



FCC TEST REPORT

Product Name	Repeater
Model Name	APEX1924
Applicant	R-tron Inc.
FCC ID	STE-APEX1924

ESTECH CO., LTD

Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204



FCC Test Report

Report Number	ESTR1104-007			
Applicant	Company Name	R-tron Inc.		
	Address	Jisan IT Venture Center 7F, 1004-9 Doksan-Dong, Gumcheon-Gu, Seoul, Korea		
Product	Product Name	Repeater		
	Model No.	APEX1924	Manufacturer	R-tron Inc.
	Serial No.	NONE	Country of origin	KOREA
Other	Issued Date	2011-04-18	Tested Date	2011-03-15 ~ 2011-04-18
Test Result	Pass			
Standard	FCC PART 24 Subpart E			
Tested by	I.K. Hong/ Engineer		 (Signature)	
Approved by	Tag-Sun Park/Engineering manager		 (Signature)	
ESTECH CO., LTD Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204				
o This is certified that the above mentioned products have been tested for the sample provided by client. o No part of this document may not be duplicated or reproduced by any means without the express written permission of Estech Co., Ltd.				



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1. General Information

1.1 EUT Description

FCC ID	STE-APEX1924
Product Name	Repeater
Model Name	APEX1924
Frequency	Uplink 1850MHz ~ 1915MHz (PCS)
	Downlink 1930MHz ~ 1995MHz (PCS)
	Uplink 1850MHz ~ 1915MHz (PCS for LTE)
	Downlink 1930MHz ~ 1995MHz(PCS for LTE)
Channel	Uplink&Downlink (25/600/1175/1275)
	Uplink&Downlink (50/600/1150/1250)
Power Rating	Input: 110~240VAC 50~60Hz



2. Laboratory Information

2.1 Laboratory Name Estech Co., Ltd.

2.2 Location

Head Office Rm. 1015, World Venture Center II, 426-5 Gasan-dong
Geumcheon-gu, Seoul, 153-803. Korea.

EMC Lab(Ichon) 58-1, Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea

EMC Lab(Yanggi) 97-1, Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

2.3 Quality System Accredited by KOLAS(ISO/IEC 17025)

2.4 Major Accredited Mark



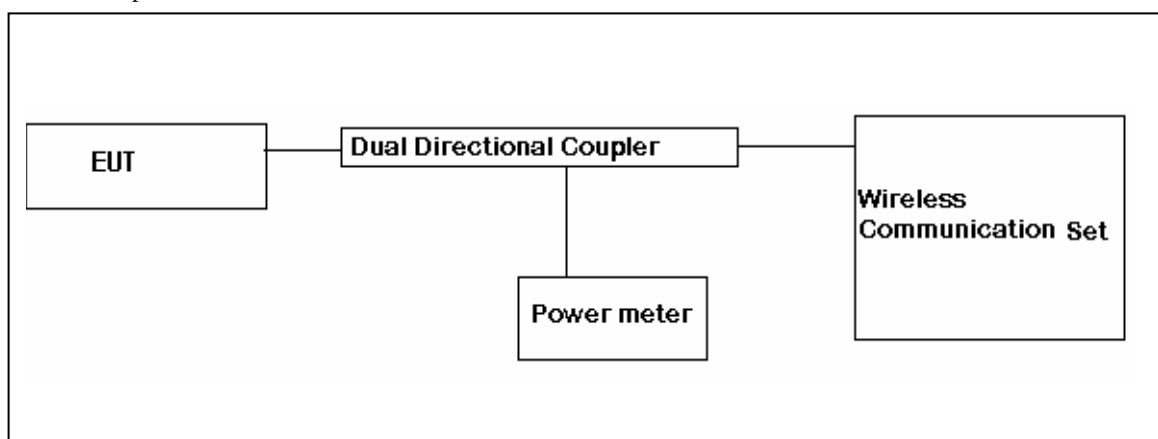
3. Summary of Test Results

Test Item	Standard	Result
RF Output Power	2.1046	PASS
Occupied Bandwidth	2.1049	PASS
Band Edge	2.1049	PASS
Spurious and Harmonic Emission at Antenna Terminal	2.1051	PASS
Field Strength of Spurious Radiation	2.1053	PASS
Frequency stability	2.1055	PASS
Modulation Characteristics	2.1047	PASS

4. RF Output Power

4.1 Test Procedure according to ANSI/TIA/EIA 603 Clause 2.2.17

1. The EUT was placed on a wooden turn table 3 meters from the receive antenna. The receive antenna height and turn table rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For reading 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.
2. The RF output port of the EUT was connected to the dual directional coupler and Wireless communications test set connected dual directional coupler. The RF Power is measured Power meter. This test was performed three channels (Low, High, Middle).
3. Test setup for RF Conducted measurement



4.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2011-09-09
Spectrum Analyzer	Agilent	E4402B	2012-02-24
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	2012-02-15
Signal Generator	HP	E4432B	2012-02-24

4.3.1 Test Results (Uplink)-PCS

Conducted power

	Ch No.	Freq (MHz)	Power Output (dBm)
Low	25	1851.25	23.93
Mid.	600	1880.00	23.94
High	1275	1993.75	23.97



4.3.2 Test Results (Downlink)-PCS

	Ch No.	Freq (MHz)	Power Output (dBm)
Low	25	1931.25	23.96
Mid	600	1960.00	23.89
High	1275	1993.75	23.98

4.3.3 Test Results (Uplink)-PCS FOR LTE

	Ch No.	Freq (MHz)	Power Output (dBm)
Low	50	1852.50	23.93
Mid	600	1880.00	23.94
High	1250	1912.50	23.97

4.3.3 Test Results (Downlink)-PCS FOR LTE

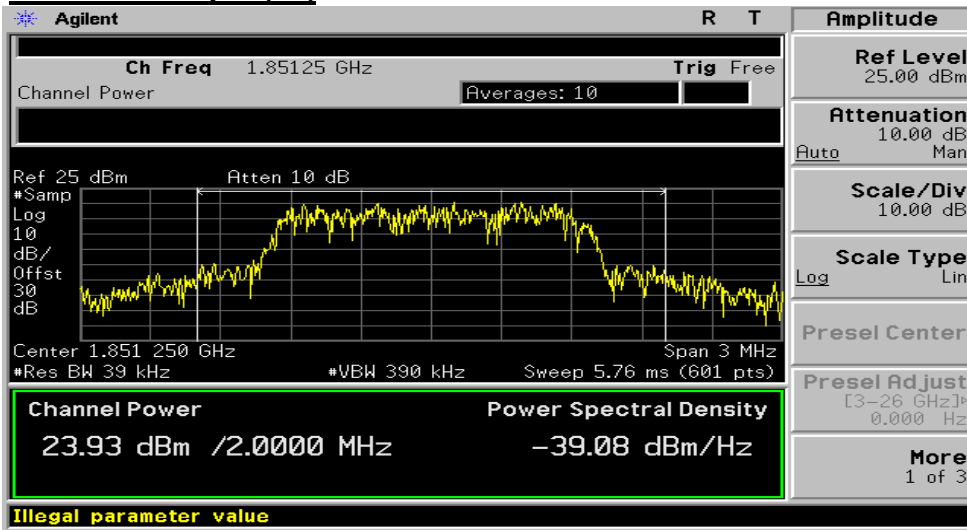
	Ch No.	Freq (MHz)	Power Output (dBm)
Low	50	1932.50	23.92
Mid	600	1960.00	23.94
High	1250	1912.50	23.90



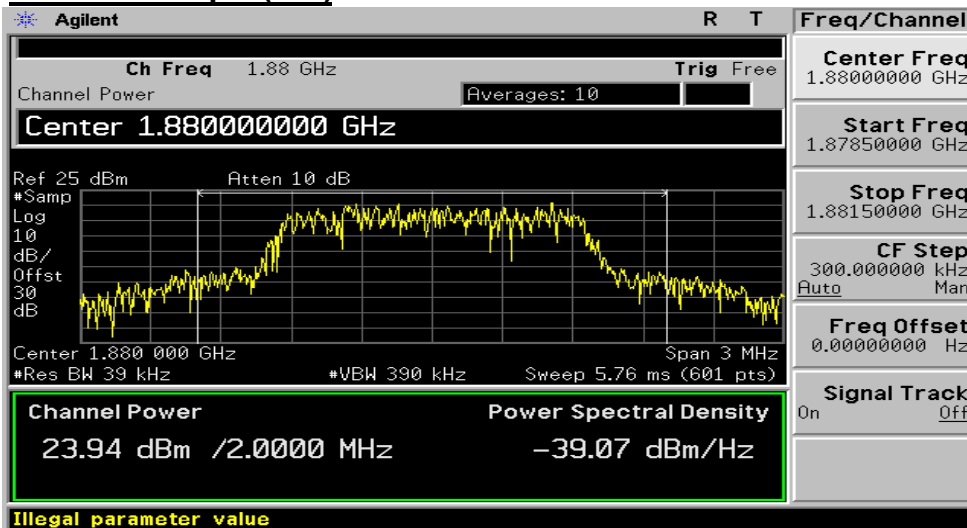
4.4 Test Plot

Uplink-PCS

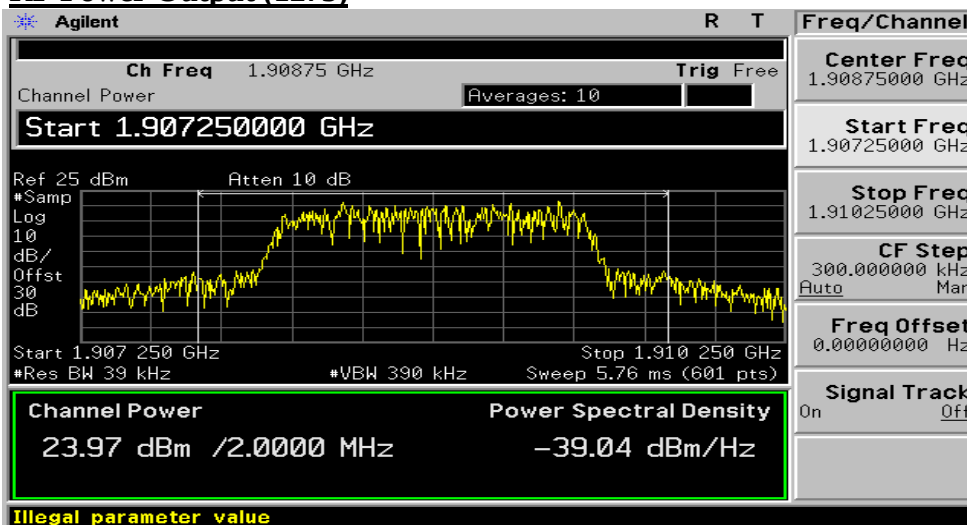
RF Power Output (25)

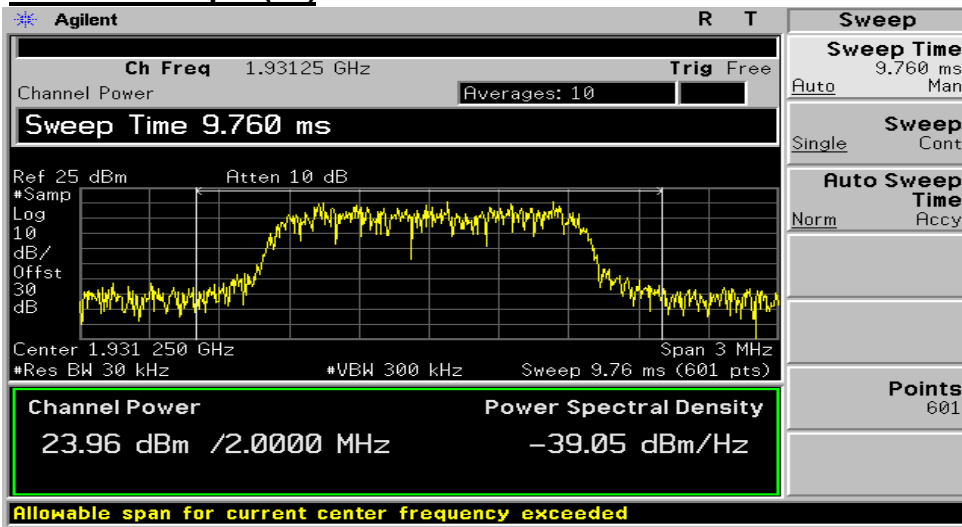
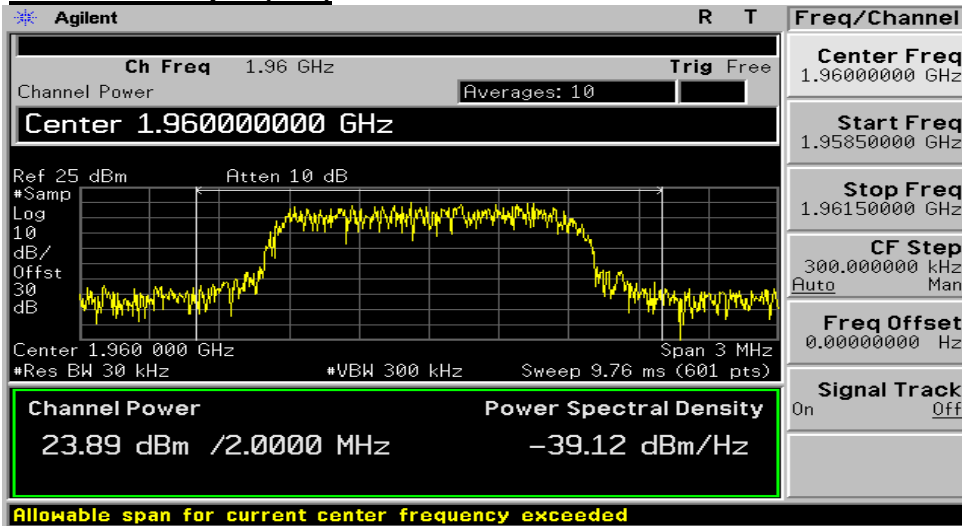
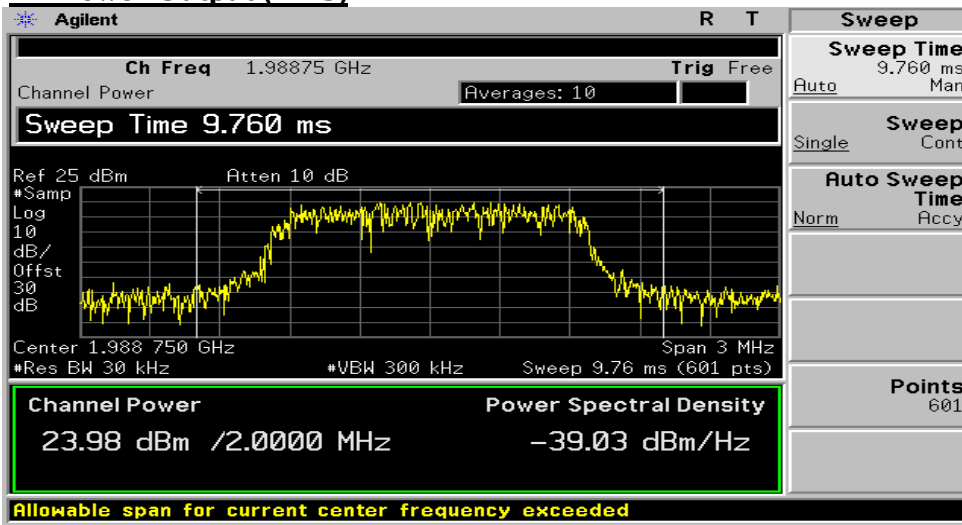


RF Power Output (600)



RF Power Output (1275)

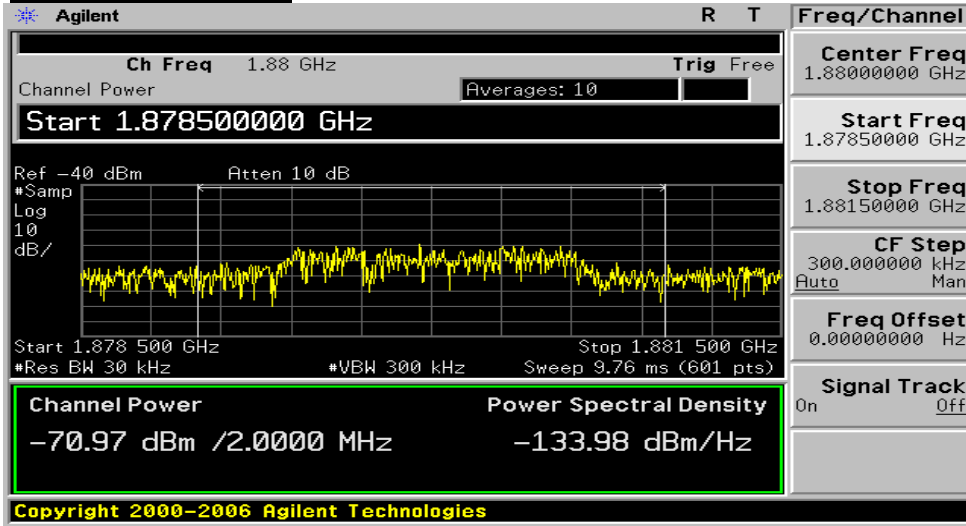


Downlink-PCS**RF Power Output (25)****RF Power Output (600)****RF Power Output (1275)**

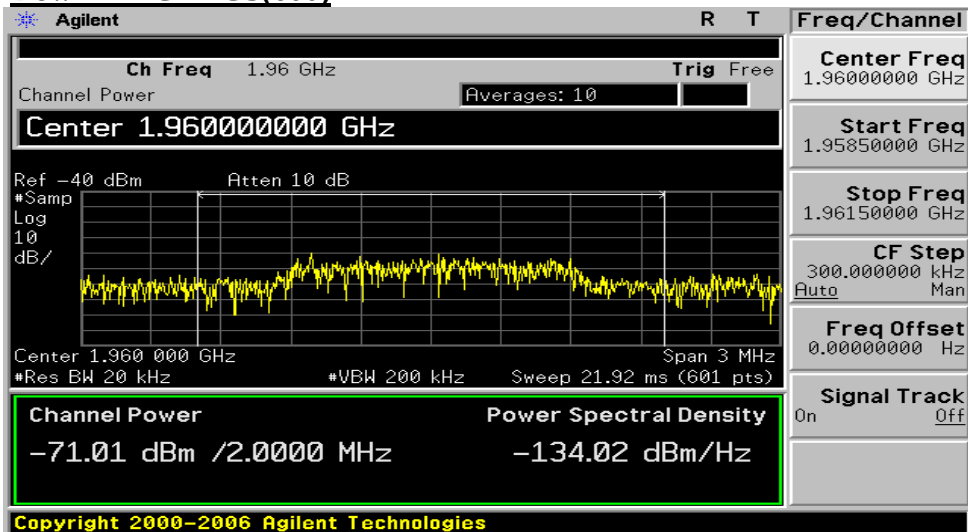


Input Signal Output Power

Uplink Ch PCS(600)

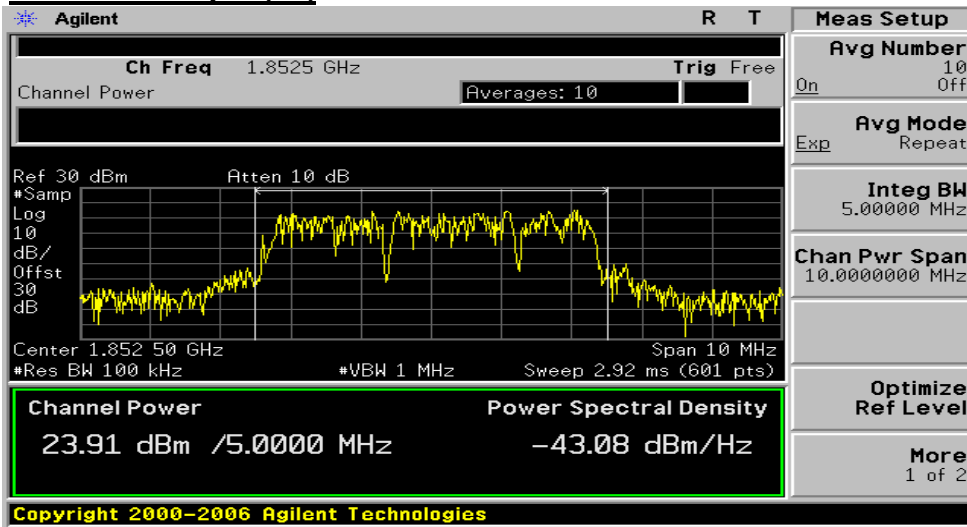
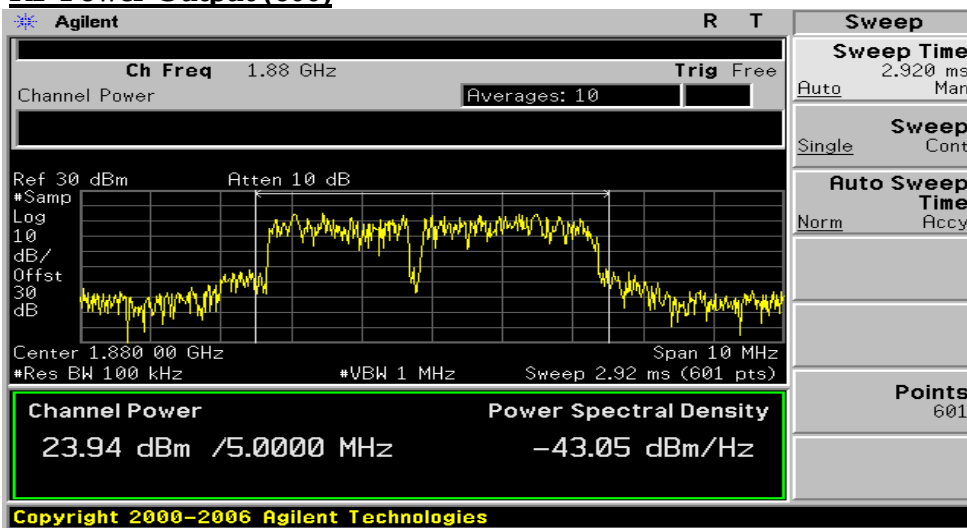
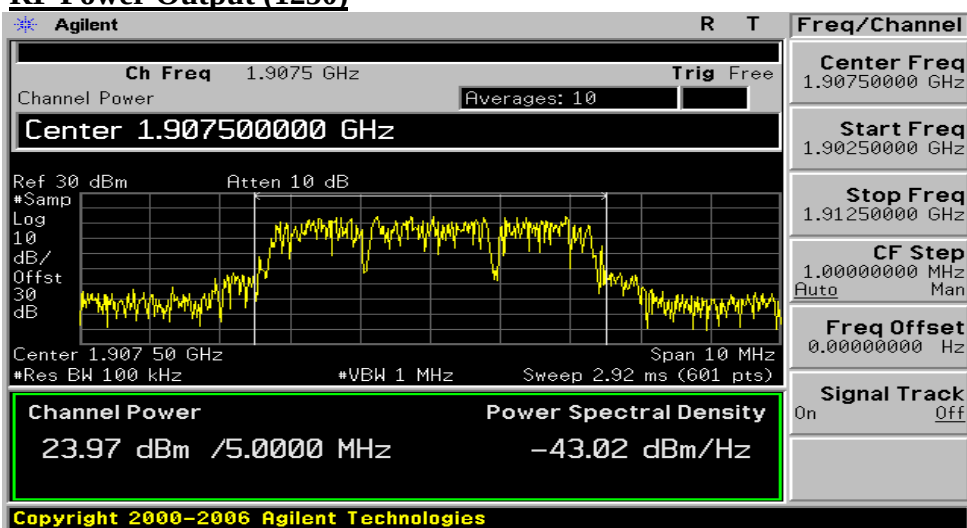


