



Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 Fax: +86-755-26636041

FCC PART 22 AND PART 24 TEST REPORT

FCC Part 22 Subpart H / Part 24 Subpart E

Report Reference No.: **CTL1507031826-WF-2**

Compiled by:
(position+printed name+signature)

Jacky Chen
(File administrators)

Jacky Chen

Tested by:
(position+printed name+signature)

Allen Wang
(Test Engineer)

Allen Wang

Approved by:
(position+printed name+signature)

Tracy Qi
(Manager)

Tracy Qi

Product Name.....: LTE WiFi Router

Model/Type reference.....: T-N100

List Model(s).....: /

Trade Mark.....: /

FCC ID.....: **XYOT-N100**

Applicant's name.....: **Asiatelco Technologies Co.**

Address of applicant.....: #289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park,
Pudong, Shanghai 201204, China

Test Firm.....: **Shenzhen CTL Testing Technology Co., Ltd.**

Address of Test Firm.....: Floor 1-A, Baisha Technology Park, No.3011, Shaheqi Road,
Nanshan District, Shenzhen, China 518055

Test specification.....:

FCC CFR Title 47 Part 2, Part 22H and Part 24E

Standard.....: **EIA/TIA 603-D: 2010**

KDB 971168 D01

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Date of Receipt.....: July 05, 2015

Date of Test Date.....: July 07, 2015 - July 14, 2015

Data of Issue.....: July 16, 2015

Result.....: Positive

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TEST REPORT

Test Report No. :	CTL1507031826-WF-2	July 16, 2015
		Date of issue

Equipment under Test : LTE WiFi Router

Model /Type : T-N100

Listed Models : /

Applicant : **Asiatelco Technologies Co.**

Address : #289 Bisheng Road, Building-8, 3F, Zhangjiang
Hi-Tech Park, Pudong, Shanghai 201204, China

Manufacturer : **Asiatelco Technologies Co.**

Address : #289 Bisheng Road, Building-8, 3F, Zhangjiang
Hi-Tech Park, Pudong, Shanghai 201204, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

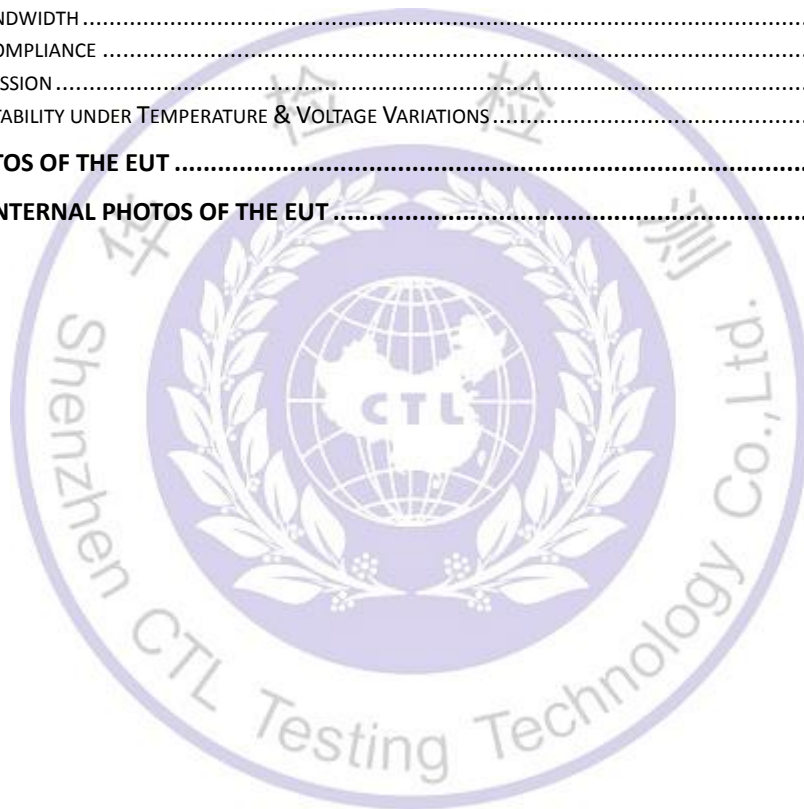
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**** Modified History ****

[illegible]

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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22](#): PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 24](#): [PUBLIC](#) MOBILE SERVICES

[TIA/EIA 603 D June 2010](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[KDB971168 D01: v02r02](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.4: 2009](#) Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c)	Pass
Peak-to-Average Ratio	Part 24.232 (d)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability	Part 2.1055 Part 22.355 Part 24.235	Pass

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	LTE WiFi Router
Model/Type reference:	T-N100
Power supply:	DC 3.7V from battery or DC 12V from adapter
Serial number:	Prototype
Adapter information:	Model:C1000 Input: 100-240V, 50/60Hz 0.45A Output:12V---1.0A
Hardware version:	725-0335-001-01
Software version:	V1.1
WIFI	
Supported type:	802.11b/802.11g/802.11n(H20)/802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7
Channel separation:	5MHz
Antenna type:	PCB Antenna : 2*TX 2*RX
Antenna gain:	2.0dBi
3G	
Operation Band:	BC0 TX: 824.70 MHz ~ 848.31 MHz BC1 TX:1851.25 MHz ~ 1908.75 MHz BC0 RX: 869.70 MHz ~ 893.31 MHz BC1 RX: 1931.25 MHz ~ 1988.75 MHz
Supported Type:	CDMA2000 1xRTT/ CDMA2000 1xEV-DO-Release 0/ CDMA2000 1xEV-DO-Revision A
Modulation Type:	QPSK
Antenna Type:	External Omni-antenna: 1*TX 2*RX
Antenna Gain:	2dBi
LTE	
Operation Band:	TD-LTE: Band 41 FDD-LTE: Band 2/4/5/12/13/25/26
Modulation Type:	QPSK, 16QAM
Release Version:	Release 9
Category:	Cat 3
Antenna Type:	External Omni-antenna: 1*TX 2*RX
Antenna gain:	2.0dBi

Note: For more details, refer to the user's manual of the EUT.

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Test Frequency:

Cellular Band		PCS Band	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1013	824.70	25	1851.25
384	836.52	600	1880.00
777	848.31	1175	1908.75

Note: All tests performed with alternate AC power supply and DC power supply, recorded the worst case at AC mode except frequency stability test.



2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061714	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062014	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBEC K	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
High-Pass Filter	K&L	9SH10-2700/X1 2750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U1 2750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Directional Coupler	Agilent	87300B	3116A03638	2015/05/20	2016/05/19

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: XYOT-N100 filing to comply with of the FCC Part 22 and Part 24 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

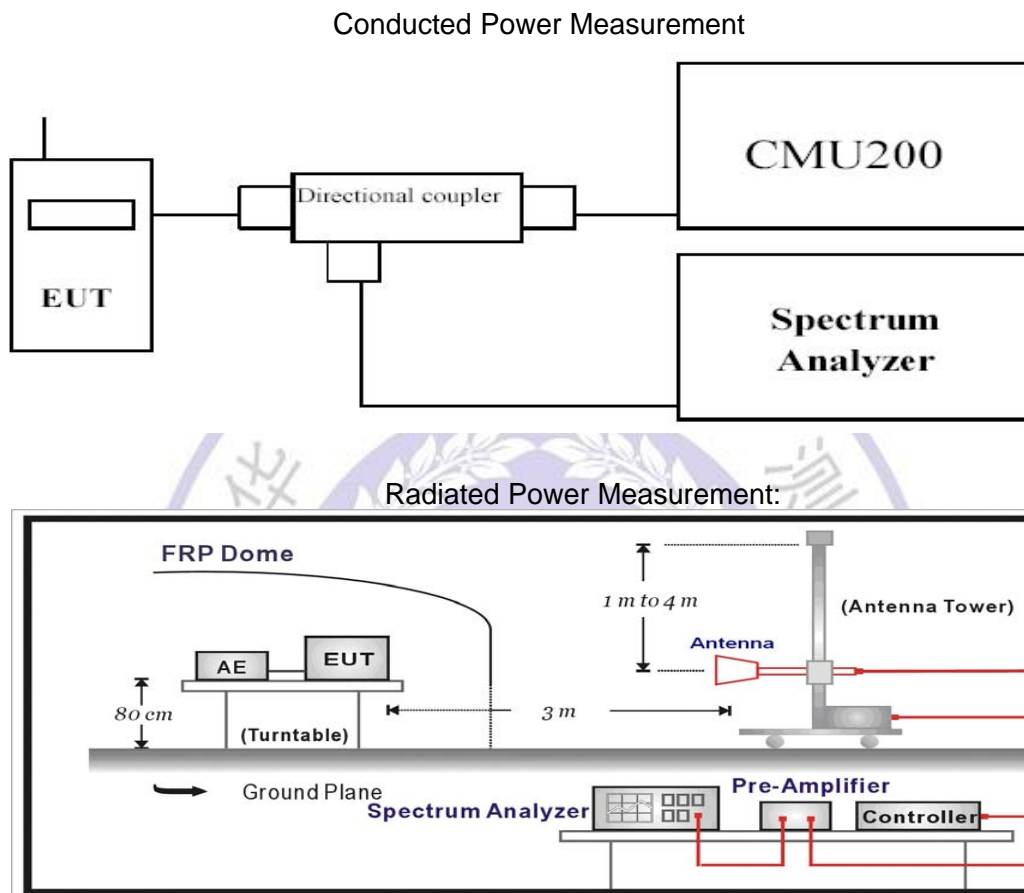
3 TEST CONDITIONS AND RESULTS

3.1 Output Power

LIMIT

GSM850/WCDMA Band V: 7W
 PCS1900/WCDMA Band II: 2W

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200, then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter

- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that 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.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q) Test site anechoic chamber refer to ANSI C63.4:2009.

TEST RESULTS**Conducted Measurement:**

EUT Mode	Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio (dB)	Limit (dBm)	Result
CDMA 1xRTT, BC0, CELL BAND	1013	824.7	24.33	/	38.45	Pass
	384	836.52	24.65	/		
	777	848.31	24.37	/		
CDMA2000 EVDO REV. 0 850MHz BAND	1013	824.7	24.20	/	38.45	Pass
	384	836.52	24.24	/		
	777	848.31	24.31	/		
CDMA2000 EVDO REV A 850MHz BAND	1013	824.7	24.14	/	38.45	Pass
	384	836.52	24.25	/		
	777	848.31	24.30	/		
CDMA2000 1xRTT, BC1, PCS BAND	25	1851.25	25.46	3.48	33.01	Pass
	600	1880.00	25.40	2.51		
	1175	1908.75	24.83	3.36		
CDMA2000 EVDO REV. 0 1900MHz BAND	25	1851.25	24.25	3.47	33.01	Pass
	600	1880.00	25.02	3.25		
	1175	1908.75	24.11	2.65		
CDMA2000 EVDO REV A 1900MHz BAND	25	1851.25	24.32	3.41	33.01	Pass
	600	1880.00	24.52	3.30		
	1175	1908.75	24.68	3.22		

Note:

1. Maximum PK burst power=maximum Avg. burst power+Peak-to-Average Ratio.
2. The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.
3. This device was tested under all R.C.s and S.O.s. The worst case is reported with RC1/SO55 for 1xRTT, FTAP Rate 2Slot 307.2 kbps/RETAP Rate 9.6 kbps for EVDO Rev.0 and FTAP Rate 2Slot 307.2 kbps/RETAP Rate 2048 bits for EVDO Rev.A with 'All Up' power control bits.

Radiated Measurement:*Remark:*

1. This device was tested under all R.C.s and S.O.s. The worst case is reported with RC1/SO55 for 1xRTT, FTAP Rate 2Slot 307.2 kbps/RETAP Rate 9.6 kbps for EVDO Rev.0 and FTAP Rate 2Slot 307.2 kbps/RETAP Rate 2048 bits for EVDO Rev.A with 'All Up' power control bits.
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$
3. $ERP = EIRP - 2.15dBi$ as EIRP by subtracting the gain of the dipole.

CDMA 1xRTT, BC0, CELL BAND

Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	-18.45	2.42	8.45	2.15	36.82	22.25	38.45	16.20	V
384	-18.11	2.46	8.45	2.15	36.82	22.55	38.45	15.90	V
777	-19.36	2.53	8.36	2.15	36.82	21.14	38.45	17.31	V

CDMA2000 EVDO REV. 0 850MHz BAND

Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	-20.29	2.42	8.45	2.15	36.82	20.41	38.45	18.04	V
384	-18.30	2.46	8.45	2.15	36.82	22.36	38.45	16.09	V
777	-19.03	2.53	8.36	2.15	36.82	21.47	38.45	16.98	V

CDMA2000 EVDO REV A 850MHz BAND

Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	-20.24	2.42	8.45	2.15	36.82	20.46	38.45	17.99	V
384	-18.14	2.46	8.45	2.15	36.82	22.52	38.45	15.93	V
777	-19.02	2.53	8.36	2.15	36.82	21.48	38.45	16.97	V

CDMA2000 1xRTT, BC1, PCS BAND

Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	-17.18	3.41	10.24	33.6	23.25	33.01	9.76	V
600	-16.48	3.49	10.24	33.6	23.87	33.01	9.14	V
1175	-16.87	3.55	10.23	33.6	23.41	33.01	9.60	V

CDMA2000 EVDO REV. 0 1900MHz BAND

Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	-18.17	3.41	10.24	33.6	22.26	33.01	10.75	V
600	-16.88	3.49	10.24	33.6	23.47	33.01	9.54	V
1175	-16.92	3.55	10.23	33.6	23.36	33.01	9.65	V

CDMA2000 EVDO REV A 1900MHz BAND

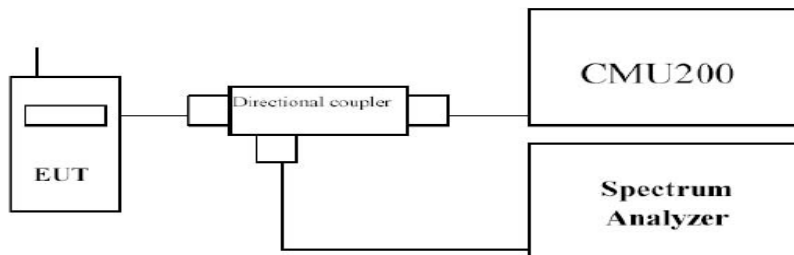
Channel	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	-17.96	3.41	10.24	33.6	22.47	33.01	10.54	V
600	-16.66	3.49	10.24	33.6	23.69	33.01	9.32	V
1175	-16.96	3.55	10.23	33.6	23.32	33.01	9.69	V

3.2 Occupied Bandwidth

LIMIT

N/A

TEST CONFIGURATION

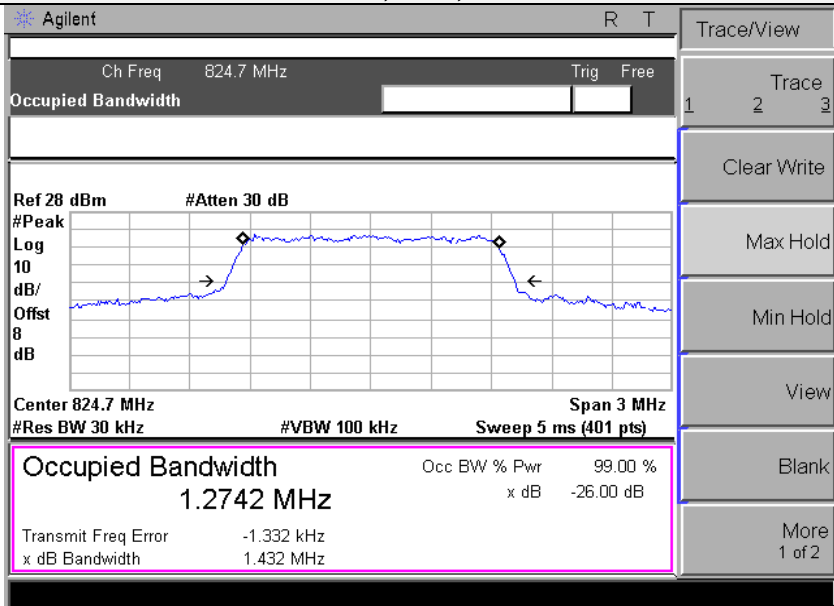
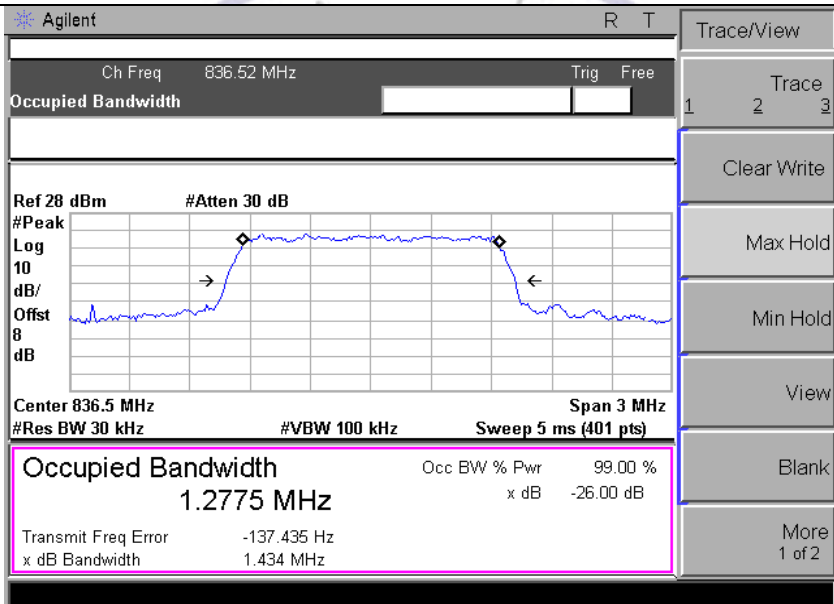
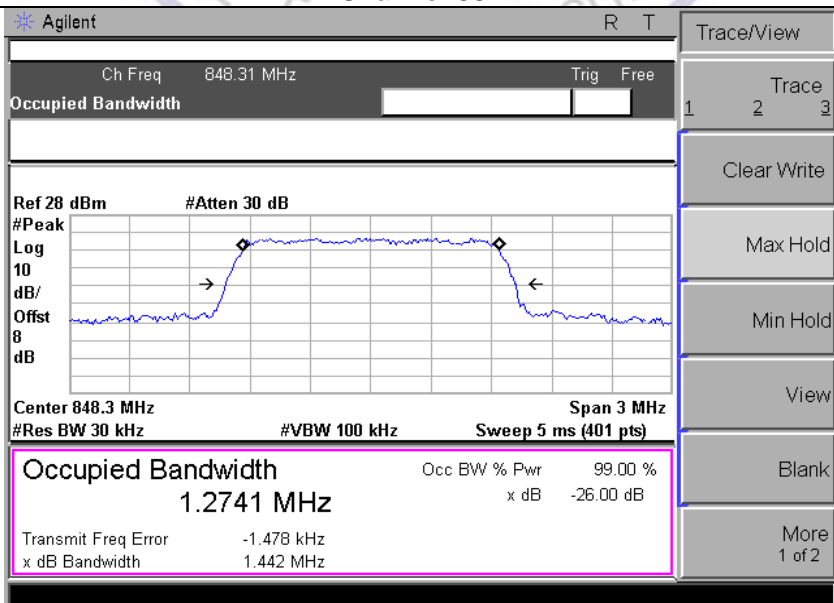


