



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM170700702202
Page: 1 of 8

RF Exposure Evaluation Report

Application No.: SZEM1707007022CR
Applicant: NTX Embedded
Product Name: WIFI Module
Model No.(EUT): WM171
Trade mark: NTX Embedded
FCC ID: 2AMU6-WM171
Standards: 47 CFR Part 1.1307 (2016)
47 CFR Part 1.1310 (2016)
Date of Receipt: 2017-07-06
Date of Test: 2017-07-11 to 2017-07-25
Date of Issue: 2017-08-04

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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SGS-CSTC Standards Technical Services Co., Ltd
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Report No.: SZEM170700702202
Page: 2 of 8

2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-08-04		Original

Authorized for issue by:				
				
		Gray Gao /Project Engineer		
				
		Eric Fu /Reviewer		



**SGS-CSTC Standards Technical Services Co., Ltd
Shenzhen Branch.**

Report No.: SZEM170700702202
Page: 3 of 8

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL INFORMATION.....	4
4.1 GENERAL DESCRIPTION OF EUT	4
4.2 TEST LOCATION	5
4.3 TEST FACILITY	5
4.4 DEVIATION FROM STANDARDS.....	6
4.5 ABNORMALITIES FROM STANDARD CONDITIONS	6
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
5 RF EXPOSURE EVALUATION	7
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	7
5.1.1 Limits	7
5.1.2 Test Procedure.....	7
4.1.3 EUT RF EXPOSURE EVALUATION.....	8



**SGS-CSTC Standards Technical Services Co., Ltd
Shenzhen Branch.**

Report No.: SZEM170700702202
Page: 4 of 8

4 General Information

4.1 General Description of EUT

Product Name:	WIFI Module
Model No.:	WM171
Trade Mark:	NTX Embedded
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n (HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels
Channels Step:	Channels with 5MHz step
Antenna Type:	PCB antenna
Antenna Gain:	3dBi
Power Supply:	DC 5V input



SGS-CSTC Standards Technical Services Co., Ltd Shenzhen Branch.

Report No.: SZEM170700702202
Page: 5 of 8

4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



**SGS-CSTC Standards Technical Services Co., Ltd
Shenzhen Branch.**

Report No.: SZEM170700702202
Page: 6 of 8

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



**SGS-CSTC Standards Technical Services Co., Ltd
Shenzhen Branch.**

Report No.: SZEM170700702202

Page: 8 of 8

4.1.3 EUT RF Exposure Evaluation

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Lowest	2412	23.6	229.09	0.072	1.0	PASS

Note: Refer to report No. SZEM170700702201 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.