



47 CFR PART 24E

TEST REPORT

of

Ix handset

Trade Name: Haier
Brand Name: Haier
Model Name: HC-C1100
Report No.: SZ10080104E01
FCC ID.: SG71008HC- C1100

prepared for

Qingdao Haier Telecom Co., Ltd

No.1, Haier Road, Hi-tech Zone, Qingdao, 266101, P.R.China

prepared by

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Bluetooth®

CTIA Authorized Test Lab

LAB CODE 20081223-00

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Change History		
Issue	Date	Reason for change
1.0	September 8, 2010	First edition

1. Test Result Certification

Equipment under Test: Ix handset

Trade Name: Haier
Brand Name: Haier
Model Name: HC-C1100
FCC ID: SG71008HC- C1100

Applicant: Qingdao Haier Telecom Co., Ltd
No.1, Haier Road, Hi-tech Zone, Qingdao, 266101, P.R.China
Manufacturer: Qingdao Haier Telecom Co., Ltd
No.1, Haier Road Hi-tech Zone, Qingdao, 266101, P.R.China

Test Standards: 47 CFR Part 2
47 CFR Part 24 Subpart E

Test Result: PASS

* We Hereby Certify That:

The equipment under test was tested by Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Tian Junjie Dated: 2010.09.08
Tian Junjie

Reviewed by: Ni Yong Dated: 2010.09.08
Ni Yong

Approved by: Shu Luan Dated: 2010.9.8
Shu Luan



2. General Information

2.1 Equipment under Test (EUT) Description

Description	Ix handset
Model Name	HC-C1100
Serial No.....	N/A
MEID.....	N/A
Hardware Version	P3v4
Software Version.....	C2060CT-HSP-R01.00.06-CT
Emission Designator.....	1M25F9W
Modulation	CDMA 1X
Frequency	Tx: 1851.25 – 1908.75 MHz; Rx: 1931.25 MHz-1988.75 MHz
Power Supply:	Battery
	Brand name: Haier
	Model Name: H15132
	Capacitance: 1000mAh
	Rated voltage: 3.7V
	Charge limited: 4.2V
	Manufacturer: BYD COMPANY LIMITED
Accessory Equipment:.....	AC Adapter (Charger for Battery)
	Brand Name: Haier
	Model Name: H21115
	Rated Input: ~ Max 36W
	Rated Output: = Max 2.75W
	Manufacturer: ZhongweiElectronicCo., LTD

NOTE:

1. The EUT is a model of CDMA 1X mobile station operating in Cellular band.
2. The normal configuration for the EUT is the Mobile Phone (MS) associated with ancillary equipments e.g. the Battery and/or the AC Adapter (Charger).
3. For detailed features about the EUT, please see user manual supplied by the applicant.



2.2 Test Standards and Results

The objective of the report is to perform tests according to 47 CFR Part 2, Part 24 for FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-09 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
3	47 CFR Part 24 (10-1-09Edition)	Personal Communications Services

Test detailed items and the results are as below:

No.	Rules	Test Type	Result
FCC Part 22 Requirement			
1	2.106 24.229	Frequencies	PASS
2	2.1046	Conducted RF Output Power	PASS
3	2.1049	20dB Occupied Bandwidth	PASS
4	2.1055 24.235	Frequency Stability	PASS
5	2.1051 2.1057 24.238	Conducted Out of Band Emissions	PASS
6	2.1051 2.1057 24.238	Band Edge	PASS
7	24.232	Transmitter Radiated Power (EIPR/ERP)	PASS

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The site was constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22, the FCC registration number is 741109.

2.3.2 Test Equipments

No.	Description	Specification
1	System Simulator	Manufacturer: Agilent Model No.: E5515C Serial No.: GB43130131
2	Spectrum Analyzer	Manufacturer: Agilent Model No.: E7405A Serial No.: US44210471
3	Telecommunication Antenna	Manufacturer: European Antennas Model No.: PSA-45010R/356 Serial No.: 403688-001
4	Trilogy Antenna	Manufacturer: Schwarzbeck Model No.: VULB 9163 Serial No.: 9163-274
5	Horn Antenna	Manufacturer: Schwarzbeck Model No.: BBHA 9120C Serial No.: 9120C-600
6	Power Splitter	Manufacturer: WEINSCHEL Model No.: 1506A Serial No.: NW521
7	Anechoic Chamber	Manufacturer: Albatross Projects GmbH
8	DC Power Supply	Manufacturer: Good Will Instrument Co., Ltd.
9	Temperature Chamber	Manufacturer: Chongqing YinHe Experimental Equip. Co., Ltd.

NOTE:

- Equipments listed above have been calibrated and are in the period of validation.

2.3.3 Test Environment Conditions

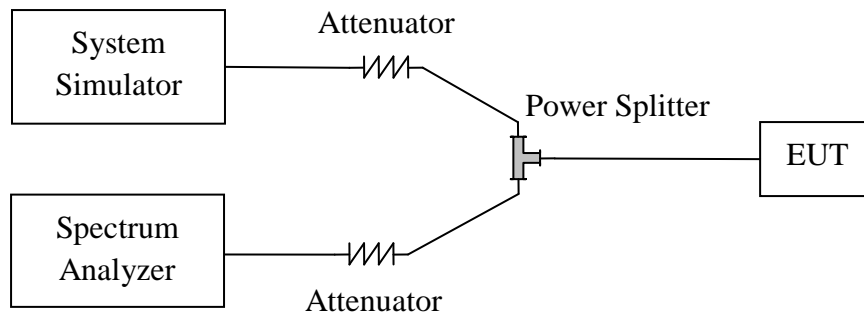
During the measurement, the environmental conditions were within the listed ranges:

Temperature:	20 - 25 °C
Relative Humidity:	40 - 60%
Atmospheric Pressure:	86-106kPa

3. 47 CFR Part 2, Part 24E Requirements

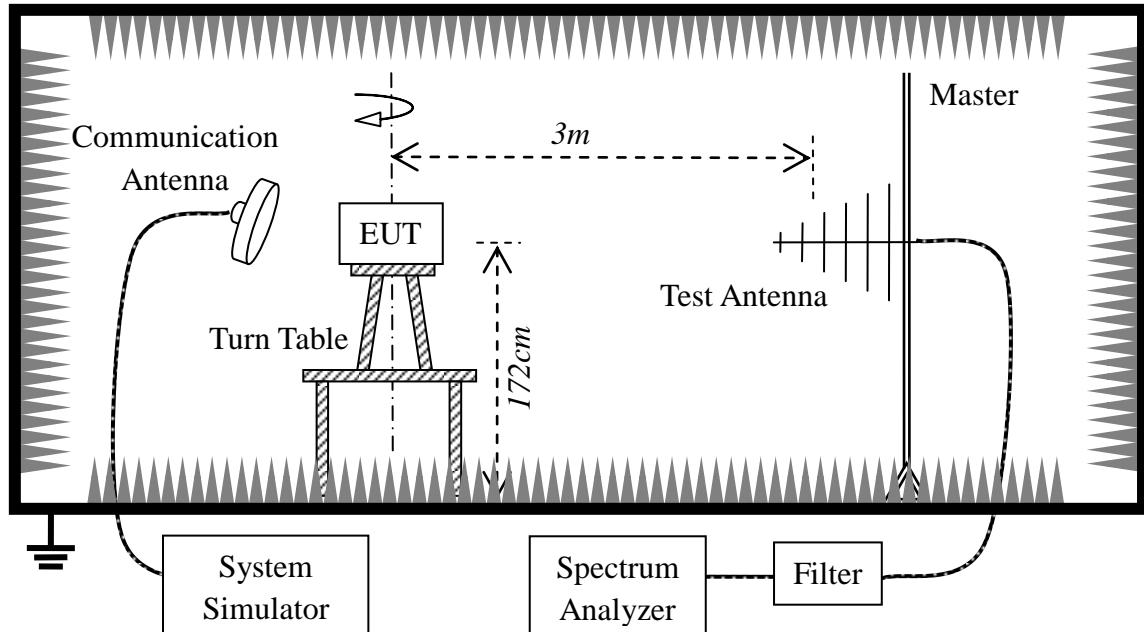
3.1 General Information

3.1.1 Conducted Related Tests



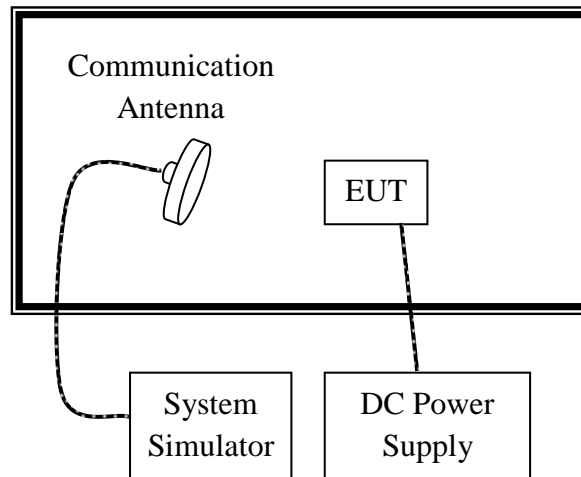
1. The EUT is coupled to the Spectrum Analyzer and the System Simulator with the suitable Attenuators through the Power Splitter; the path loss is calibrated to correct the reading.
2. The EUT is configured here as MS + Battery.
3. The EUT is commanded via the System Simulator (SS) to operate at the maximum output power .A communication link is established between the EUT and the SS.
4. The Spectrum Analyzer is set to max-peak detector function and maximum hold mode.

