





For IC Model No.: DS-3WF02C-5AC/O, DS-3WF02C-5ACUHK/O, DS-3WF02C-5ACCKV/O, DS-3WF02C-5ACUVS/O, DS-3WF02C-5ACKVO/O, DS-3WF02C-5ACHUN/O



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Compliance Certification Services (Kunshan) Inc.  
EMC Laboratory

No.10, Weiye Road, Innovation Park, Kunshan, Jiangsu, China 215300  
中国·江苏·昆山市留学生创业园伟业路10号 邮编 215300

t(86-512)57355888 f(86-512)57370818 www.sgsgroup.com.cn  
t(86-512)57355888 f(86-512)57370818 sgs.china@sgs.com

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Authorized for issue by:			
		<i>Damon Zhou</i>	
		<b>Damon Zhou / Project Engineer</b>	
		<i>Eric Lin</i>	
		<b>Eric Lin / Reviewer</b>	



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### 3 General Information

#### 3.1 General Description of E.U.T.

Power supply:	DC 12V by Adapter or DC 12V by PoE Adapter: MODEL: ADS-12FG-12N 12012EPCU INPUT: 100-240~50/60Hz, Max. 0.3A OUTPUT: DC 12V, 1A
Serial Number:	G63286396
Firmware Version:	V1.0.0 build210831
DFS Function:	Master
TPC Function:	Support

#### 3.2 Technical Specifications

5G

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(VHT20)	5180-5240	4
		802.11n(HT40)/ac(VHT40)	5190-5230	2
		802.11ac(VHT80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(VHT20)	5260-5320	4
		802.11n(HT40)/ac(VHT40)	5270-5310	2
		802.11ac(VHT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(VHT20)	5500-5720	12
		802.11n(HT40)/ac(VHT40)	5510-5710	6
		802.11ac(VHT80)	5530~5690	3
UNII Band III	802.11a/n(HT20)/ac(VHT20)	5745-5825	5	
	802.11n(HT40)/ac(VHT40)	5755-5795	2	
	802.11ac(VHT80)	5775	1	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps			
Channel Spacing:	802.11a/n(HT20)/ac(VHT20): 20MHz 802.11n(HT40)/ac(VHT40): 40MHz 802.11ac(VHT80): 80MHz			
Antenna Gain:	Antenna 1:9dBi (Provided by manufacturer) Antenna 2:9dBi (Provided by manufacturer)			



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	Directional gain:9dBi *
Antenna Type:	Antenna 1:PCB Antenna Antenna 2:PCB Antenna

\* Remark: The antenna of the EUT is cross-polarized, so the Directional Gain: 9dBi.

Remark: For frequencies falling between 5150-5250MHz and 5600-5650MHz will not be used in Canada.

### 3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

### 3.4 Test Facility

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

• **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 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. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• **ISED (CAB Identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development (ISED) Canada as an accredited testing laboratory.

CAB Identifier: CN0072.

• **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600,C-11707, T-11499, G-10216 respectively.



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## 4 Test Standards and Limits

### 4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm <sup>2</sup> )	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

### 4.2 ISED Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53W



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## 5 Measurement and Calculation

### 5.1 Maximum transmit power

The Power Data is based on the RF Test Report KSCR210900008601

5GHz for FCC

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
802.11a	5180	4.52	3.37	NA	2.83	2.17	NA
	5200	3.37	2.82	NA	2.17	1.91	NA
	5240	5.07	4.09	NA	3.21	2.56	NA
	5260	5.18	5.73	NA	3.30	3.74	NA
	5300	5.32	4.81	NA	3.40	3.03	NA
	5320	5.70	5.01	NA	3.72	3.17	NA
	5500	2.45	3.05	NA	1.76	2.02	NA
	5600	2.89	2.34	NA	1.95	1.71	NA
	5700	4.83	3.71	NA	3.04	2.35	NA
	5720	4.19	4.25	NA	2.62	2.66	NA
	5745	4.03	2.78	NA	2.53	1.90	NA
	5785	2.23	1.36	NA	1.67	1.37	NA
	5825	1.60	1.09	NA	1.45	1.29	NA
802.11n(HT20)	5180	2.51	2.09	5.32	1.78	1.62	3.40
	5200	3.15	2.77	5.97	2.07	1.89	3.95
	5240	4.26	4.16	7.22	2.67	2.61	5.27
	5260	4.43	4.27	7.36	2.77	2.67	5.45
	5300	4.93	4.84	7.90	3.11	3.05	6.17
	5320	5.10	5.18	8.15	3.24	3.30	6.53
	5500	0.90	1.17	4.05	1.23	1.31	2.54
	5600	2.32	2.20	5.27	1.71	1.66	3.37
	5700	4.46	3.99	7.24	2.79	2.51	5.30
	5720	4.84	4.09	7.49	3.05	2.56	5.61
	5745	3.00	2.74	5.88	2.00	1.88	3.87
	5785	1.22	1.53	4.39	1.32	1.42	2.75
	5825	1.55	1.09	4.34	1.43	1.29	2.72



