



China

## RF - TEST REPORT

Report Number : **SMFR-R0004** Date of Issue: 2009-6-17

Model : R-R0004

Product Type : Wireless Presenter

Applicant : Wanlida Group Co., Ltd.

Address : No. 618 Jiahe Road

: Xiamen Fujian, China

Production Facility : Wanlida Group Co., Ltd.

Address : No. 618 Jiahe Road

Xiamen Fujian, China

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including  
Appendices : 44

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*TÜV SÜD China reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD China shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD China issued reports.*

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China

## 2. Details about the Test Laboratory

### Details about the Test Laboratory

Company name: Neutron Engineering Inc.  
No.3.JinShaGang 1st Road,  
ShiXia,DaLang Town,  
DongGuan, China

Telephone: 86 769 83183000  
Fax: 86 769 83196000

January 24, 2005 File on  
Federal Communications Commission  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046

Registration Number: 319330



China

### 3. Description of the Equipment Under Test

#### Description of the Equipment Under Test

Product: Wireless Presenter  
Model no.: R-R0004  
Serial number: NIL  
Options and accessories: NIL  
Rating: R-R0004 (Presenter), 3Vd.c./150mA;

Antenna: Integral antenna inside enclosure of EUT, NOT accessible by end user  
RF Transmission 2403-2480MHz 78channels

Frequency:  
Description of the EUT: Primary function for R-R0004 is a wireless presenter which has 78 channels working from 2403MHz to 2480MHz.

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01	2403 MHz	Channel 21	2423 MHz	Channel 41	2443 MHz	Channel 61	2463 MHz
Channel 02	2404 MHz	Channel 22	2424 MHz	Channel 42	2444 MHz	Channel 62	2464 MHz
Channel 03	2405 MHz	Channel 23	2425 MHz	Channel 43	2445 MHz	Channel 63	2465 MHz
Channel 04	2406 MHz	Channel 24	2426 MHz	Channel 44	2446 MHz	Channel 64	2466 MHz
Channel 05	2407 MHz	Channel 25	2427 MHz	Channel 45	2447 MHz	Channel 65	2467 MHz
Channel 06	2408 MHz	Channel 26	2428 MHz	Channel 46	2448 MHz	Channel 66	2468 MHz
Channel 07	2409 MHz	Channel 27	2429 MHz	Channel 47	2449 MHz	Channel 67	2469 MHz
Channel 08	2410 MHz	Channel 28	2430 MHz	Channel 48	2450 MHz	Channel 68	2470 MHz
Channel 09	2411 MHz	Channel 29	2431 MHz	Channel 49	2451 MHz	Channel 69	2471 MHz
Channel 10	2412 MHz	Channel 30	2432 MHz	Channel 50	2452 MHz	Channel 70	2472 MHz
Channel 11	2413 MHz	Channel 31	2433 MHz	Channel 51	2453 MHz	Channel 71	2473 MHz
Channel 12	2414 MHz	Channel 32	2434 MHz	Channel 52	2454 MHz	Channel 72	2474 MHz
Channel 13	2415 MHz	Channel 33	2435 MHz	Channel 53	2455 MHz	Channel 73	2475 MHz
Channel 14	2416 MHz	Channel 34	2436 MHz	Channel 54	2456 MHz	Channel 74	2476 MHz
Channel 15	2417 MHz	Channel 35	2437 MHz	Channel 55	2457 MHz	Channel 75	2477 MHz
Channel 16	2418 MHz	Channel 36	2438 MHz	Channel 56	2458 MHz	Channel 76	2478 MHz
Channel 17	2419 MHz	Channel 37	2439 MHz	Channel 57	2459 MHz	Channel 77	2479 MHz
Channel 18	2420 MHz	Channel 38	2440 MHz	Channel 58	2460 MHz	Channel 78	2480 MHz
Channel 19	2421 MHz	Channel 39	2441 MHz	Channel 59	2461 MHz		
Channel 20	2422 MHz	Channel 40	2442 MHz	Channel 60	2462 MHz		



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#### 4. Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators



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## 5. Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
15.207 Conducted Emission AC Power Port	9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15.247 (b) (1) Conducted peak output power	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.247(d) Band edge compliance of RF emissions	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.247(d) Spurious RF conducted emissions	19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.247(d) 15.209 Spurious radiated emissions	25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.247(a)(2) 6dB bandwidth	29	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.247(e) Power spectral density	32	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receiver mode				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
15.107 Conducted Emission AC Power Port	35	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15.109(a), 15.205 Spurious radiated emissions	37	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



China

## 6. General Remarks

This submittal(s) (test report) is intended for

FCC ID: SMFR-R0004(For presenter R-R0004);

filing to comply with

- Section 15.109(a), 15.205, 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

Tests have been carried out in accordance with FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705 and DTS procedures KDB 558074.

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Testing Start Date: 2009-6-2

Testing End Date: 2009-6-4

- TÜV SÜD CHINA, SHENZHEN BRANCH -

Reviewed by:

Prepared by:

Kitty Xu  
Assistant Department Manager

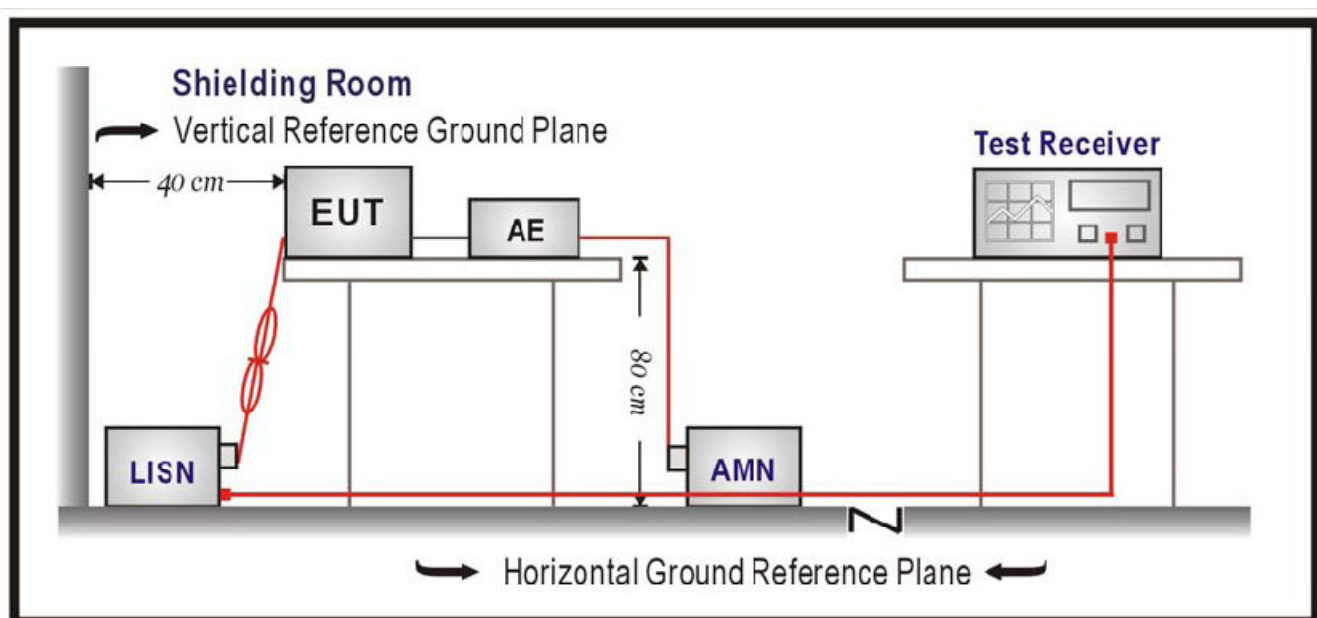
Tony Liu  
Assistant Project Manager

## 7. Technical Requirement

### a) Conducted Emission

#### Test Method

- 1 The EUT was placed on a table, which is 0.8m above ground plane
- 2 The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3 Maximum procedure was performed to ensure EUT compliance
- 4 A EMI test receiver (R&S Test Receiver ESCI) is used to test the emissions from both sides of AC line



#### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency





China

## 7.1 Conducted Emission

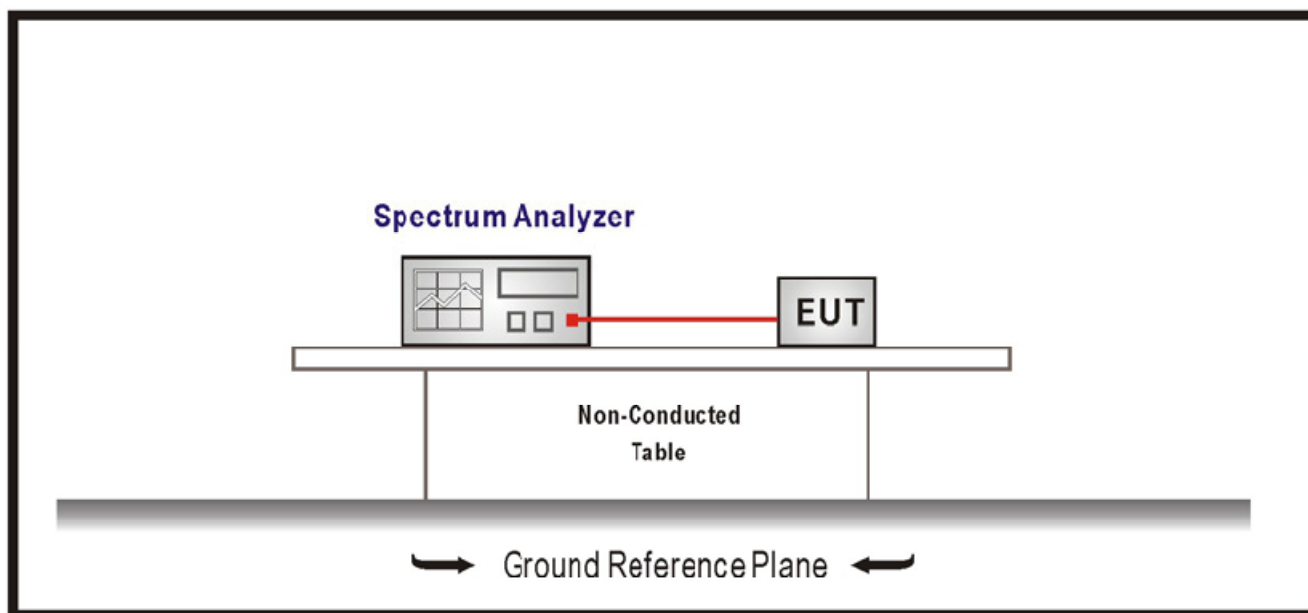
**Note: Due to the fact that UUT was powered by battery, no tests applied.**

## 7.2 Conducted peak output power

### Test Method

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

The measurement is made according to DTS procedures KDB 558074.



