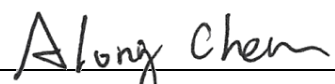


FCC Co-Location Test Report

FCC ID : U28OMSTREAMER
Equipment : Audio Streaming Module XM
Model No. : Audio Streaming Module XM
Applicant : Oticon A/S
Address : Kongebakken 9 DK-2765 Smørum, Denmark
Standard : 47 CFR FCC Part 15.247
47 CFR FCC Part 15.223
Received Date : Nov. 13, 2018
Tested Date : Nov. 13, 2018 ~ Mar. 05, 2019

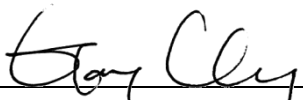
We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR8N1301CO	Rev. 01	Initial issue	Feb. 11, 2019
FR8N1301CO	Rev. 02	Update to the data from radiated emissions	Mar. 14, 2019

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 39.70MHz 30.98 (Margin -9.02dB) - PK	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared values of gain for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of the gain.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

BT	
Operating Frequency	2402 MHz ~ 2480 MHz
Antenna Type	Inverted F
Modulation Type	Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): $\pi/4$ -DQPSK Bluetooth EDR (3Mbps): 8-DPSK
Nearlink	
Operating Frequency	3.84MHz
Antenna Type	Ferrite coil antenna / Neckloop antenna
Modulation Type	ASK

1.2 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber3 / (03CH03-WS)				
Tested Date	Nov. 13, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 03, 2018	Jan. 02, 2019
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 18, 2018	Jan. 17, 2019
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 23, 2017	Nov. 22, 2018
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 07, 2017	Dec. 06, 2018
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	EMC	EMC104-SM-SM-8000	181107	Oct. 30, 2018	Oct. 29, 2019
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY32487/4	Oct. 30, 2018	Oct. 29, 2019
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Oct. 30, 2018	Oct. 29, 2019
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Oct. 30, 2018	Oct. 29, 2019
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Oct. 30, 2018	Oct. 29, 2019
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Oct. 30, 2018	Oct. 29, 2019
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Jan. 29 ~ Mar. 05, 2019				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 07, 2019	Jan. 06, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Oct. 01, 2018	Sep. 30, 2019
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Oct. 01, 2018	Sep. 30, 2019
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Oct. 01, 2018	Sep. 30, 2019
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Oct. 01, 2018	Sep. 30, 2019
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Oct. 01, 2018	Sep. 30, 2019
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Oct. 01, 2018	Sep. 30, 2019
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.3 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247

47 CFR FCC Part 15.223

ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05r01

1.4 Deviation from Test Standard and Measurement Procedure

None

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$))

Measurement Uncertainty	
Parameters	Uncertainty
Radiated emission $\leq$ 1GHz	± 3.66 dB
Radiated emission $>$ 1GHz	± 5.65 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH03-WS	23°C / 63%	Akun Chung
		24°C / 63%	Roger Lu

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Configuration
Radiated emission $\leq$ 1GHz	Nearlink + EDR	1, 2, 3, 4
Radiated emission $>$ 1GHz	Nearlink + EDR	1, 2
1) The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Z-plane results were found as the worst case and were shown in this report. 2) Two antennas are used for 3.84 MHz. The antennas are selected to perform radiated emission test with Bluetooth antenna as below test configurations. Configuration 1 : Ferrite coil antenna: 3.84 MHz / Inverted F: Bluetooth, battery mode Configuration 2 : Neckloop antenna 0.81m: 3.84 MHz / Inverted F: Bluetooth, battery mode Configuration 3 : Ferrite coil antenna: 3.84 MHz / Inverted F: Bluetooth, adapter mode Configuration 4 : Neckloop antenna 0.81m: 3.84 MHz / Inverted F: Bluetooth, adapter mode		

3 Transmitter Test Results

3.1 Unwanted Emissions into Restricted Frequency Bands

3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9~90 kHz, 110~490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.1.2 Test Procedures

