Test Report

FCC ID: SO6-IN8015

Date of issue: Jul. 03, 2017

Report Number:	MTi170804E030
Sample Description:	IP / NETWORK CAMERA
Model(s):	IN-8015 Full HD, IN-8002 Full HD, IN-8006 Full HD
Applicant:	INSTAR Deutschland GmbH
Address:	Auf der Hostert 17, 65510 Hünstetten Bechtheim, Germany
Date of Test:	Jul. 21, 2017 – Jul. 03, 2017

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

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TEST RESULT CERTIFICATION

Applicant's name .....:	**INSTAR Deutschland GmbH**
Address .....:	Auf der Hostert 17, 65510 Hünstetten Bechtheim, Germany
Manufacture's Name .....:	**INSTAR Deutschland GmbH**
Address .....:	Auf der Hostert 17, 65510 Hünstetten Bechtheim, Germany
Product name .....:	IP / NETWORK CAMERA
Model and/or type reference :	IN-8015 Full HD
Serial Model.....:	IN-8002 Full HD, IN-8006 Full HD
Standards .....:	FCC Part15.247
Test procedure.....:	ANSI C63.10-2013

This device described above has been tested by Shenzhen Toby Technology Co., Ltd. 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.

Tested by: Amy Lu

Amy Lu Jul. 03, 2017

Reviewed by: Smith Chen

Smith Chen Jul. 03, 2017

Approved by: Tom Xue

Tom Xue Jul. 03, 2017

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	**9**
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	**10**
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	**11**
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	**12**
3 . EMC EMISSION TEST	**13**
3.1 CONDUCTED EMISSION MEASUREMENT	**13**
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	**13**
3.1.2 TEST PROCEDURE	**14**
3.1.3 DEVIATION FROM TEST STANDARD	**14**
3.1.4 TEST SETUP	**14**
3.1.5 EUT OPERATING CONDITIONS	**14**
3.1.6 TEST RESULTS	**15**
3.2 RADIATED EMISSION MEASUREMENT	**17**
3.2.1 RADIATED EMISSION LIMITS	**17**
3.2.2 TEST PROCEDURE	**18**
3.2.3 DEVIATION FROM TEST STANDARD	**18**
3.2.4 TEST SETUP	**19**
3.2.5 EUT OPERATING CONDITIONS	**20**
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	**21**
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	**22**
3.2.8 TEST RESULTS (1G-25GHZ)	**23**
4 . POWER SPECTRAL DENSITY TEST	**27**
4.1 APPLIED PROCEDURES / LIMIT	**27**
4.1.1 TEST PROCEDURE	**27**
4.1.2 DEVIATION FROM STANDARD	**27**
4.1.3 TEST SETUP	**27**
4.1.4 EUT OPERATION CONDITIONS	**27**
4.1.5 TEST RESULTS	**28**
5 . 6DB EMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH	**34**

Table of Contents

	Page
5.1 APPLIED PROCEDURES / LIMIT	34
5.1.1 TEST PROCEDURE	34
5.1.2 DEVIATION FROM STANDARD	34
5.1.3 TEST SETUP	34
5.1.4 EUT OPERATION CONDITIONS	34
5.1.5 TEST RESULTS	35
6 . PEAK OUTPUT POWER TEST	41
6.1 APPLIED PROCEDURES / LIMIT	41
6.1.1 TEST PROCEDURE	41
6.1.2 DEVIATION FROM STANDARD	41
6.1.3 TEST SETUP	41
6.1.4 EUT OPERATION CONDITIONS	41
6.1.5 TEST RESULTS	42
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	43
7.1 DEVIATION FROM STANDARD	43
7.2 TEST SETUP	43
7.3 EUT OPERATION CONDITIONS	43
7.4 TEST RESULTS	44
8 . ANTENNA REQUIREMENT	48
8.1 STANDARD REQUIREMENT	48
8.2 EUT ANTENNA	48

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 Toby Technology Co., Ltd.
Add.: 10/F.,A Block, Jiada R&D Bldg.,No.5 Songpingshan, Road, Science&Technology Park, Shenzhen, 518057
FCC Registration No.:811562

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended 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	±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%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>IP / NETWORK CAMERA</td></tr>
<tr><td>Trade Name</td><td>INSTAR</td></tr>
<tr><td>Model Name</td><td>IN-8015 Full HD</td></tr>
<tr><td>Serial Model</td><td>IN-8002 Full HD, IN-8006 Full HD</td></tr>
<tr><td>Model Difference</td><td>All of the above models are the same in internal structures, circuits, and components; Only the casing and color are difference.</td></tr>
<tr><td>Product Description</td><td>The EUT is a IP/NETWORK CAMERA
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g/n20:2412~2462 MHz</td></tr>
<tr><td>Modulation Type:</td><td>11n: BPSK, QPSK, 16QAM, 64QAM with OFDM
11g: BPSK, QPSK, 16QAM, 64QAM, OFDM
11b: DQPSK, DBPSK, DSSS, CCK</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>802.11b:11/5.5/2/1 Mbps
802.11g:54/48/36/24/18/12/9/6Mbps
802.11n:65/52/6.5Mbps</td></tr>
<tr><td>Number Of Channel</td><td>802.11b/g/n20:11CH</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Output Power(Conducted):</td><td>802.11b: 18.63 dBm (Max.)
802.11g: 19.74 dBm (Max.)
802.11n20: 17.82 dBm (Max.)</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>3.0dBi</td></tr>
</table></td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Adapter information:</td><td>Model:SAW12-050-2000UD
Input:100-240V~ 50/60Hz 0.3A
Output:5V DC 2000mA</td></tr>
<tr><td>Battery</td><td>N/A</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:

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

2. Channel List

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 Antenna with reversed polarity NON standards antenna port	/	3	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	TX Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	TX 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

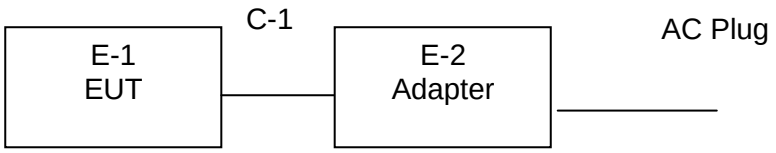
Note:

(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

(3)Dutycycle>98%

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



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	Brand	Model/Type No.	Series No.	Note
E-1	IP/NETWORK CAMERA	INSTAR	IN-8015 Full HD	N/A	EUT
E-2	Adapter	N/A	SAW12-050-2000UD	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.0m	
C-2	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

For RF conducted test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Universal Radio Communication Tester	Rohde&schwarz	CMU200	114587	2017/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2017/11/4
Dc Power Supply	GW	GPR-6030D	/	2017/11/4
Temperature & Humitidy Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2017/11/14
Broadband TRILOG Antenna	Schwarabeck	VULB9163	9163-872	2017/11/14
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1145	2017/11/14
Amplifier	HP	8447D	3113A06150	2017/11/4
Amplifier	Agilent	8449B	3008A02400	2018/7/4
Test Receiver	Schwarabeck	ESPI7	100314	2017/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2017/11/4
Signal Generator	R&S	SMT 06	832080/007	2017/11/4
Broadband TRILOG Antenna	Schwarabeck	VULB9163	9163-872	2017/11/14
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1145	2017/11/14
Amplifier	HP	8447D	3113A06150	2017/11/4
Amplifier	Agilent	8449B	3008A02400	2018/7/4
Test Receiver	Schwarabeck	ESPI	100314	2017/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2017/11/4
LISN	R&S	ENV216	1001131	2017/9/25
Test Cable	United Microwave	57793	1m	2017.12.05
Test Cable	United Microwave	A30A30-5006	10m	2017.12.05

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	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

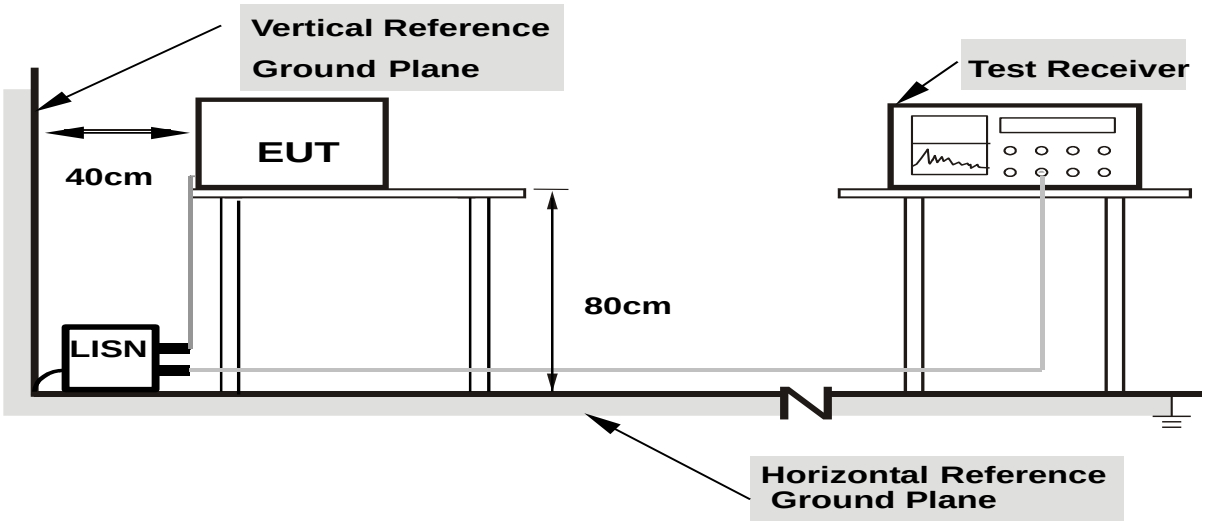
3.1.2 TEST PROCEDURE

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 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



