

TEST REPORT

Product Name : PilotPano Panoramic Camera

Brand Mark : Labpano Model No. : PIP221 Extension Model : PIP221+

Report Number : BLA-EMC-202207-A1504

FCC ID : 2ARZ2 -PIP221

Date of Sample Receipt : 2022/8/1

Date of Test : 2022/8/1 to 2022/9/5

Date of Issue : 2022/9/5

Test Standard : 47 CFR Part 15, Subpart C 15.247

Test Result : Pass

Prepared for:

Shenzhen Pisoftware Technology Co., Ltd.
C11-B, TCL International E City, 1001 Zhongshanyuan Road, Nanshan
District, Shenzhen City, 518057, P.R.China

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District,
Shenzhen, Guangdong Province, China

TEL: +86-755-23059481

Compiled by: Charlie

Approved by: Blue Thong

Review by:

Services (Shenzher)

Date:

2022/9/5





Page 2 of 138

REPORT REVISE RECORD

Version No. Date		Description
00	2022/9/5	Original





TABLE OF CONTENTS

1	TES	ST SUMMARY	5
2	GE	NERAL INFORMATION	6
3	GE	NERAL DESCRIPTION OF E.U.T	6
4	TES	ST ENVIRONMENT	7
5	TES	ST MODE	7
6	ME	ASUREMENT UNCERTAINTY	7
7		SCRIPTION OF SUPPORT UNIT	
8		BORATORY LOCATION	
9		ST INSTRUMENTS LIST	
		TENNA REQUIREMENT	
10) AN		
	10.1	CONCLUSION	
11	I RA	DIATED SPURIOUS EMISSIONS	13
	11.1	LIMITS	
	11.2	BLOCK DIAGRAM OF TEST SETUP	14
	11.3	PROCEDURE	
	11.4	TEST DATA	16
12	2 RA	DIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	24
	12.1	LIMITS	24
	12.2	BLOCK DIAGRAM OF TEST SETUP	25
	12.3	PROCEDURE	25
	12.4	TEST DATA	27
13	з со	NDUCTED SPURIOUS EMISSIONS	31
	13.1	LIMITS	31
	13.2	BLOCK DIAGRAM OF TEST SETUP	31
	13.3	TEST DATA	32
14	ь со	NDUCTED BAND EDGES MEASUREMENT	33
	14.1	LIMITS	33
	14.2	BLOCK DIAGRAM OF TEST SETUP	33
	14.3	TEST DATA	34



٦,	 	 ٠	 	٠.				
			Page	4	0	f 1	38	į

15	MIN	MUM 6DB BANDWIDTH	35
1	5.1	LIMITS	35
1	.5.2	BLOCK DIAGRAM OF TEST SETUP	35
1	.5.3	TEST DATA	35
16	POV	VER SPECTRUM DENSITY	36
1	6.1	LIMITS	36
1	6.2	BLOCK DIAGRAM OF TEST SETUP	36
	.6.3	TEST DATA	
17	CON	IDUCTED PEAK OUTPUT POWER	37
1	7.1	LIMITS	37
1	7.2	BLOCK DIAGRAM OF TEST SETUP	37
1	7.3	TEST DATA	38
18	CON	IDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	39
1	8.1	LIMITS	30
_	.8.2	BLOCK DIAGRAM OF TEST SETUP	
1	.8.3	PROCEDURE	
1	.8.4	TEST DATA	41
19	APP	ENDIX	43
		X A: PHOTOGRAPHS OF TEST SETUP	
ΔΡΙ	PENDI	X B: PHOTOGRAPHS OF EUT	139
		// Bit it viv to viv u it vi to vi t	



Page 5 of 138

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(1) & 15.247(b)(3)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass



Page 6 of 138

2 GENERAL INFORMATION

Applicant	Shenzhen Pisoftware Technology Co., Ltd.
Address	C11-B, TCL International E City, 1001 Zhongshanyuan Road,,Nanshan District, Shenzhen City, 518057, P.R.China
Manufacturer	Shenzhen Pisoftware Technology Co., Ltd.
Address	C11-B, TCL International E City, 1001 Zhongshanyuan Road, Nanshan District, Shenzhen City, 518057, P.R.China
Factory	SHENZHEN AONI ELECTRONIC CO,LTD
Address	2F、3F、6F、7F、The half laye of 8F、9F,Honghui Industrial Park,2nd Liuxian Road,Xinan street,Baoan District,Shenzhen
Product Name	PilotPano Panoramic Camera
Test Model No.	PIP221
Extension Model	PIP221+
Remark	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are model name for commercial purpose.

