FCC 47 CFR PART 15 SUBPART B

TEST REPORT

Shenzhen Nello Electronics Technology Co., Ltd .

Action Camera

Model No.: B1KS+

Additional Model: NOXPM

Prepared for	:	Shenzhen Nello Electronics Technology Co., Ltd .
Address	:	6/F,A Bldg,HuaYuan Industrial Park,1st Industrial area,FengHuang,Fuyong Town,Bao'an District,Shenzhen,China

Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
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Date of receipt of test sample	:	May 10, 2018
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	May 10, 2018 ~ June 01, 2018
Date of Report	:	June 01, 2018

FCC TEST REPORT

FCC 47 CFR PART 15 SUBPART B

Report Reference No.	**:**	**LCS180509024AEB**
Date Of Issue.....	:	June 01, 2018
Testing Laboratory Name ..... :		**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name ..... :		**Shenzhen Nello Electronics Technology Co., Ltd .**
Address.....	:	6/F,A Bldg,HuaYuan Industrial Park,1st Industrial area,FengHuang,Fuyong Town,Bao'an District,Shenzhen,China
Test Specification		
Standard	:	FCC 47 CFR Part 15 Subpart B, ANSI C63.4 -2014
Test Report Form No.	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

Test Item Description..... :		**Action Camera**
Trade Mark.....	:	GURUGEAR™
Model/ Type Reference.....	:	B1KS+
Ratings	:	DC 3.7V by Rechargeable Li-ion Battery(1000mAh) Maximum Charging Voltage: DC 4.35V
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Ace chai	Dick Su	Gavin Liang
Ace Chai / File administrators	Dick Su / Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS180509024AEB	June 01, 2018 Date of issue

Type / Model.....	: B1KS+
EUT.....	: Action Camera
Applicant.....	**: Shenzhen Nello Electronics Technology Co., Ltd .**
Address.....	: 6/F,A Bldg,HuaYuan Industrial Park,1st Industrial area,FengHuang,Fuyong Town,Bao'an District,Shenzhen,China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Shenzhen Nello Electronics Technology Co., Ltd .**
Address.....	: 6/F,A Bldg,HuaYuan Industrial Park,1st Industrial area,FengHuang,Fuyong Town,Bao'an District,Shenzhen,China
Telephone.....	: /
Fax.....	: /
Factory.....	: **/**
Address.....	: /
Telephone.....	: /
Fax.....	: /

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	June 01, 2018	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	**Standard**	**Limits**	**Results**
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B	Class B	PASS
N/A is an abbreviation for Not Applicable.			

Description of Test Mode(s)		
Mode 1	Exchange data with PC mode	Pre-scan
Mode 2	Camera mode	Pre-scan
***Note: All test modes were tested, but we only recorded the worst case in this report.		

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

EUT	: Action Camera
Test Model	: B1KS+
Additional Model	: NOXPM
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Power Supply	: DC 3.7V by Rechargeable Li-ion Battery(1000mAh) Maximum Charging Voltage: DC 4.35V
Hardware Version	: GKUB1-3559-V1.2 20171121
Software Version	: 30.8.3.16.20180515
2.4G WLAN	
Frequency Range	: 2.412-2.462GHz
Channel Number	: 11 Channels for 20MHz bandwidth(2412~2462MHz) 7 channels for 40MHz bandwidth(2422~2452MHz)
Channel Spacing	: 5MHz
Modulation Type	: IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)
Antenna Description	: PIFA antenna, 0.44dBi (Max.)
433.92MHz	
Frequency Range	: 433.92MHz Only For RX
Channel Number	: 1
Modulation Type	: ASK
Antenna Description	: PIFA antenna

2.2.Description of Test Facility

Site Description
EMC Lab. : FCC Registration Number. is 254912.

Industry Canada Registration Number. is 9642A-1.

ESMD Registration Number. is ARCB0108.

UL Registration Number. is 100571-492.

TUV SUD Registration Number. is SCN1081.

TUV RH Registration Number. is UA 50296516-001.

NVLAP Registration Code is 600167-0.