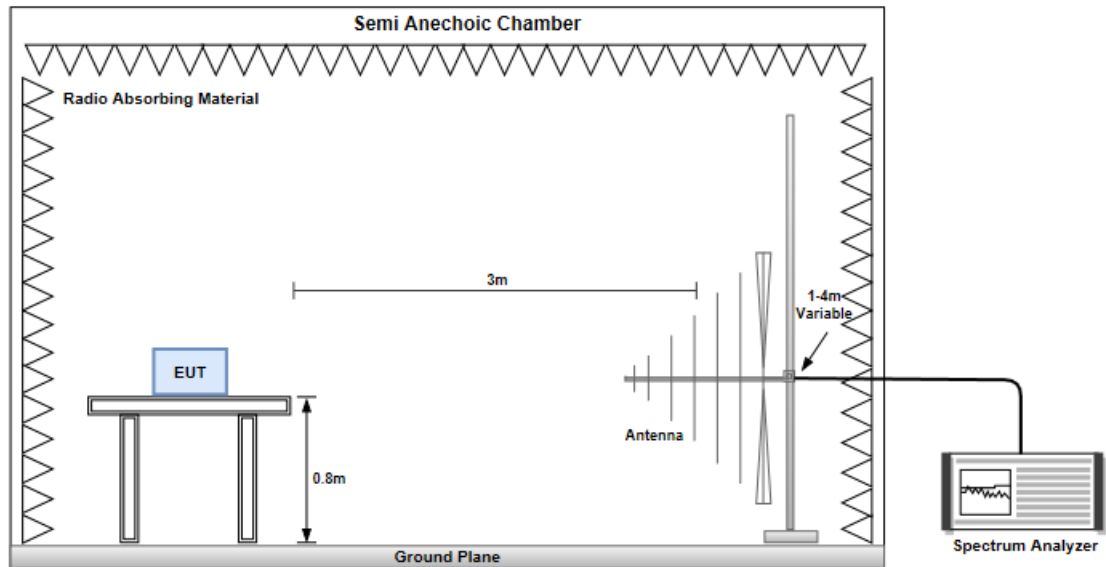
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

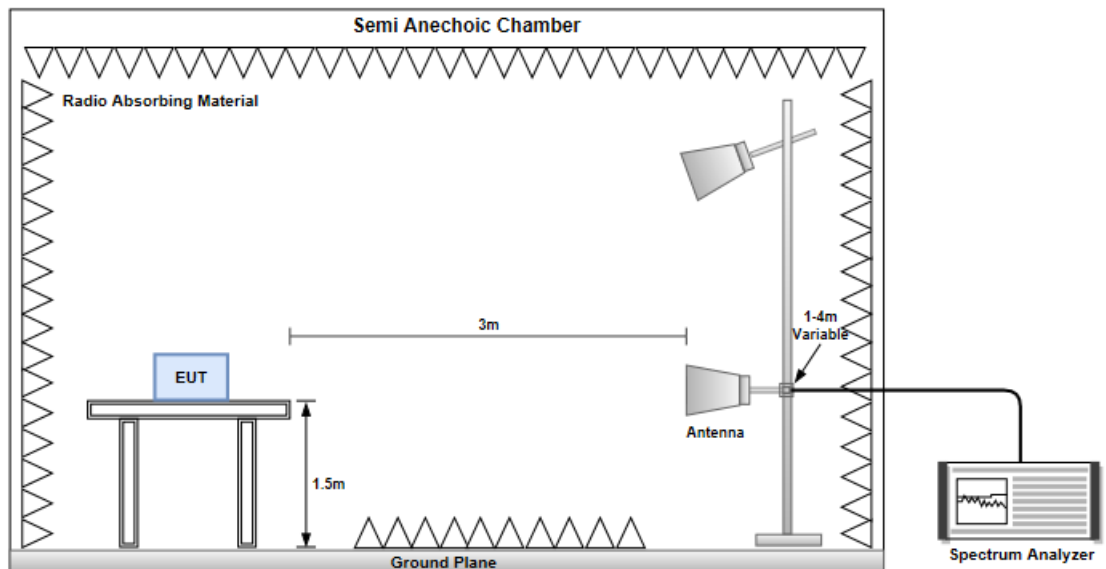
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.1.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.1.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	Nearlink + EDR		Polarization		Horizontal	
Test Configuration	1					
Level (dBuV/m)						

Modulation	Nearlink + EDR				Polarization		Horizontal		
Test Configuration	1								
Level (dBUV/m)									

Modulation	Nearlink + EDR		Polarization		Horizontal	
Test Configuration	2					
Level (dBUV/m) <						

