

# **FCC 15B Test Report**

FCC ID : VQK-M02

Equipment : Mobile Phone

Model No. : M02

Brand Name : FUJITSU

Applicant : FUJITSU LIMITED

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

Kawasaki 211-8588, Japan

Standard : FCC Part 15, Subpart B, Class B

ANSI C63.4:2009

Received Date : Nov. 24, 2015

Tested Date : Dec. 02 ~ Dec. 07, 2015

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.

Approved & Reviewed by:

Kent Chen / Assistant Manager





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# **Release Record**

Report No.	Version	Description	Issued Date
FD560301-02	Rev. 01	Initial issue	Dec. 17, 2015

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# **Summary of Test Results**

	FCC Part 15, Subpart B Emission Tests								
Ref. Std. Clause	Test Standard	Test Items	Measured	Result					
15.107	FCC Part 15, Subpart B, Class B	Conducted Emissions	-13.50dB QP@ 0.183MHz.	Pass					
15.109	FCC Part 15, Subpart B, Class B	Radiated Emissions	-8.13dB PK@ 42.61MHz.	Pass					



# 1 General Description

#### 1.1 Information

This report is issued as a supplementary report to original ICC report no. FD560301. PCB/trace layouts, product form factor and antenna are identical except following items:

#### → Wi-Fi:

5GHz function is removed by software setting and hardware modification. Hardware modification-Remove components of 5GHz transmission path to cancel 5GHz function that will not affect 2.4GHz function since 2.4GHz and 5GHz transmission path is separately.

- ♦ LTE: B26 814 ~849 MHz: Activated by software.
- ♦ Without Fingerprint: Remove components.
- ♦ Change AC adapter.
- ♦ Same cradle as original report, just change model name from F-51 to FAR-CR105.

In this report, all tests had been re-tested and presented in the following sections.

#### 1.1.1 Product Details

Product Name	Mobile Phone
Brand Name	FUJITSU
Model Name	M02
IMEI Code	353546071500032
H/W Version	v3.0.0
S/W Version	R021.3

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

WLAN	VLAN				
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz				
Antenna Type	$\lambda$ /4 Monopole Antenna				
Modulaton Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)				
Bluetooth					
Operating Frequency	2402 MHz ~ 2480 MHz				
Antenna Type	$\lambda$ /4 Monopole Antenna				
Modulaton Type	Bluetooth 4.1 LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): π/4-DQPSK Bluetooth EDR (3Mbps): 8-DPSK				

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WWAN	VWAN				
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	$\lambda$ /4 Monopole Antenna				
Modulaton Type	GSM / GPRS: GMSK WCDMA / HSDPA / HSUPA: QPSK (Uplink)				
LTE					
Operating Frequency	LTE Band 26: 814 ~ 849 MHz				
Antenna Type	$\lambda$ /4 Monopole Antenna				
Modulaton Type	QPSK, 16QAM (Uplink)				
NFC					
Operating Frequency	13.56 MHz				
Antenna Type	Loop Antenna				
Modulaton Type	ASK				
GPS					
Operating Frequency	1.57542 GHz				
Modulaton Type	BPSK				

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

Power Supply Type	5.0Vdc from AC adapter 3.8Vdc from Battery
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### 1.1.4 Accessories

No.	Equipment	Description
1	Adapter	Brand Name: Fujitsu Limited Model Name: FMV-AC346 Input rating: 100-240Vac, 50/60Hz, 0.3A Output rating: 5.0Vdc, 2A 1.1m USB shielded cable without core (for charging use)
2	Cradle	Brand Name: Fujitsu Limited Model Name: FAR-CR105 Input rating: 5Vdc, 1.5A Output rating: 5.0Vdc, 1.5A
3	Battery (Unremovable)	Brand Name: Fujitsu Limited Model Name: CA54310-0064 Power Rating: 3.8Vdc, 2330mAh, 8.9Wh



