

## **TEST REPORT**

Applicant: KEYDIY

Address of Applicant: Room 201, Building A, 5#, Chuangwei Innovation Valley,

Tangtou No.1 Road, Shiyan Subdistrict, Bao'an Shenzhen

Manufacturer/Factory: SHENZHEN YI CHE TECHNOLOGY CO.,LTD

Address of Room 201, Building A, 5#, Chuangwei Innovation Valley,

Manufacturer/Factory: Tangtou No.1 Road, Shiyan Subdistrict, Bao'an Shenzhen

Product Name: Phone As Key

Model No.: PAK

Trade Mark: KEYDIY

FCC ID: 2A3LS-PAK

Applicable standards: FCC Part 15.231

Test procedure ANSI C63.10-2013

Date of Test: Aug.15, 2024-Sep.13, 2024

Date of report issued: Sep.13, 2024

Remark:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full without prior written permission of the company.

The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

## **Prepared By**

Shenzhen ETR Standard Technology Co., Ltd.

Address: No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Compiled by: Reviewed by: Approved by:

Project Engineer Project Manager Authorized Signature

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	Report Revision History	
Report No.	Description	Issue Date
ET-24081218E02	Original	Sep.13, 2024



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## 1 Test Summary

Test Item	Section in CFR 47	Result	Test by
Antenna requirement	15.203 RSS-Gen Section 6.8	Pass	/
Conducted emission	15.207 RSS-Gen Section 8.8	Pass	Peter Huang
Transmitter field strength	15.231(b) RSS210 Annex D	Pass	Yvan
Radiated emission and	15.205 and 15.209 RSS-210 D&	Pass	Jason
Restricted band	RSS-Gen Clause 8.9&8.10		Huang
Occupied Bandwidth	15.215 RSS-Gen 6.7	Pass	Yvan
Release time	15.231(a)(2) RSS-210 D	Pass	Yvan

#### Remarks:

- 1. Pass: The EUT complies with the essential requirements in the standard.
- 2. Test according to ANSI C63.10:2013
- 3. Note: Compliance determination rules
- 1). The Compliance determination of test results does not take into account measurement uncertainty. Measurement results are determined based on regulatory limitations or requirements specified by the applicant/manufacturer. If measurement uncertainty is taken into account, the applicant/manufacturer will bear all possible risks of non-compliance.
- 2). The measurement uncertainty please refer to each test result in the "Measurement Uncertainty"

#### **Measurement Uncertainty**

Uncertainty Criterion	Measurement Uncertainty	Notes
±5%	±0.55%	(1)
±1.5dB	±0.99dB	(1)
±3dB	±0.61dB	(1)
±3dB	±0.64dB	(1)
±6dB	± 2.64dB	(1)
±6dB	±4.32 dB	(1)
±6dB	±4.56 dB	(1)
	±1.5dB ±3dB ±3dB ±6dB ±6dB	±1.5dB     ±0.99dB       ±3dB     ±0.61dB       ±3dB     ±0.64dB       ±6dB     ±2.64dB       ±6dB     ±4.32 dB

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.



## 2 General Information

## 2.1 General Description of EUT

<u> </u>
Phone As Key
PAK
N/A
Engineer sample
N/A
N/A
433.92MHz
1
N/A
ASK
PCB Antenna
-11.89dBi Max (Declare by applicant)
DC 3.7V
Please refer to User's Manual

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual



2.2 Test mode

Test mode	Description
Mode 1	TX Mode:  During test, Keep EUT is in continuous transmission mode, New battery is used during all test.

Report No.: ET-24081218E02

## 2.3 Description of Support Units

Equipmo	ent	Model	S/N	Manufacturer
Adapte	er	HW-050200CH0	/	Xiaomi

## 2.4 Test Facility

Test laboratory: Shenzhen ETR Standard Technology Co., Ltd.

CNAS Registration Number: L11864
A2LA Certificate Number: 6640.01
FCC Designation Number: CN1326
FCC Test Firm Registration: 183064
IC Company Number: 28440

## 2.5 Test Location

All tests were performed at:

Laboratory location:

No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
+86 755 85259392
Fax: +86 755 27219460

#### 2.6 Additional Instructions

None.

