

FCC Part 15C Test Report

FCC ID: 2AGDZRLC-410WS

Product Name:	WiFi IP Camera
Trademark:	replink
Model Name :	RLC-410WS, RLC-411WS
Prepared For :	Reolink Digital Technology Co., Ltd.
Address :	A218, ShiWaiTaoYuan ChuanyiYuan , 1st of PingShan Road , Xili , NanShan , Shenzhen,China
Prepared By:	Shenzhen BCTC Technology Co., Ltd.
Address :	No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	Dec. 16 - Dec. 29, 2015
Date of Report :	Dec. 30, 2015
Report No.:	BCTC-151215618

Report No.: BCTC-151215618



Applicant's name: Reolink Digital Technology Co., Ltd.

TEST RESULT CERTIFICATION

Address : A218, ShiWaiTaoYuan ChuanyiYuan , 1st of PingShan Road , Xili, NanShan, Shenzhen, China

Manufacture's Name:	Reolink Digital Technology Co., I	_td.
Address:	A218, ShiWaiTaoYuan ChuanyiY Xili , NanShan , Shenzhen,China	
Product description		
Product name:	WiFi IP Camera	
Trademark:	replink	
Model and/or type reference :	RLC-410WS, RLC-411WS	
Standards:	FCC Part15.247	
Test procedure	ANSI C63.10-2013	
	as been tested by BCTC, and the find the find the find compliance with the FCC required the report.	
·	ced except in full, without the writivised by BCTC, personal only, and	• •
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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C					
Standard Section	Test Item	Judgment	Remark		
15.207	Conducted Emission	PASS			
15.247 (a)(2)	6dB Bandwidth	PASS			
15.247 (b)	Peak Output Power	PASS			
15.247 (c)	Radiated Spurious Emission	PASS			
15.247 (d)	Power Spectral Density	PASS			
15.205	Band Edge Emission	PASS			
15.203	Antenna Requirement	PASS			

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NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.

Add.: No.101, Yousong Road, Longhua New District, Shenzhen, China

FCC Registered No.: 187086

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expended uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k=2}$, providing a level of confidence of approximately 95 % $^{\circ}$

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No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Model Name RLC-410WS, RLC-411WS The product is different for RLC-410WS has B2 cylindrical shell(L*W=9.0*6.5mm), RLC-411WS has B7 cylindrical shell(L*W=16.5*8.1mm). RLC-410WS has 4mm lens, RLC-411WS has HD electric zoom lens. The EUT is a WiFi IP Camera Operation Frequency: 802.11b/g/n20MHz:2412~2462 MHz Modulation Type: OFDM/DSSS Bit Rate of Transmitter 802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n Up to 150Mbps Number Of Channel 802.11b/g/n20MHz:11 CH Antenna Designation: Please see Note 3. Antenna Gain (dBi) 3.0dbi Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual. Channel List Please refer to the Note 2. Model:CS-1201000 I/P:AC 100-240V 50/60Hz O/P:DC 12V/1A Battery N/A	Equipment	WiFi IP Camera		
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Adapter I/P:AC 100-240V 50/60Hz O/P:DC 12V/1A Battery N/A	Channel List			
	Adapter	I/P:AC 100-240V 50/60Hz		
	Battery	N/A		
Connecting I/O Port(s) Please refer to the User's Manual	Connecting I/O Port(s)	Please refer to the User'	s Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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	Channel List for 802.11b/g/n(20)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3.

Table for Filed Antenna

Ant	. Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
Α	N/A	N/A	External	N/A	3.0	Wifi Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	Link Mode

	For Conducted Emission
Final Test Mode	Description
Mode 4	Link Mode

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For Radiated Emission							
Final Test Mode Description							
Mode 1	802.11b CH1/ CH6/ CH11						
Mode 2	802.11g CH1/ CH6/ CH11						
Mode 3	802.11n CH1/ CH6/ CH11						

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
- (2) we pretest RLC-410WS, RLC-411WS for conducted and radiated below 1GHz. the worst model's data final test other test.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test



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2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	WiFi IP Camera	replink	RLC-410WS	N/A	EUT
E-2	Adapter	replink	CS-1201000	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	0.8M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>[Length]</code> column.

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2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2015.07.06	2016.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2015.07.06	2016.07.05	1 year
3	Bilog Antenna	R&S	VULB 9168	VULB91 68-438	2015.07.06	2016.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.07.06	2016.07.05	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.07.06	2016.07.05	1 year
6	Horn Antenna	R&S	HF906	10027	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	R&S	BBV9743	9743-01 9	2015.12.22	2016.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.07.06	2016.07.05	1 year
10	RF cables	R&S	R203	R20X	2015.07.06	2016.07.05	1 year
11	Antenna connector	Florida RFLab s	Lab-Fle	RF 01#	2015.07.06	2016.07.05	1 year
12	Power Metter	ANRITSU	ML2487A	6K00001568	2015.07.06	2016.07.05	1 year
13	Power Sensor (AV)	ANRITSU	ML2491A	030989	2015.07.06	2016.07.05	1 year
14	Signal Analyzer	Agilent	N9010A	MY48030494	2015.07.06	2016.07.05	1 year

Conduction Test equipment

Item	Kind of	Manufacturer	Type No.	Serial No.	Last	Calibrated	Calibration
	Equipment				calibration	until	period
1	Test Receiver	R&S	ESCI	1166.5950K0 3-101165-ha	2015.07.06	2016.07.05	1 year
2	LISN	R&S	NSLK81 26	812646 6	2015.08.24	2016.08.23	1 year
3	LISN	R&S	NSLK81 26	812648 7	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.07.06	2016.07.05	1 year
5	RF cables	R&S	R204	R20X	2015.07.06	2016.07.05	1 year



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

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	Class B (dE	Ctandard	
FREQUENCY (MHz)	Quasi -peak	Average	Standard
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support

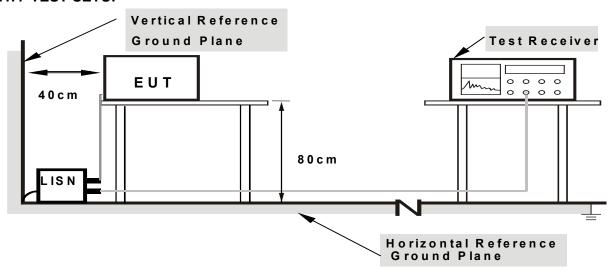
Shenzhen BCTC Technology Co., Ltd.

- equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.