### Limits for conducted peak output power measurements

Frequency Range MHz	Limit W	Limit dBm
2400-2483	$\leq 1$	$\leq 30$

### Conducted peak output power

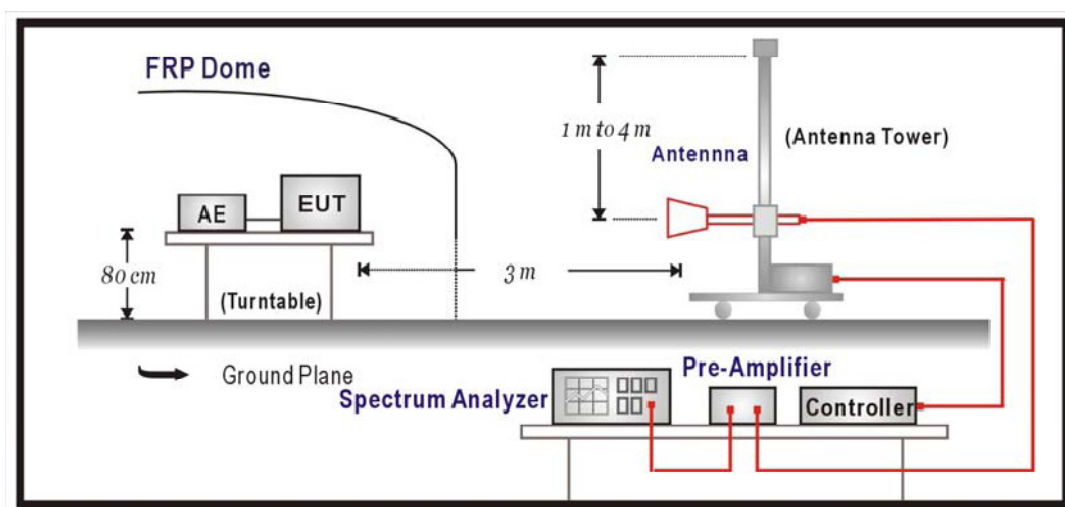
Model	Frequency	Peak power(dBm)	Results
R-R0004	CH01	-0.43	P
	CH38	-0.71	P
	CH78	-1.08	P

## 7.3 Band edge compliance of RF emissions

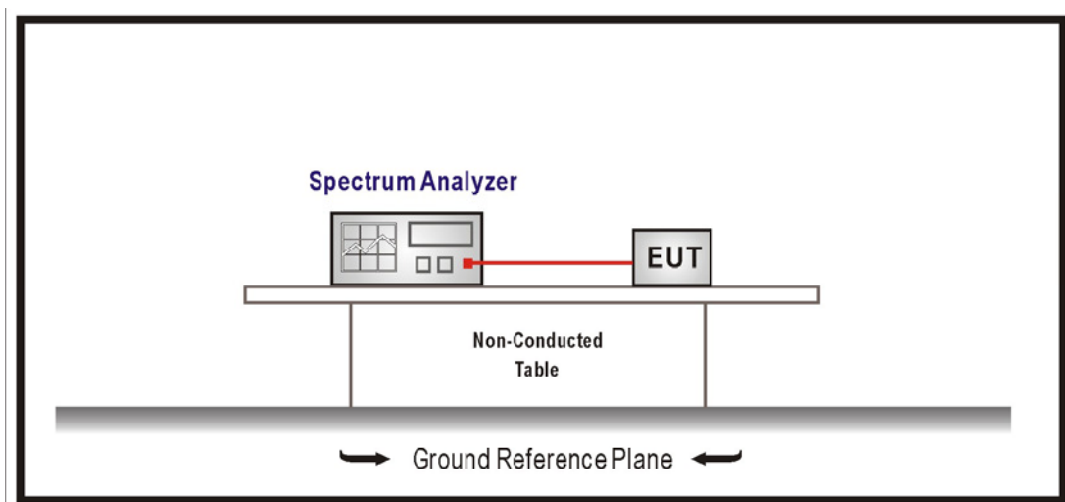
### Test Method

The measurement is made according to DTS procedures KDB 558074.

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBW to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.



The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100kHz, to measure the conducted peak band edge. Set RBW 1MHz and VBW to 10Hz, to measure the conducted AV band edge.





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## Limits

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

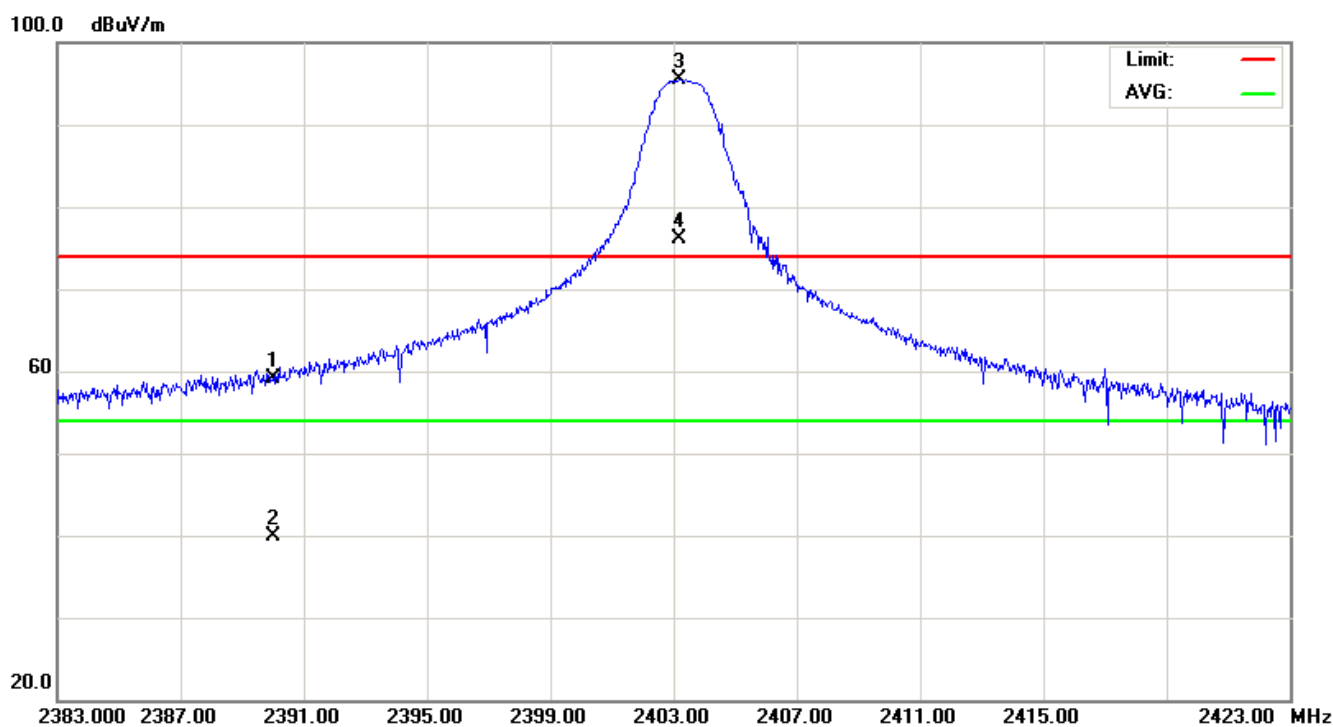
Frequency MHz	Limit Average dBuV/m	Limit Peak dBuV/m
Below 2390 Above 2483.5	54	74

## Band edge compliance of RF emissions

EUT:	Wireless Presenter	Model Name :	R-R0004
Temperature:	20°C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3V
Test Mode :	Transmit mode		
Test By:	Tony Liu	Test date	2009-06-02

### Lower edge

### Horizontal



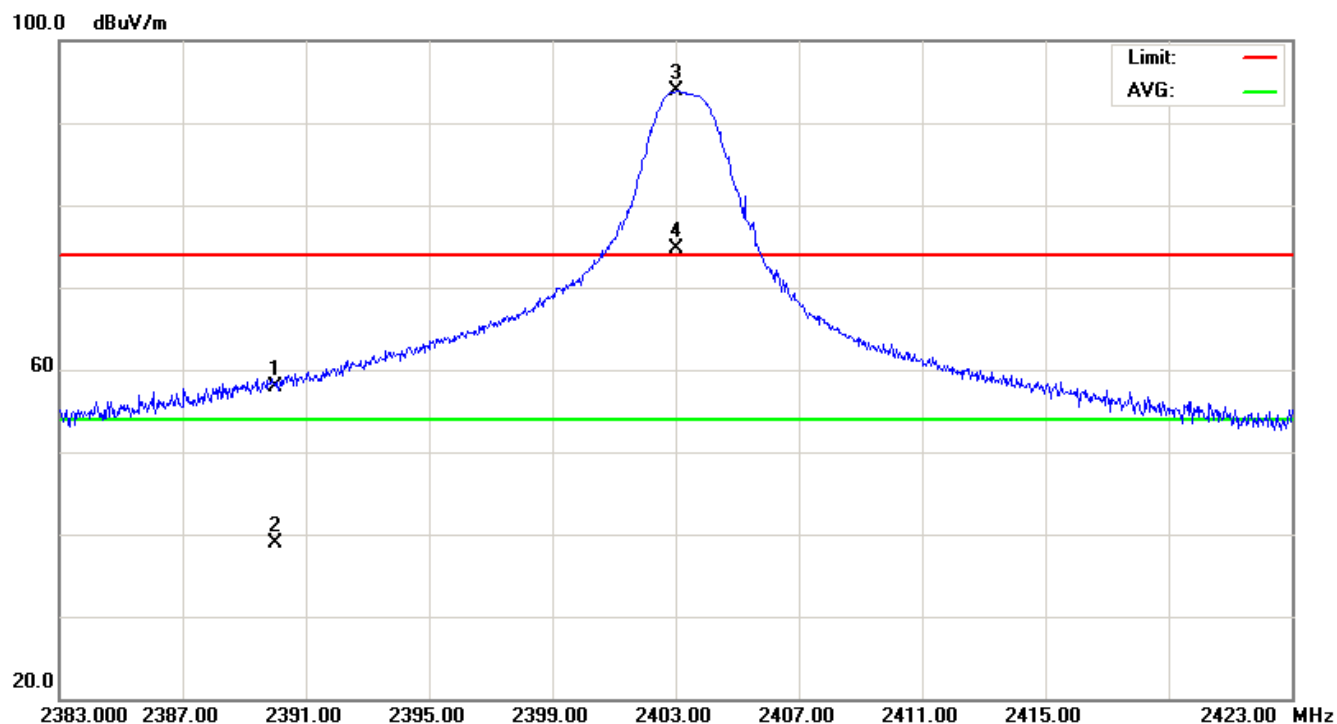
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	26.83	32.32	59.15	74.00	-14.85	peak
2		2390.000	7.50	32.32	39.82	54.00	-14.18	AVG
3	X	2403.200	63.15	32.36	95.51	74.00	21.51	peak
4	*	2403.200	43.82	32.36	76.18	54.00	22.18	AVG

Result: Pass

Report Number: SMFR-R0004

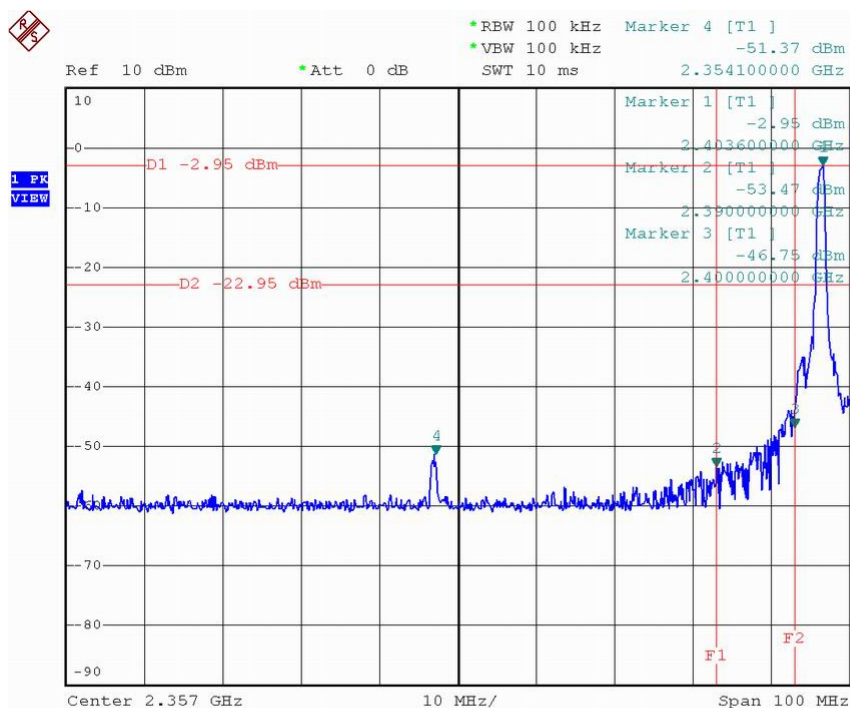
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## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	25.68	32.32	58.00	74.00	-16.00	peak
2		2390.000	6.55	32.32	38.87	54.00	-15.13	AVG
3	X	2403.000	61.51	32.36	93.87	74.00	19.87	peak
4	*	2403.000	42.38	32.36	74.74	54.00	20.74	AVG

