

# F C C - TEST REPORT

REPORT NO.: 49848

**FCC – Test Report****No. 49848**Date: 2008-03-05

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**FCC listed testlab**  
**acc. to Section 2.948 of the FCC - Rules**  
**in compliance with the requirements of**  
**ANSI C63.4 - 2003**

**Product** : USB FM Mini Transmitter

**Product Class** : - Low Power Communication Device Transmitter  
- Class B Computing Device Peripheral

**Brand Name** : -

**Model** : HC-828

**Applicant** : UNION GAIN INDUSTRIAL LIMITED

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## LABORATORY - REPORT

**APPLICANT:** UNION GAIN INDUSTRIAL LIMITED  
**ADDRESS:** Flat H, 14/F., Tsun Win Factory Building  
 60 Tsun Yip Street  
 Kwun Tong, Kowloon  
 Hong Kong

**DATE OF SAMPLE RECEIVED:** 2008-01-30

**DATE OF TESTING:** 2008-02-28 to 2008-03-05

**DESCRIPTION OF SAMPLE:**

**Product:** USB FM Mini Transmitter  
 (Frequency setting : 88.5 MHz, 88.7 MHz, 88.9 MHz, 107.5 MHz,  
 107.7 MHz, 107.9 MHz)

**Product class:** - Low Power Communication Device Transmitter  
 - Class B Computing Device Peripheral

**Model number:** HC-828

**Rating:** DC via USB socket of host computer

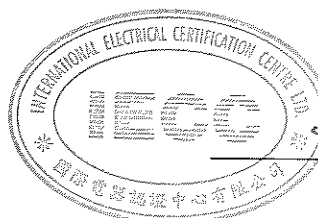
**CONDITION OF TEST SAMPLE:** The received sample was under good condition.

**INVESTIGATIONS REQUESTED:**

- For FM Transmitter :  
Measurements to the relevant clauses of F.C.C. Rules and Regulations  
Part 15 Subpart C – Intentional Radiators
- For Class B Computing Device Peripheral :  
Measurements to the relevant clauses of F.C.C. Rules and Regulations  
Part 15 Subpart B – ‘Unintentional Radiators’

**RESULTS:** See the attached sheets.

**CONCLUSIONS:** From the measurement data obtained, the tested sample was considered to have COMPLIED with the requirements for the relevant clauses of Federal Communications Commission Rules as specified above.



Stephen C. N. Wong

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### Test Location

International Electrical Certification Centre Ltd.  
Unit 602-605, 31 Lok Yip Road, On Lok Tsuen, Fanling, N.T., Hong Kong  
Tel : +852 23052570  
Fax : +852 27564480  
Email : info@iecc.com.hk

### Summary of Test Results

#### Radiated Emission:

Test result: O.K.  
Test data: See attached data sheet

#### Conducted Emission:

Test result: O.K.  
Test data: See attached data sheet

#### Measurement of Emissions within Band Edges

Test result: O.K.  
Test data: See attached data sheet

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## TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Date
Test Receiver	Rohde & Schwarz	ESCS 30	100388	12/4/2007	11/4/2008
Test Receiver	Rohde & Schwarz	ESHS 30	839667/002	2/11/2007	1/11/2008
Artificial Mains Network (LISN)	Schwarzbeck	NSLK 8127	8127312	2/11/2007	1/11/2008
Antenna	Schaffner	CBL6111C	2791	25/05/2005	24/05/2008
Antenna Mast System	Schwarzbeck	AM9104	--	--	--
Turntable with Controller	Drehtisch	DT312	--	--	--

## TEST SUPPORT UNITS

The sample was tested with PC system :

Equipment	Manufacturer	Model	Serial No.
NoteBook	DELL	PP10S	H8893 A02 FCC ID : E2K24BNHM
Ethernet router	NetScreen Technologies, Inc.	NS-5GT-103	0064022004002202
Speakers	--	--	--

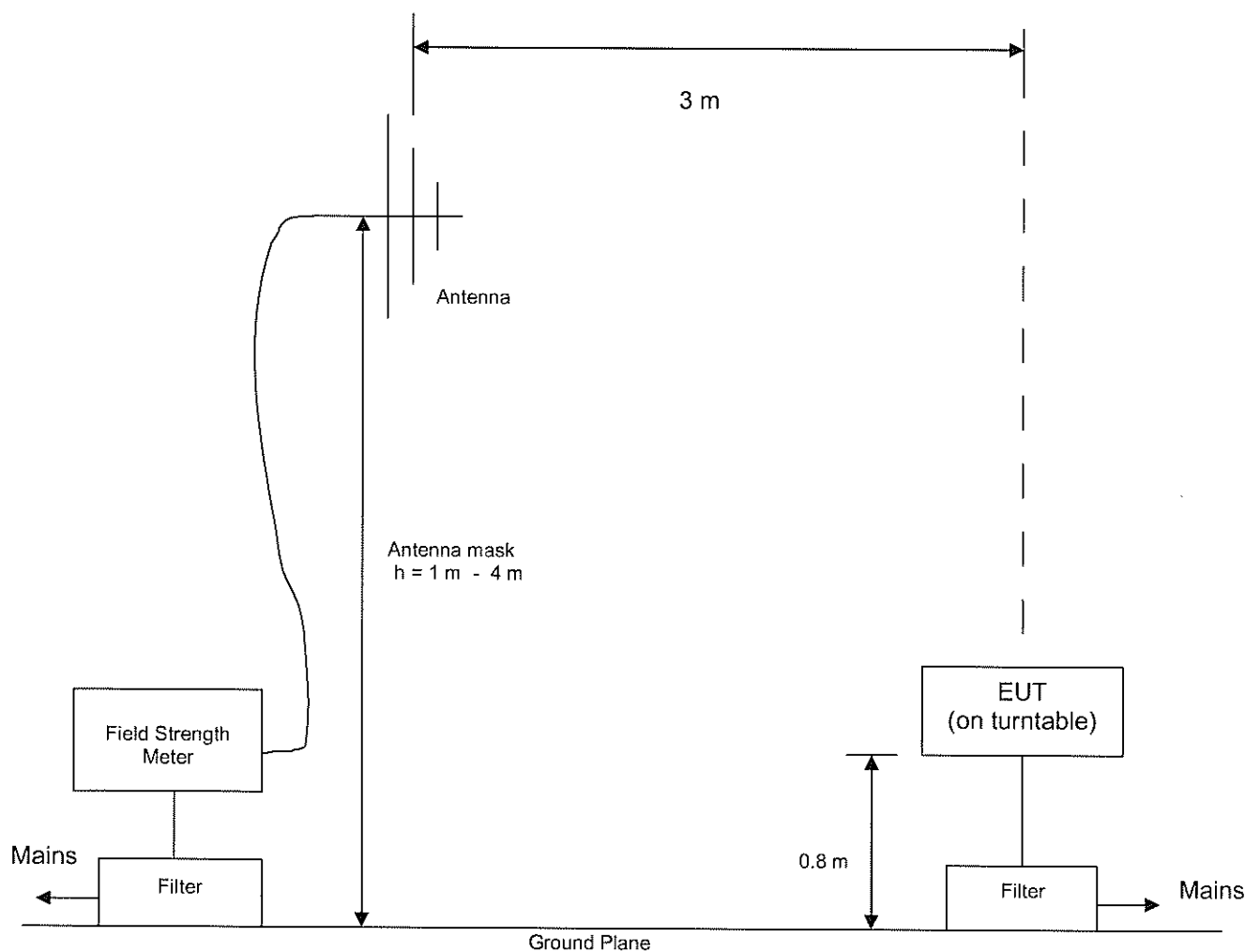
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## Radiated Emission Test Setup (3 m distance) (&gt; 30MHz)



