



# CERTIFICATION TEST REPORT

**Report Number:** 13018973-E7V2

**Applicant :** APPLE, INC  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**Model :** A2275, A2297, A2298

**FCC ID :** BCG-E3500A

**IC :** 579C-E3500A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC CFR47 PART 22H, 24E, 27L AND  
90S  
ISED RSS-132 ISSUE 3, RSS-133  
ISSUE 6 AND RSS-139 ISSUE 3

**Date Of Issue:**  
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### Revision History

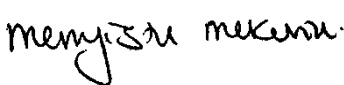
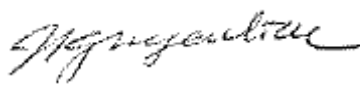
Rev.	Issue Date	Revisions	Revised By
V1	2/10/2020	Initial Issue	Lieu Nguyen
V2	3/20/2020	Address TCB Questions	Lieu Nguyen

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# 1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.	
Model	A2275, A2297, A2298	
FCC ID	BCG-E3500A <b>Error! Reference source not found.</b>	
IC	579C-E3500A	
EUT Description	SMARTPHONE	
Serial Number	FFMZW0B3PM63, FFMZW0BLPM63	
Date Tested	AUGUST 12, 2019 to NOVEMBER 20, 2019	
Applicable Standards	FCC CFR 47 Part 22H, 24E, 27L, AND 90S IC RSS-132 ISSUE 3, RSS-133 ISSUE 6, AND RSS-139 ISSUE 3	
Test Results	Complies	
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p>		
Approved & Released For UL Verification Services Inc. By	Prepared By:	
		
Mengistu Mekuria Project Engineer/Operations Lead Consumer Technology Division UL Verification Services Inc.	Lieu Nguyen Test Engineer Consumer Technology Division UL Verification Services Inc.	

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 24, Part 27 and Part 90
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP
- ISED RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)	<input type="checkbox"/> Chamber I (IC: 2324A-5)
<input checked="" type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)	<input type="checkbox"/> Chamber J (IC: 2324A-6)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)	<input type="checkbox"/> Chamber K (IC: 2324A-1)
	<input type="checkbox"/> Chamber G (IC:22541-4)	<input type="checkbox"/> Chamber L (IC: 2324A-3)
	<input type="checkbox"/> Chamber H (IC:22541-5)	<input type="checkbox"/> Chamber M (IC: 2324A-2)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U <sub>LAB</sub>
Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Radiated Disturbance, 26000 to 40000 MHz	5.17 dB
Occupied Channel Bandwidth	±0.39 %
Temperature	±0.9 °C
Supply voltages	±0.45 %
Time	±0.02 %

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (Music, application support, and video), cellular GSM, EGPRS, UMTS, LTE, TD-SCDMA, CDMA, IEEE802.11a/b/g/n/ac/ax, Bluetooth, GPS and NFC. All models support at least one UICC based SIM. The second SIM, if present, is either UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device has a built-in inductive charging receiver. The rechargeable battery is also not user accessible.

### 5.2. DIFFERENCE IN MODEL NUMBER

Model A2275, A2297 and A2298 is electrically identical to Model A2275. Three model numbers are allocated for marketing and logistic purposes only. A2275 was used to perform all final tests.

### 5.3. MAXIMUM OUTPUT POWER

#### ERP/EIRP LIMIT

FCC: §2.1046, §22.913, §24.232, §27.50 and §90.635  
IC: RSS132§5.4; RSS132§6.4 and RSS139§6.5.

#### EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015.  
KDB 971168 Section 5.6

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:



**5.3.1. LAT 1**

**GSM MODES**

<b>RSS 132 850MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	GPRS	32.75	-1.80	30.95	1244.5	40.6	-9.7
	EGPRS	27.25	-1.80	25.45	350.8	40.6	-15.2
<b>Part 22 850MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	GPRS	32.75	-1.80	28.80	758.6	38.5	-9.7
	EGPRS	27.25	-1.80	23.30	213.8	38.5	-15.2
<b>Part 24 / RSS 133 1900MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	GPRS	31.25	-1.60	29.65	922.6	33.0	-3.4
	EGPRS	26.25	-1.60	24.65	291.7	33.0	-8.4

**CDMA MODES**

<b>Part 90 BC10</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
816-824	1xRTT	25.20	-2.50	20.55	113.5	50.0	-29.5
	1xEV-DO Rev A	25.20	-2.50	20.55	113.5	50.0	-29.5
<b>RSS 132 BC0</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	1xRTT	25.20	-1.80	23.40	218.8	40.6	-17.2
	1xEV-DO Rev A	25.00	-1.80	23.20	208.9	40.6	-17.4
<b>Part 22 BC0</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	1xRTT	25.20	-1.80	21.25	133.4	38.5	-17.2
	1xEV-DO Rev A	25.00	-1.80	21.05	127.4	38.5	-17.4
<b>Part 24 / RSS 133 BC1</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	1xRTT	23.75	-1.60	22.15	164.0	33.0	-10.9
	1xEV-DO Rev A	23.75	-1.60	22.15	164.0	33.0	-10.9

**WCDMA MODE**

<b>RSS 132 Band 5</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	REL 99	25.20	-1.80	23.40	218.8	40.6	-17.2
	HSDPA	25.20	-1.80	23.40	218.8	40.6	-17.2
<b>Part 22 Band 5</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	REL 99	25.20	-1.80	21.25	133.4	38.5	-17.2
	HSDPA	25.20	-1.80	21.25	133.4	38.5	-17.2
<b>Part 24 / RSS 133 Band 2</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	REL 99	23.75	-1.60	22.15	164.0	33.0	-10.9
	HSDPA	23.75	-1.60	22.15	164.0	33.0	-10.9
<b>Part 27 / RSS 139 Band 4</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1710-1755	REL 99	25.20	-3.70	21.50	141.3	30.0	-8.5
	HSDPA	25.20	-3.70	21.50	141.3	30.0	-8.5

### 5.3.2. UAT 1

#### GSM MODES

<b>RSS 132 850MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	GPRS	30.75	-2.30	28.45	699.8	40.6	-12.2
	EGPRS	25.25	-2.30	22.95	197.2	40.6	-17.7
<b>Part 22 850MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	GPRS	30.75	-2.30	26.30	426.6	38.5	-12.2
	EGPRS	25.25	-2.30	20.80	120.2	38.5	-17.7
<b>Part 24 / RSS 133 1900MHz</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	GPRS	27.75	1.90	29.65	922.6	33.0	-3.4
	EGPRS	23.75	1.90	25.65	367.3	33.0	-7.4

#### CDMA MODES

<b>Part 90 BC10</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
816-824	1xRTT	23.50	-3.50	17.85	61.0	50.0	-32.2
	1xEV-DO Rev A	23.30	-3.50	17.65	58.2	50.0	-32.4
<b>RSS 132 BC0</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	1xRTT	23.50	-2.30	21.20	131.8	40.6	-19.4
	1xEV-DO Rev A	23.50	-2.30	21.20	131.8	40.6	-19.4
<b>Part 22 BC0</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	1xRTT	23.50	-2.30	19.05	80.4	38.5	-19.4
	1xEV-DO Rev A	23.50	-2.30	19.05	80.4	38.5	-19.4
<b>Part 24 / RSS 133 BC1</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	1xRTT	18.00	1.90	19.90	97.7	33.0	-13.1
	1xEV-DO Rev A	18.00	1.90	19.90	97.7	33.0	-13.1

**WCDMA MODE**

<b>RSS 132 Band 5</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	REL 99	23.50	-2.30	21.20	131.8	40.6	-19.4
	HSDPA	23.50	-2.30	21.20	131.8	40.6	-19.4
<b>Part 22 Band 5</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	ERP		Limit (dBm)	Margin (dB)
				dBm	mW		
824- 849	REL 99	23.50	-2.30	19.05	80.4	38.5	-19.4
	HSDPA	23.50	-2.30	19.05	80.4	38.5	-19.4
<b>Part 24 / RSS 133 Band 2</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1850-1910	REL 99	18.00	1.90	19.90	97.7	33.0	-13.1
	HSDPA	18.00	1.90	19.90	97.7	33.0	-13.1
<b>Part 27 / RSS 139 Band 4</b>							
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	EIRP		Limit (dBm)	Margin (dB)
				dBm	mW		
1710-1755	REL 99	19.25	2.40	21.65	146.2	30.0	-8.4
	HSDPA	19.25	2.40	21.65	146.2	30.0	-8.4

## 5.4. SOFTWARE AND FIRMWARE

The EUT baseband firmware: 19-1.05.18

## 5.5. MAXIMUM ANTENNA GAIN

Frequency Range (MHz)	LAT 1 Antenna Gain (dBi)	UAT 1 Antenna Gain (dBi)
816 - 824	-2.50	-3.50
824 - 849	-1.80	-2.30
1850 - 1910	-1.60	1.90
1710 - 1755	-3.70	2.40

## 5.6. WORST-CASE CONFIGURATION AND MODE

Radiated test was investigated in three orthogonal orientations X, Y and Z on LAT 1/UAT 1 on Cell band, AWS and PCS bands. For LAT 1, It was determined that X(Flatbed) orientation was the worst case orientation for Cell, AWS and PCS bands without AC/DC adapter. For UAT 1, It was determined that Y(Landscape) orientation for Cell, PCS band and X (Flatbed) orientations for AWS bands were the worst case orientation without AC/DC adapter.

Based on average conducted output power measurement investigations. The worst-case antenna ports, antenna ports with highest power, was used to perform all conducted tests.

The worst-case scenario for all measurements as followed:

Worst-case modes:

- GSM GPRS
- GSM EGPRS
- CDMA 2000 1xRTT
- CDMA 2000 1xEV-DO REV. A
- WCDMA REL 99
- WCDMA HSDPA

CDMA BC10 band is supported in USA only.

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz

For simultaneous transmission of multiple channels in the 2.4GHz/5GH WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop AC/DC adapter	Apple	85W MagSafe 2	C0651730MMMG6P4AL
Laptop	Apple	Macbook Pro	C02PM012G3QD
Laptop	Apple	Macbook Pro	C02P52HGG085

### I/O CABLES (RF Conducted Test)

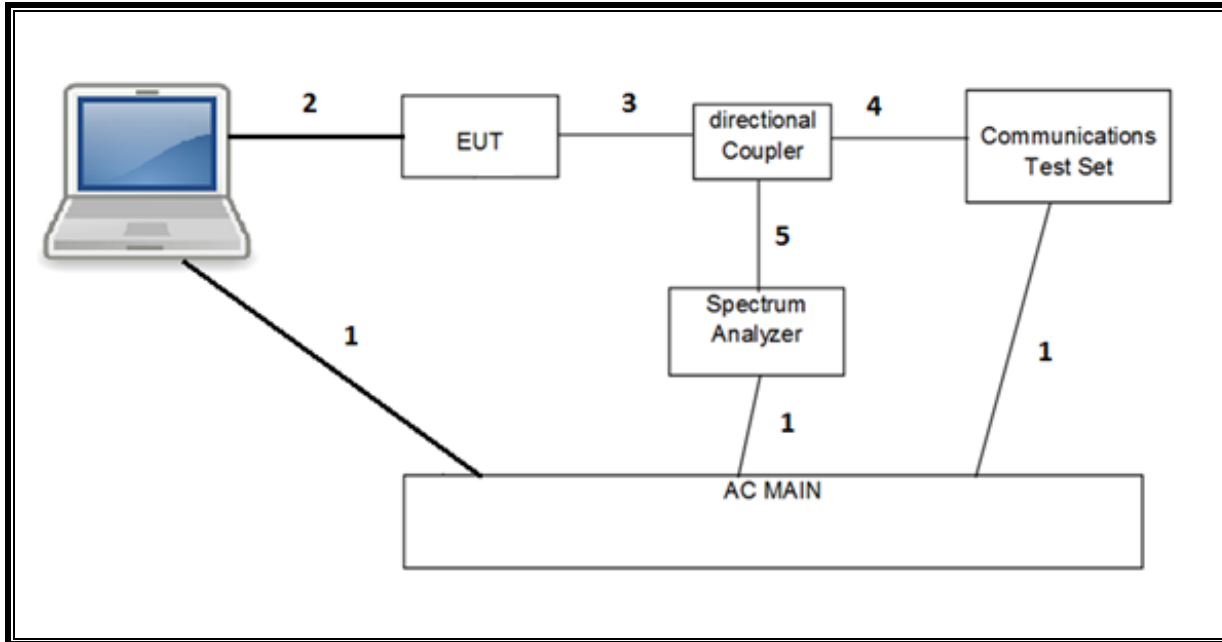
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	2.0m	N/A
2	USB	1	DC	Un-shielded	1.0m	N/A
3	RF In/Out	1	EUT	Shielded	0.6m	N/A
4	RF In/Out	1	Communication Test Set	Shielded	1.2m	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A

### I/O CABLES (RF Radiated Test)

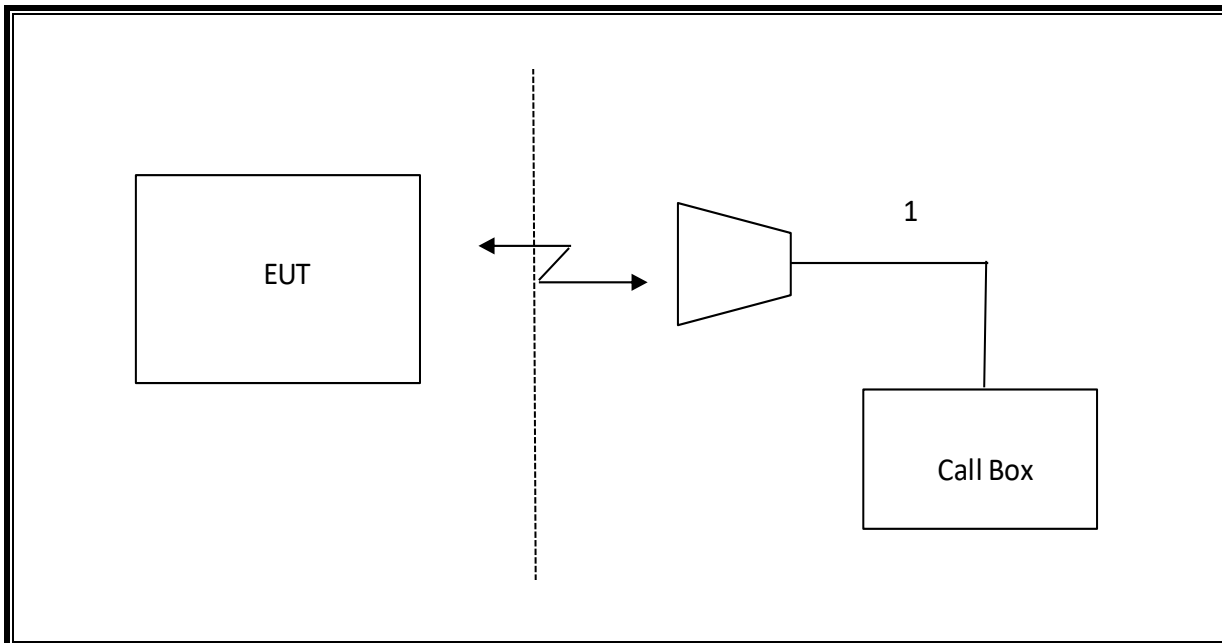
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Shielded	5.0m	N/A

### SETUP DIAGRAM

**CONDUCTED SETUP**



**RADIATED SETUP**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T344	05/07/2020
Antenna, Horn 18-26GHz	ARA	MWH-1826/B	T447	08/13/2020
Antenna, Horn 26-40GHz	ARA	MWH-2640/B	T446	08/13/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	05/14/2020
Antenna, Double Ridge Guide Horn Antenna 700MHz to 18GHz	A.H. SYSTEMS, INC.	SAS-571	PRE0194893	05/16/2021
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0181574	10/14/2020
*Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T15	10/20/2019
Amplifier, 18-26GHz	Agilent	8449B	T404	03/23/2020
Amplifier, 26-40GHz	Miteq	TTA2640	T1804	03/23/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T340	01/22/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1454	01/23/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T908	01/23/2020
Amplifier, 1 to 18GHz	MITEQ	AFS42-00101800-25-S- 42	T931	05/11/2020
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4440A	T198	01/30/2020
Directional Coupler	KRYTAR	152610	T1536	06/09/2020
Directional Coupler	KRYTAR	152610	T1537	06/08/2020
Wireless Communications Test Set, 8960 Series 10	Agilent	E5515C	T211	05/10/2020
*Filter, HPF 3.0GHz	MICROTRONICS	HPM17543	T487	12/15/2019
Filter, HPF 1.2GHz	Micro-Tronics	WHKX1.2/15G-6ST	T1182	05/30/2020
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T959	02/16/2020
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T1871	02/18/2020
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T921	02/18/2020
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T376	02/21/2020
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T958	02/20/2020
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T754	02/05/2020
*Power Meter, P-series single channel	Keysight	N1911A	T1268	01/31/2020
Power Sensor	Keysight	N1921A	T1228	03/01/2020
Antenna, Horn 1-18GHz	ETS Lindgren	T3117	T346	05/14/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0077974	05/13/2020
*Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T1616	10/28/2020
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 2.8.1 Mar 11, 2020	
Power Measurement Software	UL	UL RF	Ver 2.7, 2019	
Radiated test software	UL	UL RF	Ver 9.5 June 15, 2019	

\*Testing is completed before equipment expiration date.



## 7. RF OUTPUT POWER VERIFICATION

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows:

### 7.1. GSM

#### Using CMW500 Communication Test Set

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus

Press **RESET** > choose all to reset all settings

Connection	Press <b>Signal Off</b> to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. Off
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting > Slot configuration > Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel  Frequency Offset > + 0 Hz Mode > BCCH and TCH BCCH Level > -85 dBm (May need to adjust if link is not stable) BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel] Channel Type > Off P0 > 4 dB Slot Config > Unchanged (if already set under MS Signal) TCH > Choose desired test channel Hopping > Off Main Timeslot > 3 (Default)
Network	Coding Scheme > CS 4 (GPRS) and MCS5 (EGPRS) Bit Stream > 2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection	Press <b>Signal On</b> to turn on the signal and change settings

**RESULT**

**7.1.1. GSM GSM850**

<b>ID:</b>	39004	<b>Date:</b>	9/26/19
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**GPRS (GMSK) - Coding Scheme: CS1**

Band	Ch No.	Freq. (MHz)	LAT 1		UAT 1	
			1 slot	2 slots	1 slot	2 slots
850.0	128	824.2	<b>32.75</b>	31.54	30.66	29.75
	190	836.6	32.70	31.75	<b>30.75</b>	29.74
	251	848.8	32.65	31.45	30.64	29.67

**EGPRS (8PSK) - Coding Scheme: MCS5**

Band	Ch No.	Freq. (MHz)	LAT 1		UAT 1	
			1 slot	2 slots	1 slot	2 slots
850.0	128	824.2	<b>27.25</b>	26.16	25.24	24.25
	190	836.6	27.16	26.25	<b>25.25</b>	23.90
	251	848.8	27.13	26.09	25.15	24.23

**7.1.2. GSM GSM1900**

<b>ID:</b>	39004	<b>Date:</b>	9/26/19
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**GPRS (GMSK) - Coding Scheme: CS1**

Band	Ch No.	Freq. (MHz)	LAT 1		UAT 1	
			1 slot	2 slots	1 slot	2 slots
1900.0	512	1850.2	31.24	30.25	<b>27.75</b>	24.75
	661	1880.0	<b>31.25</b>	30.25	27.64	24.66
	810	1909.8	31.22	30.23	27.48	24.51

**EGPRS (8PSK) - Coding Scheme: MCS5**

Band	Ch No.	Freq. (MHz)	LAT 1		UAT 1	
			1 slot	2 slots	1 slot	2 slots
1900.0	512	1850.2	<b>26.25</b>	25.50	23.74	22.75
	661	1880.0	26.15	25.49	<b>23.75</b>	22.73
	810	1909.8	26.12	25.47	23.61	22.69

## 7.2. CDMA

Maximum output power is verified on the Low, Middle and High channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E for 1xRTT, section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rel. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A

### 1xRTT

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev, License</u>
--------------------	---------------------

CDMA2000 Mobile Test B.15.18, L

- Protocol Rev > 6 (IS-2000-0)
- System ID: 18; NID: 65535, Reg. Ch. #: 610 for Cell, 600 for PCS & 450 for AWS
- Radio Config (RC) > RC1 or RC3
- Service Option (SO) Setup > SO55 or SO32
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

### 1xEV-DO - Release 0 (REL 0)

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

#### EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

#### EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

**1xEV-DO - Revision A (REV A)**

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application                      Rev, License

1xEV-DO Terminal Test A.09.13

**EVDO Rev. A – RETAP**

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
  - PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters
  - Sector ID > 00000000: 00000000: 00000000: 00000000
  - Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots
  - ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

**EVDO Rev. A - FETAP**

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
  - PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000: 00000000: 00000000: 00000000
  - Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots
  - ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

**RESULT**

**7.2.1. CDMA BC10**

ID:	39004	Date:	10/3/19				
Band	Mode	Radio Configuration (RC)	Service Option (SO)	Ch No.	Freq. (MHz)	Average Power (dBm)	
						LAT 1	UAT 1
BC10 (800MHz)	1xRTT	RC1	2 (Loopback)	450	817.25	25.2	23.4
				560	820.00	25.2	23.5
				670	822.75	25.1	23.3
			55 (Loopback)	450	817.25	25.1	23.3
				560	820.00	25.0	23.4
				670	822.75	25.1	23.4
		RC2	9 (Loopback)	450	817.25	25.1	23.4
				560	820.00	25.1	23.4
				670	822.75	25.1	23.3
			55 (Loopback)	450	817.25	25.0	23.3
				560	820.00	25.0	23.4
				670	822.75	25.1	23.3
		RC3	2 (Loopback)	450	817.25	25.1	23.3
				560	820.00	25.0	23.3
				670	822.75	25.0	23.3
			55 (Loopback)	450	817.25	25.0	23.3
				560	820.00	25.0	23.4
				670	822.75	25.0	23.2
			32 (+ F-SCH)	450	817.25	25.1	23.3
				560	820.00	25.0	23.3
				670	822.75	25.0	23.2
			32 (+ SCH)	450	817.25	25.0	23.2
				560	820.00	25.0	23.2
				670	822.75	25.0	23.2
		RC4	2 (Loopback)	450	817.25	25.1	23.3
				560	820.00	24.9	23.4
				670	822.75	25.0	23.2
			55 (Loopback)	450	817.25	25.0	23.3
				560	820.00	25.0	23.3
				670	822.75	25.0	23.2
			32 (+ F-SCH)	450	817.25	25.1	23.2
				560	820.00	25.0	23.3
				670	822.75	25.1	23.3
			32 (+ SCH)	450	817.25	25.1	23.2
				560	820.00	24.9	23.2
				670	822.75	25.0	23.2
		RC5	9 (Loopback)	450	817.25	25.1	23.4
				560	820.00	25.1	23.4
				670	822.75	25.1	23.4
			55 (Loopback)	450	817.25	25.2	23.4
	560			820.00	25.1	23.4	
	670			822.75	25.1	23.4	
	1xAdvanced	RC11	2 (Loopback)	450	817.25	25.1	23.3
				560	820.00	25.0	23.4
				670	822.75	25.1	23.3
			75 (Loopback)	450	817.25	25.1	23.4
				560	820.00	25.0	23.4
				670	822.75	25.1	23.3
		32 (+ F-SCH)	450	817.25	25.1	23.2	
			560	820.00	25.0	23.4	
			670	822.75	25.1	23.3	
		32 (+ SCH)	450	817.25	25.1	23.3	
			560	820.00	25.0	23.2	
			670	822.75	25.1	23.3	
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK)	RTAP Rate: 153.6 kbps	450	817.25	25.0	23.2
				560	820	24.8	23.3
				670	822.75	25.0	23.4
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK	RETAP: 4096	450	817.25	25.2	23.4
				560	820	25.1	23.5
				670	822.75	25.0	23.4

**7.2.2. CDMA BC0**

ID:	39004	Date:	10/3/19					
Band	Mode	Radio Configuration (RC)	Service Option (SO)	Ch No.	Freq. (MHz)	Average Power (dBm)		
						LAT 1	UAT 1	
BC0 (850MHz)	1xRTT	RC1	2 (Loopback)	1013	824.70	25.2	23.4	
				384	836.52	25.2	23.5	
				777	848.31	25.0	23.3	
			55 (Loopback)	1013	824.70	25.0	23.3	
				384	836.52	25.1	23.4	
				777	848.31	24.9	23.3	
		RC2	9 (Loopback)	1013	824.70	25.1	23.3	
				384	836.52	25.0	23.3	
				777	848.31	24.9	23.3	
			55 (Loopback)	1013	824.70	25.1	23.3	
				384	836.52	25.1	23.3	
				777	848.31	24.9	23.3	
		RC3	2 (Loopback)	1013	824.70	25.0	23.2	
				384	836.52	25.1	23.3	
				777	848.31	24.8	23.2	
			55 (Loopback)	1013	824.70	25.0	23.2	
				384	836.52	25.0	23.3	
				777	848.31	24.9	23.2	
			32 (+ F-SCH)	1013	824.70	25.1	23.3	
				384	836.52	25.1	23.4	
				777	848.31	24.9	23.3	
			32 (+ SCH)	1013	824.70	24.9	23.2	
				384	836.52	24.9	23.4	
				777	848.31	24.9	23.2	
		RC4	2 (Loopback)	1013	824.70	25.0	23.2	
				384	836.52	25.0	23.4	
				777	848.31	24.9	23.2	
			55 (Loopback)	1013	824.70	25.0	23.2	
				384	836.52	25.0	23.3	
				777	848.31	24.9	23.2	
			32 (+ F-SCH)	1013	824.70	25.1	23.2	
				384	836.52	25.1	23.4	
				777	848.31	24.9	23.4	
			32 (+ SCH)	1013	824.70	24.8	23.2	
				384	836.52	24.9	23.3	
				777	848.31	24.8	23.3	
		RC5	9 (Loopback)	1013	824.70	25.1	23.3	
				384	836.52	25.1	23.4	
				777	848.31	25.0	23.3	
			55 (Loopback)	1013	824.70	25.1	23.3	
				384	836.52	25.2	23.4	
				777	848.31	25.0	23.4	
		1xAdvanced	RC11	2 (Loopback)	1013	824.70	25.1	23.3
					384	836.52	25.1	23.5
					777	848.31	24.9	23.4
				75 (Loopback)	1013	824.70	25.1	23.2
					384	836.52	25.1	23.2
					777	848.31	25.1	23.5
			32 (+ F-SCH)	1013	824.70	25.1	23.5	
				384	836.52	25.1	23.5	
	777			848.31	25.0	23.4		
	32 (+ SCH)		1013	824.70	25.1	23.2		
			384	836.52	25.1	23.4		
			777	848.31	24.9	23.4		
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK)	RTAP Rate: 153.6 kbps	1013	824.70	25.0	23.5	
				384	836.52	25.0	23.0	
				777	848.31	25.0	23.4	
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK	RETAP: 4096	1013	824.70	25.0	23.1	
				384	836.52	25.2	23.3	
				777	848.31	25.1	23.5	

**7.2.3. CDMA BC1**

ID:	39004	Date:	10/3/19					
Band	Mode	Radio Configuration (RC)	Service Option (SO)	Ch No.	Freq. (MHz)	Average Power (dBm)		
						LAT 1	UAT 1	
BC1 (1900MHz)	1xRTT	RC1	2 (Loopback)	25	1851.25	23.7	17.9	
				600	1880.00	23.7	18.0	
				1175	1908.75	23.5	17.8	
			55 (Loopback)	25	1851.25	23.4	17.5	
				600	1880.00	23.4	17.6	
				1175	1908.75	23.4	17.6	
			RC2	9 (Loopback)	25	1851.25	23.5	17.6
					600	1880.00	23.5	17.8
					1175	1908.75	23.4	17.6
		55 (Loopback)		25	1851.25	23.4	17.7	
				600	1880.00	23.5	17.6	
				1175	1908.75	23.3	17.7	
		RC3	2 (Loopback)	25	1851.25	23.3	17.6	
				600	1880.00	23.4	17.5	
				1175	1908.75	23.3	17.6	
			55 (Loopback)	25	1851.25	23.3	17.6	
				600	1880.00	23.4	17.5	
				1175	1908.75	23.3	17.6	
			32 (+ F-SCH)	25	1851.25	23.5	17.8	
				600	1880.00	23.6	17.9	
				1175	1908.75	23.5	17.9	
				32 (+ SCH)	25	1851.25	23.4	17.9
					600	1880.00	23.6	18.0
					1175	1908.75	23.4	17.8
		RC4	2 (Loopback)	25	1851.25	23.4	17.6	
				600	1880.00	23.3	17.5	
				1175	1908.75	23.3	17.6	
			55 (Loopback)	25	1851.25	23.3	17.6	
				600	1880.00	23.3	17.6	
				1175	1908.75	23.3	17.6	
			32 (+ F-SCH)	25	1851.25	23.5	17.8	
				600	1880.00	23.6	17.8	
				1175	1908.75	23.6	17.9	
			32 (+ SCH)	25	1851.25	23.4	17.8	
				600	1880.00	23.5	17.8	
				1175	1908.75	23.4	17.8	
		RC5	9 (Loopback)	25	1851.25	23.5	17.7	
				600	1880.00	23.5	17.7	
				1175	1908.75	23.4	17.7	
			55 (Loopback)	25	1851.25	23.5	17.7	
				600	1880.00	23.5	17.7	
				1175	1908.75	23.4	17.6	
		1xAdvanced	RC11	2 (Loopback)	25	1851.25	23.6	17.8
					600	1880.00	23.7	17.9
					1175	1908.75	23.6	17.9
				75 (Loopback)	25	1851.25	23.6	17.9
					600	1880.00	23.7	18.0
					1175	1908.75	23.6	17.9
				32 (+ F-SCH)	25	1851.25	23.6	17.8
					600	1880.00	23.7	17.9
					1175	1908.75	23.6	17.9
				32 (+ SCH)	25	1851.25	23.5	17.8
					600	1880.00	23.6	18.0
					1175	1908.75	23.5	17.8
		1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK)	RTAP Rate: 153.6 kbps	25	1851.25	23.5	17.9
					600	1880	23.5	17.8
					1175	1908.75	23.3	17.8
		1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK	RETAP: 4096	25	1851.25	23.7	18.0
					600	1880	23.6	17.9
					1175	1908.75	23.5	18.0

