

**FCC - TEST REPORT**

Report Number : **709502306225-00A** Date of Issue: January 22, 2024

Model : LKOUT P

Product Type : Wireless Display

Applicant : Fellowes Inc

Address : 1789 Norwood Avenue Itasca, IL 60143 United States

Production Facility : Fellowes Office Products(Suzhou) Co, Ltd

Address : 1# Shilin Road, Suzhou New & Hi-tech District,
215151 Suzhou, Jiangsu, People's Republic of China

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including
Appendices : 43



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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

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,
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FCC Registration No.: 820234

FCC Designation Number: CN1183

ISED CAB identifier CN0101

IC Registration No.: 31668



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 Bluetooth 4.2+BLE DHSS: GFSK For Wi-Fi: Direct Sequence Spread Spectrum (DSSS) for 802.11b 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 2. Bluetooth 4.2+BLE DHSS: 1Mbps 3. Wi-Fi: 11b 1 ~ 11Mbps, 11g/a 6 ~ 54Mbps, 11n HT20 6.5 ~ 72.2Mbps, 11n HT 40 13.5 ~ 150Mbps, 11ac VHT40 13.5 ~ 200Mbps, 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, antenna gain, or any information supplied.



5 Summary of Test Standards

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

Test Method:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

KDB 905462 D03 Client Without DFS New Rules v01r02

ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of
Unlicensed Wireless Devices



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	---	---	☒	☐	☐
§15.407(e)	Emission bandwidth	14-15	Site 1	☒	☐	☐
§15.407(a)	Maximum Conducted Output Power	16	Site 1	☒	☐	☐
§15.407(a)	Maximum Power Spectral Density	17-19	Site 1	☒	☐	☐
§15.407(g)	Frequencies Stability	20	Site 1	☒	☐	☐
§15.407(b)(1), §15.407(b)(4),	Spurious radiated emissions for transmitter	21-32	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Remark 1: The EUT only operation at 5G Wi-Fi 5180~5240 MHz (U-NII-1) and 5745~5825 MHz (U-NII-3).

Remark 2: N/A – Not Applicable. Conducted emission is not apply for battery operated device.

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

15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.



7 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: IDH-RMTDSPY complies with Section 15.207, 15.209, 15.407 of the FCC Part 15, Subpart E Rules.

This report is only for 5GHz Wi-Fi. The TX and RX range is 5180MHz-5240MHz, 5745MHz-5825MHz.

SUMMARY:

All tests according to the regulations cited on page 6 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:



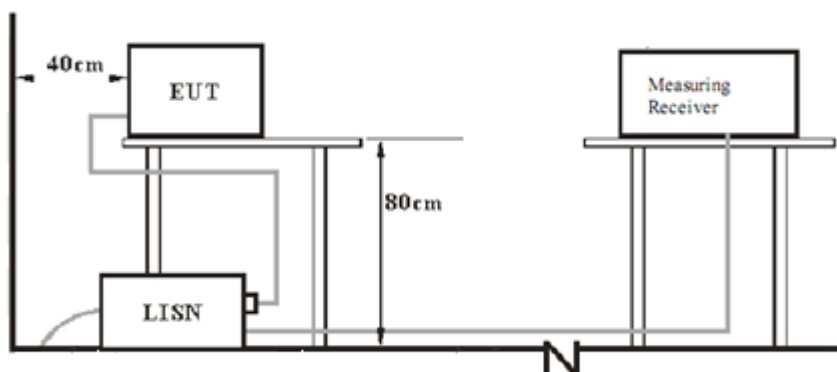
Hui TONG
Review Engineer

Jiaxi XU
Project Engineer

Cheng Huali
Test Engineer

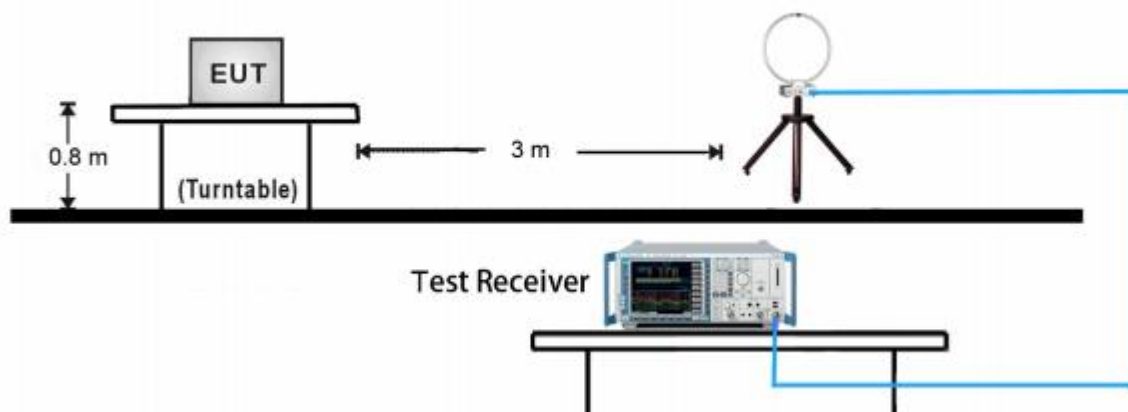
8 Test Setups

7.1 AC Power Line Conducted Emission test setups

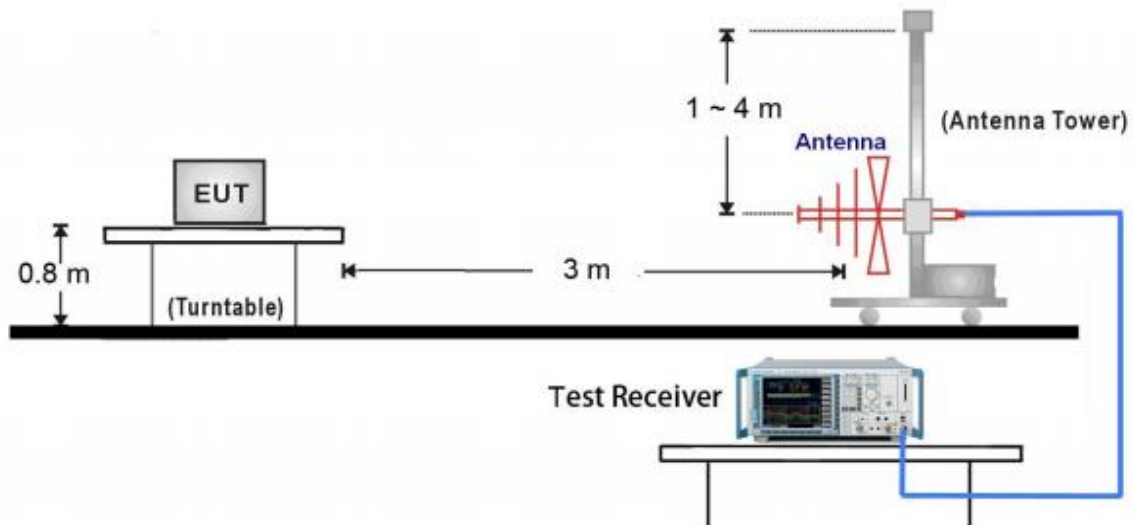


7.2 Radiated test setups

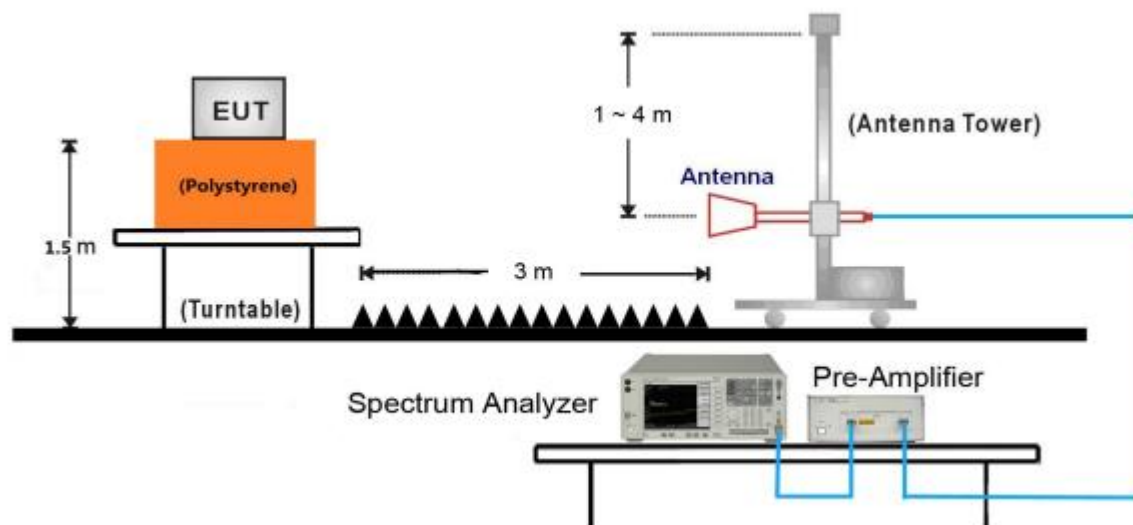
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:

