

# TEST REPORT

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**Applicant**

: PCD, LLC

**Address of Applicant**

: 7651 Southland Blvd. Orlando, FL 32809

**Product Name**

: Router

**Model No.**

: R402

**Sample No.**

: E19110011-05#04

E19110011-05#02

**FCC ID**

: 2ALJJR402

**Standards**

: FCC CFR47 Part 15, Subpart C

**Date of Receipt**

: 2020-1-2

**Date of Test**

: 2020-1-8 ~ 2020-1-21

**Date of Issue**

: 2020-1-21

**Remark:**

*This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.*

Prepared by:

Jennifer Zhou

(Jennifer Zhou)

Reviewed by:

Jesse

(Jesse)

Approved by:

Guoyou Chi

(Authorized signatory: Guoyou Chi)

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Revision Record			
Version	Date	Revisions	Revised By
1.0	2020-1-21	Original	--

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## 1 General Information

### 1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	155 Pingbei Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

### 1.2 Details of Application

Company Name	PCD, LLC
Address	7651 Southland Blvd. Orlando, FL 32809
Contact Person	Mauricio Velasco
Telephone	+1.631.495.7537
Email	mvelasco@pcdlatam.com

### 1.3 Details of EUT

Product Name	Router
Brand Name	PCD
Model No.	R402
FCC ID	2ALJJR402
Network and Wireless connectivity	WCDMA/HSDPA/HSUPA Band II/V/VIII; LTE FDD Band 2/4/7/28; WLAN 802.11b/g/n(HT20/HT40)
Mode of Operation	WLAN 802.11b/g/n(HT20/HT40)
Frequency Range	2400MHz ~ 2483.5MHz
Channel Separation	5 MHz
Modulation Type	DSSS, OFDM
Antenna Type	Internal Antenna
Antenna Gain	1dBi
Extreme Temperature Range	-10°C ~ +55°C
Test Voltage	AC 100~240V

#### Note(s):

The product has two chain for wifi chipset. Details please see clause 5.1.

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## 1.4 Test Methodology

47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
KDB Publication 662911 D01 v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

### Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

## 1.5 Test Verdict

No.	FCC Part No.	ISED Part No.	Description	Test Result	Verdict
1	15.203	RSS-247, 5.4(6)	Antenna Requirement	Clause 4.1.1	PASS
2	15.247(b)	RSS-247, 5.4(4)	Peak Output Power	Clause 4.1.2	PASS
3	15.247(a)	RSS-Gen, 6.6; RSS-247, 5.2(1)	6dB Bandwidth and 99% Bandwidth	Clause 4.1.3	PASS
4	15.247(e)	RSS-247, 5.2(2)	Power Spectral Density	Clause 4.1.4	PASS
5	15.247(d), 15.209	RSS0Gen, 8.9; RSS-247, 5.5	Conducted Spurious Emission & Authorized-band band-edge	Clause 4.1.5	PASS
6	15.247(d), 15.205, 15.209	RSS-247, 5.5	Spurious Emission	Clause 4.1.6	PASS
7	15.247(d), 15.205, 15.209	RSS-247, 5.5	Band Edge (Restricted-band band-edge)	Clause 4.1.7	PASS
8	15.207(a)	RSS-Gen 8.8	Conducted Emission	Clause 4.2.1	PASS

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## 2 Test Condition

### 2.1 Test Facility

### 2.2 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

### 2.3 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2020-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2020-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2020-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	2020-02-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
DC Power Supply	ACPOWER	ADC-0800025-15	D215010003	2020-03-15
Temperature Chamber	Muni	M/THP400L	M/161227-01	2020-05-08
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2020-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2020-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-18~40G	YINGLIAN	LB-180400-KF	N/A	2020-07-26
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2020-06-26
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2020-08-28
Test Software	BL	BL410_E	N/A	N/A
Test Software	BL	BL410_R	N/A	N/A
Amplifier and Filter group	BL	BL410_E	N/A	2020-11-01
Amplifier and Filter group and Power meter	BL	BL410_R	N/A	2020-11-01

### 2.4 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

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## 3 Test Set-up and Operation Modes

### 3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:  
For 802.11b/g/n (HT20/HT40)

Channel	Frequency	Remark
CH1	2412MHz	
CH6	2437MHz	
CH11	2462MHz	
CH13	2472MHz	Only for Output Power and Band Edge

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate (For Chain 1)	Data rate (For Chain 2)
802.11b	11Mbps	5.5Mbps
802.11g	18Mbps	18Mbps
802.11n(HT20)	MCS6	MCS6
802.11n(HT40)	MCS2	MCS2

Type	Data rate (For MIMO)
802.11b	11Mbps
802.11g	18Mbps
802.11n(HT20)	MCS6
802.11n(HT40)	MCS1

The basic operation modes are:

- A. On
  - 1. WLAN mode
    - a. Transmitting
      - i. Low Channel
      - ii. Middle Channel
      - iii. High Channel
    - b. Receiving
- B. Standby
- C. Off

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## 3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

## 3.3 Support Software

Description	Manufacturer	Software Name
/	/	/

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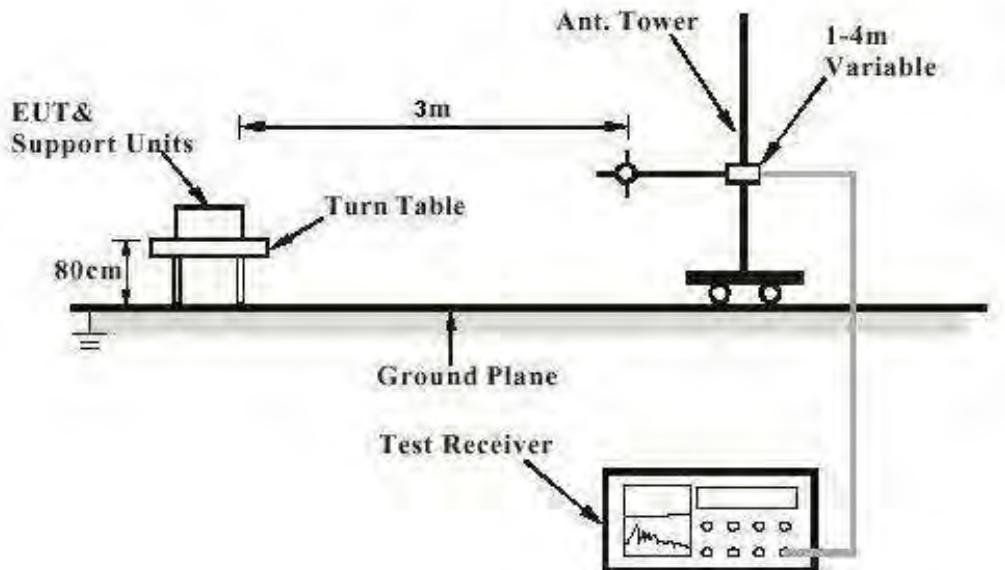
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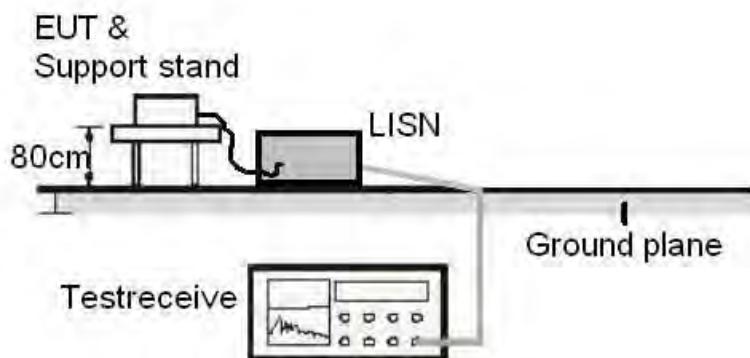
## 3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Conduction Measurement



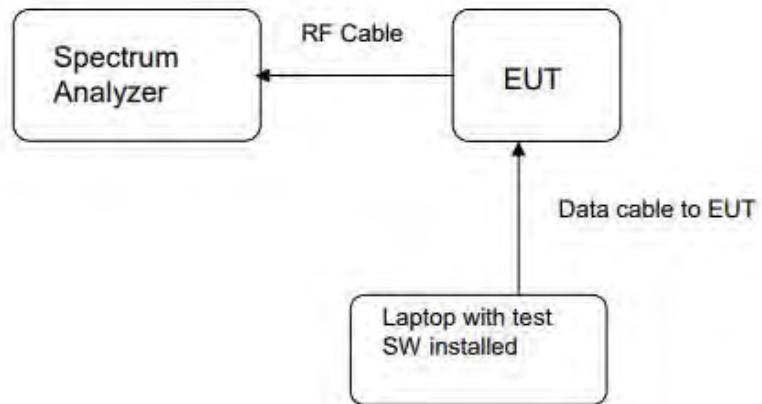
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## Diagram of Measurement Equipment Configuration for Transmitter Measurement



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## 4 Test Results

### 4.1 Transmitter Requirement & Test Suites

#### 4.1.1 Antenna Requirement

RESULT:

PASS

Test standard : FCC Part 15.247(b)(4), Part 15.203

Requirement : The use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 1 dBi. The antenna is an internal antenna with no possibility of replacement with a non-approvrd antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

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## 4.1.2 Peak Output Power

**RESULT:**

**PASS**

Test standard : FCC Part 15.247(b)(3)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 52%

**Table 1: Peak Output Power**

Test Mode	Test Channel (MHz)	Measured Peak Power				Limit (W)	
		Chain 1		Chain 2			
		(dBm)	(mW)	(dBm)	(mW)		
802.11b	2412	16.75	47.32	17.63	57.94	< 1	
	2437	17.31	53.83	16.73	47.10		
	2462	17.38	54.70	17.81	60.39		
	2472	16.37	43.35	16.16	41.30		
802.11g	2412	14.16	26.06	15.58	36.14	< 1	
	2437	14.84	30.48	15.17	32.89		
	2462	15.25	33.50	15.64	36.64		
	2472	13.56	22.70	14.41	27.61		
802.11n(HT20)	2412	14.26	26.67	15.60	36.31	< 1	
	2437	14.88	30.76	15.13	32.58		
	2462	15.13	32.58	15.64	36.64		
	2472	13.64	23.12	11.99	15.81		
802.11n(HT40)	2422	13.77	23.82	13.40	21.88	< 1	
	2437	14.26	26.67	13.49	22.34		
	2452	14.43	27.73	13.54	22.59		
	2462	13.97	24.95	13.25	21.13		

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Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)	
		MIMO			
		(dBm)	(mW)		
802.11b	2412	18.59	72.28	< 1	
	2437	18.31	67.76		
	2462	18.04	63.68		
	2472	17.72	59.16		
802.11g	2412	16.39	43.55	< 1	
	2437	16.43	43.95		
	2462	16.58	45.50		
	2472	15.51	35.56		
802.11n(HT20)	2412	16.06	40.36	< 1	
	2437	16.25	42.17		
	2462	16.41	43.75		
	2472	15.27	33.65		
802.11n(HT40)	2422	13.72	23.55	< 1	
	2437	13.84	24.21		
	2452	13.67	23.28		
	2462	13.36	21.68		

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## 4.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.247(a)(2)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 52%

Table 2: Chain 2 6dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit (MHz)
802.11b	2412	6.975	12.879	0.5
	2437	8.127	12.825	
	2462	8.210	12.776	
802.11g	2412	16.490	16.355	0.5
	2437	16.400	16.381	
	2462	15.990	16.345	
802.11n(HT20)	2412	17.750	17.658	0.5
	2437	17.630	17.617	
	2462	17.690	17.638	
802.11n(HT40)	2422	36.290	36.038	0.5
	2437	36.420	36.159	
	2452	35.740	35.900	

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Table 3: MIMO 6dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit (MHz)
802.11b	2412	7.219	13.073	0.5
	2437	7.642	12.982	
	2462	8.295	12.761	
802.11g	2412	16.390	16.386	0.5
	2437	16.340	16.362	
	2462	15.710	16.310	
802.11n(HT20)	2412	17.680	17.683	0.5
	2437	17.680	17.662	
	2462	17.330	17.610	
802.11n(HT40)	2422	35.360	36.036	0.5
	2437	35.730	36.039	
	2452	35.130	35.856	

Table 4: Chain 1 6dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit (MHz)
802.11b	2412	7.191	13.069	0.5
	2437	7.210	12.989	
	2462	6.449	12.716	
802.11g	2412	16.390	16.381	0.5
	2437	16.360	16.369	
	2462	15.740	16.321	
802.11n(HT20)	2412	17.690	17.678	0.5
	2437	17.680	17.667	
	2462	17.330	17.613	
802.11n(HT40)	2422	36.460	36.245	0.5
	2437	36.430	36.219	
	2452	36.400	36.094	

Note:

The all chains were tested respectively, but only the worst configuration shown here.

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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz



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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz



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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz



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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz



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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz



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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz



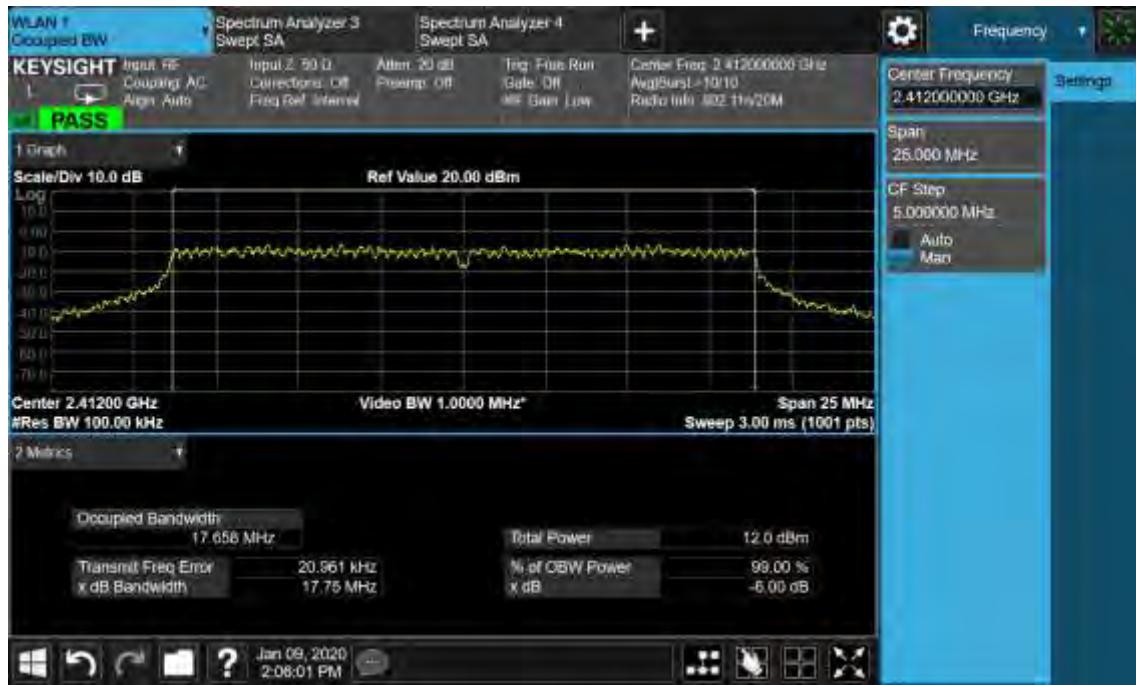
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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz



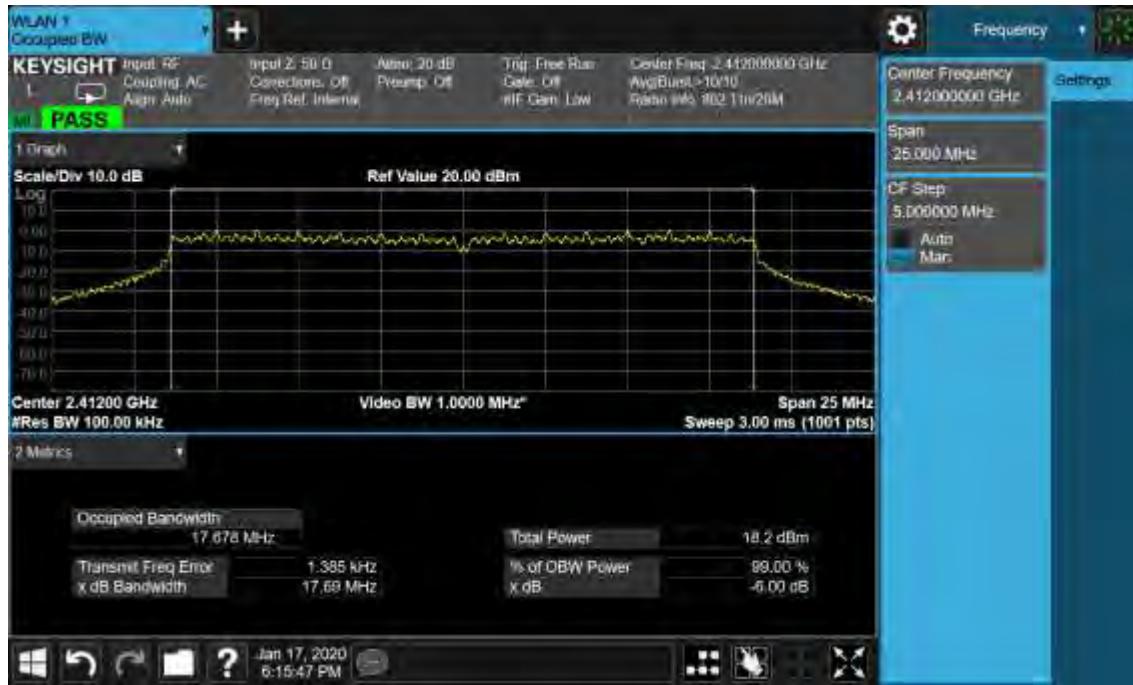
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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz



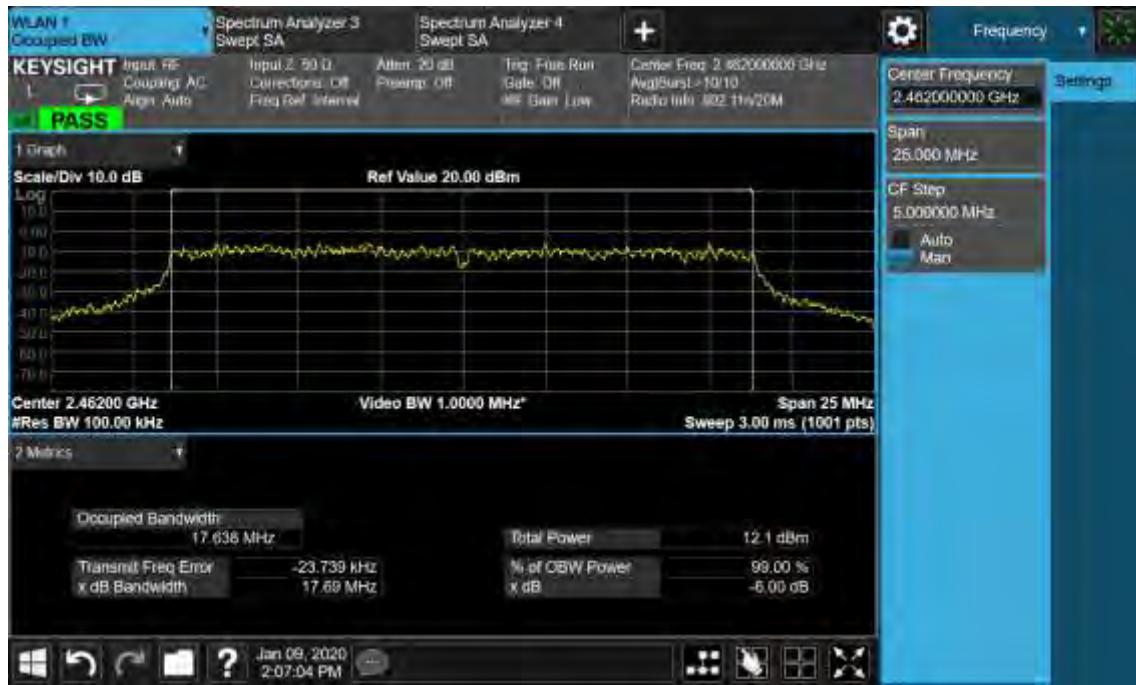
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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz



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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2422MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2422MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2422MHz



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## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2437MHz



## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2437MHz



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## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2437MHz



## Chain 2 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2452MHz



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## MIMO 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2452MHz



## Chain 1 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2452MHz



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## 4.1.4 Power Spectral Density

RESULT:

PASS

Test standard : FCC Part 15.247(e)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 52%

Table 5: Chain 2 Power Spectral Density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-6.96	8
	2437	-7.74	
	2462	-6.88	
802.11g	2412	-11.13	8
	2437	-12.08	
	2462	-11.07	
802.11n(HT20)	2412	-10.54	8
	2437	-11.06	
	2462	-11.86	
802.11n(HT40)	2422	-16.05	8
	2437	-16.24	
	2452	-15.35	

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**Table 6: MIMO Power Spectral Density**

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-7.845	8
	2437	-8.251	
	2462	-7.192	
802.11g	2412	-13.006	8
	2437	-12.997	
	2462	-11.864	
802.11n(HT20)	2412	-13.035	8
	2437	-12.449	
	2462	-11.340	
802.11n(HT40)	2422	-19.024	8
	2437	-18.099	
	2452	-18.573	

**Table 7: Chain 1 Power Spectral Density**

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-7.786	8
	2437	-3.427	
	2462	-2.515	
802.11g	2412	-14.305	8
	2437	-13.238	
	2462	-12.985	
802.11n(HT20)	2412	-14.229	8
	2437	-13.522	
	2462	-12.383	
802.11n(HT40)	2422	-18.425	8
	2437	-18.687	
	2452	-18.343	

Note:

The all chains were tested respectively, but only the worst configuration shown here.

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## Chain 2 Power Spectral Density, 802.11b, 2412MHz



## MIMO Power Spectral Density, 802.11b, 2412MHz



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## Chain 1 Power Spectral Density, 802.11b, 2412MHz



## Chain 2 Power Spectral Density, 802.11b, 2437MHz



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## MIMO Power Spectral Density, 802.11b, 2437MHz



## Chain 1 Power Spectral Density, 802.11b, 2437MHz



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## Chain 2 Power Spectral Density, 802.11b, 2462MHz



## MIMO Power Spectral Density, 802.11b, 2462MHz



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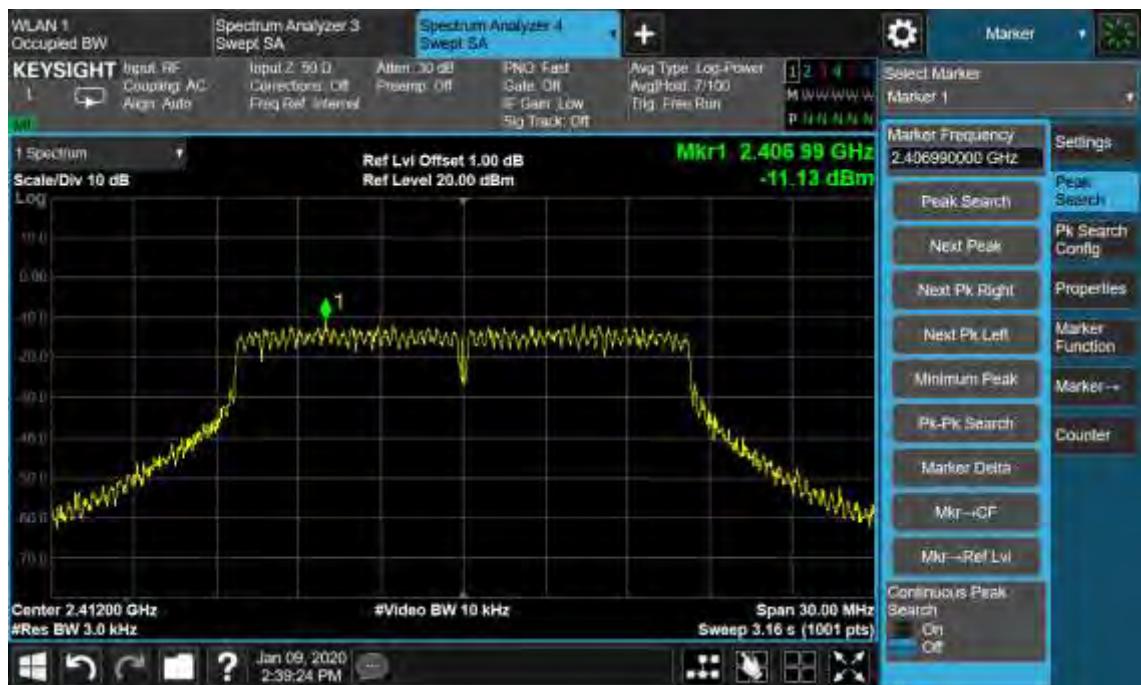
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## Chain 1 Power Spectral Density, 802.11b, 2462MHz



## Chain 2 Power Spectral Density, 802.11g, 2412MHz



# TEST REPORT

Report No.: SHE19110011-02CE

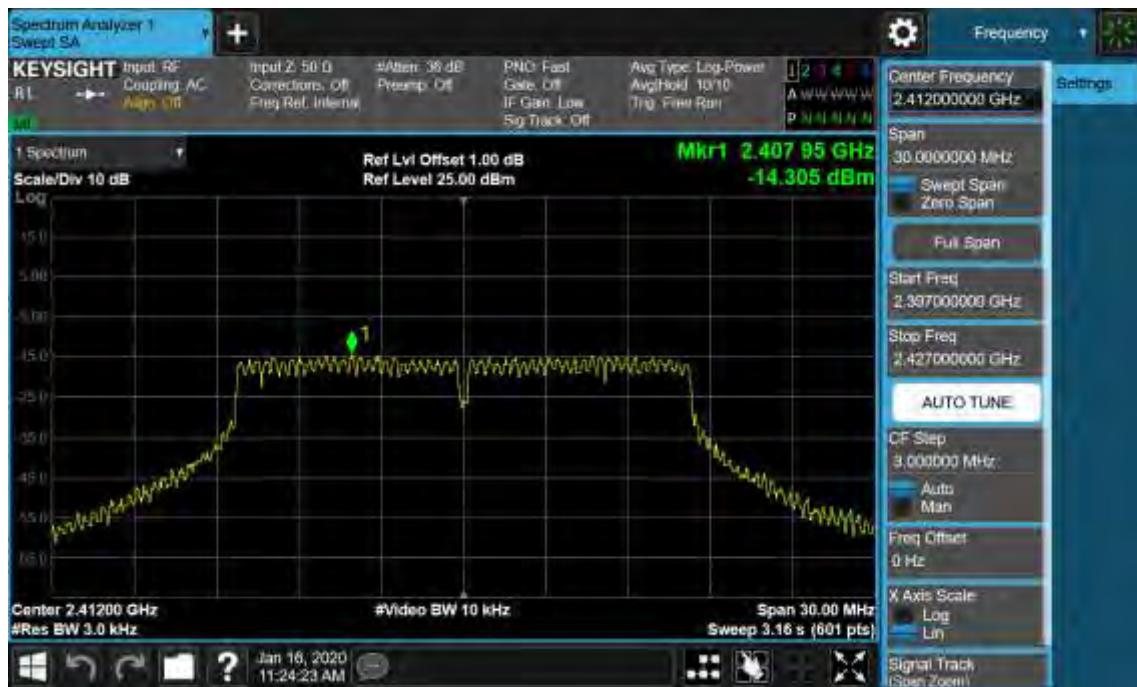
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## MIMO Power Spectral Density, 802.11g, 2412MHz



## Chain 1 Power Spectral Density, 802.11g, 2412MHz



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## Chain 2 Power Spectral Density, 802.11g, 2437MHz



MIMO Power Spectral Density, 802.11g, 2437MHz



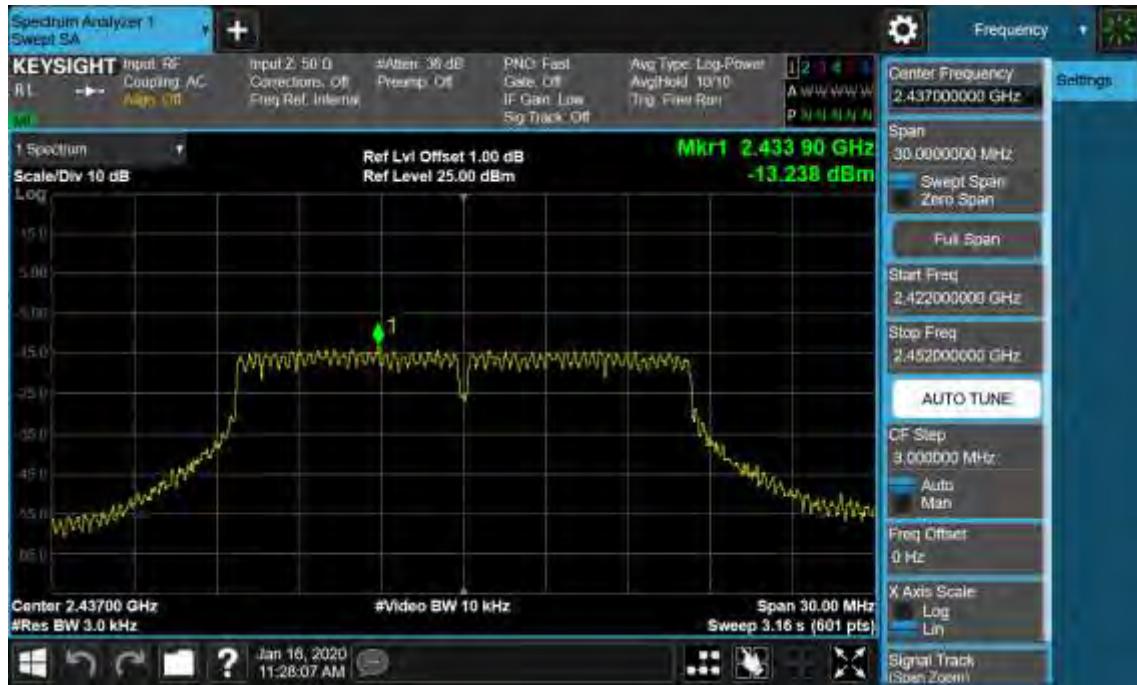
# TEST REPORT

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## Chain 1 Power Spectral Density, 802.11g, 2437MHz



