FCC Test Report

E4270267602KY2

Type / Model Name:	**Beam360L**
Product Description:	**Remote controlled LED bulb**
Applicant:	**Beam Matrix Limited**
FCC ID:	**A8CBEAM360L**

FCC --- TEST REPORT

Test Report No. : E4270267602KY2	Feb 13, 2012 Date of issue

Type / Model Name: Beam360L

Product Description： Remote controlled LED bulb

Applicant： Beam Matrix Limited

Address： Unit 12, 7th floor, Block B,
Tak Lee Industrial Building,
8 Tsing Yeung Circuit , Tuen Mun,
Hong Kong

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

File No. **E4270267602KY2**

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15:2010-10-01	Federal Communications Commission, Part 15 – Radio Frequency Device
ANSI C63.4:2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

2 SUMMARY

GENERAL REMARKS:

N/A

FINAL ASSESSMENT:

The equipment under test fulfils the FCC requirements cited in test standard listed in section 1.

Date of receipt of test sample	:	Jan 03, 2012
Testing commenced on	:	Jan 03, 2012
Testing concluded on	:	Feb 13, 2012

Checked by:

Ivan Toa
Technical Manager

Tested by:

Kidd Yang
Engineer

File No. **E4270267602KY2**

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EuT

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

3.2 Power supply system utilised

Power supply voltage: AC 120V/60Hz

3.3 Short description of the Equipment under Test (EuT)

The Equipment under test (EUT) is a 2.4GHz transceiver. At the first 10 seconds after the EuT powered up, the EuT is ready to receive pairing request RF signal from the corresponding transceiver, and then the EuT will transmit the pairing response RF signal to the corresponding transceiver at the pairing frequency.

Tested samples: One Set (model:Beam360L)

Serial number: Not Labelled

Dimensions: L: 9.0 cm W: 5.2 cm H: 1.5 cm

EuT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Operation mode 1: Transmitting mode

-

-

EuT configuration:

The following interface cables and peripheral devices were connected during the measurements:

Interface cables:

Interface cable	Length	Type	Line		Line termination
	[m]		shielded	unshielded	
N/A					

Peripheral devices:

Kind of equipment		Model and/or Manufacturer
N/A		

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

emitel (Shenzhen) Limited
Building 2, 171 Meihua Road,
Futian District, Shenzhen,
P.R. China

Laboratory registration numbers:

FCC Registration number: 746887

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 860-1060 mbar

4.3 Statement of the measurement uncertainty

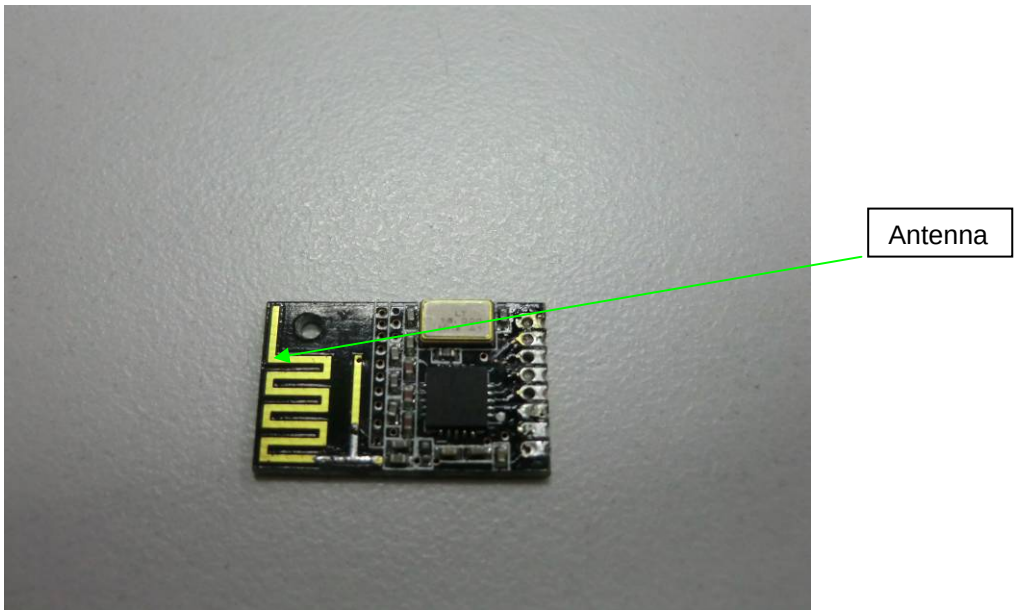
The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 “Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements” and is documented in the quality system acc. to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer does have the sole responsibility for the continued compliance of the device.

