



Spectrum Research & Testing Lab., Inc.
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.: C05041401
Report No.: FCCC05022505-01
FCC ID: GX5-CB2470
Page: 1 of 49
Issued Date: Apr. 14, 2005

Product Name: Bluetooth Audio Transmitter
Model Number: CB2470
Brand Name: Creative
Applicant: Broadxent Pte Ltd
31 International Business Park, Creative Resource,
Singapore 609921
Date of Receipt: Feb. 25, 2005
Finished date of Test: Mar. 11, 2005
Applicable Standards: 47 CFR Part 15, Subpart C
ANSI C63.4:2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By : Hugo Yeh , Date: 4/14/2005
(Hugo Yeh)

Approved By : James Liao , Date: April 14, 2005
(Johnson Ho, Director)

NVLAP[®]

Lab Code: 200099-0



TEST REPORT

TABLE OF CONTENTS

1. DOCUMENT POLICY AND TEST STATEMENT.....	4
1.1 DOCUMENT POLICY.....	4
1.2 TEST STATEMENT	4
1.3 EUT MODIFICATION.....	4
2. DESCRIPTION OF EUT AND TEST MODE	5
2.1 GENERAL DESCRIPTION OF EUT	5
2.2 DESCRIPTION OF SUPPORT UNIT.....	5
2.3 DESCRIPTION OF TEST MODE.....	6
3. DESCRIPTION OF APPLIED STANDARDS.....	6
4 TECHNICAL CHARACTERISTICS TEST	7
4.1 CHANNEL SEPARATION TEST	7
4.1.1 LIMIT	7
4.1.2 TEST EQUIPMENT	7
4.1.3 TEST SET-UP.....	7
4.1.4 TEST PROCEDURE.....	7
4.1.5 EUT OPERATING CONDITION.....	8
4.1.6 TEST RESULT.....	8
4.2 20DB BANDWIDTH.....	12
4.2.1 LIMIT	12
4.2.2 TEST EQUIPMENT	12
4.2.3 TEST SET-UP.....	12
4.2.4 TEST PROCEDURE.....	12
4.2.5 EUT OPERATING CONDITION.....	12
4.2.6 TEST RESULT.....	13
4.3 QUANTITY OF HOPPING CHANNEL TEST	17
4.3.1 LIMIT	17
4.3.2 TEST EQUIPMENT	17
4.3.3 TEST SET-UP.....	17
4.3.4 TEST PROCEDURE.....	17
4.3.5 EUT OPERATING CONDITION.....	17
4.3.6 TEST RESULT.....	18
4.4 TIME OF OCCUPANCY (DWELL TIME).....	19
4.4.1 LIMIT	19
4.4.2 TEST EQUIPMENT	19
4.4.3 TEST SET-UP.....	19
4.4.4 TEST PROCEDURE.....	19
4.4.5 EUT OPERATING CONDITION.....	19
4.4.6 TEST RESULT.....	20
4.5 PEAK POWER TEST.....	24
4.5.1 LIMIT	24



TEST REPORT

4.5.2	TEST EQUIPMENT	24
4.5.3	TEST SET-UP.....	25
4.5.4	TEST PROCEDURE.....	25
4.5.5	EUT OPERATING CONDITION.....	25
4.5.6	TEST RESULT.....	25
4.6	BAND EDGE TEST	28
4.6.1	LIMIT.....	28
4.6.2	TEST EQUIPMENT	29
4.6.3	TEST SET-UP.....	30
4.6.4	TEST PROCEDURE.....	31
4.6.5	EUT OPERATING CONDITION.....	31
4.6.6	TEST RESULT.....	31
4.7	SPURIOUS RADIATED EMISSION TEST.....	34
4.7.1	LIMIT	34
4.7.2	TEST EQUIPMENT	35
4.7.3	TEST SET-UP.....	36
4.7.4	TEST PROCEDURE.....	37
4.7.5	EUT OPERATING CONDITION.....	37
4.7.6	TEST RESULT.....	38
4.8	CONDUCTED EMISSION TEST	42
4.8.1	CONDUCTED EMISSION LIMIT	42
4.8.2	TEST EQUIPMENT	42
4.8.3	TEST SETUP.....	43
4.8.4	TEST PROCEDURE.....	43
4.8.5	TEST RESULT.....	44
5.	ANTENNA APPLICATION	45
5.1	ANTENNA REQUIREMENT	45
5.2	RESULT.....	45
6.	PHOTOS OF TESTING	46
7.	TERMS OF ABRIVATION	49



**Spectrum Research &
Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:C05041401
Report No.:FCCC05022505-01
FCC ID:GX5-CB2470
Page:4 of 49
Issued Date: Apr. 14, 2005

1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 VAC/60 Hz, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:5 of 49 Issued Date: Apr. 14, 2005
---	----------------------	--

