FCC Part 90
Measurement and Test Report

For

KZ Broadband Technologies, Ltd.

1601 Tower C, Skyworth Building,High-tech Industrial Park,Nanshan District, Shenzhen, China

FCC ID: A28AM4000DB43

FCC Rules:	FCC Part 90Z
Product Description:	LTE Outdoor CPE
Tested Model:	AirMaster 4000D B43
Report No.:	STR16048224I-1
Tested Date:	2016-05-09 to 2016-07-30
Issued Date:	2016-08-01
Tested By:	Iven Guo / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C.（518101）
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	KZ Broadband Technologies, Ltd.
Address of applicant:	1601 Tower C, Skyworth Building, High-tech Industrial Park, Nanshan District, Shenzhen, China
Manufacturer:	KZ Broadband Technologies, Ltd.
Address of manufacturer:	1601 Tower C, Skyworth Building, High-tech Industrial Park, Nanshan District, Shenzhen, China

General Description of EUT	
Product Name:	LTE Outdoor CPE
Trade Name:	AirMaster
Model No.:	AirMaster 4000D B43
Adding Model(s):	GLC130D-43, GWG130WV, AirMaster 4000M B43, AM4000D XXX, AM4000M XXX, AM4000W XXX
IMEI:	864423020276464
Rated Voltage:	DC 24V/0.5A by PoE port
Power Adaptor:	Model: G0549-240-050
	INPUT: AC100-240V 50/60Hz OUTPUT: DC24V/0.5A
Device Category:	Fixed
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model AirMaster 4000D B43 but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Support Band:	3650-3700MHz
Channel Bandwidth:	5MHz, 10MHz, 15MHz, 20MHz
Frequencies Range:	5MHzBandwidth: 3652.5~3697.5MHz 10MHzBandwidth: 3655~3695MHz 15MHzBandwidth: 3657.5~3692.5MHz 20MHzBandwidth: 3660~3690MHz
Type of Modulation:	OFDM (Worst Case QPSK)
Type of Emission:	5M0X1D, 10M0X1D, 15M0X1D, 20M0X1D
Type of Antenna:	Integral Antenna
Antenna Gain:	15 dBi

1.2 Test Standards

The following report is prepared on behalf of the KZ Broadband Technologies, Ltd. in accordance with FCC Part 2 subpart J, FCC Part 90 Z of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 90 Z of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standards and measurement guide as the below table:

Description	Procedure	Note
Transmitter Output Power and Power Density	FCC Publication KDB 971168 D01 v02r02 section 5.2.2	1
Emission Bandwidth	FCC Publication KDB 971168 D01 v02r02 section 4.2	1
Spurious Emissions at Antenna Terminal	FCC Publication KDB 971168 D01 v02r02 section 6	1
Spurious Radiation Emissions	FCC Publication KDB 971168 D01 v02r02 section 7	2
Out of Band Edges	FCC Publication KDB 971168 D01 v02r02 section 7	1
Frequency Stability	FCC Publication KDB 971168 D01 v02r02 section 9	1

Note 1: RF conducted measurement.
Note 2: Radiated emission measurement.

1.4 Test Facility

- **FCC – Registration No.: 934118**
  Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

- **Industry Canada (IC) Registration No.: 11464A**
  The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

- **CNAS Registration No.: L4062**
  Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	5MHzBandwidth	3652.5, 3675, 3697.5MHz
TM2	10MHzBandwidth	3655, 3675, 3695MHz
TM3	15MHzBandwidth	3657.5,3675, 3692.5MHz
TM4	20MHzBandwidth	3660, 3690MHz

Only tested QPSK modulation mode as determined worst case by manufacturer.
Only tested output port A (antenna 1) as determined worst case by manufacturer.

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Power Cable	0.8	Unshielded	Without Core
RJ45	2.0	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
PC	DELL	OPTIPLEX 380	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Radiated	±5.1dB
Transmitter Spurious Emissions	Conducted	±0.42dB

1.7 Test Equipment List and Details

Kind of Equipment	Manufacturer	Type	S/N	Cal Date	Due Date
Equipment list of < Shenzhen SEM.Test Technology Co., Ltd.>					
Spectrum Analyzer	Agilent	E4407B	MY41440400	2016-06-17	2017-06-16
Spectrum Analyzer	Agilent	N9020A	US47140102	2016-06-17	2017-06-16
Signal Generator	Agilent	83752A	3610A01453	2016-06-17	2017-06-16
Vector Signal Generator	Agilent	N5182A	MY47070202	2016-06-17	2017-06-16
Power Divider	Weinschel	1506A	PM204	2016-06-17	2017-06-16
Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2016-06-17	2017-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2016-06-17	2017-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-17	2017-06-16
Amplifier	Agilent	8447F	3113A06717	2016-06-17	2017-06-16
Amplifier	C&D	PAP-1G18	2002	2016-06-17	2017-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-17	2017-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-17	2017-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-332	2016-06-17	2017-06-16
Horn Antenna	ETS	3117	00086197	2016-06-17	2017-06-16
Horn Antenna	ETS	3117	00086168	2016-06-17	2017-06-16
Horn Antenna	ETS	3116B	00088203	2016-06-17	2017-06-16
Horn Antenna	ETS	3116B	00088221	2016-06-17	2017-06-16

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307	RF Exposure	Compliant
§ 90.1321, § 2.1046	Transmitter Output Power and Power Density	Compliant
§ 90.209, § 2.1049	Emission Bandwidth	Compliant
§ 90.1323, § 2.1051	Spurious Emissions at Antenna Terminal	Compliant
§ 90.1323, § 2.1053	Spurious Radiation Emissions	Compliant
§ 90.1323 (a), § 2.1051	Out of Band Edges	Compliant
§ 90.213, § 2.1055	Frequency Stability	Compliant
§ 90.7	Contention-based protocol	Compliant

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the MPE report.

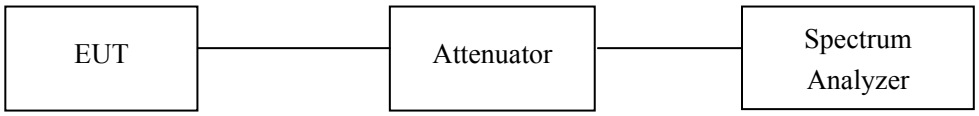
4. RF Output Power

4.1 Standard Applicable

According to §90.1321 Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

4.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per KDB 971168 D01 v02r02 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.

4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

4.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

EIRP Power

For Ant Port 0

Test Mode	Channel	EIRP/25 MHz (dBm)	FCC Part 90.1321 Limit (dBm/25MHz)	EIRP/MHz (dBm/MHz)	FCC Part 90.1321 Limit (dBm/MHz)
5MHz Bandwidth	Low Channel	33.84	36.64	28.82	30
	Middle Channel	33.24	36.64	29.22	30
	High Channel	33.93	36.64	28.69	30
10MHz Bandwidth	Low Channel	34.92	39.55	29.35	30
	Middle Channel	34.49	39.55	28.84	30
	High Channel	34.85	39.55	28.89	30
15MHz Bandwidth	Low Channel	41.16	41.30	28.75	30
	Middle Channel	41.12	41.30	29.35	30
	High Channel	40.65	41.30	29.30	30
20MHz Bandwidth	Low Channel	40.65	42.54	29.44	30
	High Channel	41.42	42.54	28.76	30

Note: limit = 44dBm + 10Log (Bandwidth/25)

EIRP=Conducted RF Power+Correction(1/x)+Antenna Gain (x means Duty Cycle)

Antenna Gain=15 dBi

For Ant Port 1

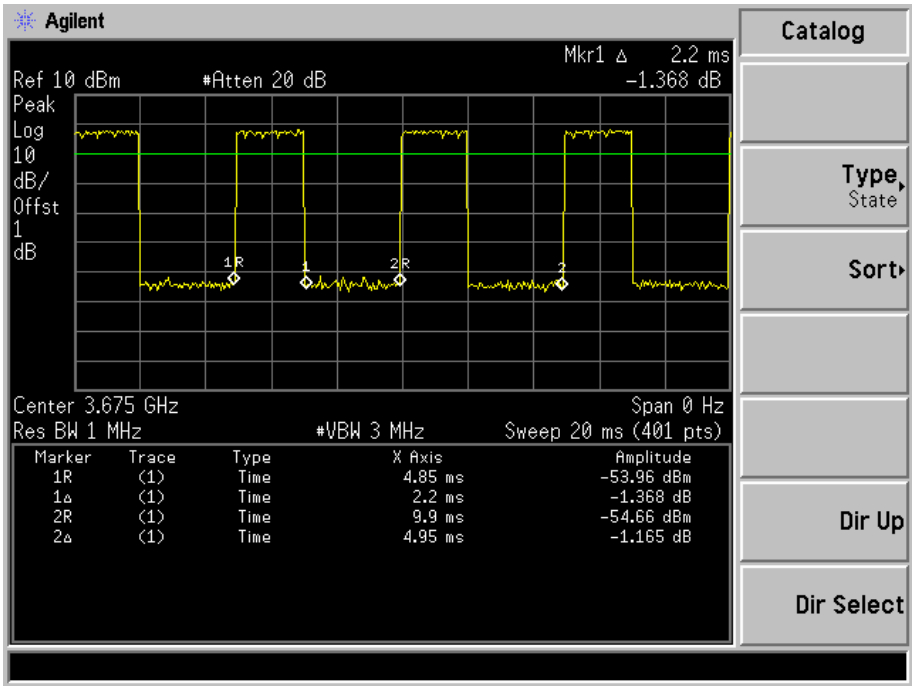
Test Mode	Channel	EIRP/25 MHz (dBm)	FCC Part 90.1321 Limit (dBm/25MHz)	EIRP/MHz (dBm/MHz)	FCC Part 90.1321 Limit (dBm/MHz)
5MHz Bandwidth	Low Channel	33.76	36.64	28.66	30
	Middle Channel	33.48	36.64	28.79	30
	High Channel	33.78	36.64	28.93	30
10MHz Bandwidth	Low Channel	34.44	39.55	28.69	30
	Middle Channel	34.59	39.55	28.62	30
	High Channel	34.90	39.55	27.93	30
15MHz Bandwidth	Low Channel	41.05	41.30	28.84	30
	Middle Channel	41.02	41.30	28.25	30
	High Channel	41.04	41.30	28.66	30
20MHz Bandwidth	Low Channel	41.29	42.54	28.93	30
	High Channel	40.85	42.54	29.32	30

Note: limit = 44dBm + 10Log (Bandwidth/25)

EIRP=Conducted RF Power+Correction(1/x)+Antenna Gain (x means Duty Cycle)

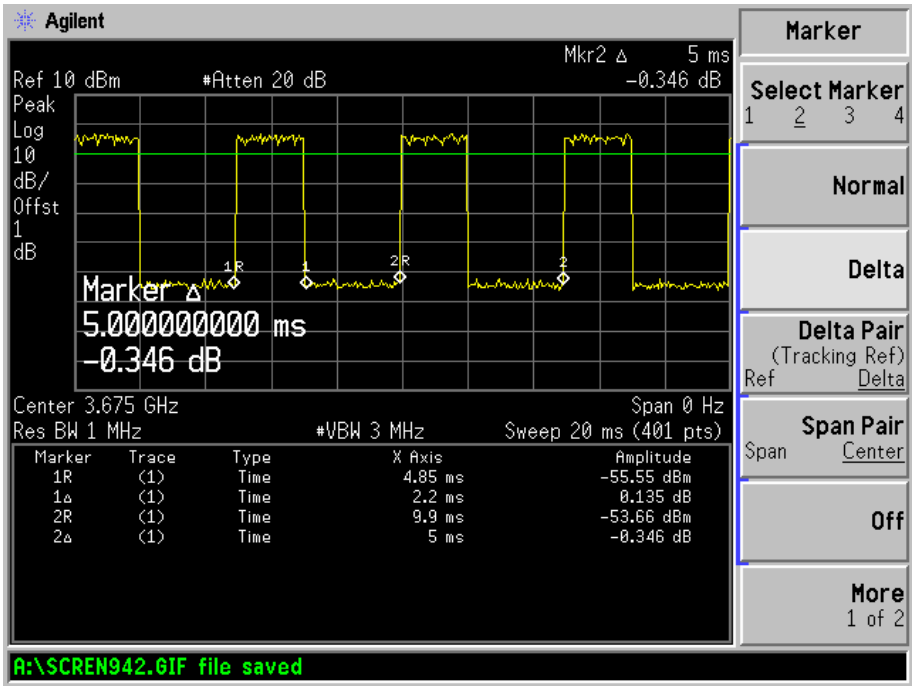
Antenna Gain=15 dBi

5MHz Bandwidth



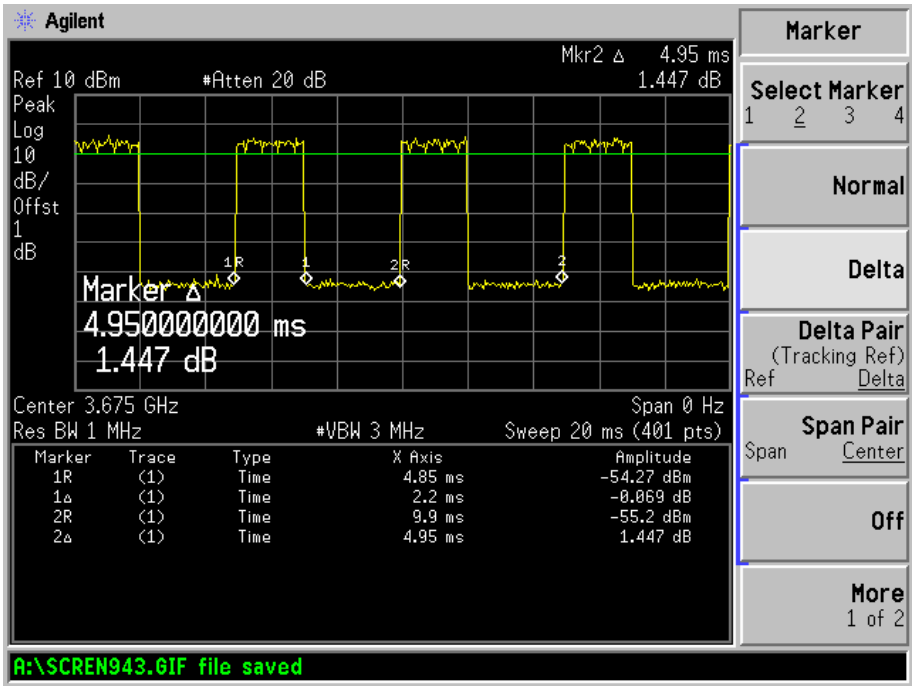
Duty cycle correction factor = 10log(1/x) = 10log (1/(2.2/4.95))=3.57 dB

10MHz Bandwidth



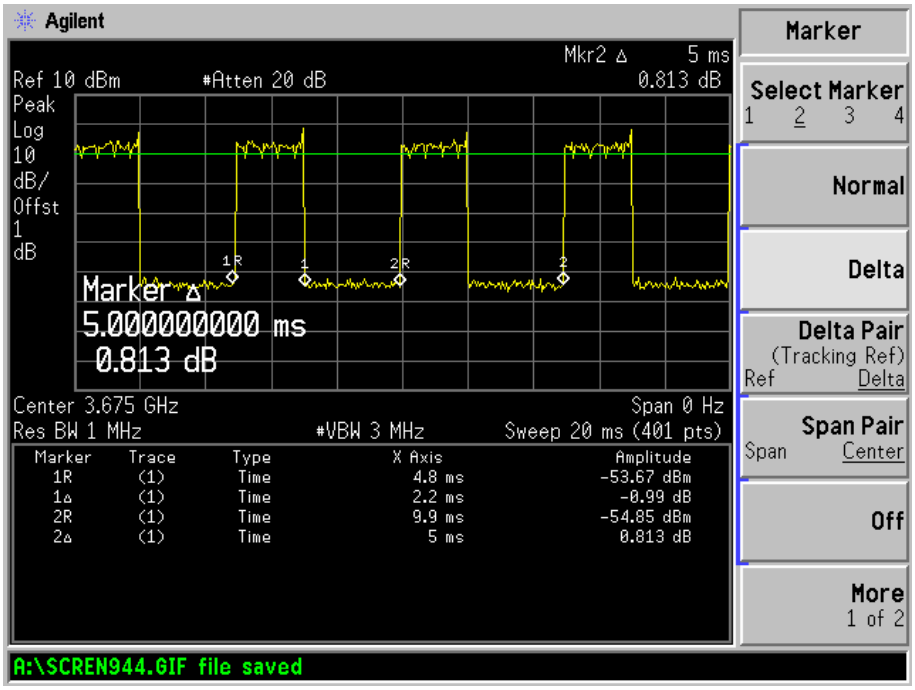
Duty cycle correction factor = 10log(1/x) = 10log(1/(2.2/5))=3.57 dB

15MHz Bandwidth



Duty cycle correction factor = 10log(1/x) = 10log(1/(2.2/4.95))=3.57 dB

20MHz Bandwidth



Duty cycle correction factor = 10log(1/x) = 10log(1/(2.2/5))=3.57 dB

5. Emission Bandwidth

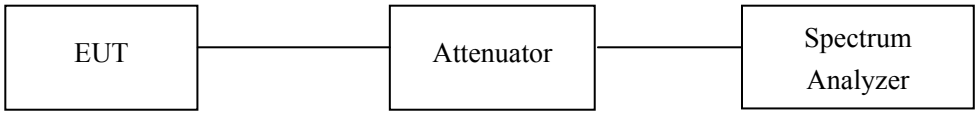
5.1 Standard Applicable

According to FCC Part 2.1049 - Occupied bandwidth
Measure the width of the emission using the 99% power bandwidth function of the spectrum analyzer

5.2 Test Procedure

KDB 971168 D01 v02r02 Power Meas License Digital Systems v02r02 4.2 Occupied bandwidth - power bandwidth (99%)

Test Configuration for the emission bandwidth testing:



5.3 Environmental Conditions

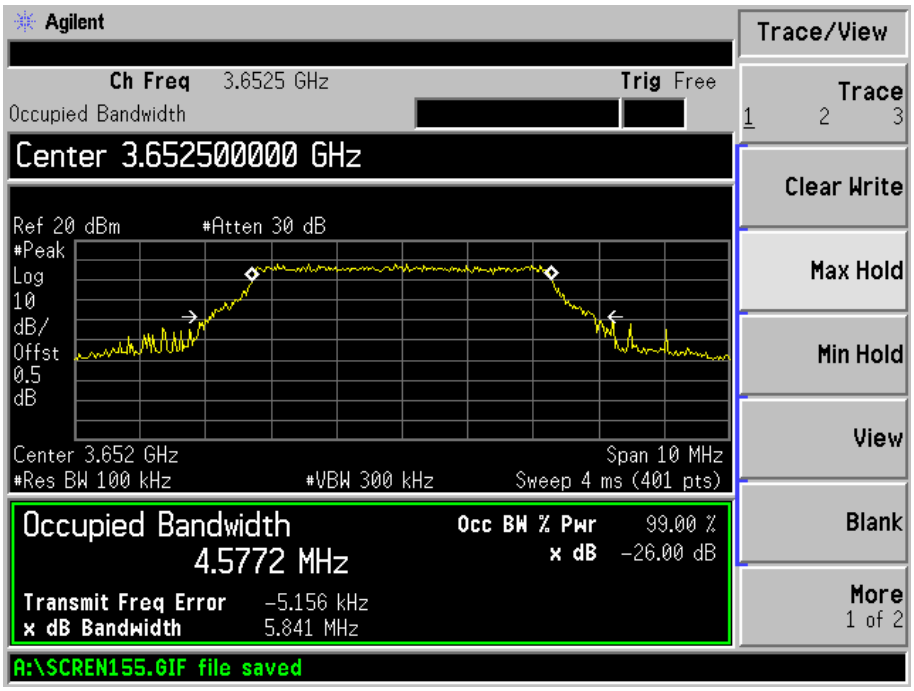
Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

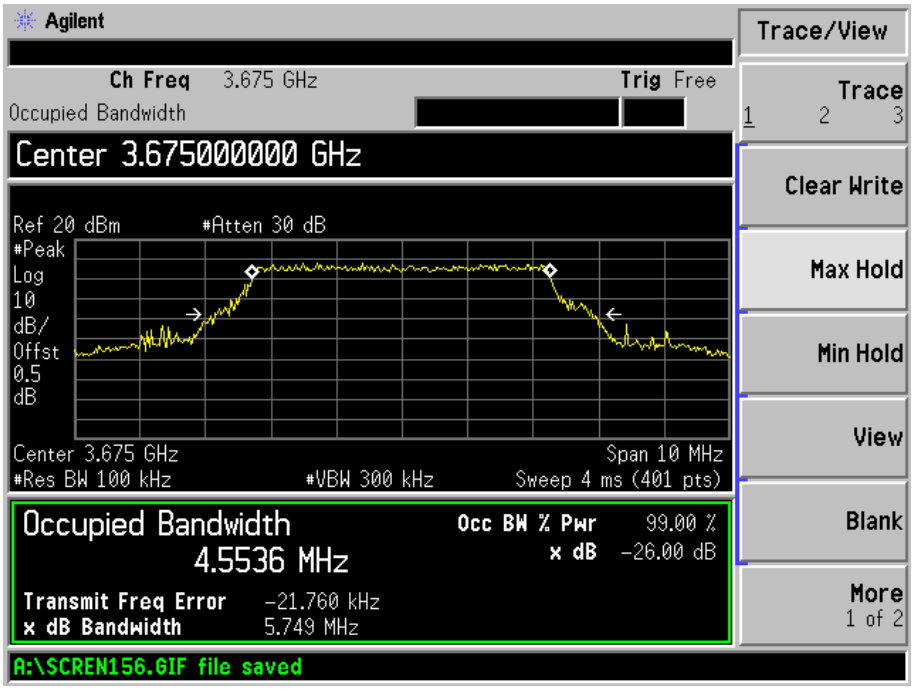
Test Mode	Channel	Occupied bandwidth Antenna Port 0	Occupied bandwidth Antenna Port 1
5MHz Bandwidth	Low Channel	4.5772	4.5632
	Middle Channel	4.5536	4.5566
	High Channel	4.5612	4.5914
10MHz Bandwidth	Low Channel	8.9431	8.9720
	Middle Channel	8.9711	8.9486
	High Channel	8.9637	8.9781
15MHz Bandwidth	Low Channel	13.4131	13.4088
	Middle Channel	13.3851	13.3802
	High Channel	13.4139	13.4212
20MHz Bandwidth	Low Channel	17.8675	17.8326
	High Channel	17.8727	17.8721