3.1.2 Radiated Power and Spurious Emission Tests



1. The test is performed in a full-Anechoic Chamber; the air loss of the site and the factors of the test system are pre-calibrated using the substitution method.
2. The EUT is configured as MS + Battery.
3. The EUT is placed on the vertical axis of a Turn Table 1.72 meters above the ground.
4. The Test Antenna is a bi-log one or a horn one, and the Test Antenna is at the same height as the EUT.
5. The EUT is commanded via the System Simulator (SS) to operate at the maximum output power. A communication link is established between the EUT and the SS.
6. The Spectrum Analyzer is set to max-peak detector function and maximum hold mode.

3.1.3 Frequency Stability Test



1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

3.2 Conducted RF Output Power

3.2.1 Requirement

According to FCC §2.1046 (a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033 (c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

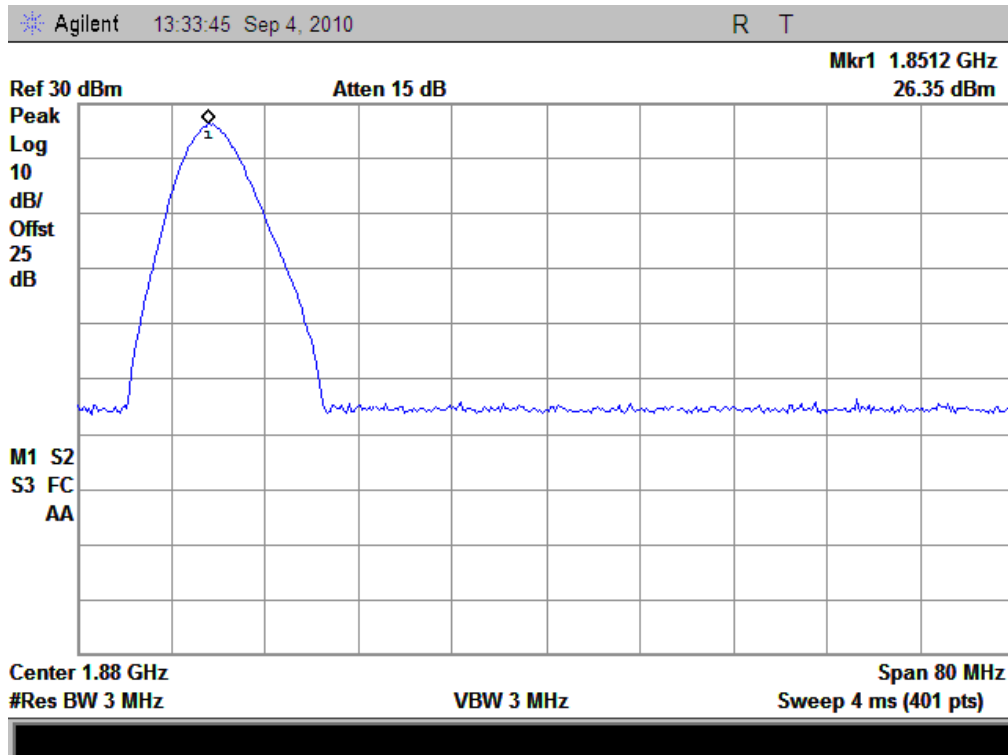
3.2.2 Test Procedure

1. Perform test system setup as section 3.1.1 (the radio frequency load attached to the EUT antenna terminal is 50Ω).
2. The resolution bandwidth of the Spectrum Analyzer is set to be comparable to the emission bandwidth of the transmitter, e.g. for GSM modulated signal (here used): RBW=VBW=1MHz, for CDMA modulated signal: RBW=VBW=3MHz.
3. The low, middle and the high channels are selected to perform tests respectively. Set the TCH number to 25 as the low channel.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.
5. Set the TCH number to 600 as the middle channel, then repeat step 4.
6. Set the TCH number to 1175 as the high channel, then repeat step 4.

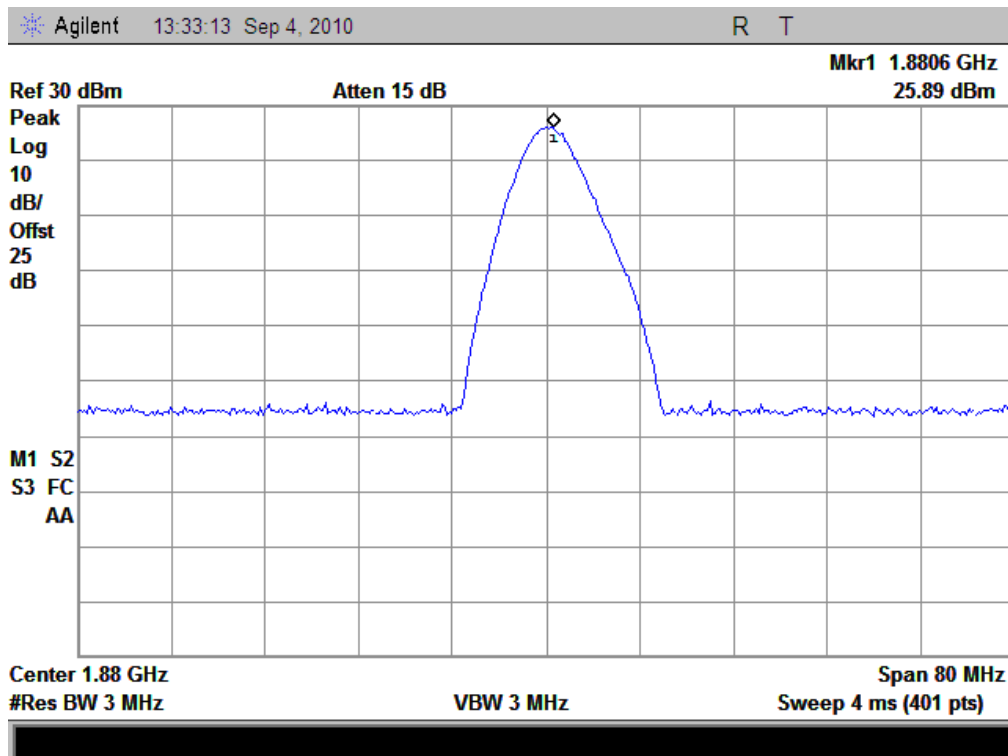
3.2.3 Test Result

No.	Channel Number	Frequency (MHz)	Measured Power		Rated Power	
			dBm	W	dBm	W
1	25	1851.25	26.35	0.43	33	2
2	600	1880.0	25.89	0.39	33	2
3	1175	1908.75	25.8	0.38	33	2

