

# FCC PART 15 C

## MEASUREMENT AND TEST REPORT

For

### YINRUN PLASTIC CRAFTS CO.,LTD

Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City, Guangdong, China

**FCC ID: R6UMONSTER-49M**

July 07, 2005

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> R/C MONSTER TUMBLER
<b>Test Engineer:</b>	Tony Wu
<b>Report Number:</b>	SE05F-081E
<b>Test Date:</b>	June 25~July 06, 2005
<b>Reviewed By:</b>	
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**Note:** This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of S&E Technologies Laboratory Ltd.

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## 1 - GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: **YINRUN PLASTIC CRAFTS CO.,LTD**

Address of applicant: Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City,  
Guangdong, China

Tel: 86-754-5509841 Fax: 86-754-5509840

Manufacturer: **YINRUN PLASTIC CRAFTS CO.,LTD**

Address of manufacturer: Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City,  
Guangdong, China

Tel: 86-754-5509841 Fax: 86-754-5509840

#### General Description of E.U.T

The **YINRUN PLASTIC CRAFTS CO.,LTD.**'s product, model number: **4016** or the "EUT" as referred to in this report is a transmitter of **R/C MONSTER TUMBLER**. The EUT is measured approximately 110cm L x 87cm W x 32cm H.

The technical data has been listed following:

Items	Description
EUT Description:	Tx of R/C MONSTER TUMBLER
Trade Name:	N/A
Model No.:	4016
Rated Voltage	DC 6V for Receiver and DC 9V for Transmitter
Frequency range	49.8617MHz
Number of channels	1
Channel Separation	None
Product Class:	Low Power Communication Device Transmitter

*\* The test data gathered are from the production sample provided by the manufacturer.*

## 1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

FCC Rules and Regulations Part 15 Subpart C Section 15.235

The objective of the manufacturer is to demonstrate compliance with the described above standards.

## 1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart C Section 15.235 for Emissions

Tests Carried Out Under FCC Part 15 Subpart C

Standard	Test Items	Status	Application
Part 15 Subpart C Section 15.235	Disturbance Voltage at The Mains Terminals	x	N/A, without AC power supply
	Radiation Emission	√	
	Occupied Bandwidth	√	

- √ Indicates that the test is applicable  
 × Indicates that the test is not applicable

## 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2001, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the Part 15 Subpart C Section 15.235 limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

All measurement required was performed at laboratory of Shenzhen Huatongwei International Inspection Co., Ltd at Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

## 1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### FCC – Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 662850, November 17, 2003.

## 1.6 Test Equipment List and Details

Table 1: Test Equipment for Emission Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2004/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESPI	100123	2005/03	1 year
Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2004/11	1 year
Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2004/11	1 year
Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	2004/11	1 year
LOOP ANTENNA	ROHDE & SCHWARZ	HFH2-Z2	100020	2004/11	1 year
HORN ANTENNA	ROHDE & SCHWARZ	HF906	100039	2004/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2004/11	1 year
RF Test Panel	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	N/A	N/A
Turntable	ETS	2088	2149	N/A	N/A
Antenna Mast	ETS	2075	2346	N/A	N/A

## 2 - SYSTEM TEST CONFIGURATION

### 2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

### 2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

### 2.3 Special Accessories

There are no special accessories necessary for compliance of this product supplied by **YINRUN PLASTIC CRAFTS CO.,LTD** and its respective support equipment manufacturers.

### 2.4 Equipment Modifications

The EUT tested was not modified by S&E.

