

## FCC Test Report

### (Part 22 – CDMA BC0)

**Report No.:** RF141118C01-3

**FCC ID:** AZ489FT7062

**Test Model:** LEX L10

**Received Date:** Dec. 16, 2014

**Test Date:** Dec. 22, 2014

**Issued Date:** Jan. 19, 2015

**Applicant:** Motorola Solutions Inc

**Address:** 1301 East Algonquin Road, Schaumburg, Illinois 60196

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

**Test Location:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>3</b>
<b>1 Certificate of Conformity</b> .....	<b>4</b>
<b>2 Summary of Test Results</b> .....	<b>5</b>
2.1 Measurement Uncertainty .....	5
2.2 Test Site And Instruments .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT .....	7
3.2 Configuration Of System Under Test.....	8
3.2.1 Description Of Support Units.....	8
3.3 Test Mode Applicability and Tested Channel Detail .....	9
3.4 EUT Operating Conditions .....	10
3.5 General Description of Applied Standards .....	10
<b>4 Test Types and Results</b> .....	<b>11</b>
4.1 Output Power Measurement .....	11
4.1.1 Limits of Output Power Measurement.....	11
4.1.2 Test Procedures.....	11
4.1.3 Test Setup.....	12
4.1.4 Test Results .....	13
4.2 Frequency Stability Measurement .....	15
4.2.1 Limits of Frequency Stabiliity Measurement .....	15
4.2.2 Test Procedure .....	15
4.2.3 Test Setup.....	15
4.2.4 Test Results .....	16
4.3 Occupied Bandwidth Measurement .....	17
4.3.1 Test Procedure .....	17
4.3.2 Test Setup.....	17
4.3.3 Test Result.....	18
4.4 Band Edge Measurement .....	19
4.4.1 Limits of Band Edge Measurement .....	19
4.4.2 Test Setup.....	19
4.4.3 Test Procedures.....	19
4.4.4 Test Results .....	20
4.5 Peak To Average Ratio.....	21
4.5.1 Limits of Peak To Average Ratio Measurement .....	21
4.5.2 Test Setup.....	21
4.5.3 Test Procedures .....	21
4.5.4 Test Results.....	22
4.6 Conducted Spurious Emissions .....	23
4.6.1 Limits of Conducted Spurious Emissions Measurement.....	23
4.6.2 Test Setup.....	23
4.6.3 Test Procedure .....	23
4.6.4 Test Results .....	24
4.7 Radiated Emission Measurement .....	33
4.7.1 Limits of Radiated Emission Measurement.....	33
4.7.2 Test Procedure .....	33
4.7.3 Deviation from Test Standard .....	33
4.7.4 Test Setup.....	34
4.7.5 Test Results .....	35
<b>5 Pictures of Test Arrangements</b> .....	<b>38</b>
<b>Appendix – Information on the Testing Laboratories</b> .....	<b>39</b>



A D T

### Release Control Record

Issue No.	Description	Date Issued
RF141118C01-3	Original release	Jan. 19, 2015



**1 Certificate of Conformity**

**Product:** Smart phone  
**Brand:** Motorola Solutions Inc  
**Test Model:** LEX L10  
**Sample Status:** Prototype  
**Applicant:** Motorola Solutions Inc  
**Test Date:** Dec. 22, 2014  
**Standards:** FCC Part 22, Subpart H

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 :** Celine Chou , **Date:** Jan. 19, 2015  
Celine Chou / Specialist

**Approved by :** Bruce Chen , **Date:** Jan. 19, 2015  
Bruce Chen / Project Engineer

## 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.
---	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 -37.74dB at 1696.62MHz.

### 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) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB



**2.2 Test Site and Instruments**

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2014	Dec. 17, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Preamplifier Agilent	8449B	3008A01961	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
Mini-Circuits Power Splitter	ZN2PD-9G	NA	Apr. 25, 2014	Apr. 24, 2015
JFW 20dB attenuation	50HF-020-SMA	NA	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 test was performed in HwaYa Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC 7450F-4.

### 3 General Information

#### 3.1 General Description of EUT

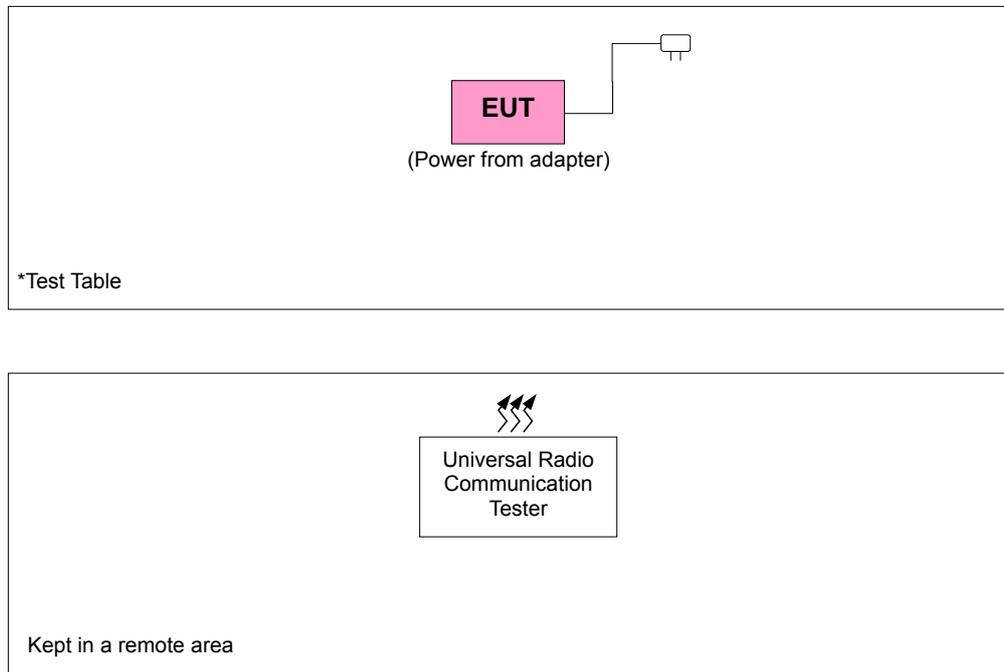
Product	Smart phone
Brand	Motorola Solutions Inc
Test Model	LEX L10
Status of EUT	Prototype
Power Supply Rating	3.7Vdc (Battery) 5Vdc (Adapter)
Mode of Operation	CDMA BC0
Modulation Type	CDMA, EVDO, 1xEVDO
Operating Frequency	824.7MHz ~ 848.31MHz
Max. ERP Power	238.781mW (23.78dBm)
Antenna Type	Inverted-L with two arms antenna with -2.77dBi gain
Antenna Connector	Coaxial connector with switch
Accessory Device	Refer to Note for more details
Data Cable Supplied	Refer to Note for more details
SW Version	M8974AAAAANLYD4050.1
HW Version	MSM-8974-1-990BPNSP-TR-01-0-AB

Note:

- The EUT contains following accessory devices and data cable.

Item	Brand	Model or P/N	Specification
Rechargeable Lithium ion battery	MOTOROLA	PMNN4472A	3.7Vdc, 2340mAh, 8.7Wh
Rechargeable Lithium ion battery	MOTOROLA	PMNN4475A	3.7Vdc, 4560mAh, 16.9Wh
ITE power supply	MOTOROLA	IU08-2050120-WP (P/N: HKTN4008A)	I/P: 100-240Vac, 50-60Hz, 0.2A O/P: 5Vdc, 1.2A
USB cable (CABLE: ES400 USB SYNC AND CHARGE)	N/A	P/N: CKN6969A	1.4m shielded cable without core
Holster	N/A	P/N: HKLN4618A	-

### 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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	Universal Radio Communication Tester	R&S	CMU200	123112	NA

NO.	Signal Cable Description Of The Above Support Units
1	NA

Note:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 acted as a communication partner to transfer data.