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	N/A
10101011	
Software Version	N/A
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel Spacing:	5MHz
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):7
Antenna Type:	FPC Antenna
Antenna Gain:	Antenna 1:0.5dBi, Antenna 2:0.5dBi(Provided by the applicant)
Note:	Antenna number: 2 SISO mode: 802.11b/802.11g MIMO mode: 802.11n(HT20)/ 802.11n(HT40) Directional gain of MIMO mode:0.5+10log2=3.51dBi
Remark:The Antenna Gain is	supplied by the customer.BlueAsia is not responsible for this data



Page 7 of 138

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	3.8Vdc

5 TEST MODE

TEST MODE	MODE TEST MODE DESCRIPTION				
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (The duty cycle is greater than 98%)				
Remark: 802.11b/g/n(HT20) and 802.11n(HT40) all have been tested, During the radiated spurious					
emission test, 802 11b/11g/11nH20/11nH40 modulations all have been tested only worse case 802 11b					

emission test, 802.11b/11g/11nH20/11nH40 modulations all have been tested, only worse case 802.11b is reported.

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)		
Radiated Emission(9kHz-30MHz)	±4.34dB		
Radiated Emission(30Mz-1000MHz)	±4.24dB		
Radiated Emission(1GHz-18GHz)	±4.68dB		
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB		



Page 8 of 138

7 DESCRIPTION OF SUPPORT UNIT

Device Type Manufacturer		Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

No tests were sub-contracted.



Page 9 of 138

9 TEST INSTRUMENTS LIST

Test Equipment Of Power Spectrum Density						
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due	
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022	
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022	
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022	
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022	

Test Equipment Of Conducted Peak Output Power					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due	
Shield room	SKET	833	N/A	25/11/2020	24/11/2023	
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022	
LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022	
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022	
EMI software	EZ	EZ-EMC	N/A	N/A	N/A	

Test Equipment Of	Antenna Require	ment			
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due



Page 10 of 138

Test Equipment Of	Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	Model S/N		Cal.Due	
Chamber	Chamber SKET		N/A	10/11/2020	9/11/2023	
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022	
Receiver	R&S	ESR7 101199		24/9/2021	23/9/2022	
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022	
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022	
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022	
EMI software	EZ	EZ-EMC	N/A	N/A	N/A	
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022	

Test Equipment Of	Test Equipment Of Radiated Emissions which fall in the restricted bands						
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due		
Chamber	SKET	966	N/A	10/11/2020	9/11/2023		
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022		
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022		
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022		
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022		
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022		
EMI software	EZ	EZ-EMC	N/A	N/A	N/A		
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022		



Page 11 of 138

Test Equipment Of Conducted Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of	Test Equipment Of Conducted Band Edges Measurement						
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due		
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022		
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022		
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022		
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022		

Test Equipment Of	Test Equipment Of Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due	
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022	
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022	
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022	
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022	



Page 12 of 138

10 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

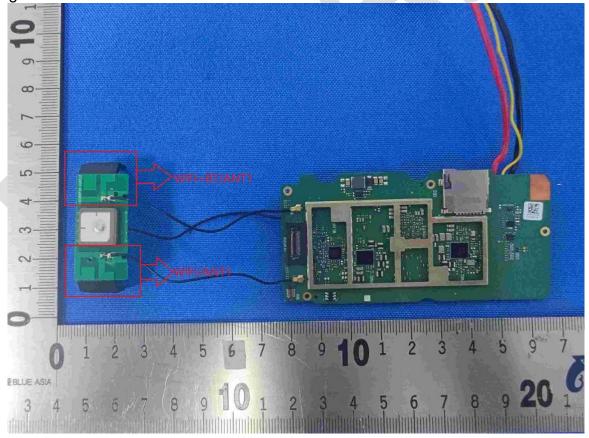
10.1 CONCLUSION

Standard 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.5dBi.





