



RADIO EXPOSURE TEST REPORT

FCC ID : LDKCG1132477

Equipment : Cisco Catalyst Wireless Gateway CG113-4GW6
Cisco Catalyst Wireless Gateway CG113-W6

Brand Name : CISCO

Model Name : CG113-4GW6B,CG113-W6B

Applicant : Cisco Systems Inc
125 West Tasman Drive San Jose California United
States 95134-1706

Manufacturer : Cisco Systems Inc
125 West Tasman Drive San Jose California United
States 95134-1706

Standard : 47 CFR Part 2.1091

The product was received on Oct. 04, 2021, and testing was started from Dec. 09, 2021 and completed on Apr. 17, 2022. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)



RF General Information			
Evaluation Mode	Downlink Frequency Range (MHz)	Uplink Frequency Range (MHz)	Modulation Type
WCDMA Band 2	1930~1990	1850~1910	WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)
WCDMA Band 4	2110~2115	1710~1755	
WCDMA Band 5	869-894	824~849	
Evaluation Mode	Downlink Frequency Range (MHz)	Uplink Frequency Range (MHz)	Modulation Type
LTE Band 2	1930~1990	1850~1910	QPSK/16QAM/64QAM
LTE Band 4	2110~2115	1710~1755	
LTE Band 5	869~894	824~849	
LTE Band 7	2620-2690	2500~2570	
LTE Band 12	729~746	699~716	
LTE Band 13	746~756	777~787	
LTE Band 14	758~768	788~798	
LTE Band 25	1930~1995	1850~1915	
LTE Band 26	859~894	814~849	
LTE Band 41	2496~2690	2496~2690	
LTE Band 43	3600~3800	3600~3800	
LTE Band 48	3550~ 3700	3550~ 3700	
LTE Band 66	2110~2200	1710~1780	
LTE Band 71	617~652	663~698	

Note: This device contains transmitter module FCC ID: N7NEM74B.

1.2 Table of WWAN module

Brand Name	Model Name	Function	FCC ID
SIERRA WIRELESS	EM7411	WCDMA Band: 2/4/5 LTE Band: 2/4/5/7/12/13/14/25/26/41/43/48/66/71 LTE CA Band: CA_5B,CA_7C,CA_41C	N7NEM74B

1.3 Antenna Information

<WLAN antenna gain>

Ant.	Port		Brand	Model Name	Antenna Type	Connector	Gain (dBi)				
	2.4 GHz	5 GHz					2.4 GHz	5GHz			
								UNII 1	UNII 2A	UNII 2C	UNII 3
1	1	1	CISCO	N/A	Printed PCB	I-PEX	3.99	4.21	4.23	4.03	4.94
2	2	2	CISCO	N/A	Printed PCB	I-PEX	2.57	4.53	3.92	4.02	4.79

<WWAN antenna gain>

Ant.	Port	Brand	Model Name	Antenna Type	Connector	WCDMA Gain (dBi)		
						Band 2	Band 4	Band 5
1~2	1~2	CISCO	N/A	Printed PCB	I-PEX	4.1	4.1	2.1

Ant.	Port	Brand	Model Name	Antenna Type	Connector	LTE Gain (dBi)
1~2	1~2	CISCO	N/A	Printed PCB	I-PEX	Note 1

Note 1

LTE Gain (dBi)						
Band 2	Band 4	Band 5	Band 7	Band 12	Band 13	Band 14
4.1	4.1	2.1	4.1	2.1	2.1	2.1

LTE Gain (dBi)						
Band 25	Band 26	Band 41	Band 43	Band 48	Band 66	Band 71
4.1	2.1	4.1	3.6	3.6	4.1	2.1

Note 2: The above information was declared by manufacturer.

<For 2.4GHz function>

For IEEE 802.11b/g/n/VHT/ax (2TX/2RX):

Pot 1 and Port 2 can be used as transmitting/receiving antenna.

Pot 1 and Port 2 could transmit/receive simultaneously.

<For 5GHz function>

For IEEE 802.11a/n/ac/ax (2TX/2RX):

Pot 1 and Port 2 can be used as transmitting/receiving antenna.

Pot 1 and Port 2 could transmit/receive simultaneously.

For WWAN function (1TX/2RX):

Only Port 1 can be use as transmitting antenna

Port 1 and Port 2 could receive simultaneously.

Note 3: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max. gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ;$$

$$j,k = (NSS1(g1,1) + NSS1(g1,2))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2) / N_{ANT}] \Rightarrow 10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$$

Where ;

G1 = Ant 1 Gain ; G2 = Ant 2 Gain

2.4GHz DG = 6.32 dBi

5 GHz U-NII-1 DG = 7.38 dBi

5 GHz U-NII-2A DG = 7.09 dBi

5 GHz U-NII-2C DG = 7.04 dBi

5 GHz U-NII-3 DG = 7.88 dBi



1.4 Table for Multiple Listing

EUT	Equipment Name	Model Name	Skus
1	Cisco Catalyst Wireless Gateway CG113-4GW6	CG113-4GW6B	LTE+ Wi-Fi sku
2	Cisco Catalyst Wireless Gateway CG113-W6	CG113-W6B	Wi-Fi sku

Note 1: From the above models, model: CG113-4GW6B (EUT 1) was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

1.5 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	DELTA	ADH-36DW B (CG113-4G-PWR-US)	INPUT: 100-240V~0.8A, 50-60Hz OUTPUT: 5.0V, 3.0A, 15.0W / 9.0V, 3.0A 3.0A / 15.0V, 2.4A, 36.0W

1.6 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISED.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

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

2.2 MPE Calculation Method

The MPE was calculated at 44 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= P_{th}.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance

R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$
1.34-30	$3,450 R^2 / f^2$
30-300	$3.83 R^2$
300-1,500	$0.0128 R^2 f$
1,500-100,000	$19.2 R^2$
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;G1D	3.99	27.26	31.25	0.50	31.75	1.49624	44	0.06150	1.00000
5.2G;D1D	7.38	25.88	33.26	0.50	33.76	2.37684	44	0.09770	1.00000
5.3G;D1D	7.09	22.84	29.93	0.06	29.99	0.99770	44	0.04101	1.00000
5.6G;D1D	7.04	22.91	29.95	0.04	29.99	0.99770	44	0.04101	1.00000
5.8G;D1D	7.88	27.37	35.25	0.50	35.75	3.75837	44	0.15448	1.00000
WCDMA Band 5	2.10	22.54	24.64	0.50	25.14	0.32659	44	0.01342	0.56440
LTE Band 43	3.60	23.80	27.40	0.50	27.90	0.61660	44	0.02534	1.00000



MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.0196	0.44	31.75	29.60	0.912	3.717	Complies
5785	0.0082		35.75	33.60	2.291	3.717	Complies
846.6	0.0564		25.14	22.99	0.199	2.098	Complies
3400	0.0140		27.90	25.75	0.376	3.717	Complies

Simultaneous Transmission Analysis Mode:**WLAN 2.4GHz + WLAN 5GHz + WWAN WCDMA**

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.44	31.75	29.60	0.912	3.717	0.96	<= 1
5785		35.75	33.60	2.291	3.717		
846.6		25.14	22.99	0.199	2.098		

WLAN 2.4GHz + WLAN 5GHz + WWAN LTE

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.44	31.75	29.60	0.912	3.717	0.96	<= 1
5785		35.75	33.60	2.291	3.717		
3400		27.90	25.75	0.376	3.717		

Note: The above antenna gain was declared by manufacturer.

————THE END————