RADIO TEST REPORT
MIC Notice No.88 Appendix No.43

Product：	IP Camera
Trade Mark：	Sricam
Model Name：	SP019
Serial Model：	SP006, SP007, SP008, SP009, SP010, SP011 SP015, SP017, SP018, SP020, SP023, SP024, SP025, SP026, SP027, SP028, NVS001, NVS002
Report No.：	SER180427601001E

Prepared for

Shenzhen Sricctv Technology Co., Ltd

The 4th Floor of Building46, 5th Industrial Park of HuaideCuigang, FuyongStreet, Bao'an,Shenzhen, China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... Shenzhen Sricctv Technology Co., Ltd

Address ..... The 4th Floor of Building46, 5th Industrial Park of HuaideCuigang, FuyongStreet, Bao'an,Shenzhen, China

Manufacturer's Name ..... Shenzhen Sricctv Technology Co., Ltd

Address ..... The 4th Floor of Building46, 5th Industrial Park of HuaideCuigang, FuyongStreet, Bao'an,Shenzhen, China

Test specification:

Standard..... MIC Notice No.88 Appendix No.43

Test item description

Product name..... IP Camera

Model and/or type reference SP019, SP006, SP007, SP008, SP009, SP010, SP011, SP015, SP017, SP018, SP020, SP023, SP024, SP025, SP026, SP027, SP028, NVS001, NVS002

Rating(s)..... DC 5V 2A

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with MIC Notice No.88 Appendix No.43 requirements. And it is applicable only to the tested sample identified in the report.

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Testing.....

Date of receipt of test item ..... 27 Apr. 2018

Date (s) of performance of tests..... 27 Apr. 2018 ~ 23 May. 2018

Date of Issue ..... 23 May. 2018

Test Result ..... **Pass**

Testing Engineer : Mary. Hu

(Mary)

Technical Manager : Jason Chen

(Jason Chen)

Authorized Signatory : Sam. Chen

(Sam Chen)

Shenzhen NTEK Testing Technology Co., Ltd. NTEK Report Seal

※ ※ Revision History ※ ※

REV.	REPORT NO.	Page Revised	ISSUED DATE	Contents
Original	SER180427601001E	Rev.01	May 23, 2018	N/A

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Part	Rule Section	Description of Test	Result
4.1	3	Frequency Error	Complies
4.2	4	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
4.3	5	Unwanted Emission Intensity	Complies
4.4	6	Antenna Power Error	Complies
4.5	7	Limitation of Collateral Emission of Receiver	Complies
4.6	8	Transmission Antenna Gain (EIRP Antenna Power)	N/A
4.7	9	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
4.8	10	Radio Interference Prevention Capability	Complies
4.8	10	Spreading Factor	Complies
4.9	Note1	Carrier Sense Capability	Complies
4.10	Note 2	Construction Protection Confirmation	Complies

NOTE:

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

(2) MIC Notice No.88 Appendix No.43

(3) MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd
Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.
FCC Registration No.:463705; IC Registration No.:9270A-1
CNAS Registration No.:L5516

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	±3.2dB
2	Radiated Emission Test	±4.7dB
3	RF power,conducted	±0.16dB
4	Spurious emissions,conducted	±0.21dB
5	All emissions,radiated(<1G)	±4.68dB
6	All emissions,radiated(>1G)	±5.0dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	IP Camera
Model Name	SP019
Trade Mark	Sricam
Serial Model	SP006, SP007, SP008, SP009, SP010, SP011, SP015, SP017, SP018, SP020, SP023, SP024, SP025, SP026, SP027, SP028, NVS001, NVS002
Model Difference	All the model are the same circuit and RF module, except the model No.
Product Description	The EUT is a IP Camera Operation Frequency: 802.11b/g/n(20MHz):2412~2472 MHz; 802.11n(40MHz):2422~2462 MHz Modulation Type: IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g/n (HT20/HT40) : OFDM(64QAM, 16QAM, QPSK, BPSK) Bit Rate of Transmitter 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n(20/40MHz): up to 150Mbps Number Of Channel 802.11b/g/n20:13 CH 802.11n40:9CH Antenna Designation: I-PEX Antenna Antenna Gain: 2dBi
Channel List	Please refer to the Note 2.
Rating(s)	DC 5V 2A
Adapter	Model: KA1503-0502000AUS Input: 100-240V~50/60Hz 0.35A Max Output: 5V ⎓ 2000mA
Battery	N/A
Hardware Version	V3.0
Software Version	00.06.00.**

Note:

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

2.

Channel	Frequency (GHz)	Channel	Frequency (GHz)
01	2.412	11	2.462
02	2.417	12	2.467
03	2.422	13	2.472
04	2.427	--	--
05	2.432	--	--
06	2.437	--	--
07	2.442	--	--
08	2.447	--	--
09	2.452	--	--
10	2.457	--	--

3.

Table for Filed Antenna

Antenna	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A(main)	N/A	N/A	I-PEX Antenna	N/A	2	2.4G 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	B Mode(802.11b) (CH01 CH07 CH13)
Mode 2	G Mode(802.11g) (CH01 CH07 CH13)
Mode 3	N Mode(802.11n/20MHz) (CH01 CH07 CH13)
Mode 4	N Mode(802.11n/40MHz) (CH03 CH07 CH11)

Final Test Mode	Description
Mode 1	B Mode(802.11b) (CH01 CH07 CH13)
Mode 2	G Mode(802.11g) (CH01 CH07 CH13)
Mode 3	N Mode(802.11n/20MHz) (CH01 CH07 CH13)
Mode 4	N Mode(802.11n/40MHz) (CH03 CH07 CH11)

2.3 TEST CONDITIONS

The WIFI module was tested while in a continuous transmitter/receiver mode.
The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

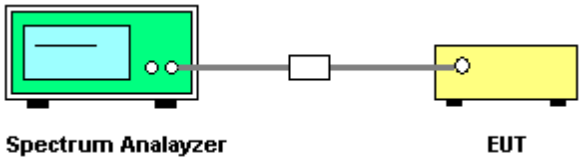
Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
DC Power	DC 5V	DC 5.5	DC 4.5V

NOTE:
Voltage Variation (%)
= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 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 Camera	Sricam	SP019	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

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.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	SPECTRUM ANALYZER	AGLIENT	E4440A	MY41000130	2018.04.08	2019.04.07	1 year
2	SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2017.10.26	2018.10.25	1 year
3	TEST RECEIVER	R&S	ESPI7	101318	2017.06.06	2018.06.05	1 year
4	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200983705	2017.06.06	2018.06.05	1 year
5	HORN ANTENNA	EM	EM-AH-10180	2011071402	2018.04.08	2019.04.07	1 year
6	HORN ANT	SCHWARZBECK	BBHA 9170	9170-181	2017.07.06	2018.07.05	1 year
7	PRE-AMPLIFIER	EMC	EMC051835SE	980246	2017.08.09	2018.08.08	1 year
8	POWER METER	DARE	RPR3006W	15I00041SNO84	2017.08.07	2018.08.06	1 year
9	TEMPORARY ANTENNA CONNECTOR (NOTE)	NTS	R001	N/A	N/A	N/A	N/A

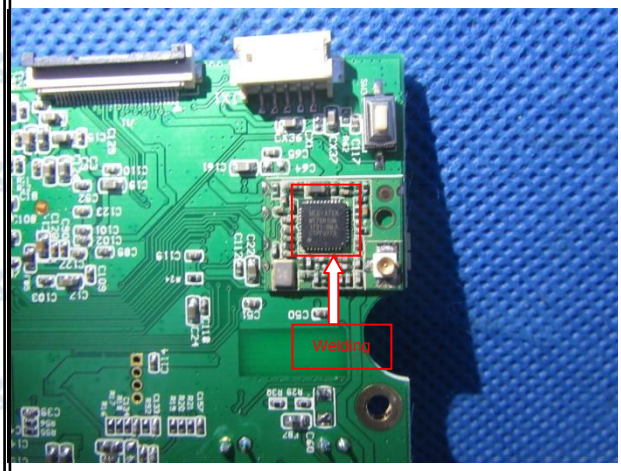
Note: All the equipments for Guangzhou Lisai Calibration.

3. RF SHIELDING METHOD

We use the following methods to prevent unauthorized access and modification of RF and modulation parts.
Step 1: RF module soldered on the motherboard by tin, The wireless module will be loaded into the host, RF line use SMD components and Modulation components are coated with buckle. This resin is not easily removed, the equipment can be damaged if the user tries to open it, Please refer to following for photo for details.Please refer to following for photo for details.
Step 2: Using the hexagonal screwsto make sure it is not opened by other tools.

Photos

Step 1



Step 2

Step 2

4. TEST RESULT FOR WIFI

4.1 FREQUENCY ERROR

4.2 LIMIT

Item	Limits
Frequency Error	50ppm

4.3 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz/30KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4 TEST PROCEDURES

(1)In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.

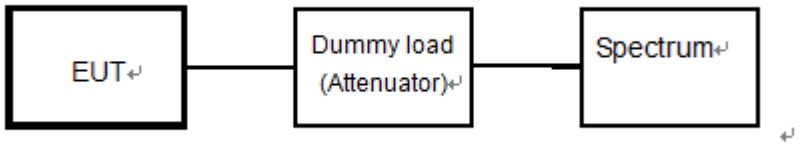
(2)In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

(3)In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.

(4)In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

4.5 TEST SETUP LAYOUT



4.1.5. EUT OPERATION DURING TEST

The EUT was placed on the test table and programmed in un-modulation function.

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4.5.1 TEST RESULT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	unmodulated-20M/40M		

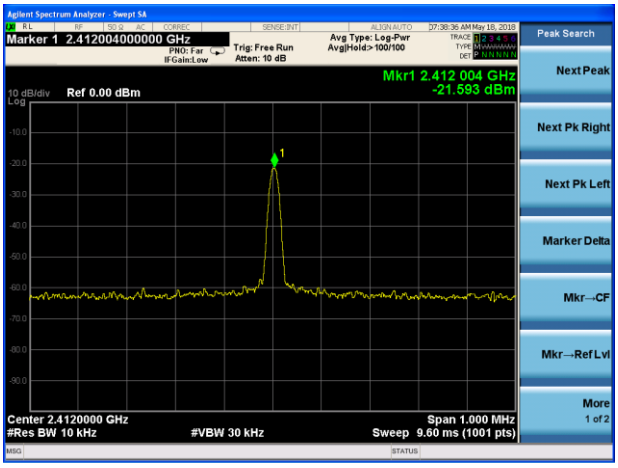
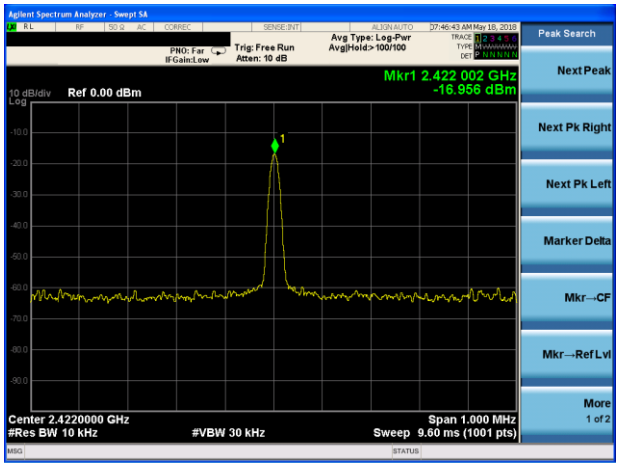
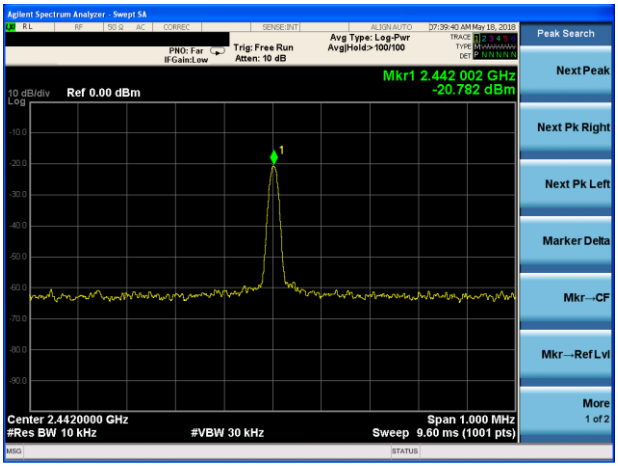
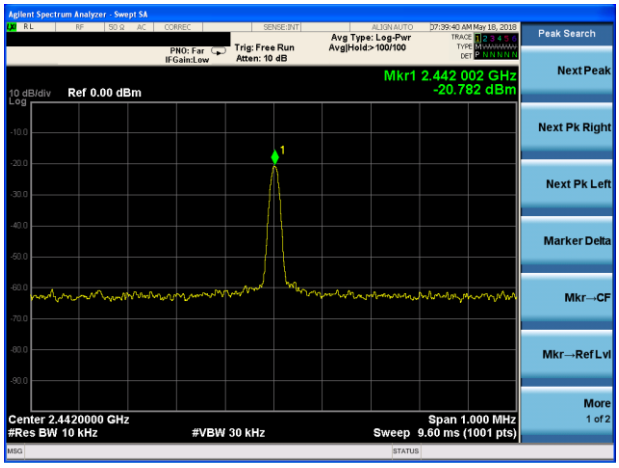
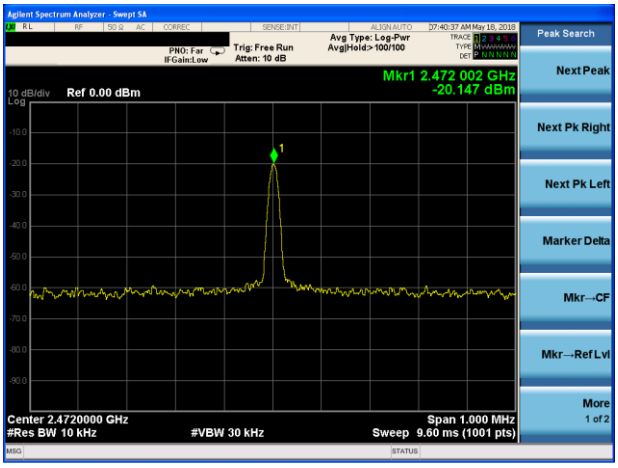
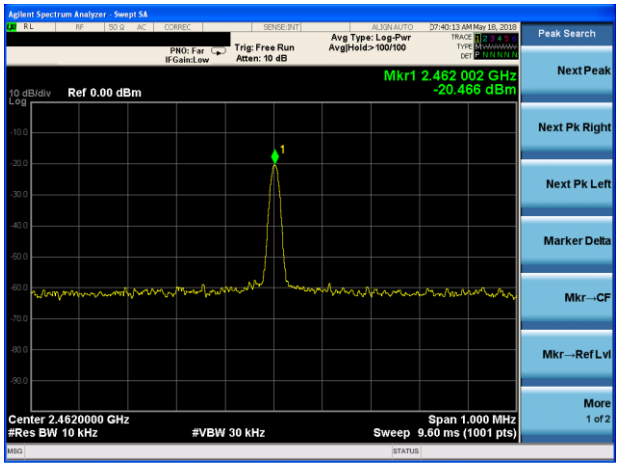
unmodulated-20M:

Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2412	2412.004	1.66	50	PASS
	2442	2442.002	0.82	50	PASS
	2472	2472.002	0.81	50	PASS

unmodulated-40M

Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2422	2422.002	0.83	50	PASS
	2442	2442.002	0.82	50	PASS
	2462	2462.002	0.81	50	PASS

Test Plot

unmodulated-20M	unmodulated-40M
CH 01	CH 03
	
CH 07	CH 07
	
CH 13	CH 11
	

5. ANTENNA POWER

5.1 LIMIT

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional$_{Note1}$
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1$_{Note2}$	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH,FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

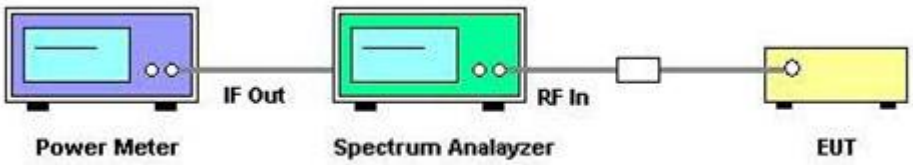
Note 1: The half-value angle of the beam directivity must be less than 360 ÷ A degrees. A shall be the rate at which the EIRP exceeds the upper limit of the omnidirectional EIRP.
Note 2: OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26 MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

5.2 TEST PROCEDURES

1. Connect the UUT to the spectrum analyser and use the following settings:
   - Centre Frequency: The centre frequency of the channel under test.
   - Resolution BW: 1 MHz.
   - Video BW: 3 MHz.
   - Span: Twice of the occupied bandwidth
   - Detector: Peak.
   - Trace Mode: Max Hold
2. When the trace is complete, find the peak value of the power envelope and record the frequency.
3. Make the following changes to the settings of the spectrum analyser:
   - Centre Frequency: Equal to the frequency recorded in step 2.
   - Span: 0 MHz.
   - Resolution BW: 1 MHz.
   - Video BW: 1 MHz.
   - Sweep time: 1 minute.
   - Detector: Average (see note).
   - Trace Mode: Max Hold.
4. Connect the RF power meter to the IF output end of the spectrum analyzer.
5. Then read the value of antenna power .

   between + 20% to - 80% power range that base on manufacturer declare the conducted power density.