5 TEST CONDITIONS AND RESULTS

5.1 Antenna Requirement

According to §15.203, 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 EuT has component antenna, which accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EuT photos for details.



The requirements of section 15.203 are **FULFILLED**.

Remarks: _____

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

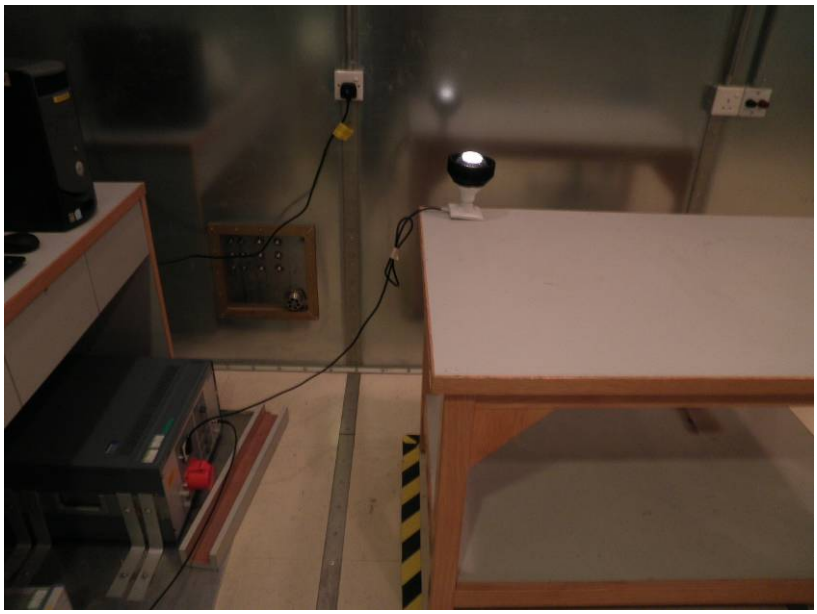
5.2 Conducted disturbance

For test instruments and accessories used see section 6.

5.2.1 Description of the test location

Test location: Shield Room

5.2.2 Photo documentation of the test set-up



5.2.3 Test specification:

Environmental conditions: Temperature: 21° C Humidity: 50% Atmospheric pressure: 101kPa

