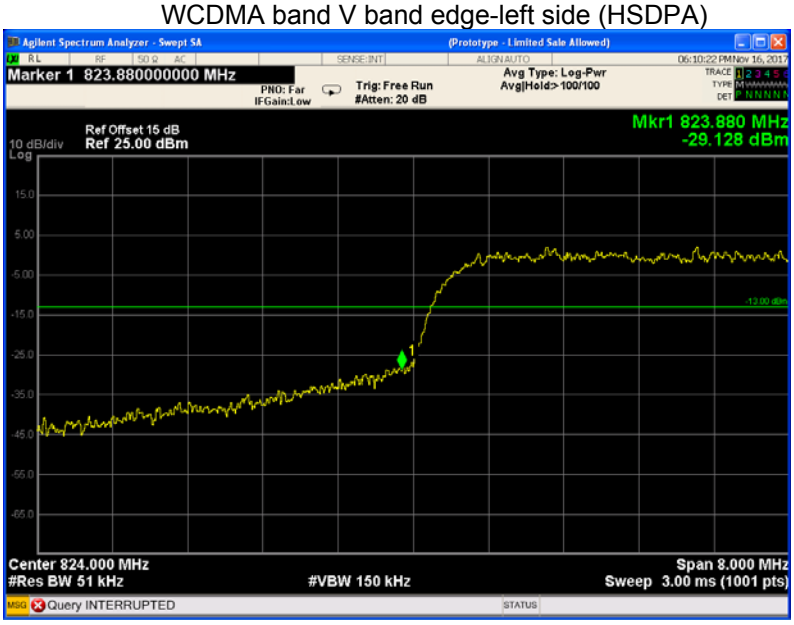
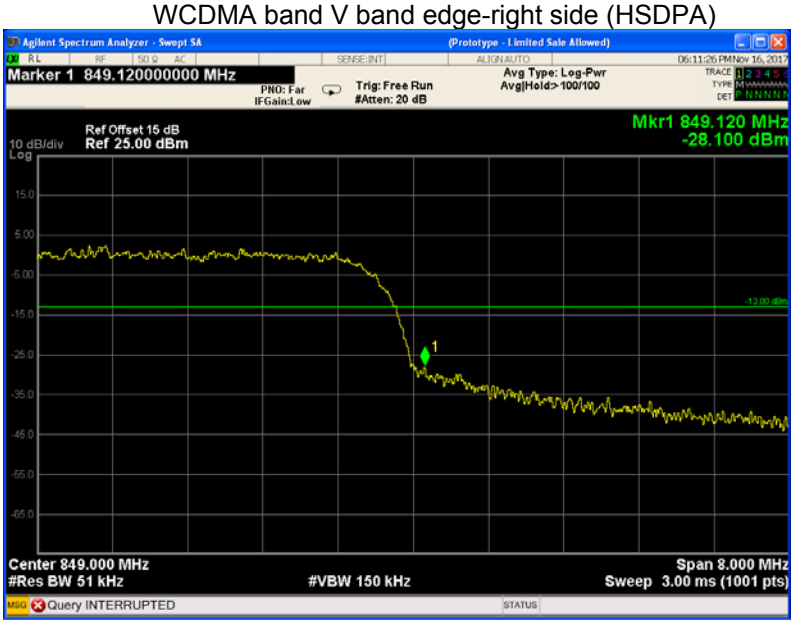
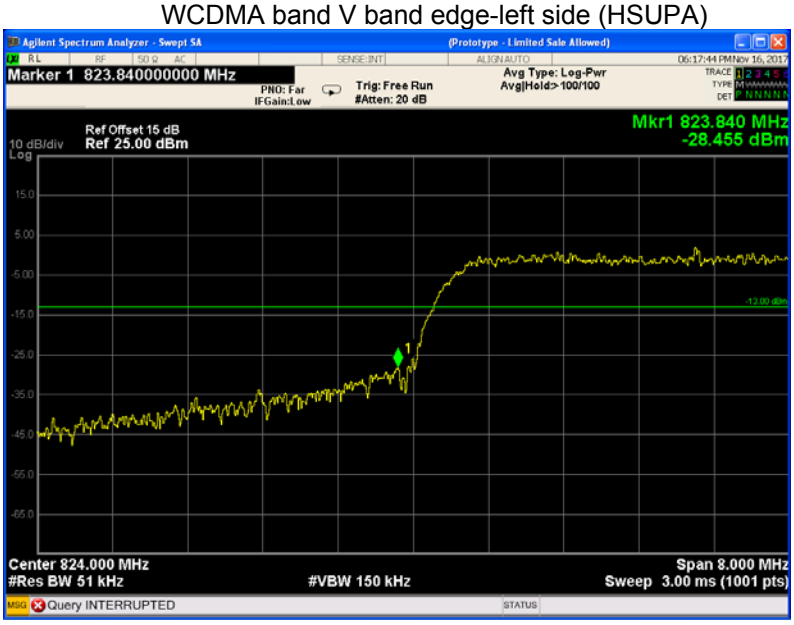
WCDMA band V band edge-left side (HSDPA)