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT NAME	Bluetooth Audio Transmitter
MODEL NUMBER	CB2470
BRAND NAME	Creative
POWER SUPPLY	DC 0.9~1.6 V, 150~350mA
FREQUENCY BAND	2.402~2.480GHz
CARRIER FREQUENCY	2.402~2.480GHz
NUMBER OF CHANNEL	79
CHANNEL SPACING	1 MHz
RATED RF OUTPUT POWER	-6~+4 dBm (0.25~2.512mW)
I.F. & L.O.	I.F.:12 MHz
MODULATION TYPE	GFSK
BIT RATE OF TRANSMISSION	1Mbps
DUTY CYCLE	Max 1600 hops/sec
ANTENNA TYPE	Multilayer Ceramic Antenna
ANTENNA GAIN	Max 2 dBi

NOTE

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF SUPPORT UNIT

The transmitter part of EUT was tested with a PC system and configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	NOTEBOOK	DELL	PP01L	DOC	1.5m unshielded power cord
2	PRINTER	EPSON	STYLUS C20SX	DOC	1.5m unshielded power cord 1.5m shielded data cord
3	MODEM	ACEEX	DM-1414	N/A	1.8m unshielded power cord 1.5m shielded data cord
4	BLUETOOTH HEADPHONE	CREATIVE	CB2530	GX5-CB2530	N/A

NOTE

For the actual test configuration, please refer to the photos of testing.



2.3 DESCRIPTION OF TEST MODE

This EUT is a FHSS system, we use BlueTest to control the EUT with RS232, Let EUT hopping on and transmit at every channel with highest power, Only output power use conducted method, others are using radiated method. After Sirfdemo330R1 send the command to EUT, it can be removed, and the EUT keep hopping.79 channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

Channel	Frequency(MHz)
0	2402
39	2441
78	2480

NOTE

1. Below 1 GHz, the channel 0, 39 and 78 were pre-tested in chamber. The channel 78, worst case one, was chosen for conducted and radiated emission test.
2. Above 1 GHz, the channel 0, 39 and 78 were tested individually.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of wireless product and to be connected with a PC system for normal use. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

ANSI C63.4: 2003

Public DA00-705 (March 2000)

All tests have been performed and recorded as the above standards.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:7 of 49 Issued Date: Apr. 14, 2005
---	----------------------	--

4 TECHNICAL CHARACTERISTICS TEST

4.1 CHANNEL SEPARATION TEST

4.1.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

FREQUENCY RANGE (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

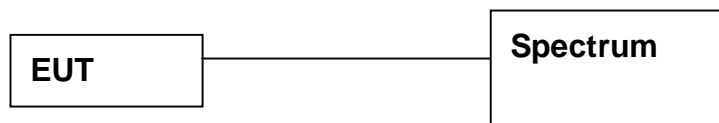
4.1.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test

EQUIPMENT/FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2006 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.1.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 Ω RF cable.

4.1.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:8 of 49 Issued Date: Apr. 14, 2005
---	----------------------	--

4.1.5 EUT OPERATING CONDITION

1. Under Windows XP ran “EMI TEST” and “Media Player” programs and PC sent "H" pattern or accessed the following peripherals directly or via EUT:

- Color Monitor
- RS232
- Printer
- FDD
- HDD

4.1.6 TEST RESULT

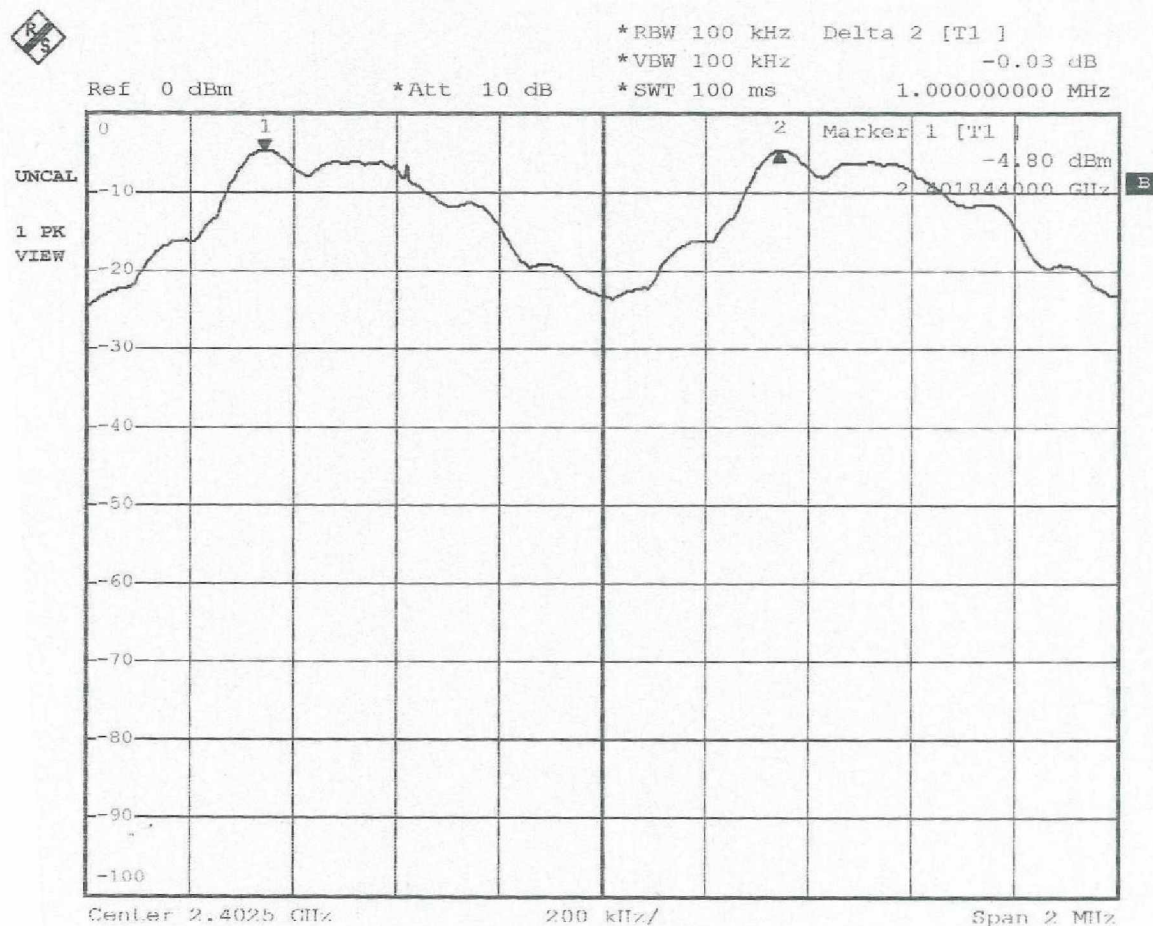
Temperature:	20°C	Humidity:	55%RH
Spectrum Detector:	PK	Tested by	Hugo Yeh
Test Result	PASS	Tested Date:	Mar. 09, 2005

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	SEPARATION READ VALUE (kHz)	SEPARATION LIMIT (kHz)
0	2402	1000.000	>25kHz
39	2441	1000.000	>25kHz
78	2480	1000.000	>25kHz



TEST REPORT

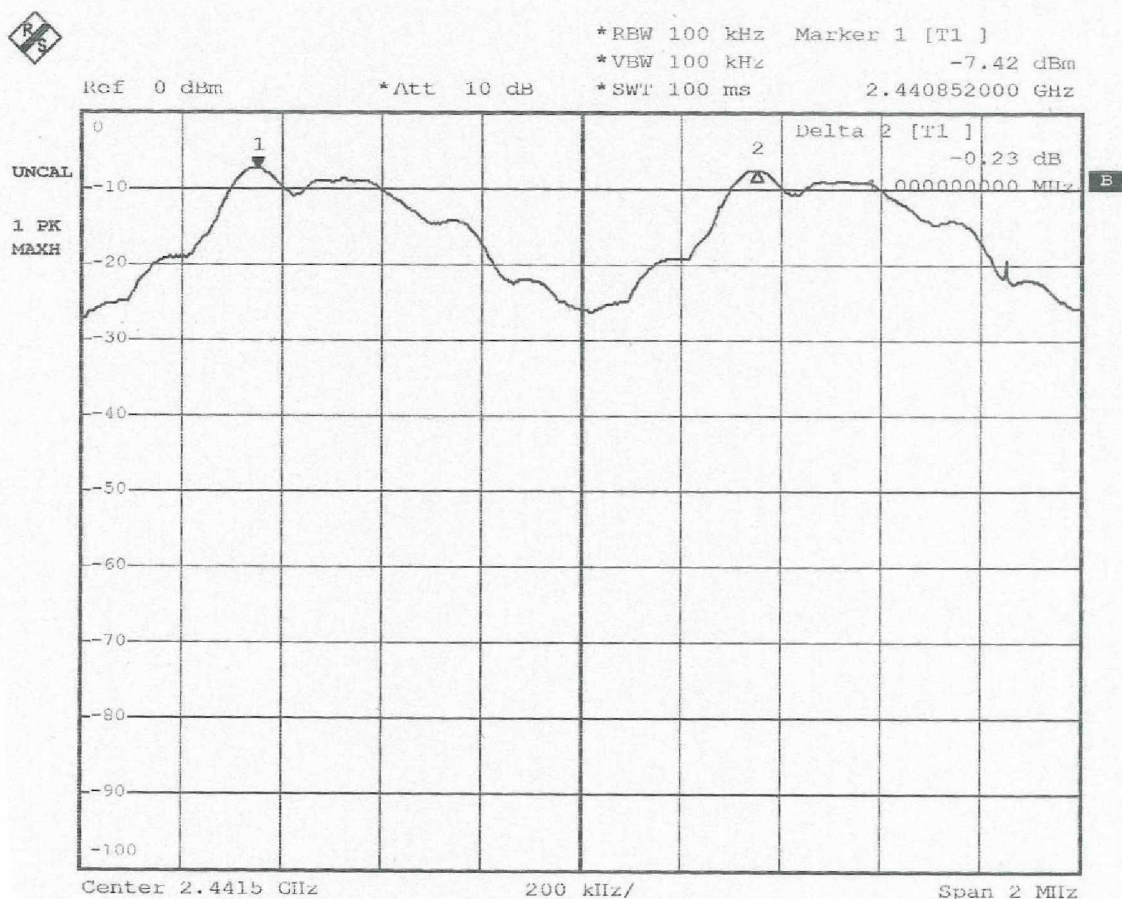
CH0:





TEST REPORT

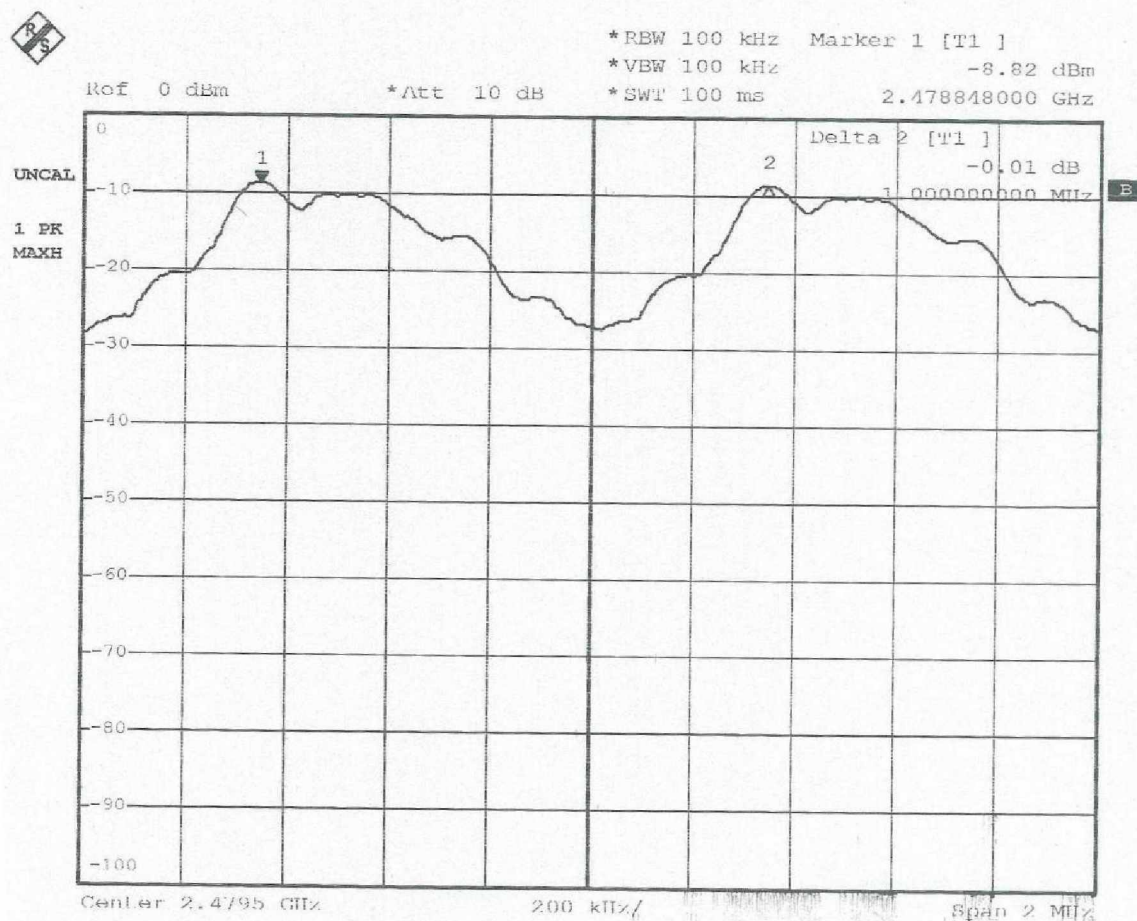
CH39:





TEST REPORT

CH78:



 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:12 of 49 Issued Date: Apr. 14, 2005
---	----------------------	---

4.2 20dB Bandwidth

4.2.1 LIMIT

FREQUENCY Range (MHz)	Limit(kHz)				
	Quantity of Hopping Channel	50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

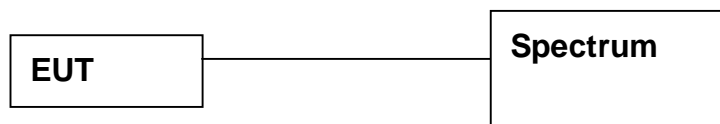
4.2.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2005 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 Ω RF cable.