TEST PROCEDURE

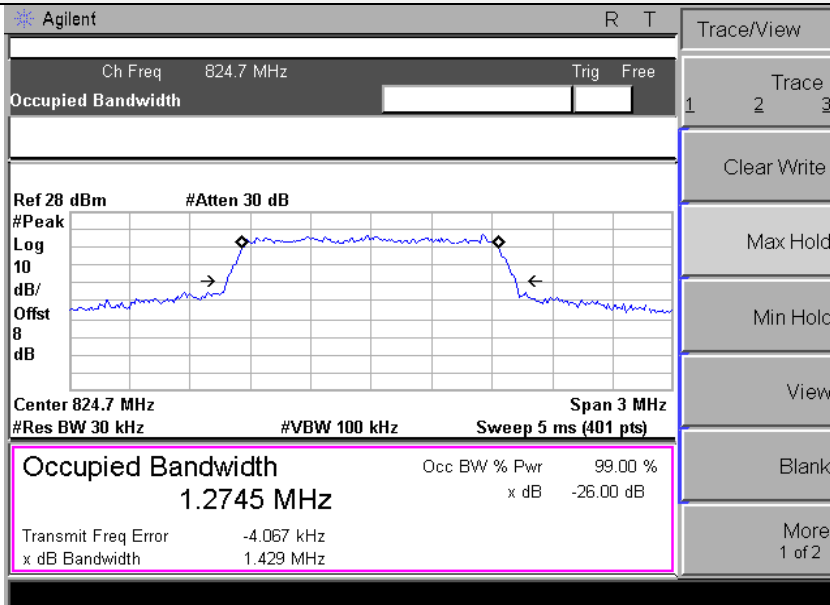
1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, VBW \geq 3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

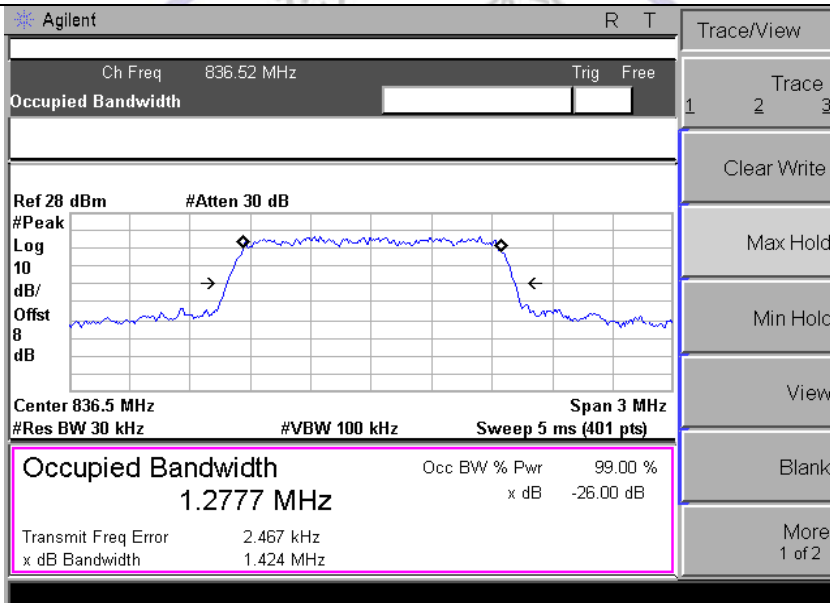
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (MHz)	-26dB bandwidth (MHz)
CDMA 1xRTT, BC0, CELL BAND	1013	824.70	1.274	1.432
	384	836.52	1.278	1.434
	777	848.31	1.274	1.442
CDMA2000 EVDO REV. 0 850MHz BAND	1013	824.70	1.275	1.429
	384	836.52	1.278	1.424
	777	848.31	1.276	1.424
CDMA2000 EVDO REV A 850MHz BAND	1013	824.70	1.278	1.421
	384	836.52	1.269	1.421
	777	848.31	1.282	1.435
CDMA2000 1xRTT, BC1, PCS BAND	25	1851.25	1.288	1.468
	600	1880.00	1.307	1.468
	1175	1908.75	1.290	1.492
CDMA2000 EVDO REV. 0 1900MHz BAND	25	1851.25	1.292	1.480
	600	1880.00	1.307	1.492
	1175	1908.75	1.288	1.467
CDMA2000 EVDO REV A 1900MHz BAND	25	1851.25	1.296	1.494
	600	1880.00	1.304	1.484
	1175	1908.75	1.296	1.424

CDMA 1xRTT, BC0, CELL BAND**Channel 1013****Channel 384****Channel 777**

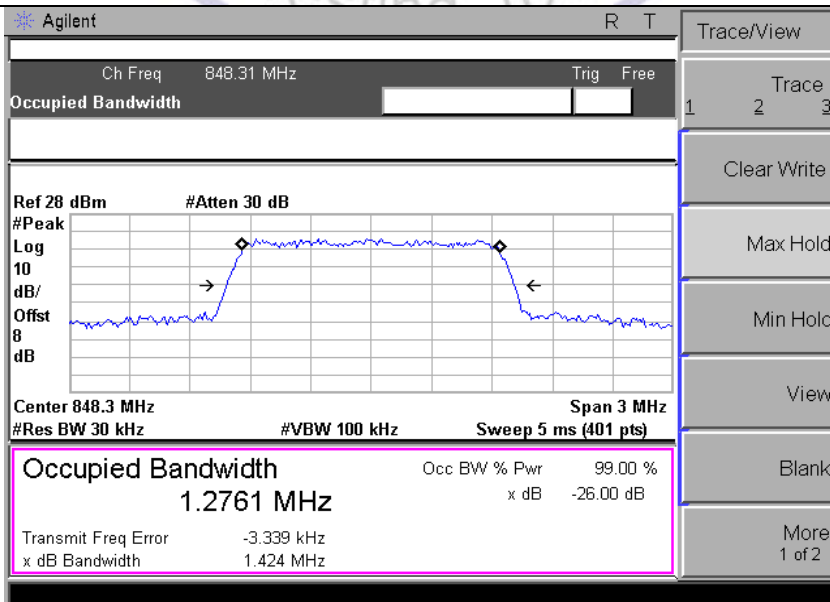
CDMA2000 EVDO REV. 0 850MHz BAND



Channel 1013

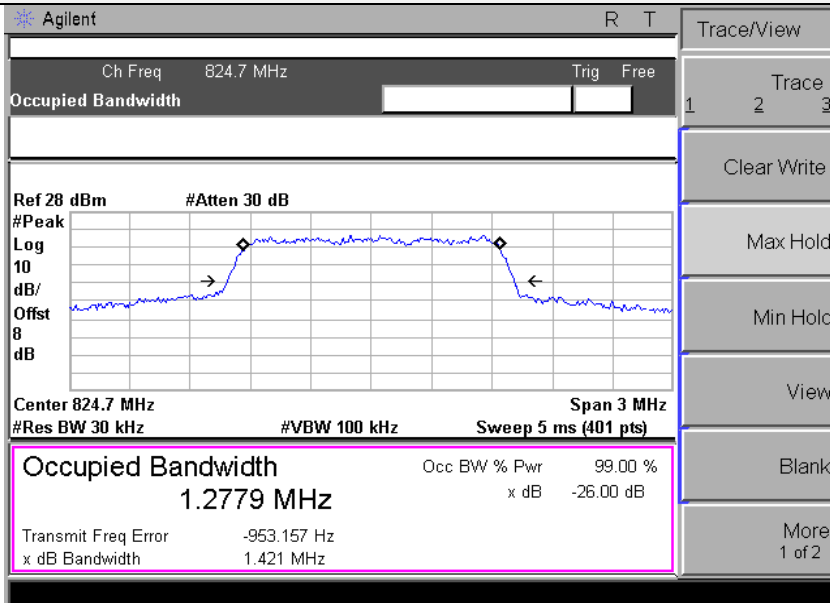


Channel 384

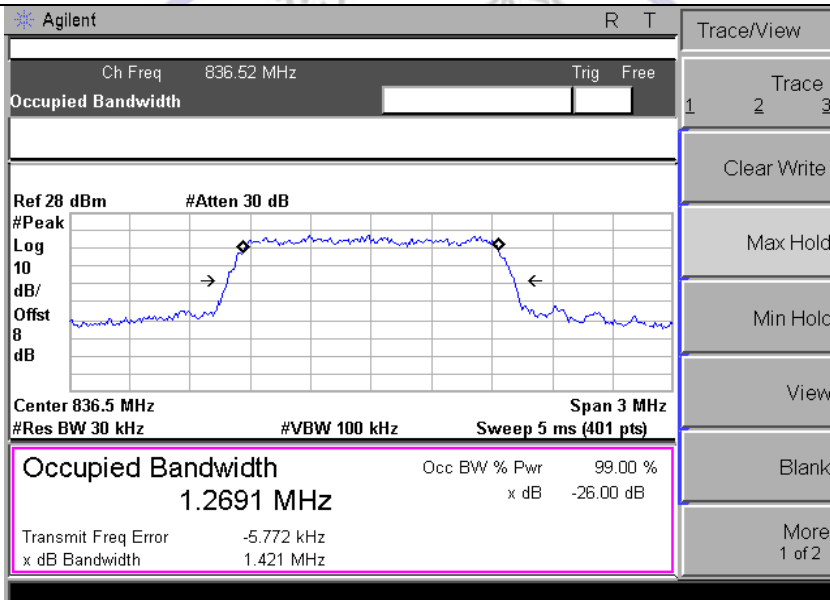


Channel 777

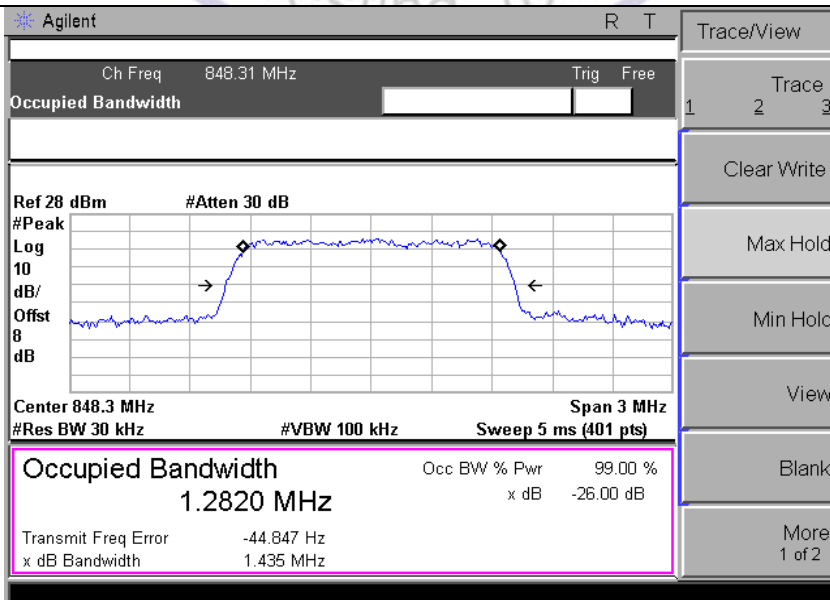
CDMA2000 EVDO REV A 850MHz BAND



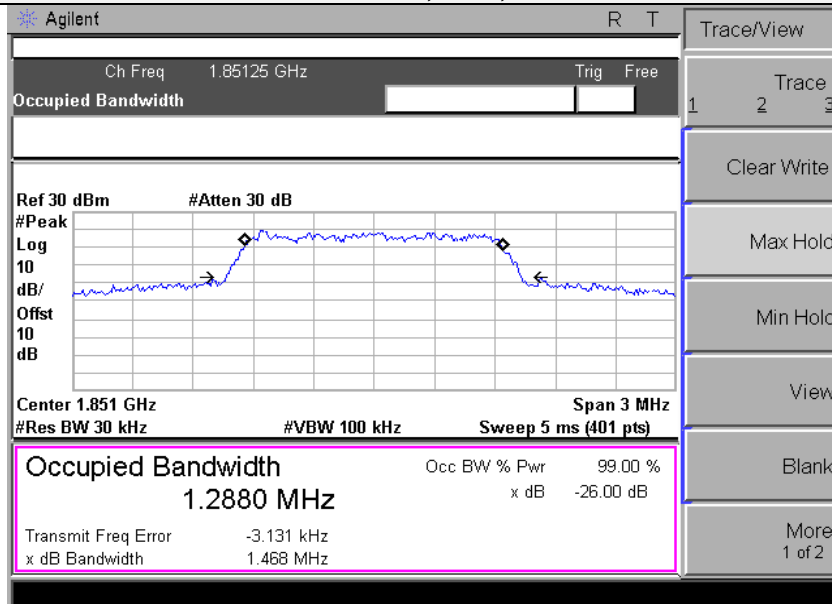
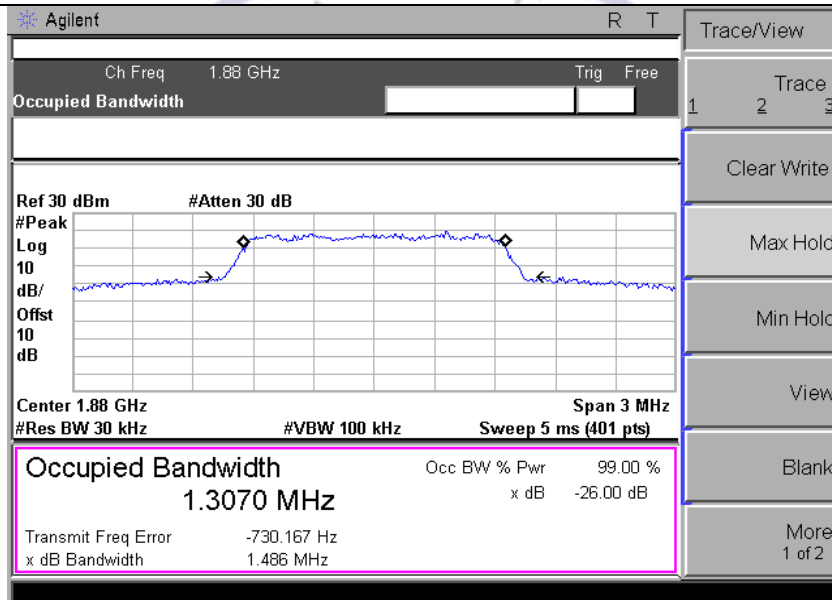
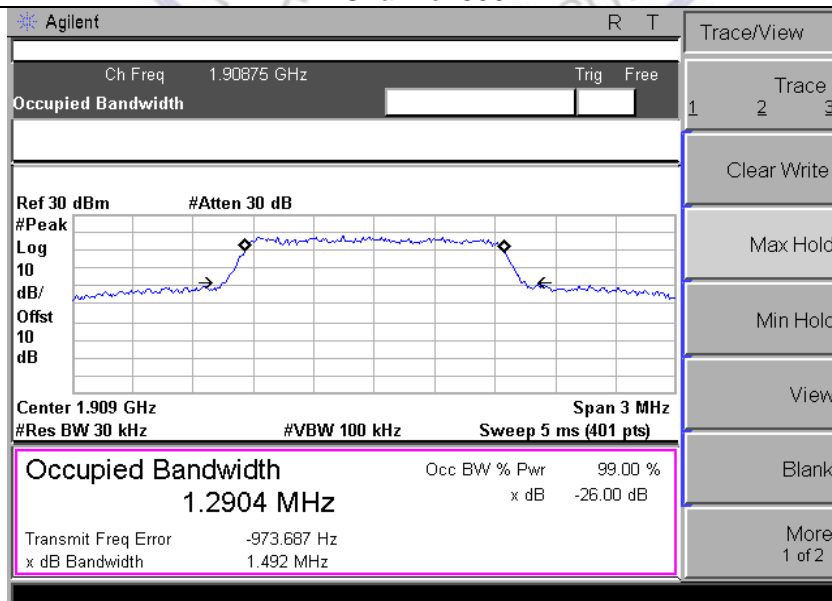
Channel 1013



