TEST REPORT

of

FCC Part 22 Subpart H and Part 24 Subpart E

FCC ID: TQ8-AVCB0GSAN

Equipment Under Test	:	DIGITAL CAR AVNT SYSTEM
Model Name	:	AVCB0GSAN
Applicant	:	Hyundai MOBIS Co., Ltd.
Manufacturer	:	Hyundai MOBIS Co., Ltd.
Date of Test(s)	:	2014. 07. 08 ~ 2014. 07. 17
Date of Issue	:	2014. 07. 21

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

Tested By: **Alvin Kim** **Date:** **2014.07.21**

Approved By: **Hyunchae You** **Date:** **2014.07.21**

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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.

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1.2. Details of applicant

Applicant : Hyundai MOBIS Co., Ltd.
Address : 203, Teheran-ro, Gangnam-gu, Seoul, 135-977, Korea
Contact Person : Choi, Seung-Hun
Phone No. : +82 31 260 0098

1.3. Description of EUT

Kind of Product	DIGITAL CAR AVNT SYSTEM
Model Name	AVCB0GSAN
Power Supply	DC 14.4 V (Vehicle Battery)
Rated Power	CDMA850: 24 ㏈m CDMA1 900: 24 ㏈m
Frequency Range	CDMA850: 824.70 ㎒ ~ 848.31 ㎒ CDMA1900: 1 851.25 ㎒ ~ 1 908.75 ㎒
Antenna Gain	CDMA850: 2.94 ㏈i CDMA1 900: 3.45 ㏈i
Support Mode	1xRTT, 1xEV-DO
Emission Designator	CDMA850 (1xRTT): 1M27F9W CDMA1 900 (1xRTT):1M27F9W CDMA850 (1xEV-DO):1M27F9W CDMA1 900 (1xEV-DO):1M27F9W

1.4. Declaration by the manufacturer

- N/A

1.5. Description of test mode

The transmitter has a maximum average output power as follows:

1xRTT

Cellular Band

Frequency (㎒)	Service Option (SO)	Channel	Average Output Power (㏈m)
824.70	RC1 55 (Loopback)	1 013	24.30
836.52		384	23.86
848.31		777	24.18

PCS Band

Frequency (㎒)	Service Option (SO)	Channel	Average Output Power (㏈m)
1 851.25	RC4 32 (+SCH)	25	23.85
1 880.00		600	24.09
1 908.75		1 175	23.88

1xEV-DO Release 0

Cellular Band - RTAP

Frequency (㎒)	RTAP Rate	Channel	Average Output Power (㏈m)
824.70	38.4	1 013	24.31
836.52		384	23.88
848.31		777	24.14

PCS Band - RTAP

Frequency (㎒)	RTAP Rate	Channel	Average Output Power (㏈m)
1 851.25	9.6	25	24.25
1 880.00		600	24.38
1 908.75		1 175	24.15

CDMA (850 / 1 900)
We found out the test mode with the highest power level after we investigated average output power of all the modulations and (or) data rates for each mode. So we chose below test mode as a representative of worst case.

- CDMA (850) 1xRTT : RC1 / 55 (Loopback), 1xEV-DO Rel0 : RTAP / 38.4
- CDMA (1 900) 1xRTT : RC4 / 32 (+SCH), 1xEV-DO Rel0 : RTAP / 9.6

1.6. Sample calculation for offset

Where relevant, the following sample calculation is provided:

1.6.1. Conducted test

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

1.6.2. Radiation test

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

1.7. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	R&S	SMBV100A	255834	Jun. 25, 2014	Annual	Jun. 25, 2015
Signal Generator	R&S	SMR40	100272	Aug. 10, 2013	Annual	Aug. 10, 2014
Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 08, 2013	Annual	Oct. 08, 2014
Mobile Test Unit	Agilent	E5515C	GB43345198	Mar. 28, 2014	Annual	Mar. 28, 2015
Directional Coupler	KRYTAR	152613	140972	Jun. 10, 2014	Annual	Jun. 10, 2015
Attenuator	AEROFLEX / INMET	18N-20dB	4	Mar. 24, 2014	Annual	Mar. 24, 2015
Low Pass Filter	Mini circuits	NLP-1200+	V8979400903-2	Mar. 21, 2014	Annual	Mar. 21, 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. 18, 2014	Annual	Mar. 18, 2015
DC Power Supply	Agilent	U8002A	MY50060028	Mar. 27, 2014	Annual	Mar. 27, 2015
Preamplifier	H.P.	8447D	2944A07087	Jan. 06, 2014	Annual	Jan. 06, 2015
Preamplifier	R&S	SCU 18	10117	Jan. 14, 2014	Annual	Jan. 14, 2015
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Apr. 28, 2014	Annual	Apr. 28, 2015
Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	396	Jun. 07, 2013	Biennial	Jun. 07, 2015
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170431	May 15, 2014	Biennial	May 15, 2016
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170223	Aug. 24, 2012	Biennial	Aug. 24, 2014
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	VHA 9103	9103-2817	May 09, 2013	Biennial	May 09, 2015
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	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.

1.8. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD : FCC Part 22 Subpart H, Part 24 Subpart E		
Section in FCC part	**Test Item**	**Result**
§2.1046 §22.913(a) §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 the MPE 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

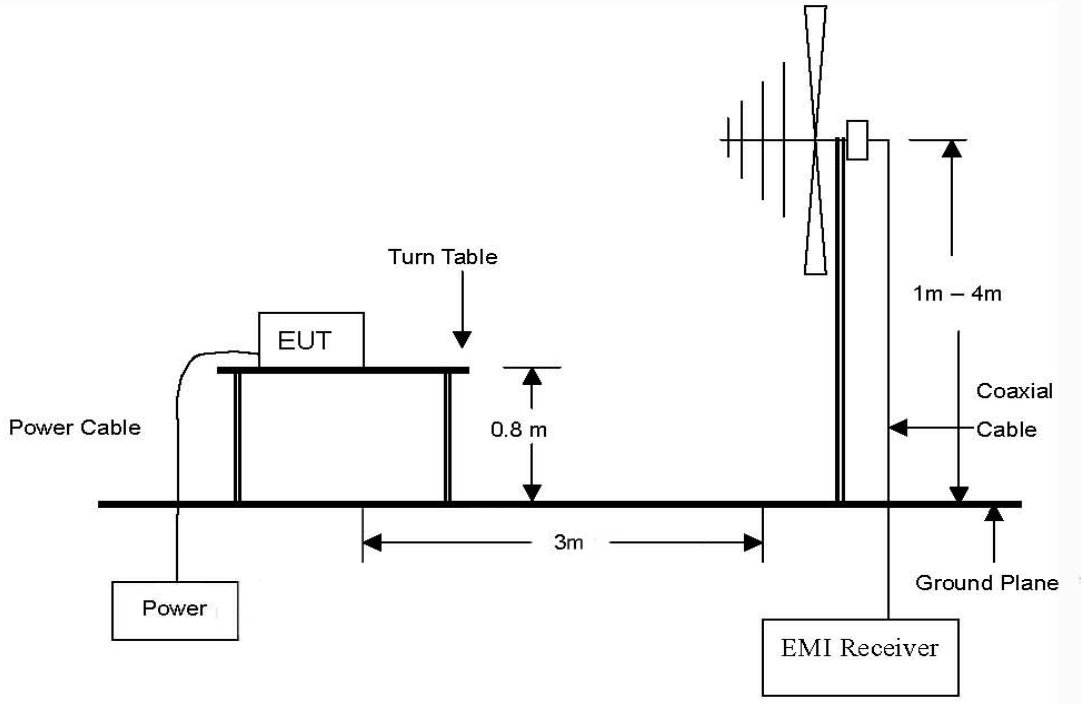
1.9. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL007834	2014.07.21	Initial

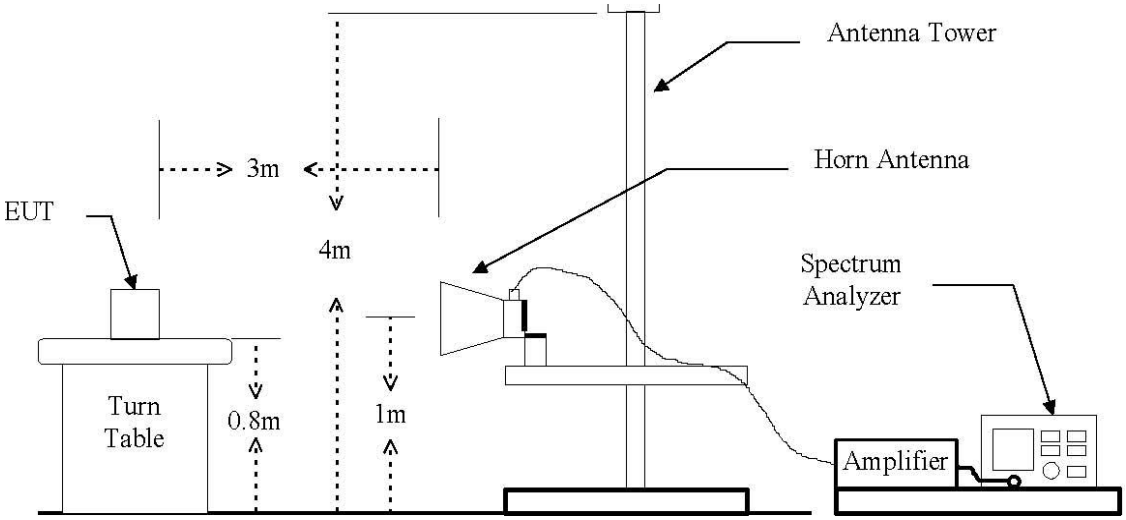
2. RF radiated output power & spurious radiated emission

2.1. Test setup

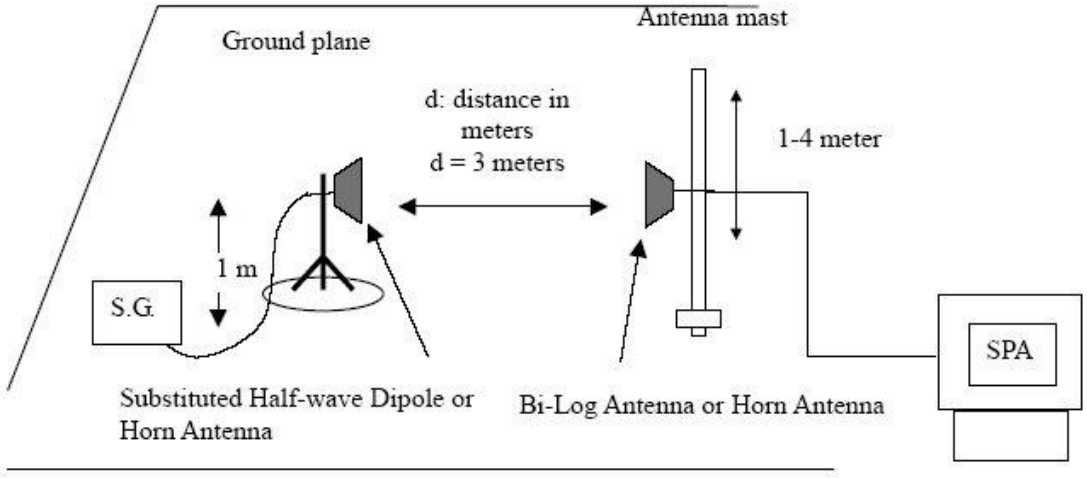
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission .The spurious emissions were investigated form 1 ㎓ to the 10th harmonic of the highest fundamental frequency or 40 ㎓, whichever is lower.



The diagram below shows the test setup for substituted method



2.2. Limit

2.2.1. RF radiated output power

FCC §22.913(a), 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 EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

2.2.2. Spurious Radiated emission

§ 22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)㏈.

