Variant FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	WiMAX EVDO Dual Mode USB Modem
BRAND NAME	:	ZTE
MODEL NAME	:	U226
FCC ID	:	Q78-ZTEAD226
STANDARD	:	47 CFR Part 2, 27(M)
CLASSIFICATION	:	Licensed Non-Broadcast Station Transmitter (TNB)
TX FREQUENCY RANGE	:	2496 MHz ~ 2690 MHz
Rx FREQUENCY RANGE	:	2496 MHz ~ 2690 MHz
MAX. EIRP POWER	:	0.10 W (QPSK, BW 5MHz) 0.10 W (QPSK, BW 10MHz) 0.10 W (16QAM, BW 5MHz) 0.10 W (16QAM, BW 10MHz)

This is a variant report which is only valid combined with the original test report. The product was received on Mar. 18, 2010 and completely tested on Mar. 25, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and 47 CFR FCC Part 27 Subpart M and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Roy Wu

Roy Wu / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW9N2716-01	Rev. 01	This is a variant report, which is based on Sporton Report Number FW9N2716 as Appendix D. The product equality declaration of ZTE for the differences is as Appendix C. It was retested and verified radiated spurious emission and EIRP tests for the differences.	Apr. 09, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§27.50	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.2	§2.1053 §27.53	Field Strength of Spurious Radiation	< $55+10\log_{10}$(P[Watts])	PASS	Under limit 3.24 dB at 7779 MHz

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	WiMAX EVDO Dual Mode USB Modem
Brand Name	ZTE
Model Name	U226
FCC ID	Q78-ZTEAD226
Tx Frequency	2496 MHz ~ 2690 MHz
Rx Frequency	2496 MHz ~ 2690 MHz
Channel Bandwidth	5MHz / 10MHz
Maximum EIRP	0.10 W (19.80 dBm) (QPSK, BW 5MHz) 0.10 W (19.89 dBm) (QPSK, BW 10MHz) 0.10 W (19.95 dBm) (16QAM, BW 5MHz) 0.10 W (20.01 dBm) (16QAM, BW 10MHz)
Antenna Type	Monopole Antenna
Type of Modulation	Uplink : OFDMA (QPSK / 16QAM)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, the test report will be issued separately.
2. This test report recorded only product characteristics and test results of Licensed Non-Broadcast Station Transmitter (TNB).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	**FCC / IC Registration No.**
	03CH07-HY	TW1022 / 4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 27(M)
- ANSI C63.4-2003
- ANSI TIA-603-C-2004

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	VSG (System Simulator)	Agilent	E6651A	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Acer	Z12	FCC DoC	N/Ac	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2 Test Configuration of Equipment Under Test

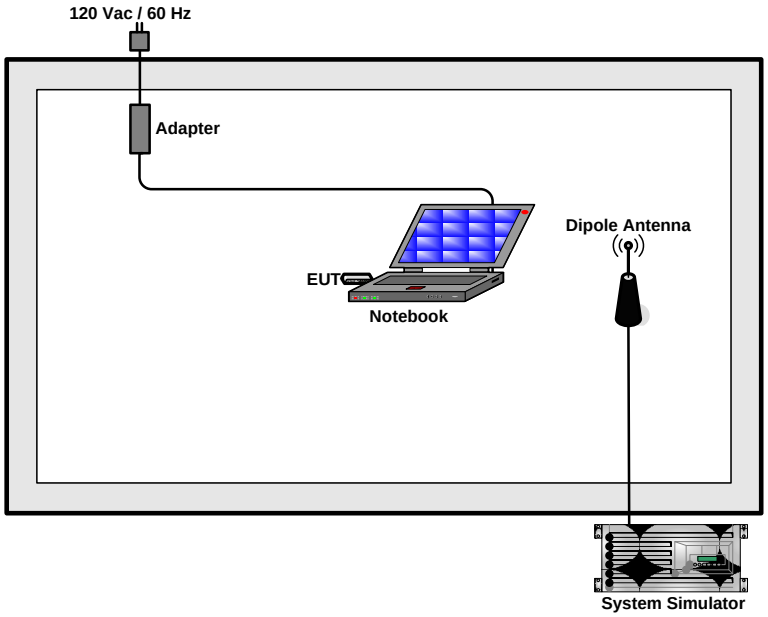
2.1 Test Mode

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Test Modes	
Band	**Radiated TCs**
802.16e (Modulation : OFDMA)	■ QPSK, BW 5MHz Link ■ QPSK, BW 10MHz Link ■ 16QAM, BW 5MHz Link ■ 16QAM, BW 10MHz Link

Note: The test matrix was based on the worst case in Sporton Report Number FW9N2716 shown in Appendix D.

