

TEST REPORT

Product Name : Bluetooth Wireless 2D Barcode Scanner

Brand Mark : N/A : U2-B Model No.

> U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20, U21, U22, U23, U24, U25, U26, U27, U28, U29, U30, V1, V2,

: V3, V5, V6, V7, V8, V9, V10, V11, V12, Extension modeo

V13, V14, V15, V16, W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12, W13. W14. W15. W16. W17. W18. W19. W20, W21, W22, W23, W25, W26, X10W

: BLA-EMC-202402-A4703 **Report Number**

FCC ID : 2A5HC-U2-B

Date of Sample Receipt : 2024/2/29

Date of Test : 2024/2/29 to 2024/4/24

Date of Issue : 2024/4/24

: 47 CFR Part 15, Subpart C 15.249 Test Standard

Test Result : Pass

Prepared for:

Sycreader Guangzhou Co., Ltd.

502#,A15,400 Xincheng Avenue, Zengcheng District Guangzhou

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:

Josu 13 hue Theng Approved by:

Date:



Page 2 of 56

REPORT REVISE RECORD

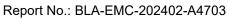
Version No. Date		Description
00	2024/4/24	Original





TABLE OF CONTENTS

1	TI	EST SUMMARY	5
2	G	ENERAL INFORMATION	6
3	G	ENERAL DESCRIPTION OF E.U.T	6
4		EST ENVIRONMENT	
5		EST MODE	
		IEASUREMENT UNCERTAINTY	
6	М	ESCRIPTION OF SUPPORT UNIT	7
7			
8	L	ABORATORY LOCATION	8
9	Т	EST INSTRUMENTS LIST	<u>ç</u>
10	R	ADIATED EMISSIONS	11
	10.1	LIMITS	11
	10.2		
	10.3		
	10.4	TEST DATA	14
11	R	ESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY	22
	11.1	LIMITS	22
	11.2		
	11.3	PROCEDURE	23
	11.4	TEST DATA	25
12	FI	IELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))	29
	12.1	LIMITS	29
	12.2		30
	12.3	PROCEDURE	30
	12.4	TEST DATA	32
13	20	0DB BANDWIDTH	44
	13.1	LIMITS	44
	13.2	BLOCK DIAGRAM OF TEST SETUP	44
	13.3	TEST DATA	44
14	A	NTENNA REQUIREMENT	45
	14.1	Conclusion	45





Page 4 of 56

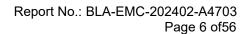
15 CO	NDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	46
15.1	LIMITS	46
15.2	BLOCK DIAGRAM OF TEST SETUP	46
15.3	PROCEDURE	46
15.4	TEST DATA	48
16 AP	PENDIX1	51
APPEND	DIX A: PHOTOGRAPHS OF TEST SETUP	54
	DIX B: PHOTOGRAPHS OF EUT	



Page 5 of 56

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass





2 GENERAL INFORMATION

Applicant	Sycreader Guangzhou Co.,Ltd.
Address	502#,A15,400 Xincheng Avenue, ZengchengDistrict Guangzhou
Manufacturer	Sycreader Guangzhou Co.,Ltd.
Address	502#,A15,400 Xincheng Avenue, ZengchengDistrict Guangzhou
Factory	N/A
Address	N/A
Product Name	Bluetooth Wireless 2D Barcode Scanner
Test Model No.	U2-B
Extension mode	U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20, U21, U22, U23, U24, U25, U26, U27, U28, U29, U30, V1, V2, V3, V5, V6, V7, V8, V9, V10, V11, V12, V13, V14, V15, V16, W1, W2, W3, W4, W5, W6, W7, W8, W9, W10, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, W21, W22, W23, W25, W26, X10W
Note	That all models are electrically identical, only model no. and color is different.

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	N/A		
Software Version	N/A		
Channel Spacing:	1MHz		7
Frequency Range:	2402MHz~2480M	ЛНz	
Modulation Type:	GFSK		
Number of Channels:	79 (declared by t	he clier	ent)
	2402 2422	2442	2462
	2403 2423	2443	2463
	2403 2423	2444	2464
	2405 2425	2445	2465
	2406 2426	2446	2466
	2407 2427	2447	2467
	2408 2428	2448	2468
	2409 2429	2449	2469
	2410 2430	2450	2470
	2411 2431	2451	2471
	2412 2432	2452	2472
	2413 2433	2453	2473
	2414 2434	2454	2474
	2415 2435	2455	2475
	2416 2436	2456	2476
	2417 2437	2457	2477
	2418 2438	2458	2478
	2419 2439	2459	2479
	2420 2440	2460	2480
	2421 2441	2461	
Antenna Type:	Metal ANT		
Antenna Gain:	3dBi(Provided by	y the a	applicant)
Power Supply:	DC3.7V		



Page 7 of 56

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	DC3.7V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION		
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.		

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)	
Occupied Channel Bandwidth	±5 %	
RF output power, conducted	±1.5 dB	
Power Spectral Density, conducted	±3.0 dB	
Unwanted Emissions, conducted	±3.0 dB	
Temperature	±3 °C	
Supply voltages	±3 %	
Time	±5 %	
Unwanted Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB	
Unwanted Radiated Emission (1GHz ~ 18GHz)	±4.44 dB	
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB	



Page 8 of 56

7 DESCRIPTION OF SUPPORT UNIT

Device Type Manufacturer		Model Name	Serial No.	Remark		
Note:						
"" means no any support device during testing.						