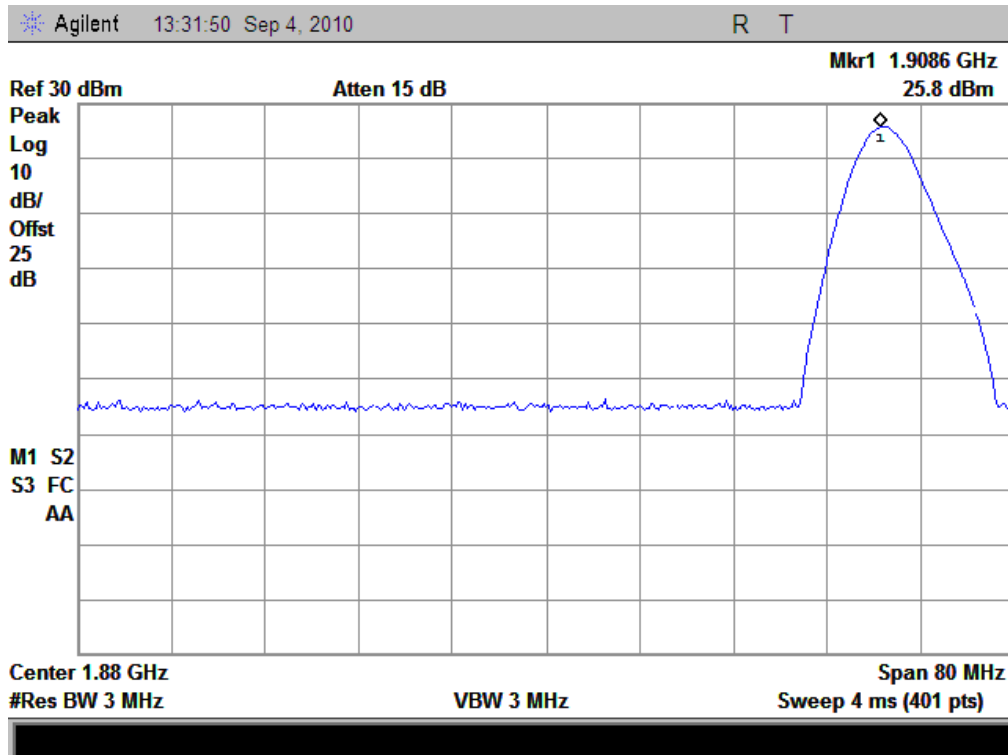
1. Plot when the TCH number set to 25:



2. Plot when the TCH number set to 600:



3. Plot when the TCH number set to 1175:



3.3 Occupied Bandwidth

3.3.1 Occupied Bandwidth Definition

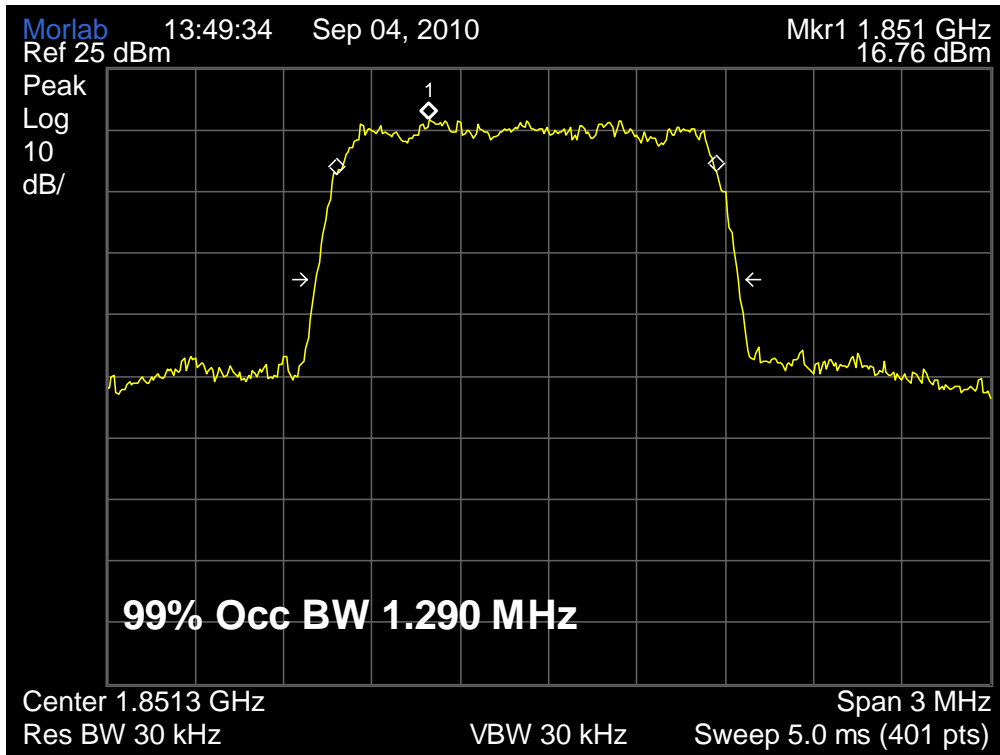
According to FCC §2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth. Test Procedure

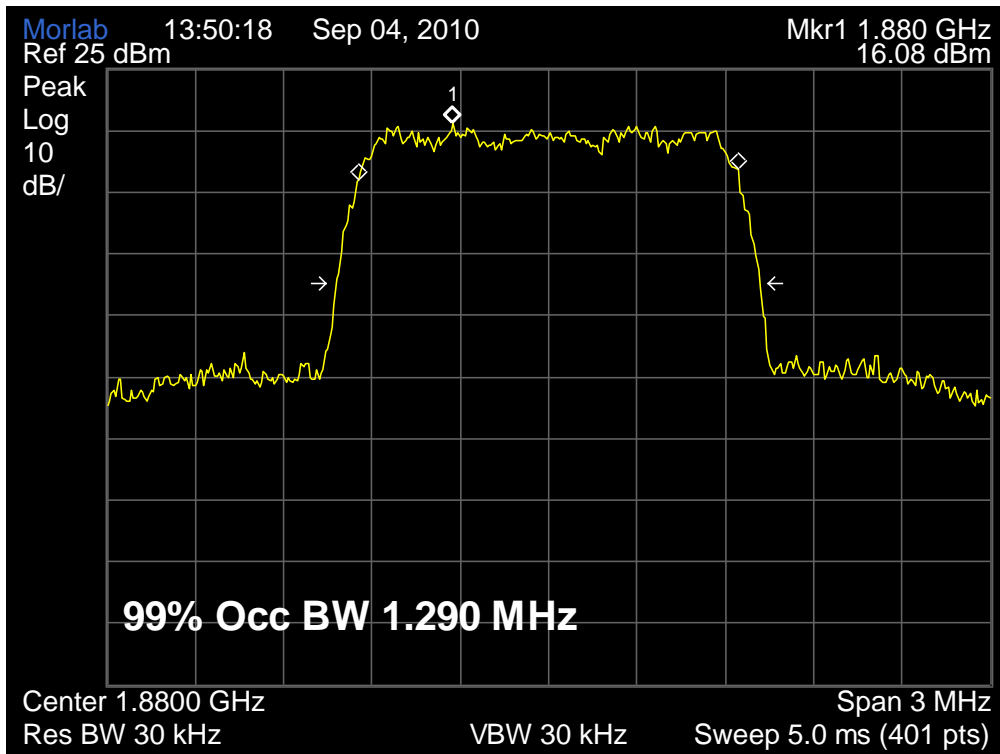
1. Perform test system setup as section 3.1.1.
2. The resolution bandwidth of the Spectrum Analyzer is set to at least one percent of the emission bandwidth, e.g. for GSM modulated signal (here used): $RBW=VBW=3kHz$, for CDMA modulated signal: $RBW=VBW=30kHz$.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 20dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.

3.3.2 Test Result

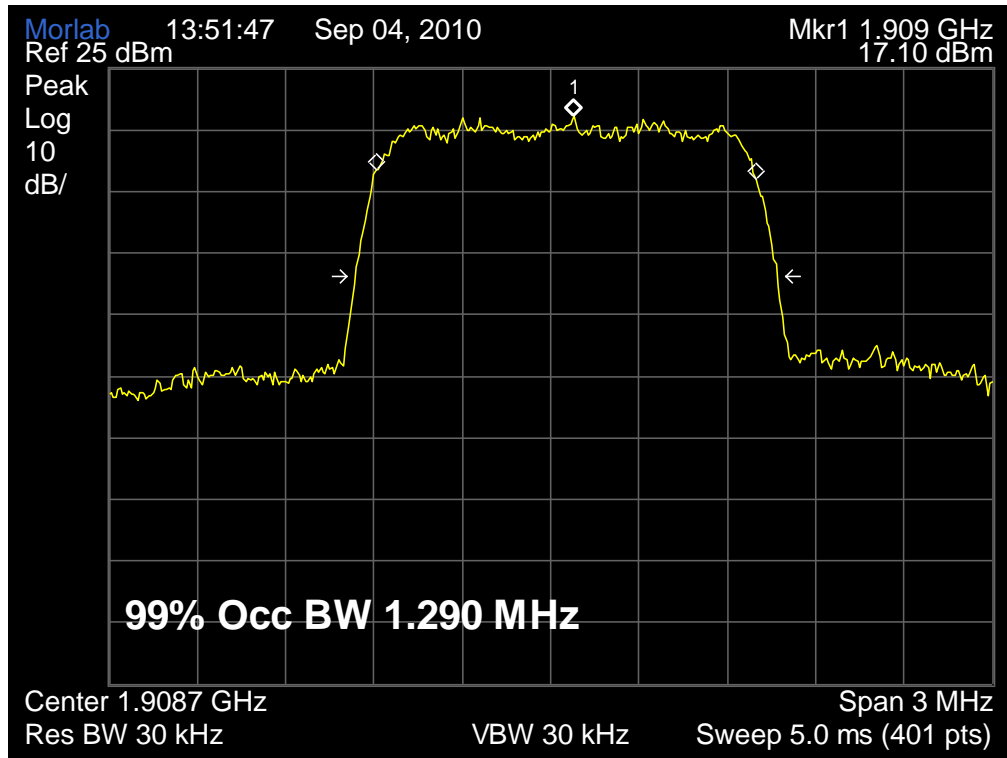
No.	Channel Number	Frequency (MHz)	Measured Occupied Bandwidth (MHz)	Refer to Plot
1	25	1851.25	1.29	Plot A
2	600	1880.0	1.29	Plot B
3	1175	1908.75	1.29	Plot C



(Plot A: CDMA 1900MHz Channel = 25)



(Plot B: CDMA 1900MHz Channel = 600)



(Plot C: CDMA 1900MHz Channel = 1175)

3.4 Conducted Spurious Emission

3.4.1 Requirement

According to FCC 24.238(a), 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. This calculated to be -13dBm.

