



FCC RF Test Report

APPLICANT : Hewlett-Packard Company
EQUIPMENT : Notebook PC
BRAND NAME : Hewlett-Packard
MODEL NAME : HSTNN-W03C
FCC ID : B94HNW03CSWTH
STANDARD : FCC 47 CFR Part 2, and 90(S)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Oct. 12, 2013 and testing was completed on Oct. 23, 2013. 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.

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



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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 26.99 dB at 1636.000 MHz



1 General Description

1.1 Applicant

Hewlett-Packard Company
3000 Hanover Street, Palo Alto, California 94304, USA

1.2 Manufacturer

Wistron Corporation
21F., No.88, Sec.1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R.O.C)

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Notebook PC
Brand Name	Hewlett-Packard
Model Name	HSTNN-W03C
FCC ID	B94HNW03CSWTH
Integrated the WWAN Module	Brand Name : Sierra Model Number : EM7355 FCC ID : N7NEM7355
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	CDMA2000 BC10 : 817.9 MHz ~ 823.1 MHz
Rx Frequency	CDMA2000 BC10 : 862.9 MHz ~ 868.1 MHz
Maximum Output Power to Antenna	CDMA2000 BC10 : 23.39 dBm
Antenna Type	PIFA Antenna
Antenna Gain	-4.31 dBi
Type of Modulation	CDMA2000 : QPSK CDMA2000 1xEV-DO : QPSK/8PSK

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

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st 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	722060/4086B-1

1.7 Applied Standards

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

- ♦ 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 in Tablet PC configurations and one test plane in Laptop PC configuration 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
CDMA2000 BC10	■ 1xEV-DO Rev. 0 Link

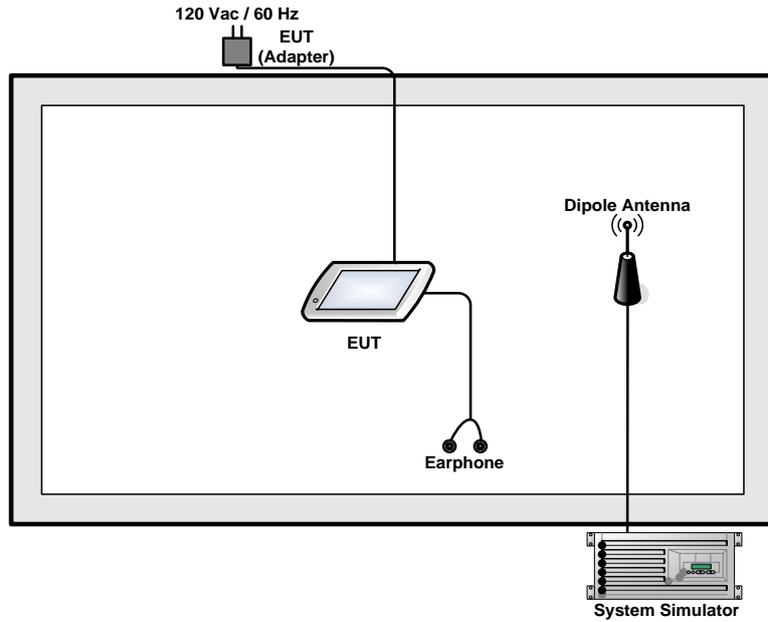
Note: The maximum RF output power levels is 1xEV-DO Rev. 0 mode for CDMA2000 BC10 on QPSK Link; only these modes were used for all tests.

The conducted power table is as follows:

