



# EMF Report

## (FCC Maximum Permissible Exposure)

**Product Name: Remote Radio Unit**

**Product Model: RRU3278**

**FCC ID: QISRRU3278**

**Report Number: SYBH(R-EMF)06705945-1**

**Global Compliance and Testing Center of Huawei Technologies Co., Ltd.**

**(Reliability Laboratory of Huawei Technologies Co., Ltd.)**

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## NOTICE

1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been recognized by the US Federal Communications Commission (FCC) to perform compliance testing subject to the Commission's Certification rules. The Designation Number is CN1173, and the Test Firm Registration Number is 294140.
4. The laboratory (Reliability Laboratory of Huawei Technologies Co., Ltd.) is also named as "Global Compliance and Testing Center of Huawei Technologies Co., Ltd."; the both names have coexisted since 2009.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
9. All dates in the test report, including attachment document(s) (if applicable), have the format of "yyyy-MM-dd".
10. If any question about this report, please contact the laboratory (PublicGCTC@huawei.com).

**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C  
**Product Name:** Remote Radio Unit  
**Product Model:** RRU3278  
**FCC ID:** QISRRU3278

**Date of Receipt Sample:** 2020-06-30  
**Start Date of Test:** 2020-06-30  
**End Date of Test:** 2020-07-23

**Test Result:** Pass

<b>Approved by Senior Engineer:</b>	2020-07-27	Zhang Xinghai	<i>Zhang Xing hai</i>
	Date	Name	Signature

<b>Prepared by:</b>	2020-07-27	Zhang Siwen	<i>Zhang Siwen</i>
	Date	Name	Signature

**MODIFICATION RECORD**

No.	Report No.	Modification Description
1	SYBH(R-EMF)06705945-1	First report.

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## 1 General Information

### 1.1 Applied Standard

FCC Rules: 47CFR FCC Part 1 (Note)

Note: The most up to date FCC rules are applied, see [http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title47/47tab\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title47/47tab_02.tpl).

Other References: FCC OET Bulletin 65  
FCC KDB Publication 447498 (10/23/2015)  
IEEE Std C95.3™ -2002

### 1.2 Test Location

TL#DG1: Global Compliance and Testing Center of Huawei Technologies Co., Ltd.  
(Reliability Laboratory of Huawei Technologies Co., Ltd.)  
No.2, New City Avenue, Songshan Lake Sci. & Tech. Industry Park, Dongguan,  
523808, P.R.C.

TL#DG2: Global Compliance and Testing Center of Huawei Technologies Co., Ltd.  
(Reliability Laboratory of Huawei Technologies Co., Ltd.)  
No.1, Gaoxiong Avenue, Songshan Lake Sci. & Tech. Industry Park, Dongguan,  
523808, P.R.C.

Note: The house number of Huawei R&D laboratory was changed from “No.18, Alishan Avenue” to “No.1, Gaoxiong Avenue” by Songshan Lake Branch of Dongguan Public Security Bureau.

### 1.3 Test Environment Condition

Ambient Temperature: Not applicable

Ambient Relative Humidity: Not applicable

Atmospheric Pressure: Not applicable

## 2 RF Exposure Requirements

According to FCC Part §1.1310(e), the maximum permissible exposure (MPE) to radiofrequency electromagnetic fields are:

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

### **3 RF Exposure Evaluation**

#### **3.1 Determine the exposure limits**

NOTE 1: According to FCC Part §1.1310(d)(2), At operating frequencies less than or equal to 6 GHz, the limits for MPE, derived from whole-body SAR limits, may be used instead of whole-body SAR limits to evaluate the environmental impact of human exposure to RF radiation.

NOTE 2: According to FCC Part §1.1310(d)(3), At operating frequencies above 6 GHz, the MPE limits shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation.



## 3.2 Compliance evaluation

### 3.2.1 Evaluation methods

NOTE: According to FCC Part §1.1310(d)(4), Detailed information on our policies regarding procedures for evaluating compliance with all of these exposure limits can be found in the FCC's OET Bulletin 65.

The compliance is demonstrated based on the following calculation model assessment:

(1) The power density according to far-field model is:

$$S = \frac{P \times G_{(\theta,\varphi)}}{4 \times \pi \times R^2}$$

, or

$$E = \frac{\sqrt{30 \times P \times G_{(\theta,\varphi)}}}{R}$$

Where:

- $S$  = power density.
- $E$  = electric field strength.
- $P$  = input power of the antenna.
- $G$  = antenna gain relative to an isotropic antenna.
- $\theta, \varphi$  = elevation and azimuth angles.
- $R$  = distance from the antenna to the point of investigation.

