FCC 15B Test Report

Equipment : Mobile Phone

Model No. : F-01F

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 : Jul. 01, 2013

Tested Date : Aug. 14 ~ Aug. 16, 2013

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

Ilac-MRA



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Report No.: FD370110 Report Version: Rev. 01



Release Record

Report No.	Version	Description	Issued Date
FD370110	Rev. 01	Initial issue	Sep. 03, 2013

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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	-10.70dB AV@ 4.454MHz.	Pass					
15.109	FCC Part 15, Subpart B, Class B	Radiated Emissions	-3.28dB QP@ 480.08MHz.	Pass					

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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-01F
IMEI Code	357611050023509
H/W Version	V2.1.0
S/W Version	R19.8e

1.1.2 Specification of the Equipment under Test (EUT)

WLAN	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			
Operating Frequency 13.56 MHz			
Antenna Type	Loop Antenna		
Modulaton Type ASK			
GPS			
Operating Frequency	1.57542 GHz		
Modulaton Type BPSK			
Note: IEEE 11ac standard is still Draft version.			

1.1.3 EUT Operational Condition

Supply Voltage		□ DC	
Type of DC Source	☐ Internal DC supply		Battery

1.1.4 Accessories

	Accessories						
No.	No. Equipment Description						
		Brand Name: Fujitsu limited					
1	1 Battery Model Name: CA54310-0052	Model Name: CA54310-0052					
		Power Rating: O/P: 3.75Vdc, 3200mA, 12Wh					

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The Equipment and Calibration Data 1.2

Test Item	Conducted Emission					
Test Site	Conduction room 1 / (CO01-WS)					
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibra				Calibration Until	
EMC Receiver	R&S	ESCS 30	100169	Oct. 02, 2012	Oct. 01, 2013	
LISN	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-667	Dec. 04, 2012	Dec. 03, 2013	
LISN (Support Unit)	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-666	Dec. 04, 2012	Dec. 03, 2013	
ISN	TESEQ	ISN T800	34406	Apr. 08, 2013	Apr. 07, 2014	
ISN	TESEQ	ISN T200A	30494	Apr. 09, 2013	Apr. 08, 2014	
ISN	TESEQ	ISN T8-Cat6	27262	Sep. 17, 2012	Sep. 16, 2013	
ISN	TESEQ	ISN ST08	22589	Jan. 24, 2013	Jan. 23, 2014	
RF Current Probe	FCC	F-33-4	121630	Dec. 04, 2012	Dec. 03, 2013	
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 25, 2012	Dec. 24, 2013	
ESH3-Z6 V-Network(+)	R&S	ESH3-Z6	100920	Nov. 21, 2012	Nov. 20, 2013	
ESH3-Z6 V-Network(-)	R&S	ESH3-Z6	100951	Jan. 30, 2013	Jan. 29, 2014	
Two-Line V-Network	R&S	ENV216	101579	Jan. 07, 2013	Jan. 06, 2014	
50 ohm terminal	NA	50	01	Apr. 22, 2013	Apr. 21, 2014	
50 ohm terminal	NA	50	02	Apr. 22, 2013	Apr. 21, 2014	
50 ohm terminal	NA	50	03	Apr. 22, 2013	Apr. 21, 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.						

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Test Item	Radiated Emission above 1GHz				
Test Site	966 chamber 2 / (03CH02-WS) Manufacturer Model No. Serial No. Calibration Date Calibration Until				
Instrument					
3m semi-anechoic chamber	CHAMPRO	SAC-03	03CH02-WS	Jan. 02, 2013	Jan. 01, 2014
Spectrum Analyzer	R&S	FSV40	101499	Jan. 28, 2013	Jan. 27, 2014
Receiver	R&S	ESR3	101657	Jan. 30,2013	Jan. 29, 2014
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-524	Jan. 11, 2013	Jan. 10, 2014
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120D	BBHA 9120 D 1095	Jan. 29, 2013	Jan. 28,2014
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Jan. 14, 2013	Jan. 13, 2014
Amplifier	Burgeon	BPA-530	100218	Dec. 14, 2012	Dec. 13, 2013
Amplifier	Agilent	83017A	MY39501309	Dec. 18, 2012	Dec. 17, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable-R03m	Woken	CFD400NL-LW	CFD400NL-003	Dec. 25, 2012	Dec. 24, 2013
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-004	Dec. 25, 2012	Dec. 24, 2013
control	EM Electronics	EM1000	060608	N/A	N/A

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			
Dedicted 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	22°C / 66%	Skys Huang
Radiated Emissions	03CH02-WS	21°C / 66%	Anderson Hong

2.2 The Worst Case Measurement Configuration

Conduction Pretest Mode			
Test Mode	Operating Description		
1	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery + USB Cable + Adapter		
2	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + Camera + Earphone + Battery + USB Cable + Adapter		
3	WCDMA 850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery + USB Cable + Adapter		
4	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery + USB Cable (Data Link with Notebook)		
For Test mode 2 is the worst case and only its data was record in this test report.			

