



FCC Part 15C Test Report

FCC ID: 2AGDZRLC-410WS

Product Name:	WiFi IP Camera
Trademark:	
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



TEST RESULT CERTIFICATION

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

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

Manufacture's Name..... : Reolink Digital Technology Co., Ltd.

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

Product description

Product name : WiFi IP Camera

Trademark :



Model and/or type reference : RLC-410WS, RLC-411WS

Standards : FCC Part15.247

Test procedure ANSI C63.10-2013

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Testing Engineer : _____

Eric Yang

(Eric Yang)

Technical Manager : _____

Sophie Lee

(Sophia Lee)

Authorized Signatory : _____

Casey Wang

(Casey Wang)



**Table of Contents**

	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	10
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	11
3 . EMC EMISSION TEST	12
3.1 CONDUCTED EMISSION MEASUREMENT	12
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
3.1.2 TEST PROCEDURE	13
3.1.3 DEVIATION FROM TEST STANDARD	13
3.1.4 TEST SETUP	13
3.1.5 EUT OPERATING CONDITIONS	13
3.1.6 TEST RESULTS	14
3.2 RADIATED EMISSION MEASUREMENT	18
3.2.1 RADIATED EMISSION LIMITS	18
3.2.2 TEST PROCEDURE	19
3.2.3 DEVIATION FROM TEST STANDARD	19
3.2.4 TEST SETUP	20
3.2.5 EUT OPERATING CONDITIONS	21
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	22
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	23
3.2.8 TEST RESULTS (1GHZ~25GHZ)	27
4 . POWER SPECTRAL DENSITY TEST	30
4.1 APPLIED PROCEDURES / LIMIT	30
4.1.1 TEST PROCEDURE	30
4.1.2 DEVIATION FROM STANDARD	30
4.1.3 TEST SETUP	30
4.1.4 EUT OPERATION CONDITIONS	30
4.1.5 TEST RESULTS	31



Table of Contents	Page
5 . BANDWIDTH TEST	37
5.1 APPLIED PROCEDURES / LIMIT	37
5.1.1 TEST PROCEDURE	37
5.1.2 DEVIATION FROM STANDARD	37
5.1.3 TEST SETUP	37
5.1.4 EUT OPERATION CONDITIONS	37
5.1.5 TEST RESULTS	38
6 . PEAK OUTPUT POWER TEST	44
6.1 APPLIED PROCEDURES / LIMIT	44
6.1.1 TEST PROCEDURE	44
6.1.2 DEVIATION FROM STANDARD	44
6.1.3 TEST SETUP	44
6.1.4 EUT OPERATION CONDITIONS	44
6.1.5 TEST RESULTS	45
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	46
7.1 DEVIATION FROM STANDARD	46
7.2 TEST SETUP	46
7.3 EUT OPERATION CONDITIONS	47
7.4 TEST RESULTS	47
8 . ANTENNA REQUIREMENT	51
8.1 STANDARD REQUIREMENT	51
8.2 EUT ANTENNA	51
9 . EUT TEST PHOTO	52
10 . EUT PHOTO	54
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	



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	

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 $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	WiFi IP Camera	
Trade Name		
Model Name	RLC-410WS, RLC-411WS	
Model Difference	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.	
Product Description	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.	
Adapter	Model:CS-1201000 I/P:AC 100-240V 50/60Hz O/P:DC 12V/1A	
Battery	N/A	
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.



2.

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
A	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

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





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	reolink	RLC-410WS	N/A	EUT
E-2	Adapter	reolink	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 『Length』 column.



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 Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration 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)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi -peak	Average	
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

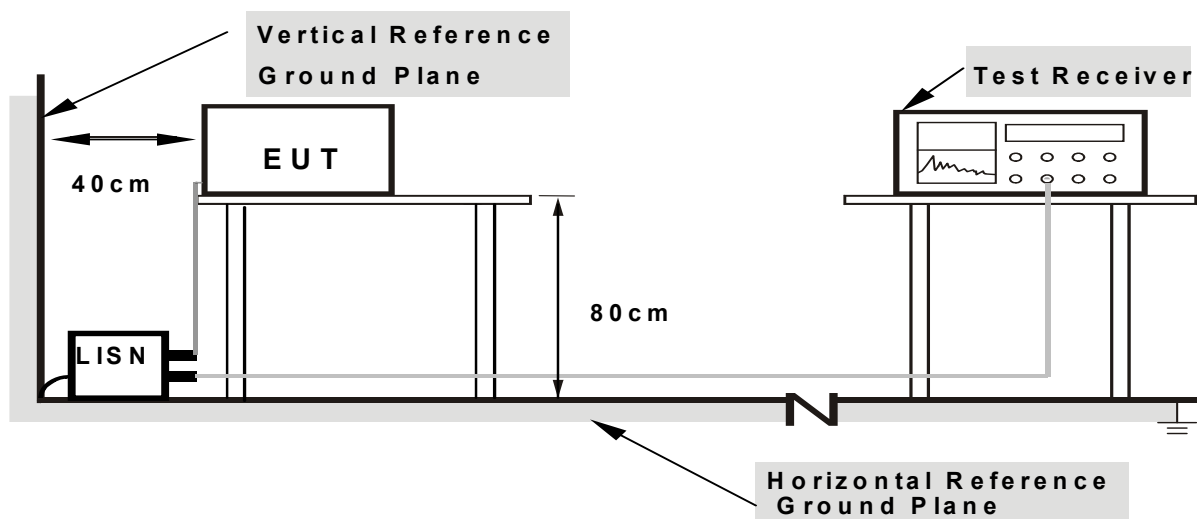
3.1.2 TEST PROCEDURE

- 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 equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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.



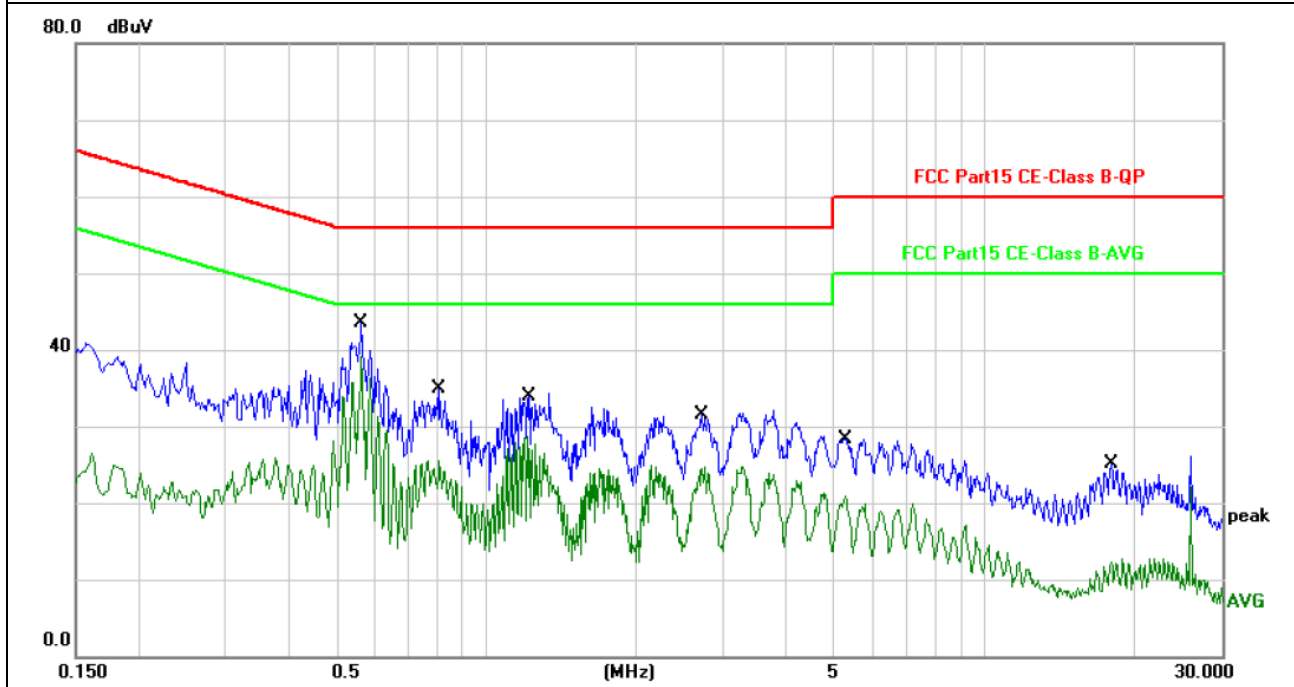
3.1.6 TEST RESULTS

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	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
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:

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



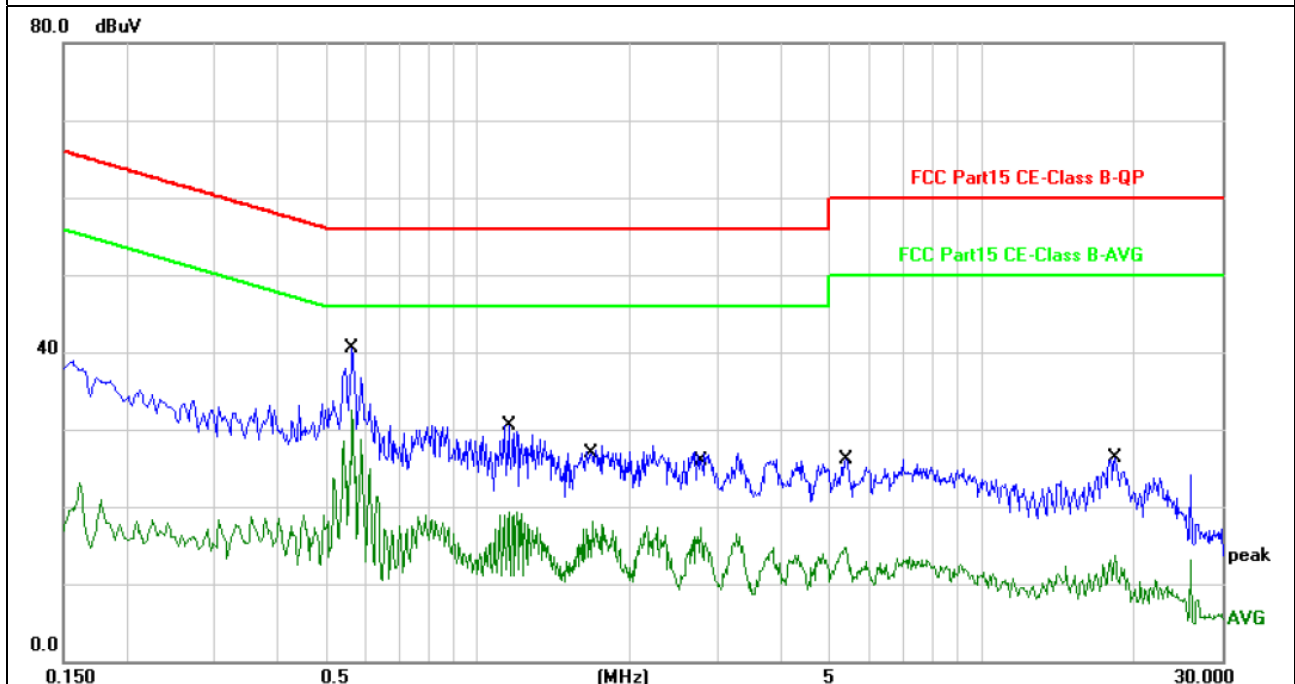


EUT :	WiFi IP Camera	Model Name. :	RLC-410WS
Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 4

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	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:

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



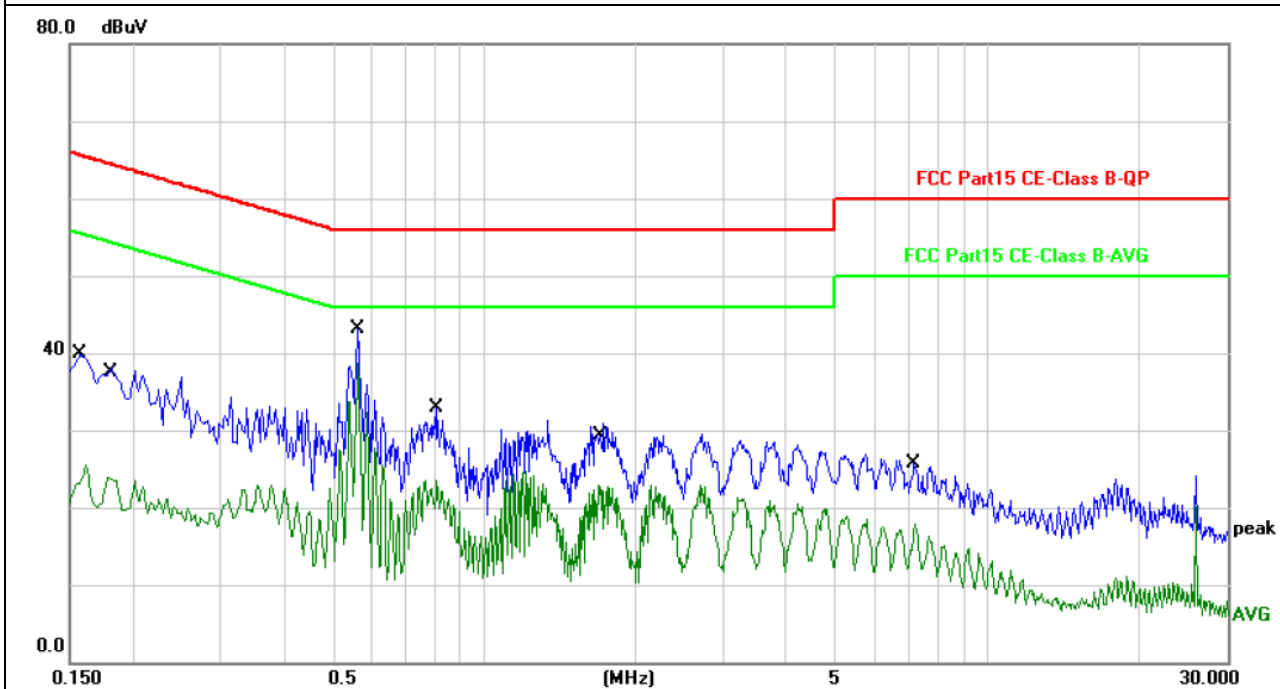


EUT :	WiFi IP Camera	Model Name. :	RLC-411WS
Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 4