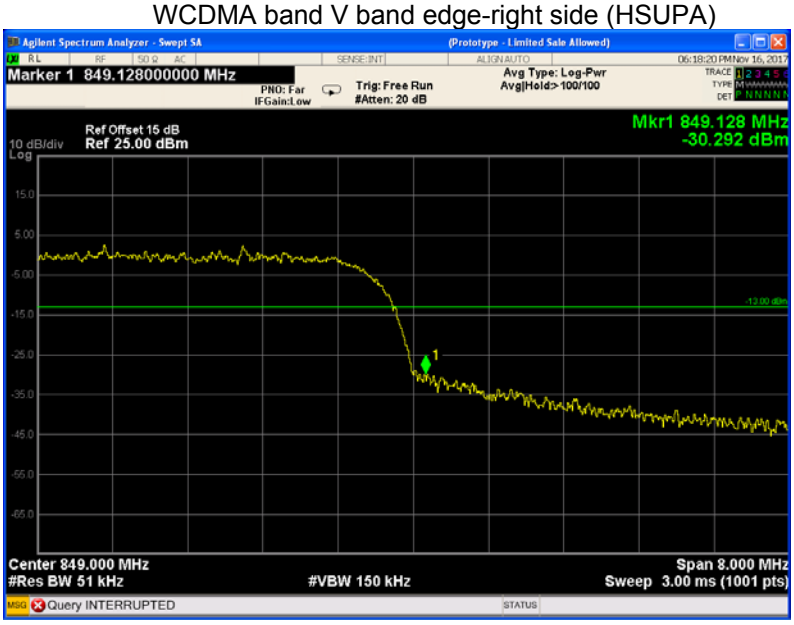
WCDMA band V band edge-right side (HSDPA)



WCDMA band V band edge-left side (HSUPA)

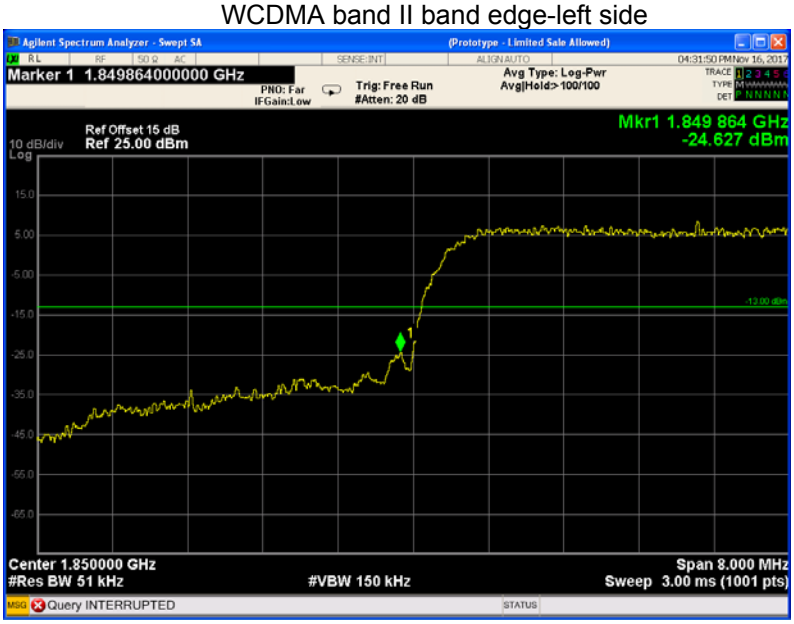


WCDMA band V band edge-right side (HSUPA)

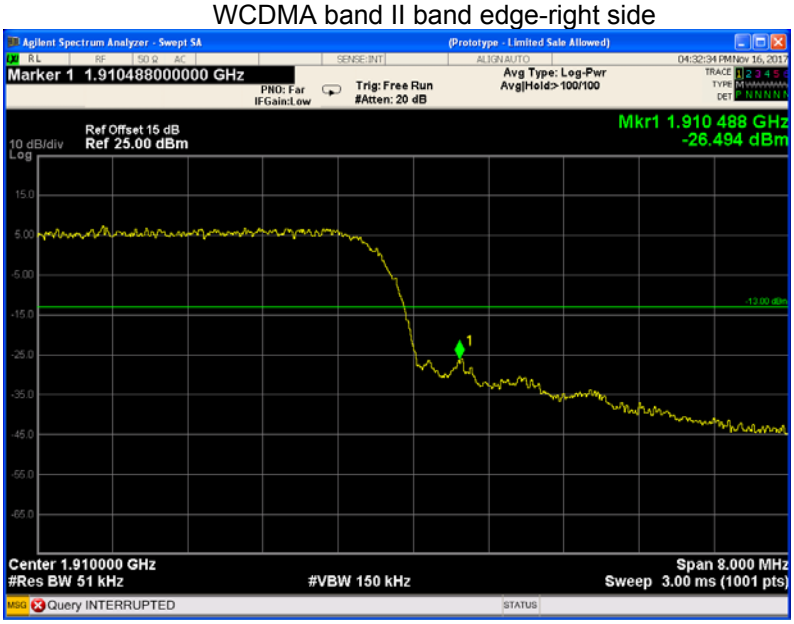


Cellular Band (Part 24E)