### 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, XYZ axis and antenna ports

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

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	1013 to 777	1013, 384, 777	CDMA
-	Frequency Stability	1013 to 777	384	CDMA
-	Occupied Bandwidth	1013 to 777	1013, 384, 777	CDMA, EVDO, 1xEVDO
-	Band Edge	1013 to 777	1013, 777	CDMA, EVDO, 1xEVDO
-	Peak To Average Ratio	1013 to 777	1013, 384, 777	CDMA, EVDO, 1xEVDO
-	Conducted Emission	1013 to 777	1013, 384, 777	CDMA, EVDO, 1xEVDO
-	Radiated Emission Below 1GHz	1013 to 777	1013	CDMA
-	Radiated Emission Above 1GHz	1013 to 777	1013, 384, 777	CDMA

#### Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	24deg. C, 63%RH	120Vac, 60Hz	Chris Lin
Frequency Stability	24deg. C, 64%RH	3.7Vdc	Match Tsui
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Radiated Emission	24deg. C, 63%RH	120Vac, 60Hz	Chris Lin

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. 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 v02r02**

**ANSI/TIA/EIA-603-C 2004**

**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

##### EIRP / ERP Measurement:

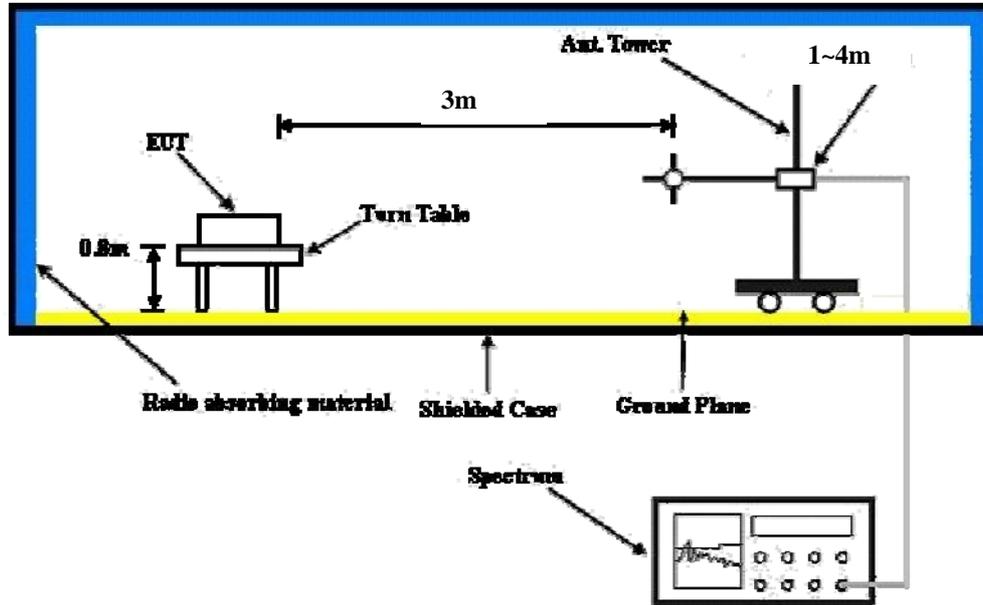
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5MHz for CDMA mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the 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 horn 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.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$ .

##### Conducted Power Measurement:

The EUT was set up for the maximum power with CDMA 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.

### 4.1.3 Test Setup

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

#### 4.1.4 Test Results

##### CONDUCTED OUTPUT POWER (dBm)

Band	CDMA2000 BC0		
Channel	1013	384	777
Frequency (MHz)	824.7	836.52	848.31
RC1+SO55	25.00	25.13	25.10
RC3+SO55	25.03	<b>25.16</b>	25.13
RC3+SO32(+ F-SCH)	25.02	25.15	25.12
RC3+SO32(+SCH)	25.00	25.13	25.10
RTAP 153.6	24.31	24.44	24.41
RETAP 4096	24.28	24.41	24.38

ERP Power (dBm)

MODE		TX channel 1013					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.70	-9.83	21.33	0.02	21.35	38.45	-17.10
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.70	-18.22	13.66	0.02	13.68	38.45	-24.77

MODE		TX channel 384					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
<b>1</b>	<b>836.52</b>	<b>-7.54</b>	<b>23.49</b>	<b>0.29</b>	<b>23.78</b>	<b>38.45</b>	<b>-14.67</b>
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.52	-17.97	13.72	0.29	14.01	38.45	-24.44

MODE		TX channel 777					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.31	-7.91	22.55	0.50	23.05	38.45	-15.40
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.31	-18.54	12.76	0.50	13.26	38.45	-25.19

NOTE: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

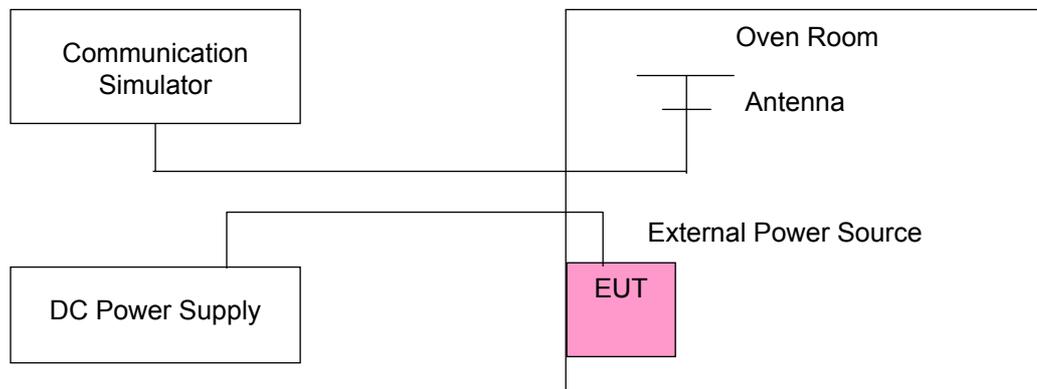
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 4.2.2 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 DC 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  $\pm 0.5$  °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.

### 4.2.3 Test Setup



#### 4.2.4 Test Results

##### Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)	Limit (ppm)
4.25	-0.014	2.5
3.70	-0.013	2.5
3.45	-0.016	2.5

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.45Vdc to 4.25Vdc.

##### Frequency Error vs. Temperature.

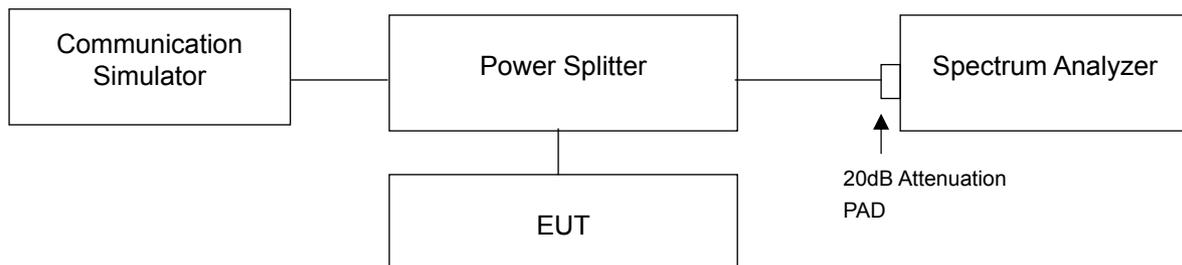
TEMP. (°C)	Frequency Error (ppm)	Limit (ppm)
60	-0.030	2.5
50	-0.031	2.5
40	-0.029	2.5
30	-0.017	2.5
20	-0.013	2.5
10	-0.023	2.5
0	-0.025	2.5
-10	-0.031	2.5
-20	-0.035	2.5

