STC Test Report

Date : 2015-12-31
No. : MH191938

Applicant	:	Heng Yu Electronic Manufacturing Co., Ltd. Room 3-5, 15/F., Nan Fung Commercial Center 19 Lam Lok Street, Kowloon Bay
Manufacturer	:	Zhuhai Heng Yu New Technology Company Limited Heng Ke Campus, Jin Hai Avenue, San Zao, Zhuhai, Guangdong R.R.C., 8109040
Description of Samples	:	Submitted sample(s) said to be Product: Wireless Keyboard Brand Name: Heng Yu Model No.: CK82A-RF FCC ID: XENCK82ARF01
Date Samples Received	:	2015-09-18
Date Tested	:	2015-10-17 to 2015-10-19
Investigation Requested	:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 and ANSI C63.10: 2013 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.
Remarks	:	---

THE HONG KONG STANDARDS AND TESTING CENTRE LTD

CHEUNG Chi, Kenneth
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

CONTENT:

1.0 General Details

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

Product:	Wireless Keyboard
Manufacturer:	Zhuhai Heng Yu New Technology Company Limited Heng Ke Campus, Jin Hal Avenue, San Zao, Zhu Hai, Guang Dong R.R.C. 8109040
Brand Name:	Heng Yu
Model Number:	CK82A-RF
Rating:	4.5Vd.c. (“AAA”*3)

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a Wireless Keyboard. The transceiver operating in the 2.4GHz ISM frequency band. The RF signal is modulated by IC, the type of modulation used is GFSK.

1.3 Date of Order

2015-09-18

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2015-10-17 to 2015-10-19

1.6 Country of Origin

China

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 and ANSI C63.10: 2013 for FCC Certification. The device was realized by test software.

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
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10: 2013	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.10: 2013	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249 & FCC 47CFR 15.209
Test Method:	ANSI C63.10: 2013
Test Date:	2015-10-19
Mode of Operation:	TX mode

Test Method:

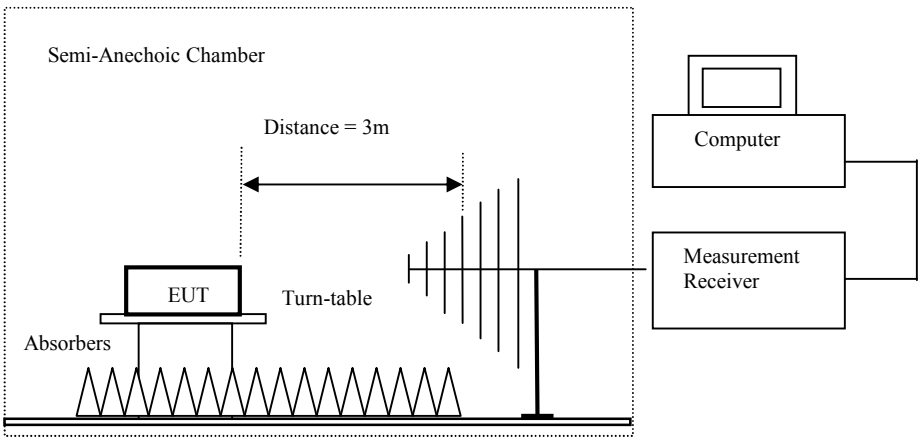
For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, 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 The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	1MHz
	VBW:	1MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Ground Plane

- 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.

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Quasi-Peak]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Lowest Frequency Channel-2404MHz) (Above 1GHz): Pass

Field Strength of Fundamental Emissions
Peak Value

Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2404.00	47.1	36.8	83.9	15,667.5	500,000	Horizontal
2404.00	48.0	36.8	84.8	17,378.0	500,000	Vertical

Field Strength of Fundamental Emissions
Average Value

Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2404.00	36.9	36.8	73.7	4,841.7	50,000	Horizontal
2404.00	37.3	36.8	74.1	5,069.9	50,000	Vertical

Field Strength of Harmonics Emission
Peak Value

Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4808.0	6.1	42.4	48.5	266.1	5,000	Horizontal
4808.0	7.7	41.5	49.2	288.4	5,000	Vertical
7212.0	2.8	46.2	49.0	281.8	5,000	Horizontal
7212.0	3.3	45.1	48.4	263.0	5,000	Vertical
9616.0	1.6	48.8	50.4	331.1	5,000	Horizontal
9616.0	3.8	48.0	51.8	389.0	5,000	Vertical
12020.0	2.8	52.4	55.2	575.4	5,000	Horizontal
12020.0	3.2	51.5	54.7	543.3	5,000	Vertical

Field Strength of Harmonics Emission Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4808.0	-5.6	42.4	36.8	69.2	500	Horizontal
4808.0	-4.5	41.5	37.0	70.8	500	Vertical
7212.0	-8.3	46.2	37.9	78.5	500	Horizontal
7212.0	-7.8	45.1	37.3	73.3	500	Vertical
9616.0	-10.6	48.8	38.2	81.3	500	Horizontal
9616.0	-9.1	48.0	38.9	88.1	500	Vertical
12020.0	-12.3	52.4	40.1	101.2	500	Horizontal
12020.0	-11.6	51.5	39.9	98.9	500	Vertical