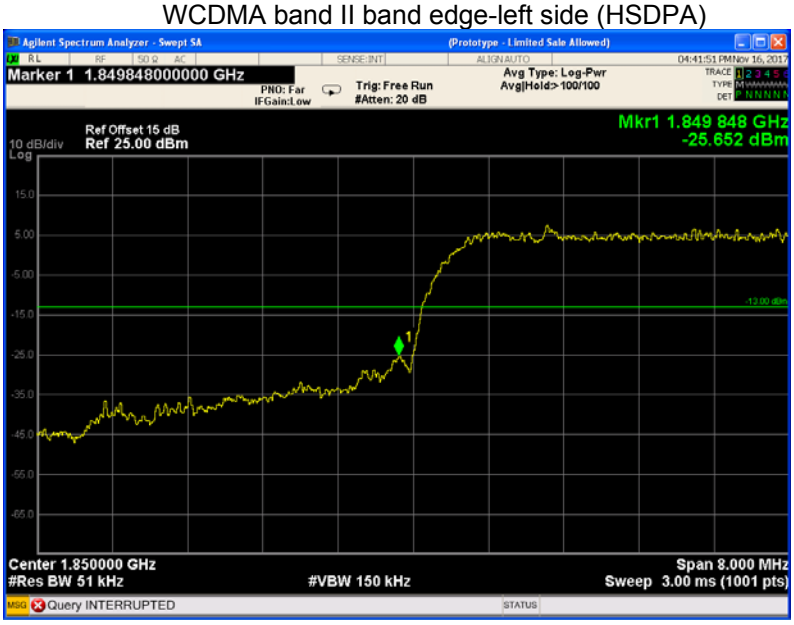
WCDMA band II band edge-left side



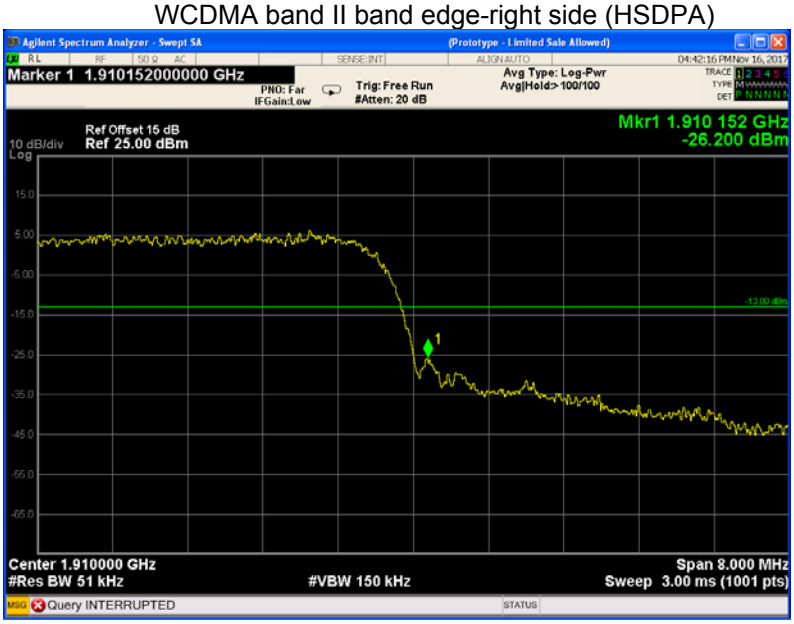
WCDMA band II band edge-right side



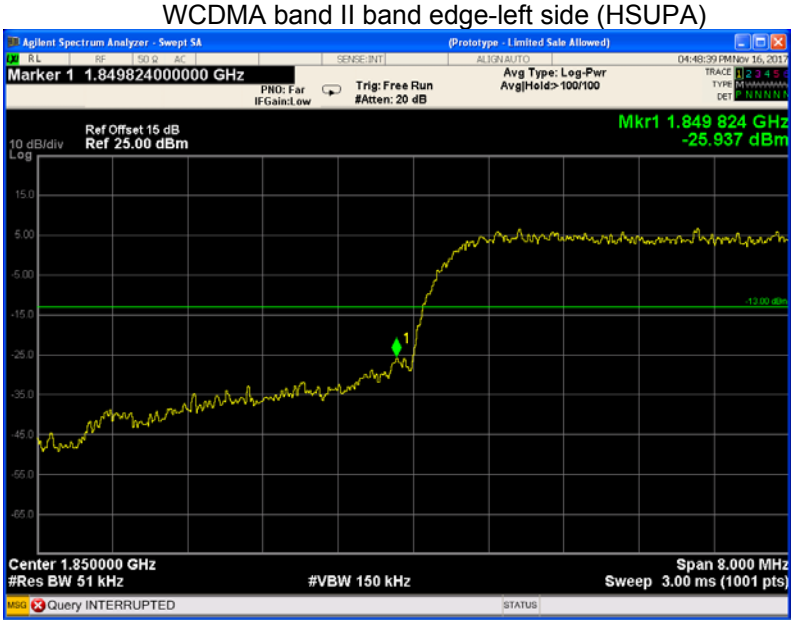
WCDMA band II band edge-left side (HSDPA)



