ENGINEERING EVAULATION
MEASUREMENT DATA

For

NextNav

484 Oakmead Pkwy,
Sunnyvale, CA 94085

Model: Tiger

Test Engineer:	**Todd Moy**
Project Number:	**T1510084 Rev F**
Test Date:	**10-13-2015**
Prepared By:	**Bay Area Compliance Laboratories Corp.** **1274 Anvilwood Ave.** **Sunnyvale, CA 94089, USA** **Tel: (408) 732-9162** **Fax: (408) 732 9164**

Product Description for Equipment under Test (EUT)

This EMC Test data report has been compiled on behalf of *NextNav.,* and their product model *Tiger*, which will henceforth be referred to as the "EUT" (Equipment under Test) in this report. The EUT are terrestrial navigation network transmitters.

Test Methodology

All of the measurements contained in this Test Report were made in accordance with ANSI C63.4-2014 "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz". All tests were performed at the Bay Area Compliance Laboratories Corp. facilities in Sunnyvale California.

Measurement Uncertainties

All measurements involve uncertainties. In the case of EMC Emissions tests, the influence quantities (factors) that make a significant contribution to the measurement uncertainties are detailed in the latest version of CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty" (i.e., CISPR 16-4-2:2011-06 + C1:2013-04 +A1:2014-02).

Based on the uncertainty models given in the latest version of CISPR16-4-2, and, based on the calibration uncertainties of the specific instruments and facilities used at BACL to perform the measurements documented in this Test Report, the following estimates have been made of BACL's Measurement Uncertainties for the measurements documented in this Test Report.

Type of Measurement	BACL Typical U_{LAB} Value (for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)	U_{CISPR} Value worst-allowable values, per Table 1 of the latest version of CISPR 16-4-2 (for a k=2 Coverage Factor, equivalent to ~ 95% level of confidence)
Conducted Disturbance (Mains Port) 150 kHz to 30 MHz (i.e., AC/DC Line Conducted Emissions measurements made with an LISN)	3.3 dB	3.4 dB
Radiated Disturbance on an OATS 30 MHz – 1000 MHz (i.e., Radiated Emissions measured in a SAC at 10 metres distance)	5.8 dB	6.3 dB
Radiated Disturbance on an OATS 1 GHz – 6 GHz (i.e., Radiated Emissions measured in a FAR at 3 metres distance)	5.1 dB	5.2 dB
Radiated Disturbance on an OATS 6 GHz – 18 GHz (i.e., Radiated Emissions measured in a FAR at 3 metres distance)	5.4 dB	5.5 dB

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SPURIOUS EMISSIONS DATA

Customer Name	*NextNav*	**Test Date**	*2015-10-8*
Project Number	*T1510084*	**Time**	*8:00 am-12:00 am*
EUT Name	*Tiger*	**Temperature (°C)**	*20*
EUT Model No.	-	**Humidity (%)**	*44*
EUT Serial No.	*106*	**ATM Pressure**	*101.51 kPa*
EUT Configuration	*Normal operating mode (IDB4)*	**Location**	*RF Bench #1*

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-10-24	1 year

Band	DL/UL	Frequency Range (MHz)	Filter Loss (dB)	Coexistence requirement (dBm)	Measured (dBm)	Measure BW	colocation requirement (uplink only) (dBm)	Measured (dBm)	Measure BW
PCS 1900	DL	1930-1990	-1.89	-47	-112.227	100 kHz	-	-	-
	UL	1850-1910	-1.63	-61	-107.674	100 kHz	-98	-107.674	100 kHz
GSM 850 OR CMDA 850	DL	869-894	Note*	-57	-114.813	100 kHz	-	-	-
	UL	824-849	-1.35	-61	-114.832	100 kHz	-98	-114.832	100 kHz
UTRA FDD Band IV/X or E-UTRA Band 4/10	DL	2110-2170	-1.69	-52	-102.545	1 MHz	-	-	-
	UL	1710-1770	-1.3	-49	-104.807	1 MHz	-96	-113.946	100 kHz
UTRA FDD	DL	729-746	-0.8	-52	-101.434	1 MHz	-	-	-

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Band XII/XVII or E-UTRA Band 12/17	UL	699-716	-0.8	-49	-104.999	1 MHz	-96	-113.964	100 kHz
UTRA FDD Band XIII or E-UTRA Band 13	DL	746-756	-0.87	-52	-100.472	1 MHz	-	-	-
	UL	777-787	-0.86	-49	-104.026	1 MHz	-96	-113.455	100 kHz
UTRA FDD Band XIV or E-UTRA Band 14	DL	758-768	-0.89	-52	-104.736	1 MHz	-	-	-
	UL	788-798	-0.95	-49	-104.991	1 MHz	-96	-113.085	100 kHz
E-UTRA Band 23	DL	2180-2200	-1.68	-52	-101.8	1 MHz	-	-	-
	UL	2000-2020	-2.8	-49	-103.39	1 MHz	-96	-112.441	100 kHz
E-UTRA Band 24	DL	1525-1559	-1.28	-52	-103.276	1 MHz	-	-	-
	UL	1626.5-1660.5	-1.18	-49	-103.344	1 MHz	-96	-114.623	100 kHz
UTRA FDD Band II/XXV or E-UTRA Band 2/25	DL	1930-1995	-2.4	-52	-103.667	1 MHz	-	-	-
	UL	1850-1915	-1.92	-49	-102.576	1 MHz	-96	-107.674	100 kHz
UTRA FDD Band V/XXVI or E-UTRA Band 5/26	DL	859-894	Note*	-52	-103.19	1 MHz	-	-	-
	UL	814-849	-1.25	-49	-104.607	1 MHz	-96	-114.59	100 kHz
E-UTRA Band 29	DL	717-728	-0.81	-52	-104.743	1 MHz	-	-	-
	DL	2350-2360	-4.58	-52	-102.08	1 MHz	-	-	-

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E-UTRA Band 30	UL	2305-2315	-4.21	-49	-102.115	1 MHz	-96	-110.956	100 kHz
E-UTRA Band 41	TDD	2496-2690	-1.97	-52	-104.055	1 MHz	-96	-113.962	100 kHz

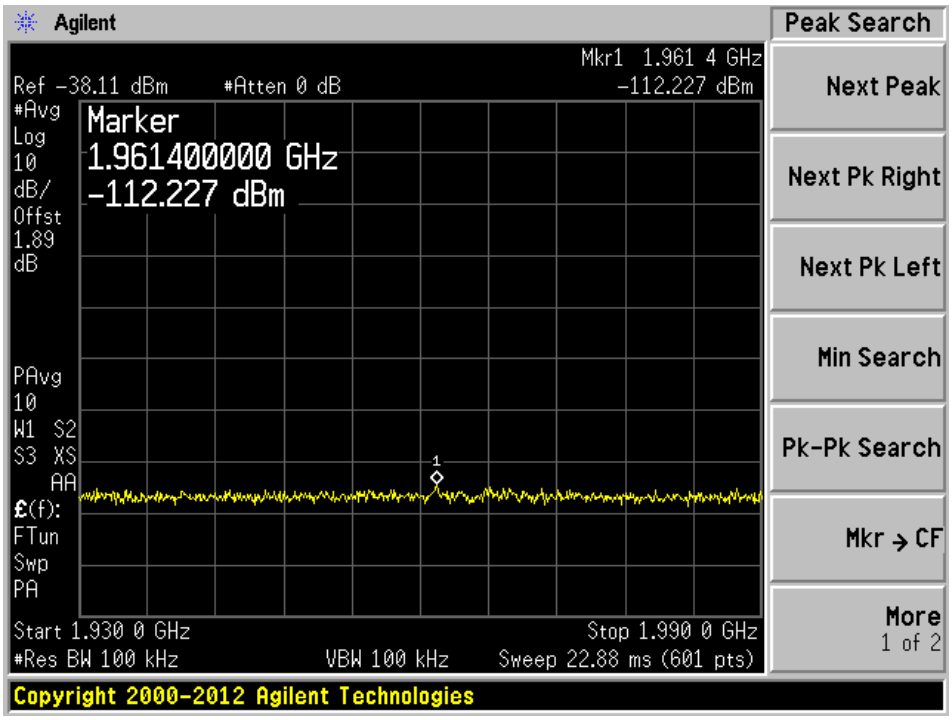
Note 1: The cutoff frequency of the filter is within this frequency range. The loss of the filter is -10 dB in the passband and -11 dB at the cutoff frequency.

Note 2: The lower cutoff frequency of the band reject filter is 875 MHz.

Please refer to the following plots.

