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FCC PART 15 SUBPART C TEST REPORT

Part 15.247

Report Reference No.: CTL1501220210-WF

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Product Name.....: IP Camera

Model/Type reference.....: JM83910-H2V

List Model(s).....: JM83913-H2M

Trade Mark.....: LBtech

FCC ID.....: OIE-JM83910-H2V

Applicant's name.....: LB Technology Co., Ltd.

Address of applicant.....: No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshan City, Guangdong, China

Test Firm.....: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm.....: Floor 1-A, Baisha Technology Park, No.3011, Shahehexi Road, Nanshan District, Shenzhen, China 518055

Test specification.....:

Standard.....: FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Date of Receipt.....: June 15, 2015

Date of Test Date.....: June 15, 2015 - July 22, 2015

Data of Issue.....: July 22, 2015

Result.....: Positive

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TEST REPORT

Test Report No. :	CTL1501220210-WF	July 22, 2015
		Date of issue

Equipment under Test : IP Camera

Model /Type : JM83910-H2V

Listed Models JM83913-H2M

Difference Description Only the color and model's name is different

Applicant : **LB Technology Co., Ltd.**

Address : No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshan City, Guangdong, China

Manufacturer **LB Technology Co., Ltd.**

Address No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshan City, Guangdong, China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

[KDB Publication No. 558074 D01 v03r02 Guidance on Measurements for Digital Transmission Systems](#)

[ANSI C63.4-2014](#)



2. SUMMARY

2.1. Equipment Under Test

Power supply system utilised

Power supply voltage : ● 120V / 60 Hz ○ 115V / 60Hz
 ○ 12 V DC ○ 24 V DC
 ● Other (specified in blank below)

DC 3.7V from battery

2.2. Description of the Equipment under Test (EUT)

The LB Technology Co., Ltd's Model: JM83910-H2V or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

General Description	
Name of EUT	IP Camera
Brand	LBtech
Model	JM83910-H2V
Support Standards	802.11b, 802.11g, 802.11n
Frequency Range	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
Type of Modulation	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels	11 for 11b/g/n(HT20), 7 for 11n(HT40)
Channel Separation	5MHz
Antenna Type	External Antenna
Antenna Gain	2 dBi

Channel List:

IEEE 802.11b/g/n(HT20): Thirteen channels are provided to the EUT, but only eleventh channels used for USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

IEEE 802.11n (HT40)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
3	2422	8	2447
4	2427	9	2452
5	2432		
6	2437		
7	2442		

2.3. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel low (2412MHz), mid (2437MHz) and high (2462MHz) for 802.11b/g/n(HT20) and Channel low (2422MHz), mid (2437MHz) and high (2452MHz) for 802.11 n HT40 with highest data rate are chosen for full testing.
3. Test Mode:

Test Mode(TM)	Description	Remark
1	Transmitting	802.11 b 2412MHz, 2437MHz, 2462MHz
2	Transmitting	802.11 g 2412MHz, 2437MHz, 2462MHz
3	Transmitting	802.11 n HT20 2412MHz, 2437MHz, 2462MHz
4	Transmitting	802.11 n HT40 2422MHz, 2437MHz, 2452MHz

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

● - supplied by the lab

o AC Adapter

Manufacturer: I.T.E.

Model No.: FJ-SW0502000DU

2.5. NOTE

1. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	√	—	—	—
802.11g	√	—	—	—
802.11n(20MHz)	√	—	—	—
802.11n(40MHz)	√	—	—	—

2. The EUT incorporates a SISO function, Physically, the EUT provides one completed transmitter and one completed receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCCID: **OIE-JM83910-H2V** filing to comply with of the FCC part15.247 Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
 Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 (2013) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

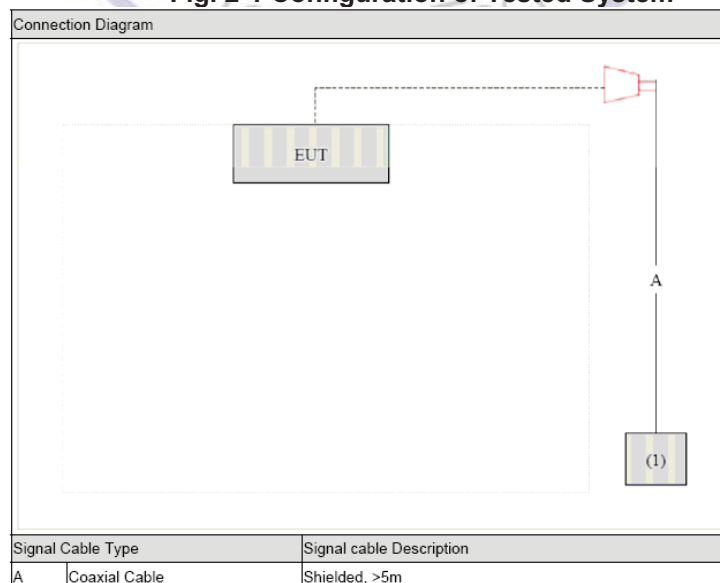
3.3. Environmental conditions

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

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Duty Cycle

Operated Mode for Worst Duty Cycle		
<input type="checkbox"/> Operated normally mode for worst duty cycle		
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle		
Mode	Duty Cycle (%)	Duty Factor (dB)
11b	100	0
11g	100	0
11n HT20	100	0
11n HT40	100	0

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Radiated Emission	12.75GHz-25 GHz	4.68dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

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

3.7. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
ULTRA-ROADBAND ANTENNA	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	Daze	ZN30900A	N/A	2015/05/19	2016/05/18
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
Power Sensor	Anritsu	MA2411B	0738552	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Transient Limiter	SCHWARZCECK	VTSD 9561F	9666	2015/06/02	2016/06/01
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19

3.8. Summary of Test Result

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

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

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

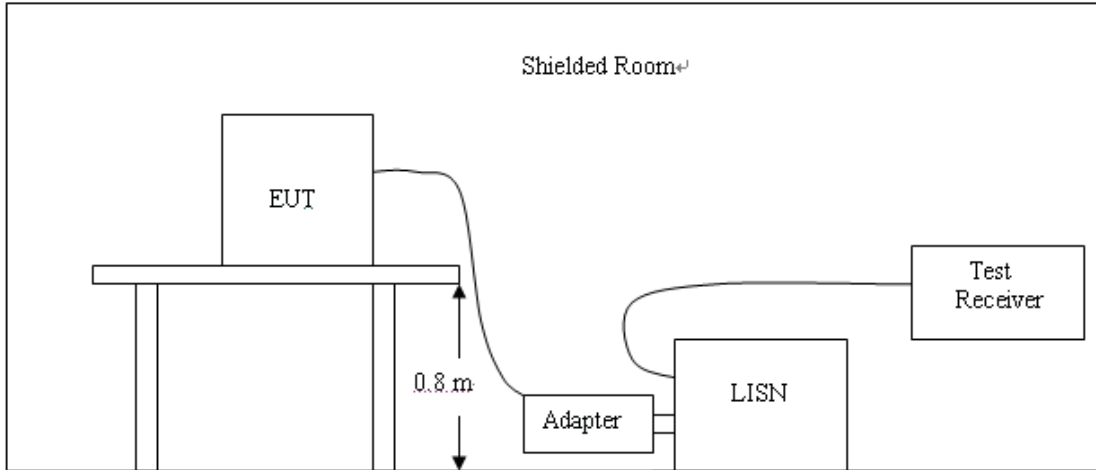
Test Items	Mode	Data Rate	Channel
AC Power Conducted Emission	Normal Link	11 Mbps	1
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Radiated Emission 30MHz~1GHz	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Radiated Emission 1GHz~10th Harmonic	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Band Edge Compliance of RF Emission	11b/DSSS	11 Mbps	1/11
	11g/OFDM	54 Mbps	1/11
	11n(20MHz)/OFDM	65Mbps	1/11
	11n(40MHz)/OFDM	150Mbps	3/9

Note1: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dBµV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

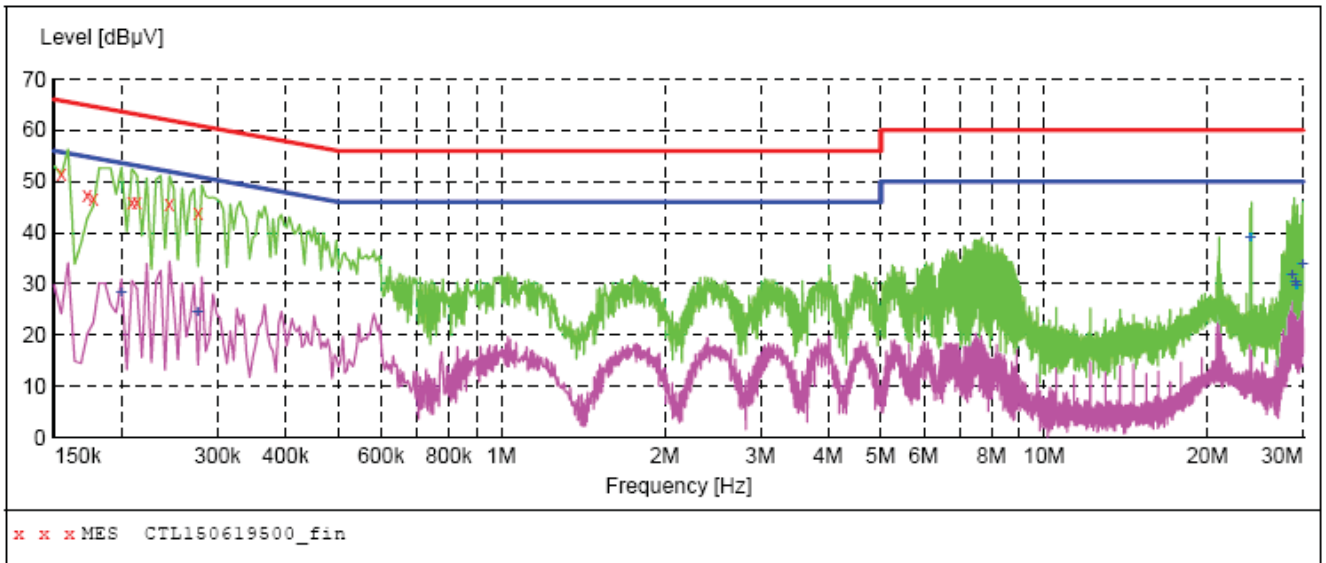
1. Please follow the guidelines in ANSI C63.4-2014.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150619500_fin"

6/19/2015 8:46AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	51.50	10.2	66	14.3	QP	N	GND
0.172500	47.20	10.2	65	17.6	QP	N	GND
0.177000	46.70	10.2	65	17.9	QP	N	GND
0.208500	46.10	10.2	63	17.2	QP	N	GND
0.213000	45.80	10.2	63	17.3	QP	N	GND
0.244500	45.60	10.2	62	16.3	QP	N	GND

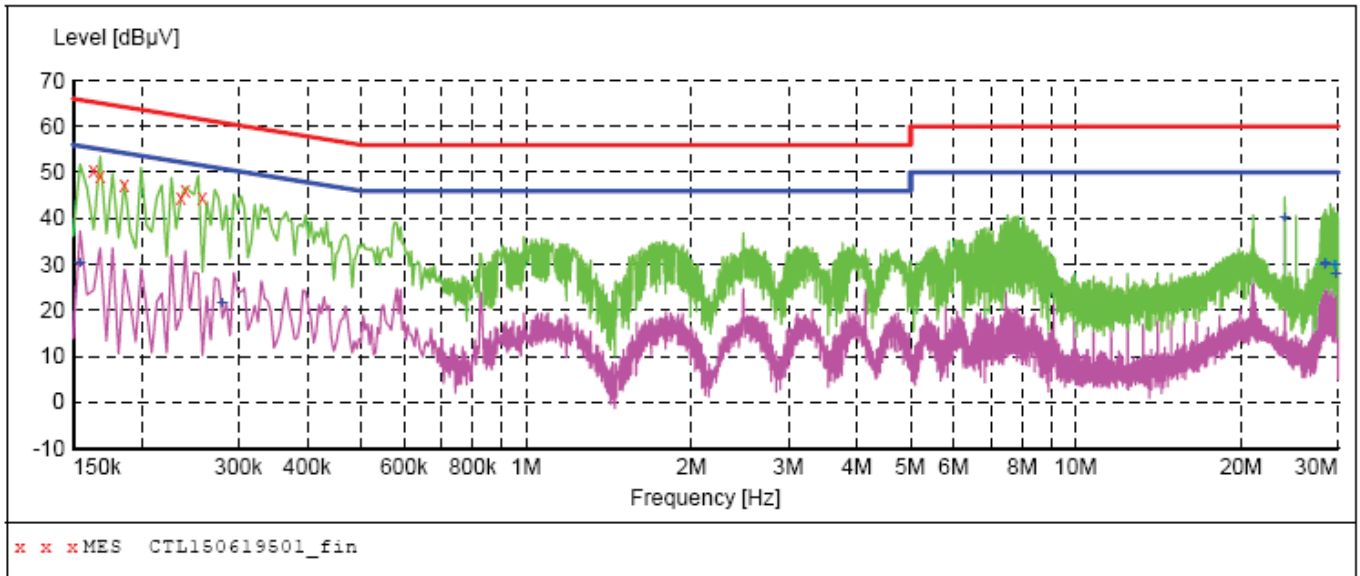
MEASUREMENT RESULT: "CTL150619500_fin2"

6/19/2015 8:46AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	28.30	10.2	54	25.3	AV	N	GND
0.276000	24.60	10.2	51	26.3	AV	N	GND
24.000000	39.20	11.1	50	10.8	AV	N	GND
28.639500	31.60	11.2	50	18.4	AV	N	GND
29.058000	30.50	11.2	50	19.5	AV	N	GND
29.179500	29.70	11.2	50	20.3	AV	N	GND

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150619501_fin"

6/19/2015 8:49AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	50.60	10.2	65	14.7	QP	L1	GND
0.168000	49.10	10.2	65	16.0	QP	L1	GND
0.186000	47.30	10.2	64	16.9	QP	L1	GND
0.235500	44.30	10.2	62	18.0	QP	L1	GND
0.240000	46.00	10.2	62	16.1	QP	L1	GND
0.258000	44.30	10.2	62	17.2	QP	L1	GND

MEASUREMENT RESULT: "CTL150619501_fin2"

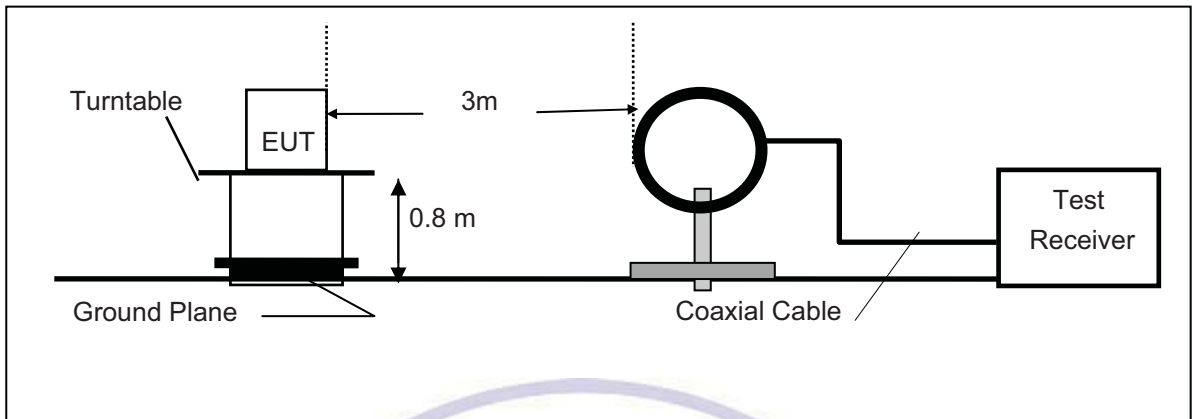
6/19/2015 8:49AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	30.20	10.2	56	25.6	AV	L1	GND
0.280500	21.60	10.2	51	29.2	AV	L1	GND
24.000000	40.20	11.1	50	9.8	AV	L1	GND
28.396500	29.90	11.2	50	20.1	AV	L1	GND
28.459500	30.20	11.2	50	19.8	AV	L1	GND
29.661000	29.80	11.3	50	20.2	AV	L1	GND

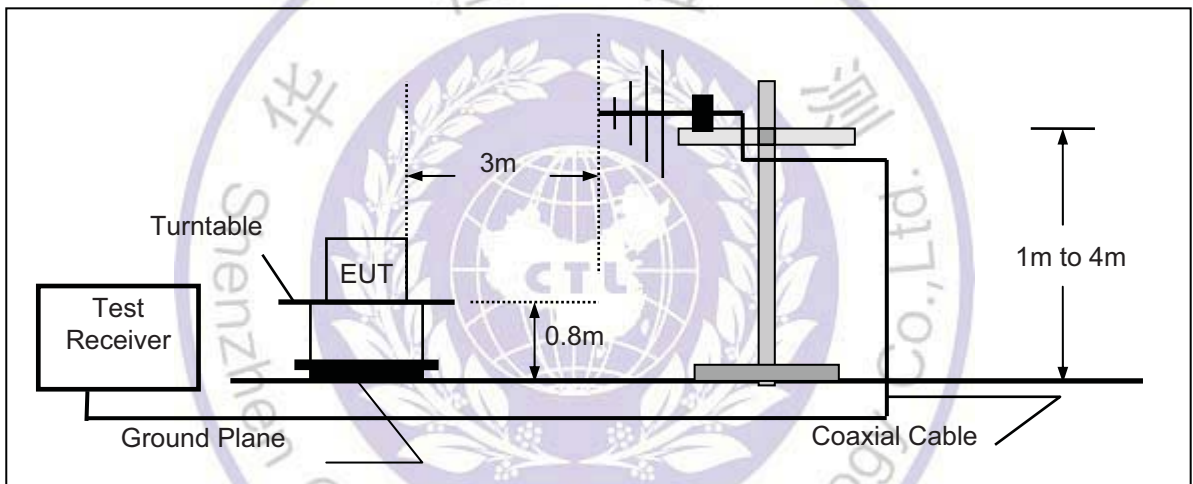
4.2. Radiated Emission Test and Band Edge

TEST CONFIGURATION

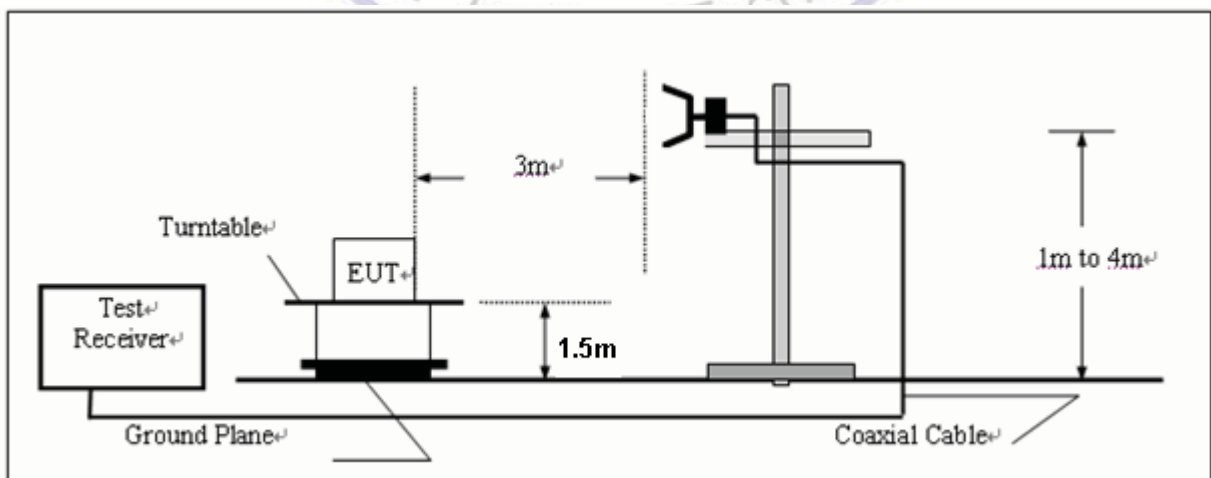
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 D01 v03r02 (Measurement Guidelines of DTS).
2. The EUT was placed on a turn table which is 0.8m above ground plane(1.5m for above 1GHz).
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f >1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Repeat above procedures until all frequency measurements have been completed.