Frequency range: 150kHz – 30MHz

The test was carried out in the following operation mode(s):
- Transmitting mode

5.2.4 Test result

Min. limit margin -16.8 dB

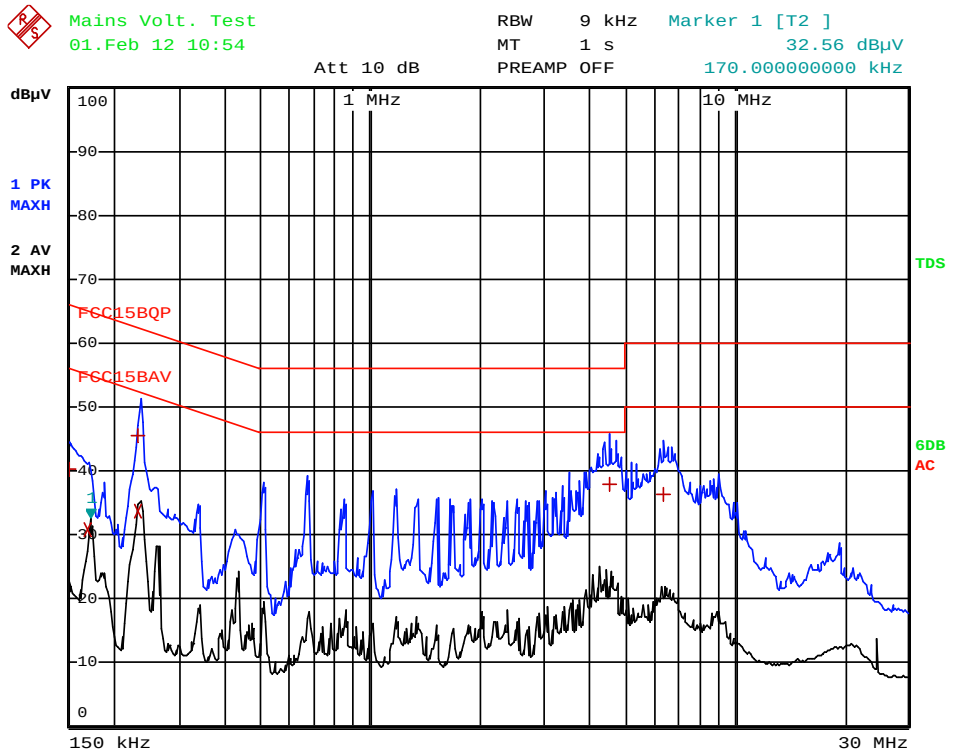
The requirements are **FULFILLED**

Remarks: 1) The emissions lower than 20dB below the limit are not measured.

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

5.2.5 Test protocol

Product Description:	Remote controlled LED bulb	Result: PASS
Operation mode:	Transmitting mode	
Date:	Jan 01, 2012	
Tested by:	Kidd Yang	
Test point:	Line 1	



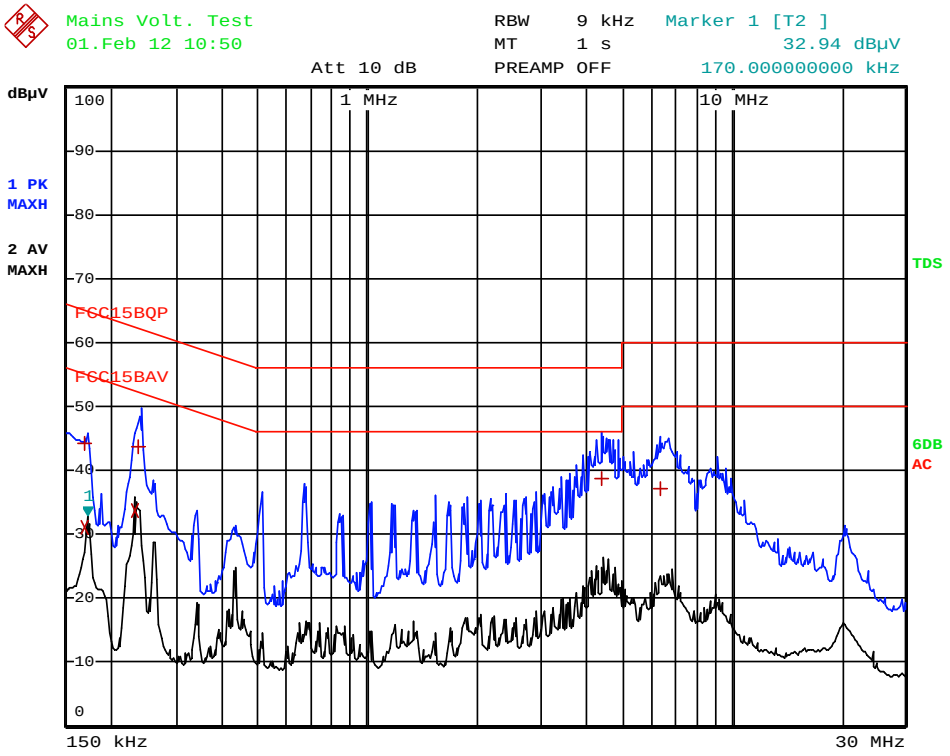
Date: 1.FEB.2012 10:54:59

Test point	Frequency [MHz]	Measured QP Value [dBµV]	Limit [dBµV/m]	Margin [dB]
Line 1	0.150	40.2	66.0	-25.8
Line 1	0.234	45.5	62.3	-16.8
Line 1	4.538	38.0	56.0	-18.0
Line 1	6.378	36.4	60.0	-23.6

