FCC Test Report

APPLICANT : MobiWire SAS EQUIPMENT : 4G Smart Phone

BRAND NAME : MobiWire

MODEL NAME : MobiWire Nuna Lite FCC ID : QPN-NUNA-LITE

STANDARD : 47 CFR Part 15 Subpart B

CLASSIFICATION : Certification

The product was received on Mar. 09, 2020 and testing was completed on Jul. 03, 2020. 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.

Reviewed by: Jason Jia / Supervisor

JasonJia

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Sporton International (Kunshan) Inc.

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Cert #5145.02

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC030903	Rev. 01	Initial issue of report	Jul. 13, 2020

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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	7.02 dB at	
					0.152 MHz	
	15.109					Under limit
3.2		15.109 Radiated Emission	< 15.109 limits	PASS	3.44 dB at	
					191.990 MHz	

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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1. General Description

1.1. Applicant

MobiWire SAS

79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France

1.2. Manufacturer

MobiWire SAS

79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France

1.3. Product Feature of Equipment Under Test

	Product Feature
Equipment	4G Smart Phone
Brand Name	MobiWire
Model Name	MobiWire Nuna Lite
FCC ID	QPN-NUNA-LITE
	GSM/WCDMA/LTE
	WLAN 2.4GHz 802.11b/g/n HT20/HT40
EUT supports Radios application	WLAN 5GHz 802.11a/n HT20/HT40
	Bluetooth BR / EDR / LE
	FM Receiver / GNSS
IMELCOdo	Conduction: 354164110001142
IMEI Code	Radiation: 354164110000060/354164110001159
HW Version	V00
SW Version	NUNA_LITE_V01
EUT Stage	Identical Prototype

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

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1.4. Product Specification of Equipment Under Test

Standards related Descript Constitution					
Standards-related Product Specification					
	GSM850: 824.2 MHz ~ 848.8 MHz				
	GSM1900: 1850.2 MHz ~ 1909.8MHz				
	WCDMA Band V: 826.4 MHz ~ 846.6 MHz				
	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz				
T., F.,	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz				
Tx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz				
	802.11a/n: 5180 MHz ~ 5240 MHz;				
	5260 MHz ~ 5320 MHz;				
	5500 MHz ~ 5700 MHz				
	5745 MHz ~ 5825 MHz				
	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 II: 1932.4 MHz ~ 1987.6 MHz				
	LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz				
D., F.,	802.11b/g/n: 2412 MHz ~ 2462 MHz				
Rx Frequency	802.11a/n: 5180 MHz ~ 5240 MHz;				
	5260 MHz ~ 5320 MHz;				
	5500 MHz ~ 5700 MHz				
	5745 MHz ~ 5825 MHz				
	Bluetooth: 2402 MHz ~ 2480 MHz				
	GNSS: 1559 MHz ~ 1610 MHz				
	FM: 88 MHz ~ 108 MHz				
	WWAN: PIFA Antenna				
Antenna Type	Bluetooth / WLAN : PIFA Antenna GNSS: PIFA Antenna				
	FM : External Earphone Antenna				
	GSM/GPRS: GMSK				
	EGPRS: GMSK for MCS 0 ~ 4 & 8PSK for MCS5 ~9				
	WCDMA : BPSK (Uplink)				
	HSDPA/DC-HSDPA : QPSK (Uplink)				
	HSUPA : QPSK (Uplink)				
	HSPA+: 16QAM				
	DC-HSDPA: 64QAM				
	LTE: QPSK / 16QAM /64QAM				
Type of Modulation	802.11b: DSSS (BPSK / QPSK / CCK)				
	,				
	802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)				
	Bluetooth LE: GFSK				
	Bluetooth (1Mbps) : GFSK				
	Bluetooth (2Mbps) :π/4-DQPSK				
	Bluetooth (3Mbps) : 8-DPSK				
	GNSS: BPSK				
	FM				

Note: GNSS Rx = GLONASS + GPS + SBAS

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1.5. Modification of EUT

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

1.6. Test Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

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Test Firm	Sporton International (Kunshan) Inc.					
	No. 1098, Pengxi North Road, Kunshan Economic Development Zone					
Test Site Location	Jiangsu Province 215300	People's Republic of Chi	ina			
Test Site Location	TEL: +86-512-57900158					
	FAX: +86-512-57900958					
	0	FOO Designation No	FCC Test Firm			
Test Site No.	Sporton Site No.	FCC Designation No.	Registration No.			
	CO01-KS 03CH02-KS	CN1257	314309			

1.7. Test Software

Item Site		Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8. Applicable Standards

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

- 47 CFR 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.

