



# VARIANT RADIO TEST REPORT (FCC Part 15 Subpart C / IC RSS-210)

Applicant:	Shenzhen Zolon Technology Co., Ltd.
Address:	401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Sub-district, Nanshan District, Shenzhen, China

Manufacturer:	Shenzhen Zolon Technology Co., Ltd.
Address:	401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Sub-district, Nanshan District, Shenzhen, China
Product:	Pay Tablet
Brand Name:	ZOLON
Model Name:	M8
FCC ID:	2AV5BM8
Date of tests:	Sep. 19, 2021 ~ Oct. 12, 2021

The tests have been carried out according to the requirements of the following standard:

- □ Part 15 Subpart C §15. 225 / IC RSS-210 issue 10(December 2019)
- RSS-Gen Issue 5 Amendment 1 (March 2019)
- **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

5011012051011. The submitted sample was found to <u>oomir Li</u> with the test requirement					
Prepared by Simon Wang	Approved by Luke Lu				
Engineer / Mobile Department	Manager / Mobile Department				
Simon Wang	lupe lu				
Date: May. 29, 2024	Date: May. 29, 2024				

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <a href="http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/">http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/</a> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report,



# **Report Revise Record**

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21090022RF07	Original release	Oct. 13, 2021
W7L-P24050005RF07	Based on the original report changing the applicant information and manufacturer information, brand name, FCC ID.	May. 29, 2024

Tel: +86 755 8869 6566



# **TABLE OF CONTENTS**

1.	GEN	IERAL DESCRIPTION	5
	1.1	Applicant	5
	1.2	Manufacturer	
	1.3	General Description Of EUT	5
	1.4	Modification of EUT	5
	1.5	Applicable Standards	5
2.	TES	T CONFIGURATION OF EQUIPMENT UNDER TEST	6
	2.1	Descriptions of Test Mode	6
	2.2	Test Configurations	7
	2.3	Support Equipment	8
	2.4	Test Setup	8
	2.5	Measurement Results Explanation Example	10
3.	TES	T RESULT	11
	3.1	20dB and 99% Bandwidth Measurement	11
	3.2	Frequency Stability Measurement	12
	3.3	Field Strength of Fundamental Emissions and Mask Measurement	14
	3.4	Radiated Emissions Measurement	17
	3.5	AC Conducted Emission Measurement	23
	3.6	Antenna Requirements	27
4	LIST	OF MEASURING EQUIPMENT	28
5	UNC	ERTAINTY OF EVALUATION	29



# **Summary of Test RESULT**

FCC Rule	IC Rule	Description	Limit	Result	Remark
-	RSS-Gen 6.7	99% Bandwidth	-	Pass	-
15.225(a)(b)(c)	RSS-210 Annex B.6	Field Strength of Fundamental Emissions	15.225(a)(b)(c) RSS-210 Annex B.6	Pass	-
15.215	-	20dB Spectrum Bandwidth	15.215	Pass	-
15.225(d) 15.209	RSS-210 Annex B.6	Radiated Emission	15.225(d) & 15.209 RSS-210 Annex B.6	Pass	-
15.207	RSS-GEN 8.8	AC Conducted Emission	15.207(a)	Pass	-
15.225(e)	Annex B.6	Frequency Stability	< ±100 ppm	Pass	
15.203	RSS-Gen 6.8	Antenna Requirement	N/A	Pass	-

Email: customerservice.sw@bureauveritas.com

### 1. General Description

### 1.1 Applicant

### Shenzhen Zolon Technology Co., Ltd.

401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Sub-district, Nanshan District, Shenzhen, China

### 1.2 Manufacturer

### Shenzhen Zolon Technology Co., Ltd.

401, Building 3, Shenzhen Software Park, Maling Community, Yuehai Sub-district, Nanshan District, Shenzhen, China

### 1.3 General Description Of EUT

Items	Description
Tx/Rx Frequency Range	13.553 ~ 13.567MHz
Channel Number	1
20dBW	2.683 kHz
99%OBW	2.284 kHz
Antenna Type	Loop Antenna
Type of Modulation	ASK

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.4 Modification of EUT

No modifications are made to the EUT during all test items.

