



EMC TEST REPORT

Applicant: Corporativo Lanix S. A. de C. V.				
Address:	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico			
Manufacturer or Supplier:	Corporativo Lanix S. A. de C. V.	Corporativo Lanix S. A. de C. V.		
Address:	Carretera Internacional Hermosi	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico		
Product:	smartphone			
Brand Name:	Brand Name: LANIX			
Model Name:	Ilium Alpha 5s			
FCC ID:	CID: ZC4ALPHA5S			
Date of tests:	Mar. 15, 2019 ~ Mar. 27, 2019			
The submitted sample of the above equipment has been tested for according to the requirements of the following standards:				
 ☑ FCC Part 15, Subpart B, Class B ☑ ANSI C63.4:2014 				
CONCLUSION: T	he submitted sample was found	to <u>COMPLY</u> with the test requirement		
Issued by Alex Chen Approved by Luke Lu		Approved by Luke Lu		
Engineer / Mobile Department		Manager / Mobile Department		
Alex		lufe lu		
Date: Mar. 28. 2019 Date: Mar. 28.		Date: Mar. 28, 2019		
This report is governed by, and	incorporates by reference, CPS Conditions of Service as poste	d at the date of issuance of this report at		
or entity, or use of our name or set forth in this report are not ind expressly noted. Our report inclu	onerabour-us/our-business/gs/abour-us/etmis-Conditions/and trademark, is permitted only with our prior written permission. T dicative or representative of the quality or characteristics of the udes all of the tests requested by you and the results thereof ba	is memory or your exclusive use. Any copying or replication or tims report to of rol any other person his report sets forth our findings solely with respect to the test samples identified herein. The results lof from which a test sample was taken or any similar or identical product unless specifically and ased upon the information that you provided to us. Measurement uncertainty is only provided upon		

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. 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 you unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



TABLE OF CONTENTS

RELEASE CONTROL RECORD	3
1 GENERAL INFORMATION	4
1.1 GENERAL DESCRIPTION OF EUT	4
1.2 SUMMARY OF TEST RESULTS	6
1.3 MEASUREMENT UNCERTAINTY	6
1.4 DESCRIPTION OF TEST MODES	7
1.5 DESCRIPTION OF SUPPORT UNITS	9
2 EMISSION TEST	0
2.1 CONDUCTED EMISSION MEASUREMENT	0
2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	0
2.1.2 TEST INSTRUMENTS	0
2.1.3 TEST PROCEDURES1	11
2.1.4 DEVIATION FROM TEST STANDARD1	11
2.1.5 TEST SETUP 1	2
2.1.6 EUT OPERATING CONDITIONS 1	2
2.1.7 TEST RESULTS 1	3
2.2 RADIATED EMISSION MEASUREMENT 1	7
2.2.1. LIMITS OF RADIATED EMISSION MEASUREMENT	7
2.2.2. TEST INSTRUMENTS	8
2.2.3. IEST PROCEDURE	9
2.2.4. DEVIATION FROM TEST STANDARD	20
	21
2.2.6. EUT OPERATING CONDITIONS	/1 \\\\
2.2.1. IEST RESULTS	:2
3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	30



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV190314W002	Original release	Mar. 28, 2019



1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCI	smartphone		
BRAND NAME LANIX			
MODEL NAME	llium Alpha 5s		
NOMINAL VOLTAGE	5.0Vdc (adapter or he 3.85Vdc (Li-ion, batte	ost equipment) ery)	
BATTERY	Brand Name: Ianix Model Name: Ilium Alpha 5s-BAT Power Rating: DC 3.85V. 3900mAh. Li-ion		
	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM	
	BT_LE	BT-LE(GFSK) for DTS	
	Bluetooth	GFSK, π/4-DQPSK, 8DPSK, LE	
MODULATION TYPE	GPS	C/A code	
	FM	FSK	
	GSM	GMSK/8PSK	
	WCDMA	BPSK/QPSK	
	LTE	QPSK/16QAM	
	WLAN	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)	
	Bluetooth/BT_LE	2402MHz ~ 2480MHz	
	GPS	1575.42MHz	
	FM	87.5MHz ~ 108MHz	
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)	
FREQUENCY	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 1712.4MHz ~ 1752.6MHz(FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)	
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2500MHz ~ 2570MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 1710.7MHz ~ 1754.3MHz (FOR LTE Band66)	
HW VERSION	V1.0		
SW VERSION	VERSION Ilium Alpha 5s_SW_01_V01		

