

# **FCC 15B Test Report**

FCC ID : 2AQYEFMP169

Equipment : Mobile Phone

Model No. : F-02L

Brand Name : FUJITSU

Applicant : FUJITSU CONNECTED TECHNOLOGIES Ltd.

Address : 1-1, Kamikodanaka 4-chome, Nakahara-ku,

Kawasaki 211-8588, Japan

Standard : FCC Part 15, Subpart B, Class B

ICES-003 Issue 6 ANSI C63.4:2014

Received Date : Feb. 13, 2019

Tested Date : Feb. 14 ~ Feb. 18, 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. 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: Approved by:

Peter Lin / Supervisor Kent Chen / Assistant Manager

Testing Laboratory

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## **Release Record**

Report No.	Version	Description	Issued Date
FD8D1403	Rev. 01	Initial issue	Mar. 22, 2019
FD8D1403	Rev. 02	Adding description of test position of section 2.2	Apr. 03, 2019

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## **Summary of Test Results**

	FCC Part 15, Subpart B Emission Tests							
Ref. Std. Clause	Std. Test Standard Test Items Measured							
15.107	FCC Part 15, Subpart B, Class B	Conducted Emissions	-8.61dB AV@ 0.521MHz.	Pass				
15.109	FCC Part 15, Subpart B, Class B	Radiated Emissions	-4.33dB QP@ 30.00MHz.	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.

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## 1 General Description

### 1.1 Information

### 1.1.1 Product Details

Product Name	Mobile Phone
Brand Name	FUJITSU
Model Name	F-02L
IMEI Code	353323100017002
H/W Version	v2.1.0
S/W Version	R020.2e

### 1.1.2 Specification of the Equipment under Test (EUT)

WLAN	<b>WLAN</b>					
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz					
Antenna Type	Monopole antenna					
Modulaton Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)					
Bluetooth						
Operating Frequency	2402 MHz ~ 2480 MHz					
Antenna Type	Monopole antenna					
Modulaton Type	Bluetooth 4.2 LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): π/4-DQPSK Bluetooth EDR (3Mbps): 8-DPSK					
LTE						
Operating Frequency	Band 5: 824 MHz ~ 849 MHz Band 12: 699 MHz ~ 716 MHz Band 17: 704 MHz ~ 716 MHz					
Antenna Type	Monopole antenna					
Modulaton Type	QPSK, 16QAM (Uplink)					
WWAN						
Operating Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz					
Antenna Type	Monopole antenna					
Modulaton Type	GSM / GPRS: GMSK WCDMA / HSDPA / HSUPA: QPSK (Uplink)					

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NFC	NFC			
Operating Frequency	13.56 MHz			
Antenna Type	Loop antenna			
Modulaton Type	ASK			
GNSS	GNSS			
Operating Frequency	1.57542 GHz			
Modulaton Type	BPSK			

## 1.1.3 Power Supply Type of Equipment under Test (EUT)

	3.8Vdc from battery: 9Vdc,1.5A from adapter (No bundle, support unit only)
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### 1.1.4 Accessories

	Accessories				
No. Equipment Description					
1	Battery	Brand: FUJITSU CONNECTED TECHNOLOGIES LIMITED Model Name: CA54310-0074 Power Rating: 3.8Vdc, 2,780mAh, 10.6Wh			

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## 1.2 The Equipment List

Test Item	Conducted Emission	Conducted Emission					
Test Site	Conduction room 1 / (	Conduction room 1 / (CO01-WS)					
Test Date	Feb. 14, 2019	Feb. 14, 2019					
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020		
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 05, 2018	Nov. 04, 2019		
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 23, 2018	Oct. 23, 2019		
Measurement Software	AUDIX	e3	6.120210k	NA	NA		
Note: Calibration Interval of instruments listed above is one year.							