# 1.2 Test Equipment and Calibration Data

Test Item	Conducted Emission						
Test Site	Conduction room 1 / (	Conduction room 1 / (CO01-WS)					
Tested Date	Dec. 02, 2015	Dec. 02, 2015					
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016		
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016		
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015		
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 / (03C	966 chamber 2 / (03CH02-WS)				
Tested Date	Dec. 07, 2015	Dec. 07, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 2016	
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Nov. 09, 2015	Nov. 08, 2016	
Preamplifier	Burgeon	BPA-530	100218	Nov. 03, 2015	Nov. 02, 2016	
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 16, 2014	Dec. 15, 2015	
LF cable 10M	EMCC	CFD400-E	CFD400-001	Jun. 17, 2015	Jun. 16, 2016	
Measurement Software	AUDIX	e3	6.120210g	NA	NA	
Note: Calibration Inte	Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1GHz					
Test Site	966 chamber 2 / (03C	966 chamber 2 / (03CH02-WS)				
Tested Date	Dec. 07, 2015	Dec. 07, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Spectrum Analyzer	R&S	FSV40	101499	Dec. 31, 2014	Dec. 30, 2015	
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 07, 2015	Oct. 06, 2016	
Preamplifier	Agilent	83017A	MY39501309	Sep. 22, 2015	Sep. 21, 2016	
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 16, 2014	Dec. 15, 2015	
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 16, 2014	Dec. 15, 2015	
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 16, 2014	Dec. 15, 2015	
Measurement Software	AUDIX	e3	6.120210g	NA	NA	
Note: Calibration Interval of instruments listed above is one year.						



### 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 ANSI C63.4:2009

### 1.4 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	±2.90 dB			
Radiated Emissions	30MHz ~ 1GHz	±3.62 dB			
Radiated Emissions	Above 1GHz	±5.60 dB			

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# 2 Test Configuration

# 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 52%	Peter Lin
Radiated Emissions ≤1GHz	03CH02-WS	22°C / 63%	Alex Tsai
Radiated Emissions >1GHz	03CH02-WS	22°C / 63%	Alex Tsai

# 2.2 The Worst Case Measurement Configuration

The Determined Test Configurations			
Conducted Emissions			
Test Mode	Operating Description		
1	GSM 850 link + BT + Wifi 2.4G link + GPS Rx + Earphone + Battery 80% + Adaptor		
2	PCS 1900 link + BT + Wifi 2.4G link + Camera(Front) + Earphone + Battery 20% + Adaptor		
3	WCDMA Band5 link + BT + Wifi 2.4G link + MPEG4 play + Earphone + Battery 20% + Adaptor		
4	LTE band 26 link + BT + Wifi 2.4G link + SD R/W + Earphone + Battery 20% + USB cable link to NB		
5	5 LTE band 26 link idle + BT + Wifi 2.4G link + Camera(Back) + Earphone + Batter 20% + Cradle + Adaptor		
Note: The worst case was marked in boldface, therefore, only its data was recorded in this report.			

The Determined Test Configurations				
Radiated Emissions				
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1	GSM 850 link + BT + Wifi 2.4G link + GPS Rx + Earphone + Battery 80% + Adaptor			
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3	WCDMA Band5 link + BT + Wifi 2.4G link + MPEG4 play + Earphone + Battery 20% + Adaptor			
4	LTE band 26 link + BT + Wifi 2.4G link + SD R/W + Earphone + Battery 20% + USB cable link to NB			
5	5 LTE band 26 link idle + BT + Wifi 2.4G link + Camera(Back) + Earphone + Batte 20% + Cradle + Adaptor			
Note: The worst case was marked in boldface, therefore, only its data was recorded in this report.				

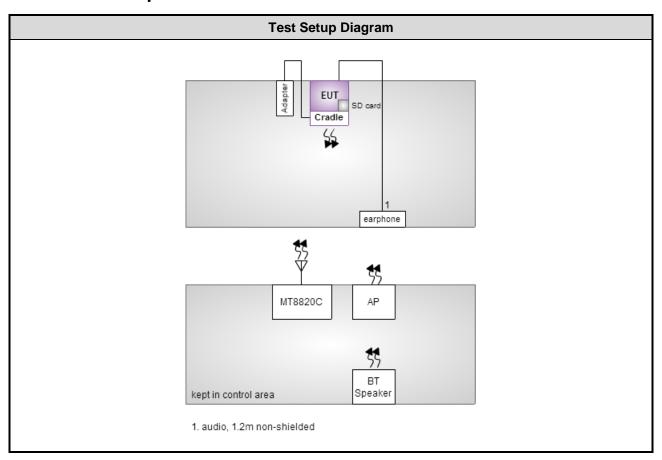
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### 2.3 Local Support Equipment List

	Support Equipment List (EMI)				
No.	Equipment	Brand	Model	S/N	Signal cable / Length (m)
1	Earphone	APPLE	MD827FE/A	6	1.2m non-shielded.
2	Wireless AP	D-LINK	DIR-815	3000228	
3	Radio Communication Tester	ANRITSU	MT8820C	6201240341	
4	BT speaker	Nokia	HF-34W		
5	SD Card	SanDisk	Micro SDHC 8GB		

### 2.4 Test Setup Chart



## 2.5 Test Software and Operating Condition

- a. The EUT was in LTE idle mode during the testing.
- b. The EUT was attached to the support BT speaker and WLAN AP in link mode.
- c. Executed "Camera" application during the test.