BV 7Layers Communications Technology (Shenzhen) Co. Ltd



BUREAU VERITAS Test Report	No.: FV190314W002
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB cable: non-shielded, detachable, 1.0meter Earphone cable: non-shielded, detachable, 1.2meter
ACCESSORY DEVICES	Refer to note as below

NOTE:

- 1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- 2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	lanix
MODEL:	llium Alpha 5s-C
INPUT:	AC 100-240V, 350mA
OUTPUT:	DC 5V, 2000mA

3. The EUT matched the following USB cable and Earphone:

USB CABLE	
BRAND:	lanix
MODEL:	llium Alpha 5s
SIGNAL LINE:	1.0 METER

EARPHONE		
BRAND:	lanix	
MODEL:	Ilium Alpha 5s	
SIGNAL LINE:	1.2 METER	

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B			
Standard Section	Test Item	Result	Remark
	Conducted Test	PASS	Meets limits minimum passing margin is -9.60dB at 18.220000MHz.
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.07dB at 31.94MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -16.73dB at 10707MHz

1.3 MEASUREMENT UNCERTAINTY

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

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	+/-2.66dB
Dedicted enviroisnes	30MHz ~ 1GHz	+/-3.26dB
Radiated emissions	1GHz ~ 18GHz	+/-4.48dB

Report Version 1



1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM850 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM1
2	GSM1900 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM2
3	WCDMA B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM1
4	WCDMA B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM2
5	WCDMA B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
6	LTE B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
7	LTE B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
8	LTE B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
9	LTE B7 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
10	LTE B12 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
11	LTE B66 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
12	Front Camera on+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
13	Back Camera on+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
14	FM RX+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
15	MPG4+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
16	GSM850 Idle+ USB Link+ Data Trasmission(EUT to SD)+ Earphone+ BT Idle+ WIFI 2.4G Idle
17	GSM850 Idle+ USB Link+ Data Trasmission(EUT to PC)+ Earphone+ BT Idle+ WIFI 2.4G Idle
	Conducted emission test
1	GSM850 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM1
2	GSM1900 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle + SIM2
3	WCDMA B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
4	WCDMA B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
5	WCDMA B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
6	LTE B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
7	LTE B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
8	LTE B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
9	LTE B7 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
10	LTE B12 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM2
11	LTE B66 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle+ SIM1
12	Front Camera on+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
13	Back Camera on+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
14	FM RX+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle
15	MPG4+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4G Idle



BUREAU Test Report No.: FV190314W002

	16	GSM850 Idle+ USB Link+ Data Trasmission(EUT to SD)+ Earphone+ BT Idle+ WIFI 2.4G Idle
	17	GSM850 Idle+ USB Link+ Data Trasmission(EUT to PC)+ Earphone+ BT Idle+ WIFI 2.4G Idle
1	NOTE:	

- 1. For conducted emission test, test mode 13, 17 was the worst case and only this mode was presented in this report.
- 2. For radiated emission test, test mode 2, 17 was the worst case and only this mode was presented in this report.



