# **TEST REPORT**

Reference No	WTX24X06141681W001
FCC ID	2AUTE-2DT23J
Applicant	Xiamen Hanin Co.,Ltd.
Address	Room 305A, Angye Building, Pioneering Park,Torch High-tech,Zone, Xiamen, China
Manufacturer	Xiamen Hanin Co.,Ltd.
Address	Room 305A, Angye Building, Pioneering Park, Torch High-tech, Zone, Xiamen, China
Product Name	Portable Label Printer
Model No	HCL-2DT23J
Standards	FCC Part 15.247
Date of Receipt sample :	2024-06-18
Date of Test	2024-06-18 to 2024-06-28
Date of Issue	2024-06-28
Test Report Form No	WTX_Part 15_247W
Test Result	Pass

Remarks:

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 approver.

## Prepared By:

#### Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:

rushan chen

Approved by:

Dashan Chen

Jason Su

Waltek Testing Group (Shenzhen) Co., Ltd. Http://www.waltek.com.cn

# TABLE OF CONTENTS

1. GENERAL INFORMATION	4
<ul> <li>1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)</li> <li>1.2 TEST STANDARDS</li></ul>	5 5 6 8
2. SUMMARY OF TEST RESULTS	. 12
3. ANTENNA REQUIREMENT	
3.1 STANDARD APPLICABLE	
3.2 EVALUATION INFORMATION	
4. FREQUENCY HOPPING SYSTEM REQUIREMENTS	
4.1 STANDARD APPLICABLE	.14
4.2 FREQUENCY HOPPING SYSTEM	
4.3 EUT PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	
5. FIELD STRENGTH OF SPURIOUS EMISSIONS	
5.1 STANDARD APPLICABLE	.16
5.2 Test Procedure	
5.3 CORRECTED AMPLITUDE & MARGIN CALCULATION	
APPENDIX PHOTOGRAPHS	. 22

# **Report version**

Version No.	Date of issue	Description
Rev.00	2024-06-28	Original
/	/	1

# **1. GENERAL INFORMATION**

## **1.1 Product Description for Equipment Under Test (EUT)**

General Description of EUT	
Product Name:	Portable Label Printer
Trade Name	1
Model No.:	HCL-2DT23J
Adding Model(s):	HM-T260, HM-T260M, HM300-M26, HM26, HM26M, HM-T261, HM-T261M, HM-T262, HM-T262M, HM-T263, HM-T263M, HM-T264, HM-T264M, HM-T265, HM-T265M, HM-T266, HM-T266M, T260, T260M, BMTU26, BMTU26M, HM-T260 Pro, HM-T260L
Rated Voltage:	DC3.7V
Battery Capacity:	1200mAh
Adapter Model:	1
Note: The test data is gathered from a	production sample, provided by the manufacturer. The appearance of
others models listed in the report is o	lifferent from main-test model HCL-2DT23.1 but the circuit and the

others models listed in the report is different from main-test model HCL-2DT23J, but the circuit and the electronic construction do not change, declared by the manufacturer.

Technical Characteristics of EUT		
Bluetooth Version:	V4.0 (BR mode)	
Frequency Range:	2402-2480MHz	
RF Output Power:	-3.23dBm (Conducted)	
Data Rate:	1Mbps	
Modulation:	GFSK	
Quantity of Channels:	79	
Channel Separation:	1MHz	
Type of Antenna:	PCB Antenna	
Antenna Gain:	0.5dBi	
Note The Antenna Gain is provided by the customer and can affect the validity of results.		

# 1.2 Test Standards

The tests were performed according to following standards:

**FCC Rules Part 15.247**: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

**<u>558074 D01 15.247 Meas Guidance v05r02</u>**: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under section 15.247 of the FCC rules.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, the equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

## 1.4 Test Facility

## Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd. Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

#### FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is mai ntained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

## Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List				
Test Mode	Description	Remark		
TM1	Low Channel	2402MHz		
TM2	Middle Channel	2441MHz		
TM3	High Channel	2480MHz		
TM4	Hopping	2402-2480MHz		

Iodulation Configure			
Modulation	Packet	Packet Type	Packet Size
	DH1	4	27
GFSK	DH3	11	183
	DH5	15	339
π/4 DQPSK	2DH1	20	54
	2DH3	26	367
	2DH5	30	679
8DPSK	3DH1	24	83
	3DH3	27	552
	3DH5	31	1021