2.2 Connection Diagram of Test System



3 Test Result

3.1 Effective Isotropic Radiated Power Measurement

3.1.1 Limit

For mobile and other user stations, mobile stations are limited to 2.0 watts EIRP and all user stations are limited to 2.0 watts transmitter output power.

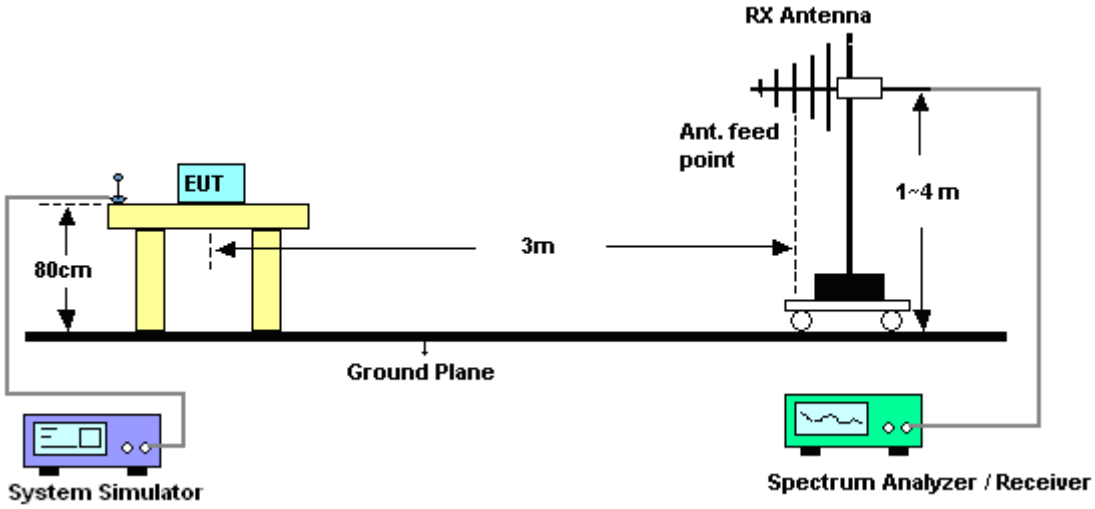
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m.
2. During the measurement, the EUT was enforced in maximum power. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP= LVL + Correction factor.

3.1.4 Test Setup



3.1.5 Test Result of Effective Isotropic Radiated Power

802.16e (QPSK, BW 5MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-24.05	43.85	19.80	0.10
Middle	-24.41	44.06	19.65	0.09
High	-24.69	44.26	19.57	0.09
Vertical Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-27.41	45.55	18.14	0.07
Middle	-29.42	46.72	17.30	0.05
High	-27.92	45.48	17.56	0.06

802.16e (QPSK, BW 10MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-23.96	43.85	19.89	0.10
Middle	-24.72	44.06	19.34	0.09
High	-25.50	44.26	18.76	0.08
Vertical Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-27.31	45.55	18.24	0.07
Middle	-29.77	46.72	16.95	0.05
High	-28.45	45.48	17.03	0.05

802.16e (16QAM, BW 5MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-23.90	43.85	19.95	0.10
Middle	-24.39	44.06	19.67	0.09
High	-24.82	44.26	19.44	0.09
Vertical Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-27.33	45.55	18.22	0.07
Middle	-29.32	46.72	17.40	0.05
High	-27.93	45.48	17.55	0.06

802.16e (16QAM, BW 10MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-23.84	43.85	20.01	0.10
Middle	-24.75	44.06	19.31	0.09
High	-25.40	44.26	18.86	0.08
Vertical Polarization				
Channel	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
Low	-27.38	45.55	18.17	0.07
Middle	-29.69	46.72	17.03	0.05
High	-28.48	45.48	17.00	0.05

3.2 Radiated Emissions Measurement

3.2.1 Description of Radiated Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and 55 + 10 log (P) dB at 5.5 MHz from the channel edges. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