### 2.5 Basic Test Setup Block Diagram

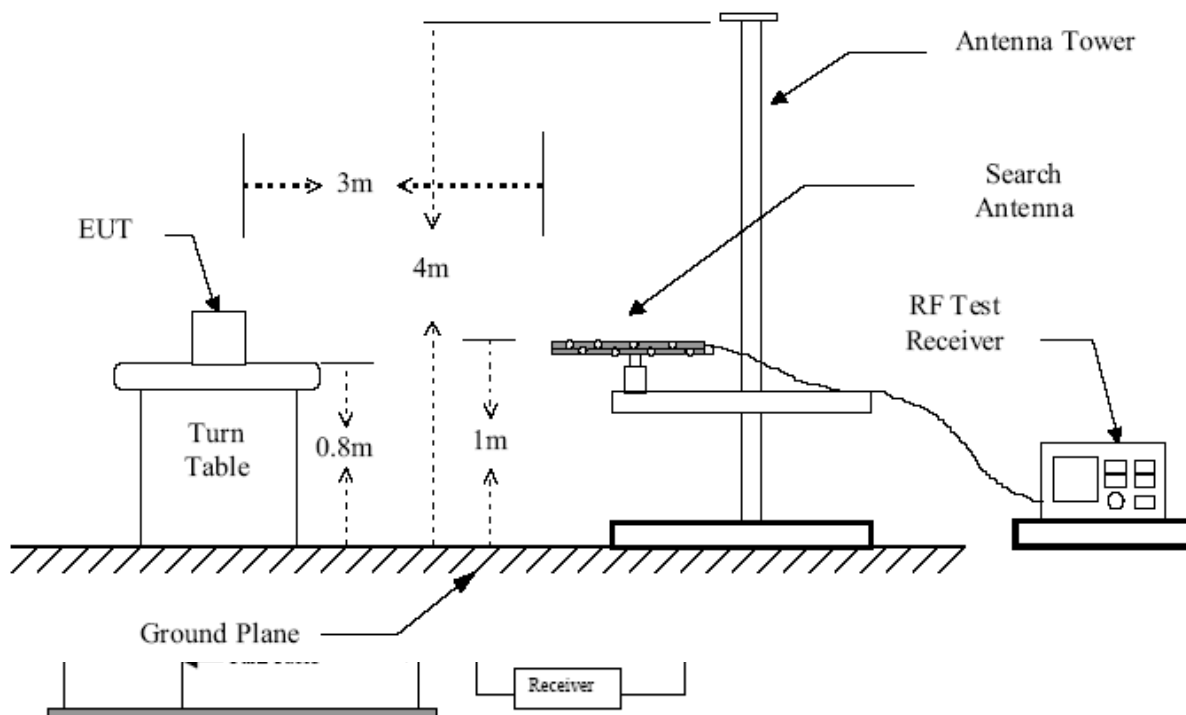


Figure 1 : Frequencies measured below 1 GHz configuration

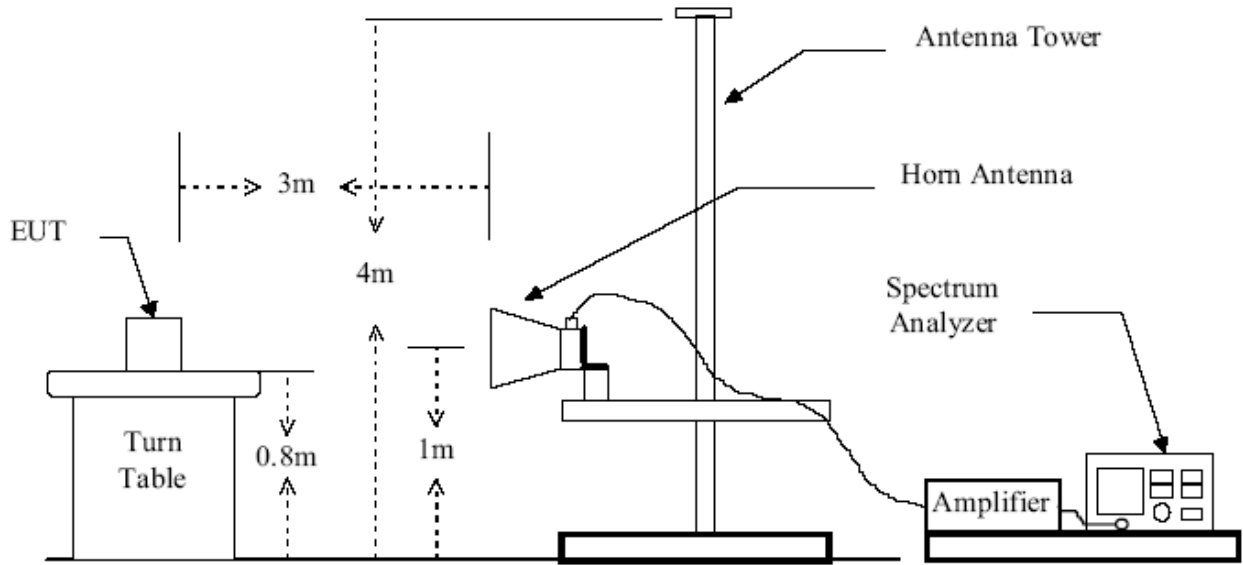


Figure 2 : Frequencies measured above 1 GHz configuration

### 3 – DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

#### 3.1 Measurement Uncertainty

All test results complied with Section 15.207 requirements. Measurement Uncertainty is 2.4 dB.

#### 3.2 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits ( dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

#### 3.3 Test Description

The EUT is excused from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by a DC 9V battery. According to the Section 15.207(d), measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



## 4- RADIATED DISTURBANCES

### 4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 4.0$  dB.

### 4.2 Limit of Radiated Disturbances

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 and above	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.  
 (2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

### 4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2001. The specification used was the FCC Part 15 Subpart B limits.

The EUT was placed on the center of the test table. In the frequency range below 1 GHz, Ultra-Broadband Antenna horn-antenna is used. In the frequency range above 1 GHz horn-antenna is used. Test setup refer to **Section 2.5 Basic Test Setup Block Diagram** of this report.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

### 4.4 Test Receiver Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 5000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting for frequency range below 1000MHz:

Detector.....Peak & Quasi-Peak  
 IF Band Width.....100KHz  
 Frequency Range.....30MHz to 1000MHz  
 Turntable Rotated.....0 to 360 degrees

Test Receiver Setting for frequency range above 1000MHz:

Detector.....Peak  
 IF Band Width.....1MHz  
 Frequency Range.....1000MHz to 5000MHz  
 Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m  
 Polarity.....Horizontal and Vertical

#### 4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 4). Power on the EUT and all the supporting units.
- 5). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 6). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
- 7). For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 8). Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode. Then all data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dB $\mu$ V of specification limits), and are distinguished with a "QP" in the data plots.

#### 4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 4.7 Radiated Emissions Test Result

Temperature ( °C )	22~23
Humidity ( %RH )	50~54
Barometric Pressure ( mbar )	950~1000
EUT	Tx of R/C MONSTER TUMBLER
M/N	4016
Operating Mode	Keep Tx operating in continuous transmitting mode