Note:

When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60 degrees for H-plane and 90 degrees for E-plane.

LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

TEST RESULTS

9KHz-30MHz:

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

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

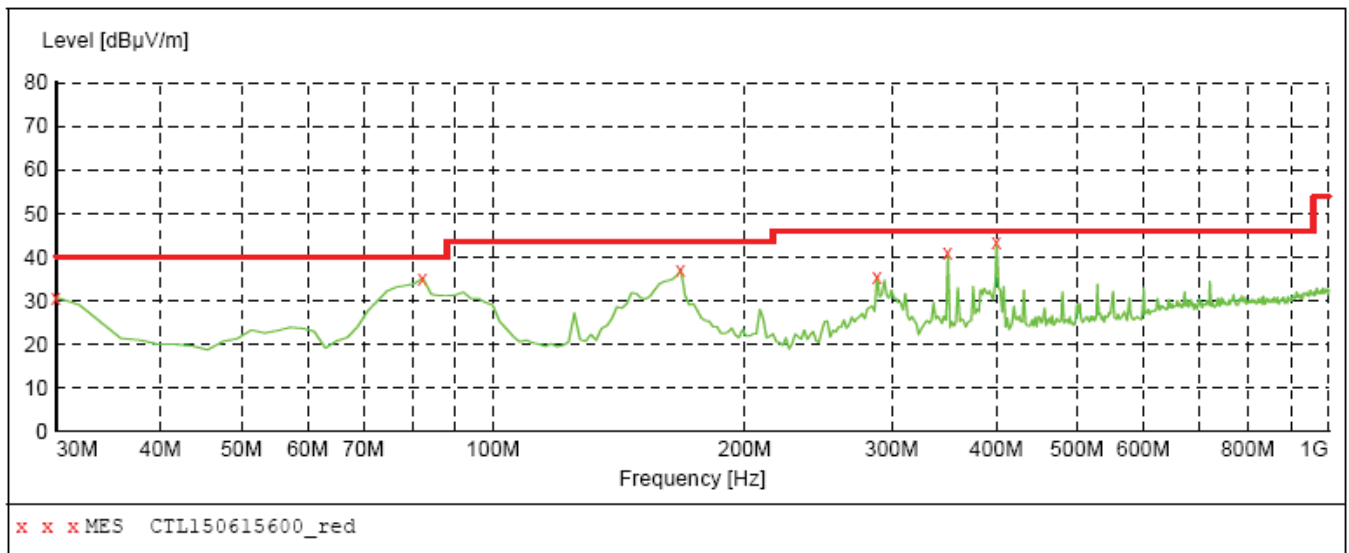
Distance extrapolation factor= 40 log (specific distance/ test distance) (dB);
 Limit line= specific limits (dBuV) + distance extrapolation factor.

Below 1GHz:

The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode, the middle channel) is the worst case for all the test mode and channel.

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



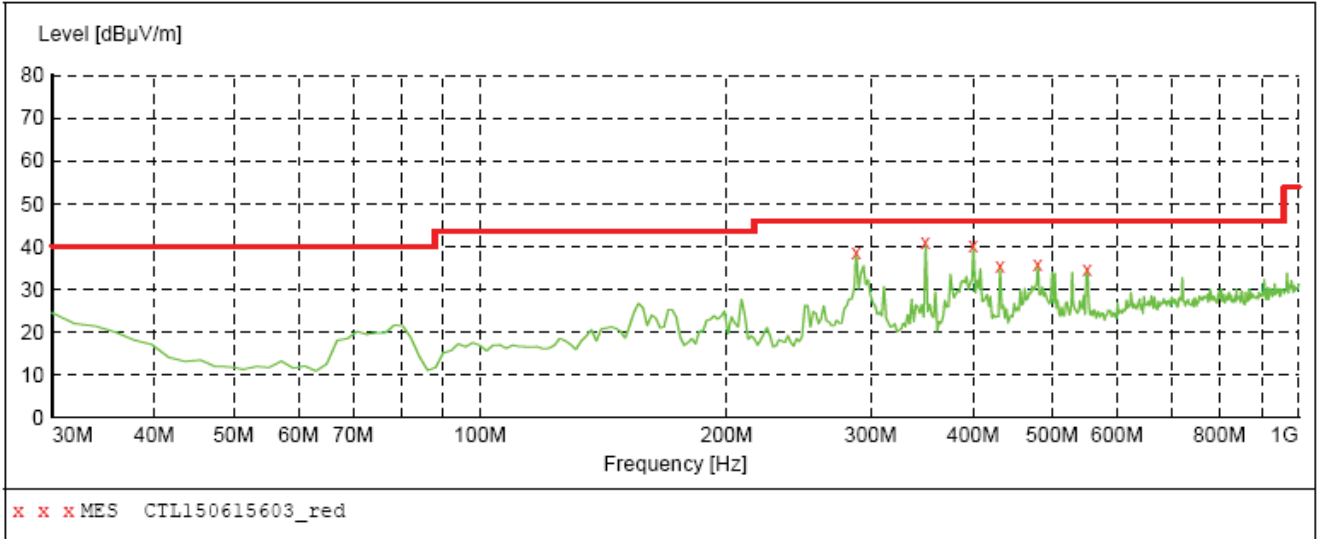
MEASUREMENT RESULT: "CTL150615600_red"

6/15/2015 9:04AM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	30.70	21.1	40.0	9.3	---	0.0	0.00	VERTICAL
82.380000	35.10	9.0	40.0	4.9	---	0.0	0.00	VERTICAL
167.740000	36.90	13.7	43.5	6.6	---	0.0	0.00	VERTICAL
288.020000	35.50	15.4	46.0	10.5	---	0.0	0.00	VERTICAL
350.100000	40.80	16.9	46.0	5.2	---	0.0	0.00	VERTICAL
400.540000	43.30	18.1	46.0	2.7	---	0.0	0.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL150615603_red"

6/15/2015 9:06AM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
288.020000	38.50	15.4	46.0	7.5	---	0.0	0.00	HORIZONTAL
350.100000	40.80	16.9	46.0	5.2	---	0.0	0.00	HORIZONTAL
400.540000	40.10	18.1	46.0	5.9	---	0.0	0.00	HORIZONTAL
431.580000	35.30	18.9	46.0	10.7	---	0.0	0.00	HORIZONTAL
480.080000	35.90	20.1	46.0	10.1	---	0.0	0.00	HORIZONTAL
551.860000	34.80	21.1	46.0	11.2	---	0.0	0.00	HORIZONTAL



Above 1GHz:

802.11b

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2411.9	83.0	30.8	113.8	Fundamental	/	PK
	V	3200	41.7	-0.6	41.1	54(note3)	12.9	PK
	V	2390	36.4	32.2	68.6	74	5.4	PK
	V	2390	17.2	32.2	49.4	54	4.6	AV
	V	2400	39.1	32.1	71.2	74	2.8	PK
	V	2400	20.2	32.1	52.3	54	1.7	AV
	V	4824	48.1	2.6	50.7	54(note3)	3.3	PK
	V	7236	59.1	8.1	67.2	74	6.8	PK
	V	7236	40.0	8.9	48.9	54	5.1	AV
H	24000	61.5	-8.9	52.6	54	1.4	PK	
6	V	2437	81.9	31.2	113.1	Fundamental	/	PK
	V	3200	43.4	-0.6	42.8	54(note3)	11.2	PK
	V	4876	47.3	2.8	50.1	54(note3)	3.9	PK
	V	7298.5	59.4	8.8	68.2	74	5.8	PK
	V	7298.5	42.5	8.1	50.6	54	3.4	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
11	V	2462.3	81.8	30.9	112.7	Fundamental	/	PK
	V	2483.5	33.3	30.2	63.5	74	10.5	PK
	V	2483.5	17.4	30.2	47.6	54	6.4	AV
	V	3200	46.0	-0.6	45.4	54(note3)	8.6	PK
	V	4924	47.7	3.0	50.7	54(note3)	3.3	PK
	V	7386	58.2	8.9	67.1	74	6.9	PK
	V	7386	41.0	8.9	49.9	54	4.1	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Remark: RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value

802.11g

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2412.1	78.3	31.9	110.2	Fundamental	/	PK
	V	2390	37.1	32.2	69.3	74	4.7	PK
	V	2390	17.2	32.2	49.4	54	4.6	AV
	V	2400	39.5	32.1	71.6	74	2.4	PK
	V	2400	20.6	32.1	52.7	54	1.3	AV
	V	3200	48.7	-0.6	48.1	54(note3)	5.9	PK
	V	4824	46.2	2.6	48.8	54(note3)	5.2	PK
	V	7236	60.6	8.9	69.5	74	4.5	PK
	V	7236	41.4	8.9	50.3	54	3.7	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
6	V	2437	78.5	31.2	109.7	Fundamental	/	PK
	V	3200	43.8	-0.6	43.2	54(note3)	10.8	PK
	V	4876	46.3	2.8	49.1	54(note3)	4.9	PK
	V	7298.5	59.4	8.8	68.2	74	5.8	PK
	V	7298.5	40.8	8.8	49.6	54	4.4	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
11	V	2462.3	79.6	30.9	110.5	Fundamental	/	PK
	V	2483.5	34.0	30.2	64.2	74	9.8	PK
	V	2483.5	16.6	30.2	46.8	54	7.2	AV
	V	3200	44.7	-0.6	44.1	54(note3)	9.9	PK
	V	4927	45.4	3.0	48.4	54(note3)	5.6	PK
	V	7386	58.4	8.9	67.3	74	6.7	PK
	V	7386	40.3	8.9	49.2	54	4.8	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Remark: RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value

802.11n(20MHz)

CH	Antenna	Frequency (MHz)	Reading Level (dBUV/m)	Factor (dB)	Measure Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	V	2411.9	78.5	30.7	109.2	Fundamental	/	PK
	V	2390	35.5	32.2	67.7	74	6.3	PK
	V	2390	17.4	32.2	49.6	54	4.4	AV
	V	2400	39.0	32.1	71.1	74	2.9	PK
	V	2400	19.3	32.1	51.4	54	2.6	AV
	V	3200	43.2	-0.6	42.6	54(note3)	11.4	PK
	V	4824	48.7	2.6	51.3	54(note3)	2.7	PK
	V	7236	60.9	8.9	69.8	74	4.2	PK
	V	7236	40.7	8.9	49.6	54	4.4	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
6	V	2437	78.5	31.2	109.7	Fundamental	/	PK
	V	3200	46.7	-0.6	46.1	54(note3)	7.9	PK
	V	4876	47.8	2.8	50.6	54(note3)	3.4	PK
	V	7298.5	59.9	8.8	68.7	74	5.3	PK
	V	7298.5	40.5	8.8	49.3	54	4.7	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
11	V	2462.3	77.9	30.9	108.8	Fundamental	/	PK
	V	2483.5	35.7	30.2	65.9	74	8.1	PK
	V	2483.5	17.5	30.2	47.7	54	6.3	AV
	V	3200	45.5	-0.6	44.9	54(note3)	9.1	PK
	V	4927	47.5	3.0	50.5	54(note3)	3.5	PK
	V	7386	60.7	9.0	69.7	74	4.3	PK
	V	7386	39.1	9.0	48.1	54	5.9	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Remark: RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value

802.11n(40MHz)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
3	V	2422.1	76.5	30.7	107.2	Fundamental	/	PK
	V	2390	35.5	32.2	67.7	74	6.3	PK
	V	2390	16.9	32.2	49.1	54	4.9	AV
	V	2400	38.3	32.1	70.4	74	3.6	PK
	V	2400	20.5	32.1	52.6	54	1.4	AV
	V	3200	44.5	-0.6	43.9	54(note3)	10.1	PK
	V	4844.1	49.1	2.6	51.7	54(note3)	2.3	PK
	V	7266	60.3	8.9	69.2	74	4.8	PK
	V	7266	40.2	8.9	49.1	54	4.9	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
6	V	2437	75.7	31.2	106.9	Fundamental	/	PK
	V	3200	47.1	-0.6	46.5	54(note3)	7.5	PK
	V	4876	48.5	2.8	51.3	54(note3)	2.7	PK
	V	7298.5	59.8	8.8	68.6	74	5.4	PK
	V	7298.5	41.6	8.8	50.4	54	3.6	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK
9	V	2452.1	76.5	30.9	107.4	Fundamental	/	PK
	V	2483.5	35.6	30.2	65.8	74	8.2	PK
	V	2483.5	17.7	30.2	47.9	54	6.1	AV
	V	3200	47.4	-0.6	46.8	54(note3)	7.2	PK
	V	4904	49.6	3.0	52.6	54(note3)	1.4	PK
	V	7356.1	60.7	9.0	69.7	74	4.3	PK
	V	7356.2	42.1	9.0	51.1	54	2.9	AV
	H	24000	61.5	-8.9	52.6	54	1.4	PK

Note: 1. Measure Level = Reading Level + Factor.

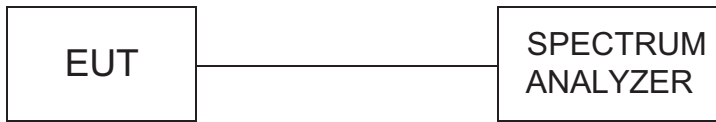
2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Remark: RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value

4.3. 6dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 D01 v03r02 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

LIMIT

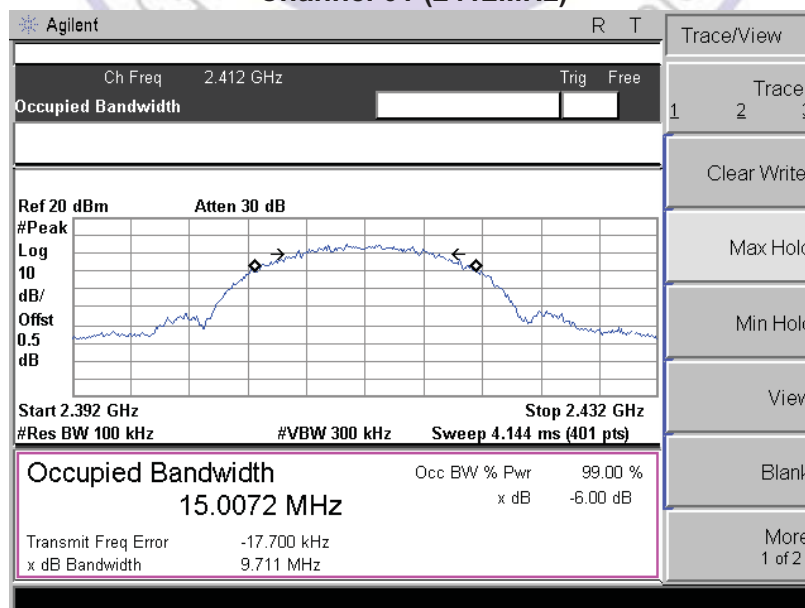
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

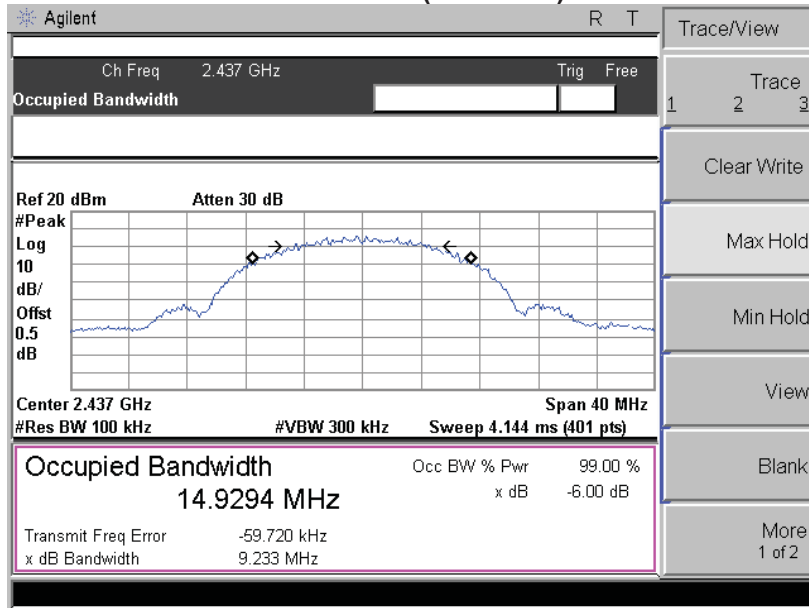
Product	:	IP Camera
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	9711	500	Pass
06	2437	9233	500	Pass
11	2462	9725	500	Pass

