
Radio Test Report

Report No.: AGC20M120301-1F2B

FCC ID : T54ADSA11B

PRODUCT DESIGNATION : 2.4GHz digital wireless camera

BRAND NAME : N/A

TEST MODEL : ADSA11B, ADW280

CLIENT : AnJieLun Electronic Techology Limited

DATE OF ISSUE : Apr. 11, 2012

STANDARD(S) : FCC Part 15 Rules

REPORT VERSION : V1.2

Attestation of Global Compliance Co., Ltd.

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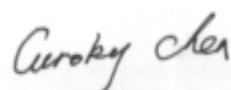
VERIFICATION OF COMPLIANCE

Applicant	AnJieLun Electronic Techology Limited 2F, 12st, LONGBI INDUSTRIAL PARK, BANTIAN VILLAGE, BUJI TOWN, SHENZHEN, GUANG DONG PROVIDENCE, CHINA
Manufacturer	AnJieLun Electronic Techology Limited 2F, 12st, LONGBI INDUSTRIAL PARK, BANTIAN VILLAGE, BUJI TOWN, SHENZHEN, GUANG DONG PROVIDENCE, CHINA
Product Designation	2.4GHz digital wireless camera
Brand Name	N/A
Test Model	ADSA11B
Serious Model	ADW280
Model Difference	All the same except for the model name
Report Number	AGC20M120301-1F2B
Date of Test	Apr. 08, 2012 to Apr. 10, 2012

WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2003. The sample tested as described in this report is in compliance with the FCC Rules Part 15 requirements.

Tested By:



Curoky Chen Apr. 11, 2012

Reviewed By:



Forrest Lei Apr. 11, 2012

Approved By:



Solger Zhang Apr. 11, 2012

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1 GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is a 2.4GHz Digital Wireless Camera designed as an “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation. It employed a hopping sequence to make sure that the 24 channels are equally used. The Rx input bandwidth is 3 MHz.

A major technical description of EUT is described as following

Operation Frequency	2408.95 MHz to 2474.23MHz
Rated Output Power	15.43dBm(max)
Hardware Version	V1.0
Software Version	V1.0
Modulation	GFSK
Number of channels	24
Antenna Designation	Fixed
Antenna Gain	1.6dBi
Power Supply	DC 5V by adapter

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: T54ADSA11B**, filing to comply with the FCC Part 15 requirements.

1.3 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 TEST FACILITY

The test site used to collect the radiated data is located on the address of Attestation of Global Compliance Co., Ltd. 2F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen. The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 . FCC register No.: 259865

1.5 SPECIAL ACCESSORIES

Refer to section 2.2.

1.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2 SYSTEM TEST CONFIGURATION

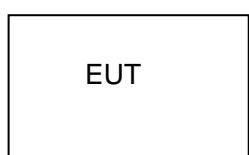
2.1 CONFIGURATION OF EUT SYSTEM

Configure 1:



Note: the EUT controlled by Receiver to work in continuous TX mode.

Configure 2:



Note: EUT worked in Normal hopping mode.

2.2 EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	2.4GHz digital wireless camera	N/A	ADSA11B	EUT
2	Power supply	Nalin	NLA10050W1A	Accessory
3	PC	Dell	Inspiron N5110	A.E

*Note: All the accessories have been used during the test.
the EUT in test setup diagram means "EUT system".*

3 SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Peak Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant
§15.247	Frequency Separation	Compliant
§15.207	Line Conduction Emission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been operated in three modulations: GFSK independently.
The following operating modes were applied for the related test items.

No.	TEST MODES
1	Low Channel(TX)
2	Middle Channel(TX)
3	High Channel(TX)
4	Normal Hopping

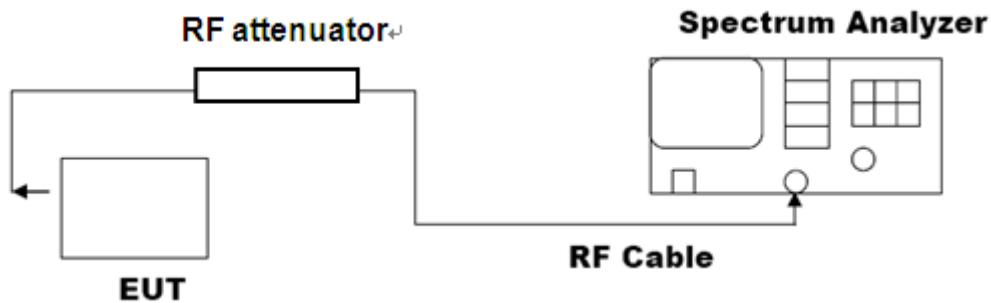
Note: All test modes were performed during the testing with configure in section 2.1, only the result of the worst case was recorded in the report.

5 PEAK OUTPUT POWER

5.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured
VBW \geq RBW; Sweep = auto; Detector function = peak
5. Set SPA Trace 1 Max hold, then View.

5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



5.3 MEASUREMENT EQUIPMENT USED

Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	06/27/2011	06/26/2012
RF attenuator	N/A	RFA20db	N/A	N/A	N/A

5.4 LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MODULATION			
Frequency (GHz)	Result (dBm)	Applicable Limits (dBm)	Pass or Fail
Channel 0	14.67	30	Pass
Channel 12	14.98	30	Pass
Channel 23	15.43	30	Pass

6 20 DB BANDWIDTH

6.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
 RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW; Sweep = auto; Detector function = peak
5. Set SPA Trace 1 Max hold, then View.

6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

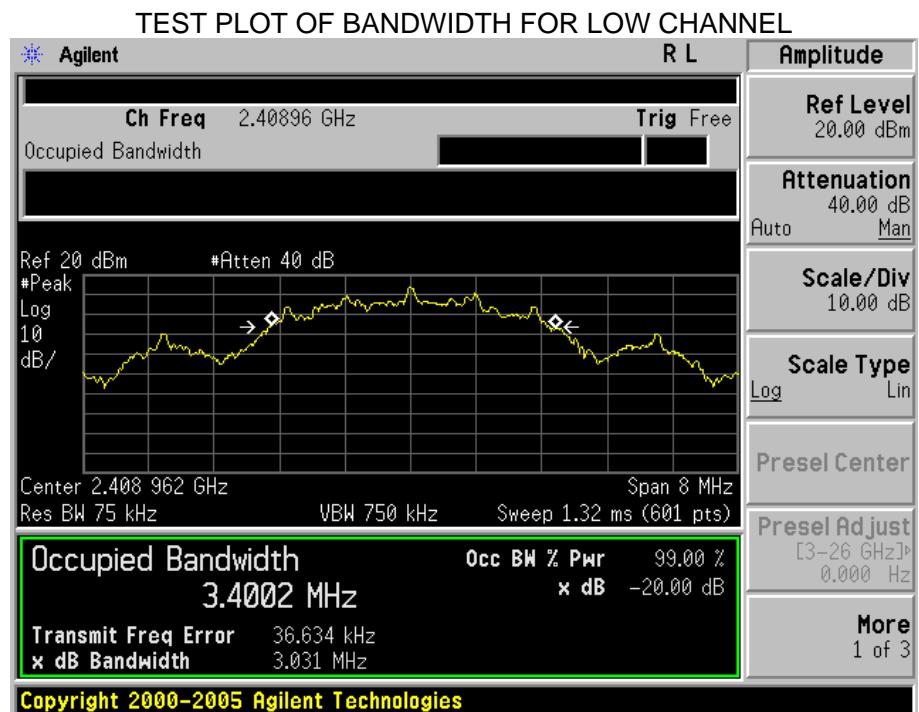
The same as described in Section 5.2

6.3 MEASUREMENT EQUIPMENT USED

The same as described in Section 5.3

6.4 LIMITS AND MEASUREMENT RESULTS

TEST RESULT			
Applicable Limits	Measurement Result		
	Test Data (MHz)	Criteria	
--	Low Channel	3.031	PASS
	Middle Channel	3.024	PASS
	High Channel	3.059	PASS



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



7. CONDUCTED SPURIOUS EMISSION

7.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
RBW = 100 kHz; VBW \geq RBW; Sweep = auto; Detector function = peak.
5. Set SPA Trace 1 Max hold, then View.

