RADIO TEST REPORT

Report No.: STS2204331W03

Issued for

Bullitt Group

One Valpy, Valpy Street, Reading, RG1 1AR United Kingdom

Product Name:	5G Smart phone
Brand Name:	CAT
Model Name:	BM1S4L
Series Model:	N/A
FCC ID:	ZL5BM1S4LE
Test Standard:	FCC Part 22H, 24E and 90S

Shenzhen STS Test Services Co., Ltd.
A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ,
Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com

TEST RESULT CERTIFICATION

Applicant's Name ..... :	Bullitt Group
Address ..... :	One Valpy, Valpy Street, Reading, RG1 1AR United Kingdom
Manufacturer's Name ..... :	Bullitt Group
Address ..... :	One Valpy, Valpy Street, Reading, RG1 1AR United Kingdom

Product Description

Product Name ..... :	5G Smart phone
Brand Name ..... :	CAT
Model Name ..... :	BM1S4L
Series Model ..... :	N/A
Test Standards ..... :	FCC Part 22H, 24E and 90S
Test Procedure ..... :	KDB 971168 D01 v03r01,ANSI C63.26(2015)

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test.....:	
Date of receipt of test item.....:	26 Apr. 2022
Date (s) of performance of tests.:	26 Apr. 2022 ~ 28 July 2022
Date of Issue .....:	28 July 2022
Test Result .....:	Pass

Testing Engineer : Chris chen

(Chris Chen)

Technical Manager : Sean She

(Sean she)

Authorized Signatory : Bovey Yang

(Bovey Yang)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	28 July 2022	STS2204331W03	ALL	Initial Issue

SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The radiated emission testing was performed according to the procedures of KDB 971168 D01 v03r01 and ANSI C63.26(2015)

FCC Rules	Test Description	Test Limit	Test Result	Reference
2.1046	Conducted Output Power	Reporting Only	PASS	
22.913d 24.232d	Peak-to-Average Ratio	< 13 dB	PASS	
2.1046 22.913 24.232 90.635	Effective Radiated Power/Equivalent Isotropic Radiated Power	< 7 Watts max. ERP(Part 22) < 2 Watts max. EIRP(Part 24) < 100 Watts max. ERP(Part 90)	PASS	
2.1049 22.917 24.238 90.209	Occupied Bandwidth	Reporting Only	PASS	
2.1055 22.355 24.235 90.213	Frequency Stability	< 2.5 ppm (Part 22,90) Emission must remain in band (Part 24)	PASS	
2.1051 22.917 24.238 90.691	Spurious Emission at Antenna Terminals	< 43+10log10(P[Watts])	PASS	
2.1051 22.917 24.238 90.691	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	
2.1051 22.917 24.238 90.691	Band Edge	< 43+10log10(P[Watts])	PASS	

1 INTRODUCTION

1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD
Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
FCC test Firm Registration Number: 625569
IC test Firm Registration Number: 12108A
A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements ofANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 toindicate a 95% level of confidence. The measurement data shown herein meets or exceeds the UCISPRmeasurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly tospecified limits to determine compliance.

No.	Item	Uncertainty
1	RF output power, conducted	±0.87dB
2	Unwanted Emissions, conducted	±2.895dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.09dB
5	All emissions, radiated 1G-6GHz	±4.92dB
6	All emissions, radiated>6G	±5.49dB
7	Conducted Emission (9KHz-30MHz)	±2.73dB

2 PRODUCT INFORMATION

Product Name	5G Smart phone
Trade Name	CAT
Model Name	BM1S4L
Series Model	N/A
Model Difference	N/A
Tx Frequency:	CDMA&EVDO: BC0: 824.70 MHz~ 848.31 MHz BC1: 1851.25 MHz~ 1908.75 MHz BC10: 817.9 MHz~ 823.10MHz
Rx Frequency:	CDMA&EVDO: BC0: 869.70 MHz~ 894.30 MHz BC1: 1931.25 MHz~ 1988.75 MHz BC10: 862.9 MHz~ 868.1 MHz
Max RF Output Power:	CDMA BC0:23.35dBm, CDMA BC1:23.60dBm, CDMA BC10:24.93dBm
Type of Emission:	CDMA BC0: 1M28F9W; CDMA BC1:1M28F9W; CDMA BC10:1M28F9W EVDO BC0:1M28F9W; EVDO BC1:1M28F9W; EVDO BC10:1M28F9W
Modulation Characteristics:	CDMA&EVDO: QPSK/8PSK
SIM Card:	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.
Antenna:	PIFA
Antenna gain:	BC0: 0.7dBi, BC1: 2.1dBi, BC10: 0.7dBi
Battery parameter:	Rated Voltage: 3.85V Charge Limit Voltage: 4.4V Capacity: 5500mAh
Adapter:	Input: AC100-240V 50/60HZ 0.50A; Output: DC5.0V 3.0A 15.0W or 9V 2.0A 18.0W or 12V 1.50A 18.0W
GPRS/EDGE Class:	Multi-Class12
Extreme Vol. Limits:	DC 3.465V~ DC 4.235V(Normal: DC 3.85V)
Extreme Temp. Tolerance	-30℃ to +50℃
Operating Temp.	-25℃ to +55℃
Hardware version number:	V1.00
Software version number:	BM1S4L.DEG
*** Note: The High Voltage 3.465V and Low Voltage 4.235V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage, the antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.*	

3 MEASUREMENT INSTRUMENTS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Signal Generator	Agilent	83752A	3610A02740	2021.09.30	2022.09.29
Wireless Communications Test Set	R&S	CMW 500	131428	2022.03.01	2023.02.28
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
Bilog Antenna	TESEQ	CBL6111D	45873	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1343	2020.10.12	2022.10.11
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	BALUN	BL410-E/18.905			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Universal Radio communication tester	R&S	CMU200	111058	2021.09.29	2022.09.28
Wireless Communications Test Set	R&S	CMW 500	131428	2022.03.01	2023.02.28
Signal Analyzer	Agilent	N9020A	MY52440124	2022.03.01	2023.02.28
Temperature& Humidity test chamber	Safety test	AG80L	171200018	2022.03.01	2023.02.28
Programmable power supply	Agilent	E3642A	MY40002025	2021.10.08	2022.10.07
Temperature & Humidity	SW-108	SuWei	N/A	2022.03.02	2023.03.01
Test SW	FARAD	LZ-RF /LzRf-3A3			

Equipment with a calibration date of “NCR” shown in this list was not used to make direct calibrated measurements.

4 TEST ITEMS

4.1 CONDUCTED OUTPUT POWER&TRANSMITTER RADIATED POWER

TEST OVERVIEW

CONDUCTED OUTPUT POWER:
A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.
TRANSMITTER RADIATED POWER (EIRP/ERP)
Determining ERP and/or EIRP from conducted RF output power measurements according to ANSI C63.26 2015 Section 5.2.5.5.
In many cases, RF output power limits are specified in terms of the ERP or the EIRP. Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are defined as the product of the power supplied to the antenna and its gain (relative to a dipole antenna in the case of ERP, and relative to an isotropic antenna in the case of EIRP); however, when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).
The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:
(1) ERP or EIRP = PMeas + GT
ERP= EIRP-2.15
where
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, e.g., dBm or dBW)
PMeas measured transmitter output power or PSD, in dBm or dBW
GT gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)
For devices utilizing multiple antennas, see 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.
The following equations demonstrate the mathematical relationship between ERP and EIRP:
a) ERP = EIRP − 2.15, where ERP and EIRP are expressed in consistent units.
b) EIRP = ERP + 2.15, where ERP and EIRP are expressed in consistent units.

TEST PROCEDURES

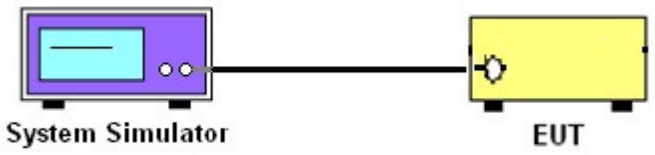
1. The transmitter output port was connected to the system simulator.

2. Set eut at maximum power through the system simulator.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 1.

4.2 PEAK TO AVERAGE RATIO

TEST OVERVIEW

According to §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.

TEST PROCEDURES

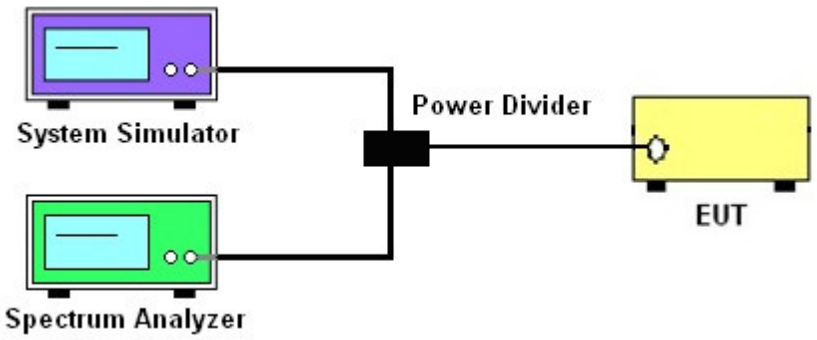
1. The testing follows FCC KDB 971168 v03r01 section.

2. The eut was connected to the peak and av system simulator& spectrum analyzer.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure average power of the spectrum analysis,

TEST SETUP



TEST RESULT

Note: Test data See Appendix 2.

4.3 OCCUPIED BANDWIDTH

TEST OVERVIEW

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

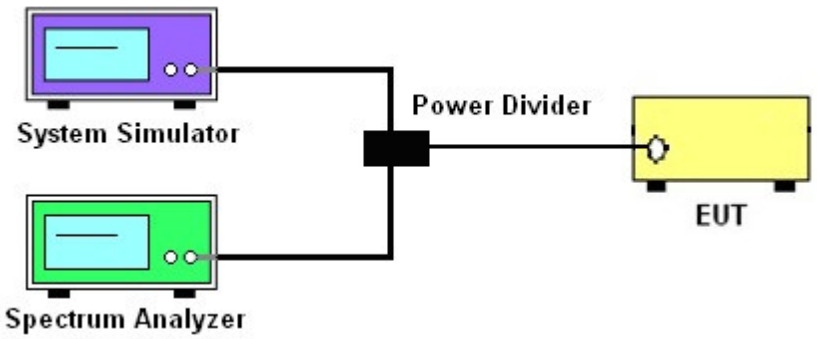
The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 Db below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

All modes of operation were investigated and the worst case configuration results are reported in this section.

TEST PROCEDURE

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7.The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

TEST SETUP



TEST RESULT

Note: Test data See Appendix 3.

4.4 FREQUENCY STABILITY

TEST OVERVIEW

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26 2015.

The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

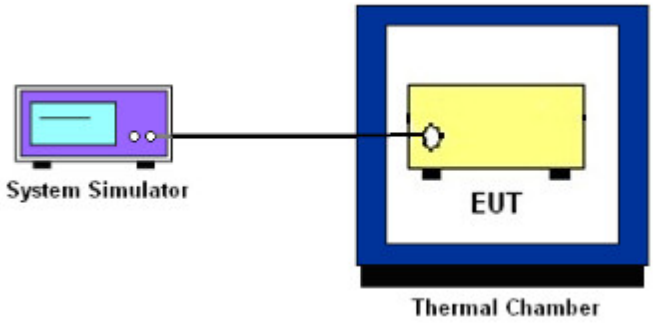
Temperature Variation

1. The testing follows FCC KDB 971168 D01 section 9.0
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Voltage Variation

1. The testing follows FCC KDB 971168 D01 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 4.

4.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

TEST OVERVIEW

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

TEST PROCEDURE

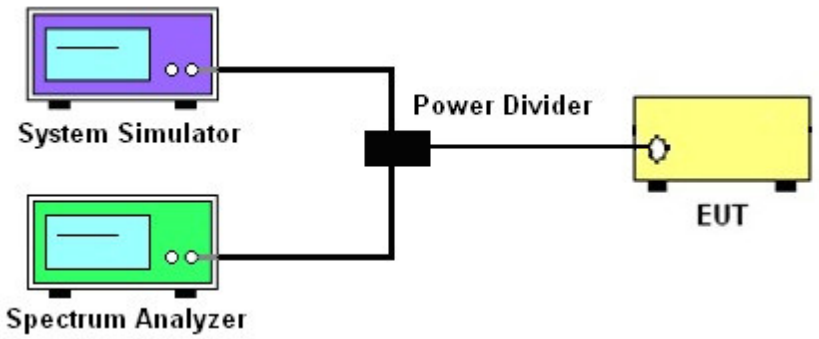
1. The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26-2015-Section 5.7.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 5.