4.2.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.
 Printed out the test result from the spectrum by hard copy function.

4.2.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.



**Spectrum Research &
Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:C05041401
Report No.:FCCC05022505-01
FCC ID:GX5-CB2470
Page:13 of 49
Issued Date: Apr. 14, 2005

4.2.6 TEST RESULT

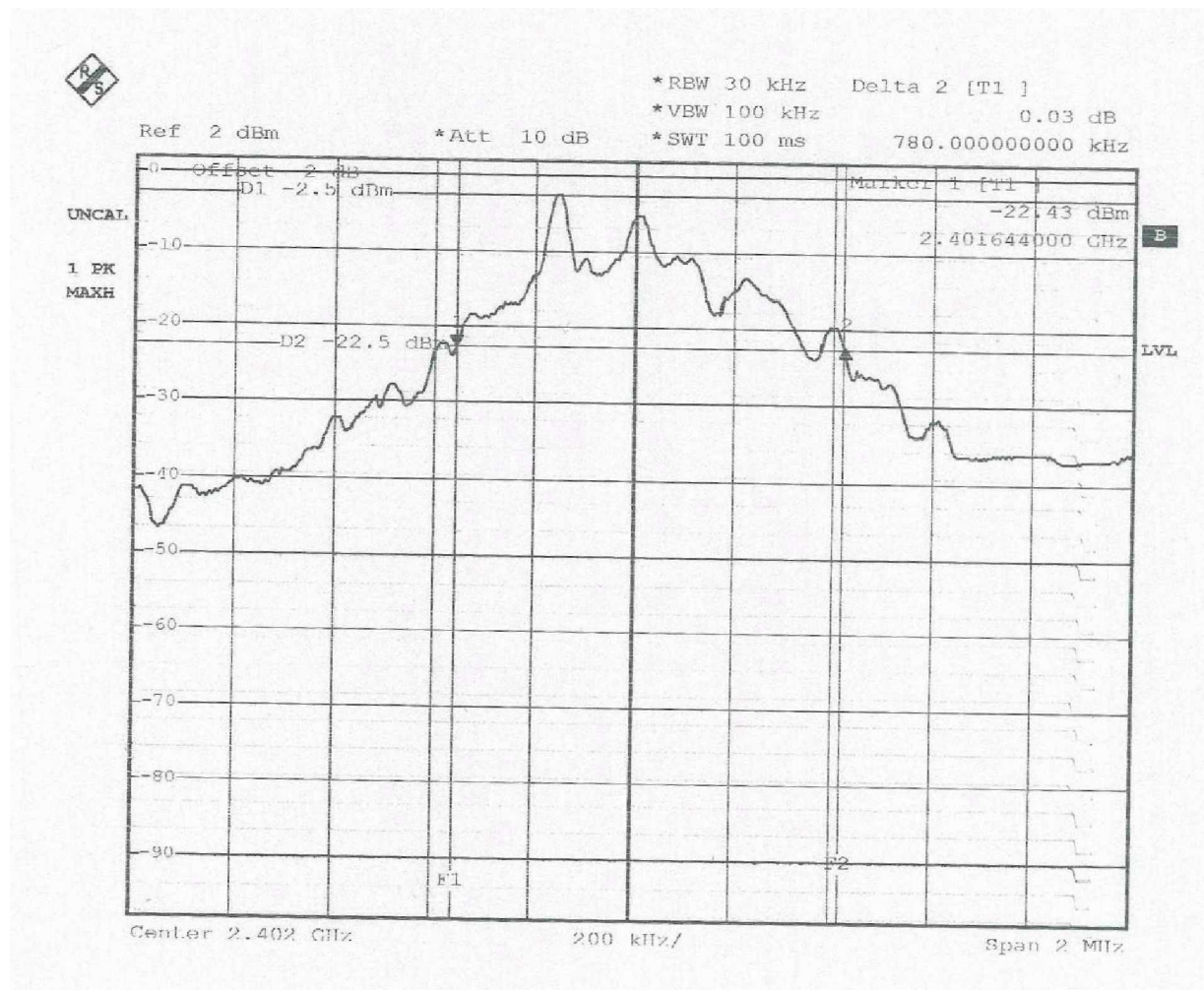
Temperature:	20°C	Humidity:	56%RH
Spectrum Detector:	PK	Tested by:	Hugo Yeh
Test Result:	PASS	Tested Date:	Mar. 10, 2005

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	20dB DOWN BW (kHz)
0	2402	780
39	2441	804
78	2480	804