7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in section 5.2

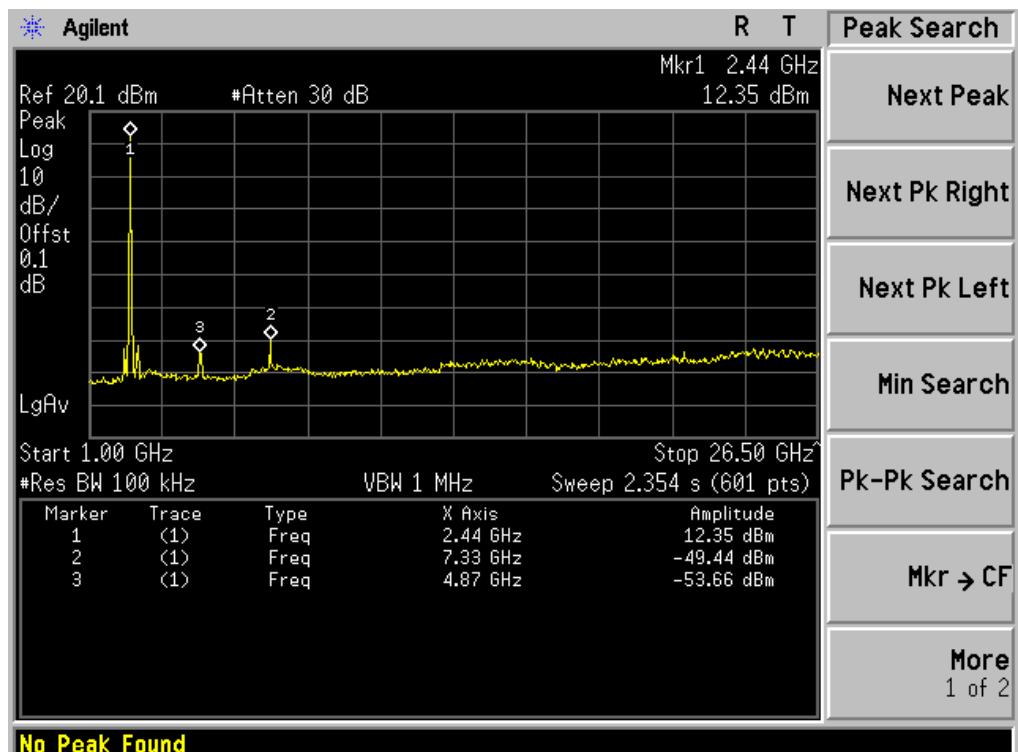
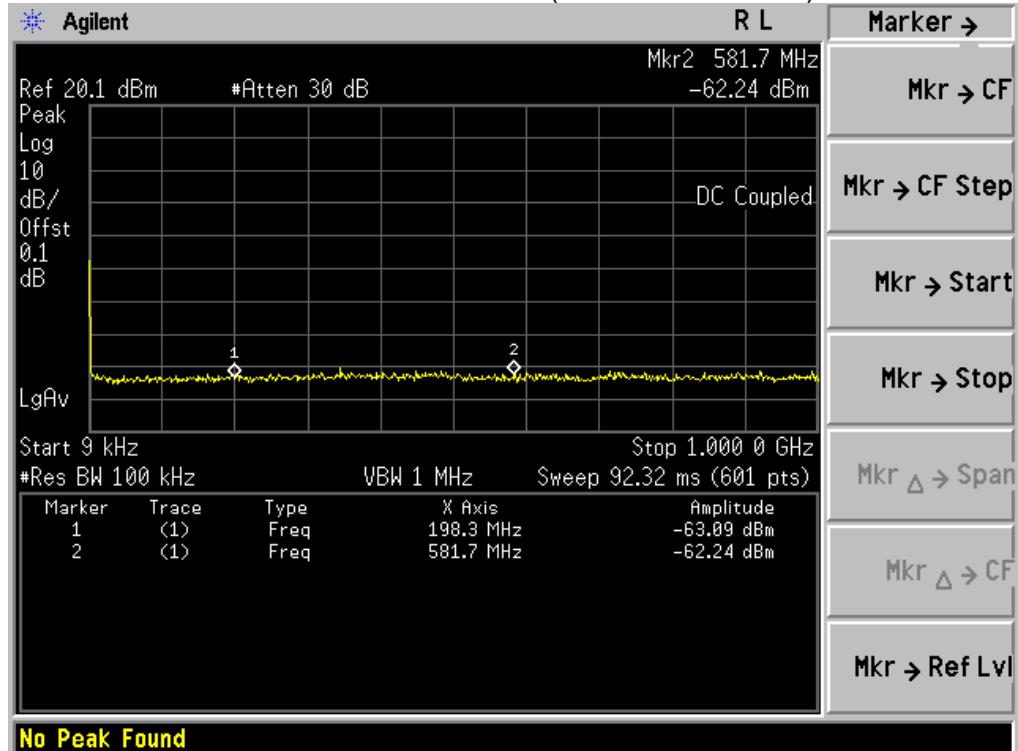
7.3 MEASUREMENT EQUIPMENT USED

The Same as described in section 5.3

7.4 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS

TEST PLOT OF OUT OF BAND EMISSIONS
WITH THE WORST CASE (MIDDLE CHANNEL)



8. RADIATED EMISSION

8.1 MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4: 2003. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

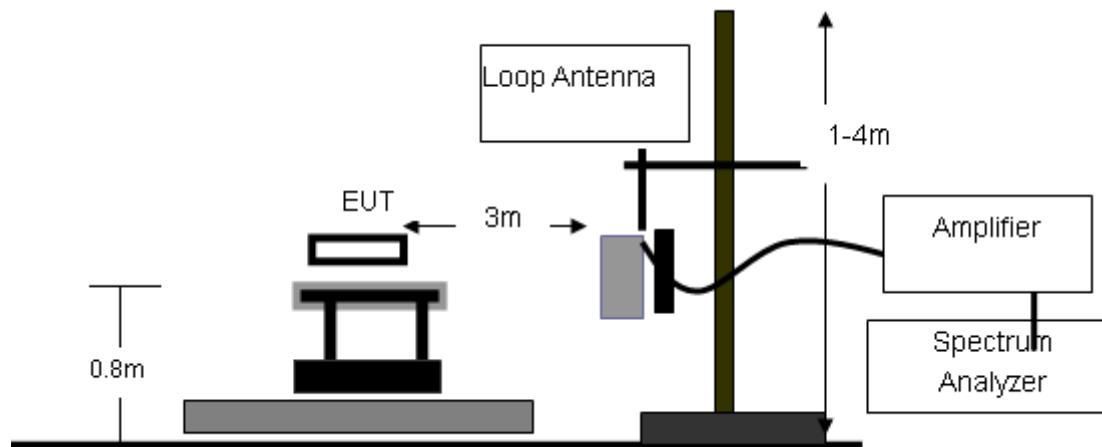
The following table is the setting of spectrum analyzer and receiver.'

Spectrum Parameter	Setting
Start Frequency	1GHz
Stop Frequency	26.5GHz
RB/VB(Emission in restricted band)	1MHz/1MHz for Peak, 1MHz/10Hz for Average
RB/VB(Emission in non-restricted band)	1MHz/1MHz for Peak

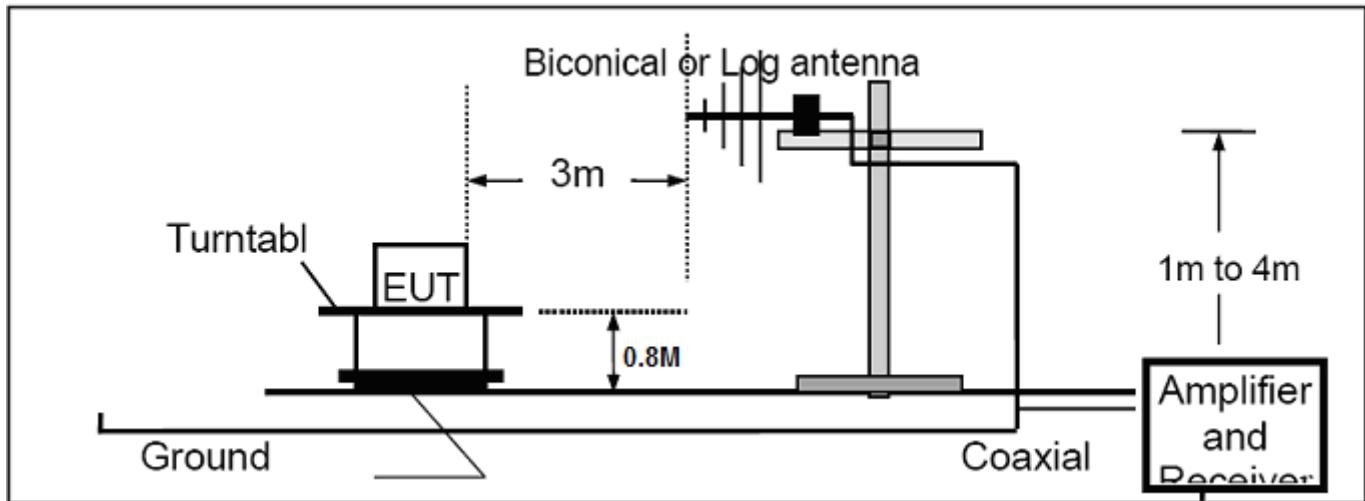
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

8.2 TEST SETUP

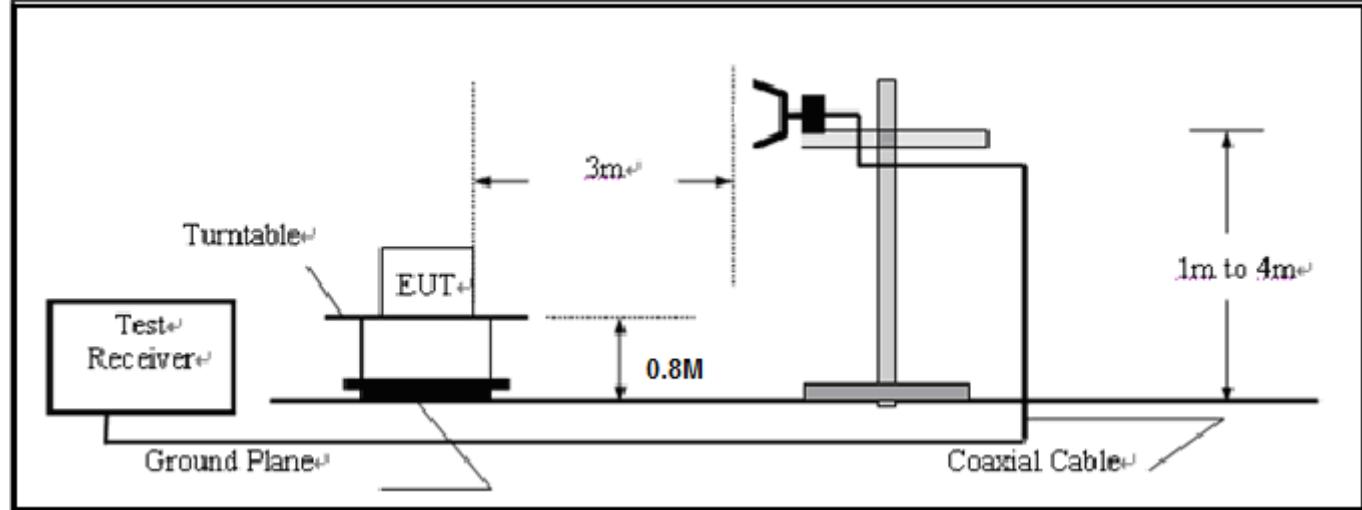
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