4.6 BAND EDGE

TEST OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26-2015-Section 5.7
2. Start and stop frequency were set such that the band edge would be placed in the center of the Plot.
3. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
4. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator.

The path loss was compensated to the results for each measurement.

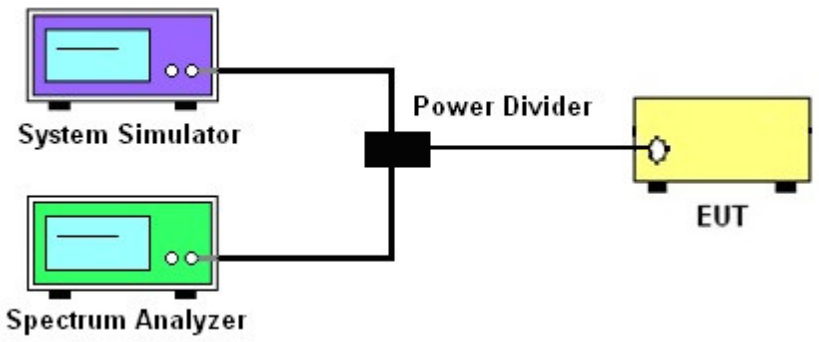
5. The band edges of low and high channels for the highest RF powers were measured.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7.The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 6.

4.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

TEST OVERVIEW

Radiated spurious emissions measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signalsoperating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas.Measurements on signals operating above 1GHz are performed using vertically and horizontally polarizedhorn antennas. All measurements are performed as peak measurements while the EUT isoperating at maximum power and at the appropriate frequencies.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

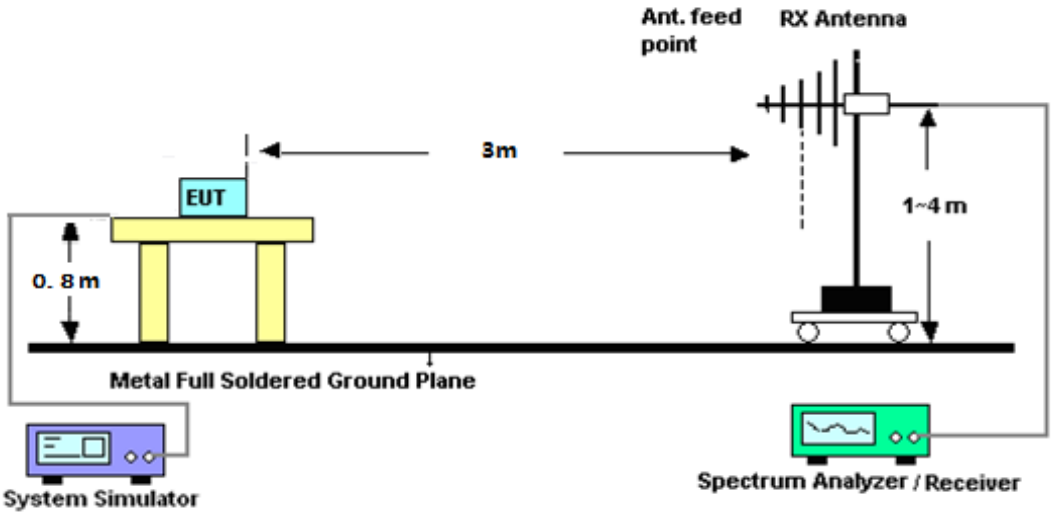
TEST PROCEDURE

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26-2015-Section 5.5.
2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5.No. of sweep points > 2 x span/RBW
6. Detector = Peak
7. Trace mode = max hold
8. The trace was allowed to stabilize
9. Effective Isotropic Spurious Radiation was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

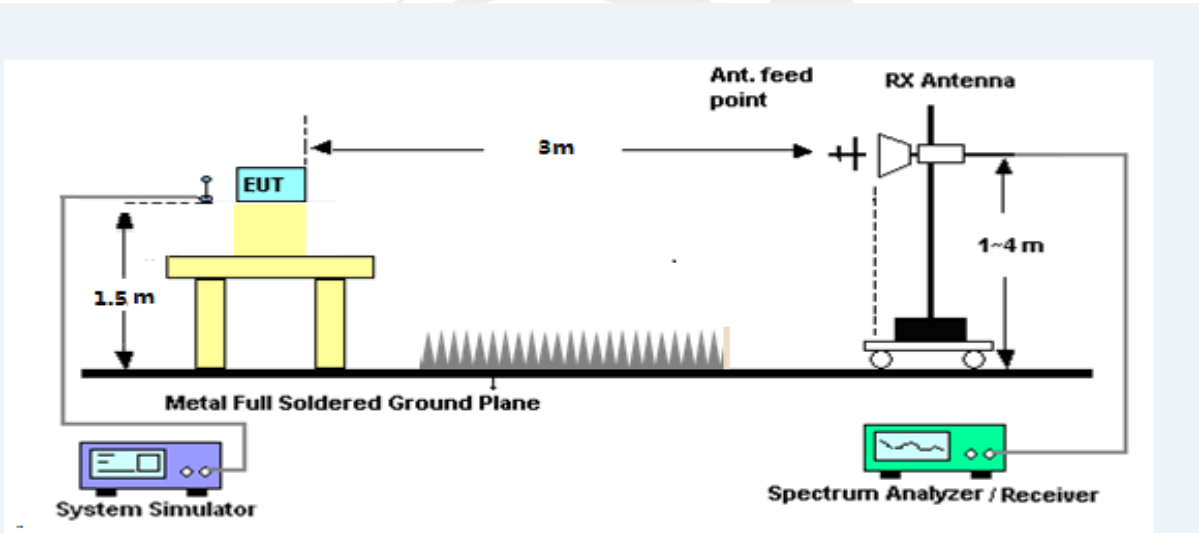
PMea=S.G Level+ Ant-Cable loss; Margin=PMea-Limit.

TEST SETUP

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



TEST RESULT

Note: Test data See Appendix 7.

APPENDIX A.TESTRESULT

A1. CONDUCTED OUTPUT POWER&TRANSMITTER RADIATED POWER

CDMA BC0							
Mode	Frequency (MHz)	Conduction AVG Power(dBm)	Ant Gain（dBi）	ERP (dBm)	ERP Limit (W)	ERP Limit (dBm)	Conclusion
CDMA BC0	824.70	23.28	0.70	21.83	7.00	38.45	PASS
	836.52	23.26	0.70	21.81	7.00	38.45	PASS
	848.31	23.26	0.70	21.81	7.00	38.45	PASS
EVDO BC0	824.70	23.32	0.70	21.87	7.00	38.45	PASS
	836.52	23.35	0.70	21.90	7.00	38.45	PASS
	848.31	23.22	0.70	21.77	7.00	38.45	PASS

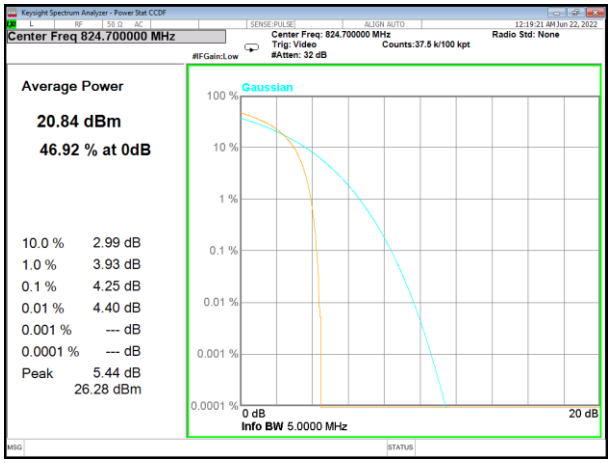
CDMA BC1							
Mode	Frequency (MHz)	Conduction AVG Power(dBm)	Ant Gain（dBi）	EIRP (dBm)	EIRP Limit(W)	EIRP Limit(dBm)	Conclusion
CDMA BC1	1851.25	23.52	2.10	25.62	2.00	33.01	PASS
	1880.00	23.40	2.10	25.50	2.00	33.01	PASS
	1908.75	23.56	2.10	25.66	2.00	33.01	PASS
EVDO BC1	1851.25	23.48	2.10	25.58	2.00	33.01	PASS
	1880.00	23.46	2.10	25.56	2.00	33.01	PASS
	1908.75	23.60	2.10	25.70	2.00	33.01	PASS

CDMA BC10							
Mode	Frequency (MHz)	Conduction AVG Power(dBm)	Ant Gain（dBi）	ERP (dBm)	ERP Limit (W)	ERP Limit (dBm)	Conclusion
CDMA BC10	818.65	24.82	0.70	23.37	100.00	50.00	PASS
	820.50	24.86	0.70	23.41	100.00	50.00	PASS
	822.35	24.93	0.70	23.48	100.00	50.00	PASS
EVDO BC10	818.65	24.80	0.70	23.35	100.00	50.00	PASS
	820.50	24.81	0.70	23.36	100.00	50.00	PASS
	822.35	24.79	0.70	23.34	100.00	50.00	PASS

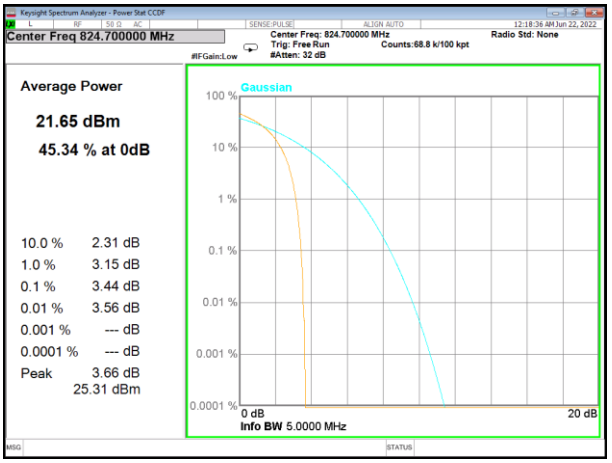
A2. PEAK-TO-AVERAGE RADIO

CDMA BC0		
Mode	Frequency (MHz)	PAR
CDMA BC0	824.7	3.44
	836.52	2.90
	848.31	3.10
EVDO BC0	824.7	4.25
	836.52	2.89
	848.31	3.12

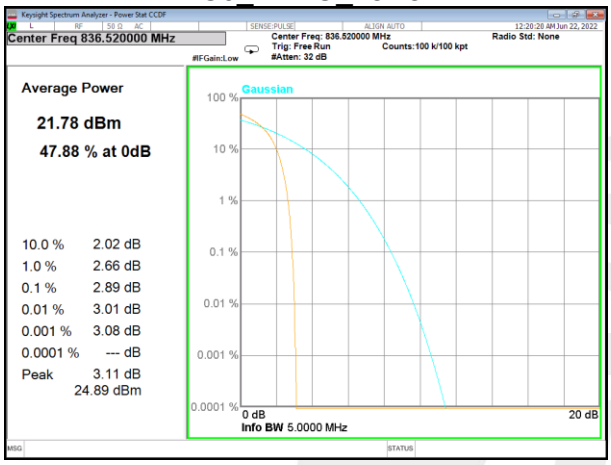
CDMA BC1		
Mode	Frequency (MHz)	PAR
CDMA BC1	1851.25	3.11
	1880	3.35
	1908.75	2.47
EVDO BC1	1851.25	3.11
	1880	3.30
	1908.75	2.44