5.3 TEST SETUP LAYOUT



5.4 TEST DEVIATION

There is no deviation with the original standard.

5.5 TEST RESULT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-B mode		

Frequency	Conducted RF output power density (dBm/MHz)	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	2.428	1.749	3	-41.71%
2442MHz	3.225	2.102	3	-29.95%
2472MHz	3.823	2.412	3	-19.61%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)				

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-G mode		

Frequency	Conducted RF output power density (dBm/MHz)	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	0.537	1.132	1.5	-24.56%
2442MHz	0.735	1.184	1.5	-21.03%
2472MHz	0.834	1.212	1.5	-19.22%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)				

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-N mode(20MHz)		

Frequency	Conducted RF output power density (dBm/MHz)	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	0.535	1.131	1.5	-24.59%
2442MHz	0.736	1.185	1.5	-21.02%
2472MHz	0.834	1.212	1.5	-19.23%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)				

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-N mode(40MHz)		

Frequency	Conducted RF output power density (dBm/MHz)	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2422MHz	-2.861	0.518	0.6	-13.75%
2442MHz	-2.560	0.555	0.6	-7.56%
2462MHz	-2.059	0.622	0.6	3.74%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)				

6. OCCUPIED BANDWITH

6.1 LIMIT

Item	Limits
Occupied Band Width:	FH 83.5MHz; OFDM1,DS ≦26MHz; OFDM2(802.11n40)≦38MHz； Others≦ 26MHz
Spreading Bandwidth:	≧500 kHz (FH, DS)

6.1.2. MEASURING INSTRUMENTS AND SETTING

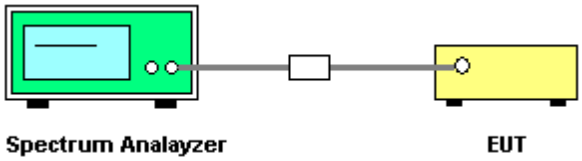
6.1.3. TEST PROCEDURES

Set the spectrum analyzer as follows :

Center frequency:	Test frequency
Frequency sweep width:	About 2~3.5 times of the Nominal bandwidth
Resolution bandwidth:	3% or less of the Nominal bandwidth
Video bandwidth:	Equal to RBW
Sweep time:	Minimum time to ensure the measuring accuracy (In the case of burst wave, one burst shall be included per data point.)
Sweep mode:	Continuous sweep
Detection mode:	Positive peak
Display mode:	Maximum hold

Note: 1. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
2. Spread Spectrum Factor limit is greater than 5

6.1.4. TEST SETUP LAYOUT



6.1.5. TEST DEVIATION

There is no deviation with the original standard.

6.1.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

6.2 TEST RESULT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-802.11b/g/n(HT20, HT40) mode		

802.11b			
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	12.225	8.8676
	2442	12.231	8.8642
	2472	12.237	8.8652

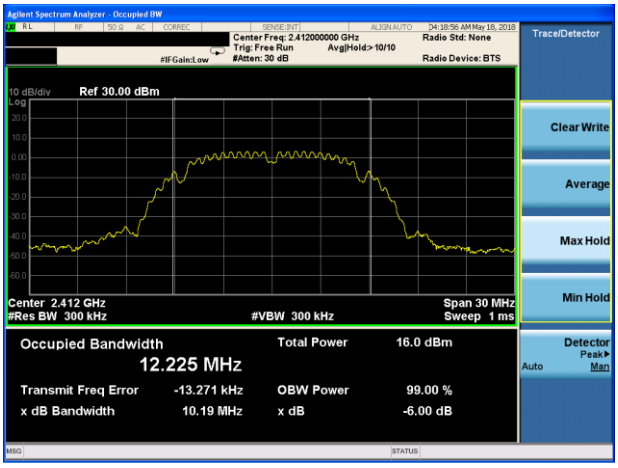
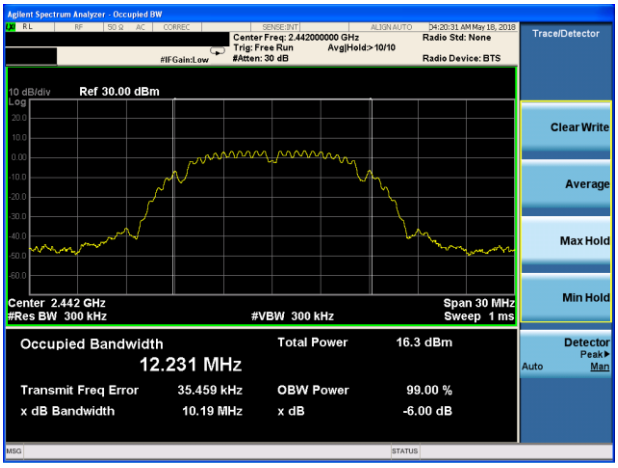
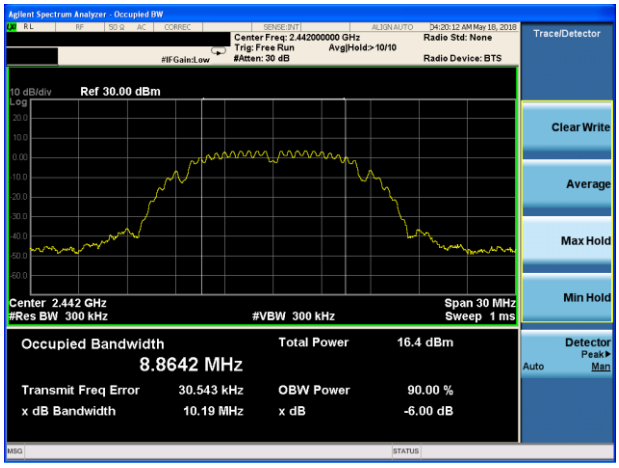
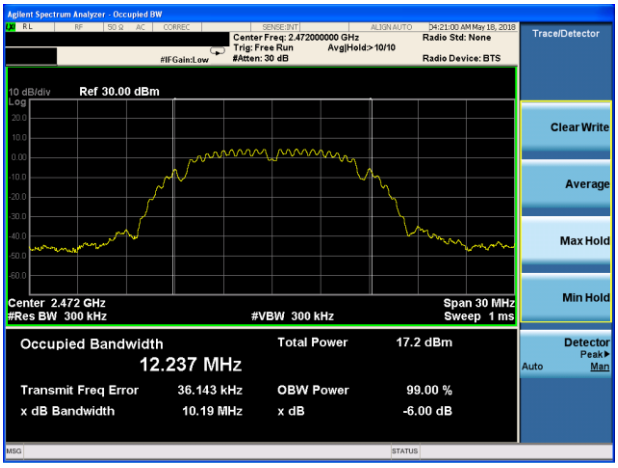
802.11g			
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	16.838	15.106
	2442	16.845	15.083
	2472	16.850	15.086

802.11n20			
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	17.640	15.847
	2442	17.635	15.847
	2472	17.646	15.832

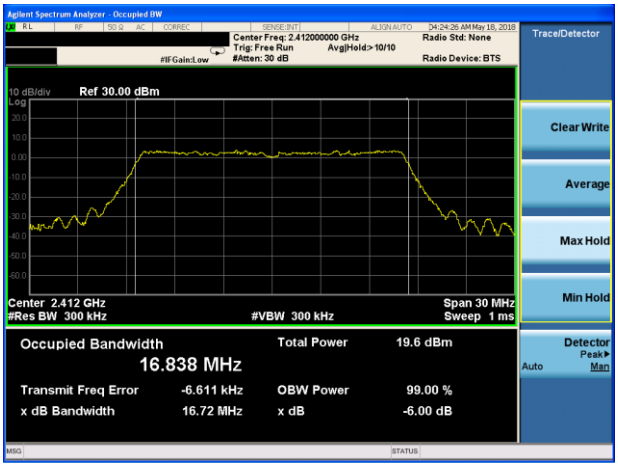
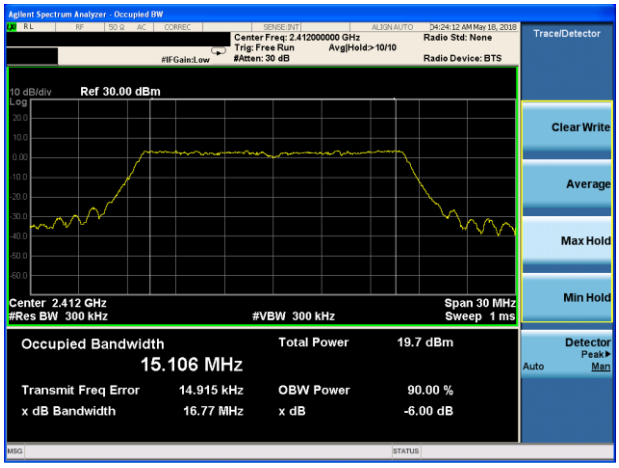
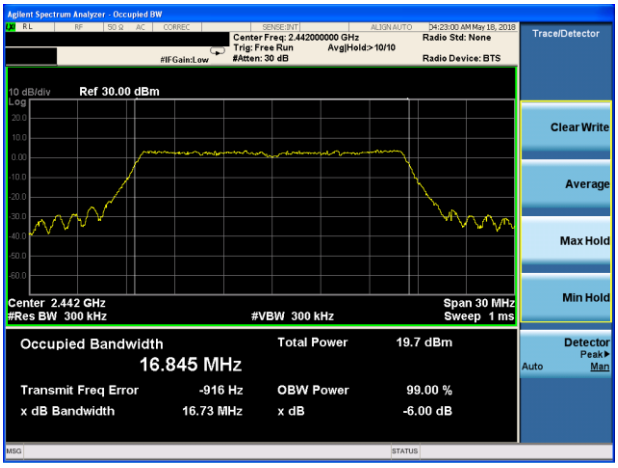
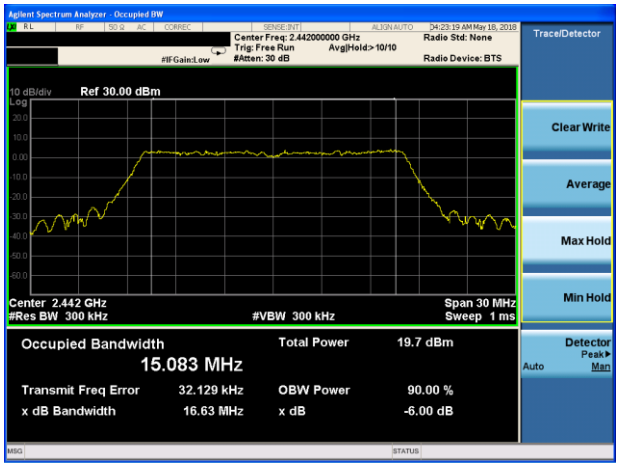
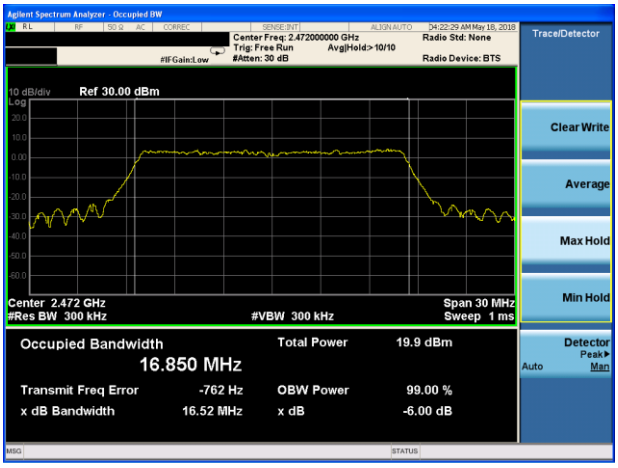
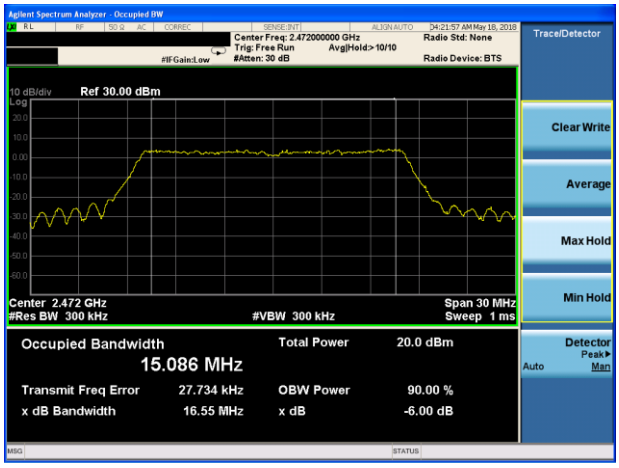
802.11n40			
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2422	35.982	32.768
	2442	35.973	32.762
	2462	35.966	32.706

Spreading Factor =Spreading Bandwidth/ Frequency equal to Transmitting Data speed

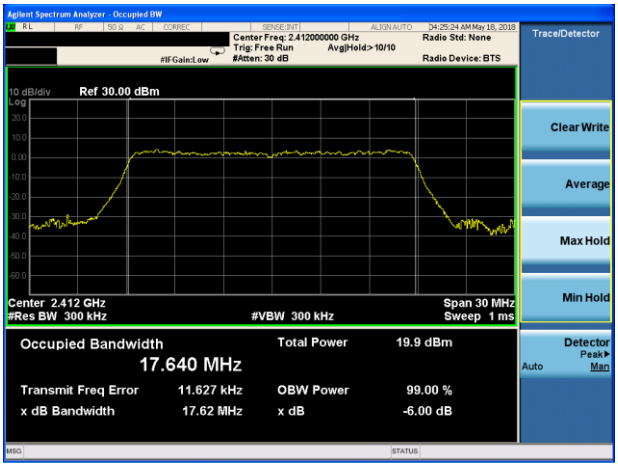
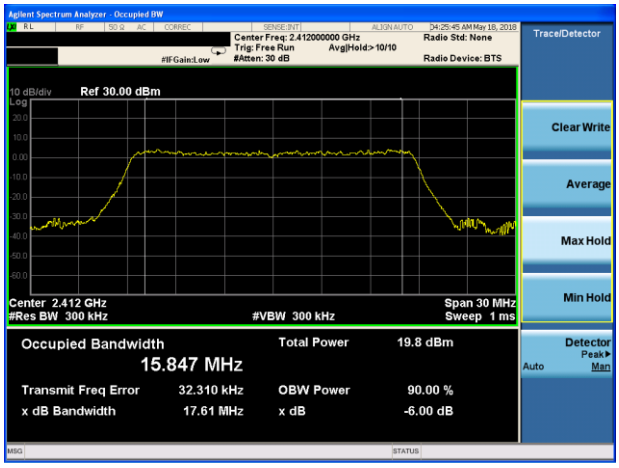
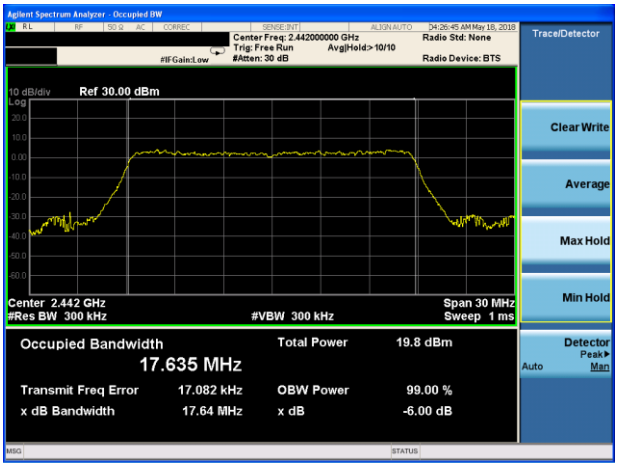
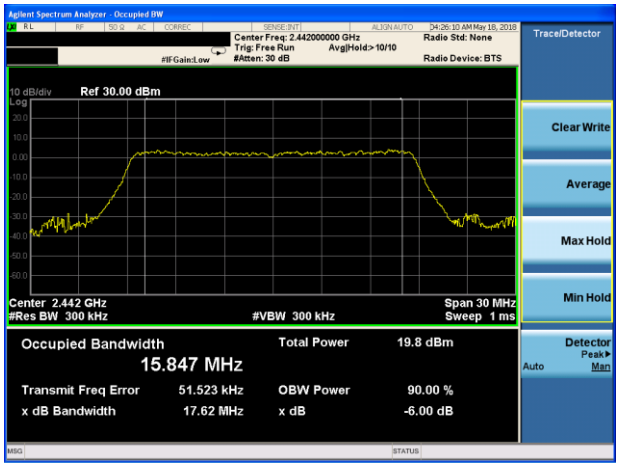
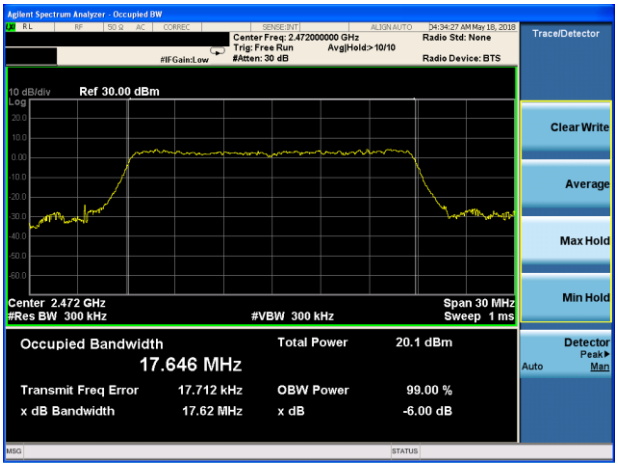
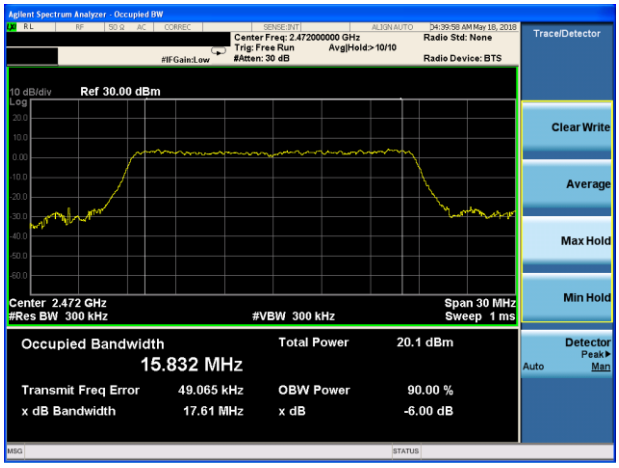
Test Plot

