

Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 1 of 80

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 210

OF

Product Name: 2.4G wireless camera product

**Brand Name:** N/A

Model Name: FCC: LW2110, LW2110PK2B

IC: LW2110

**Model Different:** For different market Segmentation.

FCC ID: UCZMC2110

IC: 8575A-LW2110

**Report No.:** ER/2011/20003

**Issue Date:** Mar. 04, 2011

FCC Rule Part: §15.247, Cat: DTS

IC Rule Part: RSS-210 issue 8:2010, Annex 8

Prepared for: Lorex Technology Inc

250 Royal Crest Court, Markham, Ontario L3R

3S1,Canada

Prepared by: SGS Taiwan Ltd.

Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone,

Taipei County, Taiwan.



**Note:** This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This document may be altered or revised by SGS Taiwan Ltd. personnel only, and shall be noted in the revision section of the document.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's soel responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 **134** 號

限公司 t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 2 of 80

# VERIFICATION OF COMPLIANCE

**Applicant:** Lorex Technology Inc

250 Royal Crest Court, Markham, Ontario L3R 3S1, Canada

**Product Name:** 2.4G wireless camera product

**Brand Name:** N/A

FCC ID: UCZMC2110
IC: 8575A-LW2110
Model No.: FCC: LW2110

FCC: LW2110 IC: LW2110

Series Model: LW2110PK2B

**Model Difference:** For different market Segmentation

**File Number:** ER/2011/20003

**Date of test:** Feb. 11, 2011 ~ Mar. 04, 2011

**Date of EUT Received:** Feb. 11, 2011

# We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and IC RSS 210 issue 8: 2010 Annex 8.

The test results of this report relate only to the tested sample identified in this report.

Test By:	tur Su	Date:	Mar. 04, 2011	
Prepared By:	Eric Su / Asst. Supervisor  Memy Chem	Date:	Mar. 04, 2011	
Approved By:	Cherry Chen / Clerk  Jim Chang / Supervisor	Date:	Mar. 04, 2011	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

台灣檢驗科技股份有限公司

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 3 of 61

# Version

Version No.	Date	Description
00	Mar. 04, 2011	Initial creation of document

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

an Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

司 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 4 of 61

#### **Table of Contents**

T	GEN	ERAL INFORMATION	0
	1.1	Product Description	6
	1.2	Related Submittal(s) / Grant (s)	7
	1.3	Test Methodology	7
	1.4	Test Facility	7
	1.5	Special Accessories	7
	1.6	Equipment Modifications	7
2	SYST	ΓΕΜ TEST CONFIGURATION	8
	2.1	EUT Configuration	8
	2.2	EUT Exercise	8
	2.3	Test Procedure	8
	2.4	Configuration of Tested System	9
3	SUM	IMARY OF TEST RESULTS	10
4	DES	CRIPTION OF TEST MODES	10
5		IDUCTED EMISSION TEST	
	5.1.	Standard Applicable:	
	5.2.	Measurement Equipment Used:	11
	5.3.	EUT Setup:	11
	5.4.	Measurement Procedure:	12
	5.5.	Measurement Result:	12
6	PEA:	K OUTPUT POWER MEASUREMENT	17
	6.1	Standard Applicable:	
	6.2	Measurement Equipment Used:	18
	6.3	.Test Set-up:	18
	6.4	Measurement Procedure:	18
	6.5	Measurement Result:	19
7	<b>6dB</b> ]	Bandwidth & 99% Bandwidth	22
	7.1	Standard Applicable:	22
	7.2	Measurement Equipment Used:	22
	7.3	Test Set-up:	22
	7.4	Measurement Procedure:	22
	7.5	Measurement Result:	23

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 5 of 61

8	100K	Hz BANDWIDTH OF BAND EDGES MEASUREMENT	26
	8.1	Standard Applicable:	26
	8.2	Measurement Equipment Used:	27
	8.3	Test SET-UP:	28
	8.3.1	Conducted Emission at antenna port:	28
	8.3.2	Radiated emission:	28
	8.4	Measurement Procedure:	29
	8.5	Field Strength Calculation:	29
	8.6	Measurement Result:	29
9	SPUR	RIOUS RADIATED EMISSION TEST	33
	9.1	Standard Applicable	33
	9.2	Measurement Equipment Used:	33
	9.3	Test SET-UP:	33
	9.4	Measurement Procedure:	34
	9.5	Field Strength Calculation	34
	9.6	Measurement Result:	34
10	Peak	Power Spectral Density	56
	10.1	Standard Applicable:	
	10.2	Measurement Equipment Used:	56
	10.3	Test Set-up:	56
	10.4	Measurement Procedure:	56
	10.5	Measurement Result:	57
11	ANTI	ENNA REQUIREMENT	60
	11.1.	Standard Applicable:	60
	11.2.	Antenna Connected Construction:	61
AP	PEND:	IX 1 PHOTOGRPHS OF SET UP	62
ΔP	PEND	IX 2 PHOTOGRPHS OF FUT	67

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。
This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This groups the reproduced except in full without prior writers appropriated groups at the parties to a transaction from exercising all reprints. and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

S Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan/台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 6 of 61

## 1 GENERAL INFORMATION

# 1.1 Product Description

#### General:

Product Name	2.4G wireless camera product		
Brand Name	N/A		
Model Name	FCC: LW2110 IC: LW2110		
Series Model	LW2110PK2B		
Model Difference	For different market Segmentation		
Power Supply	Adapter: Model No.: GQ07-120050-BU Supplier: GANG QI		

Operation mode:

Frequency Range:	2400 – 2480 MHz
Channel number:	40 channels
Max. Output Power:	9.50 dBm
Modulation type:	GFSK
Antenna Designation:	Dipole Antenna, 1.8 dBi.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 7 of 80

#### 1.2 **Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended for FCC ID: UCZMC2110 filing to comply with Section 15.247 of the FCC Part 15, Subpart E Rules and IC: 8575A-LW2110 filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

#### 1.3 **Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2007. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements

#### **Test Facility** 1.4

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

#### 1.5 **Special Accessories**

Not available for this EUT intended for grant.