### 1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.225
- ANSI C63.10-2013
- RSS-210 Issue 10
- RSS-Gen Issue 5



# 2. Test Configuration of Equipment Under Test

### 2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

	Test Items					
AC Power Line Conducted Emissions		Field Strength of Fundamental Emissions				
2	0dB Spectrum Bandwidth	Frequency Stability				
R	adiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz				
No	te:					
1.	The EUT was programmed to be in continuous	ly transmitting mode.				
2.	The ancillary equipment, NFC card, is used	to make the EUT (NFC) continuously transmit at				
	13.56MHz and is placed around 3 cm gap to th	e EUT.				
3.	Pre-Scan has been conducted to determine the	ne worst-case mode from all possible combinations				
	between available modulations, work in modes	s and data rates. Selected for the final test as listed				
	below.					

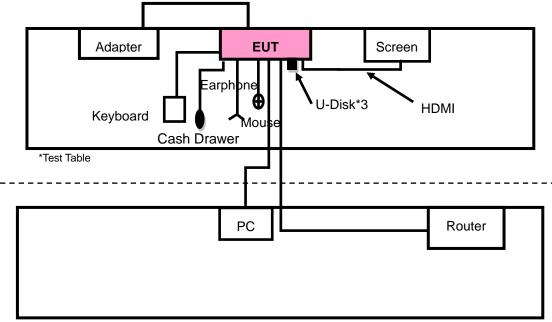
Frequency	Work in Modes	Туре	Data Rate (Kbps)			
13.56 MHz	Card Emulation Reader/Writer Peer-to-Peer	□A □B ☑F □V	□ 106 <b>□</b> 212 □ 424 □ 848			
Remark:  The mark"  " means is chosen for testing;  The mark"  " means is not chosen for testing.						

Tel: +86 755 8869 6566



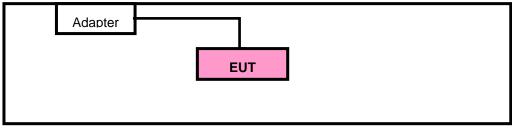
### 2.2 Test Configurations

#### <AC Conducted Emissions>



<sup>\*</sup> Kept in a remote area

#### < For Fundamental Emissions and Mask and Radiated Emissions Measurement >



\*Test Table

People's Republic of China Email: <a href="mailto:customerservice.sw@bureauveritas.com">customerservice.sw@bureauveritas.com</a>

### 2.3 Support Equipment

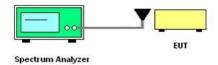
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thnikpad L440	R90FTFKP	N/A
3	SD	San Disk	Ultra	N/A	N/A
4	Earphone	Nokia	WH-108	RTF	N/A
5	Wireless AP	ABOCOM	WR224GR	060500749P	N/A

# 2.4 Test Setup

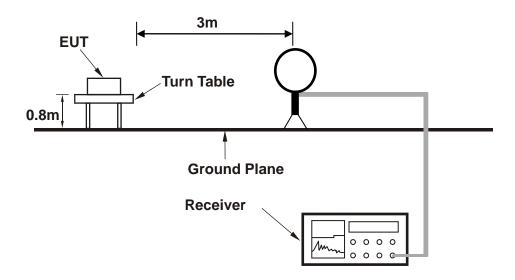
The EUT is continuously communicating during the tests.

EUT was set in the Hidden menu mode to enable NFC communications.

