

	ST REPOR	Т	
Report No	CHTEW22110125	Report Verification:	
Project No	SHT2211001301EW		
FCC ID	2ASWW-PK4G		Reportivo: ChiteW22210125
Applicant's name:	XINCHUANGXIN INTERNA	TIONAL CO.,LTD	
Address	ROOM 605 6/F, FA YUEN O YUEN STREET MONGKOK		DING, 75-77 FA
Product Name:	Feature phone		
Trade Mark	CORN		
Model No	Power K 4G		
Listed Model(s)			
Standard:	FCC CFR Title 47 Part 15 S	Subpart C Section 1	5.247
Date of receipt of test sample:	Nov. 02, 2022		
Date of testing	Nov. 03, 2022- Nov. 21, 202	2	
Date of issue	Nov. 22, 2022		
Result:	PASS		
Compiled by (Position+Printed name+Signature):	File administrator Silvia Li	Sil	via Li ung.Xiang
Supervised by (Position+Printed name+Signature):	Project Engineer Weiyang X	iang J	JJ
Approved by (Position+Printed name+Signature):	RF Manager Hans Hu	Ho	msHy
Testing Laboratory Name::	Shenzhen Huatongwei Inte	ernational Inspectio	n Co., Ltd.
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The test report merely correspond to the test sample.

2022-11-22

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- <u>FCC Rules Part 15.247</u>: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices
- KDB 558074 D01 15.247 Meas Guidance v05r02: 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

1.2. Report version

Revision No.	Date of issue	Description
N/A	2022-11-22	Original

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2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247 (c)	PASS	Xiaoqin Li
5.2	AC Conducted Emission	15.207	PASS	Xiaoqin Li
5.3	Peak Output Power	15.247 (b)(1)	PASS	Xiaoqin Li
5.4	20 dB Bandwidth	15.247 (a)(1)	PASS	Xiaoqin Li
5.5	99% Occupied Bandwidth	-	PASS ^{*1}	Xiaoqin Li
5.6	Carrier Frequency Separation	15.247 (a)(1)	PASS	Xiaoqin Li
5.7	Hopping Channel Number	15.247 (a)(1)	PASS	Xiaoqin Li
5.8	Dwell Time	15.247 (a)(1)	PASS	Xiaoqin Li
5.9	Duty Cycle Correction Factor	-	PASS ^{*1}	Xiaoqin Li
5.10	Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	PASS	Xiaoqin Li
5.11	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS	Quanhai Deng
5.12	Radiated Band Edge Emission	15.205/15.209	PASS	Quanhai Deng
5.13	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS	Quanhai Deng

Note:

- The measurement uncertainty is not included in the test result.

*1: No requirement on standard, only report these test data.

2022-11-22

3. SUMMARY

3.1. Client Information

Applicant:	XINCHUANGXIN INTERNATIONAL CO.,LTD	
Address:	ROOM 605 6/F, FA YUEN COMMERCIAL BUILDING, 75-77 FA YUEN STREET MONGKOK KL	
Manufacturer:	Shenzhen Chiteng Technology Co.,LTD	
Address:	Second Floor,Area A, Building 4, Huiye Technology Workshop, Guanguang Road, Tangjia Community, Gongming Street, Guangming New District, Shenzhen, Guangdong	

3.2. Product Description

Main unit information:		
Product Name:	Feature phone	
Trade Mark:	CORN	
Model No.:	Power K 4G	
Listed Model(s):	-	
Power supply:	DC3.7V from battery	
Hardware version:	ZS621T_MB_V1.0	
Software version:	ZS583T_240320_A24408_PowerK4G_CORN_EnFrPoSp_V01_ 20221120	
Accessory unit information:		
Battery information:	3.7Vdc, 4000mAh	
Adapter information:	Model:FSF-02 Input: AC100-240V, 50/60Hz,0.15 A Output: 5.0Vdc, 500mA	

3.3. Radio Specification Description

Bluetooth version:	V4.0
Support function ^{*2} :	EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Interna Antenna
Antenna gain:	-2.7dBi

Note:

*2: only show the RF function associated with this report.