Tel:(86-755) 85259392 Email:etr800@etrtest.com Web: www.etrlab.cn No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



## 3 Test Instruments list

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	100605	2024.3.12	2025.3.11
2	EMI Test Receiver	Rohde&schwarz	ESCI3	102696	2024.3.12	2025.3.11
3	Loop Antenna	schwarabeck	FMZB 1519 B	FMZB 1519 B	2024.3.19	2026.3.18
4	Broadband antenna	schwarabeck	VULB9168	1064	2024.3.19	2026.3.18
5	Horn antenna	schwarabeck	BBHA9120D	9120D-1145	2024.3.19	2026.3.18
6	amplifier	EMtrace	RP01A	50117	2024.3.12	2025.3.11
7	Artificial power network	schwarabeck	NSLK8127	8127483	2024.3.12	2025.3.11
8	Artificial power network	ETS	3186/2NM	1132	2024.3.12	2025.3.11
9	10dB attenuator	HUBER+SUHNE R	10dB	/	2024.3.12	2025.3.11
10	amplifier	Space-Dtronics	EWLAN0118 G-P40	19113001	2024.3.12	2025.3.11
11	Filter	Xingbo	XBLBQ- GTA19	210410-3-1	2024.3.12	2025.3.11
12	Spectrum analyzer	KEYSIGHT	N9020A	MY55370280	2024.3.12	2025.3.11
13	Power detector box	MWRFtest	MW100-PSB	MW201020JYT	2024.3.12	2025.3.11

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

Software Name	Software Name Manufacturer		Version
Conducted	Farad	EZ-EMC	Ver.EMC-CON 3A1.1
Radiated	Farad	EZ-EMC	Ver.FA-03A2 RE



## 4 Test results and Measurement Data

## 4.1 Antenna requirement

#### Standard requirement:

#### FCC part 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.

#### RSS-Gen 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

#### **EUT Antenna:**

The antenna is PCB antenna, the best case gain of the antenna is -11.89dBi, reference to the appendix II for details

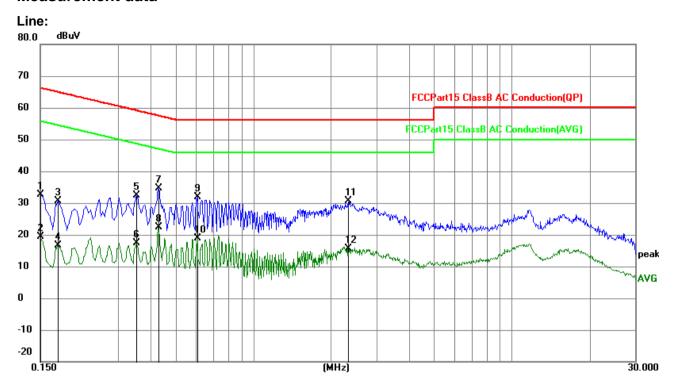


## 4.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, S	weep time=auto					
Limit:	Fraguenou ronge (MHz)	Limit (	dBuV)				
	Frequency range (MHz)	Quasi-peak	Average				
	0.15-0.5	66 to 56*	56 to 46*				
	0.5-5	56	46				
	5-30	60	50				
Toot ootun	* Decreases with the logarithn	n or the frequency.					
Test setup:		Reference Plane					
	LISN	40cm LISI	v				
	Remark E.U.T Remark E.U.T Remark E.U.T Remark E.U.T Remark E.U.T Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m						
Test procedure:	The E.U.T and simulators a line impedance stabilization 500hm/50uH coupling impe	n network (L.I.S.N.). Th	nis provides a				
	2. The peripheral devices are LISN that provides a 50ohr termination. (Please refer to photographs).	m/50uH coupling impe	dance with 50ohm				
	3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.						
Test Instruments:	Refer to section 3.0 for details	3					
Test mode:	Refer to section 2.2 for details						
Test environment:	Temp.: 24.0 °C Hu	ımid.: 42%	Press.: 1012mbar				
Test voltage:	AC 120V	ı L	, , , ,				
Test results:	Pass						