### 4.3 Occupied Bandwidth Measurement

#### 4.3.1 Test Procedure

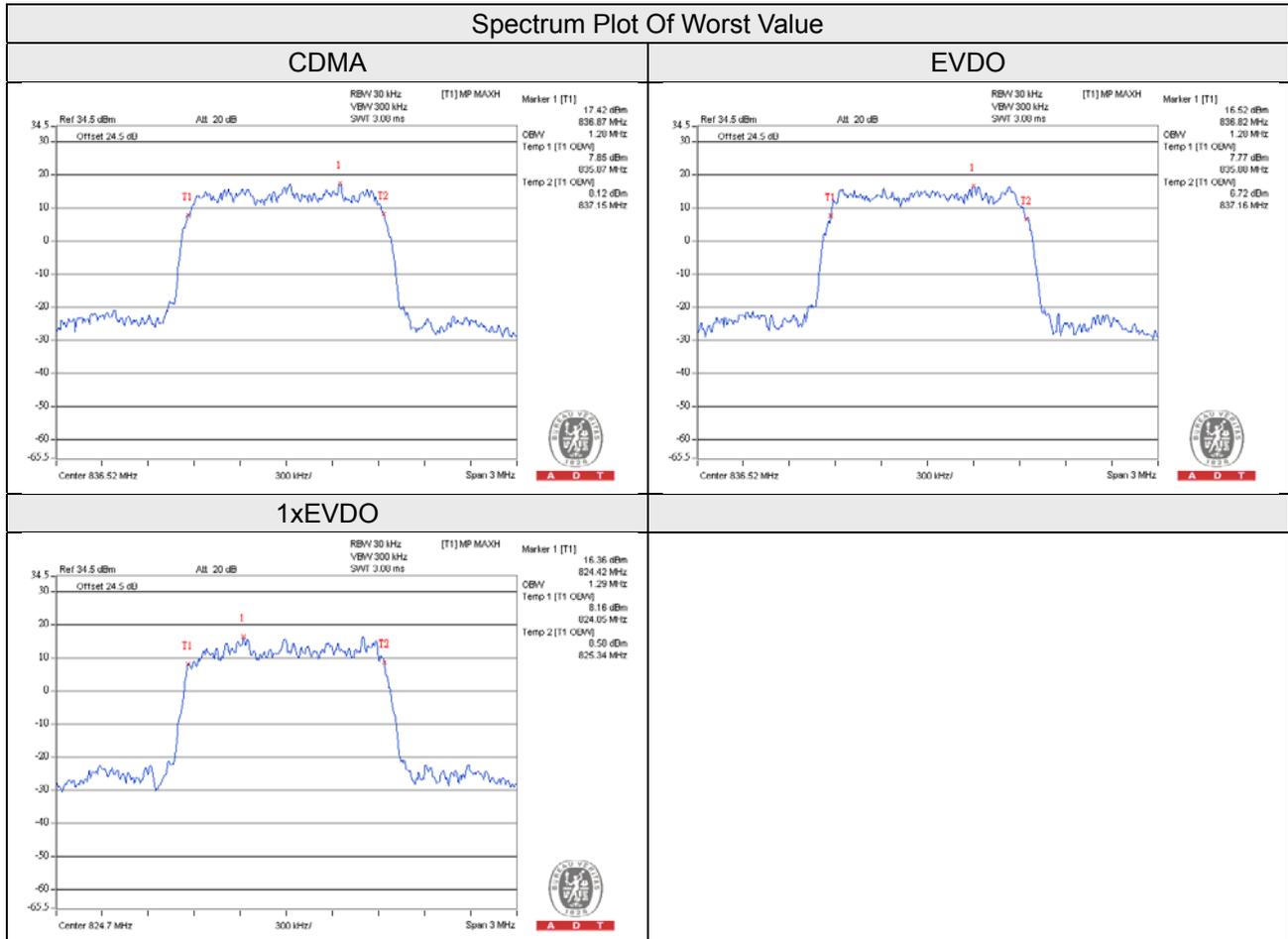
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range, RB of the spectrum is 30kHz and VB of the spectrum is 300kHz. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

#### 4.3.2 Test Setup



### 4.3.3 Test Result

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		CDMA	EVDO	1xEVDO
1013	824.70	1.27	1.27	1.29
384	836.52	1.28	1.28	1.28
777	848.31	1.27	1.28	1.26

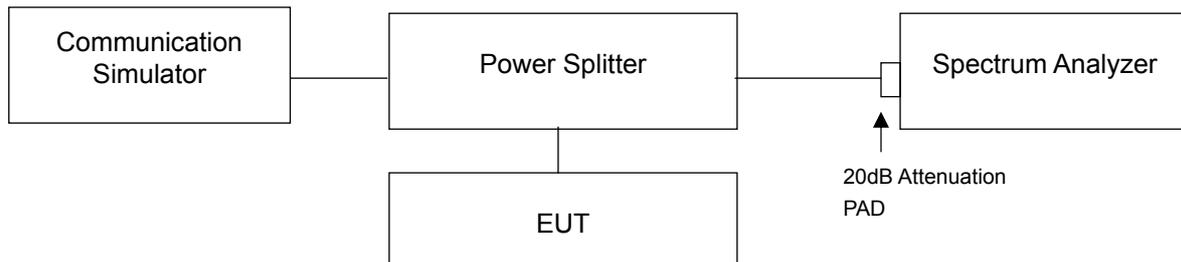


## 4.4 Band Edge Measurement

### 4.4.1 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.

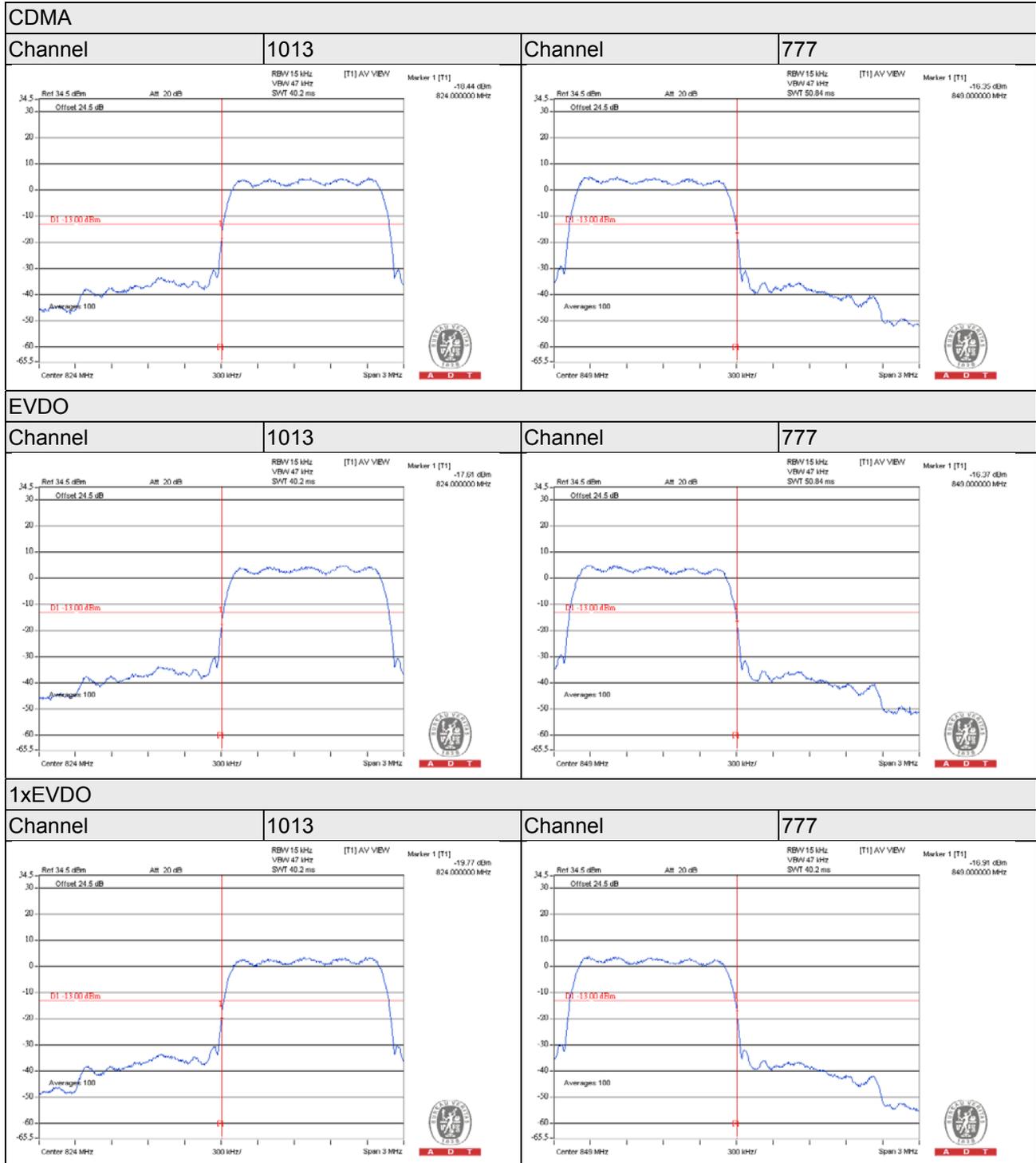
### 4.4.2 Test Setup



### 4.4.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 3MHz. RB of the spectrum is 15kHz and VB of the spectrum is 47kHz.
- Record the max trace plot into the test report.