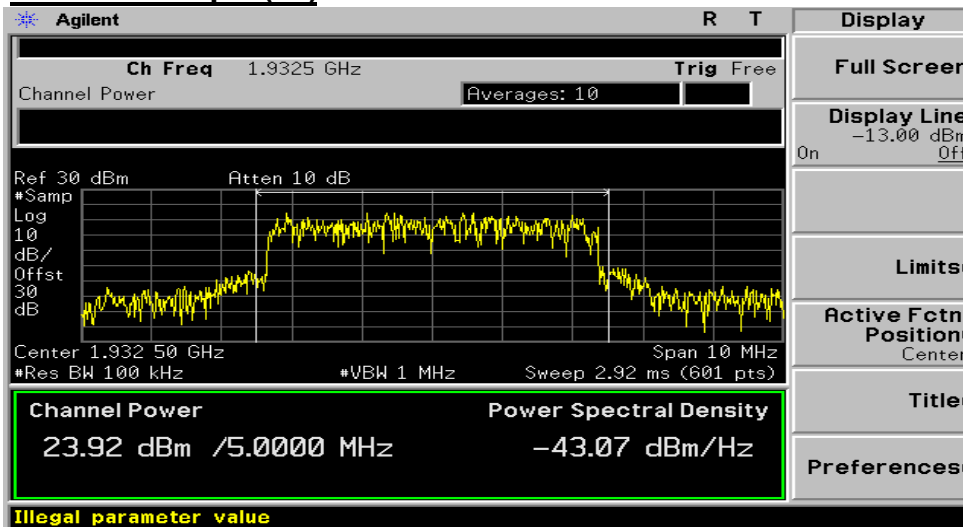
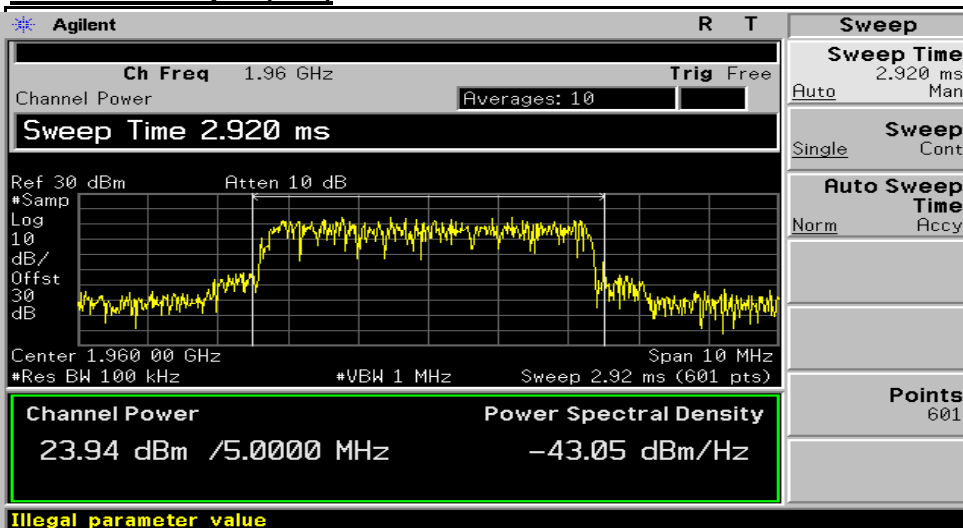
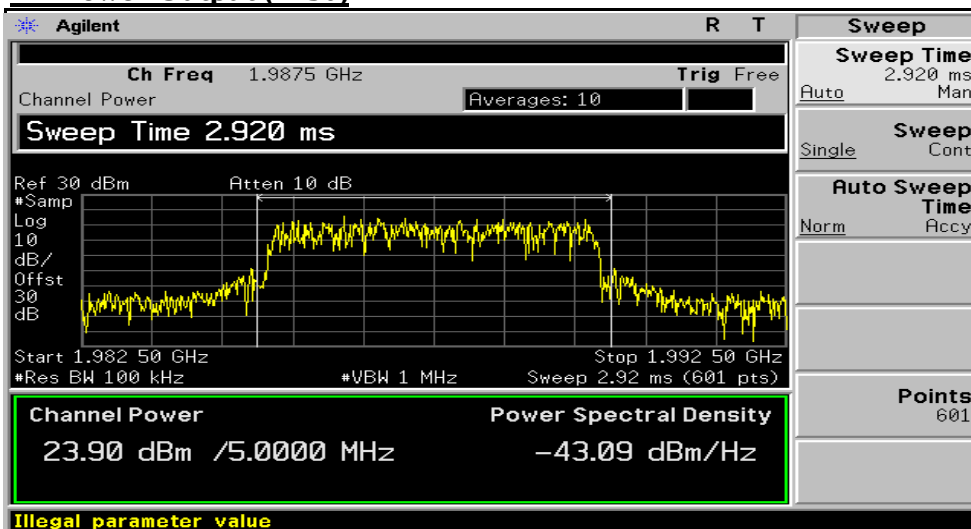
Downlink Ch PCS(600)





4.4 Test Plot

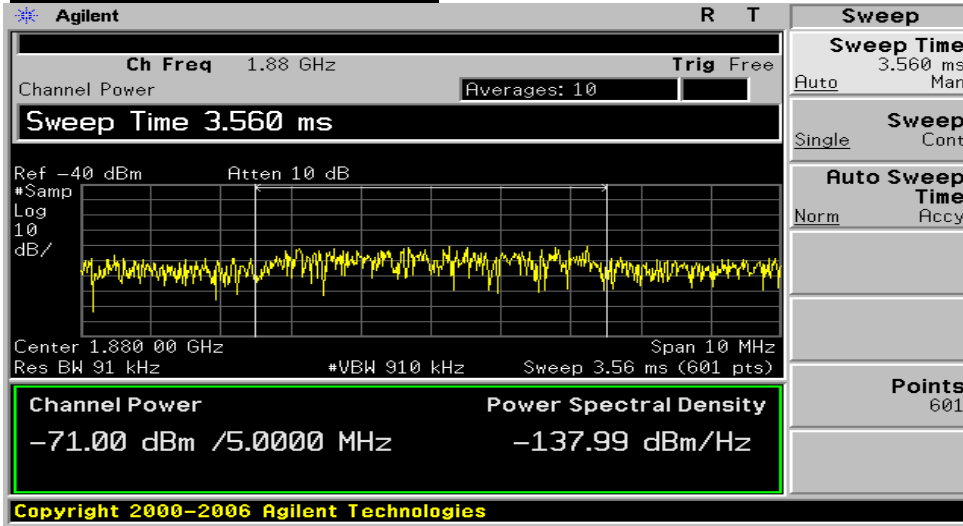
Uplink-PCS for LTERF Power Output (25)RF Power Output (600)RF Power Output (1250)

Downlink PCS for LTERF Power Output (50)RF Power Output (600)RF Power Output (1250)

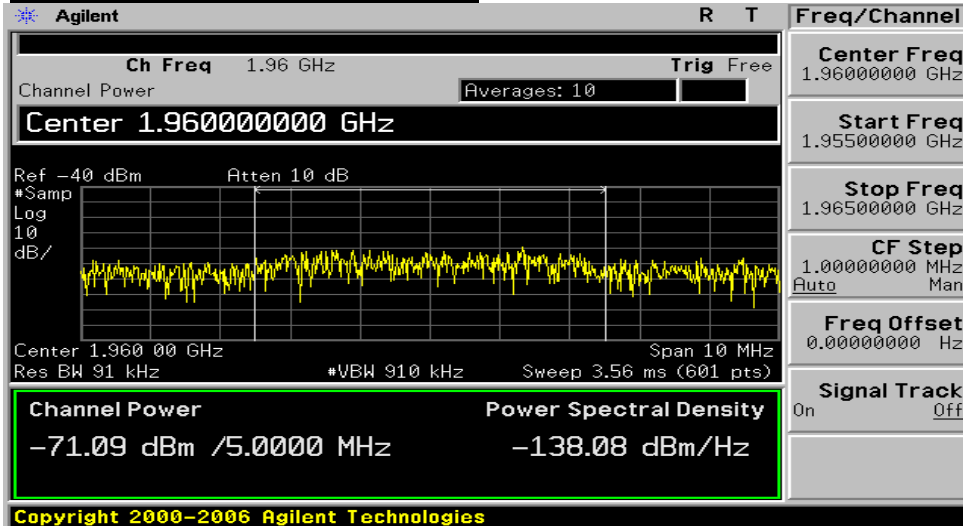


Input Signal Output Power

Uplink Ch PCS FOR LTE(600)



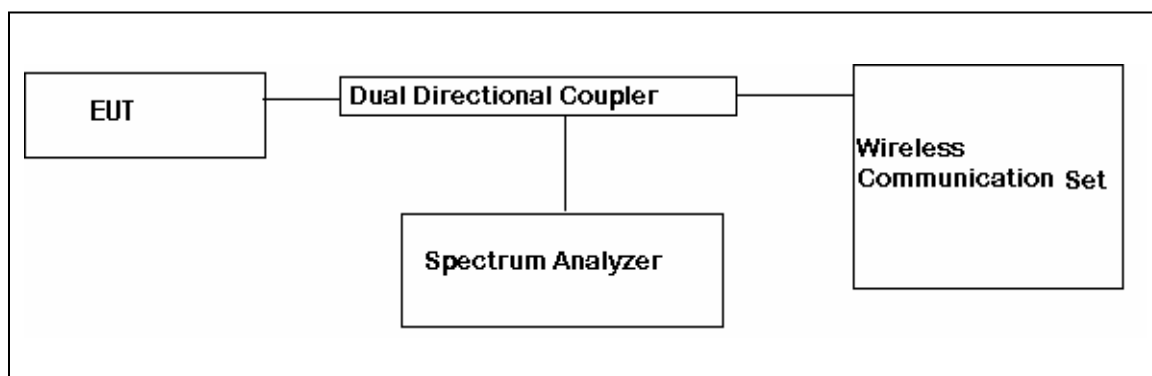
Downlink Ch PCS FOR LTE(600)



5. Occupied Bandwidth

5.1 Test Procedure

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.



5.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2011-09-09
Spectrum Analyzer	Agilent	E4402B	2012-02-24
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	2012-02-15
Signal Generator	HP	E4432B	2012-02-24

5.3 Test Results

(Uplink)-PCS Band

Channel	Frequency(MHz)	26dB Bandwidth(MHz)
25	1851.25	1.264
600	1880.00	1.260
1175	1908.75	1.262

(Downlink)-PCS Band

Channel	Frequency(MHz)	26dB Bandwidth(MHz)
25	1931.25	1.275
600	1960.00	1.265
1175	1988.75	1.263



(Uplink)-PCS for LTE

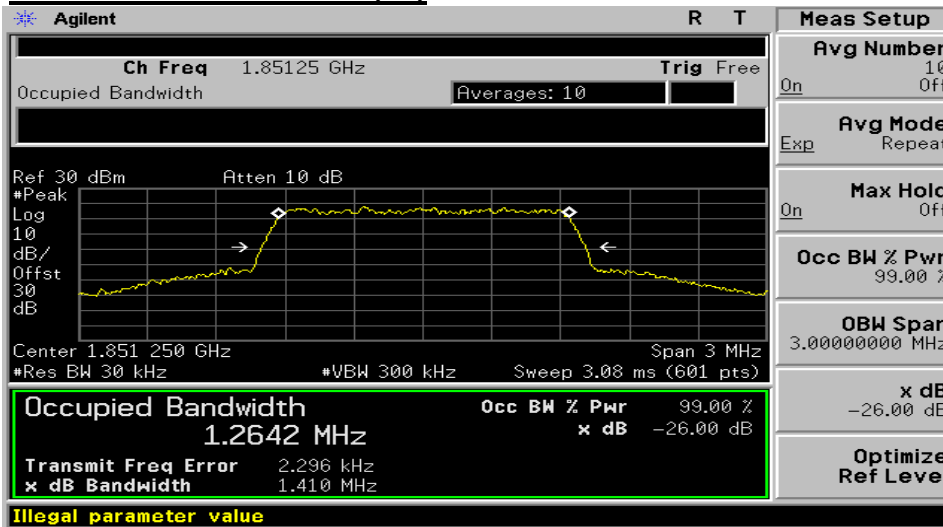
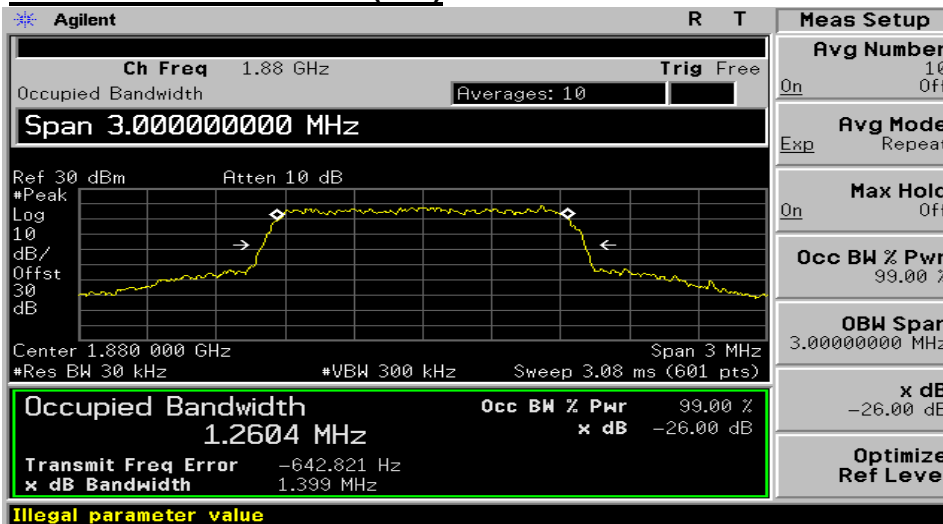
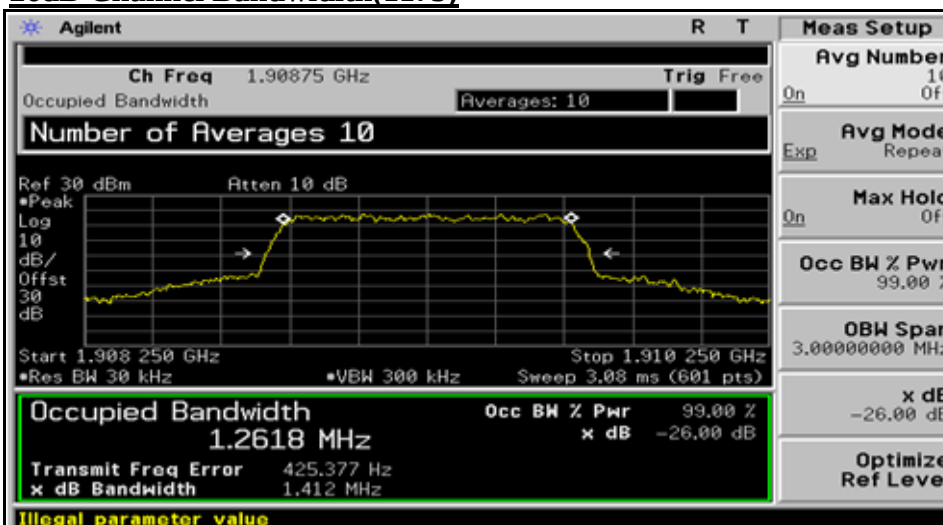
Channel	Frequency(MHz)	26dB Bandwidth(MHz)
50	1852.50	4.522
600	1880.00	4.517
1150	1907.50	4.513

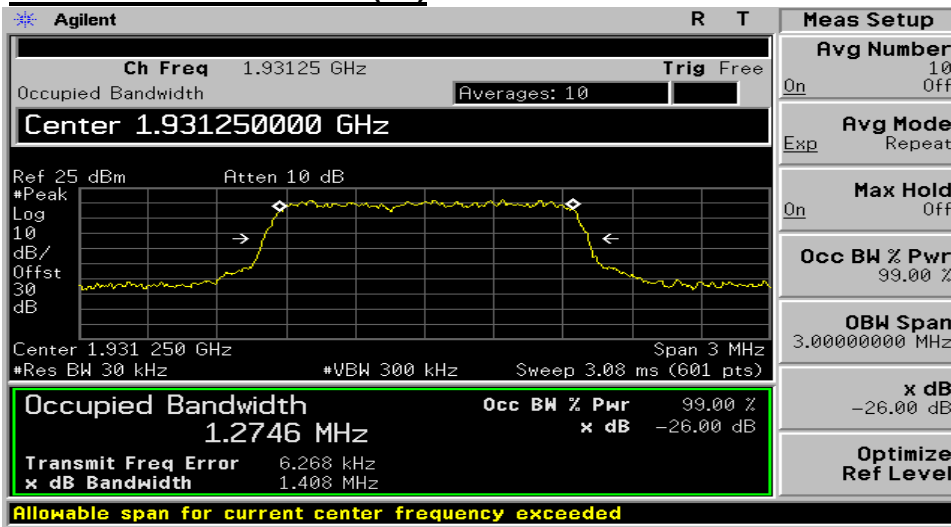
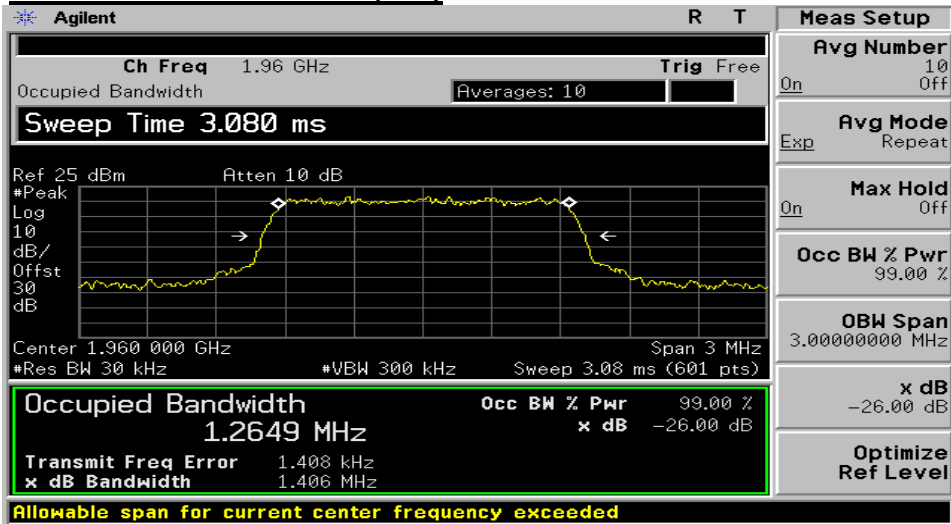
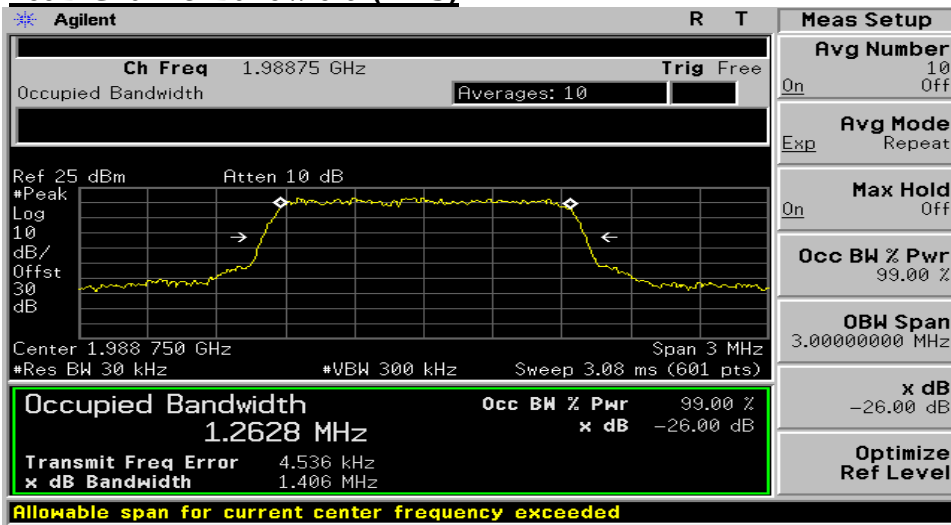
(Downlink)-PCS for LTE

