

RF Exposure Evaluation

Test report
On Behalf of
Shenzhen Yingdakang Technology CO., LTD
For
Wireless Repeater

Model No.: DA213WUS, DA213BUS, AC12RP, DWR-C5400R,
DWR-C4510R, W120RP, W121RP

FCC ID: 2ACSI-DA213WX

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1 General Description of EUT

Equipment	Wireless Repeater			
Model Name	DA213WUS			
Serial No.	DA213WUS, DA213BUS, AC12RP, DWR-C5400R, DWR-C4510R, W120RP, W121RP			
Model Difference	All model's the function, software and electric circuit are the same, only model named different. Test sample model: DA213WUS			
Trade Mark	N/A			
FCC ID	2ACSI-DA213WX			
Hardware Version:	V1.6.2			
Software Version:	V1.0			
Frequency Range :	Band	Mode	Operation frequency	Channels
	Band I UNII-I	IEEE802.11 n HT20	5180-5240MHz	4
		IEEE802.11 n HT40	5190-5230MHz	2
		IEEE802.11 ac HT20	5180-5240MHz	4
		IEEE802.11 ac HT40	5190-5230MHz	2
		IEEE802.11 ac HT80	5210MHz	1
	Band II UNII-2A	IEEE802.11 n HT20	5260-5320 MHz	4
		IEEE802.11 n HT40	5270-5310 MHz	2
		IEEE802.11 ac HT20	5260-5320 MHz	4
		IEEE802.11 ac HT40	52770-5310 MHz	2
		IEEE802.11 ac HT80	5290 MHz	1
	Band II UNII-2C	IEEE802.11 n HT20	5500-5720 MHz	12
		IEEE802.11 n HT40	5510-5710 MHz	6
		IEEE802.11 ac HT20	5500-5720 MHz	12
		IEEE802.11 ac HT40	5510-5710 MHz	6
		IEEE802.11 ac HT80	5530-5690 MHz	3
BAND III	IEEE802.11 n HT20	5745-5825 MHz	5	
	IEEE802.11 n HT40	5755-5795 MHz	2	
	IEEE802.11 ac HT20	5745-5825 MHz	5	
	IEEE802.11 ac HT40	5755-5795 MHz	2	
	IEEE802.11 ac HT80	5775 MHz	1	
Antenna Type	Internal antenna			
Antenna Gain	Antenna 1: 3dBi Antenna 2: 3dBi MIMO: 6.01dBi			
Power Source	AC 110V 60Hz			

2 RF Exposure Compliance Requirement

2.1 Standard Requirement

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	1842f	4.89f	*{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	824f	2.19f	*{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 . 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.

3 EUT RF Exposure

4

Manufacturer declared that the nearest distance between human and the EUT is 20cm

Measurement Data

2.4Gwifi

802.11b mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 2412MHz	17.98	17.37	/	17±1	17±1	/	18	18	/	0.025	1.0
Middle 2437MHz	16.00	17.15	/	17±1	17±1	/	18	18	/	0.025	1.0
Highest 2462MHz	15.61	16.50	/	16±1	16±1	/	17	17	/	0.020	1.0

802.11g mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 2412MHz	16.67	17.19	/	17±1	17±1	/	18	18	/	0.025	1.0
Middle 2437MHz	16.05	17.41	/	17±1	17±1	/	18	18	/	0.025	1.0
Highest 2462MHz	16.45	17.00	/	16±1	16±1	/	17	17	/	0.020	1.0

802.11n(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 2412MHz	16.46	17.70	20.14	17±1	17±1	20.01±1	18	18	21.01	0.10	1.0
Middle 2437MHz	16.72	17.35	20.06	17±1	17±1	20.01±1	18	18	21.01	0.10	1.0
Highest 2462MHz	16.38	17.78	20.15	17±1	17±1	20.01±1	18	18	21.01	0.10	1.0

802.11n(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 2422MHz	14.69	15.37	18.06	15±1	15±1	18.01±1	16	16	19.01	0.061	1.0
Middle 2437MHz	14.98	15.23	18.11	15±1	15±1	18.01±1	16	16	19.01	0.061	1.0
Highest 2452MHz	14.67	15.83	18.30	15±1	15±1	18.01±1	16	16	19.01	0.061	1.0

Remark:

The estimation distance is 20cm

1) The Max Conducted Peak Output Power data refer to report Report No.: HK2004170655-1E

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

3) Antenna 1: 3dBi , Antenna 2: 3dBi , MIMO: 6.01dBi

5Gwifi- BAND I

802.11n(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5180MHz	10.85	12.82	14.96	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0
Middle 5200MHz	11.27	11.96	14.64	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0
Highest 5240MHz	10.40	12.52	14.60	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0

802.11n(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5190MHz	9.78	10.15	12.98	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0
Highest 5230MHz	10.07	10.89	13.51	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0

802.11AC(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT ₁	ANT2	SUM		
Lowest 5180MHz	10.36	10.90	13.65	10.5±1	11.5± 1	14.04±1	11.5	12.5	15.04	0.025	1.0
Middle 5200MHz	9.86	12.13	14.15	10.5±1	11.5± 1	14.04±1	11.5	12.5	15.04	0.025	1.0
Highest 5240MHz	11.17	11.95	14.59	10.5±1	11.5± 1	14.04±1	11.5	12.5	15.04	0.025	1.0

