FCC Test Report

APPLICANT : Xiaomi Communications Co., Ltd.

EQUIPMENT: Mobile Phone

BRAND NAME : MI

MODEL NAME : M1808D2TG

FCC ID : 2AFZZ-XMD2TG

STANDARD : FCC CFR Title 47 Part 15 Subpart B

CLASSIFICATION: Certification

The product was received on Jul. 30, 2018 and testing was completed on Aug. 11, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China

Sporton International (Kunshan) Inc.

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APPENDIX A. SETUP PHOTOGRAPHS

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC873008	Rev. 01	Initial issue of report	Sep. 07, 2018

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
					Under limit
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	5.03 dB at
					0.153 MHz
					Under limit
3.2		Radiated Emission	< 15.109 limits	PASS	3.27 dB at
					66.860 MHz

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1. General Description

1.1. Applicant

Xiaomi Communications Co., Ltd.

The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

Report No.: FC873008

1.2. Manufacturer

Xiaomi Communications Co., Ltd.

The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

1.3. Product Feature of Equipment Under Test

	Product Feature
Equipment	Mobile Phone
Brand Name	MI
Model Name	M1808D2TG
FCC ID	2AFZZ-XMD2TG
	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/
	HSPA+ (16QAM uplink is not supported)/LTE/
ELIT cumparts Badica application	WLAN 2.4GHz 802.11b/g/n HT20
EUT supports Radios application	WLAN 5GHz 802.11a/n HT20/HT40
	WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
	Bluetooth BR/EDR/LE
IMELO. J.	Conduction: 869808030002899/869808030002907
IMEI Code	Radiation: 869808030002972/869808030002980
HW Version	P2.0
SW Version	MIUI9
EUT Stage	Identical Prototype

Remark:

- 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- 2. There are two types of EUT, the difference between two samples is for memory, the sample 1 is 6+128GB capacity and the sample 2 is 4+64GB capacity. According to the difference, we only choose sample 1 to perform full test and the sample 2 verify difference with the sample 1 for Radiation.

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1.4. Product Specification of Equipment Under Test

Standards-related Product Specification						
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5320 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz					
Rx Frequency	Bluetooth: 2402 MHz ~ 2480 MHz GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band IV: 2112.4 MHz ~ 2152.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz LTE Band 2: 1930.7 MHz ~ 1989.3 MHz LTE Band 4: 2110.7 MHz ~ 2154.3 MHz LTE Band 5: 869.7 MHz ~ 893.3 MHz LTE Band 7: 2622.5 MHz ~ 2687.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz Bluetooth: 2402 MHz ~ 2480 MHz GNSS: 1559 MHz ~ 1610 MHz					
Antenna Type	WWAN : Fixed Internal Antenna WLAN : PIFA Antenna Bluetooth : PIFA Antenna GNSS: PIFA Antenna					

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GSM: GMSK **GPRS: GMSK** EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA: BPSK (Uplink) HSDPA/DC-HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (uplink is not supported) DC-HSDPA: 64QAM **Type of Modulation** LTE: QPSK / 16QAM / 64QAM 802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM) Bluetooth LE : GFSK Bluetooth (1Mbps): GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps): 8-DPSK **GNSS: BPSK**

Note: GNSS = GPS + Glonass + Beidou + Galileo

1.5. Modification of EUT

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

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1.6. Test Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.						
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL: +86-512-57900158 FAX: +86-512-57900958						
Test Site No.	Sportor	ı Site No.	FCC Test Firm Registration No.				
	CO01-KS	03CH02-KS	630927				

1.7. Applicable Standards

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

- FCC CFR Title 47 Part 15 Subpart B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

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2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