### 7.3. WCDMA

#### TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW  $\geq$  RBW  $\geq$  26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

#### REL 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	$\beta_c/\beta_d$	8/15

#### HSDPA REL 5

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	Bc	2/15	11/15	15/15	15/15
	Bd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	11/15	15/8	15/4
	Bhs	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	D <sub>ACK</sub>	8			
	D <sub>NAK</sub>	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15			



**HSPA REL 6 (HSDPA & HSUPA)**

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	15/1
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	$\beta_{ed}$	1309/225	94/75	47/15	56/75	47/15
CM (dB)	1	3	2	3	1	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
Reference E-TFCI PO	27	27	27	27	27	
Maximum Channelization Codes	2xSF2				SF4	

**DUAL CARRIER HSDPA (DC-HSDPA (REL 8, CAT 24))**

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/lor	dB	-10
P-CCPCH and SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/lor	dB	-5
OCNS_Ec/lor	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
information Bit Payload ( $N_{INF}$ )	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

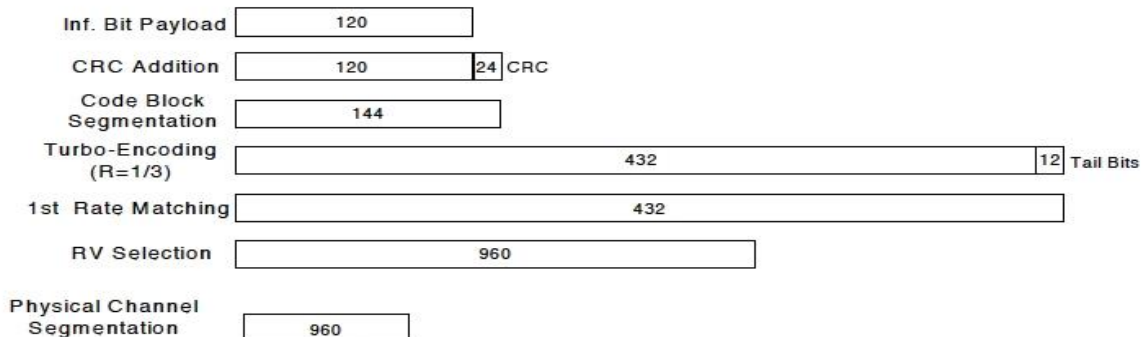


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

Mode	HSDPA	HSDPA	HSDPA	HSDPA	
Subtest	1	2	3	4	
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	$\beta_c$	2/15	11/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	$\beta_d$ (SF)	64			
	$\beta_c/\beta_d$	2/15	11/15	15/8	15/4
	$\beta_{hs}$	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = $\beta_{hs}/\beta_c$	30/15			

**HSPA+ REL 7**

The following 1 Sub-test was completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

**Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	$\beta_c$ (Note3)	$\beta_d$	$\beta_{HS}$ (Note1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the  $\beta_c$  is set to 1 and  $\beta_d = 0$  by default.

Note 4:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

**RESULT**

**7.3.1. WCDMA BAND5**

ID:	39004	Date:	9/28/19					
Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average Power (dBm)		
						LAT 1	UAT 1	
W-CDMA Band 5 (850MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	25.2	23.5	
			4183	836.6	N/A	25.1	23.5	
			4233	846.6	N/A	25.1	23.3	
	HSDPA	Subtest 1	4132	826.4	0	25.1	23.4	
			4183	836.6	0	25.2	23.4	
			4233	846.6	0	25.1	23.4	
		Subtest 2	4132	826.4	0	25.2	23.5	
			4183	836.6	0	25.2	23.4	
			4233	846.6	0	25.1	23.3	
		Subtest 3	4132	826.4	0.5	24.8	22.9	
			4183	836.6	0.5	24.8	23.0	
			4233	846.6	0.5	24.8	23.0	
		Subtest 4	4132	826.4	0.5	24.8	23.0	
			4183	836.6	0.5	24.8	23.0	
			4233	846.6	0.5	24.8	22.9	
		HSPA (HSDPA & HSUPA)	Subtest 1	4132	826.4	0	25.2	23.4
				4183	836.6	0	25.1	23.4
				4233	846.6	0	25.1	23.4
	Subtest 2		4132	826.4	2	23.4	21.9	
			4183	836.6	2	23.4	21.9	
			4233	846.6	2	23.3	21.8	
	Subtest 3		4132	826.4	1	24.4	22.6	
			4183	836.6	1	24.4	22.8	
			4233	846.6	1	24.3	22.6	
	Subtest 4		4132	826.4	2	23.5	21.8	
			4183	836.6	2	23.5	22.0	
			4233	846.6	2	23.4	21.9	
	Subtest 5		4132	826.4	0	25.2	23.0	
			4183	836.6	0	25.1	23.4	
			4233	846.6	0	25.0	23.3	
	DC-HSDPA	Subtest 1	4132	826.4	0	25.2	23.4	
			4183	836.6	0	25.1	23.4	
			4233	846.6	0	25.1	23.4	
		Subtest 2	4132	826.4	0	25.2	23.4	
			4183	836.6	0	25.2	23.3	
			4233	846.6	0	25.1	23.4	
Subtest 3		4132	826.4	0.5	24.8	22.9		
		4183	836.6	0.5	24.8	23.0		
		4233	846.6	0.5	24.7	23.0		
Subtest 4		4132	826.4	0.5	24.8	23.0		
		4183	836.6	0.5	24.8	22.9		
		4233	846.6	0.5	24.8	23.0		

**7.3.2. WCDMA BAND2**

ID:	39004	Date:	9/28/19				
Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average Power (dBm)	
						LAT 1	UAT 1
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.7	17.4
			9400	1880.0	N/A	23.6	17.6
			9538	1907.6	N/A	23.6	18.0
	HSDPA	Subtest 1	9262	1852.4	0	23.6	17.9
			9400	1880.0	0	23.7	17.9
			9538	1907.6	0	23.6	17.8
		Subtest 2	9262	1852.4	0	23.7	18.0
			9400	1880.0	0	23.7	18.0
			9538	1907.6	0	23.7	17.8
		Subtest 3	9262	1852.4	0.5	23.2	17.5
			9400	1880.0	0.5	23.4	17.5
			9538	1907.6	0.5	23.3	17.6
		Subtest 4	9262	1852.4	0.5	23.3	17.4
			9400	1880.0	0.5	23.3	17.5
			9538	1907.6	0.5	23.3	17.6
	HSPA (HSDPA & HSUPA)	Subtest 1	9262	1852.4	0	23.7	17.8
			9400	1880.0	0	23.6	17.9
			9538	1907.6	0	23.6	17.9
		Subtest 2	9262	1852.4	2	22.1	15.4
			9400	1880.0	2	22.1	15.4
			9538	1907.6	2	22.2	15.7
		Subtest 3	9262	1852.4	1	22.8	16.1
			9400	1880.0	1	22.9	16.3
			9538	1907.6	1	22.9	16.7
		Subtest 4	9262	1852.4	2	21.9	15.6
			9400	1880.0	2	21.9	15.7
			9538	1907.6	2	22.0	15.7
		Subtest 5	9262	1852.4	0	23.7	17.7
			9400	1880.0	0	23.6	17.8
			9538	1907.6	0	23.6	17.7
DC-HSDPA	Subtest 1	9262	1852.4	0	23.7	17.9	
		9400	1880.0	0	23.6	17.9	
		9538	1907.6	0	23.6	17.8	
	Subtest 2	9262	1852.4	0	23.7	17.7	
		9400	1880.0	0	23.7	17.8	
		9538	1907.6	0	23.6	17.9	
	Subtest 3	9262	1852.4	0.5	23.3	17.5	
		9400	1880.0	0.5	23.2	17.6	
		9538	1907.6	0.5	23.1	17.4	
	Subtest 4	9262	1852.4	0.5	23.1	17.5	
		9400	1880.0	0.5	23.1	17.5	
		9538	1907.6	0.5	23.1	17.6	

**7.3.3. WCDMA BAND4**

ID:	39004	Date:	9/28/19				
Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Average Power (dBm)	
						LAT 1	UAT 1
W-CDMA Band 4 (1700MHz)	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	25.1	19.2
			1413	1732.6	N/A	25.1	19.0
			1513	1752.6	N/A	25.2	19.0
	HSDPA	Subtest 1	1312	1712.4	0	25.2	19.1
			1413	1732.6	0	25.1	19.0
			1513	1752.6	0	25.2	19.0
		Subtest 2	1312	1712.4	0	25.1	19.1
			1413	1732.6	0	25.2	19.2
			1513	1752.6	0	25.1	19.0
		Subtest 3	1312	1712.4	0.5	24.6	18.9
			1413	1732.6	0.5	24.7	18.9
			1513	1752.6	0.5	24.6	18.8
		Subtest 4	1312	1712.4	0.5	24.6	18.7
			1413	1732.6	0.5	24.6	18.7
			1513	1752.6	0.5	24.7	18.7
	HSPA (HSDPA & HSUPA)	Subtest 1	1312	1712.4	0	25.1	19.1
			1413	1732.6	0	25.0	19.0
			1513	1752.6	0	25.1	19.0
		Subtest 2	1312	1712.4	2	22.9	17.1
			1413	1732.6	2	22.9	16.9
			1513	1752.6	2	22.9	17.1
		Subtest 3	1312	1712.4	1	24.3	18.2
			1413	1732.6	1	24.2	18.2
			1513	1752.6	1	24.2	18.3
		Subtest 4	1312	1712.4	2	23.0	17.3
			1413	1732.6	2	23.0	17.2
			1513	1752.6	2	23.0	17.2
	Subtest 5	1312	1712.4	0	25.1	19.1	
		1413	1732.6	0	25.0	19.1	
		1513	1752.6	0	25.1	19.1	
	DC-HSDPA	Subtest 1	1312	1712.4	0	25.1	19.1
			1413	1732.6	0	25.0	19.0
			1513	1752.6	0	25.2	19.0
		Subtest 2	1312	1712.4	0	25.1	19.0
			1413	1732.6	0	25.1	19.1
			1513	1752.6	0	25.1	19.1
Subtest 3		1312	1712.4	0.5	24.7	18.6	
		1413	1732.6	0.5	24.7	18.7	
		1513	1752.6	0.5	24.5	18.7	
Subtest 4		1312	1712.4	0.5	24.7	18.7	
		1413	1732.6	0.5	24.7	18.8	
		1513	1752.6	0.5	24.7	18.8	

## 8. CONDUCTED TEST RESULTS

### 8.1. OCCUPIED BANDWIDTH

#### RULE PART(S)

FCC: §2.1049

IC: RSS132; RSS133§2.3; RSS139

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

#### RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested.

#### GSM

Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	190	836.6	246.852	321.414
	EGPRS			249.705	314.692
GSM1900	GPRS	661	1880.0	247.043	318.911
	EGPRS			245.319	309.134

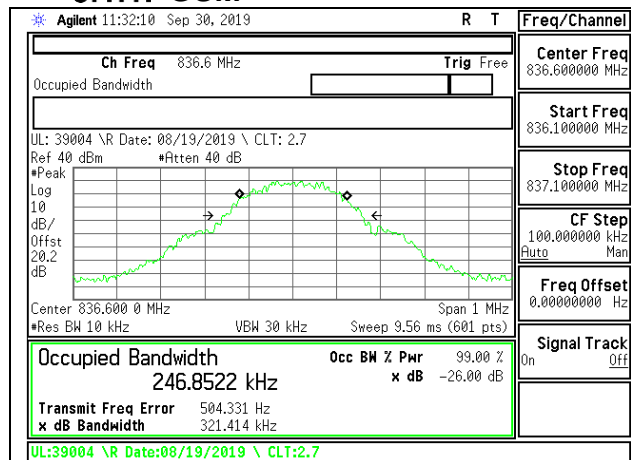
#### CDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BC10	1xRTT	560	820.0	1.2722	1.425
	1xEV-DO Rev A			1.2739	1.418
BC0	1xRTT	384	836.5	1.2733	1.432
	1xEV-DO Rev A			1.2658	1.417
BC1	1xRTT	600	1880.0	1.2743	1.431
	1xEV-DO Rev A			1.2706	1.429

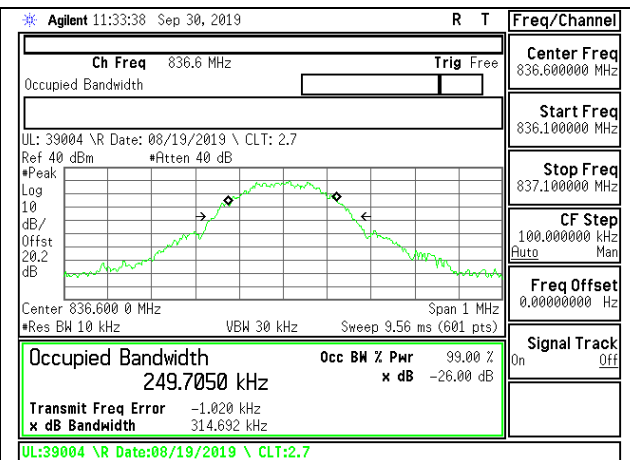
#### WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND5	REL 99	4408	836.6	4.0488	4.631
	HSDPA			4.0676	4.621
BAND2	REL 99	9800	1880.0	4.0780	4.627
	HSDPA			4.0715	4.609
BAND4	REL 99	1638	1732.6	4.0667	4.618
	HSDPA			4.0606	4.586

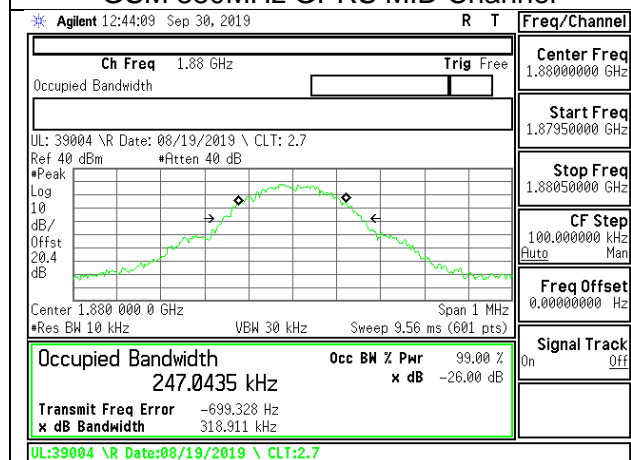
### 8.1.1. GSM



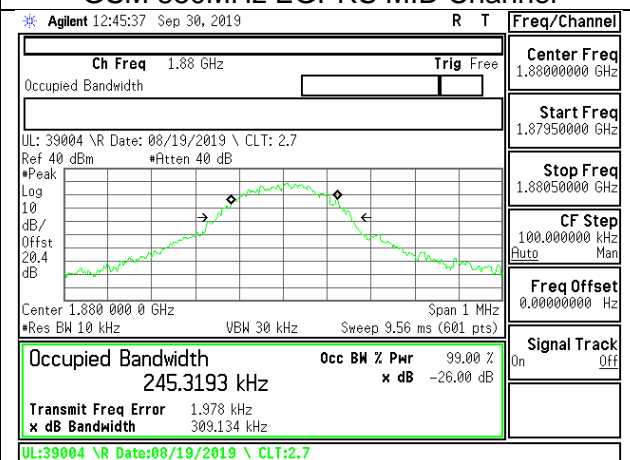
GSM 850MHz GPRS MID Channel



GSM 850MHz EGPRS MID Channel



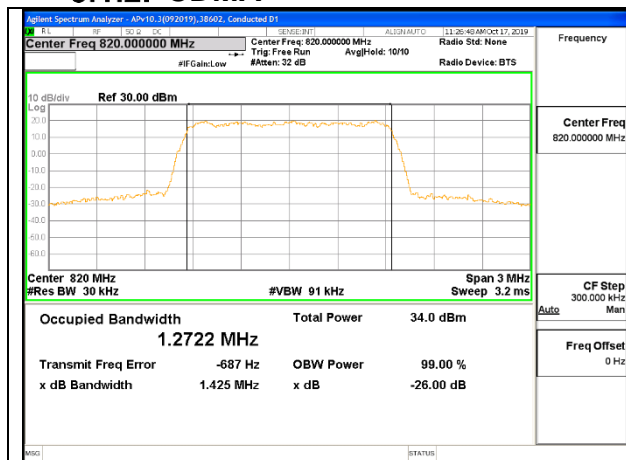
GSM 1900MHz GPRS MID Channel



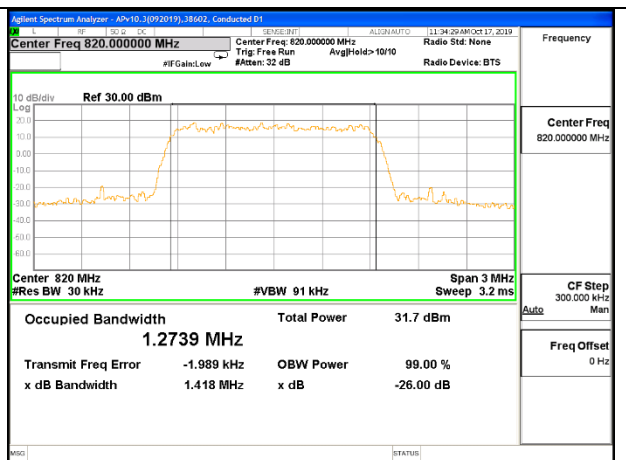
GSM 1900MHz EGPRS MID Channel



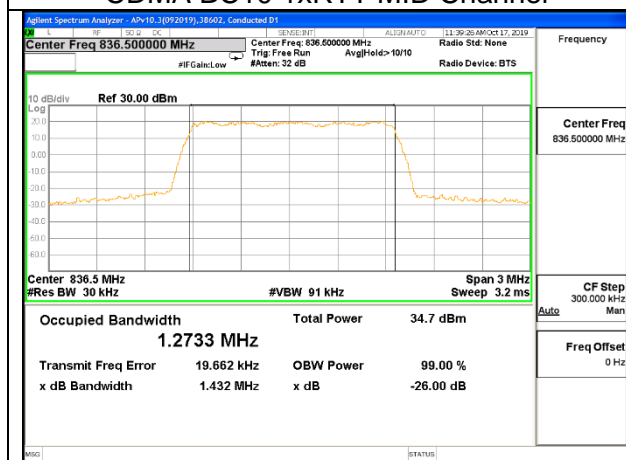
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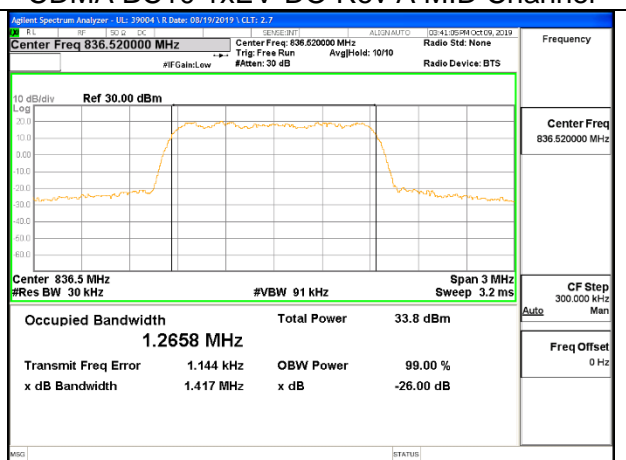
CDMA BC10 1xRTT MID Channel



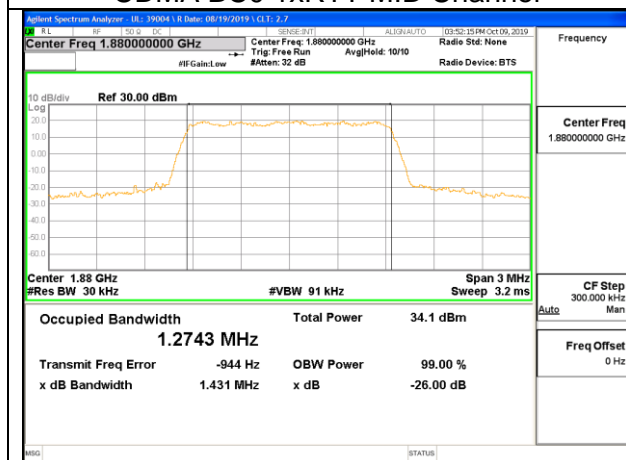
CDMA BC10 1xEV-DO Rev A MID Channel



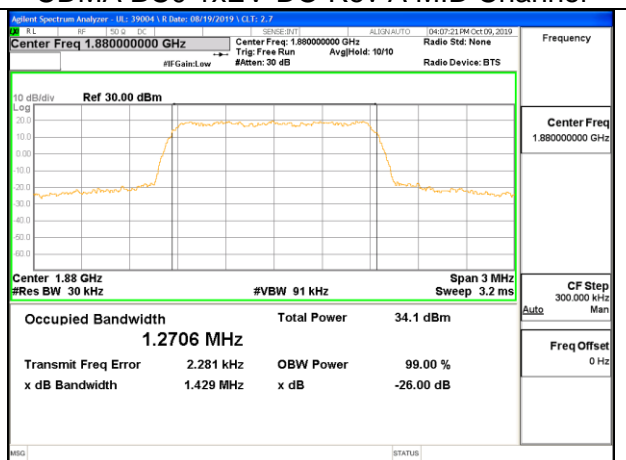
CDMA BC0 1xRTT MID Channel



CDMA BC0 1xEV-DO Rev A MID Channel

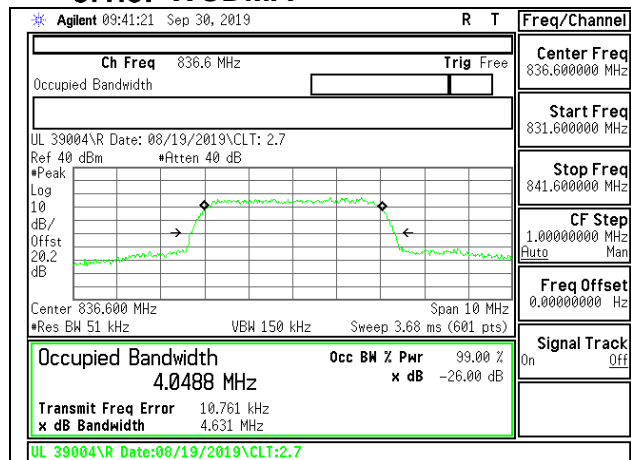


CDMA BC1 1xRTT MID Channel

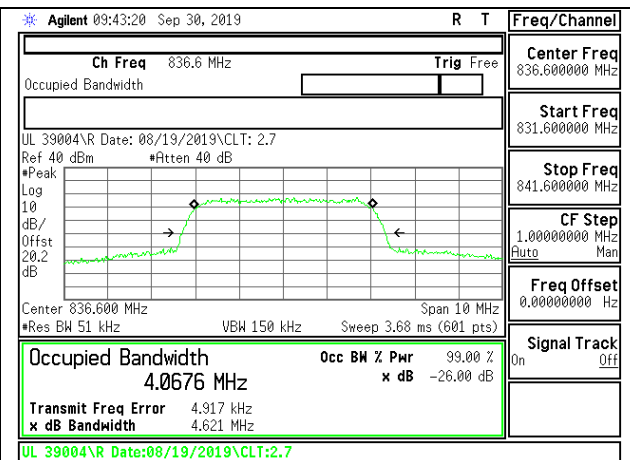


CDMA BC1 1xEV-DO Rev A MID Channel

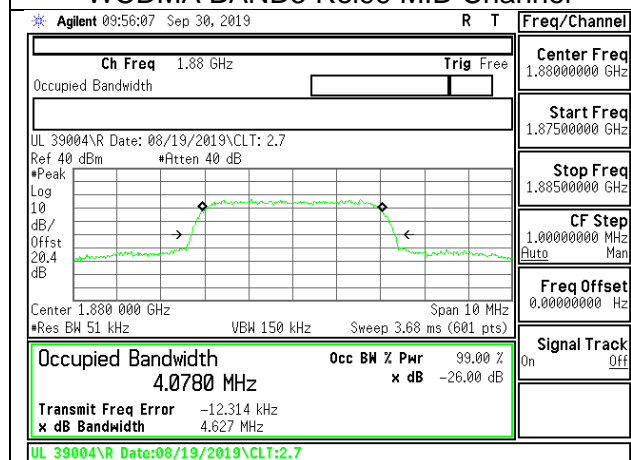
### 8.1.3. WCDMA



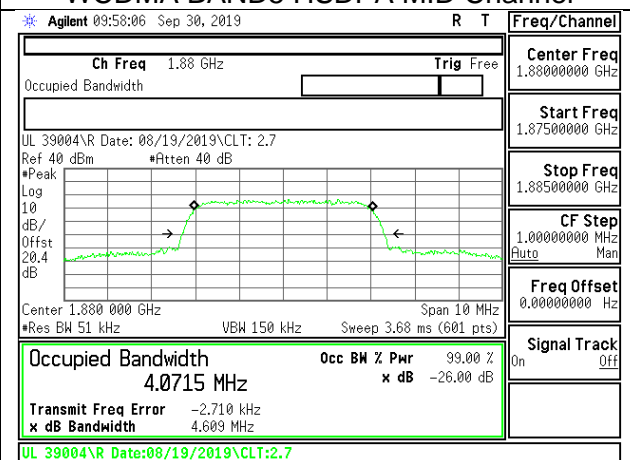
WCDMA BAND5 Rel99 MID Channel



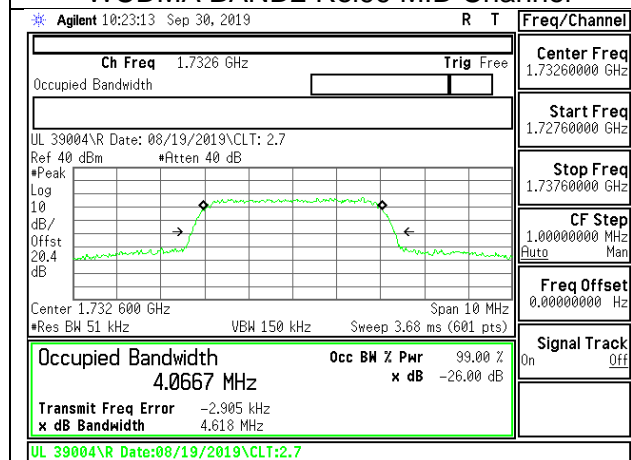
WCDMA BAND5 HSDPA MID Channel



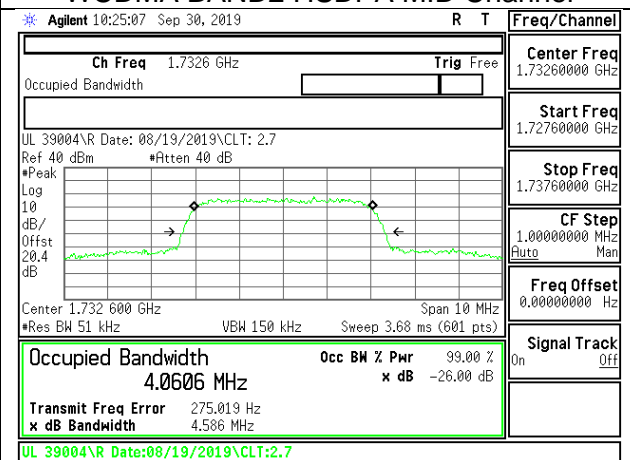
WCDMA BAND2 Rel99 MID Channel



WCDMA BAND2 HSDPA MID Channel



WCDMA BAND4 Rel99 MID Channel



WCDMA BAND4 HSDPA MID Channel

## 8.2. BAND EDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53 and §90.691  
IC: RSS132§5.5; RSS133§6.5 and RSS139§6.6

### LIMITS

FCC: §22.917, §24.238, §27.53(h)

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.

