

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

for

INTENTIONAL RADIATOR

434MHz WIRELESS REMOTE CONTROLLER TRANSCEIVER

MODEL NO: L-520BFA

FCC ID NO: NJQ520BFA

REPORT NO: 01E9251

ISSUE DATE: March 26, 2001

Prepared for
WINTECRONICS CO., LTD.
2F, NO.7-1, MING LEE STREET,
CHUNG HO CITY, TAIPEI ,
TAIWAN, R. O. C.

Prepared by
COMPLIANCE ENGINE ERING SERVICES, INC.
NO. 199, CHUNG SHENG ROAD,
HSIN TIEN CITY, TAIPEI,
TAIWAN, R. O. C.

d.b.a.
COMPLIANCE CERTIFICATION SERVICES



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TEST DATA

- Emission Bandwidth Plot
- Radiated Emission for Transmitter Mode
- Radiated Emission for Receiver Mode

1. VERIFICATION OF COMPLIANCE

COMPANY NAME: WINTECRONICS CO., LTD.
2F, NO.7-1, MING LEE STREET, CHUNG HO CITY,
TAIPEI, TAIWAN, R. O. C.

CONTACT PERSON: RAY HO / ENGINEER

TELEPHONE NO.: (02) 2249-6046

EUT DESCRIPTION: 434MHz WIRELESS REMOTE CONTROLLER TRANSCEIVER

MODEL NAME/NUMBER: L-520BFA

FCC ID: NJQ520BFA

DATE TESTED: MARCH 13, 2001

REPORT NUMBER: 01E9251

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	434MHz WIRELESS REMOTE CONTROLLER TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI C63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning :** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Engineering Services, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Engineering Services, Inc. will constitute fraud and shall nullify the document.



RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

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COMPLIANCE ENGINEERING SERVICES, INC. TEL: (02)2217-0894 FAX: (02)2217-1254
NO. 199, CHUNG SHENG ROAD, HSIN TIEN CITY, TAIPEI, TAIWAN, R. O. C.

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2. Product Description

Fundamental Frequency	434 MHz
Power Source	DC 5V
Transmitting Time	Periodic ≤ 5 seconds
Associated Transceiver	FCC ID: NJQ500HAF

3. Test Facility

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4. Measurement Standards

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

5. Test Methodology

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

6. Measurement Equipment Used

Manufacturer	Model Number	Description	Cal Due Date
H.P.	8566B	Spectrum Analyzer (100Hz – 22GHz)	12/2001
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	01/2002
EMCO	3115	Antenna (1-18GHz)	09/2001
EMCO	3142	Antenna (30-2000MHz)	06/2001
T.E.C.	PA-102	Amplifier(30-2000MHz)	05/2001
MITEQ	NSP2600-44	Amplifier(1-26GHz)	12/2001

7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 KHZ TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231
Receiver Mode	SECTION 15.109

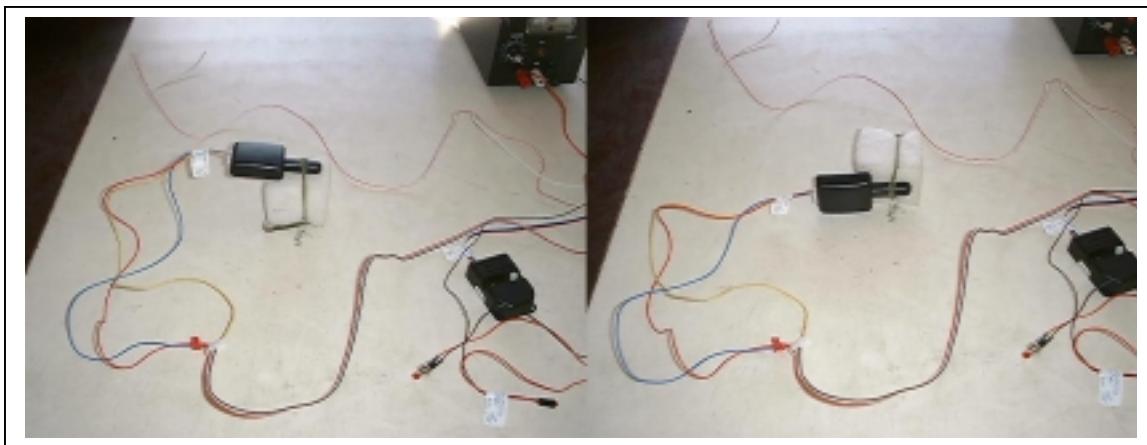
PAGE NO: 3

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NO. 199, CHUNG SHENG ROAD, HSIN TIEN CITY, TAIPEI, TAIWAN, R. O. C.