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. During the measurement of the EUT, the resolution bandwidth was to 3 ㎒ and the video bandwidth was set to 3 ㎒.
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. 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.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. 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.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824 ~ 849 ㎒) or horn antenna (1 850 ~ 1 910 ㎒) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. 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.
14. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for any change of input attenuator setting of the measuring receiver.
15. 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 ± 1) ℃
Relative humidity : 46 % R.H.

CDMA850 1xRTT mode

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(㎽)
824.70	H	35.19	3.28	-0.95	30.96	1 246.90
824.70	V	30.30	3.28	-0.95	26.07	404.62
836.52	H	34.73	3.31	-0.95	30.47	1 115.44
836.52	V	29.03	3.31	-0.95	24.77	300.10
848.31	H	36.29	3.35	-0.94	32.00	1 584.92
848.31	V	28.42	3.35	-0.94	24.13	259.06

CDMA1 900 1xRTT mode

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(㎽)
1 851.25	H	22.77	5.90	7.87	24.74	297.87
1 851.25	V	27.69	5.90	7.87	29.66	924.85
1 880.00	H	24.80	5.83	7.86	26.83	481.76
1 880.00	V	26.26	5.83	7.86	28.29	674.76
1 908.75	H	26.25	5.77	7.84	28.32	678.64
1 908.75	V	28.24	5.77	7.84	30.31	1 073.94

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dBm) - Cable loss (dB) + Ant. gain (dBd/dBi)

CDMA850 1xEV-DO mode

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(㎽)
824.70	H	35.44	3.28	-0.95	31.21	1 320.78
824.70	V	30.42	3.28	-0.95	26.19	415.95
836.52	H	34.73	3.31	-0.95	30.47	1 115.44
836.52	V	29.47	3.31	-0.95	25.21	332.10
848.31	H	36.18	3.35	-0.94	31.89	1 545.28
848.31	V	28.55	3.35	-0.94	24.26	266.93

CDMA1 900 1xEV-DO mode

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(㎽)
1 851.25	H	23.56	5.90	7.87	25.53	357.29
1 851.25	V	28.33	5.90	7.87	30.30	1 071.70
1 880.00	H	25.81	5.83	7.86	27.84	607.89
1 880.00	V	27.00	5.83	7.86	29.03	800.11
1 908.75	H	27.32	5.77	7.84	29.39	868.24
1 908.75	V	29.03	5.77	7.84	31.10	1 288.18

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dBm) - Cable loss (dB) + Ant. gain (dBd/dBi)

2.5. Spurious radiated emission

- Measured output Power : 32.00 ㏈m = 1.585 W
- Modulation Signal : CDMA850 1xRTT
- Distance : 3 meters
- Limit : 43 + 10log$_{10}$(W) = 45.00 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈d)	E.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel (824.70 ㎒)							
1 649.48	H	-39.75	5.92	7.93	-37.74	69.74	-24.74
1 649.37	V	-36.26	5.92	7.93	-34.25	66.25	-21.25
2 475.47	H	-48.56	5.81	8.92	-45.45	77.45	-32.45
2 473.53	V	-40.88	5.80	8.91	-37.77	69.77	-24.77
Middle Channel (836.52 ㎒)							
1 673.78	H	-43.38	6.01	7.93	-41.46	73.46	-28.46
1 672.51	V	-40.47	6.00	7.93	-38.54	70.54	-25.54
2 510.76	H	-47.79	5.86	8.98	-44.67	76.67	-31.67
2 510.01	V	-41.21	5.86	8.98	-38.09	70.09	-25.09
High Channel (848.31 ㎒)							
1 696.12	H	-40.21	6.09	7.93	-38.37	70.37	-25.37
1 696.56	V	-35.54	6.09	7.93	-33.70	65.70	-20.70
2 544.41	H	-52.21	5.92	9.00	-49.13	81.13	-36.13
2 543.69	V	-44.31	5.92	9.00	-41.23	73.23	-28.23

Remark:
1. E.R.P. & E.I.R.P. = S.G level (㏈m) - Cable loss (㏈) + Ant. gain (㏈d/㏈i)
2. No more harmonic above 3rd harmonic for all channel.

- Measured output Power : 30.31 dBm = 1.074 W
- Modulation Signal : CDMA1 900 1xRTT
- Distance : 3 meters
- Limit : 43 + 10log$_{10}$(W) = 43.31 dBc

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dBm)	Cable loss (dB)	Ant. gain (dBi)	E.I.R.P. (dBm)	dBc	Margin (dB)
Low Channel(1 851.25 ㎒)							
3 701.48	H	-41.59	8.05	9.07	-40.57	70.88	-27.57
3 702.52	V	-40.13	8.05	9.08	-39.10	69.41	-26.10
5 554.04	H	-29.32	9.11	10.45	-27.98	58.29	-14.98
5 554.03	V	-23.20	9.11	10.45	-21.86	52.17	-8.86
Middle Channel(1 880.00 ㎒)							
3 760.34	H	-32.93	8.32	9.10	-32.15	62.46	-19.15
3 760.01	V	-32.26	8.32	9.10	-31.48	61.79	-18.48
5 640.12	H	-31.66	9.15	10.55	-30.26	60.57	-17.26
5 640.27	V	-27.63	9.15	10.55	-26.23	56.54	-13.23
High Channel(1 908.75 ㎒)							
3 818.39	H	-29.15	8.49	9.12	-28.52	58.83	-15.52
3 816.81	V	-33.79	8.49	9.12	-33.16	63.47	-20.16
5 726.53	H	-30.56	9.22	10.63	-29.15	59.46	-16.15
5 726.51	V	-26.01	9.22	10.63	-24.60	54.91	-11.60

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dBm) - Cable loss (dB) + Ant. gain (dBd/dBi)
2. No more harmonic above 3rd harmonic for all channel.

- Measured output Power : 31.89 ㏈m = 1.545 W
- Modulation Signal : CDMA850 1xEV-DO
- Distance : 3 meters
- Limit : 43 + 10log$_{10}$(W) = 44.89 ㏈c

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (㏈m)	Cable loss (㏈)	Ant. gain (㏈d)	E.R.P. (㏈m)	㏈c	Margin (㏈)
Low Channel (824.70 ㎒)							
1 650.33	H	-39.52	5.93	7.93	-37.52	69.41	-24.52
1 650.04	V	-36.34	5.92	7.93	-34.33	66.22	-21.33
2 474.22	H	-45.50	5.81	8.92	-42.39	74.28	-29.39
2 473.72	V	-40.92	5.80	8.92	-37.80	69.69	-24.80
Middle Channel (836.52 ㎒)							
1 673.31	H	-43.09	6.01	7.93	-41.17	73.06	-28.17
1 673.17	V	-37.72	6.01	7.93	-35.80	67.69	-22.80
2 509.44	H	-47.40	5.86	8.98	-44.28	76.17	-31.28
2 509.43	V	-40.27	5.86	8.98	-37.15	69.04	-24.15
High Channel (848.31 ㎒)							
1 696.12	H	-39.50	6.09	7.93	-37.66	69.55	-24.66
1 696.31	V	-35.72	6.09	7.93	-33.88	65.77	-20.88
2 544.61	H	-50.19	5.92	9.00	-47.11	79.00	-34.11
2 544.80	V	-43.62	5.92	9.00	-40.54	72.43	-27.54

Remark:
1. E.R.P. & E.I.R.P. = S.G level (㏈m) - Cable loss (㏈) + Ant. gain (㏈d/㏈i)
2. No more harmonic above 3rd harmonic for all channel.

- Measured output Power : 31.10 dBm = 1.288 W
- Modulation Signal : CDMA1 900 1xEV-DO
- Distance : 3 meters
- Limit : 43 + 10log$_{10}$(W) = 44.10 dBc

Frequency (㎒)	Ant. Pol. (H/V)	S.G level + Amp. (dBm)	Cable loss (dB)	Ant. gain (dBi)	E.I.R.P. (dBm)	dBc	Margin (dB)
Low Channel(1 851.25 ㎒)							
3 701.85	H	-38.99	8.05	9.07	-37.97	69.07	-24.97
3 701.91	V	-36.87	8.05	9.07	-35.85	66.95	-22.85
5 553.93	H	-26.61	9.11	10.45	-25.27	56.37	-12.27
5 554.03	V	-22.69	9.11	10.45	-21.35	52.45	-8.35
Middle Channel(1 880.00 ㎒)							
3 760.41	H	-31.51	8.32	9.10	-30.73	61.83	-17.73
3 760.70	V	-30.24	8.33	9.10	-29.47	60.57	-16.47
5 640.15	H	-30.76	9.15	10.55	-29.36	60.46	-16.36
5 640.12	V	-27.26	9.15	10.55	-25.86	56.96	-12.86
High Channel(1 908.75 ㎒)							
3 818.33	H	-28.23	8.49	9.12	-27.60	58.70	-14.60
3 816.90	V	-32.32	8.49	9.12	-31.69	62.79	-18.69
5 725.91	H	-29.43	9.22	10.63	-28.02	59.12	-15.02
5 726.32	V	-25.65	9.22	10.63	-24.24	55.34	-11.24

Remark:
1. E.R.P. & E.I.R.P. = S.G level (dBm) - Cable loss (dB) + Ant. gain (dBd/dBi)
2. No more harmonic above 3rd harmonic for all channel.

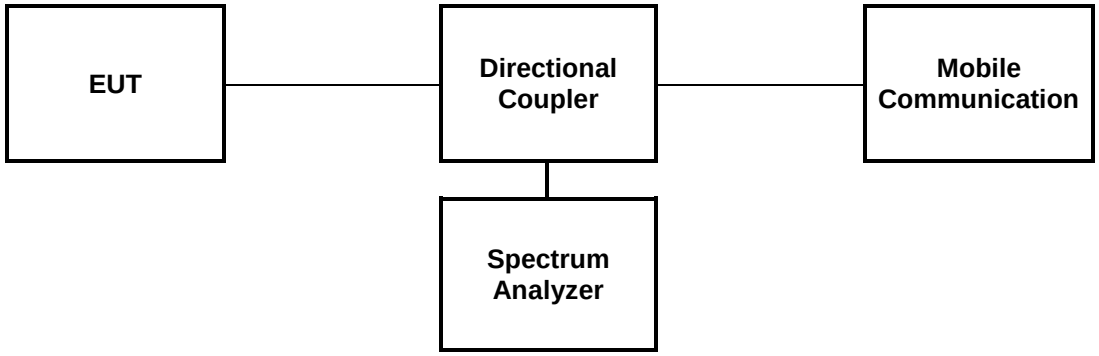
3. Occupied Bandwidth 99 %

3.1. Limit

Requirements: CFR 47, Section §2.1049.

3.2. Test Procedure

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The resolution bandwidth of the spectrum analyzer was set.
3. OBW was measured with Mobile Communication Test unit for each channel.