#### 1.6 **Equipment Modifications**

Not available for this EUT intended for grant.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. S Taiwan Ltd.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 8 of 61

#### SYSTEM TEST CONFIGURATION

#### 2.1 **EUT Configuration**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

#### 2.2 **EUT Exercise**

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

#### 2.3 **Test Procedure**

#### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 of ANSI C63.4-2003 and KDB558074.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic Format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Taiwan Ltd.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 9 of 61

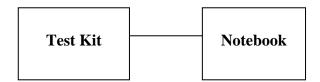
# 2.4 Configuration of Tested System

Fig. 2-1 AC Power line and Radiated Emission Configuration

EUT (TX)

EUT (RX)

Remote side



**Table 2-1 Equipment Used in Tested System** 

Item	Equipment	Mfr/Brand	Model/	Sawing No.	Data Cabla	_ ~
Item	Equipment	MIII/Draild	Type No.	Series No.	Data Cable	<b>Power Cord</b>
1.	Notebook	IBM	R61	L3A9050	N/A	N/A
2.	Test Kit	N/A	N/A	N/A	N/A	N/A

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawfull and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279 f (886-2) 2298-0488



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 10 of 61

## 3 SUMMARY OF TEST RESULTS

FCC Rules	<b>Description Of Test</b>	Result
§15.207(a)/	AC Power Line Conducted Emis-	C1:1
RSS-Gen §7.2.2	sion	Compliant
§15.247(a)(2)(b)/	D 10 D	
§A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2)/	6dB Bandwidth	
§A8.(a)	&	Compliant
RSS-Gen §4.4.1	99% Power Bandwidth	
§15.247(c)/	100 KHz Bandwidth Of	G 11 .
§A8.5	Frequency Band Edges	Compliant
§15.247(c)/		G 11
§A8.5	Spurious Emission	Compliant
§15.247/,§A8.2(b)	Peak Power Density	Compliant
§15.203/		
RSS-GEN 7.1.4,	Antenna Requirement	Compliant
RSS-210 issue 7,§A8.4		

#### 4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low  $(2402 MHz) \cdot mid (2440 MHz)$  and high (2478 MHz) with highest data rate are chosen for full testing.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 11 of 61

#### CONDUCTED EMISSION TEST

#### **5.1. Standard Applicable:**

According to §15.207 and RSS-Gen §7.2.2, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

-		mits
Frequency range	dB(	(uV)
MHz	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

#### Note

# **5.2.** Measurement Equipment Used:

	Cor	nducted Emission T	'est Site		
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2010	09/14/2011
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2011	02/01/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2011	02/01/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

## 5.3. EUT Setup:

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, to electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnifications of the subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnifications of the subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. tion and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279

<sup>1.</sup> The lower limit shall apply at the transition frequencies

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



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 12 of 61

### **5.4.** Measurement Procedure:

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all frequency measured were complete.

#### 5.5. Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

an Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan/台北縣五股工業區五工路 134 號

t (886-2) 2299-3279

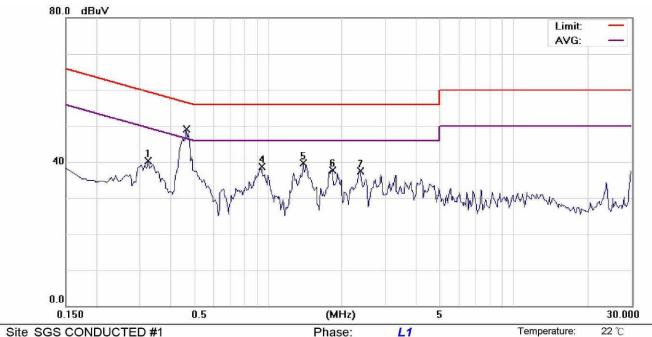


Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 13 of 61

## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode (7	ΓX)		Test Date:	Mar. 04, 2011
Temperature:	22 ℃	Humidity:	58 %	Test By:	Eric



Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

M/N: LW2110/LW2110PK2B Note: Operation mode (TX)

Power: AC 120V/60Hz Humidity: 58 % Air Pressure: EUT: 2.4G wireless camera product hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.3250	40.16	0.12	40.28	59.58	-19.30	peak		
2	*	0.4577	40.82	0.12	40.94	56.73	-15.79	QP		
3		0.4577	29.49	0.12	29.61	46.73	-17.12	AVG		
4		0.9400	38.62	0.12	38.74	56.00	-17.26	peak		
5		1.3900	39.51	0.14	39.65	56.00	-16.35	peak		
6		1.8300	37.64	0.15	37.79	56.00	-18.21	peak		
7		2.3800	37.40	0.17	37.57	56.00	-18.43	peak		

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

台灣檢驗科技股份有限公司

解析分析能物 近報日報本権制度的 (中華) 中華 (中華 and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279 f (886-2) 2298-0488 www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

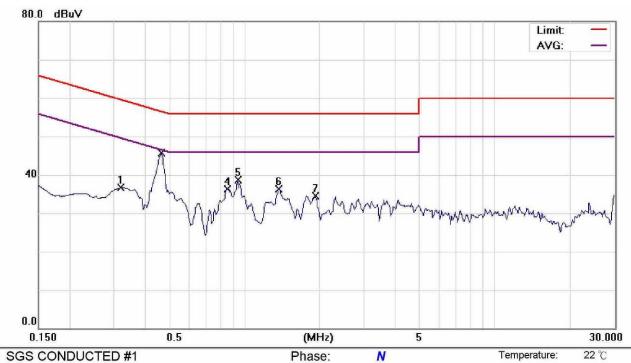
Humidity:

Air Pressure:

58 %

hpa

Page: 14 of 61



Power:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

EUT: 2.4G wireless camera product

M/N: LW2110/LW2110PK2B Note: Operation mode (TX)

No. Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	0.3200	36.61	0.12	36.73	59.71	-22.98	peak		
2	0.4645	42.89	0.12	43.01	56.61	-13.60	QP		
3 *	0.4645	36.10	0.12	36.22	46.61	-10.39	AVG		
4	0.8500	36.20	0.13	36.33	56.00	-19.67	peak		
5	0.9400	38.52	0.13	38.65	56.00	-17.35	peak		
6	1.3700	36.23	0.14	36.37	56.00	-19.63	peak		
7	1.9200	34.42	0.16	34.58	56.00	-21.42	peak		

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析能物 近報日報本権制度的 (中華) 中華 (中華 and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

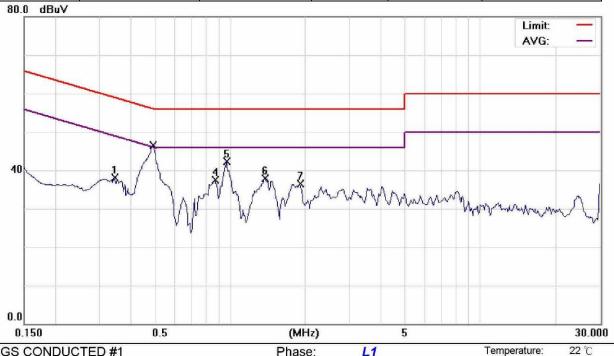
58 %

hpa

Humidity: Air Pressure:

Page: 15 of 61

Operation Mode:	Operation mode (I	RX)		Test Date:	Mar. 04, 2011
Temperature:	22 ℃	Humidity:	58 %	Test By:	Eric