### **Setup diagram for Conducted Test**

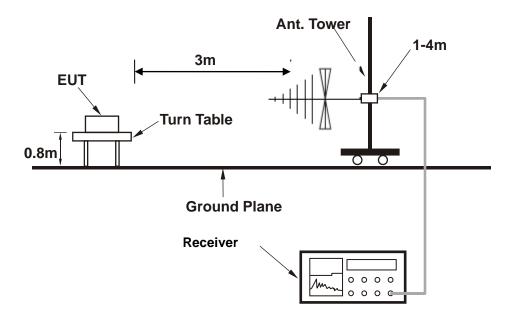


### Setup diagram for Radiation(9KHz~30MHz) Test

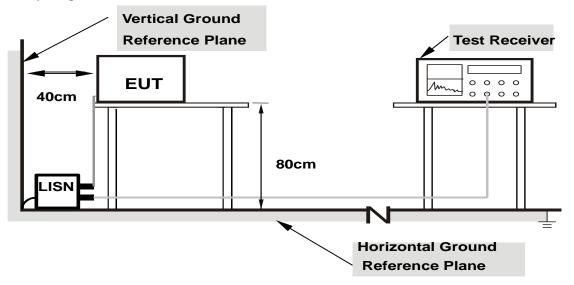




### Setup diagram for Radiation(Below 1G) Test



### **Setup diagram for AC Conducted Emission Test**



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

# 2.5 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

### Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

 $Offset(dB) = RF \ cable \ loss(dB) + attenuator \ factor(dB).$ = 5 + 10 = 15 (dB)

Email: <u>customerservice.sw@bureauveritas.com</u>

### 3. Test Result

### 3.1 20dB and 99% Bandwidth Measurement

### 3.1.1 Limit of 20dB and 99% Bandwidth

Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

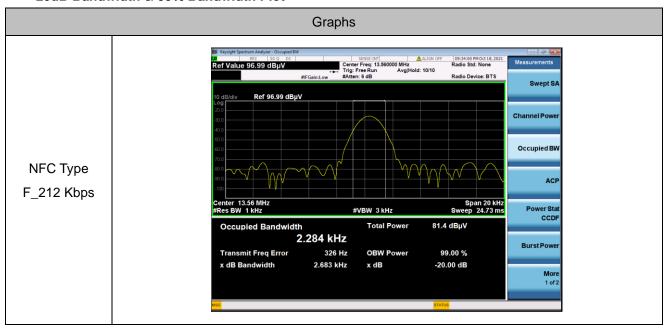
### 3.1.2 Test Procedures

- 1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
- 2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
- 3. Measured the spectrum width with power higher than 20dB below carrier.
- 4. Measured the 99% OBW.

#### 3.1.3 Test Result of 20dB and 99% Bandwidth

Test Mode :	NFC		Temperature :		23°C	
Test Engineer : Jace hu			Relative Humi	dity :	70%	
Mode	Frequency 20dB Ban		dwidth [kHz]	99	% OBW[kHz]	Verdict
NFC Type F_212 Kbps	13.56MHz	2.	.683		2.284	PASS

#### 20dB Bandwidth & 99% Bandwidth Plot



Email: customerservice.sw@bureauveritas.com



### 3.2 Frequency Stability Measurement

### 3.2.1 Limit of Frequency Stability

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

#### 3.2.2 Test Procedures

- 1. The spectrum analyzer connected via a receive antenna placed near the EUT.
- 2. EUT have transmitted signal and fixed channelize.
- 3. Set the spectrum analyzer span to view the entire emissions bandwidth.
- 4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
- 5. The fc is declaring of channel frequency. Then the frequency error formula is  $(fc-f)/fc \times 10^6$  ppm and the limit is less than  $\pm 100$ ppm.
- 6. Extreme temperature rule is -20°C~50°C.

### 3.2.3 Test Result of Frequency Stability

The NFC Type F\_212 Kbps is the worst case, Only report worst mode data



### NFC Type F\_212 Kbps

Voltage (Vdc)	Temperature (°C)	Measurement Frequency (MHz)	Frequency Tolerance(ppm)	Limit(ppm)	Result
22.8	20	13.55989	-8.11		Pass
25.2	20	13.5599	-7.37		Pass
	-20	13.55993	-5.16		Pass
	-10	13.55987	-9.59		Pass
	0	13.55992	-5.90	±100	Pass
24	10	13.5599	-7.37	1100	Pass
24	20	13.55988	-8.85		Pass
	30	13.55994	-4.42		Pass
	40	13.55993	-5.16		Pass
	50	13.55995	-3.69		Pass