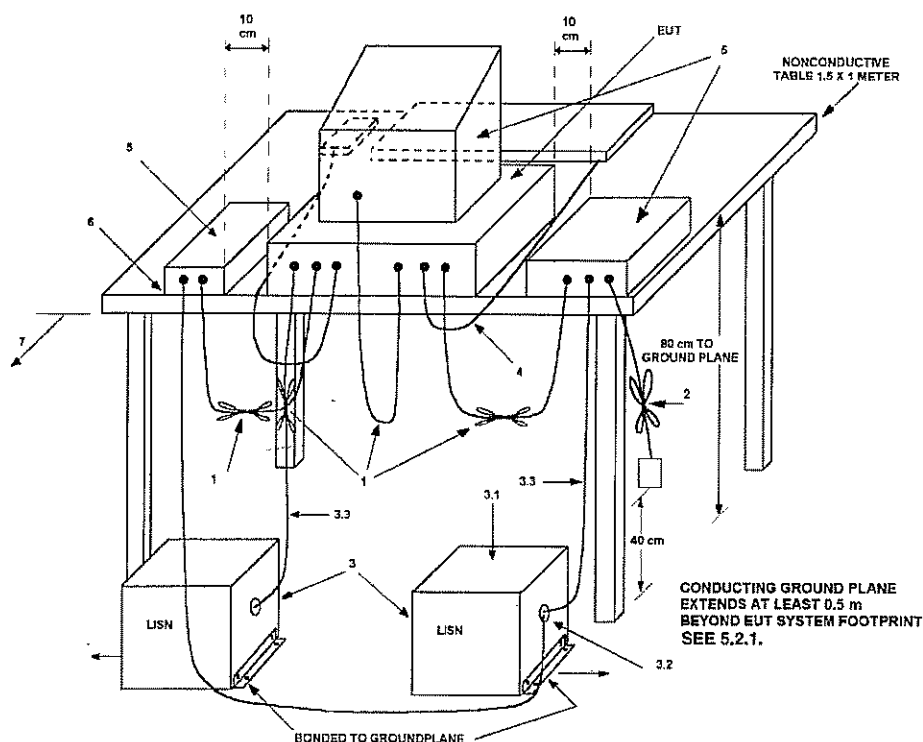
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### Conducted Emission Test Setup



#### LEGEND:

- 1) Interconnecting cables that hang closer than 40 cm to the groundplane shall be folded back and forth in the center forming a bundle 30 to 40 cm long (see 6.1.4 and 11.2.4).
- 2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see 6.1.4).
- 3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference groundplane (see 5.2.3 and 7.2.1).
  - 3.1) All other equipment powered from additional LISN(s).
  - 3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
  - 3.3) LISN at least 80 cm from nearest part of EUT chassis.
- 4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use (See 6.2.1.3 and 11.2.4).
- 5) Non-EUT components of EUT system being tested (see also Figure 13).
- 6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (see 6.2.1.1 and 6.2.1.2).
- 7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the groundplane (see 5.2.2 for options).



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**Test Procedure****Radiated Emission :**

The EUT was tested according to ANSI 63.4-2003 for the requirements of FCC Part 15 Subpart C Section 15.209 and 15.239 for FM transmission mode, and FCC Part 15 Subject B Section 15.109 for Class B Computing Device Peripheral operation.

During the test, the sample was placed on a turn table and operated with supply at rated DC voltage via the USB socket of the host computer. The computer system included a notebook computer, a pair of external speakers and an ethernet router. The table is 0.8 meter above the reference ground plane on the Open Area Test Site and can rotate 360 degrees to determine the position of the maximum emission level. A broad-band antenna for the frequency range 30 - 1000 MHz, connected with 10 meters coaxial cable to the test receiver was used for measurement. The antenna is capable of measuring both horizontal and vertical polarizations. The antenna was raised from 1 to 4 meters to find out the maximum emission level from the EUT.

During the test, the reference computer was playing a MP3 song at maximum volume. The signal was transmitted via the test sample at the selected test frequency.

An initial pre-scan was performed to find out the maximum emission level of the sample placed at 3 orthogonal planes. Final measurement (30 MHz –1000 MHz) was then performed to record the data for the emissions under worst-case condition for combination of the antenna orientation / height and turn table position.

Note : The Open Area Test Site located at IECC was placed on file with the FCC Pursuant to Section 2.948 of the FCC Rules (FCC Registration No. : 97774).

**Conducted Emission :**

The EUT was tested according to ANSI 63.4-2003 for the requirements of FCC Part 15 Subpart C Section 15.207 for FM transmission mode, and FCC Part 15 Subject B Section 15.107 for Class B Computing Device Peripheral operation.

During the test, the sample was placed on a wooden table and operated with supply at rated DC voltage via the USB socket of the host computer. The computer system included a notebook computer, a pair of external speakers and an ethernet router. The table is 0.8 meter above the floor. The reference computer was connected to the LISN which was connected to the test receiver for conducted emission measurement (150kHz – 30MHz).

