

# TEST REPORT

Report No.: SHE19120045-01FE

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**Applicant** : Shanghai Goodview Electronics Technology Co., Ltd.  
**Address of Applicant** : Room 866, NO.888, West Huanhu 2  
Road, Nanhui Xincheng Town, Pudong, 201306

**Product Name** : LCD DIGITAL DISPLAY  
**Model No.** : PF\*\*\*\*\*  
**Sample No.** : E19120045-01#02  
**FCC ID** : 2AVB8PFHL

**Standards** : FCC CFR47 Part 15, Subpart C

**Date of Receipt** : 2020-1-06  
**Date of Test** : 2020-1-06 ~ 2020-4-23  
**Date of Issue** : 2020-4-23

**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.*

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(Authorized signatory: Guoyou Chi)

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| Revision Record |            |           |            |
|-----------------|------------|-----------|------------|
| Version         | Date       | Revisions | Revised By |
| 1.0             | 2019-10-31 | 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   | Shanghai Goodview Electronics Technology Co., Ltd.                   |
| Address        | Room 866,NO.888,West Huanhu 2 Road,NanhuiXincheng Town,Pudong,201306 |
| Contact Person | Hongyue.Xu                                                           |
| Telephone      | n.a                                                                  |
| Email          | xuhongyue@goodview.com                                               |

### 1.3 Details of EUT

|                           |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| Product Name              | LCD DIGITAL DISPLAY                                                                    |
| Brand Name                | GOODVIEW                                                                               |
| Model No.                 | PF*****                                                                                |
| serial model              | (*=A to Z, 0 to 9,blank,just difference in appearance color,sales area customer code ) |
| Mode of Operation         | WLAN 802.11b/g/n(20M)                                                                  |
| Frequency Range           | 802.11b/g/n(20M): 2412-2462MHz                                                         |
| Number of Channels        | 802.11b/g/n(20M): 11 Channels;                                                         |
| Modulation Type           | 802.11b: DSSS(CCK, DQPSK, DBPSK)<br>802.11g/n(20M): OFDM(64QAM, 16QAM, QPSK, BPSK)     |
| Antenna Type              | internal Antenna                                                                       |
| Antenna Gain              | 4 dBi                                                                                  |
| Extreme Temperature Range | +10℃~ +40℃                                                                             |
| Test Voltage              | AC 100~240V                                                                            |
| Adaptive                  | Adaptive device                                                                        |
| Antenna Type              | internal Antenna                                                                       |
| Receiver Categories       | 1                                                                                      |

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## 1.4 Test Methodology

|                                                |                                                                                                                              |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15, Subpart C<br>(10-1-16 Edition) | 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)                    |
| RSS-Gen<br>(Issue 5, March 2019)               | General Requirements for Compliance of Radio Apparatus                                                                       |
| RSS-247<br>(Issue 2, February 2017)            | Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices |
| 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.

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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   | 2021-02-20    |
| Wideband Radio Communication Tester | Rohde & Schwarz | CMW 500      | 100687     | 2020-08-22    |
| 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-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           |

### 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)

| Channel                   | Frequency |
|---------------------------|-----------|
| The lowest channel(CH1)   | 2412MHz   |
| The middle channel(CH6)   | 2437MHz   |
| The Highest channel(CH11) | 2462MHz   |

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 |
|--------------|-----------|
| 802.11b      | 11Mbps    |
| 802.11g      | 54Mbps    |
| 802.11n(20M) | MCS7      |

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 |
|-------------|--------------|---------------|
| Software    | /            | RF Test Tool  |

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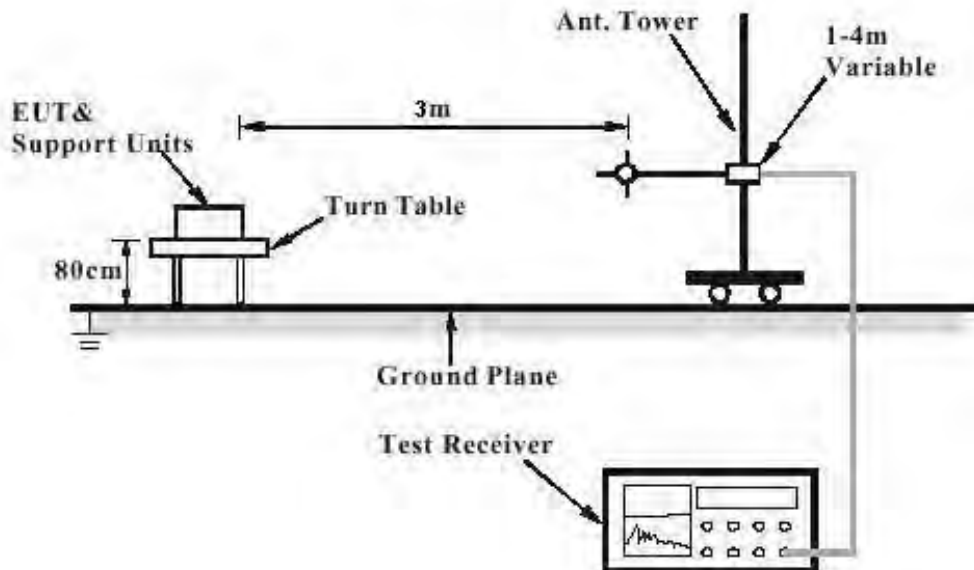
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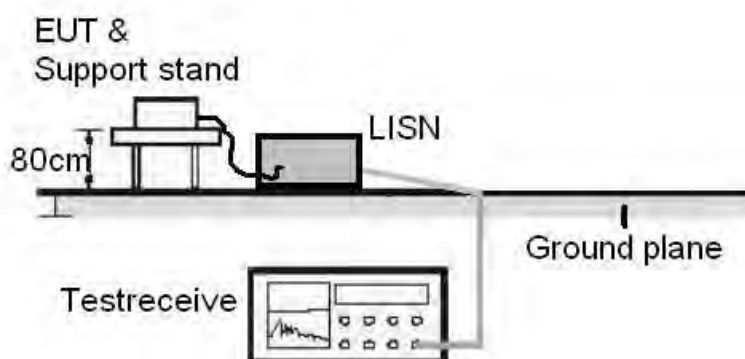
## 3.4 Test Setup Diagram

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



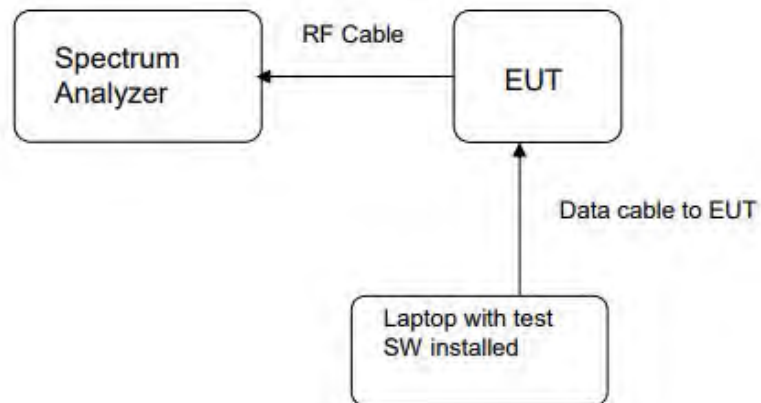
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## Diagram of Measurement Equipment Configuration for Transmitter Measurement



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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  
RSS-247 5.4(6)

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 3 dBi. The antenna is an internal antenna with no possibility of replacement with a non-approved 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 and E.I.R.P

RESULT:

**PASS**

Test standard : FCC Part 15.247(b)(3)  
RSS-247 5.4(4)  
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<br>(MHz) | Measured Peak Power |       | Limit<br>(W) |
|---------------|-----------------------|---------------------|-------|--------------|
|               |                       | (dBm)               | (mW)  |              |
| 802.11b       | 2412                  | 12.83               | 19.19 | < 1          |
|               | 2437                  | 12.22               | 16.67 |              |
|               | 2462                  | 12.27               | 16.87 |              |
| 802.11g       | 2412                  | 11.50               | 14.13 |              |
|               | 2437                  | 10.98               | 12.53 |              |
|               | 2462                  | 11.31               | 13.52 |              |
| 802.11n(HT20) | 2412                  | 10.43               | 11.04 |              |
|               | 2437                  | 9.88                | 9.73  |              |
|               | 2462                  | 10.15               | 10.35 |              |

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## 4.1.3 6dB Bandwidth and 99% Bandwidth

### RESULT:

**PASS**

Test standard : FCC Part 15.247(a)(2)  
RSS-247 5.2(1)  
RSS-Gen 6.6  
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: 6dB Bandwidth and 99% Bandwidth

| Test Mode     | Test Channel (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | 6 dB Bandwidth Limit (MHz) |
|---------------|--------------------|---------------------|---------------------|----------------------------|
| 802.11b       | 2412               | 7.12                | 11.99               | 0.5                        |
|               | 2437               | 7.73                | 11.89               |                            |
|               | 2462               | 7.24                | 11.87               |                            |
| 802.11g       | 2412               | 15.06               | 16.31               |                            |
|               | 2437               | 14.44               | 16.34               |                            |
|               | 2462               | 16.05               | 16.33               |                            |
| 802.11n(HT20) | 2412               | 15.38               | 17.51               |                            |
|               | 2437               | 15.08               | 17.48               |                            |
|               | 2462               | 16.35               | 17.52               |                            |

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Figure 1: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz

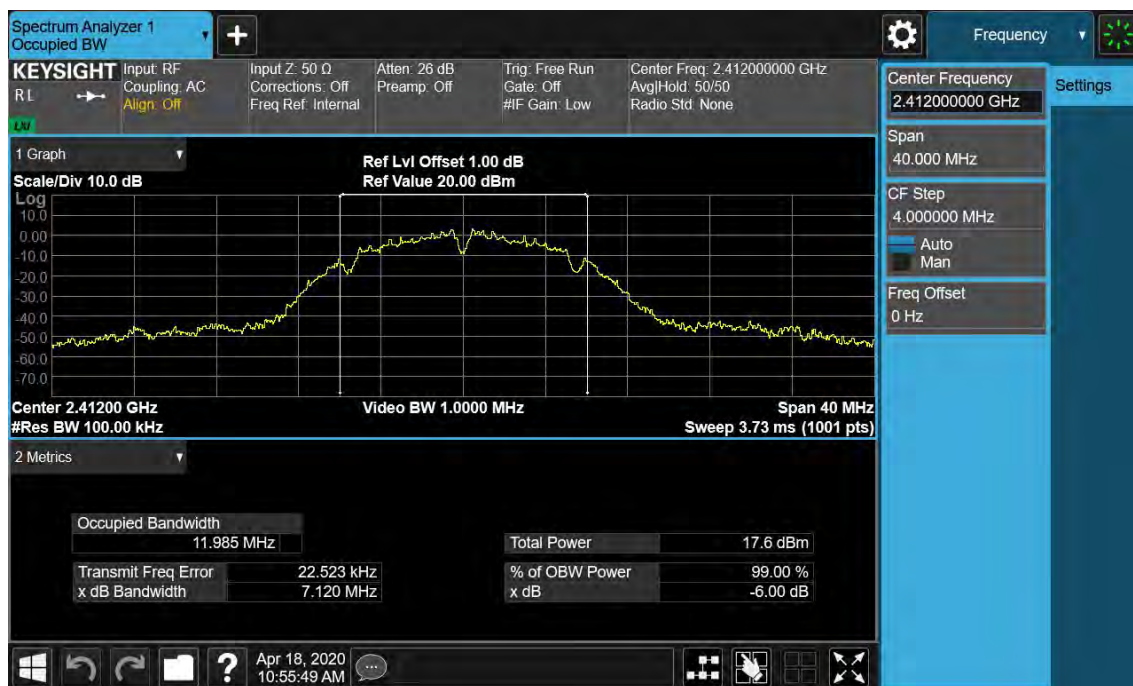


Figure 2: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz



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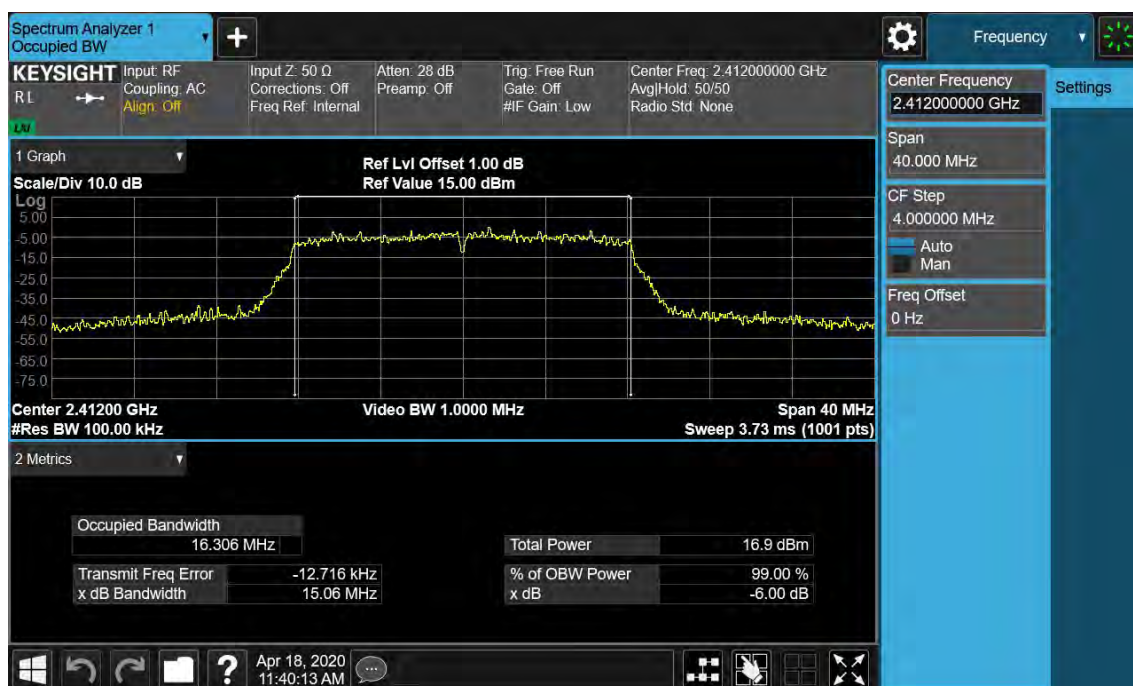
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Figure 3: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz



Figure 4: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz



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Figure 5: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz

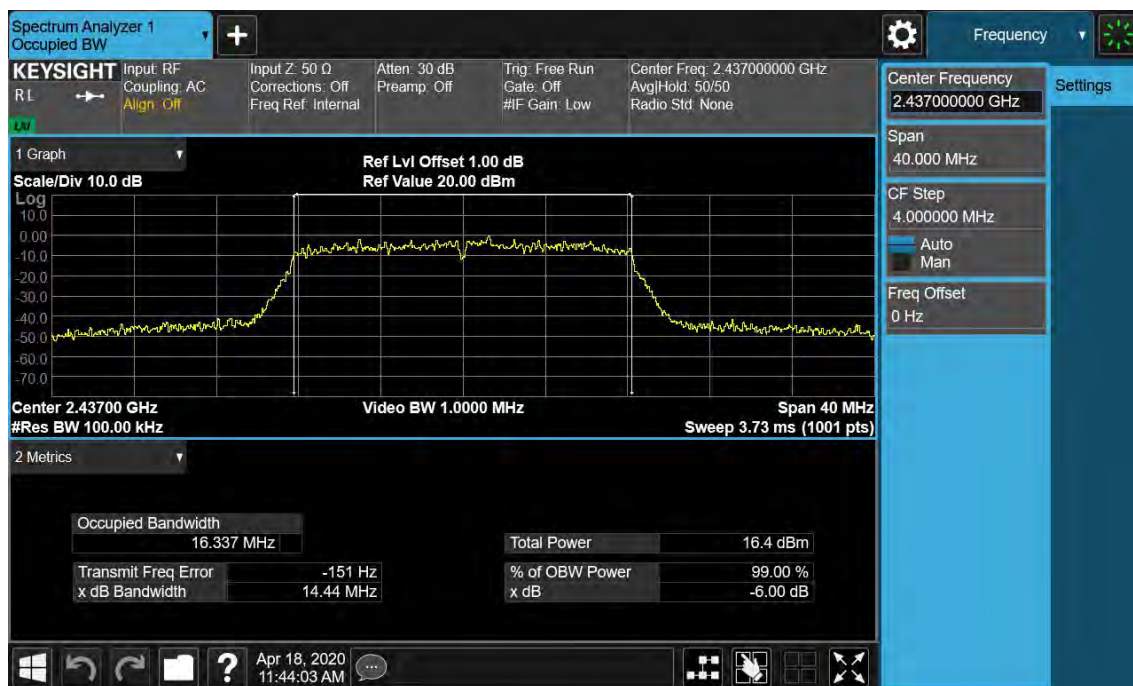
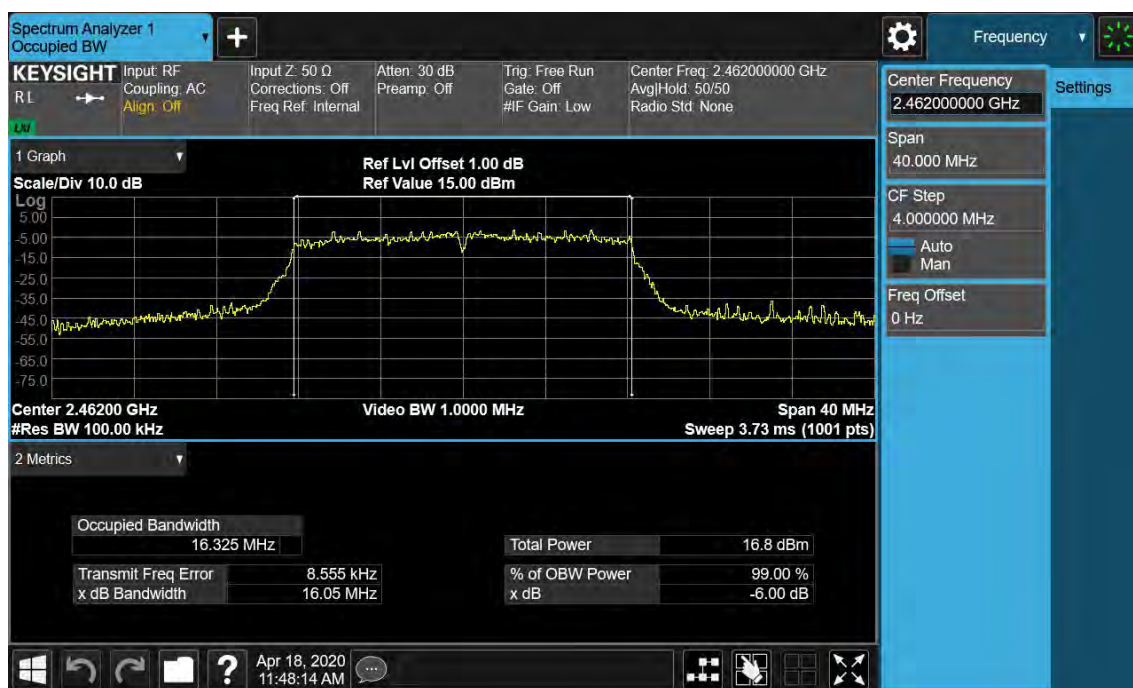


Figure 6: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz



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Figure 7: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz

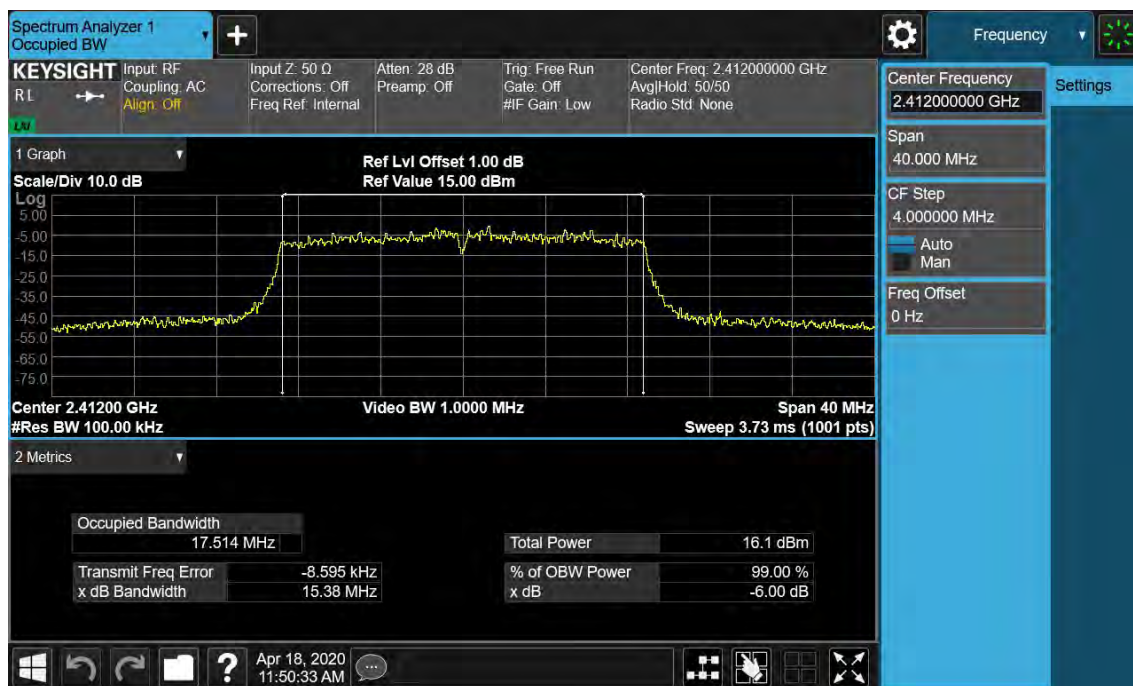
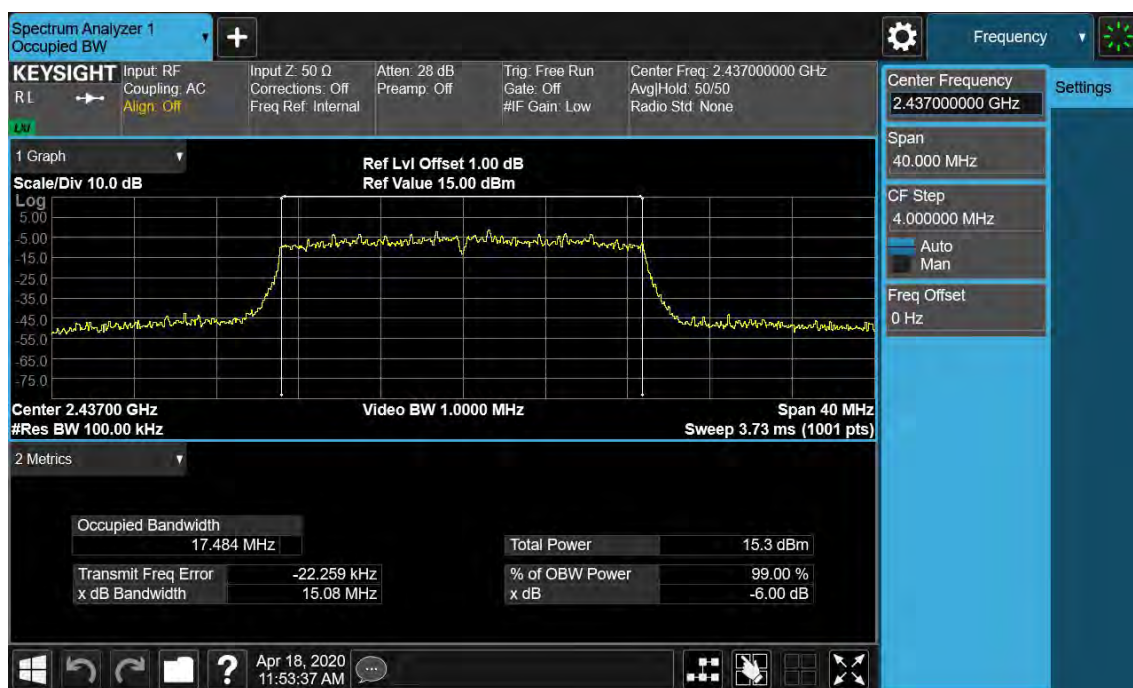


Figure 8: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz



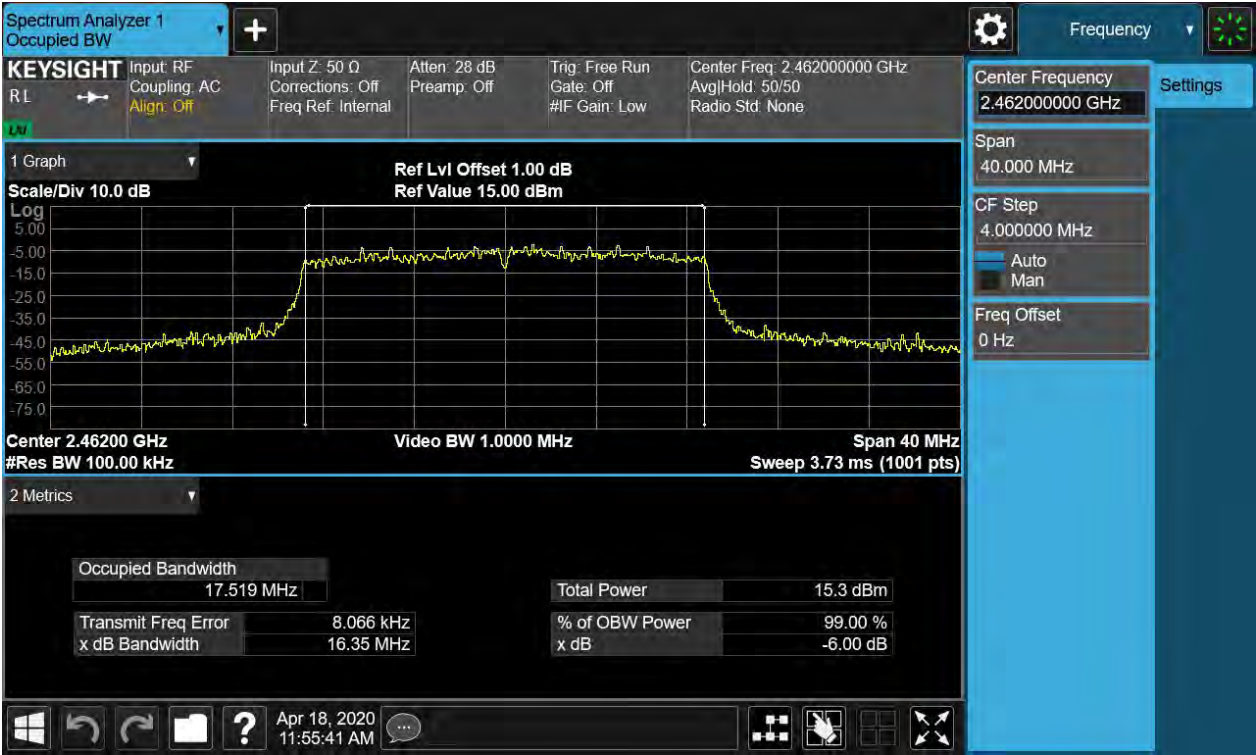
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Figure 9: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz



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## 4.1.4 Power Spectral Density

### RESULT:

**PASS**

Test standard : FCC Part 15.247(e)  
RSS-247 5.2(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 3: Power Spectral Density

| Test Mode     | Test Channel (MHz) | Measured Result (dBm/3kHz) | Limit (dBm/3kHz) |
|---------------|--------------------|----------------------------|------------------|
| 802.11b       | 2412               | -12.56                     | 8                |
|               | 2437               | -12.58                     |                  |
|               | 2462               | -12.91                     |                  |
| 802.11g       | 2412               | -13.43                     |                  |
|               | 2437               | -13.67                     |                  |
|               | 2462               | -13.43                     |                  |
| 802.11n(HT20) | 2412               | -16.58                     |                  |
|               | 2437               | -16.49                     |                  |
|               | 2462               | -16.56                     |                  |

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Figure 10: Power Spectral Density, 802.11b, 2412MHz



Figure 11: Power Spectral Density, 802.11b, 2437MHz



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Figure 12: Power Spectral Density, 802.11b, 2462MHz



Figure 13: Power Spectral Density, 802.11g, 2412MHz



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Figure 14: Power Spectral Density, 802.11g, 2437MHz

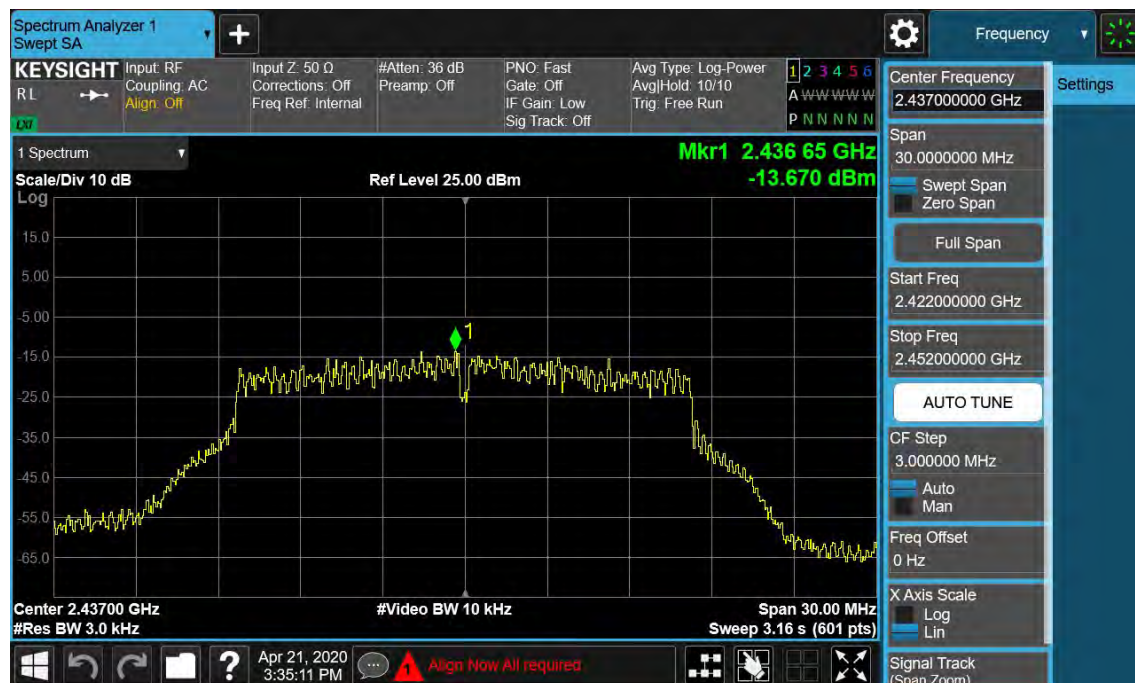


Figure 15: Power Spectral Density, 802.11g, 2462MHz



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Figure 16: Power Spectral Density, 802.11n(HT20), 2412MHz