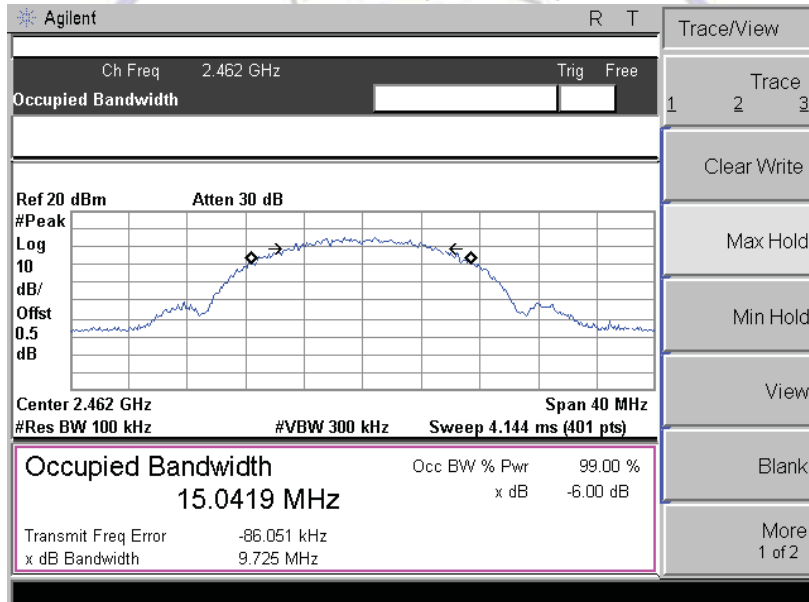
Channel 01 (2412MHz)



Channel 06 (2437MHz)



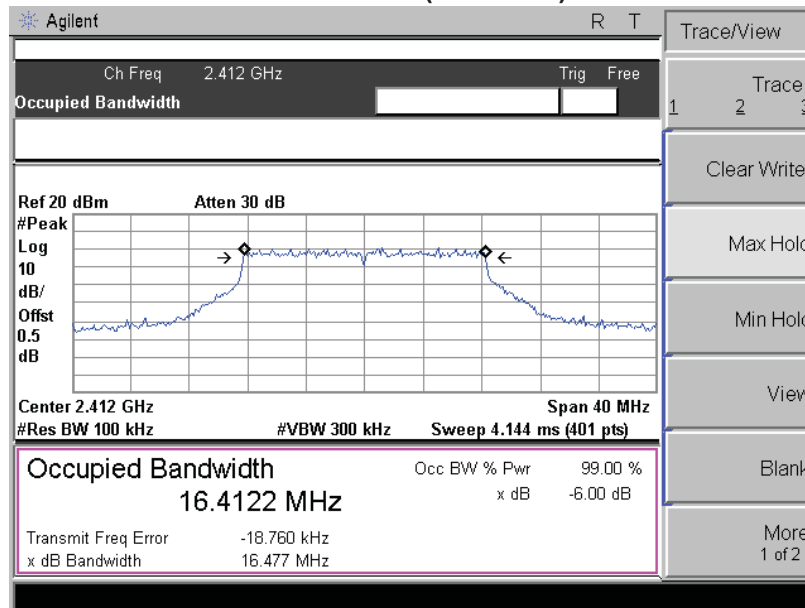
Channel 11 (2462MHz)



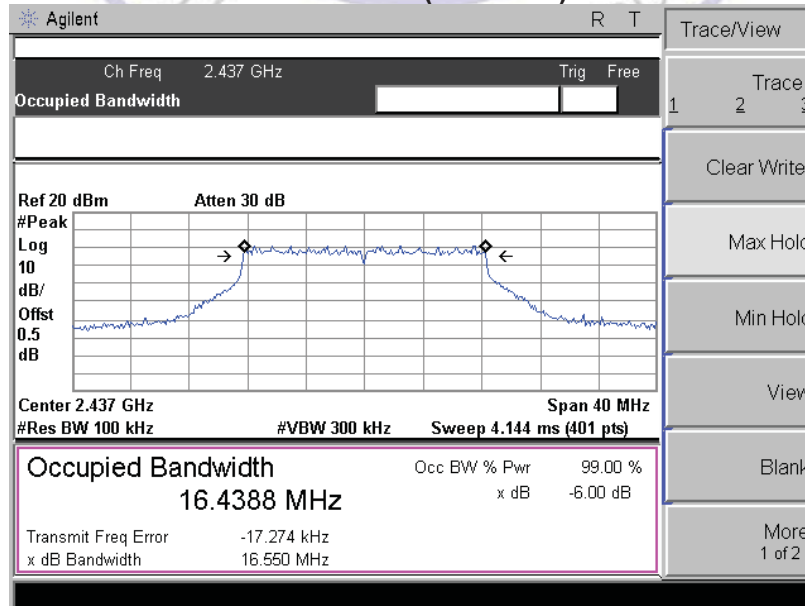
Product	:	IP Camera
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16477	500	Pass
06	2437	16550	500	Pass
11	2462	16543	500	Pass

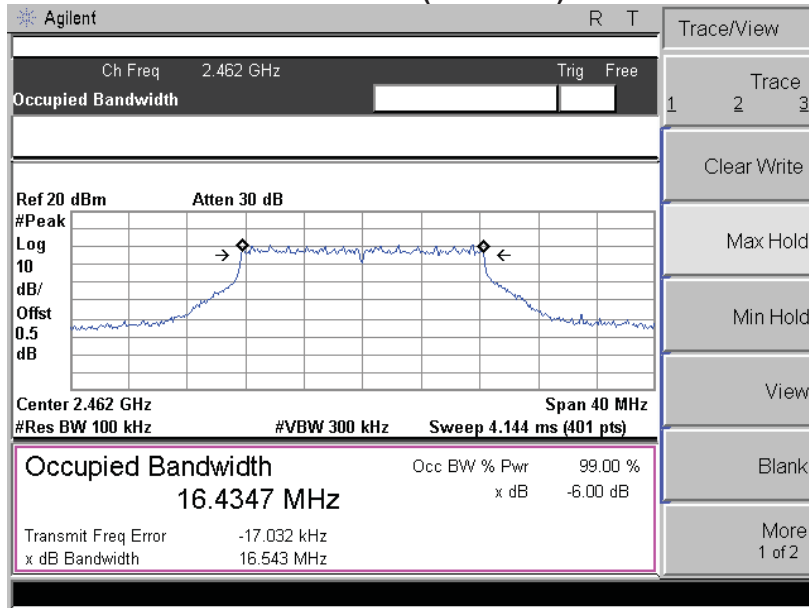
Channel 01 (2412MHz)



Channel 06 (2437MHz)



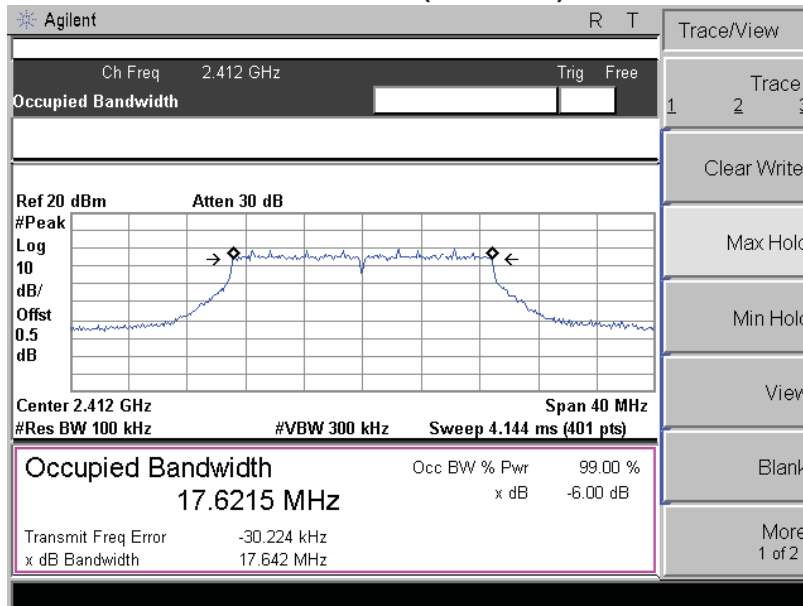
Channel 11 (2462MHz)



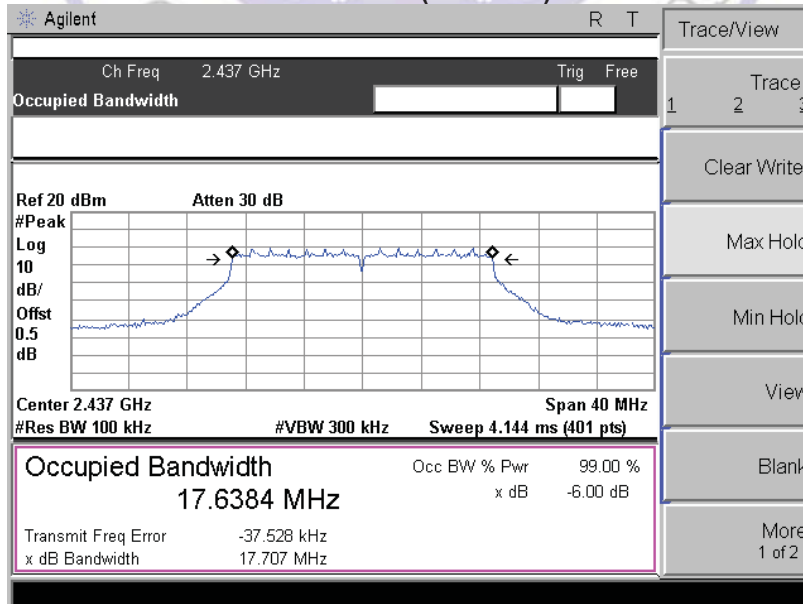
Product	:	IP Camera
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	17642	500	Pass
06	2437	17707	500	Pass
11	2462	17723	500	Pass

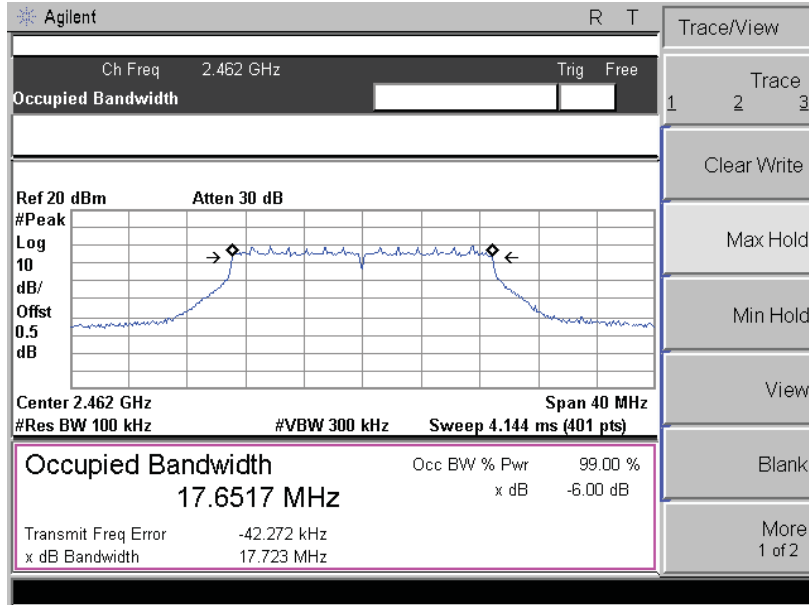
Channel 01 (2412MHz)



Channel 06 (2437MHz)



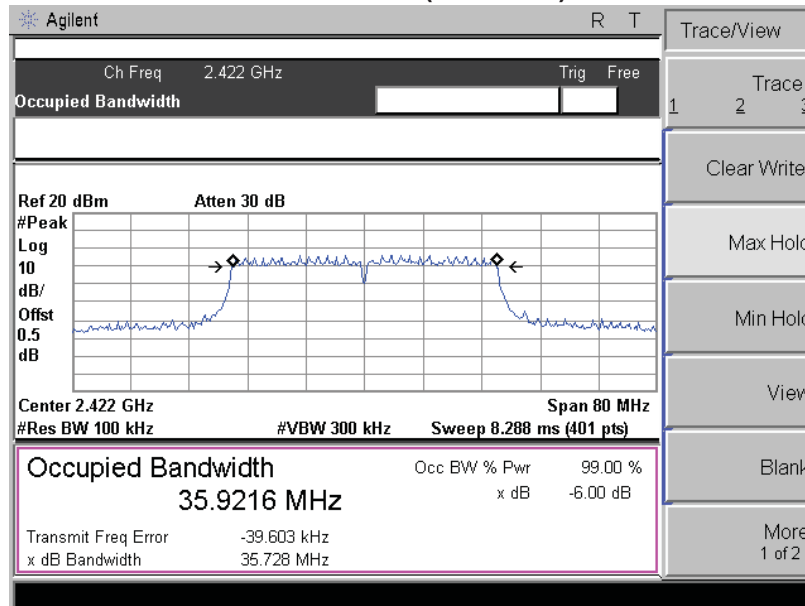
Channel 11 (2462MHz)



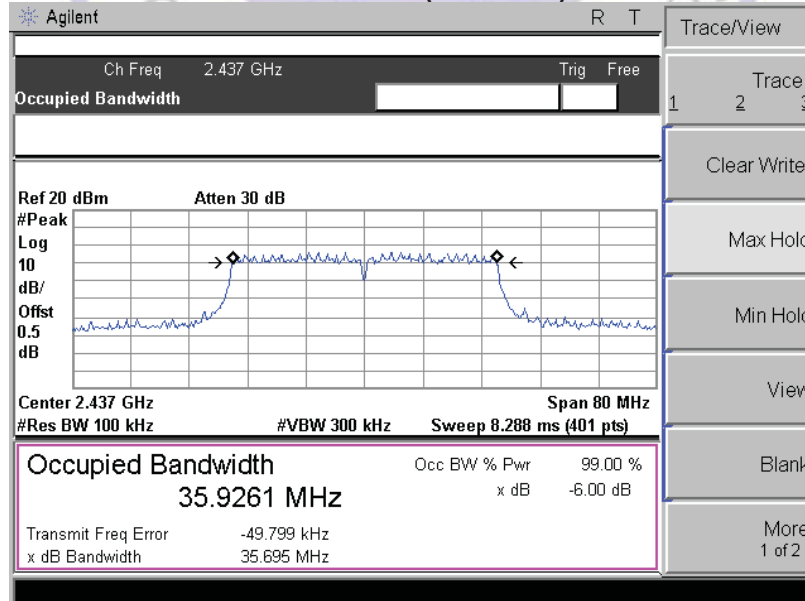
Product	:	IP Camera
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	35728	500	Pass
06	2437	35695	500	Pass
09	2452	35703	500	Pass

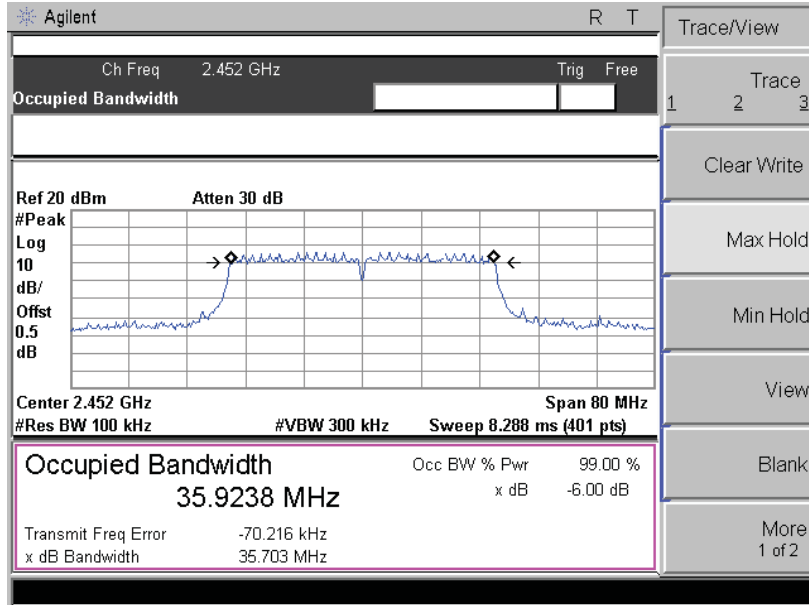
Channel 03 (2422MHz)



Channel 06 (2437MHz)

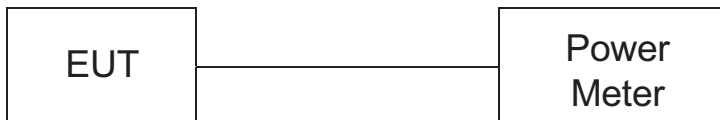


Channel 09 (2452MHz)



4.4. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2013 and KDB558074 D01 v03r02, The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the wideband power meter to test peak power and record the result.

LIMIT

The Peak Output Power Measurement limits are 30dBm.