TEST REPORT

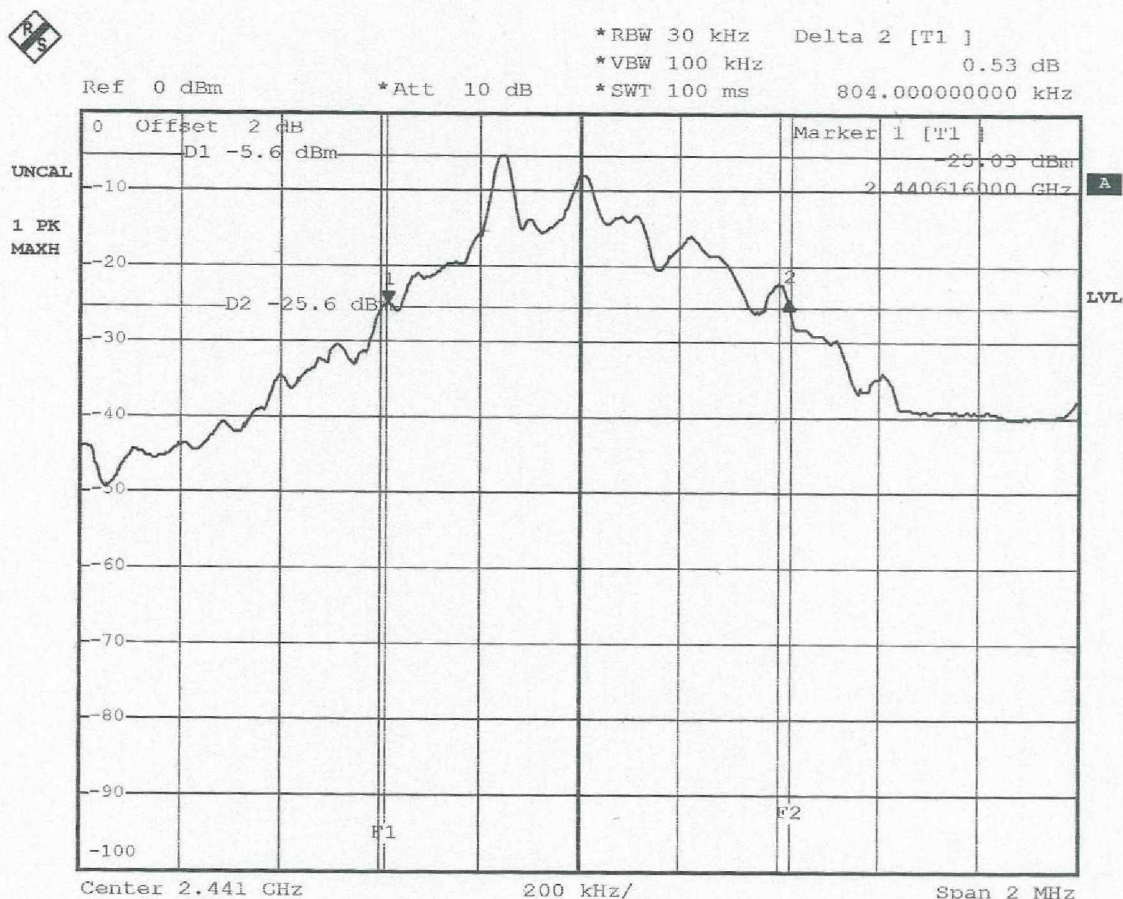
CH0:





TEST REPORT

Ch39:



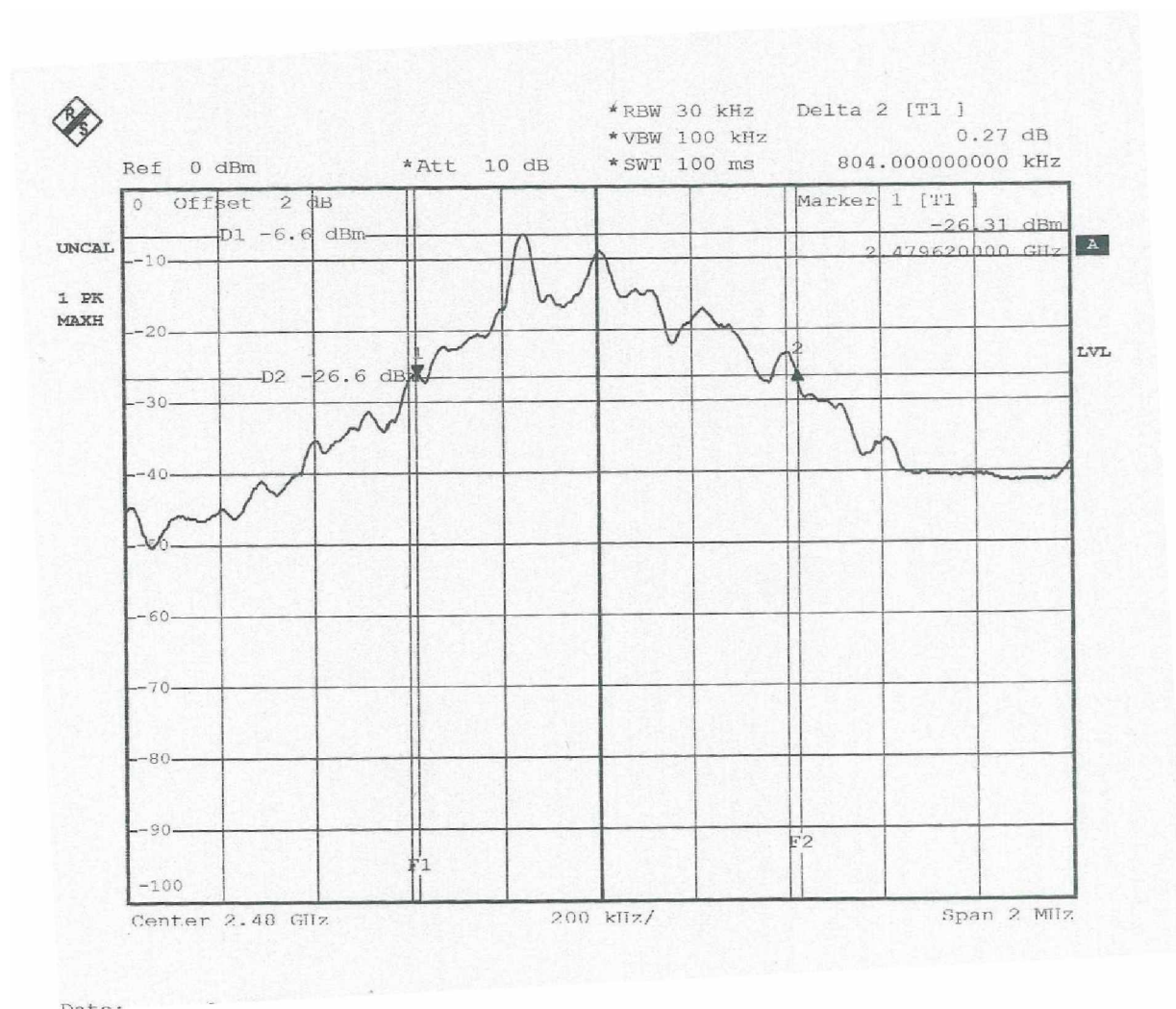


Spectrum Research & Testing Lab., Inc.
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:C05041401
Report No.:FCCC05022505-01
FCC ID:GX5-CB2470
Page:16 of 49
Issued Date: Apr. 14, 2005

CH78:



 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:17 of 49 Issued Date: Apr. 14, 2005
---	----------------------	---

4.3 QUANTITY OF HOPPING CHANNEL TEST

4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247.

FREQUENCY RANGE (MHz)	Limit (Quantity of Hopping Channel)			
	20dB bandwidth <250kHz	20dB bandwidth >250kHz	20dB bandwidth <1MHz	20dB bandwidth >1MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	75	15
5725-5850	N/A	N/A	75	N/A

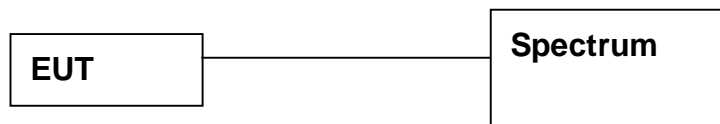
4.3.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2005 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 Ω RF cable.

4.3.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

4.3.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.