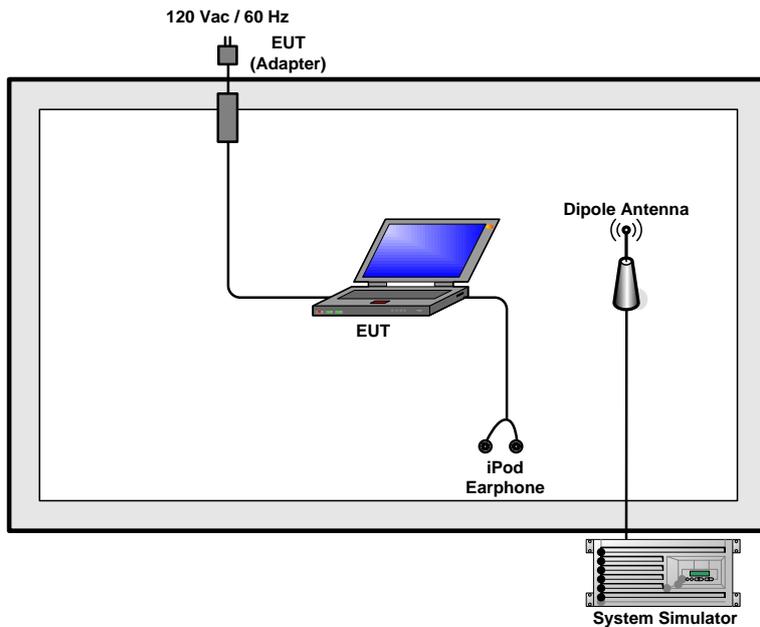
Conducted Power (*Unit: dBm)			
Band	CDMA2000 BC10		
	476	580	684
Channel	476	580	684
Frequency	817.90	820.50	823.10
1xRTT RC1 SO55	23.28	23.32	23.34
1xRTT RC3 SO55	23.26	23.30	23.32
1xRTT RC3 SO32(+ F-SCH)	23.25	23.29	23.31
1xRTT RC3 SO32(+SCH)	23.26	23.30	23.32
1xEV-DO RTAP 153.6kbps	23.32	23.37	23.39
1xEV-DO RETAP 4096Bits	23.25	23.29	23.30

2.2 Connection Diagram of Test System

<EUT with Tablet PC Mode>



<EUT with Laptop PC Mode>



Remark: The EUT is set in Tablet PC and Laptop PC configurations during test.