FCC: §90.691 Emission mask requirements for EA-based systems.

- (a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
- (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{Log}_{10}(f/6.1)$  decibels or  $50 + 10 \text{Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
- (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10\text{Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

### RSS132§5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P ( dBW) by at least  $43 + 10 \log_{10}p$  (watts).
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10} p$  (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

### RSS133§6.5

Equipment shall comply with the limits in (i) and (ii) below.

- (iii) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10}p$ (watts).
- (iv) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10}p$  (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

### RSS139§6.6

- In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.
- (v) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

## **TEST PROCEDURE**

The transmitter output was connected to a R&S CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

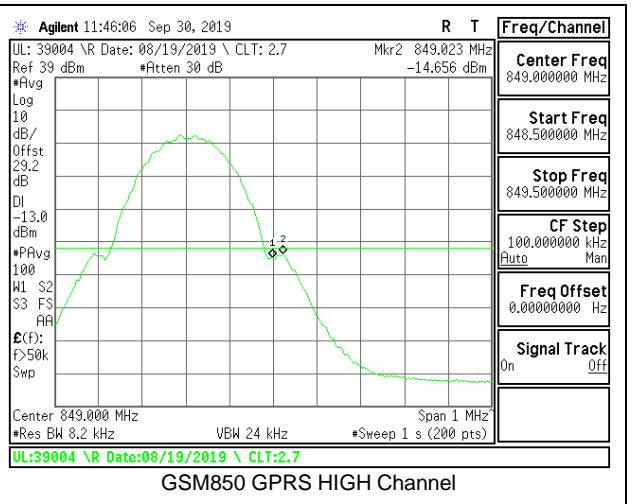
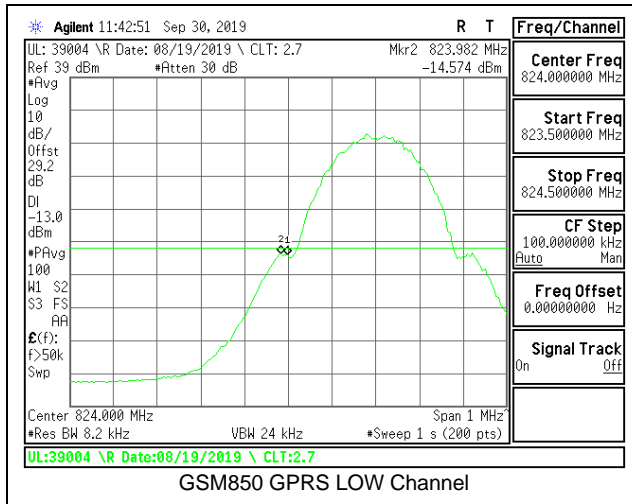
For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

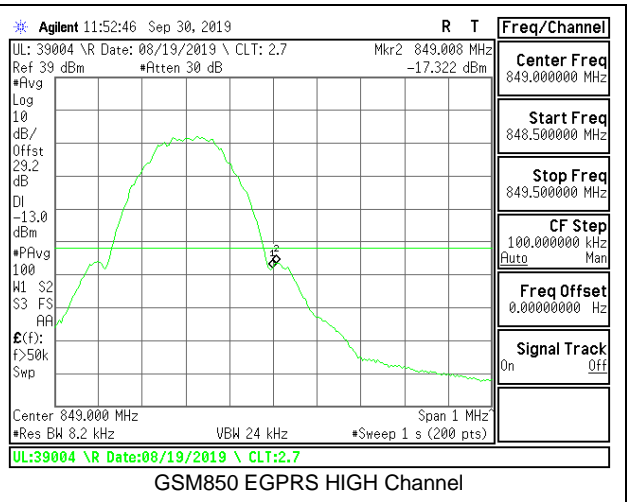
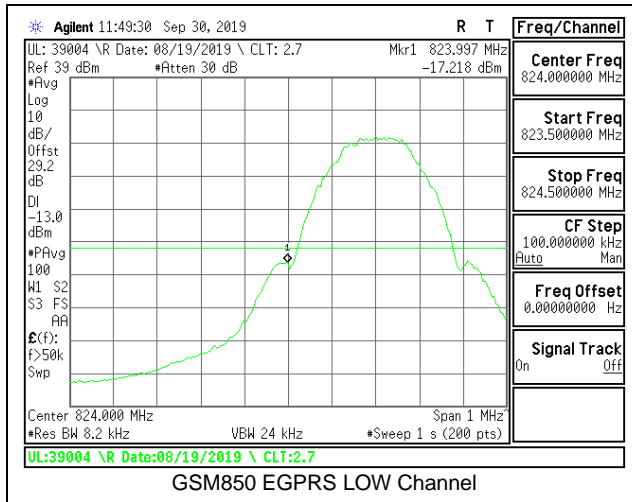
## **RESULTS**

### 8.2.1. GSM GSM850

#### GPRS

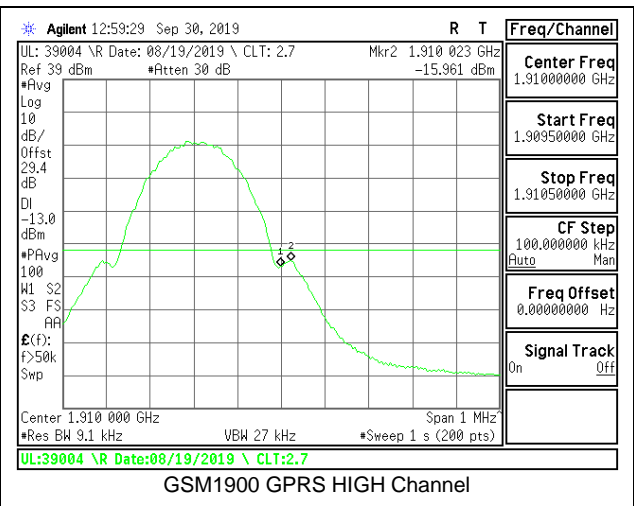
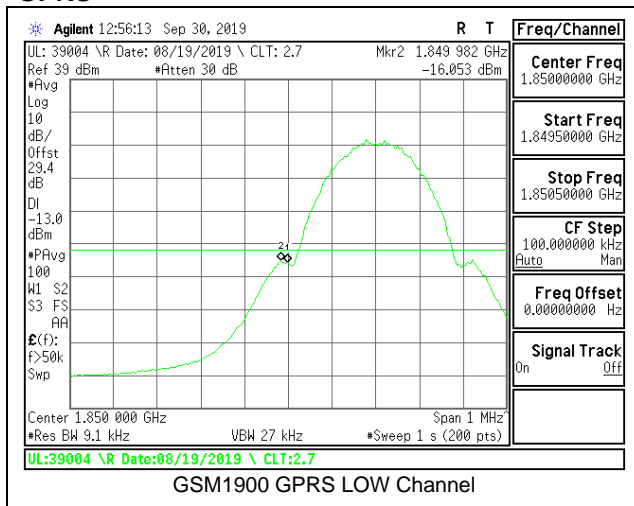


#### EGPRS

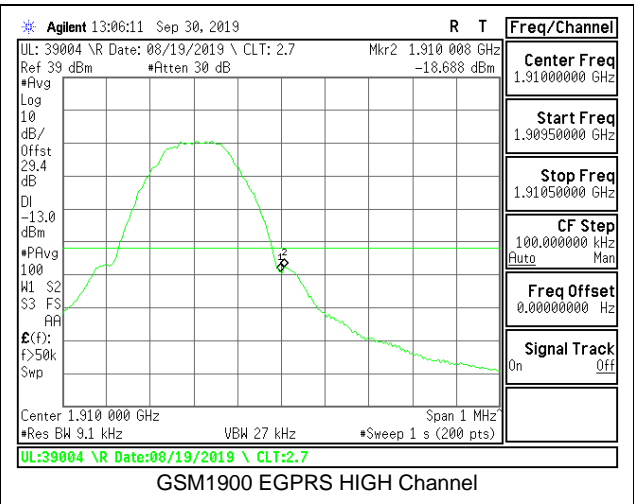
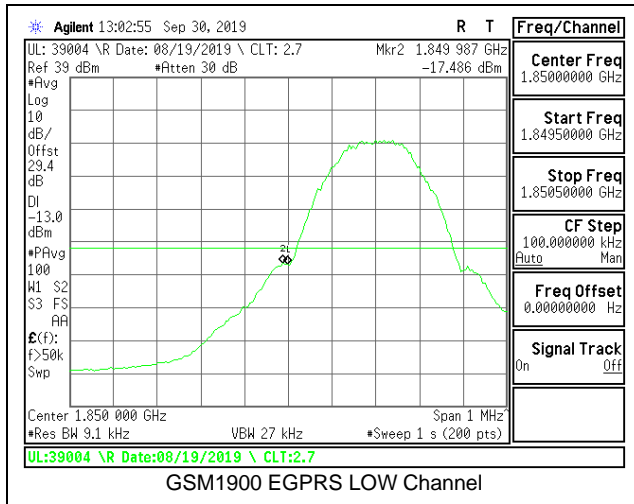


### 8.2.2. GSM GSM1900

#### GPRS



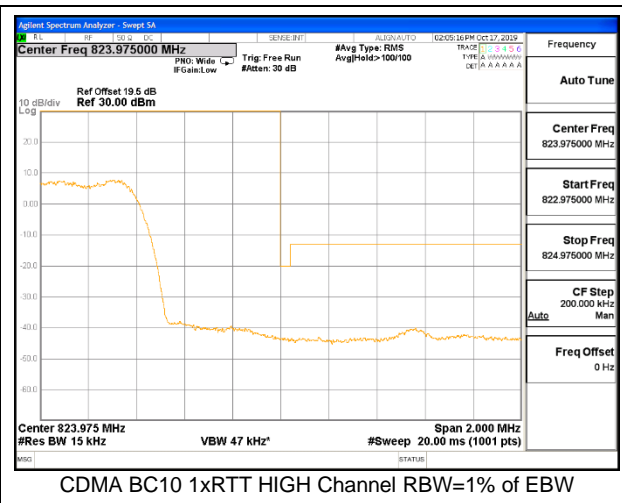
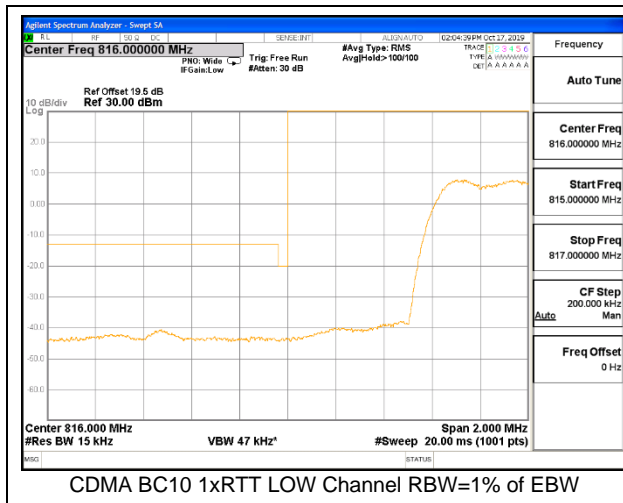
#### EGPRS



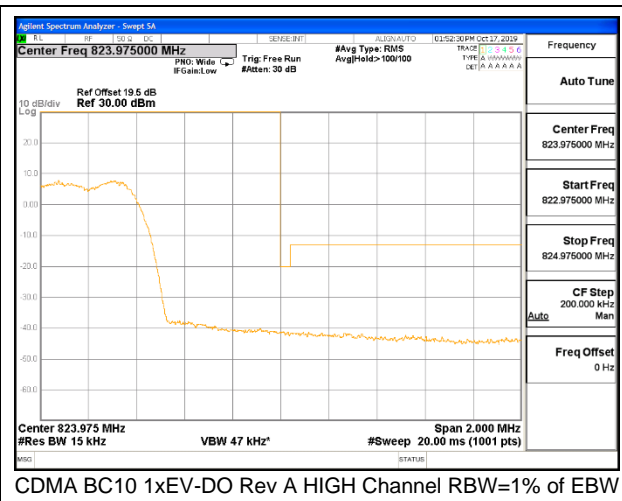
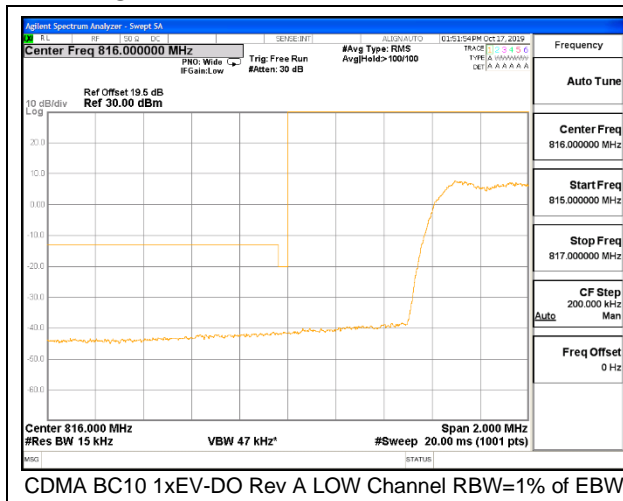
### 8.2.3. CDMA BC10

<b>ID:</b>	39004	<b>Date:</b>	10/17/19
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#### 1xRTT



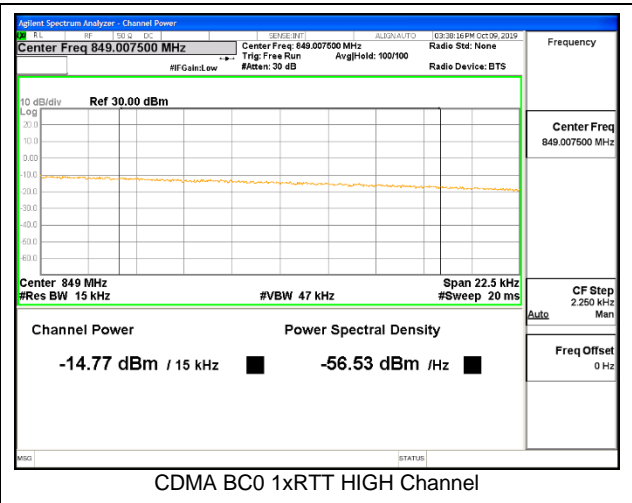
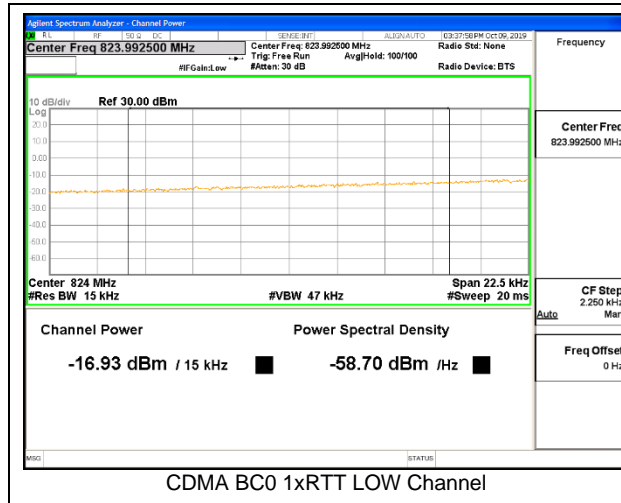
#### 1xEV-DO



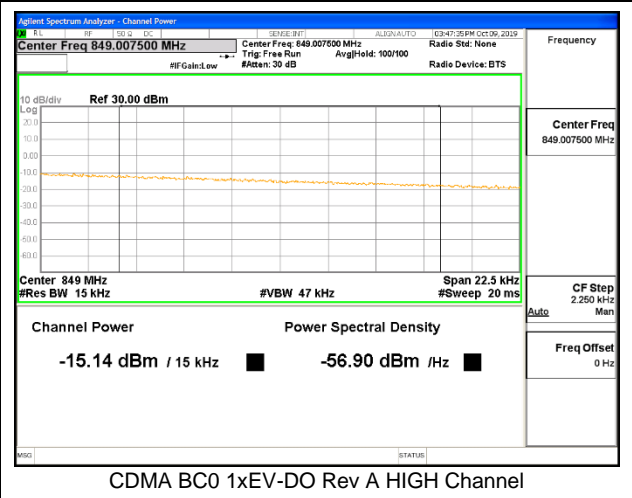
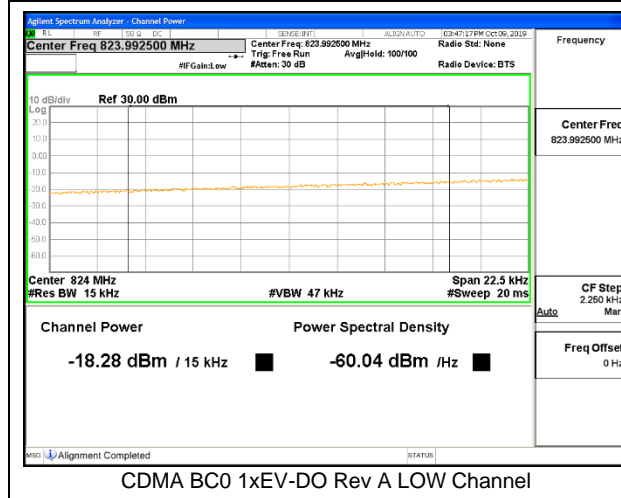
### 8.2.4. CDMA BC0

<b>ID:</b>	39004	<b>Date:</b>	10/9/19
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#### 1xRTT



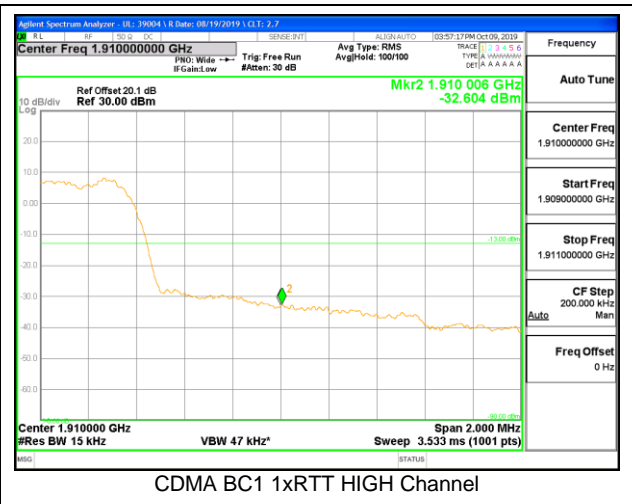
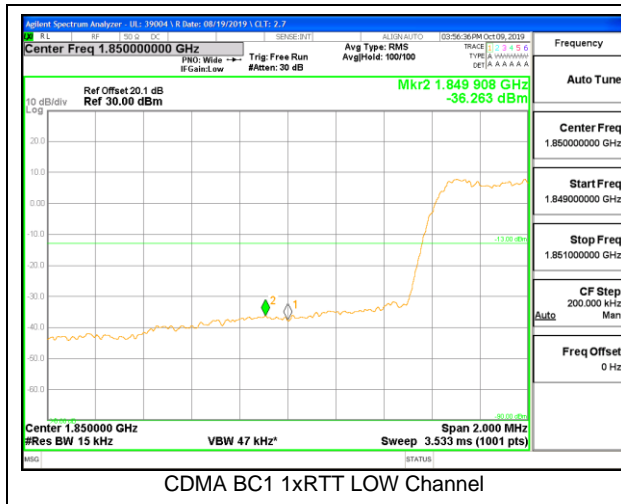
#### 1xEV-DO



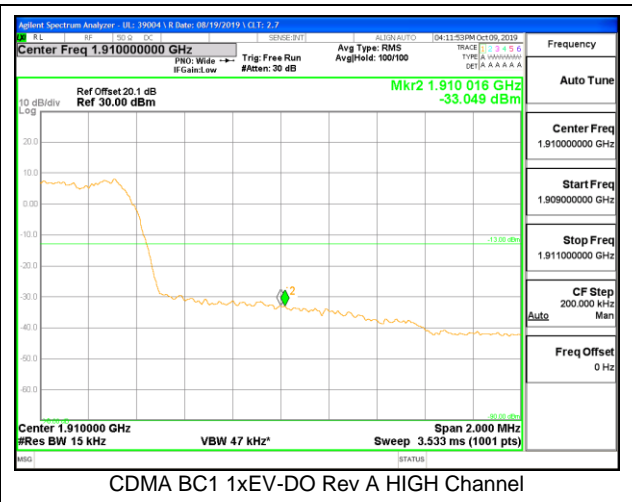
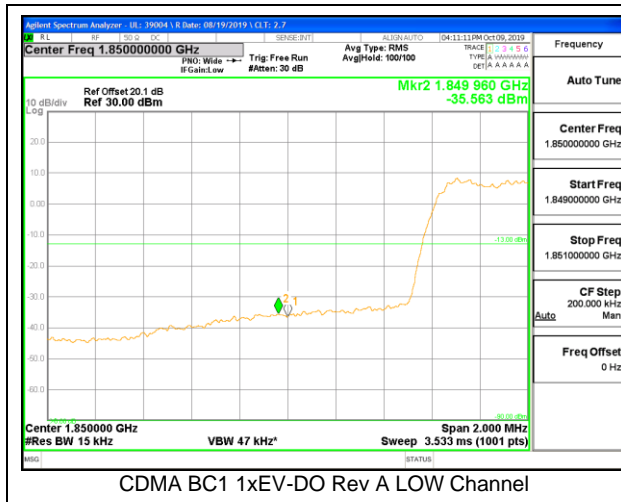


### 8.2.5. CDMA BC1

#### 1xRTT

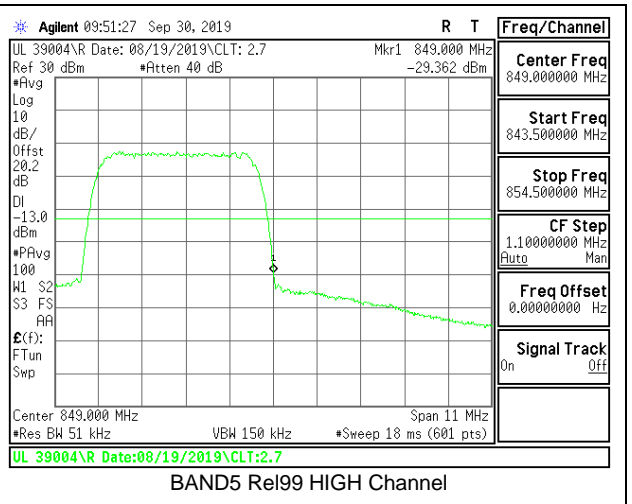
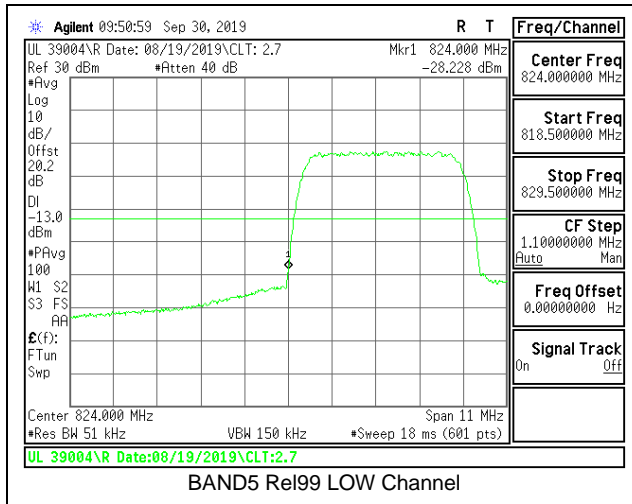


#### 1xEV-DO

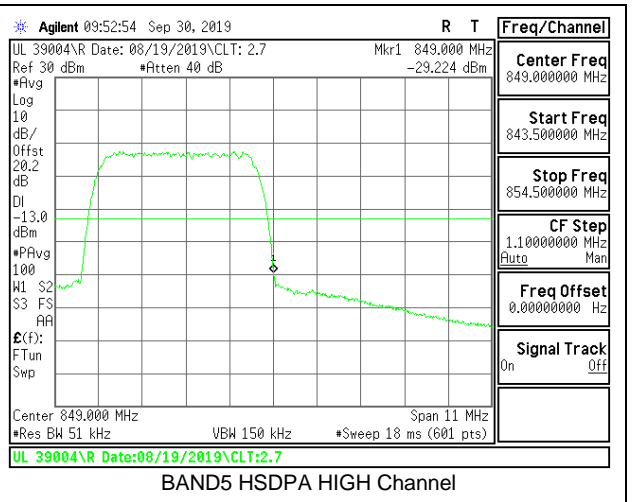
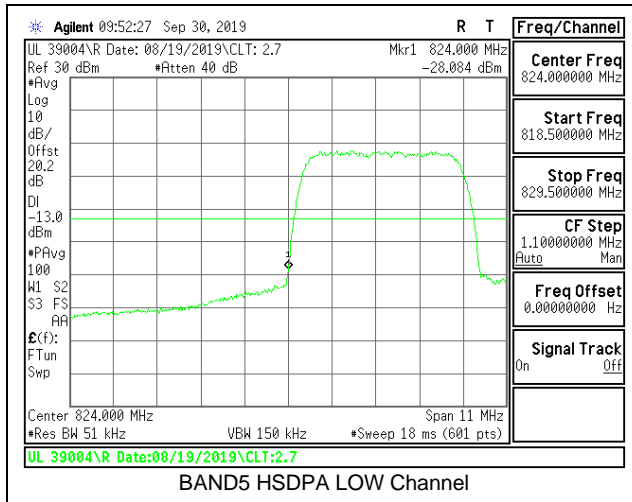


### 8.2.6. WCDMA BAND5

#### Rel99

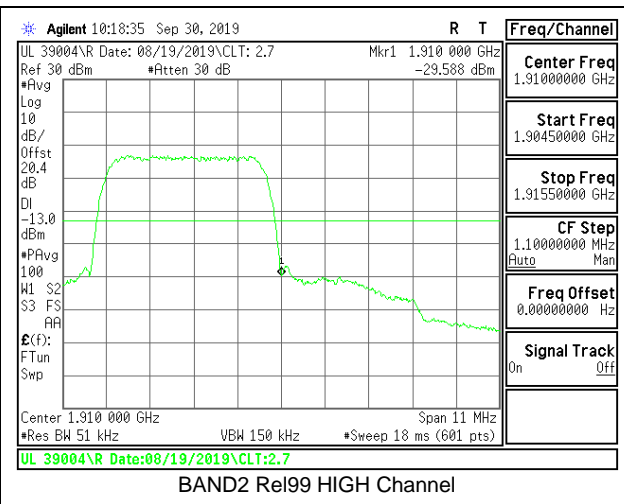
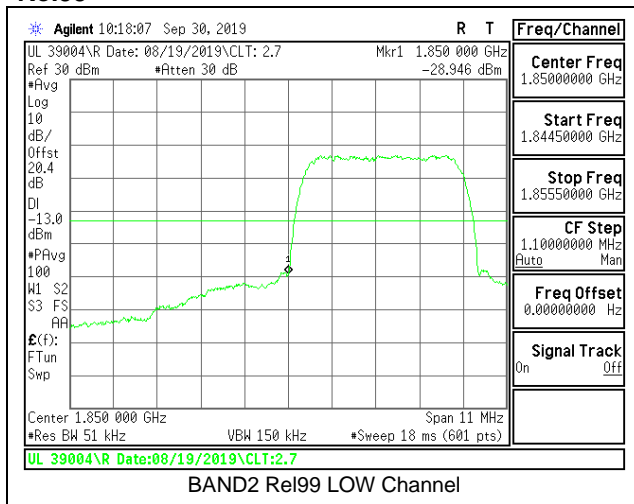