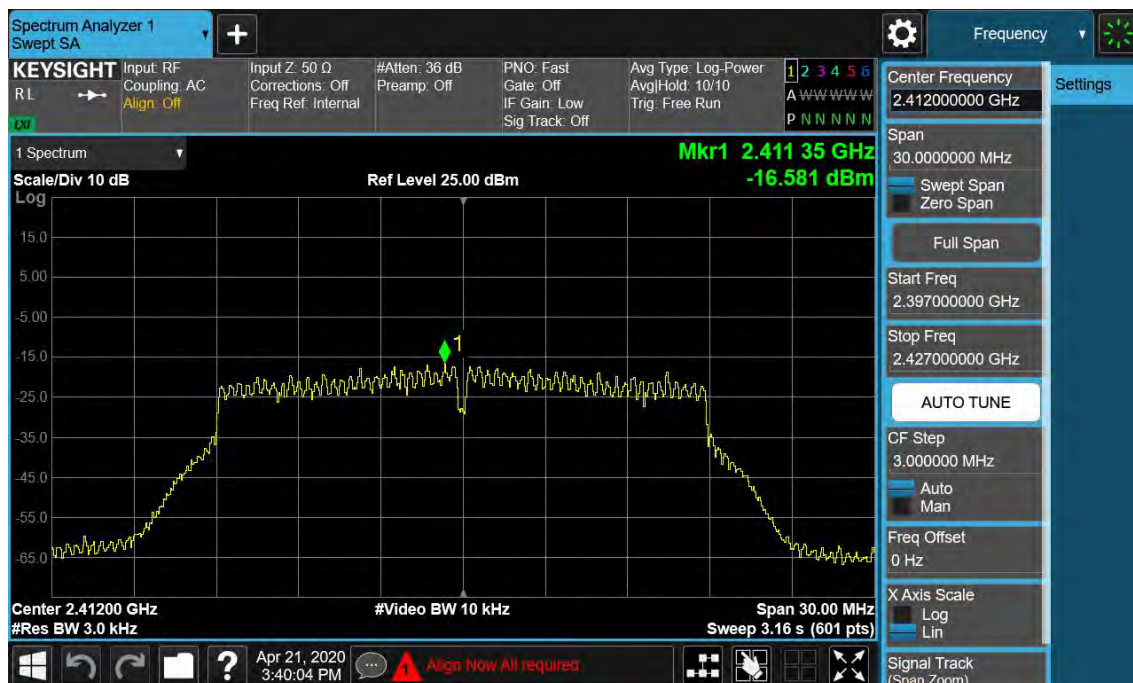
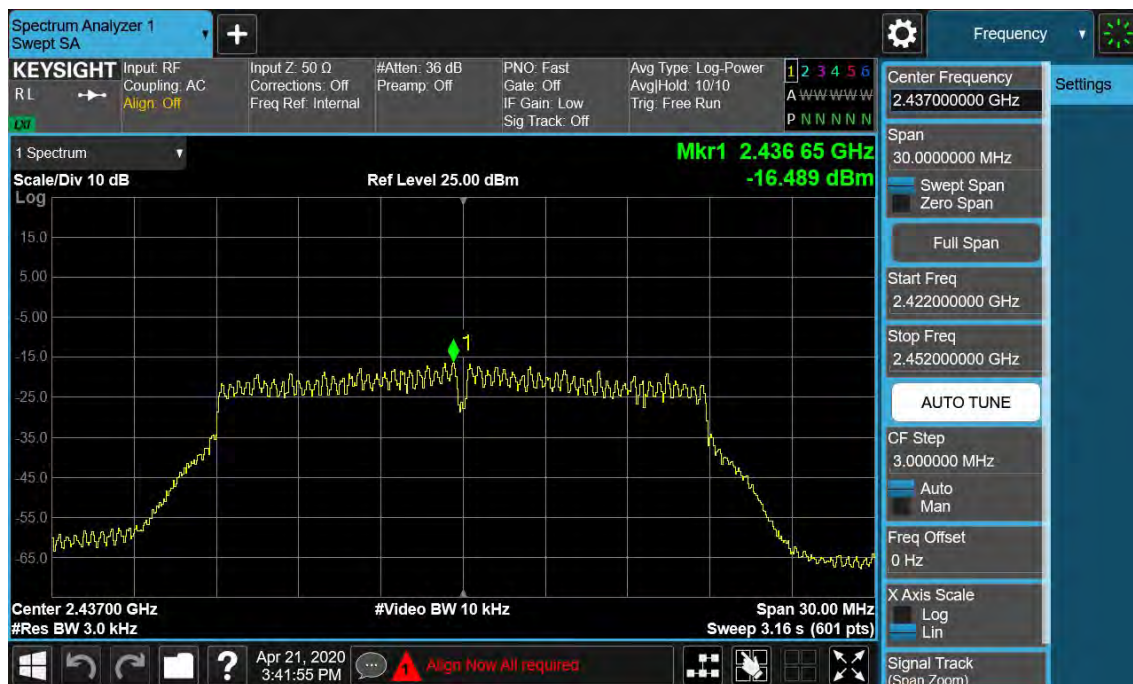


Figure 17: Power Spectral Density, 802.11n(HT20), 2437MHz



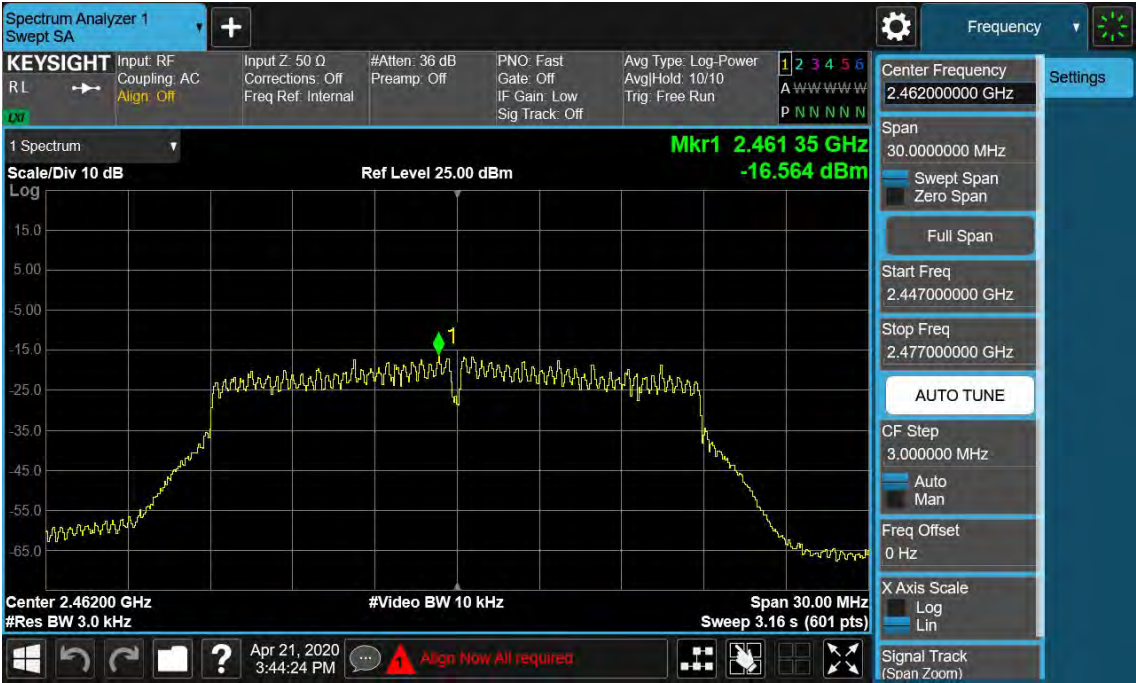
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Figure 18: Power Spectral Density, 802.11n(HT20), 2462MHz



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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  
RSS-247 5.5  
RSS-Gen 8.9  
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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Figure 19: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz Carrier Level