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### 3 Emission Tests Results

#### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

Applicable Standard: FCC Part 15, Subpart B §15.107, ICES-003 §6.1					
_	Class A (dBµV)		Class B (dBµV)		
Frequency Range (MHz)	Limits				
()	Quasi-peak	Average	Quasi-peak	Average	
0.15 to 0.50	79	66	66 to 56	56 to 46	
0.50 to 5	73	60	56	46	
5 to 30	73	60	60	50	

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

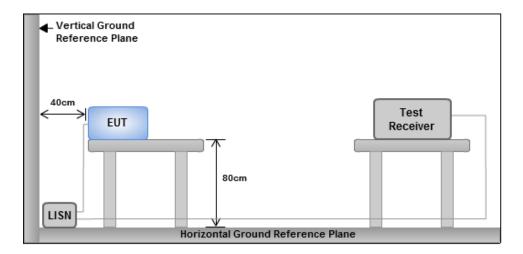
#### 3.1.2 Test Procedures

- a. The EUT was placed on a table with a height of 0.8 meters from the metal ground plane and 0.4 meters from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. The test equipment EUT installed received DC power through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- c. All the support units were connected to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The measurement frequency range extends from 150 kHz to 30 MHz.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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### 3.1.3 Test Setup



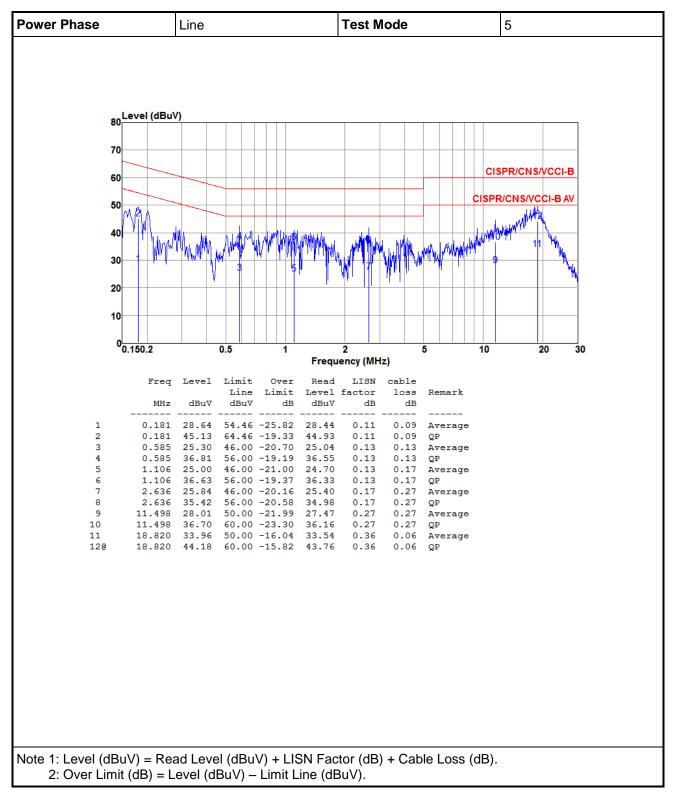
Note: 1. Support units were connected to second LISN.

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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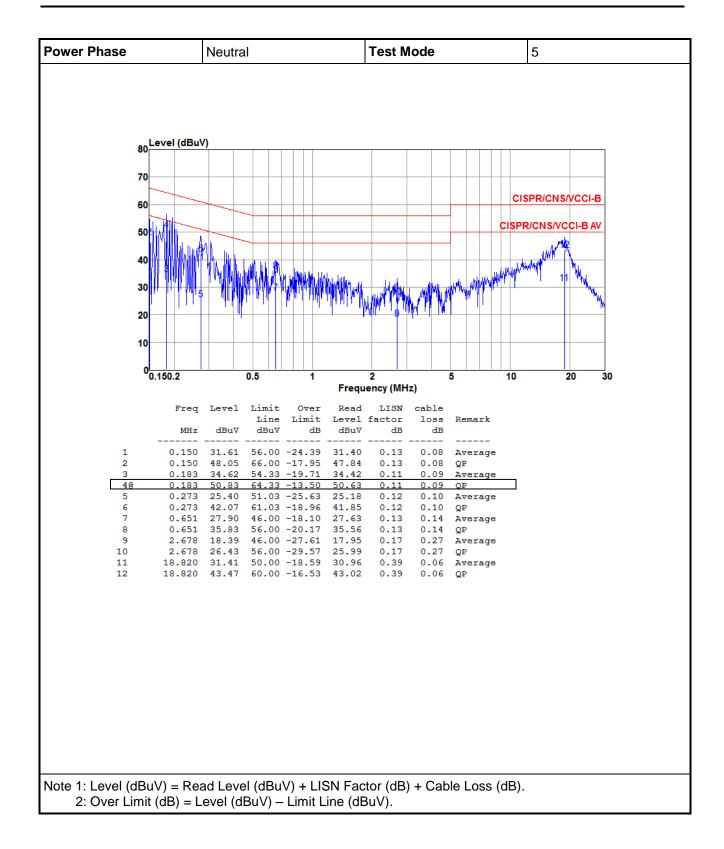