### 4.4.4 Test Results

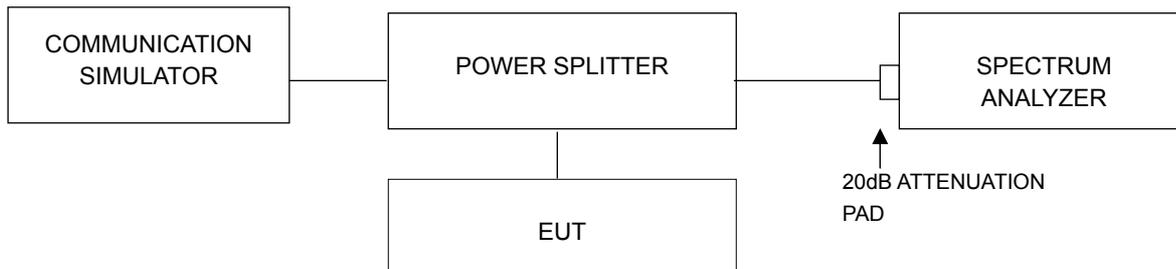


## 4.5 Peak To Average Ratio

### 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

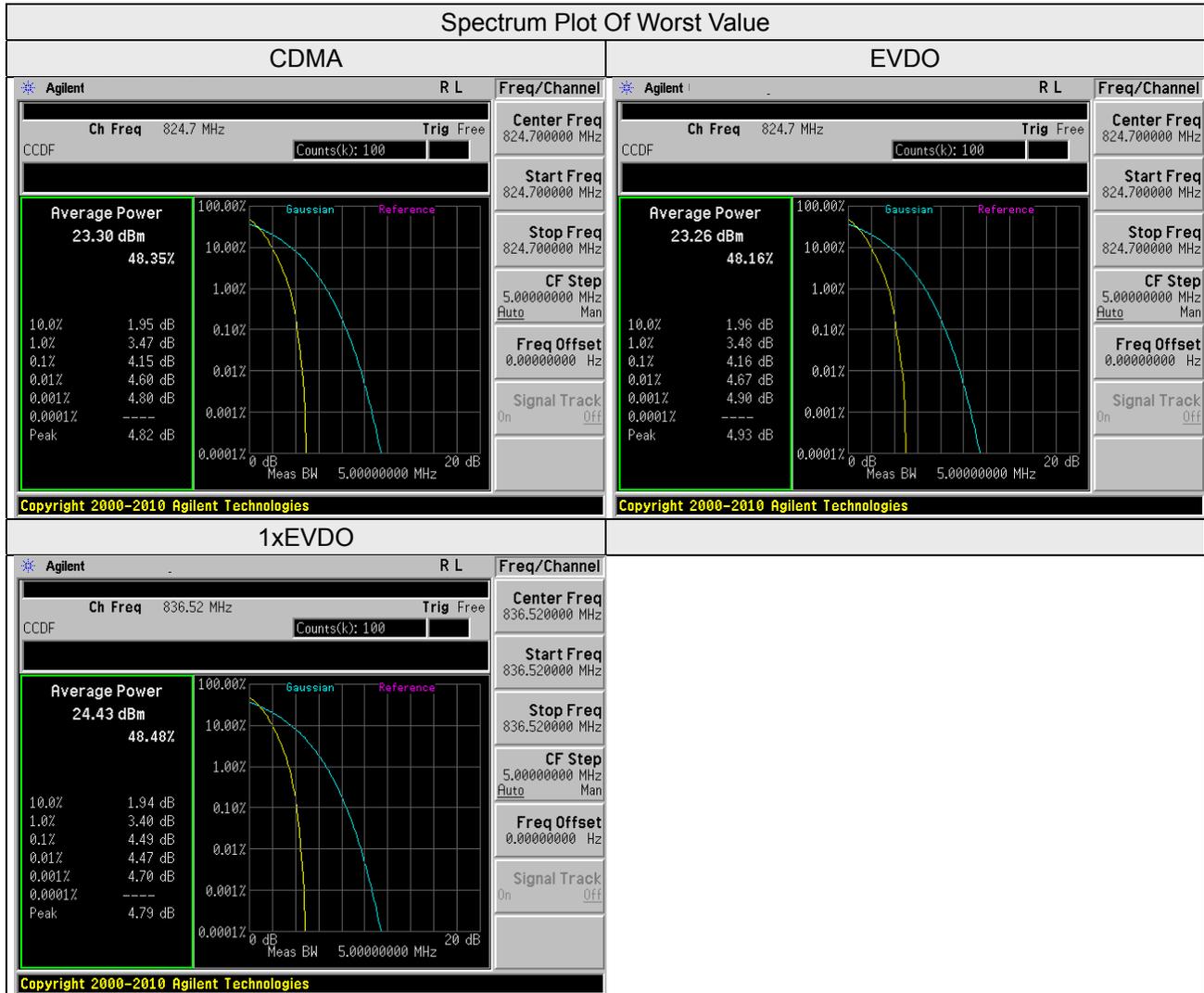


### 4.5.3 Test Procedures

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	Frequency (MHz)	Peak To Average Ratio (dB)		
		CDMA	EVDO	1xEVDO
1013	824.70	4.15	4.16	4.14
384	836.52	4.00	4.09	4.49
777	848.31	3.82	3.85	3.34