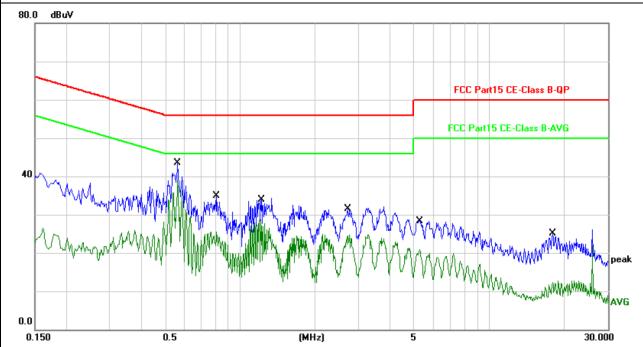
3.1.6 TEST RESULTS

EUT:	WiFi IP Camera	Model Name. :	RLC-410WS
Temperature:	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode:	Mode 4

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB	dBu∨	dBu∨	dB	Detector	Comment	
1	0.5620	33.45	10.12	43.57	56.00	-12.43	QP		
2 *	0.5620	29.05	10.12	39.17	46.00	-6.83	AVG		
3	0.8059	24.80	10.15	34.95	56.00	-21.05	QP		
4	0.8059	15.36	10.15	25.51	46.00	-20.49	AVG		
5	1.2140	24.17	10.17	34.34	56.00	-21.66	QP		
6	1.2140	18.47	10.17	28.64	46.00	-17.36	AVG		
7	2.7139	21.27	10.19	31.46	56.00	-24.54	QP		
8	2.7139	14.54	10.19	24.73	46.00	-21.27	AVG		
9	5.2499	18.19	10.13	28.32	60.00	-31.68	QP		
10	5.2499	10.77	10.13	20.90	50.00	-29.10	AVG		
11	17.9859	15.02	10.16	25.18	60.00	-34.82	QP		
12	17.9859	2.58	10.16	12.74	50.00	-37.26	AVG		

Remark:

- All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.



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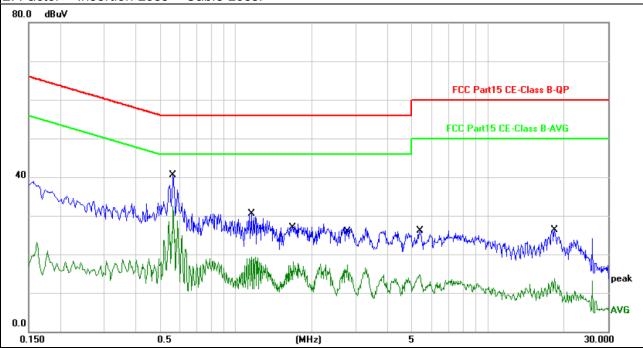


EUT:	WiFi IP Camera	Model Name. :	RLC-410WS
Temperature :	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode:	Mode 4

No. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.5620	30.46	10.12	40.58	56.00	-15.42	QP	
2 *	0.5620	22.40	10.12	32.52	46.00	-13.48	AVG	
3	1.1500	20.34	10.17	30.51	56.00	-25.49	QP	
4	1.1500	9.17	10.17	19.34	46.00	-26.66	AVG	
5	1.6860	17.66	10.18	27.84	56.00	-28.16	QP	
6	1.6860	7.89	10.18	18.07	46.00	-27.93	AVG	
7	2.7700	16.79	10.19	26.98	56.00	-29.02	QP	
8	2.7700	7.11	10.19	17.30	46.00	-28.70	AVG	
9	5.3778	16.06	10.13	26.19	60.00	-33.81	QP	
10	5.3778	4.60	10.13	14.73	50.00	-35.27	AVG	
11	18.3699	16.21	10.16	26.37	60.00	-33.63	QP	
12	18.3699	3.45	10.16	13.61	50.00	-36.39	AVG	

Remark:

- All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.



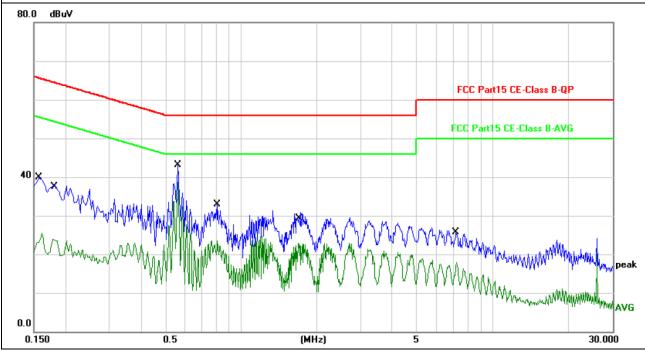
EUT:	WiFi IP Camera	Model Name. :	RLC-411WS
Temperature :	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode:	Mode 4

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No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB	dBu∀	dBu∀	dB	Detector	Comment	
1	0.1580	29.81	10.05	39.86	65.56	-25.70	QP		
2	0.1580	15.43	10.05	25.48	55.56	-30.08	AVG		
3	0.1780	27.54	10.06	37.60	64.57	-26.97	QP		
4	0.1780	13.87	10.06	23.93	54.57	-30.64	AVG		
5	0.5620	32.95	10.12	43.07	56.00	-12.93	QP		
6 *	0.5620	28.55	10.12	38.67	46.00	-7.33	AVG		
7	0.8059	21.21	10.15	31.36	56.00	-24.64	QP		
8	0.8059	13.36	10.15	23.51	46.00	-22.49	AVG		
9	1.6860	20.62	10.18	30.80	56.00	-25.20	QP		
10	1.6860	12.82	10.18	23.00	46.00	-23.00	AVG		
11	7.1380	15.53	10.10	25.63	60.00	-34.37	QP		
12	7.1380	7.88	10.10	17.98	50.00	-32.02	AVG		

Remark:

- All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.