Radiation Pretest Mode		
Test Mode	Operating Description	
1	GSM850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GPS Rx + Earphone + Battery + USB Cable + Adapter	
2	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + Camera + Earphone + Battery + USB Cable + Adapter	
3	WCDMA 850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + MPEG4 + Earphone + Battery + USB Cable + Adapter	
4	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery + USB Cable (Data Link with Notebook)	
For Test mode 4 is the worst case and only its data was record in this test report.		

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The Determined Worst Case Configurations		
Conducted Emissions		
Test Mode	Operating Description	
1	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + Camera + Earphone + Battery + USB Cable + Adapter	
Radiated Emissions		
Test Mode ≤1GHz	Operating Description	
1	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery + USB Cable (Data Link with Notebook)	
Test Mode >1GHz	Operating Description	
1	PCS1900 Idle + Bluetooth Idle + WLAN (5G) Idle + SD Card R/W + Earphone + Battery + USB Cable (Data Link with Notebook)	

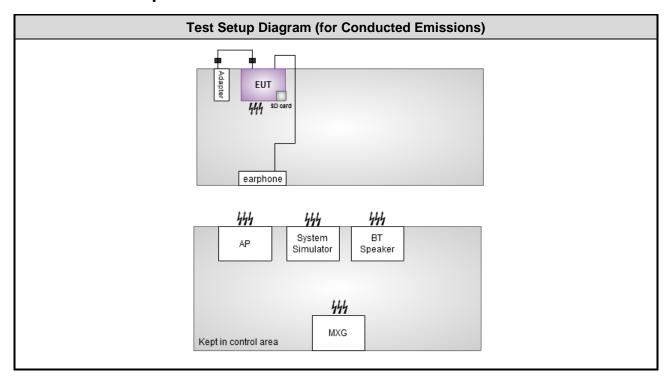
Local Support Equipment List 2.3

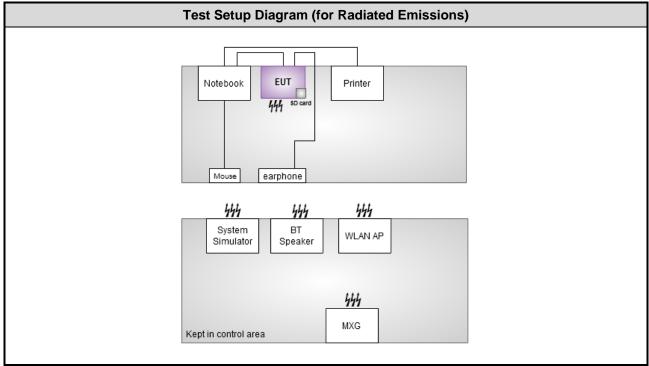
	Support Equipment List					
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Adapter	NTT docomo	AC Adaptor 04	54		1.0m non-shielded with 2 core
2	Earphone	APPLE	MD827FE/A	6		1.2m non-shielded w/o core
3	AP	D-LINK	DIR-815	3000228		
4	BT speaker	Nokia	HF-34W			
5	System Simulator	R&S	CMU200	108087		
6	GPS Station (MXG)	Agilent	N5182B	MY530500 81		
7	Micro SD card	SanDisk	8GB			
8	Notebook	DELL	Latitude E5430	654RWW1	DoC	USB 1m shielded w/o core
9	Printer	EPSON	XP-30	QSDK0024 61		1.8m shielded w/o core
10	Mouse	DELL	MS111-L	2C3-00NA		1.8m 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, and is in continuous receiving mode by setting system simulator's paging reorganization.
- b. The EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.
- c. Execute "GPS Test" to make the EUT receive continuous signals from GPS station.
- d. Turn on camera to capture images.

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3 Emission Tests Results

3.1 Conducted Emissions

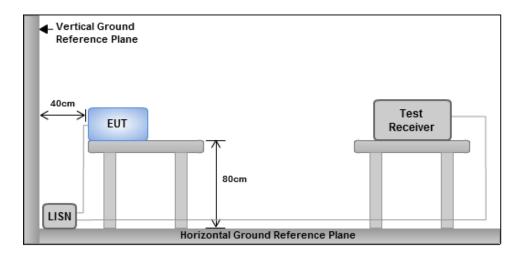
3.1.1 Limit of Conducted Emissions

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.