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## Test Results

### Radiated Emission :

#### (1) For FM Transmission mode :

Test Requirement:	FCC Part 15 Subpart C Section 15.209 and 15.239
Test Method:	ANSI C63.4 : 2003
Deviations from Standard Test Method:	Nil
Frequency Range:	30MHz – 1000MHz
Measurement Distance:	3 m
Detector:	Peak / Average (for fundamental frequency) Quasi-Peak (for frequencies outside the operation band)

Refer to page 12- 14 for measurement data.

#### (2) For Class B Computing Device Peripheral operation :

Test Requirement:	FCC Part 15 Subpart B Section 15.109
Test Method:	ANSI C63.4 : 2003
Deviations from Standard Test Method:	Nil
Frequency Range:	30MHz – 1000MHz
Measurement Distance:	3 m
Class:	Class B
Detector:	Quasi-Peak

Refer to page 15 for measurement data

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## Test Result

### Conducted Emission :

Test Requirement: FCC Part 15 Subpart C Section 15.207 for FM transmission mode, and FCC Part 15 Subject B Section 15.107 for Class B Computing Device Peripheral operation.

Test Method: ANSI C63.4 : 2003

Deviations from Standard Test Method: Nil

Frequency Range: 150kHz – 30MHz

Detector: Quasi-Peak / Average

Refer to page 16 - 19 for measurement data.

### Band Edges Plot :

Refer to page 20 - 22.

## Interference Radiation

Date : 2008-03-05

Measurement of Radiated Emissions

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Acc: FCC Part 15 Subpart C (15.239 &amp; 15.209)

IECC Ref: 49848  
 Model: HC-828  
 Applicant: UNION GAIN INDUSTRIAL LIMITED

Test Equipment  
 Receiver: Rohde & Schwarz ESCS 30  
 Antenna: Schaffner CBL6111C

Ser.Nr.: --

Set under test: USB FM Mini Transmitter  
 Connected sets: -  
 Operating mode: Transmitting a MP3 audio song played by the host computer (maximum volume)

Transmission frequency : 88.5 MHz

Peak  
Av.

Frequency (MHz)	Horz. Reading dB(μV)	Vert. Reading dB(μV)	Corr. Factor (dB)	Horiz. Test Result dB(μV/m)	Vert. Test Result dB(μV/m)	Limit dB(μV/m)
88.5	26	24	8.4	34.4	32.4	68.0
88.5	24	22	8.4	32.4	30.4	48.0
30	< 16	< 16	17.6	< 33.6	< 33.6	40.0
100	< 16	< 16	10.1	< 26.1	< 26.1	43.5
177	< 16	< 16	9.0	< 25.0	< 25.0	43.5
265.5	< 16	< 16	13.8	< 29.8	< 29.8	46.0
354	< 16	< 16	15.5	< 31.5	< 31.5	46.0
442.5	< 16	< 16	18.0	< 34.0	< 34.0	46.0
531	< 16	< 16	19.7	< 35.7	< 35.7	46.0
619.5	< 16	< 16	21.6	< 37.6	< 37.6	46.0
708	< 16	< 16	22.8	< 38.8	< 38.8	46.0
796.5	< 16	< 16	24.0	< 40.0	< 40.0	46.0
885	< 16	< 16	25.2	< 41.2	< 41.2	46.0
973.5	< 16	< 16	27.1	< 43.1	< 43.1	54.0
1000	< 16	< 16	27.3	< 43.3	< 43.3	54.0

Note : 1. Unless otherwise indicated, the recorded readings are in quasi-peak values.

2. The above results were the worst case results with the sample inserted directly to the USB socket of the host computer (without extension cable).

3. Due to the transmitted signal is not in pulse waveform, the average value of the radiation at the fundamental frequency is recorded by direct measurement. Calculation from time domain plots is not applicable.

Operator : RT

## Interference Radiation

Date : 2008-03-05

Measurement of Radiated Emissions

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Acc: FCC Part 15 Subpart C (15.239 &amp; 15.209)

IECC Ref: 49848  
 Model: HC-828  
 Applicant: UNION GAIN INDUSTRIAL LIMITED

Test Equipment  
 Receiver: Rohde & Schwarz ESCS 30  
 Antenna: Schaffner CBL6111C

Ser.Nr.: --

Set under test: USB FM Mini Transmitter  
 Connected sets: -  
 Operating mode: Transmitting a MP3 audio song played by the host computer (maximum volume)

Transmission frequency : 88.9 MHz

Peak  
Av.

Frequency (MHz)	Horz. Reading dB(μV)	Vert. Reading dB(μV)	Corr. Factor (dB)	Horiz. Test Result dB(μV/m)	Vert. Test Result dB(μV/m)	Limit dB(μV/m)
88.9	25	35	8.6	33.6	43.6	68.0
88.9	23	32	8.6	31.6	40.6	48.0
30	< 16	< 16	17.6	< 33.6	< 33.6	40.0
100	< 16	< 16	10.1	< 26.1	< 26.1	43.5
177.8	< 16	< 16	8.9	< 24.9	< 24.9	43.5
266.7	< 16	< 16	13.7	< 29.7	< 29.7	46.0
355.6	< 16	< 16	15.6	< 31.6	< 31.6	46.0
444.5	< 16	< 16	18.1	< 34.1	< 34.1	46.0
533.4	< 16	< 16	19.9	< 35.9	< 35.9	46.0
622.3	< 16	< 16	21.8	< 37.8	< 37.8	46.0
711.2	< 16	< 16	22.9	< 38.9	< 38.9	46.0
800.1	< 16	< 16	24.0	< 40.0	< 40.0	46.0
889	< 16	< 16	25.1	< 41.1	< 41.1	46.0
977.9	< 16	< 16	27.0	< 43.0	< 43.0	54.0
1000	< 16	< 16	27.3	< 43.3	< 43.3	54.0

Note : 1. Unless otherwise indicated, the recorded readings are in quasi-peak values.

2. The above results were the worst case results with the sample inserted directly to the USB socket of the host computer (without extension cable).

3. Due to the transmitted signal is not in pulse waveform, the average value of the radiation at the fundamental frequency is recorded by direct measurement. Calculation from time domain plots is not applicable.