TEST RESULTS

Product	:	IP Camera
Test Item	:	Power Output
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	18.10	30.00	Pass
6	2437	18.14	30.00	Pass
11	2462	18.04	30.00	Pass

Product	:	IP Camera
Test Item	:	Power Output
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	15.03	30.00	Pass
6	2437	15.53	30.00	Pass
11	2462	15.72	30.00	Pass

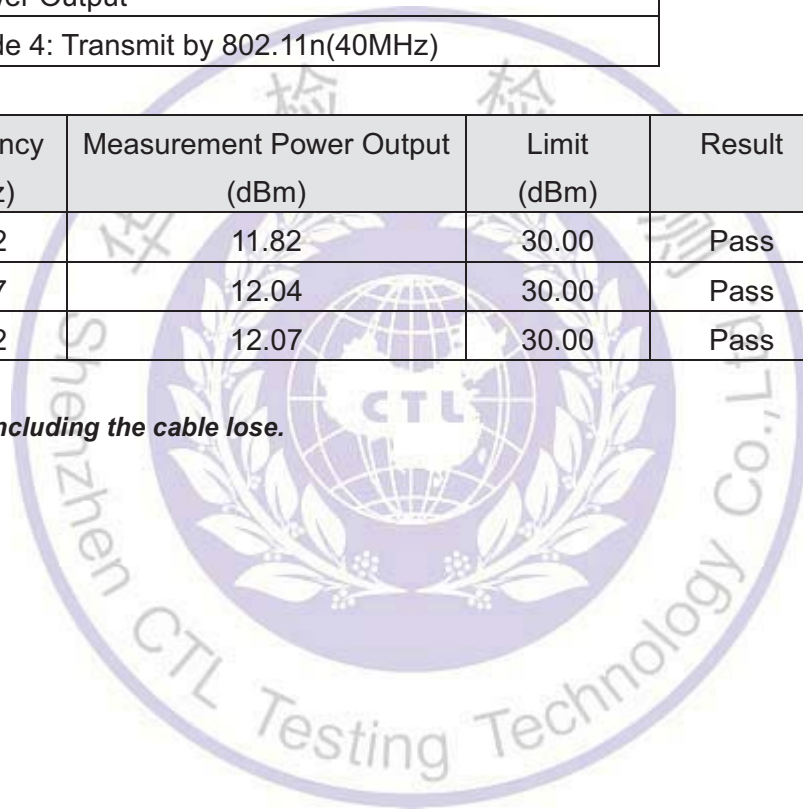
Product	:	IP Camera
Test Item	:	Power Output
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	14.10	30.00	Pass
6	2437	14.92	30.00	Pass
11	2462	14.86	30.00	Pass

Product	:	IP Camera
Test Item	:	Power Output
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

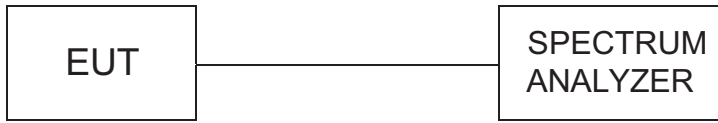
Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
3	2422	11.82	30.00	Pass
6	2437	12.04	30.00	Pass
9	2452	12.07	30.00	Pass

Note: The test results including the cable lose.



4.5. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 v03r02 for compliance to FCC 47CFR 15.247 and requirements. Set RBW= 3 kHz, VBW ≥ 10KHz, SPAN to 1.5 times greater than the EBW,.

LIMIT

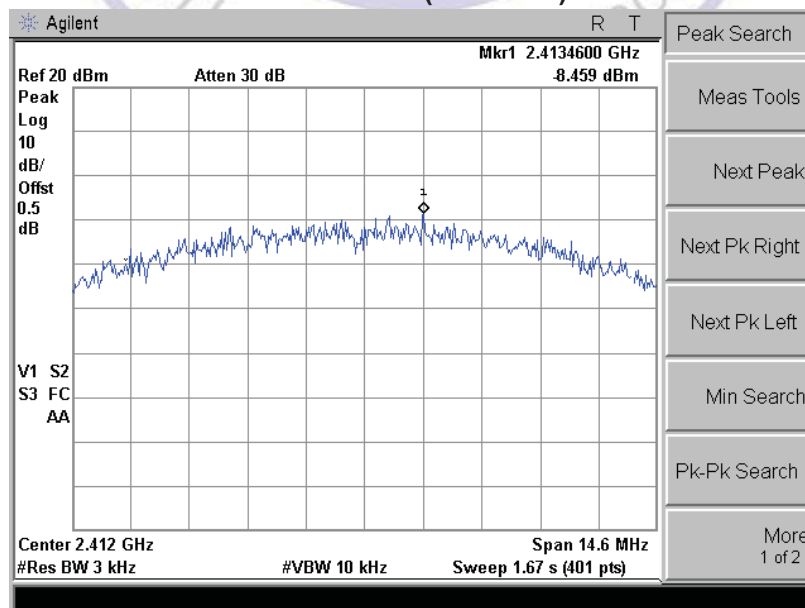
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

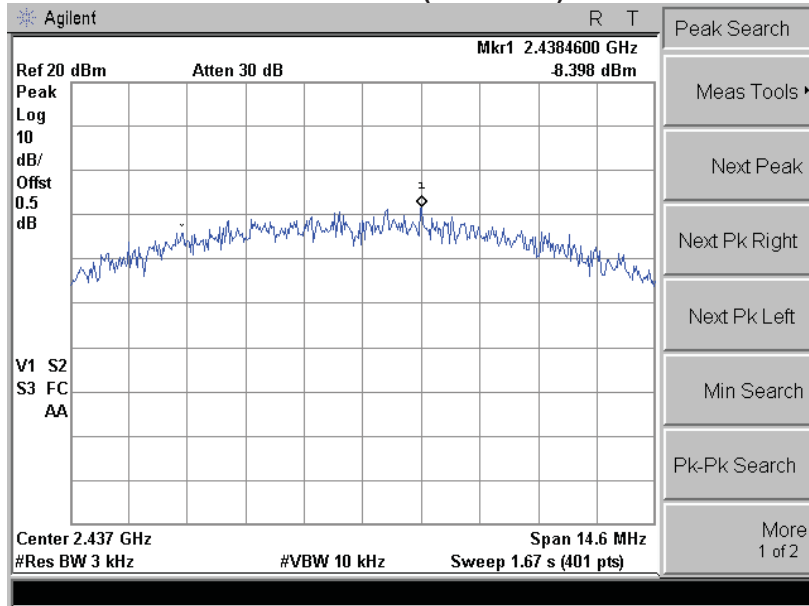
Product	:	IP Camera
Test Item	:	Power Spectral Density
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-8.459	8	Pass
06	2437	-8.398	8	Pass
11	2462	-8.587	8	Pass

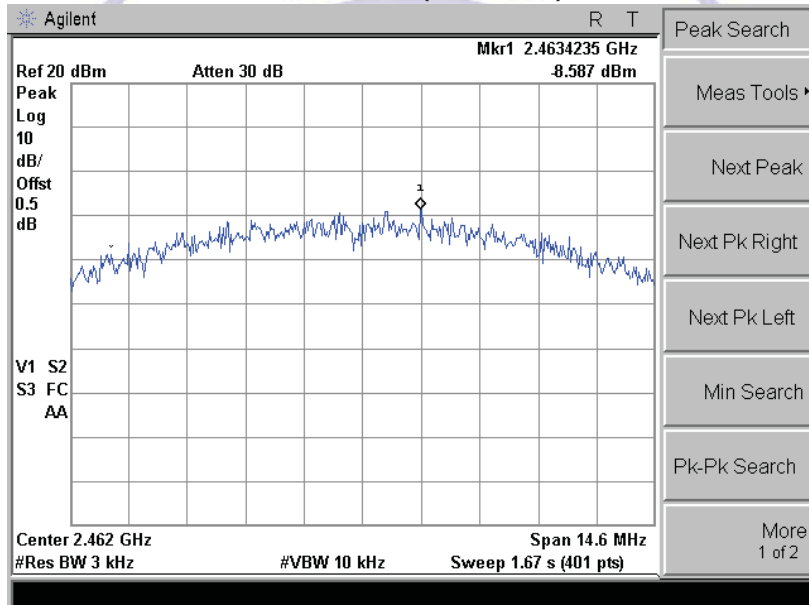
Channel 01 (2412MHz)



Channel 06 (2437MHz)



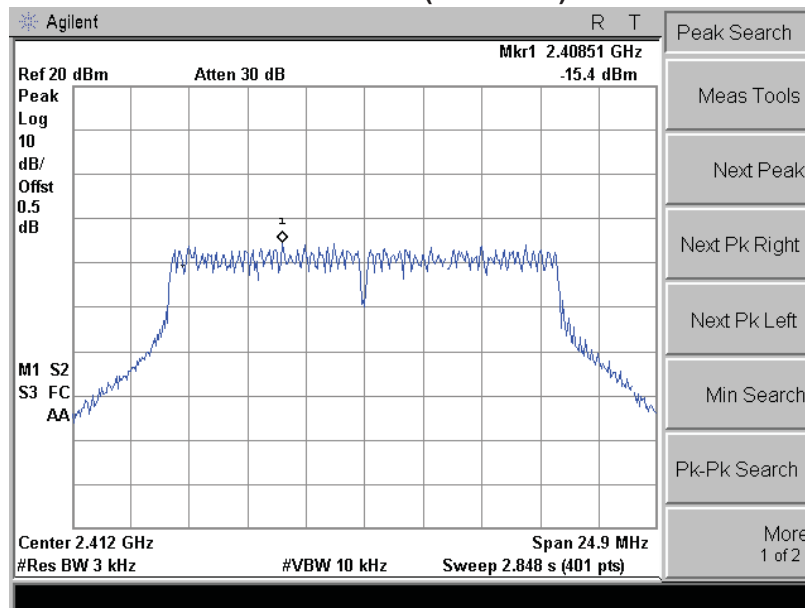
Channel 11 (2462MHz)



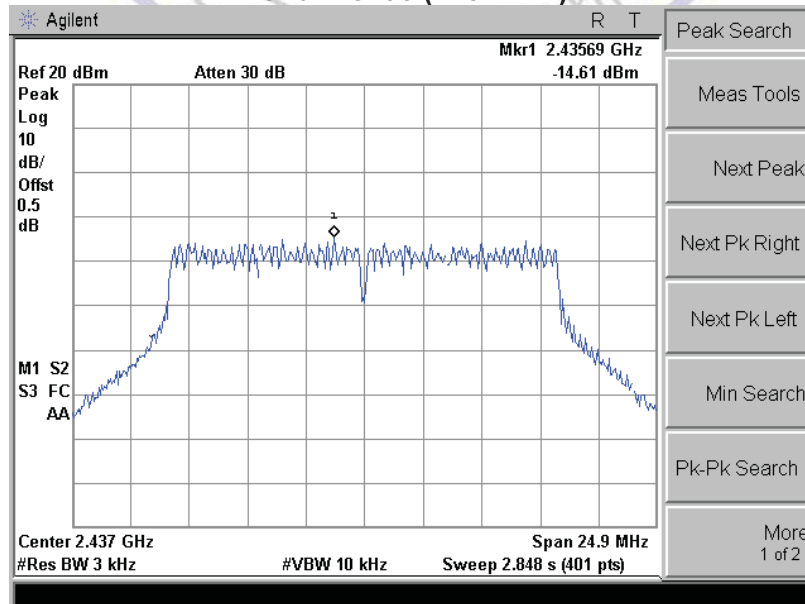
Product	:	IP Camera
Test Item	:	Power Spectral Density
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-15.40	8	Pass
06	2437	-14.61	8	Pass
11	2462	-14.79	8	Pass

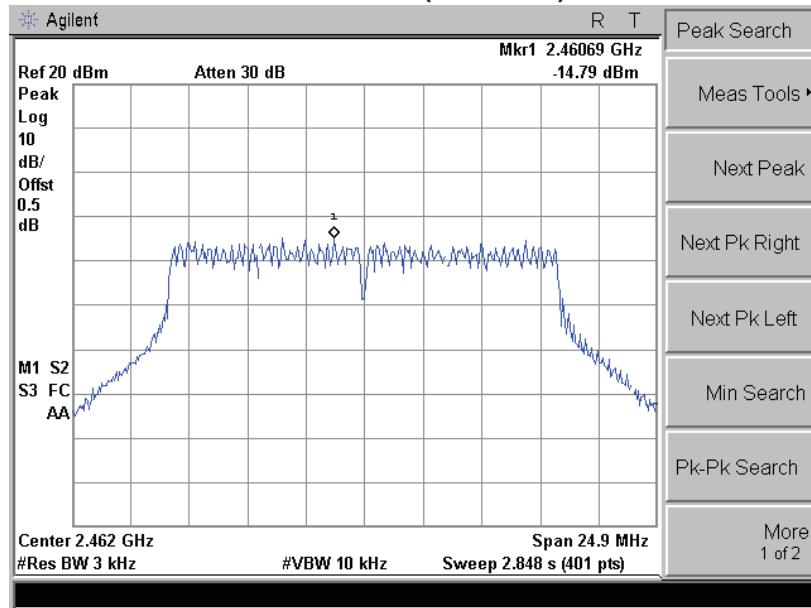
Channel 01 (2412MHz)



Channel 06 (2437MHz)



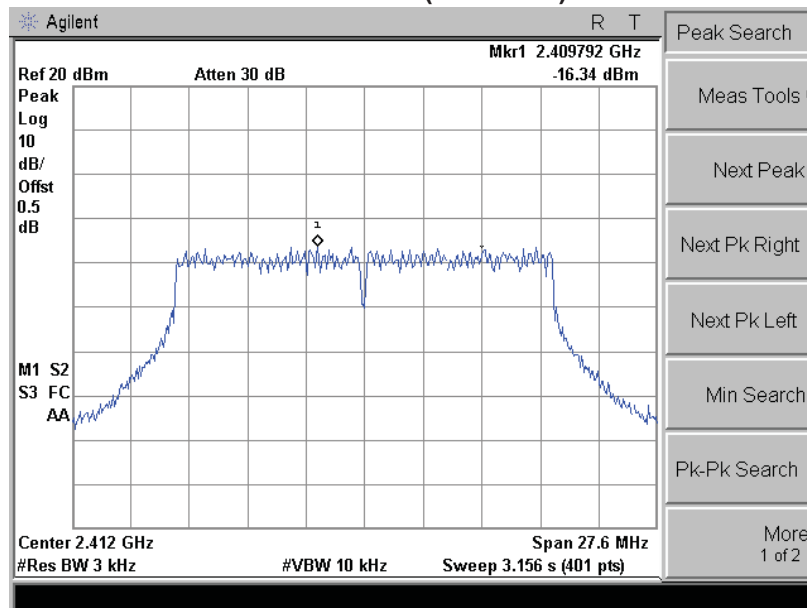
Channel 11 (2462MHz)



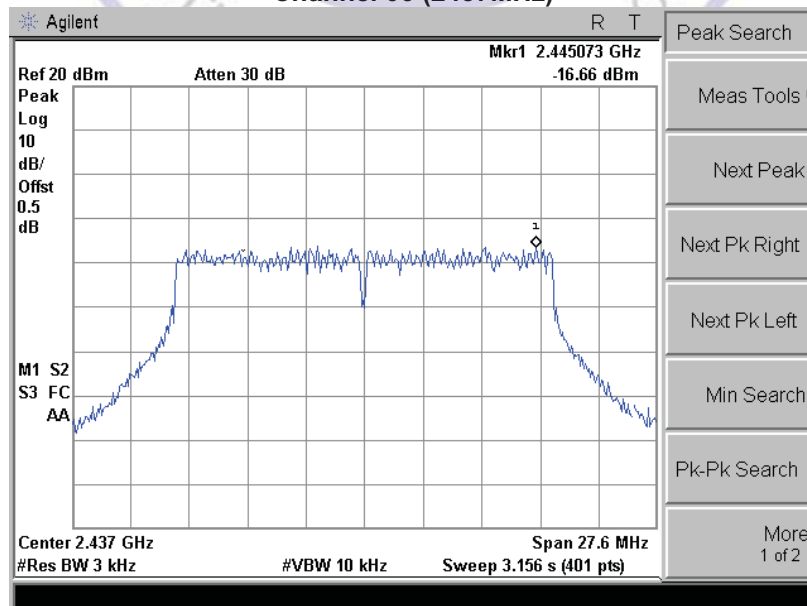
Product	:	IP Camera
Test Item	:	Power Spectral Density
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-16.34	8	Pass
06	2437	-16.66	8	Pass
11	2462	-15.98	8	Pass

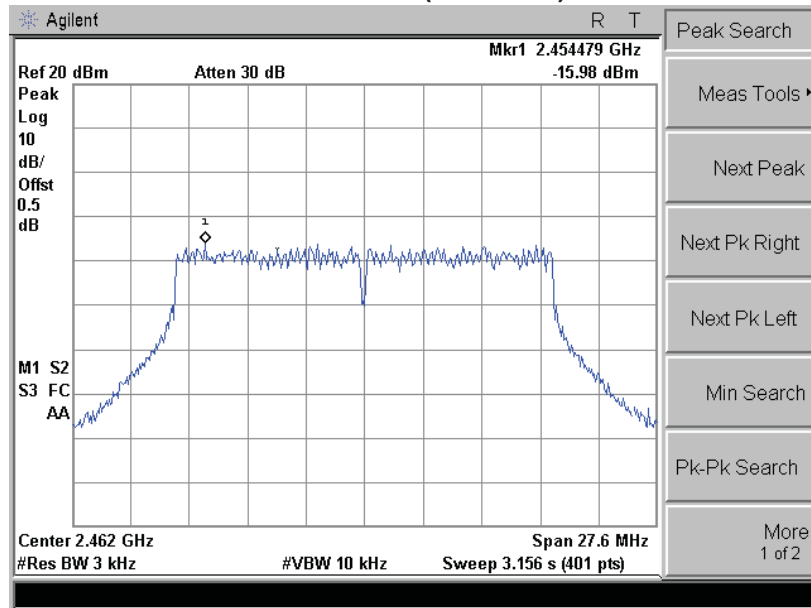
Channel 01 (2412MHz)



Channel 06 (2437MHz)



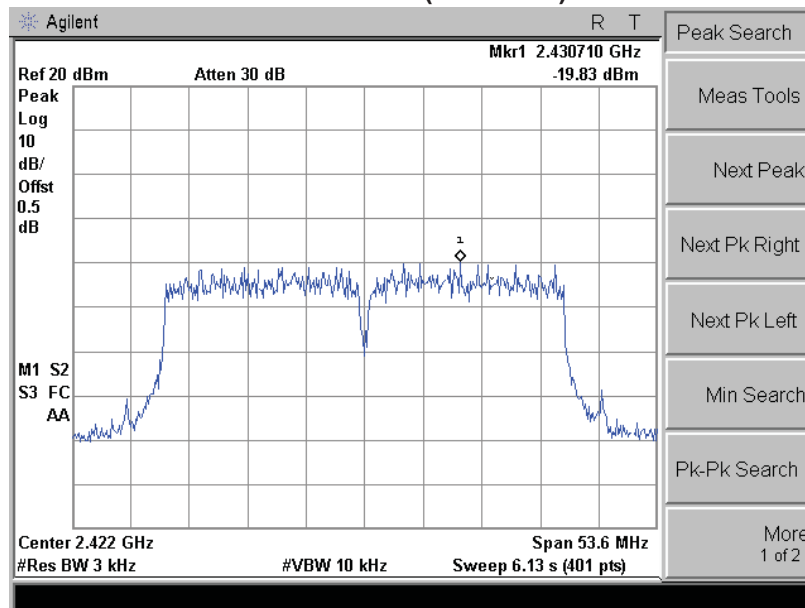
Channel 11 (2462MHz)



