Test Report

Date : 2018-03-15
No. : HM18010001

Applicant:	Ewig Industries Macao Commercial Offshore Limited Avenida Da Praia Grande No. 619, EDF. Comercial Si Toi L6, Macau
Manufacturer:	DONG GUAN Q&S ELECTRONIC MANUFACTURING COMPANY LIMITED Yin Chan Industrial District, Fu Gang Village, Xiang Mang West Road, Qing Xi Town, Dongguan City, Guang Dong Province, China
Description of Sample(s):	Product: BioLite FirePit Brand Name: BioLite Model Number: FPB FCC ID: N9ZFPB
Date Sample(s) Received:	2018-01-18
Date Tested:	2018-02-28 to 2018-03-05
Investigation Requested:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2017 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.
Remark(s):	---

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

Test Report

CONTENT:

1.0 General Details

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

Product:	BioLite FirePit
Manufacturer:	DONG GUAN Q&S ELECTRONIC MANUFACTURING COMPANY LIMITED Yin Chan Industrial District, Fu Gang Village, Xiang Mang West Road, Qing Xi Town, Dongguan City, Guang Dong Province, China
Brand Name:	BioLite
Additional Brand Name	EWIG
Model Number:	FPB
Additional Model Number:	BIO006
Rating:	120Va.c, 5Vd.c (Powered by USB) Li-ion Rechargeable Battery x1 = 3.7Vd.c

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is BioLite FirePit, which is 2.4GHz transceiver. (Bleutooth LE only) The transmission signal is digital modulated with channel frequency range 2402-2480MHz. The R.F. signal was modulated by IC.

1.3 Date of Order

2018-01-18

1.4 Submitted Sample(s):

2 Samples

1.5 Test Duration

2018-02-28 to 2018-03-05

1.6 Country of Origin

China

1.7 Antenna Details

Antenna Type (Bluetooth):	Embedded BLE antenna
Antenna Gain (Bluetooth):	-1.5dBi

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2017 Regulations and ANSI C63.10:2013 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
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10:2013	N/A	☒	☐
AC power-line conducted emissions	FCC 47CFR 15.207	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 Field Strength of Fundamental & Harmonics Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.10:2013
Test Date:	2018-02-28
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, 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. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

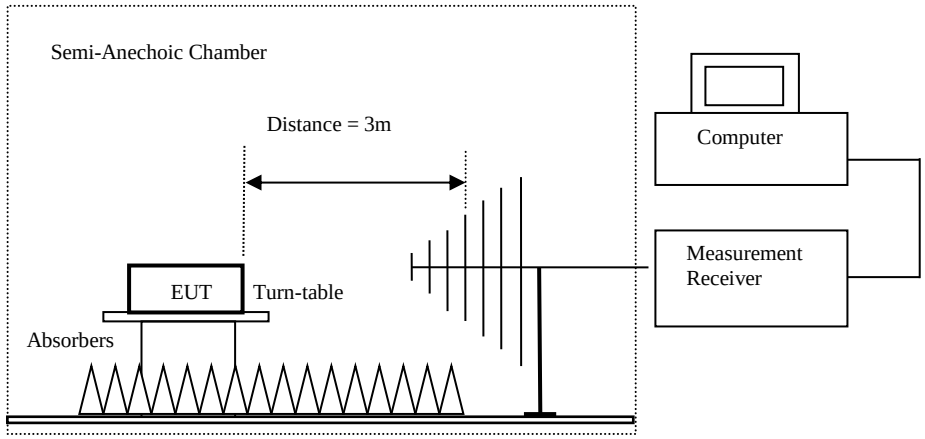
Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd.
FCC Test Firm Registration Number 723883
Designation Number HK0001

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:	3MHz
	VBW:	3MHz
	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.

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

Fundamental frequency [MHz]	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Result of TX mode (FSK) (Lowest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics 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
2402.0	49.3	27.9	77.2	7,244.4	500,000	Vertical
* 4804.0	8.7	32.1	40.8	109.6	5,000	Vertical
7206.0	2.3	38.6	40.9	110.9	5,000	Vertical
9608.0	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12010.0					5,000	Vertical
14412.0					5,000	Vertical
16814.0					5,000	Vertical
* 19216.0					5,000	Vertical
21618.0					5,000	Vertical
24020.0					5,000	Vertical

Field Strength of Fundamental and Harmonics 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
2402.0	41.8	27.9	69.7	3,054.9	50,000	Vertical
* 4804.0	2.3	32.1	34.4	52.5	500	Vertical
7206.0	-1.2	38.6	37.4	74.1	500	Vertical
9608.0	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12010.0					500	Vertical
14412.0					500	Vertical
16814.0					500	Vertical
* 19216.0					500	Vertical
21618.0					500	Vertical
24020.0					500	Vertical

Result of TX mode (FSK) (Middle Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics 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
2440.0	47.4	27.9	75.3	5,821.0	500,000	Vertical
* 4880.0	8.7	32.1	40.8	109.6	5,000	Vertical
* 7320.0	2.4	38.6	41.0	112.2	5,000	Vertical
9760.0	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12200.0					5,000	Vertical
14640.0					5,000	Vertical
17080.0					5,000	Vertical
* 19520.0					5,000	Vertical
21960.0					5,000	Vertical
24400.0					5,000	Vertical

Field Strength of Fundamental and Harmonics 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
2440.0	45.1	27.9	73.0	4,466.8	50,000	Vertical
* 4880.0	2.4	32.1	34.5	53.1	500	Vertical
* 7320.0	-1.4	38.6	37.2	72.4	500	Vertical
9760.0	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12200.0					500	Vertical
14640.0					500	Vertical
17080.0					500	Vertical
* 19520.0					500	Vertical
21960.0					500	Vertical
24400.0					500	Vertical

