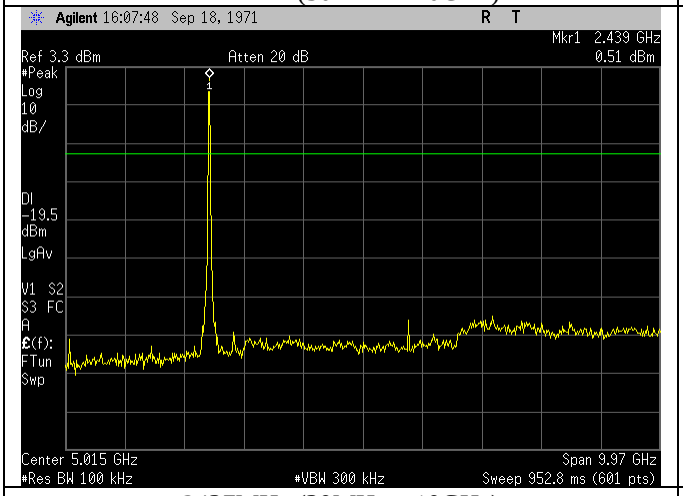
802.11n Conducted Spurious Emissions, Peak Detection



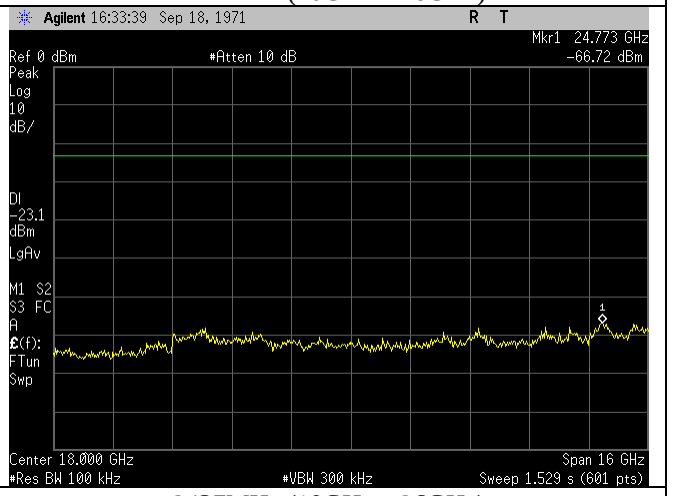
2412MHz (30MHz – 10GHz)



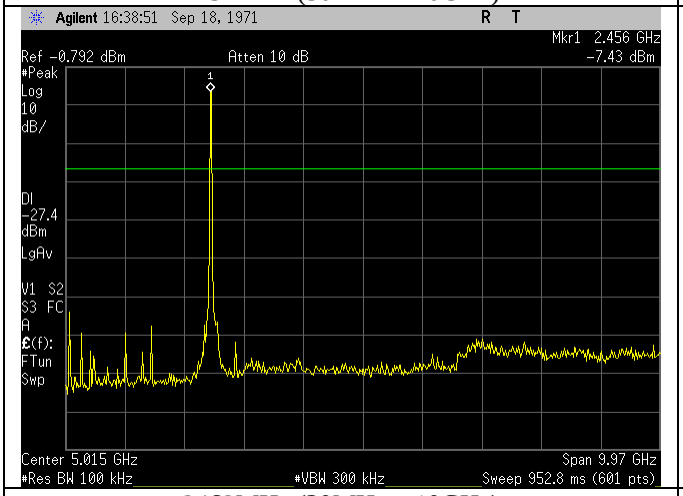
2412MHz (10GHz – 26GHz)



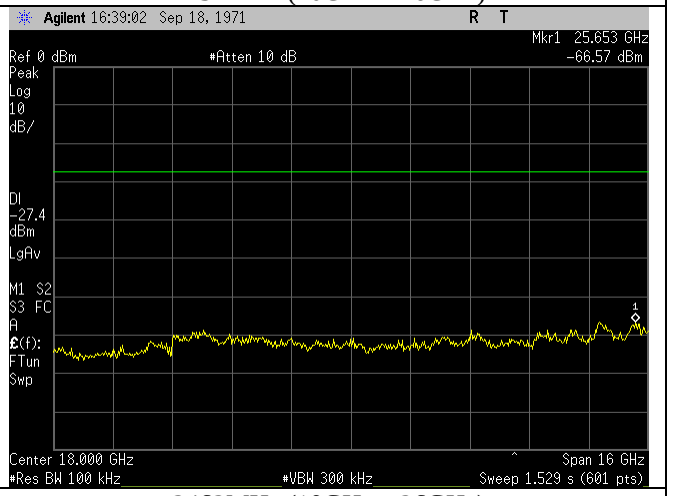
2437MHz (30MHz – 10GHz)



2437MHz (10GHz – 26GHz)

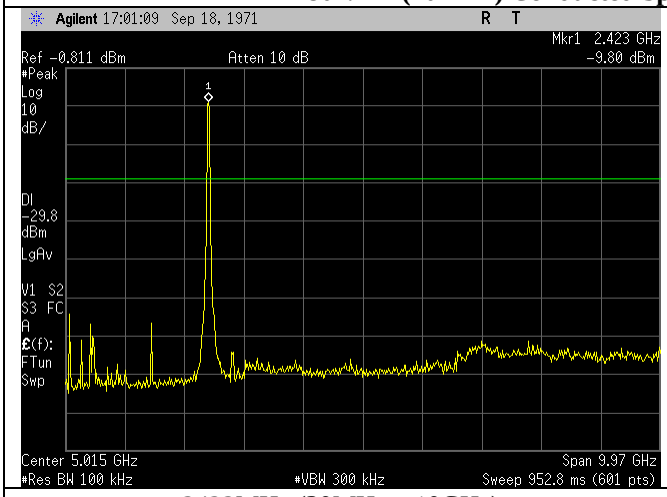


2462MHz (30MHz – 10GHz)

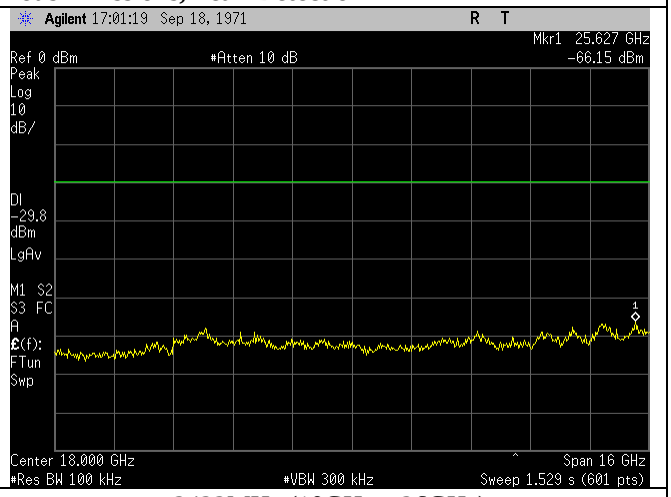


2462MHz (10GHz – 26GHz)

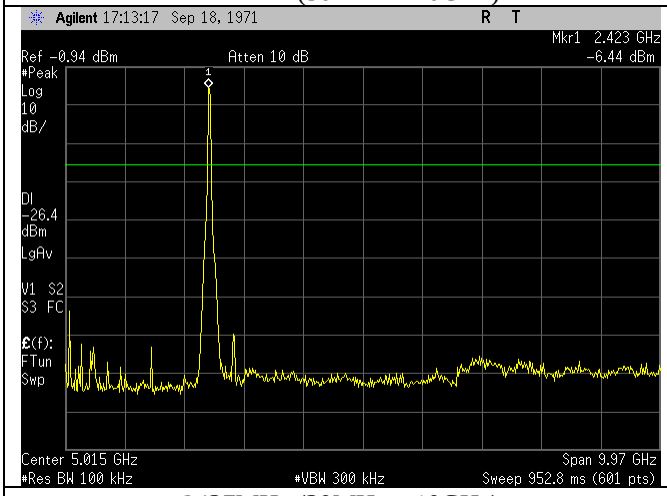
802.11n (40MHz) Conducted Spurious Emissions, Peak Detection



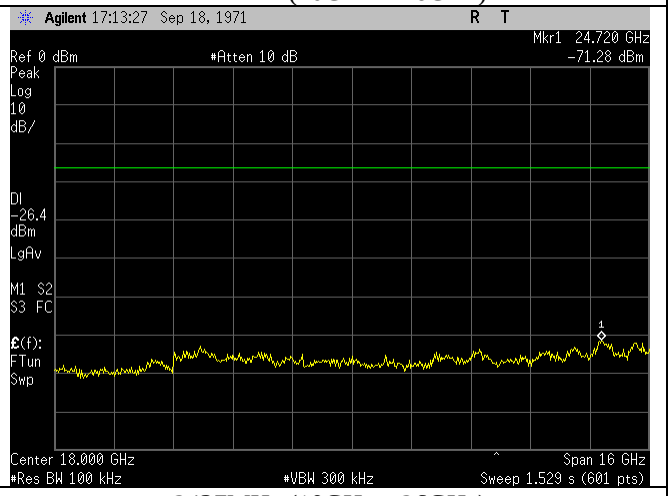
2422MHz (30MHz – 10GHz)



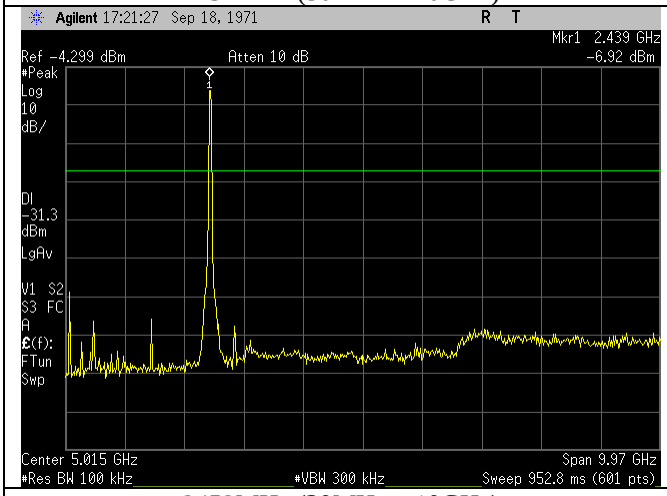
2422MHz (10GHz – 26GHz)



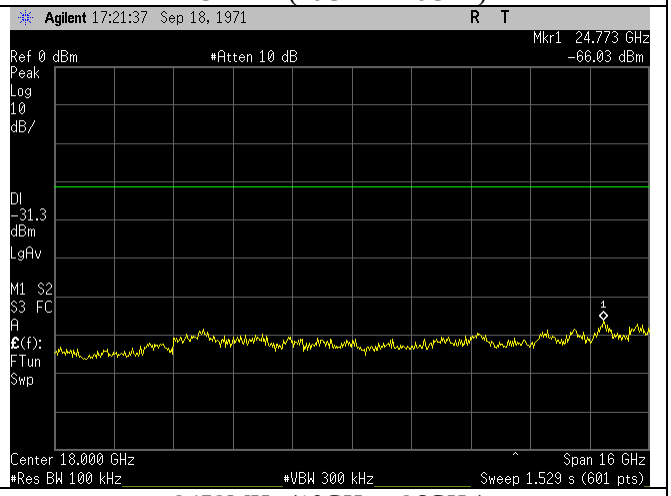
2437MHz (30MHz – 10GHz)



2437MHz (10GHz – 26GHz)



2452MHz (30MHz – 10GHz)



2452MHz (10GHz – 26GHz)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

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

§15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§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])

Table 15. 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 16.

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

Table 16. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: The antenna-port methodology form ANSI C63.10: 2013 Section 11.12.2 was utilized as an alternative to radiated emissions in the restricted bands.

The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. For frequencies below 1GHz, the RBW was set to 100 kHz and the VBW was set to 3x the RBW. For frequencies above 1GHz the RBW was set to 1MHz and the VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. The maximum antenna gain was added to the measurement trace as was the appropriate maximum ground reflection factor as outlined in section 11.12.2 of ANSI C63.10. The resultant EIRP was then converted to an equivalent electric field strength which is shown on the graphical plots which follow. Measurements were carried out at the low, mid and high channels.

In order to assess the cabinet radiated spurious emissions, a radiated scan was performed with the antenna of proper impedance installed. The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes if multiple mounting orientations are supported. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.

Radiated measurements below 30MHz were performed in a semi-anechoic chamber that has been correlated to an open area site.