Test Report No.: FV190314W002

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

FOR	EMISSION TESTS				
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	GPS Simulator +Antenna	TOJOIN	GNSS-5000A	E1-010-010119	N/A
2	Wireless AP	ABOCOM	WR224GR	060500749P	N/A
3	FM signal generator	Rohde & Schwarz	SMB100A	109279	N/A
4	Printer	HP	Hp LaserJet 1300	CNSJF75989	N/A
5	Notebook	Lenovo	Thnikpad X520	SL10H14859JS	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	N/A
3	N/A
4	N/A
5	N/A



2 EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)				
	Quasi-peak	Average			
0.15 ~ 0.5 0.5 ~ 5	66 to 56	56 to 46			
5~30	60	50			

NOTE: 1. The lower limit shall apply at the transition frequencies.

- 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
- 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 26,19	Feb. 25, 20
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 26,19	Feb. 25, 20

NOTE: 1. The test was performed in CE shielded room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



2.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

2.1.4 DEVIATION FROM TEST STANDARD

No deviation.



2.1.5 TEST SETUP



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

2.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.



2.1.7 TEST RESULTS

Mode 13

TEST VOLTAGE	DC 5V From Adapter	Detector Function &	Quasi-Peak (QP) /
	Input 120 Vac, 60 Hz	Resolution Bandwidth	Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.436000		28.96	47.14	-18.18	L	ON	10.0
0.436000	42.45		57.14	-14.69	L	ON	10.0
0.668000	40.36		56.00	-15.64	L	ON	10.0
0.668000		29.20	46.00	-16.80	L	ON	10.0
0.696000	42.40		56.00	-13.60	L	ON	10.0
0.696000		30.56	46.00	-15.44	L	ON	10.0
8.788000		34.11	50.00	-15.89	L	ON	10.4
8.788000	42.97		60.00	-17.03	L	ON	10.4
11.480000		35.00	50.00	-15.00	L	ON	10.5
11.480000	43.32		60.00	-16.68	L	ON	10.5
18.220000		40.40	50.00	-9.60	L	ON	10.5
18.220000	49.16		60.00	-10.84	L	ON	10.5

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

- 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
- 3. The emission levels of other frequencies were very low against the limit.
- 4. Margin value = Emission level Limit value
- 5. Correction factor = Insertion loss + Cable loss
- 6. Emission Level = Correction Factor + Reading Value.



BV 7Layers Communications Technology (Shenzhen) Co. Ltd No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen51800, China Tel: +86 755 8869 6566 Fax: +86 755 8869 6577 Email: <u>customerservice.dg@cn.bureauveritas.com</u>



TEST VOLTAGE		DC 5V From Adapter Input 120 Vac, 60 Hz		Detector Function & Resolution Bandwidth			Quasi-Peak (QP) / Average (AV), 9 kHz		
ENVIRONMENTAL CONDITIONS 25deg			. C, 52RH		TESTED BY			John Wen	
Frequency (MHz)	Quasi (dB	iPeak uV)	CAverage (dBuV)	Limit (dBuV	; /)	Margin (dB)	Line	Filter	Corr. (dB)
0.692000		-	33.03	46.00		-12.97	Ν	ON	9.9
0.692000	43.	87		56.00		-12.13	Ν	ON	9.9
1.040000			31.79	46.00		-14.21	Ν	ON	10.0
1.040000	44.	36		56.00		-11.64	Ν	ON	10.0
1.356000		-	26.72	46.00		-19.28	Ν	ON	10.0
1.356000	39.	59		56.00		-16.41	Ν	ON	10.0
8.472000		-	35.23	50.00		-14.77	Ν	ON	10.3
8.472000	43.	81		60.00		-16.19	Ν	ON	10.3
17.108000		-	34.92	50.00		-15.08	Ν	ON	10.4
17.108000	44.	98		60.00		-15.02	Ν	ON	10.4
18.128000		-	37.62	50.00		-12.38	Ν	ON	10.4
18.128000	45.	74		60.00	1	-14.26	Ν	ON	10.4

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

- 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
- 3. The emission levels of other frequencies were very low against the limit.
- 4. Margin value = Emission level Limit value
- 5. Correction factor = Insertion loss + Cable loss
- 6. Emission Level = Correction Factor + Reading Value.





