

FCC 15B Test Report

FCC ID : VQK-F05F

Equipment : Mobile Phone

Model No. : F-05F

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 : Dec. 25, 2013

Tested Date : Mar. 05 ~ Mar. 10, 2014

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

lac-MRA



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Release Record

Report No.	Version	Description	Issued Date
FD3D2502	Rev. 01	Initial issue	Mar. 24, 2014

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Summary of Test Results

	FCC Part 15, Subpart B Emission Tests								
Ref. Std. Clause	I. Test Standard Test Items Measured Res								
15.107	FCC Part 15, Subpart B, Class B	Conducted Emissions	-6.60dB AV@ 0.440MHz.	Pass					
15.109	FCC Part 15, Subpart B, Class B	Radiated Emissions	-3.28dB PK@ 480.08MHz.	Pass					



1 General Description

1.1 Information

1.1.1 Product Details

Product Name	Mobile Phone
Brand Name	FUJITSU
Model Name	F-05F
IMEI Code	359401050025037
H/W Version	V2.1.0
S/W Version	R18Ae

1.1.2 Specification of the Equipment under Test (EUT)

VLAN				
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	λ/4 Monopole Antenna			
Modulaton Type 802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM)				
Bluetooth				
Operating Frequency	2402 MHz ~ 2480 MHz			
Antenna Type	λ /4 Monopole Antenna			
Modulaton Type Bluetooth 4.0 LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): π/4-DQPSK Bluetooth EDR (3Mbps): 8-DPSK				
WWAN				
Operating Frequency	TX: GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz RX: GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz			
Antenna Type	λ /4 Monopole Antenna			
Modulaton Type	GSM: GMSK GPRS: GMSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)			

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RFID/NFC	RFID/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 EUT Operational Condition

Power Supply Type	Battery: 3.75Vdc / 3200mAh Adapter: DC5.0V 1.8A, DC9.0V 1.8A
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1.1.4 Accessories

	Accessories					
No. Equipment Description						
	Battery (Built-in battery)	Brand Name: Panasonic				
1		Model Name: CA54310-0052				
		Power Rating: O/P: 3.75Vdc, 3200mA				

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1.2 The Equipment and Calibration Data

Test Item	Conducted Emission					
Test Site	Conduction room 1 / (Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
EMC Receiver	R&S	ESCS 30	100169	Oct. 15, 2013	Oct. 14, 2014	
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 23, 2013	Nov. 22, 2014	
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Dec. 04, 2013	Dec. 03, 2014	
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Apr. 24, 2013	Apr. 23, 2014	
50 ohm terminal (Support Unit)	NA	50	04	Apr. 22, 2013	Apr. 21, 2014	
Note: Calibration Interval of instruments listed above is one year.						

Test Item	Radiated Emission below 1GHz test					
Test Site	966 chamber1 / (03CH01-WS)					
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
Receiver	R&S	ESR3	101658	Jan. 10, 2014	Jan. 09, 2015	
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 02, 2014	Jan. 01, 2015	
Preamplifier	Burgeon	BPA-530	SN:100219	Nov. 22, 2013	Nov. 21, 2014	
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 16, 2013	Dec. 15, 2014	
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 16, 2013	Dec. 15, 2014	
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)					
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
Spectrum Analyzer	R&S	FSV40	101499	Feb. 08, 2014	Feb. 07, 2015		
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Jan. 07, 2014	Jan. 06, 2015		
Preamplifier	Agilent	83017A	MY39501309	Dec. 09, 2013	Dec. 08, 2014		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 17, 2013	Dec. 16, 2014		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 17, 2013	Dec. 16, 2014		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 17, 2013	Dec. 16, 2014		
Note: Calibration Inter	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 ANSI C63.4:2009

1.4 Measurement Uncertainty

CISPR 16-4-2 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	2.8 dB				
Redicted Emissions	30MHz ~ 1GHz	3.9 dB				
Radiated Emissions	Above 1GHz	4.2 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 / 53%	Skys Huang
Radiated Emissions ≤1GHz	03CH01-WS	21°C / 65%	Peter Lin
Radiated Emissions >1GHz	03CH02-WS	20°C / 68%	Peter Lin