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 56

9 TEST INSTRUMENTS LIST

Test Equipm	Test Equipment Of Radiated Spurious Emissions							
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due			
Chamber 1	SKET	966	N/A	2023/11/16	2026/11/15			
Chamber 2	SKET	966	N/A	2021/07/20	2024/07/19			
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29			
Receiver	R&S	ESR7	101199	2023/08/30	2024/08/29			
Receiver	R&S	ESPI7	101477	2023/07/07	2024/07/06			
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/10/12	2025/10/11			
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12			
Horn Antenna	Schwarzbeck	BBHA 9170	1106	2022/04/24	2024/04/23			
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2023/07/07	2024/07/06			
Amplifier	SKET	PA-000318G-45	N/A	2023/08/30	2024/08/29			
Amplifier	SKET	LNPA_18G40G-50	SK2022071301	2023/07/14	2024/07/13			
Filter group	SKET	2.4G/5G Filter group r	N/A	2023/07/07	2024/07/06			
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A			
Loop antenna	SCHNARZBE CK	FMZB1519B	00102	2022/09/14	2025/09/13			
1kHZ calibration audio source	SKET	MCS-ABT-C35	N/A	2023/09/04	2024/09/03			
Free Field Microphone	SKET	MGS MP 663	0414	2023/09/04	2024/09/03			
Audio shielding box	SKET	SB-ABT-C35	N/A	2023/03/30	2024/03/29			
Controller	SKET	N/A	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A			
Signal Generator DTV	ECREDIX	DSG-1000	N/A	N/A	N/A			



Page 10 of56

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)							
Equipment	Cal.Date	Cal.Due					
Shield room	SKET	833	N/A	2023/11/16	2025/11/15		
Receiver	R&S	ESPI3	101082	2023/08/30	2024/08/29		
LISN	R&S	ENV216	3560.6550.15	2023/08/30	2024/08/29		
LISN	AT	AT166-2	AKK1806000003	2023/08/30	2024/08/29		
ISN	TESEQ	ISNT8-cat6	53580	2023/08/30	2024/08/29		
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2023/07/07	2024/07/06		
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2023/07/07	2024/07/06		
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A		



Page 11 of 56

10 RADIATED EMISSIONS

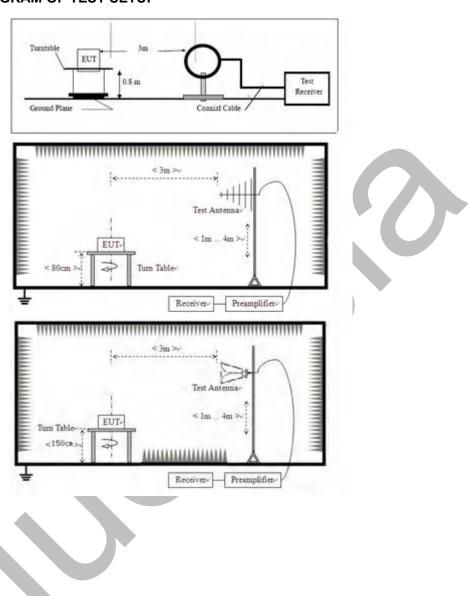
Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

10.1 LIMITS

Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	-	300
0.490MHz-1.705MHz	24000/F (kHz)			30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3



10.2 BLOCK DIAGRAM OF TEST SETUP





Page 13 of 56

10.3 PROCEDURE\

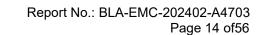
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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.
- 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.



Temperature:

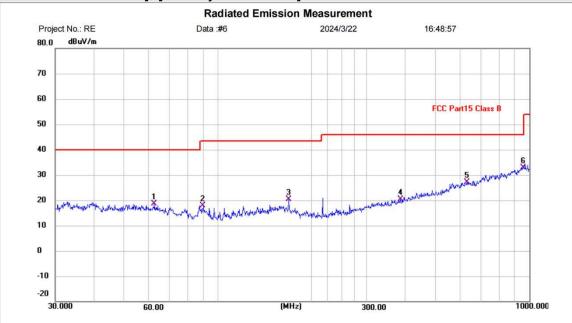
%RH

Humidity:



10.4 TEST DATA

[TestMode: TX below 1G]; [Polarity: Horizontal]



Polarization: Horizontal

Limit: FCC Part15 Class B

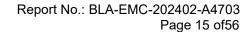
EUT: Bluetooth Wireless 2D

M/N: U2-B Mode: 2.4G Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	62.4314	0.13	18.42	18.55	40.00	-21.45	QP	Р	
2	89.5899	2.51	15.33	17.84	43.50	-25.66	QP	Р	
3	168.4138	1.61	18.75	20.36	43.50	-23.14	QP	Р	
4	385.2805	-1.31	21.63	20.32	46.00	-25.68	QP	Р	
5	629.4772	-0.15	27.37	27.22	46.00	-18.78	QP	Р	
6 *	955.4381	0.98	31.86	32.84	46.00	-13.16	QP	Р	

Power:

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

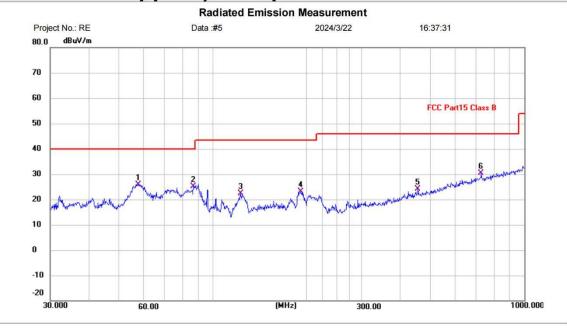


Temperature:

(C)



[TestMode: TX below 1G]; [Polarity: Vertical]



Polarization: Vertical

Limit: FCC Part15 Class B

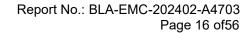
Mode: 2.4G Note:

Site

Power: Humidity: %RH EUT: Bluetooth Wireless 2D M/N: U2-B

1		Carl .							
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	57.5939	7.27	18.68	25.95	40.00	-14.05	QP	Р	
2	86.5027	10.58	14.57	25.15	40.00	-14.85	QP	Р	
3	122.8339	4.50	17.85	22.35	43.50	-21.15	QP	Р	
4	191.7450	6.98	16.08	23.06	43.50	-20.44	QP	Р	
5	454.3100	0.74	23.42	24.16	46.00	-21.84	QP	Р	
6	726.8052	1.65	28.64	30.29	46.00	-15.71	QP	Р	