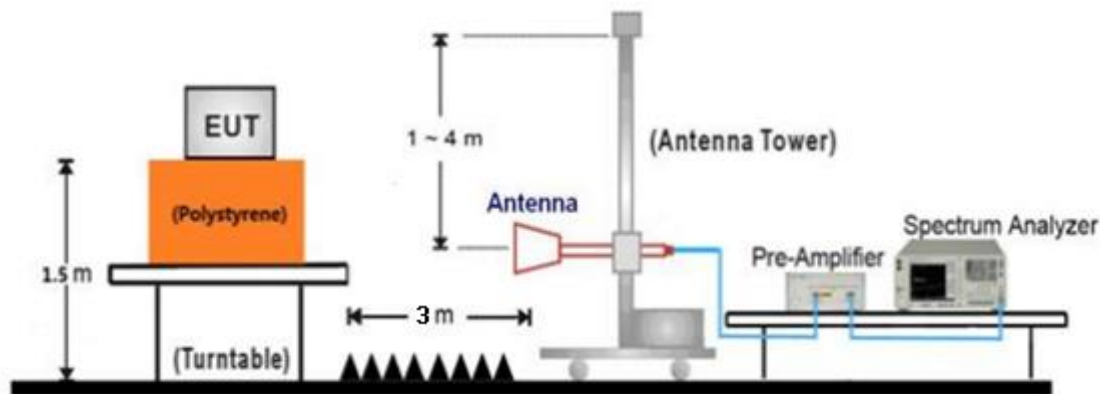


1GHz ~ 18GHz Test Setup:

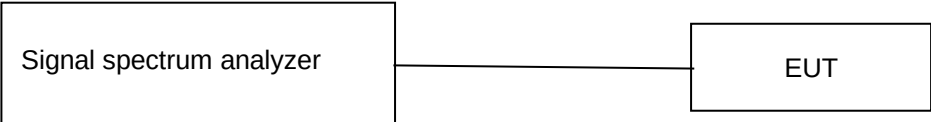




18GHz ~ 40GHz Test Setup:



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:

Test Mode	Channel	Index Value (Power level setting)	Frequency (MHz)
802.11a, 802.11n HT20 802.11ac20	36	41	5180
	44	41	5220
	48	41	5240
	149	47	5745
	157	47	5785
	165	47	5825
802.11n HT40 802.11ac40	38	41	5190
	46	41	5230
	151	47	5755
	159	47	5795
802.11ac80	42	41	5210
	155	47	5755

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Modulation Type	Data Rate
802.11a OFDM	6Mbps
802.11n (HT20): OFDM	MCS0 (6.5Mbps)
802.11n (HT20): OFDM	MCS0 (6.5Mbps)
802.11n (HT40): OFDM	MCS0 (13.5Mbps)
802.11ac (VHT20): OFDM	11ac 6.5Mbps (20MHz)
802.11ac (VHT40): OFDM	11ac13.5Mbps (40MHz)
802.11ac (VHT80): OFDM	11ac 29.3Mbps (80MHz)

10 Technical Requirement

10.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively

Limit

According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: “*” Decreasing linearly with logarithm of the frequency



Conducted Emission

150k-30MHz Conducted Emission Test

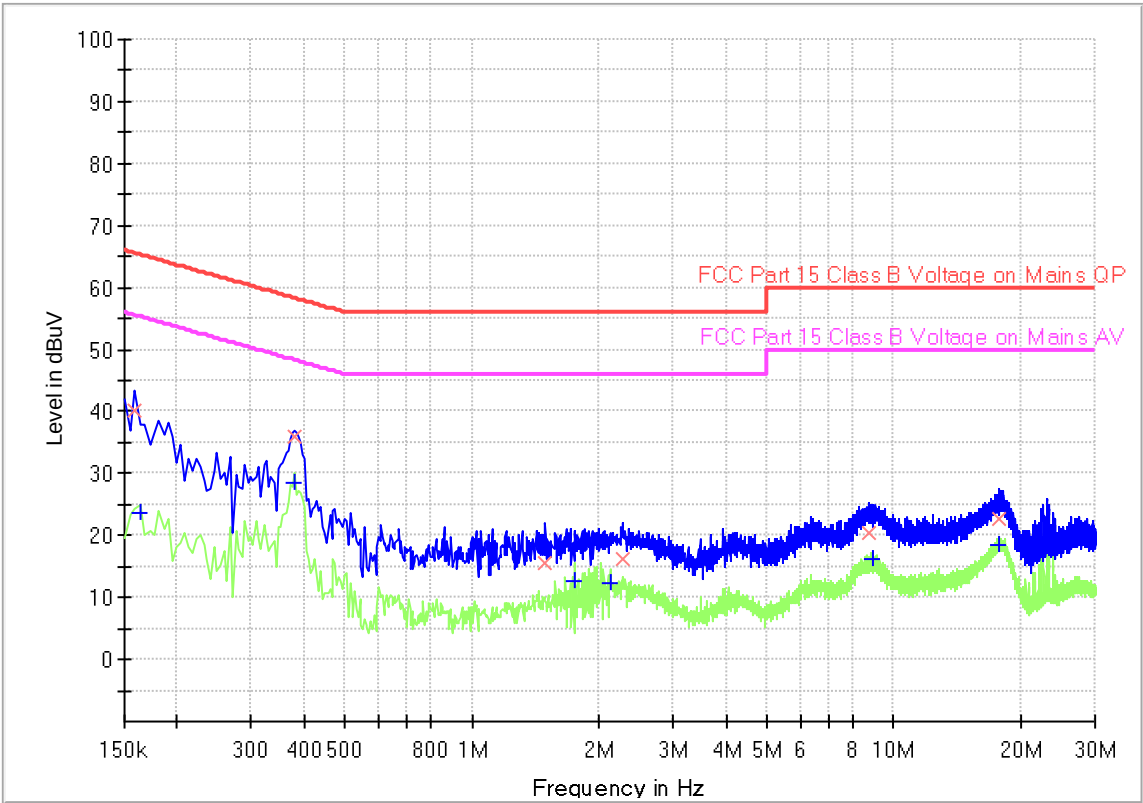
EUT Information

EUT Name:	Wireless Display
Model	LKOUT P
Client:	Fellowes Inc.
Op Cond	Power on, AC 120V/560Hz, T24.1, H39.1%, P102.5kPa
Operator:	Cheng Huali
Standard	FCC Part 15.407
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)
0.159000	40.06	---	65.52	25.46	1000.0	9.000	L1	19.4
0.163500	---	23.72	55.28	31.56	1000.0	9.000	L1	19.4
0.379500	---	28.63	48.29	19.66	1000.0	9.000	L1	19.5
0.379500	35.79	---	58.29	22.50	1000.0	9.000	L1	19.5
1.491000	15.52	---	56.00	40.48	1000.0	9.000	L1	19.5
1.756500	---	12.58	46.00	33.42	1000.0	9.000	L1	19.5
2.125500	---	12.32	46.00	33.68	1000.0	9.000	L1	19.5
2.274000	16.07	---	56.00	39.93	1000.0	9.000	L1	19.5
8.736000	20.55	---	60.00	39.45	1000.0	9.000	L1	19.8
8.911500	---	16.21	50.00	33.79	1000.0	9.000	L1	19.8
17.731500	---	18.51	50.00	31.49	1000.0	9.000	L1	20.2
17.736000	22.66	---	60.00	37.34	1000.0	9.000	L1	20.2

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)