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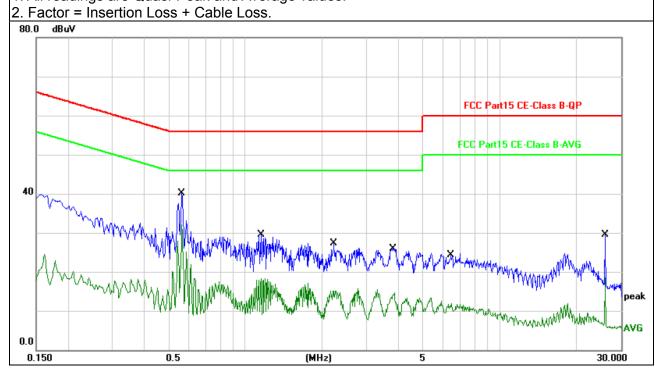
EUT:	WiFi IP Camera	Model Name. :	RLC-411WS
Temperature :	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode:	Mode 4

Report No.: BCTC-BCTC-151215618

No. M	lk. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment	
1	0.5620	29.96	10.12	40.08	56.00	-15.92	QP		
2 *	0.5620	21.90	10.12	32.02	46.00	-13.98	AVG		
3	1.1500	19.34	10.17	29.51	56.00	-26.49	QP		
4	1.1500	8.17	10.17	18.34	46.00	-27.66	AVG		
5	2.2300	17.14	10.18	27.32	56.00	-28.68	QP		
6	2.2300	5.01	10.18	15.19	46.00	-30.81	AVG		
7	3.8060	15.76	10.17	25.93	56.00	-30.07	QP		
8	3.8060	4.45	10.17	14.62	46.00	-31.38	AVG		
9	6.4860	13.03	10.09	23.12	60.00	-36.88	QP		
10	6.4860	1.82	10.09	11.91	50.00	-38.09	AVG		
11	25.9980	19.33	10.20	29.53	60.00	-30.47	QP		
12	25.9980	8.36	10.20	18.56	50.00	-31.44	AVG		

Remark:

- 1. All readings are Quasi-Peak and Average values.



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3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

Shenzhen BCTC Technology Co., Ltd.

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

	E: 1101 (I	10:1
Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)				
PREQUENCT (MIDZ)	PEAK	AVERAGE			
Above 1000	74	54			

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	25GHz	
RB / VB (emission in restricted	1 MHz / 1 MHz for Dook, 1 MHz / 10Hz for Average	
band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average	

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

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3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

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- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

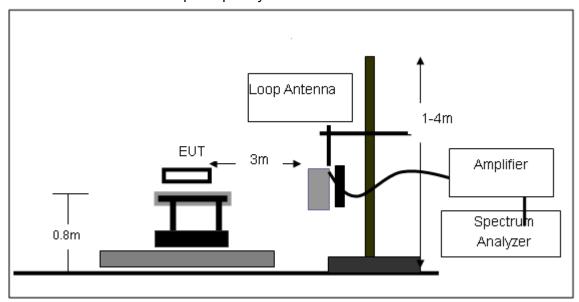
3.2.3 DEVIATION FROM TEST STANDARD

No deviation



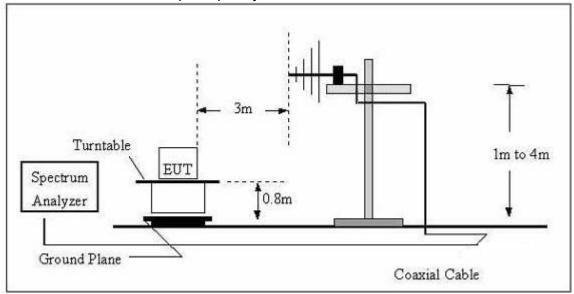
3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



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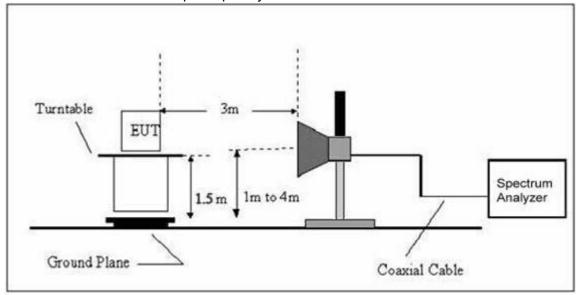
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





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(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.6 TEST RESULTS (BETWEEN 9KHZ - 30 MHZ)

Shenzhen BCTC Technology Co., Ltd.

EUT:	WiFi IP Camera	Model Name. :	RLC-410WS
Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage:	DC 12V from adapter
Test Mode:	Mode 4	Polarization :	

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



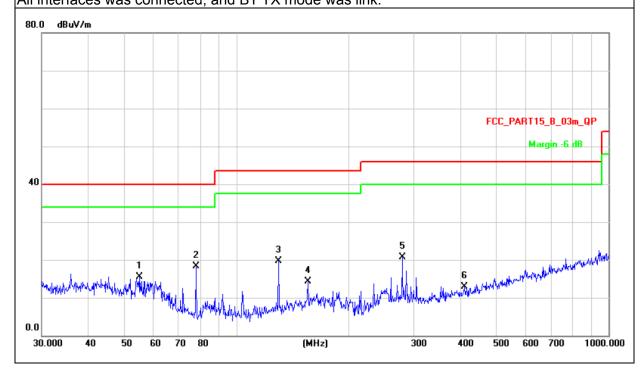
3.2.7 TEST RESULTS (BETWEEN 30MHZ - 1GHZ)

EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	26℃	Relative Humidity:	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		55.0274	26.66	-11.13	15.53	40.00	-24.47	QP			
2	*	77.8654	35.61	-17.33	18.28	40.00	-21.72	QP			
3		129.9226	33.81	-14.11	19.70	43.50	-23.80	QP			
4		155.9101	27.16	-12.87	14.29	43.50	-29.21	QP			
5		279.0436	33.85	-13.13	20.72	46.00	-25.28	QP			
6		410.3825	22.84	-9.96	12.88	46.00	-33.12	QP			

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.



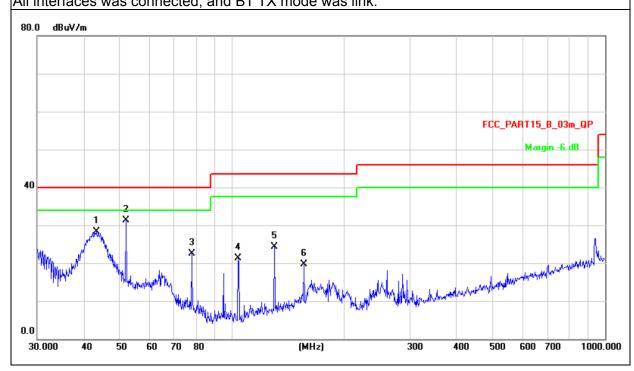


EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	26 ℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		43.2017	37.60	-9.25	28.35	40.00	-11.65	QP			
2	*	52.0251	42.02	-10.63	31.39	40.00	-8.61	QP			
3		77.8654	39.81	-17.33	22.48	40.00	-17.52	QP			
4		103.8055	37.39	-16.16	21.23	43.50	-22.27	QP			
5		129.9226	38.42	-14.11	24.31	43.50	-19.19	QP			
6		155.9101	32.61	-12.87	19.74	43.50	-23.76	QP			

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.