3.3 Test Results

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

Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
CDMA850	1xRTT RC1 55 (Loopback)	824.70	1.27
		836.52	1.27
		848.31	1.27
CDMA1 900	1xRTT RC4 32 (+SCH)	1 851.25	1.27
		1 880.00	1.27
		1 908.75	1.27

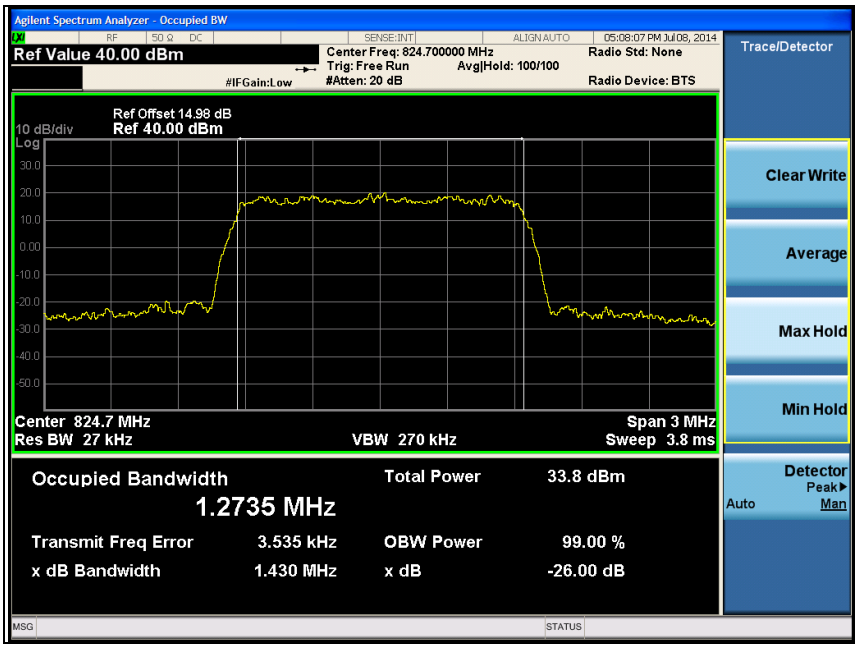
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
CDMA850	1xEV-DO(Rel0) RTAP 38.4	824.70	1.27
		836.52	1.27
		848.31	1.27
CDMA1 900	1xEV-DO(Rel0) RTAP 9.6	1 851.25	1.27
		1 880.00	1.27
		1 908.75	1.27

Please refer to the following plots.

