

FCC Test Report (PART 22)

Report No.: RF180206E03-2

FCC ID: S9GM510

Test Model: M510

Received Date: Feb. 06, 2018

Test Date: Mar. 07 to 08, 2018

Issued Date: Apr. 24, 2018

Applicant: Ruckus Wireless, Inc.

Address: 350 West Java Drive, Sunnyvale, CA 94089

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Taiwan R.O.C.

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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180206E03-2	Original release.	Apr. 24, 2018

1 Certificate of Conformity

Product: M510 Access Point

Brand: Ruckus Wireless

Test Model: M510


Sample Status: ENGINEERING SAMPLE

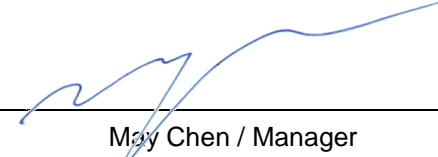
Applicant: Ruckus Wireless, Inc.

Test Date: Mar. 07 to 08, 2018

Standards: FCC Part 22

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  _____, **Date:** Apr. 24, 2018
Claire Kuan / Specialist

Approved by :  _____, **Date:** Apr. 24, 2018
May Chen / Manager

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	PASS	Meet the requirement of limit.
2.1047	Modulation characteristics	PASS	Meet the requirement
---	Peak to Average Ratio	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -33.52dB at 2479.2MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Test Site and Instruments

For radiated spurious emissions test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	5D-FB	LOOPCAB-001 LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Mar. 07, 2018

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	July 01, 2017	June 30, 2018
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018
ESG Vector signal generator Agilent	E4438C	MY45094468/005 506 602 UK6 UNJ	Nov. 26, 2017	Nov. 25, 2018
ESG Vector signal generator Agilent	E4438C	MY47271330 506 602 UNJ	Oct. 11, 2017	Oct. 10, 2018
Mech Switch Absorptive Mini-Circuits	MSP4TA-18+	0140	Feb. 12, 2018	Feb. 11, 2019
FXD ATTEN Mini-Circuits	BW-S3W2+	MN71981	Feb. 12, 2018	Feb. 11, 2019
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Mar. 08, 2018

3 General Information

3.1 General Description of EUT

Product	M510 Access Point	
Brand	Ruckus Wireless	
Test Model	M510	
Status of EUT	ENGINEERING SAMPLE	
Power Supply Rating	DC 48V from POE or DC 12V from adapter or DC 12V from Terminal	
Modulation Type	WCDMA, HSDPA, HSUPA	BPSK
Operating Frequency	WCDMA, HSDPA, HSUPA	826.4MHz ~846.6MHz
Max. ERP Power	WCDMA	173.78mW (22.40dBm)
Emission Designator	WCDMA	4M13F9W
Antenna Type	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	NA	
Data Cable Supplied	NA	

Note:

1. The EUT is a WLAN, WWAN and GPS device.
2. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	WLAN 5GHz	WWAN WCDMA	GPS
2	WLAN 2.4GHz	WLAN 5GHz	WWAN LTE	GPS

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. The EUT must be supplied with a POE or power adapter as following table:

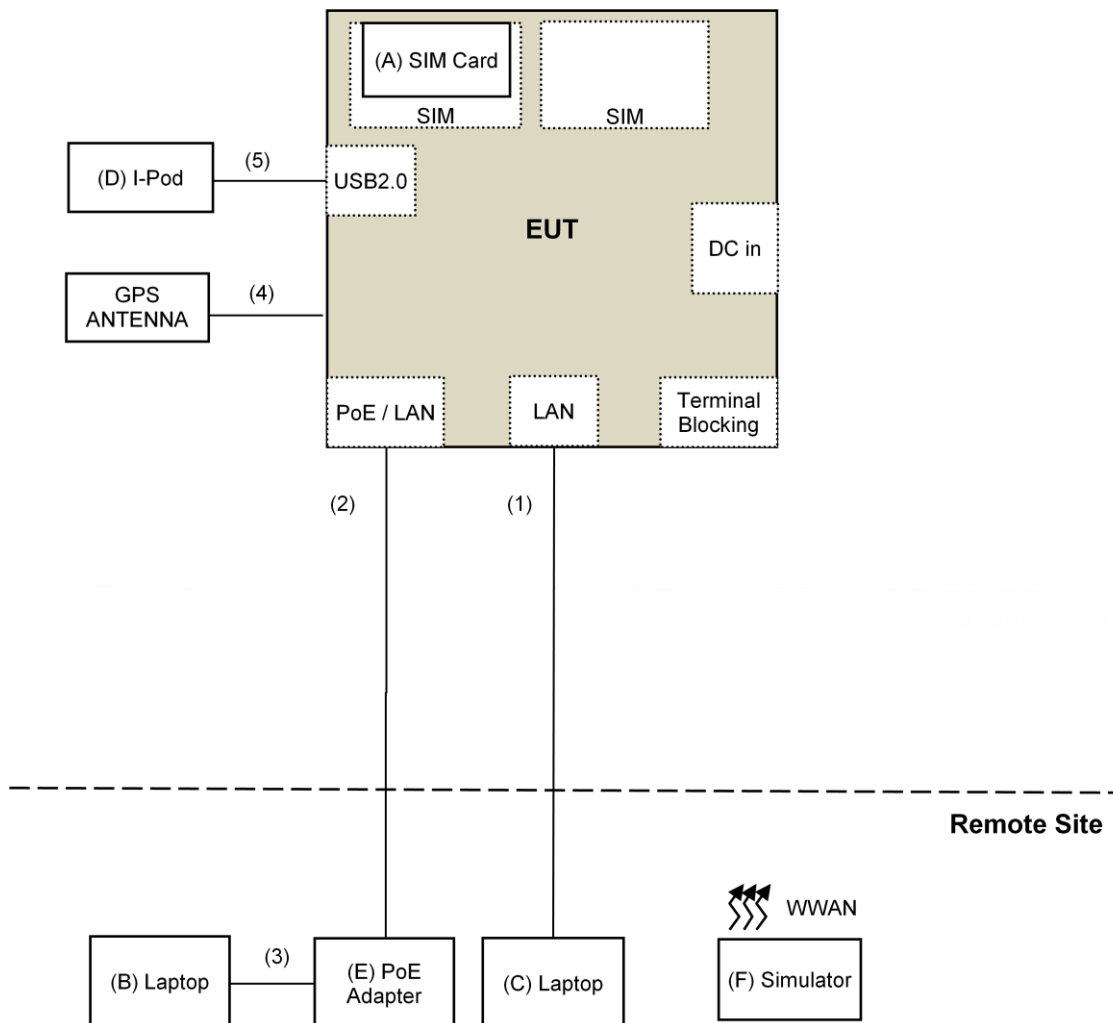
PoE (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	740-64214-001	Input: 100-240V, 0.75A, 50/60Hz Output: 48V, 0.5A
Adapter (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	NBS24J120200B3	Input: 100-240V, 0.6A, 50/60Hz Output: 12V, 2.0A