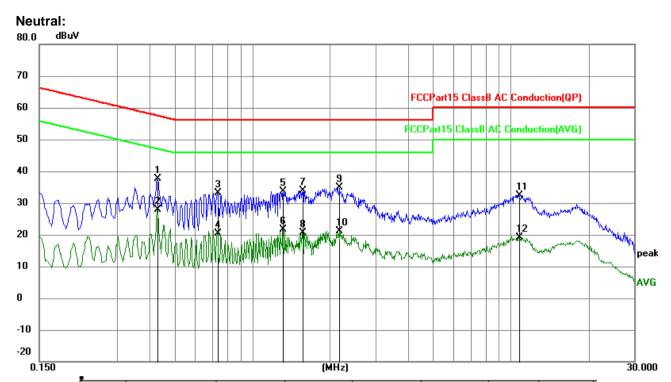


## Measurement data



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	22.86	9.80	32.66	66.00	-33.34	QP
2	0.1500	9.52	9.80	19.32	56.00	-36.68	AVG
3	0.1758	20.87	9.81	30.68	64.68	-34.00	QP
4	0.1758	6.81	9.81	16.62	54.68	-38.06	AVG
5	0.3523	22.48	9.88	32.36	58.91	-26.55	QP
6	0.3523	7.59	9.88	17.47	48.91	-31.44	AVG
7	0.4289	24.78	9.91	34.69	57.27	-22.58	QP
8	0.4289	12.49	9.91	22.40	47.27	-24.87	AVG
9	0.6088	21.86	9.94	31.80	56.00	-24.20	QP
10	0.6088	8.97	9.94	18.91	46.00	-27.09	AVG
11	2.3233	20.78	9.85	30.63	56.00	-25.37	QP
12	2.3233	5.84	9.85	15.69	46.00	-30.31	AVG





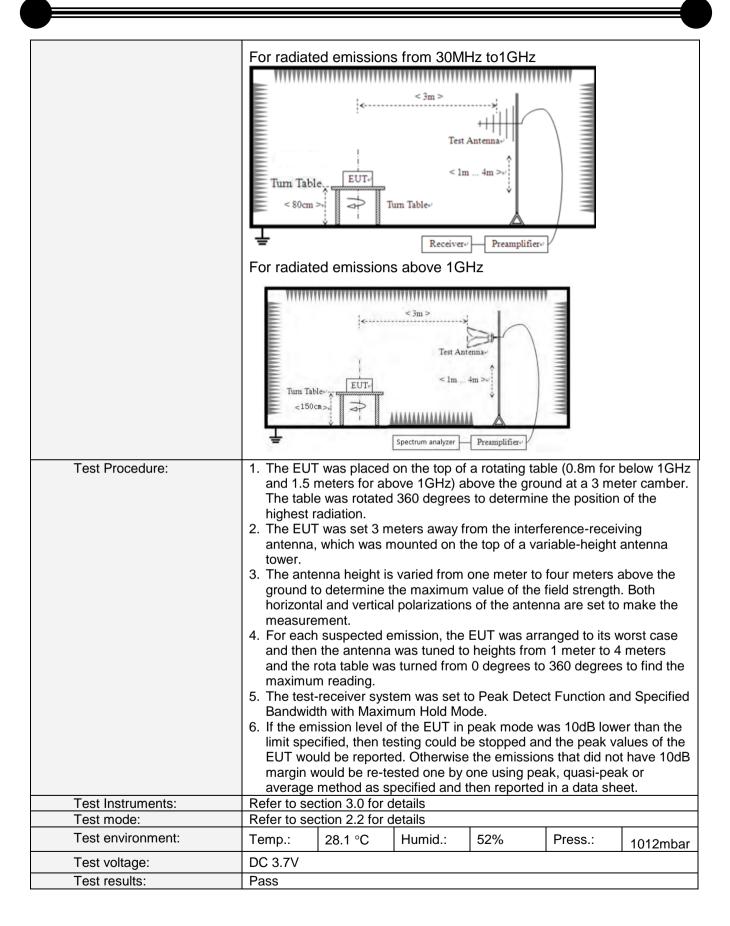
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4289	27.81	9.91	37.72	57.27	-19.55	QP
2	0.4289	18.07	9.91	27.98	47.27	-19.29	AVG
3	0.7347	23.13	9.94	33.07	56.00	-22.93	QP
4	0.7347	10.55	9.94	20.49	46.00	-25.51	AVG
5	1.3149	23.59	9.92	33.51	56.00	-22.49	QP
6	1.3149	11.72	9.92	21.64	46.00	-24.36	AVG
7	1.5669	23.88	9.90	33.78	56.00	-22.22	QP
8	1.5669	10.71	9.90	20.61	46.00	-25.39	AVG
9	2.1749	24.95	9.85	34.80	56.00	-21.20	QP
10	2.1749	11.22	9.85	21.07	46.00	-24.93	AVG
11	10.7835	22.66	9.82	32.48	60.00	-27.52	QP
12	10.7835	9.38	9.82	19.20	50.00	-30.80	AVG