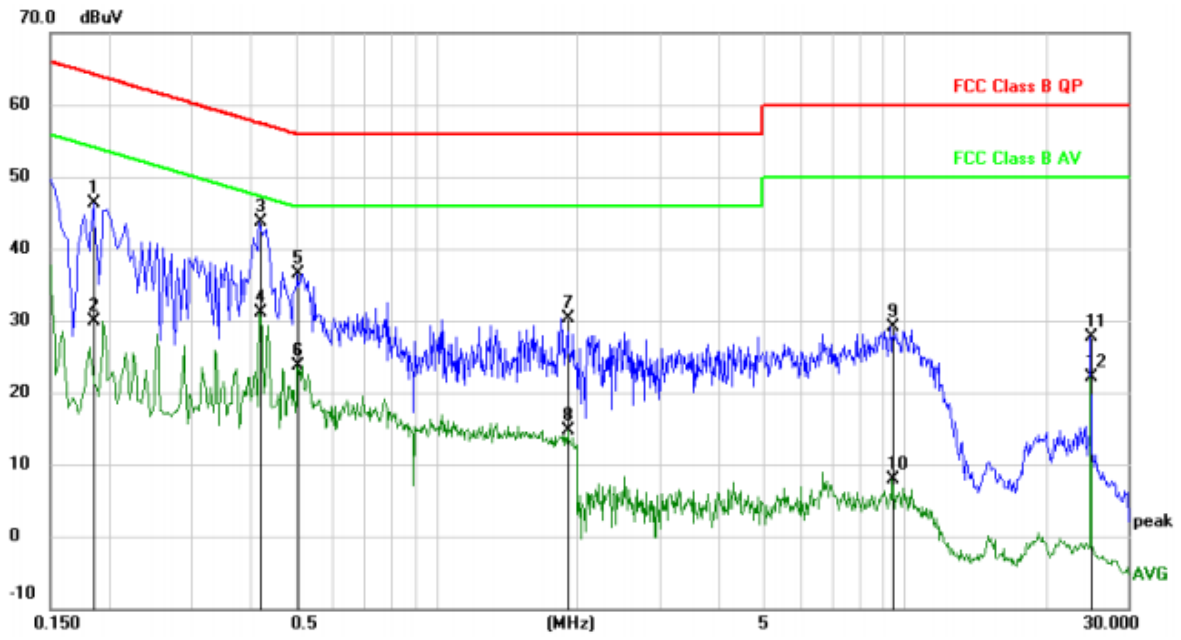
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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.

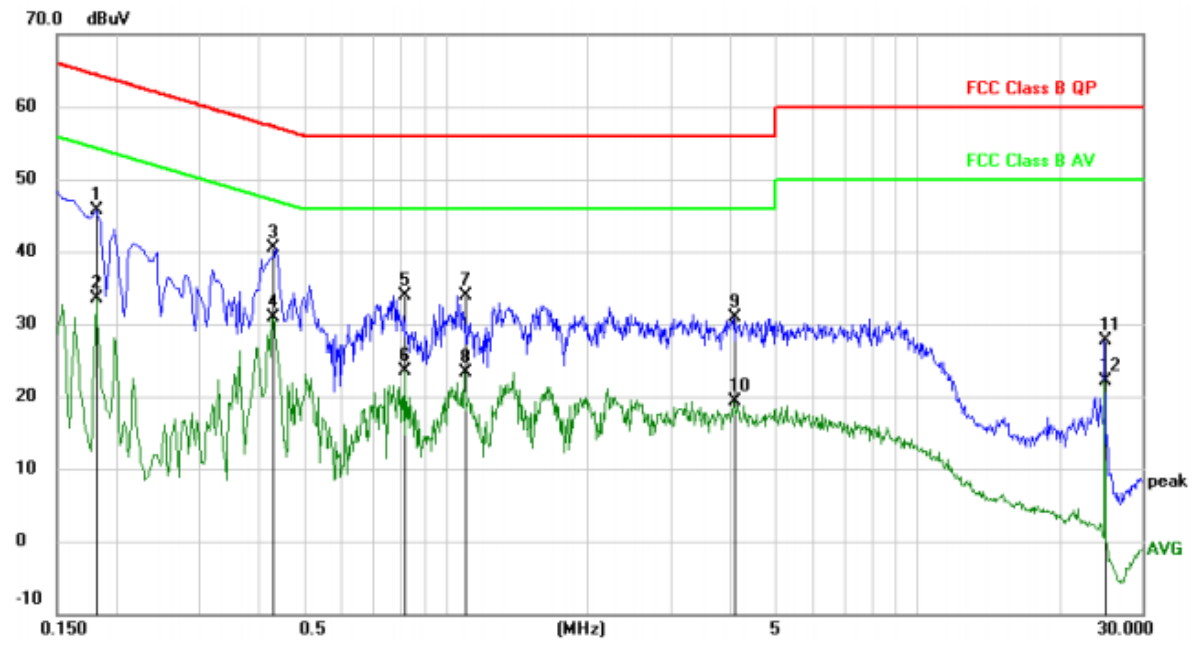
3.1.6 TEST RESULTS

EUT：	IP/NETWORK CAMERA	Model Name. ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5Vfrom adapter AC 120V/60Hz	Test Mode：	Mode 4



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	46.32	0.00	46.32	64.21	-17.89	QP	
2		0.1860	29.83	0.00	29.83	54.21	-24.38	AVG	
3	*	0.4200	43.80	0.00	43.80	57.45	-13.65	QP	
4		0.4200	31.17	0.00	31.17	47.45	-16.28	AVG	
5		0.5055	36.56	0.00	36.56	56.00	-19.44	QP	
6		0.5055	23.67	0.00	23.67	46.00	-22.33	AVG	
7		1.9095	30.32	0.00	30.32	56.00	-25.68	QP	
8		1.9095	14.69	0.00	14.69	46.00	-31.31	AVG	
9		9.4245	29.09	0.00	29.09	60.00	-30.91	QP	
10		9.4245	7.86	0.00	7.86	50.00	-42.14	AVG	
11		25.0035	27.69	0.05	27.74	60.00	-32.26	QP	
12		25.0035	21.96	0.05	22.01	50.00	-27.99	AVG	

EUT：	IP/NETWORK CAMERA	Model Name. ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity：	55%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5Vfrom adapter AC 120V/60Hz	Test Mode：	Mode 4



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1815	45.62	0.00	45.62	64.42	-18.80	QP	
2		0.1815	33.53	0.00	33.53	54.42	-20.89	AVG	
3		0.4290	40.50	0.00	40.50	57.27	-16.77	QP	
4	*	0.4290	30.85	0.00	30.85	47.27	-16.42	AVG	
5		0.8205	33.98	0.00	33.98	56.00	-22.02	QP	
6		0.8205	23.59	0.00	23.59	46.00	-22.41	AVG	
7		1.0950	33.89	0.00	33.89	56.00	-22.11	QP	
8		1.0950	23.21	0.00	23.21	46.00	-22.79	AVG	
9		4.0785	30.93	0.00	30.93	56.00	-25.07	QP	
10		4.0785	19.33	0.00	19.33	46.00	-26.67	AVG	
11		25.0035	27.75	0.05	27.80	60.00	-32.20	QP	
12		25.0035	21.99	0.05	22.04	50.00	-27.96	AVG	

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, RMS detector 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:

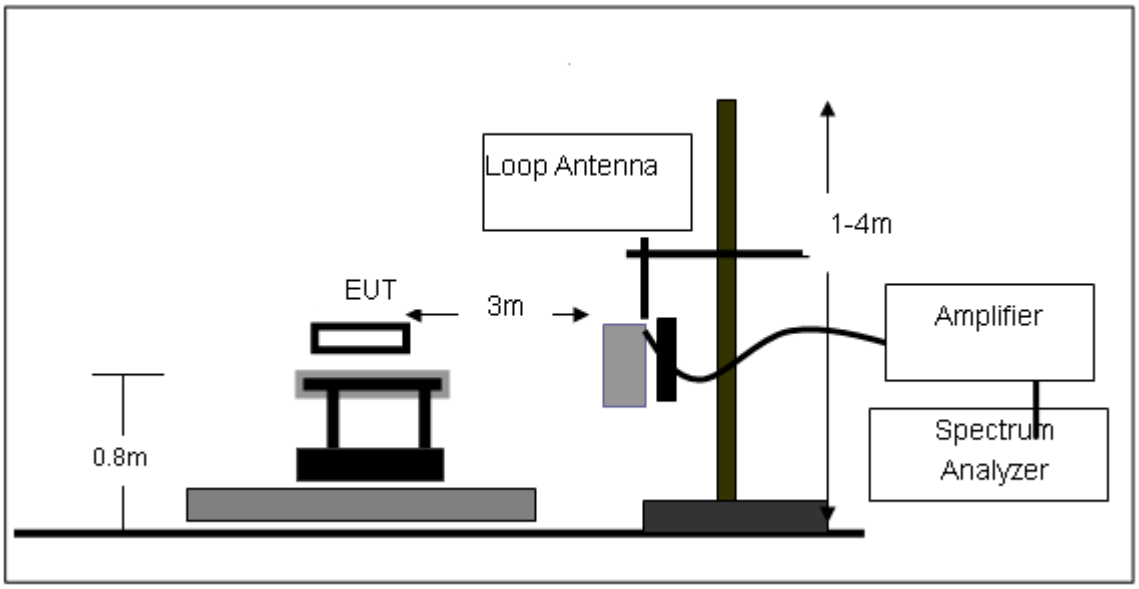
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