4. The antennas provided to the EUT, please refer to the following table:

WLAN								
Antenna NO.	Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1	5GHz_chain_0 2.4GHz_chain_1	1	2.4~2.4835	PIFA	i-pex (MHF)	120	0	1
		3	5.15~5.85				0	3
2	5GHz_chain_1 2.4GHz_chain_0	1.2	2.4~2.4835	PIFA	i-pex (MHF)	70	0	1.2
		3	5.15~5.85				0	3
GPS								
Antenna Net Gain(dBi)			Frequency range (MHz)	Antenna Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1.66			1575.42	Dipole	i-pex (MHF)	80	0.34	2
WWAN								
Antenna NO.	Antenna Type	Brand	Model	Band	Freq. Range	Gain (dBi)		
1 (Main)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.66		
				WCDMA IV (B4)	1710~1755	1.66		
				WCDMA V (B5)	824~849	1.66		
				LTE Band (2)	1850~1910	1.66		
				LTE Band (4)	1710~1755	1.66		
				LTE Band (12)	698~716	1.53		
2 (Aux)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.5		
				WCDMA IV (B4)	1710~1755	1.5		
				WCDMA V (B5)	824~849	1.5		
				LTE Band (2)	1850~1910	1.5		
				LTE Band (4)	1710~1755	1.5		
				LTE Band (12)	698~716	1.37		

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	SIM Card	R&S	CMW-Z04	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JL03FF4T1	NA	Provided by Lab
E.	PoE Adapter	Ruckus	740-64214-001	NA	NA	Supplied by client
F.	Simulator	R&S	CMU200	121040	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	3	No	0	Provided by Lab
4.	GPS Cable	1	5	No	0	Supplied by client
5.	USB Cable	1	0.1	Yes	0	Provided by Lab

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XY axis and antenna ports

The worst case was found when positioned on Y-plane. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

Test Mode	Test Condition
A	Power from POE
B	Power from adapter
C	Power from Terminal

The worst radiated emission was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.

WCDMA Band V

Test Item	Available Channel	Tested Channel	Mode
ERP	4132 to 4233	4132, 4182, 4233	WCDMA
Modulation Characteristics	4132 to 4233	4132, 4233	WCDMA
Frequency Stability	4132 to 4233	4182	WCDMA
Occupied Bandwidth	4132 to 4233	4132, 4182, 4233	WCDMA
Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA
Band Edge	4132 to 4233	4132, 4233	WCDMA
Conducted Emission	4132 to 4233	4132, 4182, 4233	WCDMA
Radiated Emission Below 1GHz	4132 to 4233	4132, 4182, 4233	WCDMA
Radiated Emission Above 1GHz	4132 to 4233	4132, 4182, 4233	WCDMA

Test Condition:

Test Item	Environmental Conditions	Input Power (System)	Tested By
ERP	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Modulation Characteristics	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
Frequency Stability	23deg. C, 68%RH	120Vac, 60Hz	Jyunchun Lin
Occupied Bandwidth	23deg. C, 68%RH	120Vac, 60Hz	Jyunchun Lin
Band Edge	23deg. C, 68%RH	120Vac, 60Hz	Jyunchun Lin
Peak to Average Ratio	23deg. C, 68%RH	120Vac, 60Hz	Jyunchun Lin
Conducted Emission	23deg. C, 68%RH	120Vac, 60Hz	Jyunchun Lin
Radiated Emission Below 1GHz	23deg. C, 68%RH	120Vac, 60Hz	Eason Tseng

Radiated Emission Above 1GHz	23deg. C, 68%RH	120Vac, 60Hz	Eason Tseng
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3.4 EUT Operating Conditions