Only tested QPSK modulation mode as determined worst case by manufacturer

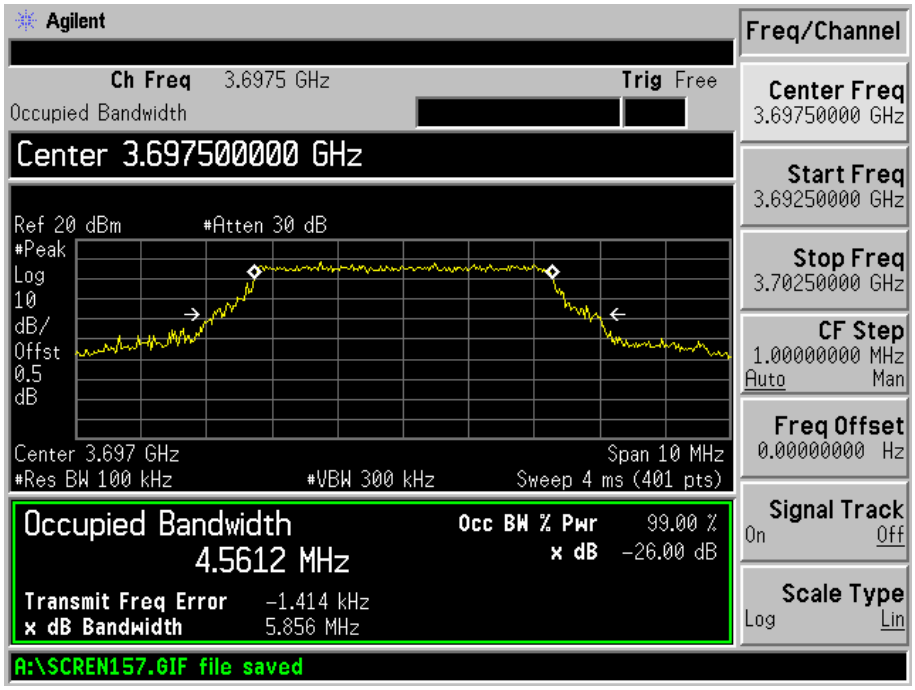
Ant Port 0
5MHz Bandwidth
Low Channel



Middle Channel

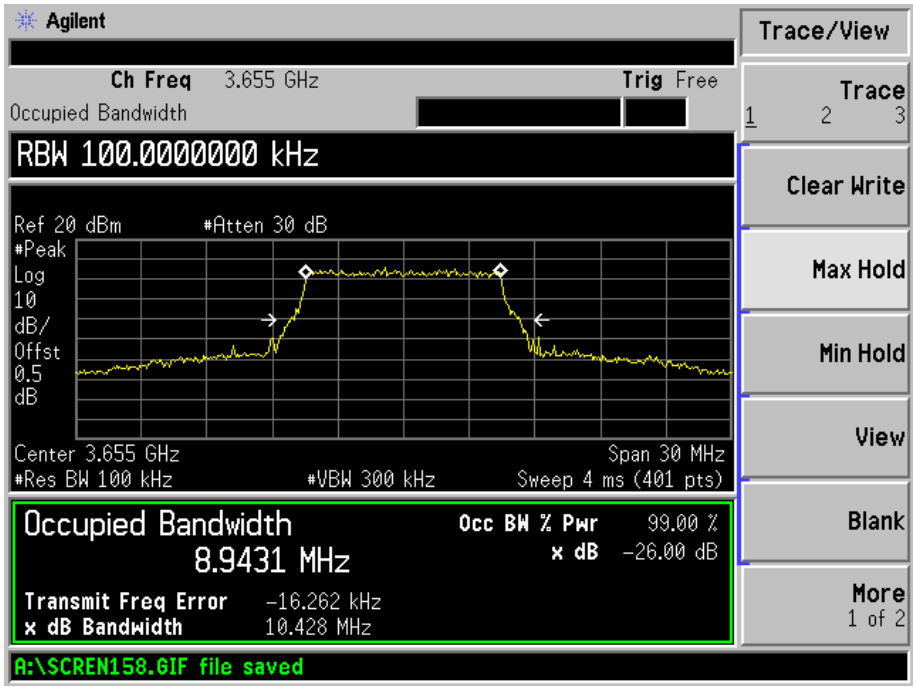


High Channel

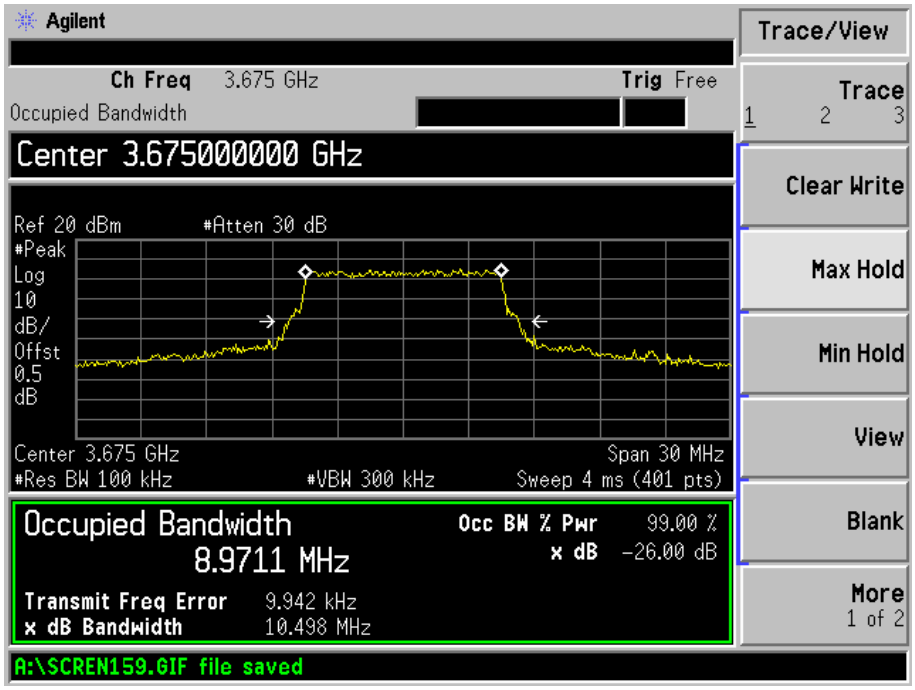


10MHz Bandwidth

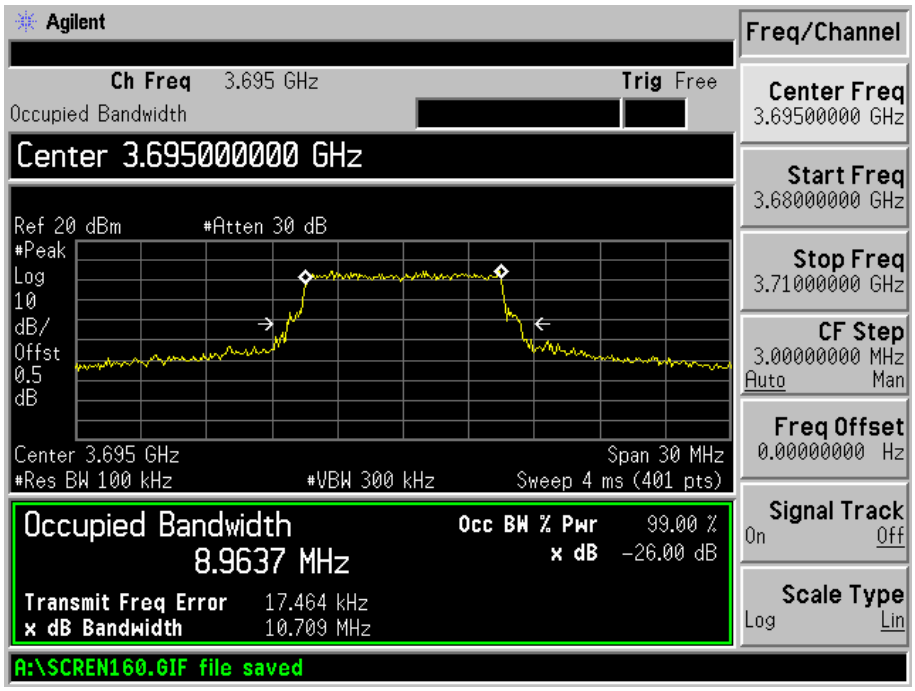
Low Channel



Middle Channel

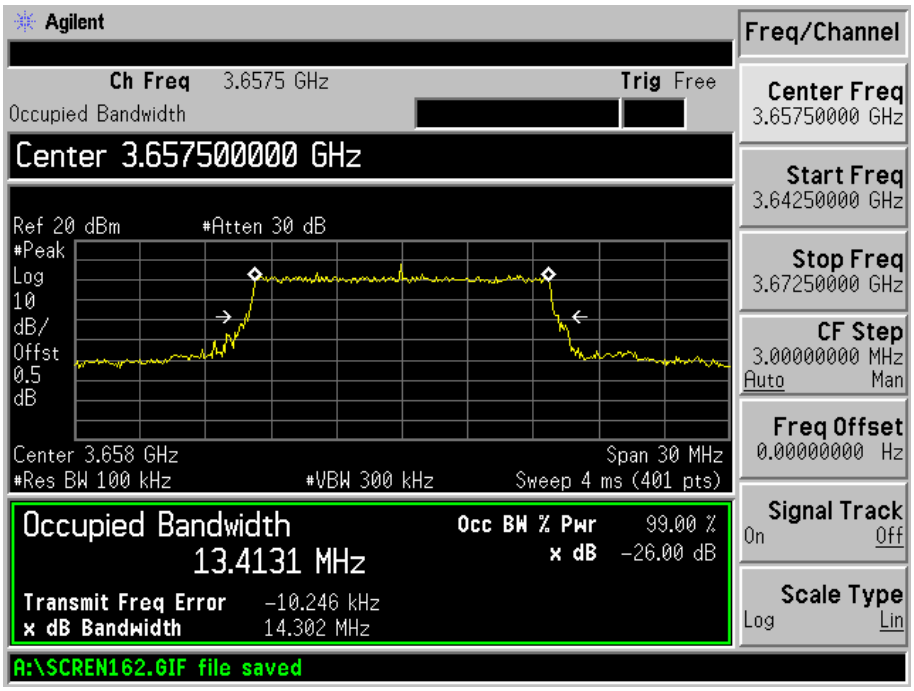


High Channel

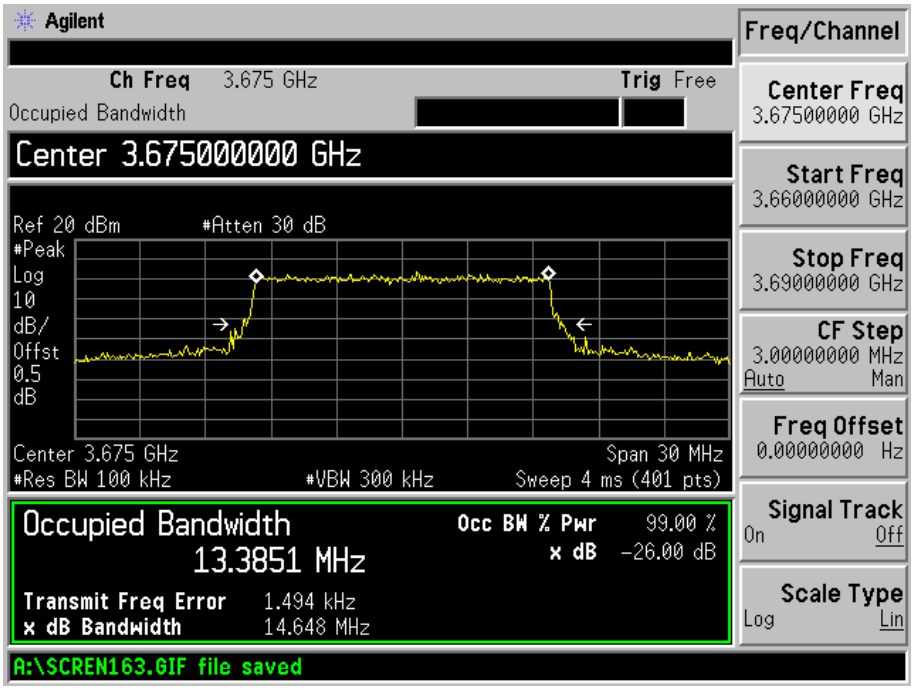


15MHz Bandwidth

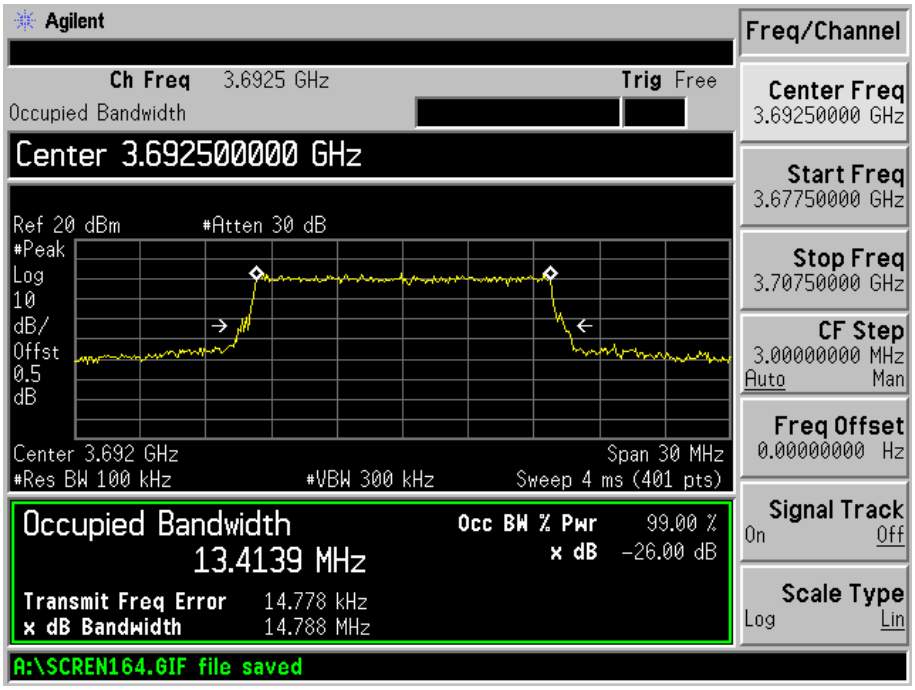
Low Channel



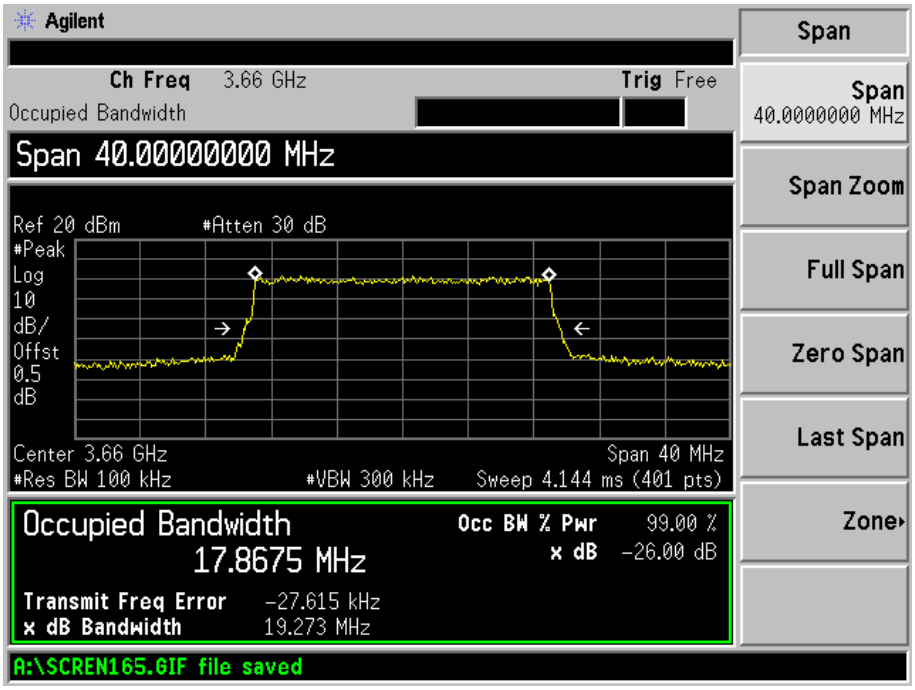
Middle Channel



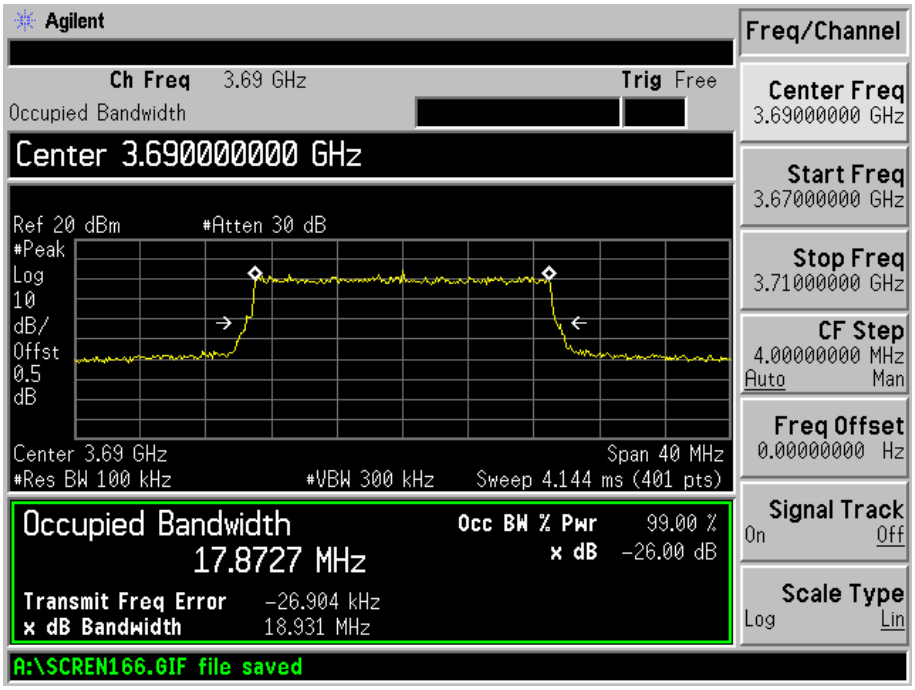
High Channel



20MHz Bandwidth Low Channel



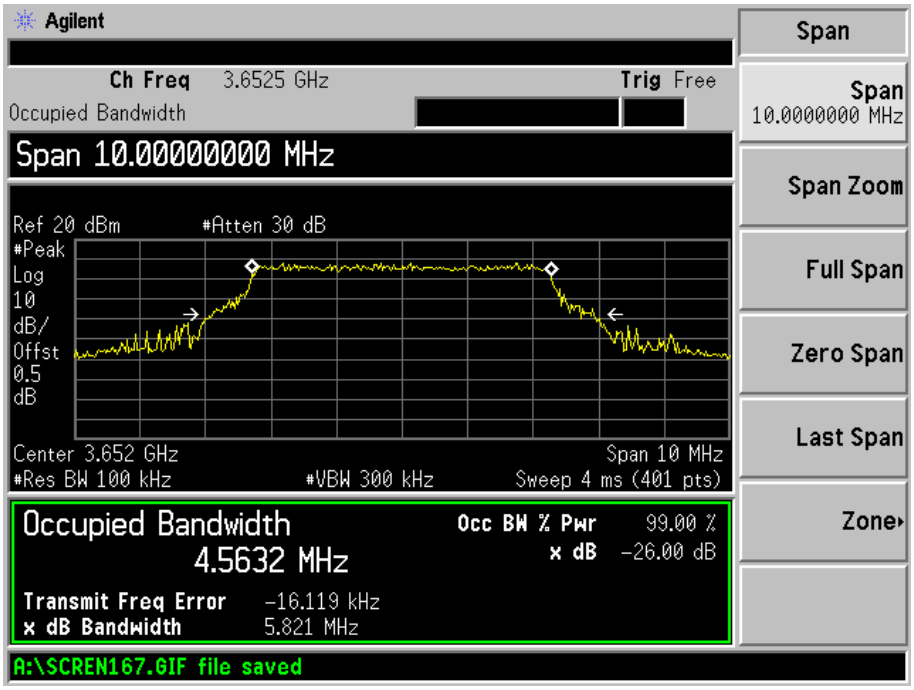
High Channel



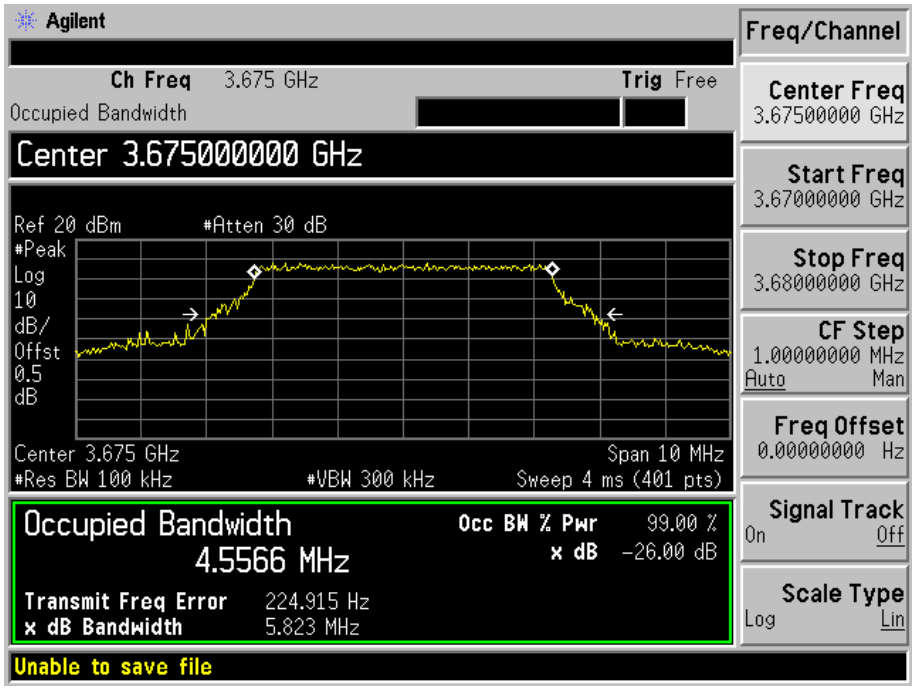
Ant Port 1

5MHz Bandwidth

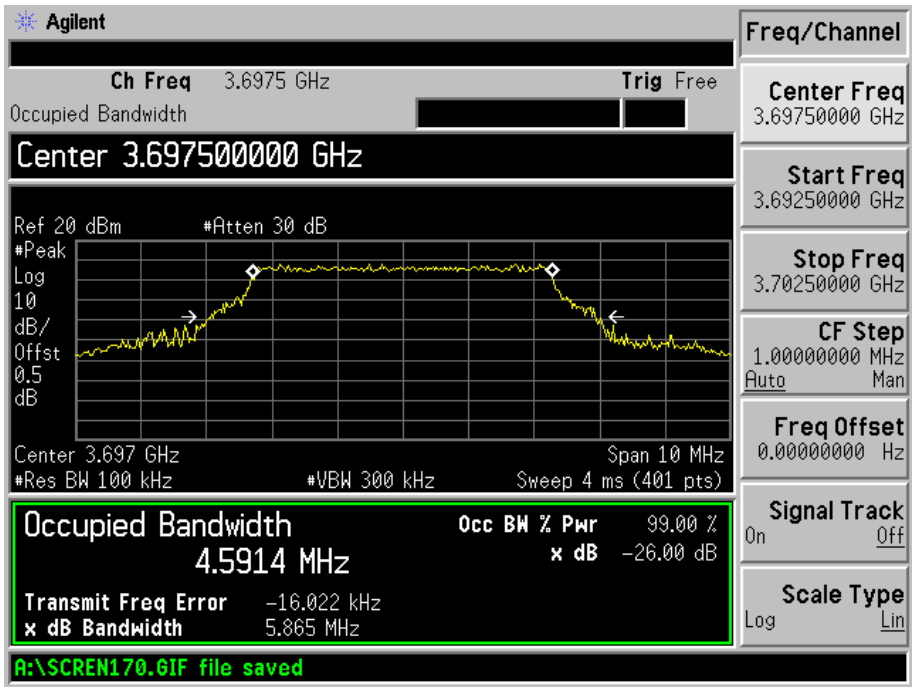
Low Channel



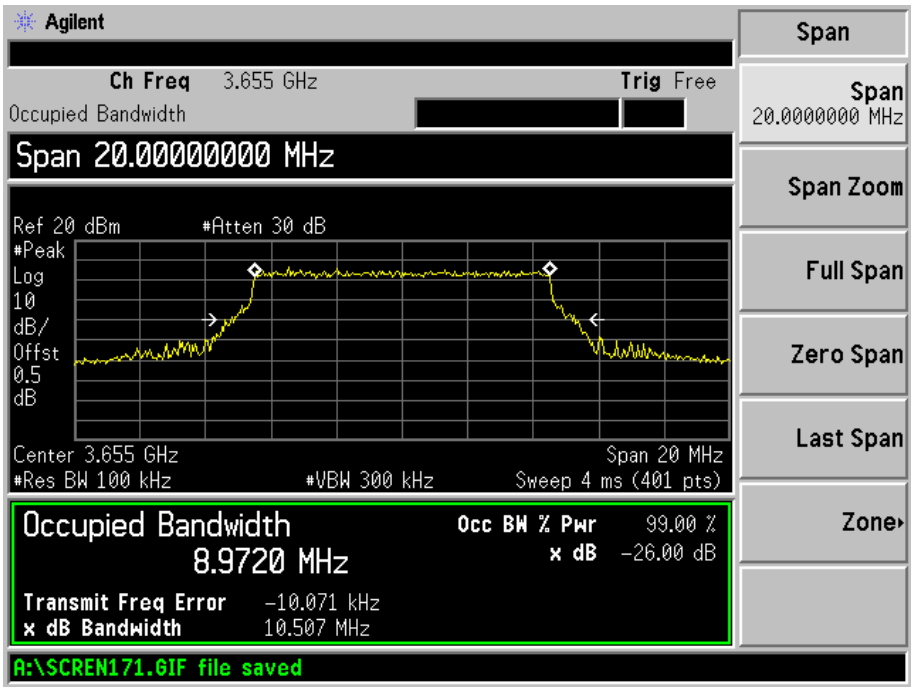
Middle Channel



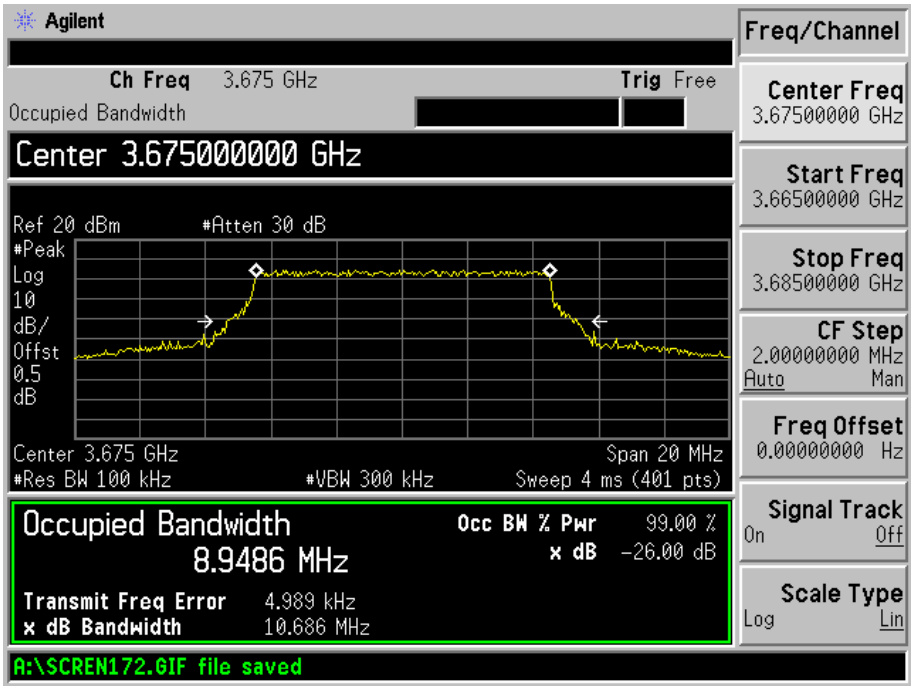
High Channel



10MHz Bandwidth
Low Channel



Middle Channel



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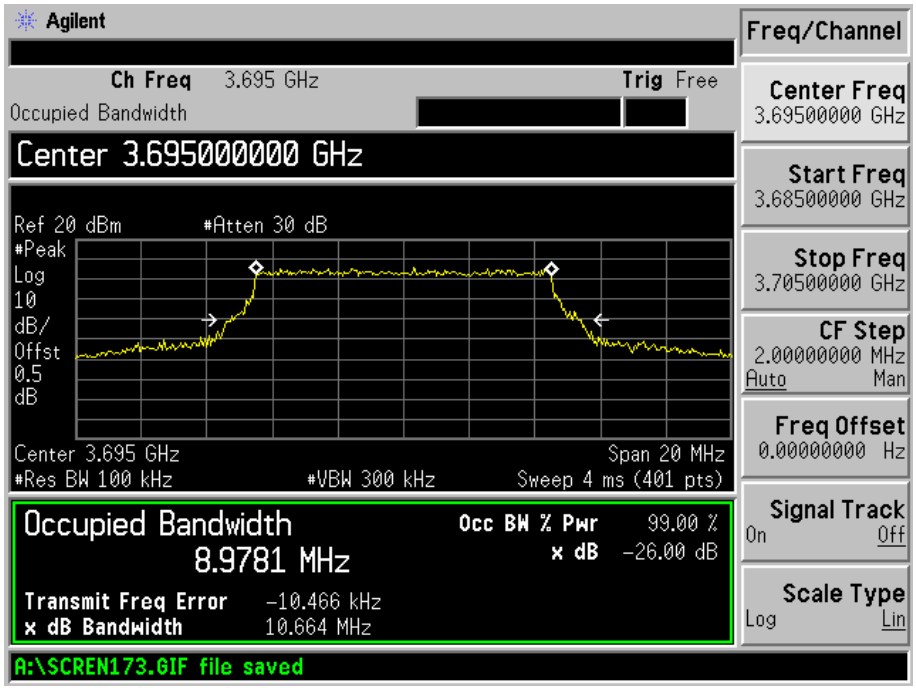
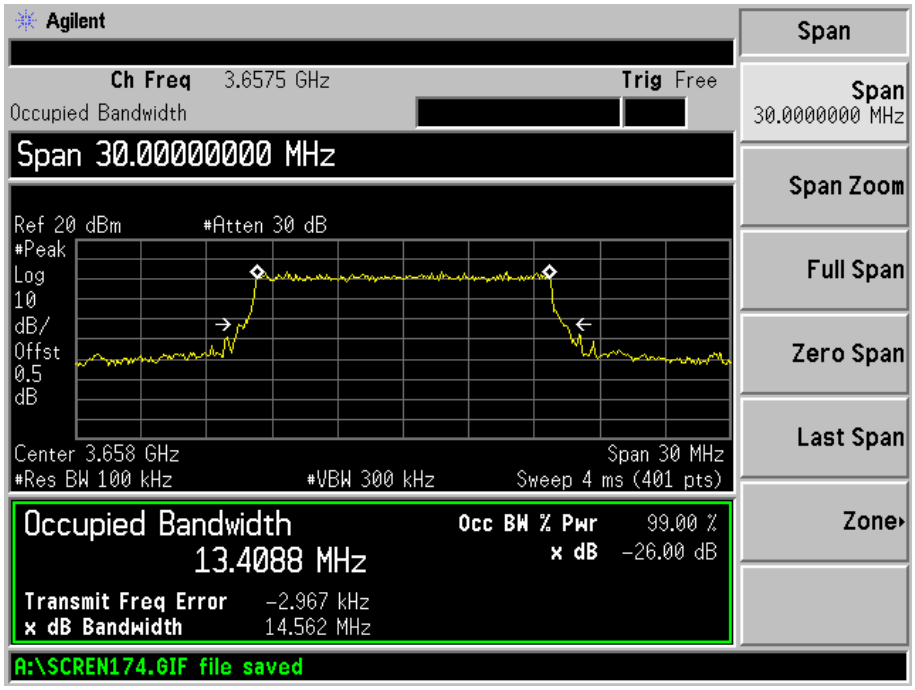
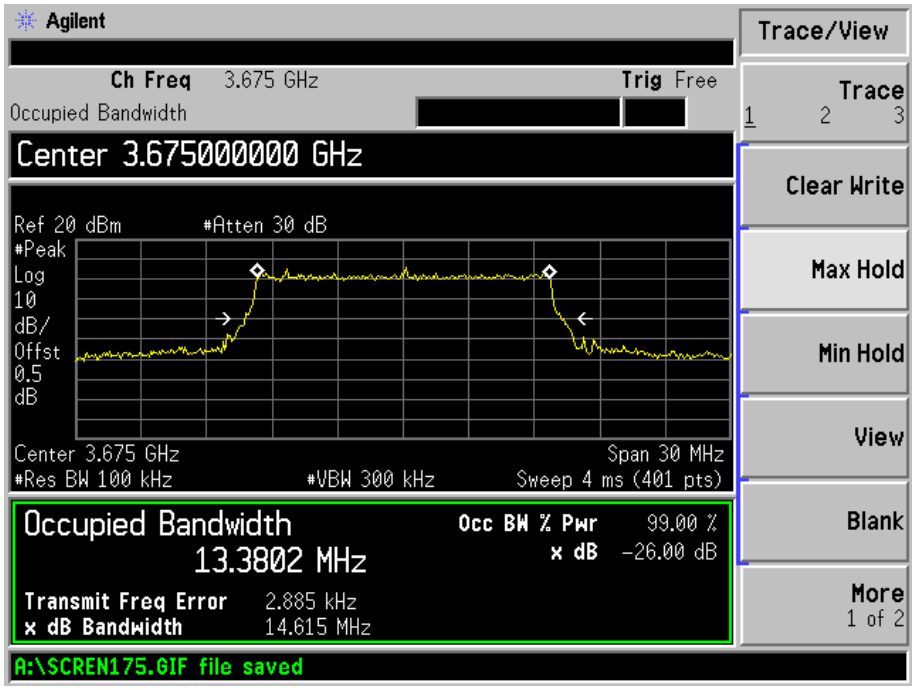