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Test Items	Function Type
	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1(Charging from Adapter1) + Camera (Rear) + Antenna 1 for Sample 1
	Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN (5G) Idle + USB Cable 2(Charging from Adapter2) + Camera (Front) + Antenna 1 for Sample 1
AC Conducted	Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 2(Charging from Adapter2) + MPEG4 + Antenna 1 for Sample 1
Emission	Mode 4: WCDMA Band II Idle + Bluetooth Idle + WLAN (5G) Idle + USB Cable 1(Data Link with Notebook) + GNSS Rx + Antenna 1 for Sample 1
	Mode 5: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 2(Data Link with Notebook) + GNSS Rx + Antenna 1 for Sample 1
	Mode 6: GSM1900 Idle + Bluetooth Idle + WLAN (5G) Idle + USB Cable 2(Charging from Adapter2) + Camera (Front) + Antenna 2 for Sample 1
	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1(Charging from Adapter1) + Camera (Rear) + Antenna 1 for Sample 1
	Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN (5G) Idle + USB Cable 2(Charging from Adapter2) + Camera (Front) + Antenna 1 for Sample 1
	Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1(Charging from Adapter1) + MPEG4 + Antenna 1 for Sample 1
	Mode 4: WCDMA Band II Idle + Bluetooth Idle + WLAN (5G) Idle + USB Cable 1(Data Link with Notebook) + GNSS Rx + Antenna 1 for Sample 1
	Mode 5: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 2(Data Link with Notebook) + GNSS Rx + Antenna 1 for Sample 1
Radiated	Mode 6: LTE Band 4 Idle + Bluetooth Idle + WLAN (5G) Idle + type C to Earphone Cable 1 + GNSS Rx + Earphone + Antenna 1 for Sample 1
Emissions	Mode 7: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + type C to Earphone Cable 2 + GNSS Rx + Earphone + Antenna 1 for Sample 1
	Mode 8: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + type C to Earphone Cable 3 + GNSS Rx + Earphone + Antenna 1 for Sample 1
	Mode 9: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + type C to Earphone Cable 4 + GNSS Rx + Earphone + Antenna 1 for Sample 1
	Mode 10 : LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + type C to Earphone Cable 5 + GNSS Rx + Earphone + Antenna 1 for Sample 1
	Mode 11 : LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 2(Data Link with Notebook) + GNSS Rx + Antenna 2 for Sample 1
	Mode 12 : LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 2(Data Link with Notebook) + GNSS Rx + Antenna 1 for Sample 2

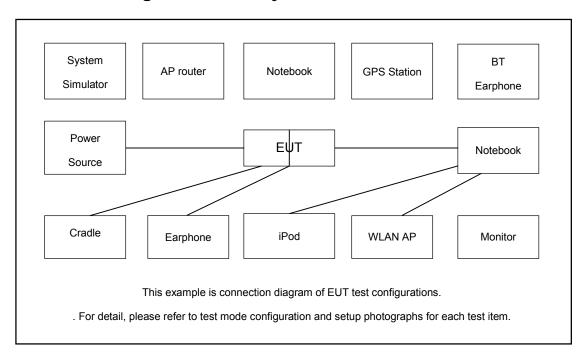
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Remark:

- 1. The worst case of AC is mode 6; only the test data of this mode is reported.
- **2.** The worst case of RE is mode 5; only the test data of this mode is reported.
- Data Link with Notebook means data application transferred mode between EUT and Notebook.
- **4.** The Antenna 1 is Bottom Antenna, the Antenna 2 is Top Antenna. The Antenna 2 verify worse case of Antenna 1.

2.2. Connection Diagram of Test System



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2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	GNSS Station	RACELOGIC	RLLS03-2RP	N/A	N/A	Unshielded,1.8m
3.	FM Station	R&S	SMBV100A	258305	N/A	Unshielded, 1.8 m
4.	GNSS Station	ADIVIC	MP9000	N/A	N/A	Unshielded, 1.8 m
5.	Bluetooth Earphone	Xiaomi	LYEJ02LM	J02LM N/A N/A		N/A
6.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
7.	WLAN AP	TP-LINK	TL-WDR5600	N/A	N/A	Unshielded,1.8m
8.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
9.	Notebook	Dell	Latitude3440	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
10.	iPod	Apple	A1199	FCC DoC	Shielded, 1.2m	N/A
11.	SD Card	Kingston	8GB	N/A	N/A	N/A
12.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
13.	Earphone	Xiaomi	YDJC01JY	N/A	Unshielded, 1.2m	N/A

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2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

- 1. Data application is transferred between Notebook and EUT via USB cable.
- 2. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
- 3. Execute "Video Player" to play MPEG4 files.
- 4. Turn on camera to capture images.

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3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits 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.

<Class B Limit>

Frequency of emission	Conducted limit (dBuV)				
(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.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room 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.

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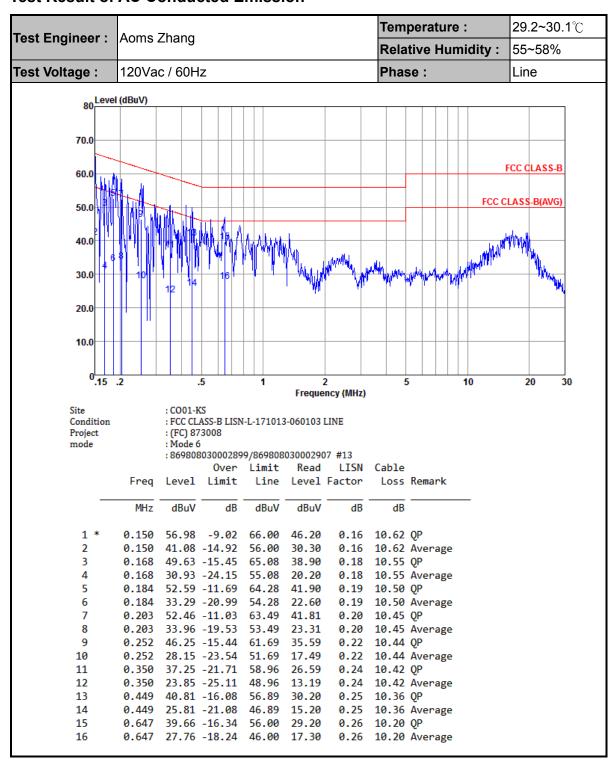
3.1.4 Test Setup



