TEST REPORT

of

FCC Part 22 Subpart H, Part 24 Subpart E
FCC ID: OELGM01CAB

Equipment Under Test		Blood Glucose Meter
Model Name	:	GM01CAB (alt. : GM01CAD)
Applicant	:	i-SENS, Inc.
Manufacturer	:	i-SENS, Inc.
Date of Test(s)	:	2015.03.17 ~ 2015.03.26
Date of Issue	:	2015.03.26

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date:** **2015.03.26**

Jaeha Chung

Approved By: **Date:** **2015.03.26**

Hyunchae You

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-837

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

Telephone : + 82 31 688 0901
FAX : + 82 31 688 0921

1.2. Details of applicant

Applicant : i-SENS, Inc.
Address : 43, Banpo-daero 28-gil, Seocho-gu, Seoul, 137-873 Korea
Contact Person : Shin, Hyun-Yong
Phone No. : + 82 2 910 0834

1.3. Description of EUT

Kind of Product	Blood Glucose Meter
Model Name	GM01CAB (Alt.: GM01CAD)
Power Supply	DC 3.7 V
Rated Power	WCDMA850: 23.5 dB m WCDMA1900: 22.0 dB m
Frequency Range	WCDMA850: 826.4 ㎒ ~ 846.6 ㎒ WCDMA1900: 1 852.4 ㎒ ~ 1 907.6 ㎒
Emission Designator	WCDMA850: 4M17F9D WCDMA1900: 4M18F9D
H/W Version	V1.0.6
S/W Version	V64.52.3

1.4. Declaration of Manufacturer

The EUT uses data & HSDPA only.

1.5. Sample calculation for offset

Where relevant, the following sample calculation is provided:

1.5.1. Conducted test

Offset value (㏈) = Directional Coupler (㏈) + Attenuator (㏈) + Cable loss (㏈)

1.5.2. Radiation test

E.R.P. & E.I.R.P. = [S.G level + Amp.](㏈ m) - Cable loss(㏈) + Ant. gain (㏈ d/㏈ i)

1.6. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	Agilent	N9030A	US51350132	Sep. 24, 2014	Annual	Sep. 24, 2015
Spectrum Analyzer	R&S	FSV30	103100	Jul. 17, 2014	Annual	Jul. 17, 2015
Mobile Test Unit	R&S	CMW 500	144035	Mar. 03, 2015	Annual	Mar. 03, 2016
Directional Coupler	KRYTAR	152613	140972	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright	WHK3.0/18G-10SS	344	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright	WHKX1.5/15G-6SS	4	Mar. 13, 2015	Annual	Mar. 13, 2016
DC Power Supply	Agilent	U8002A	MY41000836	May 07, 2014	Annual	May 07, 2015
Preamplifier	H.P.	8447F	2944A03909	Aug. 27, 2014	Annual	Aug. 27, 2015
Preamplifier	R&S	SCU-18	1391123	Dec. 26, 2014	Annual	Dec. 26, 2015
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Apr. 28, 2014	Annual	Apr. 28, 2015
Test Receiver	R&S	ESU26	100109	Mar. 03, 2015	Annual	Mar. 03, 2016
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	396	Jun. 07, 2013	Biennial	Jun. 07, 2015
Horn Antenna	R&S	HF906	100326	Sep. 01, 2014	Biennial	Sep. 01, 2016
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	BBHA9170223	Sep. 01, 2014	Biennial	Sep. 01, 2016
Dipole Antenna	Schwarzbeck Mess-Elektronik	VHA 9103	9103-2817	May 09, 2013	Biennial	May 09, 2015
Dipole Antenna	Schwarzbeck Mess-Elektronik	UHA 9105	9105-2514	May 09, 2013	Biennial	May 09, 2015
Antenna Master	INNCO	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	INNCO	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.4 m)	N/A	N.C.R.	N/A	N.C.R.

1.7. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 and 24		
Section in FCC part	**Test Item**	**Result**
§22.913(a)(2) §24.232(c)	RF Radiated Output Power	Complied
§2.1053 §22.917(a) §24.238(a)	Spurious Radiated Emission	Complied
§2.1046	Conducted Output Power	See SAR Report
§2.1049	Occupied Bandwidth	Complied
§24.232(d)	Peak-Average Ratio	Complied
§2.1051 §22.917(a) §24.238(a)	Spurious Emission at Antenna Terminal	Complied
§2.1055 §22.355 §24.235	Frequency Stability	Complied
§22.917(a) §24.238(a)	Band Edge	Complied

1.8. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL008545	2015.03.26	Initial

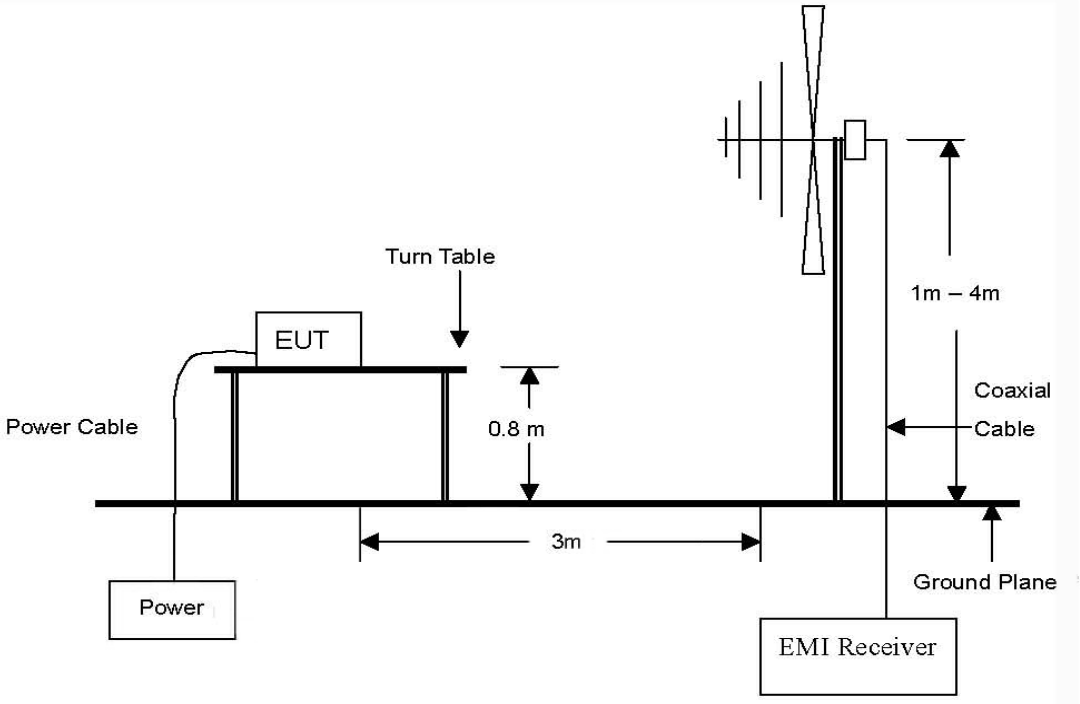
1.9. Information of Alternative model

Model	Information
GM01CAB	- Basic model name.
GM01CAD	- Same as the basic model name except model name.

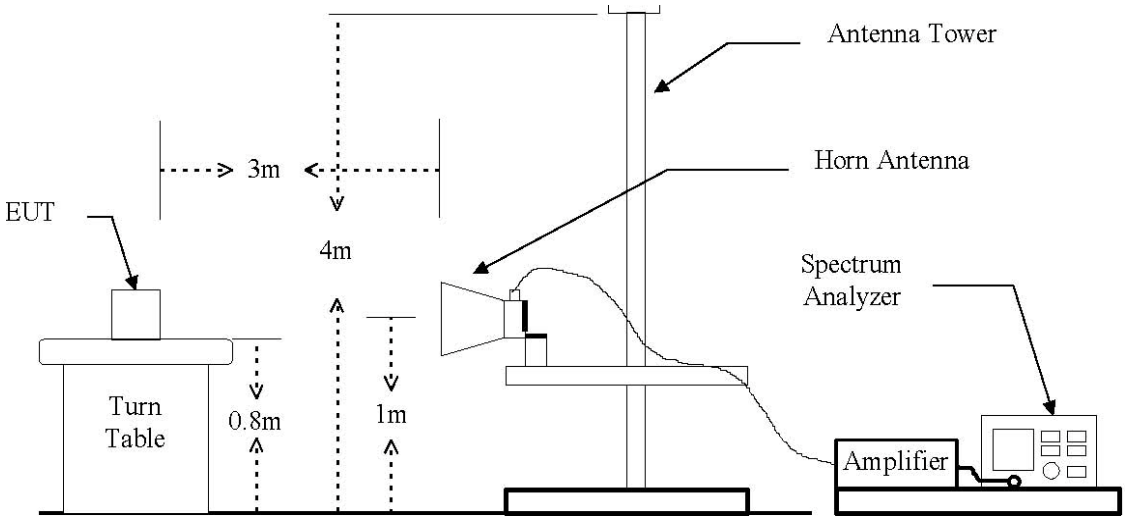
2. RF radiated output power & spurious radiated emission

