



STC Test Report



Date: 2015-06-11

Page 1 of 35

No.: DM119762

Applicant: Electronics Tomorrow Ltd.
Unit 903-7, 9/F., Tower 1, Harbour Center, 1 Hok Cheung Street, Hung Hom, Kowloon, HK

Manufacturer: Gaojin Electronics (Shenzhen) Co., Ltd.
11 Fang Keng Road, Pinghu Zhen, Longgang, Shenzhen, Guangdong Province, The People's Republic of China

Description of Sample(s): Submitted sample(s) said to be
Product: Bluetooth Thermometer Logger
Brand Name: N/A
Model Number: A620
FCC ID: PEQA62000515

Date Sample(s) Received: 2015-06-03

Date Tested: 2015-06-04 to 2015-06-10

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014. FCC KDB Publication 558074 D01 DTS Meas Guidance v02 and ANSI C63.4:2014 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s): For additional model(s) details, please page 3.


LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 2 of 35

No.: DM119762

CONTENT:

Cover	Page 1 of 35
Content	Page 2 of 35
<u>1.0 General Details</u>	
1.1 Test Laboratory	Page 3 of 35
1.2 Equipment Under Test [EUT] Description of EUT operation	Page 3 of 35
1.3 Date of Order	Page 3 of 35
1.4 Submitted Sample(s)	Page 3 of 35
1.5 Test Duration	Page 3 of 35
1.6 Country of Origin	Page 3 of 35
1.7 RF Module Details	Page 4 of 35
1.8 Antenna Details	Page 4 of 35
1.9 Channel List	Page 4 of 35
<u>2.0 Technical Details</u>	
2.1 Investigations Requested	Page 5 of 35
2.2 Test Standards and Results Summary	Page 5 of 35
<u>3.0 Test Results</u>	
3.1 Emission	Page 6-30 of 35
<u>Appendix A</u>	
List of Measurement Equipment	Page 31 of 35
<u>Appendix B</u>	
Photographs of EUT	Page 32-35 of 35

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 3 of 35

No.: DM119762

1.0 General Details

1.1 Test Laboratory

STC (Dongguan) Company Limited
EMC Laboratory
68 Fumin Nan Road, Dalang, Dongguan, Guangdong, China

Telephone: (86 769) 81119888
Fax: (86 769) 81116222

1.2 Equipment Under Test [EUT] Description of Sample(s)

Product: Bluetooth Thermometer Logger
Manufacturer: Gaojin Electronics (Shenzhen) Co., Ltd.
11 Fang Keng Road, Pinghu Zhen, Longgang, Shenzhen,
Guangdong Province, The People's Republic of China
Brand Name: N/A
Model Number: A620
Additional Model Number: A621
Rating: 3.0Vd.c. ("AA" battery x 2)

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Bluetooth Thermometer Logger of Electronics Tomorrow Ltd., it is modulation by IC; and type is frequency hopping spread spectrum Modulation.

1.3 Date of Order

2015-06-03

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2015-06-04 to 2015-06-10

1.6 Country of Origin

China

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 4 of 35

No.: DM119762

1.7 RF Module Details

Module Model Number: BAC-2
Module FCC ID:
Module Transmission Type: Bluetooth 4.0
Modulation: GFSK
Data Rates: 1Mbps
Frequency Range: 2400-2483.5MHz
Carrier Frequencies: 2402MHz – 2480MHz

Module Specification (specification provided by manufacturer)

1.8 Antenna Details

Antenna Type: Meander line PCB antenna
Antenna Gain: -1.06dBi

1.9 Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 5 of 35

No.: DM119762

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 Regulations, FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02 and ANSI C63.4:2014 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Maximum Peak Output Power	FCC 47CFR 15.247(b)(3)	FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02	N/A	☒	☐	☐
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.4:2014	N/A	☒	☐	☐
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2014	N/A	☐	☐	☒
Power Spectral Density	FCC 47CFR 15.247(e)	FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02	N/A	☒	☐	☐
6dB Bandwidth	FCC 47CFR 15.247(a)(2)	FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02	N/A	☒	☐	☐
Band Edge Emissions (Radiated)	FCC 47CFR 15.247(d)	FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02	N/A	☒	☐	☐
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐
RF Exposure	FCC 47CFR 15.247(i)	N/A	N/A	☒	☐	☐

Remark: The product is a battery-powered, don't need to test the AC mains conducted emissions.

Note: N/A - Not Applicable

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 6 of 35

No.: DM119762

3.0 Test Results

3.1 Emission

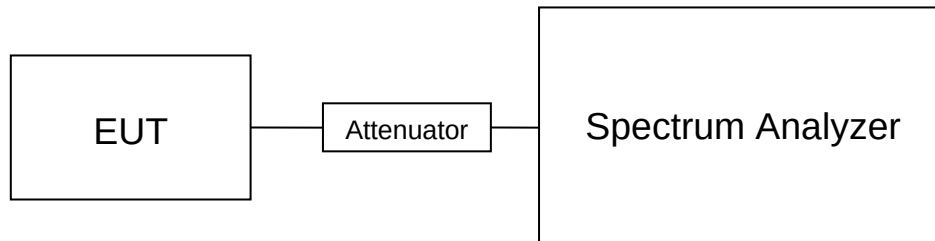
3.1.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v03r02
Test Date:	2015-06-09
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in mW.