According to 24.238(a), in the 1MHz 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. Thus the 26dB emission bandwidth is measurement for showing compliance at the band-edge.

3.4.2 Test Procedure

1. Perform test system setup as section 3.1.1.
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer.
3. The lowest, middle and the highest channels are selected to perform tests respectively.
4. Set the RBW of the Spectrum Analyzer to 1MHz, and the measuring frequency range from 9kHz to 10th harmonic of the fundamental frequency (here used 10GHz); mark the fundamental frequency and the harmonics thereof; finally record the harmonics and the plot. Note: the measuring frequency range can be divided into several parts to perform tests.
5. In the 1MHz bands immediately outside and adjacent to the frequency black, the RBW of the Spectrum Analyzer was set to at least one percent of the emission bandwidth of the fundamental emission of the transmitter, e.g. for GSM modulated signal (here used): RBW=3kHz, for CDMA modulated signal: RBW=30kHz.

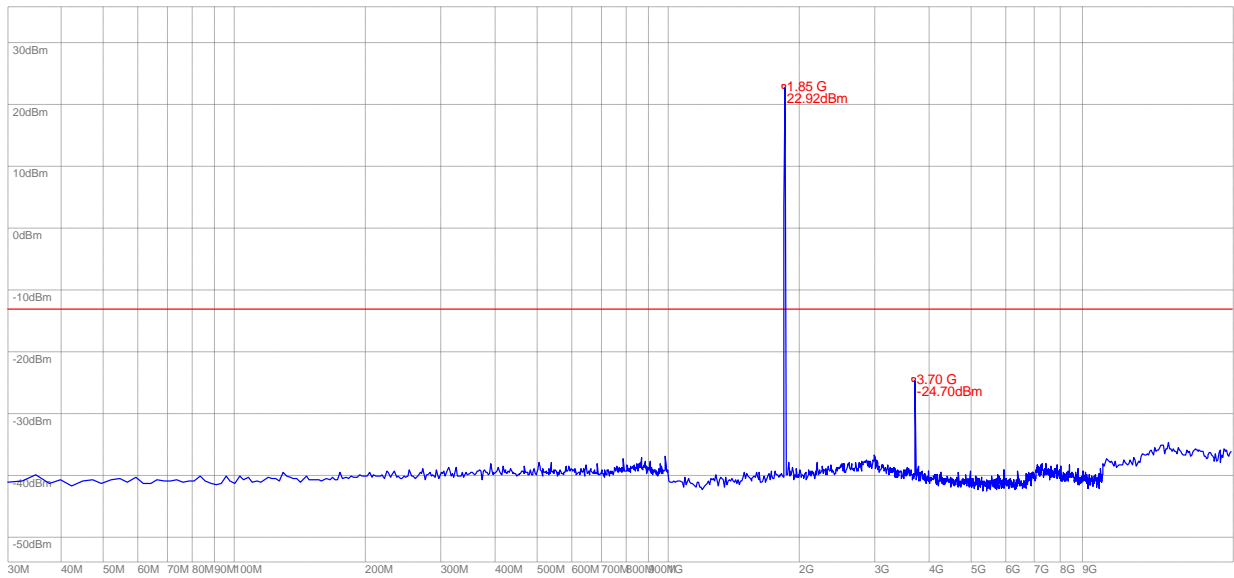
3.4.3 Test Result

3.4.3.1 Table for the Harmonics and Plots for the Spurious Emission

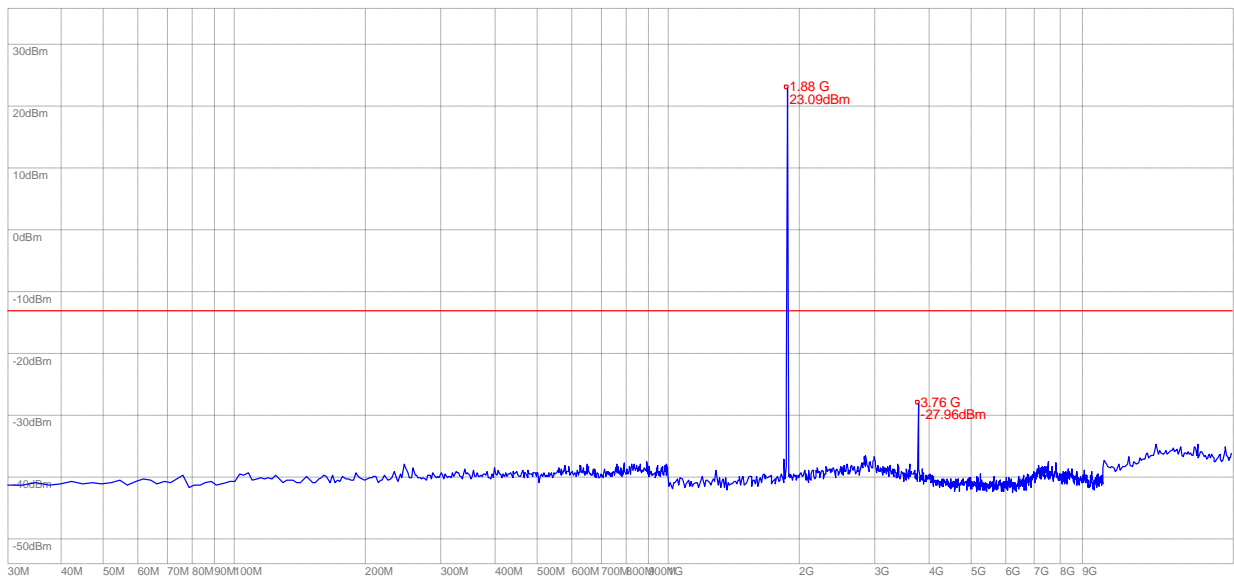
1. Table for the Harmonics:

No.	Channel	Frequency(MHz)	Measured Max Spurious Emission(dBm)	Limit(dBm)
1.	25	1851.25	-24.70	-13
2.	600	1880.0	-27.96	-13
3.	1175	1908.75	-24.87	-13

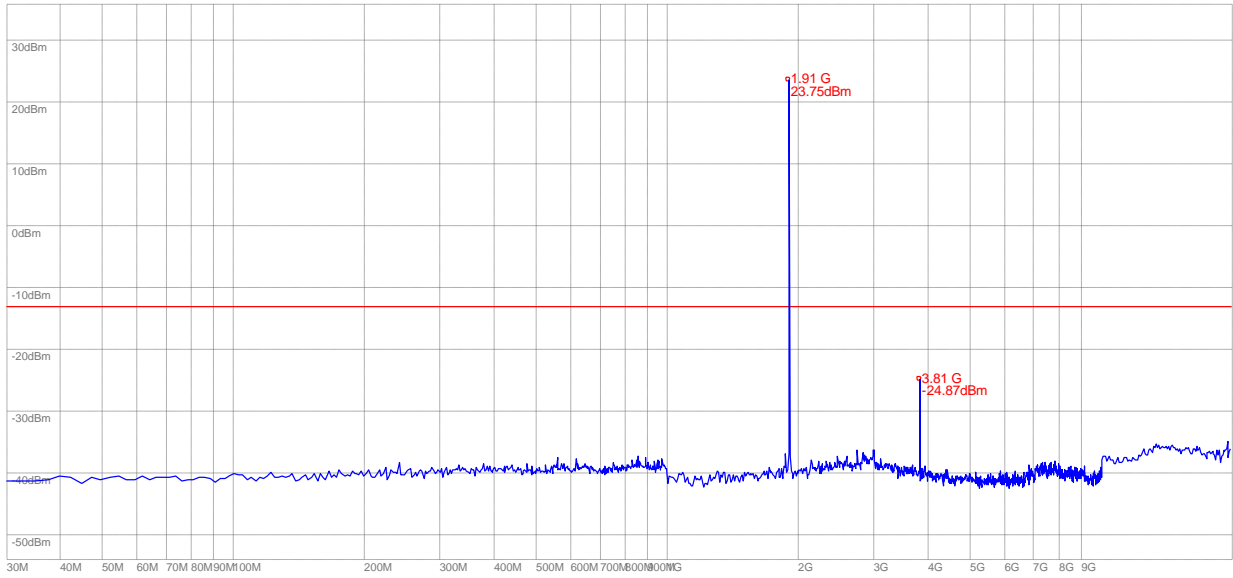
2. Plot for Spurious Emission:



(Plot A: CDMA 1900MHz Channel = 25, 30MHz to 20GHz)



(Plot B: CDMA 1900MHz Channel = 600, 30MHz to 20GHz)



(Plot C: CDMA 1900MHz Channel = 1175, 30MHz to 20GHz)

3.5 Band Edge

3.5.1 Requirement

According to FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

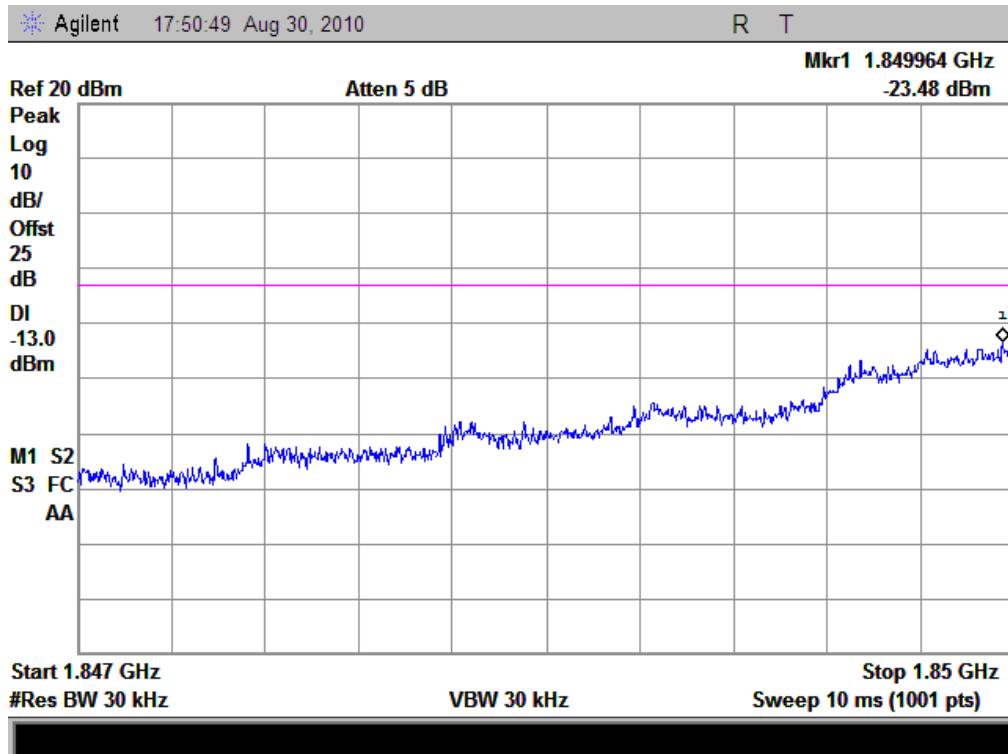
3.5.2 Test Result

The lowest and highest channels are tested to verify the band edge emissions.

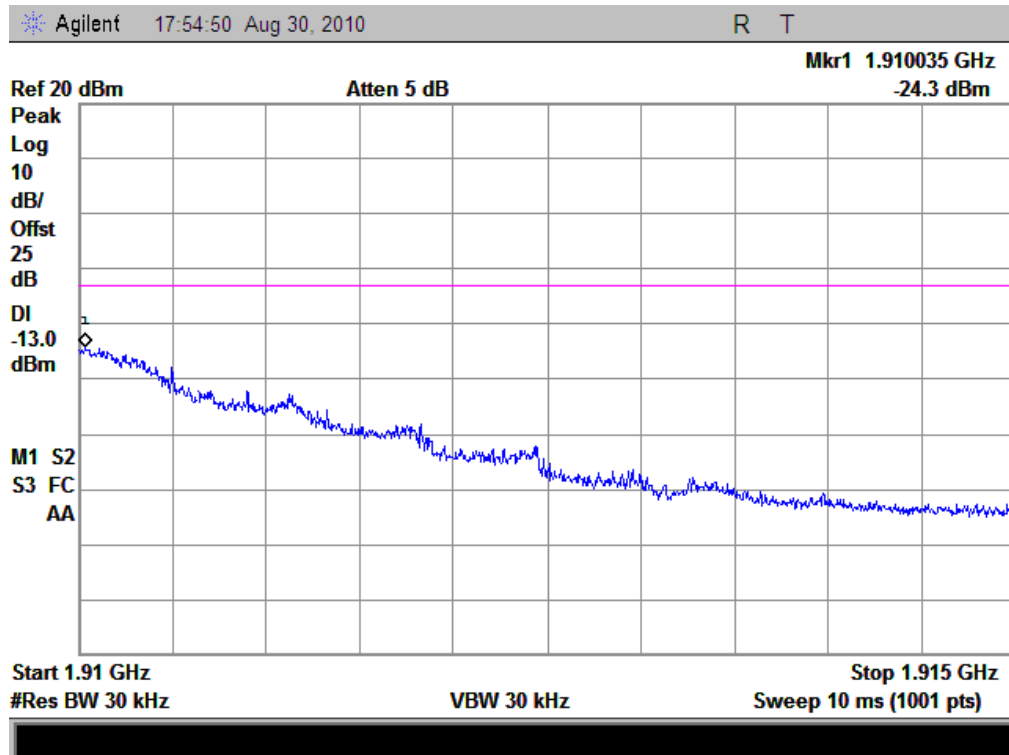
1. Test Verdict:

Band	Channe 1	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
CDMA 1900MHz	25	1851.25	-23.48	Plat A	-13	PASS
	1175	1908.75	-24.3	Plot B		PASS

2. Plots



(Plot A: CDMA 1900MHz Channel = 25)



(Plot B: CDMA 1900MHz Channel = 1175)

3.6 Transmitter Radiated Power (EIRP)

3.6.1 Requirement

According to FCC 24.232, the EIRP of Cellular mobile transmitters must not exceed 2 Watts (33dBm).

According to FCC 24.232, the equipment must employ means to limit the power to the minimum necessary for successful communications. We tested the minimum power via conduct method please refer to section 3.1.1 of this report.