Test Report No.: FV190314W002

Mode 17

3.552000

4.684000

4.684000

TEST VOLTAGE Data			a trasmission ut 120 Vac, 60 Hz		Detector Function & Resolution Bandwidth			Quasi-Peak (QP) / Average (AV), 9 kHz	
ENVIRONMENTAL CONDITIONS 25deg.			C, 52RH		TESTED BY			John Wen	
Frequency (MHz)	Qua: (dl	siPeak BuV)	CAverage (dBuV)	Lim (dBu	it V)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000			32.33	54.3	9	-22.06	L	ON	9.9
0.182000	52	2.03		64.3	9	-12.36	L	ON	9.9
0.204000			31.00	53.4	5	-22.45	L	ON	9.9
0.204000	49	9.97		63.4	5	-13.47	L	ON	9.9
0.432000			19.16	47.2	1	-28.05	L	ON	10.0
0.432000	36	6.87		57.2	1	-20.34	L	ON	10.0
2.116000			20.73	46.0	0	-25.27	L	ON	10.1
2.116000	32	2.63		56.0	0	-23.37	L	ON	10.1
3.552000			22.31	46.0	0	-23.69	L	ON	10.2

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

- 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
- 3. The emission levels of other frequencies were very low against the limit.

56.00

46.00

56.00

- 4. Margin value = Emission level Limit value
- 5. Correction factor = Insertion loss + Cable loss

33.84

37.64

----44.29

6. Emission Level = Correction Factor + Reading Value.



No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen51800, China

ON

ON

ON

10.2

10.2

10.2

L

L

L

-18.36

-12.16

-11.71



TEST VOLTA	Data trasmission Input 120 Vac, 60 Hz			Detector Function & Resolution Bandwidth			Quasi-Peak (QP) / Average (AV), 9 kHz		
ENVIRONMENTAL CONDITIONS 25de			eg. C, 52RH		TESTED BY			John Wen	
Frequency (MHz)	Quas (dB	iPeak uV)	CAverage (dBuV)	Limit (dBuV	: /)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	1	-	34.03	54.39)	-20.36	Ν	ON	9.9
0.182000	53.65			64.39		-10.75	Ν	ON	9.9
0.200000			35.20	53.61		-18.41	Ν	ON	9.9
0.200000	51.	.74		63.61		-11.87	Ν	ON	9.9
0.424000		-	15.05	47.37	•	-32.32	Ν	ON	9.9
0.424000	35.	68		57.37		-21.69	Ν	ON	9.9
2.120000		-	20.52	46.00)	-25.48	Ν	ON	10.0
2.120000	32.	68		56.00)	-23.32	Ν	ON	10.0
3.600000		-	21.86	46.00)	-24.14	Ν	ON	10.1
3.600000	35.	.99		56.00)	-20.01	Ν	ON	10.1
4.596000		-	33.53	46.00)	-12.47	Ν	ON	10.1
4.596000	44.	35		56.00)	-11.65	Ν	ON	10.1

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

3. The emission levels of other frequencies were very low against the limit.

- 4. Margin value = Emission level Limit value
- 5. Correction factor = Insertion loss + Cable loss
- 6. Emission Level = Correction Factor + Reading Value.





2.2 RADIATED EMISSION MEASUREMENT

2.2.1. LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)								
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B				
30-88	39	29.5						
88-216	43.5	33.1	40	30				
216-230	46.4	25.6						
230-960	40.4	33.0	47	27				
960-1000	49.5	43.5	47	57				
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined				
3000+	Peak: 69.5	Peak: 63.5	Not defined	Not defined				

Radiated Emissions Limits at 3 meters (dBµV/m)								
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B				
30-88	49.5	40						
88-216	54	43.5	50.5	40.5				
216-230	56.0	46						
230-960	50.9	40	57 F	47 5				
960-1000	60	54	57.5	47.5				
1000-3000			Avg: 56	Avg: 50				
	Avg: 60	Avg: 54	Peak: 76	Peak: 70				
3000+	Peak: 80	Peak: 74	Avg: 60	Avg: 54				
			Peak: 80	Peak: 74				



Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

NOTE: 1. The lower limit shall apply at the transition frequencies.

- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 - 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 - 4. QP detector shall be applied if not specified.

2.2.2. TEST INSTRUMENTS

Frequency range below1GHz

			a			
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.	
3m Semi-anechoic		0;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	Euroshieldpn-	Eab 26 10	Feb. 25,20	
Chamber	EIS-LINDGREN		CT0001143-1216	Feb. 20, 19		
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20	
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25,20	
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 09,18	Jul. 08,19	

Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn- CT0001143-1216	Feb. 26,19	Feb. 25,20
Horn Antenna	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25, 20
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 09,18	Jul. 08,19

NOTE: 1. The test was performed in 3m chamber.

- 2. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
- 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



2.2.3. TEST PROCEDURE

<Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

- 1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
- 4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) Amplifier Gain(dB) (if the raw value contains the amplifier).
- 5. Margin value = Emission level Limit value.



<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

NOTE:

- 1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.
- 3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
- 4. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- 5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
- 6. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) Amplifier Gain(dB) (if the raw value contains the amplifier)
- 7. Margin value = Emission level Limit value.

2.2.4. DEVIATION FROM TEST STANDARD

No deviation.



2.2.5. TEST SETUP





- Pre-amplifier
- * : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

2.2.6. EUT OPERATING CONDITIONS

Same as item 2.1.6.

BV 7Layers Communications Technology (Shenzhen) Co. Ltd



2.2.7. TEST RESULTS

Mode 2

TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK	
31.94	30.01	50.55	40	-9.99	16.2	0.8	37.54	100	303	QP	
94.02	24.42	51.17	43.5	-19.08	8.98	1.29	37.02	100	249	QP	
186.17	22.24	46.7	43.5	-21.26	10.45	1.73	36.64	100	127	QP	
260.86	24.13	45.33	46	-21.87	13.24	2.08	36.52	100	235	QP	
358.83	20.46	38.72	46	-25.54	15.92	2.45	36.63	100	196	QP	
422.85	26.19	42.76	46	-19.81	17.5	2.7	36.77	100	217	QP	

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

2. Negative sign (-) in the margin column signify levels below the limit.

- 3. Frequency range scanned: 30MHz to 1000MHz.
- 4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK	
31.94	36.93	57.53	40	-3.07	16.14	0.8	37.54	100	137	QP	
92.08	28.67	55.56	43.5	-14.83	8.85	1.29	37.03	100	236	QP	
105.66	27.48	53.62	43.5	-16.02	9.49	1.35	36.98	100	133	QP	
230.79	25.15	47.46	46	-20.85	12.28	1.94	36.53	100	276	QP	
422.85	23.58	40.03	46	-22.42	17.62	2.7	36.77	100	116	QP	
594.54	23.5	37.56	46	-22.5	20.02	3.15	37.23	100	284	QP	

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

- 2. Negative sign (-) in the margin column signify levels below the limit.
- 3. Frequency range scanned: 30MHz to 1000MHz.
- 4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK	
3890	29.87	33.44	54	-24.13	37.22	5.59	46.38	100	360	Average	
3890	36.29	39.86	74	-37.71	37.22	5.59	46.38	100	360	Peak	
5182	32.74	35.68	54	-21.26	35.98	7.43	46.35	100	360	Average	
5182	36.54	39.48	74	-37.46	35.98	7.43	46.35	100	360	Peak	
7239	32.33	32.14	54	-21.67	37.3	8.64	45.75	100	360	Average	
7239	39.63	39.44	74	-34.37	37.3	8.64	45.75	100	360	Peak	