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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).

Test Items	Function Type
	Mode 1: GSM 850 (Middle) Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + Camera(Rear) + USB Cable (Charging from Adapter)
	Mode 2: PCS 1900 Idle + Bluetooth Idle + WLAN Idle(5G) + Earphone + Camera(Front) + USB Cable (Charging from Adapter)
AC Conducted Emission	Mode 3: WCDMA Band V (High) Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + MPEG4 + USB Cable (Charging from Adapter)
	Mode 4: LTE Band 7 Idle + Bluetooth Idle + WLAN Idle(5G) + Earphone + FM Rx(98MHz) + USB Cable (Charging from Adapter)
	Mode 5: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + GNSS Rx + USB Cable (Data Link with Notebook)
	Mode 1: GSM 850 (Middle) Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + Camera(Rear) + USB Cable (Charging from Adapter)
	Mode 2: PCS 1900 Idle + Bluetooth Idle + WLAN Idle(5G) + Earphone + Camera(Front) + USB Cable (Charging from Adapter)
Radiated Emissions	Mode 3: WCDMA Band V (High) Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + MPEG4 + USB Cable (Charging from Adapter)
	Mode 4: LTE Band 7 Idle + Bluetooth Idle + WLAN Idle(5G) + Earphone + FM Rx(98MHz) + USB Cable (Charging from Adapter)
	Mode 5: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle(2.4G) + Earphone + GNSS Rx + USB Cable (Data Link with Notebook)

Remark:

- 1. The worst case of AC is mode 1; 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.** Pre-scanned Low/Middle/High channel for GSM 850/WCDMA Band V and FM Rx, the worst channel was recorded in this report.

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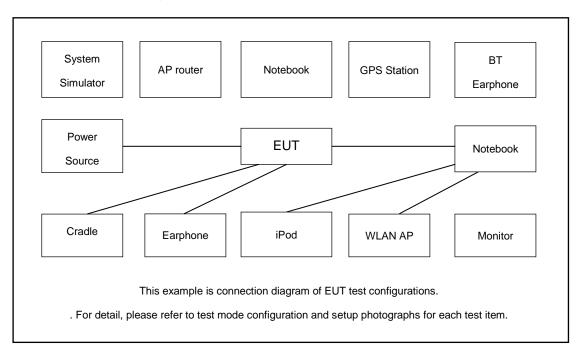
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2.2. Connection Diagram of Test System



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

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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	Anritus	MT8000A	N/A	N/A	Unshielded,1.8m
2.	Base Station	Anritsu	MT8820C	Fcc DoC	N/A	Shielded, 1.5m
3.	GNSS Station	R&S	SMBV100A	N/A	N/A	Unshielded,1.8m
4.	FM Station	R&S	SMBV100A	258305	N/A	N/A
5.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	Unshielded,1.8m
6.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
7.	Notebook	Lenovo	V130-141KB001	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
8.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
9.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
10.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
11.	Hard disk	KINGSHARE	KSP6120G	Fcc DoC	Shielded, 1.2m	N/A
12.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
13.	SD Card	Kingston	8GB	N/A	N/A	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 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 camera to capture images.
- 3. Turn on MPEG4 function.
- 4. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
- 5. Turn on FM function to make the EUT receive continuous signals from FM station.

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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.