## Band Edge

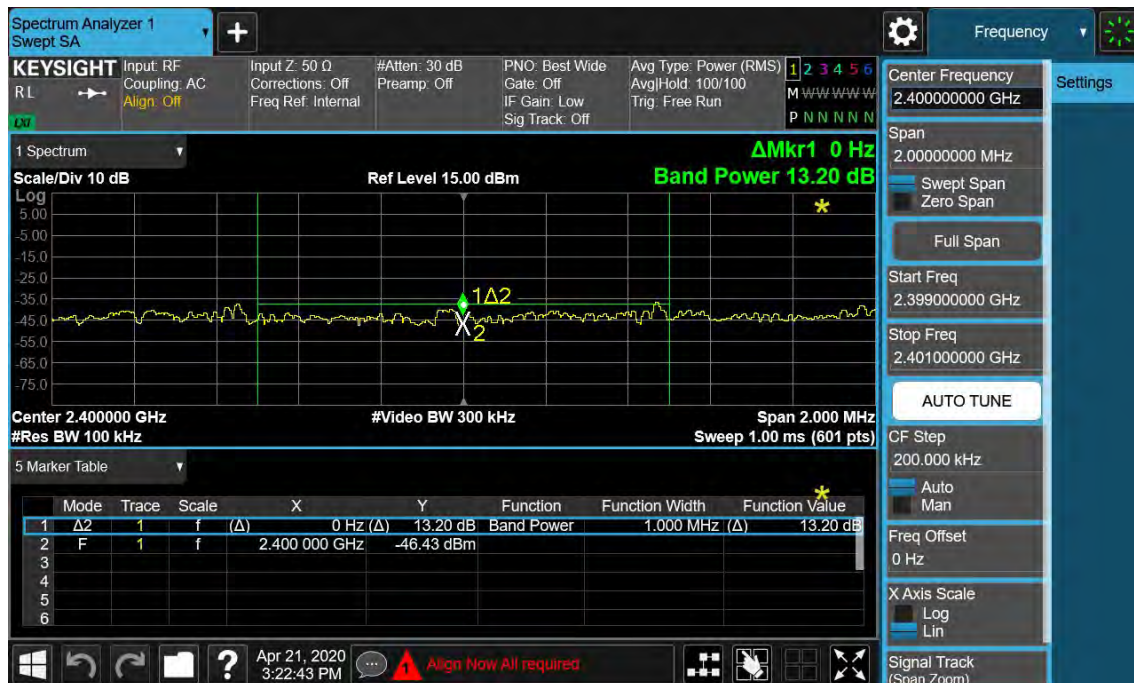


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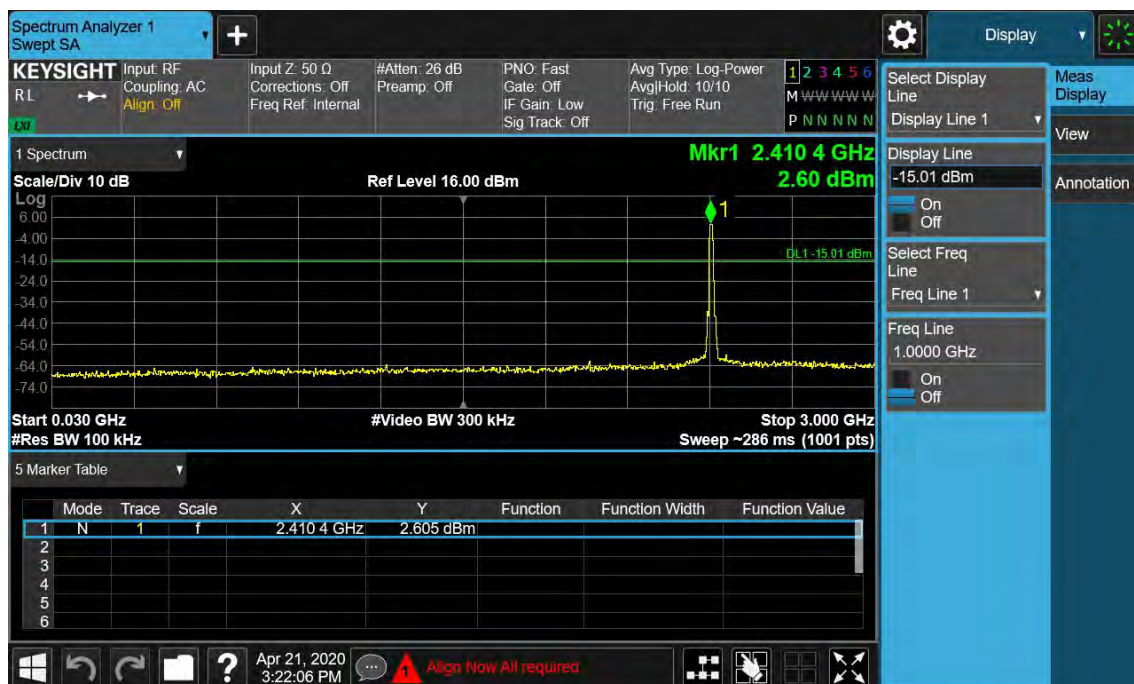
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## Conducted spurious emissions 30MHz-25GHz



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Figure 20: 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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Figure 21: 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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Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz Carrier Level



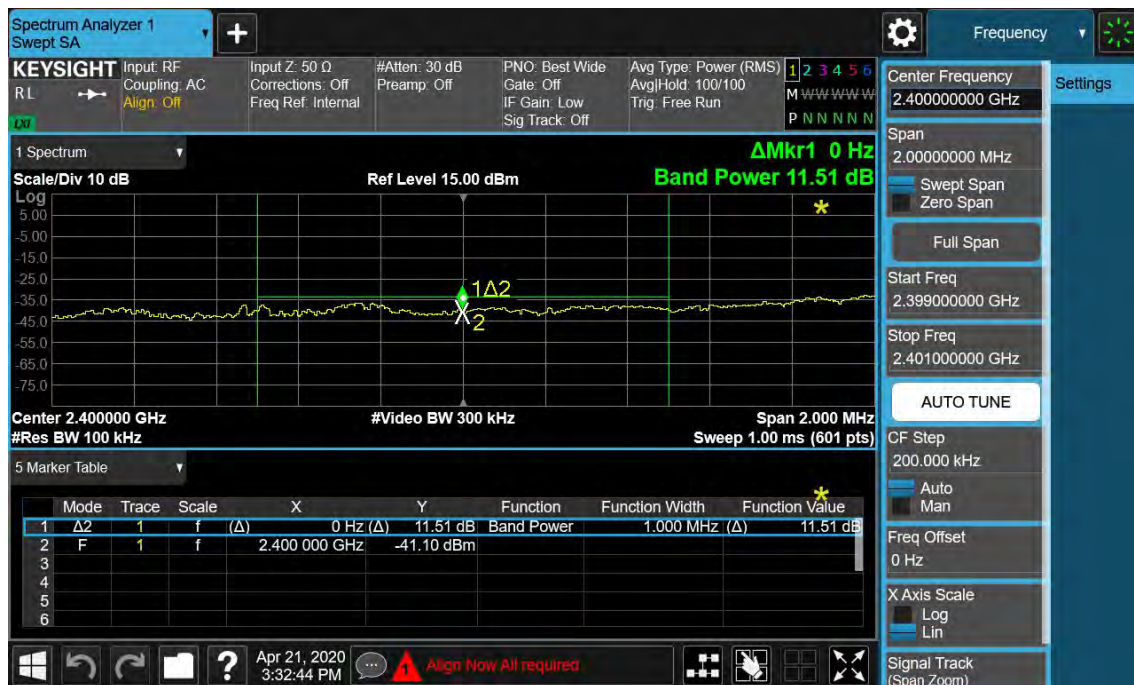
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## Band Edge



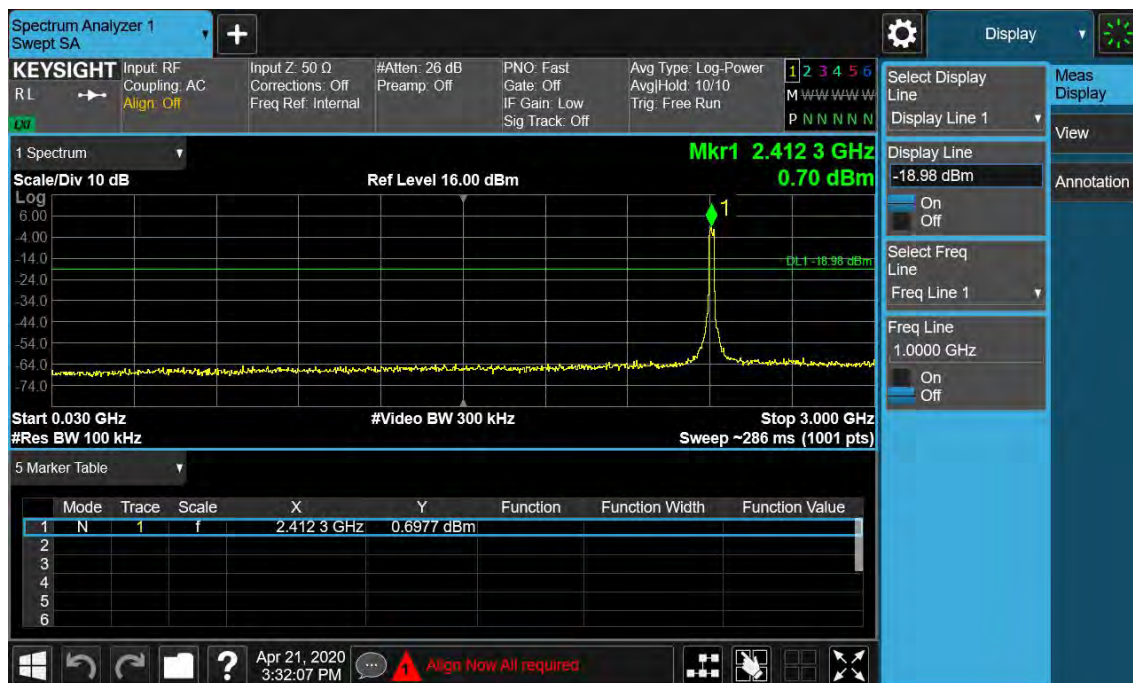
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## Conducted spurious emissions 30MHz-25GHz