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
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:

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



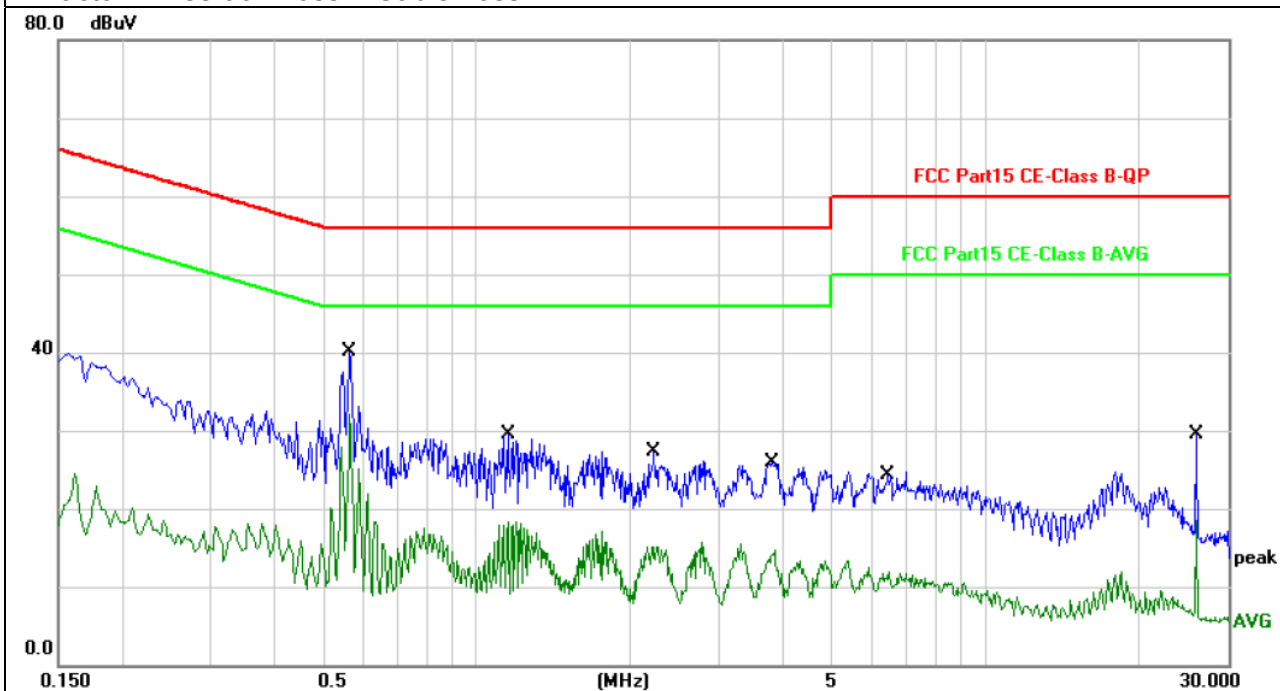


EUT :	WiFi IP Camera	Model Name. :	RLC-411WS
Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 4

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
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.
2. Factor = Insertion Loss + Cable Loss.





3.2 RADIATED EMISSION MEASUREMENT

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

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.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (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)	
	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 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



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.
- 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:

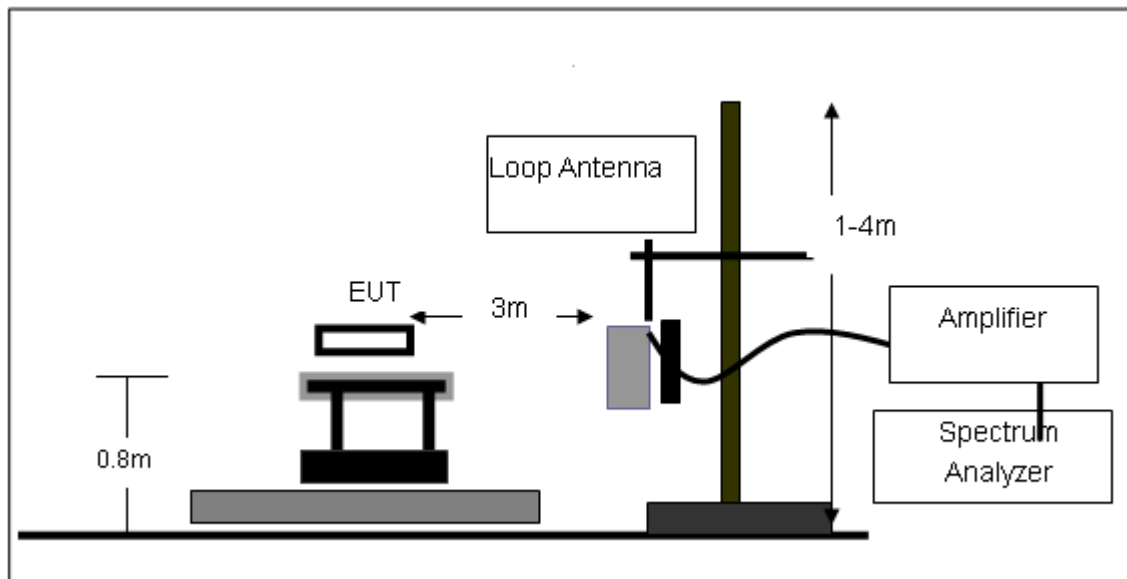
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

3.2.3 DEVIATION FROM TEST STANDARD

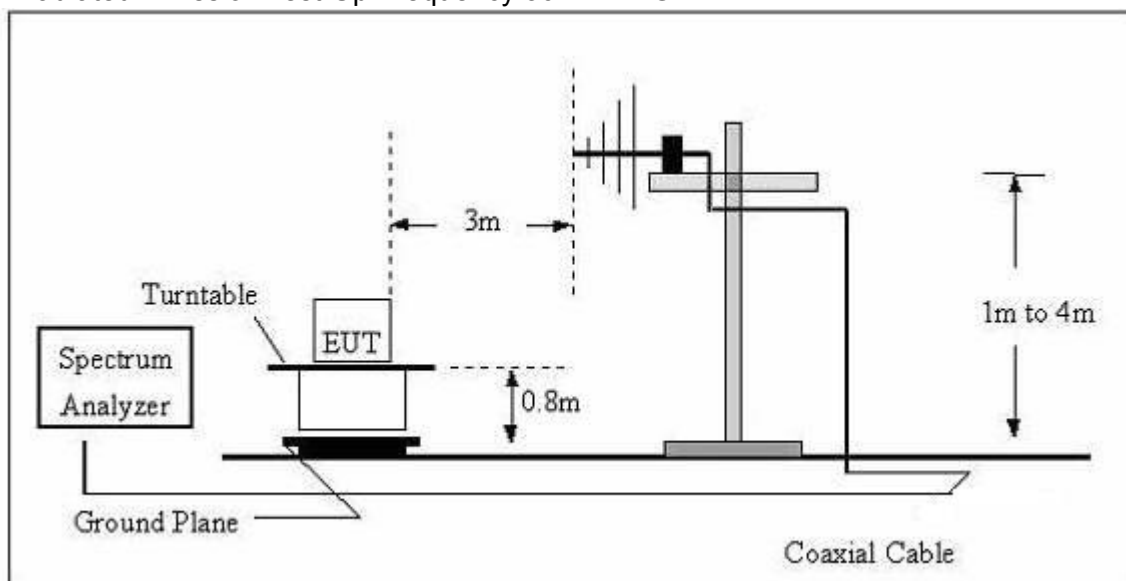
No deviation

3.2.4 TEST SETUP

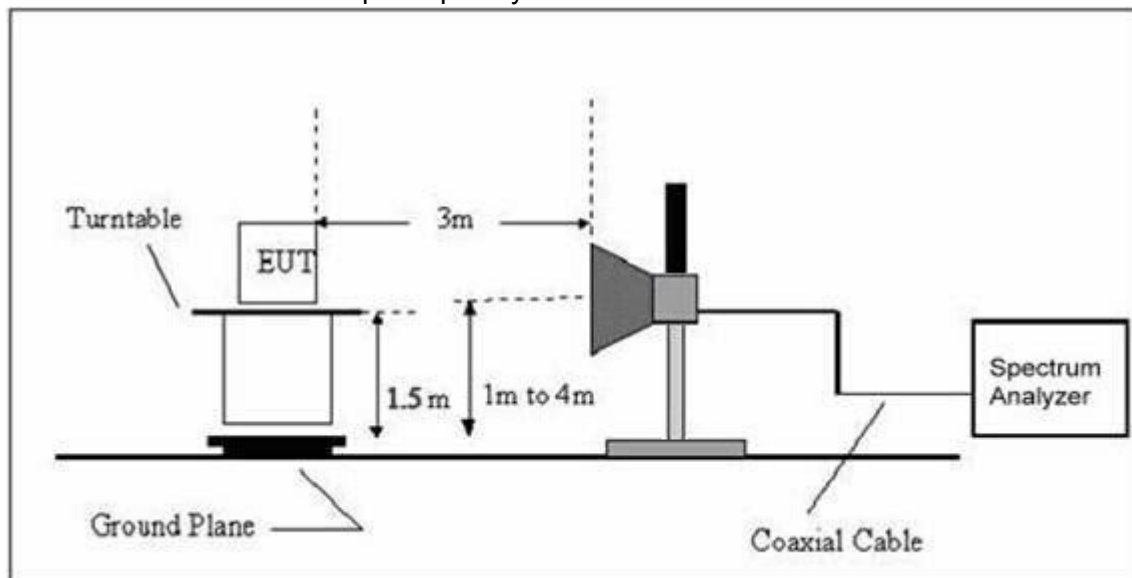
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



(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)**

EUT:	WiFi IP Camera	Model Name. :	RLC-410WS
Temperature:	20℃	Relative Humidity:	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 = $40 \log (\text{specific distance/test distance})$ (dB);

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

**3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)**

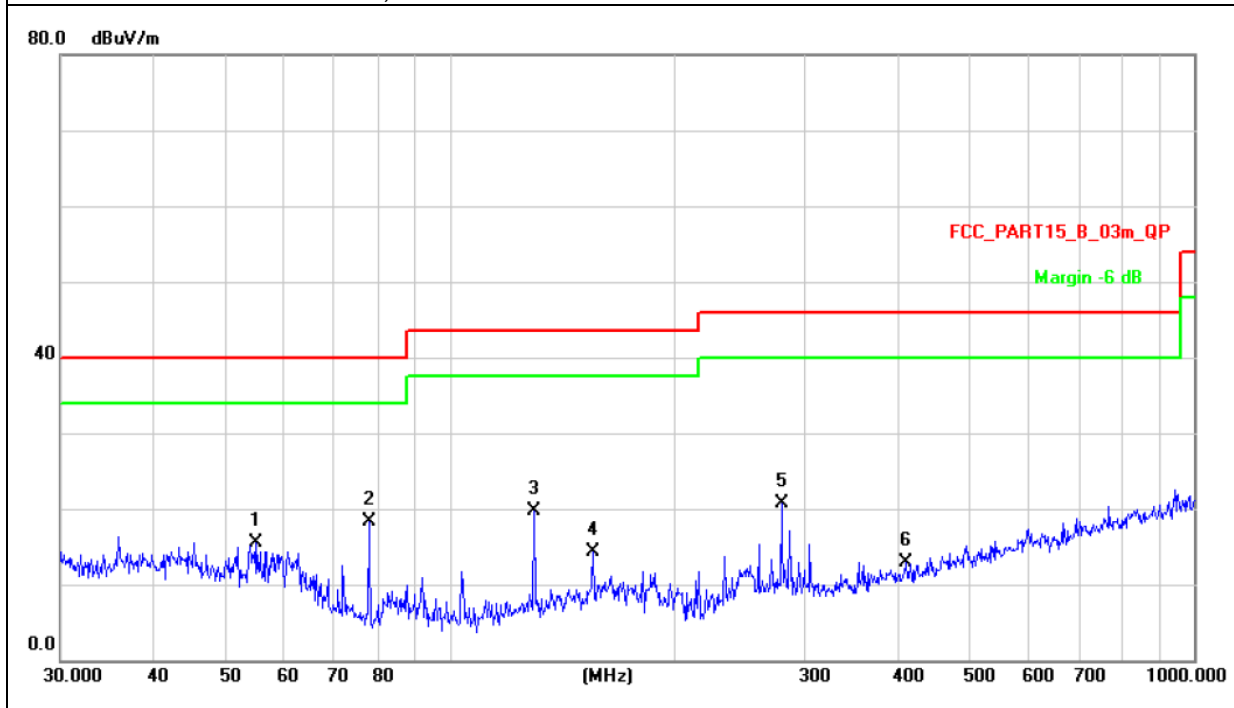
EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
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.