Operator : RT

## Interference Radiation

Date : 2008-03-05

Measurement of Radiated Emissions

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Acc: FCC Part 15 Subpart C (15.239 &amp; 15.209)

IECC Ref: 49848  
 Model: HC-828  
 Applicant: UNION GAIN INDUSTRIAL LIMITED

Test Equipment  
 Receiver: Rohde & Schwarz ESCS 30  
 Antenna: Schaffner CBL6111C

Ser.Nr.: --

Set under test: USB FM Mini Transmitter  
 Connected sets: -  
 Operating mode: Transmitting a MP3 audio song played by the host computer (maximum volume)

Transmission frequency : 107.9 MHz

Peak  
Av.

Frequency (MHz)	Horz. Reading dB(μV)	Vert. Reading dB(μV)	Corr. Factor (dB)	Horiz. Test Result dB(μV/m)	Vert. Test Result dB(μV/m)	Limit dB(μV/m)
107.9	32	35	10.5	42.5	45.5	68.0
107.9	30	33	10.5	40.5	43.5	48.0
30	< 16	< 16	17.6	< 33.6	< 33.6	40.0
100	< 16	< 16	10.1	< 26.1	< 26.1	43.5
215.8	< 16	< 16	8.5	< 24.5	< 24.5	43.5
323.7	< 16	< 16	14.5	< 30.5	< 30.5	46.0
431.6	< 16	< 16	17.7	< 33.7	< 33.7	46.0
539.5	< 16	< 16	20.3	< 36.3	< 36.3	46.0
647.4	< 16	< 16	21.7	< 37.7	< 37.7	46.0
755.3	< 16	< 16	24.1	< 40.1	< 40.1	46.0
863.2	< 16	< 16	25.4	< 41.4	< 41.4	46.0
971.1	< 16	< 16	27.1	< 43.1	< 43.1	54.0
1000	< 16	< 16	27.3	< 43.3	< 43.3	54.0

Note : 1. Unless otherwise indicated, the recorded readings are in quasi-peak values.

2. The above results were the worst case results with the sample inserted directly to the USB socket of the host computer (without extension cable).

3. Due to the transmitted signal is not in pulse waveform, the average value of the radiation at the fundamental frequency is recorded by direct measurement. Calculation from time domain plots is not applicable.

Operator : RT

# Interference Radiation

Date : 2008-03-05

Measurement of Radiated Emissions  
Acc: FCC Part 15 Subpart B (15.109)

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IECC Ref: 49848  
Model: HC-828  
Applicant: UNION GAIN INDUSTRIAL LIMITEDTest Equipment  
Receiver: Rohde & Schwarz ESCS 30  
Antenna: Schaffner CBL6111C

Ser.Nr.: --

Set under test: USB FM Mini Transmitter  
Connected sets: -  
Operating mode: Transmitting a MP3 audio song played by the host computer (maximum volume)

Transmission frequency : 88.5MHz / 88.9MHz / 107.9 MHz

Frequency (MHz)	Horz. Reading dB(μV)	Vert. Reading dB(μV)	Corr. Factor (dB)	Horiz. Test Result dB(μV/m)	Vert. Test Result dB(μV/m)	Limit dB(μV/m)
30	< 16	< 16	17.6	< 33.6	< 33.6	40.0
100	< 16	< 16	10.1	< 26.1	< 26.1	43.5
300	< 16	< 16	13.9	< 29.9	< 29.9	43.5
500	< 16	< 16	19.1	< 35.1	< 35.1	46.0
700	< 16	< 16	22.4	< 38.4	< 38.4	46.0
1000	< 16	< 16	27.3	< 43.3	< 43.3	46.0

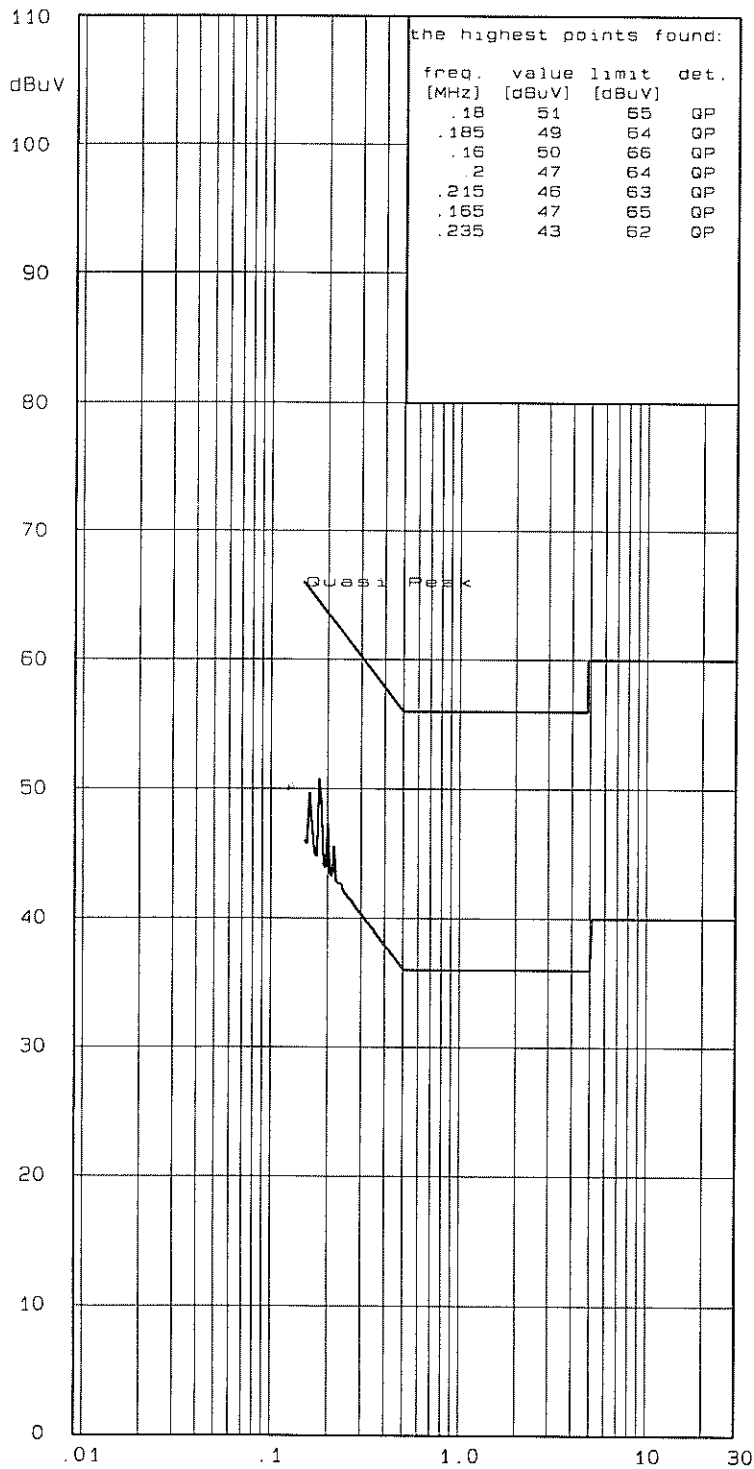
- Note : 1. All recorded readings are in quasi-peak values.  
2. The above results were the worst case results with the sample inserted directly to the USB socket of the host computer (without extension cable).