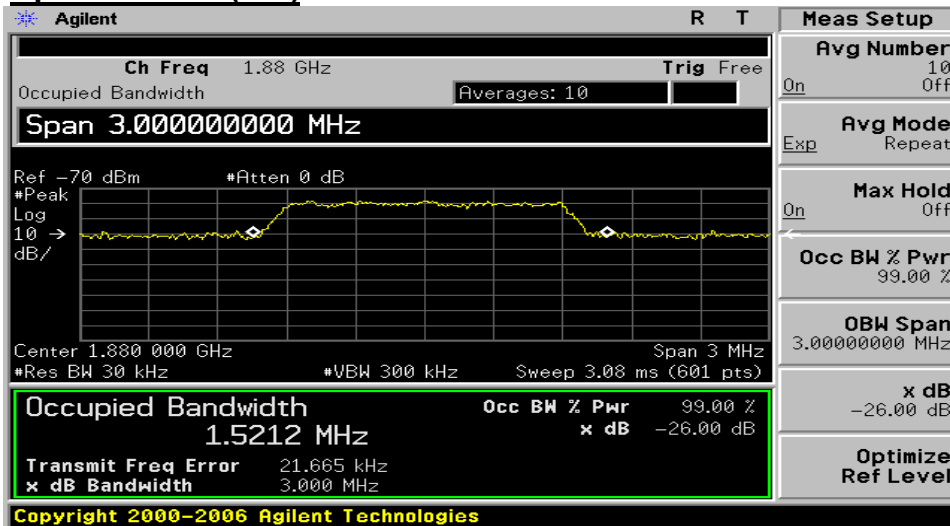
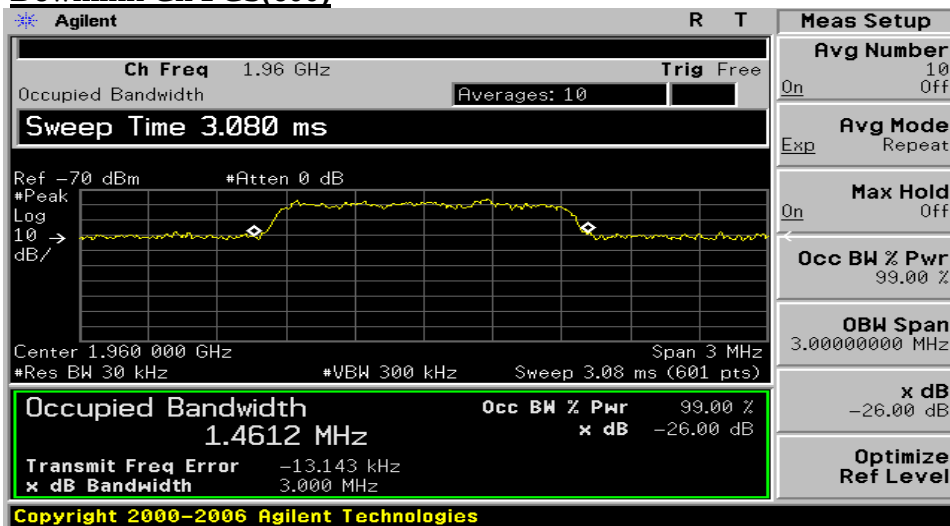
Channel	Frequency(MHz)	26dB Bandwidth(MHz)
50	1932.50	4.513
600	1960.00	4.530
1150	1987.50	4.511



5.4 Test Plot

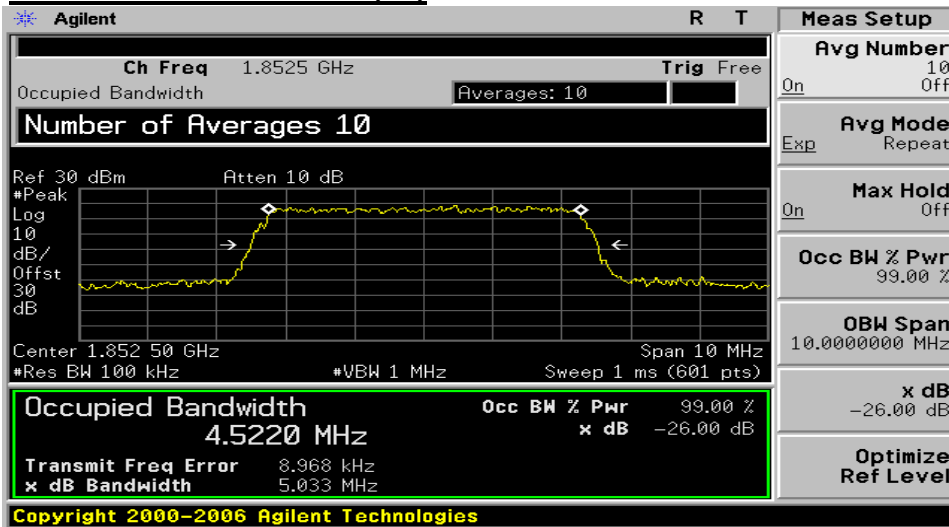
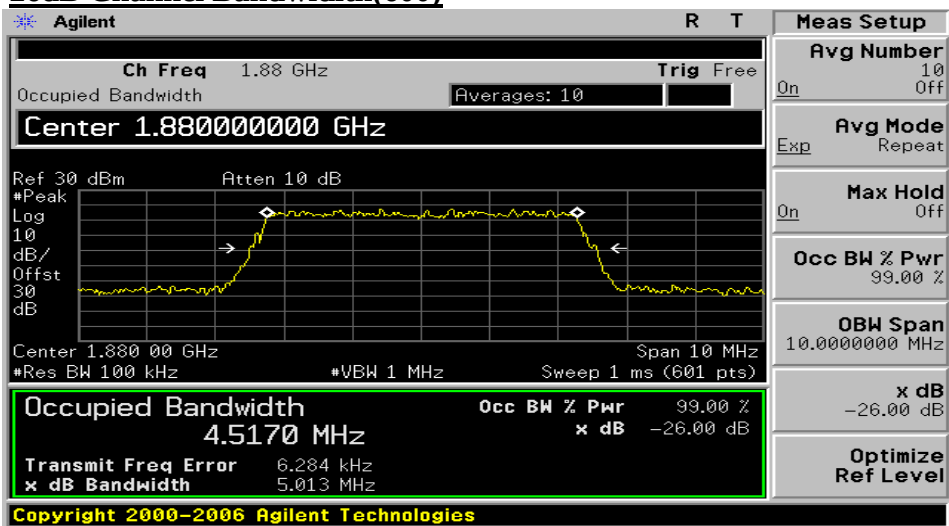
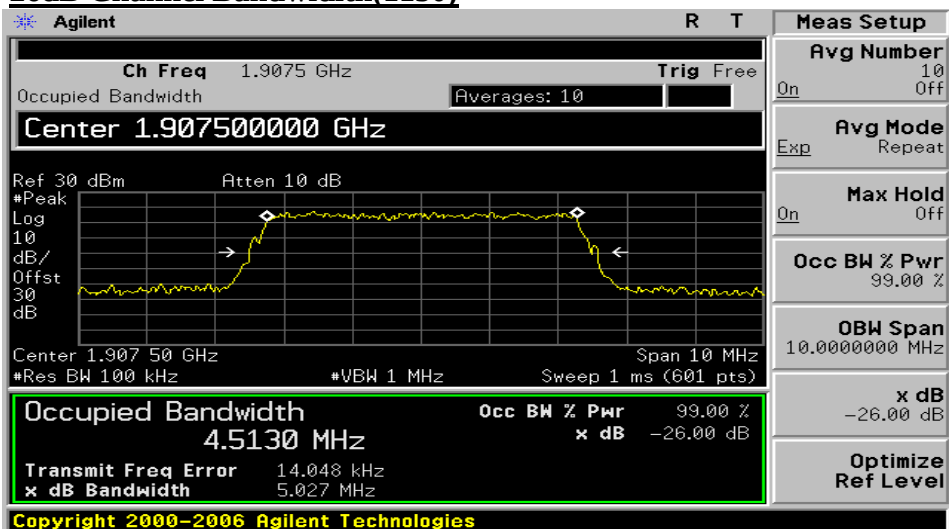
Uplink-PCS26dB Channel Bandwidth(25)26dB Channel Bandwidth(600)26dB Channel Bandwidth(1175)

Downlink-PCS26dB Channel Bandwidth(25)26dB Channel Bandwidth(600)26dB Channel Bandwidth(1175)

Input Signal BandwidthUplink Ch PCS (600)Downlink Ch PCS(600)



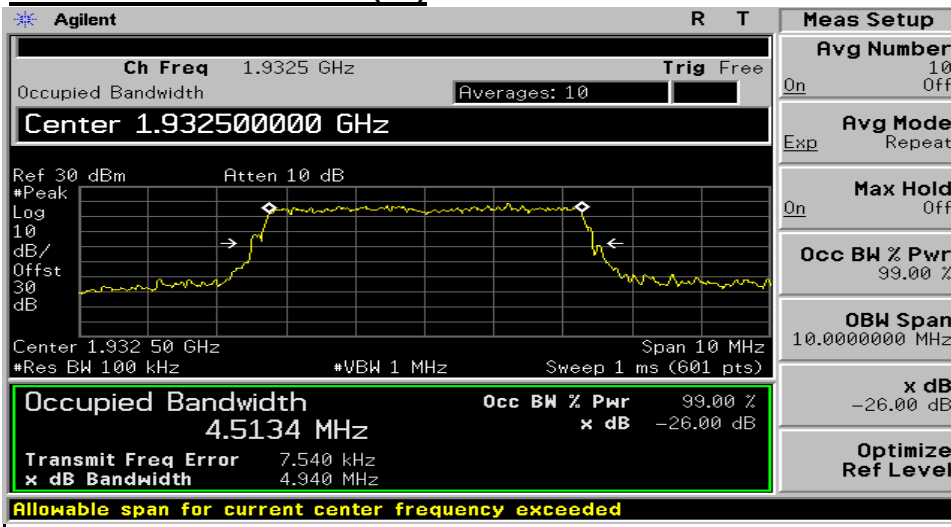
5.4 Test Plot

Uplink-PCS for LTE26dB Channel Bandwidth(50)26dB Channel Bandwidth(600)26dB Channel Bandwidth(1150)

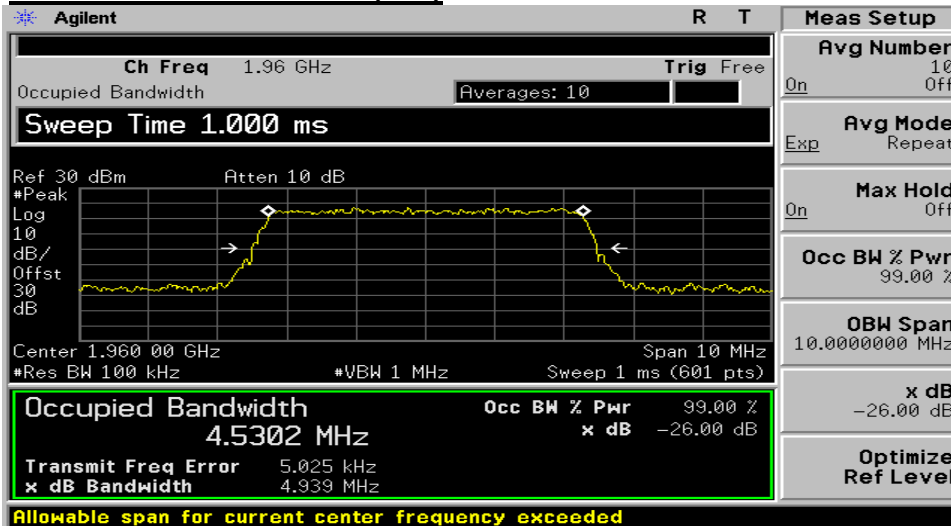


Downlink-PCS for LTE

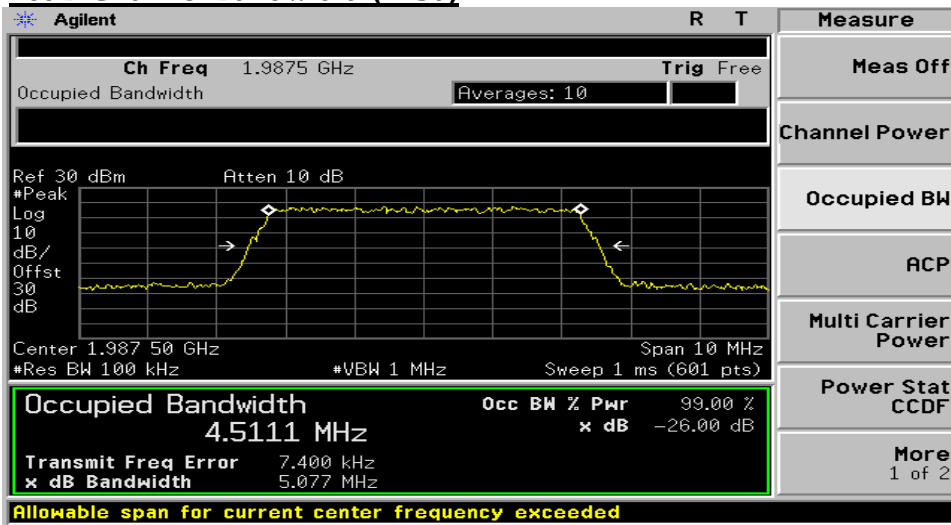
26dB Channel Bandwidth(50)

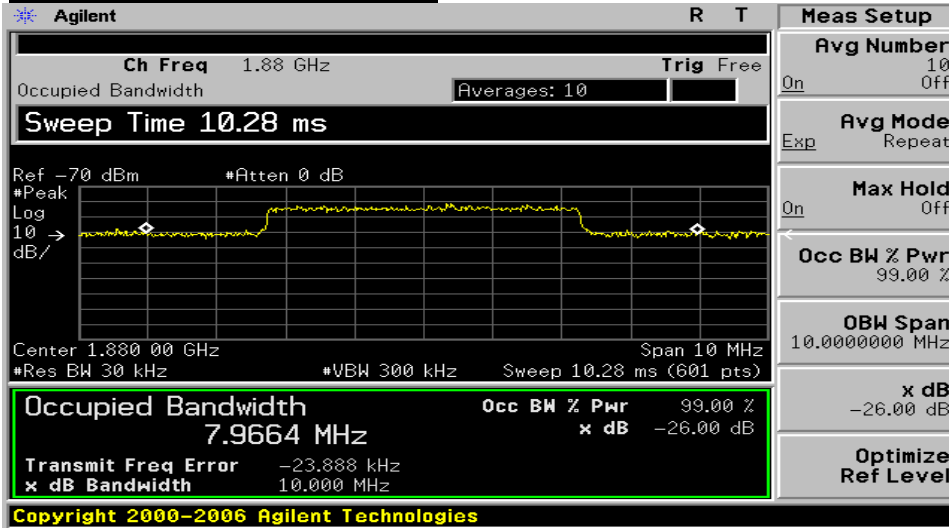
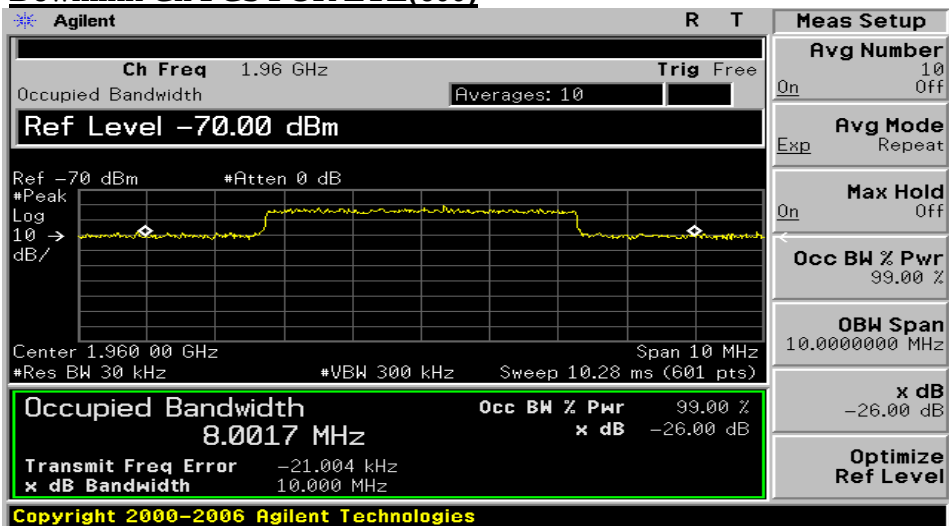


26dB Channel Bandwidth(600)



26dB Channel Bandwidth(1150)



Input Signal BandwidthUplink Ch PCS FOR LTE(600)Downlink Ch PCS FOR LTE(600)

6. Spurious and Harmonic Emission at Antenna Terminal

6.1 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the 1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

22.917(f): Mobile emission in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed -80dBm at the transmit antenna connector.

6.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2011-09-09
Spectrum Analyzer	Agilent	E4402B	2012-02-24
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	2012-02-15
Signal Generator	HP	E4432B	2012-02-24

6.3 Test Results (Uplink)

(Spurious Emission: Band Edge)-PCS

Channel	Frequency	Result	Limit	Margin
25	1981.25	-47.54	-13.00	34.54
1175	1908.75	-48.75	-13.00	35.75

(Spurious Emission: Out of Band)-PCS

Channel	Frequency	Result	Limit	Margin
25	1851.25	-46.35	-13.00	33.35
600	1880.00	-46.65	-13.00	33.65
1175	1908.75	-46.40	-13.00	33.40

6.4 Test Results (Downlink)

(Spurious Emission: Band Edge)-PCS

Channel	Frequency	Result	Limit	Margin
25	1931.25	-48.98	-13.00	35.98
1175	1988.75	-49.25	-13.00	36.25

(Spurious Emission: Out of Band)-PCS

Channel	Frequency	Result	Limit	Margin
25	1931.25	-46.35	-13.00	33.35
600	1960.00	-46.73	-13.00	33.73
1175	1988.75	-46.87	-13.00	33.87

6.4 Test Results (Uplink)

(Spurious Emission: Band Edge)-PCS for LTE

Channel	Frequency	Result	Limit	Margin
50	1852.50	-28.40	-13.00	15.40
1150	1907.50	-27.02	-13.00	14.02

(Spurious Emission: Out of Band)-PCS for LTE

Channel	Frequency	Result	Limit	Margin
50	1852.50	-37.33	-13.00	24.33
600	1880.00	-37.07	-13.00	24.07
1150	1907.50	-37.31	-13.00	24.31

6.4 Test Results (Downlink)

(Spurious Emission: Band Edge)-PCS for LTE

Channel	Frequency	Result	Limit	Margin
50	1932.50	-27.67	-13.00	14.67
1150	1987.50	-25.83	-13.00	12.83

(Spurious Emission: Out of Band)-PCS for LTE

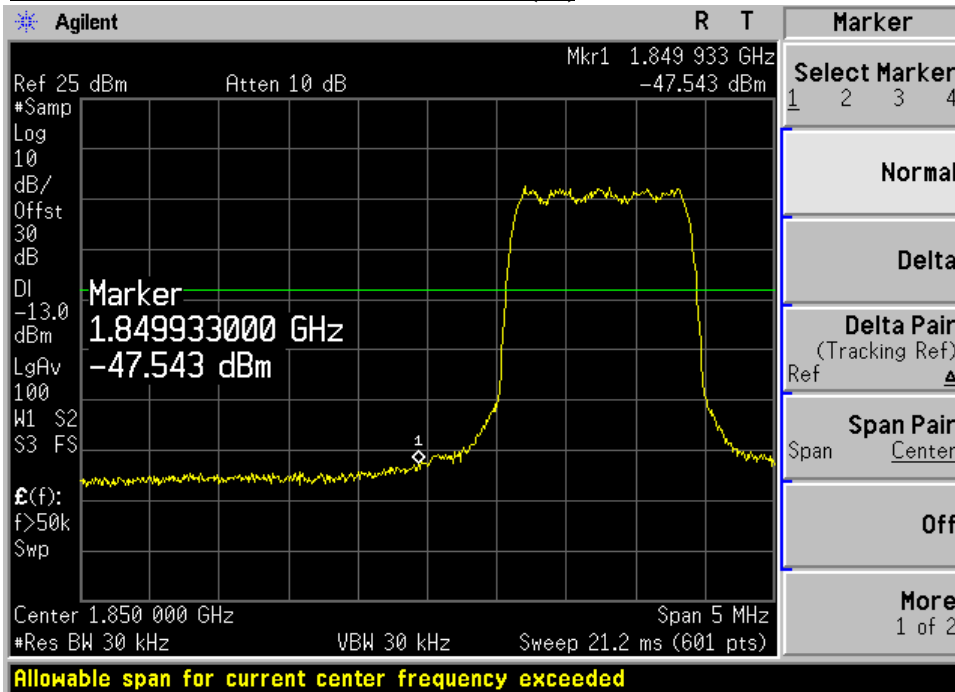
Channel	Frequency	Result	Limit	Margin
50	1932.50	-36.98	-13.00	23.98
600	1960.00	-37.17	-13.00	24.17
1150	1987.50	-36.20	-13.00	23.20



