

TEST REPORT

Reference No...... : WTS18S12133823-9W
FCC ID : 2AC88-ELTS18A02
Applicant..... : HONGKONG UCLOUDLINK NETWORK TECHNOLOGY LIMITED
Address..... : Suite 603, 6/F, Laws Commercial Plaza, 788 Cheung Sha Wan Road, Kowloon, Hong Kong
Manufacturer : The same as above
Address..... : The same as above
Product Name..... : Smart Phone
Model No...... : ELTS18A02
Brand..... : GlocalMe
Standards..... : FCC CFR47 Part 22 Subpart H:2018
FCC CFR47 Part 24 Subpart E:2018
Date of Receipt sample : 2018-12-25
Date of Test : 2018-12-26 to 2019-03-20
Date of Issue..... : 2019-03-21
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

Ford Wang

Ford Wang / Project Engineer

Approved by:



Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC (The Federal Communications Commission), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:**A. Accreditations for Conformity Assessment (International)**

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. ISED CAB identifier: CN0013			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Contents

	Page
1 COVER PAGE.....	1
2 LABORATORIES INTRODUCTION.....	2
3 CONTENTS	4
4 REVISION HISTORY	6
5 GENERAL INFORMATION.....	7
5.1 GENERAL DESCRIPTION OF E.U.T.	7
5.2 DETAILS OF E.U.T.	7
5.3 TEST MODE	9
6 TEST SUMMARY	10
7 EQUIPMENT USED DURING TEST	11
7.1 EQUIPMENTS LIST	11
7.2 MEASUREMENT UNCERTAINTY	13
7.3 TEST EQUIPMENT CALIBRATION	13
8 RF OUTPUT POWER	14
8.1 EUT OPERATION.....	14
8.2 TEST PROCEDURE	14
8.3 TEST RESULT	15
9 PEAK-TO-AVERAGE RATIO.....	18
9.1 EUT OPERATION.....	18
9.2 TEST PROCEDURE	18
9.3 TEST RESULT	19
10 BANDWIDTH.....	20
10.1 EUT OPERATION.....	20
10.2 TEST PROCEDURE.....	20
10.3 TEST RESULT	21
11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS	28
11.1 EUT OPERATION.....	28
11.2 TEST PROCEDURE.....	28
11.3 TEST RESULT	29
12 SPURIOUS RADIATED EMISSIONS.....	33
12.1 EUT OPERATION.....	33
12.2 TEST SETUP	33
12.3 SPECTRUM ANALYZER SETUP	34
12.4 TEST PROCEDURE.....	35
12.5 SUMMARY OF TEST RESULTS	36
13 BAND EDGE MEASUREMENT	37
13.1 EUT OPERATION.....	37
13.2 TEST PROCEDURE.....	37
13.3 TEST RESULT	38
14 FREQUENCY STABILITY.....	42
14.1 EUT OPERATION.....	42
14.2 TEST PROCEDURE.....	42
14.3 TEST RESULT	43

15 RF EXPOSURE.....45

16 PHOTOGRAPHS OF TEST SETUP AND EUT.....46

4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S12133 823-9W	2018-12-25	2018-12-26 to 2019-03-20	2019-03-21	original	-	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	Smart Phone
Model(s):	ELTS18A02
Model Description:	N/A
GSM Band(s):	GSM 850/900/1800/1900MHz
GPRS/EGPRS Class:	12
WCDMA Band(s):	FDD Band I/II/IV/V/VIII
CDMA Band(s):	BC0/ BC1
LTE Band(s):	FDD Band 2/4/5/7/12/13/17/26 TDD Band 41
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/ n(HT20/40)/ac(HT20/40/80)
Bluetooth Version:	Bluetooth v4.1 with BLE
GPS:	Support
NFC:	Support
Hardware Version:	S20i_M_VB
Software Version:	S20iQ19_C00_TSV1.4001.001.190226 userdebug release-keys
Highest frequency (Exclude Radio):	1.8GHz
Storage Location:	Internal Storage
Note:	This EUT has two SIM card slots, and use same one RF module. We found that RF parameters are the same, when we insert the card 1 and card 2. So we usually performed the test under main card slot 1.

5.2 Details of E.U.T.

Operation Frequency:	CDMA2000 BC0: 824.70~848.31MHz CDMA2000 BC1: 1851.25~1908.75MHz
Max. RF output power:	CDMA2000 BC 0: 23.50dBm CDMA2000 BC 1: 21.97dBm
Type of Modulation:	CDMA2000: QPSK, 8PSK
Antenna installation:	CDMA2000: internal permanent antenna
Antenna Gain	CDMA2000 BC0: -3.69dBi CDMA2000 BC1: -3.34dBi
Type of Emission:	CDMA2000 BC0: 1M28F9W, CDMA2000 BC1: 1M29F9W,
Ratings:	Battery DC 3.85V, 2000mAh DC 5V, 2.0A charging from adapter 1

(Adapter Input: 100-240V~50/60Hz 0.3A)
DC 5V, 2.0A charging from adapter 2
(Adapter Input: 100-240V~50/60Hz MAX 0.35A)

Adapter 1: Manufacturer: ShenZhen HuaJin Electronics CO.,LTD
Model No.: HJ-0502000W2-US

Adapter 2: Manufacturer: Shenzhen Flypower Technology Co., Ltd.
Model No.: PS10J050K2000UU

5.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Support Band	Test Mode	Channel Frequency	Channel Number
CDMA2000 BC0	Voice	824.70 MHz	1013
		836.52 MHz	384
		848.31 MHz	777
	1xEVDO	824.70 MHz	1013
		836.52 MHz	384
		848.31 MHz	777
CDMA2000 BC1	Voice	1851.25 MHz	25
		1880.00 MHz	600
		1908.75 MHz	1175
	1xEVDO	1851.25 MHz	25
		1880.00 MHz	600
		1908.75 MHz	1175

6 Test Summary

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c)	PASS
Peak-to-Average Ratio	24.232 (d)	PASS
Bandwidth	2.1049 22.905 22.917 24.238	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a)	PASS
Out of band emission, Band Edge	22.917 (a) 24.238 (a)	PASS
Frequency Stability	2.1055 22.355 24.235	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2018-09-12	2019-09-11
2.	LISN	R&S	ENV216	101215	2018-09-12	2019-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2018-09-12	2019-09-11
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2018-09-12	2019-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018-09-12	2019-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2018-09-12	2019-09-11
4.	Cable	LARGE	RF300	-	2018-09-12	2019-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2018-04-29	2019-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-09	2019-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2018-04-09	2019-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-09-12	2019-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-04-09	2019-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-04-09	2019-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-13	2019-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2018-04-13	2019-04-12
9	Universal Radio Communication Tester	R&S	CMU 200	112461	2018-04-13	2019-04-12
10	Signal Generator	R&S	SMR20	100046	2018-09-12	2019-09-11
11	Smart Antenna	SCHWARZBECK	HA08	-	2018-04-09	2019-04-08
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date

1	Test Receiver	R&S	ESCI	101296	2018-04-13	2019-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-09	2019-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2018-04-13	2019-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2018-04-13	2019-04-12
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2018-09-12	2019-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2018-09-12	2019-09-11
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	2018-09-12	2019-09-11
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2018-09-12	2019-09-11

7.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Confidence interval: 95%. Confidence factor:k=2	

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 RF OUTPUT POWER

Test Requirement:	FCC Part 2.1046, 22.913 (a),24.232 (c)
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

8.1 EUT Operation

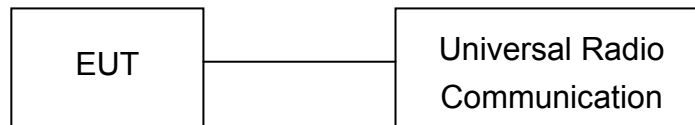
Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

8.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

8.3 Test Result

Conducted Power

Conducted Power(dBm)						
Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency	824.70	836.52	848.31	1851.25	1880.00	1908.75
Voice	23.43	23.47	23.50	21.81	21.85	21.97
1xEVDO	23.00	24.00	23.79	21.81	21.16	21.45

Radiated Power

Main board

Max. ERP and EIRP

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Voice BC0 Channel 1013										
824.70	86.33	302	1.4	H	19.30	0.20	0.00	19.10	38.45	-19.35
824.70	86.35	188	1.8	V	19.25	0.20	0.00	19.05	38.45	-19.40
Voice BC0 Channel 384										
836.52	86.51	136	2.1	H	19.48	0.20	0.00	19.28	38.45	-19.17
836.52	86.64	235	2.2	V	19.54	0.20	0.00	19.34	38.45	-19.11
Voice BC0 Channel 777										
848.31	86.19	58	2.2	H	19.16	0.20	0.00	18.96	38.45	-19.49
848.31	86.31	14	1.4	V	19.21	0.20	0.00	19.01	38.45	-19.44
1xEVDO BC0 Channel 1013										
824.70	86.43	213	1.1	H	19.40	0.20	0.00	19.20	38.45	-19.25
824.70	86.37	355	1.1	V	19.27	0.20	0.00	19.07	38.45	-19.38
1xEVDO BC0 Channel 384										
836.52	86.41	232	1.8	H	19.38	0.20	0.00	19.18	38.45	-19.27
836.52	86.21	177	1.2	V	19.11	0.20	0.00	18.91	38.45	-19.54
1xEVDO BC0 Channel 777										
848.31	85.99	194	2.2	H	18.96	0.20	0.00	18.76	38.45	-19.69
848.31	87.01	275	1.0	V	19.91	0.20	0.00	19.71	38.45	-18.74