Page 13 of 138

11 RADIATED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25℃
Humidity	60%

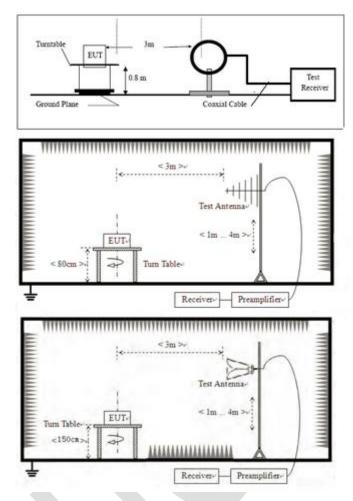
11.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



Page 15 of 138

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

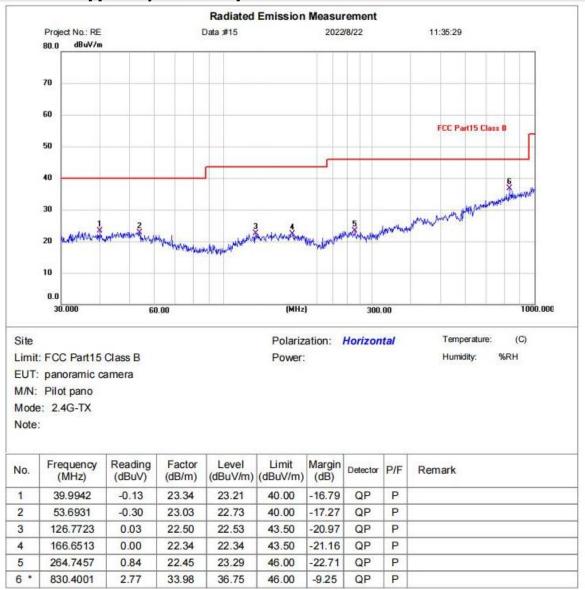
- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
- Final Test Level = Receiver Reading + Antenna Factor + Cable Factor Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



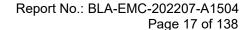
11.4 TEST DATA

Below 1GHz

[TestMode: TX];[Polarity: Horizontal]

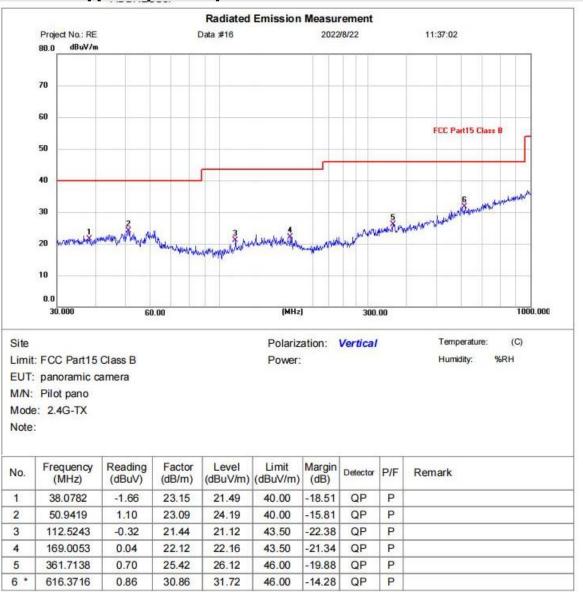


^{*:}Maximum data x:Over limit !:over margin

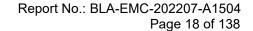




[TestMode: TX];[Polarity: Vertical]



^{*:}Maximum data x:Over limit !:over margin



Temperature:

Humidity:

(C)

%RH



Above 1GHz

[TestMode: TX lowest channel]; [Polarity: Horizontal]

Radiated Emission Measurement Project No.: RE Data :#35 2022/7/29 9:52:42 dBuV/m FCC Part15 (PK) 70 60 50 40 30 20 10 1000.000 2175.00 3350.00 4525.00 5700.00 (MHz) 8050.00 9225.00 10400.00 11575.00 12750.00

Polarization: Horizontal

Limit: FCC Part15 (PK)

EUT: panoramic camera

M/N: Pilot pano

Mode: 2.4G WIFI B TX-L

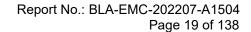
Note:

Site

Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
	2412.000	42.22	-0.96	41.26	74.00	-32.74	peak		
	3796.500	41.83	7.65	49.48	74.00	-24.52	peak		
	4824.000	39.39	3.62	43.01	74.00	-30.99	peak		
	7326.000	40.65	6.44	47.09	74.00	-26.91	peak		
	9648.000	38.15	9.37	47.52	74.00	-26.48	peak		
*	11316.500	38.59	11.88	50.47	74.00	-23.53	peak		
		MHz 2412.000 3796.500 4824.000 7326.000	Mk. Freq. Level MHz dBuV 2412.000 42.22 3796.500 41.83 4824.000 39.39 7326.000 40.65 9648.000 38.15	Mk. Freq. Level Factor MHz dBuV dB/m 2412.000 42.22 -0.96 3796.500 41.83 7.65 4824.000 39.39 3.62 7326.000 40.65 6.44 9648.000 38.15 9.37	Mk. Freq. Level Factor ment MHz dBuV dB/m dBuV/m 2412.000 42.22 -0.96 41.26 3796.500 41.83 7.65 49.48 4824.000 39.39 3.62 43.01 7326.000 40.65 6.44 47.09 9648.000 38.15 9.37 47.52	Mk. Freq. Level Factor ment Limit MHz dBuV dB/m dBuV/m dBu	Mk. Freq. Level Factor ment Limit Over MHz dBuV dB/m dBuV/m dBuV/m dB 2412.000 42.22 -0.96 41.26 74.00 -32.74 3796.500 41.83 7.65 49.48 74.00 -24.52 4824.000 39.39 3.62 43.01 74.00 -30.99 7326.000 40.65 6.44 47.09 74.00 -26.91 9648.000 38.15 9.37 47.52 74.00 -26.48	Mk. Freq. Level Factor ment Limit Over MHz dBuV dBuV dBuV/m dBuV/m dBuV/m dB Detector 2412.000 42.22 -0.96 41.26 74.00 -32.74 peak 3796.500 41.83 7.65 49.48 74.00 -24.52 peak 4824.000 39.39 3.62 43.01 74.00 -30.99 peak 7326.000 40.65 6.44 47.09 74.00 -26.91 peak 9648.000 38.15 9.37 47.52 74.00 -26.48 peak	Mk. Freq. Level Factor ment Limit Over MHz dBuV dBl/m dBuV/m dBuV/m dB Detector Comment 2412.000 42.22 -0.96 41.26 74.00 -32.74 peak 3796.500 41.83 7.65 49.48 74.00 -24.52 peak 4824.000 39.39 3.62 43.01 74.00 -30.99 peak 7326.000 40.65 6.44 47.09 74.00 -26.91 peak 9648.000 38.15 9.37 47.52 74.00 -26.48 peak

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



10400.00 11575.00 12750.00

(C)

%RH

Temperature:

Humidity:

9225.00



[TestMode: TX lowest channel]; [Polarity: Vertical]

Radiated Emission Measurement Project No.: RE Data :#36 2022/7/29 9:56:07 dBuV/m 80.0 FCC Part15 (PK) 70 60 FCC Part 15 (AV) 50 40 30 20 10 0.0

Polarization: Vertical

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

1000.000 2175.00

3350.00

4525.00

5700.00

M/N: Pilot pano

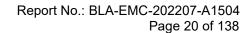
Mode: 2.4G WIFI B TX-L

Note:

No.	No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2412.000	41.36	-0.96	40.40	74.00	-33.60	peak		
2		3655.500	41.79	7.76	49.55	74.00	-24.45	peak		
3		4824.000	38.92	3.62	42.54	74.00	-31.46	peak		
4		7326.000	39.31	6.44	45.75	74.00	-28.25	peak		
5		9648.000	38.27	9.37	47.64	74.00	-26.36	peak		
6	*	11387.000	39.60	11.78	51.38	74.00	-22.62	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



10400.00 11575.00 12750.00

(C)

%RH

Temperature:

Humidity:



[TestMode: TX middle channel]; [Polarity: Horizontal]

3350.00

4525.00

5700.00

8050.00

Polarization: Horizontal

9225.00

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

1000.000 2175.00

M/N: Pilot pano

0.0

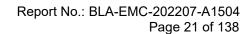
Mode: 2.4G WIFI B TX-M

Note:

No. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1	2437.000	41.41	-1.07	40.34	74.00	-33.66	peak		
2	3820.000	42.21	7.41	49.62	74.00	-24.38	peak		
3	4874.000	41.00	3.39	44.39	74.00	-29.61	peak		
4	7311.000	39.62	6.37	45.99	74.00	-28.01	peak		
5	9748.000	37.38	9.59	46.97	74.00	-27.03	peak		
6 *	11739.500	39.72	11.70	51.42	74.00	-22.58	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



Temperature:

Humidity:

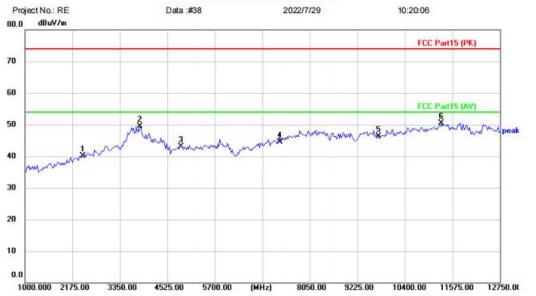
(C)

%RH



[TestMode: TX middle channel]; [Polarity: Vertical]

Radiated Emission Measurement



Polarization: Vertical

Limit: FCC Part15 (PK)

EUT: panoramic camera

M/N: Pilot pano

Mode: 2.4G WIFI B TX-M

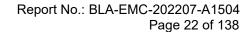
Note:

Site

No.	lo. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2437.000	41.19	-1.07	40.12	74.00	-33.88	peak		
2		3843.500	42.35	7.12	49.47	74.00	-24.53	peak		
3		4874.000	39.74	3.39	43.13	74.00	-30.87	peak		
4		7311.000	38.06	6.37	44.43	74.00	-29.57	peak		
5		9748.000	36.65	9.59	46.24	74.00	-27.76	peak		
6	*	11293.000	38.64	11.91	50.55	74.00	-23.45	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



Temperature:

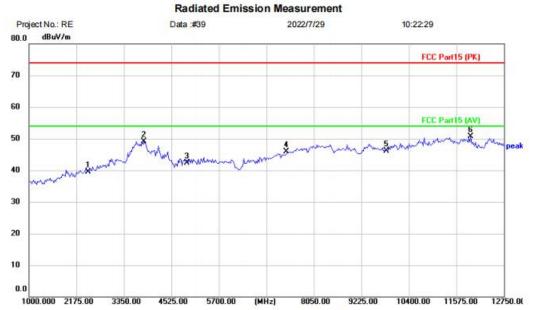
Humidity:

(C)

%RH



[TestMode: TX highest channel]; [Polarity: Vertical]



Polarization: Vertical

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

M/N: Pilot pano

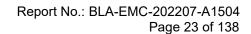
Mode: 2.4G WIFI B TX-H

Note:

No. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1	2462.000	40.73	-1.18	39.55	74.00	-34.45	peak		
2	3843.500	42.07	7.12	49.19	74.00	-24.81	peak		
3	4924.000	38.85	3.46	42.31	74.00	-31.69	peak		
4	7386.000	39.23	6.68	45.91	74.00	-28.09	peak		
5	9848.000	36.26	9.88	46.14	74.00	-27.86	peak		
6 *	11927.500	39.22	11.39	50.61	74.00	-23.39	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



10400.00 11575.00 12750.00

(C)

%RH

Temperature:

Humidity:

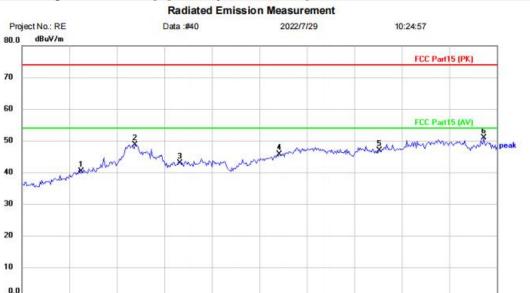


[TestMode: TX highest channel]; [Polarity: Horizontal]

3350.00

4525.00

5700.00



8050.00

Polarization: Horizontal

9225.00

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

1000.000 2175.00

M/N: Pilot pano

Mode: 2.4G WIFI B TX-H

Note:

No.	No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2462.000	41.43	-1.18	40.25	74.00	-33.75	peak		
2		3796.500	41.10	7.65	48.75	74.00	-25.25	peak		
3		4924.000	39.51	3.46	42.97	74.00	-31.03	peak		
4		7386.000	39.01	6.68	45.69	74.00	-28.31	peak		
5		9848.000	37.07	9.88	46.95	74.00	-27.05	peak		
6	*	12421.000	39.02	11.79	50.81	74.00	-23.19	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



Page 24 of 138

12 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25℃
Humidity	60%

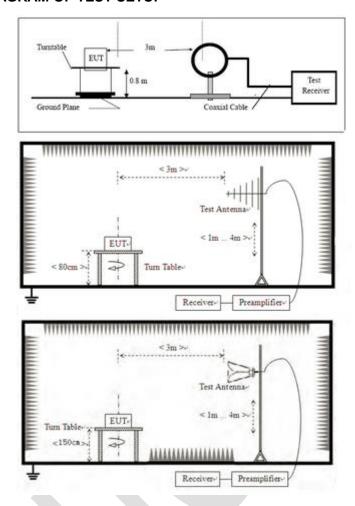
12.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 PROCEDURE

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



Page 26 of 138

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.





Temperature:

Humidity:

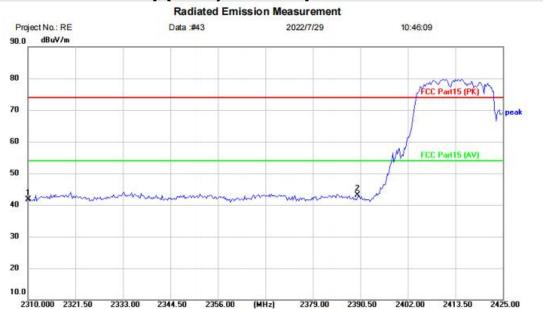
(C)

%RH

Page 27 of 138

12.4 TEST DATA

[TestMode: TX lowest channel]; [Polarity: Horizontal]



Polarization: Horizontal

Site

Limit: FCC Part15 (PK)

EUT: panoramic camera

M/N: Pilot pano

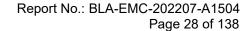
Mode: 2.4G WIFI B TX-L

Note:

No.	Mk.		Reading Level	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over			
							dB	Detector	Comment	
1		2310.000	45.55	-3.93	41.62	74.00	-32.38	peak		
2	*	2390.000	46.61	-3.58	43.03	74.00	-30.97	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



2425.00

(C)

%RH



[TestMode: TX lowest channel]; [Polarity: Vertical]

Radiated Emission Measurement Project No.: RE Data :#44 2022/7/29 10:48:02 dBuV/m 90.0 80 FCC Part15 (PK) 70 60 50 40 30 20 10.0

Polarization: Vertical

2390.50

Temperature:

Humidity:

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

2310.000 2321.50

2333.00

2344.50

2356.00

M/N: Pilot pano

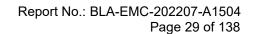
Mode: 2.4G WIFI B TX-L

Note:

No.	Mk.	. Freq.	Reading Level	Correct Factor	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Limit dBuV/m	Over			
			dBuV				dB	Detector	Comment	
1		2310.000	45.23	-3.93	41.30	74.00	-32.70	peak		
2	*	2390.000	45.48	-3.58	41.90	74.00	-32.10	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



2500.00

(C)

%RH

Temperature:

Humidity:



[TestMode: TX highest channel]; [Polarity: Horizontal]

2460.00

2465.00

2470.00

Radiated Emission Measurement Project No.: RE Data :#41 2022/7/29 10:37:34 dBuV/m 90.0 80 FCC Part15 (PK) 70 60 FCC Part 15 (AV) 50 40 30 20 10.0

(MHz)

Power:

2480.00

Polarization: Horizontal

2485.00

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

2450.000 2455.00

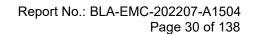
M/N: Pilot pano

Mode: 2.4G WIFI B TX-H

Note:

No.	No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment		Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		2483.500	41.08	-3.14	37.94	74.00	-36.06	peak		
2	*	2500.000	41.50	-3.08	38.42	74.00	-35.58	peak		

*:Maximum data x:Over limit !:over margin (Reference Only



Temperature:

Humidity:

(C)

%RH



[TestMode: TX highest channel]; [Polarity: Vertical]

