FCC - TEST REPORT

Report Number	:	68.950.12.040.01	Date of Issue:	5 April 2012

Model	:	XCR Catch, XCG Catch, RRR
Product Type	:	Laser receiver and Remote control
Applicant	:	ODA Electronics Limited
Address	:	Shunjing Industrial Areas, Shunxin Village, Changping Town, 523568 Dongguan, PEOPLE'S REPUBLIC OF CHINA
Production Facility	:	ODA Electronics Limited
Address	:	Shunjing Industrial Areas, Shuxin Village, Changping Town, 523568 Dongguan, PEOPLE'S REPUBLIC OF CHINA
Test Result	:	■ Positive ☐ Negative
Total pages including Appendices	:	24

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6 floor, H Hall, Century Craftwork Culture Square, No. 4001, Fuqiang Road, Futian District, Shenzhen 518048, P. R. China, Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

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Jiangsu TÜV Product Service Ltd. – Shenzhen Branch
6 floor, H Hall, Century Craftwork Culture Square, No. 4001, Fuqiang Road, Futian District, Shenzhen 518048, P. R. China, Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

2 Details about the Test Laboratory

Details about the Test Laboratory

Test site1:

Company name: Jiangsu TÜV Product Service Ltd. – Shenzhen Branch
6th Floor, H Hall,
Century Craftwork Culture Square,
No. 4001, Fuqiang Road,
Futian District 518048,
Shenzhen,P.R.C.

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

Test site2:

Company name: Audix Technology (shenzhen) Co.,Ltd
Block Shenzhen, Science & Industry Park,
Nantou, Shenzhen,
Guangdong,
China

Telephone: 86 755 2663 9496
Fax: 86 755 2663 2877

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6 floor, H Hall, Century Craftwork Culture Square, No. 4001, Fuqiang Road, Futian District, Shenzhen 518048, P. R. China, Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product: Laser receiver and Remote control

Model no.: XCR Catch

Brand Name: Leica

Options and accessories: NIL

Rating: 4.5VDC(Supplied by 3*1.5 V LR6/AA batteries)

RF Transmission Frequency: 2409MHz

Antenna Gain: 1dBi

Description of the EUT: NIL

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C, 10-1-2011 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Result			Test Location
		Pass	Fail	N/A	
§15.205(a), §15.209(a), 15.249(a), §15.249(c), §15.35 Radiated Emissions	8	☒	☐	☐	Test Site2
§15.249(d) Out of Band Emissions	16	☒	☐	☐	Test Site2
FCC §15.215(c) – 20dB Bandwidth Testing	22	☒	☐	☐	Test Site2

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6 General Remarks

Remarks
This submittal(s) (test report) is intended for FCC ID: A7Y-LXCRG complies with Section 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

The difference between three models only lies in the name, so all the RF tests were applied on XCR Catch, XCG Catch and RRR are deemed to fulfil relevant requirement without further testing.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

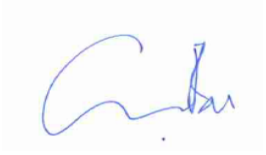
☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: 3 December 2011

Testing Start Date: 5 December 2011

Testing End Date: 2 March 2012

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

Reviewed by:	Prepared by:	Tested by:
		
Ken Li	Cookies Bu	Leo Li
EMC Project Manager	EMC Project Engineer	EMC Test Engineer

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6 floor, H Hall, Century Craftwork Culture Square, No. 4001, Fuqiang Road, Futian District, Shenzhen 518048, P. R. China, Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

7 Technical Requirement

7.1 Radiated Emissions

Test Method

1 The EUT is placed on a turntable, which is 0.8m above ground plane.
2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4The spectrum analyzer or receiver is set as:
Below 1000MHz:

Quasi-Peak: RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

5 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Limits for radiated emissions measurements