Mode (802.11b)	Mode (802.11b)
CH01-Occupied Bandwidth (99%)	CH01-Spread Bandwidth (90%)
	
CH07-Occupied Bandwidth (99%)	CH07-Spread Bandwidth (90%)
	
CH13-Occupied Bandwidth (99%)	CH13-Spread Bandwidth (90%)
	

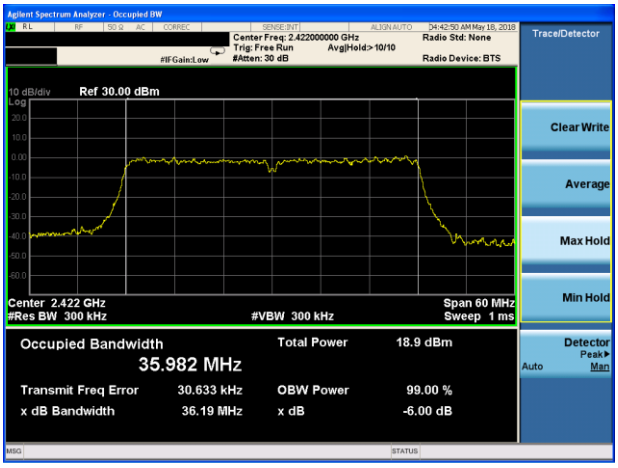
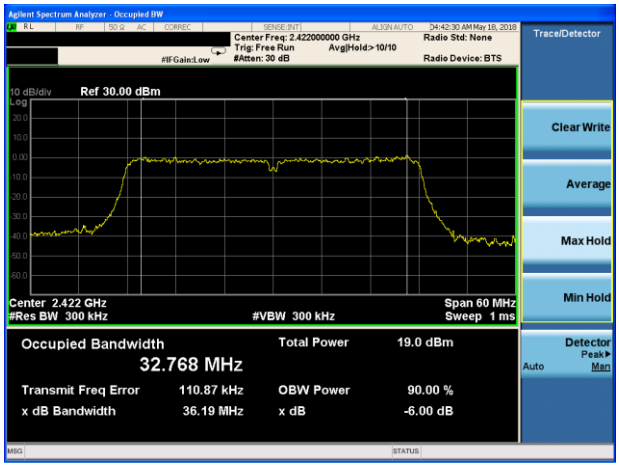
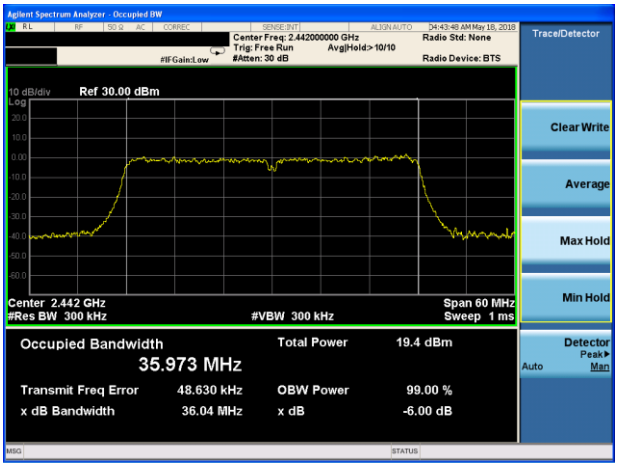
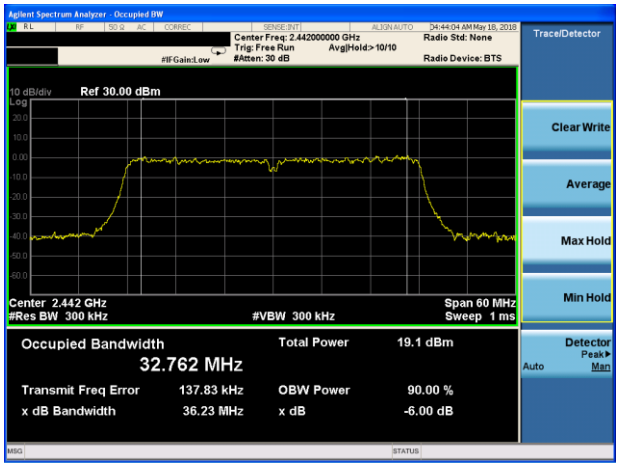
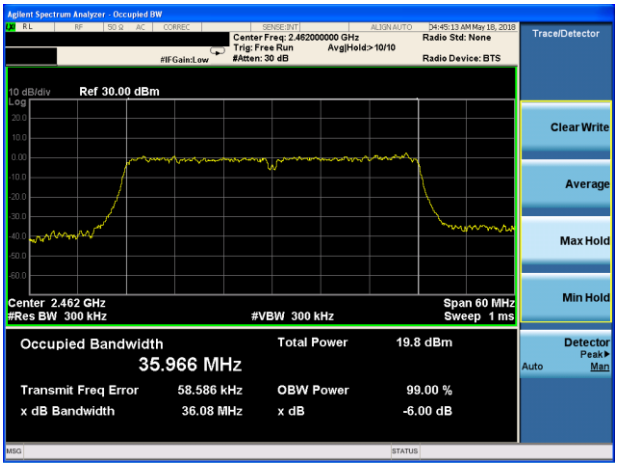
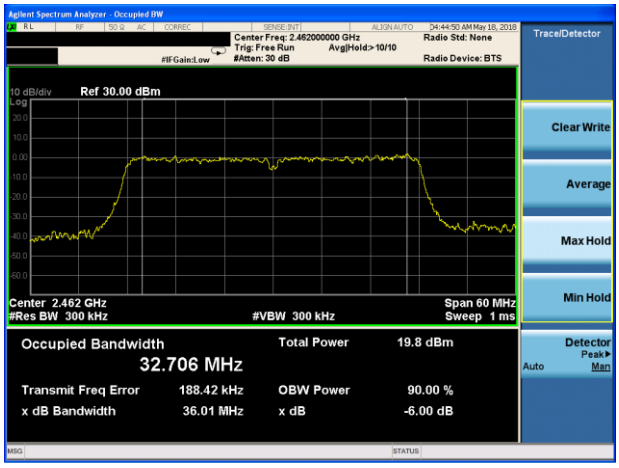
Test Plot

Mode (802.11g)	Mode (802.11g)
CH01-Occupied Bandwidth (99%)	CH01-Spread Bandwidth (90%)
	
CH07-Occupied Bandwidth (99%)	CH07-Spread Bandwidth (90%)
	
CH13-Occupied Bandwidth (99%)	CH13-Spread Bandwidth (90%)
	

Test Plot

Mode (802.11n20)	Mode (802.11n20)
CH01-Occupied Bandwidth (99%)	**CH01-Spread Bandwidth (90%)**
	
CH07-Occupied Bandwidth (99%)	**CH07-Spread Bandwidth (90%)**
	
CH13-Occupied Bandwidth (99%)	**CH13-Spread Bandwidth (90%)**
	

Test Plot

Mode (802.11n40)	Mode (802.11n40)
CH03-Occupied Bandwidth (99%)	CH03-Spread Bandwidth (90%)
	
CH07-Occupied Bandwidth (99%)	CH07-Spread Bandwidth (90%)
	
CH11-Occupied Bandwidth (99%)	CH11-Spread Bandwidth (90%)
	

7. UNWANTED EMISSION INTENSITY MEASUREMENT

7.1 LIMIT

Item	Limits
TX Spurious Emission	≦2.5 μW (30MHz≦f≦1000MHz)
	≦2.5 μW (1000MHz<f≦2387MHz)
	≦25 μW (2387MHz<f≦2400MHz)
	≦25 μW (2483.5MHz≦f<2496.5MHz)
	≦2.5 μW (2496.5MHz≦f<12500MHz)

7.2 MEASURING INSTRUMENTS AND SETTING

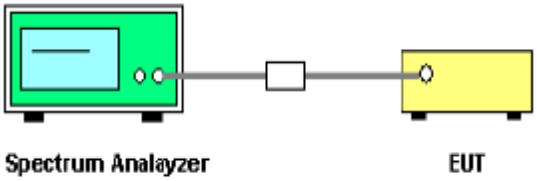
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
   Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
   Sweep Mode: Continuous sweep / Detect mode: Positive peak
   Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Meaured_ Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

7.4 TEST SETUP LAYOUT



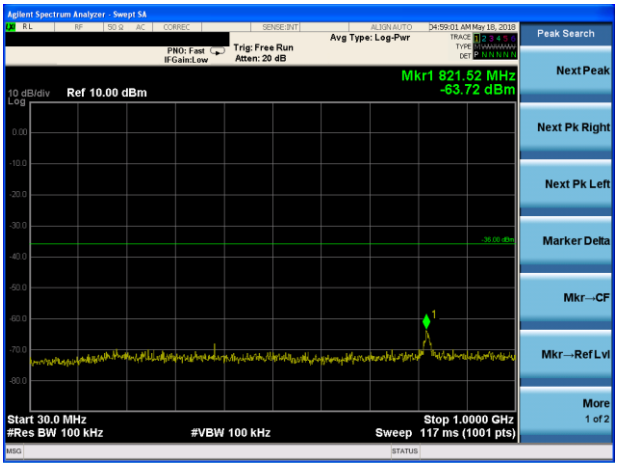
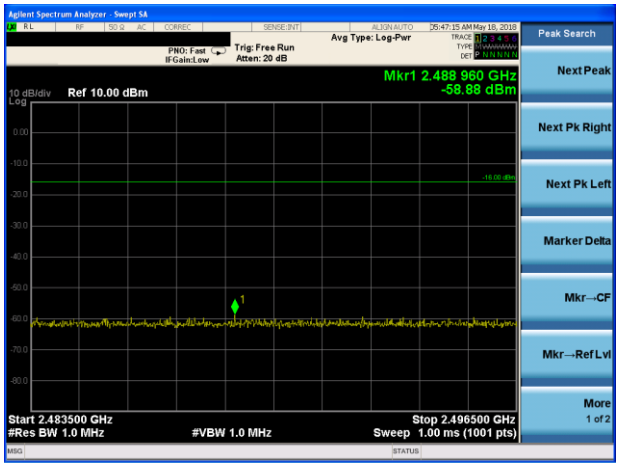
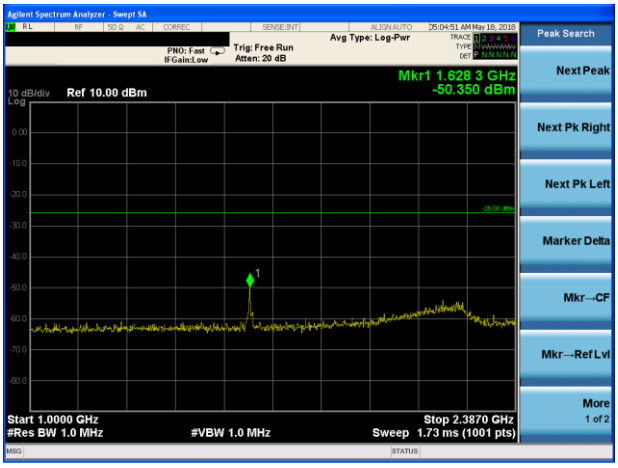
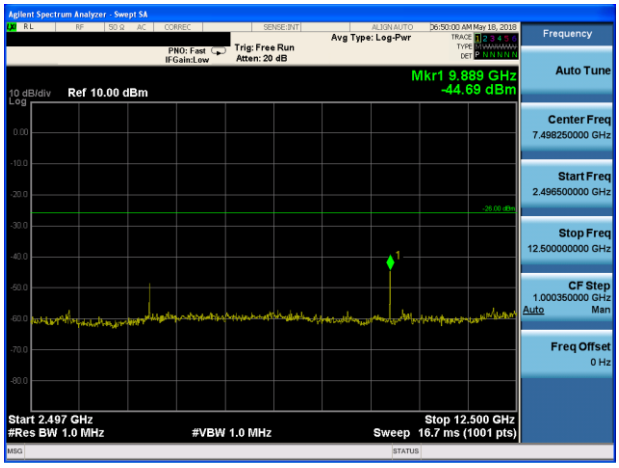
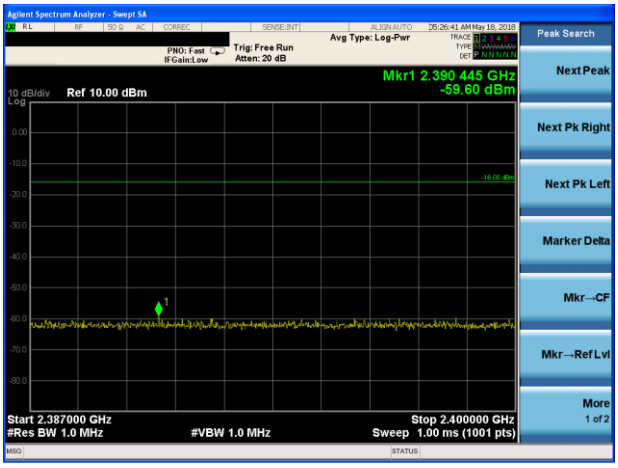
7.5 TEST DEVIATION

There is no deviation with the original standard.

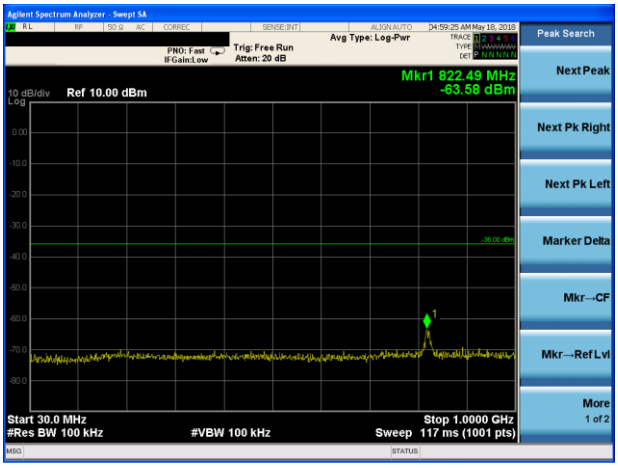
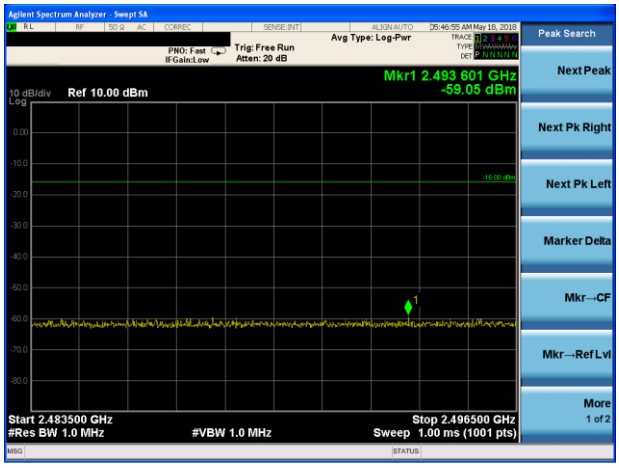
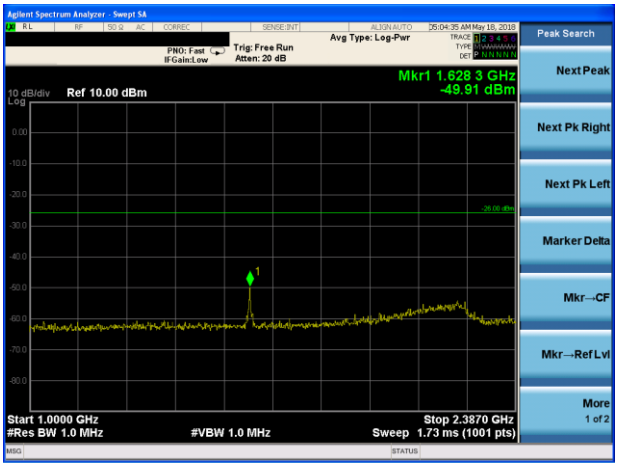
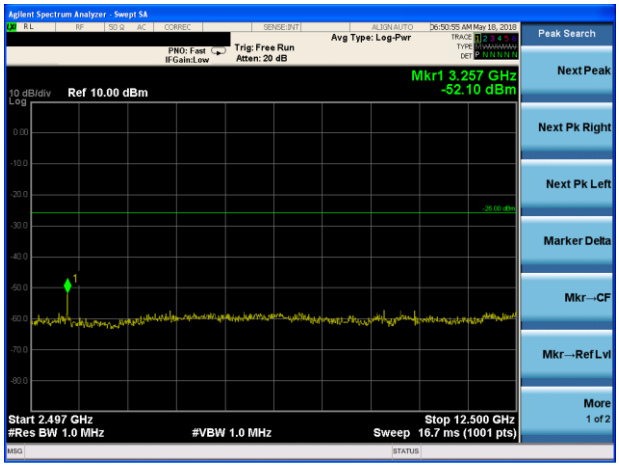
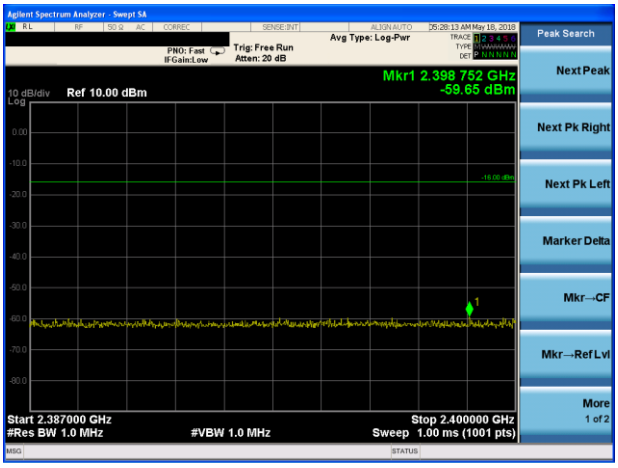
7.6 TEST RESULT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-802.11b/g/n(HT20, HT40) mode		