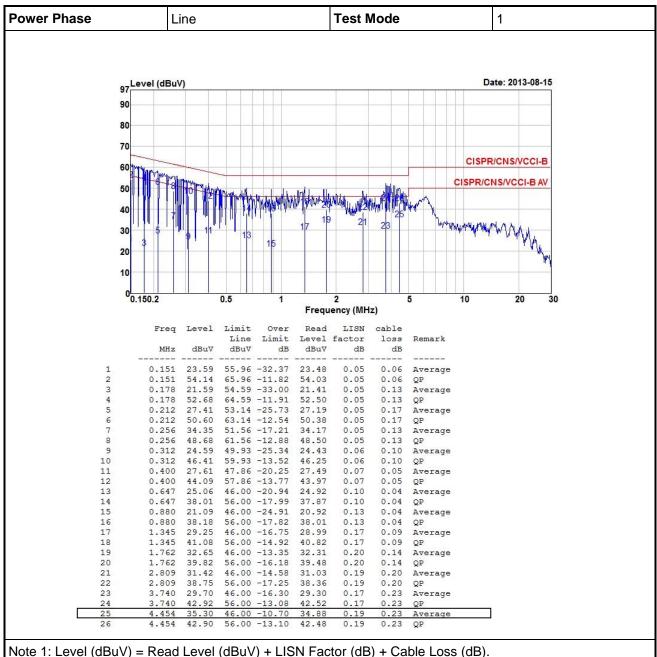
Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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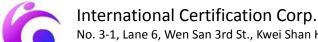
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Test Result of Conducted Emissions



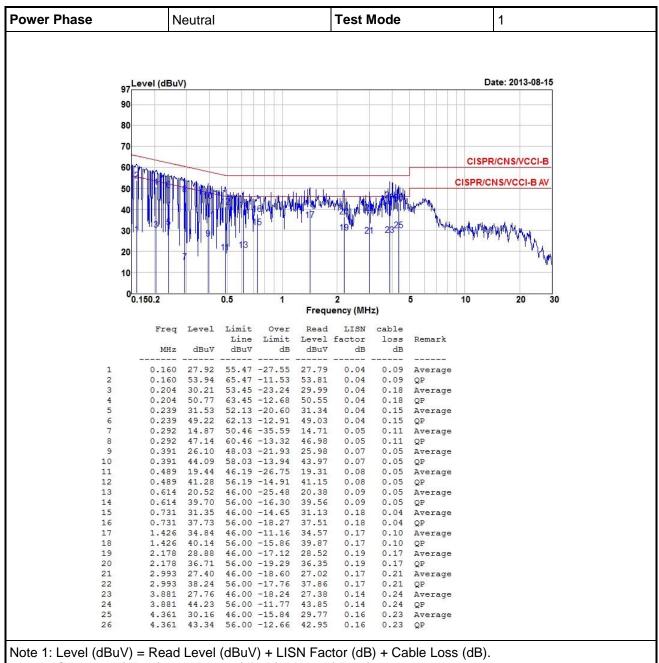
2: Over Limit (dBuV) = Limit Line (dBuV) - Level (dBuV).

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

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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:

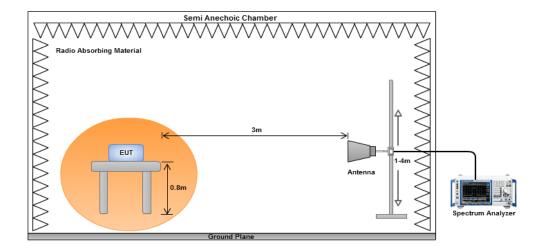
- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- 3. RBW=1MHz, VBW=3MHz and RMS detector is for average measured value of radiated emission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

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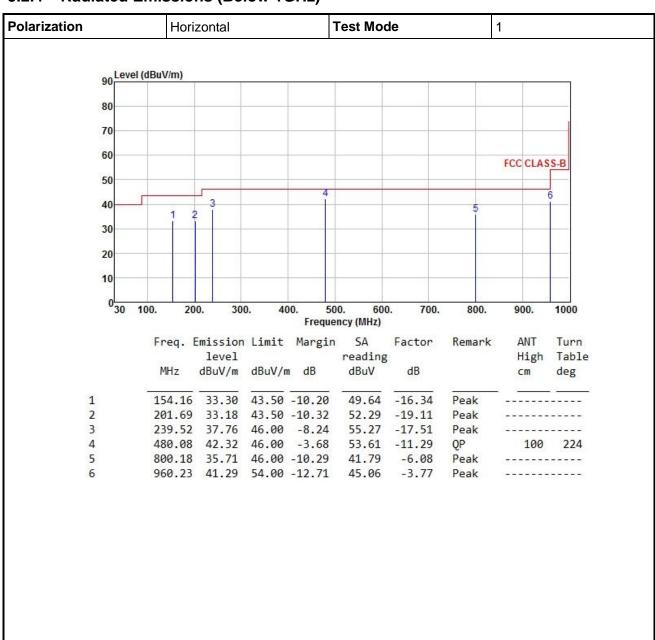
Test Setup 3.2.3