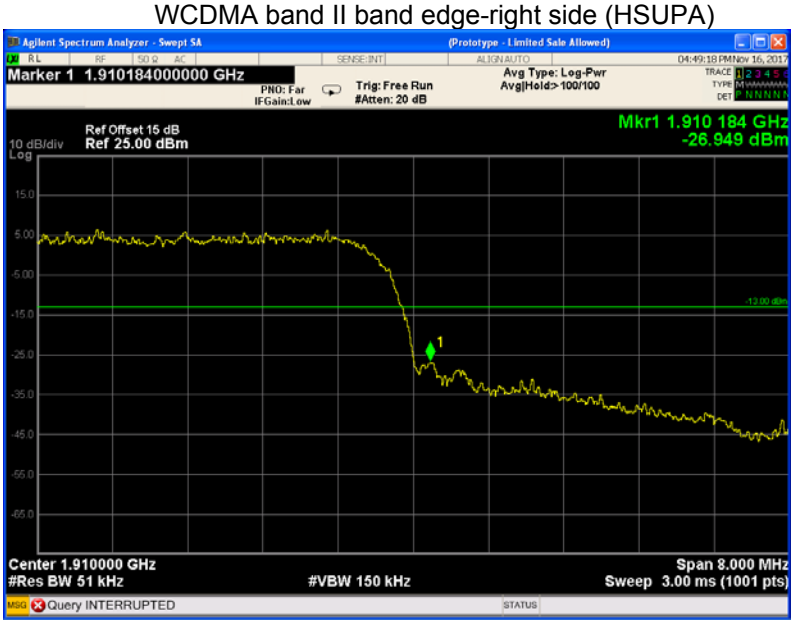
WCDMA band II band edge-right side (HSDPA)



WCDMA band II band edge-left side (HSUPA)

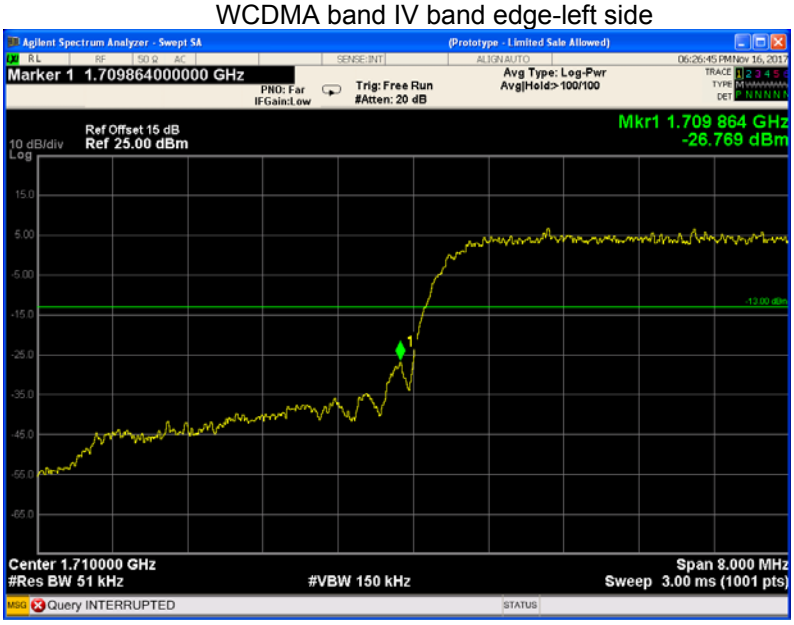


WCDMA band II band edge-right side (HSUPA)

