

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.org.cn

TEST REPORT					
Report No. ······:	CTC2024181901				
FCC ID:	2AYMH-PC160				
FCC Applicant······:	HANSHOW TECHNOLOGY CO., LTI	D.			
Address:	The 1st Floor Podium and Floor 4 of E Building 5, Jiaxing Photovoltaic Techn No.1288, Kanghe Road, Xiuzhou Dist Prov,P.R.China	ology Innovation Park,			
Manufacturer:	HANSHOW TECHNOLOGY CO., LTI	D.			
Address:	The 1st Floor Podium and Floor 4 of E Building 5, Jiaxing Photovoltaic Techn No.1288, Kanghe Road, Xiuzhou Dist Prov,P.R.China	ology Innovation Park,			
Product Name·····:	electronic shelf label				
Trade Mark······:	Hanshow				
Model/Type reference······:	Polaris-C-160R				
Listed Model(s) ·····:	Polaris-C-160R-N				
Standard·····:	·: FCC CFR Title 47 Part 15 Subpart C Section 15.249				
Date of receipt of test sample:	Jul. 28, 2024				
Date of testing	Jul. 29, 2024 ~ Jul. 31, 2024				
Date of issue	Aug. 08, 2024				
Result:	PASS				
Compiled by:					
(Printed name+signature)	Lucy Lan	lucylan			
Supervised by:		Zic shang			
(Printed name+signature)	Eric Zhang	V			
		1 0.00			
Approved by:		Topone			
(Printed name+signature)	Totti Zhao	'			
Testing Laboratory Name:	CTC Laboratories, Inc.				
Address	Room 101 Building B, No. 7, Lanqing Community, Guanhu Subdistrict, Long Guangdong, China				
This test report may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CTC. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to CTC within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit. The test report merely					

•

correspond to the test sample.

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下自国家认证认可监督管理委员会



Table of Contents

Page

1.	TEST	SUMMARY	4
1.	.1.	Test Standards	4
1.	.2.	REPORT VERSION	
1.	.3.	TEST DESCRIPTION	5
1.	.4.	Test Facility	
1.	.5.	MEASUREMENT UNCERTAINTY	6
1.	.6.	ENVIRONMENTAL CONDITIONS	
2.	GENI	ERAL INFORMATION	8
2.	.1.	CLIENT INFORMATION	8
2.	.2.	GENERAL DESCRIPTION OF EUT	8
2.	.3.	DESCRIPTION OF TEST MODES	9
2.	.4.	ACCESSORY EQUIPMENT INFORMATION	
2.	.5.	Measurement Instruments List	11
3.		ITEM AND RESULTS	
3.	.1.	AC Power Line Conducted Emissions	12
3.	.2.	20 DB OCCUPIED BANDWIDTH	14
3.	.3.	RADIATED FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL	17
3.	.4.	RADIATED SPURIOUS EMISSIONS AND BANDEDGE EMISSION	24
3.	.5.	ANTENNA REQUIREMENT	35



1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Report No.	Date of issue	Description
01	CTC2024181901	Aug. 08, 2024	Original

1.3. Test Description

Test Item	Section in CFR 47	RSS-210	Result	Test Engineer
AC Power Line Conducted Emissions	15.207	RSS-Gen 8.8	N/A	N/A
20dB Occupied Bandwidth	15.215/15.249	/	PASS	Alicia Liu
Field strength of the Fundamental signal	15.249(a)	RSS-210 F.1.a	PASS	Lucy Lan
Spurious Emissions	15.209/15.249(a)	RSS-210 F.1.e	PASS	Lucy Lan
Band edge Emissions	15.205/15.249(d)	/	PASS	Lucy Lan
Antenna requirement	15.203	/	PASS	Lucy Lan

Note: The measurement uncertainty is not included in the test result.

"N/A" This device is only powered battery, no need for part 15.207.

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 日目家认证认可监督管理委员会



1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

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

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in th e identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Indus try Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (F CC) Federal Communications Commission. The acceptance letter from the FCC is maintained inour files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement characteristics; Part 2" and is documented in the CTC Laboratories, Inc.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test Items	Measurement Uncertainty	Notes
DTS Bandwidth	±0.0196%	(1)
Maximum Conducted Output Power	±0.686 dB	(1)
Maximum Power Spectral Density Level	±0.743 dB	(1)
Band-edge Compliance	±1.328 dB	(1)
Unwanted Emissions In Non-restricted Freq Bands	9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB	(1)
Conducted Emissions 9kHz~30MHz	±3.08 dB	(1)
Radiated Emissions 30~1000MHz	±4.51 dB	(1)
Radiated Emissions 1~18GHz	±5.84 dB	(1)
Radiated Emissions 18~40GHz	±6.12 dB	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	HANSHOW TECHNOLOGY CO., LTD.
Address:	The 1st Floor Podium and Floor 4 of Building 1, Floor 7 of Building 5, Jiaxing Photovoltaic Technology Innovation Park, No.1288, Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Prov, P.R. China
Manufacturer	HANSHOW TECHNOLOGY CO., LTD.
Address:	The 1st Floor Podium and Floor 4 of Building 1, Floor 7 of Building 5, Jiaxing Photovoltaic Technology Innovation Park, No.1288, Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Prov, P.R. China