2.2 The Worst Case Measurement Configuration

Conduction Pretest Mode		
Pretest Mode	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery 20% + USB Cable + Adapter	
2	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery 100% + USB Cable + Adapter	
3	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + Camera + Earphone + Battery 20% + USB Cable + Adapter	
4	WCDMA850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery 20% + USB Cable + Adapter	
5	GSM850 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery 20% + USB Cable (Data Link with Notebook)	
For Pretest mode 1 is the worst case and only its data was record in this test report.		

Radiation Pretest Mode		
Pretest Mode	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery 20% + USB Cable + Adapter	
2	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery 100% + USB Cable + Adapter	
3	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + Camera + Earphone + Battery 20% + USB Cable + Adapter	
4	WCDMA850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery 20% + USB Cable + Adapter	
5	GSM850 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery 20% + USB Cable (Data Link with Notebook)	
For Pretest mode 5 is the worst case and only its data was record in this test report.		



The Determined Worst Case Configurations		
Conducted Emissions		
Test Mode	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery 20% + USB Cable + Adapter	
Radiated Emissions		
Test Mode ≤1GHz	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery 20% + USB Cable (Data Link with Notebook)	
Test Mode >1GHz	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery 20% + USB Cable (Data Link with Notebook)	

2.3 Local Support Equipment List

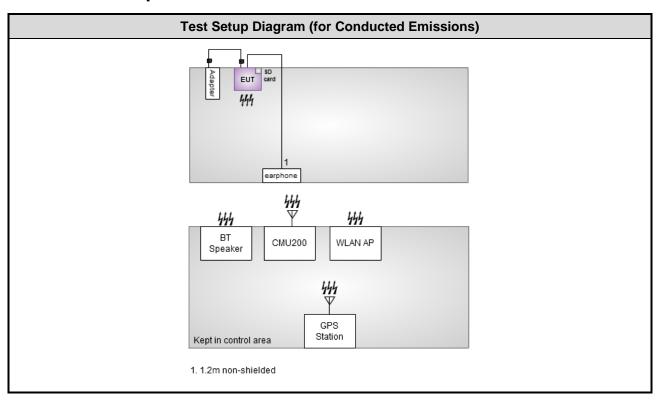
	Support Equipment List				
No.	Equipment	Brand	Model	S/N	Signal cable / Length (m)
1	Adapter	NTT docomo	AC Adaptor 05		1.2m non-shielded with 2 cores
2	Radio Communication Analyzer	R&S	CMU200	108087	
3	GPS Station (MXG)	Agilent	N5182B	MY53050081	
4	Earphone	APPLE	MD827FE/A	6	1.2m non-shielded w/o core
5	AP	D-LINK	DIR-815	3000228	
6	BT speaker	Nokia	HF-34W		
7	Micro SD card	SanDisk	Micro SDHC 8GB		
8	Notebook	DELL	Latitude E5430	764RWW1	
9	Printer	EPSON	XP-30	QSDK002410	USB, 1.8m shielded w/o core
10	Mouse	DELL	MS111-L	2C3-00N9	USB, 1.8m shielded w/o core
11	HDD	WD	WDBKXH5000 ABK	WX31AB2102 13	USB, 0.5m shielded w/o core

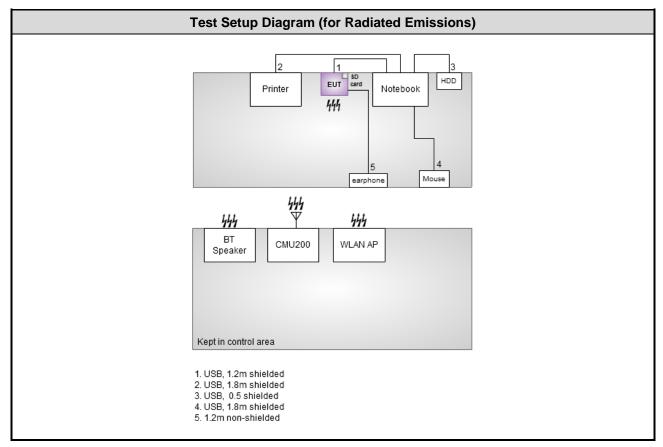
Note: Item 1 was provided by client.