15MHz Bandwidth

Low Channel



Middle Channel



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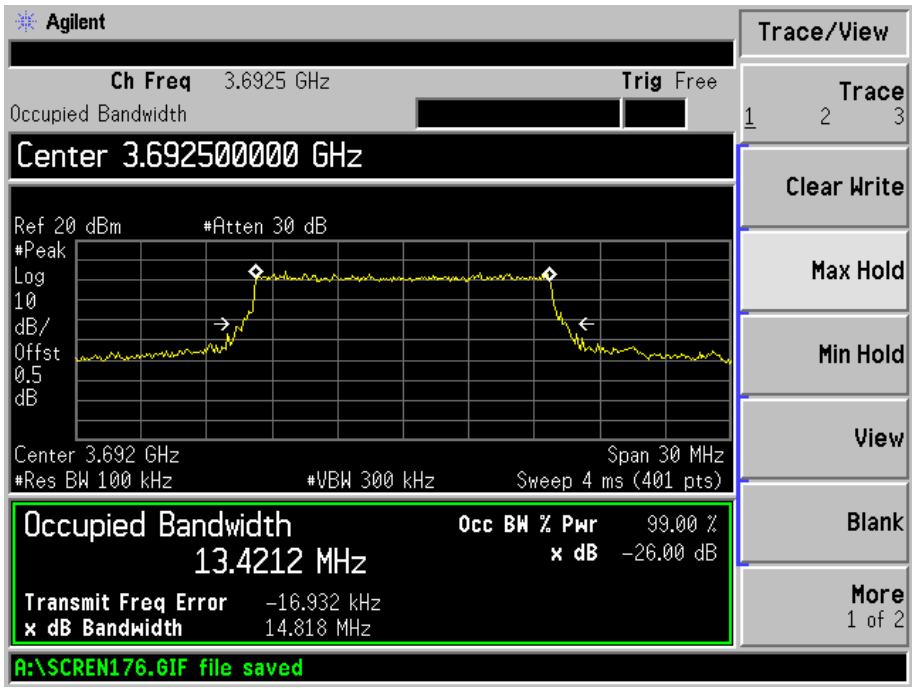
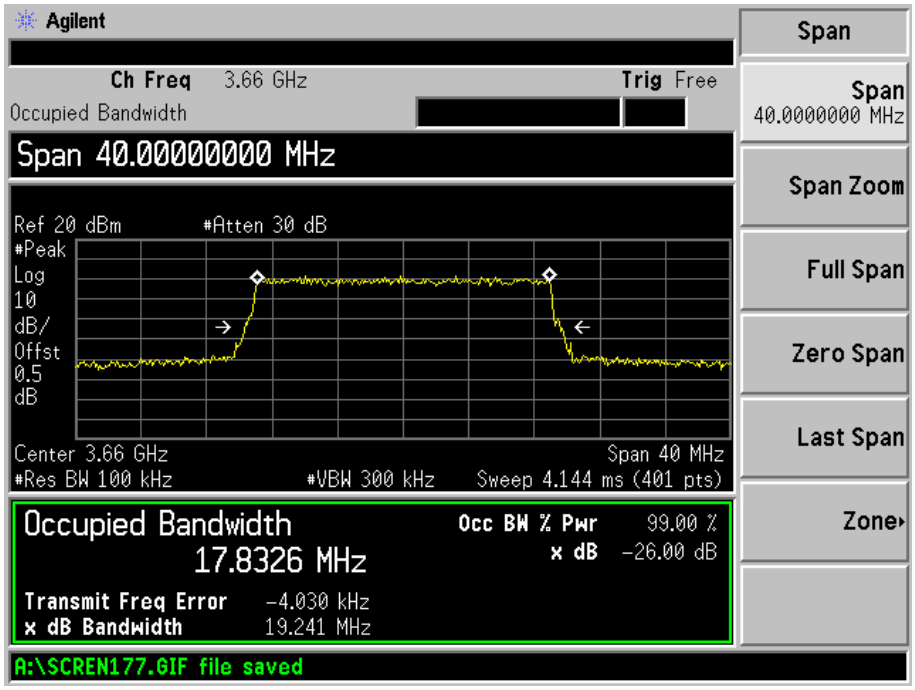
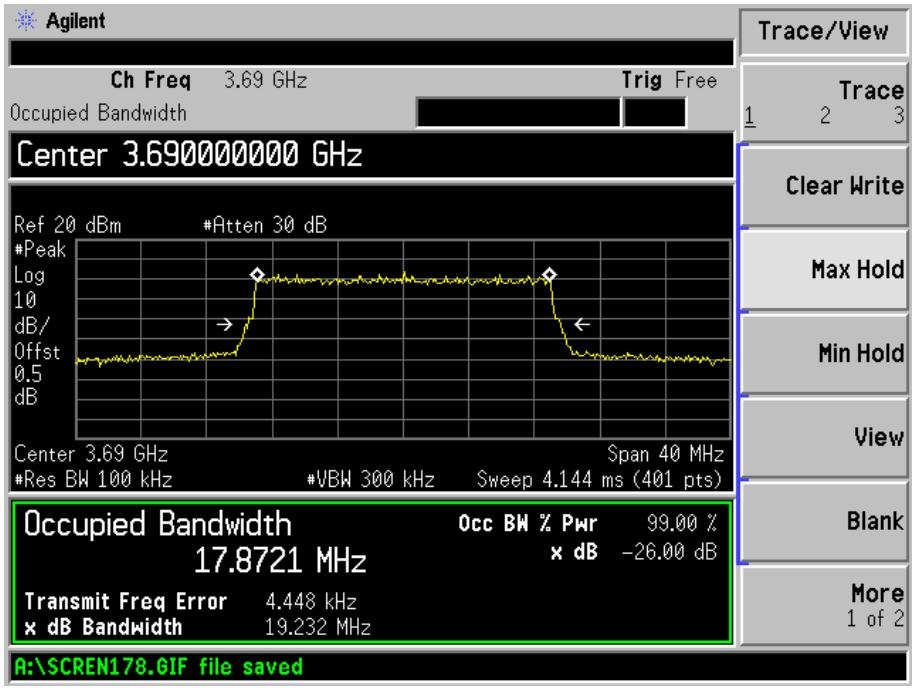


20MHz Bandwidth Low Channel



High Channel



6. Spurious Conducted Emissions

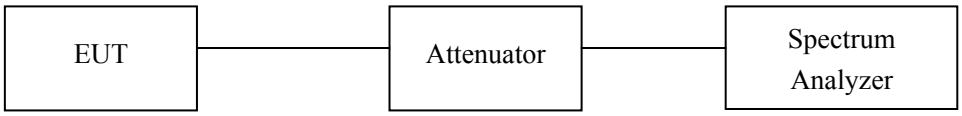
6.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

6.2 Test Procedure

KDB 971168 D01 v02r02 Power Meas License Digital Systems v02r02 section 6.0 Spurious Emissions at Antenna Terminals

Test Configuration for the out of band emissions testing:



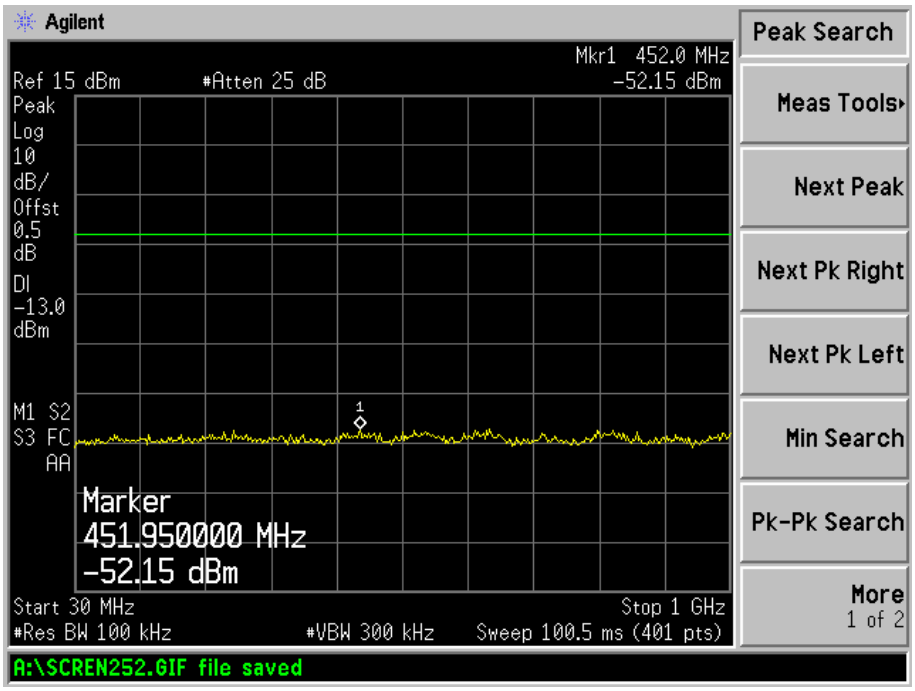
6.3 Environmental Conditions

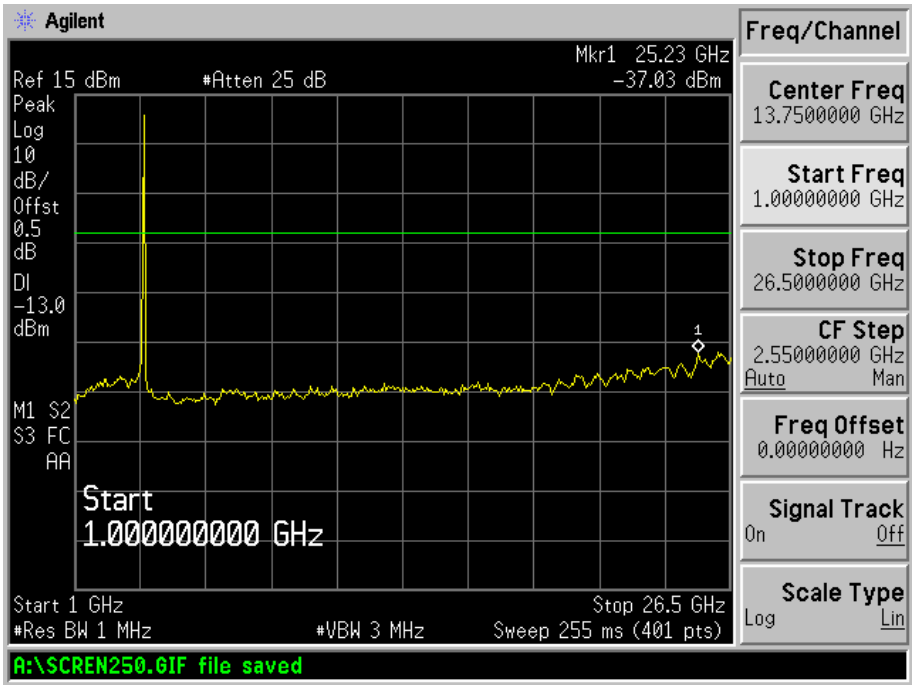
Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

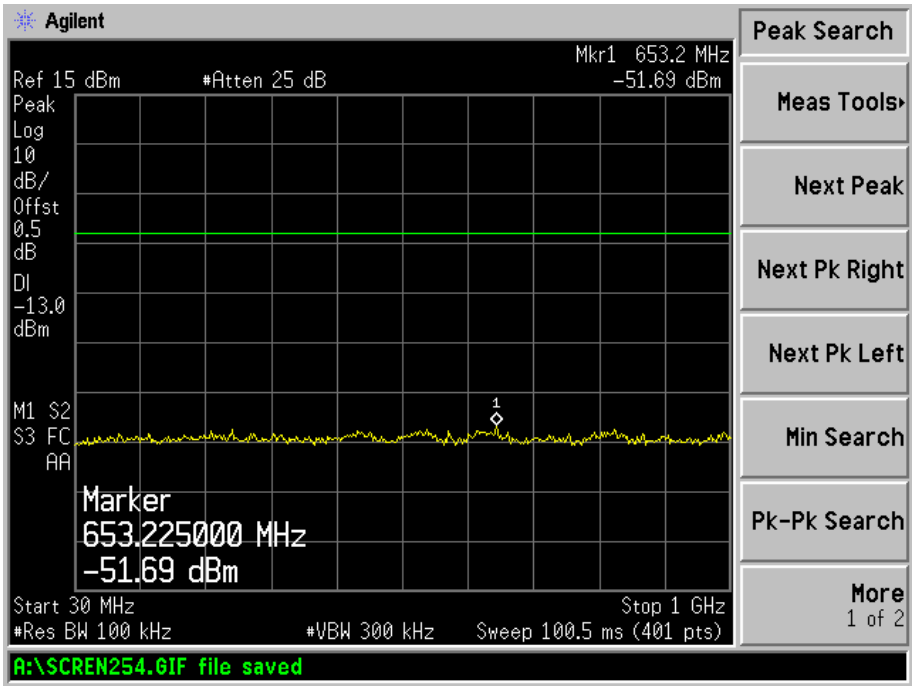
Calculated limit = -13 dBm.
Test Result: Pass
Emissions above 26.5GHz are attenuated more than 20dB below the permissible limits and test data are not reported.