2.2. General Description of EUT

Product Name:	electronic shelf label
Trade Mark:	Hanshow
Model/Type reference:	Polaris-C-160R-N
Listed Model(s):	Only the model name is different.
Power supply:	Battery:3V
Hardware version:	HSEL3_01_60F_33
Software version:	ROM-153-DRIVER-150
2.4GHz	
Modulation:	GFSK
Operation frequency:	2402-2480MHz
Channel numbers:	157
Channel separation:	0.5MHz
Antenna type:	PCB layout antenna
Antenna gain:	0.85dBi

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn 中国国家认证认可监督管理委员会 EN

For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



2.3. Description of Test Modes

The EUT has been tested under test mode condition. The Applicant provides software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402.0	41	2422.0	81	2442.0	121	2462.0
2	2402.5	42	2422.5	82	2442.5	122	2462.5
3	2403.0	43	2423.0	83	2443.0	123	2463.0
4	2403.5	44	2423.5	84	2443.5	124	2463.5
5	2404.0	45	2424.0	85	2444.0	125	2464.0
6	2404.5	46	2424.5	86	2444.5	126	2464.5
7	2405.0	47	2425.0	87	2445.0	127	2465.0
8	2405.5	48	2425.5	88	2445.5	128	2465.5
9	2406.0	49	2426.0	89	2446.0	129	2466.0
10	2406.5	50	2426.5	90	2446.5	130	2466.5
11	2407.0	51	2427.0	91	2447.0	131	2467.0
12	2407.5	52	2427.5	92	2447.5	132	2467.5
13	2408.0	53	2428.0	93	2448.0	133	2468.0
14	2408.5	54	2428.5	94	2448.5	134	2468.5
15	2409.0	55	2429.0	95	2449.0	135	2469.0
16	2409.5	56	2429.5	96	2449.5	136	2469.5
17	2410.0	57	2430.0	97	2450.0	137	2470.0
18	2410.5	58	2430.5	98	2450.5	138	2470.5
19	2411.0	59	2431.0	99	2451.0	139	2471.0
20	2411.5	60	2431.5	100	2451.5	140	2471.5
21	2412.0	61	2432.0	101	2452.0	141	2472.0
22	2412.5	62	2432.5	102	2452.5	142	2472.5
23	2413.0	63	2433.0	103	2453.0	143	2473.0
24	2413.5	64	2433.5	104	2453.5	144	2473.5
25	2414.0	65	2434.0	105	2454.0	145	2474.0
26	2414.5	66	2434.5	106	2454.5	146	2474.5
27	2415.0	67	2435.0	107	2455.0	147	2475.0
28	2415.5	68	2435.5	108	2455.5	148	2475.5
29	2416.0	69	2436.0	109	2456.0	149	2476.0
30	2416.5	70	2436.5	110	2456.5	150	2476.5

CTC Laboratories, Inc.

Tel.: (86)755-27521059 中国国家认证认可监督管理委员会 EN

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Fax: (86)755-27521011 Http://www.sz-ctc.org.cn

For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



31	2417.0	71	2437.0	111	2457.0	151	2477.0
32	2417.5	72	2437.5	112	2457.5	152	2477.5
33	2418.0	73	2438.0	113	2458.0	153	2478.0
34	2418.5	74	2438.5	114	2458.5	154	2478.5
35	2419.0	75	2439.0	115	2459.0	155	2479.0
36	2419.5	76	2439.5	116	2459.5	156	2479.5
37	2420.0	77	2440.0	117	2460.0	157	2480.0
38	2420.5	78	2440.5	118	2460.5		
39	2421.0	79	2441.0	119	2461.0		
40	2421.5	80	2441.5	120	2461.5		

Test Mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit. (duty cycle>98%).

For AC power line conducted emissions:

The EUT was set to connect with large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

2.4. Accessory Equipment Information

Equipment Information						
Name	Model S/N Manufacture		Manufacturer			
1	/	/	/			
Cable Information						
Name	Shielded Type	Ferrite Core	Length			
1	/	/	/			
1	/	/	/			
Test Software Information						
Name	Software version	/	/			
Frequency Set	/	/	/			

CTC Laboratories, Inc.

ΞN



2.5. Measurement Instruments List

RF Test System								
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until			
1	Spectrum Analyzer	R&S	FSV40-N	101654	Aug. 07, 2024			
2	Test Software	Tonscend	JS1120-3	V3.3.38	/			

Radiated Emission (3m chamber 3)

		-)				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck VULB 9163		01026	Dec. 18, 2024	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 01, 2024	
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 12, 2024	
4	Broadband Amplifier	SCHWARZBECK	BBV9743B	259	Dec. 12, 2024	
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 12, 2024	
6	3m chamber 3	YIHENG	EE106	/	Aug. 28, 2026	
7	Test Software	FARA	EZ-EMC	FA-03A2	/	

Note: 1. The Cal. Interval was one year.