Modulation	Nearlink + EDR			Polarization		Horizontal																																																															
Test Configuration	2																																																																				
Level (dBuV/m) Freq. Emission Limit Margin SA Factor Remark ANT Turn MHz level dBuV/m dBuV/m dB reading dBuV dB cm deg <table><tr><td>1</td><td>39.65</td><td>28.42</td><td>40.00</td><td>-11.58</td><td>36.91</td><td>-8.49</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>2</td><td>46.55</td><td>27.96</td><td>40.00</td><td>-12.04</td><td>36.00</td><td>-8.04</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>54.25</td><td>24.12</td><td>40.00</td><td>-15.88</td><td>32.33</td><td>-8.21</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>4</td><td>159.12</td><td>21.63</td><td>43.50</td><td>-21.87</td><td>29.85</td><td>-8.22</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>439.42</td><td>28.28</td><td>46.00</td><td>-17.72</td><td>32.25</td><td>-3.97</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>6</td><td>454.79</td><td>28.45</td><td>46.00</td><td>-17.55</td><td>32.08</td><td>-3.63</td><td>Peak</td><td>---</td><td>---</td></tr></table> Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m). Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.										1	39.65	28.42	40.00	-11.58	36.91	-8.49	Peak	---	---	2	46.55	27.96	40.00	-12.04	36.00	-8.04	Peak	---	---	3	54.25	24.12	40.00	-15.88	32.33	-8.21	Peak	---	---	4	159.12	21.63	43.50	-21.87	29.85	-8.22	Peak	---	---	5	439.42	28.28	46.00	-17.72	32.25	-3.97	Peak	---	---	6	454.79	28.45	46.00	-17.55	32.08	-3.63	Peak	---	---
1	39.65	28.42	40.00	-11.58	36.91	-8.49	Peak	---	---																																																												
2	46.55	27.96	40.00	-12.04	36.00	-8.04	Peak	---	---																																																												
3	54.25	24.12	40.00	-15.88	32.33	-8.21	Peak	---	---																																																												
4	159.12	21.63	43.50	-21.87	29.85	-8.22	Peak	---	---																																																												
5	439.42	28.28	46.00	-17.72	32.25	-3.97	Peak	---	---																																																												
6	454.79	28.45	46.00	-17.55	32.08	-3.63	Peak	---	---																																																												

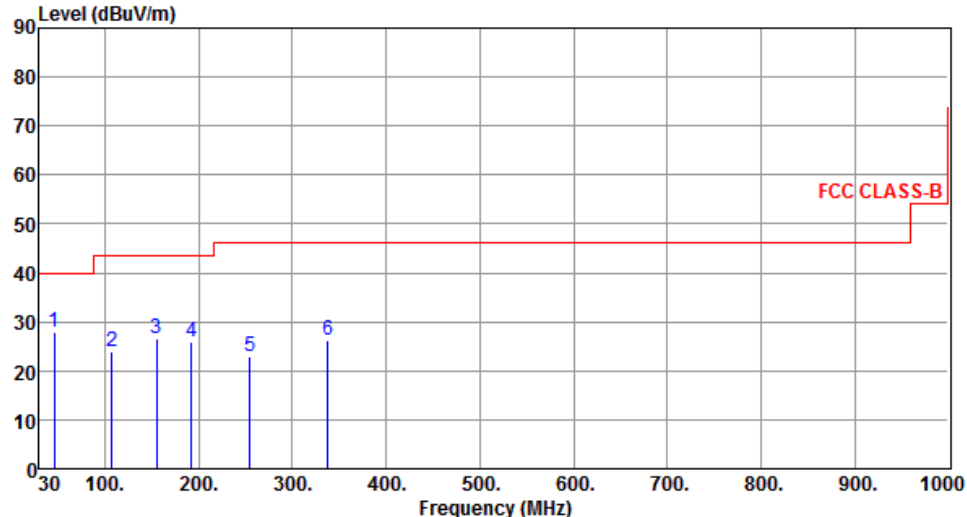
Modulation	Nearlink + EDR		Polarization		Horizontal	
Test Configuration	3					
Level (dBuV/m)						

Modulation	Nearlink + EDR				Polarization		Horizontal		
Test Configuration	3								
Level (dBuV/m)									

Modulation	Nearlink + EDR				Polarization		Horizontal		
Test Configuration	4								
Level (dBuV/m)									

Modulation	Nearlink + EDR		Polarization		Horizontal	
Test Configuration	4					

Level (dBuV/m)



	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
								cm	deg
1	45.52	27.76	40.00	-12.24	35.85	-8.09	Peak	---	---
2	107.60	23.99	43.50	-19.51	36.26	-12.27	Peak	---	---
3	155.13	26.45	43.50	-17.05	34.77	-8.32	Peak	---	---
4	191.99	25.89	43.50	-17.61	36.71	-10.82	Peak	---	---
5	255.04	22.95	46.00	-23.05	32.10	-9.15	Peak	---	---
6	337.49	26.32	46.00	-19.68	32.99	-6.67	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.1.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	Nearlink + EDR				Polarization		Horizontal		
Test Configuration	1								
Level (dBUV/m)									

Modulation	Nearlink + EDR				Polarization		Vertical		
Test Configuration	1								
Level (dBuV/m) <									

Modulation	Nearlink + EDR	Polarization	Horizontal
Test Configuration	2		

Level (dBuV/m)

Frequency (MHz)

	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	3311.00	27.95	54.00	-26.05	26.65	1.30	Average	100	150
2	3311.00	40.46	74.00	-33.54	39.16	1.30	Peak	100	150
3	4185.00	29.42	54.00	-24.58	25.79	3.63	Average	100	260
4	4185.00	41.97	74.00	-32.03	38.34	3.63	Peak	100	260

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	Nearlink + EDR				Polarization		Vertical		
Test Configuration	2								
Level (dBuV/m)									

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

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Kou District, New Taipei City,
Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,
Kwei Shan District, Tao Yuan City
333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C..

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==