Test Conditions		
Temperature:	22~25 °C	
Relative Humidity:	45~55 %	
ATM Pressure:	1019 mbar	

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	0.5	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Adapter	JIEYUAN	JY-2000-CE-XSZ	/
Phone	XIAOMI	MI10	/

# **1.6 Measurement Uncertainty**

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
	Radiated	30-200MHz ±4.52dB
Transmitter Spurious Emissions		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-26GHz ±3.92dB

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A 1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2024-02-24	2025-02-23
WTXE1005A 1005	Spectrum Analyzer	Agilent	N9020A	US471401 02	2024-03-19	2025-03-18
WTXE1084A 1001	Spectrum Analyzer	Agilent	N9020A	MY543205 48	2024-02-24	2025-02-23
WTXE1004A 1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2024-02-27	2025-02-26
Chamber A:	Below 1GHz					
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2024-02-24	2025-02-23
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1007A 1001	Amplifier	HP	8447F	2805A034 75	2024-02-24	2025-02-23
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2024-02-24	2025-02-23
Chamber A:	Above 1GHz					
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2024-02-24	2025-02-23
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	2002	2024-02-27	2025-02-26
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2024-02-26	2025-02-25
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
Chamber B	Below 1GHz			•		
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A104 57	2024-02-24	2025-02-23

# 1.7 Test Equipment List and Details

Waltek Testing Group (Shenzhen) Co., Ltd. Http://www.waltek.com.cn

WTXE1001A	EMI Test	Rohde &					
1002	Receiver	Schwarz	ESPI	101391	2024-02-24	2025-02-23	
Chamber C	Below 1GHz						
WTXE1093A EMI Test		Rohde &		400404	0004 00 07	0005 00 00	
1001	Receiver	Schwarz	ESIB 26	100401	2024-02-27	2025-02-26	
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17	
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25	
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2024-02-24	2025-02-23	
Chamber C	: Above 1GHz	·					
WTXE1093A	EMI Test	Rohde &		100401	2024-02-27	2025 02 26	
1001	Receiver	Schwarz	ESIB 26	100401	2024-02-27	2025-02-26	
WTXE1103A 1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09	
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2024-02-27	2025-02-26	
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16	
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28	
Conducted	Room 1#	· · · · · ·					
WTXE1104A	EMI Test	Rohde &	ESCI	100525	2023-12-12	2024-12-11	
1029	Receiver	Schwarz	LOOI	100323	2020-12-12	2024-12-11	
WTXE1002A 1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2024-02-24	2025-02-23	
WTXE1003A 1001	AC LISN	Schwarz beck	NSLK8126	8126-279	2024-02-24	2025-02-23	
Conducted	Room 2#				·	·	
WTXE1001A	EMI Test	Rohde &	ESPI	101259	2024-02-24	2025-02-23	
1004	Receiver	Schwarz	LOFI	101209	2024-02-24	2020-02-20	
WTXE1003A 1003	LISN	Rohde & Schwarz	ENV 216	100097	2024-02-24	2025-02-23	

Software List								
Description	Manufacturer	Model	Version					
EMI Test Software	Farad	EZ-EMC						
(Radiated Emission)*	raiau		RA-03A1					
EMI Test Software								
(Conducted Emission Room	Farad	EZ-EMC	RA-03A1					
1#)*								
EMI Test Software								
(Conducted Emission Room	SKET	EMC-I	V2.0					
2#)*								

\*Remark: indicates software version used in the compliance certification testing.

# 2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	N/A
§15.207(a)	Conducted Emission	N/A
§15.209(a)	Radiated Spurious Emissions	Compliant
§15.247(a)(1)(iii)	Quantity of Hopping Channel	N/A
§15.247(a)(1)	Channel Separation	N/A
§15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	N/A
§15.247(a)	20dB Bandwidth	N/A
§15.247(b)(1)	RF Power Output	N/A
§15.247(d)	Band Edge (Out of Band Emissions)	N/A
§15.247(a)(1)	Frequency Hopping Sequence	N/A
§15.247(g), (h)	Frequency Hopping System	Compliant

Class II Permissive Change: Report a new battery, with no changes made to other circuits and wireless components.