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Voice BC1 Channel 25										
1851.50	82.39	27	2.2	H	8.42	0.31	10.40	18.51	33	-14.49
1851.50	82.01	300	2.4	V	8.73	0.31	10.40	18.82	33	-14.18
Voice BC1 Channel 600										
1880.00	82.31	70	2.2	H	8.46	0.31	10.40	18.55	33	-14.45
1880.00	81.69	86	1.2	V	8.57	0.31	10.40	18.66	33	-14.34
Voice BC1 Channel 1175										
1908.50	81.69	313	2.5	H	7.96	0.32	10.40	18.04	33	-14.96
1908.50	81.11	248	1.6	V	8.15	0.32	10.40	18.23	33	-14.77
1xEVDO BC1 Channel 25										
1851.50	82.13	4	1.4	H	8.16	0.31	10.40	18.25	33	-14.75
1851.50	81.97	137	1.3	V	8.69	0.31	10.40	18.78	33	-14.22
1xEVDO BC1 Channel 600										
1880.00	82.39	31	2.2	H	8.54	0.31	10.40	18.63	33	-14.37
1880.00	81.74	157	1.5	V	8.62	0.31	10.40	18.71	33	-14.29
1xEVDO BC1 Channel 1175										
1908.50	82.31	164	2.1	H	8.58	0.32	10.40	18.66	33	-14.34
1908.50	81.36	90	1.7	V	8.58	0.32	10.40	18.66	33	-14.34

9 Peak-to-Average Ratio

Test Requirement:	24.232 (d)
Test Method:	N/A
Test Mode:	Transmitting

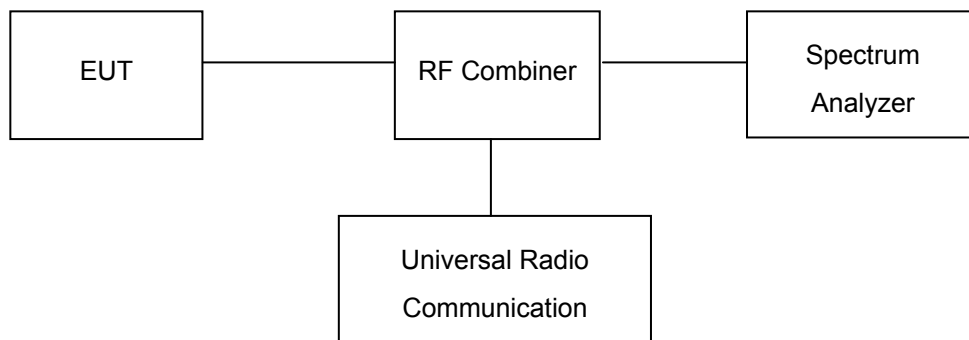
9.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

9.2 Test Procedure

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.



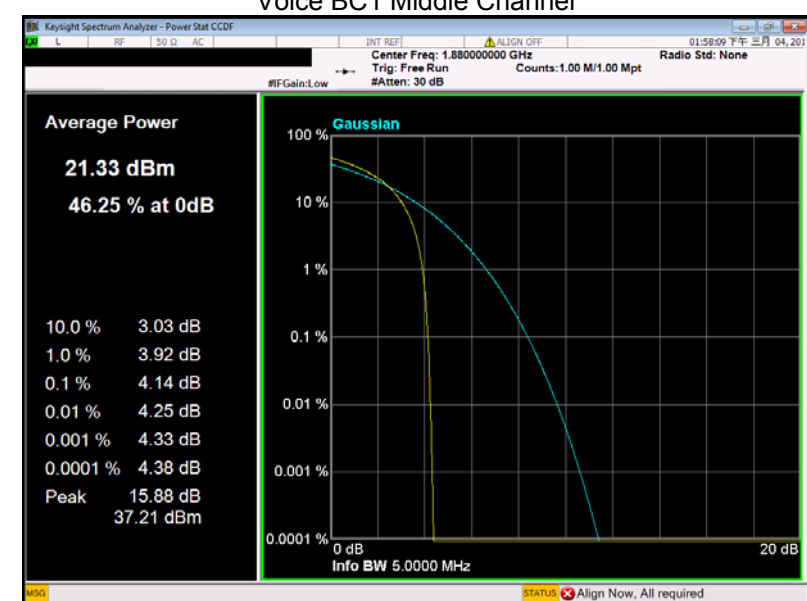
9.3 Test Result

Cellular Band (Part 24E)

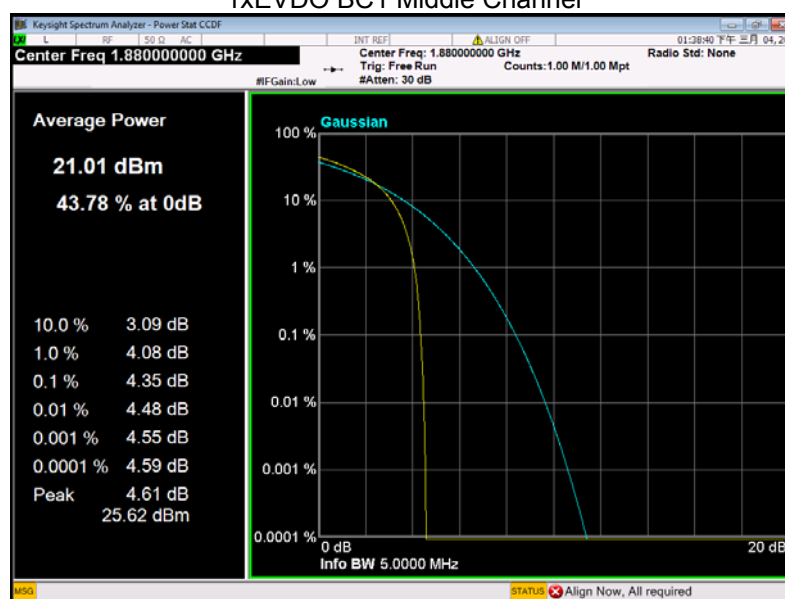
Mode	Voice BC1			1xEVDO BC1			Limit (dB)
Channel	25	600	1175	25	600	1175	
Frequency (MHz)	1851.25	1880.00	1908.75	1851.25	1880.00	1908.75	
Peak-to-Average Ratio (dB)	4.10	4.14	4.05	4.27	4.35	4.29	13

Test Plots (Part 24E)

Voice BC1 Middle Channel



1xEVDO BC1 Middle Channel



10 BANDWIDTH

Test Requirement:	FCC Part 2.1049,22.917,22.905,24.238
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

10.1 EUT Operation

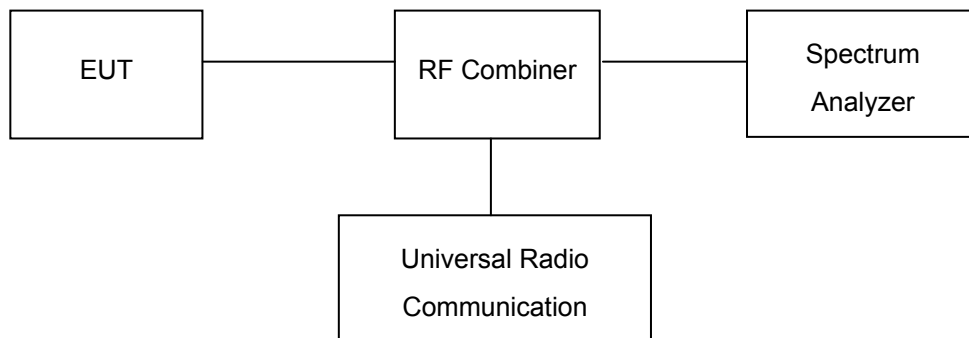
Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

10.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.

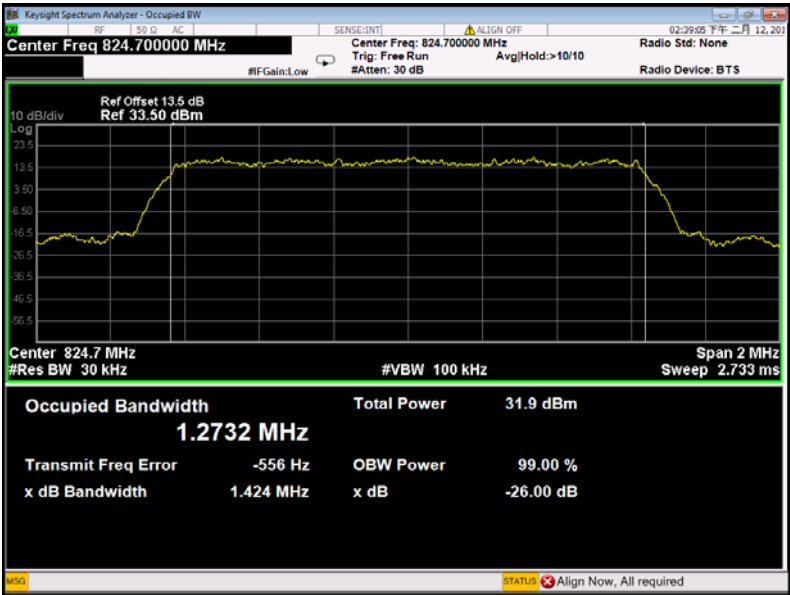
The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99%bandwidth was recorded.