According to §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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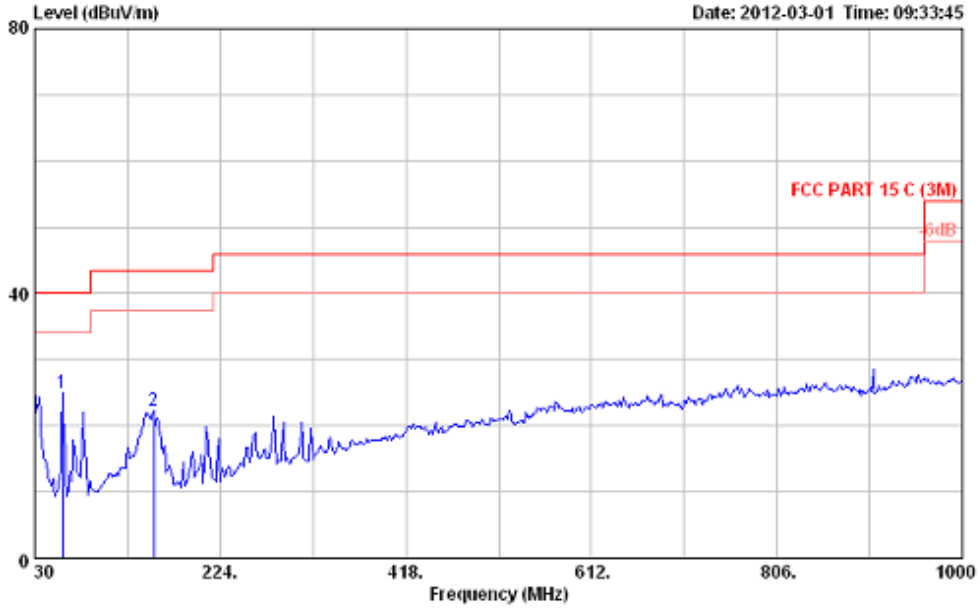
6 floor, H Hall, Century Craftwork Culture Square, No. 4001, Fuqiang Road, Futian District, Shenzhen 518048, P. R. China, Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Radiated Emissions

30MHz-1GHz, Vertical



Site : 3m Chamber
Condition : FCC PART 15 C (3M) 3m 2010 CBL6111C 2598 VERTICAL
: RBW:120.000KHz VBW:1000.000KHz SWT:Auto
Env./Ins. : 24*C/56%
Engineer : Vicent
EUT : Measure Instrument
Power rating : DC 4.5V
Test Mode : Tx

	Freq	Antenna Factor	Limit Line	Cable Loss	Read Level	Level	Over Limit	Remark
	MHz	dB/m	dBuV/m	dB	dBuV	dBuV/m	dB	
1 max	59.10	6.22	40.00	0.40	45.63	24.99	-15.01	Peak
2	154.16	11.36	43.50	0.80	37.40	22.37	-21.13	Peak

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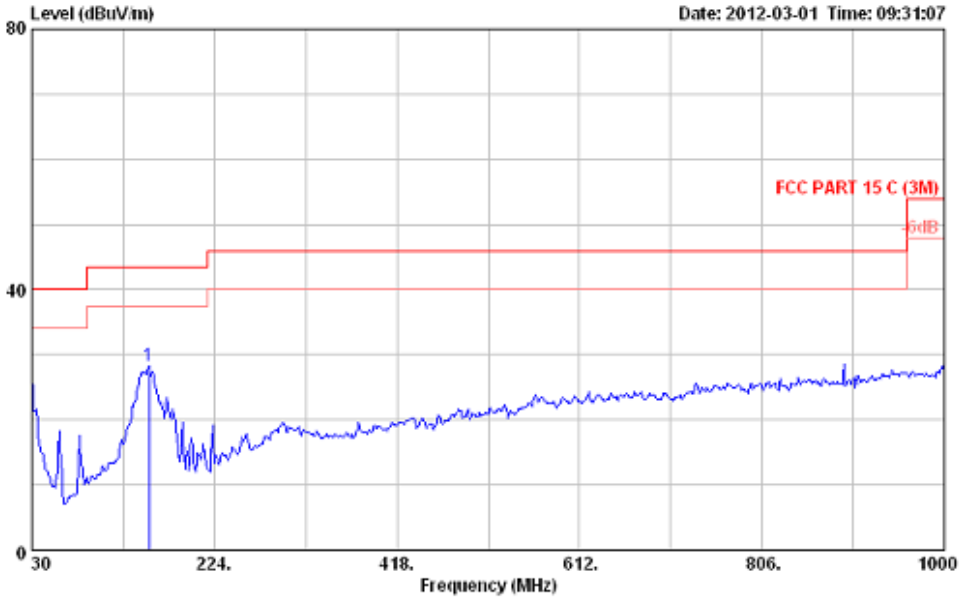
Radiated Emissions

