

# FCC Part 15C

## Measurement and Test Report

For

**Guangzhou Tendystar Telecom Co., Ltd**

**Rm1701-1702, New Century Commercial Trade Center, No.2-6 HongDe Load,  
Guangzhou, China**

**FCC ID: UDAE2**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> Bluetooth Headset
<b>Model:</b>	<u>E2</u>
<b>Report No.:</b>	<u>STR06068005E-3</u>
<b>Test/Witness Engineer:</b>	<u>Alex Lee</u>
<b>Test Date:</b>	<u>2006-06-30</u>
<b>Prepared By:</b> <b>Shenzhen SEM.Test Compliance Service Co., Ltd</b> Room 609-610, Baotong Building, Baomin 1 <sup>st</sup> Road, Baoan District, Shenzhen, Guangdong, P.R.C. (518133)	
<b>Approved &amp; Authorized By:</b>	

**Note:** This test report is limited to the above client company and the product model only. It may not be duplicated without prior permission by SEM.Test Compliance Service Co., Ltd.

**TABLE OF CONTENTS**

<b>1. LETTER OF EXPLANATION .....</b>	<b>3</b>
<b>2. GENERAL INFORMATION .....</b>	<b>4</b>
2.1 Product Description for Equipment Under Test (EUT).....	4
2.2 Test Standards .....	4
2.3 Test Methodology.....	5
2.4 Test Facility .....	5
<b>3. EMC EQUIPMENT LIST AND DETAILS .....</b>	<b>6</b>
<b>4. SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
<b>5. TEST PROCEDURE.....</b>	<b>8</b>
<b>6. ANTENNA REQUIREMENT .....</b>	<b>9</b>
<b>7. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING .....</b>	<b>10</b>
<b>8. DWELL TIME OF A HOPPING CHANNEL .....</b>	<b>12</b>
<b>9. 20-DB BANDWIDTH.....</b>	<b>14</b>
<b>10. POWER OUTPUT.....</b>	<b>15</b>
<b>11. FIELD STRENGTH OF SPURIOUS EMISSIONS .....</b>	<b>16</b>
<b>12. RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND .....</b>	<b>20</b>
<b>TEST SETUP PHOTO.....</b>	<b>22</b>

**EXHIBIT INCLUDING:**

REQUEST FOR CONFIDENTIALITY LETTER

BLOCK DIAGRAM

SCHEMATIC

LABEL SAMPLE

LABEL LOCATION

USERS MANUAL

EXTERNAL PHOTOGRAPHS

INTERNAL PHOTOGRAPHS

OPERATIONAL DESCRIPTION

TEST SET UP PHOTOGRAPHS

## 1. LETTER OF EXPLANATION

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June 24, 2006  
Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road  
Columbia, MD 21046

SUBJECT:

FCC ID: UDAE2

To Whom It May Concern:

The attached application is for a portable device that employs a bluetooth device.

The unit employs internal antenna. The Bluetooth antenna has a gain of +1.1 dBi.

Should you have any questions or require any further information with regards to this, please feel free to contact me.

Sincerely,



Engineer

MRD/sh

Encl.

## 2. GENERAL INFORMATION

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

#### Client Information

Applicant: Guangzhou Tendystar Telecom Co., Ltd.  
 Address of applicant: Rm1701-1702, New Century Commercial Trade Center,  
 No.2-6 HongDe Load, Guangzhou, China  
 Manufacturer: Guangzhou Tendystar Telecom Co., Ltd  
 Address of manufacturer: Rm1701-1702, New Century Commercial Trade Center,  
 No.2-6 HongDe Load, Guangzhou, China

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

Items	Description
EUT Description:	Bluetooth Headset
Trade Name:	Tendystar
Model No.:	E2
Rated Voltage:	DC 3.6V battery
Max. Output Power	2.5mW
Frequency range:	2402-2480MHz
Number of channels:	79
Size:	8.00 cm L x 2.00 cm W x 2.50 cm H
Channel Separation:	1MHz
Type of Antenna:	Permanently attached antenna
Note: The Model of T2 and TDS601 have the same internal construction and they have only different appearance. All the tests of this report are carried on Model E2. For more information refer to the circuit diagram form and the user's manual.	

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

### 2.2 Test Standards

The following report of is prepared on behalf of the Guangzhou Tendystar Telecom Co., Ltd. in accordance with FCC rules, sec 15.247, sec 15.205, sec 15.209 and sec 15.35. All measurements contained in this report were conducted with ANSI C63.4-2003, 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 objective of the manufacturer is to determine compliance with FCC rules, sec 15.247, sec 15.205, sec 15.209 and sec 15.35.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained

## 2.3 Test Methodology

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.

## 2.4 Test Facility

All measurement required was performed at laboratory of Shenzhen Academy of Metrology and quality Inspection, Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China.

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

United States of American Federal Communications Commission (**FCC**), and the registration number is **274801**

Industry Canada (**IC**), and the registration number is **IC4174**.

China National Accreditation Committee for Laboratories (**CNAL**) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is **L0579**.

Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number is **R-1966**

### 3. EMC EQUIPMENT LIST and Details

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Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	ESPI-3	100016	2006-1-24	2007-1-25
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	2006-1-24	2007-1-25
Triple Loop Antenna	Schwarzbeck	HXYZ9170	9124	2006-1-24	2007-1-25
EMI Test Receiver	Rohde & Schwarz	ESI26	A040904-2	2006-1-24	2007-1-25
Bilog Antenna	Chase	CBL6112B	2591	2006-1-24	2007-1-25
Signal Generator	Rohde & Schwarz	SMR20	100047	2006-1-24	2007-1-25
Antenna	Schwarzbeck	VUBA9117	115	2006-1-24	2009-1-25
Horn Antenna	Rohde & Schwarz	HF906	100013	2006-1-24	2007-1-25
Horn Antenna	Rohde & Schwarz	HF906	100014	2006-1-24	2007-1-25
3m chamber	Albatross Projects	9X6X6	----	2006-1-24	2008-1-25

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

## 4. SUMMARY OF TEST RESULTS

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FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.247(a)(1)(iii)	Quantity of Hopping Channel	Compliant
§ 15.247(a)(1)	Channel Separation	Compliant
§ 15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	Compliant
§ 15.247(a)	20dB Bandwidth	Compliant
§ 15.247(b)(1)	Power Output	Compliant
§ 15.209(a)(f)	Radiated Emission	Compliant
§ 15.247(c)	Band edge	Compliant

## 5. TEST PROCEDURE

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**RADIATION INTERFERENCE:** The test procedure used was ANSI C63.4-2003 using a spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 22°C with a humidity of 55%.

**CHANNEL SEPERATION:** The measurements were made with the spectrum analyzer's Resolution Bandwidth (RBW) = 100KHz and the Video Bandwidth (VBW) = 300KHz and the span set as shown on plot. Than marked the delta of the adjacency channel.

**BANDWIDTH 20 dB:** The measurements were made with the spectrum analyzer's Resolution Bandwidth (RBW) = 100KHz and the Video Bandwidth (VBW) = 300kHz and the span set as shown on plot. From the peak point of the channel down to the 20dB, the delta of frequency is reading.

**TIME OF OCCUPANCY (DWELL TIME OF A HOPPING CHANNEL):** The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no.(s), The quantity of False was get from single sweep. In addition, the time of single Pluses was tested.

**QUANTITY OF HOPPING CHANNEL:** Set the EUT in transmitting mode from first channel to last. By using the Max-Hold function record the Quantity of the channel.

**POWER OUTPUT:** The RF power output was measured at the antenna feed point using a peak power meter or measured on a radiated basis for the device has an integral antenna.

**BANDEdge TEST:** An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2003 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

## 6. ANTENNA REQUIREMENT

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**RULE PART NO.:** 15.247 (b) (3)

**REQUIREMENTS:**

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.

**Test Result/Plots:**

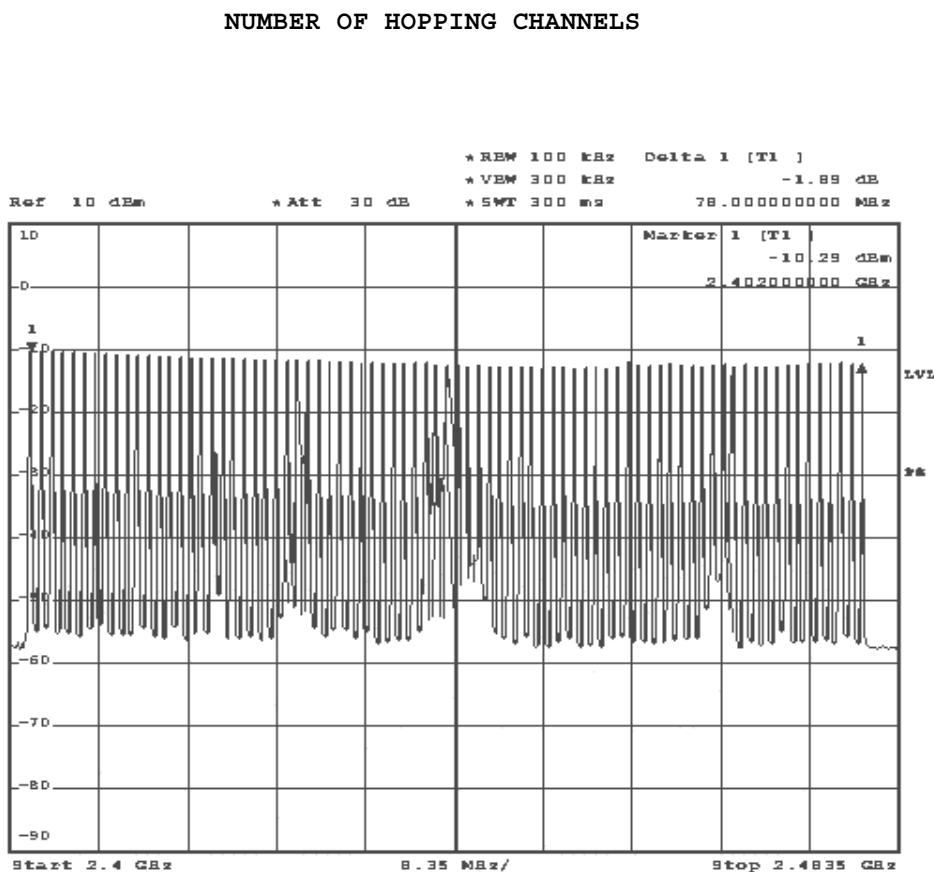
This product has a permanent antenna (PCB Layout antenna), does meet the requirement of this section.

