

FCC RF Exposure Evaluation

1. Product Information

FCC ID:	2AANYER605	
Contain FCC ID:	XMR201807EP06A	
Product name	Edge Router	
Test Model number	ER605	
Additional Model No	FCC:ER606, ER608, ER609, ER615, ER616, ER618, ER610, ER625, ER626, ER628, ER620, ER655, ER656, ER658, ER665, ER666, ER668, ER695, ER696, ER698 IC:ER608, ER615, ER618, ER625	
Power supply*	9-48Vdc	
Modulation Type	WIFI	802.11b : DSSS 802.11g/n : OFDM 802.11a/n/ac : OFDM
	WCDMA	QPSK
	LTE	QPSK, 16QAM
Antenna Type	Suction cup Antenna	
Antenna Gain	<p>For WIFI: Suction cup Antenna 2.4G WLAN:2.6 dBi 5G RLAN: 0.02dBi</p> <p>For WCDMA/LTE: Suction cup Antenna Main antenna: Band II: 2.5 dBi Band IV: 2.5 dBi Band V: 2.5 dBi LTE Band 2: 2.5 dBi LTE Band 4: 2.5 dBi LTE Band 5: 2.5 dBi LTE Band 7: 2.5 dBi LTE Band 12: 2.5 dBi LTE Band 13: 2.5 dBi LTE Band 25: 2.5 dBi LTE Band 26: 2.5 dBi LTE Band 26: 2.5 dBi LTE Band 30: 0 dBi LTE Band 66: 2.5 dBi</p> <p>AUX-Only RX: Band II: 2.5 dBi Band IV: 2.5 dBi Band V: 2.5 dBi</p>	

	LTE Band 2: 2.5 dBi LTE Band 4: 2.5 dBi LTE Band 5: 2.5 dBi LTE Band 7: 2.5 dBi LTE Band 12: 2.5 dBi LTE Band 13: 2.5 dBi LTE Band 25: 2.5 dBi LTE Band 26: 2.5 dBi LTE Band 26: 2.5 dBi LTE Band 30: 0 dBi LTE Band 66: 2.5 dBi	
Hardware version	V1.2	
Software version	V2.0	
FCC Operation frequency	WIFI	2412MHz~2462MHz 5180MHz~5240MHz 5745MHz~5825MHz
	WCDMA	824 MHz ~ 849 MHz (FOR WCDMA 850) 1710 MHz ~ 1755 MHz (FOR WCDMA 1700) 1850 MHz ~ 1910 MHz (FOR WCDMA 1900)
	LTE	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 824 MHz LTE Band 26: 824 MHz ~ 894 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Exposure category	General population/uncontrolled environment	
EUT Type	Production Unit	

*Note: Pre-scan all voltages, the report only lists the worst voltage DC12V test results.
 Contain WCDMA /LTE Module

2. Evaluation method and Limit

According to ANSI/IEEE C95.1-1992, the Criteria Listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

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 Exposure				

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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

The MPE was calculated at **20 cm** to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

Maximum conducted output power (Measured) & Manufacturing tolerance

Specification	Operating Mode	Conducted Output Power (dBm)	Target (dBm)	Tolerance ±(dB)
2.4GWIFI	802.11b	16.82	17	1
	802.11g	16.49	17	1
	802.11n(HT20)	16.64	17	1
	802.11n(HT40)	16.64	17	1
5GWIFI	802.11a	17.66	17	1

	802.11n20	18.45	18	1
	802.11n40	18.6	18	1
	802.11ac20	18.59	18	1
	802.11ac40	18.72	18	1
	802.11ac80	18.64	18	1
WCDMA	Band II	22.82	23	1
	Band IV	22.84	23	1
	Band V	20.71	21	1
LTE	Band 2	23.38	23	1
	Band 4	22.47	23	1
	Band 5	21.05	22	1
	Band 7	23.3	23	1
	Band 12	20.85	21	1
	Band 13	20.68	21	1
	Band 25	23.38	23	1
	Band 26	21.25	22	1
	Band 30	25.54	25	1
	Band 66	22.47	23	1

Note:

According to KDB Publication 447498 D01, Section 7.2

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0 , according to calculated/estimated, numerically modeled, or measured field strengths or power density. The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to the MPE limit at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios.

