

**FCC - TEST REPORT**Report Number : **709502306225-00C** Date of Issue: January 22, 2024Model : LKOUT PProduct Type : Wireless DisplayApplicant : Fellowes IncAddress : 1789 Norwood Avenue Itasca, IL 60143 United StatesProduction Facility : Fellowes Office Products(Suzhou) Co, LtdAddress : 1# Shilin Road, Suzhou New & Hi-tech District,  
215151 Suzhou, Jiangsu, People's Republic of ChinaTest Result : ☒ **Positive** ☐ **Negative**Total pages including  
Appendices : 42

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## 2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|-------|-----------------------|---------------|
| 1     | First Issue           | 01/22/2024    |

## 3 Details about the Test Laboratory

### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch  
No.16 Lane, 1951 Du Hui Road,  
Shanghai 201108,  
P.R. China

Test Firm FCC  
Registration  
Number: 820234

Designation  
number: CN1183

IC Company  
Number: 31668

CAB identifier: CN0101

Telephone: +86 21 6141 0123  
Fax: +86 21 6140 8600

#### 4 Description of the Equipment under Test

Product: Wireless Display

Model no.: LKOUT P

FCC ID: IDH-RMTDSPY

Options and accessories: NA

Rating: DC 12V for Wireless Display  
100-240V~, 50/60Hz for adapter

RF Transmission Frequency: 2402~2480MHz for Bluetooth  
For 2.4G & 5G Wi-Fi  
For 802.11b/g/n-HT20: 2412~2462 MHz  
For 802.11n-HT40: 2422~2452 MHz  
5180~5240 MHz (U-NII-1)  
5745~5825 MHz (U-NII-3)  
WCDMA Band II/IV/V  
LTE Band 2/4/5/12/13/14/66/71

No. of Operated Channel: 79 channels for Bluetooth 2.1+EDR

| Ch | Fre (MH) | Ch | Fre (MH) | Ch | Fre (MH) | Ch | Fre (MH) | Ch | Fre (MHz) |
|----|----------|----|----------|----|----------|----|----------|----|-----------|
| 1  | 2402     | 17 | 2418     | 33 | 2434     | 49 | 2450     | 65 | 2466      |
| 2  | 2403     | 18 | 2419     | 34 | 2435     | 50 | 2451     | 66 | 2467      |
| 3  | 2404     | 19 | 2420     | 35 | 2436     | 51 | 2452     | 67 | 2468      |
| 4  | 2405     | 20 | 2421     | 36 | 2437     | 52 | 2453     | 68 | 2469      |
| 5  | 2406     | 21 | 2422     | 37 | 2438     | 53 | 2454     | 69 | 2470      |
| 6  | 2407     | 22 | 2423     | 38 | 2439     | 54 | 2455     | 70 | 2471      |
| 7  | 2408     | 23 | 2424     | 39 | 2440     | 55 | 2456     | 71 | 2472      |
| 8  | 2409     | 24 | 2425     | 40 | 2441     | 56 | 2457     | 72 | 2473      |
| 9  | 2410     | 25 | 2426     | 41 | 2442     | 57 | 2458     | 73 | 2474      |
| 10 | 2411     | 26 | 2427     | 42 | 2443     | 58 | 2459     | 74 | 2475      |
| 11 | 2412     | 27 | 2428     | 43 | 2444     | 59 | 2460     | 75 | 2476      |
| 12 | 2413     | 28 | 2429     | 44 | 2445     | 60 | 2461     | 76 | 2477      |
| 13 | 2414     | 29 | 2430     | 45 | 2446     | 61 | 2462     | 77 | 2478      |
| 14 | 2415     | 30 | 2431     | 46 | 2447     | 62 | 2463     | 78 | 2479      |
| 15 | 2416     | 31 | 2432     | 47 | 2448     | 63 | 2464     | 79 | 2480      |
| 16 | 2417     | 32 | 2433     | 48 | 2449     | 64 | 2465     |    |           |

## 40 channels for Bluetooth 4.2 BLE

| Ch | Fre(MHz) | Ch | Fre(MHz) | Ch | Fre(MHz) | Ch | Fre(MHz) |
|----|----------|----|----------|----|----------|----|----------|
| 0  | 2402     | 10 | 2422     | 20 | 2442     | 30 | 2462     |
| 1  | 2404     | 11 | 2424     | 21 | 2444     | 31 | 2464     |
| 2  | 2406     | 12 | 2426     | 22 | 2446     | 32 | 2466     |
| 3  | 2408     | 13 | 2428     | 23 | 2448     | 33 | 2468     |
| 4  | 2410     | 14 | 2430     | 24 | 2450     | 34 | 2470     |
| 5  | 2412     | 15 | 2432     | 25 | 2452     | 35 | 2472     |
| 6  | 2414     | 16 | 2434     | 26 | 2454     | 36 | 2474     |
| 7  | 2416     | 17 | 2436     | 27 | 2456     | 37 | 2476     |
| 8  | 2418     | 18 | 2438     | 28 | 2458     | 38 | 2478     |
| 9  | 2420     | 19 | 2440     | 29 | 2460     | 39 | 2480     |

2.4GHz WIFI: 11 for 802.11b/802.11g/802.11(H20);  
7 for 802.11n(HT40)

| 802.11b/g/n(HT20) |          |    |          | 802.11n(HT40) |          |    |          |
|-------------------|----------|----|----------|---------------|----------|----|----------|
| Ch                | Fre(MHz) | Ch | Fre(MHz) | Ch            | Fre(MHz) | Ch | Fre(MHz) |
| 1                 | 2412     | 7  | 2442     | 3             | 2422     | 8  | 2447MHz  |
| 2                 | 2417     | 8  | 2447     | 4             | 2427     | 9  | 2452MHz  |
| 3                 | 2422     | 9  | 2452     | 5             | 2432     |    |          |
| 4                 | 2427     | 10 | 2457     | 6             | 2437     |    |          |
| 5                 | 2432     | 11 | 2462     | 7             | 2442     |    |          |
| 6                 | 2437     |    |          |               |          |    |          |

## 5180~5240 MHz (U-NII-1):

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 36      | 5180            | 44      | 5220            |
| 40      | 5200            | 48      | 5240            |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 38      | 5190            | 46      | 5230            |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 42      | 5210            |

## 5745~5825 MHz (U-NII-3): Channel 149 – 165

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 149     | 5745            | 161     | 5805            |
| 153     | 5765            | 165     | 5825            |
| 157     | 5785            |         |                 |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 151     | 5755            | 159     | 5795            |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 155     | 5755            |



|                         |                                                                                                                                                                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modulation:             | Bluetooth 2.1+EDR FHSS: GFSK, $\pi/4$ DQPSK, 8DPSK<br>Bluetooth 4.2+BLE DHSS: GFSK<br>For Wi-Fi: Direct Sequence Spread Spectrum (DSSS) for 802.11b<br>Orthogonal Frequency Division Multiplexing (OFDM) for 802.11a/b/g/n/ac                           |
| Hardware Version:       | V2.0                                                                                                                                                                                                                                                    |
| Software Version:       | 11.0.1_#7210_10.1_2168A1-V2.0                                                                                                                                                                                                                           |
| Data speed:             | 1. Bluetooth 2.1+EDR FHSS: 1Mbps, 2Mbps, 3Mbps<br>2. Bluetooth 4.2+BLE DHSS: 1Mbps<br>3. Wi-Fi: 11b 1 ~ 11Mbps,<br>11g/a 6 ~ 54Mbps, 11n HT20 6.5 ~ 72.2Mbps,<br>11n HT 40 13.5 ~ 150Mbps,<br>11ac VHT40 13.5 ~ 200Mbps,<br>11ac VHT80 29.3 ~ 433.3Mbps |
| Antenna Type:           | PCB Antenna                                                                                                                                                                                                                                             |
| Antenna Gain:           | 1.99dBi for 2.4GHz; 1.98dBi for 5GHz                                                                                                                                                                                                                    |
| Description of the EUT: | The Equipment Under Test (EUT) is an Infrared Thermal Camera with Bluetooth and Wi-Fi Module. The EUT support Bluetooth 4.2+EDR and support BLE function and Wi-Fi operated at 5GHz and 2.4GHz. Only Bluetooth 4.2+EDR included in this report.         |
| Test sample no.:        | SHA-749413-2 (RF Conducted); SHA-749413-3 (RF Radiated)                                                                                                                                                                                                 |

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

## 5 Summary of Test Standards

| Test Standards                             |                                                                        |
|--------------------------------------------|------------------------------------------------------------------------|
| FCC Part 15 Subpart C<br>10-1-2021 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.

## 6 Summary of Test Results

| Technical Requirements |                                             |            |           |                                     |                          |                                     |
|------------------------|---------------------------------------------|------------|-----------|-------------------------------------|--------------------------|-------------------------------------|
| FCC Part 15 Subpart C  |                                             |            |           |                                     |                          |                                     |
| Test Condition         |                                             | Pages      | Test Site | Test Result                         |                          |                                     |
|                        |                                             |            |           | Pass                                | Fail                     | N/A                                 |
| §15.207                | Conducted emission AC power port            | 14-18      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247 (b) (3)        | Conducted peak output power                 | 19-21      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(a)(1)          | 20dB bandwidth                              | ---        | ---       | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)          | Carrier frequency separation                | ---        | ---       | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii)     | Number of hopping frequencies               | ---        | ---       | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii)     | Dwell Time                                  | ---        | ---       | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(2)          | 6dB bandwidth                               | 22-23      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(e)             | Power spectral density                      | 24-25      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d)             | Spurious RF conducted emissions             | 26-29      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d)             | Band edge                                   | 30-32      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d) & §15.209   | Spurious radiated emissions for transmitter | 33-39      | Site 1    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.203                | Antenna requirement                         | See note 1 |           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses a PCB antenna, which gain is 1.99dBi for 2.4GHz and 1.98dBi for 5GHz. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.



## 7 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: IDH-RMTDSPY complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

This report is only for 2.4G BLE.