Results of Tx mode (Middle Frequency Channel- 2442MHz) (Above 1GHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2442.00	48.0	36.4	84.4	16,595.9	500,000	Horizontal
2442.00	48.2	36.8	85.0	17,782.8	500,000	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2442.00	37.3	36.4	73.7	4,841.7	50,000	Horizontal
2442.00	37.8	36.8	74.6	5,370.3	50,000	Vertical

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4884.0	7.1	42.5	49.6	302.0	5,000	Horizontal
4884.0	6.9	41.6	48.5	266.1	5,000	Vertical
7326.0	2.6	46.3	48.9	278.6	5,000	Horizontal
7326.0	4.3	45.2	49.5	298.5	5,000	Vertical
9768.0	0.7	48.9	49.6	302.0	5,000	Horizontal
9768.0	2.3	48.1	50.4	331.1	5,000	Vertical
12210.0	2.5	52.5	55.0	562.3	5,000	Horizontal
12210.0	2.9	51.6	54.5	530.9	5,000	Vertical

Field Strength of Harmonics Emission Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4884.0	-4.2	42.5	38.3	82.2	500	Horizontal
4884.0	-4.6	41.6	37.0	70.8	500	Vertical
7326.0	-8.7	46.3	37.6	75.9	500	Horizontal
7326.0	-7.3	45.2	37.9	78.5	500	Vertical
9768.0	-10.6	48.9	38.3	82.2	500	Horizontal
9768.0	-9.4	48.1	38.7	86.1	500	Vertical
12210.0	-11.9	52.5	40.6	107.2	500	Horizontal
12210.0	-11.9	51.6	39.7	96.6	500	Vertical

Results of Tx mode (Highest Frequency Channel – 2480MHz) (Above 1GHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2480.00	48.4	36.4	84.8	17,378.0	500,000	Horizontal
2480.00	48.7	36.8	85.5	18,836.5	500,000	Vertical

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2480.00	38.6	36.4	75.0	5,623.4	50,000	Horizontal
2480.00	38.6	36.8	75.4	5,888.4	50,000	Vertical

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4960.0	6.4	42.7	49.1	285.1	5,000	Horizontal
4960.0	6.9	41.4	48.3	260.0	5,000	Vertical
7440.0	3.0	46.5	49.5	298.5	5,000	Horizontal
7440.0	2.4	45.6	48.0	251.2	5,000	Vertical
9920.0	1.2	49.7	50.9	350.8	5,000	Horizontal
9920.0	3.1	48.6	51.7	384.6	5,000	Vertical
12400.0	2.5	52.7	55.2	575.4	5,000	Horizontal
12400.0	2.8	51.7	54.5	530.9	5,000	Vertical

Field Strength of Harmonics Emission Avarage Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4960.0	-4.3	42.7	38.4	83.2	500	Horizontal
4960.0	-3.4	41.4	38.0	79.4	500	Vertical
7440.0	-8.6	46.5	37.9	78.5	500	Horizontal
7440.0	-8.0	45.6	37.6	75.9	500	Vertical
9920.0	-10.7	49.7	39.0	89.1	500	Horizontal
9920.0	-10.1	48.6	38.5	84.1	500	Vertical
12400.0	-12.0	52.7	40.7	108.4	500	Horizontal
12400.0	-11.3	51.7	40.4	104.7	500	Vertical

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Calculated measurement uncertainty (9kHz - 30MHz): 2.0dB
(30MHz – 1GHz): 4.9dB
(1GHz - 26GHz): 4.0dB
Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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