Operator : RT



# IT 1/2

Interference voltage 150kHz – 30MHz  
Acc. FCC Part 15 Subpart B 15.107 and Subpart C 15.207



Spl./Ser.No.: 01/--

Client : UNION GAIN

Product: USB FM TRANSMITTER

IECC-No.: 49848

Date: 18 FEB 2008

Test equipment:

Rohde & Schwarz ESHS-30

Schwarzbeck NSLK8127

Connected sets:

--

Operating mode:

DATA TRANSFER

(L)

TEST W/ REFERENCE COMPUTER

--

RFI suppression parts:

--

\* two dB safety margin for  
type approval necessary

Operator: KT

Result:

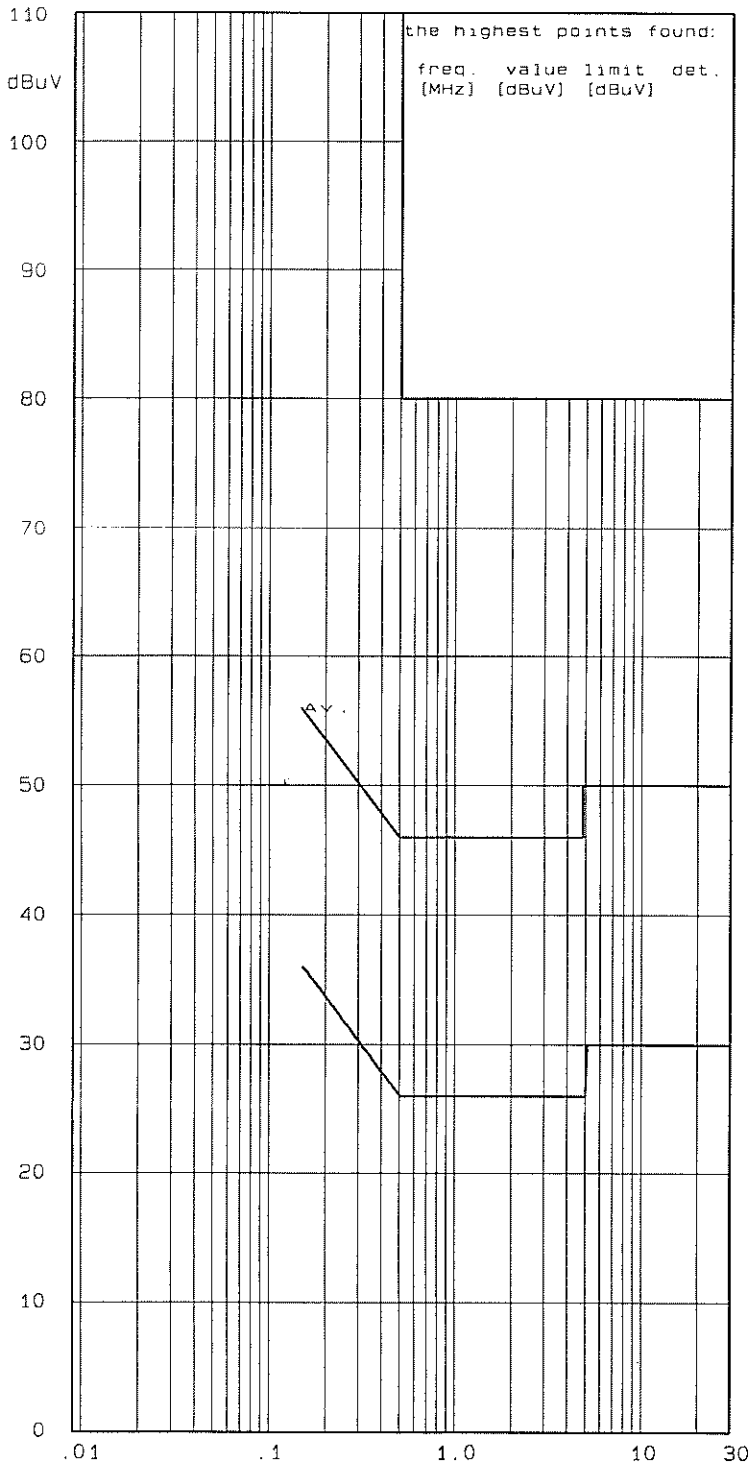
IECC





# IT 1/2

Interference voltage 150kHz – 30MHz  
Acc. FCC Part 15 Subpart B 15.107 and Subpart C 15.207



Spl./Ser.No.: 01/--

Client : UNION GAIN

Product: USB FM TRANSMITTER

IECC-No.: 49848

Date: 18 FEB 2008

Test equipment:

Rohde & Schwarz ESHS-30

Schwarzbeck NSLK8127

Connected sets:

--

Operating mode:

DATA TRANSFER

(L)

TEST W/ REFERENCE COMPUTER

--

RFI suppression parts:

--

\* two dB safety margin for  
type approval necessary

Operator: KT

Result:

el

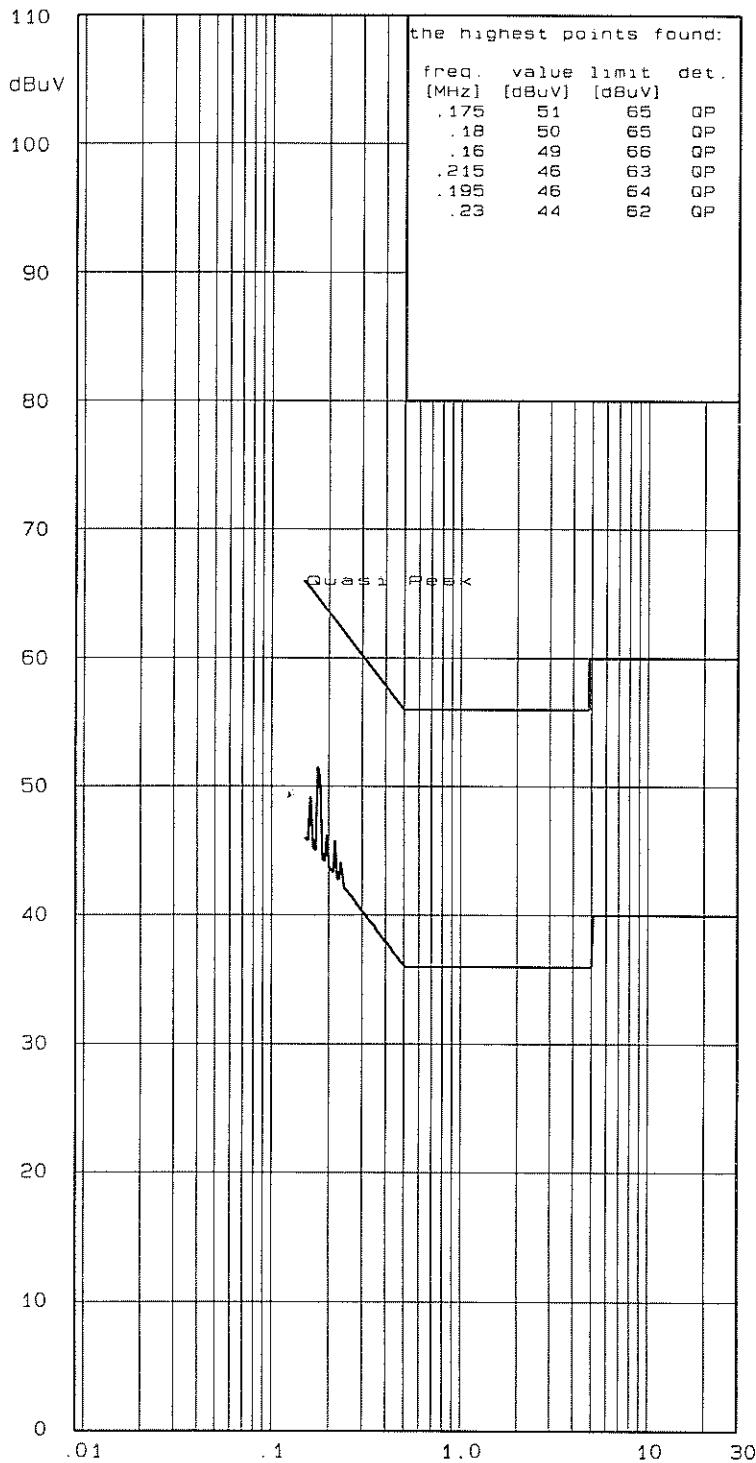
IECC

f [MHz]



# IT 1/2

Interference voltage 150kHz – 30MHz  
Acc. FCC Part 15 Subpart B 15.107 and Subpart C 15.207



Spl./Ser.No.: 01/--

Client : UNION GAIN

Product: USB FM TRANSMITTER

IECC-No.: 49848

Date: 18 FEB 2008

Test equipment:

Rohde & Schwarz ESHS-30

Schwarzbeck NSLK8127

Connected sets:

--

Operating mode:

DATA TRANSFER

(N)

TEST W/ REFERENCE COMPUTER

--

RFI suppression parts:

--

\* two dB safety margin for  
type approval necessary

Operator: KT

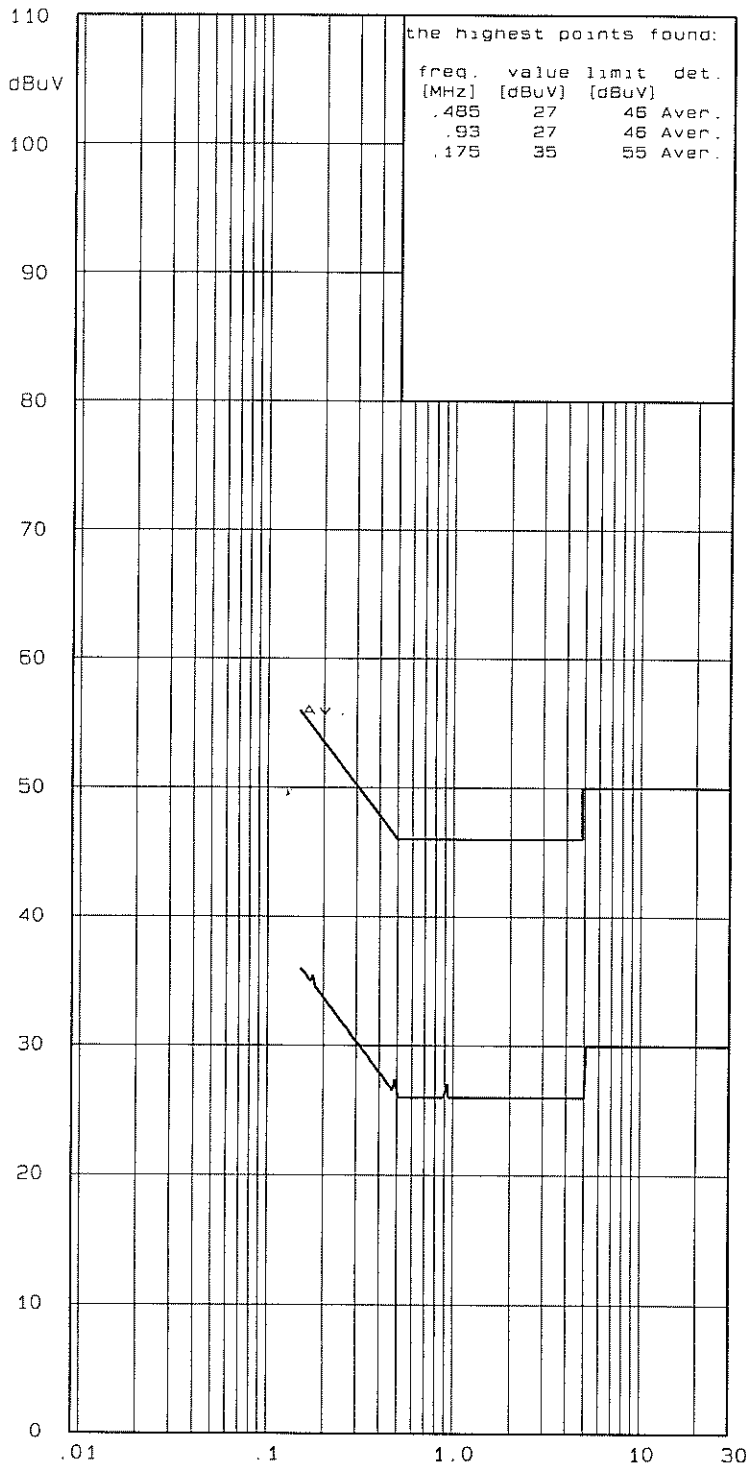
Result: *OK*

IECC



# IT 1/2

Interference voltage 150kHz – 30MHz  
Acc. FCC Part 15 Subpart B 15.107 and Subpart C 15.207