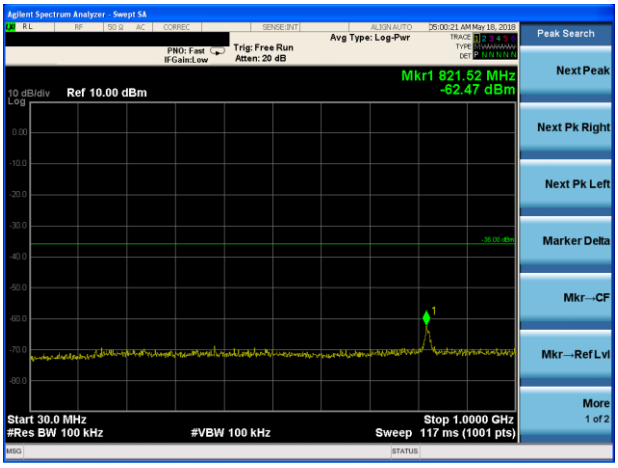
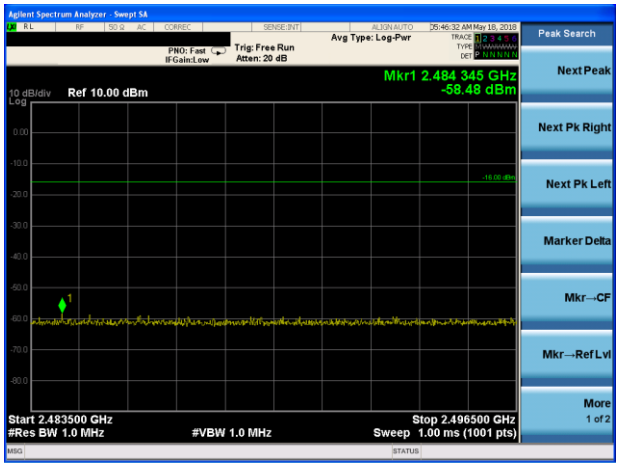
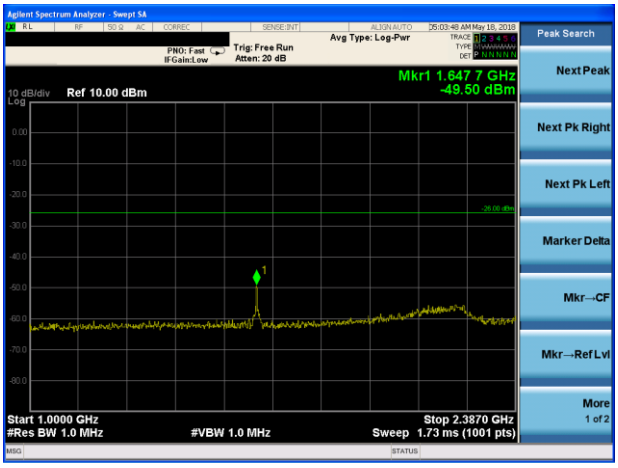
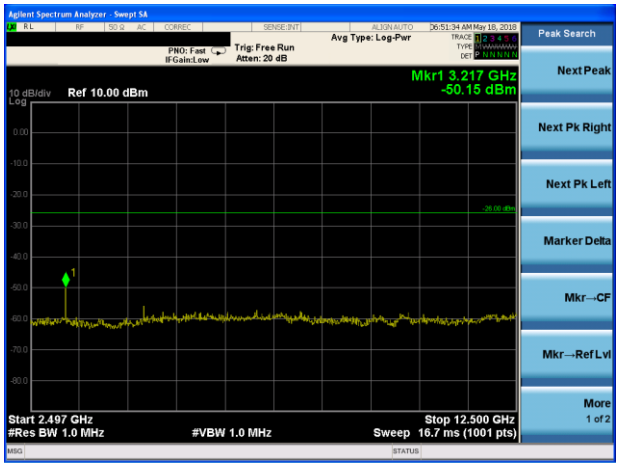
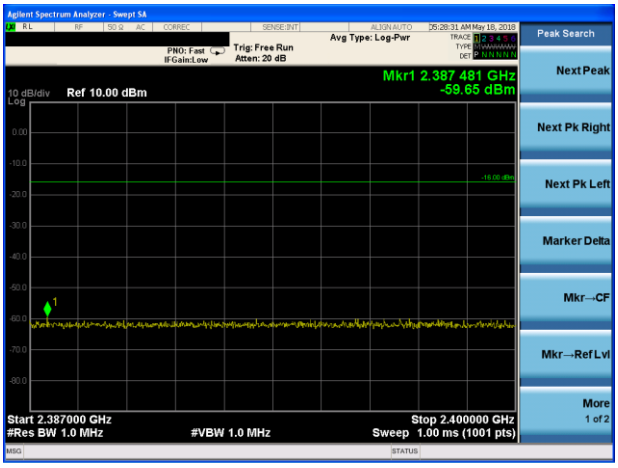
Test Plot

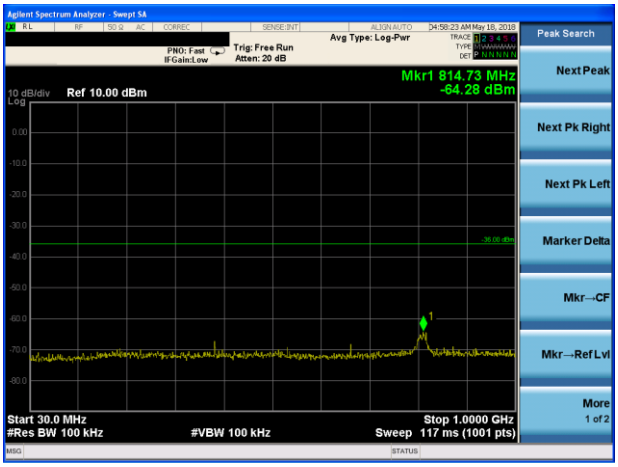
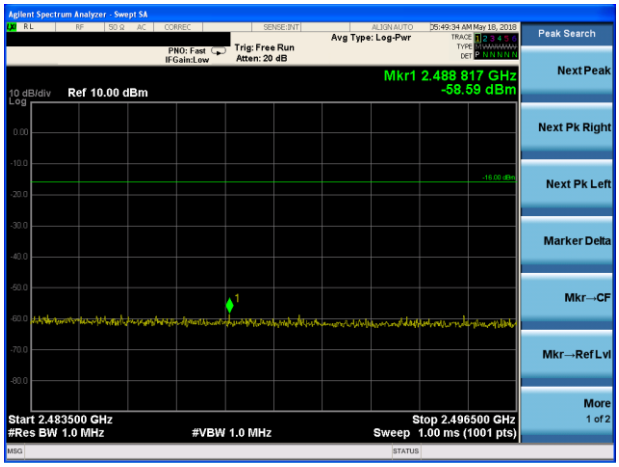
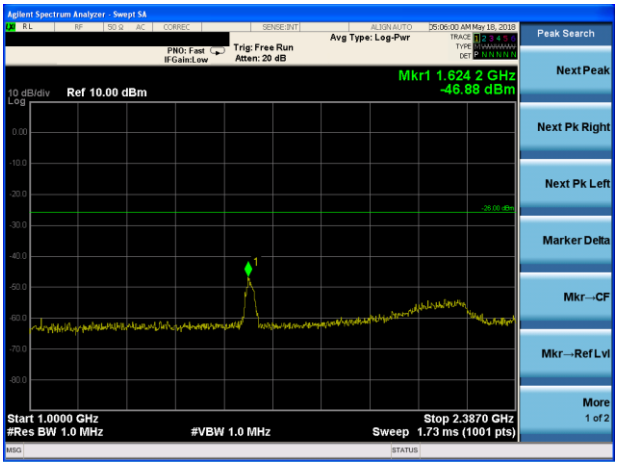
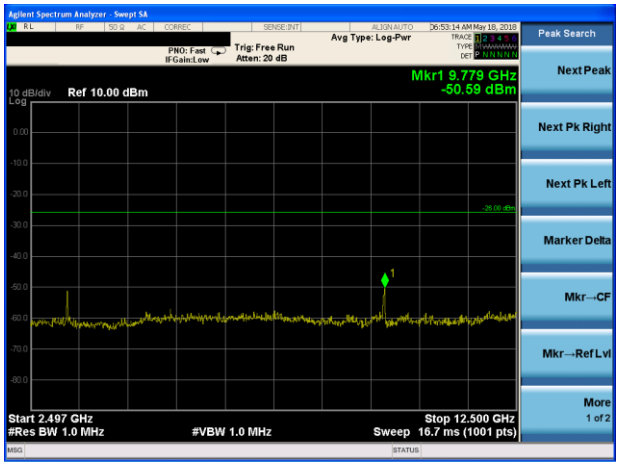
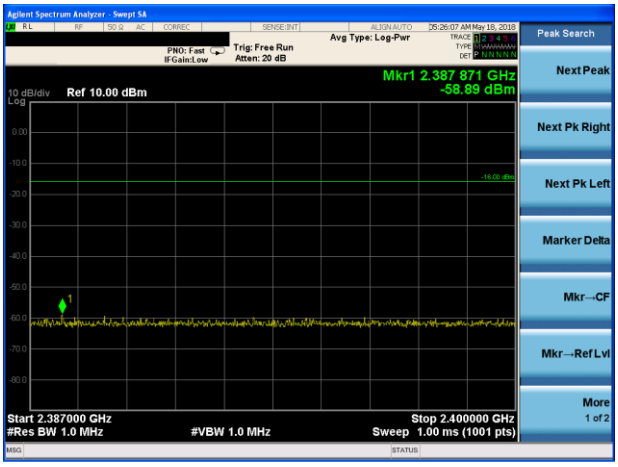
Mode (802.11b)	Mode (802.11b)
CH 01 (30 MHz ≦ f ≦ 1000 MHz)	CH 01 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 01 (1000 MHz < f ≦ 2387 MHz)	CH 01 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 01 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

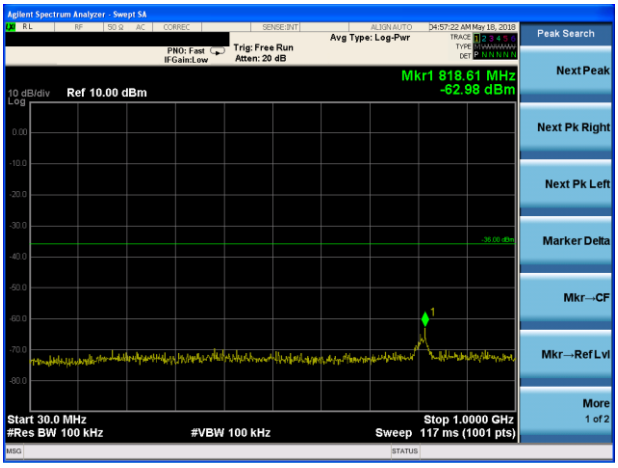
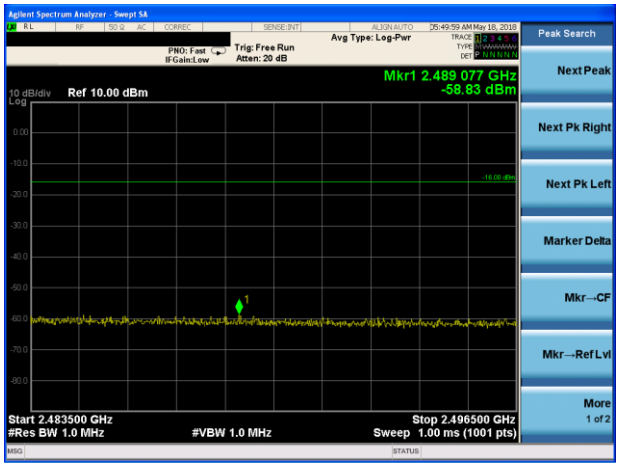
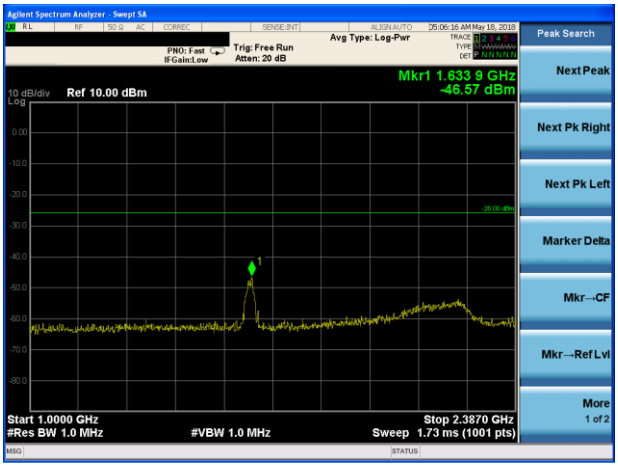
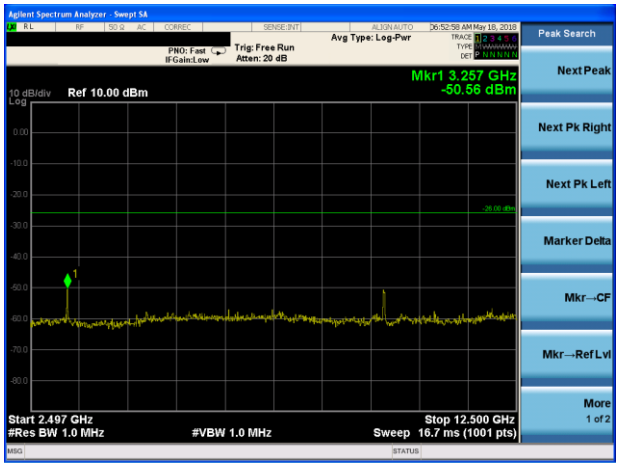
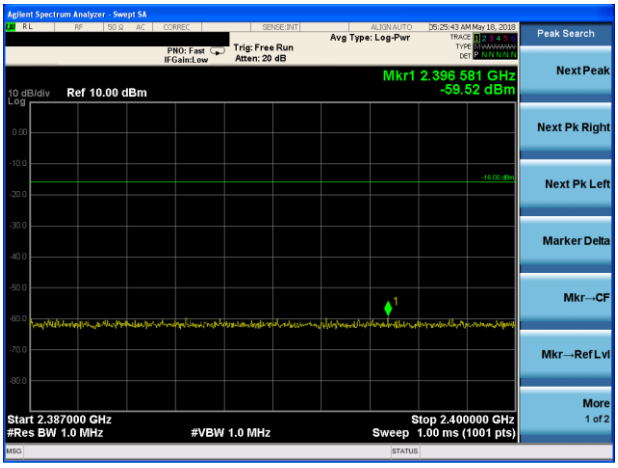
Mode (802.11b)	Mode (802.11b)
CH 07 (30 MHz ≦ f ≦ 1000 MHz)	CH 07 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 07 (1000 MHz < f ≦ 2387 MHz)	CH 07 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 07 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