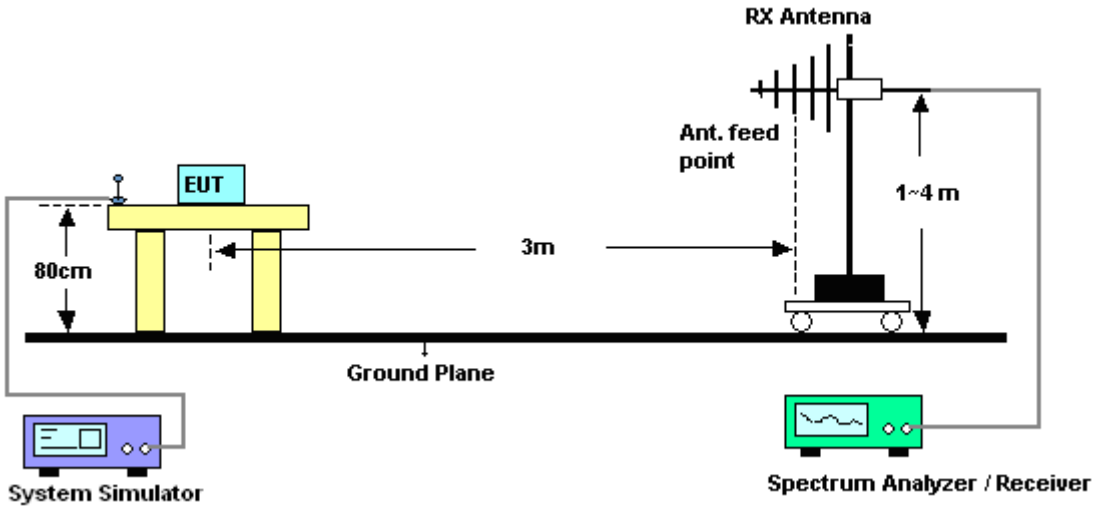
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

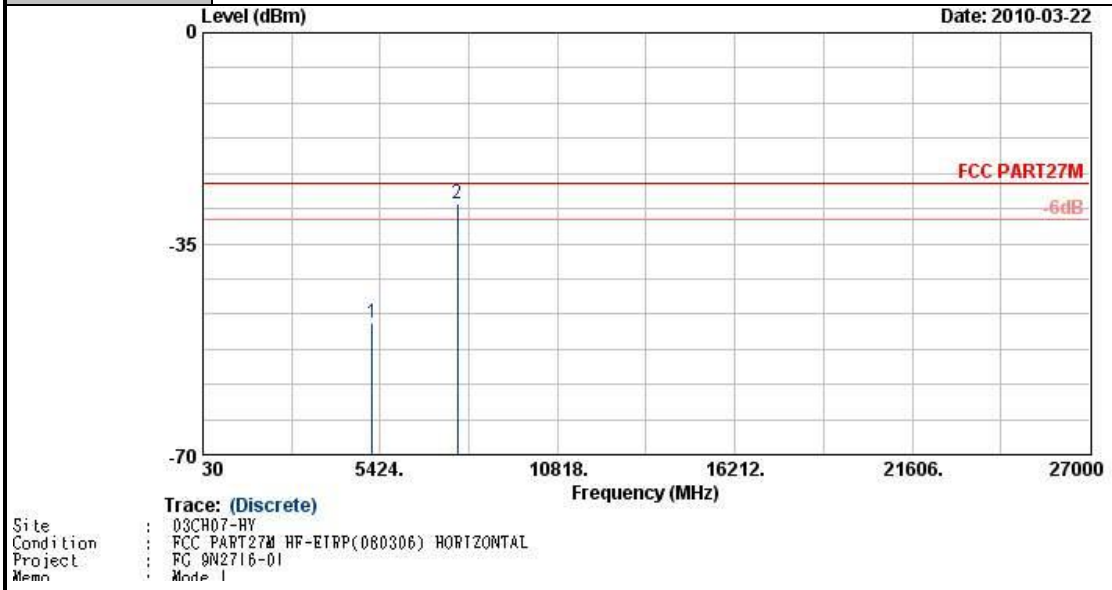
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 1MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