Email: customerservice.sw@bureauveritas.com

### 3.3 Field Strength of Fundamental Emissions and Mask Measurement

### 3.3.1 Limit of Field Strength of Fundamental Emissions and Mask

Rules and specifications	FCC CFR 47 Part 15 section 15.225 IC RSS-210 B.6						
Description	Compliance with th	e spectrum mask is t	ested with RBW set t	o 9kHz.			
Frog of Emission (MUT)	Field Strength	Field Strength	Field Strength	Field Strength			
Freq. of Emission (MHz)	(µV/m) at 30m	(dBµV/m) at 30m	(dBµV/m) at 10m	(dBµV/m) at 3m			
1.705~13.110	30	29.5	48.58	69.5			
13.110~13.410	106	40.5	59.58	80.5			
13.410~13.553	334	50.5	69.58	90.5			
13.553~13.567	15848	84.0	103.08	124.0			
13.567~13.710	334	50.5	69.58	90.5			
13.710~14.010	106	40.5	59.58	80.5			
14.010~30.000	30	29.5	48.58	69.5			

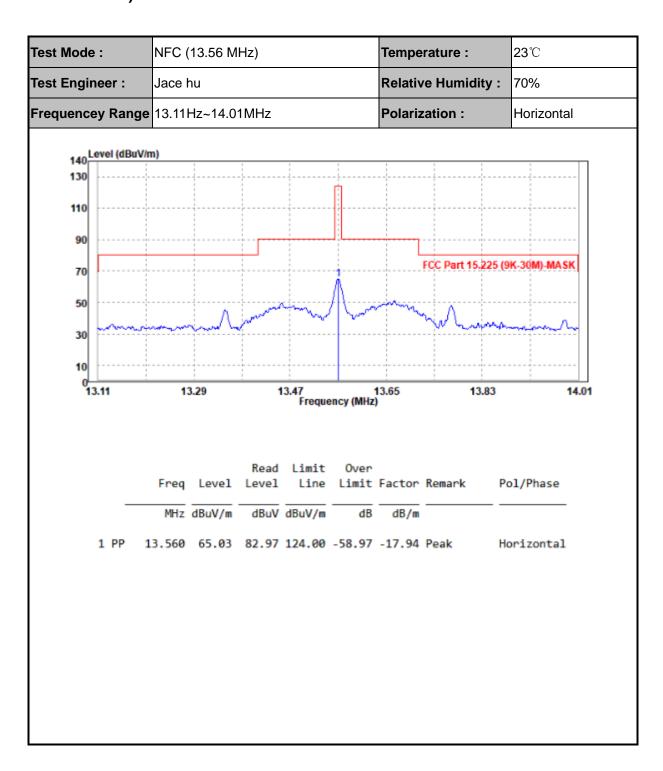
#### 3.3.2 Test Procedures

- Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
- 4. For Fundamental emissions, use the receiver to measure QP reading.
- 5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- 6. Compliance with the spectrum mask is tested with RBW set to 9kHz.

Note: Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).

Email: customerservice.sw@bureauveritas.com

### 3.3.3 Test Results of Field Strength of Fundamental Emissions and Mask (1.705 MHz ~ 30 MHz)





Test Mode :	NFC (	(13.56 M	lHz)			Tempe	rature :	23℃
Test Engineer :	Jace I	Jace hu Relative Humidity: 70				: 70%		
requencey Ran	<b>ge</b> 13.111	13.11Hz~14.01MHz Polarization : Vertical					Vertical	
140 Level (dBuV	//m)							•
130					ļ			
110								
90								
					1	F	CC Part 15.225 (	9K-30M)-MASK
70					1			
50	war of the same	~~~~	- MAN	m	WV	my	mhaman	anner de la comme
30	-							
10							-	
13.11	13.	29	13	3.47 Eroguer	1; ncy (MHz)	3.65	13.83	14.01
				rrequei	icy (mriz)			
			Read	Limit	0ver			
	Freq	Level				Factor	Remark	Pol/Phase
_	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1 PP	13.560	69.11	87.05	124.00	-54.89	-17.94	Peak	Vertical

### 3.4 Radiated Emissions Measurement

#### 3.4.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies	Field Strength	Measurement Distance
(MHz)	(μV/m)	(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