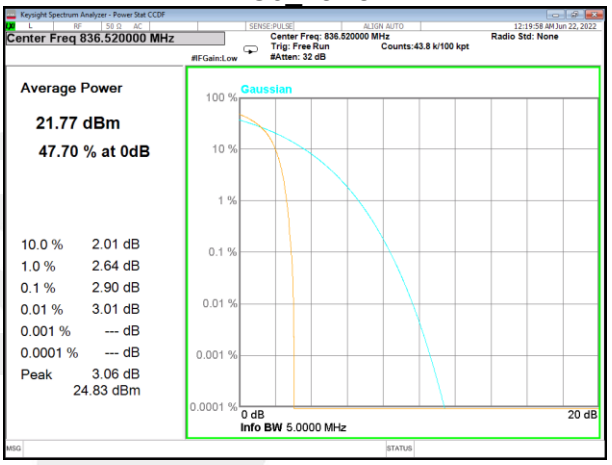
BC0_EVDO_Lower



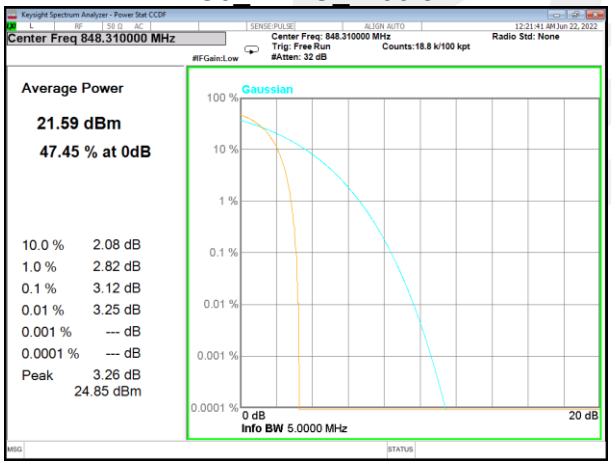
BC0_Lower



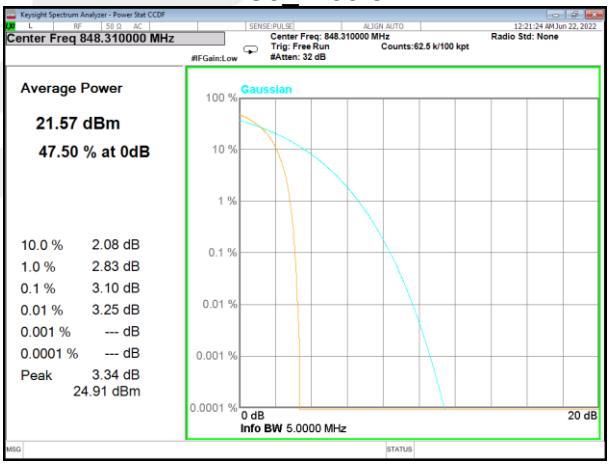
BC0_EVDO_Middle



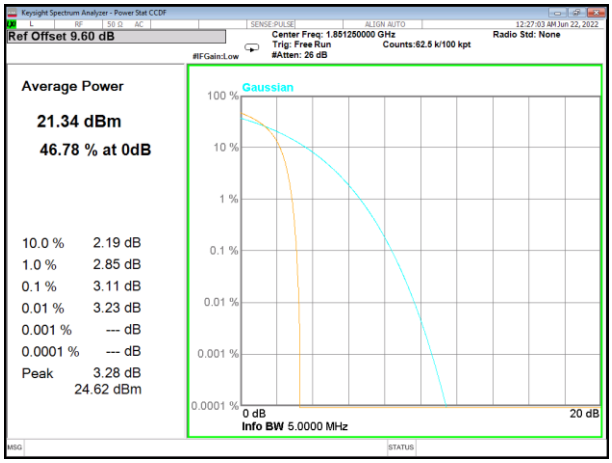
BC0_Middle



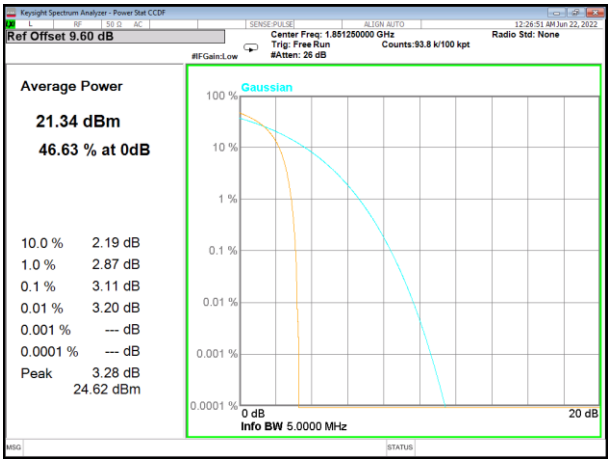
BC0_EVDO_Higher



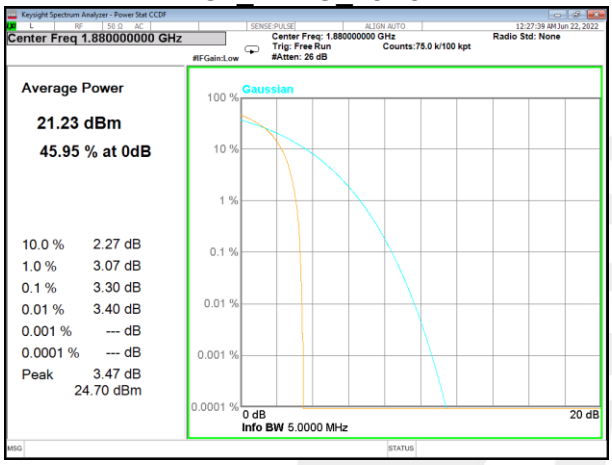
BC0_Higher



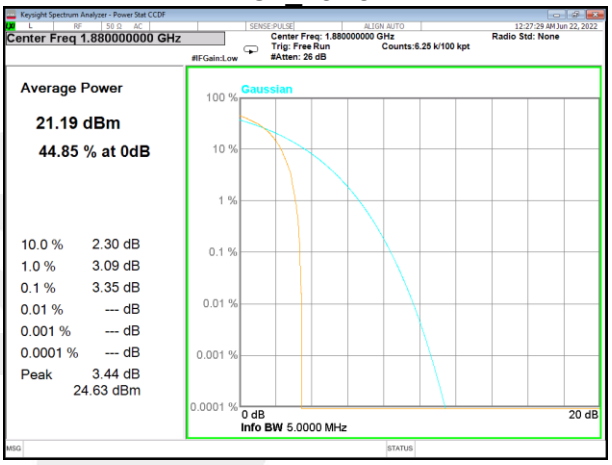
BC1_EVDO_Lower



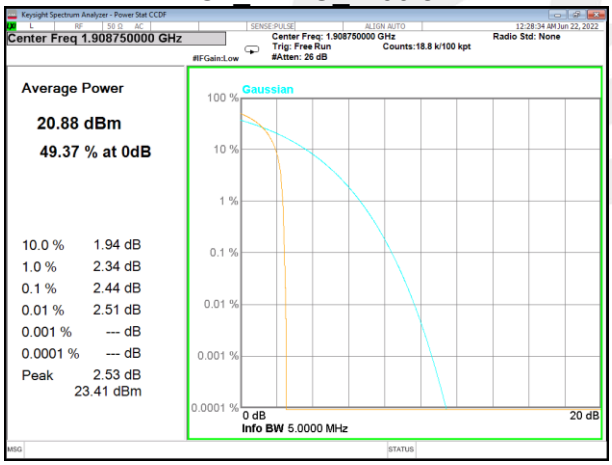
BC1_Lower



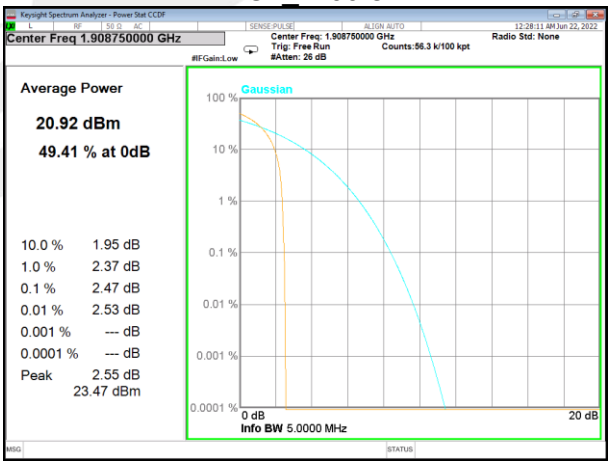
BC1_EVDO_Middle



BC1_Middle



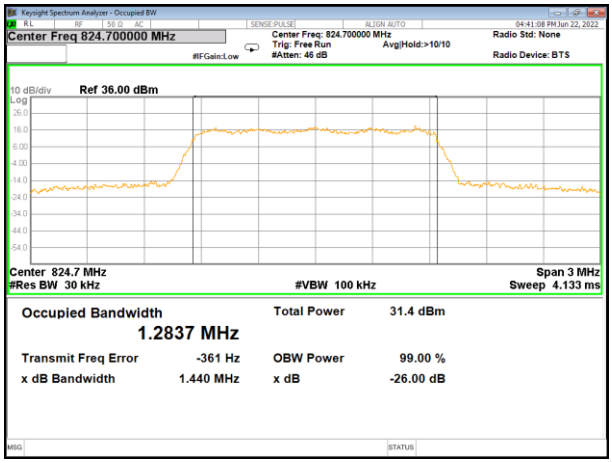
BC1_EVDO_Higher



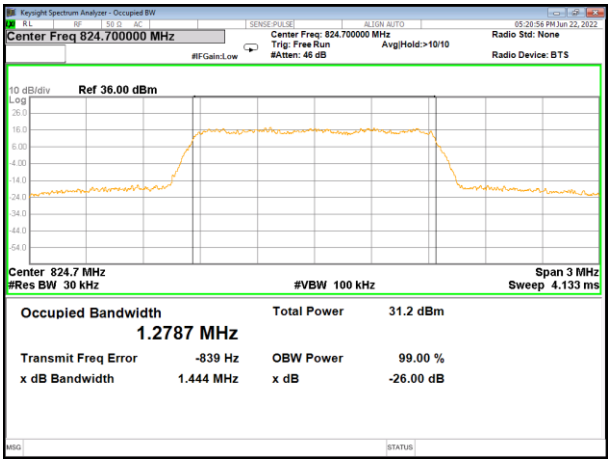
BC1_Higher

A3. OCCUPIED BANDWIDTH (99% OCCUPIED BANDWIDTH/26dB BANDWIDTH)

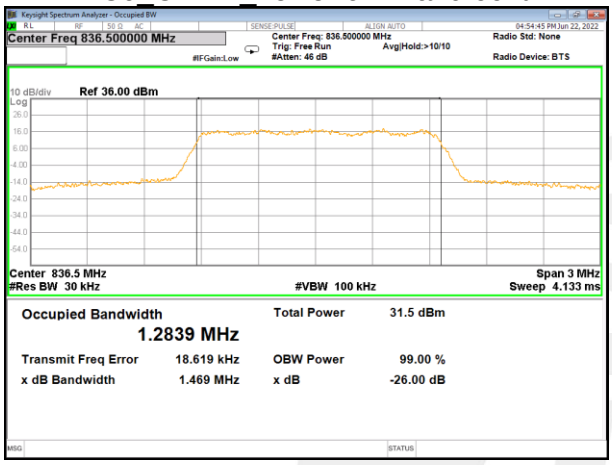
CDMA Bandwidth [MHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BC0	1.2837	1.44	1.2839	1.469	1.2873	1.468
BC0-EVDO	1.2787	1.444	1.286	1.46	1.2837	1.461
BC1	1.2865	1.467	1.2814	1.453	1.3073	1.864
BC1-EVDO	1.285	1.459	1.2794	1.453	1.3081	1.987
BC10	1.2786	1.476	1.2746	1.452	1.2747	1.439
BC10-EVDO	1.2787	1.475	1.2757	1.433	1.2817	1.461