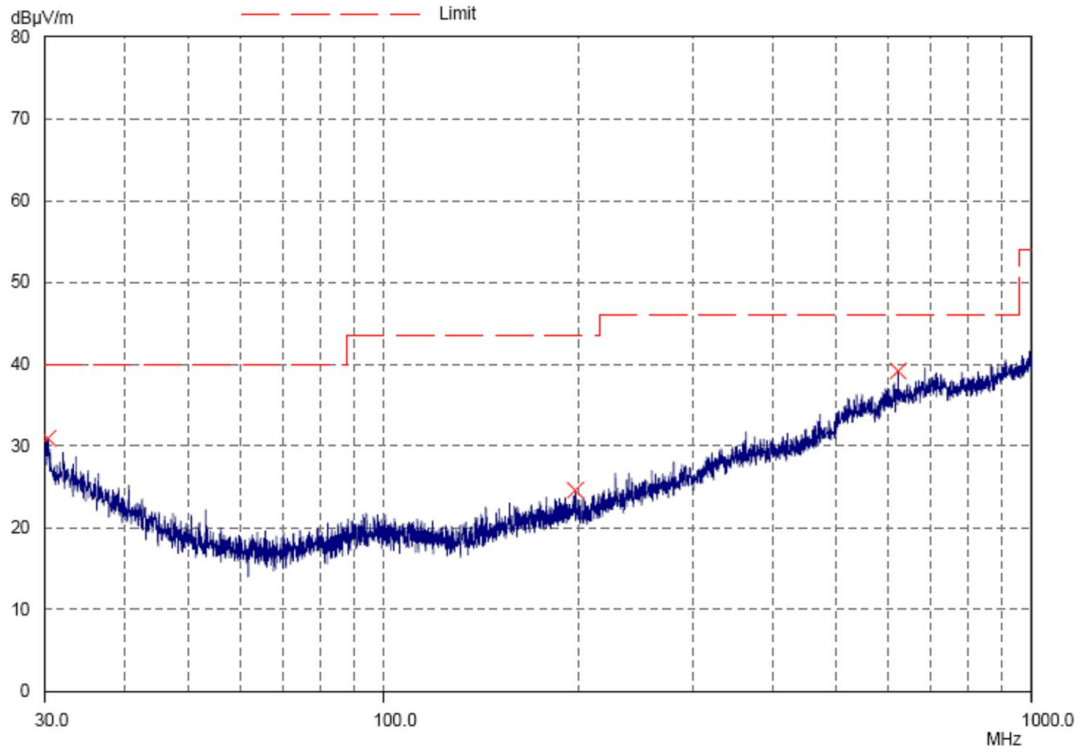
Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

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.

Results of TX mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Results of TX mode (2404MHz) (30MHz – 1GHz): PASS
Please refer to the following table for result details

Horizontal



Results of TX mode (2404MHz) (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
30.3	Horizontal	30.9	40.0	35.1	100
197.9	Horizontal	24.6	43.5	17.0	150
623.3	Horizontal	39.2	46.0	91.2	200

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

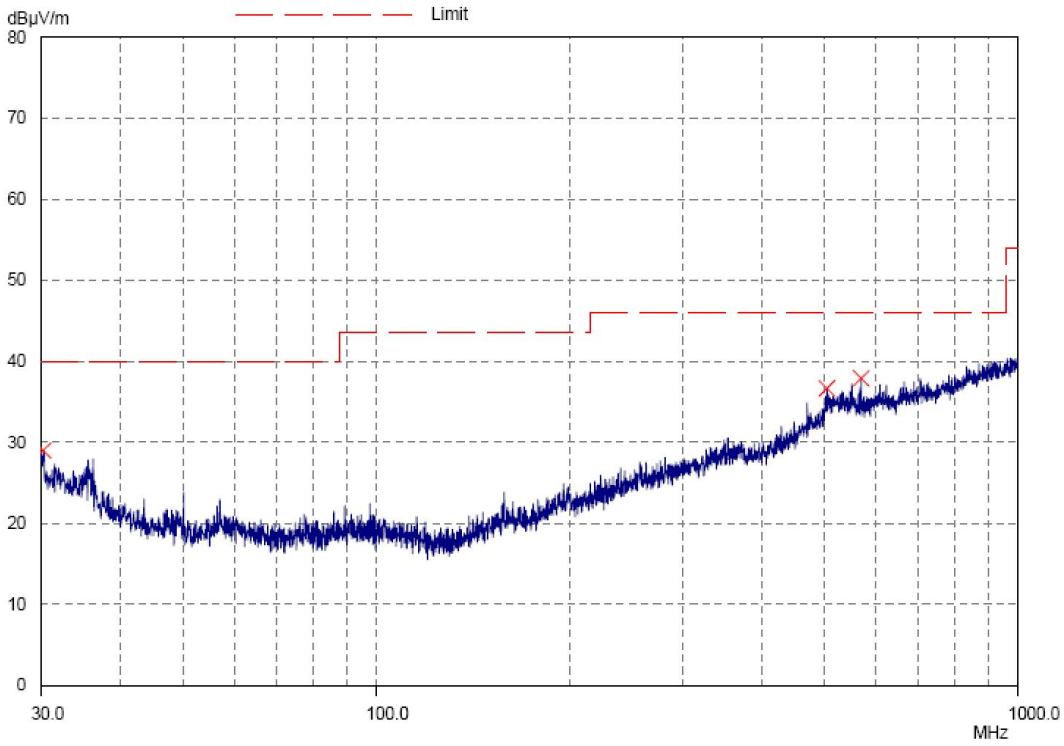
Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

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.

Results of TX mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Results of TX mode (2404MHz) (30MHz – 1GHz): PASS
Please refer to the following table for result details

Vertical



Results of TX mode (2404MHz) (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
30.3	Vertical	29.0	40.0	28.2	100
505.1	Vertical	36.7	46.0	68.4	200
570.8	Vertical	37.9	46.0	78.5	200

Remarks:
Calculated measurement uncertainty (9kHz - 30MHz): 2.0dB
(30MHz – 1GHz): 4.9dB
(1GHz - 26GHz): 4.0dB
Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.249
Test Method:	ANSI C63.10: 2013
Test Date:	2015-10-17
Mode of Operation:	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.