(2) For single or multiple RF sources, the calculated power density should comply with following:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

, or

$$\sum_i \frac{E_i^2}{E_{Limit,i}^2} \leq 1$$

Where:

- $S_i$  = the power density when the  $f$  is  $i$ .
- $S_{Limit,i}$  = the reference level requirement (general public) for power density when the  $f$  is  $i$ .
- $E_i$  = the electric field strength when the  $f$  is  $i$ .
- $E_{Limit,i}$  = the Action levels (ALs) requirement (worker) for electric field strength when the  $f$  is  $i$ .
- $f$  = operating frequency.

### 3.2.2 Evaluation results

#### 3.2.2.1 STEP 1 – Determine individual RF exposure source contributions

NOTE 1: In terms of  $f$ , the lowest transmission frequency or operating frequency range is used for evaluation.

NOTE 2: In terms of  $P$ , the time-average power transferred into the antenna port(s) is used for evaluation. In the absence of additional information, assume no power is dissipated in the antenna and no power reflected.

NOTE 3: In terms of  $G_{(\theta,\varphi)}$ , the peak antenna gain at the frequency under evaluation is used for evaluation.

NOTE 4: In terms of  $EIRP$ , the calculated  $EIRP (=P \times G_{(\theta,\varphi)})$  power value, or the directly measured time-average  $EIRP$  power value may be used for evaluation.

NOTE 5: In terms of “Corr. Power”: in some circumstances, only the  $P$  and/or  $EIRP$  power value other than time-average power is available, e.g. the value is the peak one or no duty cycle is considered. These power values can be used as conservative evaluation based on worst case consideration; while, appropriate correction can be used to get the time-average power value if applicable.

NOTE 6: In terms of  $EIRP^*$ , it is the corrected  $EIRP$  after considering “Corr. Power”, and it is used to calculate  $S_i$ . If no correction is considered,  $EIRP^* = EIRP$ .

NOTE 7: In the following table, the power value is the rated value + maximum tolerance declared by manufacturer.

Individual RF Source	$f$	$S_{Limit,i}$ (GP)	$S_{Limit,i}$ (O)	$P$	$G_{(\theta,\varphi)}$	$EIRP$	$EIRP$	Corr. Power	$EIRP^*$	Note
	MHz	$W/m^2$	$W/m^2$	dBm	dBi	dBm	W		W	
LTE Band 48 (3550-3700)	3550	10	50	37+1	17	55	316.23	75% Duty cycle	316.23	
Note 1: For the radio transmitter of the EUT and associated antennas(s): <input type="checkbox"/> EUT with integrated antennas <input type="checkbox"/> EUT with connectors for external antennas <input checked="" type="checkbox"/> EUT intended to use external antenna not supplied by the same manufacturer, for which one typical system configuration consisting of a combination of the EUT and a representative antenna system is used for evaluation.										

#### 3.2.2.2 STEP 2 – Evaluate the whole product RF exposure

NOTE: For simultaneous transmission, if applicable, only the supported simultaneous transmission mode(s) are listed. For some products, the simultaneous transmission mode(s) may not be supported.

RF Sources Combination Transmission	$R$ (GP)	$R$ (O)	$S_i$ (GP)	$S_i$ (O)	$\sum_i \frac{S_i}{S_{Limit,i}}$ (GP)	$\sum_i \frac{S_i}{S_{Limit,i}}$ (O)	Limit (GP)	Limit (O)	Verdict	Note
	m	m	$W/m^2$	$W/m^2$						
#1	1.59	0.71	9.95396	49.9199	0.9954	0.9984	$\leq 1$	$\leq 1$	Pass	Worst case
Note 1: The $R$ is declared by manufacturer.										

## 4 **Conclusion**

The product is deemed to fulfil the maximum permissible exposure (MPE) to radiofrequency electromagnetic fields as specified in FCC Part §1.1310(e).

### SUPPLEMENTARY INFORMATION:

- The EUT shall be properly operated such that exposures will be compliant with the RF exposure requirements. The Annex A of this document gives a general RF exposure guidelines information for reference.
- The EUT cannot be modified to change its power or antenna so that it could exceed the RF exposure requirements. Otherwise, the re-evaluation is required.

**Annex A General RF Exposure Guidelines Information (Informative)**

The following RF exposure information may be used in product manual/instructions as general guidelines:

This device complies with relevant RF radiation exposure. This equipment should be installed and/or operated with a minimum distance as below between the radiator and your body:

- 47 CFR Part 1 General Population: 1.59 meters
- 47 CFR Part 1 Occupational: 0.71 meters

(\* based on a representative antenna system for this device which has no antenna supplied)

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END