

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION

**Product Name** : Wireless Projector Adapter  
**Model Number** : PTXXX Series  
**Trade Name** : N/A  
**FCC ID** : XSDPTXXX  
**Report Number** : SZEE091012430911-1  
**Date** : October 30, 2009

Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.249	PASS

Prepared for:

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*N/A means not applicable.*

## 1. CERTIFICATION INFORMATION

**Applicant & Address:** Advanced Sun Wah Electronic Co., Ltd  
Unit 10,19F/,Kowloon Plaza, No.485 Castle Peak Road, Lai Chi  
Kok, Kowloon,Hongkong,China  
Advanced Sun Wah Electronic Co., Ltd

**Manufacturer & Address:** Unit 10,19F/,Kowloon Plaza, No.485 Castle Peak Road, Lai Chi  
Kok, Kowloon,Hongkong,China

**Type of Test:** FCC Part 15 (Certification)

**FCC ID:** XSDPTXXX

**Equipment Under Test:** Wireless Projector Adapter

**Model Name:** PTXXX(XXX stand for 000-999)

**Test Model:** PT501

**Trade Name:** N/A

**Serial Number:** Not Applicable

**Technical Data:** DC 3V

**Date of test:** October 26,2009 to October 30, 2009

**Condition of Test Sample:** Normal

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart C and the measurement procedure according to ANSI C63.4.

The test results of this report relate only to the tested sample identified in this report.

Prepared by :

  
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Reviewed by :

  
Louisa Lu

Approved by :

  
Jim Zhang  
Manager



Date

:

October 30, 2009

## 2. TEST SUMMARY

Clause	Test Item	Result
1	20dB Bandwidth	PASS
2	Bandedge Emission	PASS
3	Radiated Emission	PASS

## 3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Uncertainty
Maximum Peak Conducted Output Power	0.5 dB
Radiated Emissions / Bandedge Emission	3.4 dB

## 4. PRODUCT INFORMATION

Items	Description
Rating	DC 3V
Intentional Transceiver	Intentional Transceiver
Modulation	FSK
Frequency Range	2402 ~ 2480 MHz
Channel Number	79 (at intervals of 1MHz)
Antenna	Type: PCB Antenna
	Gain: 0dBi

The models of Wireless Projector Adaptor is PTXXX, all the models are identical except for the color, the appearance and the model name. And the test model is PT501, all the test results are applicable to the other models.

## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 3V DC. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

### 5.2 EUT Exercising Software

There was no special software to exercise the device.

## 6. TABLE OF TEST MODE

Preliminary tests were performed the entire possible Configuration in different modulation type and different data rate according to the following table to find the worst cases. And only one group of the worst - case data for each test item is shown in the report.

Test Items	Test Mode	Modulation	Channel
20dB Bandwidth	Transmitting	FSK	0 / 78
Bandedge Emission	Transmitting	FSK	0 / 78
Radiated Emission	Transmitting	FSK	0 / 39 / 78

## 7. TEST EQUIPMENT LIST

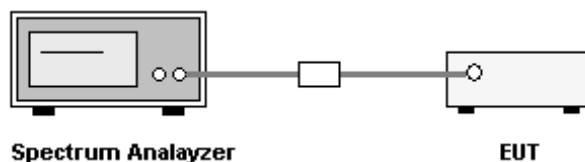
Equipment	Manufacturer	Model Number	Serial Number	Due Date
Spectrum Analyzer	Agilent	E440A	MY46185649	08/25/2010
Loop Antenna	ETS-LINDGREN	6502	00071730	08/25/2010
Biconilog Antenna	A.H.System	SAS-521-2	487	06/05/2010
Horn Antenna	ETS-LINDGREN	3117	00057407	06/27/2010
Preamplifier(9kHz-1GHz)	Agilent	11909A	186871	06/19/2011
Microwave Preamplifier	Agilent	8449B	3008A02425	06/19/2011
10M Chamber & Accessories	Rainford	N/A	N/A	06/19/2011

## 8. 20DB BANDWIDTH MEASUREMENT

### 8.1. LIMITS

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 8.2. BLOCK DIAGRAM OF TEST SETUP