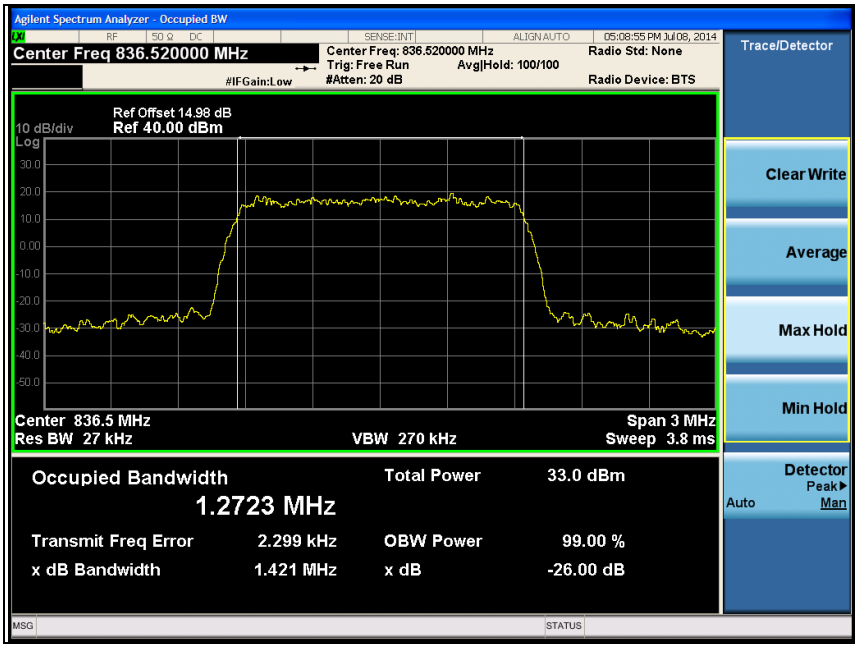
CDMA850

1xRTT

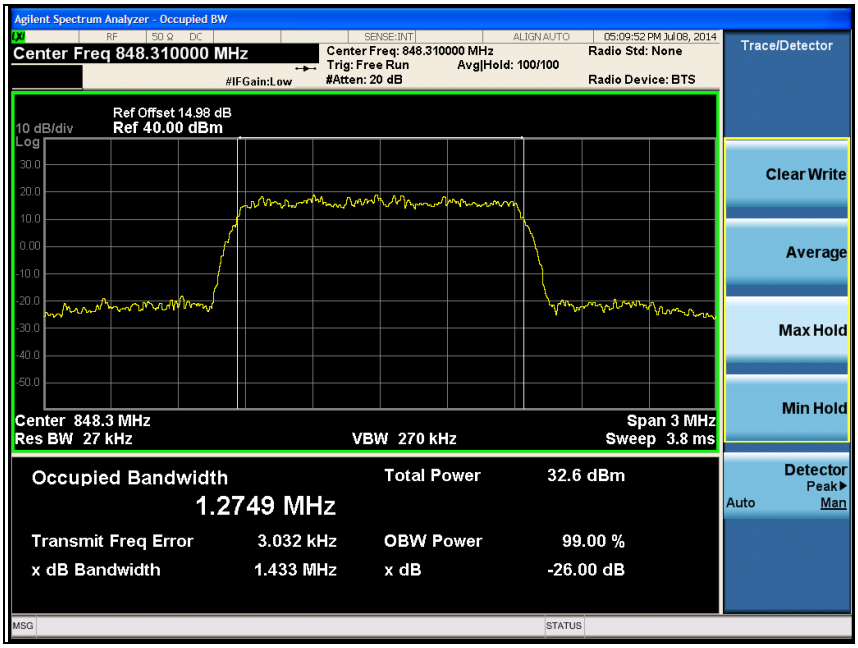
Low Channel



Middle Channel



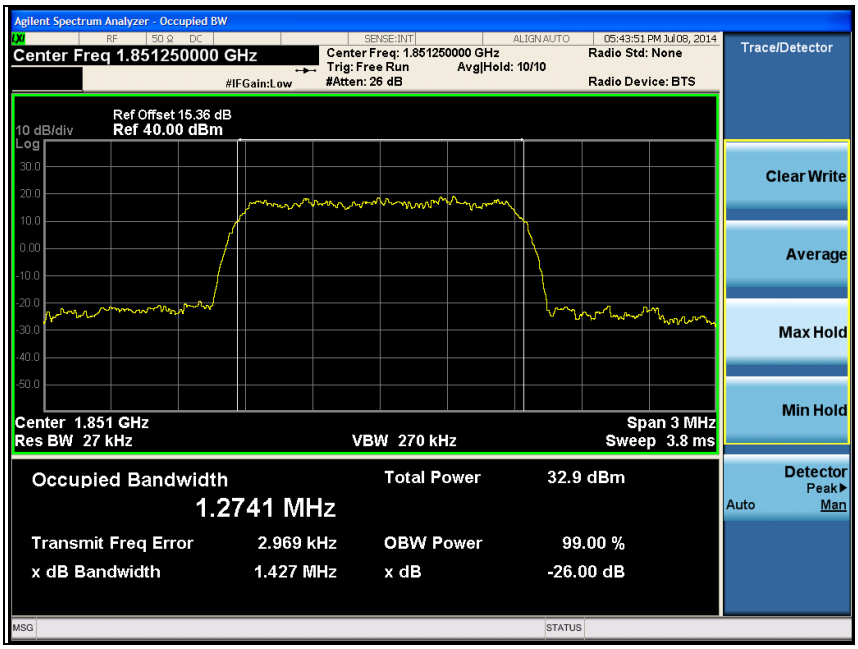
High Channel



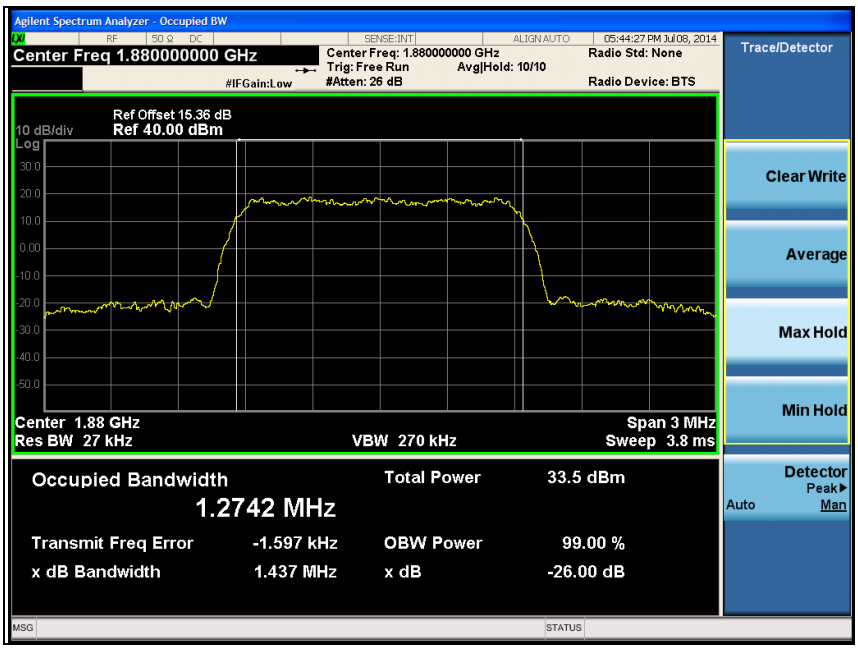
CDMA1 900

1xRTT

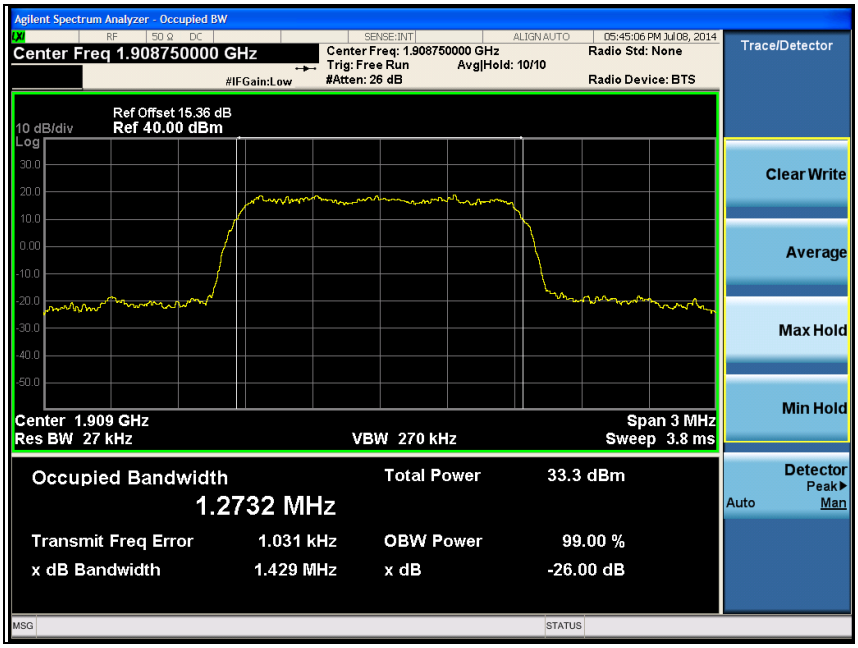
Low Channel



Middle Channel



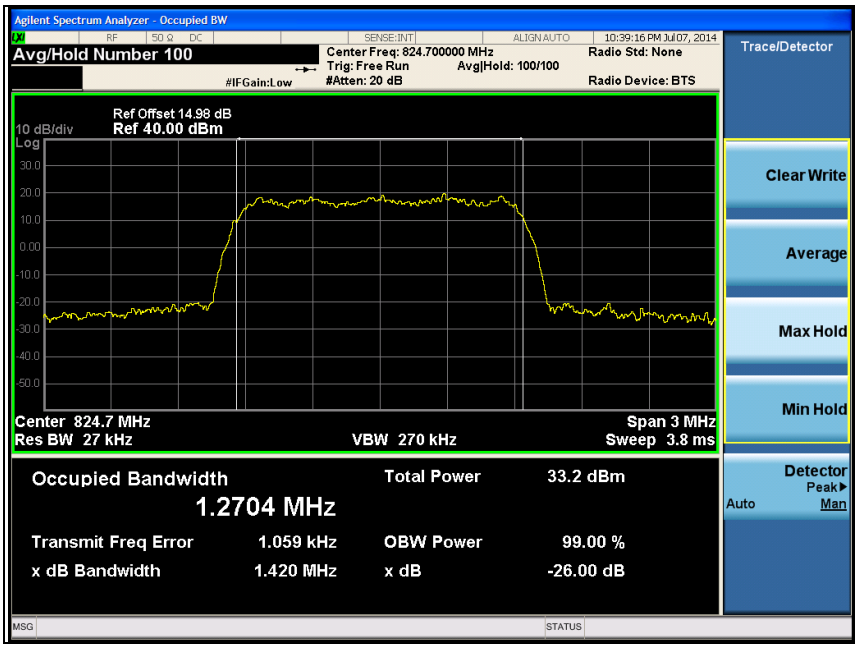
High Channel



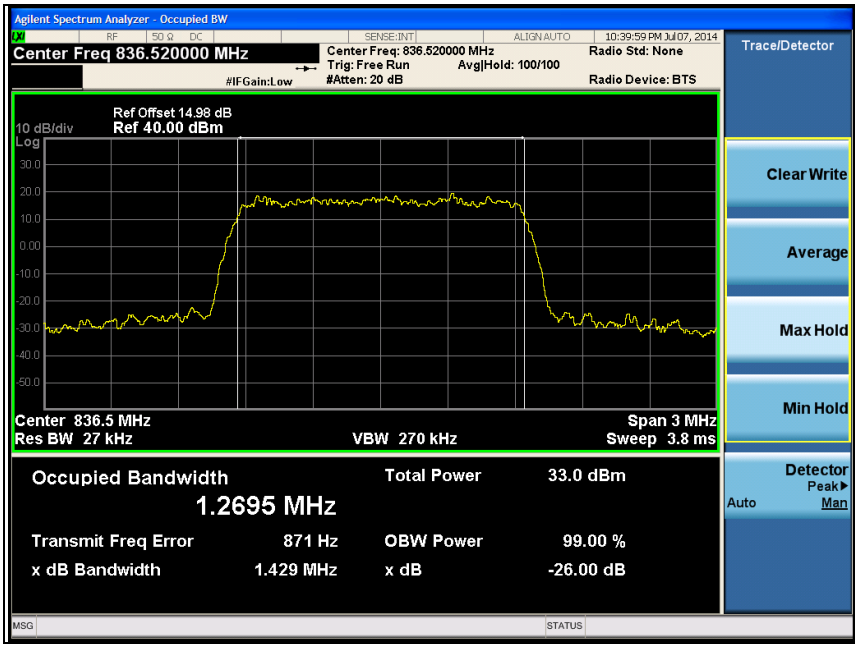
CDMA850

1xEV-DO

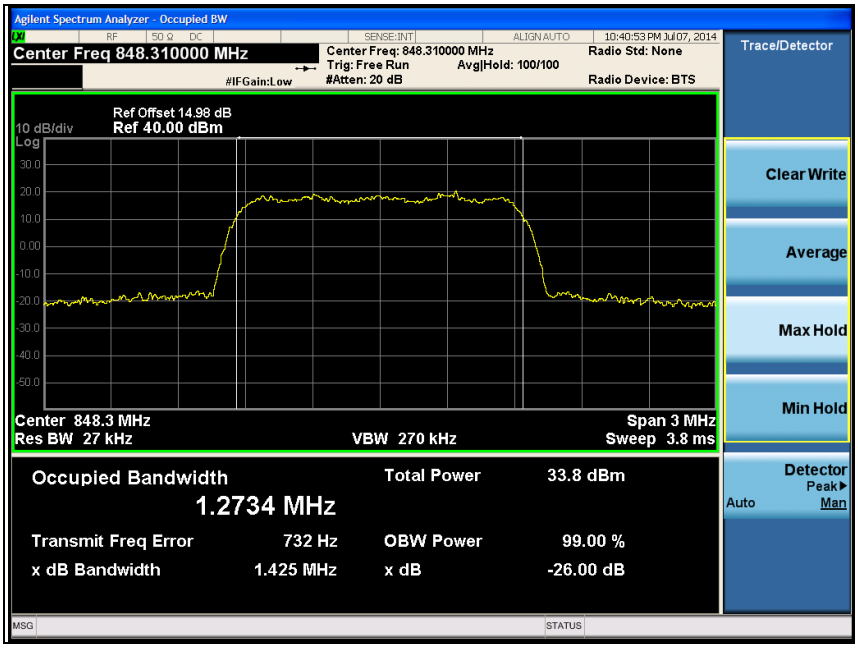
Low Channel



Middle Channel



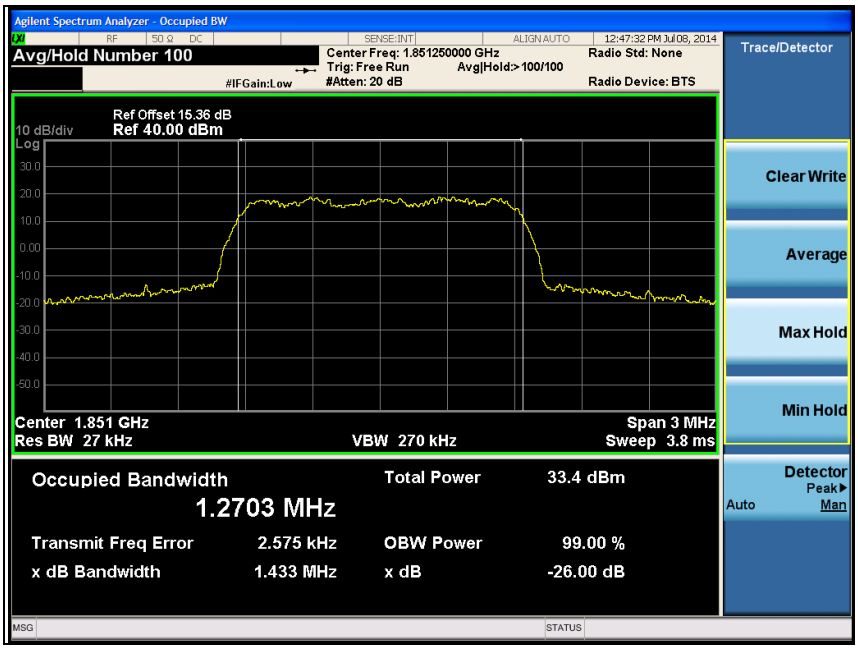
High Channel



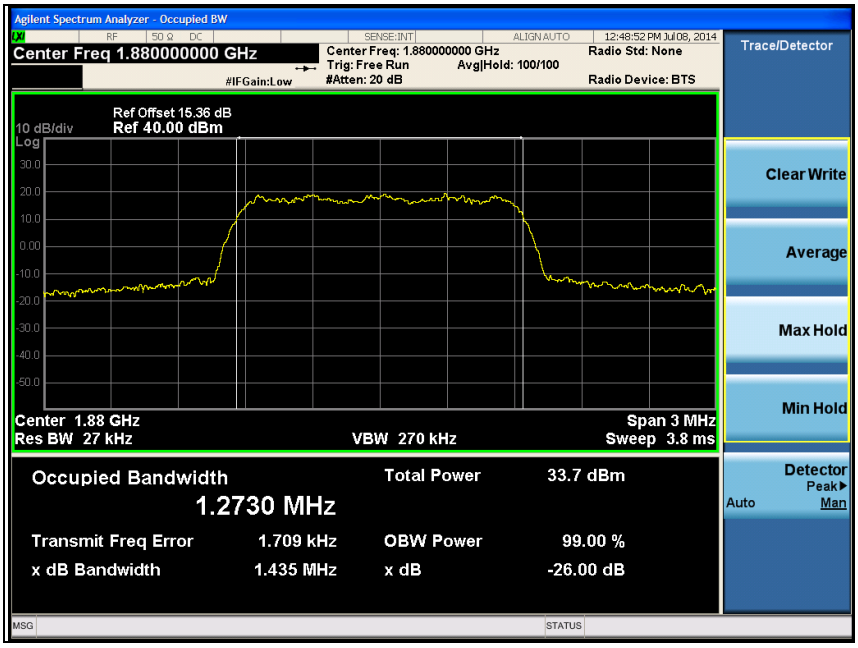
CDMA1 900

1xEV-DO

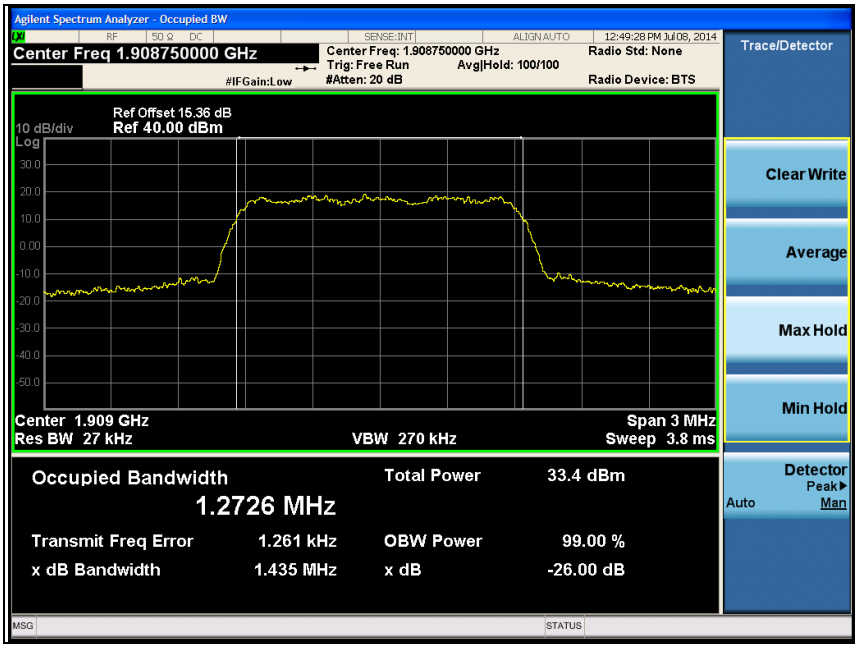
Low Channel



Middle Channel



High Channel



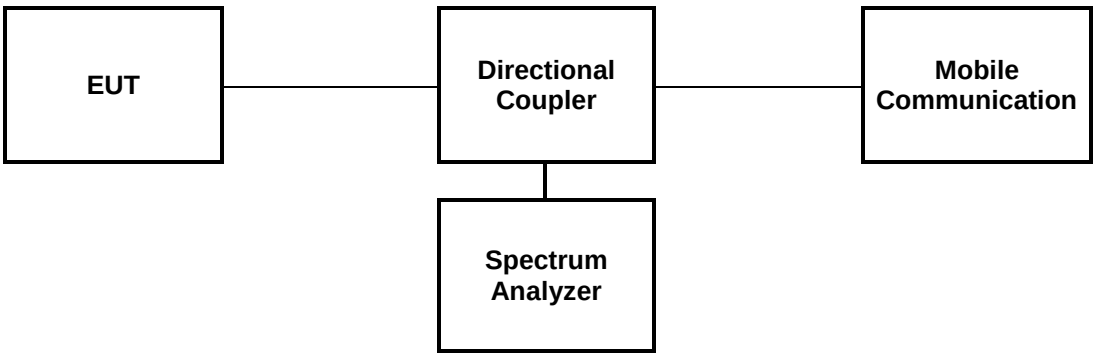
4. Peak-Average Ratio

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

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.