Spl./Ser.No.: 01/--

Client : UNION GAIN

Product: USB FM TRANSMITTER

IECC-No.: 49848

Date: 18 FEB 2008

Test equipment:

Rohde & Schwarz ESHS-30

Schwarzbeck NSLK8127

Connected sets:

--

Operating mode:

DATA TRANSFER

(N)

TEST W/ REFERENCE COMPUTER

--

RFI suppression parts:

--

\* two dB safety margin for  
type approval necessary

Operator: KT

Result:

IECC

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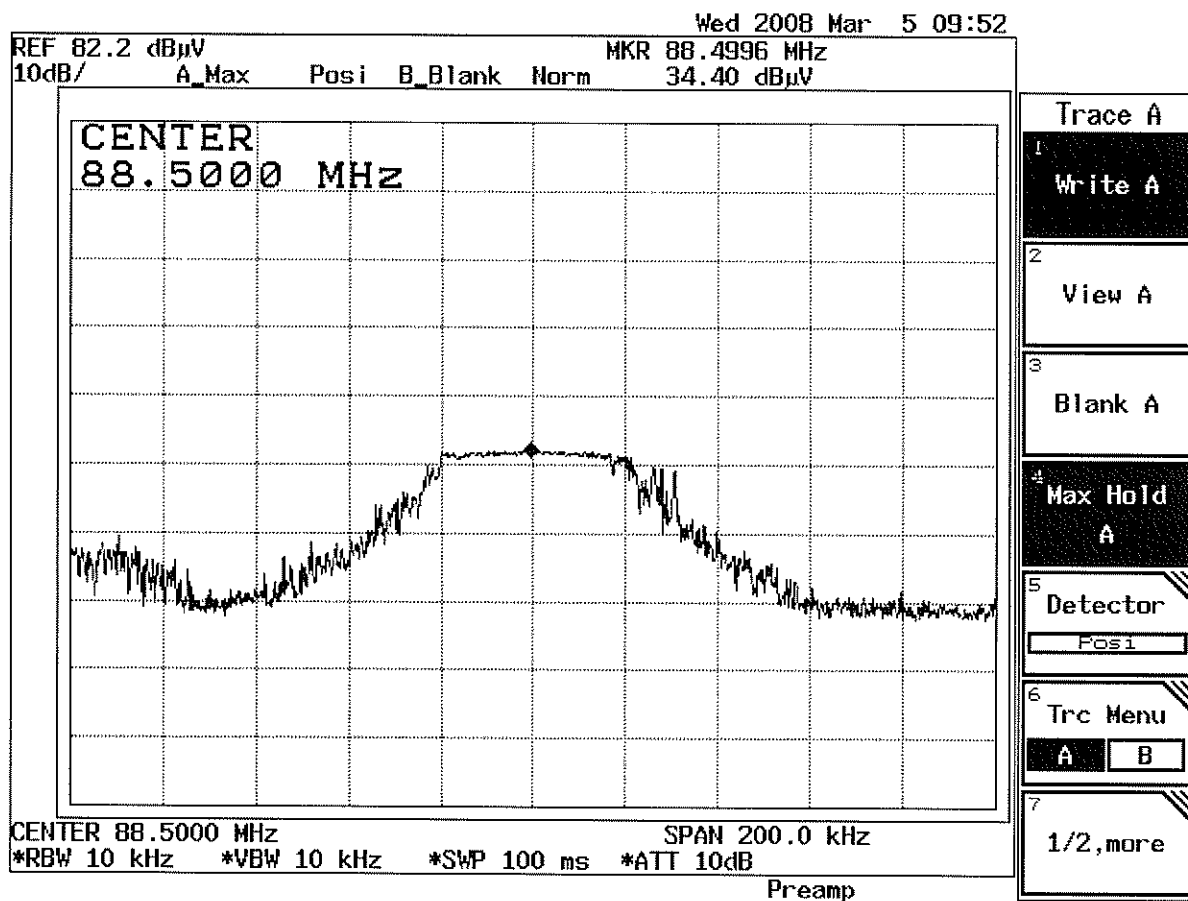
Date: 2008-03-05

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Measurement Data of Emissions within  
Band Edges