## 4.3 Radiated Emission Measurement

4.5 Radiated Emission	weasurement					
Test Requirement:	FCC Part15 C S				and 15.205	ō(a).
To at Marth at 1	RSS-210 D & R					
Test Method: Test site:	ANSI C63.10: 2			n		
		Measurement Distance: 3m			Damark	
Receiver setup:	Frequency		etector	RBW	VBW	Remark
	9kHz- 150kHz	Qua	ısi-peak	200Hz	300Hz	Quasi-peak Value
	150kHz-	Oua	ısi-peak	9kHz	10kHz	Quasi-peak Value
	30MHz	Qua	isi-peak	SKIIZ	TUKITZ	Quasi-peak value
	30MHz-	Oua	si-peak	120KHz	300KHz	Quasi-peak Value
	1GHz	Quu	or pour	1201112	0001112	Quasi peak value
		F	Peak	1MHz	3MHz	Peak Value
	Above 1GHz		Peak	1MHz	10Hz	Average Value
Limit:				strength of	· .	strength of spurious
(Field strength of the	Fundament	tal		ndamental	11010	emissions
fundamental signal)	frequency (M			ovolts/meter)	) (m	nicrovolts/meter)
- ,	40.66-40.7		,	2.250	,	225
	70-130			1.250		125
	130-174		112	50 to 3750		1125 to 375
	174-260			3.750		375
	260-470		1375	50 to 12500		1375 to 1250
	Above 470	0		12500		1250
Limit:	Freque	ency		Limit (u		Remark
(Spurious Emissions)	0.009MHz-0			2400/F(kHz) @300m		Quasi-peak Value
	0.490MHz-1			24000/F(kH		Quasi-peak Value
	1.705MHz-3			30 @3		Quasi-peak Value
	30MHz-8			100 @		Quasi-peak Value
	88MHz-2			150 @3m		Quasi-peak Value
	216MHz-9			200 @		Quasi-peak Value
	960MHz-	·1GHz		500 @3m		Quasi-peak Value
	Above 1	GHz	<u> </u>	500 @3m 5000 @3m		Average Value Peak Value
Limit:	Emissions radio	tod or	utaida af			bands, except for
(band edge)						w the level of the
(band edge)						in Section 15.209,
	whichever is the					7 117 00011011 10.200;
Test setup:					ON 41 I—	
	For radiated e	missi	ons iron	1 9KHZ 10 31	JIVIMZ	
	- 11111111111111	11111111	,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	111111111111111	"" =
	E					3
	E		<	3m >		3
	E	<		)	1	3
	E	i		T	1	3
	Turn Table EUT-    Som >   Turn Table-					
	- 80cm					
	<u> </u>					
	=			Receive	T+	







#### **Measurement Data**

## 4.3.1 Field Strength of Fundamental

#### Peak value:

Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
433.92	91.90	-16.01	75.89	100.83	-24.94	Vertical
433.92	93.22	-16.01	77.21	100.83	-23.62	Horizontal

## Average value:

Frequency (MHz)	Peak Level (dBuV/m)	DC Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
433.92	75.89	-6.51	69.38	80.83	-11.45	Vertical
433.92	77.21	-6.51	70.70	80.83	-10.13	Horizontal

Remark: Average=Peak+ Duty Cycle factor (see 4.5 clause)



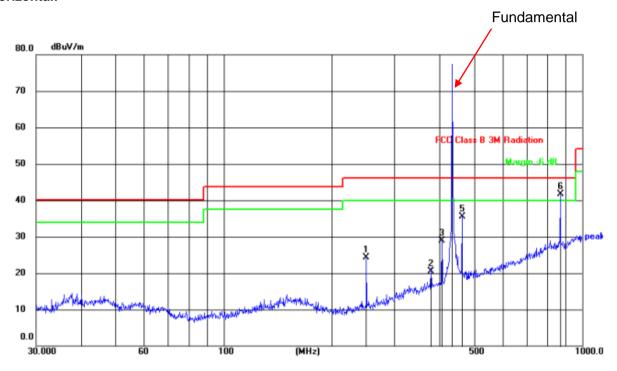
## 4.3.2 Spurious emissions and Bandedge