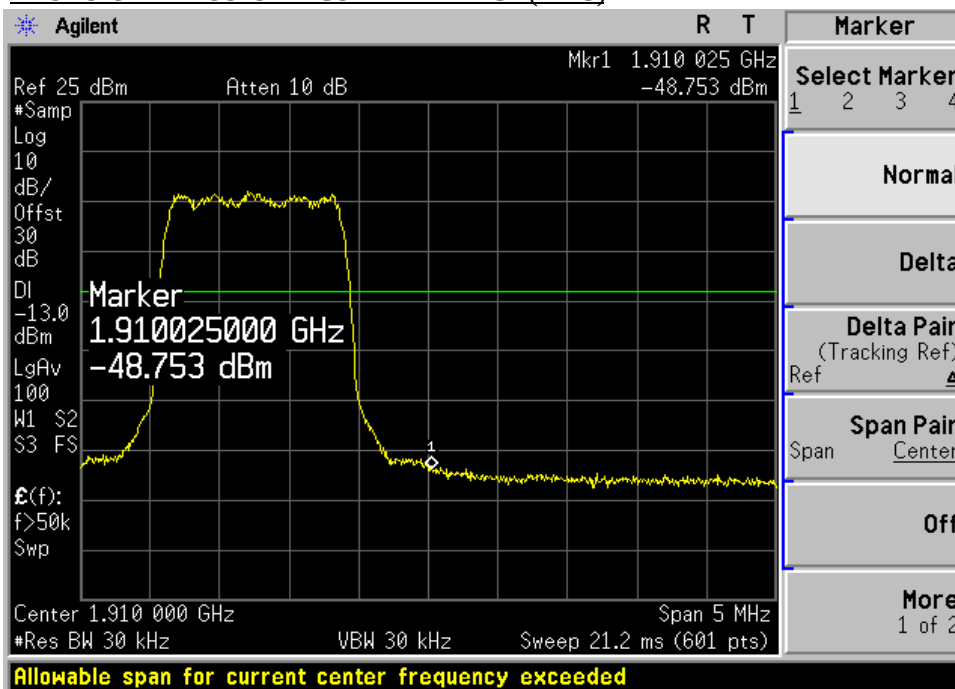
6.5 Test Plot

Uplink

PLOTS OF EMISSION PCS BAND EDGE(25)



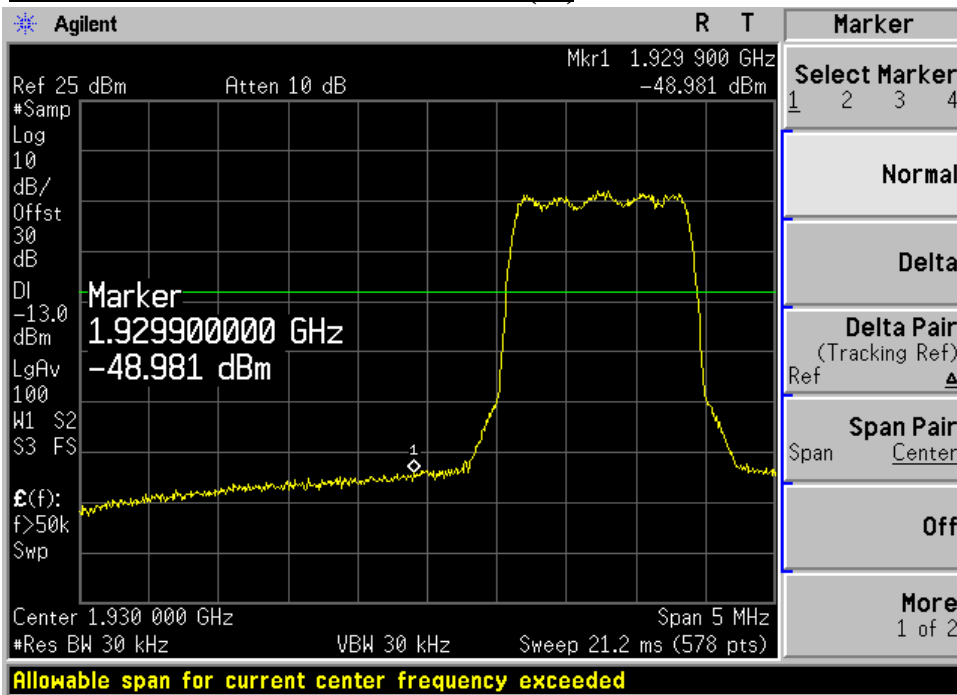
PLOTS OF EMISSION PCS BAND EDGE(1175)



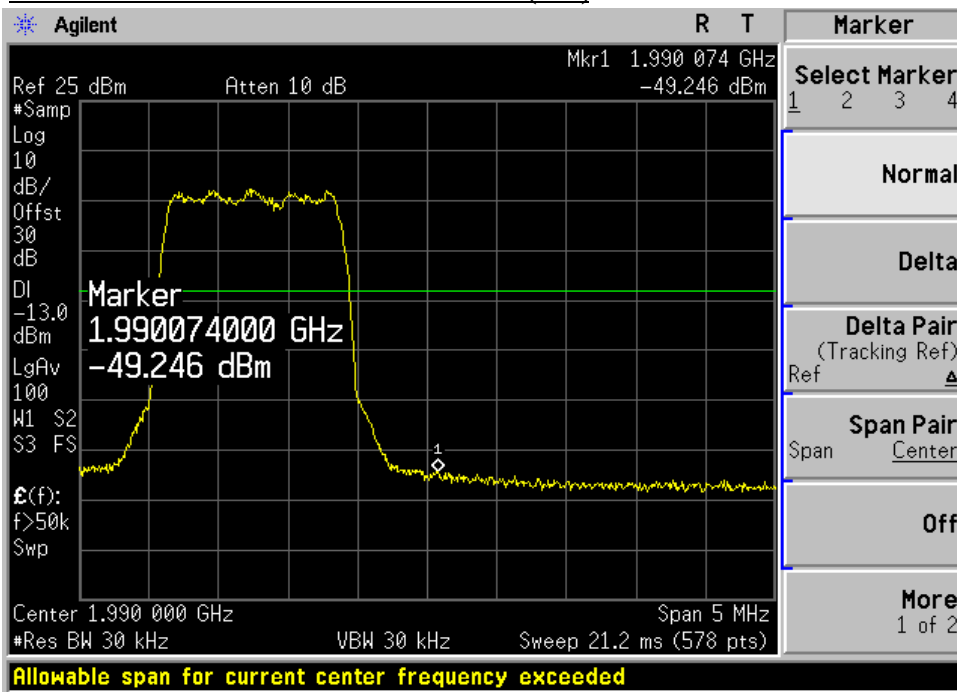


Downlink

PLOTS OF EMISSION PCS BAND EDGE(25)



PLOTS OF EMISSION PCS BAND EDGE(600)

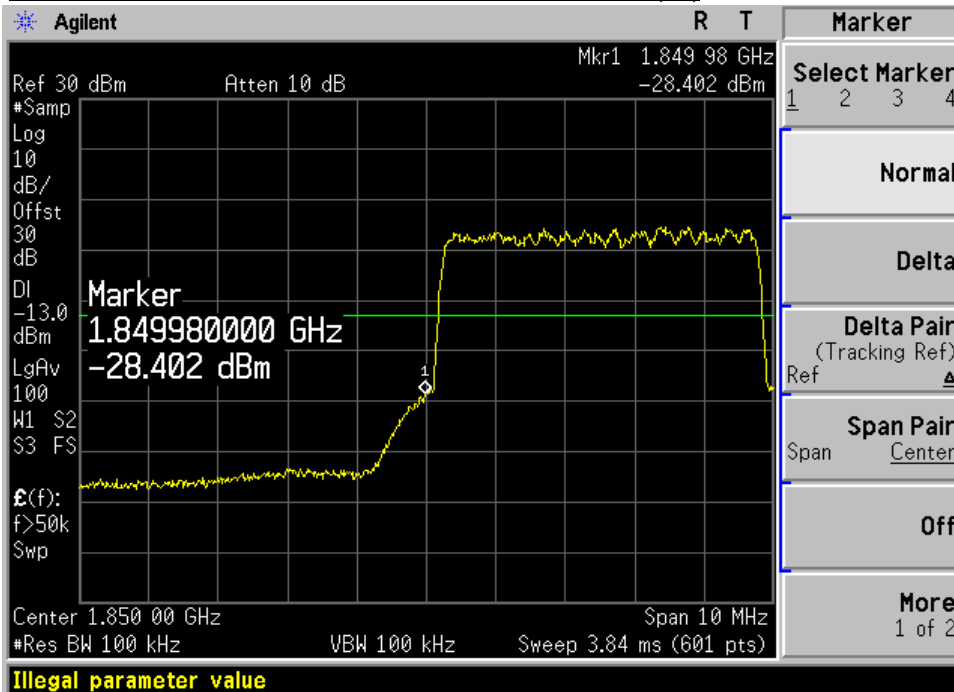




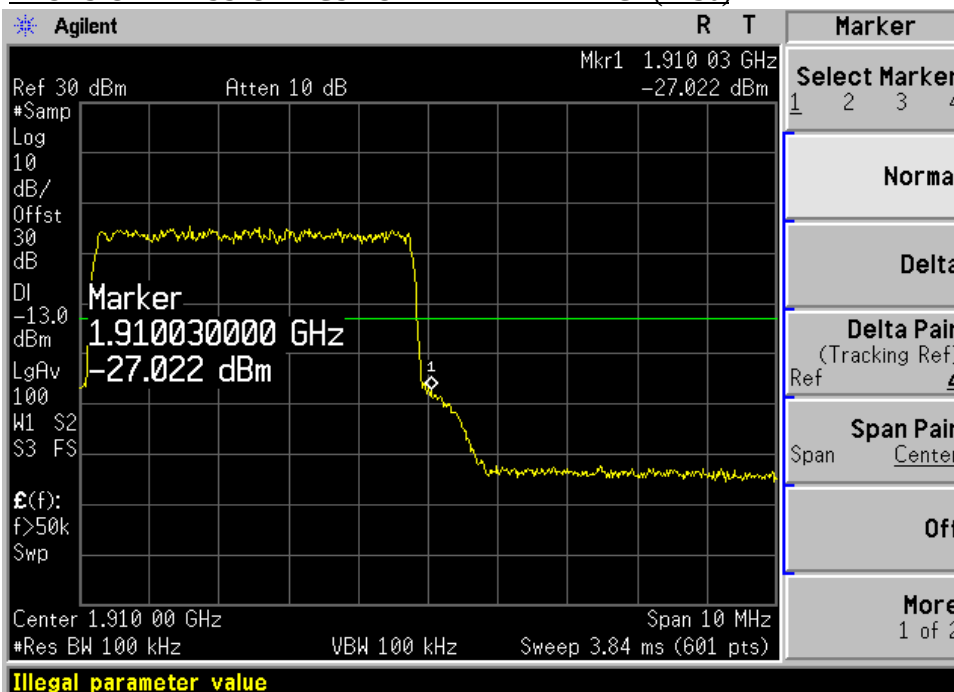
6.5 Test Plot

Uplink

PLOTS OF EMISSION PCS FOR LTE BAND EDGE(50)



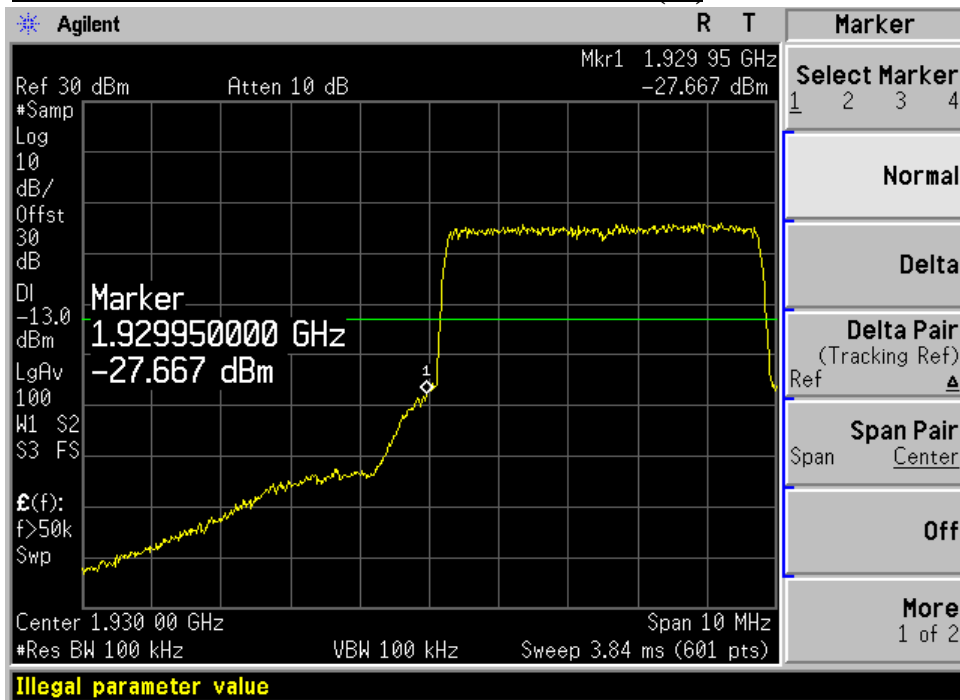
PLOTS OF EMISSION PCS FOR LTE BAND EDGE(1150)



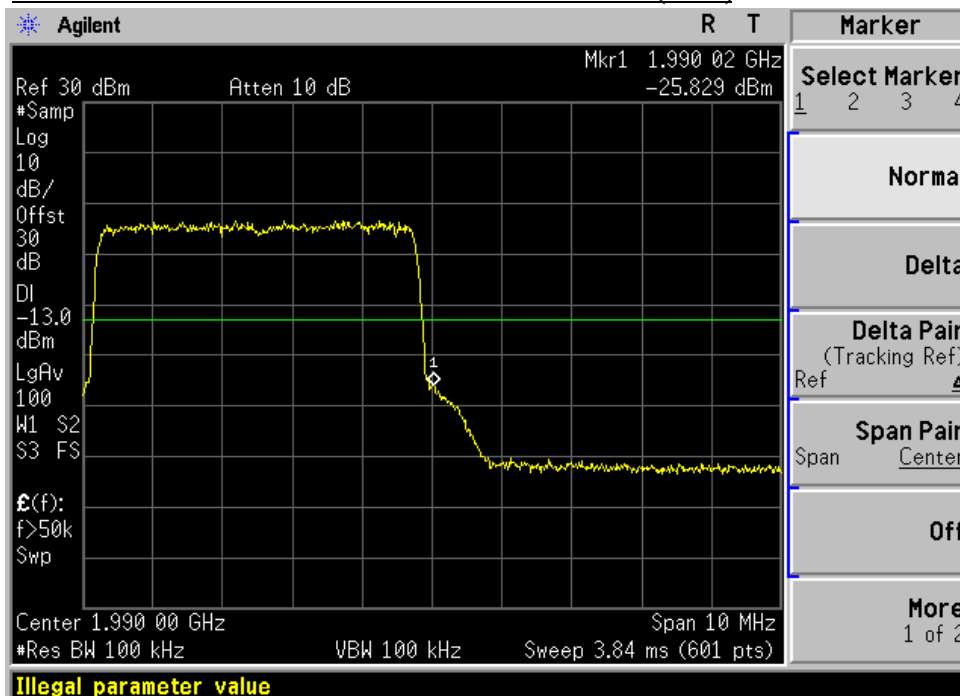


Downlink

PLOTS OF EMISSION PCS FOR LTE BAND EDGE(50)

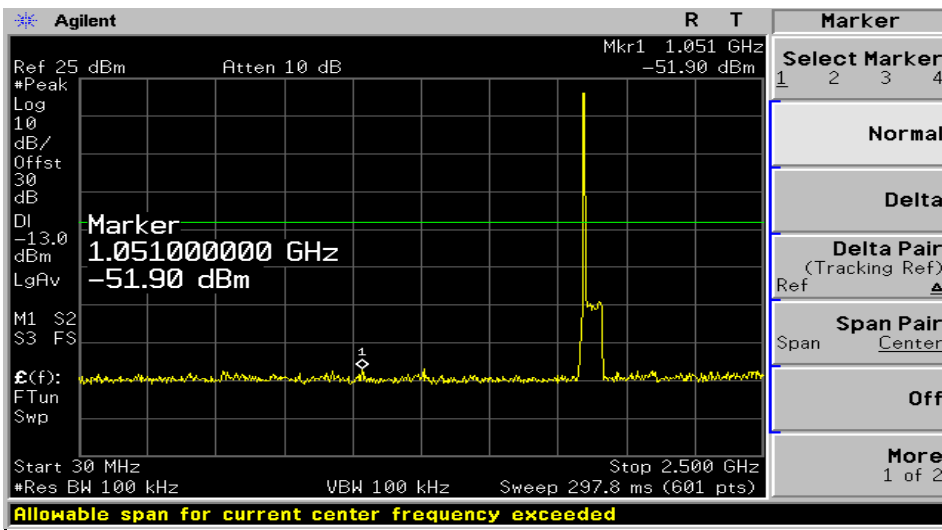


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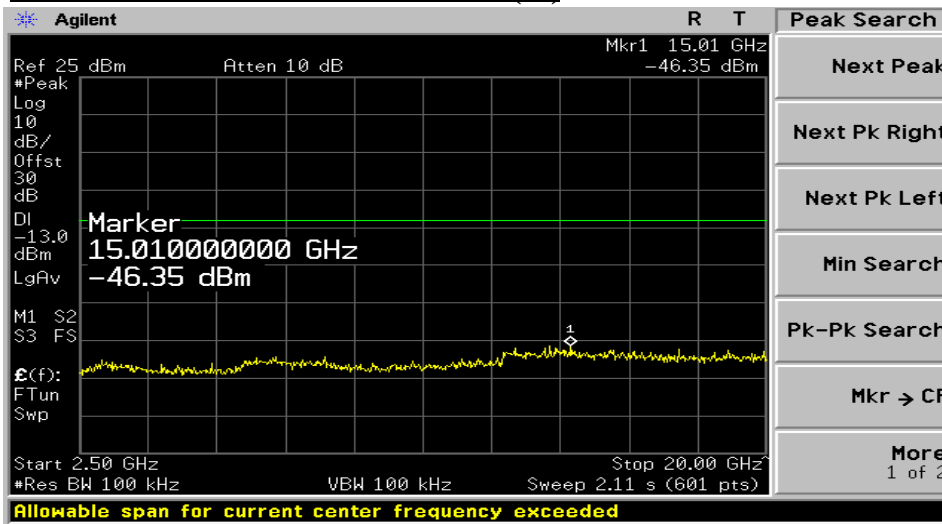


Uplink

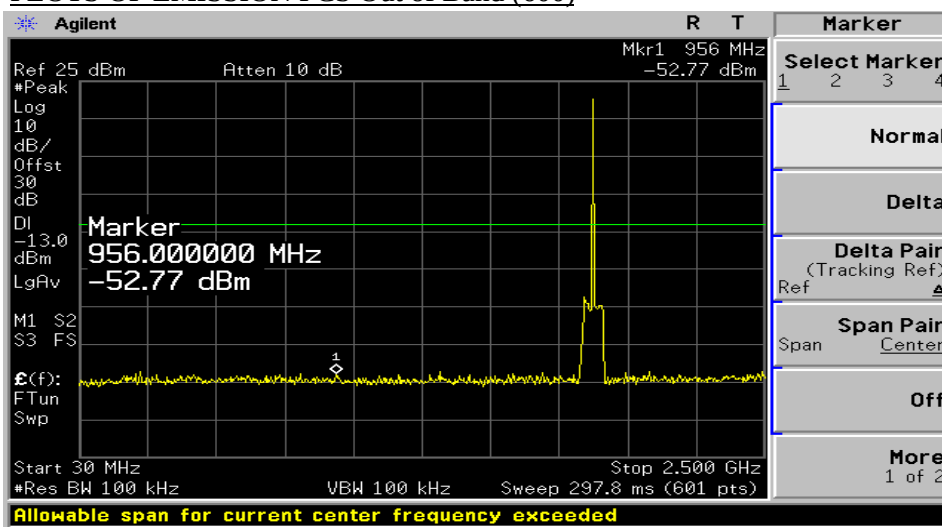
PLOTS OF EMISSION PCS Out of Band (25)