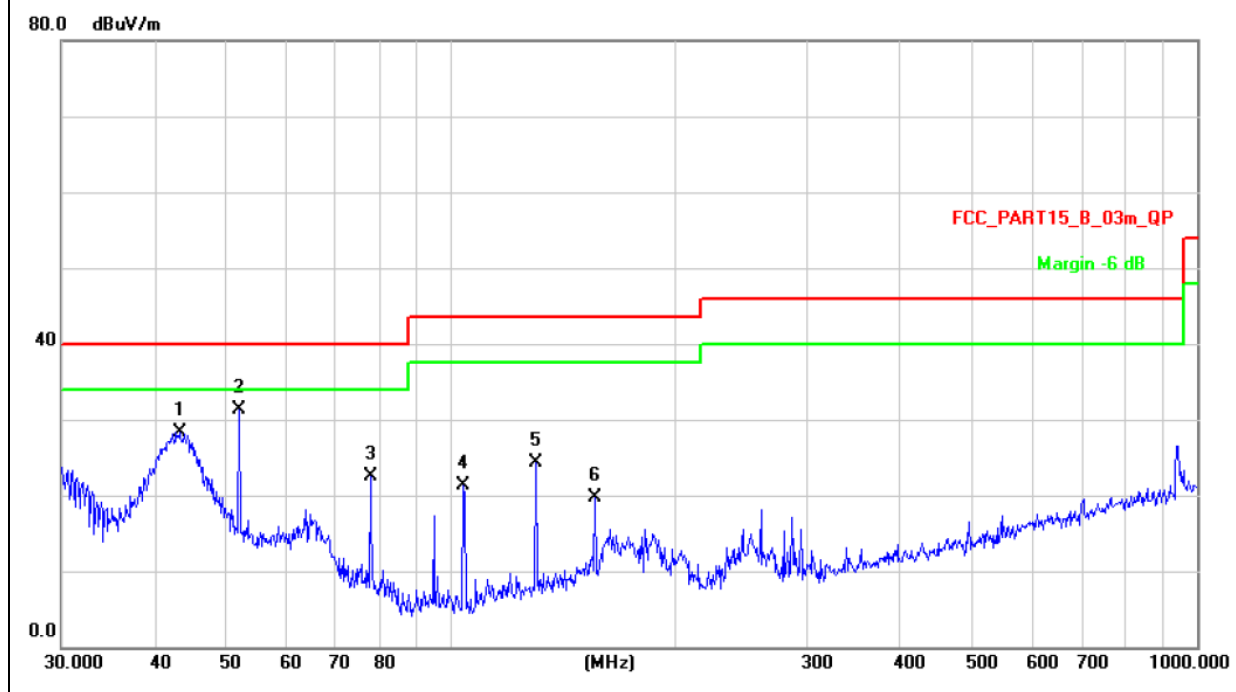
EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
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.





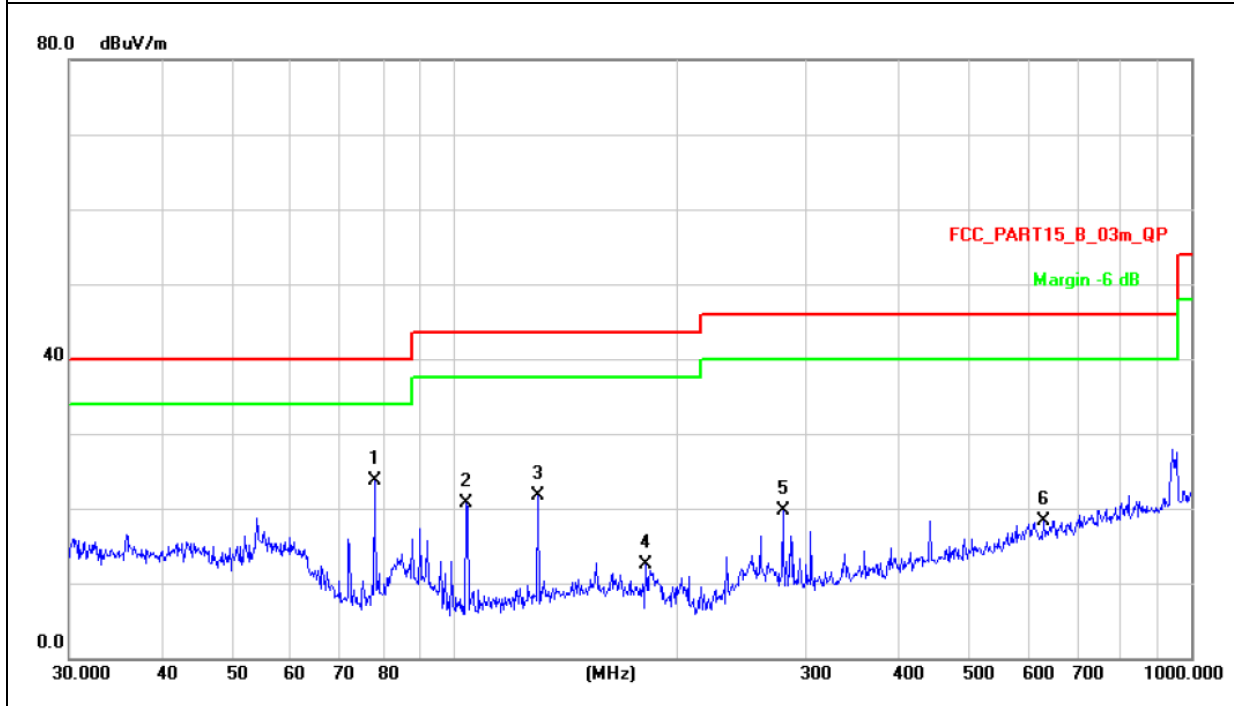
EUT :	WiFi IP Camera	Model Name :	RLC-411WS
Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
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.





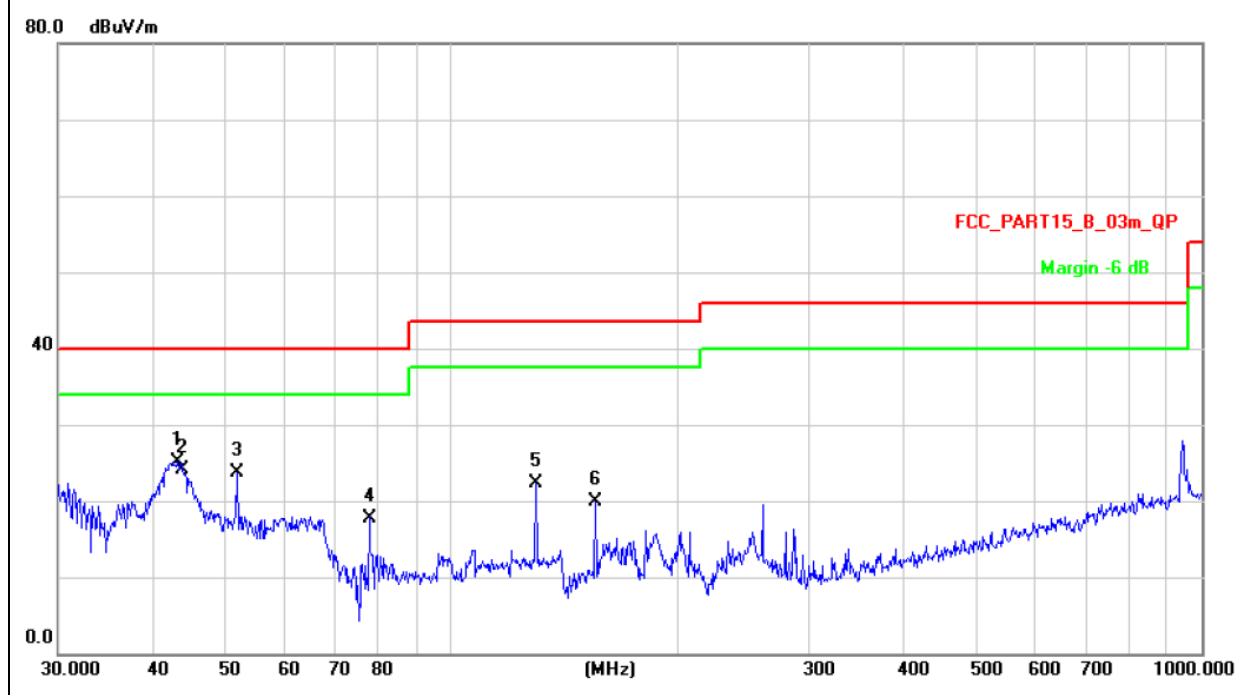
EUT :	WiFi IP Camera	Model Name :	RLC-411WS
Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V from adapter		
Test Mode :	Mode 4		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
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.



**3.2.8 TEST RESULTS (1GHZ~25GHZ)****802.11b**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4825.215	65.02	-3.64	61.38	74	-12.62	Pk
H	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 (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4876.211	64.23	-3.64	60.59	74	-13.41	Pk
H	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 (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4912.732	64.70	-3.66	61.04	74	-12.96	Pk
H	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

Normal Voltage							
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4821.527	66.66	-3.6	63.06	74	-10.94	Pk
H	4821.527	46.40	-3.6	42.80	54	-11.20	AV
Remark:							
Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11g

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4874.145	66.59	-3.64	62.95	74	-11.05	Pk
H	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

Normal Voltage							
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4914.032	64.49	-3.62	60.87	74	-13.13	pk
H	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 (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4822.322	65.48	-3.6	61.88	74	-12.12	Pk
H	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 (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4874.312	65.69	-3.64	62.05	74	-11.95	Pk
H	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 Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
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
H	4923.144	59.53	-3.66	55.87	74	-18.13	pk
H	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 $\geq 3 \times \text{RBW}$.
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

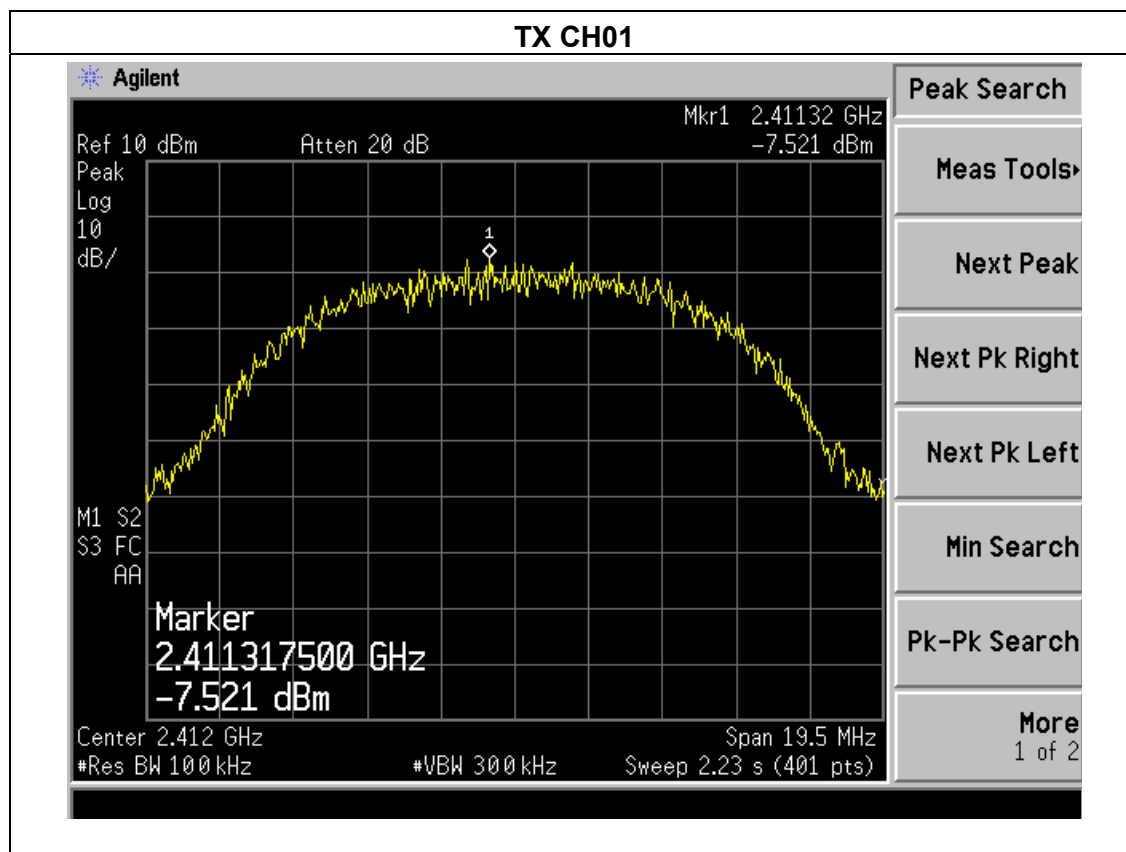
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