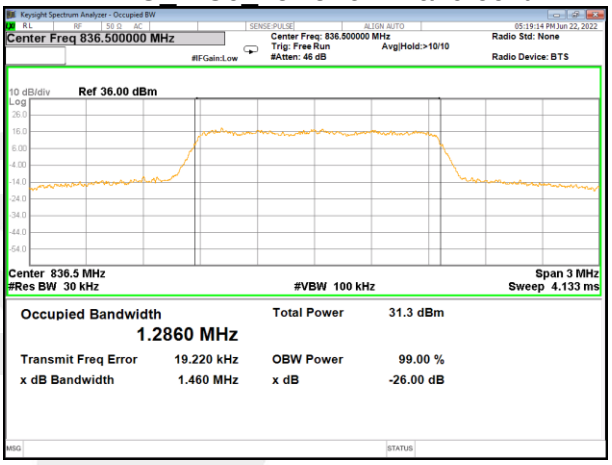
BC0_CDMA_Lower 6BW and 99%



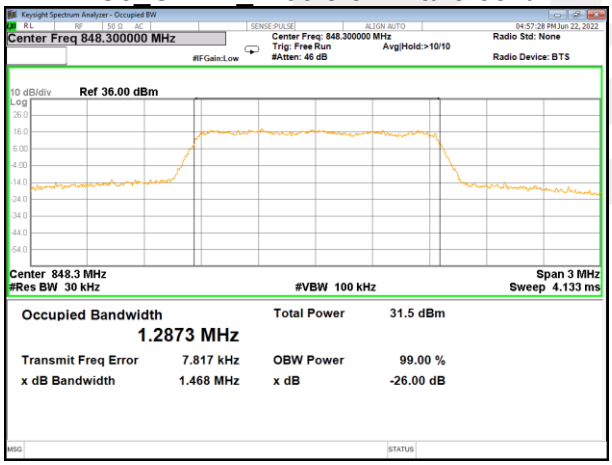
EVDO_ BC0_Lower 6BW and 99%



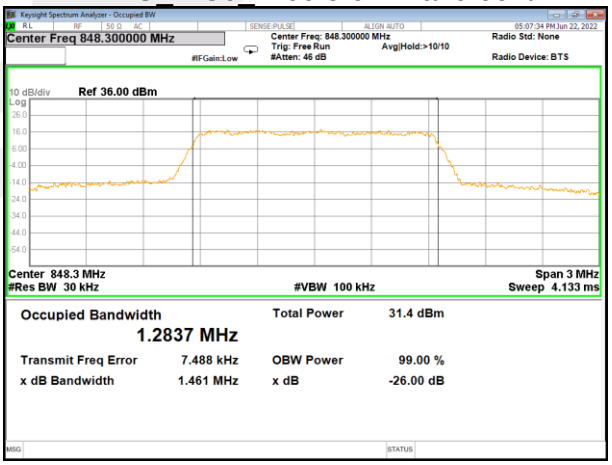
BC0_CDMA_Middle 6BW and 99%



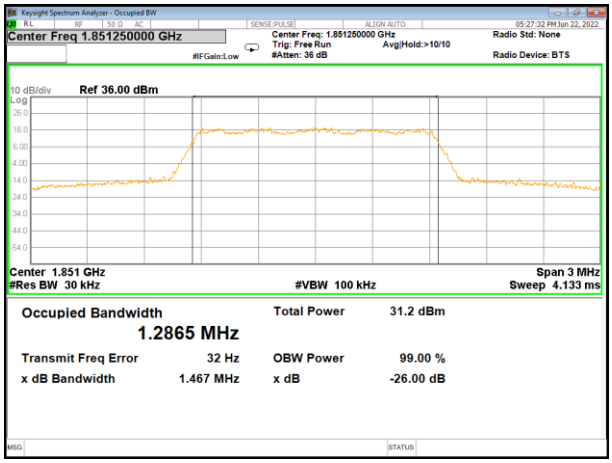
EVDO_ BC0_Middle 6BW and 99%



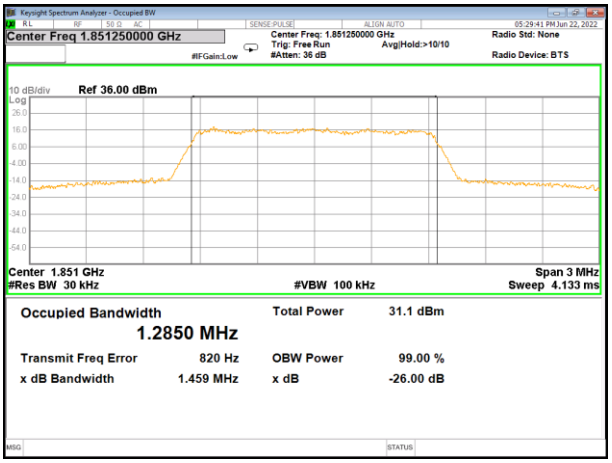
BC0_CDMA_Higher 6BW and 99%



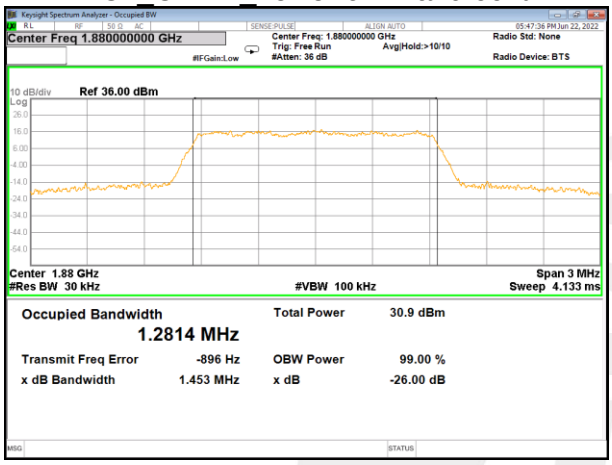
EVDO_ BC0_Higher 6BW and 99%



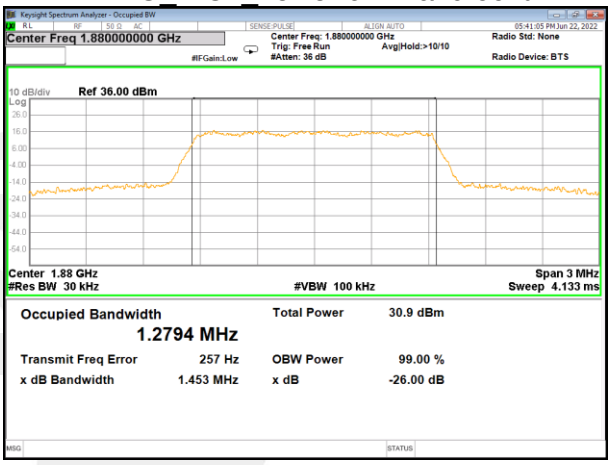
BC1_CDMA_Lower 6BW and 99%



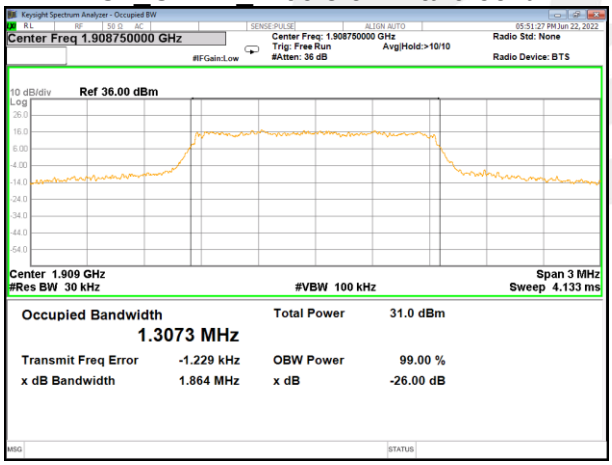
EVDO_ BC1_Lower 6BW and 99%



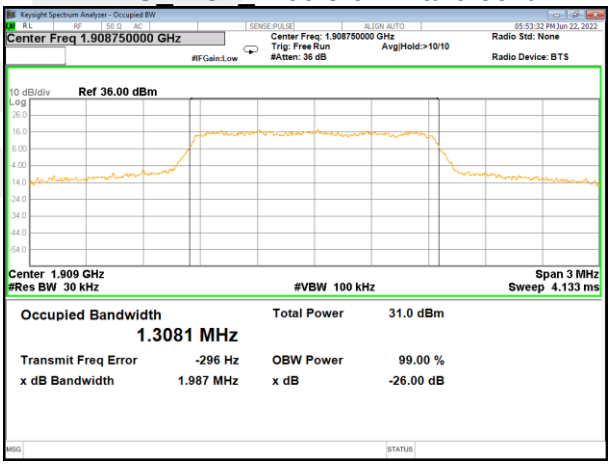
BC1_CDMA_Middle 6BW and 99%



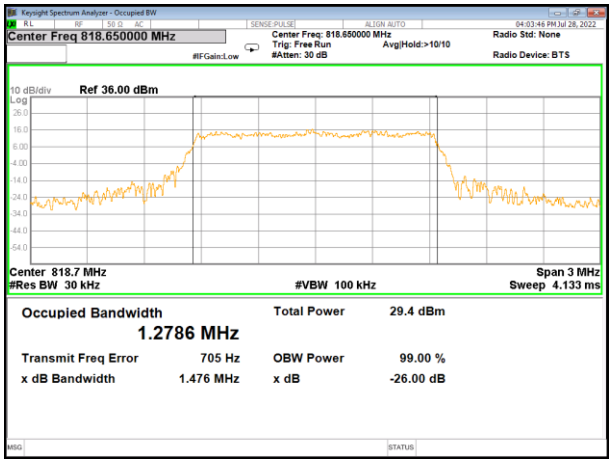
EVDO_ BC1_Middle 6BW and 99%



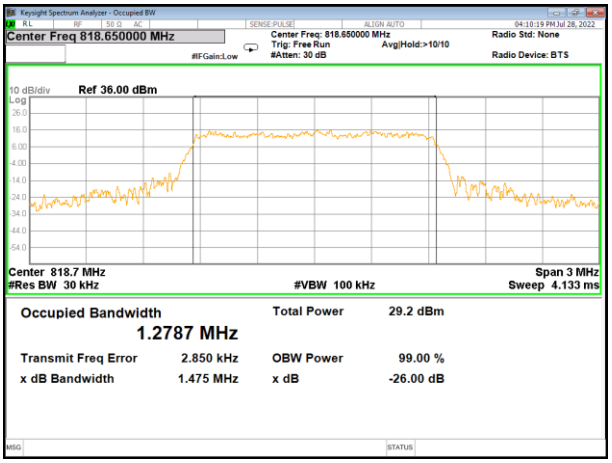
BC1_CDMA_Higher 6BW and 99%



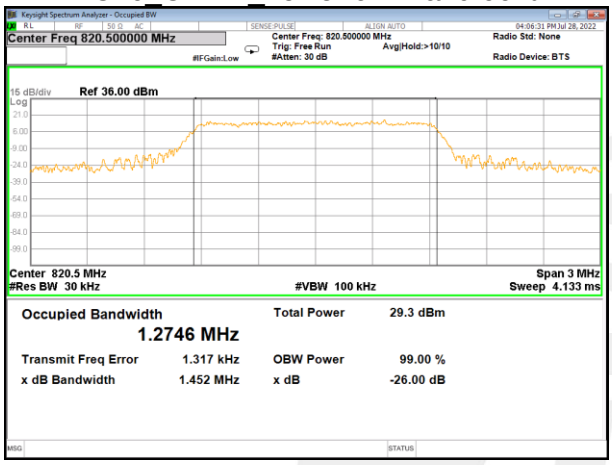
EVDO_ BC1_Higher 6BW and 99%



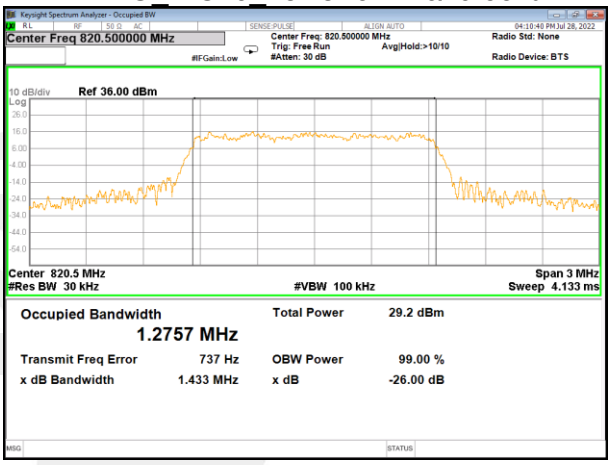
BC10_CDMA_Lower 6BW and 99%



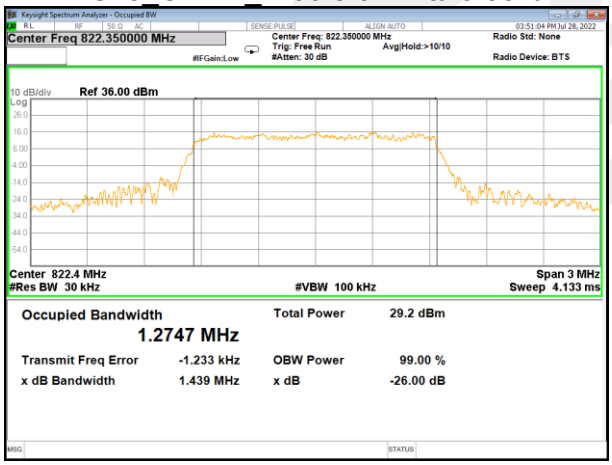
EVDO_ BC10_Lower 6BW and 99%



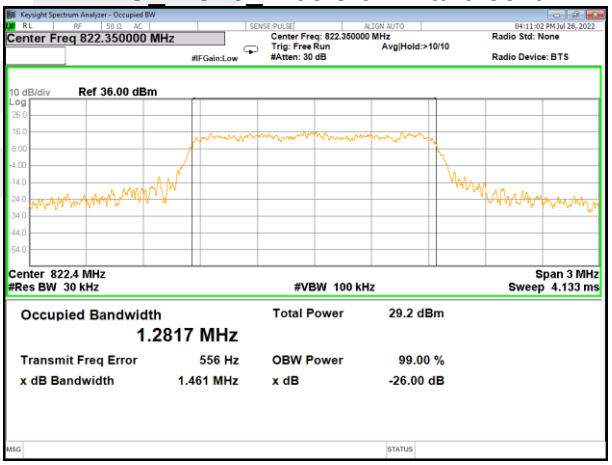
BC10_CDMA_Middle 6BW and 99%



EVDO_ BC10_Middle 6BW and 99%



BC10_CDMA_Higher 6BW and 99%



EVDO_ BC10_Higher 6BW and 99%

A4. FREQUENCY STABILITY

Normal Voltage = 3.85V; Battery End Point (BEP) = 4.235V; Maximum Voltage =3.465V

CDMA BC0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	32.31	0.039	2.5ppm	PASS
40		31.01	0.037		
30		20.08	0.024		
20		23.64	0.028		
10		30.09	0.036		
0		22.61	0.027		
-10		23.10	0.028		
-20		23.85	0.029		
-30		34.70	0.041		
20	Maximum Voltage	34.60	0.041		
20	BEP	19.04	0.023		

EVDO BC0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	12.05	0.014	2.5ppm	PASS