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Radiated Emissions (Below 1GHz)



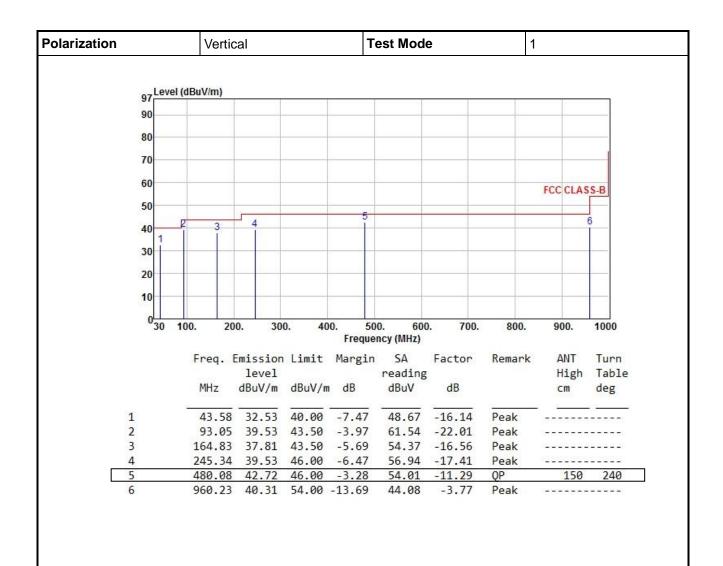
Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB).

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).

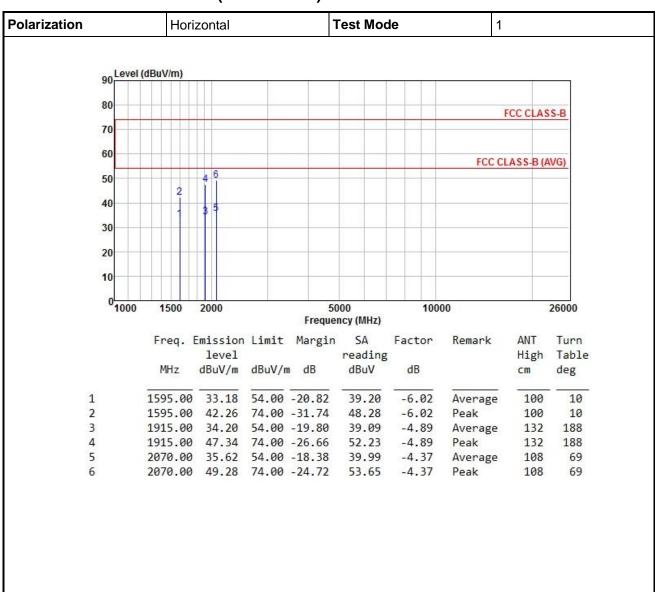
2: Over Limit (dBuV/m) = Limit Line (dBuV/m) – Level (dBuV/m).

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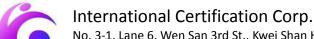
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Radiated Emissions (Above 1GHz)



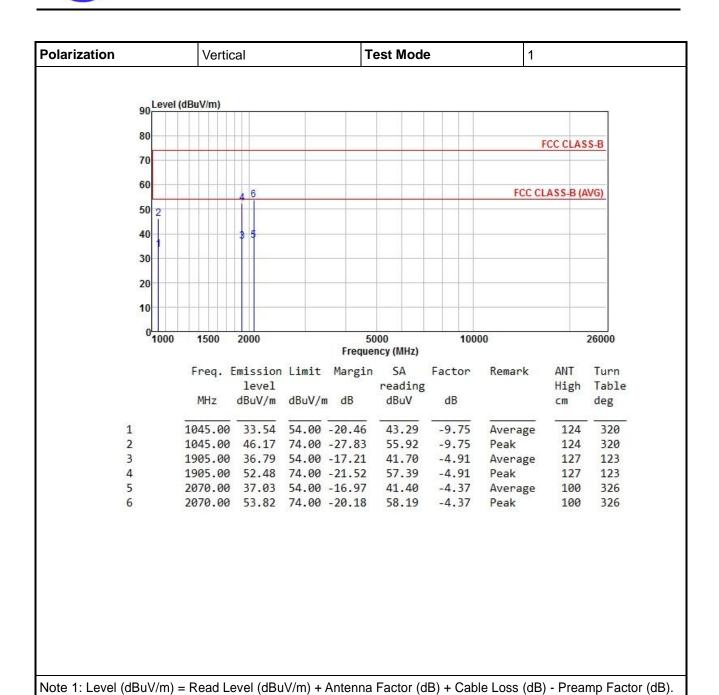
Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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