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	N/A	Unshielded, 1.0 m	N/A

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.

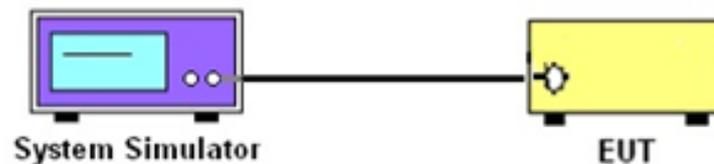
3.1.2 Measuring Instruments

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.

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)	23.32	23.37	23.39
Conducted Power (Watts)	0.21	0.22	0.22

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.

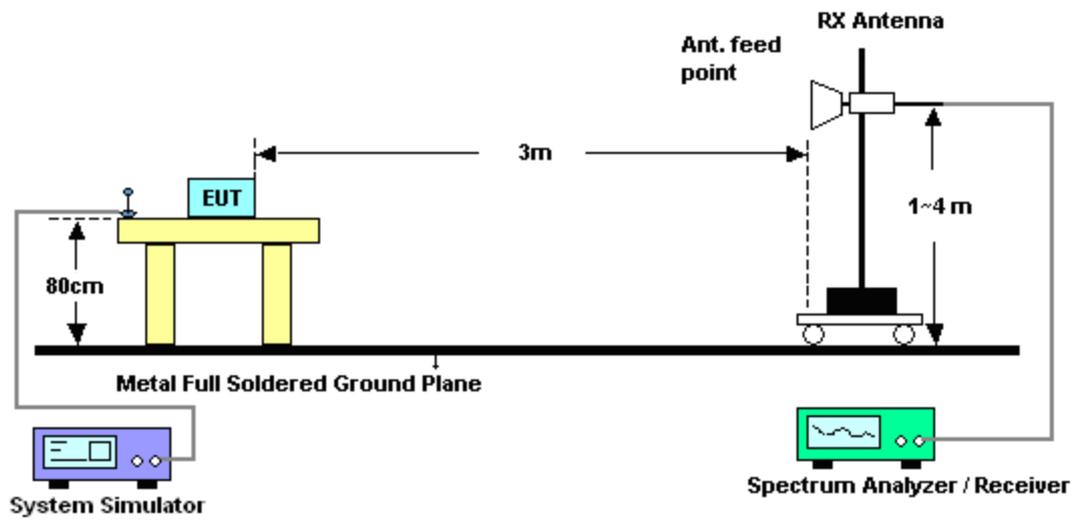
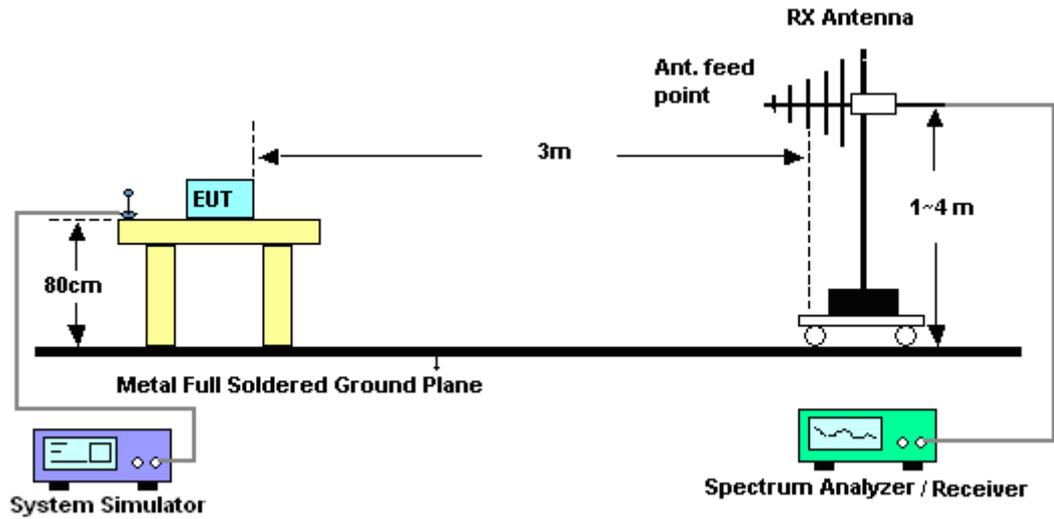
3.2.2 Measuring Instruments