8.3 TEST EQUIPMENT LIST

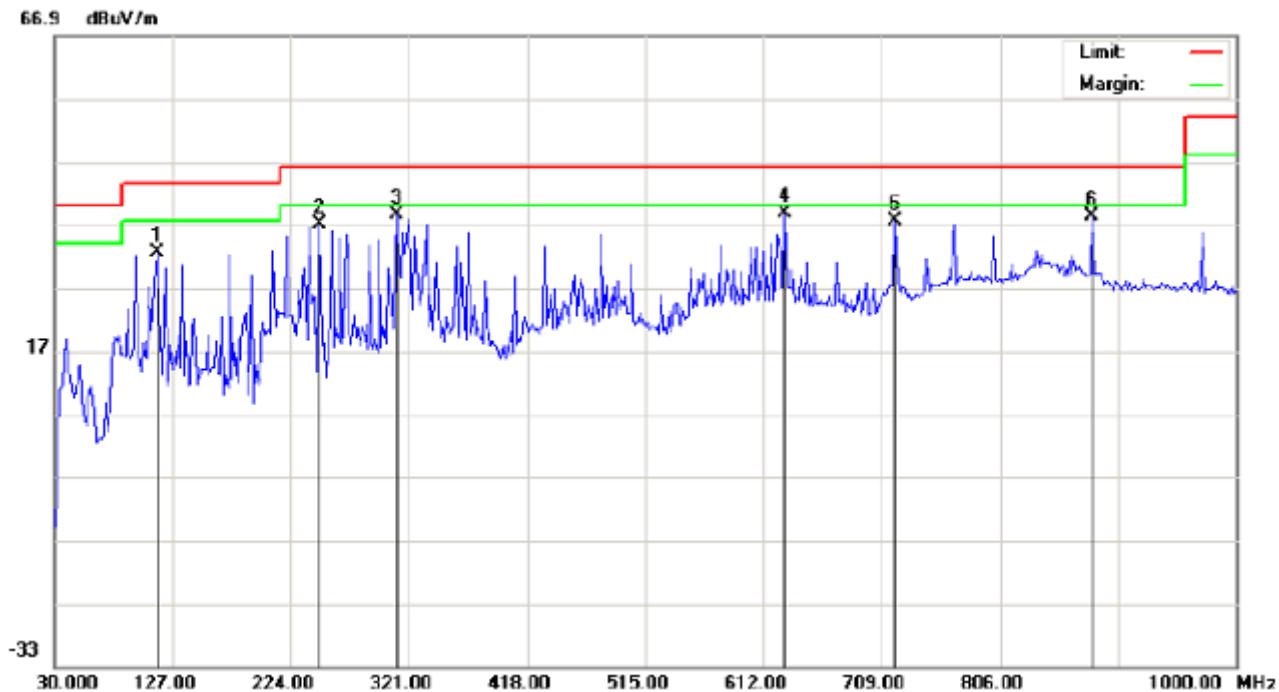
Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	06/27/2011	06/26/2012
Amplifier	EM	EM30180	0607030	06/27/2011	06/26/2012
Horn Antenna	EM	EM-AH-10180	N/A	06/27/2011	06/26/2012
EMI Test Receiver	Rohde & Schwarz	ESCI	N/A	06/27/2011	06/26/2012
Amplifier	EM	EM30180	N/A	06/27/2011	06/26/2012
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	06/27/2011	06/26/2012
Loop Antenna	Daze	ZN30900N	SEL0097	06/27/2011	06/26/2012
Isolation Transformer	LETEAC	LTBK	--	06/27/2011	06/26/2012

8.4 TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ



Site: site #1

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Class B 3M Radiation

Power: AC 120V/60Hz

Humidity: 60 %

EUT: 2.4GHz digital wireless camera

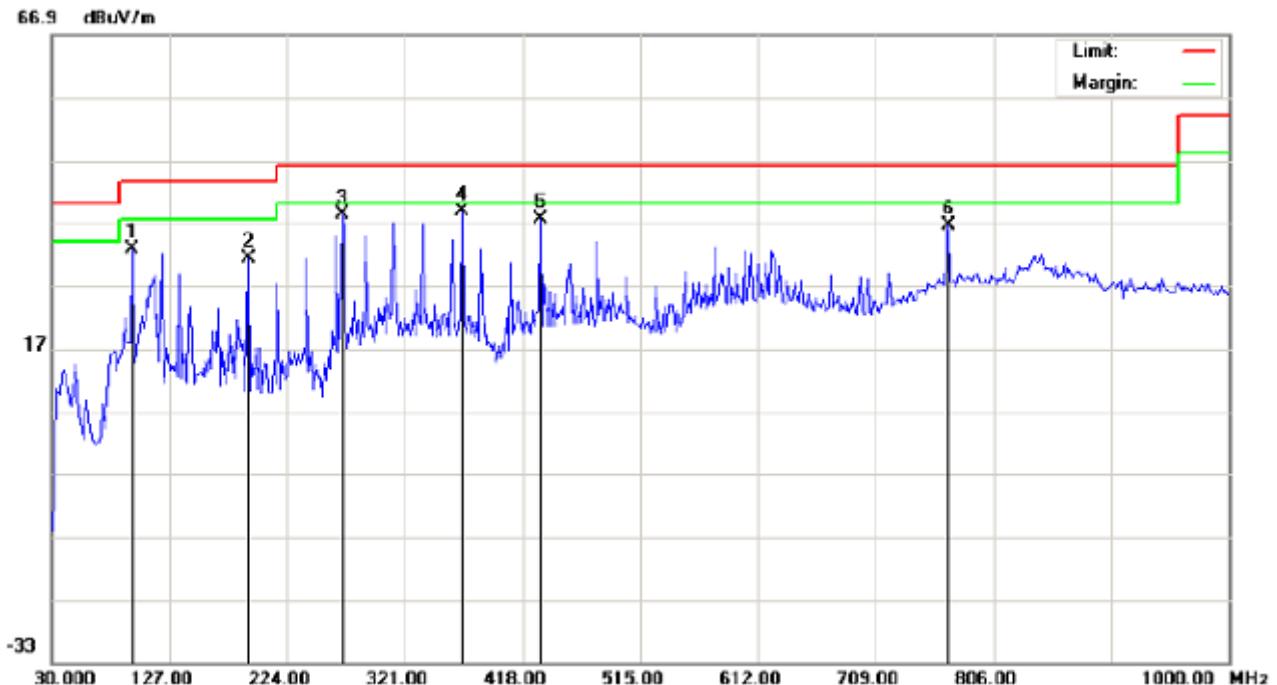
Distance:

M/N: ASDA11B

Mode: channel 12 TX

Note:

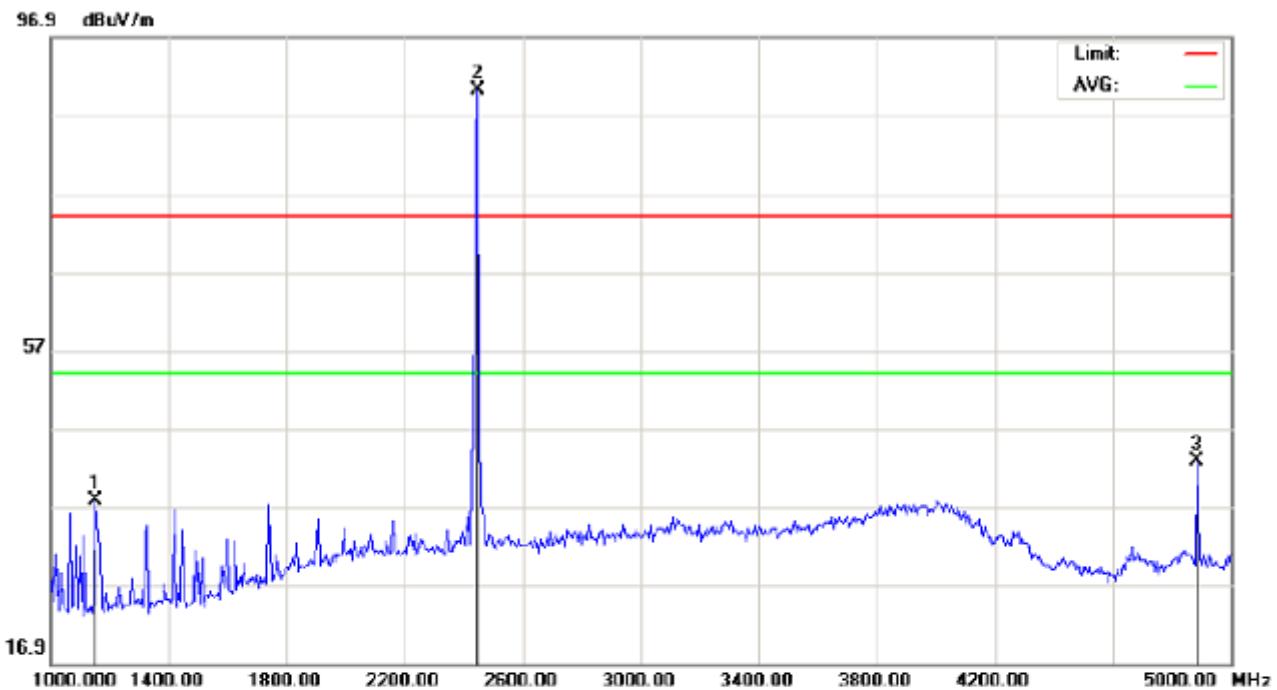
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		114.0667	20.34	12.23	32.57	43.50	-10.93	peak			
2		248.2500	27.36	9.63	36.99	46.00	-9.01	peak			
3		311.3000	20.83	17.74	38.57	46.00	-7.43	peak			
4	*	629.7833	13.88	24.90	38.78	46.00	-7.22	peak			
5		720.3167	13.46	24.15	37.61	46.00	-8.39	peak			
6		881.9833	9.28	28.98	38.26	46.00	-7.74	peak			



Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation Power: AC 120V/60Hz Humidity: 60 %
 EUT: 2.4GHz digital wireless camera Distance:
 M/N: ADSA11B
 Mode: channel 12 TX
 Note:

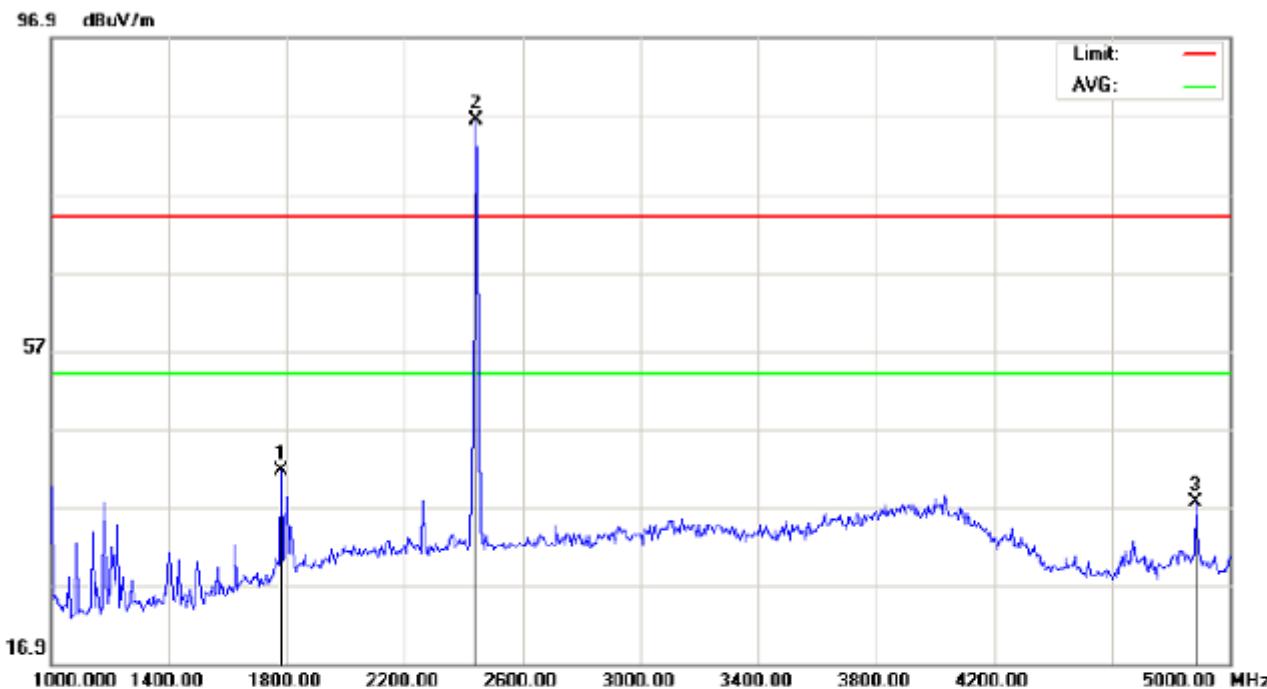
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		on	degree	
1		96.2833	18.57	14.16	32.73	43.50	-10.77	peak			
2		191.6667	23.54	7.78	31.32	43.50	-12.18	peak			
3		269.2667	21.40	16.89	38.29	46.00	-7.71	peak			
4	*	367.8833	19.54	19.16	38.70	46.00	-7.30	peak			
5		432.5500	16.51	21.09	37.60	46.00	-8.40	peak			
6		768.8167	8.74	27.81	36.55	46.00	-9.45	peak			

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)



Site: site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: 2.4GHz digital wireless camera Distance: 3m
M/N: ADSA11B
Mode: channel 12 TX
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1153.333	33.33	4.47	37.80	74.00	-36.20	peak			
2	*	2446.667	79.89	10.37	90.26	74.00	16.26	peak			
3		4886.667	34.94	7.90	42.84	74.00	-31.16	peak			



Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: 2.4GHz digital wireless camera Distance: 3m
 M/N: ADSA11B
 Mode: channel 12 TX
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1780.000	34.08	7.57	41.65	74.00	-32.35	peak			
2	*	2440.000	76.08	10.36	86.44	74.00	12.44	peak			
3		4886.667	29.62	7.90	37.52	74.00	-36.48	peak			

Note: 5~25GHz at least have 20dB margin. no recording in the test report.
 Factor=Antenna Factor+ Cable loss-Amplifier gain, Margin=Measurement-Limit.

9 BAND EDGES EMISSION

9.1 MEASUREMENT PROCEDURE

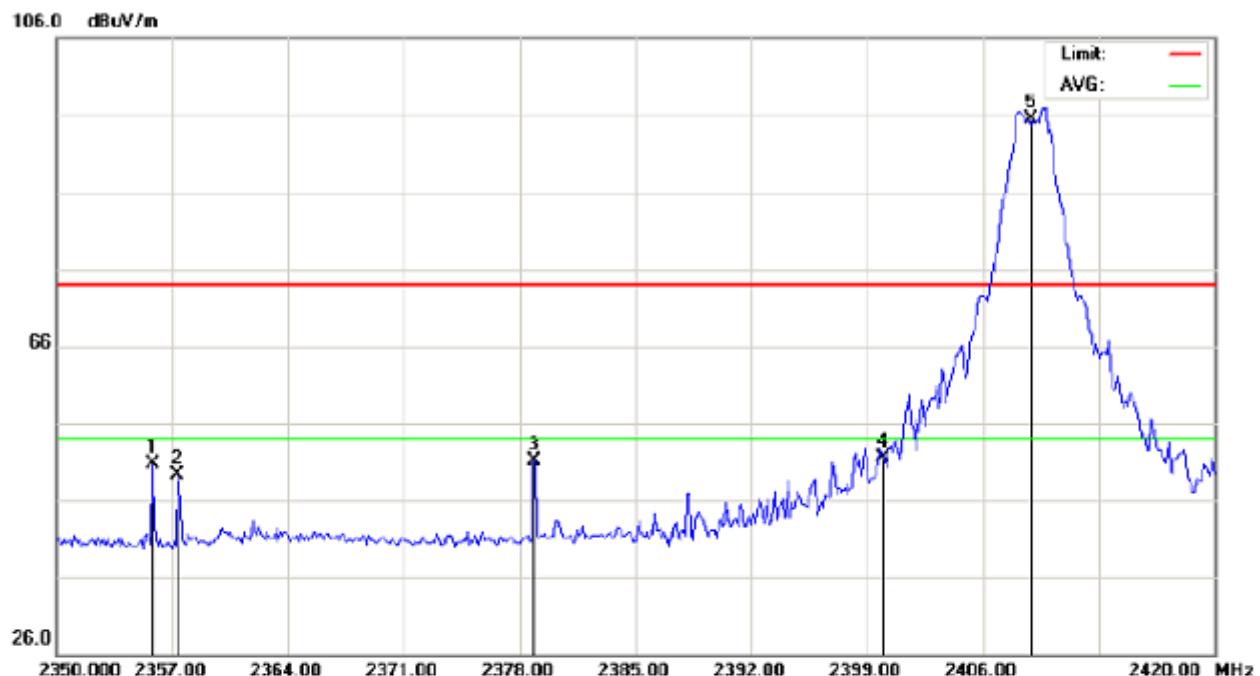
1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, $RBW \geq 1\% \text{span}$, $VBW \geq RBW$
3. The band edges was measured and recorded.

9.2 TEST SET-UP

The Same as described in section 8.2

9.3 TEST RESULT

TEST PLOT OF BAND EDGE FOR LOW CHANNEL



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHz/PL

Power:

Humidity: 60 %

EUT: 2.4GHz digital wireless camera

Distance: 3m

MON: ADSA11B

Mode: channel 0 TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuVm	dB		cm	degree	
1		2355.833	40.43	10.27	50.70	74.00	-23.30	peak			
2		2357.350	38.98	10.27	49.25	74.00	-24.75	peak			
3		2378.933	40.83	10.30	51.13	74.00	-22.87	peak			
4		2400.000	41.21	10.32	51.53	74.00	-22.47	peak			
5	*	2408.950	85.09	10.33	95.42	74.00	21.42	peak			



Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power:
 EUT: 2.4GHz digital wireless camera Distance: 3m
 M/N: ADSA11B
 Mode: channel 0 TX
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1		2356.650	38.78	10.27	49.05	74.00	-24.95	peak			
2		2388.150	38.40	10.31	48.71	74.00	-25.29	peak			
3		2400.000	41.45	10.32	51.77	74.00	-22.23	peak			
4	*	2408.950	82.87	10.33	93.20	74.00	19.20	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL



Site: site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %

EUT: 2.4GHz digital wireless camera Distance: 3m

M/N: ADSA11B

Mode: channel 23 TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1	*	2474.225	80.78	10.40	91.18	74.00	17.18	peak			
2		2483.500	36.55	10.41	46.96	74.00	-27.04	peak			
3		2489.158	34.65	10.42	45.07	74.00	-28.93	peak			



Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: 2.4GHz digital wireless camera Distance: 3m
 M/N: ADSA11B
 Mode: channel 23 TX
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2474.225	80.66	10.40	91.06	74.00	17.06	peak			
2		2483.500	35.44	10.41	45.85	74.00	-28.15	peak			
3		2492.517	38.26	10.42	48.68	74.00	-25.32	peak			
4		2504.975	33.98	10.44	44.42	74.00	-29.58	peak			
5		2517.325	36.86	10.47	47.33	74.00	-26.67	peak			
6		2524.150	35.91	10.49	46.40	74.00	-27.60	peak			

10. NUMBER OF HOPPING FREQUENCY

10.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz.
4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=RBW.