Test Item	Radiated Emission below 1GHz				
Test Site	966 chamber 2 / (03CH02-WS)				
Test Date	Feb. 18, 2019				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	Agilent	N9038A	MY53290044	Sep. 17, 2018	Sep. 16, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Dec. 03, 2018	Dec. 02, 2019
Preamplifier	EMC	EMC02325	980194	Sep. 18, 2018	Sep. 17, 2019
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160501	Oct. 22, 2018	Oct. 21, 2019
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Oct. 22, 2018	Oct. 21, 2019
LF cable 10M	EMCC	CFD400-E	CFD400-001	Oct. 22, 2018	Oct. 21, 2019
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1GHz					
Test Site	966 chamber 2 / (03CH02-WS)					
Test Date	Feb. 18, 2019	Feb. 18, 2019				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Spectrum Analyzer	Agilent	N9010A	MY53400091	Nov. 07, 2018	Nov. 06, 2019	
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Sep. 22, 2018	Sep. 21, 2019	
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019	
Preamplifier	Agilent	83017A	MY39501309	Sep. 25, 2018	Sep. 24, 2019	
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019	
RF Cable	EMC	EMC105-SM-SM-8000	180512	Oct. 22, 2018	Oct. 21, 2019	
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Oct. 22, 2018	Oct. 21, 2019	
Measurement Software	AUDIX	e3	6.120210g	NA	NA	
Note: Calibration Inte	Note: Calibration Interval of instruments listed above is one year.					

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### 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC Part 15, Subpart B, Class B ICES-003 Issue 6 ANSI C63.4:2014

### 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					
Test Item Frequency Uncertainty					
Conducted Emissions	150kHz ~ 30MHz	±2.92 dB			
Dedicted Emissions	30MHz ~ 1GHz	±4.32 dB			
Radiated Emissions	Above 1GHz	±4.9 dB			

Note: The results of measurements of emissions shall reference the measurement uncertainty considerations contained in CISPR 16-4-2.

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## 2 Test Configuration

## 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 57%	Alex Tsai
Radiated Emissions	03CH02-WS	22°C / 58%	Vincent Yeh

➤ FCC site registration No.: 933633➤ IC site registration No.: 10807A-2

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## 2.2 The Worst Case Measurement Configuration

The Determined Worst Case Configurations			
Conducted Emissions			
Test Mode	Operating Description		
1	BT/Wifi 2.4G idle, GNSS Rx, with Earphone, Battery 20%, EUT: Z-axis, with Adaptor, 120V/60Hz		
2	2G link, BT/Wifi 5G idle, Camera(Front), with Earphone, Battery 80%, EUT: Z-axis, with Adaptor		
3	3G link, BT/Wifi 2.4G idle, MPEG4 play, with Earphone, Battery 20%, EUT: Z-axis, with Adaptor		
4	4G link, BT/Wifi 5G idle, SD R/W, with Earphone, Battery 20%, w/ USB cable link to notebook, EUT: Z-axis		
5	2G idle, BT/Wifi 2.4G idle, Camera(Back), with Earphone, Battery 20%, EUT: Z-axis, with Adaptor		
Note: The worst case was marked in boldface, therefore, only its data was recorded in this report.			

The Determined Worst Case Configurations				
Radiated Emissions				
Pretest Mode	Operating Description			
1	NFC link, BT/Wifi 2.4G idle, GNSS Rx, with Earphone, Battery 80%, EUT: X-axis, Standalone			
2	2G link, BT/Wifi 5G idle, Camera(Front), with Earphone, Battery 20%, EUT: Y-axis, with Adaptor, 120V/60Hz			
3	3G link, BT/Wifi 2.4G idle, MPEG4 play, with Earphone, Battery 20%, EUT: Z-axis, with Adaptor, 120V/60Hz			
4	4G link, BT/Wifi 5G idle, SD R/W, with Earphone, Battery 20%, w/ USB cable link to notebook, EUT: Z-axis, 120V/60Hz			
5	4G idle, BT/Wifi 2.4G idle, Camera(Back), with Earphone, Battery 20%, EUT: Z-axis, with Adaptor, 120V/60Hz			
Note: The worst case was marked in boldface, therefore, only its data was recorded in this report.				