## Chain 2 Power Spectral Density, 802.11g, 2462MHz



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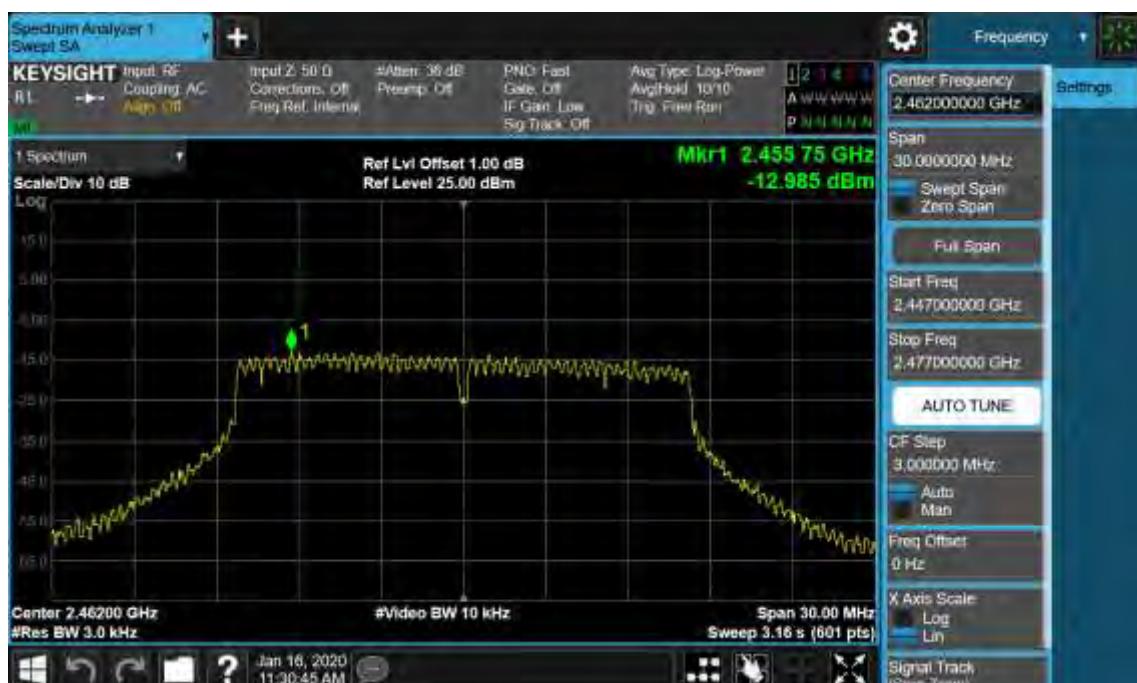
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## MIMO Power Spectral Density, 802.11g, 2462MHz



## Chain 1 Power Spectral Density, 802.11g, 2462MHz



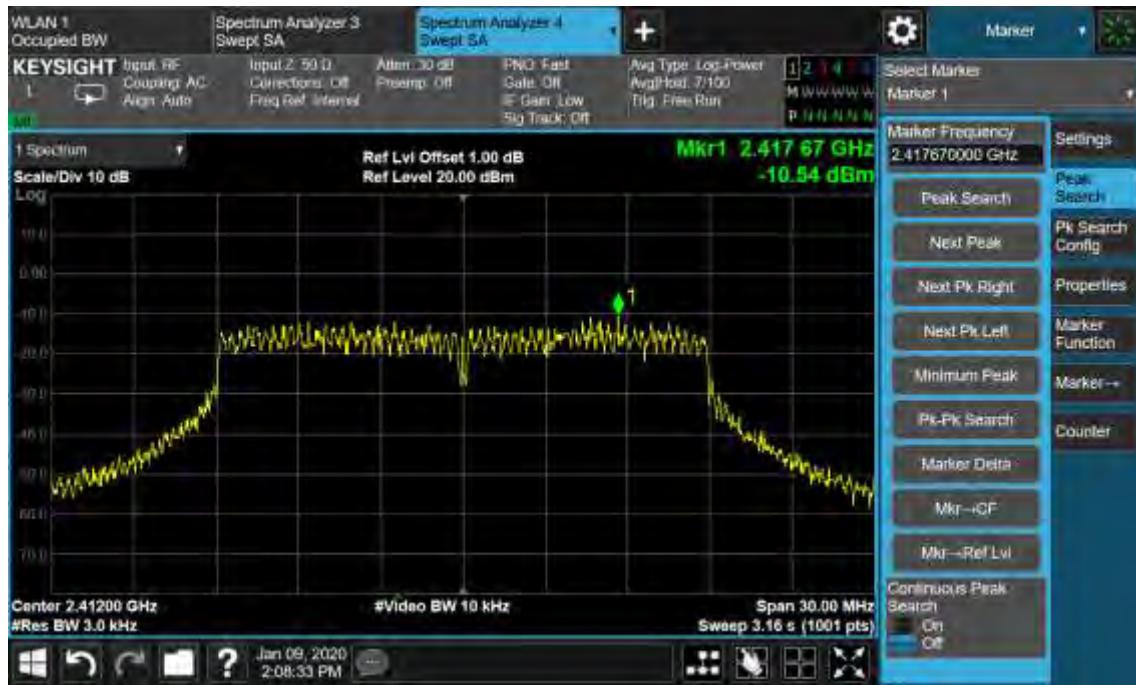
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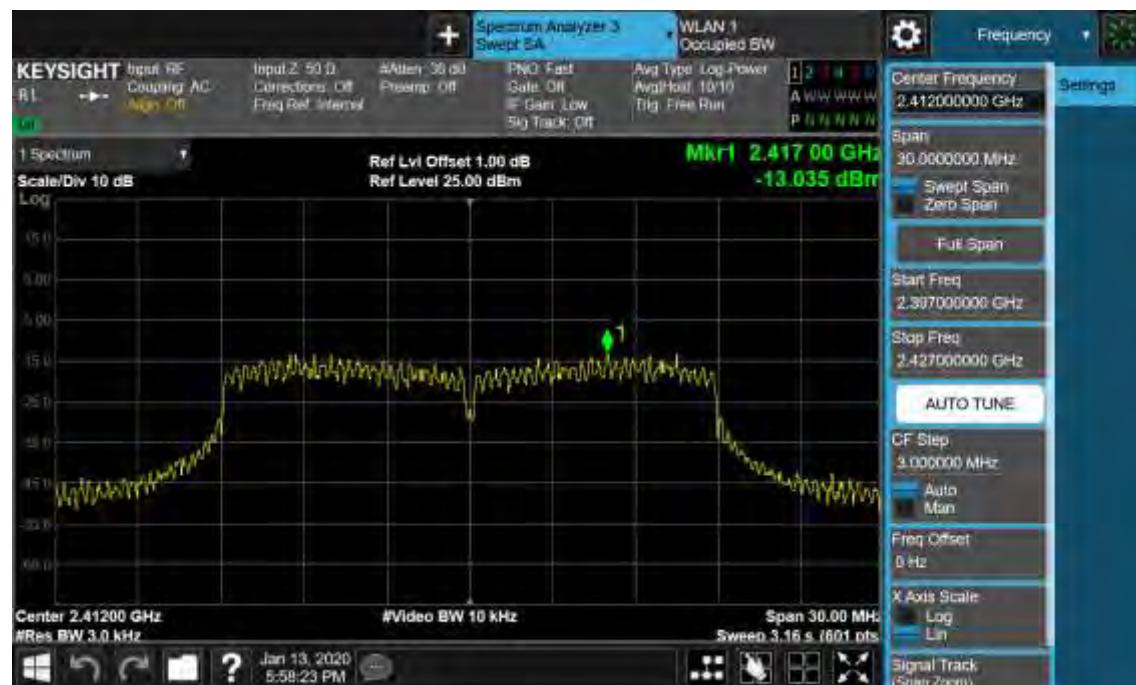
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## Chain 2 Power Spectral Density, 802.11n(HT20), 2412MHz



## MIMO Power Spectral Density, 802.11n(HT20), 2412MHz



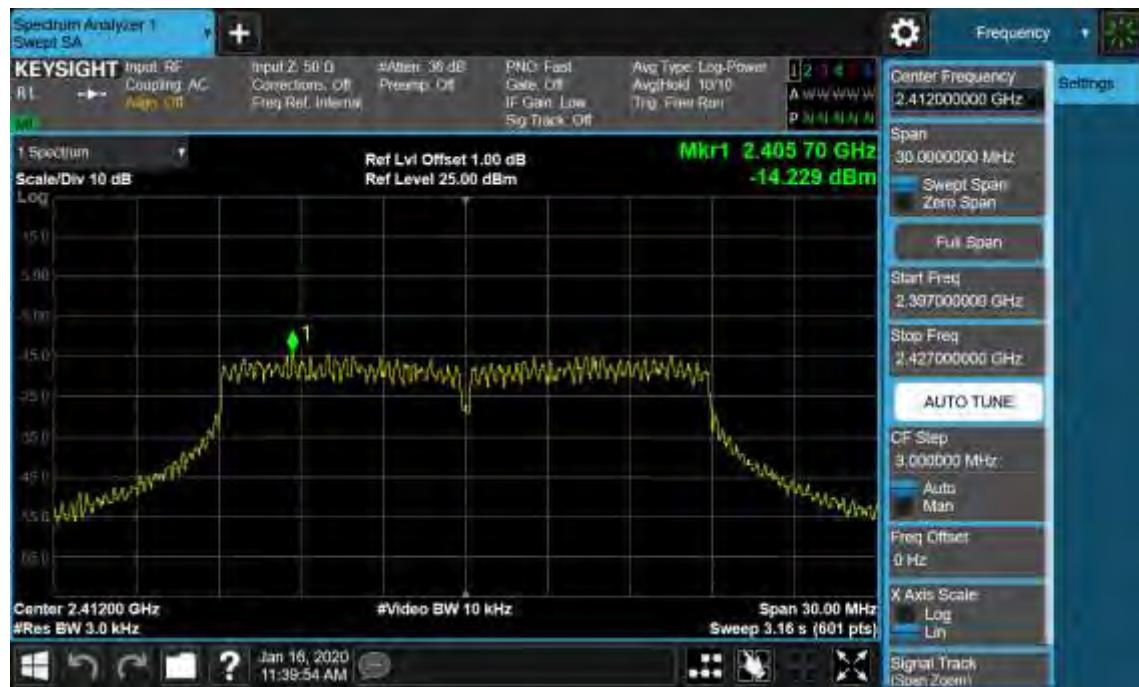
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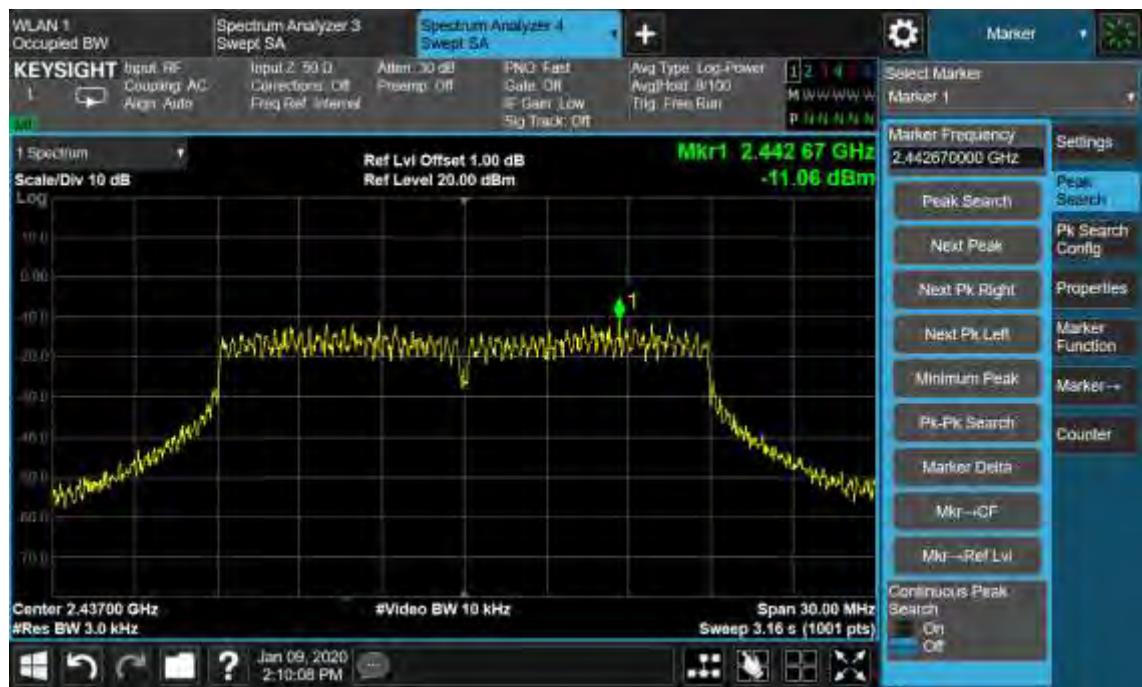
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## Chain 1 Power Spectral Density, 802.11n(HT20), 2412MHz



## Chain 2 Power Spectral Density, 802.11n(HT20), 2437MHz



# TEST REPORT

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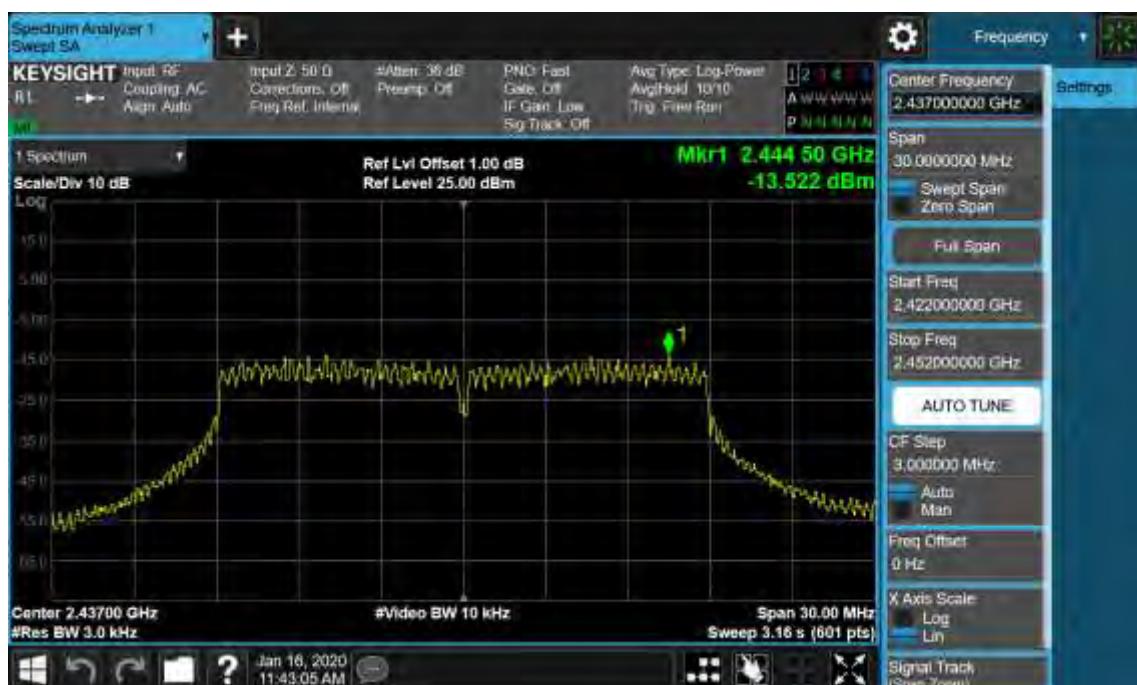
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## MIMO Power Spectral Density, 802.11n(HT20), 2437MHz