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.		
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China		
Connect information:	Phone: 86-755-26715499 E-mail: <u>cs@szhtw.com.cn</u> <u>http://www.szhtw.com.cn</u>		
Qualifications	Туре	Accreditation Number	
Qualifications	FCC	762235	

4. TEST CONFIGURATION

4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

Channel	Frequency (MHz)	
00	2402	
01	2403	
:	÷	
39	2441	
:	:	
77	2479	
78	2480	

4.2. Descriptions of Test mode

Preliminary tests were performed in different data rates and recorded the RF output power in the clause 5.3

Note:

- 1) The manufacturer declare that the maximum power value of the product is set as a default value in the enter test mode software.
- 2) All the test data for each data rate were verified, found GFSK Modulation which is worse case mode

4.3. Test mode

The engineering test program was provided and enabled to make EUT continuous transmitting.				
Modulation / Data Rate				
Test Item	GFSK 1Mbps	π/4DQPSK 2Mbps	8DPSK 3Mbps	
Conducted test item	\checkmark	√	✓	
Radiated test item	\checkmark	-	-	

the highest RF output power at preliminary tests.

The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

4.4. Test sample information

Test item	HTW sample no.	
RF Conducted test items	Please refer to the description in the appendix report	
RF Radiated test items	YPHT22110013001	
EMI test items	YPHT22110013003	

Note:

RF Conducted test items: Peak Output Power, 20 dB Bandwidth, 99% Occupied Bandwidth, Carrier Frequency Separation, Hopping Channel Number, Dwell Time, Duty Cycle Correction Factor, Pseudorandom Frequency Hopping Sequence, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission EMI test items: AC Conducted Emission

4.5. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?			
✓ No			
Item	Equipment	Trade Name	Model No.
1			
2			

4.6. Testing environmental condition

Туре	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Peak Output Power	1.07
3	Power Spectral Density	1.07
4	6dB Bandwidth	0.002%
5	99% Occupied Bandwidth	0.002%
6	Duty cycle	-
7	Conducted Band Edge and Spurious Emission	1.68dB
8	Radiated Band Edge Emission	4.54dB for 30MHz-1GHz
0		5.10dB for above 1GHz
9	Padiated Spurious Emission	4.54dB for 30MHz-1GHz
9	Radiated Spurious Emission	5.10dB for above 1GHz

4.7. Statement of the measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.8. Equipment Used during the Test

•	Conducted E	mission					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
•	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2022/08/30	2023/08/29
•	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2022/08/29	2023/08/28
•	Pulse Limiter	R&S	HTWE0193	ESH3-Z2	101447	2022/08/29	2023/08/28
•	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLE X_142	EF-NM- BNCM-2M	2022/09/17	2023/09/16
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

•	Radiated emi	ssion-6th test sit	te				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2023/09/29
•	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2022/08/30	2023/08/29
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2024/04/05
•	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2024/04/05
•	Pre-Amplifer	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2022/11/04	2023/11/03
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2022/02/25	2023/02/24
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

•	Radiated em	ission-7th test s	ite				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2018/09/27	2023/09/26
•	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2022/08/25	2023/08/24
•	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
•	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/04/27	2023/04/26
•	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2022/11/04	2023/11/03
•	Broadband Pre- amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2022/02/28	2023/02/27
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	Test Software	Audix	N/A	E3	N/A	N/A	N/A

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Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2022/08/25	2023/08/24
•	Signal & Spectrum Analyzer	R&S	HTWE0262	FSW26	103440	2022/08/25	2023/08/24
•	Spectrum Analyzer	Agilent	HTWE0286	N9020A	MY50510187	2022/08/25	2023/08/24
•	Radio communication tester	R&S	HTWE0287	CMW500	137688-Lv	2022/08/25	2023/08/24
•	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

<u>REQUIREMENT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responseble 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.