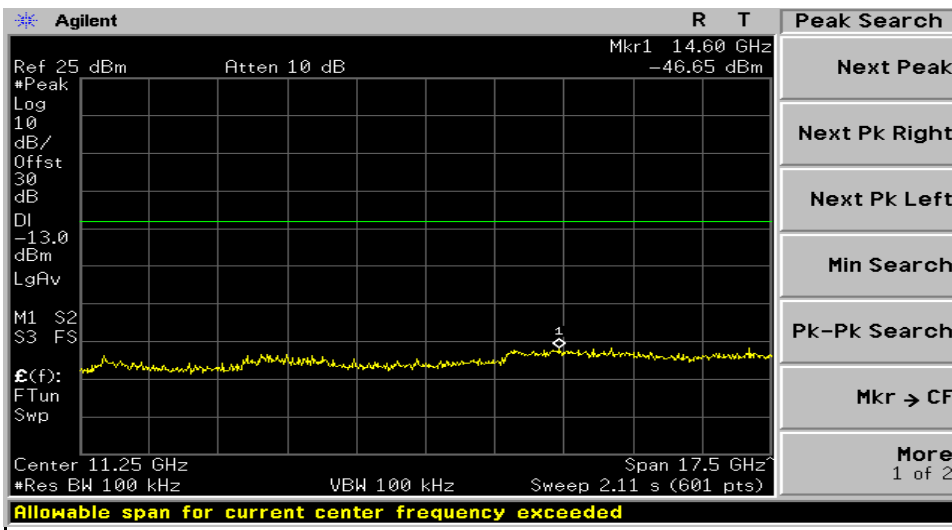
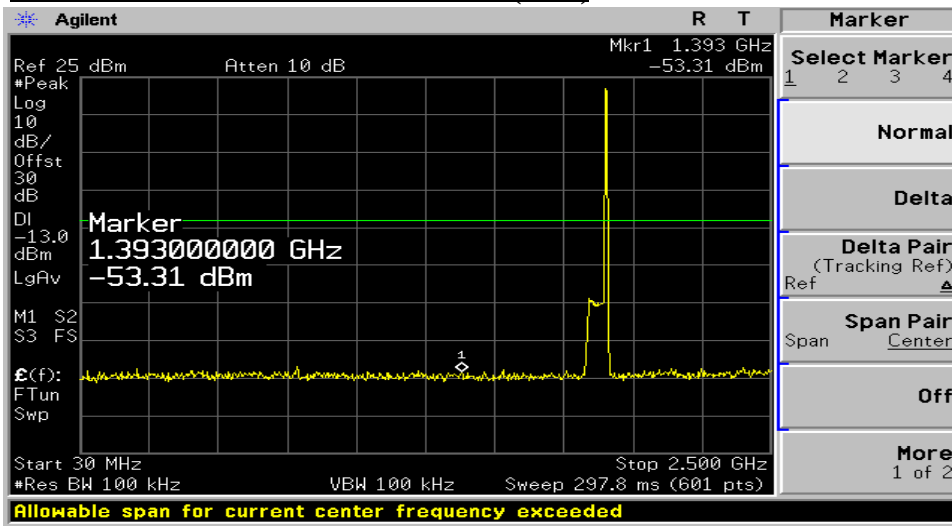
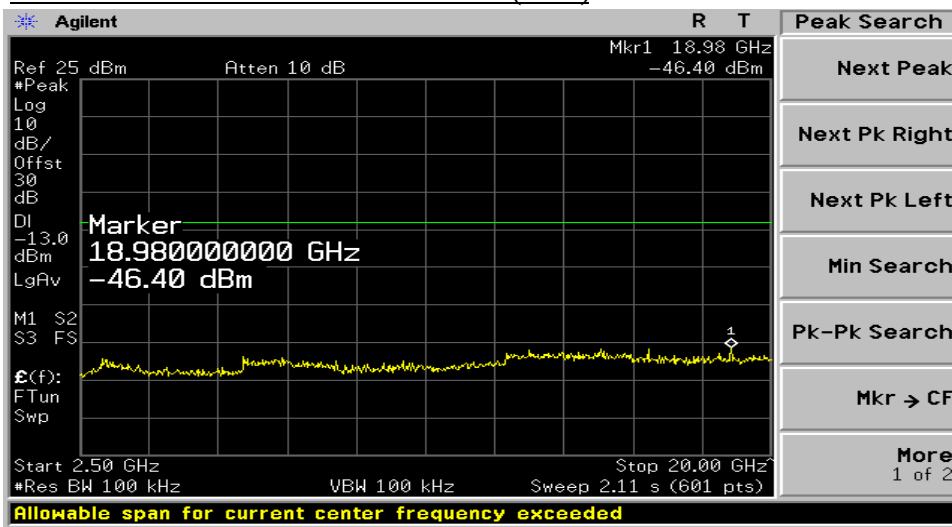


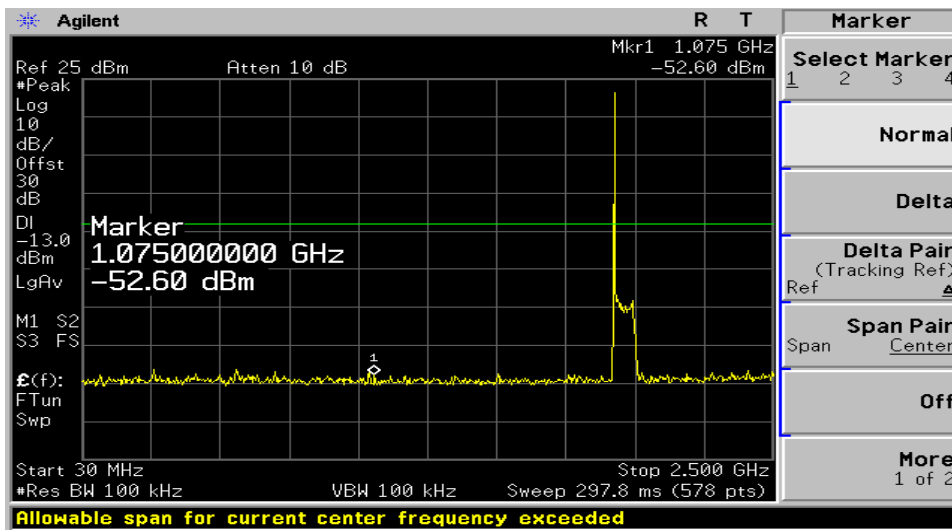
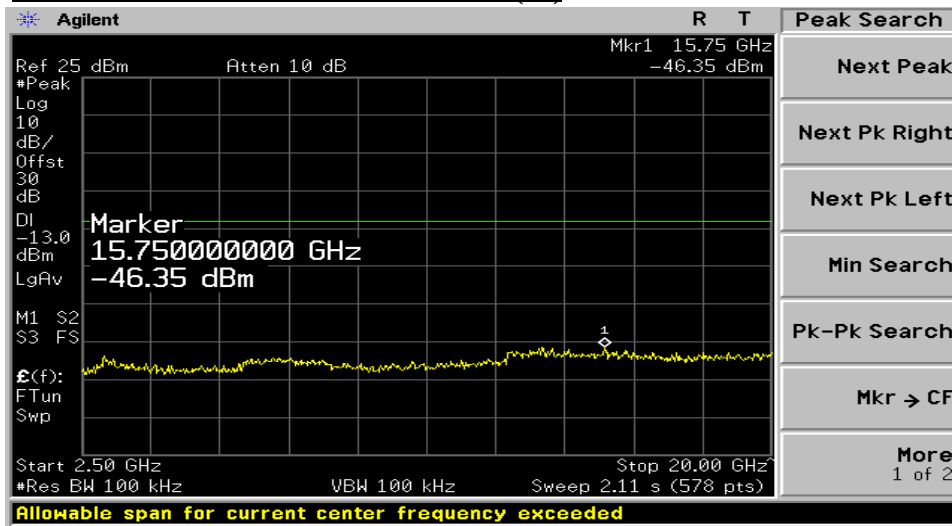
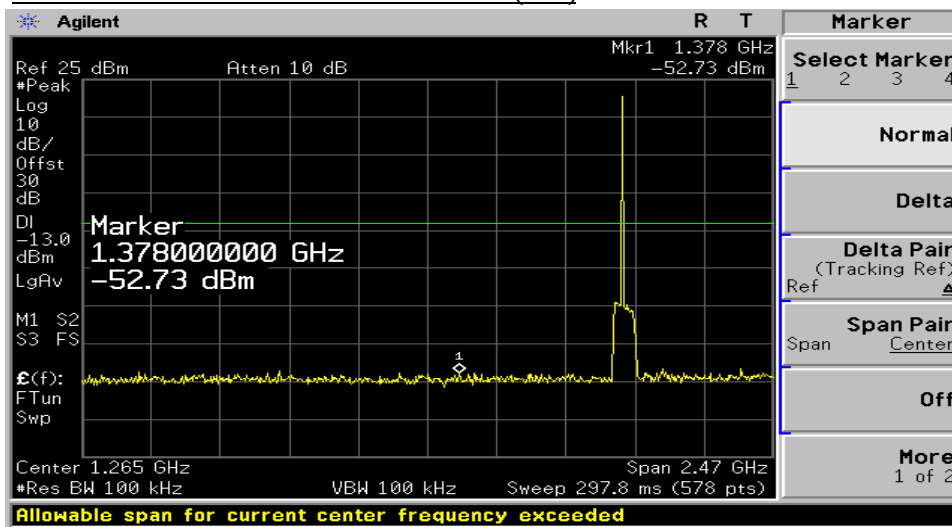
PLOTS OF EMISSION PCS Out of Band (25)

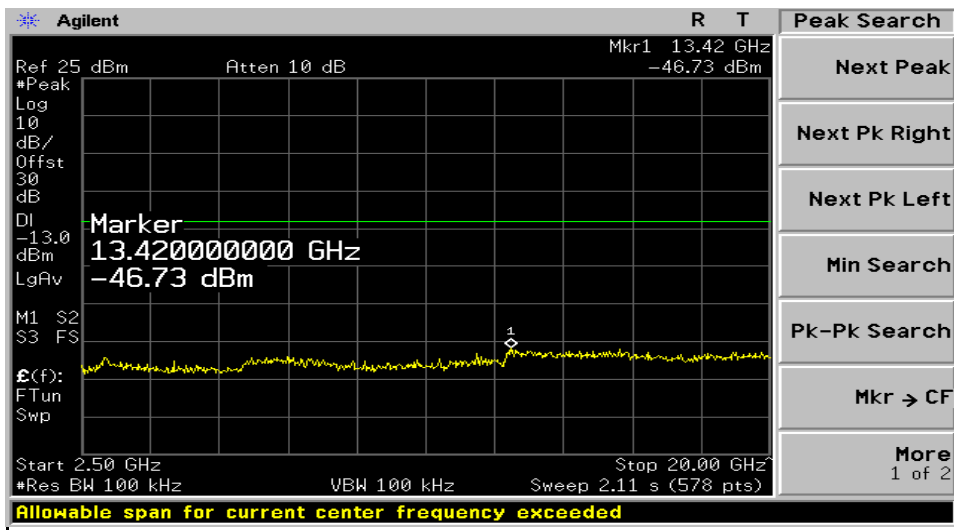
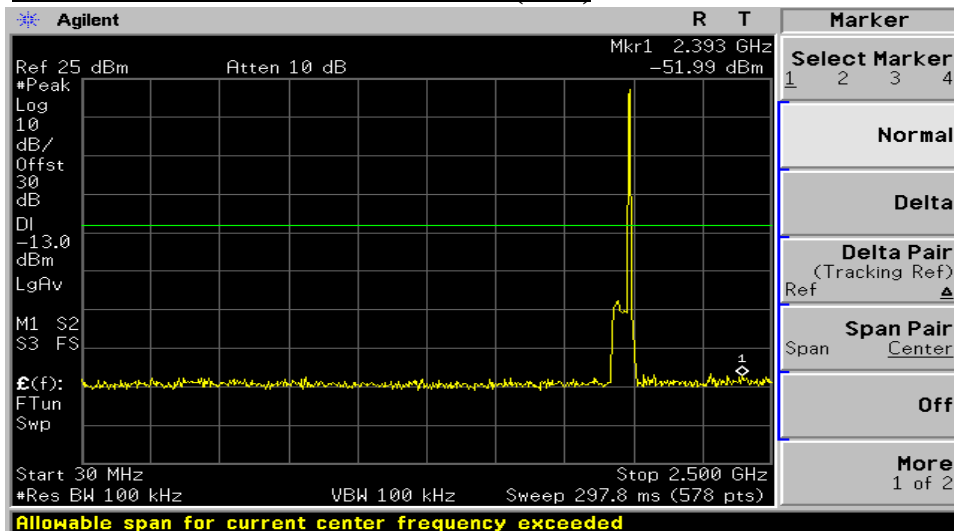
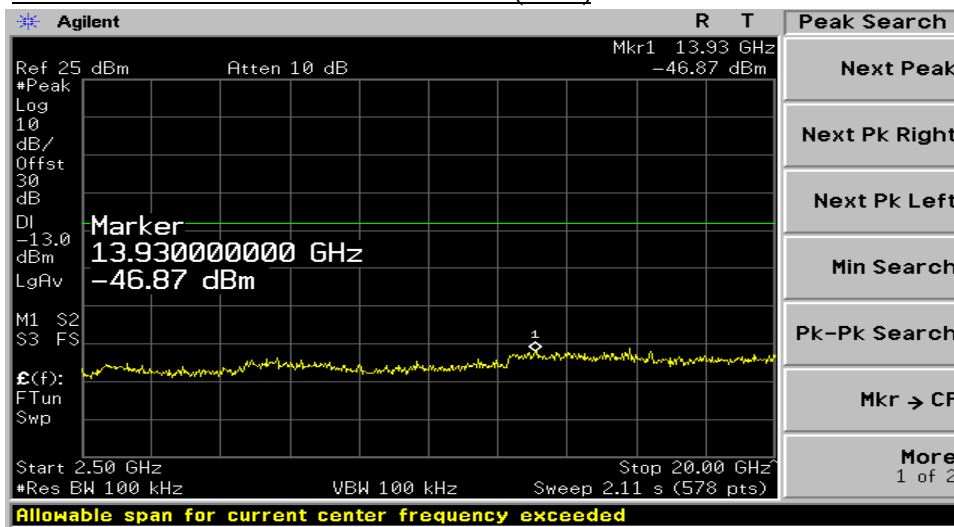


PLOTS OF EMISSION PCS Out of Band (600)



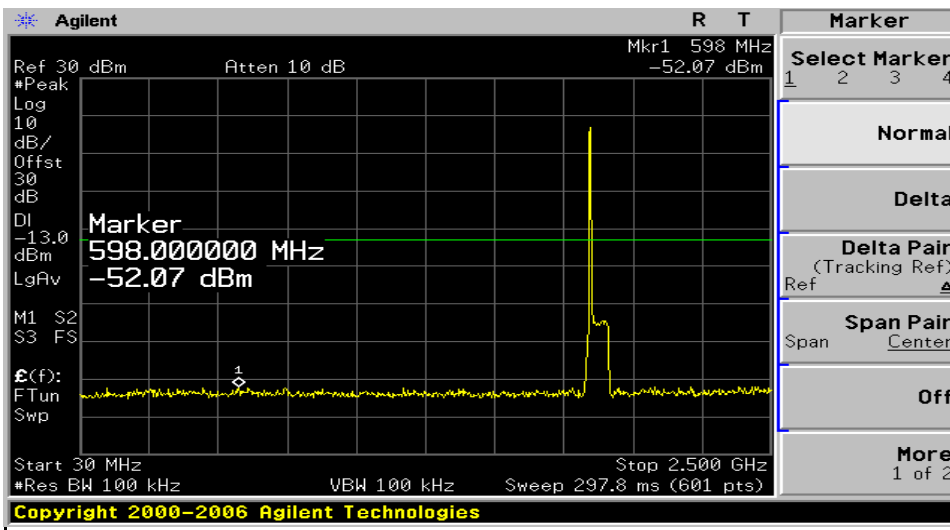
UplinkPLOTS OF EMISSION PCS Out of Band (600)PLOTS OF EMISSION PCS Out of Band (1150)PLOTS OF EMISSION PCS Out of Band (1150)

**Downlink****PLOTS OF EMISSION PCS Out of Band (25)****PLOTS OF EMISSION PCS Out of Band (25)****PLOTS OF EMISSION PCS Out of Band (600)**

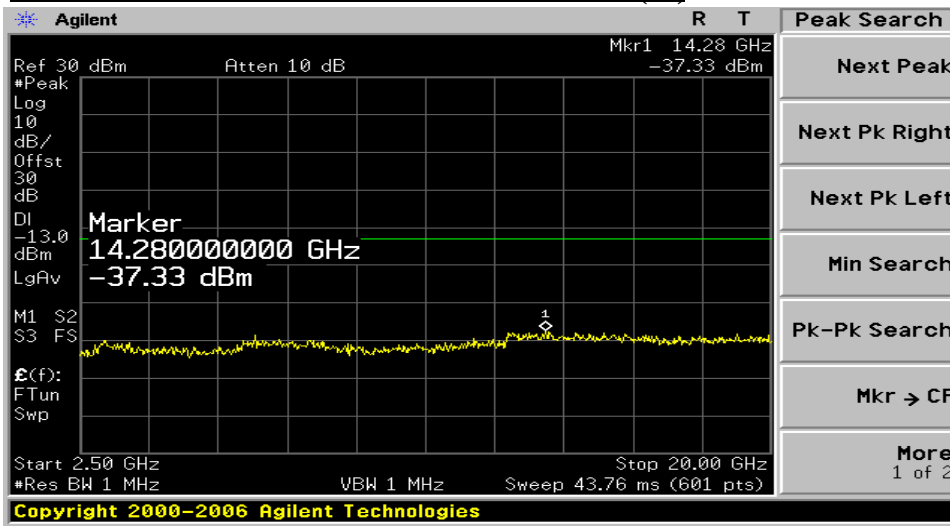
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Uplink

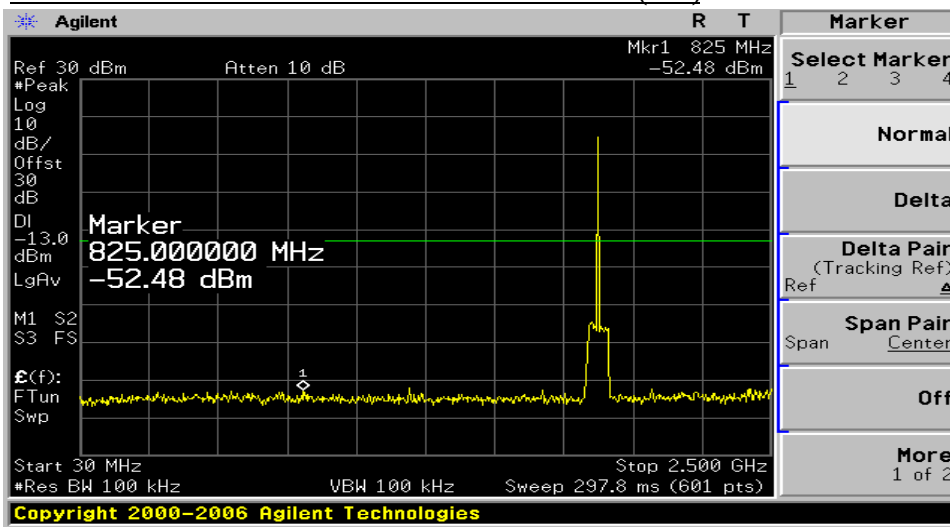
PLOTS OF EMISSION PCS FOR LTE Out of Band (50)



PLOTS OF EMISSION PCS FOR LTE Out of Band (50)



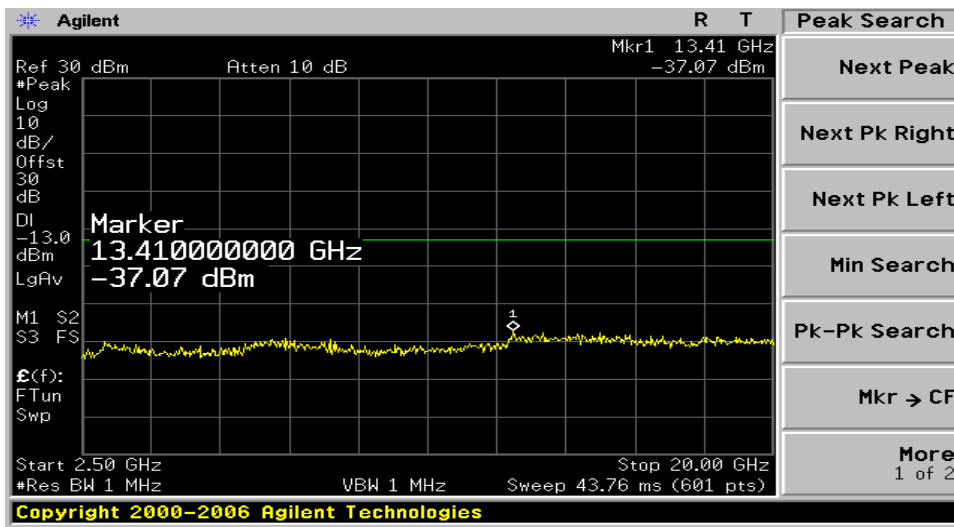
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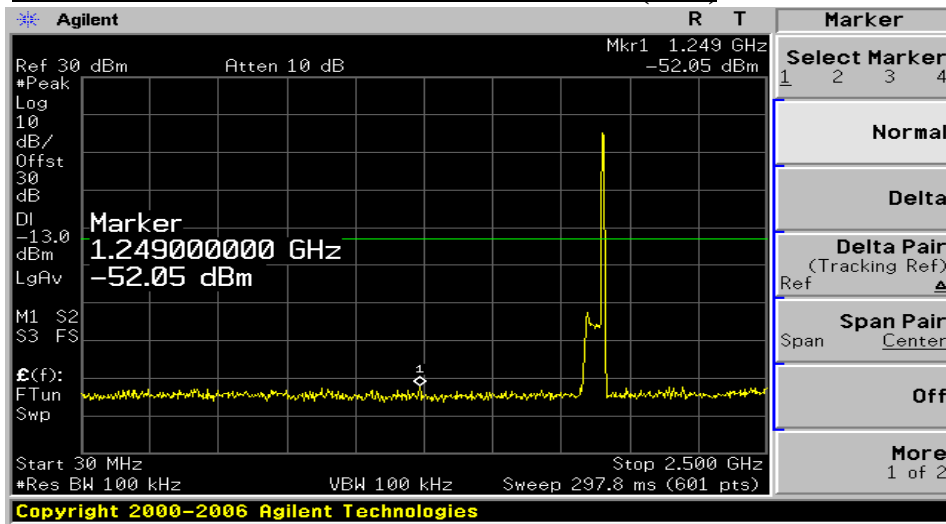


