

# FCC RF Test Report

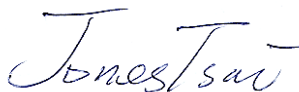
APPLICANT : Xplore Technologies Corp.  
EQUIPMENT : Wireless Modules  
BRAND NAME : Xplore Technologies  
MODEL NAME : EM7355  
FCC ID : Q2GEM7355B  
STANDARD : FCC 47 CFR Part 2, and 90(S)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Feb. 02, 2015 and testing was completed on Mar. 06, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 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: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

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FCC ID : Q2GEM7355B

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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A , Reporting only	PASS	-
3.2	§2.1053 §90.691	Field Strength of Spurious Radiation	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 39.89 dB at 1636.000 MHz



# 1 General Description

## 1.1 Applicant

Xplore Technologies Corp.  
14000 Summit Road Suite 900, Austin, Texas, 78728 USA

## 1.2 Manufacturer

Sierra Wireless Inc.  
13811, Wireless Way, Richmond, British Columbia, Canada

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Wireless Modules
Brand Name	Xplore Technologies
Model Name	EM7355
FCC ID	Q2GEM7355B
Installed into Rugged Tablet PC	Brand name : Xplore Technologies Corp Model name : iX101B2
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE
EUT Stage	Production Unit

## 1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	817.9 MHz ~ 823.1 MHz
Rx Frequency	862.9 MHz ~ 868.1 MHz
Maximum Output Power to Antenna	23.54 dBm
Antenna Type	PIFA Antenna
Type of Modulation	QPSK

Remark: This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.	
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH02-HY	03CH07-HY

## 1.7 Applied Standards

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

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ FCC 47 CFR Part 2, 90
- ♦ ANSI / TIA / EIA-603-C-2004

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

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz for CDMA2000 BC10.

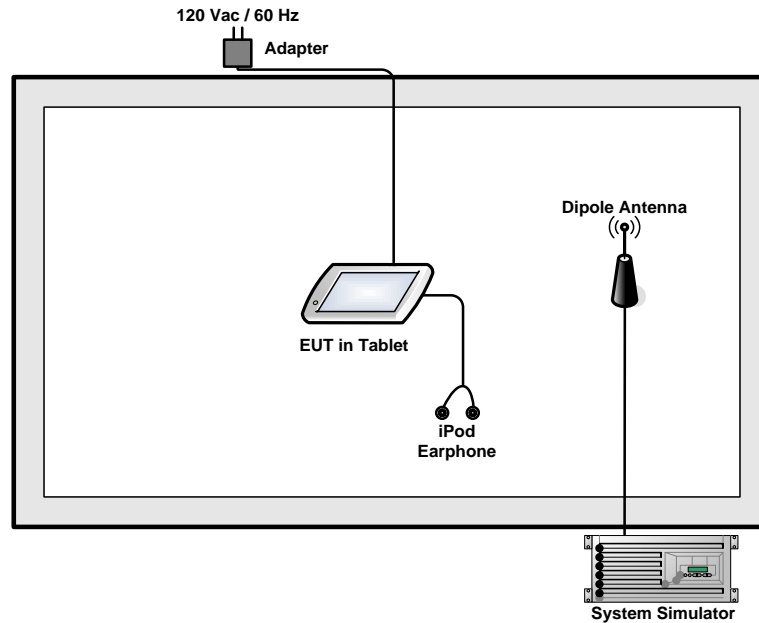
Test Modes		
Band	Radiated TCs	Conducted TCs
CDMA2000 BC10	■ 1xEV-DO Rev. 0 Link	■ 1xEV-DO Rev. 0 Link

**Note:** The maximum RF output power levels are 1xEV-DO Rev. 0 RTAP 153.6kbps mode for CDMA2000 BC10 on QPSK Link; only these modes were used for all tests.

The conducted power table is as follows:

Conducted Power (*Unit: dBm)			
Band	CDMA2000 BC10		
Channel	476	580	684
Frequency	817.90	820.50	823.10
1xRTT RC1 SO55	23.49	23.48	23.39
1xRTT RC3 SO55	23.50	23.53	23.43
1xEVDO RTAP 153.6kbps	23.45	23.54	23.40
1xEVDO RETAP 4096Bits	23.44	23.49	23.38

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

## 2.4 Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$



### 3 Test Result

#### 3.1 Conducted Output Power Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

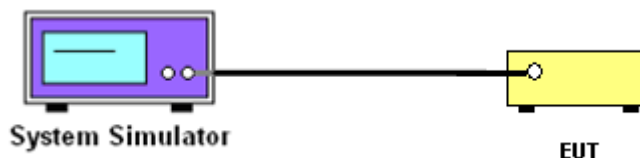
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure maximum average power for CDMA.