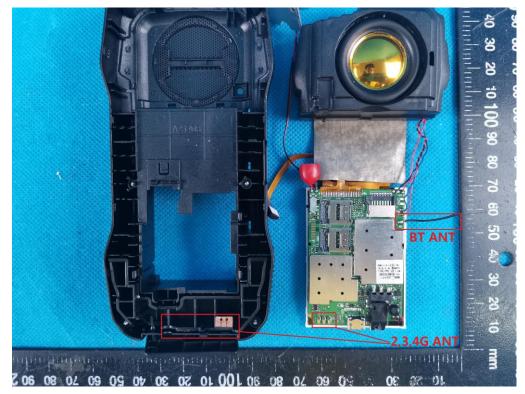
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULT

☑ Passed □ Not Applicable

The antenna type is a Interna Antenna, the directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. AC Conducted Emission

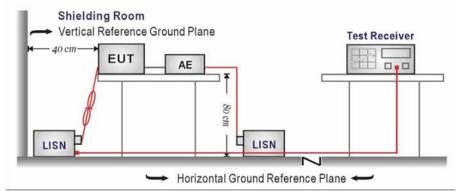
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

	Limit (d	BuV)
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

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup according to ANSI C63.10 requirements.
- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
- 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE

Please refer to the clause 4.3

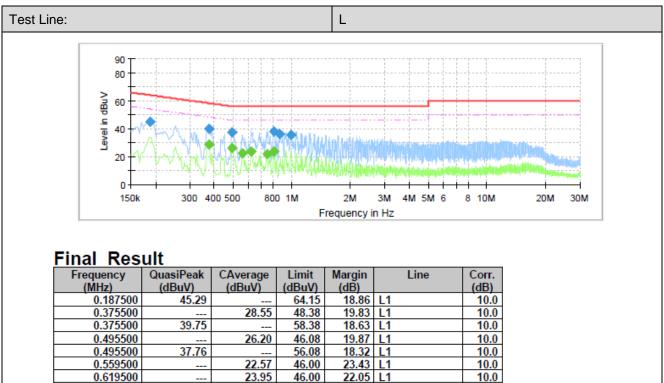
TEST RESULT

☑ Passed □ Not Applicable

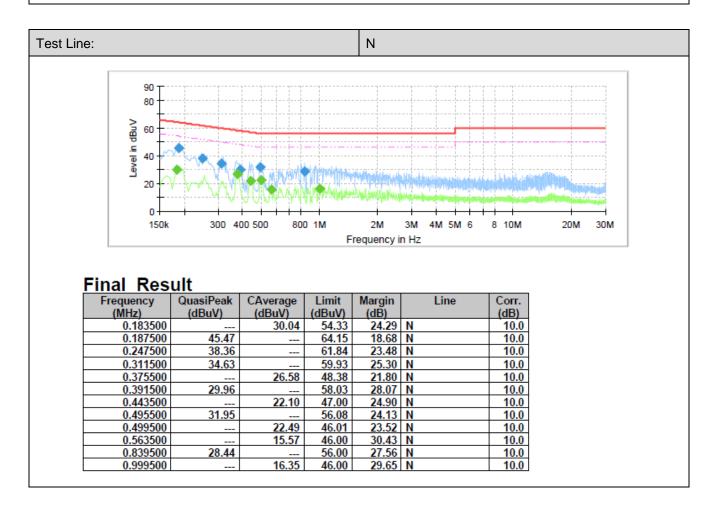
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Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Corr
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)		(dB)
0.187500	45.29		64.15	18.86	L1	10.
0.375500		28.55	48.38	19.83	L1	10.
0.375500	39.75		58.38	18.63	L1	10.
0.495500		26.20	46.08	19.87	L1	10
0.495500	37.76		56.08	18.32	L1	10
0.559500		22.57	46.00	23.43	L1	10
0.619500		23.95	46.00	22.05	L1	10
0.747500		22.10	46.00	23.90	L1	10
0.807500	38.06		56.00	17.94	L1	10.
0.811500		23.50	46.00	22.50	L1	10
0.867500	36.38		56.00	19.62	L1	10
0.995500	35.92		56.00	20.08	L1	10