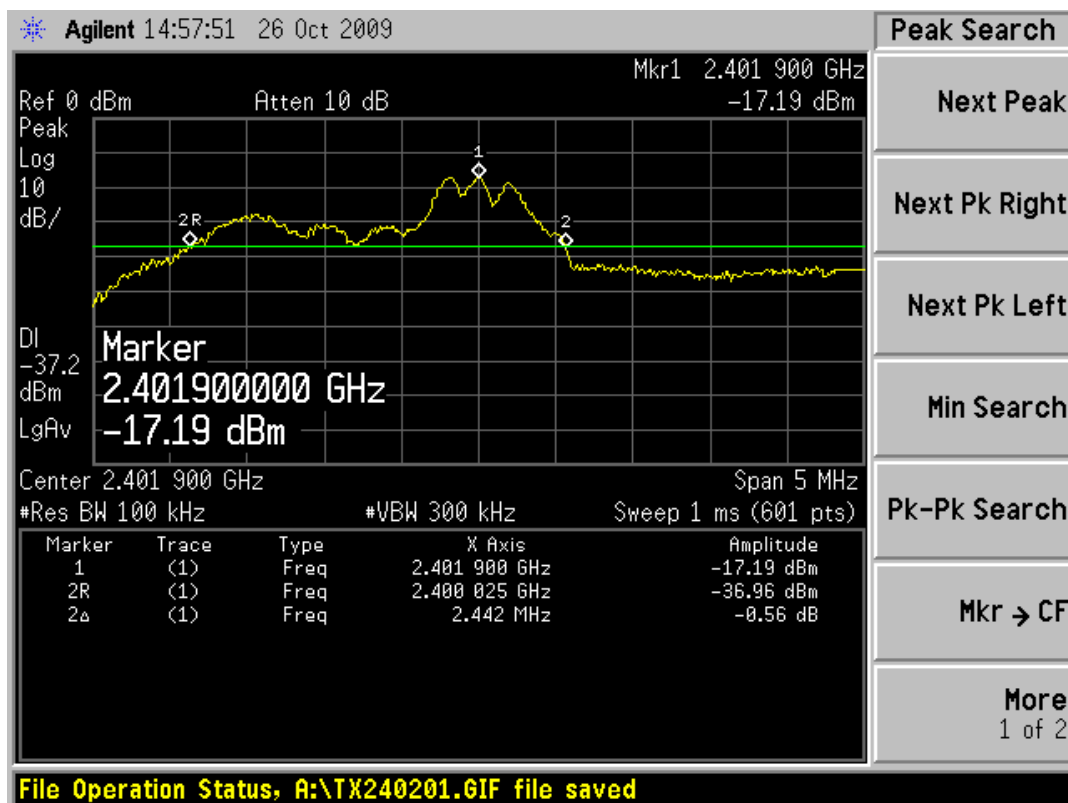


### 8.3. TEST PROCEDURE

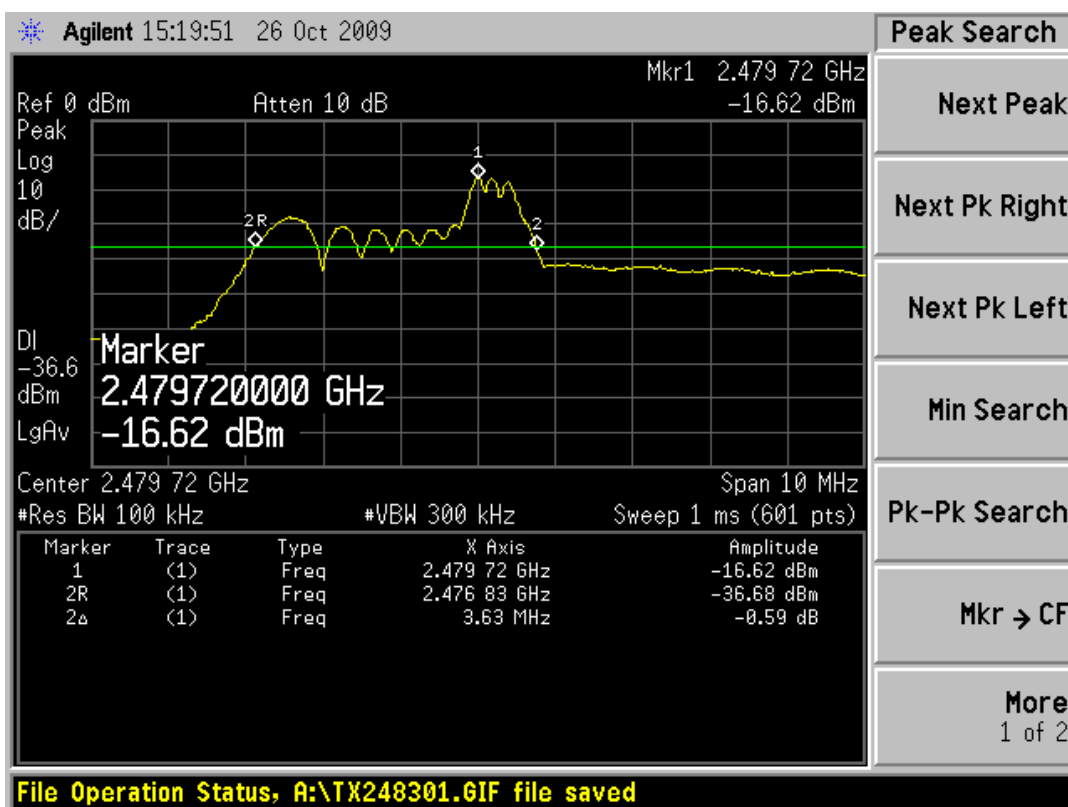
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level.
4. The 20dB bandwidth was determined from where the channel output spectrum intersected the display line.

### 8.4. TEST RESULT

Channel	Frequency (MHz)	20 dB BW (MHz)	Result
CH0	2402	2.44	3.63 MHz
CH78	2480	3.63	



Channel 0\_ 2402 MHz



Channel 78\_ 2480 MHz

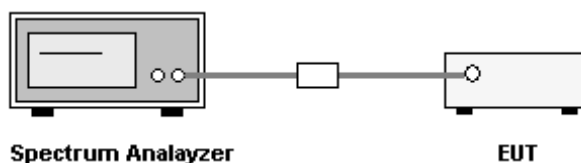


## 9. BAND EDGE EMISSION MEASUREMENT

### 9.1. LIMITS

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 9.2. BLOCK DIAGRAM OF TEST SETUP