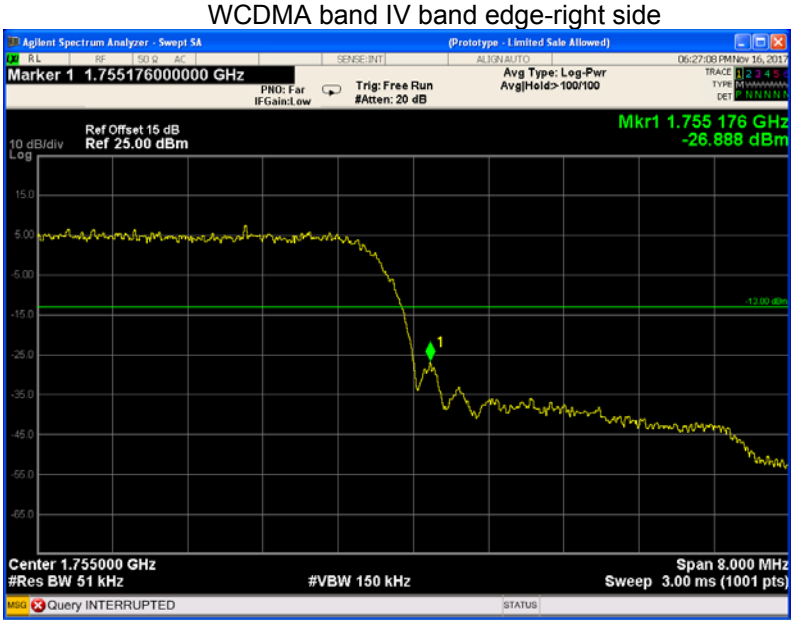


Part 27

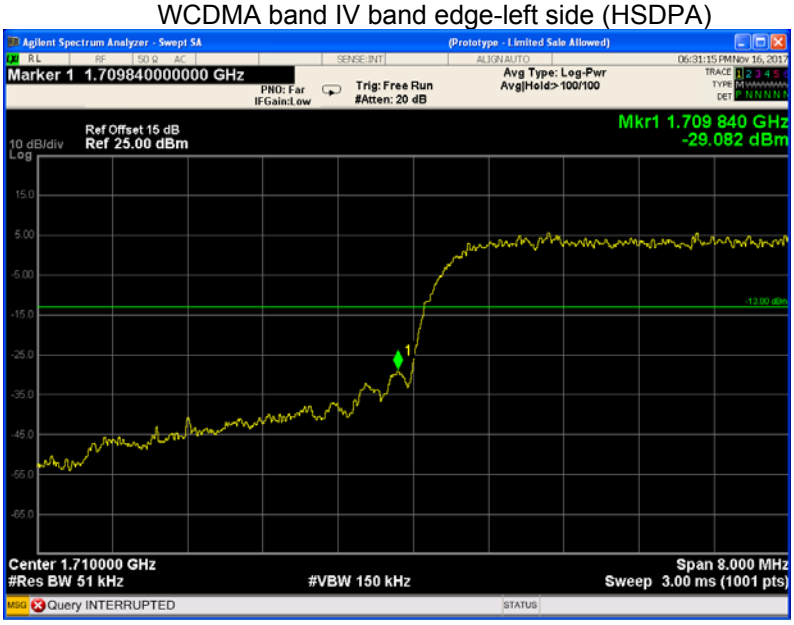
WCDMA band IV band edge-left side



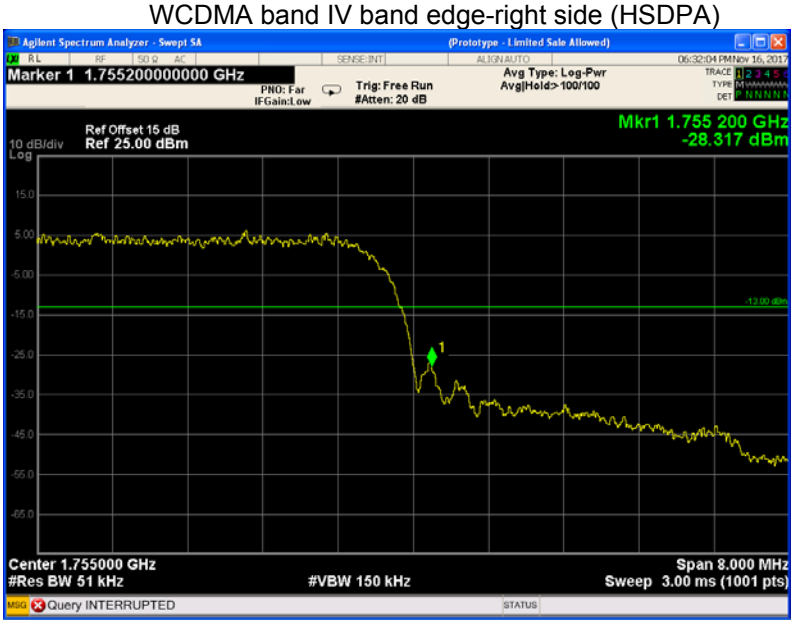
WCDMA band IV band edge-right side



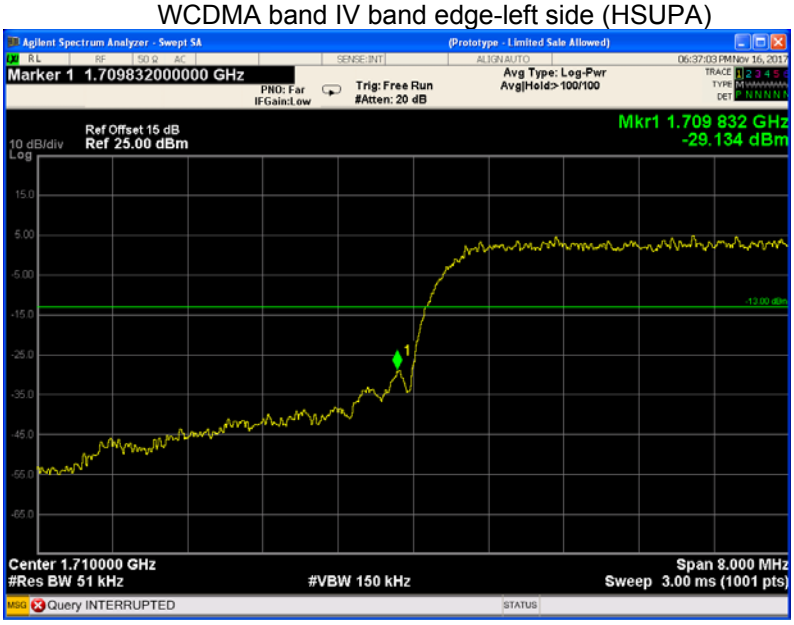
WCDMA band IV band edge-left side (HSDPA)



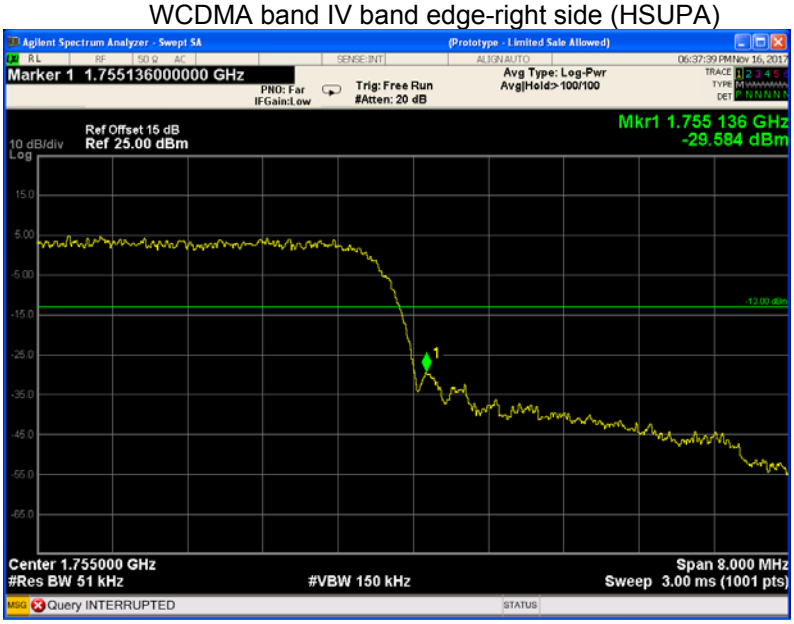
WCDMA band IV band edge-right side (HSDPA)