Result of TX mode (FSK) (Highest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics 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
2480.0	48.6	27.9	76.5	6,683.4	500,000	Vertical
* 4960.0	10.4	32.1	42.5	133.4	5,000	Vertical
* 7440.0	1.9	38.6	40.5	105.9	5,000	Vertical
9920.0	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12400.0					5,000	Vertical
14880.0					5,000	Vertical
17360.0					5,000	Vertical
* 19840.0					5,000	Vertical
22320.0					5,000	Vertical
24800.0					5,000	Vertical

Field Strength of Fundamental and Harmonics 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
2480.0	40.5	27.9	68.4	2,630.3	50,000	Vertical
* 4960.0	2.2	32.1	34.3	51.9	500	Vertical
* 7440.0	-1.4	38.6	37.2	72.4	500	Vertical
9920.0	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12400.0					500	Vertical
14880.0					500	Vertical
17360.0					500	Vertical
* 19840.0					500	Vertical
22320.0					500	Vertical
24800.0					500	Vertical

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 1000 MHz 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.

Calculated measurement uncertainty : 9kHz to 30MHz 2.4dB
30MHz to 18GHz 5.0dB

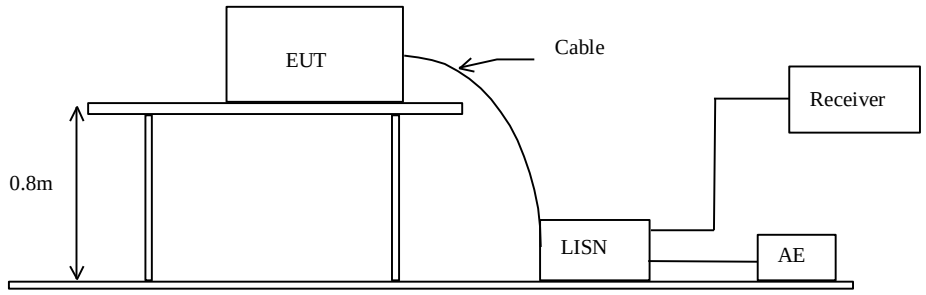
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.10:2013
Test Date:	2018-03-05
Mode of Operation:	Tx mode

Test Method:

The test was performed in accordance with ANSI C63.10:2013, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



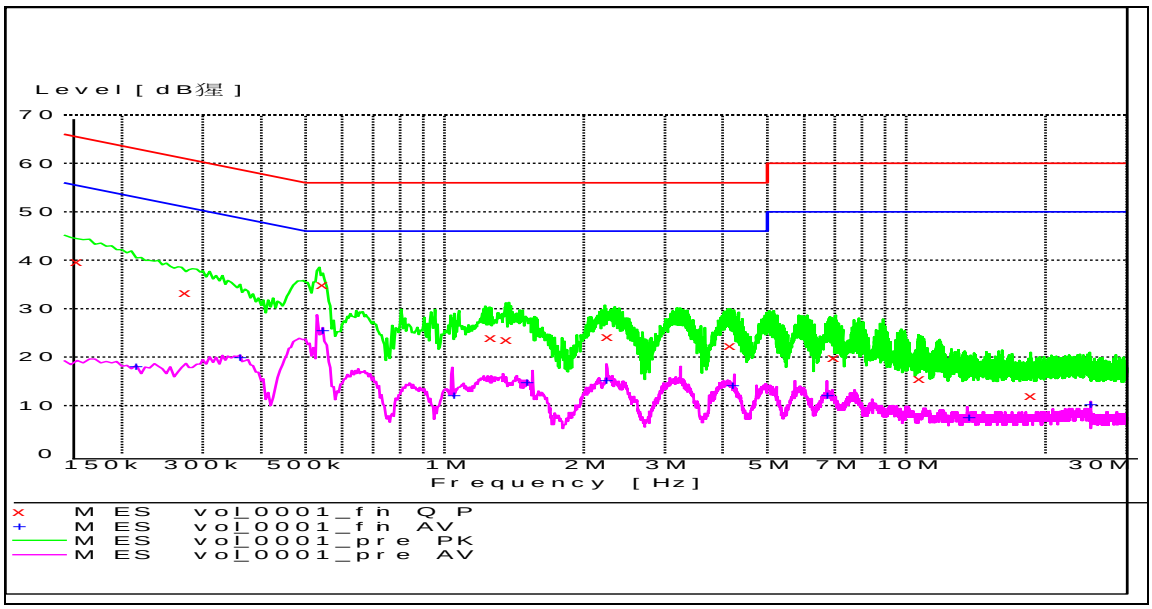
Limit for Conducted Emissions (FCC 47CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Tx mode – Live: PASS