40		35.81	0.043		
30		16.74	0.020		
20		32.72	0.039		
10		15.06	0.018		
0		13.30	0.016		
-10		32.48	0.039		
-20		11.57	0.014		
-30		26.03	0.031		
20	Maximum Voltage	19.06	0.023		
20	BEP	26.83	0.032		

CDMA BC1					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	16.33	0.009	Within Authorized Band	PASS
40		30.02	0.016		
30		33.62	0.018		
20		14.83	0.008		
10		12.35	0.007		
0		27.58	0.015		
-10		27.10	0.014		
-20		35.46	0.019		
-30		33.96	0.018		
20	Maximum Voltage	16.30	0.009		
20	BEP	15.51	0.008		

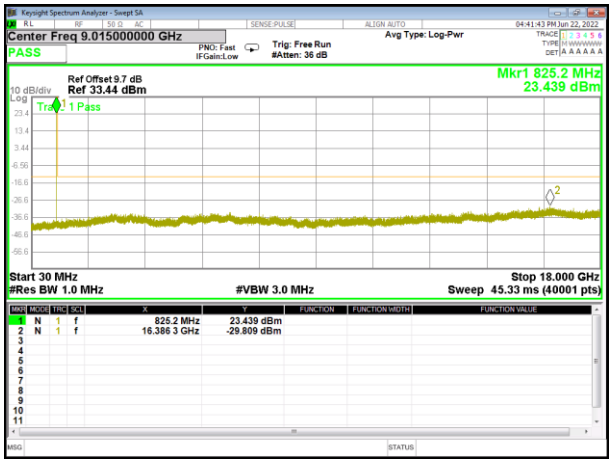
EVDO BC1					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	11.50	0.006	Within Authorized Band	PASS
40		30.09	0.016		
30		28.31	0.015		
20		27.55	0.015		
10		13.47	0.007		
0		21.43	0.011		
-10		24.48	0.013		
-20		24.57	0.013		
-30		35.87	0.019		
20	Maximum Voltage	24.64	0.013		
20	BEP	36.20	0.019		

CDMA BC10					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	19.91	0.002	2.5ppm	PASS
40		21.84	0.002		
30		35.64	0.004		
20		18.21	0.002		
10		11.98	0.001		
0		14.43	0.002		
-10		14.99	0.002		
-20		24.02	0.003		
-30		17.95	0.002		
20	Maximum Voltage	15.81	0.002		
20	BEP	21.43	0.002		

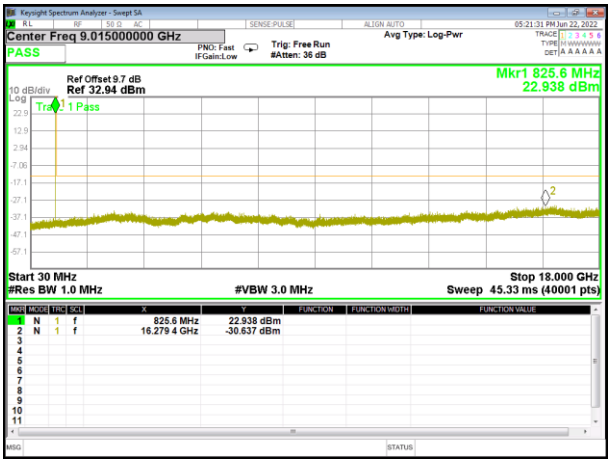
EVDO BC10					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	17.37	0.002	2.5ppm	PASS
40		31.44	0.004		
30		16.24	0.002		
20		12.62	0.001		
10		31.44	0.004		
0		16.80	0.002		
-10		35.81	0.004		
-20		27.62	0.003		
-30		25.71	0.003		
20	Maximum Voltage	21.86	0.002		
20	BEP	29.68	0.003		

1. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

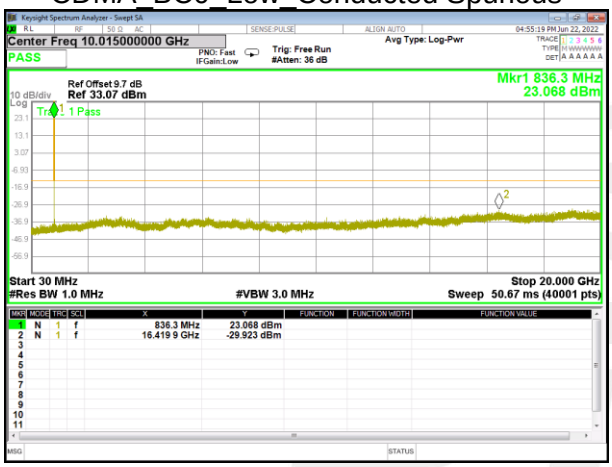
A5. SPURIOUS EMISSIONS AT ANTENNA TERMINALS