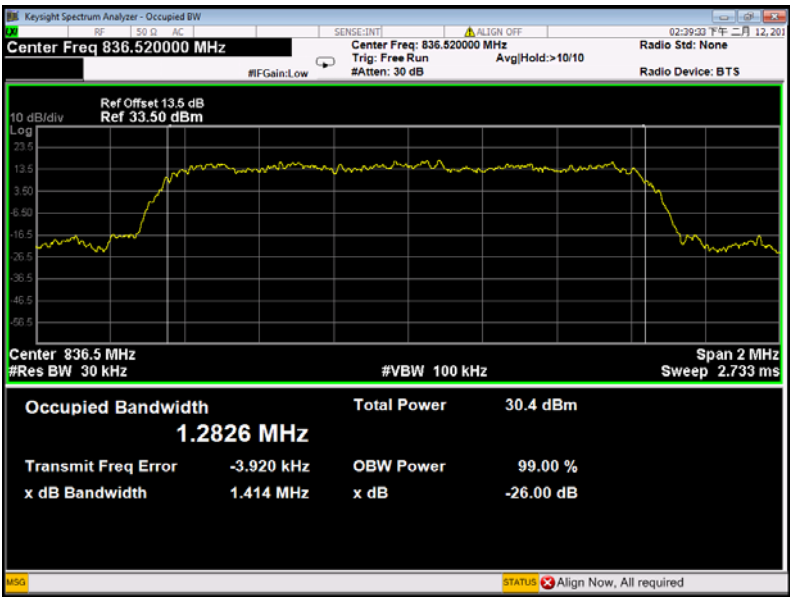
10.3 Test Result

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(mHz)	26 dB Emission Bandwidth(mHz)
Voice BC0	1013	824.70	1.27	1.42
	384	836.52	1.28	1.41
	777	848.31	1.28	1.43
1xEVDO BC0	1013	824.70	1.28	1.43
	384	836.52	1.27	1.42
	777	848.31	1.27	1.43
Voice BC1	25	1851.25	1.28	1.43
	600	1880.00	1.29	1.44
	1175	1908.75	1.29	1.45
1xEVDO BC1	25	1851.25	1.28	1.43
	600	1880.00	1.28	1.44
	1175	1908.75	1.28	1.44