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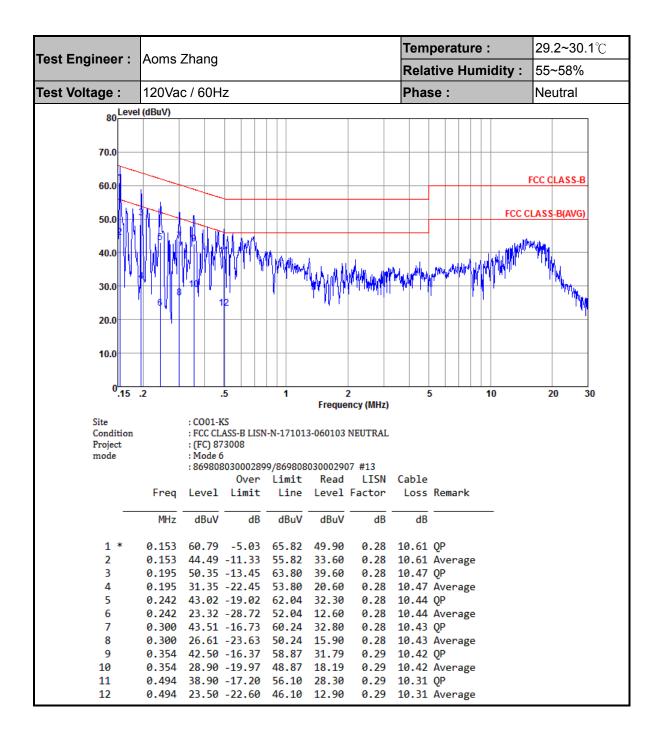
3.1.5 Test Result of AC Conducted Emission



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3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency	Field Strength	Measurement Distance		
(MHz)	(microvolts/meter)	(meters)		
30 – 88	100	3		
88 – 216	150	3		
216 - 960	200	3		
Above 960	500	3		

3.2.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

- 1. The EUT was placed on a turntable with 0.8 meter above ground.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest radiation.
- 4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
- 5. 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.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
- 7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
- 8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
- 9. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level

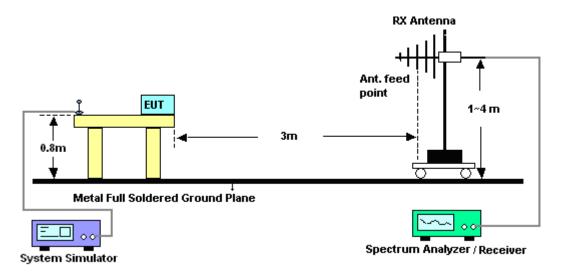
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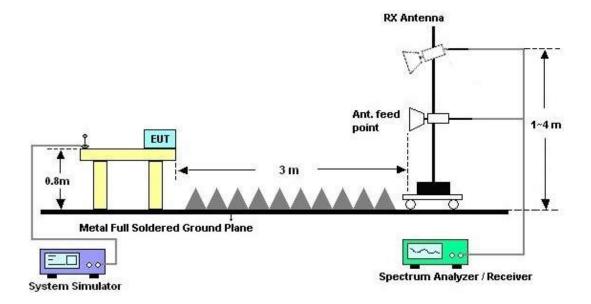
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3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