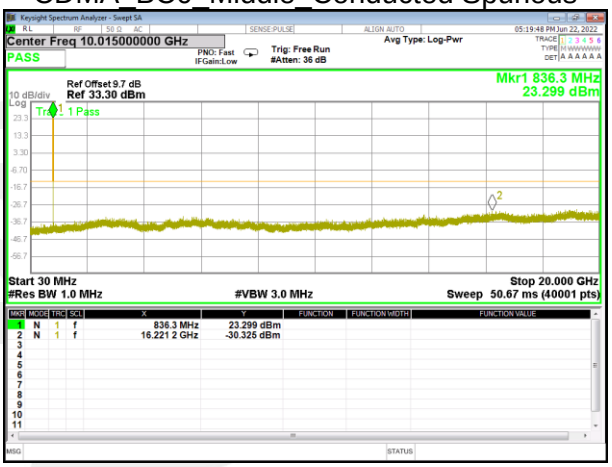
CDMA_BC0_Low_Conducted Spurious



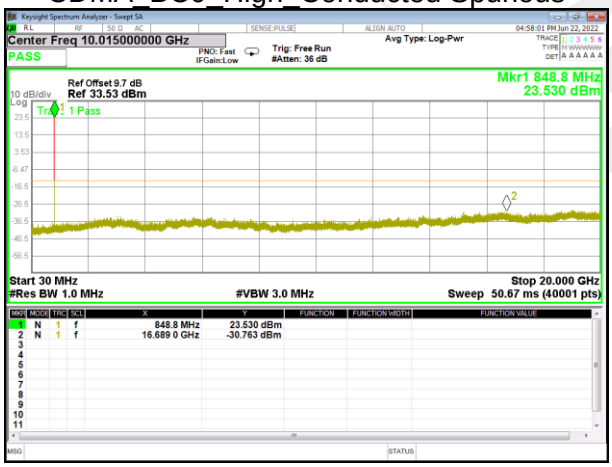
CDMA_BC0_Middle_Conducted Spurious



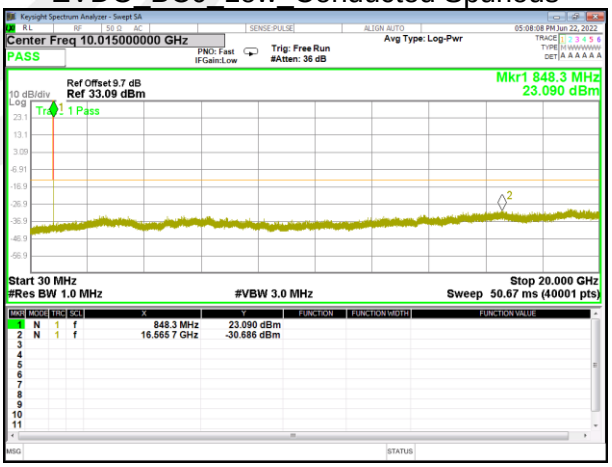
CDMA_BC0_High_Conducted Spurious



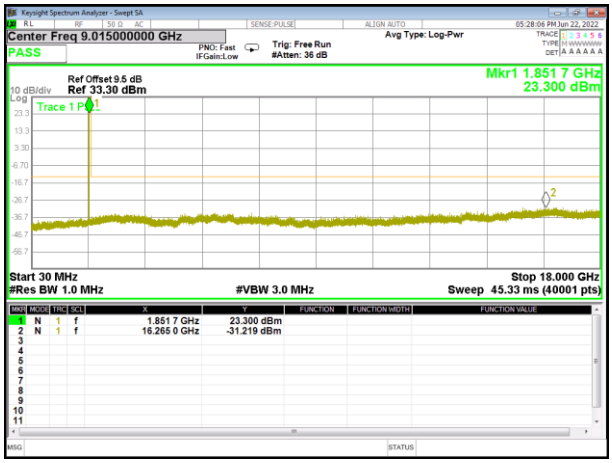
EVDO_BC0_Low_Conducted Spurious



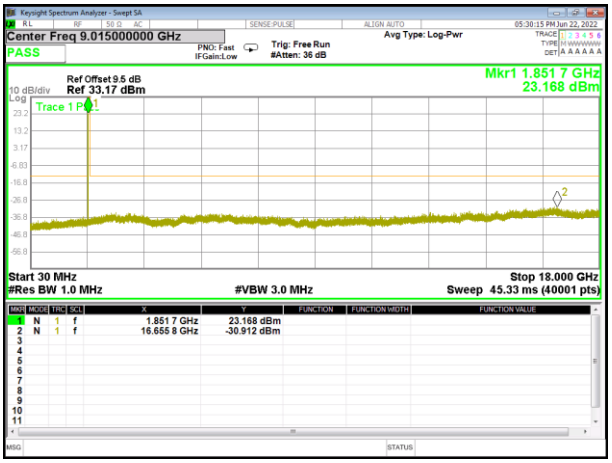
EVDO_BC0_Middle_Conducted Spurious



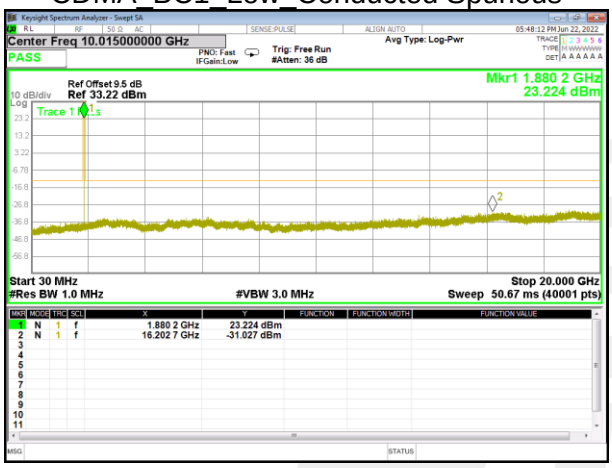
EVDO_BC0_High_Conducted Spurious



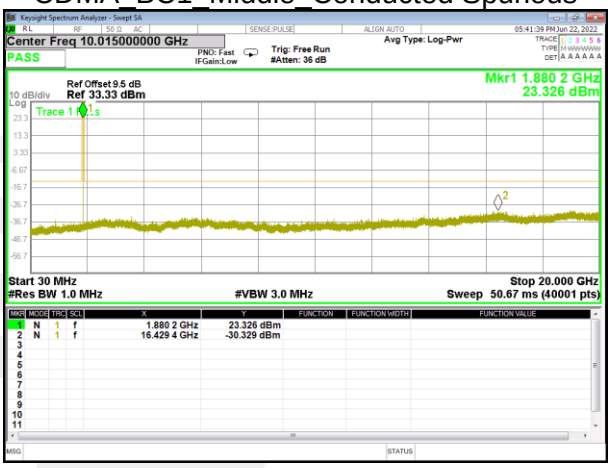
CDMA_BC1_Low_Conducted Spurious



CDMA_BC1_Middle_Conducted Spurious



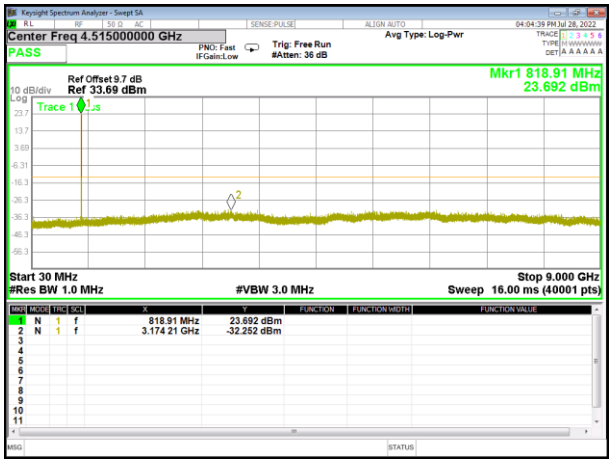
CDMA_BC1_High_Conducted Spurious



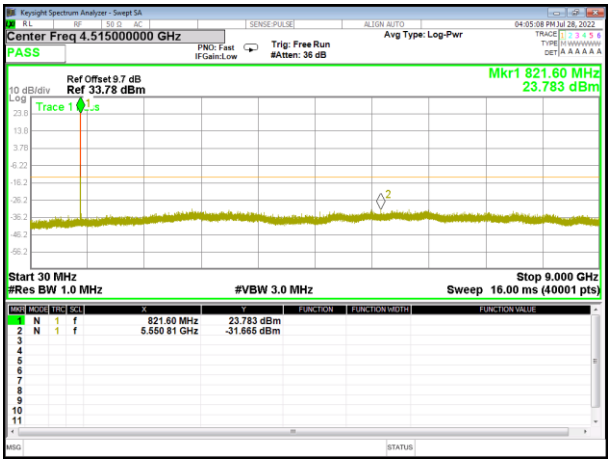
EVDO_BC1_Low_Conducted Spurious

EVDO_BC1_Middle_Conducted Spurious

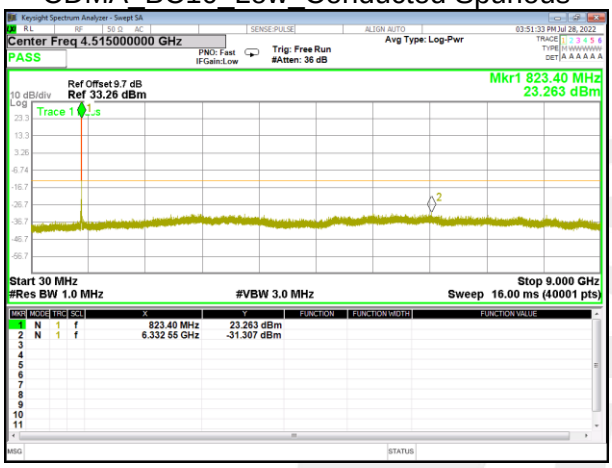
EVDO_BC1_High_Conducted Spurious



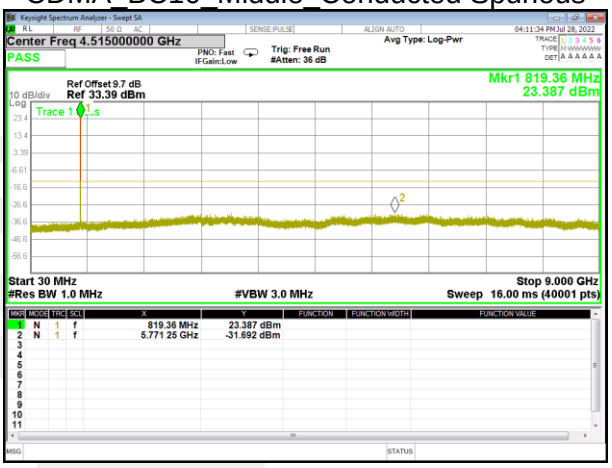
CDMA_BC10_Low_Conducted Spurious



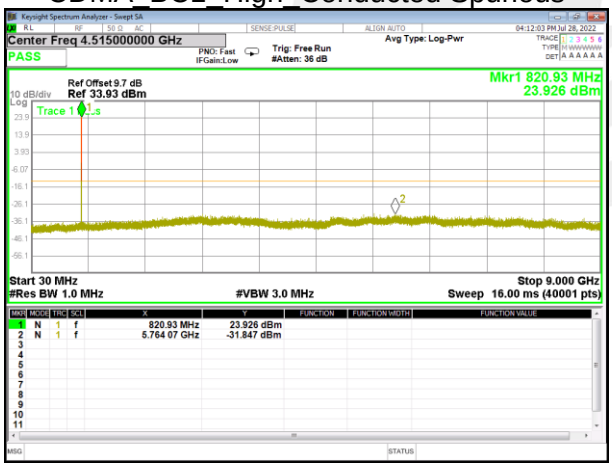
CDMA_BC10_Middle_Conducted Spurious



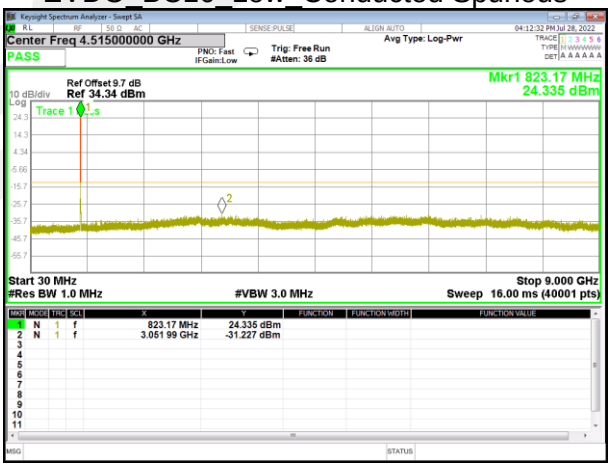
CDMA_BC1_High_Conducted Spurious



EVDO_BC10_Low_Conducted Spurious

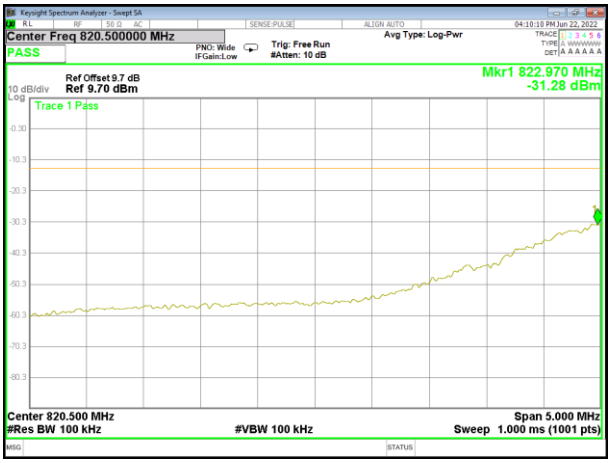


EVDO_BC10_Middle_Conducted Spurious

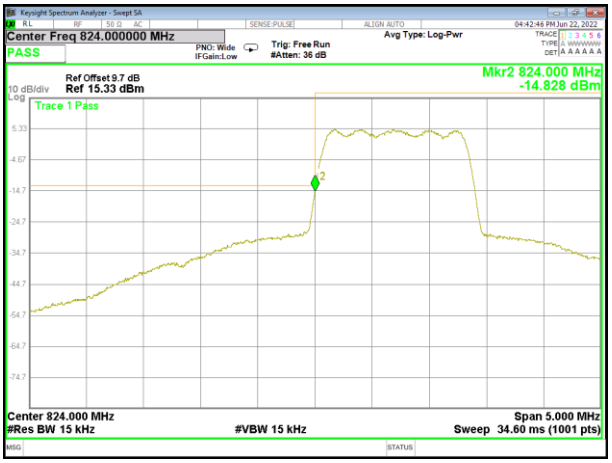


EVDO_BC10_High_Conducted Spurious

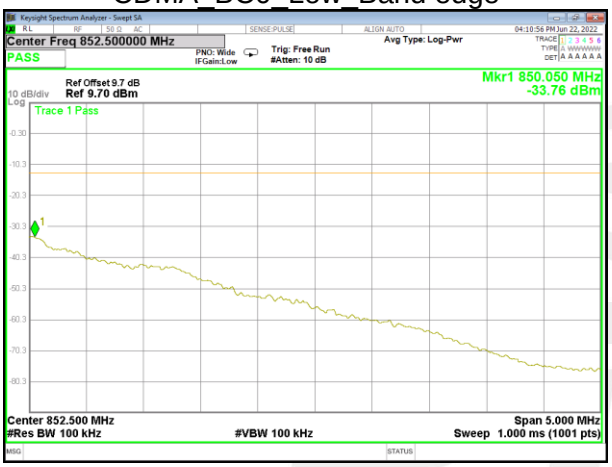
A6. BAND EDGE



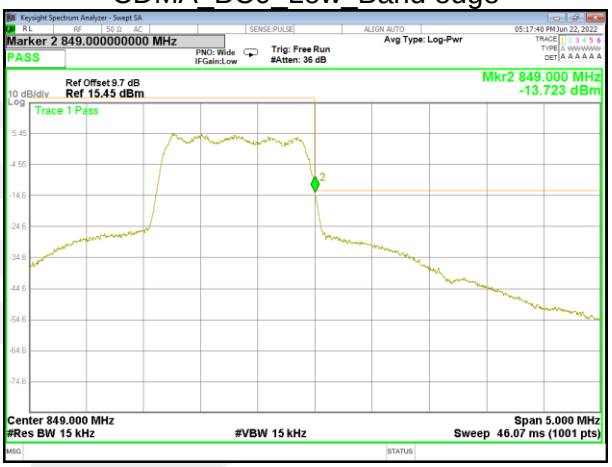