#### 3.1.4 Test Result of Conducted Emissions



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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.

#### 3.2.2 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 a height of 0.8 m test table above the ground plane.
- 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.

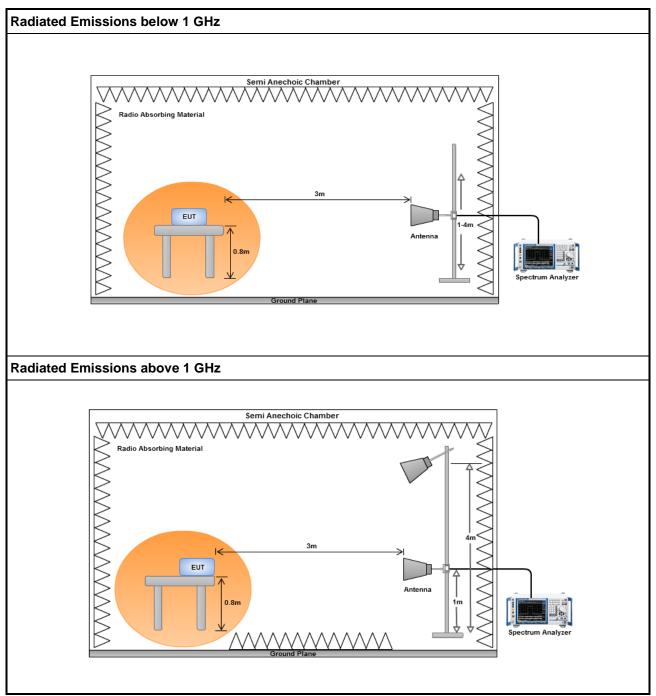
#### Note:

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

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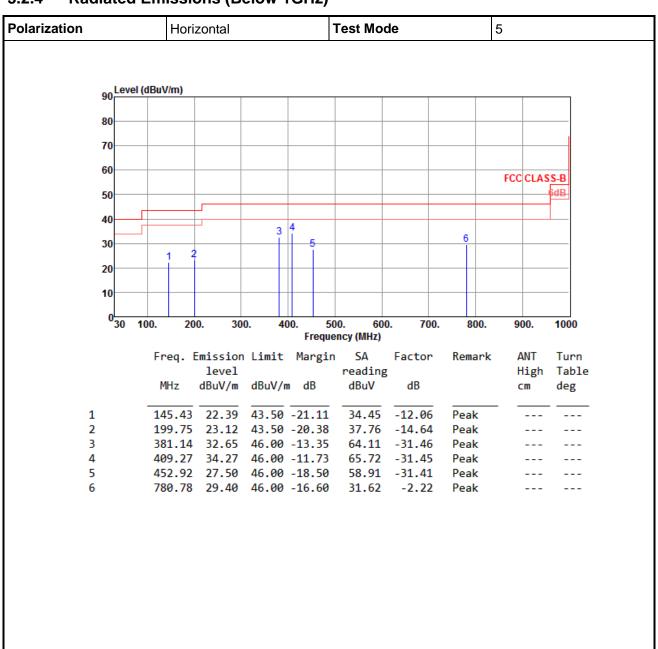
### 3.2.3 Test Setup



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### 3.2.4 Radiated Emissions (Below 1GHz)