Phase:

Power:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP) EUT: 2.4G wireless camera product

M/N: LW2110/LW2110PK2B Note: Operation mode (RX)

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.3450	38.02	0.12	38.14	59.08	-20.94	peak		
2	*	0.4889	42.44	0.12	42.56	56.19	-13.63	QP		
3		0.4889	32.30	0.12	32.42	46.19	-13.77	AVG		
4		0.8700	37.29	0.12	37.41	56.00	-18.59	peak		
5		0.9700	42.25	0.12	42.37	56.00	-13.63	peak		
6		1.3800	37.74	0.14	37.88	56.00	-18.12	peak		
7		1.9000	36.34	0.16	36.50	56.00	-19.50	peak		

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析能物 近報日報本権制度的 (中華) 中華 (中華 and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279



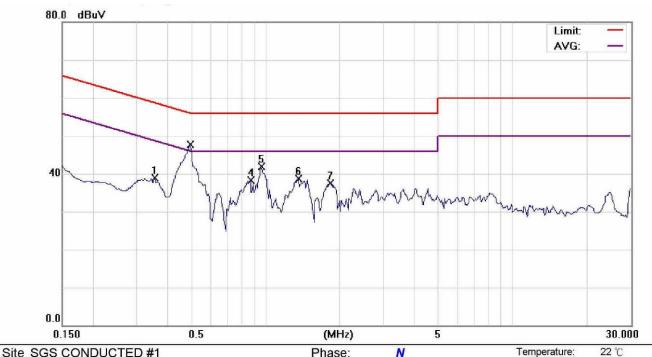
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Humidity:

Air Pressure:

hpa

Page: 16 of 61



Power:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

EUT: 2.4G wireless camera product

M/N: LW2110/LW2110PK2B Note: Operation mode (RX)

Vo.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3550	38.83	0.12	38.95	58.84	-19.89	peak	
2		0.4944	44.87	0.12	44.99	56.09	-11.10	QP	
3	*	0.4944	38.22	0.12	38.34	46.09	-7.75	AVG	
4		0.8700	38.23	0.13	38.36	56.00	-17.64	peak	
5		0.9600	41.75	0.13	41.88	56.00	-14.12	peak	
6		1.3600	38.61	0.14	38.75	56.00	-17.25	peak	
7		1.8300	37.31	0.15	37.46	56.00	-18.54	peak	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析能物 近報日報本権制度的 (中華) 中華 (中華 and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 17 of 61

#### PEAK OUTPUT POWER MEASUREMENT

# **6.1 Standard Applicable:**

According to  $\S15.247(a)(2)$ , (b)

- (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
- (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (c) Operation with directional antenna gains greater than 6 dBi.
- (1) Fixed point-to-point operation:
- (i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.
- (ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

According to RSS-210 issue 7,§A8.4(4), For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析方程就等。如果日和大集到例如之体而具具 中间对政体而集体音列之本而是体音列之 不取日本版中的电话。 不可能的技术 and, for electronic bocument is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Taiwan Ltd.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



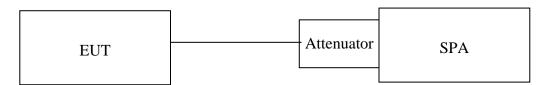
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 18 of 61

# **6.2** Measurement Equipment Used:

vicusurement Be	[0-1p-110110 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
	Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2009	04/18/2011					
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012					
DC Block	Agilent	BLK-18	155452	07/05/2010	07/04/2011					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012					
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2010	07/04/2011					
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2010	07/04/2011					
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2010	07/04/2011					
Splitter	Agilent	11636B	N/A	07/05/2010	07/04/2011					

# 6.3 .Test Set-up:



#### **6.4 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 loss RF cable from the antenna port to the power meter or spectrum. (Channel power function, RBW, VBW = 1MHz,Bandwidth=26dB occupied Bandwidth)
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

S Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 19 of 61

## **6.5** Measurement Result:

Frequency (MHz)	Reading Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	9.50	9.50	0.00891	1
2440.00	8.89	8.89	0.00774	1
2478.00	8.33	8.33	0.00681	1

Cable loss = 0

\*Note: Offset 0.8dB

iS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

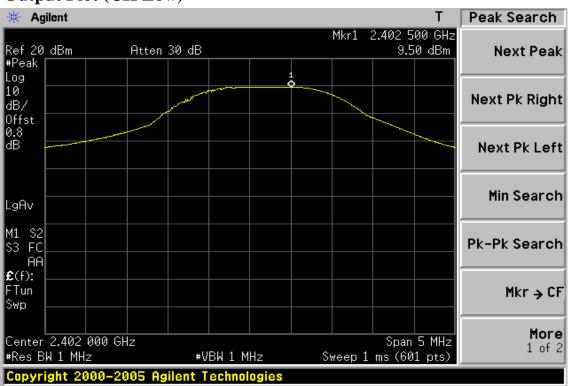
t (886-2) 2299-3279



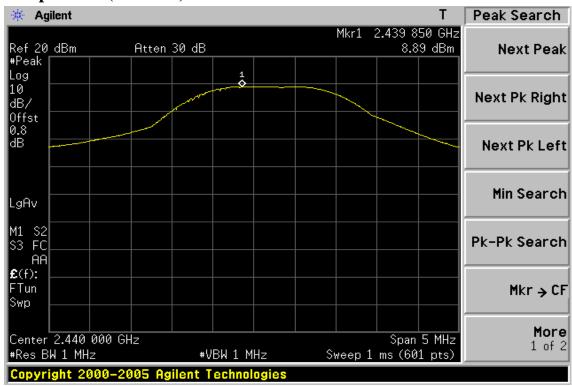
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 20 of 61

# **Power Output Plot (CH Low)**



# **Power Output Plot (CH Mid)**



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawfull and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 **134** 號

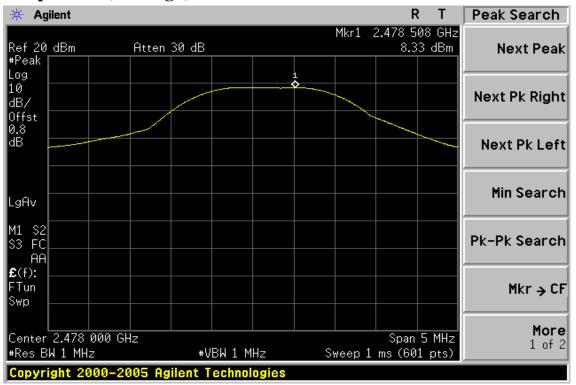
t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 21 of 61

# **Power Output Plot (CH High)**



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 22 of 61

# 7 6dB Bandwidth & 99% Bandwidth

# 7.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 7: 2007 Annex 8.2. Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum 6 dB bandwidth shall be at least 500 kHz.