2.3.Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is

cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.4.Measurement Uncertainty

Test	**Parameters**	**Expanded uncertainty (Ulab)**	**Expanded uncertainty (Ucispr)**
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 4.0 dB ± 3.6 dB
Power disturbance	Level accuracy (30MHz to 300MHz)	± 2.90dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.60 dB	± 2.63 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	± 2.63 dB
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 2.63 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	N/A
Mains Harmonic	Voltage	± 0.510%	N/A
Voltage Fluctuations & Flicker	Voltage	± 0.510%	N/A
EMF		± 21.59%	N/A

（1）Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

（2）The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

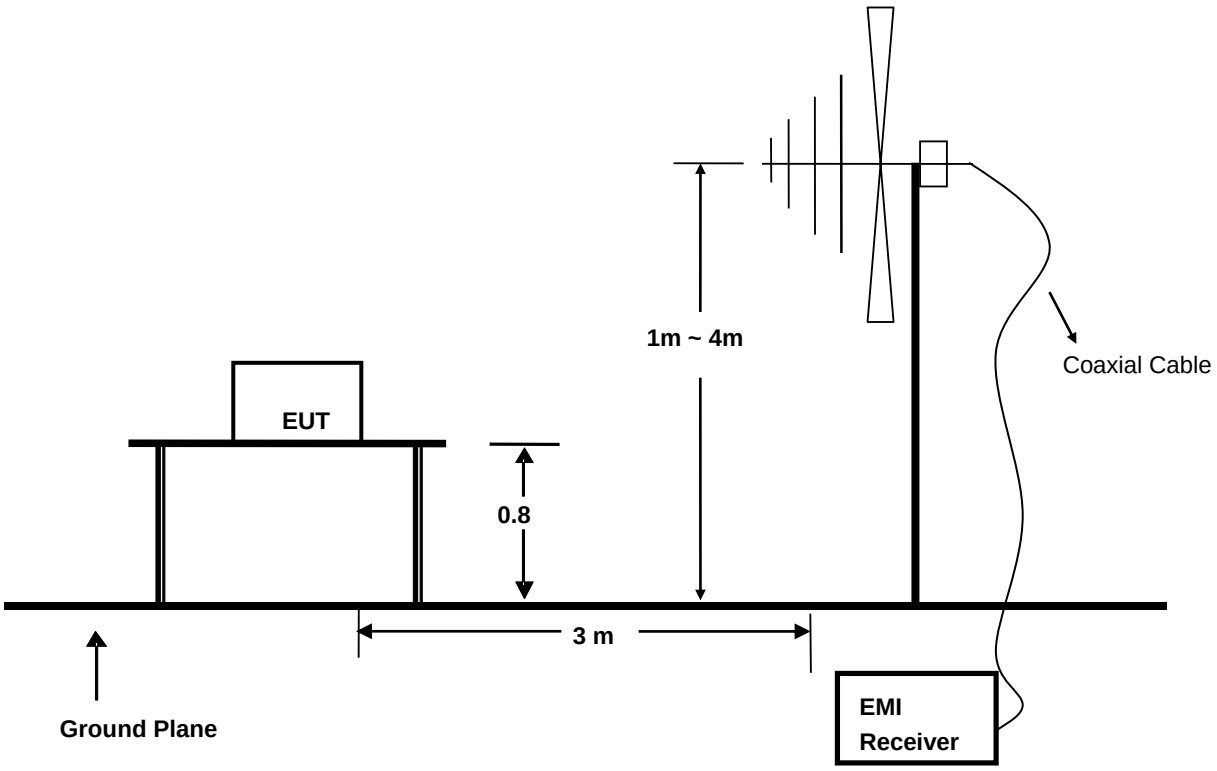
3. RADIATED EMISSION MEASUREMENT

3.1.Test Equipment

The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal. Day	Cal. Due Day
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2017-06-18	2018-06-17
2	EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101181	2017-06-18	2018-06-17
3	Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	July 16, 2017	July 15, 2018
4	Log per Antenna	SCHWARZBECK	VULB9163	9163-470	2017-06-10	2018-06-09
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Positioning Controller	MF	MF-7082	/	N/A	N/A
7	RF Cable	Hubersuhner	Sucoflex104	FP2RX2	2017-06-18	2018-06-17
8	Horn Antenna	EMCO	3115	6741	2017-06-10	2018-06-09
9	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2017-06-18	2018-06-17
10	Amplifier	SCHAFFNER	COA9231A	18667	2017-06-18	2018-06-17
11	Amplifier	Agilent	8449B	3008A02120	2017-06-18	2018-06-17
12	Amplifier	MITEQ	AMF-6F-260400	9121372	2017-06-18	2018-06-17

3.2.Block Diagram of Test Setup



3.3.Radiated Emission Limit (Class B)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.4.EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.5.Operating Condition of EUT

3.5.1.Setup the EUT as shown in Section 3.2.