CDMA_BC0_Low_Band edge



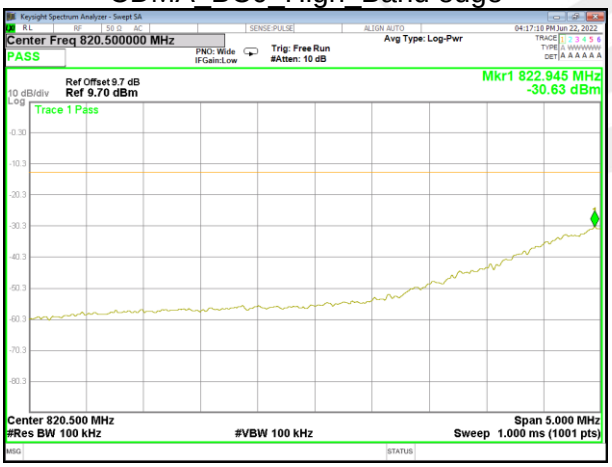
CDMA_BC0_Low_Band edge



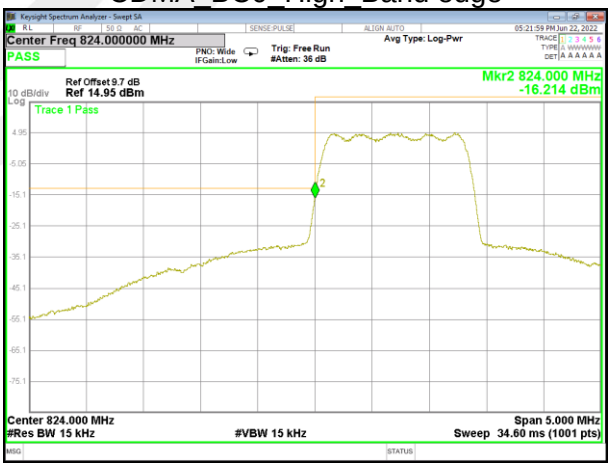
CDMA_BC0_High_Band edge



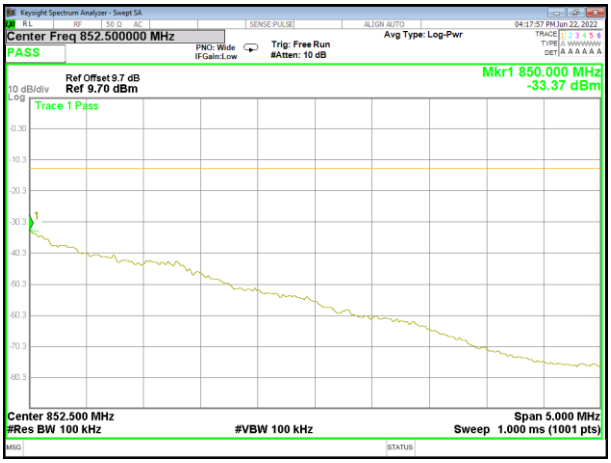
CDMA_BC0_High_Band edge



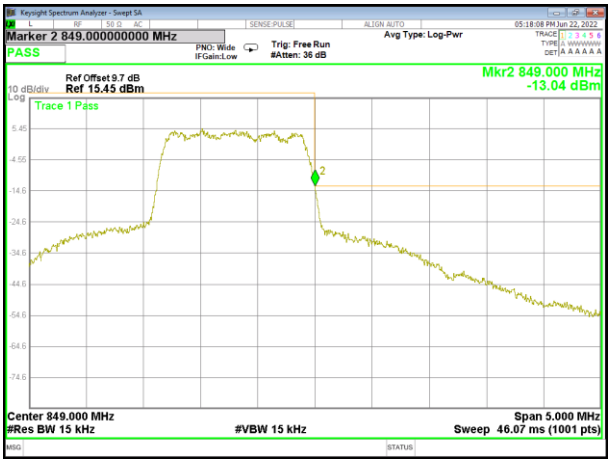
EVDO_BC0_Low_Band edge



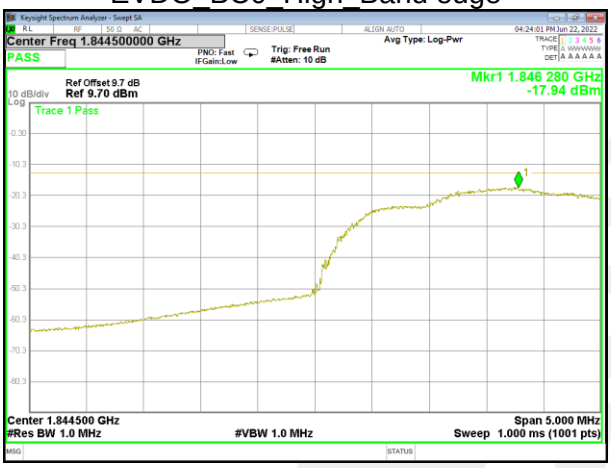
EVDO_BC0_Low_Band edge



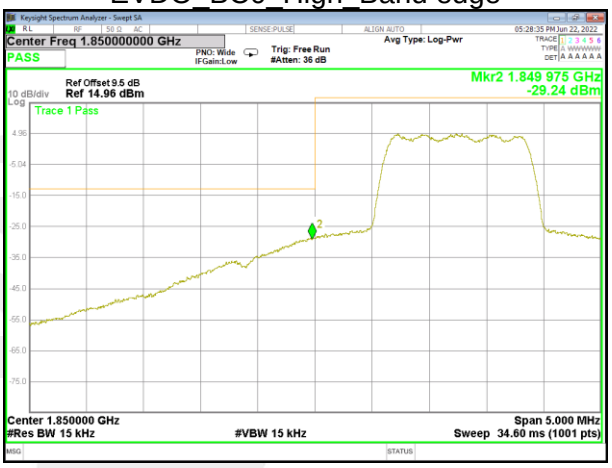
EVDO_BC0_High_Band edge



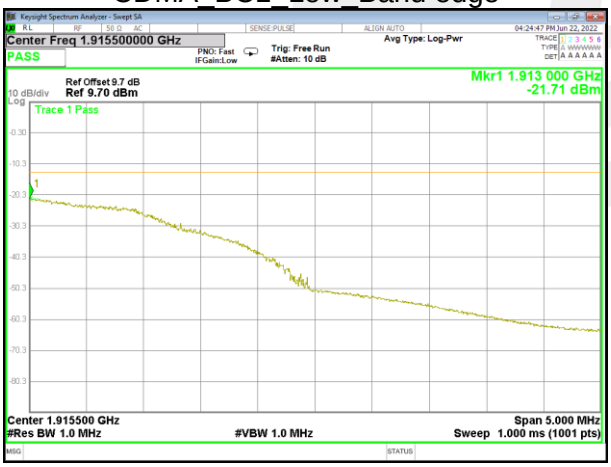
EVDO_BC0_High_Band edge



CDMA_BC1_Low_Band edge

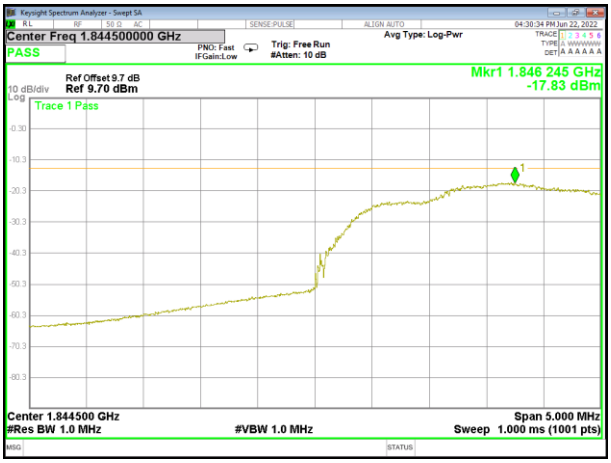


CDMA_BC1_Low_Band edge

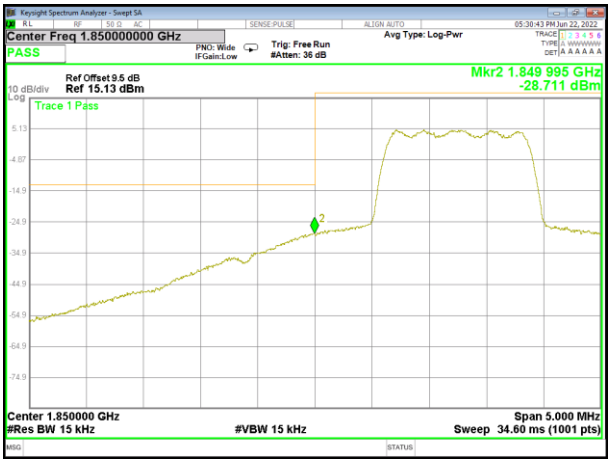


CDMA_BC1_High_Band edge

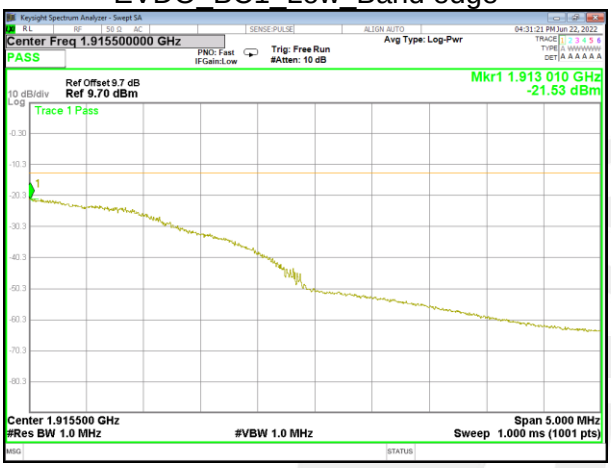
CDMA_BC1_High_Band edge



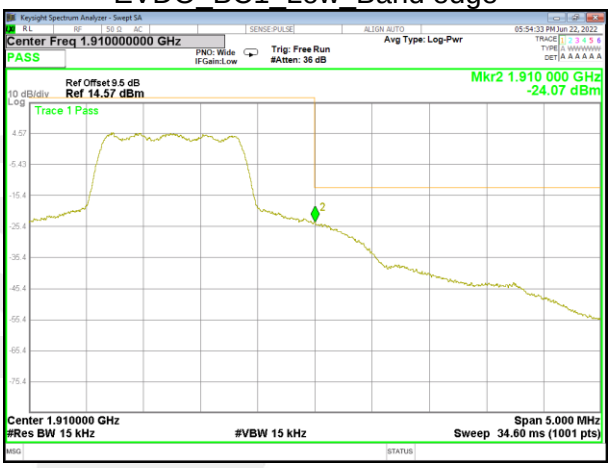
EVDO_BC1_Low_Band edge



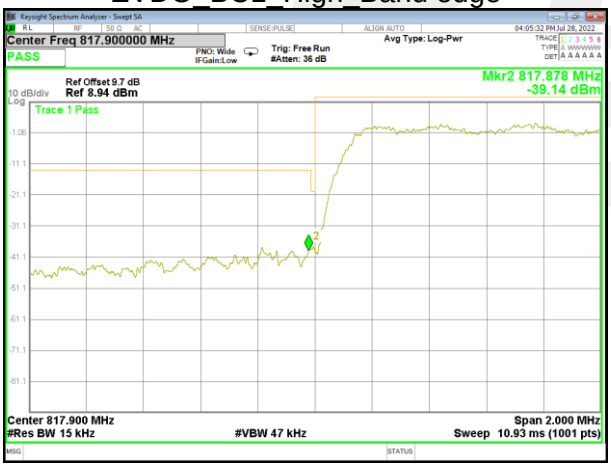
EVDO_BC1_Low_Band edge



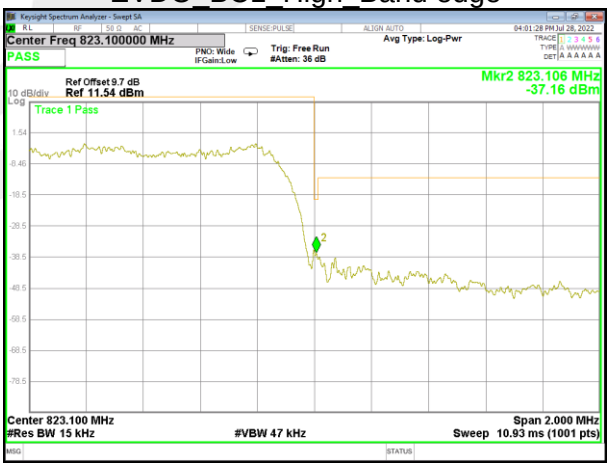
EVDO_BC1_High_Band edge



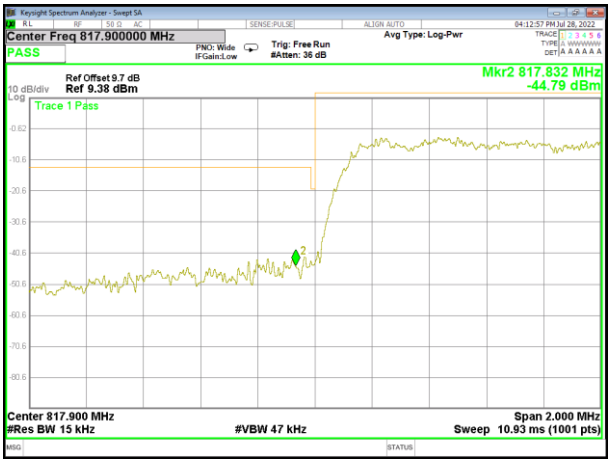
EVDO_BC1_High_Band edge



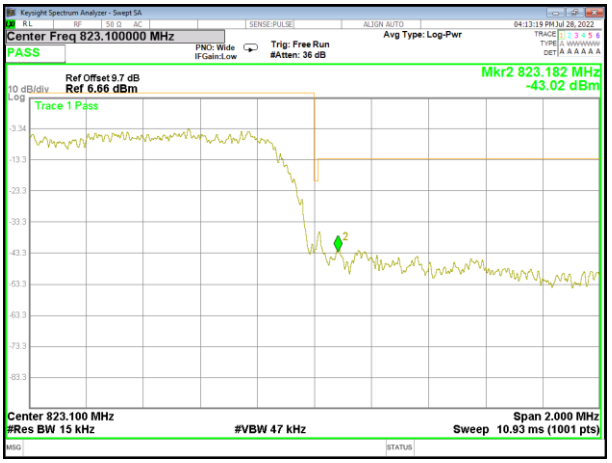
CDMA_BC10_Low_Band edge



CDMA_BC10_High_Band edge



EVDO_BC10_Low_Band edge



EVDO_BC10_High_Band edge

A7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

Note: (1) Spurious emissions which are attenuated by more than 20dB below the permissible value for frequeny below 1000MHz.