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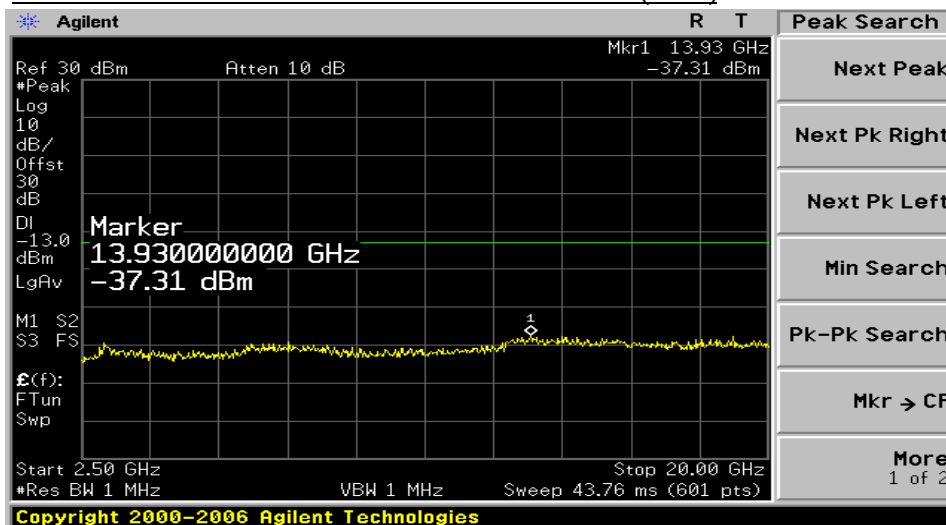
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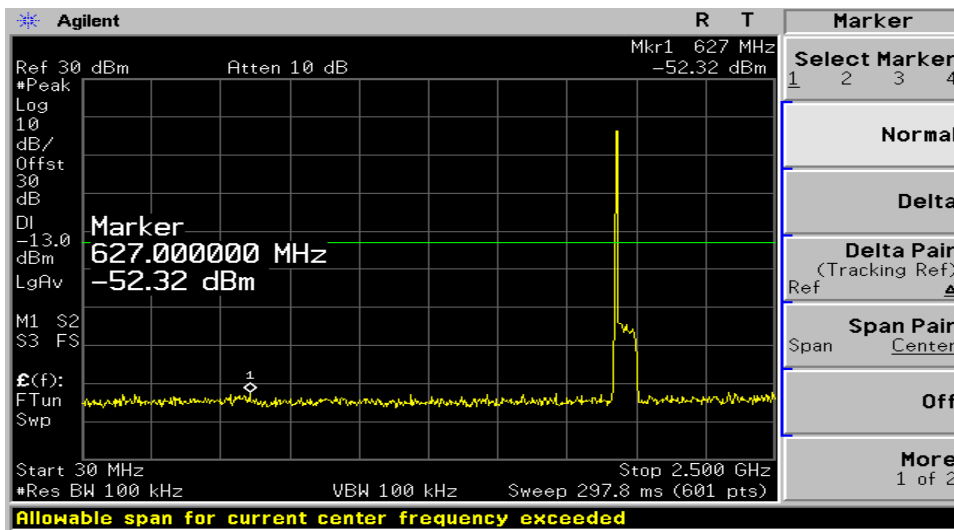
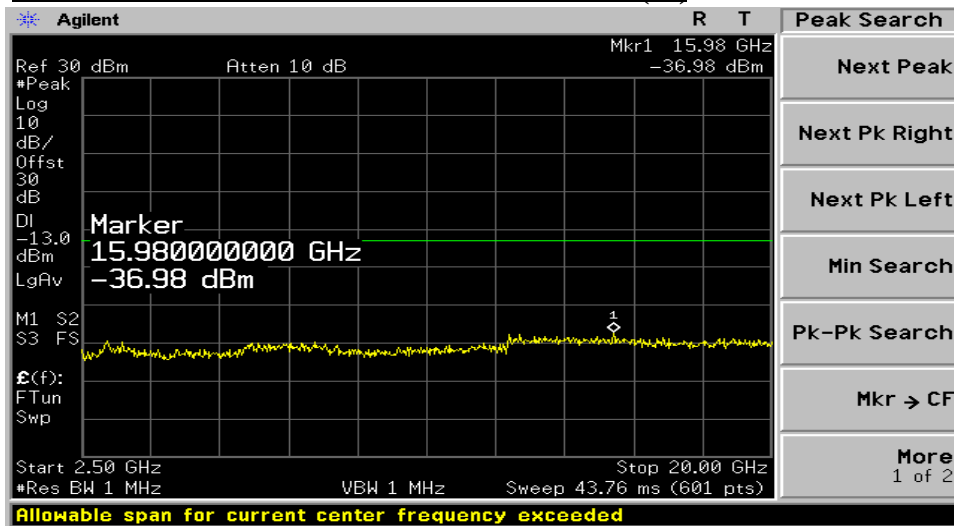
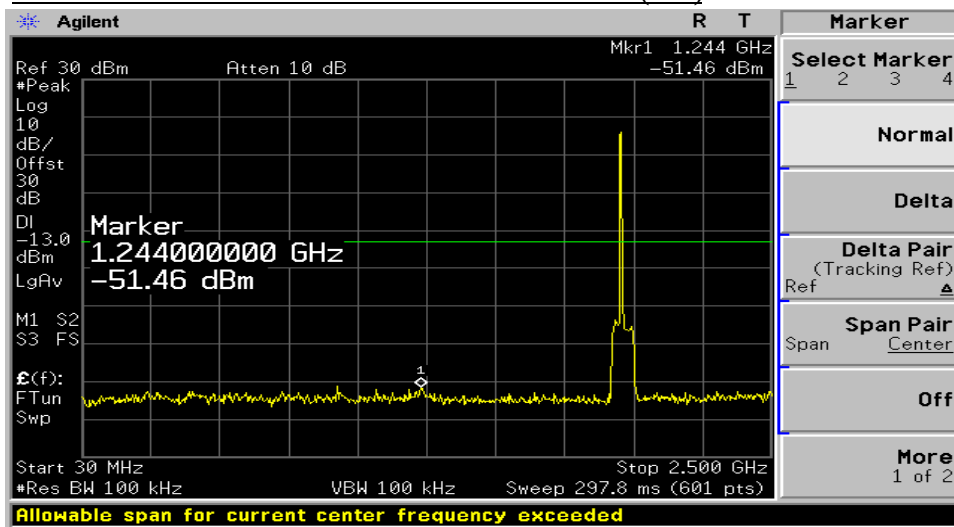


PLOTS OF EMISSION PCS FOR LTE Out of Band (1150)



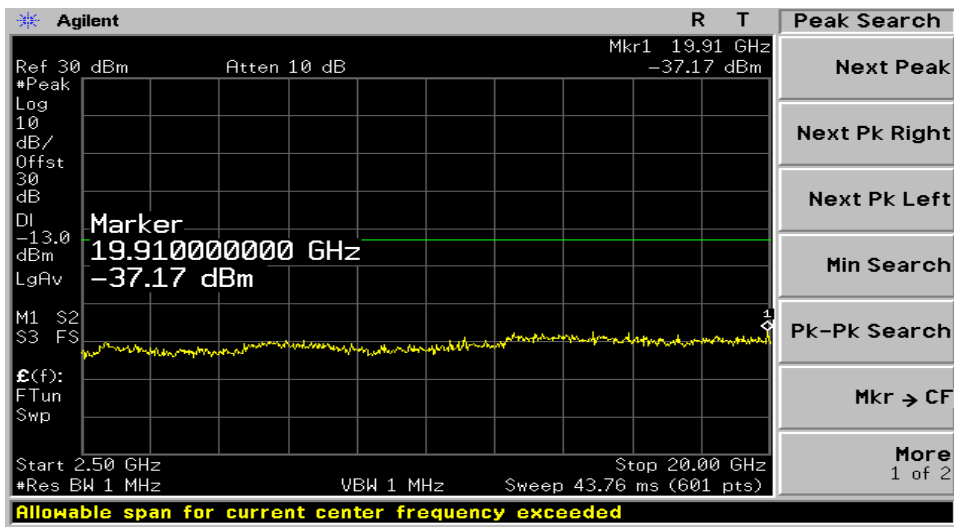
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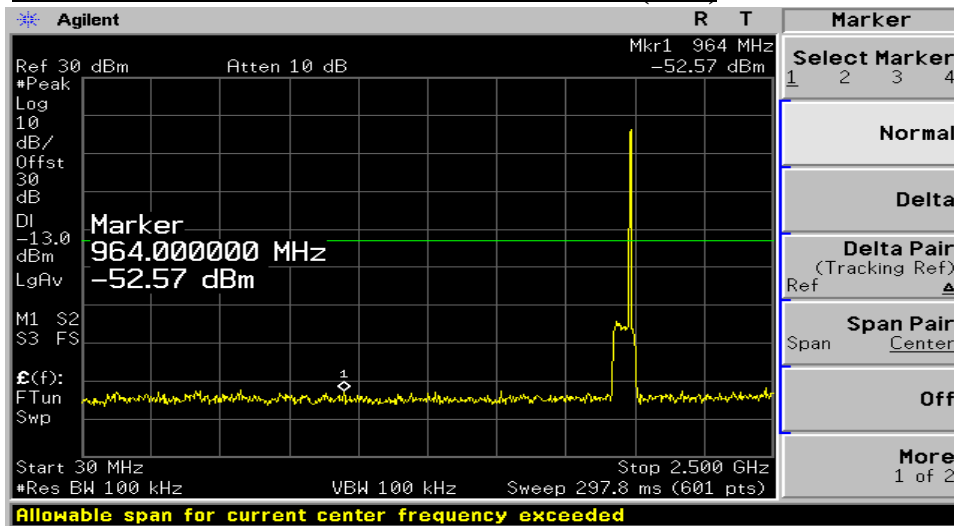
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Downlink

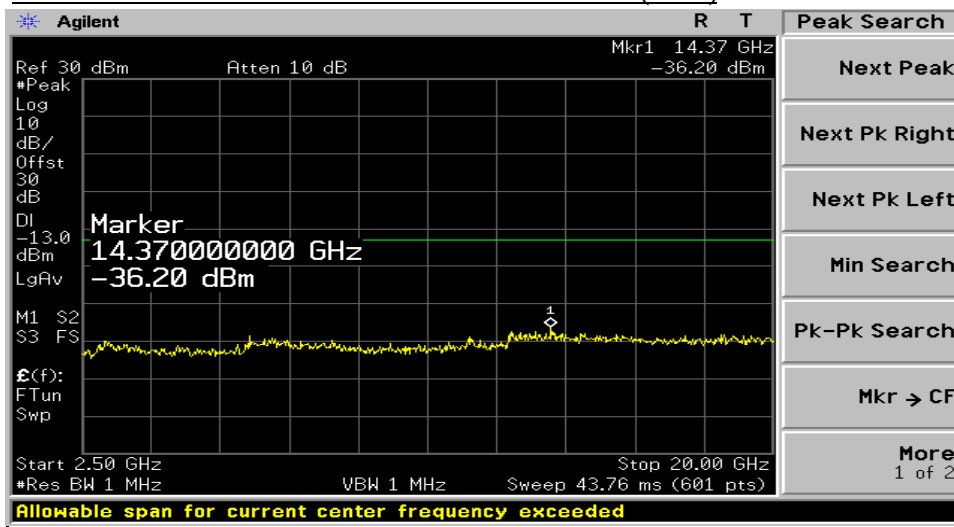
PLOTS OF EMISSION PCS FOR LTE Out of Band (600)



PLOTS OF EMISSION PCS FOR LTE Out of Band (1150)



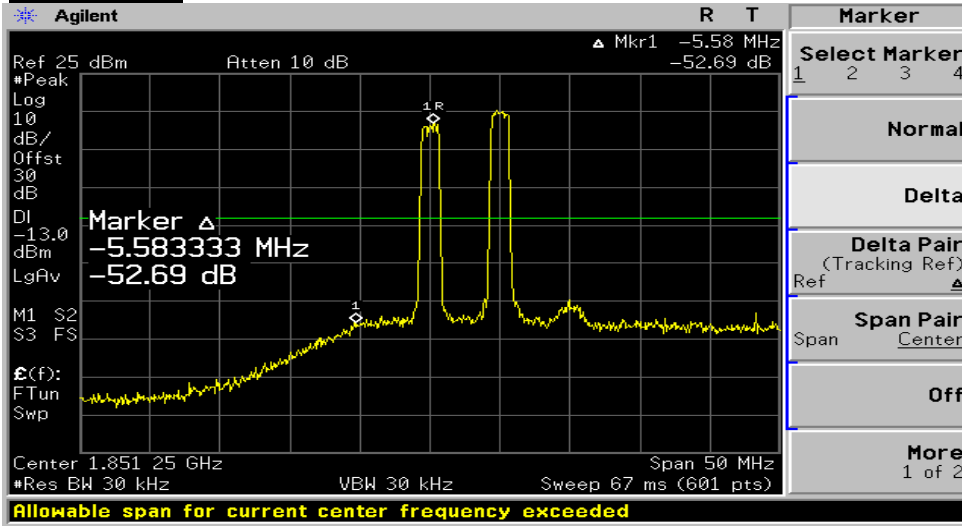
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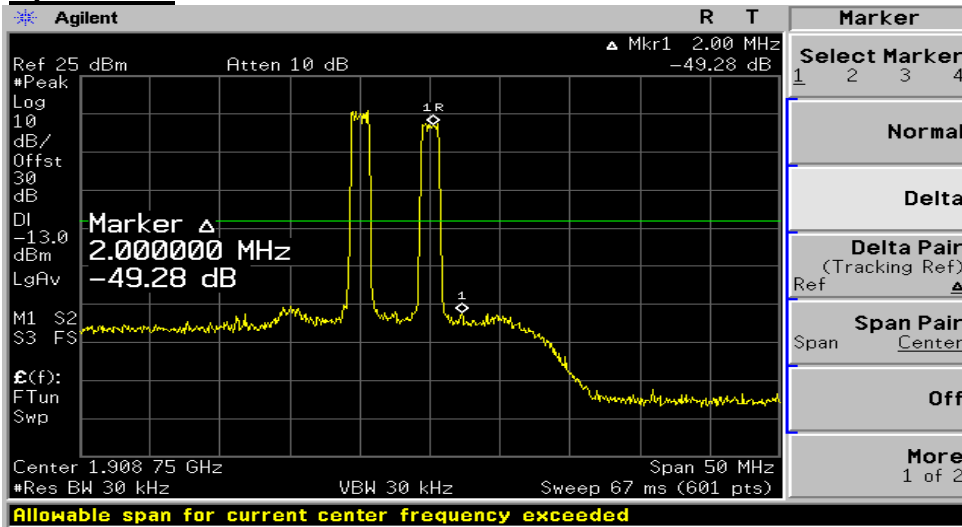