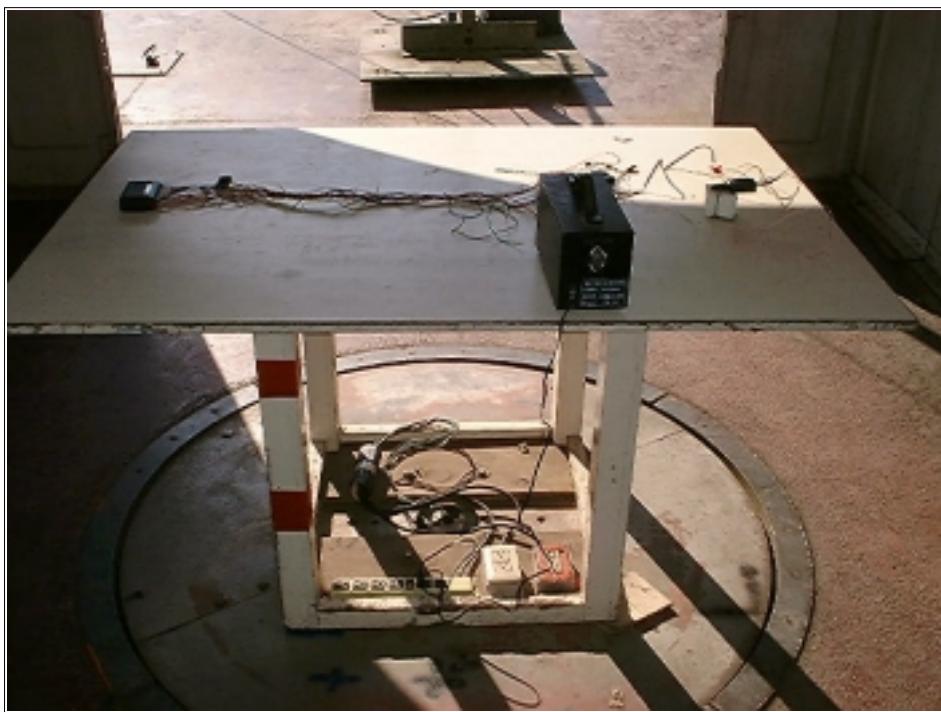
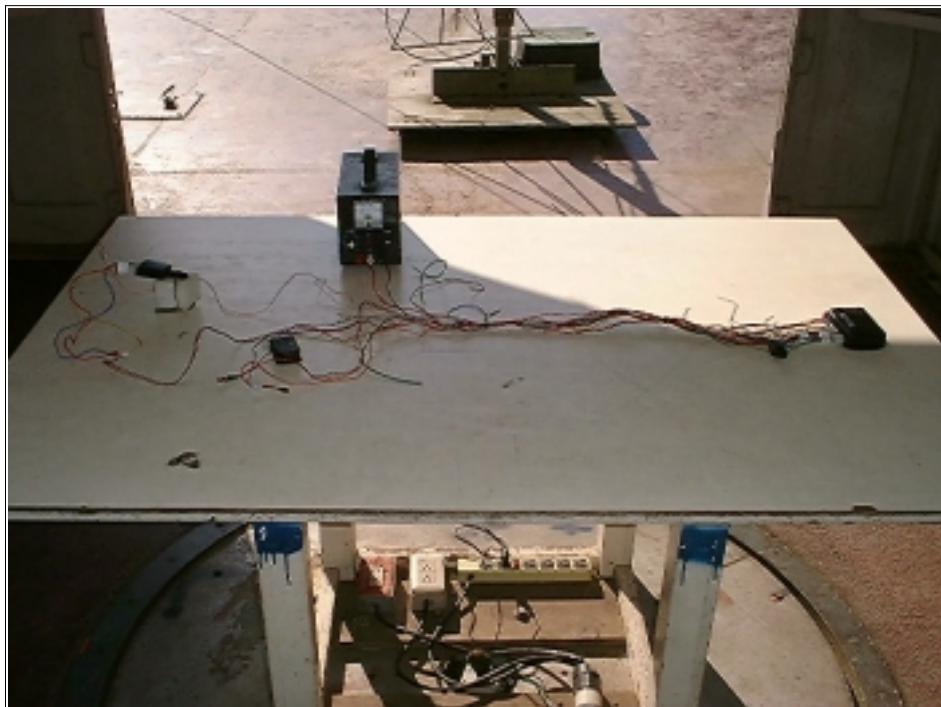
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9 . SYSTEM TEST CONFIGURATION

Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



Radiated Open Site Test Set-up (Transmitter Mode)



Radiated Open Site Test Set-up (Receiver Mode)

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10. Test Procedure
Radiated Emissions, 15.231(4)(b)