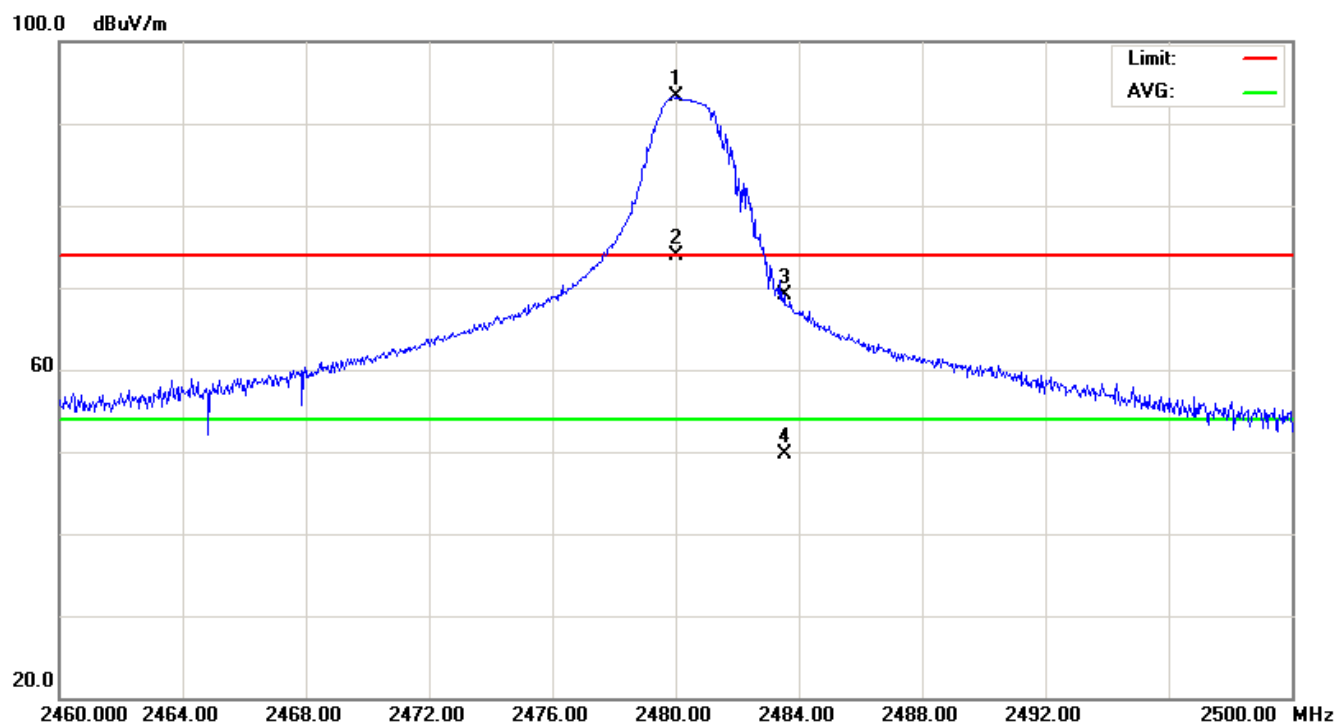
Result: Pass



Date: 2.JUN.2009 19:30:57

Result: Pass

Upper edge  
Horizontal

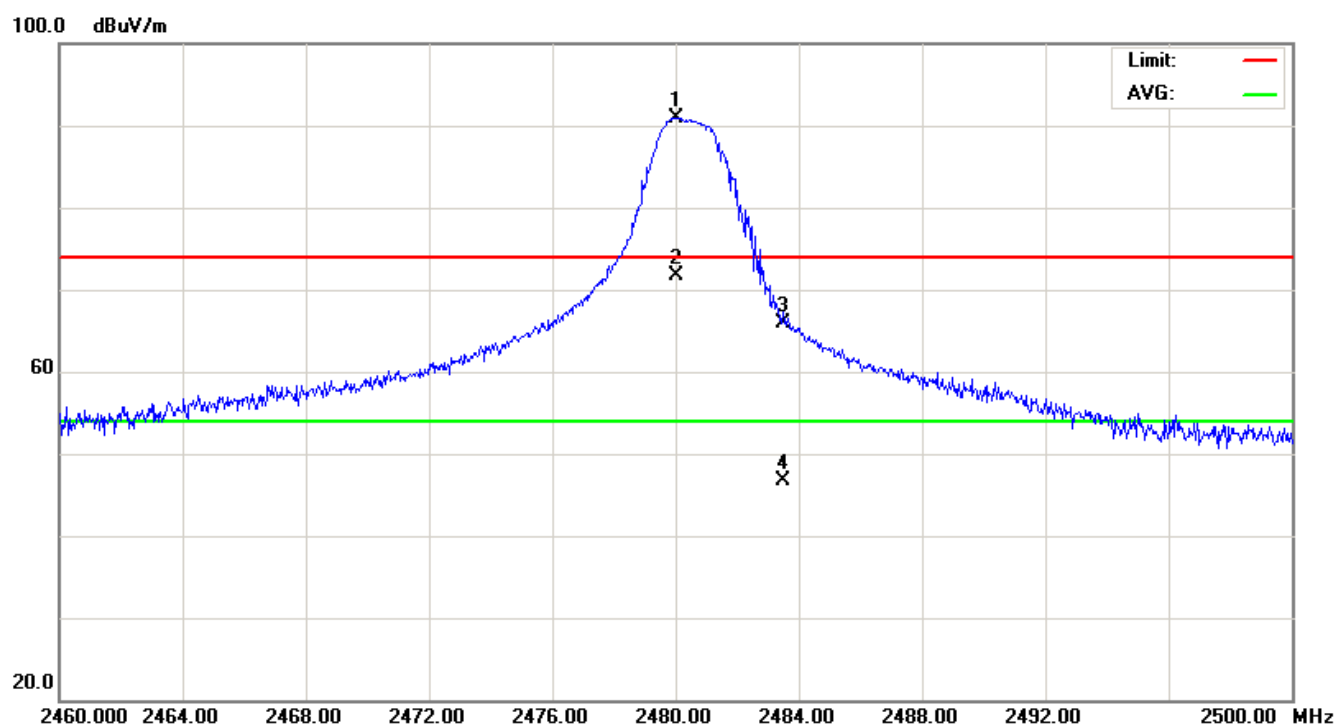


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2480.000	60.59	32.63	93.22	74.00	19.22	peak
2	*	2480.000	41.26	32.63	73.89	54.00	19.89	AVG
3		2483.500	36.49	32.63	69.12	74.00	-4.88	peak
4		2483.500	17.16	32.63	49.79	54.00	-4.21	AVG

Result: Pass

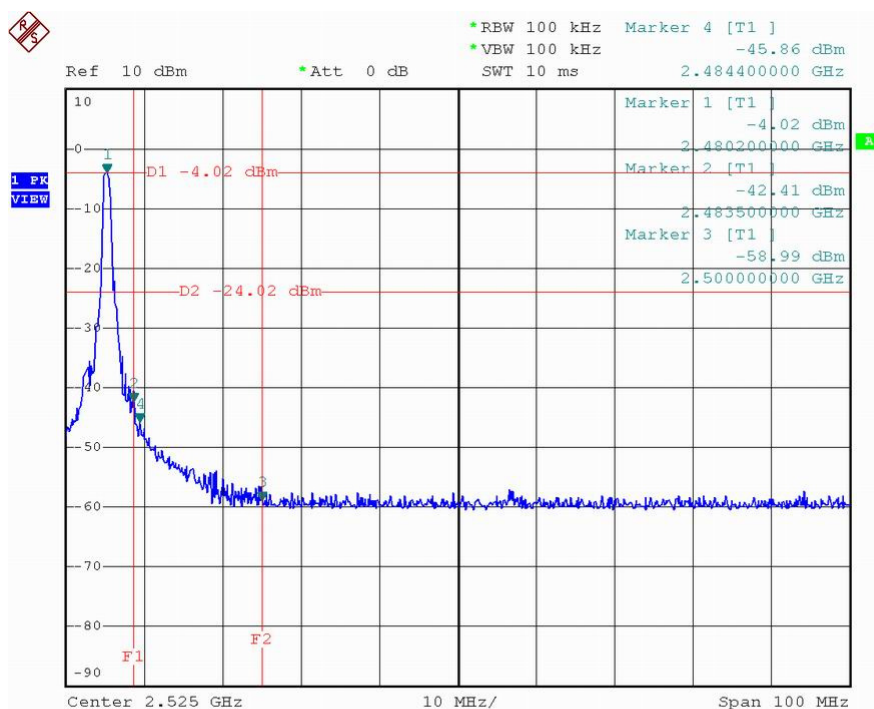


## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2480.000	58.33	32.63	90.96	74.00	16.96	peak
2	*	2480.000	39.00	32.63	71.63	54.00	17.63	AVG
3		2483.500	33.36	32.63	65.99	74.00	-8.01	peak
4		2483.500	14.03	32.63	46.66	54.00	-7.34	AVG

Result: Pass



Date: 2.JUN.2009 19:34:12

Result: Pass

## 7.4 Spurious RF conducted emissions

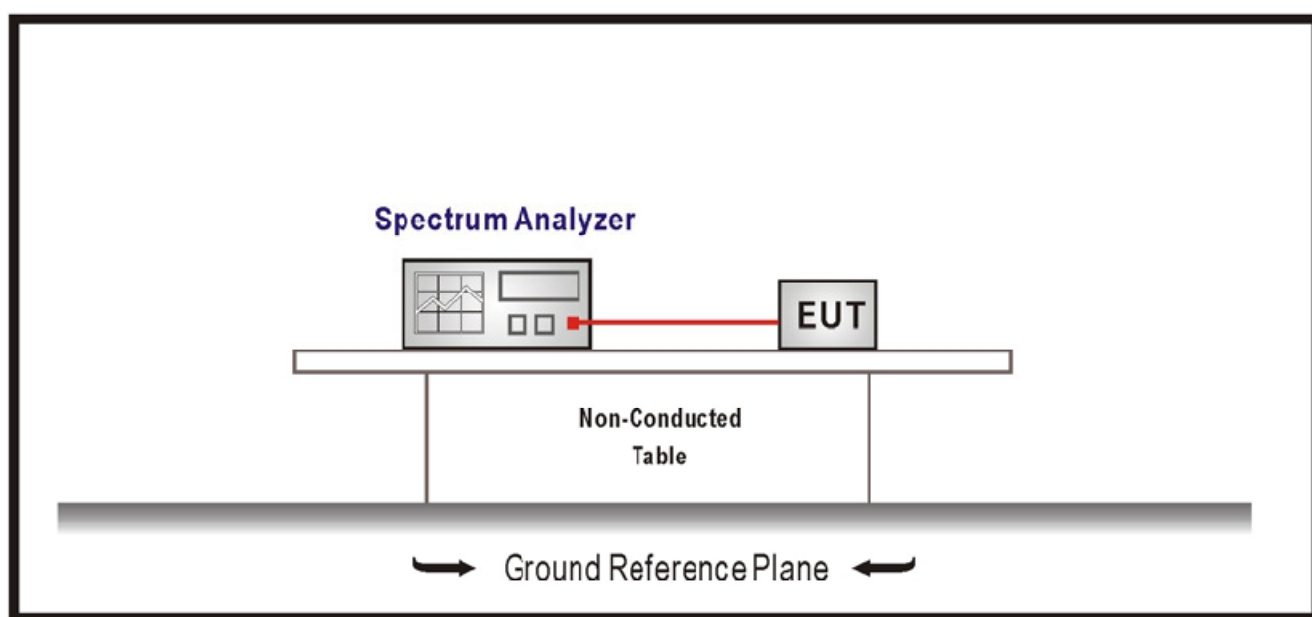
### Test Method

The measurement is made according to DTS procedures KDB 558074.

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The resolution bandwidth(RBW) and the video bandwidth (VBW) of the spectrum analyzer were respectively set to 100kHz and 100kHz.