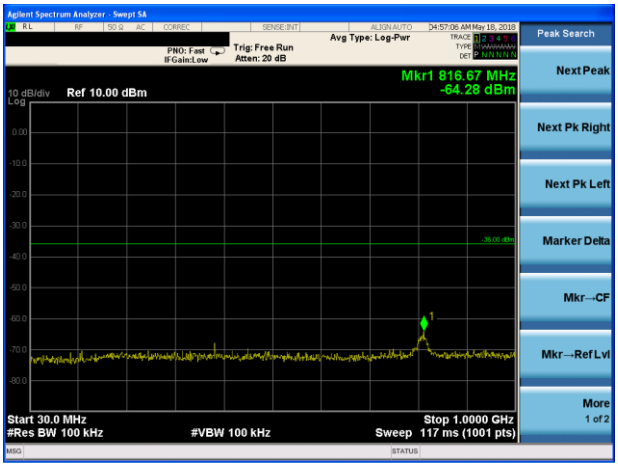
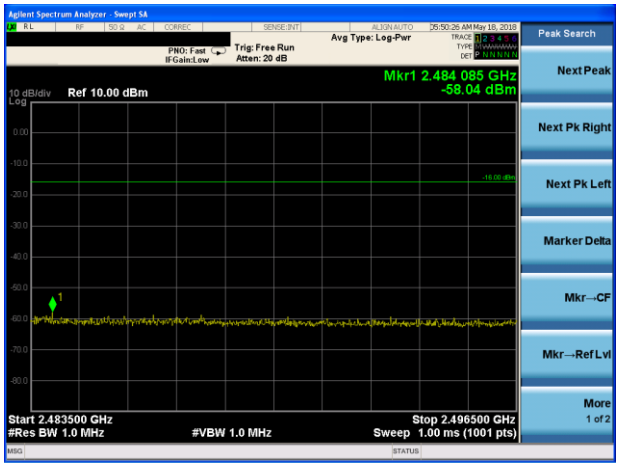
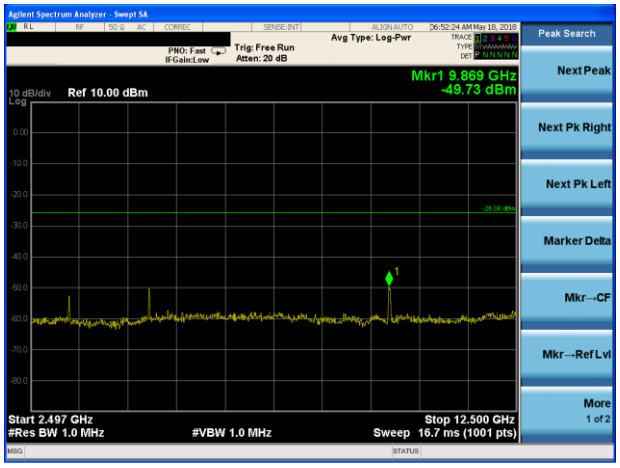
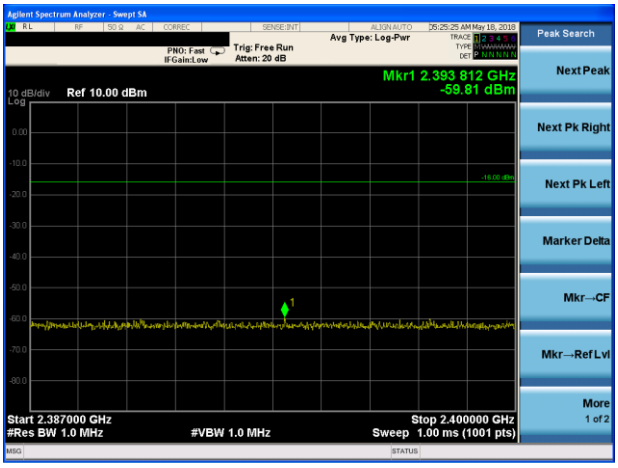
Mode (802.11b)	Mode (802.11b)
CH 13 (30 MHz ≦ f ≦ 1000 MHz)	CH 13 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 13 (1000 MHz < f ≦ 2387 MHz)	CH 13 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 13 (2387 MHz < f ≦ 2400 MHz)	
	

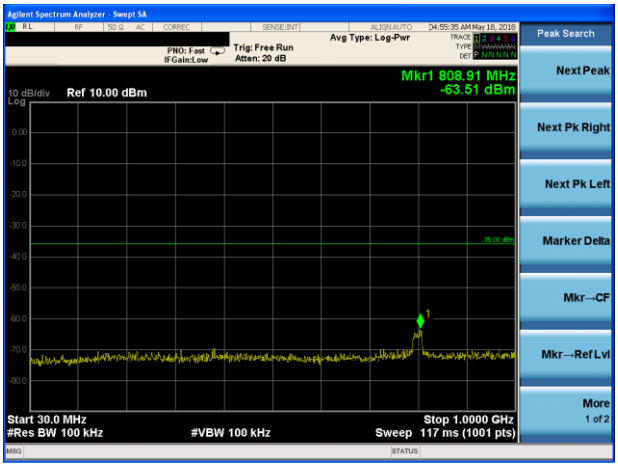
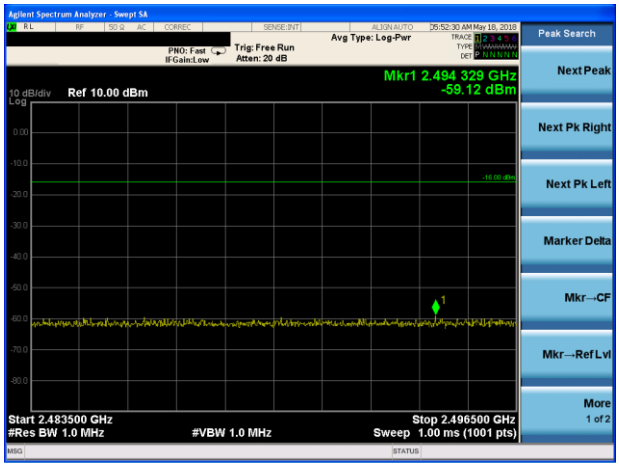
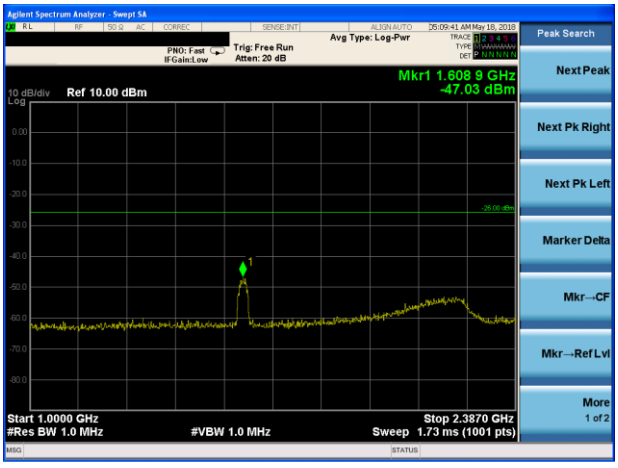
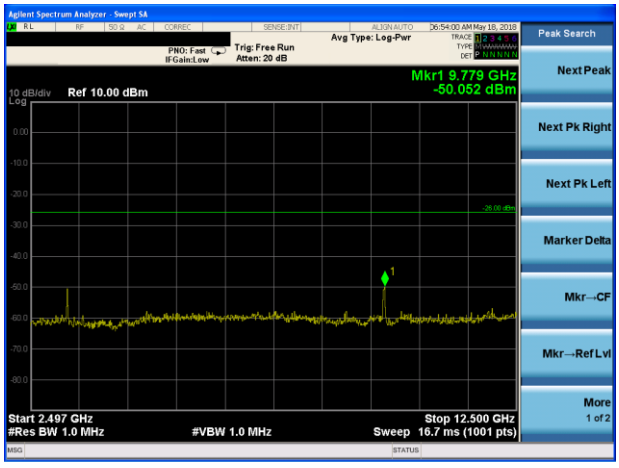
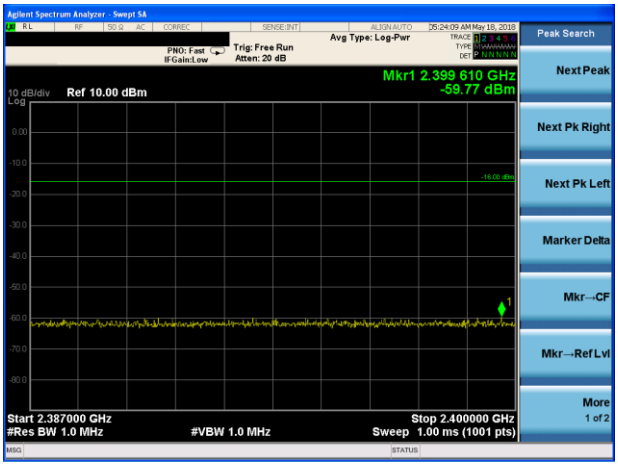
Test Plot	
Mode (802.11g)	**Mode (802.11g)**
CH 01 (30 MHz ≦ f ≦ 1000 MHz)	**CH 01 (2483.5 MHz < f ≦ 2496.5 MHz)**
	
CH 01 (1000 MHz < f ≦ 2387 MHz)	**CH 01 (2496.5 MHz < f ≦ 12.5GHz)**
	
CH 01 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

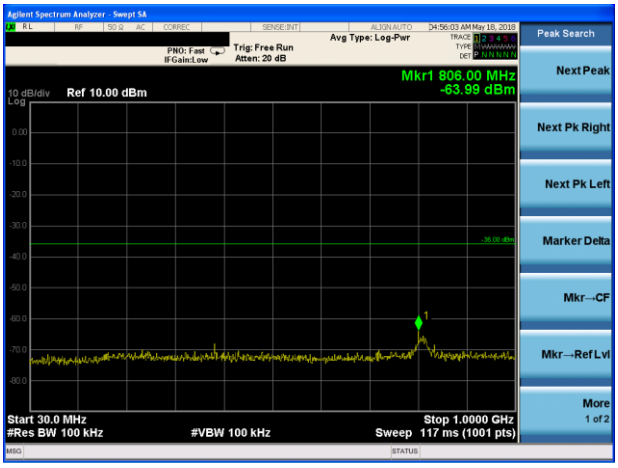
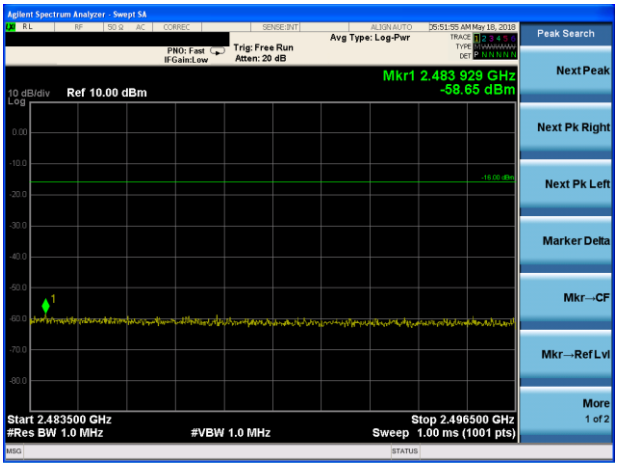
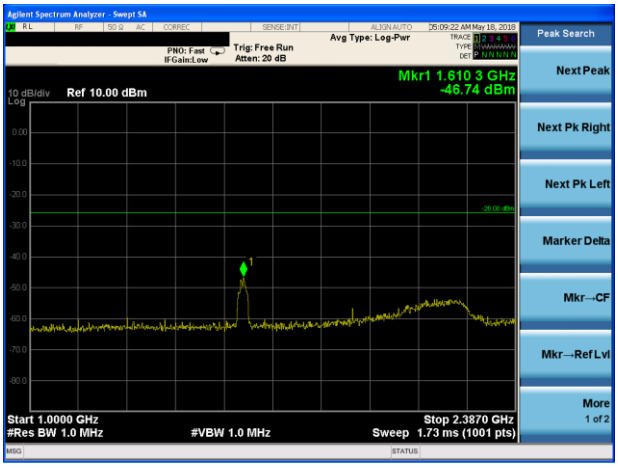
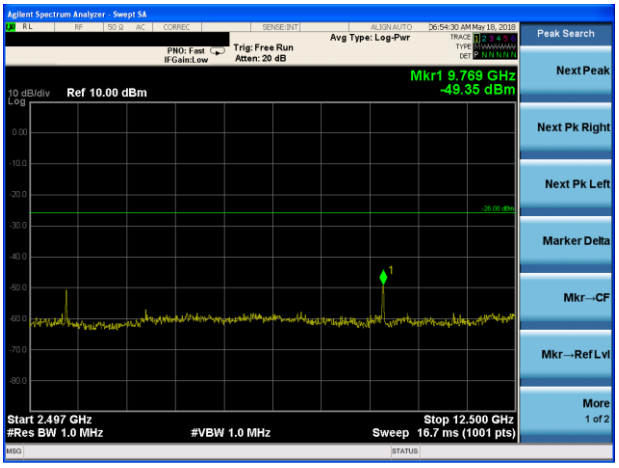
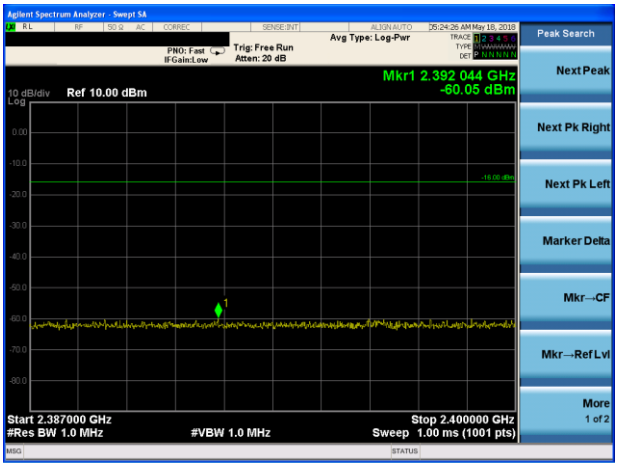
Mode (802.11g)	Mode (802.11g)
CH 07 (30 MHz ≦ f ≦ 1000 MHz)	CH 07 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 07 (1000 MHz < f ≦ 2387 MHz)	CH 07 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 07 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

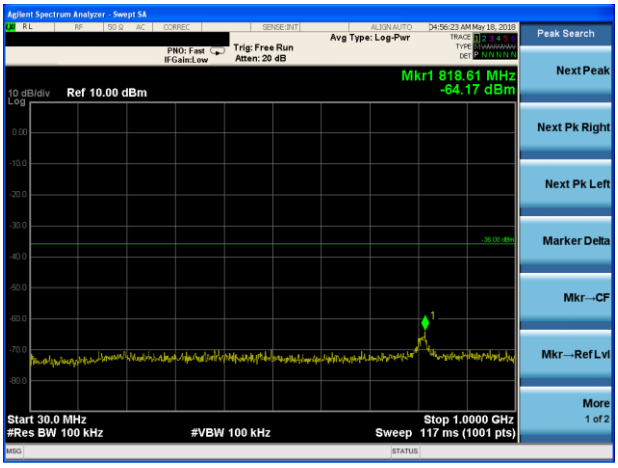
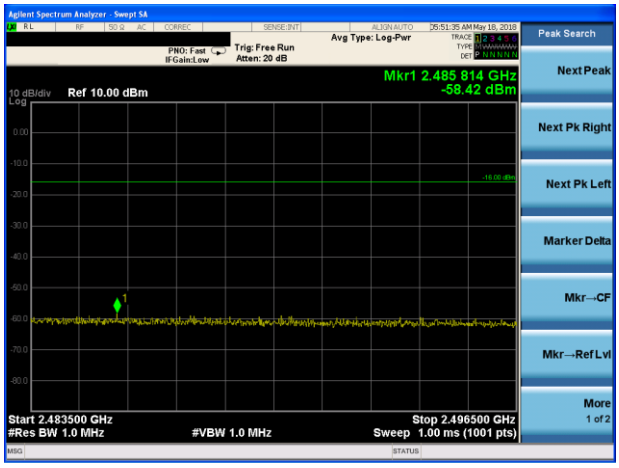
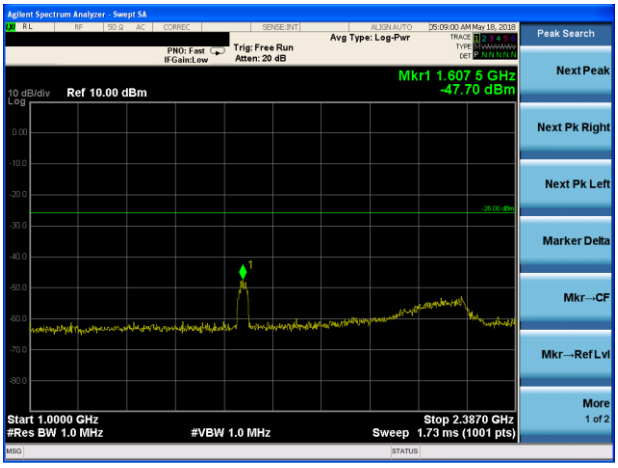
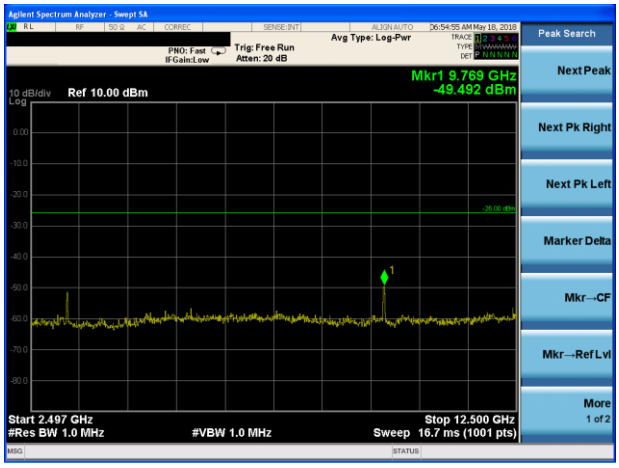
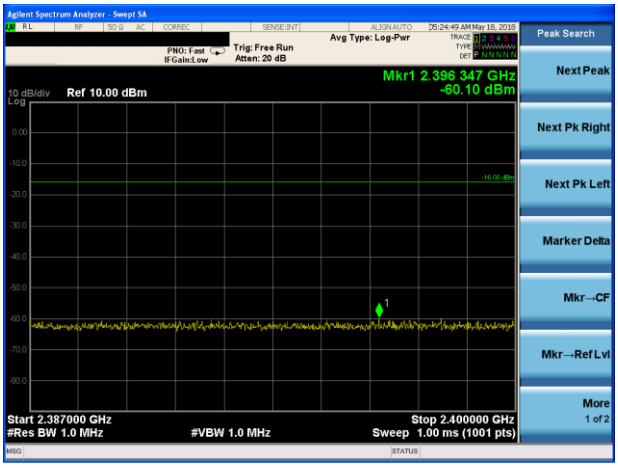
Mode (802.11g)	Mode (802.11g)
CH 13 (30 MHz ≦ f ≦ 1000 MHz)	CH 13 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 13 (1000 MHz < f ≦ 2387 MHz)	CH 13 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 13 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot	
Mode (802.11n20)	**Mode (802.11n20)**
CH 01 (30 MHz ≦ f ≦ 1000 MHz)	**CH 01 (2483.5 MHz < f ≦ 2496.5 MHz)**
	