Inter-modulation Signal

Uplink -PCS

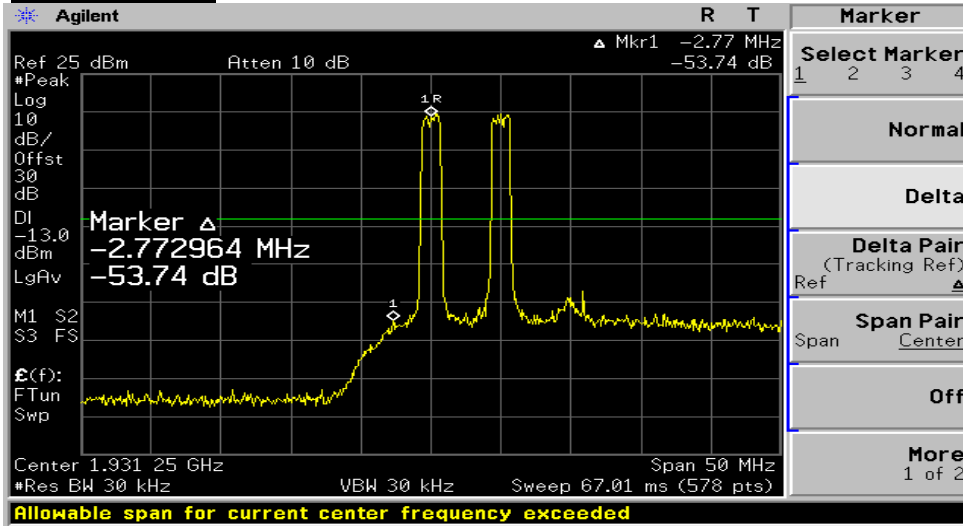


Uplink-PCS

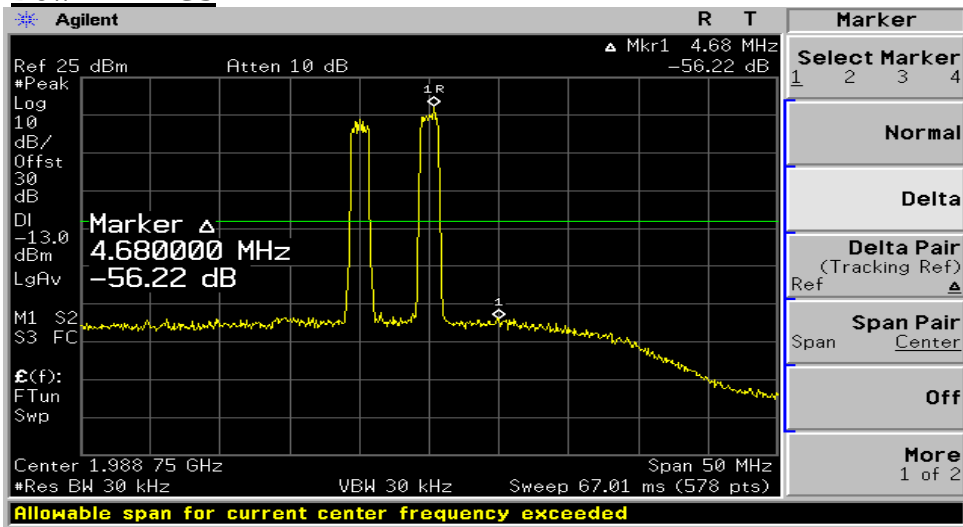




Downlink-PCS



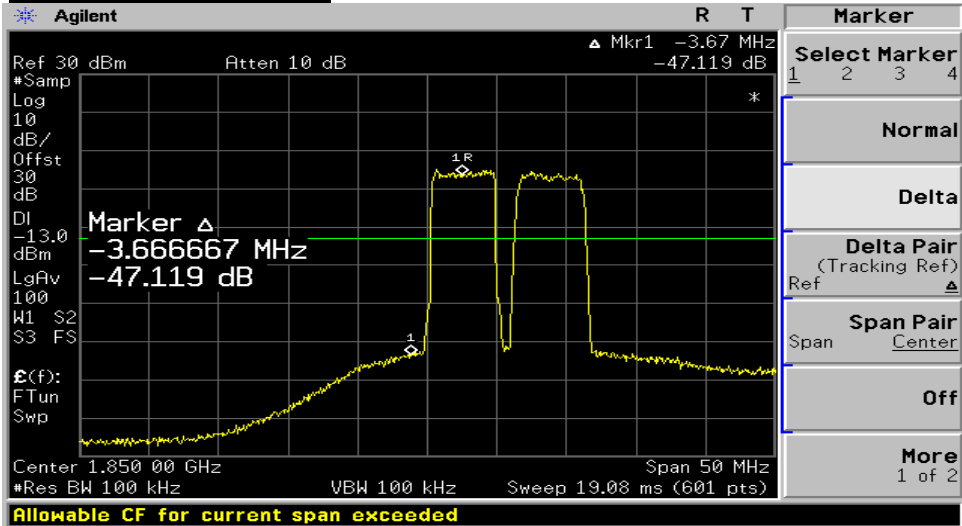
Downlink-PCS



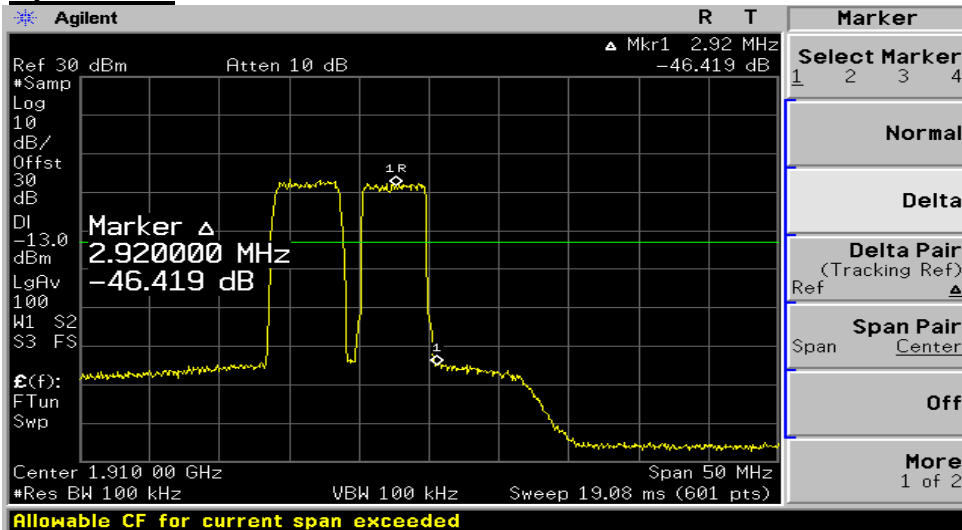


Inter-modulation Signal

Uplink -PCS FOR LTE

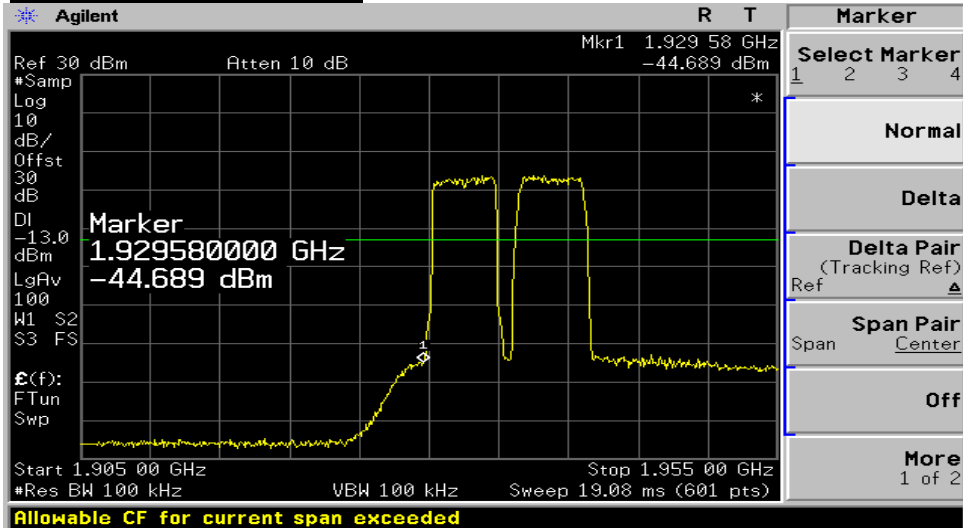


Uplink-PCS

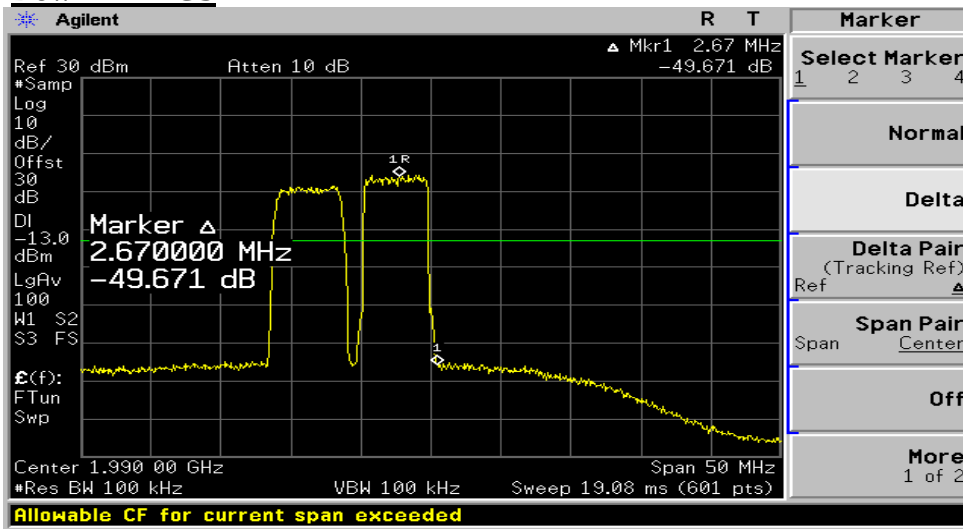




Downlink-PCS FOR LTE



Downlink-PCS



7. Field Strength of Spurious Radiation

7.1 Test Procedure according to ANSI/TIA/EIA 603 Clause 3.2.12 & FCC 22.917(h)

Radiation and harmonic emission are measured outdoors at our 3 meters test range. The equipment under test is placed on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

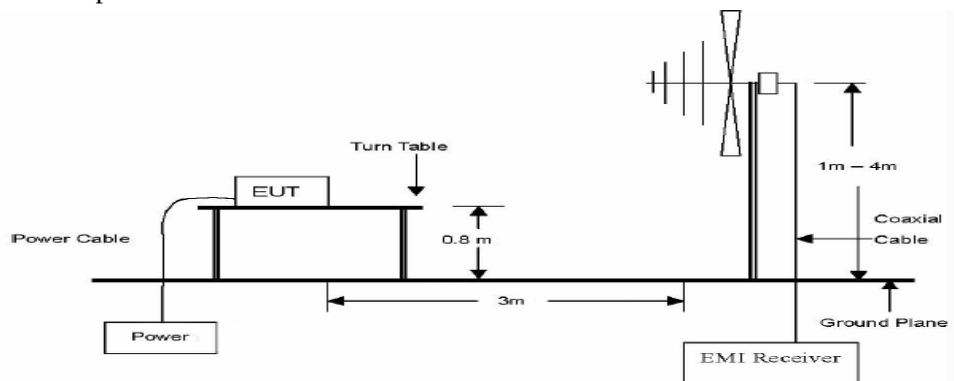
7.2 Test Equipments

The following test equipments are used during tests

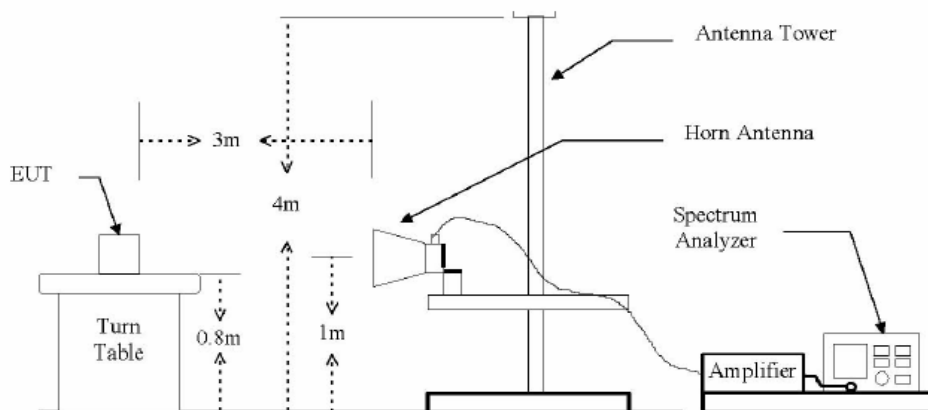
Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	ESPI	2012-01-18
Signal Generator	HP	83620B	2011-08-27
Power Meter	HP	EPM-442A	2012-01-27
Power Sensor	HP	8481A	2012-01-27
Pre Amplifier	HP	8449B	2012-01-27
Attenuator	JFW	50FH-010-5	2012-01-27
Attenuator	HP	8491B	2012-01-27
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2012-07-14
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2011-06-01

7.3 Test Setup

Test setup for 30 MHz to 1 GHz



Test setup for above 1 GHz





7.3 Test Results

Uplink

PCS(Ch25)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3702.50	41.04	12.04	18.00	-48.20	-54.16	-13.00	V

PCS(Ch600)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3760.00	40.86	12.10	18.00	-49.10	-55.00	-13.00	H

PCS(Ch1175)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3817.50	41.64	12.20	18.40	-47.60	-53.80	-13.00	V

Remark

- * The TX signal isn't detected from 3rd harmonics.
- * $EIRP = SG\ Reading + AG(dBi) - CL(dB)$
- * $ERP = SG\ Reading + AG(dBi) - CL(dB) + 2.15(dB)$



Downlink

PCS(Ch25)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3862.50	40.89	12.24	19.20	-47.60	-54.56	-13.00	V

PCS(Ch600)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3920.00	40.69	12.36	19.00	-47.20	-53.84	-13.00	H

PCS(Ch1175)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3977.50	41.00	12.40	19.10	-46.60	-53.30	-13.00	V

Remark

- * The TX signal isn't detected from 3rd harmonics.
- * EIRP = SG Reading + AG(dBi)-CL(dB)
- * ERP = SG Reading + AG(dBi)-CL(dB)+2.15(dB)



7.3 Test Results

Uplink

PCS FOR LTE(Ch50)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3705.00	40.80	12.05	17.90	-48.30	-54.15	-13.00	V

PCS FOR LTE(Ch600)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3760.00	40.90	12.10	18.00	-49.10	-55.00	-13.00	V

PCS FOR LTE(Ch1150)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3815.00	41.20	12.20	18.50	-48.30	-54.60	-13.00	V

Remark

- * The TX signal isn't detected from 3rd harmonics.
- * EIRP = SG Reading + AG(dBi)-CL(dB)
- * ERP = SG Reading + AG(dBi)-CL(dB)+2.15(dB)



Downlink

PCS FOR LTECh50)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3865.00	41.10	12.25	19.30	-47.00	-54.05	-13.00	V

PCS FOR LTE(Ch600)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3920.00	40.60	12.36	19.00	-47.20	-53.84	-13.00	V

PCS FOR LTE(Ch1150)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
3975.00	40.70	12.39	19.10	-46.50	-53.21	-13.00	V

Remark

- * The TX signal isn't detected from 3rd harmonics.
- * EIRP = SG Reading + AG(dBi)-CL(dB)
- * ERP = SG Reading + AG(dBi)-CL(dB)+2.15(dB)

8. Frequency stability

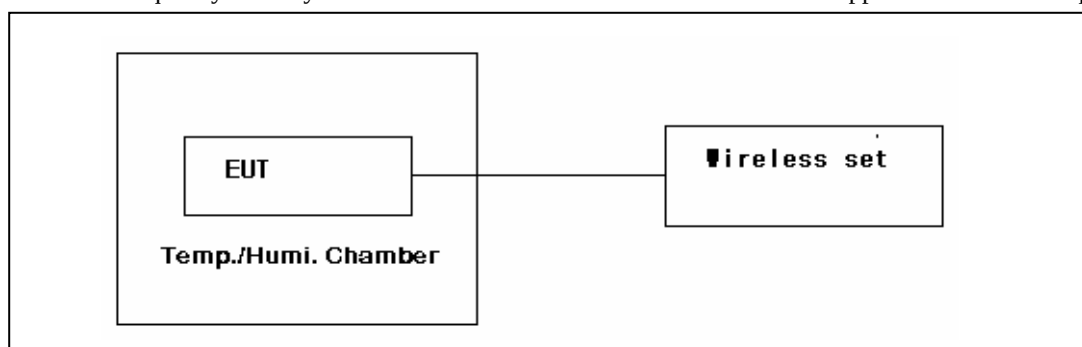
8.1 Test Procedure

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from -30 °C to +60 °C using an environmental chamber.

b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

※ The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 2.5 ppm of the center frequency.



8.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2011-09-09
Spectrum Analyzer	Agilent	E4402B	2012-02-24
Slidacs	Digitek power	-	N/A
DC Power Supply	INTERACT	AK-3010	2012-02-24
Tem/Hum Chamber	TABAI ESPEC CORP	PSL-2GT	2012-02-07
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	2012-02-15
Signal Generator	HP	E4432B	2012-02-24



8.3 Test Results

Uplink-PCS

Operating Frequency :	1,880,000,000	
Channel :	600	
Reference Voltage :	110.00	VAC
Deviation Limit :	0.00010	

Voltage (%)	Power (VAC)	Temperature (°C)	Frequency (Hz)	Deviation
100	110.0	+20 °C (Ref)	1,880,000,007	0.000007
100		-30	1,880,000,008	0.000008
100		-20	1,880,000,005	0.000005
100		-10	1,880,000,006	0.000006
100		0	1,880,000,012	0.000012
100		10	1,880,000,011	0.000011
100		20	1,880,000,005	0.000005
100		25	1,880,000,007	0.000007
100		30	1,880,000,020	0.000020
100		40	1,880,000,015	0.000015
100		50	1,880,000,014	0.000014
100		60	1,880,000,016	0.000016
85	93.5	20	1,880,000,017	0.000017
115	126.5	20	1,880,000,015	0.000015
EndPoint	85.0	20	1,880,000,016	0.000016



Downlink-PCS

Operting Frequency :	1,880,000,000	
Channel :	600	
Reference Voltage :	110.00	VAC
Deviatin Limit :	0.00010	

Voltage (%)	Power (VAC)	Temperature (℃)	Frequency (Hz)	Deviation
100	110.0	+20℃ (Ref)	1,879,999,980	0.000020
100		-30	1,879,999,985	0.000015
100		-20	1,879,999,990	0.000010
100		-10	1,879,999,990	0.000010
100		0	1,879,999,995	0.000005
100		10	1,879,999,995	0.000005
100		20	1,879,999,980	0.000020
100		25	1,879,999,985	0.000015
100		30	1,879,999,990	0.000010
100		40	1,879,999,990	0.000010
100		50	1,879,999,995	0.000005
100		60	1,879,999,995	0.000005
85	93.5	20	1,879,999,985	0.000015
115	126.5	20	1,879,999,985	0.000015
EndPoint	85.0	20	1,879,999,980	0.000020



Uplink-LTE

Operating Frequency :	1,880,000,000	
Channel :	600	
Reference Voltage :	110.00	VAC
Deviation Limit :	0.00010	

Voltage (%)	Power (VAC)	Temperature (°C)	Frequency (Hz)	Deviation
100	110.0	+20 °C (Ref)	1,879,999,995	0.000000
100		-30	1,879,999,990	0.000001
100		-20	1,879,999,990	0.000001
100		-10	1,879,999,990	0.000001
100		0	1,879,999,985	0.000001
100		10	1,879,999,990	0.000001
100		20	1,879,999,995	0.000000
100		25	1,879,999,995	0.000001
100		30	1,879,999,985	0.000001
100		40	1,879,999,990	0.000001
100		50	1,879,999,990	0.000001
100		60	1,879,999,990	0.000001
85	93.5	20	1,879,999,985	0.000002
115	126.5	20	1,879,999,990	0.000001
EndPoint	85.0	20	1,879,999,995	0.000001



Uplink-LTE

Operting Frequency :	1,880,000,000	
Channel :	600	
Reference Voltage :	110.00	VAC
Deviatin Limit :	0.00010	

Voltage (%)	Power (VAC)	Temperature (℃)	Frequency (Hz)	Deviation
100	110.0	+20℃ (Ref)	1,879,999,995	0.000000
100		-30	1,879,999,995	0.000001
100		-20	1,879,999,990	0.000001
100		-10	1,879,999,995	0.000001
100		0	1,879,999,990	0.000001
100		10	1,879,999,990	0.000001
100		20	1,879,999,995	0.000000
100		25	1,879,999,990	0.000001
100		30	1,879,999,995	0.000001
100		40	1,879,999,990	0.000001
100		50	1,879,999,985	0.000001
100		60	1,879,999,985	0.000001
85	93.5	20	1,879,999,995	0.000002
115	126.5	20	1,879,999,990	0.000001
EndPoint	85.0	20	1,879,999,995	0.000001



9. Spurious and Harmonic Emission at Antenna Terminal(G band)

9.1 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the 1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

22.917(f): Mobile emission in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed -80dBm at the transmit antenna connector.

9.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2011-09-09
Spectrum Analyzer	Agilent	E4402B	2012-02-24
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	2012-02-15
Signal Generator	HP	E4432B	2012-02-24

9.3 Test Results (Uplink)

(Spurious Emission: Band Edge)-PCS_G band

Channel	Frequency	Result	Limit	Margin
1275	1913.75	-45.81	-13.00	32.81

(Spurious Emission: Out of Band)-PCS_G band

Channel	Frequency	Result	Limit	Margin
1275	1913.75	-46.06	-13.00	33.06



9.3 Test Results (Downlink)

(Spurious Emission: Band Edge)-PCS_G band

Channel	Frequency	Result	Limit	Margin
1275	1993.75	-49.93	-13.00	36.93

(Spurious Emission: Out of Band)-PCS_G band

Channel	Frequency	Result	Limit	Margin
1275	1993.75	-45.66	-13.00	32.66

9.3 Test Results (Uplink)

(Spurious Emission: Band Edge)-PCS for LTE_G band

Channel	Frequency	Result	Limit	Margin
1250	1912.50	-31.02	-13.00	18.02

(Spurious Emission: Out of Band)-PCS for LTE_G band

Channel	Frequency	Result	Limit	Margin
1250	1912.50	-46.47	-13.00	33.47

9.3 Test Results (Downlink)

(Spurious Emission: Band Edge)-PCS for LTE_G band

Channel	Frequency	Result	Limit	Margin
1250	1992.50	-29.32	-13.00	16.32

(Spurious Emission: Out of Band)-PCS for LTE_G band

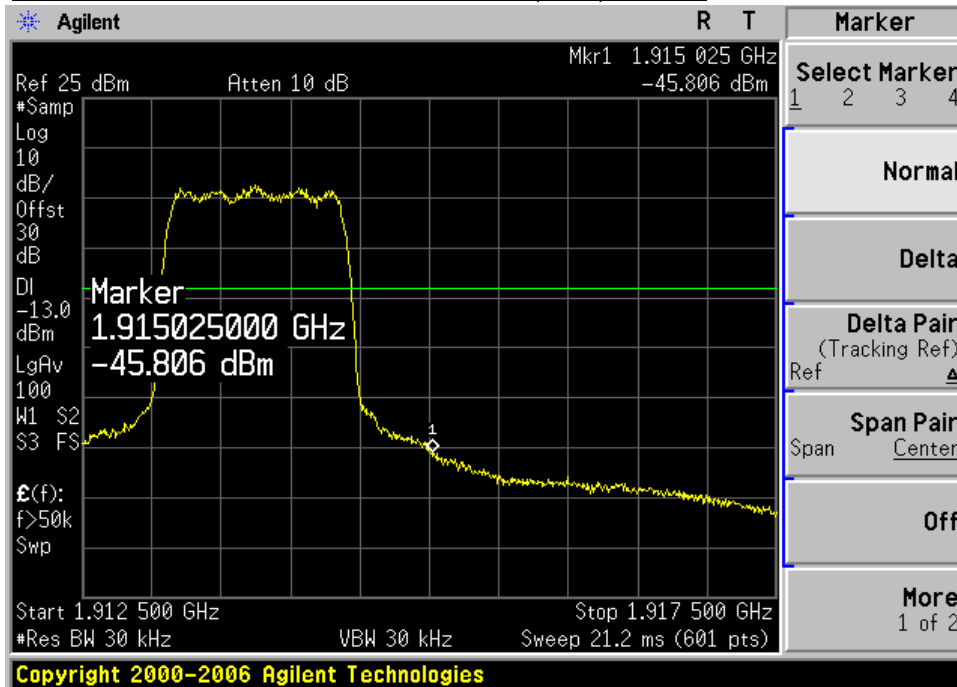
Channel	Frequency	Result	Limit	Margin
1250	1992.50	-45.98	-13.00	32.98