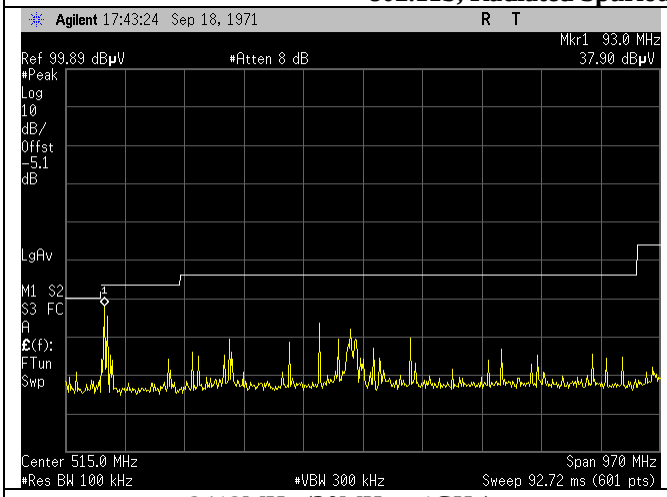
Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d)**.

Test Engineer(s): Bryan Taylor, Sergio Gutierrez

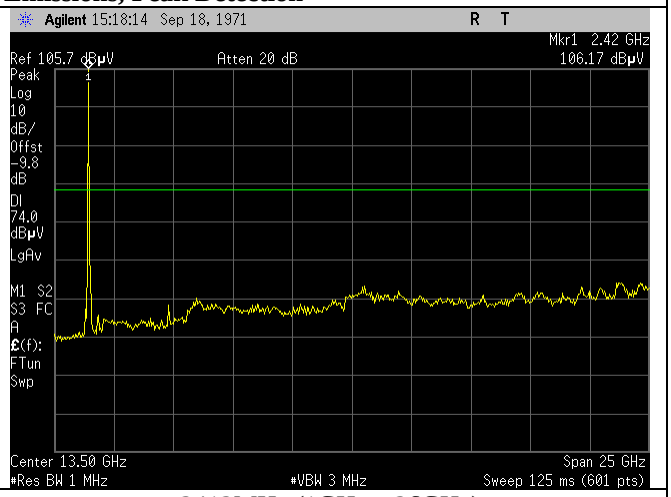
Test Date(s): 6/28/2023 – 7/14/2023

Radiated Spurious Emissions Test Results

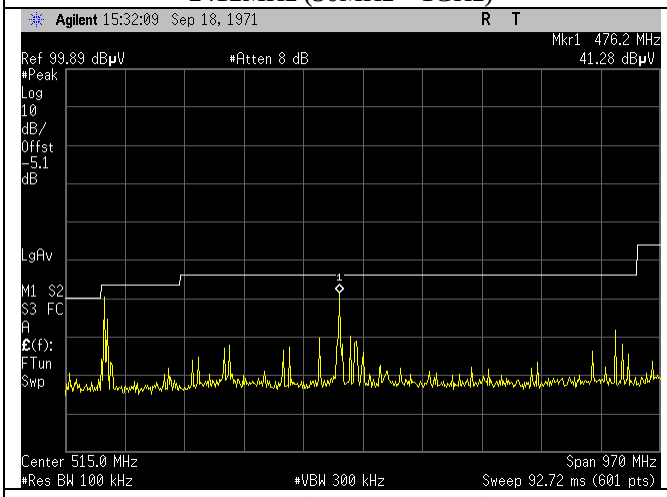
802.11b, Radiated Spurious Emissions, Peak Detection



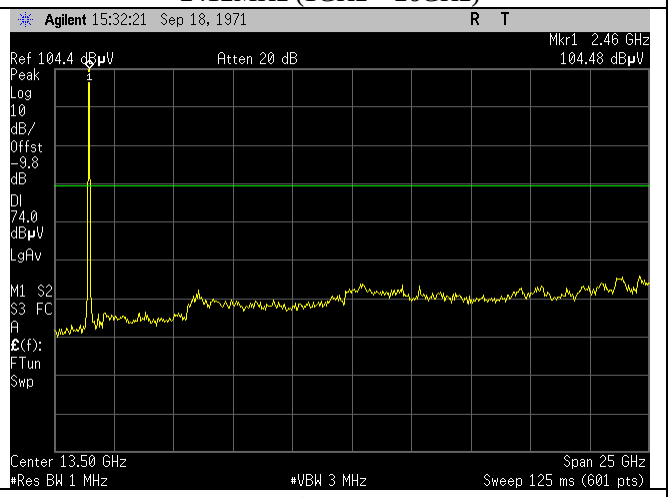
2412MHz (30MHz – 1GHz)



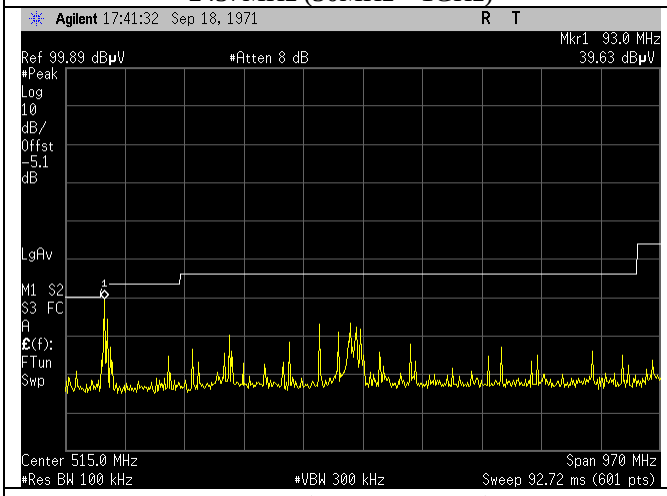
2412MHz (1GHz – 26GHz)



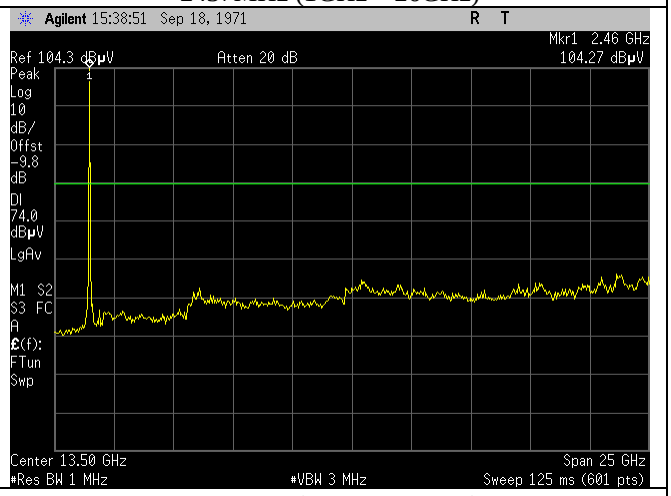
2437MHz (30MHz – 1GHz)



2437MHz (1GHz – 26GHz)

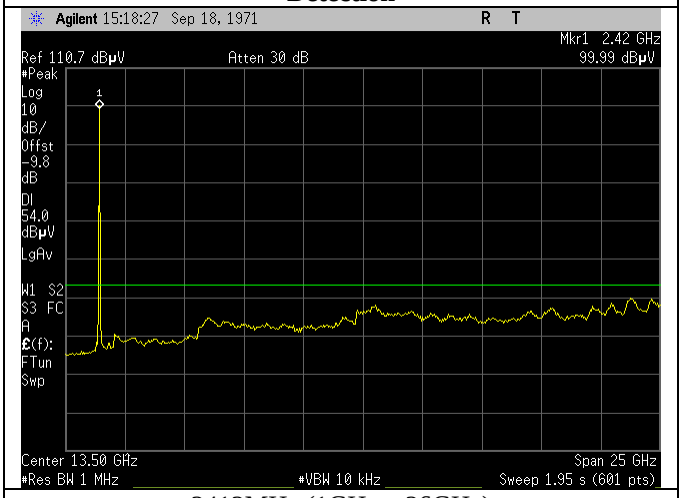


2462MHz (30MHz – 1GHz)

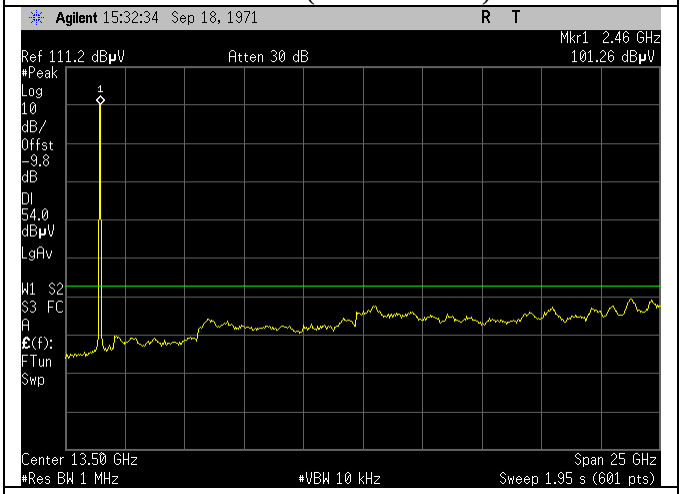


2462MHz (1GHz – 26GHz)

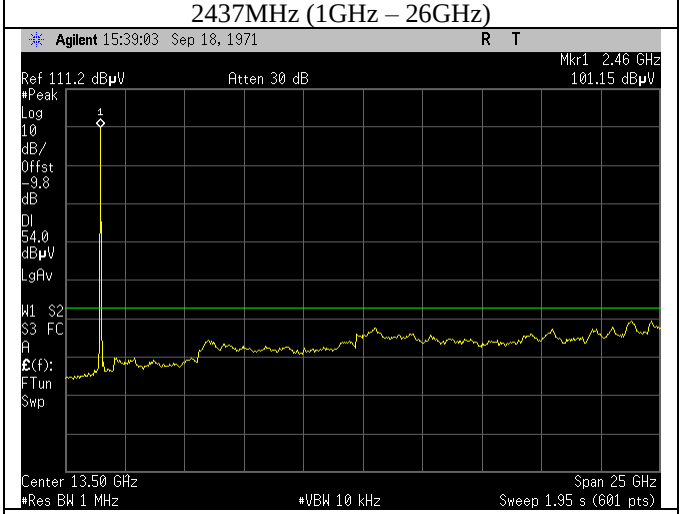
802.11b, Radiated Spurious Emissions, Average Detection



2412MHz (1GHz – 26GHz)

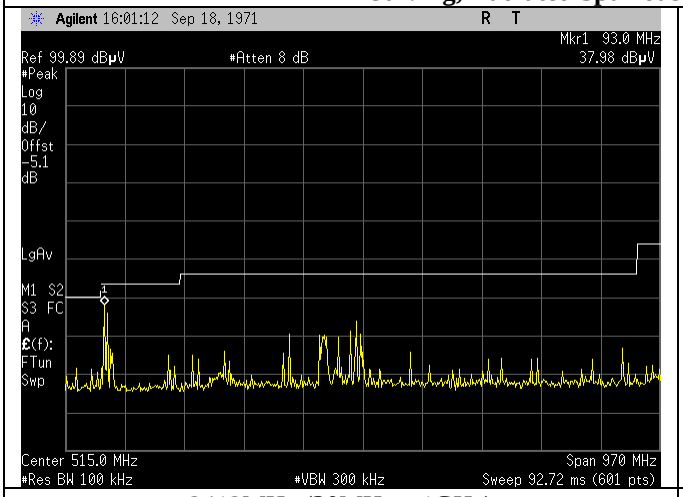


2437MHz (1GHz – 26GHz)

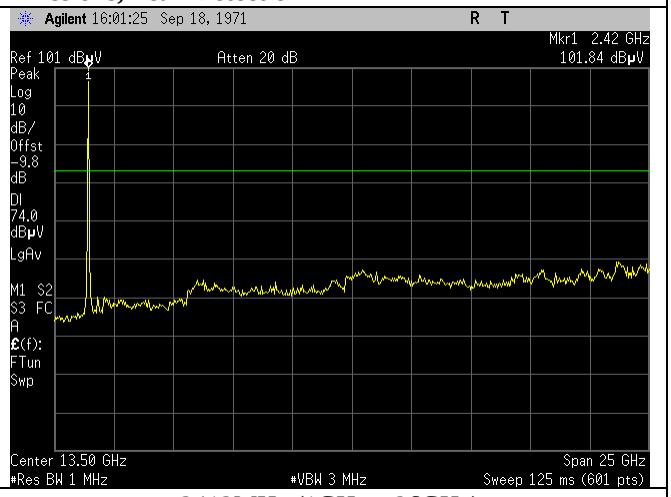


2462MHz (1GHz – 26GHz)