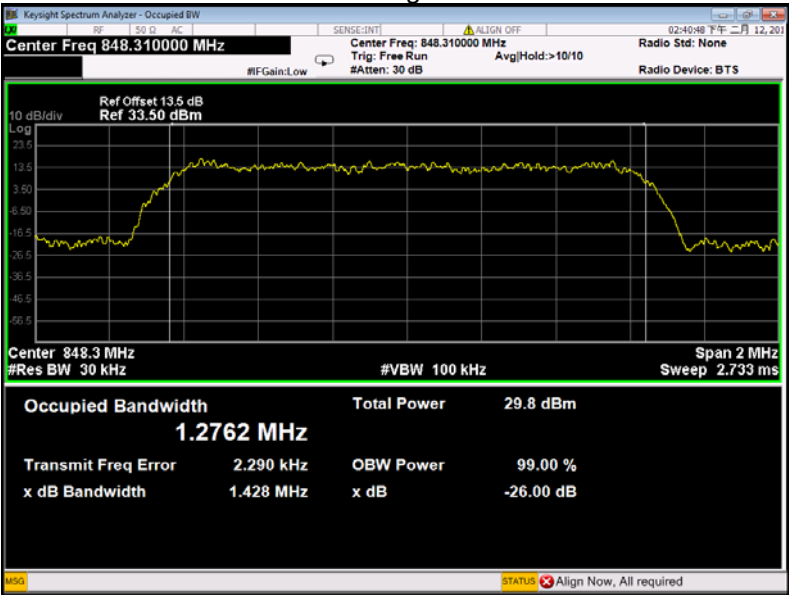
Test Plots
Voice BC0 Low Channel



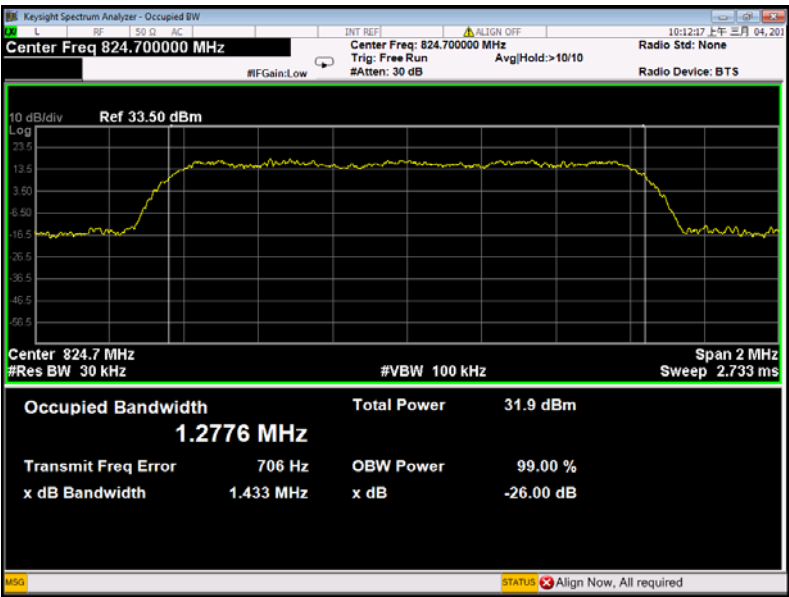
Voice BC0 Middle Channel



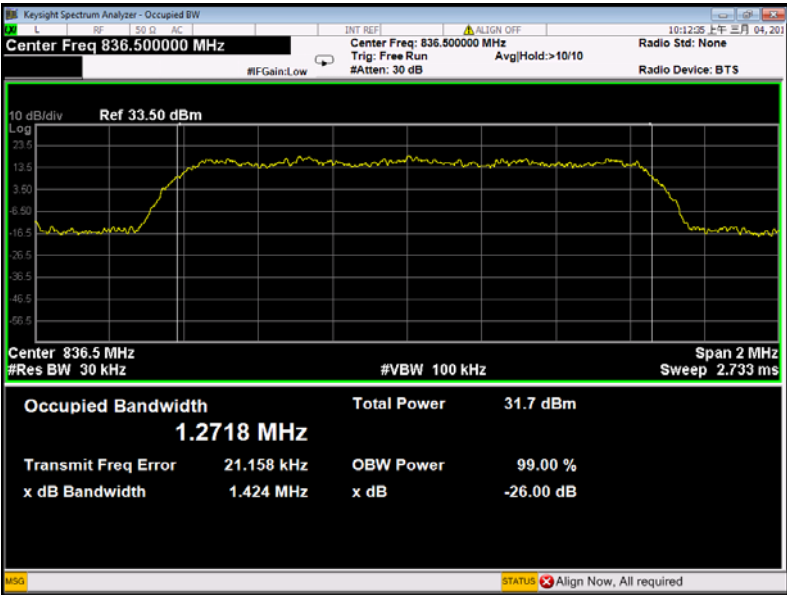
Voice BC0 High Channel



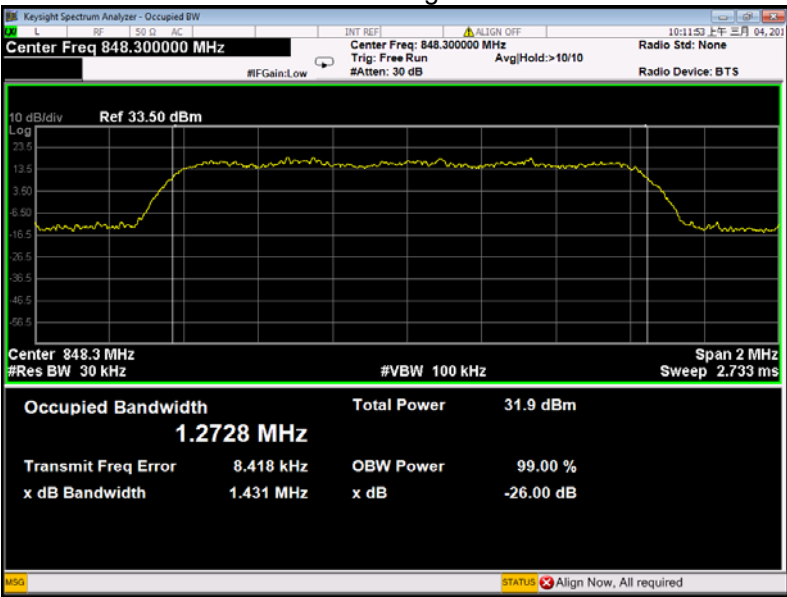
1xEVDO BC0 Low Channel



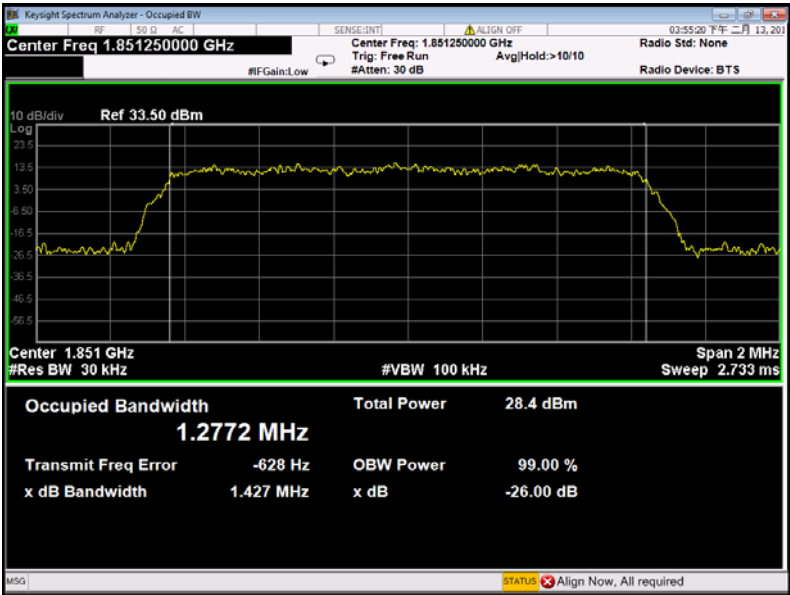
1xEVDO BC0 Middle Channel



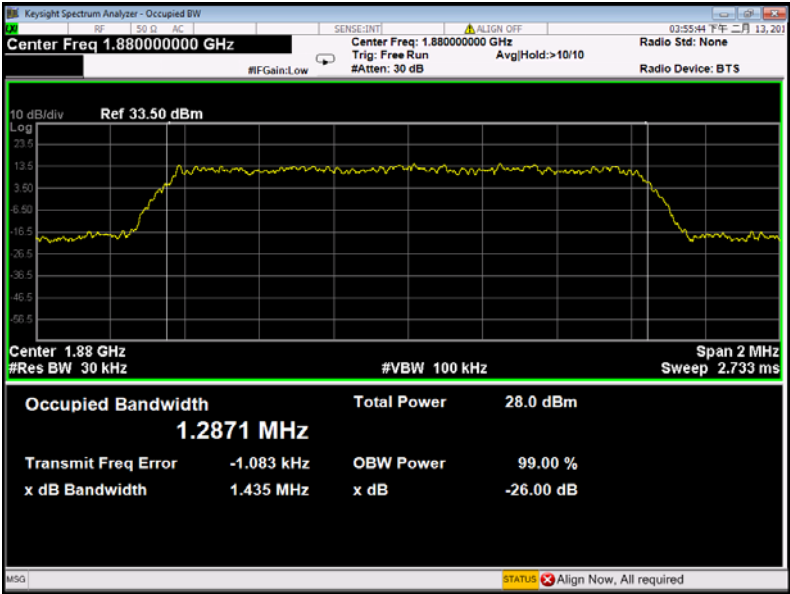
1xEVDO BC0 High Channel



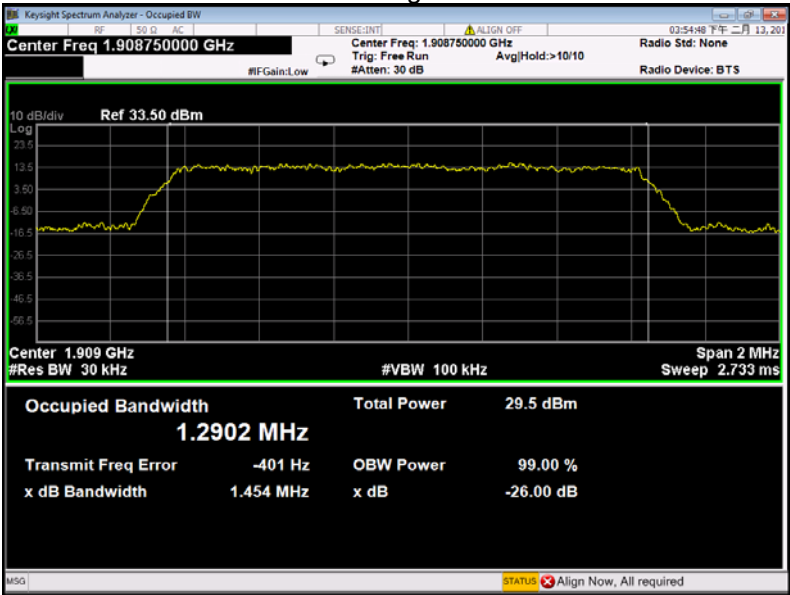
Voice BC1 Low Channel



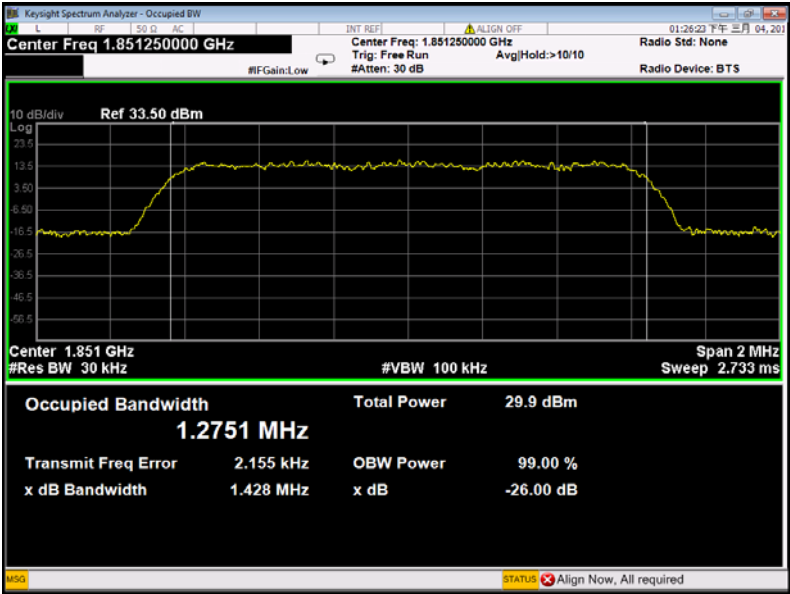
Voice BC1 Middle Channel



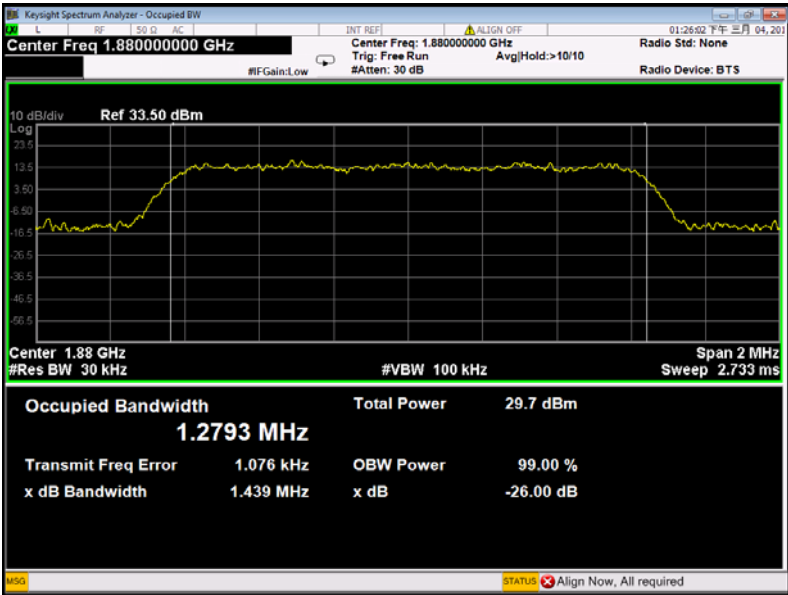
Voice BC1 High Channel



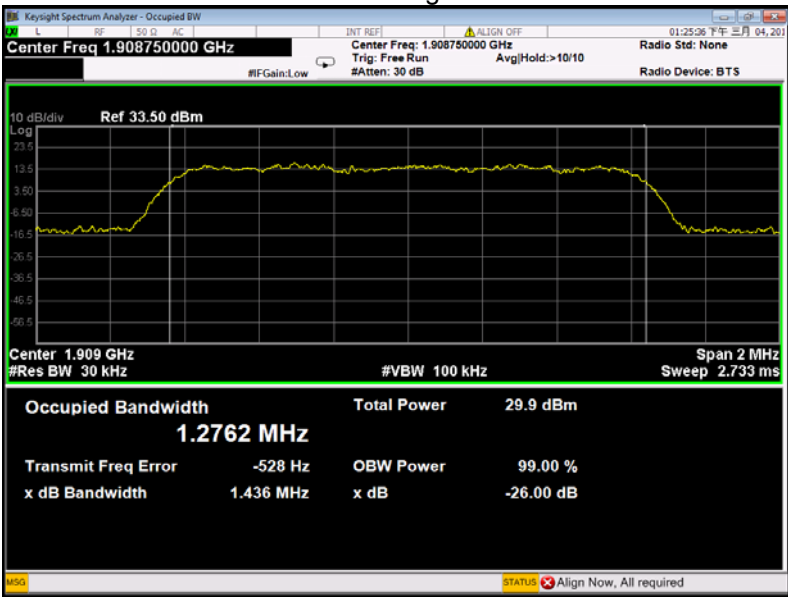
1xEVDO BC1 Low Channel



1xEVDO BC1 Middle Channel



1xEVDO BC1 High Channel



11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

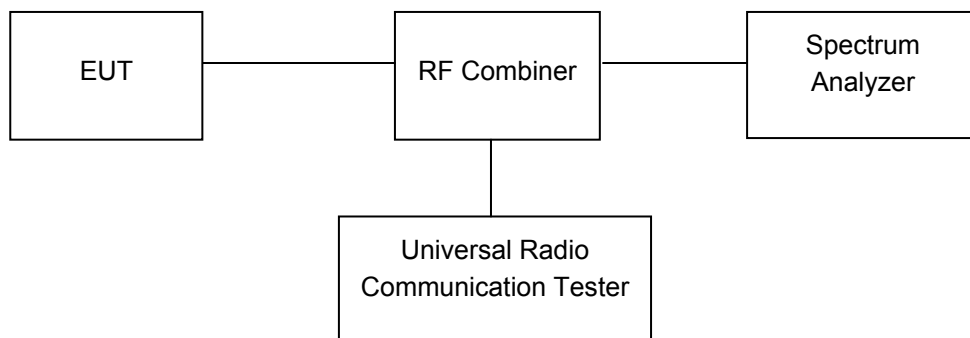
11.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.3kPa

11.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.