PCS 1900

Downlink: 1930-1990 MHz



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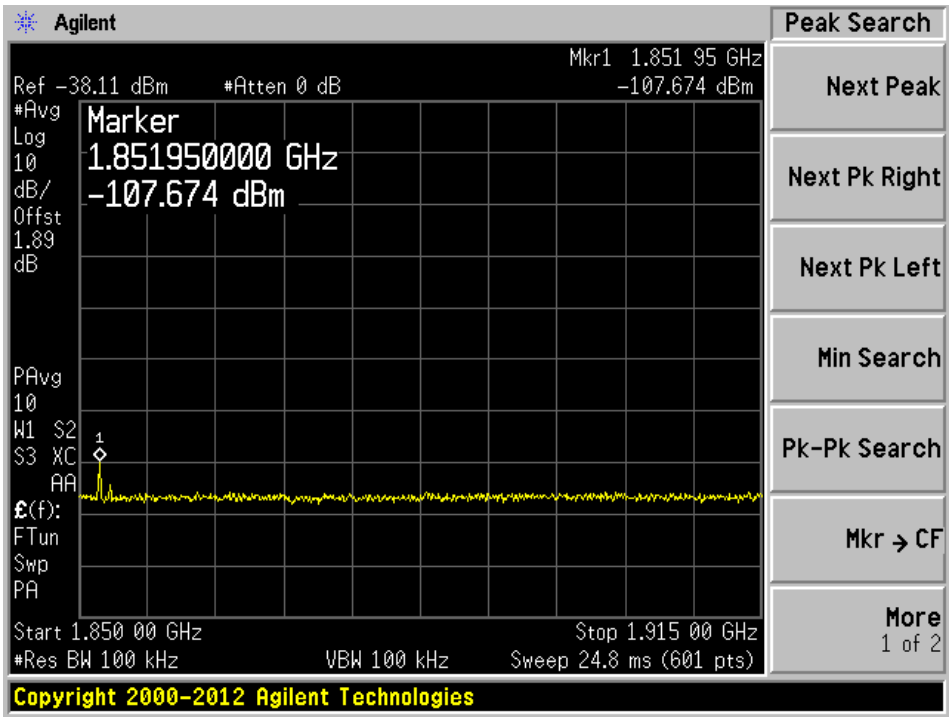
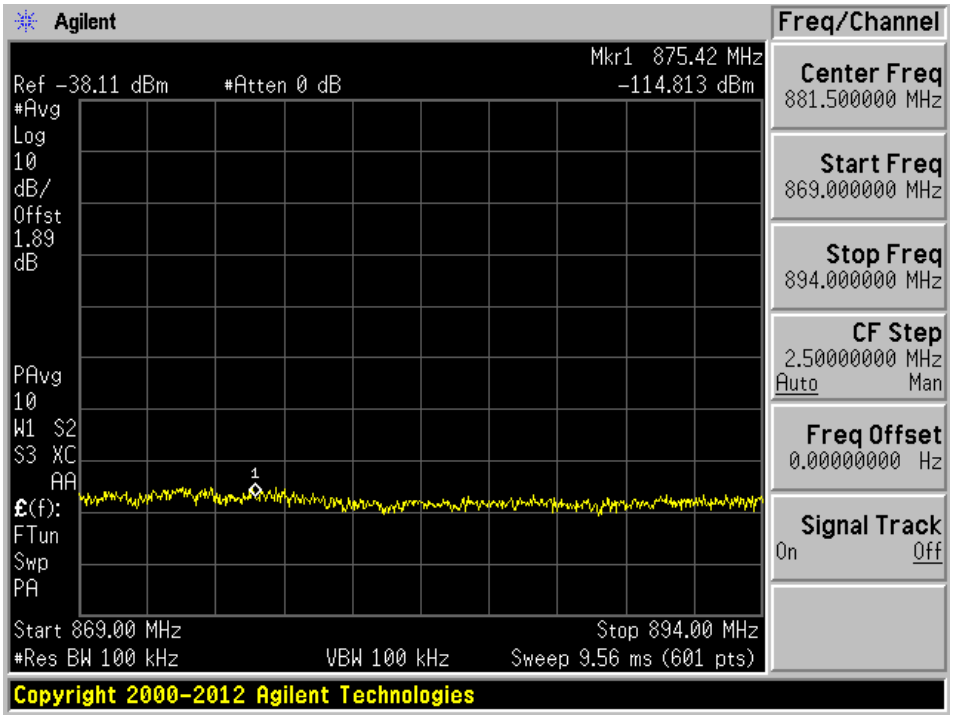
Uplink: 1850-1910 MHz



GMS 850 or CDMA 850

Downlink: 869-894 MHz



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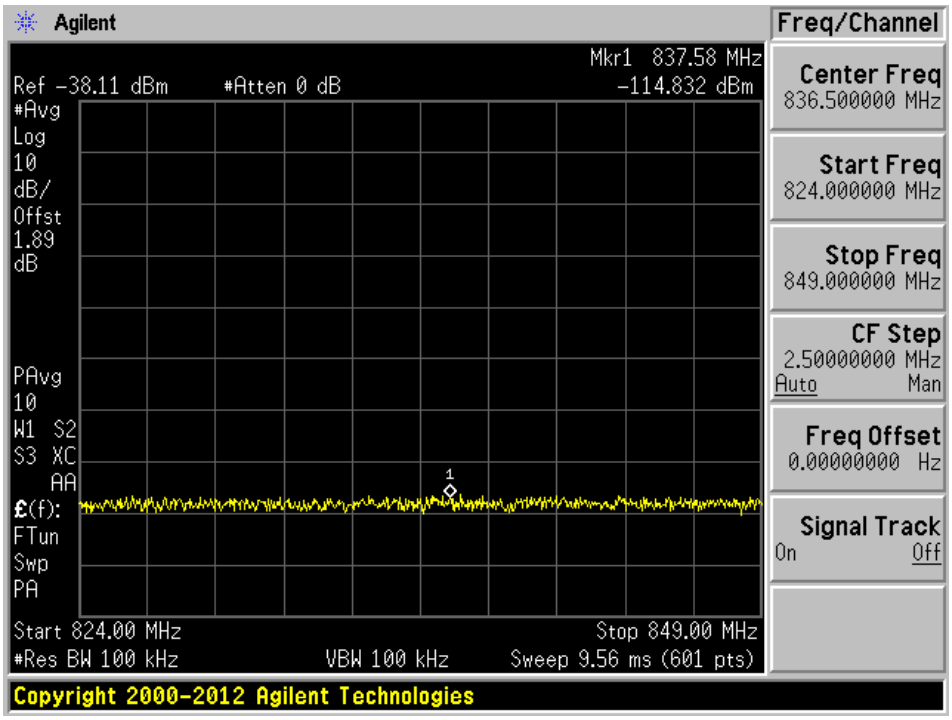
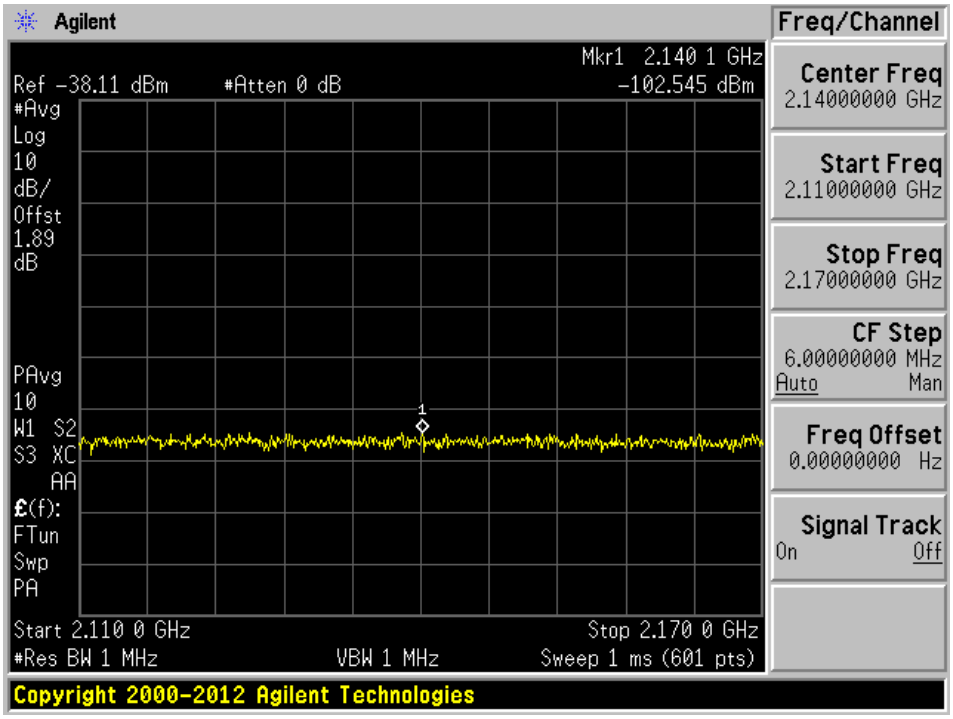
Uplink: 824-849 MHz



UTRA FDD Band IV/X or E-UTRA Band 4/10

Downlink: 2110-2170 MHz



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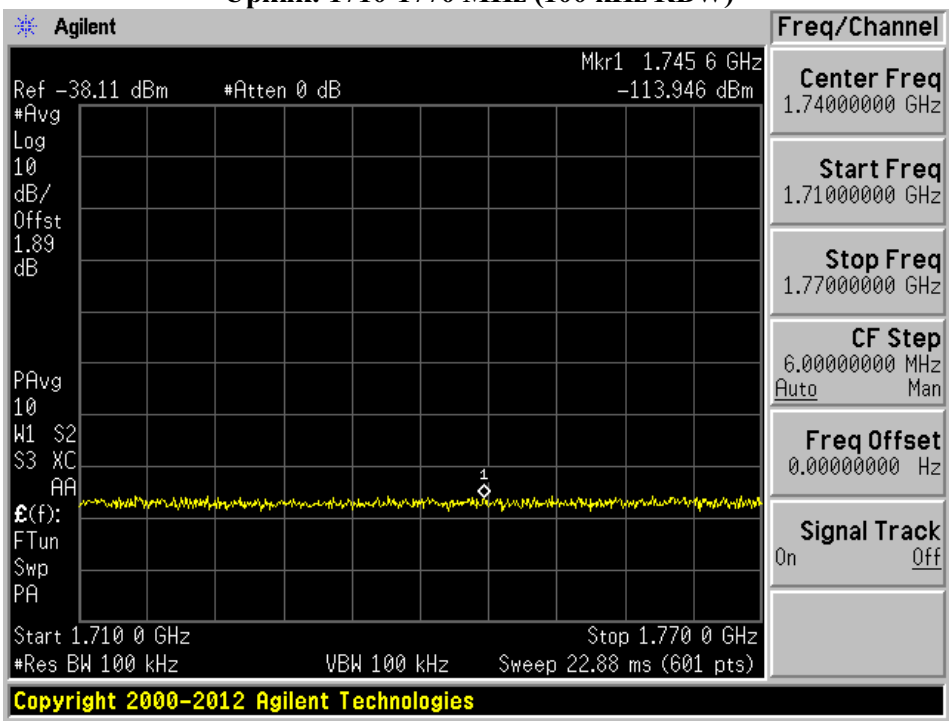
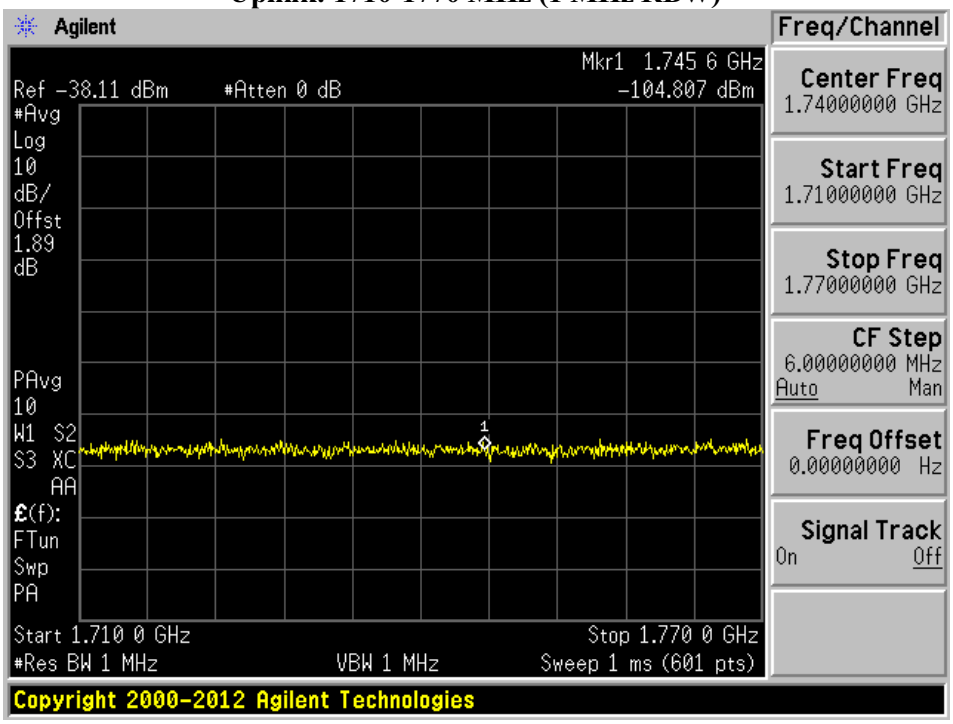
Uplink: 1710-1770 MHz (100 kHz RBW)