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

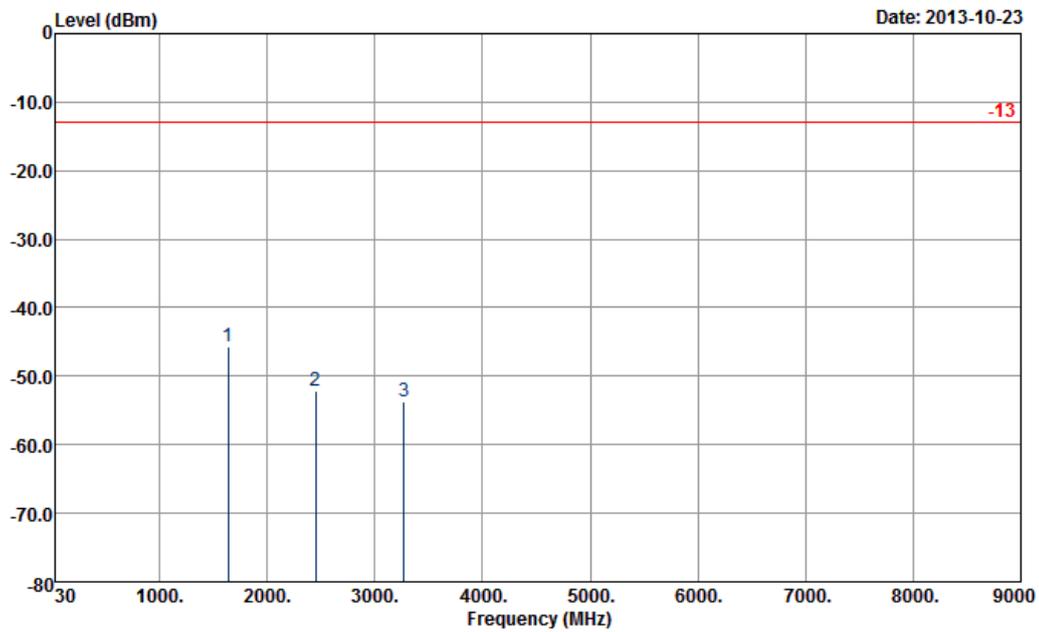




3.2.5 Test Result of Field Strength of Spurious Radiated

<Low Channel>

Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

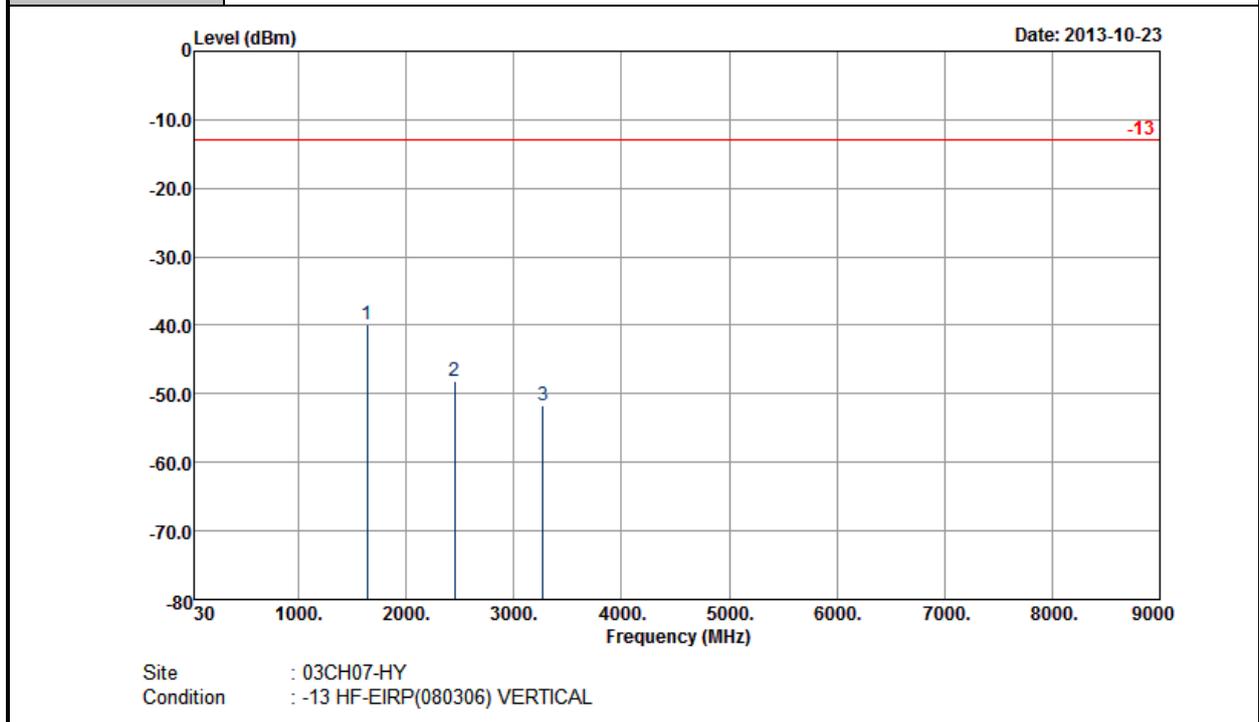


Site : 03CH07-HY
 Condition : -13 HF-EIRP(080306) HORIZONTAL

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	-45.65	-13	-32.65	-54.34	-49.64	1.51	5.50	H	Pass
2452	-52.14	-13	-39.14	-65.36	-56.21	2.04	6.11	H	Pass
3271	-53.61	-13	-40.61	-67.53	-59.01	2.45	7.85	H	Pass



Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

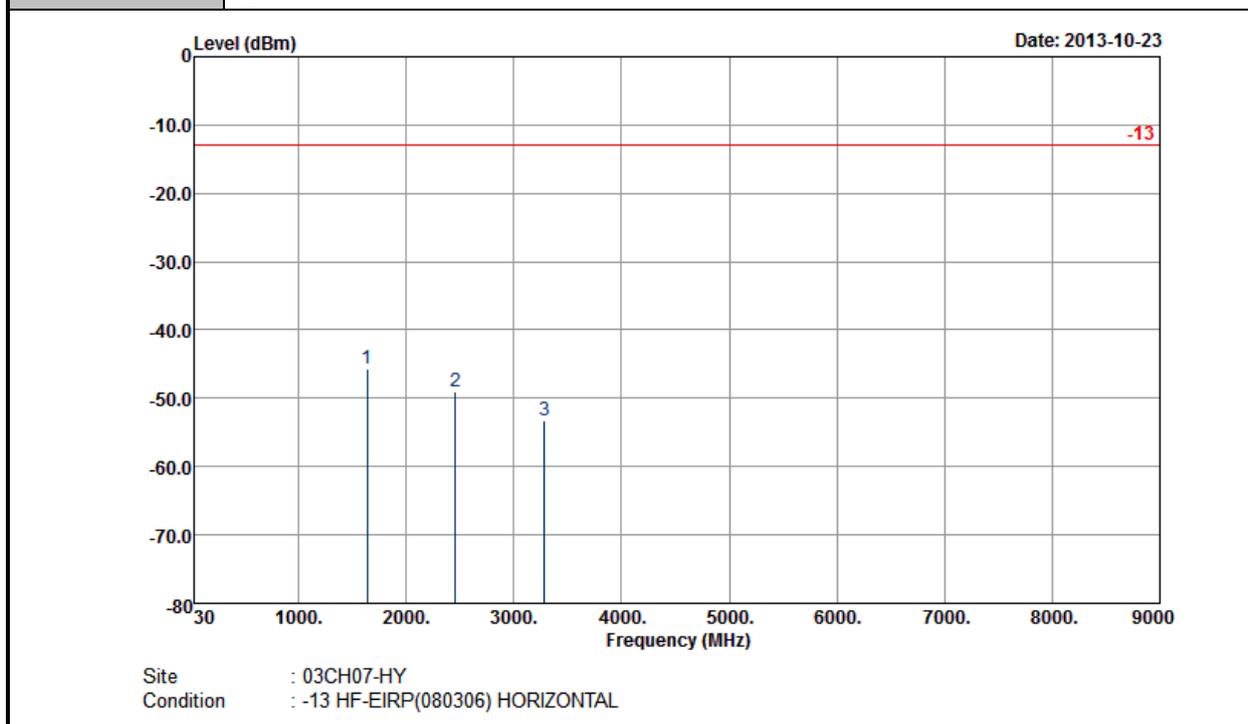


Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1636	-39.99	-13	-26.99	-50.87	-43.98	1.51	5.50	V	Pass
2452	-48.22	-13	-35.22	-61.87	-52.29	2.04	6.11	V	Pass
3271	-51.78	-13	-38.78	-67.48	-57.18	2.45	7.85	V	Pass



<Middle Channel>

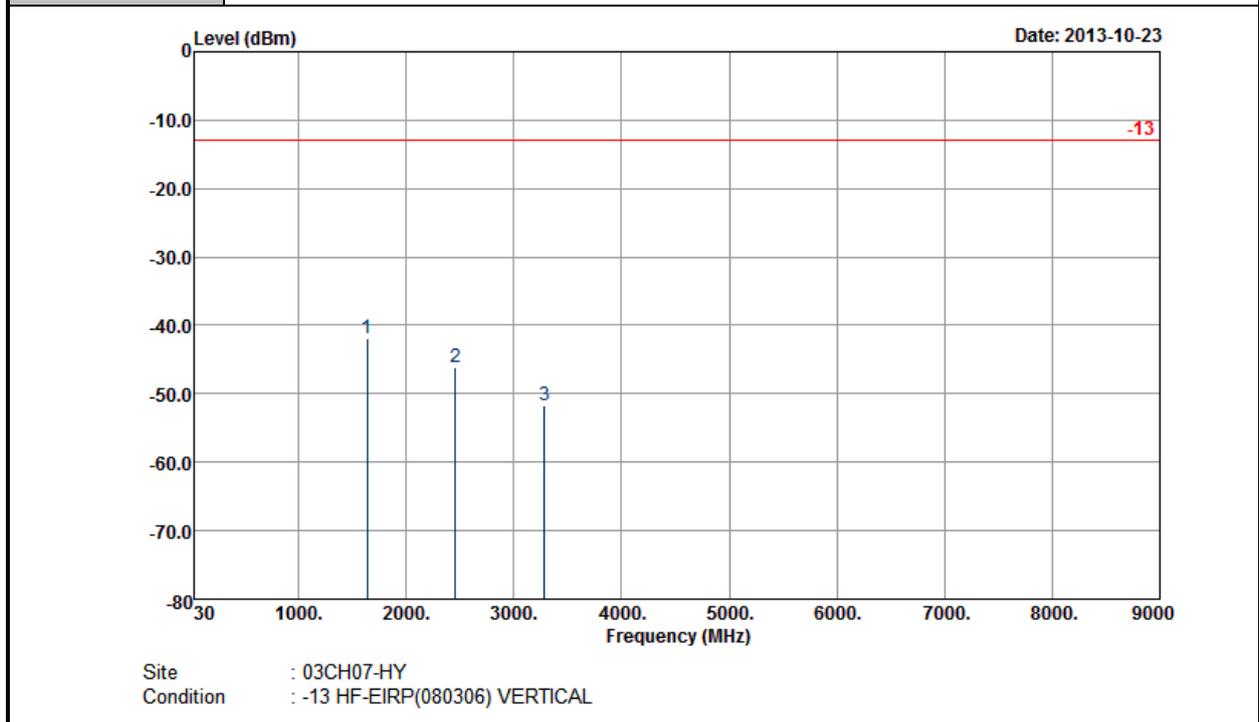
Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-45.75	-13	-32.75	-54.64	-49.74	1.51	5.50	H	Pass
2461	-49.07	-13	-36.07	-62.37	-53.14	2.04	6.11	H	Pass
3283	-53.22	-13	-40.22	-67.11	-58.62	2.45	7.85	H	Pass



Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

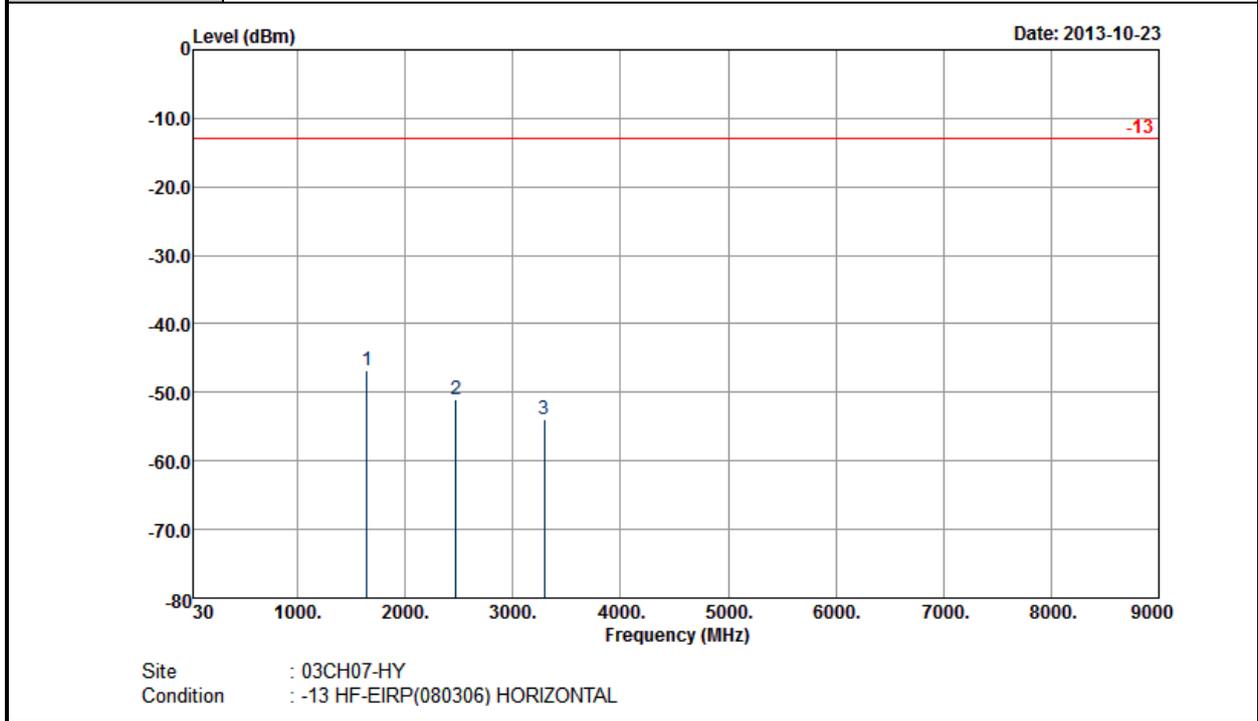


Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1639	-41.83	-13	-28.83	-52.9	-45.82	1.51	5.50	V	Pass
2461	-46.11	-13	-33.11	-59.66	-50.18	2.04	6.11	V	Pass
3282	-51.73	-13	-38.73	-67.32	-57.13	2.45	7.85	V	Pass