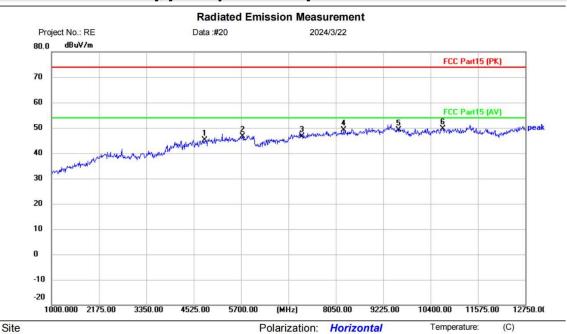
*:Maximum data x:Over limit l:over margin



%RH



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

Note:

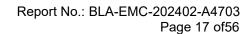
No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1		4804.000	39.50	5.64	45.14	74.00	-28.86	peak		
2		5735.250	38.41	8.11	46.52	74.00	-27.48	peak		
3		7206.000	37.40	9.24	46.64	74.00	-27.36	peak		
4		8238.000	39.20	9.86	49.06	74.00	-24.94	peak		
5		9608.000	36.86	12.31	49.17	74.00	-24.83	peak		
6	*	10705.50	36.43	13.12	49.55	74.00	-24.45	peak		

Power:

*:Maximum data x:Over limit !:over margin

Receiver: ESR_1 Spectrum Analyzer: FSP40

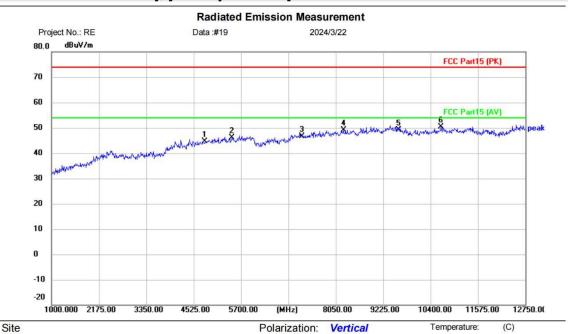
Antenna: EZ 9120D 1G-18G Engineer Signature:



%RH



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

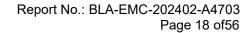
M/N: U-2B Mode: 2.4G-2402

Note:

No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	38.87	5.64	44.51	74.00	-29.49	peak	
2		5476.750	38.66	7.56	46.22	74.00	-27.78	peak	
3		7206.000	37.27	9.24	46.51	74.00	-27.49	peak	
4		8238.000	39.21	9.86	49.07	74.00	-24.93	peak	
5		9608.000	36.75	12.31	49.06	74.00	-24.94	peak	
6	*	10658.50	37.44	12.93	50.37	74.00	-23.63	peak	

Power:

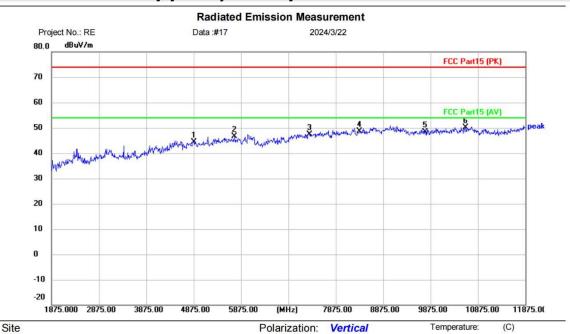
*:Maximum d	lata x:Over limit	!:over margin			Reference Only
Receiver:	ESR_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9120D 1G-18G		Engineer Signature		



%RH



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2440

Note:

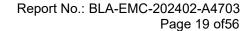
No. Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4880.000	38.67	5.72	44.39	74.00	-29.61	peak	
2	5735.000	38.49	8.11	46.60	74.00	-27.40	peak	
3	7320.000	38.07	9.43	47.50	74.00	-26.50	peak	
4	8375.000	38.39	10.19	48.58	74.00	-25.42	peak	
5	9760.000	36.16	12.21	48.37	74.00	-25.63	peak	
6 *	10615.00	37.48	12.74	50.22	74.00	-23.78	peak	

Power:

*:Maximum data Reference Only x:Over limit !:over margin FSP40 Receiver: ESR_1 Spectrum Analyzer:

Engineer Signature

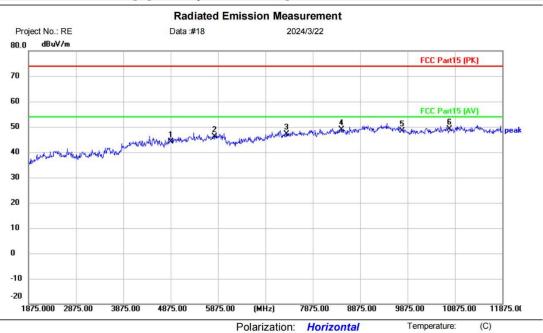
Antenna: EZ 9120D 1G-18G



%RH



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2440

Note:

Site

No. Mi	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4880.000	38.29	5.72	44.01	74.00	-29.99	peak	
2	5795.000	38.19	7.96	46.15	74.00	-27.85	peak	
3	7320.000	37.82	9.43	47.25	74.00	-26.75	peak	
4	8475.000	38.06	10.78	48.84	74.00	-25.16	peak	
5	9760.000	36.29	12.21	48.50	74.00	-25.50	peak	
6 *	10765.00	36.10	12.93	49.03	74.00	-24.97	peak	

Power:

*:Maximum data x:Over limit !:over margin

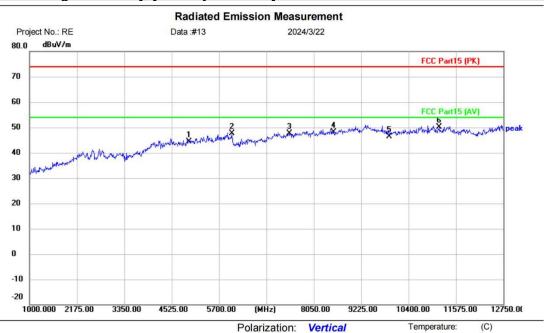
Receiver: ESR_1 Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G Engineer Signature:

%RH



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



Site Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

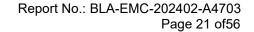
M/N: U-2B Mode: 2.4G-2480

Note:

No. Mi	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4960.000	37.74	6.60	44.34	74.00	-29.66	peak	
2	6017.250	41.98	5.63	47.61	74.00	-26.39	peak	
3	7440.000	38.03	9.64	47.67	74.00	-26.33	peak	
4	8543.500	36.96	11.18	48.14	74.00	-25.86	peak	
5	9920.000	34.29	12.14	46.43	74.00	-27.57	peak	
6 *	11163.75	37.39	12.73	50.12	74.00	-23.88	peak	

Power:

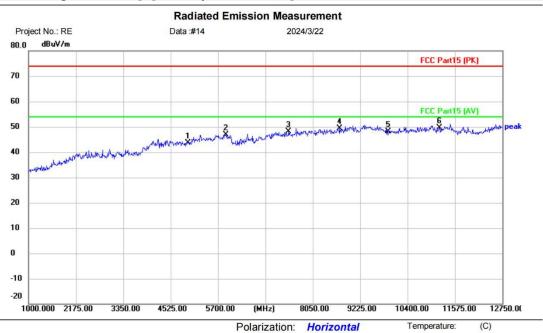
*:Maximum o	data x:Over limit	!:over margin			Reference Only
Receiver:	ESR_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9120D 1G-18G		Engineer Signature		



%RH



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



Site Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2480

Note:

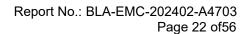
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1		4960.000	37.11	6.60	43.71	74.00	-30.29	peak		
2		5899.750	38.33	8.66	46.99	74.00	-27.01	peak		
3		7440.000	38.48	9.64	48.12	74.00	-25.88	peak		
4		8719.750	37.89	11.53	49.42	74.00	-24.58	peak		
5		9920.000	35.92	12.14	48.06	74.00	-25.94	peak		
6	*	11187.25	37.01	12.71	49.72	74.00	-24.28	peak		

Power:

*:Maximum data x:Over limit !:over margin

Receiver: ESR_1 Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G Engineer Signature:



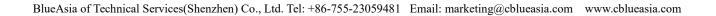


11 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY

Test Standard	47 CFR Part 15, Subpart C 15.249				
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6				
Test Mode (Pre-Scan)	TX				
Test Mode (Final Test)	TX				
Tester	Jozu				
Temperature	25℃				
Humidity	60%				

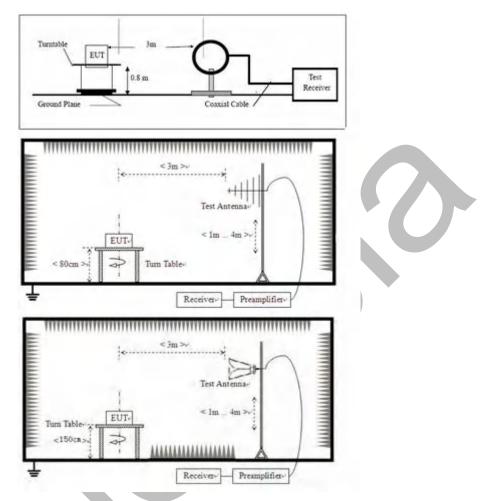
11.1 LIMITS

Frequency	Limit (dBµV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above IGHZ	74.0	Peak Value





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.

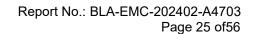


Page 24 of 56

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



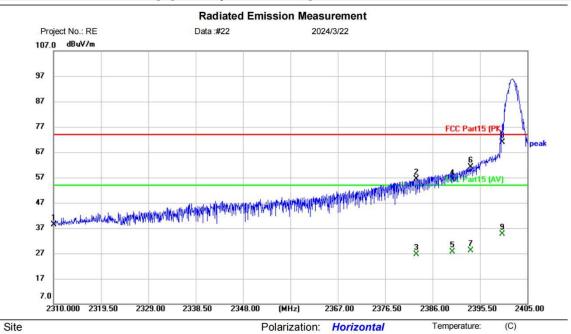


%RH



11.4 TEST DATA

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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

Note:

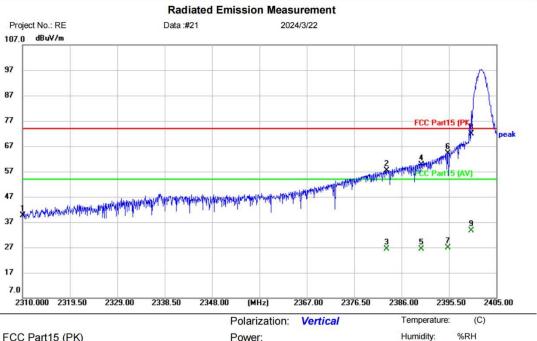
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	41.38	-2.89	38.49	74.00	-35.51	peak	
2		2382.770	59.20	-2.71	56.49	74.00	-17.51	peak	
3		2382.770	29.22	-2.71	26.51	54.00	-27.49	AVG	
4		2390.000	58.82	-2.70	56.12	74.00	-17.88	peak	
5		2390.000	30.21	-2.70	27.51	54.00	-26.49	AVG	
6		2393.695	63.77	-2.69	61.08	74.00	-12.92	peak	
7		2393.695	30.79	-2.69	28.10	54.00	-25.90	AVG	
8	*	2400.000	73.53	-2.67	70.86	74.00	-3.14	peak	
9		2400.000	37.39	-2.67	34.72	54.00	-19.28	AVG	

Power:

*:Maximum	data x:Over limit	!:over margin			Reference Only
Receiver:	ESR_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9120D 1G-18G		Engineer Signature		



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

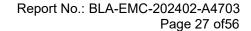
Note:

Site

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	42.42	-2.89	39.53	74.00	-34.47	peak	
2		2383.055	60.19	-2.71	57.48	74.00	-16.52	peak	
3		2383.055	29.19	-2.71	26.48	54.00	-27.52	AVG	
4		2390.000	62.38	-2.70	59.68	74.00	-14.32	peak	
5		2390.000	29.18	-2.70	26.48	54.00	-27.52	AVG	
6		2395.310	66.87	-2.68	64.19	74.00	-9.81	peak	
7		2395.310	29.46	-2.68	26.78	54.00	-27.22	AVG	
8	*	2400.000	74.50	-2.67	71.83	74.00	-2.17	peak	
9		2400.000	36.25	-2.67	33.58	54.00	-20.42	AVG	