Uplink: 1710-1770 MHz (1 MHz RBW)



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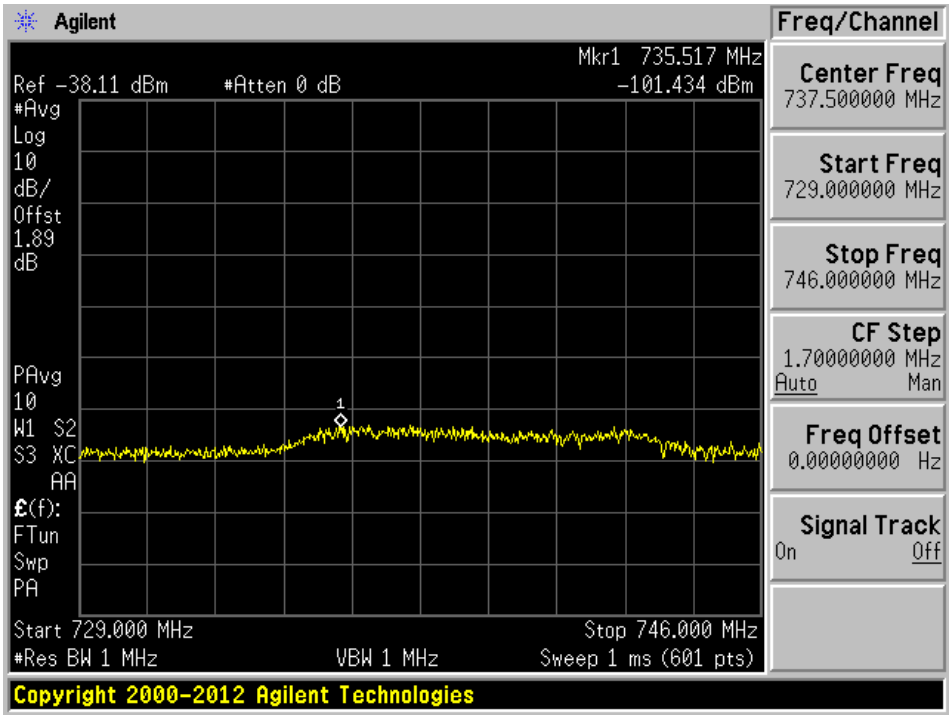
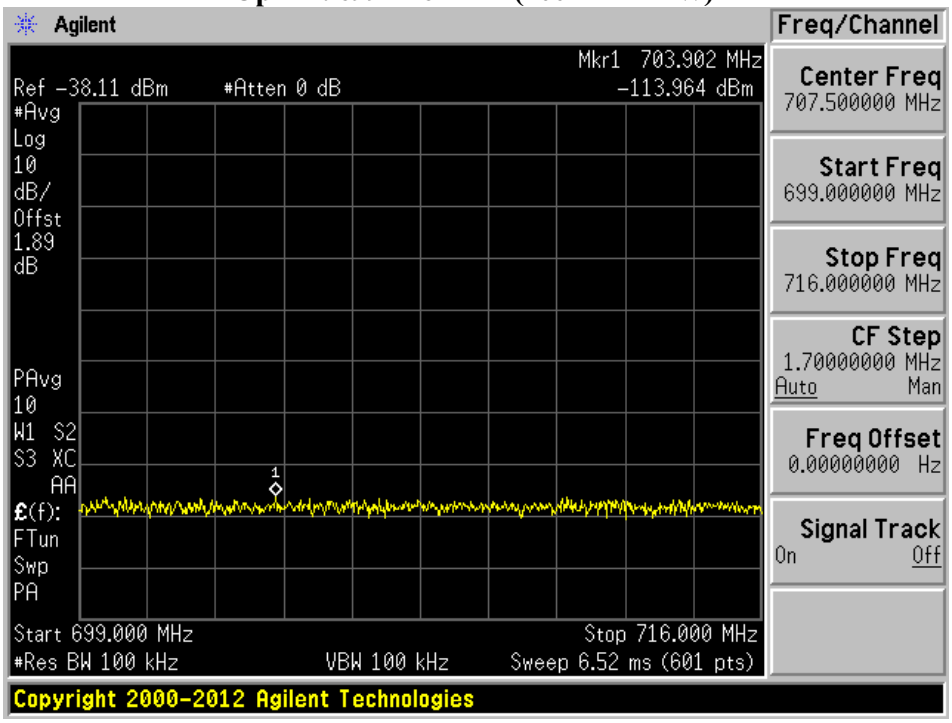
UTRA FDD Band XII/XVII or E-UTRA Band 12/17

Downlink: 729-746 MHz



Uplink: 699-716 MHz (100 kHz RBW)



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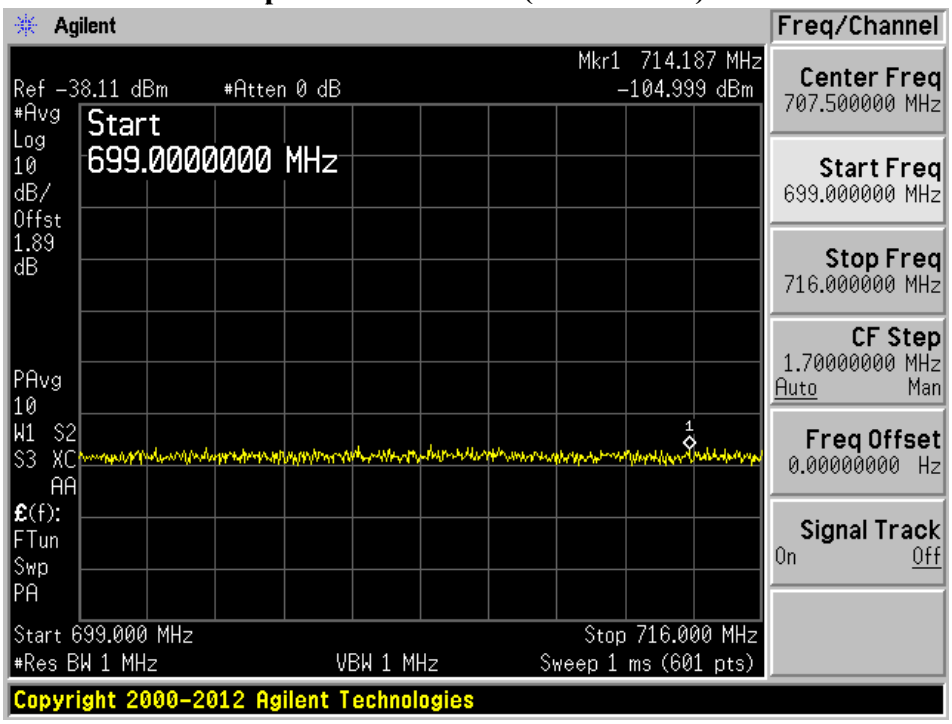
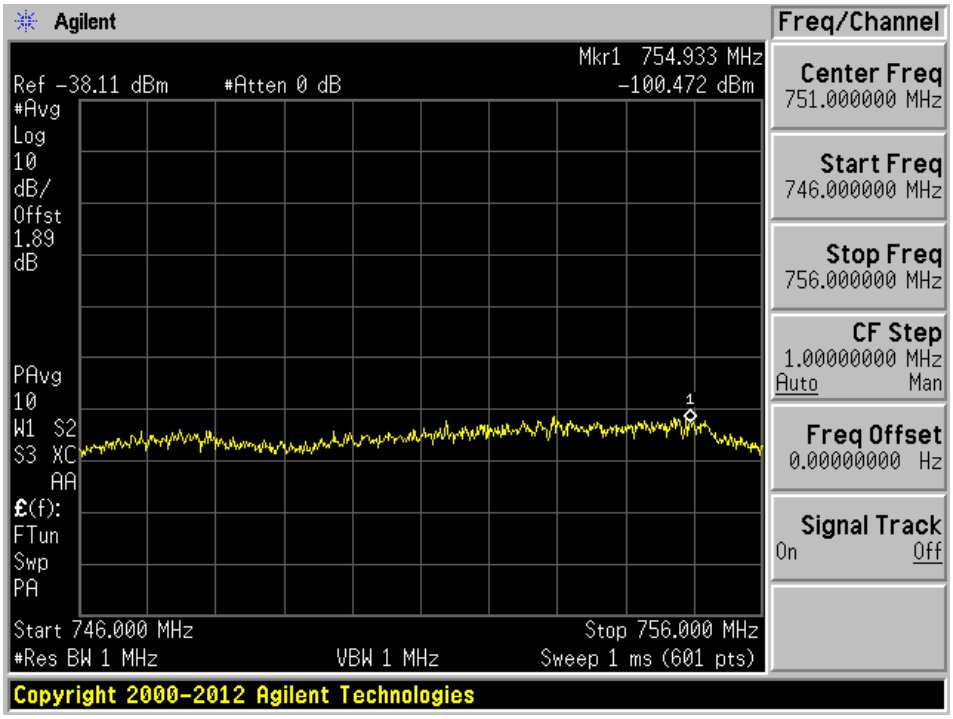
Uplink: 699-716 MHz (1 MHz RBW)