(2) Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value

(3)Test is divided into three directions, X/Y/Z. X pattern for the worst.

CDMA BC0: (30-9000)MHz							
The Worst Test Results for Channel 1013/824.7MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1649.53	-34.45	9.40	4.75	-29.80	-13.00	-16.80	H
2474.29	-35.30	10.60	8.39	-33.09	-13.00	-20.09	H
3298.01	-33.49	12.00	11.79	-33.28	-13.00	-20.28	H
1649.60	-34.95	9.40	4.75	-30.30	-13.00	-17.30	V
2474.21	-35.10	10.60	8.39	-32.89	-13.00	-19.89	V
3298.14	-32.28	12.00	11.79	-32.07	-13.00	-19.07	V
The Worst Test Results for Channel 384/836.52MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.53	-33.53	9.40	4.75	-28.88	-13.00	-15.88	H
2509.71	-35.00	10.60	8.39	-32.79	-13.00	-19.79	H
3346.10	-32.29	12.00	11.79	-32.08	-13.00	-19.08	H
1673.40	-35.50	9.40	4.75	-30.85	-13.00	-17.85	V
2509.44	-34.49	10.60	8.39	-32.28	-13.00	-19.28	V
3346.04	-33.20	12.00	11.79	-32.99	-13.00	-19.99	V
The Worst Test Results for Channel 1175/848.31MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1696.40	-33.65	9.40	4.75	-29.00	-13.00	-16.00	H
2544.23	-34.10	10.60	8.39	-31.89	-13.00	-18.89	H
3393.67	-33.14	12.00	11.79	-32.93	-13.00	-19.93	H
1696.50	-35.81	9.40	4.75	-31.16	-13.00	-18.16	V
2544.15	-33.81	10.60	8.39	-31.60	-13.00	-18.60	V
3393.82	-32.80	12.00	11.79	-32.59	-13.00	-19.59	V

EVDO BC0: (30-9000)MHz							
The Worst Test Results for Channel 1013/824.7MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1649.67	-34.86	9.40	4.75	-30.21	-13.00	-17.21	H
2474.37	-35.40	10.60	8.39	-33.19	-13.00	-20.19	H
3298.18	-32.80	12.00	11.79	-32.59	-13.00	-19.59	H
1649.27	-35.77	9.40	4.75	-31.12	-13.00	-18.12	V
2474.19	-35.10	10.60	8.39	-32.89	-13.00	-19.89	V
3298.35	-32.39	12.00	11.79	-32.18	-13.00	-19.18	V
The Worst Test Results for Channel 384/836.52MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.65	-33.92	9.40	4.75	-29.27	-13.00	-16.27	H
2509.48	-35.26	10.60	8.39	-33.05	-13.00	-20.05	H
3346.43	-33.51	12.00	11.79	-33.30	-13.00	-20.30	H
1673.52	-34.81	9.40	4.75	-30.16	-13.00	-17.16	V
2509.50	-33.86	10.60	8.39	-31.65	-13.00	-18.65	V
3346.24	-31.88	12.00	11.79	-31.67	-13.00	-18.67	V
The Worst Test Results for Channel 1175/848.31MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1696.19	-34.29	9.40	4.75	-29.64	-13.00	-16.64	H
2544.40	-35.41	10.60	8.39	-33.20	-13.00	-20.20	H
3393.56	-32.16	12.00	11.79	-31.95	-13.00	-18.95	H
1696.60	-35.76	9.40	4.75	-31.11	-13.00	-18.11	V
2544.51	-33.90	10.60	8.39	-31.69	-13.00	-18.69	V
3393.42	-32.24	12.00	11.79	-32.03	-13.00	-19.03	V

CDMA BC1: (30-20000)MHz							
The Worst Test Results for Channel 25/1851.25MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3702.54	-33.97	12.60	12.93	-34.30	-13.00	-21.30	H
5553.54	-35.34	13.10	17.11	-39.35	-13.00	-26.35	H
7405.80	-33.19	11.50	22.20	-43.89	-13.00	-30.89	H
3702.40	-35.94	12.60	12.93	-36.27	-13.00	-23.27	V
5553.73	-35.15	13.10	17.11	-39.16	-13.00	-26.16	V
7405.54	-32.83	11.50	22.20	-43.53	-13.00	-30.53	V
The Worst Test Results for Channel 600/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.95	-33.74	12.60	12.93	-34.07	-13.00	-21.07	H
5640.26	-35.11	13.10	17.11	-39.12	-13.00	-26.12	H
7519.89	-33.17	11.50	22.20	-43.87	-13.00	-30.87	H
3759.99	-34.58	12.60	12.93	-34.91	-13.00	-21.91	V
5640.34	-35.08	13.10	17.11	-39.09	-13.00	-26.09	V
7520.24	-32.10	11.50	22.20	-42.80	-13.00	-29.80	V
The Worst Test Results for Channel 1175/1908.75MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3817.48	-34.78	12.60	12.93	-35.11	-13.00	-22.11	H
5726.17	-34.09	13.10	17.11	-38.10	-13.00	-25.10	H
7634.98	-32.25	11.50	22.20	-42.95	-13.00	-29.95	H
3817.72	-35.99	12.60	12.93	-36.32	-13.00	-23.32	V
5726.19	-34.41	13.10	17.11	-38.42	-13.00	-25.42	V
7635.32	-32.14	11.50	22.20	-42.84	-13.00	-29.84	V

EVDO BC1: (30-20000)MHz							
The Worst Test Results for Channel 25/1851.25MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3702.31	-34.57	12.60	12.93	-34.90	-13.00	-21.90	H
5553.52	-35.28	13.10	17.11	-39.29	-13.00	-26.29	H
7405.84	-33.26	11.50	22.20	-43.96	-13.00	-30.96	H
3702.39	-35.63	12.60	12.93	-35.96	-13.00	-22.96	V
5553.26	-35.25	13.10	17.11	-39.26	-13.00	-26.26	V
7405.59	-32.85	11.50	22.20	-43.55	-13.00	-30.55	V
The Worst Test Results for Channel 600/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3760.19	-33.97	12.60	12.93	-34.30	-13.00	-21.30	H
5640.24	-34.90	13.10	17.11	-38.91	-13.00	-25.91	H
7520.20	-33.40	11.50	22.20	-44.10	-13.00	-31.10	H
3760.14	-35.89	12.60	12.93	-36.22	-13.00	-23.22	V
5639.88	-34.48	13.10	17.11	-38.49	-13.00	-25.49	V
7520.19	-32.32	11.50	22.20	-43.02	-13.00	-30.02	V
The Worst Test Results for Channel 1175/1908.75MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3817.50	-33.46	12.60	12.93	-33.79	-13.00	-20.79	H
5725.98	-34.38	13.10	17.11	-38.39	-13.00	-25.39	H
7635.00	-33.00	11.50	22.20	-43.70	-13.00	-30.70	H
3817.46	-35.10	12.60	12.93	-35.43	-13.00	-22.43	V
5725.91	-35.04	13.10	17.11	-39.05	-13.00	-26.05	V
7635.26	-32.86	11.50	22.20	-43.56	-13.00	-30.56	V

CDMA BC10: (30-9000)MHz							
The Worst Test Results for Channel 506/818.65MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1636.75	-34.33	9.40	4.75	-29.68	-13.00	-16.68	H
2455.64	-35.05	10.60	8.39	-32.84	-13.00	-19.84	H
3274.23	-32.56	12.00	11.79	-32.35	-13.00	-19.35	H
1636.61	-35.18	9.40	4.75	-30.53	-13.00	-17.53	V
2455.83	-33.78	10.60	8.39	-31.57	-13.00	-18.57	V
3274.50	-32.29	12.00	11.79	-32.08	-13.00	-19.08	V
The Worst Test Results for Channel 580/820.5MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1640.45	-34.89	9.40	4.75	-30.24	-13.00	-17.24	H
2461.62	-34.41	10.60	8.39	-32.20	-13.00	-19.20	H
3282.20	-33.17	12.00	11.79	-32.96	-13.00	-19.96	H
1640.79	-35.16	9.40	4.75	-30.51	-13.00	-17.51	V
2461.49	-35.14	10.60	8.39	-32.93	-13.00	-19.93	V
3282.02	-32.12	12.00	11.79	-31.91	-13.00	-18.91	V
The Worst Test Results for Channel 654/822.35MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1644.38	-34.34	9.40	4.75	-29.69	-13.00	-16.69	H
2466.62	-35.01	10.60	8.39	-32.80	-13.00	-19.80	H
3289.11	-32.71	12.00	11.79	-32.50	-13.00	-19.50	H
1644.85	-35.74	9.40	4.75	-31.09	-13.00	-18.09	V
2466.42	-34.81	10.60	8.39	-32.60	-13.00	-19.60	V
3289.30	-32.67	12.00	11.79	-32.46	-13.00	-19.46	V

EVDO BC10: (30-9000)MHz							
The Worst Test Results for Channel 506/818.65MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1636.41	-34.14	9.40	4.75	-29.49	-13.00	-16.49	H
2455.59	-34.87	10.60	8.39	-32.66	-13.00	-19.66	H
3274.27	-32.54	12.00	11.79	-32.33	-13.00	-19.33	H
1636.76	-35.84	9.40	4.75	-31.19	-13.00	-18.19	V
2455.59	-33.76	10.60	8.39	-31.55	-13.00	-18.55	V
3274.11	-32.71	12.00	11.79	-32.50	-13.00	-19.50	V
The Worst Test Results for Channel 580/820.5MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1640.67	-33.73	9.40	4.75	-29.08	-13.00	-16.08	H
2461.75	-35.43	10.60	8.39	-33.22	-13.00	-20.22	H
3282.32	-32.40	12.00	11.79	-32.19	-13.00	-19.19	H
1640.68	-34.53	9.40	4.75	-29.88	-13.00	-16.88	V
2461.65	-33.92	10.60	8.39	-31.71	-13.00	-18.71	V
3282.36	-32.87	12.00	11.79	-32.66	-13.00	-19.66	V
The Worst Test Results for Channel 654/822.35MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1644.51	-33.93	9.40	4.75	-29.28	-13.00	-16.28	H
2466.62	-34.39	10.60	8.39	-32.18	-13.00	-19.18	H
3289.13	-32.17	12.00	11.79	-31.96	-13.00	-18.96	H
1644.65	-35.83	9.40	4.75	-31.18	-13.00	-18.18	V
2466.54	-33.85	10.60	8.39	-31.64	-13.00	-18.64	V
3289.25	-33.14	12.00	11.79	-32.93	-13.00	-19.93	V

APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※