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802.11n(HT40)	5190	3.98	3.52	6.77	2.50	2.25	4.75
	5230	5.20	4.81	8.02	3.31	3.03	6.34
	5270	5.45	5.21	8.34	3.51	3.32	6.82
	5310	6.09	5.76	8.94	<b>4.06</b>	<b>3.77</b>	<b>7.83</b>
	5510	2.70	2.63	5.68	1.86	1.83	3.70
	5590	3.36	3.00	6.19	2.17	2.00	4.16
	5670	5.71	4.89	8.33	3.72	3.08	6.81
	5710	5.77	4.89	8.36	3.78	3.08	6.85
	5755	4.01	3.46	6.75	2.52	2.22	4.73
	5795	2.92	2.44	5.70	1.96	1.75	3.72
802.11ac(VHT20)	5180	3.25	2.54	5.92	2.11	1.79	3.91
	5200	4.01	3.23	6.65	2.52	2.10	4.62
	5240	5.18	4.63	7.92	3.30	2.90	6.19
	5260	5.15	4.75	7.96	3.27	2.99	6.25
	5300	5.81	5.26	8.55	3.81	3.36	7.16
	5320	6.02	5.53	8.79	4.00	3.57	7.57
	5500	2.14	1.69	4.93	1.64	1.48	3.11
	5600	3.64	2.60	6.16	2.31	1.82	4.13
	5700	5.50	4.38	7.99	3.55	2.74	6.30
	5720	4.19	3.98	7.10	2.62	2.50	5.13
	5745	4.18	3.17	6.71	2.62	2.07	4.69
	5785	2.79	1.81	5.34	1.90	1.52	3.42
	5825	1.59	0.63	4.15	1.44	1.16	2.60
802.11ac(VHT40)	5190	3.96	2.99	6.51	2.49	1.99	4.48
	5230	5.04	4.17	7.64	3.19	2.61	5.81
	5270	5.41	4.82	8.14	3.48	3.03	6.52
	5310	5.90	5.24	8.59	3.89	3.34	7.23
	5510	2.54	-0.84	3.98	1.79	0.82	2.50
	5590	3.12	1.89	5.56	2.05	1.55	3.60
	5670	5.48	3.92	7.78	3.53	2.47	6.00
	5710	5.76	5.00	8.41	3.77	3.16	6.93
	5755	3.84	2.83	6.37	2.42	1.92	4.34
	5795	2.49	1.28	4.94	1.77	1.34	3.12



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802.11ac(VHT80)	5210	3.93	3.46	6.71	2.47	2.22	4.69
	5290	4.82	4.59	7.72	3.03	2.88	5.92
	5530	2.41	2.11	5.27	1.74	1.63	3.37
	5610	4.07	3.41	6.76	2.55	2.19	4.74
	5690	5.89	4.72	8.35	3.88	2.96	6.84
	5775	2.72	2.27	5.51	1.87	1.69	3.56

5GHz EIRP for ISED

Test Mode	Frequency (MHz)	Tx Type	Measured Output Power (dBm)			EIRP (dBm)			EIRP (mw)		
			Ant 1	Ant 2	Total	Ant 1	Ant 2	Total	Ant 1	Ant 2	Total
802.11a	5260	SISO	5.18	5.73	/	14.18	14.73	/	26.18	29.72	/
	5300	SISO	5.32	4.81	/	14.32	13.81	/	27.04	24.04	/
	5320	SISO	5.70	5.01	/	14.7	14.01	/	29.51	25.18	/
	5500	SISO	2.45	3.05	/	11.45	12.05	/	13.96	16.03	/
	5700	SISO	4.83	3.71	/	13.83	12.71	/	24.15	18.66	/
	5720	SISO	4.19	4.25	/	13.19	13.25	/	20.84	21.13	/
	5745	SISO	4.03	2.78	/	13.03	11.78	/	20.09	15.07	/
	5785	SISO	2.23	1.36	/	11.23	10.36	/	13.27	10.86	/
802.11n(HT20)	5260	MIMO	4.43	4.27	7.36	13.43	13.27	16.36	22.03	21.23	43.25
	5300	MIMO	4.93	4.84	7.90	13.93	13.84	16.9	24.72	24.21	48.98
	5320	MIMO	5.10	5.18	8.15	14.1	14.18	17.15	25.70	26.18	51.88
	5500	MIMO	0.90	1.17	4.05	9.9	10.17	13.05	9.77	10.40	20.18
	5700	MIMO	4.46	3.99	7.24	13.46	12.99	16.24	22.18	19.91	42.07
	5720	MIMO	4.84	4.09	7.49	13.84	13.09	16.49	24.21	20.37	44.57
	5745	MIMO	3.00	2.74	5.88	12	11.74	14.88	15.85	14.93	30.76
	5785	MIMO	1.22	1.53	4.39	10.22	10.53	13.39	10.52	11.30	21.83
802.11n(HT40)	5270	MIMO	5.45	5.21	8.34	14.45	14.21	17.34	27.86	26.36	54.20
	5310	MIMO	6.09	5.76	8.94	15.09	14.76	17.94	<b>32.28</b>	<b>29.92</b>	<b>62.23</b>
	5510	MIMO	2.70	2.63	5.68	11.7	11.63	14.68	14.79	14.55	29.38
	5670	MIMO	5.71	4.89	8.33	14.71	13.89	17.33	29.58	24.49	54.08
	5710	MIMO	5.77	4.89	8.36	14.77	13.89	17.36	29.99	24.49	54.45
	5755	MIMO	4.01	3.46	6.75	13.01	12.46	15.75	20.00	17.62	37.58
	5795	MIMO	2.92	2.44	5.70	11.92	11.44	14.7	15.56	13.93	29.51