Test Setup:



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 7 of 35

No.: DM119762

Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

Results of BT4.0 Tx Mode, (2402MHz to 2480MHz) : Pass (TX Unit) (GFSK) Maximum conducted output power		
Channel	Frequency(MHz)	Output Power(Watt)
0	2402	0.000962
19	2440	0.000667
39	2480	0.000367

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 26GHz 1.7dB

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



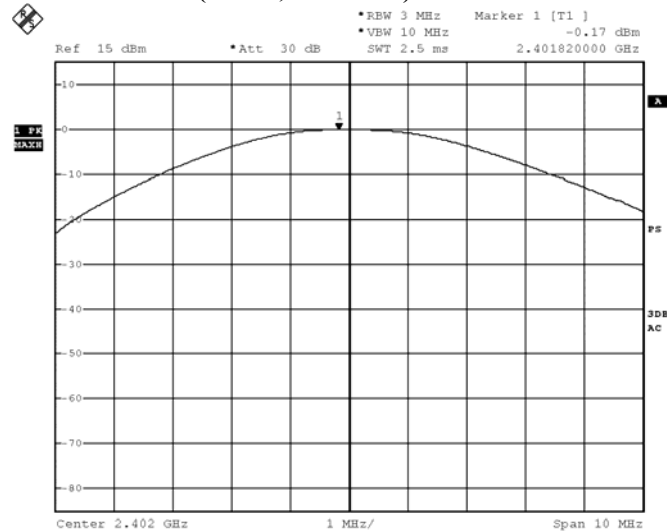
STC Test Report

Date: 2015-06-11

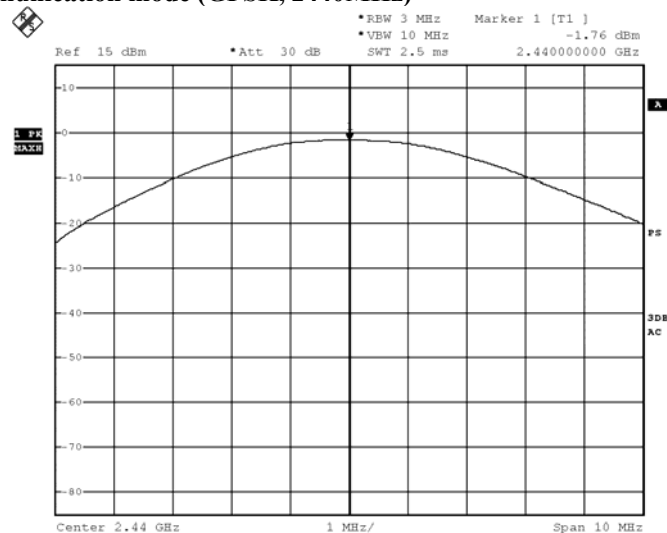
Page 8 of 35

No.: DM119762

Test plot of Maximum Peak Conducted Output Power :
Bluetooth Communication mode (GFSK, 2402MHz)



Bluetooth Communication mode (GFSK, 2440MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



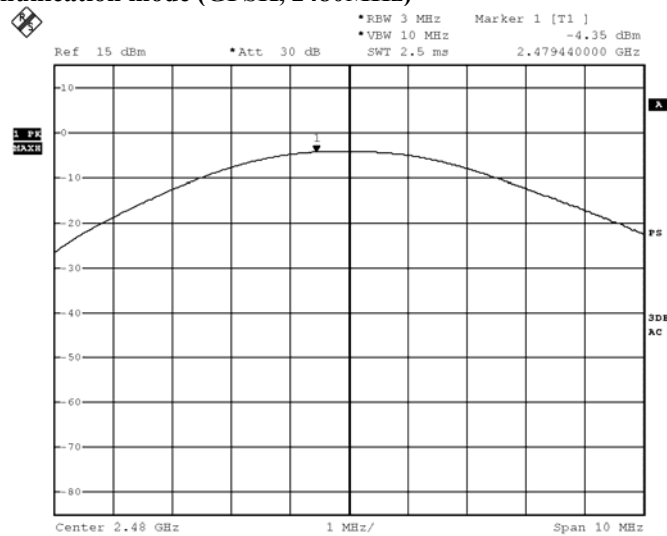
STC Test Report

Date: 2015-06-11

Page 9 of 35

No.: DM119762

Bluetooth Communication mode (GFSK, 2480MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 10 of 35

No.: DM119762

3.1.2 Radiated Emissions

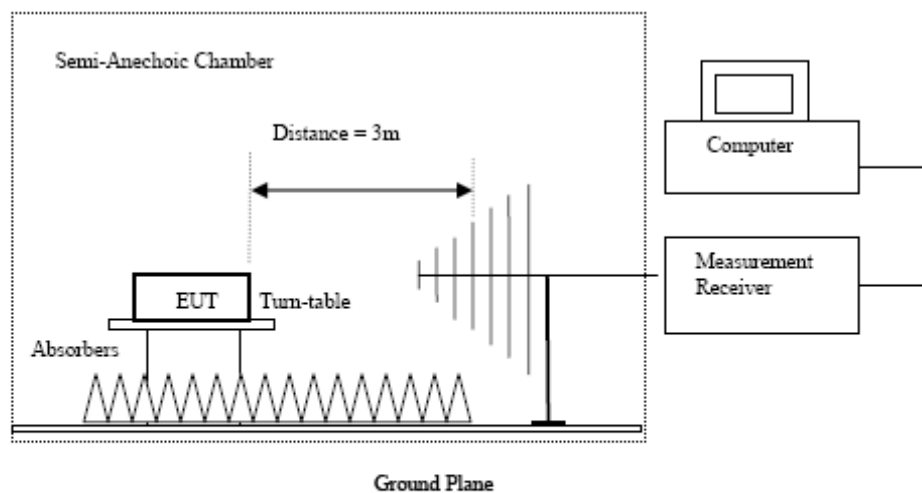
Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.4:2014
Test Date:	2015-06-04 to 2015-06-09
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located on the G/F of “STC (Dongguan) Company Limited” with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 11 of 35

No.: DM119762

Limits for Radiated Emissions [FCC 47 CFR 15.247 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of TX mode (GFSK) (9kHz – 30MHz): Pass

The Low Frequency, which started from 9KHz to 30MHz, was Pre-scan and the result which was more than 20dB lower than the Limit line.