#### ■ Below 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

#### ■ Below 1GHz

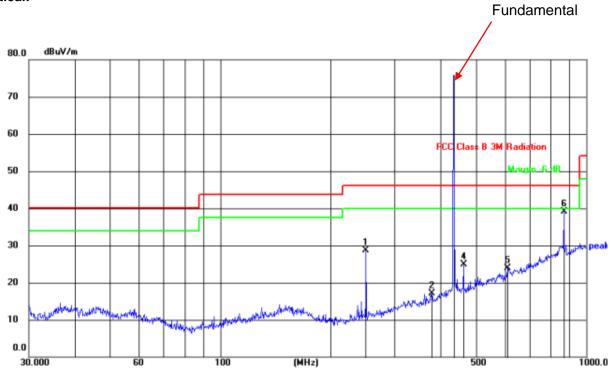
#### Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	250.3010	46.48	-22.25	24.23	46.00	-21.77	QP
2	378.5842	38.62	-18.03	20.59	46.00	-25.41	QP
3	406.0880	45.97	-17.04	28.93	46.00	-17.07	QP
4	462.3455	51.06	-15.54	35.52	46.00	-10.48	QP
5	869.1300	47.60	-5.95	41.65	60.83	-19.18	QP







No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	250.3009	51.04	-22.25	28.79	46.00	-17.21	QP
2	378.5842	35.08	-18.03	17.05	46.00	-28.95	QP
3	462.3455	40.50	-15.54	24.96	46.00	-21.04	QP
4	609.9215	35.24	-11.33	23.91	46.00	-22.09	QP
5	869.1300	45.03	-5.95	39.08	60.83	-21.75	QP



#### ■ Above 1GHz

#### Peak value:

No.	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Polar
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(H/V)
1	1301.332	64.75	-15.66	49.09	80.83	-31.74	Horizontal
2	1736.483	64.73	-15.90	48.83	74.00	-25.17	Horizontal
3	2168.510	58.20	-15.38	42.82	74.00	-31.18	Horizontal
4	2603.351	63.22	-13.64	49.58	74.00	-24.42	Horizontal
1	1301.174	64.18	-15.66	48.52	74.00	-25.48	Vertical
2	1736.273	57.27	-15.90	41.37	74.00	-32.63	Vertical
3	2168.247	56.77	-15.38	41.39	74.00	-32.61	Vertical
4	2608.020	66.14	-13.63	52.51	74.00	-21.49	Vertical

### Average value:

J. u.g.	4.40.						
No	Frequency	Peak	DC Factor	Result	Limits	Margin	Polar
No.	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(H/V)
1	1301.332	49.71	-6.51	43.20	60.83	-17.63	Horizontal
2	1736.483	49.46	-6.51	42.95	54.00	-11.05	Horizontal
3	2168.510	43.43	-6.51	36.92	54.00	-17.08	Horizontal
4	2603.351	50.13	-6.51	43.62	54.00	-10.38	Horizontal
1	1301.174	49.15	-6.51	42.64	54.00	-11.36	Vertical
2	1736.273	42.00	-6.51	35.49	54.00	-18.51	Vertical
3	2168.247	42.00	-6.51	35.49	54.00	-18.51	Vertical
4	2608.020	53.06	-6.51	46.55	54.00	-7.45	Vertical

## Remark:

- 1. Final Level =Receiver Read level +Correction Factor(Antenna Factor + Cable Loss Preamplifier Factor)
- 2. The emission levels of other frequencies are more than 20 dB below the limit and not show in test report.
- 3. "\*", means this data is the too weak instrument of signal is unable to test.
- 4. Average=Peak+ Duty Cycle factor

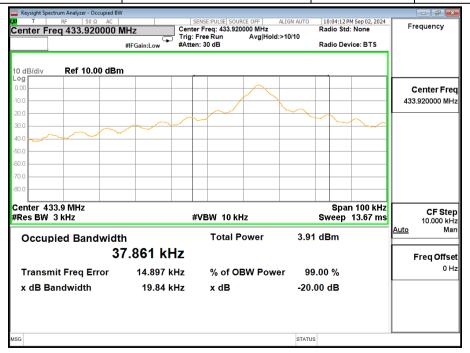


## 4.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231		
Test Method:	ANSI C63.10:2013		
Limit:	20dB bandwidth of the emissions shall not exceed 0.25% of the center frequency		
Test setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane		
Test Procedure:	With the EUT's antenna attached, the EUT's 20dB Bandwidth power		
rest i locedule.	was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.		
Test Instruments:	Refer to section 3.0 for details		
Test mode:	Refer to section 2.2 for details		
Test results:	Pass		