WCDMA band IV band edge-left side (HSUPA)



WCDMA band IV band edge-right side (HSUPA)



14 FREQUENCY STABILITY

Test Requirement:	FCC Part 2.1055, 22.355, 24.235, 27.5(h),27.54
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

14.1 EUT Operation

Operating Environment **:**

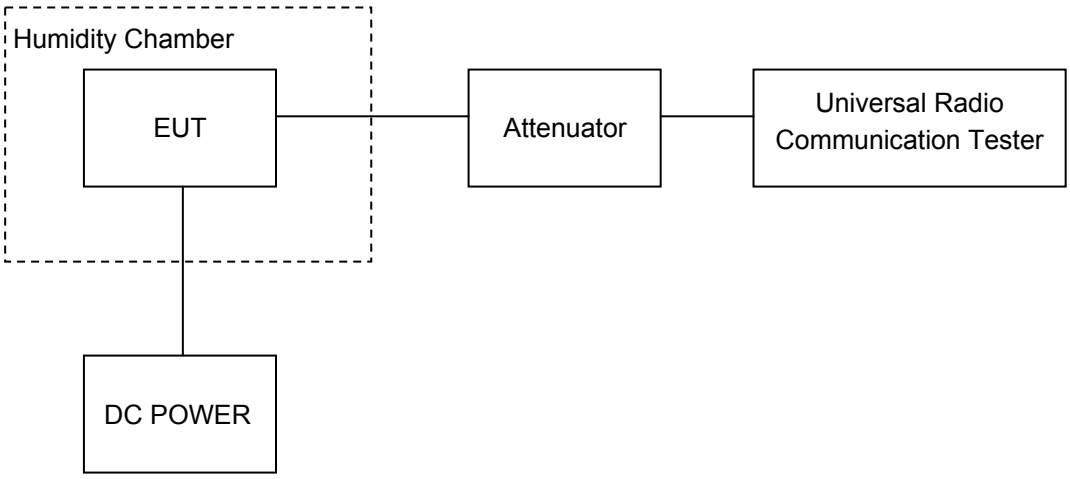
Temperature:	22.9 °C
Humidity:	52.0 % RH
Atmospheric Pressure:	101.3kPa