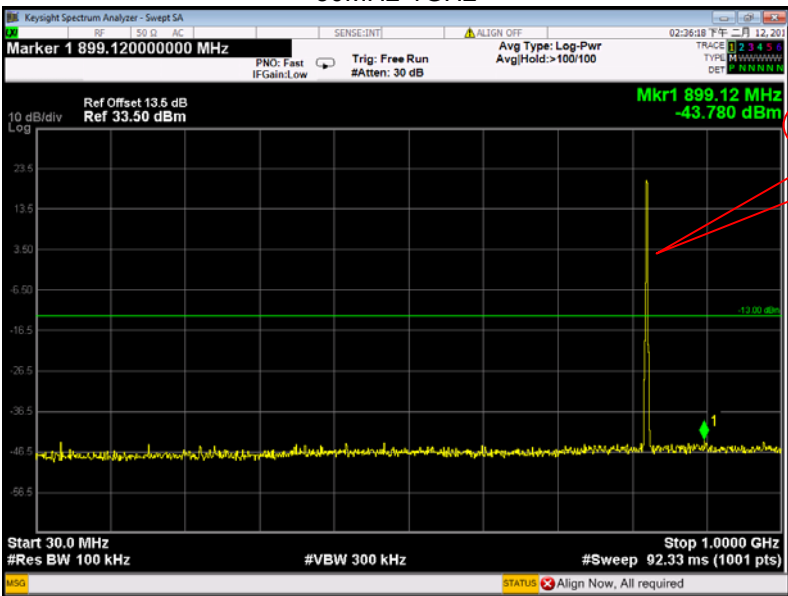
11.3 Test Result

Remark: All test mode were tested only the worst data were recorded.

Cellular Band (Part 22H)

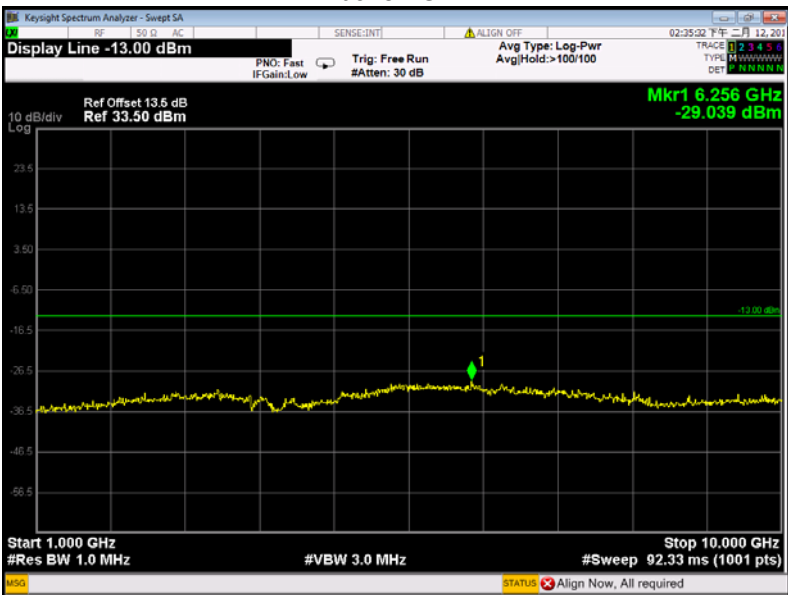
Voice BC0 - channel 384

30MHz-1GHz



Fundamental

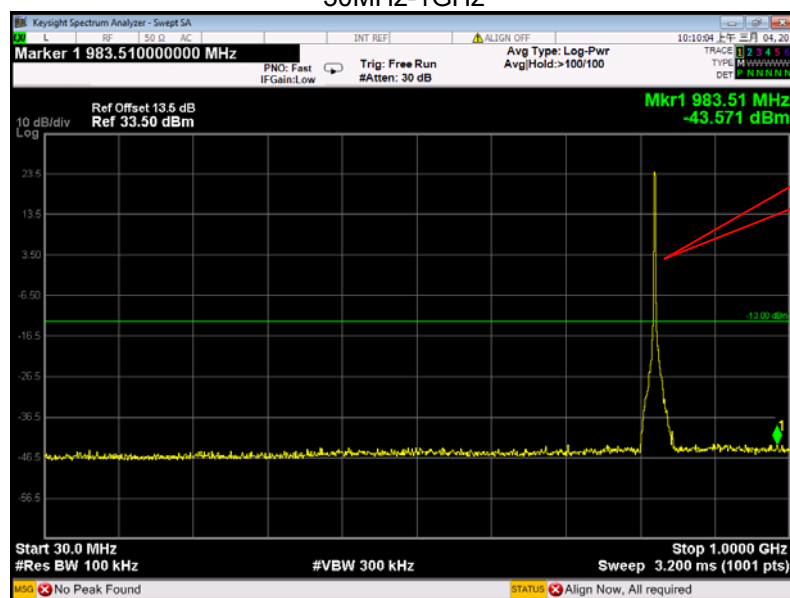
Above 1GHz



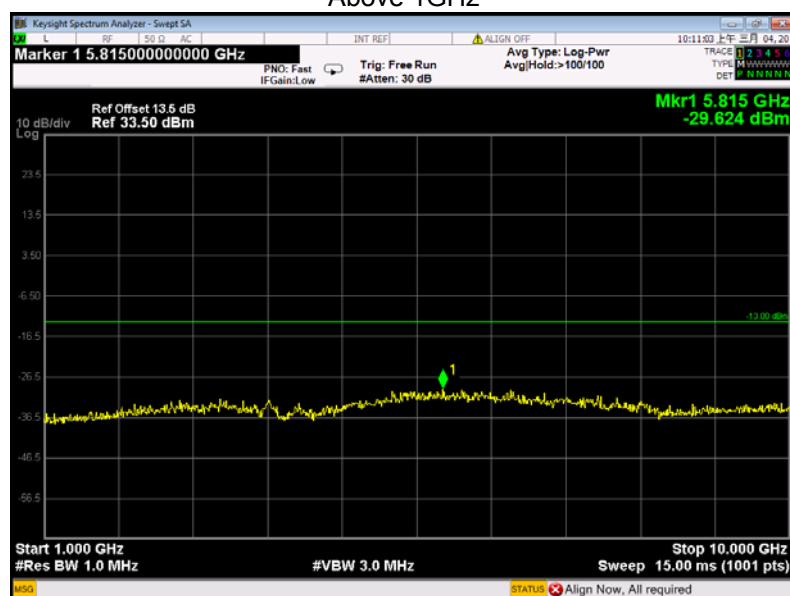
Cellular Band (Part 22H)