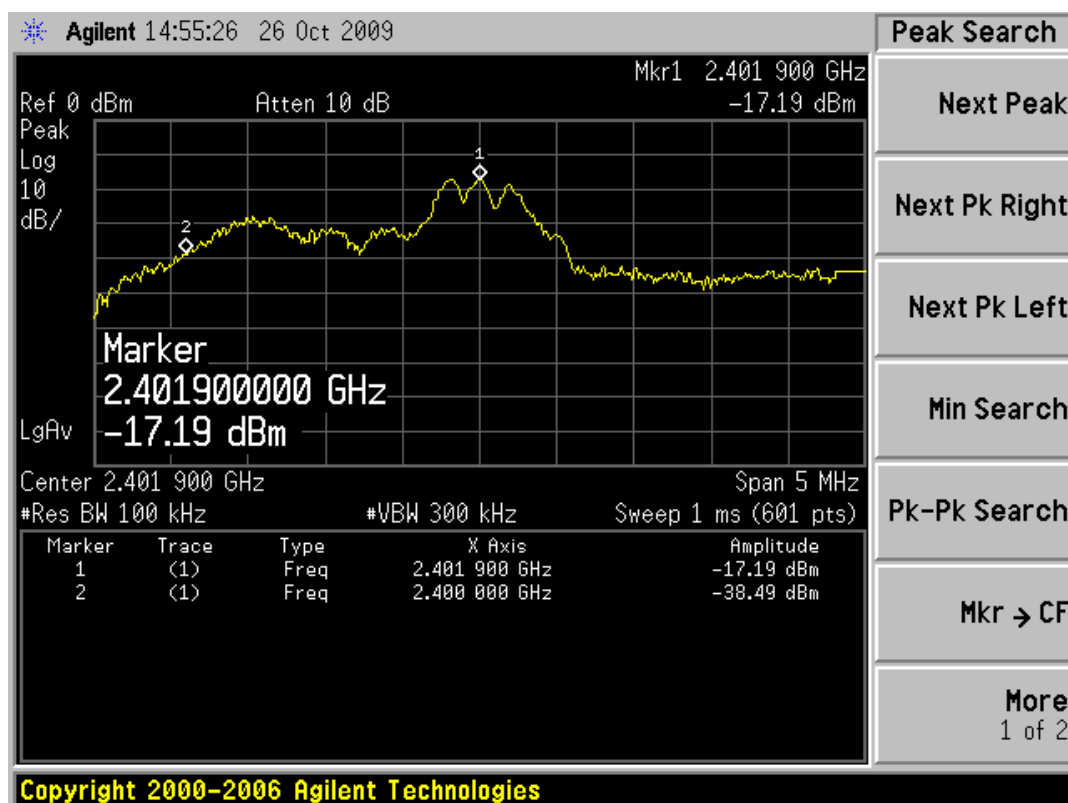


### 9.3. TEST PROCEDURE

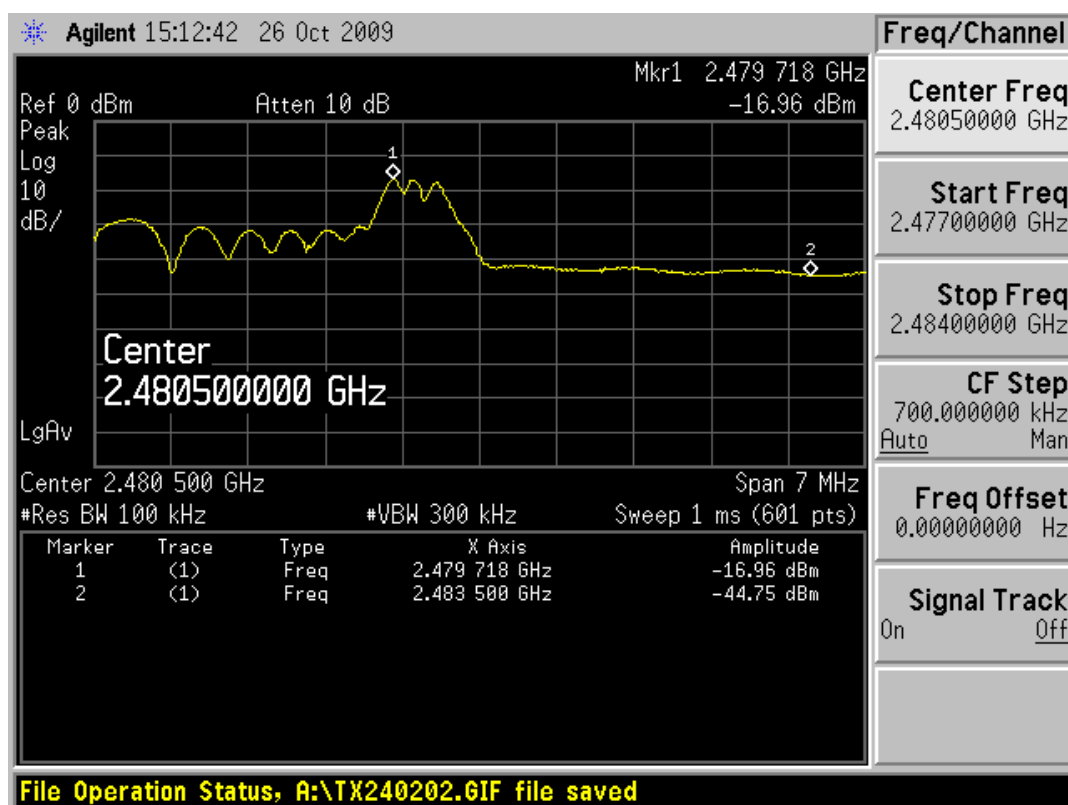
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the emission drops at the band-edge relative to the highest fundamental emission level.
4. Use the marker-delta method to determine band-edge compliance as required.