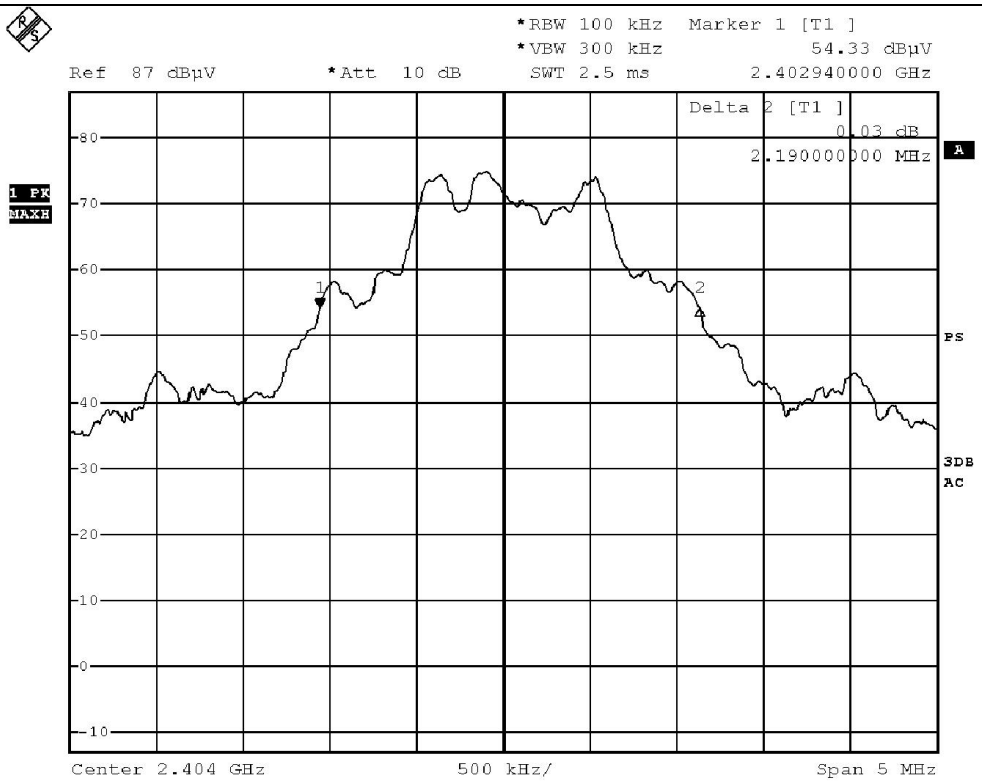
Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Limits for 20dB Bandwidth of Fundamental Emission (Low Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2404	2.19

20dB Bandwidth of Fundamental Emission



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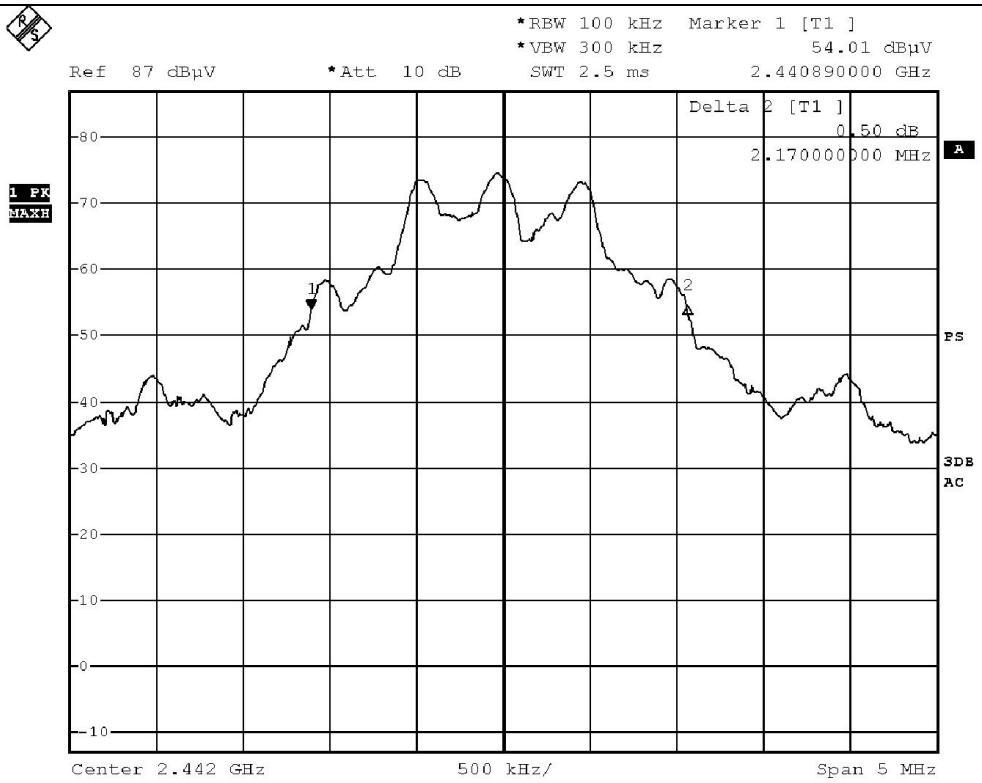
Limits for 20dB Bandwidth of Fundamental Emission (Middle Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2442	2.17