LINE	Frequency [MHz]	Measured AV Value [dBµV]	Limit [dBµV/m]	Margin [dB]
Line 1	0.170	30.9	54.9	-24.0
Line 1	0.234	33.8	52.3	-18.5

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

Product Description:	Remote controlled LED bulb	Result: PASS
Operation mode:	Transmitting mode	
Date:	Jan 01, 2012	
Tested by:	Kidd Yang	
Test point:	Neutral	



Date: 1.FEB.2012 10:50:14

Test point	Frequency [MHz]	Measured QP Value [dBµV]	Limit [dBµV/m]	Margin [dB]
Neutral	0.170	44.2	64.9	-20.7
Neutral	0.238	43.6	62.1	-18.5
Neutral	4.402	38.7	56.0	-17.3
Neutral	6.406	37.2	60.0	-22.8

LINE	Frequency [MHz]	Measured AV Value [dBµV]	Limit [dBµV/m]	Margin [dB]
Neutral	0.170	31.1	54.9	-23.8
Neutral	0.230	33.6	52.4	-18.8

File No. **E4270267602KY2**

5.3 Radiated Emission

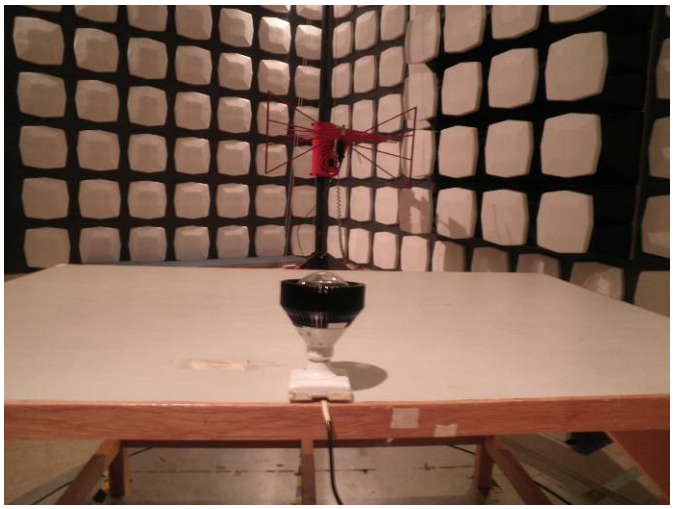
For test instruments and accessories used see section 6.

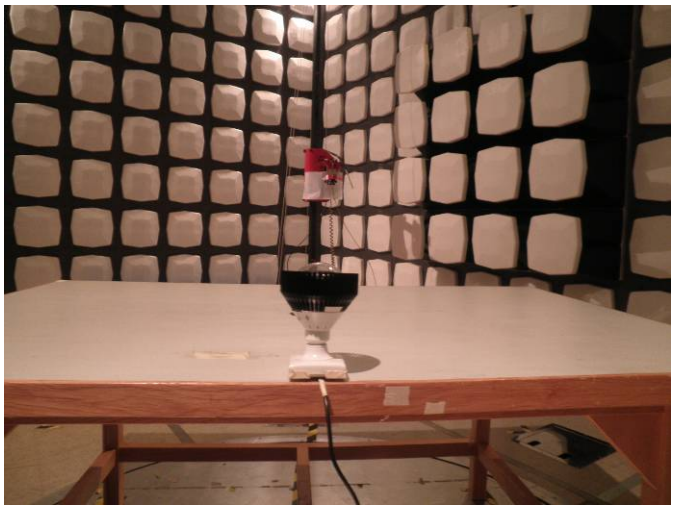
5.3.1 Description of the test location

Test location: Semi-anechoic Chamber

Test distance: 3m

5.3.2 Photo documentation of test





5.3.3 Test result

Frequency range: 30MHz to 24800MHz

Min. limit margin: -10.8dB

The requirements of section 15.209(a) and 15.249(a) are **FULFILLED**.