#### HSDPA

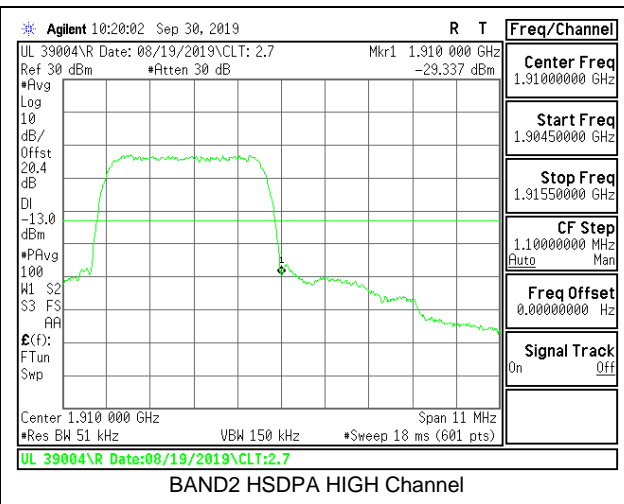
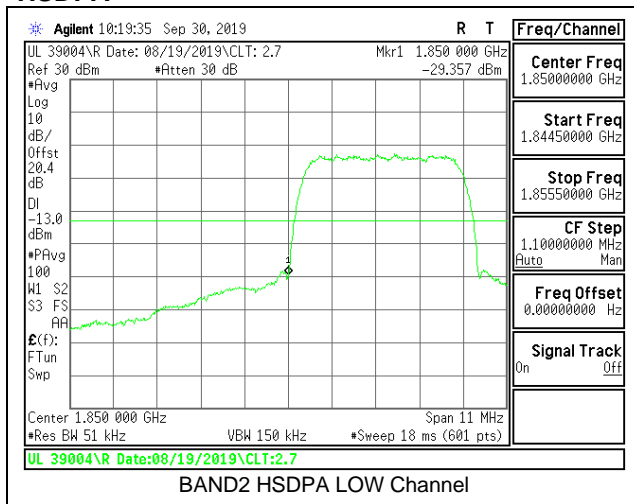


### 8.2.7. WCDMA BAND2

#### Rel99

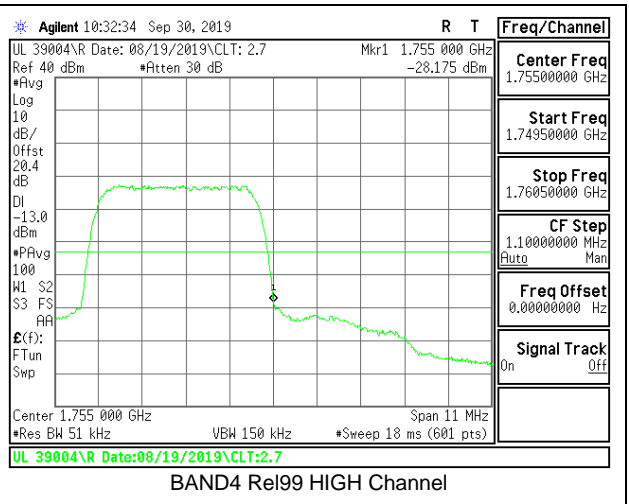
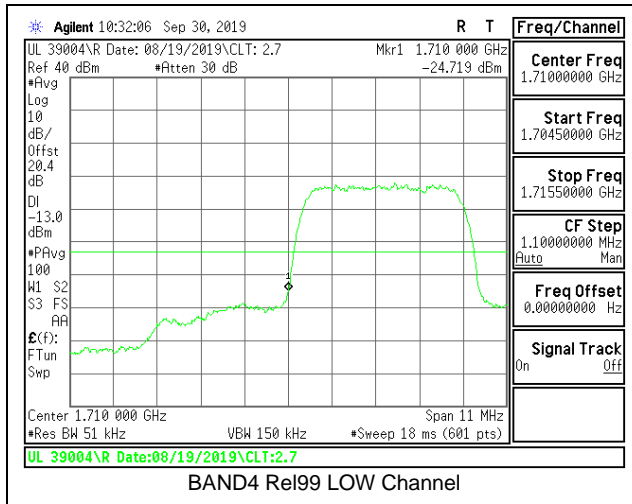


#### HSDPA

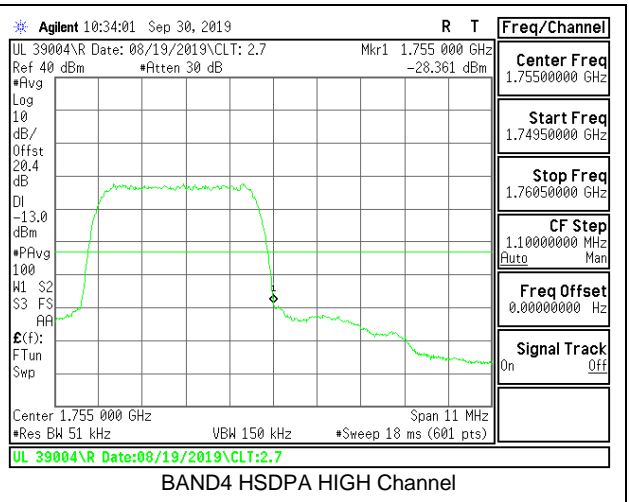
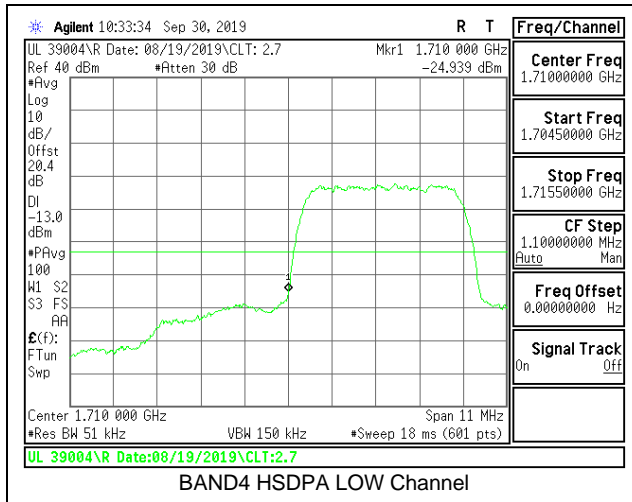


### 8.2.8. WCDMA BAND4

#### Rel99



#### HSDPA



### **8.3. OUT OF BAND EMISSIONS**

#### **RULE PART(S)**

FCC: §2.1051, §22.917, §24.238, §27.53 and §90.691  
IC: RSS132§5.5; RSS133§6.5 and RSS139§6.6

#### **LIMITS**

FCC: §22.917, §24.238, §27.53 (h), §90.691

The minimum permissible attenuation level of any spurious emissions is  $43 + 10 \log (P)$  dB where transmitting power (P) in Watts.

The minimum permissible attenuation level of any spurious emissions is  $43 + 10 \log (P)$  dB where transmitting power (P) in Watts.

#### **TEST PROCEDURE**

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

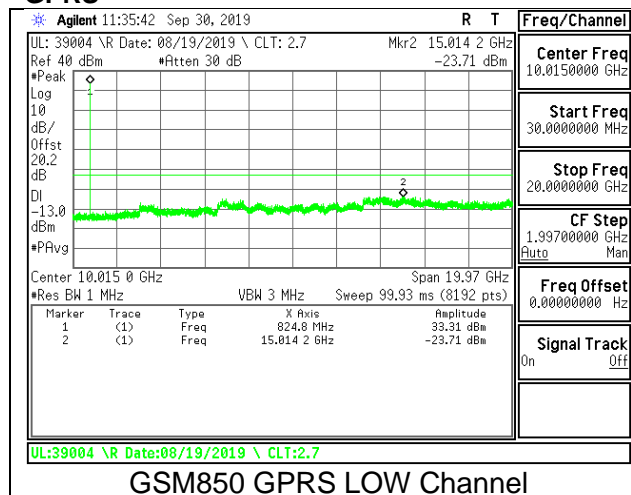
For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

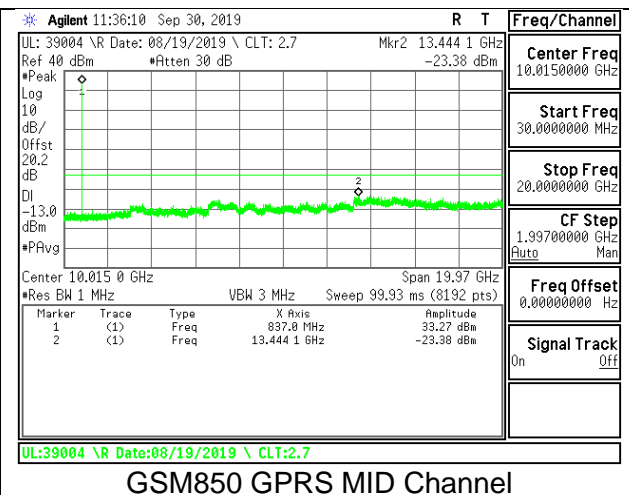
#### **RESULTS**

### 8.3.1. GSM850

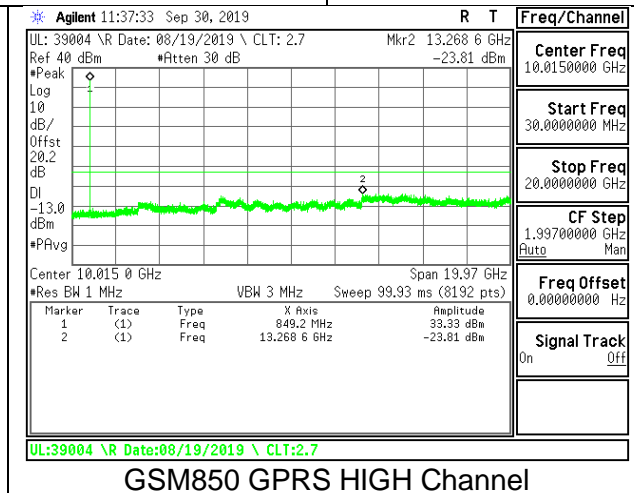
#### GPRS



GSM850 GPRS LOW Channel

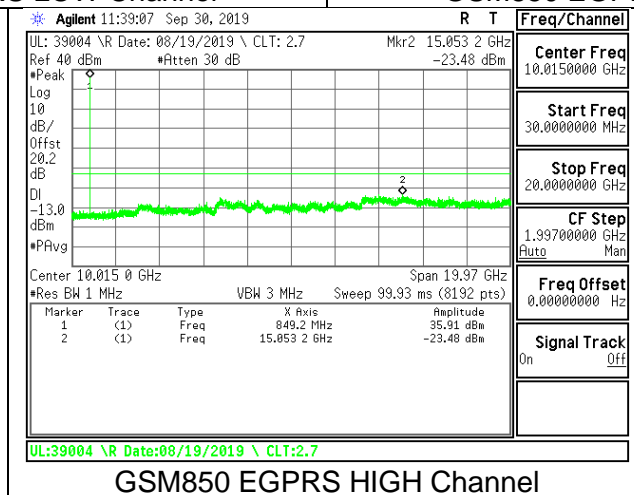
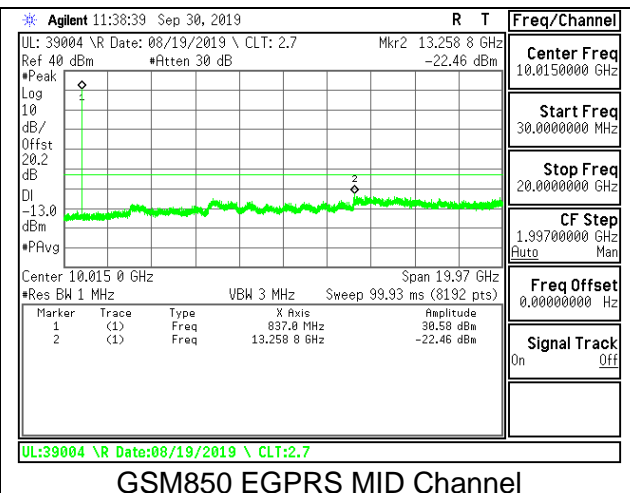
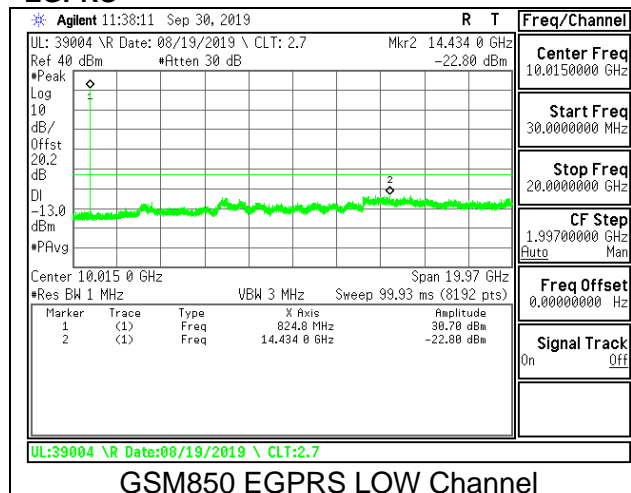


GSM850 GPRS MID Channel



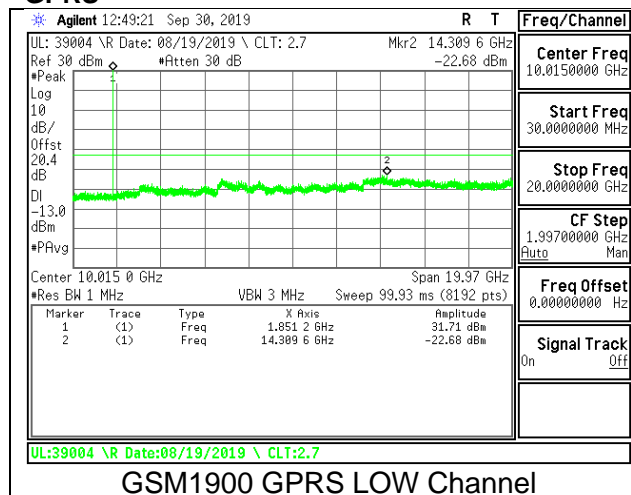
GSM850 GPRS HIGH Channel

**EGPRS**

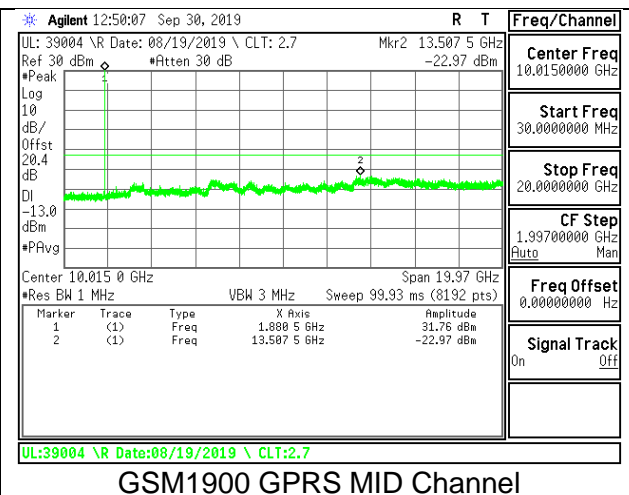


### 8.3.2. GSM1900

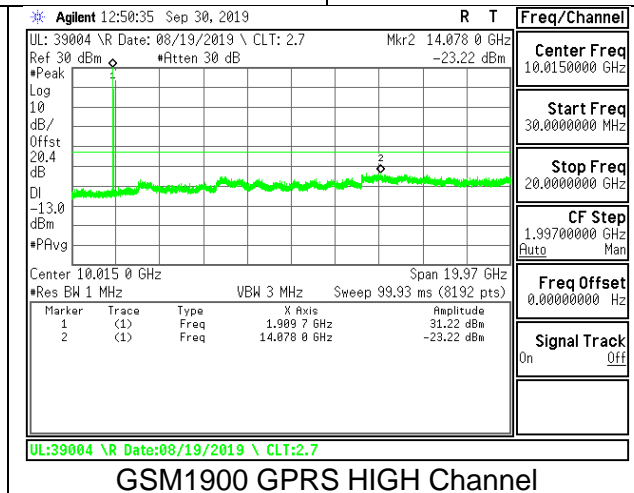
#### GPRS



GSM1900 GPRS LOW Channel



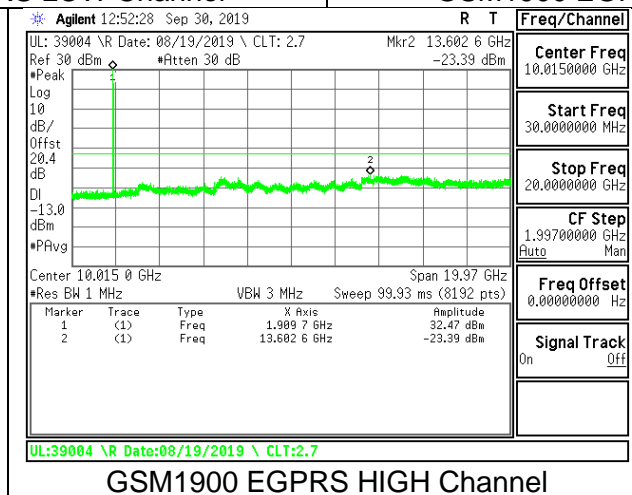
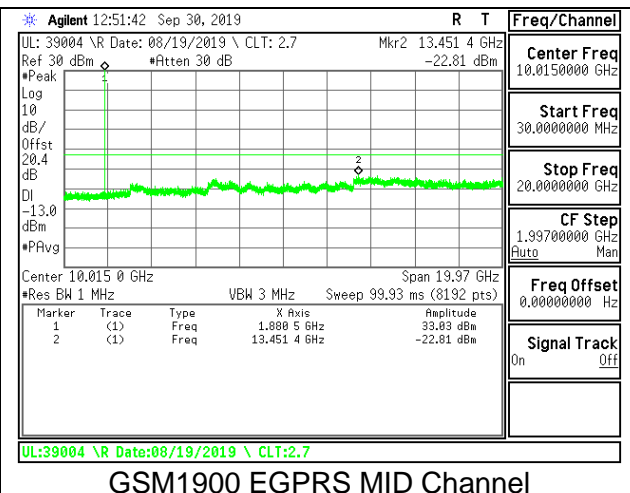
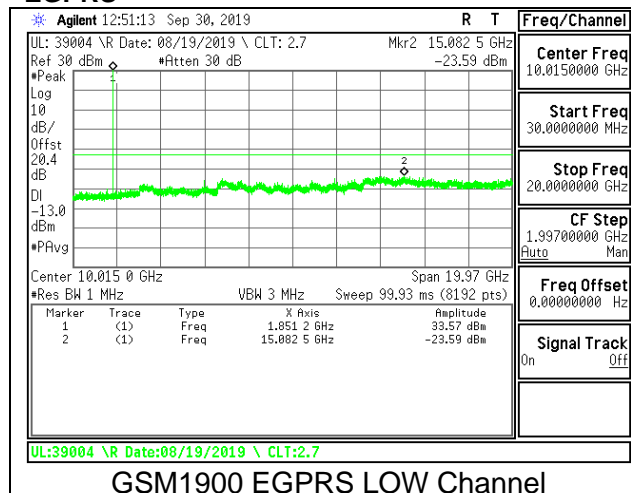
GSM1900 GPRS MID Channel