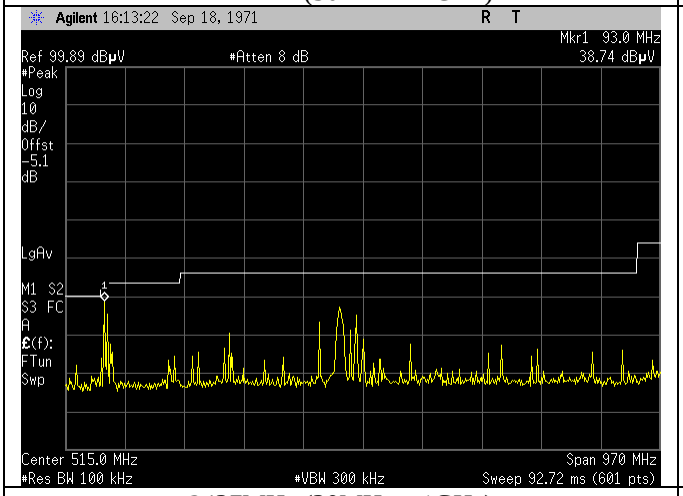
802.11g, Radiated Spurious Emissions, Peak Detection



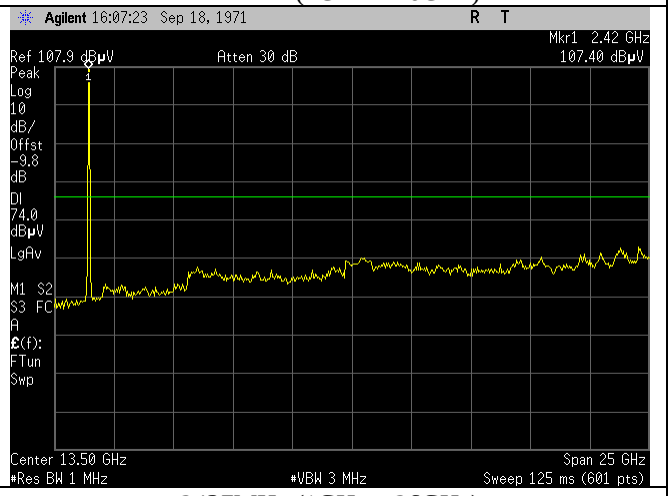
2412MHz (30MHz – 1GHz)



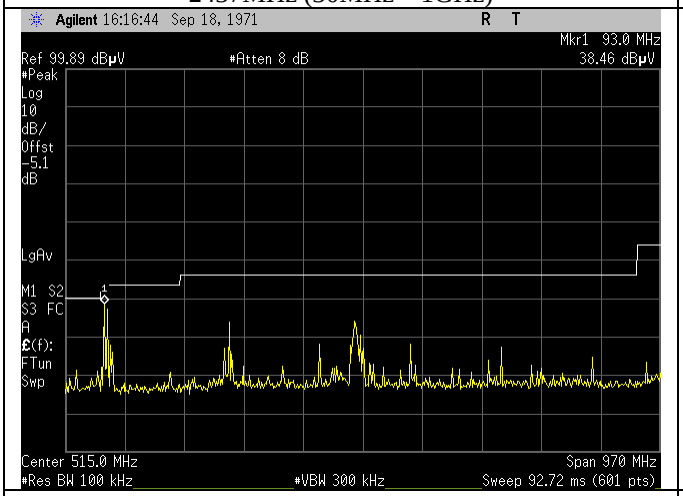
2412MHz (1GHz – 26GHz)



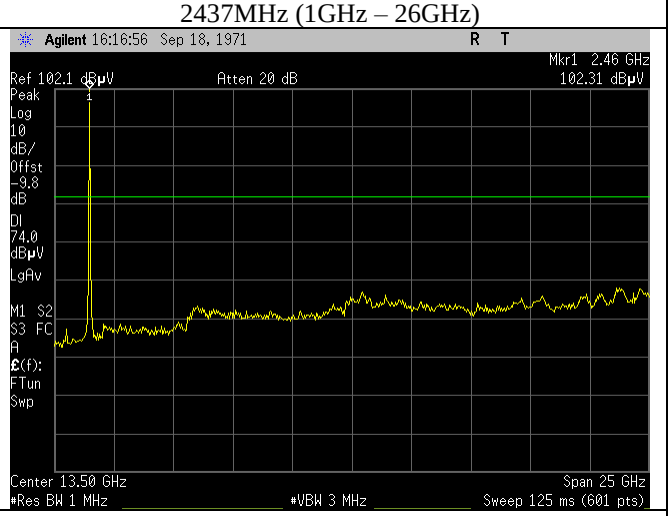
2437MHz (30MHz – 1GHz)



2437MHz (1GHz – 26GHz)

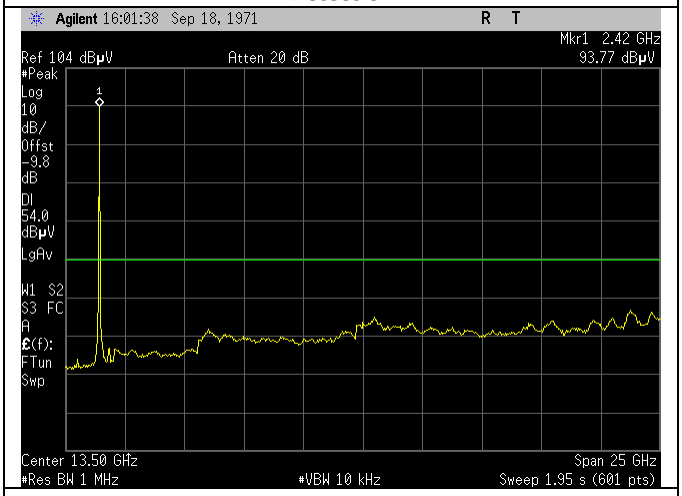


2462MHz (30MHz – 1GHz)

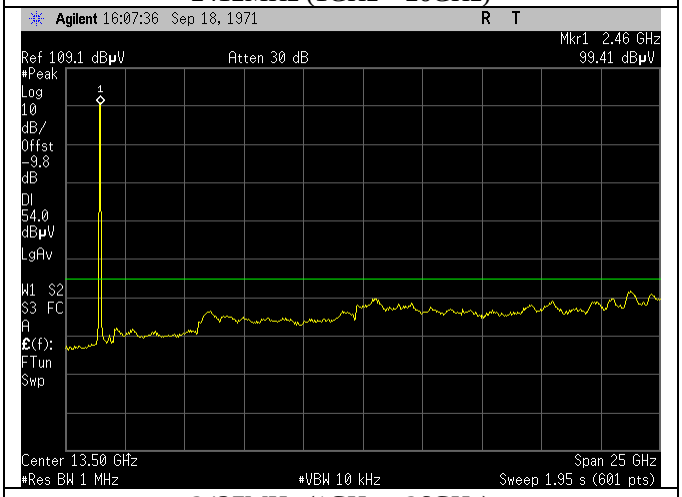


2462MHz (1GHz – 26GHz)

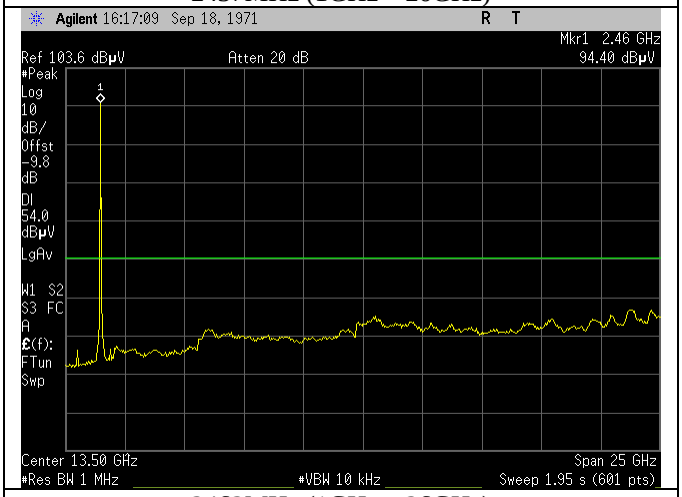
802.11g, Radiated Spurious Emissions, Average Detection



2412MHz (1GHz – 26GHz)

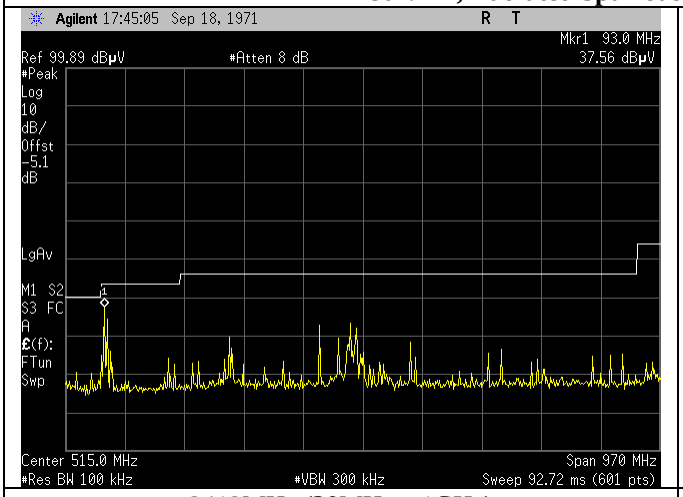


2437MHz (1GHz – 26GHz)

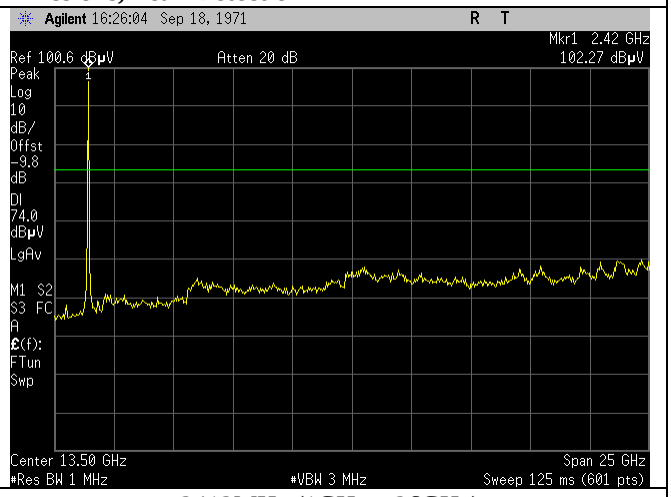


2462MHz (1GHz – 26GHz)

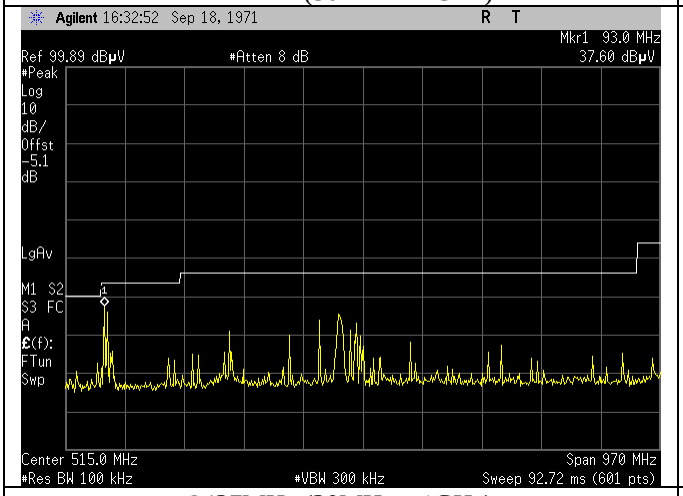
802.11n, Radiated Spurious Emissions, Peak Detection



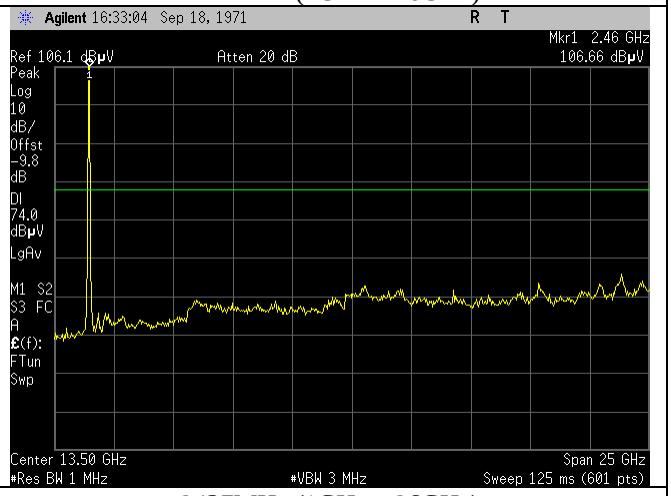
2412MHz (30MHz – 1GHz)