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2.4 Test Setup Chart





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2.5 Test Software and Operating Condition

- a. The EUT was in GSM idle mode during the testing. The EUT was synchronized to the BCCH.
- b. The EUT was attached to the support BT speaker or WLAN AP in idle mode.
- c. Executed "GPS Test" to make the EUT receive continuous signals from GPS station.
- d. Data application is transferred between notebook, SD Card, HDD and EUT via USB cable.

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3 Emission Tests Results

3.1 Conducted Emissions

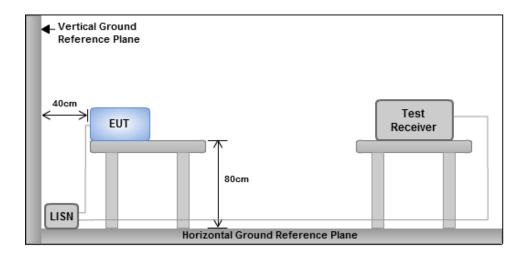
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit			
Frequency Emission (MHz)	Quasi-Peak	Average	
0.15-0.5	66 - 56 *	56 - 46 *	
0.5-5	56	46	
5-30	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 Ω LISN port.
- c. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.

3.1.3 Test Setup



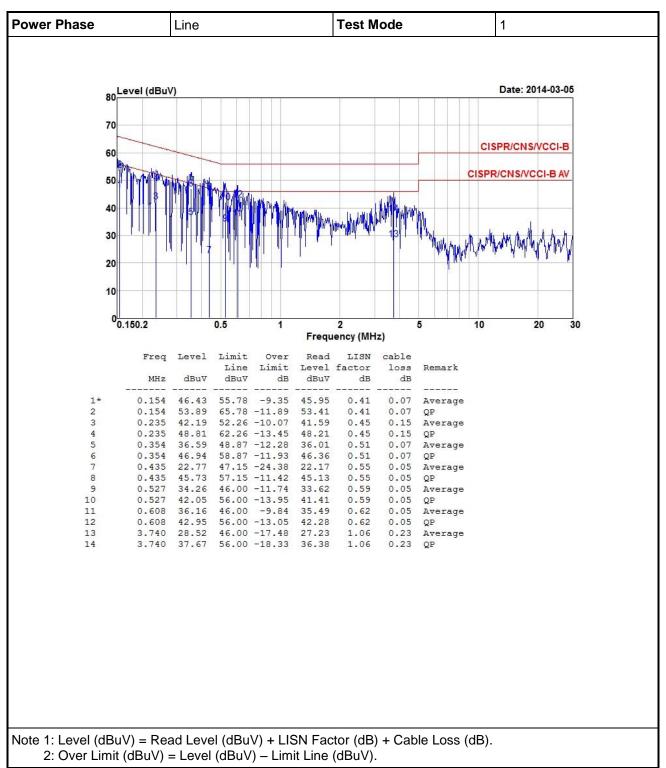
Note: 1. Support units were connected to second LISN.