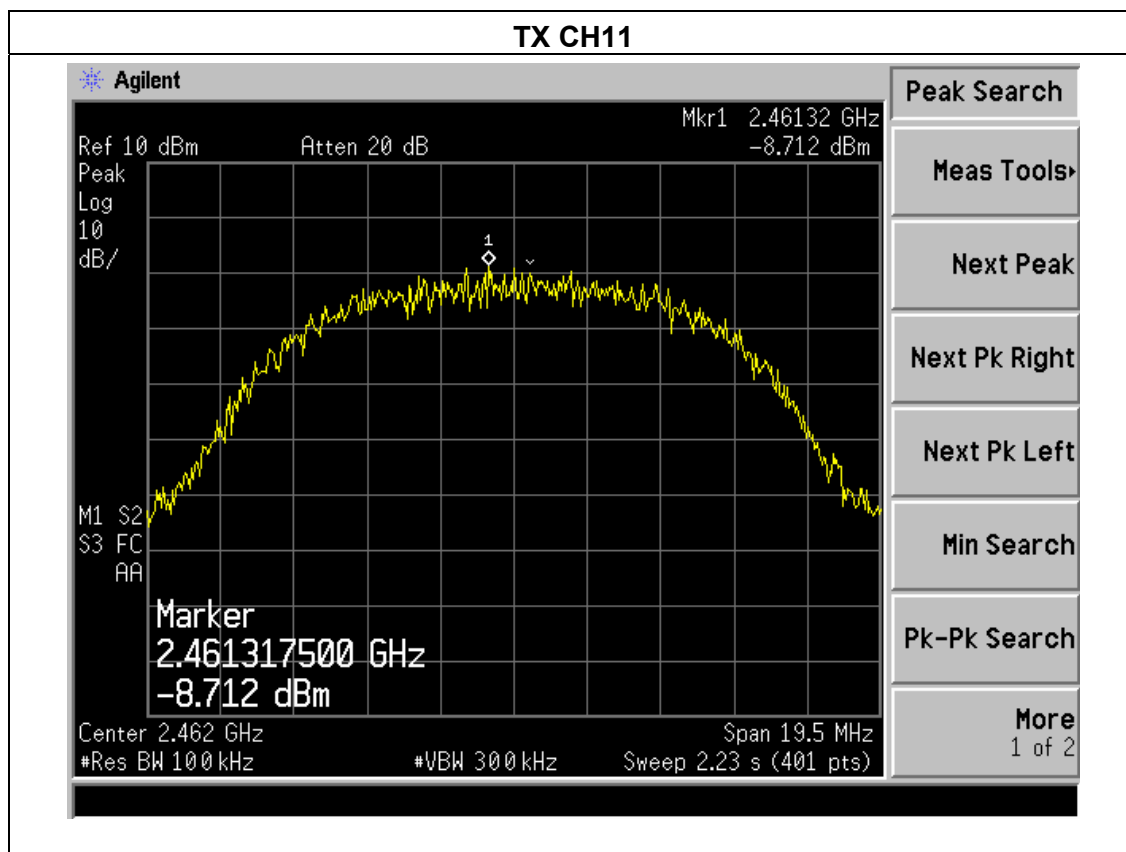
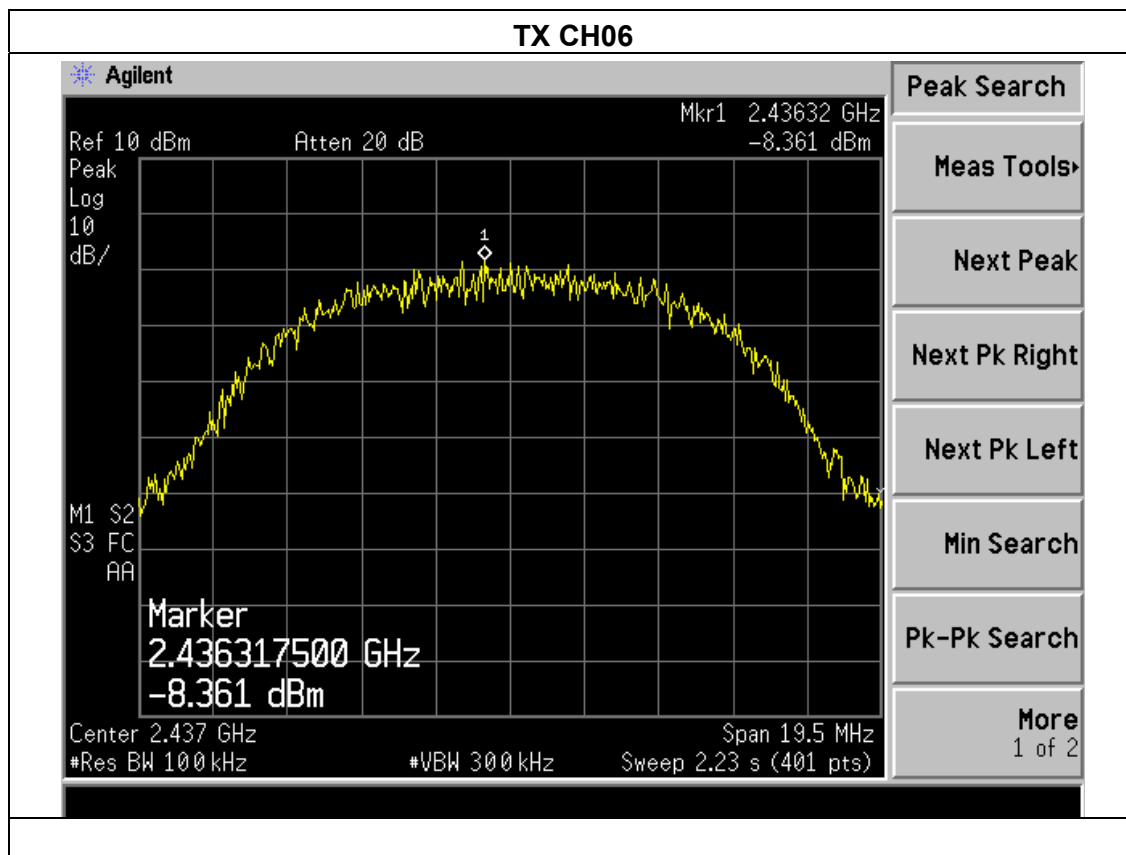


4.1.5 TEST RESULTS

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

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

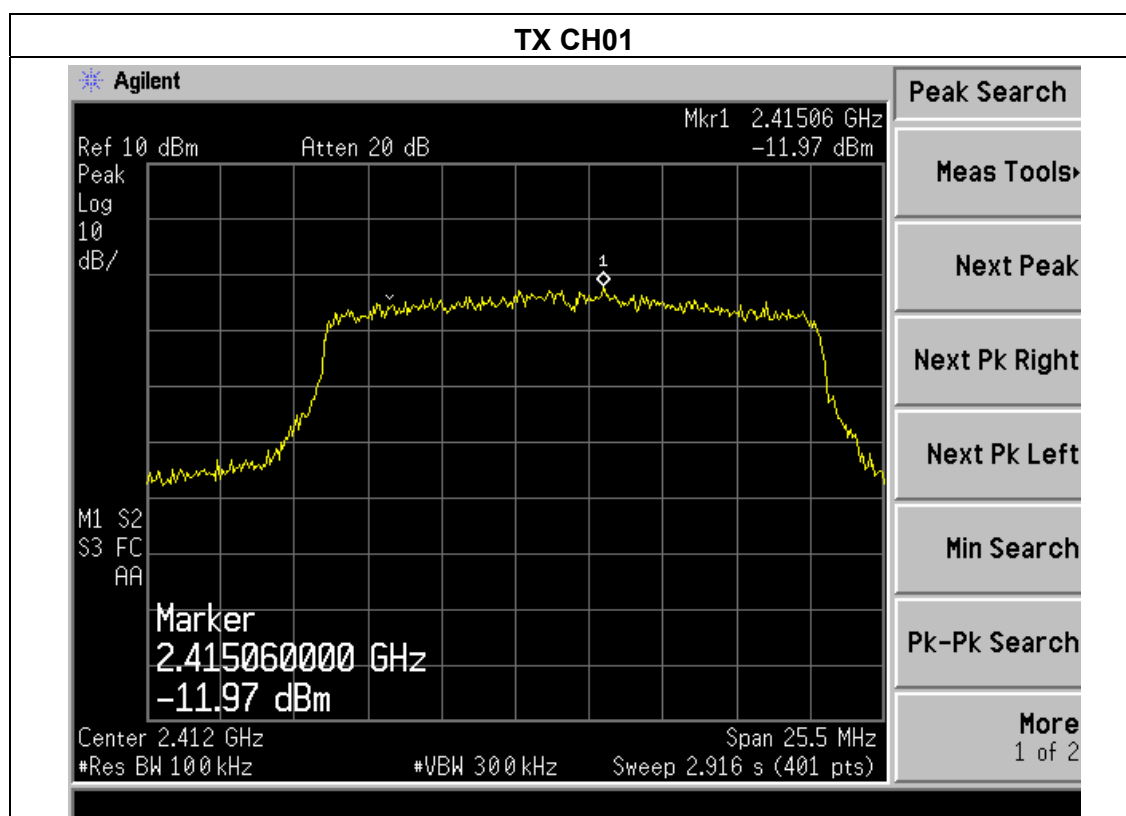


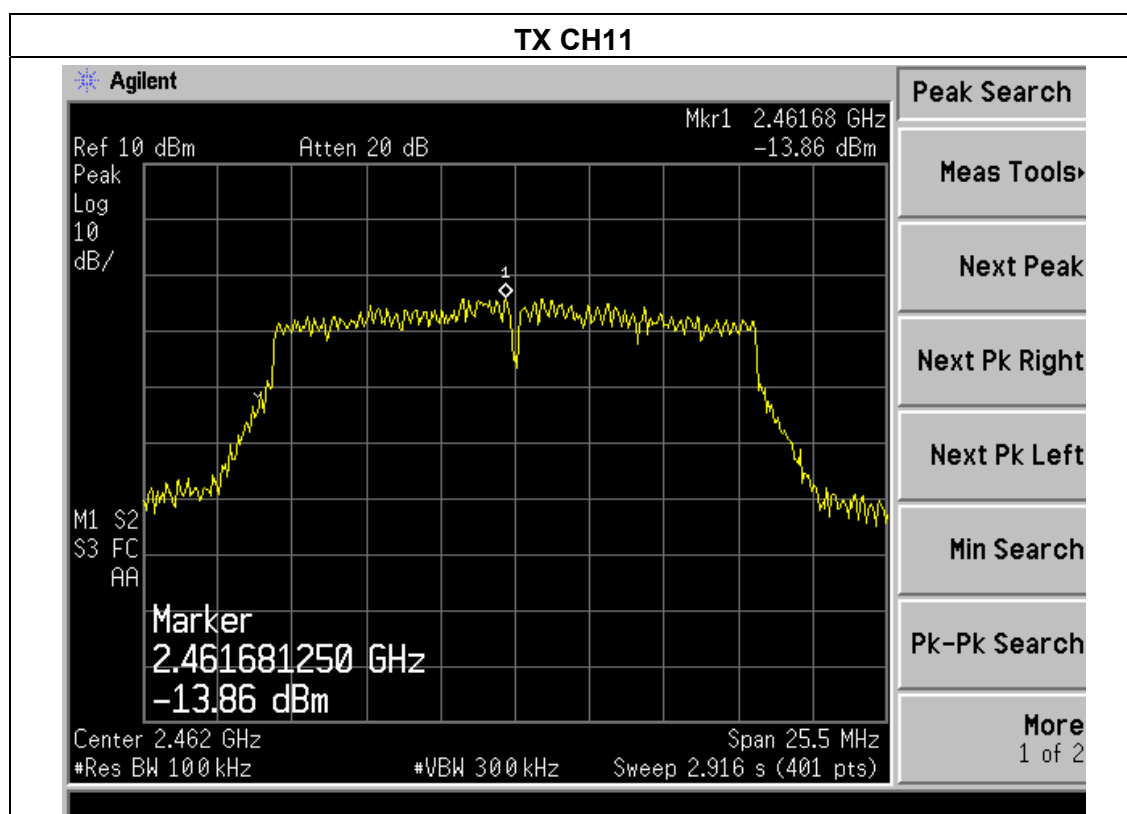
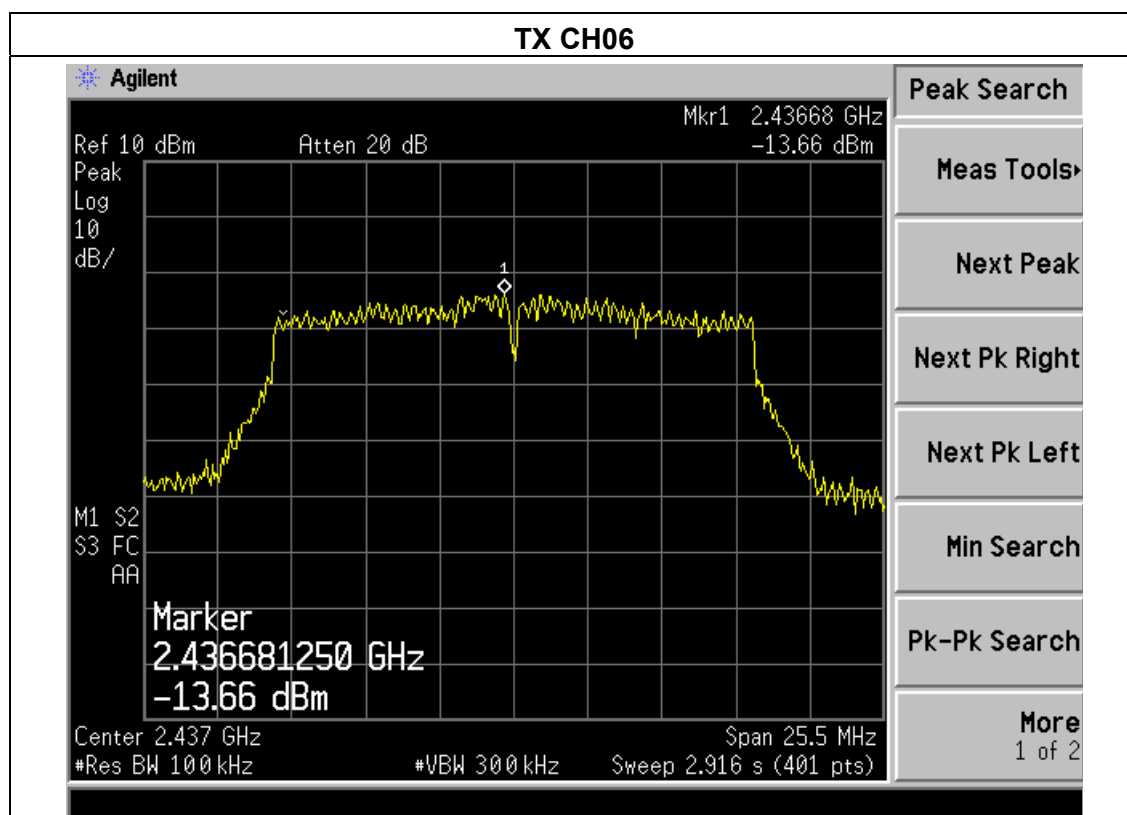




EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25°C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

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

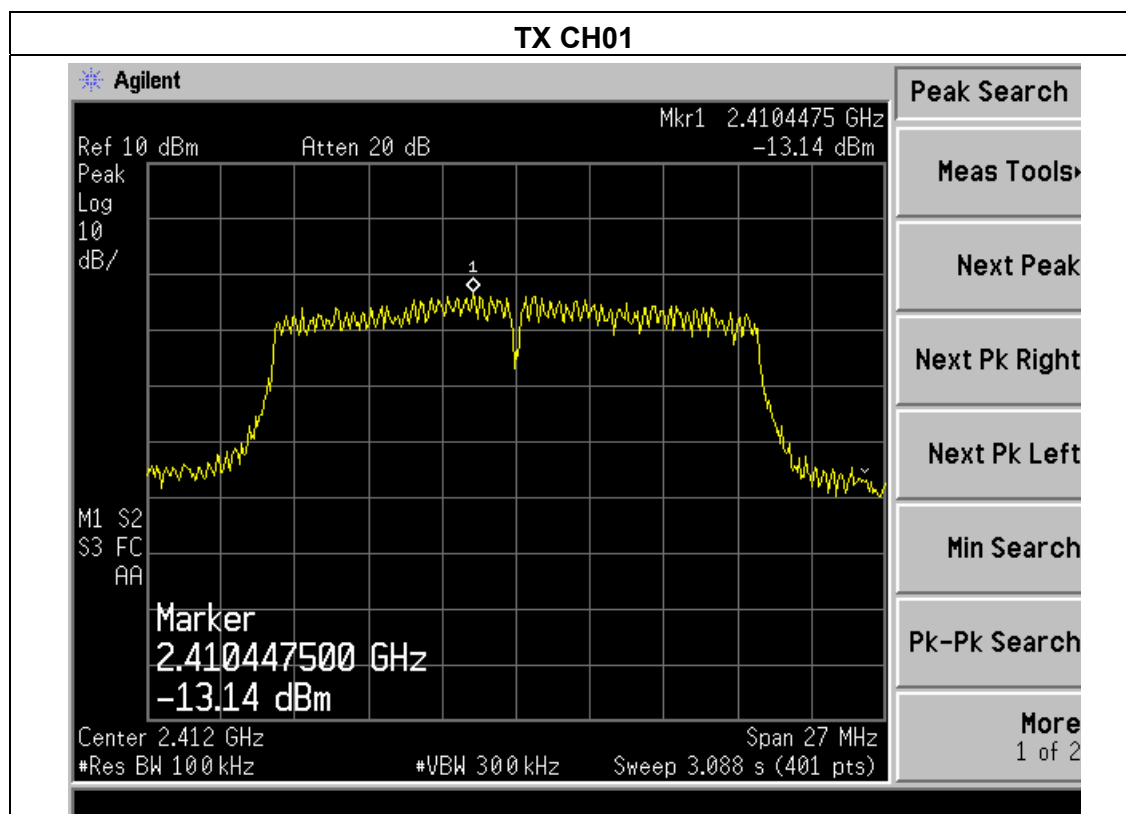






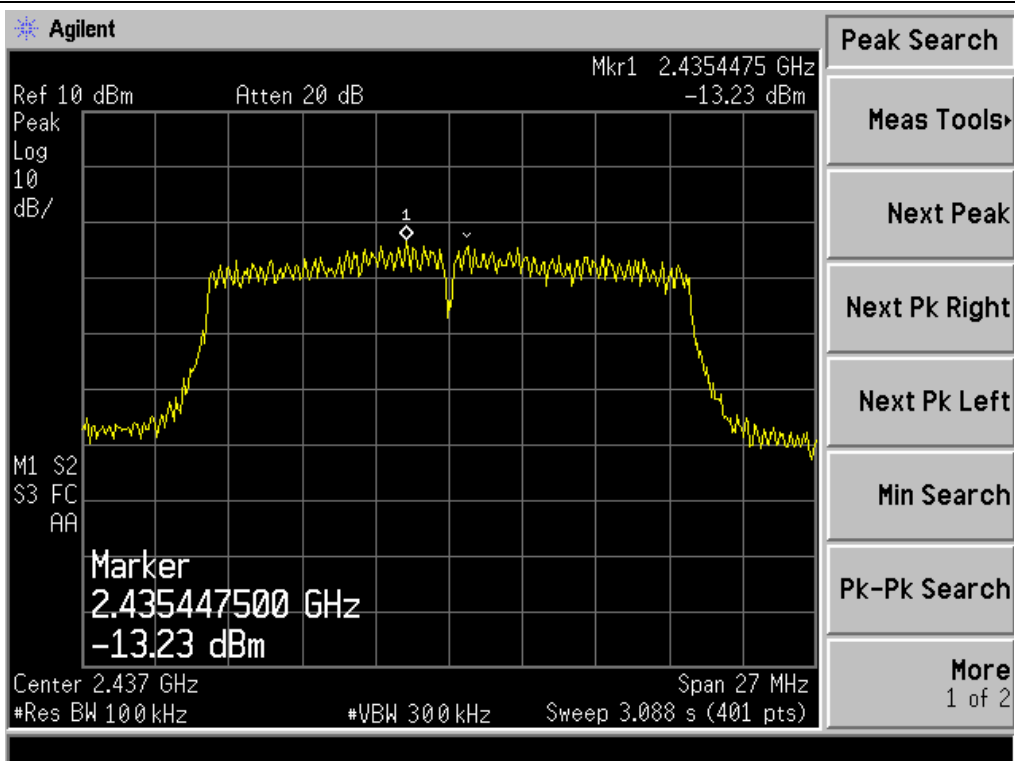
EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25°C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX n Mode(20M) /CH01, CH06, CH11		

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

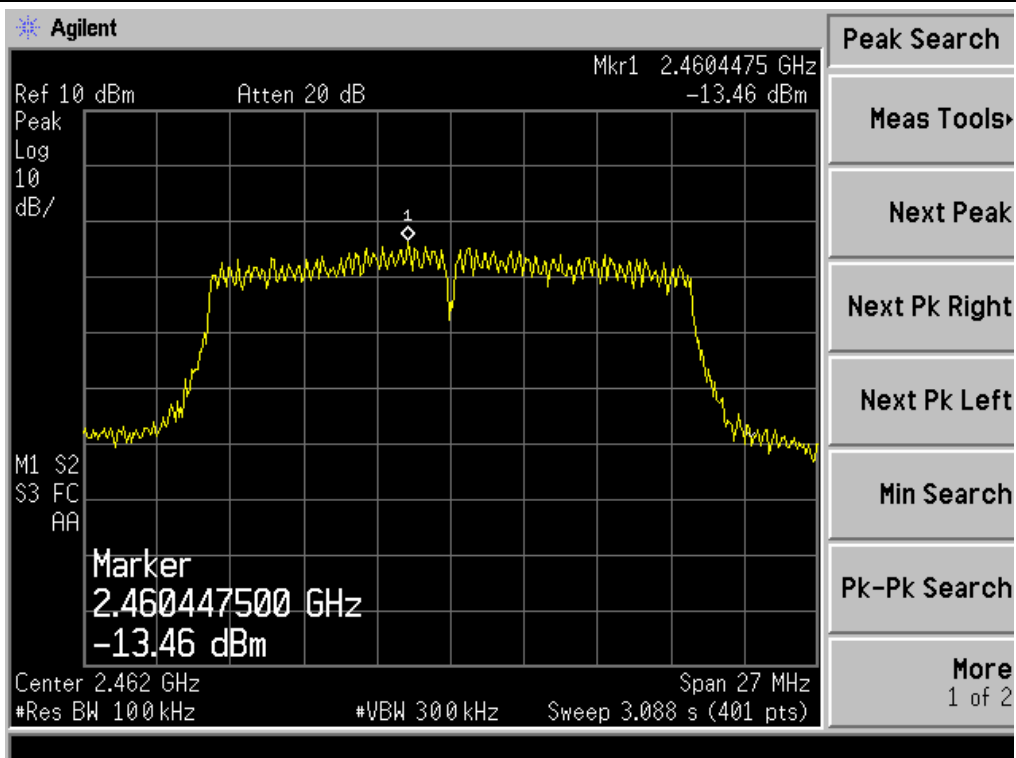




TX CH06



TX CH11





5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
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

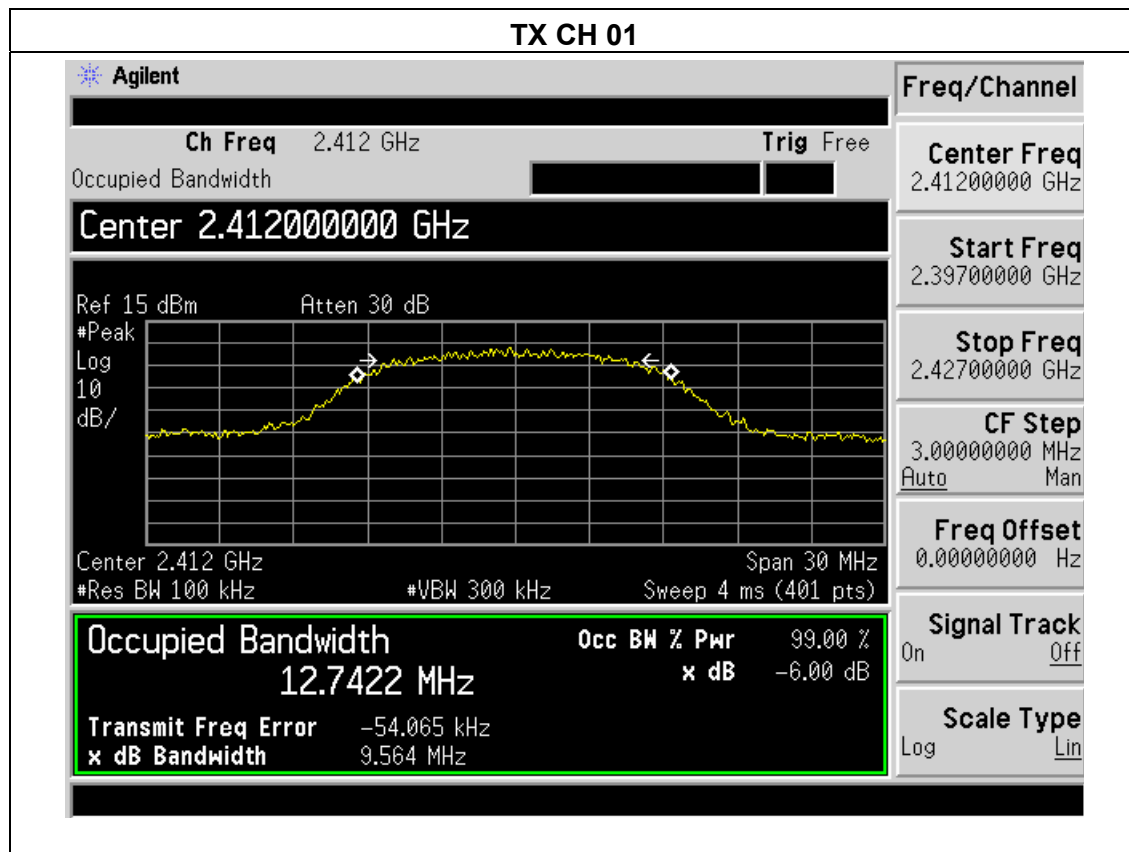
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