3.5.2.Let the EUT work in test mode (ON) and measure it.

3.6.Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120kHz.

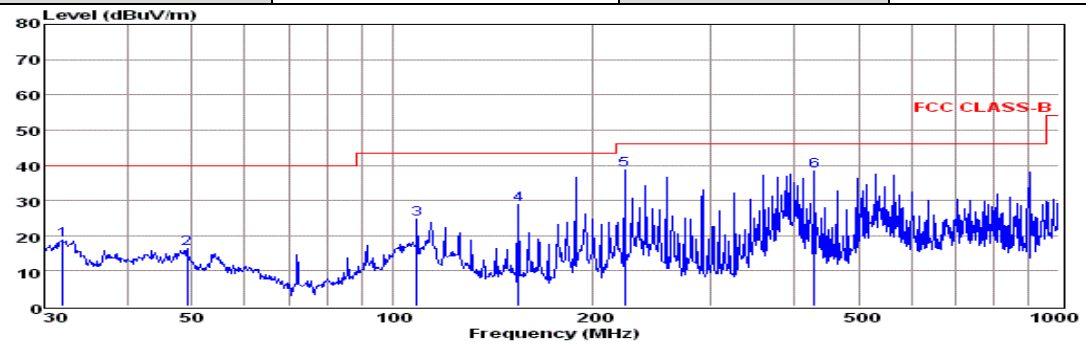
The frequency range from 30MHz to 1000MHz is checked.

3.7.Radiated Emission Noise Measurement Result

PASS.

The scanning waveforms please refer to the next page.

Model No.	B1KS+	Test Mode	Mode 1
Environmental Conditions	24.2℃, 53.1% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	WangChuang		

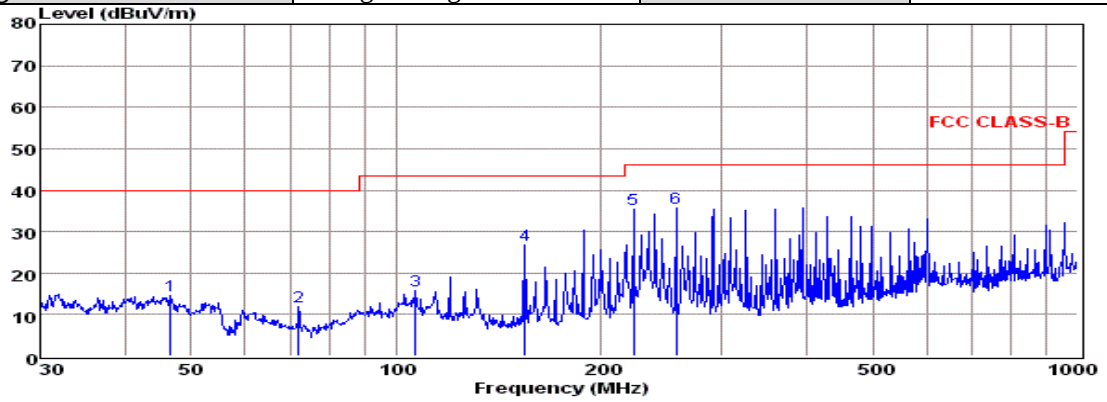


pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	31.95	5.94	0.37	12.32	18.63	40.00	-21.37	QP
2	49.19	2.63	0.35	13.30	16.28	40.00	-23.72	QP
3	108.65	11.50	0.68	12.37	24.55	43.50	-18.95	QP
4	154.28	19.79	0.76	8.44	28.99	43.50	-14.51	QP
5	222.95	26.34	0.95	11.33	38.62	46.00	-7.38	QP
6	429.52	21.70	1.28	15.51	38.49	46.00	-7.51	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Model No.	B1KS+	Test Mode	Mode 1
Environmental Conditions	24.2℃, 53.1% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	WangChuang		



pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	46.67	0.80	0.35	13.45	14.60	40.00	-25.40	QP
2	71.83	2.94	0.55	8.34	11.83	40.00	-28.17	QP
3	106.76	2.44	0.68	12.54	15.66	43.50	-27.84	QP
4	154.28	17.50	0.76	8.44	26.70	43.50	-16.80	QP
5	222.95	23.20	0.95	11.33	35.48	46.00	-10.52	QP
6	257.42	22.54	1.01	12.06	35.61	46.00	-10.39	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Test Mode: (above 1GHz)	**Tested by:** WangChuang
Test voltage: DC 3.7V	**Test Distance:** 3m
Detector Function: Peak+AV	**Test Results:** Passed