REMARKS: 1.1

1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

2. Negative sign (-) in the margin column signify levels below the limit.

3. Frequency range scanned: 1GHz to 18GHz.

4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK	
3941	27.6	32.47	54	-26.4	35.96	5.55	46.38	100	360	Average	
3941	32.61	37.48	74	-41.39	35.96	5.55	46.38	100	360	Peak	
5250	28.92	31.46	54	-25.08	36.35	7.44	46.33	100	360	Average	
5250	33.75	36.29	74	-40.25	36.35	7.44	46.33	100	360	Peak	
8378	33.25	31.22	54	-20.75	38.43	9.06	45.46	100	360	Average	
8378	39.27	37.24	74	-34.73	38.43	9.06	45.46	100	360	Peak	

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

2. Negative sign (-) in the margin column signify levels below the limit.

3. Frequency range scanned: 1GHz to 18GHz.

4. Only emissions significantly above equipment noise floor are reported.





Mode 17

TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK		
84.32	22.51	50.11	40	-17.49	8.27	1.23	37.1	100	178	QP		
156.1	33	57.95	43.5	-10.5	10.19	1.62	36.76	100	245	QP		
282.2	35.52	56.17	46	-10.48	13.71	2.15	36.51	100	231	QP		
376.29	36.9	54.59	46	-9.1	16.46	2.52	36.67	100	124	QP		
480.08	37.14	52.89	46	-8.86	18.24	2.92	36.91	100	316	QP		
597.45	29.77	43.79	46	-16.23	20.06	3.16	37.24	100	147	QP		

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

- 2. Negative sign (-) in the margin column signify levels below the limit.
- 3. Frequency range scanned: 30MHz to 1000MHz.
- 4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Rose Ma		

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M									
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
40.67	23.68	47.34	40	-16.32	12.88	0.93	37.47	100	164	QP
84.32	24.08	51.52	40	-15.92	8.43	1.23	37.1	100	135	QP
152.22	34.8	60.14	43.5	-8.7	9.86	1.58	36.78	100	223	QP
242.43	28.76	50.44	46	-17.24	12.84	2	36.52	100	284	QP
397.63	34.29	51.16	46	-11.71	17.23	2.61	36.71	100	169	QP
599.39	31.63	45.63	46	-14.37	20.09	3.16	37.25	100	188	QP

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is

- measured corresponding to relevant limit and recorded in the data table. 2. Negative sign (-) in the margin column signify levels below the limit.
- 2. Inegative sign (-) in the margin column signify levels below the il

3. Frequency range scanned: 30MHz to 1000MHz.

4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz		
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz		
TESTED BY	Rose Ma				

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M									
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
3924	28.95	32.33	54	-25.05	37.43	5.57	46.38	100	360	Average
3924	35.8	39.18	74	-38.2	37.43	5.57	46.38	100	360	Peak
8939	33.39	30.58	54	-20.61	38.25	9.92	45.36	100	360	Average
8939	39.27	36.46	74	-34.73	38.25	9.92	45.36	100	360	Peak
10486	36.17	31.49	54	-17.83	39.58	10.72	45.62	100	360	Average
10486	42.13	37.45	74	-31.87	39.58	10.72	45.62	100	360	Peak

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

2. Negative sign (-) in the margin column signify levels below the limit.

3. Frequency range scanned: 1GHz to 18GHz.

4. Only emissions significantly above equipment noise floor are reported.





TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Rose Ma		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
3975	27.99	32.69	54	-26.01	36.15	5.53	46.38	100	360	Average
3975	34.54	39.24	74	-39.46	36.15	5.53	46.38	100	360	Peak
7222	32.46	31.93	54	-21.54	37.68	8.61	45.76	100	360	Average
7222	39.44	38.91	74	-34.56	37.68	8.61	45.76	100	360	Peak
10707	37.27	32.65	54	-16.73	39.72	10.72	45.82	100	360	Average
10707	44.02	39.4	74	-29.98	39.72	10.72	45.82	100	360	Peak

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.

- 2. Negative sign (-) in the margin column signify levels below the limit.
- 3. Frequency range scanned: 1GHz to 18GHz.
- 4. Only emissions significantly above equipment noise floor are reported.





3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END----