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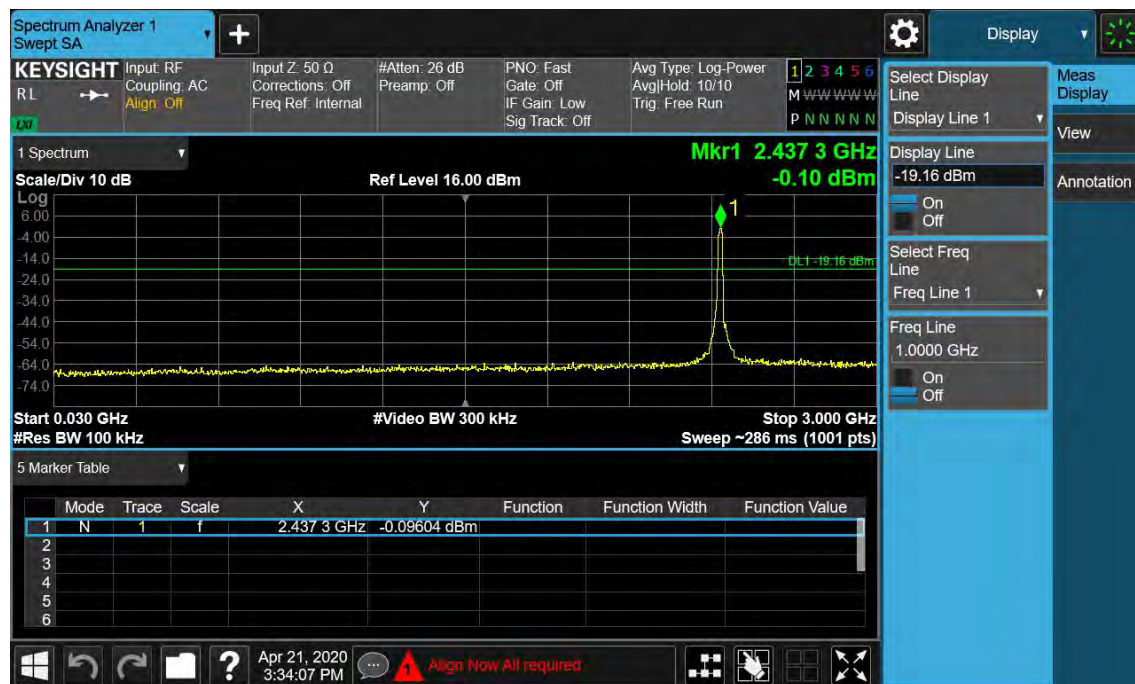
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Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level



## Conducted spurious emissions 30MHz-25GHz



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Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



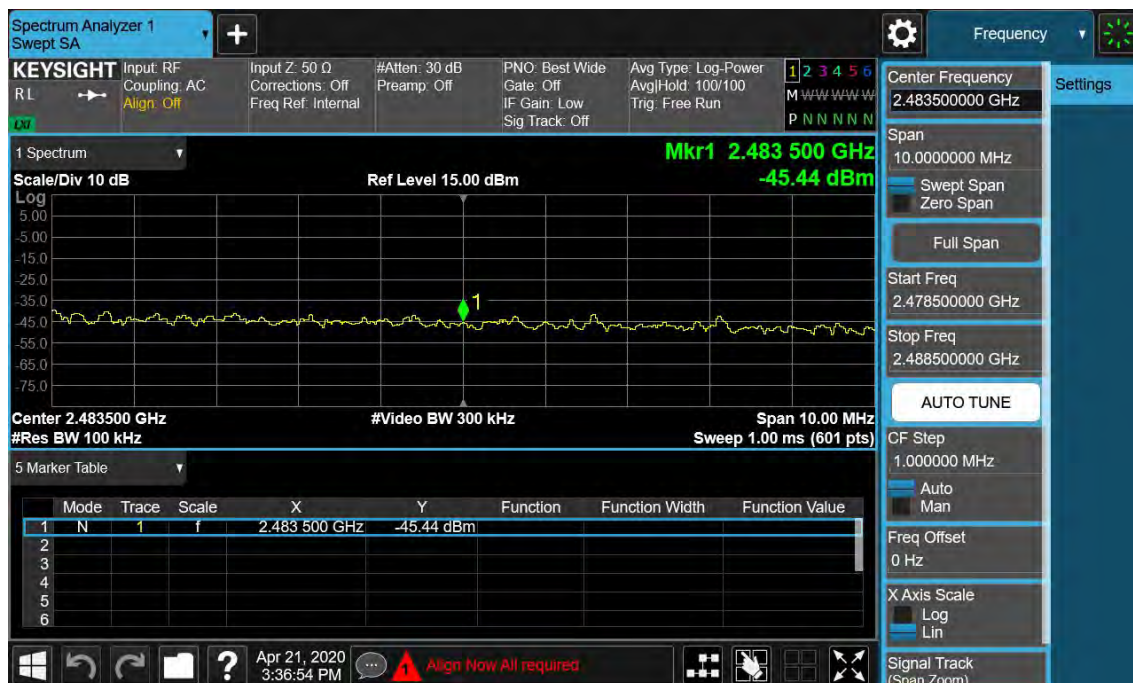
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## Band Edge



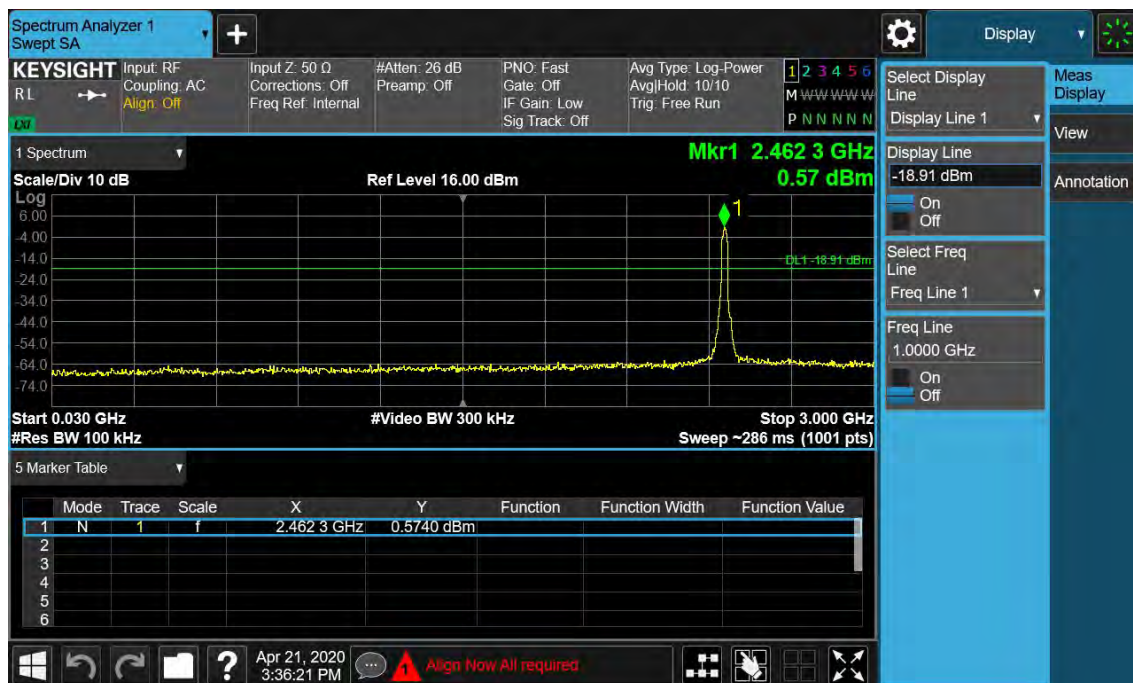
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## Conducted spurious emissions 30MHz-25GHz



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Figure 25: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz Carrier Level



## Band Edge



# TEST REPORT

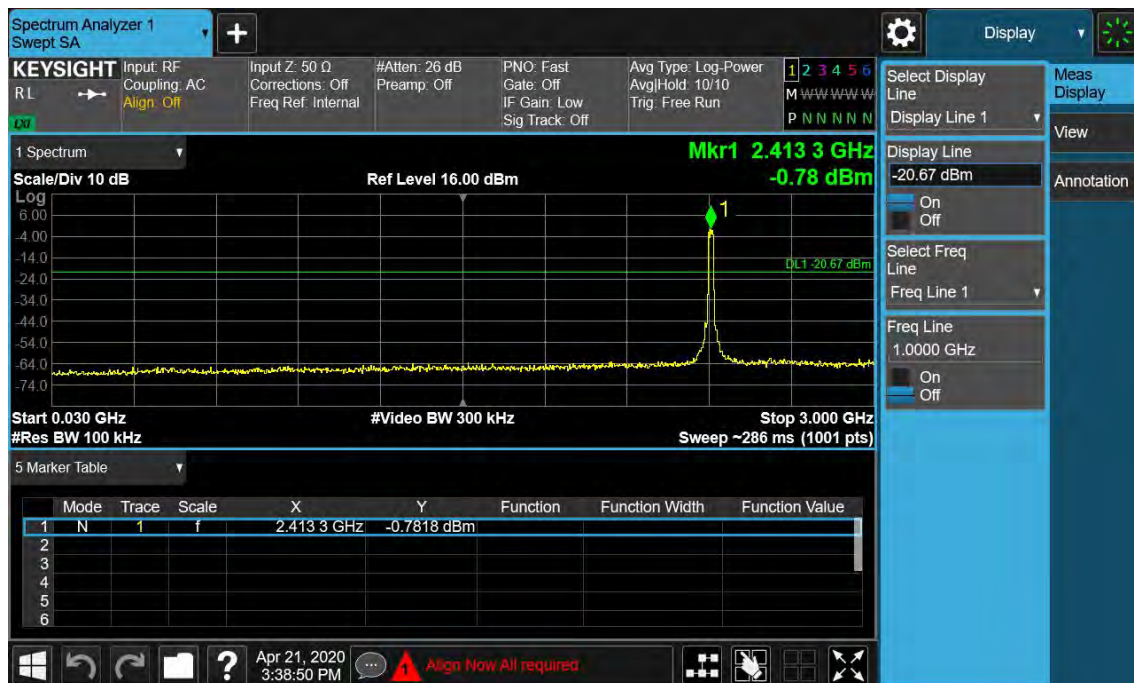
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## Conducted spurious emissions 30MHz-25GHz



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Figure 26: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level