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 Test Procedures

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

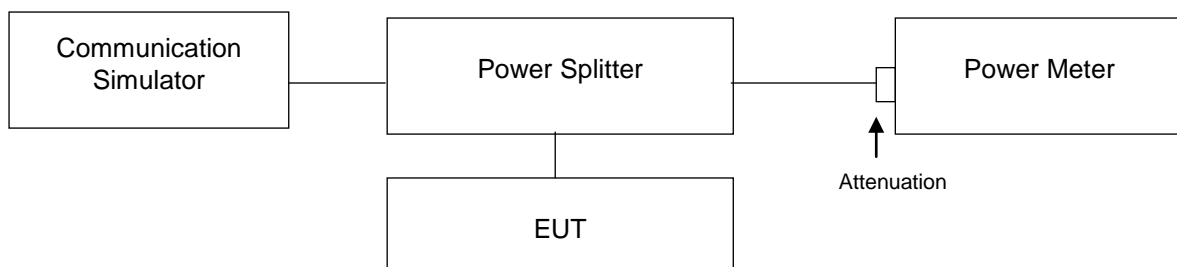
Conducted Power Measurement:

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

EIRP / ERP Measurement:

1. EIRP = Conducted output power level + Antenna gain
2. ERP power = EIRP power - 2.15dBi.

4.1.3 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

Band	WCDMA V			
	Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6	
RMC	22.80	22.89	22.77	
HSDPA Subtest-1	21.02	21.07	20.96	
HSDPA Subtest-2	21.40	21.45	21.35	
HSDPA Subtest-3	20.93	20.96	20.85	
HSDPA Subtest-4	20.92	20.95	20.86	
HSUPA Subtest-1	20.14	20.19	20.10	
HSUPA Subtest-2	20.94	21.01	20.92	
HSUPA Subtest-3	20.37	20.41	20.31	
HSUPA Subtest-4	18.67	18.71	18.64	
HSUPA Subtest-5	20.75	20.80	20.72	

ERP POWER

Channel Number	Freq. (MHz)	Conducted Average Power (dBm)	Gain	ERP(dBm)	ERP(mW)	Pass /Fail	Setting
4132	826.4	22.80	1.66	22.31	170.22	Pass	Max
4182	836.4	22.89	1.66	22.40	173.78	Pass	Max
4233	846.6	22.77	1.66	22.28	169.04	Pass	Max

4.2 Modulation characteristics Measurement

4.2.1 Limits of Modulation characteristics

N/A

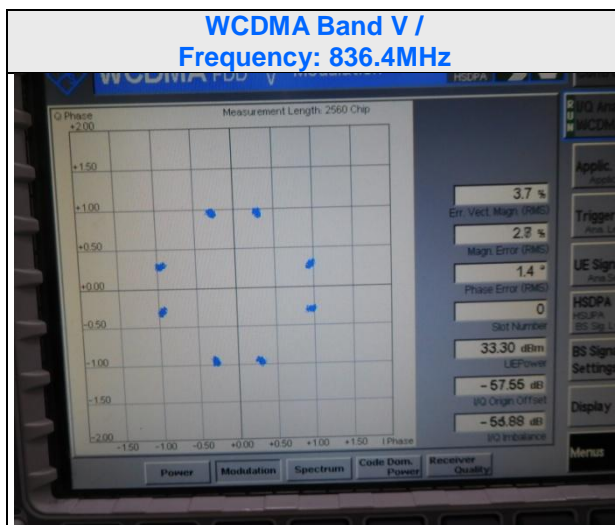
4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup



4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

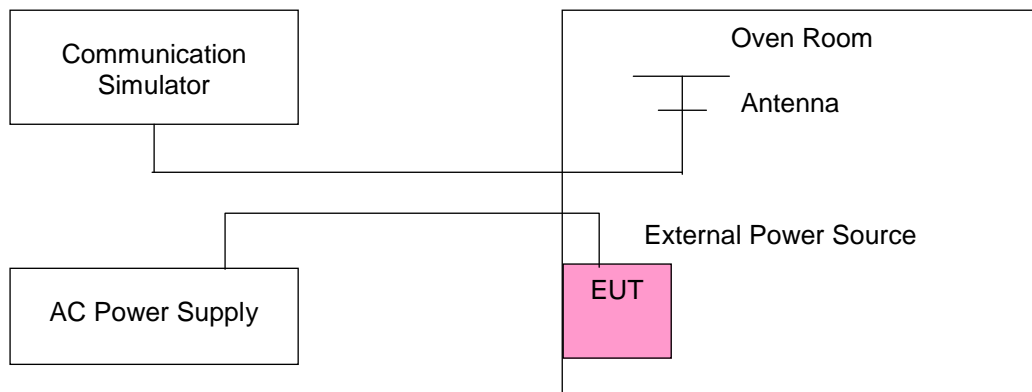
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

WCDMA

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)	Limit (ppm)
	WCDMA	
102	0.044	2.5
138	0.039	2.5

Frequency Error vs. Temperature.