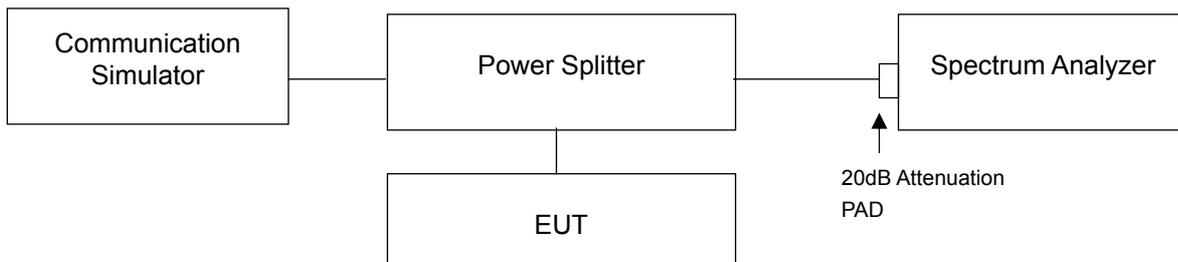


## 4.6 Conducted Spurious Emissions

### 4.6.1 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  $-13\text{dBm}$ .

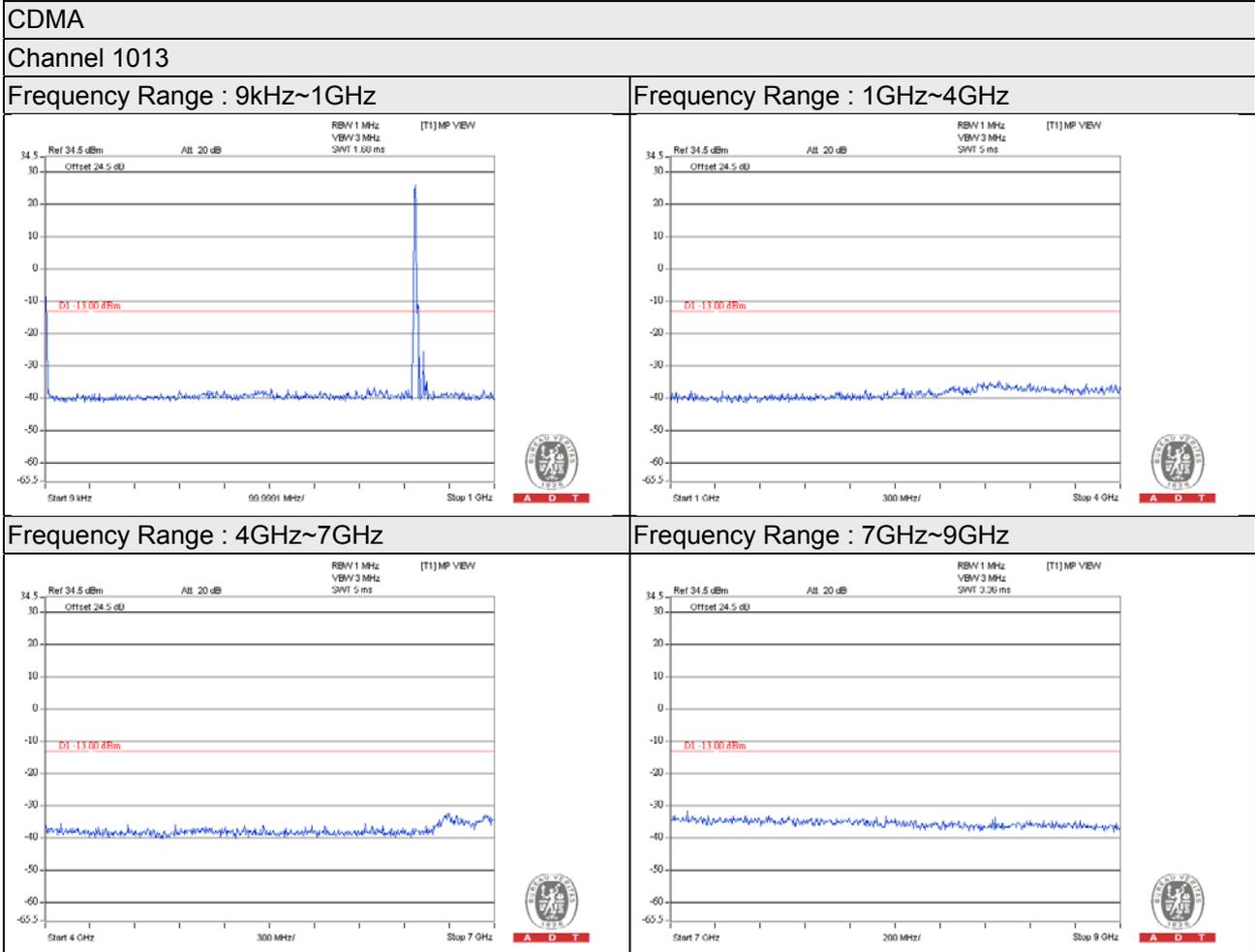
### 4.6.2 Test Setup



### 4.6.3 Test Procedure

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

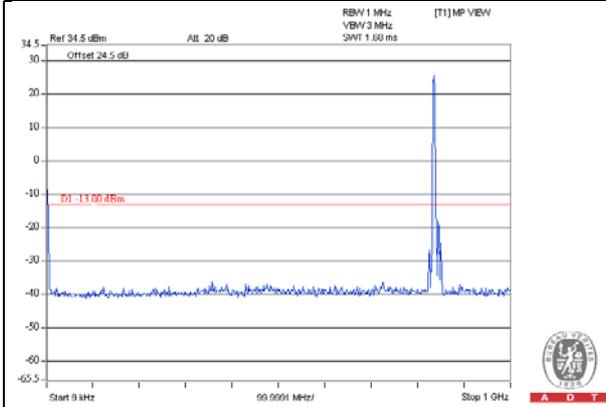
### 4.6.4 Test Results



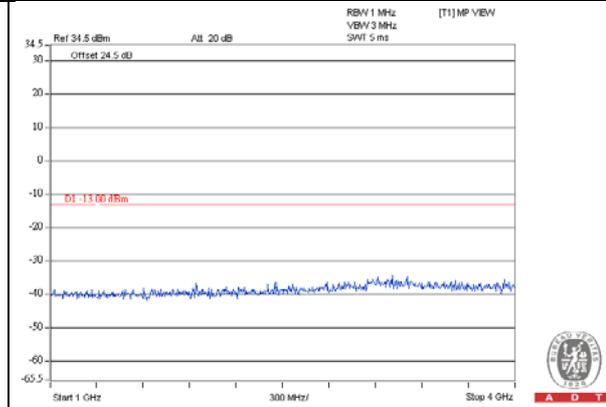
CDMA

Channel 384

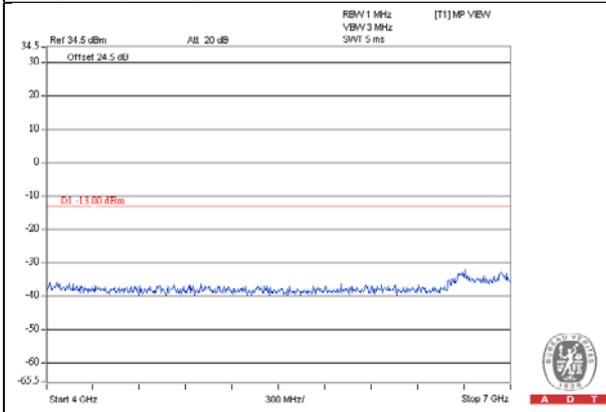
Frequency Range : 9kHz~1GHz



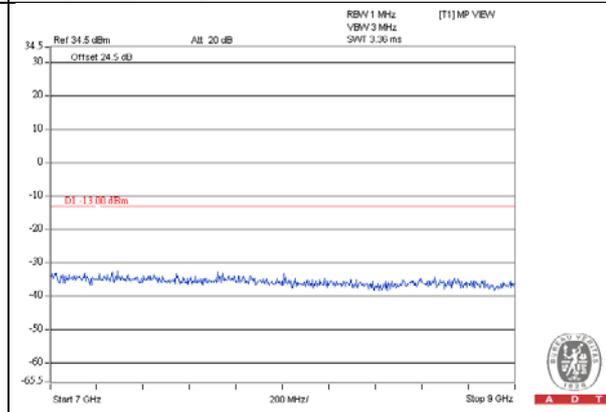
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



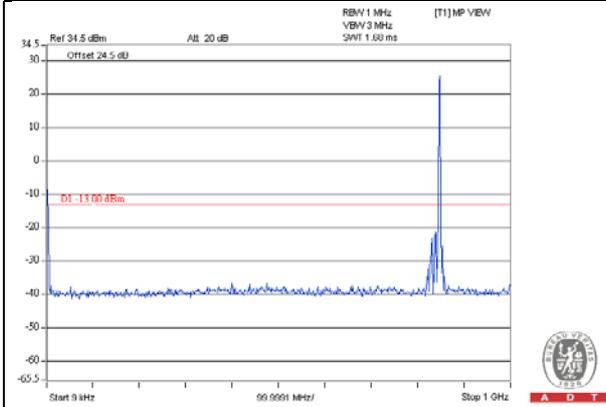
Frequency Range : 7GHz~9GHz



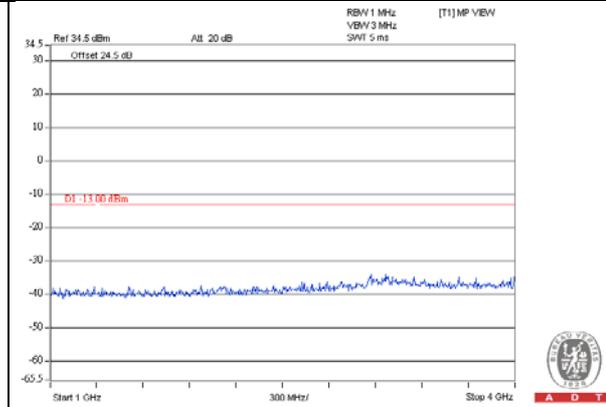
CDMA

Channel 777

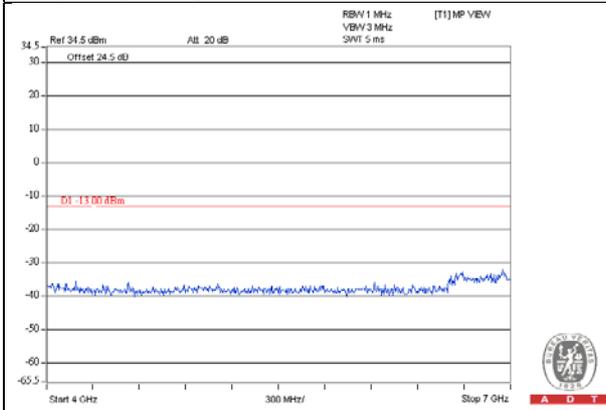
Frequency Range : 9kHz~1GHz



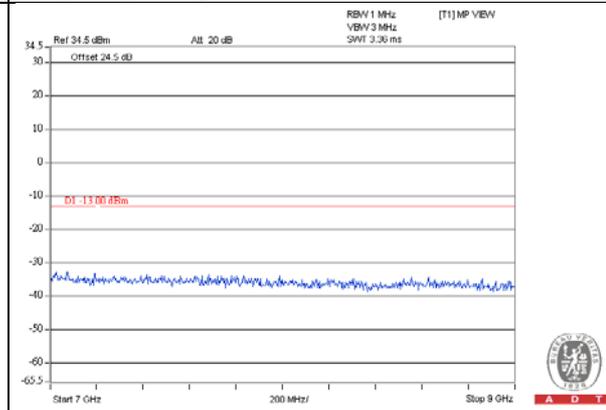
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