30MHz-1GHz, Horizontal



Site : 3m Chamber
Condition : FCC PART 15 C (3M) 3m 2010 CBL6111C 2598 HORIZONTAL
: RBW:120.000KHz VBW:1000.000KHz SWT:Auto
Env./Ins. : 24°C/56%
Engineer : Vicent
EUT : Measure Instrument
Power rating : DC 4.5V
Test Mode : Tx

	Freq	Antenna Factor	Limit Line	Cable Loss	Read Level	Level	Over Limit	Remark
	MHz	dB/m	dBuV/m	dB	dBuV	dBuV/m	dB	
1 max	154.16	11.36	43.50	0.80	43.31	28.28	-15.22	Peak

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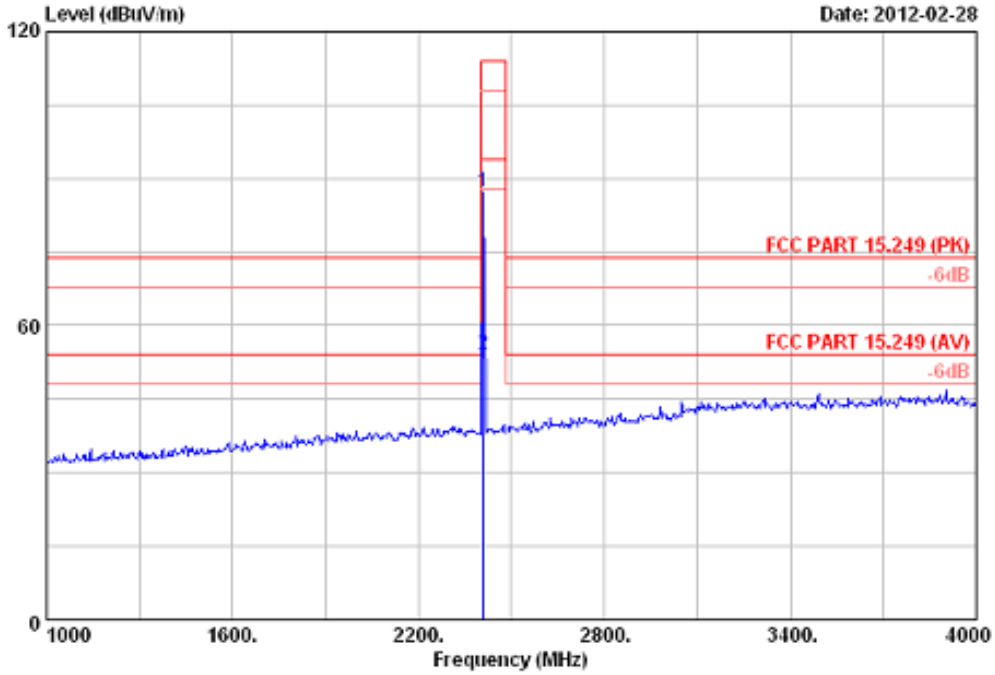
Radiated Emissions

Above 1GHz, Vertical



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 45
Ant. pol. : VERTICAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2409.000	27.98	6.03	34.44	87.69	87.26	114.00	26.74	Peak
2	2409.000	27.98	6.03	34.44	54.54	54.11	94.00	39.89	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported

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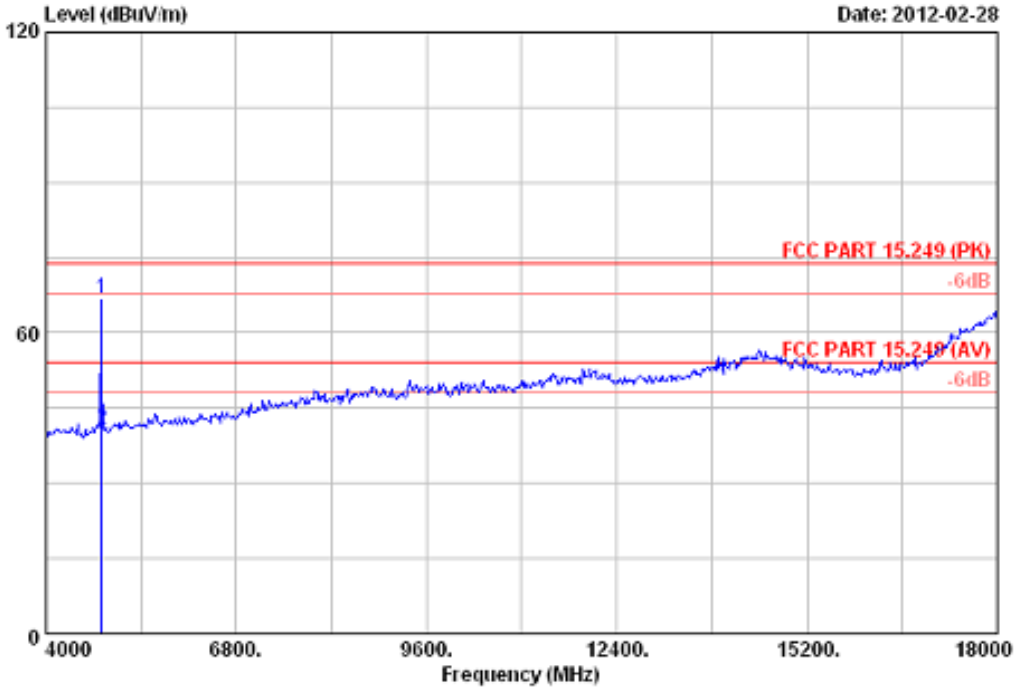
Radiated Emissions



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 51
Ant. pol. : VERTICAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4818.000	32.89	8.53	34.60	59.93	66.75	74.00	7.25	Peak
2	4818.000	32.89	8.53	34.60	34.03	40.85	54.00	13.15	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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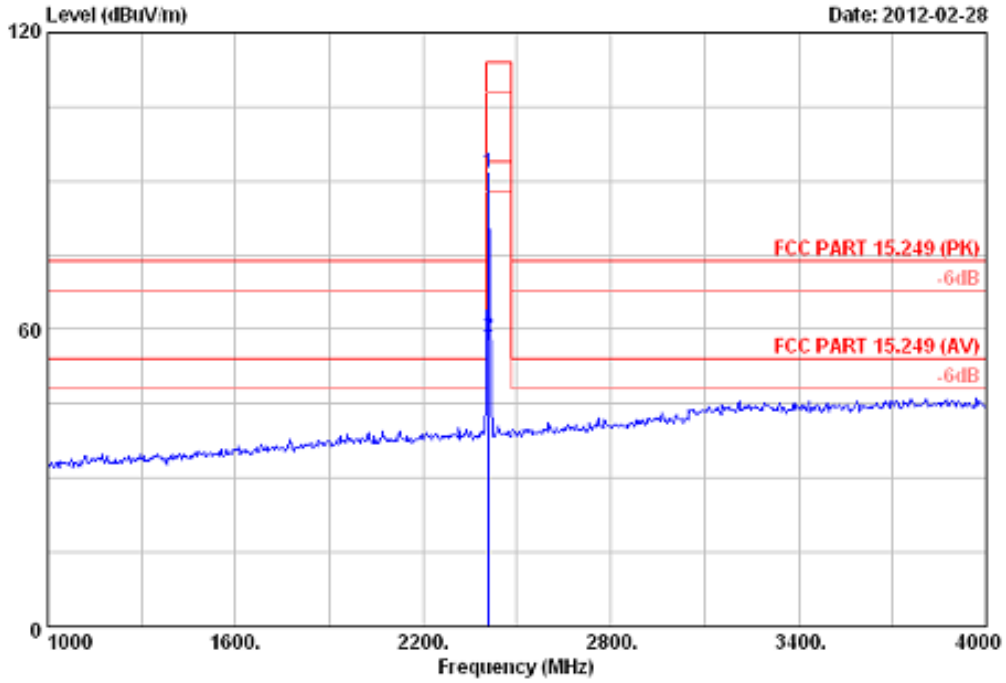
Radiated Emissions

Above 1GHz, Horizontal



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 44
Ant. pol. : HORIZONTAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2409.000	27.98	6.03	34.44	92.01	91.58	114.00	22.42	Peak
2	2409.000	27.98	6.03	34.44	58.86	58.43	94.00	35.57	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not repor