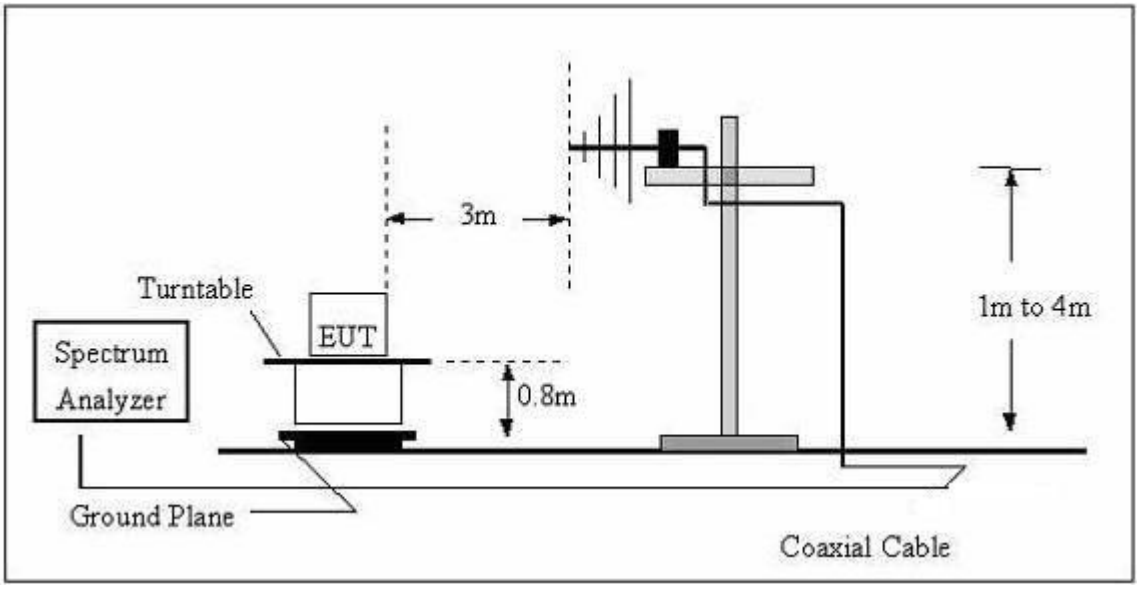
No deviation

3.2.4 TEST SETUP

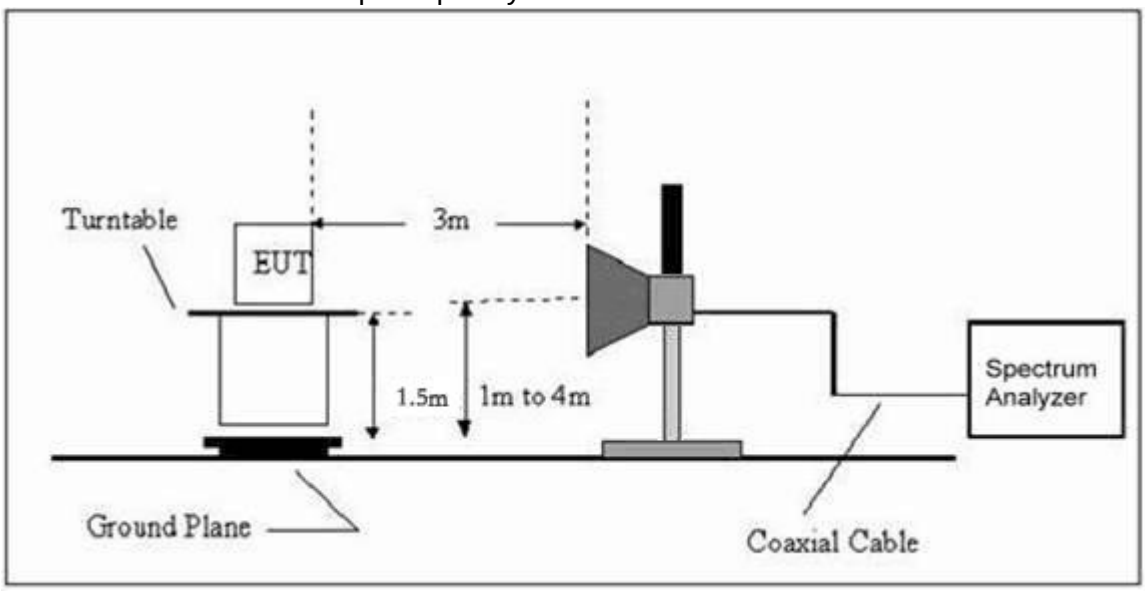
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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：	IP/NETWORK CAMERA	Model Name. ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity :	55%
Pressure：	1010 hPa	Test Voltage ：	DC 5Vfrom adapter AC 120V/60Hz
Test Mode ：	TX	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：	IP/NETWORK CAMERA	Model Name ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity：	55%
Pressure：	1010 hPa	Test Voltage ：	DC 5Vfrom adapter
Test Mode ：	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
V	197.8925	55.04	-13.94	41.10	43.50	-2.40	QP
V	297.2241	53.50	-10.70	42.80	46	-3.20	QP
V	334.8589	52.90	-9.90	43.00	46	-3.00	QP
V	595.1326	49.02	-5.42	43.60	46	-2.40	QP
V	750.1082	47.40	-3.50	43.90	46	-2.10	QP
V	893.8567	45.07	-1.37	43.70	46	-2.30	QP
H	111.3468	54.46	-14.66	39.80	43.50	-3.70	QP
H	185.7880	55.69	-15.19	40.50	43.50	-3.00	QP
H	222.9500	55.34	-12.94	42.40	46	-3.60	QP
H	297.2241	53.00	-10.70	42.30	46	-3.70	QP
H	526.3967	48.82	-6.62	42.20	46	-3.80	QP
H	675.2078	47.70	-4.50	43.20	46	-2.80	QP

Remark:

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

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

Factor added by measurement software automatically

3.2.8 TEST RESULTS (1G-25GHZ)

802.11b

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (2412 MHz)							
Vertical	2491.777	60.32	-11.65	48.67	74	25.33	Pk
Horizontal	2498.247	57.22	-12.73	44.49	74	29.51	Pk
Vertical	4824.184	57.32	-3.6	53.72	74	20.28	Pk
Horizontal	4824.184	57.32	-9.23	48.09	74	25.91	Pk
Vertical	1485.838	61.02	-17.1	43.92	74	30.08	Pk
Vertical	1636.784	60.71	-16.06	44.65	74	29.35	Pk
Vertical	2095.928	59.52	-11.88	47.64	74	26.36	Pk
Horizontal	1074.301	61.25	-19.69	41.56	74	32.44	Pk
Horizontal	1483.178	60.24	-17.09	43.15	74	30.85	Pk
Horizontal	1895.832	57.26	-14.25	43.01	74	30.99	Pk
Mid Channel (2437 MHz)							
Vertical	2474.777	57.01	-11.65	45.36	74	28.64	Pk
Horizontal	2474.144	57.7	-9.37	48.33	74	25.67	Pk
Vertical	4874.425	57.08	-6.15	50.93	74	23.07	Pk
Horizontal	4874.979	57.08	-6.83	50.25	74	23.75	Pk
Vertical	1433.535	64.07	-17.12	46.95	74	27.05	Pk
Vertical	1636.784	61.4	-16.06	45.34	74	28.66	Pk
Vertical	2284.166	55.14	-12.83	42.31	74	31.69	Pk
Horizontal	1280.515	60.8	-17.82	42.98	74	31.02	Pk
Horizontal	1636.784	59.63	-16.06	43.57	74	30.43	Pk
Horizontal	1892.438	59.75	-14.28	45.47	74	28.53	Pk
High Channel (2462 MHz)							
Vertical	2453.883	57.7	-12.91	44.79	74	29.21	Pk
Horizontal	2453.839	57.7	-11.59	46.11	74	27.89	Pk
Vertical	4926.325	54.21	-9.22	44.99	74	29.01	Pk
Horizontal	4926.683	54.21	-3.64	50.57	74	23.43	Pk
Vertical	1187.688	58.73	-18.27	40.46	74	33.54	Pk
Vertical	1636.784	57.54	-16.06	41.48	74	32.52	Pk
Vertical	2084.693	55.13	-11.99	43.14	74	30.86	Pk
Horizontal	1534.540	57.79	-16.94	40.85	74	33.15	Pk
Horizontal	1786.985	57.5	-15.04	42.46	74	31.54	Pk
Horizontal	1892.438	57.38	-14.28	43.1	74	30.9	Pk

802.11g

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2412							
V	4824.428	52.48	-3.53	48.95	74	25.05	Pk
V	4824.428	32.57	-3.53	29.04	54	24.96	AV
H	4824.529	54.39	-3.54	50.85	74	23.15	Pk
H	4824.529	32.66	-3.54	29.12	54	24.88	AV
operation frequency:2437							
V	4873.548	52.67	-3.64	49.03	74	24.97	Pk
V	4873.548	34.4	-3.64	30.76	54	23.24	AV
H	4875.279	53.87	-3.64	50.23	74	23.77	Pk
H	4875.279	33.42	-3.64	29.78	54	24.22	AV
operation frequency:2462							
V	4924.358	54.89	-3.75	51.14	74	22.86	pk
V	4924.358	34.56	-3.75	30.81	54	23.19	AV
H	4924.591	51.07	-3.74	47.33	74	26.67	pk
H	4924.591	34.71	-3.74	30.97	54	23.03	pk

Remark:

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

802.11n(20)

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2412							
V	4824.428	51.58	-3.53	48.05	74	25.95	Pk
H	4824.529	54.63	-3.54	51.09	74	22.91	Pk
operation frequency:2437							
V	4873.548	51.98	-3.53	48.45	74	25.55	Pk
H	4875.279	54.27	-3.54	50.73	74	23.27	Pk
operation frequency:2462							
V	4924.358	53.04	-3.75	49.29	74	24.71	pk
H	4924.591	51.9	-3.74	48.16	74	25.84	pk

Remark:

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

Note: The PK value is less than the AV value, AV value is not required
Factor added by measurement software automatically.