14.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



14.3 Test Result

Modem 1

Cellular Band (Part 22H)

WCDMA Band V Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-7	-0.0037	2.5
40		1	0.0005	2.5
30		3	0.0016	2.5
20		-2	-0.0011	2.5
10		-5	-0.0027	2.5
0		4	0.0021	2.5
-10		-6	-0.0032	2.5
-20		2	0.0011	2.5
-30		-4	-0.0021	2.5
20	10.2	-5	-0.0027	2.5
20	13.8	-3	-0.0016	2.5

WCDMA Band V Test Frequency:836.6MHz(HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-7	-0.0084	2.5
40		-8	-0.0096	2.5
30		-10	-0.0120	2.5
20		-2	-0.0024	2.5
10		6	0.0072	2.5
0		-7	-0.0084	2.5
-10		-9	-0.0108	2.5
-20		-4	-0.0048	2.5
-30		7	0.0084	2.5
20	10.2	-1	-0.0012	2.5
20	13.8	-9	-0.0108	2.5

WCDMA Band V Test Frequency:836.6MHz(HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-2	-0.0024	2.5
40		-11	-0.0132	2.5
30		-2	-0.0024	2.5
20		-4	-0.0048	2.5
10		-4	-0.0048	2.5
0		-6	-0.0072	2.5
-10		-11	-0.0132	2.5
-20		3	0.0036	2.5
-30		-9	-0.0108	2.5
20	10.2	-5	-0.0060	2.5
20	13.8	3	0.0036	2.5

PCS Band (Part 24E)

WCDMA Band II Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	7	0.0037	2.5
40		-4	-0.0021	2.5
30		-8	-0.0043	2.5
20		1	0.0005	2.5
10		7	0.0037	2.5
0		-7	-0.0037	2.5
-10		-1	-0.0005	2.5
-20		10	0.0053	2.5
-30		-2	-0.0011	2.5
20	10.2	-7	-0.0037	2.5
20	13.8	4	0.0021	2.5

WCDMA Band II Test Frequency:1880.0MHz(HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-1	-0.0005	2.5
40		5	0.0027	2.5
30		-3	-0.0016	2.5
20		-3	-0.0016	2.5
10		3	0.0016	2.5
0		-5	-0.0027	2.5
-10		1	0.0005	2.5
-20		-3	-0.0016	2.5
-30		2	0.0011	2.5
20	10.2	3	0.0016	2.5
20	13.8	-11	-0.0059	2.5

WCDMA Band II Test Frequency:1880.0MHz(HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	5	0.0027	2.5
40		-7	-0.0037	2.5
30		3	0.0016	2.5
20		-2	-0.0011	2.5
10		-9	-0.0048	2.5
0		-6	-0.0032	2.5
-10		-2	-0.0011	2.5
-20		-3	-0.0016	2.5
-30		1	0.0005	2.5
20	10.2	-8	-0.0043	2.5
20	13.8	4	0.0021	2.5

Part 27

WCDMA Band IV Test Frequency:1732.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	4	0.0023	2.5
40		-5	-0.0029	2.5
30		9	0.0052	2.5
20		3	0.0017	2.5
10		6	0.0035	2.5
0		3	0.0017	2.5
-10		5	0.0029	2.5
-20		7	0.0040	2.5
-30		9	0.0052	2.5
20	10.2	10	0.0058	2.5
20	13.8	11	0.0063	2.5

WCDMA Band IV Test Frequency:1732.6MHz (HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	4	0.0023	2.5
40		-5	-0.0029	2.5
30		9	0.0052	2.5
20		3	0.0017	2.5
10		6	0.0035	2.5
0		3	0.0017	2.5
-10		5	0.0029	2.5
-20		7	0.0040	2.5
-30		9	0.0052	2.5
20	10.2	10	0.0058	2.5
20	13.8	11	0.0063	2.5

WCDMA Band IV Test Frequency:1732.6MHz (HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	4	0.0023	2.5
40		-5	-0.0029	2.5
30		9	0.0052	2.5
20		3	0.0017	2.5
10		6	0.0035	2.5
0		3	0.0017	2.5
-10		5	0.0029	2.5
-20		7	0.0040	2.5
-30		9	0.0052	2.5
20	10.2	10	0.0058	2.5
20	13.8	11	0.0063	2.5

Modem 2

Cellular Band (Part 22H)

WCDMA Band V Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-7	-0.0037	2.5
40		1	0.0005	2.5
30		3	0.0016	2.5
20		-2	-0.0011	2.5
10		-5	-0.0027	2.5
0		4	0.0021	2.5
-10		-6	-0.0032	2.5
-20		2	0.0011	2.5
-30		-4	-0.0021	2.5
20	10.2	-5	-0.0027	2.5
20	13.8	-3	-0.0016	2.5