Note: Report is for Class II Permissive Change only. Updated test data include Antenna Requirement, Radiated Spurious Emissions and Frequency Hopping System. The test data refer to Original equipment (FCC ID: 2AUTE-2DT23J), the original FCC ID issue date: 07/02/2023.

# 3. Antenna Requirement

## 3.1 Standard Applicable

According to FCC Part 15.203, 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 shall be considered sufficient to comply with the provisions of this section.

## **3.2 Evaluation Information**

This product has a PCB antenna, fulfill the requirement of this section.

# 4. Frequency Hopping System Requirements

#### 4.1 Standard Applicable

According to FCC Part 15.247(a)(1), the system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

## 4.2 Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1MHz each; centred from 2402 to 2480MHz) in the range 2,400-2,483.5MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good"

channels, away from the areas of interference, thus having no impact on the bandwidth used. This device was tested with a Bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for 558074 D01 15.247 Meas Guidance v05r02 and FCC Part 15.247 rule.

## 4.3 EUT Pseudorandom Frequency Hopping Sequence

Pseudorandom Frequency Hopping Sequence Table as below:

Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45 etc.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

# 5. Field Strength of Spurious Emissions

## 5.1 Standard Applicable

According to §15.247(d), in any 100kHz 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 20dB below that in the 100kHz 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 30dB instead of 20dB. 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).

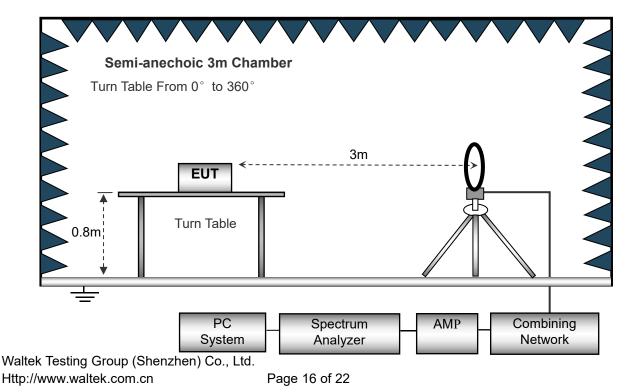
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

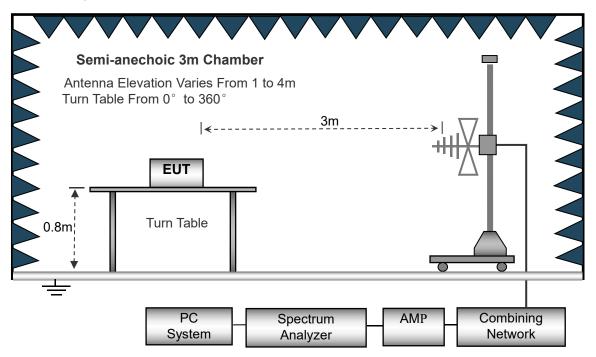
#### 5.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

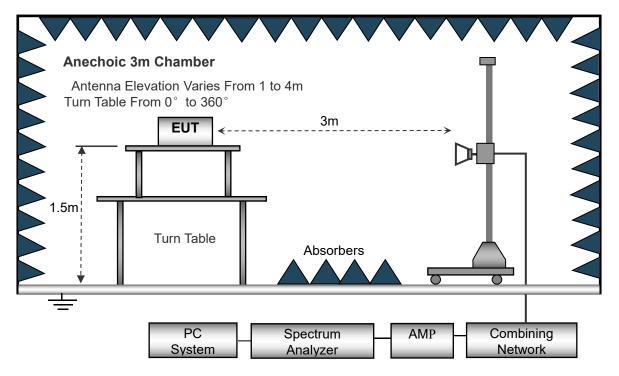
The test setup for emission measurement below 30MHz.





The test setup for emission measurement from 30MHz to 1GHz.