2. The Cal. Interval was three year of the chamber

3. The cable loss has calculated in test result which connection between each test instruments..



3. TEST ITEM AND RESULTS

3.1. AC Power Line Conducted Emissions

<u>Limit</u>

Fraguanov	Maximum RF Line Voltage (dBμV)					
Frequency	Quasi-peak Level	Average Level				
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *				
500kHz~5MHz	56	46				
5MHz~30MHz	60	50				

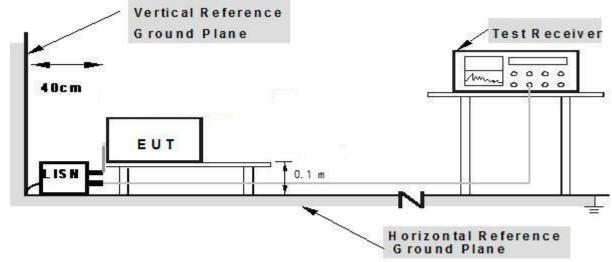
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Configuration



Note: 1.Support units were connected to second LISN. 2.Both of LISNs (ANN) are 80 cm from EUT and at least 80 from other units and other metal planes

Test Procedure

- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 10 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 10 cm from any other grounded conducting surface.
- The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 7. During the above scans, the emissions were maximized by cable manipulation.

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Langing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 日目家认证认可监督管理委员会 For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



Please refer to the clause 2.3

Test Results

N/A

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 日目家认证认可监督管理委员会

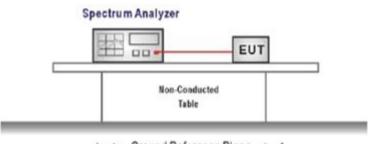


3.2. 20 dB Occupied Bandwidth

Limit

Operation frequency range 2400MHz~2483.5MHz.

Test Configuration



Ground Reference Plane

Test Procedure

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:
- Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a test channel RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW
 - Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

Test Mode

Please refer to the clause 2.3

Test Results

ΕN

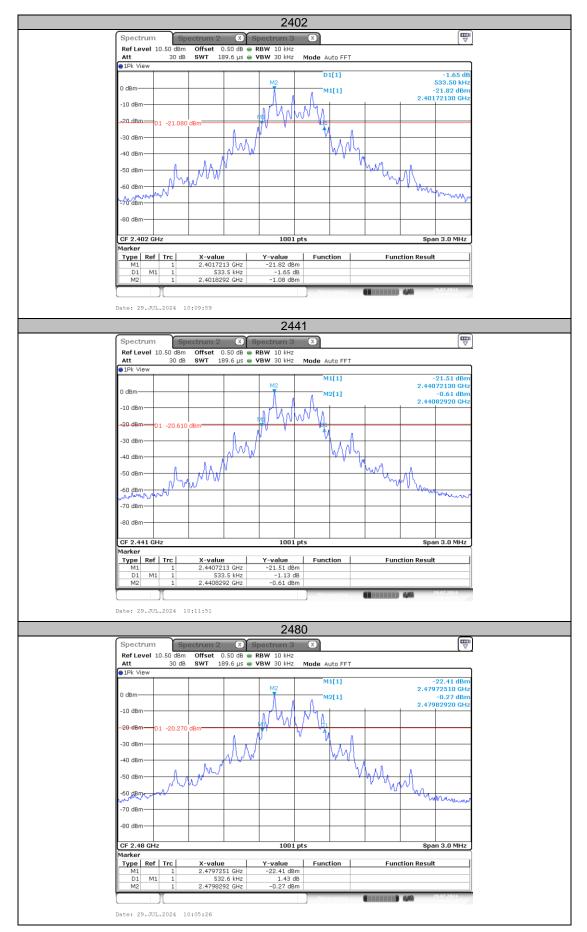
Frequency (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Result
2402	533.5	536.5	Pass
2441	533.5	533.5	Pass
2480	532.6	533.5	Pass

CTC Laboratories, Inc.

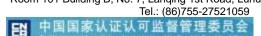
Room 101 Building B, No. 7, Langing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn 可监督管理委员会 中国国家认证认

For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



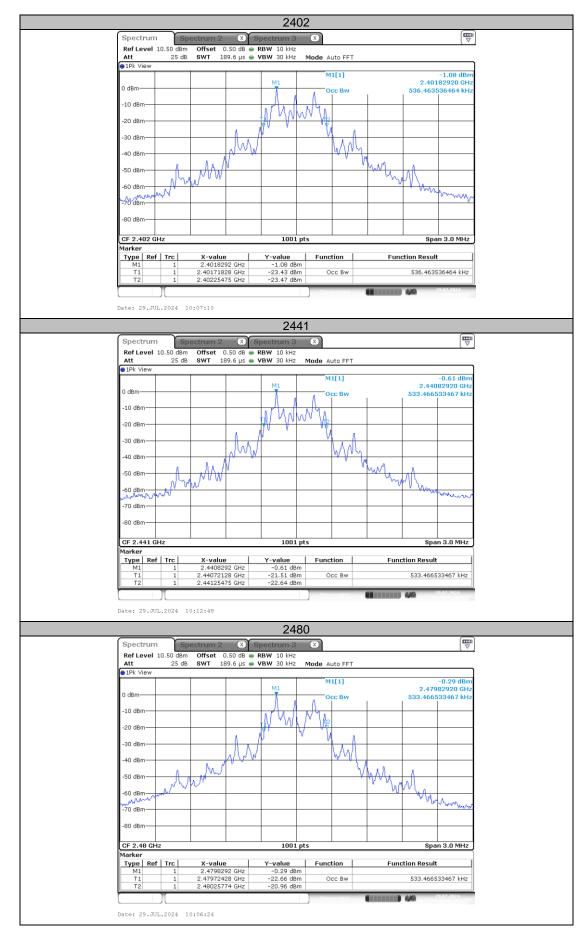


CTC Laboratories, Inc.



Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn





CTC Laboratories, Inc.



Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



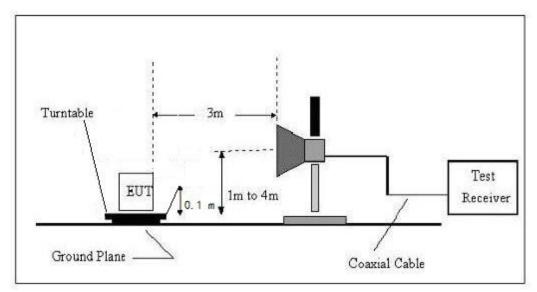
3.3. Radiated field strength of the fundamental signal

Limit

Fundamental frequency	Field strength of fundamental (millivolts/meter/ AVG)	Field strength of harmonics (microvolts/meter/ AVG)
902-928 MHz	50 (94dBuV/m @3m)	500 (54dBuV/m @3m)
2400-2483.5 MHz	50 (94dBuV/m @3m)	500 (54dBuV/m @3m)
5725-5875 MHz	50 (94dBuV/m @3m)	500 (54dBuV/m @3m)
24.0-24.25 GHz	250 (108dBuV/m @3m)	2500 (68dBuV/m @3m)

Frequencies above 1000 MHz, the field strength limits are based on average limits

Test Configuration



Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- 2. The EUT is placed on a turn table which is 0.1 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- 5. The receiver set as follow: RBW=1MHz, VBW=3MHz Peak detector for Peak value.

Test Mode

Please refer to the clause 2.3



Test Results

est Mode		Hor	izont	al									
20.0 dBu∀/n	e	2.40	G Mo	de 240	2MHz								
	n	_										114	lBu¥/m
10													jin -6 dB
00													
0													
						1							
0						-	$\overline{}$						
0							$ \rightarrow $						
0					r								
0	and the state of the	Marries Mar								and the second	e and the second se	anne	mar
D		Manuf Manuf	n Auguran					- North	manut	Ward Care			Junter
0													
)													
0													
0.0													
No.	Freque (MH			ading BuV)	Fac (dB	ctor /m)		evel iV/m)		nit V/m)	Mar (dE	-	Detector
1 *	2402.1	137	8	4.56	-3.	20	81	.36	114	.00	-32.	64	peak

CTC Laboratories, Inc.

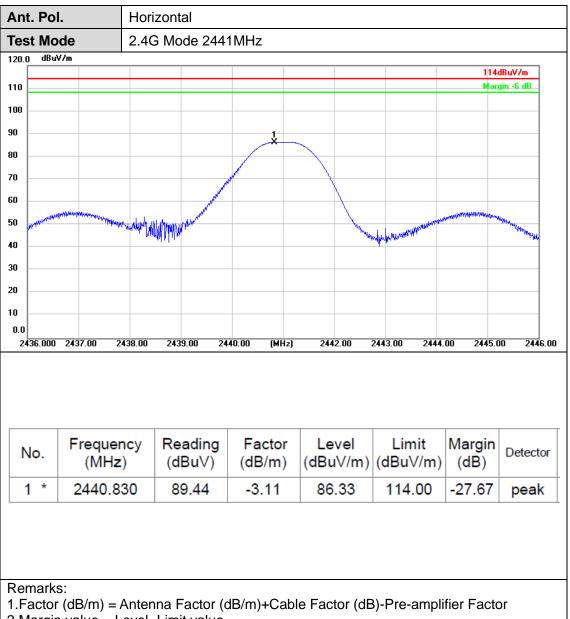
Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下配中国国家认证认可监督管理委员会



2.40	G Mode 2402	2MHz				1BuV/m jin -6 dB
					mari	
		1				
			\mathbf{X}			
		Man				
and the second second	Allertown			h undative for	apprentition and the second	mulu
and the second s	admichater .		- My	mane and the second second		"HUNK
8.00 2399.00	2400.00 240	01.00 (MHz)	2403.00	2404.00 2405.	00 2406.0	0 2407.
requency (MHz)	Reading (dBuV)	Factor (dB/m)		Limit (dBuV/m)	Margin (dB)	Detector
2402.110	75.25	-3.20	72.05	114.00	-41.95	peak
	8.00 2399.00 requency (MHz)	requency (MHz) Reading (dBuV)	Reading (MHz) Reading Factor (dB/m)	requency Reading Factor Level (dBuV) (dBuV)	requency Reading (MHz) Reading (dBuV) Factor Level (dBuV/m) Limit (dBuV/m)	requency (MHz) Reading (MHz) Reading (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Margin (dBuV/m) (dBuV/m) Margin (dBuV/m) (dB)

2.Margin value = Level -Limit value

EN



2.Margin value = Level -Limit value

EN

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and 中国国家认证认可监督管理委员会 Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