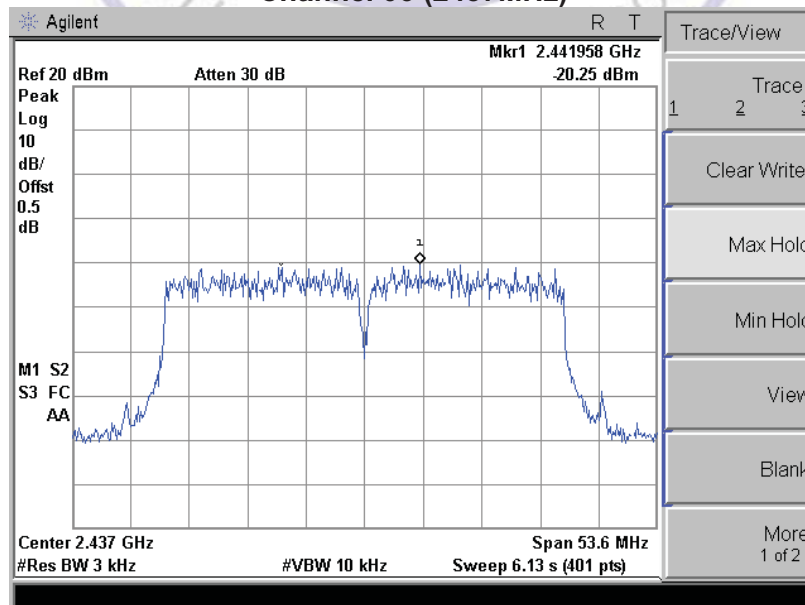
Product	:	IP Camera
Test Item	:	Power Spectral Density
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
03	2422	-19.83	8	Pass
06	2437	-20.25	8	Pass
09	2452	-19.61	8	Pass

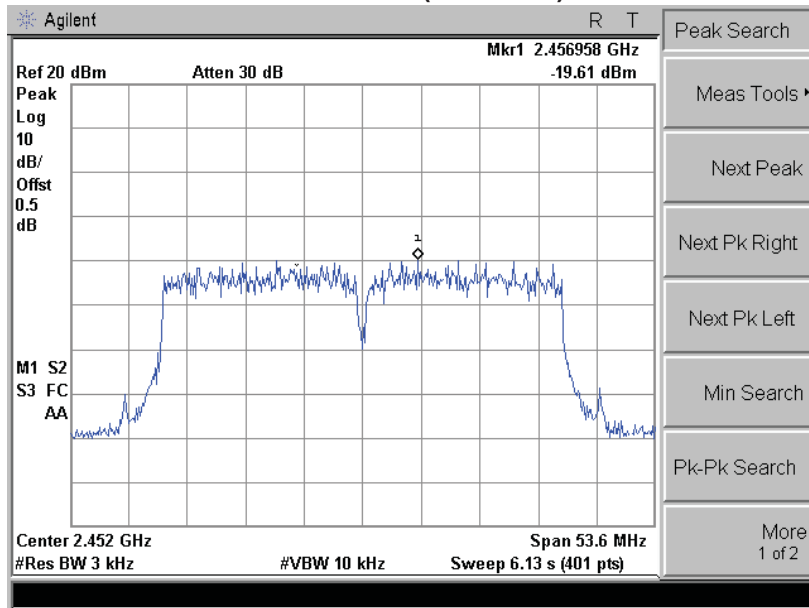
Channel 03 (2422MHz)



Channel 06 (2437MHz)

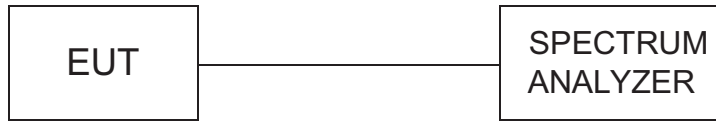


Channel 09 (2452MHz)



4.6. Spurious RF Conducted Emission and Bandedge

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 v03r02 for compliance to FCC 47CFR 15.247 requirements.

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequency range from 30MHz to 26.5GHz.

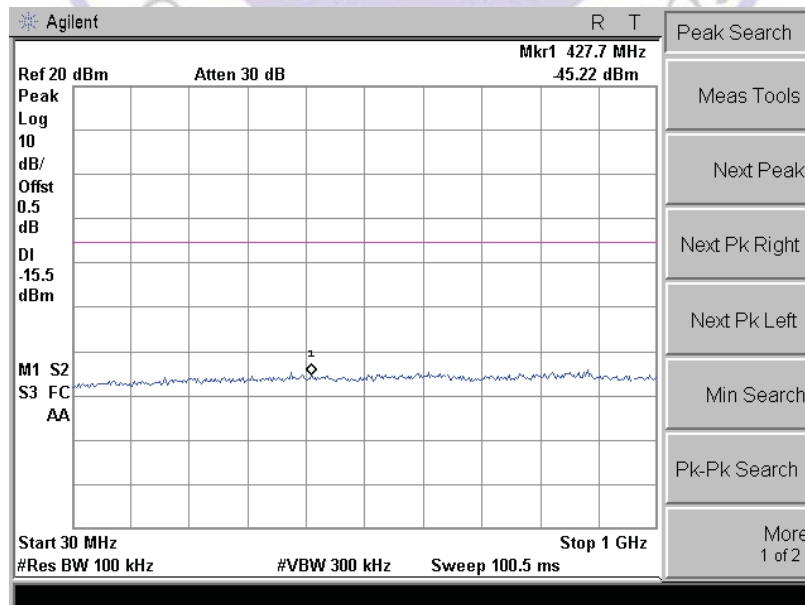
LIMIT

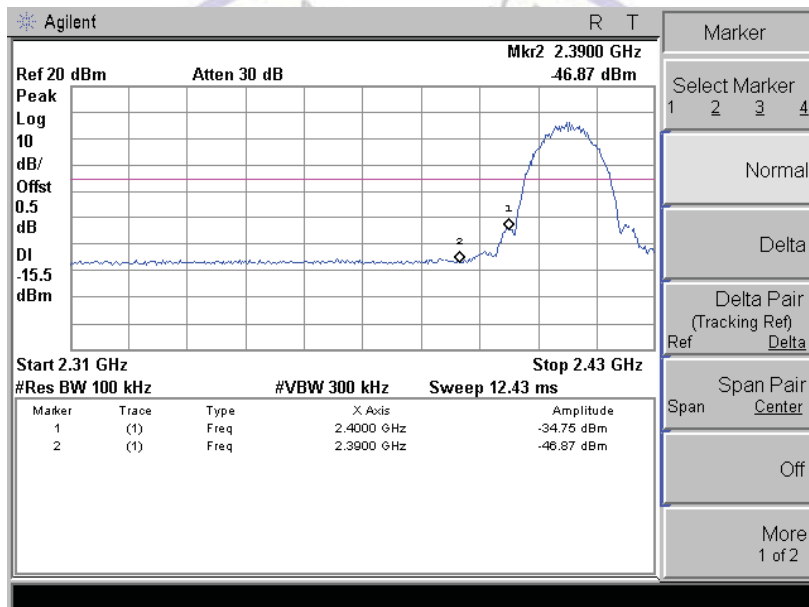
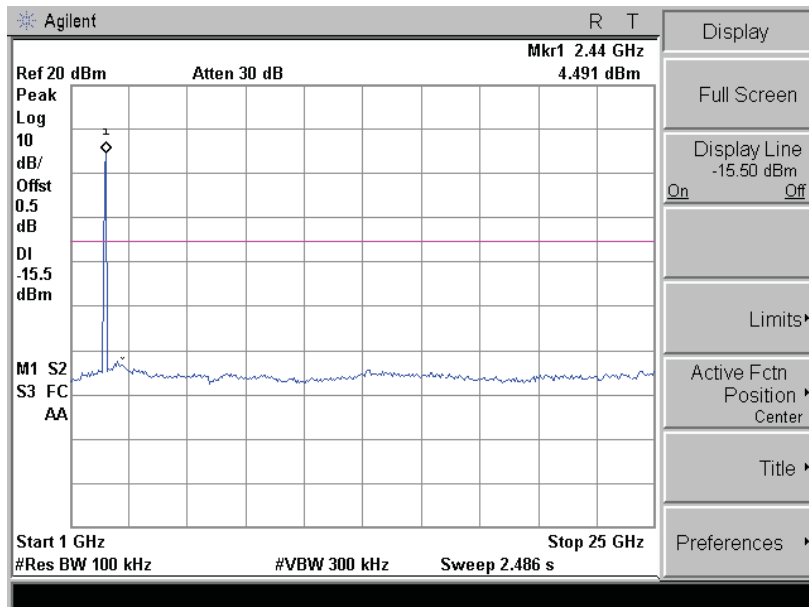
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

TEST RESULTS

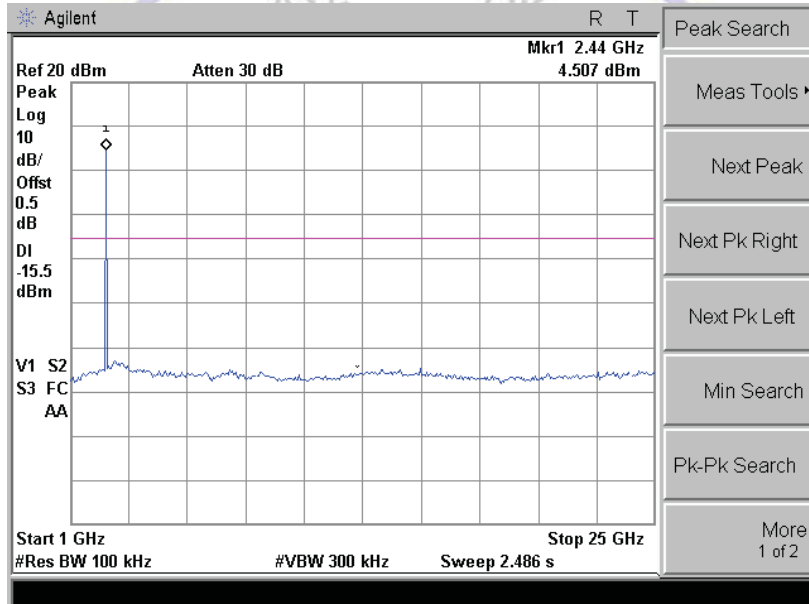
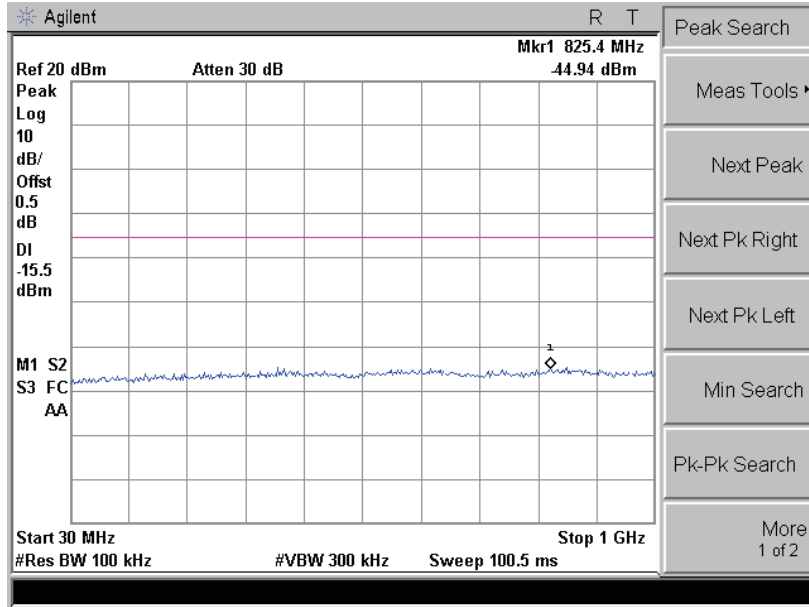
Product	:	IP Camera
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 1: Transmit by 802.11b

Channel 01 (2412MHz)

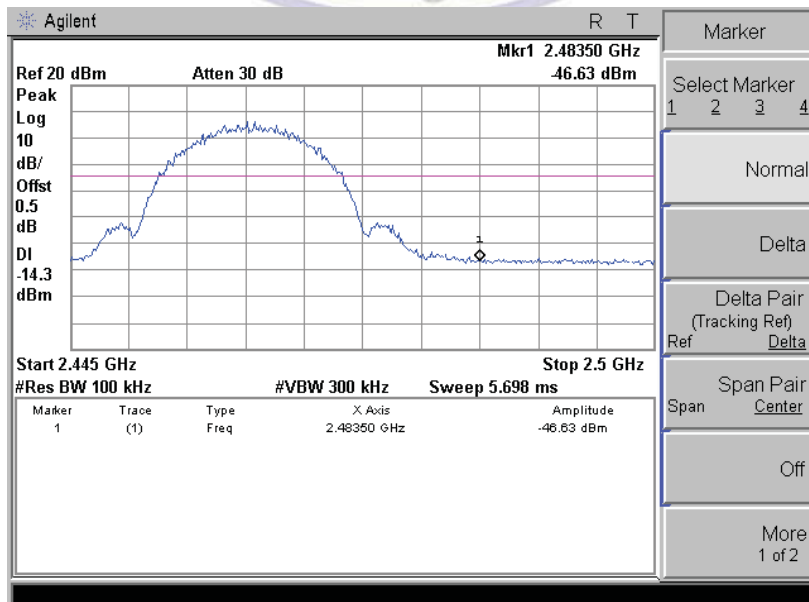
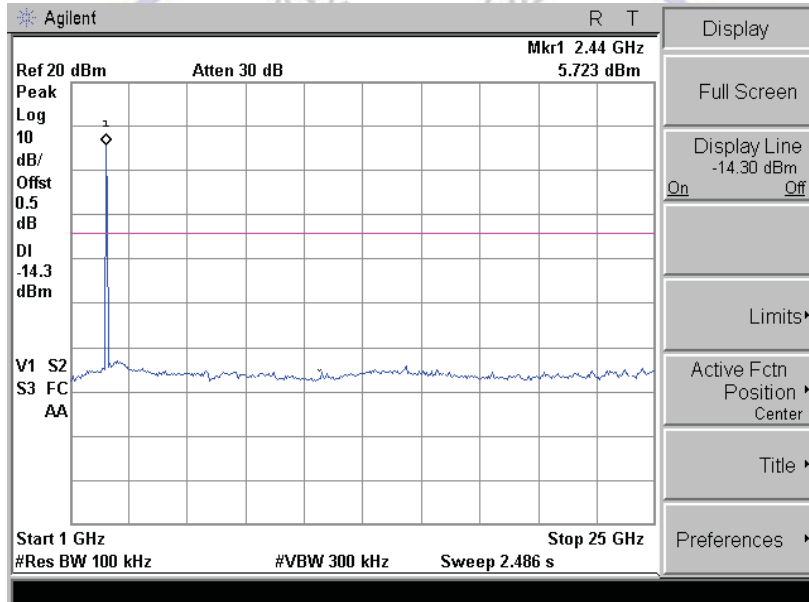
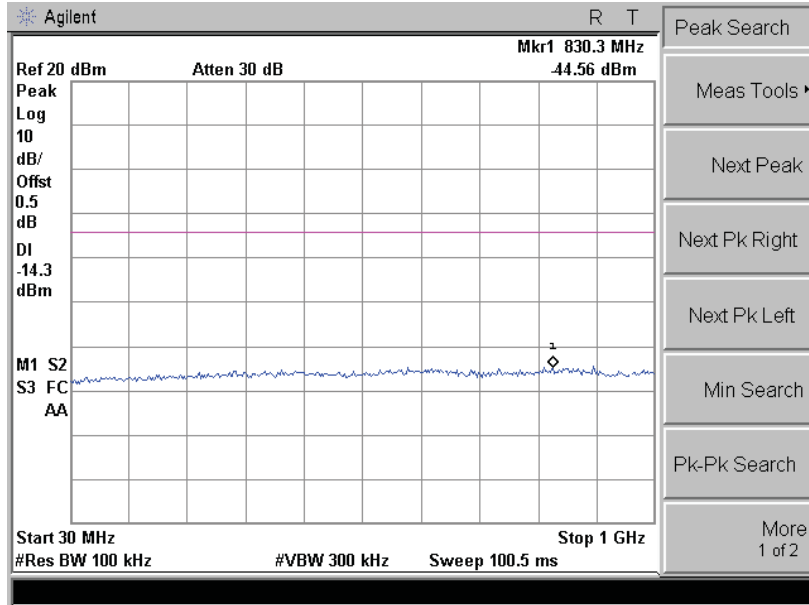




Channel 06 (2437MHz)

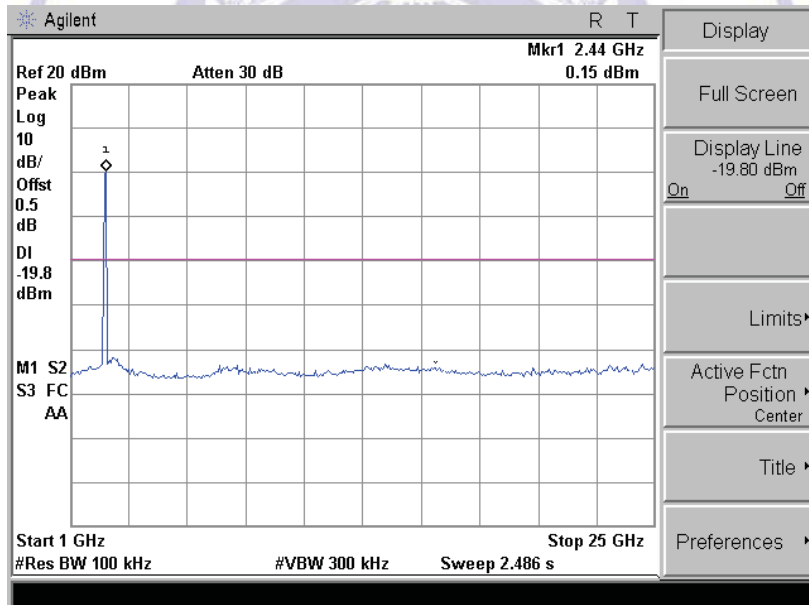
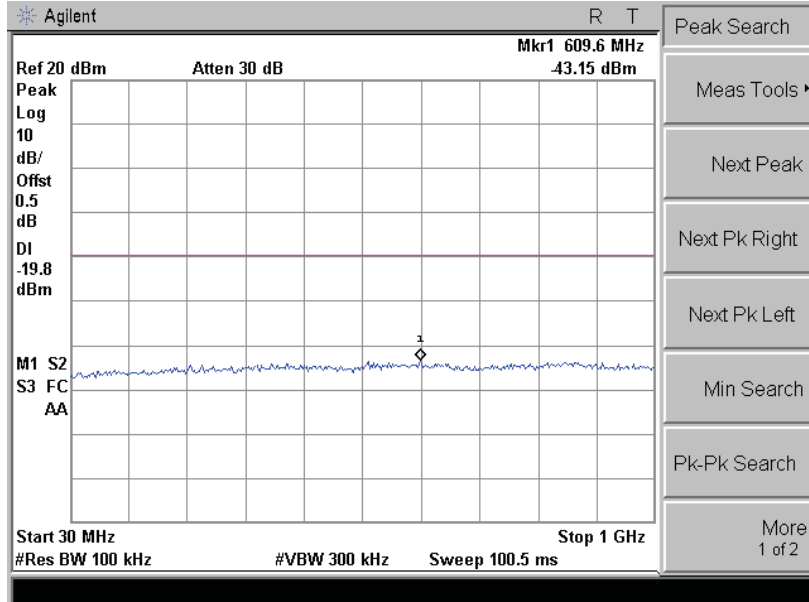