The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

## 5.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

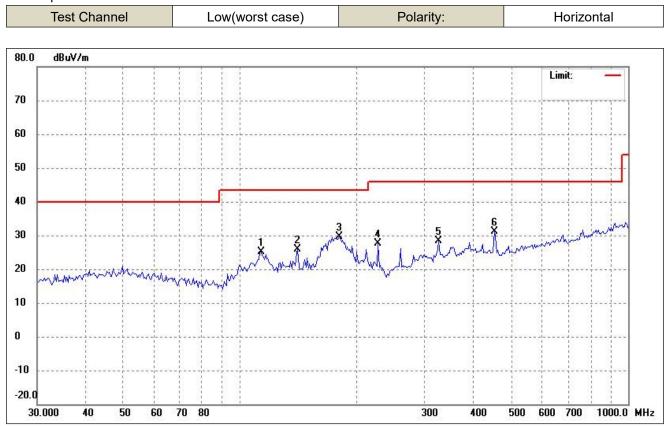
Corr. Ampl. = Indicated Reading + Correct Correct = Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - FCC Part 15 Limit

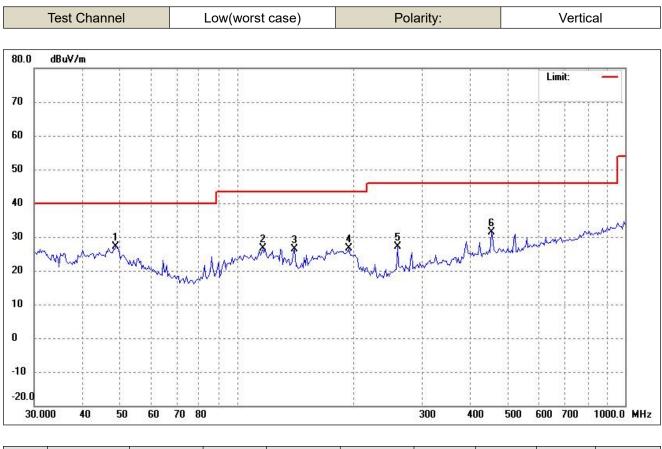
## 5.4 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported. All test modes (different data rate and different modulation) are performed, but only the worst case (GFSK) is recorded in this report.



## Spurious Emissions Below 1GHz

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	113.2198	36.32	-11.24	25.08	43.50	-18.42	-	-	peak
2	140.7766	35.19	-9.37	25.82	43.50	-17.68	-	-	peak
3	180.0303	39.84	-10.32	29.52	43.50	-13.98	-	-	peak
4	227.0164	39.49	-11.76	27.73	46.00	-18.27	-	-	peak
5	324.8643	35.97	-7.55	28.42	46.00	-17.58	-	-	peak
6	452.0011	35.80	-4.56	31.24	46.00	-14.76	-	-	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	48.7190	35.35	-8.18	27.17	40.00	-12.83	-	-	peak
2	116.4475	37.65	-10.90	26.75	43.50	-16.75	-	-	peak
3	140.7766	35.77	-9.37	26.40	43.50	-17.10	-	-	peak
4	194.4985	38.28	-11.67	26.61	43.50	-16.89	-	-	peak
5	259.4433	36.98	-9.79	27.19	46.00	-18.81	-	-	peak
6	452.0011	35.83	-4.56	31.27	46.00	-14.73	-	-	peak

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector	
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V		
Low Channel-2402MHz								
4804.000	53.80	-12.67	41.13	74.00	-32.87	Н	PK	
7206.000	53.73	-6.21	47.52	74.00	-26.48	Н	PK	
4804.000	55.61	-12.67	42.94	74.00	-31.06	V	PK	
7206.000	53.94	-6.21	47.73	74.00	-26.27	V	PK	
			Middle Chan	nel-2441MHz				
4882.000	54.98	-12.56	42.42	74.00	-31.58	Н	PK	
7323.000	54.55	-6.50	48.05	74.00	-25.95	Н	PK	
4882.000	54.40	-12.56	41.84	74.00	-32.16	V	PK	
7323.000	54.14	-6.50	47.64	74.00	-26.36	V	PK	
			High Chann	el-2480MHz				
4960.000	54.93	-12.44	42.49	74.00	-31.51	Н	PK	
7440.000	53.88	-6.80	47.08	74.00	-26.92	Н	PK	
4960.000	55.89	-12.44	43.45	74.00	-30.55	V	PK	
7440.000	53.82	-6.80	47.02	74.00	-26.98	V	PK	

#### Spurious Emissions Above 1GHz

Note: 1. Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

2. Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

# **APPENDIX PHOTOGRAPHS**

Please refer to "ANNEX"

\*\*\*\*\* END OF REPORT \*\*\*\*\*