GSM1900 GPRS HIGH Channel

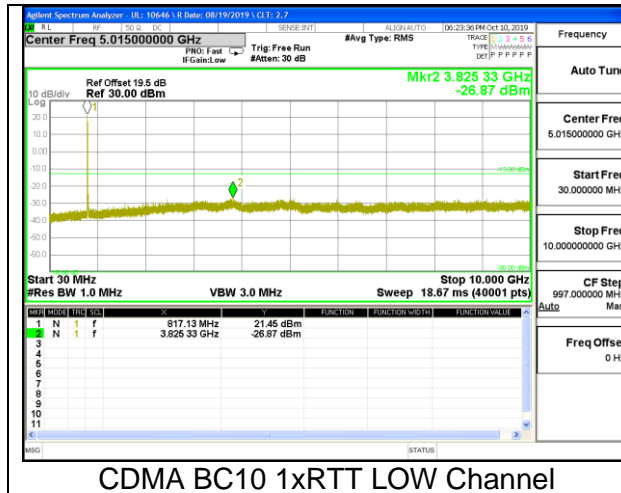


**EGPRS**

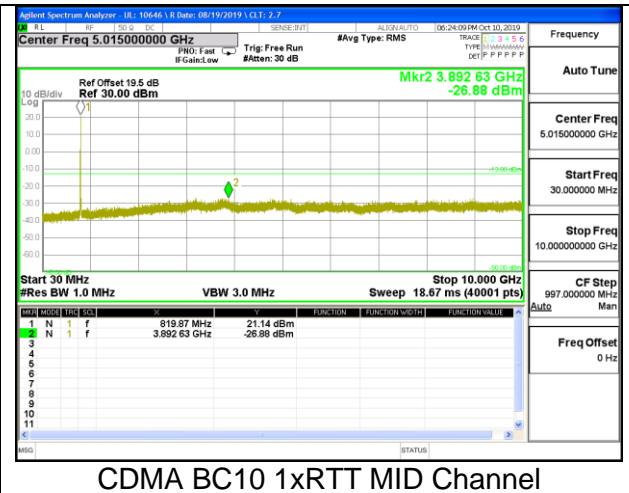


### 8.3.3. CDMA BC10

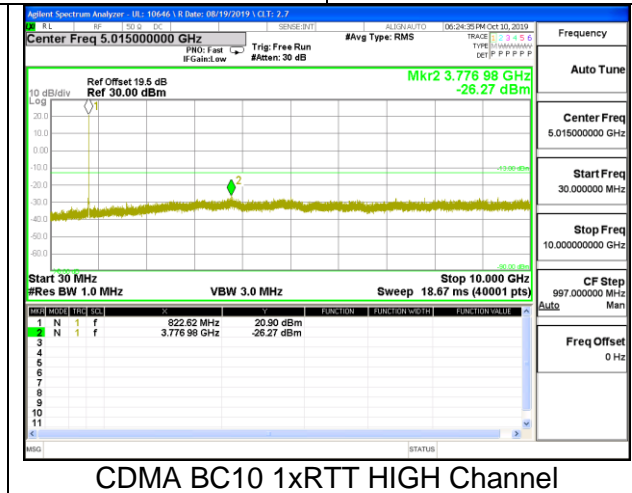
#### 1xRTT



CDMA BC10 1xRTT LOW Channel

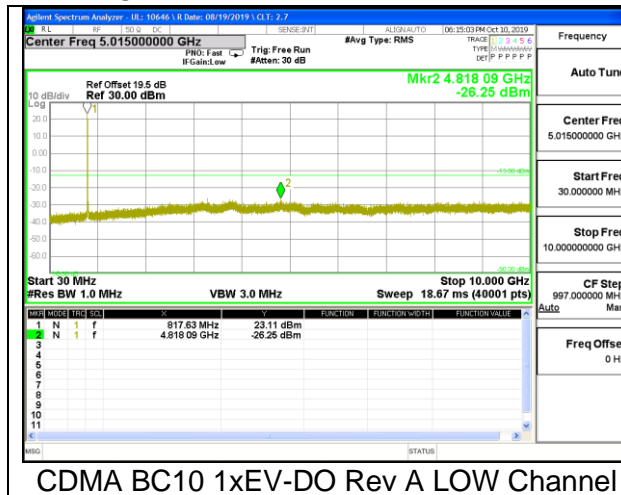


CDMA BC10 1xRTT MID Channel

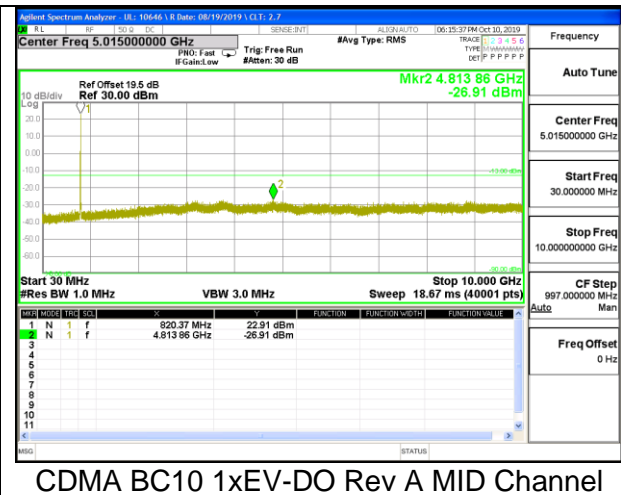


CDMA BC10 1xRTT HIGH Channel

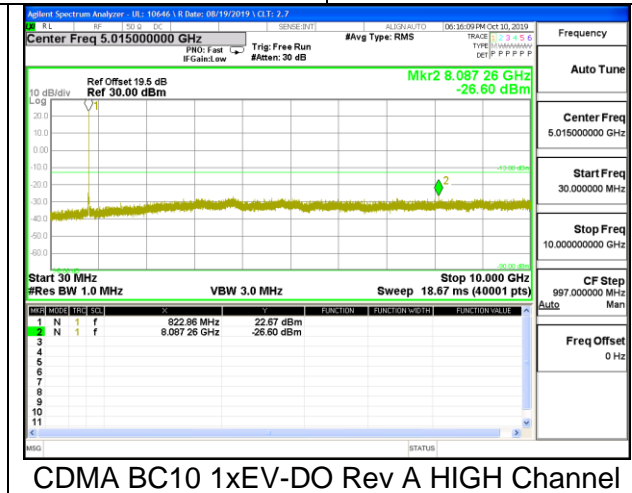
1xEV-DO



CDMA BC10 1xEV-DO Rev A LOW Channel



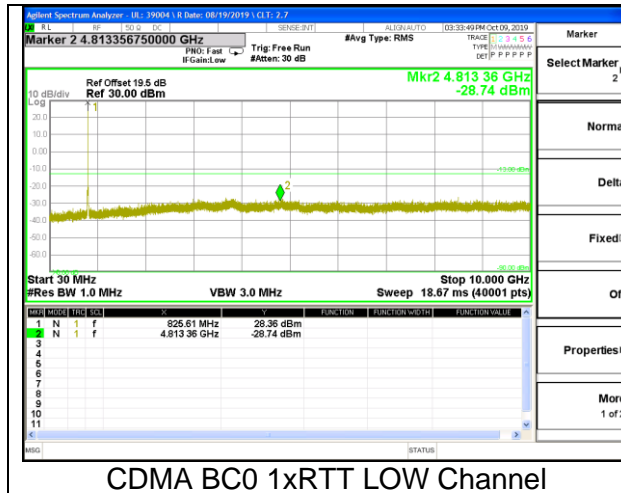
CDMA BC10 1xEV-DO Rev A MID Channel



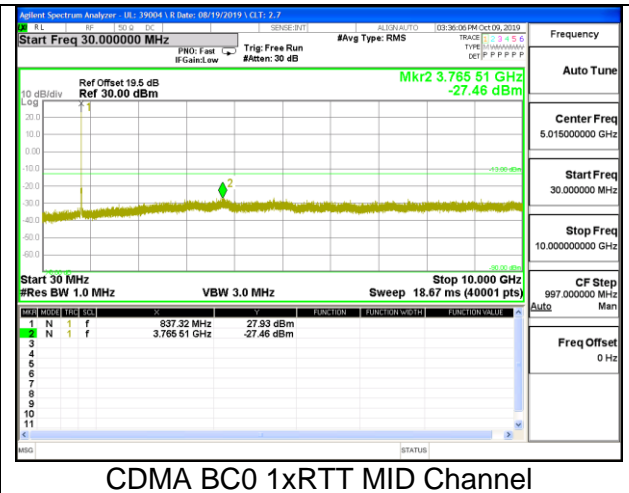
CDMA BC10 1xEV-DO Rev A HIGH Channel

### 8.3.4. CDMA BC0

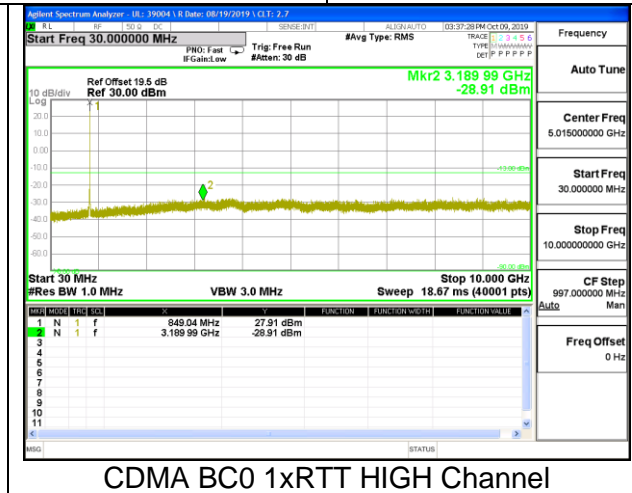
#### 1xRTT



CDMA BC0 1xRTT LOW Channel

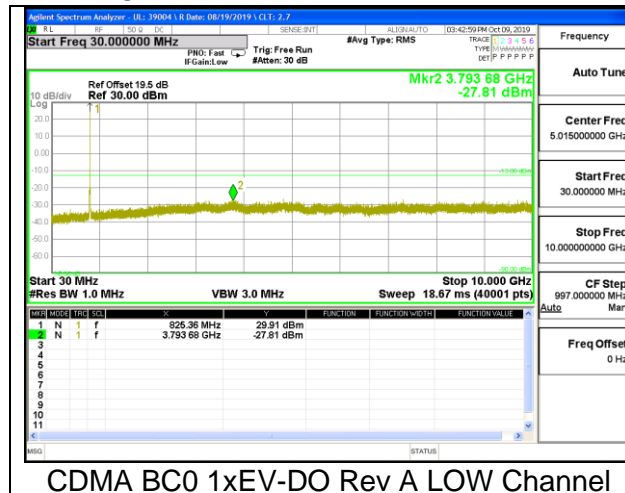


CDMA BC0 1xRTT MID Channel

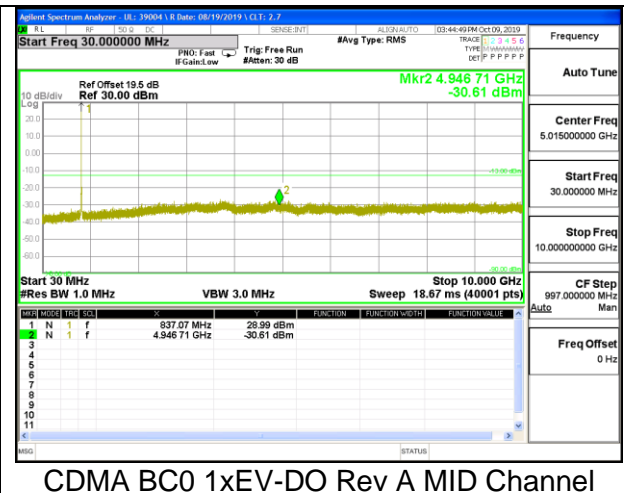


CDMA BC0 1xRTT HIGH Channel

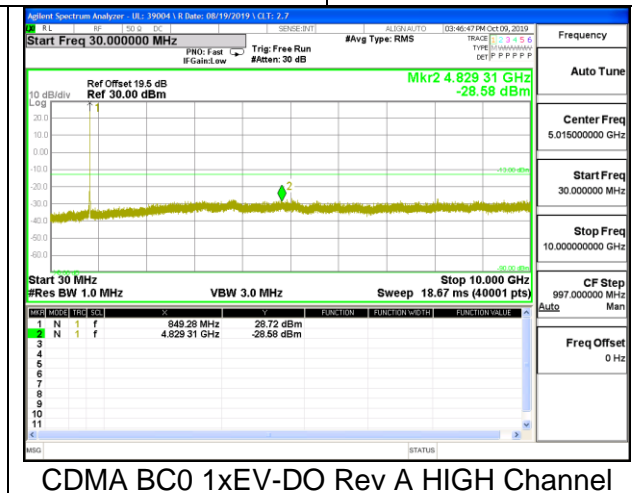
1xEV-DO



CDMA BC0 1xEV-DO Rev A LOW Channel



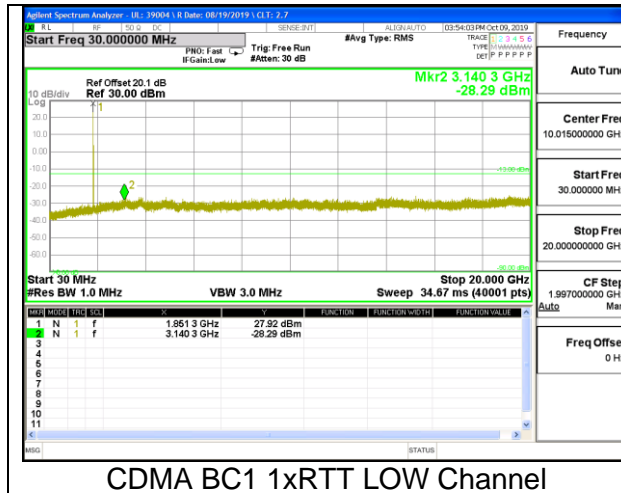
CDMA BC0 1xEV-DO Rev A MID Channel



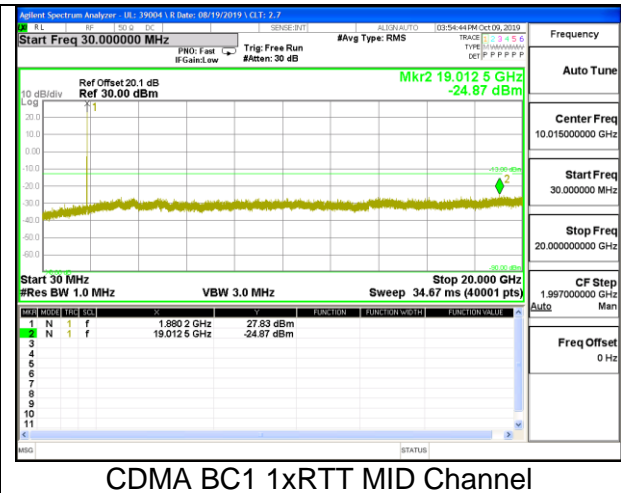
CDMA BC0 1xEV-DO Rev A HIGH Channel

### 8.3.5. CDMA BC1

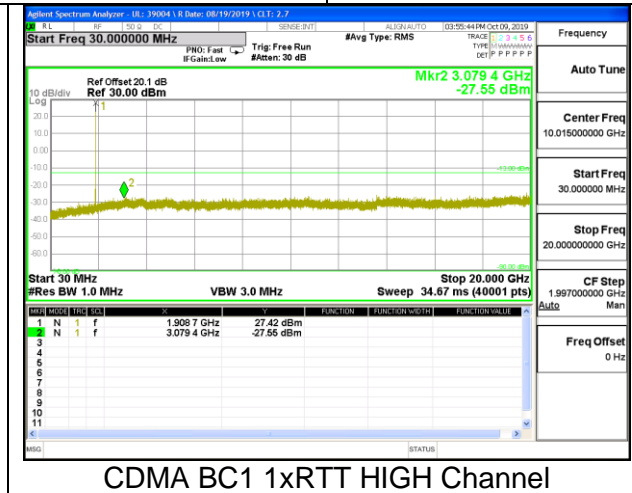
#### 1xRTT



CDMA BC1 1xRTT LOW Channel

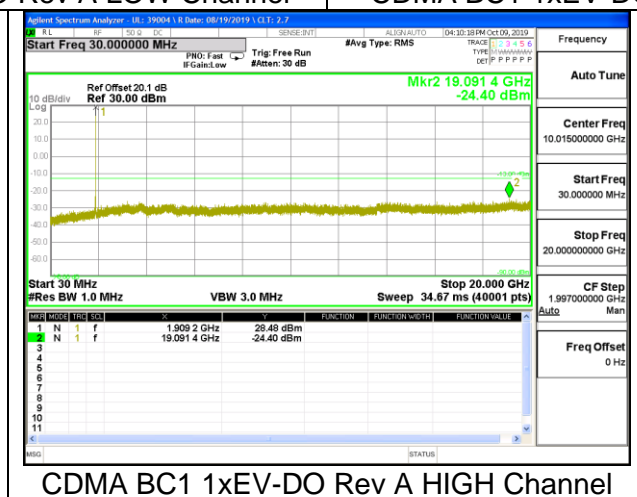
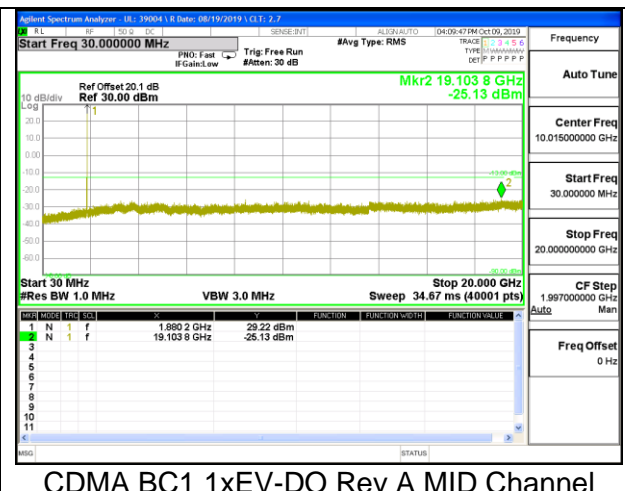
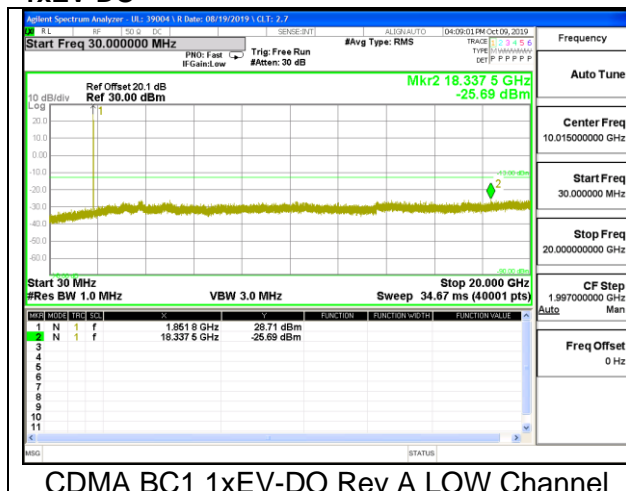


CDMA BC1 1xRTT MID Channel



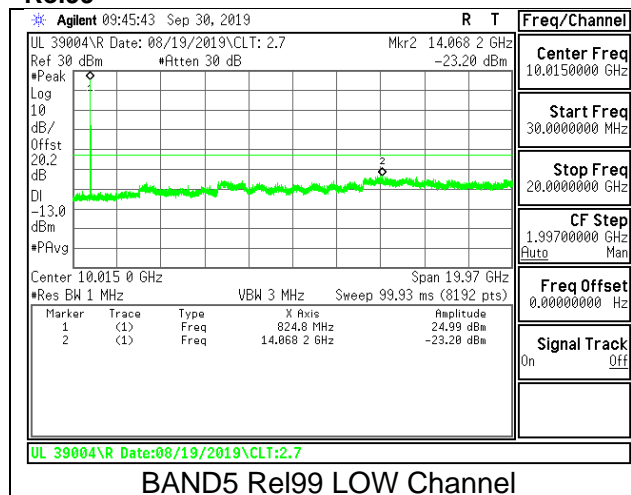
CDMA BC1 1xRTT HIGH Channel

1xEV-DO

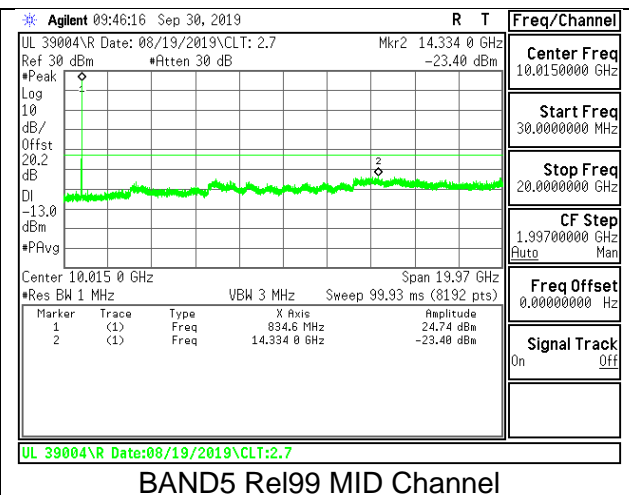


### 8.3.6. WCDMA BAND5

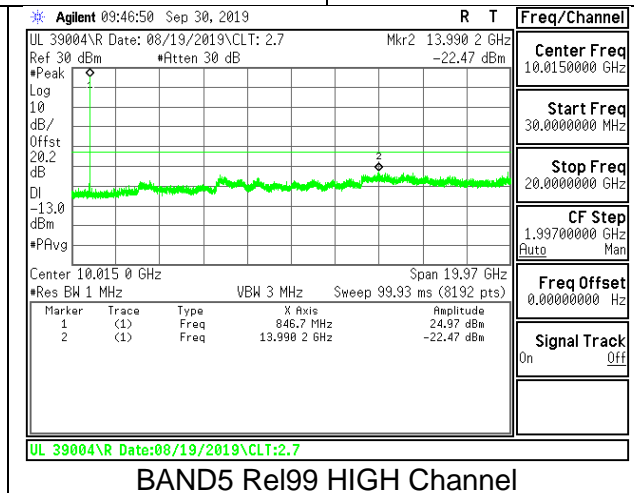
#### Rel99



BAND5 Rel99 LOW Channel



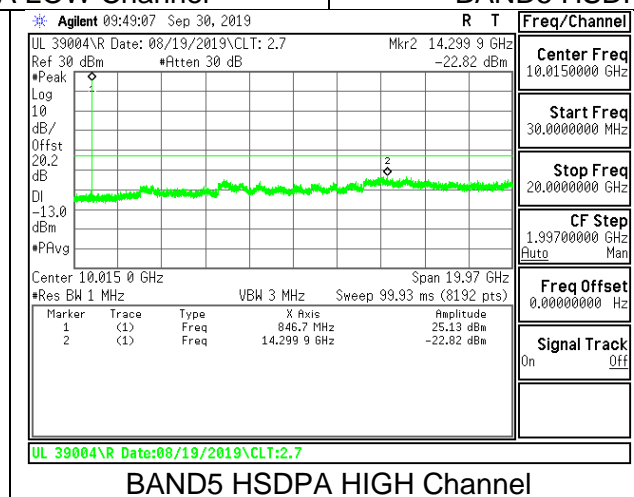
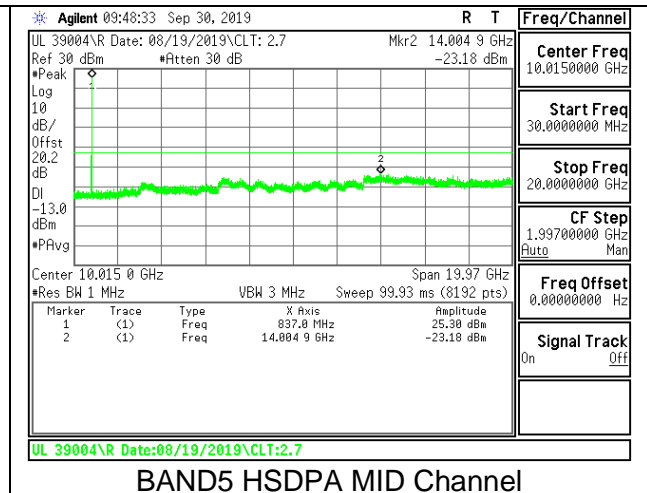
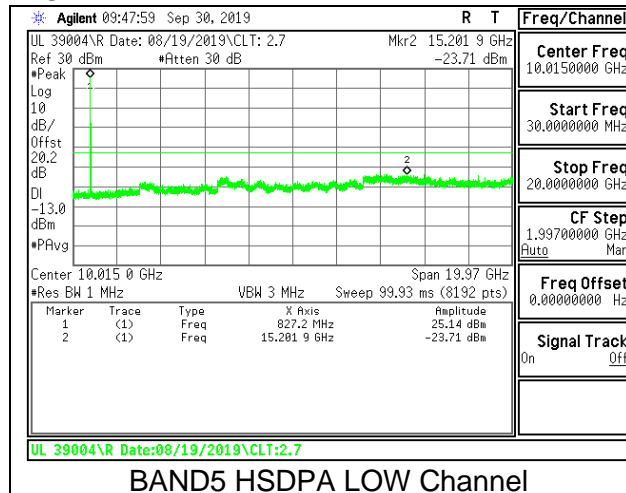
BAND5 Rel99 MID Channel



BAND5 Rel99 HIGH Channel

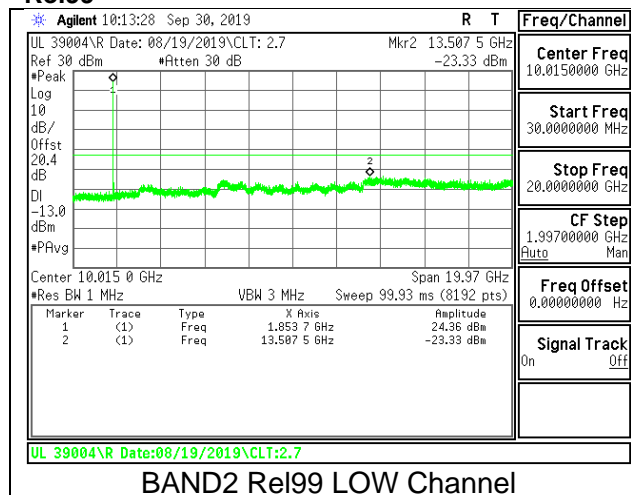


**HSDPA**

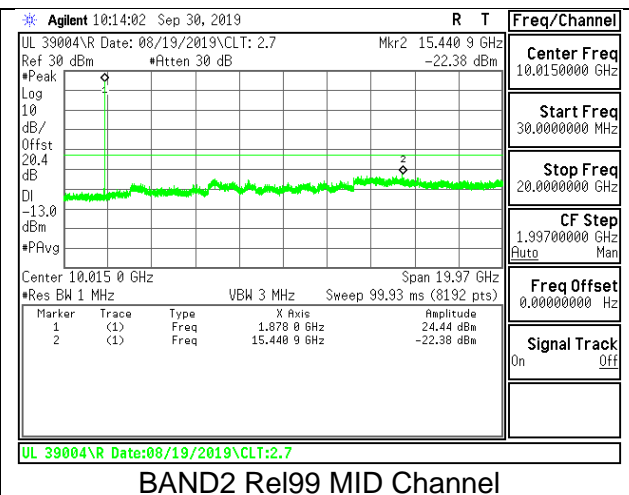


### 8.3.7. WCDMA BAND2

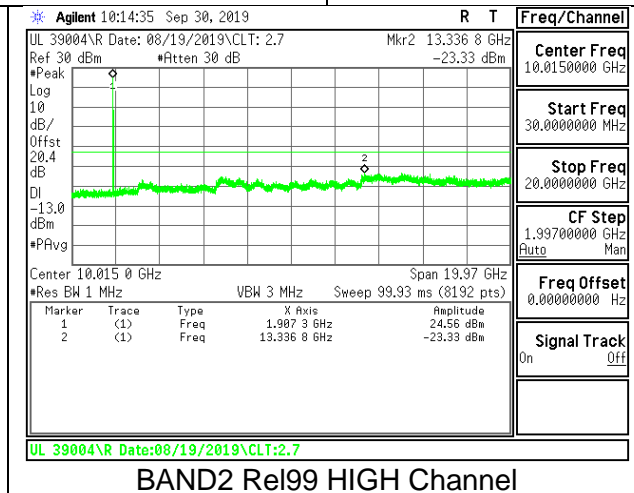
#### Rel99



BAND2 Rel99 LOW Channel

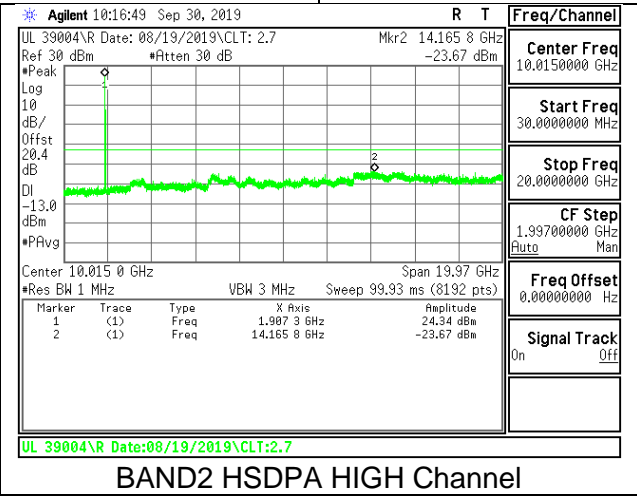
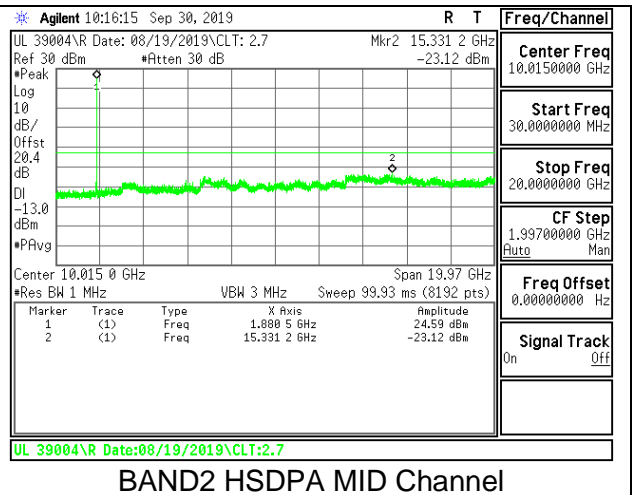
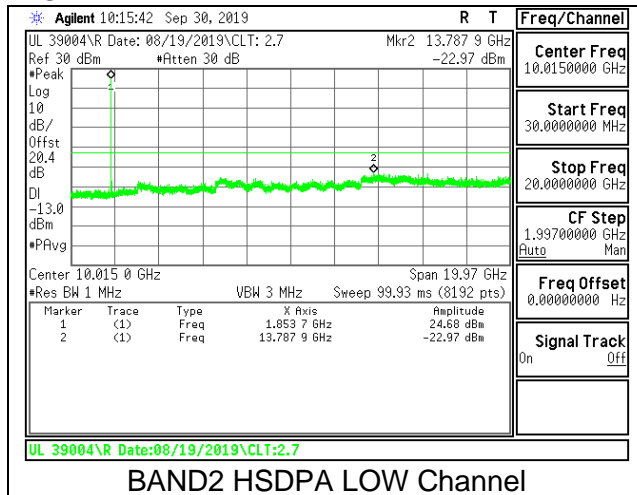


BAND2 Rel99 MID Channel



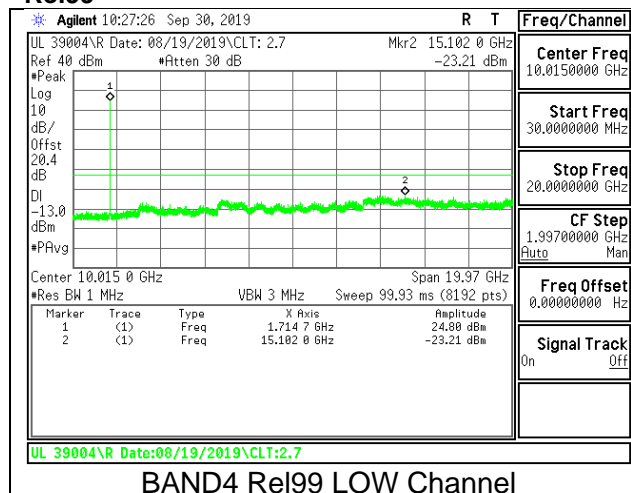
BAND2 Rel99 HIGH Channel

**HSDPA**

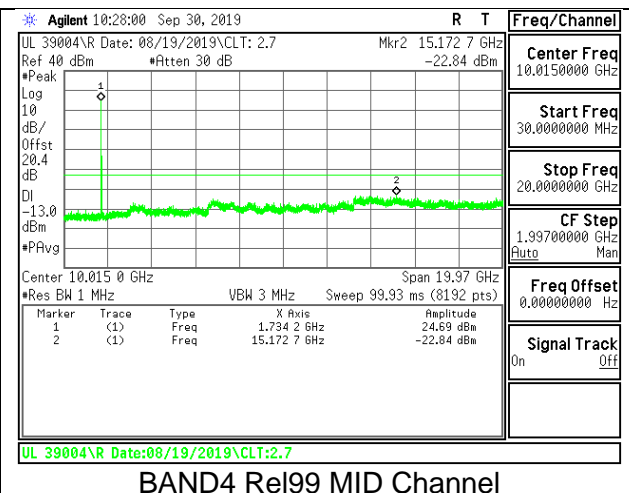


### 8.3.8. WCDMA BAND4

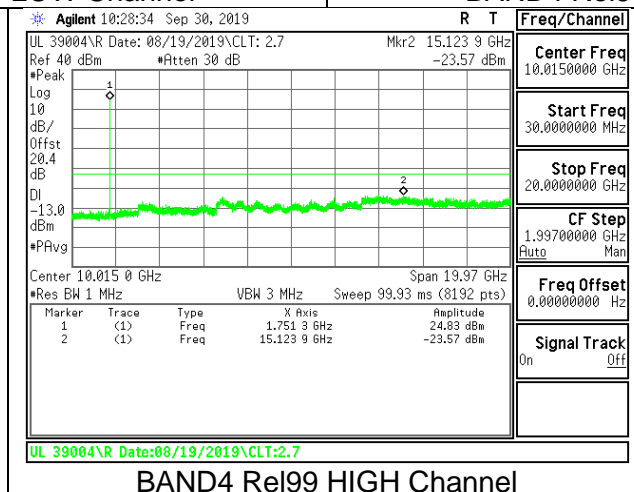
#### Rel99



BAND4 Rel99 LOW Channel

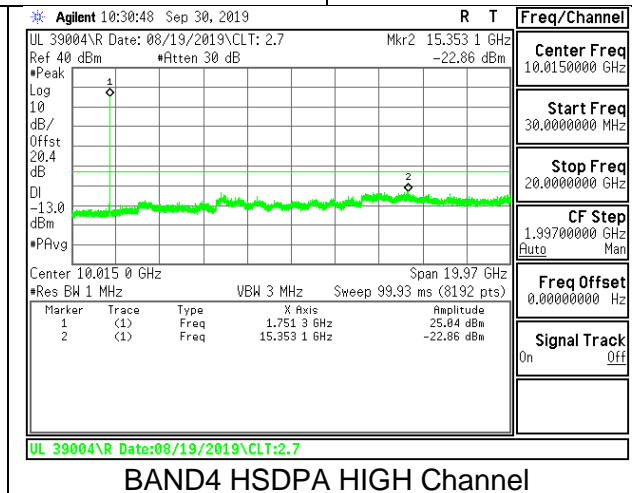
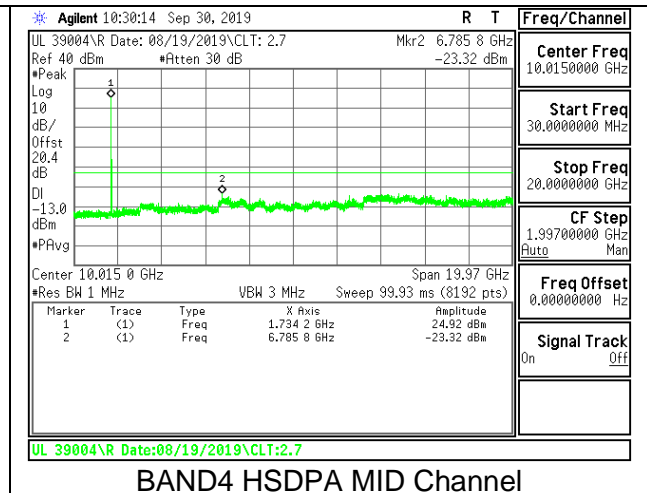
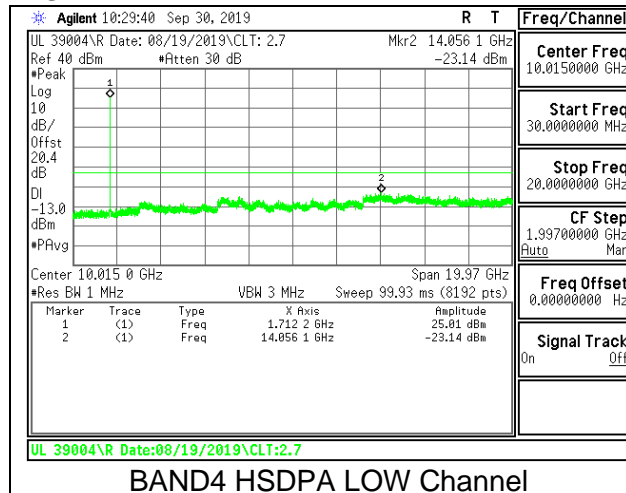


BAND4 Rel99 MID Channel



BAND4 Rel99 HIGH Channel

**HSDPA**



## 8.4. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213  
IC: RSS132§5.3; RSS133§6.3 and RSS139§6.4

### LIMITS

FCC §22.355, §90.213

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

FCC §24.235 & §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

RSS132§5.3

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  SRSP for mobile stations and  $\pm 1.5$  ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within each of the sub-bands (see Section 5.1) when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS133§6.3

The carrier frequency shall not depart from the reference frequency, in excess of  $\pm 2.5$  ppm for mobile stations and  $\pm 1.0$  ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS139§6.4

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.

End Voltage, 3.2VDC.

#### **Frequency Stability vs Temperature:**

The EUT is placed inside a temperature chamber. The temperature is set to  $20^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

#### **Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case).

### RESULTS

See the following pages.