# 7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

#### 7.3 Test Set-up:

Refer to section 6.3 for details.

#### 7.4 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 loss RF cable from the 3.antenna port to the spectrum analyzer.
- 3.Set the spectrum analyzer as RBW  $\ge$  1% of emission Bandwidth, VBW = 3\*RBW, Span= 50MHz, Sweep=auto
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 23 of 61

### 7.5 Measurement Result:

#### 6dB Bandwidth

СН	Bandwidth (MHz)	Bandwidth (KHz)	Result
Lower	0.528	> 500	PASS
Mid	0.567	> 500	PASS
Higher	0.564	> 500	PASS

## 99% Bandwidth

Frequency	Bandwidth
MHz	(MHz)
2402	1.73
2440	1.75
2478	1.76

Note: Refer to next page for plots.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

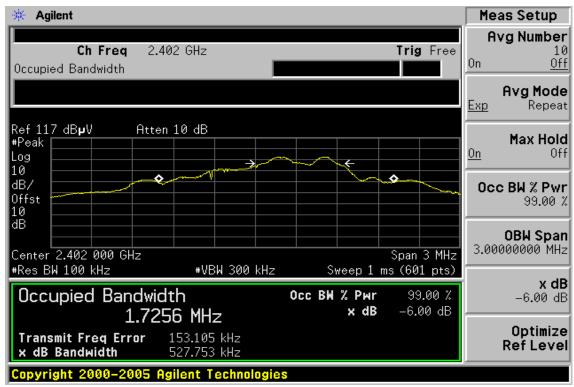
GS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



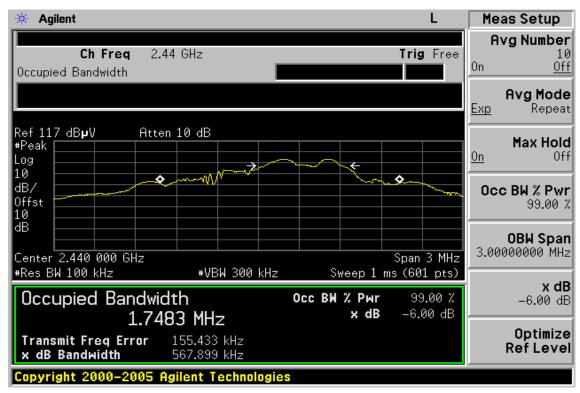
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 24 of 61

#### 6dB Band Width & 99% Bandwidth Test Data CH-Low



#### 6dB Band Width & 99% Bandwidth Test Data CH-Mid



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

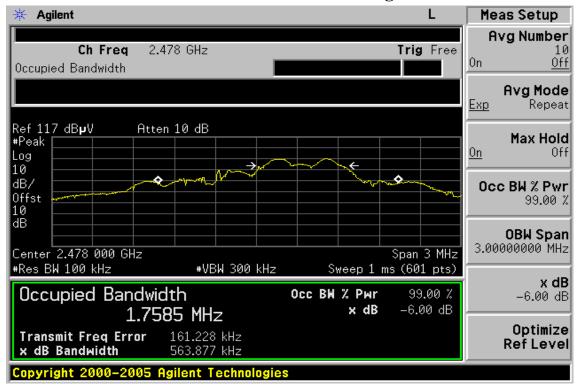
t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 25 of 61

# 6dB Band Width & 99% Bandwidth Test Data CH-High



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 26 of 61

#### 8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

# 8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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 the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to RSS-210 issue 7,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

n Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

台灣檢驗科技股份有限公司 t (886-2) 2299-3279

f (886-2) 2298-0488 www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 27 of 61

# 8.2 Measurement Equipment Used:

## 8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

#### 8.2.2. Radiated emission:

	90	66 Chamber			
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2011	02/11/2012
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2009	07/07/2011
Bilog Antenna	SCHWAZBECK	VULB9160	3136	09/15/2010	09/14/2011
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2009	05/08/2011
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2011	01/04/2012
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2011	01/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012
3m Site	SGS	966 chamber	N/A	11/08/2010	11/09/2011

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。
This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and objections under the transaction documents. This document is full without prior within appropriate the transaction from exercising all reports or the propriate of the Company. Any quality of the Company. and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 28 of 61

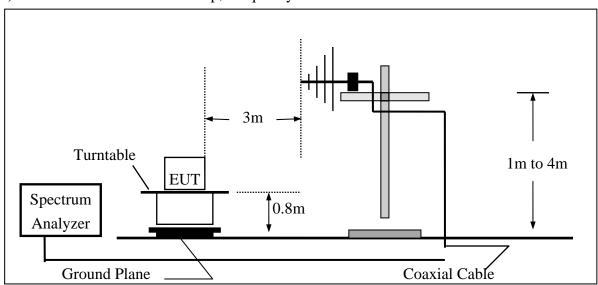
#### 8.3 Test SET-UP:

# 8.3.1 Conducted Emission at antenna port:

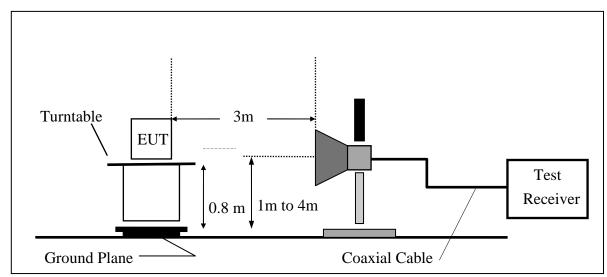
Refer to section 6.3 for details.

#### 8.3.2 Radiated emission:

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



# (B) Radiated Emission Test Set-UP Frequency Over 1 GHz



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279 f (886-2) 2298-0488



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 29 of 61

#### **8.4 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 loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=50MHz, Sweep = auto
- 5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
- 6. Repeat above procedures until all frequency measured were complete.

# **8.5 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	

#### **8.6** Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and <a href="https://www.sgs.com/terms">conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 30 of 61

# **Band Edges Test Data CH-Low**



# **Band Edges Test Data CH-High**



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Hor.

Page: 31 of 61

Pol

#### **Radiated Emission:**

Operation Mode TX CH Low Test Date Mar. 04, 2011 Fundamental Frequency 2412 MHz Test By Eric Tmperature 25  $^{\circ}$ C Pol Ver.