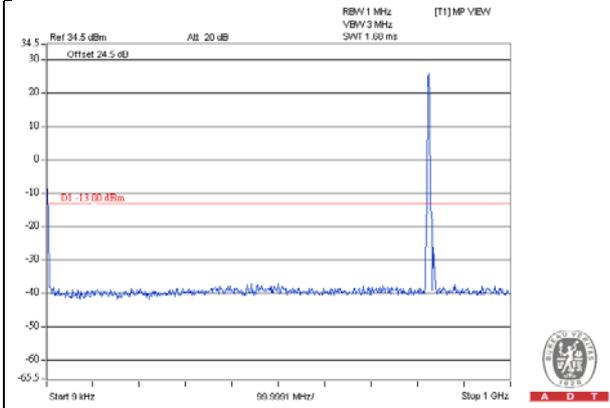
Frequency Range : 7GHz~9GHz



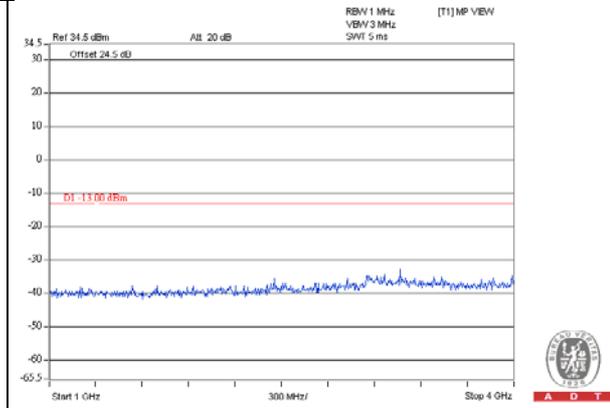
EVDO

Channel 1013

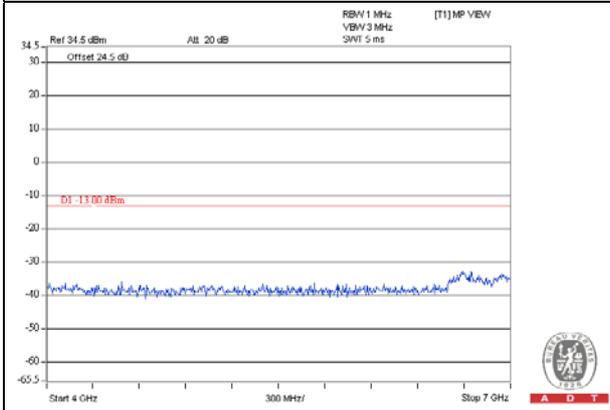
Frequency Range : 9kHz~1GHz



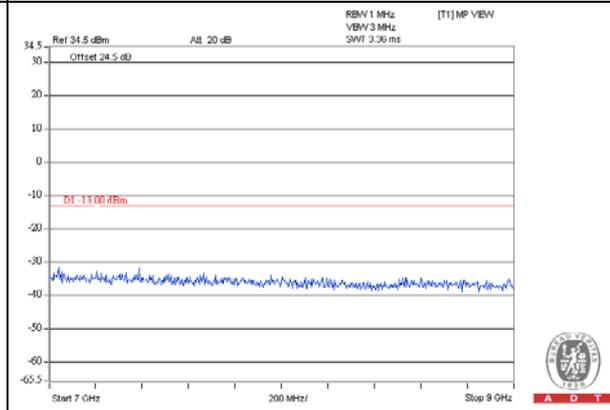
Frequency Range : 1GHz~4GHz

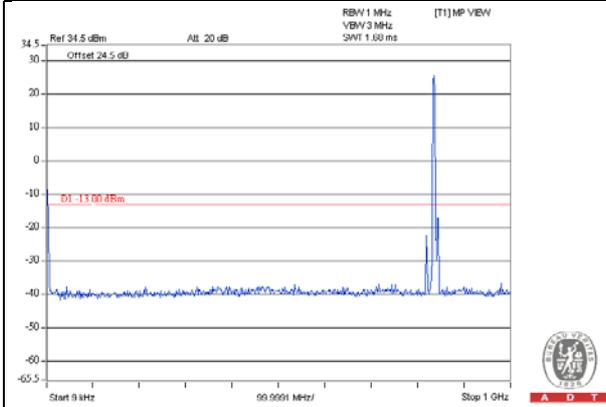
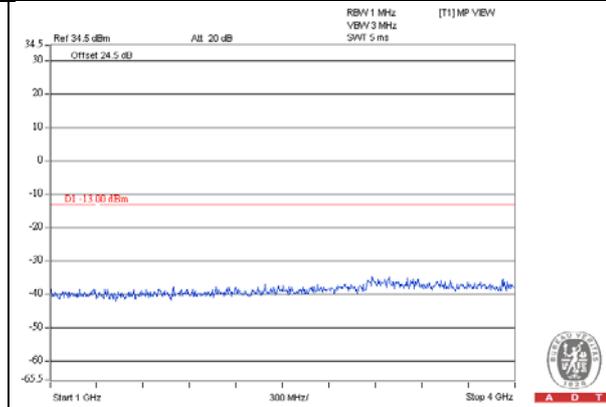
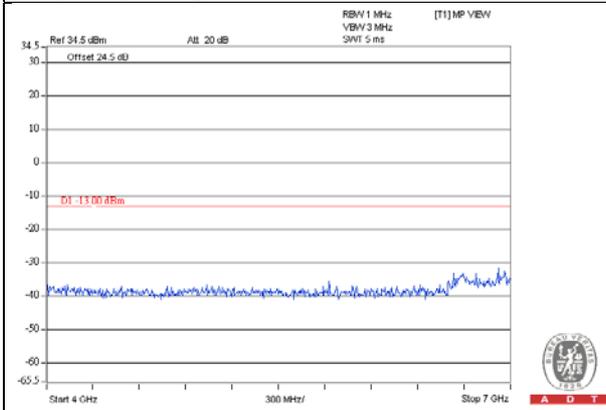
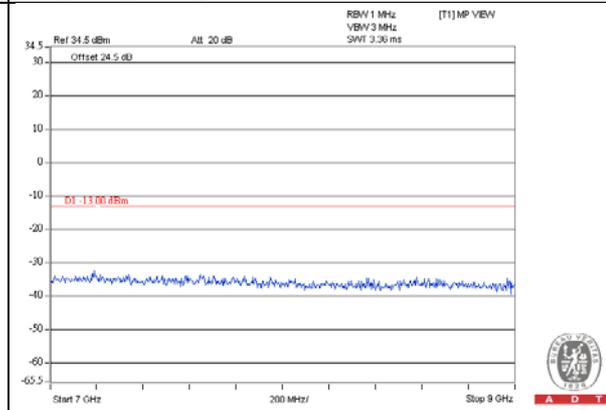


Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

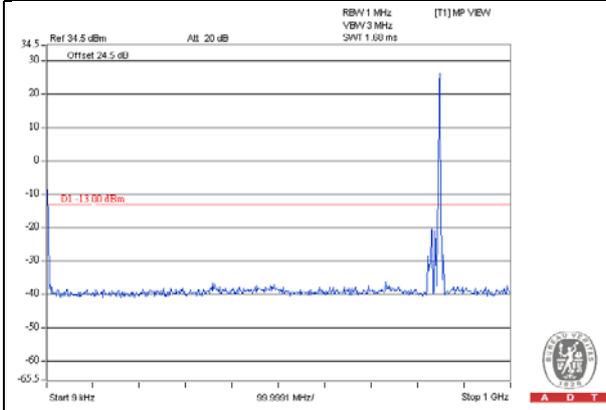


**EVDO****Channel 384****Frequency Range : 9kHz~1GHz****Frequency Range : 1GHz~4GHz****Frequency Range : 4GHz~7GHz****Frequency Range : 7GHz~9GHz**