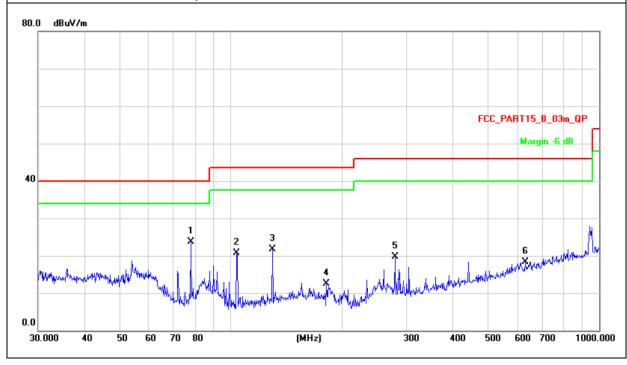
EUT:	WiFi IP Camera	Model Name :	RLC-411WS
Temperature :	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization:	Horizontal
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	77.8654	41.07	-17.33	23.74	40.00	-16.26	QP			
2		103.8055	36.89	-16.13	20.76	43.50	-22.74	QP			
3		129.9226	35.87	-14.11	21.76	43.50	-21.74	QP			
4		181.9202	27.15	-14.58	12.57	43.50	-30.93	QP			
5		279.0436	32.81	-13.13	19.68	46.00	-26.32	QP			
6		631.6884	23.67	-5.41	18.26	46.00	-27.74	QP			

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.





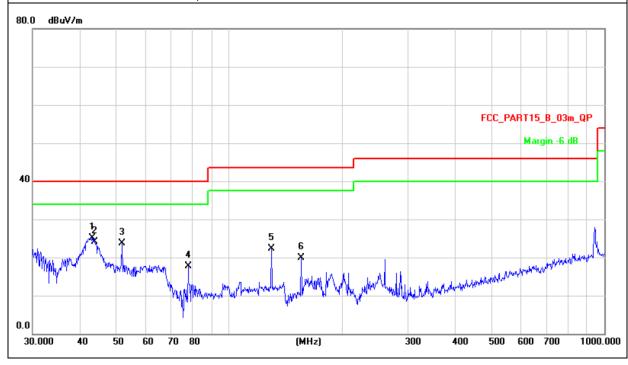
EUT:	WiFi IP Camera	Model Name :	RLC-411WS
Temperature :	26 ℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

Report No.: BCTC-BCTC-151215618

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	43.2017	34.39	-9.25	25.14	40.00	-14.86	QP			
2		43.9658	33.49	-9.35	24.14	40.00	-15.86	QP			
3		51.8430	34.21	-10.60	23.61	40.00	-16.39	QP			
4		77.8654	35.13	-17.33	17.80	40.00	-22.20	QP			
5		129.9226	36.44	-14.11	22.33	43.50	-21.17	QP			
6		155.9101	32.75	-12.87	19.88	43.50	-23.62	QP			

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.



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3.2.8 TEST RESULTS (1GHZ~25GHZ)

802.11b

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector			
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре			
	operation frequency:2412									
V	4825.166	65.51	-3.64	61.87	74	-12.13	Pk			
V	4825.166	47.10	-3.64	43.46	54	-10.54	AV			
Н	4825.215	65.02	-3.64	61.38	74	-12.62	Pk			
Н	4825.215	45.80	-3.64	42.16	54	-11.84	AV			

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11b

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector				
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре				
	operation frequency:2437										
V	4876.053	63.29	-3.63	59.66	74	-14.34	Pk				
V	4876.053	45.11	-3.63	41.48	54	-12.52	AV				
Н	4876.211	64.23	-3.64	60.59	74	-13.41	Pk				
Н	4876.211	44.78	-3.64	41.14	54	-12.86	AV				

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11b

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector				
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре				
	operation frequency:2462										
V	4913.115	65.92	-3.64	62.28	74	-11.72	Pk				
V	4913.115	47.95	-3.64	44.31	74	-9.69	AV				
Н	4912.732	64.70	-3.66	61.04	74	-12.96	Pk				
Н	4912.732	47.72	-3.66	44.06	54	-9.94	AV				

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11g

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector				
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре				
	operation frequency:2412										
V	4821.224	68.51	-3.6	64.91	74	-9.09	Pk				
V	4821.224	46.68	-3.6	43.08	54	-10.92	AV				
Н	4821.527	66.66	-3.6	63.06	74	-10.94	Pk				
Н	4821.527	46.40	-3.6	42.80	54	-11.20	AV				

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

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802.11g

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector				
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре				
	operation frequency:2437										
V	4874.354	66.02	-3.63	62.39	74	-11.61	Pk				
V	4874.354	47.17	-3.63	43.54	54	-10.46	AV				
Н	4874.145	66.59	-3.64	62.95	74	-11.05	Pk				
Н	4874.145	46.28	-3.64	42.64	54	-11.36	AV				

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11g

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector			
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре			
	operation frequency:2462									
V	4914.103	65.70	-3.62	62.08	74	-11.92	pk			
V	4914.103	46.73	-3.62	43.11	54	-10.89	pk			
Н	4914.032	64.49	-3.62	60.87	74	-13.13	pk			
Н	4914.032	47.51	-3.62	43.89	54	-10.11	pk			

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n(20MHz)

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector				
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре				
	operation frequency:2412										
V	4822.217	65.31	-3.58	61.73	74	-12.27	Pk				
V	4822.217	46.93	-3.58	43.35	54	-10.65	AV				
Н	4822.322	65.48	-3.6	61.88	74	-12.12	Pk				
Н	4822.322	46.18	-3.6	42.58	54	-11.42	AV				

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11n(20MHz)

Normal Voltage

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
	operation frequency:2437						
V	4874.054	67.13	-3.63	63.50	74	-10.50	Pk
V	4874.054	46.62	-3.63	42.99	54	-11.01	AV
Н	4874.312	65.69	-3.64	62.05	74	-11.95	Pk
Н	4874.312	45.85	-3.64	42.21	54	-11.79	AV

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11n(20MHz)

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
	operation frequency:2462						
V	4922.213	64.47	-3.64	60.83	74	-13.17	pk
V	4922.213	43.82	-3.64	40.18	54	-13.82	AV
Н	4923.144	59.53	-3.66	55.87	74	-18.13	pk
Н	4923.144	42.55	-3.66	38.89	54	-15.11	pk

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

==== == ==						
FCC Part15 (15.247) , Subpart C						
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS		

4.1.1 TEST PROCEDURE

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS bandwidth.
- 3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