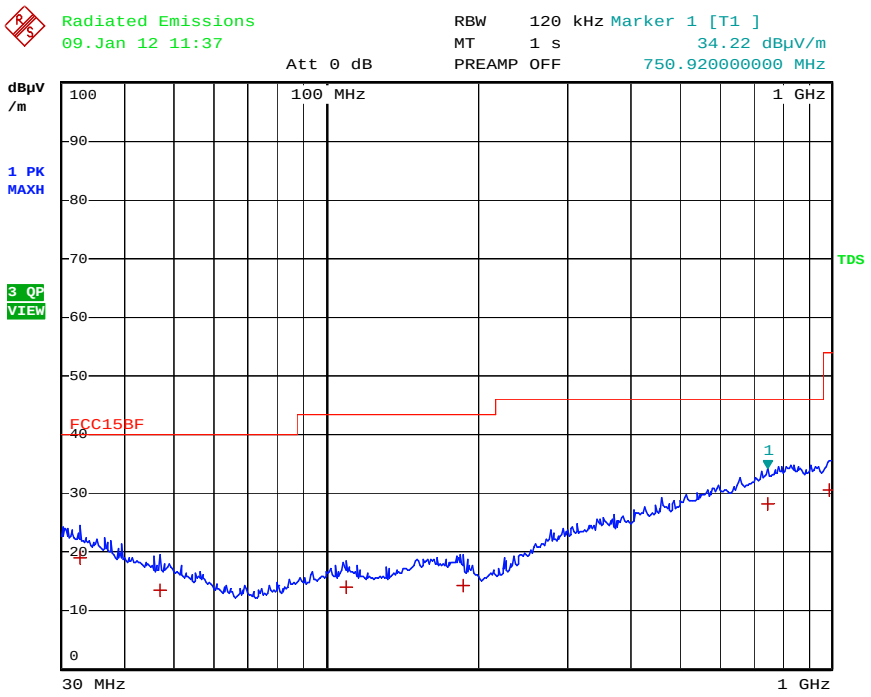
Remarks: 1) The emissions lower than 20dB below the limit are not measured.

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

5.3.4 Test protocol

Product Description:	Remote controlled LED bulb	Result:	PASS
Operation mode:	Transmitting mode		
Date:	Jan 17, 2012		
Tested by:	Kidd Yang		
Operation frequency:	2402MHz(worst case)		
Polarization:	Horizontal		

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	Video bandwidth	step size	Measurement time	Detector
30	1000	120 KHz	1 MHz	40 KHz	100ms	Peak