3.2.4 Test Setup



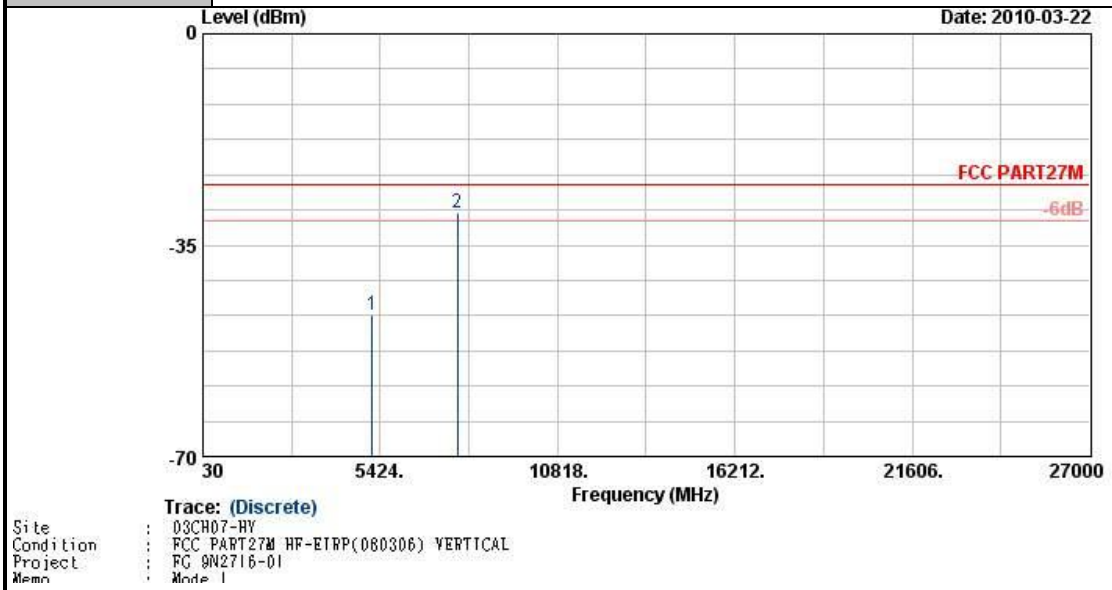
3.2.5 Test Result of Radiated Emissions

Band :	802.16e	**Temperature :**	23~24°C
Test Mode :	QPSK, BW 5MHz, Middle Ch (2593MHz)	**Relative Humidity :**	48~51%
Test Engineer :	Cona Huang	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



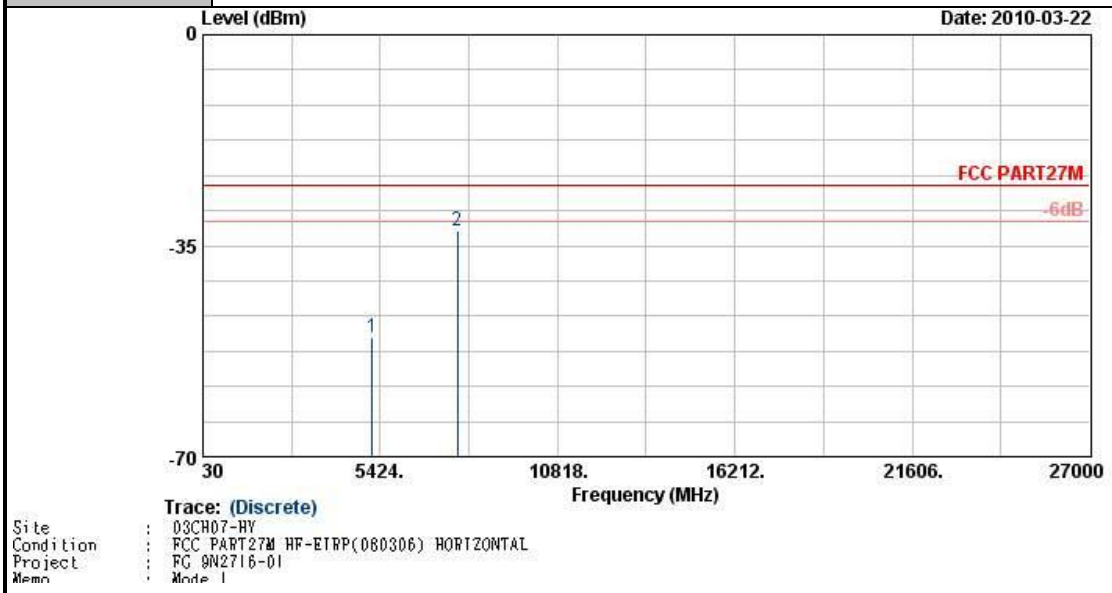
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-48.10	-25	-23.10	-63.32	-56.41	2.14	10.45	H	Pass
7779	-28.39	-25	-3.39	-49.49	-38.58	2.13	12.32	H	Pass

