FCC RF Test Report

APPLICANT	**: Fibocom Wireless Inc.**
EQUIPMENT	**: 5G Module**
BRAND NAME	**: Fibocom**
MODEL NAME	**: FM350-GL**
FCC ID	**: ZMOFM350GL**
STANDARD	**: 47 CFR Part 2, 96**
CLASSIFICATION	**: Citizens Band End User Devices (CBE)**
EQUIPMENT TYPE	**: End User Equipment**

The product was received on Mar. 08, 2021 and completely tested on Apr. 14, 2021. We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 and shown 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager

ACCREDITED Cert #5145.01

Sporton International (ShenZhen) Inc.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FG130810F	01	Initial issue of report	Apr. 28, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 9.01 dB at 7360.200 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.

1 General Description

1.1 Applicant

Fibocom Wireless Inc.
1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China

1.2 Manufacturer

Fibocom Wireless Inc.
1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	5G Module
Brand Name	Fibocom
Model Name	FM350-GL
FCC ID	ZMOFM350GL
Tx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Rx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM
IMEI Code	Radiation: 882146050002276
HW Version	V1.0.6
SW Version	81600.0000.00.09.03.03
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. This is a variant report for FM350-GL. The change note could be referred to the product equality declaration which is exhibit separately. Based on the similarity between current and previous project, only the related test cases from original test report (Sporton Report Number FG051802F) were verified for the differences.

1.4 Testing Site

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH03-SZ	CN1256	421272

1.5 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24

1.6 Applied Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 940660 D01 Part 96 CBRS v03
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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

2 Test Configuration of Equipment Under Test

2.1 Test Mode

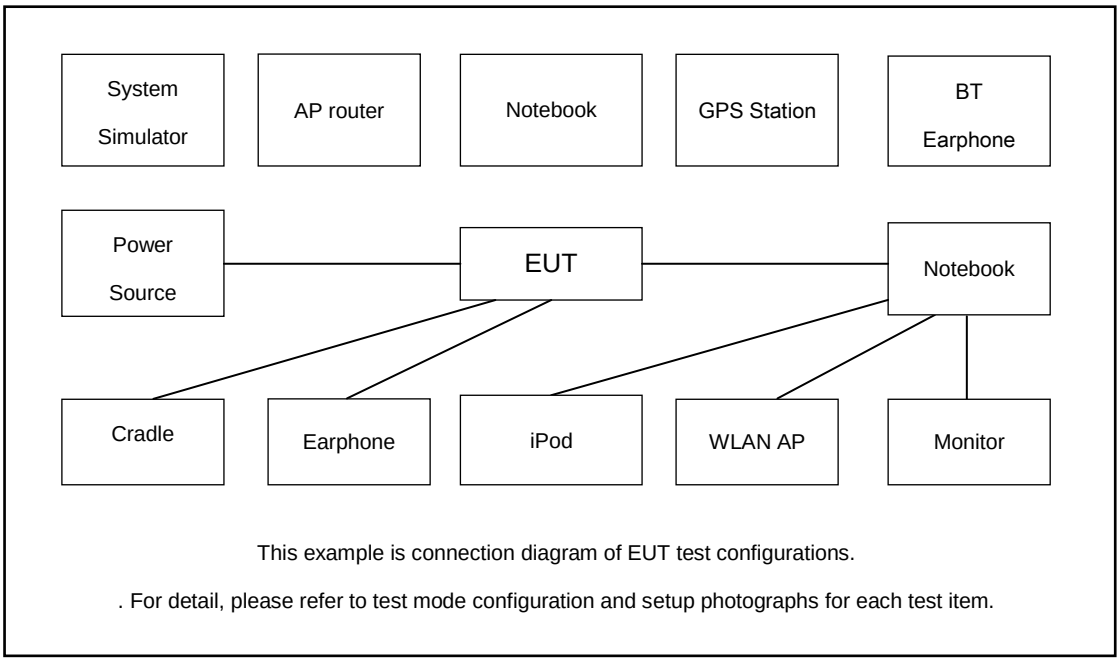
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	48	Worst Case													v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. For modulation of 256QAM, the maximum power of 256QAM is lower than other modulation (QPSK/16QAM/64QAM), therefore, according to engineering evaluation, we choose higher power (QPSK/16QAM/64QAM) to perform all tests and show in the report.																

Test Items	Band	Bandwidth (MHz)							Modulation				RB #			Test Channel		
		20+20	20+15	15+20	20+10	10+20	20+5	5+20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	48C	Worst Case															v	
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. For modulation of 256QAM, the maximum power of 256QAM is lower than other modulation (QPSK/16QAM/64QAM), therefore, according to engineering evaluation, we choose higher power (QPSK/16QAM/64QAM) to perform all tests and show in the report.																	