Date: 9.JAN.2012 11:37:50

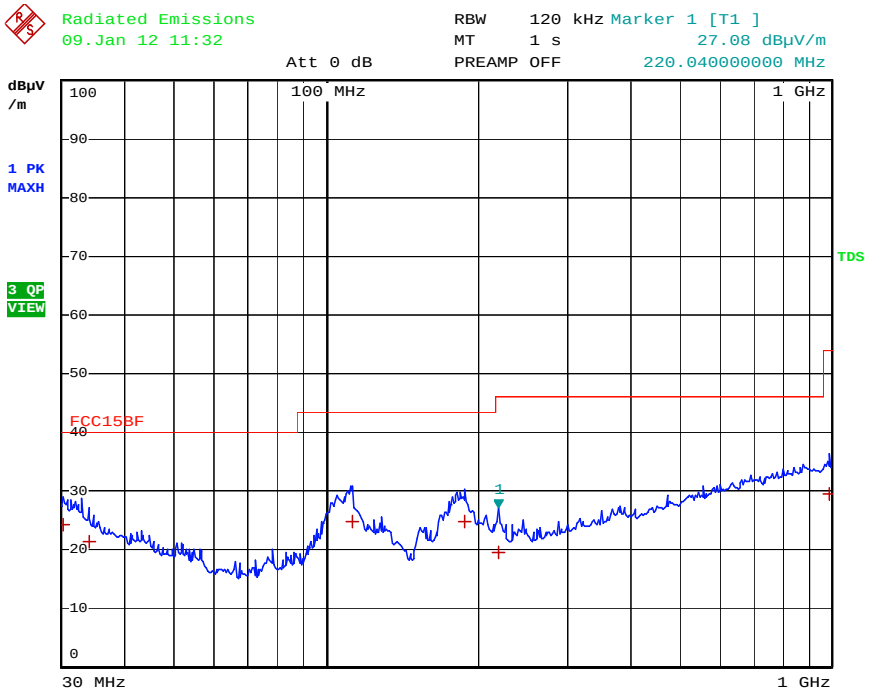
Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	Measured Result dBuV/m	limit (dBuV/m)	margin (dB)
H	32.64	2.1	16.8	18.9	40.0	-21.1
H	46.92	4.6	8.8	13.4	40.0	-26.6
H	109.60	5.8	8.2	14.0	43.5	-29.5
H	187.40	6.2	8.1	14.3	43.5	-29.2
H	750.92	4.0	24.1	28.1	46.0	-17.9
H	990.48	3.6	26.9	30.5	54.0	-23.5

Note: The Lowest, middle and highest operation frequency are measured and the worst case data is reported above.

emitel (Shenzhen)Limited, *Building 2*，*No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

Product Description:	Remote control having RF interface	Result:	PASS
Operation mode:	Transmitting mode		
Date:	Jan 09, 2012		
Tested by:	Kidd Yang		
Operation frequency:	2402MHz(worst case)		
Polarization:	Vertical		

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	Video bandwidth	step size	Measurement time	Detector
30	1000	120 KHz	1 MHz	40 KHz	100ms	Peak



Date: 9.JAN.2012 11:32:45

Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	Measured Result dBuV/m	limit (dBuV/m)	margin (dB)
V	30.24	4.1	20.1	24.2	40.0	-15.8
V	33.92	1.3	20.1	21.4	40.0	-18.6
V	113.04	15.3	9.6	24.9	43.5	-18.6
V	188.48	14.3	10.6	24.9	43.5	-18.6
V	220.04	0.6	19.0	19.6	46.0	-26.4
V	990.04	3.37	26.2	29.57	54.0	-24.4

Note: The Lowest, middle and highest operation frequency are measured and the worst case data is reported above.

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	Video bandwidth	step size	Measurement time	Detector
1000	24800	1 MHz	3 MHz	400 KHz	100ms	Peak

Fundamental emission

Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	PK Measured Result (dBuV/m)	AV limit (dBuV/m)	margin (dB)
V	2402.0	49.1	36.7	85.8	94.0	-8.2
H	2402.0	30.3	36.0	66.3	94.0	-27.7
V	2441.0	49.5	37.2	86.7	94.0	-7.3
H	2441.0	29.4	35.9	65.3	94.0	-28.7
V	2480.0	48.4	37.2	85.6	94.0	-8.4
H	2480.0	30.7	37.1	67.8	94.0	-26.2

Note: Since the peak measured values are less than the average limit, it is deemed to comply without measuring the average value.

Harmonics and spurious emission

The lowest frequency: 2402.0MHz

Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	PK Measured Result (dBuV/m)	AV limit (dBuV/m)	margin (dB)
V	4804.0	33.4	11.2	44.6	54.0	-9.4
H	4804.0	30.1	11.2	41.3	54.0	-12.7
V	7206.0	24.1	18.8	42.9	74.0	-31.1
H	7206.0	18.8	18.8	37.6	74.0	-36.4
V	9608.0	22.3	21.5	43.8	74.0	-30.2
H	9608.0	17.5	21.5	39.0	74.0	-35.0

Note: Since the peak measured values are less than the average limit, it is deemed to comply without measuring the average value.