Radiated Emission Measurement Project No.: RE Data :#42 2022/7/29 10:39:36 dBuV/m 90.0 80 FCC Part15 (PK) 70 60 FCC Part 15 (AV) 50 40 30 20 10.0 2500.00 2450.000 2455.00 2460.00 2465.00 2470.00 2480.00 2485.00

Polarization: Vertical

Site Limit: FCC Part15 (PK)

EUT: panoramic camera

M/N: Pilot pano

Mode: 2.4G WIFI B TX-H

Note:

No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment dBuV/m		Over			
						dBuV/m	dB	Detector	Comment	
1		2483.500	41.94	-3.14	38.80	74.00	-35.20	peak		
2	*	2500.000	42.59	-3.08	39.51	74.00	-34.49	peak		

Power:

*:Maximum data x:Over limit !:over margin (Reference Only



Page 31 of 138

13 CONDUCTED SPURIOUS EMISSIONS

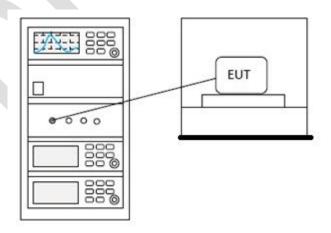
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25℃
Humidity	60%

13.1 LIMITS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

13.2 BLOCK DIAGRAM OF TEST SETUP





Page 32 of 138

13.3 TEST DATA





Page 33 of 138

14 CONDUCTED BAND EDGES MEASUREMENT

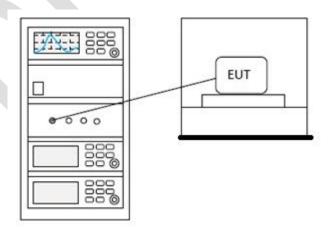
Test Standard	47 CFR Part 15, Subpart C 15.247	
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	
Test Mode (Pre-Scan)	TX	
Test Mode (Final Test)	TX	
Tester	Charlie	
Temperature	25℃	
Humidity	60%	

14.1 LIMITS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

14.2 BLOCK DIAGRAM OF TEST SETUP





Page 34 of 138

14.3 TEST DATA





Page 35 of 138

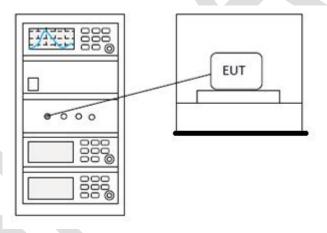
15 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247	
Test Method	ANSI C63.10 (2013) Section 11.8.1	
Test Mode (Pre-Scan)	TX	
Test Mode (Final Test)	TX	
Tester	Charlie	
Temperature	25℃	
Humidity	60%	

15.1 LIMITS

Limit:	≥500 kHz
	_500 M12

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 TEST DATA



Page 36 of 138

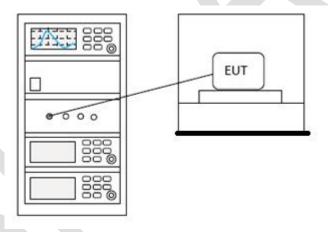
16 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247	
Test Method	ANSI C63.10 (2013) Section 11.10.2	
Test Mode (Pre-Scan)	TX	
Test Mode (Final Test)	TX	
Tester	Charlie	
Temperature	25℃	
Humidity	60%	

16.1 LIMITS

Limit: | ≤8dBm in any 3 kHz band during any time interval of continuous transmission

16.2 BLOCK DIAGRAM OF TEST SETUP



16.3 TEST DATA



Page 37 of 138

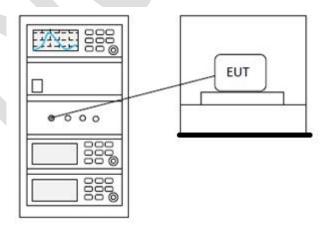
17 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247	
Test Method	ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1	
Test Mode (Pre-Scan)	TX	
Test Mode (Final Test)	TX	
Tester	Charlie	
Temperature	25℃	
Humidity	60%	

17.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5505 5050	1 for frequency hopping systems and digital
5725-5850	modulation

17.2 BLOCK DIAGRAM OF TEST SETUP





Page 38 of 138

17.3 TEST DATA