Result of Tx mode (2402.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4804.0	13.4	41.5	54.9	74.0	19.1	Vertical
4804.0	12.3	42.4	54.7	74.0	19.3	Horizontal
7206.0	8.4	45.1	53.5	74.0	20.5	Vertical
7206.0	8.0	46.2	54.2	74.0	19.8	Horizontal
9608.0	6.9	48.0	54.9	74.0	19.1	Vertical
9608.0	5.1	48.8	53.9	74.0	20.1	Horizontal
12010.0	3.6	51.8	55.4	74.0	18.6	Vertical
12010.0	3.1	52.4	55.5	74.0	18.5	Horizontal

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 12 of 35

No.: DM119762

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4804.0	-1.0	41.5	40.5	54.0	13.5	Vertical
4804.0	-2.6	42.4	39.8	54.0	14.2	Horizontal
7206.0	-6.3	45.1	38.8	54.0	15.2	Vertical
7206.0	-5.9	46.2	40.3	54.0	13.7	Horizontal
9608.0	-9.2	48.0	38.8	54.0	15.2	Vertical
9608.0	-9.2	48.8	39.6	54.0	14.4	Horizontal
12010.0	-11.3	51.8	40.5	54.0	13.5	Vertical
12010.0	-11.6	52.4	40.8	54.0	13.2	Horizontal

Result of Tx mode (2440.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4880.0	13.6	41.6	55.2	74.0	18.8	Vertical
4880.0	12.1	42.5	54.6	74.0	19.4	Horizontal
7320.0	1.7	53.2	54.9	74.0	19.1	Vertical
7320.0	8.8	46.3	55.1	74.0	18.9	Horizontal
9760.0	7.1	48.1	55.2	74.0	18.8	Vertical
9760.0	5.6	48.9	54.5	74.0	19.5	Horizontal
12200.0	4.0	51.6	55.6	74.0	18.4	Vertical
12200.0	3.5	52.5	56.0	74.0	18.0	Horizontal

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4880.0	-0.2	41.6	41.4	54.0	12.6	Vertical
4880.0	-2.7	42.5	39.8	54.0	14.2	Horizontal
7320.0	-4.8	45.2	40.4	54.0	13.6	Vertical
7320.0	-6.5	46.3	39.8	54.0	14.2	Horizontal
9760.0	-8.7	48.1	39.4	54.0	14.6	Vertical
9760.0	-8.8	48.9	40.1	54.0	13.9	Horizontal
12200.0	-11.4	51.6	40.2	54.0	13.8	Vertical
12200.0	-11.1	52.5	41.4	54.0	12.6	Horizontal

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 13 of 35

No.: DM119762

Result of Tx mode (2480.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4960.0	13.3	41.4	54.7	74.0	19.3	Vertical
4960.0	11.3	42.7	54.0	74.0	20.0	Horizontal
7440.0	8.4	45.6	54.0	74.0	20.0	Vertical
7440.0	8.0	46.5	54.5	74.0	19.5	Horizontal
9920.0	5.6	48.6	54.2	74.0	19.8	Vertical
9920.0	4.8	49.7	54.5	74.0	19.5	Horizontal
12400.0	4.0	51.7	55.7	74.0	18.3	Vertical
12400.0	2.8	52.7	55.5	74.0	18.5	Horizontal

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4960.0	-2.2	41.4	39.2	54.0	14.8	Vertical
4960.0	-3.2	42.7	39.5	54.0	14.5	Horizontal
7440.0	-6.7	45.6	38.9	54.0	15.1	Vertical
7440.0	-7.3	46.5	39.2	54.0	14.8	Horizontal
9920.0	-9.3	48.6	39.3	54.0	14.7	Vertical
9920.0	-9.5	49.7	40.2	54.0	13.8	Horizontal
12400.0	-11.2	51.7	40.5	54.0	13.5	Vertical
12400.0	-12.3	52.7	40.4	54.0	13.6	Horizontal

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement (9kHz-30MHz): 3.3dB

uncertainty (30MHz -1GHz): 4.6dB

(1GHz -26GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 14 of 35

No.: DM119762

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

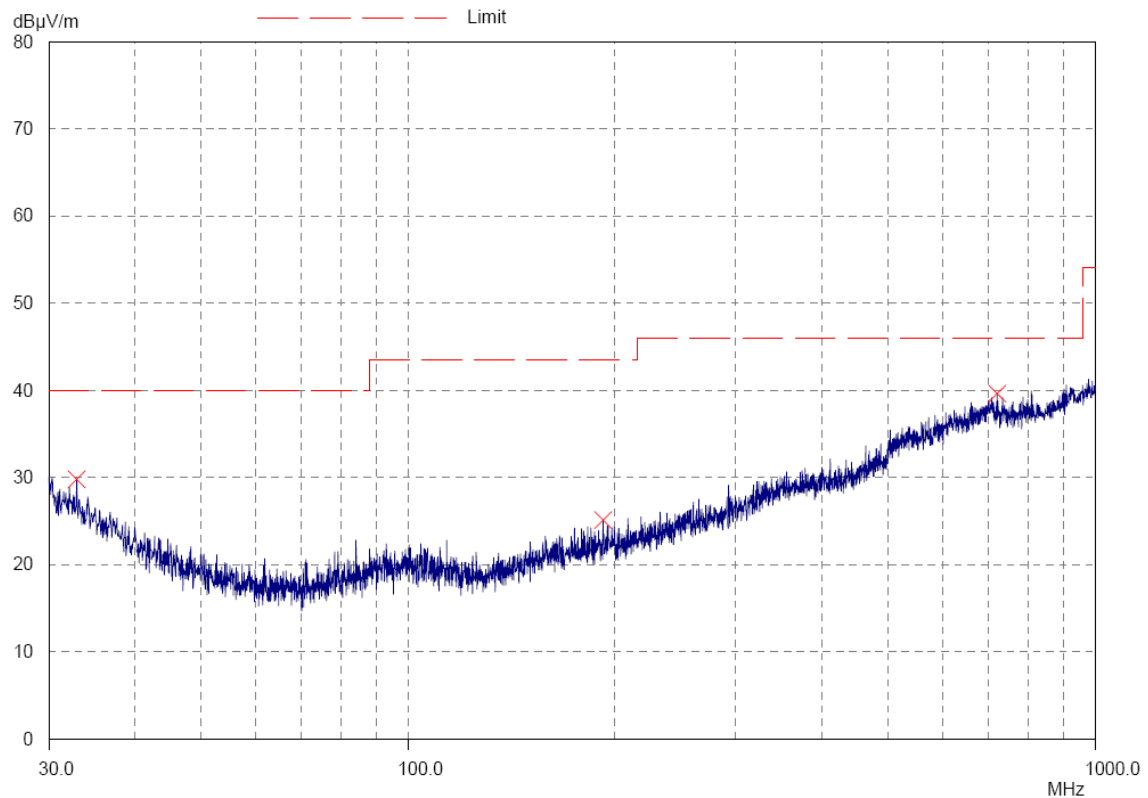
Frequency Range	Quasi-Peak Limits
[MHz]	[μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (30MHz – 1GHz): Pass