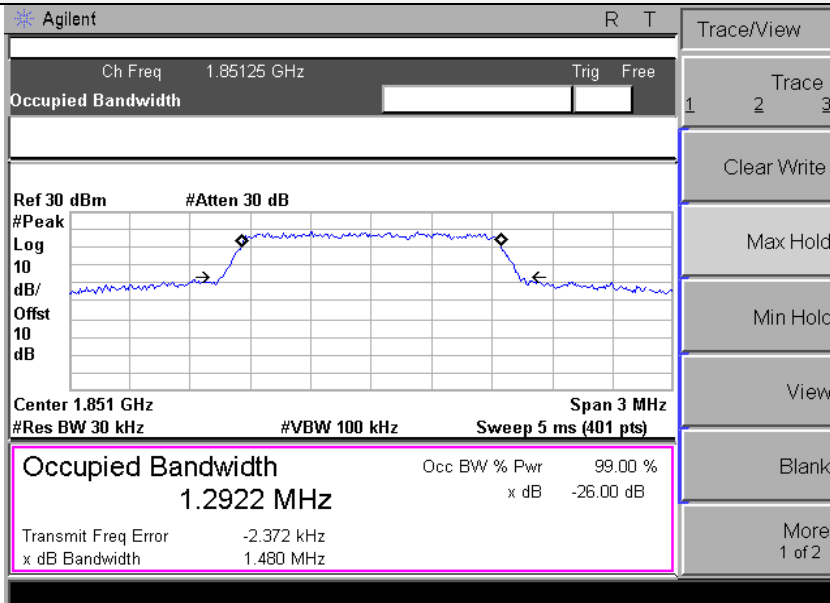
Channel 384



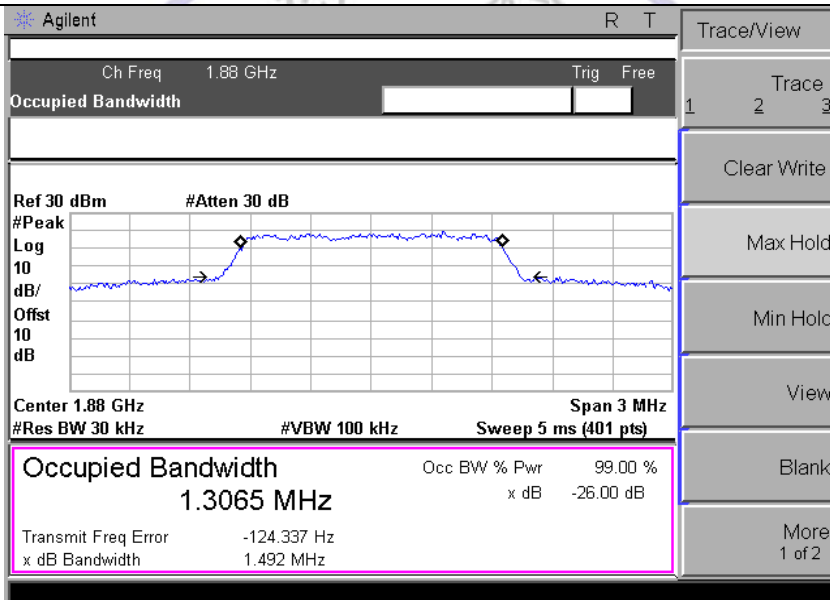
Channel 777

CDMA2000 1xRTT, BC1, PCS BAND**Channel 25****Channel 600****Channel 1175**

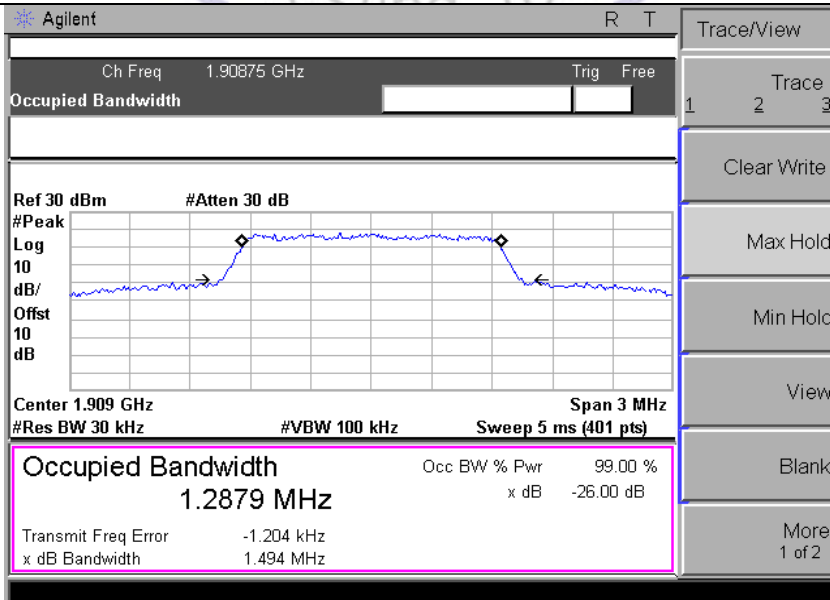
CDMA2000 EVDO REV. 0 1900MHz BAND



Channel 25

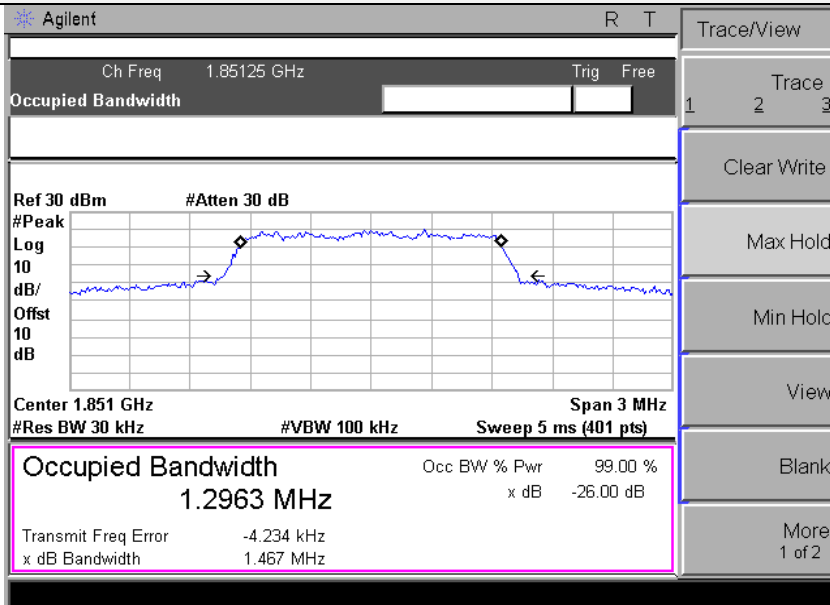


Channel 600

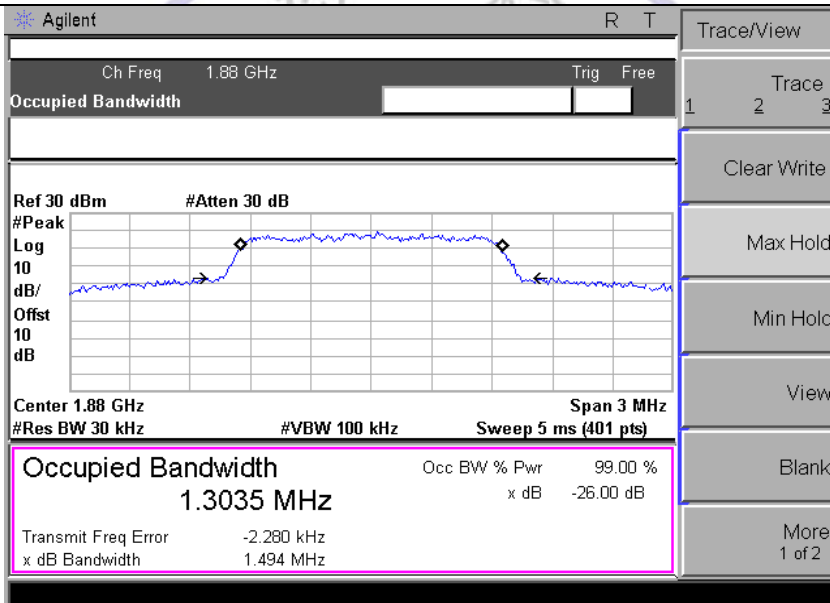


Channel 1175

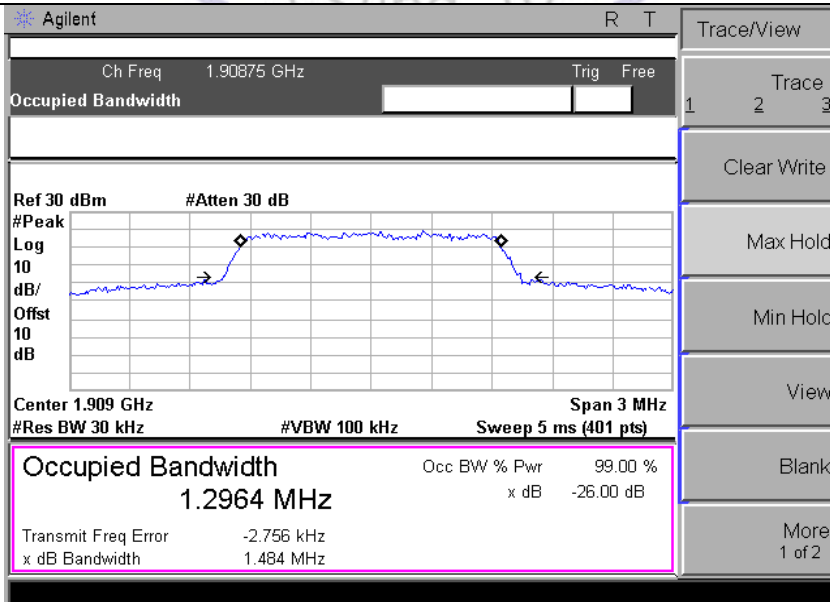
CDMA2000 EVDO REV A 1900MHz BAND



Channel 25



Channel 600



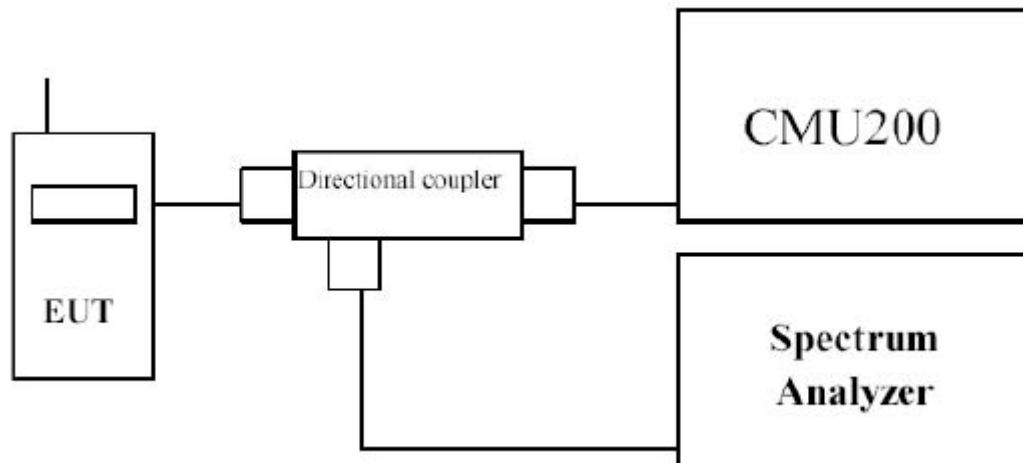
Channel 1175

3.3 Band Edge compliance