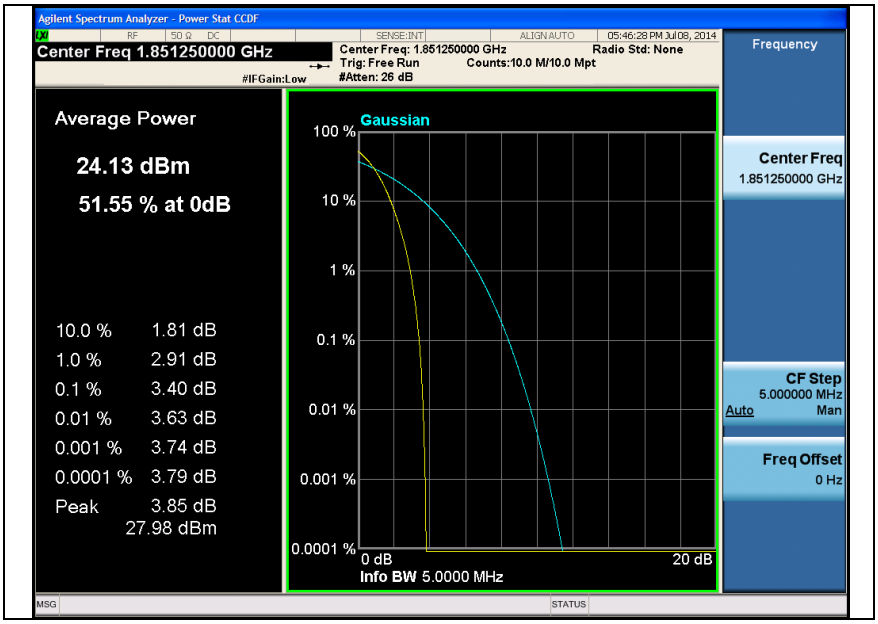
Band	Mode	Frequency (㎒)	PAR (㏈)
CDMA1 900	1xRTT RC4 32 (+SCH)	1 851.25	3.40
		1 880.00	3.22
		1 908.75	3.36
CDMA1 900	1xEV-DO(Rel0) RTAP 9.6	1 851.25	4.29
		1 880.00	4.32
		1 908.75	4.40

Please refer to the following plots.

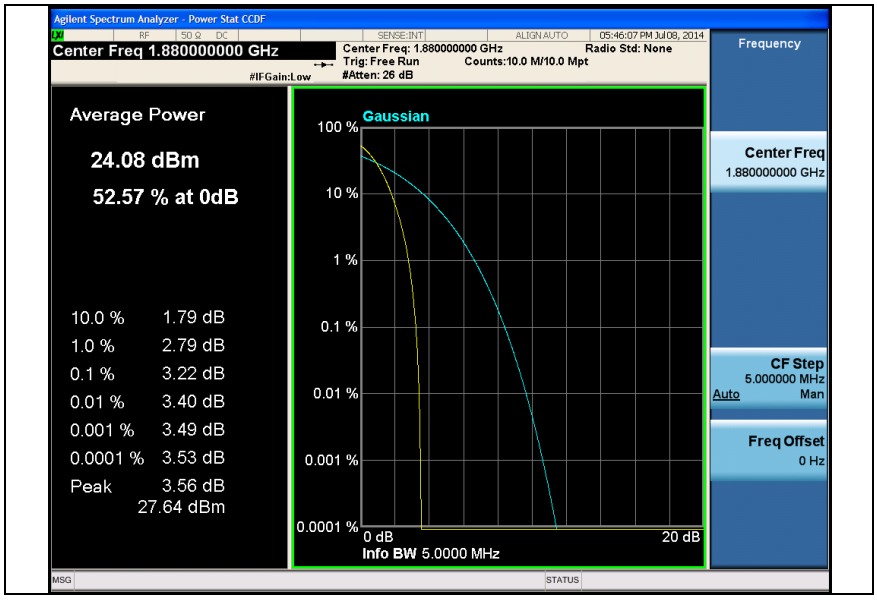
CDMA1 900

1xRTT

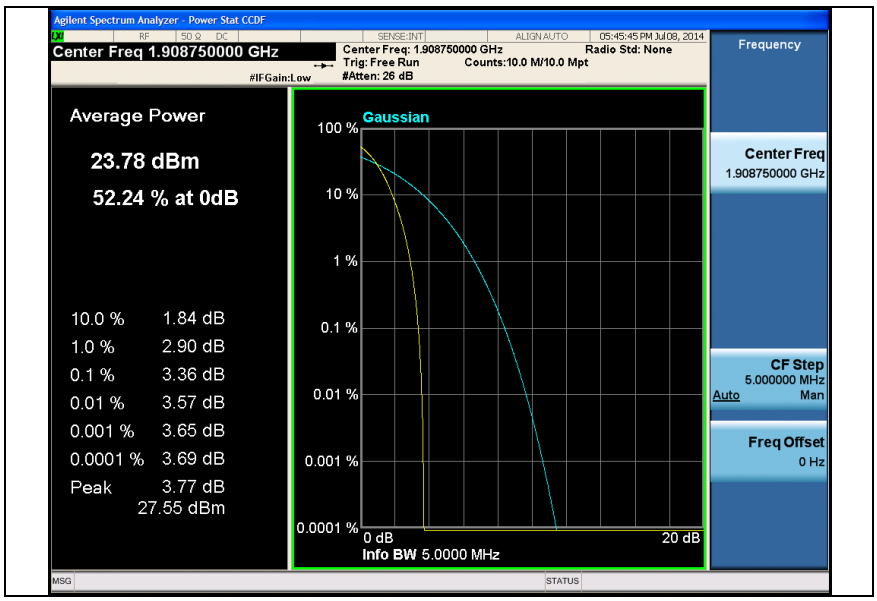
Low Channel



Middle Channel



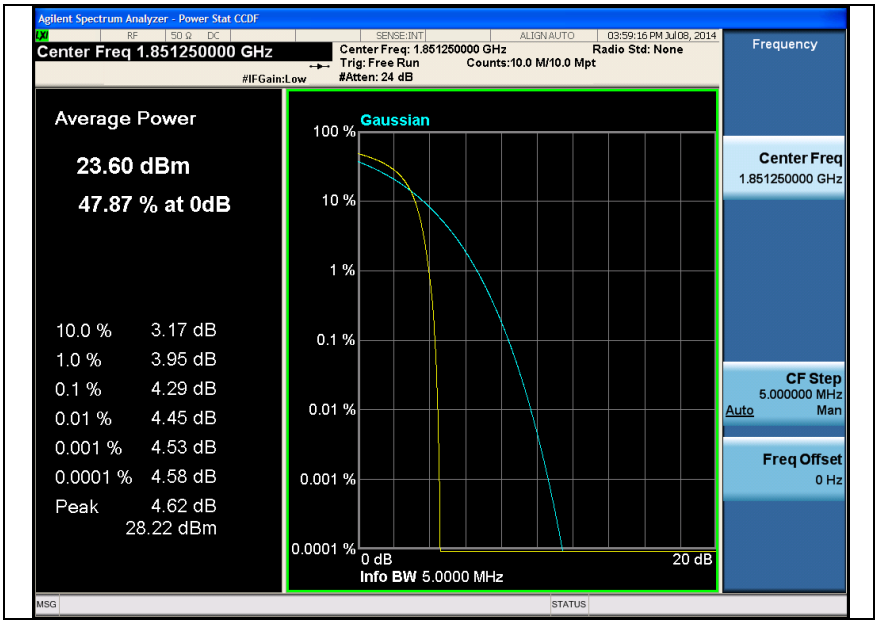
High Channel



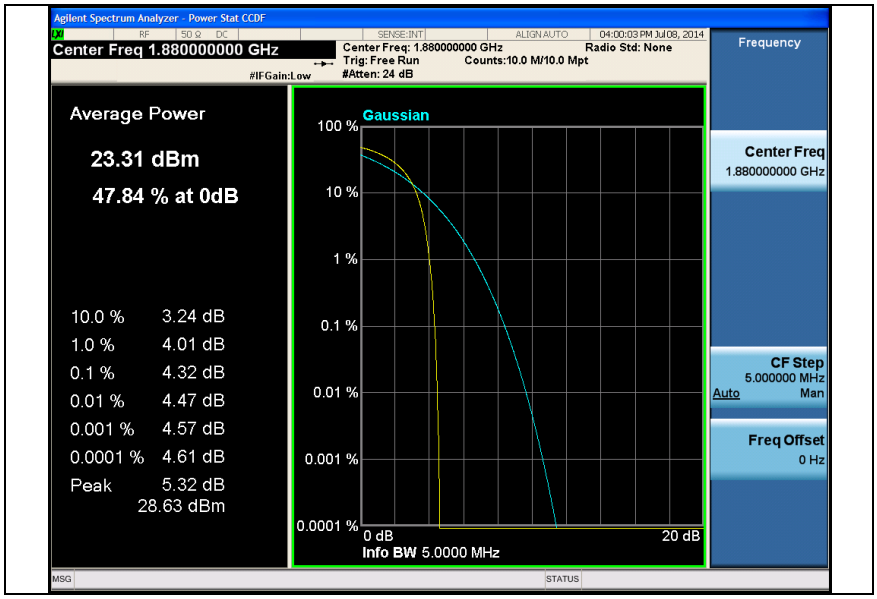
CDMA1 900

1xEV-DO

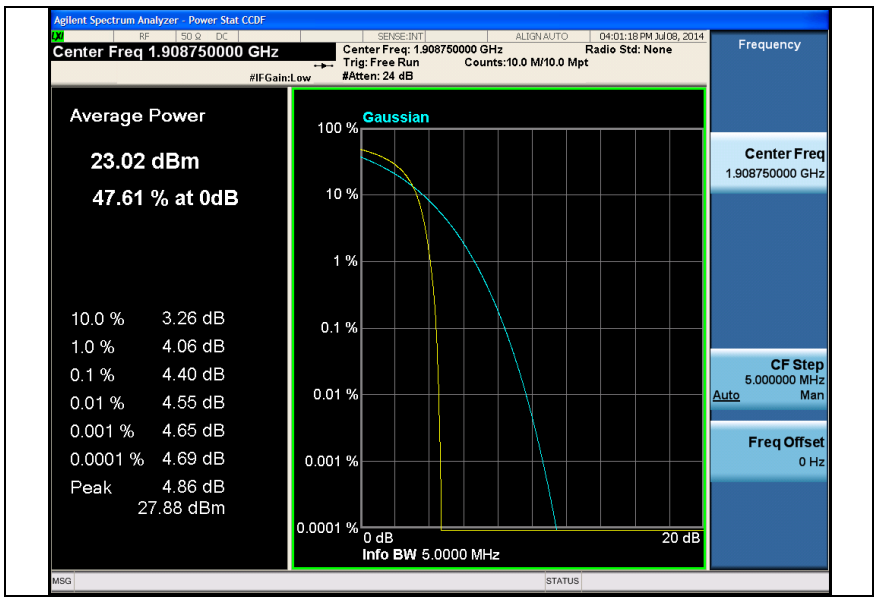
Low Channel



Middle Channel



High Channel



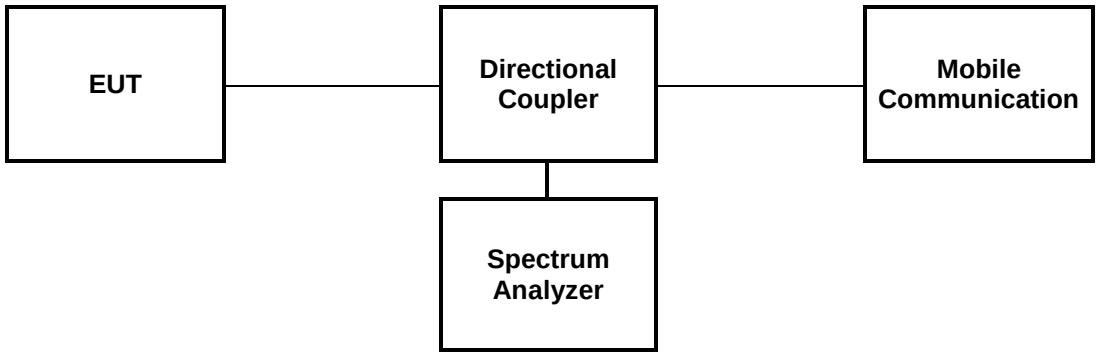
5. Spurious Emissions at Antenna Terminal

5.1. Limit

§22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43 + 10log(P)㏈.