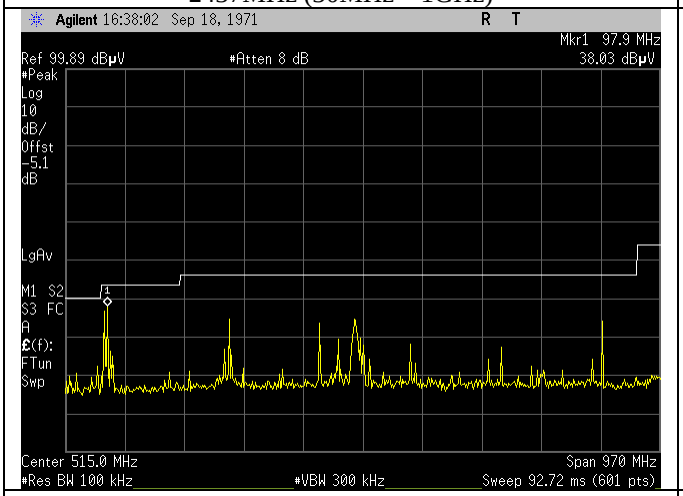
2412MHz (1GHz – 26GHz)



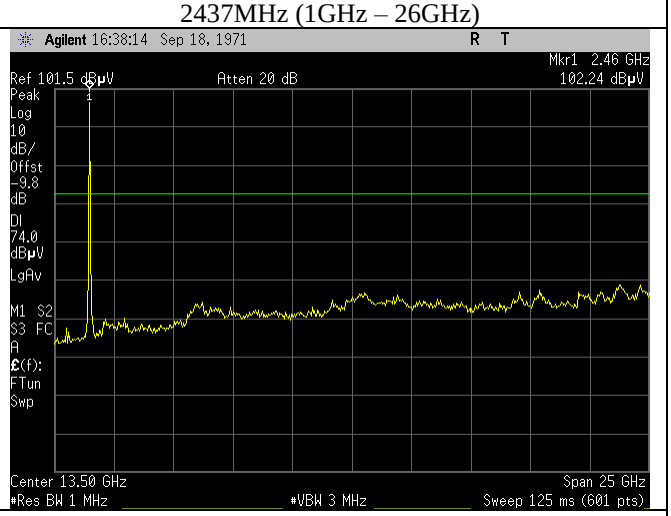
2437MHz (30MHz – 1GHz)



2437MHz (1GHz – 26GHz)

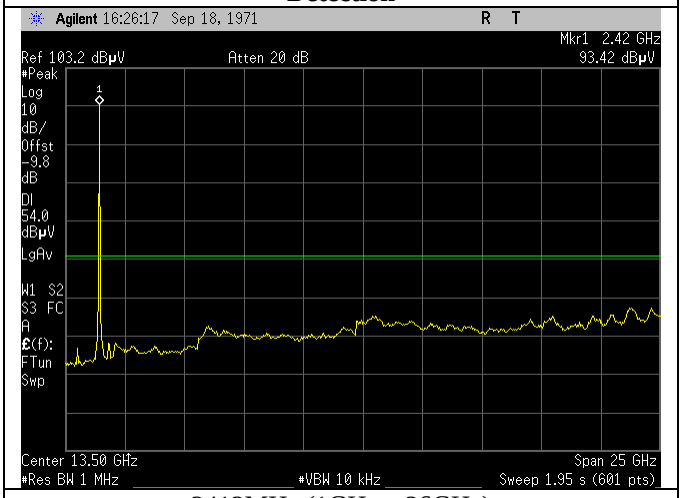


2462MHz (30MHz – 1GHz)

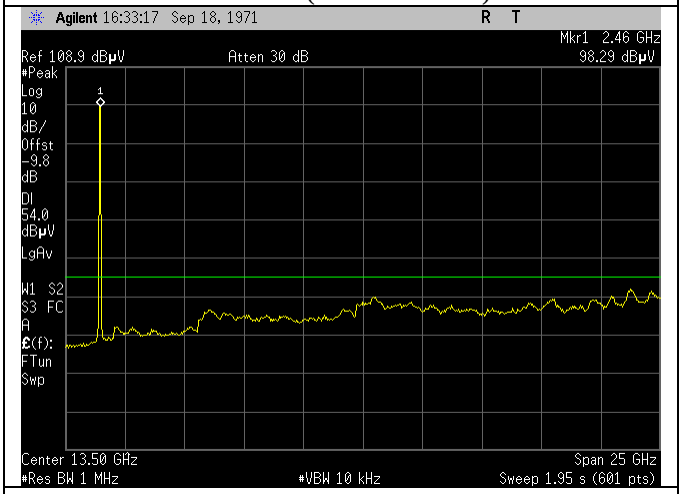


2462MHz (1GHz – 26GHz)

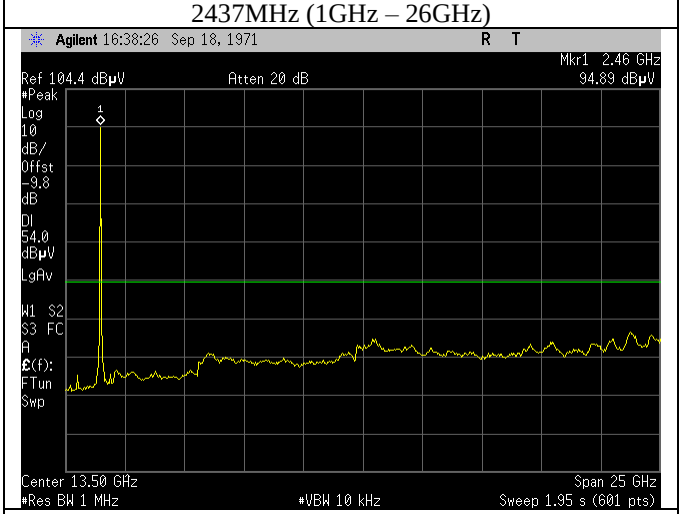
802.11n, Radiated Spurious Emissions, Average Detection



2412MHz (1GHz – 26GHz)

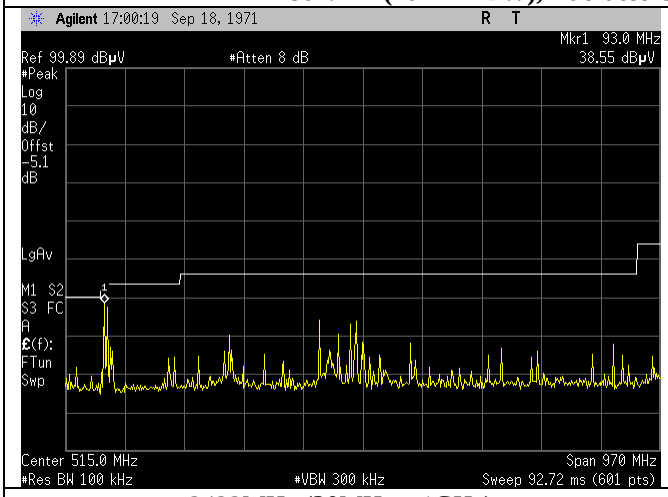


2437MHz (1GHz – 26GHz)

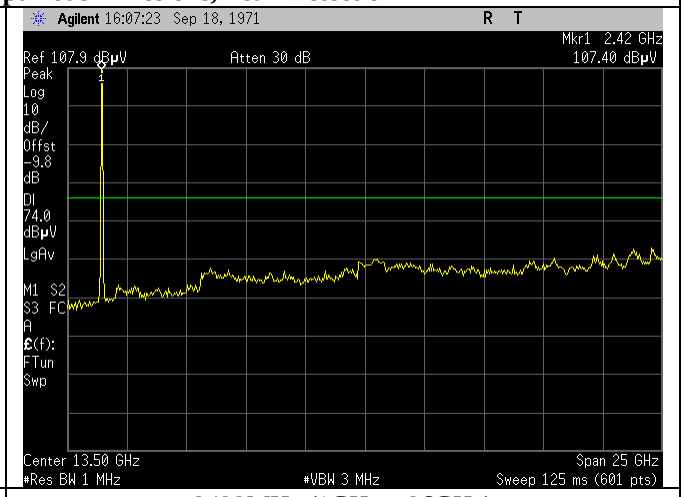


2462MHz (1GHz – 26GHz)

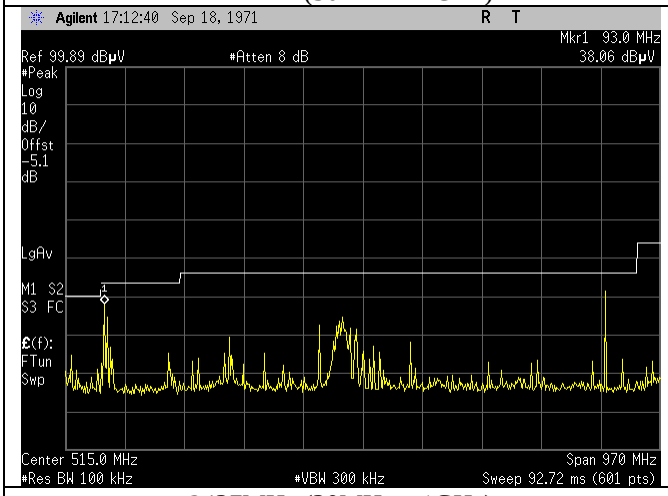
802.11n (40MHz BW), Radiated Spurious Emissions, Peak Detection



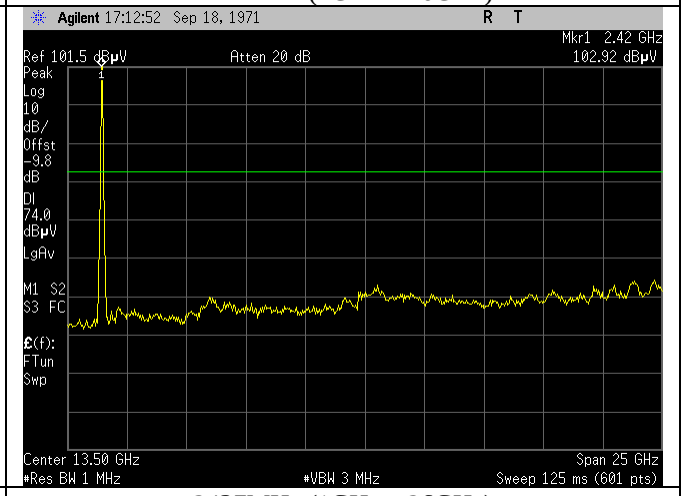
2422MHz (30MHz – 1GHz)



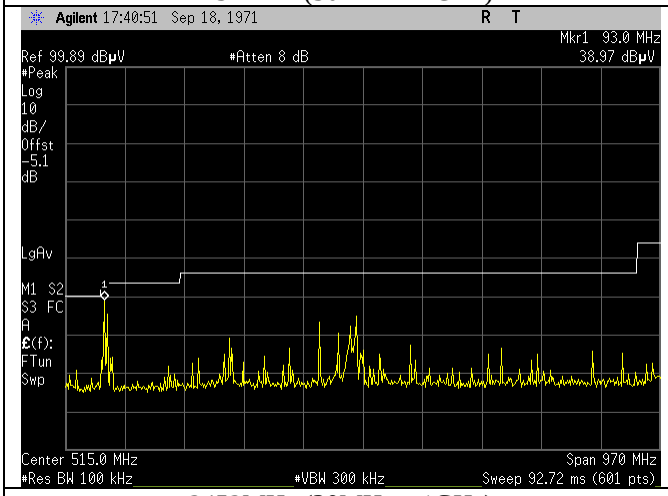
2422MHz (1GHz – 26GHz)



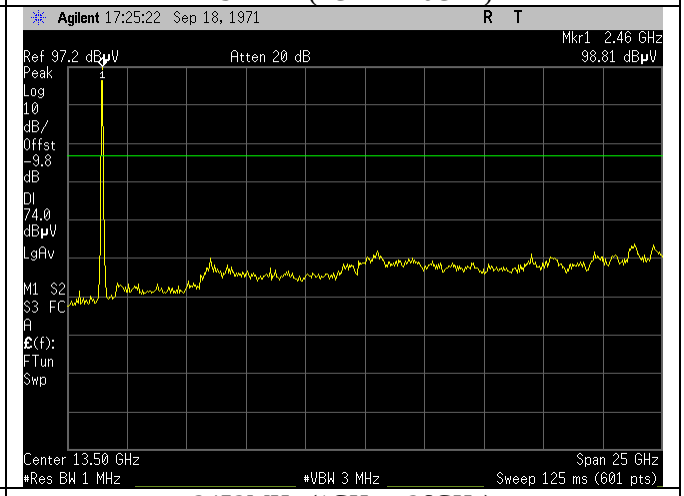
2437MHz (30MHz – 1GHz)