150k-30MHz Conducted Emission Test

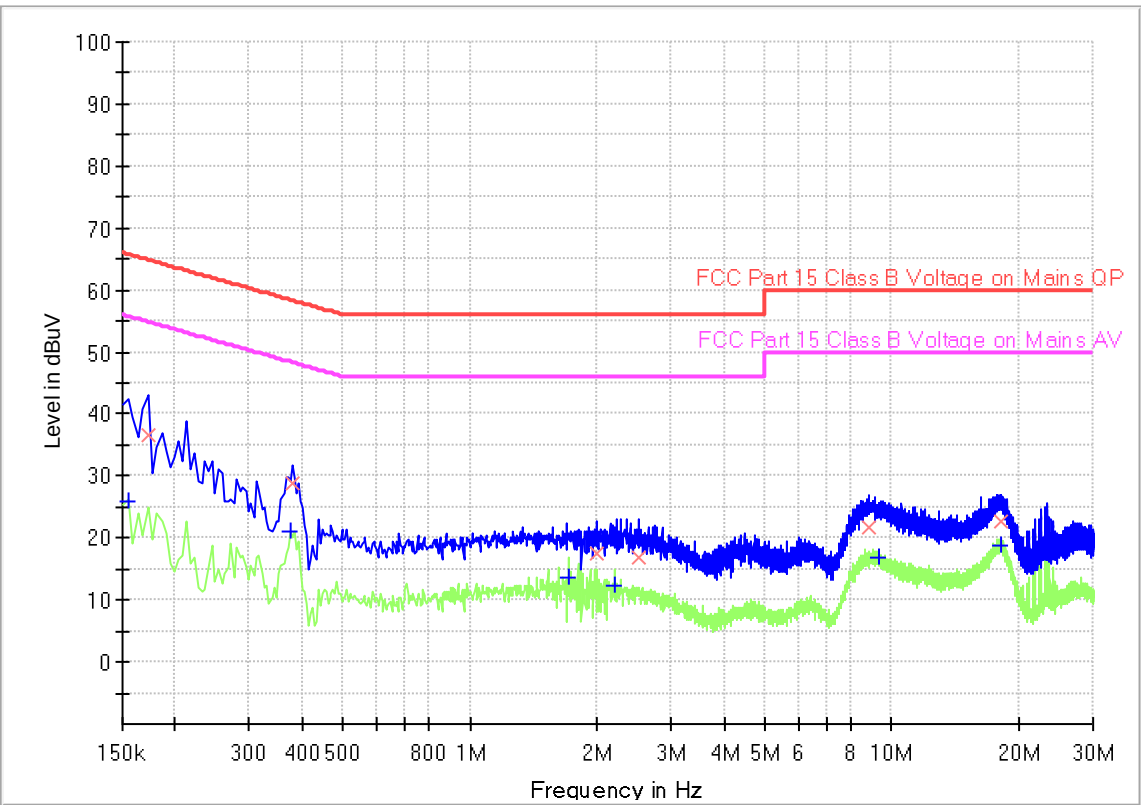
EUT Information

EUT Name:	Wireless Display
Model	LKOUT P
Client:	Fellowes Inc.
Op Cond	Power on, AC 120V/560Hz, T24.1, H39.1%, P102.5kPa
Operator:	Cheng Huali
Standard	FCC Part 15.407
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)
0.154500	---	26.04	55.75	29.71	1000.0	9.000	N	19.4
0.172500	36.67	---	64.84	28.17	1000.0	9.000	N	19.4
0.375000	---	20.90	48.39	27.49	1000.0	9.000	N	19.5
0.379500	28.97	---	58.29	29.32	1000.0	9.000	N	19.5
1.711500	---	13.73	46.00	32.27	1000.0	9.000	N	19.5
1.999500	17.58	---	56.00	38.42	1000.0	9.000	N	19.5
2.206500	---	12.19	46.00	33.81	1000.0	9.000	N	19.5
2.508000	16.97	---	56.00	39.03	1000.0	9.000	N	19.5
8.835000	21.84	---	60.00	38.16	1000.0	9.000	N	19.7
9.330000	---	16.72	50.00	33.28	1000.0	9.000	N	19.7
18.154500	---	18.81	50.00	31.19	1000.0	9.000	N	20.1
18.231000	22.70	---	60.00	37.30	1000.0	9.000	N	20.1

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

10.2 Emission bandwidth

1、 Test Method of 26dB Bandwidth

According to KDB789033 D02

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Limit: No limit

2、 Test Method of 6dB Bandwidth

According to KDB789033 D02

- a) Set RBW = 100KHz
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Limit: $\geq 500\text{KHz}$

3、 Test Method of 99% Bandwidth

According to KDB789033 D02

- a) Set center frequency to the nominal EUT channel center frequency
- b) Set span = 1.5 times to 5.0 times the OBW.
- c) Set RBW = 1 % to 5 % of the OBW
- d) Set VBW $\geq 3 \cdot \text{RBW}$
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99 % power bandwidth function of the instrument (if available).
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Limit: No limit

Test data should be referred to Appendix A for 709502306225-00A.

10.3 Maximum conducted output power

Test Method

According to C63.10, the EUT was placed on 0.8m height table, the RF output of EUT was connected to the test power meter by RF cable. The path loss was compensated to the results for each measurement.

1. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:

The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.

At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

2. If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in 12.2 in C63.10-2020.
3. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
4. Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25%).

Limits:

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Test data should be referred to Appendix A for 709502306225-00A.

10.4 Maximum power spectral density

Test Method

Test Method (Method SA-2 in C63.10-2020)

The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement. (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. Measure the duty cycle.
2. Set span to encompass the entire emission bandwidth (EBW) of the signal.
3. Set RBW = 1 MHz.
4. Set VBW $\geq$ 3 MHz.
5. Number of points in sweep $\geq$ 2 Span / RBW.
6. Sweep time = auto.
7. Detector = RMS
8. Trace average at least 100 traces in power averaging mode.
9. Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.

Limit:

The maximum power spectral density shall not exceed 11dBm for the 5.15-5.25GHz, 5.25-5.35GHz, 5.47-5.725 GHz Band in any 1 megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500kHz band.

Test data should be referred to Appendix A for 709502306225-00A.



10.5 Frequencies Stability

Test Method

1. Connect the UUT to the spectrum analyzer
2. Set Centre Frequency of the channel under test.
3. Set Detector PEAK
4. Set RBW: 10KHz, VBW: 3RBW
5. Set Span: Encompass the entire emissions bandwidth (EBW) of the signal.
6. Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value and the extreme temperature is -30°C to 50°C

Limit: 20ppm



Test result as below table:

Condition	Mode	Frequency (MHz)	Antenna	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
-30°C, 102V	a	5180	Ant1	-29299	-5.65617761	20	Pass
-30°C, 138V	a	5180	Ant1	-25672	-4.95598456	20	Pass
20°C, 120V	a	5180	Ant1	-28680	-5.53667954	20	Pass
50°C, 102V	a	5180	Ant1	-26614	-5.11807692	20	Pass
50°C, 138V	a	5180	Ant1	-25891	-4.97903846	20	Pass
-30°C, 102V	a	5200	Ant1	-20805	-4.00096154	20	Pass
-30°C, 138V	a	5200	Ant1	-29166	-5.56603053	20	Pass
20°C, 120V	a	5200	Ant1	-29909	-5.70782443	20	Pass
50°C, 102V	a	5200	Ant1	-27933	-5.33072519	20	Pass
50°C, 138V	a	5200	Ant1	-27112	-5.15437262	20	Pass
-30°C, 102V	a	5240	Ant1	-23567	-4.48041825	20	Pass
-30°C, 138V	a	5240	Ant1	-26013	-4.94543726	20	Pass
20°C, 120V	a	5240	Ant1	-29315	-5.55208333	20	Pass
50°C, 102V	a	5240	Ant1	-23203	-4.39450758	20	Pass
50°C, 138V	a	5240	Ant1	-23713	-4.49109848	20	Pass
-30°C, 102V	a	5745	Ant1	-26728	-5.02406015	20	Pass
-30°C, 138V	a	5745	Ant1	-27799	-5.22537594	20	Pass
20°C, 120V	a	5745	Ant1	-27826	-5.23045113	20	Pass
50°C, 102V	a	5745	Ant1	-28043	-5.09872727	20	Pass
50°C, 138V	a	5745	Ant1	-27972	-5.08581818	20	Pass
-30°C, 102V	a	5785	Ant1	-27673	-5.03145455	20	Pass
-30°C, 138V	a	5785	Ant1	-22713	-4.05589286	20	Pass
20°C, 120V	a	5785	Ant1	-21404	-3.82214286	20	Pass
50°C, 102V	a	5785	Ant1	-28026	-5.00464286	20	Pass
50°C, 138V	a	5785	Ant1	-24665	-4.32719298	20	Pass
-30°C, 102V	a	5825	Ant1	-26818	-4.70491228	20	Pass
-30°C, 138V	a	5825	Ant1	-20249	-3.55245614	20	Pass
20°C, 120V	a	5825	Ant1	-26362	-4.60874126	20	Pass
50°C, 102V	a	5825	Ant1	-27638	-4.83181818	20	Pass
50°C, 138V	a	5825	Ant1	-27167	-4.74947552	20	Pass