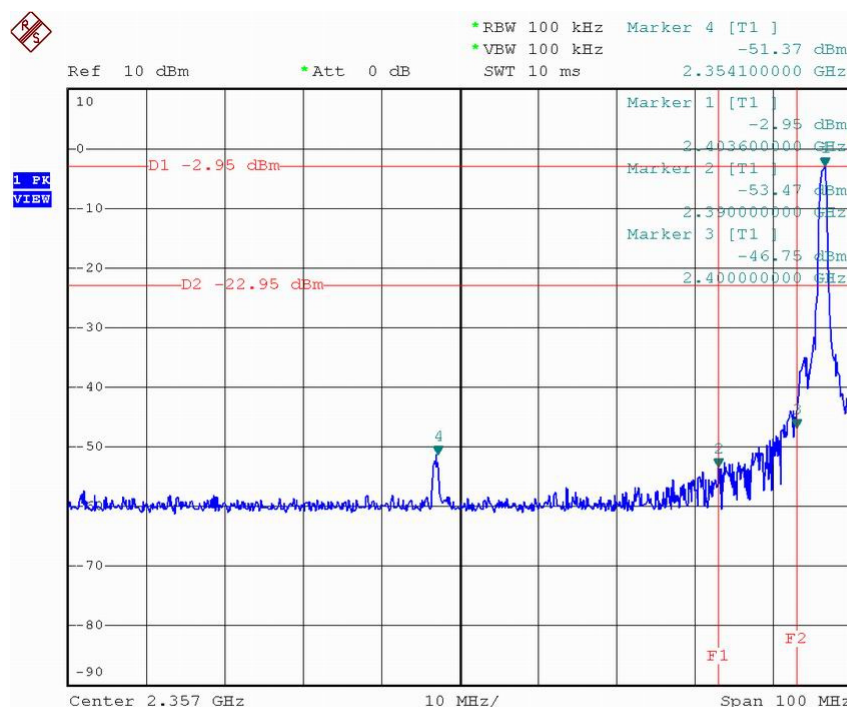


### Limit

Frequency Range MHz	Limit (dBc)
1000-25000	-20

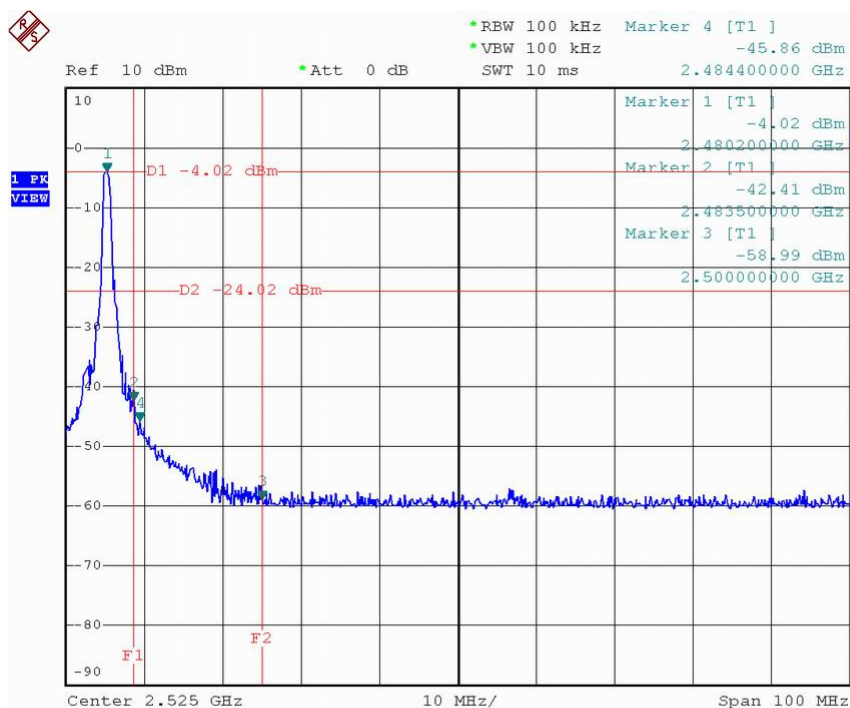
## Spurious RF conducted emissions

EUT:	Wireless Presenter	Model Name :	R-R0004
Temperature:	20°C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3V
Test Mode :	Transmit mode		
Test By:	Tony Liu	Test date	2009-06-02



Date: 2.JUN.2009 19:30:57

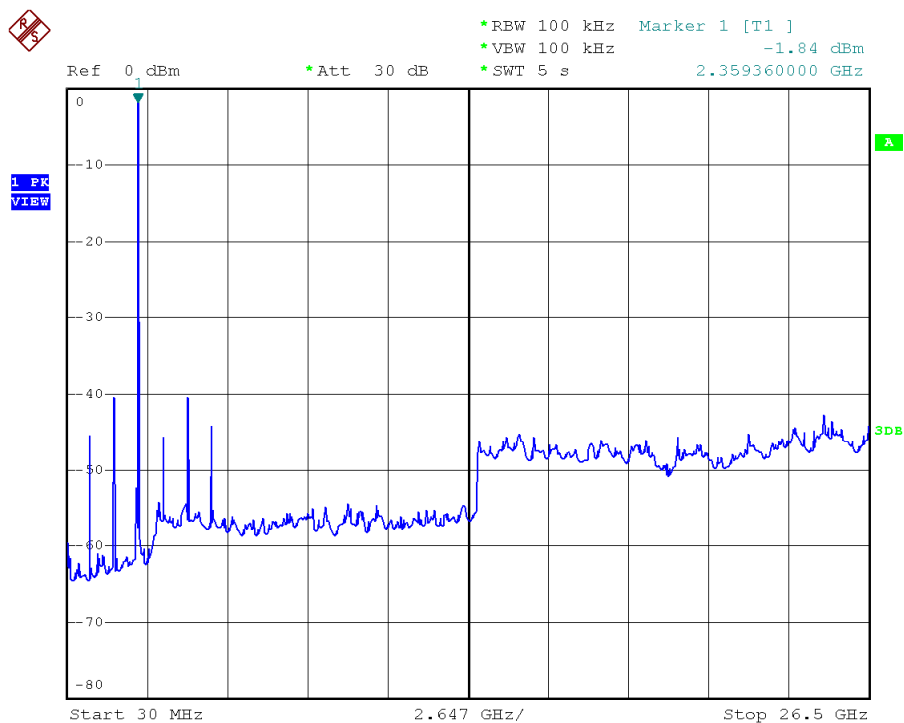
\*: The highest emission of  $f < 2390\text{MHz}$  was detected at  $2.3541\text{GHz}$  which below the  $20\text{dBc}$  limit line.



Date: 2.JUN.2009 19:34:12

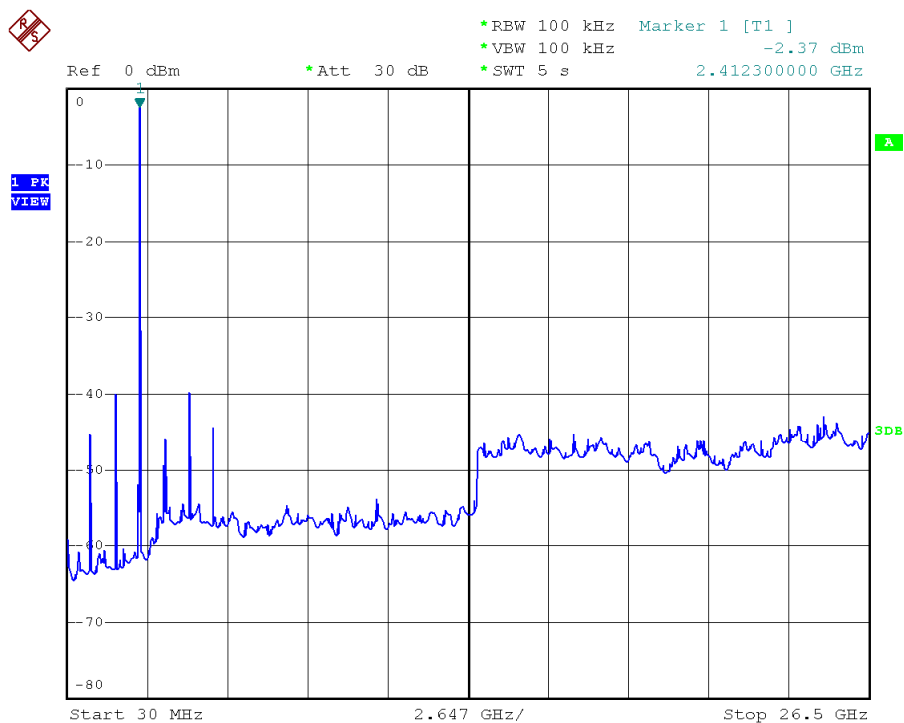
\*: The highest emission of  $f > 2483.5$  MHz was detected at 2.4385 GHz which below the 20 dBc limit line.

2403MHz



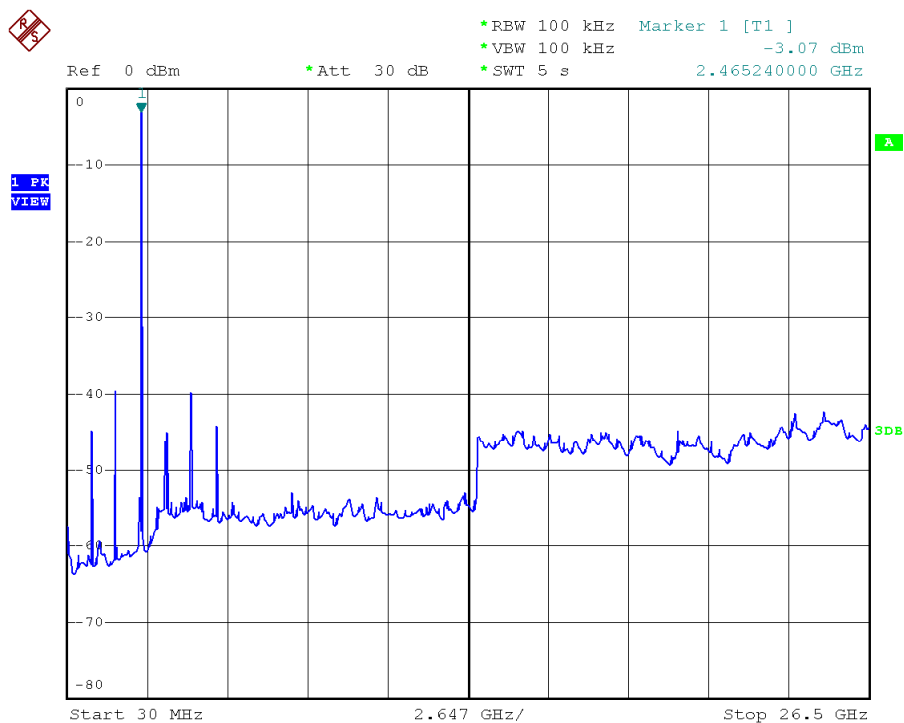
Date: 2.JUN.2009 22:01:08

2440MHz



Date: 2.JUN.2009 22:02:12

2480MHz



Date: 2.JUN.2009 22:07:58

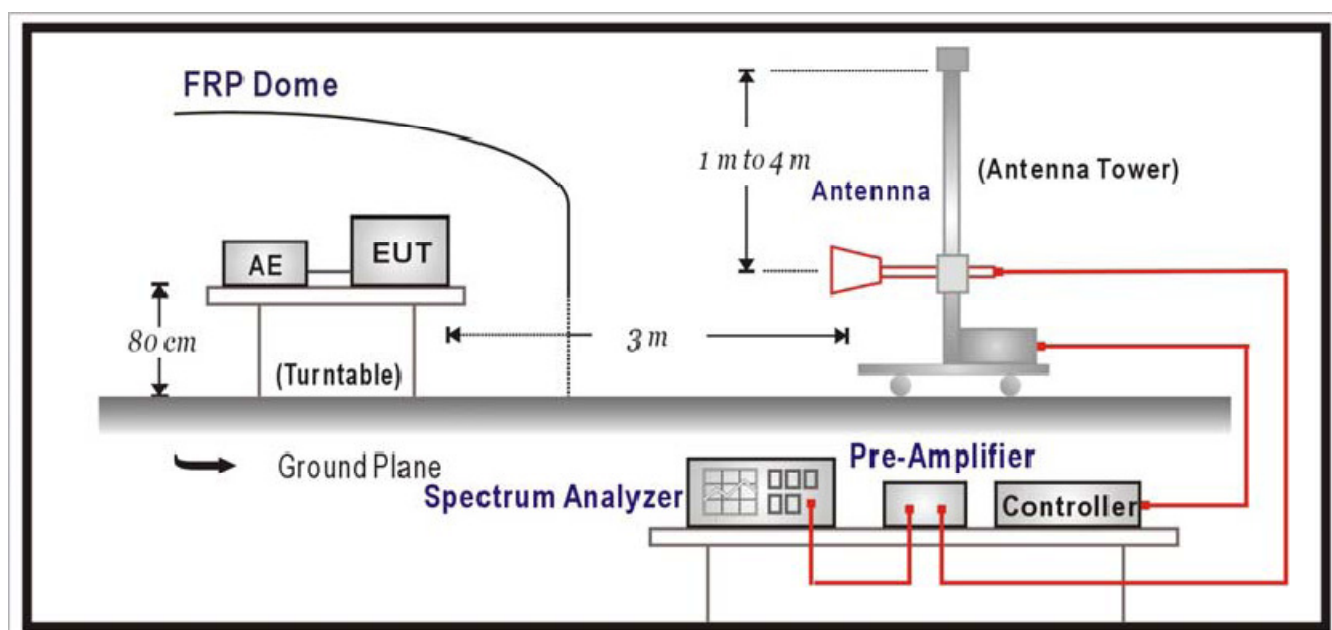


## 7.5 Spurious radiated emissions

### Test Method

The measurement is made according to DTS procedures KDB 558074.