**8.4.1. GSM**

<b>ID:</b>	30606	<b>Date:</b>	10/18/19
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**GSM GPRS GSM850**

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0417	848.9576		
Extreme (50C)		824.0417	848.9576	-6.9	-0.01
Extreme (40C)		824.0417	848.9576	-5.4	-0.01
Extreme (30C)		824.0417	848.9576	2.5	0.00
Extreme (10C)		824.0417	848.9576	2.6	0.00
Extreme (0C)		824.0417	848.9576	2.1	0.00
Extreme (-10C)		824.0417	848.9576	5.4	0.01
Extreme (-20C)		824.0417	848.9576	2.9	0.00
Extreme (-30C)		824.0417	848.9576	4.1	0.00
20C	15%	824.0417	848.9576	-0.6	0.00
	-15%	824.0417	848.9576	-4.3	-0.01
	End Point	824.0417	848.9576	3.7	0.00

**GSM GPRS GSM1900**

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.0428	1909.9597		
Extreme (50C)		1850.0428	1909.9597	-7.1	0.00
Extreme (40C)		1850.0428	1909.9597	-3.7	0.00
Extreme (30C)		1850.0428	1909.9597	-0.7	0.00
Extreme (10C)		1850.0428	1909.9597	3.1	0.00
Extreme (0C)		1850.0428	1909.9597	1.8	0.00
Extreme (-10C)		1850.0428	1909.9597	4.3	0.00
Extreme (-20C)		1850.0428	1909.9597	3.1	0.00
Extreme (-30C)		1850.0428	1909.9597	3.5	0.00
20C	15%	1850.0428	1909.9597	-9.3	0.00
	-15%	1850.0428	1909.9597	3.7	0.00
	End Point	1850.0428	1909.9597	4.2	0.00

**8.4.2. CDMA**

<b>ID:</b>	30606	<b>Date:</b>	10/18/19
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**CDMA 1xRTT BC10**

Limit		816.35	823.65	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	816.5604	823.4415		
Extreme (50C)		816.5604	823.4415	-2.3	0.00
Extreme (40C)		816.5604	823.4415	2.0	0.00
Extreme (30C)		816.5604	823.4415	-2.1	0.00
Extreme (10C)		816.5604	823.4415	-1.8	0.00
Extreme (0C)		816.5604	823.4415	1.0	0.00
Extreme (-10C)		816.5604	823.4415	-1.0	0.00
Extreme (-20C)		816.5604	823.4415	-1.3	0.00
Extreme (-30C)		816.5604	823.4415	0.5	0.00
20C	15%	816.5604	823.4415	-1.5	0.00
	-15%	816.5604	823.4415	-0.8	0.00
	End Point	816.5604	823.4415	1.3	0.00

**CDMA 1xRTT BC0**

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0103	848.9984		
Extreme (50C)		824.0103	848.9984	-2.1	0.00
Extreme (40C)		824.0103	848.9984	0.4	0.00
Extreme (30C)		824.0103	848.9984	0.8	0.00
Extreme (10C)		824.0103	848.9984	-1.0	0.00
Extreme (0C)		824.0103	848.9984	0.2	0.00
Extreme (-10C)		824.0103	848.9984	-2.3	0.00
Extreme (-20C)		824.0103	848.9984	1.4	0.00
Extreme (-30C)		824.0103	848.9984	-2.5	0.00
20C	15%	824.0103	848.9984	-1.3	0.00
	-15%	824.0103	848.9984	-0.9	0.00
	End Point	824.0103	848.9984	-2.2	0.00



**CDMA 1xRTT BC1**

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.5623	1909.4396		
Extreme (50C)		1850.5623	1909.4396	1.0	0.00
Extreme (40C)		1850.5623	1909.4396	2.4	0.00
Extreme (30C)		1850.5623	1909.4396	2.3	0.00
Extreme (10C)		1850.5623	1909.4396	2.3	0.00
Extreme (0C)		1850.5623	1909.4396	-0.5	0.00
Extreme (-10C)		1850.5623	1909.4396	2.3	0.00
Extreme (-20C)		1850.5623	1909.4396	-1.0	0.00
Extreme (-30C)		1850.5623	1909.4396	2.2	0.00
20C	15%	1850.5623	1909.4396	1.8	0.00
	-15%	1850.5623	1909.4396	1.4	0.00
	End Point	1850.5623	1909.4396	2.3	0.00

**8.4.3. WCDMA**

<b>ID:</b>	30606	<b>Date:</b>	10/18/19
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**WCDMA Rel99 BAND5**

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.1830	848.8000		
Extreme (50C)		824.1830	848.8000	-3.5	0.00
Extreme (40C)		824.1830	848.8000	-3.3	0.00
Extreme (30C)		824.1830	848.8000	-2.9	0.00
Extreme (10C)		824.1830	848.8000	-3.7	0.00
Extreme (0C)		824.1830	848.8000	-3.9	0.00
Extreme (-10C)		824.1830	848.8000	-3.9	0.00
Extreme (-20C)		824.1830	848.8000	-3.0	0.00
Extreme (-30C)		824.1830	848.8000	-4.9	-0.01
20C	15%	824.1830	848.8000	-3.2	0.00
	-15%	824.1830	848.8000	-4.1	0.00
	End Point	824.1830	848.8000	-5.3	-0.01

**WCDMA Rel99 BAND2**

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.2000	1909.7830		
Extreme (50C)		1850.2000	1909.7830	-8.1	0.00
Extreme (40C)		1850.2000	1909.7830	4.1	0.00
Extreme (30C)		1850.2000	1909.7830	2.3	0.00
Extreme (10C)		1850.2000	1909.7830	1.7	0.00
Extreme (0C)		1850.2000	1909.7830	0.9	0.00
Extreme (-10C)		1850.2000	1909.7830	5.2	0.00
Extreme (-20C)		1850.2000	1909.7830	2.6	0.00
Extreme (-30C)		1850.2000	1909.7830	3.8	0.00
20C	15%	1850.2000	1909.7830	3.2	0.00
	-15%	1850.2000	1909.7830	-5.3	0.00
	End Point	1850.2000	1909.7830	-4.1	0.00

**WCDMA Rel99 BAND4**

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1710.1830	1754.8000		
Extreme (50C)		1710.1830	1754.8000	7.5	0.00
Extreme (40C)		1710.1830	1754.8000	8.7	0.01
Extreme (30C)		1710.1830	1754.8000	7.4	0.00
Extreme (10C)		1710.1830	1754.8000	8.9	0.01
Extreme (0C)		1710.1830	1754.8000	-15.2	-0.01
Extreme (-10C)		1710.1830	1754.8000	-9.8	-0.01
Extreme (-20C)		1710.1830	1754.8000	9.1	0.01
Extreme (-30C)		1710.1830	1754.8000	-8.8	-0.01
20C	15%	1710.1830	1754.8000	7.6	0.00
	-15%	1710.1830	1754.8000	8.2	0.00
	End Point	1710.1830	1754.8000	-7.5	0.00

## 8.5. PEAK TO AVERAGE RATIO

### LIMITS

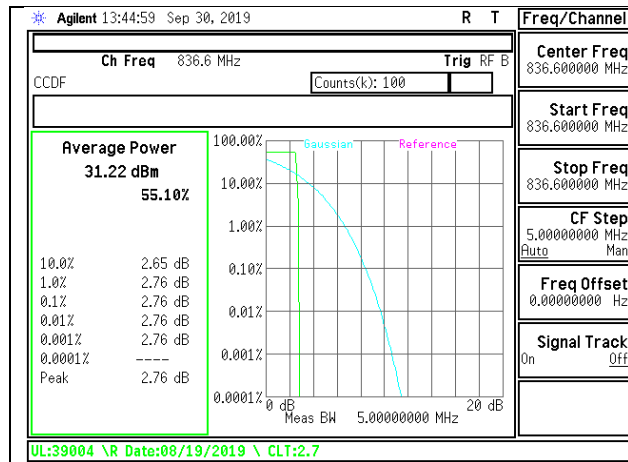
In addition, the peak to average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

### RESULT

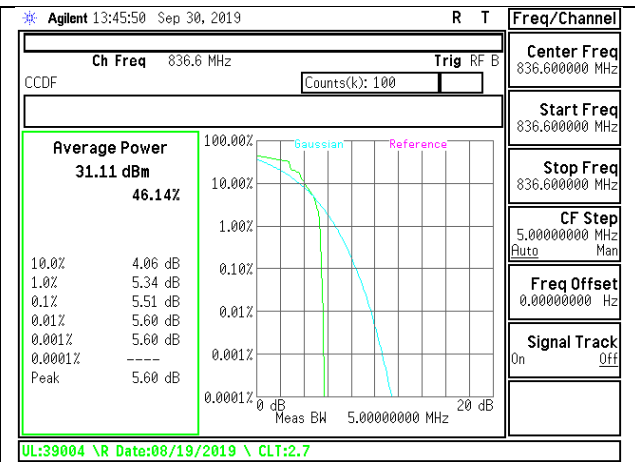
LAT 1 antenna was used to measure as the worst case. The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

**8.5.1. GSM**

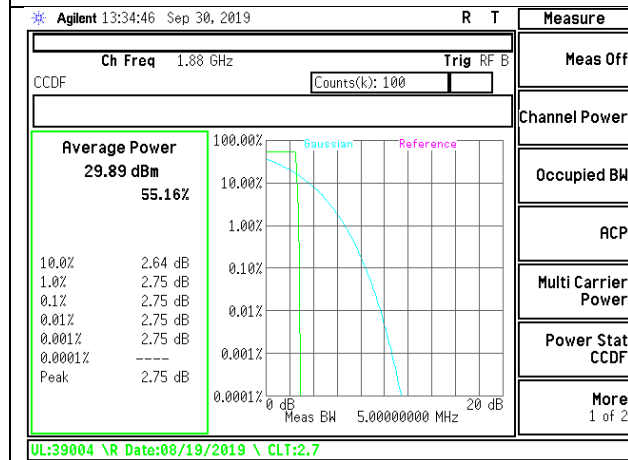
<b>ID:</b>	39004	<b>Date:</b>	9/30/19
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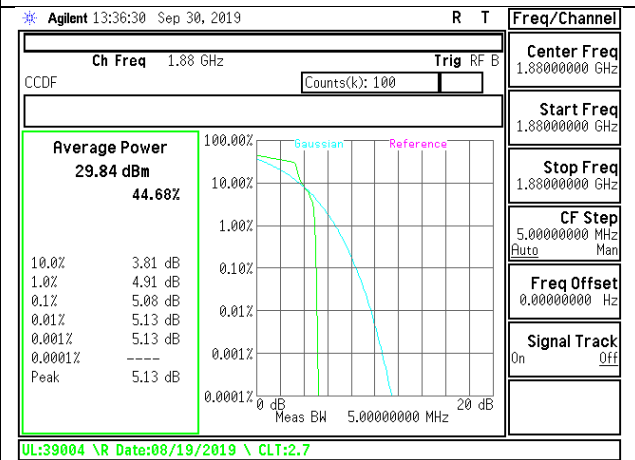
**GSM 850MHz GPRS MID Channel**



**GSM 850MHz EGPRS MID Channel**

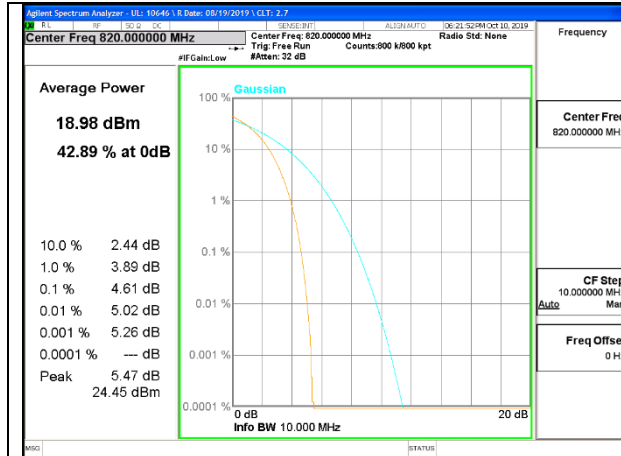


**GSM 1900MHz GPRS MID Channel**

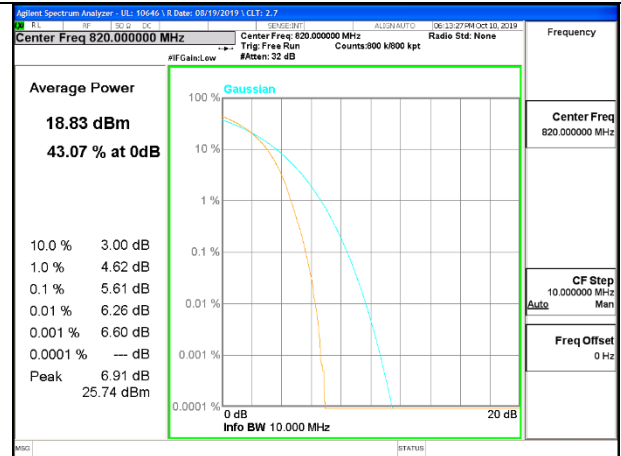


**GSM 1900MHz EGPRS MID Channel**

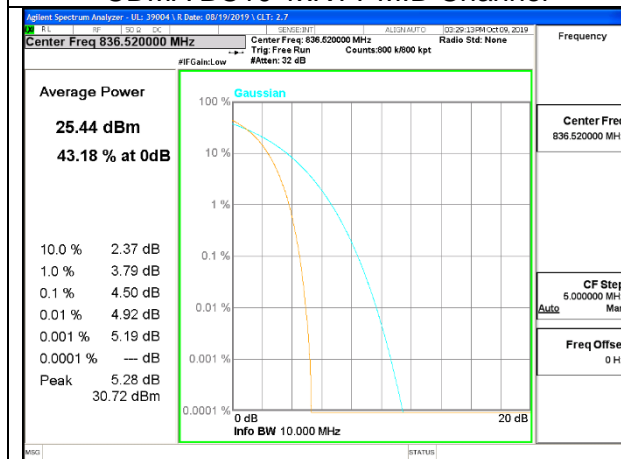
### 8.5.2. CDMA



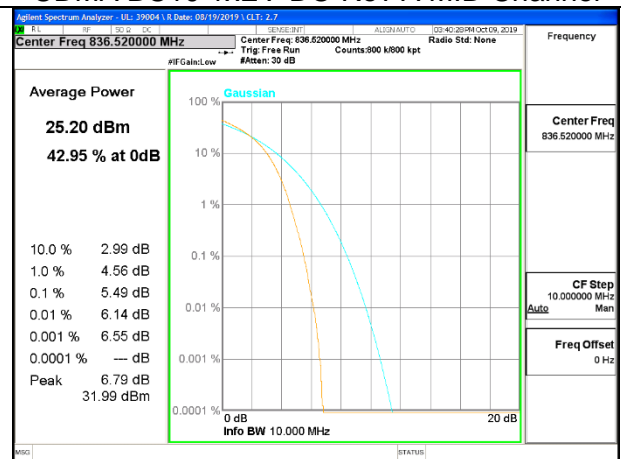
CDMA BC10 1xRTT MID Channel



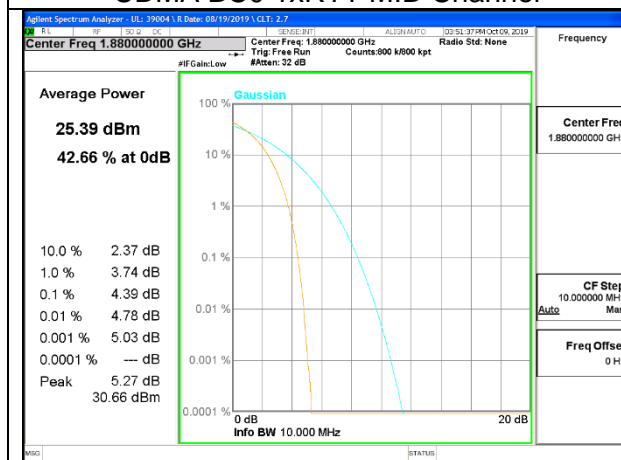
CDMA BC10 1xEV-DO Rev A MID Channel



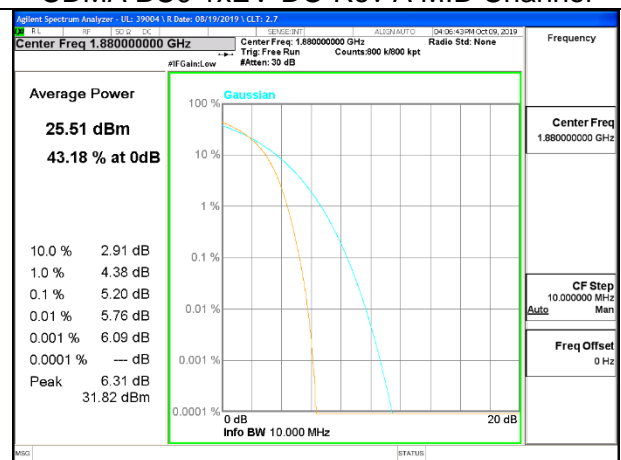
CDMA BC0 1xRTT MID Channel



CDMA BC0 1xEV-DO Rev A MID Channel



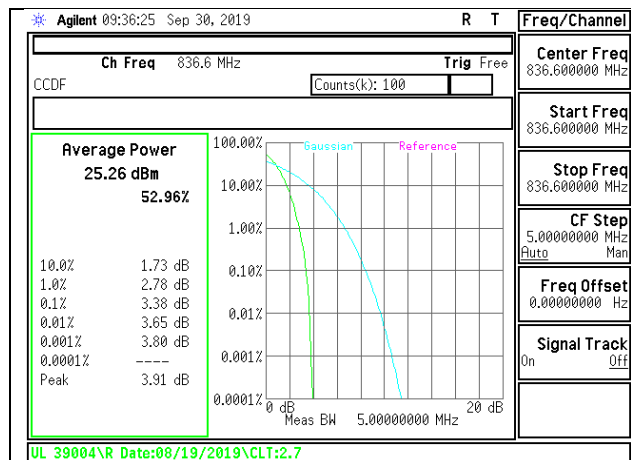
CDMA BC1 1xRTT MID Channel



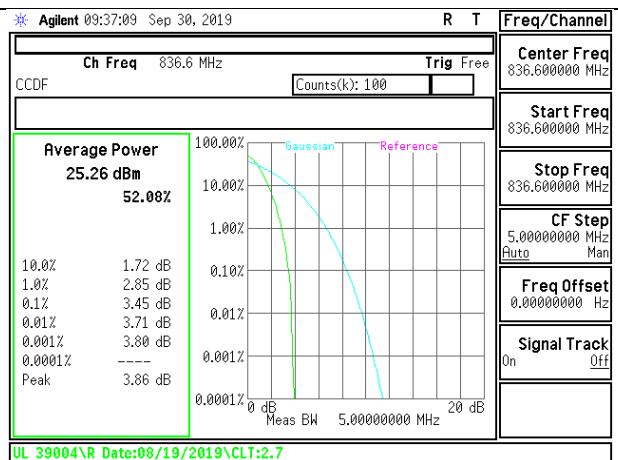
CDMA BC1 1xEV-DO Rev A MID Channel

**8.5.3. WCDMA**

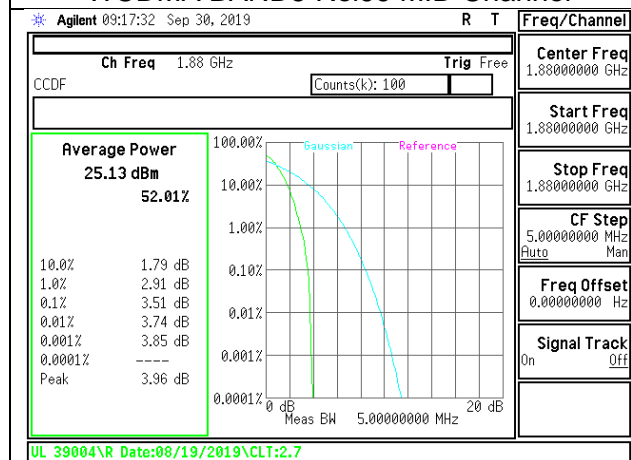
<b>ID:</b>	39004	<b>Date:</b>	9/30/19
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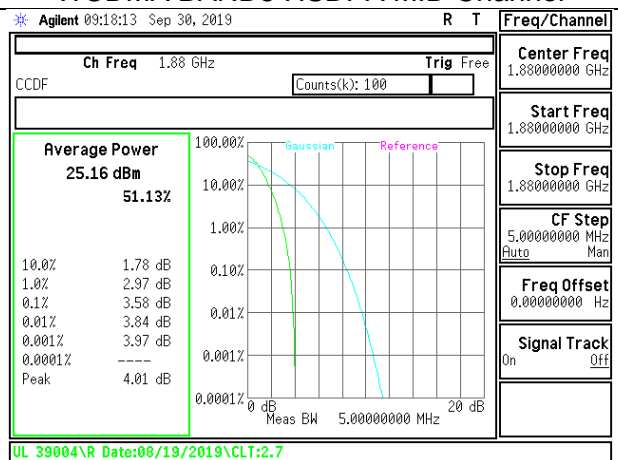
WCDMA BAND5 Rel99 MID Channel



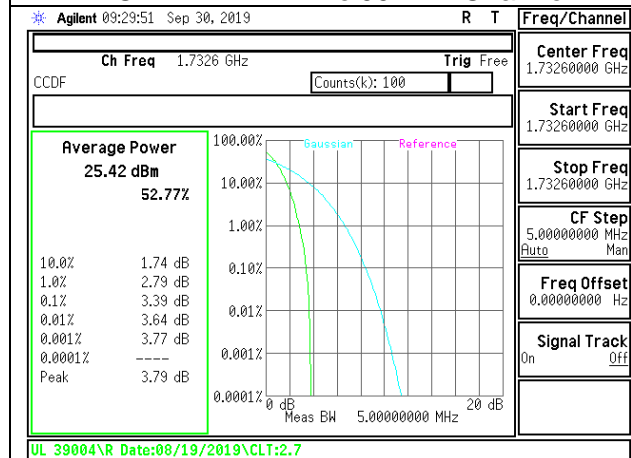
WCDMA BAND5 HSDPA MID Channel



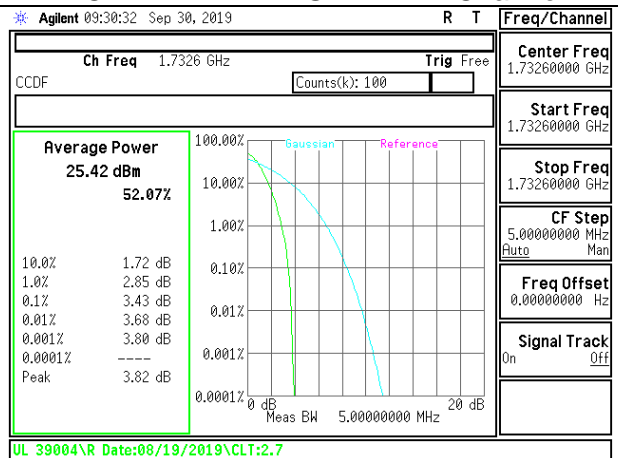
WCDMA BAND2 Rel99 MID Channel



WCDMA BAND2 HSDPA MID Channel



WCDMA BAND4 Rel99 MID Channel



WCDMA BAND4 HSDPA MID Channel

## 9. RADIATED TEST RESULTS

### 9.1. FIELD STRENGTH OF SPURIOUS RADIATION, LAT 1

#### RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691.  
IC: RSS132§5.5; RSS133§6.5 and RSS139§6.6

#### LIMIT

FCC: §22.917(a), §24.238(a), §27.53 (h), §90.691

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.

#### RSS132§5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P ( dBW) by at least  $43 + 10 \log_{10} p$  (watts).
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10} p$  (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

#### RSS133§6.5

Equipment shall comply with the limits in (i) and (ii) below.

- (i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10} p$  (watts).
- (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10} p$  (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

#### RSS139§6.6

- (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, Footnote 2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.
- (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

#### TEST PROCEDURE

KDB 971168 D01

#### RESULTS



**9.1.1. GSM**

**GSM 850MHz**

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	12492
Configuration:	EUT only
Mode:	GSM850 GPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.2MHz									
1.64802	-61.43	Pk	28.7	-31.7	11.2	-53.23	-13	-40.23	V
1.64859	-61.1	Pk	28.7	-31.7	12.1	-52	-13	-39	H
2.46658	-66.25	Pk	32.6	-30.6	11.9	-52.35	-13	-39.35	H
2.47317	-67	Pk	32.5	-30.6	11.5	-53.6	-13	-40.6	V
3.29608	-67.15	Pk	32.9	-29.6	11.4	-52.45	-13	-39.45	H
3.30128	-67.32	Pk	32.9	-29.5	11.2	-52.72	-13	-39.72	V
Mid Channel 836.6MHz									
1.67326	-59.66	Pk	28.9	-31.6	12.6	-49.76	-13	-36.76	H
3.34802	-67.02	Pk	32.8	-29.3	10.5	-53.02	-13	-40.02	H
1.67283	-62.02	Pk	28.9	-31.6	11.4	-53.32	-13	-40.32	V
2.50897	-66.27	Pk	32.6	-30.6	11.4	-52.87	-13	-39.87	H
2.5109	-66.29	Pk	32.6	-30.7	11.7	-52.69	-13	-39.69	V
3.34551	-66.53	Pk	32.8	-29.3	11	-52.03	-13	-39.03	V
High Channel 848.8MHz									
1.69726	-64.86	Pk	28.8	-31.6	12.6	-55.06	-13	-42.06	H
1.6978	-65.44	Pk	28.8	-31.6	12.9	-55.34	-13	-42.34	V
2.5468	-66.86	Pk	32.6	-30.5	12.1	-52.66	-13	-39.66	H
2.55231	-66.58	Pk	32.5	-30.5	12.1	-52.48	-13	-39.48	V
3.3926	-67.5	Pk	32.7	-29.1	11.2	-52.7	-13	-39.7	H
3.39308	-67.14	Pk	32.7	-29.1	11.1	-52.44	-13	-39.44	V

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	GSM850 EGPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.2MHz									
1.66563	-79	Pk	28.7	-31.6	12.4	-69.5	-13	-56.5	H
1.94606	-77.43	Pk	31	-31.3	12.9	-64.83	-13	-51.83	V
2.29613	-76.84	Pk	31.9	-30.9	12.2	-63.64	-13	-50.64	H
2.65918	-76.9	Pk	32.6	-30.2	12	-62.5	-13	-49.5	V
3.76527	-70.4	Pk	33.6	-28.9	11.6	-54.1	-13	-41.1	H
3.84293	-70.57	Pk	33.7	-28.7	11.1	-54.47	-13	-41.47	V
Mid Channel 836.6MHz									
1.82218	-78.4	Pk	30.6	-31.4	12.1	-67.1	-13	-54.1	H
1.89561	-78.69	Pk	30.8	-31.4	12.4	-66.89	-13	-53.89	V
2.55502	-76.23	Pk	32.5	-30.4	12.2	-61.93	-13	-48.93	H
2.63387	-76.09	Pk	32.6	-30.2	13	-60.69	-13	-47.69	V
3.5075	-76.62	Pk	33.9	-29.3	11.4	-60.62	-13	-47.62	H
3.87966	-71.4	Pk	33.6	-28.5	11.8	-54.5	-13	-41.5	V
High Channel 848.8MHz									
1.68211	-78.52	Pk	28.9	-31.6	12.2	-69.02	-13	-56.02	H
1.71838	-78.16	Pk	29.4	-31.5	13.7	-66.56	-13	-53.56	V
2.32351	-76.99	Pk	31.9	-30.8	12.3	-63.59	-13	-50.59	V
2.56696	-76.23	Pk	32.5	-30.4	12.5	-61.63	-13	-48.63	H
3.07113	-75.75	Pk	33.4	-29.7	11.2	-60.85	-13	-47.85	H
3.13082	-76.01	Pk	33.1	-29.6	11.5	-61.01	-13	-48.01	V

Pk - Peak detector

**GSM 1900MHz**

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	GSM1900 GPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.70033	-63.4	Pk	33.2	-28.9	11.2	-47.9	-13	-34.9	H
7.3996	-70.84	Pk	35.7	-23.5	10.6	-48.04	-13	-35.04	H
3.70083	-65.19	Pk	33.2	-28.9	11.4	-49.49	-13	-36.49	V
7.39649	-70.89	Pk	35.6	-23.5	10.9	-47.89	-13	-34.89	V
5.55061	-63.96	Pk	34.8	-27.3	10.8	-45.66	-13	-32.66	H
5.55095	-65.36	Pk	34.8	-27.3	11	-46.86	-13	-33.86	V
Mid Channel, 1880.0MHz									
3.76005	-61.24	Pk	33.5	-28.9	11.6	-45.04	-13	-32.04	H
7.52087	-70.47	Pk	35.7	-23.4	10.4	-47.77	-13	-34.77	H
3.76001	-60.44	Pk	33.5	-28.9	11.1	-44.74	-13	-31.74	V
7.51753	-70.99	Pk	35.7	-23.4	10.7	-47.99	-13	-34.99	V
5.63988	-69.69	Pk	34.8	-27.1	10.7	-51.29	-13	-38.29	H
5.6402	-67.65	Pk	34.9	-27.1	10.8	-49.05	-13	-36.05	V
High Channel, 1909.8MHz									
3.81958	-62.73	Pk	33.7	-28.6	11.6	-46.03	-13	-33.03	H
7.63697	-70.87	Pk	35.8	-23.4	10.7	-47.77	-13	-34.77	H
3.81968	-60.58	Pk	33.7	-28.6	11.4	-44.08	-13	-31.08	V
7.6347	-70.49	Pk	35.8	-23.4	11.2	-46.89	-13	-33.89	V
5.72877	-69.06	Pk	34.8	-26.6	10.6	-50.26	-13	-37.26	H
5.73167	-68.2	Pk	34.9	-26.6	10.5	-49.4	-13	-36.4	V