BAND EDGE(Radiated)

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b							
2390	56.34	-13.06	43.28	74	30.72	peak	Vertical
2390	56.79	-13.06	43.73	74	30.27	peak	Horizontal
2483.5	57.43	-12.78	44.65	74	29.35	peak	Vertical
2483.5	57.69	-12.78	44.91	74	29.09	peak	Horizontal
802.11g							
2390	57.28	-13.06	44.22	74	29.78	peak	Vertical
2390	57.59	-13.06	44.53	74	29.47	peak	Horizontal
2483.5	57.31	-12.78	44.53	74	29.47	peak	Vertical
2483.5	55.74	-12.78	42.96	74	31.04	peak	Horizontal
802.11n20							
2390	56.34	-13.06	43.28	74	30.72	peak	Vertical
2390	56.79	-13.06	43.73	74	30.27	peak	Horizontal
2483.5	57.43	-12.78	44.65	74	29.35	peak	Vertical
2483.5	57.69	-12.78	44.91	74	29.09	peak	Horizontal

NOTE: The PK value is less than the AV value, AV value is not required.

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

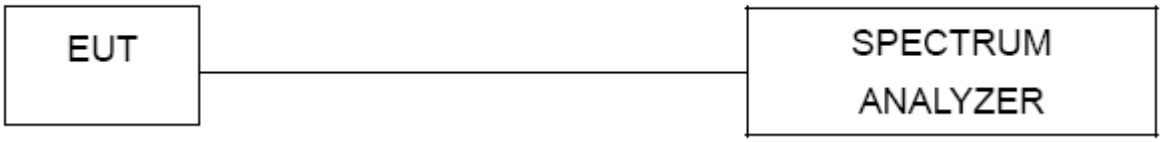
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 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.
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

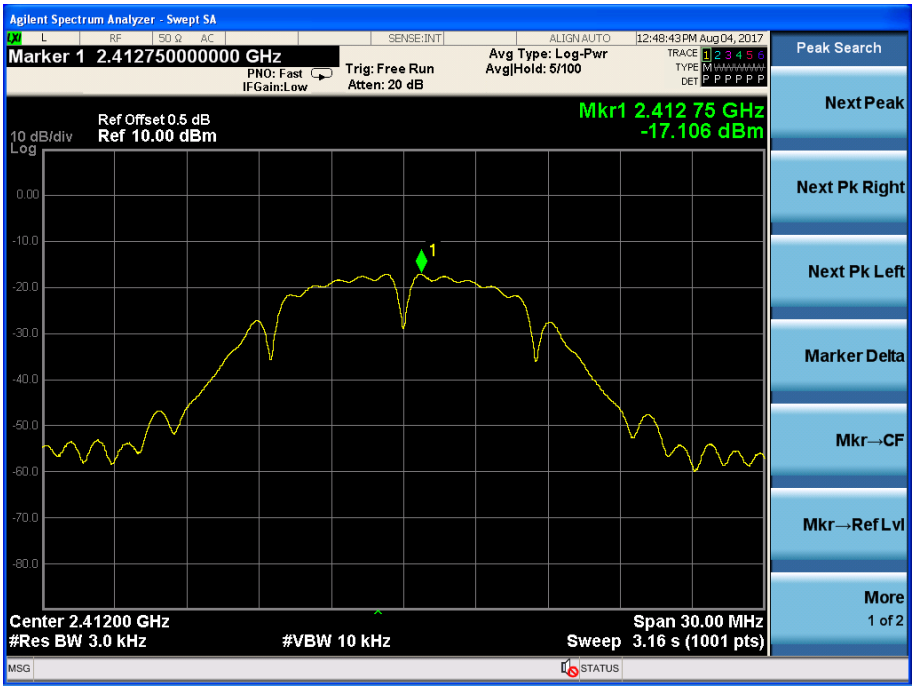
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1015 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-17.106	8	PASS
2437 MHz	-17.432	8	PASS
2462 MHz	-17.805	8	PASS

TX CH01



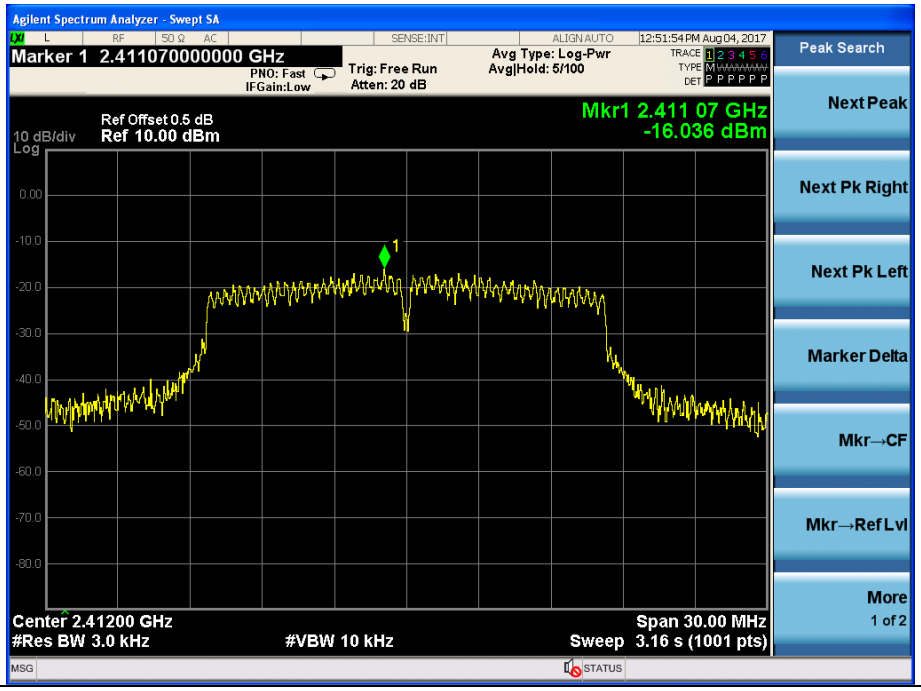
TX CH06

TX CH11

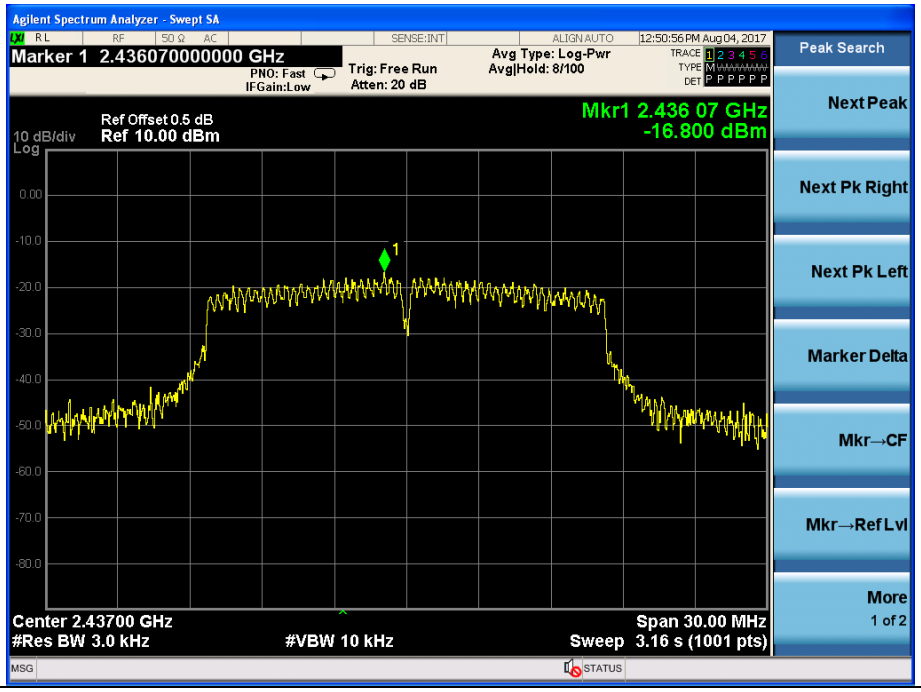
EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1015 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-16.036	8	PASS
2437 MHz	-16.800	8	PASS
2462 MHz	-17.346	8	PASS