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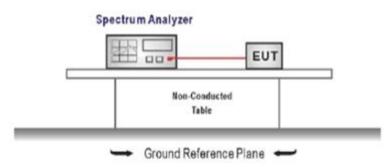
5.3. Peak Output Power

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1):

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 nonoverlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW≥ the 20 dB bandwidth of the emission being measured, VBW≥RBW Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

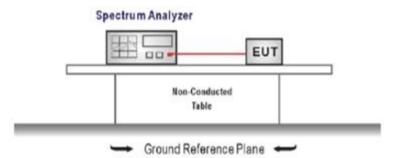
Please refer to appendix A on the appendix report

5.4. 20 dB Bandwidth

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW \ge 1% of the 20 dB bandwidth, VBW \ge RBW

- Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix B on the appendix report

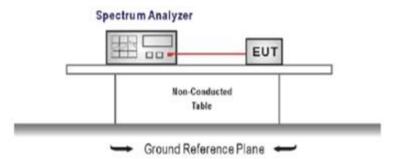
2022-11-22

5.5. 99% Occupied Bandwidth

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =channel center frequency Span≥1.5 x OBW RBW = 1%~5%OBW VBW ≥ 3 × RBW Sweep time= auto couple Detector = Peak Trace mode = max hold

3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix C on the appendix report

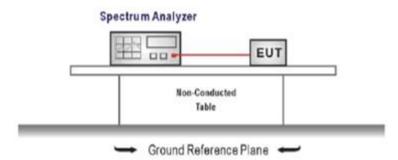
5.6. Carrier Frequencies Separation

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

RBW \geq 1% of the span, VBW \geq RBW

Sweep = auto, Detector function = peak, Trace = max hold

4. Measure and record the results in the test report.

TEST MODE

Please refer to the clause 4.3

TEST RESULTS

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix D on the appendix report

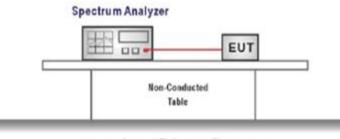
5.7. Hopping Channel Number

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = the frequency band of operation RBW ≥ 1% of the span, VBW ≥ RBW Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE

Please refer to the clause 4.3

TEST RESULTS

☑ Passed □ Not Applicable

<u>TEST DATA</u>

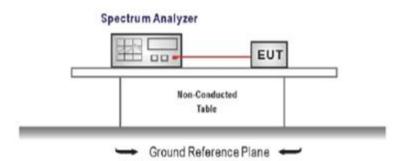
Please refer to appendix E on the appendix report

5.8. Dwell Time

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW ≥ RBW Sweep = as necessary to capture the entire dwell time per hopping channel, Detector function = peak, Trace = max hold

4. Measure and record the results in the test report.

TEST MODE

Please refer to the clause 4.3

TEST RESULTS

☑ Passed □ Not Applicable

TEST DATA

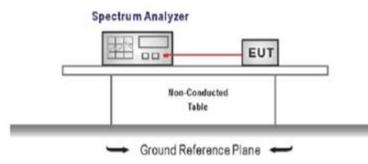
Please refer to appendix F on the appendix report

5.9. Duty Cycle Correction Factor (DCCF)

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW ≥ RBW Sweep = as necessary to capture the entire dwell time per hopping channel, Detector function = peak, Trigger mode
- 4. Measure and record the duty cycle data

TEST MODE

Please refer to the clause 4.3

TEST DATA

Please refer to appendix G on the appendix report

5.10. Pseudorandom Frequency Hopping Sequence

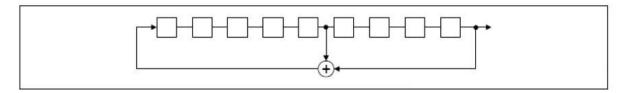
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems shall have hopping channel carrier fre-quencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-ternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier fre-quencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to chan-nel frequencies that are selected at the system hopping rate from a pseudo ran-domly ordered list of hopping fre-quencies. Each frequency must be used equally on the average by each trans-mitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their cor-responding transmitters and shall shift frequencies in synchronization with the transmitted signals.