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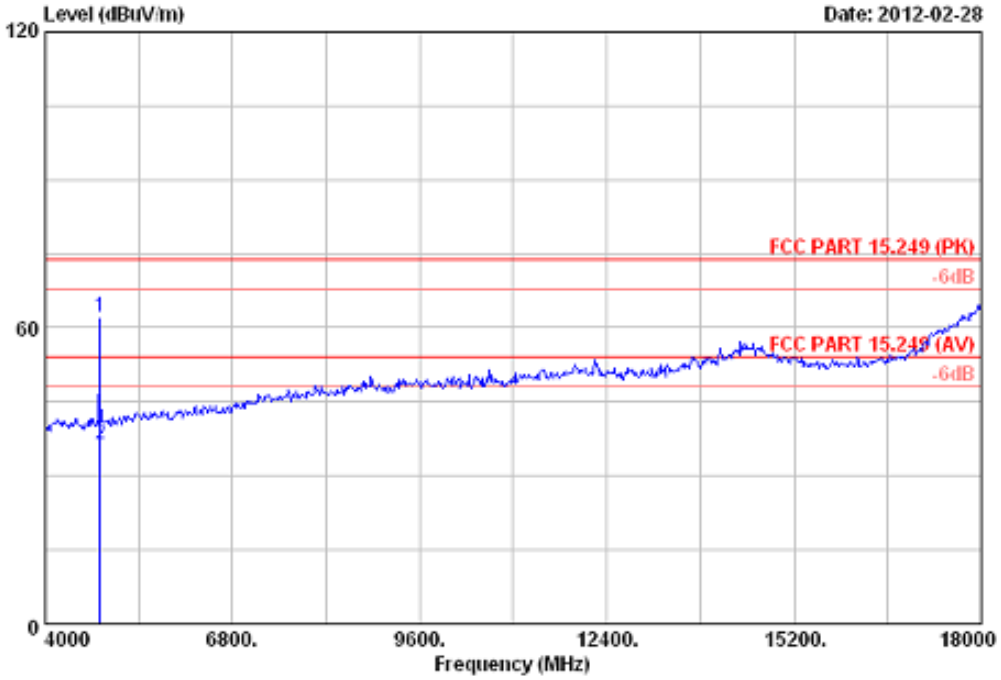
Radiated Emissions



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 50
Ant. pol. : HORIZONTAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4818.000	32.89	8.53	34.60	55.38	62.20	74.00	11.80	Peak
2	4818.000	32.89	8.53	34.60	29.48	36.30	54.00	17.70	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 08, 2013
Amp	HP	8449B	3008A02495	May 08, 2013
Antenna	EMCO	3115	9607-4877	May 17, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May 08, 2013

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7.2 Out of Band Emissions

Test Method

1 The EUT is placed on a turntable, which is 0.8m above ground plane.
2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4The spectrum analyzer or receiver is set as:
(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto
5 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Limits

According to §15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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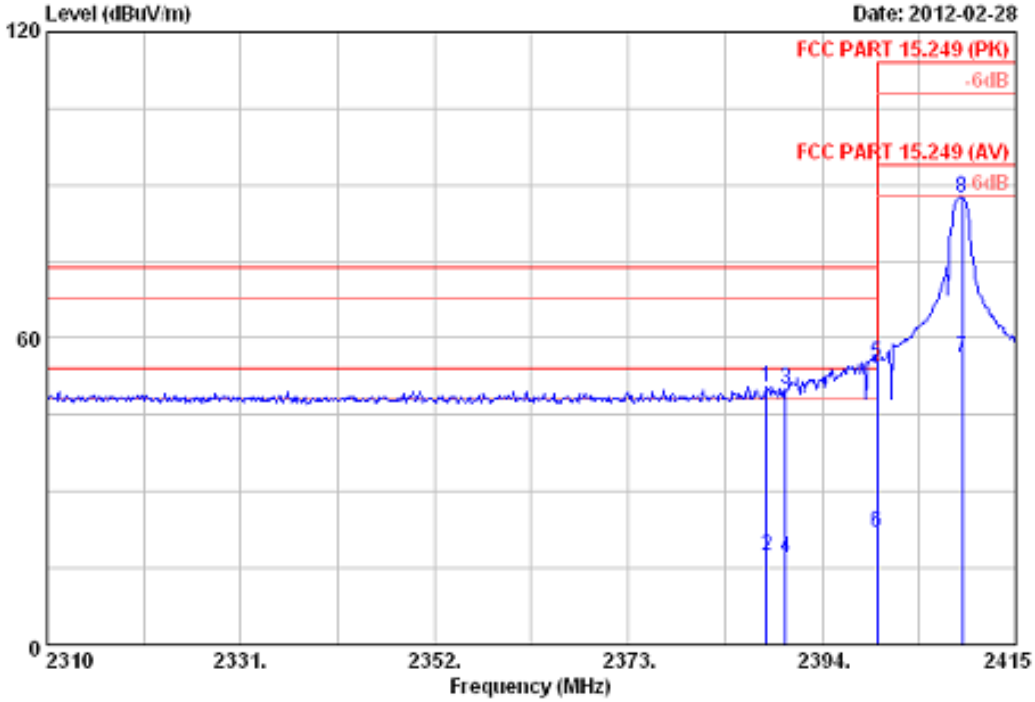
Out of Band Emissions