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	GSM1900 EGPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LTE	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.70304	-66.17	Pk	33.2	-28.9	11.2	-50.67	-13	-37.67	H
7.4027	-70.24	Pk	35.7	-23.5	10.4	-47.64	-13	-34.64	H
3.69786	-66.25	Pk	33.2	-28.9	11.6	-50.35	-13	-37.35	V
7.40463	-71.2	Pk	35.7	-23.5	10.7	-48.3	-13	-35.3	V
5.54816	-68.97	Pk	34.8	-27.3	11	-50.47	-13	-37.47	V
5.55505	-68.51	Pk	34.8	-27.3	10.8	-50.21	-13	-37.21	H
Mid Channel, 1880MHz									
3.76112	-65.74	Pk	33.6	-28.9	11.6	-49.44	-13	-36.44	H
7.52123	-69.41	Pk	35.7	-23.4	10.4	-46.71	-13	-33.71	H
3.75613	-66.29	Pk	33.5	-28.9	11.2	-50.49	-13	-37.49	V
7.51842	-70.32	Pk	35.7	-23.4	10.7	-47.32	-13	-34.32	V
5.6416	-67.63	Pk	34.9	-27.1	10.8	-49.03	-13	-36.03	V
5.64531	-67.75	Pk	34.9	-27.1	10.5	-49.45	-13	-36.45	H
High Channel, 1909.8MHz									
3.81102	-66.87	Pk	33.7	-28.6	11.2	-50.57	-13	-37.57	H
7.63478	-70.06	Pk	35.8	-23.4	10.7	-46.96	-13	-33.96	H
3.81972	-65.91	Pk	33.7	-28.6	11.4	-49.41	-13	-36.41	V
7.62989	-70.4	Pk	35.8	-23.3	11.3	-46.6	-13	-33.6	V
5.72959	-68.54	Pk	34.9	-26.6	10.7	-49.54	-13	-36.54	H
5.73207	-68.93	Pk	34.9	-26.6	10.5	-50.13	-13	-37.13	V

Pk - Peak detector

**9.1.2. CDMA**

**CDMA BC10**

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC10 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	PRE0194893	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 817.25MHz									
1.96455	-64.81	Pk	28	-29.3	9.1	-57.01	-13	-44.01	H
1.98392	-64.89	Pk	28.3	-29.1	11.4	-54.29	-13	-41.29	V
2.51339	-64.63	Pk	30.1	-28.5	9.1	-53.93	-13	-40.93	H
2.67638	-65.6	Pk	29.6	-28	10.3	-53.7	-13	-40.7	V
3.28884	-65.22	Pk	30.8	-27.1	9.6	-51.92	-13	-38.92	V
3.86173	-64.15	Pk	31.5	-26.8	9.1	-50.35	-13	-37.35	H
Mid Channel 820MHz									
1.93753	-64.25	Pk	27.6	-29.2	10.9	-54.95	-13	-41.95	H
1.98487	-65.16	Pk	28.3	-29.1	11.4	-54.56	-13	-41.56	V
2.38329	-65.01	Pk	30.2	-28.8	9.8	-53.81	-13	-40.81	H
2.67878	-64.89	Pk	29.6	-28.1	10.3	-53.09	-13	-40.09	V
3.09994	-64.95	Pk	30.8	-27.7	10.6	-51.25	-13	-38.25	V
3.2229	-65.12	Pk	31.1	-27.4	9.7	-51.72	-13	-38.72	H
High Channel 822.75MHz									
1.98364	-63.97	Pk	28.3	-29.1	11.4	-53.37	-13	-40.37	V
2.08887	-65.12	Pk	28.6	-28.9	11.3	-54.12	-13	-41.12	H
2.44897	-64.81	Pk	30.3	-28.6	9.3	-53.81	-13	-40.81	V
2.47293	-65.04	Pk	30.2	-28.4	8.9	-54.34	-13	-41.34	H
3.53295	-65.99	Pk	30.2	-26.9	9.8	-52.89	-13	-39.89	V
3.79193	-64.7	Pk	30.9	-26.9	10.3	-50.4	-13	-37.4	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	12491
Configuration:	EUT Only
Mode:	CDMA BC10 EV-DO Rev A
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 817.25MHz									
1.63452	-56.12	Pk	28.5	-31.7	11.5	-47.82	-13	-34.82	H
1.63454	-59.66	Pk	28.5	-31.7	11.1	-51.76	-13	-38.76	V
2.44941	-65.97	Pk	32.5	-30.5	12	-51.97	-13	-38.97	V
2.45365	-66.45	Pk	32.5	-30.5	12.4	-52.05	-13	-39.05	H
3.27453	-67.07	Pk	32.9	-29.4	10.4	-53.17	-13	-40.17	H
3.2784	-66.73	Pk	32.9	-29.4	10.7	-52.53	-13	-39.53	V
Mid Channel 820MHz									
1.63986	-61.62	Pk	28.6	-31.7	11.5	-53.22	-13	-40.22	V
1.63994	-55.46	Pk	28.6	-31.7	12.2	-46.36	-13	-33.36	H
2.45606	-66.44	Pk	32.5	-30.5	12.4	-52.04	-13	-39.04	H
2.46405	-66.43	Pk	32.6	-30.6	11.2	-53.23	-13	-40.23	V
3.27471	-66.92	Pk	32.9	-29.4	10.4	-53.02	-13	-40.02	H
3.29735	-66.97	Pk	32.9	-29.5	11.3	-52.27	-13	-39.27	V
High Channel 822.75MHz									
1.64563	-56.17	Pk	28.7	-31.7	12.3	-46.87	-13	-33.87	H
1.64548	-57.89	Pk	28.7	-31.7	11.4	-49.49	-13	-36.49	V
2.46305	-66.53	Pk	32.6	-30.6	12.2	-52.33	-13	-39.33	V
2.46343	-66.37	Pk	32.6	-30.6	11.3	-53.07	-13	-40.07	H
3.31064	-67.49	Pk	32.8	-29.4	11	-53.09	-13	-40.09	H
3.31329	-67.69	Pk	32.8	-29.4	11.5	-52.79	-13	-39.79	V

Pk - Peak detector

**CDMA BC0**

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC0 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	PRE0194893	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.7MHz									
1.67294	-63.52	Pk	25.4	-29.9	10.6	-57.42	-13	-44.42	H
1.93755	-64.56	Pk	27.6	-29.2	10.6	-55.56	-13	-42.56	V
2.35464	-64.54	Pk	30.1	-28.7	10.6	-52.54	-13	-39.54	H
2.90385	-65.14	Pk	29.7	-27.8	8.9	-54.34	-13	-41.34	V
3.10355	-64.58	Pk	30.9	-27.6	10.7	-50.58	-13	-37.58	V
3.2519	-64.68	Pk	31	-27.4	10.2	-50.88	-13	-37.88	H
Mid Channel 836.52MHz									
1.67339	-56	Pk	25.4	-29.9	9	-51.5	-13	-38.5	V
1.6737	-53.46	Pk	25.4	-29.9	10.5	-47.46	-13	-34.46	H
2.03096	-64.64	Pk	28.6	-29	10.4	-54.64	-13	-41.64	V
2.36358	-64.85	Pk	30.1	-28.7	10.8	-52.65	-13	-39.65	H
3.0387	-64.71	Pk	30.6	-27.8	10.6	-51.31	-13	-38.31	H
3.178	-64.86	Pk	31.1	-27.6	9.5	-51.86	-13	-38.86	V
High Channel 848.31MHz									
1.67363	-63.87	Pk	25.4	-29.9	10.5	-57.87	-13	-44.87	H
2.03717	-64.74	Pk	28.6	-29	10.5	-54.64	-13	-41.64	V
2.09614	-64.65	Pk	28.6	-28.9	10.8	-54.15	-13	-41.15	H
2.41413	-65.1	Pk	30.3	-28.7	9.3	-54.2	-13	-41.2	V
3.02905	-65.15	Pk	30.5	-27.6	10.2	-52.05	-13	-39.05	H
3.16494	-64.97	Pk	31.1	-27.7	9.8	-51.77	-13	-38.77	V

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	12491
Configuration:	EUT Only
Mode:	CDMA BC0 EV-DO Rev A
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.7MHz									
1.64964	-60.24	Pk	28.7	-31.7	11.2	-52.04	-13	-39.04	V
1.64991	-57.2	Pk	28.7	-31.6	12.1	-48	-13	-35	H
2.45981	-66.65	Pk	32.5	-30.6	11.6	-53.15	-13	-40.15	V
2.47218	-66.71	Pk	32.6	-30.6	11.8	-52.91	-13	-39.91	H
3.28617	-66.92	Pk	32.9	-29.5	11.1	-52.42	-13	-39.42	H
3.29292	-66.91	Pk	32.9	-29.5	11.2	-52.31	-13	-39.31	V
Mid Channel 836.52MHz									
1.67318	-61.92	Pk	28.9	-31.6	12.6	-52.02	-13	-39.02	H
3.3385	-67.02	Pk	32.8	-29.3	10.7	-52.82	-13	-39.82	H
1.67268	-63.36	Pk	28.9	-31.6	11.4	-54.66	-13	-41.66	V
3.35334	-66.72	Pk	32.8	-29.4	11.5	-51.82	-13	-38.82	V
2.51188	-66.48	Pk	32.6	-30.7	11.5	-53.08	-13	-40.08	H
2.51428	-66.24	Pk	32.6	-30.6	11.7	-52.54	-13	-39.54	V
High Channel 848.31MHz									
1.71142	-65.73	Pk	29.2	-31.6	13.1	-55.03	-13	-42.03	V
1.72929	-67.48	Pk	29.5	-31.5	12.3	-57.18	-13	-44.18	H
2.54639	-66.34	Pk	32.6	-30.5	12	-52.24	-13	-39.24	V
2.54736	-66.57	Pk	32.6	-30.5	12	-52.47	-13	-39.47	H
3.36535	-67.34	Pk	32.8	-29.3	11.7	-52.14	-13	-39.14	V
3.38746	-67.01	Pk	32.7	-29	11.1	-52.21	-13	-39.21	H

Pk - Peak detector



**CDMA BC1**

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC1 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	PRE0194893	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1851.25MHz									
2.36534	-65.3	Pk	30.1	-28.7	10.8	-53.1	-13	-40.1	H
2.52902	-64.66	Pk	30.1	-28.5	9.6	-53.46	-13	-40.46	V
3.26335	-65.21	Pk	30.9	-27.3	9.8	-51.81	-13	-38.81	V
3.78349	-64.79	Pk	30.9	-26.8	10	-50.69	-13	-37.69	H
3.78361	-65.07	Pk	30.9	-26.8	10	-50.97	-13	-37.97	H
4.52354	-65.5	Pk	31.9	-26	10.3	-49.3	-13	-36.3	V
Mid Channel 1880.00MHz									
2.36661	-65.28	Pk	30.1	-28.6	10.8	-52.98	-13	-39.98	H
3.90131	-65.62	Pk	31.6	-26.7	9.7	-51.02	-13	-38.02	V
5.03053	-65.7	Pk	33.8	-25	8.5	-48.4	-13	-35.4	V
2.64315	-65.26	Pk	29.8	-28.1	9	-54.56	-13	-41.56	V
3.14034	-65.57	Pk	31	-27.6	9.8	-52.37	-13	-39.37	H
5.15414	-64.95	Pk	34	-25.5	9.1	-47.35	-13	-34.35	H
High Channel 1908.75MHz									
2.31841	-65.08	Pk	29.6	-28.8	11	-53.28	-13	-40.28	H
2.36237	-65.07	Pk	30.1	-28.7	9.7	-53.97	-13	-40.97	V
3.02969	-65.11	Pk	30.5	-27.6	10.4	-51.81	-13	-38.81	H
3.0963	-65.35	Pk	30.8	-27.6	10.6	-51.55	-13	-38.55	V
3.85755	-64.41	Pk	31.5	-26.7	9.7	-49.91	-13	-36.91	V
4.00251	-65.58	Pk	31.7	-26.8	9.9	-50.78	-13	-37.78	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	10/11/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC1 EV-DO Rev A
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	PRE0194893	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1851.25MHz									
3.10928	-69.59	Pk	30.9	-27.6	10.4	-55.89	-13	-42.89	V
3.26655	-68.51	Pk	30.9	-27.2	10.1	-54.71	-13	-41.71	H
4.41854	-69.88	Pk	31.7	-25.9	10	-54.08	-13	-41.08	V
4.66904	-69.82	Pk	32.5	-26.1	9.9	-53.52	-13	-40.52	H
6.45082	-70.65	Pk	35.8	-23.9	7.9	-50.85	-13	-37.85	V
7.86026	-72.66	Pk	38	-21.7	7.5	-48.86	-13	-35.86	H
Mid Channel 1880.00MHz									
3.19698	-68.57	Pk	31.1	-27.5	9.9	-55.07	-13	-42.07	H
3.3072	-69.22	Pk	30.8	-27.2	9.9	-55.72	-13	-42.72	V
5.2326	-70.02	Pk	33.8	-25.3	8.9	-52.62	-13	-39.62	H
5.93678	-69.66	Pk	34.8	-24.7	8.8	-50.76	-13	-37.76	V
7.19098	-69.38	Pk	37.2	-22.7	7.9	-46.98	-13	-33.98	H
7.81442	-72.04	Pk	37.9	-22.2	8	-48.34	-13	-35.34	V
High Channel 1908.75MHz									
4.22979	-69.4	Pk	31.2	-25.8	9.5	-54.5	-13	-41.5	H
4.41933	-68.91	Pk	31.7	-25.9	10	-53.11	-13	-40.11	V
6.49991	-71.49	Pk	36.1	-23.7	7.7	-51.39	-13	-38.39	V
6.50775	-70.32	Pk	36.2	-23.8	8.3	-49.62	-13	-36.62	H
9.05275	-71.7	Pk	37.7	-20.2	8.4	-45.8	-13	-32.8	V
9.47074	-73.04	Pk	37.8	-19.7	8.7	-46.24	-13	-33.24	H

Pk - Peak detector

**9.1.3. WCDMA**

**WCDMA BAND 5**

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 5 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	PRE0194893	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 826.4MHz									
1.9771	-67.34	Pk	28.2	-29.3	10.9	-57.54	-13	-44.54	V
2.09511	-67.51	Pk	28.6	-28.9	11	-56.81	-13	-43.81	H
2.59533	-67.52	Pk	30	-28.4	8.9	-57.02	-13	-44.02	V
2.77128	-68.34	Pk	29.3	-28	10	-57.04	-13	-44.04	H
3.57427	-68.79	Pk	30.1	-27	10	-55.69	-13	-42.69	V
3.85084	-68.31	Pk	31.4	-26.7	9.4	-54.21	-13	-41.21	H
Mid Channel, 836.6MHz									
1.73801	-68.04	Pk	25.8	-29.6	9.5	-62.34	-13	-49.34	H
1.97502	-67.05	Pk	28.2	-29.3	10.5	-57.65	-13	-44.65	V
2.3937	-68.09	Pk	30.3	-28.8	10.1	-56.49	-13	-43.49	H
2.53052	-67.18	Pk	30.1	-28.5	9.5	-56.08	-13	-43.08	V
3.27691	-68.03	Pk	30.9	-27.2	9.8	-54.53	-13	-41.53	H
3.36226	-69.11	Pk	30.6	-27.1	9.8	-55.81	-13	-42.81	V
High Channel, 846.6MHz									
1.69401	-67.68	Pk	25.5	-29.7	10.4	-61.48	-13	-48.48	H
1.68371	-68	Pk	25.5	-29.8	9.8	-62.5	-13	-49.5	V
2.52979	-67.79	Pk	30.1	-28.5	8.9	-57.29	-13	-44.29	H
2.53422	-68.22	Pk	30.1	-28.4	9.4	-57.12	-13	-44.12	V
3.38554	-69.42	Pk	30.4	-27.2	8.8	-57.42	-13	-44.42	V
3.39007	-68.36	Pk	30.4	-27.3	8.7	-56.56	-13	-43.56	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	WCDMA Band 5 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 826.4MHz									
1.65378	-66.21	Pk	25.3	-29.9	9.7	-61.11	-13	-48.11	V
1.65759	-67.41	Pk	25.4	-29.9	10.7	-61.21	-13	-48.21	H
2.47637	-68.5	Pk	30.2	-28.4	8.8	-57.9	-13	-44.9	H
2.47873	-67.96	Pk	30.2	-28.4	8.8	-57.36	-13	-44.36	V
3.005	-68.45	Pk	30.5	-27.8	9.2	-56.55	-13	-43.55	V
3.00647	-68.4	Pk	30.5	-27.7	9.6	-56	-13	-43	H
Mid Channel, 836.6MHz									
1.67448	-68.11	Pk	25.4	-29.9	10.5	-62.11	-13	-49.11	H
1.66987	-66.89	Pk	25.4	-29.8	9	-62.29	-13	-49.29	V
3.34855	-68.65	Pk	30.6	-27.2	9.4	-55.85	-13	-42.85	V
2.51248	-68.44	Pk	30.1	-28.5	9.1	-57.74	-13	-44.74	H
2.51256	-68.91	Pk	30.1	-28.5	9.5	-57.81	-13	-44.81	V
3.34014	-68.34	Pk	30.7	-27.2	8.9	-55.94	-13	-42.94	H
High Channel, 846.6MHz									
1.6902	-67.48	Pk	25.5	-29.7	10.4	-61.28	-13	-48.28	H
1.69472	-67.48	Pk	25.5	-29.7	9.6	-62.08	-13	-49.08	V
2.53917	-68.23	Pk	30.1	-28.4	8.8	-57.73	-13	-44.73	H
2.53939	-68.45	Pk	30.1	-28.4	9	-57.75	-13	-44.75	V
3.3837	-68.53	Pk	30.4	-27.2	8.5	-56.83	-13	-43.83	H
3.38773	-68.94	Pk	30.4	-27.2	8.7	-57.04	-13	-44.04	V

Pk - Peak detector

**WCDMA BAND 2**

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	WCDMA Band 2 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.7049	-69.51	Pk	30.5	-26.8	10.2	-55.61	-13	-42.61	H
7.41118	-71.68	Pk	37.2	-23	6.9	-50.58	-13	-37.58	H
3.70258	-69.41	Pk	30.4	-26.8	9.7	-56.11	-13	-43.11	V
7.41128	-71.32	Pk	37.2	-23	7.1	-50.02	-13	-37.02	V
5.559	-71.15	Pk	33.7	-25	8.9	-53.55	-13	-40.55	V
5.55988	-69.52	Pk	33.7	-25	9	-51.82	-13	-38.82	H
Mid Channel, 1880.0MHz									
3.7606	-70	Pk	30.7	-26.9	9.3	-56.9	-13	-43.9	H
7.52306	-72.05	Pk	37	-22.8	7.4	-50.45	-13	-37.45	H
3.75975	-70.05	Pk	30.7	-26.9	9.6	-56.65	-13	-43.65	V
7.51773	-72.13	Pk	37	-22.8	7.5	-50.43	-13	-37.43	V
5.64163	-70.56	Pk	33.7	-25	8	-53.86	-13	-40.86	V
5.64321	-70.4	Pk	33.7	-25	8	-53.7	-13	-40.7	H
High Channel, 1907.6MHz									
3.81265	-68.88	Pk	31.1	-26.9	9.3	-55.38	-13	-42.38	H
7.62927	-72.71	Pk	37.1	-22.7	7.4	-50.91	-13	-37.91	H
3.81618	-69.18	Pk	31.1	-26.9	9.8	-55.18	-13	-42.18	V
7.62618	-72.4	Pk	37.1	-22.7	7.4	-50.6	-13	-37.6	V
5.71949	-70.27	Pk	33.7	-24.6	7.7	-53.47	-13	-40.47	V
5.72171	-70.47	Pk	33.7	-24.6	7.7	-53.67	-13	-40.67	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	WCDMA Band 2 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.70677	-69.74	Pk	30.5	-26.8	10.2	-55.84	-13	-42.84	H
7.41107	-71.95	Pk	37.2	-22.9	6.9	-50.75	-13	-37.75	H
3.70538	-69.58	Pk	30.5	-26.8	9.9	-55.98	-13	-42.98	V
7.40781	-71.88	Pk	37.2	-23	7	-50.68	-13	-37.68	V
5.55687	-71.19	Pk	33.7	-25	8.8	-53.69	-13	-40.69	V
5.55964	-70.72	Pk	33.7	-25	9	-53.02	-13	-40.02	H
Mid Channel, 1880.0MHz									
3.75594	-69.65	Pk	30.7	-26.8	9.3	-56.45	-13	-43.45	H
7.52219	-72.29	Pk	37	-22.8	7.5	-50.59	-13	-37.59	H
3.75702	-69.29	Pk	30.7	-26.9	9.6	-55.89	-13	-42.89	V
7.51714	-71.83	Pk	37	-22.8	7.5	-50.13	-13	-37.13	V
5.63924	-70.42	Pk	33.7	-24.9	8.2	-53.42	-13	-40.42	V
5.6398	-69.89	Pk	33.7	-24.9	8.3	-52.79	-13	-39.79	H
High Channel, 1907.6MHz									
3.81506	-69.24	Pk	31.1	-26.9	9.4	-55.64	-13	-42.64	H
7.62501	-72.08	Pk	37.1	-22.7	7.4	-50.28	-13	-37.28	H
3.81334	-68.07	Pk	31.1	-26.9	9.6	-54.27	-13	-41.27	V
7.62736	-71.85	Pk	37.1	-22.7	7.4	-50.05	-13	-37.05	V
5.71981	-71.13	Pk	33.7	-24.6	7.7	-54.33	-13	-41.33	V
5.72195	-71.38	Pk	33.7	-24.6	7.7	-54.58	-13	-41.58	H

Pk - Peak detector

**WCDMA BAND 4**

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 4 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
2.1112	-59.58	Pk	28.5	-28.6	10.2	-49.48	-13	-36.48	H
2.11246	-55.82	Pk	28.5	-28.6	9.4	-46.52	-13	-33.52	V
3.03047	-68.66	Pk	30.5	-27.6	10.5	-55.26	-13	-42.26	H
3.29162	-69.49	Pk	30.8	-27.2	9.7	-56.19	-13	-43.19	V
3.93093	-68.36	Pk	31.7	-26.6	9.8	-53.46	-13	-40.46	H
5.05164	-70.01	Pk	33.9	-25	9.6	-51.51	-13	-38.51	V
Mid Channel, 1732.6MHz									
2.1335	-56.57	Pk	28.5	-28.9	10.4	-46.57	-13	-33.57	V
2.13367	-60.62	Pk	28.5	-28.9	11.4	-49.62	-13	-36.62	H
3.09804	-77.05	Pk	30.8	-27.7	10.6	-63.35	-13	-50.35	V
3.14474	-68.66	Pk	31.1	-27.7	9.8	-55.46	-13	-42.46	H
4.18965	-69.5	Pk	31.3	-26.2	9.4	-55	-13	-42	H
5.10813	-68.88	Pk	34	-25.2	9.3	-50.78	-13	-37.78	V
High Channel, 1752.6MHz									
2.15118	-61.33	Pk	28.5	-28.9	10.3	-51.43	-13	-38.43	H
2.15354	-57.16	Pk	28.5	-28.9	10.1	-47.46	-13	-34.46	V
3.03109	-68.8	Pk	30.5	-27.6	10.6	-55.3	-13	-42.3	H
3.1403	-67.48	Pk	31	-27.6	10.3	-53.78	-13	-40.78	V
4.73177	-70.29	Pk	32.7	-26	9.2	-54.39	-13	-41.39	V
5.96647	-70.01	Pk	35	-24.7	7.9	-51.81	-13	-38.81	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 4 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
2.11016	-64.07	Pk	28.5	-28.6	10.2	-53.97	-13	-40.97	H
2.11186	-61.04	Pk	28.5	-28.6	9.5	-51.64	-13	-38.64	V
2.57853	-70.36	Pk	30.1	-28.4	9.6	-59.06	-13	-46.06	V
3.25091	-71.04	Pk	31	-27.4	10.2	-57.24	-13	-44.24	H
3.9437	-71.11	Pk	31.8	-26.8	9.9	-56.21	-13	-43.21	V
4.51578	-72.1	Pk	31.9	-25.8	10.2	-55.8	-13	-42.8	H
Mid Channel, 1732.6MHz									
2.1316	-54.35	Pk	28.5	-28.8	10.3	-44.35	-13	-31.35	V
2.1317	-59.52	Pk	28.5	-28.8	11	-48.82	-13	-35.82	H
3.14227	-69.06	Pk	31	-27.6	10.3	-55.36	-13	-42.36	V
3.93756	-67.93	Pk	31.8	-26.7	10.1	-52.73	-13	-39.73	H
3.94163	-68.67	Pk	31.8	-26.8	10	-53.67	-13	-40.67	V
4.74803	-68.72	Pk	32.8	-26	9	-52.92	-13	-39.92	H
High Channel, 1752.6MHz									
2.15169	-54.92	Pk	28.5	-28.9	10.4	-44.92	-13	-31.92	V
2.15346	-59.12	Pk	28.5	-28.9	9.9	-49.62	-13	-36.62	H
3.08554	-68.36	Pk	30.8	-27.6	9.6	-55.56	-13	-42.56	V
3.29693	-69.32	Pk	30.8	-27.1	9.7	-55.92	-13	-42.92	H
4.11149	-69.35	Pk	31.4	-26.4	9.4	-54.95	-13	-41.95	V
4.4088	-70.2	Pk	31.7	-26	10.3	-54.2	-13	-41.2	H

Pk - Peak detector



## 9.2. FIELD STRENGTH OF SPURIOUS RADIATION, UAT 1

### 9.2.1. GSM

#### GSM 850MHz

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	50822
Configuration:	EUT only
Mode:	GSM850 GPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.2MHz									
1.84838	-78.48	Pk	30.7	-31.4	12.8	-66.38	-13	-53.38	V
1.95638	-77.58	Pk	31.2	-31.2	12.2	-65.38	-13	-52.38	H
3.04313	-76.84	Pk	33.1	-29.9	11.9	-61.74	-13	-48.74	H
3.10765	-76.13	Pk	33.2	-29.6	11.7	-60.83	-13	-47.83	V
3.84185	-71.59	Pk	33.7	-28.7	11.1	-55.49	-13	-42.49	H
3.85927	-71.57	Pk	33.7	-28.6	11.4	-55.07	-13	-42.07	V
Mid Channel 836.6MHz									
1.91077	-78.04	Pk	30.9	-31.3	11.2	-67.24	-13	-54.24	H
1.96835	-78.01	Pk	31.3	-31.2	12.8	-65.11	-13	-52.11	V
2.58417	-77.17	Pk	32.5	-30.2	12.1	-62.77	-13	-49.77	H
3.13988	-76.29	Pk	33	-29.5	11.6	-61.19	-13	-48.19	H
3.20488	-75.79	Pk	33	-29.6	11.2	-61.19	-13	-48.19	V
3.8039	-71.06	Pk	33.7	-28.7	11.4	-54.66	-13	-41.66	V
High Channel 848.8MHz									
1.84761	-78.86	Pk	30.7	-31.4	13.1	-66.46	-13	-53.46	H
2.00623	-77.87	Pk	31.7	-31.2	12.9	-64.47	-13	-51.47	V
2.63288	-76.45	Pk	32.6	-30.2	13	-61.05	-13	-48.05	V
2.69823	-76.89	Pk	32.4	-30.3	11.9	-62.89	-13	-49.89	H
3.62271	-73.44	Pk	33.2	-28.8	11.1	-57.94	-13	-44.94	V
3.85569	-71.71	Pk	33.7	-28.6	11.9	-54.71	-13	-41.71	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/24/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	GSM850 EGPRS
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.2MHz									
1.97931	-78.68	Pk	31.4	-31.2	11.9	-66.58	-13	-53.58	V
2.05749	-78.33	Pk	31.6	-31.2	12.4	-65.53	-13	-52.53	H
2.52431	-77.19	Pk	32.6	-30.6	12	-63.19	-13	-50.19	H
2.63832	-76.21	Pk	32.6	-30.2	12.7	-61.11	-13	-48.11	V
3.74086	-71.39	Pk	33.4	-28.9	11.6	-55.29	-13	-42.29	V
3.86891	-71.62	Pk	33.6	-28.5	11.5	-55.02	-13	-42.02	H
Mid Channel 836.6MHz									
1.84552	-78.7	Pk	30.7	-31.4	13.3	-66.1	-13	-53.1	H
1.90249	-77.93	Pk	30.9	-31.3	12.7	-65.63	-13	-52.63	V
2.35416	-77.24	Pk	31.9	-30.7	12.6	-63.44	-13	-50.44	V
2.56679	-76.94	Pk	32.5	-30.4	12.5	-62.34	-13	-49.34	H
3.7042	-71.34	Pk	33.2	-28.9	11.2	-55.84	-13	-42.84	V
3.84029	-71.15	Pk	33.7	-28.7	11.1	-55.05	-13	-42.05	H
High Channel 848.8MHz									
1.71539	-78.88	Pk	29.3	-31.5	13.3	-67.78	-13	-54.78	V
1.83605	-78.96	Pk	30.8	-31.4	12.4	-67.16	-13	-54.16	H
2.29262	-77.73	Pk	31.9	-30.8	12.1	-64.53	-13	-51.53	H
2.63978	-76.48	Pk	32.7	-30.2	12.6	-61.38	-13	-48.38	V
3.66988	-71.48	Pk	33.2	-28.9	11.4	-55.78	-13	-42.78	H
3.82816	-71.59	Pk	33.7	-28.7	11.2	-55.39	-13	-42.39	V