TEST RESULTS

The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the friststage. The sequence begins with the frist one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An explame of pseudorandom frequency hopping sequence as follows:

0	2	4	6			64	78	1	73	75 7
Т				 	Γ		 1		 	
					1		1		1	
						18	1		1	
				 	1		 1		 L	

Each frequency used equally one the average by each transmitter.

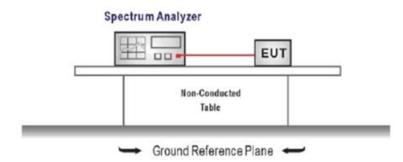
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

5.11. Conducted Band edge and Spurious Emission

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Emission level measurement

Set the center frequency and span to encompass frequency range to be measured

RBW = 100 kHz, VBW \ge 3 x RBW

Detector = peak, Sweep time = auto couple, Trace mode = max hold

Allow trace to fully stabilize

Use the peak marker function to determine the maximum amplitude level.

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix H on the appendix report

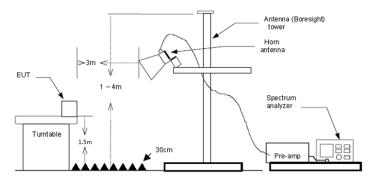
5.12. Radiated Band edge Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
- 5. Use the following spectrum analyzer settings:
 - a) Span shall wide enough to fully capture the emission being measured
 - b) Set RBW=100kHz for <1GHz, VBW=3*RBW, Sweep time=auto, Detector=peak, Trace=max hold
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)

Averager level = Peak level + DCCF

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

Note:

- 1) Level= Reading + Factor; Factor = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

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Test chan	Test channel: Mark Frequency MHz		CH00 Reading Antenna Cable dBuV/m dB dB					Horizo	Horizontal		
Mark									Over Remark limit		
1	2310.00	41.45	27.96	3.89	37.56	35.74	74.00	-38.26	Peak		
2	2390.03	40.63	27.72	3.99	37.45	34.89	74.00	-39.11	Peak		

Test channel:		CH00	CH00					Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m		Over limit	Remark	
1	2310.00	40.52	27.96	3.89	37.56	34.81	74.00	-39.19	Peak	
2	2390.03	40.45	27.72	3.99	37.45	34.71	74.00	-39.29	Peak	

est chann	el:	CH78			Polarity			Horizor	Horizontal		
Mark 1 2	Frequency MHz 2483.50 2500.00	Reading dBuV/m 63.16 40.71	Antenna dB 27.43 27.40	Cable dB 4.03 4.04	Preamp dB 37.26 37.26	Level dBuV/m 57.36 34.89	Limit dBuV/m 74.00 74.00	Over limit -16.64 -39.11	Remark Peak Peak		
			Band	edge Ei	mission c	of Average	e				
No.	Freq. [MHz]	PK level [dBµV/m]		CF	Level [dBµV/n		.imit ⊧µV/m]	Margin [dB]	Polarity		
1	2483.50	57.36	6 -30	-30.75		5	4.00	27.39	Horizontal		

Test channel:		CH78	CH78					Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2483.50	59.33	27.43	4.03	37.26	53.53	74.00	-20.47	Peak	
2	2500.00	40.50	27.40	4.04	37.26	34.68	74.00	-39.32	Peak	

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5.13. Radiated Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