20dB Bandwidth of Fundamental Emission



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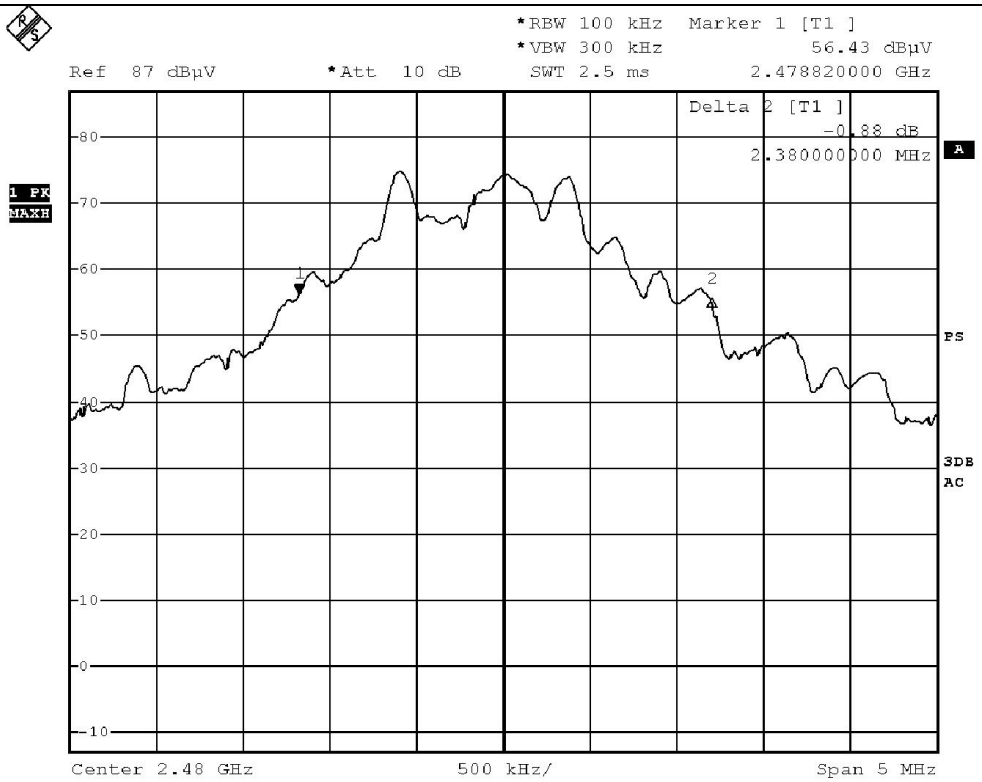
Limits for 20dB Bandwidth of Fundamental Emission (High Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2480	2.38

20dB Bandwidth of Fundamental Emission



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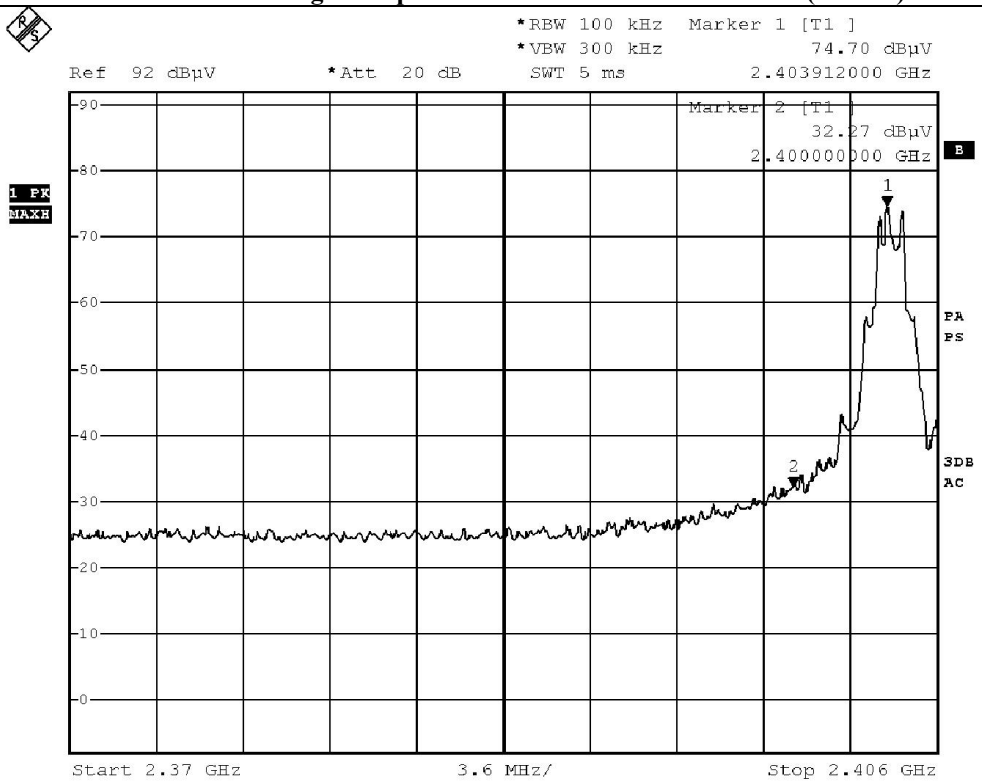
Band-edge Compliance of RF Conducted Emissions Measurement:

Limit：
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.