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.



### Limit

Frequency MHz	Field Strength uV/m	Field Strength dBuV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK



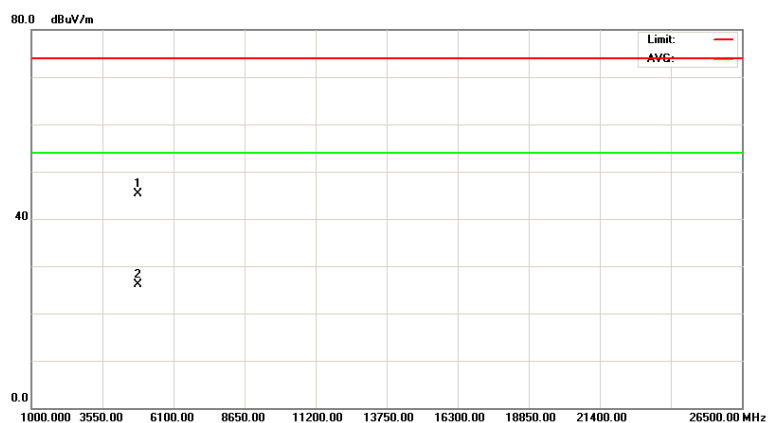
China

## Radiated Emission

EUT:	Wireless Presenter	Model Name :	R-R0004
Test Mode :	Transmit mode		
Test By:	Tony Liu	Test date	2009-06-04

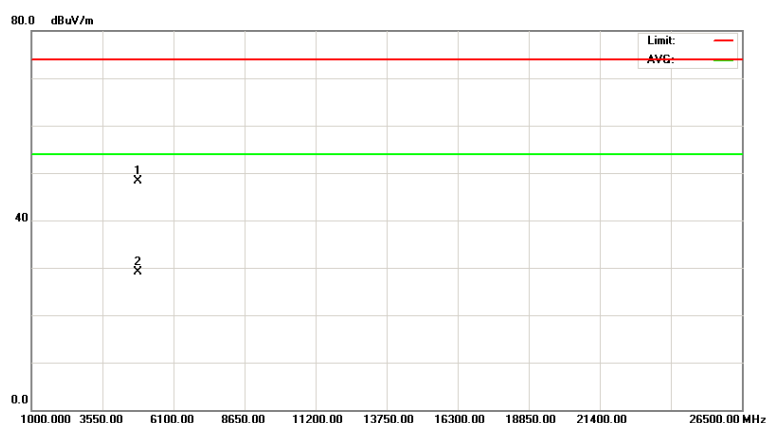
CH01 2403MHz

Horizontal



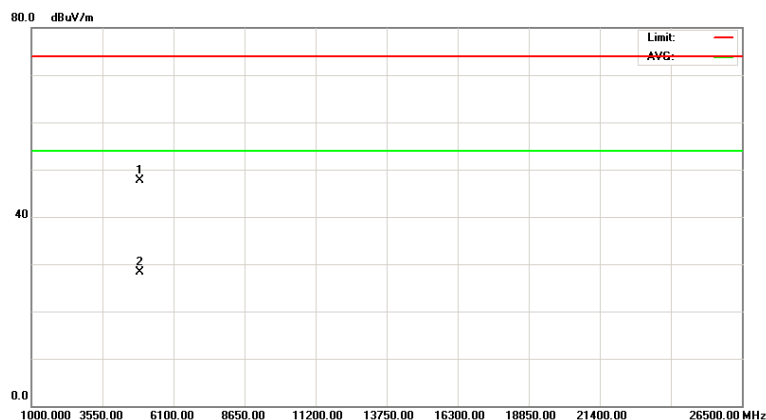
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		4806.230	40.94	4.45	45.39	74.00	-28.61	peak
2	*	4806.230	21.61	4.45	26.06	54.00	-27.94	AVG

Vertical



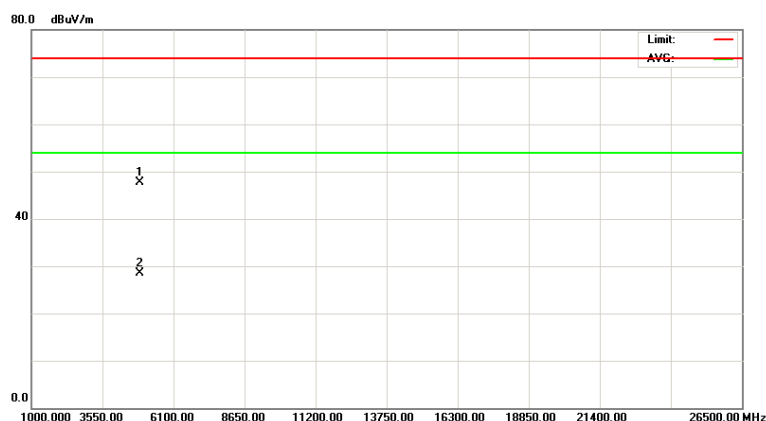
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		4806.270	43.90	4.45	48.35	74.00	-25.65	peak
2	*	4806.270	24.57	4.45	29.02	54.00	-24.98	AVG

## CH38 2440MHz Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4880.600	43.01	4.70	47.71	74.00	-26.29	peak
2	*	4880.600	23.68	4.70	28.38	54.00	-25.62	AVG

## Vertical

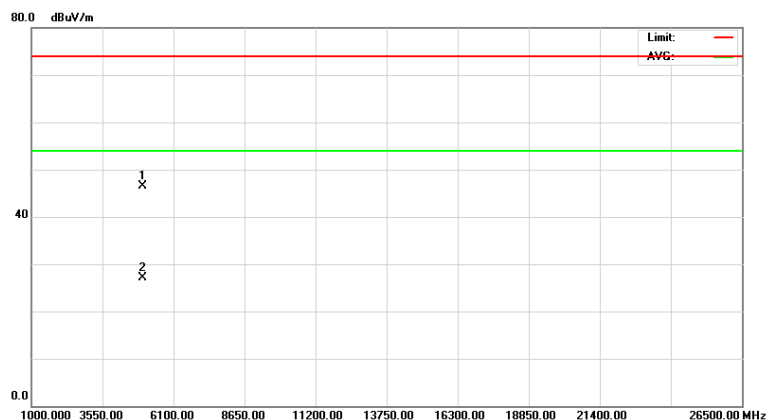


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4880.075	43.07	4.70	47.77	74.00	-26.23	peak
2	*	4880.075	23.74	4.70	28.44	54.00	-25.56	AVG



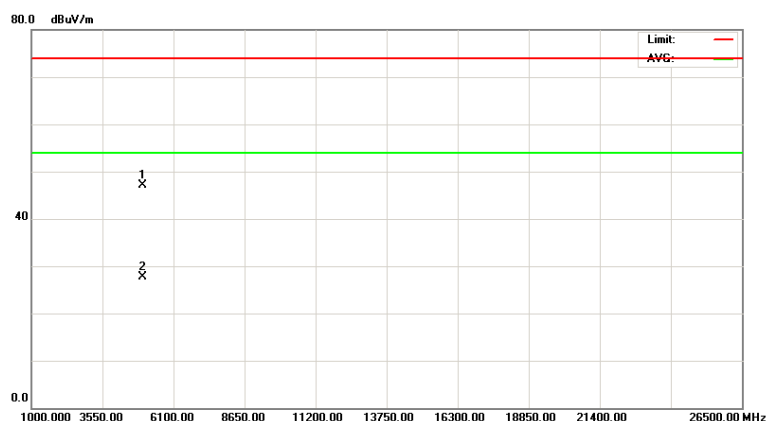
China

## CH78 2480MHz Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4961.025	42.09	4.95	47.04	74.00	-26.96	peak
2	*	4961.025	22.76	4.95	27.71	54.00	-26.29	AVG

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4960.630	41.54	4.95	46.49	74.00	-27.51	peak
2	*	4960.630	22.21	4.95	27.16	54.00	-26.84	AVG

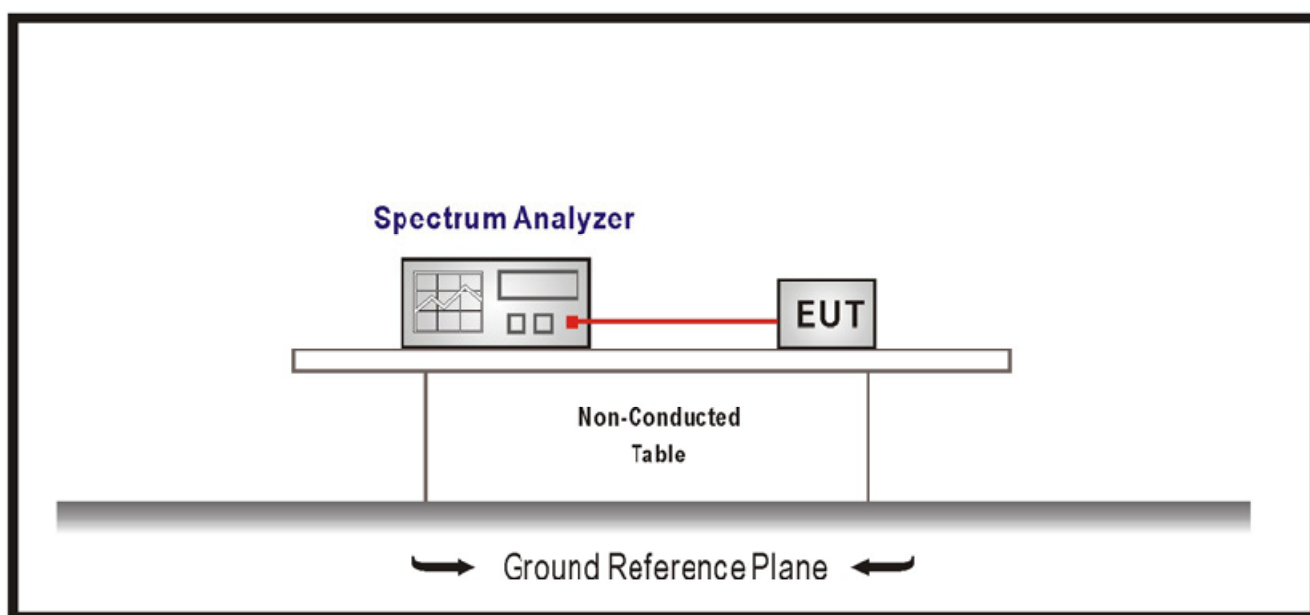
Result: Pass

## 7.6 6 dB bandwidth

### Test Method

The measurement is made according to DTS procedures KDB 558074

- 1 Place the EUT on the table and set it in the transmitting mode.
- 2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3 Mark the peak frequency and  $-6\text{dB}$  (upper and lower) frequency.