## 7. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING

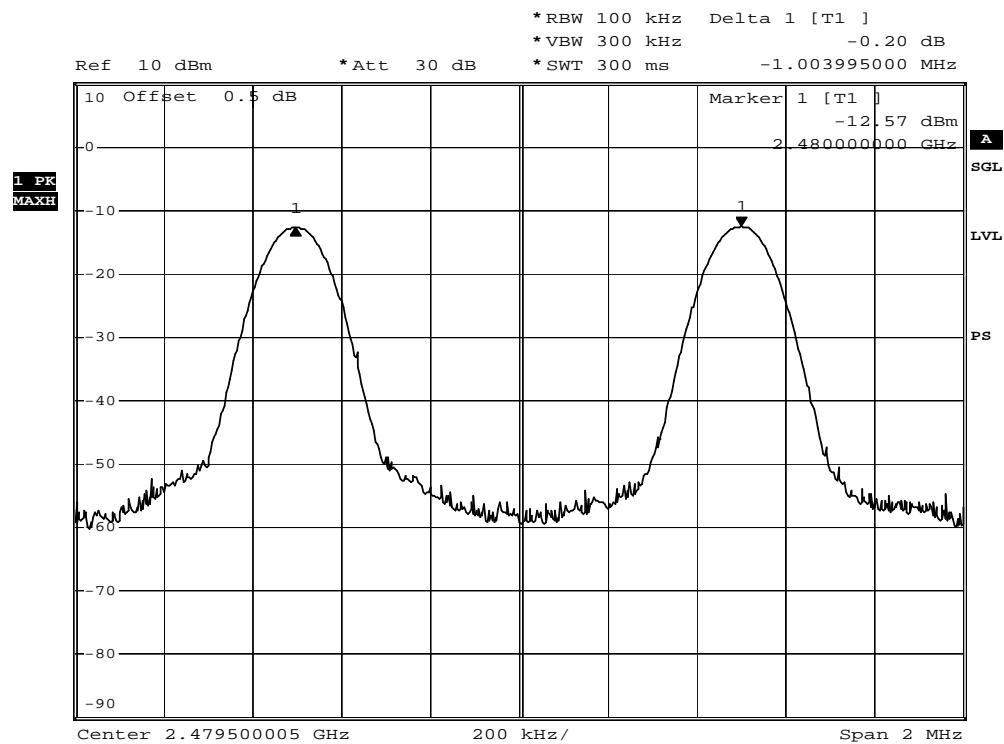
**RULES PART NO.:** 15.247 (a) (1)

**REQUIREMENTS:** The number of hops is 79 hops at a separation of 1 MHz; the requirement in the 2400 - 2483.5 MHz band is a minimum of 75 hops.