Condition	Mode	Frequency (MHz)	Antenna	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
-30°C, 102V	n20	5180	Ant1	-25644	-4.95057915	20	Pass
-30°C, 138V	n20	5180	Ant1	-21497	-4.15	20	Pass
20°C, 120V	n20	5180	Ant1	-20132	-3.88648649	20	Pass
50°C, 102V	n20	5180	Ant1	-27872	-5.36	20	Pass
50°C, 138V	n20	5180	Ant1	-21293	-4.09480769	20	Pass
-30°C, 102V	n20	5200	Ant1	-21671	-4.1675	20	Pass
-30°C, 138V	n20	5200	Ant1	-28814	-5.49885496	20	Pass
20°C, 120V	n20	5200	Ant1	-24022	-4.58435115	20	Pass
50°C, 102V	n20	5200	Ant1	-22317	-4.25896947	20	Pass
50°C, 138V	n20	5200	Ant1	-27822	-5.28935361	20	Pass
-30°C, 102V	n20	5240	Ant1	-27931	-5.31007605	20	Pass
-30°C, 138V	n20	5240	Ant1	-29789	-5.66330798	20	Pass
20°C, 120V	n20	5240	Ant1	-24781	-4.69337121	20	Pass
50°C, 102V	n20	5240	Ant1	-21463	-4.06496212	20	Pass
50°C, 138V	n20	5240	Ant1	-27172	-5.14621212	20	Pass
-30°C, 102V	n20	5745	Ant1	-26952	-5.06616541	20	Pass
-30°C, 138V	n20	5745	Ant1	-28722	-5.39887218	20	Pass
20°C, 120V	n20	5745	Ant1	-20004	-3.76015038	20	Pass
50°C, 102V	n20	5745	Ant1	-28740	-5.22545455	20	Pass
50°C, 138V	n20	5745	Ant1	-20206	-3.67381818	20	Pass
-30°C, 102V	n20	5785	Ant1	-25278	-4.596	20	Pass
-30°C, 138V	n20	5785	Ant1	-22827	-4.07625	20	Pass
20°C, 120V	n20	5785	Ant1	-26093	-4.65946429	20	Pass
50°C, 102V	n20	5785	Ant1	-25196	-4.49928571	20	Pass
50°C, 138V	n20	5785	Ant1	-21217	-3.7222807	20	Pass
-30°C, 102V	n20	5825	Ant1	-29158	-5.1154386	20	Pass
-30°C, 138V	n20	5825	Ant1	-20394	-3.57789474	20	Pass
20°C, 120V	n20	5825	Ant1	-25060	-4.38111888	20	Pass
50°C, 102V	n20	5825	Ant1	-22597	-3.95052448	20	Pass
50°C, 138V	n20	5825	Ant1	-23975	-4.19143357	20	Pass
-30°C, 102V	n40	5190	Ant1	-25045	-4.70770677	20	Pass
-30°C, 138V	n40	5190	Ant1	-21236	-3.86109091	20	Pass
20°C, 120V	n40	5190	Ant1	-25360	-4.61090909	20	Pass
50°C, 102V	n40	5190	Ant1	-20591	-3.74381818	20	Pass
50°C, 138V	n40	5190	Ant1	-26342	-4.70392857	20	Pass
-30°C, 102V	n40	5230	Ant1	-24659	-4.40339286	20	Pass
-30°C, 138V	n40	5230	Ant1	-29547	-5.27625	20	Pass
20°C, 120V	n40	5230	Ant1	-25099	-4.40333333	20	Pass
50°C, 102V	n40	5230	Ant1	-26542	-4.65649123	20	Pass
50°C, 138V	n40	5230	Ant1	-28473	-4.99526316	20	Pass
-30°C, 102V	n40	5755	Ant1	-23056	-4.03076923	20	Pass
-30°C, 138V	n40	5755	Ant1	-24238	-4.23741259	20	Pass
20°C, 120V	n40	5755	Ant1	-20091	-3.51241259	20	Pass
50°C, 102V	n40	5755	Ant1	-27247	-4.74273281	20	Pass
50°C, 138V	n40	5755	Ant1	-28474	-4.95630983	20	Pass
-30°C, 102V	n40	5795	Ant1	-25045	-4.70770677	20	Pass
-30°C, 138V	n40	5795	Ant1	-21236	-3.86109091	20	Pass
20°C, 120V	n40	5795	Ant1	-25360	-4.61090909	20	Pass
50°C, 102V	n40	5795	Ant1	-20591	-3.74381818	20	Pass
50°C, 138V	n40	5795	Ant1	-26342	-4.70392857	20	Pass



Condition	Mode	Frequency (MHz)	Antenna	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
-30°C, 102V	ac20	5180	Ant1	-25644	-4.95057915	20	Pass
-30°C, 138V	ac20	5180	Ant1	-21497	-4.15	20	Pass
20°C, 120V	ac20	5180	Ant1	-20132	-3.88648649	20	Pass
50°C, 102V	ac20	5180	Ant1	-27872	-5.36	20	Pass
50°C, 138V	ac20	5180	Ant1	-21293	-4.09480769	20	Pass
-30°C, 102V	ac20	5200	Ant1	-21671	-4.1675	20	Pass
-30°C, 138V	ac20	5200	Ant1	-28814	-5.49885496	20	Pass
20°C, 120V	ac20	5200	Ant1	-24022	-4.58435115	20	Pass
50°C, 102V	ac20	5200	Ant1	-22317	-4.25896947	20	Pass
50°C, 138V	ac20	5200	Ant1	-27822	-5.28935361	20	Pass
-30°C, 102V	ac20	5240	Ant1	-27931	-5.31007605	20	Pass
-30°C, 138V	ac20	5240	Ant1	-29789	-5.66330798	20	Pass
20°C, 120V	ac20	5240	Ant1	-24781	-4.69337121	20	Pass
50°C, 102V	ac20	5240	Ant1	-21463	-4.06496212	20	Pass
50°C, 138V	ac20	5240	Ant1	-27172	-5.14621212	20	Pass
-30°C, 102V	ac20	5745	Ant1	-26952	-5.06616541	20	Pass
-30°C, 138V	ac20	5745	Ant1	-28722	-5.39887218	20	Pass
20°C, 120V	ac20	5745	Ant1	-20004	-3.76015038	20	Pass
50°C, 102V	ac20	5745	Ant1	-28740	-5.22545455	20	Pass
50°C, 138V	ac20	5745	Ant1	-20206	-3.67381818	20	Pass
-30°C, 102V	ac20	5785	Ant1	-25278	-4.596	20	Pass
-30°C, 138V	ac20	5785	Ant1	-22827	-4.07625	20	Pass
20°C, 120V	ac20	5785	Ant1	-26093	-4.65946429	20	Pass
50°C, 102V	ac20	5785	Ant1	-25196	-4.49928571	20	Pass
50°C, 138V	ac20	5785	Ant1	-21217	-3.7222807	20	Pass
-30°C, 102V	ac20	5825	Ant1	-29158	-5.1154386	20	Pass
-30°C, 138V	ac20	5825	Ant1	-20394	-3.57789474	20	Pass
20°C, 120V	ac20	5825	Ant1	-25060	-4.38111888	20	Pass
50°C, 102V	ac20	5825	Ant1	-22597	-3.95052448	20	Pass
50°C, 138V	ac20	5825	Ant1	-23975	-4.19143357	20	Pass
-30°C, 102V	ac40	5190	Ant1	-25045	-4.70770677	20	Pass
-30°C, 138V	ac40	5190	Ant1	-21236	-3.86109091	20	Pass
20°C, 120V	ac40	5190	Ant1	-25360	-4.61090909	20	Pass
50°C, 102V	ac40	5190	Ant1	-20591	-3.74381818	20	Pass
50°C, 138V	ac40	5190	Ant1	-26342	-4.70392857	20	Pass
-30°C, 102V	ac40	5230	Ant1	-24659	-4.40339286	20	Pass
-30°C, 138V	ac40	5230	Ant1	-29547	-5.27625	20	Pass
20°C, 120V	ac40	5230	Ant1	-25099	-4.40333333	20	Pass
50°C, 102V	ac40	5230	Ant1	-26542	-4.65649123	20	Pass
50°C, 138V	ac40	5230	Ant1	-28473	-4.99526316	20	Pass
-30°C, 102V	ac40	5755	Ant1	-23056	-4.03076923	20	Pass
-30°C, 138V	ac40	5755	Ant1	-24238	-4.23741259	20	Pass
20°C, 120V	ac40	5755	Ant1	-20091	-3.51241259	20	Pass
50°C, 102V	ac40	5755	Ant1	-27247	-4.74273281	20	Pass
50°C, 138V	ac40	5755	Ant1	-28474	-4.95630983	20	Pass
-30°C, 102V	ac40	5795	Ant1	-25045	-4.70770677	20	Pass
-30°C, 138V	ac40	5795	Ant1	-21236	-3.86109091	20	Pass
20°C, 120V	ac40	5795	Ant1	-25360	-4.61090909	20	Pass
50°C, 102V	ac40	5795	Ant1	-20591	-3.74381818	20	Pass
50°C, 138V	ac40	5795	Ant1	-26342	-4.70392857	20	Pass
-30°C, 102V	ac80	5210	Ant1	-22702	-4.04670232	20	Pass
-30°C, 138V	ac80	5210	Ant1	-26279	-4.68431373	20	Pass
20°C, 120V	ac80	5210	Ant1	-22929	-4.08716578	20	Pass
50°C, 102V	ac80	5210	Ant1	-27284	-4.79507909	20	Pass
50°C, 138V	ac80	5210	Ant1	-26155	-4.59666081	20	Pass
-30°C, 102V	ac80	5775	Ant1	-26713	-4.69472759	20	Pass
-30°C, 138V	ac80	5775	Ant1	-27275	-4.72294372	20	Pass
20°C, 120V	ac80	5775	Ant1	-25620	-4.43636364	20	Pass
50°C, 102V	ac80	5775	Ant1	-29978	-5.19099567	20	Pass
50°C, 138V	ac80	5775	Ant1	-22702	-4.04670232	20	Pass

10.6 Spurious radiated emissions for transmitter

Transmitting spurious emission test result as below:

Test Method:

Radiated Mode:

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 3meter 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
5. Use the following spectrum analyzer settings According to C63.10:
 - 1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - 2) For Above 1GHz:
Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - 3) Procedures for Average Unwanted Emissions Measurements above 1000 MHz
 - a) RBW = 1 MHz.
 - b) VBW $\geq$ [3 $\times$ RBW].
 - c) Detector = Power averaging (rms), if [span / (# 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.

(2) 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. 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.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBuV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

According to part 15.407b (1) (2) (3) (4),

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

According to part 15.407b (9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

According to part 15.407b (10), the provisions of §15.205 and apply to intentional radiators operating under this section.

Note: According to C63.10, the Conversion Factors between E[dBuV/m] and EIRP[dBm] as below: $E[dBuV/m] = EIRP[dBm] + 95.2$, for $d = 3$ meters.

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.

Radiated Mode:

Pre-scan with all band and only the worst case listed in the report.