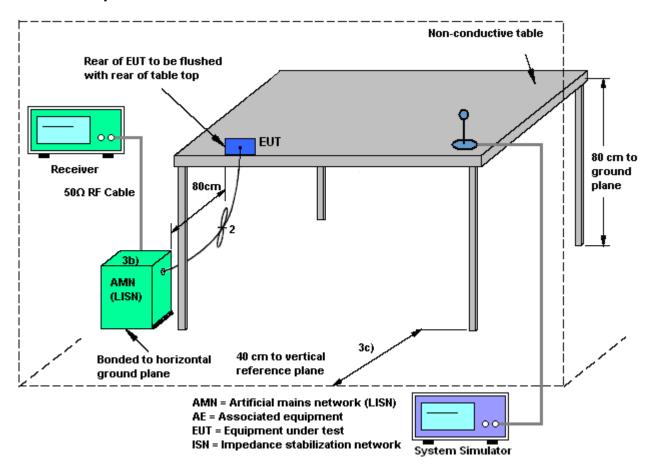
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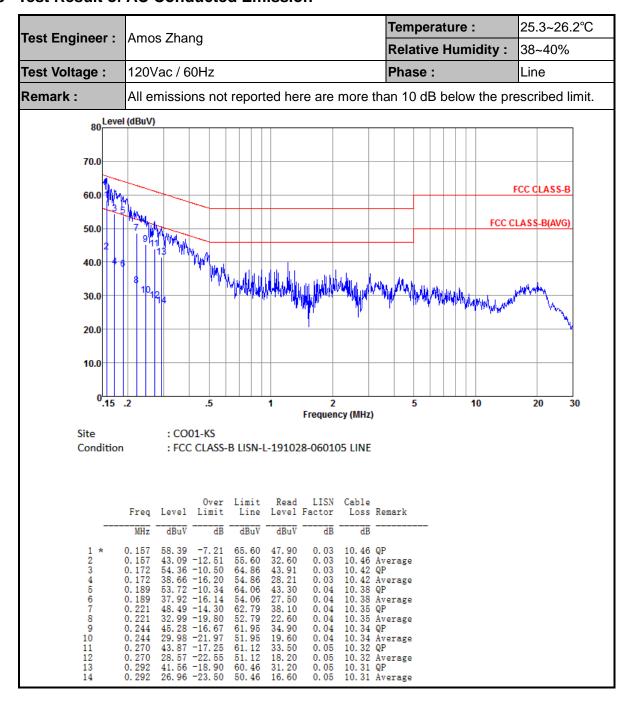
3.1.4 Test Setup



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3.1.5 Test Result of AC Conducted Emission



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Temperature: 25.3~26.2°C Test Engineer: Amos Zhang **Relative Humidity:** 38~40% Test Voltage: 120Vac / 60Hz Phase: Neutral Remark: All emissions not reported here are more than 10 dB below the prescribed limit. 80 Level (dBuV) 70.0 FCC CLASS-B 60.0 FCC CLASS-B(AVG) 50.0 40.0 30.0 20.0 10.0 5 20 10 30 2 Frequency (MHz) : CO01-KS Site Condition : FCC CLASS-B LISN-N-191028-060105 NEUTRAL 0ver Limit Read LISN Cable Level Limit Level Factor Loss Remark Line dBuV dBuV dBuV MHz dB dB dB 58. 85 -7. 02 46. 05 -9. 82 54. 72 -10. 53 39. 42 -15. 83 53. 08 -11. 38 38. 68 -15. 78 48. 94 -14. 46 33. 94 -19. 46 46. 33 -16. 06 31. 63 -20. 76 42. 91 -18. 21 29. 31 -21. 81 41. 00 -19. 32 29. 60 -20. 72 40. 64 -15. 36 32. 64 -13. 36 65. 87 55. 87 65. 25 55. 25 0.08 0.08 0.08 10.47 QP 10.47 Average 10.44 QP 0.152 0.152 48.30 35.50 10.44 Average 10.40 QP 28. 90 42. 60 0. 08 0. 08 0.164 0. 181 64. 46 28. 20 38. 50 23. 50 35. 91 21. 21 32. 50 18. 90 54. 46 63. 40 53. 40 0. 08 0. 08 0. 08 0. 181 0. 205 10.40 Average 10.36 QP 0.205 0. 08 0. 08 0. 09 0. 09 62. 39 52. 39 0.232 10.34 QP 0. 232 0. 270 0. 270 10 10.34 Average 11 12 61. 12 51. 12 10.32 QP 10.32 Average 60. 32 50. 32 56. 00 0.297 30.60 19. 20 30. 30 22. 30 0.09 10.31 Average 10.24 QP 14 15 0. 297 0. 507

Note:

- 1. Level($dB\mu V$) = Read Level($dB\mu V$) + LISN Factor(dB) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB μ V) Limit Line(dB μ V)

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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.
- 6. 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 $(dB\mu V/m) = 20 \log Emission level (\mu V/m)$
- 9. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level

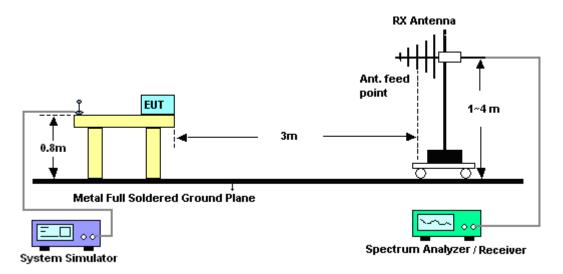
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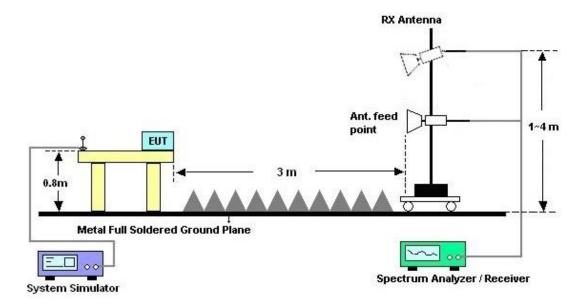
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3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