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

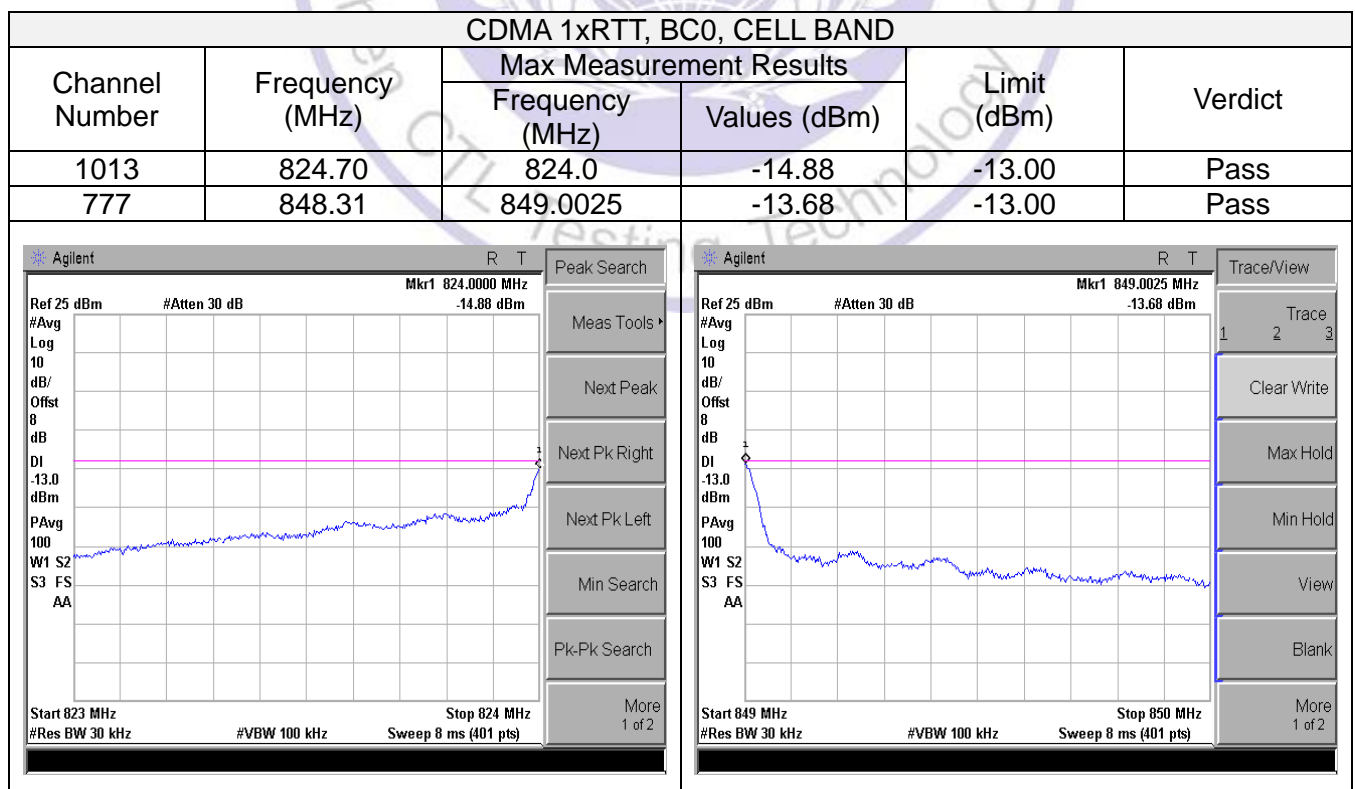
TEST CONFIGURATION

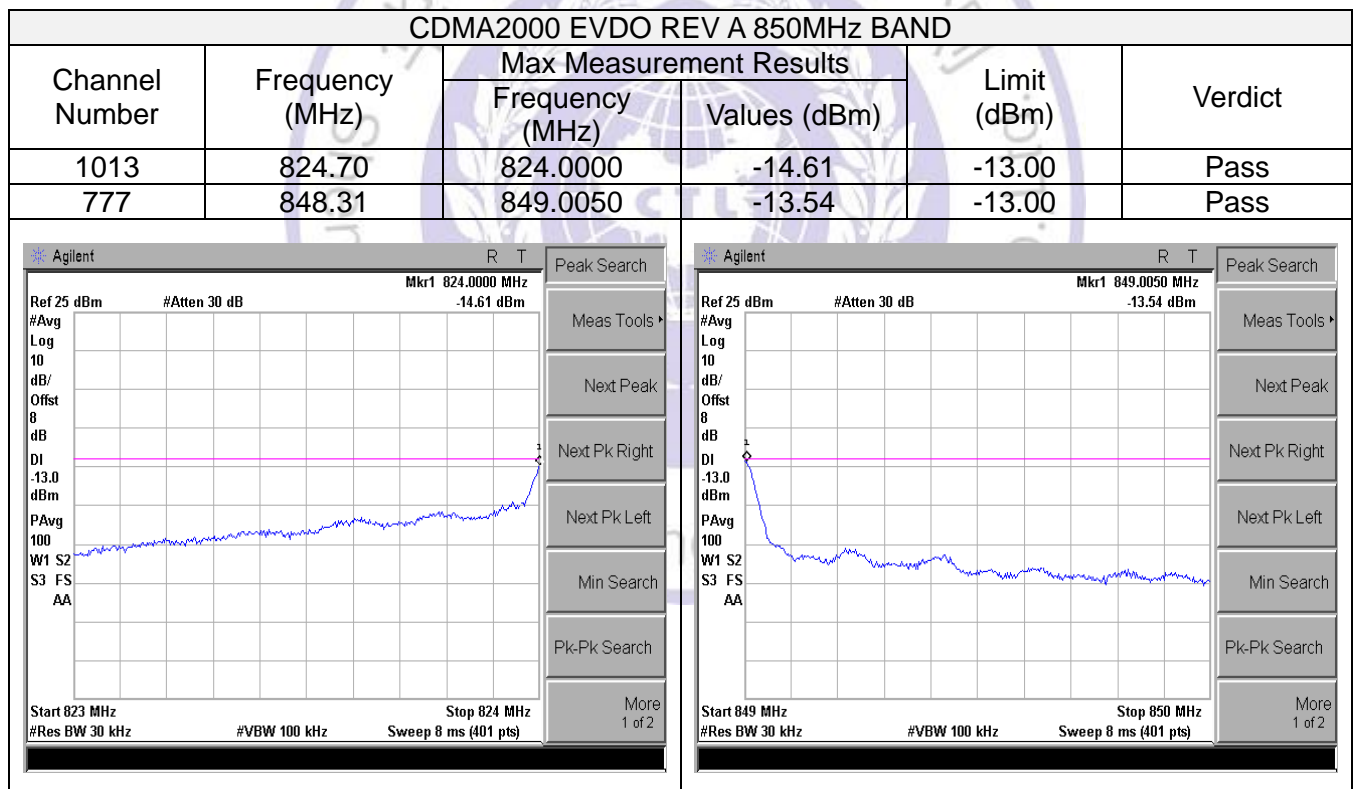
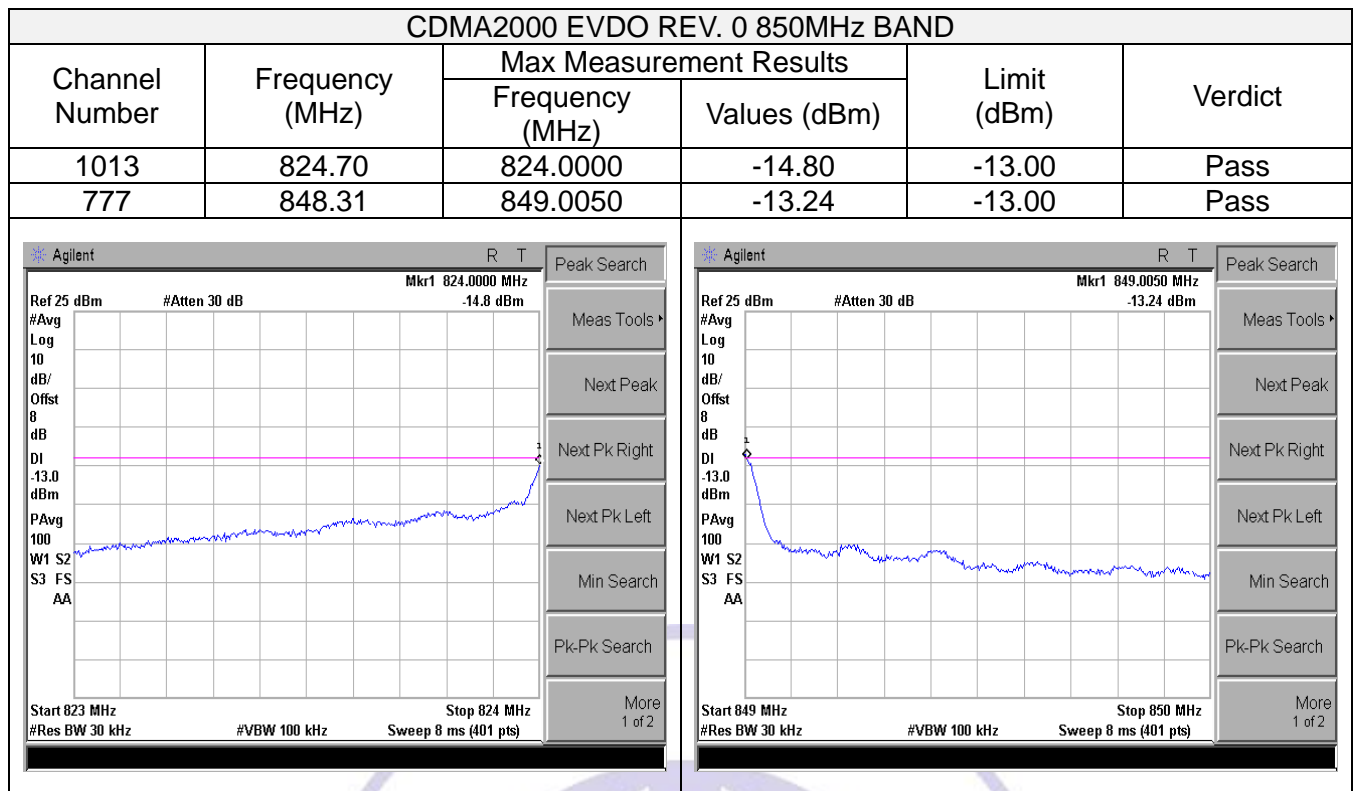


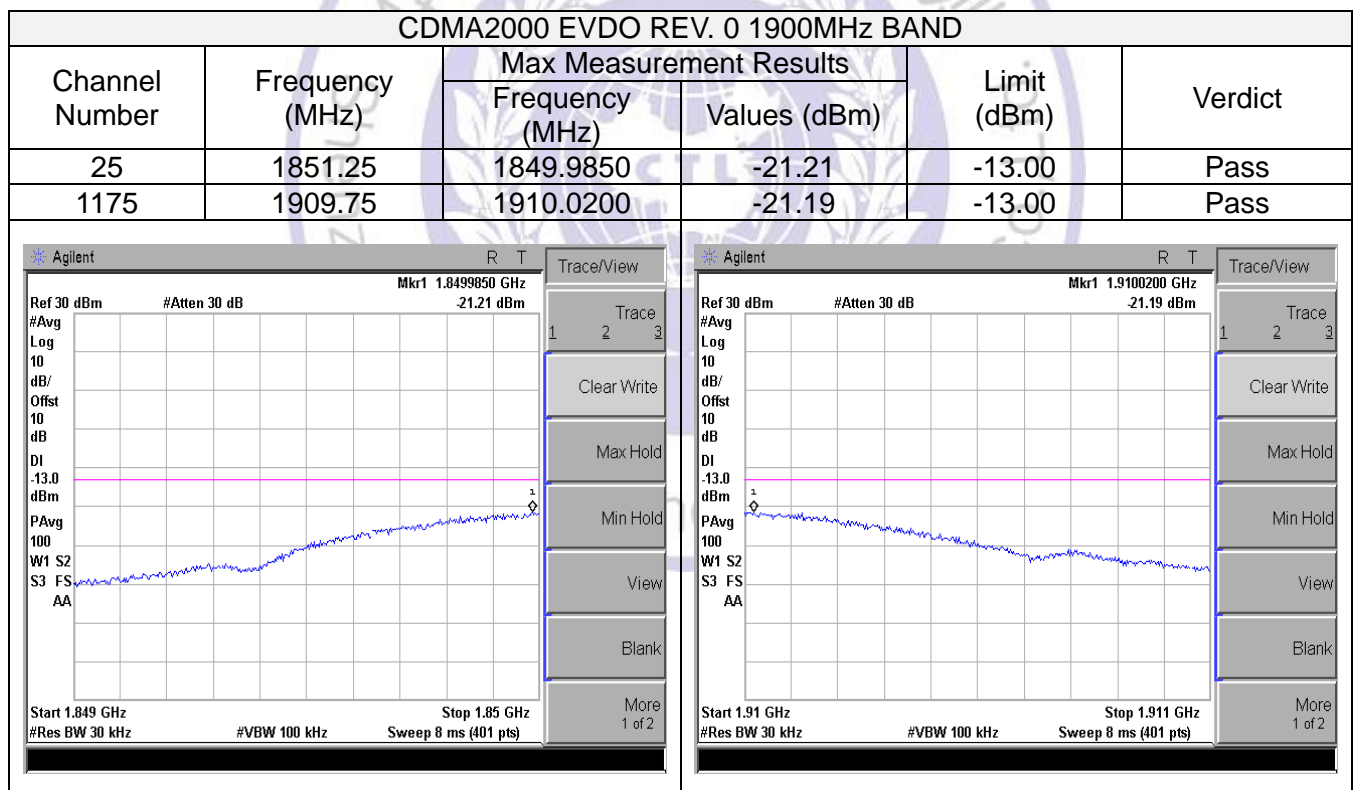
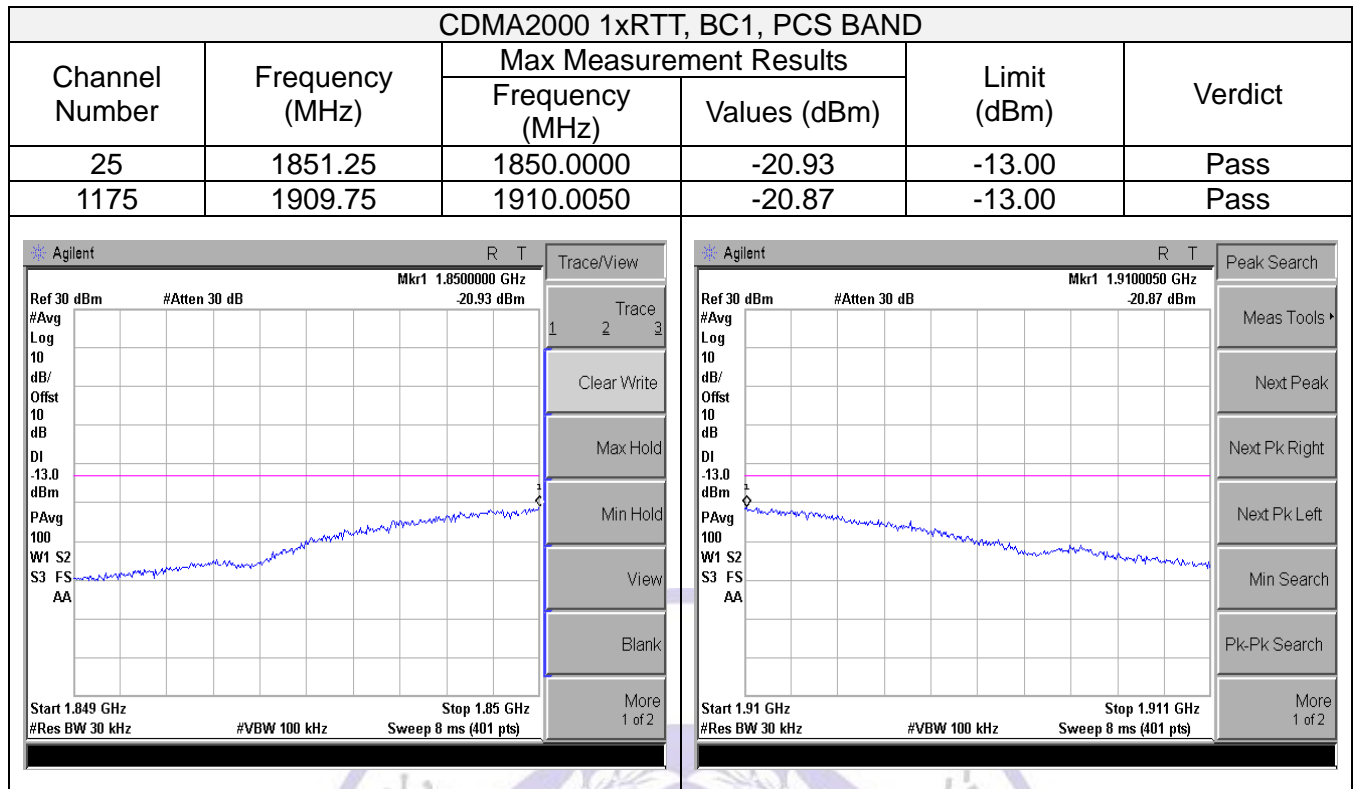
TEST PROCEDURE

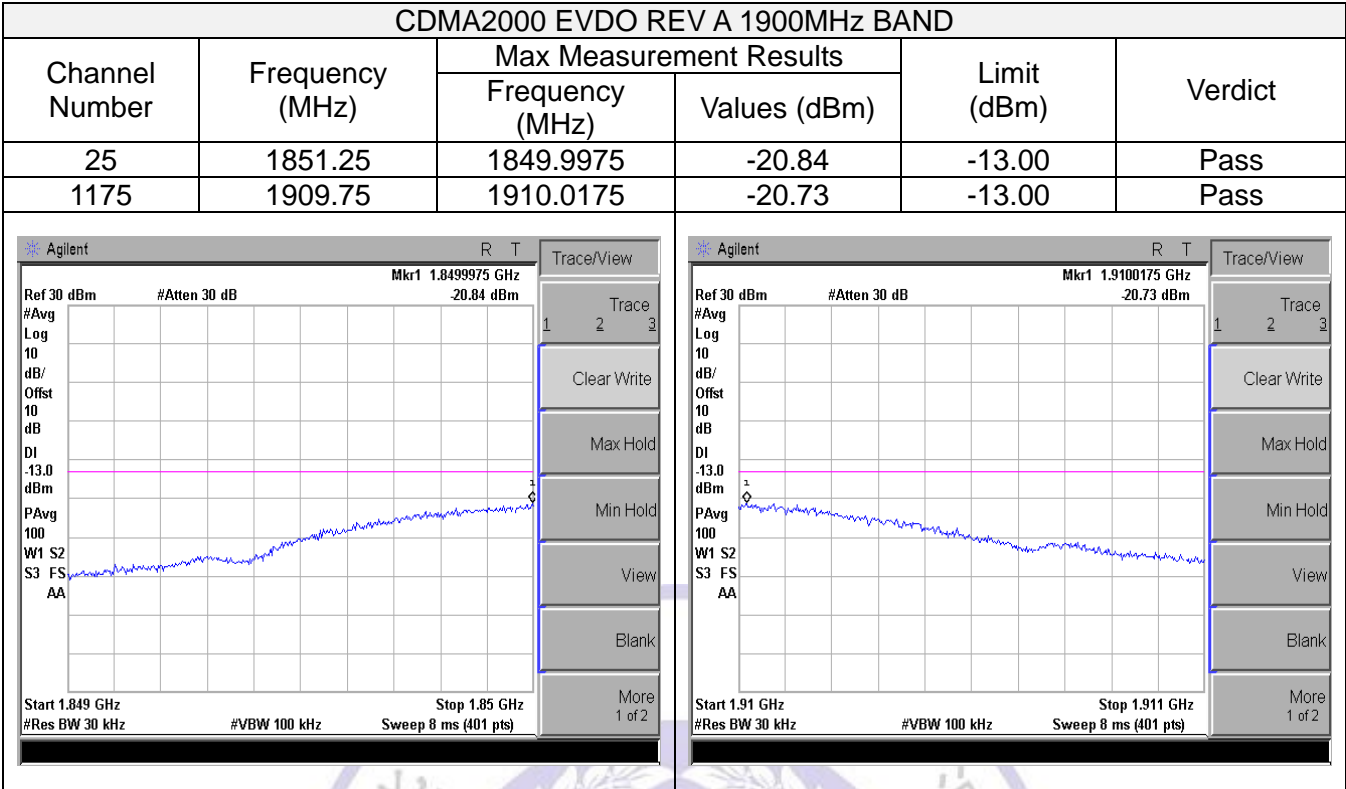
In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

TEST RESULTS









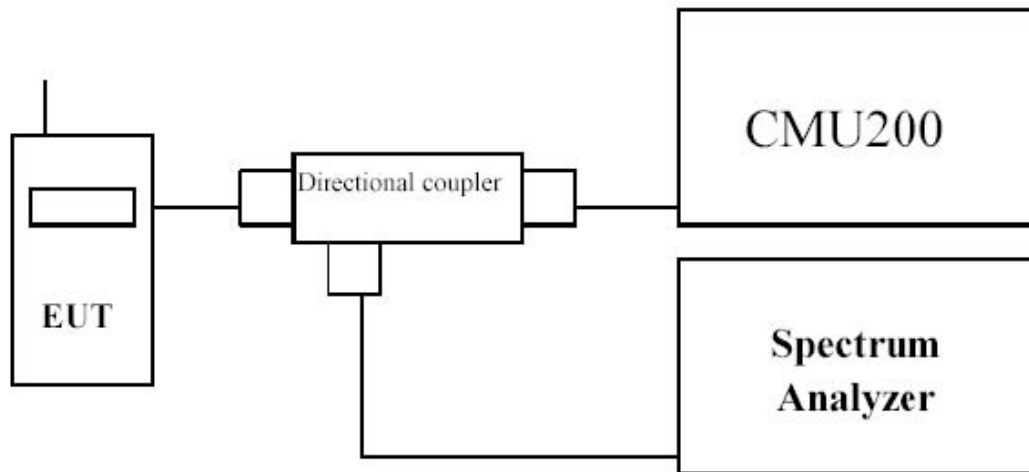
3.4 Spurious Emission

LIMIT

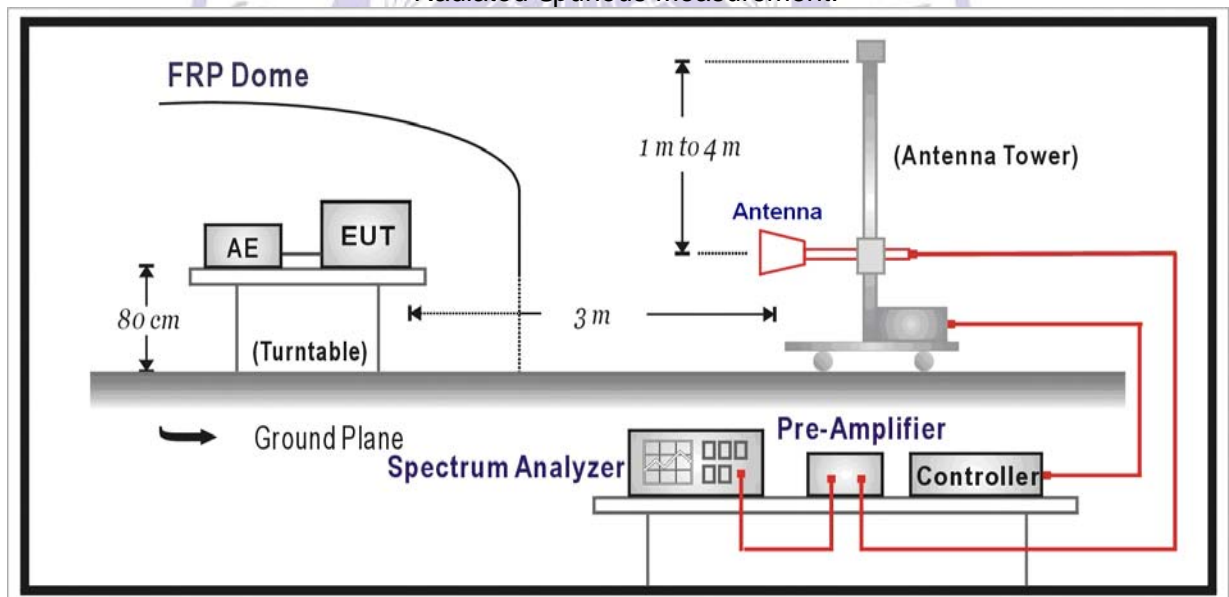
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200 then selects a channel for testing.