Frequency MHz	Emission Level dBμV/m		Limits dBμV/m		Margin dBμV/m		Polarization
	Peak	AV	Peak	AV	Peak	AV	
1285.33	49.63	30.56	70.00	50.00	-20.37	-19.44	H
1999.72	52.88	30.28	70.00	50.00	-17.12	-19.72	H
2241.17	50.77	37.18	70.00	50.00	-19.23	-12.82	H
3378.63	50.62	37.39	74.00	54.00	-23.38	-16.61	H
4373.01	57.52	36.43	74.00	54.00	-16.48	-17.57	H
5703.95	50.02	31.51	74.00	54.00	-23.98	-22.49	H
1285.65	50.21	30.62	70.00	50.00	-19.79	-19.38	V
2000.02	52.52	30.45	70.00	50.00	-17.48	-19.55	V
2241.34	49.83	36.75	70.00	50.00	-20.17	-13.25	V
3378.97	50.12	37.04	74.00	54.00	-23.88	-16.96	V
4372.78	58.41	36.35	74.00	54.00	-15.59	-17.65	V
5704.21	49.34	31.93	74.00	54.00	-24.66	-22.07	V

4. AC POWER LINE CONDUCTED EMISSIONS

4.1 Standard Applicable

According to §15.107 : For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

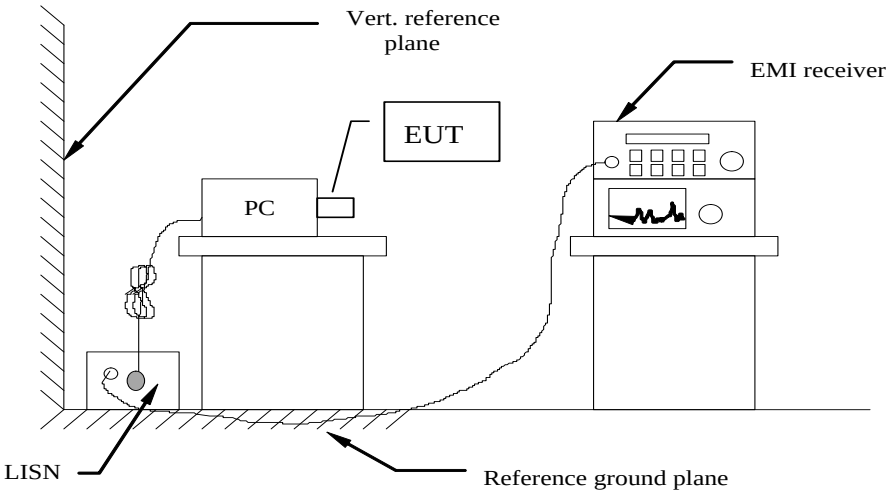
* Decreasing linearly with the logarithm of the frequency

4.2 Test Equipment

The following test equipment are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal. Day	Cal. Due Day
1	EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101181	2017-06-18	2018-06-17
2	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2017-06-18	2018-06-17
3	Artificial Mains	ROHDE & SCHWARZ	ENV216	101288	2017-06-18	2018-06-17
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	RF Cable	Harbour Industries	1452	N/A	2017-06-18	2018-06-17

4.3 Block Diagram of Test Setup

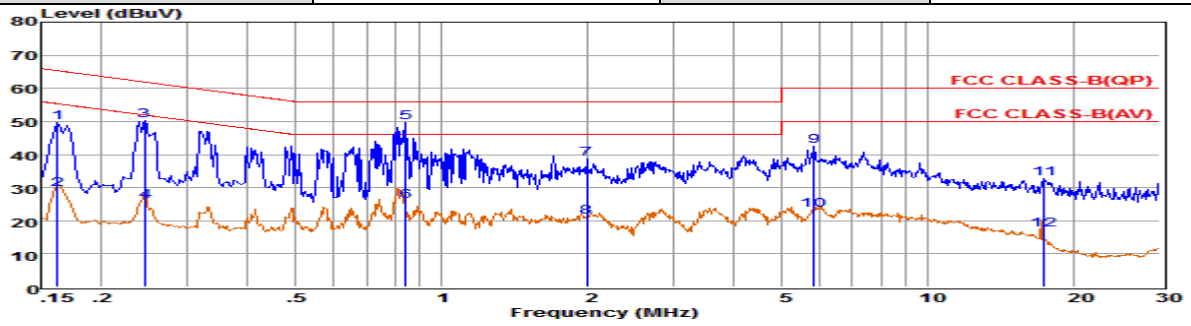


4.4 Test Results

PASS

The test data please refer to following page.