**Test Result/Plots:**



CHANNEL/CARRIER SPACING is 1MHz



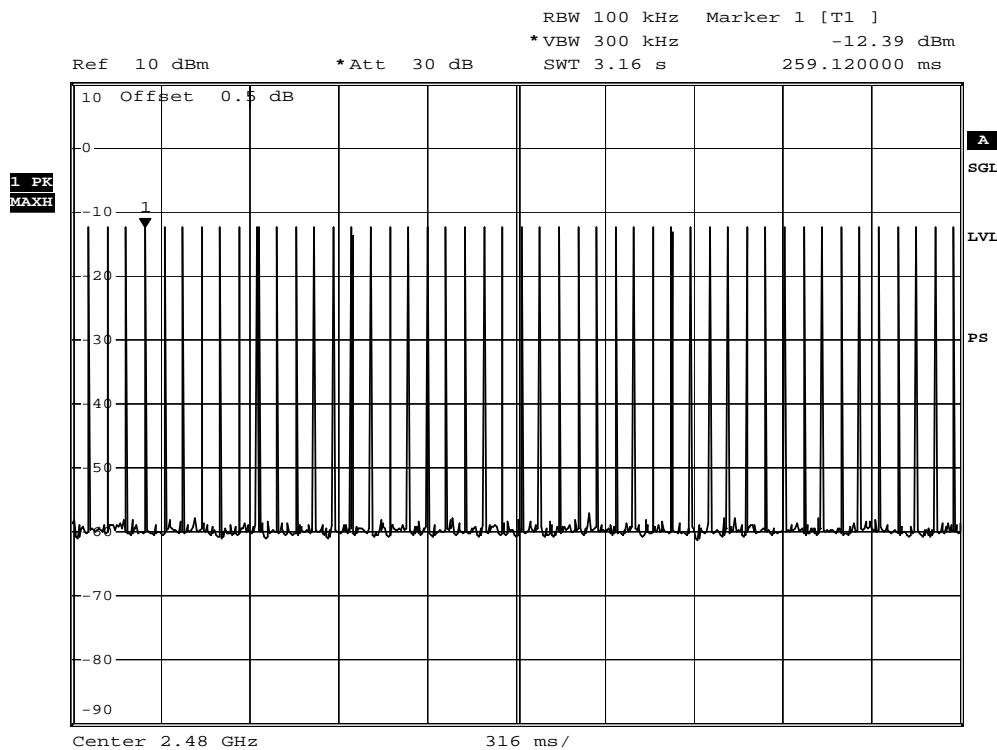
## 8. DWELL TIME OF A HOPPING CHANNEL

**RULES PART NO.:** 15.247(a)(1)(i)

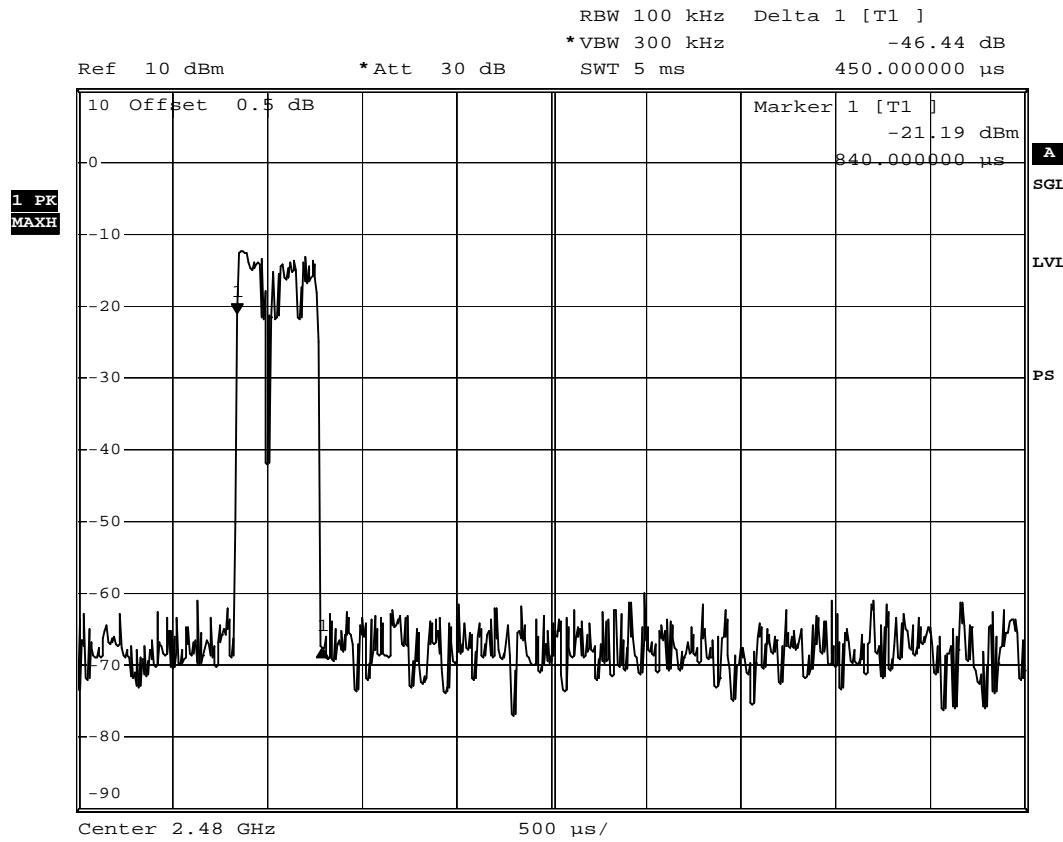
**REQUIREMENTS:** The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

**Test Result/Plots:**

Pluses Number of hopping channel is 47 Pluses within 3.16s, so the Pluses Number in 0.4X79s is 470 Pluses.



Single pulse swell time is 450.00 •s



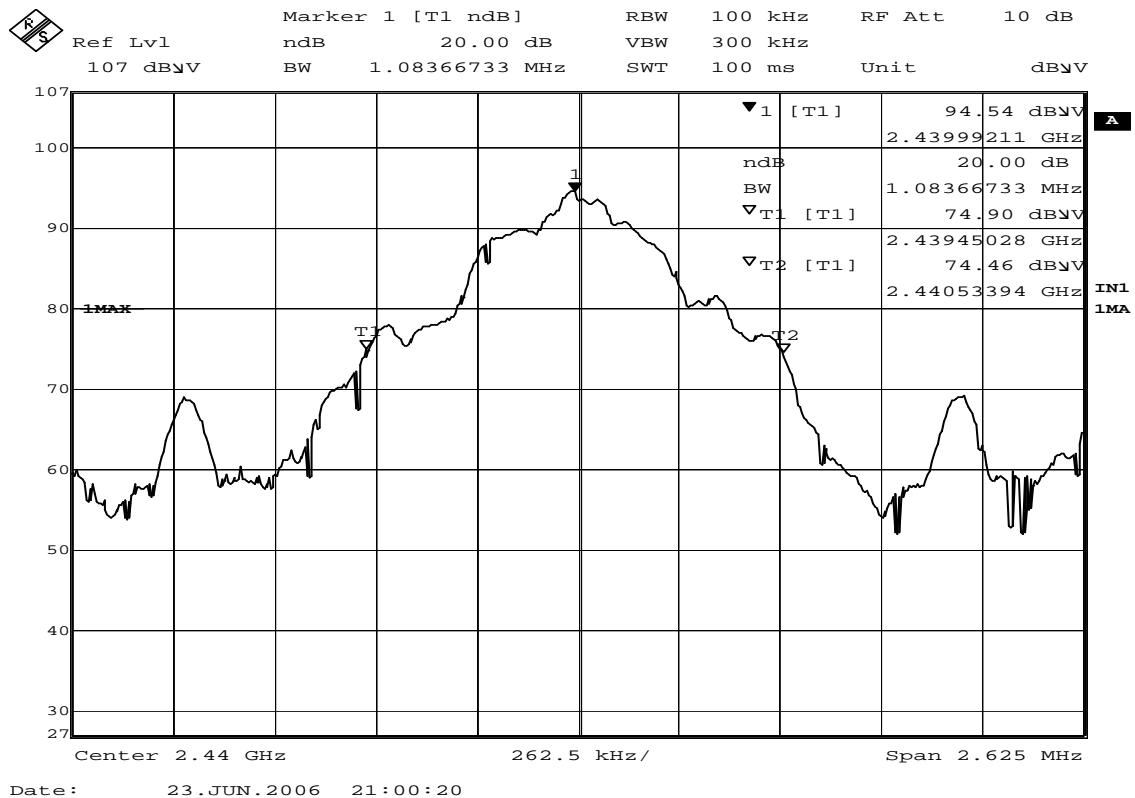
The dwell time = 470X450.00•s  
= 211.5ms (<0.4s)  
Meet the standards requirement