5.2. Test Procedure

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

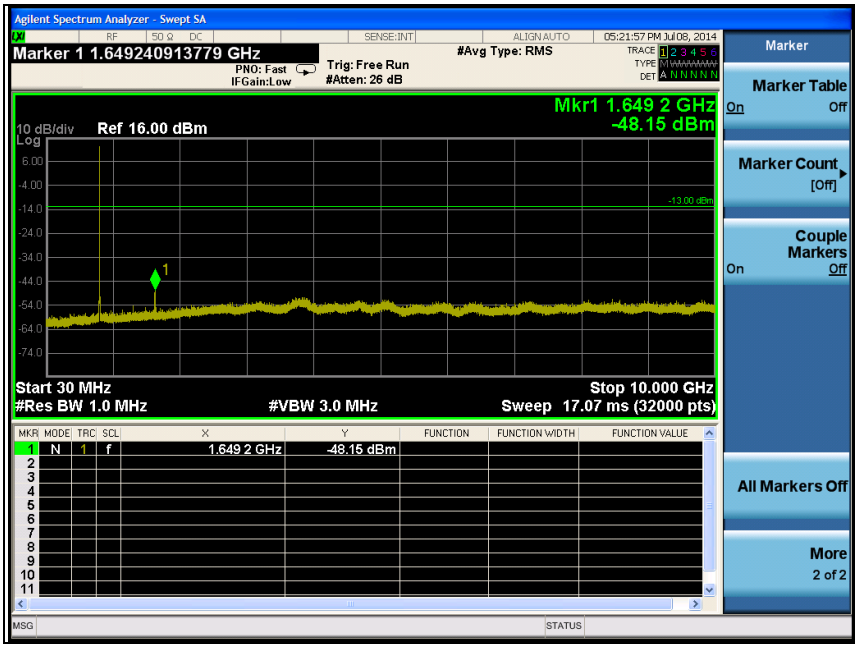
Ambient temperature	:	(24 ± 1) ℃
Relative humidity	:	47 % R.H.

Please refer to the following plots.

CDMA850

1xRTT

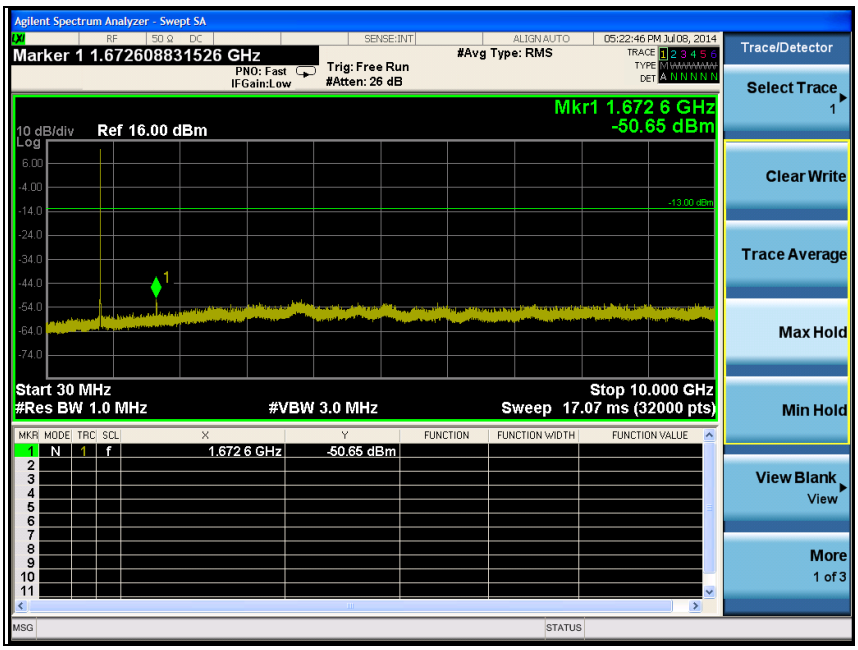
Low Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (㎒)	Reading values (dB m)	Offset (dB)	Result (dB m)
1 649.20	-48.15	15.43	-32.72

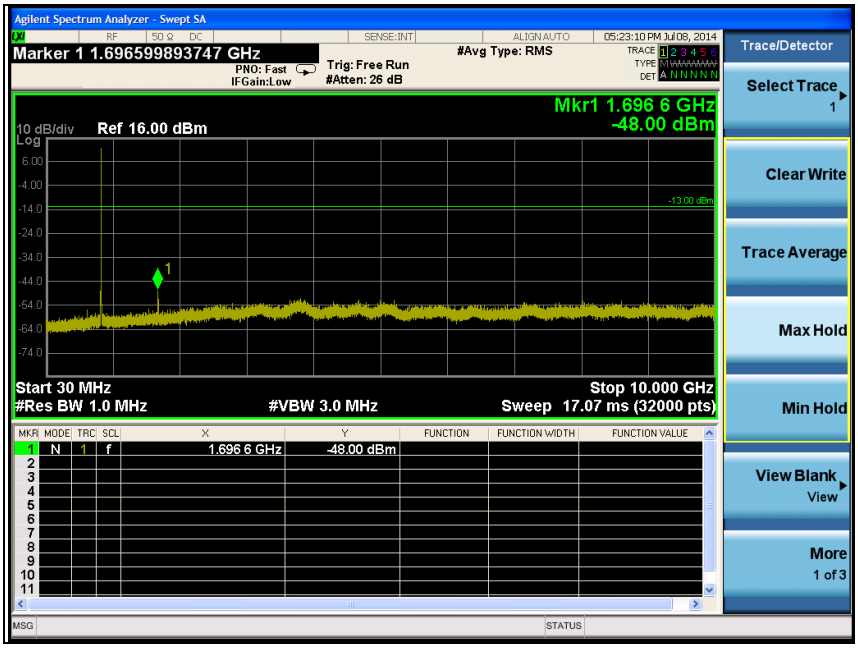
Middle Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
1 672.60	-50.65	15.43	-35.22

High Channel



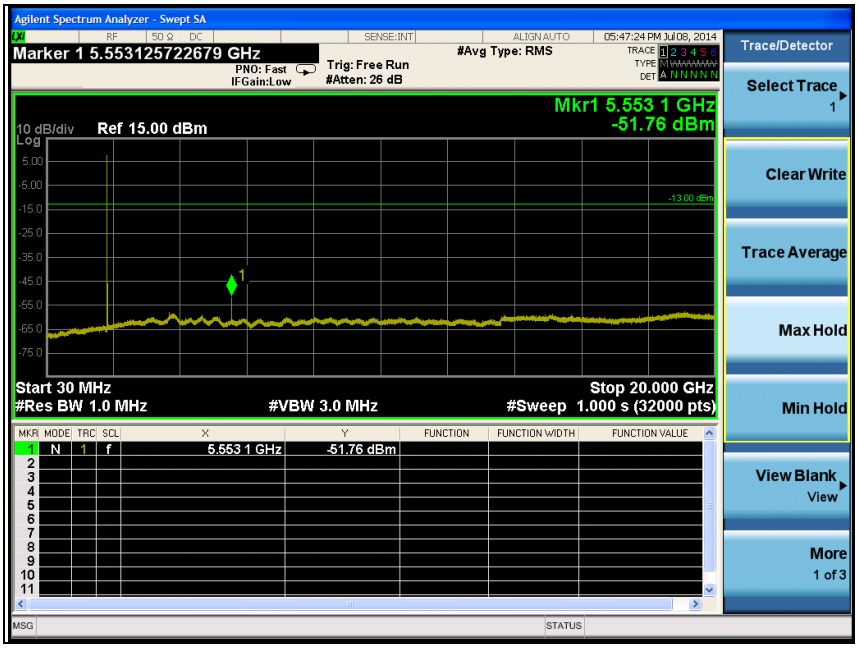
Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
1 696.60	-48.00	15.47	-32.53

CDMA1 900

1xRTT

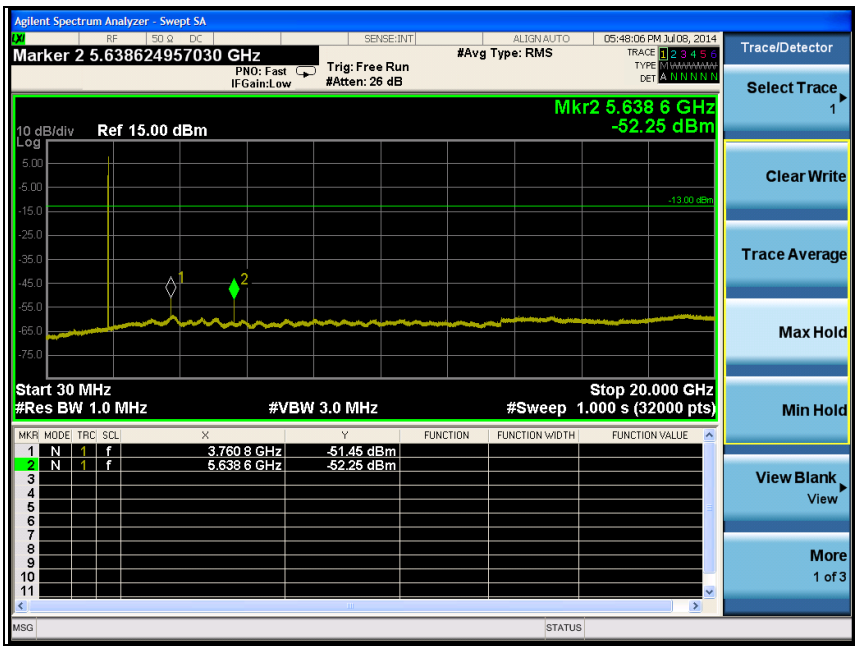
Low Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
5 553.10	-51.76	17.70	-34.06

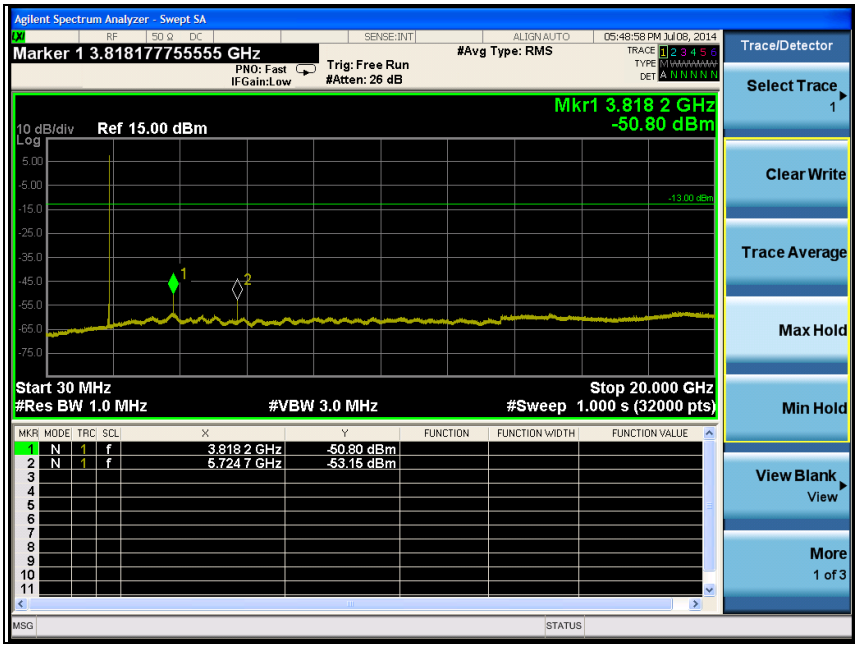
Middle Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
3 760.80	-51.45	16.31	-35.14
5 638.60	-52.25	17.30	-34.95