Test plots see following pages

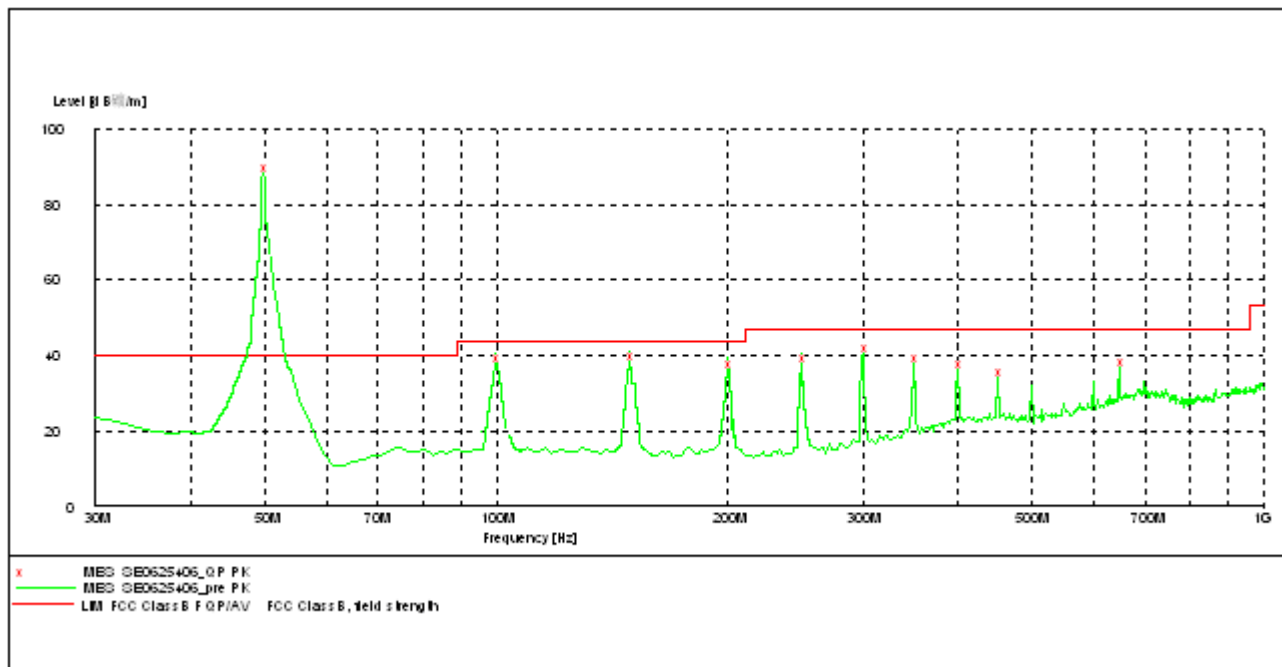
49.8617 MHz Tx in operation							
Maximum Frequency (MHz)	Spurious Emission Position and Level					Limit	Margin
	Polarity	m	Deg°	Transd	dBµV/m	dBµV/m	dBµV/m
99.7235	V	1.00	179.0	11.7	39.78	43.5	2.0
149.5850	V	1.00	65.0	10.8	40.01	43.5	2.1
199.4468	V	3.00	0	10.7	38.25	43.5	2.3
249.3087	V	1.03	55.0	12.4	39.35	46	9.1
299.1704	V	1.02	155.0	13.6	42.54	46	7.8
349.0321	V	1.00	0	17.2	39.42	46	7.2
398.8940	V	1.00	45.0	18.5	37.65	46	---
448.7558	V	1.02	121.0	18.3	35.46	46	---
---	---	---	---	---	---	---	---
Maximum Frequency (MHz)	Spurious Emission Position and Level					Limit	Margin
	Polarity	m	Deg°	Transd	dBµV/m	dBµV/m	dBµV/m
99.7235	H	1.02	0	11.7	35.12	43.5	8.4
149.5850	H	1.00	14.0	10.8	35.67	43.5	7.8
199.4468	H	3.10	148.0	10.7	32.87	43.5	10.6
249.3087	H	1.00	126.0	12.4	36.02	46	10.0
299.1704	H	1.02	345.0	13.6	33.88	46	12.1
349.0321	H	1.00	95.0	17.2	29.12	46	16.9
398.8940	H	---	---	---	---	46	---
448.7558	H	---	---	---	---	46	---
---	---	---	---	---	---	---	---
Remark:							
--- Means that The emission level of the rest measuring harmonic up to 5GHz are so low below applicable limit in operation mode, so the result were not recorded.							

**Radiated Emission Test Data**

EUT: Tx of R/C MONSTER TUMBLER  
 Operating Condition: Continuous Transmitting  
 Test Site: 3m CHAMBER  
 Operator: Jimmy  
 Test Specification: DC 9V from Bettary  
 Comment: Polarisation:Vertical  
 Start of Test: 06/28/05 / 05:26:24PM

**SCAN TABLE: "test Field(30M-1G)"**

Short Description:	Field Strength(30M-1G)		Meas. Time	IF Bandw.	Transducer
Start Frequency	Stop Frequency	Step Width	Detector		
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz HL562new