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 10, 2023

Testing Start Date: August 14, 2023

Testing End Date: December 21, 2023

-TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:



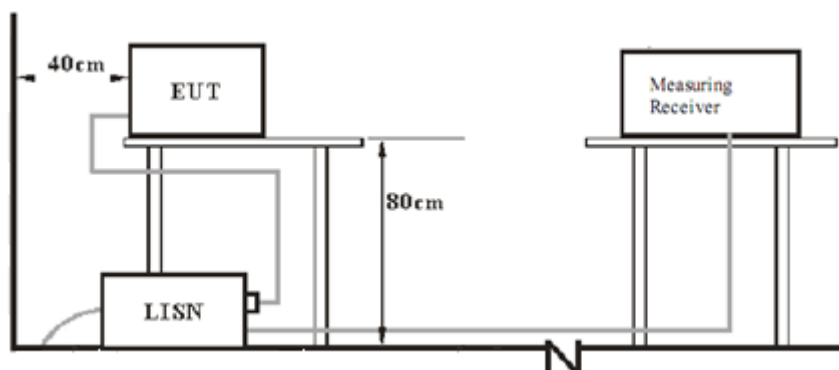
Hui TONG  
Review Engineer

Jiaxi XU  
Project Engineer

Cheng Huali  
Test Engineer

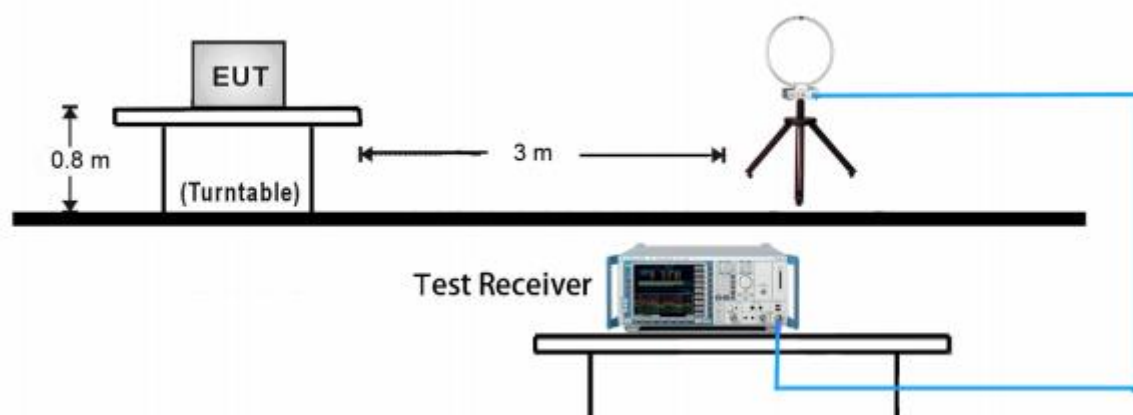
## 8 Test Setups

### 7.1 AC Power Line Conducted Emission test setups

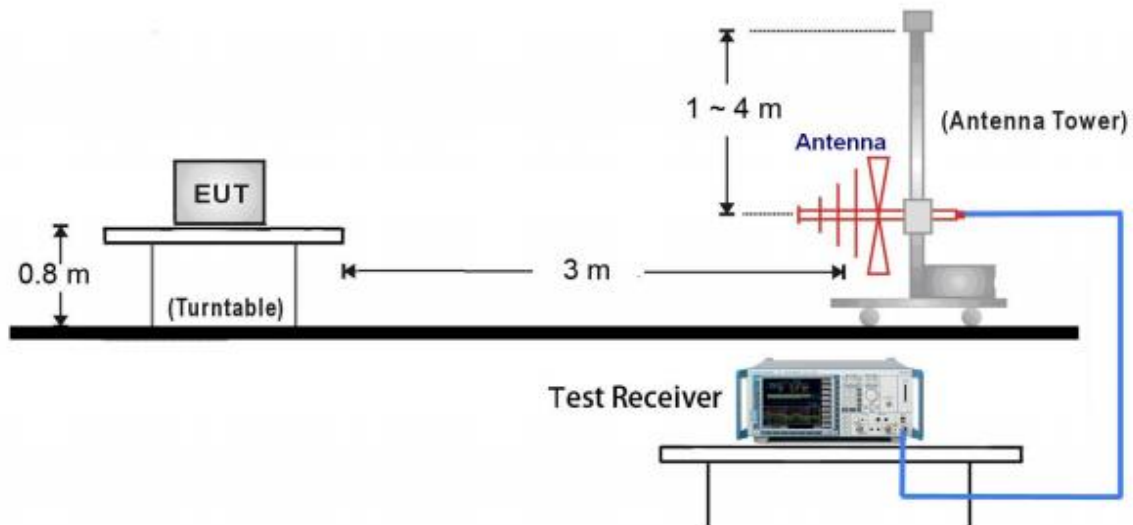


### 7.2 Radiated test setups

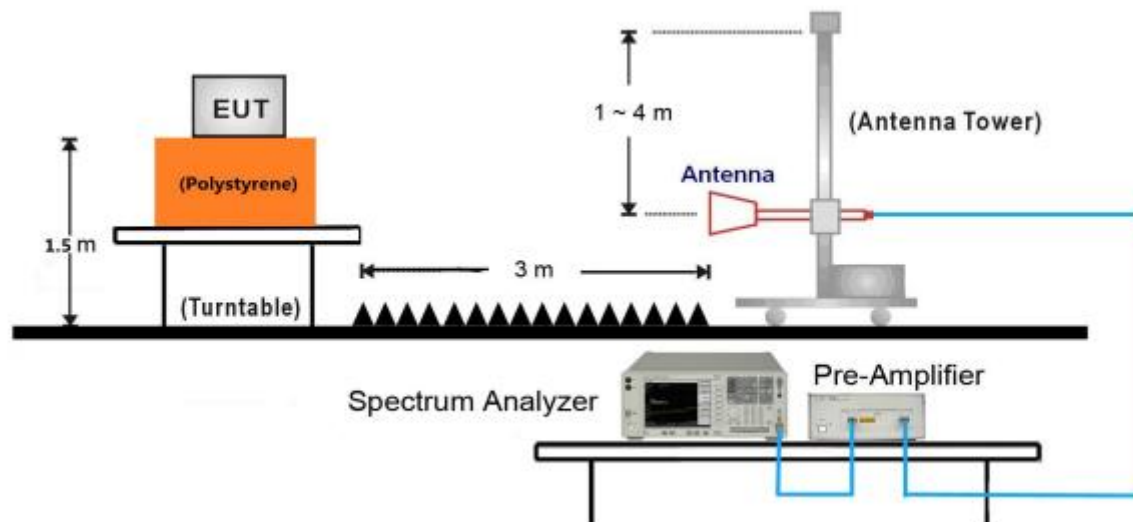
#### 9kHz ~ 30MHz Test Setup:



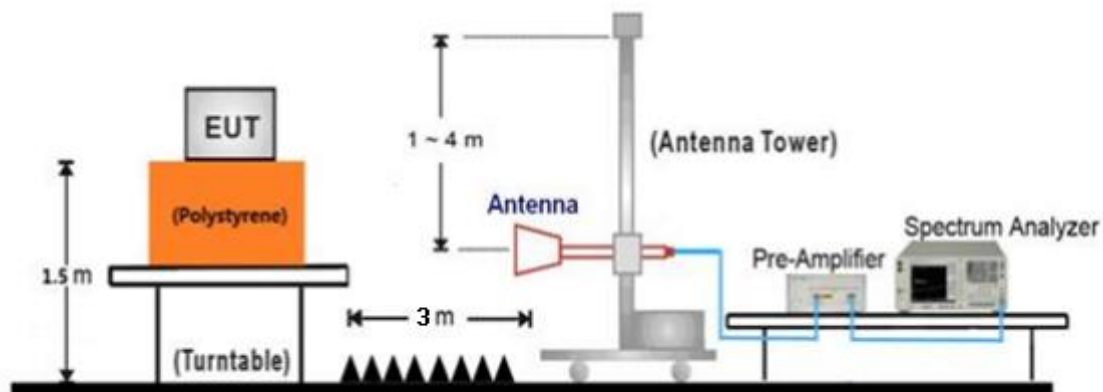
### 30MHz ~ 1GHz Test Setup:



### 1GHz ~ 18GHz Test Setup:



### 18GHz ~ 25GHz Test Setup:



### 7.3 Conducted RF test setups



## 9 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH)     |
|-------------|--------------|-------------------|-----------------|
| Notebook    | Lenove       | E470              | PF-OU5TS7 17/09 |

Test software: adb commend, which used to control the EUT in continues transmitting mode

The system was configured to channel 0, 19, and 39 for the test.

Test Mode Applicability and Tested Channel Detail:

| Mode    | Tested Channel | Data Rate (Mbps) | Modulation | Index Value (Power level setting) |
|---------|----------------|------------------|------------|-----------------------------------|
| 802.11b | 1              | 1                | GFSK       | 0x17                              |
|         | 19             | 1                | GFSK       | 0x17                              |
|         | 39             | 1                | GFSK       | 0x17                              |

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power.