## 9. 20-dB BANDWIDTH

**RULE PART NO.:** 15.247(a)(1)(iii)

**REQUIREMENTS:**

**Test Result/Plots:** The 20 dB bandwidth measured was 1083.67 kHz.



Three places in the band were measured and the worst case presented above.

## 10. POWER OUTPUT

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**RULE PART NO.:** 15.247 (b) (1)

**REQUIREMENTS:** 1.0 Watt or +30 dBm

**Method:** 15.247 (c)

The device under test has an integral antenna and the power was measured on a radiated basis.

**Test Result/Plots:**

2402 MHz 2.53 mW EIRP

2441 MHz 2.51 mW EIRP

2480 MHz 2.55 mW EIRP

## 11. FIELD STRENGTH OF SPURIOUS EMISSIONS

**RULES PART NO.:** 15.247 (c), 15.205 & 15.209 (b)

**REQUIREMENTS:**

FIELD STRENGTH of Fundamental: 902-928MHz	FIELD STRENGTH of Harmonics: 2.4-2.4835GHz 127.38dBuV/m @3m	Section 15.209: 30 - 88 MHz 40 dBuV/m @3M 88 - 216 MHz 43.5 dBuV/m @3M 216 - 960 MHz 46 dBuV/m @3M ABOVE 960 MHz 54dBuV/m @3M
	127.37dBuV/m @3m 54 dBuV/m @3m	

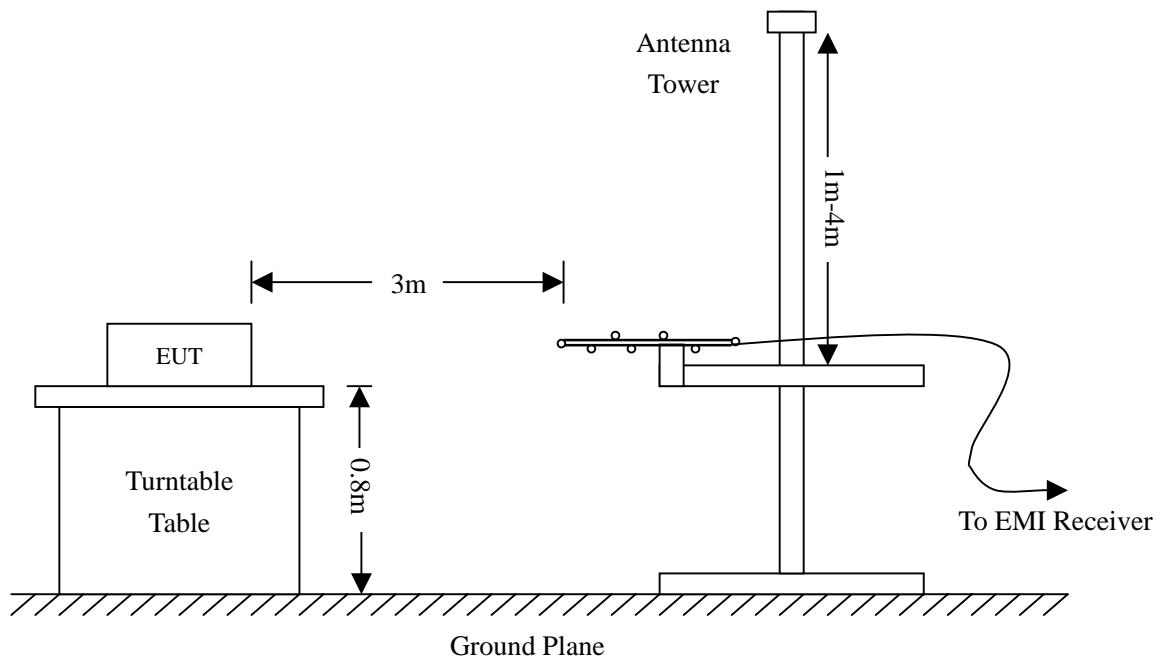
EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