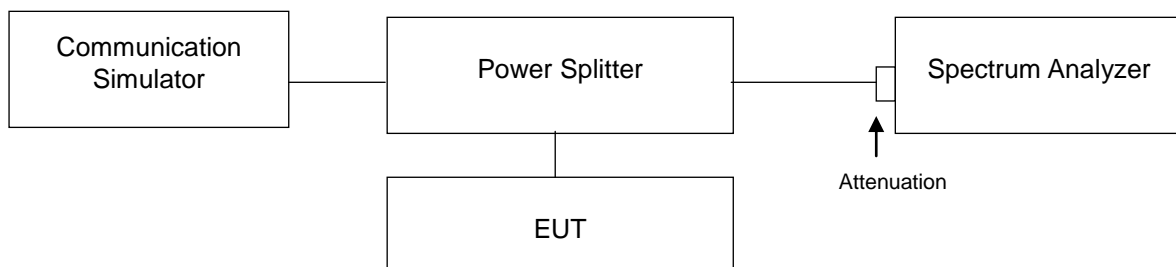
TEMP. (°C)	Frequency Error (ppm)	Limit (ppm)
	WCDMA	
75	0.044	2.5
70	0.045	2.5
60	0.037	2.5
50	0.027	2.5
40	0.035	2.5
30	0.024	2.5
20	0.037	2.5
10	0.031	2.5
0	0.025	2.5
-10	0.051	2.5
-20	0.029	2.5
-30	0.055	2.5

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

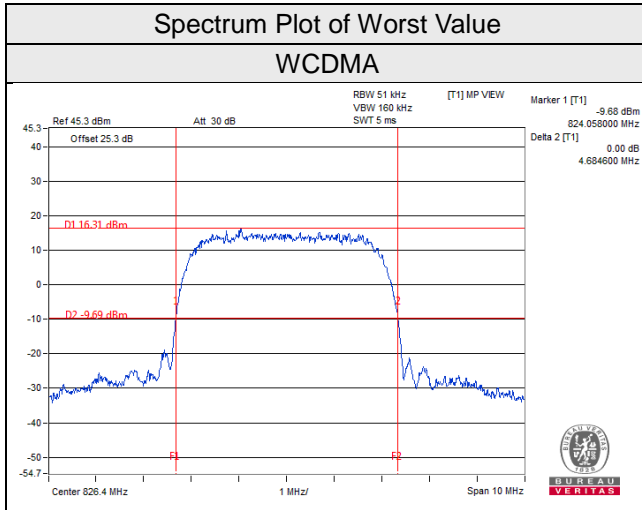
All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.2 Test Setup



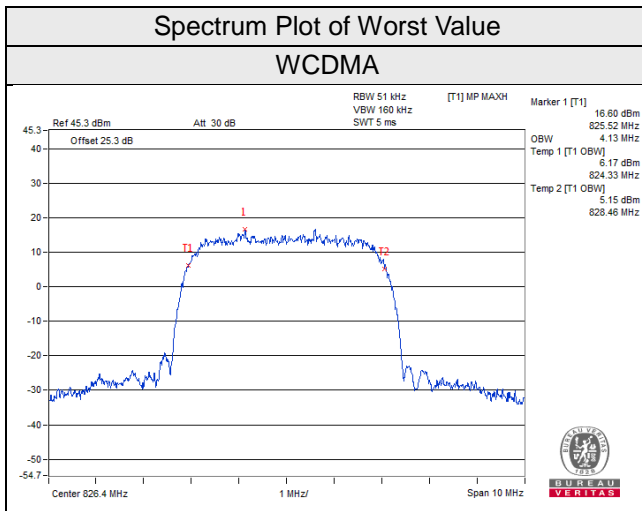
4.4.3 Test Result (-26dB Bandwidth)

Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		WCDMA
4132	826.4	4.68
4182	836.4	4.66
4233	846.6	4.68



4.4.4 Test Result (Occupied Bandwidth)

Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)
		WCDMA
4132	826.4	4.13
4182	836.4	4.13
4233	846.6	4.12