Please refer to the following table for result details

Horizontal



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 15 of 35

No.: DM119762

Result of Bluetooth Communication mode (30MHz – 1GHz): Pass

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBμV/m	Limit @3m dBμV/m	Level @3m μV/m	Limit @3m μV/m
32.9	Horizontal	29.8	40.0	30.9	100
192.3	Horizontal	25.1	43.5	18.0	150
720.6	Horizontal	39.6	46.0	95.5	200

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 16 of 35

No.: DM119762

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

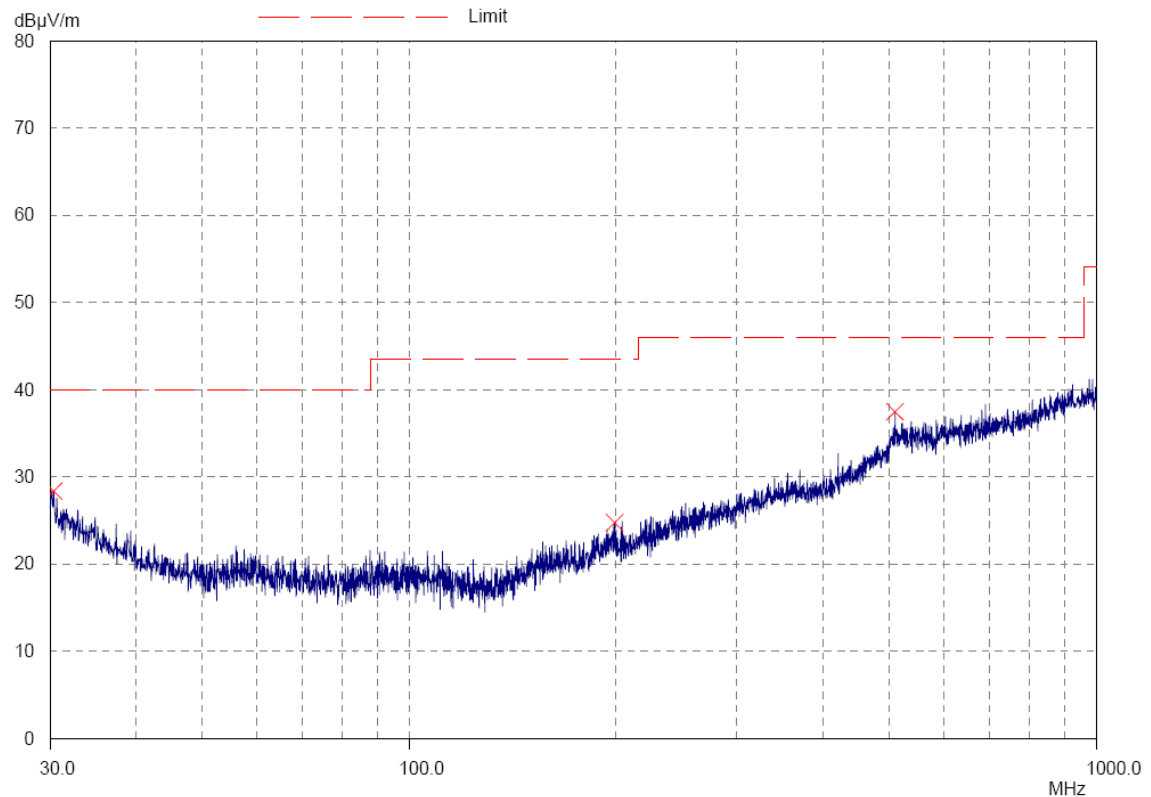
Frequency Range	Quasi-Peak Limits
[MHz]	[$\mu\text{V/m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (30MHz – 1GHz): Pass

Please refer to the following table for result details

Vertical



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 17 of 35

No.: DM119762

Result of Bluetooth Communication mode (30MHz – 1GHz): Pass

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.4	Vertical	28.3	40.0	26.0	100
199.1	Vertical	24.7	43.5	17.2	150
509.3	Vertical	37.4	46.0	74.1	200

Remarks:

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 18 of 35

No.: DM119762

3.1.3 Power Spectral Density

Test Requirement: FCC 47CFR 15.247(e)
Test Method: FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date: 2015-06-09
Mode of Operation: Bluetooth 4.0 Tx mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz , VBW= 10KHz , Set the span to 1.5 times the DTS channel bandwidth. Detector = peak, Sweep time = auto couple , Trace mode = max hold. Measure the Power Spectral Density (PSD) and record the results in dBm.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Test Limit:

The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Results of BT 4.0 Mode (Tx:2402MHz to 2480MHz) : Pass (TX Unit)

Maximum power spectral density

Transmitter Frequency (MHz)	Maximum Power spectral density level / 3kHz band (dBm)	Maximum Power spectral density / 3kHz band limit (dBm)
2402.0	-13.43	8
2440.0	-14.78	8
2480.0	-16.46	8