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Test jig	N/A	N/A	N/A	N/A	N/A

2.4 Frequency List of Low/Middle/High Channels

LTE Band 48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	55340	55990	56640
	Frequency	3560.0	3625.0	3690.0
15	Channel	55315	55990	56665
	Frequency	3557.5	3625.0	3692.5
10	Channel	55290	55990	56690
	Frequency	3555.0	3625.0	3695.0
5	Channel	55265	55990	56715
	Frequency	3552.5	3625.0	3697.5

LTE Band 48C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
5 + 20	PCC	Channel	55273	55898	56523
		Frequency	3553.3	3615.8	3678.3
	SCC	Channel	55390	56015	56640
		Frequency	3565	3627.5	3690
20 + 5	PCC	Channel	55340	55965	56590
		Frequency	3560	3622.5	3685
	SCC	Channel	55457	56082	56707
		Frequency	3571.7	3634.2	3696.7
10 + 20	PCC	Channel	55295	55896	56496
		Frequency	3555.5	3615.6	3675.6
	SCC	Channel	55439	56040	56640
		Frequency	3569.9	3630	3690
20 + 10	PCC	Channel	55340	55941	56541
		Frequency	3560	3620.1	3680.1
	SCC	Channel	55484	56085	56685
		Frequency	3574.4	3634.5	3694.5
15 + 20	PCC	Channel	55318	55893	56469
		Frequency	3557.8	3615.3	3672.9
	SCC	Channel	55489	56064	56640
		Frequency	3574.9	3632.4	3690
20 + 15	PCC	Channel	55340	55916	56491
		Frequency	3560	3617.6	3675.1
	SCC	Channel	55511	56087	56662
		Frequency	3577.1	3634.7	3692.2
20 +20	PCC	Channel	55340	55891	56442
		Frequency	3560	3615.1	3670.2
	SCC	Channel	55538	56089	56640
		Frequency	3579.8	3634.9	3690

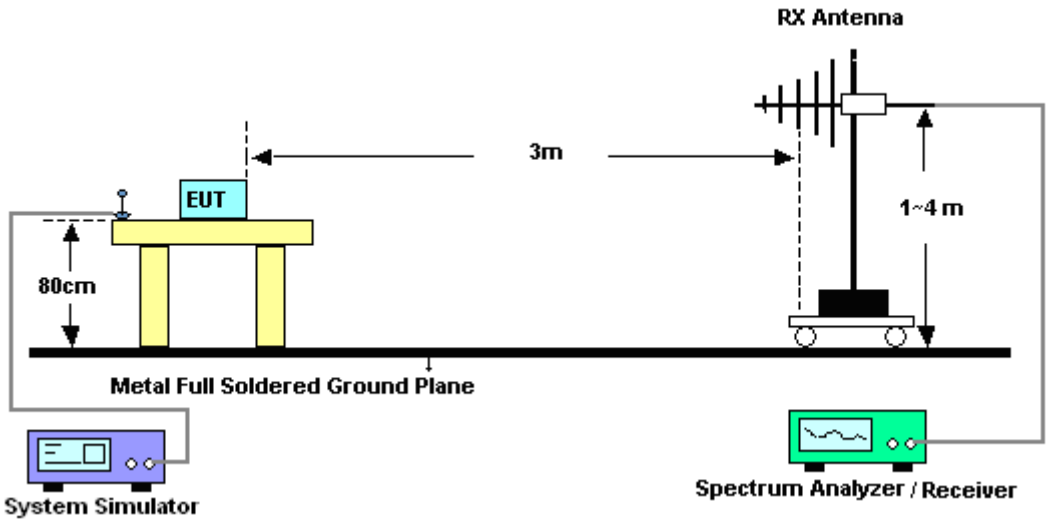
3 Radiated Test Items

3.1 Measuring Instruments

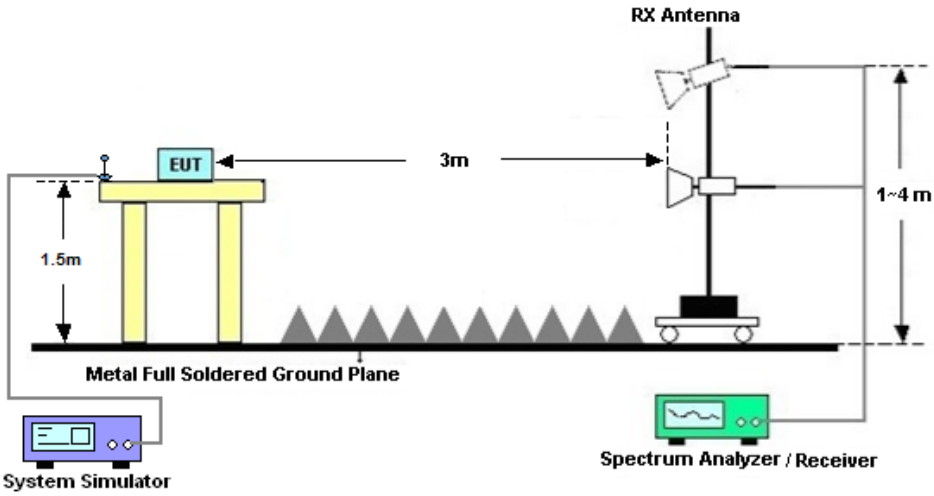
See list of measuring instruments of this test report.