### Limit

Limit [kHz]

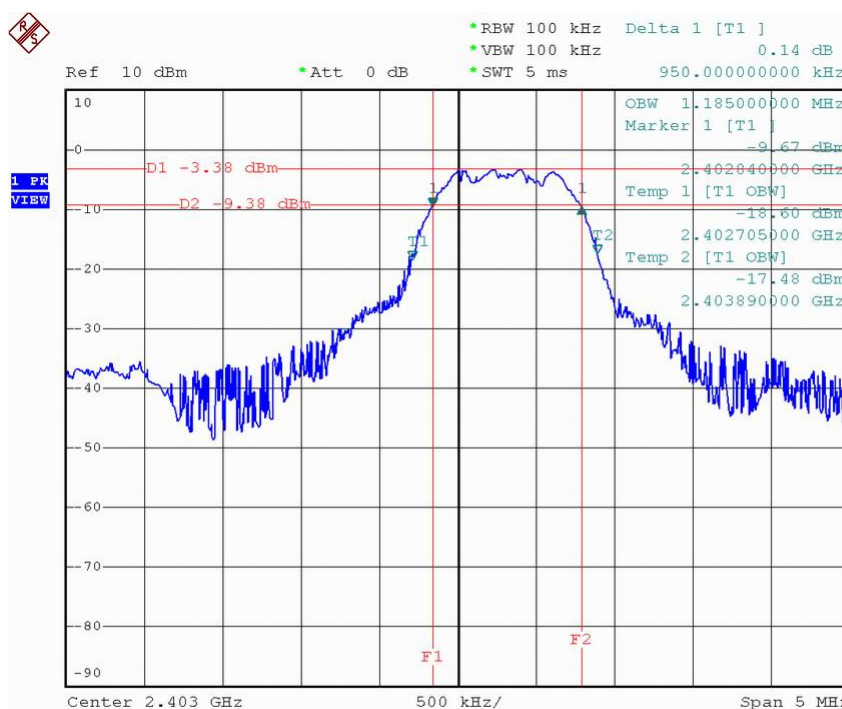
$\geq 500$

## 6 dB bandwidth

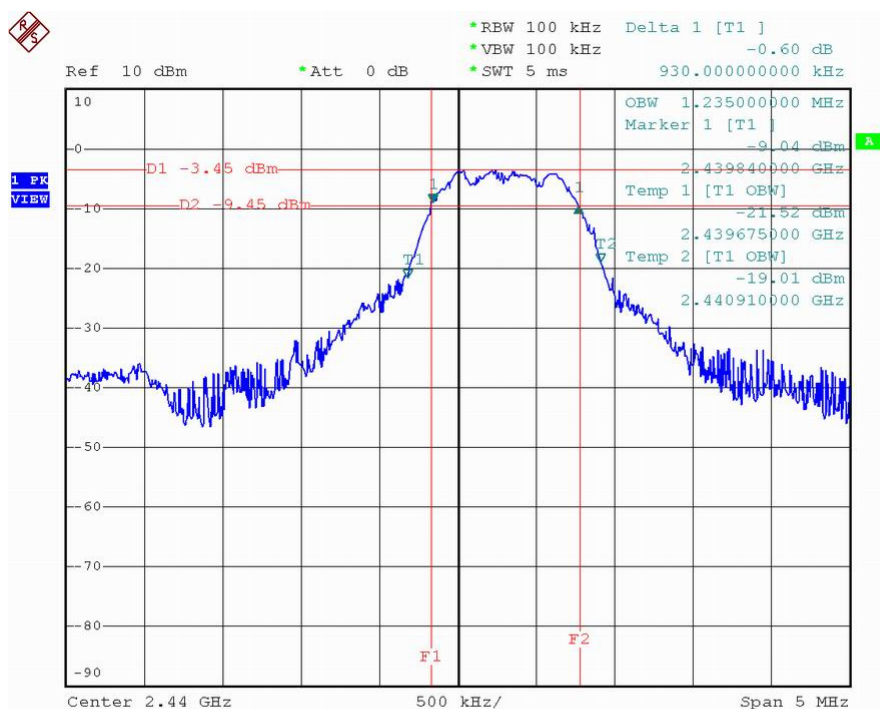
## 6 dB bandwidth

EUT:	Wireless Presenter	Model Name :	R-R0004
Temperature:	20°C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3V
Test Mode :	Transmit mode		
Test By:	Tony Liu	Test date	2009-06-02

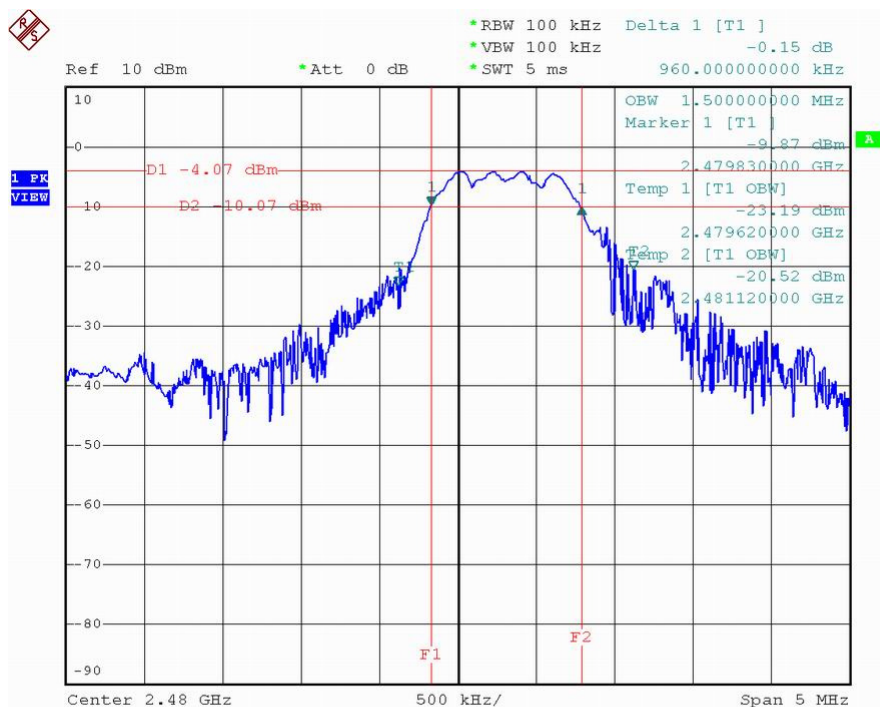
Frequency MHz	Bandwidth kHz	Limit kHz	Result
2403	950	≥ 500	Pass
2440	930	≥ 500	Pass
2480	960	≥ 500	Pass



Date: 2.JUN.2009 19:27:43



Date: 2.JUN.2009 19:22:42

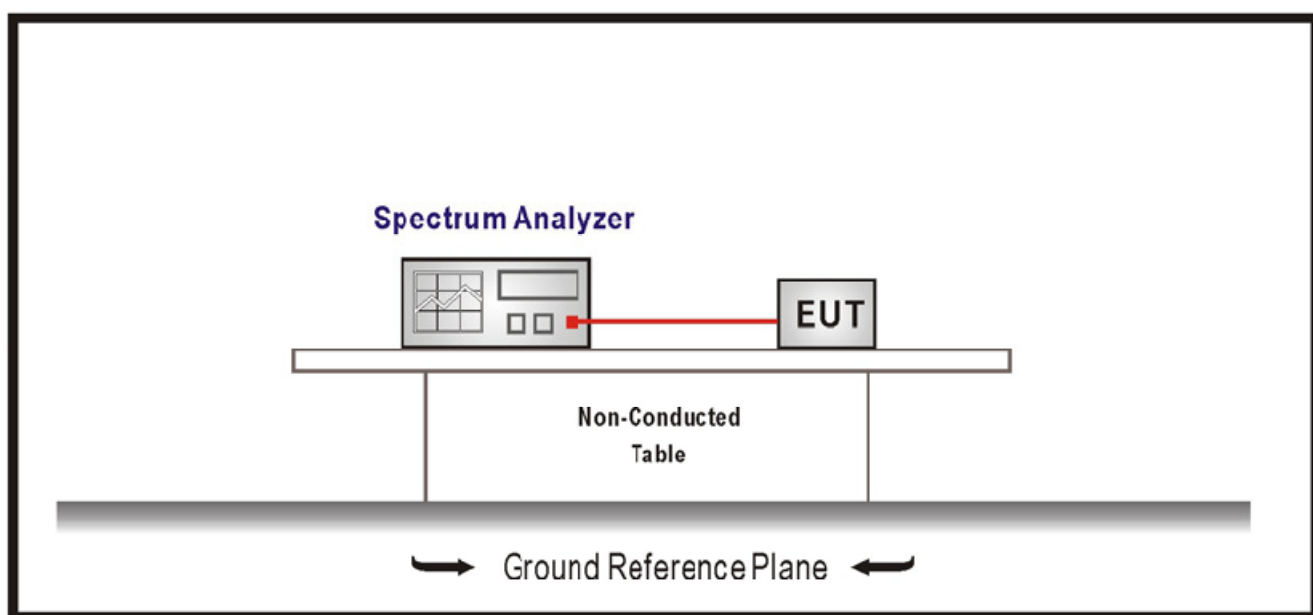


Date: 2.JUN.2009 19:25:22

## 7.7 Power spectral density

### Test Method

- 1 Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2 Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 1.5MHz, Sweep = 500 s
- 3 Record the max reading.



### Limit

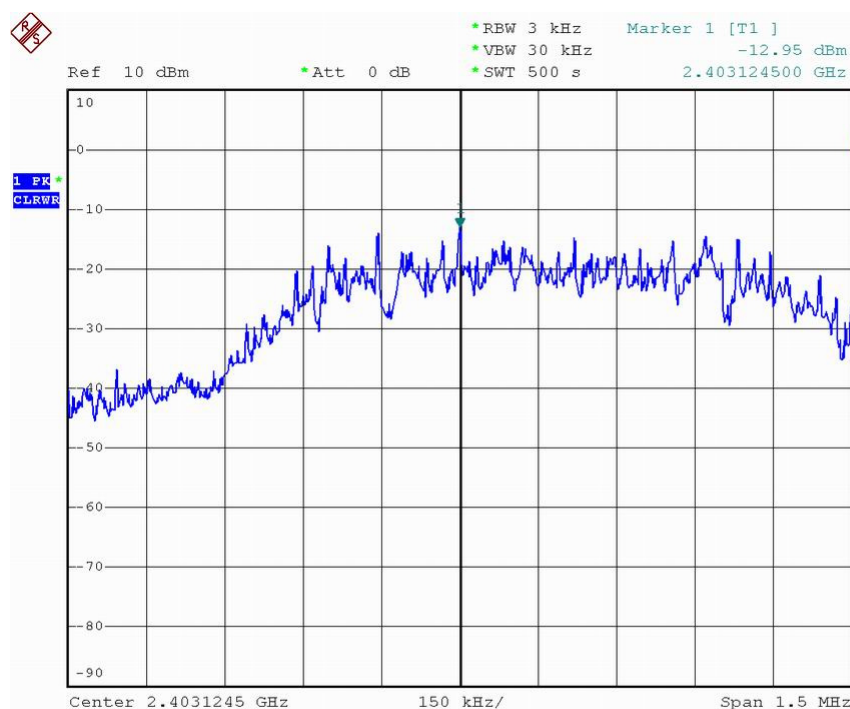
Limit dBm / 3 kHz
8



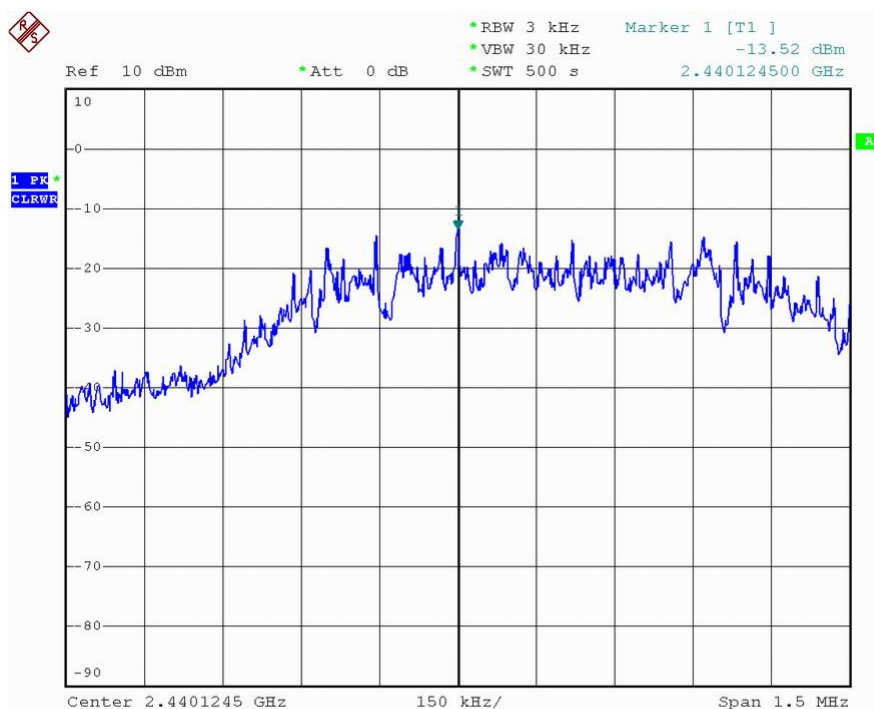
## Power spectral density

EUT:	Wireless Presenter	Model Name :	R-R0004
Temperature:	20°C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3V
Test Mode :	Transmit mode		
Test By:	Tony Liu	Test date	2009-06-02