#### **Measurement Data**

Center Frequency	20dB bandwidth(kHz)	Limit(kHz)	Result
433.92MHz	19.840	1084.8	Pass



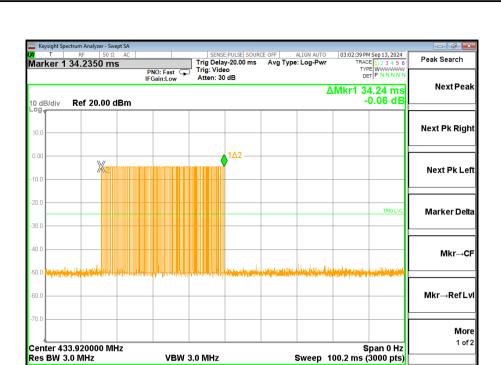


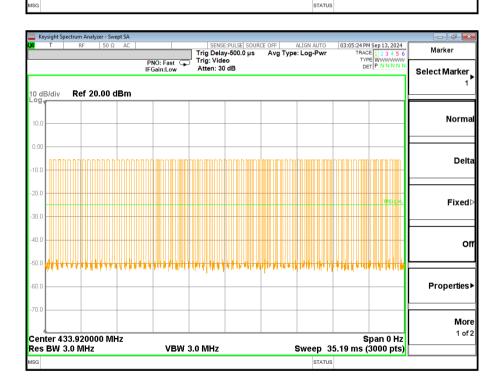
## 4.5 DUTY CYCLE

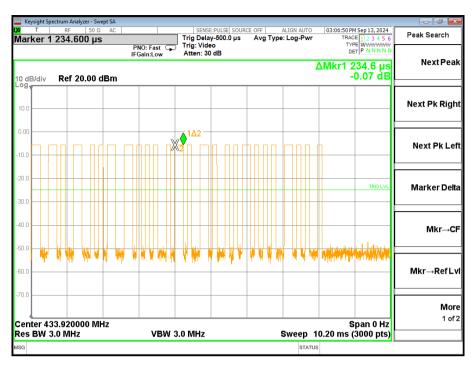
Test Requirement:	FCC Part15 C Section 15.231		
Test Method:	ANSI C63.10:2013		
Limit:	N/A		
Test setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane		
Test Procedure:	<ol> <li>The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.</li> <li>The Duty Cycle Was Determined By The Following Equation: To Calculate The Actual Field Intensity, The Duty Cycle Correction Factor In Decibel Is Needed For Later Use And Can Be Obtained From Following Conversion         Duty Cycle(%)=Total On Interval In A Complete Pulse Train/ Length Of A Complete Pulse Train * %         Duty Cycle Correction Factor(Db)=20 * Log10(Duty Cycle(%)     </li> </ol>		
Test Instruments:	Refer to section 3.0 for details		
Test mode:	Refer to section 2.2 for details		
Test results:	Pass		

#### Test data:

Ton = (43\*0.1088ms)+(49\*0.2346ms) = 16.1738msTp=34.24ms Duty cycle= Ton/ Tp\*100%=16.1738/34.24\*100%=47.24% DC Correction Factor= 20log (Duty cycle) =20log (0.4724) =-6.51











## 4.6 Release time

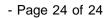
Test Requirement:	FCC Part15 C Section 15.231		
Test Method:	ANSI C63.10:2013		
Limit:	5s		
Test setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane		
Test Procedure:	The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below. Spectrum Setting: RBW= 1MHz, VBW=3MHz, Sweep time = 10s. Note:  (1)Refer to the plot (As Below), We find a manumotive operated transmitter shall employ a switch that will automatically deactivate the transmitteri immediately, within not more than 5 seconds of being released.  (2)The EUT is comply with FCC PART 15 clause 15.231(a)(1). Manumotive working mode are pre-tested. and only the worst result is reported		
Test Instruments:	Refer to section 3.0 for details		
Test mode:	Refer to section 2.2 for details		
Test results:	Pass		



#### Test Result:

Cease time(s)	Limit(s)	Result
0.228	5	Pass







5 T	est	Setu	p Pl	hoto
-----	-----	------	------	------

Reference to the **appendix I** for details.

## 6 EUT Constructional Details

Reference to the appendix II for details.

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