UTRA FDD Band XIII or E-UTRA Band 13

Downlink: 746-756 MHz



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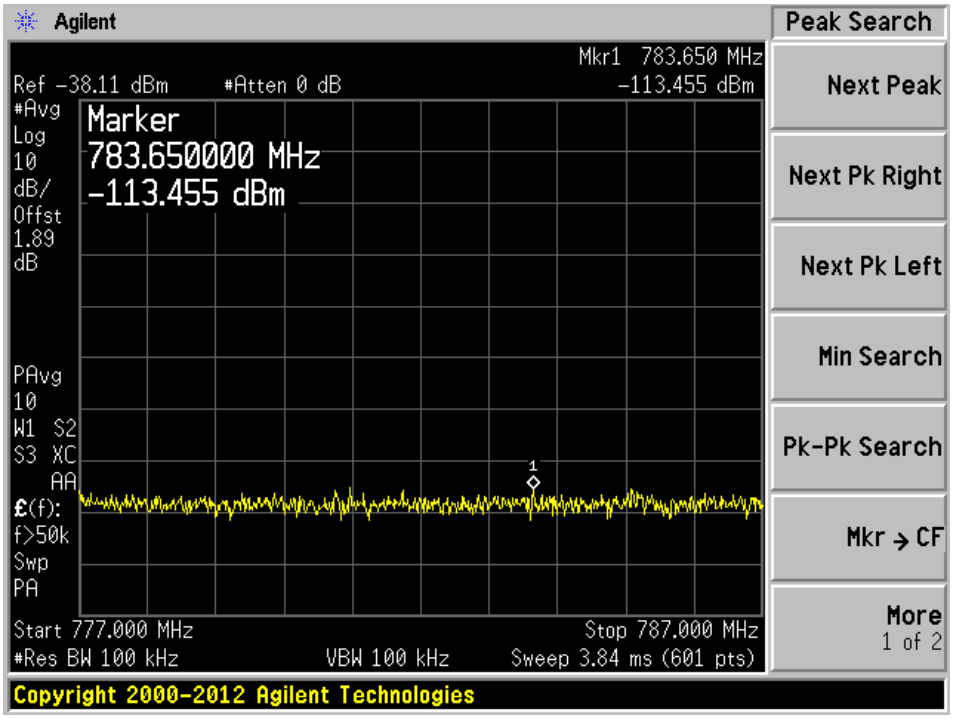
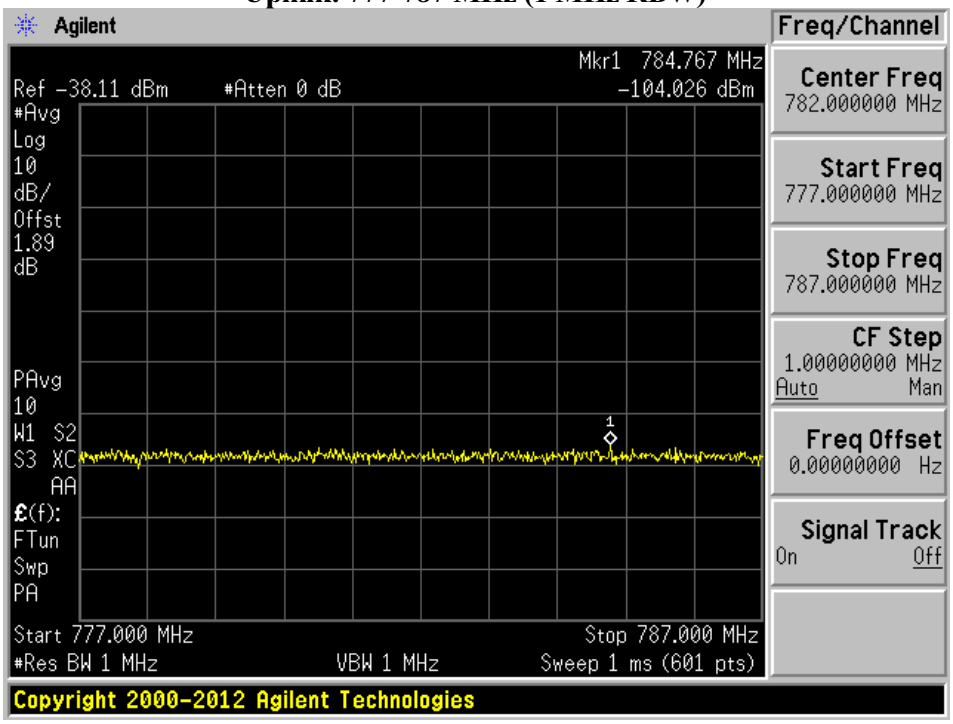
Uplink: 777-787 MHz (100 kHz RBW)



Uplink: 777-787 MHz (1 MHz RBW)



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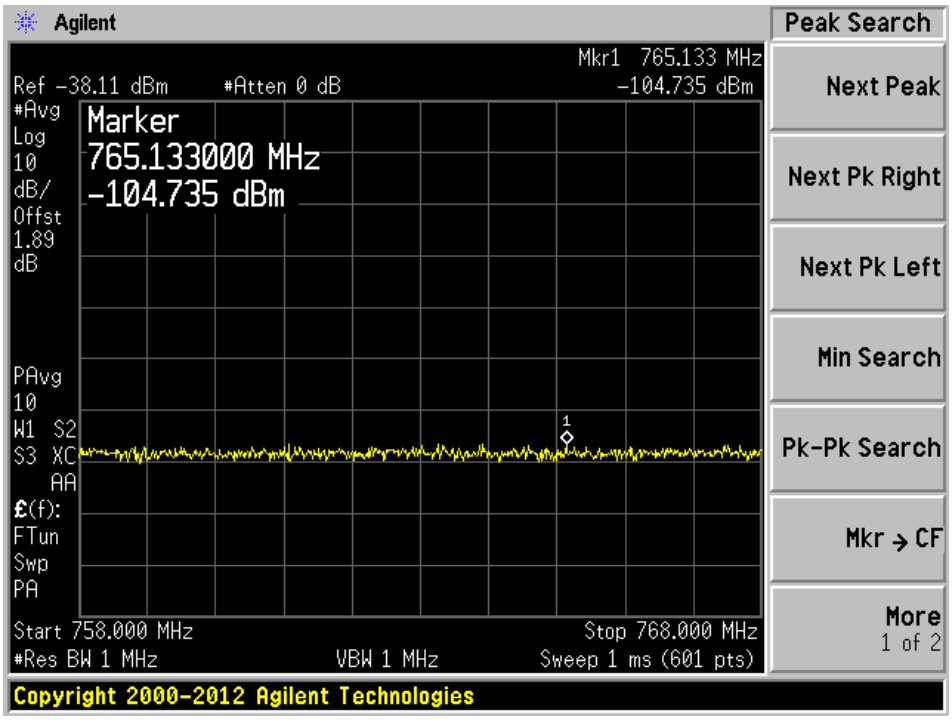
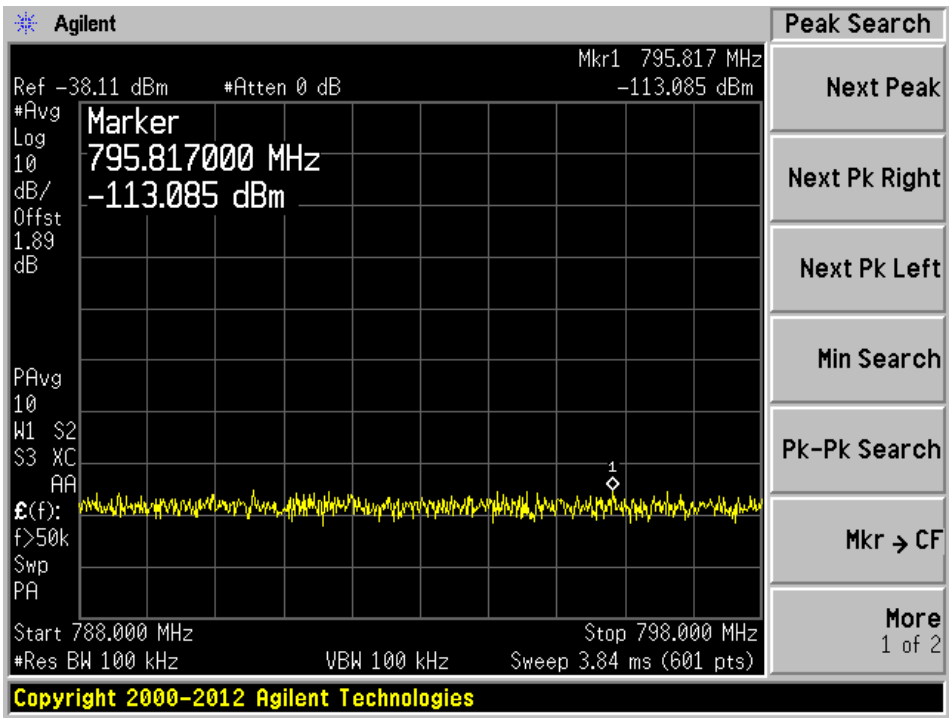
UTRA FDD Band XIV or E-UTRA Band 14

Downlink: 758-768 MHz



Uplink: 788-798 MHz (100 kHz RBW)