Left band test result
Vertical:



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 42
Ant. pol. : VERTICAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.015	27.96	6.01	34.44	51.10	50.63	74.00	23.37	Peak
2	2388.015	27.96	6.01	34.44	17.90	17.43	54.00	36.57	Average
3	2390.000	27.96	6.01	34.44	50.71	50.24	74.00	23.76	Peak
4	2390.000	27.96	6.01	34.44	17.51	17.04	54.00	36.96	Average
5	2400.000	27.96	6.01	34.44	55.60	55.13	74.00	18.87	Peak
6	2400.000	27.96	6.01	34.44	22.40	21.93	54.00	32.07	Average
7	2409.225	27.98	6.03	34.44	56.75	56.32	94.00	37.68	Average
8	2409.225	27.98	6.03	34.44	87.90	87.47	114.00	26.53	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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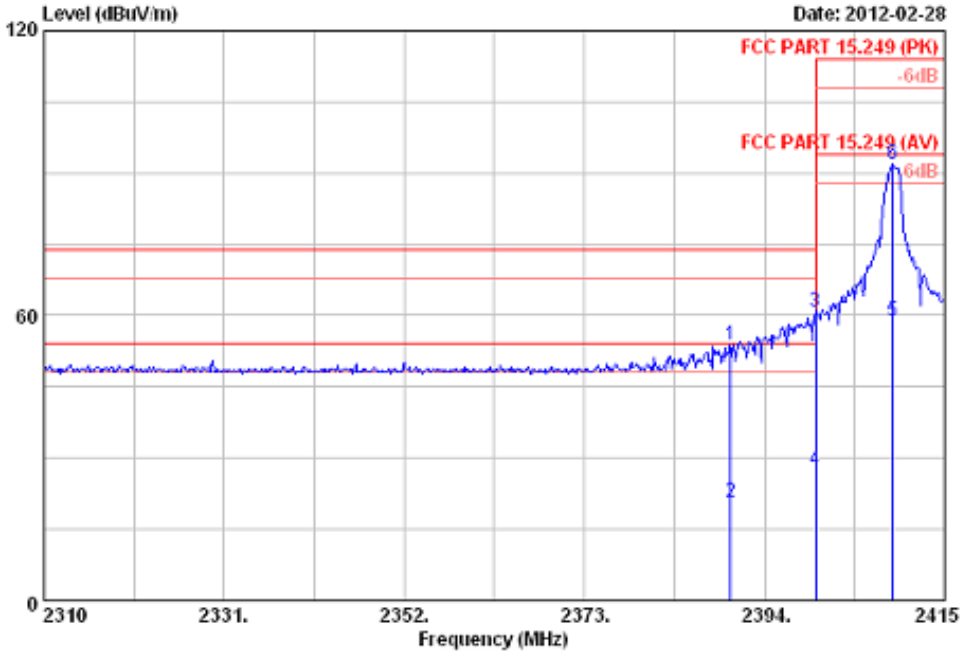
Out of Band Emissions

Left band test result
Horizontal:



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 43
Ant. pol. : HORIZONTAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	54.43	53.96	74.00	20.04	Peak
2	2390.000	27.96	6.01	34.44	21.23	20.76	54.00	33.24	Average
3	2400.000	27.96	6.01	34.44	61.23	60.76	74.00	13.24	Peak
4	2400.000	27.96	6.01	34.44	28.03	27.56	54.00	26.44	Average
5	2408.910	27.98	6.03	34.44	59.26	58.83	94.00	35.17	Average
6	2408.910	27.98	6.03	34.44	92.41	91.98	114.00	22.02	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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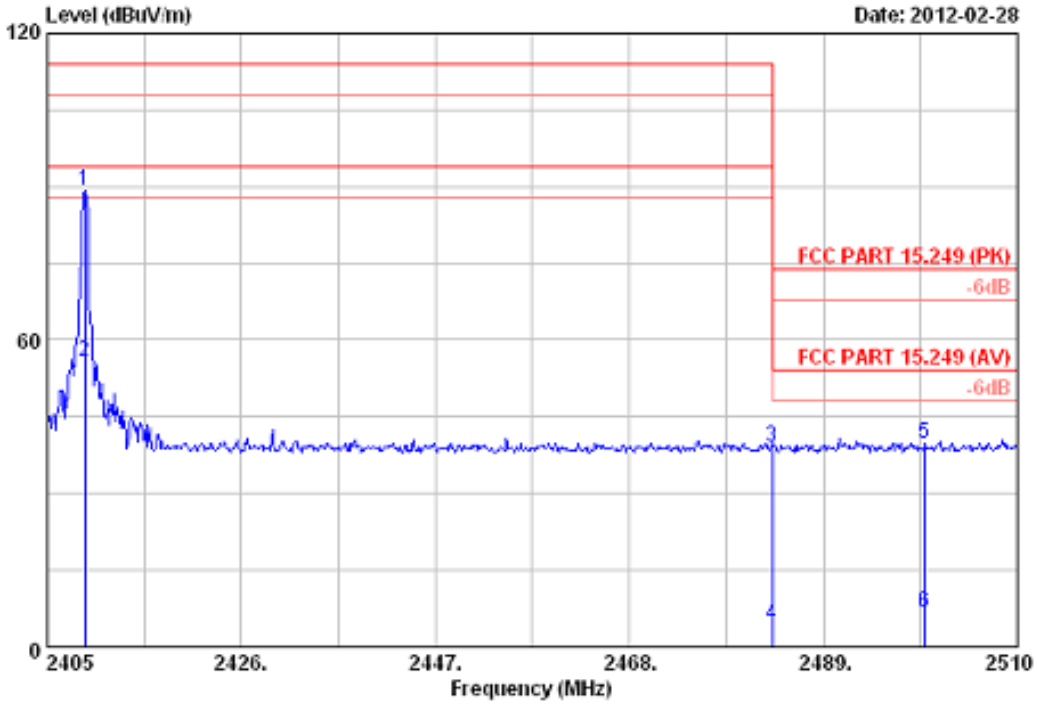
Out of Band Emissions

Right band test result
Vertical:



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 46
Ant. pol. : VERTICAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2408.990	27.98	6.03	34.44	89.53	89.10	114.00	24.90	Peak
2	2408.990	27.98	6.03	34.44	56.38	55.95	94.00	38.05	Average
3	2483.500	28.08	6.15	34.45	39.35	39.13	74.00	34.87	Peak
4	2483.500	28.08	6.15	34.45	4.40	4.18	54.00	49.82	Average
5	2500.000	28.10	6.18	34.45	39.85	39.68	74.00	34.32	Peak
6	2500.000	28.10	6.18	34.45	6.95	6.78	54.00	47.22	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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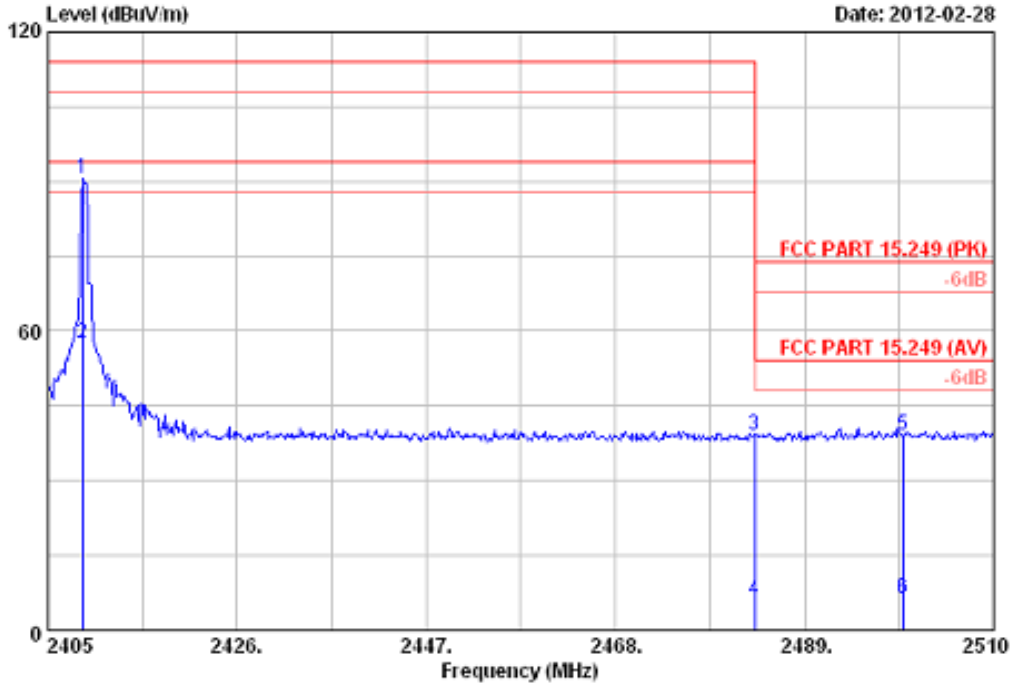
Out of Band Emissions