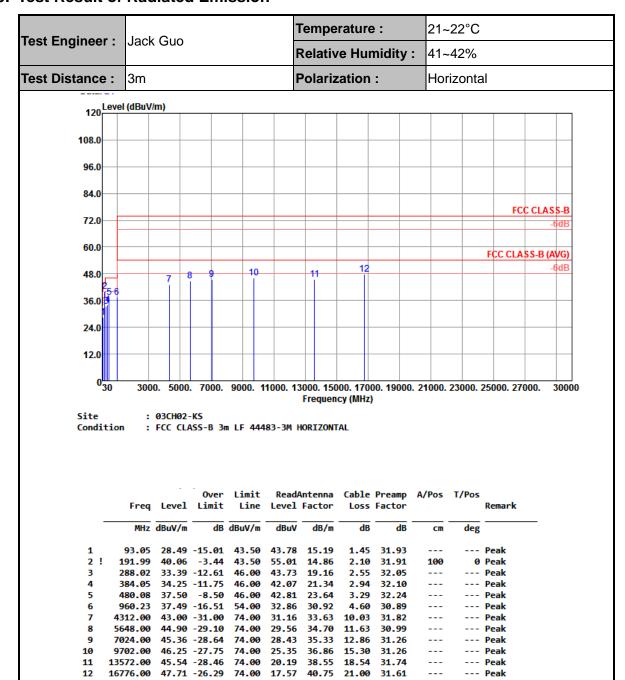
For radiated emissions above 1GHz



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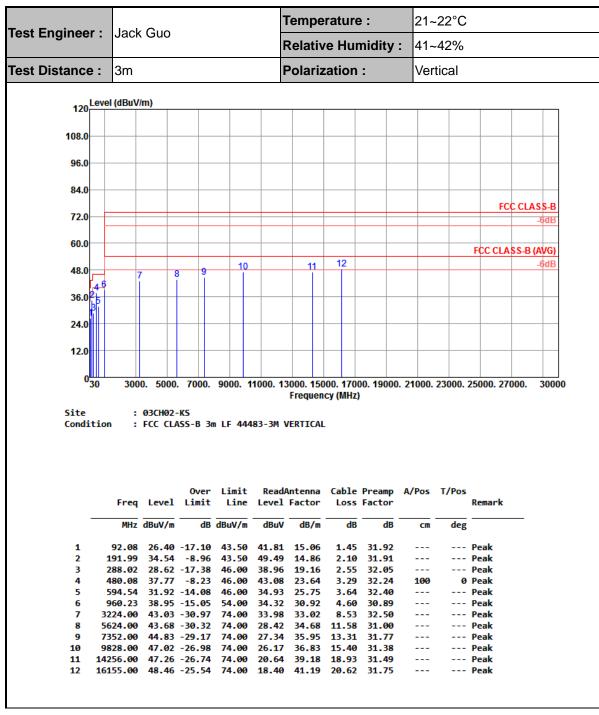
3.2.5. Test Result of Radiated Emission



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Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) Preamp Factor(dB)
- 2. Over Limit(dB) = Level(dB μ V/m) Limit Line(dB μ V/m)

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4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Ma x 30dBm	Oct. 18, 2019	Jul. 03, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 18, 2019	Jul. 03, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 30, 2019	Jul. 03, 2020	Dec. 29, 2020	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 10, 2019	Jul. 03, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Jul. 03, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Jul. 03, 2020	Jan. 07, 2021	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2019	Jul. 03, 2020	Aug. 05, 2020	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5G Hz	Oct. 18, 2019	Jul. 03, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Jul. 03, 2020	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 03, 2020	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 03, 2020	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 16, 2019	Apr. 02, 2020	Apr. 15, 2020	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Apr. 02, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Apr. 02, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Apr. 02, 2020	Oct. 17, 2020	Conduction (CO01-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	2.9dB
of 95% (U = 2Uc(y))	2.90Б

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	4.9dB
of 95% (U = 2Uc(y))	4.900

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

Measuring Uncertainty for a Level of Confidence	5.0dB
of 95% (U = 2Uc(y))	5.00B

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

Measuring Uncertainty for a Level of Confidence	5 4 JD
of 95% (U = 2Uc(y))	5.1dB

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