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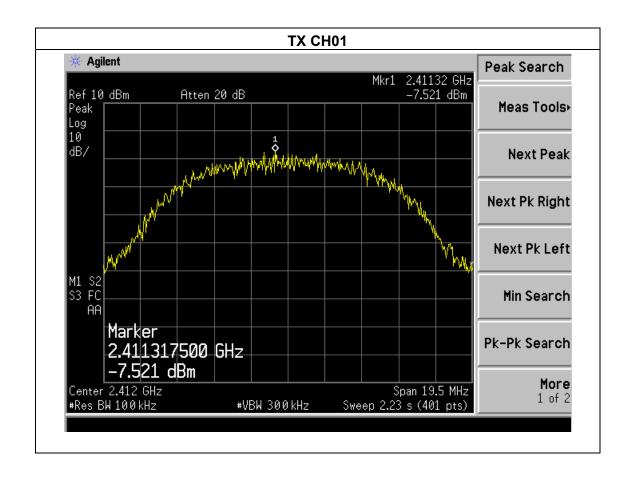


4.1.5 TEST RESULTS

EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature:	25 ℃	Relative Humidity:	60%
Pressure :	1015 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX b Mode /CH01, CH06, CH1	1	

Report No.: BCTC-BCTC-151215618

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-7.52	8	PASS
2437 MHz	-8.36	8	PASS
2462 MHz	-8.71	8	PASS

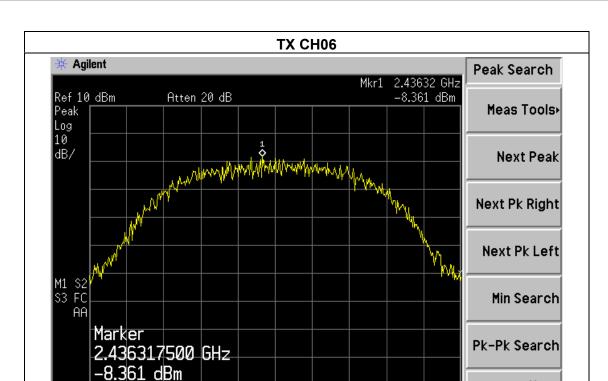


More

1 of 2

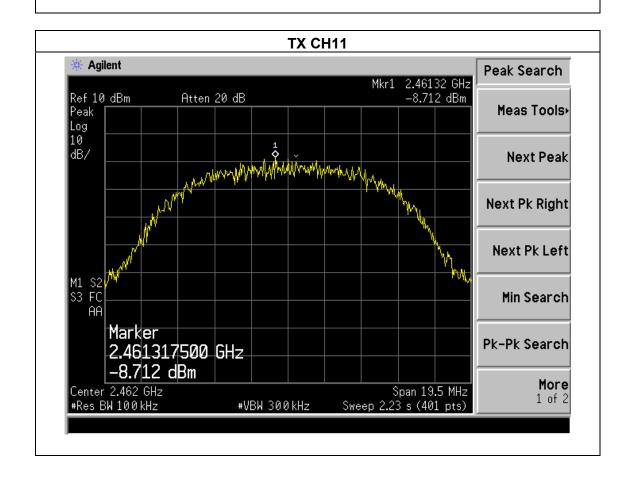


Center 2.437 GHz #Res BW 100kHz



#VBW 300kHz

Span 19.5 MHz Sweep 2.23 s (401 pts)

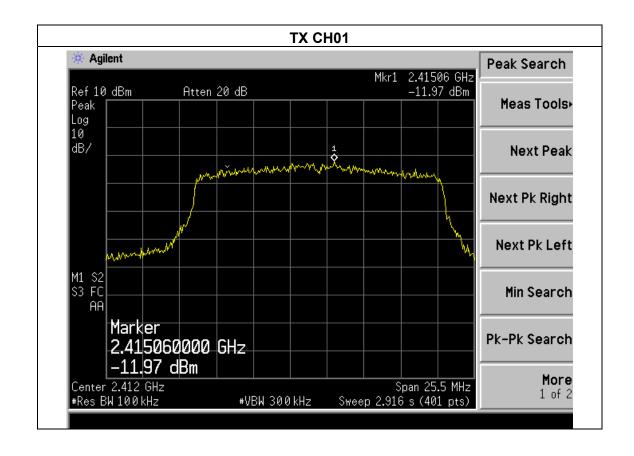




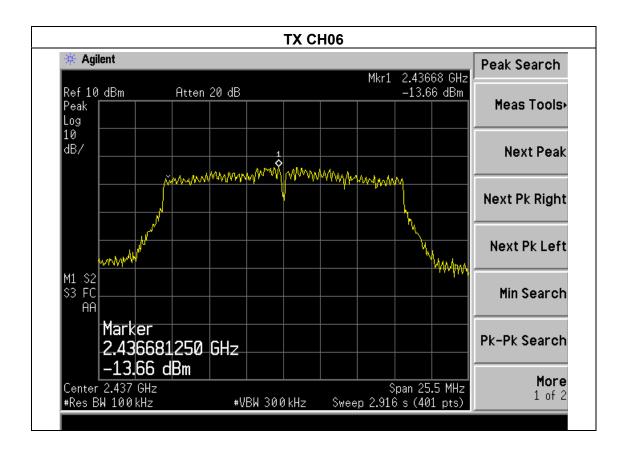
EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25℃	Relative Humidity:	60%
Pressure:	1015 hPa	Test Voltage :	DC 12V from adapter
Test Mode : TX g Mode /CH01, CH06, CH11			

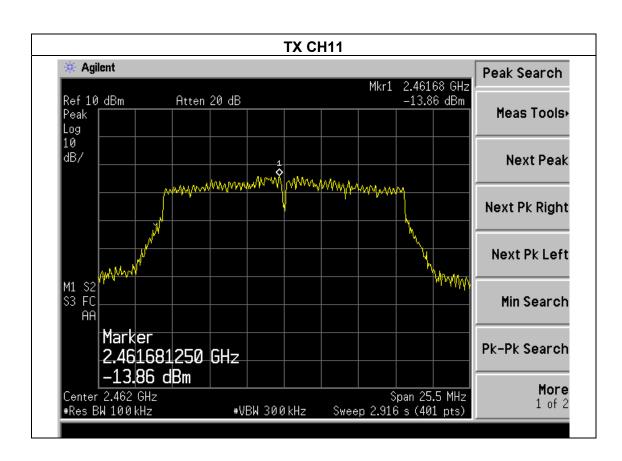
Report No.: BCTC-BCTC-151215618

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-11.97	8	PASS
2437 MHz	-13.66	8	PASS
2462 MHz	-13.86	8	PASS