### 3.4.2 Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

**Note:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

### 3.4.3 Test Procedures

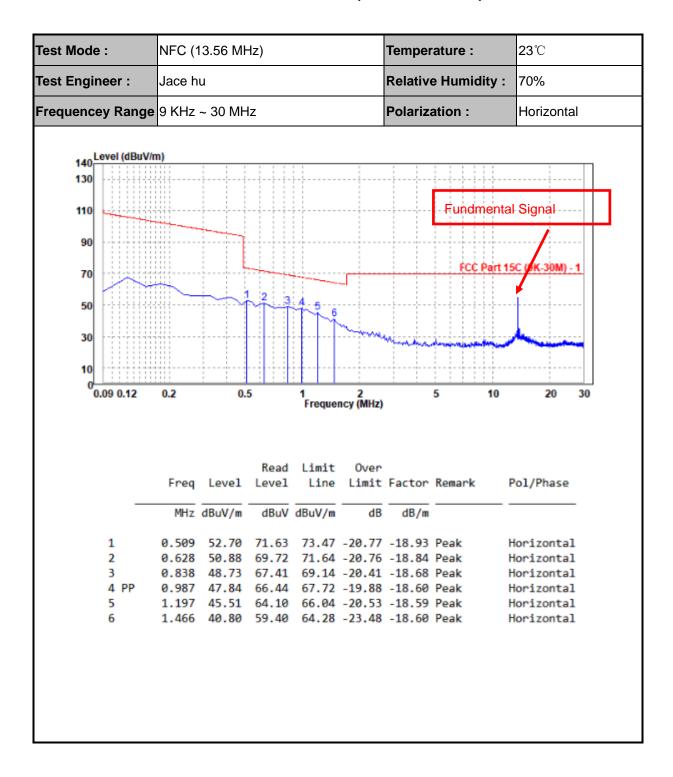
- Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the



turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- 7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.