## 10 Technical Requirement

### 10.1 Conducted Emission

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

#### Limit

According to §15.207, conducted emissions limit as below:

| Frequency<br>MHz | QP Limit<br>dB $\mu$ V | AV Limit<br>dB $\mu$ V |
|------------------|------------------------|------------------------|
| 0.150-0.500      | 66-56*                 | 56-46*                 |
| 0.500-5          | 56                     | 46                     |
| 5-30             | 60                     | 50                     |

Decreasing linearly with logarithm of the frequency

## Conducted Emission

# 150k-30MHz Conducted Emission Test

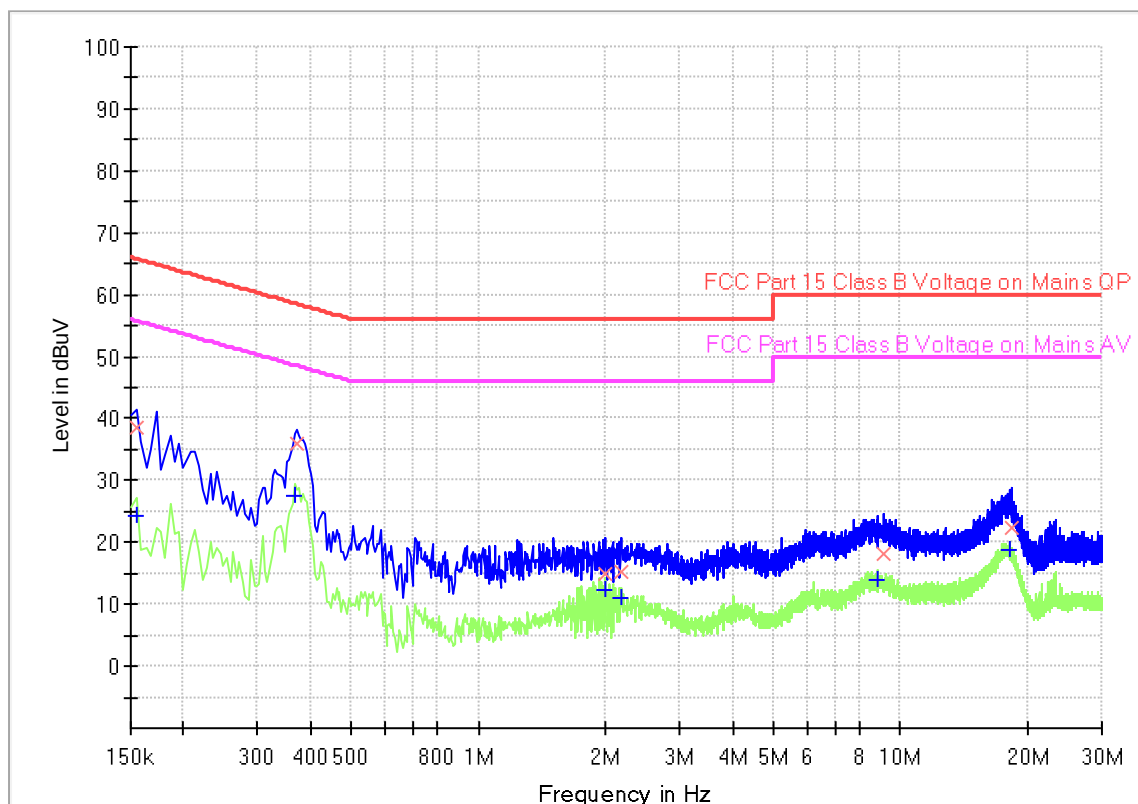
## EUT Information

|             |                                                                            |
|-------------|----------------------------------------------------------------------------|
| EUT Name:   | Wireless Display                                                           |
| Model:      | LKOUT P                                                                    |
| Client:     | Fellowes Inc.                                                              |
| Op Cond:    | Power on, transmitting at 2402MHz, AC 120V/560Hz, T24.1, H39.1%, P102.5kPa |
| Operator:   | Cheng Huali                                                                |
| Standard:   | FCC Part 15.209(a)                                                         |
| Comment:    | Phase L                                                                    |
| Sample No.: | SHA-749413-2                                                               |

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamp |
|------------------|-----------|-----------|--------|------------|--------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB   |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB   |





## Final\_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.154500        | ---              | 24.41           | 55.75        | 31.34       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.154500        | 38.64            | ---             | 65.75        | 27.11       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.366000        | ---              | 27.37           | 48.59        | 21.22       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.370500        | 36.00            | ---             | 58.49        | 22.49       | 1000.0          | 9.000           | L1   | 19.5       |
| 1.999500        | ---              | 12.37           | 46.00        | 33.63       | 1000.0          | 9.000           | L1   | 19.5       |
| 2.004000        | 15.04            | ---             | 56.00        | 40.96       | 1000.0          | 9.000           | L1   | 19.5       |
| 2.179500        | 15.34            | ---             | 56.00        | 40.66       | 1000.0          | 9.000           | L1   | 19.5       |
| 2.179500        | ---              | 10.89           | 46.00        | 35.11       | 1000.0          | 9.000           | L1   | 19.5       |
| 8.812500        | ---              | 13.79           | 50.00        | 36.21       | 1000.0          | 9.000           | L1   | 19.8       |
| 9.132000        | 18.16            | ---             | 60.00        | 41.84       | 1000.0          | 9.000           | L1   | 19.8       |
| 18.069000       | ---              | 18.67           | 50.00        | 31.33       | 1000.0          | 9.000           | L1   | 20.2       |
| 18.361500       | 22.30            | ---             | 60.00        | 37.70       | 1000.0          | 9.000           | L1   | 20.3       |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

# 150k-30MHz Conducted Emission Test

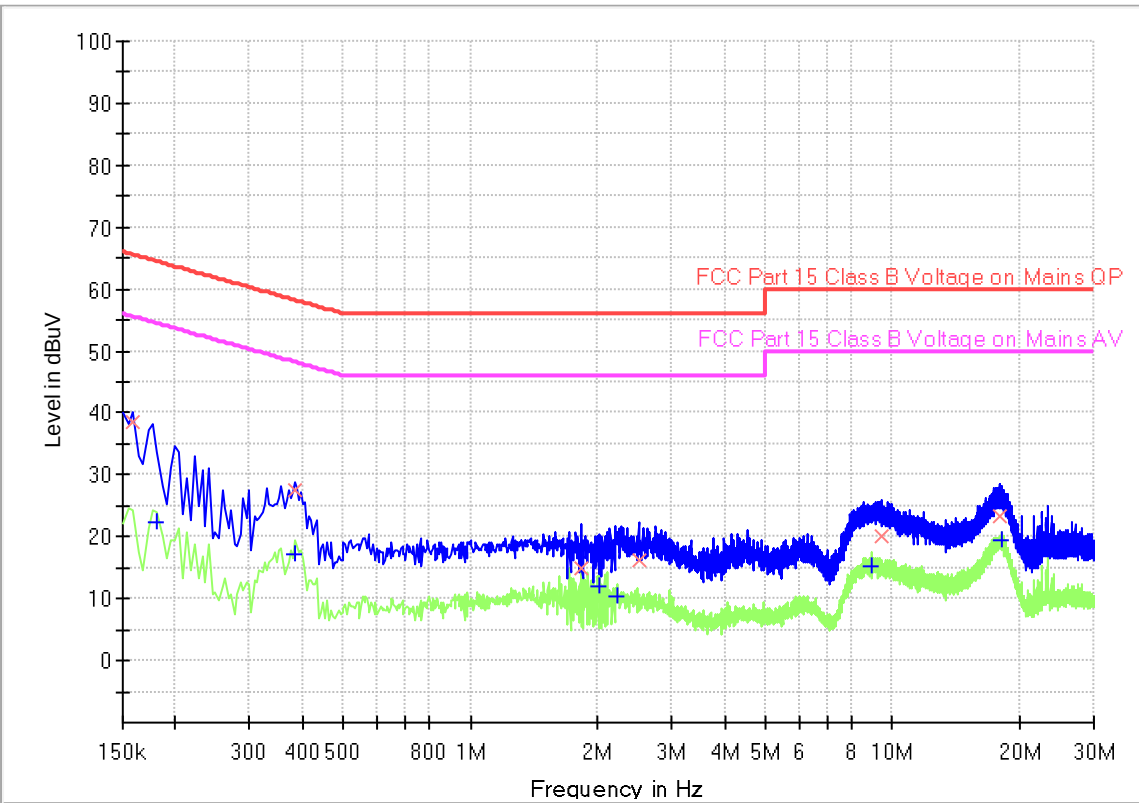
## EUT Information

|             |                                                                            |
|-------------|----------------------------------------------------------------------------|
| EUT Name:   | Wireless Display                                                           |
| Model       | LKOUT P                                                                    |
| Client:     | Fellowes Inc.                                                              |
| Op Cond     | Power on, transmitting at 2402MHz, AC 120V/560Hz, T24.1, H39.1%, P102.5kPa |
| Operator:   | Cheng Huali                                                                |
| Standard    | FCC Part 15.209(a)                                                         |
| Comment:    | Phase N                                                                    |
| Sample No.: | SHA-749413-2                                                               |

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamp |
|------------------|-----------|-----------|--------|------------|--------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB   |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB   |





## Final\_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.159000        | 38.43            | ---             | 65.52        | 27.09       | 1000.0          | 9.000           | N    | 19.4       |
| 0.181500        | ---              | 22.36           | 54.42        | 32.06       | 1000.0          | 9.000           | N    | 19.4       |
| 0.384000        | ---              | 17.28           | 48.19        | 30.91       | 1000.0          | 9.000           | N    | 19.5       |
| 0.384000        | 27.38            | ---             | 58.19        | 30.81       | 1000.0          | 9.000           | N    | 19.5       |
| 1.833000        | 14.84            | ---             | 56.00        | 41.16       | 1000.0          | 9.000           | N    | 19.5       |
| 2.026500        | ---              | 11.84           | 46.00        | 34.16       | 1000.0          | 9.000           | N    | 19.5       |
| 2.233500        | ---              | 10.47           | 46.00        | 35.53       | 1000.0          | 9.000           | N    | 19.5       |
| 2.503500        | 16.35            | ---             | 56.00        | 39.65       | 1000.0          | 9.000           | N    | 19.5       |
| 8.916000        | ---              | 15.27           | 50.00        | 34.73       | 1000.0          | 9.000           | N    | 19.7       |
| 9.447000        | 20.23            | ---             | 60.00        | 39.77       | 1000.0          | 9.000           | N    | 19.7       |
| 17.875500       | 23.44            | ---             | 60.00        | 36.56       | 1000.0          | 9.000           | N    | 20.0       |
| 18.064500       | ---              | 19.41           | 50.00        | 30.59       | 1000.0          | 9.000           | N    | 20.1       |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

## 10.2 Conducted peak output power

### Test Method

1. Measure the duty cycle D of the transmitter output signal.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
4. Set VBW  $\geq [3 \times \text{RBW}]$ .
5. Number of points in sweep  $\geq [2 \times \text{span} / \text{RBW}]$ . (This gives bin-to-bin spacing  $\leq \text{RBW} / 2$ , so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
8. Do not use sweep triggering. Allow the sweep to "free run."
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
10. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11. Add  $[10 \log (1 / D)]$ , where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission).