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400 – Lowest Fundamental (2404)	42.43

Band-edge Compliance of RF Conducted Emissions (Lowest)



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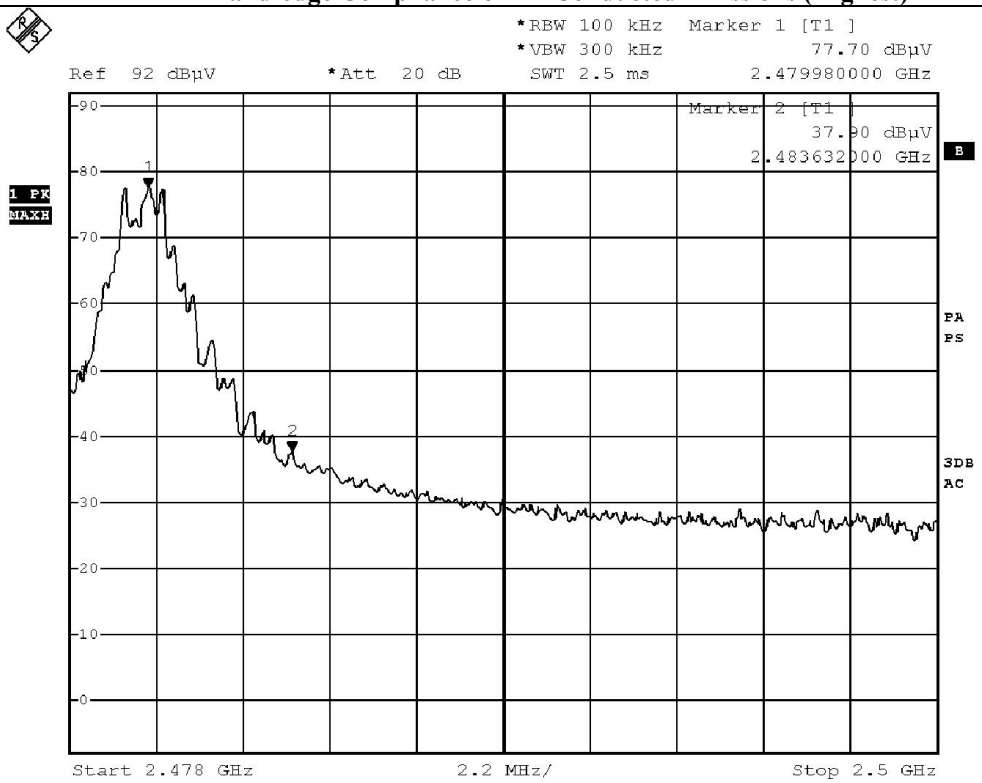
Band-edge Compliance of RF Conducted Emissions Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental (2474) - 2480	39.80

Band-edge Compliance of RF Conducted Emissions (Highest)



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Band-edge Compliance of RF Radiated Emissions Measurement:

Limit：
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.

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
2390.0	6.2	36.8	43.0	74.0	31.0	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
2390.0	-0.5	36.8	36.3	54.0	17.7	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
2483.5	7.6	36.4	44.0	74.0	30.0	Horizontal

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
2483.5	0.6	36.4	37.0	54.0	17.0	Horizontal

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2014/01/15	2016/01/25
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2014/01/23	2016/01/23
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2014/09/29	2016/09/29
EM320	BICONILOG ANTENNA	ETS-LINDGREN	3142D	00094856	2014/08/06	2016/08/06
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2014/01/15	2016/01/15
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2015/06/01	2016/06/01
EM527	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 102	24514	2014/08/26	2016/08/26
EM528	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 102	24515	2014/08/26	2016/08/26