X-Axis	Y-Axis	Z-Axis

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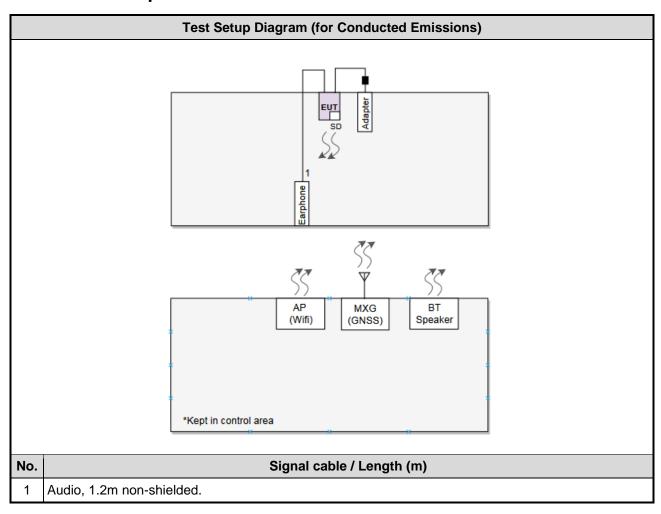
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### 2.3 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	S/N	Remarks
1	Earphone	APPLE	MD827FE/A	6	
2	Wireless AP	D-LINK	DIR-815	3000228	
3	Radio Communication Tester	ANRITSU	MT8820C	6201240341	
4	MXG	Agilent	N5182B		
5	BT speaker	Nokia	HF-34W		
6	Adapter	NTT docomo	AC Adapter 06		Provided by applicant.
7	SD Card	SanDisk	Micro SDHC		

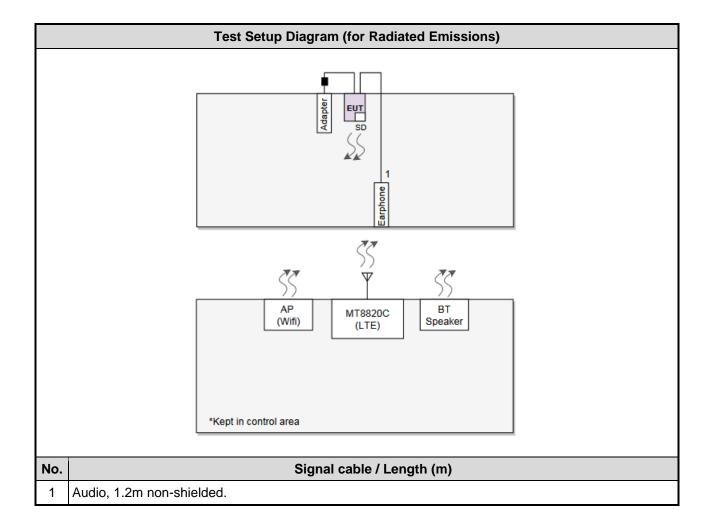
### 2.4 Test Setup Chart



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### 2.5 Test Software and Operating Condition

#### <Conducted Emissions>

- a. The EUT was charging with adapter during the test.
- b. Support earphone was connecting to the EUT. The audio output to support earphone.
- c. The EUT was attached to the support BT speaker and WLAN AP in idle mode.
- d. The EUT was in GNSS Rx mode during the test.

#### <Radiated Emissions>

- a. The EUT was charging with adapter during the test.
- b. Support earphone was connecting to the EUT. The audio output to support earphone.
- The EUT was in LTE idle mode during the test.
- d. The EUT was attached to the support BT speaker and WLAN AP in idle mode.
- e. The EUT was activating back camera during the test.

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### 3 Emission Tests Results

### 3.1 Conducted Emissions

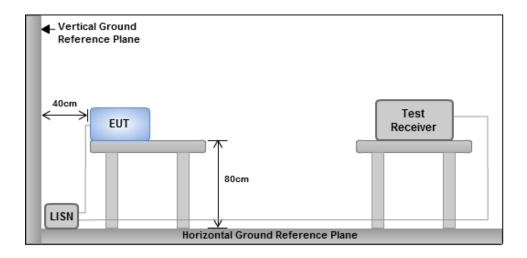
#### 3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0,15 to 0,5	66 - 56 *	56 - 46 *
0,5 to 5	56	46
5 to 30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

#### 3.1.2 Test Procedures

- a. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- b. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
- c. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.