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

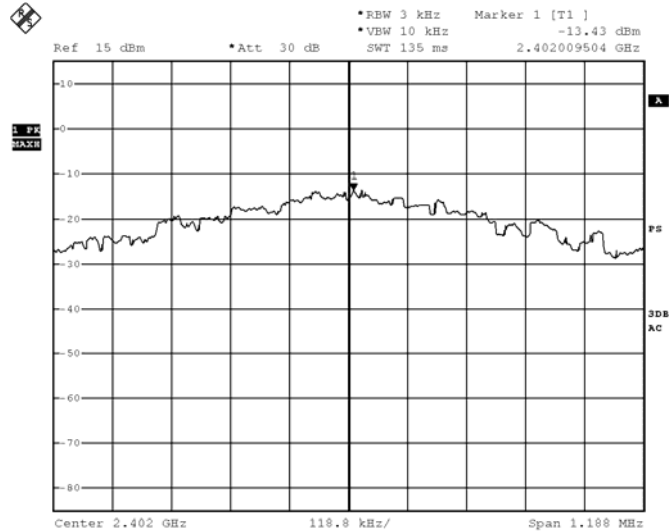
Date: 2015-06-11

Page 19 of 35

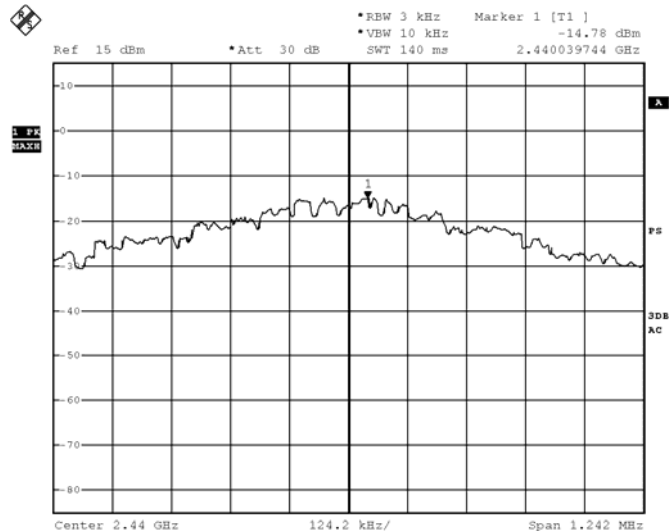
No.: DM119762

Bluetooth 4.0 mode (Tx: 2402MHz to 2480MHz)

2402.0 MHz



2440.0 MHz



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



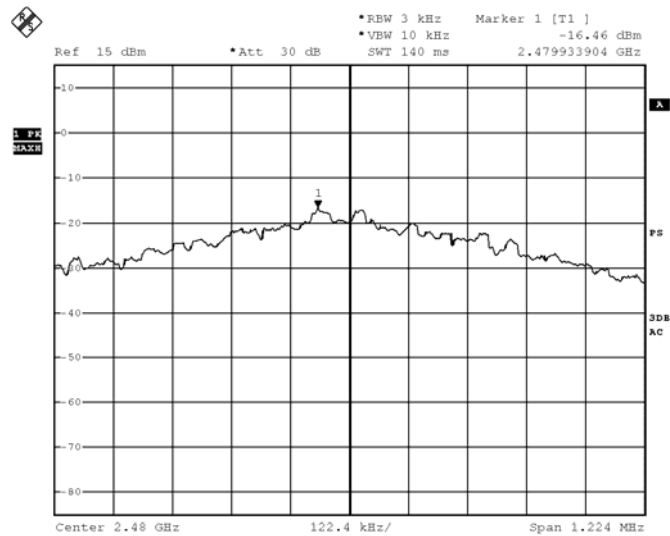
STC Test Report

Date: 2015-06-11

Page 20 of 35

No.: DM119762

2480.0 MHz



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 21 of 35

No.: DM119762

3.1.4 6dB Bandwidth Measurement

Test Requirement:	FCC 47CFR 15.247(a)(2)
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date:	2015-06-09
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

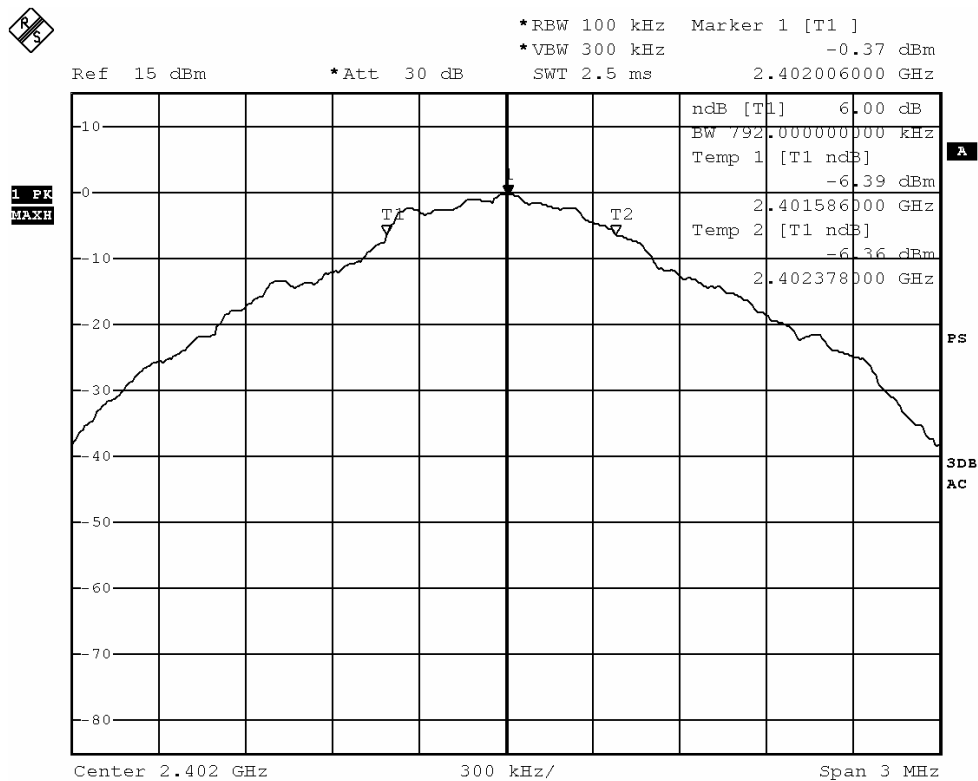
Page 22 of 35

No.: DM119762

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2402.0	792.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2402MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