### Limits

According to §15.247 (b) (3), conducted peak output power limit as below:

#### Conducted peak output power

| Frequency Range<br>MHz | Limit<br>W | Limit<br>dBm |
|------------------------|------------|--------------|
| 2400-2483.5            | $\leq 1$   | $\leq 30$    |

Test result as below table

| Frequency<br>(MHz) | Duty cycle<br>Factor (dB) | Conducted<br>Power (dBm) | Total Power<br>(dBm)<br>§15.247 (b) (1) | Result |
|--------------------|---------------------------|--------------------------|-----------------------------------------|--------|
| 2402MHz            | 2                         | 2.24                     | 4.24                                    | Pass   |
| 2440MHz            | 2                         | 1.11                     | 3.11                                    | Pass   |
| 2480MHz            | 2                         | 0.55                     | 2.55                                    | Pass   |

## Duty cycle

## Test Graphs

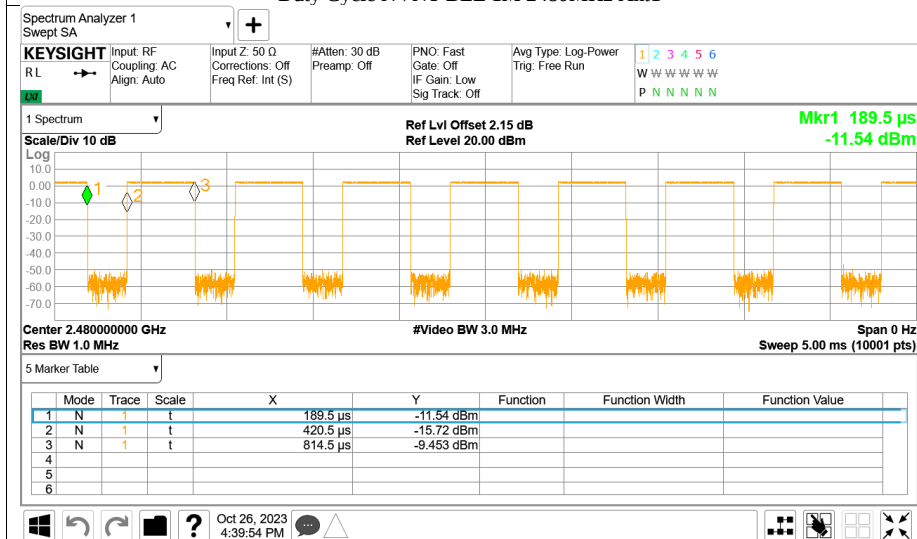
## Duty Cycle NVNT BLE 1M 2402MHz Ant1



## Duty Cycle NVNT BLE 1M 2440MHz Ant1

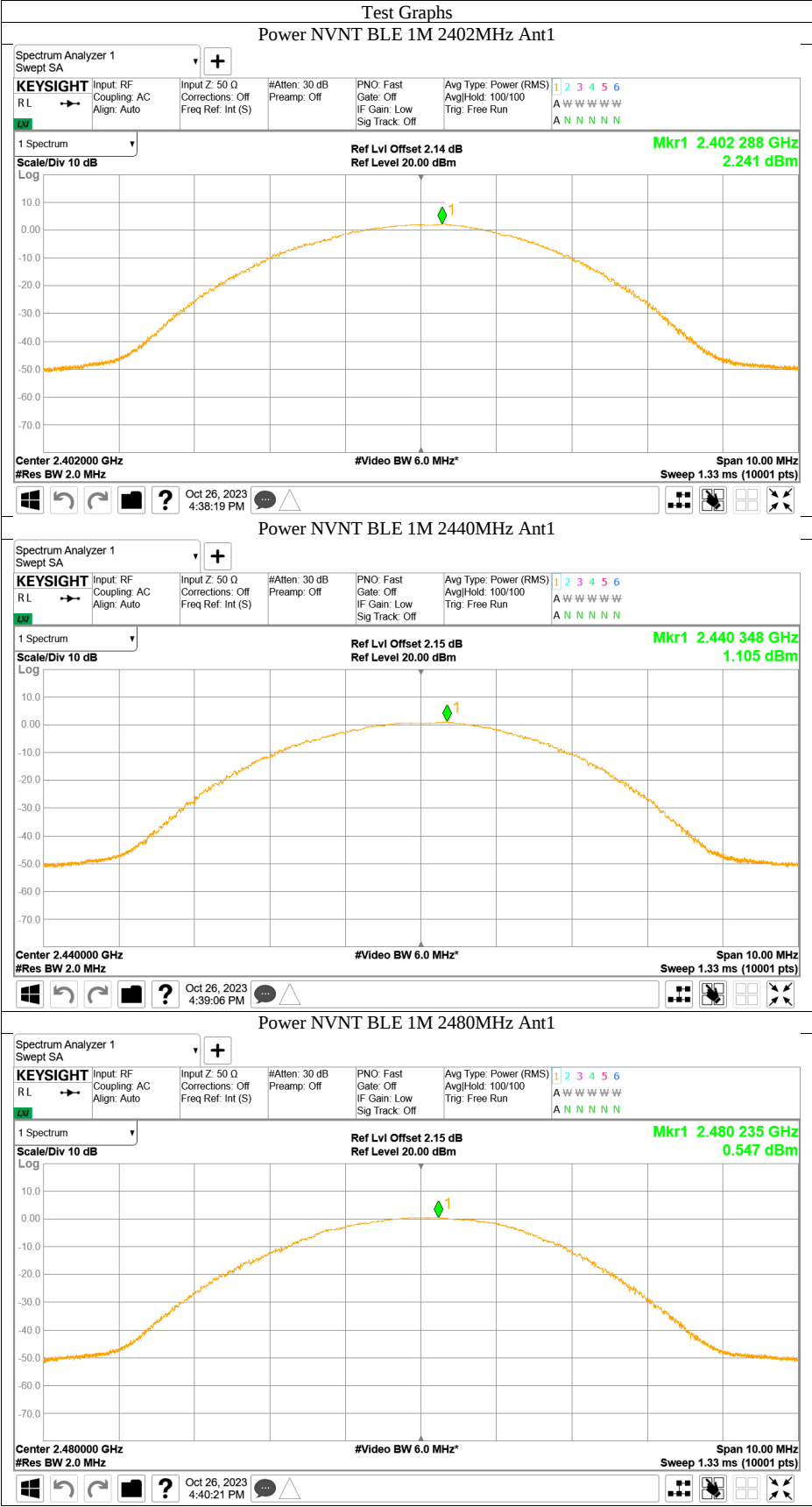


## Duty Cycle NVNT BLE 1M 2480MHz Ant1





Conducted Output Power



## 10.3 6dB bandwidth

### Test Method for 6 dB Bandwidth

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:  
RBW=100KHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Use the automatic bandwidth measurement capability of an instrument, use the X dB bandwidth mode with X set to 6 dB.
5. Allow the trace to stabilize, record the 6 dB Bandwidth value.

### Limit

#### 6dB bandwidth Limit [kHz]

---

$\geq 500$

### Test result

| Data transmission rate | Frequency MHz | 6dB bandwidth (MHz) |            | Result  |
|------------------------|---------------|---------------------|------------|---------|
|                        |               | result              | limit      | verdict |
| 1Mbps                  | 2402          | 0.717               | $\geq 0.5$ | Pass    |
|                        | 2440          | 0.694               | $\geq 0.5$ | Pass    |
|                        | 2480          | 0.709               | $\geq 0.5$ | Pass    |



6dB Bandwidth



## 10.4 Power spectral density

### Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW $\geq$ 3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

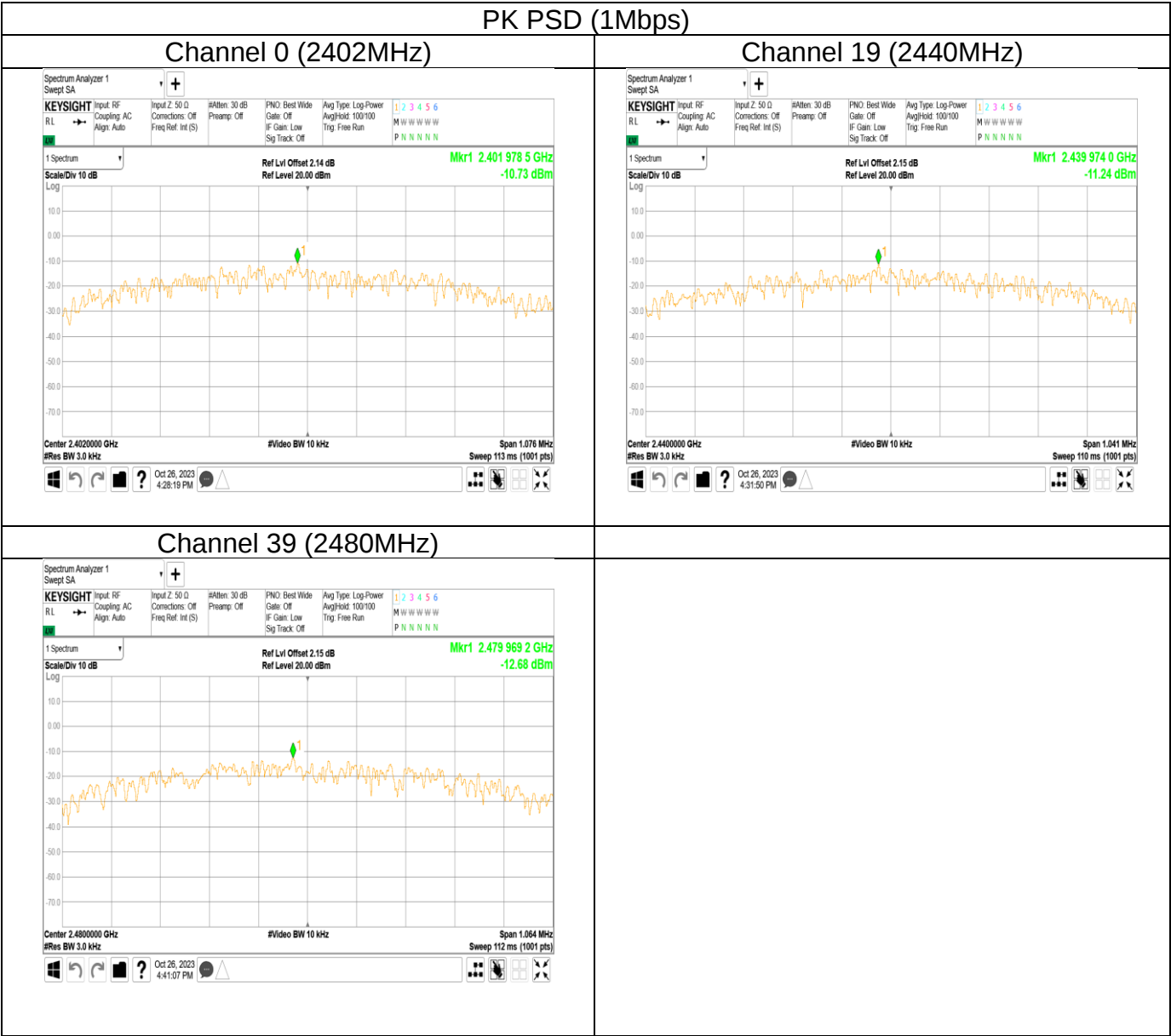
### Limit

Limit [dBm/3kHz]