1xEVDO BC0 - channel 384

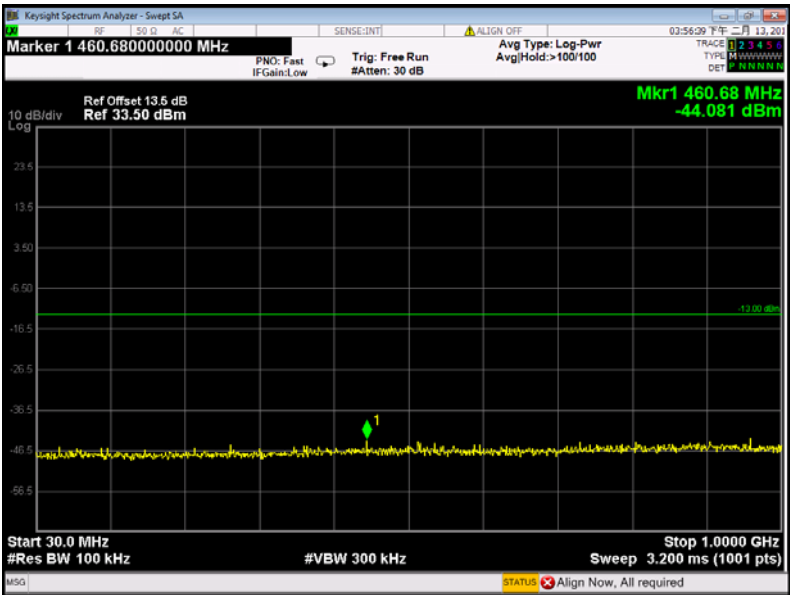
30MHz-1GHz



Above 1GHz

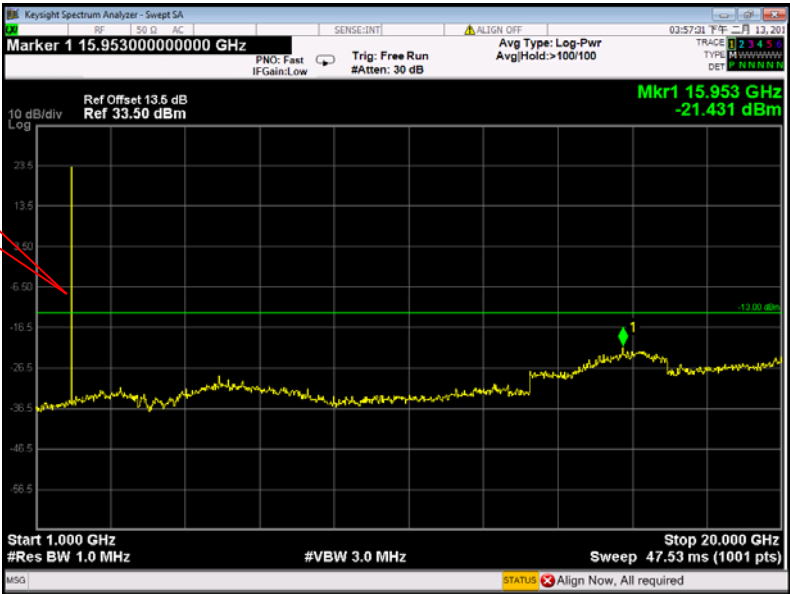


Cellular Band (Part 24E)
Voice BC1 - channel 600
30MHz-1GHz



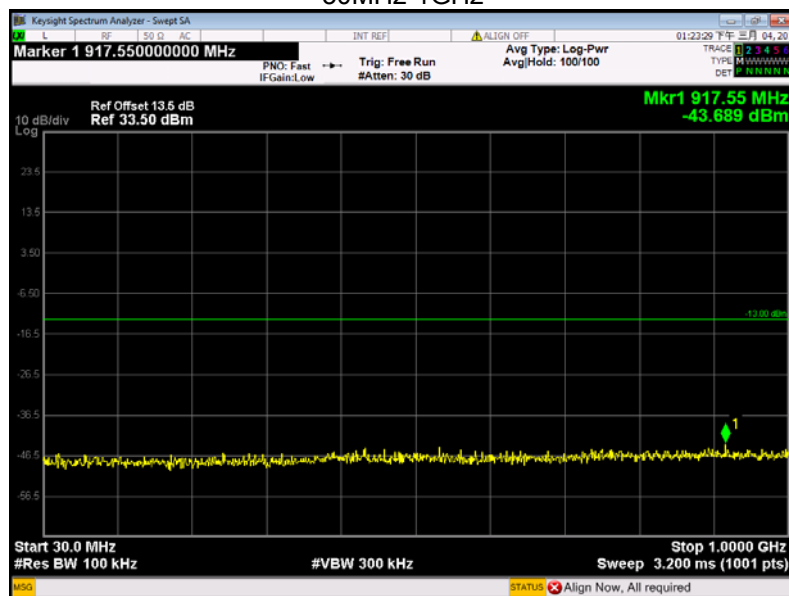
Above 1GHz

Fundamental



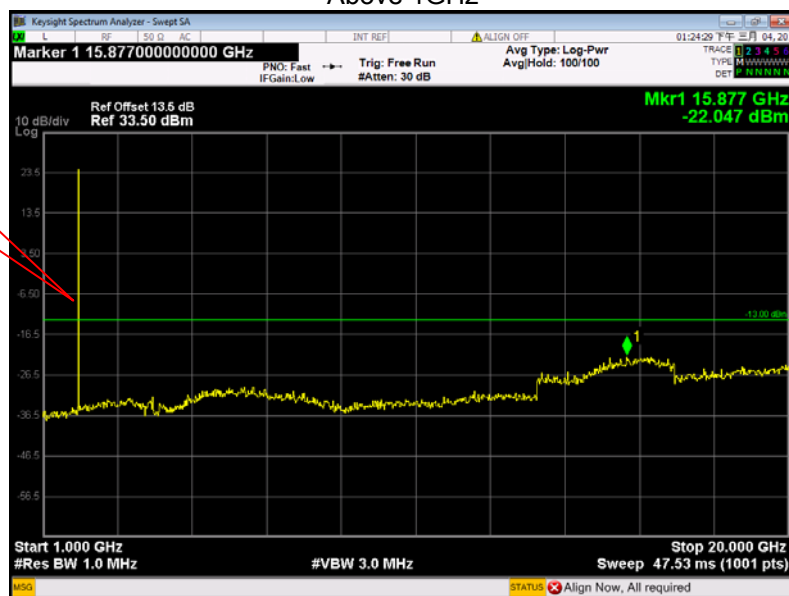
Cellular Band (Part 24E)
1xEVDO BC1 - channel 600

30MHz-1GHz



Above 1GHz

Fundamental



12 SPURIOUS RADIATED EMISSIONS

Test Requirement:	FCC Part 2.1053,22.917,24.238
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

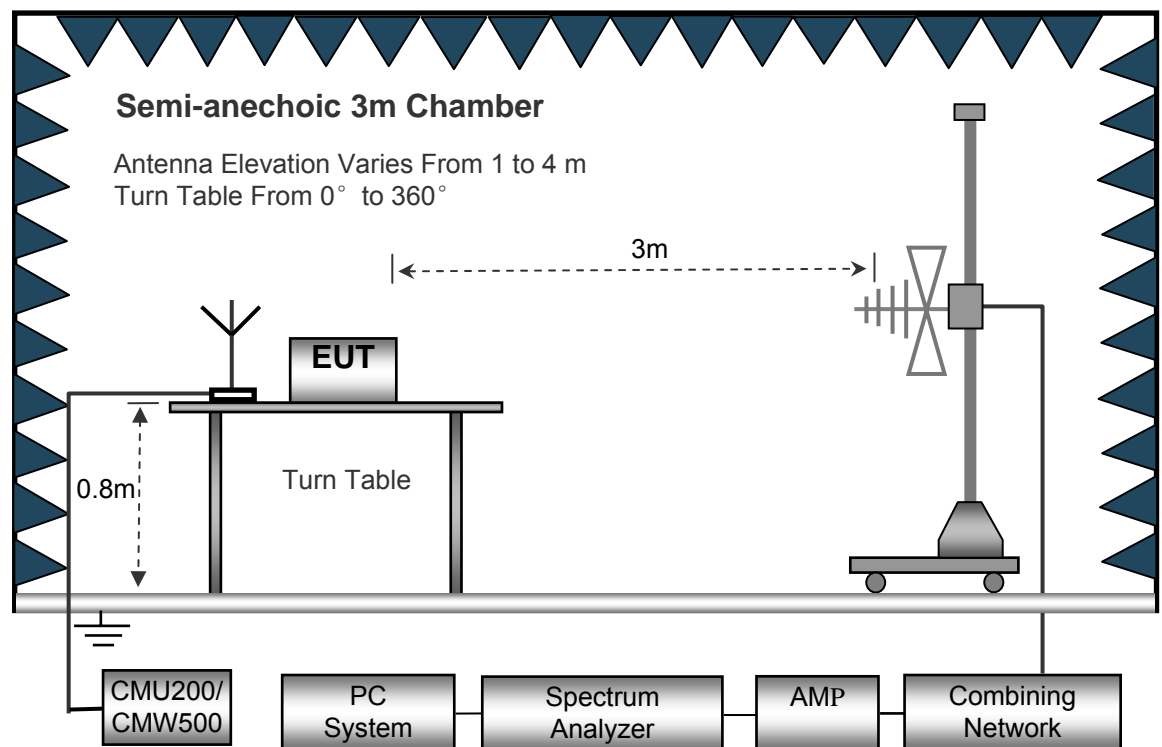
12.1 EUT Operation

Operating Environment :

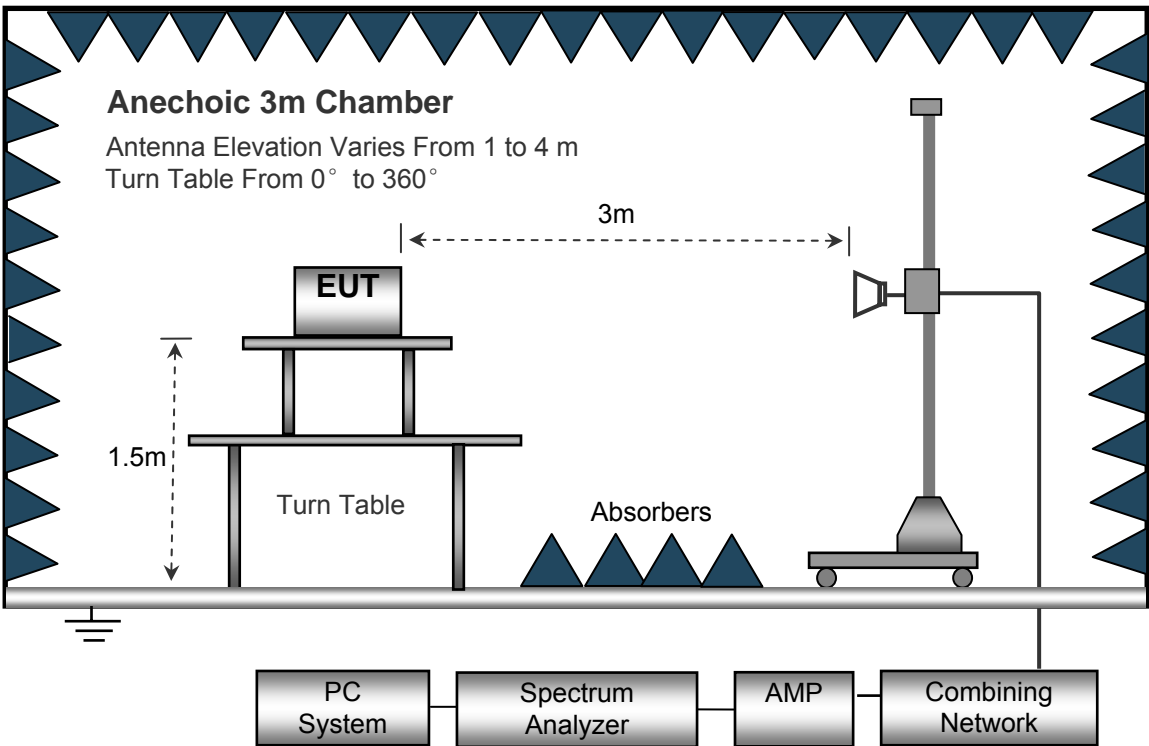
Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

12.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

12.4 Test Procedure

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level
Spurious attenuation limit in dB = $43 + 10 \lg (\text{power out in Watts})$
8. Repeat above procedures until the measurements for all frequencies are completed.

12.5 Summary of Test Results

For 19.2MHz,

The measurements were more than 20 dB below the limit and not reported.

Remark: Test performed from 30MHz to 10th harmonics with low/middle/high channels, only the worst data were recorded.