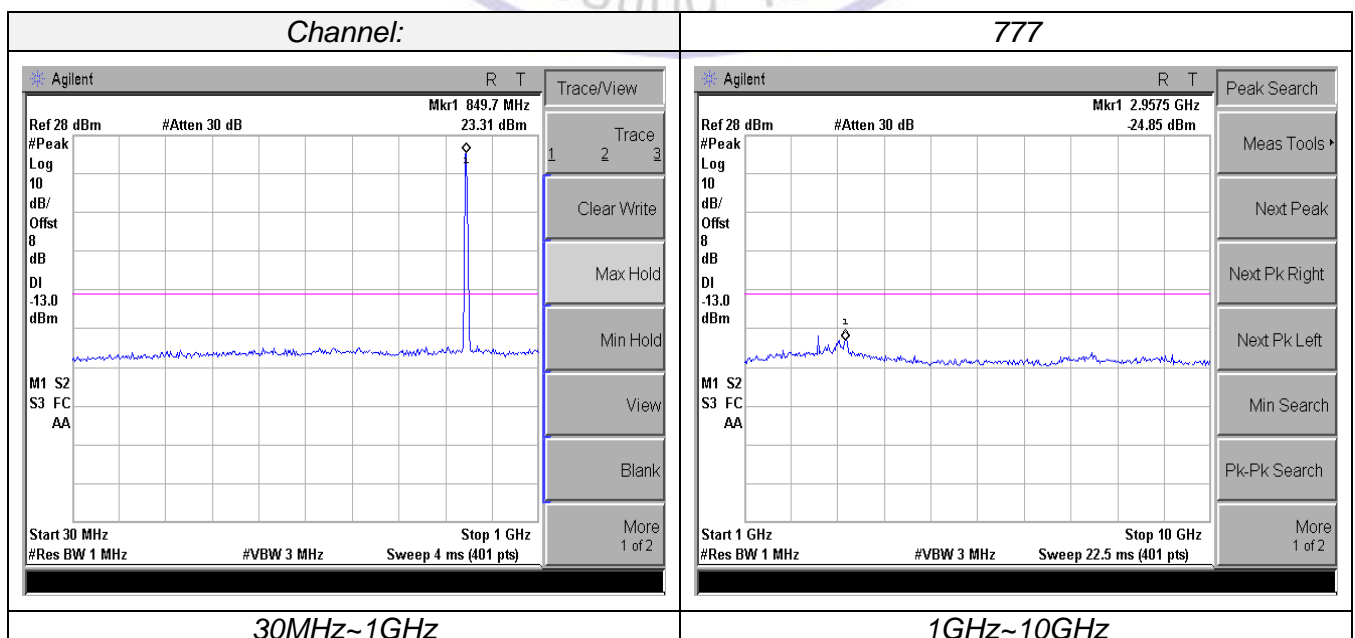
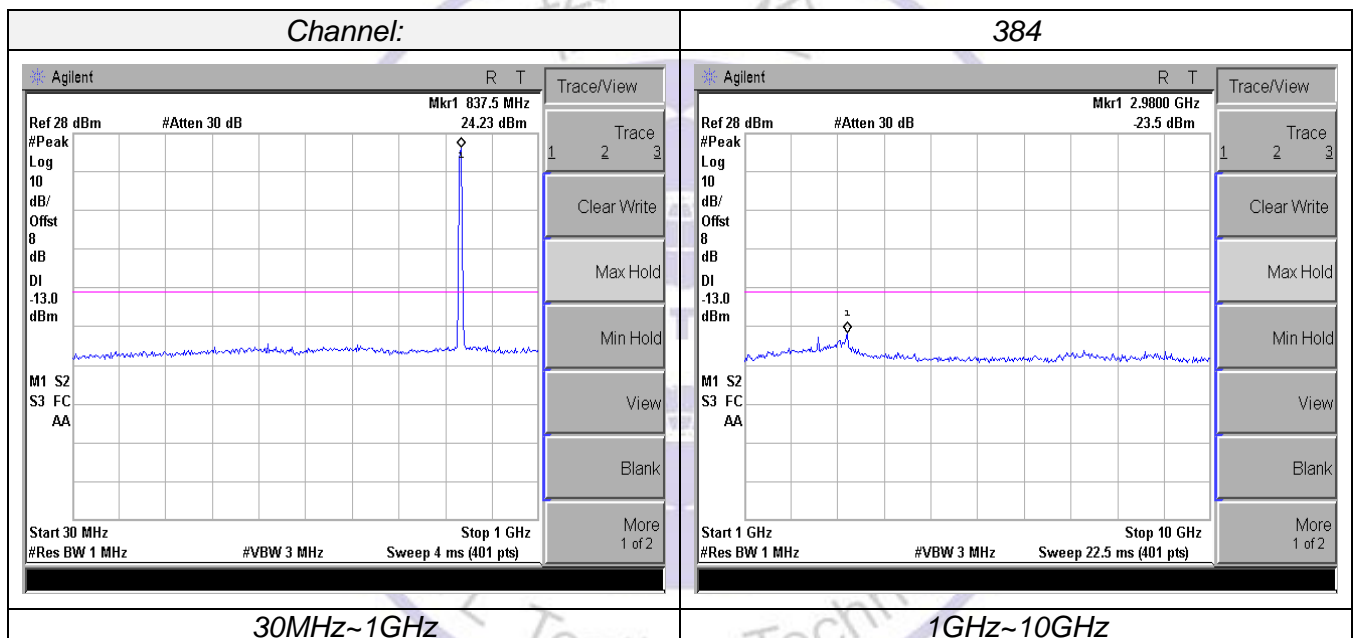
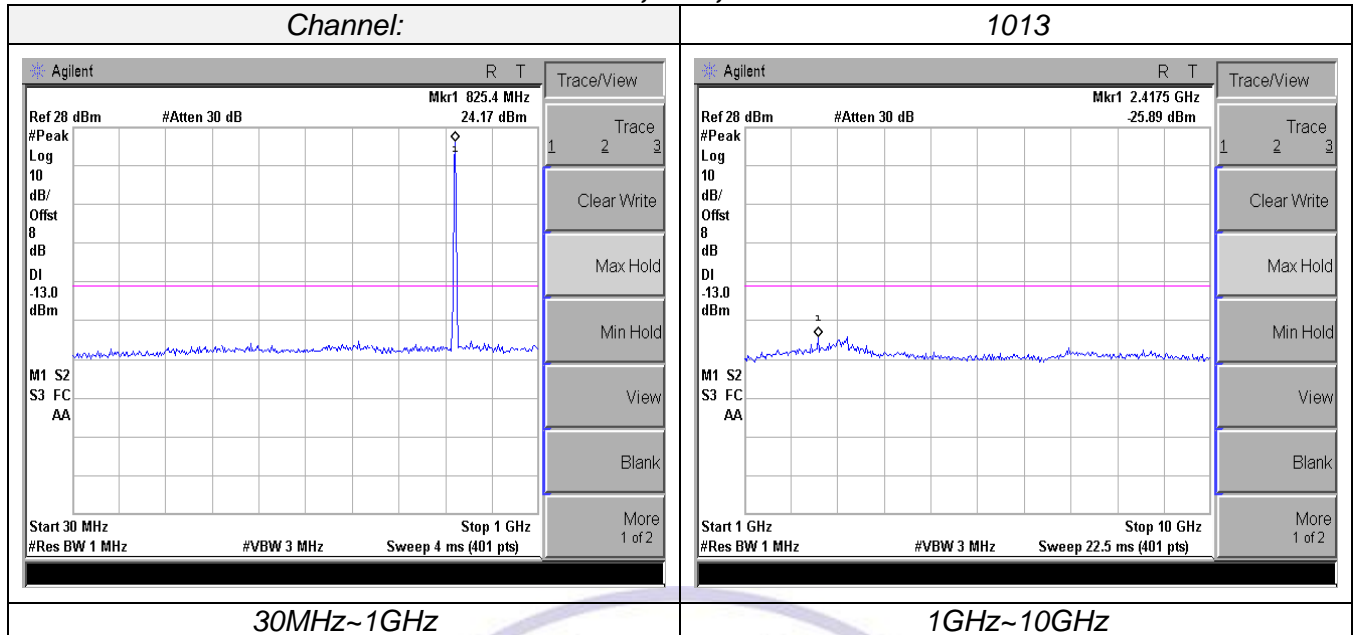
- d) Add a correction factor to the display of spectrum, and then test.
- e) The resolution bandwidth of the spectrum analyzer was set at 1MHz for Part 22 and 1MHz for Part 24, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

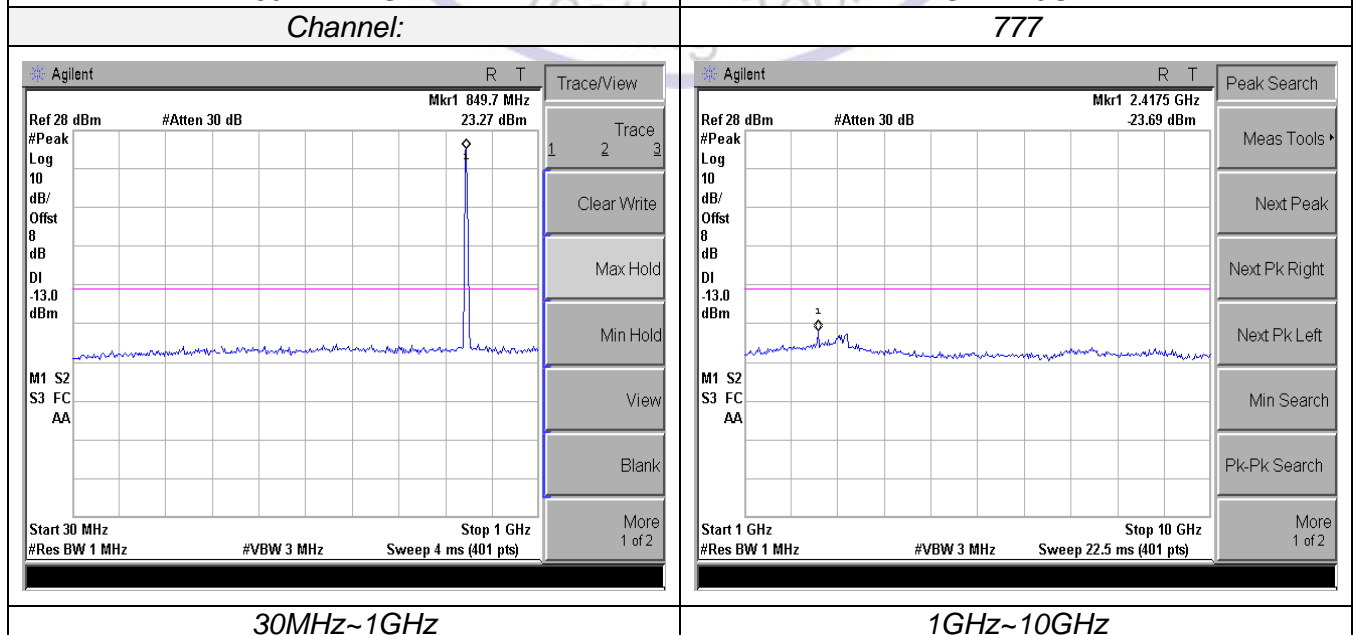
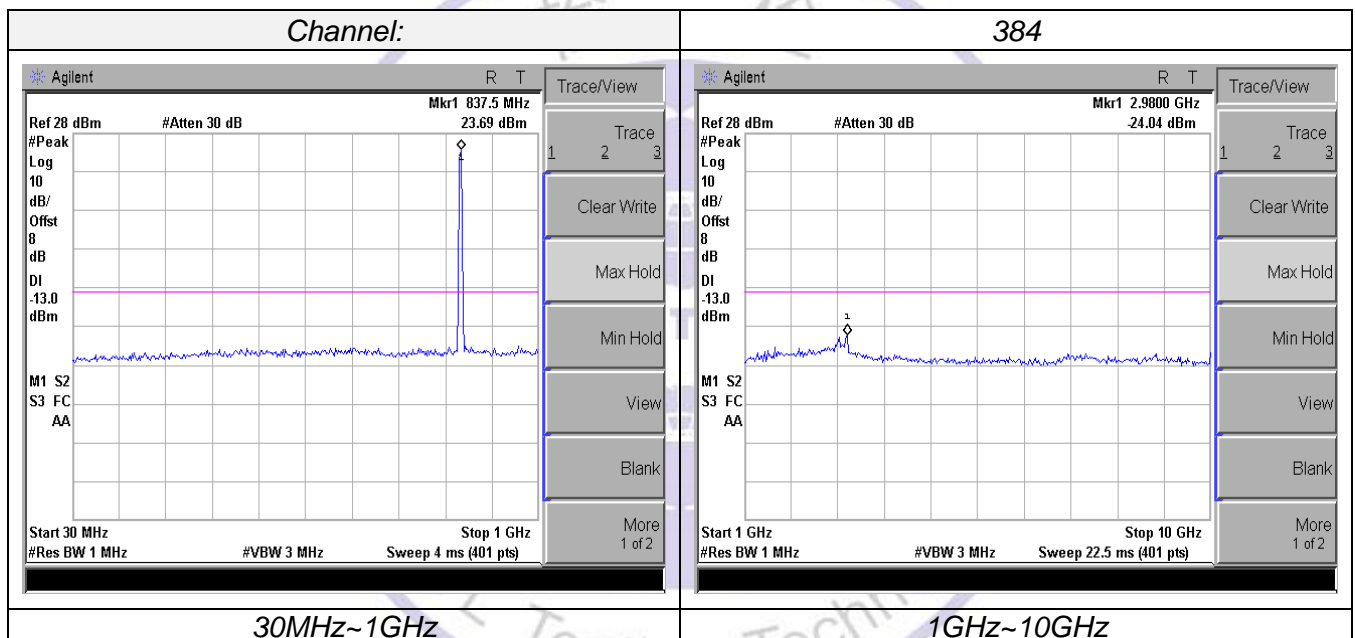
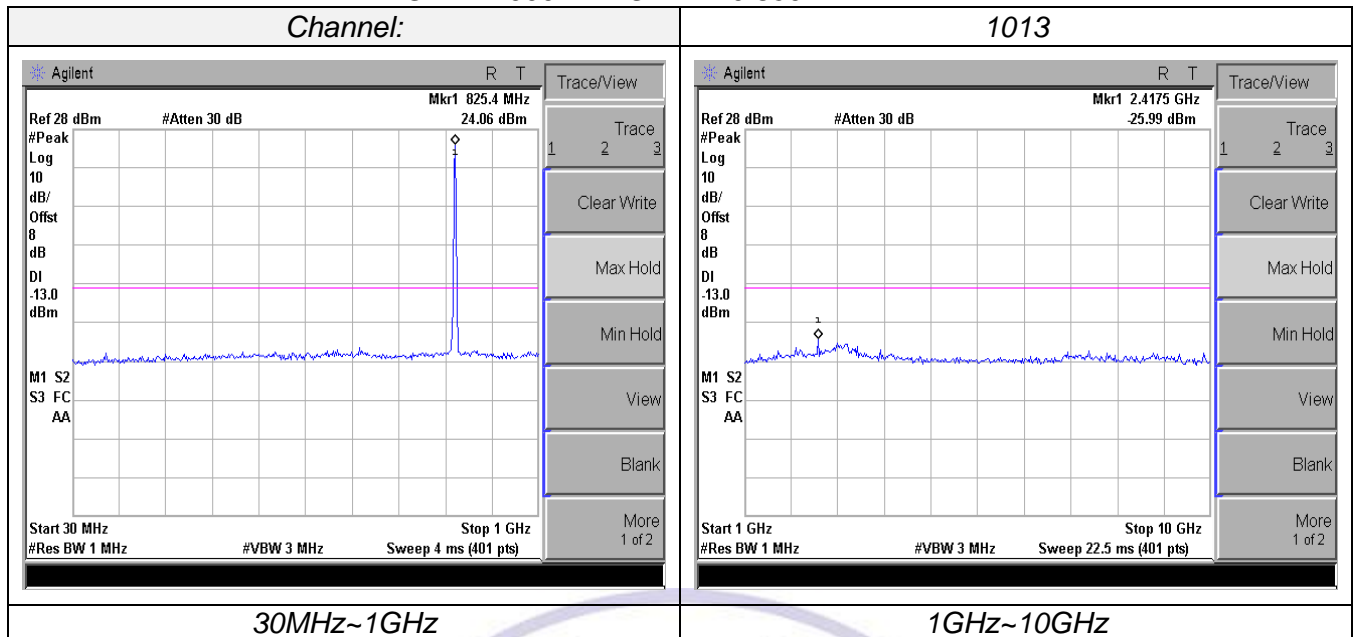
Radiated Spurious Measurement:

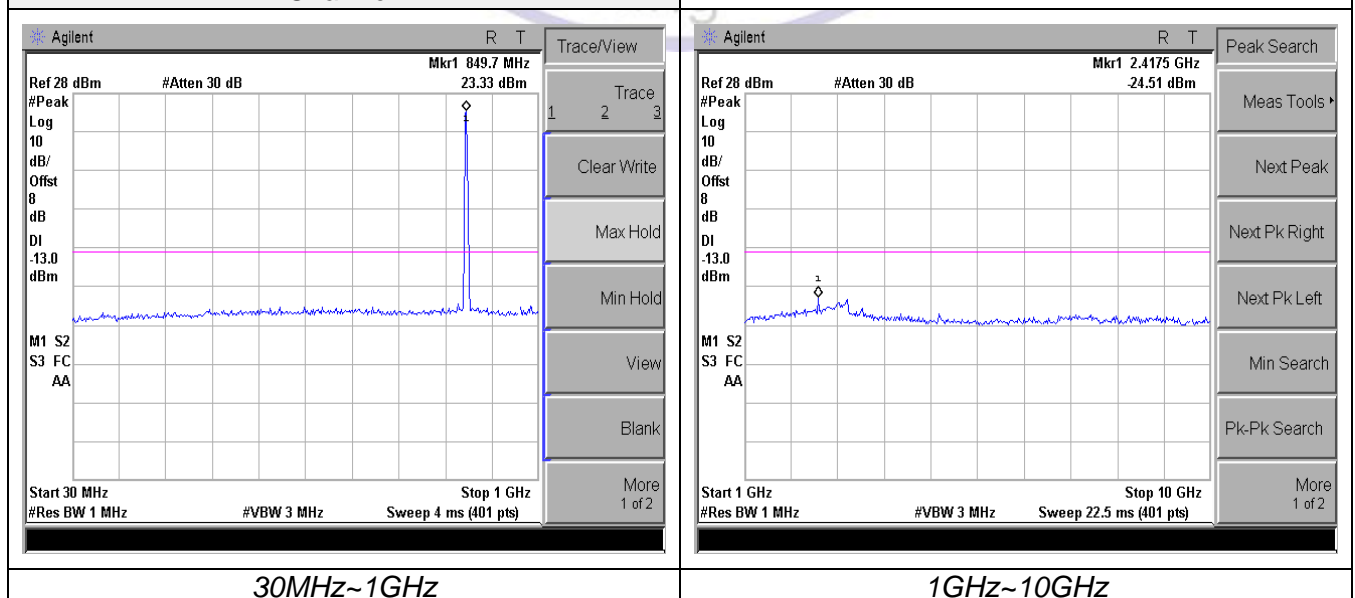
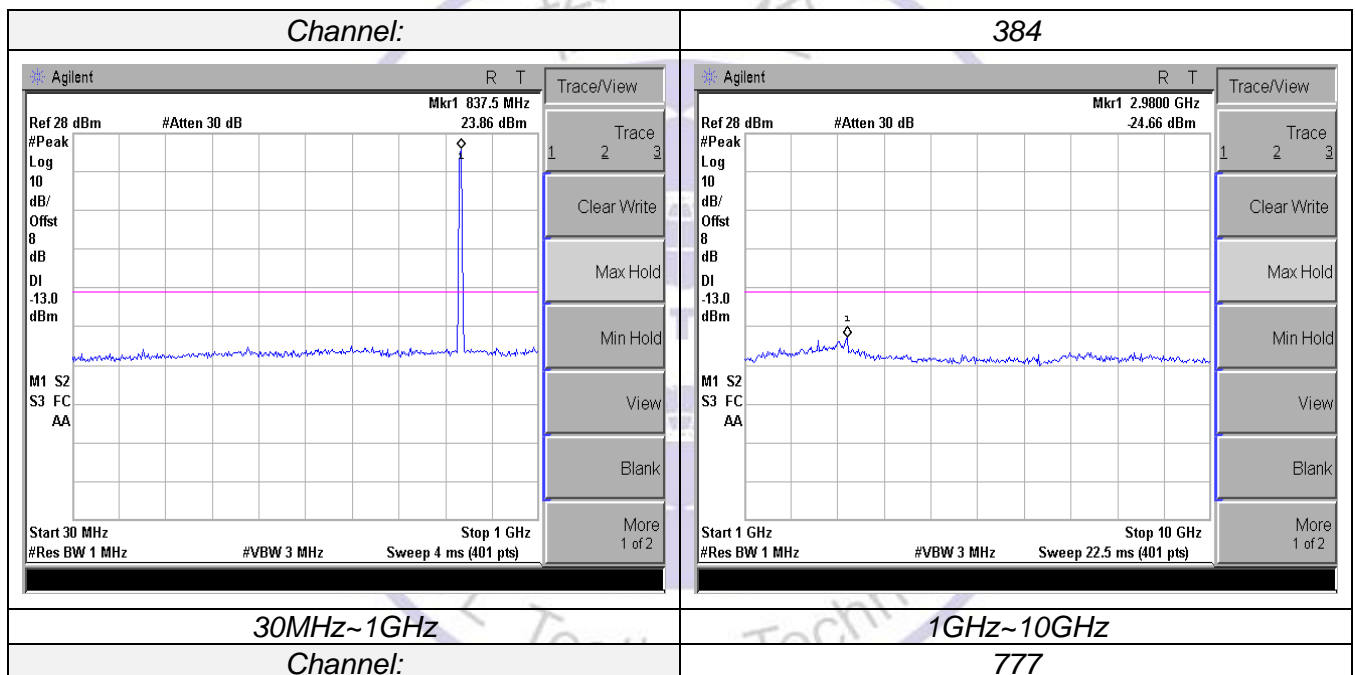
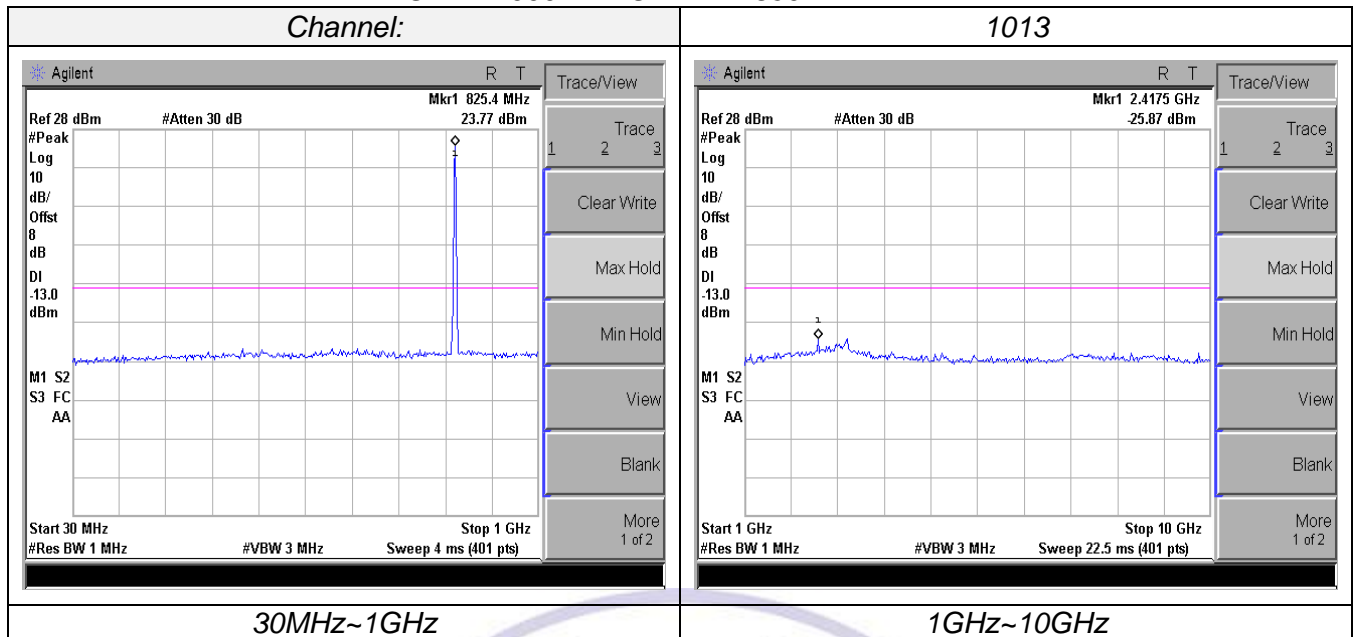
- a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that 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.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q) The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
- r) Test site anechoic chamber refer to ANSI C63.4: 2019

TEST RESULTS

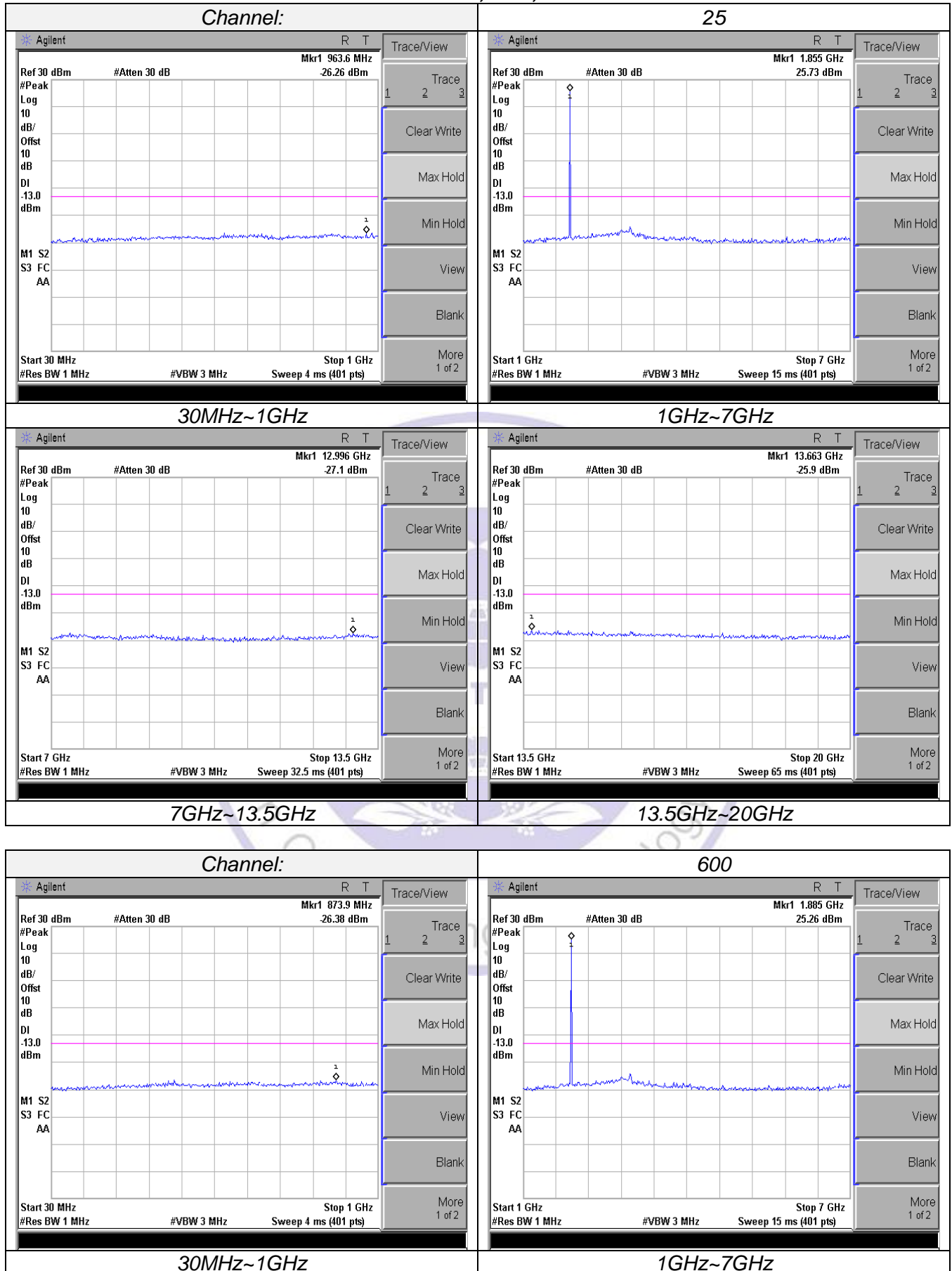
Conducted Measurement:

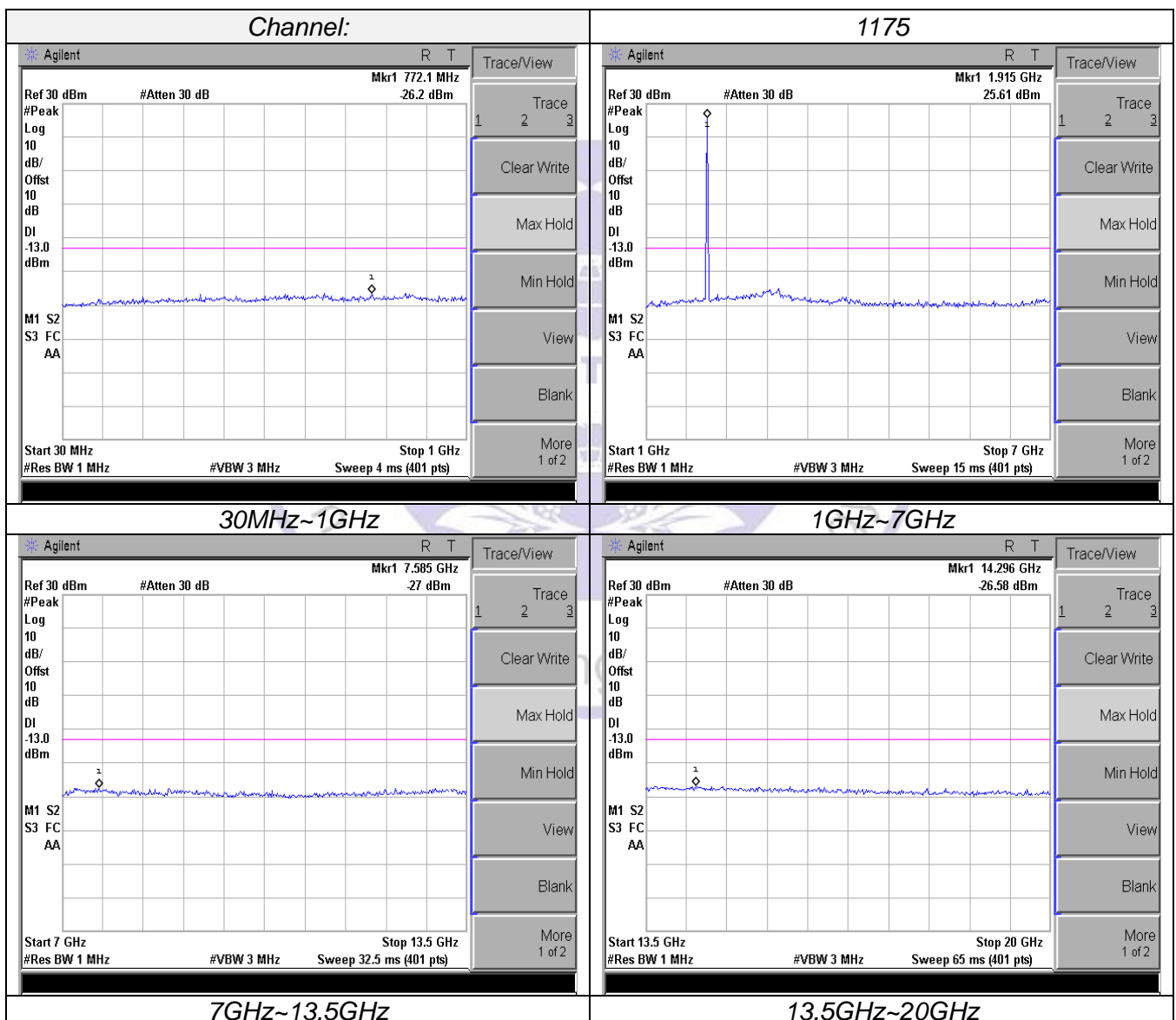
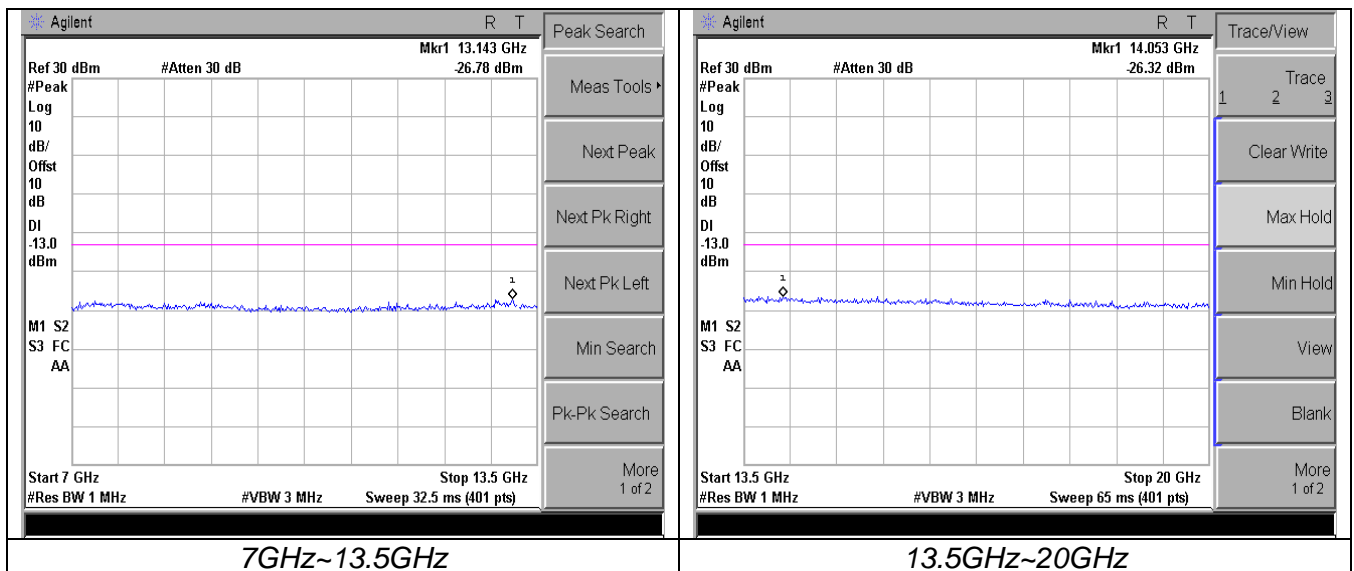
CDMA 1xRTT, BC0, CELL BAND