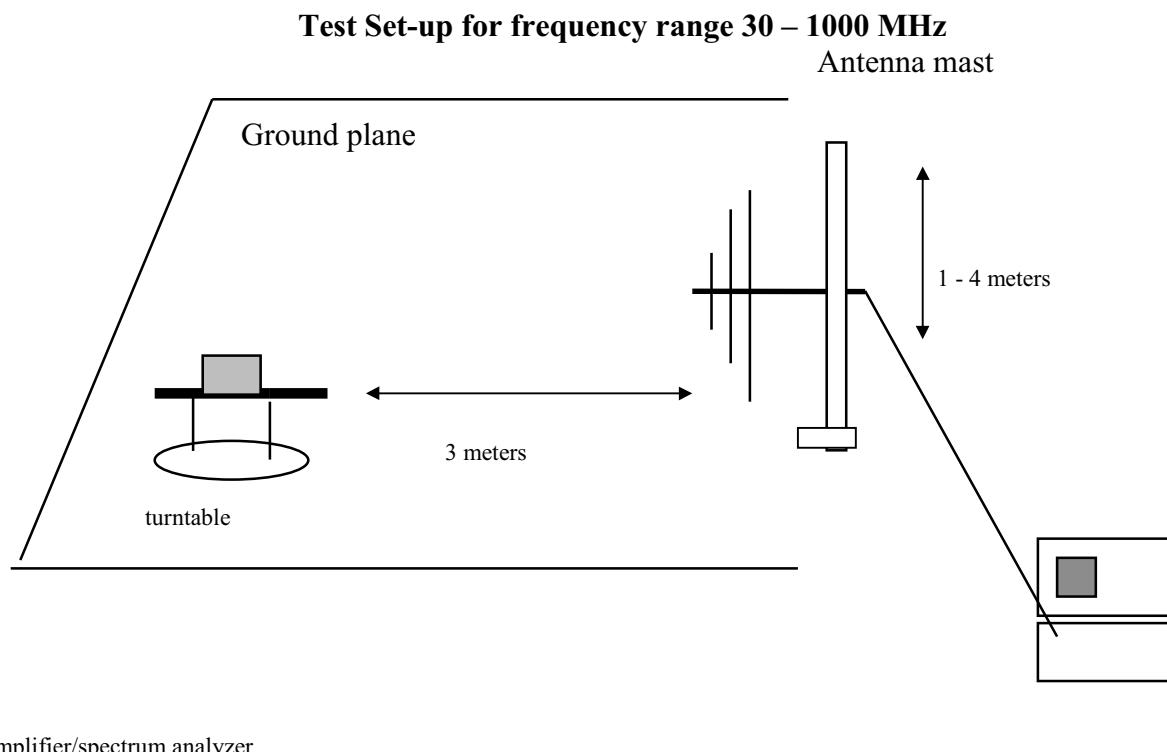


Fig. 1

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test set-up for measurements above 1GHz

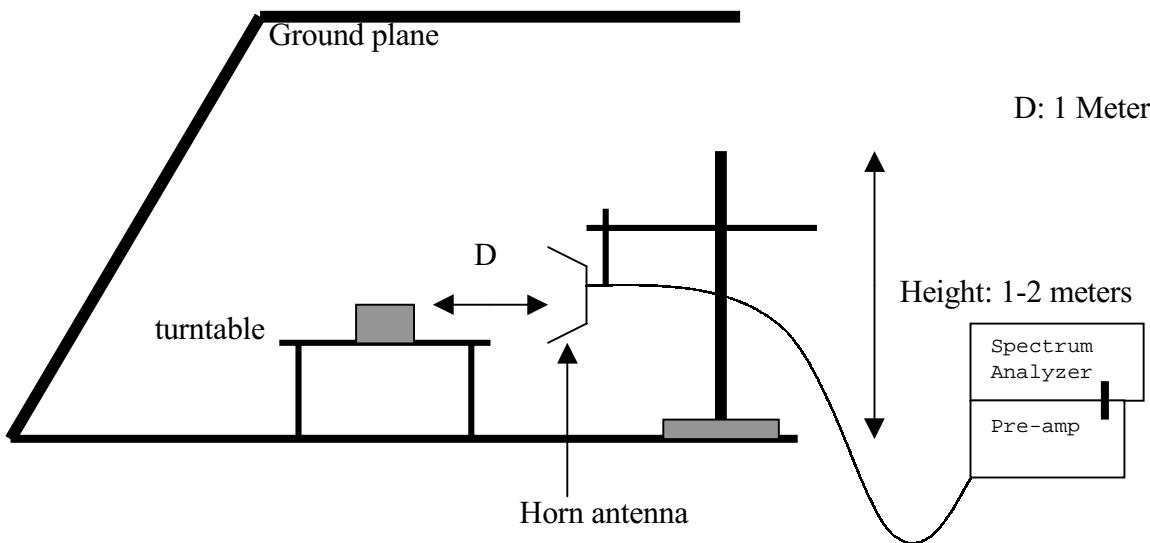


FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

11. Equipment Modifications

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

NONE

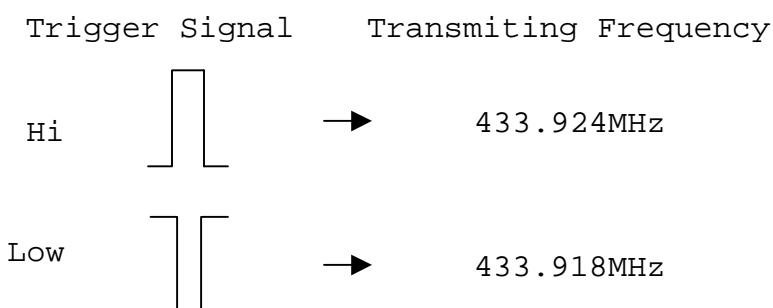
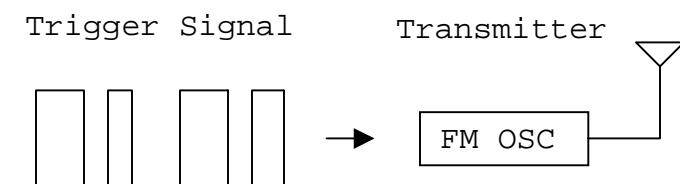
12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	
		SECTION 15.109	X

12.1 Maximum Modulation Percentage (M%)

CALCULATION: No duty cycle.

Note: Following is the diagram to show the modulation method of the EUT.



This EUT works as a FM modulation. Signal HI will trigger FM OSC to generate a 433.924MHz frequency and signal LOW will trigger FM OSC to generate a 433.918 MHz frequency. It is only 0.006MHz deviation, so that there is no duty cycle on it.