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of Conducted Output Power

CDMA 2000 BC10			
Modes	CDMA 2000 1xEV-DO Rev. 0		
Test Status	RTAP 153.6K		
Channel	467 (Low)	580 (Mid)	684 (High)
Frequency (MHz)	817.9	820.5	823.1
Conducted Power (dBm)	23.45	23.54	23.40
Conducted Power (Watts)	0.2213	0.2259	0.2188

**Note:** maximum burst average power for CDMA.



## 3.2 Field Strength of Spurious Radiation Measurement

### 3.2.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43+10\log_{10}(P[\text{Watts}])$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 3.2.2 Measuring Instruments

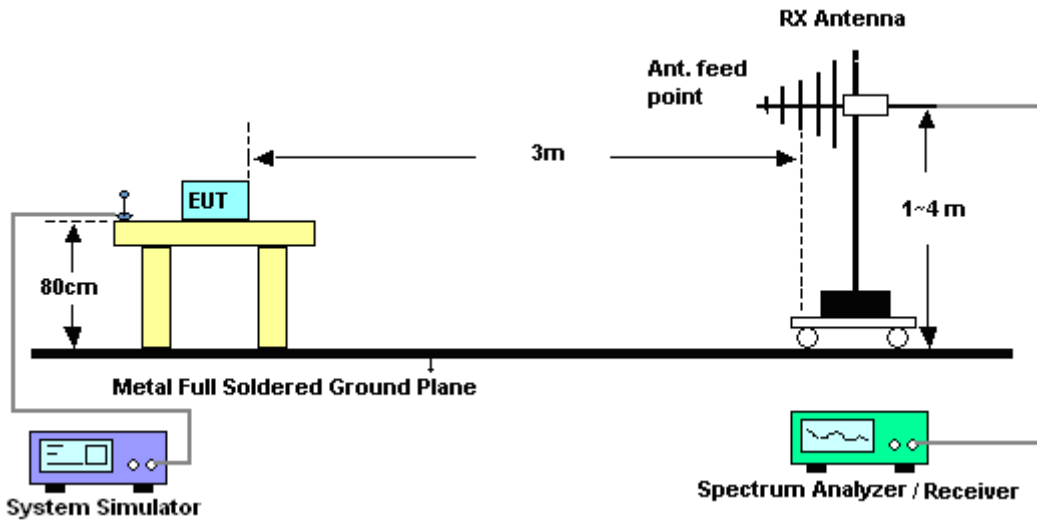
The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

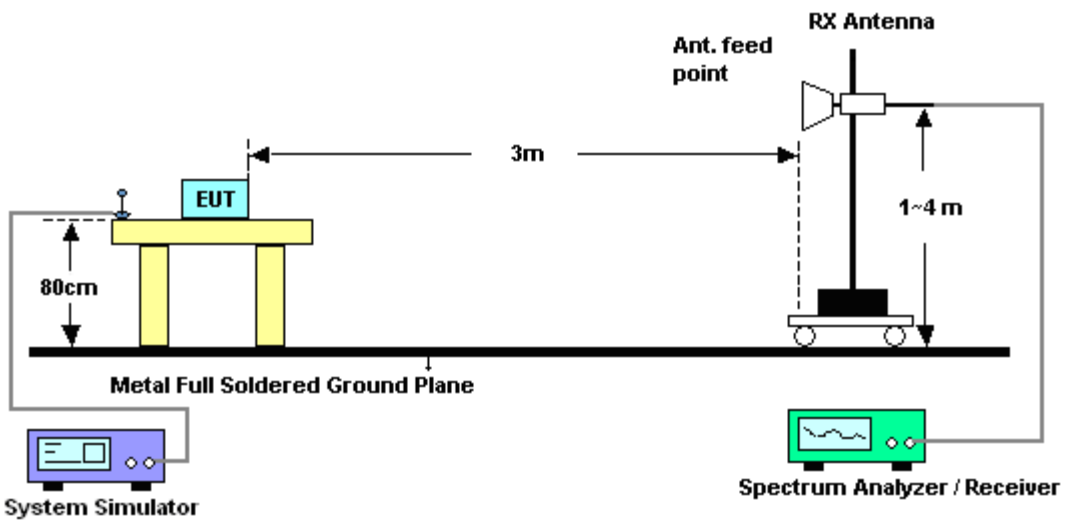
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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 = 3MHz, 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.  $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
11.  $\text{ERP (dBm)} = \text{EIRP} - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13\text{dBm}$ .