5.1.5 TEST RESULTS

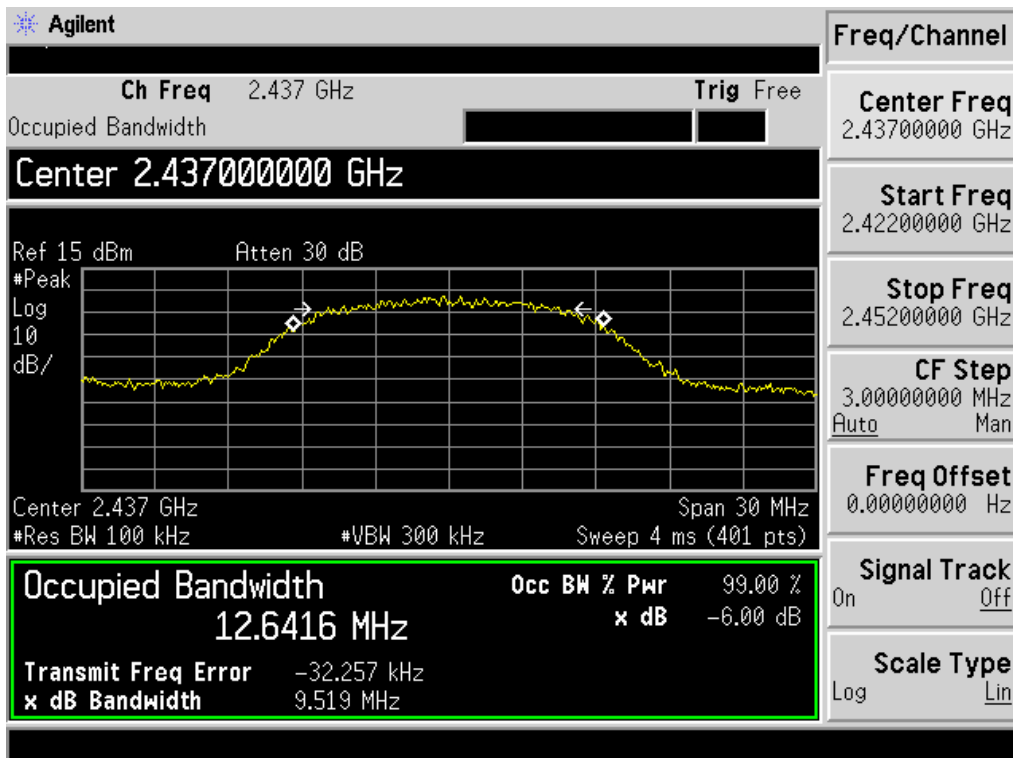
EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX b Mode /CH01, CH06, CH11		

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

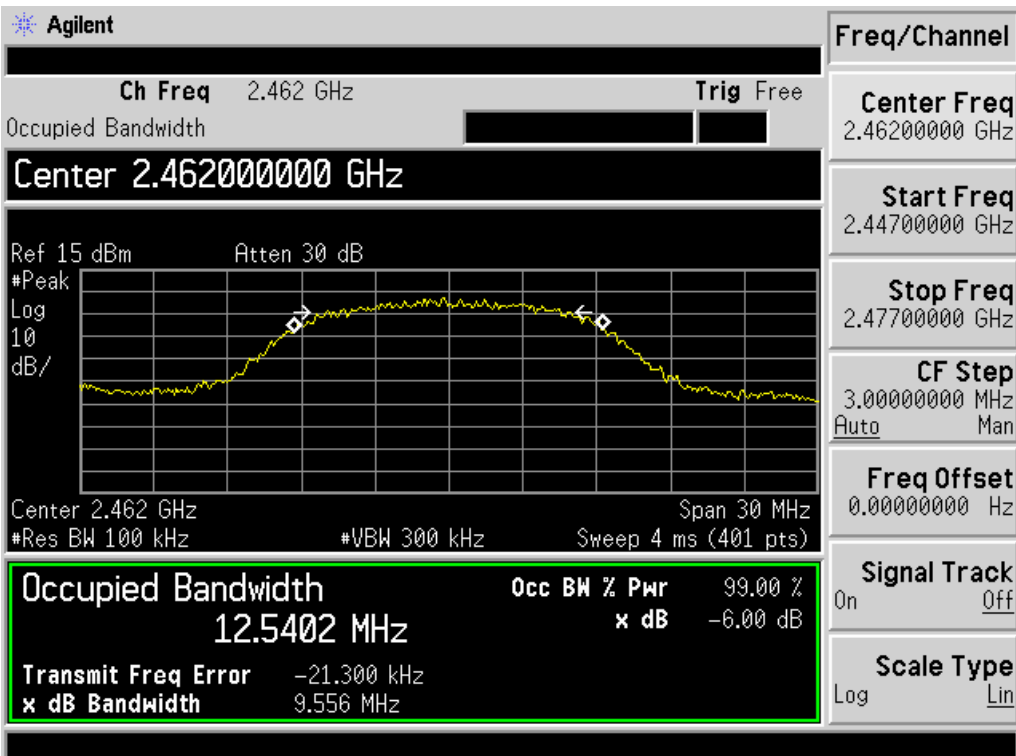




TX CH 06



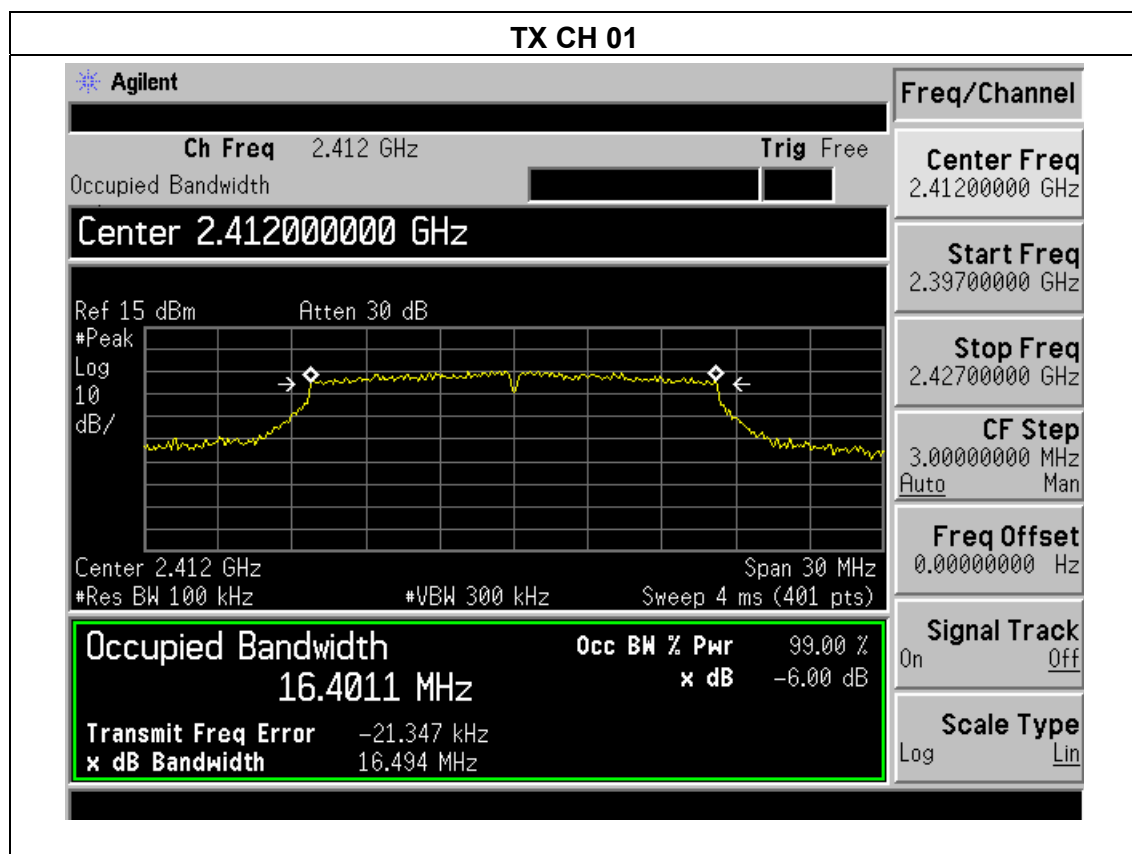
TX CH 11





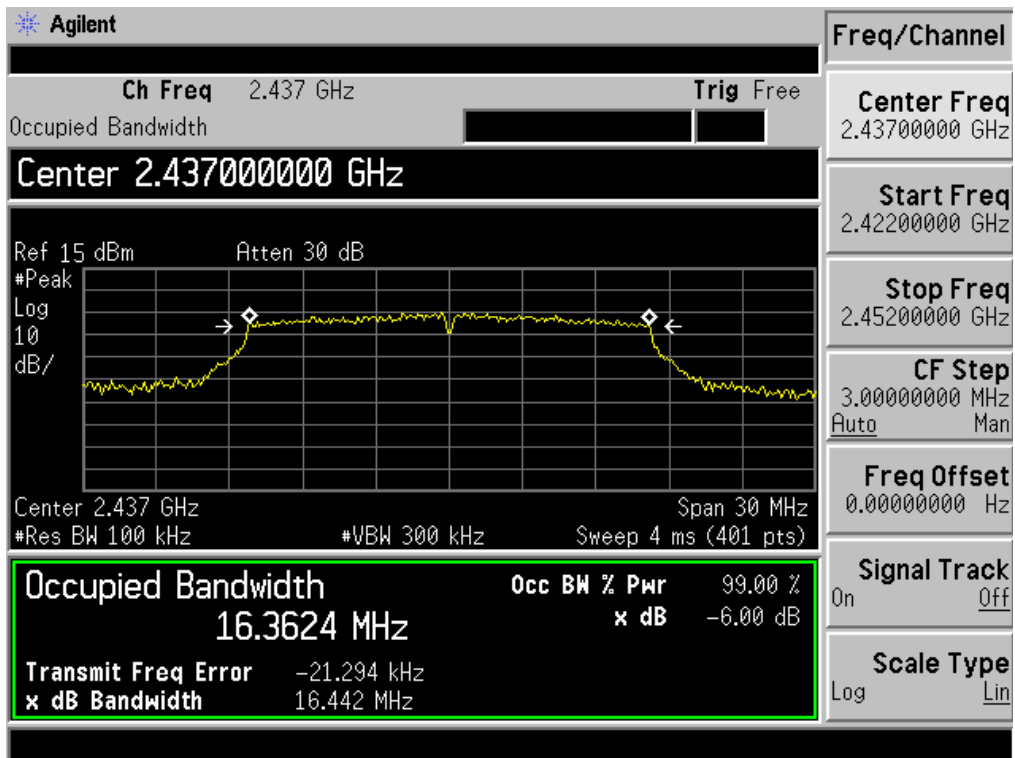
EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