Power:

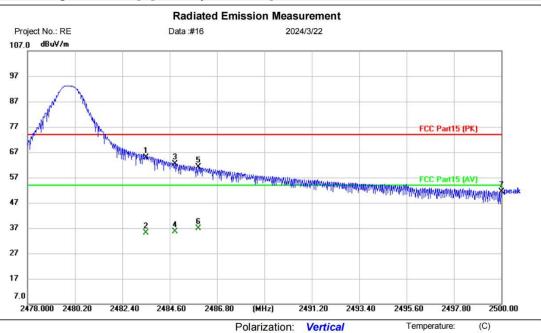
*:Maximum	data x:Over limit	!:over margin			(Reference Only
Receiver:	ESR_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9120D 1G-18G		Engineer Signature		



%RH



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



Site Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2480

Note:

No. M	Иk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 *	*	2483.500	67.78	-2.91	64.87	74.00	-9.13	peak		
2		2483.500	38.01	-2.91	35.10	54.00	-18.90	AVG		
3		2484.842	65.30	-2.92	62.38	74.00	-11.62	peak		
4		2484.842	38.60	-2.92	35.68	54.00	-18.32	AVG		
5		2485.942	64.03	-2.92	61.11	74.00	-12.89	peak		
6		2485.942	39.82	-2.92	36.90	54.00	-17.10	AVG		
7		2500.000	54.31	-3.00	51.31	74.00	-22.69	peak		

Power:

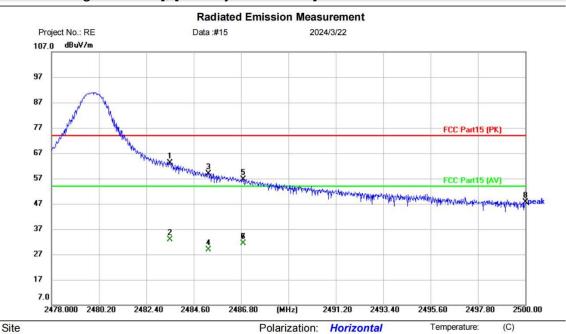
*:Maximum	data	x:Over limit	!:over margin			Reference Only
Receiver:	ESR_	_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9	120D 1G-18G		Engineer Signature:		

Engineer Signature

%RH



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



Limit: FCC Part15 (PK)

EUT: Bluetooth Wireless 2D

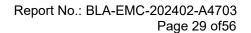
M/N: U-2B Mode: 2.4G-2480

Note:

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	65.98	-2.91	63.07	74.00	-10.93	peak	
2		2483.500	35.81	-2.91	32.90	54.00	-21.10	AVG	
3		2485.282	61.91	-2.92	58.99	74.00	-15.01	peak	
4		2485.282	31.83	-2.92	28.91	54.00	-25.09	AVG	
5		2486.910	59.53	-2.93	56.60	74.00	-17.40	peak	
6		2486.910	34.32	-2.93	31.39	54.00	-22.61	AVG	
7		2486.910	34.32	-2.93	31.39	54.00	-22.61	AVG	
8		2500.000	50.55	-3.00	47.55	74.00	-26.45	peak	

Power:

*:Maximum da	ata x:Over limit	!:over margin			(Reference Only
Receiver:	ESR_1		Spectrum Analyzer:	FSP40	
Antenna:	EZ 9120D 1G-18G		Engineer Signature		





12 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))

Test Standard	47 CFR Part 15, Subpart C 15.249			
Test Method	ANSI C63.10 (2013) Section 6.5&6.6			
Test Mode (Pre-Scan)	TX			
Test Mode (Final Test)	TX			
Tester	Jozu			
Temperature	25℃			
Humidity	60%			

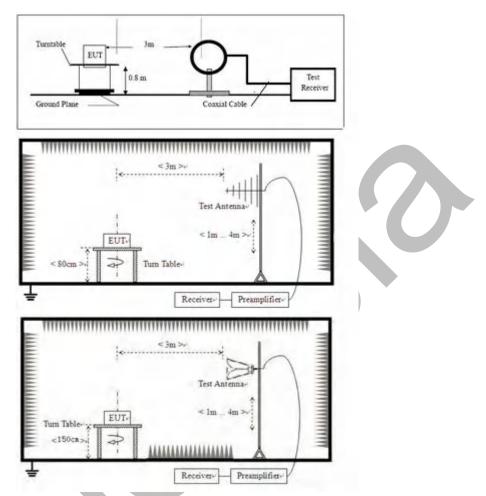
12.1 LIMITS

Frequency	Limit (dBµV/m @3m)	Remark
2400MH- 2402 FMH-	94.0	Average Value
2400MHz-2483.5MHz	114.0	Peak Value





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 31 of 56

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



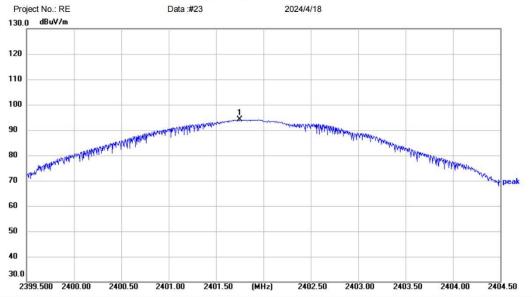


Page 32 of 56

12.4 TEST DATA

2402 Horizontal peak:





Site Polarization: Horizontal Temperature: (C)
Limit: Power: Humidity: %RH

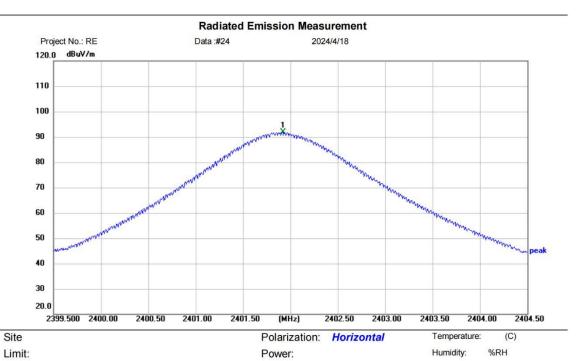
EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