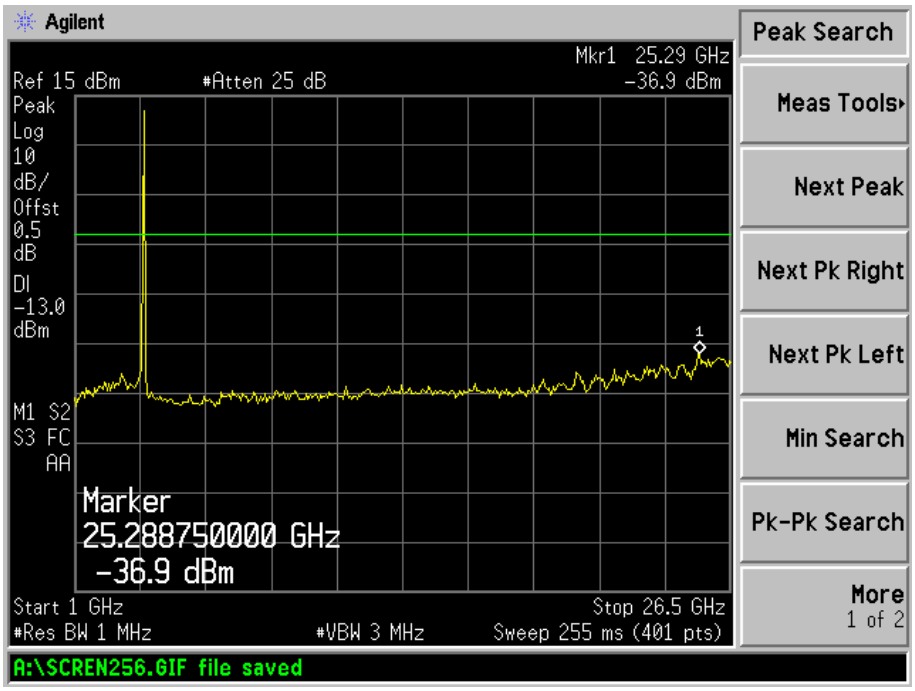
Ant Port 0
5MHz Bandwidth
Low Channel



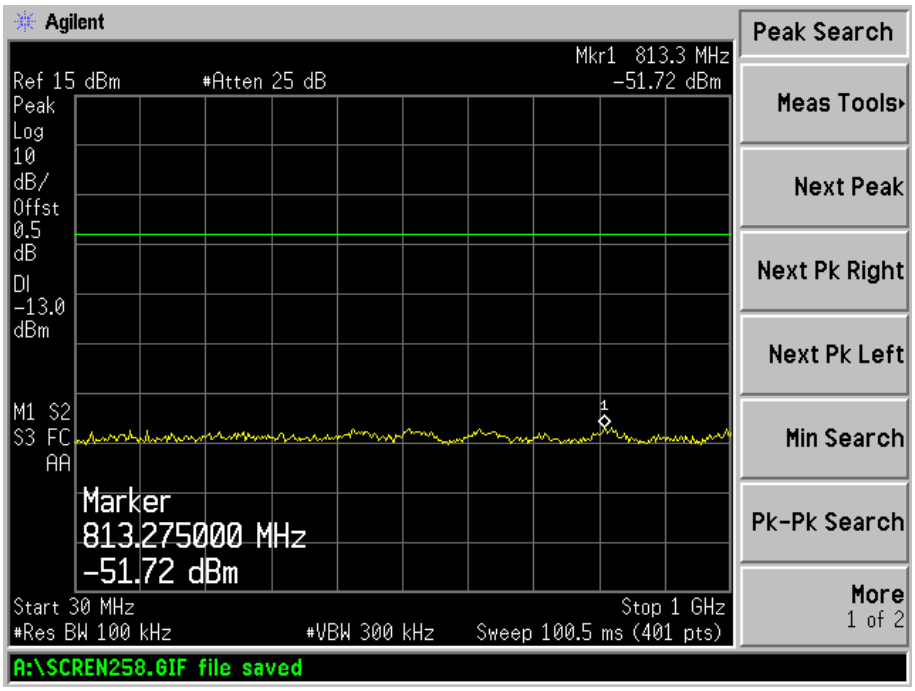


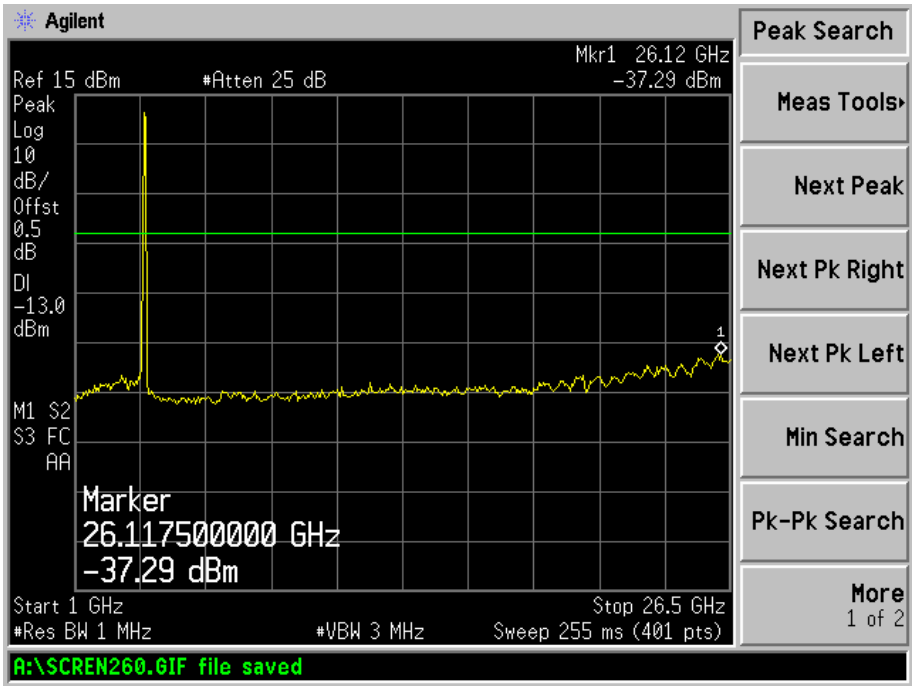
Middle Channel



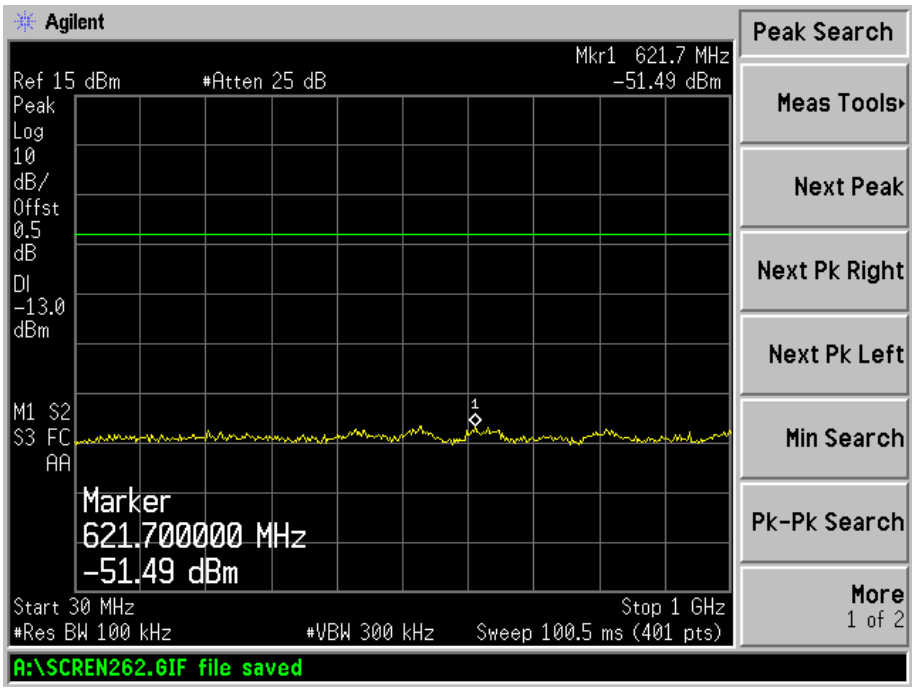


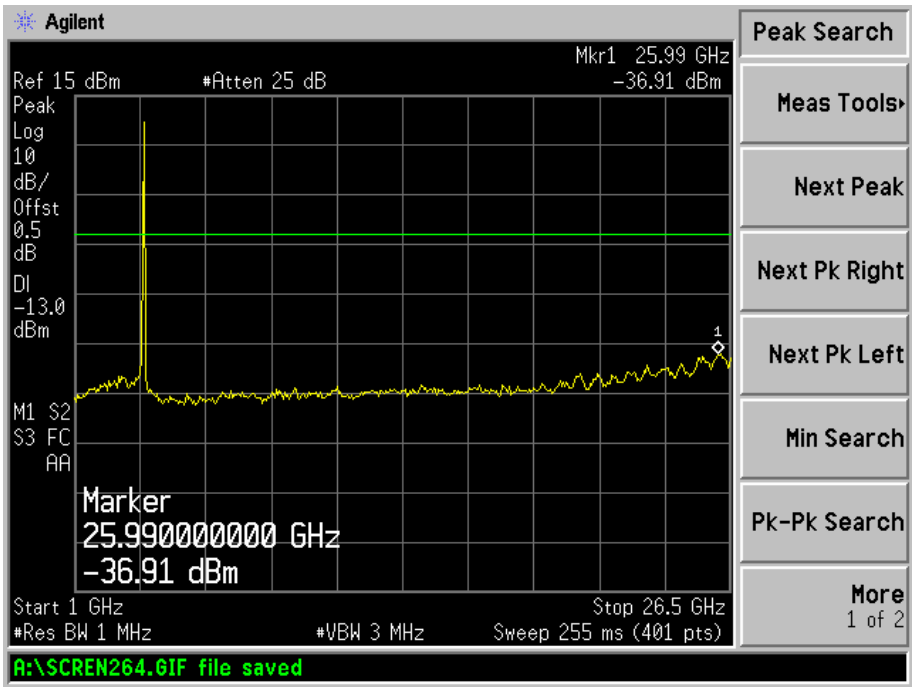
High Channel



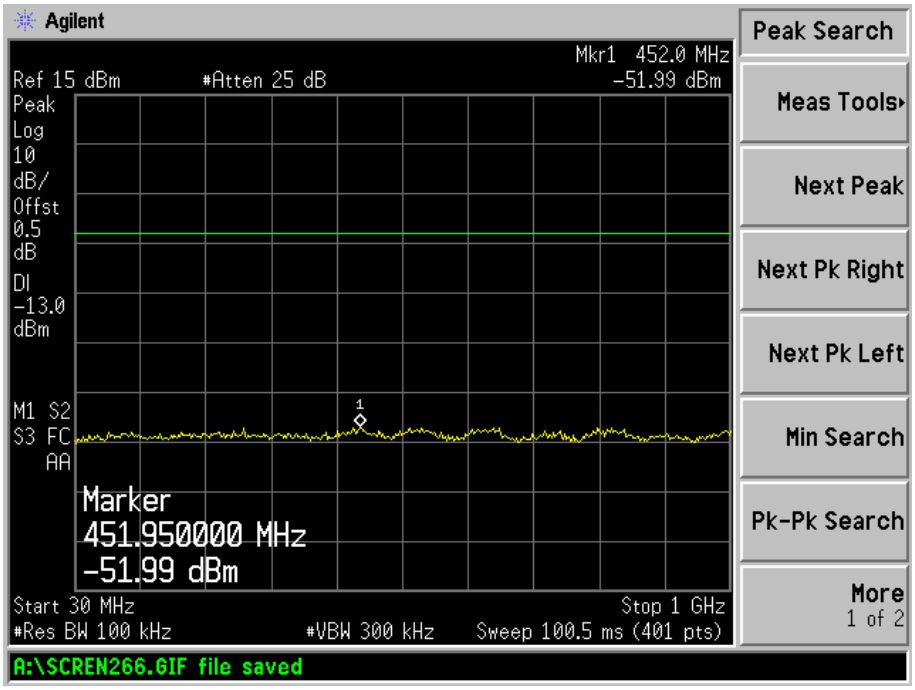


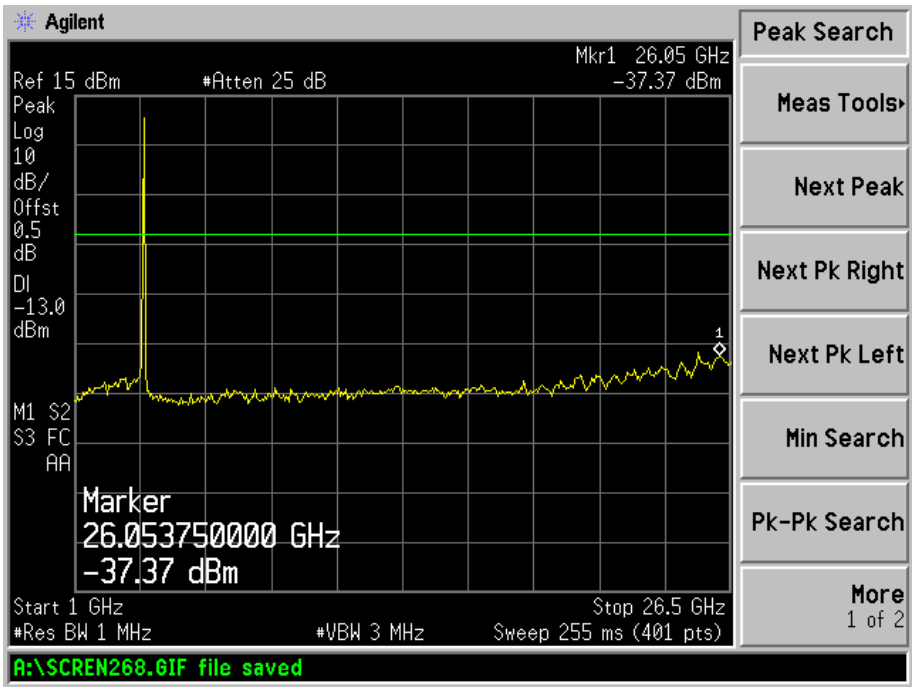
10MHz Bandwidth
Low Channel



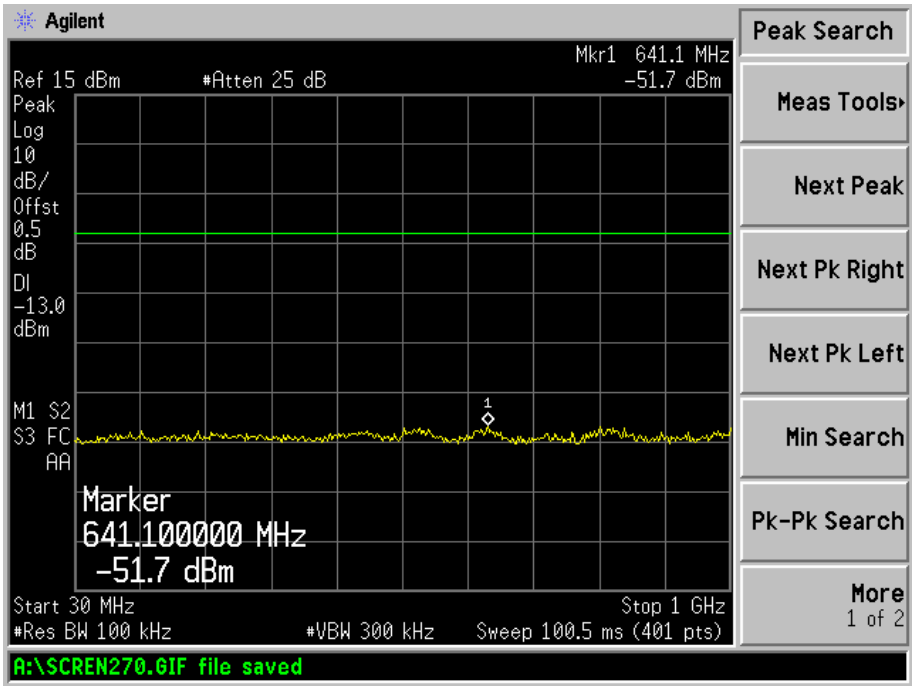


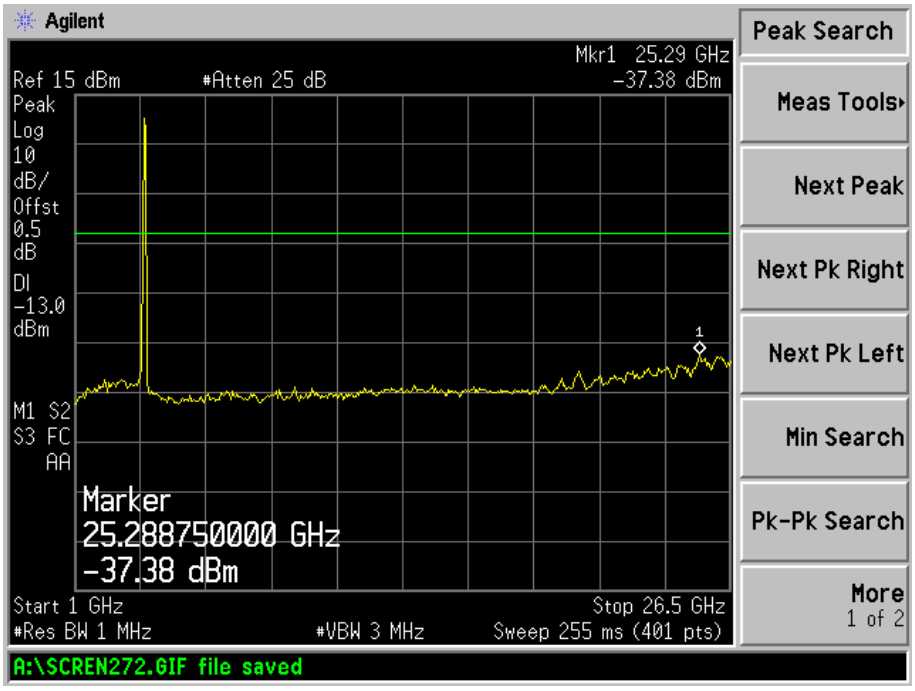
Middle Channel



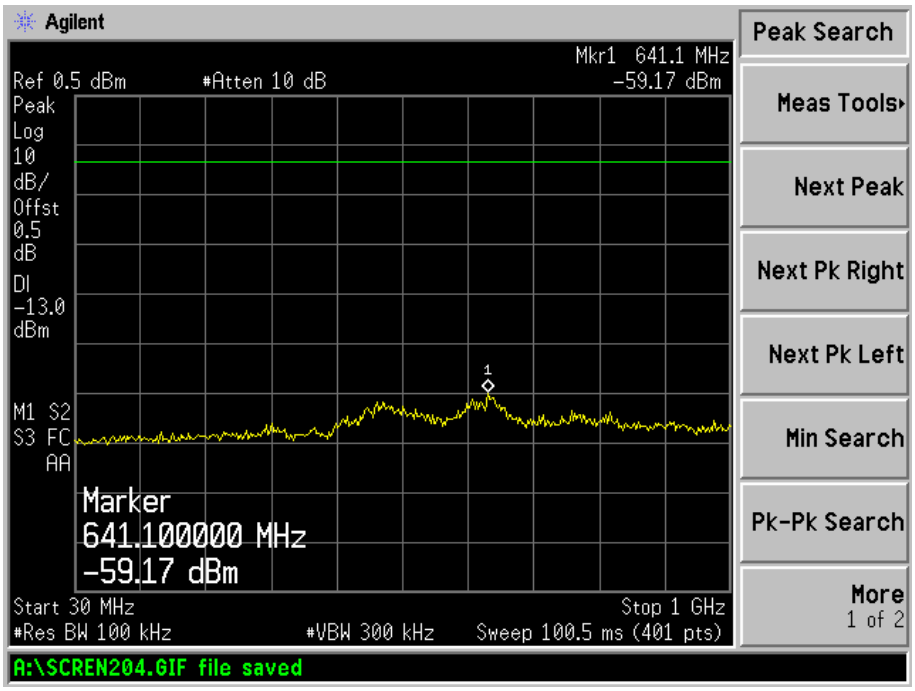