2437MHz (1GHz – 26GHz)

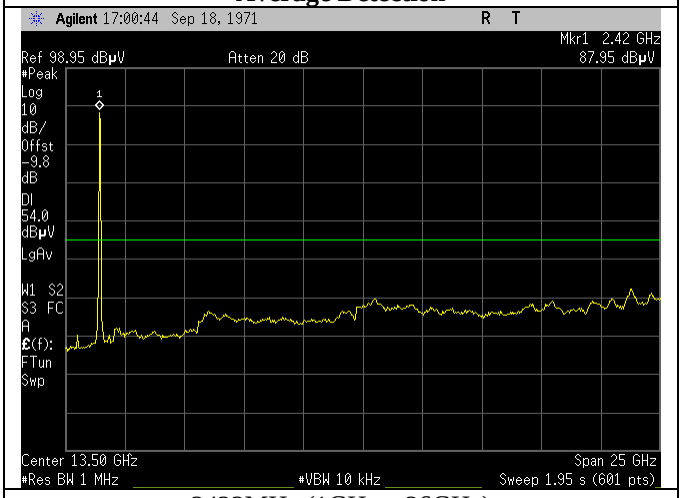


2452MHz (30MHz – 1GHz)

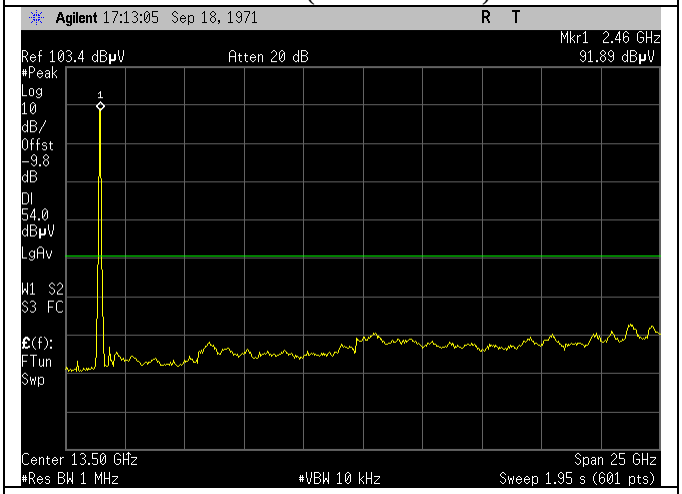


2452MHz (1GHz – 26GHz)

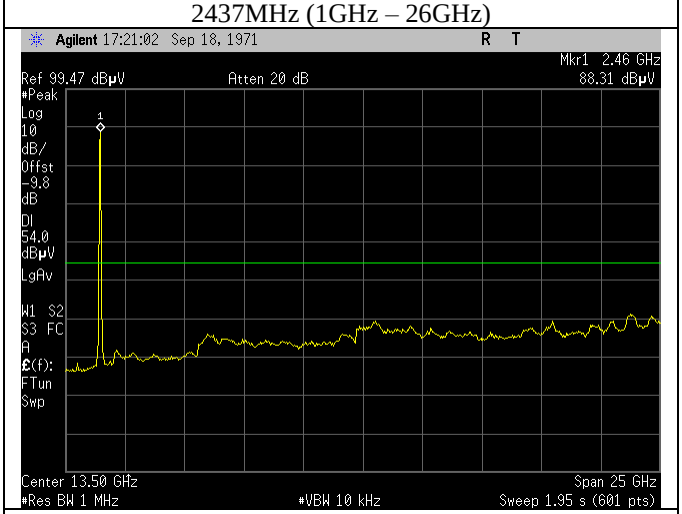
802.11n (40MHz BW), Radiated Spurious Emissions, Average Detection



2422MHz (1GHz – 26GHz)

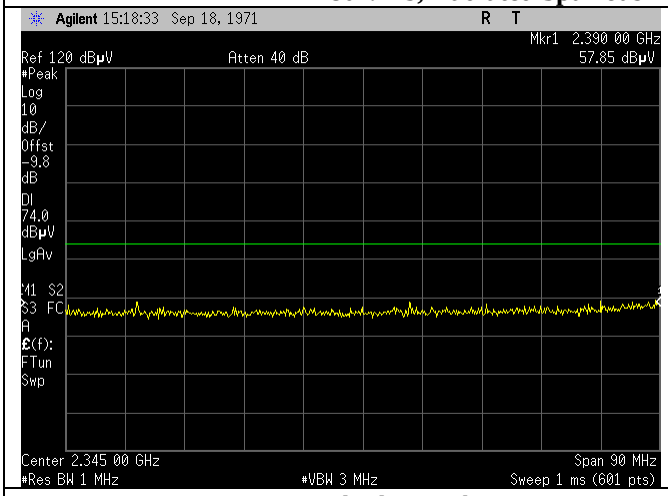


2437MHz (1GHz – 26GHz)

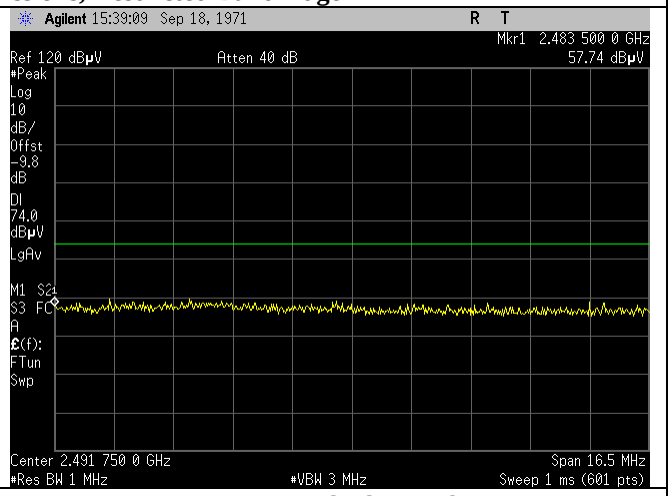


2452MHz (1GHz – 26GHz)

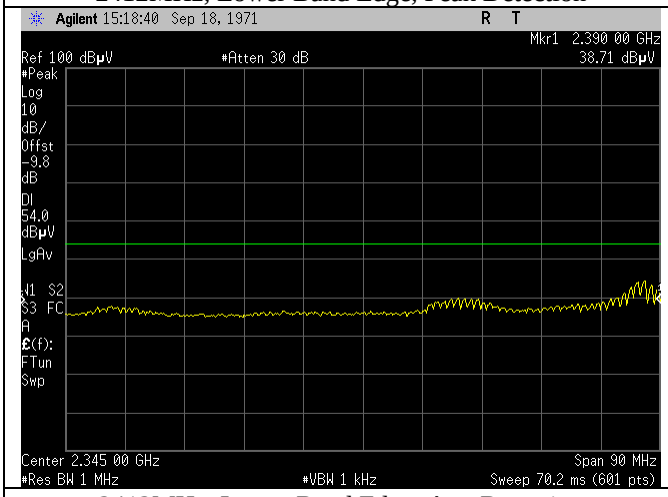
802.11b, Radiated Spurious Emissions, Restricted Band Edge



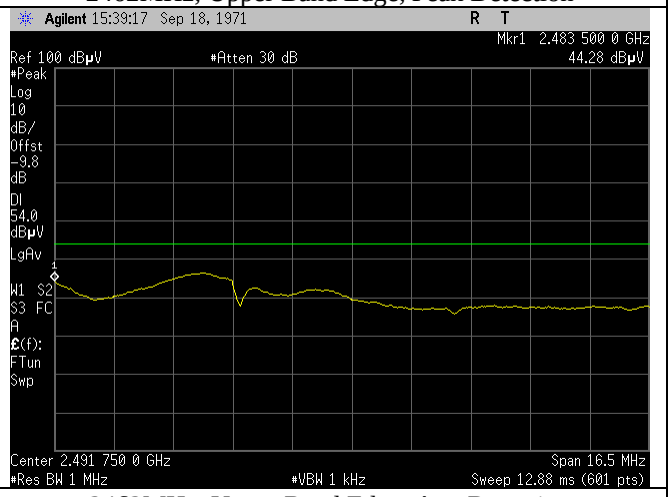
2412MHz, Lower Band Edge, Peak Detection



2462MHz, Upper Band Edge, Peak Detection



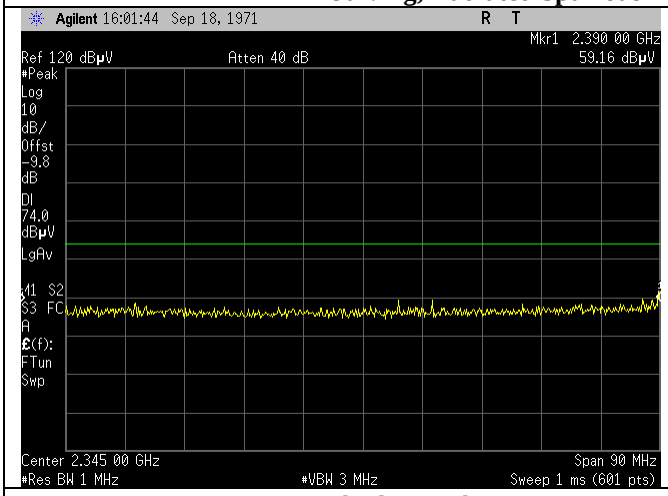
2412MHz, Lower Band Edge, Avg Detection



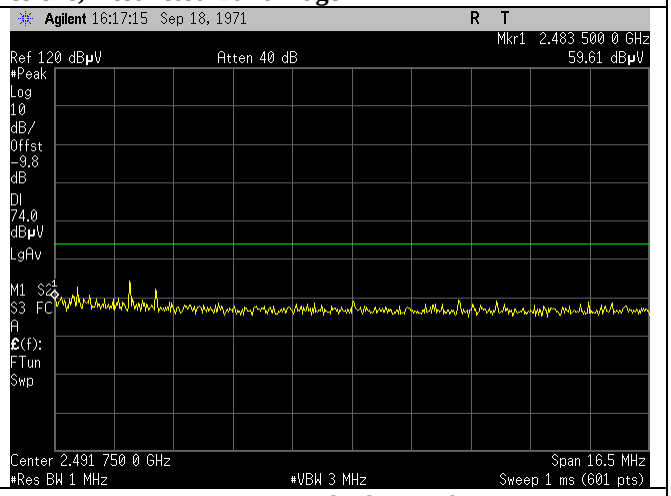
2462MHz, Upper Band Edge, Avg Detection

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Result
2390.0	57.85	74.00	16.15	38.71	54.00	15.29	Pass
2483.5	57.74	74.00	16.26	44.28	54.00	9.72	Pass

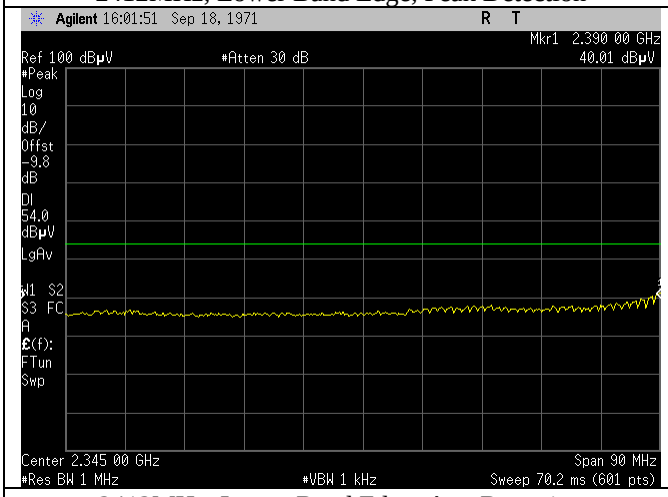
802.11g, Radiated Spurious Emissions, Restricted Band Edge



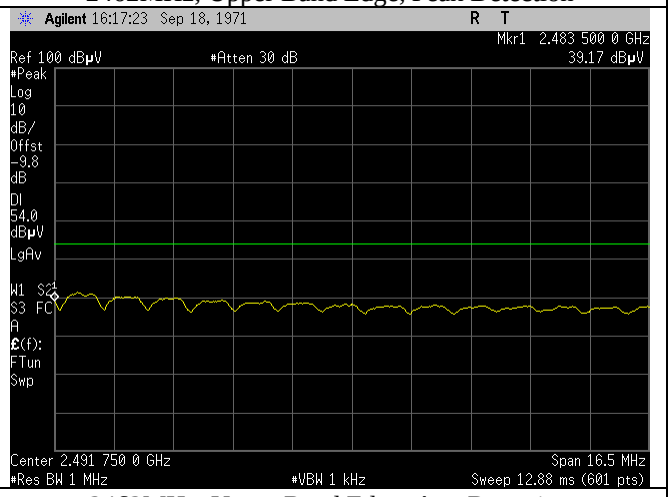
2412MHz, Lower Band Edge, Peak Detection