10.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

Conducted Method.

10.3 MEASUREMENT EQUIPMENT USED

The Same as described in section 5.3

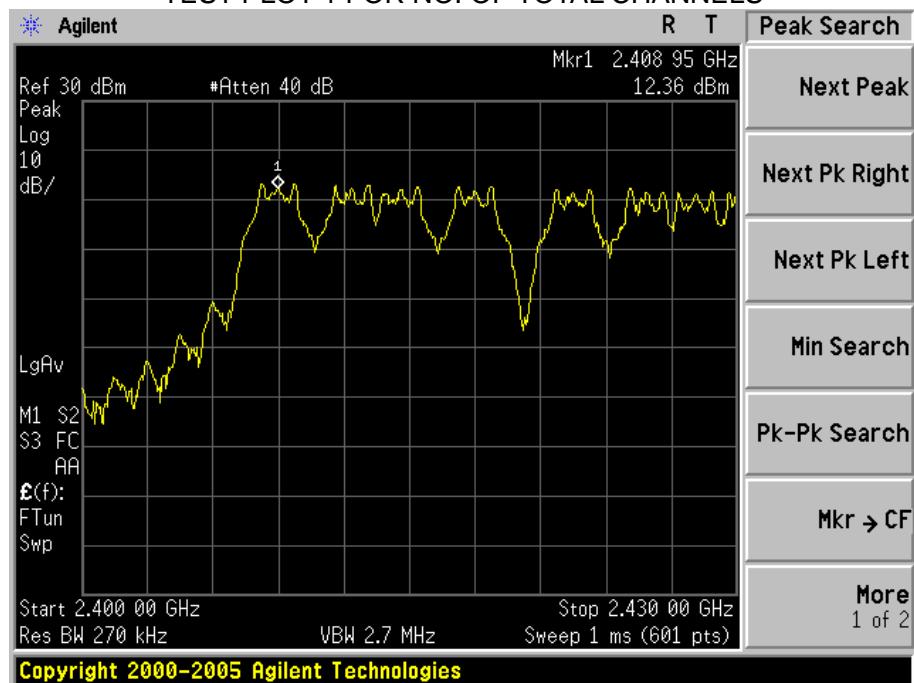
10.4 LIMITS AND MEASUREMENT RESULT

10.4 AND MEASUREMENT RESULT

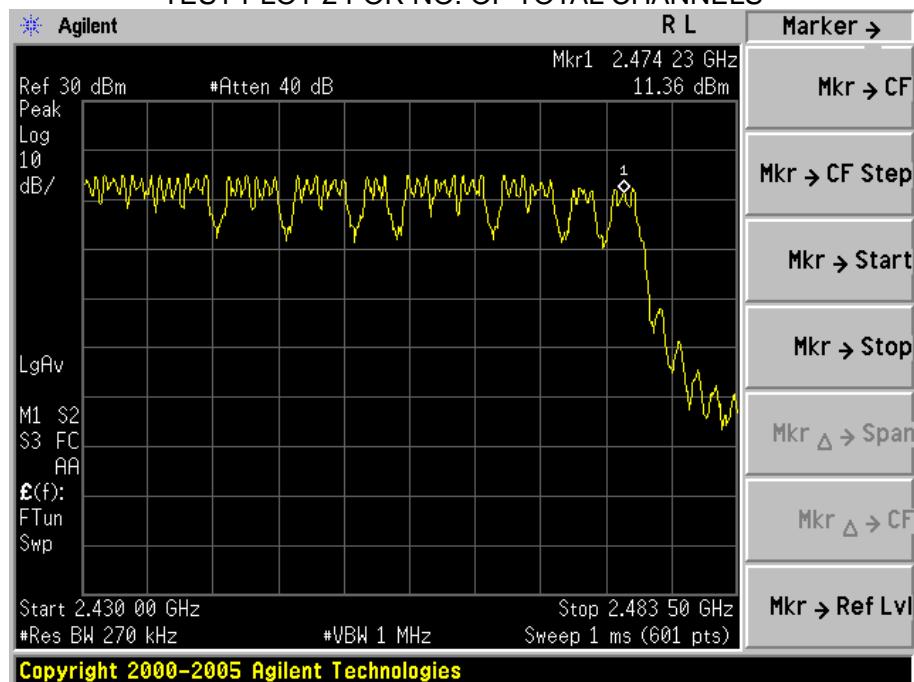
TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=15	24	PASS

Channel	Frequency (GHz)	Channel	Frequency (GHz)
00	2.40895	14	2.44834
01	2.41234	15	2.45060
02	2.41459	16	2.45397
03	2.41797	17	2.45735
04	2.42247	18	2.45960
05	2.42584	19	2.46185
06	2.42809	20	2.46522
07	2.43034	21	2.46747
08	2.43259	22	2.47085
09	2.43484	23	2.47423
10	2.43709		
11	2.43934		
12	2.44272		
13	2.44497		

TEST PLOT-1 FOR NO. OF TOTAL CHANNELS



TEST PLOT-2 FOR NO. OF TOTAL CHANNELS



11. TIME OF OCCUPANCY (DWELL TIME)

11.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = zero span, centered on a hopping channel
4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz,.

11.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
Conducted Method

11.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

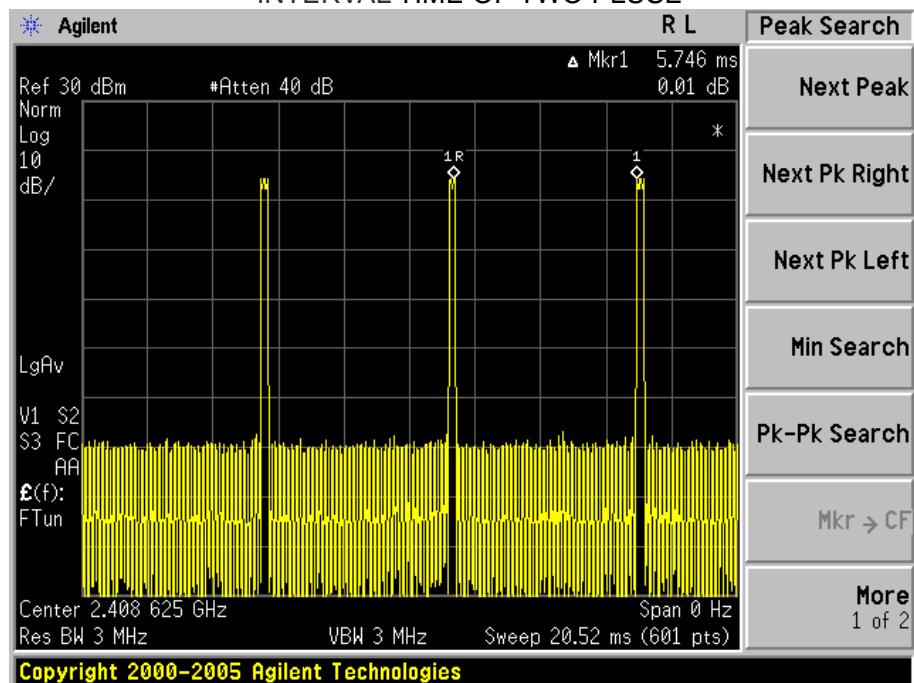
11.4 LIMITS AND MEASUREMENT RESULT

Test Result(worst)

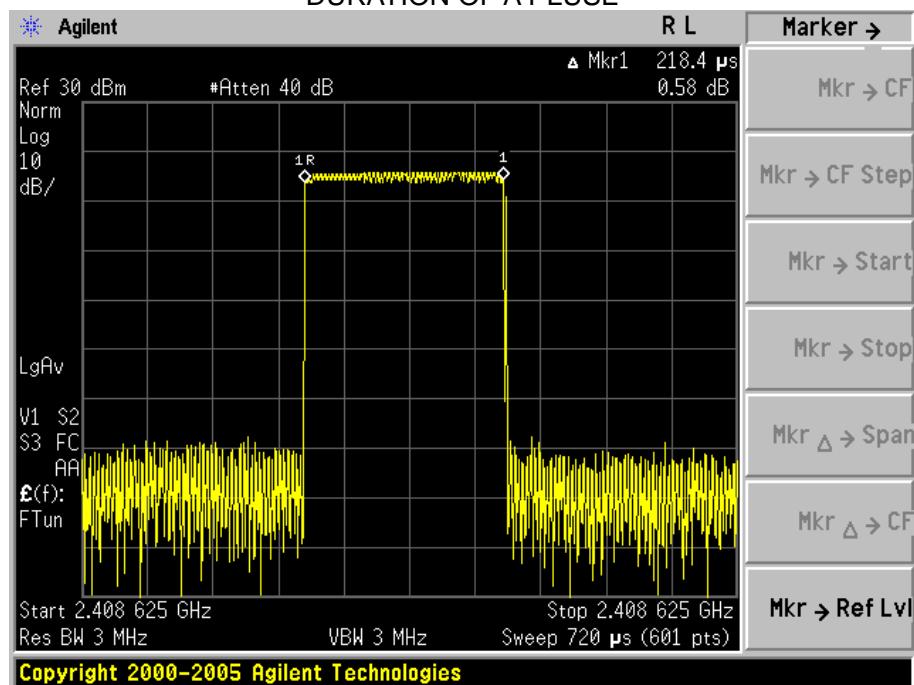
Time of Pulse (ms)	Interval Time Of Two Pluses (ms)	Dwell Time (ms)	Limit (ms)
0.2184	5.746	364.89	400

Interval Time of Two Pluse= 5.746ms
Duration of A Pluse = 0.2184ms
Dwell time = $24 \times 0.4 \times 1000(s) \times 0.2184ms / 5.746ms = 364.89ms$

INTERVAL TIME OF TWO PLUSE



DURATION OF A PLUSE



12. FREQUENCY SEPARATION

12.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) \geq 1% of the span Video (or Average) Bandwidth (VBW) \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.