WCDMA Band V Test Frequency:836.6MHz(HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-7	-0.0084	2.5
40		-8	-0.0096	2.5
30		-10	-0.0120	2.5
20		-2	-0.0024	2.5
10		6	0.0072	2.5
0		-7	-0.0084	2.5
-10		-9	-0.0108	2.5
-20		-4	-0.0048	2.5
-30		7	0.0084	2.5
20	10.2	-1	-0.0012	2.5
20	13.8	-9	-0.0108	2.5

WCDMA Band V Test Frequency:836.6MHz(HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-2	-0.0024	2.5
40		-11	-0.0132	2.5
30		-2	-0.0024	2.5
20		-4	-0.0048	2.5
10		-4	-0.0048	2.5
0		-6	-0.0072	2.5
-10		-11	-0.0132	2.5
-20		3	0.0036	2.5
-30		-9	-0.0108	2.5
20	10.2	-5	-0.0060	2.5
20	13.8	3	0.0036	2.5

PCS Band (Part 24E)

WCDMA Band II Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	5	0.0027	2.5
40		-9	-0.0048	2.5
30		3	0.0016	2.5
20		-1	-0.0005	2.5
10		-3	-0.0016	2.5
0		6	0.0032	2.5
-10		6	0.0032	2.5
-20		5	0.0027	2.5
-30		7	0.0037	2.5
20	10.2	-8	-0.0043	2.5
20	13.8	-8	-0.0043	2.5

WCDMA Band II Test Frequency:1880.0MHz(HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-1	-0.0005	2.5
40		5	0.0027	2.5
30		-3	-0.0016	2.5
20		-3	-0.0016	2.5
10		3	0.0016	2.5
0		-5	-0.0027	2.5
-10		1	0.0005	2.5
-20		-3	-0.0016	2.5
-30		2	0.0011	2.5
20	10.2	3	0.0016	2.5
20	13.8	-11	-0.0059	2.5

WCDMA Band II Test Frequency:1880.0MHz(HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	1	0.0005	2.5
40		8	0.0043	2.5
30		-1	-0.0005	2.5
20		-1	-0.0005	2.5
10		-9	-0.0048	2.5
0		5	0.0027	2.5
-10		-7	-0.0037	2.5
-20		-6	-0.0032	2.5
-30		-7	-0.0037	2.5
20	10.2	7	0.0037	2.5
20	13.8	0	0.0000	2.5

Part 27

WCDMA Band IV Test Frequency:1732.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	4	0.0023	2.5
40		-4	-0.0023	2.5
30		-4	-0.0023	2.5
20		-1	-0.0006	2.5
10		2	0.0012	2.5
0		-10	-0.0058	2.5
-10		-3	-0.0017	2.5
-20		7	0.0040	2.5
-30		-4	-0.0023	2.5
20	10.2	0	0.0000	2.5
20	13.8	-5	-0.0029	2.5

WCDMA Band IV Test Frequency:1732.6MHz (HSDPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	8	0.0046	2.5
40		6	0.0035	2.5
30		7	0.0040	2.5
20		1	0.0006	2.5
10		-2	-0.0012	2.5
0		5	0.0029	2.5
-10		-4	-0.0023	2.5
-20		-7	-0.0040	2.5
-30		-7	-0.0040	2.5
20	10.2	-4	-0.0023	2.5
20	13.8	4	0.0023	2.5

WCDMA Band IV Test Frequency:1732.6MHz (HSUPA)				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12	-4	-0.0023	2.5
40		-7	-0.0040	2.5
30		3	0.0017	2.5
20		1	0.0006	2.5
10		5	0.0029	2.5
0		-3	-0.0017	2.5
-10		0	0.0000	2.5
-20		-1	-0.0006	2.5
-30		1	0.0006	2.5
20	10.2	-1	-0.0006	2.5
20	13.8	6	0.0035	2.5

15 RF Exposure

Test Requirement: FCC Part 1.1307

Test Mode: The EUT work in test mode(Tx).

15.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

15.2 The procedures / limit

FCC Part 1.1307:

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ;

*Plane-wave equivalent power density

15.3 MPE Calculation Method

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the gain of the used antenna, the RF power density can be obtained

FCC Part 1.1307:

Modem 1:

Mode	Antenna Gain (dBi)	Antenna Gain (numeric)	Max.Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
WCDMA Band II	4.79	3.013	22.89	194.536	0.1166	1.0
WCDMA Band V	1.10	1.288	22.60	181.970	0.0466	1.0
WCDMA Band IV	3.93	2.472	22.61	182.390	0.0897	1.0

Modem 2:

Mode	Antenna Gain (dBi)	Antenna Gain (numeric)	Max.Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
WCDMA Band II	4.79	3.013	22.60	181.970	0.1091	1.0
WCDMA Band V	1.10	1.288	22.71	186.638	0.0478	1.0
WCDMA Band IV	3.93	2.472	22.70	186.209	0.0916	1.0

16 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS17S1093648E_Photo.

====== End of Report ======