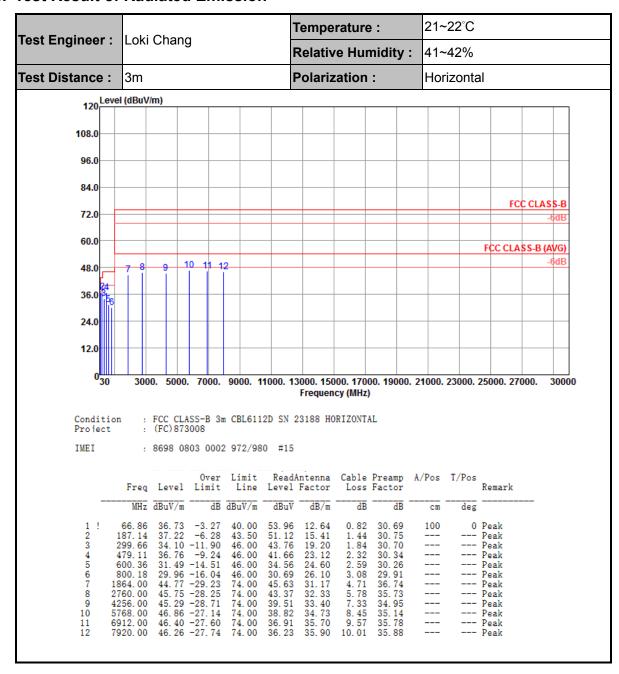


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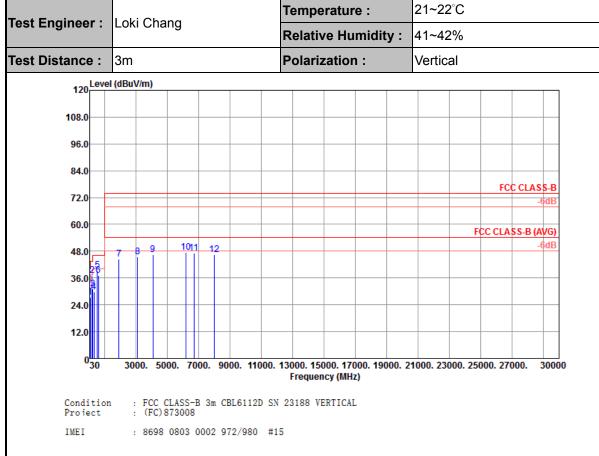
3.2.5. Test Result of Radiated Emission



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	Freq	Level	Over Limit			ntenna Factor		Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 2	66. 86 185. 20		-12.68 -6.45	40.00 43.50	44. 55 50. 99	12.64 15.38	0.82 1.43	30. 69 30. 75	100		Peak
3	232. 73	31. 22	-14.78	46.00	43.61	16.66	1.67	30.72			Peak
4 5	298. 69 509. 18	29. 88 39. 28	-16. 12 -6. 72	46. 00 46. 00	39. 55 43. 58	19. 19 23. 60	1.84 2.40	30. 70 30. 30			Peak Peak
6 7	600.36 1896.00		-8. 76 -29. 39	46.00 74.00	40.31 45.04	24.60 31.50	2. 59 4. 75	30. 26 36. 68			Peak Peak
8	3088.00 4064.00		-28.39 -27.60	74.00 74.00	41. 95 40. 78	32. 97 33. 50	6. 19 7. 14	35. 50 35. 02			Peak Peak
10	6200.00	47.52	-26.48	74.00	38.45	35.40	8.89	35. 22			Peak
11 12	6688. 00 8008. 00		-26. 82 -27. 59		37. 71 36. 28	35. 60 36. 00	9. 27 10. 03	35. 40 35. 90			Peak Peak

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4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 19, 2018	Aug. 07, 2018	Apr. 18, 2019	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Aug. 07, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Aug. 07, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Aug. 07, 2018	Oct. 11, 2018	Conduction (CO01-KS)
Transient limiter	COM-POWER	LIT-153	531040	150kHz~30MHz	Aug. 25, 2017	Aug. 07, 2018	Aug. 24, 2018	Conduction (CO01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;M ax 30dBm	Oct. 19, 2017	Aug. 11, 2018	Oct. 18, 2018	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44G,MAX 30dB	Apr. 17, 2018	Aug. 11, 2018	Apr. 16, 2019	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Jan. 29, 2018	Aug. 11, 2018	Jan. 28, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 21, 2017	Aug. 11, 2018	Oct. 20, 2018	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Aug. 11, 2018	Feb. 06, 2019	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18~40GHz	Oct. 12, 2017	Aug. 11, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1MHz ~1000MHz / 32 dB	Apr. 17, 2018	Aug. 11, 2018	Apr. 16, 2019	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1-26.5GHz Gain 30dB	Oct. 12, 2017	Aug. 11, 2018	Oct. 11, 2018	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Aug. 11, 2018	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 11, 2018	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 11, 2018	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required

Sporton International (Kunshan) Inc.

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5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	2.9 dB
of 95% (U = 2Uc(y))	2.9 UD

<u>Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	4 0 dD
of 95% (U = 2Uc(y))	4.8 dB

<u>Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	5.2 dB
of 95% (U = 2Uc(y))	3.2 ub

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence	5.0 dB
of 95% (U = 2Uc(y))	0.0 dB

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