**Method of Measuring Radiated Spurious Emissions**

The procedure used was ANSI STANDARD C63.4-2003 & the FCC/OET

**Basic Test Setup Block Diagram**



**Test Result/Plots:** Above 1 GHz and to the tenth harmonic

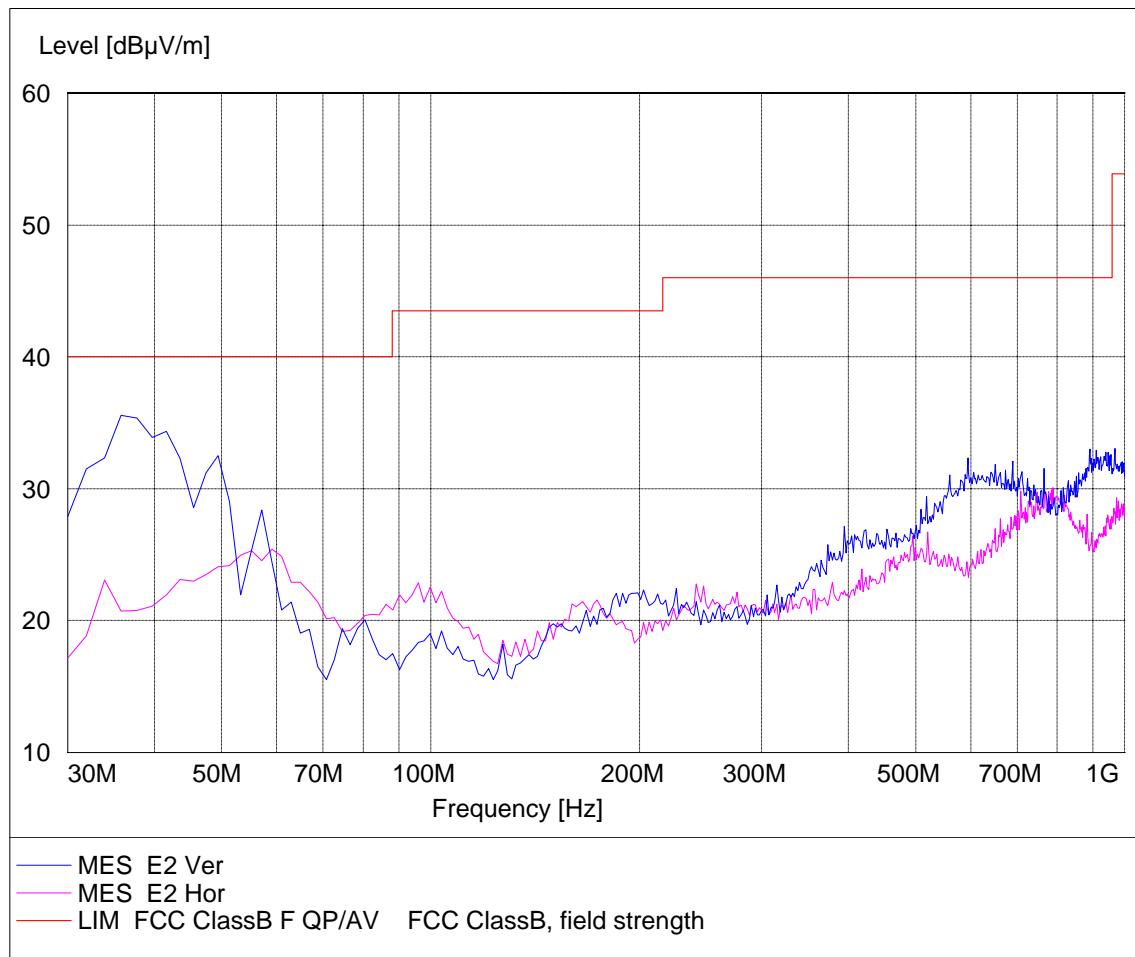
Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4804.0R	AV	40.5	60	h	34.1	5.2	33.00	46.81	54	-7.2
4804.0R	AV	37.5	150	v	34.1	5.2	33.00	43.78	54	-10.2
7206.0	AV	32.3	270	h	37.4	6.1	33.50	42.33	54	-11.7
7206.0	AV	31.4	270	v	37.4	6.1	33.50	41.40	54	-12.6
2402.0	AV	108.0	45	h	29.1	3.7	34.00	107.02		(Fund.)
2402.0	AV	105.0	45	v	29.1	3.7	34.00	103.57		(Fund.)
4804.0R	PK	46.6	60	h	34.1	5.2	33.00	52.85	74	-21.2
4804.0R	PK	44.8	150	v	34.1	5.2	33.00	51.07	74	-22.9
7206.0	PK	40.5	270	h	37.4	6.1	33.50	50.54	74	-23.5
7206.0	PK	39.3	270	v	37.4	6.1	33.50	49.30	74	-24.7
2402.0	PK	110.0	45	h	29.1	3.7	34.00	108.32		(Fund.)
2402.0	PK	108.0	45	v	29.1	3.7	34.00	106.90		(Fund.)
Middle Channel (1G to 25GHz)										
4882.0R	AV	41.25	60	h	34.1	5.2	33.00	49.40	54	-4.6
4882.0R	AV	40.35	270	v	34.1	5.2	33.00	49.10	54	-4.9
7323.0	AV	31.52	45	h	37.4	6.1	33.50	43.20	54	-10.8
7323.0	AV	30.25	270	v	37.4	6.1	33.50	42.40	54	-11.6
2441.0	AV	95.46	120	h	29.1	3.7	34.00	95.40		(Fund.)
2441.0	AV	94.15	45	v	29.1	3.7	34.00	94.60		(Fund.)
4882.0R	PK	46.5	60	h	34.1	5.2	33.00	54.80	74	-19.2
4882.0R	PK	45.7	270	v	34.1	5.2	33.00	53.00	74	-21.0
7323.0	PK	38.4	45	h	37.4	6.1	33.50	49.40	74	-24.6
7323.0	PK	37.6	270	v	37.4	6.1	33.50	48.50	74	-25.5
2441.0	PK	109	120	h	29.1	3.7	34.00	109.30		(Fund.)
2441.0	PK	101	45	v	29.1	3.7	34.00	107.20		(Fund.)
High Channel (1G to 25GHz)										
4960.0R	AV	42.33	60	h	34.1	5.2	33.00	51.90	54	-2.1
4960.0R	AV	38.26	180	v	34.1	5.2	33.00	47.50	54	-6.5
7440.0	AV	32.15	270	h	37.4	6.1	33.50	46.30	54	-7.7
7440.0	AV	29.68	270	v	37.4	6.1	33.50	41.20	54	-12.8
2480.0	AV	106.02	45	h	29.1	3.7	34.00	106.80		(Fund.)
2480.0	AV	104.52	45	v	29.1	3.7	34.00	106.30		(Fund.)
4960.0R	PK	48.4	60	h	34.1	5.2	33.00	56.50	74	-17.5
4960.0R	PK	44.7	180	v	34.1	5.2	33.00	53.00	74	-21.0
7440.0	PK	38.6	270	h	37.4	6.1	33.50	49.40	74	-24.6

