TEST REPORT

No. I15Z40275-EMC01

for

Asiatelco Technologies Co.

LTE Mobile hotspot

Model Name: ALM-N245

FCC ID: XYOALM-N245

with

Hardware Version: KF1030

Software Version: N245V1.0.0B03

Issued Date: 2015-06-05

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL Beijing.

Test Laboratory:

FCC 2.948 Listed: No. 525429

IC O.A.T.S listed: No. 12389A-1

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@catr.cn, website: www.chinattl.com

CONTENTS

1. Test Laboratory

1.1. Testing Location

Location 2: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

Air pressure 980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

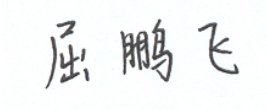
Testing Start Date: 2015-03-23

Testing End Date: 2015-03-30

1.4. Signature

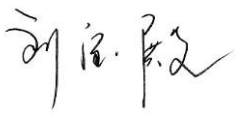
Zhang Ying

(Prepared this test report)



Qu Pengfei

(Reviewed this test report)



Liu Baodian

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Asiatelco Technologies Co.
Address /Post:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pu dong, Shanghai 201204, China
City:	Shanghai
Postal Code:	201204
Country:	China
Contact Person:	Yang Zhan
Contact Email	zyang@asiatelco.com
Telephone:	021-51688806-192
Fax:	021-33932400

2.2. Manufacturer Information

Company Name:	HUIZHOU QIAOXING TELECOMMUNICATION INDUSTRY CO.,LTD
Address /Post:	Huizhou Qiaoxing Industrial Park, Tangquan, Huizhou City, Guan gdong Province,P.R.C
City:	Guangdong
Postal Code:	516023
Country:	China
Telephone:	0752-2820345 2820322
Fax:	0752-2820377

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	CDMA Band class 0/Band class 1 1X RTT、EV-DO LTE FDD bands 2/4/5/12/25/26, TDD band 41 WLAN (802.11 b/g/n)
FCC ID	XYOALM-N245
Antenna	Internal
Power supply	Battery (charged by travel adapter or vehicle charger)
Extreme vol. Limits	3.4VDC to 4.2VDC (nominal: 3.7VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	863867020576672	KF1030	N245V1.0.0B03

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Revision
AE1	Battery	/	/
AE2	Battery	/	/

AE1, AE2

Model name	N-1800
Manufacturer	Heyuan New Lingjia Electroacoustic Co.,Ltd
Minimum Capacitance	1800mAh
Nominal Voltage	3.7 V

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) is a model of LTE Mobile hotspot with integrated antenna.
The EUT supports Band class 0/Band class 1, supports 1X RTT、EV-DO. It has WLAN (802.11 b/g/n) functions.
Manual and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the client.

3.5. EUT set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 + AE1	ERP/EIRP/RSE tests

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-14 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-14 Edition
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r01

5. LABORATORY ENVIRONMENT

Fully-anechoic chamber FAC-3 (9 meters×6.5 meters×4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

CDMA800

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	22.913(a.2)	5.4	A.1	2
2	Emission Limit	22.917(a), 2.1051	5.5	A.2	2

CDMA1900

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	24.232(c)	5.4	A.1	2
2	Emission Limit	24.238(a), 2.1051	5.5	A.2	2

6.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by TMC according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1.

This report only deals with the CDMA functions among the features described in section 3.

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	EMI Antenna	VULB 9163	9163-235	Schwarzbeck	2017-10-29	3 Years
2.	EMI Antenna	3117	ETS-Lindgren	00119024	2016-01-20	3 Years
3.	EMI Antenna	9117	Schwarzbeck	167	2016-04-01	3 Years
4.	EMI Antenna	3117	ETS-Lindgren	00058888	2017-04-20	3 Years
5.	Signal Generator	N5183A	MY49060052	Agilent	2016-03-02	1 Year
6.	Power Amplifier	5S1G4	0341863	AR	/	1 Year
7.	Universal Radio Communication Tester	CMW500	116588	R&S	2015-10-23	1 Year
8.	Spectrum Analyzer	E4440A	MY48250642	Agilent	2016-03-02	1 Year

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 22.913 and 24.232

A.1.1 Summary

During the process of testing, the EUT was controlled via Agilent Universal Radio Communication Tester (E5515C) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Radiated

A.1.2.1 Description

This is the test for the maximum radiated power from the EUT.