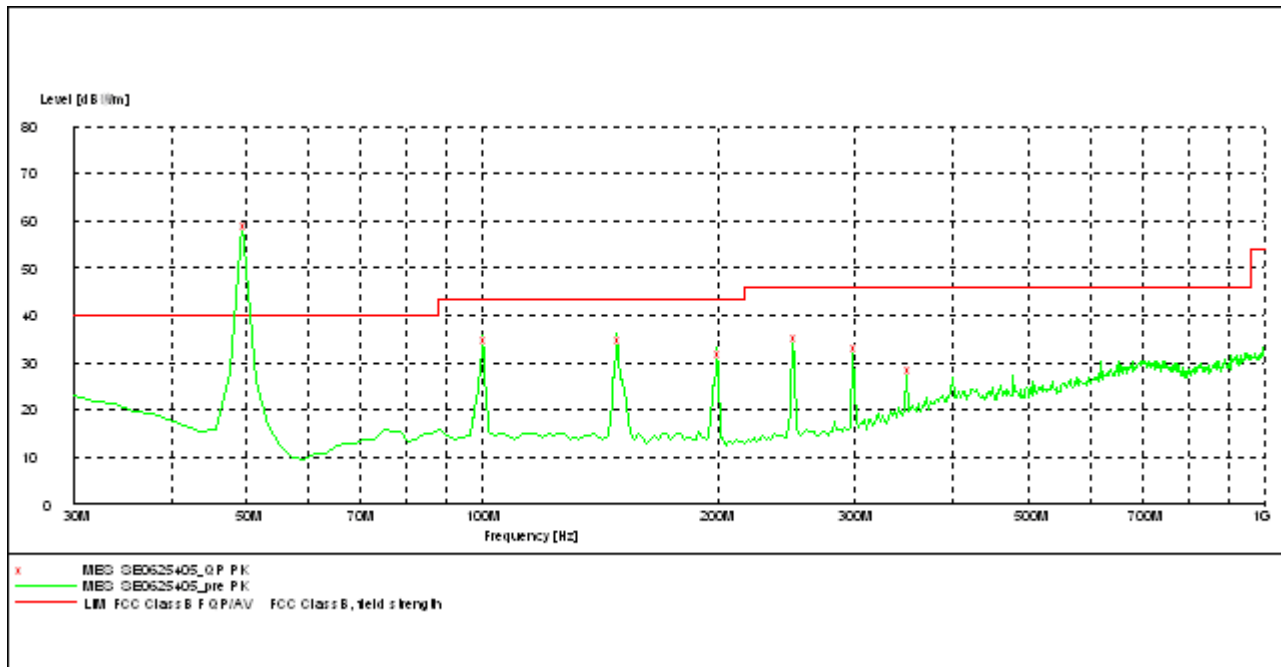


**Radiated Emission Test Data**

EUT: Tx of R/C MONSTER TUMBLER  
 Operating Condition: Continuous Transmitting  
 Test Site: 3m CHAMBER  
 Operator: Jimmy  
 Test Specification: DC 9V from Bettary  
 Comment: Polarisation: Horizontal  
 Start of Test: 06/24/05 / 05:36:05PM

**SCAN TABLE: "test Field(30M-1G)"**

Short Description:	Field Strength(30M-1G)		Meas.	IF	Transducer
Start Frequency	Stop Frequency	Step Width	Detector	Bandw.	
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	120 kHz	HL562new