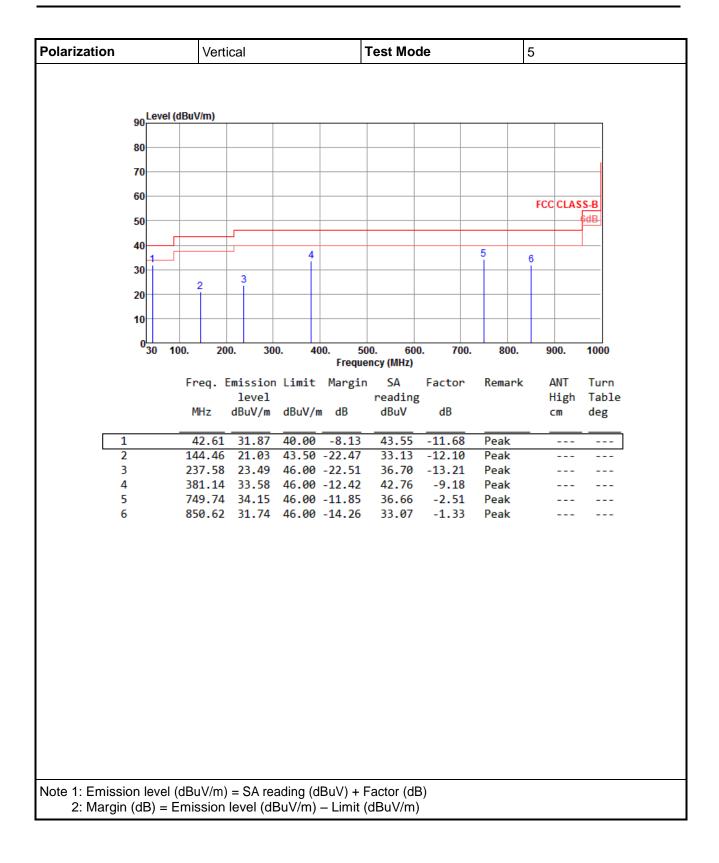


Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)

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

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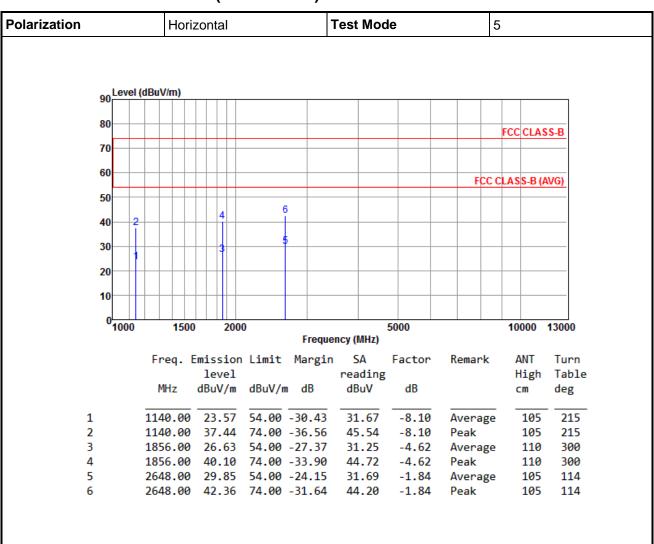




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### 3.2.5 Radiated Emissions (Above 1GHz)

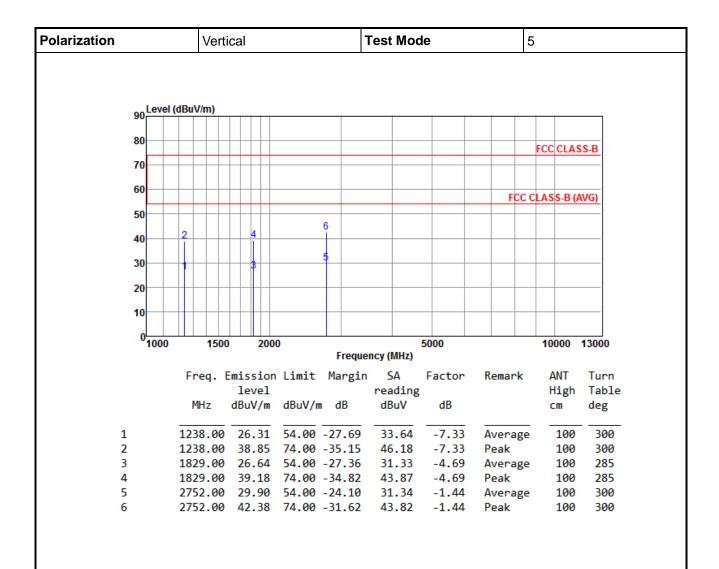


Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)

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, 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 Hsiang. Location map can be found on our website <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

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<u>==END</u>==

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