12.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

12.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

12.4 LIMITS AND MEASUREMENT RESULT

TEST RESULT (WORST CASE)

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	MHz	KHz	
CH13-CH14	2.25	≥ 25 KHz or 2/3 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION



13 FCC LINE CONDUCTED EMISSION TEST

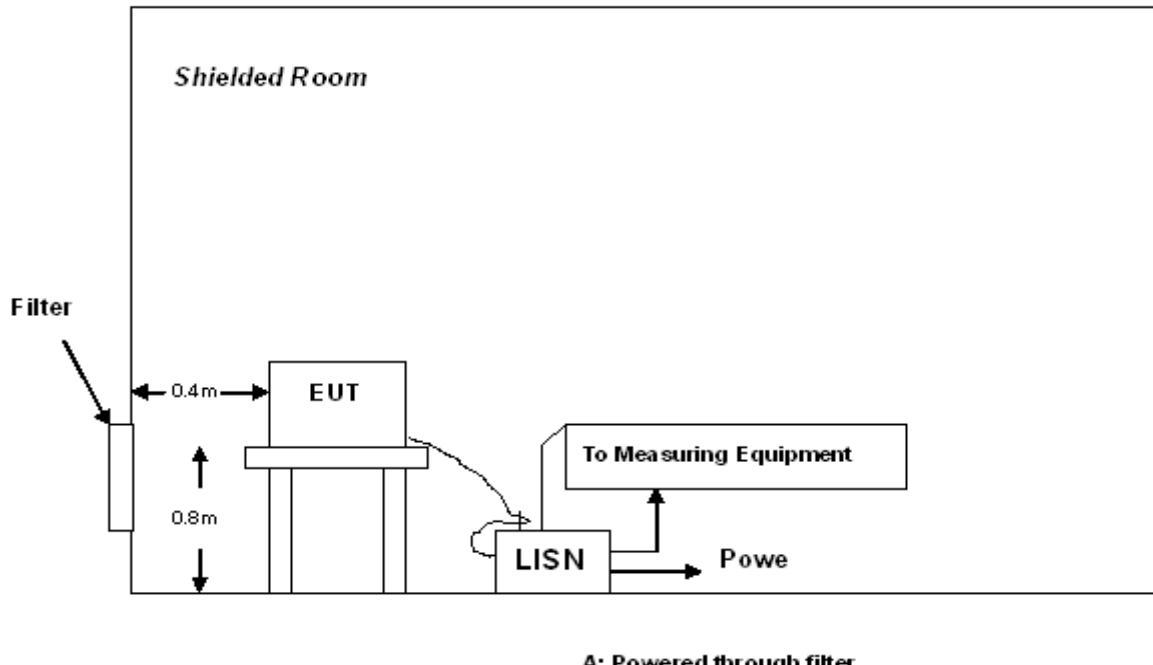
13.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. (dBuV)	Average (dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

**Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

13.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



13.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) All support equipments received AC120V/60Hz power from a LISN, if any.
- 5) The EUT charged by adapter which received power from a LISN..
- 6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The test mode(s) were scanned during the preliminary test.

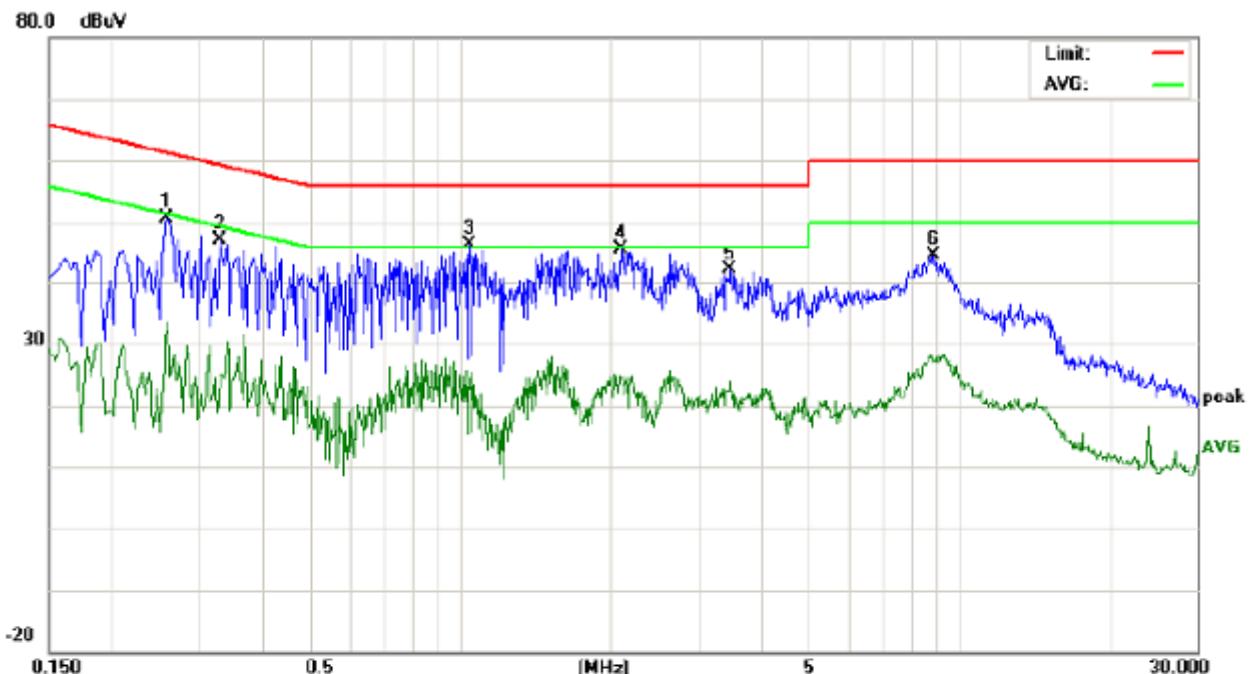
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

13.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

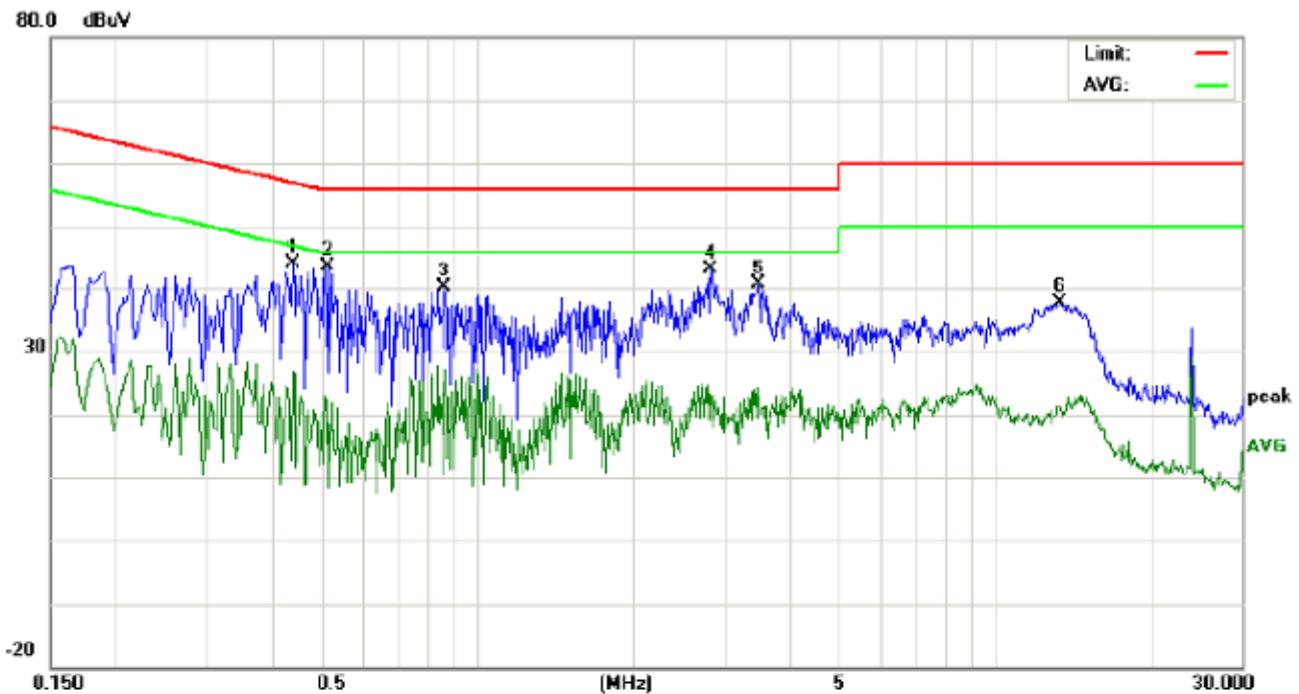
13.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2580	40.44		23.14	10.27	50.71		33.41	61.49	51.49	-10.78	-18.08	P	
2	0.3300	36.81		14.88	10.30	47.11		25.18	59.45	49.45	-12.34	-24.27	P	
3	1.0460	35.92		13.94	10.37	46.29		24.31	56.00	46.00	-9.71	-21.69	P	
4	2.1020	35.40		14.18	10.26	45.66		24.44	56.00	46.00	-10.34	-21.56	P	
5	3.4820	31.53		13.24	10.51	42.04		23.75	56.00	46.00	-13.96	-22.25	P	
6	8.8939	34.37		16.93	10.24	44.61		27.17	60.00	50.00	-15.39	-22.83	P	