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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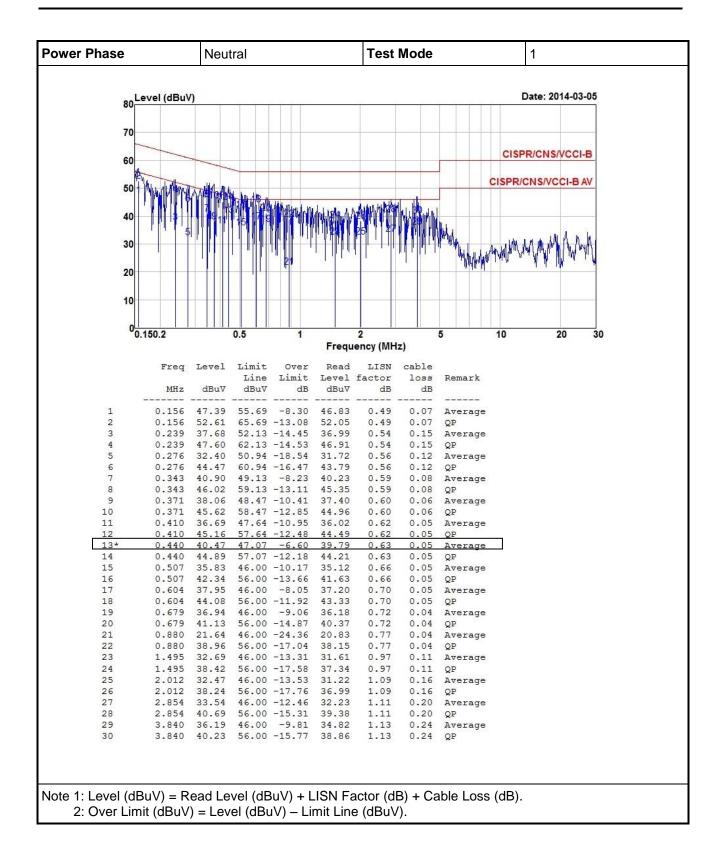


3.1.4 Test Result of Conducted Emissions



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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.

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.
- 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.

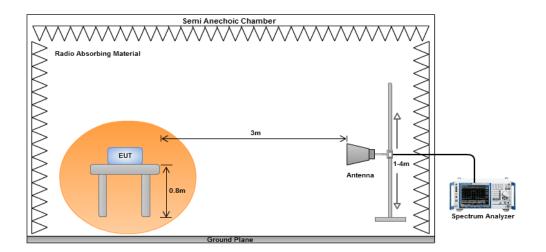
Note:

- 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=3MHz and RMS detector is for average measured value of radiated emission above 1GHz.

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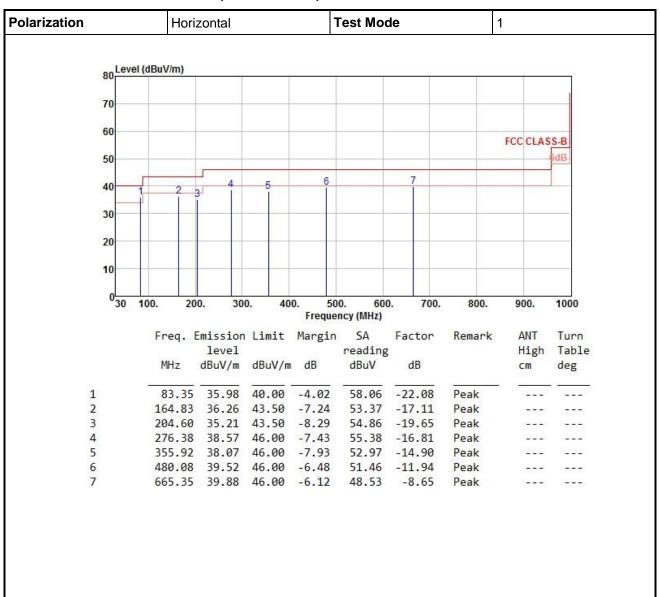
3.2.3 Test Setup



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3.2.4 Radiated Emissions (Below 1GHz)