<High Channel>

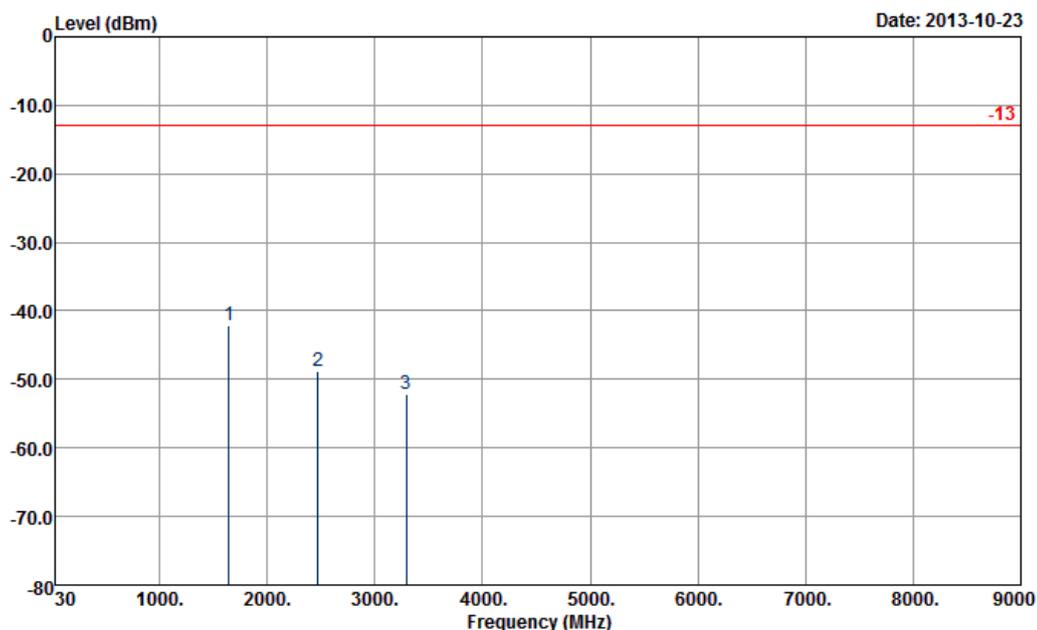
Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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
1648	-46.85	-13	-33.85	-55.48	-50.84	1.51	5.50	H	Pass
2470	-50.95	-13	-37.95	-64.05	-55.02	2.04	6.11	H	Pass
3295	-54.03	-13	-41.03	-68.04	-59.43	2.45	7.85	H	Pass



Band :	CDMA2000 BC10	Temperature :	21~23°C
Test Mode :	1xEV-DO Rev. 0_RTAP 153.6K	Relative Humidity :	49~51%
Test Engineer :	Stan Hsieh	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH07-HY
 Condition : -13 HF-EIRP(080306) VERTICAL

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	-42.02	-13	-29.02	-53.07	-46.01	1.51	5.50	V	Pass
2470	-48.91	-13	-35.91	-62.61	-52.98	2.04	6.11	V	Pass
3295	-52.09	-13	-39.09	-67.76	-57.49	2.45	7.85	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	Aug. 01, 2013	Oct. 15, 2013	Jul. 31, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz~30GHz	Nov. 30, 2012	Oct. 23, 2013	Nov. 29, 2013	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 10, 2013	Oct. 23, 2013	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 22, 2013	Oct. 23, 2013	Aug. 21, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	30MHz~1GHz	Feb. 26, 2013	Oct. 23, 2013	Feb. 25, 2014	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Dec. 01, 2012	Oct. 23, 2013	Nov. 30, 2013	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Oct. 23, 2013	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Oct. 23, 2013	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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