High Channel



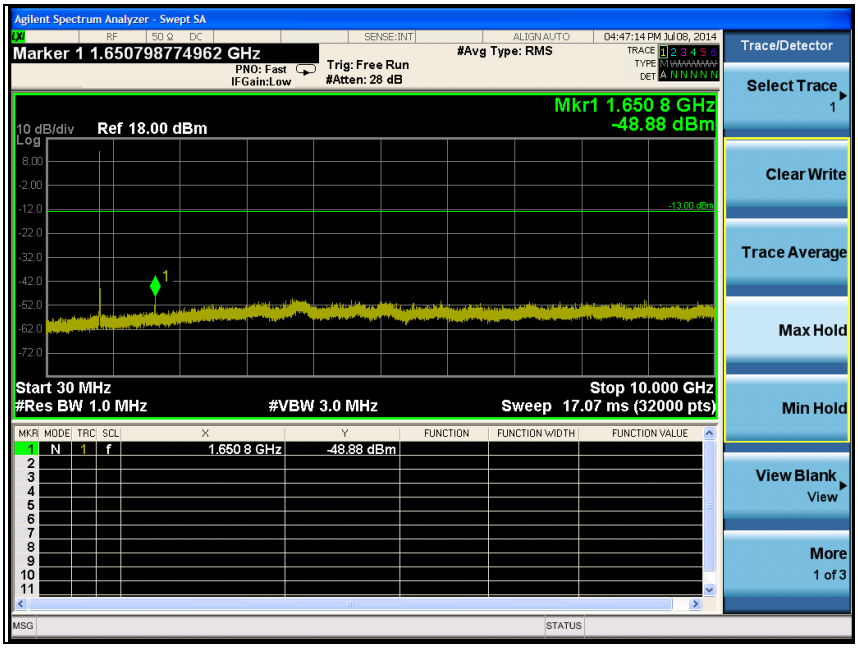
Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
3 818.20	-50.80	16.44	-34.36
5 724.70	-53.15	17.60	-35.55

CDMA850

1xEV-DO

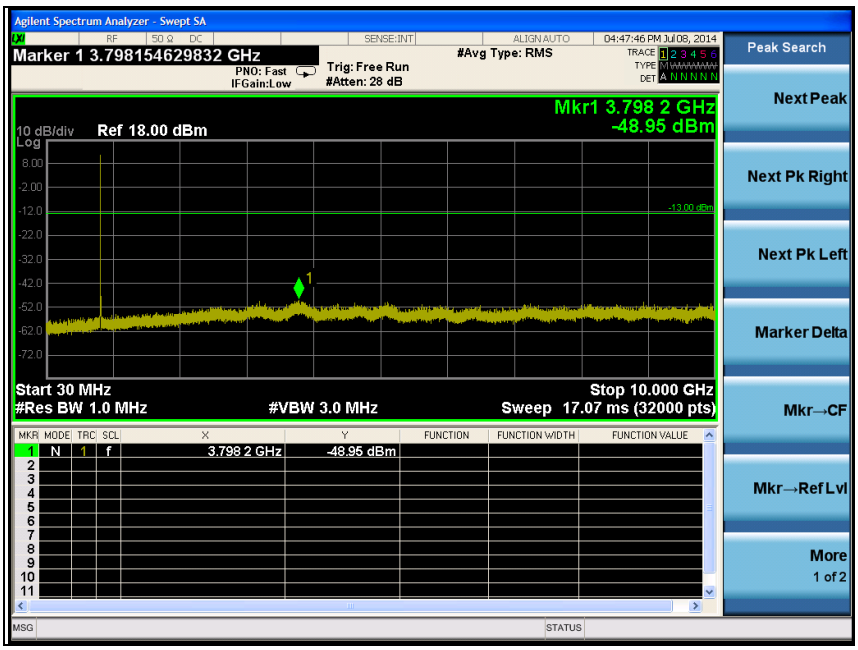
Low Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
1 650.80	-48.88	15.43	-33.45

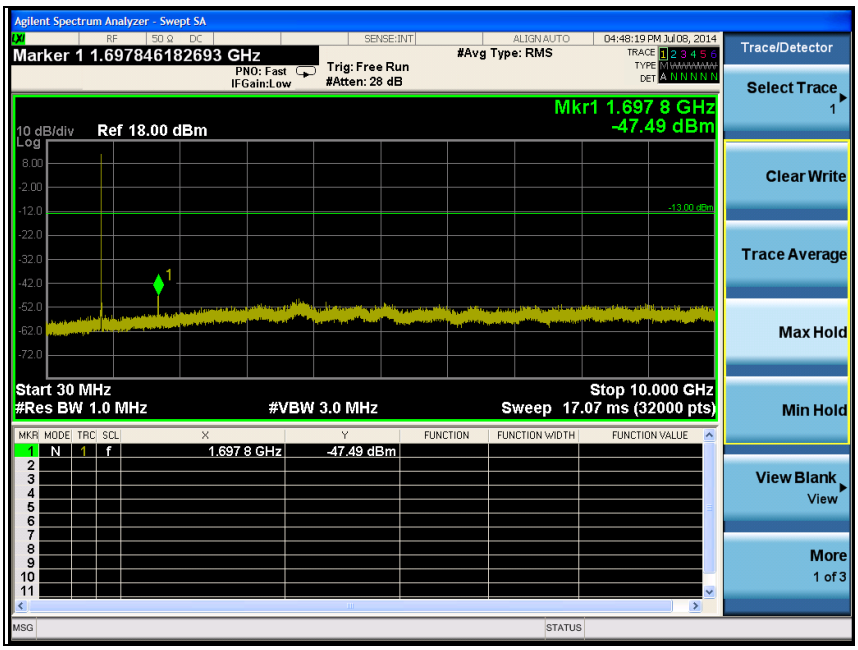
Middle Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
3 798.20	-48.95	16.44	-32.51

High Channel



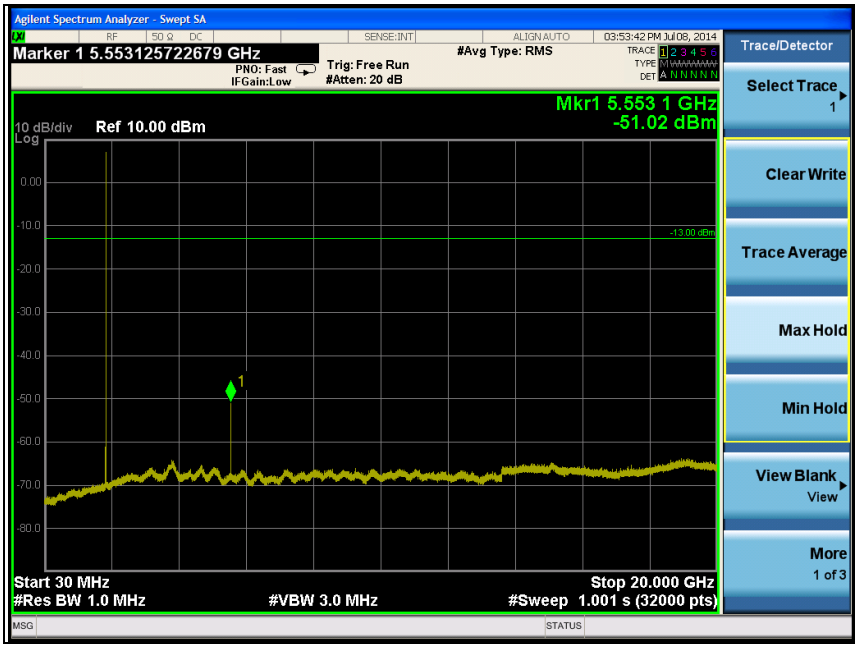
Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
1 697.80	-47.49	15.47	-32.02

CDMA1 900

1xEV-DO

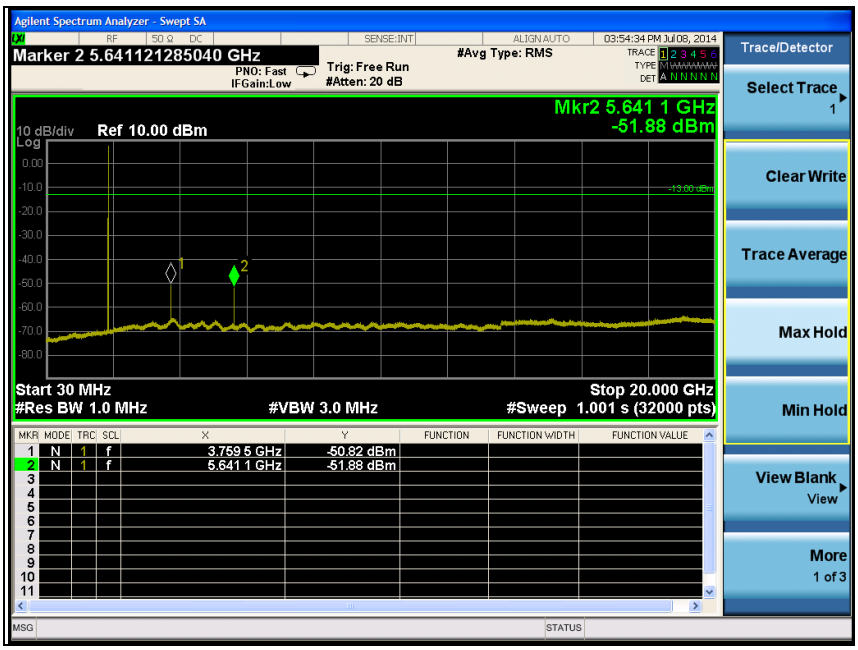
Low Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
5 553.10	-51.02	17.21	-33.81

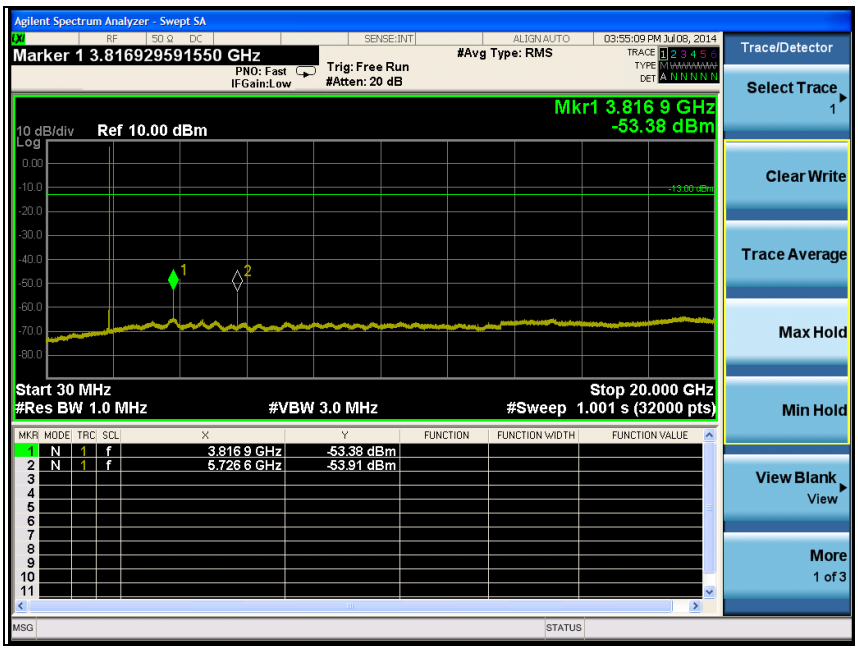
Middle Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
3 759.50	-50.82	16.31	-34.51
5 641.10	-51.88	17.30	-34.58