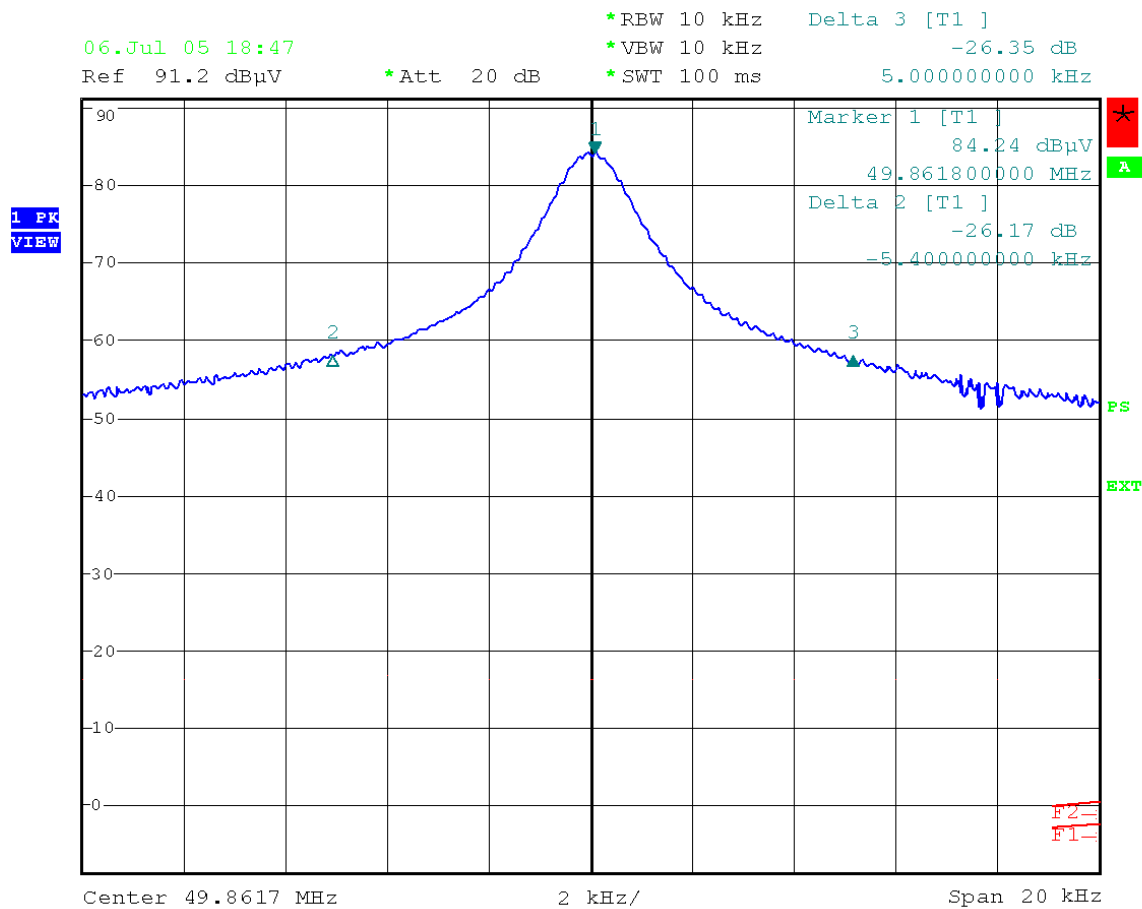
Frequency (MHz)	Maximum Test Result (dB(μ V/m))		FCC Limit (dB(μ V/m))		Margin (dB(μ V/m))
	Peak	Average*	Peak	Average	
49.8617	84.24	78.23	100	80	1.7

**Remark :** 1) The above peak value is the maximum value of the measurement in 3 orthogonal planes

2)\* Calculation for radiation (average) from the below time domain plot:

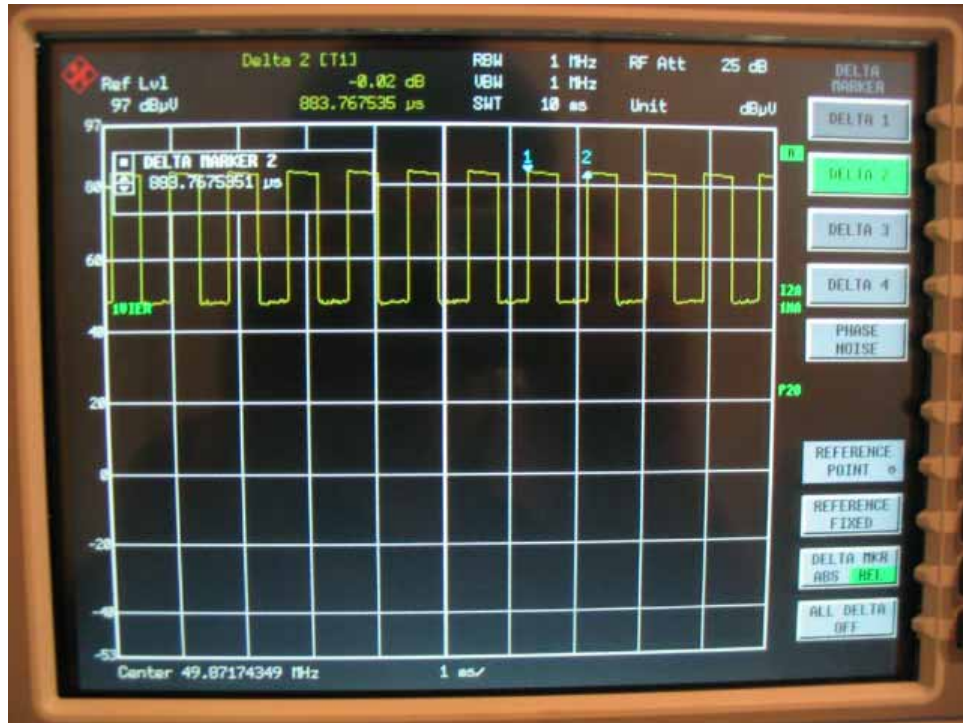
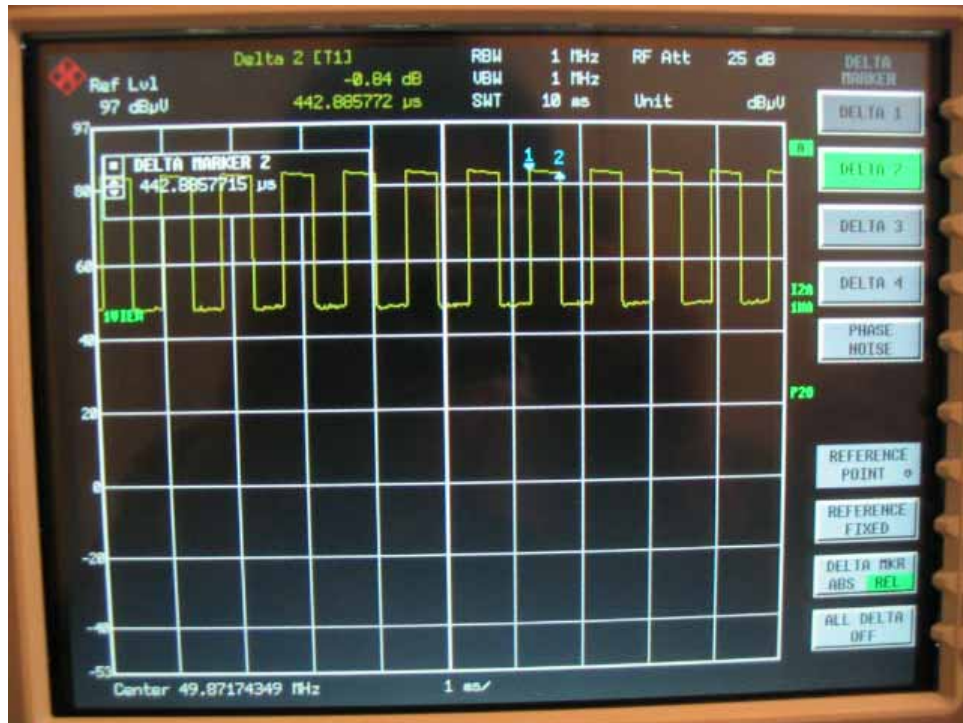
Measured duty cycle(average) = 0.443 / 0.884=0.501

Radiation(average)= 84.24+20\*log(0.501)=78.23 dB(μ V/m)



EBCF-226 LINE:N

Date: 6.JUL.2005 18:47:48



## 5- OCCUPIED BANDWIDTH

### 5.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 4.0$  dB.

### 5.2 Limit of Occupied Bandwidth

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the un-modulated carrier or to the general limits of 15.209, whichever permits the higher emission levels.