#### 3.1.3 Test Setup



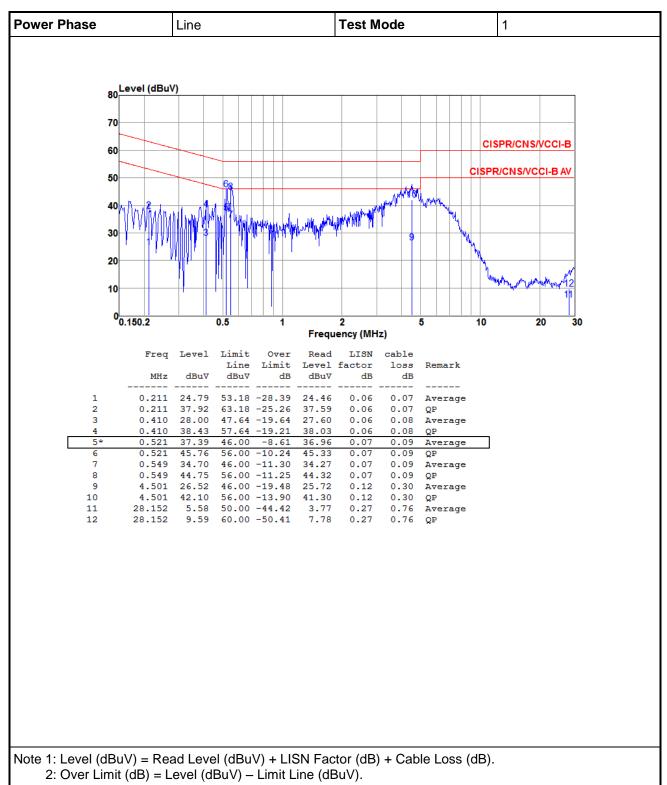
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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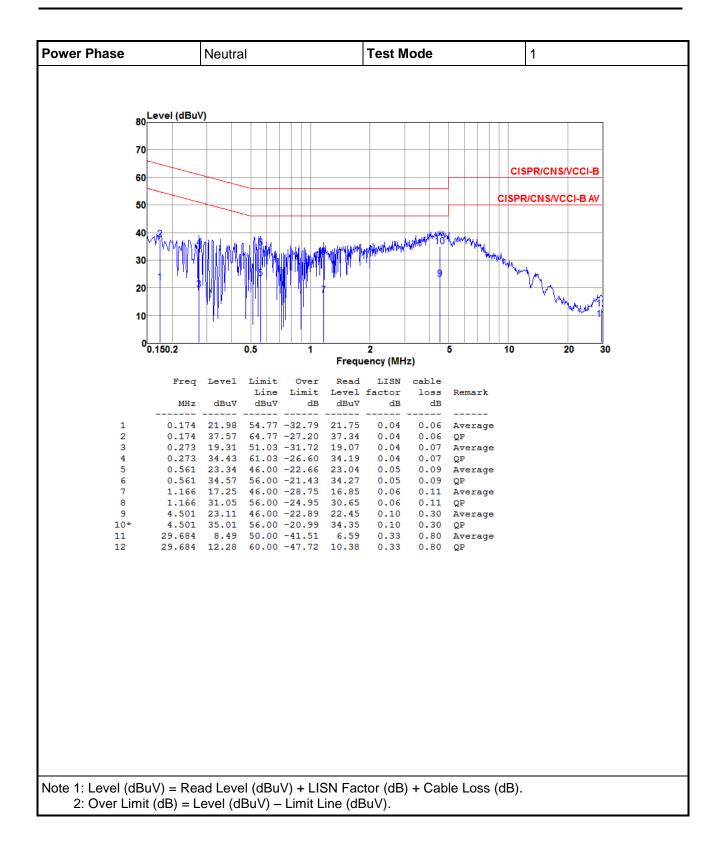


#### 3.1.4 Test Result of Conducted Emissions



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### 3.2 Radiated Emissions

### 3.2.1 Limit of Radiated Emissions

According to FCC Part 15, Subpart B §15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

Note: According to FCC Part 15, Subpart B §15.33: For an unintentional radiator is shown in the table above.