12.2 The Emissions Bandwidth

The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
434 MHz	264.4 kHz < (refer to plot)	434X0.25% = 1085 kHz



Date 26.Mar.'04

TRG

Ref.Lv1 Delta

-0.28 dB
264.4 kHz

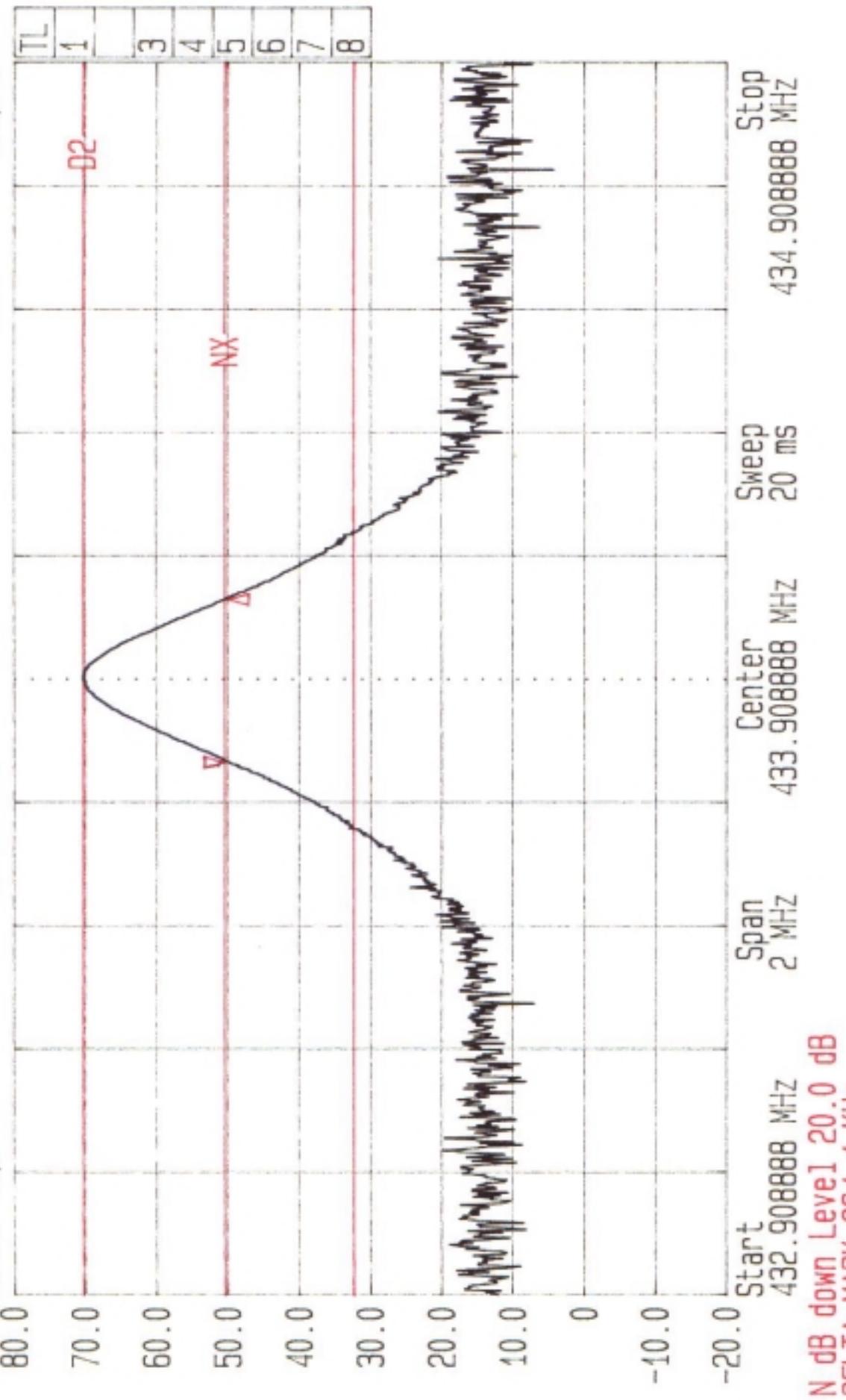
Res.BW
T6.Lv1
CF.Stp

120 kHz [imp]
off

10 dB
[dB μ V]

200.000 kHz
RF.Att
Unit

300 kHz



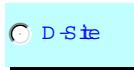


FCC, VCCI, CISPR, CE, AUSTEL, NZUL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road
Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 01E9251
Report #: 9251D1
Date & Time: 3/13/2001
Test Engr: VINCE CHIANG

Company:	WINTECRONICS CO., LTD.
EUT Description:	L-520BFA (434MHz Transceiver)
Test Configuration :	EUT /DC POWER
Type of Test:	FCC 15.231(b)
Mode of Operation:	Transmitter Mode