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	$\mathbf{CF}(\mathbf{dB})$	(dBuV/m)	(dBuV/m)	(dBuV/m	)(dBuV/m)	(dB)	

Operation Mode TX CH Low Test Date Mar. 04, 2011 Fundamental Frequency 2412 MHz Test By Eric

Temperature 25 °C

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	$\mathbf{CF}(\mathbf{dB})$	(dBuV/m)	(dBuV/m)	(dBuV/m	)(dBuV/m	<b>(dB)</b>	

#### Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column  $^{\circ}$
- (3) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (4) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

台灣檢驗科技股份有限公司

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 32 of 61

#### **Radiated Emission:**

Operation Mode TX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478 MHz Test By Eric Pol Temperature Ver. 25 °C

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m	)(dBuV/m)	(dB)	
2483.50	78.24	50.71	-0.59	77.65	50.12	74.00	54.00	-3.88	AV

Operation Mode TX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478 MHz Test By Eric Temperature 25 °C Pol Hor.

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m	)(dBuV/m	) <b>(dB)</b>	
2483.50	68.98	49.14	-0.59	68.39	48.55	74.00	54.00	-5.45	AV

#### Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column o
- (3) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析方程就等。如果日和大集到例如之体而具具 中间对政体而集体音列之本而是体音列之 不取日本版中的电话。 不可能的技术 and, for electronic bocument is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

S Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 台灣檢驗科技股份有限公司 t (886-2) 2299-3279 f (886-2) 2298-0488

www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 33 of 61

#### 9 SPURIOUS RADIATED EMISSION TEST

# 9.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-210 issue 7,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

## 9.2 Measurement Equipment Used:

### 9.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

#### 9.2.2. Radiated emission:

Refer to section 7.2 for details.

#### 9.3 Test SET-UP:

#### 9.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

#### 9.3.2. Radiated emission:

Refer to section 7.3 for details.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 34 of 61

#### 9.4 Measurement Procedure:

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7. Repeat above procedures until all frequency measured were complete.

# 9.5 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	

#### 9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

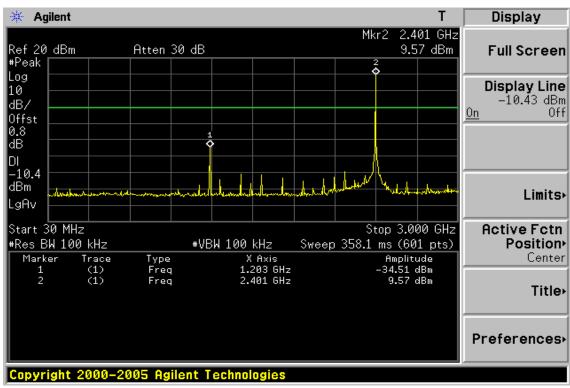
t (886-2) 2299-3279 f (886-2) 2298-0488



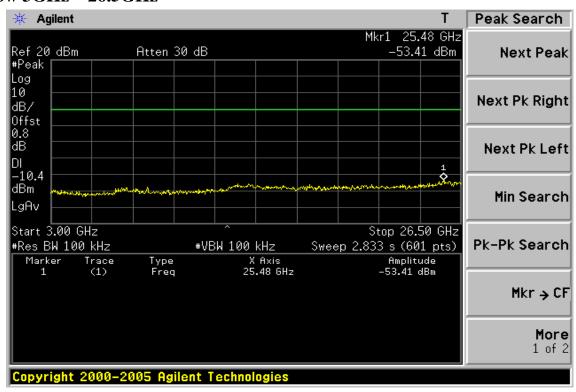
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 35 of 61

# **Conducted Spurious Emission Measurement Result Ch Low 30MHz – 3GHz**



#### Ch Low 3GHz - 26.5GHz



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawfull and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

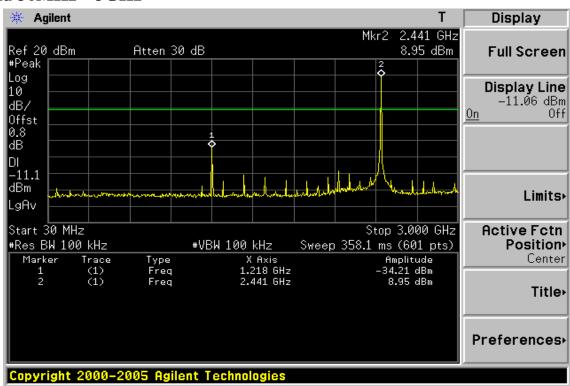
t (886-2) 2299-3279



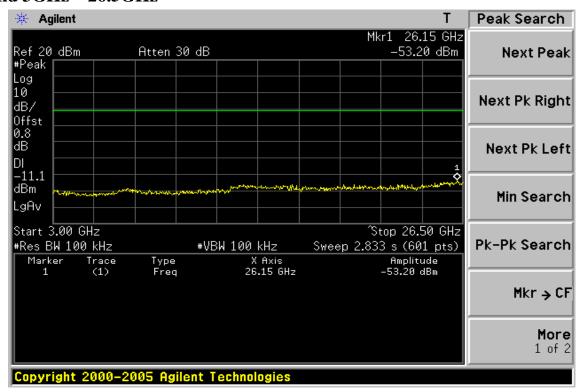
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 36 of 61

#### Ch Mid 30MHz – 3GHz



#### Ch Mid 3GHz – 26.5GHz



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

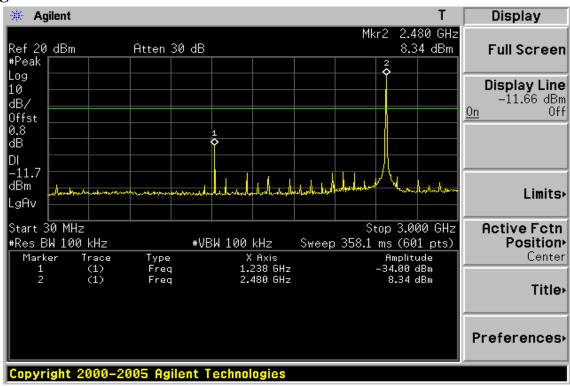
公司 t (886-2) 2299-3279



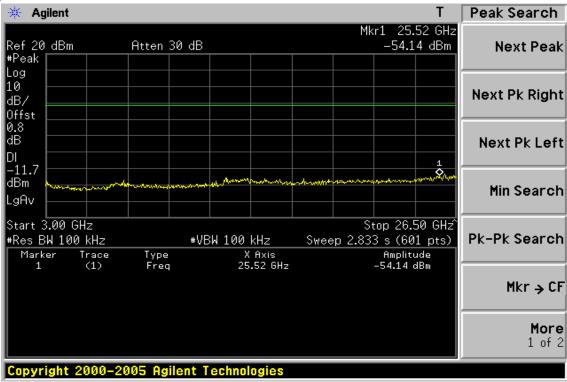
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 37 of 61