### 9.4. TEST RESULT

Channel_Freq. (MHz)	Fundamental Emission (dBμV/m)	delta	Final Emission ( dBμV/m)	Limit (dBμV/m)	Result (Pass / Fail)
CH0_ 2402	84.3	-21.3	63	74 (PK)	Pass
CH0_ 2402	70.2	-21.3	48.9	54 (AV)	Pass
CH78_ 2480	84.1	-27.79	56.31	74 (PK)	Pass
CH78_ 2480	68.7	-27.79	40.91	54 (AV)	Pass



CH0 \_ 2402MHz



CH78\_ 2480MHz

## 10. RADIATED EMISSIONS MEASUREMENT

### 10.1. LIMITS

intentional radiators operated within these frequency bands shall comply with the following:

Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

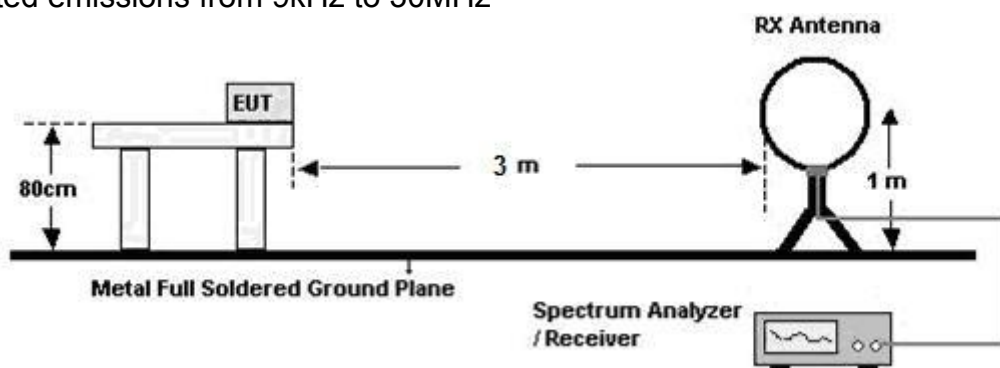
The field strength of any emissions, which appear outside of operating frequency band and restricted band specified on 15.205(a), shall not exceed the general radiated emission limits as below.

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

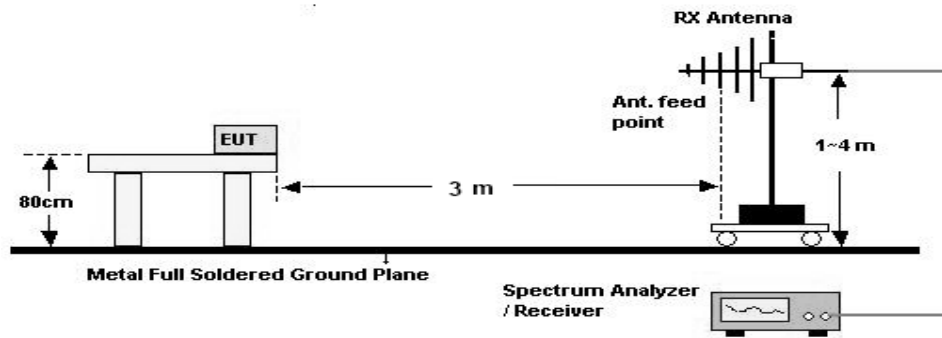
**Note:** the tighter limit applies at the band edges.

### 10.2. BLOCK DIAGRAM OF TEST SETUP

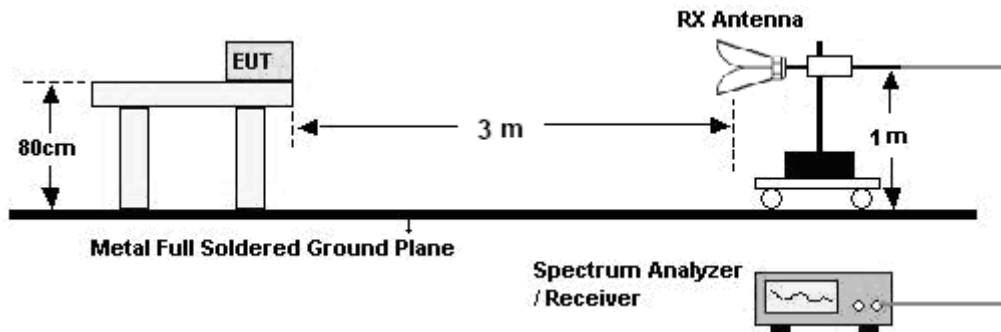
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from 1GHz to 25GHz