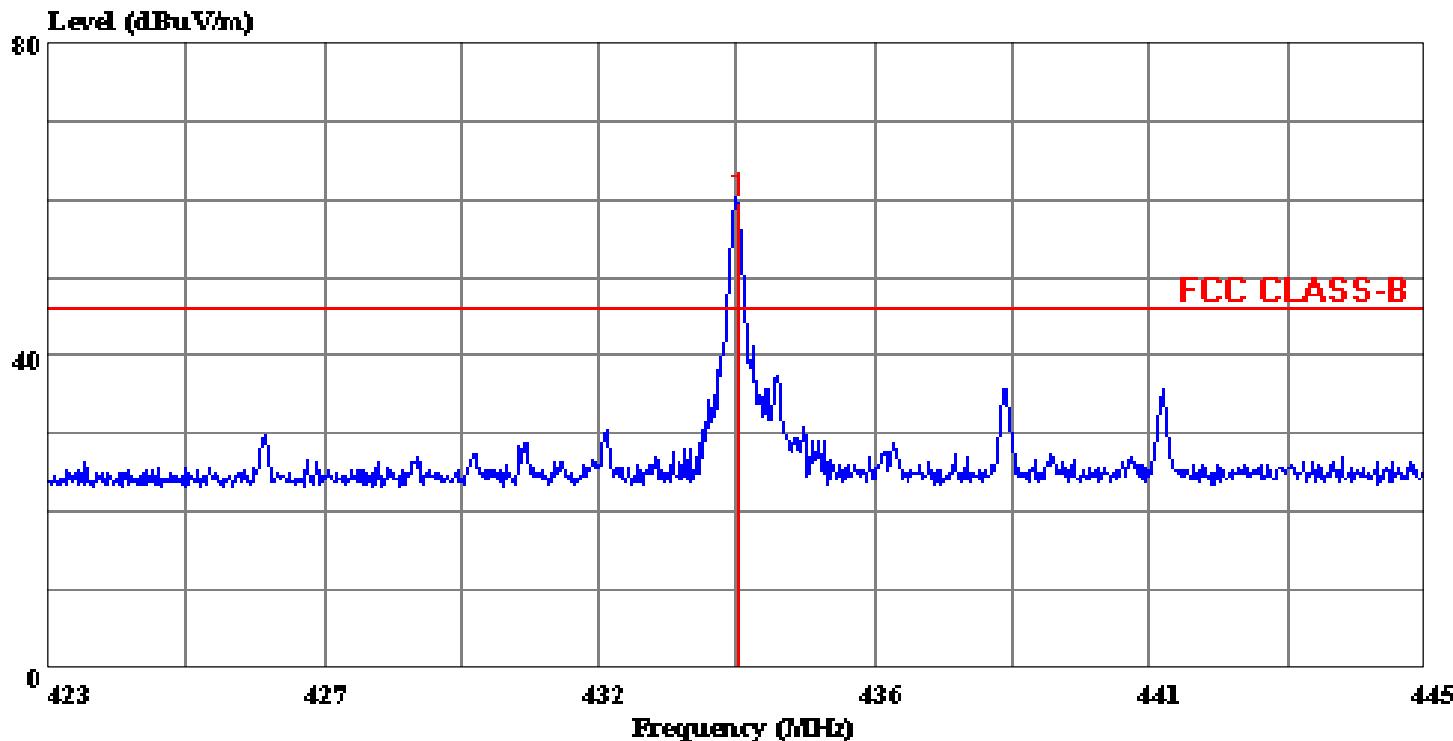
$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 100\%$$

$$\text{Av Reading} = \text{Pk Reading} + 20 * \log(M\%)$$

$$20^* \log(M\%) = 0$$

Data#: 13 File#: 9251f.emi

Date: 2001-03-13 Time: 16:16:09



(CCS E-Site)

Trace: 11

Ref Trace:

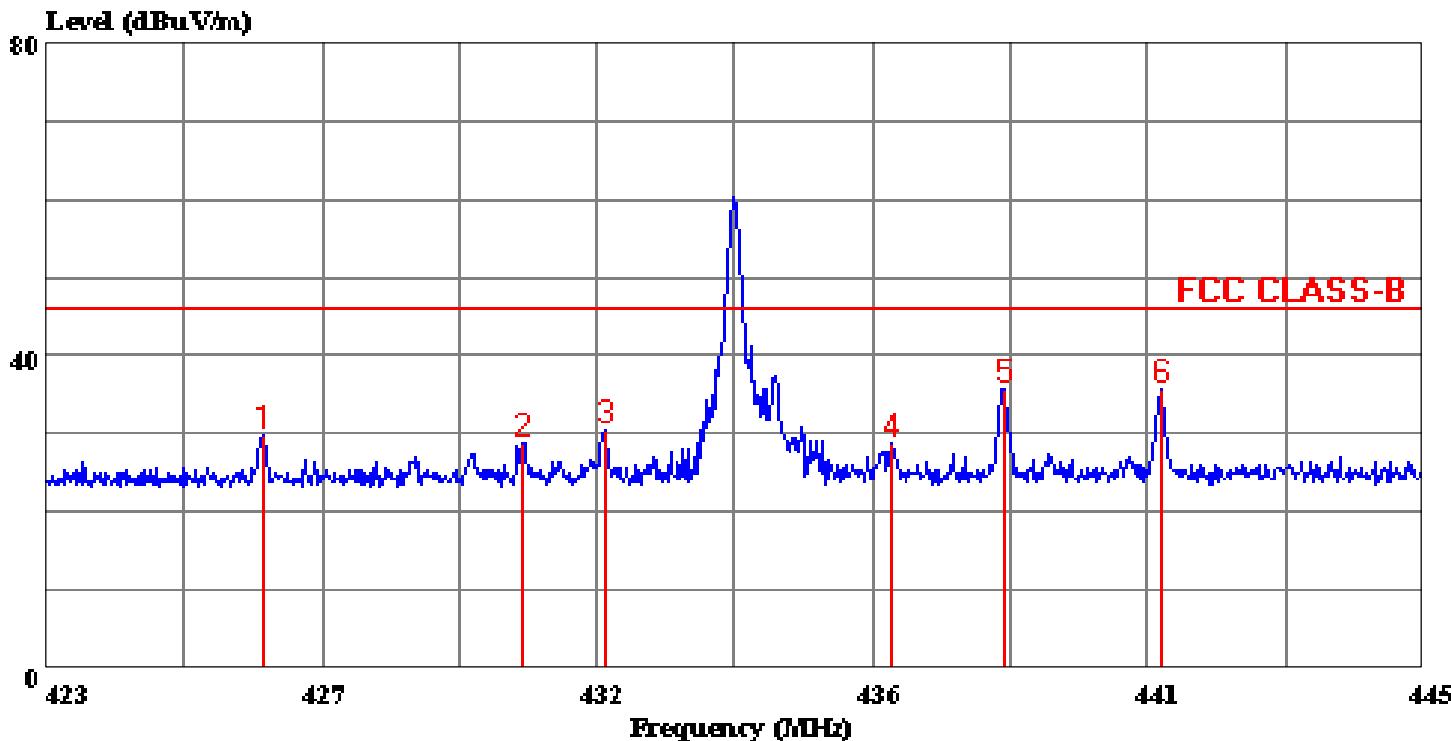
Condition: VERTICAL
 Report No. : 01E9251
 Test Engr. : VINCE CHIANG
 Company : WINTECRONICS CO., LTD.
 EUT : L-520BFA
 Test Config : EUT/DC POWER/TX
 Type of Test: FCC 15.109
 Mode of Op. : Receiver Mode