### 5.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2001.

The EUT was placed on the center of the nonmetal table which is 0.8 meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

### 5.4 Test Procedure

- 1) Turn on the transmitter, and set it to transmit the pulse train continuously.
- 2) Tune a spectrum analyzer to the transmitter, carrier frequency, and set the spectrum analyzer resolution bandwidth to 100kHz and video bandwidth to 100kHz, then select Peak function to scan the channel frequency.
- 3) The 20dB bandwidth was measured and recorded.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.



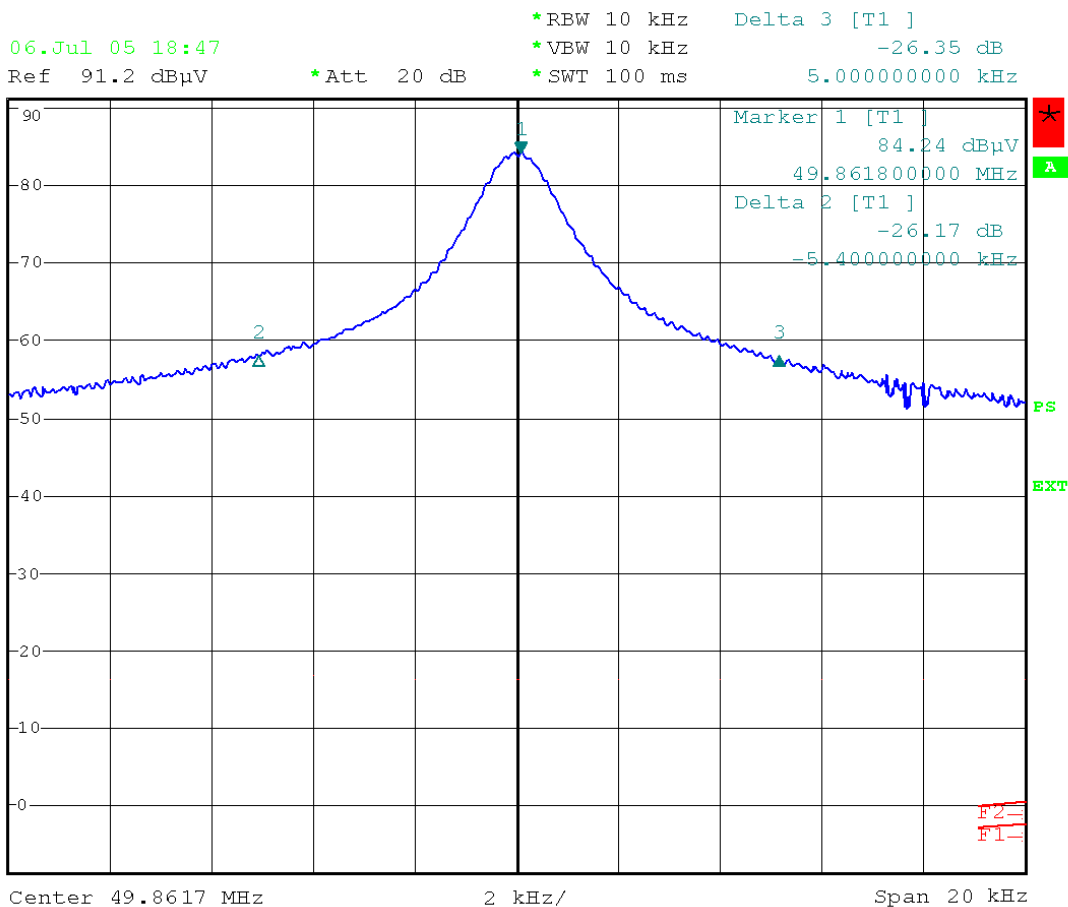
**YINRUN**

**5.5 Emi**

- Temp
- Humid
- Baron
- EUT
- M/N
- Opera

Center 49.8617 MHz      2 kHz/      Span 20 kHz

EBCF-226 LINE:N  
Test plot  
Date: 6.JUL.2005 18:47:48



EBCF-226 LINE:N  
Date: 6.JUL.2005 18:47:48

**Result:** The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges has attenuated more than 26 dB below the level of the un-modulated carrier.