Worst case: 802.11a, 802.11n(HT40), 802.11ac(VHT80)

Transmitting spurious emission worse case test result as below:

Transmitting spurious emission test result as below:

802.11a Modulation 5180MHz Test Result

Frequency Range MHz	Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Margin dB	Detector	Result
1000-7000	5066.30*	47.50	Horizontal	74.00	26.50	PK	Pass
1000-7000	5053.35*	47.97	Vertical	74.00	26.03	PK	Pass
7000-40000	10356**	50.81	Horizontal	68.20	17.39	PK	Pass
7000-40000	10356**	47.11	Vertical	68.20	21.09	PK	Pass

802.11a Modulation 5200MHz Test Result

Frequency Range MHz	Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Margin dB	Detector	Result
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	10397**	51.87	Horizontal	68.20	16.33	PK	Pass
7000-40000	10397**	47.36	Vertical	68.20	20.84	PK	Pass

802.11a Modulation 5240MHz Test Result

Frequency Range MHz	Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Margin dB	Detector	Result
1000-7000	5351.00*	46.82	Horizontal	74.00	27.18	PK	Pass
1000-7000	5353.48*	47.19	Vertical	74.00	26.81	PK	Pass
7000-40000	10482**	50.64	Horizontal	68.20	17.56	PK	Pass
7000-40000	10482**	47.03	Vertical	68.20	21.17	PK	Pass

802.11a Modulation 5745MHz Test Result

Frequency Range MHz	Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Margin dB	Detector	Result
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11487*	51.59	Horizontal	74.00	22.41	PK	Pass
7000-40000	11487*	48.32	Vertical	74.00	25.68	PK	Pass

802.11a Modulation 5785MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11570*	53.37	Horizontal	74.00	20.63	PK	Pass
7000-40000	11570*	46.40	Horizontal	54.00	7.60	AV	Pass
7000-40000	11570*	48.59	Vertical	74.00	25.41	PK	Pass

802.11a Modulation 5825MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11648*	58.49	Horizontal	74.00	15.51	PK	Pass
7000-40000	11648*	51.40	Horizontal	54.00	2.60	AV	Pass
7000-40000	11655*	48.32	Vertical	74.00	25.68	PK	Pass

802.11n(HT40) Modulation 5190MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	5150*	47.78	Horizontal	74.00	26.22	PK	Pass
1000-7000	5150*	46.65	Vertical	74.00	27.35	PK	Pass
7000-40000	10378**	52.11	Horizontal	68.20	16.09	PK	Pass
7000-40000	10378**	46.89	Vertical	68.20	21.31	PK	Pass

802.11n(HT40) Modulation 5230MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	5423*	47.96	Horizontal	74.00	26.04	PK	Pass
1000-7000	5424*	49.21	Vertical	74.00	24.79	PK	Pass
7000-40000	10460**	50.94	Horizontal	68.20	17.26	PK	Pass
7000-40000	10460**	48.10	Vertical	68.20	20.1	PK	Pass

802.11n(HT40) Modulation 5755MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11512*	49.89	Horizontal	74.00	24.11	PK	Pass
7000-40000	11513*	48.28	Vertical	74.00	25.72	PK	Pass

802.11n(HT40) Modulation 5795MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11602*	54.23	Horizontal	74.00	19.77	PK	Pass
7000-40000	11602*	47.40	Horizontal	54.00	6.6	AV	Pass
7000-40000	11582*	48.24	Vertical	74.00	25.76	PK	Pass

802.11ac(VHT80)Modulation 5210MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	5140*	48.78	Horizontal	74.00	25.22	PK	Pass
1000-7000	5358*	46.30	Horizontal	74.00	27.7	PK	Pass
1000-7000	4991*	47.53	Vertical	74.00	26.47	PK	Pass
1000-7000	5367*	47.61	Vertical	74.00	26.39	PK	Pass
7000-40000	10420**	48.61	Horizontal	68.20	19.59	PK	Pass
7000-40000	10420**	47.67	Vertical	68.20	20.53	PK	Pass

802.11ac(VHT80)Modulation 5755MHz Test Result

Frequency Range	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	MHz	dBuV/m		dBuV/m	dB		
1000-7000	--	--	Horizontal	68.20	--	PK	Pass
1000-7000	--	--	Vertical	68.20	--	PK	Pass
7000-40000	11551*	49.58	Horizontal	74.00	24.42	PK	Pass
7000-40000	11551*	47.53	Vertical	74.00	26.47	PK	Pass

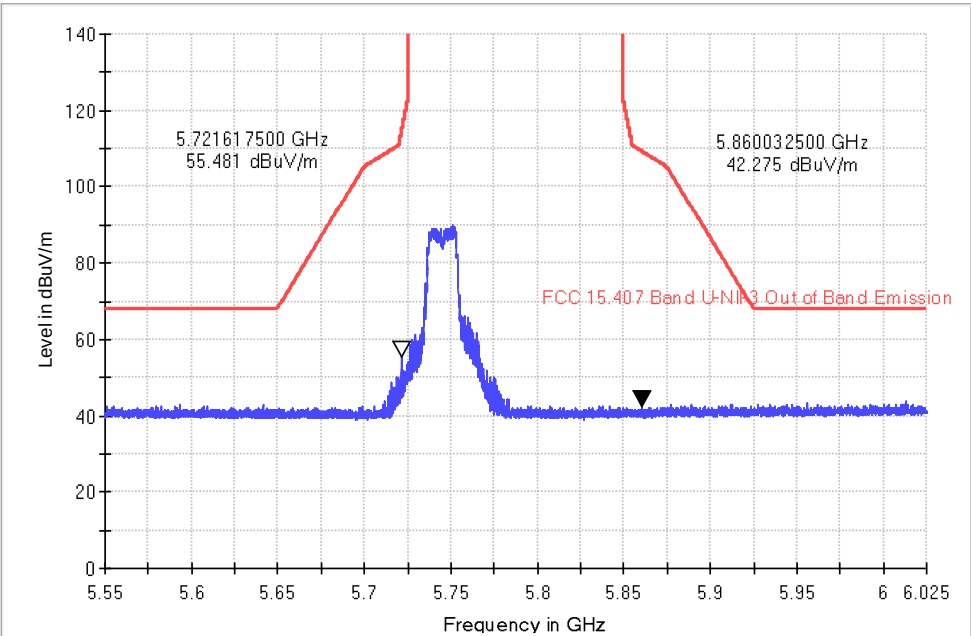
Remark:

- (1) Above 1GHz Corrector factor= Antenna Factor +Cable Loss - Amp. Factor.
- (2) Below 1GHz Corrector factor= Antenna Factor +Cable Loss.
- (3) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (4) "**" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBuV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.
- (5) We test all modes and only the worst case for each bandwidth recorded in the report.
- (6) Testing is carried out with frequency rang 30MHz to 40GHz, which data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (7) The Low frequency, which start from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



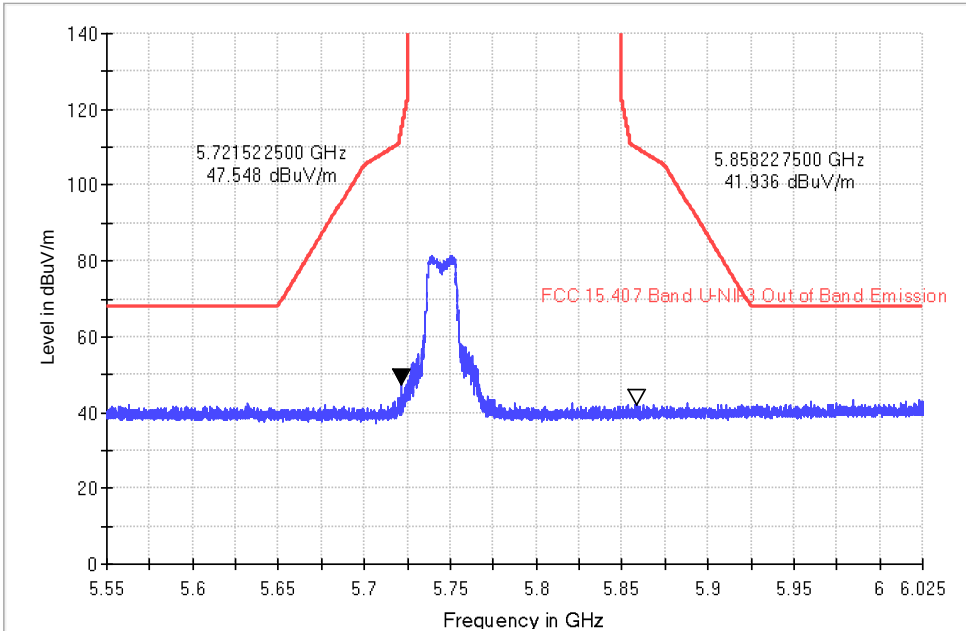
Out of Band Emission
802.11a: CH 5745MHz
Horizontal