Page: 1

Freq	Read Level
MHz	dBuV
1 * 434.022	65.90

Data#: 15 File#: 9251f.emi

Date: 2001-03-13 Time: 16:19:54



(CCS E-Site)

Trace: 11

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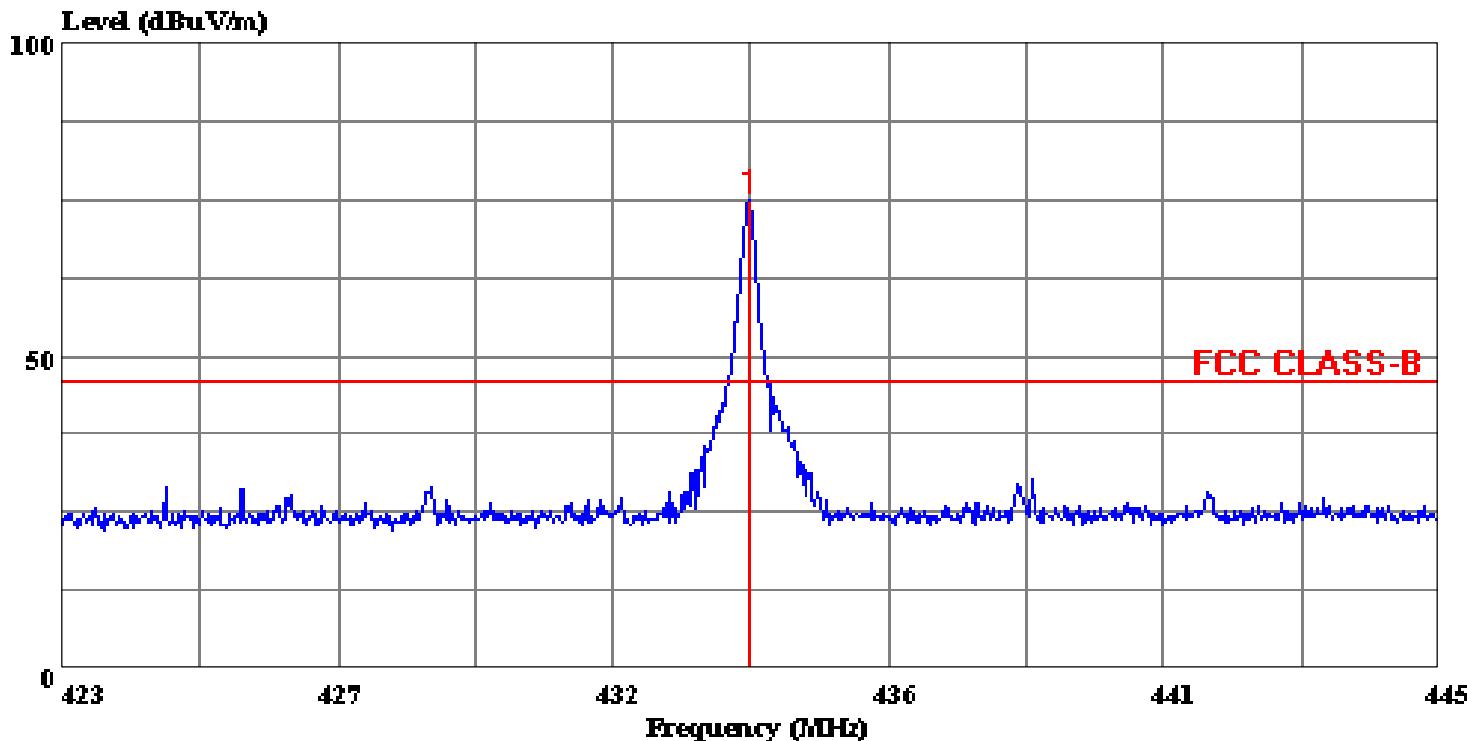
Condition: VERTICAL
 Report No. : 01E9251
 Test Engr. : VINCE CHIANG
 Company : WINTECRONICS CO., LTD.
 EUT : L-520BFA
 Test Config : EUT/DC POWER/TX
 Type of Test: FCC 15.109
 Mode of Op. : Receiver Mode