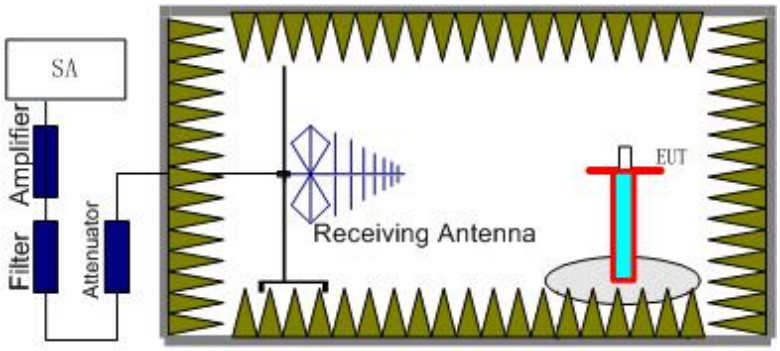
Rule Part 22.913(a)(2) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

Rule Part 24.232 specifies, "Mobile/portable stations are limited to 2 watts EIRP. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

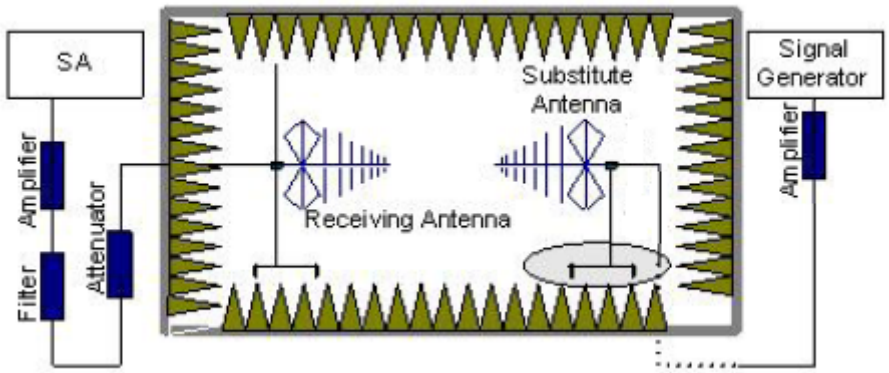
A.1.2.2 Method of Measurement

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.
   The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power (EIRP) = P_{Mea} - P_{Ag} - P_{cl} - G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (Unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15.

CDMA800- ERP

Limits

Band	Peak ERP (dBm)
CDMA800(BC0)	≤38.45dBm (7W)

Measurement result

1x RTT

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Peak ERP(dBm)	Polarization
824.70	-23.04	2.26	-45.79	-0.95	19.29	Horizontal
836.52	-20.04	2.26	-45.66	-0.82	**22.03**	Horizontal
848.31	-19.96	2.27	-45.55	-0.80	21.97	Vertical

Sample calculation: 836.52MHz

Peak ERP (dBm) = P_{Mea}(-20.04dBm) - G_a (-0.82dBi) - P_{Ag} (-45.66 dB) - P_{cl} (2.26 dB) – 2.15dBm
= 22.03 dBm

Ev-Do

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	RMS ERP(dBm)	Polarization
824.70	-22.80	2.26	-45.79	-0.95	19.53	Horizontal
836.52	-19.54	2.26	-45.66	-0.82	**22.53**	Horizontal
848.31	-18.80	2.27	-45.55	-0.80	23.13	Vertical

Sample calculation: 836.52MHz

Peak ERP (dBm) = P_{Mea}(-19.54dBm) - G_a (-0.82dBi) - P_{Ag} (-45.66 dB) - P_{cl} (2.26 dB) – 2.15dBm
= 22.53 dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Note: Expanded measurement uncertainty for CDMA800 (BC0) is *U* = 1.07dB, *k* = 2.