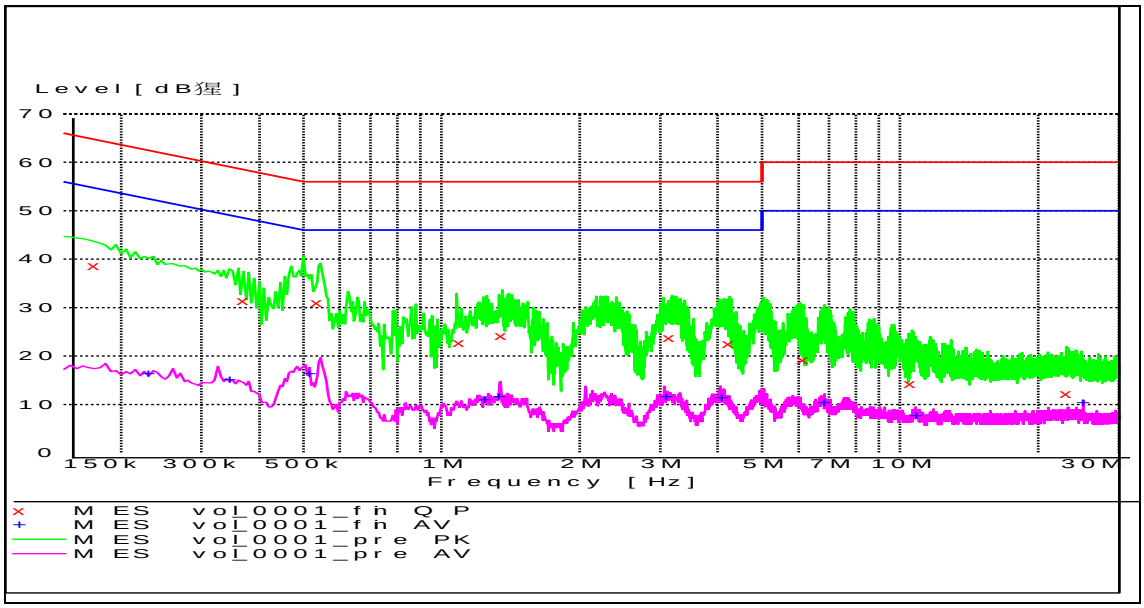
MEASUREMENT RESULT: "vol_0001_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.160000	39.70	9.9	66	25.8	L1	GND
0.275000	33.20	9.9	61	27.8	L1	GND
0.545000	34.90	10.0	56	21.1	L1	GND
1.260000	24.00	9.9	56	32.0	L1	GND
1.365000	23.50	9.9	56	32.5	L1	GND
2.255000	24.10	10.2	56	31.9	L1	GND
4.155000	22.30	10.5	56	33.7	L1	GND
6.985000	19.80	10.6	60	40.2	L1	GND
10.705000	15.50	10.4	60	44.5	L1	GND
18.650000	12.00	10.7	60	48.0	L1	GND

MEASUREMENT RESULT: "vol_0001_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.215000	18.00	9.9	53	35.0	L1	GND
0.360000	19.90	10.0	49	28.8	L1	GND
0.545000	25.40	10.0	46	20.6	L1	GND
1.050000	11.90	9.8	46	34.1	L1	GND
1.510000	14.70	10.0	46	31.3	L1	GND
2.245000	15.20	10.2	46	30.8	L1	GND
4.205000	14.00	10.5	46	32.0	L1	GND
6.750000	12.10	10.6	50	37.9	L1	GND
13.680000	7.50	10.7	50	42.5	L1	GND
25.060000	10.20	10.8	50	39.8	L1	GND

Results of Tx mode –Neutral: PASS



MEASUREMENT RESULT: "vol_0001_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.175000	38.70	9.9	65	26.0	N	GND
0.370000	31.40	10.0	59	27.1	N	GND
0.535000	31.10	10.0	56	24.9	N	GND
1.095000	22.70	9.8	56	33.3	N	GND
1.350000	24.10	9.9	56	31.9	N	GND
3.145000	23.80	10.4	56	32.2	N	GND
4.230000	22.50	10.5	56	33.5	N	GND
6.160000	19.20	10.6	60	40.8	N	GND
10.565000	14.40	10.4	60	45.6	N	GND
23.110000	12.20	10.9	60	47.8	N	GND

MEASUREMENT RESULT: "vol_0001_fin AV"

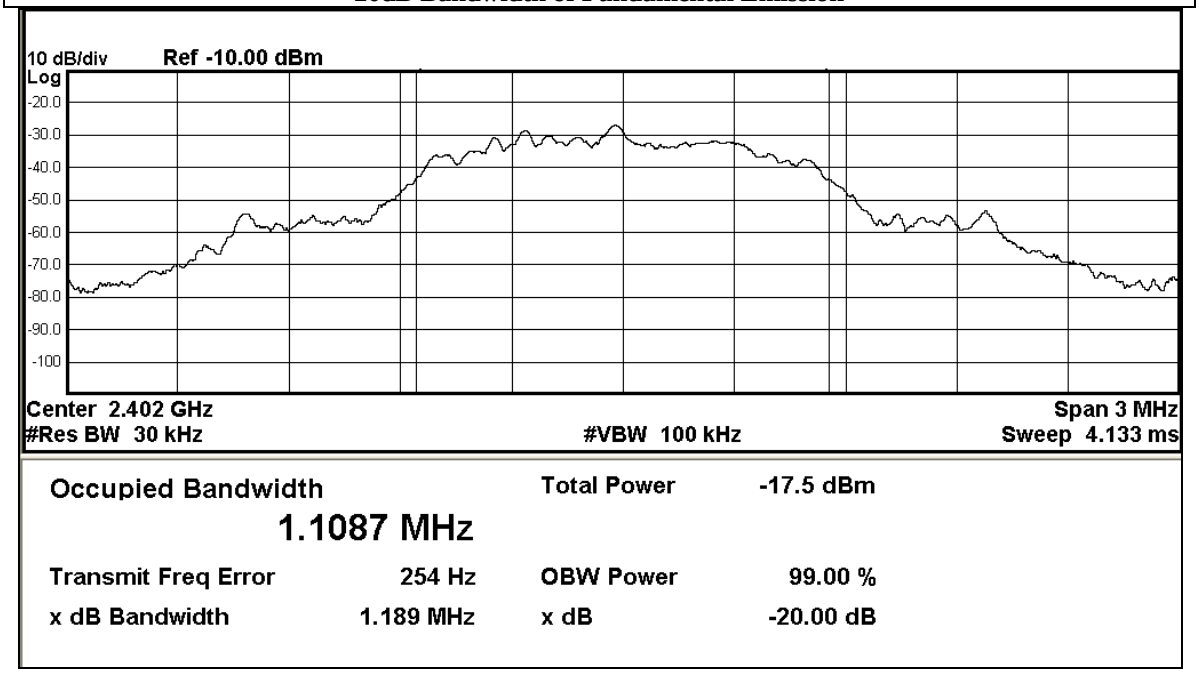
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.230000	16.40	9.9	52	36.0	N	GND
0.345000	15.10	10.0	49	34.0	N	GND
0.515000	16.30	10.0	46	29.7	N	GND
1.245000	10.90	9.9	46	35.1	N	GND
1.335000	11.60	9.9	46	34.4	N	GND
3.090000	11.60	10.4	46	34.4	N	GND
4.090000	11.50	10.5	46	34.5	N	GND
6.835000	10.30	10.6	50	39.7	N	GND
10.870000	7.70	10.4	50	42.3	N	GND
25.060000	10.30	10.8	50	39.7	N	GND