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

The middle frequency: 2441.0MHz

Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	PK Measured Result (dBuV/m)	AV limit (dBuV/m)	margin (dB)
V	4882.0	32.1	11.1	43.2	54.0	-10.8
H	4804.0	27.3	11.1	38.4	54.0	-15.6
V	7323.0	22.3	19.5	41.8	54.0	-12.2
H	7323.0	16.2	19.5	35.7	54.0	-18.3
V	9764.0	20.5	22.4	42.9	74.0	-31.1
H	9764.0	16.3	22.4	38.7	74.0	-35.3

Note: Since the peak measured values are less than the average limit, it is deemed to comply without measuring the average value.

The highest frequency: 2480MHz

Polarization	Frequency (MHz)	Read Value (dBuV/m)	Factor (dB)	PK Measured Result (dBuV/m)	AV limit (dBuV/m)	margin (dB)
V	4960.0	32.0	11.3	43.3	54.0	-10.7
H	4960.0	29.7	11.3	41.0	54.0	-13.0
V	7440.0	21.2	19.7	40.9	54.0	-13.1
H	7440.0	16.8	19.7	36.5	54.0	-17.5
V	9920.0	19.1	23.4	42.5	74.0	-31.5
H	9920.0	14.7	23.4	38.1	74.0	-35.9

Note: Since the peak measured values are less than the average limit, it is deemed to comply without measuring the average value.

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn

5.4 Band Edge

For test instruments and accessories used see section 6.