2.1. Test setup

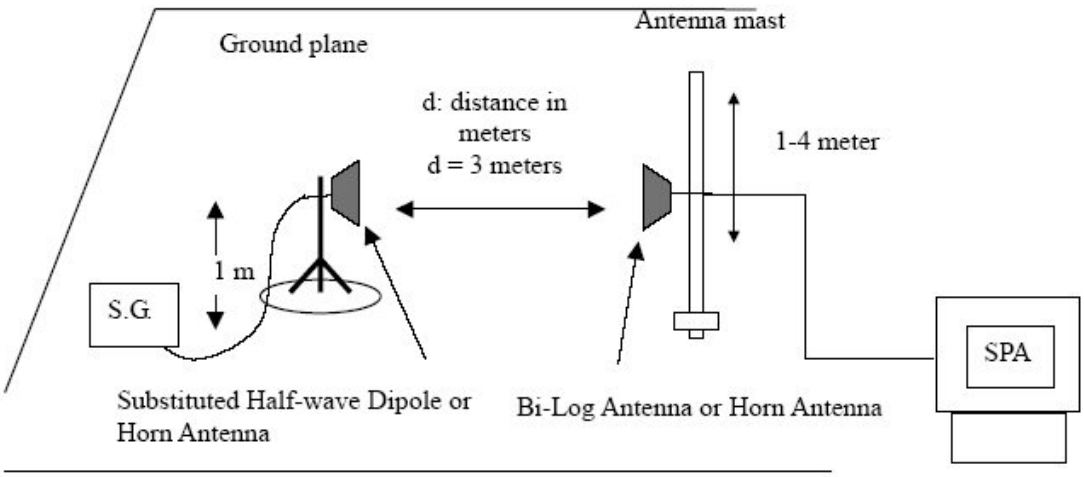
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to 20 ㎓ Emissions.



The diagram below shows the test setup for substituted method.



2.2. Limit

2.2.1. Limit of radiated output power

FCC §22.913(a)(2), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
FCC §24.232(c), Mobile and portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.2.2. Limit of spurious radiated emission

FCC §22.917(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 + 10log(P) dB.
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 + 10log(P) dB..

2.3. Test procedure: Based on ANSI/TIA 603C: 2004

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions occupied bandwidth, RBW = 1-5 % of the OBW (not to exceed 1 ㎒), VBW ≥ 3 x RBW, Detector = RMS, sweep time = auto, trace average at least 100 traces in power averaging(i.e., RMS) mode, per the guidelines of KDB 971168 v02r02.
5. Radiated spurious emissions measurement method was set as follows:
   RBW = 100 ㎑ for emissions below 1 ㎓ and 1 ㎒ for emissions above 1 ㎓, VBW ≥ 3 x RBW,
   Detector = Peak, trace mode = max hold, per the guidelines of KDB 971168 v02r02.
6. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
7. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
8. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
9. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
10. The maximum signal level detected by the measuring receiver shall be noted.
11. The EUT was replaced by half-wave dipole (1 **GHz** below) or horn antenna (1 **GHz** above) connected to a signal generator.
12. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in **dB**m, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

2.4. Test result for RF radiated output power

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

WCDMA850

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈d)	E.R.P.	
					(㏈m)	(㎽)
826.40	V	20.15	3.42	-2.86	13.87	24.38
826.40	H	22.57	3.42	-2.86	16.29	42.52
836.60	V	22.77	3.44	-3.04	16.29	42.55
836.60	H	23.46	3.44	-3.04	16.98	49.87
846.60	V	25.09	3.48	-3.23	18.38	68.80
846.60	H	24.71	3.48	-3.23	18.00	63.05

WCDMA1900

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈i)	E.I.R.P.	
					(㏈m)	(㎽)
1 852.40	V	18.44	5.03	7.87	21.28	134.28
1 852.40	H	22.97	5.03	7.87	25.81	381.43
1 880.00	V	15.77	5.11	7.86	18.52	71.16
1 880.00	H	22.92	5.11	7.86	25.67	369.30
1 907.60	V	15.37	5.17	7.84	18.04	63.69
1 907.60	H	22.92	5.17	7.84	25.59	362.46

Remark:
1. E.R.P. & E.I.R.P. = [S.G level + Amp.](㏈m) - Cable loss(㏈) + Ant. gain (㏈d/㏈i)
2. The E.R.P. & E.I.R.P. was measured in three orthogonal EUT position(x-axis, y-axis and z-axis).
3. The data reported in the table above was measured in worst case.

2.5. Spurious radiated emission

- Measured output Power: 18.38 ㏈m = 68.87 ㎽
- Modulation Signal: WCDMA850
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$(W) = 31.38 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈d)	E.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel (826.4 ㎒)							
1 650.75	V	-24.48	4.38	5.78	-23.08	41.46	10.08
1 650.77	H	-25.91	4.38	5.78	-24.51	42.89	11.51
Middle Channel (836.6 ㎒)							
1 671.20	V	-15.17	4.44	5.78	-13.83	32.21	0.83
1 671.11	H	-17.82	4.44	5.78	-16.48	34.86	3.48
High Channel (846.6 ㎒)							
1 695.20	V	-18.84	4.52	5.78	-17.58	35.96	4.58
1 695.33	H	-21.88	4.52	5.78	-20.62	39.00	7.62

- Measured output Power: 25.81 ㏈m = 381.07 ㎽
- Modulation Signal: WCDMA1900
- Distance: 3 meters
- Limit: 43 + 10log$_{10}$(W) = 38.81 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈i)	E.I.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel(1 852.4 ㎒)							
3 706.78	V	-43.21	7.52	9.08	-41.65	67.46	28.65
3 706.82	H	-45.02	7.52	9.08	-43.46	69.27	30.46
Middle Channel(1 880.0 ㎒)							
3 761.99	V	-44.24	7.57	9.10	-42.71	68.52	29.71
3 761.85	H	-45.46	7.57	9.10	-43.93	69.74	30.93
High Channel(1 907.6 ㎒)							
3 813.22	V	-45.34	7.62	9.12	-43.84	69.65	30.84
3 813.35	H	-44.70	7.62	9.12	-43.20	69.01	30.20

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](**㏈**m) - Cable loss(**㏈**) + Ant. gain (**㏈**d/**㏈**i)
2. The data reported in the table above was measured in worst case.

3. Occupied Bandwidth 99 %

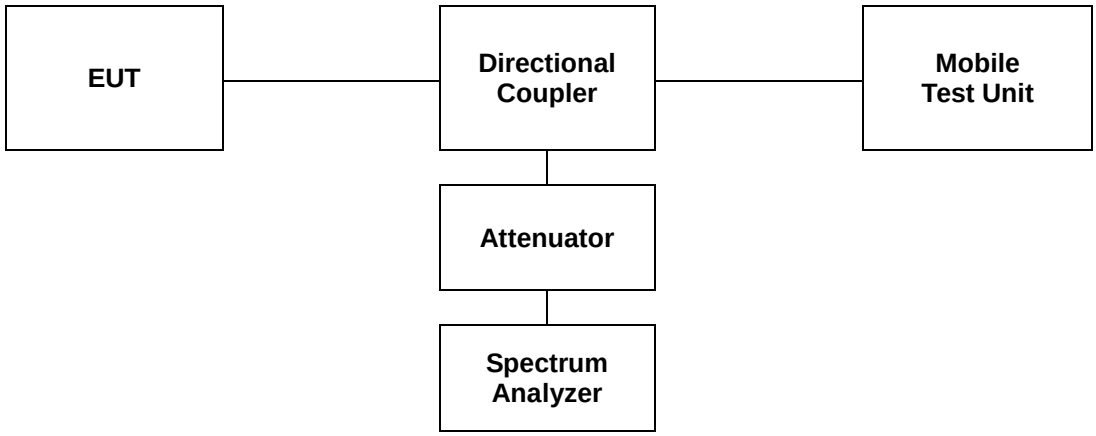
3.1. Limit

Requirements: CFR 47, Section §2.1049.

3.2. Test Procedure

The test follows section 4.2 of FCC KDB Publication 971168_v02r02.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The spectrum analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth.



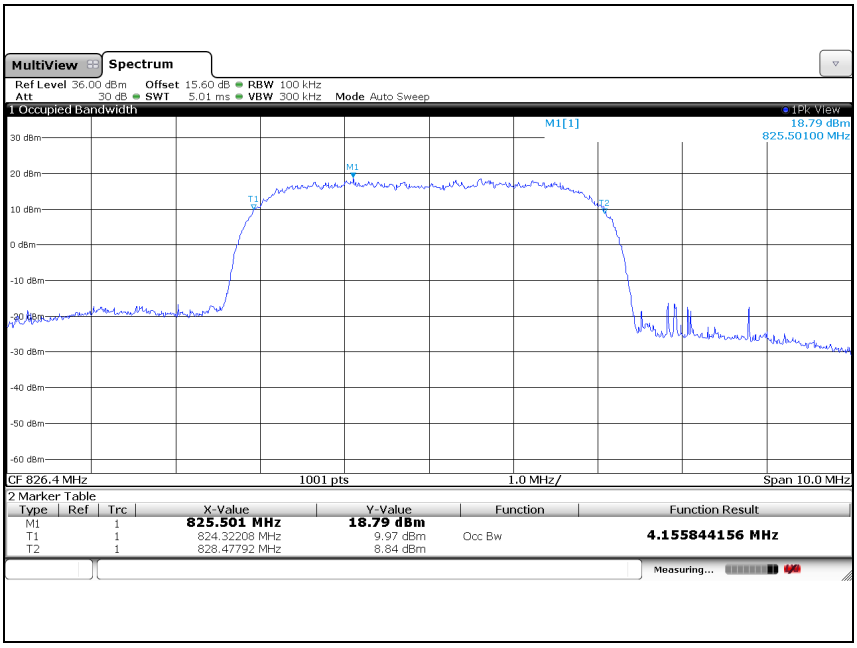
3.3 Test Results

Ambient temperature : (24 ± 1) ℃
Relative humidity : 47 % R.H.