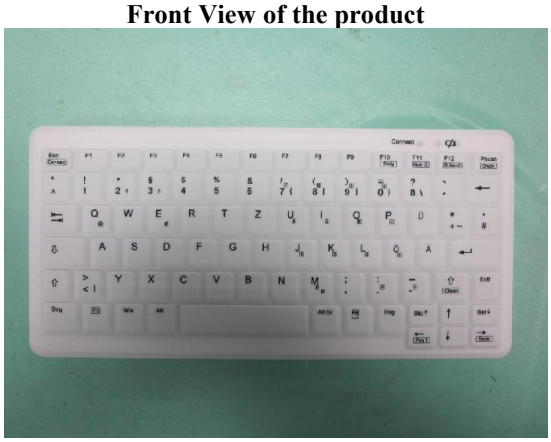
Remarks:-

N/A Not Applicable or Not Available

Appendix B

Photographs of EUT

Front View of the product

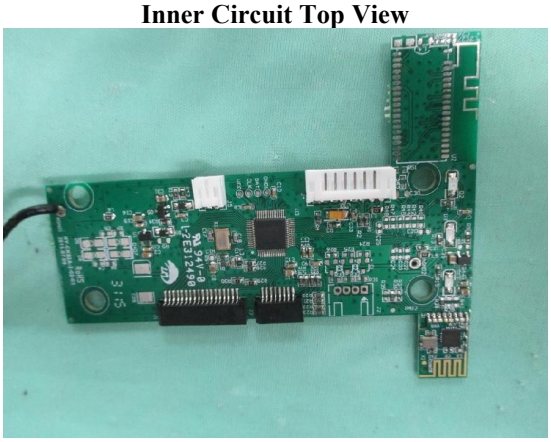


Rear View of the product

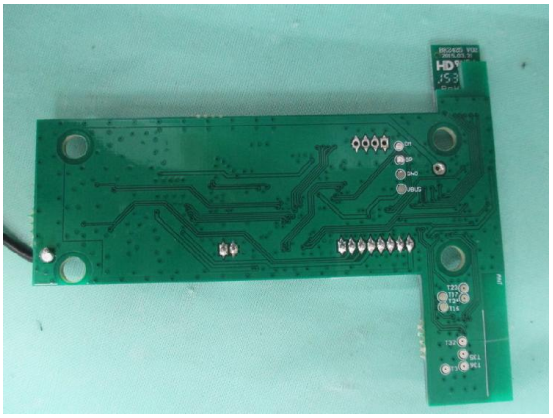
Inside View of the product

Inside View of the product

Inner Circuit Top View

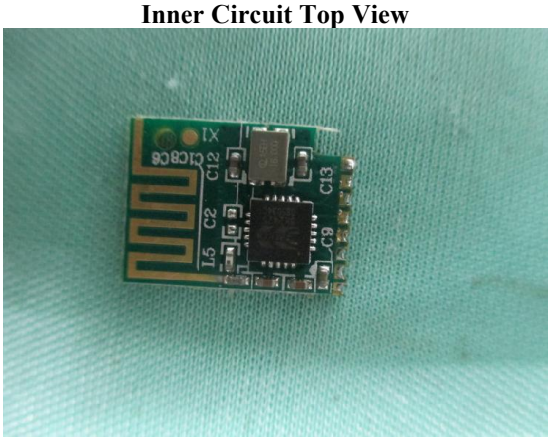


Inner Circuit Bottom View

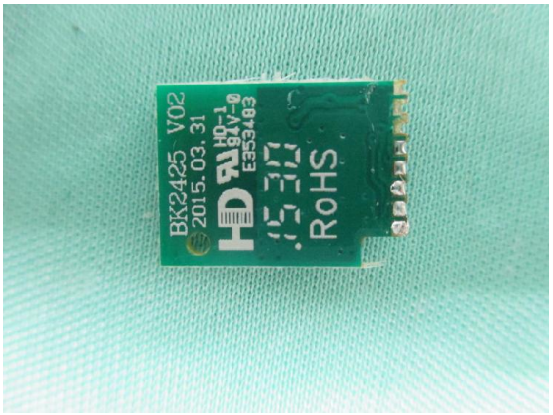


Photographs of EUT

Inner Circuit Top View

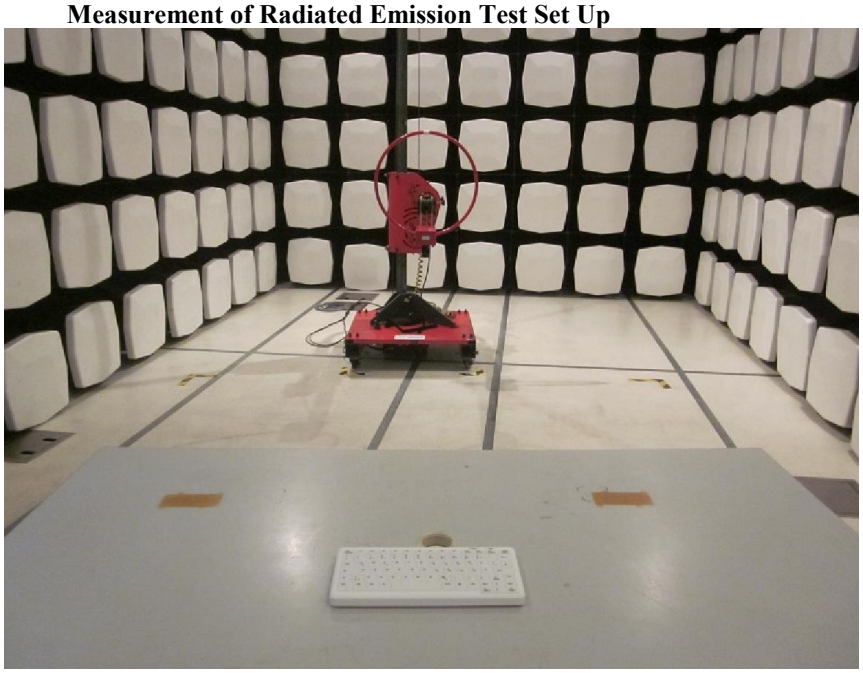


Inner Circuit Bottom View

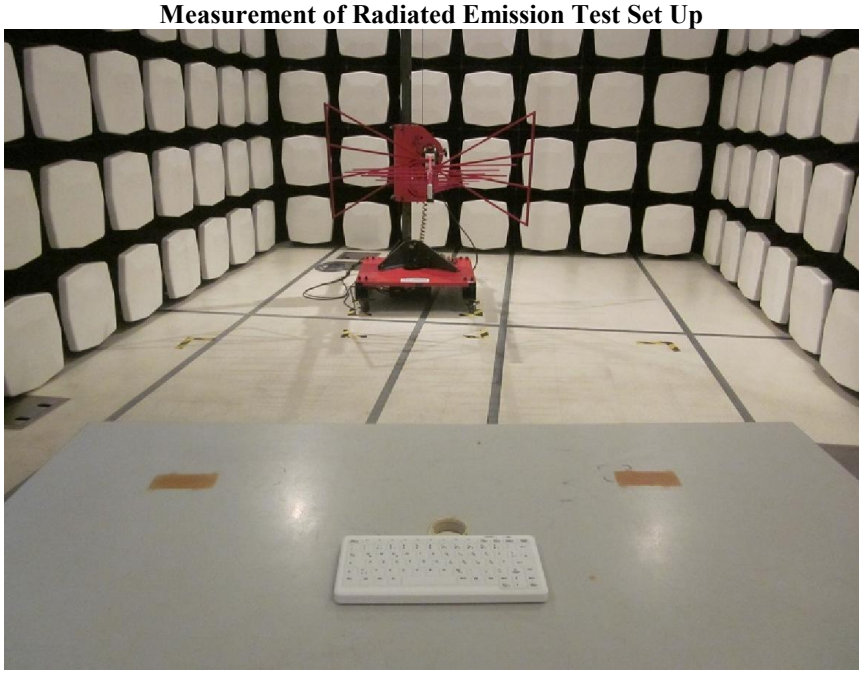


Photographs of EUT

Measurement of Radiated Emission Test Set Up

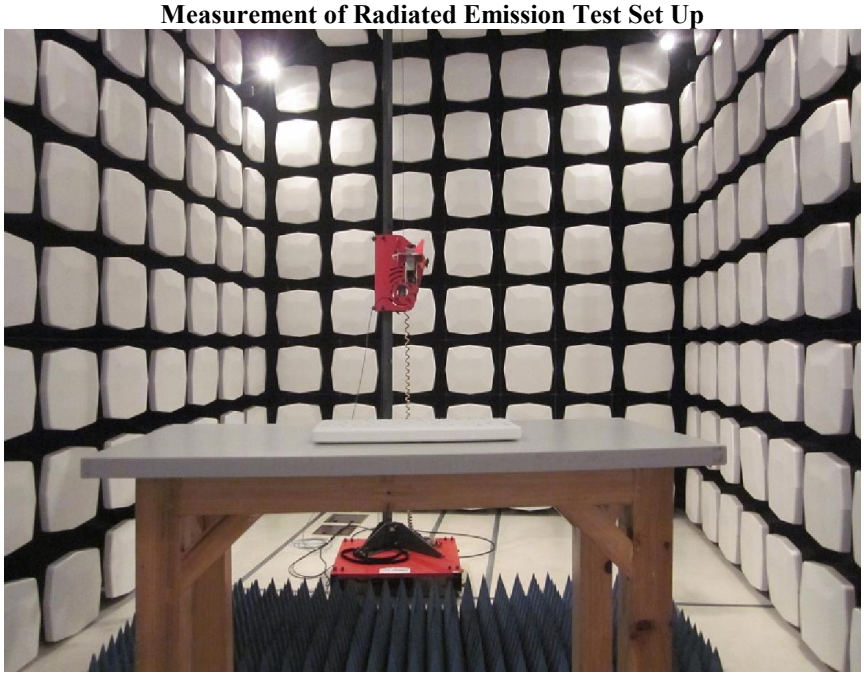


Measurement of Radiated Emission Test Set Up



Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

STC Test Report

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by The Hong Kong Standards & Testing Centre Limited (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The Company provides its services on the basis that such terms and conditions constitute express agreement between the Company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by the Company as a result of this application for testing service (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to his customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. The Report refers only to the sample tested and does not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

5. In the event of the improper use the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

6. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

7. The Company will not be liable for or accept responsibility for any loss or damage howsoever arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

9. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

10. Issuance records of the Report are available on the internet at www.stc-group.org. Further enquiry of validity or verification of the Reports should be addressed to the Company.