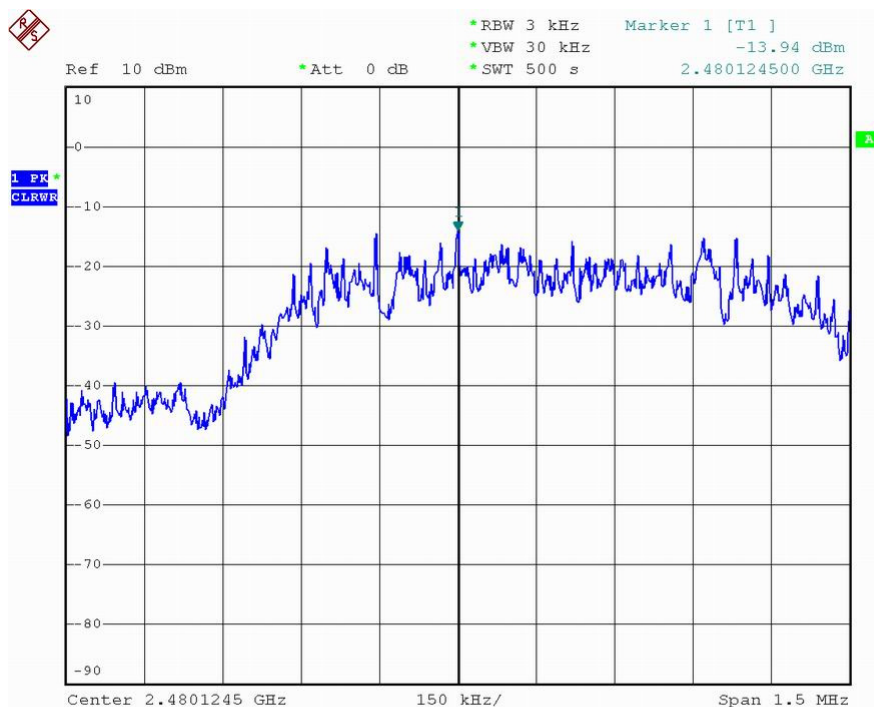
Frequency MHz	P dBm	Result
2403	-12.95	Pass
2440	-13.52	Pass
2480	-13.94	Pass



Date: 2.JUN.2009 19:09:11



Date: 2.JUN.2009 19:18:54

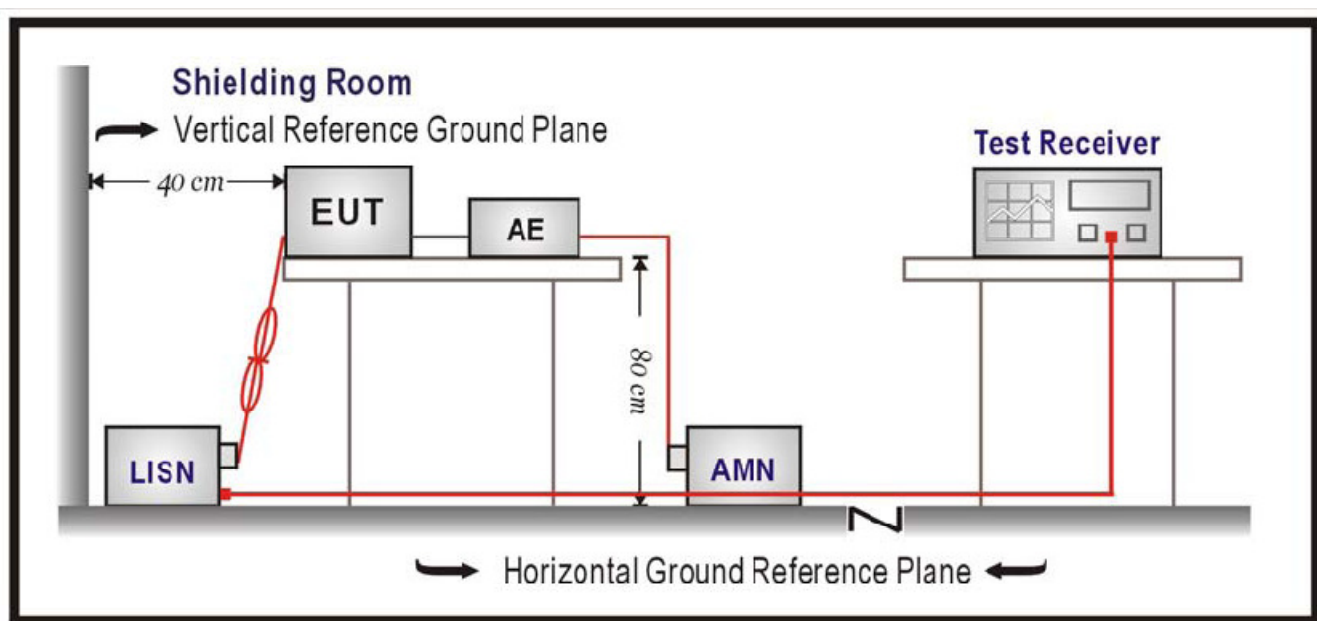


Date: 2.JUN.2009 18:58:48

## 7.8 Conducted Emission-receiver mode

### Test Method

- 1 The EUT was placed on a table, which is 0.8m above ground plane
- 2 The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3 Maximum procedure was performed to ensure EUT compliance
- 4 A EMI test receiver (R&S Test Receiver ESCI) is used to test the emissions from both sides of AC line



### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency



China

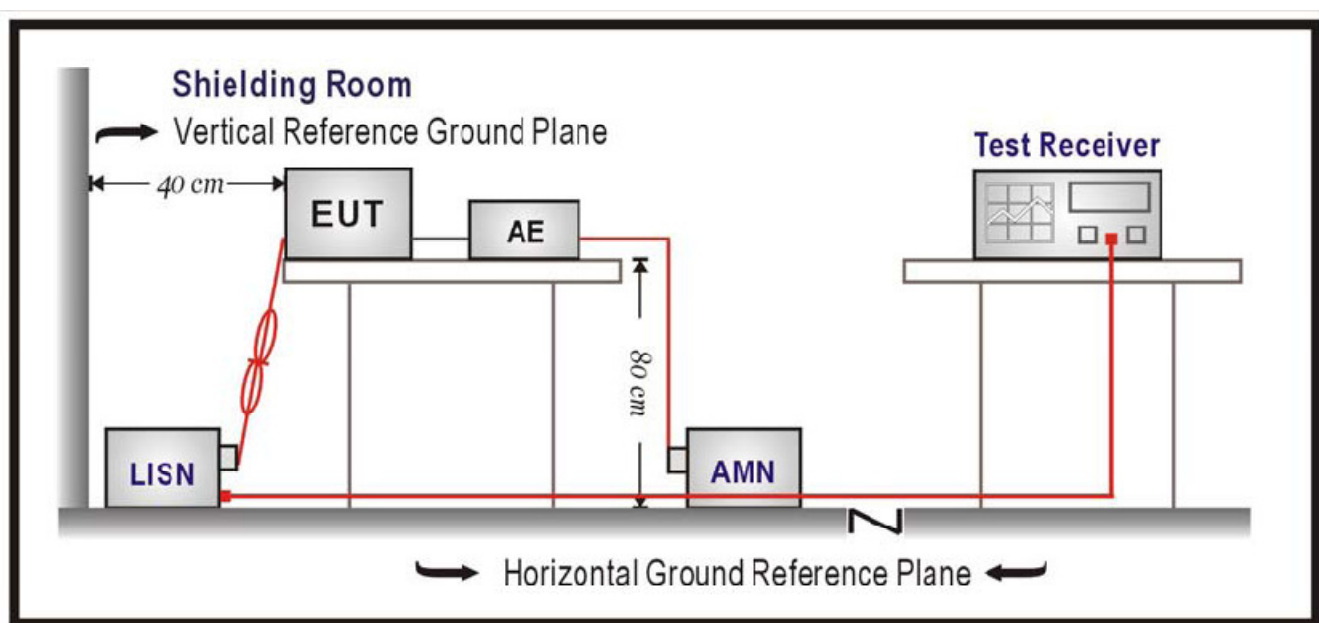
## Conducted Emission

**Note: Due to the fact that UUT was powered by battery, no tests applied.**

## 7.9 Radiated emissions

### Test Method

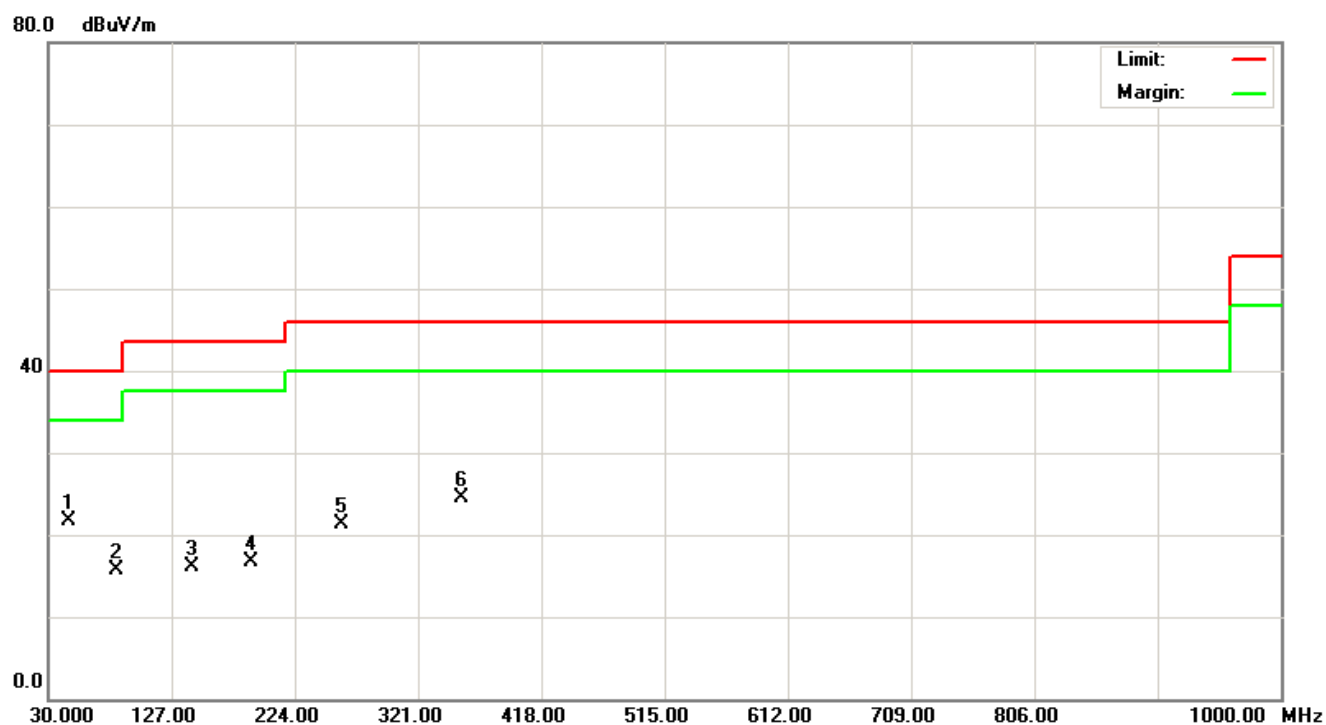
- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.