	2	.4G Mo										
		2.4G Mode 2441MHz										
0								114	lBu¥/m			
								Mar	jin -6 dB			
0												
				1	~							
					\rightarrow							
hillowania	nutre the s		handberrow			\mathbf{X}		mentermanya	a d a			
laure		www.theft.com	and an			think	Mary Margallan		m have Poly			
.0 2436.000 2437	.00 2438.	00 243	9.00 244	40.00 (MH	z) 244	2.00	2443.00 2444.1	00 2445.0	10 2446.			
	equency (MHz)		ading BuV)	Facto (dB/m)		evel iV/m)	Limit (dBuV/m)	Margin (dB)	Detecto			
	440.833	8	0.63	-3.11	77	.52	114.00	-36.48	peak			

CTC Laboratories, Inc.



nt. Pol			zontal					
est Mo		2.40	G Mode 248	0MHz				
0.0 dBu\	//m						114	lBuV/m
0								jin -6 dB
0								
				1				
				1				
					\rightarrow			
					$ \rightarrow $		ينحوب ور	
and and an		and a marked and a second second	Norman Made		```	The work where	and the second se	and a construction of
[Audredon a			Mary Marken		
.0 2475.000	2476.00	2477.00	2478.00 24	79.00 (MHz)	2481.00	2482.00 2483.	.00 2484.0	10 2485.
No.	Frequ (MF	-	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
	2479	.813	82.79	-3.03	79.76	114.00	-34.24	peak
	2479	.813	82.79	-3.03	79.76	114.00	-34.24	ре

2.Margin value = Level -Limit value

EN



nt. Pol		Verti	ical					
est Mo		2.40	6 Mode 248	OMHz				
20.0 dBuV	7m							
10								dBuV/m gin -6 dB
							Mai	ym -o ub
00								
o								
o				*				
o					\searrow			
0								
o								
	water a specific property we		Ward			(hatter and the second s	ward have marined the	mayor .
		Marchar Marker	Mary Maple W		www.	Mon wellow March working		and when
_								
0								
0 0.0 2475.000		477.00		79.00 (MHz)		2482.00 2483.	00 2484.0	10 2485
0.0		477.00 ncy		79.00 (MHz) Factor (dB/m)	2481.00		00 2484.0 Margin (dB)	00 2485 Detecto
0.0	2476.00 2	477.00	2478.00 24		2481.00	2482.00 2483.		

2.Margin value = Level -Limit value

EN

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下配中国国家认证认可监督管理委员会 中国国家认证认可监督管理委员会 Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



3.4. Radiated Spurious Emissions and Bandedge Emission

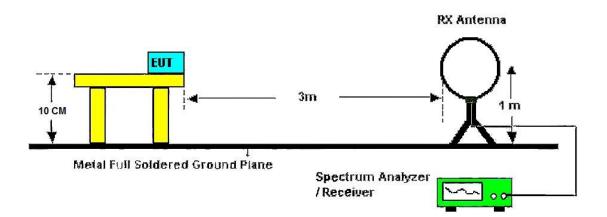
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

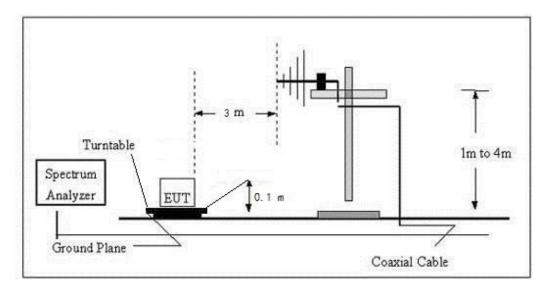
Frequency	Limit (dBuV/m @3m)	Value		
30MHz~88MHz	40.00	Quasi-peak		
88MHz~216MHz	43.50	Quasi-peak		
216MHz~960MHz	46.00	Quasi-peak		
960MHz~1GHz	54.00	Quasi-peak		
Above 1GHz	54.00	Average		
	74.00	Peak		

Test Configuration

9 kHz ~ 30 MHz



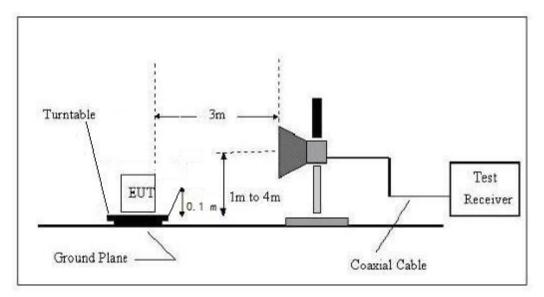
30 MHz ~ 1 GHz



CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn EN





Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- 2. The EUT is placed on a turn table which is 0.1 meter above ground for below 1 GHz, and 0.1 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 4. Set to the maximum power setting and enable the EUT transmit continuously.
- 5. Use the following spectrum analyzer settings
 - Span shall wide enough to fully capture the emission being measured; (1)Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(2)From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW=3MHz RMS detector for Average value.

Test Mode

Please refer to the clause 2.3

Test Results

Radiated Spurious Emissions

9 kHz ~ 30 MHz

> The EUT was pre-scanned the frequency band (9 kHz ~ 30 MHz), found the radiated level lower than the limit, so don't show on the report.