No. M	k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 *	2	401.755	93.34	0.69	94.03			peak		



Horizontal AVG:



EUT: Bluetooth Wireless 2D

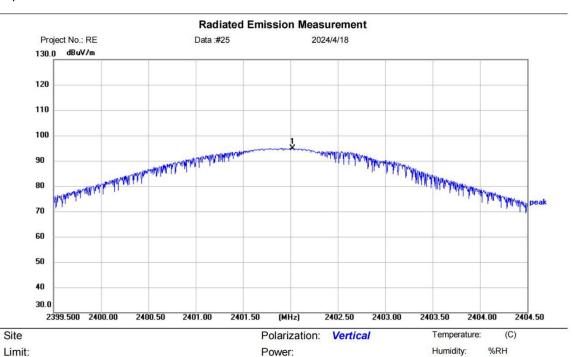
M/N: U-2B

Mode: 2.4G-2402

No.	MŁ	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2401.920	91.17	0.69	91.86			AVG	



Vertical peak



Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

No.	M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2402.020	94.09	0.69	94.78			peak		

Vertical AVG

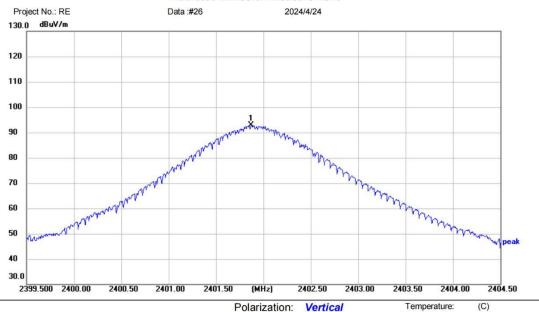
Report No.: BLA-EMC-202402-A4703

Humidity:

%RH

Page 35 of 56

Radiated Emission Measurement



Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2402

Note:

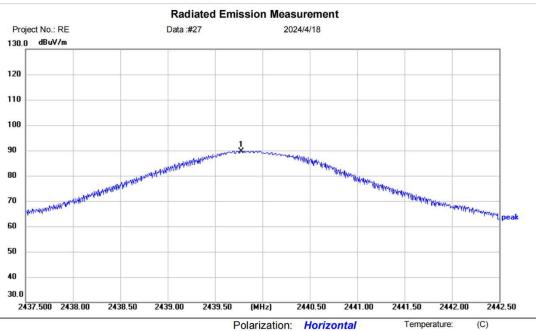
Site

No.	M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2401.870	92.17	0.69	92.86			peak		

Power:



2440 Horizontal peak



Site Polarization: Horizontal Temperature: (C)
Limit: Power: Humidity: %RH

EUT: Bluetooth Wireless 2D

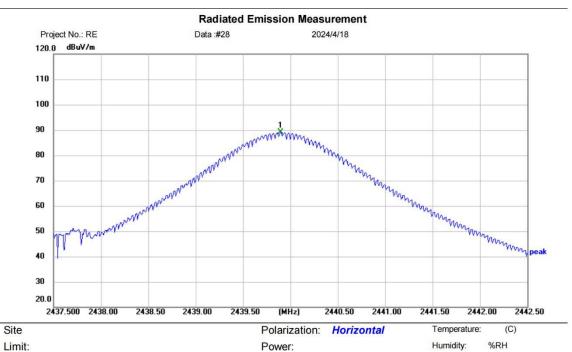
M/N: U-2B

Mode: 2.4G-2440

No. Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2439.775	88.99	0.70	89.69			peak	



Horizontal AVG



Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2440

No.	Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2439.895	88.36	0.70	89.06			AVG		

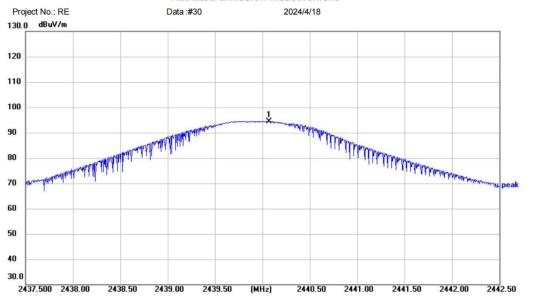


Vertical peak

Report No.: BLA-EMC-202402-A4703

Page 38 of56

Radiated Emission Measurement



Site Polarization: Vertical Temperature: (C)
Limit: Power: Humidity: %RH

EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2440

Note:

No.	Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2440.070	93.73	0.70	94.43			peak		

*:Maximum data x:Over limit !:over margin

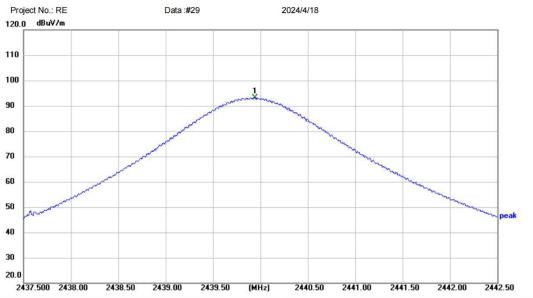
Receiver: ESR_1 Spectrum Analyzer: FSP40



Page 39 of 56

Vertical AVG





Site Polarization: Vertical Temperature: (C)
Limit: Power: Humidity: %RH

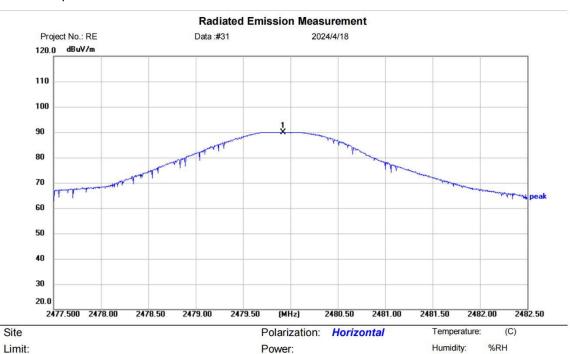
EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2440