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Voice BC0 Channel 1013										
223.12	41.64	344	2.2	H	-68.87	0.15	0.00	-69.02	-13.00	-56.02
223.12	44.54	163	1.1	V	-63.05	0.15	0.00	-63.20	-13.00	-50.20
1649.40	66.43	220	1.1	H	-47.54	0.30	9.40	-38.44	-13.00	-25.44
1649.40	58.23	187	1.9	V	-55.30	0.30	9.40	-46.20	-13.00	-33.20
2474.10	58.83	75	1.5	H	-55.17	0.43	10.60	-45.00	-13.00	-32.00
2474.10	48.45	263	2.0	V	-61.83	0.43	10.60	-51.66	-13.00	-38.66

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Voice BC1 Channel 1175										
223.12	46.70	285	1.4	H	-63.81	0.15	0.00	-63.96	-13.00	-50.96
223.12	38.94	253	1.2	V	-68.65	0.15	0.00	-68.80	-13.00	-55.80
3817.50	65.95	140	1.2	H	-45.59	2.37	12.50	-35.46	-13.00	-22.46
3817.50	59.98	5	1.6	V	-49.83	2.37	12.50	-39.70	-13.00	-26.70
5726.25	53.58	55	2.2	H	-56.03	2.86	12.90	-45.99	-13.00	-32.99
5726.25	44.73	197	1.7	V	-64.15	2.86	12.90	-54.11	-13.00	-41.11

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

13 Band Edge Measurement

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

13.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.3 % RH
Atmospheric Pressure:	101.3kPa

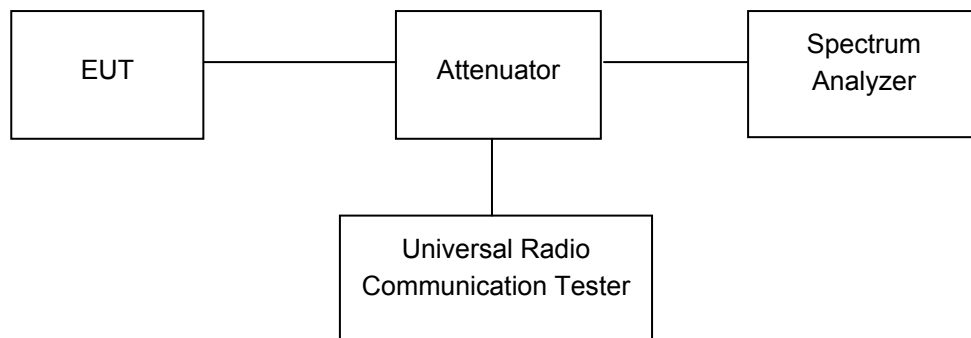
13.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

According to FCC Part 22.917(a), the power of any emissions 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.

According to FCC Part 24.238(a), the power of any emissions 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 center of the spectrum analyzer was set to block edge frequency

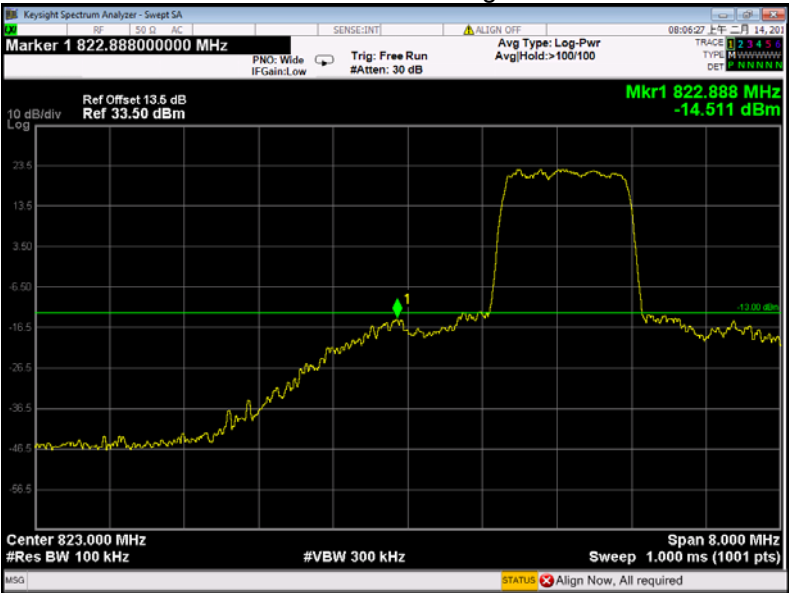


13.3 Test Result

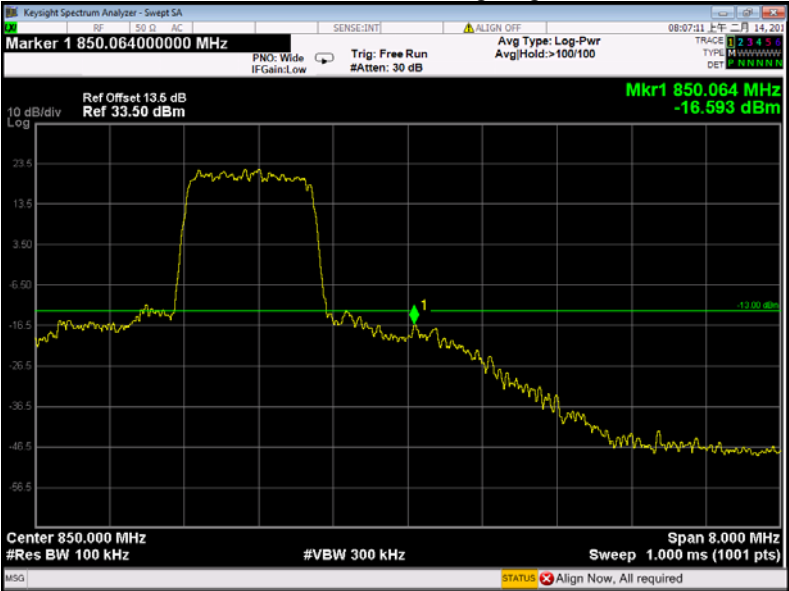
Test plots

Cellular Band (Part 22H)