2462MHz, Upper Band Edge, Peak Detection



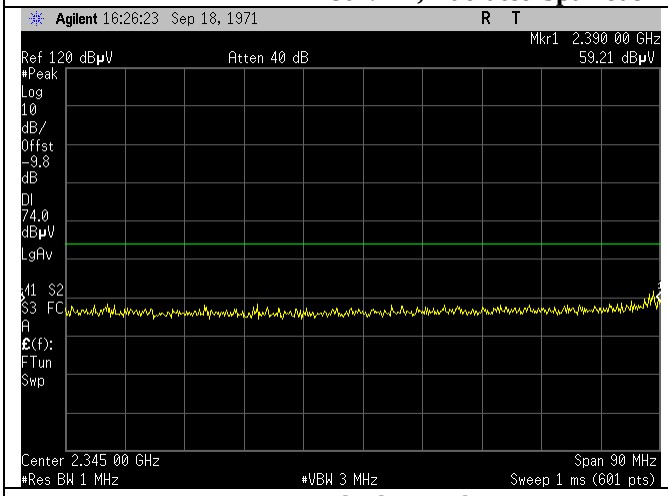
2412MHz, Lower Band Edge, Avg Detection



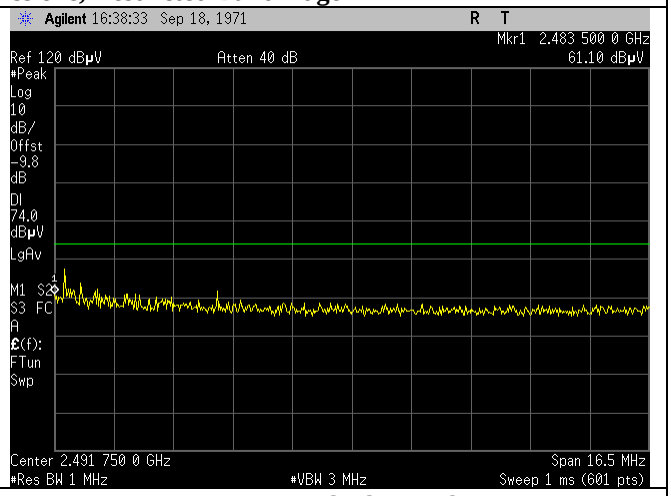
2462MHz, Upper Band Edge, Avg Detection

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Result
2390.0	59.16	74.00	14.84	40.01	54.00	13.99	Pass
2483.5	59.61	74.00	14.39	39.17	54.00	14.83	Pass

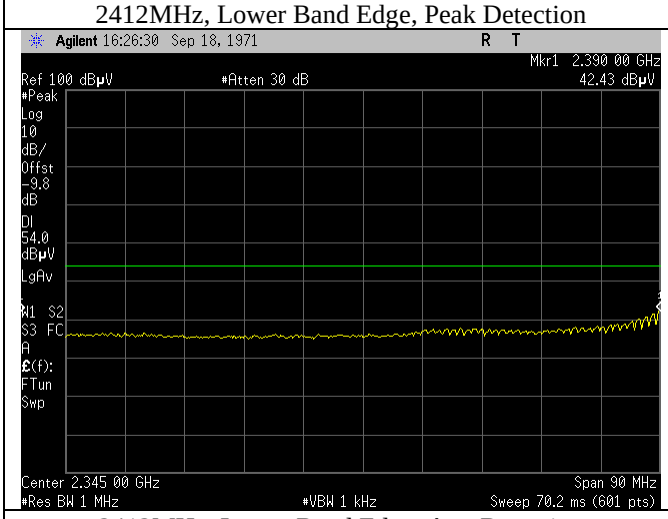
802.11n, Radiated Spurious Emissions, Restricted Band Edge



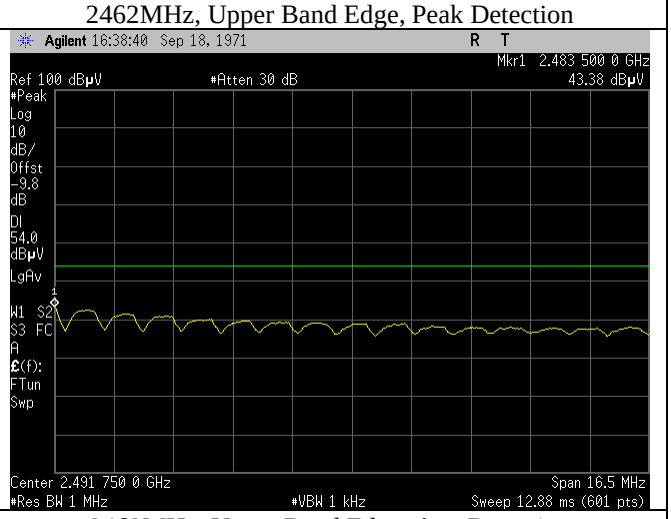
2412MHz, Lower Band Edge, Peak Detection



2462MHz, Upper Band Edge, Peak Detection



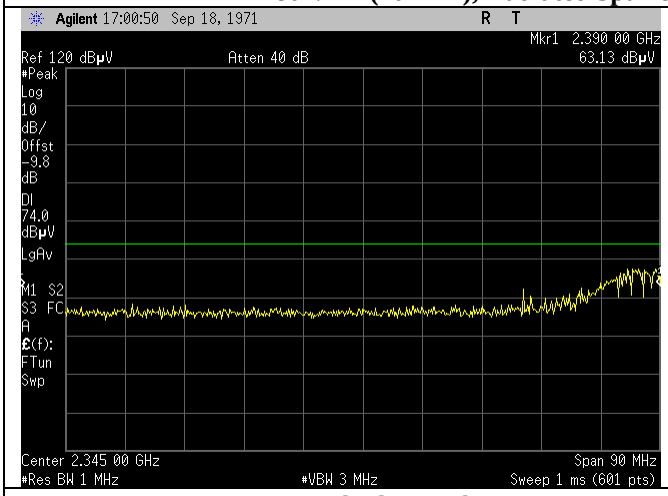
2412MHz, Lower Band Edge, Avg Detection



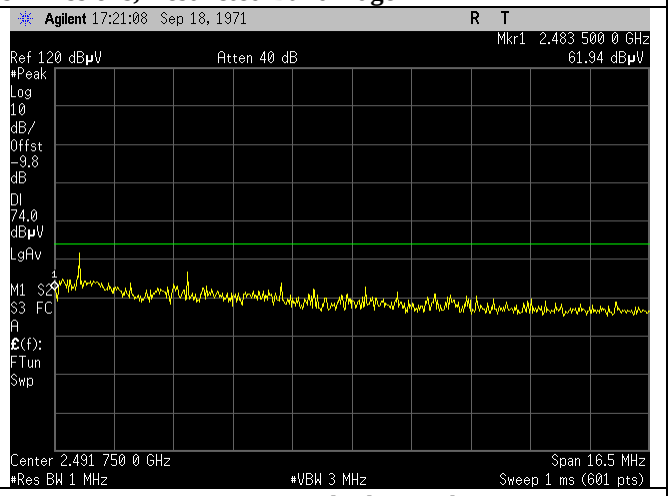
2462MHz, Upper Band Edge, Avg Detection

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Result
2390.0	59.21	74.00	14.79	42.43	54.00	11.57	Pass
2483.5	61.10	74.00	12.9	43.38	54.00	10.62	Pass

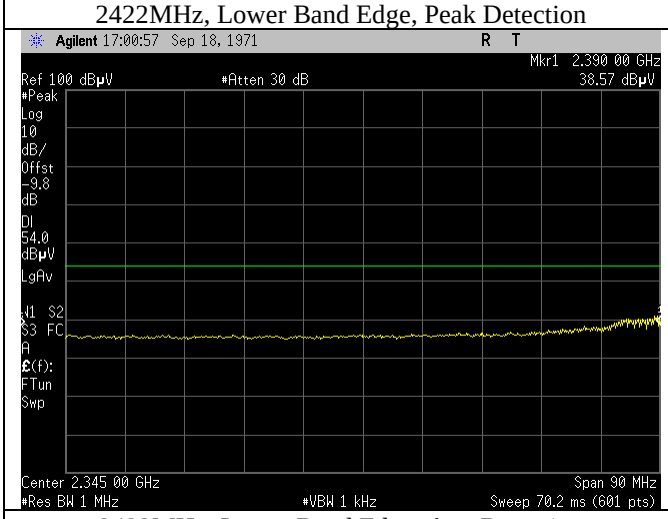
802.11n (40MHz), Radiated Spurious Emissions, Restricted Band Edge



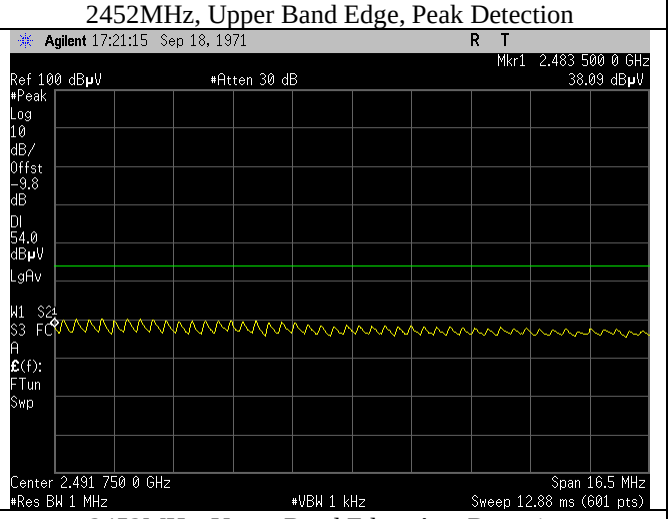
2422MHz, Lower Band Edge, Peak Detection



2452MHz, Upper Band Edge, Peak Detection



2422MHz, Lower Band Edge, Avg Detection



2452MHz, Upper Band Edge, Avg Detection

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Result
2390.0	63.13	74.00	10.87	38.57	54.00	15.43	Pass
2483.5	61.94	74.00	12.06	38.09	54.00	15.91	Pass