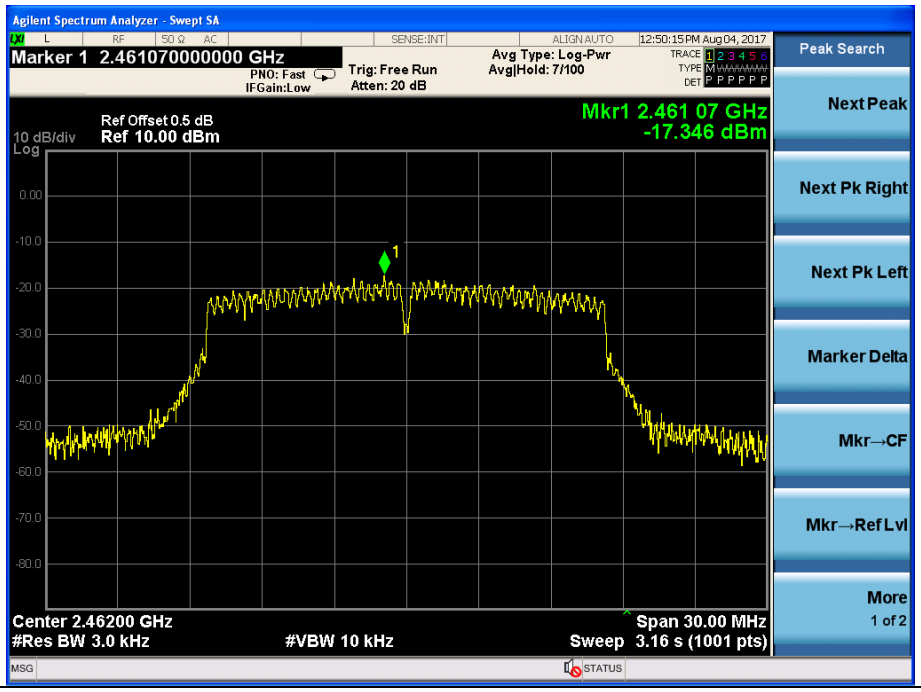
TX CH01



TX CH06



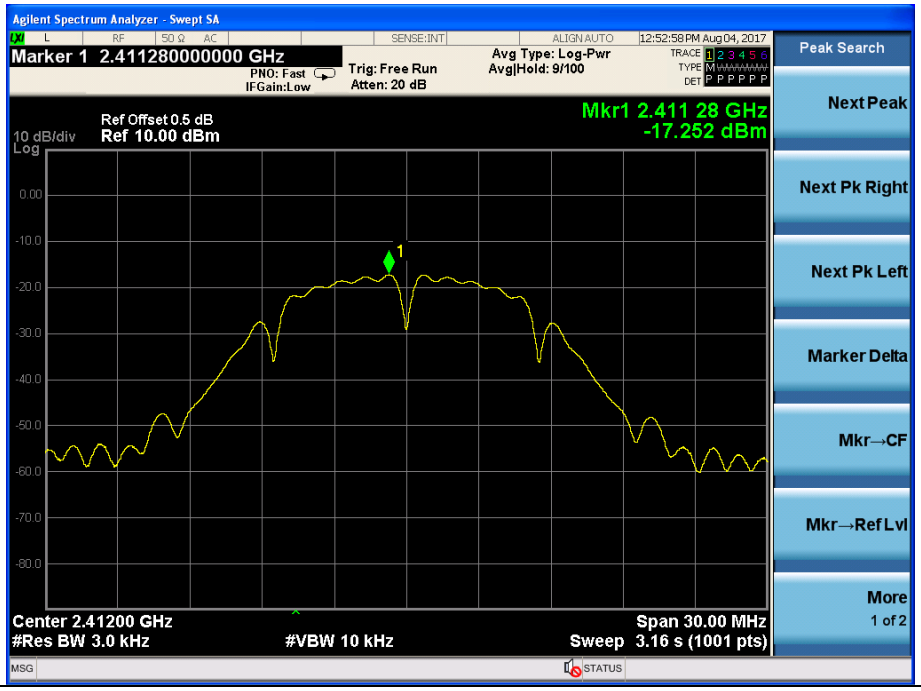
TX CH11



EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1015 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX n20 Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-17.252	8	PASS
2437 MHz	-17.652	8	PASS
2462 MHz	-18.060	8	PASS

TX CH01



TX CH06

TX CH11

5. 6DB EMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

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

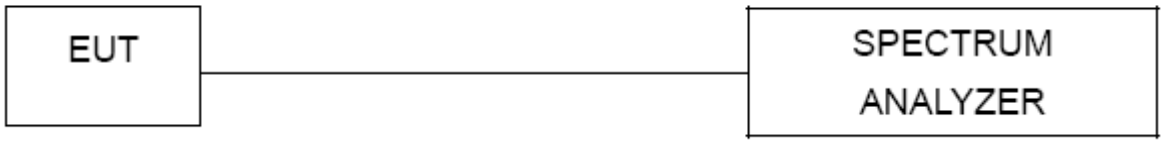
5.1.1 TEST PROCEDURE

1. Set RBW= 100 kHz.
2. Set the video bandwidth (VBW) ≥ 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) 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

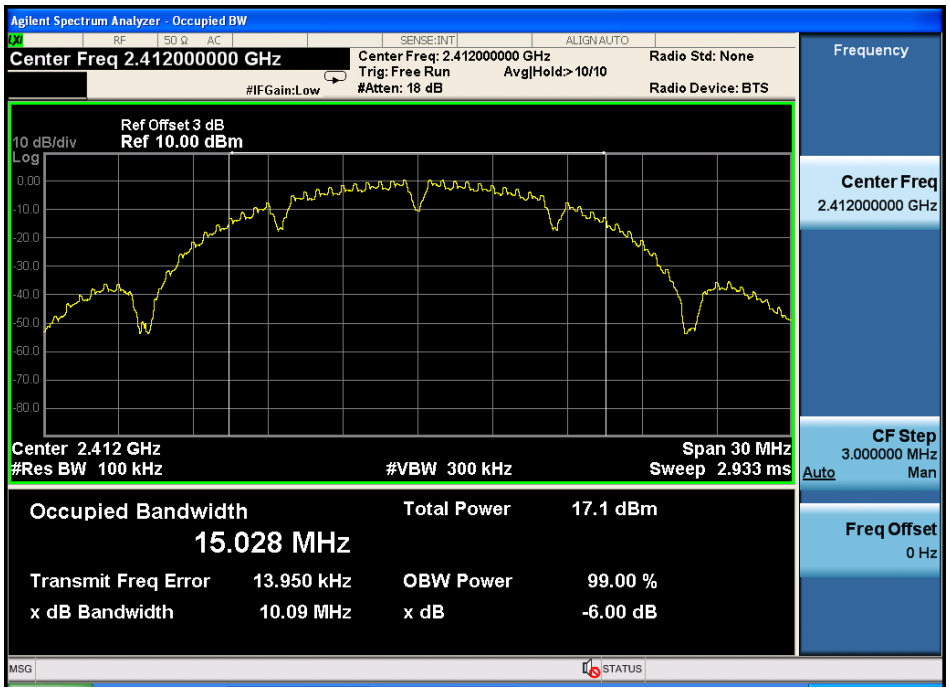
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

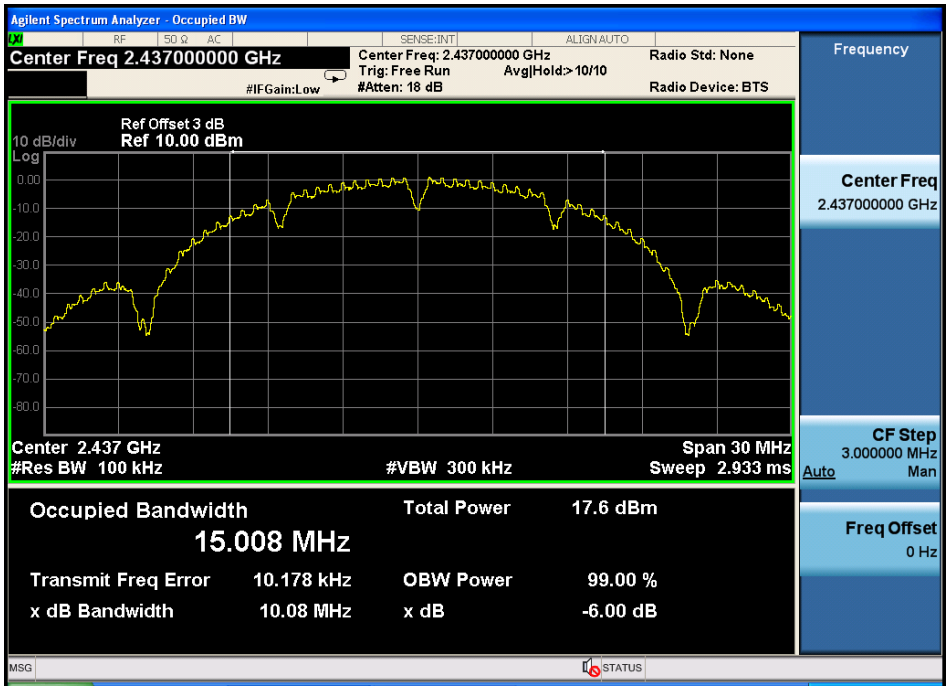
EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.09	/	500	Pass
Middle	2437	10.08	/	500	Pass
High	2462	10.09	/	500	Pass