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

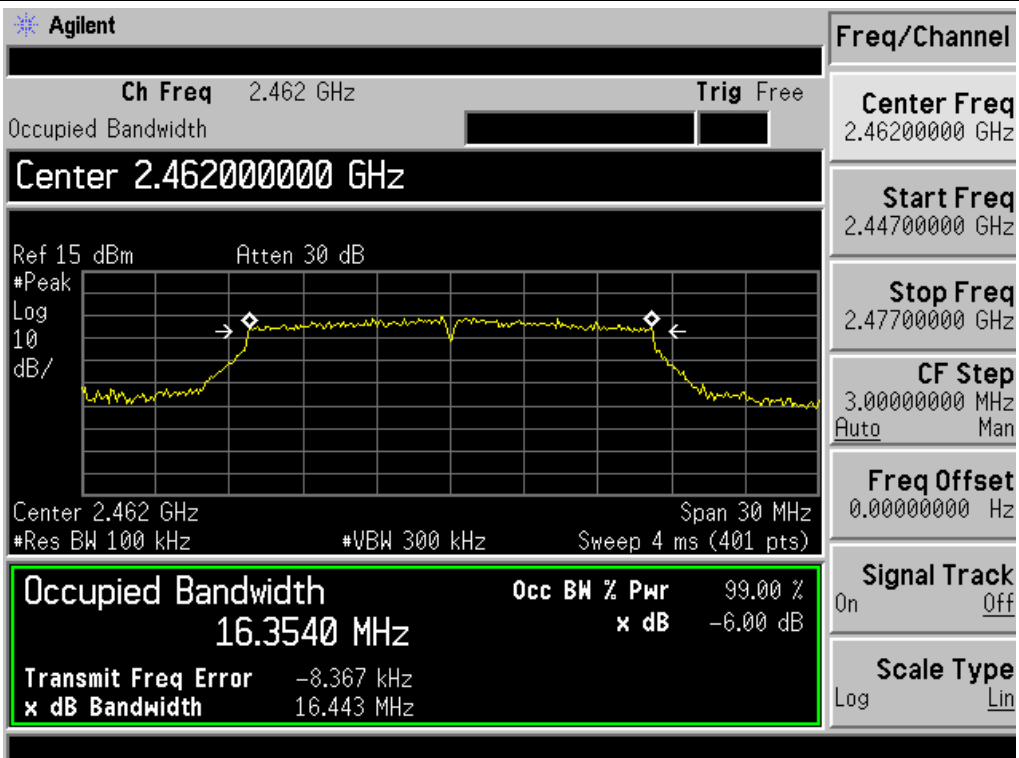




TX CH 06



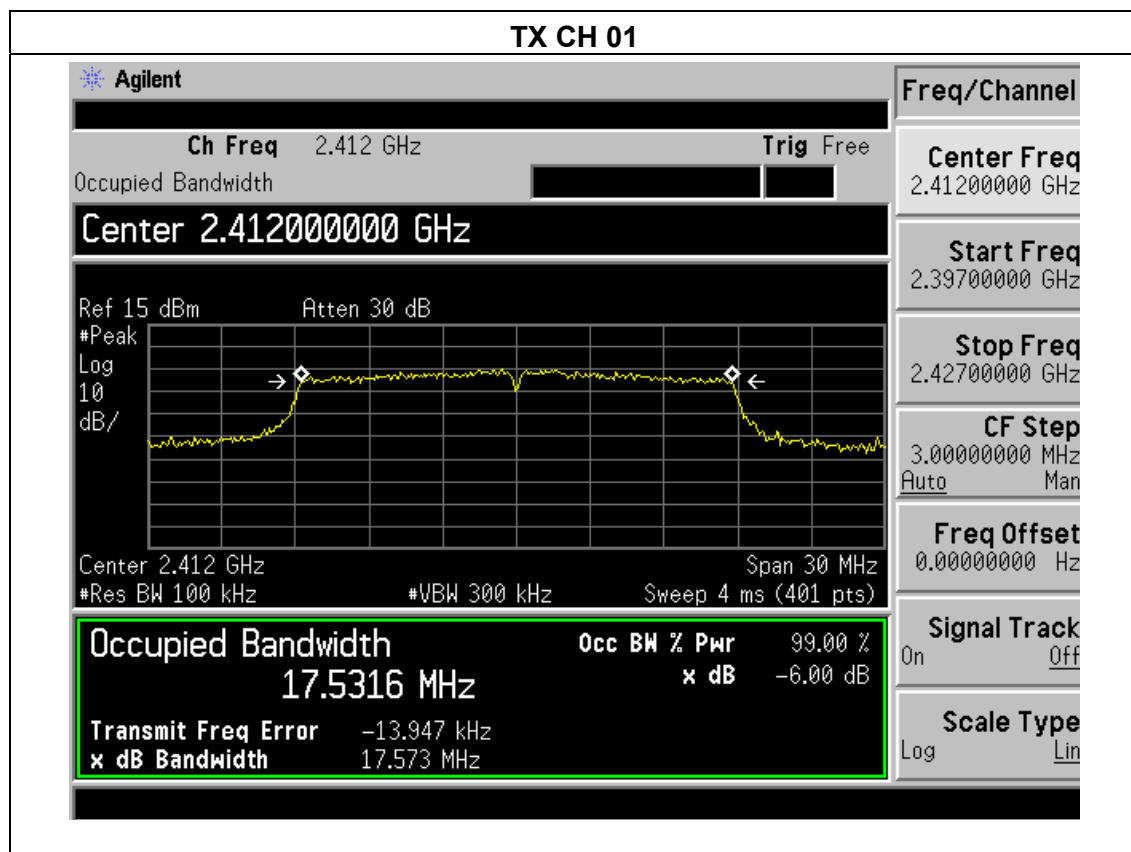
TX CH 11

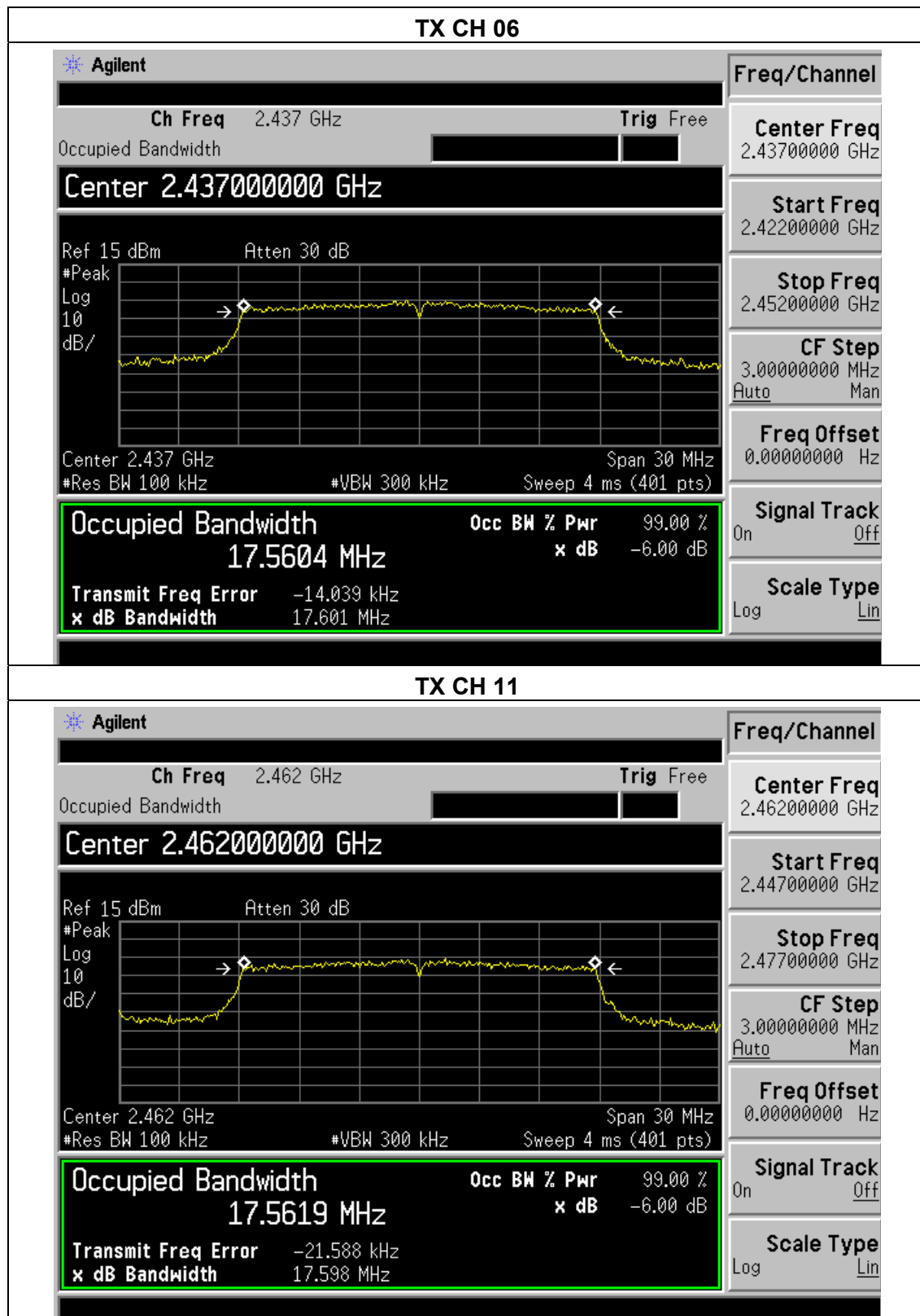




EUT :	WiFi IP Camera	Model Name :	RLC-410WS
Temperature :	25°C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12V from adapter
Test Mode :	TX n Mode(20M) /CH01, CH06, CH11		

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°C	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)).

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





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

Radiated

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

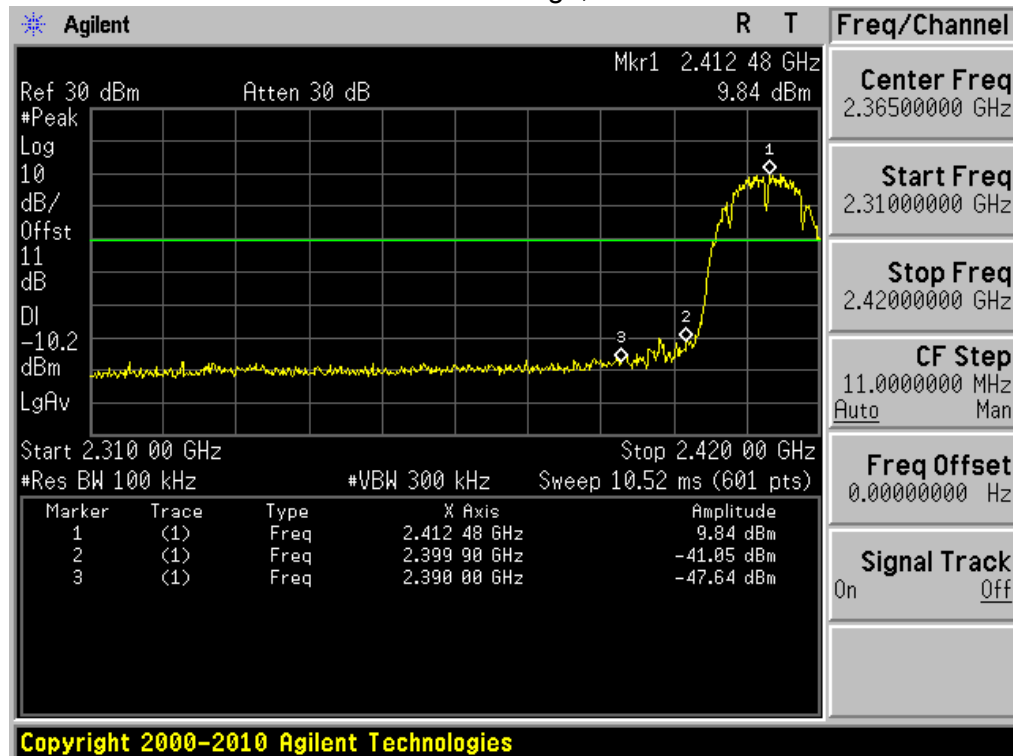
Remark:

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

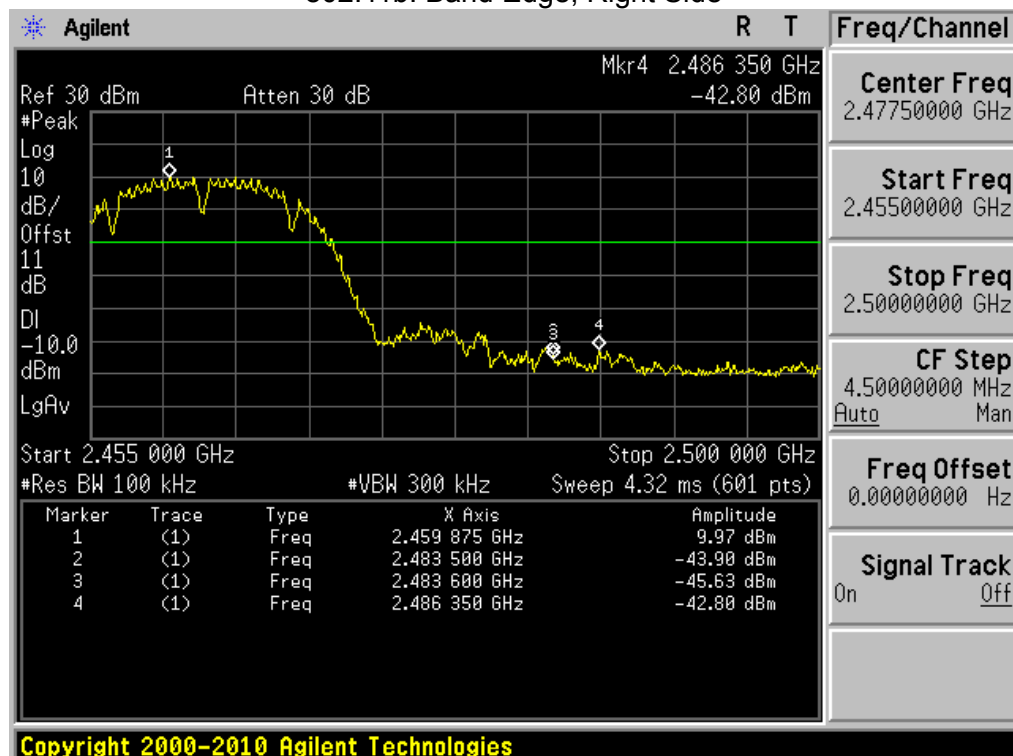
If peak level below the average limit, the average level was no recording.