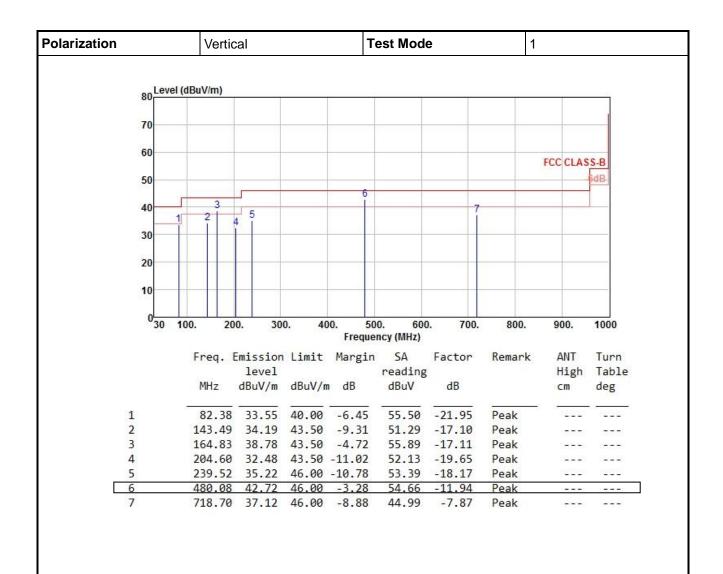


Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB).

2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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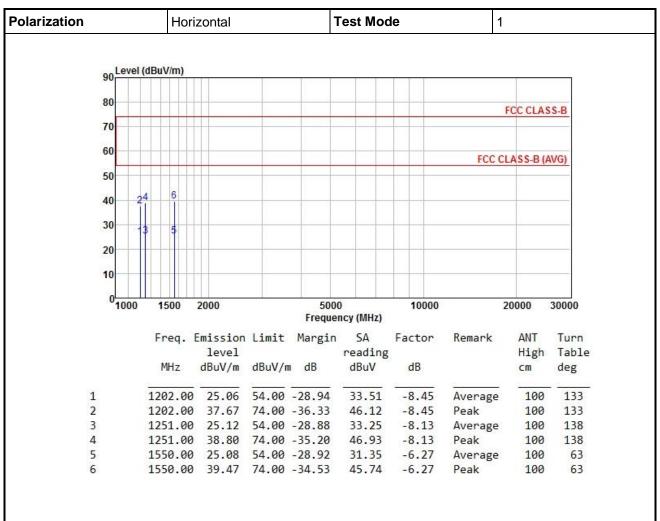


Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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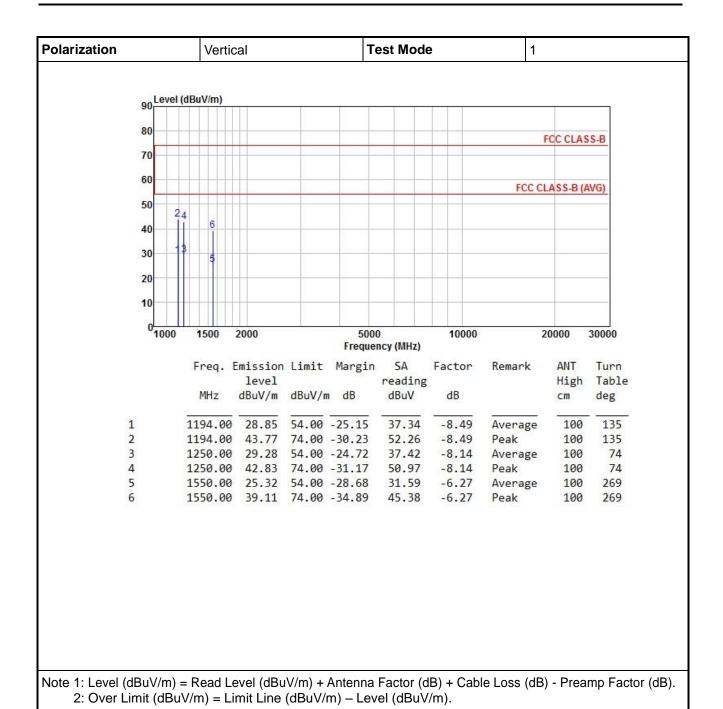
3.2.5 Radiated Emissions (Above 1GHz)



Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (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 http://www.icertifi.com.tw.

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