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2402.0	1.19

TX mode, Lowest Channel

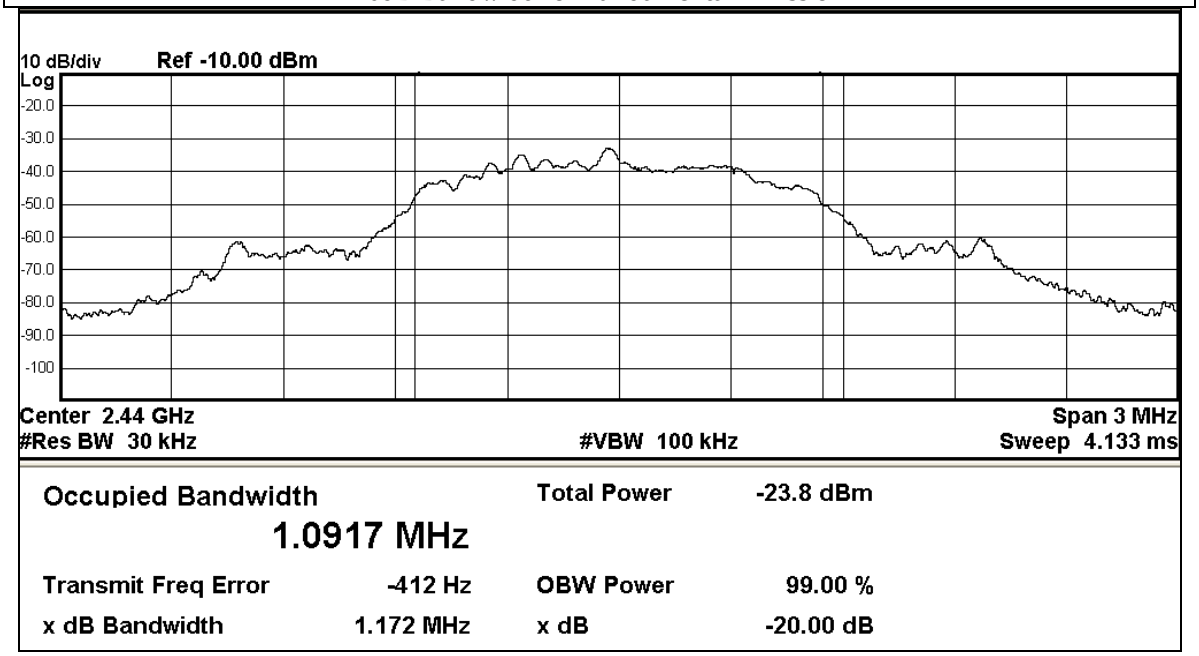
20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [MHz]
2440.0	1.17

TX mode, Middle Channel

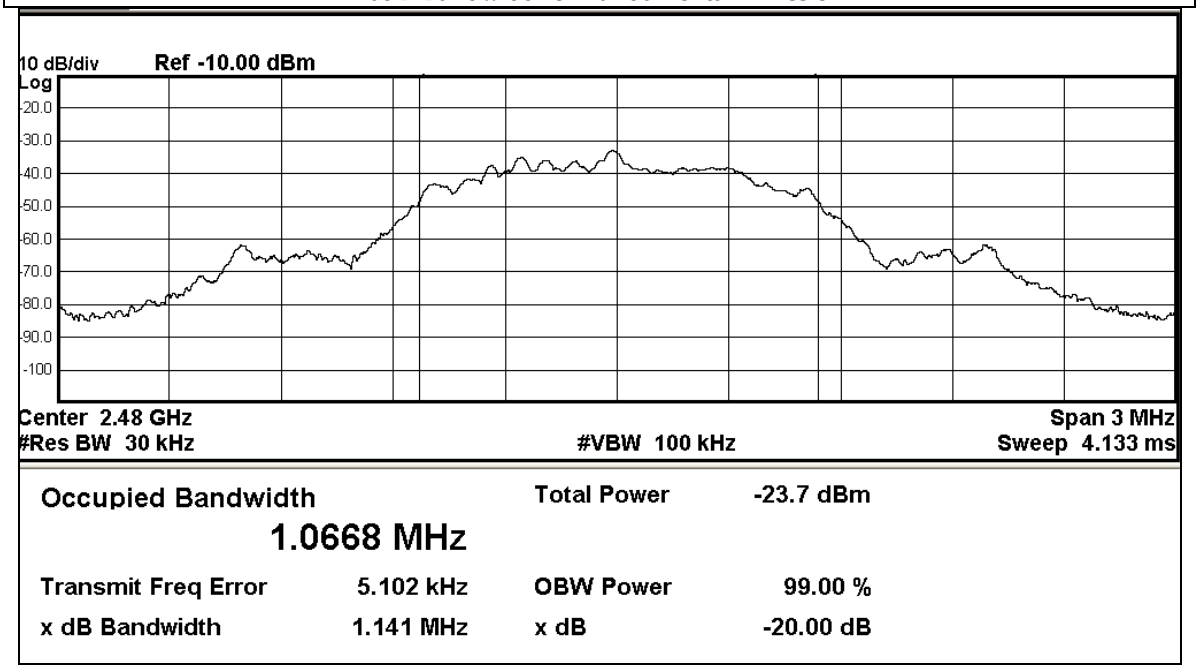
20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [MHz]
2480.0	1.14