### 3.2.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5 Test Result of Field Strength of Spurious Radiated

<Low Channel>

<b>Band :</b>	CDMA2000 BC10						<b>Temperature :</b>	23~24°C	
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)						<b>Relative Humidity :</b>	46~48%	
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh						<b>Polarization :</b>	Horizontal	
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1636	-57.11	-13	-44.11	-67.68	-58.91	0.97	4.92	H	Pass
2452	-58.50	-13	-45.50	-74.18	-60.33	1.28	5.26	H	Pass
3271	-60.45	-13	-47.45	-77.25	-63.76	1.53	6.99	H	Pass

<b>Band :</b>	CDMA2000 BC10						<b>Temperature :</b>	23~24°C	
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)						<b>Relative Humidity :</b>	46~48%	
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh						<b>Polarization :</b>	Vertical	
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1636	-52.89	-13	-39.89	-63.83	-54.69	0.97	4.92	V	Pass
2452	-57.88	-13	-44.88	-75.25	-59.71	1.28	5.26	V	Pass
3271	-58.91	-13	-45.91	-77.13	-62.22	1.53	6.99	V	Pass



<Middle Channel>

<b>Band :</b>	CDMA2000 BC10	<b>Temperature :</b>	23~24°C						
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)	<b>Relative Humidity :</b>	46~48%						
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh	<b>Polarization :</b>	Horizontal						
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1639	-58.72	-13	-45.72	-69.2	-60.51	0.97	4.91	H	Pass
2461	-58.48	-13	-45.48	-74.13	-60.33	1.28	5.28	H	Pass
3283	-60.85	-13	-47.85	-77.64	-64.21	1.54	7.05	H	Pass

<b>Band :</b>	CDMA2000 BC10	<b>Temperature :</b>	23~24°C						
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)	<b>Relative Humidity :</b>	46~48%						
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh	<b>Polarization :</b>	Vertical						
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1639	-54.83	-13	-41.83	-66.12	-56.62	0.97	4.91	V	Pass
2461	-54.80	-13	-41.80	-72.4	-56.65	1.28	5.28	V	Pass
3283	-59.13	-13	-46.13	-77.51	-62.49	1.54	7.05	V	Pass



<High Channel>

<b>Band :</b>	CDMA2000 BC10	<b>Temperature :</b>	23~24°C						
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)	<b>Relative Humidity :</b>	46~48%						
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh	<b>Polarization :</b>	Horizontal						
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1645	-59.15	-13	-46.15	-70.07	-60.92	0.98	4.89	H	Pass
2470	-57.80	-13	-44.80	-73.7	-59.68	1.28	5.31	H	Pass
3292	-60.96	-13	-47.96	-77.85	-64.36	1.54	7.08	H	Pass

<b>Band :</b>	CDMA2000 BC10	<b>Temperature :</b>	23~24°C						
<b>Test Mode :</b>	1xEV-DO Rev. 0_RTAP 153.6K (QPSK)	<b>Relative Humidity :</b>	46~48%						
<b>Test Engineer :</b>	Nike Yu, Ken Wu, and Stan Hsieh	<b>Polarization :</b>	Vertical						
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency ( MHz )	ERP ( 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
1645	-54.21	-13	-41.21	-65.64	-55.98	0.98	4.89	V	Pass
2470	-58.23	-13	-45.23	-75.37	-60.11	1.28	5.31	V	Pass
3292	-59.36	-13	-46.36	-77.87	-62.76	1.54	7.08	V	Pass



### 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	Rohde & Schwarz	CMU200	117995	N/A	Jul. 29, 2014	Feb. 15, 2015	Jul. 28, 2015	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Feb. 15, 2015	Jun. 08, 2015	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 17, 2014	Feb. 15, 2015	Jul. 16, 2015	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV 30	100895	9kHz ~ 30GHz	Apr. 11, 2014	Mar. 03, 2015 ~ Mar. 06, 2015	Apr. 10, 2015	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Mar. 03, 2015 ~ Mar. 06, 2015	Sep. 26, 2015	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Mar. 03, 2015 ~ Mar. 06, 2015	Aug. 18, 2015	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 17, 2014	Mar. 03, 2015 ~ Mar. 06, 2015	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Oct. 21, 2014	Mar. 03, 2015 ~ Mar. 06, 2015	Oct. 20, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Mar. 03, 2015 ~ Mar. 06, 2015	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Mar. 03, 2015 ~ Mar. 06, 2015	N/A	Radiation (03CH07-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.50
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