3. Conducted Power

3.1 Test Setup Block Diagram for WWAN



3.2 Test Setup Block Diagram for WLAN



3.3 Test Procedure

WWAN:

- 1) The EUT was directly connected to the Base Station and antenna output port as show in the Block diagram;
 2) Reading average power in RMS detector.

WLAN/RLAN

- 1) The EUT was directly connected to the spectrum analyser and antenna output port as show in the Block diagram;
 2) Reading average power in RMS detector.

3.3 Measurement Equipment

Item	Equipment	Manufacturer	Model No.	Inventory No.	Last Cal.	Next Cal.
1	Base Station	R&S	CMW500	164998	2021-12-29	2022-12-28
2	Spectrum Analyzer	Keysight	N9010A	MY56070788	2021-12-28	2022-12-27

4. Evaluation Results

Collocated WWAN and other Wireless									For FCC	
Band	Frequency (MHz)	Antenna Distance (cm)	Ant Gain (dBi)	Antenna Gain in Linear	Maximum Power (dBm)	Maximum EIRP(ERP) (dBm)	Maximum EIRP(ERP) (W)	Average EIRP(ERP) (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
WCDMA Band II	1850	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
WCDMA Band IV	1710	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
WCDMA Band V	824	20	2.5	1.78	22	22.35	0.172	171.79	0.034	0.55
LTE Band 2	1850	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
LTE Band 4	1710	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
LTE Band 5	824	20	2.5	1.78	23	23.35	0.216	216.27	0.043	0.55
LTE Band 7	2500	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
LTE Band 12	699	20	2.5	1.78	22	22.35	0.172	171.79	0.034	0.47
LTE Band 13	777	20	2.5	1.78	22	22.35	0.172	171.79	0.034	0.52
LTE Band 25	1850	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
LTE Band 26	814	20	2.5	1.78	23	23.35	0.216	216.27	0.043	0.54
LTE Band 30	2305	20	0	1.00	26	26.00	0.398	398.11	0.079	1
LTE Band 66	1710	20	2.5	1.78	24	26.50	0.447	446.68	0.089	1
2.4GHz	2412	20	2.6	1.82	18	20.60	0.115	114.82	0.023	1

WLAN										
5GHz RLAN	5180	20	0.0 2	1.00	19	19.02	0.080	79.80	0.016	1

For WIFI 2.4G/5G and LTE/WCDMA can transmit simultaneously, the total evaluation result as below:

Collocated WWAN and other Wireless							For FCC	
No.	Configurations	Maximum MPE Value				Limits	Margin	PASS/Fail
		WWAN	WLAN	RLAN	Transmit simultaneously			
1	WCDMA Band 2	0.09	0.02	0.02	0.13	1	0.87	PASS
2	WCDMA Band 4	0.09	0.02	0.02	0.13	1	0.87	PASS
3	WCDMA Band 5	0.06	0.02	0.02	0.10	1	0.90	PASS
4	LTE Band 2	0.09	0.02	0.02	0.13	1	0.87	PASS
5	LTE Band 4	0.09	0.02	0.02	0.13	1	0.87	PASS
6	LTE Band 5	0.08	0.02	0.02	0.12	1	0.88	PASS
7	LTE Band 7	0.09	0.02	0.02	0.13	1	0.87	PASS
8	LTE Band 12	0.07	0.02	0.02	0.11	1	0.89	PASS
9	LTE Band 13	0.07	0.02	0.02	0.10	1	0.90	PASS
10	LTE Band 25	0.09	0.02	0.02	0.13	1	0.87	PASS
11	LTE Band 26	0.08	0.02	0.02	0.12	1	0.88	PASS
12	LTE Band 30	0.08	0.02	0.02	0.12	1	0.88	PASS
13	LTE Band 66	0.09	0.02	0.02	0.13	1	0.87	PASS

Remark:

1. Output power including tune up tolerance;
2. The exposure safety distance is 20cm;
3. EIRP=. Maximum Output Power + Antenna Gain
4. ERP=. Maximum Output Power + Antenna Gain – 2.15

5. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure.

.....THE END OF REPORT.....