7440.0	PK	35.7	270	v	37.4	6.1	33.50	50.50	74	-23.5
2480.0	PK	111.6	45	h	29.1	3.7	34.00	110.20		(Fund.)
2480.0	PK	111.2	45	v	29.1	3.7	34.00	108.50		(Fund.)

**Emissions attenuated more than 20 dB below the permissible value are not reported.**

**Test Result/Plots:** from 30 MHz to 1 GHz

Frequency (MHz)	Table Degree	Antenna Hight (m)	Polar (H/V)	Corr.Ampl (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
36.6	45	1.3	H	31.4	40	-8.6
34.3	60	1.2	V	27.7	40	-12.3
600.00	60	1.0	H	30.3	46	-15.7
512.2	180	1.2	V	27.9	46	-18.1
49.2	180	1.2	H	21.1	40	-18.9
700	270	1.0	V	25.0	46	-21.0
60	270	1.0	V	17.7	40	-22.4
398.20	45	1.3	H	19.6	46	-26.4
58.1	90	1.2	H	13.0	40	-27.0
96	60	1.0	V	15.5	43.5	-28.0
236.2	45	1.4	V	16.9	46	-29.1
224	45	1.2	H	11.3	46	-34.7



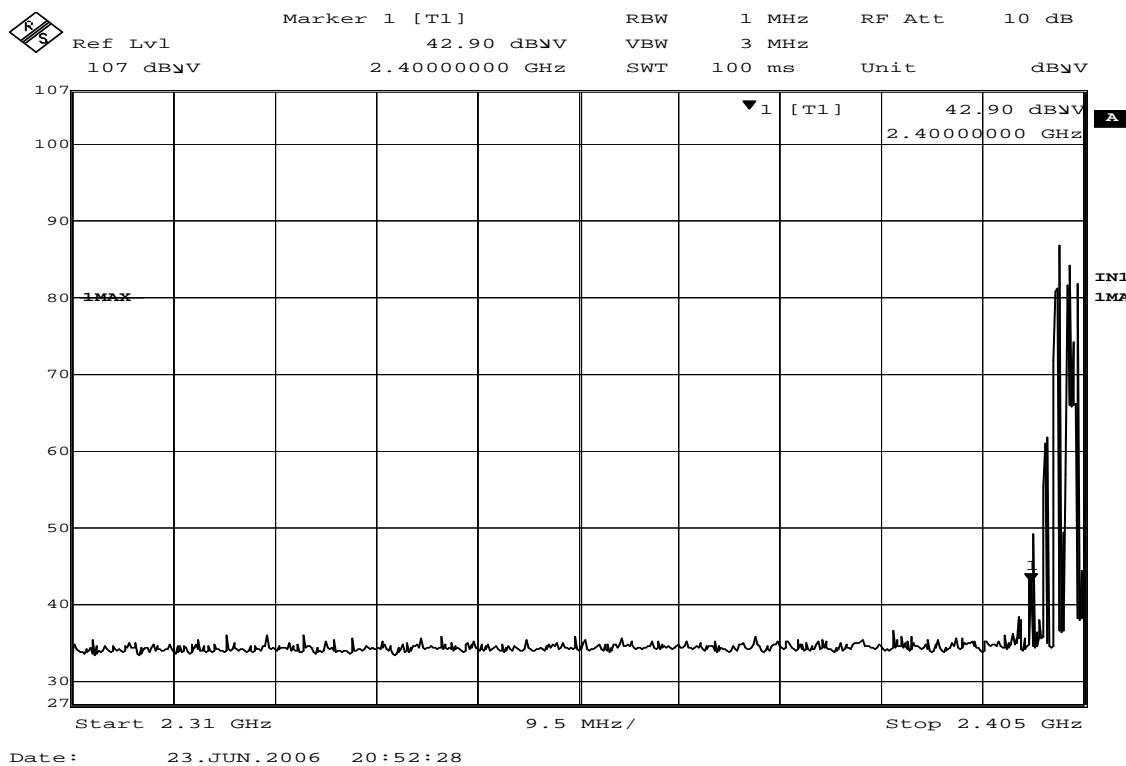
## 12. RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