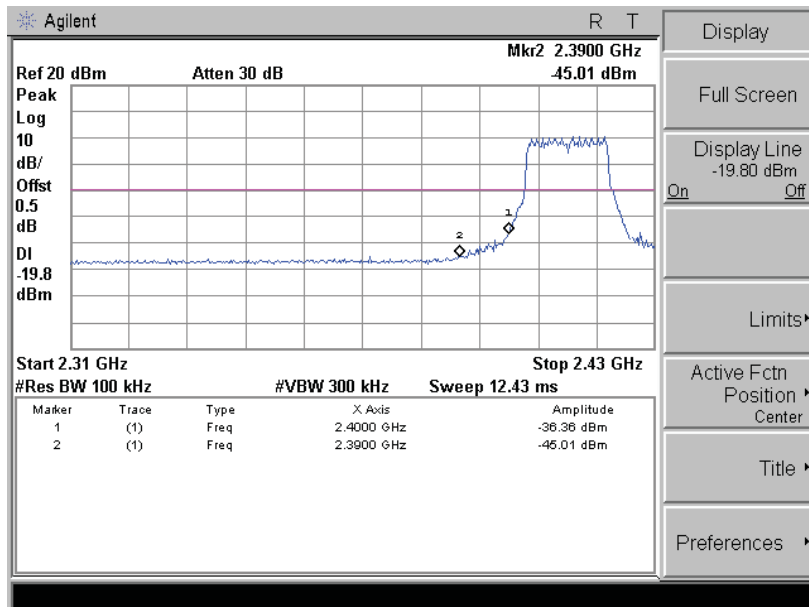
Channel 11 (2462MHz)



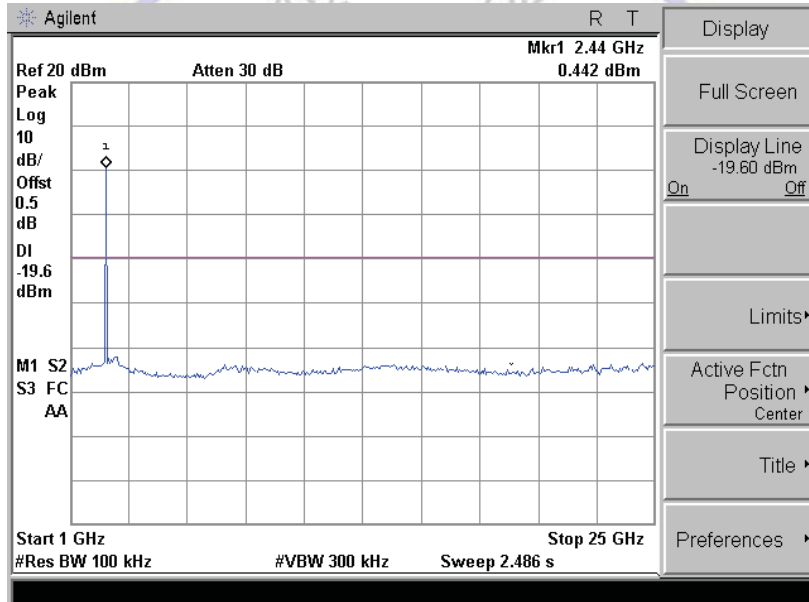
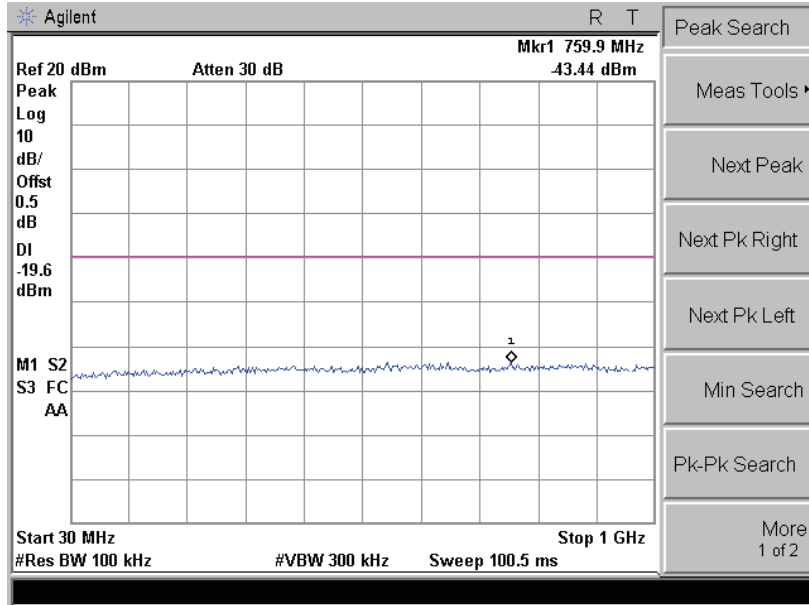
Product	:	IP Camera
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit by 802.11g

Channel 01 (2412MHz)

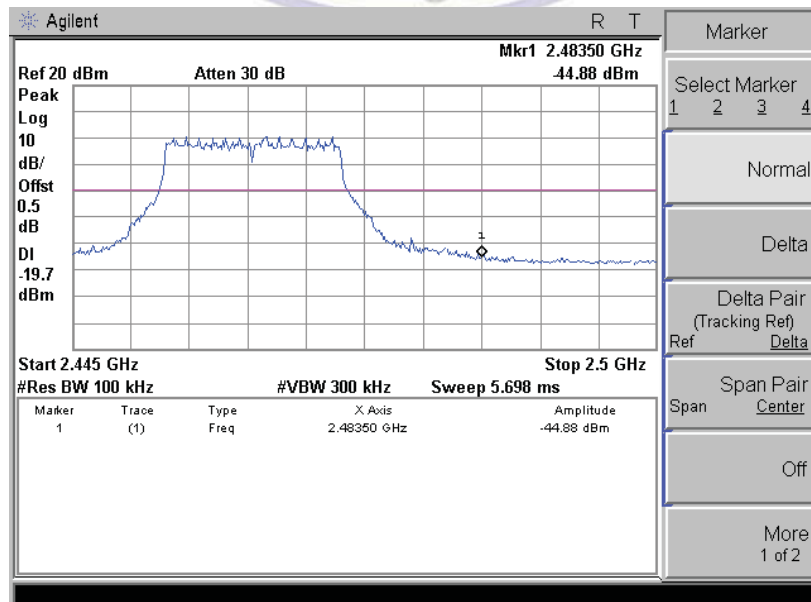
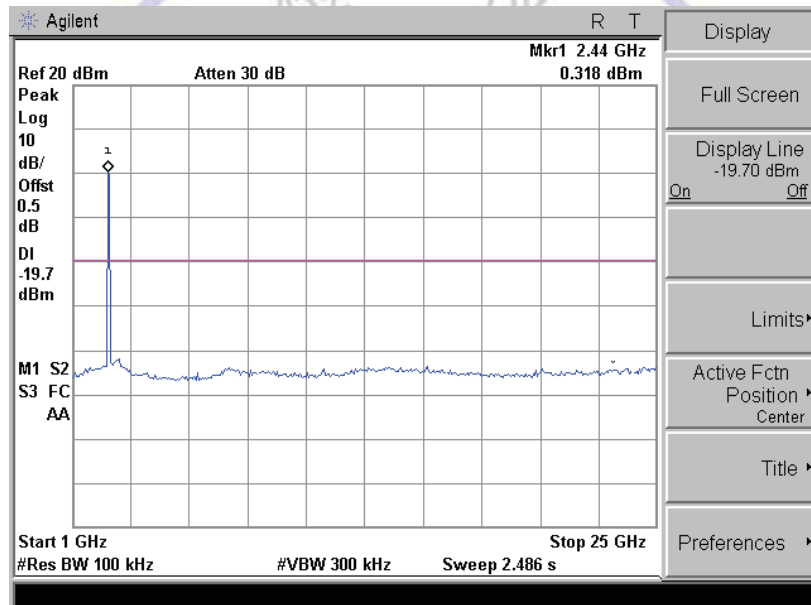
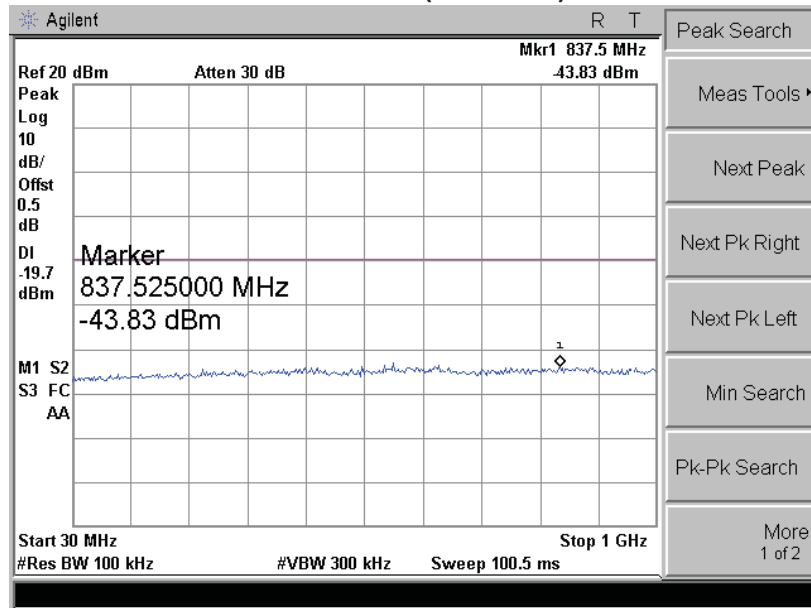




Channel 06 (2437MHz)

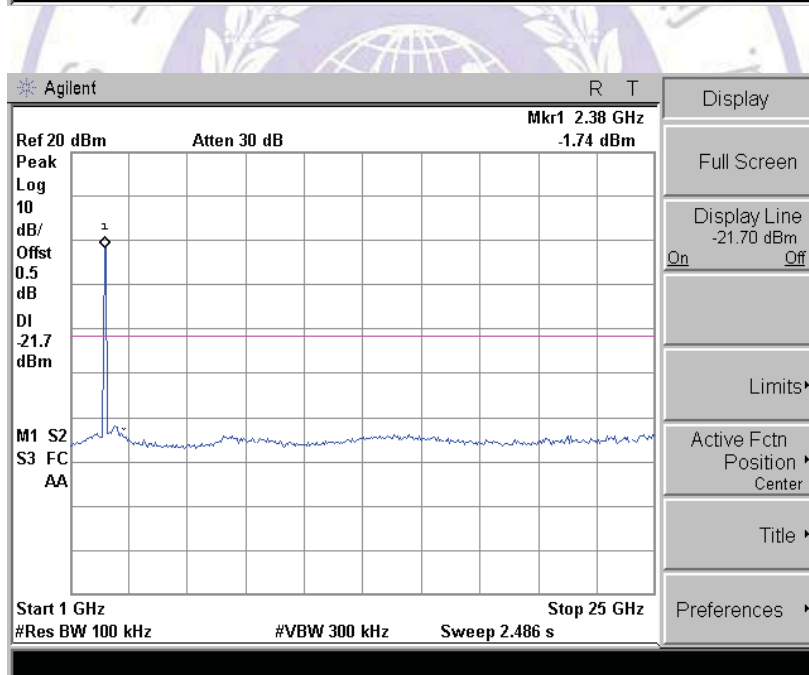
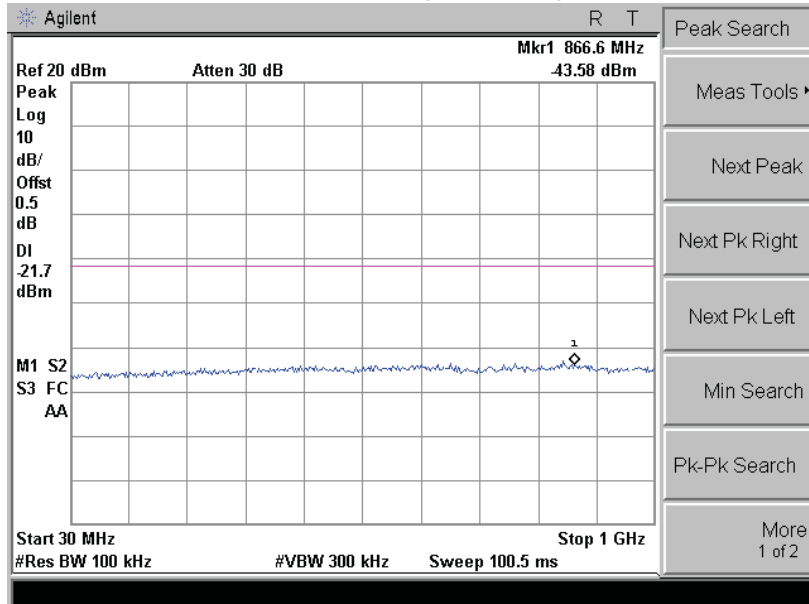


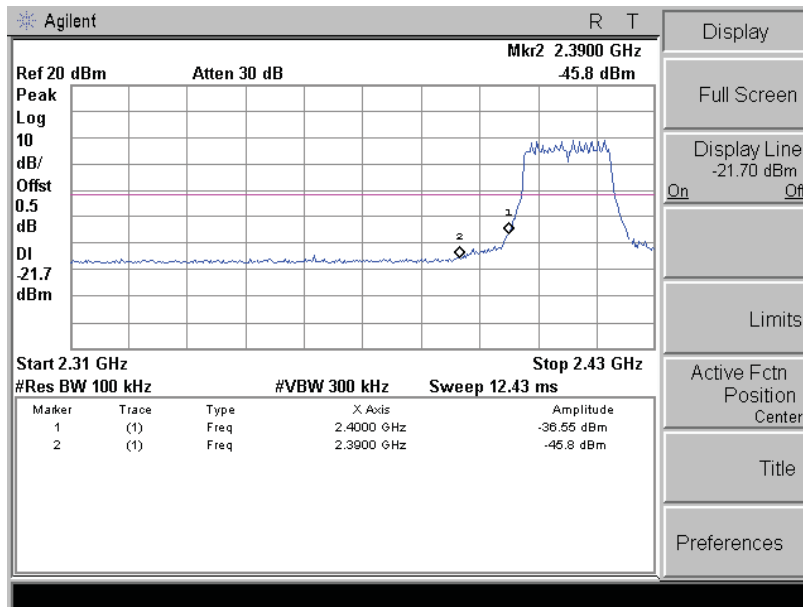
Channel 11 (2462MHz)



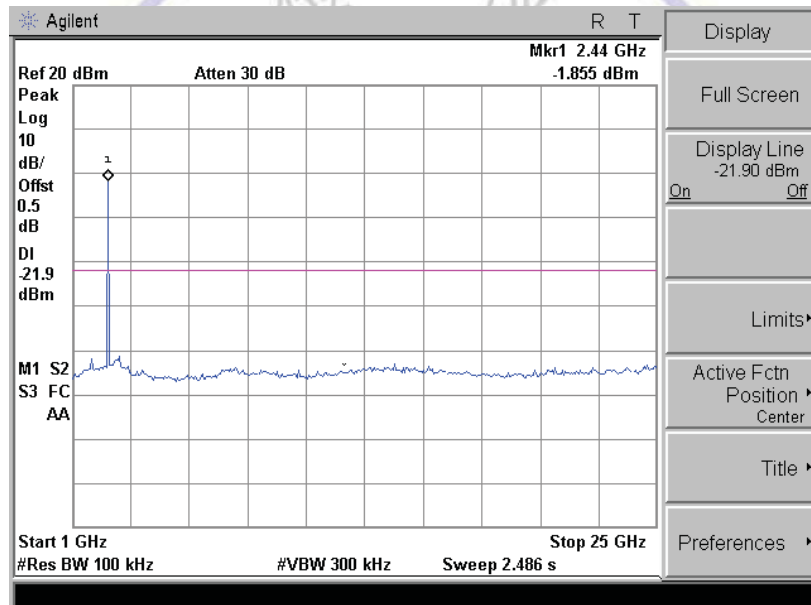
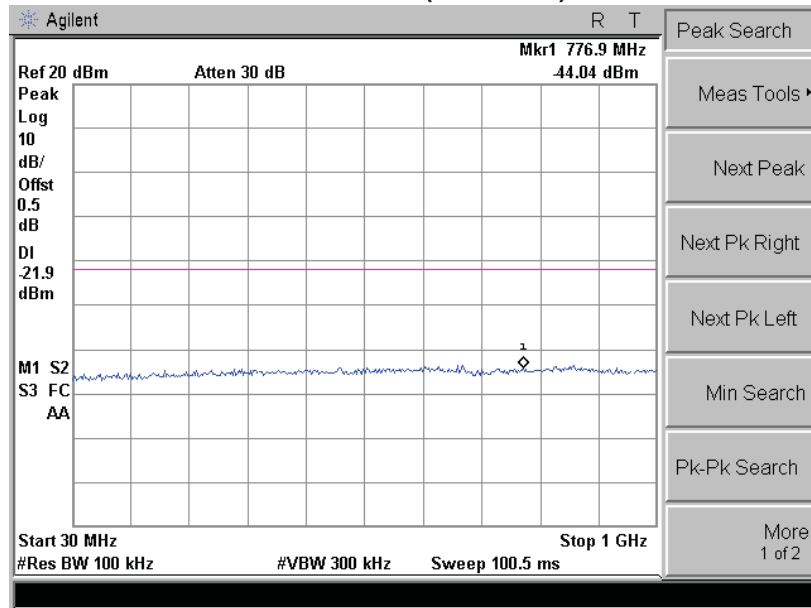
Product	:	IP Camera
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel 01 (2412MHz)