# Ch High 30MHz – 3GHz



# Ch High 3GHz - 26.5GHz



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 38 of 61

### Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH Low Test Date Mar. 04, 2011

Fundamental Frequency 2402MHz Test By Eric Pol Temperature Ver./Hor 25 °C

Humidity 62 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
144.46	V	Peak	45.95	-12.66	33.29	43.50	-10.21
191.99	V	Peak	45.26	-15.57	29.69	43.50	-13.81
233.70	V	Peak	50.19	-14.32	35.87	46.00	-10.13
293.84	V	Peak	49.20	-12.58	36.62	46.00	-9.38
367.56	V	Peak	50.36	-11.31	39.05	46.00	-6.95
384.05	V	Peak	48.04	-11.08	36.96	46.00	-9.04
51.34	H	Peak	43.85	-13.93	29.92	40.00	-10.08
144.46	Н	Peak	39.02	-12.66	26.36	43.50	-17.14
192.96	Н	Peak	43.47	-15.56	27.91	43.50	-15.59
306.45	Н	Peak	45.23	-12.29	32.94	46.00	-13.06
335.55	Н	Peak	48.50	-11.82	36.68	46.00	-9.32
354.95	Н	Peak	46.68	-11.50	35.18	46.00	-10.82

#### Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析記述 近期日間水便町間域に飛出車具 中時時間は開車を開車の人。本報日本語本名中間間間 中不可能的機能 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 39 of 61

# Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440MHz Test By Eric Temperature 25 °C Pol Ver./Hor

Humidity 62 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
144.46	V	Peak	42.23	-12.66	29.57	43.50	-13.93
193.93	V	Peak	45.81	-15.68	30.13	43.50	-13.37
233.70	V	Peak	49.71	-14.32	35.39	46.00	-10.61
343.31	V	Peak	50.20	-11.62	38.58	46.00	-7.42
367.56	V	Peak	48.64	-11.31	37.33	46.00	-8.67
481.05	V	Peak	42.26	-9.40	32.86	46.00	-13.14
49.40	Н	Peak	44.46	-13.93	30.53	40.00	-9.47
193.93	Н	Peak	48.51	-15.68	32.83	43.50	-10.67
245.34	Н	Peak	47.03	-13.96	33.07	46.00	-12.93
306.45	Н	Peak	46.22	-12.29	33.93	46.00	-12.07
334.58	Н	Peak	48.38	-11.81	36.57	46.00	-9.43
384.05	Н	Peak	45.19	-11.08	34.11	46.00	-11.89

#### Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

台灣檢驗科技股份有限公司

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 40 of 61

# Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478MHz Test By Eric Temperature 25 °C Pol Ver./Hor

Humidity 62 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
193.93	V	Peak	46.41	-15.68	30.73	43.50	-12.77
241.46	V	Peak	49.74	-14.03	35.71	46.00	-10.29
329.73	V	Peak	50.00	-11.88	38.12	46.00	-7.88
367.56	V	Peak	48.59	-11.31	37.28	46.00	-8.72
432.55	V	Peak	42.90	-10.21	32.69	46.00	-13.31
481.05	V	Peak	44.13	-9.40	34.73	46.00	-11.27
41.64	Н	Peak	40.54	-13.51	27.03	40.00	-12.97
191.99	Н	Peak	46.50	-15.57	30.93	43.50	-12.57
241.46	Н	Peak	43.93	-14.03	29.90	46.00	-16.10
330.70	Н	Peak	48.34	-11.85	36.49	46.00	-9.51
342.34	Н	Peak	47.63	-11.62	36.01	46.00	-9.99
427.70	Н	Peak	43.30	-10.29	33.01	46.00	-12.99

#### Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 41 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Mar. 04, 2011

Fundamental Frequency 2402MHz Test By Eric Pol Temperature Ver. 25 °C

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1201.0	57.60	49.05	-5.34	52.26	43.71	74.00	54.00	-10.29	AV
2105.0	43.55	43.55	-2.55	41.00		74.00	54.00	-13.00	Peak
2183.0	44.50	44.50	-1.87	42.63		74.00	54.00	-11.37	Peak
4802.5	42.83	42.83	5.19	48.02		74.00	54.00	-5.98	Peak
12010.0						74.00	54.00		
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析記述 近期日間水便町間域に飛出車具 中時時間は開車を開車の人。本報日本語本名中間間間 中不可能的機能 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 Taiwan Ltd. t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 42 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Mar. 04, 2011

Fundamental Frequency 2402MHz Test By Eric Pol Temperature Hor 25 °C

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1201.0	58.45	50.05	-5.34	53.11	44.71	74.00	54.00	-9.29	AV
1442.0	37.53		-4.89	32.64		74.00	54.00	-21.36	Peak
1585.0	38.88		-4.18	34.70		74.00	54.00	-19.30	Peak
2105.0	36.19		-2.55	33.64		74.00	54.00	-20.36	Peak
4802.5	39.25		5.19	44.44		74.00	54.00	-9.56	Peak
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 43 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440MHz Test By Eric Temperature 25 °C Pol Ver

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1227.5	55.39		-5.20	50.19		74.00	54.00	-3.81	Peak
3137.5	45.73		-2.18	43.55		74.00	54.00	-10.45	Peak
4887.0	41.19		5.41	46.60		74.00	54.00	-7.40	Peak
9760.0						74.00	54.00		
12200.0						74.00	54.00		
14640.0						74.00	54.00		
17080.0						74.00	54.00		
19520.0						74.00	54.00		
21960.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

下分目記述 2 中級日本代表生 2 中級日本代本生 2 中級日本学 2 中級日本代本生 2 中級日本学 2 中教育学 2 中級日本学 2 中級日本学 2 中級日本学 2 中



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 44 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440 MHz Test By Eric Temperature  $25 \,^{\circ}\text{C}$  Pol Hor

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1227.5	56.06		-5.20	50.86		74.00	54.00	-3.14	Peak
1598.0	38.53		-4.11	34.42		74.00	54.00	-19.58	Peak
2137.5	40.01		-2.18	37.83		74.00	54.00	-16.17	Peak
4887.0	39.03		5.41	44.44		74.00	54.00	-9.56	Peak
12200.0						74.00	54.00		
14640.0						74.00	54.00		
17080.0						74.00	54.00		
19520.0						74.00	54.00		
21960.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 45 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478 MHz Test By Eric Temperature  $25 \, ^{\circ}\text{C}$  Pol Ver

Humidity 62%

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1247.00	53.06		-5.03	48.03		74.00	54.00	-5.97	Peak
2092.00	45.10		-2.61	42.49		74.00	54.00	-11.51	Peak
4965.0	37.24		5.61	42.85		74.00	54.00	-11.15	Peak
9912.0						74.00	54.00		
12390.0						74.00	54.00		
14868.0						74.00	54.00		
17346.0						74.00	54.00		
19824.0						74.00	54.00		
22302.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 46 of 61

# Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478 MHz Test By Eric Temperature  $25 \, ^{\circ}\text{C}$  Pol Hor

Humidity 62 %

	Peak	$\mathbf{AV}$		Actu	<b>Actual FS</b>		$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1239.0	57.58	50.08	-5.18	52.40	44.90	74.00	54.00	-9.10	AV
1468.0	39.97		-4.74	35.23		74.00	54.00	-18.77	Peak
2092.0	38.03		-2.61	35.42		74.00	54.00	-18.58	Peak
9912.0						74.00	54.00		
12390.0						74.00	54.00		
14868.0						74.00	54.00		
17346.0						74.00	54.00		
19824.0						74.00	54.00		
22302.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

下分目記述 2 中級日本代表生 2 中級日本代本生 2 中級日本学 2 中級日本代本生 2 中級日本学 2 中教育学 2 中級日本学 2 中級日本学 2 中級日本学 2 中

 SGS Taiwan Ltd.
 No.134, Wu Kung Road, Wuku İndustrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號台灣檢驗科技股份有限公司
 t (886-2) 2299-3279
 f (886-2) 2298-0488
 www.tw.sgs.com



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 47 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode **RX CH Low** Test Date Mar. 04, 2011

Fundamental Frequency 2402MHz Test By Eric Pol Temperature Ver./Hor 25 °C

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	<b>Actual FS</b>	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
193.92	V	Peak	48.23	-15.68	32.55	43.50	-10.95
241.46	V	Peak	48.30	-14.03	34.27	46.00	-11.73
289.96	V	Peak	51.08	-12.68	38.40	46.00	-7.60
350.10	V	Peak	48.74	-11.54	37.20	46.00	-8.80
384.05	V	Peak	47.44	-11.08	36.36	46.00	-9.64
432.55	V	Peak	43.25	-10.21	33.04	46.00	-12.96
41.64	Н	Peak	43.65	-13.51	30.14	40.00	-9.86
144.46	Н	Peak	39.30	-12.66	26.64	43.50	-16.86
193.93	Н	Peak	46.69	-15.68	31.01	43.50	-12.49
241.46	Н	Peak	44.29	-14.03	30.26	46.00	-15.74
335.55	Н	Peak	43.43	-11.82	31.61	46.00	-14.39
432.55	Н	Peak	42.71	-10.21	32.50	46.00	-13.50

# Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析分析記述 近期日間水便町間域に飛出車具 中時時間は開車を開車の人。本報日本語本名中間間間 中不可能的機能 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. S Taiwan Ltd.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

台灣檢驗科技股份有限公司

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 48 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440MHz Test By Eric Pol Temperature Ver./Hor 25°C

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
235.64	V	Peak	49.26	-14.18	35.08	46.00	-10.92
296.75	V	Peak	47.09	-12.49	34.60	46.00	-11.40
331.67	V	Peak	45.59	-11.86	33.73	46.00	-12.27
350.10	V	Peak	45.14	-11.54	33.60	46.00	-12.40
427.70	V	Peak	45.15	-10.29	34.86	46.00	-11.14
481.05	V	Peak	43.04	-9.40	33.64	46.00	-12.36
44.55	Н	Peak	44.53	-13.62	30.91	40.00	-9.09
144.46	Н	Peak	39.11	-12.66	26.45	43.50	-17.05
193.93	Н	Peak	46.46	-15.68	30.78	43.50	-12.72
241.46	Н	Peak	44.20	-14.03	30.17	46.00	-15.83
350.10	Н	Peak	44.37	-11.54	32.83	46.00	-13.17
427.70	Н	Peak	43.88	-10.29	33.59	46.00	-12.41

#### Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

解析方程就等。如果日和大集到例如之体而具具 中间对政体而集体音列之本而是体音列之 不取日本版中的电话。 不可能的技术 and, for electronic bocument is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 49 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2478MHz Test By Eric Temperature 25 °C Pol Ver./Hor

Humidity 65%

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	<b>Actual FS</b>	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
144.46	V	Peak	42.50	-12.66	29.84	43.50	-13.66
193.93	V	Peak	48.57	-15.68	32.89	43.50	-10.61
241.46	V	Peak	49.17	-14.03	35.14	46.00	-10.86
296.75	V	Peak	47.47	-12.49	34.98	46.00	-11.02
432.55	V	Peak	42.90	-10.21	32.69	46.00	-13.31
481.05	V	Peak	43.29	-9.40	33.89	46.00	-12.11
144.46	Н	Peak	39.16	-12.66	26.50	43.50	-17.00
193.93	Н	Peak	45.21	-15.68	29.53	43.50	-13.97
235.64	Н	Peak	44.47	-14.18	30.29	46.00	-15.71
289.96	Н	Peak	41.62	-12.68	28.94	46.00	-17.06
335.55	Н	Peak	42.67	-11.82	30.85	46.00	-15.15
432.55	Н	Peak	41.68	-10.21	31.47	46.00	-14.53

#### Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz •
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

下分目記述 2 中級日本代表生 2 中級日本代本生 2 中級日本学 2 中級日本代本生 2 中級日本学 2 中教育学 2 中級日本学 2 中級日本学 2 中級日本学 2 中



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 50 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH Low Test Date Mar. 04, 2011

Fundamental Frequency 2402 MHz Test By Eric Temperature  $25^{\circ}$ C Pol Ver.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1442.0	36.59		-4.89	31.70		74.00	54.00	-22.30	Peak
2755.0	35.38		0.07	35.45		75.00	54.00	-18.55	Peak
7206.0						74.00	54.00		
9608.0						74.00	54.00		
12010.0						74.00	54.00		
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		
24020.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^{\circ}$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

下分目記述 2 中級日本代表生 2 中級日本代本生 2 中級日本学 2 中級日本代本生 2 中級日本学 2 中教育学 2 中級日本学 2 中級日本学 2 中級日本学 2 中



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 51 of 61

## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode 802.11b RX CH Low Test Date Mar. 04, 2011

Fundamental Frequency 2402 MHz Test By Eric Temperature 25 °C Pol Hor

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1013.0	38.12		-5.69	32.43		74.00	54.00	-21.57	Peak
1442.0	37.17		-4.89	32.28		75.00	54.00	-21.72	Peak
7206.0						74.00	54.00		
9608.0						74.00	54.00		
12010.0						74.00	54.00		
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		
24020.0						74.00	54.00		

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^{\circ}$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 52 of 61