Line Conducted Emission Test Line 2-N



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.4420	33.86		16.58	10.36	44.22		26.94	57.02	47.02	-12.80	-20.08	P	
2	0.5180	33.28		8.24	10.38	43.66		18.62	56.00	46.00	-12.34	-27.38	P	
3	0.8660	29.66		12.74	10.37	40.03		23.11	56.00	46.00	-15.97	-22.89	P	
4	2.8340	32.58		12.40	10.51	43.09		22.91	56.00	46.00	-12.91	-23.09	P	
5	3.4980	30.24		11.59	10.51	40.75		22.10	56.00	46.00	-15.25	-23.90	P	
6	13.3819	27.46		11.01	10.13	37.59		21.14	60.00	50.00	-22.41	-28.86	P	

APPENDIX I
PHOTOGRAPHS OF THE EUT
TOTAL VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



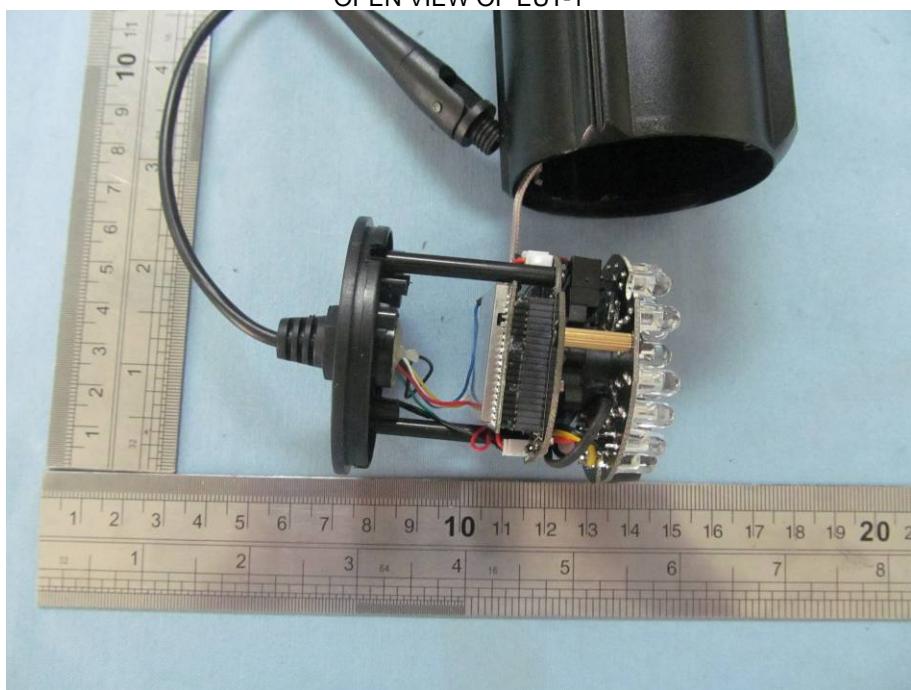
LEFT VIEW OF EUT