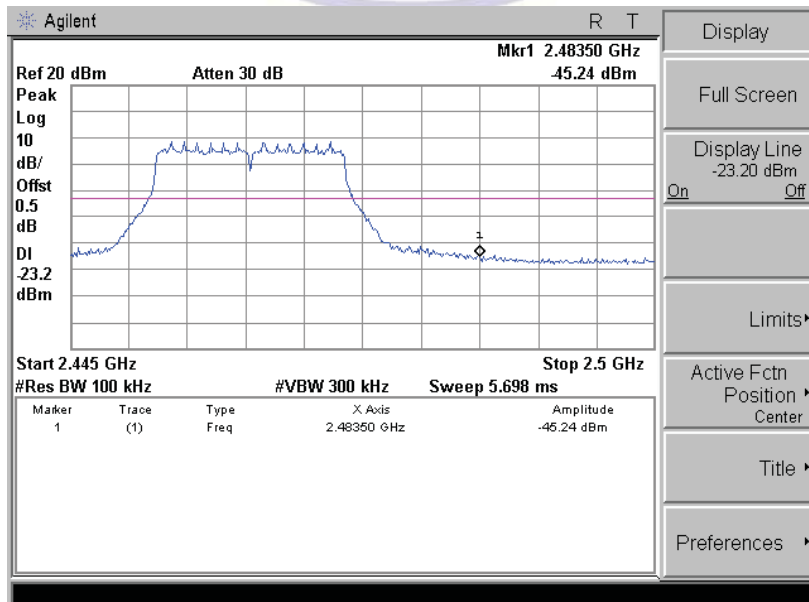
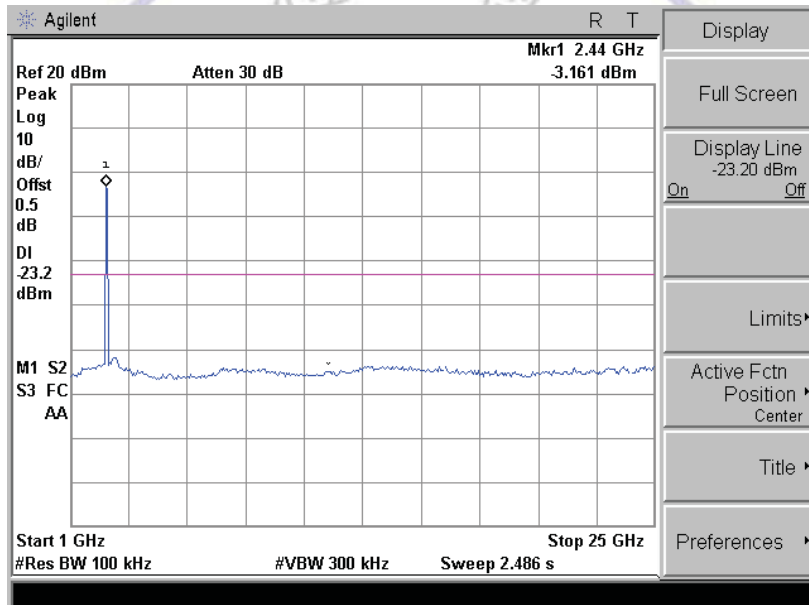
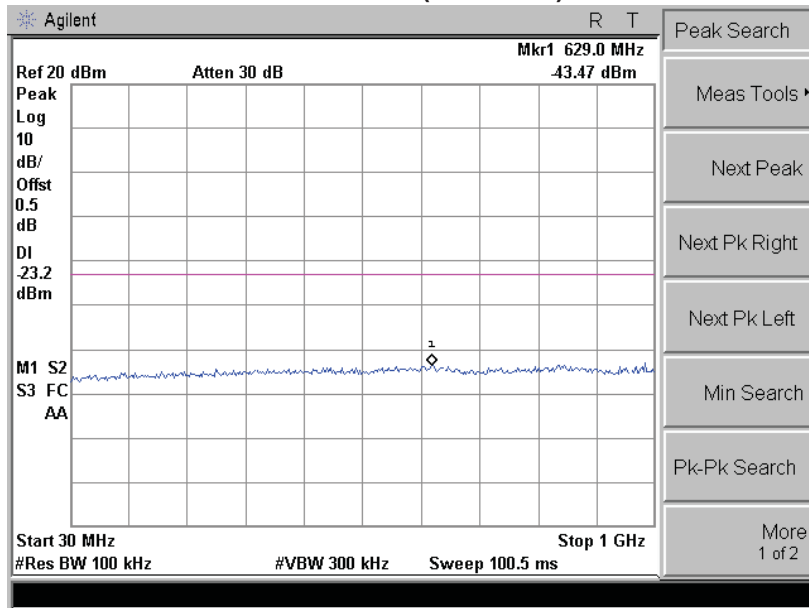




Channel 06 (2437MHz)

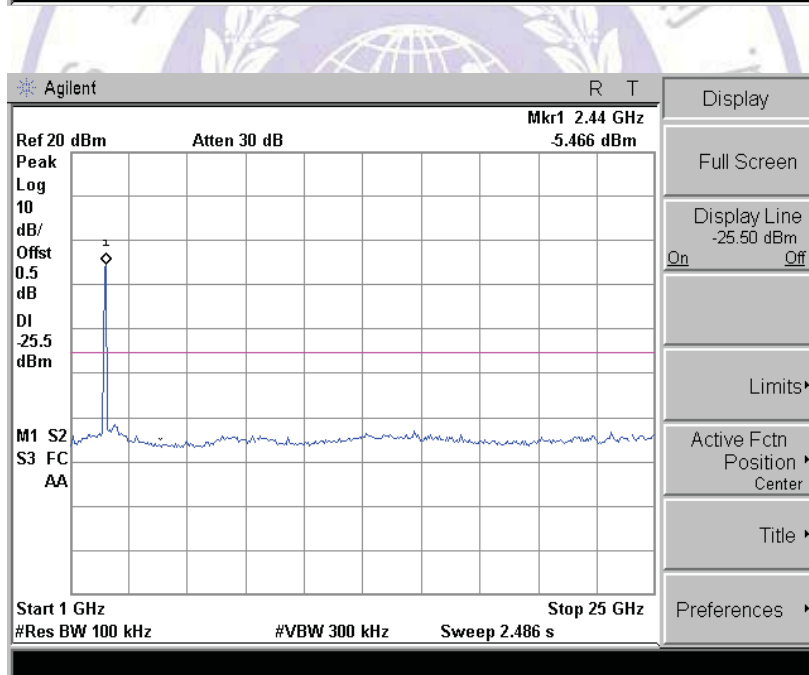
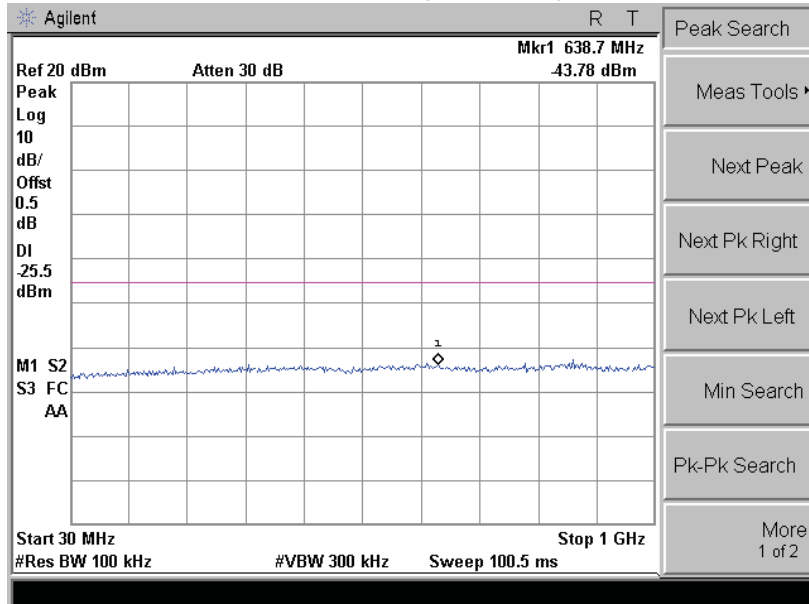


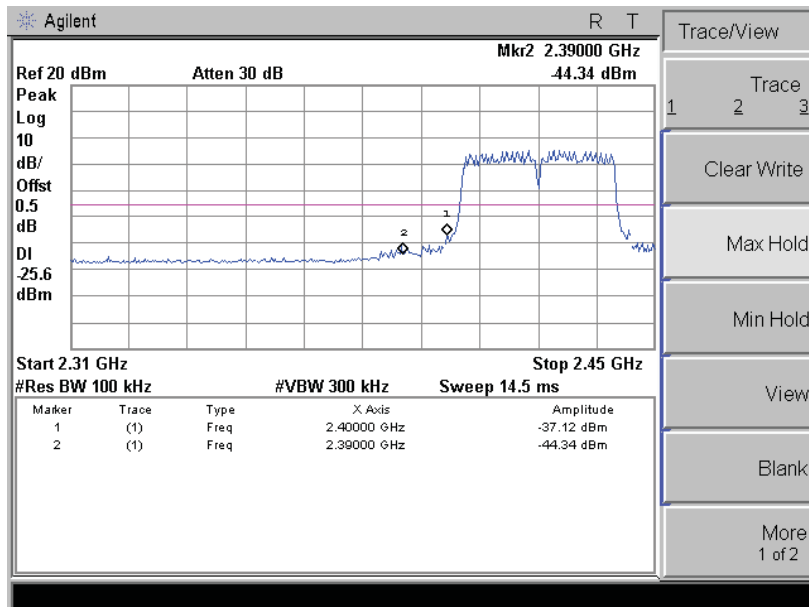
Channel 11 (2462MHz)



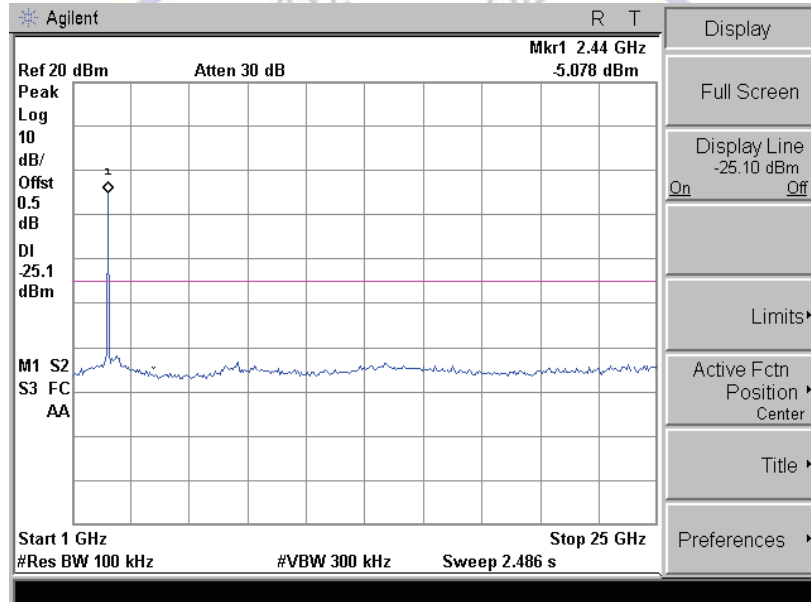
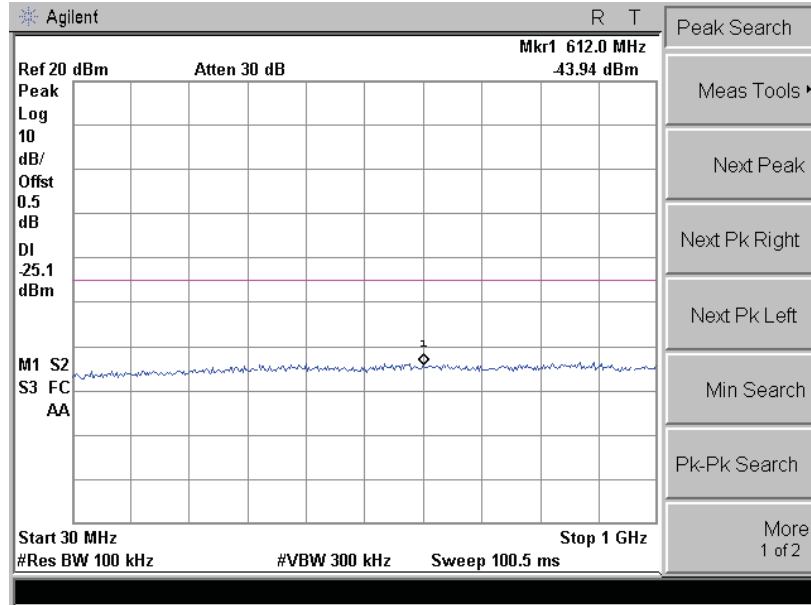
Product	:	IP Camera
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel 03 (2422MHz)

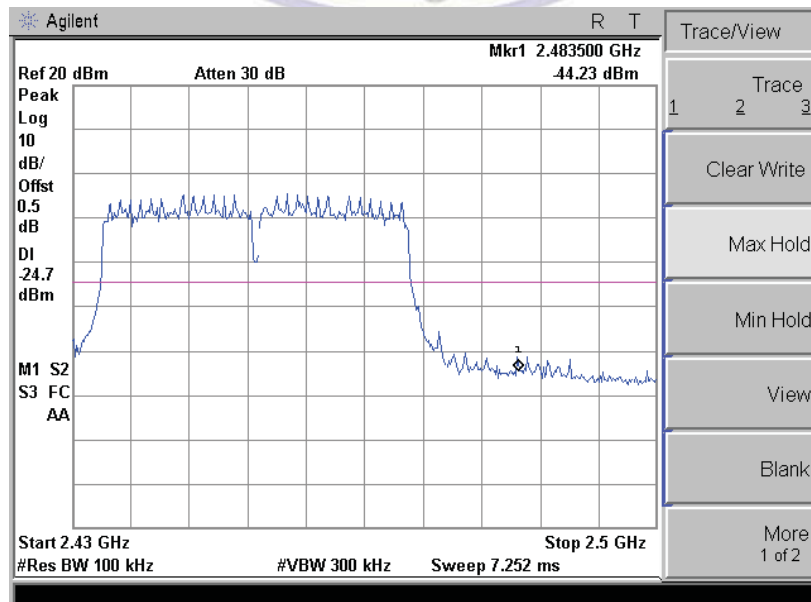
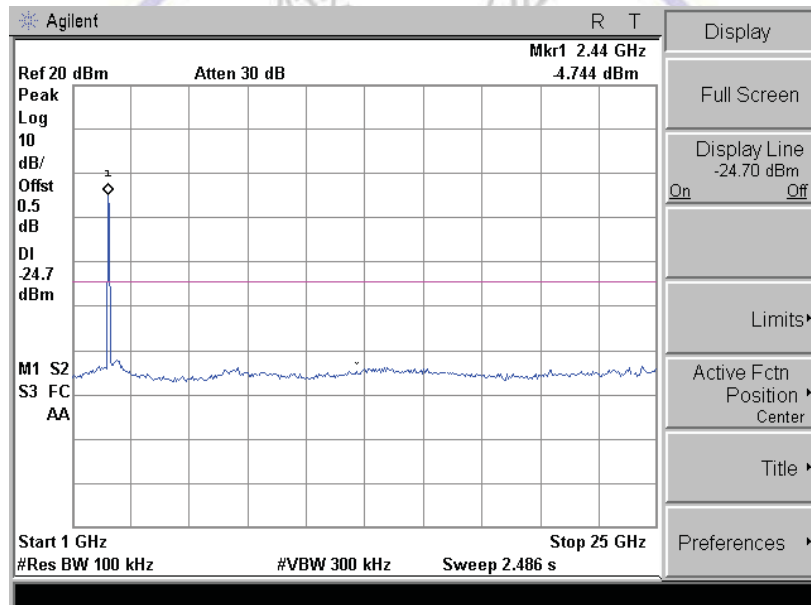
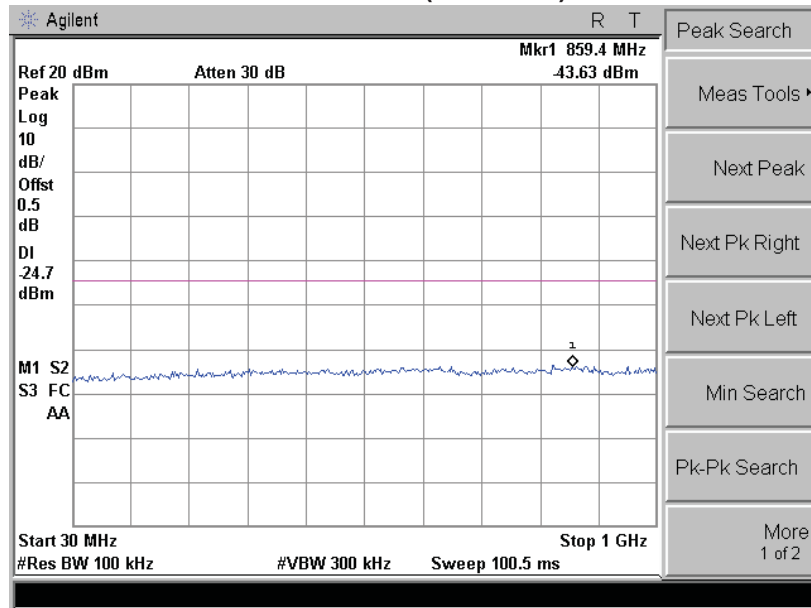




Channel 06 (2437MHz)



Channel 09 (2452MHz)