Minimum necessary power = -63.03dBm/MHz

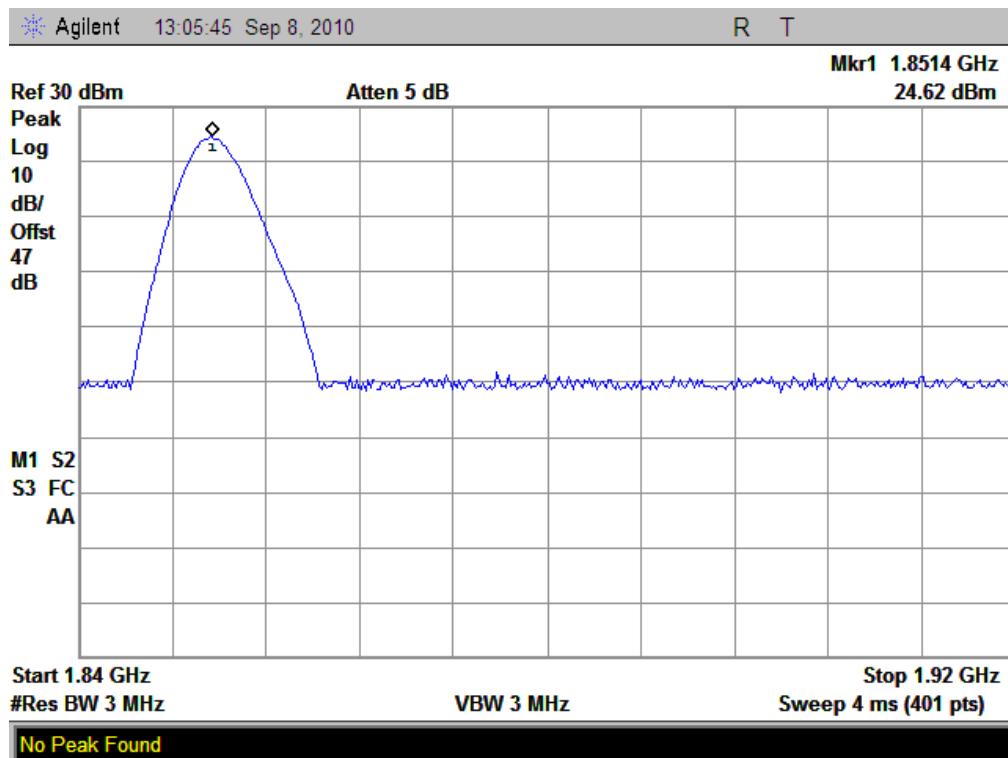
3.6.2 Test Procedure

1. Perform test system setup as section 3.1.2.
2. The resolution bandwidth of the Spectrum Analyzer is set to be comparable to the emission bandwidth of the transmitter, e.g. for GSM modulated signal (here used): RBW=VBW=1MHz, for CDMA modulated signal: RBW=VBW=3MHz.
3. The low, middle and the high channels are selected to perform tests respectively. Set the TCH number to 25 as the low channel.
4. Employ the bi-log Test Antenna as the test system receiving antenna; set the polarization of the Test Antenna to be the same as that of the EUT transmitting antenna.
5. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the peak; finally record the peak and the plot.
6. Set the TCH number to 600 as the middle channel, then repeat step 5.
7. Set the TCH number to 1175 as the high channel, then repeat step 5.

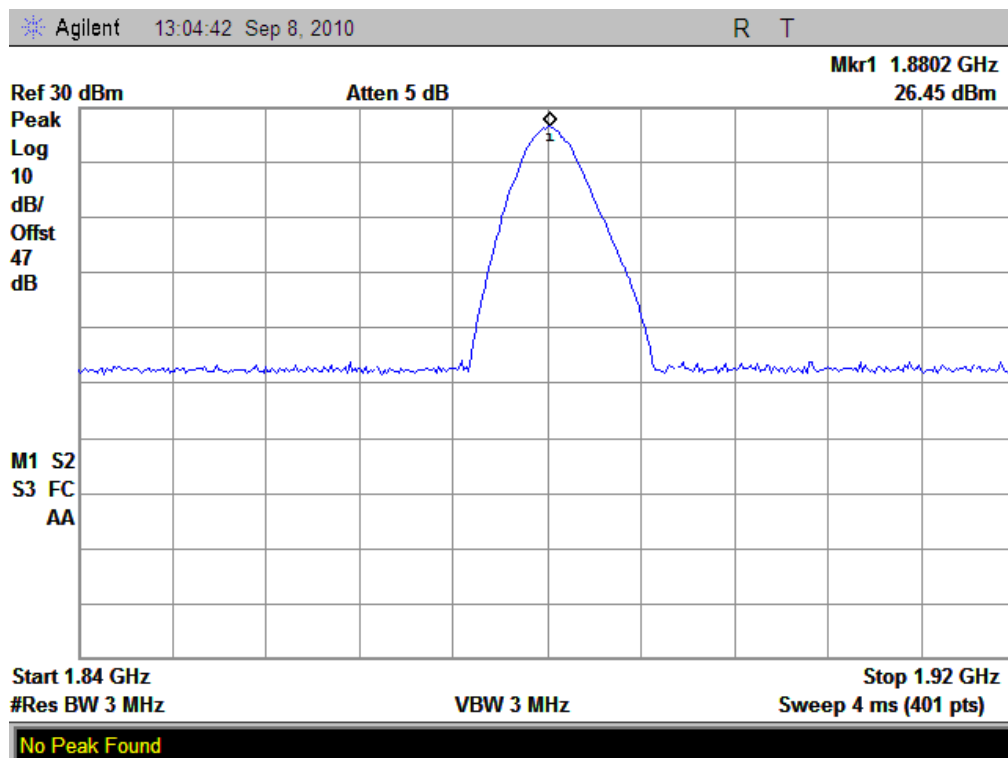
3.6.3 Test Result

No.	Channel	Frequency (MHz)	Measured ERP		Limit EIRP	
			dBm	W	dBm	W
1	25	1851.3	24.62	0.29	33	2
2	600	1880.0	26.45	0.44	33	2
3	1175	1908.8	24.55	0.29	33	2

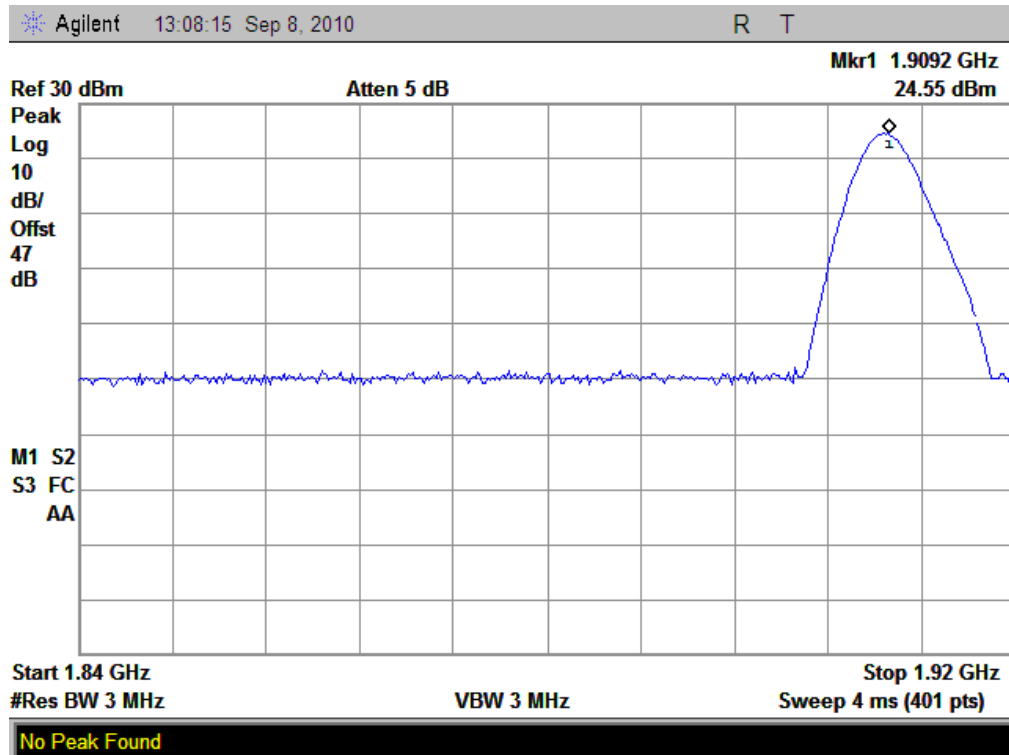
1. Plot when the TCH number set to 25:



2. Plot when the TCH number set to 600:



3. Plot when the TCH number set to 1175:



3.7 Radiated Spurious Emission

3.7.1 Requirement

According to FCC 24.238(a), 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. This calculated to be -13dBm.

3.7.2 Test Procedure

1. Perform test system setup as section 3.1.2.
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer, and set the RBW of the Spectrum Analyzer to 1MHz.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Employ the bi-log Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 30MHz to 3GHz.
5. The measurement is performed with the Test Antenna at both horizontal and vertical polarization respectively. Set the polarization of the Test Antenna to be horizontal.
6. Actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the fundamental frequency and the harmonics thereof, after then record the harmonics and the plot.
7. Set the polarization of the Test Antenna to be vertical, then repeat step 6.
8. Employ the horn Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 3GHz to 10th harmonic of the fundamental frequency (here used 20GHz for CDMA1900MHz).