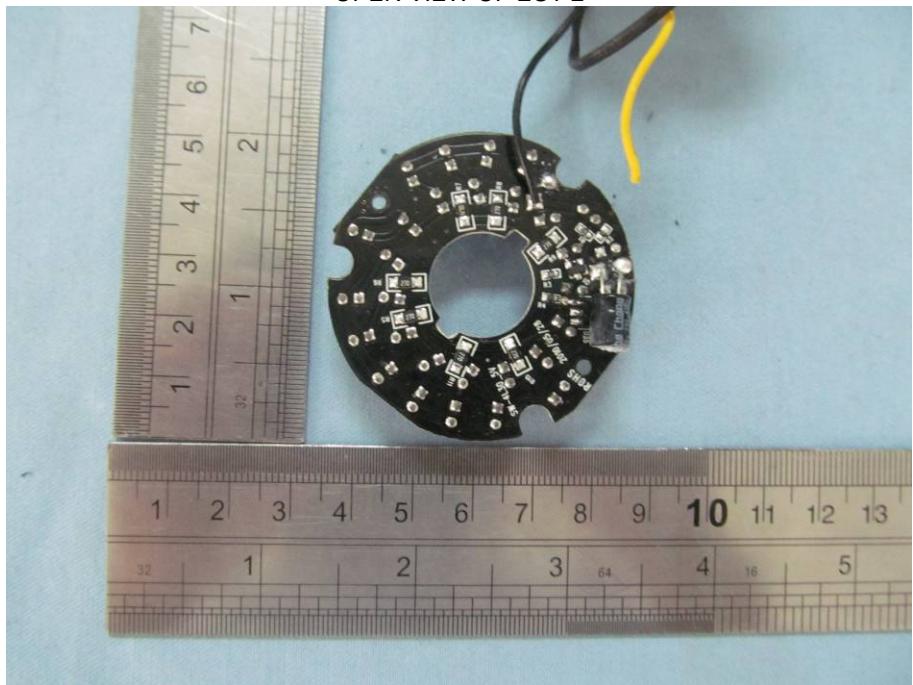
RIGHT VIEW OF EUT



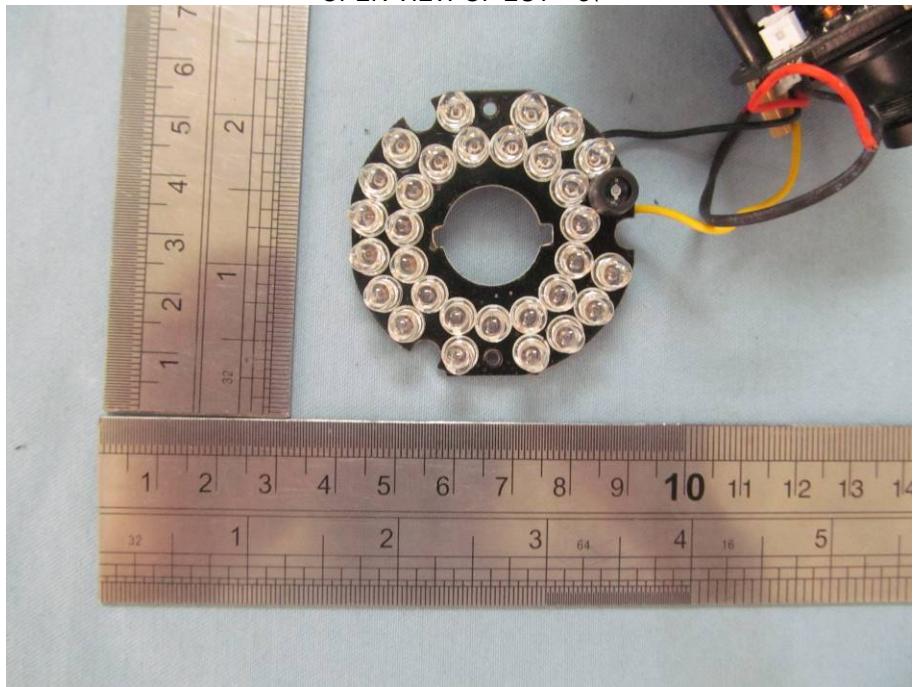
OPEN VIEW OF EUT-1



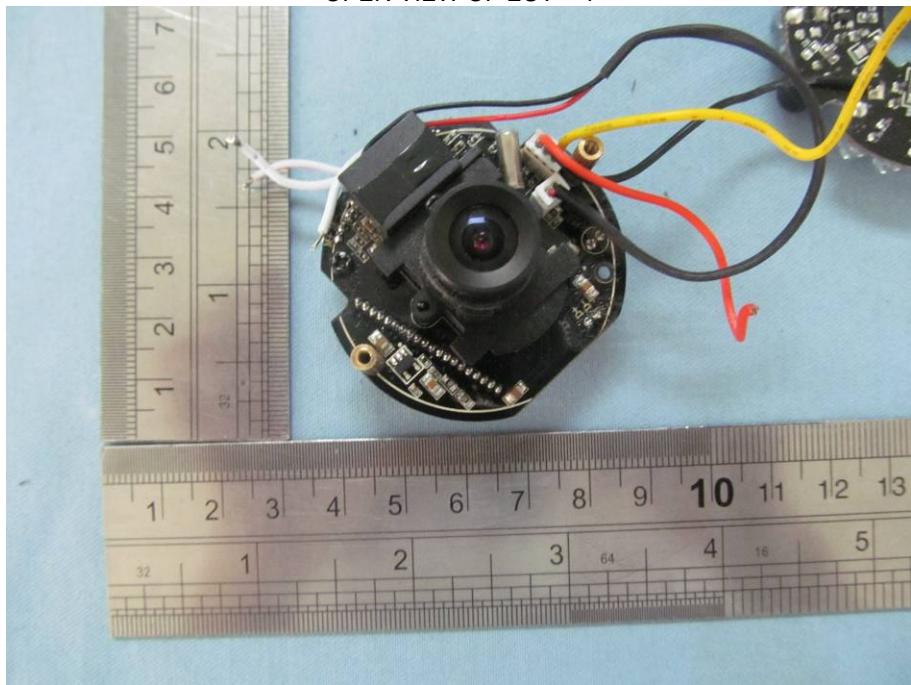
OPEN VIEW OF EUT-2



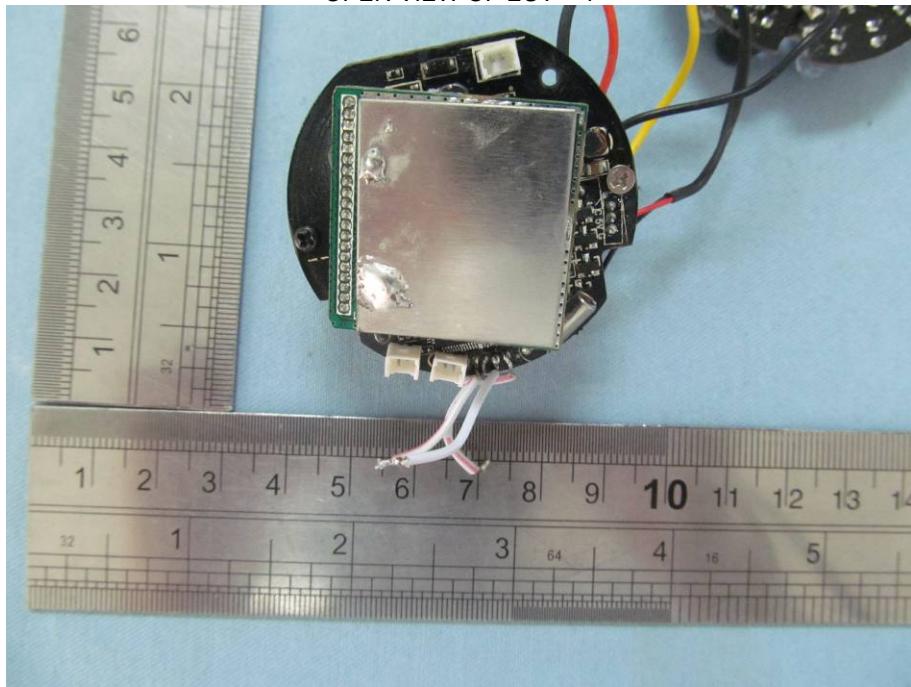
OPEN VIEW OF EUT – 3\



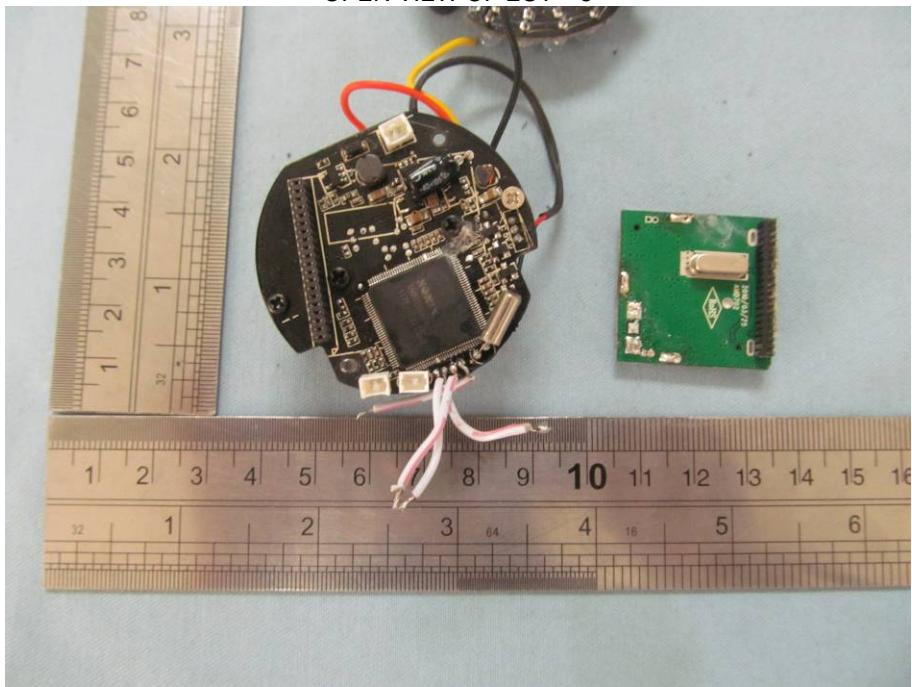
OPEN VIEW OF EUT – 4



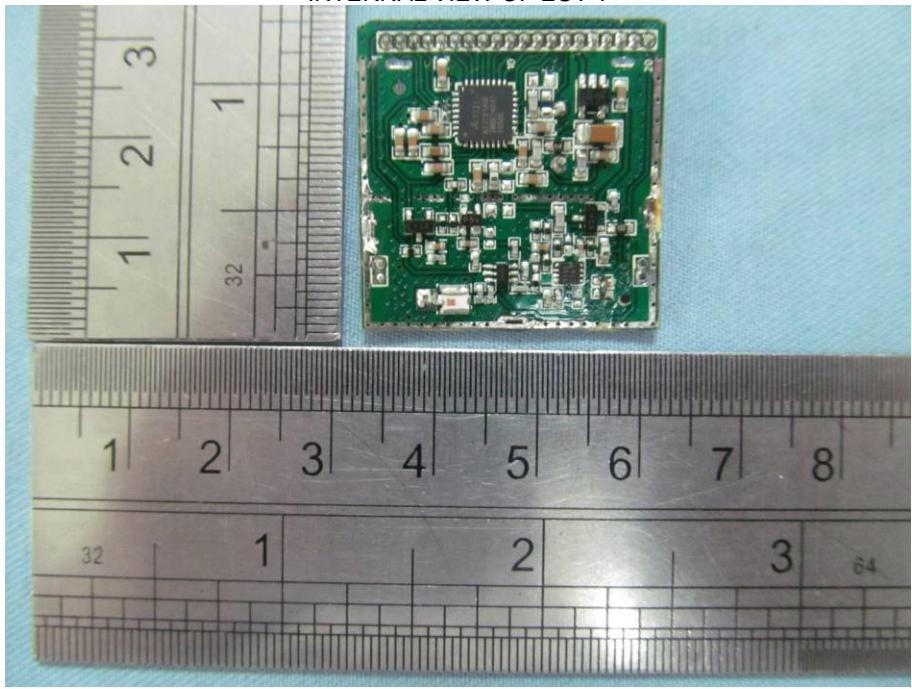
OPEN VIEW OF EUT – 4



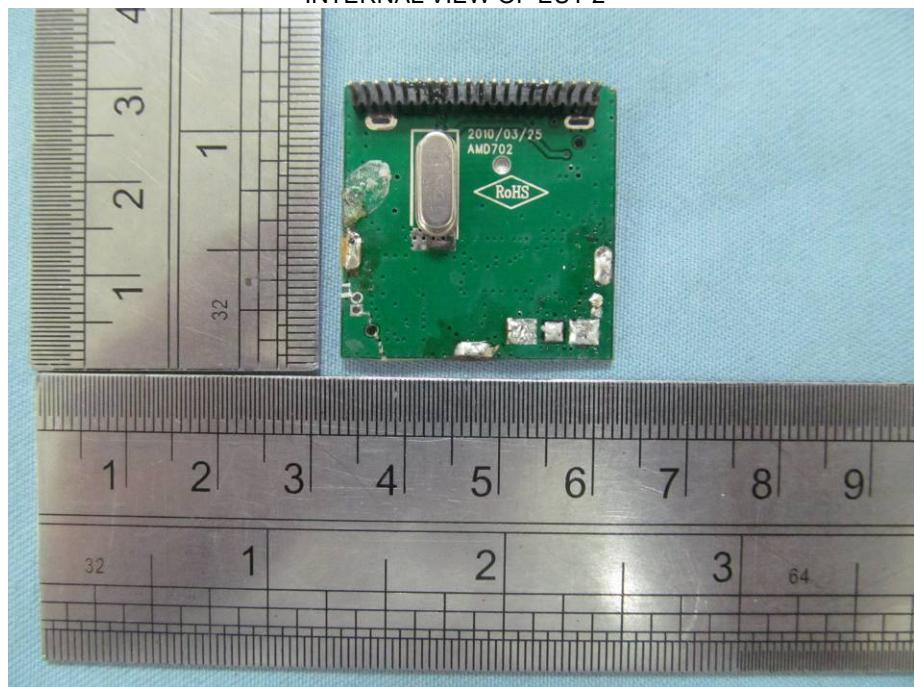
OPEN VIEW OF EUT – 5



INTERNAL VIEW OF EUT-1



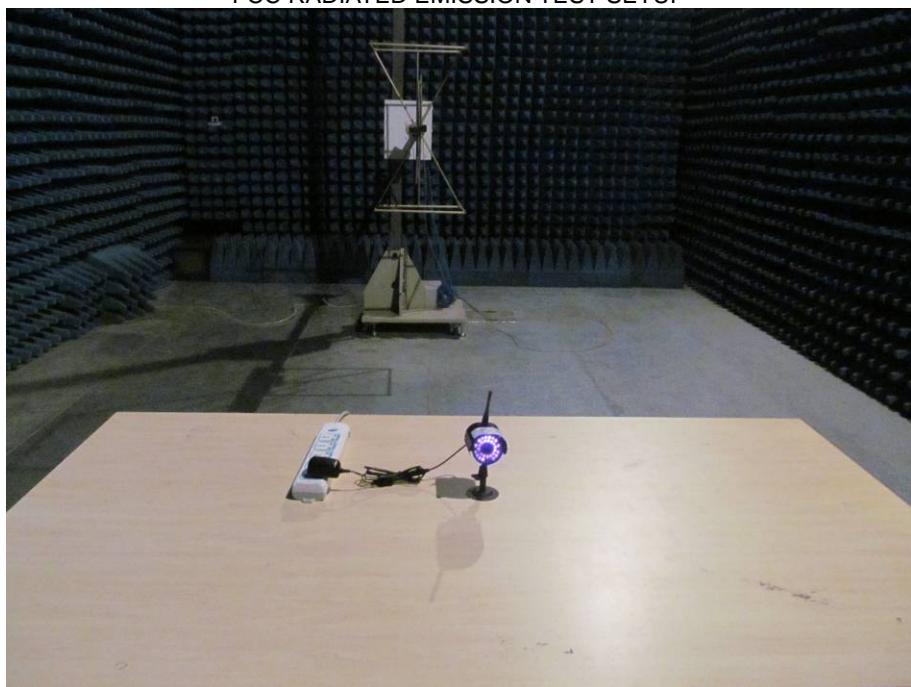
INTERNAL VIEW OF EUT-2



APPENDIX II
PHOTOGRAPHS OF THE TEST SETUP
FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP



----END OF REPORT----