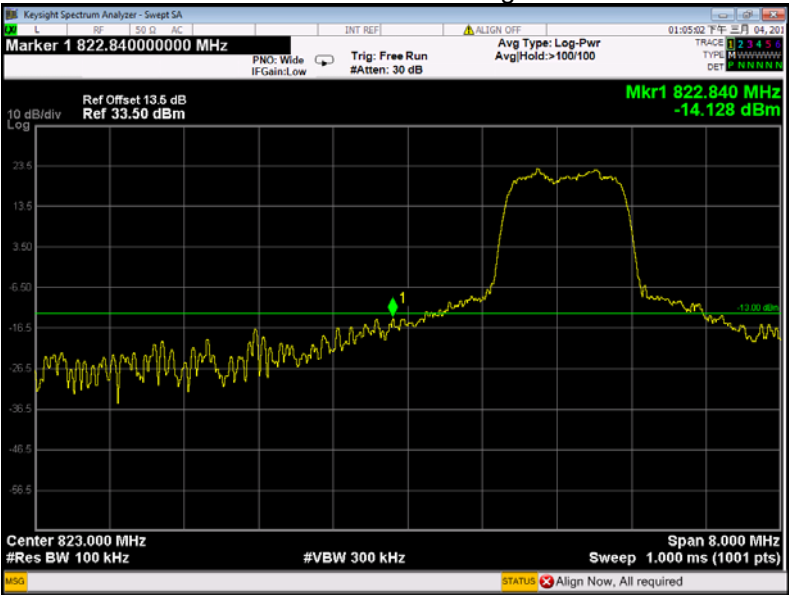
Voice BC0 band edge-left side



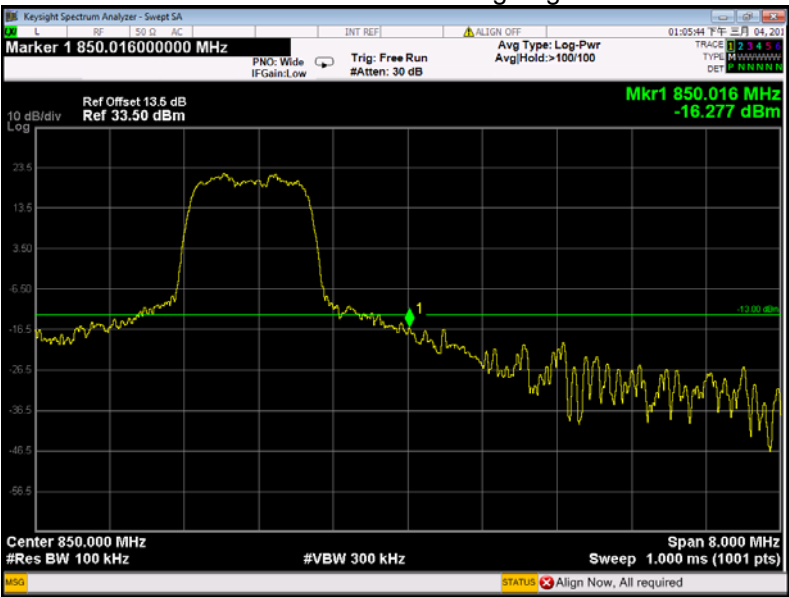
Voice BC0 band edge-right side



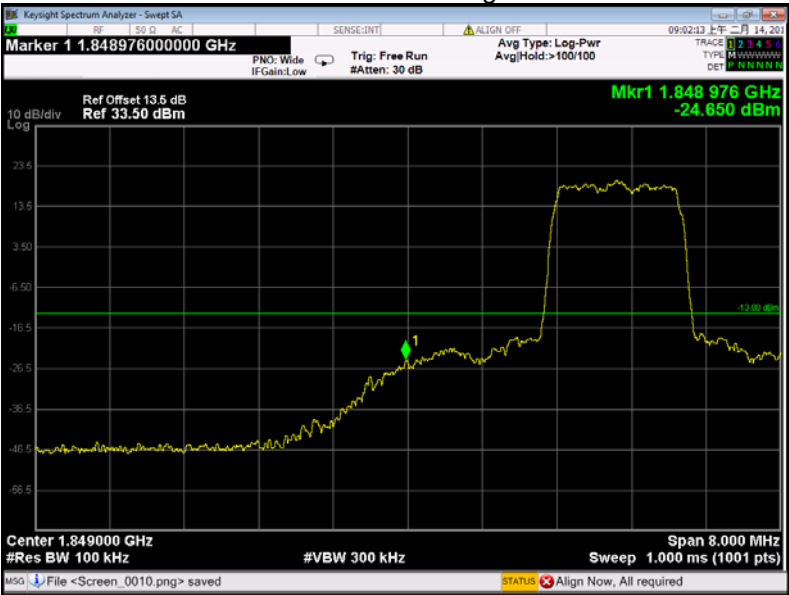
1xEVDO BC0 band edge-left side



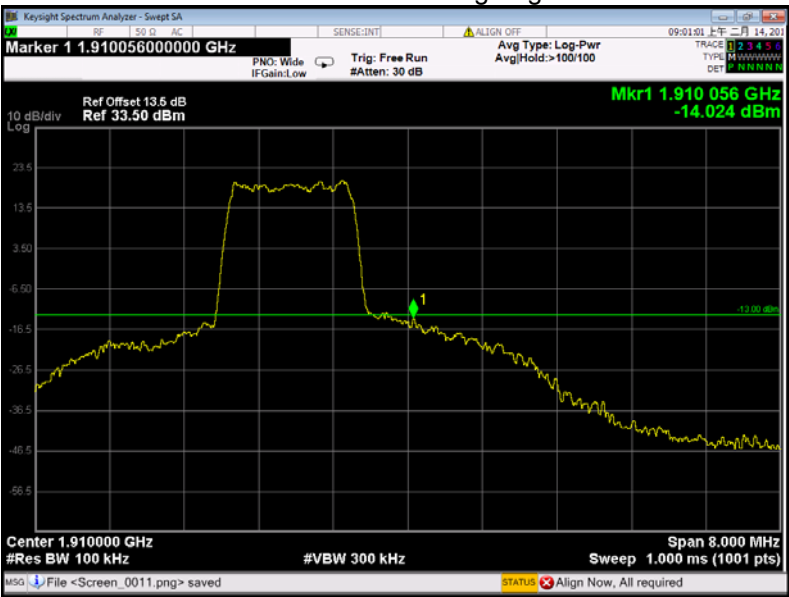
1xEVDO BC0 band edge-right side



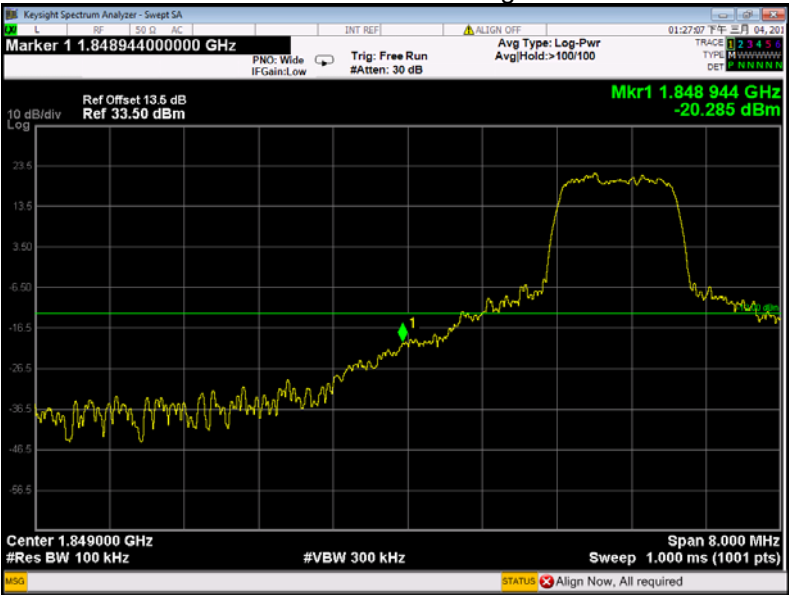
Cellular Band (Part 24E)
Voice BC1 band edge-left side



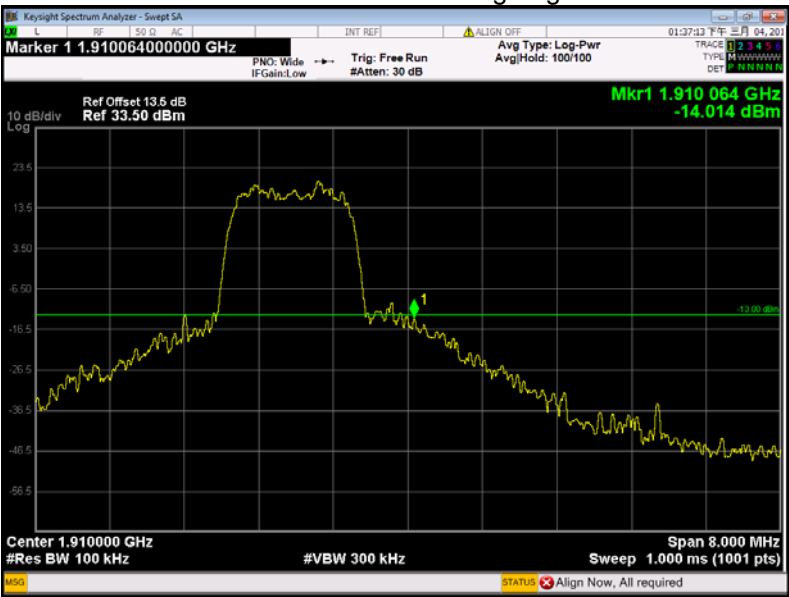
Voice BC1 band edge-right side



1xEVDO BC1 band edge-left side



1xEVDO BC1 band edge-right side



14 FREQUENCY STABILITY

Test Requirement:	FCC Part 2.1055,22.355,24.235
Test Method:	ANSI C63.26:2015 ANSI/TIA-603-E:2016
Test Mode:	Transmitting

14.1 EUT Operation

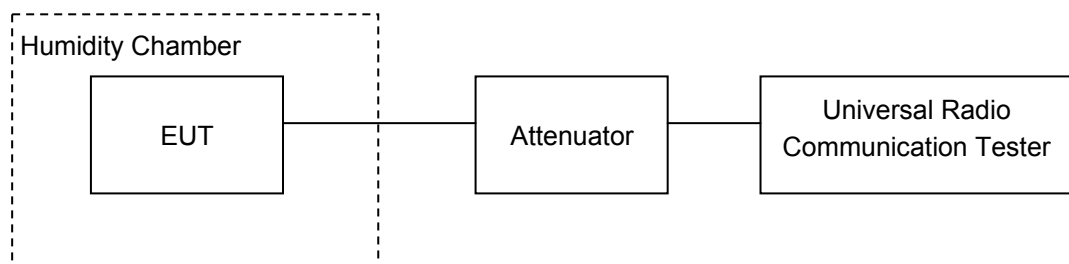
Operating Environment :	
Temperature:	22.9 °C
Humidity:	52.0 % RH
Atmospheric Pressure:	101.3kPa

14.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



14.3 Test Result

Cellular Band (Part 22H)

Voice BC0 Test Frequency:836.52MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.85	-5	-0.0060	2.5
40		2	0.0024	2.5
30		-7	-0.0084	2.5
20		2	0.0020	2.5
10		8	0.0096	2.5
0		2	0.0024	2.5
-10		0	0.0000	2.5
-20		-1	-0.0012	2.5
-30		-5	-0.0060	2.5
20	3.3	-4	-0.0048	2.5
20	4.2	2	0.0024	2.5

1xEVDO BC0 Test Frequency:836.52MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.85	-7	-0.0084	2.5
40		1	0.0012	2.5
30		3	0.0036	2.5
20		1	0.0012	2.5
10		7	0.0084	2.5
0		5	0.0060	2.5
-10		-5	-0.0060	2.5
-20		3	0.0036	2.5
-30		-7	-0.0084	2.5
20	3.3	6	0.0072	2.5
20	4.2	-1	-0.0012	2.5

PCS Band (Part 24E)

Voice BC1 Test Frequency:1880.00MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.85	-9	-0.0048	2.5
40		-2	-0.0011	2.5
30		-1	-0.0005	2.5
20		0	-0.0002	2.5
10		-7	-0.0037	2.5
0		-9	-0.0048	2.5
-10		-1	-0.0005	2.5
-20		-3	-0.0016	2.5
-30		-1	-0.0005	2.5
20	3.3	5	0.0027	2.5
20	4.2	6	0.0032	2.5

1xEVDO BC1 Test Frequency:1880.00MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.85	10	0.0053	2.5
40		5	0.0027	2.5
30		-4	-0.0021	2.5
20		2	0.0011	2.5
10		11	0.0059	2.5
0		-7	-0.0037	2.5
-10		5	0.0027	2.5
-20		2	0.0011	2.5
-30		3	0.0016	2.5
20	3.3	-7	-0.0037	2.5
20	4.2	2	0.0011	2.5

15 RF Exposure

Remark: refer to SAR test report: WTS18S12133823-1W

16 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS18S12133823W_Photo.

===== End of Report =====