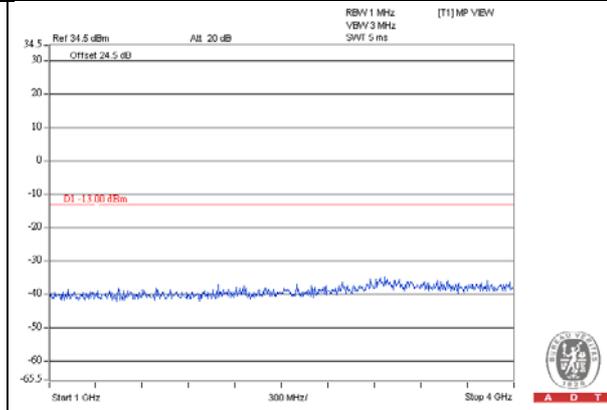
EVDO

Channel 777

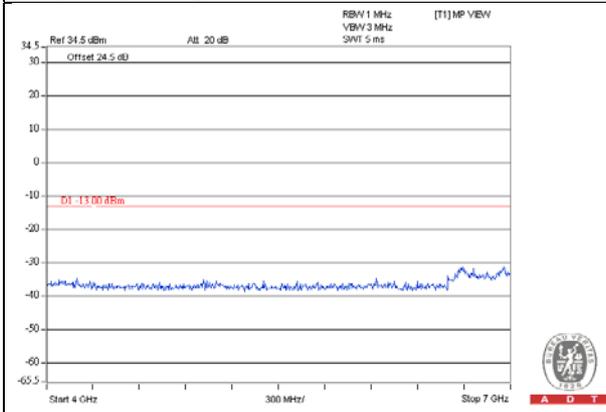
Frequency Range : 9kHz~1GHz



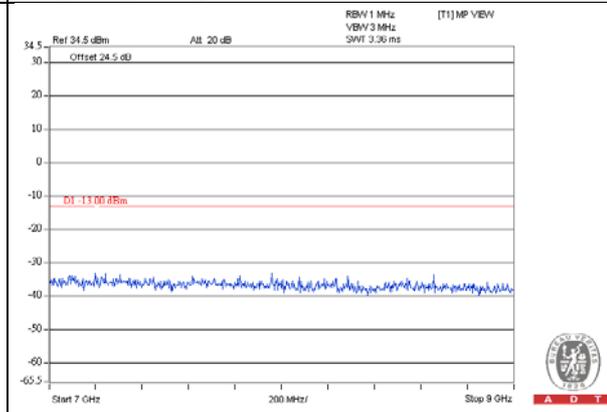
Frequency Range : 1GHz~4GHz

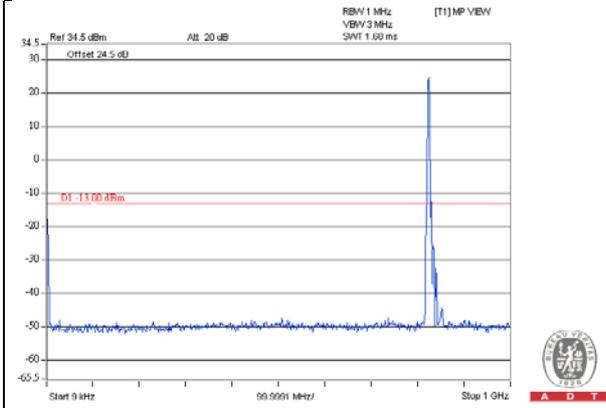
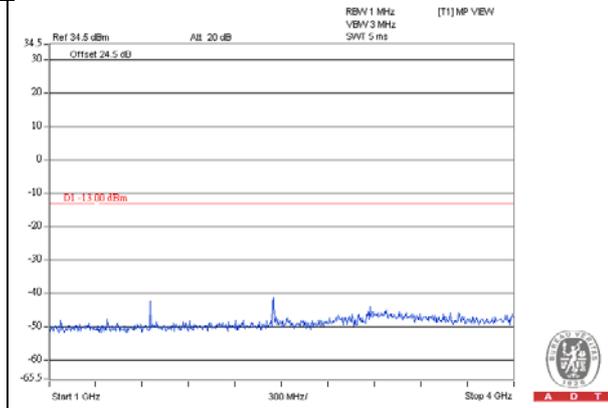
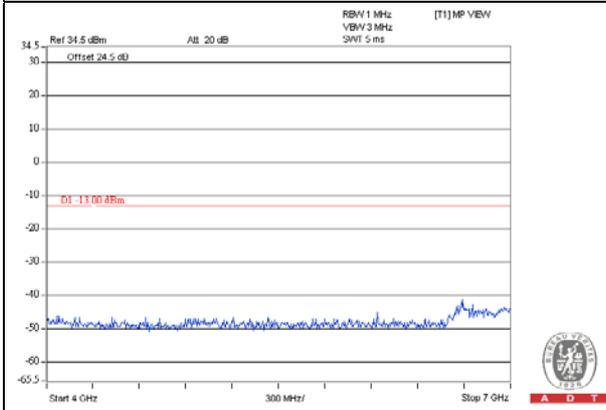
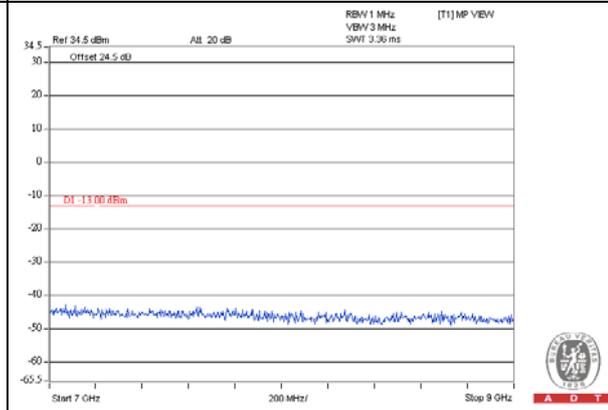


Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

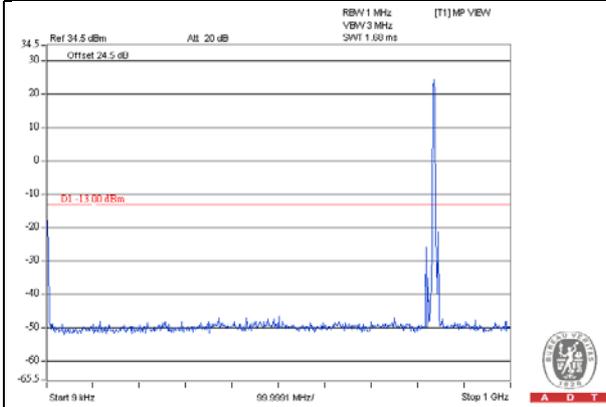


**1xEVDO****Channel 1013****Frequency Range : 9kHz~1GHz****Frequency Range : 1GHz~4GHz****Frequency Range : 4GHz~7GHz****Frequency Range : 7GHz~9GHz**

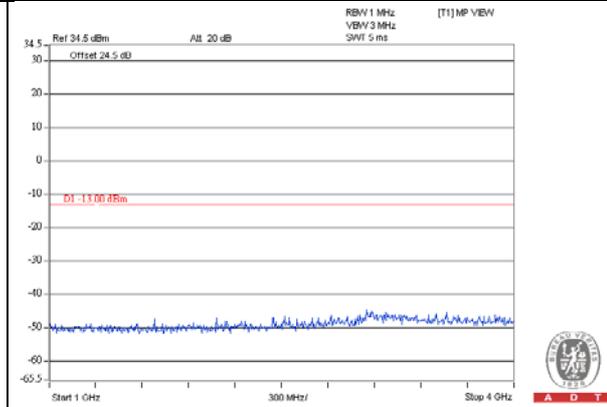
1xEVDO

Channel 384

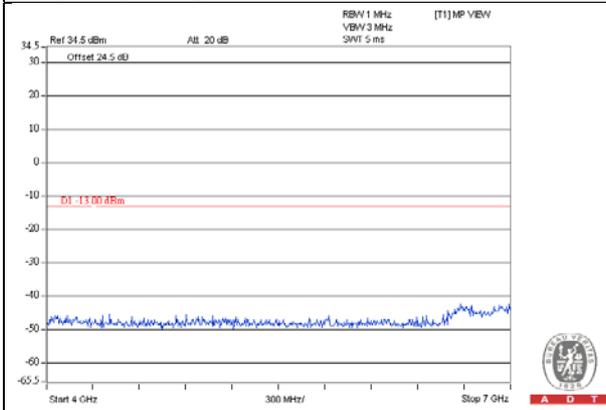
Frequency Range : 9kHz~1GHz



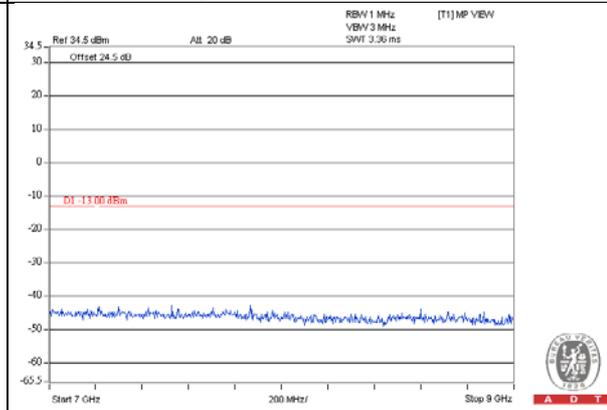
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