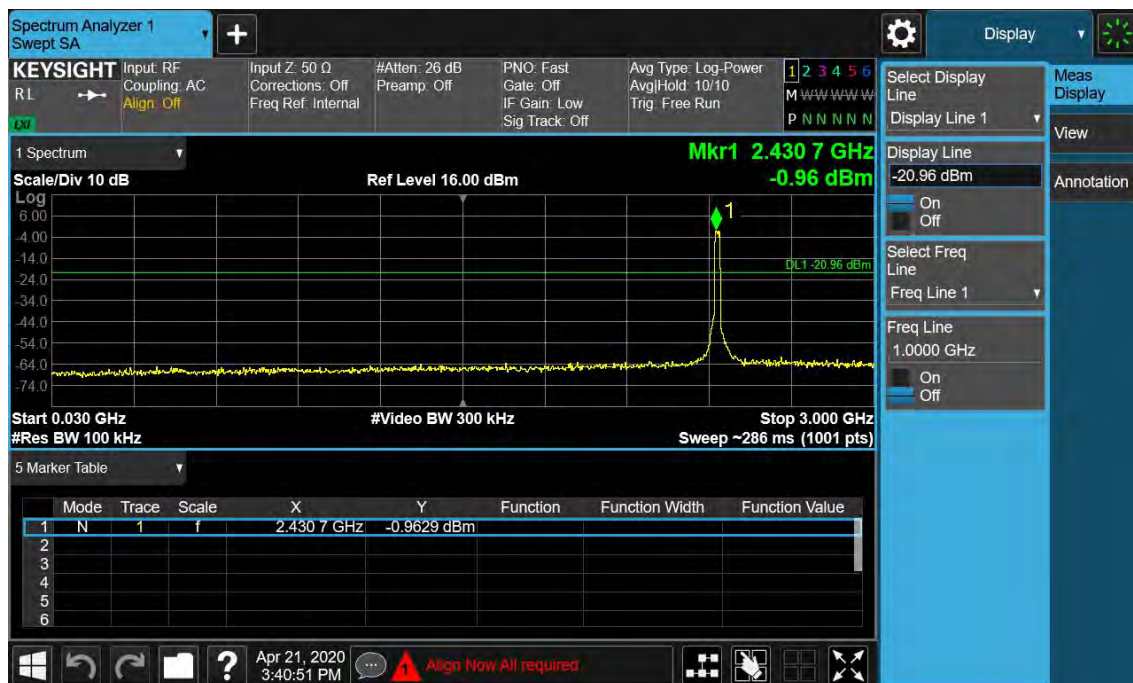
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## Conducted spurious emissions 30MHz-25GHz



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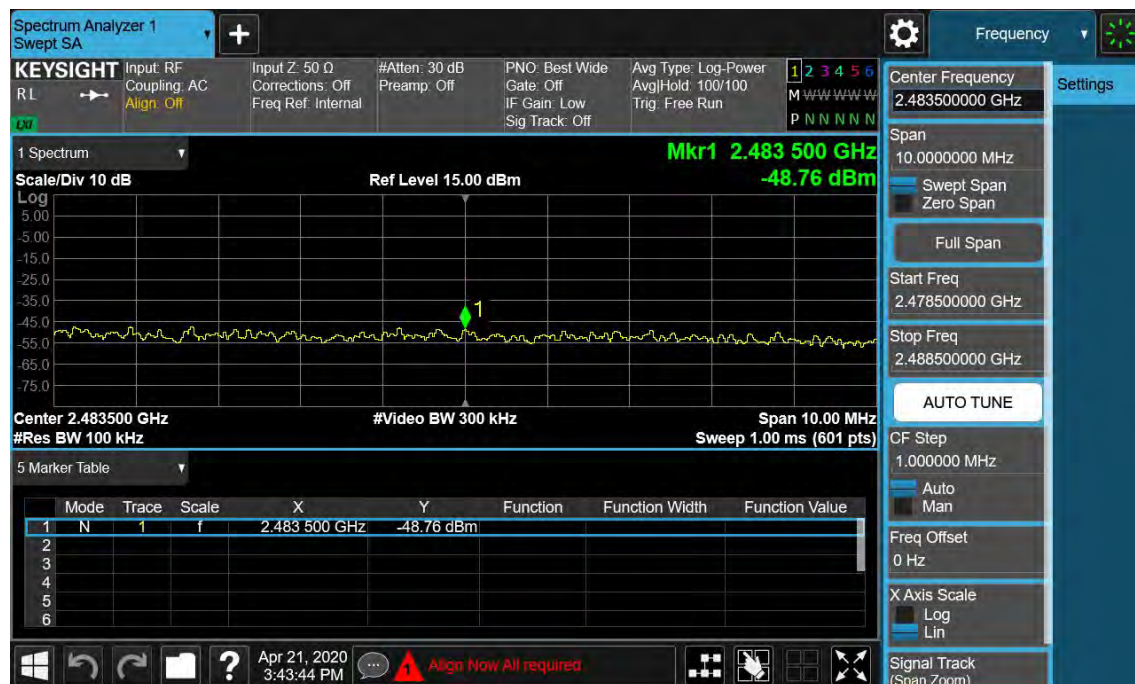
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Figure 27: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz Carrier Level



## Band Edge

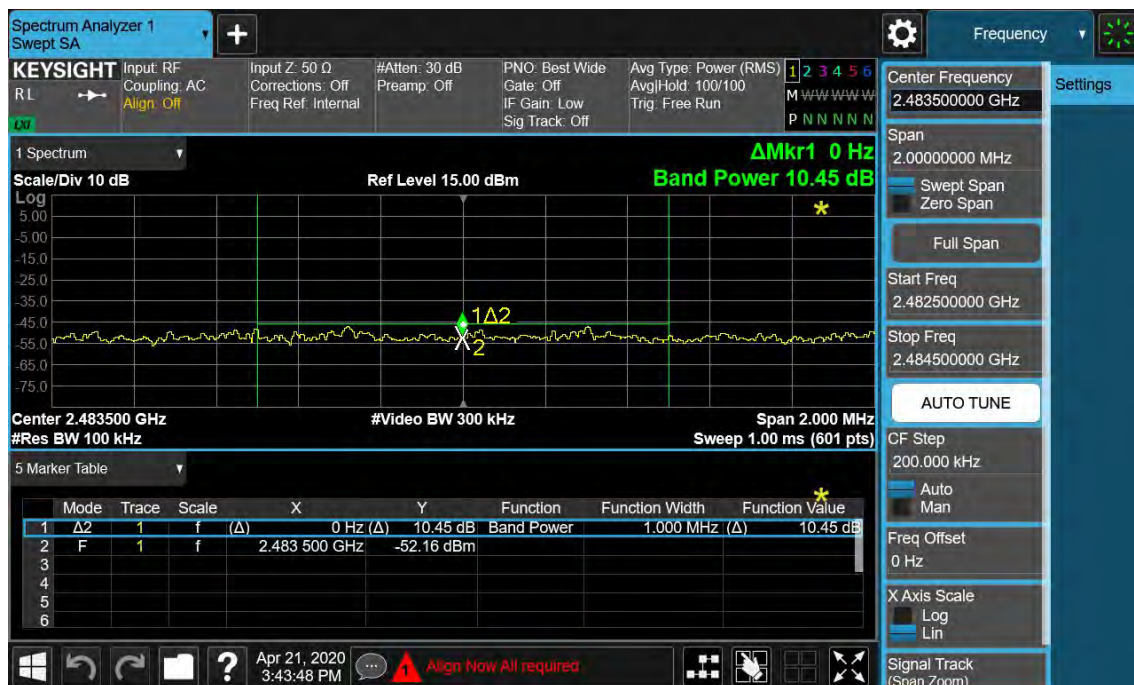


# TEST REPORT

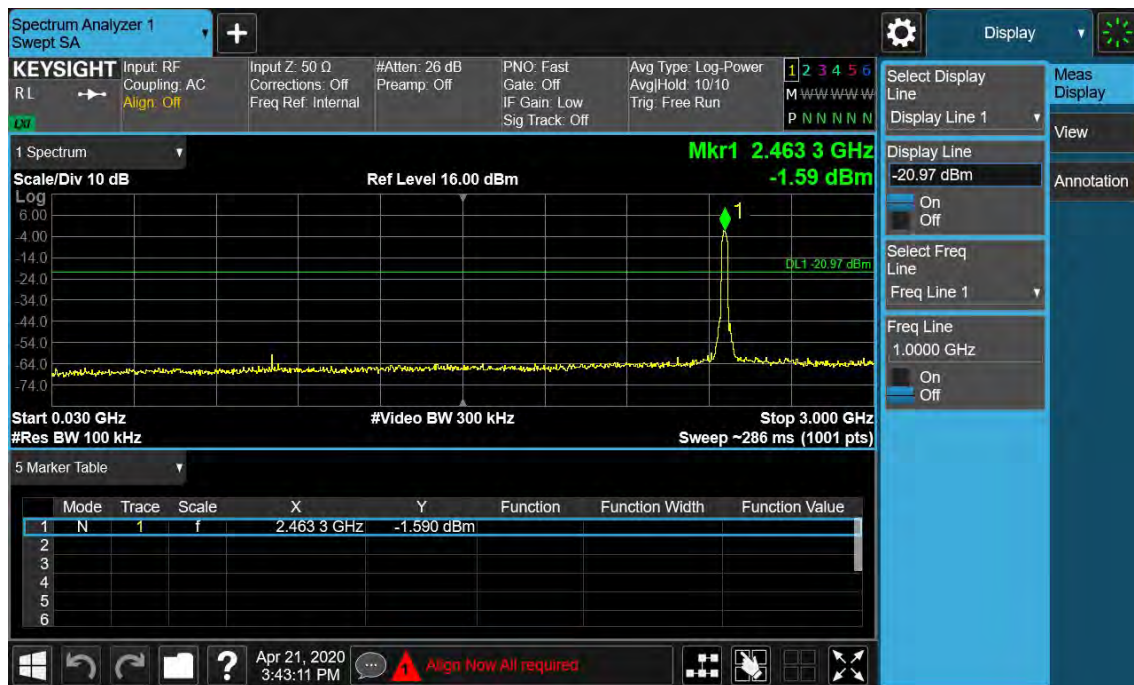
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## Conducted spurious emissions 30MHz-25GHz



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## 4.1.6 Spurious Emission

RESULT:

**PASS**

Test standard : FCC Part 15.247(d), 15.205, 15.209  
RSS-247 5.5  
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%

For details refer to following test plot.

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## Notes:

1. 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.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. The EUT is working in the Normal link mode below 1 GHz.
4. Test plots please refer to the annex document "Annex A WIFI TX RADIATED SPURIOUS EMISSION DATA of SHE19120045-01FE".

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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<br>RSS-247 5.5 |
| 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%             |

For details refer to following test plot.