CH 01 (1000 MHz < f ≦ 2387 MHz)	**CH 01 (2496.5 MHz < f ≦ 12.5GHz)**
	
CH 01 (2387 MHz < f ≦ 2400 MHz)	
	

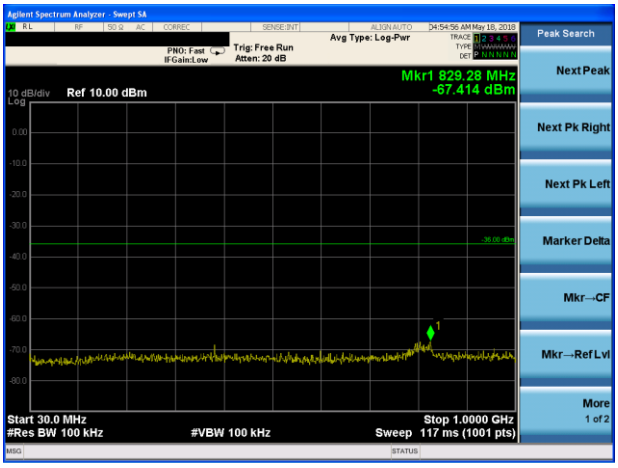
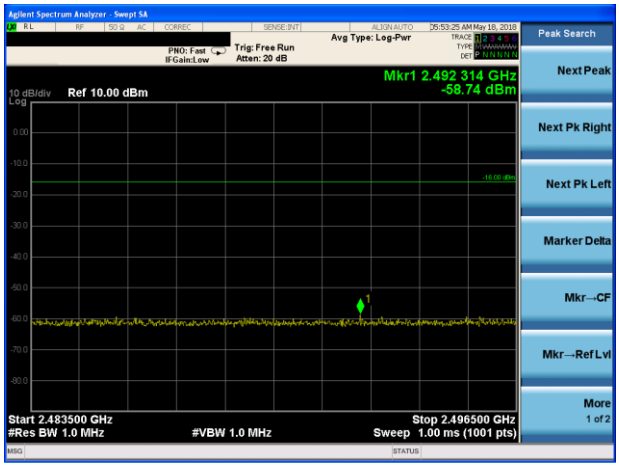
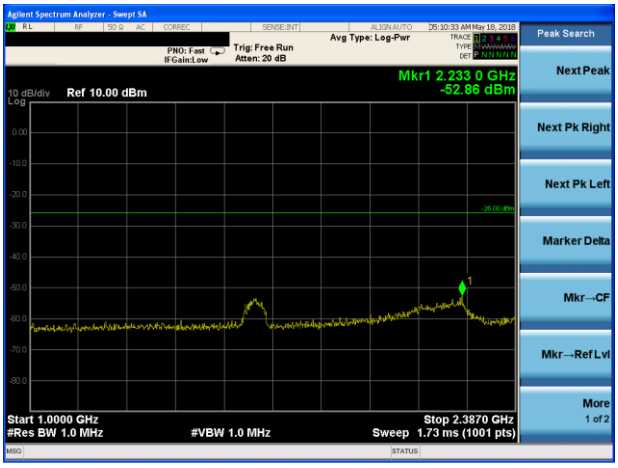
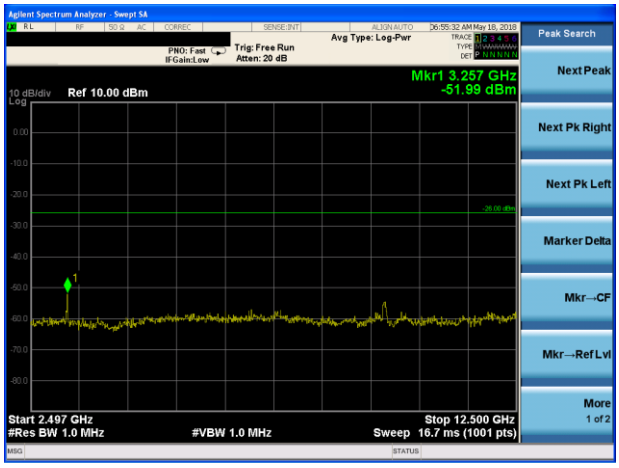
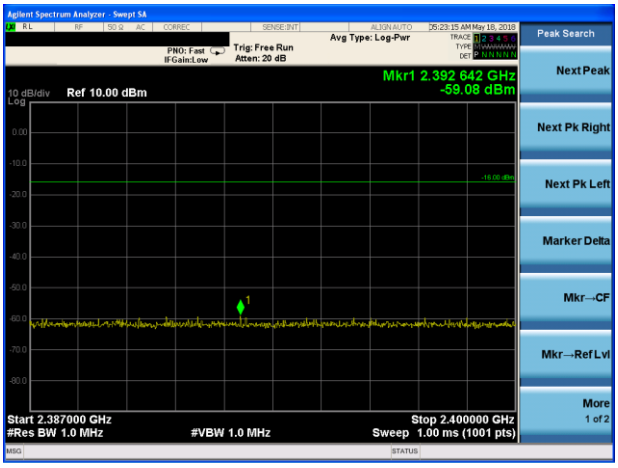
Test Plot

Mode (802.11n20)	Mode (802.11n20)
CH 07 (30 MHz ≦ f ≦ 1000 MHz)	CH 07 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 07 (1000 MHz < f ≦ 2387 MHz)	CH 07 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 07 (2387 MHz < f ≦ 2400 MHz)	
	

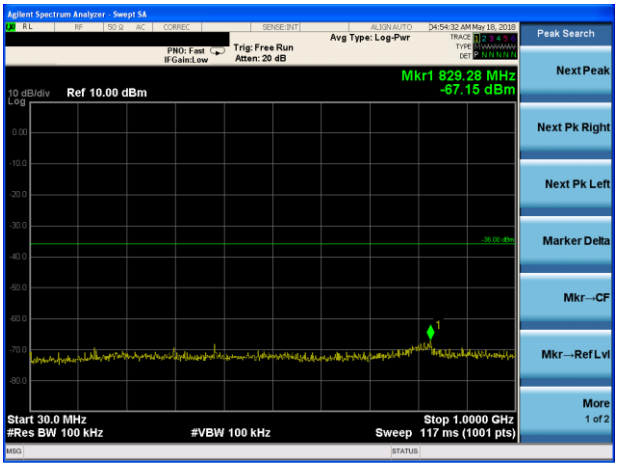
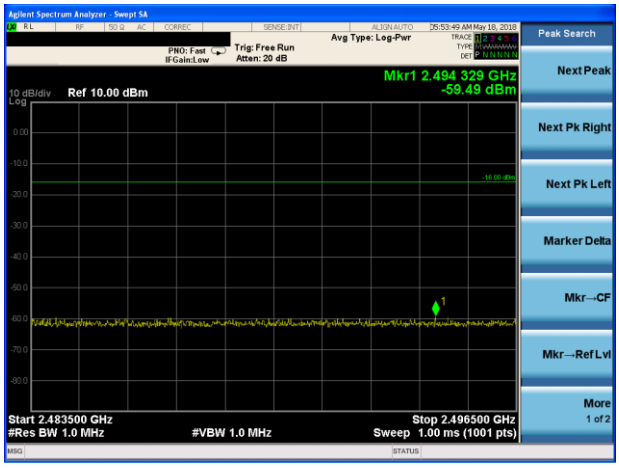
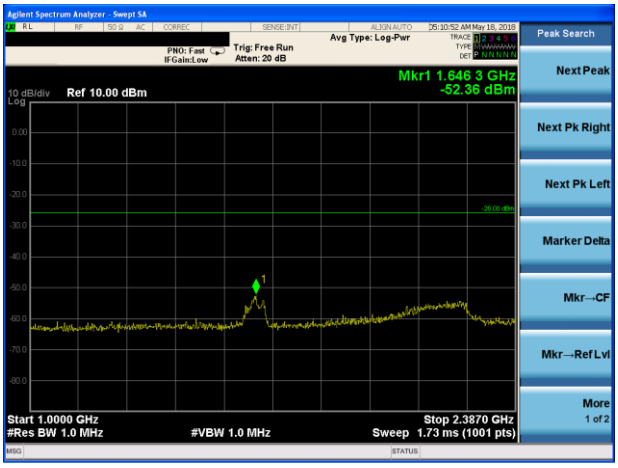
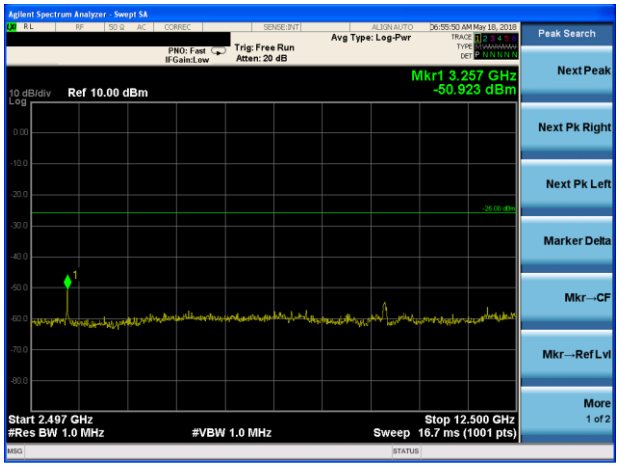
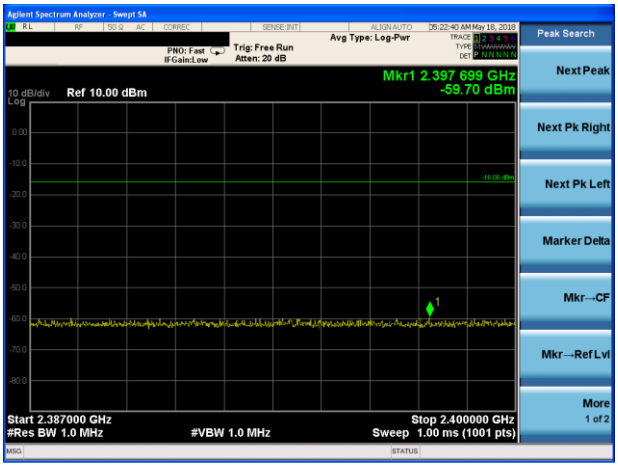
Test Plot

Mode (802.11n20)	Mode (802.11n20)
CH 13 (30 MHz ≦ f ≦ 1000 MHz)	CH 13 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 13 (1000 MHz < f ≦ 2387 MHz)	CH 13 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 13 (2387 MHz < f ≦ 2400 MHz)	
	

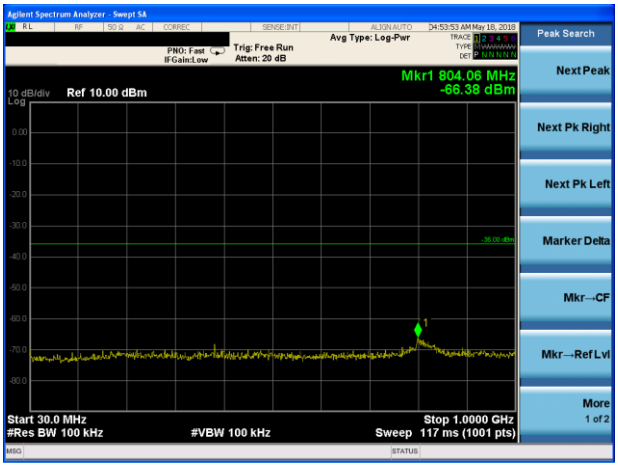
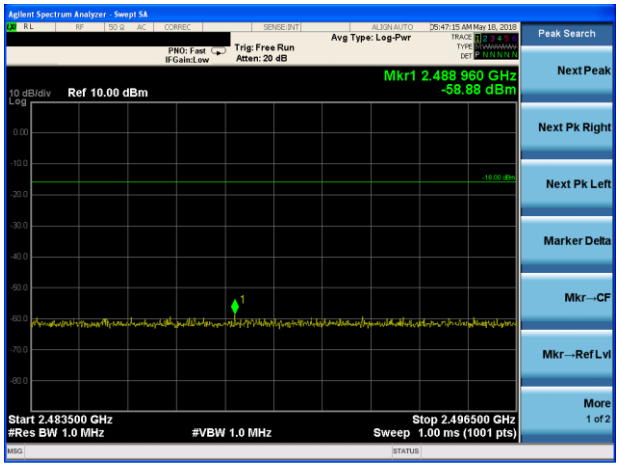
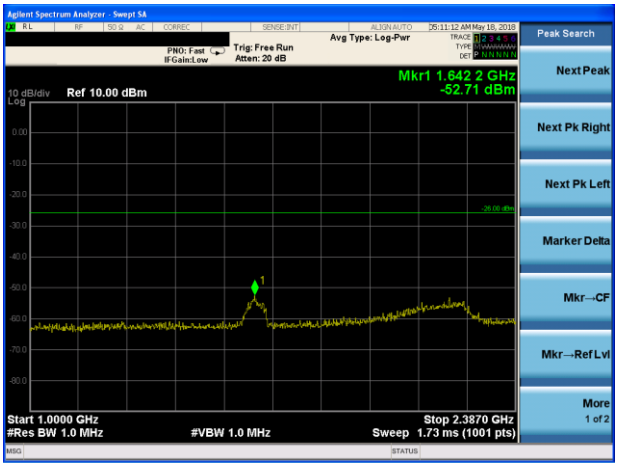
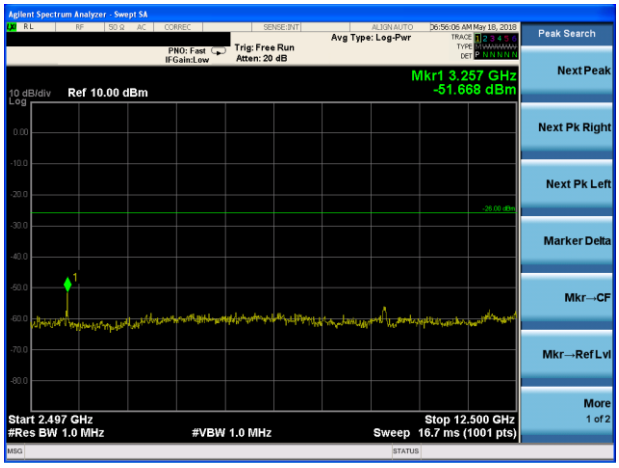
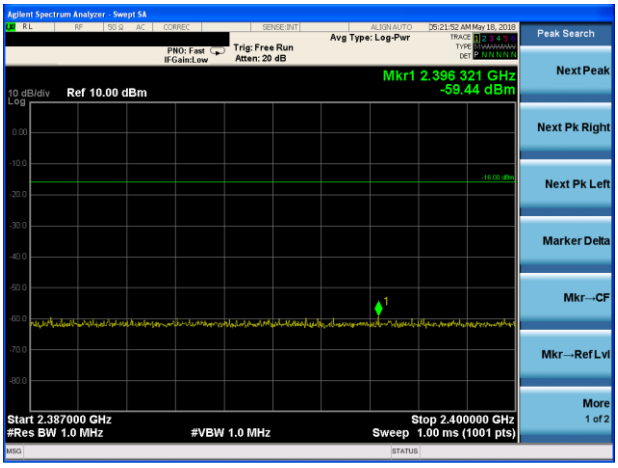
Test Plot