FCC 15.407 U-NII Out of Band Emission



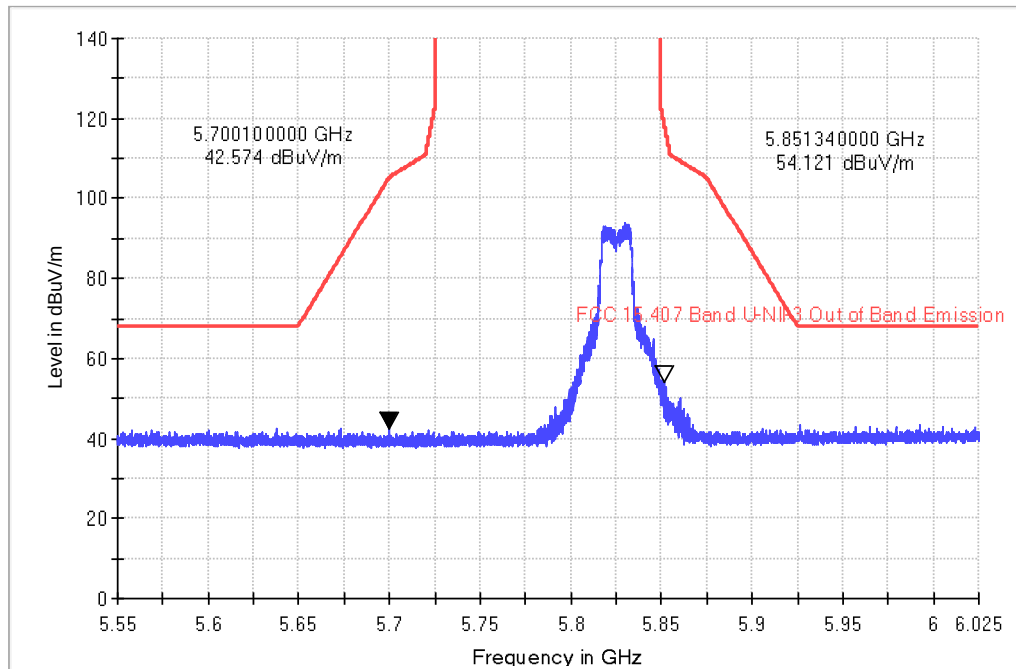
Vertical

FCC 15.407 U-NII Out of Band Emission

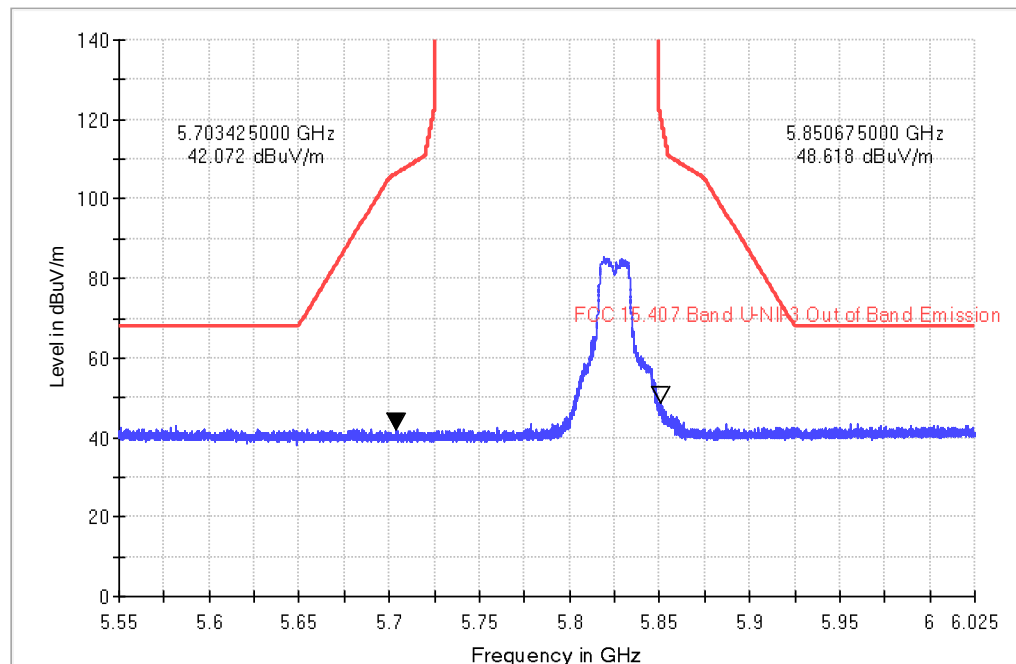


**802.11a: CH 5825MHz
Horizontal**

FCC 15.407 U-NII Out of Band Emission

**Vertical**

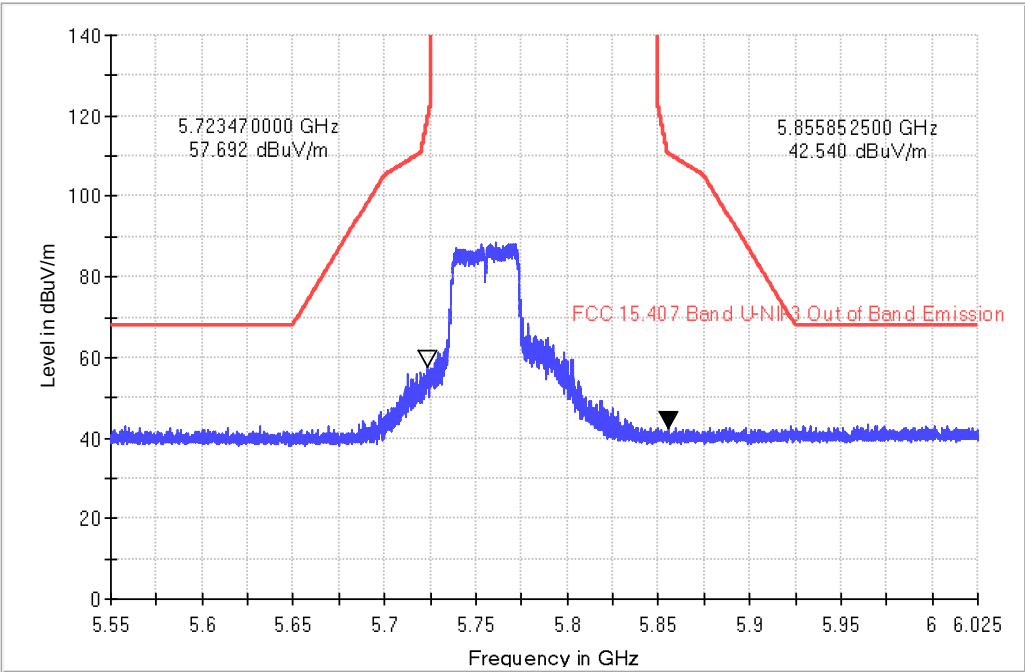
FCC 15.407 U-NII Out of Band Emission





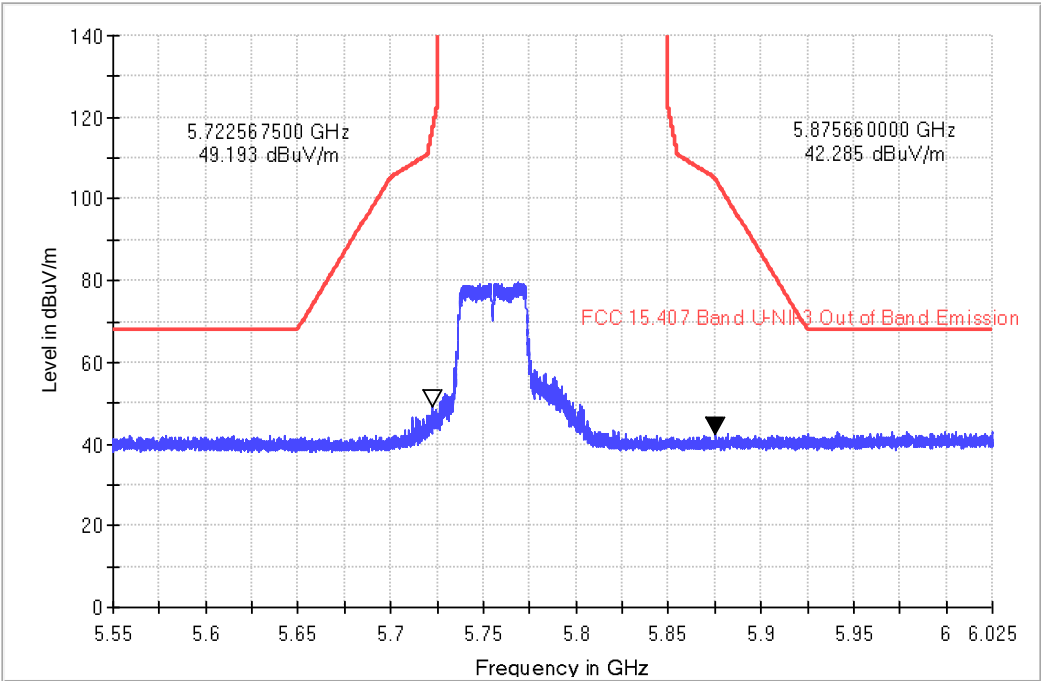
802.11n(HT40):CH 5755
Horizontal

FCC 15.407 U-NII Out of Band Emission



Vertical