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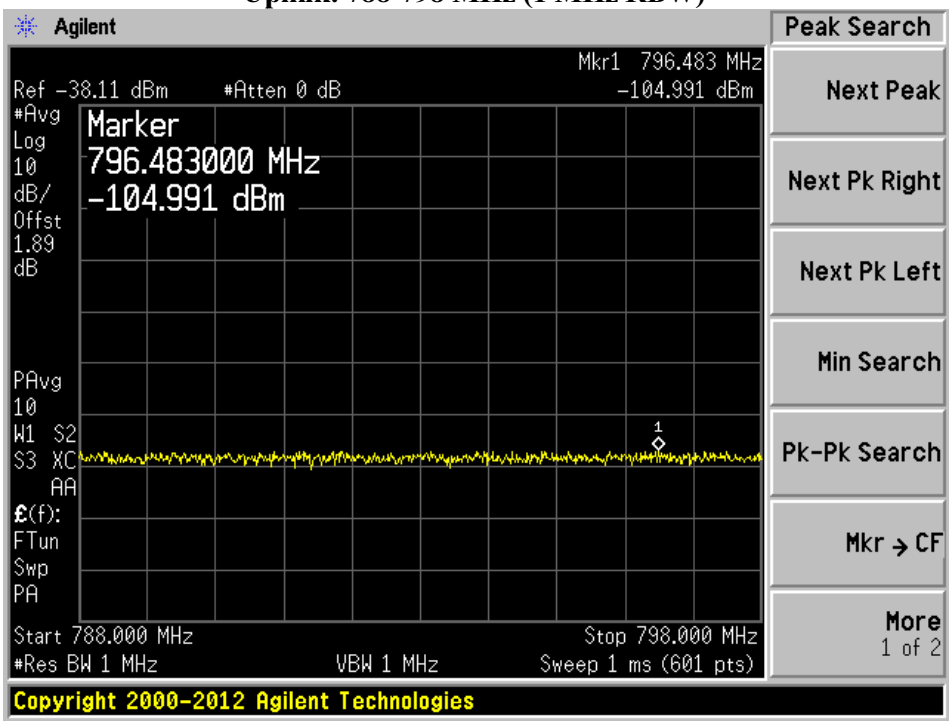
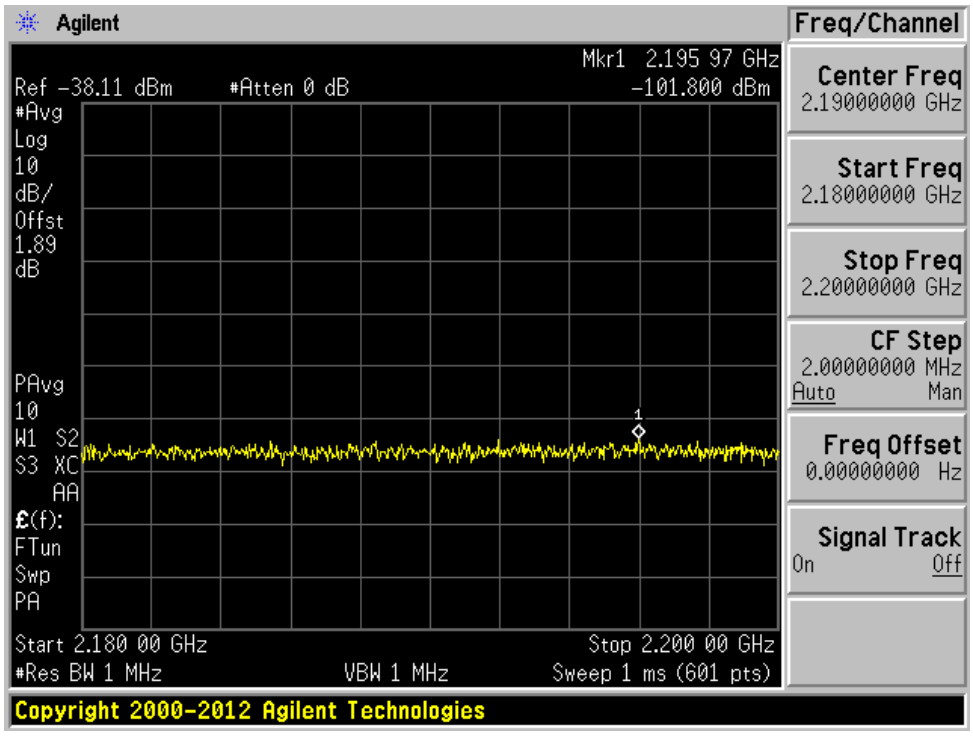
Uplink: 788-798 MHz (1 MHz RBW)



E-UTRA Band 23

Downlink: 2180-2200 MHz



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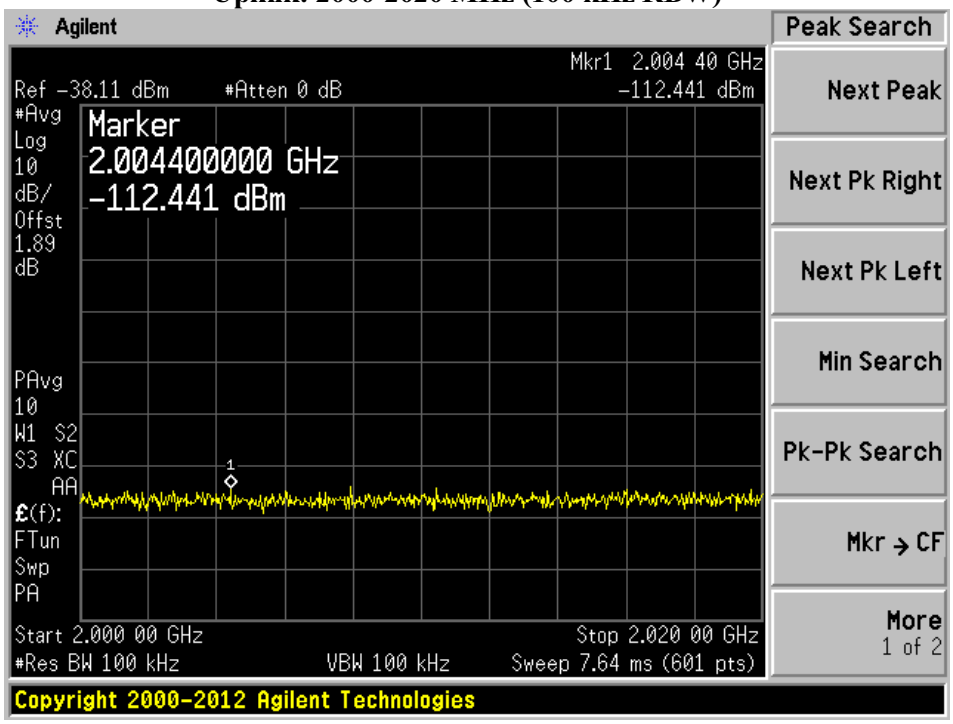
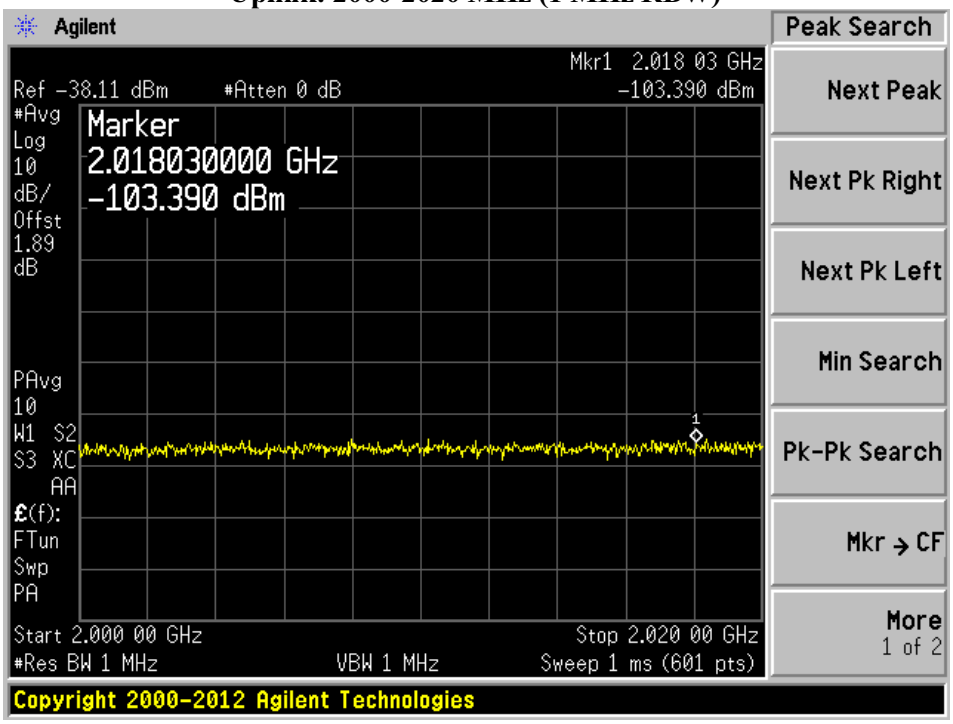
Uplink: 2000-2020 MHz (100 kHz RBW)



Uplink: 2000-2020 MHz (1 MHz RBW)



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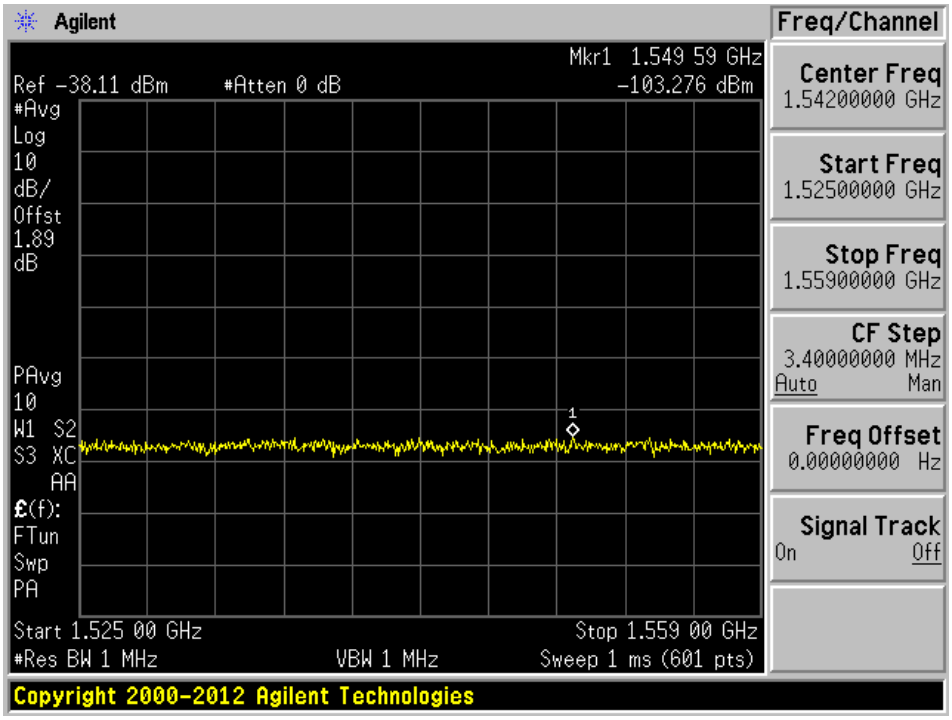
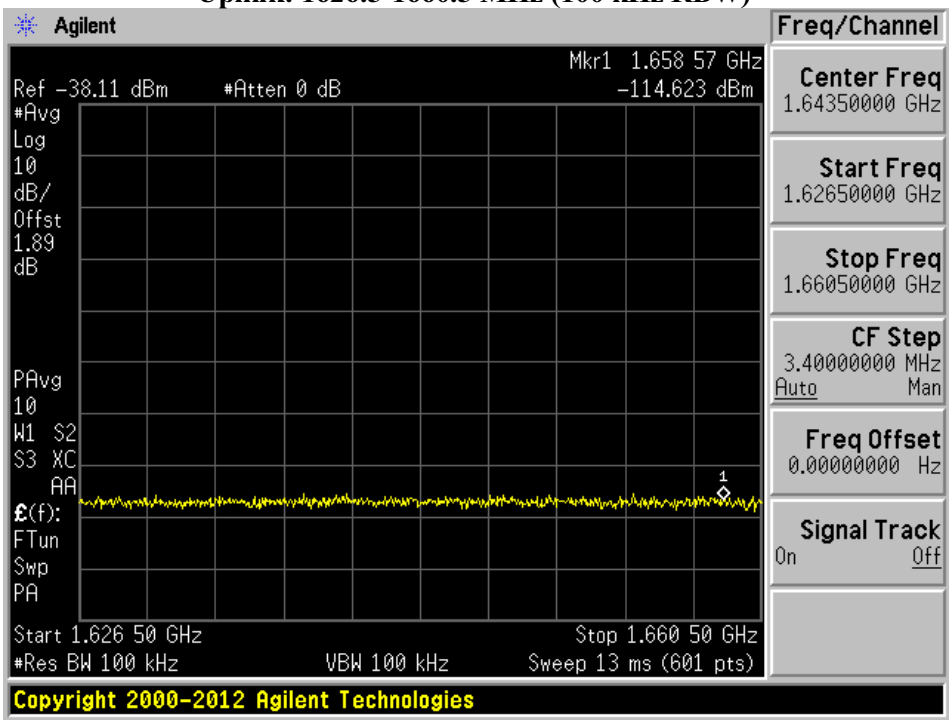
E-UTRA Band 24