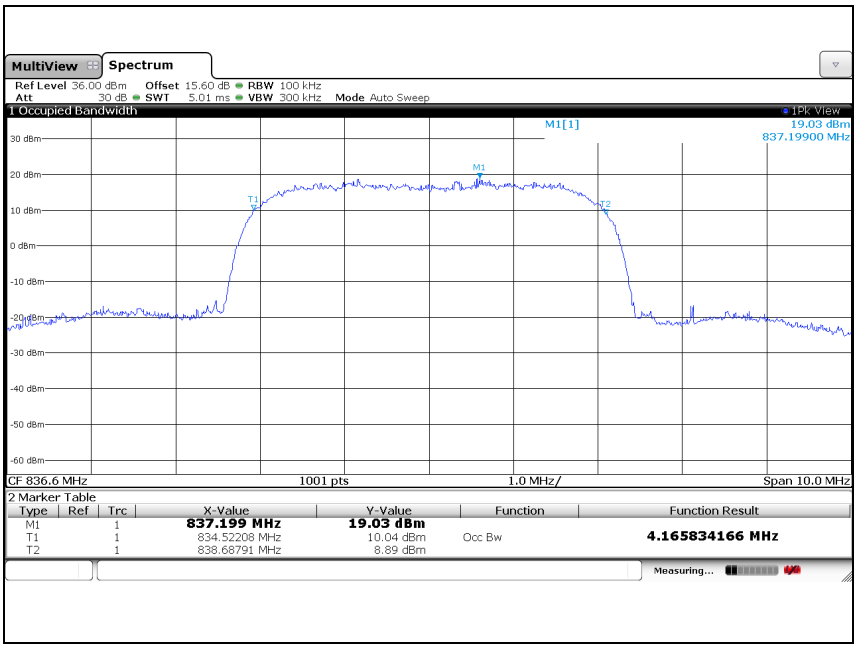
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
WCDMA850	HSDPA	826.4	4.16
		836.6	4.17
		848.6	4.16
WCDMA1900	HSDPA	1 852.4	4.17
		1 880.0	4.18
		1 907.6	4.17

Please refer to the following plots.