9.4 Test Plot

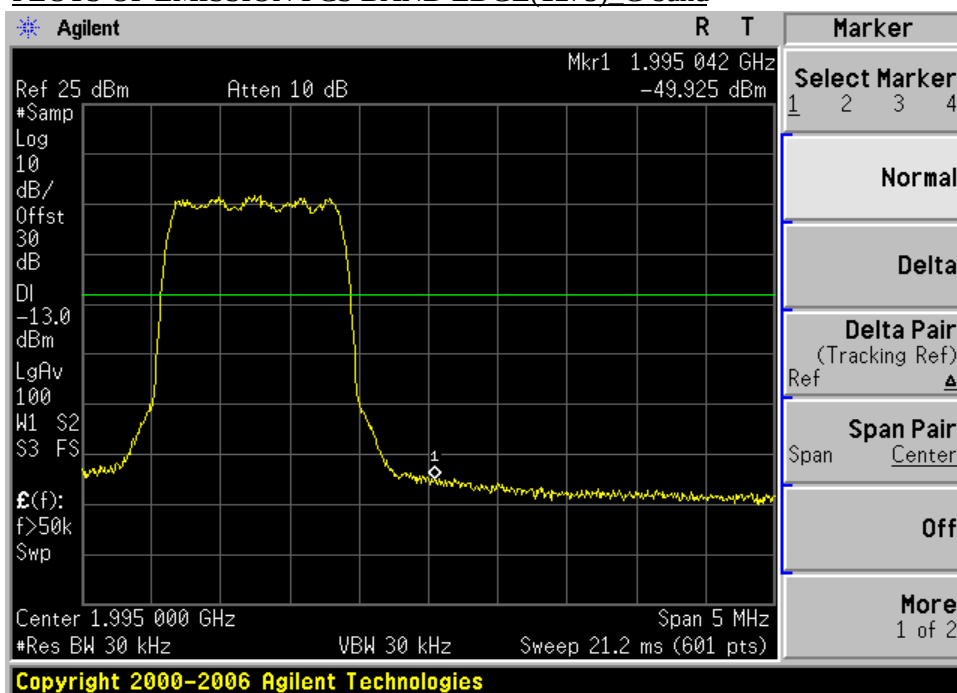
Uplink

PLOTS OF EMISSION PCS BAND EDGE(1275) G band



Downlink

PLOTS OF EMISSION PCS BAND EDGE(1275) G band

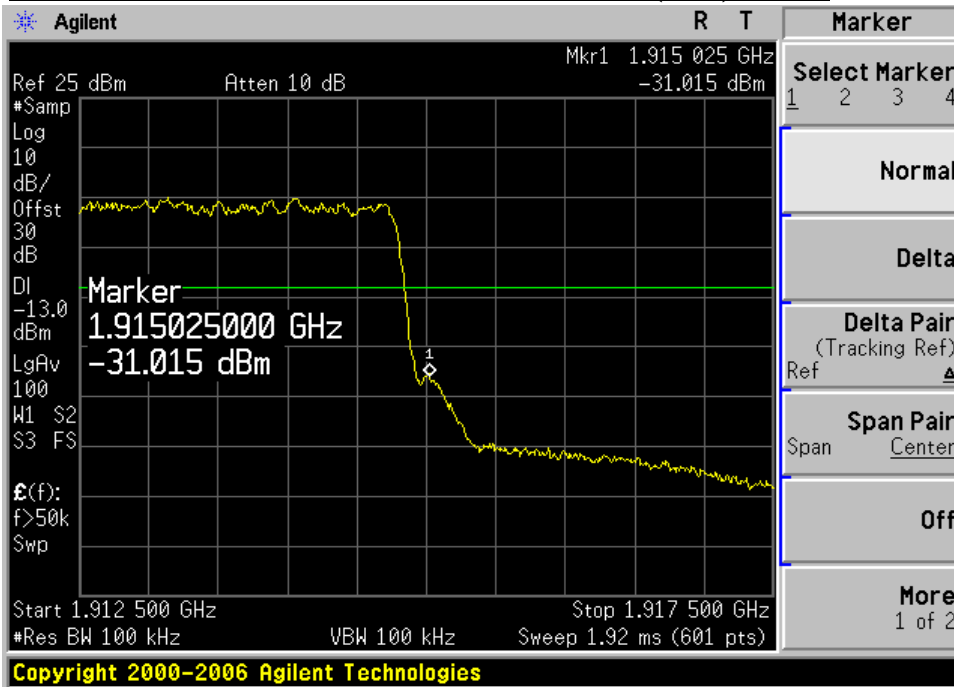




9.4 Test Plot

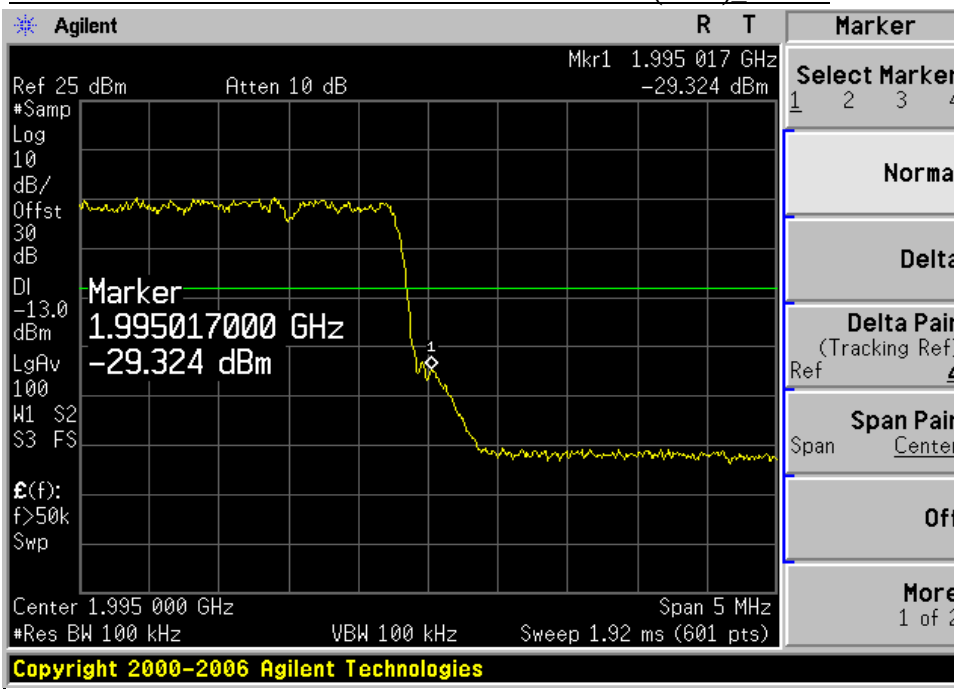
Uplink

PLOTS OF EMISSION PCS FOR LTE BAND EDGE(1250) _G band



Downlink

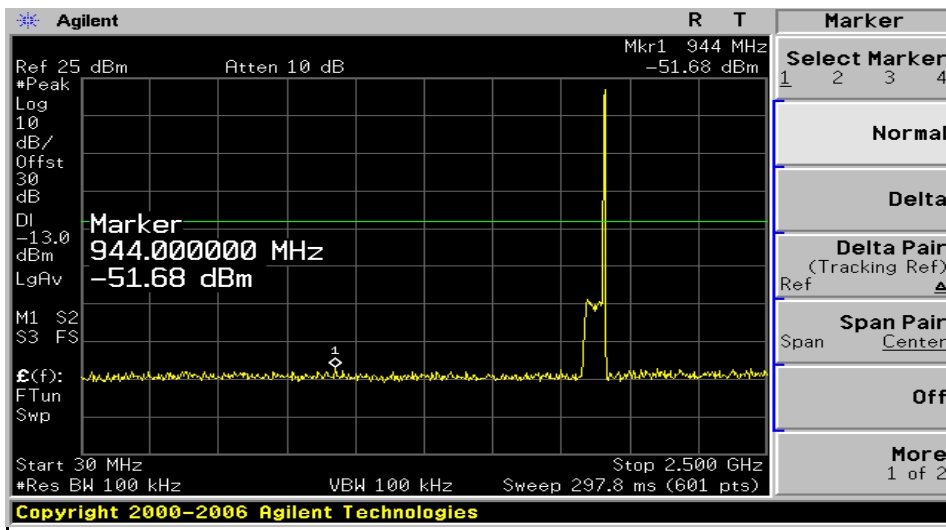
PLOTS OF EMISSION PCS FOR LTE BAND EDGE(1250) _G band



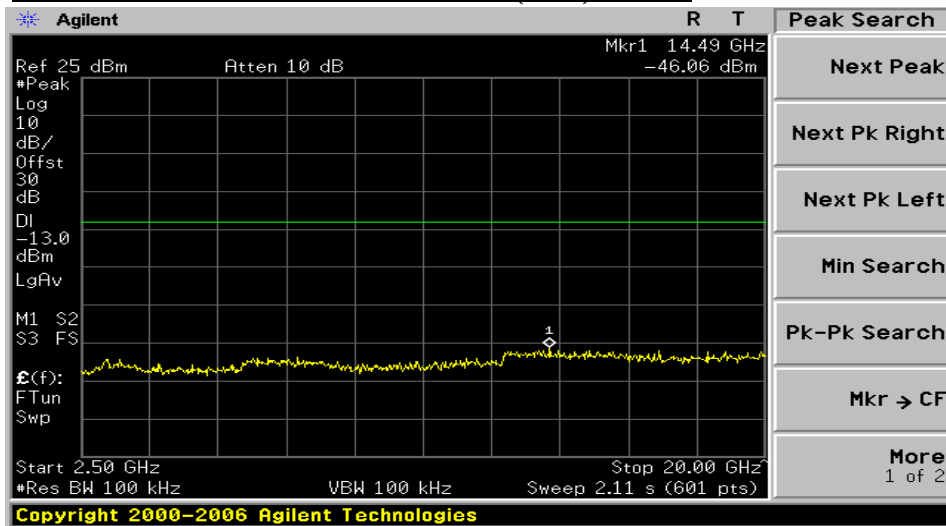


Uplink

PLOTS OF EMISSION PCS Out of Band (1275) .G band

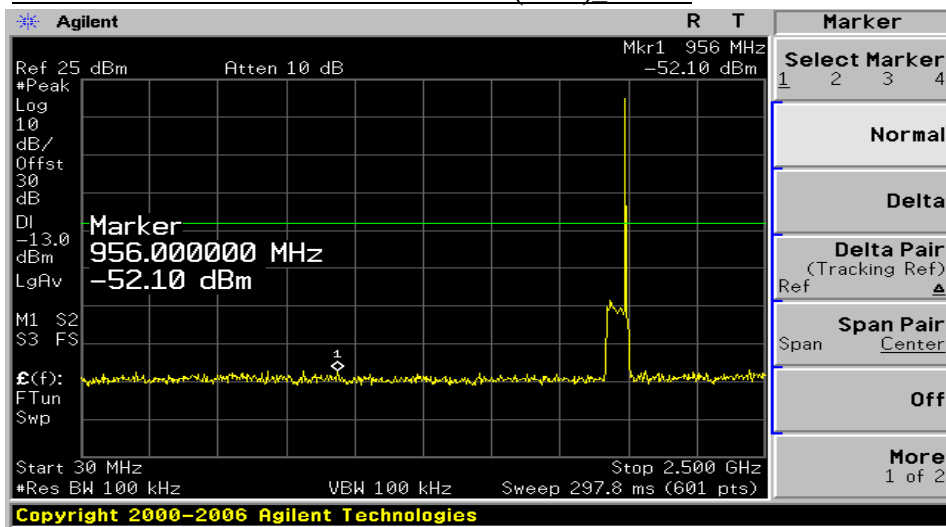


PLOTS OF EMISSION PCS Out of Band (1275) .G band



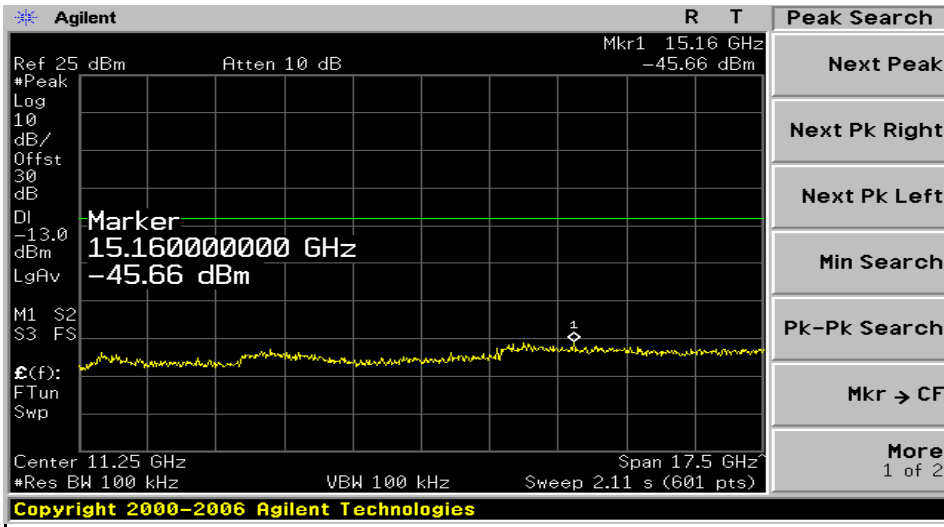
Downlink

PLOTS OF EMISSION PCS Out of Band (1275) .G band





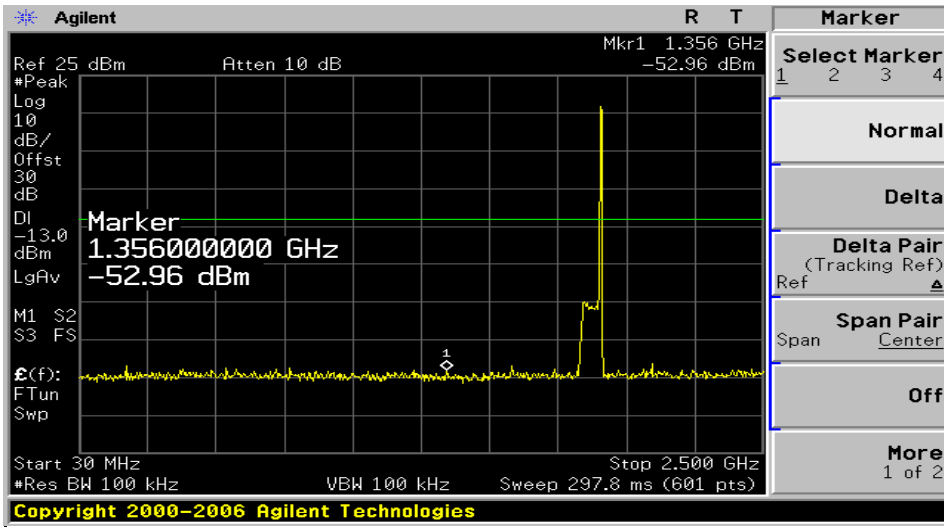
PLOTS OF EMISSION PCS Out of Band (1275) G band



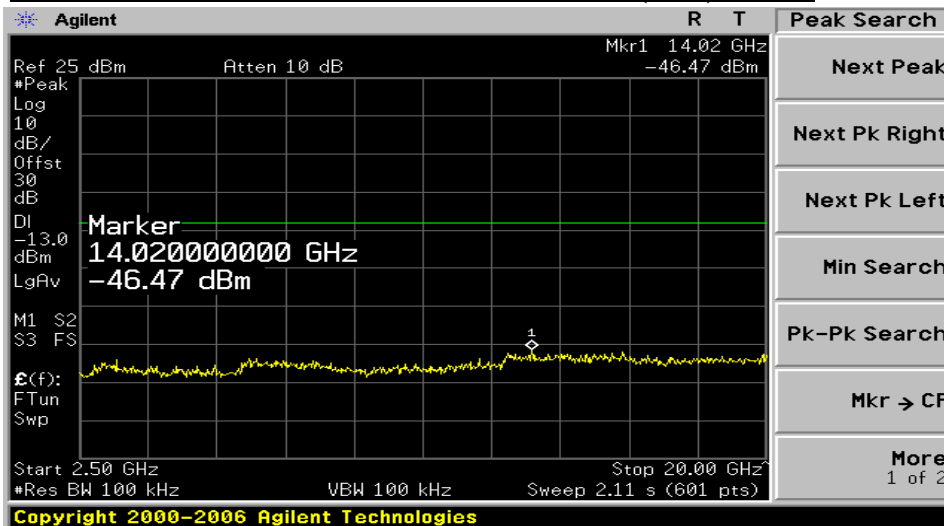


Uplink

PLOTS OF EMISSION PCS FOR LTE Out of Band (1250) G band

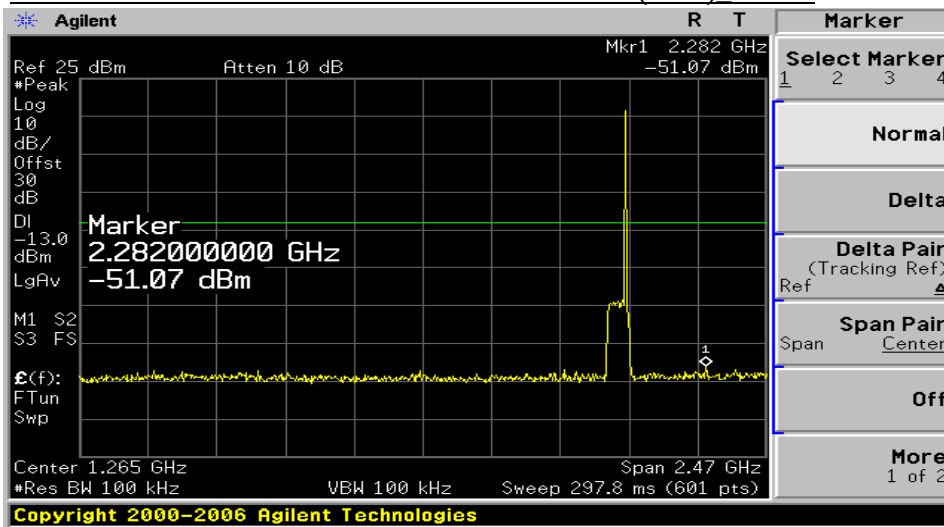


PLOTS OF EMISSION PCS FOR LTE Out of Band (1250) G band



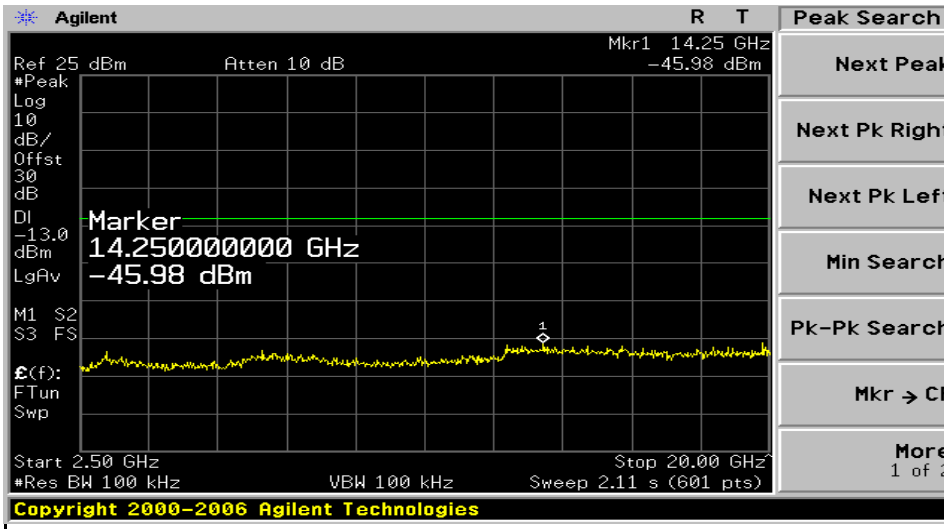
Downlink

PLOTS OF EMISSION PCS FOR LTE Out of Band (1250) G band





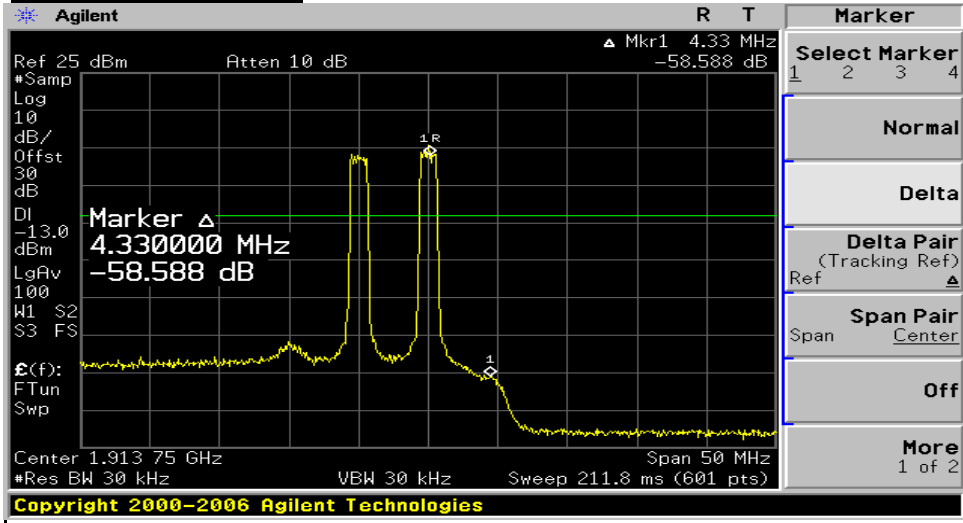
PLOTS OF EMISSION PCS FOR LTE Out of Band (1250) G band



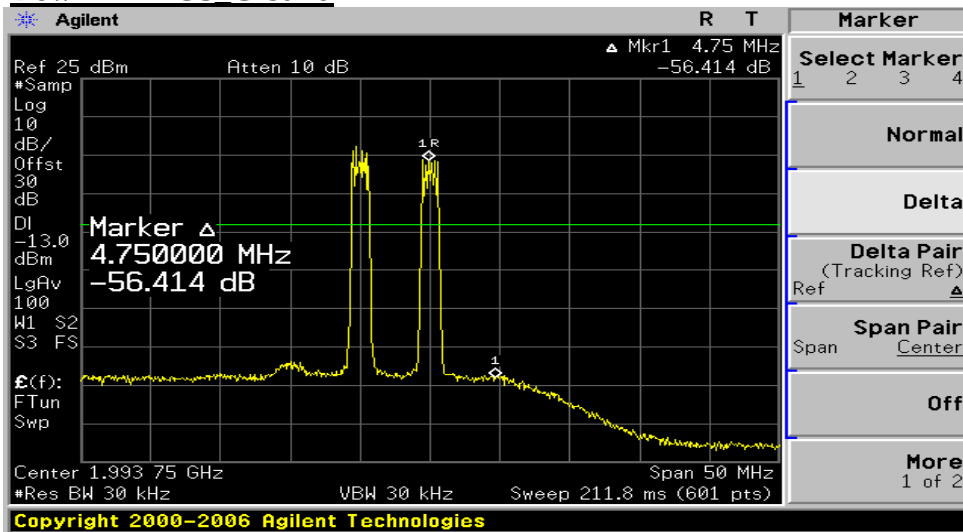


Inter-modulation Signal

Uplink -PCS G band



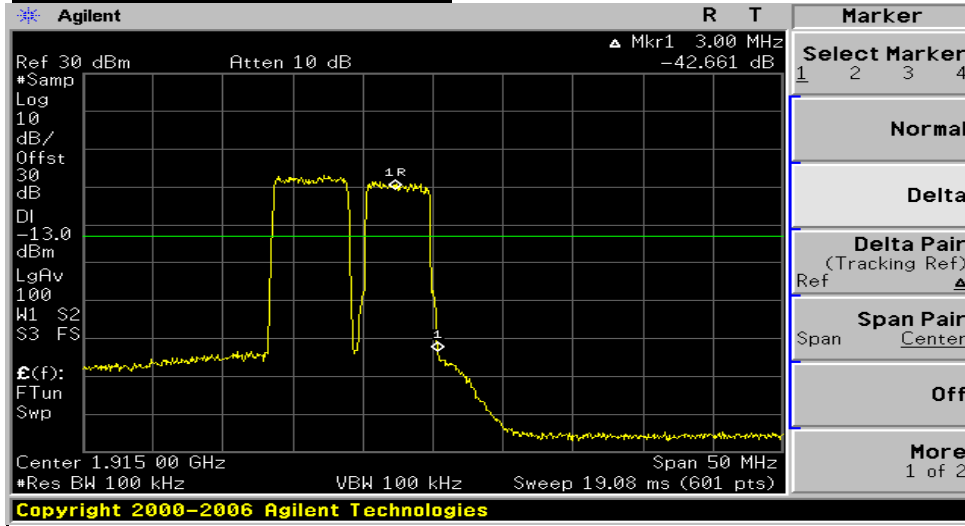
Downlink-PCS G band





Inter-modulation Signal

Uplink -PCS FOR LTE G band



Downlink-PCS FOR LTE G band