## Chain 1 Power Spectral Density, 802.11n(HT20), 2437MHz



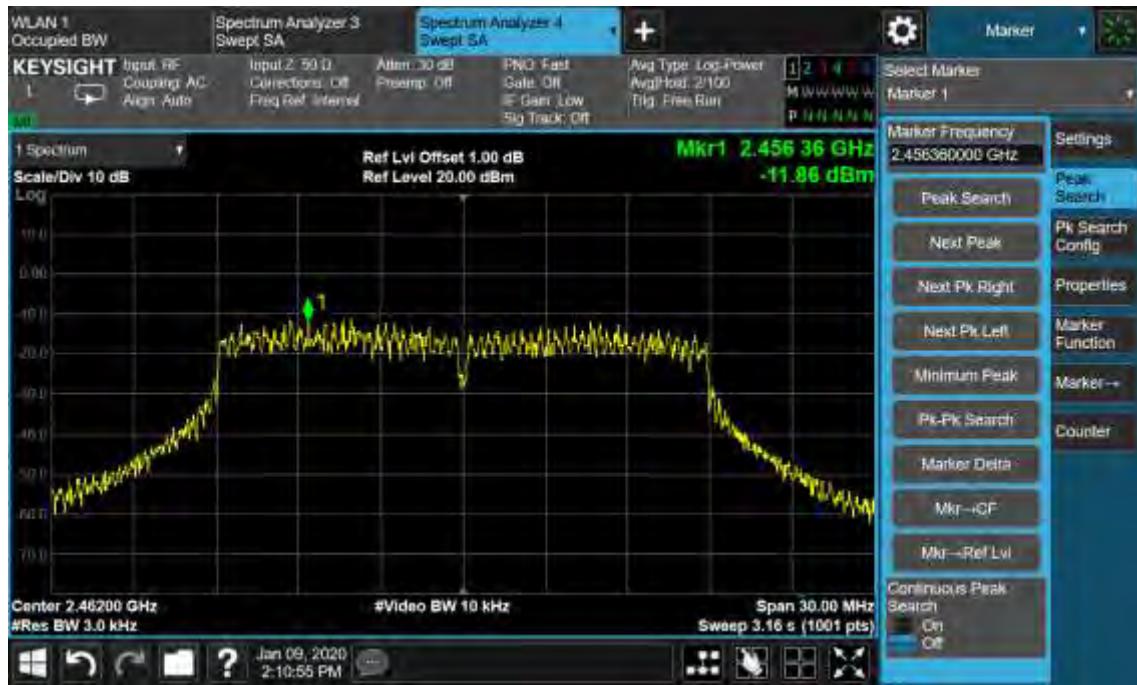
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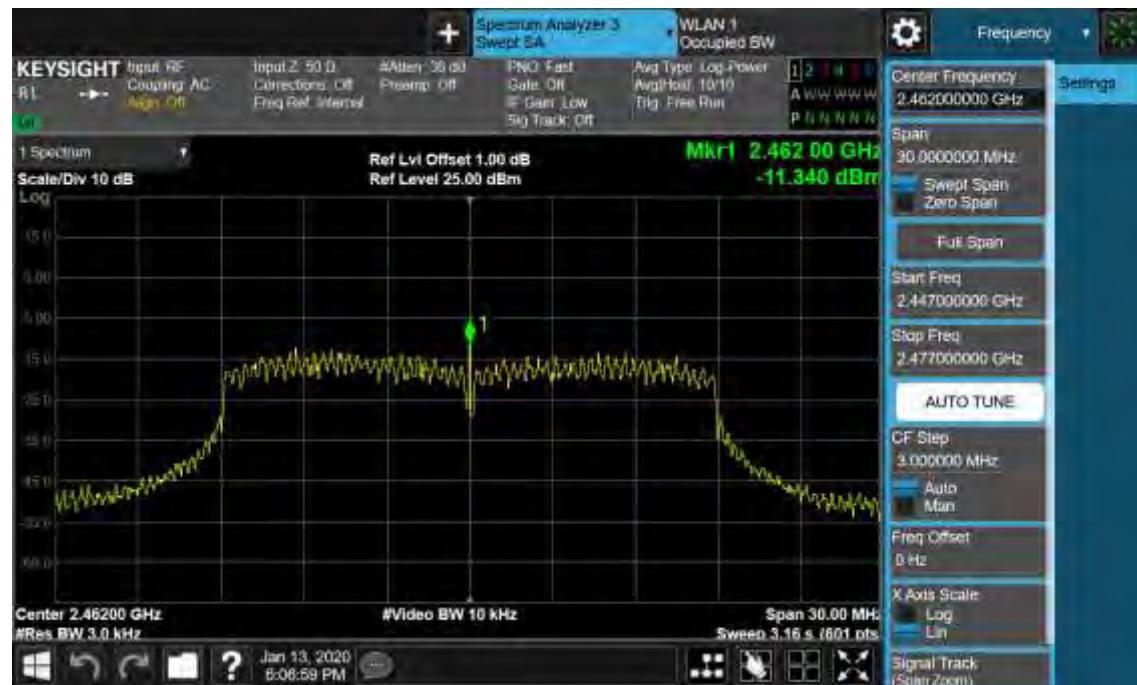
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## Chain 2 Power Spectral Density, 802.11n(HT20), 2462MHz



## MIMO Power Spectral Density, 802.11n(HT20), 2462MHz



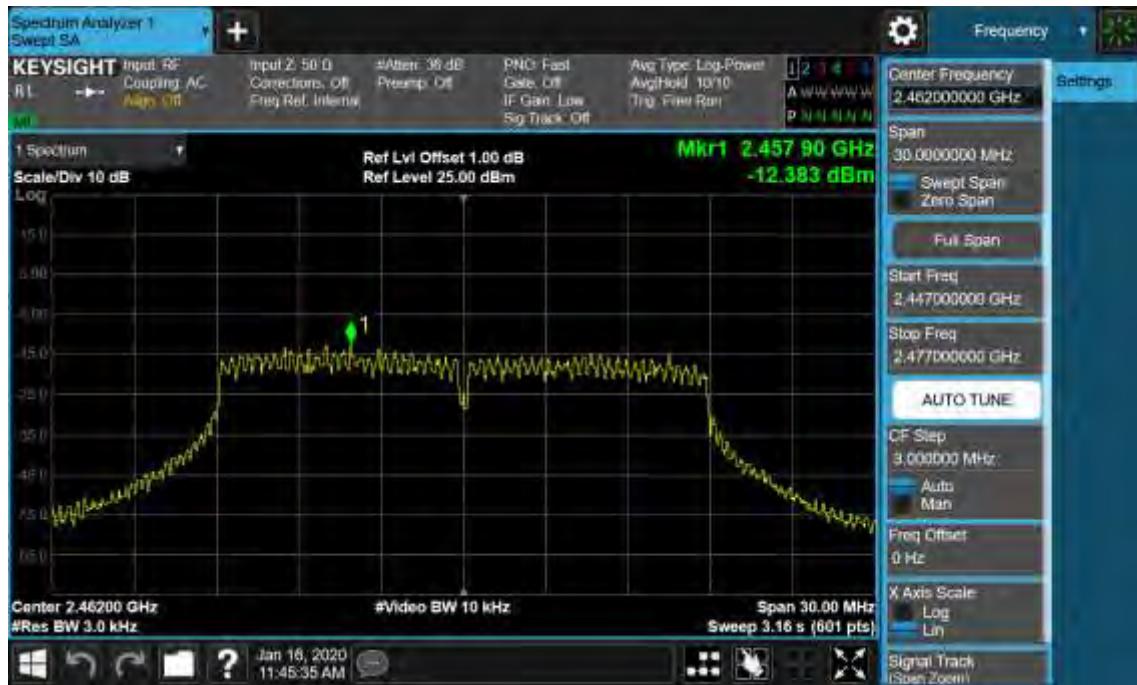
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Report No.: SHE19110011-02CE

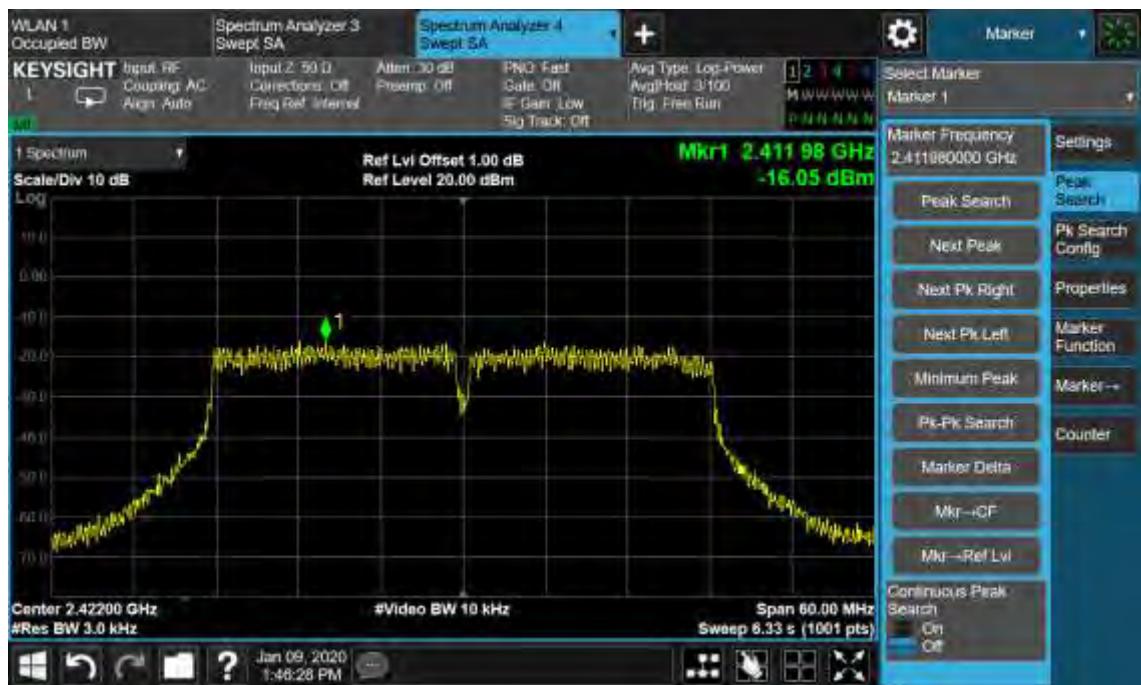
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## Chain 1 Power Spectral Density, 802.11n(HT20), 2462MHz



## Chain 2 Power Spectral Density, 802.11n(HT40), 2422MHz



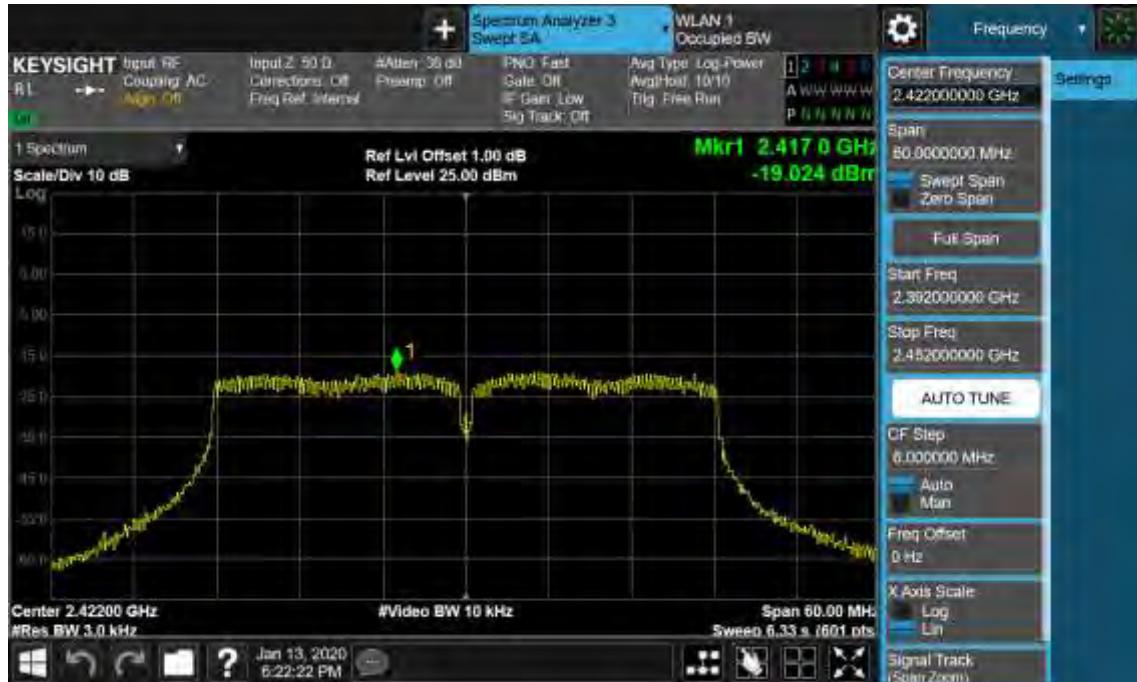
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Report No.: SHE19110011-02CE