3.7.3 Test Result

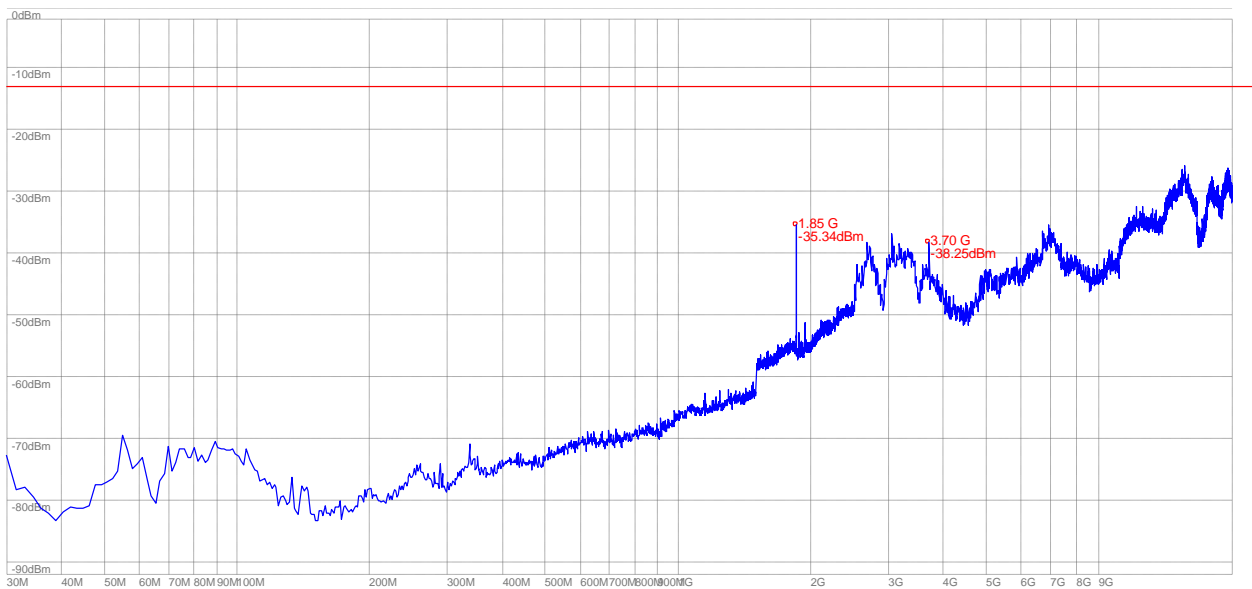
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

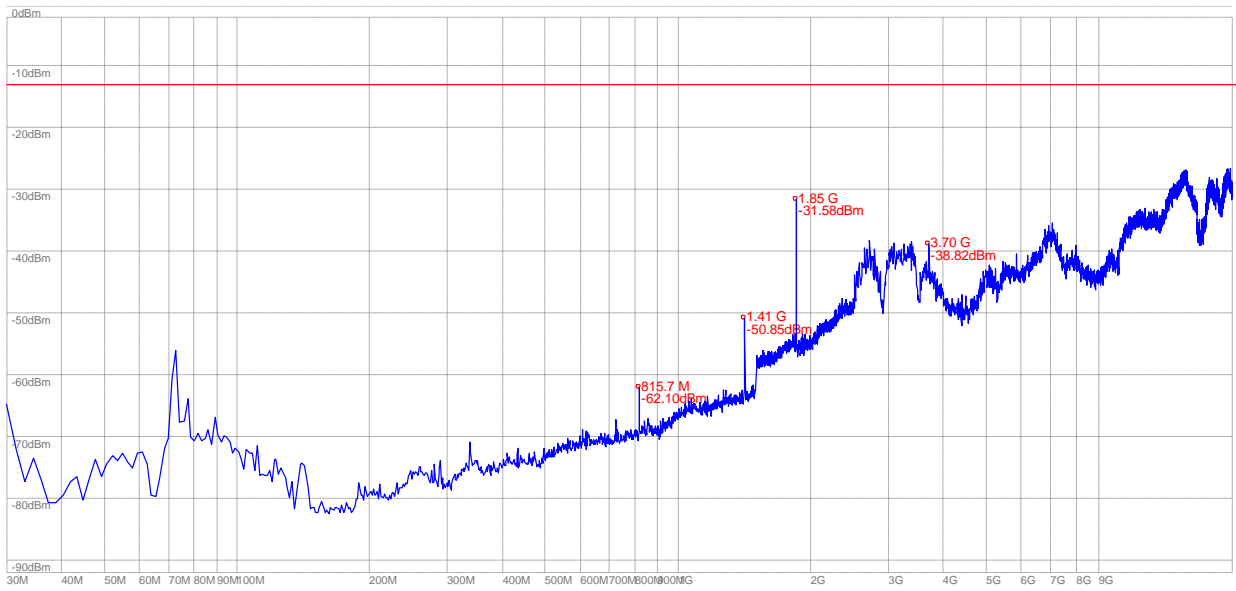
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
CDMA 1900MHz	25	1851.25	-38.25	-38.82	Plot A.1/A.2	-13	PASS
	600	1880.0	-37.99	-53.44	Plot B.1/B.2		PASS
	1175	1908.75	-53.92	-37.51	Plot C.1/C.2		PASS

2. Test Plot for the Whole Measurement Frequency Range:

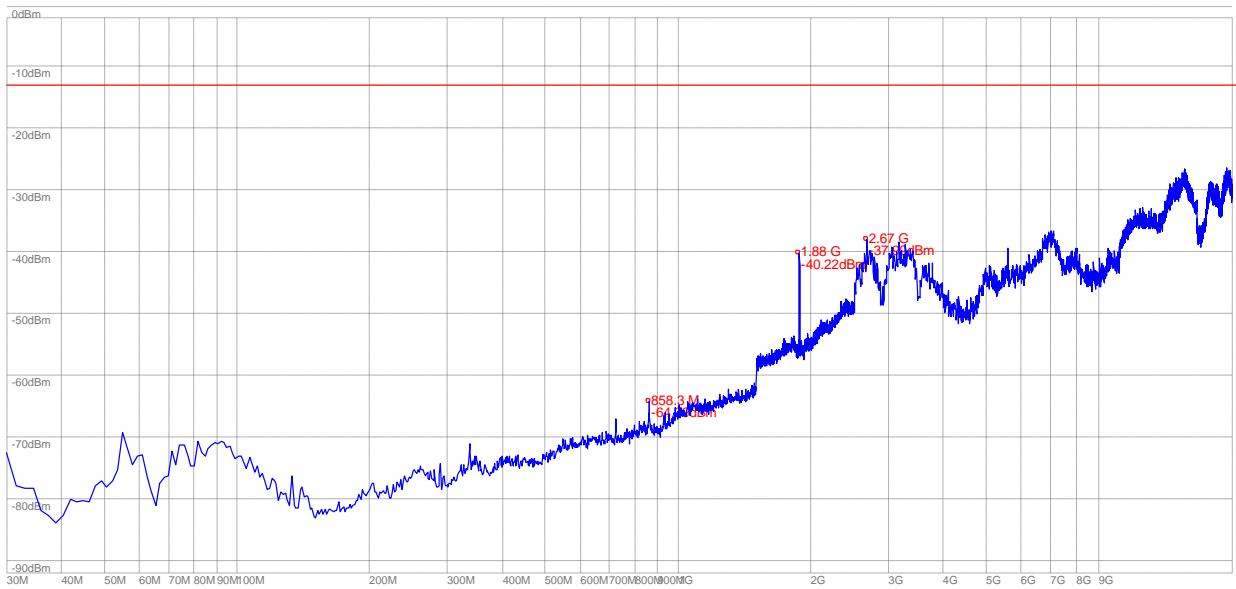
Note: the power of the EUT transmitting frequency should be ignored.



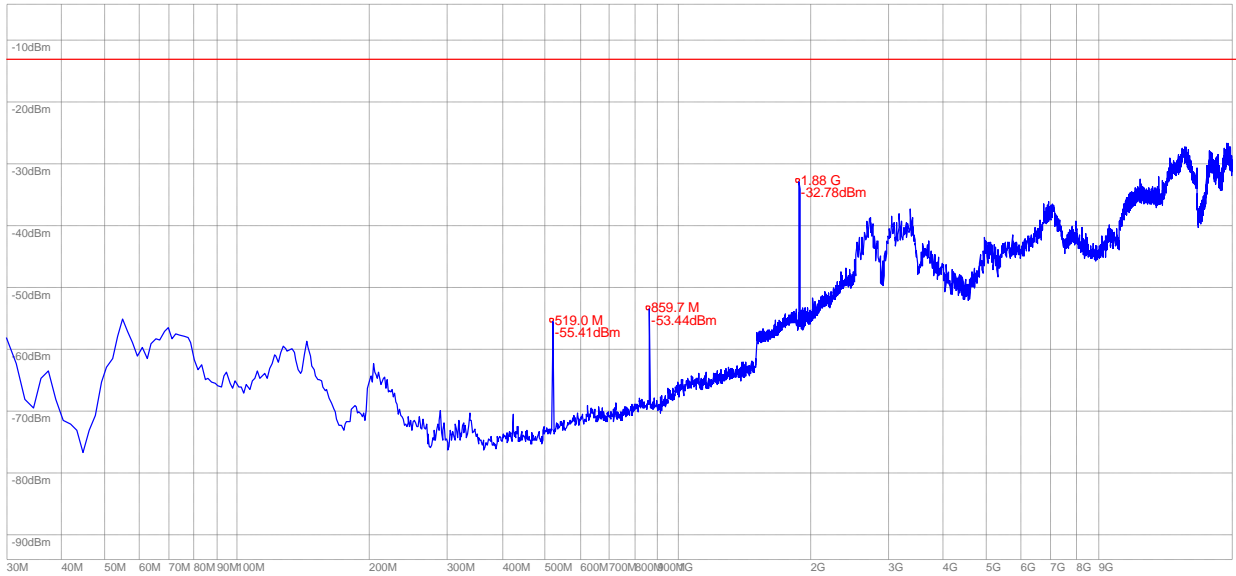
(Plot A.1: Plot when the TCH number set to 25, Test Antenna Horizontal)