CDMA1900- EIRP

Limits

Band	Peak EIRP (dBm)
CDMA1900(BC1)	≤33dBm (2W)

Measurement result

1x RTT

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Peak EIRP(dBm)	Polarization
1851.25	-23.32	2.91	-43.74	-4.87	22.38	Horizontal
1880.00	-21.18	2.85	-43.75	-4.82	24.54	Vertical
1908.75	-20.14	2.86	-43.77	-4.76	**25.53**	Horizontal

Sample calculation: 1880.00MHz

Peak EIRP (dBm) = P_{Mea}(-20.14dBm) - G_a (-4.76dBi) - P_{Ag} (-43.77 dB) - P_{cl} (2.86dB)
= 25.53 dBm

Ev-Do

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	RMS EIRP(dBm)	Polarization
1851.25	-22.63	2.91	-43.74	-4.87	23.07	Vertical
1880.00	-21.43	2.85	-43.75	-4.82	24.29	Vertical
1908.75	-20.06	2.86	-43.77	-4.76	**25.61**	Horizontal

Sample calculation: 1908.75MHz

Peak EIRP (dBm) = P_{Mea}(-20.06dBm) - G_a (-4.76dBi) - P_{Ag} (-43.77 dB) - P_{cl} (2.86dB)
= 25.61 dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Note: Expanded measurement uncertainty for CDMA1900 (BC1) is *U* = 1.07dB, k=2.

A.2 EMISSION LIMT

Reference

FCC: CFR 2.1051, Part 22.917(a), 24.238(a).

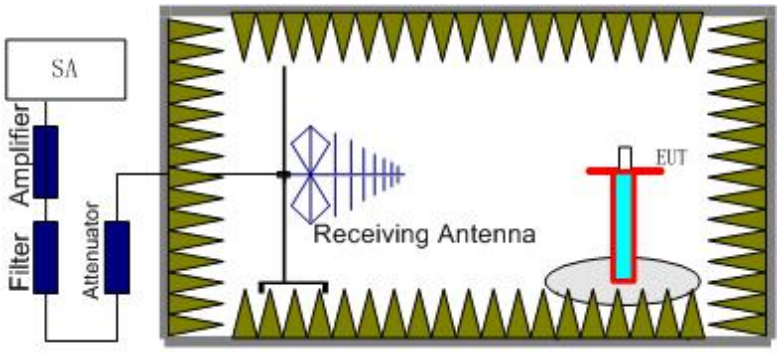
A.2.1 Measurement Method

The measurements procedures in TIA-603C-2004 are used. This measurement is carried out in fully-anechoic chamber 3.

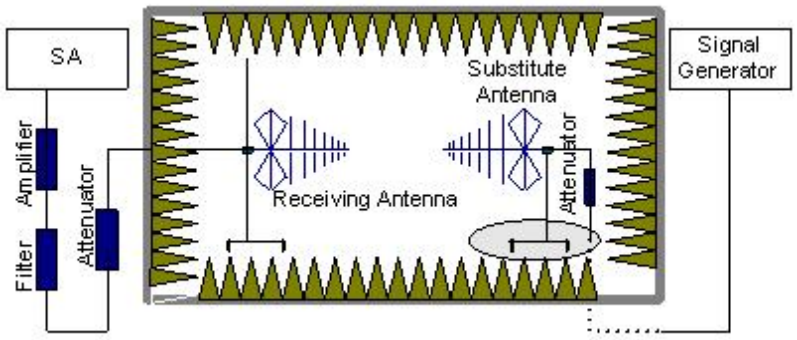
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 22.917(a) and 24.238(a). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of CDMA800 and CDMA 1900.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.
   An amplifier should be connected in for the test.
   The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power (EIRP) = P_{Mea}+ P_{pl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dB.