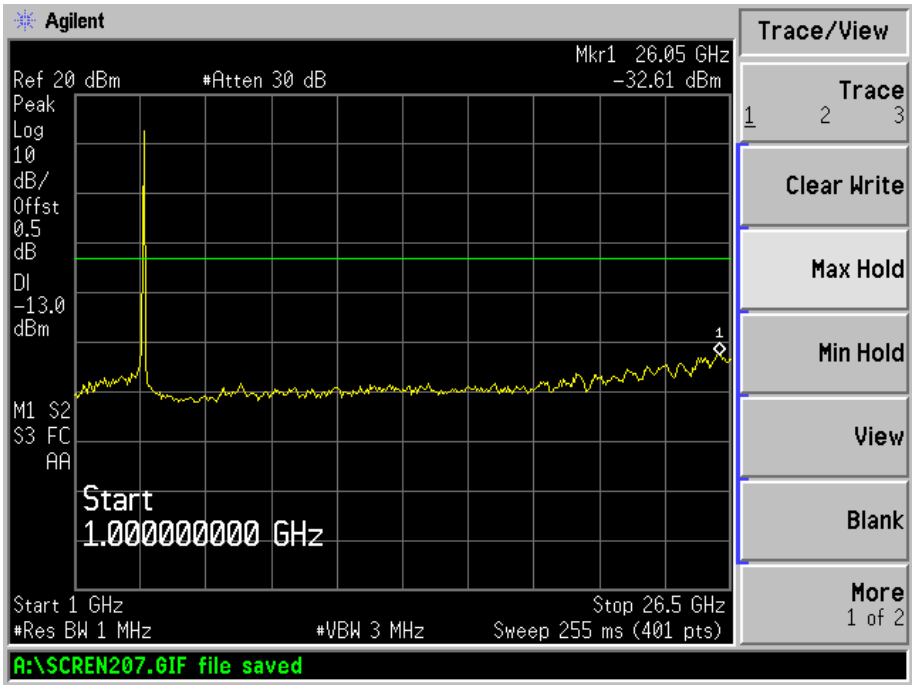
High Channel



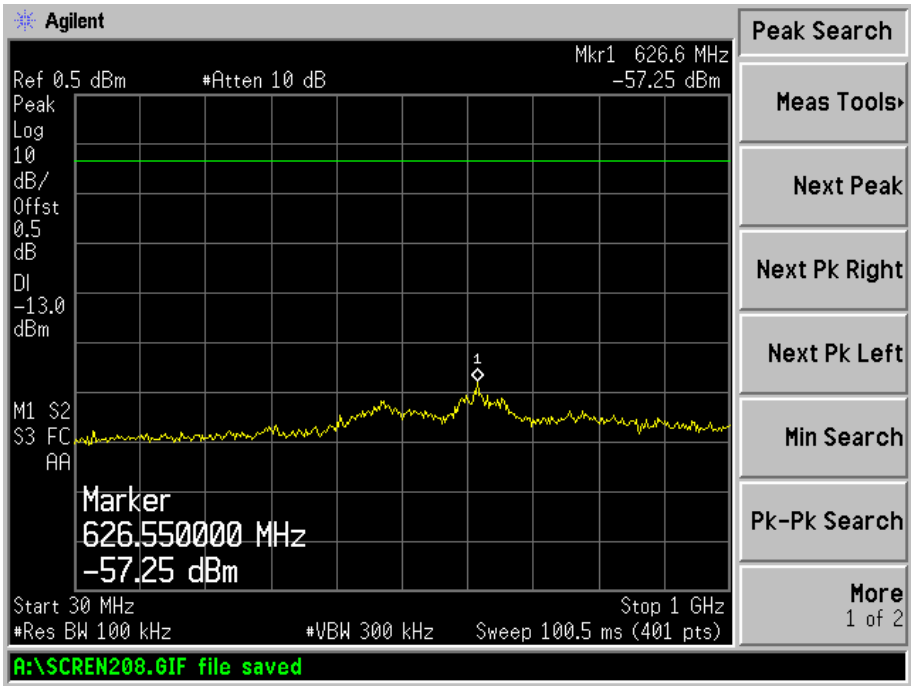


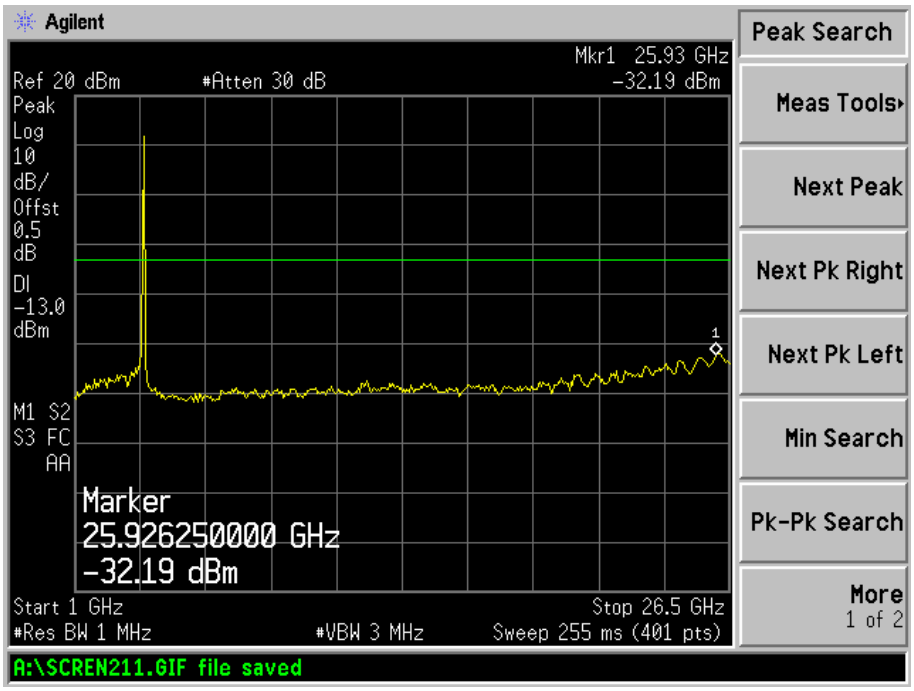
15MHz Bandwidth
Low Channel



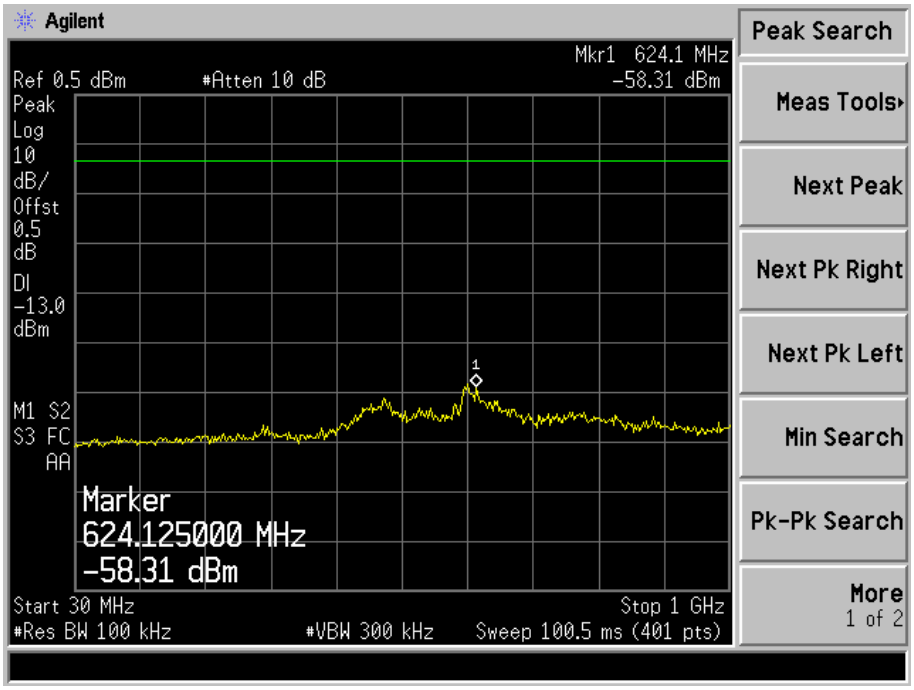


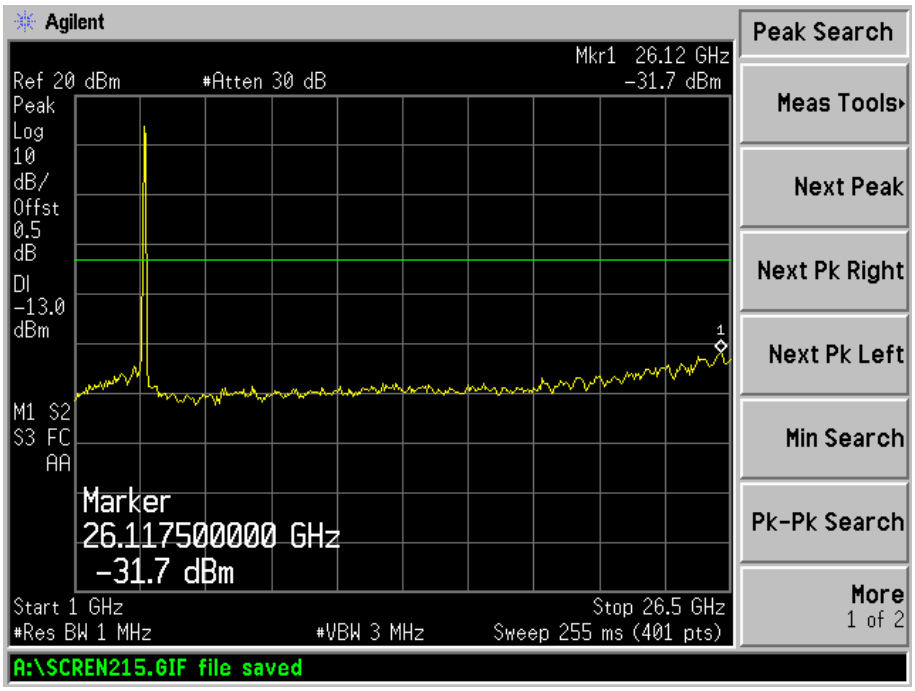
Middle Channel



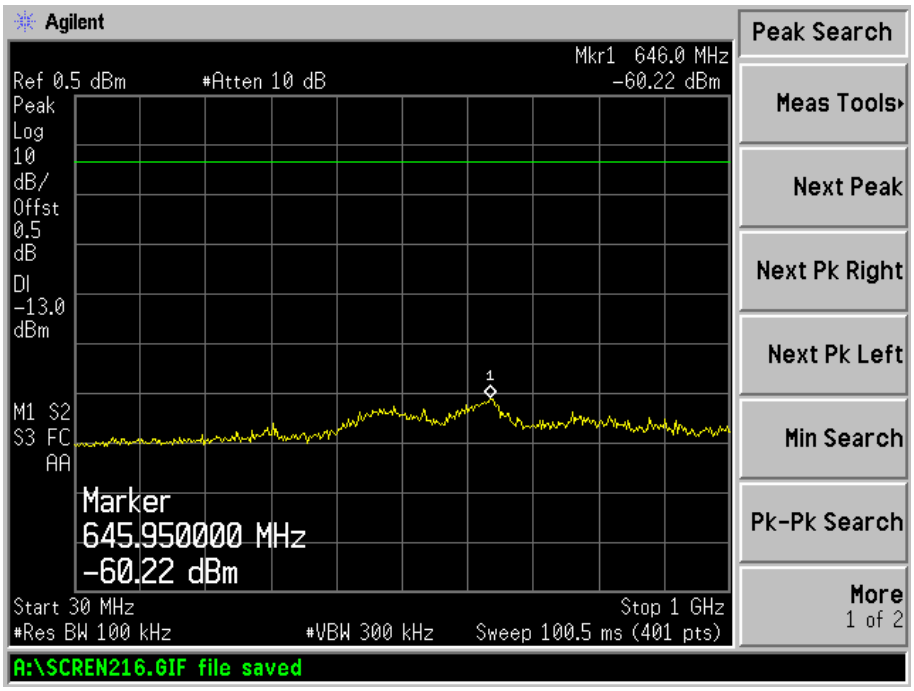


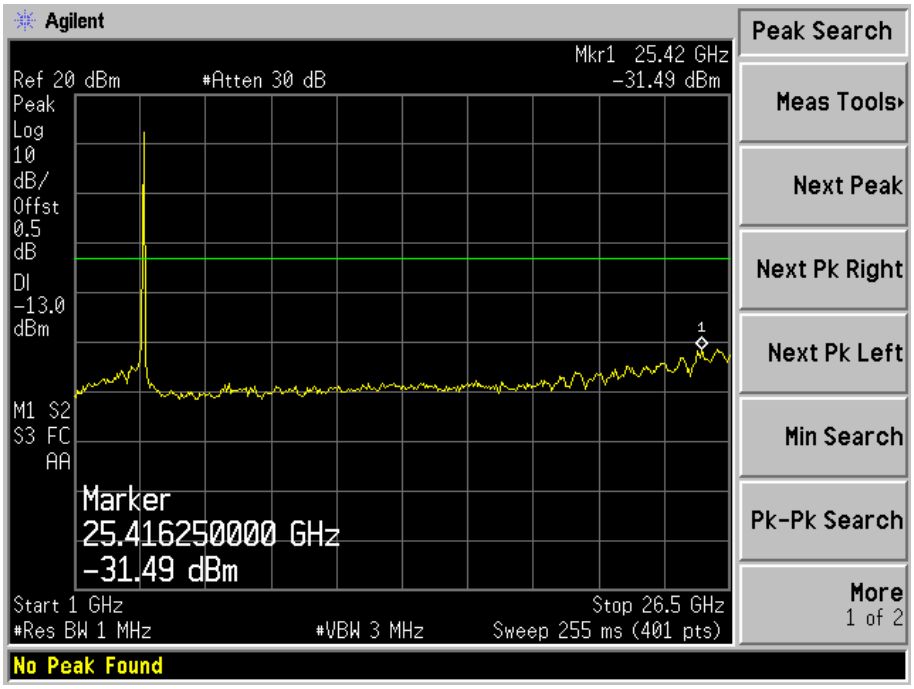
High Channel



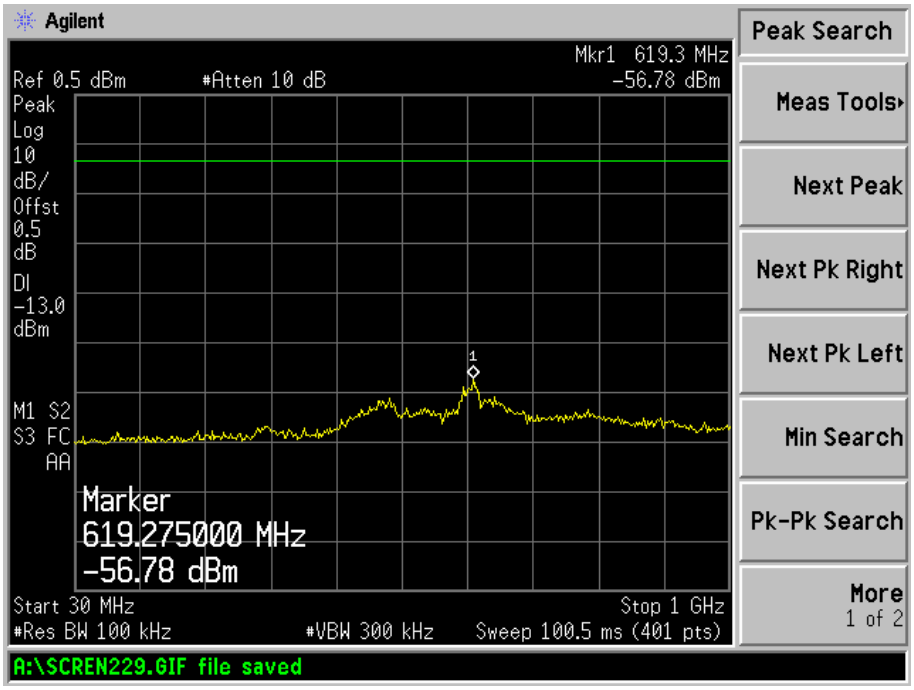


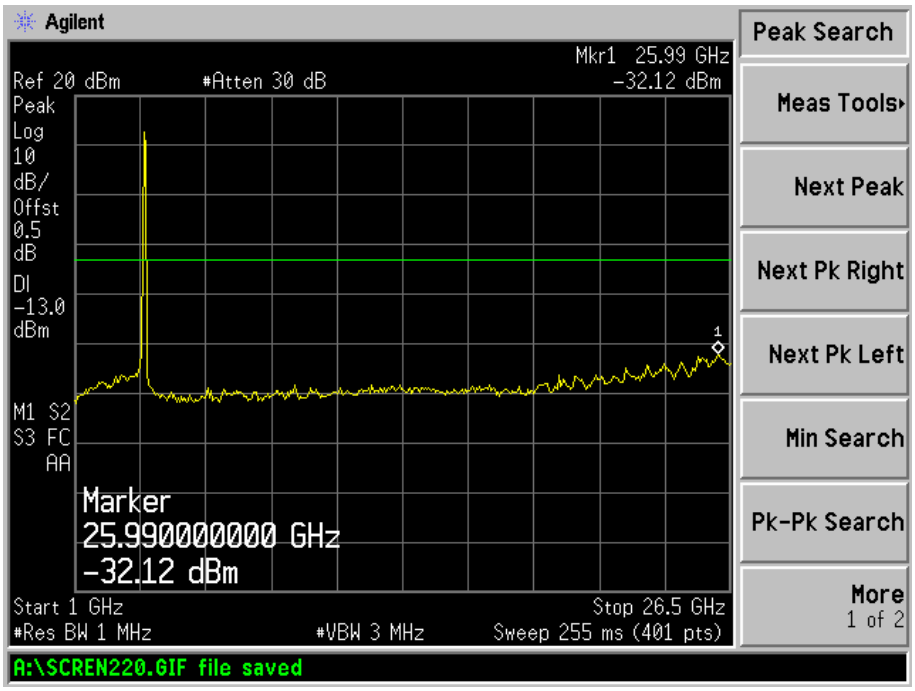
20MHz Bandwidth
Low Channel