$\leq 8$

### Test result

| Data transmission rate | Frequency              | Power spectral density | Result |
|------------------------|------------------------|------------------------|--------|
| 1Mbps                  | MHz                    | dBm/3kHz               |        |
|                        | Top channel 2402MHz    | -10.73                 | Pass   |
|                        | Middle channel 2440MHz | -11.24                 | Pass   |
|                        | Bottom channel 2480MHz | -12.68                 | Pass   |



## 10.5 Spurious RF conducted emissions

### Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span.  
RBW = 100 kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
5. The level displayed must comply with the limit specified in this Section. Submit these plots.
6. Repeat above procedures until all frequencies measured were complete.

### Limit

| Frequency Range<br>MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000               | -20         |



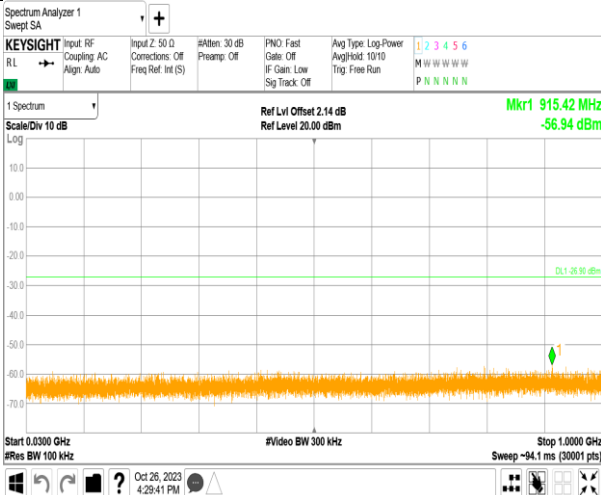
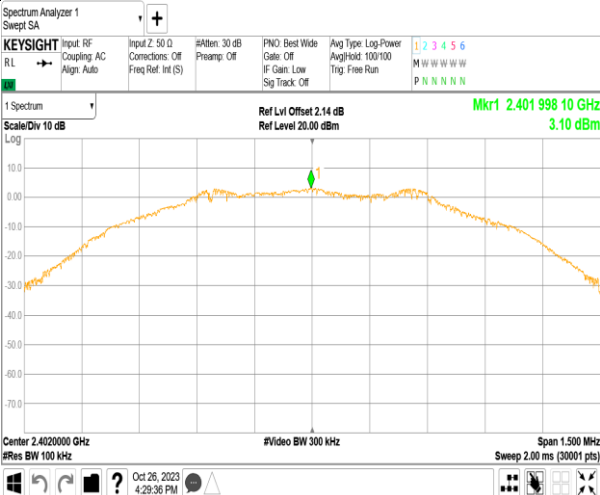
Spurious RF conducted emissions

Out-of-Band Emissions (1Mbps)

Channel 0 (2402MHz)

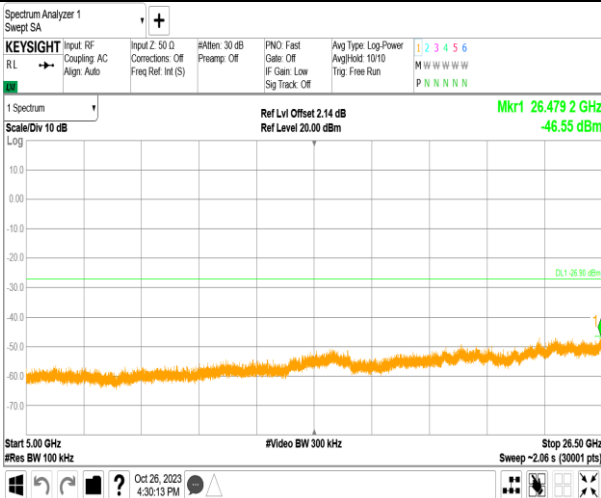
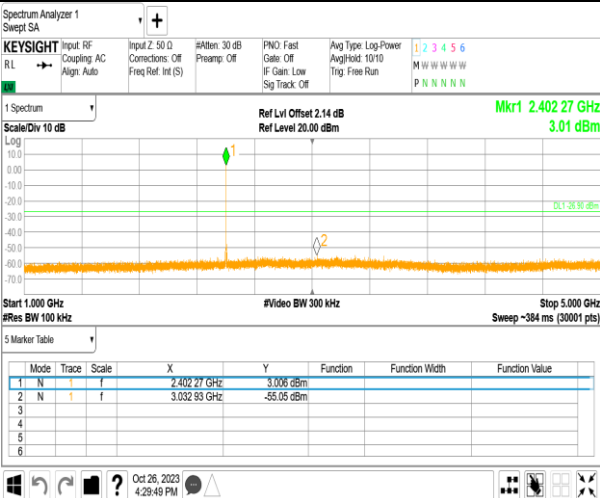
Reference point

Spurious Emission (30MHz – 1GHz)



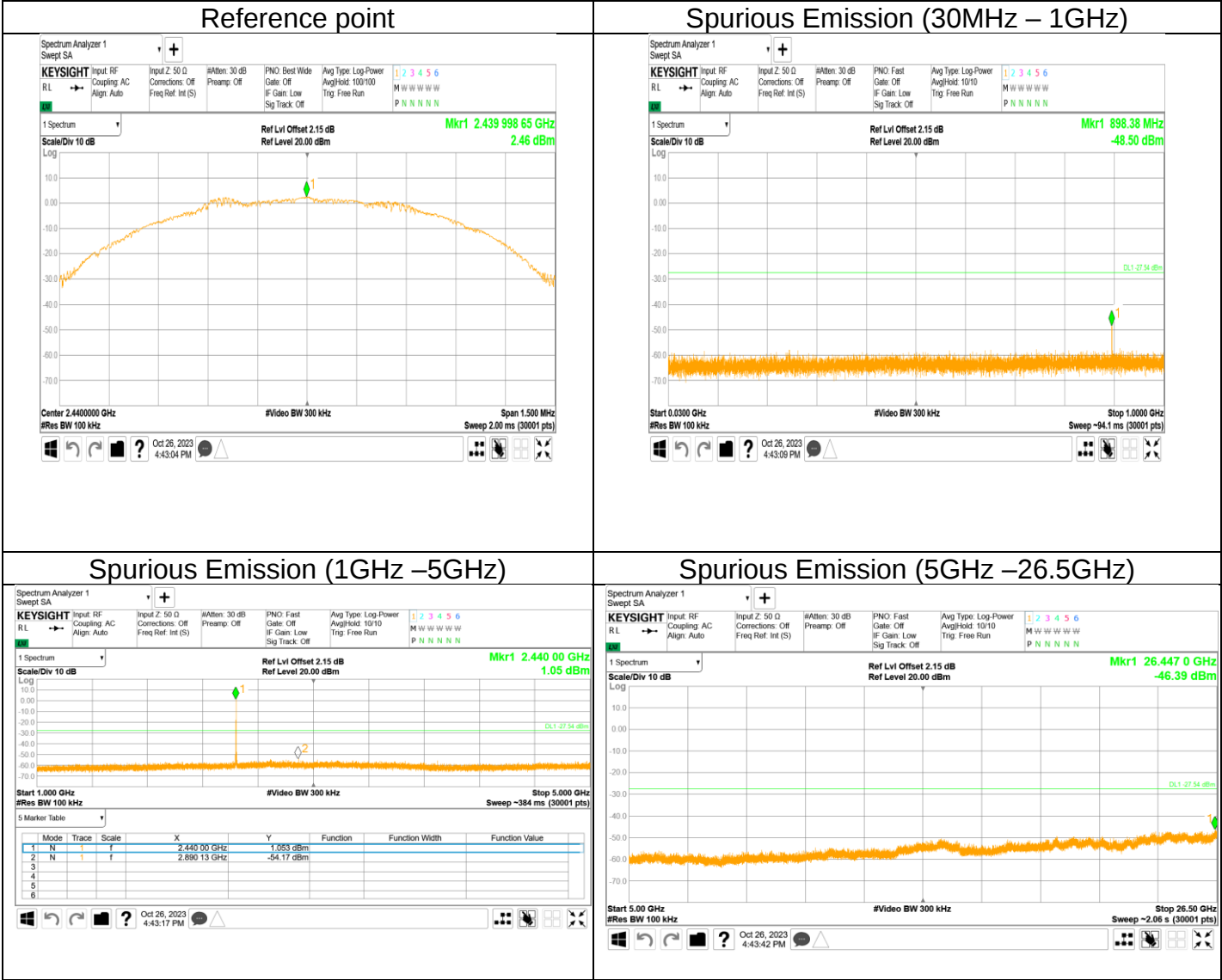
Spurious Emission (1GHz – 5GHz)