TX mode, Highest Channel

20dB Bandwidth of Fundamental Emission

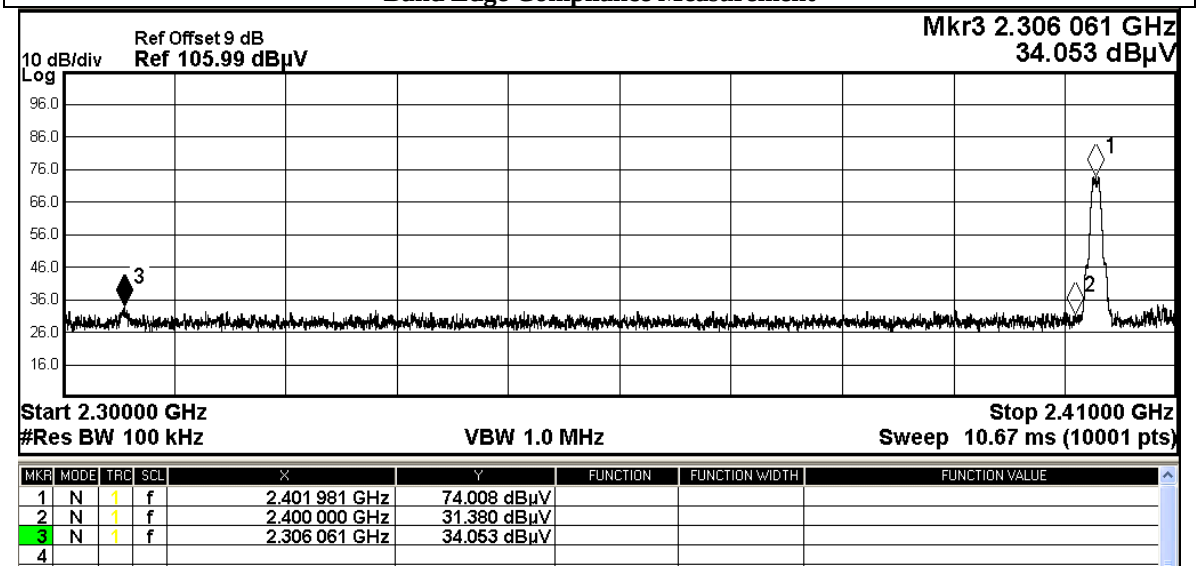


Band Edge Measurement:

TX mode

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400MHz – Lowest Fundamental	42.6

Band Edge Compliance Measurement



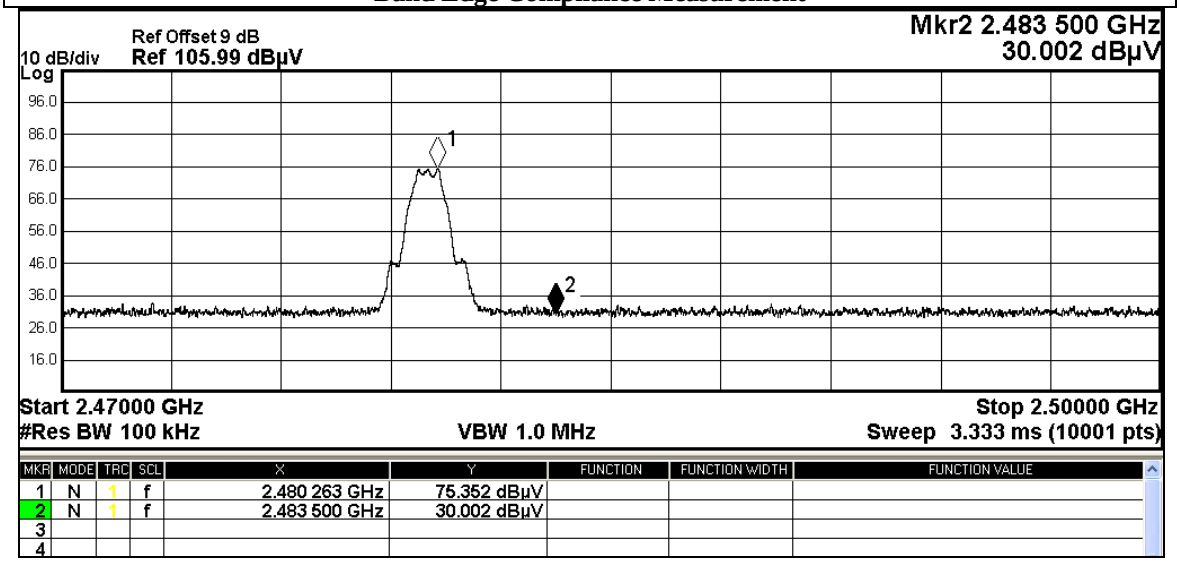
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.401 981 GHz	74.008 dBµV			
2	N	1	f	2.400 000 GHz	31.380 dBµV			
3	N	1	f	2.306 061 GHz	34.053 dBµV			
4								