### 10.3. TEST PROCEDURE

#### A. Above 30MHz

- The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### B. Below 30MHz

- The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

# 10.4. TEST RESULT

Worst case-- Modulation Type: FSK Data Rate: 1Mbps

Note 1: Limit dB $\mu$ V/m @1m = Limit dB $\mu$ V/m @300m+ 90

Limit dB $\mu$ V/m @1m = Limit dB $\mu$ V/m @30m + 50

Limit dB $\mu$ V/m @1m = Limit dB $\mu$ V/m @3m +10

Note 2: No additional spurious emissions detected between lowest internal used/generated radio frequency and 30 MHz.

RE Test Result				
Frequency (MHz)	Detector (PK/QP/AV)	Final Emission (dBuV/m)	Limit (dBuV/m)	Result (P/F)
576.4330	QP	29.0	46.00	Pass
917.5500	QP	26.5	46.00	Pass
2402.0000	PK	84.3	---	Pass
2402.0000	AV	70.2	---	Pass
4804.0000	PK	67.4	74.00	Pass
4804.0000	AV	49.6	54.00	Pass
7206.0000	PK	58.4	74.00	Pass
7206.0000	AV	45.2	54.00	Pass
9608.0000	PK	50.4	74.00	Pass
9608.0000	AV	46.3	54.00	Pass

CH0\_2402MHz

RE Test Result				
Frequency (MHz)	Detector (PK/QP/AV)	Final Emission (dBuV/m)	Limit (dBuV/m)	Result (P/F)
852.8830	QP	25.1	46	Pass
949.8830	QP	26.2	46	Pass
2440.0000	PK	84.7	---	Pass
2440.0000	AV	81.0	---	Pass
4880.0000	PK	69.6	74	Pass
4880.0000	AV	50.0	54	Pass
7320.0000	PK	57.6	74	Pass
7320.0000	AV	43.7	54	Pass

CH39 \_ 2440MHz

RE Test Result				
Frequency (MHz)	Detector (PK/QP/AV)	Final Emission (dBuV/m)	Limit (dBuV/m)	Result (P/F)
707.3830	QP	22.2	46	Pass
961.2000	QP	26.3	46	Pass
2480.0000	PK	84.1	---	Pass
2480.0000	AV	68.7	---	Pass
4960.0000	PK	70.3	74	Pass
4960.0000	AV	50.4	54	Pass
7440.0000	PK	58.3	74	Pass
7440.0000	AV	46.9	54	Pass
9920.0000	PK	51.7	74	Pass
9920.0000	AV	43.6	54	Pass