CDMA2000 EVDO REV. 0 850MHz BAND

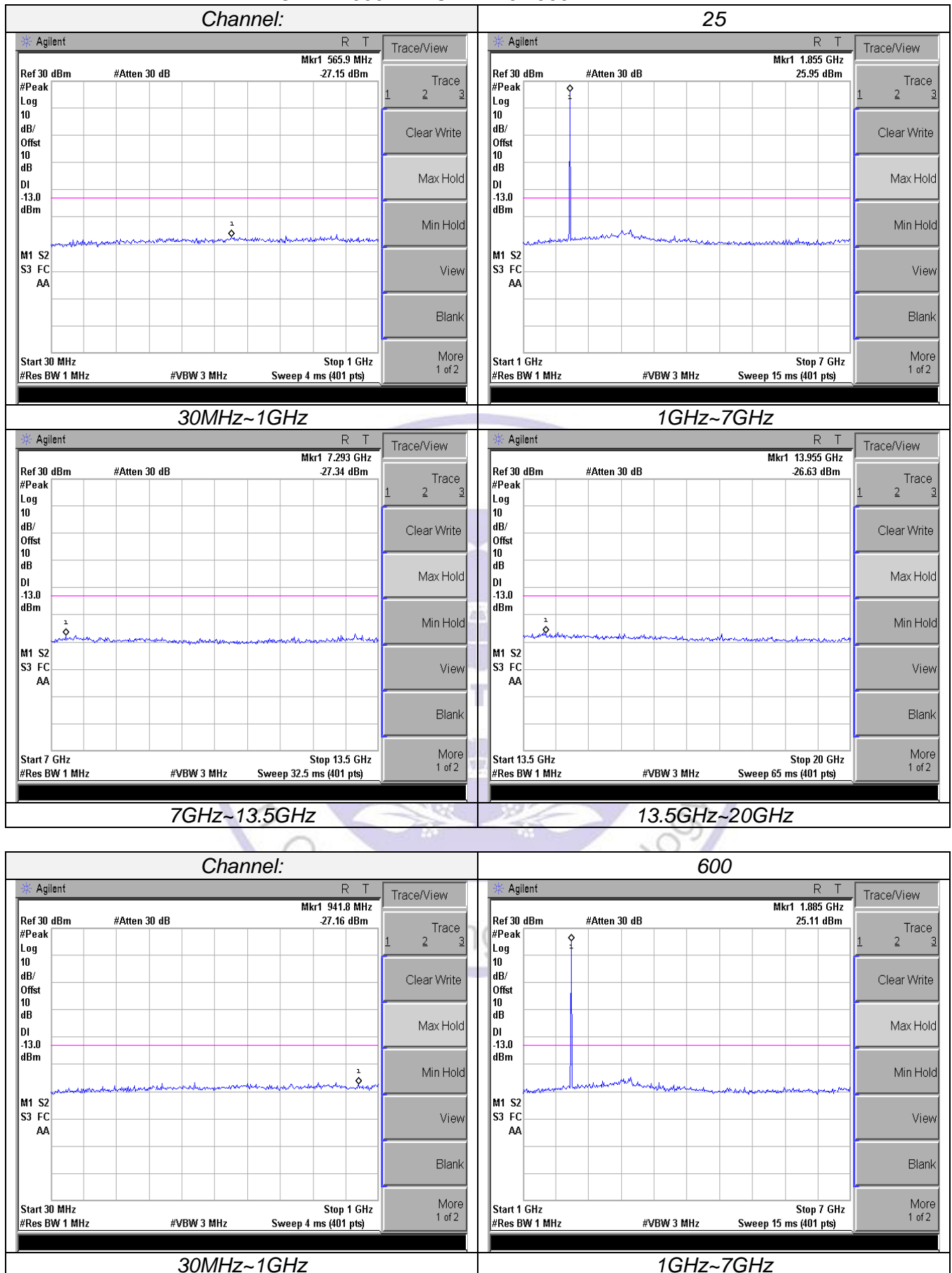
CDMA2000 EVDO REV A 850MHz BAND

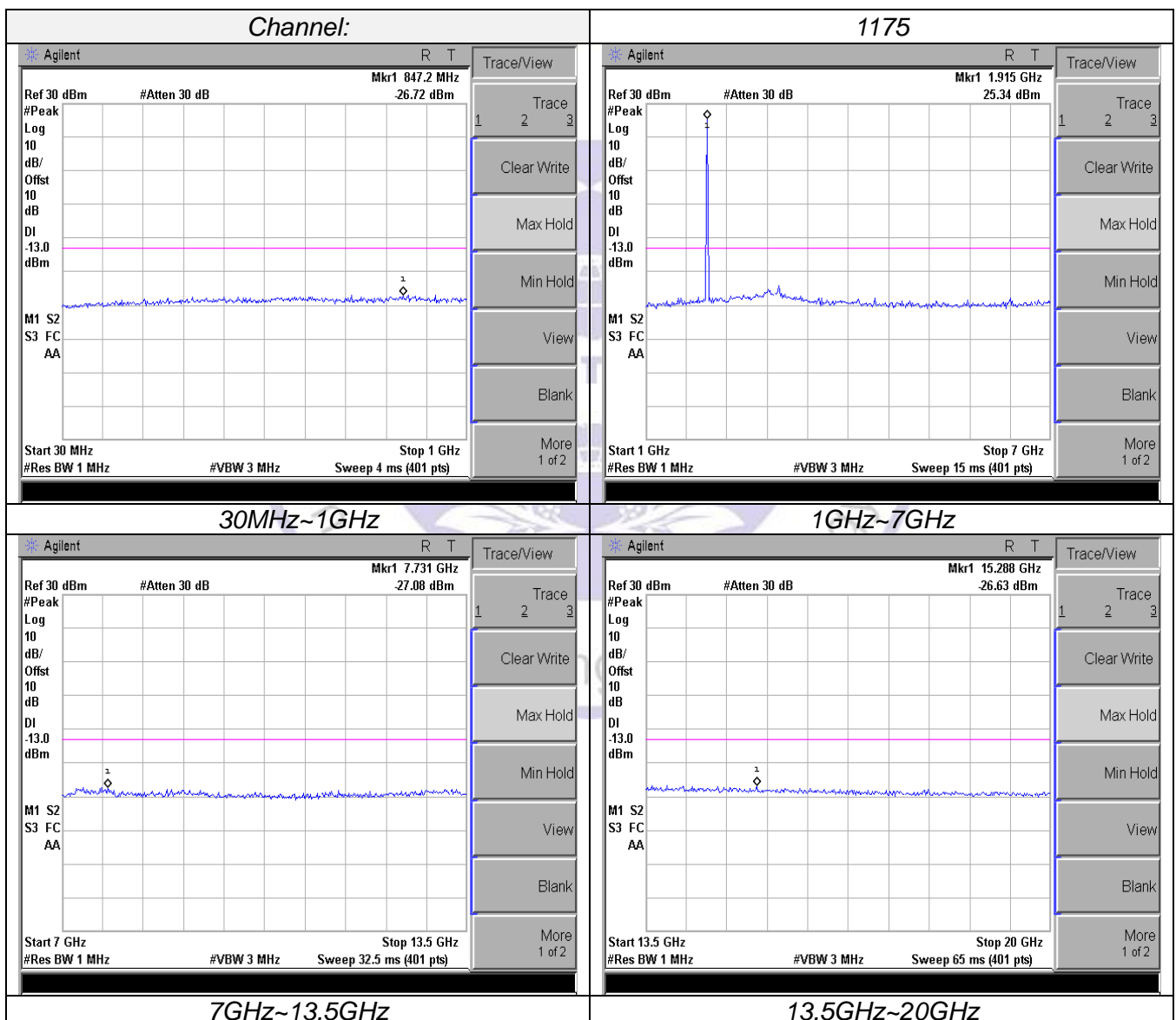
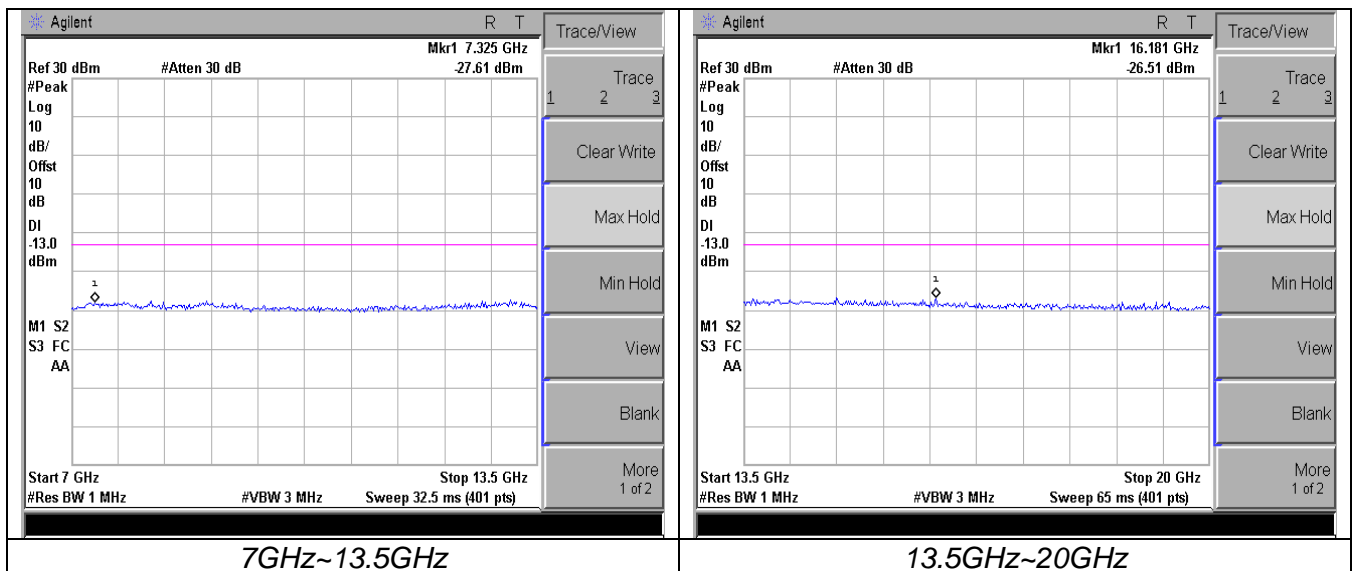
CDMA2000 1xRTT, BC1, PCS BAND