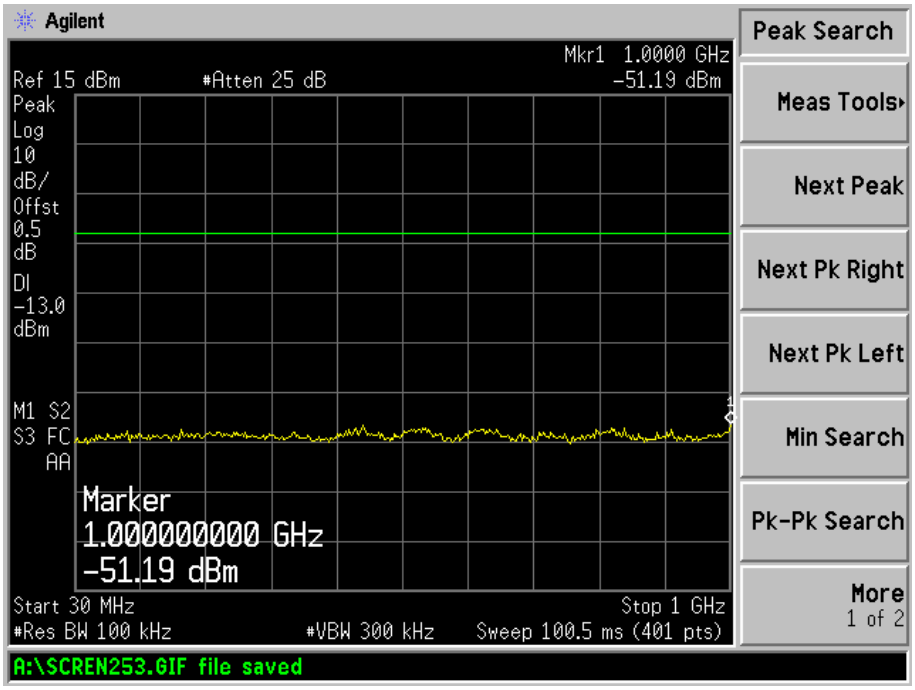


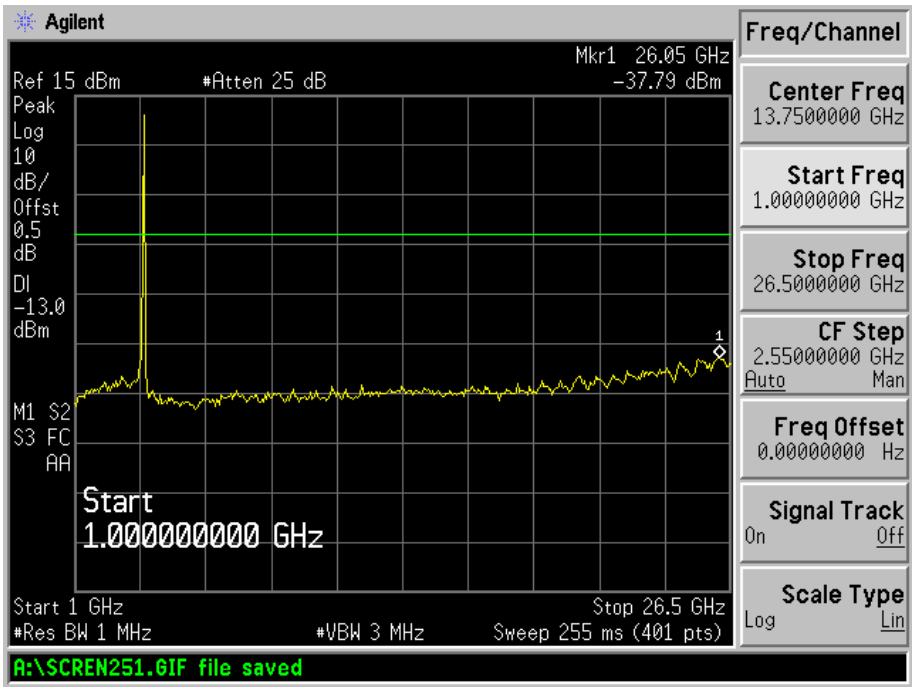
High Channel



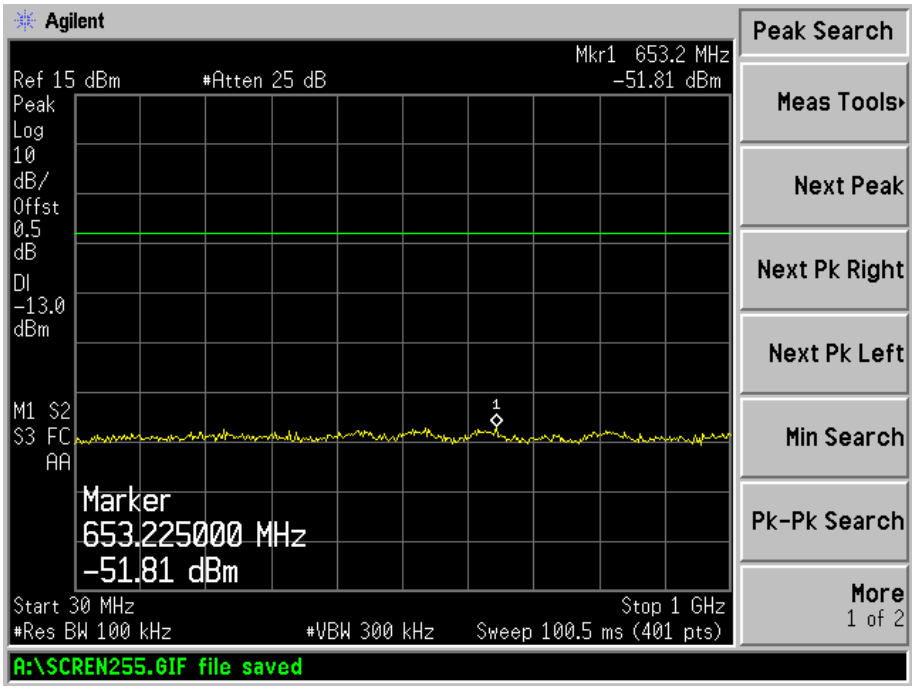


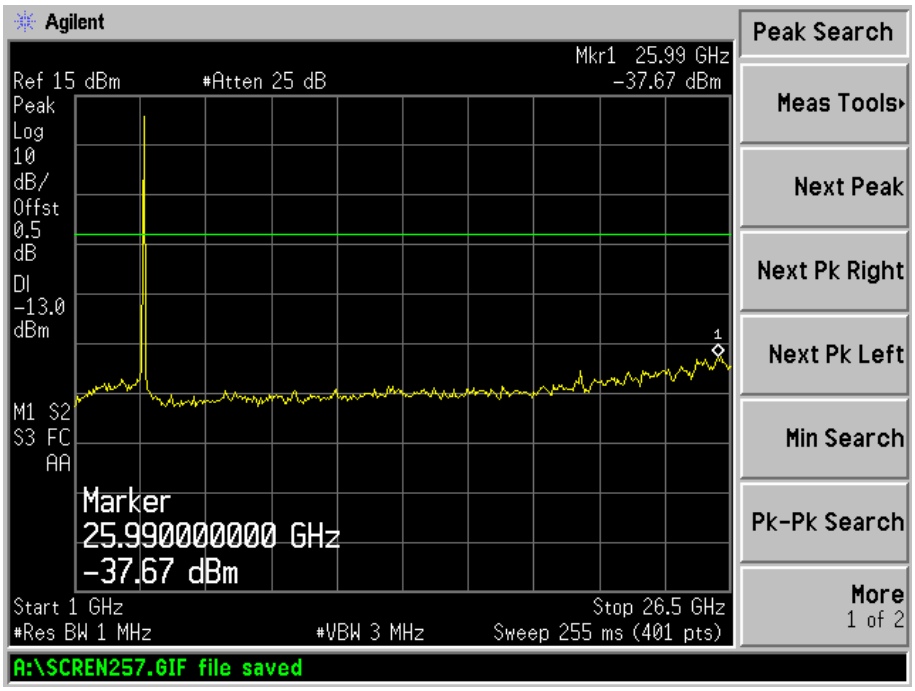
Ant Port 1
5MHz Bandwidth
Low Channel



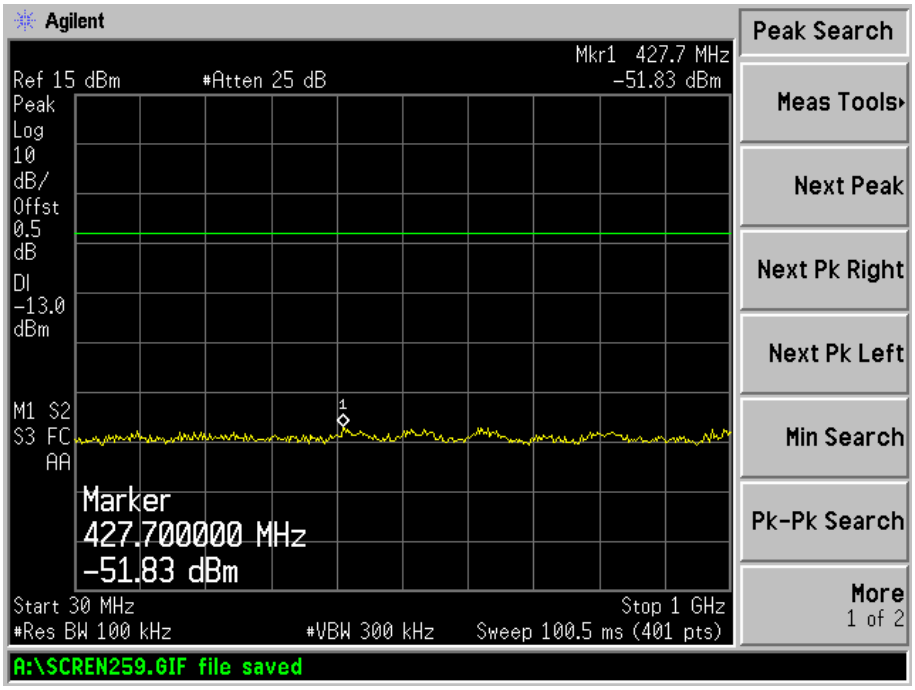


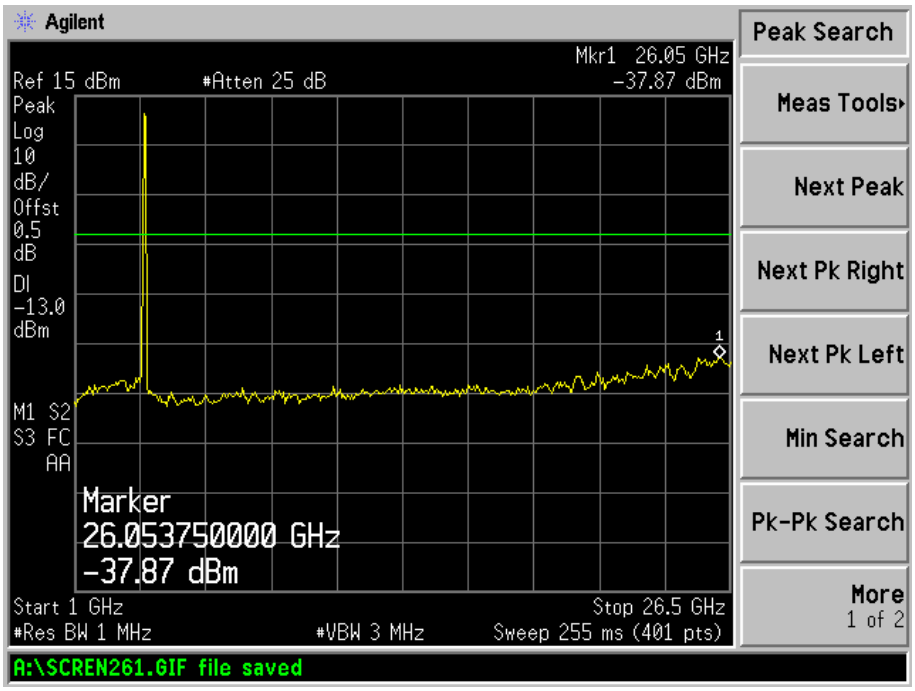
Middle Channel



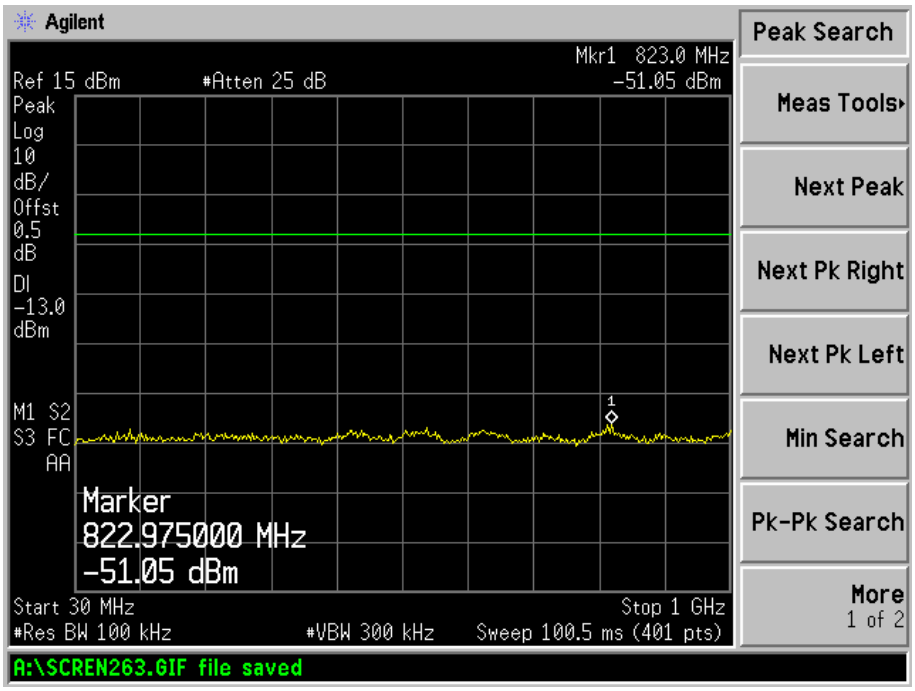


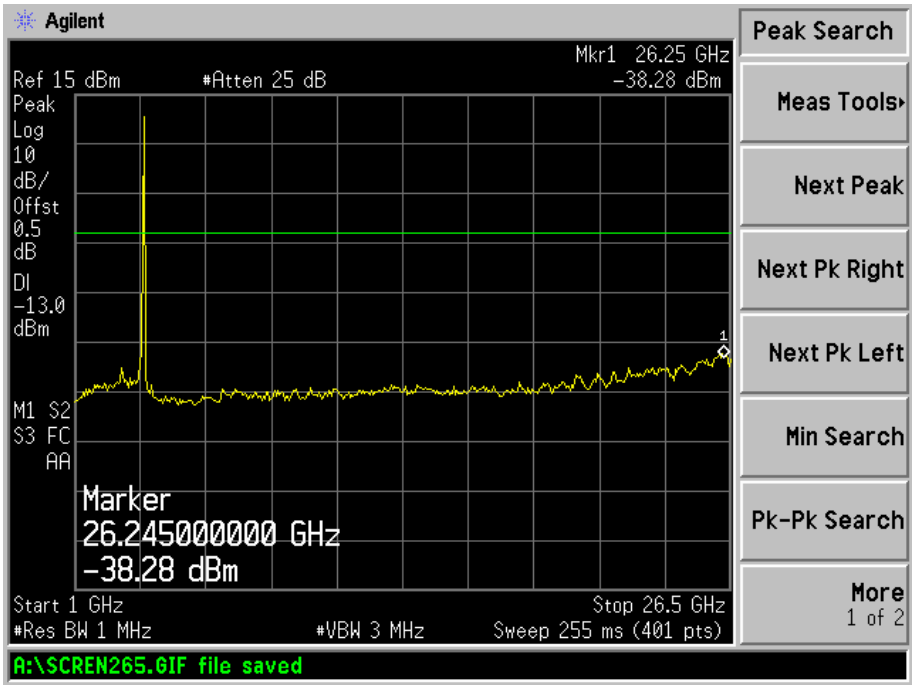
High Channel



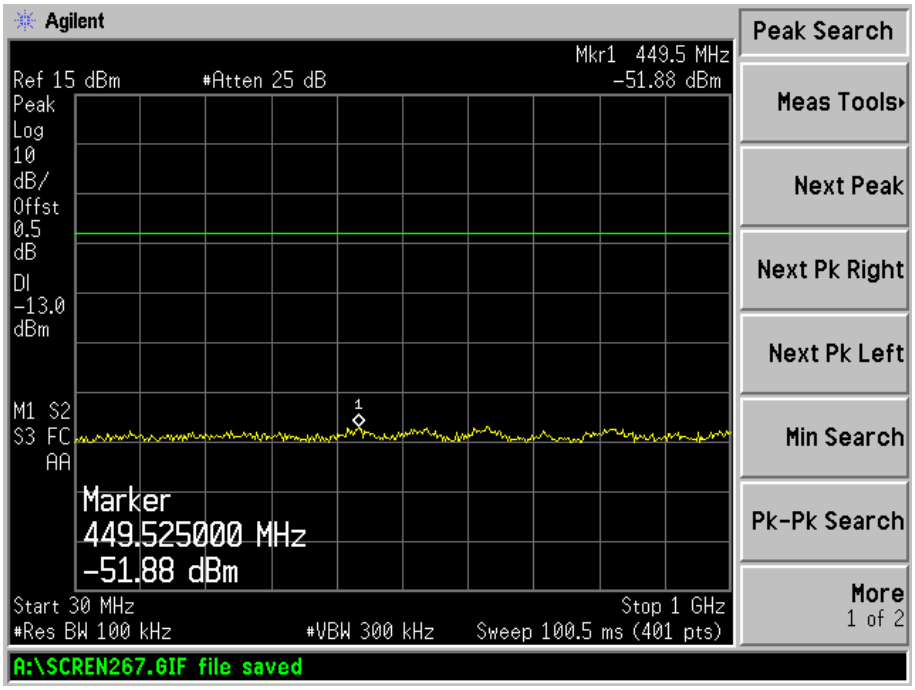


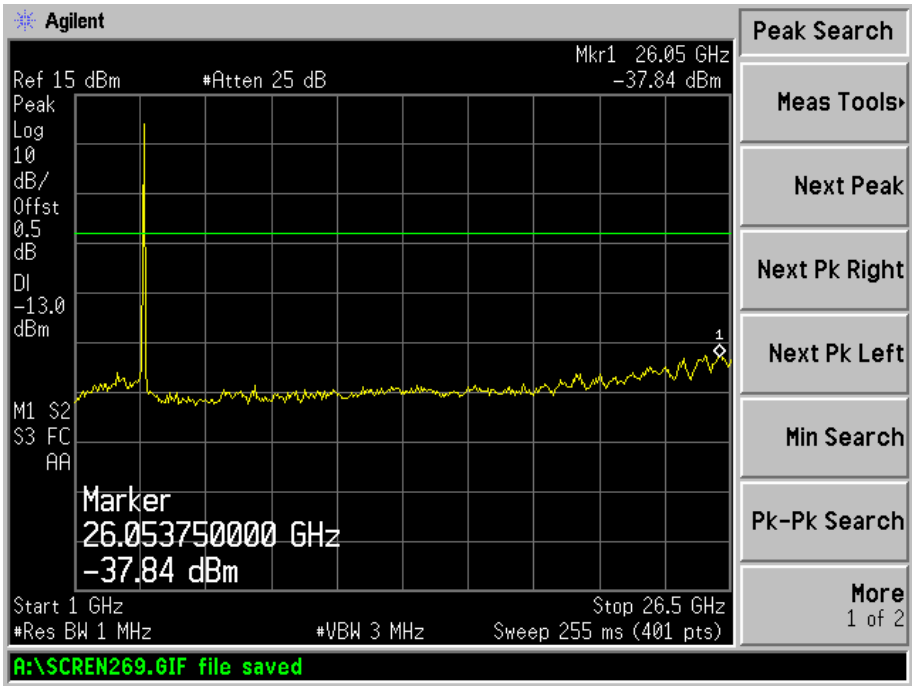
10MHz Bandwidth
Low Channel