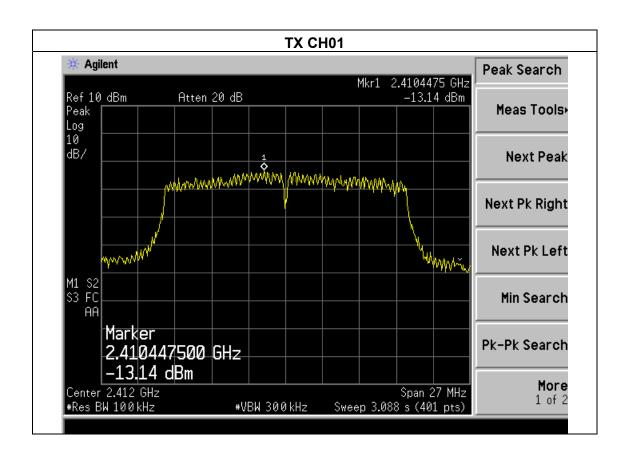


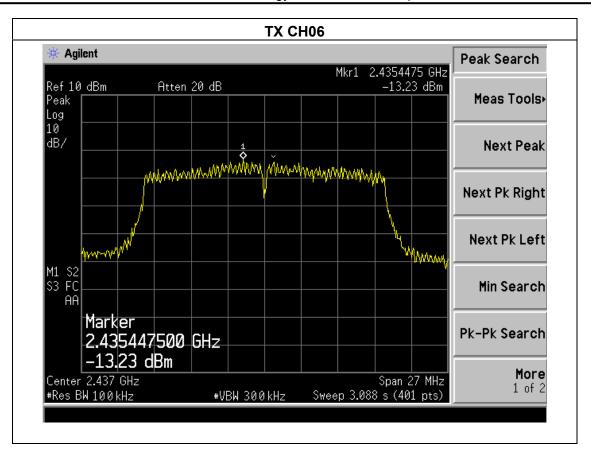


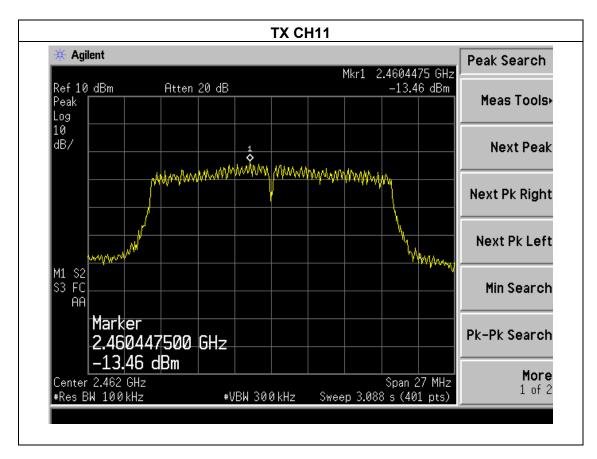


EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25℃	Relative Humidity:	60%
Pressure:	1015 hPa	Test Voltage :	DC 12V from adapter
Test Mode : TX n Mode(20M) /CH01, CH06, CH11			

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-13.14	8	PASS
2437 MHz	-13.23	8	PASS
2462 MHz	-13.46	8	PASS









5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

	FCC Part15 (15.247) , Subpart C				
Section Test Item Limit Frequency Range (MHz) Result				Result	
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS	

5.1.1 TEST PROCEDURE

- 1. Set RBW = 100 kHz.
- 2. Set the video bandwidth (VBW) \geq 3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

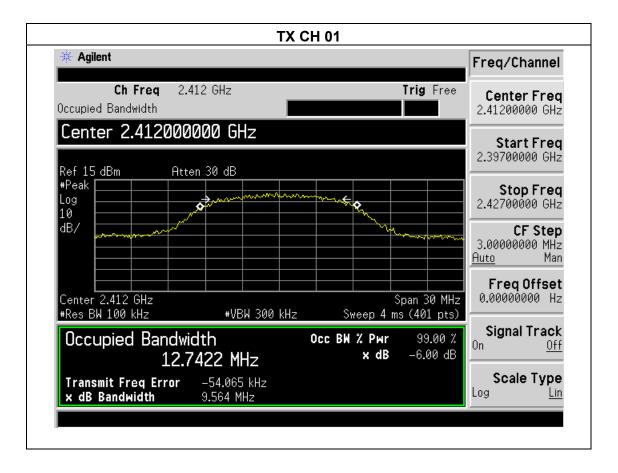
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

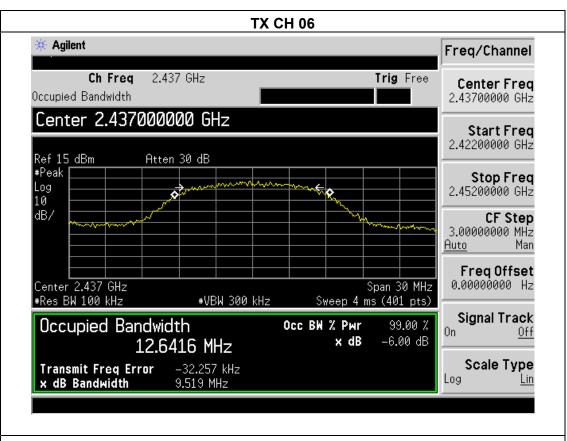


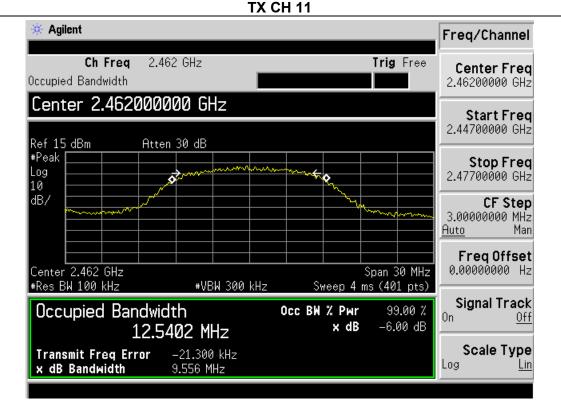
5.1.5 TEST RESULTS

EUT:	WiFi IP Camera	Model Name :	RLC-410WS	
Temperature:	25 ℃	Relative Humidity:	60%	
Pressure :	1012 hPa	Test Voltage :	DC 12V from adapter	
Test Mode :	t Mode : TX b Mode /CH01, CH06, CH11			

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.564	500	Pass
Middle	2437	9.519	500	Pass
High	2462	9.556	500	Pass