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#### 3.2.2 Test Procedures

#### Measuring below 1 GHz:

- a. 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 a height of 0.8 m test table above the ground plane.
- b. 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.
- c. 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.

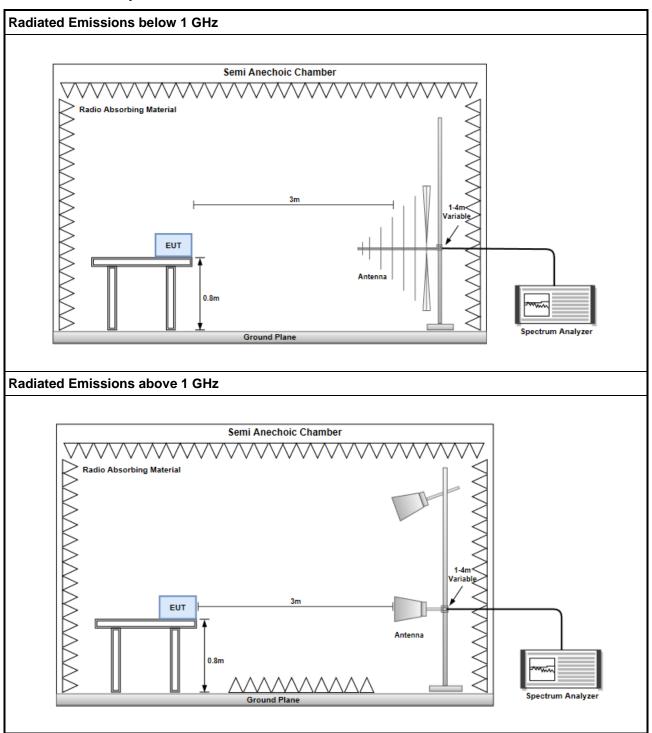
#### Measuring above 1 GHz:

- Same test set up as below 1GHz radiated testing.
- b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.
- d. The table was rotated 360 degrees to determine the position of the highest radiation.
- e. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- f. Set the Horn Antenna at 1m height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.
- g. When EUT locating on the turn-table, the Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.
- h. If emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

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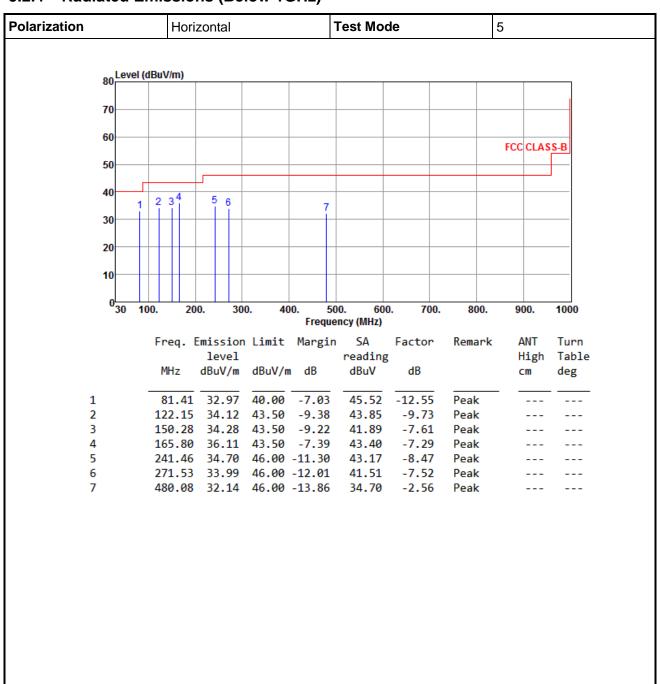