Model No.	B1KS+	Test Mode	Mode 1
Environmental Conditions	23.5℃, 53.1% RH	Detector Function	Quasi-peak
Pol	Line	Distance	3m
Test Engineer	WangChuang		

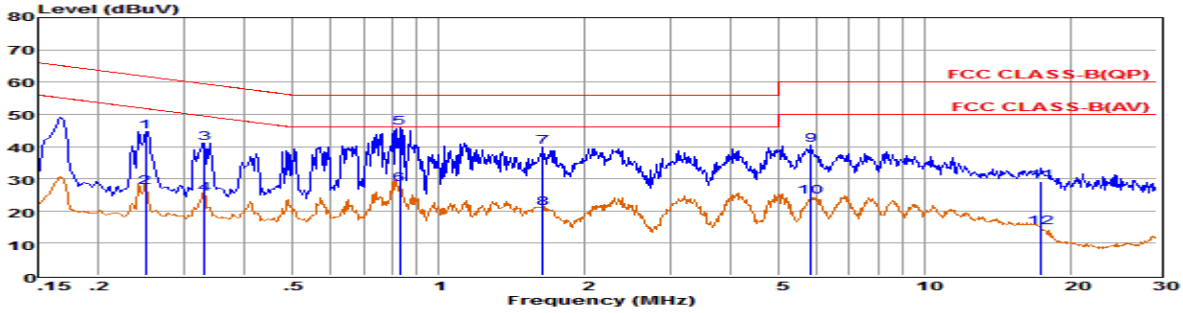


Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.16	30.12	9.59	0.02	10.00	49.73	65.34	-15.61	QP
2	0.16	9.78	9.59	0.02	10.00	29.39	55.33	-25.94	Average
3	0.25	30.61	9.63	0.03	10.00	50.27	61.91	-11.64	QP
4	0.25	6.35	9.63	0.03	10.00	26.01	51.90	-25.89	Average
5	0.84	30.06	9.63	0.04	10.00	49.73	56.00	-6.27	QP
6	0.84	6.34	9.63	0.04	10.00	26.01	46.00	-19.99	Average
7	1.99	18.88	9.64	0.05	10.00	38.57	56.00	-17.43	QP
8	1.99	1.33	9.64	0.05	10.00	21.02	46.00	-24.98	Average
9	5.84	22.82	9.66	0.06	10.00	42.54	60.00	-17.46	QP
10	5.84	3.50	9.66	0.06	10.00	23.22	50.00	-26.78	Average
11	17.38	12.98	9.73	0.11	10.00	32.82	60.00	-27.18	QP
12	17.38	-2.61	9.73	0.11	10.00	17.23	50.00	-32.77	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Model No.	B1KS+	Test Mode	Mode 1
Environmental Conditions	23.5℃, 53.1% RH	Detector Function	Quasi-peak
Pol	Neutral	Distance	3m
Test Engineer	WangChuang		



Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.25	25.02	9.60	0.03	10.00	44.65	61.78	-17.13	QP
2	0.25	7.71	9.60	0.03	10.00	27.34	51.77	-24.43	Average
3	0.33	21.52	9.61	0.03	10.00	41.16	59.44	-18.28	QP
4	0.33	5.51	9.61	0.03	10.00	25.15	49.44	-24.29	Average
5	0.83	26.11	9.63	0.04	10.00	45.78	56.00	-10.22	QP
6	0.83	8.58	9.63	0.04	10.00	28.25	46.00	-17.75	Average
7	1.64	20.06	9.63	0.05	10.00	39.74	56.00	-16.26	QP
8	1.64	1.19	9.63	0.05	10.00	20.87	46.00	-25.13	Average
9	5.84	20.57	9.67	0.06	10.00	40.30	60.00	-19.70	QP
10	5.84	4.58	9.67	0.06	10.00	24.31	50.00	-25.69	Average
11	17.38	9.39	9.78	0.11	10.00	29.28	60.00	-30.72	QP
12	17.38	-5.07	9.78	0.11	10.00	14.82	50.00	-35.18	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

5. PHOTOGRAPH

Please refer to separated files for Test Setup Photos of the EUT.

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Please refer to separated files for External and internal Photos of the EUT.

---------- THE END OF TEST REPORT ----------