Mode (802.11n40)	Mode (802.11n40)
CH 03 (30 MHz ≦ f ≦ 1000 MHz)	CH 03 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 03 (1000 MHz < f ≦ 2387 MHz)	CH 03 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 03 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

Mode (802.11n40)	Mode (802.11n40)
CH 07 (30 MHz ≦ f ≦ 1000 MHz)	CH 07 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 07 (1000 MHz < f ≦ 2387 MHz)	CH 07 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 07 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

Mode (802.11n40)	Mode (802.11n40)
CH 11 (30 MHz ≦ f ≦ 1000 MHz)	CH 13 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 11 (1000 MHz < f ≦ 2387 MHz)	CH 11 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 11 (2387 MHz < f ≦ 2400 MHz)	
	

8. IMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

8.1 LIMIT

Item	Limits
RX Spurious Emission:	≦4nW (f<1GHz)
	≦20nW (1GHz≦f)

8.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

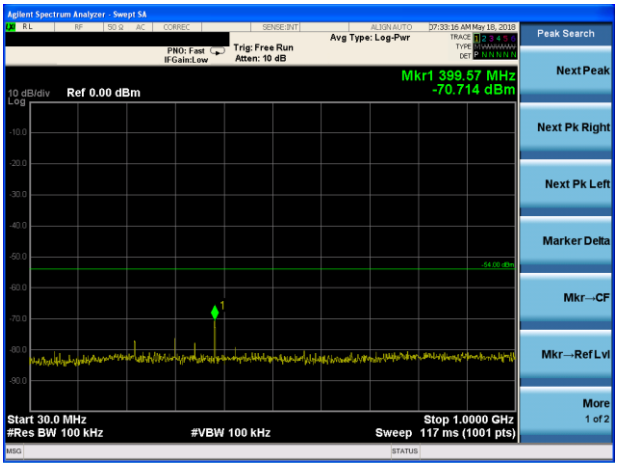
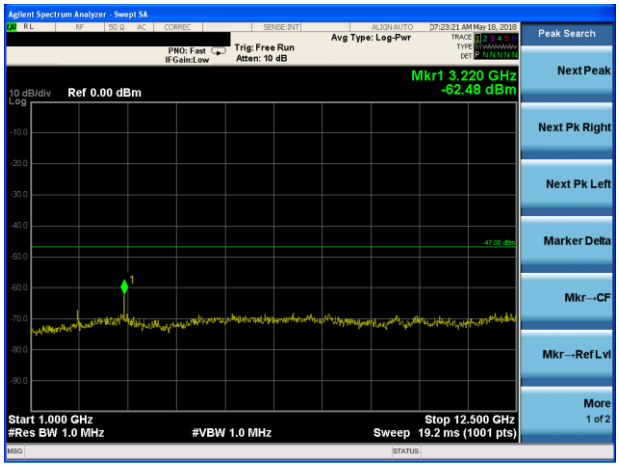
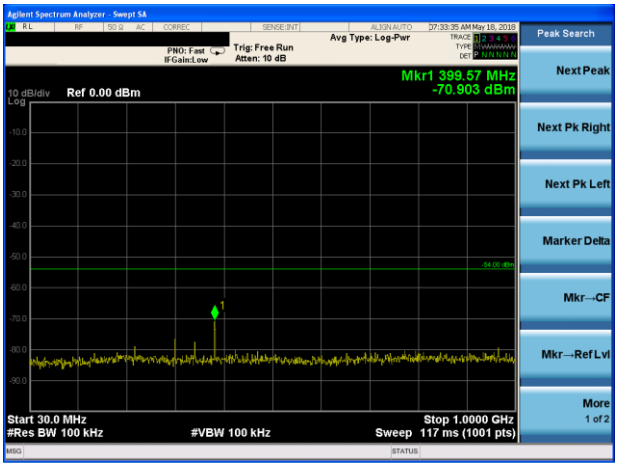
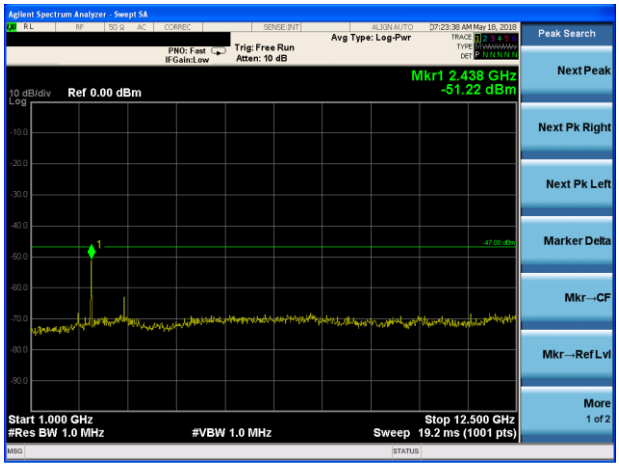
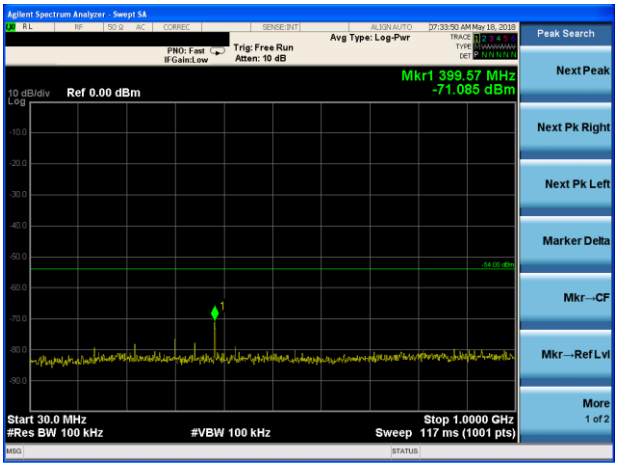
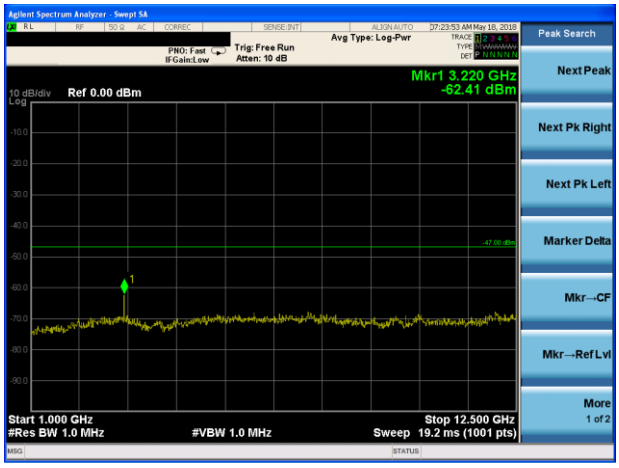
8.3 TEST PROCEDURES

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
   AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

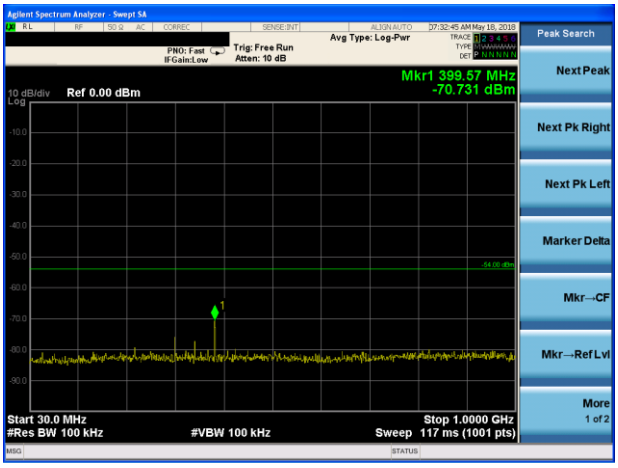
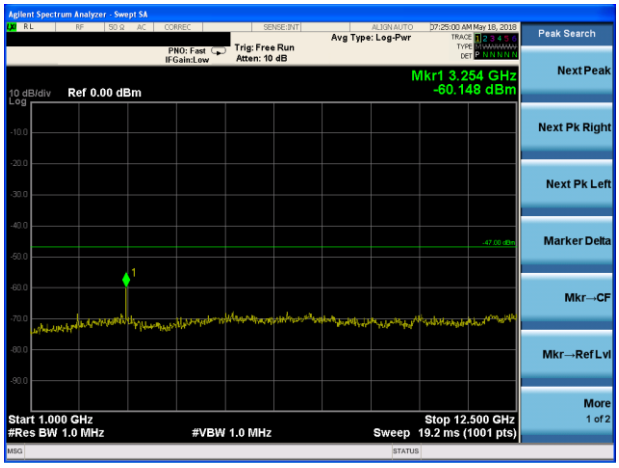
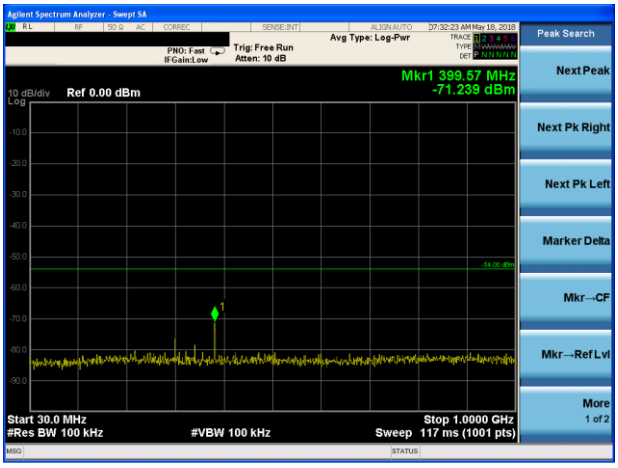
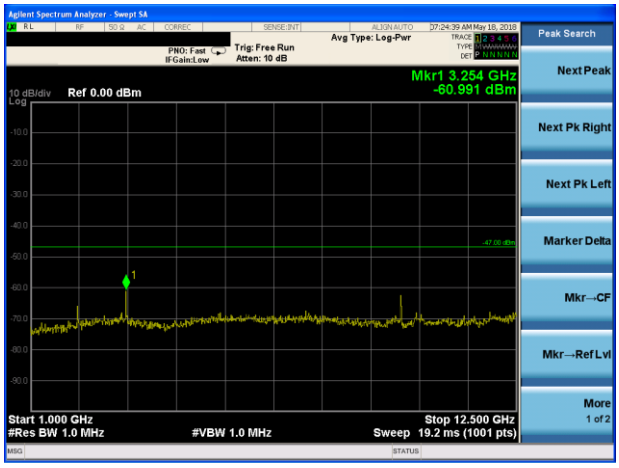
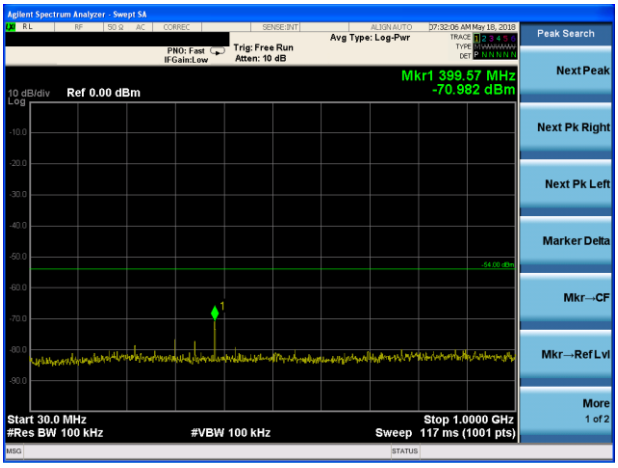
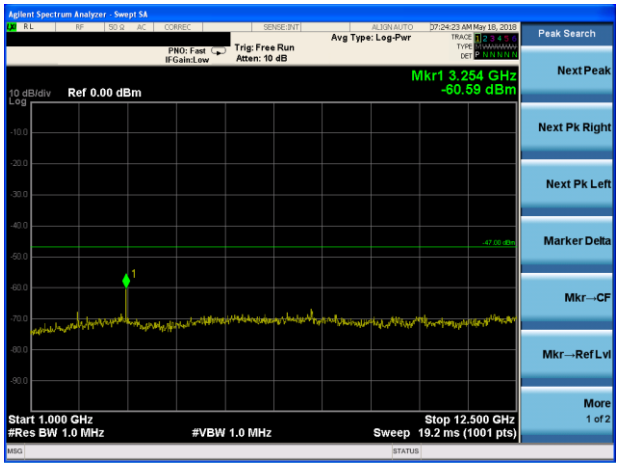
8.4 TEST RESULT

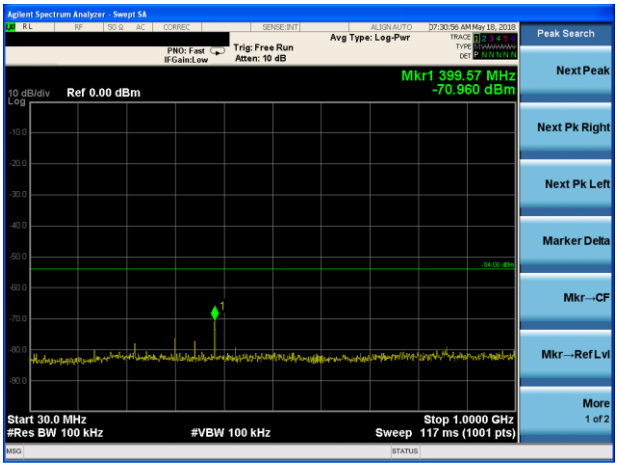
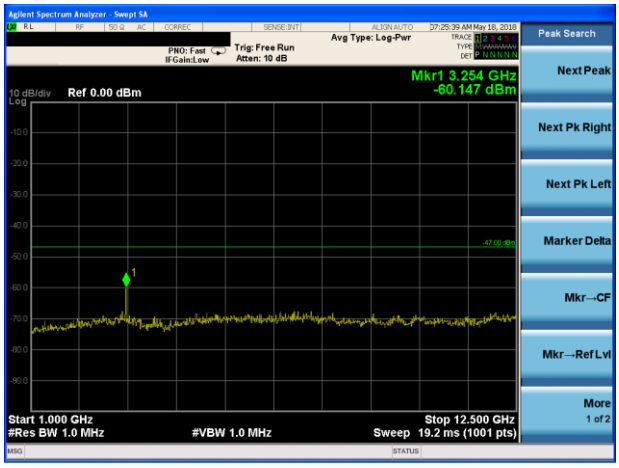
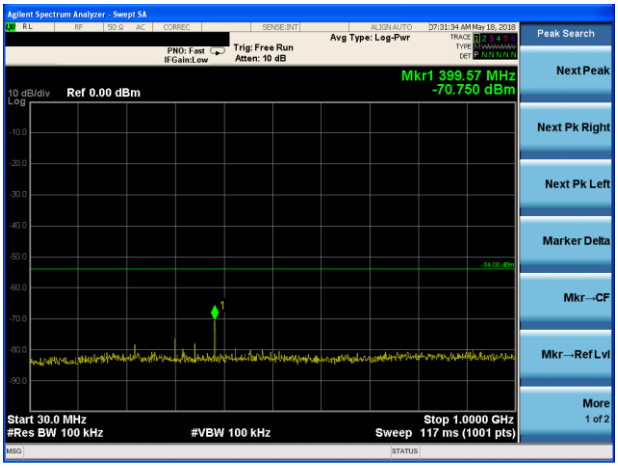
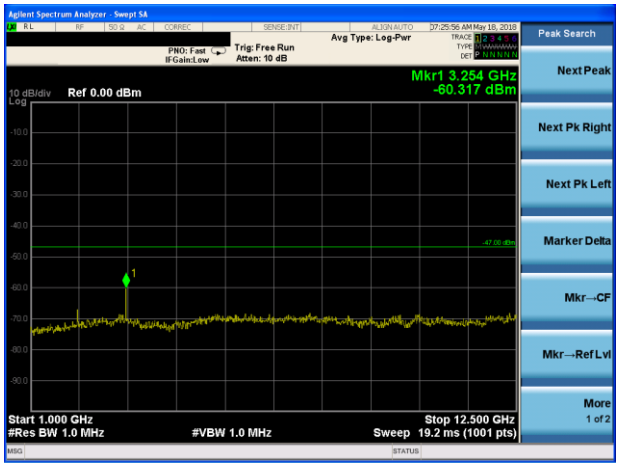
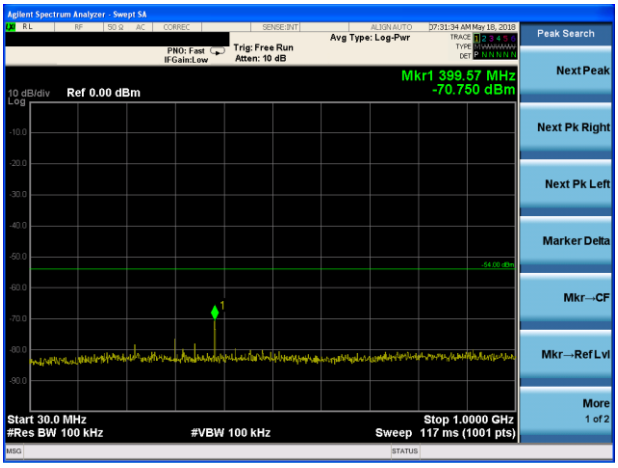
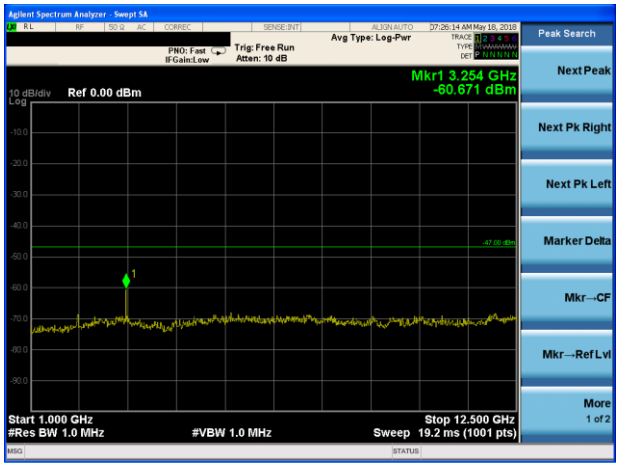
EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage(DC 5V)
Operation Mode:	Normal Voltage-802.11b/g/n(HT20, HT40) RX mode		