#### 3.4.4 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)



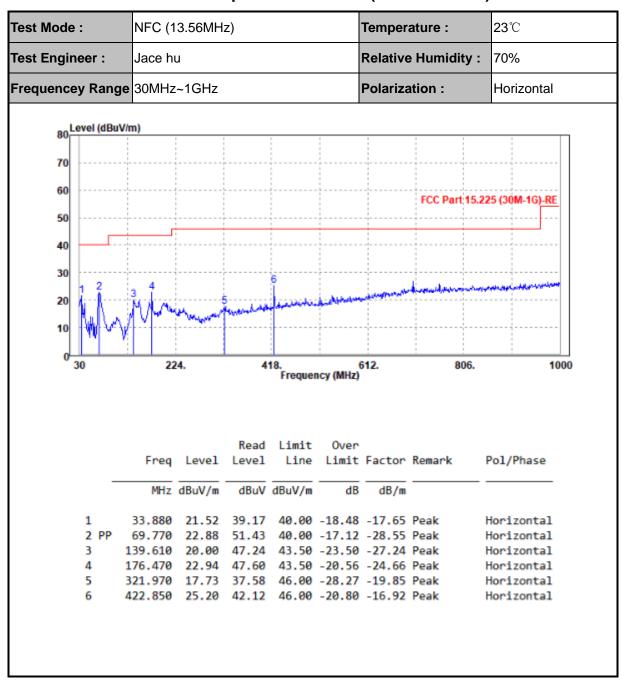


Relative Humidity: 70%  equencey Range 9 KHz ~ 30 MHz  Polarization: Vertical  140  130  110  90  70  Fundmental Signal Foct Part 15C (9K/SOM) - 1  50  30  10  0.09 0.12 0.2 0.5 1  Frequency (MHz) 5 10 20 30  Read Limit Over Limit Factor Remark Pol/Phase  MHz dBuV/m dBuV dBuV/m dB dB/m  1 PP 0.539 50.52 69.43 72.98 -22.46 -18.91 Peak Vertical 2 0.688 39.78 58.57 70.85 -31.07 -18.79 Peak Vertical 3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical 6 1.526 31.15 49.74 63.93 -32.78 -18.59 Peak Vertical	est Mode :	NFC (13.56	6 MHz)			Tempe	rature :	23℃
140   130   110   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100	est Engineer :	Jace hu				Relativ	e Humidity :	70%
Fundmental Signs   Fundmental	requencey Range	9 KHz ~ 30	MHz			Polarization : Ve		Vertical
Fundmental Signs   Fundmental	Lovel (dDvV)	iren l						
Fundmental Signs								
Freq Level Level Line Limit Factor Remark Pol/Phase    Read Limit Over   Frequency (MHz)   5   10   20   30	130							
Freq Level Line Limit Factor Remark Pol/Phase    Read Limit Over   Level Line Limit Factor Remark Pol/Phase	110	<u>                                     </u>		++				
Freq Level Line Limit Factor Remark Pol/Phase    Read Limit Over   Level Line Limit Factor Remark Pol/Phase	90						Fur	ndmental Signa
Freq Level Level Line Limit Factor Remark Pol/Phase    Read Limit Over   Line Limit Factor Remark   Pol/Phase							: : : <del> </del>	
Read Limit Over Freq Level Level Line Limit Factor Remark Pol/Phase  MHz dBuV/m dBuV dBuV/m dB dB/m  1 PP 0.539 50.52 69.43 72.98 -22.46 -18.91 Peak Vertical 2 0.688 39.78 58.57 70.85 -31.07 -18.79 Peak Vertical 3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical	70	1111		-	-			
Read Limit Over   Freq Level Level Line Limit Factor Remark   Pol/Phase   MHz   dBuV/m   dBuV   dBuV/m   dB   dB/m	50		~ <del>\</del>					
Read Limit Over   Frequency (MHz)   5   10   20   30	30		\^\~	34 TT 5	6			
0.09 0.12 0.2 0.5 1 2 Frequency (MHz) 5 10 20 30  Read Limit Over Freq Level Level Line Limit Factor Remark Pol/Phase  MHz dBuV/m dBuV dBuV/m dB dB/m  1 PP 0.539 50.52 69.43 72.98 -22.46 -18.91 Peak Vertical 2 0.688 39.78 58.57 70.85 -31.07 -18.79 Peak Vertical 3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical	30							
Read   Limit   Over   Frequency (MHz)   S   10   20   30								
Read Limit Over Freq Level Level Line Limit Factor Remark Pol/Phase  MHz dBuV/m dBuV/m dBuV/m dB dB/m  1 PP 0.539 50.52 69.43 72.98 -22.46 -18.91 Peak Vertical 2 0.688 39.78 58.57 70.85 -31.07 -18.79 Peak Vertical 3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical		0.2	0.5	1	2		5 10	20 30
1 PP				Freque	ency (MHz)	)		20 30
2 0.688 39.78 58.57 70.85 -31.07 -18.79 Peak Vertical 3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical	_		el Level	Limit Line	Over	Factor		
3 0.868 36.36 55.03 68.84 -32.48 -18.67 Peak Vertical 4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical	_		el Level	Limit Line	Over	Factor		
4 0.957 35.51 54.12 67.98 -32.47 -18.61 Peak Vertical 5 1.227 31.73 50.32 65.83 -34.10 -18.59 Peak Vertical		MHz dBuV	rel Level //m dBuV 52 69.43	Limit Line dBuV/m	Over Limit dB	Factor dB/m -18.91	Remark	Pol/Phase ———— Vertical
	2	MHz dBuV 0.539 50. 0.688 39.	dBuV dBuV 52 69.43 78 58.57	Limit Line dBuV/m 72.98 70.85	Over Limit dB -22.46	Factor dB/m -18.91 -18.79	Remark Peak Peak	Pol/Phase ————— Vertical Vertical
0 1.520 51.15 45.74 05.55 -52.70 -10.55 Fedk Vertical	2 3 4	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12	Limit Line dBuV/m 72.98 70.85 68.84 67.98	Over Limit dB -22.46 -31.07 -32.48 -32.47	Factor dB/m -18.91 -18.79 -18.67 -18.61	Remark  Peak Peak Peak Peak Peak	Pol/Phase  Vertical Vertical Vertical Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical
	2 3 4 5	MHz dBuV 0.539 50. 0.688 39. 0.868 36. 0.957 35. 1.227 31.	dBuV 52 69.43 78 58.57 36 55.03 51 54.12 73 50.32	Limit Line dBuV/m 72.98 70.85 68.84 67.98 65.83	Over Limit dB -22.46 -31.07 -32.48 -32.47 -34.10	Factor  dB/m  -18.91 -18.79 -18.67 -18.61 -18.59	Remark  Peak Peak Peak Peak Peak Peak	Pol/Phase  Vertical  Vertical  Vertical  Vertical  Vertical