3.2 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.3 Test Result of Radiated Test

Please refer to Appendix A.

3.4 Radiated Spurious Emission

3.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
   Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
   The limit line is −40dBm/MHz

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 17, 2020	Apr. 07, 2021~ Apr. 14, 2021	Apr. 16, 2021	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Jun. 22, 2020	Apr. 07, 2021~ Apr. 14, 2021	Jun. 21, 2021	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 30, 2020	Apr. 07, 2021~ Apr. 14, 2021	Apr. 29, 2021	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 17, 2020	Apr. 07, 2021~ Apr. 14, 2021	Oct. 16, 2021	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 21, 2020	Apr. 07, 2021~ Apr. 14, 2021	Jul. 20, 2021	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 23, 2020	Apr. 07, 2021~ Apr. 14, 2021	Apr. 22, 2021	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 25, 2020	Apr. 07, 2021~ Apr. 14, 2021	Dec. 24, 2021	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Apr. 07, 2021~ Apr. 14, 2021	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 07, 2021~ Apr. 14, 2021	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 07, 2021~ Apr. 14, 2021	NCR	Radiation (03CH03-SZ)

NCR: No Calibration Required.

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.0dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.6dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.8dB**

Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 48 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	7102.10	-57.21	-40	-17.21	-53.34	-60.54	8.25	11.58	H
	10653.15	-54.58	-40	-14.58	-56.63	-56.13	10.45	12.00	H
	14204.20	-50.13	-40	-10.13	-56.80	-51.84	11.74	13.45	H
	7102.10	-50.26	-40	-10.26	-46.51	-53.59	8.25	11.58	V
	10653.15	-54.28	-40	-14.28	-56.2	-55.83	10.45	12.00	V
	14204.20	-50.45	-40	-10.45	-56.81	-52.16	11.74	13.45	V
Middle	7232.00	-57.64	-40	-17.64	-54.35	-60.94	8.30	11.60	H
	10848.00	-54.04	-40	-14.04	-57.14	-55.56	10.48	12.00	H
	14464.00	-50.25	-40	-10.25	-57.61	-51.95	11.80	13.50	H
	7232.00	-50.06	-40	-10.06	-46.81	-53.36	8.30	11.60	V
	10848.00	-53.97	-40	-13.97	-56.83	-55.49	10.48	12.00	V
	14464.00	-50.73	-40	-10.73	-57.88	-52.43	11.80	13.50	V
Highest	7362.20	-57.62	-40	-17.62	-54.91	-60.94	8.30	11.62	H
	11043.30	-52.92	-40	-12.92	-57.07	-54.60	10.52	12.20	H
	14724.40	-51.55	-40	-11.55	-58.36	-53.25	11.85	13.55	H
	7362.20	-53.03	-40	-13.03	-50.37	-56.35	8.30	11.62	V
	11043.30	-53.50	-40	-13.50	-57.34	-55.18	10.52	12.20	V
	14724.40	-51.26	-40	-11.26	-58.16	-52.96	11.85	13.55	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 48C_CA / 20MHz + 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	7139.80	-57.94	-40	-17.94	-54.24	-61.24	8.30	11.60	H
	10709.70	-54.78	-40	-14.78	-57.13	-56.30	10.48	12.00	H
	14279.60	-49.46	-40	-9.46	-56.33	-51.16	11.80	13.50	H
	7139.80	-49.29	-40	-9.29	-45.68	-52.59	8.30	11.60	V
	10709.70	-54.89	-40	-14.89	-57.08	-56.41	10.48	12.00	V
	14279.60	-49.72	-40	-9.72	-56.31	-51.42	11.80	13.50	V
Middle	7250.00	-58.21	-40	-18.21	-54.99	-61.51	8.30	11.60	H
	10875.00	-54.16	-40	-14.16	-57.42	-55.68	10.48	12.00	H
	14500.00	-49.35	-40	-9.35	-56.80	-51.05	11.80	13.50	H
	7250.00	-51.58	-40	-11.58	-48.41	-54.88	8.30	11.60	V
	10875.00	-54.46	-40	-14.46	-57.46	-55.98	10.48	12.00	V
	14500.00	-49.59	-40	-9.59	-56.85	-51.29	11.80	13.50	V
Highest	7360.20	-57.92	-40	-17.92	-55.20	-61.22	8.30	11.60	H
	11040.30	-53.34	-40	-13.34	-57.48	-54.86	10.48	12.00	H
	14720.40	-50.47	-40	-10.47	-57.30	-52.17	11.80	13.50	H
	7360.20	-49.01	-40	-9.01	-46.34	-52.31	8.30	11.60	V
	11040.30	-53.30	-40	-13.30	-57.13	-54.82	10.48	12.00	V
	14720.40	-50.34	-40	-10.34	-57.25	-52.04	11.80	13.50	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.