802.11b: Band Edge, Left Side

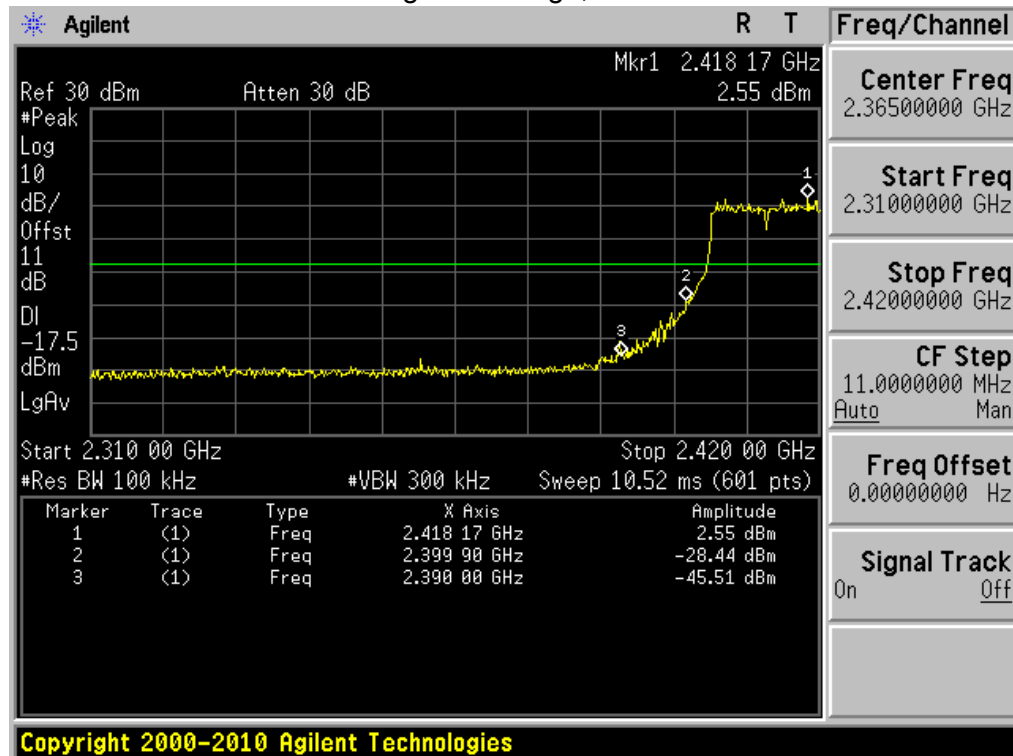


802.11b: Band Edge, Right Side

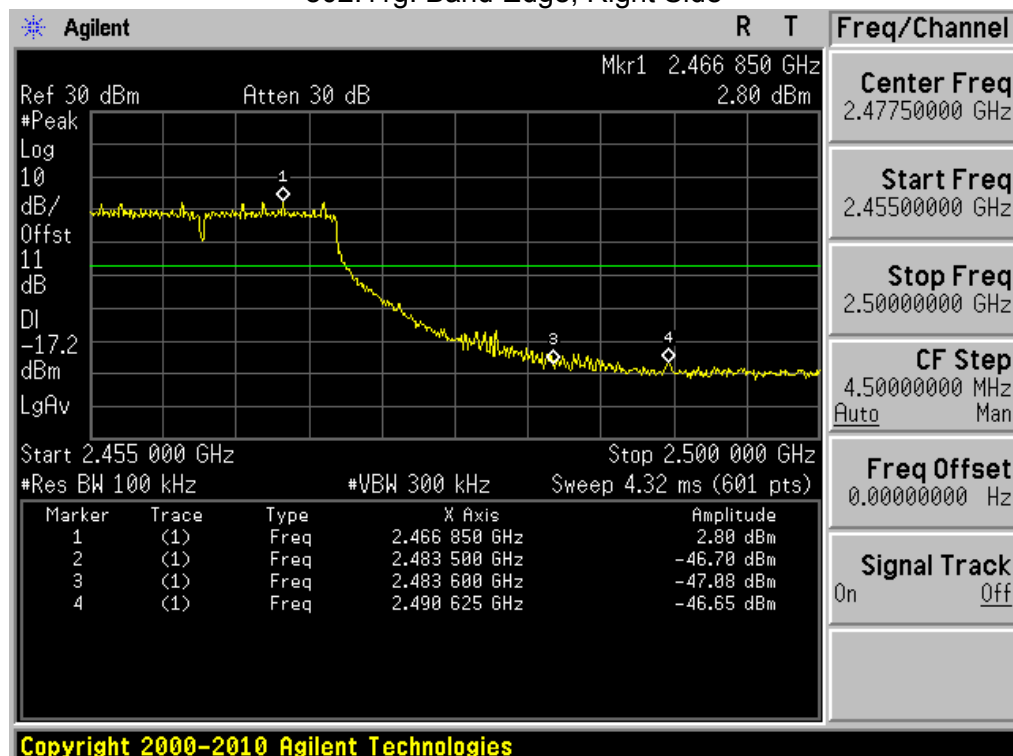




802.11g: Band Edge, Left Side

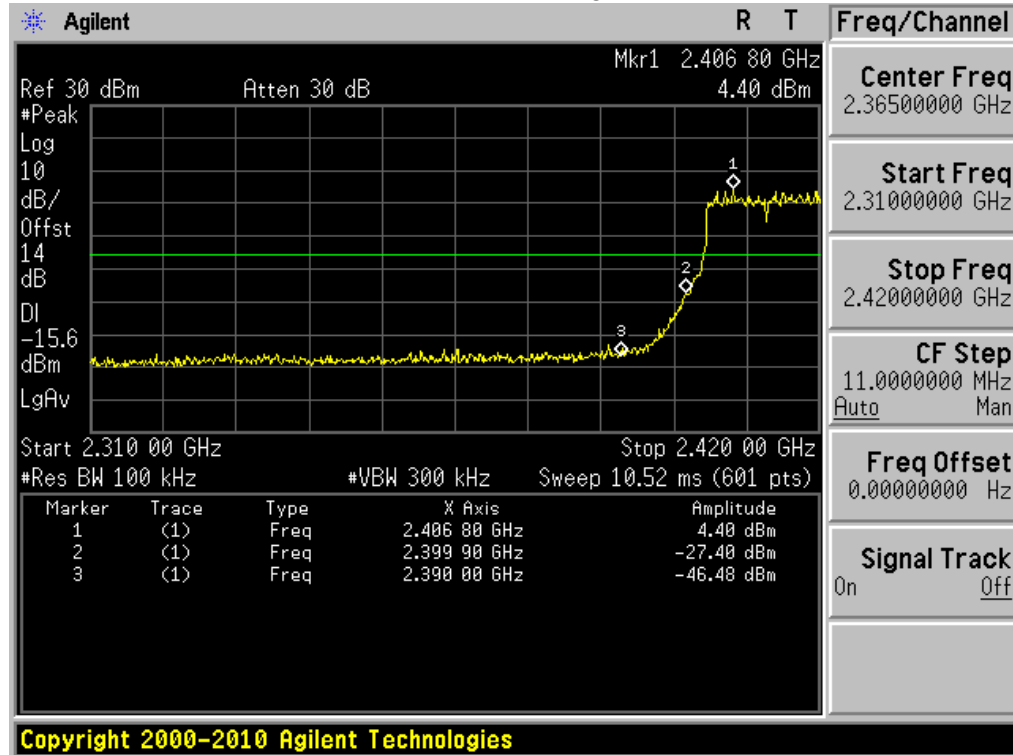


802.11g: Band Edge, Right Side

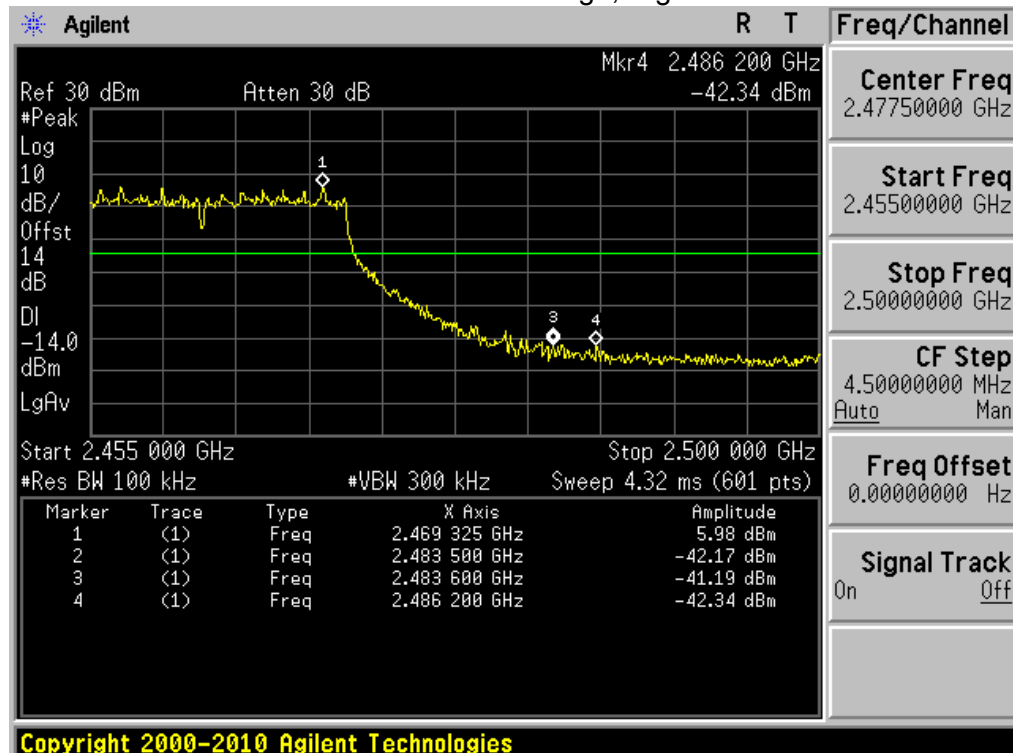




802.11n-HT20: Band Edge, Left Side



802.11n-HT20: Band Edge, Right Side





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.

8.2 EUT ANTENNA

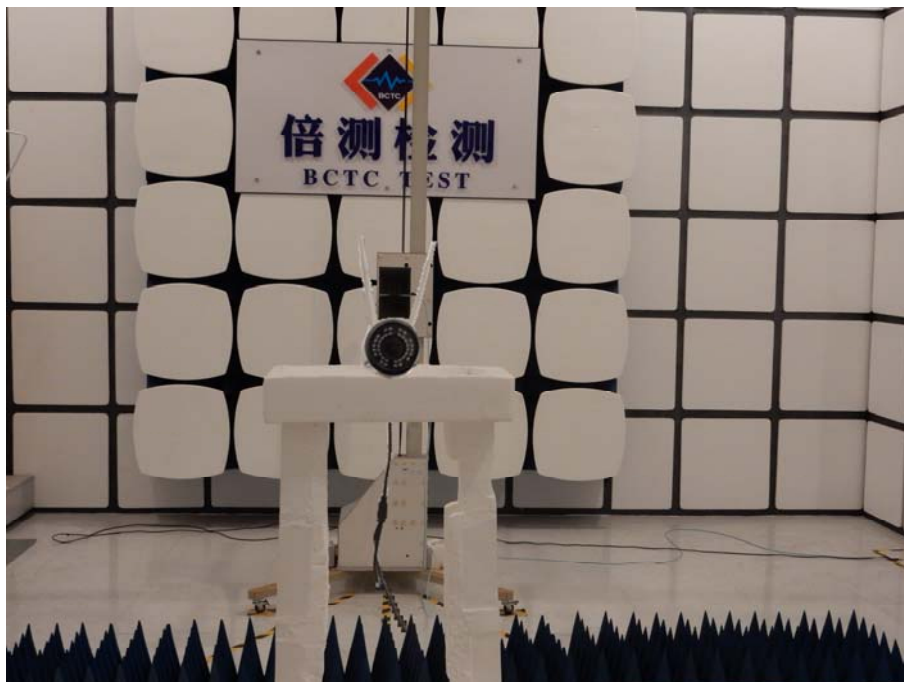
The EUT antenna is external antenna,. It comply with the standard requirement.

9. EUT TEST PHOTO

Radiated Measurement Photos



Radiated Measurement Photos





Conducted Measurement Photos





10. EUT PHOTO





Model:RLC-411WS





Model:RLC-410WS



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