Page: 1

Freq	Read	Probe	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor			
MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB
1 426.476	36.40	17.14	3.47	27.22	29.79	46.00	-16.21 Peak
2 430.612	35.30	17.23	3.50	27.18	28.85	46.00	-17.15 Peak
3 431.910	36.80	17.26	3.50	27.17	30.40	46.00	-15.60 Peak
4 436.508	34.90	17.36	3.53	27.13	28.67	46.00	-17.33 Peak
5 438.290	41.90	17.40	3.55	27.11	35.74	46.00	-10.26 Peak
6 440.820	41.90	17.46	3.56	27.09	35.83	46.00	-10.17 Peak

Data#: 14 File#: 9251f.emi

Date: 2001-03-13 Time: 16:17:08



(CCS E-Site)

Trace: 12

Ref Trace:

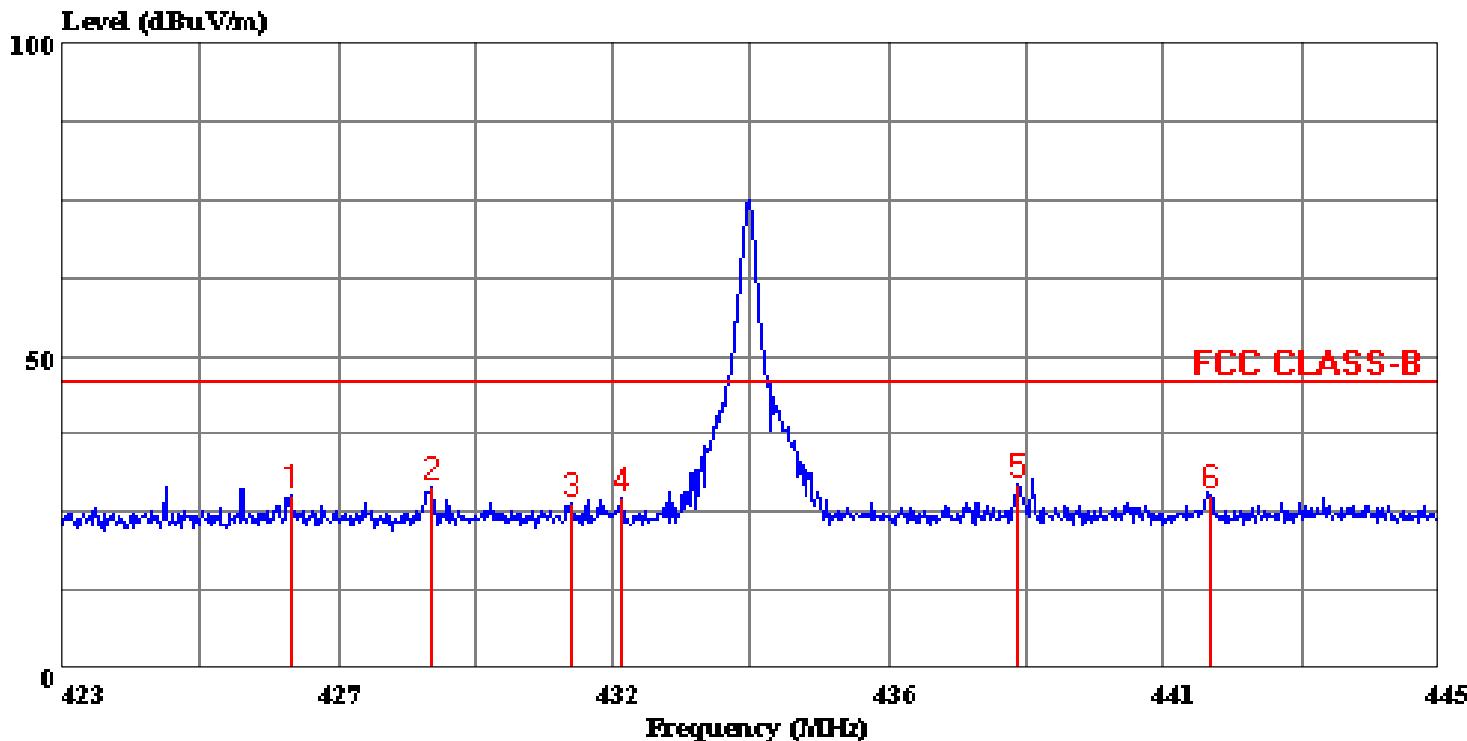
Condition: HORIZONTAL
 Report No. : 01E9251
 Test Engr. : VINCE CHIANG
 Company : WINTECRONICS CO., LTD.
 EUT : L-520BFA
 Test Config : EUT/DC POWER/TX
 Type of Test: FCC 15.109
 Mode of Op. : Receiver Mode