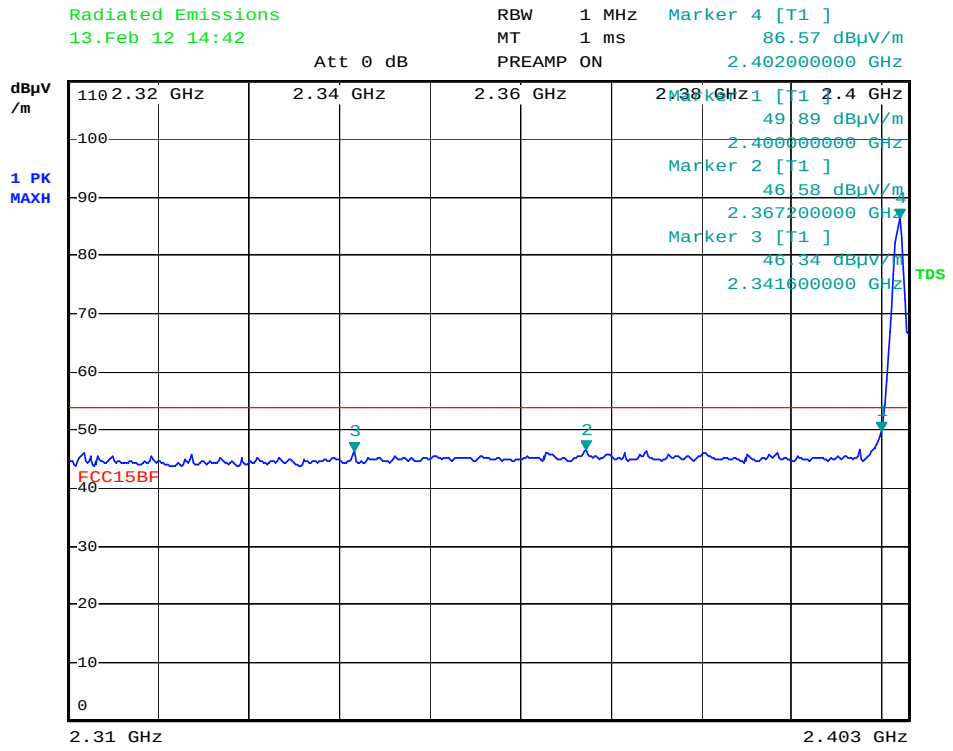
5.4.1 Description of the test location

Test location: Semi-anechoic Chamber

Test distance: 3m

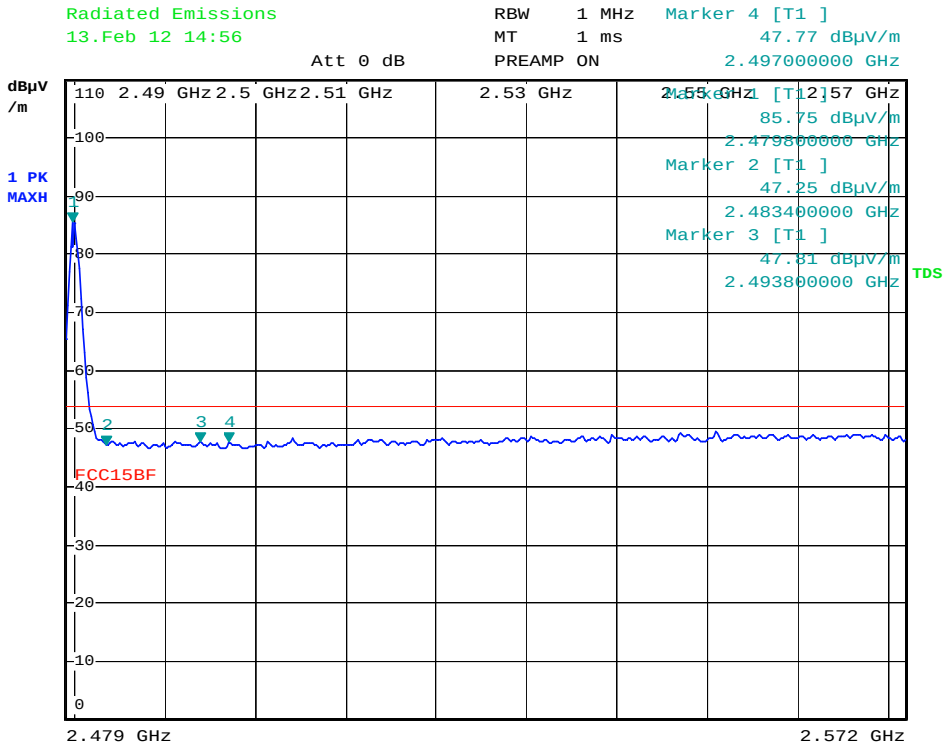
5.4.2 Photo documentation of the test

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	Video bandwidth	Measurement time	Detector
2310	2403	1 MHz	3 MHz	1 ms	Peak
2479	2572	1 MHz	3 MHz	1 ms	Peak



Date: 13.FEB.2012 14:42:28

Note: Both horizontal and vertical are measured and the worst case data is reported above.



Date: 13.FEB.2012 14:56:07

Note: Both horizontal and vertical are measured and the worst case data is reported above.

5.4.3 Test result

Frequency Band	Test result
2310MHz to 2400MHz	<54.0 dB uV/m
2483.5MHz to 2500MHz	<54.0 dB uV/m

The requirements of section 15.249(d) are **FULFILLED**

Remarks:

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test Item	Model / Type	Kind of Equipment	Manufacturer	Next Cal. Date	Equipment No.
Radiated Emission	ESPI3	EMI Test Receiver	Rohde & Schwarz	Apr 26, 2012	04-02/03-06-002
	U3772	Spectrum Analyzer	Advantest	Apr 26, 2012	04-02/11-08-001
	3142C	Biconilog Antenna	EMCO	Mar 26,2013	04-02/24-06-001
	3117	Horn Antenna	ETS Lindgren	Mar 26,2013	04-02/24-07-001
	BBV 9718	Broadband Preamplifier	Rohde & Schwarz	Apr 26, 2012	04-02/17-09-001
Band edge	ESPI3	EMI Test Receiver	Rohde & Schwarz	Apr 26, 2012	04-02/03-06-002
	3117	Horn Antenna	ETS Lindgren	Mar 26,2013	04-02/24-07-001

emitel (Shenzhen)Limited, *Building 2，No.171 Meihua Road* , Futian District, Shenzhen, P.R.China。
Phone: +86 (755) 8318 2012 Fax: +86 (755) 8312 3810 Email: info@emitel.com.cn