**RULE PART NO.:** 15.205

**REQUIREMENTS:** Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m).

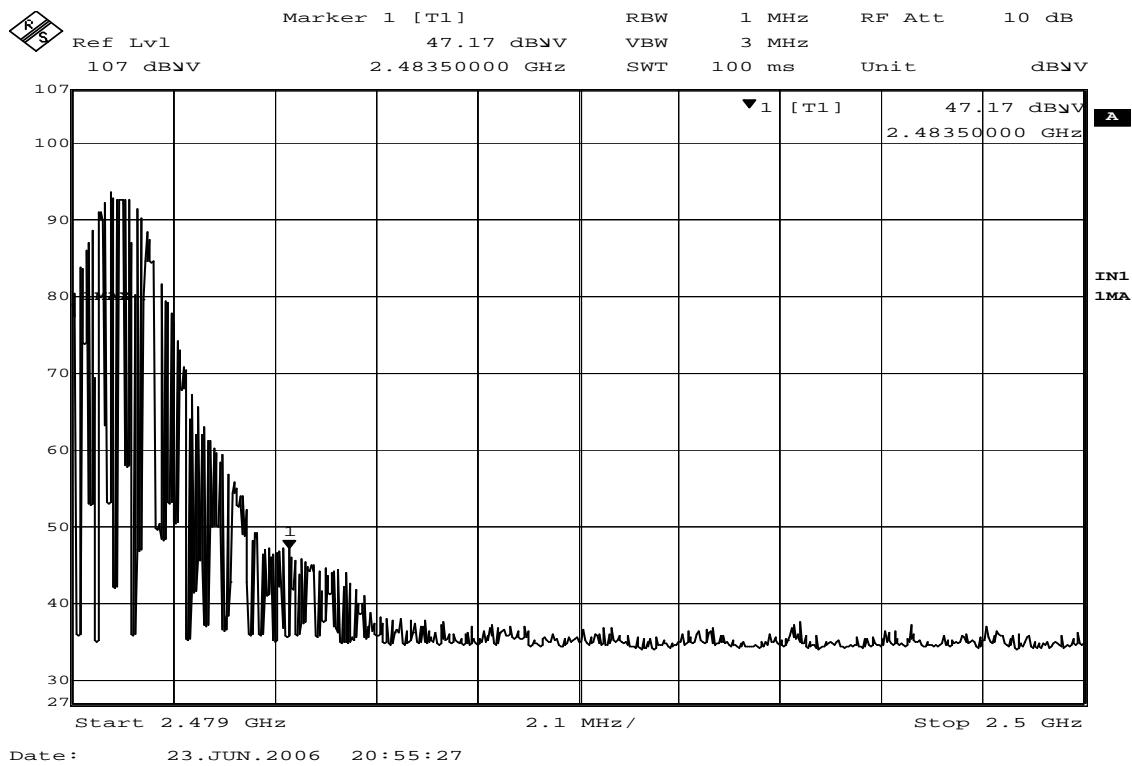
**TEST PROCEDURE:** An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2003 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

Lower Bandedge/ Restricted Band



From Plot, Reading is 42.90 dBuV/m with TDS has been calculated  
Peak meets the Average Value (54 dBuV/m).

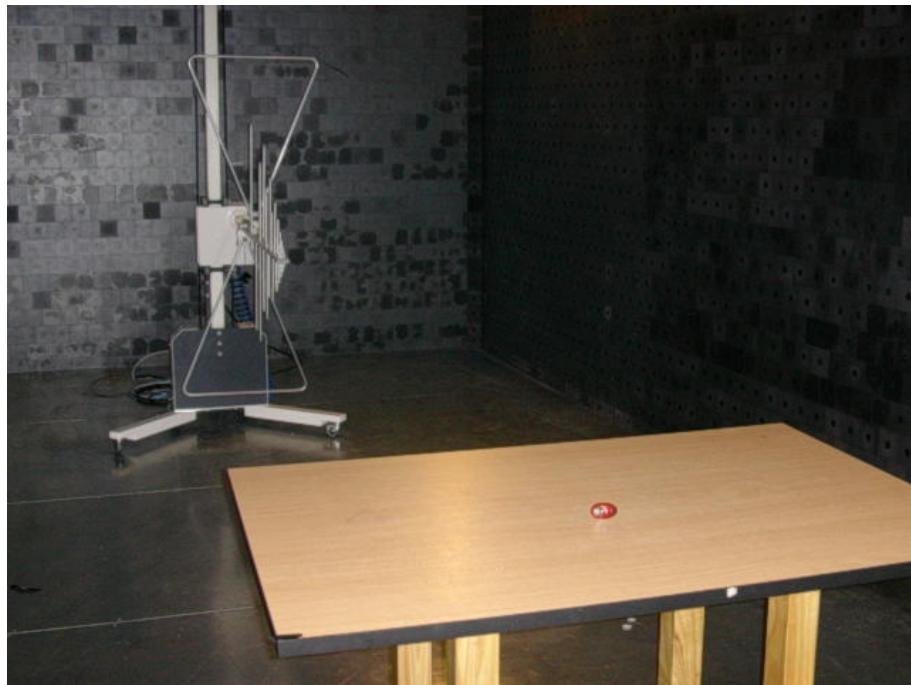
Upper bandedge and restricted band (peak value)



From Plot, Reading is 47.17 dB<sub>UV</sub>/m with TDS has been calculated  
Peak meets the Average Value (54 dB<sub>UV</sub>/m).

## TEST SETUP PHOTO

RADIATION TEST (30MHz to 1GHz)



RADIATION TEST (1MHz to 25GHz)