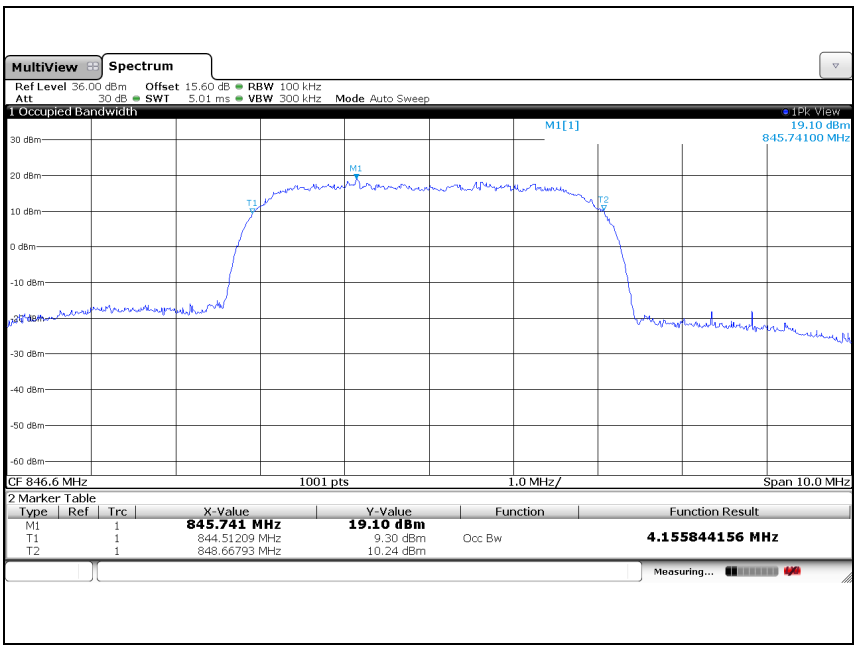
WCDMA850
99 %
Low Channel



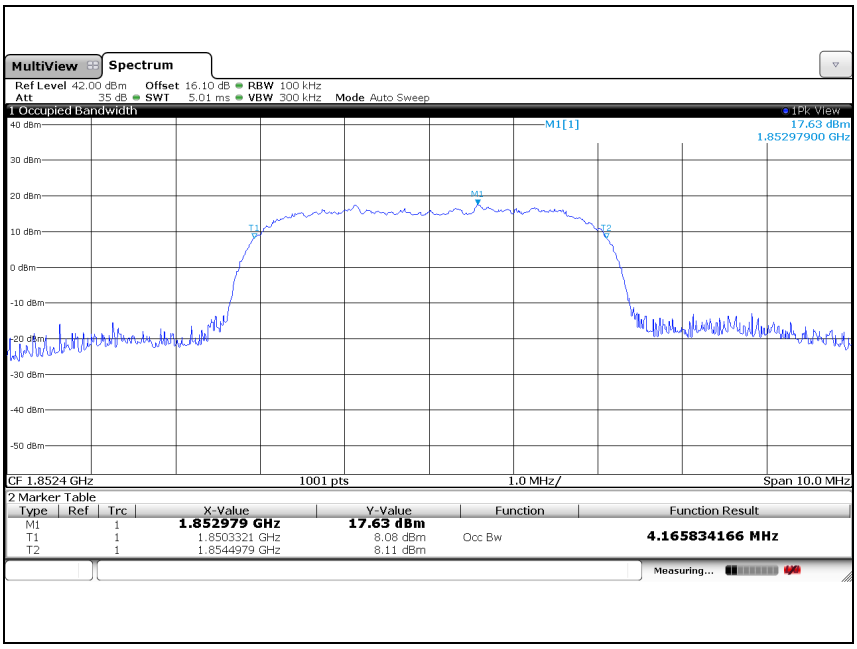
Middle Channel



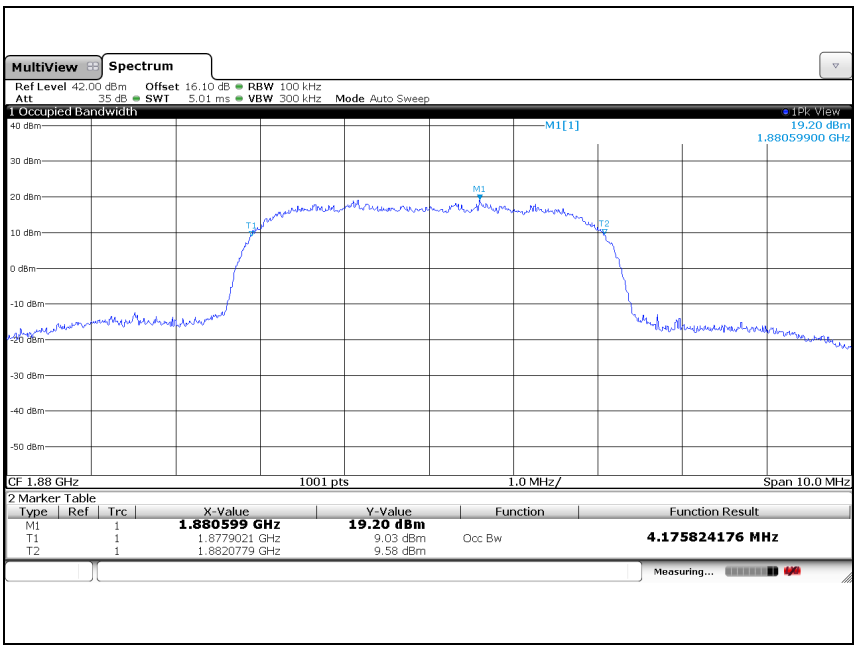
High Channel



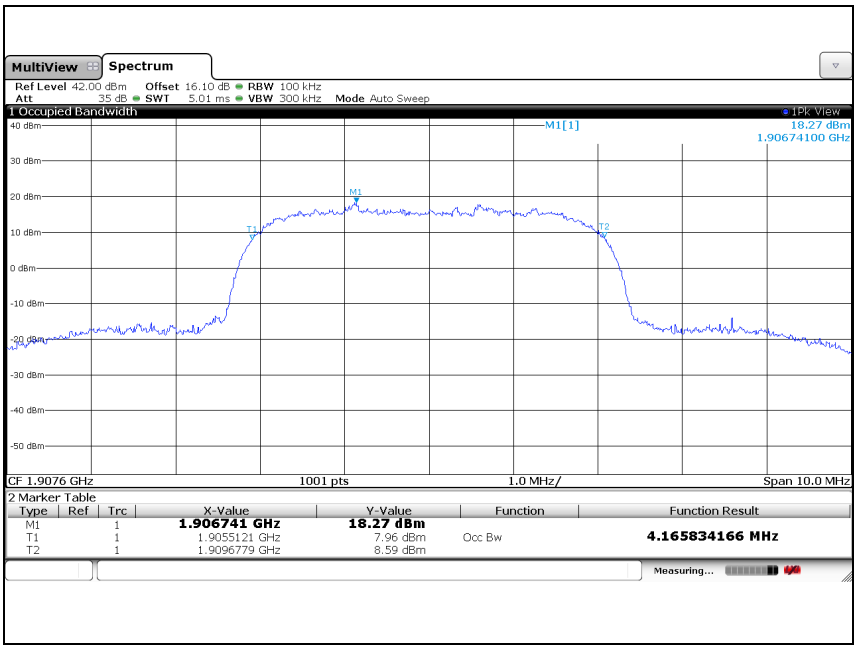
WCDMA1900
99 %
Low Channel



Middle Channel



High Channel



4. Peak-Average Ratio

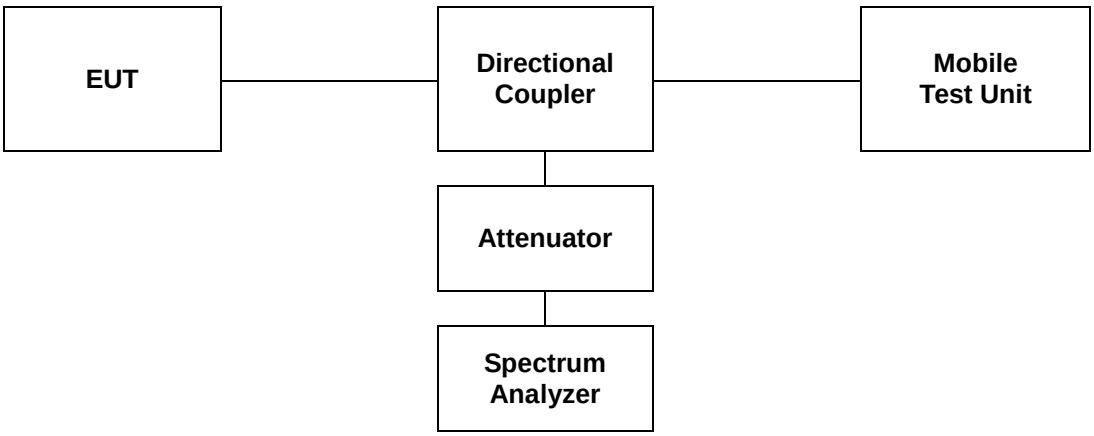
4.1. Limit

§24.232(d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.2. Test Procedure

The test follows section 5.7.1 of FCC KDB Publication 971168_v02r02.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The CCDF function of the spectrum analyzer was set.
3. PAR was measured with spectrum analyzer for each channel.



4.3 Test Results

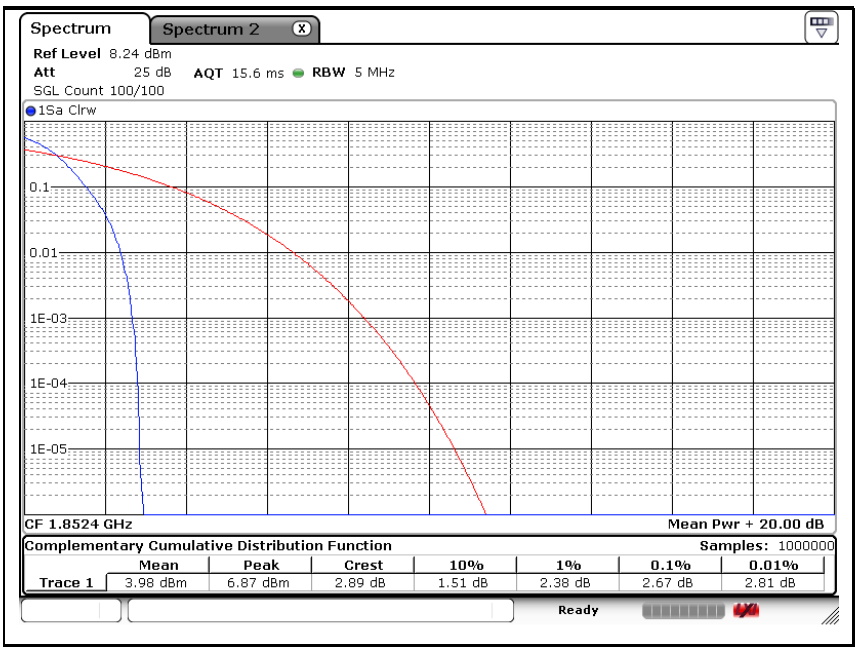
Ambient temperature : (24 ± 1) ℃
Relative humidity : 47 % R.H.

Please refer to the following plots.

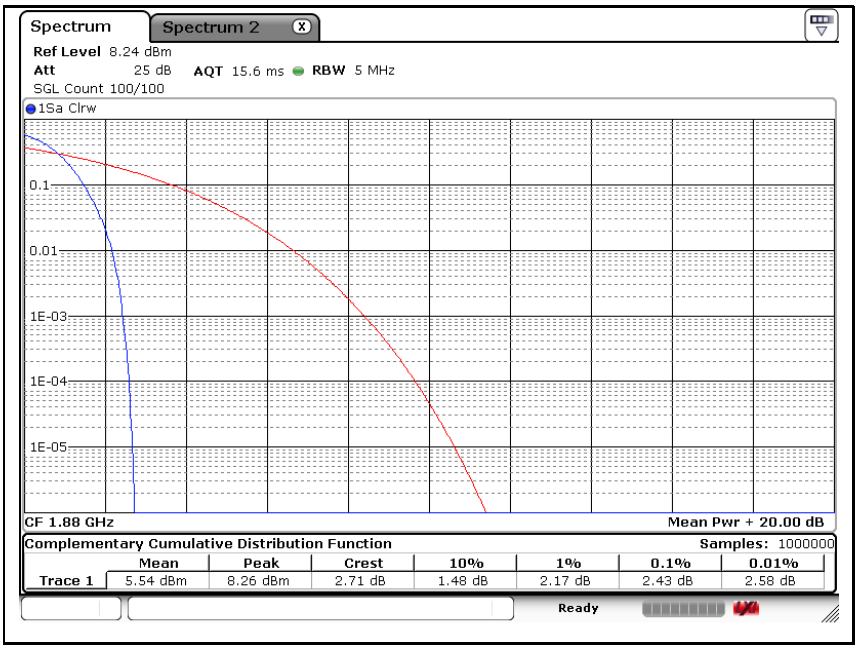
Band	Mode	Frequency (㎒)	PAR (㏈)
WCDMA1900	HSDPA	1 852.4	2.67
		1 880.0	2.43
		1 907.6	2.41

Peak-Average Ratio
WCDMA1900

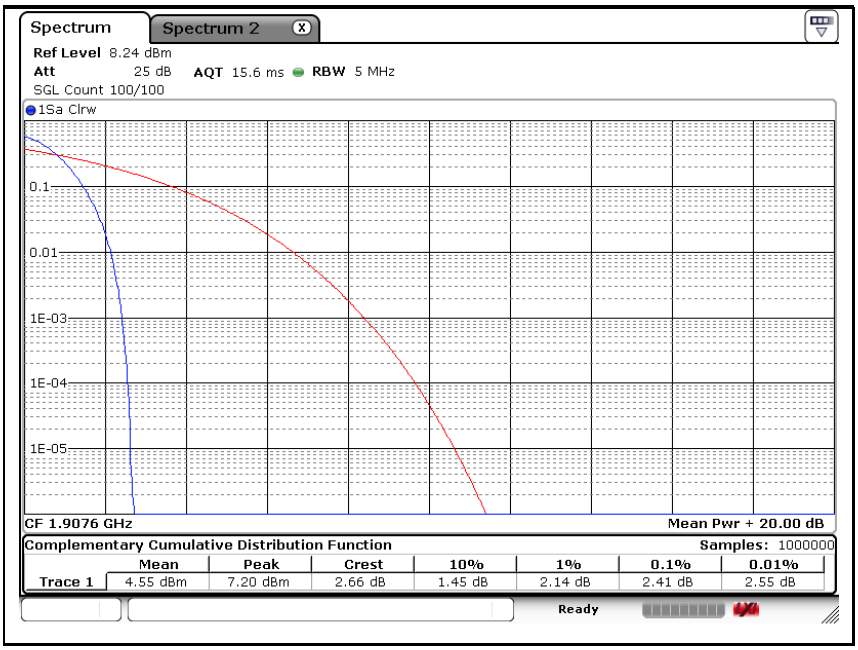
Low Channel



Middle Channel



High Channel



5. Spurious Emissions at Antenna Terminal

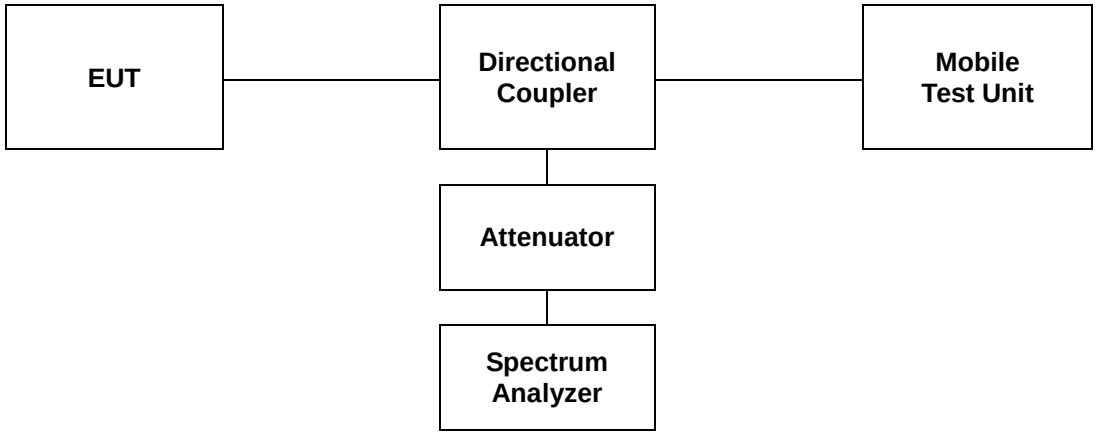
5.1. Limit

FCC §22.917(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 + 10log(P) ㏈.
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) ㏈.