Worst Case Cabinet Spurious Emissions

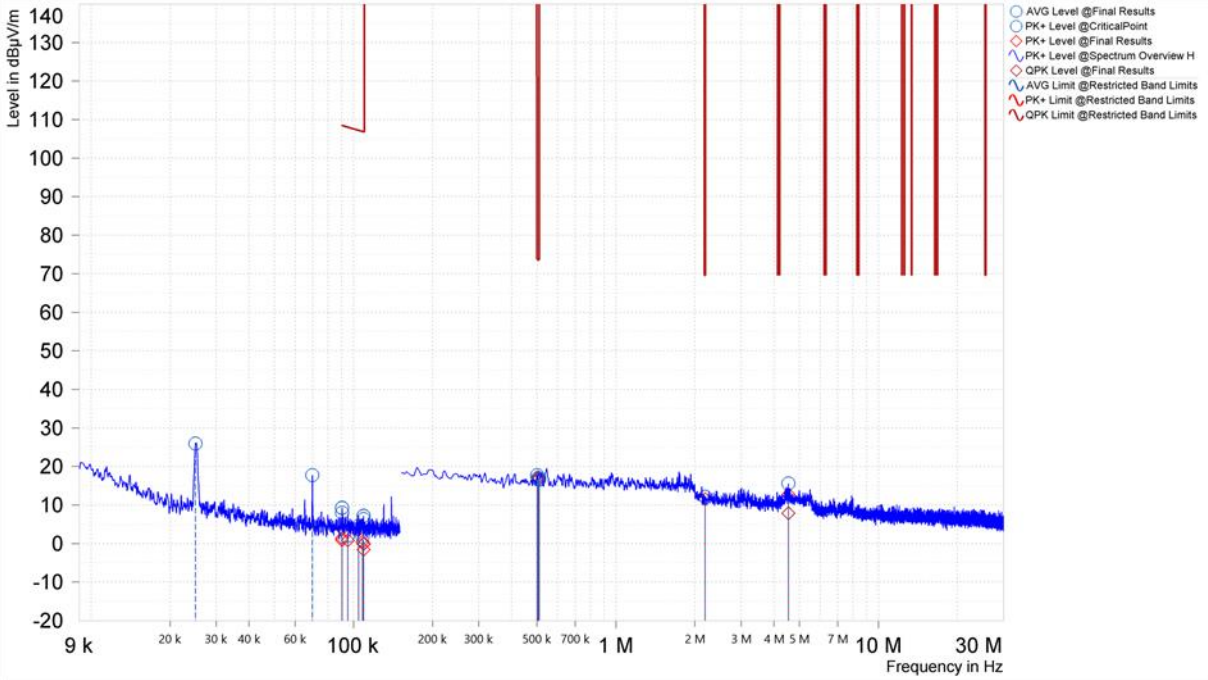


Figure 6. Worst Case Cabinet Radiation, 9kHz – 30MHz, Coplanar Loop

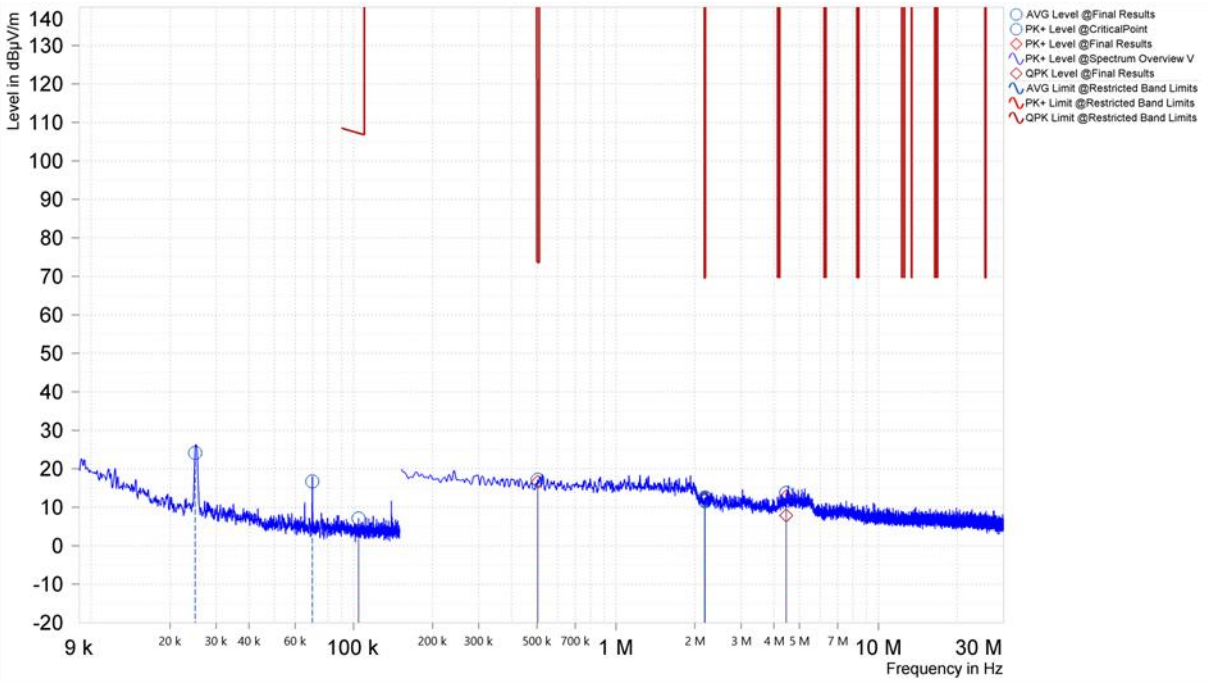


Figure 7. Worst Case Cabinet Radiation, 9kHz – 30MHz, Coaxial Loop

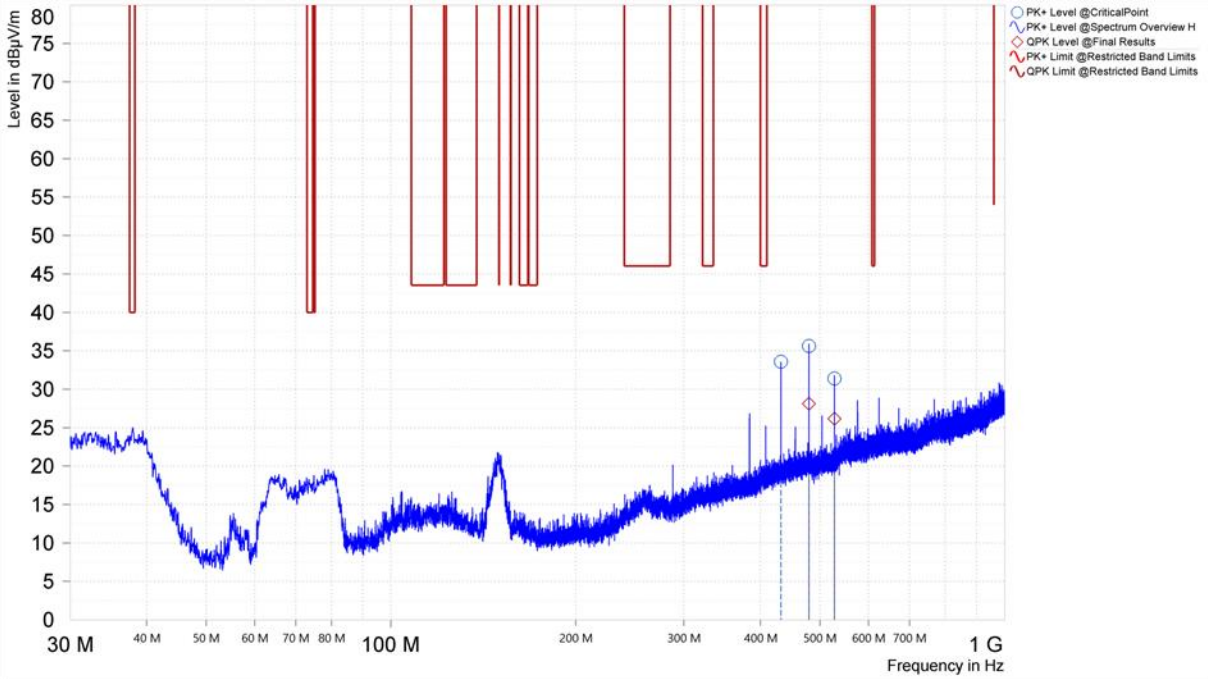


Figure 8. Worst Case Cabinet Radiation, 30MHz – 1GHz, Horizontal Polarity

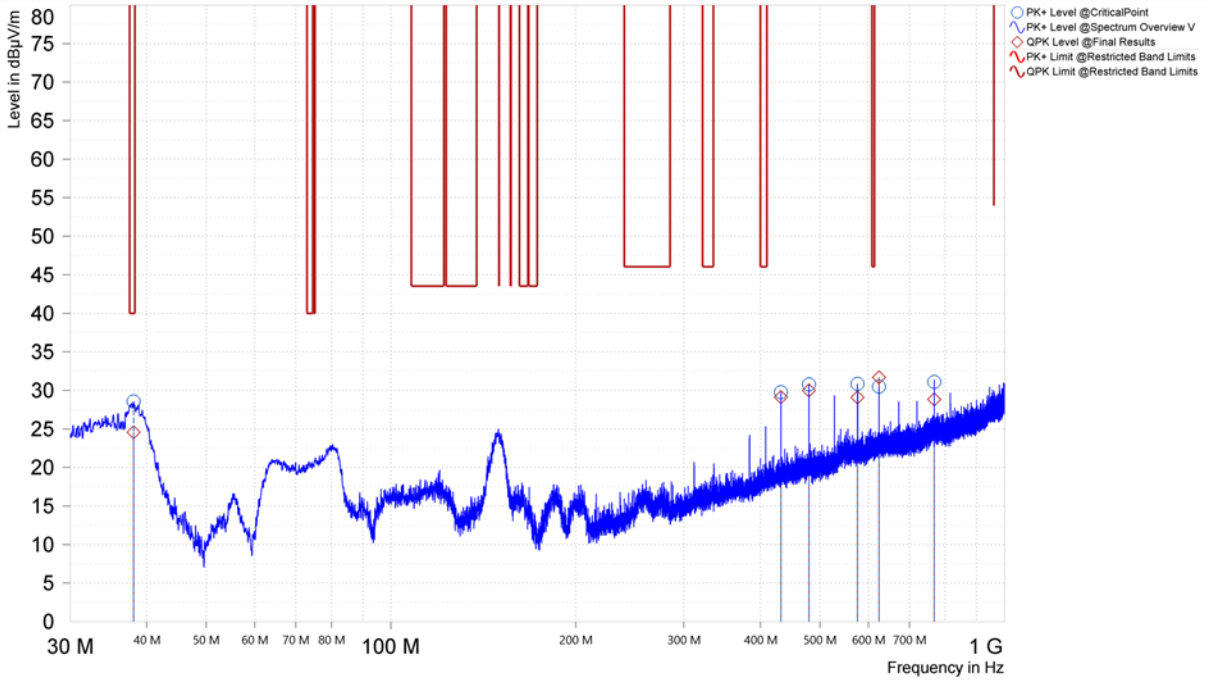


Figure 9. Worst Case Cabinet Radiation, 30MHz – 1GHz, Vertical Polarity

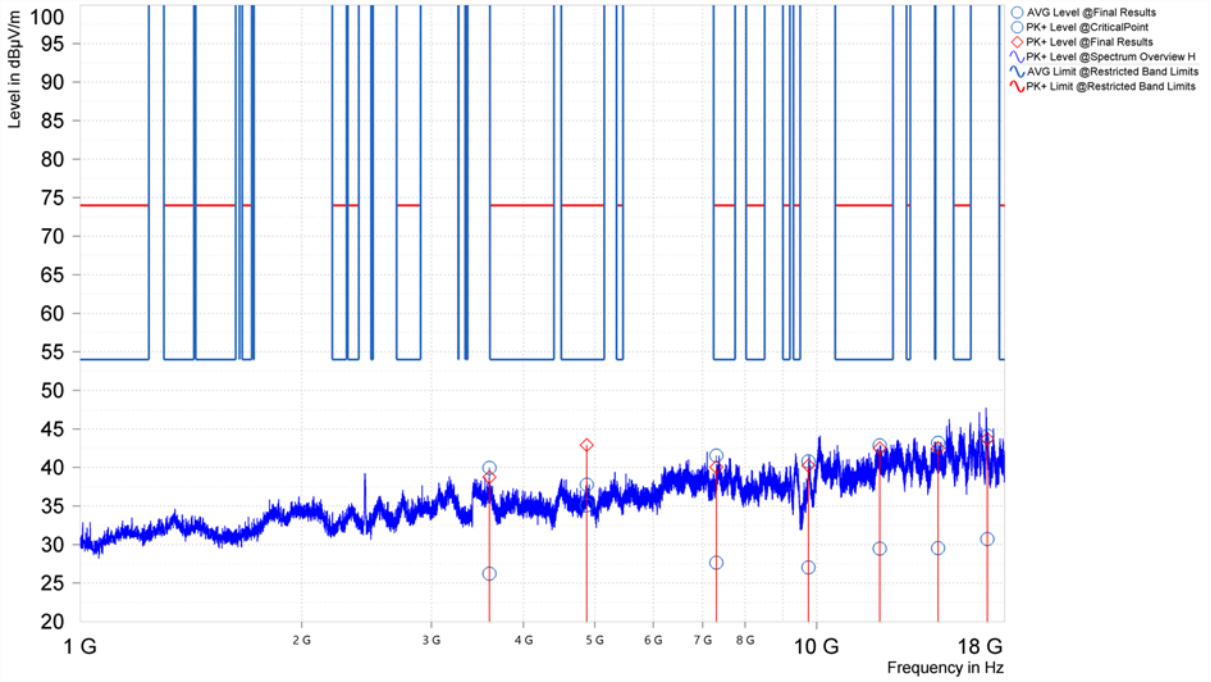


Figure 10. Worst Case Cabinet Radiation, 1GHz – 18GHz, Horizontal Polarity

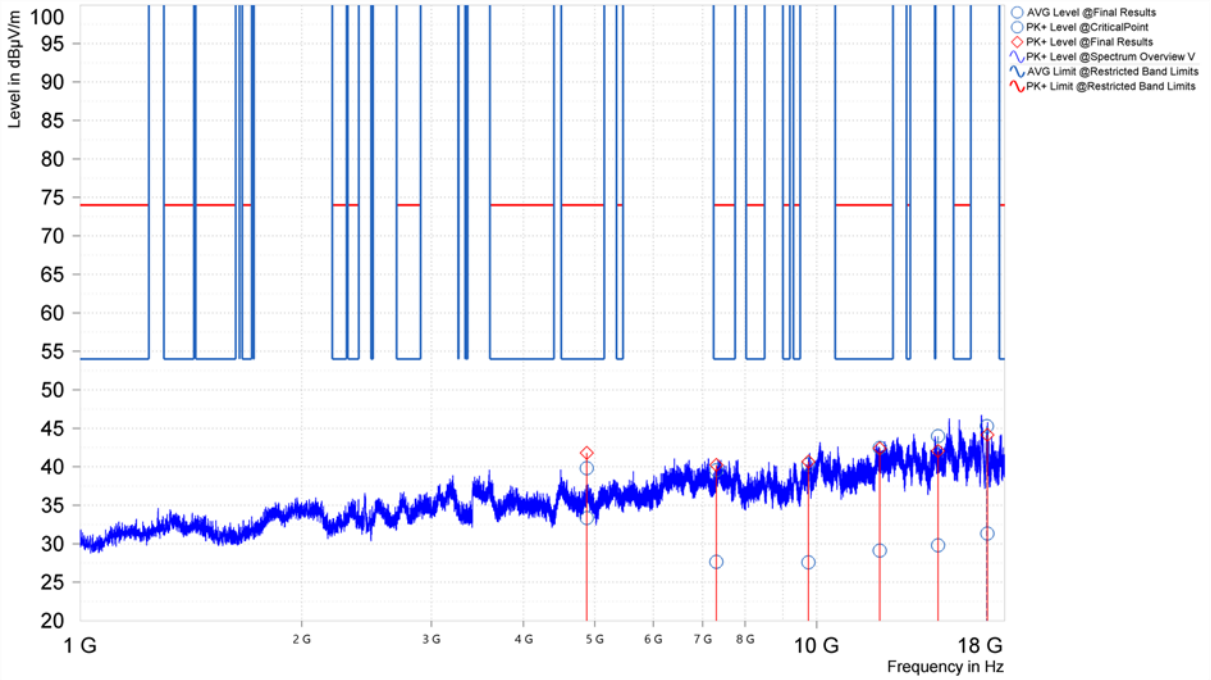


Figure 11. Worst Case Cabinet Radiation, 1GHz – 18GHz, Vertical Polarity

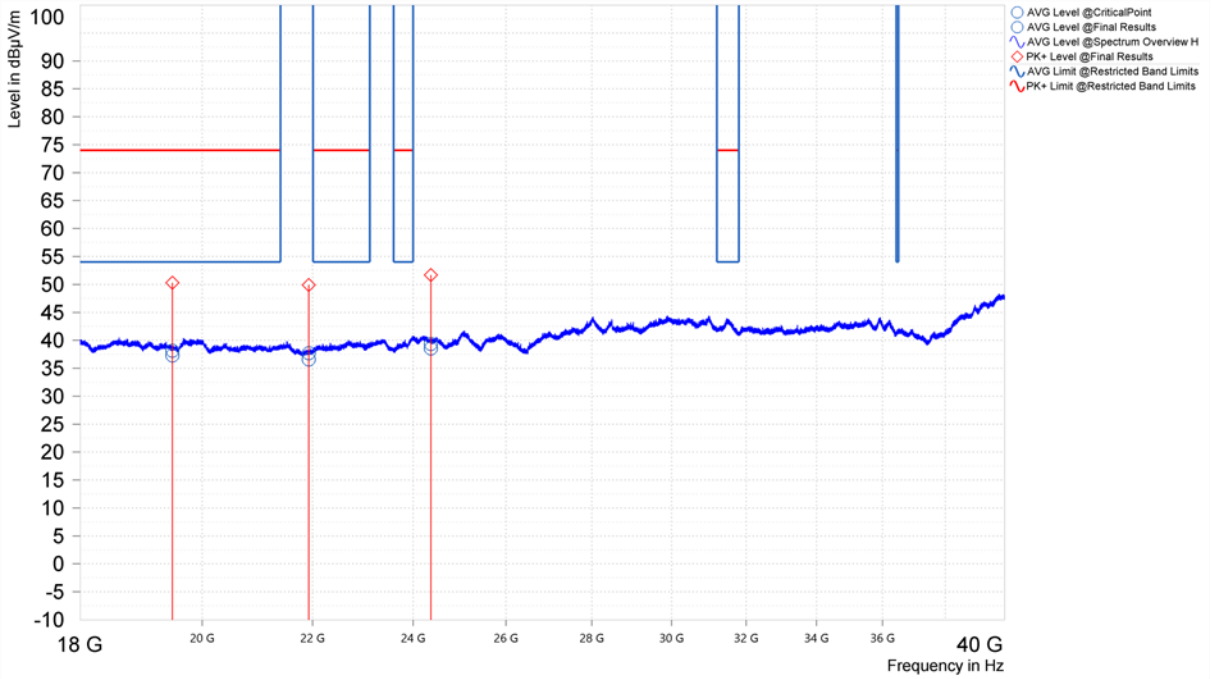


Figure 12. Worst Case Cabinet Radiation, 18GHz – 40GHz, Horizontal Polarity

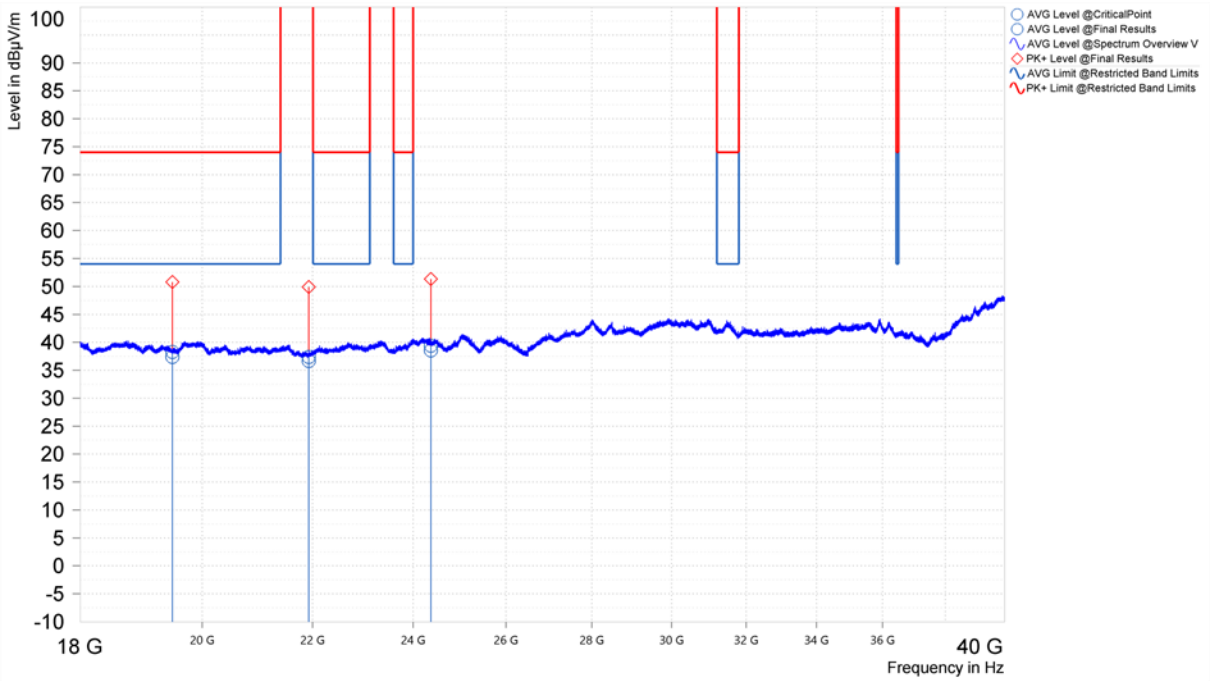


Figure 13. Worst Case Cabinet Radiation, 18GHz – 40GHz, Vertical Polarity

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.090	3.73	108.48	**104.75**	11.93	H	159	1	0.200	**Pass**
0.090	0.86	108.48	**107.61**	11.92	H	0	1	0.200	**Pass**
0.091	1.41	108.47	**107.06**	11.92	H	23	1	0.200	**Pass**
0.095	0.80	108.05	**107.24**	11.69	H	172	1	0.200	**Pass**
0.105	4.04	107.22	**103.18**	11.50	V	249	1	0.200	**Pass**
0.105	3.46	107.22	**103.76**	11.50	H	235	1	0.200	**Pass**
0.108	0.43	106.92	**106.49**	11.55	H	278	1	0.200	**Pass**
0.109	-1.59	106.85	**108.44**	11.56	H	270	1	0.200	**Pass**
0.109	-0.16	106.84	**107.01**	11.56	H	215	1	0.200	**Pass**
0.109	-0.03	106.84	**106.87**	11.56	H	0	1	0.200	**Pass**
0.501	17.00	73.69	**56.69**	11.41	H	101	1	9.000	**Pass**
0.503	16.58	73.65	**57.07**	11.43	V	47	1	9.000	**Pass**
0.506	17.19	73.62	**56.42**	11.45	H	108	1	9.000	**Pass**
0.508	16.85	73.58	**56.73**	11.47	H	157	1	9.000	**Pass**
0.510	16.85	73.54	**56.69**	11.49	H	127	1	9.000	**Pass**
2.175	12.30	69.54	**57.24**	11.84	V	229	1	9.000	**Pass**
2.182	12.30	69.54	**57.24**	11.84	V	60	1	9.000	**Pass**
2.184	12.11	69.54	**57.43**	11.84	V	0	1	9.000	**Pass**
2.186	12.32	69.54	**57.22**	11.83	V	0	1	9.000	**Pass**
2.189	11.48	69.54	**58.06**	11.83	H	354	1	9.000	**Pass**