## **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440 MHz Test By Eric Temperature 25 °C Pol Ver

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1442.0	39.57		-4.89	34.68		74.00	54.00	-19.32	Peak
2755.0	35.49		0.07	35.56		75.00	54.00	-18.44	Peak
7323.0						74.00	54.00		
9764.0						74.00	54.00		
12205.0						74.00	54.00		
14646.0						74.00	54.00		
17087.0						74.00	54.00		
19528.0						74.00	54.00		
21969.0						74.00	54.00		
24410.0						74.00	54.00		

## Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^\circ$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 53 of 61

## **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH Mid Test Date Mar. 04, 2011

Fundamental Frequency 2440 MHz Test By Eric Temperature  $25 \,^{\circ}\text{C}$  Pol Hor

Humidity 65%

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1013.0	38.08		-5.69	32.39		74.00	54.00	-21.61	Peak
1442.0	37.48		-4.89	32.59		75.00	54.00	-21.41	Peak
7323.0						74.00	54.00		
9764.0						74.00	54.00		
12205.0						74.00	54.00		
14646.0						74.00	54.00		
17087.0						74.00	54.00		
19528.0						74.00	54.00		
21969.0						74.00	54.00		
24410.0						74.00	54.00		

## Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^\circ$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 54 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2480 MHz Test By Eric Temperature 25 °C Pol Ver

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1442.0	38.40		-4.89	33.51		74.00	54.00	-20.49	Peak
2755.0	36.06		0.07	36.13		75.00	54.00	-17.87	Peak
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		
14880.0						74.00	54.00		
17360.0						74.00	54.00		
19840.0						74.00	54.00		
22320.0						74.00	54.00		
24800.0						74.00	54.00		

## Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^\circ$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 55 of 61

# **Radiated Spurious Emission Measurement Result**

Operation Mode RX CH High Test Date Mar. 04, 2011

Fundamental Frequency 2480 MHz Test By Eric Temperature 25 °C Pol Hor

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1013.0	37.78		-5.69	32.09		74.00	54.00	-21.91	Peak
1442.0	37.12		-4.89	32.23		75.00	54.00	-21.77	Peak
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		
14880.0						74.00	54.00		
17360.0						74.00	54.00		
19840.0						74.00	54.00		
22320.0						74.00	54.00		
24800.0						74.00	54.00		

## Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency  $^\circ$
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 56 of 61

# **Peak Power Spectral Density**

# 10.1 Standard Applicable:

According to §15.247(e) 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 7, §A8.2(2) and §A8.3(2), The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0 second duration.

# **10.2** Measurement Equipment Used:

Refer to section 6.2 for details.

# 10.3 Test Set-up:

Refer to section 6.3 for details.

### 10.4 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 loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 300MHz, Sweep=100s
- 4. Record the max. reading.
- 5. Repeat above procedures until all frequency measured were complete.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 余非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, telectronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery of falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 57 of 61

# 10.5 Measurement Result:

#### 802.11b

-					
I	СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit
		Reading (dBm)	(dB)	Level (dBm)	(dBm)
ĺ	Low	4.74	0.00	4.74	8
ĺ	Mid	4.10	0.00	4.10	8
ĺ	High	3.54	0.00	3.54	8

Note: offset 0.8 dB

Note: Refer to next page for plots.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

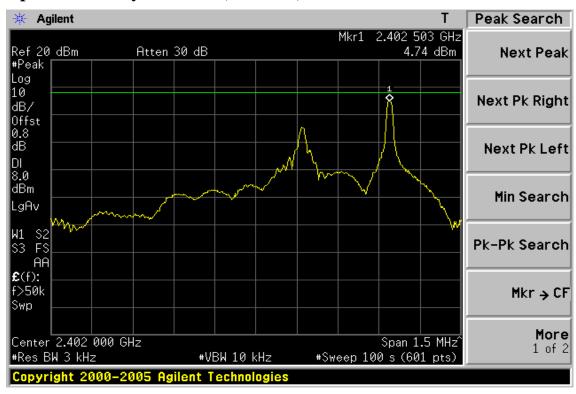
t (886-2) 2299-3279



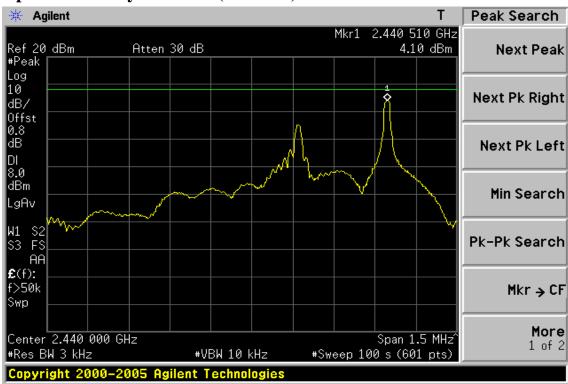
Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 58 of 61

# **Power Spectral Density Test Plot (CH-Low)**



# **Power Spectral Density Test Plot (CH-Mid)**



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com/terms and conditions.htm">www.sgs.com/terms and conditions.htm</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="https://www.sgs.com/terms-e-document.htm">www.sgs.com/terms-e-document.htm</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

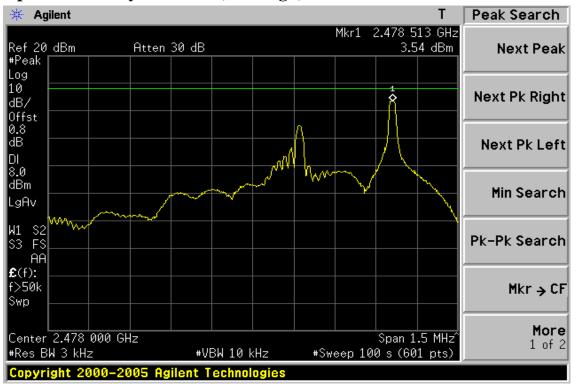
t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 59 of 61

# **Power Spectral Density Test Plot (CH-High)**



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Taiwan Ltd. No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

t (886-2) 2299-3279



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 60 of 61

# 11 ANTENNA REQUIREMENT

# 11.1. Standard Applicable:

According to §15.203, Antenna requirement.

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.4, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



Report No.: ER/2011/20003 Issue Date: Mar. 04, 2011

Page: 61 of 61

### 11.2. Antenna Connected Construction:

The directional gains of antenna used for transmitting is 1.8 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> and conditions.htm and, for electronic format documents, subject to Terms and Conditions of Service printed overleaf, available on request or accessible at <a href="www.sgs.com/terms">www.sgs.com/terms</a> e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawfull and offenders may be prosecuted to the fullest extent of the law.

 SGS Taiwan Ltd.
 No.134, Wu Kung Road, Wuku İndustrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號台灣檢驗科技股份有限公司
 t (886-2) 2299-3279
 f (886-2) 2298-0488
 www.tw.sgs.com