Spurious Emission (5GHz – 26.5GHz)



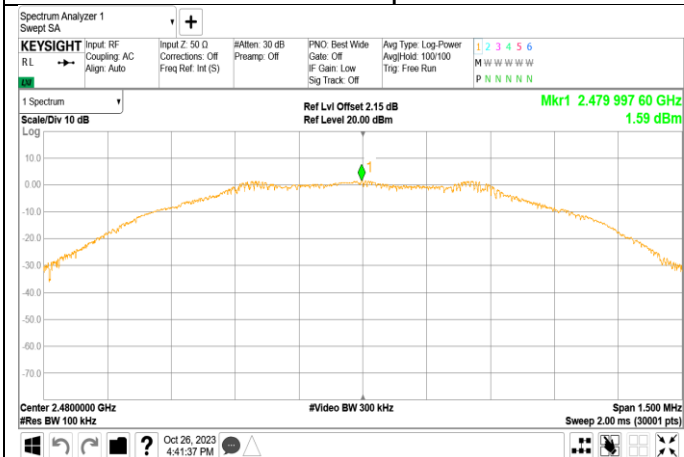


Out-of-Band Emissions (1Mbps)  
Channel 19 (2440MHz)

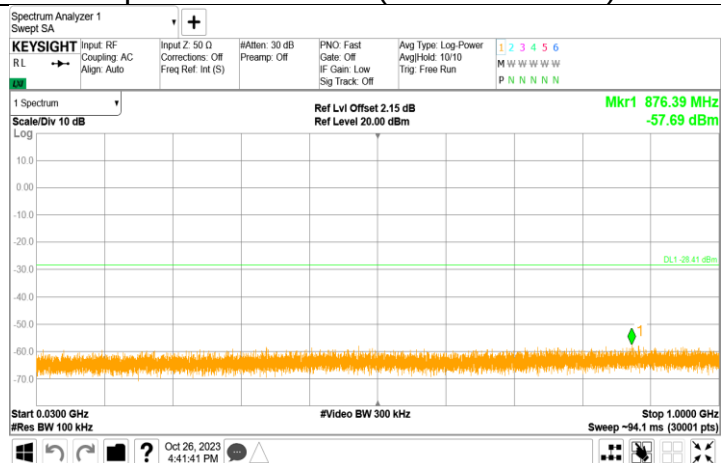


## Out-of-Band Emissions (1Mbps) Channel 39 (2480MHz)

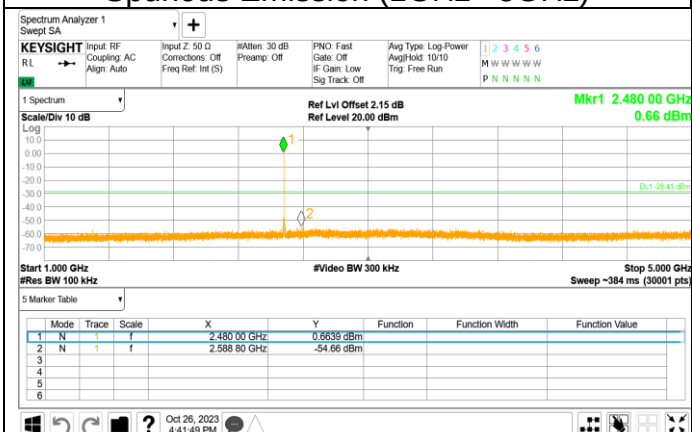
### Reference point



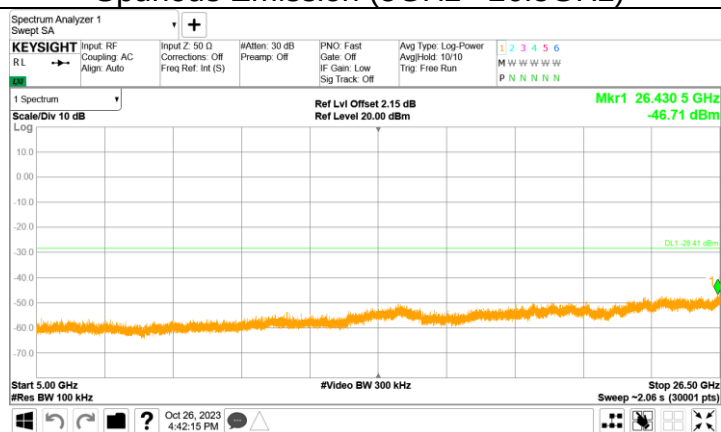
### Spurious Emission (30MHz – 1GHz)



### Spurious Emission (1GHz – 5GHz)



### Spurious Emission (5GHz – 26.5GHz)



## 10.6 Band edge

### Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize, use the peak and delta measurement to record the result.
5. The level displayed must comply with the limit specified in this Section.
6. Repeat above procedures until all frequencies measured were complete and submit all the plots.

### Limit

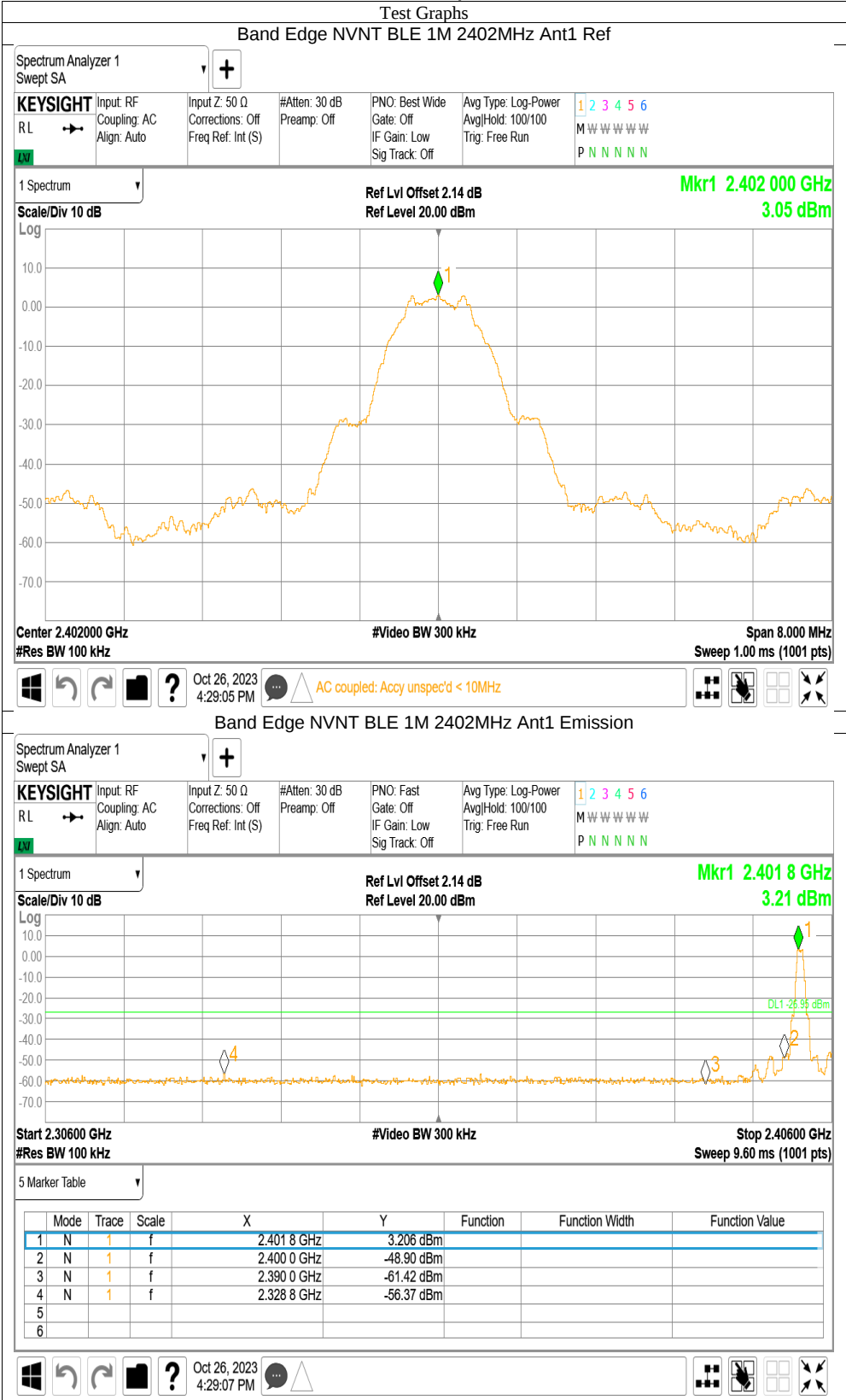
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that 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 § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB.