5.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168_v02r02.

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

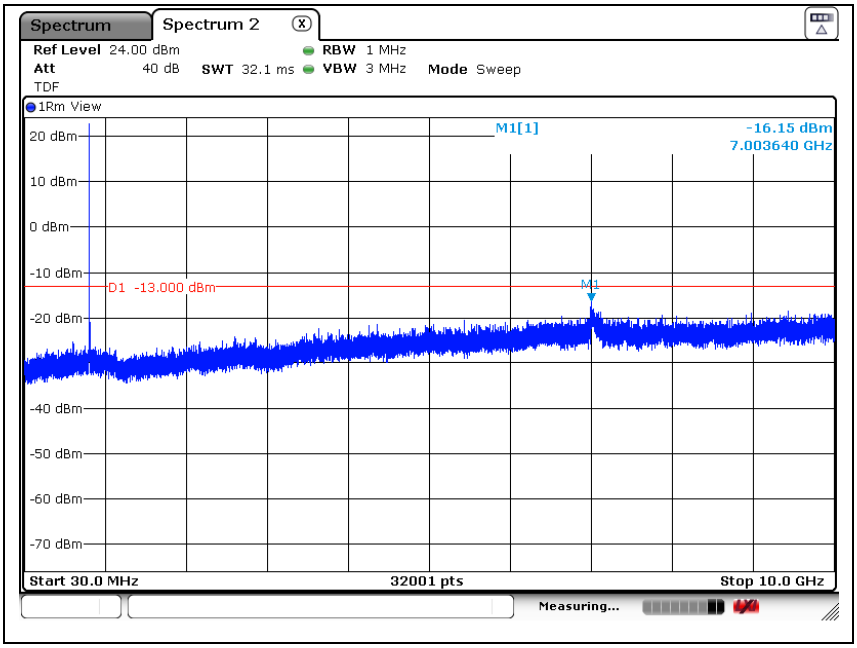


5.3. Test Results

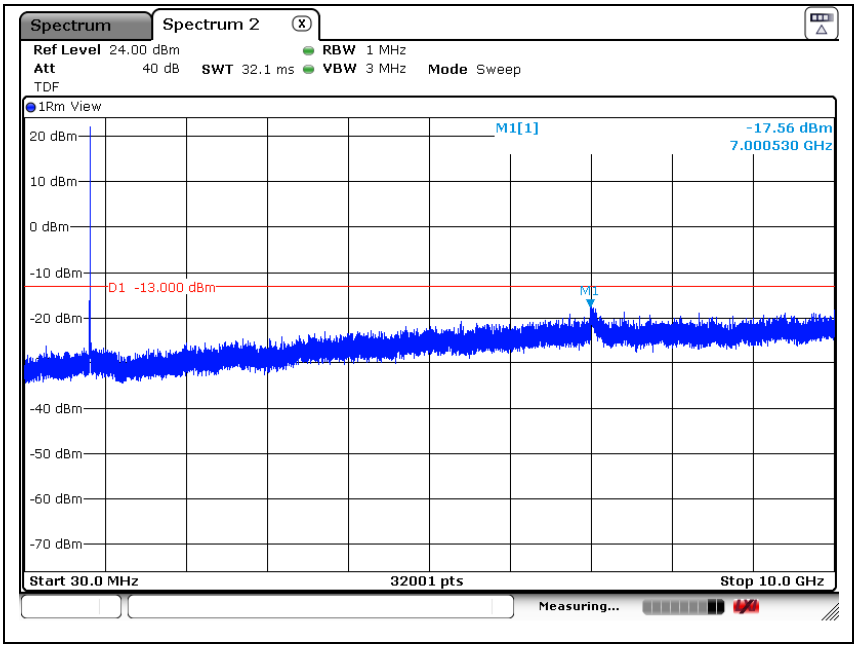
Ambient temperature	:	(24 ± 1) ℃
Relative humidity	:	47 % R.H.

Please refer to the following plots.