Operation Frequency : 88.5 MHz



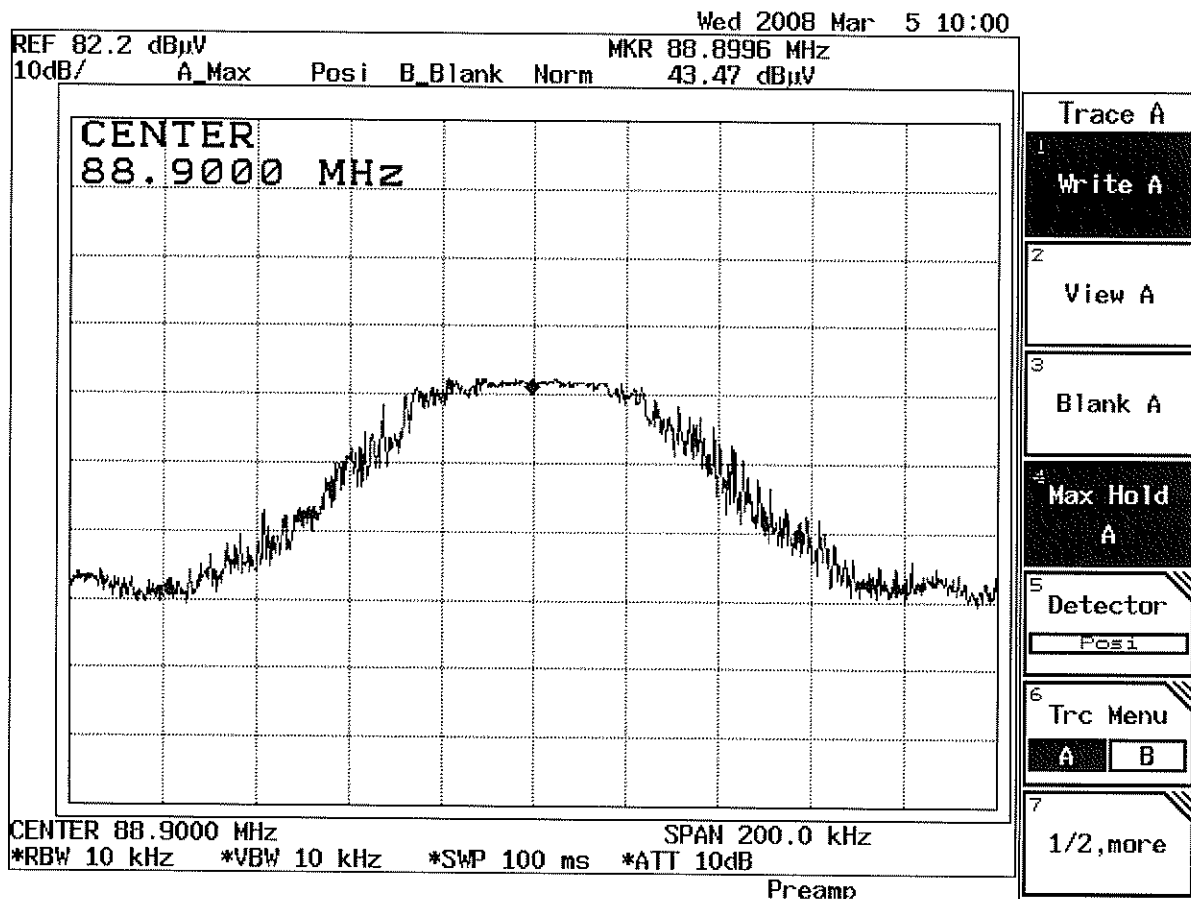
Result : The field strength of any emission within the operation band did not exceed 68 dB( $\mu$ V/m) for average value or 48 dB( $\mu$ V/m) for peak value. Refer to page 12 for the recorded value for the emission at the fundamental frequency.

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Measurement Data of Emissions within  
Band EdgesOperation Frequency : 88.9 MHz

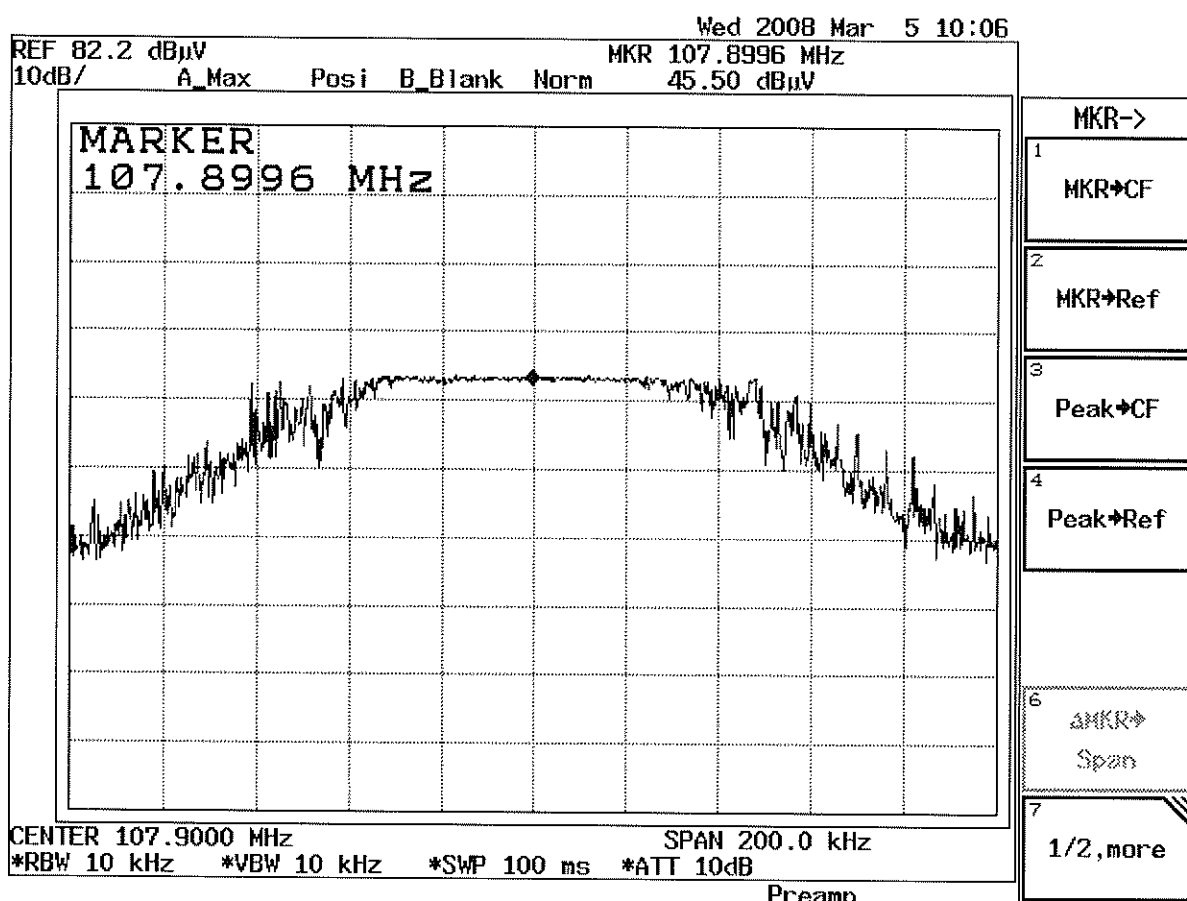
Result : The field strength of any emission within the operation band did not exceed 68 dB(μV/m) for average value or 48 dB(μV/m) for peak value. Refer to page 13 for the recorded value for the emission at the fundamental frequency.

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Measurement Data of Emissions within  
Band EdgesOperation Frequency : 107.9 MHz

Result : The field strength of any emission within the operation band did not exceed 68 dB(μV/m) for average value or 48 dB(μV/m) for peak value. Refer to page 14 for the recorded value for the emission at the fundamental frequency.



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**Photo of Sample**