4.8. Antenna Requirement

STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

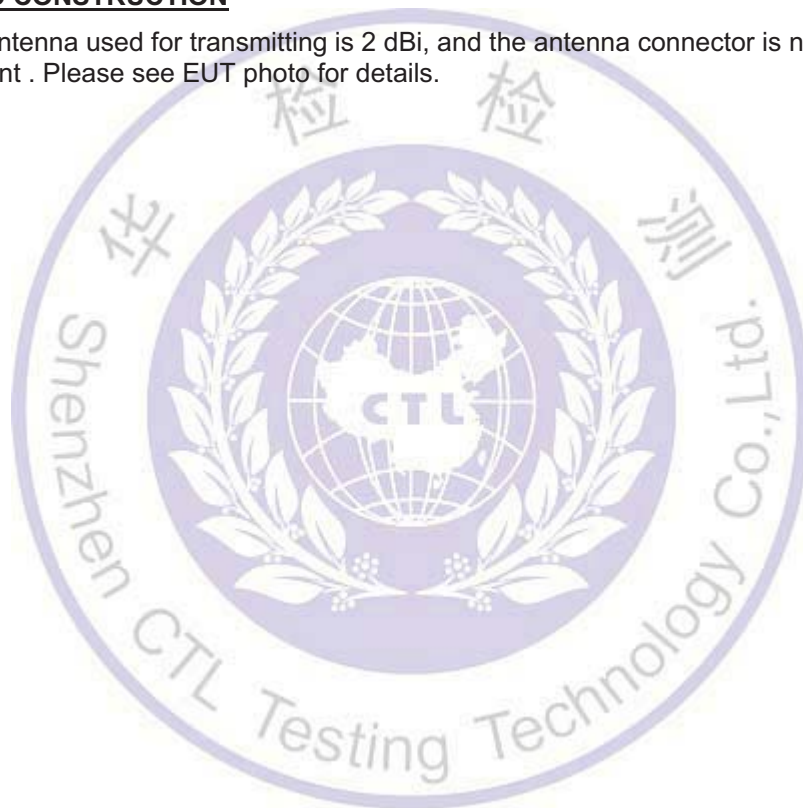
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

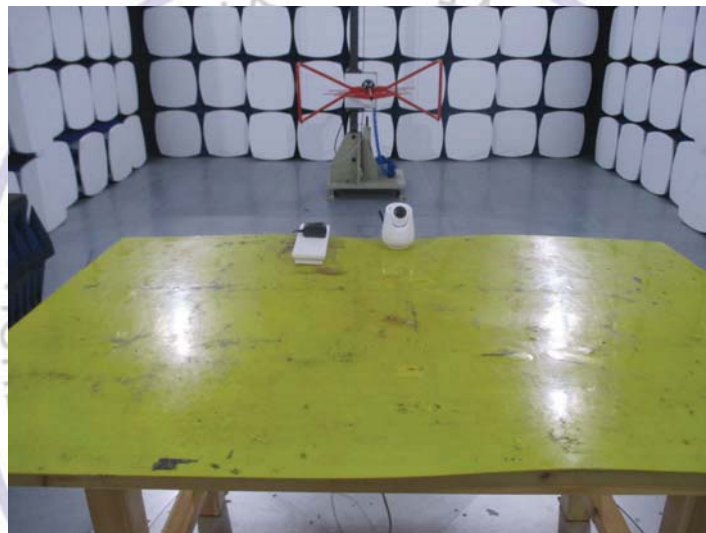
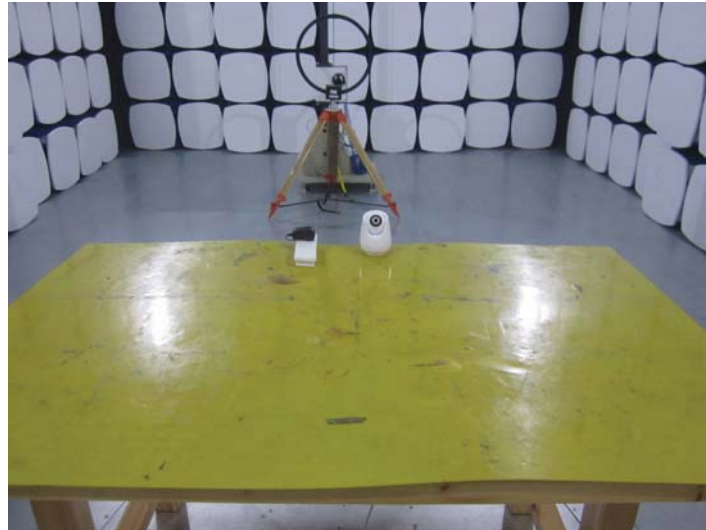
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

ANTENNA CONNECTED CONSTRUCTION

The directional gains of antenna used for transmitting is 2 dBi, and the antenna connector is non-standard and designed with permanent attachment . Please see EUT photo for details.



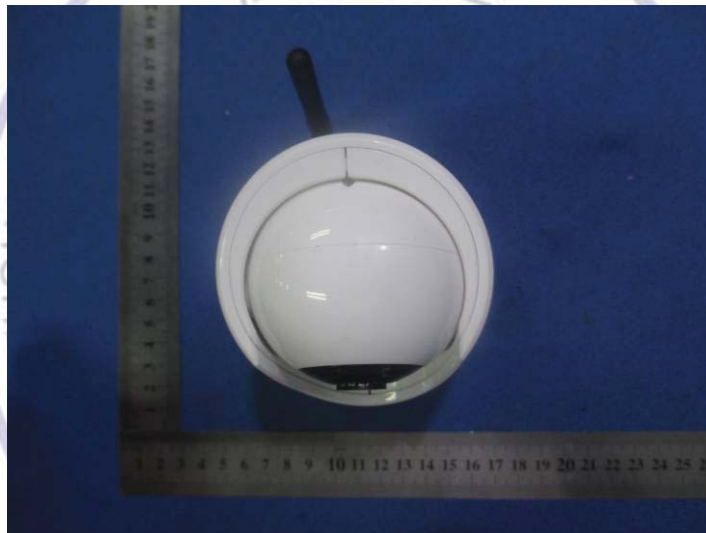
5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

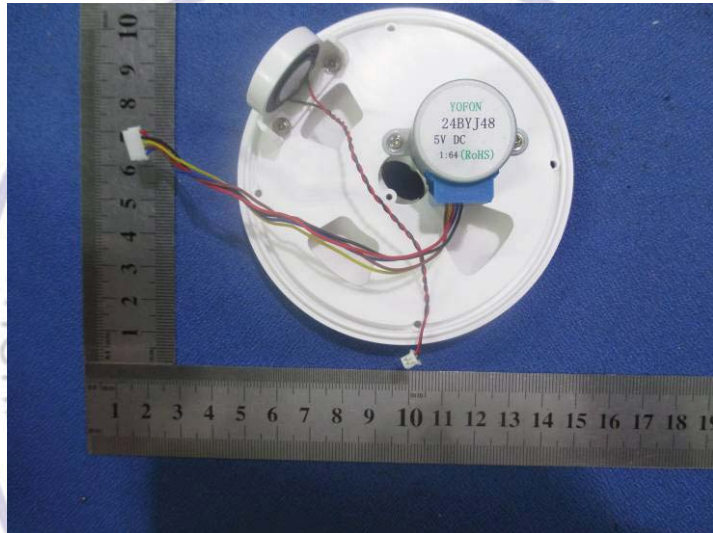
External Photos of EUT

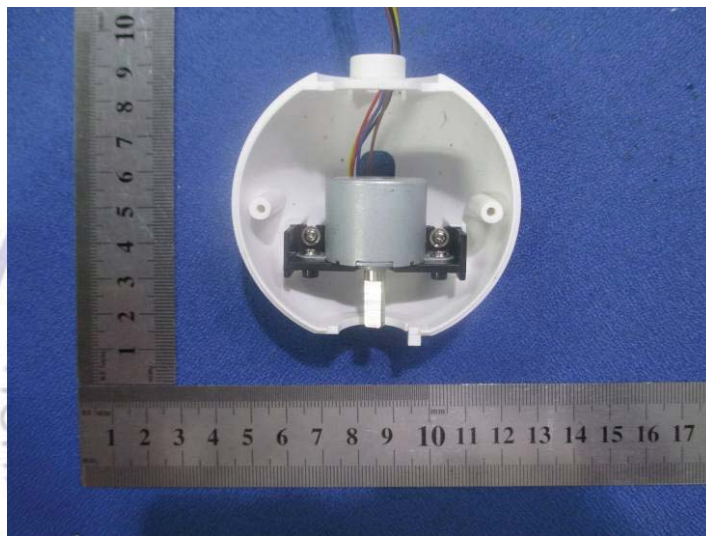
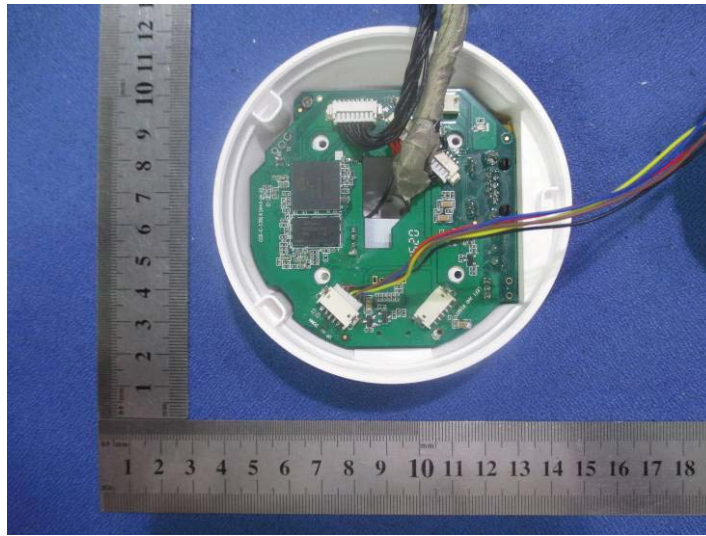


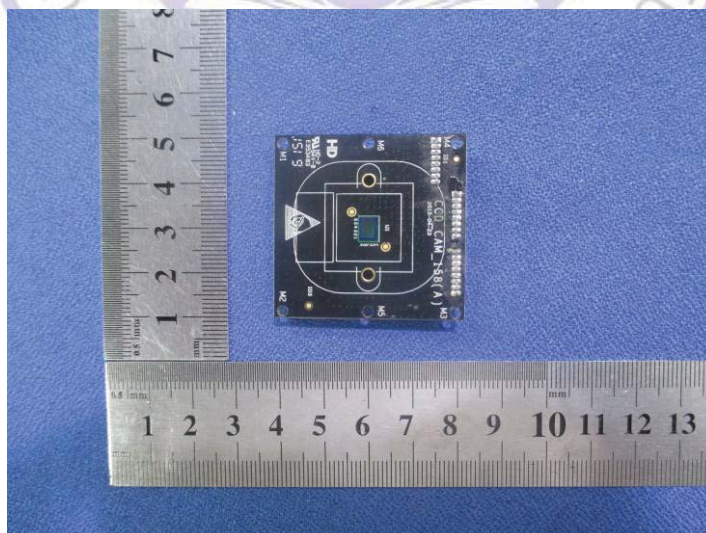
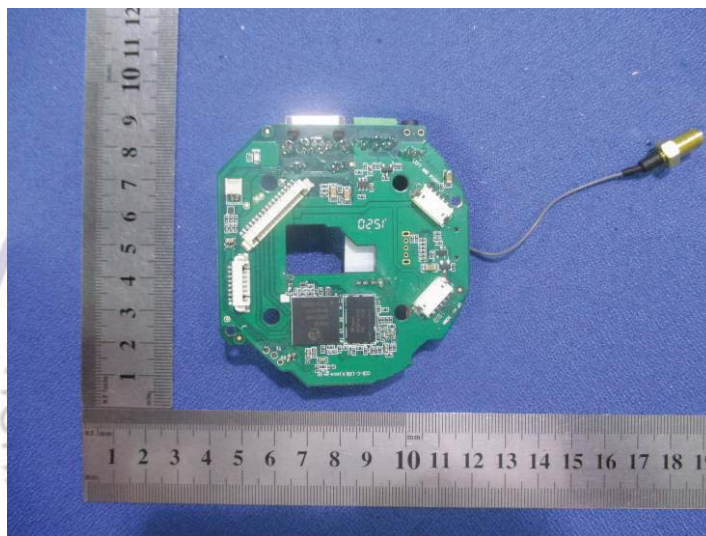
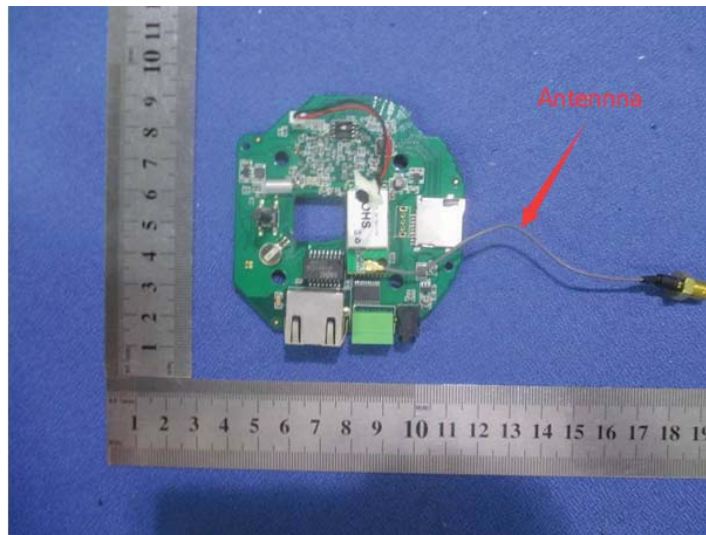


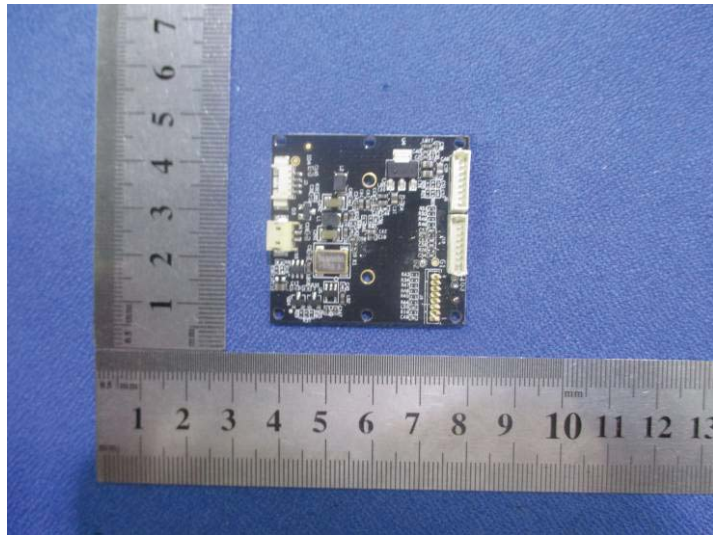


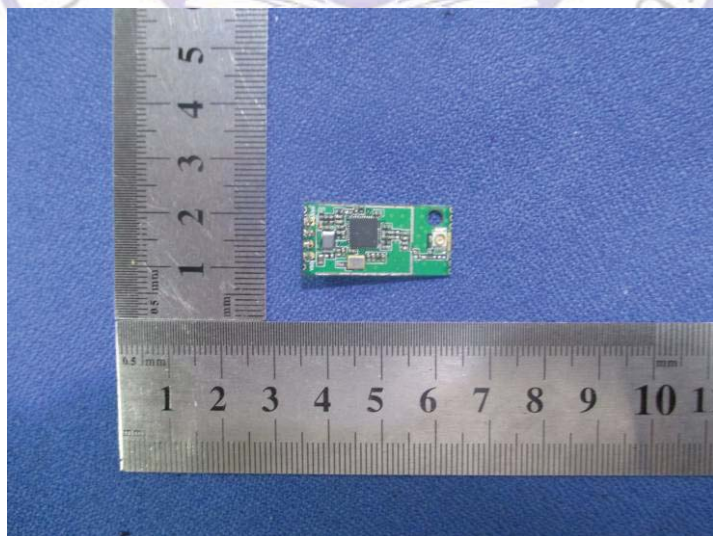
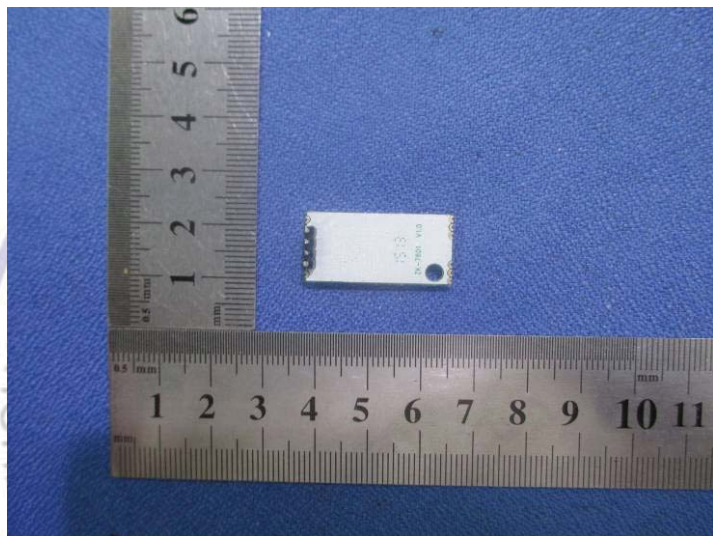
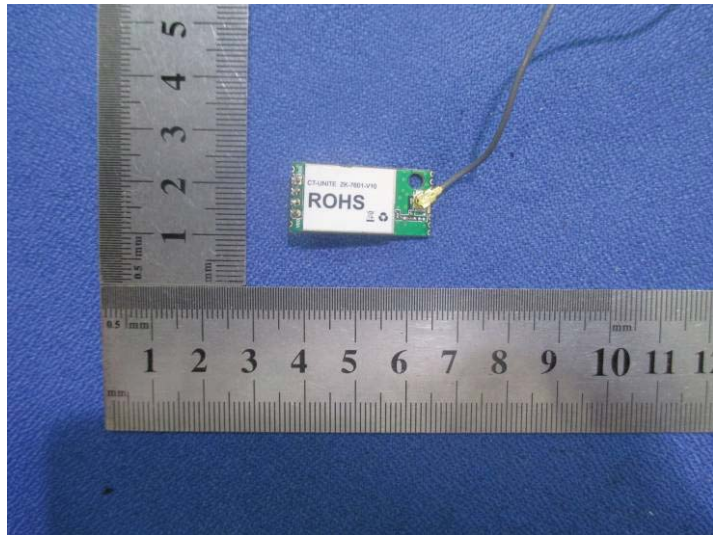
Internal Photos of EUT











.....End of Report.....