Downlink: 1525-1559 MHz



Uplink: 1626.5-1660.5 MHz (100 kHz RBW)



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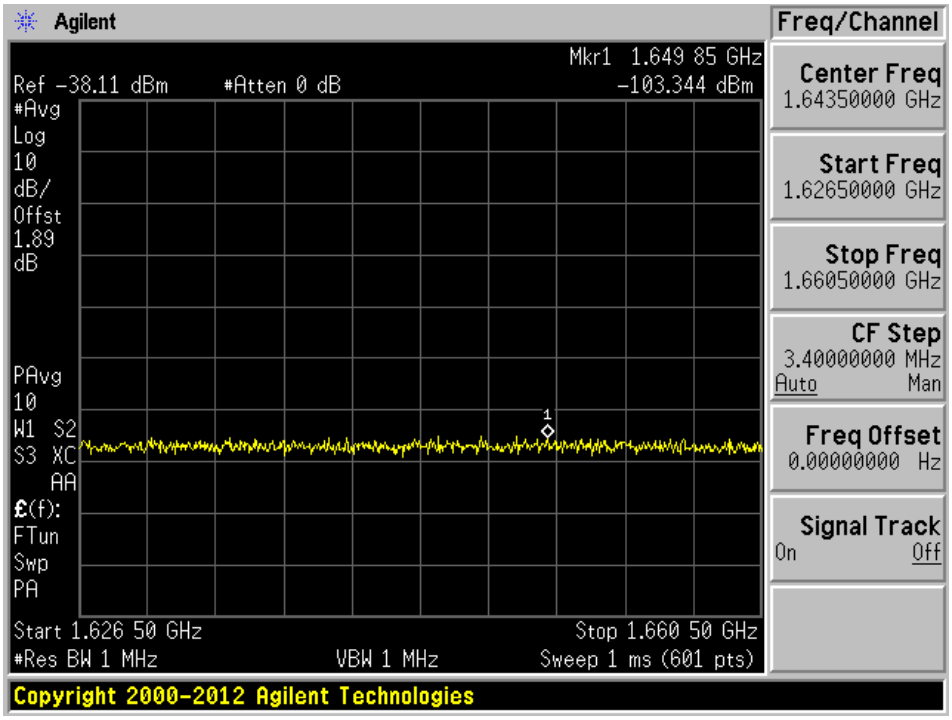
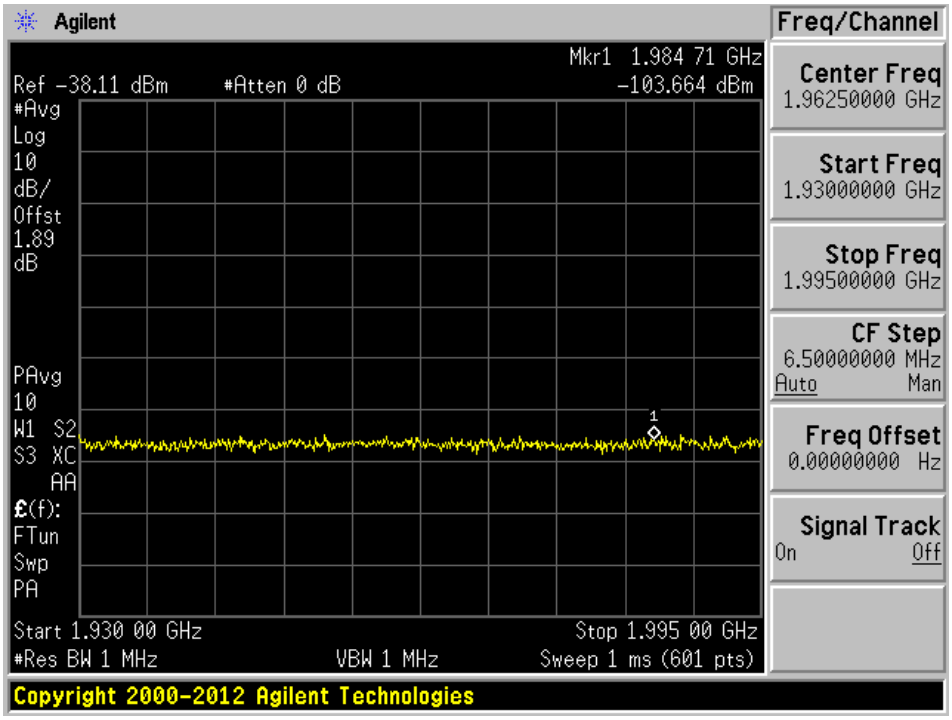
Uplink: 1626.5-1660.5 MHz (1 MHz RBW)



UTRA FDD Band II/XXV or E-UTRA Band 2/25

Downlink: 1930-1995 MHz



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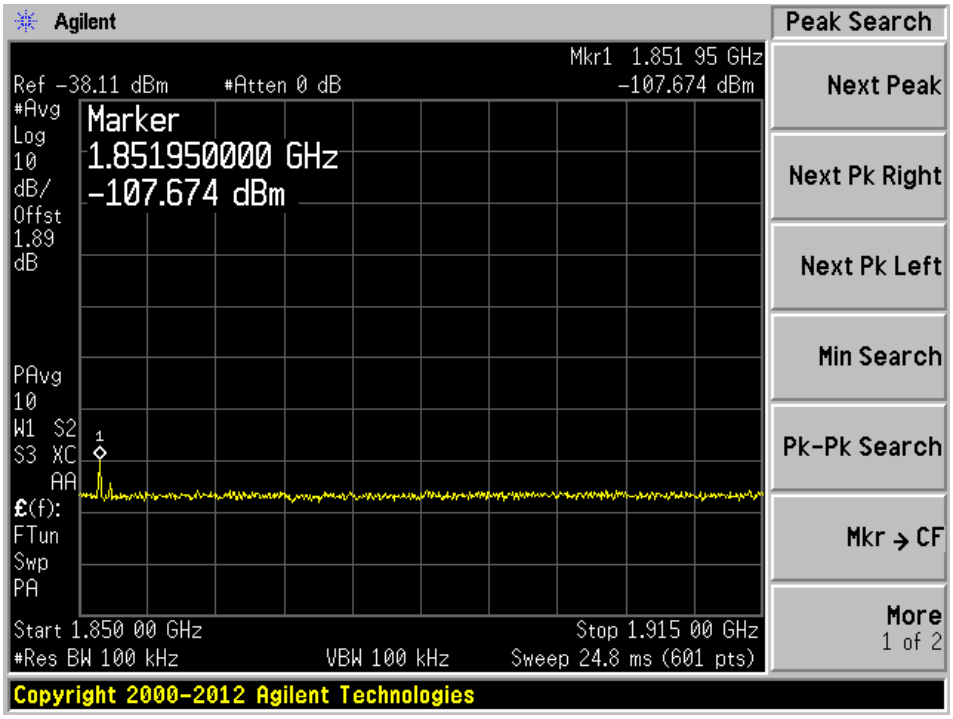
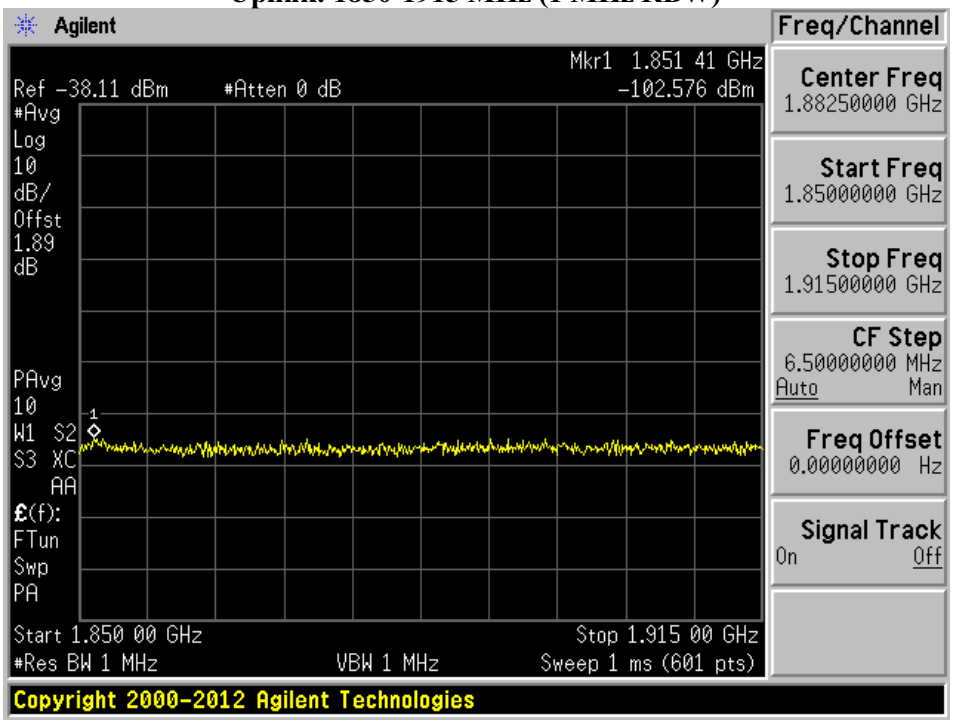
Uplink: 1850-1915 MHz (100 kHz RBW)