Band :	802.16e	**Temperature :**	23~24°C
Test Mode :	QPSK, BW 5MHz, Middle Ch (2593MHz)	**Relative Humidity :**	48~51%
Test Engineer :	Cona Huang	**Polarization :**	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



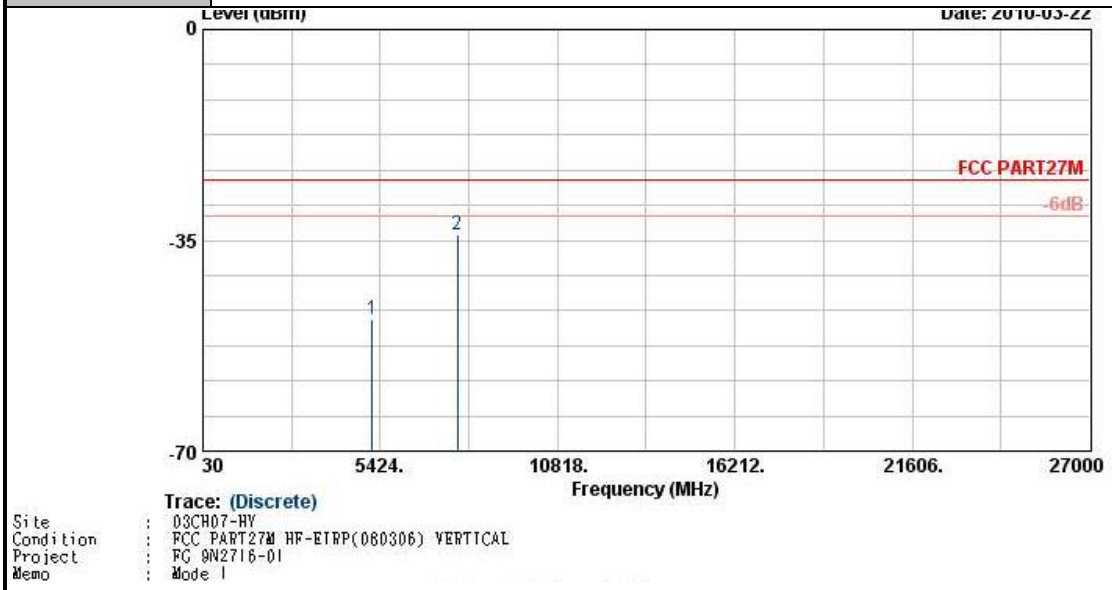
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-46.62	-25	-21.62	-62.8	-54.93	2.14	10.45	V	Pass
7779	-29.57	-25	-4.57	-50.57	-39.76	2.13	12.32	V	Pass

Band :	802.16e	Temperature :	23~24°C
Test Mode :	QPSK, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



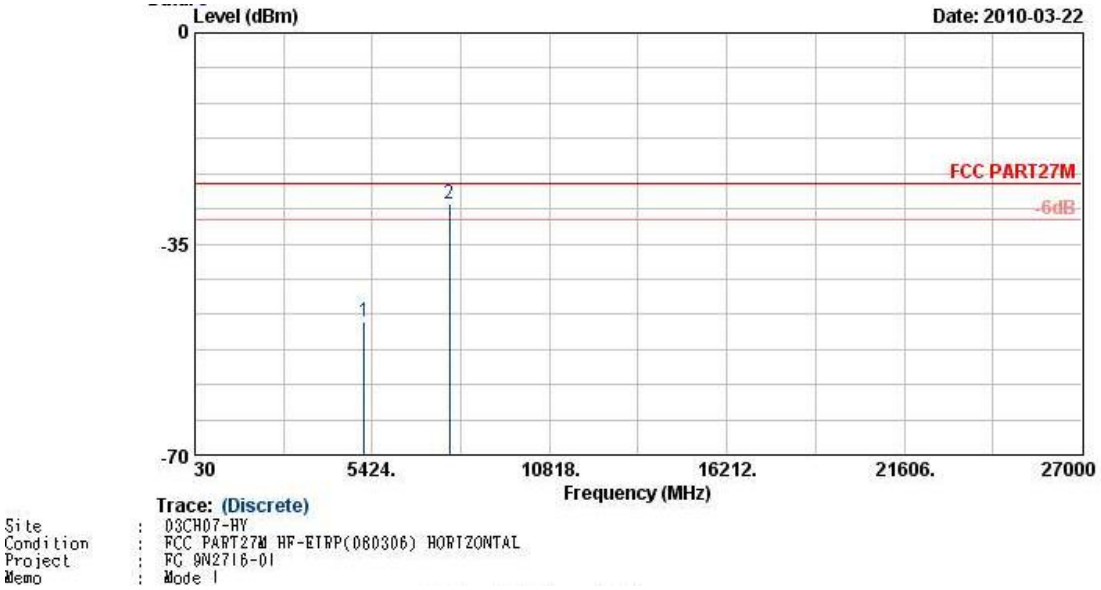
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-50.22	-25	-25.22	-65.44	-58.53	2.14	10.45	H	Pass
7779	-32.65	-25	-7.65	-53.75	-42.84	2.13	12.32	H	Pass