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2439.945	92.51	0.70	93.21			AVG		



2480 Horizontal peak



Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2480

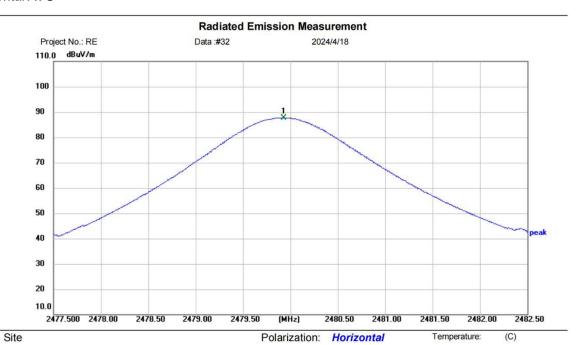
No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2479.925	89.24	0.70	89.94			peak		

Humidity:

%RH



Horizontal AVG



Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2480

Note:

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2479.930	87.05	0.70	87.75			AVG		

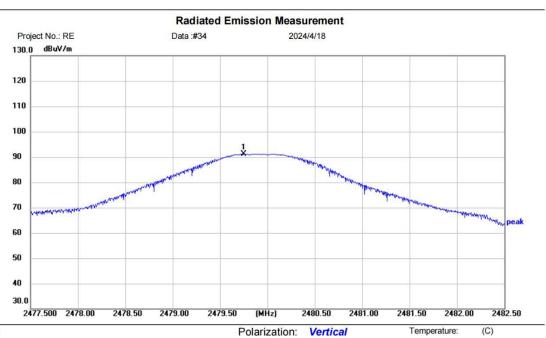
Power:



%RH

Page 42 of 56

Vertical peak



Site Polarization: Vertical Temperatu Limit: Power: Humidity:

EUT: Bluetooth Wireless 2D M/N: U-2B

Mode: 2.4G-2480

No. M	k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1 *	2	479.755	90.54	0.70	91.24			peak		

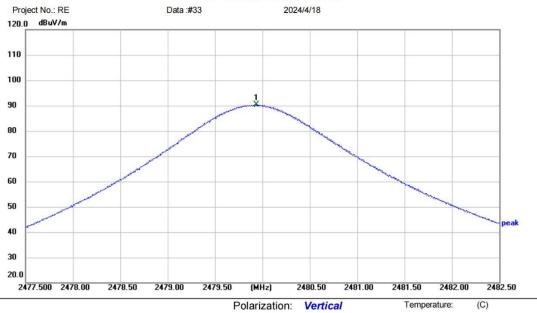
Humidity:

%RH

Page 43 of 56

Vertical AVG





Limit: EUT: Bluetooth Wireless 2D

M/N: U-2B Mode: 2.4G-2480

Note:

Site

No.	M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	2479.935	89.59	0.70	90.29			AVG		

Power:

NOTE: RBW >20dB BW VBW >=RBW, PK detector is for PK value, RMS detector is for AV value.



Page 44 of 56

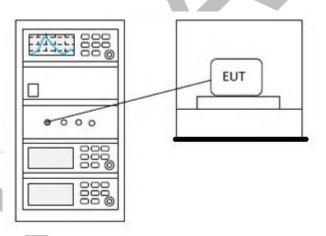
13 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

13.1 LIMITS

Limit: N/A

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



Page 45 of 56

14 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	N/A

14.1 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 3dBi.



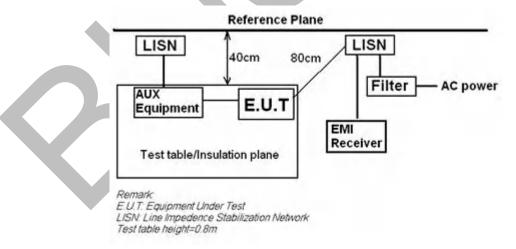
15 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

15.1 LIMITS

Frequency of		Conducted limit(dBµV)					
emission(MHz)	Quasi-pea	ık	Average				
0.15-0.5	66 to 56*		56 to 46*				
0.5-5	56		46				
5-30	60		50				
*Decreases with the logarithm	of the frequency.						

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.



Page 47 of 56

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

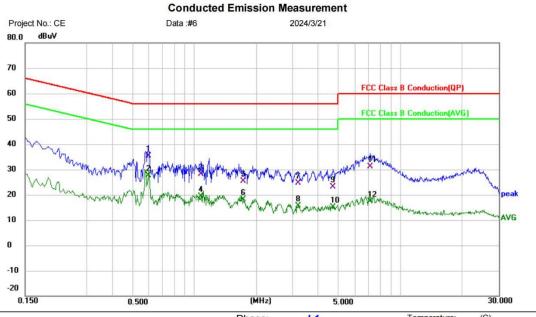
Remark: LISN=Read Level+ Cable Loss+ LISN Factor





15.4 TEST DATA

[TestMode: Tx]; [Line: Line] ;[Power:AC120V/60Hz]



Limit: FCC Class B Conduction(QP)

EUT: Bluetooth Wireless 2D

M/N: U2-B Mode: 2.4G Note:

Site

Phase:	L1	Temperature:	(C)
Power:		Humidity:	%RH
Distance:	RBW: 9 KHz		

Distance: RBW: 9 KHz

VBW: 30 KHz Sweep Time: 10 ms

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.5940	25.34	9.92	35.26	56.00	-20.74	QP			
2	*	0.5940	17.67	9.92	27.59	46.00	-18.41	AVG			
3		1.0740	18.23	9.82	28.05	56.00	-27.95	QP			
4		1.0740	9.60	9.82	19.42	46.00	-26.58	AVG			
5		1.7260	15.31	10.05	25.36	56.00	-30.64	QP			
6		1.7260	8.06	10.05	18.11	46.00	-27.89	AVG			
7		3.1780	14.50	10.05	24.55	56.00	-31.45	QP			
8		3.1780	5.54	10.05	15.59	46.00	-30.41	AVG			
9		4.7180	12.91	10.18	23.09	56.00	-32.91	QP			
10		4.7180	4.91	10.18	15.09	46.00	-30.91	AVG			
11		7.1540	20.19	10.93	31.12	60.00	-28.88	QP			
12		7.1540	6.43	10.93	17.36	50.00	-32.64	AVG			