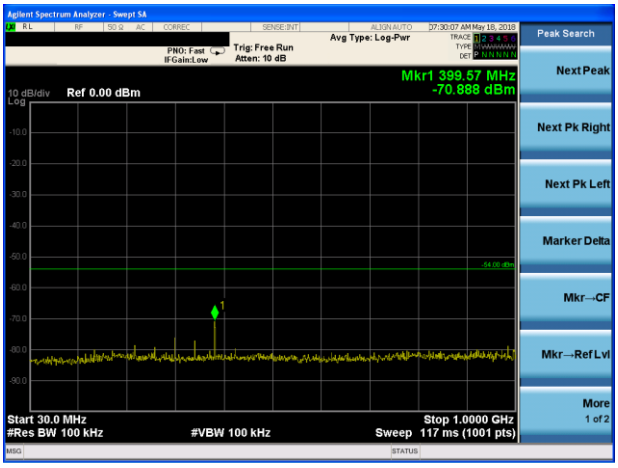
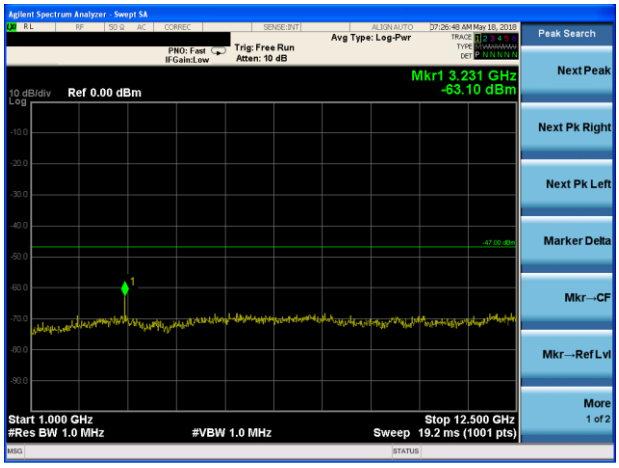
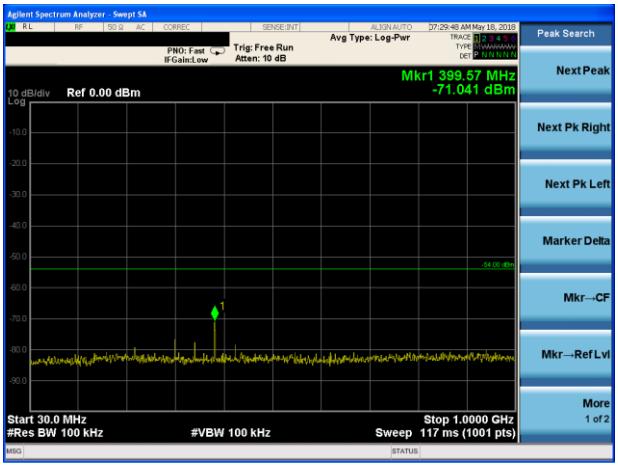
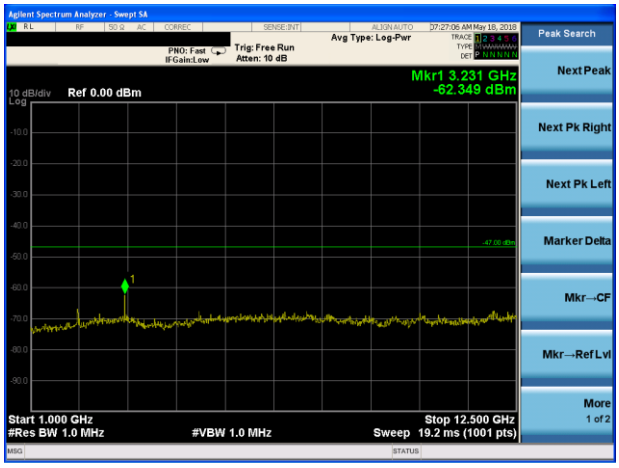
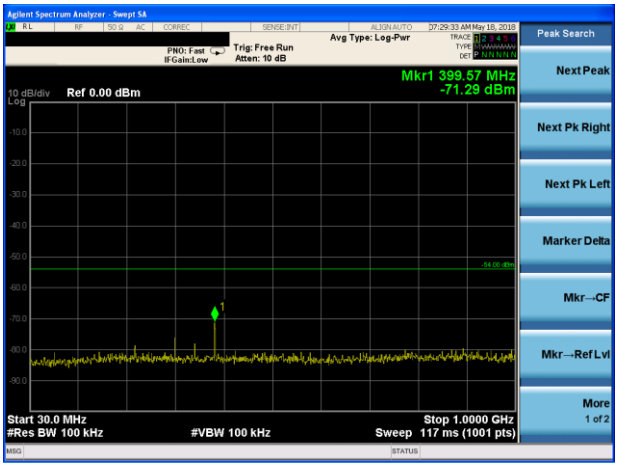
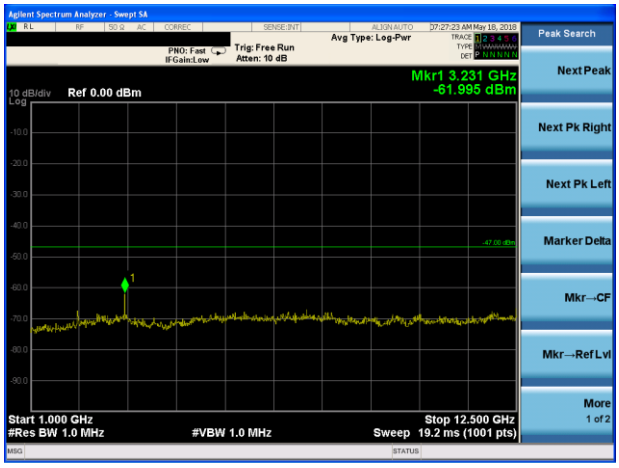
Test Plot

30 MHz ≦ f ≦ 1000 MHz	1000 MHz ≦ f < 12500 MHz
802.11b RX Mode-CH01	802.11b RX Mode-CH01
	
802.11b RX Mode-CH07	802.11b RX Mode-CH07
	
802.11b RX Mode-CH13	802.11b RX Mode-CH13
	

Test Plot

30 MHz ≦ f ≦ 1000 MHz	1000 MHz ≦ f < 12500 MHz
802.11g RX Mode-CH01	802.11g RX Mode-CH01
	
802.11g RX Mode-CH07	802.11g RX Mode-CH07
	
802.11g RX Mode-CH13	802.11g RX Mode-CH13
	

Test Plot	
30 MHz ≦ f ≦ 1000 MHz	1000 MHz ≦ f < 12500 MHz
802.11n20 RX Mode-CH01	802.11n20 RX Mode-CH01
	
802.11n20 RX Mode-CH07	802.11n20 RX Mode-CH07
	
802.11n20 RX Mode-CH13	802.11n20 RX Mode-CH13
	

Test Plot	
30 MHz ≦ f ≦ 1000 MHz	1000 MHz ≦ f < 12500 MHz
802.11n40 RX Mode-CH03	802.11n40 RX Mode-CH03
	
802.11n40 RX Mode-CH07	802.11n40 RX Mode-CH07
	
802.11n40 RX Mode-CH11	802.11n40 RX Mode-CH11
	

9. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

9.1 LIMIT

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional$_{Note1}$
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1$_{Note2}$	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH,FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

Note 1: The half-value angle of the beam directivity must be less than 360 ÷ A degrees. A shall be the rate at which the EIRP exceeds the upper limit of the omnidirectional EIRP.

Note 2: OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26 MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

Note 3: This test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

9.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

9.3 TEST PROCEDURES

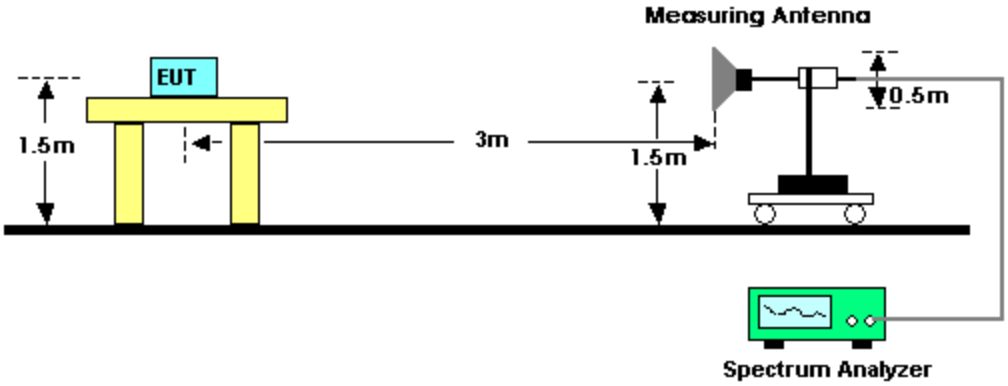
1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.

Gt: gain of replacing antenna (dBi)
L: feeder loss between SSG and replacing antenna
Pt: Output power of the SSG

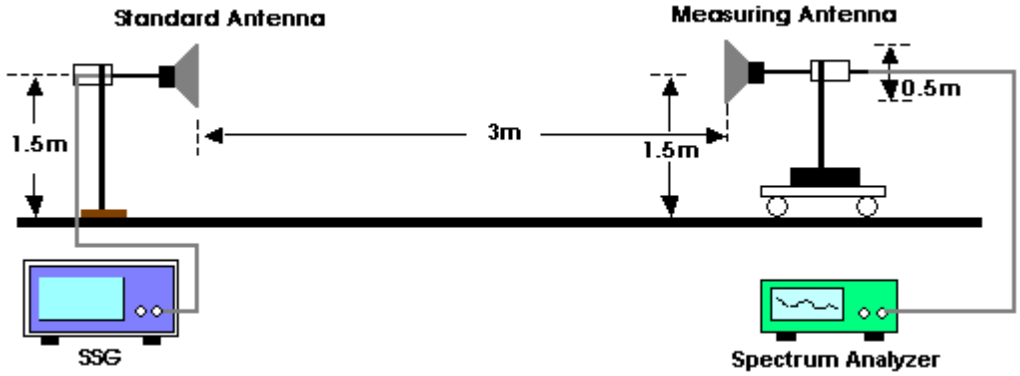
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

9.4 TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



9.5 TEST DEVIATION

There is no deviation with the original standard.

9.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

9.7 RESULTS OF TRANSMISSION ANTENNA GAIN

Note: The peak antenna gain of the EUT which is less than 2.14dBi.

10. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

10.1 LIMIT

Item	Limits
3dB antenna beam width	360/A (If A<1; then A=1) A = {EIRP Power [mW] / 16.36 for DS, OFDM} or A = {EIRP Power [mW] / 4.9 for FH}
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

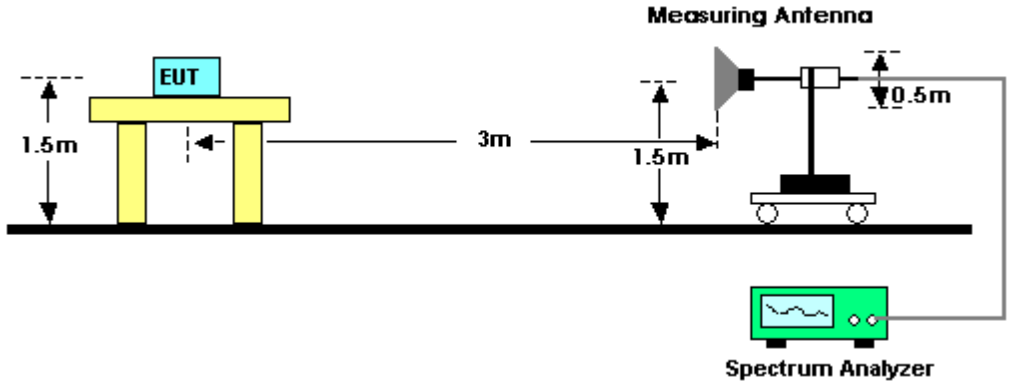
10.2 MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.3 TEST PROCEDURES

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).
   A = {EIRP Power [mW] / 16.36 for DS, OFDM} or
   A = {EIRP Power [mW] / 4.9 for FH}

10.4 TEST SETUP LAYOUT



10.5 TEST DEVIATION

There is no deviation with the original standard.

10.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

10.7 TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

The test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

11. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

11.1 LIMIT

Item	Limits
Identification code	≧48 bits

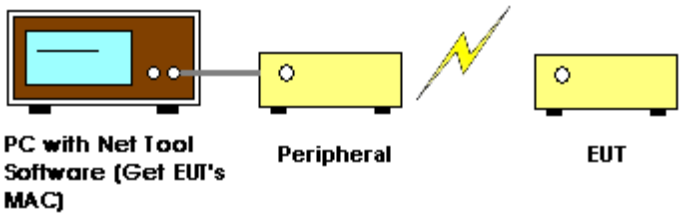
11.2 MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

11.3 TEST PROCEDURES

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes form EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification ocde: a. Transmit the predetermined identification codes form the counterpart. b . Check if communication is normal. c. Transmit the signals other than predetermined ID codes form the counterpart. d. check if the EUT stops the transmission, or if it displays that idnetification codes are different from the predetermined ones.

11.4 TEST SETUP LAYOUT



11.5 TEST DEVIATION

There is no deviation with the original standard.

11.6 EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

11.7 TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test result:	Compliance

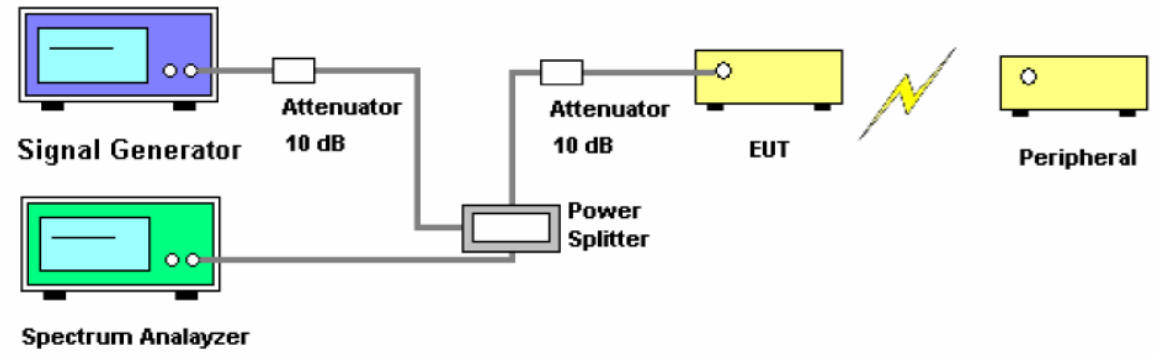
12 CARRIER SENSE CAPABILITY

12.1 LIMIT

EUT stop RF transmission signal after carrier inject to EUT

12.2 TEST PROCEDURE

Measurement System Diagram



1. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is (on 22.79+G-20*log(f)dBm)(G is the antenna gain, f is the test frequency).
2. turn off the RF signal of the SG.
3. EUT have transmitted the maximum modulation signal and fixed channelize.
4. Setting of SA :RBW/VBW=1MHz/1MHz,Span=50MHz,Sweep time=auto, Sweep mode=continuous, Detect mode=positive peak
5. SG RF signal on.
6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous transmitted signal.

12.3 TEST RESULT

EUT：	IP Camera	Model:	SP019
Temperature:	25^{0}C	Tested by:	Mary Hu
Humidity:	55 % RH	Test Voltage	Normal Voltage& extreme Voltage
Operation Mode:	802.11n40 mode		

Mode	Channel	Result		
		Normal Voltage	High Voltage	Low Voltage
802.11n40	CH3	Pass	Pass	Pass
	CH7	Pass	Pass	Pass
	CH11	Pass	Pass	Pass

Note: For this test just evaluate the mode which bandwidth≥26MHz.
Pin=22.79+G-20*log(freq_MHz)[dBm]
Limit:100mw/m eirp
Confirmed at -44dBm
Result:OK

13. EUT TEST PHOTO

Measurement Photos