CH78 \_ 2480MHz

## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

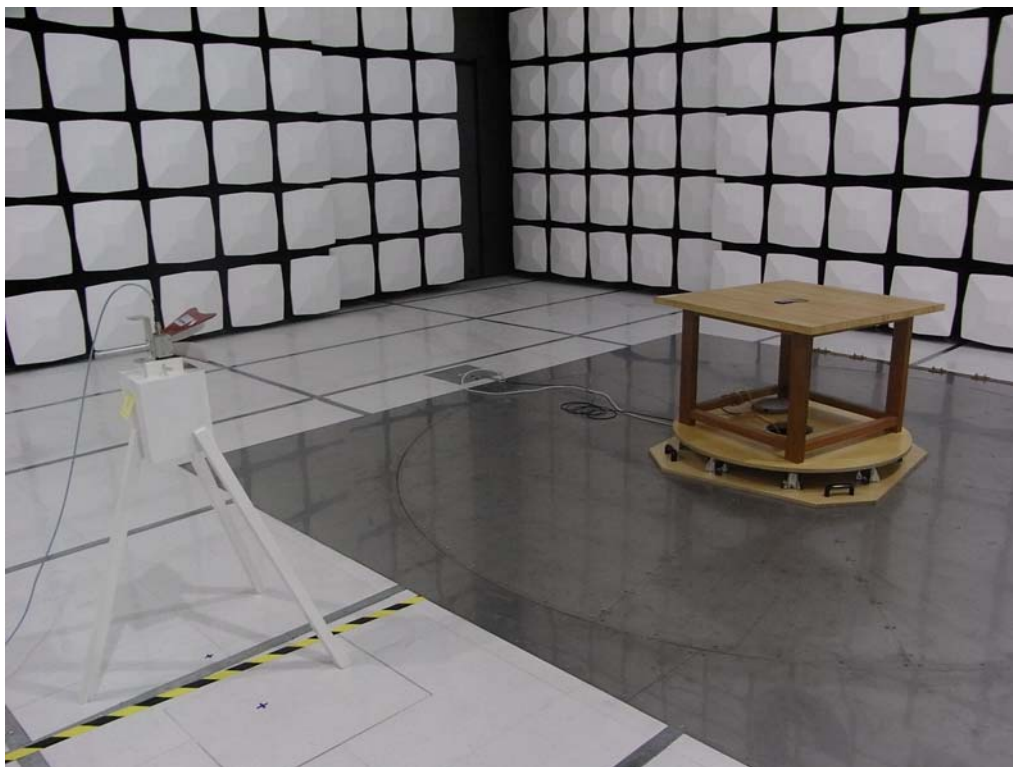


**TEST SETUP OF RADIATED EMISSION (9kHz-30MHz)**



**TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)**





**TEST SETUP OF RADIATED EMISSION (above 1GHz)**



## APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT



Front View of EUT



Rear View of EUT



## APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



Uncovered View of EUT-1

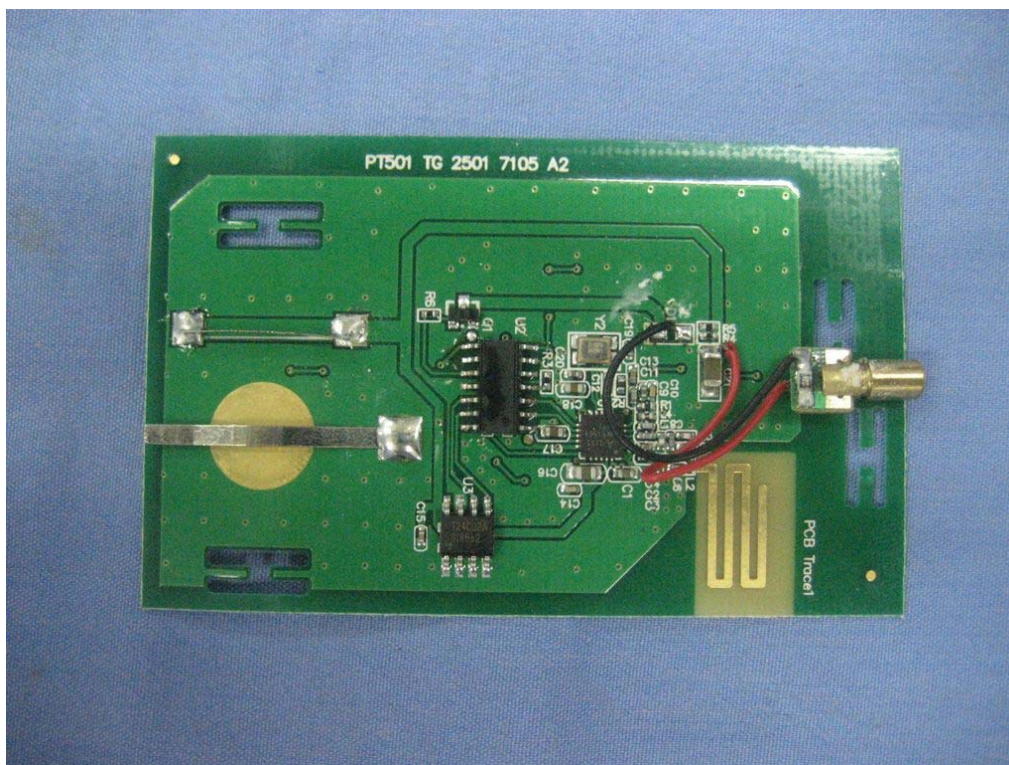


Uncovered View of EUT-2





Front view of PCB1



Back view of PCB1

----- End of report -----