Page: 1

Freq	Read Level
MHz	dBuV
1 * 433.956	81.20

Data#: 16 File#: 9251f.emi

Date: 2001-03-13 Time: 16:21:30



(CCS E-Site)

Trace: 12

Ref Trace:

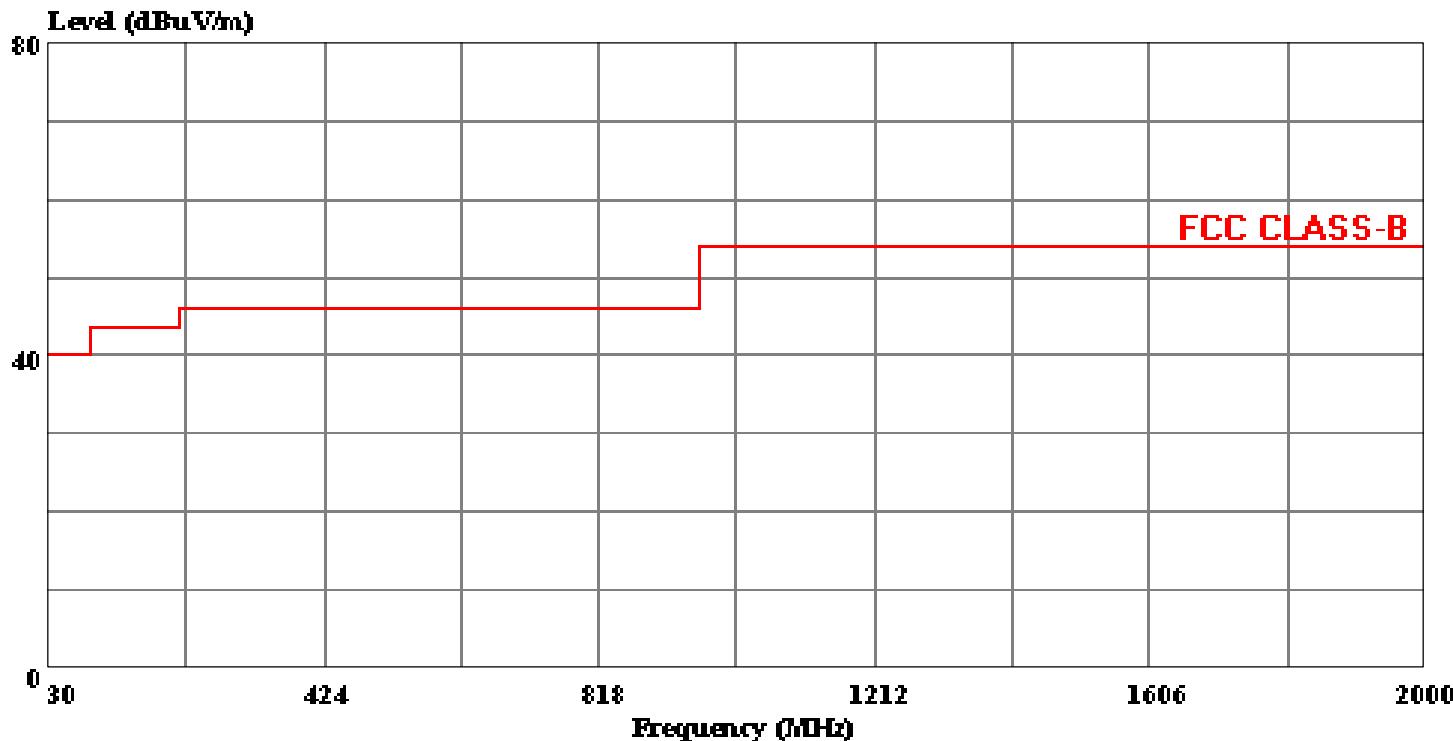
Condition: HORIZONTAL
 Report No. : 01E9251
 Test Engr. : VINCE CHIANG
 Company : WINTECRONICS CO., LTD.
 EUT : L-520BFA
 Test Config : EUT/DC POWER/TX
 Type of Test: FCC 15.109
 Mode of Op. : Receiver Mode

Page: 1

Freq	Read	Probe	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor			
MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB
1 426.652	34.10	17.15	3.47	27.22	27.50	46.00	-18.50 Peak
2 428.874	35.60	17.20	3.48	27.20	29.08	46.00	-16.92 Peak
3 431.118	32.90	17.24	3.50	27.18	26.47	46.00	-19.53 Peak
4 431.910	33.50	17.26	3.50	27.17	27.10	46.00	-18.90 Peak
5 438.268	35.80	17.40	3.55	27.11	29.64	46.00	-16.36 Peak
6 441.348	33.90	17.47	3.57	27.08	27.85	46.00	-18.15 Peak

Data#: 18 File#: 9251f.emi

Date: 2001-03-13 Time: 16:29:16



(CCS E-Site)

Trace:

Ref Trace:

Report No. : 01E9251
Test Engr. : VINCE CHIANG
Company : WINTECRONICS CO., LTD.
EUT : L-520BFA
Test Config : EUT/DC POWER/TX
Type of Test: FCC 15.109
Mode of Op. : Receiver Mode
: No other emissions were found within
: 20dB below the limits from 30-2000MHz.