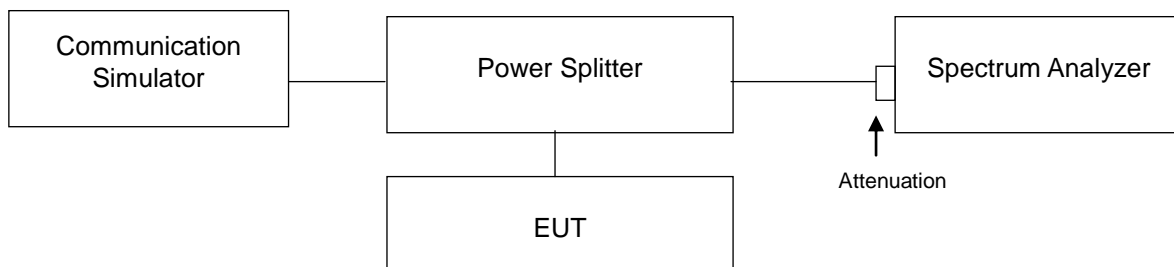


4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

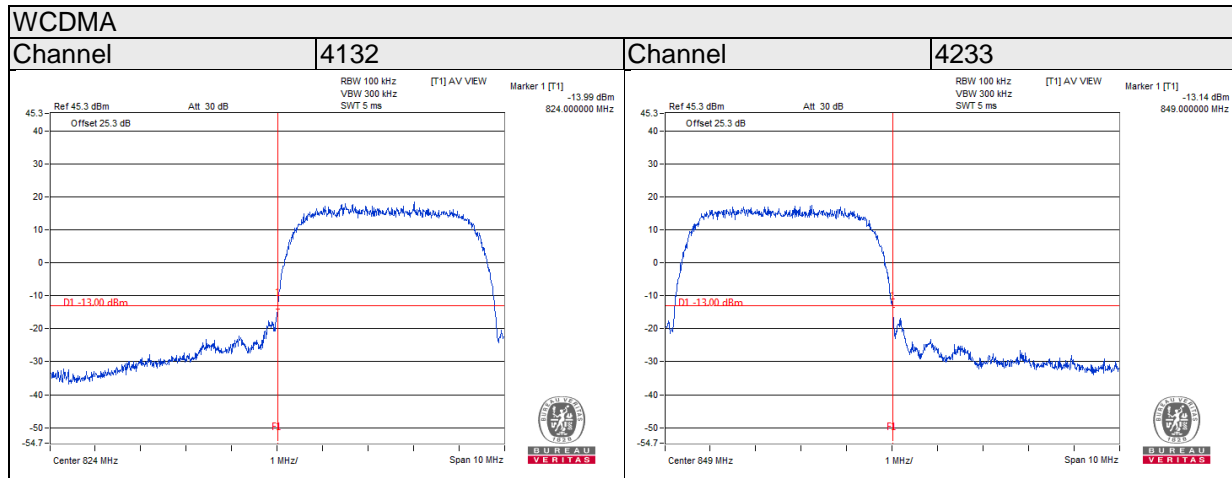
4.5.2 Test Setup



4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and s RB of the spectrum is $>1\%$ EMISSION BANDWIDTH and VB of the spectrum is $\geq 3*RB$.
- Record the max trace plot into the test report.

4.5.4 Test Results

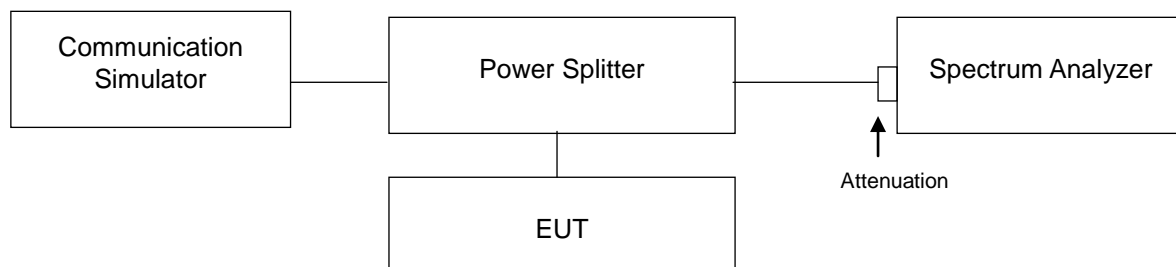


4.6 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.5.2 Test Setup

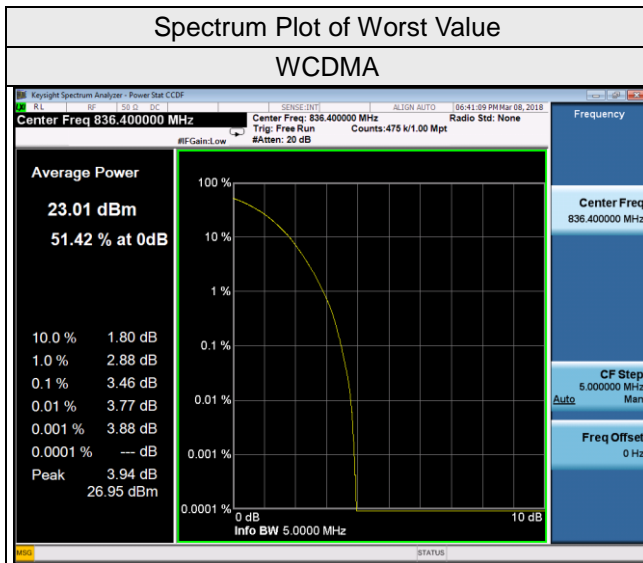


4.5.3 Test Procedures

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

Channel	Freq. (MHz)	Peak to Average Ratio (dB)	Limit(dB)	Pass /Fail
		WCDMA		
4132	826.4	3.06	13	Pass
4183	836.4	3.46	13	Pass
4233	846.6	3.06	13	Pass

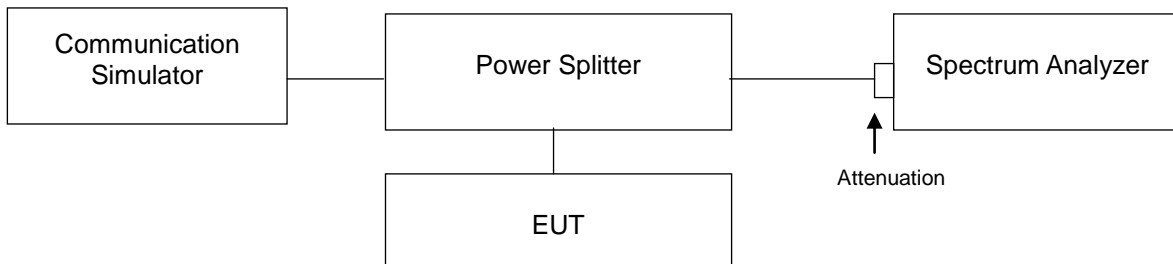


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm .

4.7.2 Test Setup



4.7.3 Test Procedure

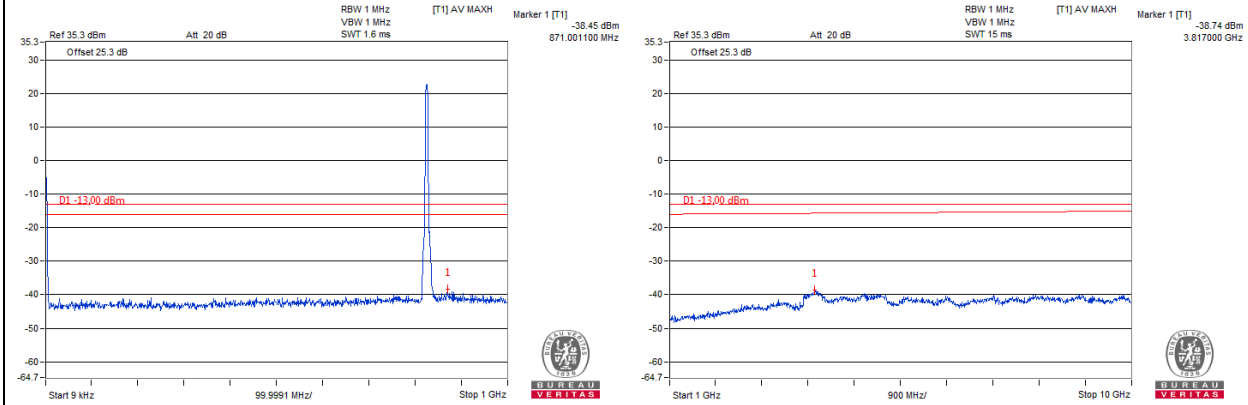
- a. All measurements were done at middle operational frequency range.
- b. Measuring frequency range is from 9 kHz to 10GHz. RBW:1 MHz and VBW=1 MHz is used for measurement.

4.7.4 Test Results

WCDMA

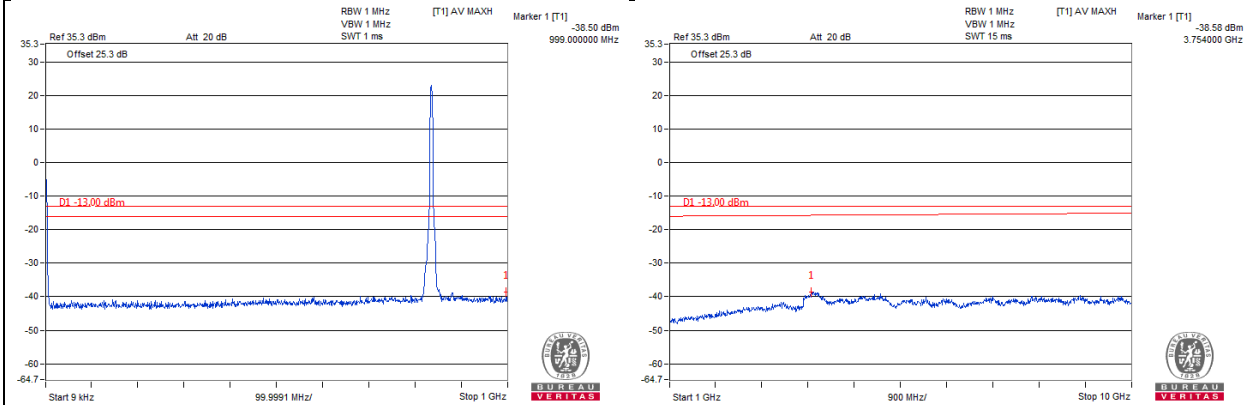
Channel 4132

Frequency Range : 9kHz~1GHz Frequency Range : 1GHz~10GHz



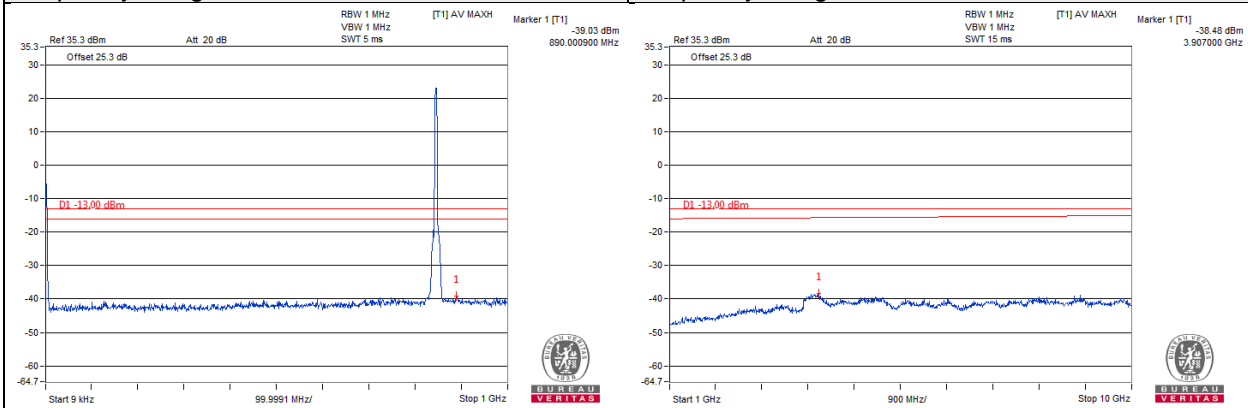
Channel 4182

Frequency Range : 9kHz~1GHz Frequency Range : 1GHz~10GHz



Channel 4233

Frequency Range : 9kHz~1GHz Frequency Range : 1GHz~10GHz



4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm .

4.8.2 Test Procedure

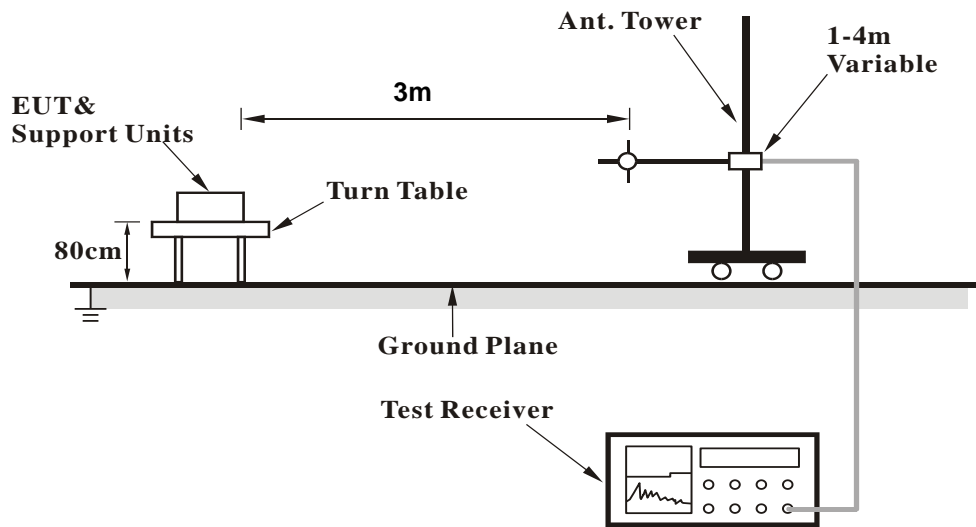
- a. The power was measured with Spectrum Analyzer.
- b. Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8m/1.5m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step b. Record the power level of S.G
- d. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna}$.
- e. ERP power can be calculated form EIRP power by subtracting the gain of dipole, $\text{ERP power} = \text{EIRP power} - 2.15\text{dBi}$.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/1MHz.

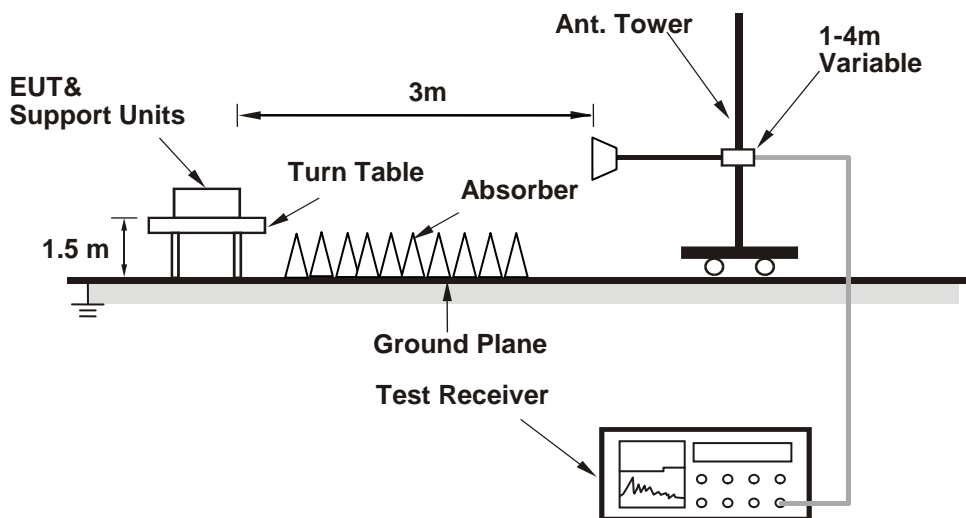
4.8.3 Deviation from Test Standard

No deviation.

**4.8.4 Test Setup
For Below 1GHz**



For Above 1GHz:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

BELOW 1GHz

WCDMA:

Mode	TX channel 4132	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.52	34.90	-60.75	-1.58	-62.33	-13	-49.33
2	271.77	39.30	-57.78	3.90	-53.88	-13	-40.88
3	304.19	40.70	-57.41	3.70	-53.70	-13	-40.70
4	313.19	41.20	-57.28	3.68	-53.60	-13	-40.60
5	342	41.30	-58.72	3.64	-55.08	-13	-42.08
6	353.91	42.30	-57.71	3.57	-54.14	-13	-41.14

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	31.55	36.40	-37.57	-14.52	-52.09	-13	-39.09
2	74.55	37.00	-60.20	-2.09	-62.29	-13	-49.29
3	255.65	37.40	-59.19	4.00	-55.19	-13	-42.19
4	347.97	40.30	-59.72	3.61	-56.11	-13	-43.11
5	419.67	39.80	-60.36	3.13	-57.23	-13	-44.23
6	463.74	39.40	-60.25	2.83	-57.43	-13	-44.43

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4182	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	84.19	33.87	-61.67	-1.54	-63.21	-13	-50.21
2	271.71	38.81	-58.59	3.40	-55.19	-13	-42.19
3	303.22	40.18	-57.85	3.69	-54.16	-13	-41.16
4	312.48	40.92	-57.53	3.68	-53.85	-13	-40.85
5	341.64	40.06	-66.28	2.62	-63.65	-13	-50.65
6	353.44	41.54	-56.69	7.18	-49.51	-13	-36.51

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	32.44	35.56	-32.19	-15.57	-47.76	-13	-34.76
2	74.89	36.60	-60.54	-2.07	-62.61	-13	-49.61
3	255.79	37.13	-84.10	-2.05	-86.15	-13	-73.15
4	347.23	40.10	-57.04	2.40	-54.64	-13	-41.64
5	419.51	39.29	-59.33	3.49	-55.84	-13	-42.84
6	463.82	38.51	-57.25	1.92	-55.33	-13	-42.33