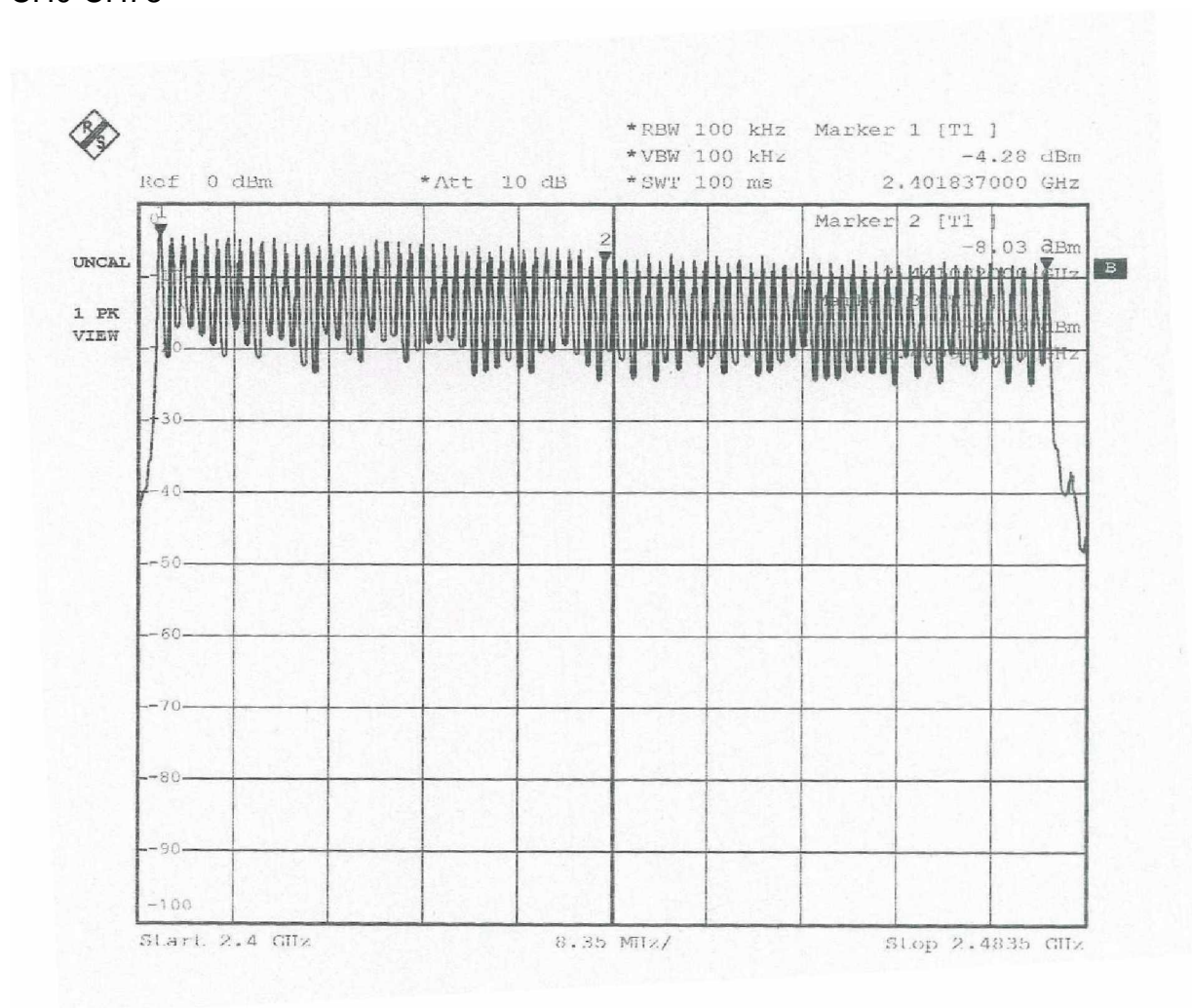
TEST REPORT

4.3.6 TEST RESULT

Temperature:	20°C	Humidity:	56%RH
Spectrum Detector:	PK	Tested by:	Hugo Yeh
Test Result:	PASS	Tested Date:	Mar. 09, 2005

HOPPING CHANNEL FREQUENCY RANGE	QUANTITY OF HOPPING CHANNEL READ VALUE	QUANTITY OF HOPPING CHANNEL LIMIT
2402~2480	79	75

CH0-CH78



 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:19 of 49 Issued Date: Apr. 14, 2005
---	----------------------	---

4.4 Time of occupancy (Dwell Time)

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247.

FREQUENCY RANGE (MHz)	LIMIT (ms)		
	20dB bandwidth <250kHz(50Channel)	20dB bandwidth >250kHz(25Channel)	20dB bandwidth <1MHz(75Channel)
902-928	400(20s)	400(10s)	NA
2400-2483.5	NA	NA	400(30s)
5725-5850	NA	NA	400(30s)

NOTE: The “()” is all channel’s average time of occupancy.

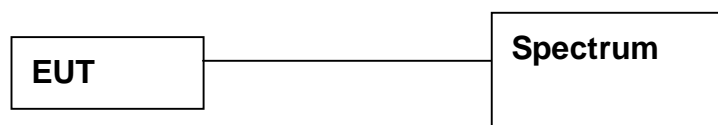
4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2005 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.4.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.
 Printed out the test result from the spectrum by hard copy function.

4.4.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	<h1>TEST REPORT</h1>	Reference No.:C05041401 Report No.:FCCC05022505-01 FCC ID:GX5-CB2470 Page:20 of 49 Issued Date: Apr. 14, 2005
---	----------------------	---

4.4.6 TEST RESULT

Temperature:	20°C	Humidity:	56%RH
Spectrum Detector:	PK	Tested by:	Hugo Yeh
Test Result:	PASS	Tested Date:	Mar. 09, 2005

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	Pulse Time (μs)	Burts (in 1 sec.)	Time of occupancy (Dwell Time) (ms)	Average time of occupancy LIMIT (ms)
0	2402.00	107.5	10	32.25	400
39	2441.00	108	10	32.40	400
78	2480.00	108	10	32.40	400

Note:
Dwell Time:

Pulse Time*Burts*0.4*79