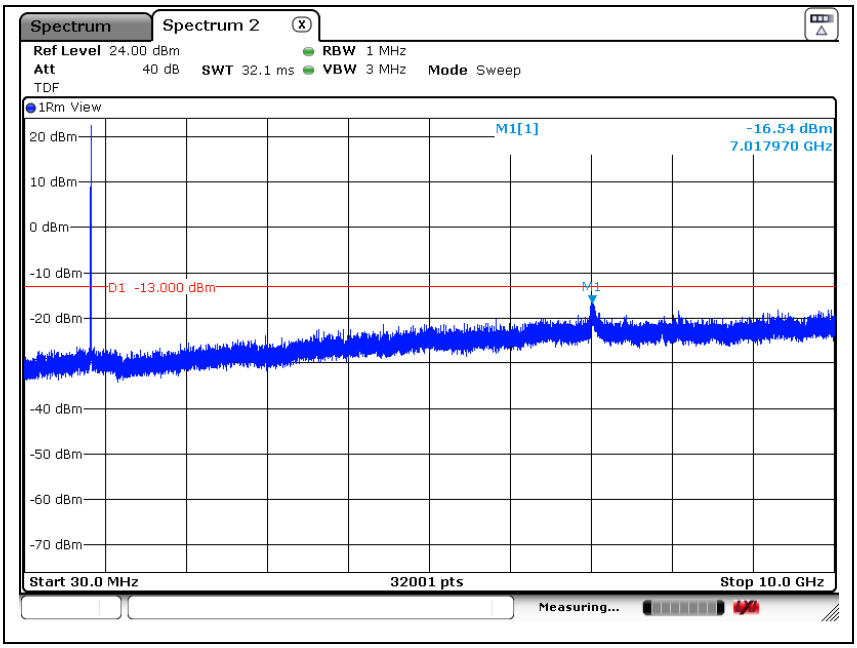
WCDMA850
Low Channel



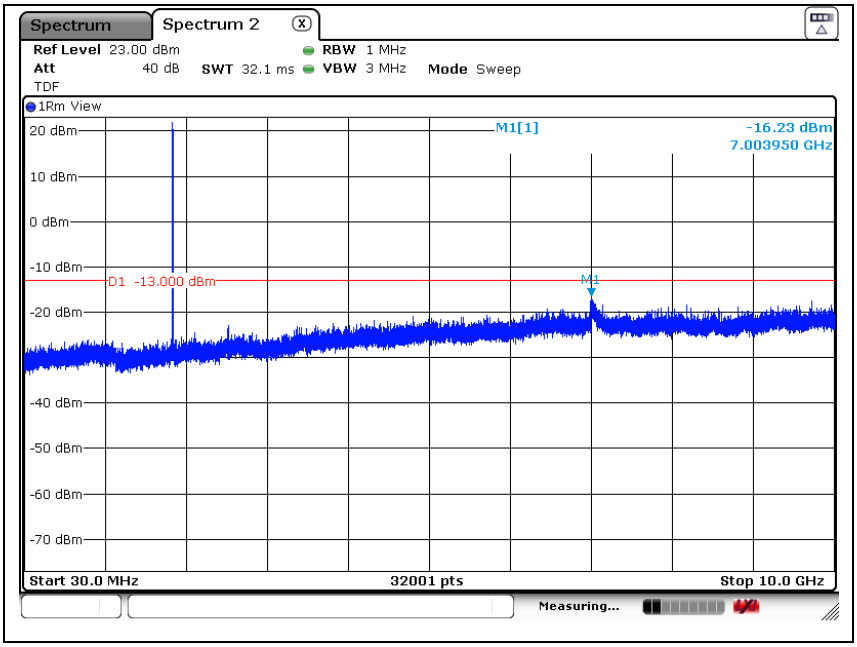
Middle Channel

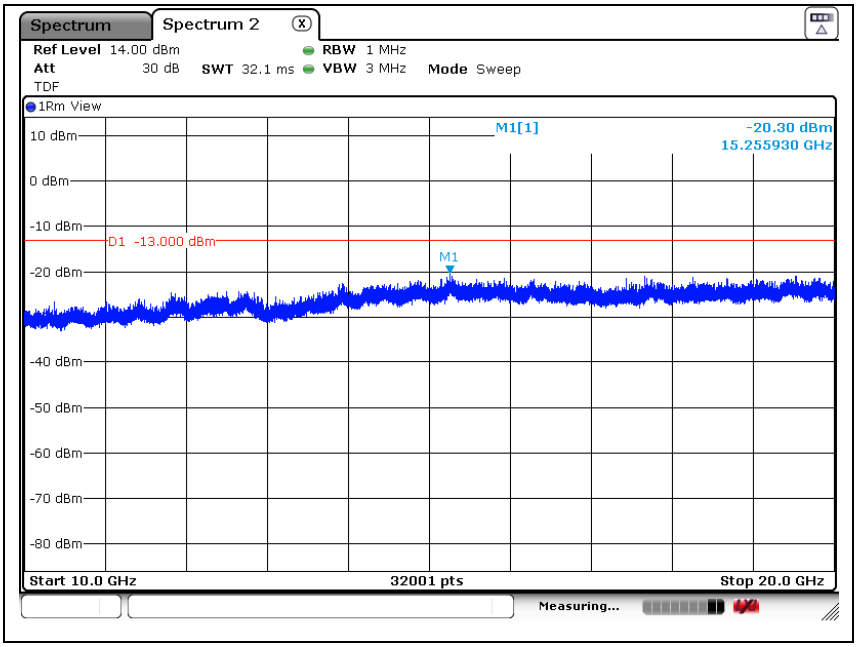


High Channel

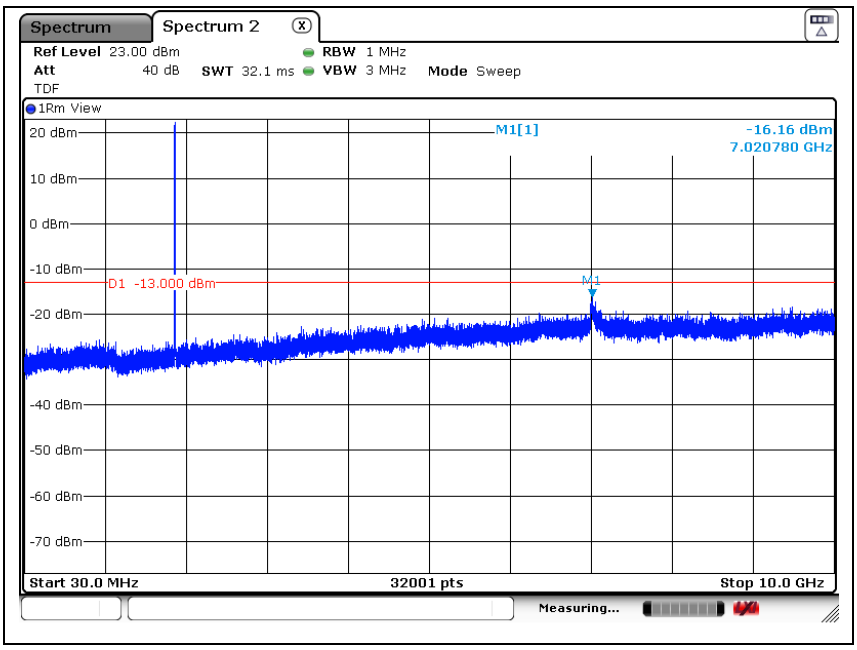


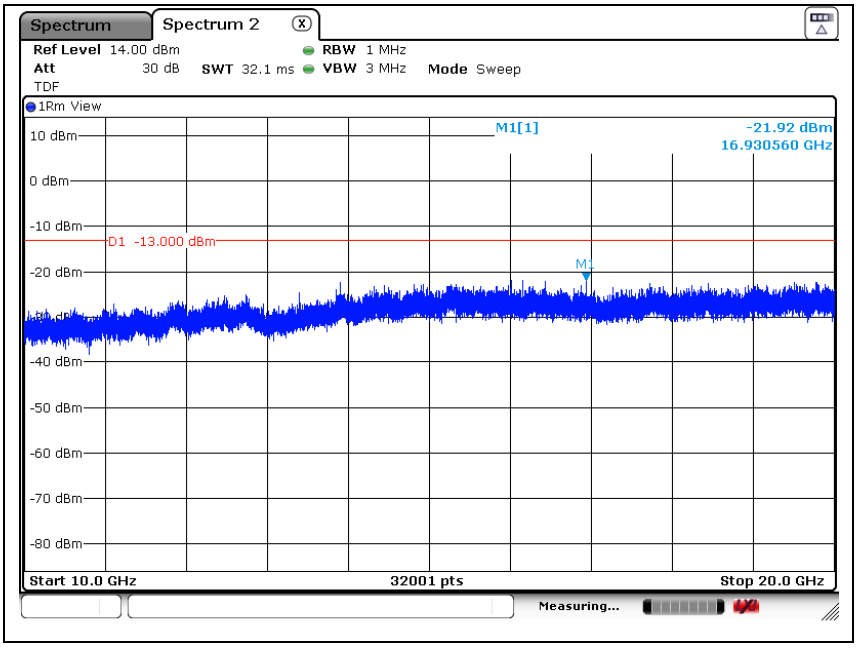
WCDMA1900
Low Channel



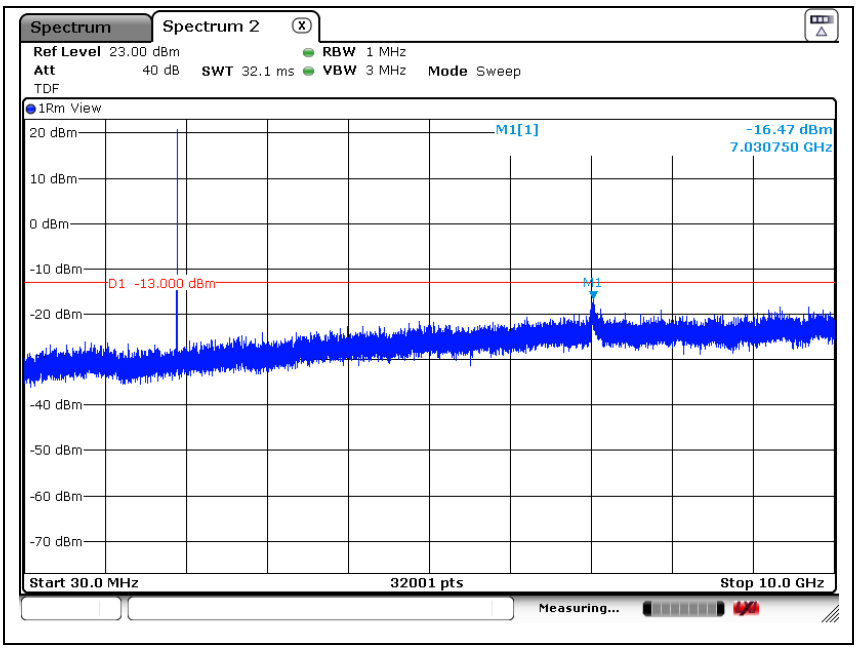


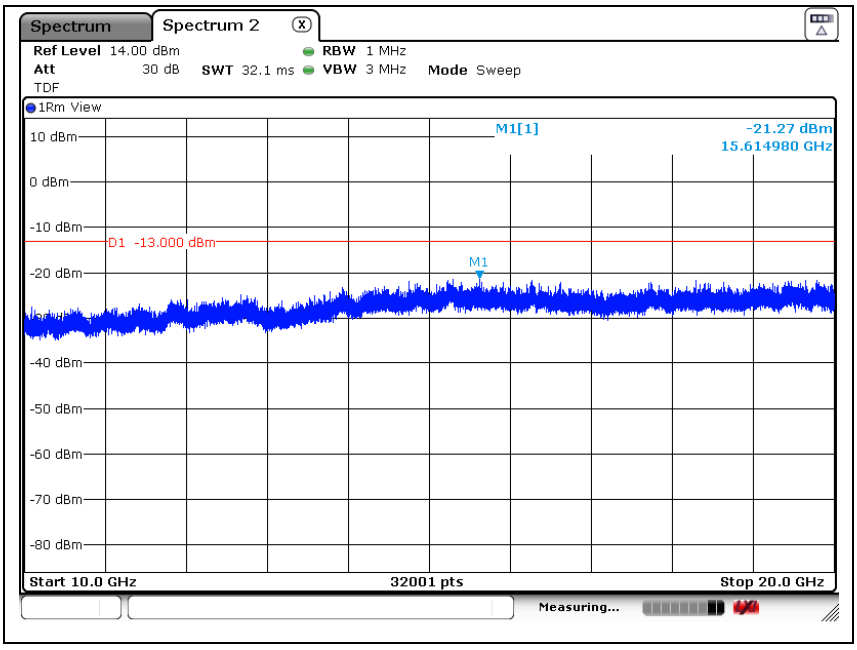
Middle Channel





High Channel





6. Band Edge

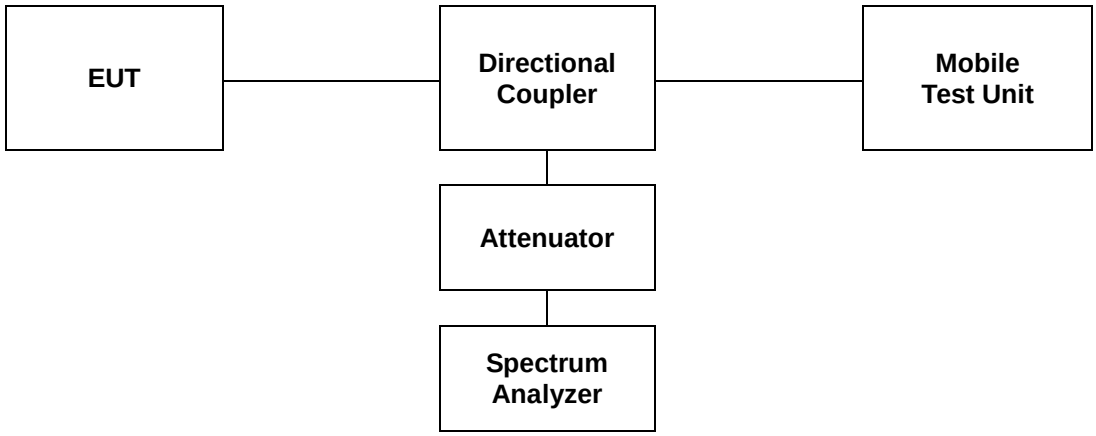
6.1. Limit

FCC §22.917(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 + 10log(P) ㏈.
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) ㏈.