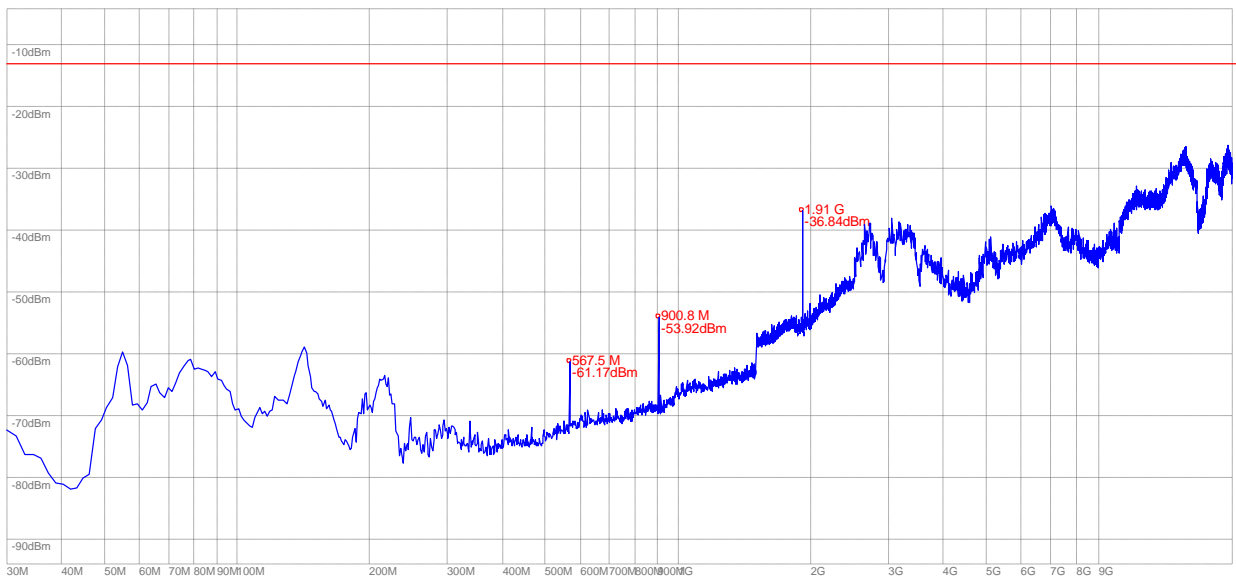
(Plot A.2: Plot when the TCH number set to 25, Test Antenna Vertical)



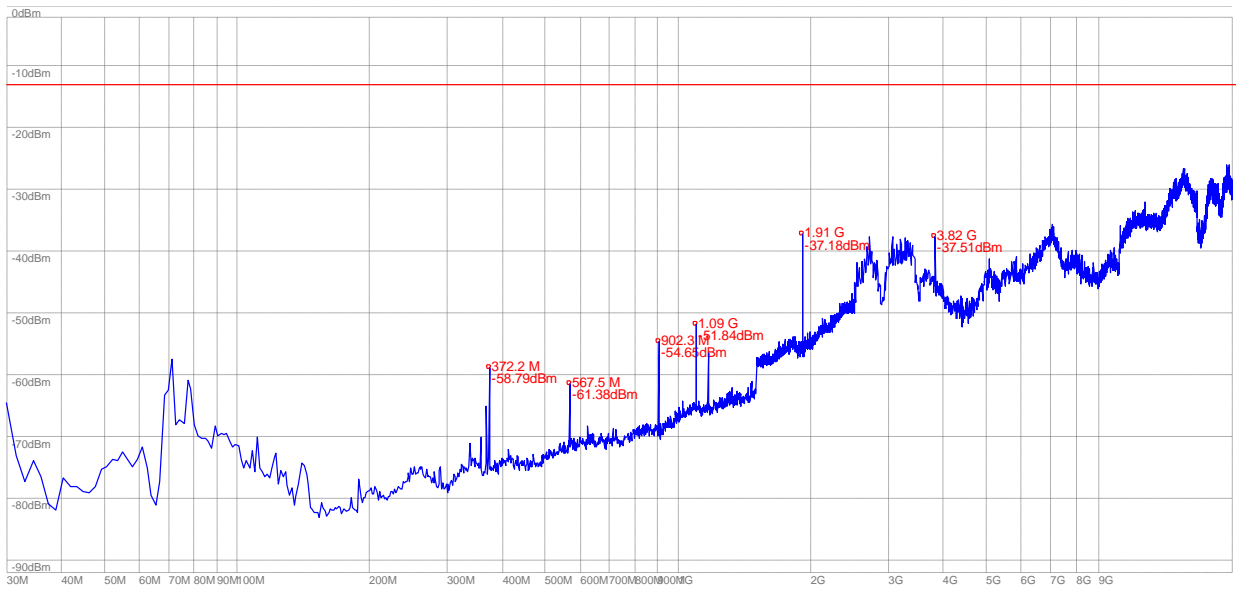
(Plot B.1: Plot when the TCH number set to 600, Test Antenna Horizontal)



(Plot B.2: Plot when the TCH number set to 600, Test Antenna Vertical)



(Plot C.1: Plot when the TCH number set to 1175, Test Antenna Horizontal)



(Plot C2: Plot when the TCH number set to 1175, Test Antenna Vertical)

3.8 Frequency Stability

3.8.1 Frequency Stability Requirement

According to FCC 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

According to FCC §2.1055, the test conditions are:

- (a) Temperature:
The temperature is varied from -30 °C to +50 °C at intervals of not more than 10 °C.
- (b) Primary Supply Voltage:
For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

3.8.2 Test Procedure

1. Perform test system setup as section 3.1.3.
2. Set the voltage of the DC Power Supply to normal supply voltage (here used 3.7V) and the temperature of the Temperature Chamber to vary from -30 °C to +50 °C at intervals of 10 °C.
3. At each temperature level, the EUT is powered off and kept in the Temperature Chamber for two hours. After sufficient stabilization, turn on the EUT, command it via the System Simulator (SS) to operate at the maximum output power i.e. A communication link is established between the EUT and the SS.
4. The low, middle and the high channels are selected to perform tests respectively. Set the TCH number to 25 as the low channel.
5. The frequency deviation is measured (directly read from the SS, which can report the parameter) within three minutes.
6. Set the TCH number to 600 as the middle channel, then repeat step 5.
7. Set the TCH number to 1175 as the high channel, then repeat step 5.
8. Adjust the temperature of the Temperature Chamber as specified in step 2, then repeat step 3 to 7.
9. Set the voltage of the DC Power Supply to high extreme supply voltage (here used 4.2V) and the temperature of the Temperature Chamber to normal (here used +22 °C), then repeat step 3 to 8.
10. Set the voltage of the DC Power Supply to low extreme supply voltage (here used 3.6V) and the temperature of the Temperature Chamber to normal (here used +22 °C), then repeat step 3 to 8.

3.8.3 Test Result

No.	Test Conditions		Frequency Deviation at Channels Used						limits
	Voltage	Temperature	25		600		1175		
			Hz	ppm	Hz	ppm	Hz	ppm	
1	3.7V	-30 °C	-20.01	-0.017	-8.05	-0.007	-10.28	-0.009	±2.5ppm
2		-20 °C	-10.22	-0.008	6.33	0.005	9.67	0.008	
3		-10 °C	18.75	0.015	7.89	0.007	-7.41	-0.006	
4		0 °C	8.79	0.007	15.2	0.013	3.54	0.003	
5		+10 °C	-0.68	-0.001	-3.55	-0.003	-6.33	-0.005	
6		+20 °C	9.35	0.008	17	0.014	10.07	0.009	
7		+30 °C	10.27	0.008	-8.07	-0.007	-3.66	-0.003	
8		+40 °C	17.56	0.014	5.52	0.005	9.51	0.008	
9		+50 °C	5.43	0.004	-3.09	-0.003	5.74	0.005	
10	4.2V	+22 °C	1.99	0.002	8.77	0.007	-3.11	-0.003	
11	3.6V	+22 °C	7.67	0.006	-9.61	-0.008	10.97	0.009	

TEST Result: PASS

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