BV 7Layers Communications Technology

Email: customerservice.sw@bureauveritas.com

### 3.4.5 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)



ng, People's Republic of China Email: <a href="mailto:customerservice.sw@bureauveritas.com">customerservice.sw@bureauveritas.com</a>



est Mode :	NFC (1	3.56MH	z)			Temper	ature :	23℃	
est Engineer :	Jace h	Jace hu Rela		Relative Humidity :		70%	70%		
requencey Rang	<b>e</b> 30MHz	30MHz~1GHz				Polariza	ation :	Vertical	
	•							•	
80 Level (dBuV	//m)			!	!	!			$\neg$
70									-
60							FCC Part 15.2	25 (30M-1G) <u>-RE</u>	Ē
50									-
40									-
1 -									
302	11 -			6			and the second		w
20	r™.i		. substitut	والم ومسالم	housempayer	Paringhan March	Will with the same of the same		-
10		A PARTICIPATION OF A PARTICIPATI	with the same						-
.0						i			
0 30	22	4.	4	18.		612.	806.	1	000
0 30	22	4.	4	18. Frequer	icy (MHz)	512.	806.	1	000
0 30	22	4.	4	18. Frequer		612.	806.	1	000
0 30	22	4.	4	18. Frequer		512.	806.	1	000
0 30			Read	Frequer	Over				000
0 30		4. Level	Read	Frequer	Over			1 Pol/Phase	000
30	Freq		Read Level	Frequer	Over	Factor	Remark		000
0 30	Freq	Level	Read Level	Limit Line dBuV/m	Over Limit	Factor	Remark		000
_	Freq	Level dBuV/m	Read Level dBuV 49.21 55.50	Limit Line dBuV/m 40.00	Over Limit dB -9.09	Factor dB/m -18.30 -28.35	Remark Peak Peak	Pol/Phase	000
1 PP 2 3	Freq MHz 33.880 69.770 112.450	Level dBuV/m 30.91 27.15 24.19	Read Level dBuV 49.21 55.50 51.74	Limit Line dBuV/m 40.00 40.00 43.50	Over Limit dB -9.09 -12.85 -19.31	Factor  dB/m  -18.30 -28.35 -27.55	Remark Peak Peak Peak	Pol/Phase  Vertical Vertical Vertical	000
1 PP 2	Freq MHz 33.880 69.770	Level  dBuV/m  30.91 27.15 24.19 28.27	Read Level dBuV 49.21 55.50 51.74 53.48	Limit Line dBuV/m 40.00	Over Limit dB -9.09 -12.85 -19.31 -15.23	Factor  dB/m  -18.30 -28.35 -27.55 -25.21	Remark  Peak Peak Peak Peak Peak	Pol/Phase ———— Vertical Vertical	0000

### 3.5 AC Conducted Emission Measurement

#### 3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission	Conducted Limit (dBμV)			
(MHz)	Quasi-Peak	Average		
0.15-0.5	66 to 56*	56 to 46*		
0.5-5	56	46		
5-30	60	50		

<sup>\*</sup>Decreases with the logarithm of the frequency.

#### 3.5.2 Test Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

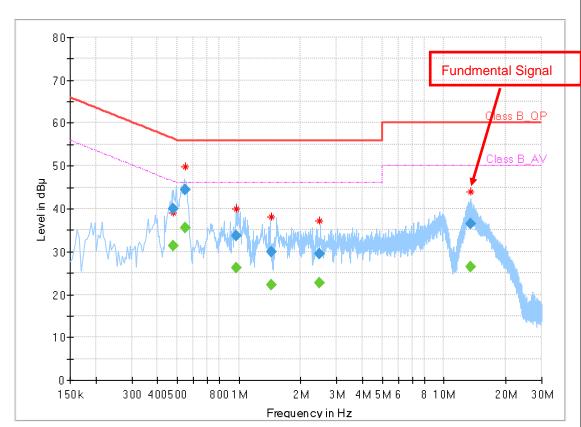
Tel: +86 755 8869 6566



### 3.5.3 Test Result of AC Conducted Emission

Test Mode :	NFC	Temperature :	<b>25</b> ℃
Test Engineer :	Carl Xie	Relative Humidity :	55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	NFC		





Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)			(dB)
0.480000		31.28	46.34	15.06	L1	ON	9.7
0.480000	40.03		56.34	16.31	L1	ON	9.7
0.544000		35.58	46.00	10.42	L1	ON	9.7
0.544000	44.34		56.00	11.66	L1	ON	9.7
0.968000		26.28	46.00	19.72	L1	ON	9.7
0.968000	33.73		56.00	22.27	L1	ON	9.7
1.436000		22.12	46.00	23.88	L1	ON	9.7
1.436000	29.92		56.00	26.08	L1	ON	9.7
2.464000		22.61	46.00	23.39	L1	ON	9.7
2.464000	29.49		56.00	26.51	L1	ON	9.7
13.564000		26.44	50.00	23.56	L1	ON	9.8
13.564000	36.51		60.00	23.50	L1	ON	9.8

BV 7Layers Communications Technology (Shenzhen) Co., Ltd

Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People's Republic of China

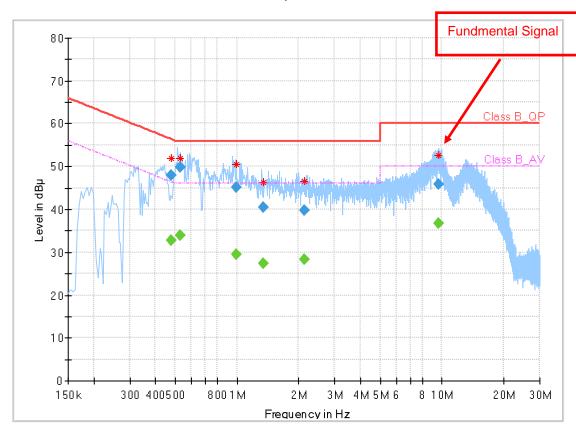
Tel: +86 755 8869 6566 Fax: +86 755 8869 6577

Email: <u>customerservice.sw@bureauveritas.com</u>



Test Mode :	NFC	Temperature :	25℃
Test Engineer :	Carl Xie	Relative Humidity :	55%
Test Voltage :	AC 120V/60Hz	Phase :	Neutral
Function Type:	NEC		

Full Spectrum



Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
(MHz)	(dB µ V)	(dB µ V)	(dB μ	(dB)			(dB)
			\/\				
0.480000		32.83	46.34	13.51	N	ON	9.7
0.480000	48.04		56.34	8.30	N	ON	9.7
0.528000		33.81	46.00	12.19	N	ON	9.7
0.528000	49.74		56.00	6.26	N	ON	9.7
0.992000		29.45	46.00	16.55	N	ON	9.7
0.992000	45.20		56.00	10.80	N	ON	9.7
1.348000		27.45	46.00	18.55	N	ON	9.8
1.348000	40.40		56.00	15.60	N	ON	9.8
2.140000		28.38	46.00	17.62	N	ON	9.8
2.140000	39.78		56.00	16.22	N	ON	9.8
9.636000		36.84	50.00	13.16	N	ON	9.8
9.636000	45.75		60.00	14.25	N	ON	9.8





3.6 Antenna Requirements

3.6.1 Standard Applicable

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with

any jacket for installing an antenna with extension cable. 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. The

manufacturer may design the unit so that the user can replace a broken antenna, but the use of a

standard antenna jack or electrical connector is prohibited.

3.6.2 Antenna Connected Construction

An Loop Antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi.



# 4 List of Measuring Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn- CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Test Software	E3	V 9.160323	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Loop Antenna	SCHWARZBEC K	FMZB1519B	00173	Sep. 04,21	Sep. 05,22

**NOTE:** 1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

- 2. The test was performed in 3m Chamber.
- 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

Email: <u>customerservice.sw@bureauveritas.com</u>



# 5 Uncertainty of Evaluation

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.42dB
Radiated emission	30MHz ~ 1GMHz	2.50dB
	1GHz ~ 18GHz	3.51dB
	18GHz ~ 40GHz	3.96dB

MEASUREMENT	UNCERTAINTY
Occupied Channel Bandwidth	±196.4Hz
RF output power, conducted	±2.31dB
Power density, conducted	±2.31dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.