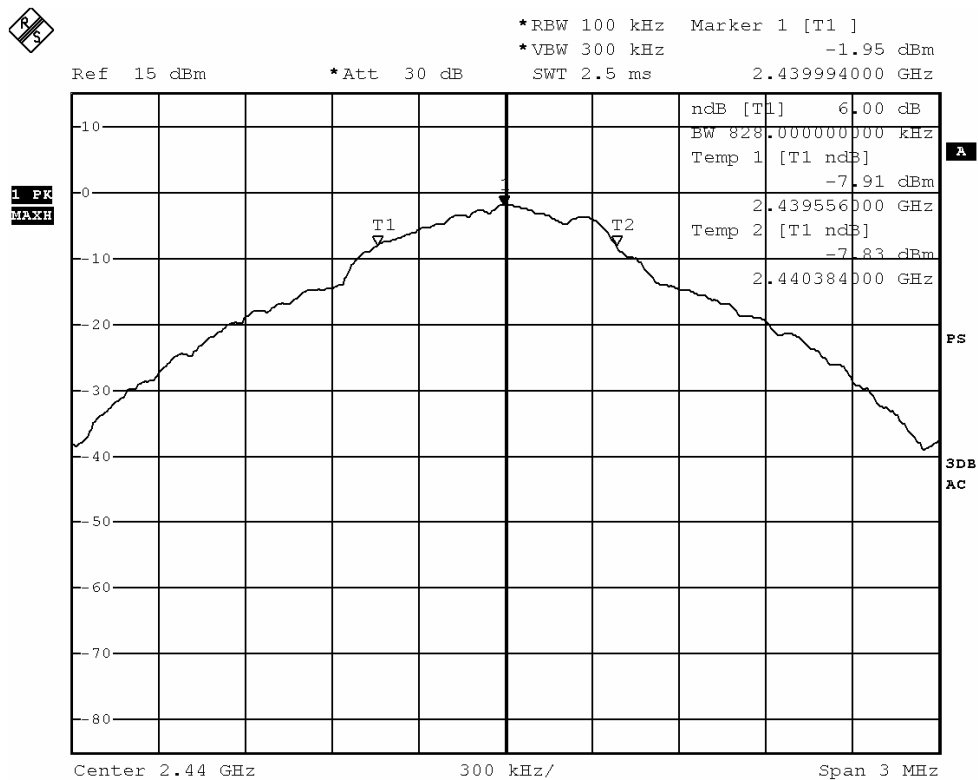
Page 23 of 35

No.: DM119762

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2440.0	828.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2440MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

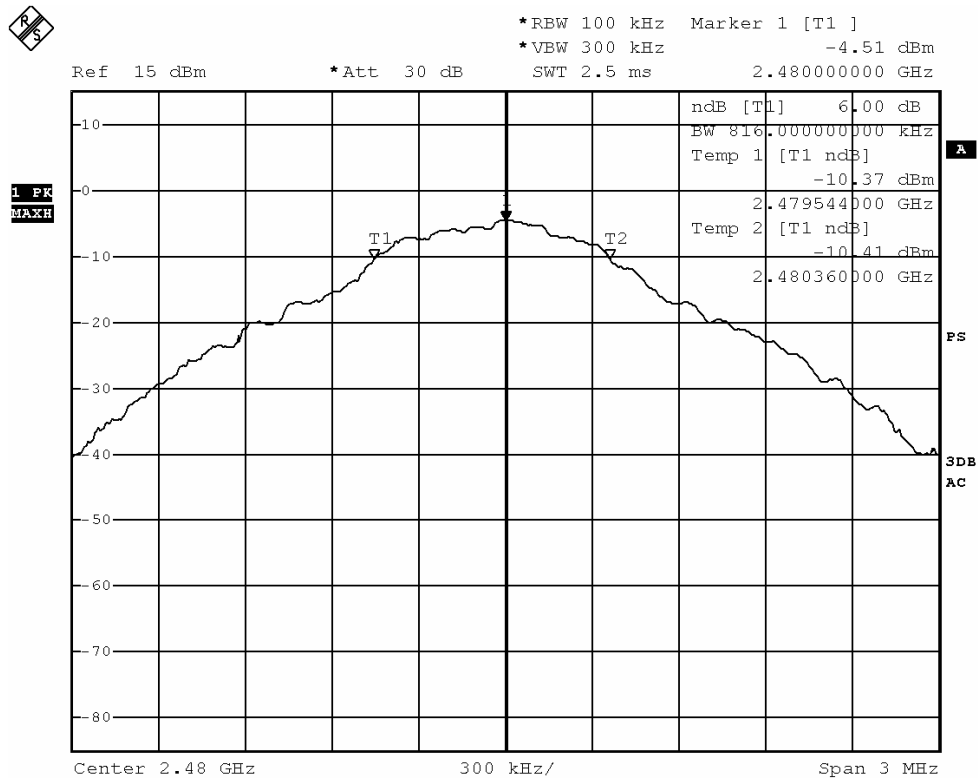
Page 24 of 35

No.: DM119762

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2480.0	816.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2480MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 25 of 35

No.: DM119762

3.1.5 Band Edges Measurement

Test Requirement:	FCC 47CFR 15.247
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date:	2015-06-09
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW and VBW are set to 100kHz for this measurement.