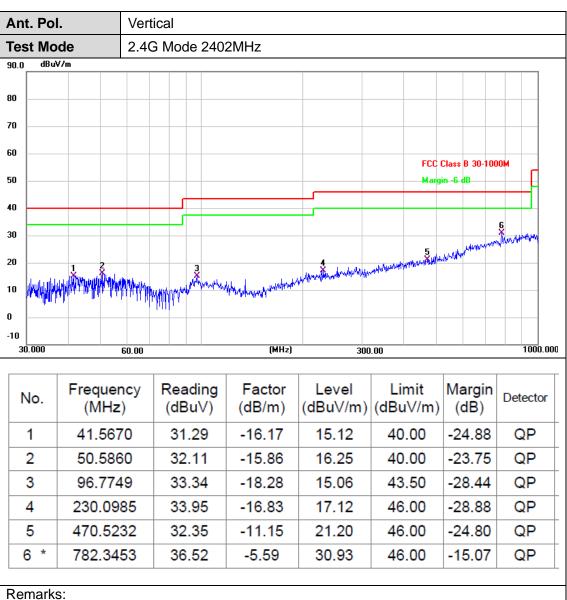


30 MHz ~ 1 GHz

nt. Po).	Hori	Horizontal 2.4G Mode 2402MHz									
est Mo		2.40	G Moo	de 240	2MHz							
0.0 dBu	l∀/m											
0												
0												
)								CC Class I	0 20 100	1014		
,								LL LIASS I largin -6-d				
,			r			+ -						
										6		
)								5	howard	WWWWWWWWW		
							Art.	h as a practic				
)	1	2		3			man for many works the second					
		2 M	6.15.6 Å kT*1	nutrum 3	after the and when the service was	al dar wig al der the way way	prender manufacture					
	yuu ahaan yuu ahaan ahaa	2 X	www	autoria and a start and a start and a start a	defense openligter frankrikene	al der mit der der der Konstander	production and a production of the second					
	Harby Arathy Jacob Markey	÷	un han an a	and a straight of the straight	Approximate the second water	alder-martale-ter-horizon	(halend for from the property for specific					
	Anny Security Marshal	2 111 111 60.00	wyn/W	and a start of the	(MHz)		0.00			1000.		
0 30.000	Ereque	60.00	Res		(MHz)	30	0.00			1000.		
0	Frequer (MHz	60.00 TCY		ading BuV)			0.00 Limit	Ma	argin dB)	1000.		
0 30.000		60.00 ncy	(dE	ading	(мн₂) Factor	Level	0.00 Limit	m) (c	argin	1000.		
0 30.000 No.	(MHz	60.00 ncy) 70	(dE 31	ading 3uV)	(мн₂) Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/r	m) (c	argin dB)	1000.		
No.	(MHz 41.567	60.00 fo.00 fo.00 fo.00	(dE 31 33	ading 3u∨) .36	(мн ₂) Factor (dB/m) -16.17	Level (dBuV/m 15.19	0.00 Limit (dBuV/r 40.00	m) Ma (c -24 -25	argin dB) 4.81	1000. Detecto		
No. 1 2	(MHz 41.567 66.966	60.00 ncy) 70 59 54	(dE 31 33 31	ading 3uV) .36 5.29	(мн ₂) Factor (dB/m) -16.17 -18.68	30 Level (dBuV/m 15.19 14.61	0.00 Limit (dBuV/r 40.00 40.00	m) Ma -24 -25	argin dB) 4.81 5.39	Detecto QP QP		
No. 1 2 3	(MHz 41.567 66.966 103.80	60.00 ncy) 70 54 20	(dE 31 33 31 33	ading 3uV) .36 5.29 .42	(MHz) Factor (dB/m) -16.17 -18.68 -17.62	30 Level (dBuV/m 15.19 14.61 13.80	Limit (dBuV/r 40.00 40.00 43.50	m) Ma -24 -28 -28 -28	argin dB) 4.81 5.39 9.70	Detecto QP QP QP		

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value





1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and 可监督管理委员会 中国国家认证认 ΕN



Above 1 GHz

Ant. Po	Ι.	Hori	zontal							
Test Mo	de	2.40	G Mode 2402	2MHz						
Remark	Remark: No report for the emission which more than 10 dB below the prescribed limit.									
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1 *	4803.1	67	25.75	1.99	27.74	54.00	-26.26	AVG		
2	4803.2	14	41.74	1.99	43.73	74.00	-30.27	peak		
	(dB/m) = /		na Factor (c	dB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or		

Ant. Po	Ι.	Vert	ical					
Test Mo	ode	2.40	G Mode 2402	2MHz				
Remark	:		report for the scribed limit.		which more t	han 10 dB t	pelow the)
				1	1			
No.	Frequency (MHz)			Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4803.1	41	40.61	1.99	42.60	74.00	-31.40	peak
2 *	4803.7	25	25.70	2.00	27.70	54.00	-26.30	AVG

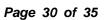
2.Margin value = Level -Limit value



nt. Po	I.	Horizontal								
est Mo	ode	2.40	G Mode 244	1MHz						
Remark	(:		report for the scribed limit.		which more t	than 10 dB t	pelow the)		
					1					
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
No. 1	•)					-	Detector peak		