Band Edge Measurement:

TX mode

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental – 2483.5MHz	45.4

Band Edge Compliance Measurement



Result of TX mode FSK, Band-edge measurement: PASS

Field Strength of Fundamental and Harmonics 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
2306.1	5.4	27.6	33.0	44.7	5,000	Vertical
2484.0	3.4	28.0	31.4	37.2	5,000	Vertical

Field Strength of Fundamental and Harmonics 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
2306.1	-0.3	27.6	27.3	23.2	500	Vertical
2484.0	-0.7	28.0	27.3	23.2	500	Vertical

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

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

Result of Tx mode, (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions Quasi-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
43.6	24.0	9.0	33.0	44.7	100	Vertical
86.0	18.0	7.0	25.0	17.8	150	Vertical
314.0	22.9	13.6	36.5	66.8	150	Vertical
86.0	21.1	7.2	28.3	26.0	200	Horizontal
347.1	25.0	15.7	40.7	108.4	200	Horizontal
757.9	17.9	22.6	40.5	105.9	200	Horizontal

Appendix A

LIST OF MEASUREMENT EQUIPMENT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2017/04/20	2018/04/20
EM355	BICONILOG ANTENNA	ETS-LINDGREN	3143B	00094856	2017/02/29	2019/02/29
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2017/06/15	2018/06/15
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2016/04/27	2018/04/27
EM302	PRECISION OMNIDIRECTIONAL DIPOLE (1 – 6GHZ)	SEIBERSDORF LABORATORIES	POD 16	161806/L	2016/05/11	2018/05/11
EM303	PRECISION OMNIDIRECTIONAL DIPOLE (6 – 18GHZ)	SEIBERSDORF LABORATORIES	POD 618	6181908/L	2016/05/11	2018/05/11

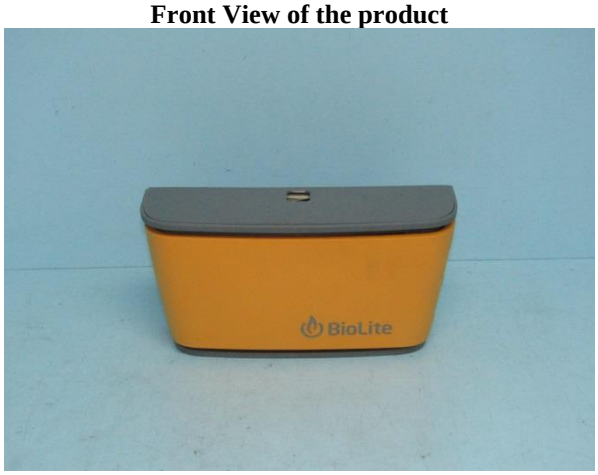
Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