6.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168_v02r02.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The center of the spectrum analyzer was set to block edge frequency.



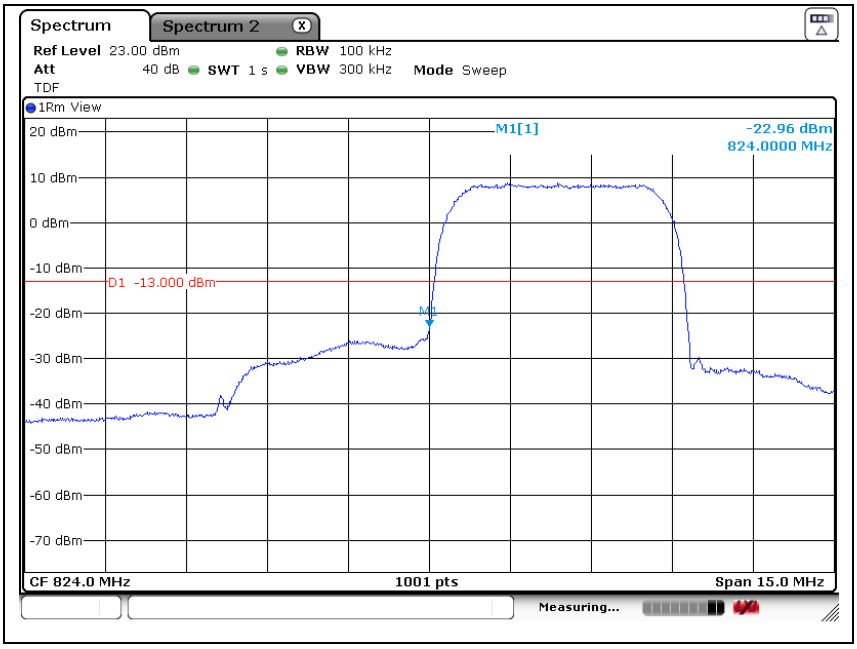
6.3. Test Results

Ambient temperature : (24 ± 1) ℃
Relative humidity : 47 % R.H.

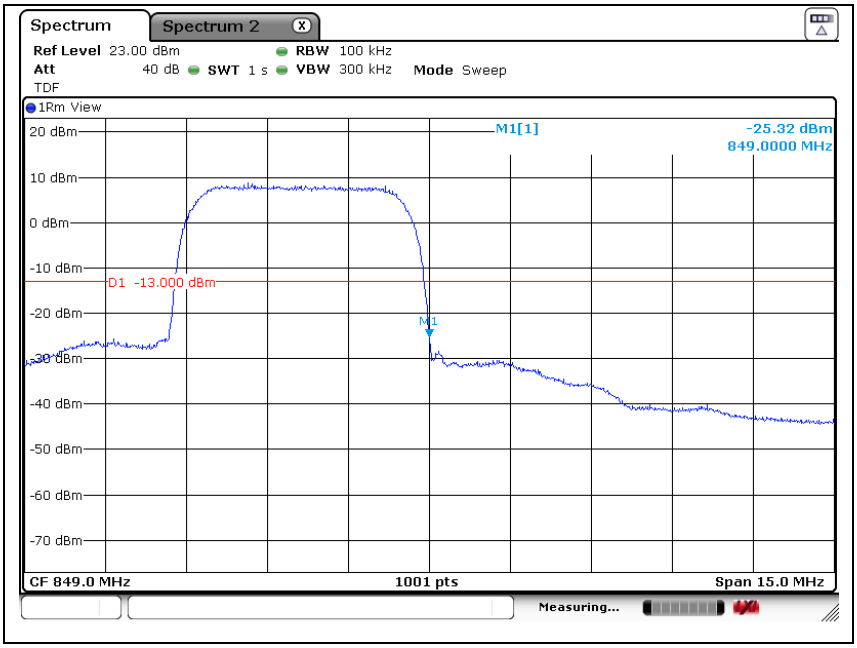
Please refer to the following plots.