A.2.2 Measurement Limit

Part 22.917(a) and 24.238(a) all specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the CDMA BC0 (836.52MHz, 848.31MHz and 824.7MHz) and CDMA BC1 (1851.25MHz, 1880.00MHz and 1908.75 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the CDMA BC0 or CDMA BC1 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The worst case

CDMA BC0, Channel 384/836.52MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak ERP (dBm)	Limit （dBm）	Polarity
1673.72	-25.00	3.54	-5.19	-25.50	-13.00	Vertical
3644.05	-55.98	5.49	-8.40	-55.22	-13.00	Horizontal
4615.13	-57.44	5.91	-9.52	-55.98	-13.00	Horizontal
5537.23	-59.09	6.65	-10.59	-57.30	-13.00	Vertical
8041.43	-55.20	7.59	-12.63	-52.31	-13.00	Vertical
9197.98	-49.47	8.01	-13.22	-46.41	-13.00	Vertical

CDMA BC0, Channel 777/848.31MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak ERP (dBm)	Limit （dBm）	Polarity
1697.44	-23.64	3.45	-5.14	-24.10	-13.00	Vertical
3692.99	-55.59	5.35	-8.47	-54.62	-13.00	Horizontal
4453.39	-57.66	5.92	-9.35	-56.38	-13.00	Vertical
5346.22	-57.60	6.61	-10.38	-55.98	-13.00	Vertical
7437.15	-57.35	7.14	-12.12	-54.52	-13.00	Vertical
8672.12	-57.19	7.71	-13.03	-54.02	-13.00	Horizontal

CDMA BC0, Channel 1013/824.7MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak ERP (dBm)	Limit （dBm）	Polarity
1650.06	-26.54	3.42	-5.23	-26.88	-13.00	Vertical
3396.76	-56.22	5.50	-7.95	-55.92	-13.00	Vertical
4012.96	-57.33	5.71	-8.91	-56.28	-13.00	Vertical
5383.90	-59.36	6.61	-10.44	-57.68	-13.00	Vertical
6324.32	-57.61	6.92	-10.82	-55.86	-13.00	Horizontal
9268.71	-56.74	8.37	-13.26	-54.00	-13.00	Vertical

CDMA BC1, Channel 25/1851.25MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarity
3702.20	-48.95	5.35	-8.48	-45.82	-13.00	Horizontal
5552.75	-43.97	6.59	-10.59	-39.97	-13.00	Horizontal
7403.51	-47.26	7.21	-12.08	-42.39	-13.00	Vertical
9256.21	-46.97	8.35	-13.25	-42.07	-13.00	Vertical
11109.99	-46.16	8.91	-13.18	-41.89	-13.00	Vertical
12960.78	-44.52	9.51	-13.48	-40.55	-13.00	Vertical

CDMA BC1, Channel 600/1880.00MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarity
3759.28	-44.81	5.14	-8.56	-41.39	-13.00	Horizontal
5640.96	-50.36	6.85	-10.57	-46.64	-13.00	Horizontal
7518.61	-50.44	7.52	-12.21	-45.75	-13.00	Vertical
9774.92	-55.80	8.17	-13.13	-50.84	-13.00	Vertical
13293.38	-48.01	9.87	-13.91	-43.97	-13.00	Horizontal
14278.93	-48.52	10.16	-14.44	-44.24	-13.00	Horizontal

CDMA BC1, Channel 1175/1908.75MHz

Frequency (MHz)	P_{Mea} (dBm)	P_{pl} (dB)	G_a (dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarity
3817.53	-46.46	5.45	-8.64	-43.27	-13.00	Horizontal
5727.24	-49.86	6.76	-10.55	-46.07	-13.00	Horizontal
7433.25	-55.57	7.17	-12.12	-50.62	-13.00	Vertical
9607.89	-56.74	8.56	-13.29	-52.01	-13.00	Horizontal
11358.25	-52.71	9.15	-13.13	-48.73	-13.00	Vertical
13197.50	-49.13	9.77	-13.78	-45.12	-13.00	Horizontal

Note: Expanded measurement uncertainty for this test item is U = 4.2 dB, k = 2.

*****END OF REPORT*****