Band :	802.16e	Temperature :	23~24°C
Test Mode :	QPSK, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



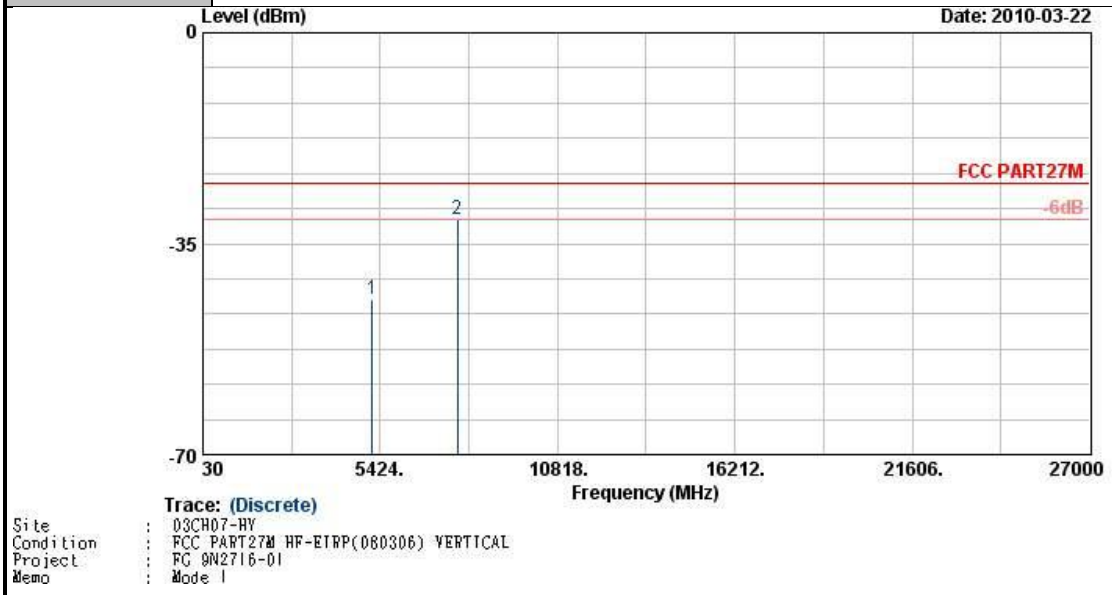
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-48.04	-25	-23.04	-64.22	-56.35	2.14	10.45	V	Pass
7779	-34.03	-25	-9.03	-55.03	-44.22	2.13	12.32	V	Pass

Band :	802.16e	Temperature :	23~24°C
Test Mode :	16QAM, BW 5MHz, Middle Ch (2593MHz)	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-47.87	-25	-22.87	-63.09	-56.18	2.14	10.45	H	Pass
7779	-28.24	-25	-3.24	-49.34	-38.43	2.13	12.32	H	Pass

Band :	802.16e	**Temperature :**	23~24°C
Test Mode :	16QAM, BW 5MHz, Middle Ch (2593MHz)	**Relative Humidity :**	48~51%
Test Engineer :	Cona Huang	**Polarization :**	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