Uplink: 1850-1915 MHz (1 MHz RBW)



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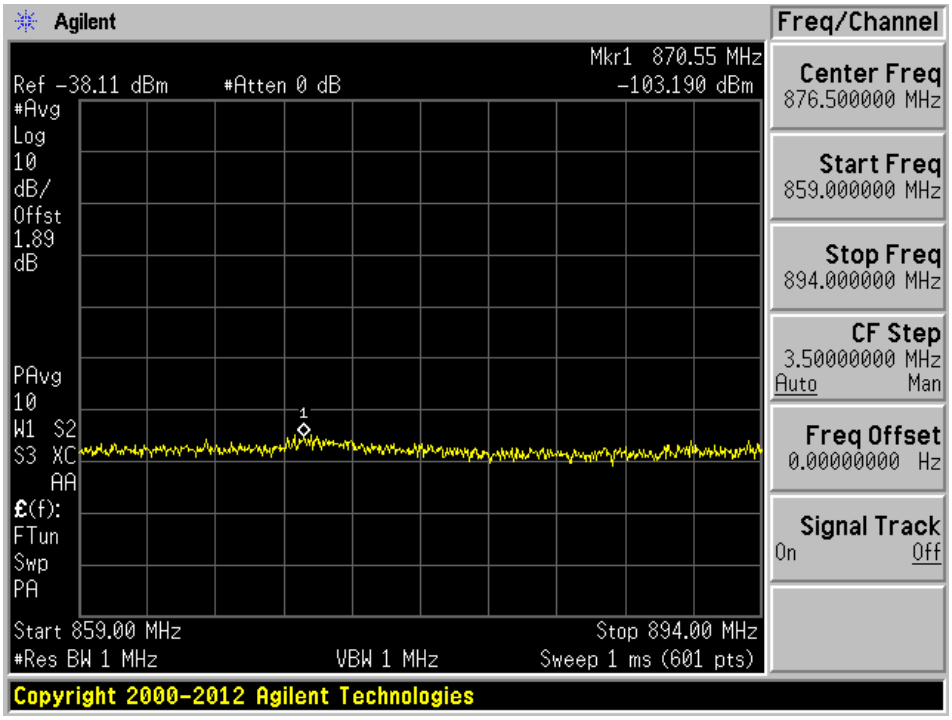
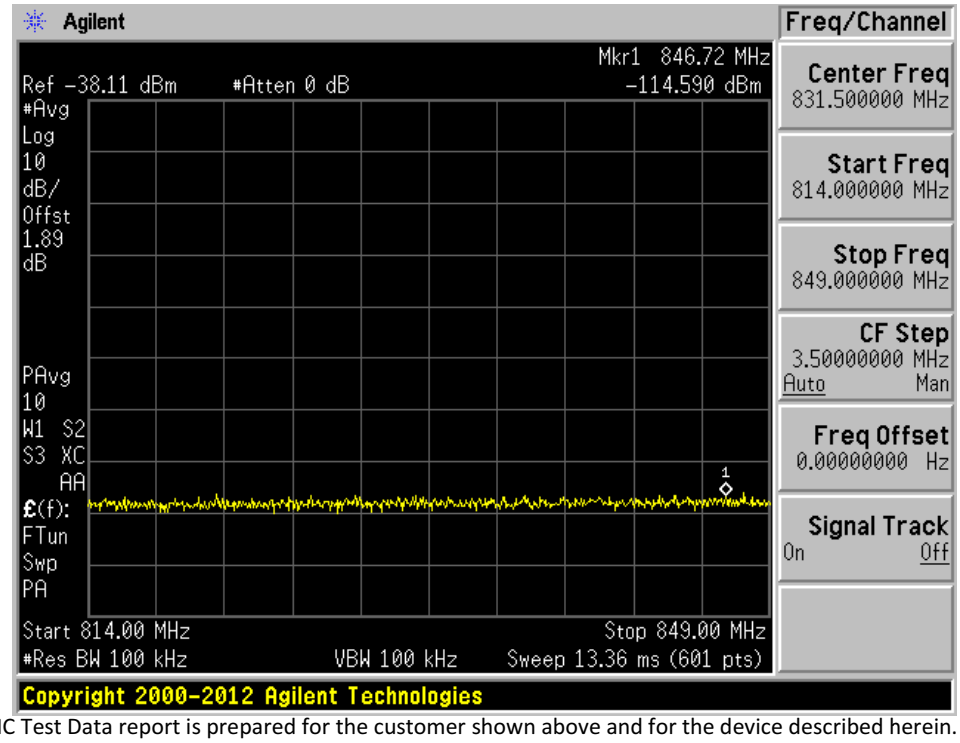
UTRA FDD Band II/XXV or E-UTRA Band 5/26

Downlink: 859-894 MHz



Uplink: 814-849 MHz (100 kHz RBW)



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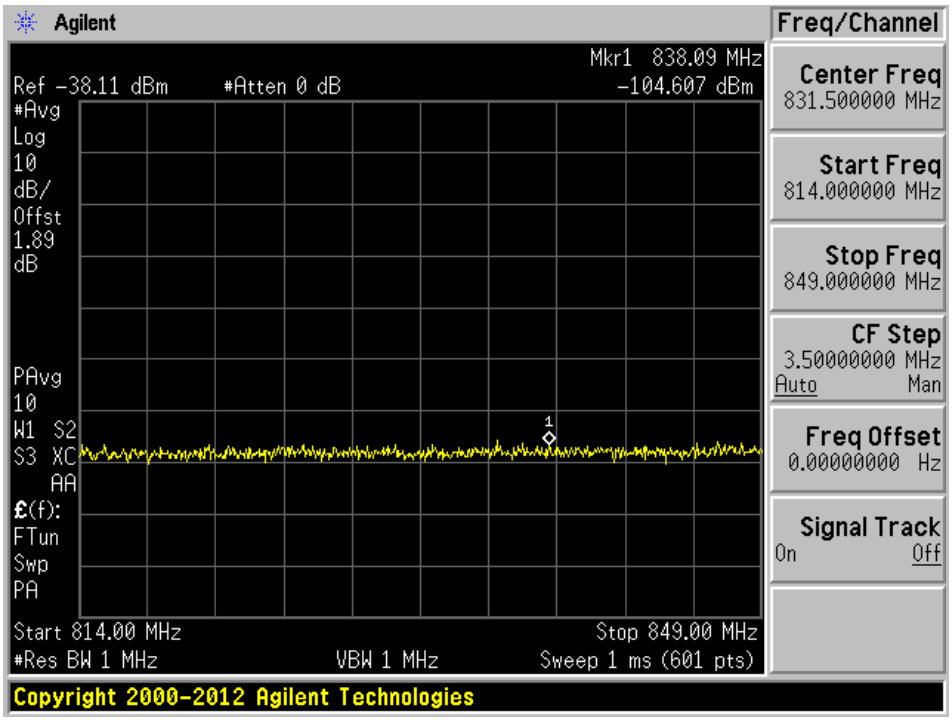
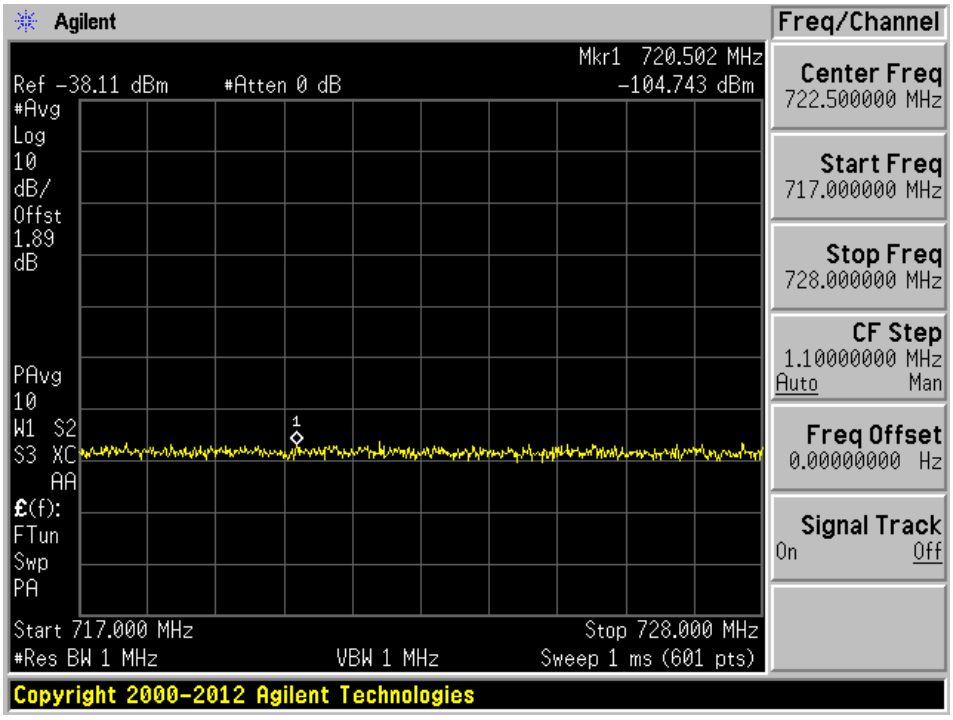
Uplink: 814-849 MHz (1 MHz RBW)