Test Setup:

As Test Setup of clause 3.1.2 in this test report.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 26 of 35

No.: DM119762

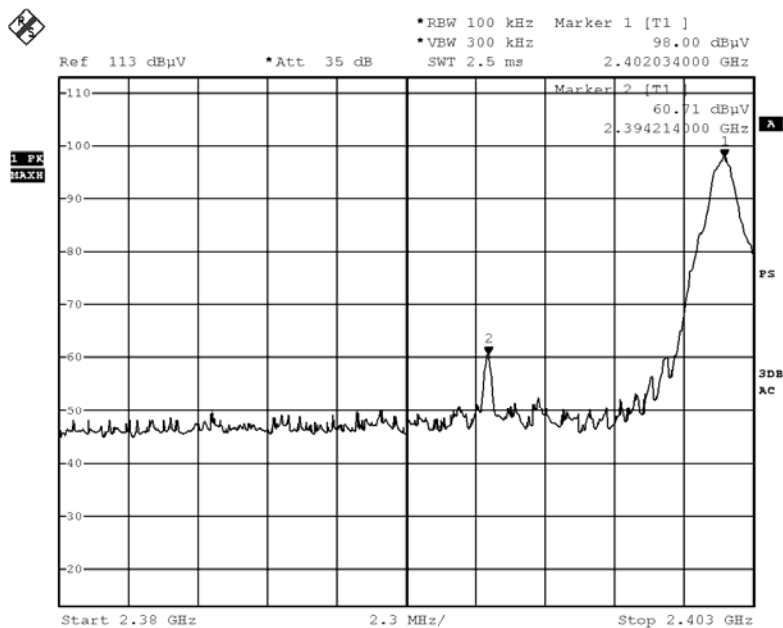
Band-edge Compliance of RF Conducted Emissions Measurement:

Limit :

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. Attenuation below the general limits specified in Section 15.209(a) is not required.

Frequency Range	Radiated Emission Attenuated below the Fundamental
[MHz]	[dB]
2400 – Lowest Fundamental (2402)	37.29

Band-edge Compliance of RF Conducted Emissions – Lowest (GFSK: Bluetooth DTS mode 2402MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

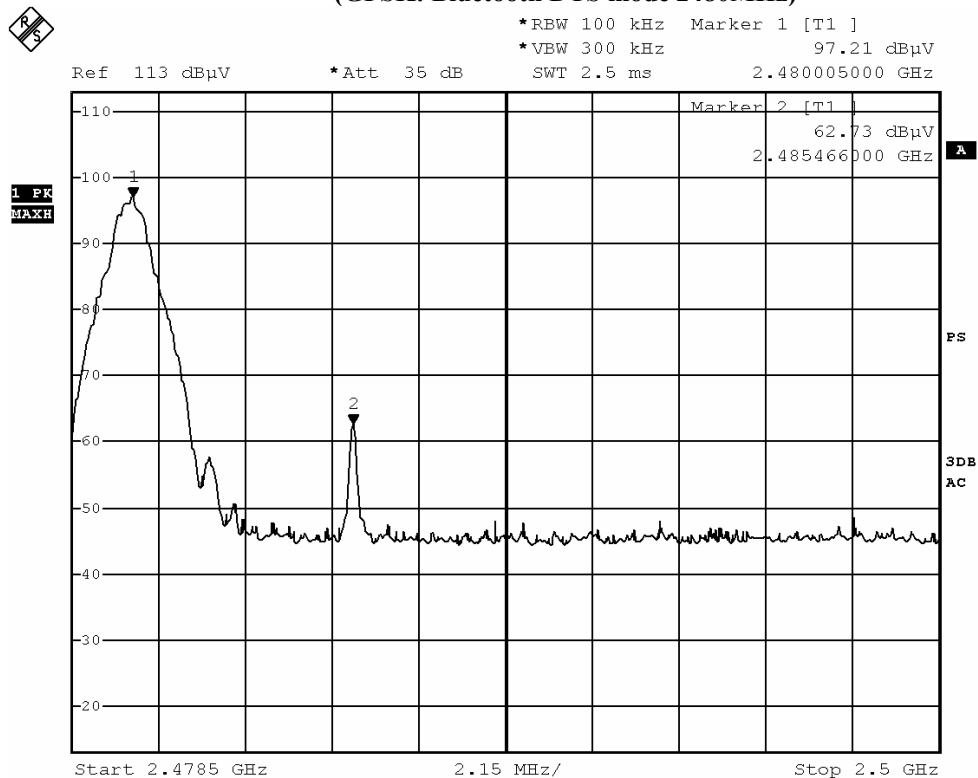
Page 27 of 35

No.: DM119762

Band-edge Compliance of RF Conducted Emissions Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2483.5 - Highest Fundamental (2480)	34.48

Band-edge Compliance of RF Conducted Emissions – Highest (GFSK: Bluetooth DTS mode 2480MHz)



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 28 of 35

No.: DM119762

Band-edge Compliance of RF Radiated Emissions Measurement:

Limit :

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).

Result: Band-edge Compliance of RF Radiated Emissions (Lowest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2364.5	24.4	36.8	61.2	74.0	12.8	Vertical
2390.0	12.6	36.8	49.4	74.0	24.6	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2364.5	8.9	36.8	45.7	54.0	8.3	Vertical
2390.0	3.5	36.8	40.3	54.0	13.7	Vertical

Result: Band-edge Compliance of RF Radiated Emissions (Highest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2485.5	26.1	36.8	62.9	74.0	11.1	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2485.5	10.8	36.8	47.6	54.0	6.4	Vertical

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 29 of 35

No.: DM119762

3.1.6 Antenna Requirement

Test Requirements: § 15.203

Test Specification:

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Results:

This is Meander line antenna. There is no external antenna, the antenna gain = -1.06dBi.
All component install on inside of EUT. User unable to remove or changed the Antenna.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 30 of 35

No.: DM119762

3.1.7 RF Exposure

Test Requirement:	FCC 47CFR 15.247(i)
Test Date:	2015-06-09
Mode of Operation:	BT mode

Test Results:

RF Exposure Evaluation

The Maximum conducted output power = 0.962 mW (at frequency = 2.402 GHz)

It's Conducted source-based time-averaging output power = 0.915 mW (at frequency = 2.402 GHz)

Since the SAR test exclusion thresholds for 2450MHz at test separation distances ≤ 5 mm = 10mW and the Conducted source-based time-averaging output power is less than 10mW.

Therefore, the SAR evaluation can be exempted.

