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

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RF Exposure Evaluation Report

Application No.:	SZEM1810009031CR
Applicant:	Hytera Communications Corporation Limited
Address of Applicant:	Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, 518057 China
Manufacturer:	Hytera Communications Corporation Limited
Address of Manufacturer:	Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, 518057 China
Factory:	Hytera Communications Corporation Limited Baolong Branch
Address of Factory:	Plant No.3, Hytera Hi-Tech Park, Baolong Industrial Area, Longgang District, Shenzhen, People's Republic of China
Product Name:	800MHz Radio Remote Unit
Model No.(EUT):	RRU3800F080
Trade Mark:	Hytera
FCC ID:	YAM-RRU3800F080
Standards:	47 CFR Part 1.1307 (2016) 47 CFR Part 1.1310 (2016)
Date of Receipt:	2018-10-17
Date of Test:	2017-10-25 to 2018-11-13
Date of Issue:	2018-11-14
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
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.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2018-11-14		Original

Authorized for issue by:				
				
		Edison Li /Project Engineer		
				
		Eric Fu /Reviewer		

3 Contents

4 General Information

4.1 General Description of EUT

Power supply:	-48 VDC
Sample Type:	Fixed Production
Operation Frequency Range:	TX: 859MHz-894MHz RX: 814MHz-849MHz
Modulation Type:	QPSK, 16QAM, 64QAM
Output Power:	2*40W per port
Antenna Type:	External Antenna
Max Antenna Gain:	17dBi
Extreme temp. Tolerance:	-40℃ to +55℃

4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
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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 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 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.

• **Innovation, Science and Economic Development Canada**

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

CAB identifier: CN0006.

IC#: 4620C.

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: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

For Uncontrolled Environment, the limit of MPE is f/1500 mW/cm^2 . 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.

5.1.3 EUT RF Exposure Evaluation

1) Test Results

Antenna Gain: 17dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 50.12 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

For 859MHz-869MHz:

Test Frequency (MHz)	Maximun Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	MIMO Output Power (dBm)	Max Tune-up tolerance power (dBm)	Max Tune-up tolerance power (mW)	Power density (mW/cm^2)	Minimum Distance to Human body (cm)
859.7	17	50.12	48.79	49.03	79983.43	0.57	**746.06**
864.0	17	50.12	48.67	49.03	79983.43	0.58	744.20
868.3	17	50.12	49.03	49.03	79983.43	0.58	742.35

For 869MHz-894MHz:

Test Frequency (MHz)	Maximun Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	MIMO Output Power (dBm)	Max Tune-up tolerance power (dBm)	Max Tune-up tolerance power (mW)	Power density (mW/cm^2)	Minimum Distance to Human body (cm)
869.7	17	50.12	48.89	49.03	79983.43	0.58	741.76
881.5	17	50.12	48.66	49.03	79983.43	0.59	736.77
893.3	17	50.12	49.00	49.03	79983.43	0.60	731.89

The maximum rated power is 40W per port.

To satisfy RF exposure requirements, a separation distance of 746.06 cm or more should be maintained between this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

End of Report