### Limit

Frequency MHz	Field Strength uV/m	Field Strength dBμV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

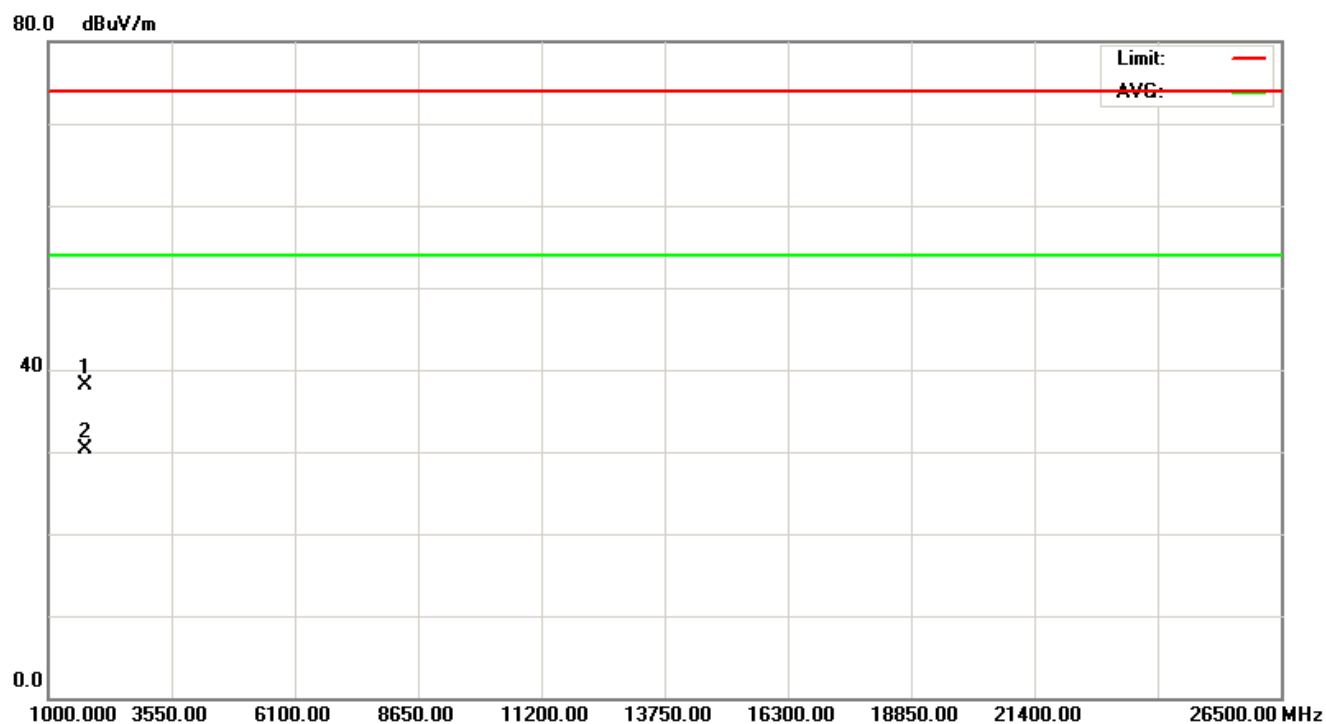
# Horizontal 30-1000MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	44.7800	36.78	-15.13	21.65	40.00	-18.35	peak
2		83.1700	35.26	-19.59	15.67	40.00	-24.33	peak
3		143.1700	30.17	-14.04	16.13	43.50	-27.37	peak
4		188.6600	32.18	-15.40	16.78	43.50	-26.72	peak
5		260.8400	34.77	-13.39	21.38	46.00	-24.62	peak
6		354.7800	33.78	-9.36	24.42	46.00	-21.58	peak

Result: Pass

Above 1000MHz

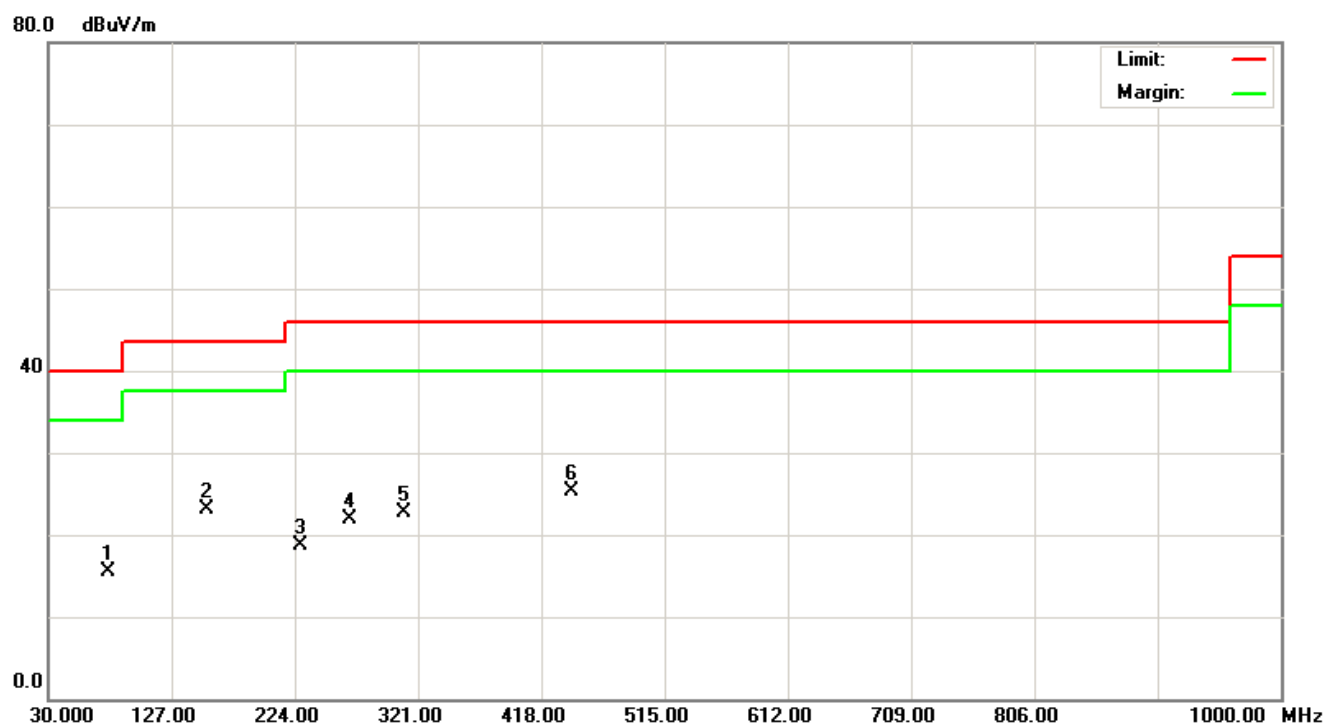


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	1763.700	42.89	-4.69	38.20	54.00	-15.80	AVG
2		1763.700	34.90	-4.69	30.21	54.00	-23.79	AVG

Result: Pass

## Vertical

30-1000MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		76.7800	34.09	-18.66	15.43	40.00	-24.57	peak
2	*	154.3200	36.78	-13.64	23.14	43.50	-20.36	peak
3		227.8900	32.91	-14.15	18.76	46.00	-27.24	peak
4		267.0300	35.00	-13.09	21.91	46.00	-24.09	peak
5		309.7600	33.98	-11.35	22.63	46.00	-23.37	peak
6		442.1700	32.10	-6.87	25.23	46.00	-20.77	peak

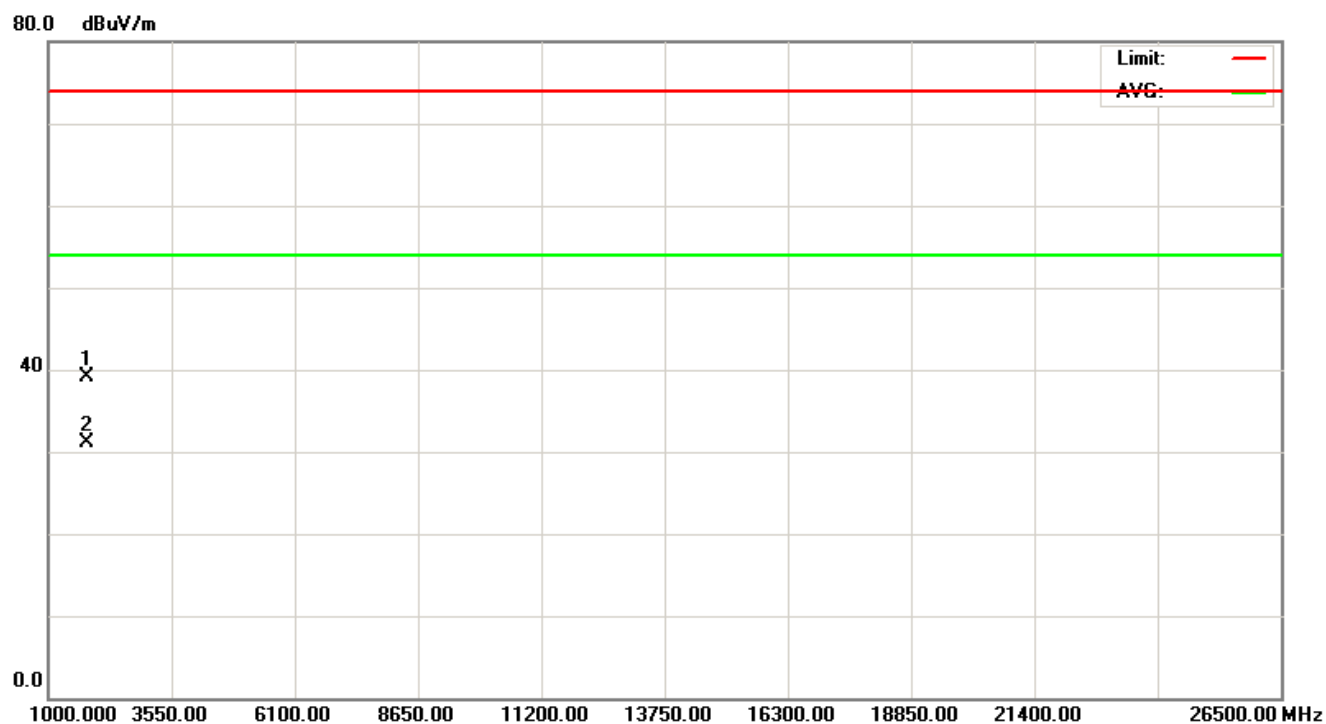
Result: Pass





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Above 1000MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		1766.300	43.81	-4.69	39.12	74.00	-34.88	peak
2	*	1766.300	35.87	-4.69	31.18	54.00	-22.82	AVG

Result: Pass



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## 7.10 Maximum Permissible Exposure (MPE)

### Test Method

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in ADT, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

### RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
300-1500	...	...	F/1500	6
1500-100,000	...	...	1.0	30

Friis transmission formula :  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

where

$P_d$  = power density in  $mW/cm^2$

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale, for R-R0004,  $G = -2.86dBi$

$\pi = 3.1416$

$R$  = distance between observation point and center of the radiator in cm; for R-R0004,  $R = 3cm$

Frequency(MHz)	Peak power (dBm/mW)	Power Density (mW/cm <sup>2</sup> )	Limit of Power Density (mW/cm <sup>2</sup> )
CH01(2403)	-0.43/0.91	0.00415	1.0
CH38(2440)	-0.71/0.85	0.00389	1.0
CH78(2480)	-1.08/0.78	0.00357	1.0

## 8 .Test Equipment list

### 8.1 CONDUCTED EMISSION MEASUREMENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00042991	Jan. 23, 2010
2	LISN	EMCO	3816/2	00042990	Jan. 23, 2010
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 26, 2009
4	50Ω Terminator	N/A	N/A	N/A	May.11, 2010
5	Test Cable	N/A	C01	N/A	Nov. 26, 2009
6	EMI Test Receiver	R&S	ESCI	100082	Mar. 06, 2010

### 8.2 RADIATED EMISSION MEASUREMENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	Schwarzbeck	VULB 9160	3058	Mar. 18, 2010
2	Test Cable	N/A	10M_OS02	N/A	Nov. 26, 2009
3	Test Cable	N/A	OS02-1/-2/-3	N/A	Nov. 26, 2009
4	Pre-Amplifier	Anritsu	MH648A(OS02)	M10061	Nov. 26, 2009
5	EMI Test Receiver	R&S	ESCI	100082	Jan. 29, 2010
6	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A
7	Turn Table	Chance Most	CMTB-1.5	N/A	N/A
8	Horn Antenna	Schwarzbeck	BBHA9170	9170187	Oct. 23, 2009
9	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Mar. 09, 2009
10	Microflex Cable	United Microwave	57793	1m	Mar. 09, 2009
11	Microflex Cable	United Microwave	A30A30-5006	10M	Jul. 06, 2009