Table 17. Worst Case Cabinet Radiation, 9kHz – 30MHz

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
38.070	24.57	40.00	15.43	-6.68	V	300	1.71	120.000	Pass

Table 18. Worst Case Cabinet Radiation, 30MHz – 1GHz

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
4,874.000	42.90	74.00	31.10	35.10	54.00	18.90	-3.45	H	169	1.46	Pass
4,874.000	41.81	74.00	32.19	33.35	54.00	20.65	-3.45	V	346	3.64	Pass
7,311.000	40.04	74.00	33.96	27.63	54.00	26.37	-2.84	H	158	3.5	Pass
7,311.000	40.23	74.00	33.77	27.65	54.00	26.35	-2.84	V	10	3.44	Pass
12,185.000	42.47	74.00	31.53	29.45	54.00	24.55	-1.80	H	149	1.42	Pass
12,185.000	42.39	74.00	31.61	29.11	54.00	24.89	-1.80	V	55	3.57	Pass
19,496.000	50.29	74.00	23.71	37.28	54.00	16.72	12.32	H	133	3.6	Pass
19,496.010	50.80	74.00	23.20	37.38	54.00	16.62	12.32	V	50	2.24	Pass

Table 19. Worst Case Cabinet Radiation, 1GHz – 40GHz

IV. Test Equipment

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 #	Description	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4771	Spectrum Analyzer	Keysight	E4446A	4/25/2022	10/26/2023
1A1083	Receiver	Rohde & Schwarz	ESU40	10/14/2022	10/14/2023
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	7/13/2023	7/13/2024
1A1050	Bilog Antenna (30MHz – 1GHz)	Schaffner	CBL 6112D	1/24/2023	1/24/2024
1A1183	Horn Antenna (1GHz – 18GHz)	ETS Lindgren	3117	1/4/2023	1/4/2024
1A1161	Horn Antenna (18GHz – 40GHz)	ETS Lindgren	3116C	7/15/2022	7/15/2023
1A1065	EMI Receiver	Rohde & Schwarz	ESCI	8/4/2022	8/4/2023
1A1087	Pulse Limiter	Rohde & Schwarz	ESH3Z2	6/24/2022	06/24/2023
1A1122	LISN	Teseq	NNB 51	9/19/2022	9/19/2023
1A1123	LISN	Teseq	NNB 51	12/20/2022	12/20/2023
1A1149	DC Milliohm Meter	GW Instek	GOM-802	9/20/2022	9/20/2023
1A1099	Generator	Com-Power	CGO-51000	See Note	
1A1088	Preamplifier	Rohde & Schwarz	TS-PR1	See Note	
1A1044	Generator	Com-Power	CG-520	See Note	
1A1073	Multi Device Controller	ETS	2090	See Note	
1A1074	System Controller	Panasonic	WV-CU101	See Note	
1A1080	Multi-Device	ETS	2090	See Note	
1A1180	Preamplifier	Miteq	AMF-7D-01001800-22-10P	See Note	

Table 20. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

End of Report