High Channel



Note:
Offset (dB) = Directional Coupler(dB) + Cable loss (dB)
Result (dB m) = Offset (dB) + Reading values (dB m)

Frequency (MHz)	Reading values (dB m)	Offset (dB)	Result (dB m)
3 816.90	-53.38	16.44	-36.94
5 726.60	-53.91	17.60	-36.31

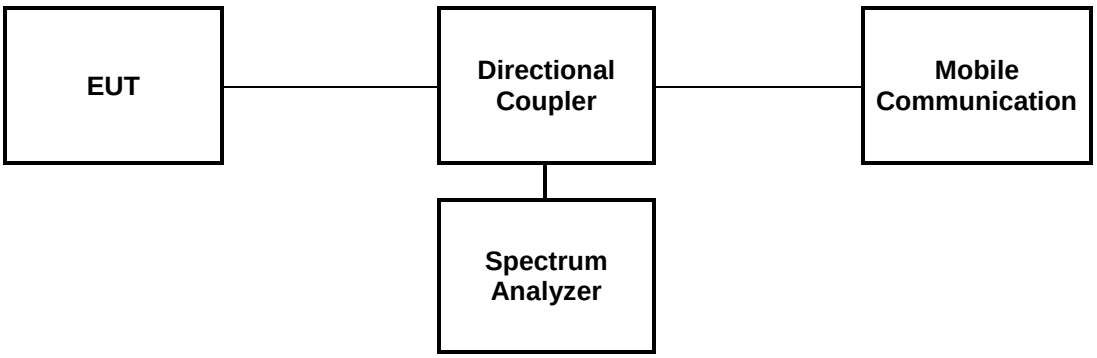
6. Band Edge

6.1. Limit

§22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)dB.

6.2. Test Procedure

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

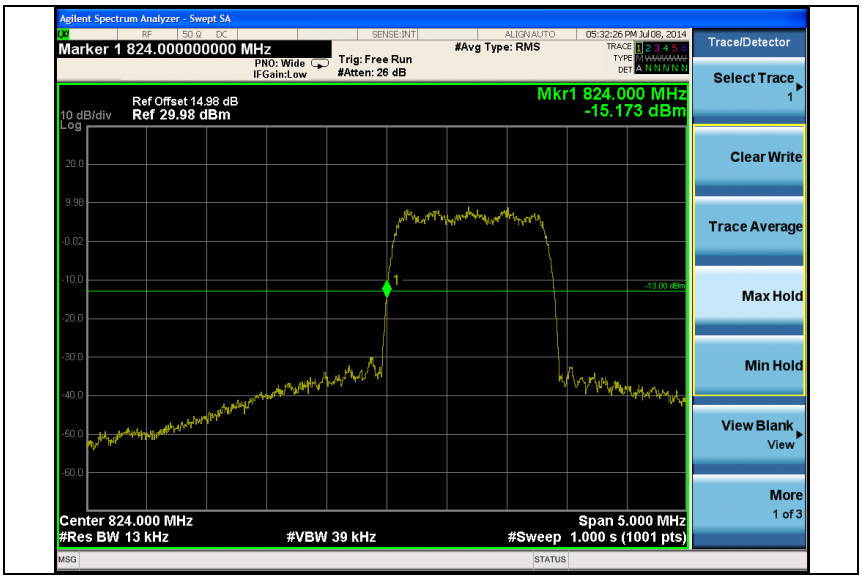
Ambient temperature	:	(24 ± 1) ℃
Relative humidity	:	47 % R.H.

Please refer to the following plots.

CDMA850 (band edge)

1xRTT

Low Channel



High Channel

CDMA1 900 (Band edge)

1xRTT

Low Channel

High Channel

CDMA850 (4 ㎒ SPAN)

1xRTT

Low Channel

High Channel

CDMA1 900 (4 ㎒ SPAN)

1xRTT

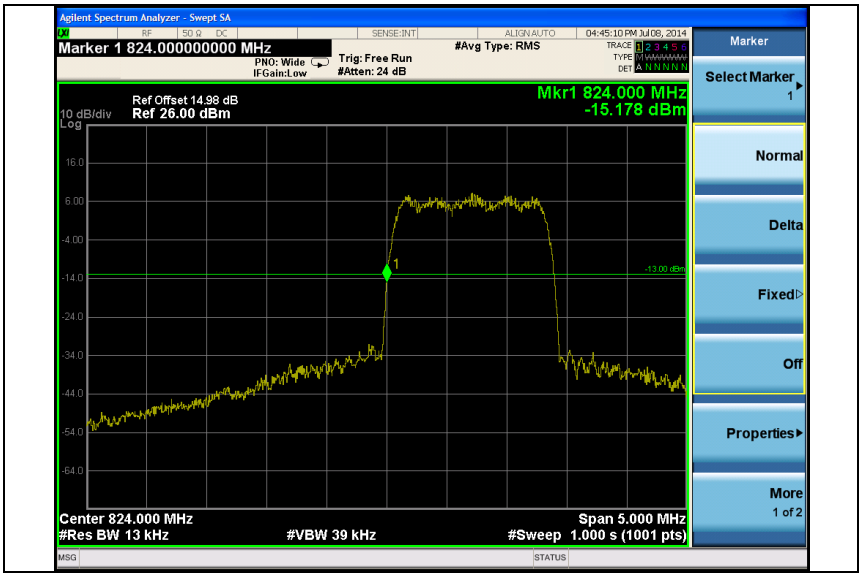
Low Channel

High Channel

CDMA850 (band edge)

1xEV-DO

Low Channel

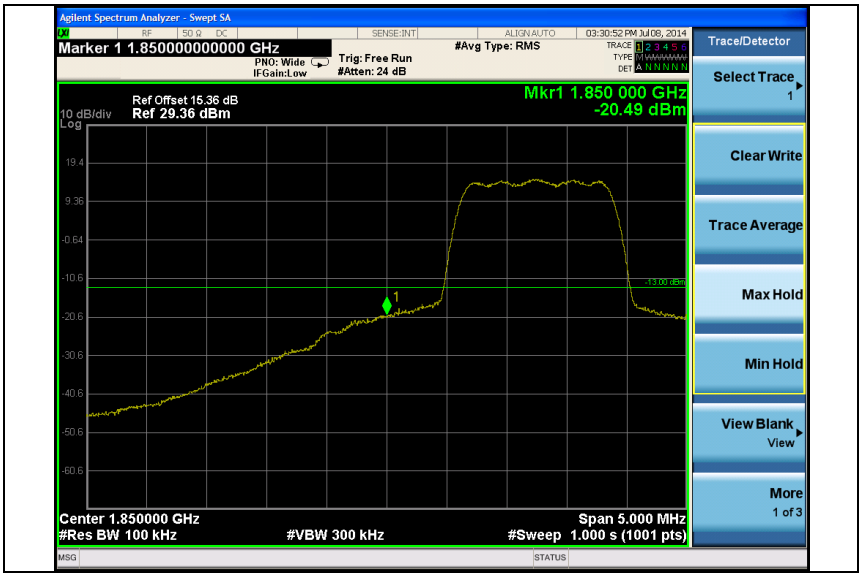


High Channel

CDMA1 900 (Band edge)

1xEV-DO

Low Channel



High Channel

CDMA850 (4 ㎒ SPAN)

1xEV-DO

Low Channel

High Channel

CDMA1 900 (4 ㎒ SPAN)

1xEV-DO

Low Channel

High Channel

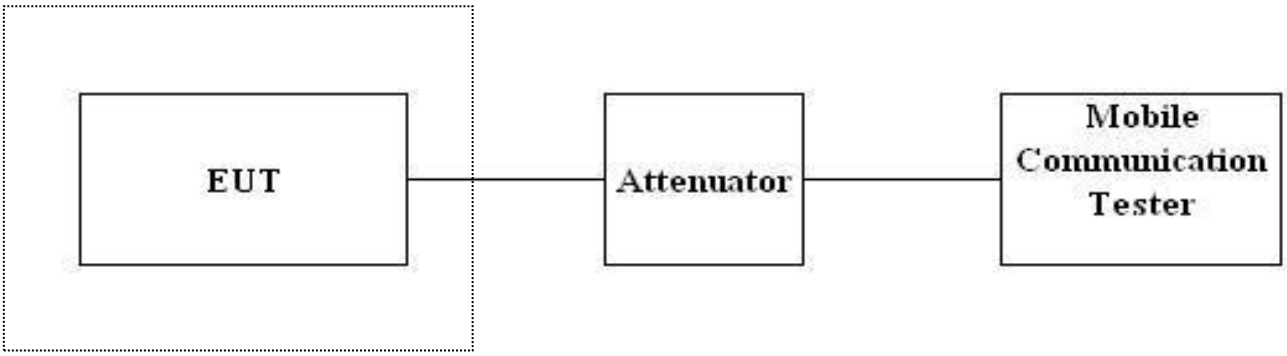
7. Frequency Stability

7.1. Limit

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:
According to §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.
§24.235 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7.2. Test Procedure

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 frequency counter 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 the counter.



Temperature Chamber

7.3. Test Results

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

CDMA850 1xRTT mode at middle channel

Reference Frequency: 836.52 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
-30	14.4	1	-0.004 782
-20		3	-0.002 391
-10		-2	-0.008 368
0		-3	-0.009 563
10		1	-0.004 782
20		5	**Ref**
30		4	-0.001 195
40		4	-0.001 195
50		7	0.002 391
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	16.6 (+15 %)	3	-0.002 391
	12.2 (-15 %)	6	0.001 195

CDMA1 900 1xRTT mode at middle channel

Reference Frequency: 1 880.0 ㎒ Limit: The Fundamental emission stays within the authorized frequency block			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
-30	14.4	4	0.000 000
-20		-2	-0.003 191
-10		3	-0.000 532
0		3	-0.000 532
10		2	-0.001 064
20		4	**Ref**
30		-5	-0.004 787
40		-3	-0.003 723
50		3	-0.000 532
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**Ppm**
24	16.6 (+15 %)	8	0.002 128
	12.2 (-15 %)	3	-0.000 532

CDMA850 1xEV-DO mode at middle channel

Reference Frequency: 836.52 ㎒, Limit: 2.5 ppm			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
-30	14.4	-3	-0.010 759
-20		-4	-0.011 954
-10		-2	-0.009 563
0		-3	-0.010 759
10		-1	-0.008 368
20		6	**Ref**
30		4	-0.002 391
40		5	-0.001 195
50		4	-0.002 391
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	16.6 (+15 %)	5	-0.001 195
	12.2 (-15 %)	4	-0.002 391

CDMA1 900 1xEV-DO mode at middle channel

Reference Frequency: 1 880.0 ㎒ Limit: The Fundamental emission stays within the authorized frequency block			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
-30	14.4	-1	-0.000 532
-20		-3	-0.001 596
-10		-4	-0.002 128
0		-2	-0.001 064
10		3	0.001 596
20		0	**Ref**
30		-1	-0.000 532
40		-4	-0.002 128
50		1	0.000 532
Frequency Stability versus power Supply			
Environment Temperature (℃)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
24	16.6 (+15 %)	-3	-0.001 596
	12.2 (-15 %)	1	0.000 532