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4233	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	83.2	32.75	-62.96	-1.59	-64.56	-13	-51.56
2	271.87	38.60	-58.80	3.39	-55.40	-13	-42.40
3	303.98	39.00	-59.05	3.69	-55.37	-13	-42.37
4	313.31	40.35	-58.14	3.68	-54.46	-13	-41.46
5	341.83	39.29	-67.04	2.62	-64.41	-13	-51.41
6	354.16	40.74	-57.49	7.17	-50.32	-13	-37.32

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	32.86	34.36	-33.64	-15.45	-49.09	-13	-36.09
2	74.07	36.51	-60.77	-2.12	-62.89	-13	-49.89
3	255.24	36.69	-84.42	-2.04	-86.47	-13	-73.47
4	347.47	38.75	-58.38	2.40	-55.99	-13	-42.99
5	420.4	38.10	-60.51	3.48	-57.03	-13	-44.03
6	463.14	37.69	-58.06	1.92	-56.14	-13	-43.14

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

ABOVE 1GHz

WCDMA:

Mode	TX channel 4132	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1652.8	35.86	-69.01	6.27	-62.74	-13	-49.74
2	2479.2	47.29	-53.15	6.63	-46.52	-13	-33.52
3	3305.6	36.94	-67.70	7.97	-59.72	-13	-46.72
4	4132	36.98	-70.07	7.47	-62.60	-13	-49.60
5	4958.4	38.79	-67.53	7.00	-60.53	-13	-47.53
6	5784.8	39.62	-67.03	6.92	-60.11	-13	-47.11
7	6611.2	40.85	-64.97	5.71	-59.25	-13	-46.25
8	7437.6	44.87	-59.90	4.60	-55.30	-13	-42.30
9	8264	45.91	-58.86	4.17	-54.69	-13	-41.69

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1652.8	29.5	-75.37	6.27	-69.10	-13	-56.10
2	2479.2	36.5	-63.94	6.63	-57.31	-13	-44.31
3	3305.6	34.12	-70.52	7.97	-62.54	-13	-49.54
4	4132	34.52	-72.53	7.47	-65.06	-13	-52.06
5	4958.4	36.61	-69.71	7.00	-62.71	-13	-49.71
6	5784.8	38.63	-68.02	6.92	-61.10	-13	-48.10
7	6611.2	42.33	-63.49	5.71	-57.77	-13	-44.77
8	7437.6	44.98	-59.79	4.60	-55.19	-13	-42.19
9	8264	45.91	-58.86	4.17	-54.69	-13	-41.69

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4182	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	36.84	-67.94	6.31	-61.63	-13	-48.63
2	2509.2	46.93	-53.74	6.66	-47.08	-13	-34.08
3	3345.6	36.35	-68.81	7.63	-61.18	-13	-48.18
4	4182	36.78	-70.21	7.44	-62.77	-13	-49.77
5	5018.4	38.29	-68.12	7.01	-61.11	-13	-48.11
6	5854.8	40.02	-66.51	6.87	-59.64	-13	-46.64
7	6691.2	40.8	-64.67	5.56	-59.11	-13	-46.11
8	7527.6	45.47	-59.30	4.52	-54.78	-13	-41.78
9	8364	45.57	-59.20	4.18	-55.02	-13	-42.02

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1672.8	29.71	-75.07	6.31	-68.76	-13	-55.76
2	2509.2	37.17	-63.50	6.66	-56.84	-13	-43.84
3	3345.6	33.26	-71.90	7.63	-64.27	-13	-51.27
4	4182	35.5	-71.49	7.44	-64.05	-13	-51.05
5	5018.4	36.99	-69.42	7.01	-62.41	-13	-49.41
6	5854.8	38.02	-68.51	6.87	-61.64	-13	-48.64
7	6691.2	42.24	-63.23	5.56	-57.67	-13	-44.67
8	7527.6	45.57	-59.20	4.52	-54.68	-13	-41.68
9	8364	45.57	-59.20	4.18	-55.02	-13	-42.02

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4233	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1693.2	36.42	-68.26	6.34	-61.91	-13	-48.91
2	2539.8	46.23	-54.69	6.69	-48.00	-13	-35.00
3	3386.4	36.91	-68.30	7.69	-60.62	-13	-47.62
4	4233	36.28	-70.66	7.42	-63.24	-13	-50.24
5	5079.6	38.6	-67.90	7.03	-60.87	-13	-47.87
6	5926.2	39.37	-66.92	6.89	-60.03	-13	-47.03
7	6772.8	41.34	-63.79	5.41	-58.39	-13	-45.39
8	7619.4	46.4	-58.37	4.44	-53.93	-13	-40.93
9	8466	44.65	-60.10	4.20	-55.90	-13	-42.90

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1693.2	28.75	-75.93	6.34	-69.58	-13	-56.58
2	2539.8	36.51	-64.41	6.69	-57.72	-13	-44.72
3	3386.4	32.76	-72.45	7.69	-64.77	-13	-51.77
4	4233	34.87	-72.07	7.42	-64.65	-13	-51.65
5	5079.6	36.6	-69.90	7.03	-62.87	-13	-49.87
6	5926.2	37.1	-69.19	6.89	-62.30	-13	-49.30
7	6772.8	41.51	-63.62	5.41	-58.22	-13	-45.22
8	7619.4	44.93	-59.84	4.44	-55.40	-13	-42.40
9	8466	46.37	-58.38	4.20	-54.18	-13	-41.18

Remarks:

1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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