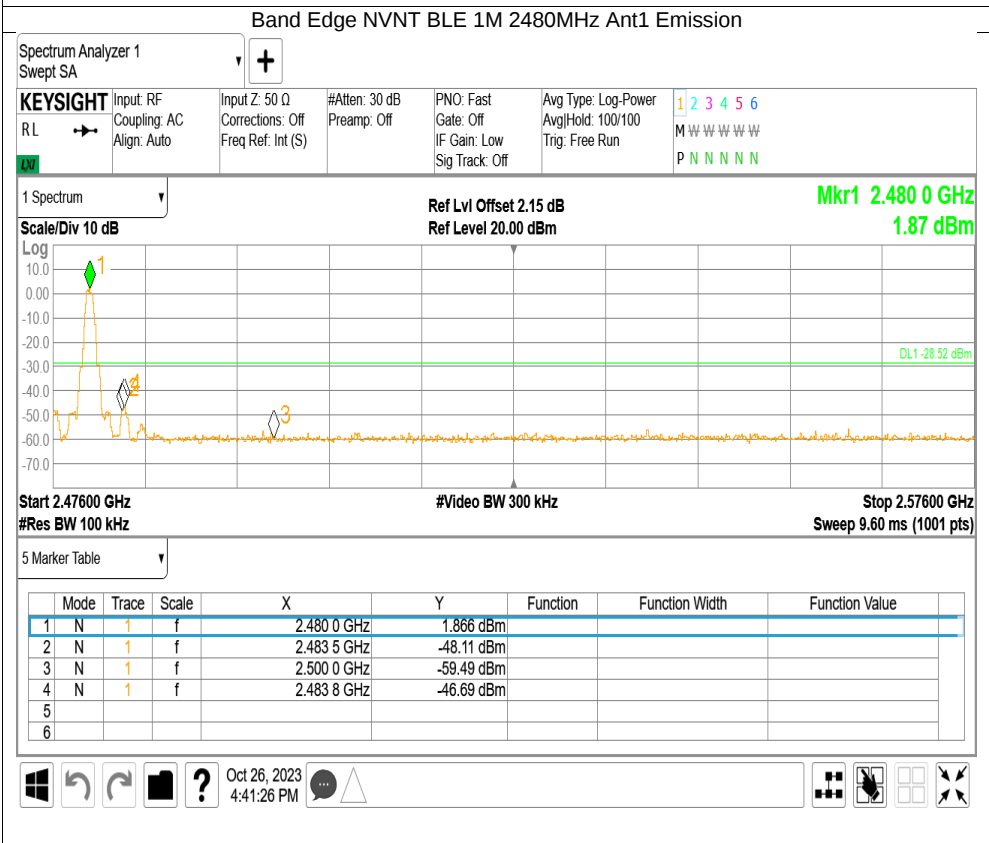
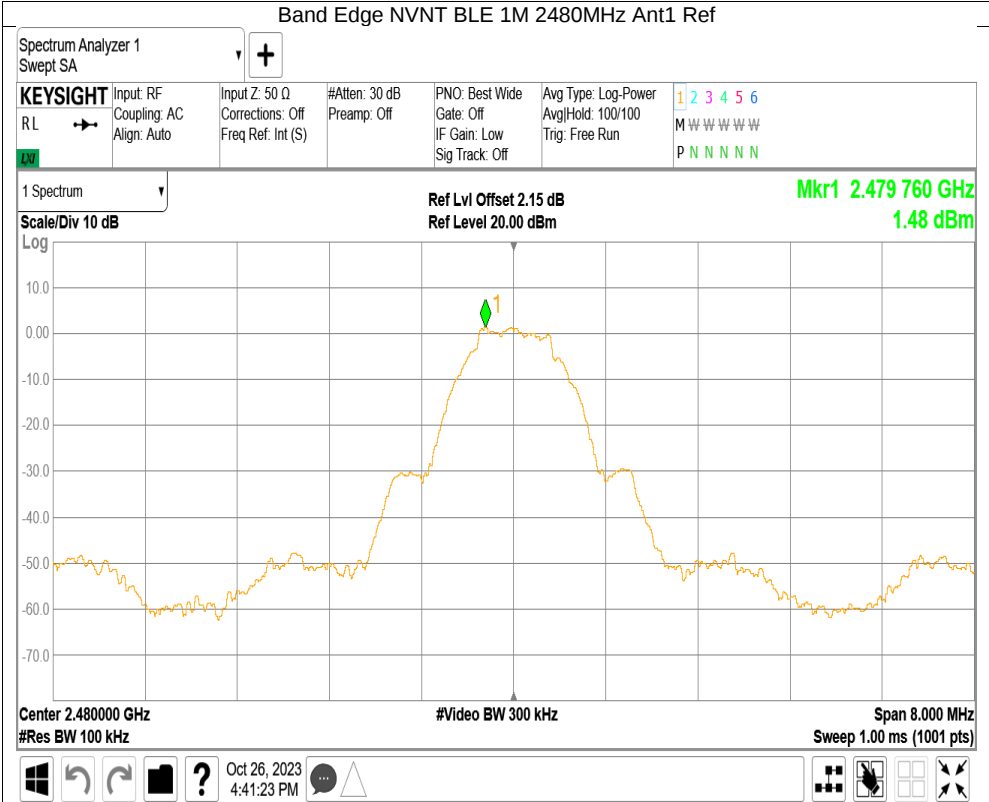
| Frequency Range<br>MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000               | -20         |

### Test result



1Mbps





## 10.7 Spurious radiated emissions for transmitter

### Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10
  - 1) Procedure for Unwanted Emissions Measurements Below 1000 MHz  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz to 120kHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
  - 2) For Peak unwanted emissions Above 1GHz:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.  
Procedures for average unwanted emissions measurements above 1GHz
    - a) RBW = 1MHz.
    - b)  $VBW \leq [3 \times RBW]$ .
    - c) Detector = RMS (power averaging), if  $[span / (\# \text{ of points in sweep})] \leq RBW / 2$ .  
Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
    - d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
    - e) Sweep time = auto.
    - f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of  $1 / D$ , where  $D$  is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
    - g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
      - 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is  $[10 \log (1 / D)]$ , where  $D$  is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
  - 3) If linear voltage averaging mode was used in the preceding step e), then the correction

factor is  $[20 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission (AV) at frequency above 1GHz.

## Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that 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 § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength 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).

| Frequency<br>MHz | Field Strength<br>$\mu\text{V/m}$ | Field Strength<br>$\text{dB}\mu\text{V/m}$ | Detector | Measurement distance<br>meters |
|------------------|-----------------------------------|--------------------------------------------|----------|--------------------------------|
| 0.009-0.490      | 2400/F(kHz)                       | 48.5-13.8                                  | AV       | 300                            |
| 0.490-1.705      | 24000/F(kHz)                      | 33.8-23.0                                  | QP       | 30                             |
| 1.705-30         | 30                                | 29.5                                       | QP       | 30                             |
| 30-88            | 100                               | 40                                         | QP       | 3                              |
| 88-216           | 150                               | 43.5                                       | QP       | 3                              |
| 216-960          | 200                               | 46                                         | QP       | 3                              |
| 960-1000         | 500                               | 54                                         | QP       | 3                              |
| Above 1000       | 500                               | 54                                         | AV       | 3                              |
| Above 1000       | 5000                              | 74                                         | PK       | 3                              |

### Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Data of measurement within frequency range 9kHz-30MHz is the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.

### Test result

Above 1GHz Transmitting spurious emission test result as below:

| Test mode:GFSK 1Mbps (2402MHz) |                        |               |             |          |              |
|--------------------------------|------------------------|---------------|-------------|----------|--------------|
| Frequency MHz                  | Measure Level (dBuV/m) | Limit (dBuV/M | Margin (dB) | Detector | Polarization |
| 2383.44                        | 43.23                  | 74.00         | 30.77       | PK       | Horiznotal   |
| 4804.11                        | 40.21                  | 74.00         | 33.79       | PK       | Horiznotal   |
| 2383.52                        | 43.09                  | 74.00         | 30.91       | PK       | Vertical     |
| 4804.12                        | 40.34                  | 74.00         | 33.66       | PK       | Vertical     |

| Test mode:GFSK 1Mbps (2440MHz) |                        |               |             |          |              |
|--------------------------------|------------------------|---------------|-------------|----------|--------------|
| Frequency MHz                  | Measure Level (dBuV/m) | Limit (dBuV/M | Margin (dB) | Detector | Polarization |
| 4879.40                        | 41.21                  | 74.00         | 32.79       | PK       | Horiznotal   |
| 4879.25                        | 40.45                  | 74.00         | 33.55       | PK       | Vertical     |

| Test mode:GFSK 1Mbps (2480MHz) |                        |               |             |          |              |
|--------------------------------|------------------------|---------------|-------------|----------|--------------|
| Frequency MHz                  | Measure Level (dBuV/m) | Limit (dBuV/M | Margin (dB) | Detector | Polarization |
| 2483.66                        | 47.18                  | 74.00         | 26.82       | PK       | Horiznotal   |
| 4960.43                        | 41.21                  | 74.00         | 32.79       | PK       | Horiznotal   |
| 2483.51                        | 44.51                  | 74.00         | 29.49       | PK       | Vertical     |
| 4959.30                        | 41.34                  | 74.00         | 32.66       | PK       | Vertical     |

Remark:

- (1) Emission level= Original Receiver Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
- (3) Margin = limit – Corrected Reading

The worst case of Radiated Emission below 1GHz:

## 30-1000MHz Radiated Emission

### EUT Information

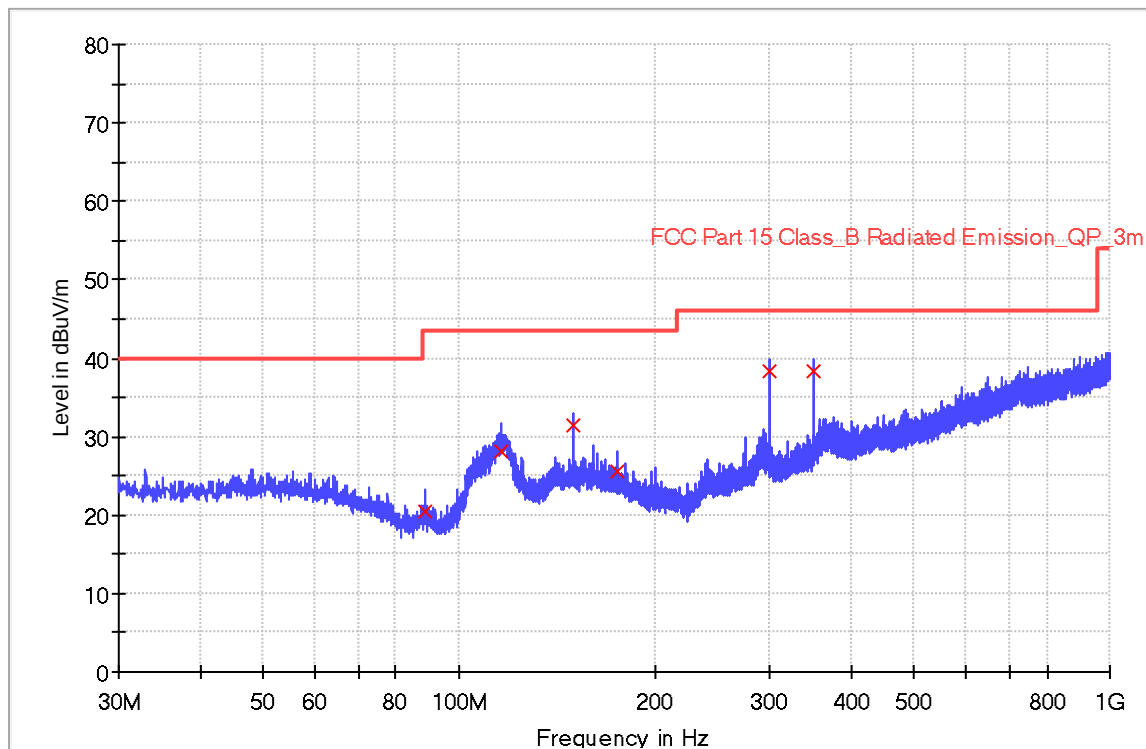
|            |                                                                          |
|------------|--------------------------------------------------------------------------|
| EUT Name:  | Wireless Display                                                         |
| Model:     | LKOUT P                                                                  |
| Client:    | Fellowes Inc.                                                            |
| Op Cond:   | Power on, transmitting at 2402MHz, AC 120V/60Hz, T23.9, 47.4%, P102.5kPa |
| Operator:  | Cheng Huali                                                              |
| Test Spec: | FCC Part 15.209(a)                                                       |
| Comment:   | Horizontal                                                               |
| Sample No: | SHA-749413-2                                                             |

### Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

|                 |             |
|-----------------|-------------|
| Hardware Setup: | RE_VULB9168 |
| Receiver:       | [ESR 3]     |
| Level Unit:     | dBuV/m      |

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 88.920000       | 20.4               | 1000.0          | 120.000         | 200.0       | H   | 117.0         | 14.7         | 23.1              | 43.5                 |
| 116.000000      | 28.0               | 1000.0          | 120.000         | 187.0       | H   | 301.0         | 17.8         | 15.5              | 43.5                 |
| 149.960000      | 31.5               | 1000.0          | 120.000         | 169.0       | H   | 196.0         | 20.9         | 12.0              | 43.5                 |
| 174.960000      | 25.6               | 1000.0          | 120.000         | 154.0       | H   | 49.0          | 19.9         | 17.9              | 43.5                 |
| 299.960000      | 38.5               | 1000.0          | 120.000         | 106.0       | H   | 36.0          | 21.5         | 7.6               | 46.0                 |
| 349.960000      | 38.3               | 1000.0          | 120.000         | 112.0       | H   | 125.0         | 22.6         | 7.7               | 46.0                 |



# 30-1000MHz Radiated Emission

## EUT Information

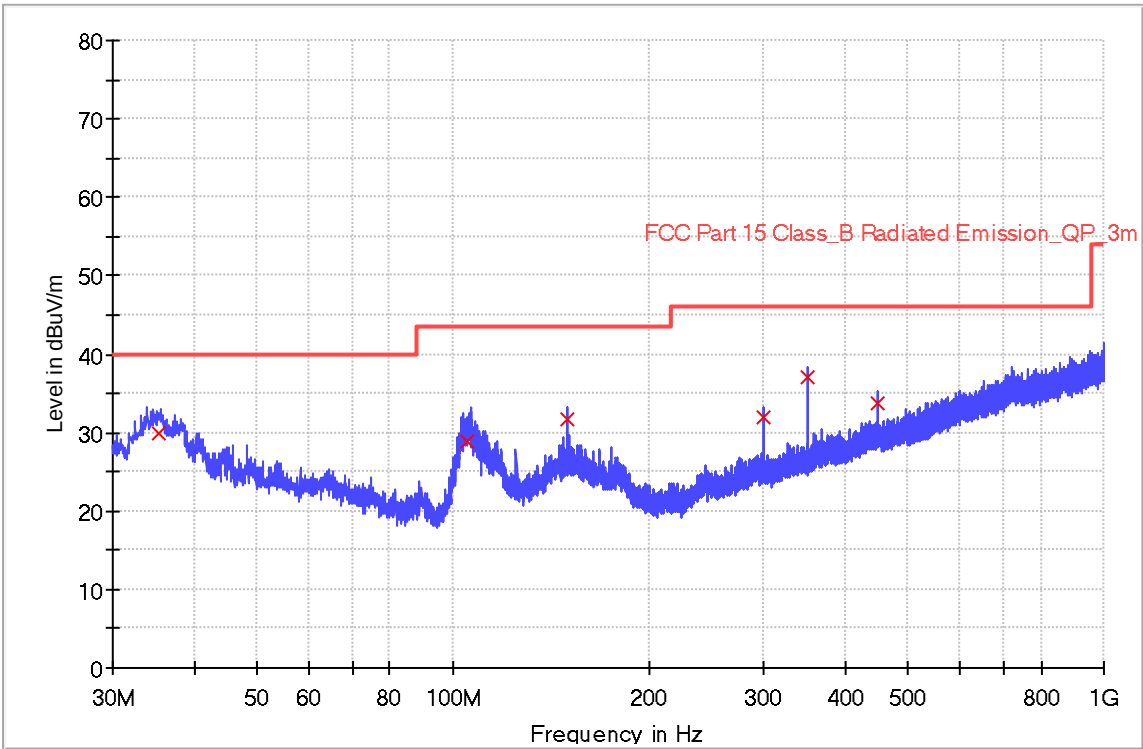
|            |                                                                |
|------------|----------------------------------------------------------------|
| EUT Name:  | Wireless Display                                               |
| Model:     | LKOUT P                                                        |
| Client:    | Fellowes Inc.                                                  |
| Op Cond:   | Power on, transmitting at 2402MHz, AC 120V/60Hz, T23.9, 47.4%, |
| Operator:  | Cheng Huali                                                    |
| Test Spec: | FCC Part 15.247                                                |
| Comment:   | Vertical                                                       |
| Sample No: | SHA-749413-2                                                   |

## Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

|                 |             |
|-----------------|-------------|
| Hardware Setup: | RE_VULB9168 |
| Receiver:       | [ESR 3]     |
| Level Unit:     | dBuV/m      |

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000



## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 35.200000       | 29.8               | 1000.0          | 120.000         | 112.0       | V   | 136.0         | 19.5         | 10.2              | 40.0                 |
| 104.880000      | 28.8               | 1000.0          | 120.000         | 103.0       | V   | 95.0          | 16.7         | 14.7              | 43.5                 |
| 150.000000      | 31.7               | 1000.0          | 120.000         | 132.0       | V   | 236.0         | 20.9         | 11.8              | 43.5                 |
| 300.000000      | 32.0               | 1000.0          | 120.000         | 123.0       | V   | 98.0          | 21.5         | 14.0              | 46.0                 |
| 350.000000      | 37.0               | 1000.0          | 120.000         | 165.0       | V   | 47.0          | 22.6         | 9.0               | 46.0                 |
| 450.000000      | 33.8               | 1000.0          | 120.000         | 145.0       | V   | 163.0         | 25.9         | 12.2              | 46.0                 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

## 11 Test Equipment List

List of Test Instruments  
Test Site1

|    | DESCRIPTION                          | MANUFACTURER       | MODEL NO. | SERIAL NO. | CAL. DATE | CAL. DUE DATE |
|----|--------------------------------------|--------------------|-----------|------------|-----------|---------------|
| C  | Signal spectrum analyzer             | Agilent            | N9020B    | MY59050168 | 2023-2-10 | 2024-2-9      |
|    | Wideband power sensor                | Rohde & Schwarz    | NRP-Z81   | 105903     | 2023-2-10 | 2024-2-9      |
|    | 10dB Attenuator                      | Aeroflex Weinschel | CG-4689   | 93459      | 2023-2-10 | 2024-2-9      |
| RE | EMI Test Receiver                    | Rohde & Schwarz    | ESR3      | 101906     | 2023-8-1  | 2024-7-31     |
|    | Signal Analyzer                      | Rohde & Schwarz    | FSV40     | 101091     | 2023-8-1  | 2024-7-31     |
|    | Trilog Super Broadband Test Antenna  | Schwarzbeck        | VULB 9168 | 961        | 2021-9-23 | 2024-9-22     |
|    | Double-ridged waveguide horn antenna | Rohde & Schwarz    | HF907     | 102868     | 2021-3-15 | 2024-3-14     |
|    | Pre-amplifier                        | Rohde & Schwarz    | SCU-18D   | 19006451   | 2023-8-1  | 2024-7-31     |
|    | Loop antenna                         | Rohde & Schwarz    | HFH2-Z2   | 100443     | 2023-6-15 | 2024-6-14     |
|    | Double Ridged Horn Antenna           | ETS-Lindgren       | 3116C     | 00246076   | 2023-7-7  | 2026-7-6      |
|    | 3m Semi-anechoic chamber             | TDK                | 9X6X6     | ----       | 2021-5-8  | 2024-5-7      |
| CE | EMI Test Receiver                    | Rohde & Schwarz    | ESR3      | 101907     | 2023-8-1  | 2024-7-31     |
|    | LISN                                 | Rohde & Schwarz    | ENV216    | 101924     | 2023-8-1  | 2024-7-31     |

| Measurement Software Information |          |                 |           |
|----------------------------------|----------|-----------------|-----------|
| Test Item                        | Software | Manufacturer    | Version   |
| C                                | MTS 8310 | MWRFTtest       | 2.0.0.0   |
| RE                               | EMC 32   | Rohde & Schwarz | V10.50.40 |
| CE                               | EMC 32   | Rohde & Schwarz | V9.15.03  |

### C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density\*
- Spurious RF conducted emissions
- Band edge

## 12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| Items                                    | Extended Uncertainty                                                                                                                |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Conducted Disturbance at Mains Terminals | 150kHz to 30MHz, LISN, 3.16dB                                                                                                       |
| Radiated Disturbance                     | 9kHz to 30MHz, 3.52dB<br>30MHz to 1GHz, 5.03dB (Horizontal)<br>5.12dB (Vertical)<br>1GHz to 18GHz, 5.49dB<br>18GHz to 40GHz, 5.63dB |
| RF Conducted Measurement                 | Power related: 1.16dB<br>Frequency related: $6.00 \times 10^{-8}$                                                                   |

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.



## 13 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

## 14 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----