Photographs of EUT

Front View of the product



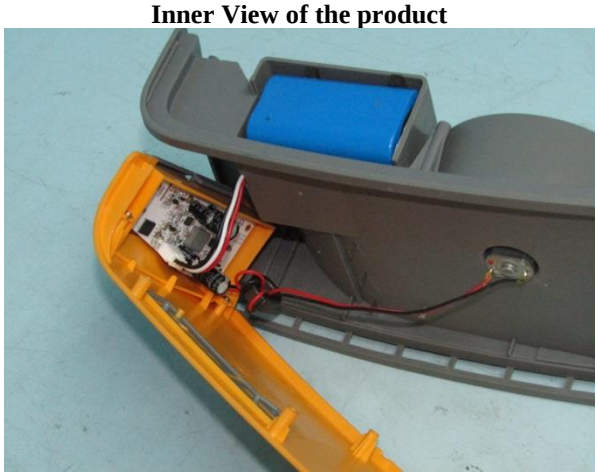
Rear View of the product

Rear View of the product

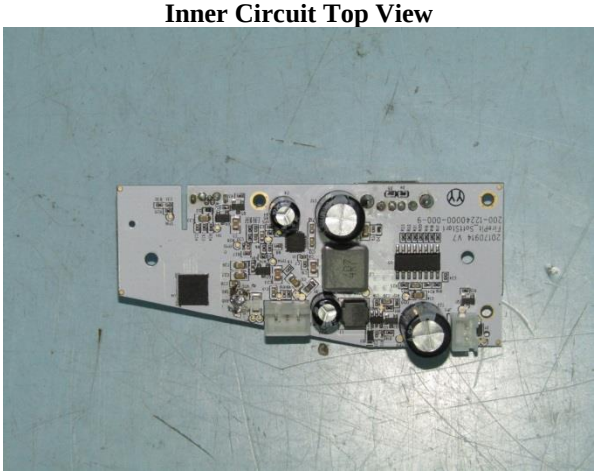
Rear View of the product

Photographs of EUT

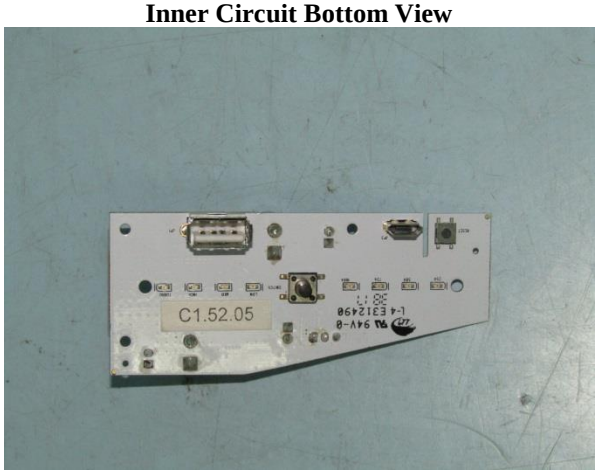
Inner View of the product



Inner Circuit Top View

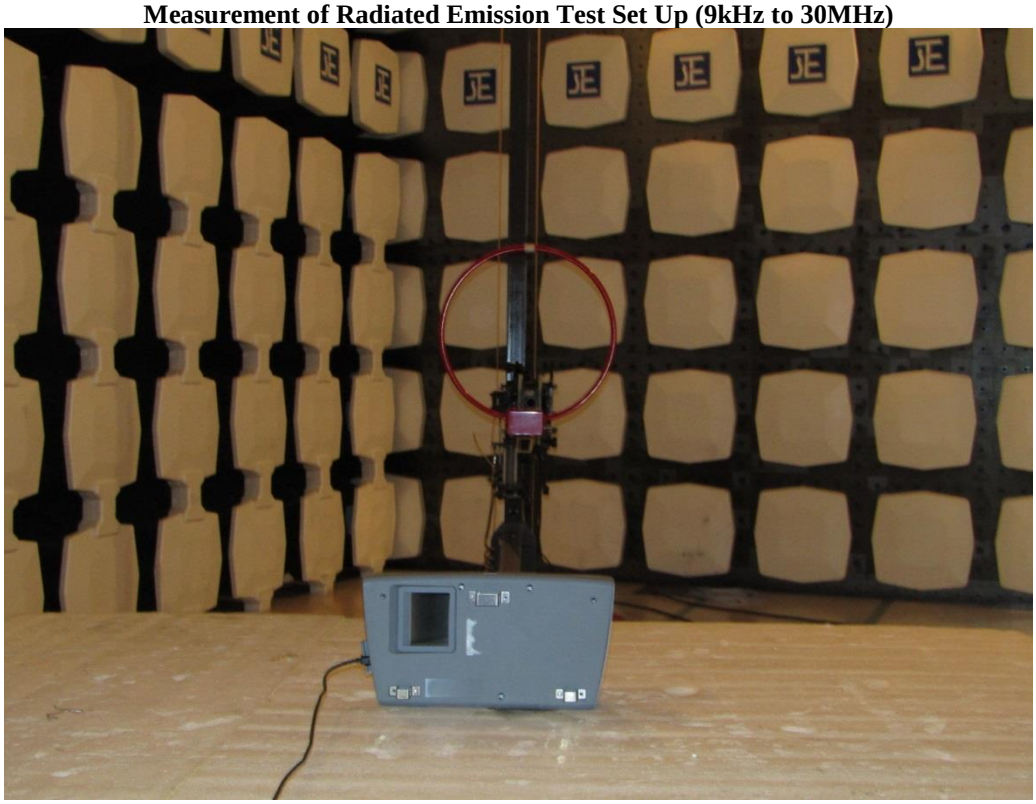


Inner Circuit Bottom View



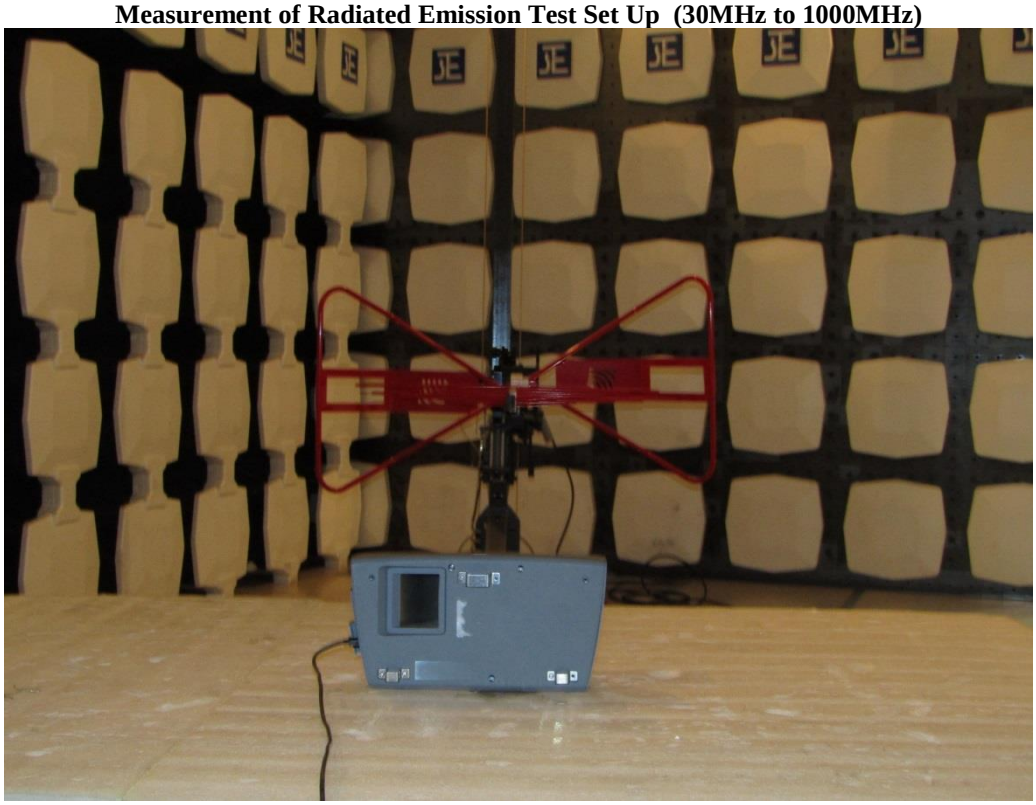
Photographs of EUT

Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)