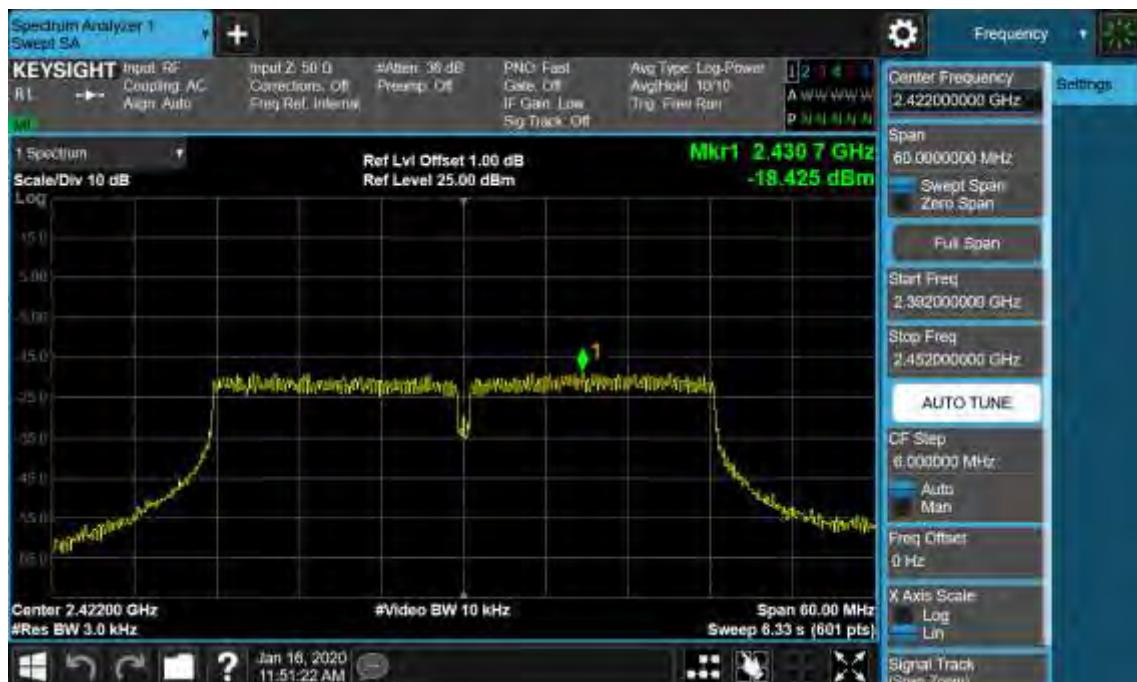
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## MIMO Power Spectral Density, 802.11n(HT40), 2422MHz



## Chain 1 Power Spectral Density, 802.11n(HT40), 2422MHz



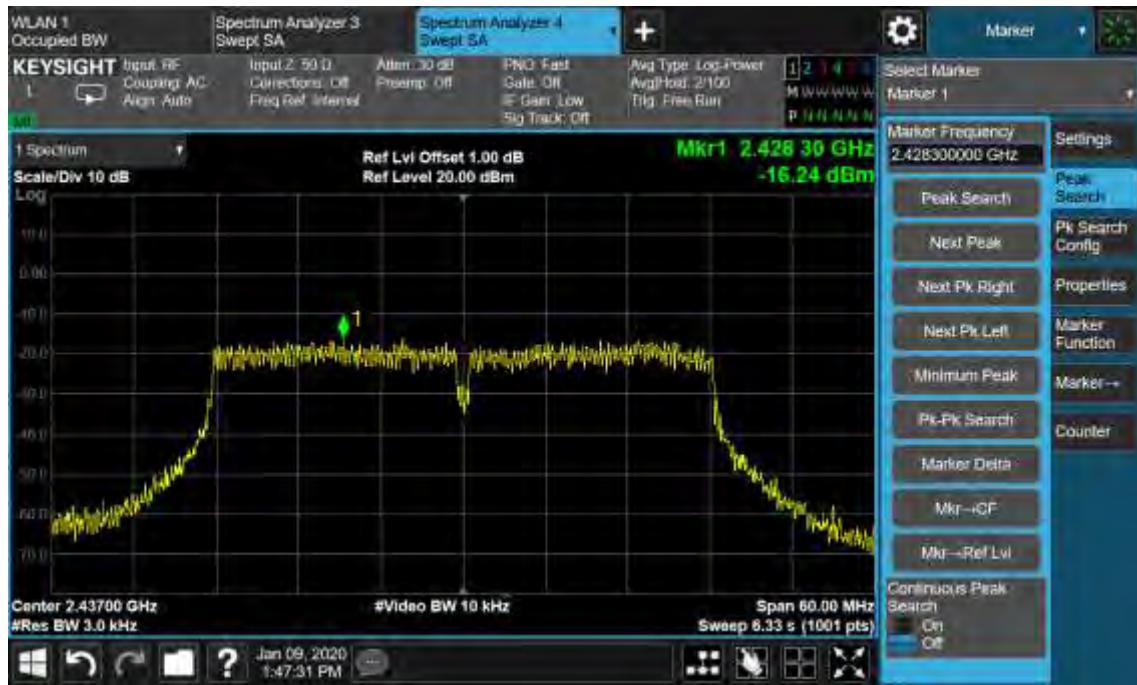
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## Chain 2 Power Spectral Density, 802.11n(HT40), 2437MHz



## MIMO Power Spectral Density, 802.11n(HT40), 2437MHz



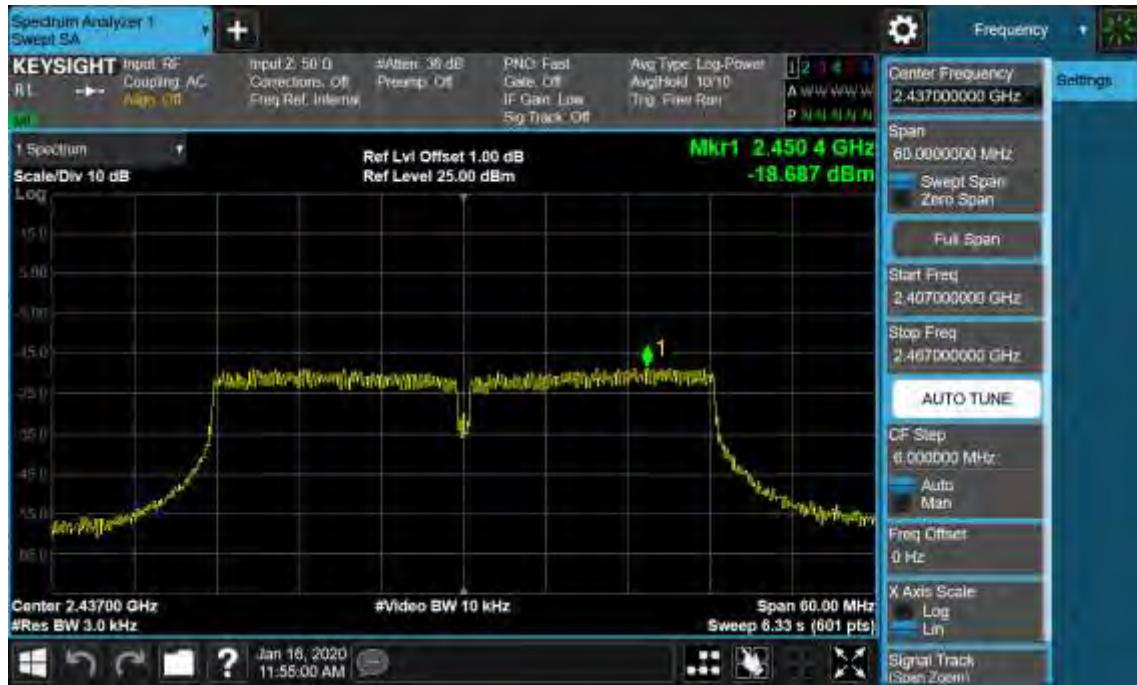
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Report No.: SHE19110011-02CE

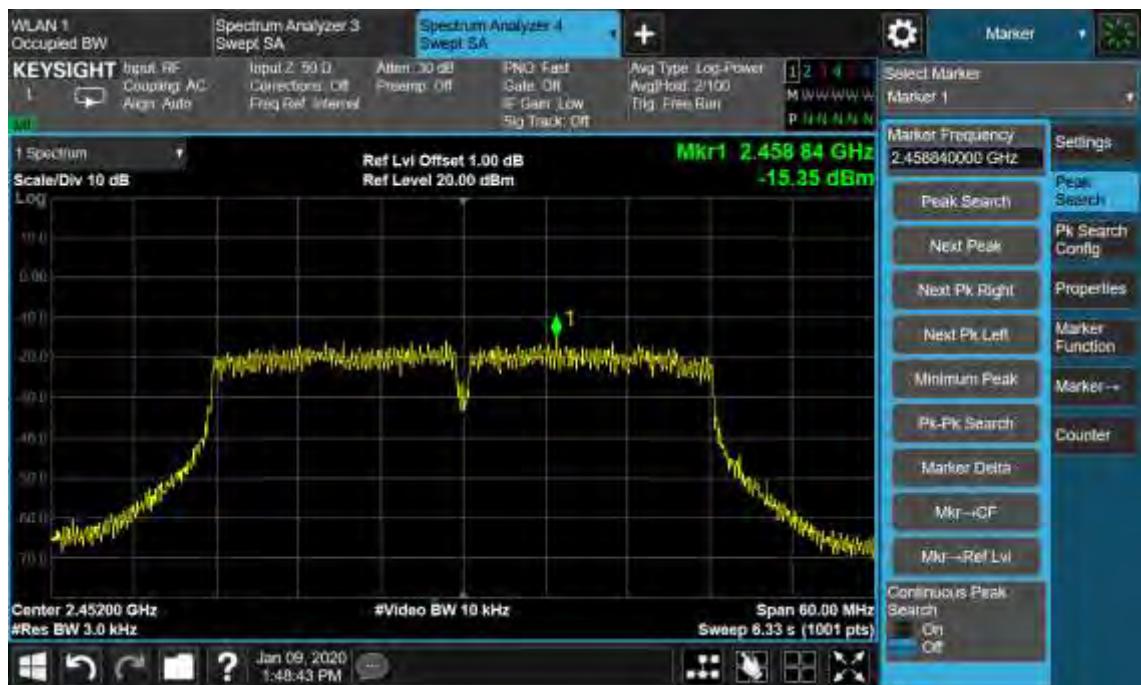
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## Chain 1 Power Spectral Density, 802.11n(HT40), 2437MHz



## Chain 2 Power Spectral Density, 802.11n(HT40), 2452MHz



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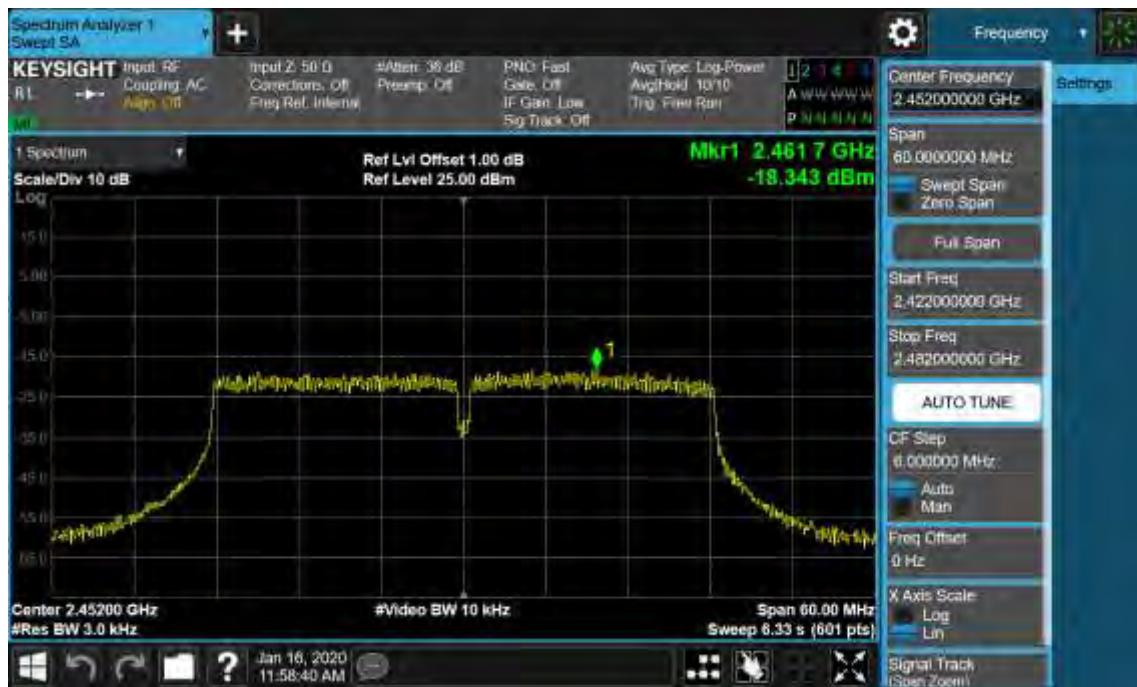
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## MIMO Power Spectral Density, 802.11n(HT40), 2452MHz



## Chain 1 Power Spectral Density, 802.11n(HT40), 2452MHz



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## 4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT:

PASS

Test standard : FCC Part 15.247(d), 15.209

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

### Test setup

Test Channel : Low/Middle/High for spurious, Low/High for Band Edge

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 52%

For details refer to following test plot.

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Note:

The all chains were tested respectively, but only the worst configuration shown here.

## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz Carrier Level



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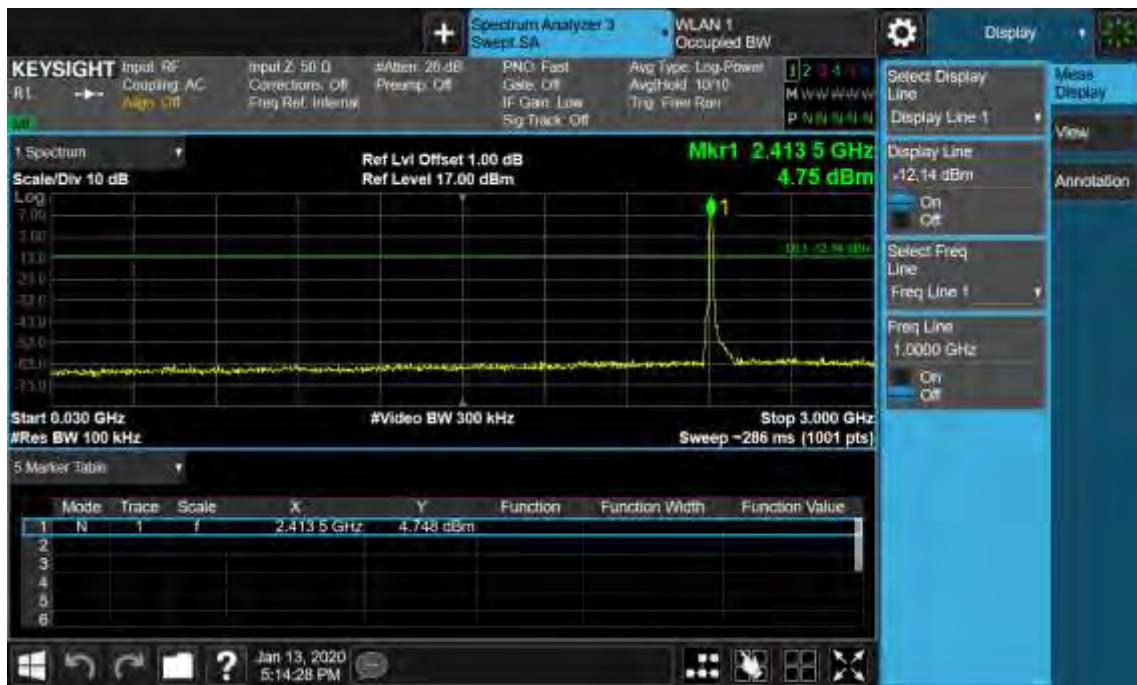
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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz

Carrier Level



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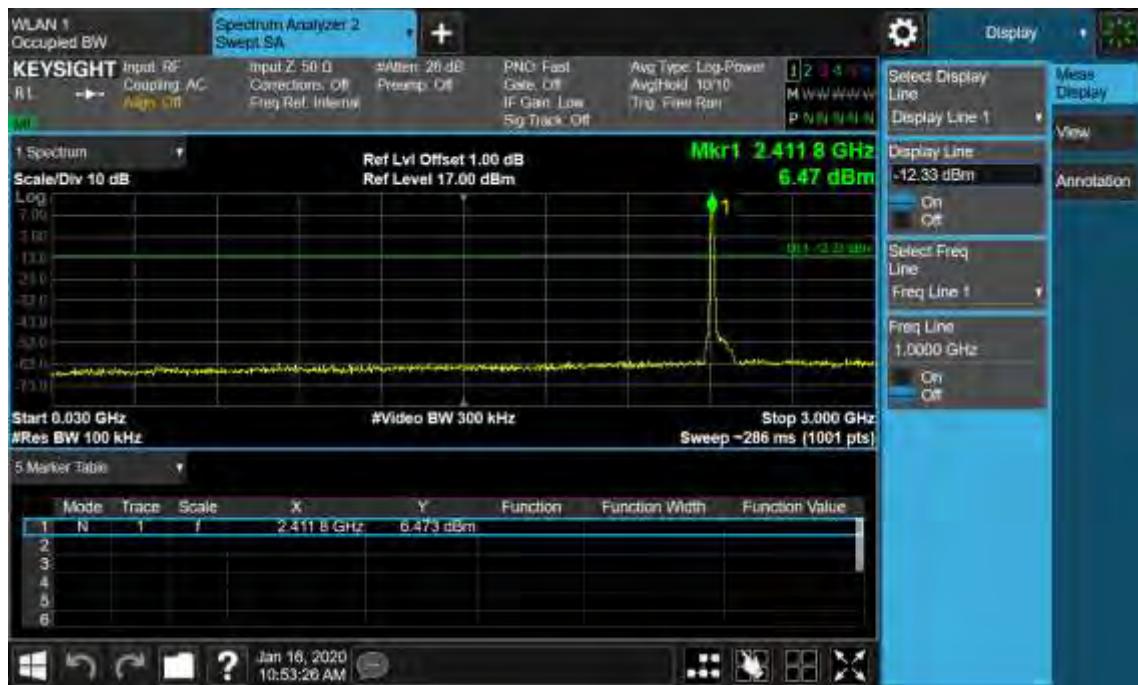
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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## **Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2437MHz Carrier Level**



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2437MHz Carrier Level



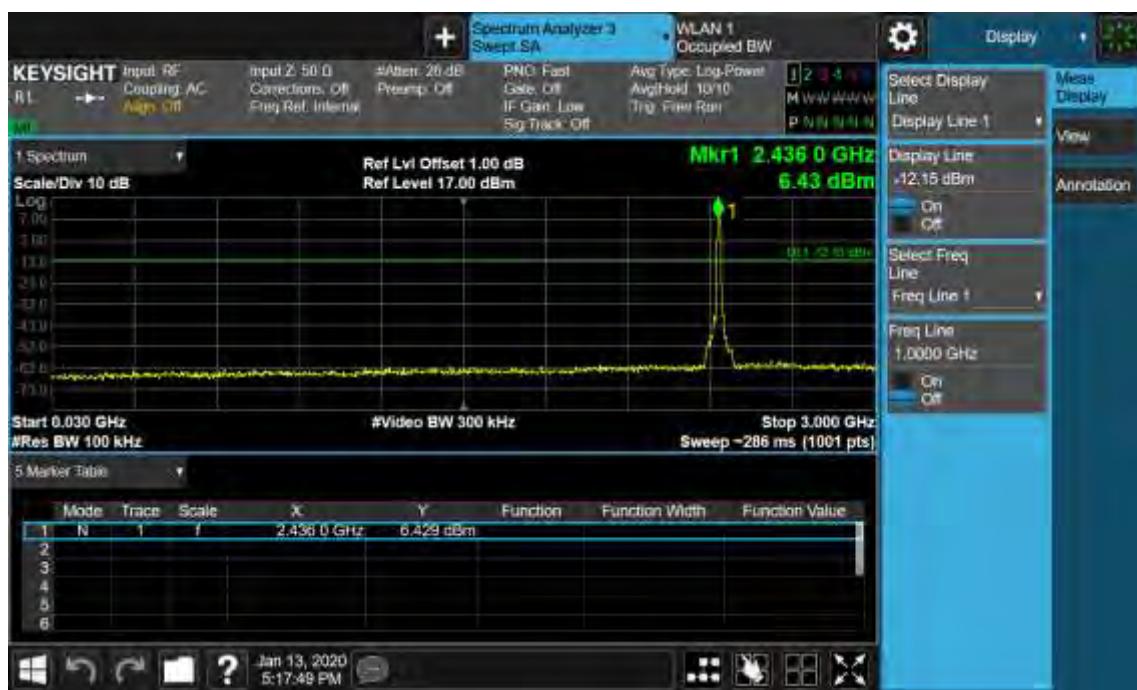
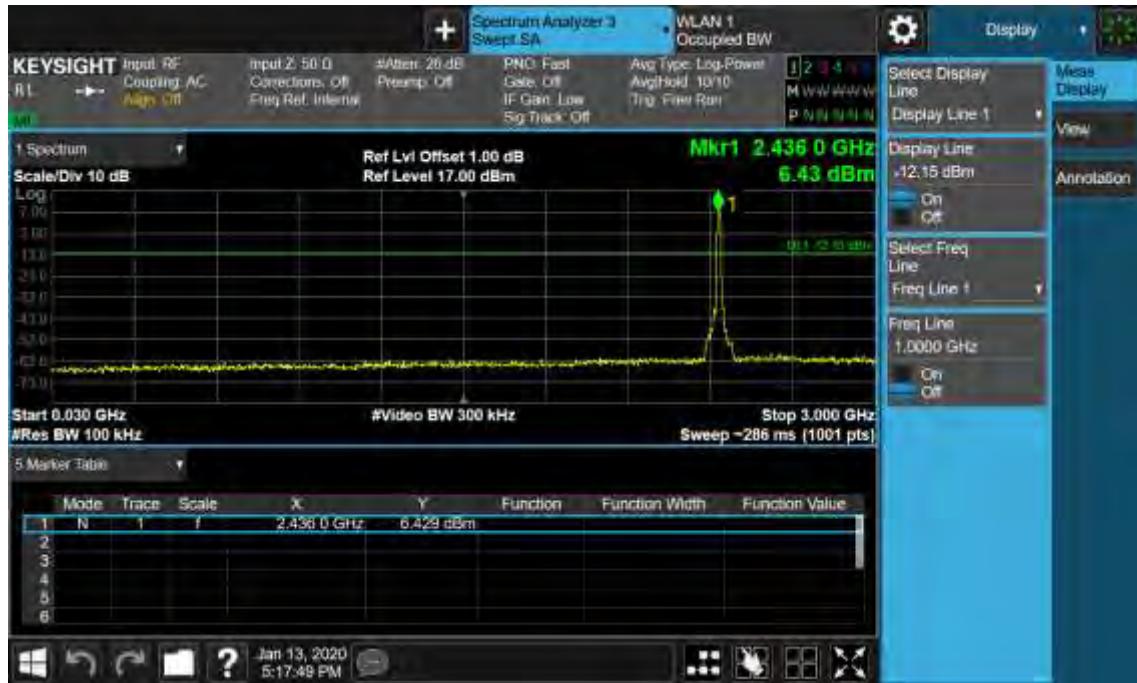
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## Conducted spurious emissions 30MHz-25GHz



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2437MHz Carrier Level



## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2462MHz Carrier Level



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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#### MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2462MHz

## **Carrier Level**



## Band Edge



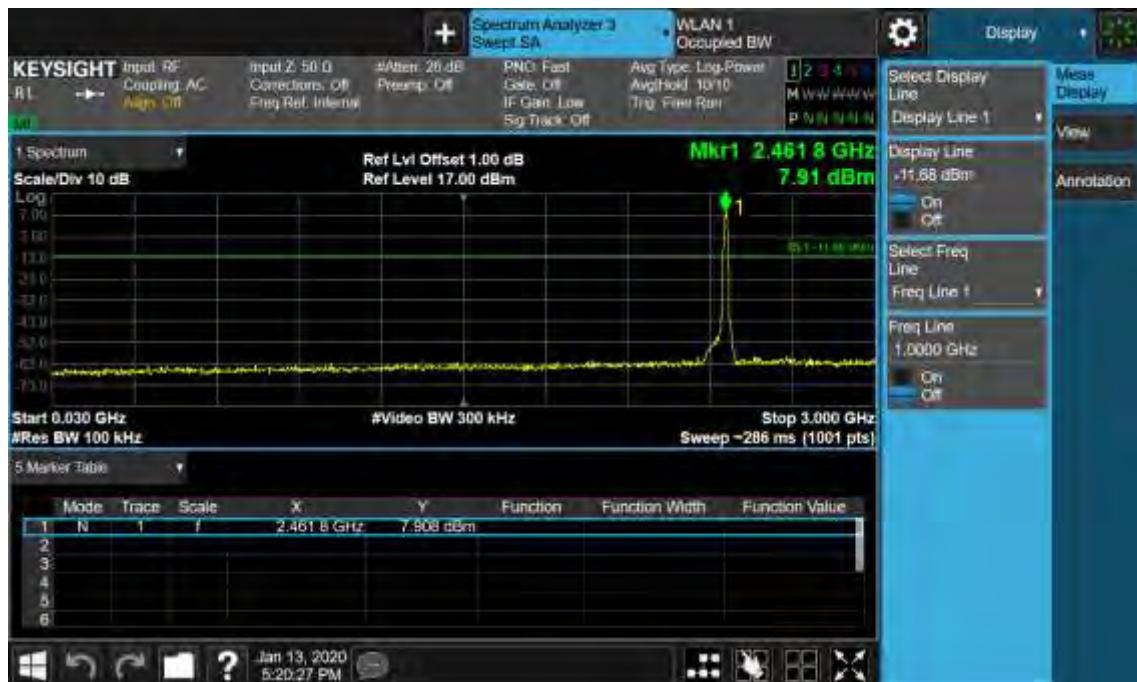
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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2462MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2472MHz Carrier Level



## Band Edge



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2472MHz Carrier Level



## Band Edge



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2472MHz Carrier Level



## Band Edge



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz Carrier Level



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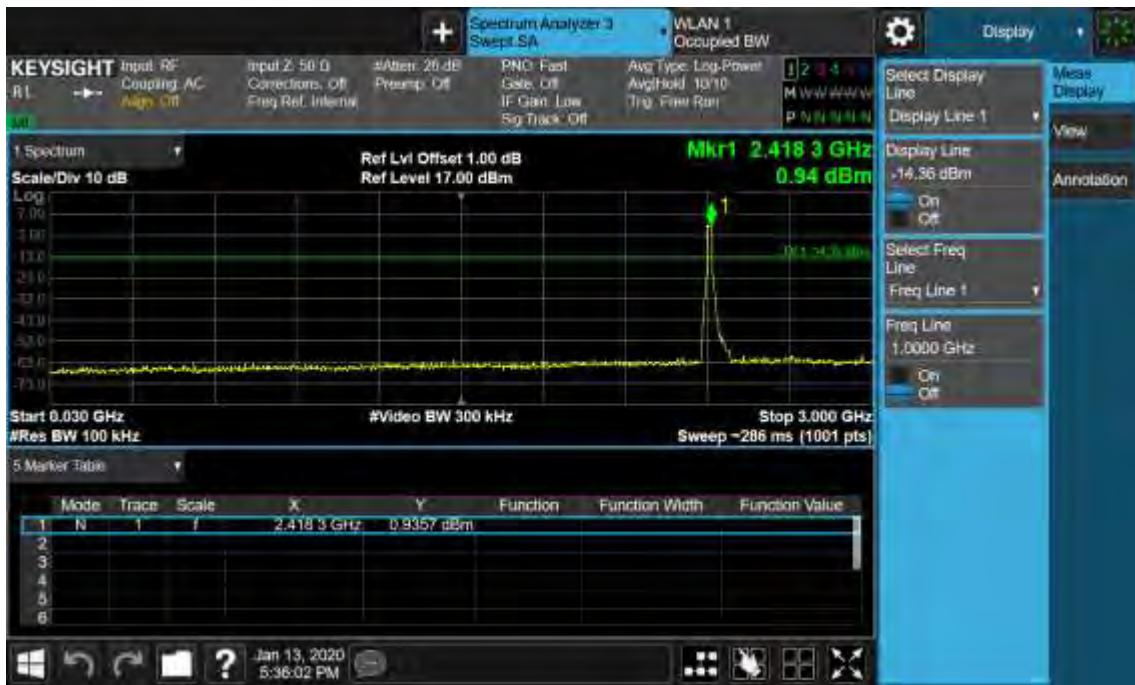
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## Band Edge



### **Conducted spurious emissions 30MHz-25GHz**



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**Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz Carrier Level**



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level



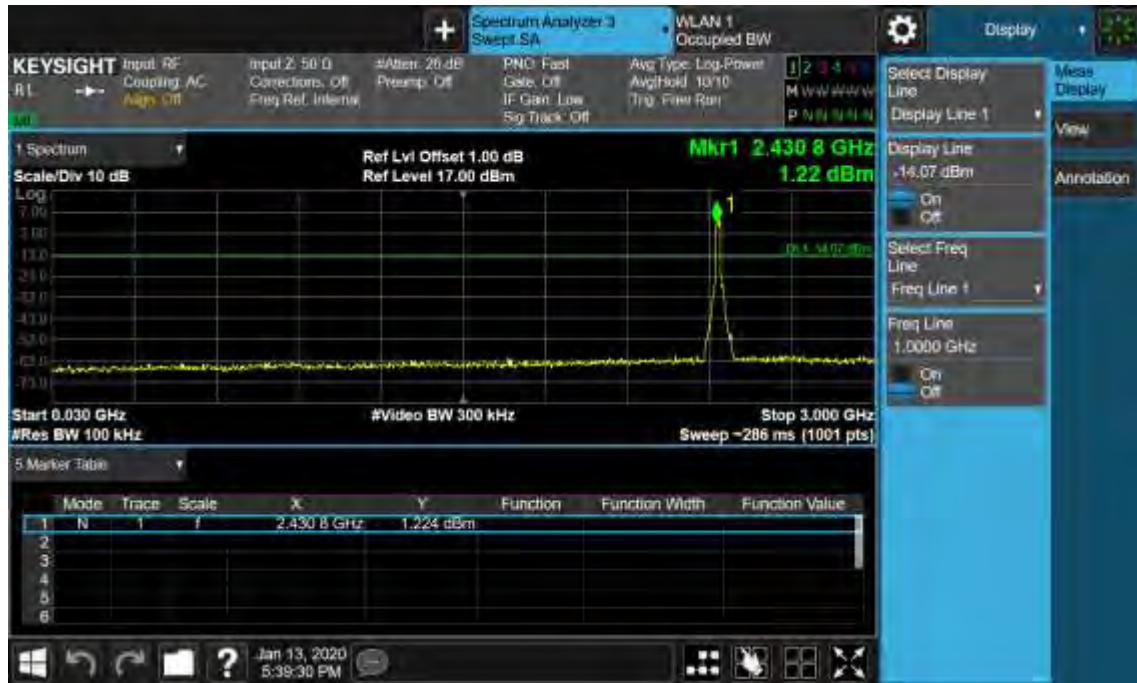
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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level



## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2472MHz Carrier Level



## Band Edge



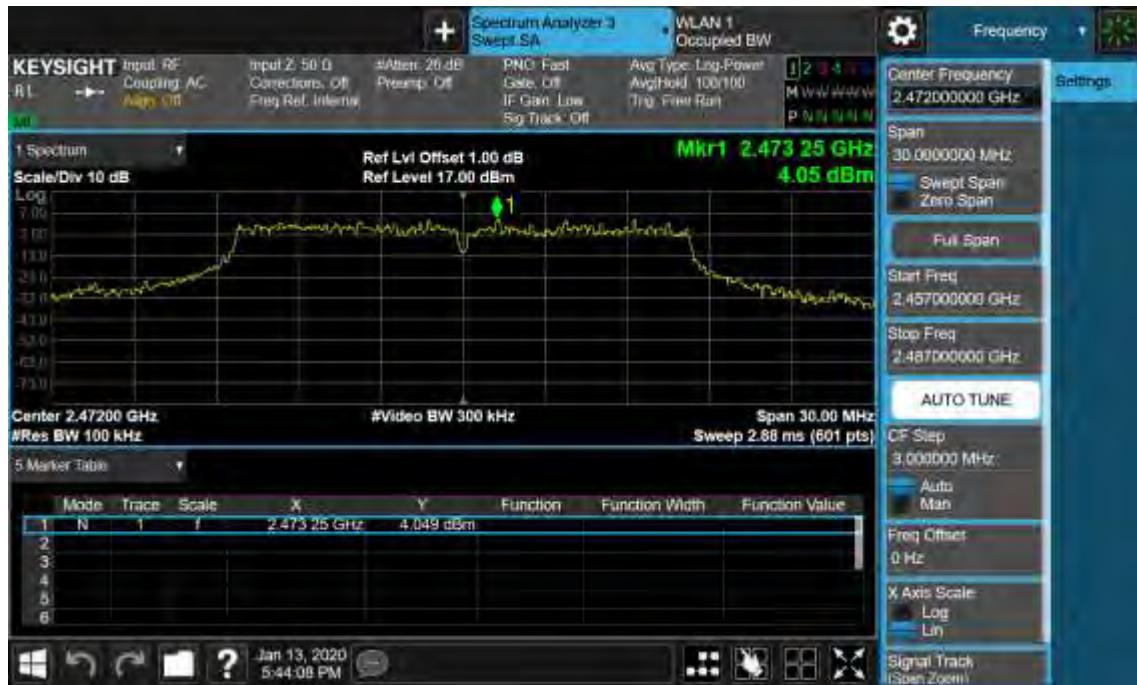
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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2472MHz Carrier Level



## Band Edge



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2472MHz Carrier Level



## Band Edge



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz Carrier Level



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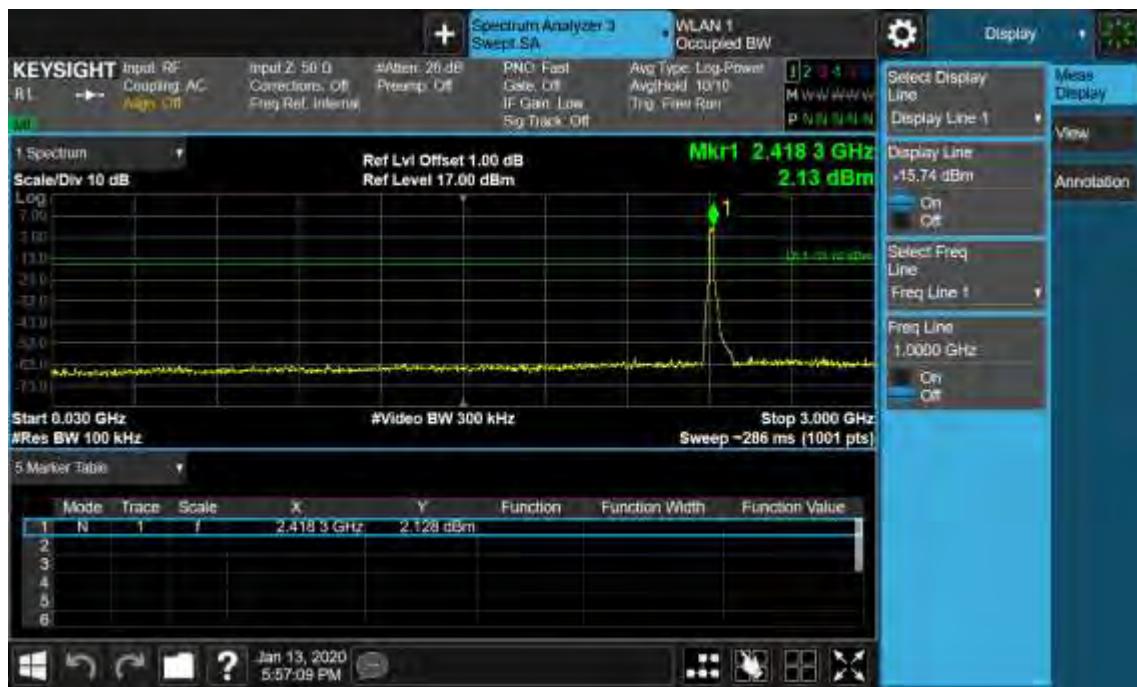
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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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**Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz Carrier Level**



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level



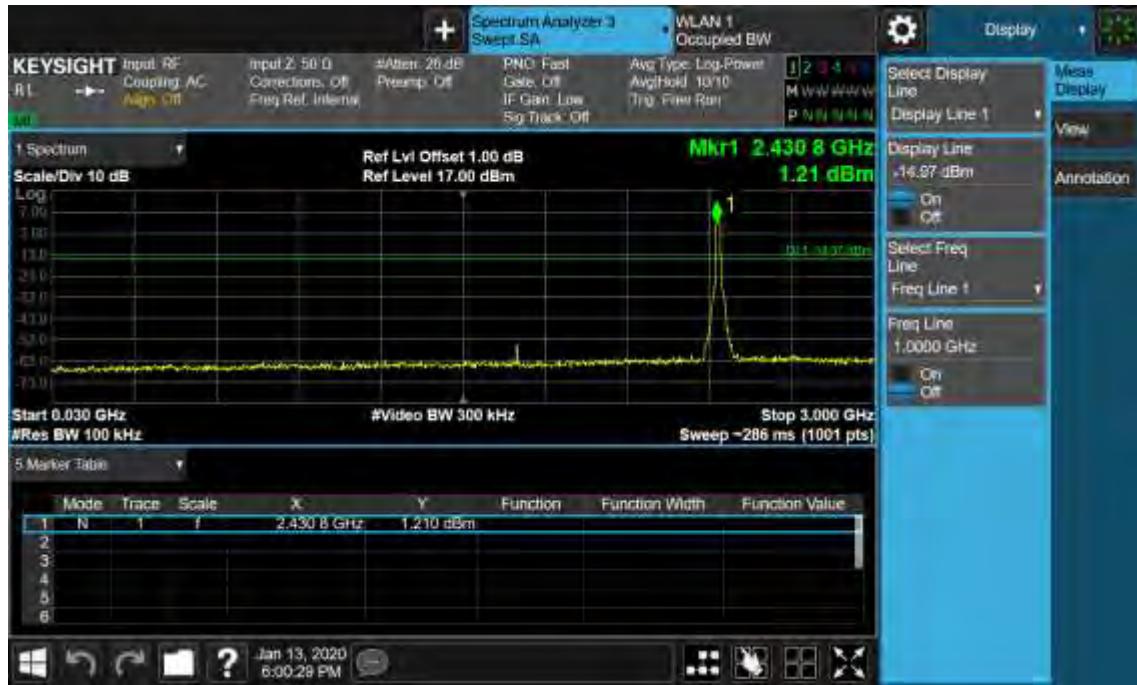
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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level



## Conducted spurious emissions 30MHz-25GHz



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Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz

Carrier Level



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz Carrier Level



## Band Edge



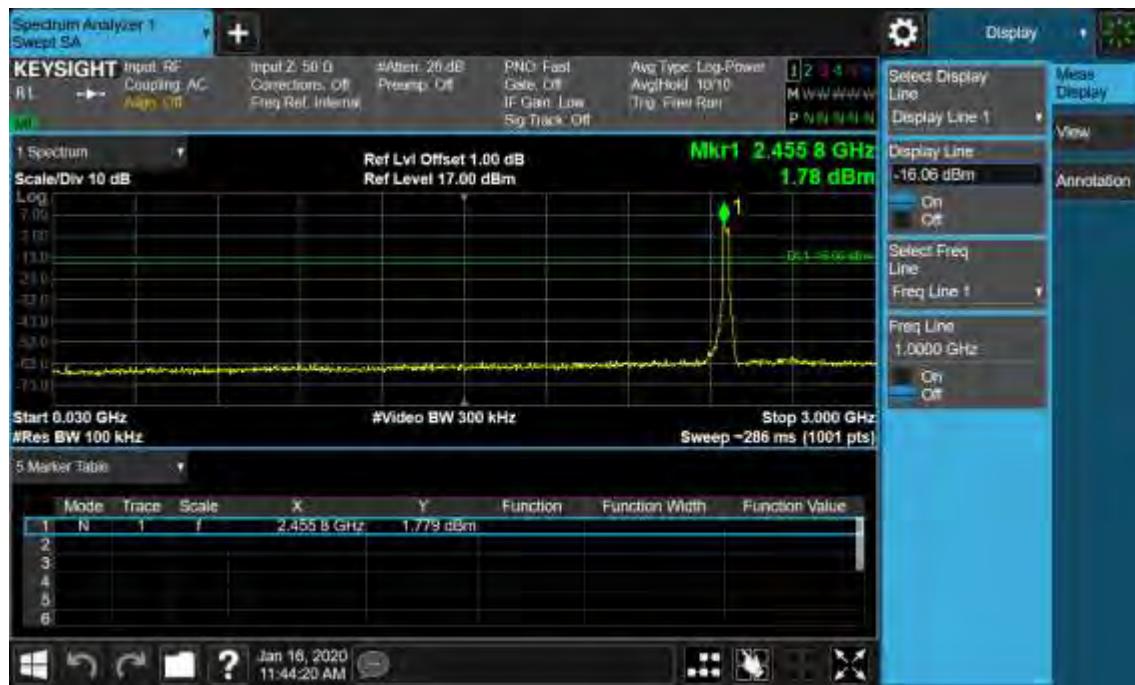
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## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2472MHz Carrier Level



## Band Edge



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2472MHz Carrier Level



## Band Edge



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2472MHz Carrier Level



## Band Edge



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2422MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2422MHz Carrier Level



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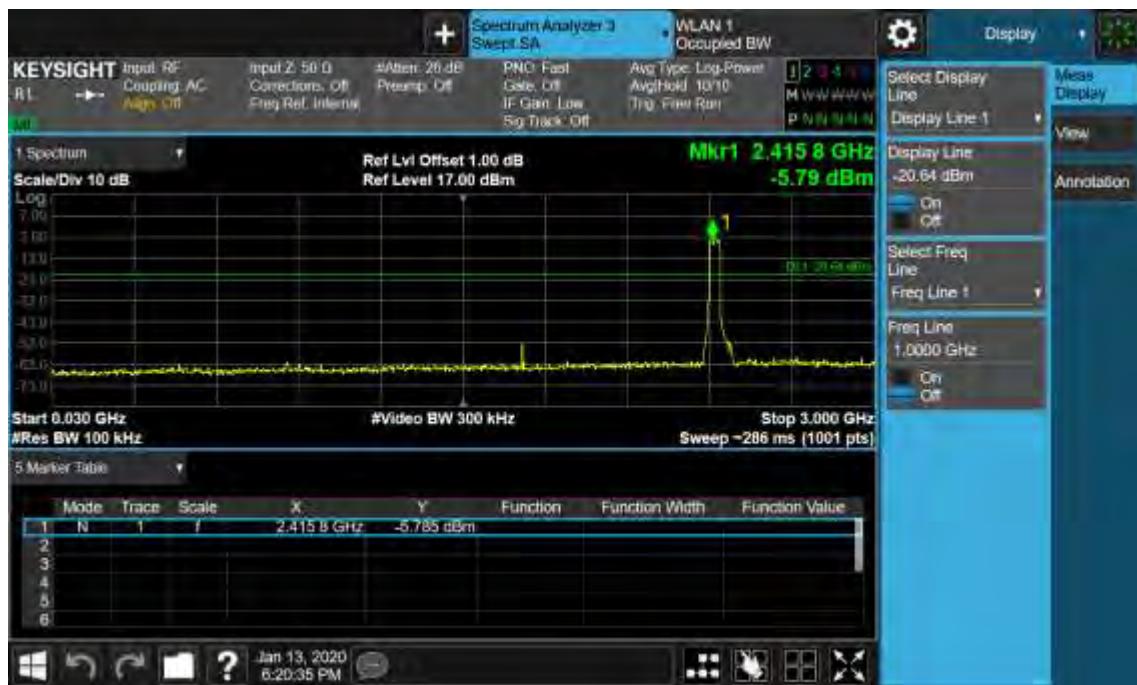
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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## **Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2422MHz Carrier Level**



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2437MHz Carrier Level



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## Conducted spurious emissions 30MHz-25GHz



## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2437MHz Carrier Level



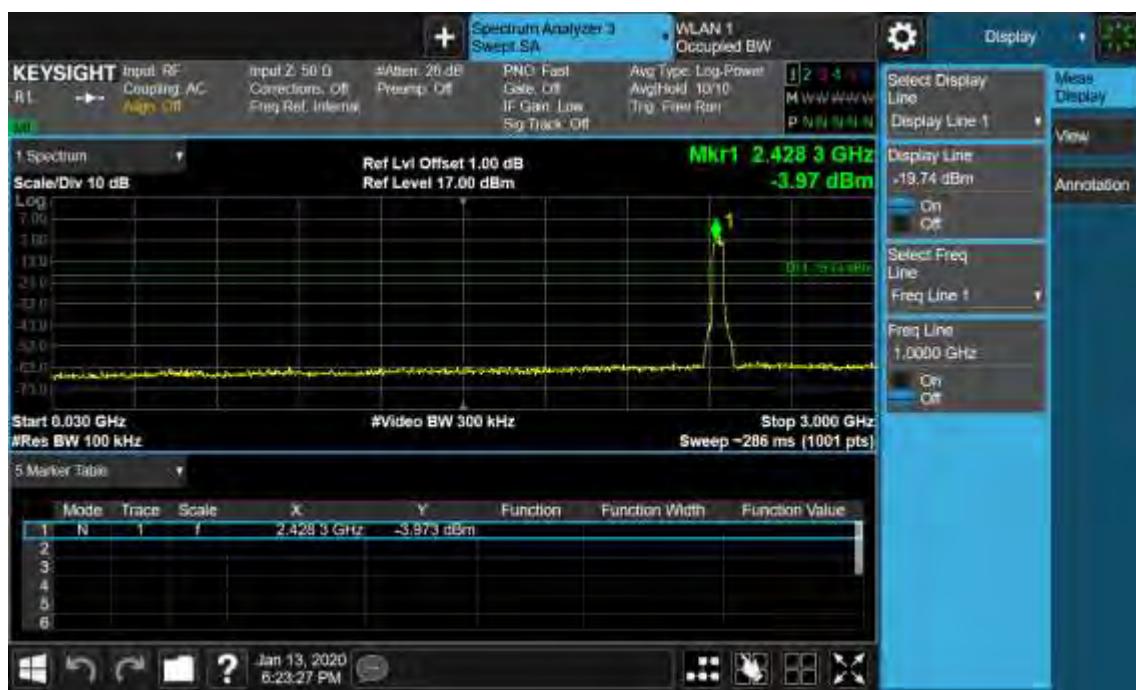
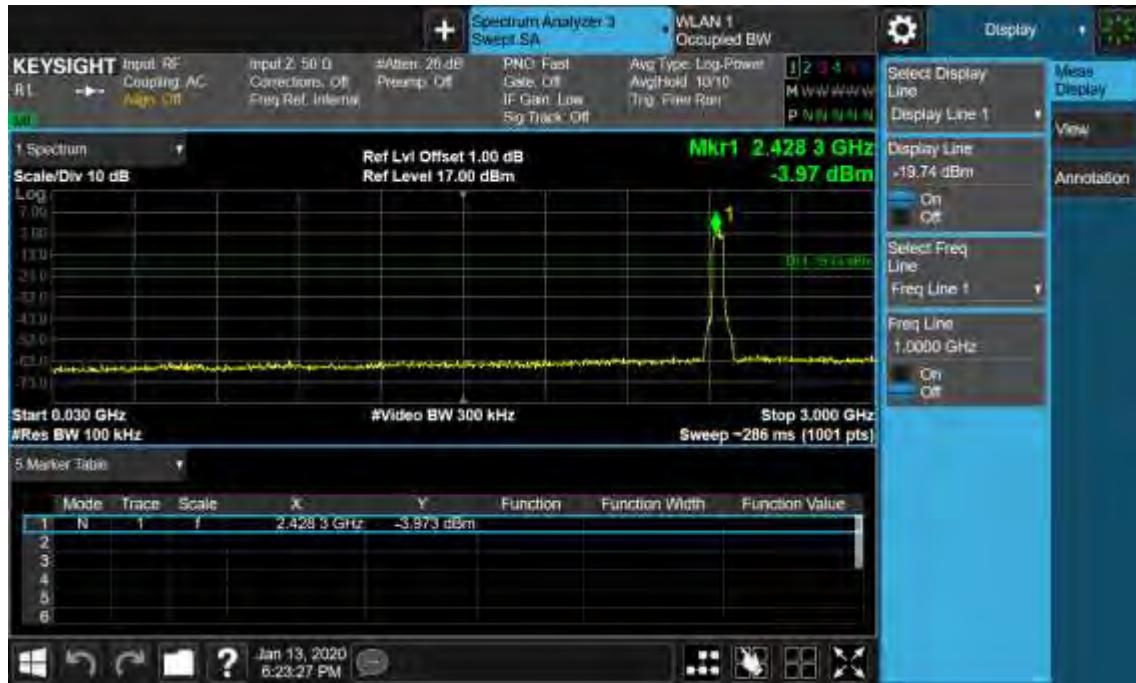
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## Conducted spurious emissions 30MHz-25GHz



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2437MHz Carrier Level



## Conducted spurious emissions 30MHz-25GHz



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Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2452MHz Carrier Level



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## Band Edge



## Conducted spurious emissions 30MHz-25GHz



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## Chain12 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2452MHz Carrier Level



## Band Edge



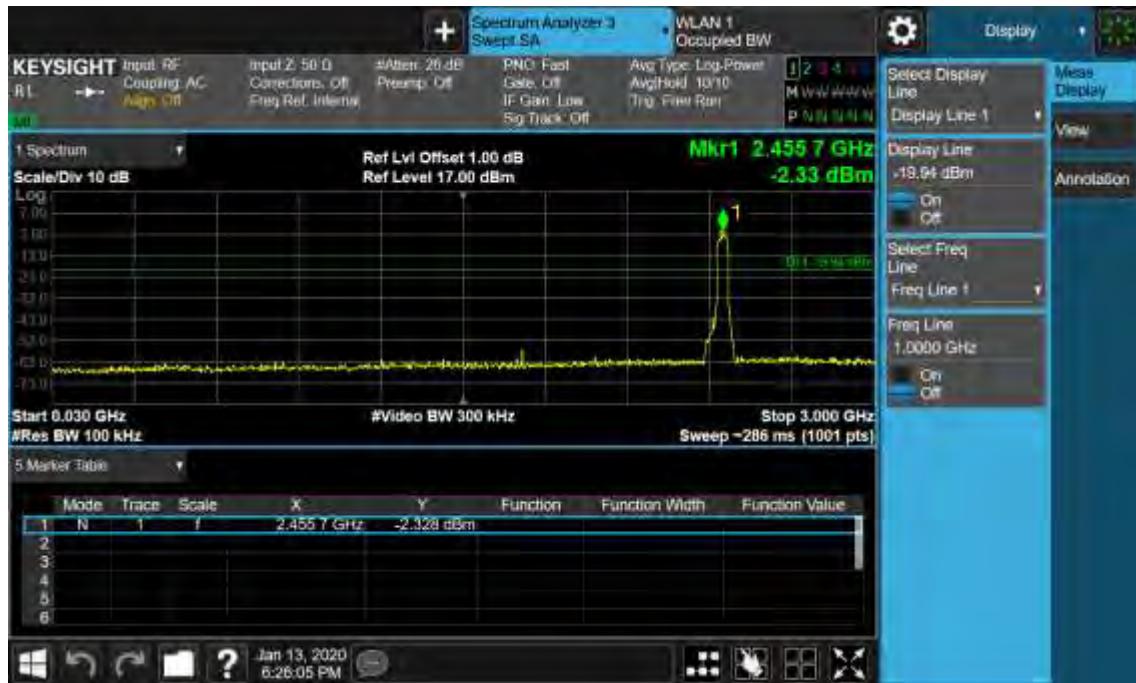
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## Conducted spurious emissions 30MHz-25GHz



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## Chain1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2452MHz Carrier Level



## Band Edge



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## Conducted spurious emissions 30MHz-25GHz



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## Chain 2 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2462MHz Carrier Level



## Band Edge



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## MIMO Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2462MHz Carrier Level



## Band Edge



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## Chain 1 Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2462MHz Carrier Level



## Band Edge



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## 4.1.6 Spurious Emission

RESULT:

PASS

Test standard : FCC Part 15.247(d), 15.205, 15.209

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : 3m Semi-Anechoic Chamber

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A

Ambient temperature : 25°C

Relative humidity : 52%

### Notes:

1. Test plots please refer to the annex document

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC chain 0”.

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC chain 1”.

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC mimo”.

2. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.

3. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.

4. The EUT is working in the Normal link mode below 1 GHz.

5. The all chains were tested respectively, but only the worst configuration shown here.

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## 4.1.7 Band Edge (Restricted-band band-edge)

RESULT:

PASS

Test standard : FCC Part 15.247(d), 15.205, 15.209

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : 3m Semi-Anechoic Chamber

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1

Ambient temperature : 25°C

Relative humidity : 52%

Note:

1. Test plots please refer to the annex document

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC chain 0”.

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC chain 1”.

“WIFI2.4G-TX EXHIBIT A of SHE19110011-02CE FCC mimo”.

2. The all chains were tested respectively, but only the worst configuration shown here.

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## 4.2 Mains Emissions

### 4.2.1 Conducted Emission on AC Mains

RESULT:

PASS

Test standard : FCC Part 15.207(a)

Requirement : ANSI C63.10-2013

Kind of test site : Shielded room

#### Test setup

Input Voltage : AC 120V, 60Hz; AC 240V, 50Hz

Operation Mode : A

Earthing : Not Connected

Ambient temperature : 25°C

Relative humidity : 52%

For details refer to following test plot.

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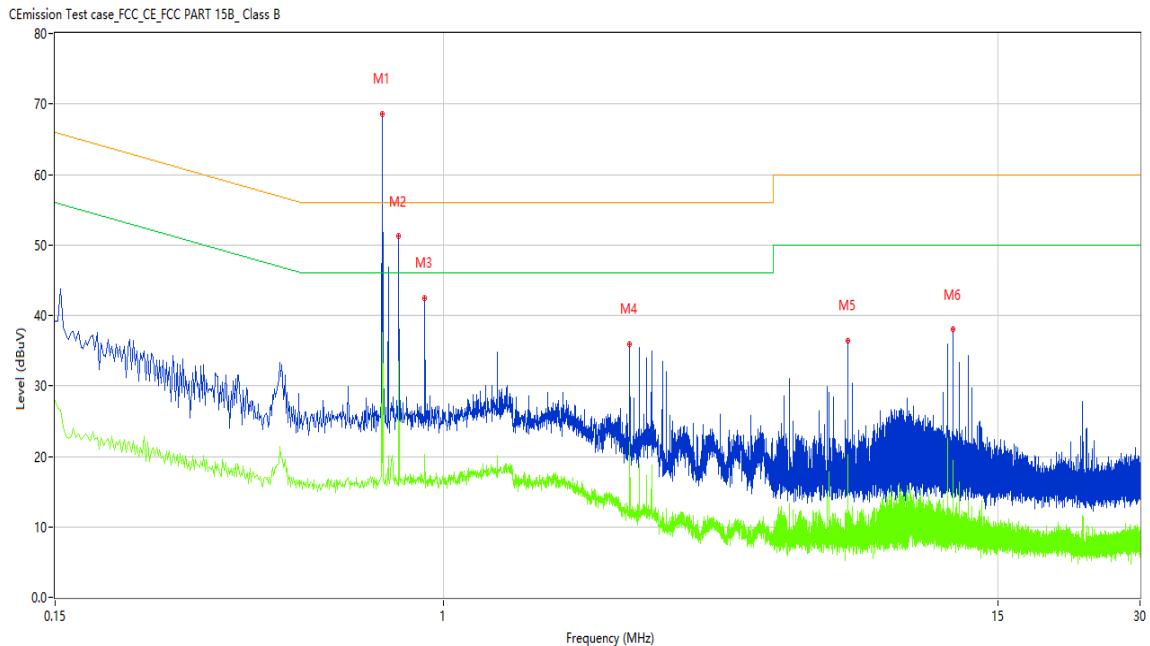
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Note:

The all configurations were tested respectively, but only the worst configuration shown here.

**Figure 1: Conducted Emission on AC Mains, L Phase**



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.740	64.71	10.15	56.00	8.71	Peak	L	N/A
1*	0.740	47.78	10.15	56.00	-8.22	QP	L	Pass
1**	0.740	37.51	10.15	46.00	-8.49	AV	L	Pass
2	0.804	51.21	10.15	56.00	-4.79	Peak	L	Pass
2**	0.804	33.42	10.15	46.00	-12.58	AV	L	Pass
3	0.912	42.50	10.15	56.00	-13.50	Peak	L	Pass
3**	0.912	20.31	10.15	46.00	-25.69	AV	L	Pass
4	2.484	35.90	10.19	56.00	-20.10	Peak	L	Pass
4**	2.484	22.04	10.19	46.00	-23.96	AV	L	Pass
5	7.196	36.41	10.31	60.00	-23.59	Peak	L	Pass
5**	7.196	20.21	10.31	50.00	-29.79	AV	L	Pass
6	12.042	37.97	10.46	60.00	-22.03	Peak	L	Pass
6**	12.042	19.37	10.46	50.00	-30.63	AV	L	Pass

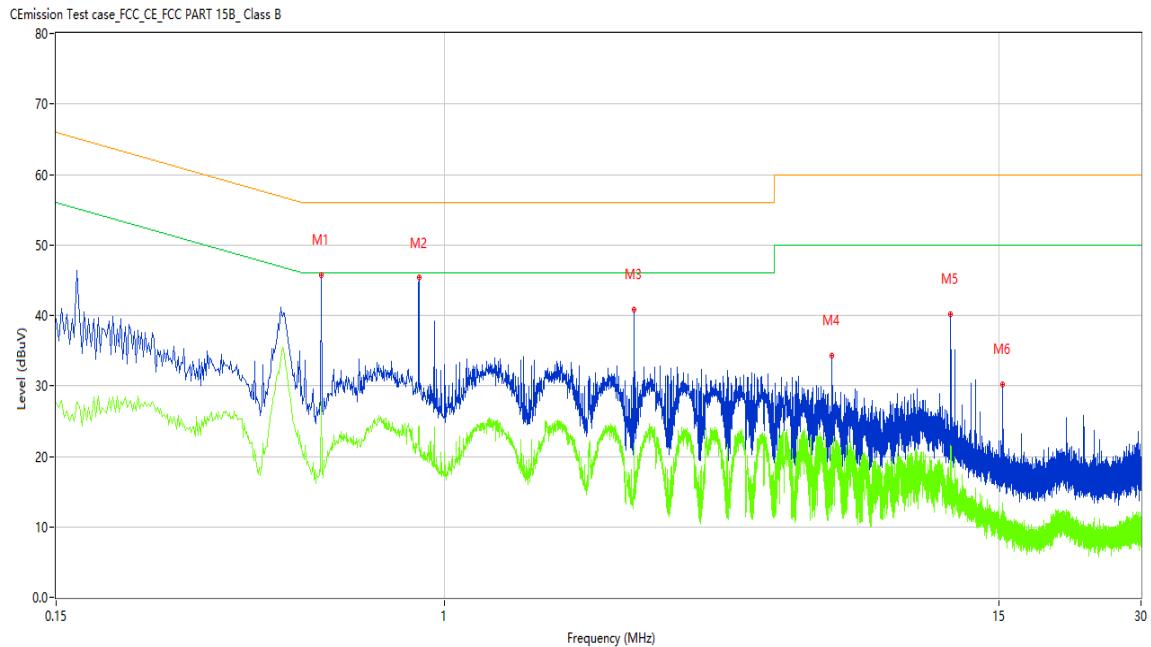
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**Figure 2: Conducted Emission on AC Mains, N Phase**



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.548	47.77	10.15	56.00	-8.23	Peak	N	Pass
1*	0.548	28.64	10.15	56.00	-27.36	QP	N	Pass
1**	0.548	27.69	10.15	46.00	-18.31	AV	N	Pass
2	0.882	45.32	10.15	56.00	-10.68	Peak	N	Pass
2**	0.882	24.30	10.15	46.00	-21.70	AV	N	Pass
3	2.528	40.90	10.20	56.00	-15.10	Peak	N	Pass
3**	2.528	21.96	10.20	46.00	-24.04	AV	N	Pass
4	6.638	34.34	10.30	60.00	-25.66	Peak	N	Pass
4**	6.638	21.60	10.30	50.00	-28.40	AV	N	Pass
5	11.816	40.20	10.45	60.00	-19.80	Peak	N	Pass
5**	11.816	21.61	10.45	50.00	-28.39	AV	N	Pass
6	15.292	30.20	10.47	60.00	-29.80	Peak	N	Pass
6**	15.292	13.41	10.47	50.00	-36.59	AV	N	Pass

\*\*\*End of the report\*\*\*