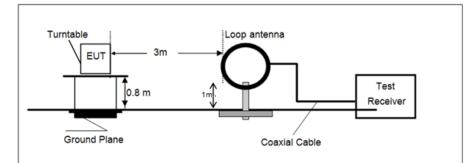
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

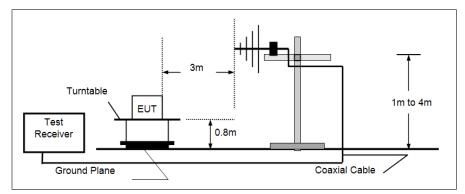
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
	54.00	Average
Above 1GHz	74.00	Peak

TEST CONFIGURATION

➢ 9 kHz ~ 30 MHz

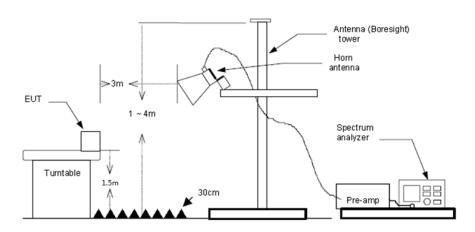


> 30 MHz ~ 1 GHz



> Above 1 GHz

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Page:

TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10.
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)

Averager level = Peak level + DCCF

TEST MODE

Please refer to the clause 4.3

TEST RESULT

☑ Passed □ Not Applicable

Note:

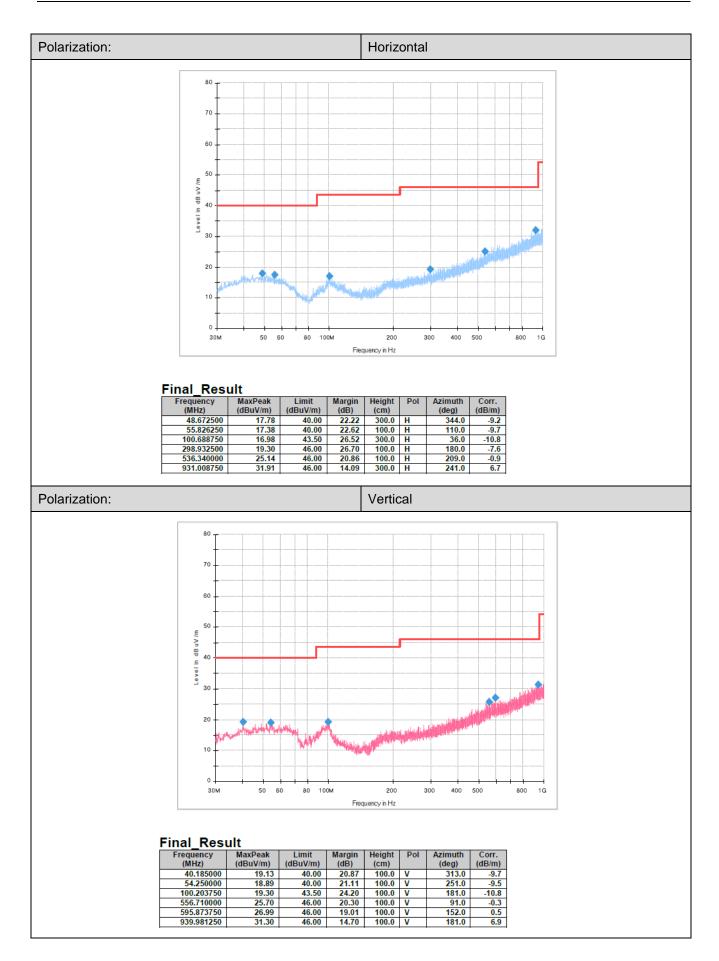
- 1) Level= Reading + Factor/Transd; Factor/Transd = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

For 9 kHz ~ 30 MHz

The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

For 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH39 which it was worst case, so only show the worst case's data on this report.