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

Ant. Po	l.	Verti	ical						
Test Mo	de	2.4G Mode 2441MHz							
Remark	:		eport for the cribed limit.	emission v	which more t	han 10 dB t	pelow the)	
No.	Frequency (MHz)			Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4881.9	57	39.53	2.09	41.62	74.00	-32.38	peak	
2 *	4882.7	13	24.49	2.09	26.58	54.00	-27.42	AVG	
	(dB/m) = /		na Factor (c Limit value	dB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or	





Ant. Pol	l.	Hori	zontal					
Test Mo	de	2.40	6 Mode 2480	OMHz				
Remark	:		eport for the cribed limit.	emission v	vhich more t	han 10 dB t	pelow the	1
No.	Frequency (MHz)		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4959.8	92	39.16	2.21	41.37	74.00	-32.63	peak
2 *	4960.0	05	23.20	2.21	25.41	54.00	-28.59	AVG
	(dB/m) = /		na Factor (c Limit value	IB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or

Ant. Pol	-	Vert	ical							
Test Mo	de	2.40	G Mode 248	0MHz						
Remark	:		eport for the cribed limit.		which more t	han 10 dB t	pelow the)		
No.	Frequency (MHz)				Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	4959.6	57	23.91	2.21	26.12	54.00	-27.88	AVG		
2	4960.4	32	38.90	2.21	41.11	74.00	-32.89	peak		
Remarks	5:									
1.Factor	$(dB/m) = \lambda$	Anter	ina Factor (d	dB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or		

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Ro	ad, Luhu Community, Guanhi
Tel.: (86)755-275	21059 Fax: (86)755-2752
EN 中国国家认证认可监督管理委	For anti-fake verific

Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : http://yz.cnca.cn



Bandedge Emission

	Pol.			zontal					
est I			2.40	G Mode 240	2MHz				
20.0	dBu¥	/m							
10 -									
00 -									
o							FCC Part15 C	- Above 1G PK	
ן ד									<u> </u>
0							ECC Part15 C	- Above 1G AV	
ן ר	1 X			3 X			5 z		
n	2			* 4		. k. a	6.8		
)					ut i satu at data da anti-				
)									
)									
0.0 2300.0	.000	2325.00 2	350.00	2375.00 2	400.00 (MHz)	2450.00	2475.00 2500.	00 2525.0	10 2550.0
		Frequer	ncy	Reading	Factor	Level	Limit	Margin	
No.	•	(MHz	-	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)		Detector
1		0240.0							
		2310.0	00	15.24	31.24	46.48	74.00	-27.52	peak
2		2310.0		15.24 3.65	31.24 31.24	46.48 34.89	74.00 54.00	-27.52 -19.11	peak AVG
2 3			00						•
3	*	2310.0	00 00	3.65	31.24	34.89	54.00	-19.11	AVG
3	*	2310.0 2390.0	00 00 00	3.65 13.23	31.24 31.31	34.89 44.54	54.00 74.00	-19.11 -29.46	AVG peak
3 4	*	2310.0 2390.0 2390.0	00 00 00 00	3.65 13.23 5.05	31.24 31.31 31.31	34.89 44.54 36.36	54.00 74.00 54.00	-19.11 -29.46 -17.64	AVG peak AVG
3 4 5	*	2310.0 2390.0 2390.0 2483.5	00 00 00 00 00	3.65 13.23 5.05 16.85	31.24 31.31 31.31 31.48	34.89 44.54 36.36 48.33	54.00 74.00 54.00 74.00	-19.11 -29.46 -17.64 -25.67	AVG peak AVG peak

2.Margin value = Level -Limit value

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下配中国国家认证认可监督管理委员会 中国国家认证认可监督管理委员会 EN