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 31 of 35

No.: DM119762

Appendix A

List of Measurement Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD004	LISN	ROHDE & SCHWARZ	ESH3-Z5	100102	2015.3.24	2016.3.24
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2015.3.24	2016.3.24
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2014.06.10	2015.06.10
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2014.06.10	2015.06.10
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2015.3.24	2016.3.24
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2014.11.29	2016.11.29
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2014.11.15	2015.11.15
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A	N/A
EMD088	Video Contol Unit	ETS.LINDGREN	Y21953A	2601073	N/A	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A	N/A
EMD102	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A
EMD111	Power meter	ROHDE & SCHWARZ	NRVD	102051	2015.3.24	2016.3.24
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2015.3.24	2016.3.24
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2015.3.24	2016.3.24
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2014.04.28	2016.04.28
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO Inc.	JXTXLB-42-15-C-KF	J2021100721001	2015.04.09	2017.04.09

Remarks:-

N/A Not Applicable or Not Available

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 32 of 35

No.: DM119762

Appendix B

Photographs of EUT

Front View of the product



Rear View of the product



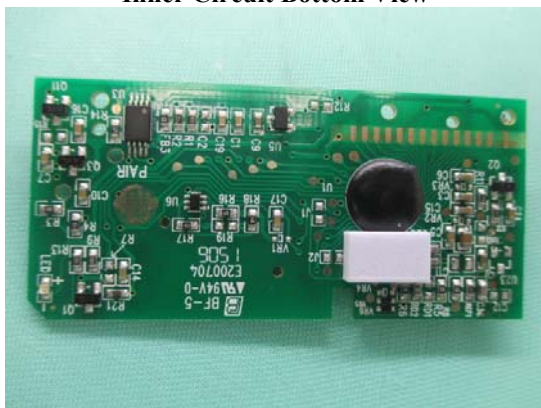
Inside View of the product



Inner Circuit Top View



Inner Circuit Bottom View



Inner Circuit Top View



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

Date: 2015-06-11

Page 33 of 35

No.: DM119762

Photographs of EUT

Inner Circuit Bottom View



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

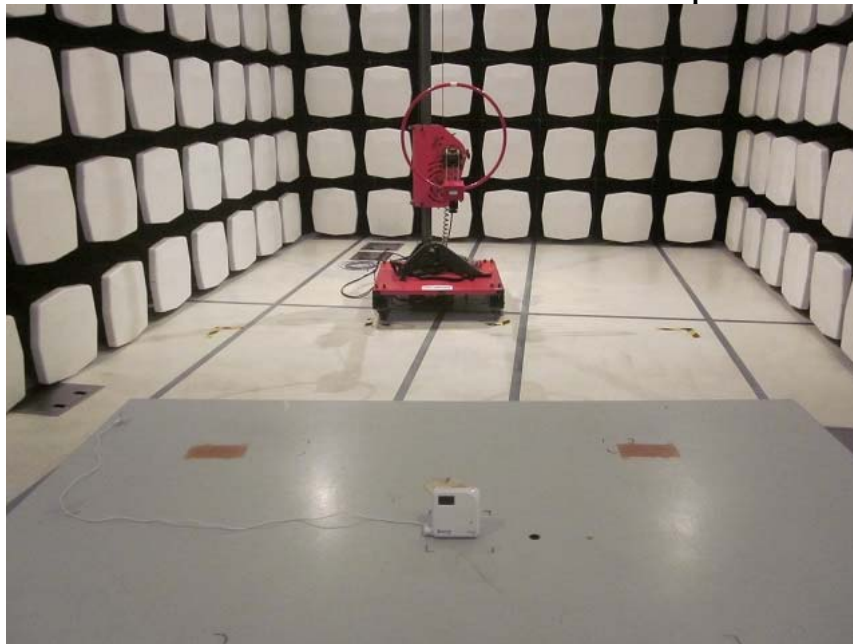
Date: 2015-06-11

Page 34 of 35

No.: DM119762

Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Radiated Emission Test Set Up



STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.



STC Test Report

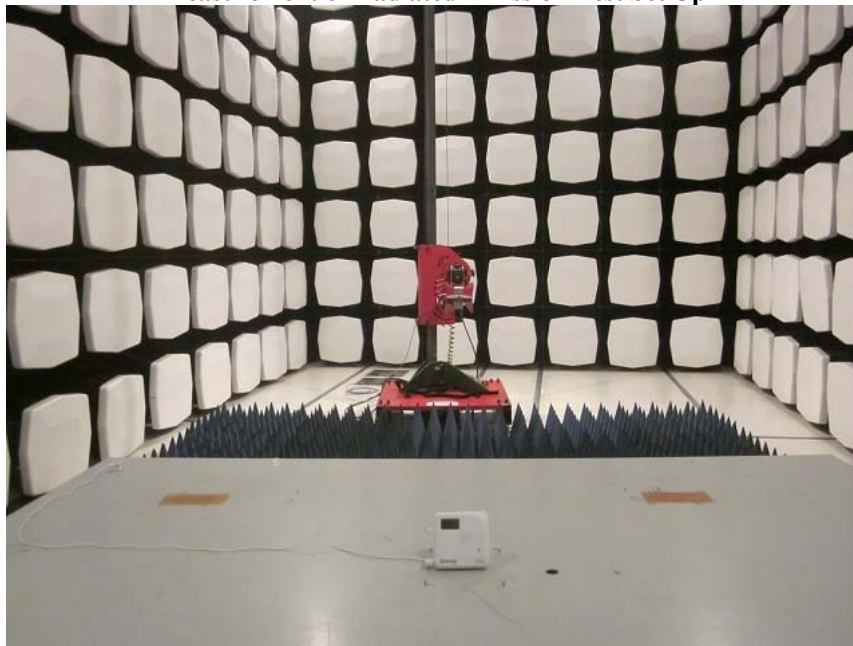
Date: 2015-06-11

Page 35 of 35

No.: DM119762

Photographs of EUT

Measurement of Radiated Emission Test Set Up



******* End of Test Report *******

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

This report shall not be reproduced unless with prior written approval from STC (Dongguan) Company Limited.
For Conditions of Issuance of this test report, please refer to the overleaf or Homepage.