802.11AC(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5190MHz	9.96	10.07	13.03	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0
Highest 5230MHz	9.93	10.71	13.35	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0

802.11AC(HT80) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
5210MHz	8.60	8.22	11.42	9±1	9±1	12.01±1	10	10	13	0.016	1.0

5Gwifi- BAND 2A

802.11n(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5260MHz	11.75	12.82	15.33	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0
Middle 5280MHz	11.59	12.69	15.19	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0
Highest 5320MHz	10.00	11.51	13.27	11±1	12±1	14.54±1	12	13	15.54	0.028	1.0

802.11n(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5270MHz	11.62	11.18	14.41	11±1	10.5±1	13.77±1	12	11.5	14.77	0.024	1.0
Highest 5310MHz	10.71	9.13	13.00	11±1	10.5±1	13.77±1	12	11.5	14.77	0.024	1.0

802.11AC(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5260MHz	10.37	11.07	13.74	11±1	10.5±1	13.77±1	12	11.5	14.77	0.024	1.0
Middle 5280MHz	10.20	9.75	12.99	11±1	10.5±1	13.77±1	12	11.5	14.77	0.024	1.0
Highest 5320MHz	11.74	9.99	13.96	11±1	10.5±1	13.77±1	12	11.5	14.77	0.024	1.0

802.11AC(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5270MHz	9.07	8.97	12.03	9±1	9.5±1	12.27±1	10	10.5	13.27	0.017	1.0
Highest 5310MHz	9.36	10.02	12.71	9±1	9.5±1	12.27±1	10	10.5	13.27	0.017	1.0

802.11AC(HT80) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
5290MHz	7.61	7.73	10.68	8±1	8±1	11.01±1	9	9	12.01	0.013	1.0

5Gwifi- BAND 2C

802.11n(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5500MHz	11.30	12.12	14.74	12±1	12±1	15.01±1	13	13	16.01	0.032	1.0
Middle 5600MHz	12.34	11.42	14.92	12±1	12±1	15.01±1	13	13	16.01	0.032	1.0
Highest 5720MHz	11.97	11.34	13.72	12±1	12±1	15.01±1	13	13	16.01	0.032	1.0

802.11n(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5510MHz	10.83	10.87	13.86	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0
Middle 5590MHz	10.70	11.83	14.31	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0
Highest 5710MHz	10.02	10.72	13.39	10±1	11±1	13.54±1	11	12	14.54	0.023	1.0

802.11AC(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5500MHz	11.08	11.12	14.11	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0
Middle 5600MHz	10.79	11.35	14.09	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0
Highest 5720MHz	10.32	10.04	12.71	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0

802.11AC(HT40) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5510MHz	9.05	9.99	12.56	10±1	10±1	13.01±1	11	11	14.01	0.020	1.0
Middle 5590MHz	10.74	9.07	13.00	10±1	10±1	13.01±1	11	11	14.01	0.020	1.0
Highest 5710MHz	9.51	9.39	12.46	10±1	10±1	13.01±1	11	11	14.01	0.020	

802.11AC(HT80) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5530MHz	7.58	8.10	10.86	8±1	8±1	11.01±1	9	9	12.01	0.013	1.0
Highest 5610MHz	7.30	8.12	10.74	8±1	8±1	11.01±1	9	9	12.01	0.013	1.0

5Gwifi- BAND III

802.11n(HT20) mode

Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm ²)	Limit (mW/cm ²)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5745MHz	10.37	12.50	14.57	11.5±1	11.5±1	14.51±1	12.5	12.5	15.51	0.028	1.0
Middle 5785MHz	12.09	12.16	15.14	11.5±1	11.5±1	14.51±1	12.5	12.5	15.51	0.028	1.0
Highest 5825MHz	10.92	10.95	13.95	11.5±1	11.5±1	14.51±1	12.5	12.5	15.51	0.028	1.0

802.11n(HT40) mode											
Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5755MHz	10.87	10.86	13.88	10±1	10±1	13.01±1	11	11	14.01	0.02	1.0
Middle 5795MHz	9.83	10.44	13.16	10±1	10±1	13.01±1	11	11	14.01	0.02	1.0

802.11AC(HT20) mode											
Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5745MHz	11.77	11.48	14.64	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0
Middle 5785MHz	10.85	11.07	13.97	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0
Highest 5825MHz	10.24	10.92	13.60	11±1	11±1	14.01±1	12	12	15.01	0.025	1.0

802.11AC(HT40) mode											
Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5755MHz	10.66	10.75	13.72	10±1	10±1	13.01±1	11	11	14.01	0.02	1.0
Middle 5795MHz	10.23	10.25	13.25	10±1	10±1	13.01±1	11	11	14.01	0.02	1.0

802.11AC(HT80) mode											
Test channel	Peak Output Power (dBm)			Tune up tolerance (dBm)			Max tune-up Power (dBm)			Max Calculated value (mW/cm2)	Limit (mW/cm2)
	ANT1	ANT2	SUM	ANT1	ANT2	SUM	ANT1	ANT2	SUM		
Lowest 5775MHz	8.85	9.42	12.15	9±1	9±1	12.01±1	10	10	13.01	0.016	1.0

Note : The estimation distance is 20cm

1) The Max Conducted Peak Output Power data refer to report Report No.: HK2004170655-1E

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

3) Antenna 1: 3dBi , Antenna 2: 3dBi , MIMO: 6.01dBi