Bandedge_WDCMA850

Low Channel

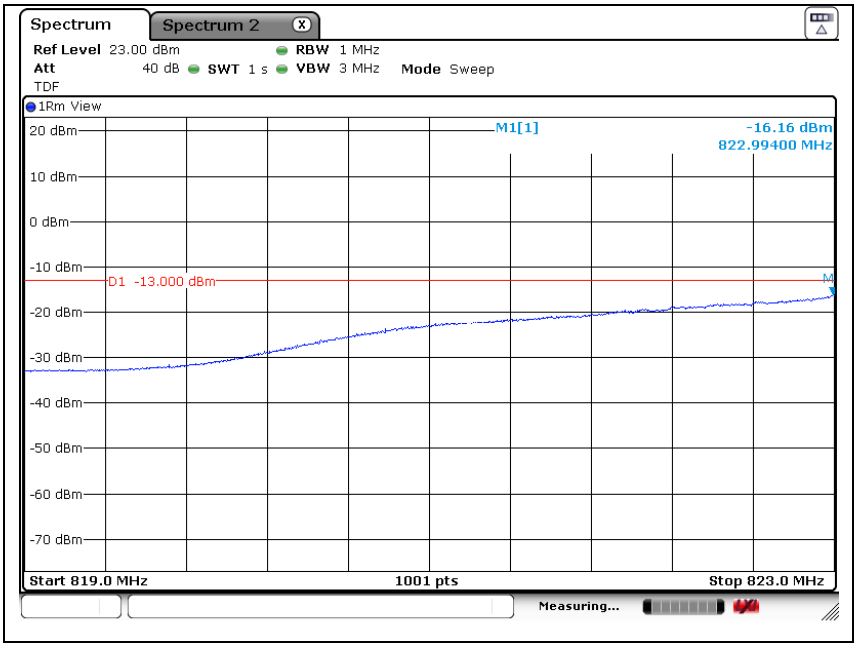


High Channel

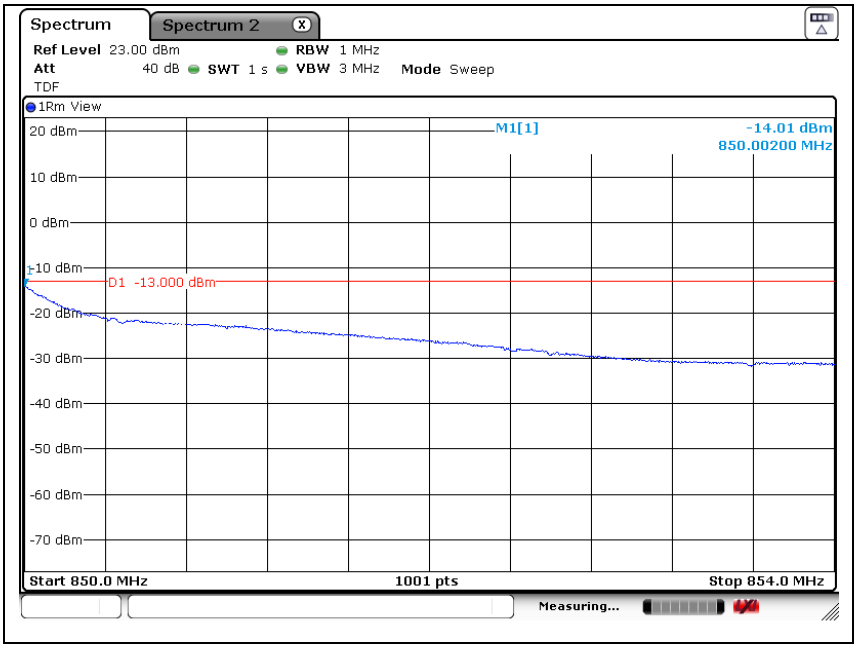


4 ㎒ span plot_WCDMA850

Low Channel

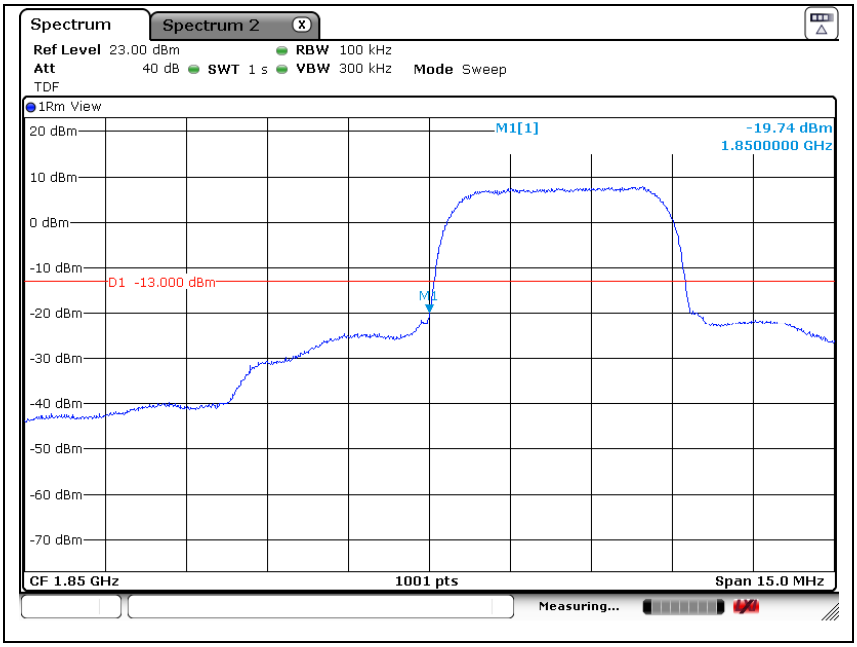


High Channel

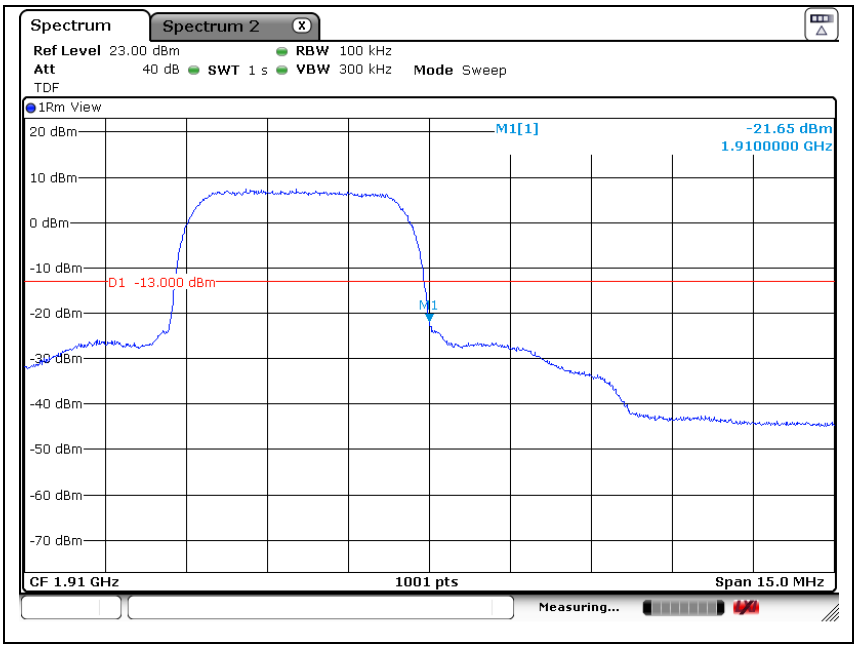


Bandedge_WCDMA1900

Low Channel

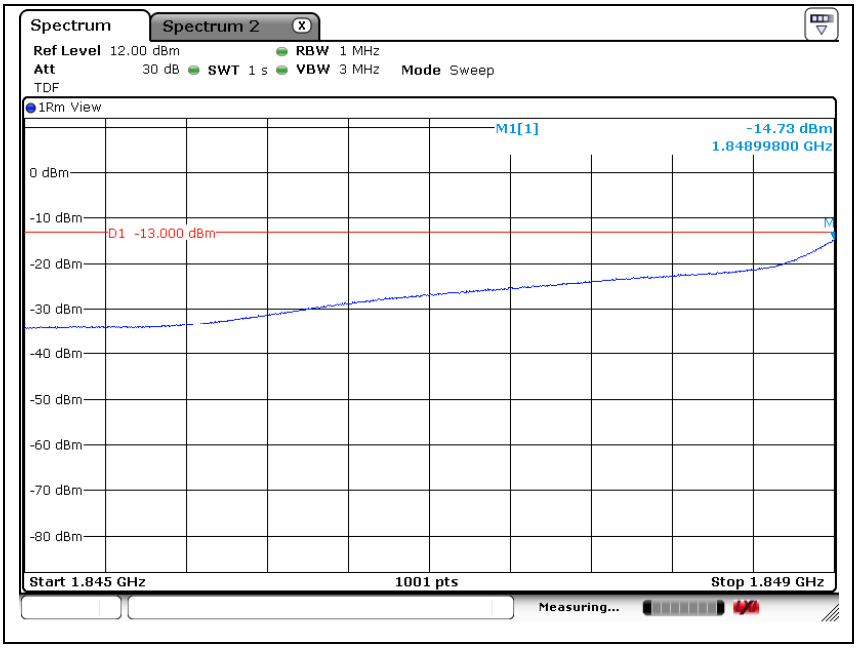


High Channel

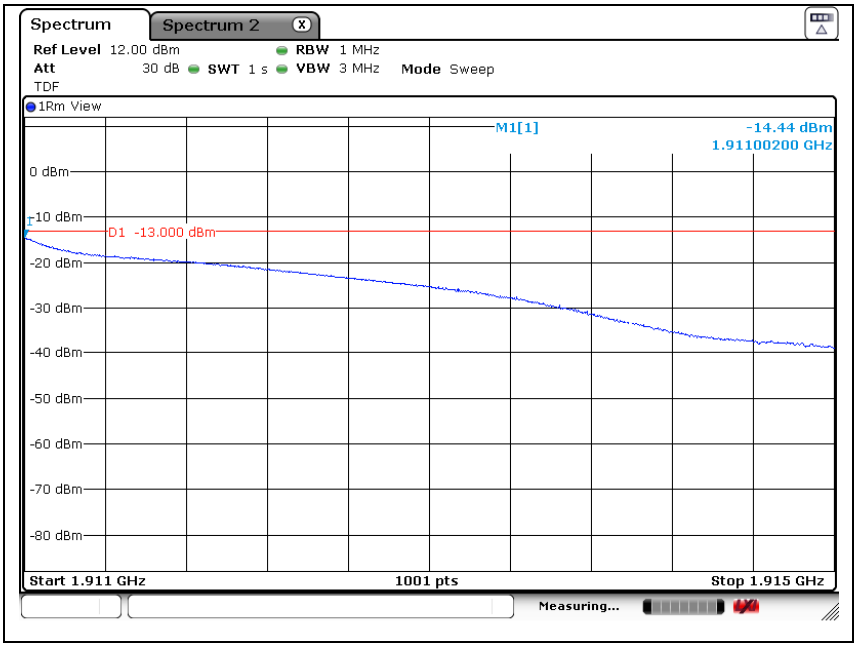


4 ㎒ span plot_WCDMA1900

Low Channel



High Channel



7. Frequency Stability

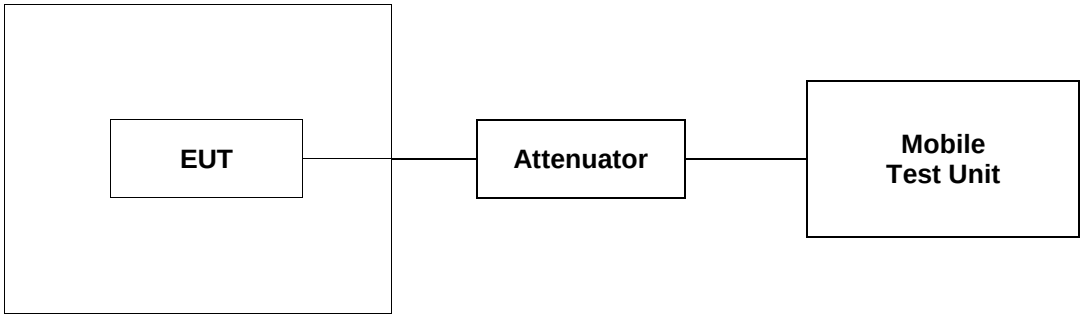
7.1. Limit

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:
FCC §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.
For Mobile devices operating in the 824 to 849 ㎒ band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.
FCC §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7.2. Test Procedure

The test follows ANSI/TIA-603-C-2004

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



Temperature chamber

7.3. Test Results

Ambient temperature : (24 ± 1) ℃
Relative humidity : 47 % R.H.

WCDMA850 mode at middle channel

Reference Frequency: 836.6 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.7	4	0.001 195
40		-5	-0.009 563
30		-2	-0.005 977
24		3	Ref.
10		1	-0.002 391
0		-2	-0.005 977
-10		0	-0.003 586
-20		-2	-0.005 977
-30		-1	-0.004 781
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	4.26	7	0.004 781
	3.43(batt. End point)	-5	-0.009 563

WCDMA1900 mode at middle channel

Reference Frequency: 1880.0 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	3.70	3	-0.001 064
40		-9	-0.007 447
30		1	-0.002 128
24		5	Ref.
10		2	-0.001 596
0		4	-0.000 532
-10		-3	-0.004 255
-20		1	-0.002 128
-30		-2	-0.003 723
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	4.26	7	0.001 064
	3.43(batt. End point)	-5	-0.005 319