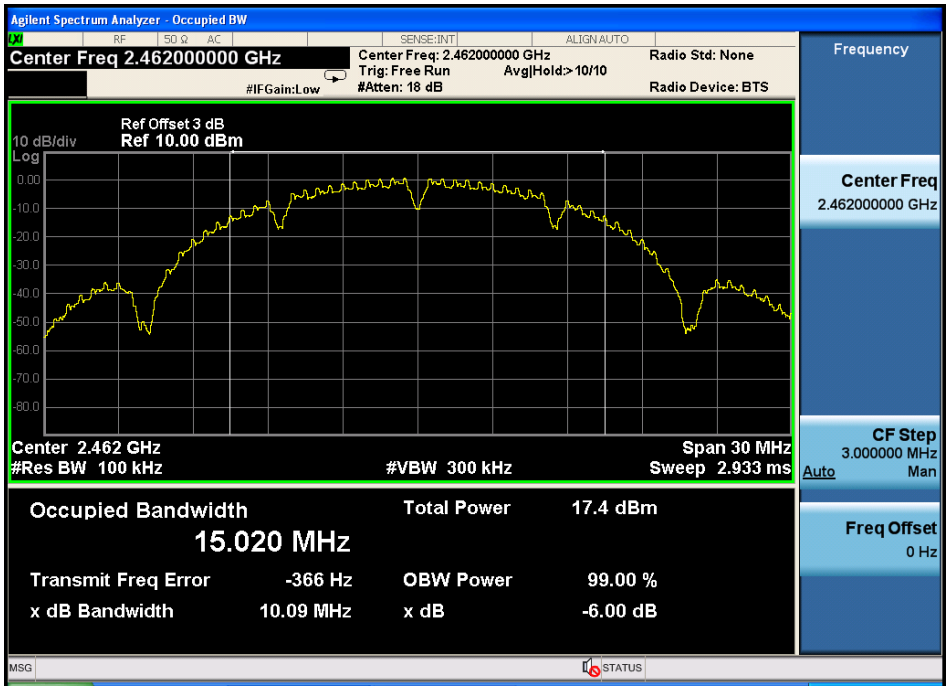
TX CH 01



TX CH 06



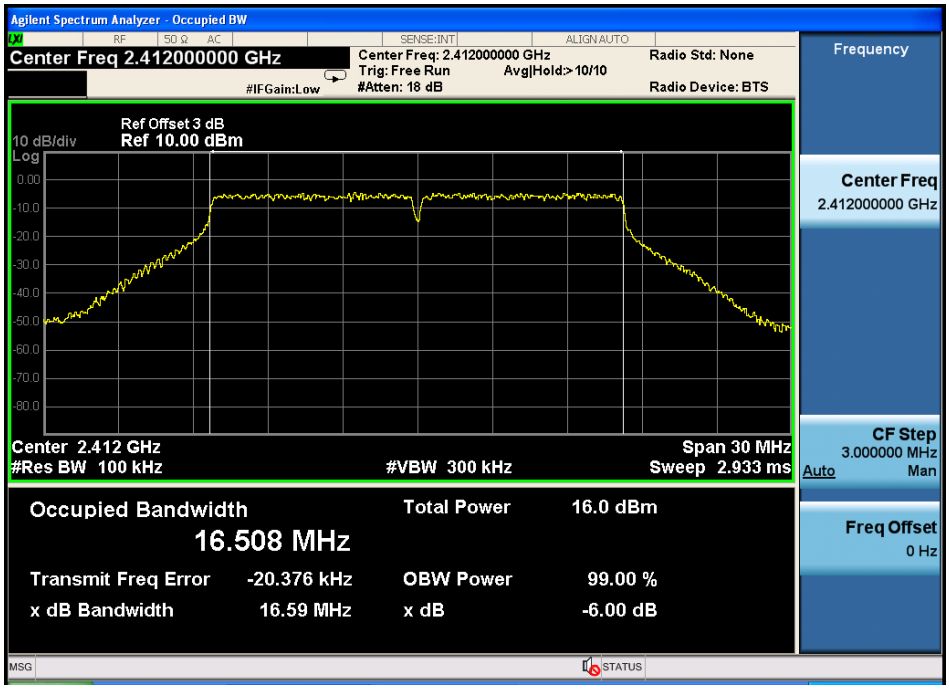
TX CH 11



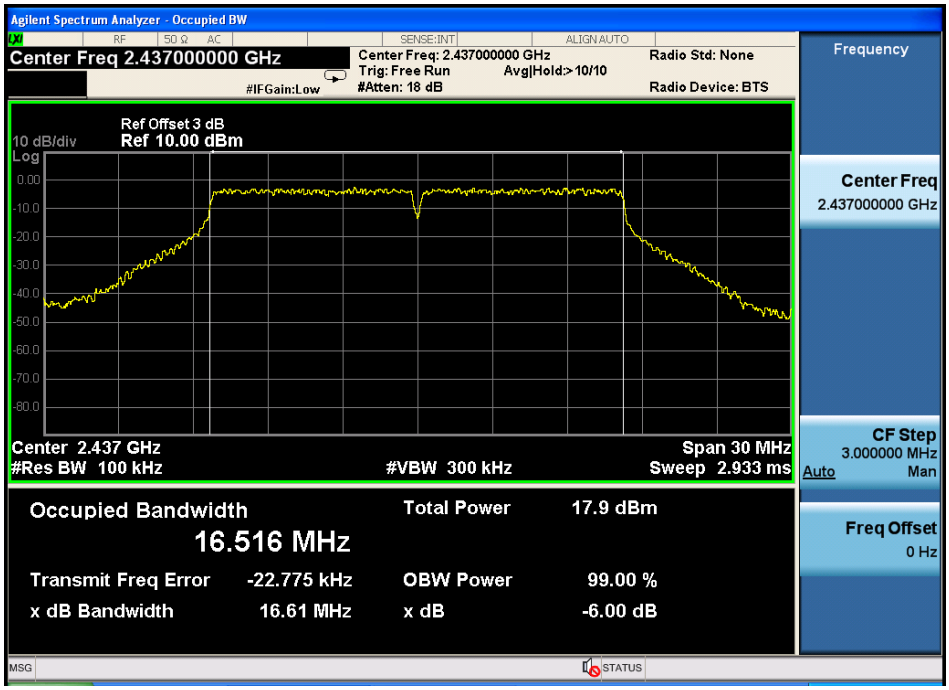
EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.59	/	500	Pass
Middle	2437	16.61	/	500	Pass
High	2462	16.59	/	500	Pass