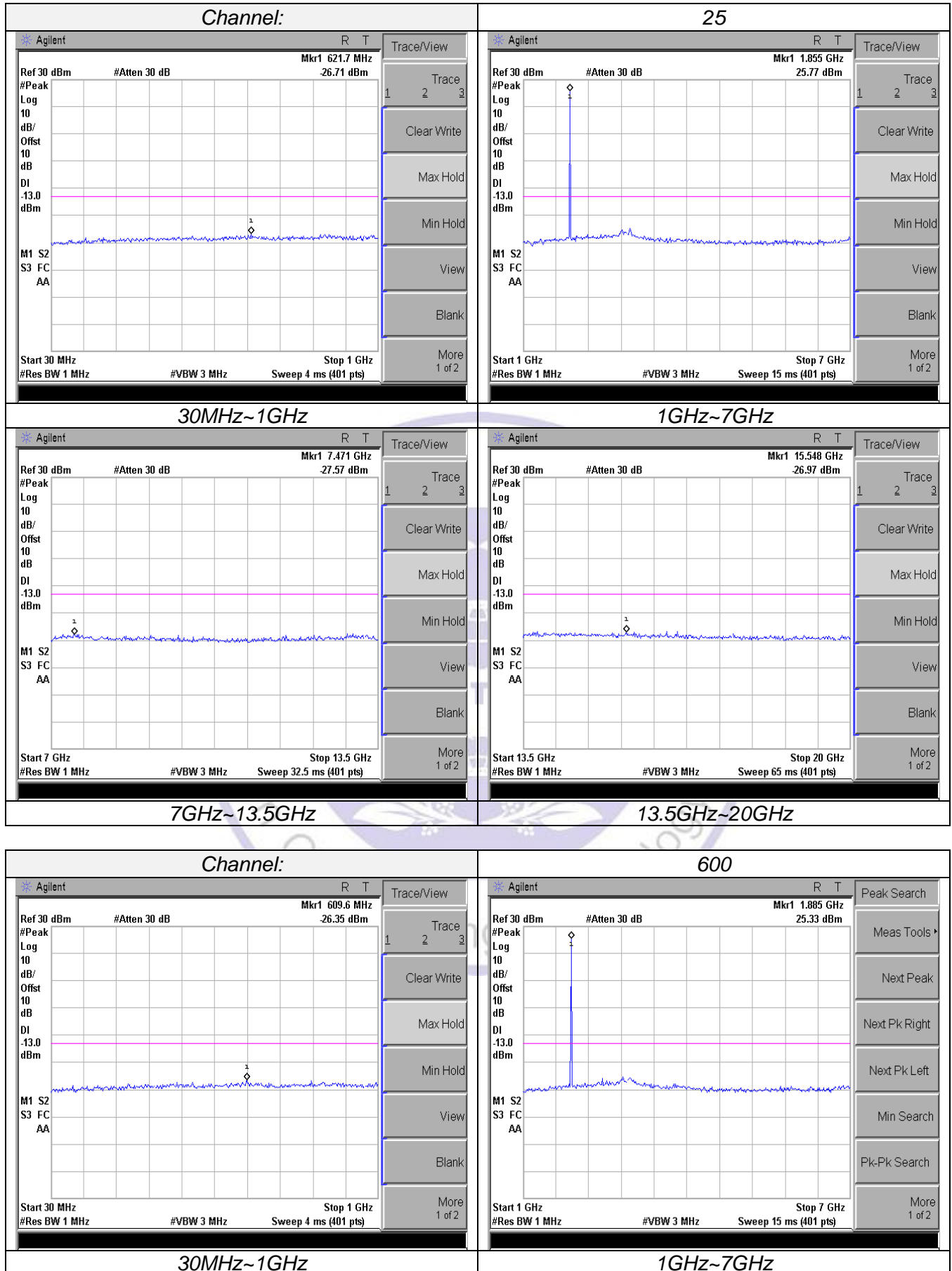


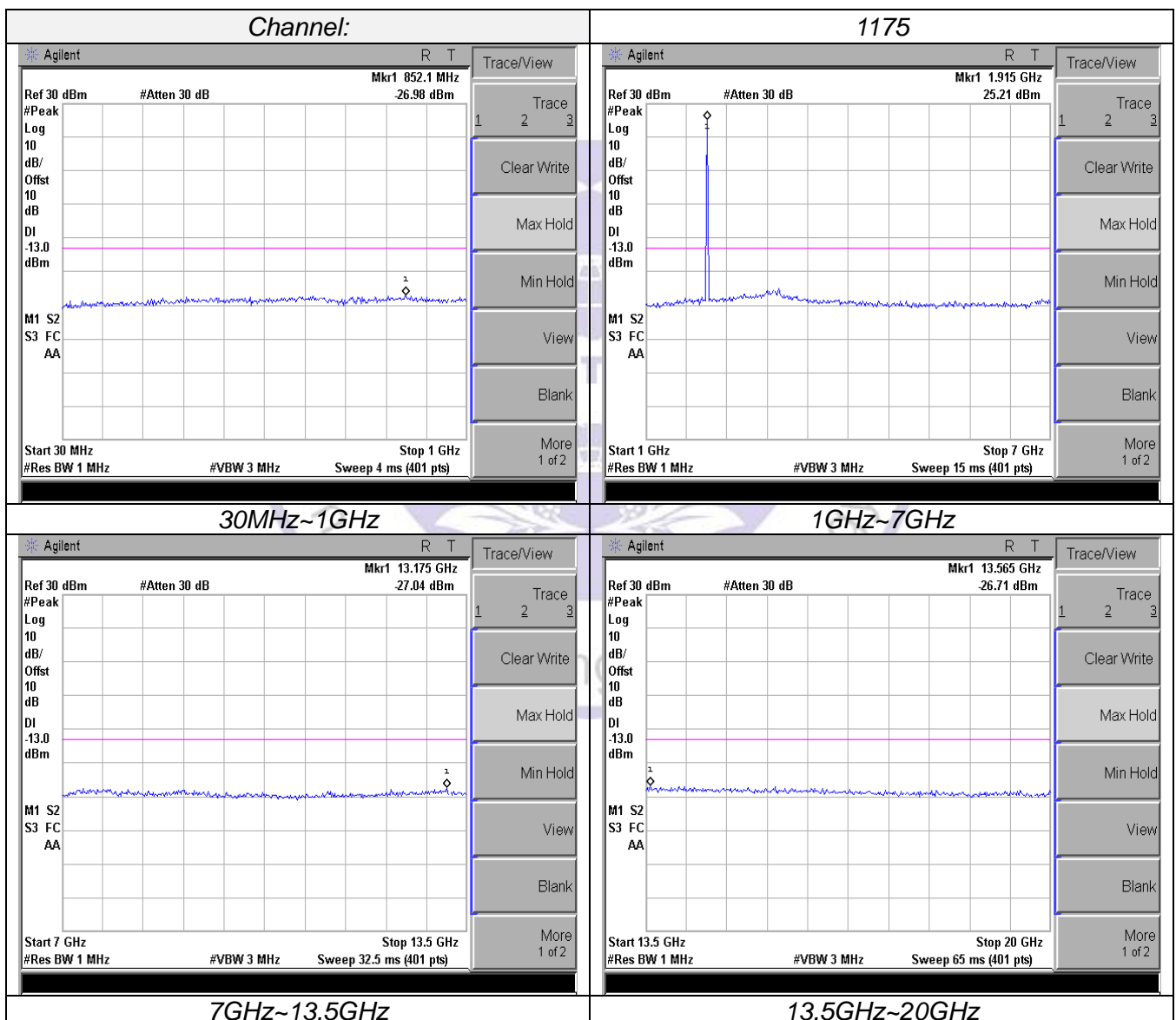
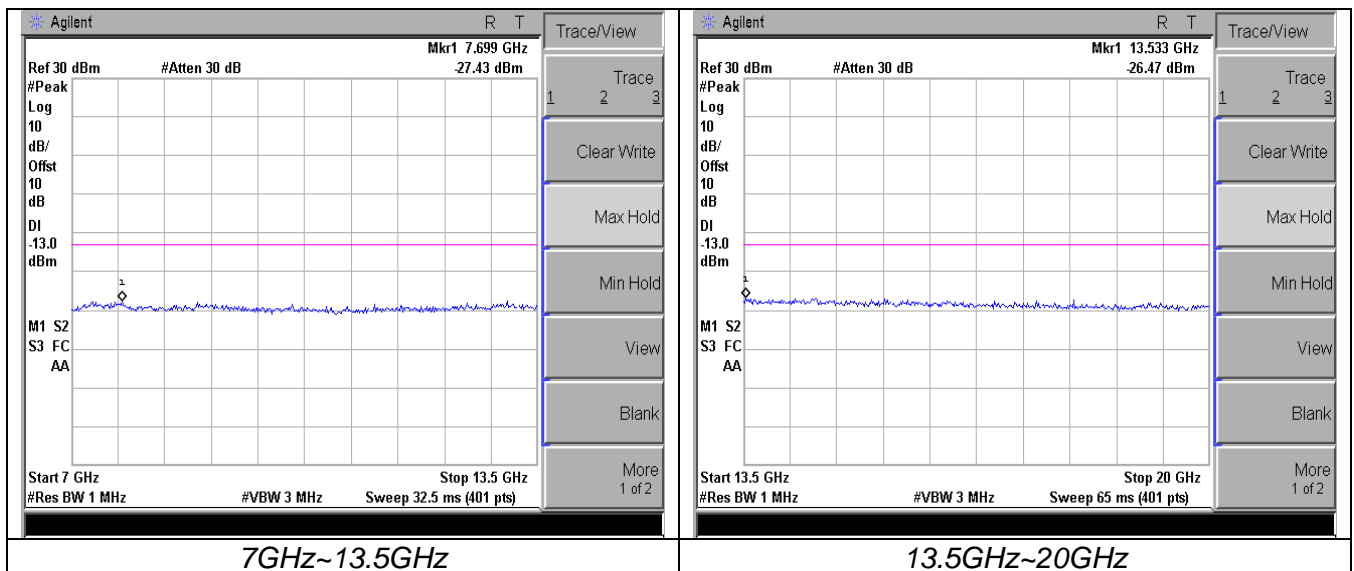
CDMA2000 EVDO REV. 0 1900MHz BAND





CDMA2000 EVDO REV A 1900MHz BAND





Radiated Measurement:

Remark:

1. This device was tested under all R.C.s and S.O.s. The worst case is reported with RC1/SO55 for 1xRTT, FTAP Rate 2Slot 307.2 kbps/RETAP Rate 9.6 kbps for EVDO Rev.0 and FTAP Rate 2Slot 307.2 kbps/RETAP Rate 2048 bits for EVDO Rev.A with 'All Up' power control bits.
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
3. We were not recorded other points as values lower than limits.
4. $Margin = Limit - EIRP$

CDMA 1xRTT, BC0, CELL BAND

Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	1649.40	-37.20	3.00	3.00	9.58	-30.62	-13.00	17.62	H
	2474.10	-45.94	3.03	3.00	10.72	-38.25	-13.00	25.25	H
	1649.40	-35.24	3.00	3.00	9.68	-28.56	-13.00	15.56	V
	2474.10	-42.89	3.03	3.00	10.72	-35.20	-13.00	22.20	V
384	1673.04	-37.86	3.00	3.00	9.61	-31.25	-13.00	18.25	H
	2509.56	-46.99	3.03	3.00	10.77	-39.25	-13.00	26.25	H
	1673.04	-33.86	3.00	3.00	9.61	-27.25	-13.00	14.25	V
	2509.56	-43.89	3.03	3.00	10.77	-36.15	-13.00	23.15	V
777	1696.62	-36.91	3.00	3.00	9.77	-30.14	-13.00	17.14	H
	2544.93	-45.11	3.03	3.00	10.89	-37.25	-13.00	24.25	H
	1696.62	-36.13	3.00	3.00	9.77	-29.36	-13.00	16.36	V
	2544.93	-44.30	3.03	3.00	10.89	-36.44	-13.00	23.44	V

CDMA2000 EVDO REV. 0 850MHz BAND

Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	1649.40	-37.05	3.00	3.00	9.58	-30.47	-13.00	17.47	H
	2474.10	-45.95	3.03	3.00	10.72	-38.26	-13.00	25.26	H
	1649.40	-34.16	3.00	3.00	9.68	-27.48	-13.00	14.48	V
	2474.10	-41.81	3.03	3.00	10.72	-34.12	-13.00	21.12	V
384	1673.04	-39.08	3.00	3.00	9.61	-32.47	-13.00	19.47	H
	2509.56	-44.21	3.03	3.00	10.77	-36.47	-13.00	23.47	H
	1673.04	-35.16	3.00	3.00	9.61	-28.55	-13.00	15.55	V
	2509.56	-45.00	3.03	3.00	10.77	-37.26	-13.00	24.26	V
777	1696.62	-37.09	3.00	3.00	9.77	-30.32	-13.00	17.32	H
	2544.93	-46.27	3.03	3.00	10.89	-38.41	-13.00	25.41	H
	1696.62	-36.24	3.00	3.00	9.77	-29.47	-13.00	16.47	V
	2544.93	-44.43	3.03	3.00	10.89	-36.57	-13.00	23.57	V

CDMA2000 EVDO REV A 850MHz BAND

Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1013	1649.40	-38.05	3.00	3.00	9.58	-31.47	-13.00	18.47	H
	2474.10	-45.84	3.03	3.00	10.72	-38.15	-13.00	25.15	H
	1649.40	-34.94	3.00	3.00	9.68	-28.26	-13.00	15.26	V
	2474.10	-43.05	3.03	3.00	10.72	-35.36	-13.00	22.36	V
384	1673.04	-38.75	3.00	3.00	9.61	-32.14	-13.00	19.14	H
	2509.56	-44.00	3.03	3.00	10.77	-36.26	-13.00	23.26	H
	1673.04	-35.35	3.00	3.00	9.61	-28.74	-13.00	15.74	V
	2509.56	-44.90	3.03	3.00	10.77	-37.16	-13.00	24.16	V
777	1696.62	-38.24	3.00	3.00	9.77	-31.47	-13.00	18.47	H
	2544.93	-47.42	3.03	3.00	10.89	-39.56	-13.00	26.56	H
	1696.62	-35.51	3.00	3.00	9.77	-28.74	-13.00	15.74	V
	2544.93	-45.12	3.03	3.00	10.89	-37.26	-13.00	24.26	V

CDMA2000 1xRTT, BC1, PCS BAND

Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	3702.50	-43.79	4.39	3.00	12.34	-35.84	-13.00	22.84	H
	5553.75	-45.66	5.31	3.00	13.52	-37.45	-13.00	24.45	H
	3702.50	-38.20	4.39	3.00	12.34	-30.25	-13.00	17.25	V
	5553.75	-41.42	5.31	3.00	13.52	-33.21	-13.00	20.21	V
600	3760.00	-40.08	4.41	3.00	12.34	-32.15	-13.00	19.15	H
	5640.00	-45.65	5.38	3.00	13.58	-37.45	-13.00	24.45	H
	3760.00	-37.40	4.41	3.00	12.34	-29.47	-13.00	16.47	V
	5640.00	-46.61	5.38	3.00	13.58	-38.41	-13.00	25.41	V
1175	3817.50	-38.16	4.45	3.00	12.45	-30.16	-13.00	17.16	H
	5726.25	-46.84	5.47	3.00	13.66	-38.65	-13.00	25.65	H
	3817.50	-35.15	4.45	3.00	12.45	-27.15	-13.00	14.15	V
	5726.25	-46.81	5.48	3.00	13.66	-38.63	-13.00	25.63	V

CDMA2000 EVDO REV 0 1900MHz BAND

Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	3702.50	-40.31	4.39	3.00	12.34	-32.36	-13.00	19.36	H
	5553.75	-46.43	5.31	3.00	13.52	-38.22	-13.00	25.22	H
	3702.50	-35.79	4.39	3.00	12.34	-27.84	-13.00	14.84	V
	5553.75	-43.77	5.31	3.00	13.52	-35.56	-13.00	22.56	V
600	3760.00	-40.17	4.41	3.00	12.34	-32.24	-13.00	19.24	H
	5640.00	-44.50	5.38	3.00	13.58	-36.30	-13.00	23.30	H
	3760.00	-36.47	4.41	3.00	12.34	-28.54	-13.00	15.54	V
	5640.00	-45.45	5.38	3.00	13.58	-37.25	-13.00	24.25	V
1175	3817.50	-38.69	4.45	3.00	12.45	-30.69	-13.00	17.69	H
	5726.25	-46.93	5.47	3.00	13.66	-38.74	-13.00	25.74	H
	3817.50	-35.66	4.45	3.00	12.45	-27.66	-13.00	14.66	V
	5726.25	-45.46	5.48	3.00	13.66	-37.28	-13.00	24.28	V

CDMA2000 EVDO REV A 1900MHz BAND

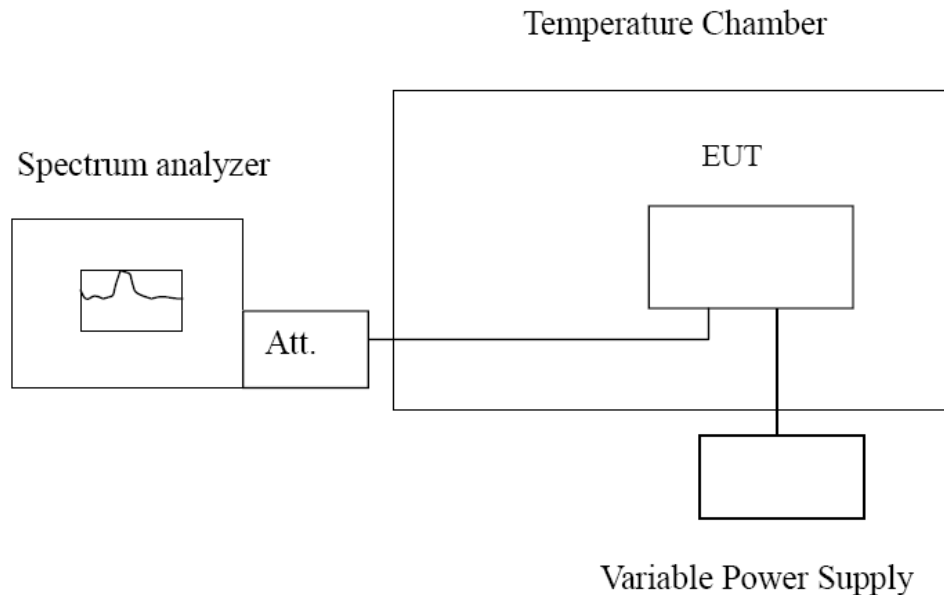
Channel	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
25	3702.50	-38.60	4.39	3.00	12.34	-30.65	-13.00	17.65	H
	5553.75	-39.68	5.31	3.00	13.52	-31.47	-13.00	18.47	H
	3702.50	-35.21	4.39	3.00	12.34	-27.26	-13.00	14.26	V
	5553.75	-43.68	5.31	3.00	13.52	-35.47	-13.00	22.47	V
600	3760.00	-39.51	4.41	3.00	12.34	-31.58	-13.00	18.58	H
	5640.00	-44.46	5.38	3.00	13.58	-36.26	-13.00	23.26	H
	3760.00	-35.78	4.41	3.00	12.34	-27.85	-13.00	14.85	V
	5640.00	-45.46	5.38	3.00	13.58	-37.26	-13.00	24.26	V
1175	3817.50	-39.44	4.45	3.00	12.45	-31.44	-13.00	18.44	H
	5726.25	-46.78	5.47	3.00	13.66	-38.59	-13.00	25.59	H
	3817.50	-35.26	4.45	3.00	12.45	-27.26	-13.00	14.26	V
	5726.25	-45.48	5.48	3.00	13.66	-37.30	-13.00	24.30	V

3.5 Frequency Stability under Temperature & Voltage Variations

LIMIT

Cellular Band: $\pm 2.5\text{ppm}$ PCS Band: Within the authorized frequency block

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Frequency Stability under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C . After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of $+50^{\circ}\text{C}$ reached.

Frequency Stability under Voltage Variations:

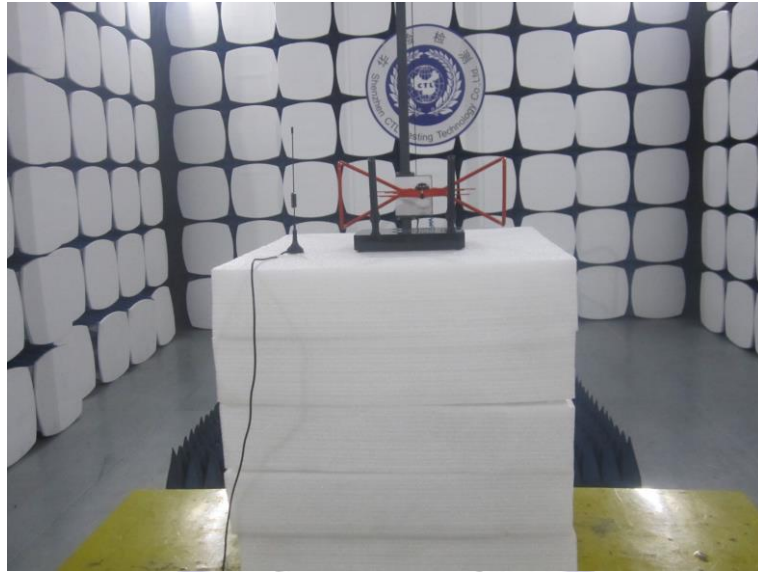
Set chamber temperature to 20°C . Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark: we test all modulation type and record worst case at Voice mode with DC power supply.

Reference Frequency: Cell Band Middle channel=384 frequency=836.52MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	36	0.043	2.5	Pass
	-20	57	0.068		
	-10	58	0.069		
	0	63	0.075		
	10	45	0.054		
	20	58	0.069		
	30	36	0.043		
	40	44	0.053		
	50	52	0.062		
3.70	25	36	0.043		
4.20	25	75	0.090		
End point 3.50	25	54	0.043		
Reference Frequency: PCS Band Middle channel=600 frequency=1880MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	54	0.035	Within the authorized frequency block	Pass
	-20	26	0.029		
	-10	39	0.035		
	0	41	0.031		
	10	45	0.037		
	20	52	0.039		
	30	50	0.033		
	40	44	0.035		
	50	48	0.038		
3.70	25	39	0.028		
4.20	25	36	0.029		
End point 3.50	25	42	0.043		

4 Test Setup Photos of the EUT



5 External and Internal Photos of the EUT

Please reference to the test report No.: CTL1507031826-WF-1

***** End of Report *****