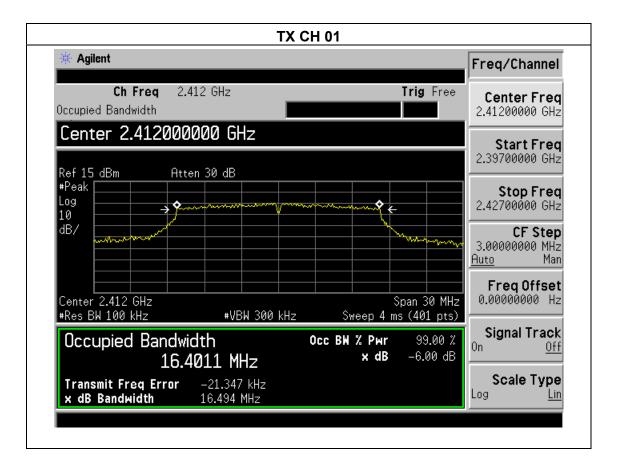


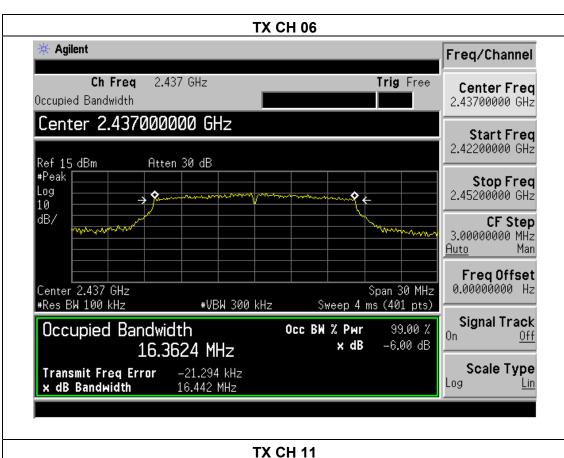


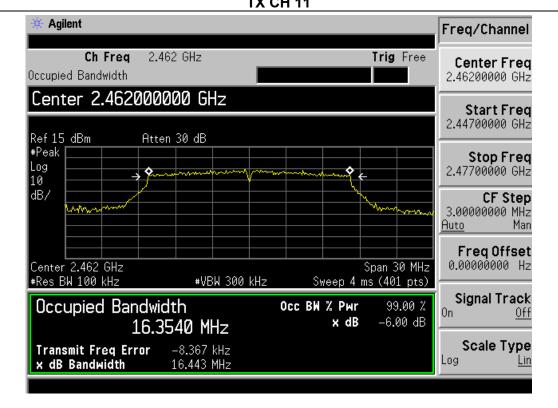


EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature:	25℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.494	500	Pass
Middle	2437	16.442	500	Pass
High	2462	16.443	500	Pass



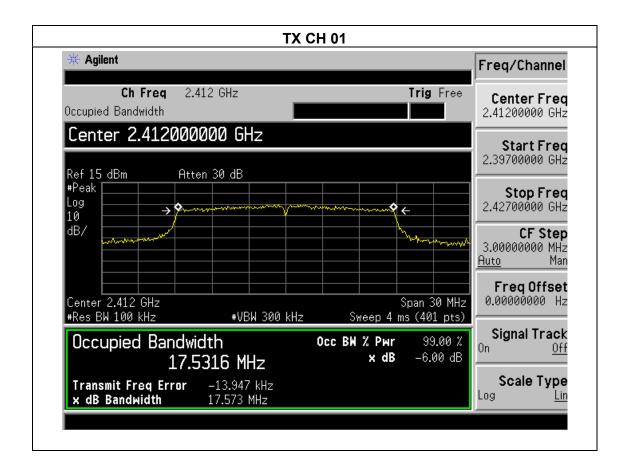




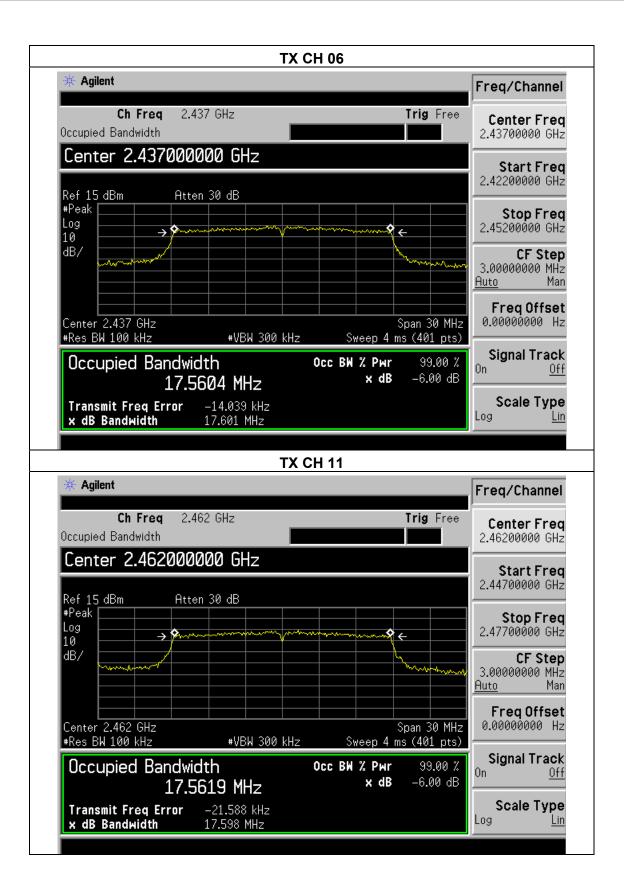


EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode : TX n Mode(20M) /CH01, CH06, CH11			

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.573	500	Pass
Middle	2437	17.601	500	Pass
High	2462	17.598	500	Pass







6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS	

6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.1.5 TEST RESULTS

EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25 ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX b/g/n(20M)		

	TX 802.11b Mode				
Test Channe	Frequency	Maximum Conducted Output Power(PK)	LIMIT		
	(MHz)	(dBm)	dBm		
CH01	2412	17.34	30		
CH06	2437	17.15	30		
CH11	2462	17.27	30		
	TX 802.11g Mode				
CH01	2412	15.42	30		
CH06	2437	15.57	30		
CH11	2462	15.43	30		
	TX 802.11n-HT20 Mode				
CH01	2412	14.54	30		
CH06	2437	14.43	30		
CH11	2462	14.38	30		



7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP

EUT	•	SPECTRUM
		ANALYZER

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7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.4 TEST RESULTS

EUT:	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25 ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 12V from adapter