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No.10, Weiye Road, Innovation Park, Kunshan, Jiangsu, China 215300  
 中国·江苏·昆山市留学生创业园伟业路10号 邮编 215300

t(86-512)57355888 f(86-512)57370818 www.sgsgroup.com.cn  
 t(86-512)57355888 f(86-512)57370818 sgs.china@sgs.com

802.11ac(VHT20)	5260	MIMO	5.15	4.75	7.96	14.15	13.75	16.96	26.00	23.71	49.66
	5300	MIMO	5.81	5.26	8.55	14.81	14.26	17.55	30.27	26.67	56.89
	5320	MIMO	6.02	5.53	8.79	15.02	14.53	17.79	31.77	28.38	60.12
	5500	MIMO	2.14	1.69	4.93	11.14	10.69	13.93	13.00	11.72	24.72
	5700	MIMO	5.50	4.38	7.99	14.5	13.38	16.99	28.18	21.78	50.00
	5720	MIMO	4.19	3.98	7.10	13.19	12.98	16.10	20.84	19.86	40.74
	5745	MIMO	4.18	3.17	6.71	13.18	12.17	15.71	20.80	16.48	37.24
	5785	MIMO	2.79	1.81	5.34	11.79	10.81	14.34	15.10	12.05	27.16
	5825	MIMO	1.59	0.63	4.15	10.59	9.63	13.15	11.46	9.18	20.65
802.11ac(VHT40)	5270	MIMO	5.41	4.82	8.14	14.41	13.82	17.14	27.61	24.10	51.76
	5310	MIMO	5.90	5.24	8.59	14.9	14.24	17.59	30.90	26.55	57.41
	5510	MIMO	2.54	-0.84	3.98	11.54	8.16	12.98	14.26	6.55	19.86
	5670	MIMO	5.48	3.92	7.78	14.48	12.92	16.78	28.05	19.59	47.64
	5710	MIMO	5.76	5.00	8.41	14.76	14.00	17.41	29.92	25.12	55.08
	5755	MIMO	3.84	2.83	6.37	12.84	11.83	15.37	19.23	15.24	34.43
	5795	MIMO	2.49	1.28	4.94	11.49	10.28	13.94	14.09	10.67	24.77
802.11ac(VHT80)	5290	MIMO	4.82	4.59	7.72	13.82	13.59	16.72	24.10	22.86	46.99
	5530	MIMO	2.41	2.11	5.27	11.41	11.11	14.27	13.84	12.91	26.73
	5690	MIMO	5.89	4.72	8.35	14.89	13.72	17.35	30.83	23.55	54.33
	5775	MIMO	2.72	2.27	5.51	11.72	11.27	14.51	14.86	13.40	28.25



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 中国·江苏·昆山市留学生创业园伟业路10号 邮编 215300

t(86-512)57355888 f(86-512)57370818 www.sgsgroup.com.cn  
 t(86-512)57355888 f(86-512)57370818 sgs.china@sgs.com

### 5.2 MPE Calculation

For FCC:

According to the formula  $S = P / 4\pi R^2$ , we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) MPE limit = 1mW/cm<sup>2</sup>

For 5G WiFi - Antenna1:

The max. antenna gain is 9 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
4.06	7.943	20	0.00642	1	Pass

For 5G WiFi - Antenna2:

The max. antenna gain is 9 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
3.77	7.943	20	0.00596	1	Pass

In MIMO mode:

The max. antenna gain is 9 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
7.83	7.943	20	0.01237	1	Pass

For ISED:

For 5GHz WiFi SISO mode:

Antenna 1: E.I.R.P. = P \* G = 0.032W < 4.50W

Antenna 2: E.I.R.P. = P \* G = 0.030W < 4.50W

For 5GHz WiFi MIMO mode: E.I.R.P. = P \* G = 0.062W < 4.50W

So the device is exclusion from SAR test

**--End of the Report--**



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t(86-512)57355888 f(86-512)57370818 www.sgsgroup.com.cn  
 t(86-512)57355888 f(86-512)57370818 sgs.china@sgs.com