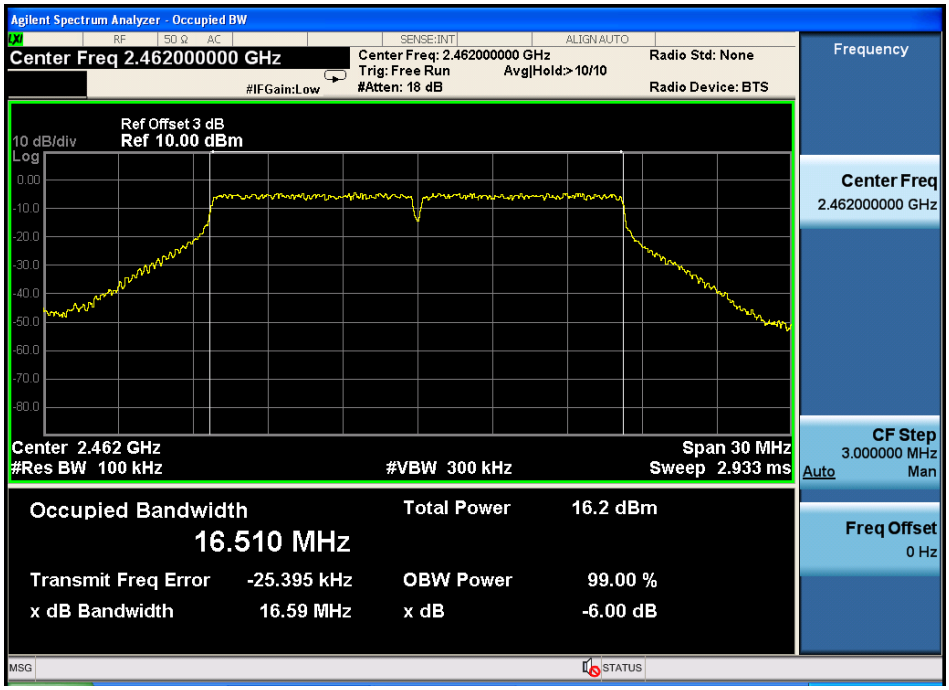
TX CH 01



TX CH 06



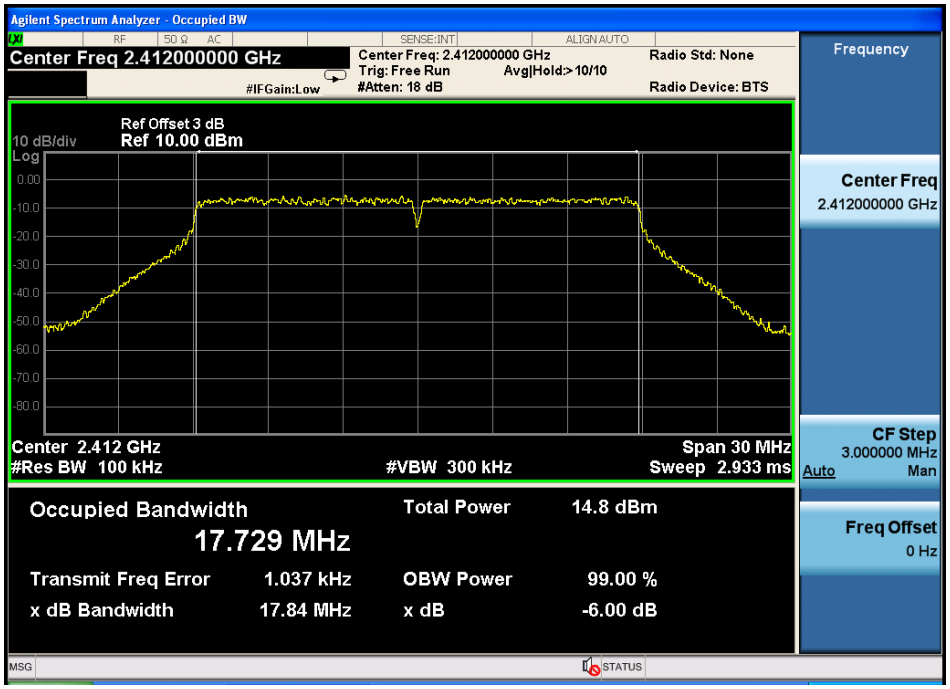
TX CH 11



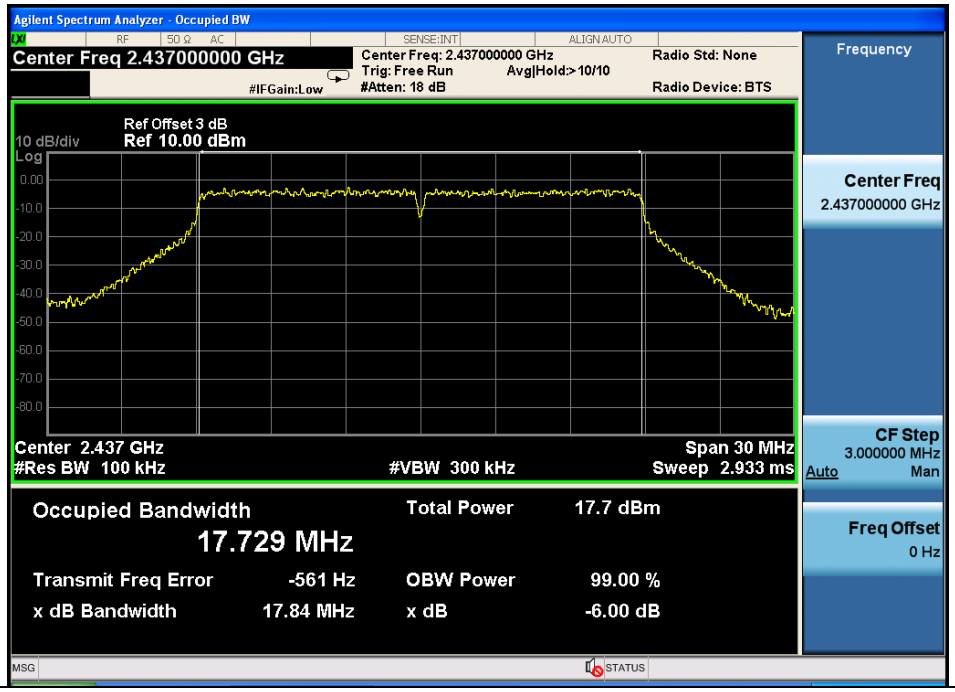
EUT :	IP/NETWORK CAMERA	Model Name :	IN-8015 Full HD
Temperature :	25℃	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	TX n20 Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.84	/	500	Pass
Middle	2437	17.84	/	500	Pass
High	2462	17.84	/	500	Pass

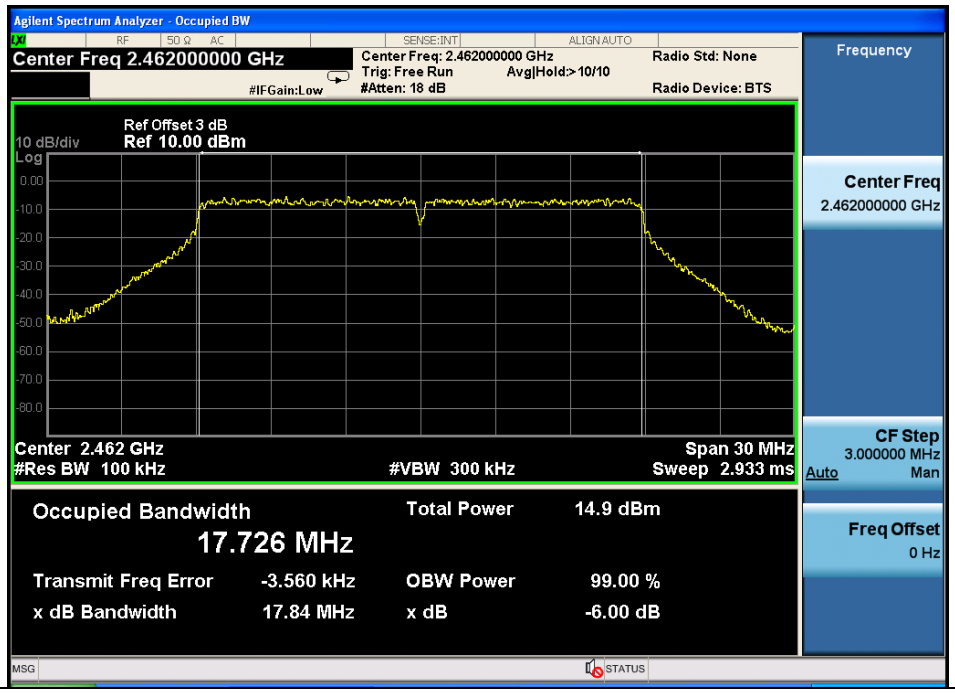
TX CH 01



TX CH 06



TX CH 11



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

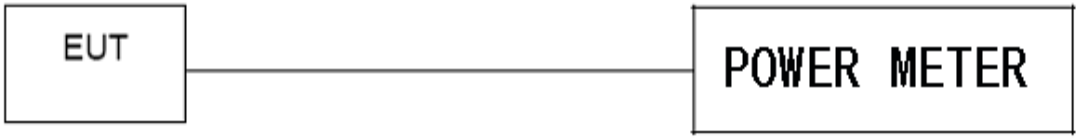
6.1.1 TEST PROCEDURE

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：	IP/NETWORK CAMERA	Model Name ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity：	55%
Pressure：	1012 hPa	Test Voltage ：	DC 5Vfrom adapter
Test Mode ：	TX b/g/n Mode /CH01, CH06, CH11		

Test Channe	Frequency	Maximum Conducted Output Power(PK) (dBm)	LIMIT
	(MHz)	TX 802.11b Mode	dBm
CH01	2412	18.34	30
CH06	2437	18.63	30
CH11	2462	18.42	30
TX 802.11g Mode			
CH01	2412	19.74	30
CH06	2437	18.65	30
CH11	2462	18.69	30
TX 802.11n20 Mode			
CH01	2412	17.49	30
CH06	2437	17.82	30
CH11	2462	17.24	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)).

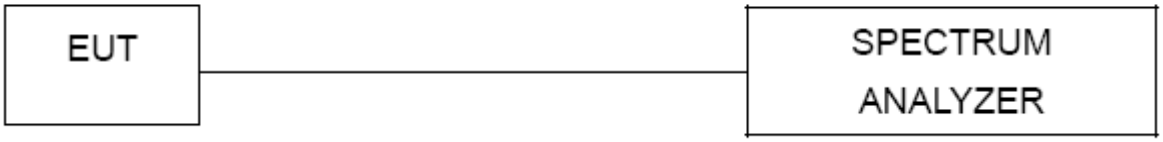
TEST PROCEDURE

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

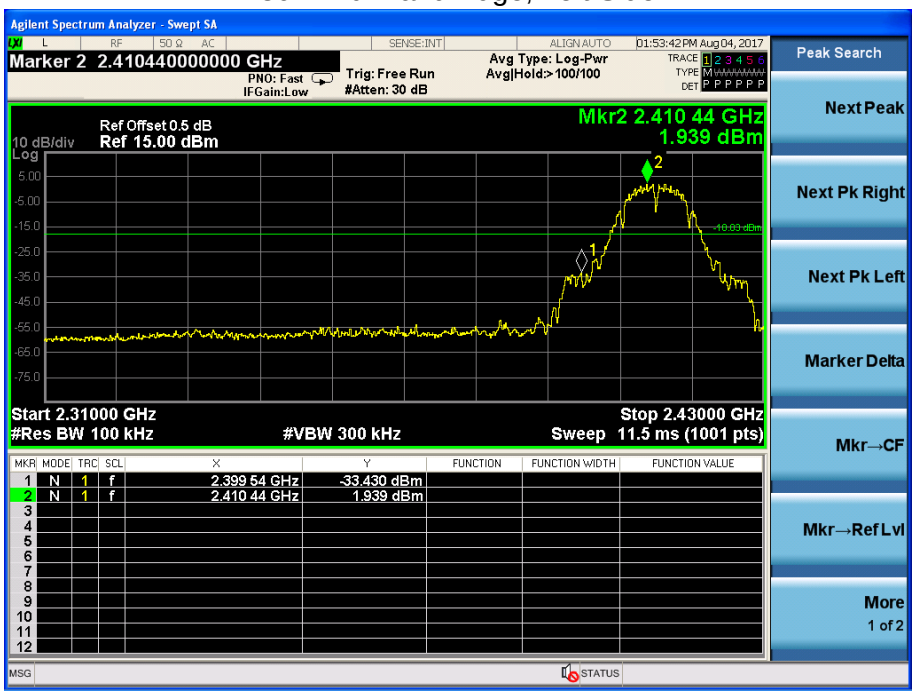
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.4 TEST RESULTS