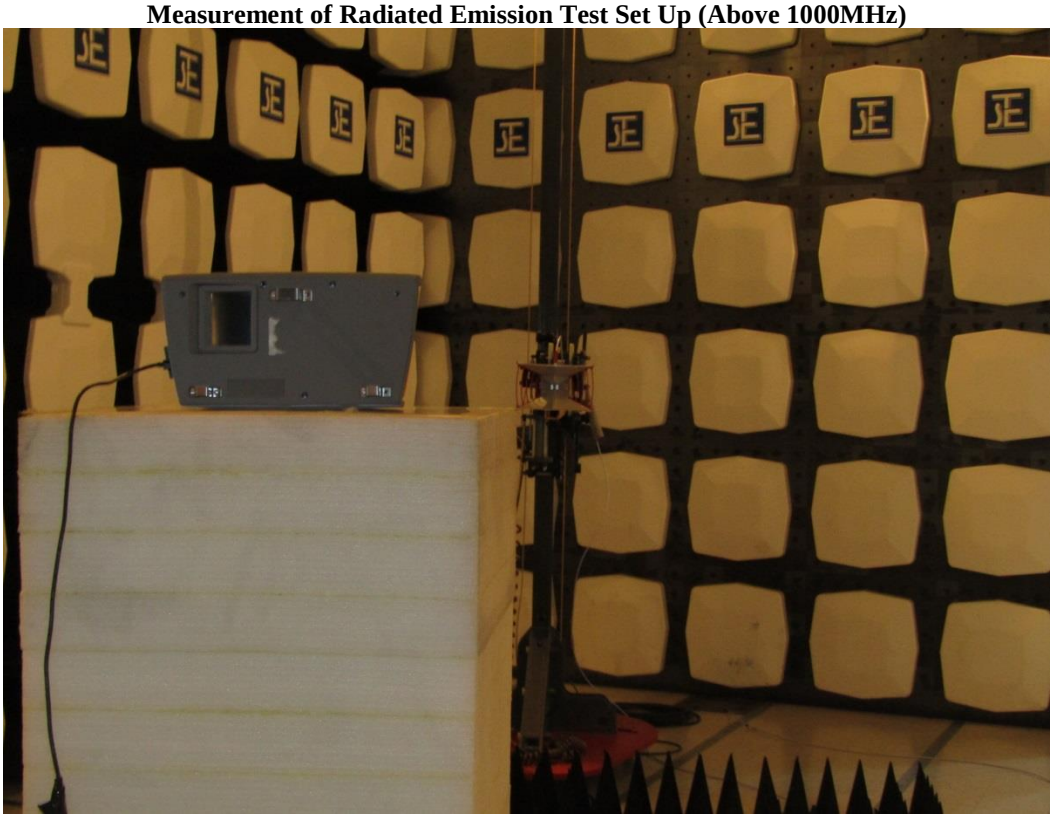
Photographs of EUT

Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)

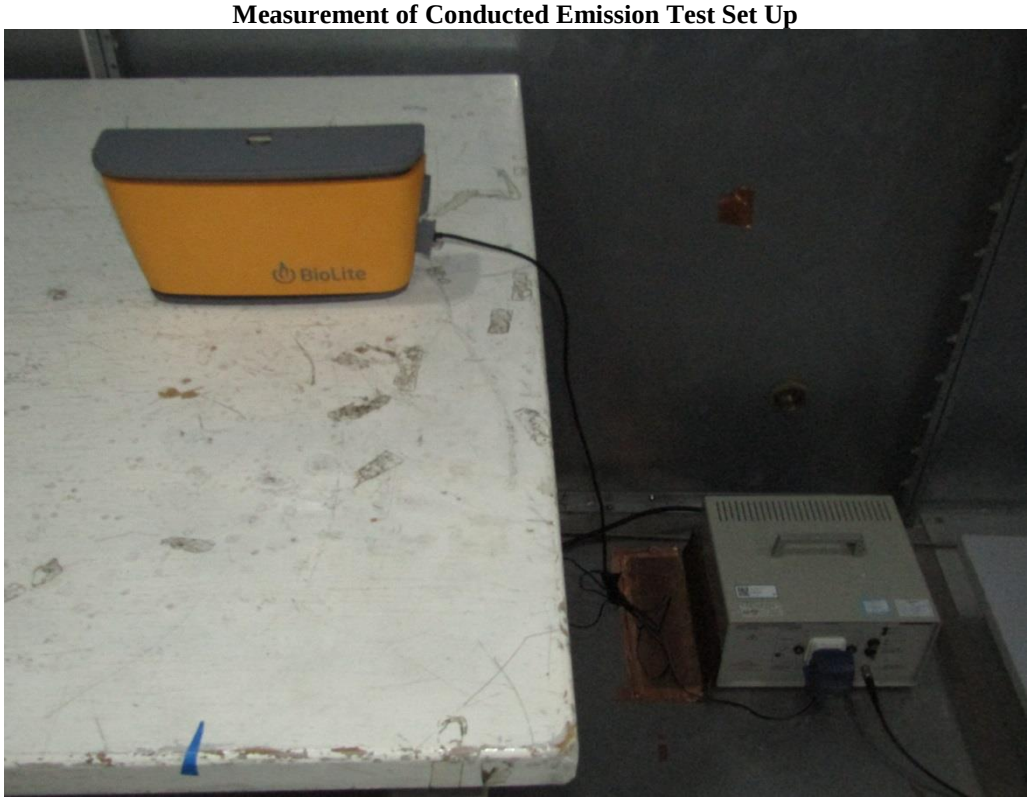


Photographs of EUT

Measurement of Radiated Emission Test Set Up (Above 1000MHz)



Measurement of Conducted Emission Test Set Up



******* End of 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.