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Radiated

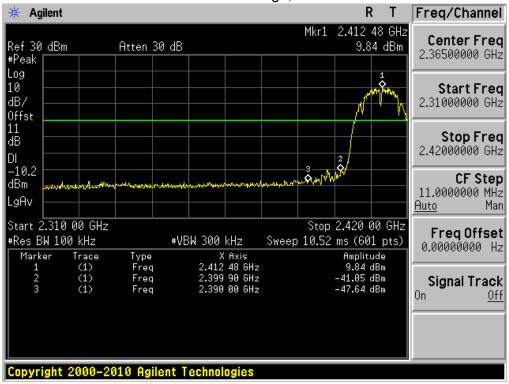
Modulation Type:	Frequency (MHz)	Antenna polarization (H/V)	Factor (dB)	Emission (dBuV/m) PK	Band edge Limit (dBuV/m) PK AV		Result Pass
802.11b	<2400	Н	1.42	50.40	74.00	54.00	Pass
	<2400	V	1.39	49.61	74.00	54.00	Pass
	>2483.5	Н	1.62	49.45	74.00	54.00	Pass
	>2483.5	V	1.75	50.05	74.00	54.00	Pass
802.11g	<2400	Н	1.42	49.67	74.00	54.00	Pass
	<2400	V	1.39	49.39	74.00	54.00	Pass
	>2483.5	Н	1.62	49.71	74.00	54.00	Pass
	>2483.5	V	1.75	50.12	74.00	54.00	Pass
802.11n20	<2400	Н	1.42	50.17	74.00	54.00	Pass
	<2400	V	1.39	49.66	74.00	54.00	Pass
	>2483.5	Н	1.62	49.50	74.00	54.00	Pass
	>2483.5	V	1.75	50.18	74.00	54.00	Pass
802.11n40	<2400	Н	1.42	49.96	74.00	54.00	Pass
	<2400	V	1.39	49.60	74.00	54.00	Pass
	>2483.5	Н	1.62	49.65	74.00	54.00	Pass
	>2483.5	V	1.75	50.23	74.00	54.00	Pass

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

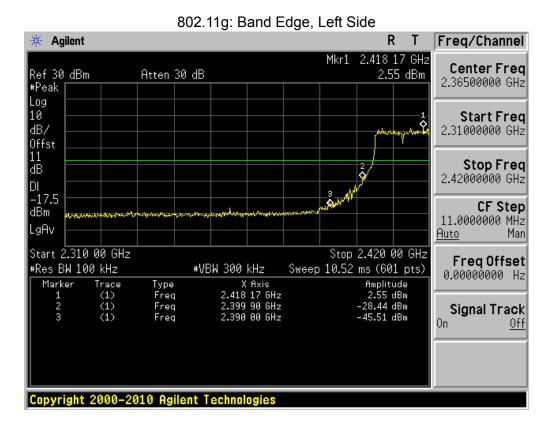
If peak level below the average limit, the average level was no recording.

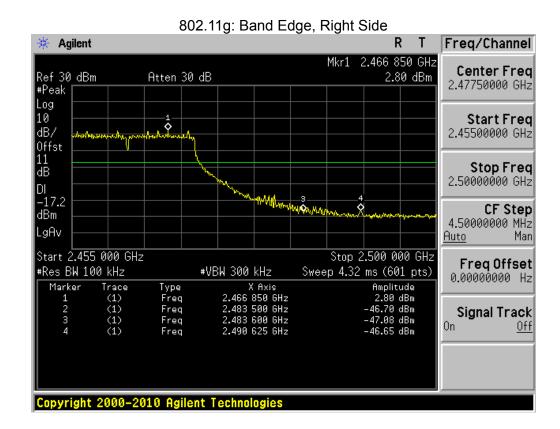


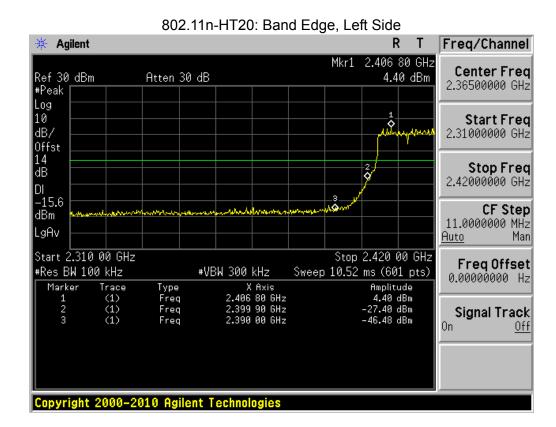


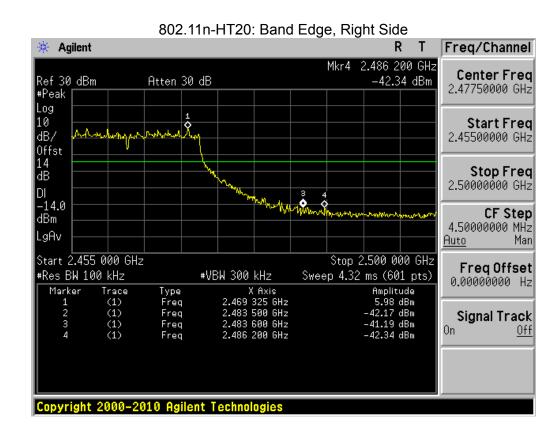














8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

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8.2 EUT ANTENNA

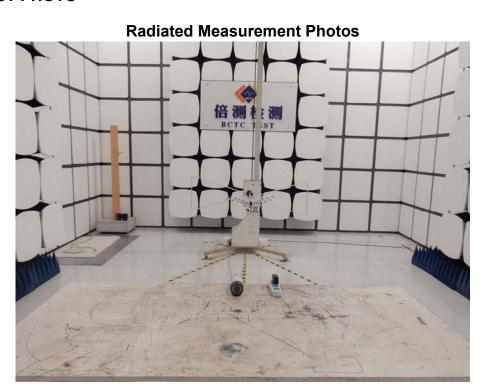
The EUT antenna is external antenna,. It comply with the standard requirement.

FCC Report

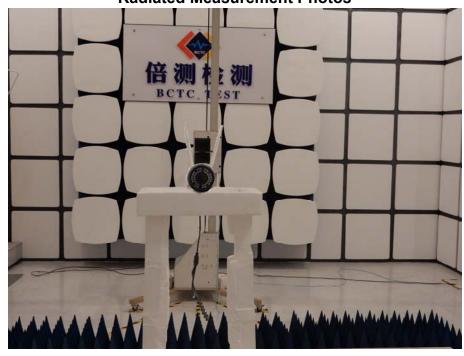
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9. EUT TEST PHOTO



Radiated Measurement Photos











10. EUT PHOTO







Model:RLC-411WS





Model:RLC-410WS





* * * * * END OF REPORT * * * * *