*:Maximum data x:Over limit !:over margin

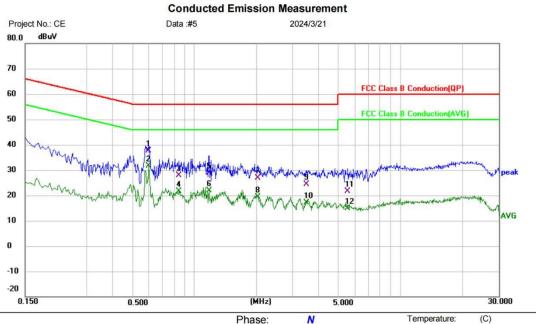
Receiver: ESPI_1 Spectrum Analyzer: ESPI

L.I.S.N: Engineer Signature:

Test Result: Pass



[TestMode: Tx]; [Line: Neutral] ;[Power:AC120V/60Hz]



Limit: FCC Class B Conduction(QP)

EUT: Bluetooth Wireless 2D

M/N: U2-B Mode: 2.4G Note:

Site

Phase: N Temperature: Power: Humidity:

ESPI

Distance: RBW: 9 KHz

VBW: 30 KHz Sweep Time: 10 ms

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.5980	27.81	9.86	37.67	56.00	-18.33	QP			
2	*	0.5980	21.77	9.86	31.63	46.00	-14.37	AVG			
3		0.8420	17.98	9.90	27.88	56.00	-28.12	QP			
4		0.8420	11.71	9.90	21.61	46.00	-24.39	AVG			
5		1.1780	18.97	9.89	28.86	56.00	-27.14	QP			
6		1.1780	12.01	9.89	21.90	46.00	-24.10	AVG			
7		2.0260	16.81	10.02	26.83	56.00	-29.17	QP			
8		2.0260	9.42	10.02	19.44	46.00	-26.56	AVG			
9		3.4940	14.34	10.05	24.39	56.00	-31.61	QP			
10		3.4940	7.19	10.05	17.24	46.00	-28.76	AVG			
11		5.5620	11.03	10.55	21.58	60.00	-38.42	QP			
12		5.5620	4.40	10.55	14.95	50.00	-35.05	AVG			
*:Maximum data		x:Over lim	it !:over	margin						(Reference Only	

Spectrum Analyzer:

Engineer Signature

Test Result: Pass

Receiver:

L.I.S.N:

ESPI_1



Page 50 of 56

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss.



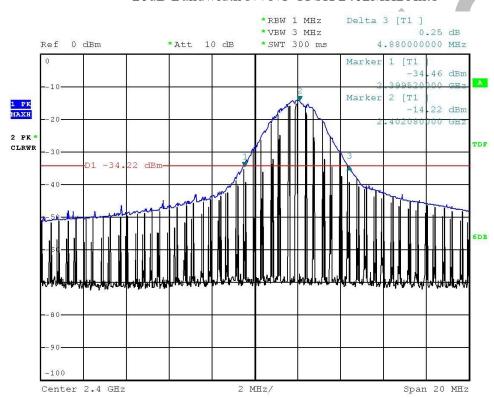


16 APPENDIX1

-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2402	Ant1	4.88	Pass
NVNT	GFSK	2440	Ant1	4.20	Pass
NVNT	GFSK	2480	Ant1	3.52	Pass

-20dB Bandwidth NVNT GFSK 2402MHz Ant1

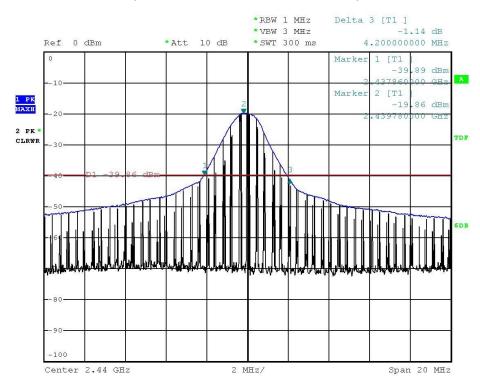




Date: 21.MAR.2024 18:05:29



-20dB Bandwidth NVNT GFSK 2440MHz Ant1

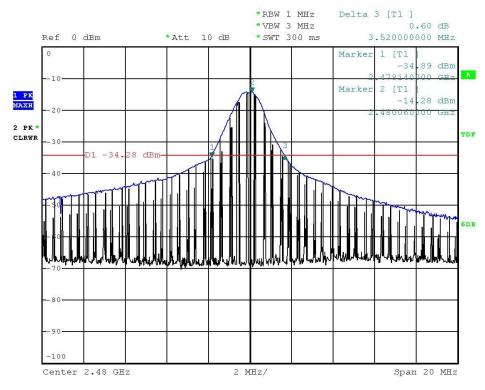








-20dB Bandwidth NVNT GFSK 2480MHz Ant1

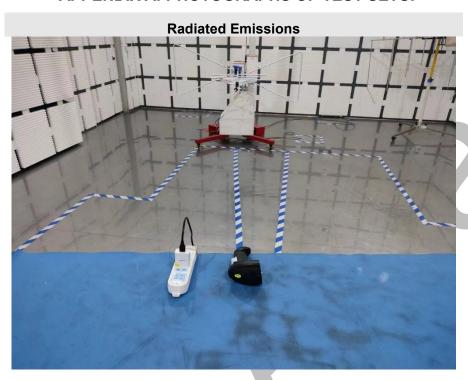








APPENDIX A: PHOTOGRAPHS OF TEST SETUP











Page 56 of 56

APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202402-A4701

----END OF REPORT----

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.