nt. Pol.			Vert	ical					
est	Mod		2.40	G Mode 240	2MHz				
20.0	dBu¥.	/m							
10 -									
00 -									
)			_						
נ							ECC Part15 (: - Above 1G P	
ן ו								, - ADOVE TO F	<u> </u>
)							ECC Part15 (- Above 1G A	v
י ד	1 X			3 X			5 7 X X		
	2			4			6 8	ten a second bride size and second	
			3. 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6						
0									
0.0 2300									
	0.000	2325.00 23	350.00	2375.00 24	00.00 (MHz)	2450.00	2475.00 2500).00 2525.	00 2550.0
NIa				2375.00 24 Reading	оо.оо (мн _{г)} Factor	2450.00	2475.00 2500 Limit		
No		2325.00 23 Frequer (MHz	ncy		. ,		Limit	Margin	
No 1		Frequer	ncy)	Reading	Factor	Level	Limit	Margin	Detector
		Frequer (MHz	ncy) 00	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1		Frequer (MHz 2310.00	ncy) 00	Reading (dBuV) 15.46	Factor (dB/m) 31.24	Level (dBuV/m) 46.70	Limit (dBuV/m) 74.00	Margin (dB) -27.30	Detector peak
1		Frequer (MHz 2310.00 2310.00	ncy) 00 00	Reading (dBuV) 15.46 3.74	Factor (dB/m) 31.24 31.24	Level (dBuV/m) 46.70 34.98	Limit (dBuV/m) 74.00 54.00	Margin (dB) -27.30 -19.02	Detector peak AVG peak
1 2 3		Frequer (MHz 2310.00 2310.00 2390.00	ncy) 00 00 00 00	Reading (dBuV) 15.46 3.74 17.78	Factor (dB/m) 31.24 31.24 31.31	Level (dBuV/m) 46.70 34.98 49.09	Limit (dBuV/m) 74.00 54.00 74.00	Margin (dB) -27.30 -19.02 -24.91	Detector peak AVG peak
1 2 3 4 5		Frequer (MHz 2310.00 2310.00 2390.00 2390.00	ncy) 00 00 00 00 00	Reading (dBu∨) 15.46 3.74 17.78 3.89	Factor (dB/m) 31.24 31.24 31.31 31.31	Level (dBuV/m) 46.70 34.98 49.09 35.20	Limit (dBuV/m) 74.00 54.00 74.00 54.00	Margin (dB) -27.30 -19.02 -24.91 -18.80	Detector peak AVG peak AVG
1 2 3 4 5) .	Frequer (MHz 2310.00 2310.00 2390.00 2390.00 2483.50	ncy) 00 00 00 00 00 00	Reading (dBuV) 15.46 3.74 17.78 3.89 15.82	Factor (dB/m) 31.24 31.24 31.31 31.31 31.48	Level (dBuV/m) 46.70 34.98 49.09 35.20 47.30	Limit (dBuV/m) 74.00 54.00 74.00 54.00 74.00	Margin (dB) -27.30 -19.02 -24.91 -18.80 -26.70	Detector peak AVG peak AVG peak

2.Margin value = Level -Limit value

EN

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下配中国国家认证认可监督管理委员会 可监督管理委员会 中国

An	t. Pol	-	Hori	zontal					
Tes	st Mo		2.40	6 Mode 2480	OMHz				
120.0) dBu¥	//m							
110									
100									
90									
80							FCC Part15 C	- Above 16 P	ĸ
70								Abore ruli	
60							FCC Part15 C	- Above 16 A	v
50	1 X			3 X			5 7 X X		
40	2			4		. deta	min Gurman		
30									
20									
10									
0.0 23	300.000	2325.00 2	350.00	2375.00 24	00.00 (MHz)	2450.00	2475.00 2500.	00 2525.0	00 2550.00
Ν	۹o.	Frequer (MHz	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	2310.0	00	14.52	31.24	45.76	74.00	-28.24	peak
	2	2310.0	00	3.94	31.24	35.18	54.00	-18.82	AVG
	3	2390.0	00	16.93	31.31	48.24	74.00	-25.76	peak
	4	2390.0	00	4.72	31.31	36.03	54.00	-17.97	AVG
	5	2483.5	00	15.82	31.48	47.30	74.00	-26.70	peak
	6	2483.5	00	3.73	31.48	35.21	54.00	-18.79	AVG
	7	2500.0	00	15.08	31.51	46.59	74.00	-27.41	peak
	B *	2500.0	00	4.57	31.51	36.08	54.00	-17.92	AVG

Remark:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and 可监督管理委员会 中国 国家い EN ūΕΰ



nt. Pol	•	Vert	ical									
est Mo	de	2.40	6 Mode	248	OMHz							
20.0 dBuV	'/m				1							
0												
									F	CC Part15 C	- Above 1G	PK
										-	- Above 1G	AV
×				ж						5 7 X X		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and the second		erronaerran war	and the second	· · · · · · · · · · · · · · · · · · ·	Mayna	whenter	where from a state	and	6 8	maga and the	the second s
.0												
2300.000	2325.00 2	350.00	2375.0	) 24	00.00 (	MHz)	245	0.00	2475.0	0 2500	.00 2525	.00 <b>255</b> 0.
No.	Frequer (MHz		Read (dBu	<u> </u>	Fact (dB/r			vel iV/m)		.imit 8u∀/m)	Margir (dB)	Detector
1	2310.0	00	14.	27	31.2	4	45	.51	7	4.00	-28.49	peak
2	2310.0	00	3.9	4	31.2	4	35	.18	5	4.00	-18.82	AVG
3	2390.0	00	13.	98	31.3	1	45	.29	7	4.00	-28.71	peak
4	2390.0	00	3.5	5	31.3	1	34	.86	5	4.00	-19.14	AVG
5	2483.5	00	14.	78	31.4	8	46	.26	7	4.00	-27.74	peak
6 *	2483.5	00	4.2	6	31.4	8	35	.74	5	4.00	-18.26	AVG
7	2500.0	00	14.	17	31.5	1	45	.68	7	4.00	-28.32	peak
8	2500.0	00	4.1	0	31.5	1	35	.61	5	4.00	-18.39	AVG
emark:							1				1	

2.Margin value = Level -Limit value

中国

iĿι

EN

CTC Laboratories, Inc.

Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 下配中国国家认证认可监督管理委员会 可监督管理委员会



### 3.5. Antenna requirement

### **Requirement**

### FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of anantenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

CTC Laboratories, Inc. Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Tel.: (86)755-27521059 中国国家认证认可监督管理委员会