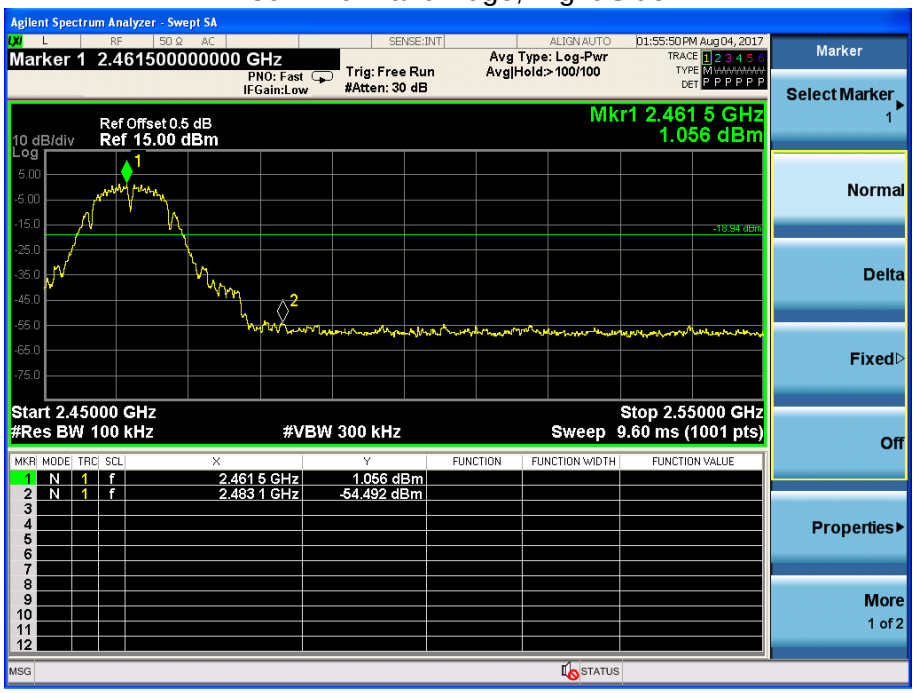
EUT：	IP/NETWORK CAMERA	Model Name ：	IN-8015 Full HD
Temperature：	25℃	Relative Humidity：	55%
Pressure：	1012 hPa	Test Voltage ：	DC 5Vfrom adapter

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
802.11b mode			
Left-band	35.369	20	Pass
Right-band	55.548	20	Pass
802.11g mode			
Left-band	26.414	20	Pass
Right-band	43.435	20	Pass
802.11n20 mode			
Left-band	37.783	20	Pass
Right-band	55.488	20	Pass

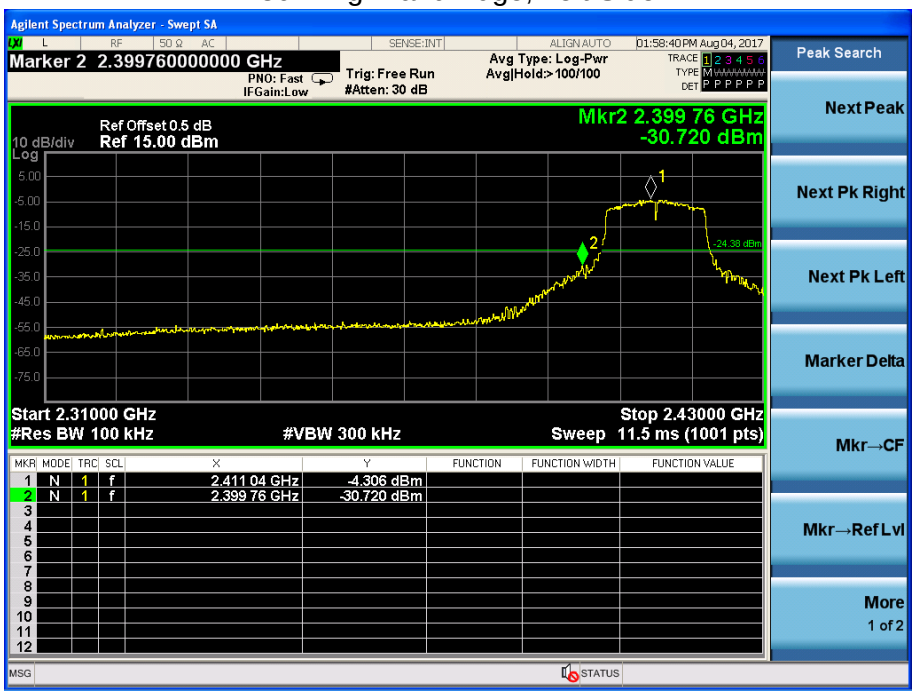
802.11b: Band Edge, Left Side



802.11b: Band Edge, Right Side

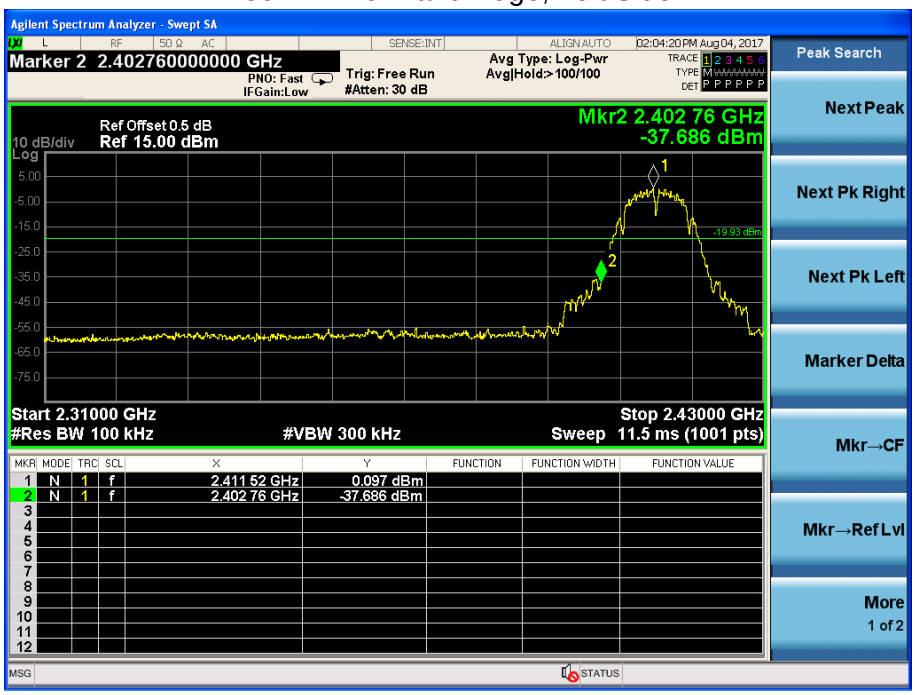


802.11g: Band Edge, Left Side

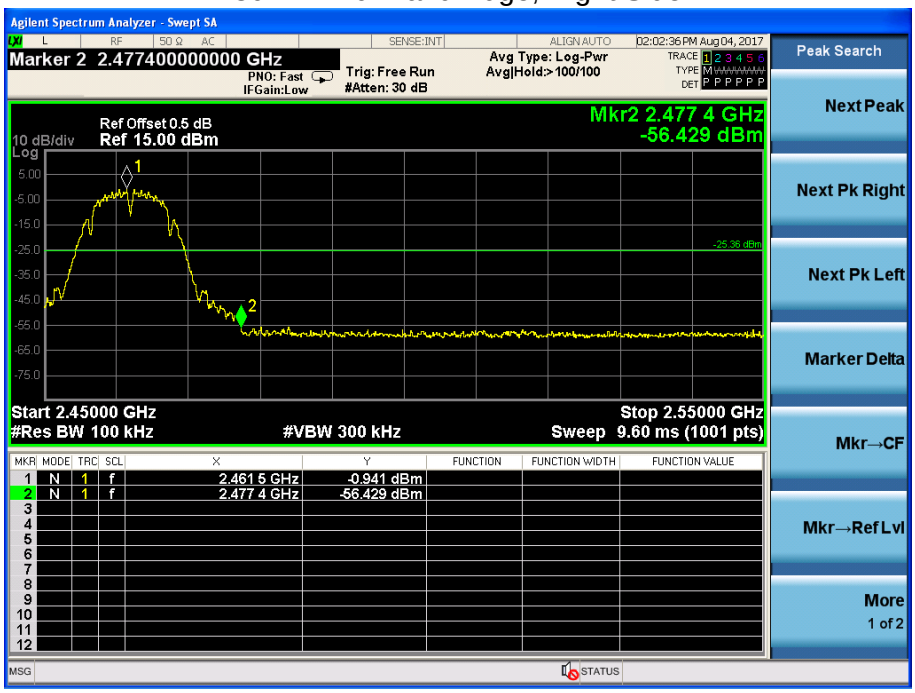


802.11g: Band Edge, Right Side

802.11n20: Band Edge, Left Side



802.11n20: 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

2.1 Note 3

----END OF REPORT----