Pk - Peak detector

**GSM 1900MHz**

Company:	
Project #:	13018973
Date:	9/25/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	GSM1900 GPRS
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
2.6686	-68.88	Pk	29.7	-28	9.9	-57.28	-13	-44.28	H
3.09212	-68.66	Pk	30.8	-27.6	10.4	-55.06	-13	-42.06	V
3.74191	-68.27	Pk	30.6	-26.8	9.9	-54.57	-13	-41.57	H
3.94654	-69.01	Pk	31.8	-26.7	9.8	-54.11	-13	-41.11	V
5.03704	-69.31	Pk	33.8	-25	8.9	-51.61	-13	-38.61	V
5.10445	-69.57	Pk	34	-25.2	9.5	-51.27	-13	-38.27	H
Mid Channel, 1880.0MHz									
3.04089	-67.09	Pk	30.6	-27.7	10.5	-53.69	-13	-40.69	H
3.31368	-68.94	Pk	30.8	-27.1	9.8	-55.44	-13	-42.44	V
4.41674	-69.39	Pk	31.7	-26	10.3	-53.39	-13	-40.39	H
5.05769	-69.95	Pk	33.9	-24.9	9.1	-51.85	-13	-38.85	V
5.55782	-70.6	Pk	33.7	-25	8.9	-53	-13	-40	H
6.25594	-70.82	Pk	35.1	-24.4	7.6	-52.52	-13	-39.52	V
High Channel, 1909.8MHz									
2.37811	-67.86	Pk	30.2	-28.6	9.5	-56.76	-13	-43.76	V
3.03995	-69.01	Pk	30.6	-27.7	10.6	-55.51	-13	-42.51	H
3.93542	-68.67	Pk	31.7	-26.6	9.8	-53.77	-13	-40.77	V
3.93806	-68.59	Pk	31.8	-26.7	10.1	-53.39	-13	-40.39	H
4.66898	-69.61	Pk	32.5	-26.1	9.9	-53.31	-13	-40.31	H
5.04881	-70.36	Pk	33.9	-25	9.5	-51.96	-13	-38.96	V

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	12492
Configuration:	EUT Only
Mode:	GSM1900 EGPRS
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LTE	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.69709	-69.74	Pk	30.4	-26.9	10.5	-55.74	-13	-42.74	H
7.4025	-71.18	Pk	37.2	-22.9	7.1	-49.78	-13	-36.78	H
3.69972	-69.58	Pk	30.4	-26.9	9.7	-56.38	-13	-43.38	V
7.40433	-71.73	Pk	37.2	-23	7	-50.53	-13	-37.53	V
5.54992	-71.14	Pk	33.7	-25	8.5	-53.94	-13	-40.94	V
5.55101	-70.51	Pk	33.7	-25	8.7	-53.11	-13	-40.11	H
Mid Channel, 1880MHz									
3.76047	-69.27	Pk	30.7	-26.9	9.3	-56.17	-13	-43.17	H
7.5199	-72.42	Pk	37	-22.8	7.5	-50.72	-13	-37.72	H
3.75843	-69.88	Pk	30.7	-26.9	9.6	-56.48	-13	-43.48	V
7.51958	-71.86	Pk	37	-22.8	7.4	-50.26	-13	-37.26	V
5.63674	-69.95	Pk	33.7	-24.9	8.5	-52.65	-13	-39.65	V
5.64337	-69.94	Pk	33.7	-25	8	-53.24	-13	-40.24	H
High Channel, 1909.8MHz									
3.82128	-69.52	Pk	31.2	-26.9	9.5	-55.72	-13	-42.72	H
7.6386	-71.78	Pk	37.2	-22.6	7.4	-49.78	-13	-36.78	H
3.81663	-68.47	Pk	31.1	-26.9	9.8	-54.47	-13	-41.47	V
7.63605	-71.59	Pk	37.2	-22.6	7.2	-49.79	-13	-36.79	V
5.73208	-69.8	Pk	33.7	-24.2	7.8	-52.5	-13	-39.5	H
5.73251	-70.86	Pk	33.7	-24.3	7.8	-53.66	-13	-40.66	V

Pk - Peak detector

### 9.2.2. CDMA

#### CDMA BC10

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC10 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 817.25MHz									
2.02957	-64.76	Pk	28.6	-29	10.2	-54.96	-13	-41.96	V
2.09365	-64.69	Pk	28.6	-28.9	11.2	-53.79	-13	-40.79	H
2.32409	-65.11	Pk	29.7	-28.8	9.6	-54.61	-13	-41.61	V
2.67455	-65.73	Pk	29.6	-28	9.8	-54.33	-13	-41.33	H
3.25162	-65.41	Pk	31	-27.4	10.2	-51.61	-13	-38.61	H
3.31193	-65.09	Pk	30.8	-27.1	9.8	-51.59	-13	-38.59	V
Mid Channel 820MHz									
1.97827	-64.47	Pk	28.2	-29.3	11.1	-54.47	-13	-41.47	V
2.3131	-59.59	Pk	29.6	-28.6	11.1	-47.49	-13	-34.49	H
2.5796	-65.23	Pk	30.1	-28.4	9.6	-53.93	-13	-40.93	V
3.03531	-65.42	Pk	30.6	-27.7	10.8	-51.72	-13	-38.72	H
3.16189	-65.14	Pk	31.1	-27.7	9.9	-51.84	-13	-38.84	V
3.78658	-65.05	Pk	30.9	-26.8	10.1	-50.85	-13	-37.85	H
High Channel 822.75MHz									
1.97922	-65.07	Pk	28.2	-29.2	11.3	-54.77	-13	-41.77	V
2.4683	-61.47	Pk	30.2	-28.5	8.9	-50.87	-13	-37.87	H
2.46845	-64.48	Pk	30.2	-28.5	8.9	-53.88	-13	-40.88	V
3.14753	-65.62	Pk	31.1	-27.6	10.3	-51.82	-13	-38.82	V
3.19491	-64.79	Pk	31.1	-27.5	9.9	-51.29	-13	-38.29	H
3.91819	-64.85	Pk	31.7	-26.5	9.4	-50.25	-13	-37.25	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC10 EV-DO Rev A
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 817.25MHz									
2.4527	-56.32	Pk	30.3	-28.6	8.6	-46.02	-13	-33.02	H
2.4527	-57.65	Pk	30.3	-28.6	9.1	-46.85	-13	-33.85	V
3.10787	-64.98	Pk	30.9	-27.6	10.6	-51.08	-13	-38.08	V
3.26078	-65.29	Pk	31	-27.3	10.4	-51.19	-13	-38.19	H
3.2681	-65.65	Pk	30.9	-27.2	9.9	-52.05	-13	-39.05	H
4.46091	-64.83	Pk	31.8	-25.7	10.1	-48.63	-13	-35.63	V
Mid Channel 820MHz									
2.46096	-54.97	Pk	30.3	-28.6	8.8	-44.47	-13	-31.47	H
2.46101	-56.31	Pk	30.3	-28.6	9	-45.61	-13	-32.61	V
3.10945	-65.17	Pk	30.9	-27.6	10.4	-51.47	-13	-38.47	V
3.78451	-64.83	Pk	30.9	-26.8	10	-50.73	-13	-37.73	H
4.67814	-65.31	Pk	32.5	-26.2	9.7	-49.31	-13	-36.31	V
5.01228	-65.89	Pk	33.7	-25.2	8.8	-48.59	-13	-35.59	H
High Channel 822.75MHz									
2.46717	-58.81	Pk	30.2	-28.5	8.8	-48.31	-13	-35.31	V
2.46802	-61.85	Pk	30.2	-28.5	8.9	-51.25	-13	-38.25	H
3.10131	-66.61	Pk	30.9	-27.6	10.6	-52.71	-13	-39.71	V
3.12256	-66.12	Pk	31	-27.5	9.6	-53.02	-13	-40.02	H
3.9233	-67.34	Pk	31.7	-26.5	9.8	-52.34	-13	-39.34	V
3.93775	-67.54	Pk	31.8	-26.7	10.1	-52.34	-13	-39.34	H

Pk - Peak detector

**CDMA BC0**

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	12559
Configuration:	EUT Only
Mode:	CDMA BC0 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.7MHz									
2.09143	-64.31	Pk	28.6	-28.9	11.3	-53.31	-13	-40.31	H
2.47332	-60.13	Pk	30.2	-28.4	8.9	-49.43	-13	-36.43	H
2.63404	-65.2	Pk	29.9	-28.2	9.7	-53.8	-13	-40.8	V
3.15147	-65.07	Pk	31.1	-27.6	10.2	-51.37	-13	-38.37	V
3.15387	-64.95	Pk	31.1	-27.7	9.7	-51.85	-13	-38.85	H
4.44097	-64.49	Pk	31.7	-25.9	9.5	-49.19	-13	-36.19	V
Mid Channel 836.52MHz									
4.14914	-69.54	Pk	31.4	-26.2	9.3	-55.04	-13	-42.04	H
3.93951	-68.55	Pk	31.8	-26.7	10.1	-53.35	-13	-40.35	V
2.50871	-62.07	Pk	30.1	-28.5	9.1	-51.37	-13	-38.37	H
2.51004	-67.1	Pk	30.1	-28.6	9.3	-56.3	-13	-43.3	V
3.16801	-68.16	Pk	31.1	-27.6	9.5	-55.16	-13	-42.16	H
3.21123	-68.6	Pk	31.1	-27.5	9.5	-55.5	-13	-42.5	V
High Channel 848.31MHz									
1.99138	-64.64	Pk	28.4	-29	10.7	-54.54	-13	-41.54	V
2.04707	-65.19	Pk	28.7	-28.9	10.8	-54.59	-13	-41.59	V
2.14369	-64.97	Pk	28.5	-28.9	9.8	-55.57	-13	-42.57	V
2.54524	-63.15	Pk	30.1	-28.3	9.1	-52.25	-13	-39.25	H
3.04927	-64.69	Pk	30.6	-27.6	9.7	-51.99	-13	-38.99	H
3.23953	-65.37	Pk	31	-27.3	9.9	-51.77	-13	-38.77	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC0 EV-DO Rev A
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 824.7MHz									
2.47315	-57.33	Pk	30.2	-28.4	8.9	-46.63	-13	-33.63	H
2.47512	-62.5	Pk	30.2	-28.4	8.9	-51.8	-13	-38.8	V
3.14712	-65.28	Pk	31.1	-27.6	10.3	-51.48	-13	-38.48	V
3.35555	-65.85	Pk	30.6	-27.2	9.5	-52.95	-13	-39.95	H
3.85272	-64.92	Pk	31.4	-26.7	9.6	-50.62	-13	-37.62	V
3.92938	-64.39	Pk	31.7	-26.6	9.8	-49.49	-13	-36.49	H
Mid Channel 836.52MHz									
2.50949	-58.53	Pk	30.1	-28.5	9.3	-47.63	-13	-34.63	V
2.51068	-56.13	Pk	30.1	-28.6	9.1	-45.53	-13	-32.53	H
3.20956	-65.09	Pk	31.1	-27.6	9.7	-51.89	-13	-38.89	V
3.23603	-64.72	Pk	31	-27.4	9.8	-51.32	-13	-38.32	H
3.86079	-64.56	Pk	31.5	-26.7	9.3	-50.46	-13	-37.46	V
4.42171	-65.04	Pk	31.7	-25.9	10.2	-49.04	-13	-36.04	H
High Channel 848.31MHz									
2.54372	-56.09	Pk	30.1	-28.3	8.9	-45.39	-13	-32.39	V
2.54391	-59.96	Pk	30.1	-28.3	9	-49.16	-13	-36.16	H
3.17392	-65.31	Pk	31.1	-27.6	9.8	-52.01	-13	-39.01	V
3.25746	-65.4	Pk	31	-27.3	10.3	-51.4	-13	-38.4	H
3.72386	-64.7	Pk	30.5	-26.7	10	-50.9	-13	-37.9	V
3.72914	-64.65	Pk	30.6	-26.7	9.9	-50.85	-13	-37.85	H

Pk - Peak detector



**CDMA BC1**

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	12559
Configuration:	EUT Only
Mode:	CDMA BC1 1xRTT
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1851.25MHz									
1.97995	-65.31	Pk	28.2	-29.2	11.4	-54.91	-13	-41.91	V
1.99553	-63.96	Pk	28.5	-29.1	10.3	-54.26	-13	-41.26	H
2.08914	-63.84	Pk	28.6	-28.9	11.3	-52.84	-13	-39.84	H
2.63143	-65.17	Pk	29.9	-28.2	9.5	-53.97	-13	-40.97	V
2.63755	-65.34	Pk	29.8	-28.2	9.1	-54.64	-13	-41.64	H
3.08688	-64.97	Pk	30.8	-27.6	9.8	-51.97	-13	-38.97	V
Mid Channel 1880.00MHz									
1.87976	-57.94	Pk	26.8	-29.4	10.8	-49.74	-13	-36.74	H
1.87977	-55.82	Pk	26.8	-29.4	9.5	-48.92	-13	-35.92	V
2.14101	-64.15	Pk	28.5	-28.8	11.2	-53.25	-13	-40.25	H
2.58394	-65.28	Pk	30.1	-28.4	9.6	-53.98	-13	-40.98	V
2.59006	-64.04	Pk	30.1	-28.3	9.1	-53.14	-13	-40.14	H
3.14942	-64.61	Pk	31.1	-27.6	10.2	-50.91	-13	-37.91	V
High Channel 1908.75MHz									
1.98323	-65.17	Pk	28.3	-29.1	11.4	-54.57	-13	-41.57	V
2.05208	-64.91	Pk	28.7	-28.9	10	-55.11	-13	-42.11	H
2.42429	-59.12	Pk	30.3	-28.7	9.1	-48.42	-13	-35.42	V
2.56918	-64.82	Pk	30.1	-28.4	10.3	-52.82	-13	-39.82	H
3.14928	-64.77	Pk	31.1	-27.6	10.2	-51.07	-13	-38.07	V
3.24322	-69.65	Pk	31	-27.3	10.2	-55.75	-13	-42.75	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/30/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	CDMA BC1 EV-DO Rev A
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1851.25MHz									
2.28117	-64.55	Pk	29.2	-28.6	9.7	-54.25	-13	-41.25	V
2.39411	-65.37	Pk	30.3	-28.8	10.1	-53.77	-13	-40.77	H
3.19379	-64.5	Pk	31.1	-27.5	9.6	-51.3	-13	-38.3	V
3.26351	-64.87	Pk	30.9	-27.3	10.4	-50.87	-13	-37.87	H
3.94023	-64.93	Pk	31.8	-26.7	10.1	-49.73	-13	-36.73	H
4.00669	-64.83	Pk	31.7	-26.8	9.9	-50.03	-13	-37.03	V
Mid Channel 1880.00MHz									
2.35569	-65.1	Pk	30.1	-28.7	10.7	-53	-13	-40	H
2.36507	-64.97	Pk	30.1	-28.7	9.9	-53.67	-13	-40.67	V
3.10131	-64.9	Pk	30.9	-27.6	10.6	-51	-13	-38	V
3.26117	-64.65	Pk	30.9	-27.3	10.4	-50.65	-13	-37.65	H
3.92772	-64.65	Pk	31.7	-26.5	9.6	-49.85	-13	-36.85	V
4.53353	-64.91	Pk	31.9	-25.8	10	-48.81	-13	-35.81	H
High Channel 1908.75MHz									
2.47069	-64.99	Pk	30.2	-28.4	9	-54.19	-13	-41.19	V
2.83858	-65.18	Pk	29.3	-27.8	9.4	-54.28	-13	-41.28	H
3.12402	-77.07	Pk	31	-27.5	9.9	-63.67	-13	-50.67	V
3.76279	-64.66	Pk	30.7	-26.8	9.3	-51.46	-13	-38.46	H
3.87823	-65.17	Pk	31.5	-26.7	9.4	-50.97	-13	-37.97	V
5.04358	-65.59	Pk	33.8	-25.1	9	-47.89	-13	-34.89	H

Pk - Peak detector

**9.2.3. WCDMA**

**WCDMA BAND 5**

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 5 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 826.4MHz									
1.982	-67.45	Pk	28.3	-29.2	11.5	-56.85	-13	-43.85	V
2.08941	-68.06	Pk	28.6	-28.9	11.3	-57.06	-13	-44.06	H
2.82619	-68.15	Pk	29.3	-27.9	9.7	-57.05	-13	-44.05	V
3.18364	-68.49	Pk	31.1	-27.6	9.9	-55.09	-13	-42.09	H
3.94748	-69.02	Pk	31.8	-26.7	9.8	-54.12	-13	-41.12	V
3.96981	-69.21	Pk	31.8	-26.7	9.8	-54.31	-13	-41.31	H
Mid Channel, 836.6MHz									
1.64188	-67.54	Pk	25.3	-29.9	10.8	-61.34	-13	-48.34	H
1.75376	-66.51	Pk	25.9	-29.6	9.3	-60.91	-13	-47.91	V
2.31647	-67.45	Pk	29.6	-28.7	11.1	-55.45	-13	-42.45	H
2.69759	-68.99	Pk	29.5	-28.1	9.4	-58.19	-13	-45.19	V
3.91802	-68.42	Pk	31.7	-26.5	9.4	-53.82	-13	-40.82	H
3.94906	-69.07	Pk	31.8	-26.7	9.8	-54.17	-13	-41.17	V
High Channel, 846.6MHz									
1.86303	-67.18	Pk	26.7	-29.3	10.1	-59.68	-13	-46.68	H
2.03677	-67.14	Pk	28.6	-29	10.5	-57.04	-13	-44.04	V
2.7288	-68.24	Pk	29.4	-28	9.6	-57.24	-13	-44.24	H
3.05454	-68.59	Pk	30.6	-27.6	9.6	-55.99	-13	-42.99	V
3.93135	-68.44	Pk	31.7	-26.6	9.8	-53.54	-13	-40.54	H
4.26324	-69.91	Pk	31.2	-25.9	9.6	-55.01	-13	-42.01	V

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	12491
Configuration:	EUT Only
Mode:	WCDMA Band 5 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 826.4MHz									
1.66052	-64.6	Pk	25.4	-29.8	10.4	-58.6	-13	-45.6	H
1.65552	-63.74	Pk	25.4	-29.9	9.6	-58.64	-13	-45.64	V
2.47878	-64.39	Pk	30.2	-28.4	8.7	-53.89	-13	-40.89	H
2.48181	-65.3	Pk	30.2	-28.5	8.7	-54.9	-13	-51.9	V
3.29591	-64.84	Pk	30.8	-27.1	9.7	-51.44	-13	-38.44	V
3.29823	-65.13	Pk	30.8	-27.1	9.8	-51.63	-13	-38.63	H
Mid Channel, 836.6MHz									
1.66882	-64.53	Pk	25.4	-29.8	10.7	-58.23	-13	-45.23	H
3.35019	-66	Pk	30.6	-27.2	9.3	-53.3	-13	-40.3	H
1.66893	-64.38	Pk	25.4	-29.8	8.9	-59.88	-13	-46.88	V
2.50184	-65.11	Pk	30.1	-28.6	9.4	-54.21	-13	-41.21	V
2.5155	-64.68	Pk	30.1	-28.5	9.2	-53.88	-13	-40.88	H
3.34541	-65.25	Pk	30.6	-27.2	9.3	-52.55	-13	-39.55	V
High Channel, 846.6MHz									
1.6928	-64.79	Pk	25.5	-29.7	10.4	-58.59	-13	-45.59	H
4.24152	-66.17	Pk	31.2	-26.1	9.3	-51.77	-13	-38.77	H
1.68959	-64.65	Pk	25.5	-29.7	9.7	-59.15	-13	-46.15	V
4.23765	-65.79	Pk	31.2	-26.1	9.3	-51.39	-13	-38.39	V
2.54159	-64.92	Pk	30.1	-28.4	8.9	-54.32	-13	-41.32	H
2.54947	-64.94	Pk	30.1	-28.4	9.1	-54.14	-13	-41.14	V

Pk - Peak detector

**WCDMA BAND 2**

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	12491
Configuration:	EUT Only
Mode:	WCDMA Band 2 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.71091	-68.37	Pk	30.5	-26.9	9.9	-54.87	-13	-41.87	H
3.69838	-69.01	Pk	30.4	-26.9	9.8	-55.71	-13	-42.71	V
5.55684	-70.43	Pk	33.7	-25	8.8	-52.93	-13	-39.93	V
5.55988	-70.45	Pk	33.7	-25	9	-52.75	-13	-39.75	H
12.96854	-73.89	Pk	43.8	-19.5	9.5	-40.09	-13	-27.09	V
12.97942	-73.71	Pk	43.8	-19.5	9.7	-39.71	-13	-26.71	H
Mid Channel, 1880.0MHz									
3.76227	-64.31	Pk	30.7	-26.8	9.3	-51.11	-13	-38.11	H
3.76478	-64.92	Pk	30.8	-26.8	9.6	-51.32	-13	-38.32	V
5.63127	-65.36	Pk	33.7	-24.9	8.5	-48.06	-13	-35.06	V
5.65303	-65.64	Pk	33.7	-24.8	8.4	-48.34	-13	-35.34	H
16.92105	-67.39	Pk	41.7	-16.8	11.8	-30.69	-13	-17.69	H
16.93202	-67.46	Pk	41.7	-16.6	12.2	-30.16	-13	-17.16	V
High Channel, 1907.6MHz									
3.81572	-65.57	Pk	31.1	-26.9	9.4	-51.97	-13	-38.97	H
3.81192	-65.35	Pk	31.1	-27	9.5	-51.75	-13	-38.75	V
5.731	-65.9	Pk	33.7	-24.2	7.9	-48.5	-13	-35.5	H
5.7385	-66.03	Pk	33.7	-24.3	7.7	-48.93	-13	-35.93	V
15.26687	-66.55	Pk	40.2	-19.4	10.7	-35.05	-13	-22.05	V
15.2833	-66.49	Pk	40.1	-19.2	10.5	-35.09	-13	-22.09	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/27/2019
Test Engineer:	12491
Configuration:	EUT Only
Mode:	WCDMA Band 2 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.67644	-65.13	Pk	30.3	-26.8	10.1	-51.53	-13	-38.53	H
3.71084	-64.57	Pk	30.5	-26.9	9.9	-51.07	-13	-38.07	V
5.55881	-65.8	Pk	33.7	-25	8.9	-48.2	-13	-35.2	H
5.56603	-65.51	Pk	33.7	-25	8.8	-48.01	-13	-35.01	V
12.95729	-66.7	Pk	43.9	-19.5	9.4	-32.9	-13	-19.9	H
12.9642	-66.22	Pk	43.8	-19.5	9.5	-32.42	-13	-19.42	V
Mid Channel, 1880.0MHz									
3.77152	-68.6	Pk	30.8	-26.9	9.5	-55.2	-13	-42.2	H
11.26929	-66.19	Pk	39	-18.7	8.5	-37.39	-13	-24.39	H
3.76495	-64.75	Pk	30.8	-26.8	9.6	-51.15	-13	-38.15	V
11.29116	-67.04	Pk	38.9	-18.6	8.1	-38.64	-13	-25.64	V
5.63434	-66.05	Pk	33.7	-24.8	8.6	-48.55	-13	-35.55	H
5.65002	-66	Pk	33.7	-24.9	8	-49.2	-13	-36.2	V
High Channel, 1907.6MHz									
3.82034	-65.43	Pk	31.2	-26.9	9.6	-51.53	-13	-38.53	H
3.81475	-64.9	Pk	31.1	-26.9	9.7	-51	-13	-38	V
5.70882	-65.42	Pk	33.7	-24.7	7.6	-48.82	-13	-35.82	V
5.71509	-65.62	Pk	33.7	-24.6	7.9	-48.62	-13	-35.62	H
17.15096	-66.93	Pk	42.5	-16.5	11.4	-29.53	-13	-16.53	H
17.17011	-67.44	Pk	42.5	-16.4	11.4	-29.94	-13	-16.94	V

Pk - Peak detector

**WCDMA BAND 4**

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 4 Rel 99
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
2.11096	-55.75	Pk	28.5	-28.6	9.5	-46.35	-13	-33.35	V
2.11341	-64.86	Pk	28.5	-28.7	10.2	-54.86	-13	-41.86	H
3.0308	-68.06	Pk	30.5	-27.6	10.6	-54.56	-13	-41.56	H
3.09964	-69.04	Pk	30.8	-27.7	10.6	-55.34	-13	-42.34	V
4.98967	-69.33	Pk	33.5	-25.1	9.3	-51.63	-13	-38.63	H
5.16928	-69.29	Pk	34	-25.3	9.4	-51.19	-13	-38.19	V
Mid Channel, 1732.6MHz									
2.13164	-55.87	Pk	28.5	-28.8	10.3	-45.87	-13	-32.87	V
2.13259	-60.13	Pk	28.5	-28.8	11.2	-49.23	-13	-36.23	H
3.25764	-68.15	Pk	31	-27.3	9.8	-54.65	-13	-41.65	V
3.2601	-67.96	Pk	31	-27.3	10.4	-53.86	-13	-40.86	H
3.89718	-68.01	Pk	31.6	-26.5	9.8	-53.11	-13	-40.11	V
3.94024	-68.76	Pk	31.8	-26.7	10.1	-53.56	-13	-40.56	H
High Channel, 1752.6MHz									
2.15159	-56.4	Pk	28.5	-28.9	10.4	-46.4	-13	-33.4	V
2.15338	-60.27	Pk	28.5	-28.9	9.9	-50.77	-13	-37.77	H
3.03478	-68.13	Pk	30.6	-27.7	10.9	-54.33	-13	-41.33	H
3.15079	-67.93	Pk	31.1	-27.6	10.2	-54.23	-13	-41.23	V
4.39686	-69.11	Pk	31.6	-25.9	9.4	-54.01	-13	-41.01	V
5.54321	-70.41	Pk	33.7	-25.1	8.7	-53.11	-13	-40.11	H

Pk - Peak detector

Company:	
Project #:	13018973
Date:	9/26/2019
Test Engineer:	50822
Configuration:	EUT Only
Mode:	WCDMA Band 4 HSDPA
Chamber #:	Chamber B

Frequency (GHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
2.1116	-59.17	Pk	28.5	-28.6	10.2	-49.07	-13	-36.07	H
2.11346	-54.66	Pk	28.5	-28.7	9.4	-45.46	-13	-32.46	V
2.96844	-67.91	Pk	30.2	-27.8	9.2	-56.31	-13	-43.31	H
3.40817	-68.5	Pk	30.3	-27.2	9.1	-56.3	-13	-43.3	V
4.40113	-69.34	Pk	31.6	-25.8	10	-53.54	-13	-40.54	V
5.06063	-69.85	Pk	33.9	-24.9	8.8	-52.05	-13	-39.05	H
Mid Channel, 1732.6MHz									
2.13192	-58.89	Pk	28.5	-28.8	11	-48.19	-13	-35.19	H
2.13332	-55.91	Pk	28.5	-28.9	10.4	-45.91	-13	-32.91	V
2.97941	-64.59	Pk	30.3	-27.8	10	-52.09	-13	-39.09	H
3.13795	-68.12	Pk	31	-27.6	10.3	-54.42	-13	-41.42	V
3.9437	-67.96	Pk	31.8	-26.8	10	-52.96	-13	-39.96	H
4.21547	-72.84	Pk	31.2	-26.2	9.4	-58.44	-13	-45.44	V
High Channel, 1752.6MHz									
2.15149	-61.21	Pk	28.5	-28.9	10.3	-51.31	-13	-38.31	H
2.15176	-54.67	Pk	28.5	-28.9	10.4	-44.67	-13	-31.67	V
2.36271	-68.26	Pk	30.1	-28.7	10.7	-56.16	-13	-43.16	H
3.14145	-68.24	Pk	31	-27.6	10.3	-54.54	-13	-41.54	V
3.94306	-68.13	Pk	31.8	-26.8	10	-53.13	-13	-40.13	V
3.94751	-68.99	Pk	31.8	-26.7	10	-53.89	-13	-40.89	H

Pk - Peak detector



## 10. SETUP PHOTOS

Please refer to 13018973-EP1V1 for setup photos

**END OF TEST REPORT**