1. Test plots please refer to the annex document "Annex A WIFI TX RADIATED SPURIOUS EMISSION DATA of SHE19120045-01FE".

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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)<br>RSS-Gen 8.8 |
| 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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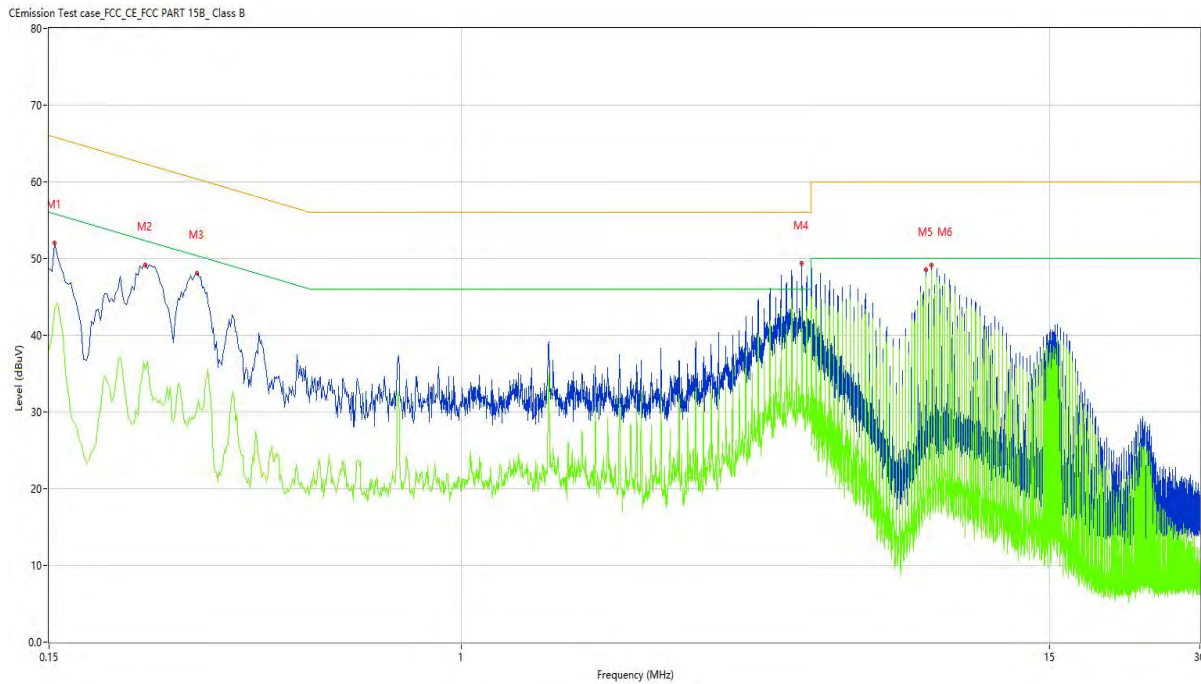
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Note:

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

**Figure 28: Conducted Emission on AC Mains, L Phase**



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.150           | 51.41          | 10.15       | 66.00        | -14.59          | Peak     | L    | Pass    |
| 1*  | 0.150           | 47.53          | 10.15       | 66.00        | -18.47          | QP       | L    | Pass    |
| 1** | 0.150           | 38.07          | 10.15       | 56.00        | -17.93          | AV       | L    | Pass    |
| 2   | 0.234           | 49.87          | 10.14       | 62.31        | -12.44          | Peak     | L    | Pass    |
| 2*  | 0.234           | 46.55          | 10.14       | 62.31        | -15.76          | QP       | L    | Pass    |
| 2** | 0.234           | 35.58          | 10.14       | 52.31        | -16.73          | AV       | L    | Pass    |
| 3   | 0.296           | 48.97          | 10.14       | 60.35        | -11.38          | Peak     | L    | Pass    |
| 3*  | 0.296           | 46.01          | 10.14       | 60.35        | -14.34          | QP       | L    | Pass    |
| 3** | 0.296           | 30.36          | 10.14       | 50.35        | -19.99          | AV       | L    | Pass    |
| 4   | 4.800           | 50.39          | 10.25       | 56.00        | -5.61           | Peak     | L    | Pass    |
| 4*  | 4.800           | 46.91          | 10.25       | 56.00        | -9.09           | QP       | L    | Pass    |
| 4** | 4.800           | 45.63          | 10.25       | 46.00        | -0.37           | AV       | L    | Pass    |
| 5   | 8.508           | 48.63          | 10.35       | 60.00        | -11.37          | Peak     | L    | Pass    |
| 5*  | 8.508           | 47.28          | 10.35       | 60.00        | -12.72          | QP       | L    | Pass    |
| 5** | 8.508           | 47.71          | 10.35       | 50.00        | -2.29           | AV       | L    | Pass    |
| 6   | 8.726           | 49.49          | 10.35       | 60.00        | -10.51          | Peak     | L    | Pass    |
| 6*  | 8.726           | 47.92          | 10.35       | 60.00        | -12.08          | QP       | L    | Pass    |
| 6** | 8.726           | 48.41          | 10.35       | 50.00        | -1.59           | AV       | L    | Pass    |

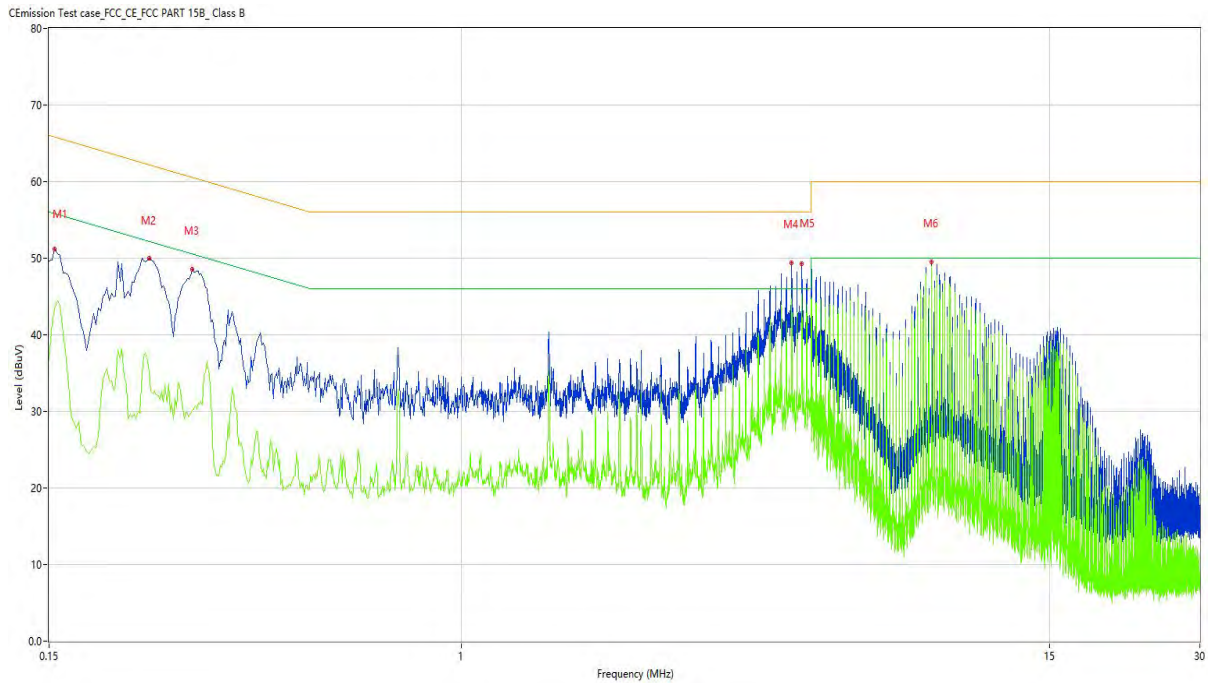
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**Figure 29: Conducted Emission on AC Mains, N Phase**



| No. | Frequency (MHz) | Results (dBUV) | Factor (dB) | Limit (dBUV) | Over Limit (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-----------------|----------|------|---------|
| 1   | 0.150           | 51.29          | 10.15       | 66.00        | -14.71          | Peak     | N    | Pass    |
| 1*  | 0.150           | 47.82          | 10.15       | 66.00        | -18.18          | QP       | N    | Pass    |
| 1** | 0.150           | 36.72          | 10.15       | 56.00        | -19.28          | AV       | N    | Pass    |
| 2   | 0.238           | 50.60          | 10.14       | 62.17        | -11.57          | Peak     | N    | Pass    |
| 2*  | 0.238           | 47.43          | 10.14       | 62.17        | -14.74          | QP       | N    | Pass    |
| 2** | 0.238           | 35.23          | 10.14       | 52.17        | -16.94          | AV       | N    | Pass    |
| 3   | 0.290           | 49.19          | 10.14       | 60.52        | -11.33          | Peak     | N    | Pass    |
| 3*  | 0.290           | 45.92          | 10.14       | 60.52        | -14.60          | QP       | N    | Pass    |
| 3** | 0.290           | 30.16          | 10.14       | 50.52        | -20.36          | AV       | N    | Pass    |
| 4   | 4.582           | 50.31          | 10.25       | 56.00        | -5.69           | Peak     | N    | Pass    |
| 4*  | 4.582           | 47.08          | 10.25       | 56.00        | -8.92           | QP       | N    | Pass    |
| 4** | 4.582           | 44.69          | 10.25       | 46.00        | -1.31           | AV       | N    | Pass    |
| 5   | 4.800           | 50.51          | 10.25       | 56.00        | -5.49           | Peak     | N    | Pass    |
| 5*  | 4.800           | 47.07          | 10.25       | 56.00        | -8.93           | QP       | N    | Pass    |
| 5** | 4.800           | 45.17          | 10.25       | 46.00        | -0.83           | AV       | N    | Pass    |
| 6   | 8.728           | 49.93          | 10.35       | 60.00        | -10.07          | Peak     | N    | Pass    |
| 6*  | 8.728           | 48.84          | 10.35       | 60.00        | -11.16          | QP       | N    | Pass    |
| 6** | 8.728           | 48.89          | 10.35       | 50.00        | -1.11           | AV       | N    | Pass    |

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