E-UTRA Band 29

Downlink: 717-728 MHz



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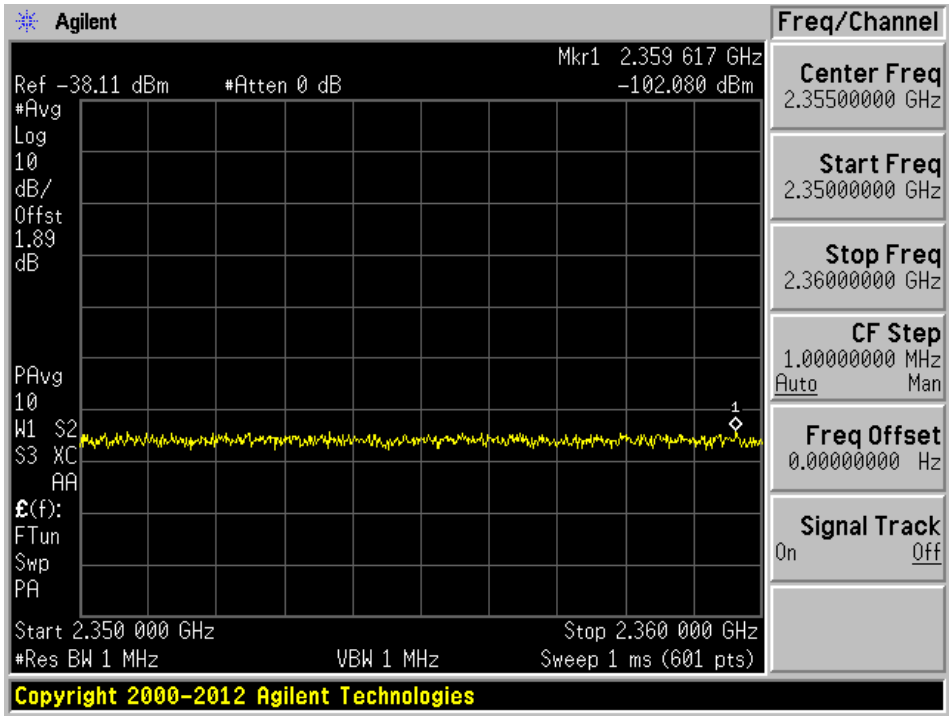
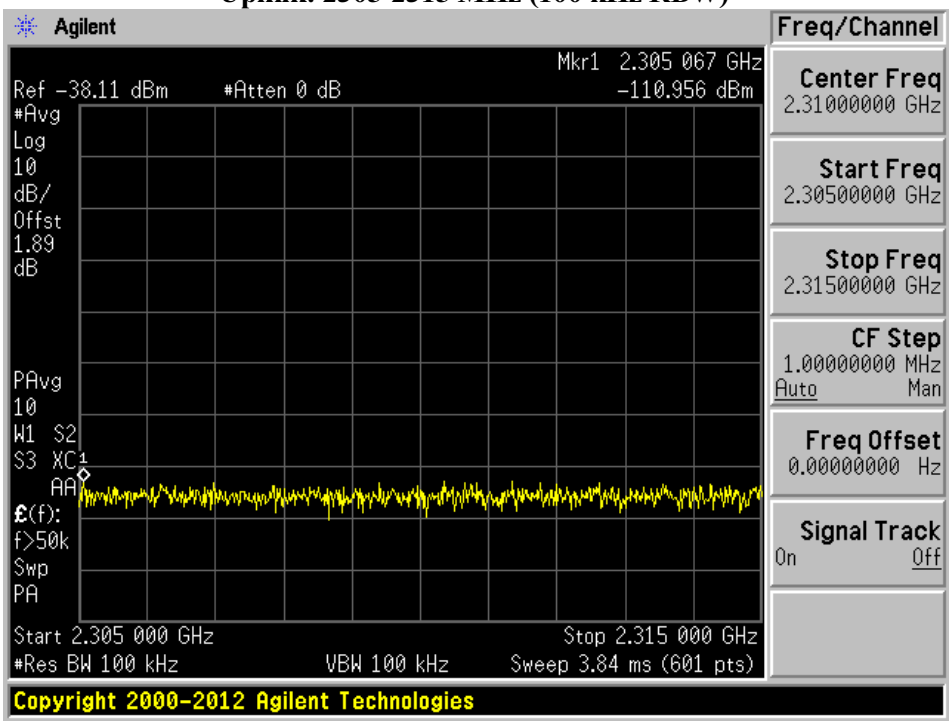
E-UTRA Band 30

Downlink: 2350-2360 MHz



Uplink: 2305-2315 MHz (100 kHz RBW)



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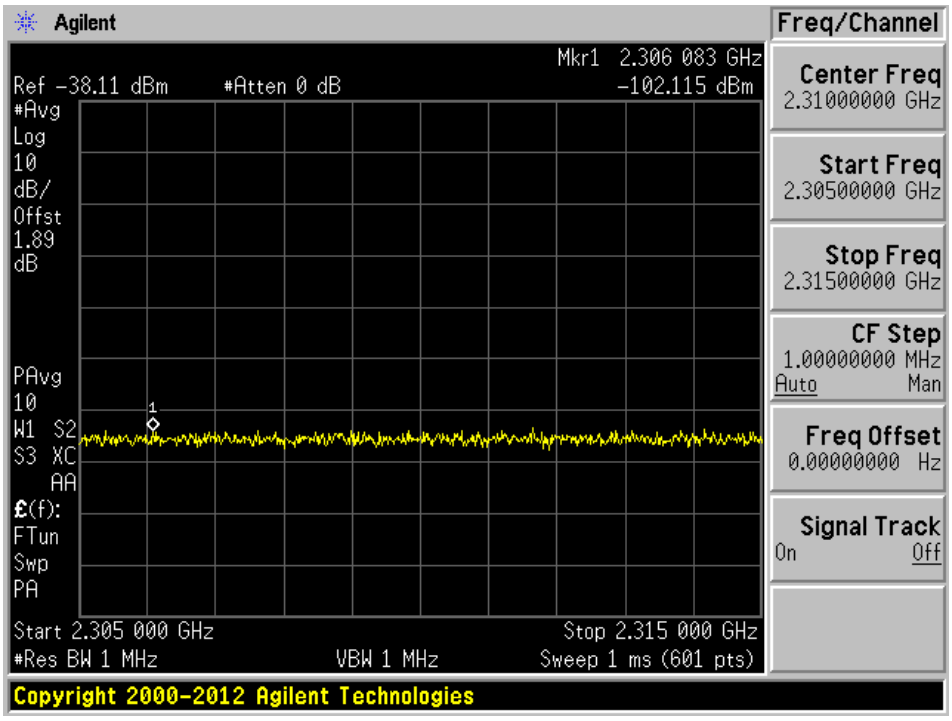
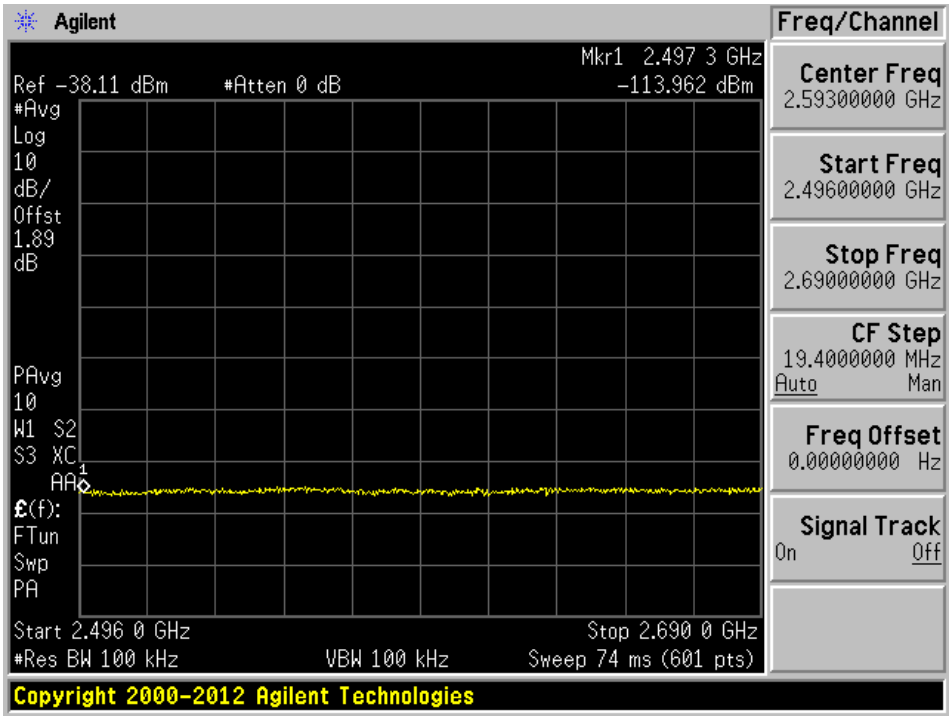
Uplink: 2305-2315 MHz (1 MHz RBW)



E-UTRA Band 41

TDD: 2496-2690 MHz (100 kHz)



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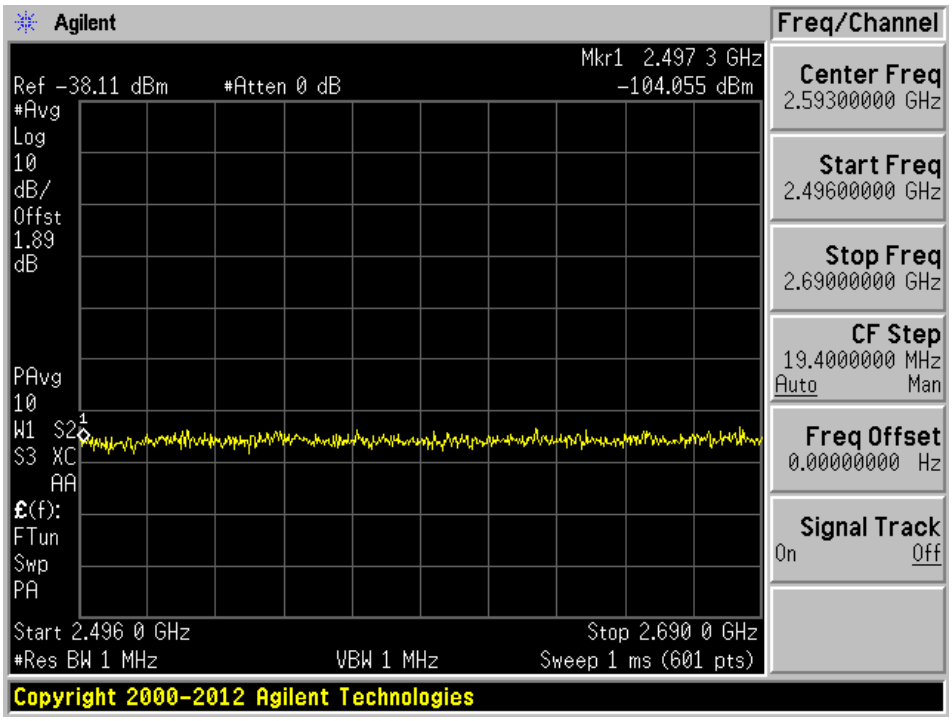
TDD: 2496-2690 MHz (1 MHz)



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