For 1 GHz ~ 25 GHz

Test channel		CH00	CH00			Polarity			Horizontal	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	1350.36	39.16	26.30	2.95	36.42	31.99	74.00	-42.01	Peak	
2	4700.57	38.72	31.40	5.67	35.74	40.05	74.00	-33.95	Peak	
3	8002.06	35.69	37.10	7.61	33.31	47.09	74.00	-26.91	Peak	
4	11370.05	34.43	40.54	9.38	36.45	47.90	74.00	-26.10	Peak	
Test channel	Fest channel		CH00			Polarity			Vertical	
				C-1-1-		Level	Limit	Over	Remark	
Mark	Frequency	Reading	Antenna							
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB				Reliar R	
	Frequency MHz 1402.92	Reading dBuV/m 39.49	dB 26.10	dB 3.05	dB	dBuV/m 32.05	dBuV/m 74.00	limit -41.95	Peak	
Mark 1 2	MHz	dBuV/m	dB	dB	dB 36.59	dBuV/m	dBuV/m	limit		
1	MHz 1402.92	dBuV/m 39.49	dB 26.10	dB 3.05	dB 36.59 37.00	dBuV/m 32.05	dBuV/m 74.00	limit -41.95	Peak	

Test channel	CH39	H39			Polarity			Horizontal	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1207.28	40.67	25.64	2.78	36.64	32.45	74.00	-41.55	Peak
2	4883.52	39.08	31.40	5.84	35.18	41.14	74.00	-32.86	Peak
3	7961.43	34.98	36.95	7.58	33.32	46.19	74.00	-27.81	Peak
4	11515.68	34.13	40.85	9.47	36.37	48.08	74.00	-25.92	Peak
Test channel		СН39			Polarity			Vertical	
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
THEFT	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	Nellion K
1	1232.12	39.58	25.79	2.80	36.57	31.60	74.00	-42.40	Peak
2	4883.52	40.28	31.40	5.84	35.18	42.34	74.00	-31.66	Peak
3	7413.73	36.69	36.60	7.31	34.00	46.60	74.00	-27.40	Peak
4	11370.05	34.98	40.54	9.38	36.45	48.45	74.00	-25.55	Peak

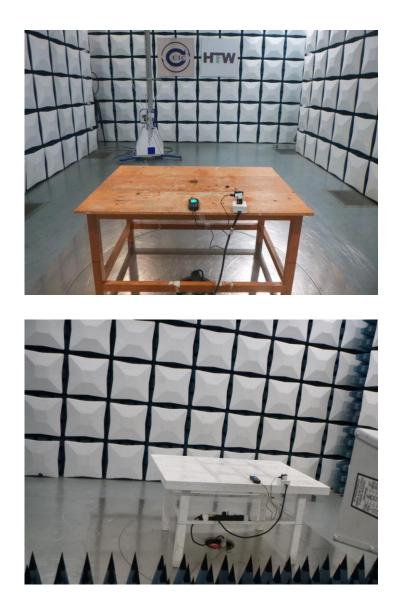
Test channel	CH78			Polari	Polarity			Horizontal	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1479.96	39.78	25.98	3.13	36.81	32.08	74.00	-41.92	Peak
2	4958.68	39.52	31.57	5.82	35.20	41.71	74.00	-32.29	Peak
3	8104.56	35.88	37.18	7.67	33.33	47.40	74.00	-26.60	Peak
4	11341.14	35.13	40.48	9.36	36.46	48.51	74.00	-25.49	Peak
Test channel	Test channel				Polari	ity		Vertic	al
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1693.72	40.96	25.10	3.27	37.11	32.22	74.00	-41.78	Peak
2	4958.68	38.84	31.57	5.82	35.20	41.03	74.00	-32.97	Peak
	8042.90	34.65	37.19	7.64	33.31	46.17	74.00	-27.83	Peak
3	0042.50								

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6. TEST SETUP PHOTOS

Radiated Emission



AC Conducted Emission



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Refer to the test report No.: CHTEW22110125

8. APPENDIX REPORT