Right band test result
Horizontal:



Site no. : 3m Chamber
Dis. / Ant. : 3m 2011 3115 4580
Limit : FCC PART 15.249 (PK)
Env. / Ins. : 23*C/54%
EUT : Measure Instrument
Power supply : DC 4.5V
Test mode : Tx Mode

Data no. : 47
Ant. pol. : HORIZONTAL
Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2408.885	27.98	6.03	34.44	91.03	90.60	114.00	23.40	Peak
2	2408.885	27.98	6.03	34.44	57.88	57.45	94.00	36.55	Average
3	2483.500	28.08	6.15	34.45	39.17	38.95	74.00	35.05	Peak
4	2483.500	28.08	6.15	34.45	6.22	6.00	54.00	48.00	Average
5	2500.000	28.10	6.18	34.45	39.40	39.23	74.00	34.77	Peak
6	2500.000	28.10	6.18	34.45	6.67	6.50	54.00	47.50	Average

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 08, 2013
Amp	HP	8449B	3008A02495	May 08, 2013
Antenna	EMCO	3115	9607-4877	May 17, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May 08, 2013

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7.3 20dB Bandwidth Testing

Test Method

1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2 Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

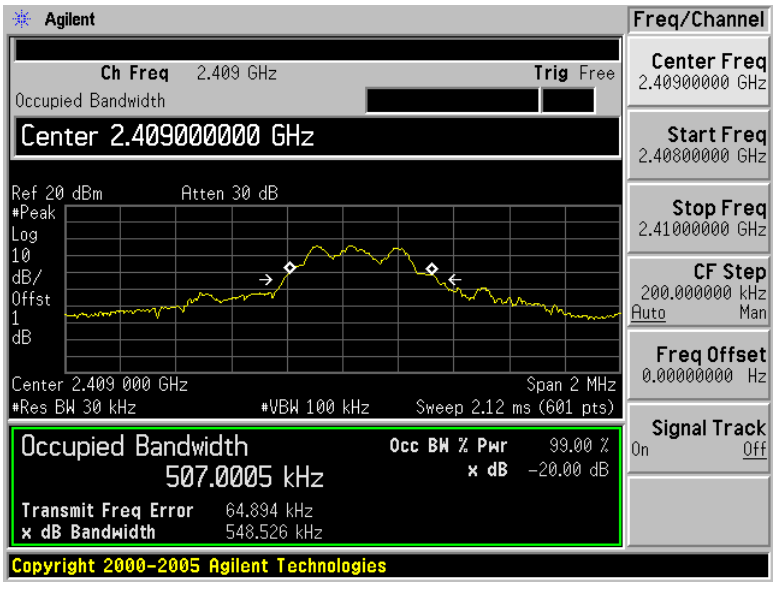
3 Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Limits:

Per 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

20dB Bandwidth Testing

Frequency (MHz)	20 dB Bandwidth (kHz)	Test Result
2409	548.526	Pass



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Test Equipment

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8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dBμV/m)	U=4.32dB (30MHz-25GHz)

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