### 3.2.3 Test Setup





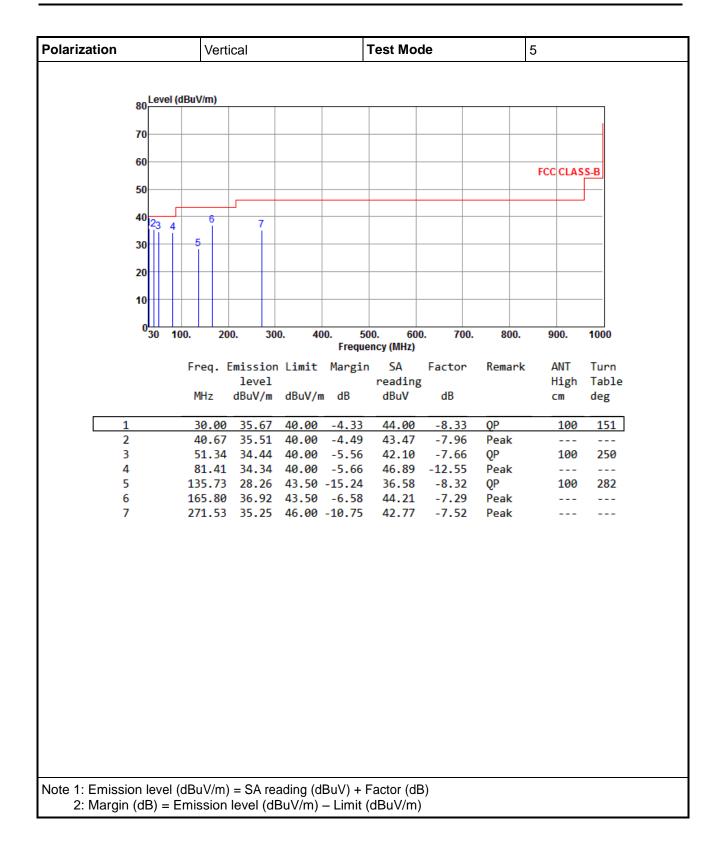
### 3.2.4 Radiated Emissions (Below 1GHz)



Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)

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



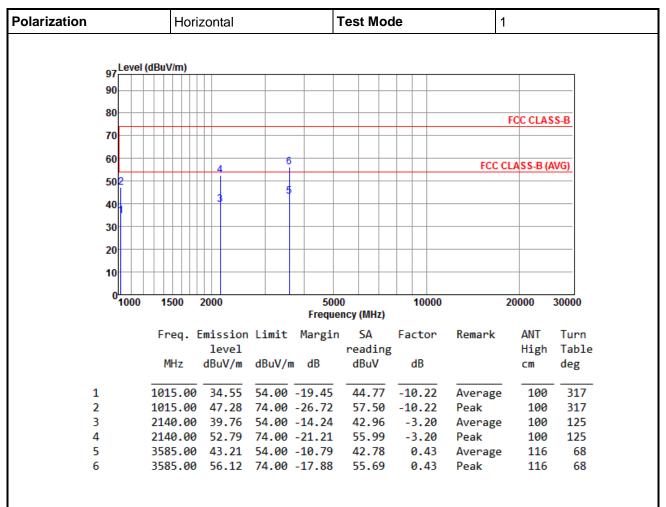


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#### 3.2.5 Radiated Emissions (Above 1GHz)



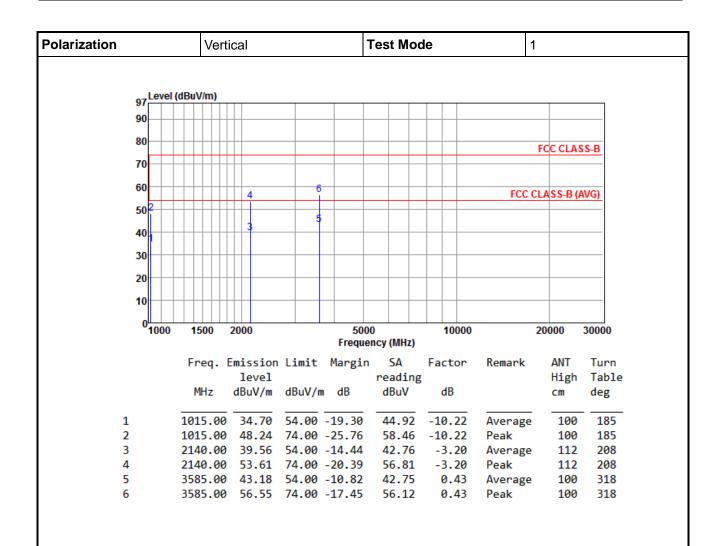
Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)

2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m)

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Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)

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

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### 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 <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

Linkou

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