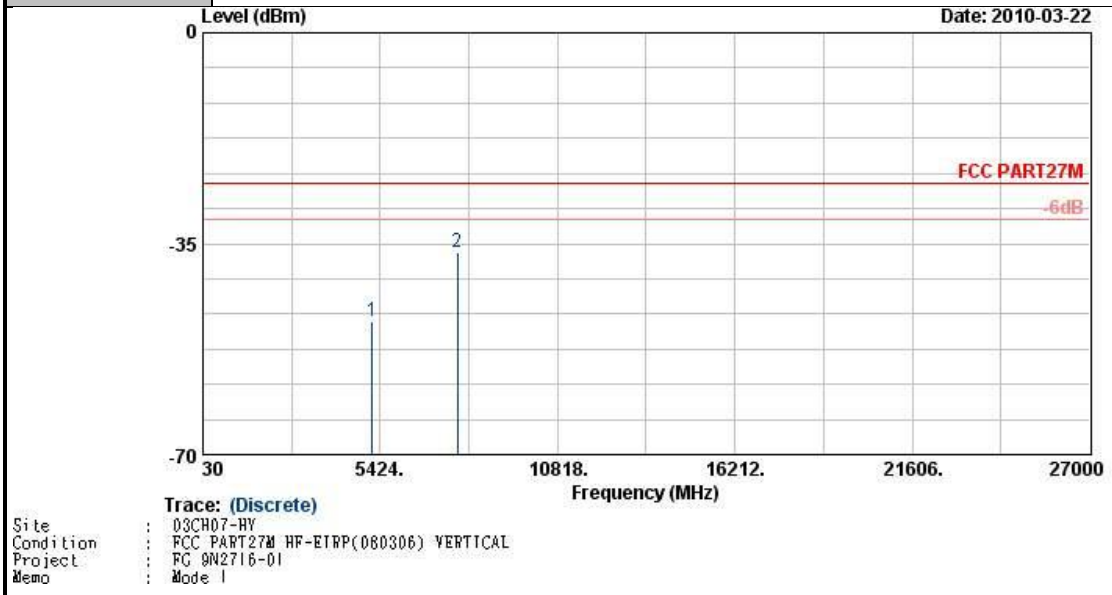


Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-44.15	-25	-19.15	-60.33	-52.46	2.14	10.45	V	Pass
7779	-30.87	-25	-5.87	-51.87	-41.06	2.13	12.32	V	Pass

Band :	802.16e	Temperature :	23~24°C
Test Mode :	16QAM, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-50.43	-25	-25.43	-65.65	-58.74	2.14	10.45	H	Pass
7779	-32.77	-25	-7.77	-53.87	-42.96	2.13	12.32	H	Pass

Band :	802.16e	Temperature :	23~24°C
Test Mode :	16QAM, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	48~51%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5186	-47.87	-25	-22.87	-64.05	-56.18	2.14	10.45	V	Pass
7779	-36.36	-25	-11.36	-57.36	-46.55	2.13	12.32	V	Pass

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB. GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)
WiMAX Base Station (System Simulator)	Agilent	E6651A	N/A	N/A	Sep. 23, 2008	Sep. 22, 2010	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

6 Certification of TAF Accreditation

Certificate No. : L1190-100316

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : March 16, 2010

P1, total 21 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix

Appendix A. Photographs of EUT

Please refer to Sporton report number EP9N2716-01 as below.

Appendix C. Product Equality Declaration

ZTE中兴

Product Change Description

As the applicant of below model, [ZTE Corporation] declares that the product,

[U226 EVDO sub-board xf9C]
[ZTE Corporation]

is the variant of the initial certified product of,

[AD226 EVDO sub-board xf9B]
[ZTE Corporation]

The changes of the variant model are as following：
1、On the EVDO sub-board, we added two 5pF capacitances on the USB HUB (uplink) data cable.
2、On the EVDO sub-board ,We added one NTC， two resistors and one capacitance to fast stabilize the control of TCXO and reduce the time of searching and entering the network.
3、On the EVDO sub-board, we added a series inductor to achieve better performance.
4、On the EVDO sub-board, we delete the resistors and capacitances connected the shield of USB connecter to GND for ESD.
5、In the temperature test， We added a heat insulation material to decrease the temperature of shell.
Except those changes above, the others are remained as previous model.
6、The pattern of main antenna has been changed a little, but the form of main antenna is still monopole.

Signature:

Date:2010-03-24

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Appendix D. Original Report

Please refer to Sporton Report Number FW9N2716 as below.