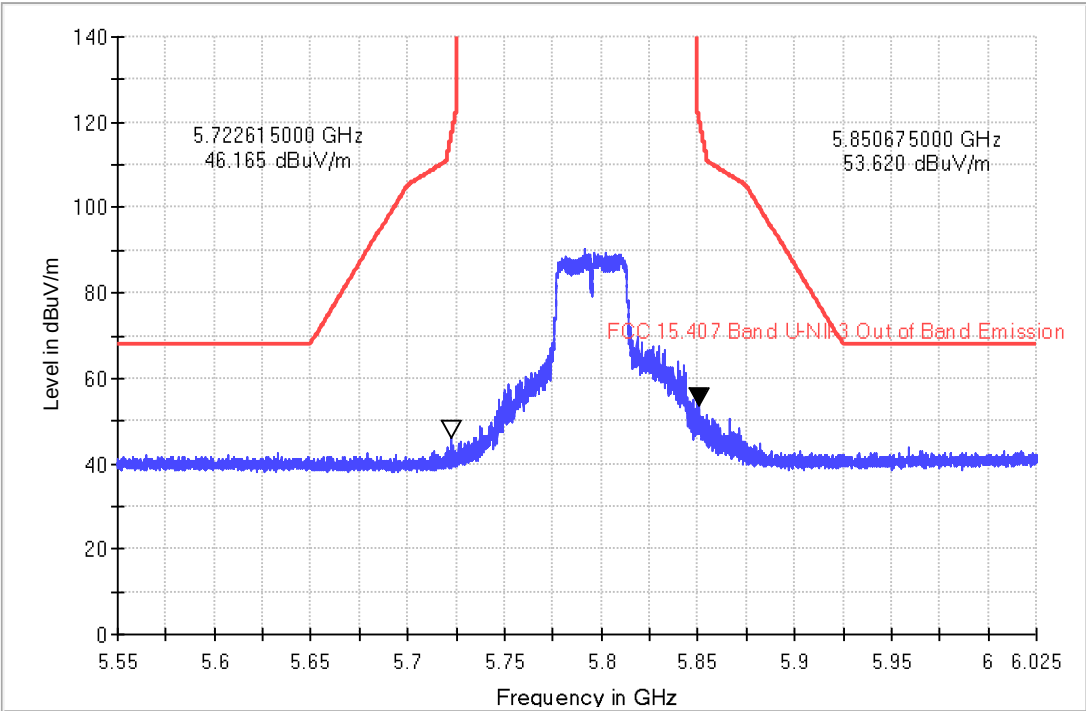
FCC 15.407 U-NII Out of Band Emission





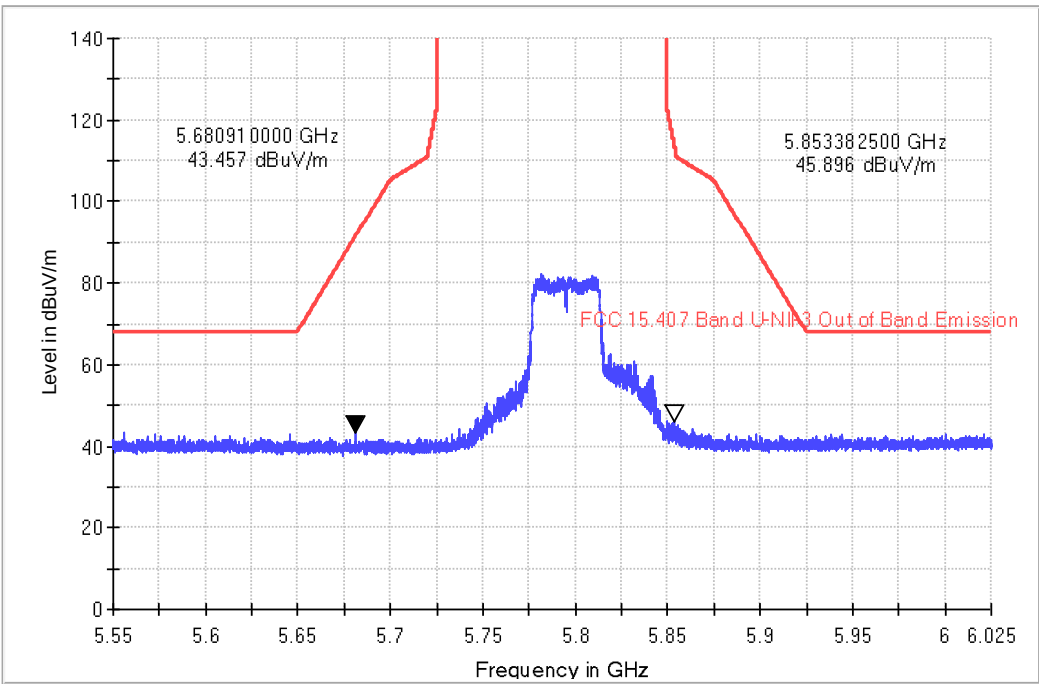
802.11n(HT40):CH 5795
Horizontal

FCC 15.407 U-NII Out of Band Emission



Vertical

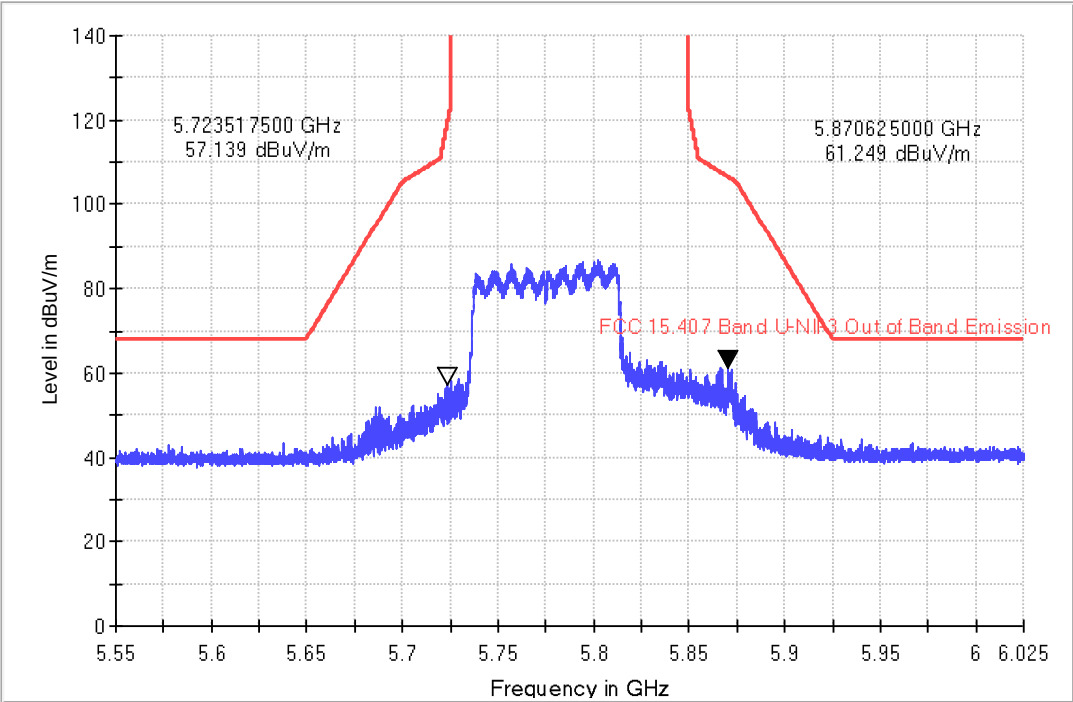
FCC 15.407 U-NII Out of Band Emission





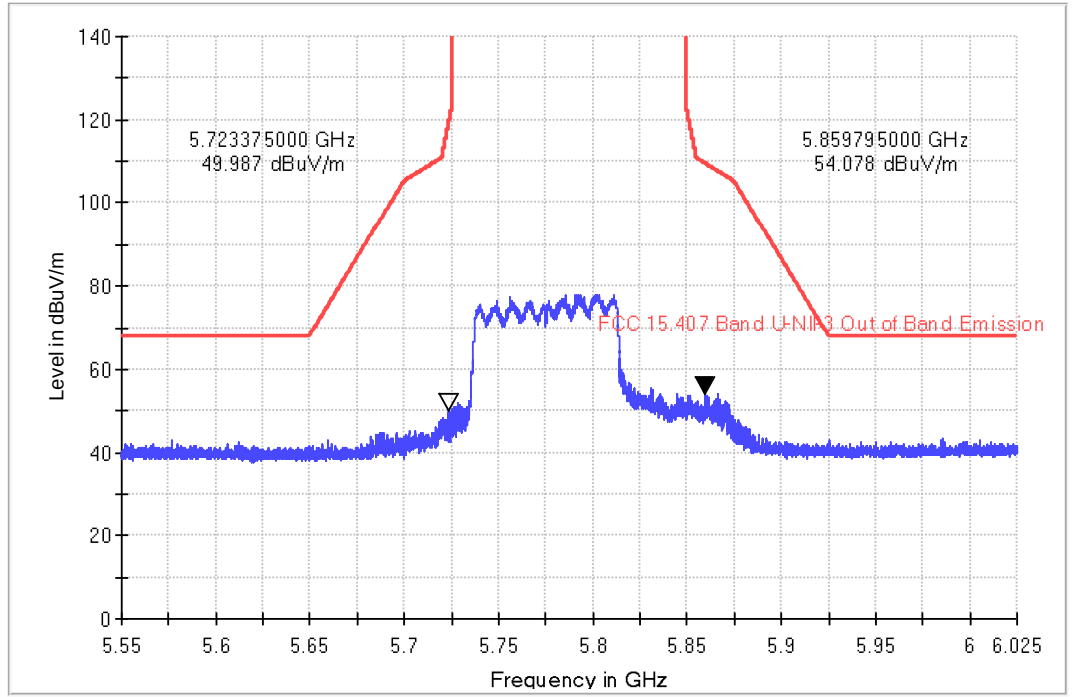
802.11ac(VHT80):CH 5755
Horizontal

FCC 15.407 U-NII Out of Band Emission



Vertical

FCC 15.407 U-NII Out of Band Emission





The worst case of Radiated Emission below 1GHz:

30-1000MHz Radiated Emission

EUT Information

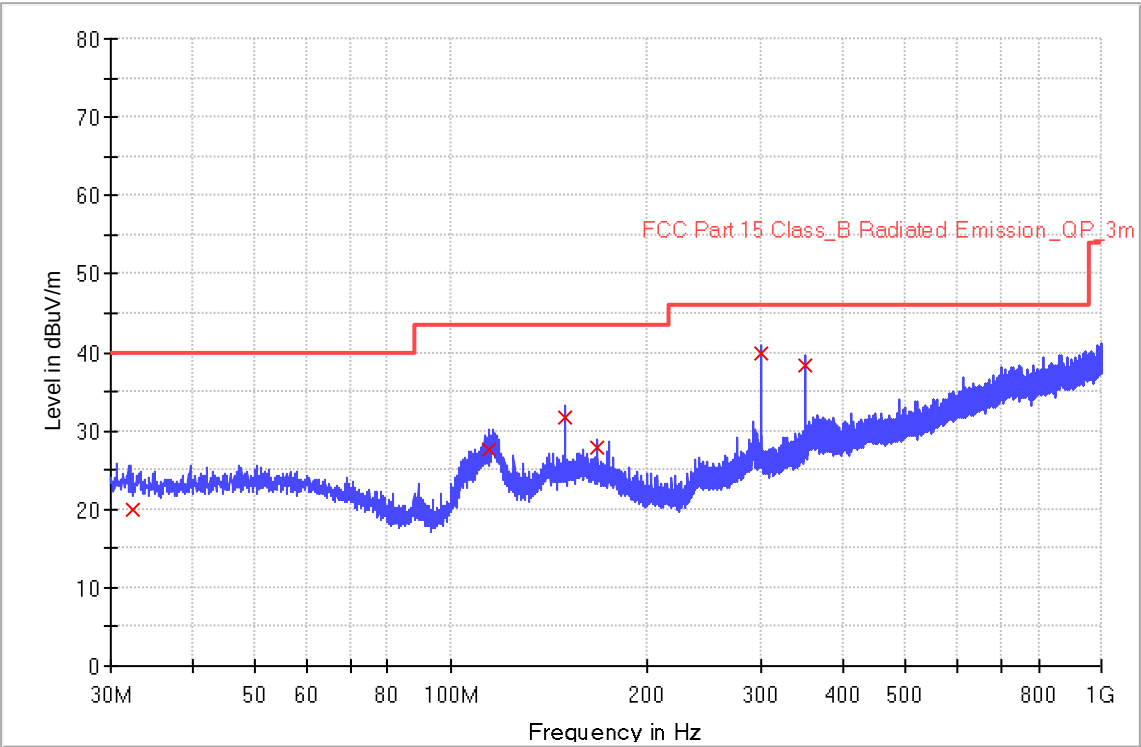
EUT Name:	Wireless Display
Model:	LKOUT P
Client:	Fellowes Inc.
Op Cond:	Power on, transmitting at 802.11a_5180MHz, AC 120V/60Hz, T23.9, 47.4%, P102.5kPa
Operator:	Cheng Huali
Test Spec:	FCC Part 15.209(a)
Comment:	Horizontal
Sample No:	SHA-749413-2

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)
32.480000	19.8	1000.0	120.000	132.0	H	358.0	19.4	20.2	40.0
114.640000	27.6	1000.0	120.000	201.0	H	49.0	17.7	15.9	43.5
150.000000	31.8	1000.0	120.000	186.0	H	105.0	20.9	11.7	43.5
168.000000	27.8	1000.0	120.000	114.0	H	229.0	20.4	15.7	43.5
300.000000	39.9	1000.0	120.000	112.0	H	56.0	21.5	6.1	46.0
350.000000	38.4	1000.0	120.000	105.0	H	236.0	22.6	7.6	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.



30-1000MHz Radiated Emission

EUT Information

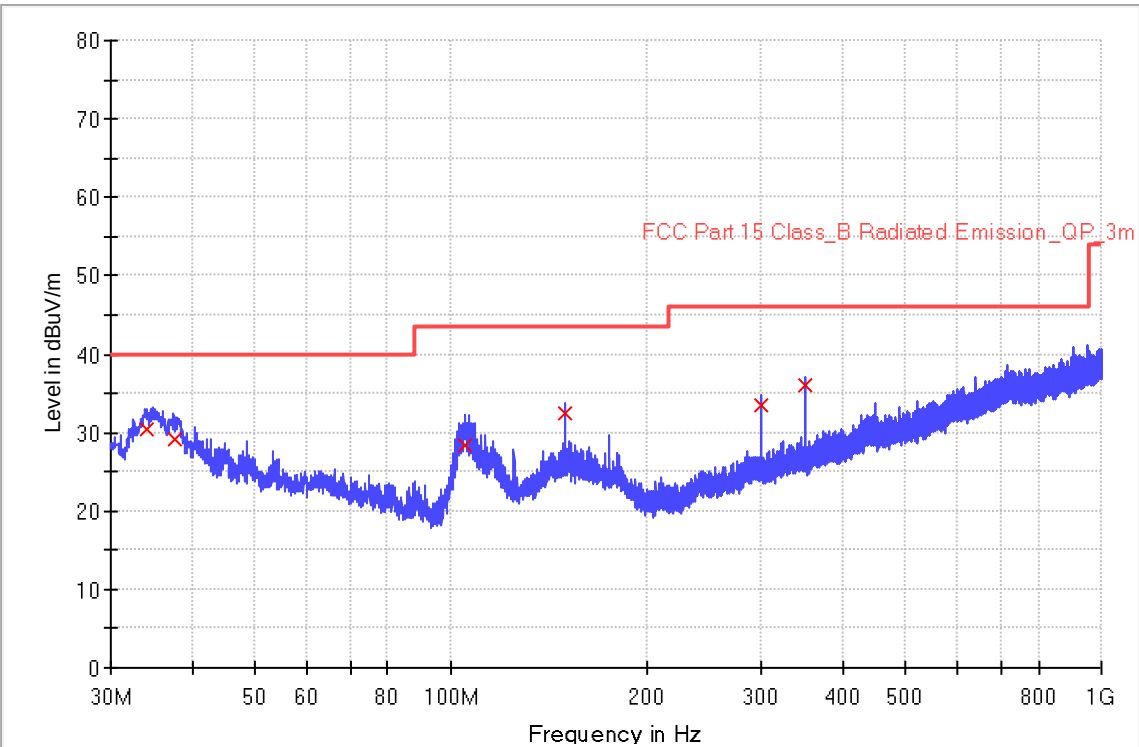
EUT Name: Wireless Display
Model: LKOUT P
Client: Fellowes Inc.
Op Cond: Power on, transmitting at 802.11a_5180MHz, AC 120V/60Hz, T23.9, 47.4%, P102.5kPa
Operator: Cheng Huali
Test Spec: FCC Part 15.209(a)
Comment: Vertical
Sample No: SHA-749413-2

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)
34.040000	30.5	1000.0	120.000	105.0	V	117.0	19.4	9.5	40.0
37.520000	29.2	1000.0	120.000	114.0	V	314.0	19.7	10.8	40.0
105.080000	28.3	1000.0	120.000	123.0	V	201.0	16.7	15.2	43.5
150.000000	32.4	1000.0	120.000	198.0	V	169.0	20.9	11.1	43.5
300.000000	33.5	1000.0	120.000	178.0	V	152.0	21.5	12.5	46.0
350.000000	36.1	1000.0	120.000	184.0	V	32.0	22.6	9.9	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. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2024-7-31
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2024-7-31
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2024-7-31
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2024-9-22
	Horn Antenna	Rohde & Schwarz	HF907	102393	2024-3-14
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2024-7-31
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2024-6-14
	Double Ridged Horn Antenna	ETS-Lindgren	3116C	00246076	2026-7-6
	3m Semi-anechoic chamber	TDK	9X6X6	----	2024-5-7
CE	EMI Test Receiver	Rohde & Schwarz	ESR3	101907	2024-7-31
	LISN	Rohde & Schwarz	ENV216	101924	2024-7-31
Measurement Software Information					
Test Item	Software	Manufacturer	Version		
C	MTS 8310	MWRFTest	3.0.0.0		
RE	EMC 32	Rohde & Schwarz	V10.50.40		
CE	EMC 32	Rohde & Schwarz	V9.15.03		

C - Conducted RF tests

- Conducted peak output power
- 26/6dB bandwidth, 99% Occupied Bandwidth
- Power spectral density*
- Frequencies Stability

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 30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical) 1GHz to 18GHz, 5.49dB 18GHz to 40GHz, 5.63dB
RF Conducted Measurement	Power related: 1.16dB Frequency related: 6.00×10^{-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-----