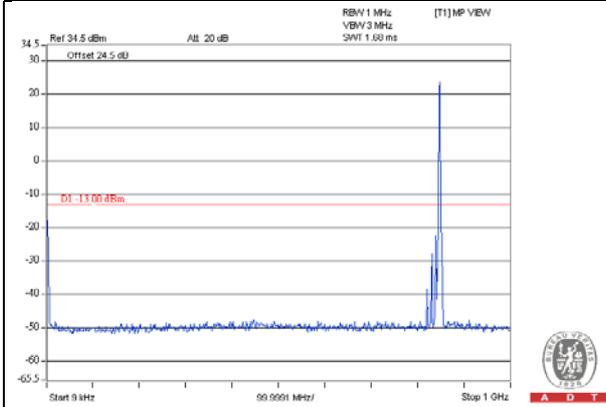
Frequency Range : 7GHz~9GHz



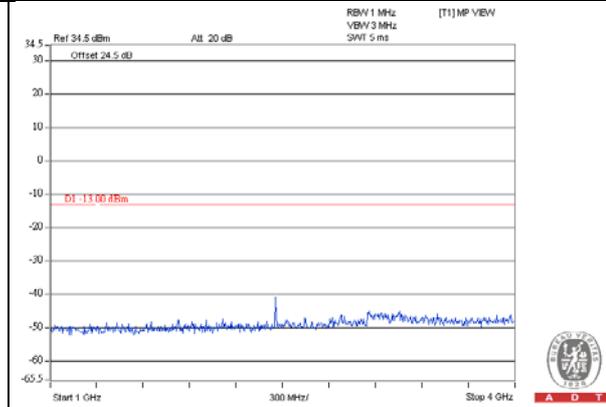
1xEVDO

Channel 777

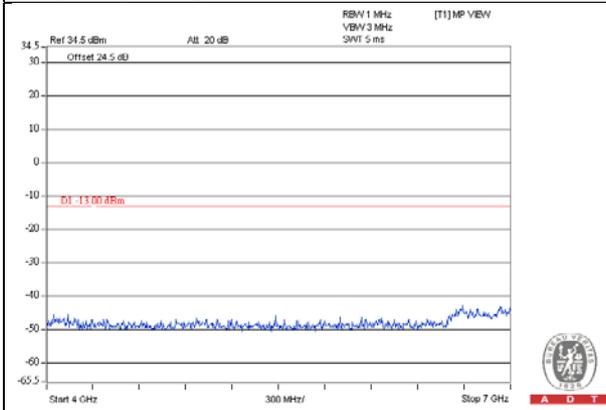
Frequency Range : 9kHz~1GHz



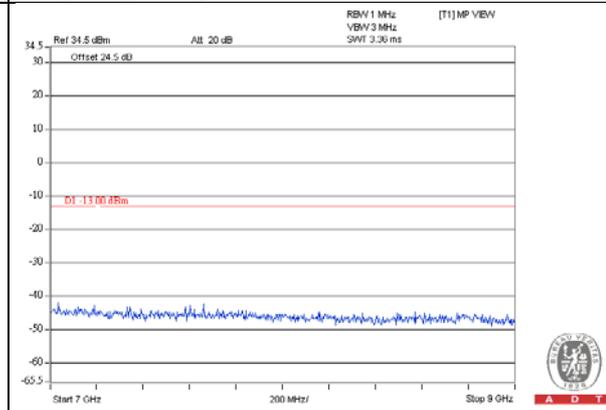
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz



## 4.7 Radiated Emission Measurement

### 4.7.1 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  $-13\text{dBm}$ .

### 4.7.2 Test Procedure

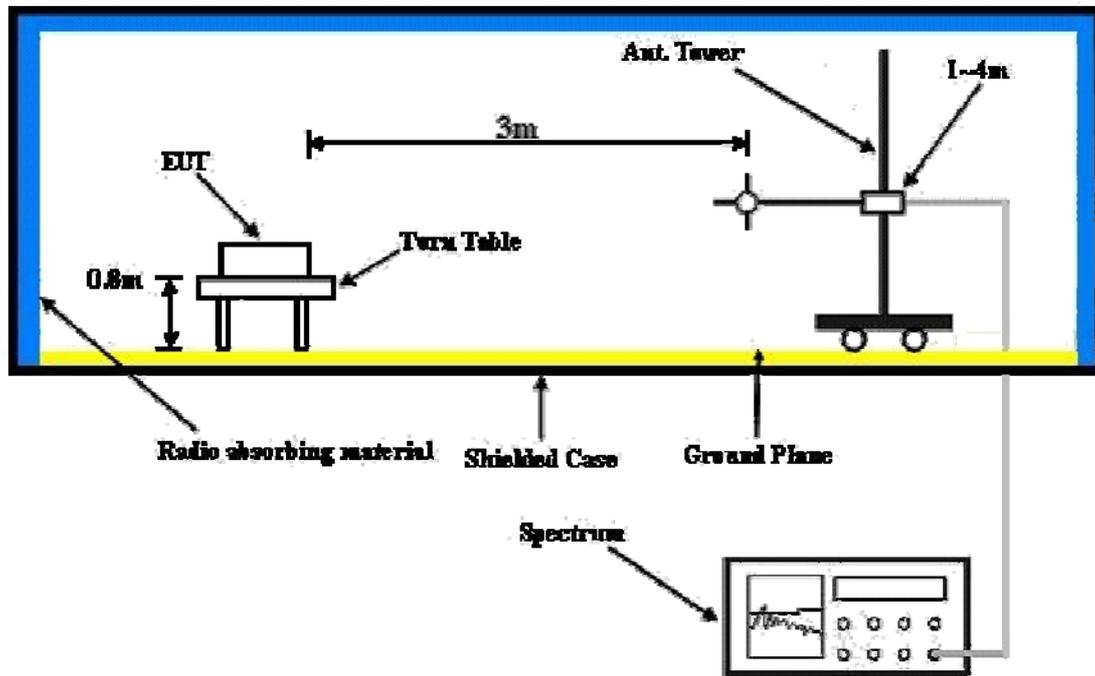
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn 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 a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$ .

**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.7.3 Deviation from Test Standard

No deviation.

#### 4.7.4 Test Setup



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



#### 4.7.5 Test Results

Below 1GHz

Mode	TX channel 1013	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 63%RH	Input Power	120Vac, 60Hz
Tested By	Chris Lin		

##### Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	86.26	-48.62	-57.60	0.09	-57.51	-13.00	-44.51
2	127.00	-50.11	-59.49	-0.06	-59.55	-13.00	-46.55
3	196.84	-52.37	-68.51	5.07	-63.44	-13.00	-50.44
4	385.02	-59.69	-68.06	5.25	-62.81	-13.00	-49.81
5	782.72	-68.76	-69.98	4.25	-65.73	-13.00	-52.73
6	937.92	-66.36	-65.31	3.92	-61.39	-13.00	-48.39

##### Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	80.44	-48.71	-52.93	-1.52	-54.45	-13.00	-41.45
2	187.14	-53.66	-61.78	3.84	-57.94	-13.00	-44.94
3	270.56	-58.71	-62.91	5.29	-57.62	-13.00	-44.62
4	633.34	-68.28	-70.44	4.70	-65.74	-13.00	-52.74
5	877.78	-68.82	-68.40	3.94	-64.46	-13.00	-51.46
6	937.92	-66.29	-63.56	3.92	-59.64	-13.00	-46.64

Remarks:

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



Above 1GHz

Mode	TX channel 1013	Frequency Range	Above 1000MHz
Environmental Conditions	24deg. C, 63%RH	Input Power	120Vac, 60Hz
Tested By	Chris Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1649.40	-54.79	-58.04	5.49	-52.55	-13.00	-39.55
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1649.40	-55.27	-56.38	5.49	-50.89	-13.00	-37.89

Remarks:

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

Mode	TX channel 384	Frequency Range	Above 1000MHz
Environmental Conditions	24deg. C, 63%RH	Input Power	120Vac, 60Hz
Tested By	Chris Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.04	-55.50	-58.55	5.54	-53.01	-13.00	-40.01
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.04	-55.90	-56.71	5.54	-51.17	-13.00	-38.17

Remarks:

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



Mode	TX channel 777	Frequency Range	Above 1000MHz
Environmental Conditions	24deg. C, 63%RH	Input Power	120Vac, 60Hz
Tested By	Chris Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1696.62	-58.14	-60.98	5.59	-55.39	-13.00	-42.39

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1696.62	-55.81	-56.33	5.59	-50.74	-13.00	-37.74

Remarks:

1. Output Power (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:

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab/Telecom Lab**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---