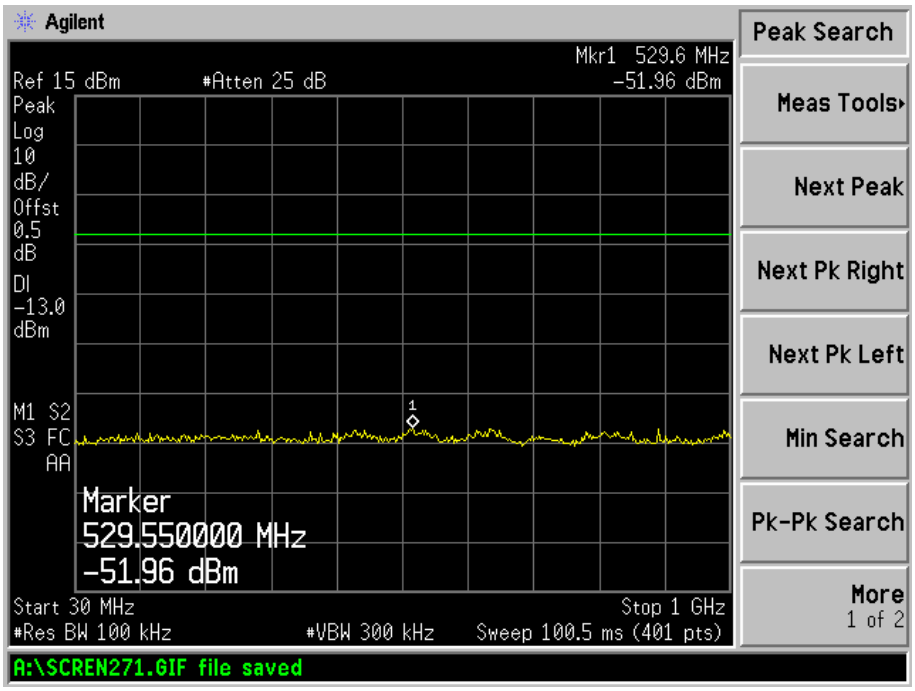


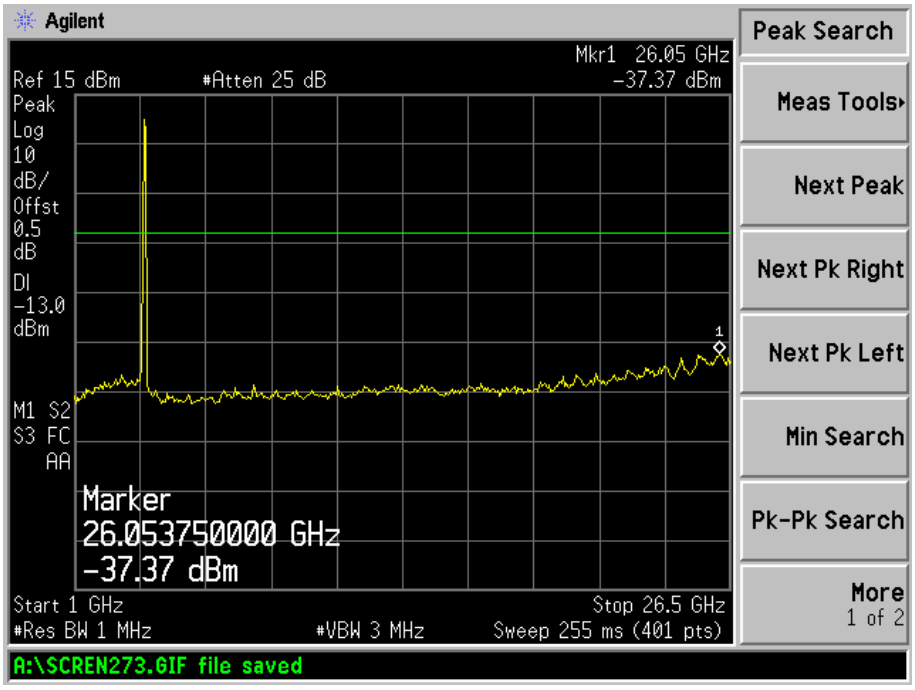
Middle Channel



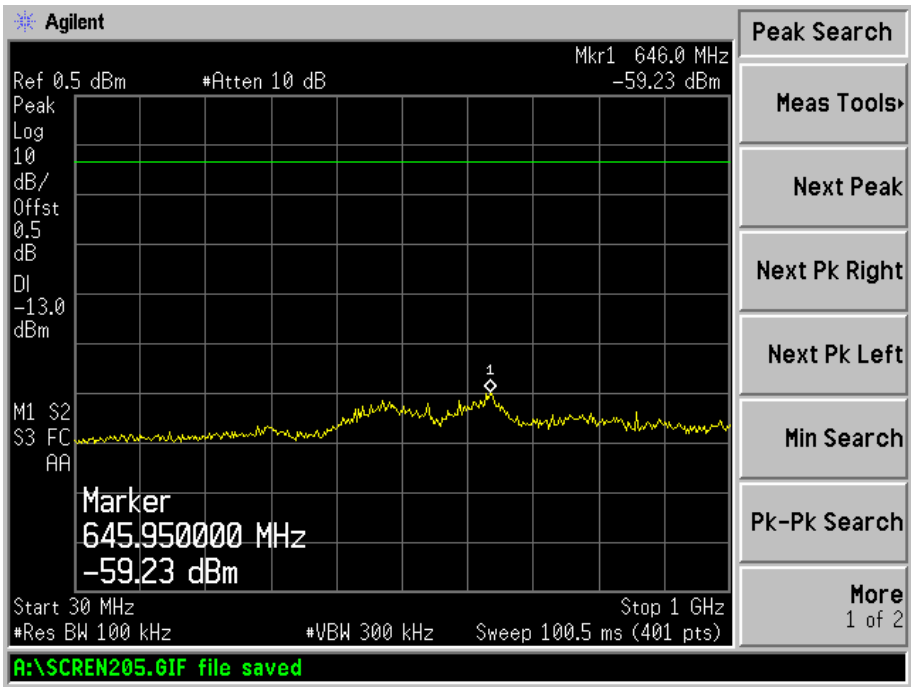


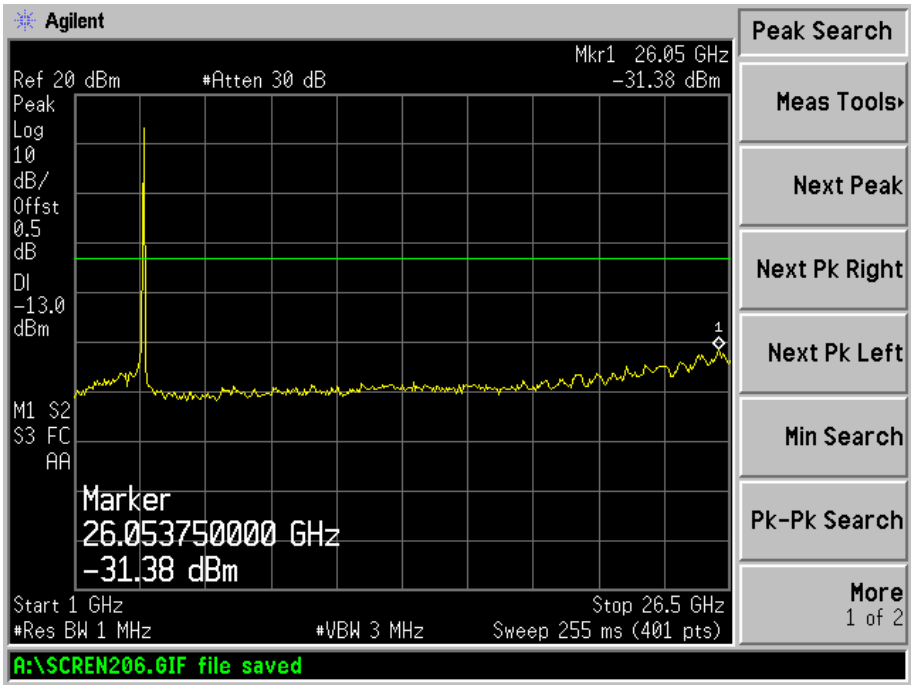
High Channel



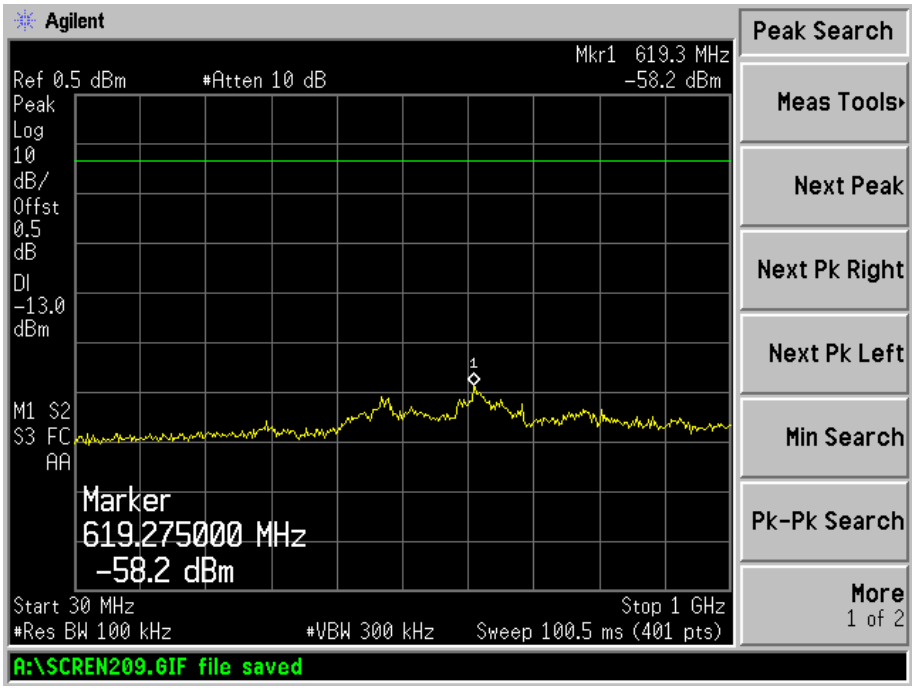


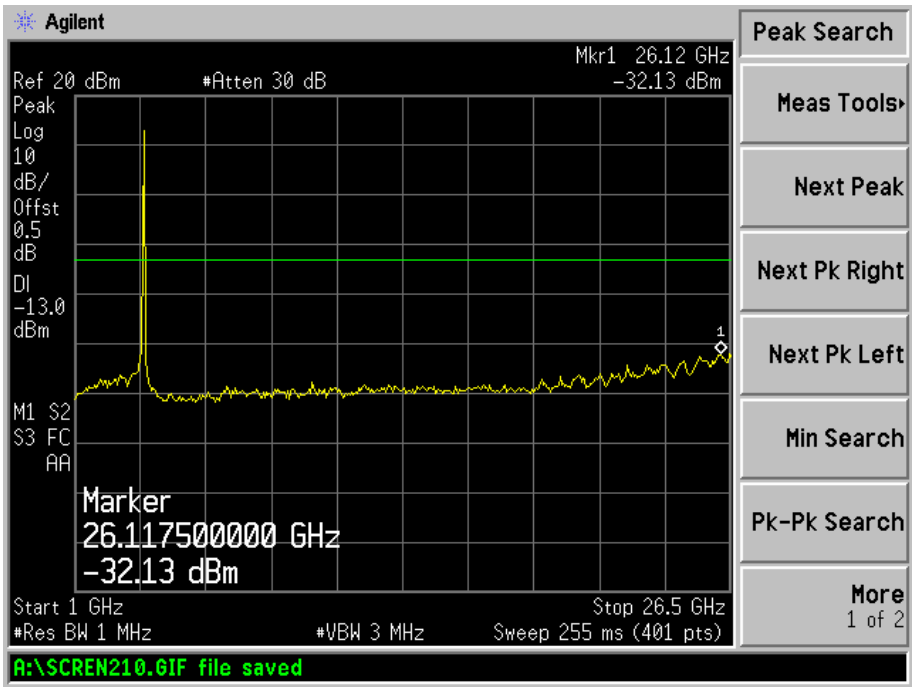
15MHz Bandwidth
Low Channel



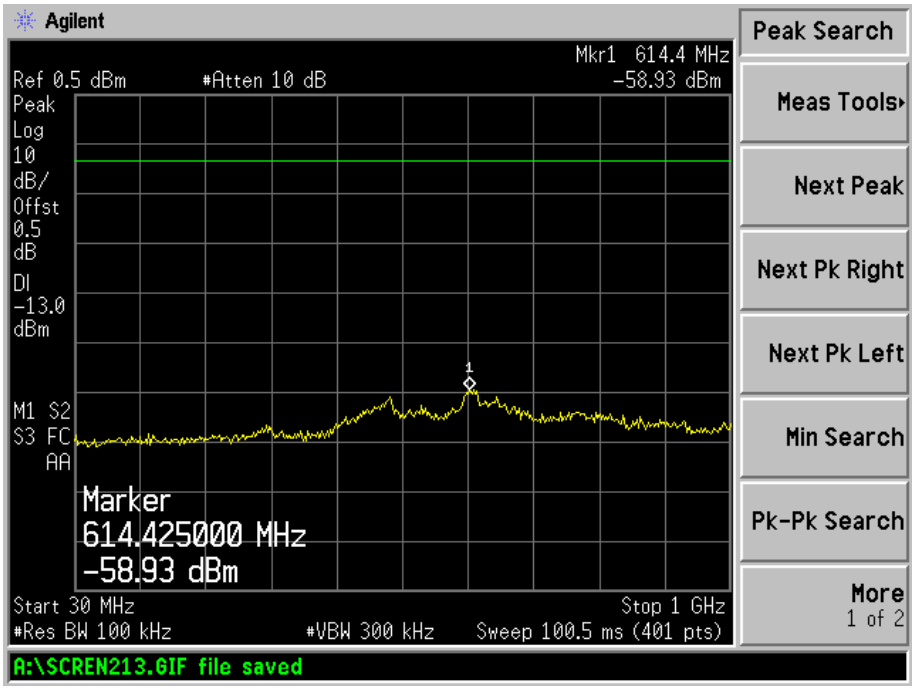


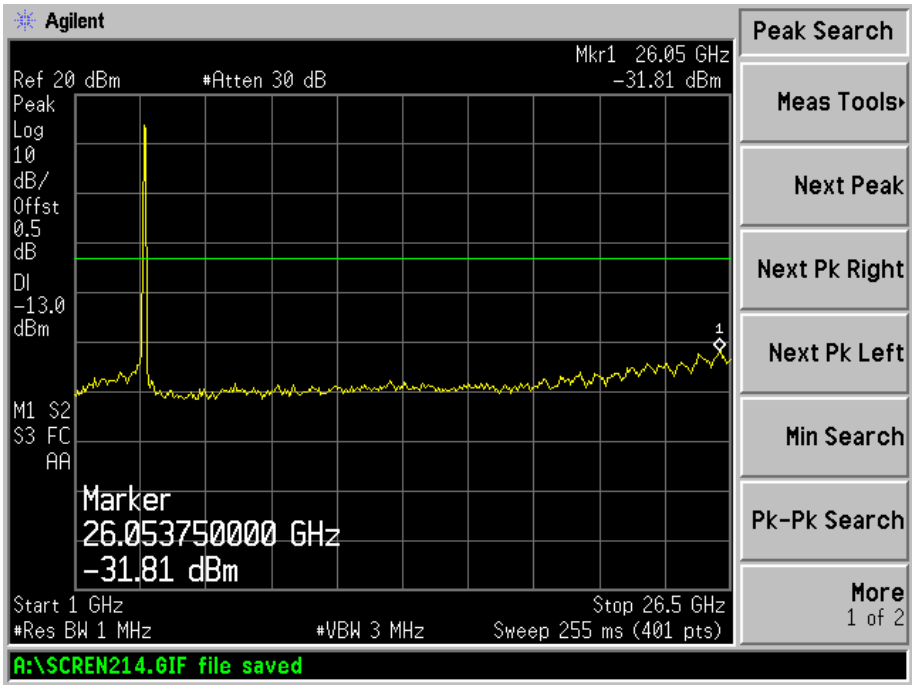
Middle Channel



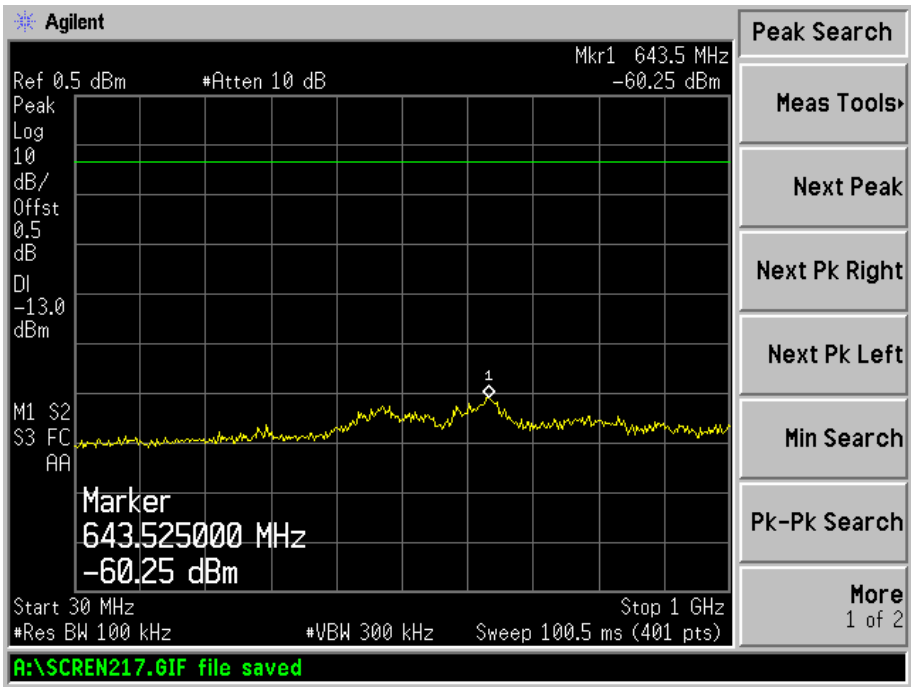


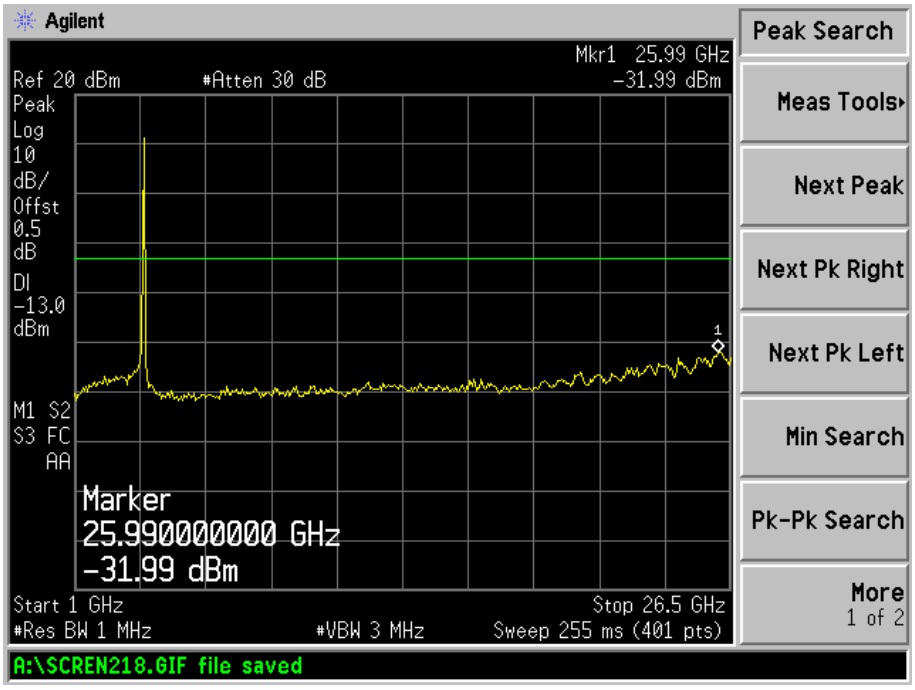
High Channel



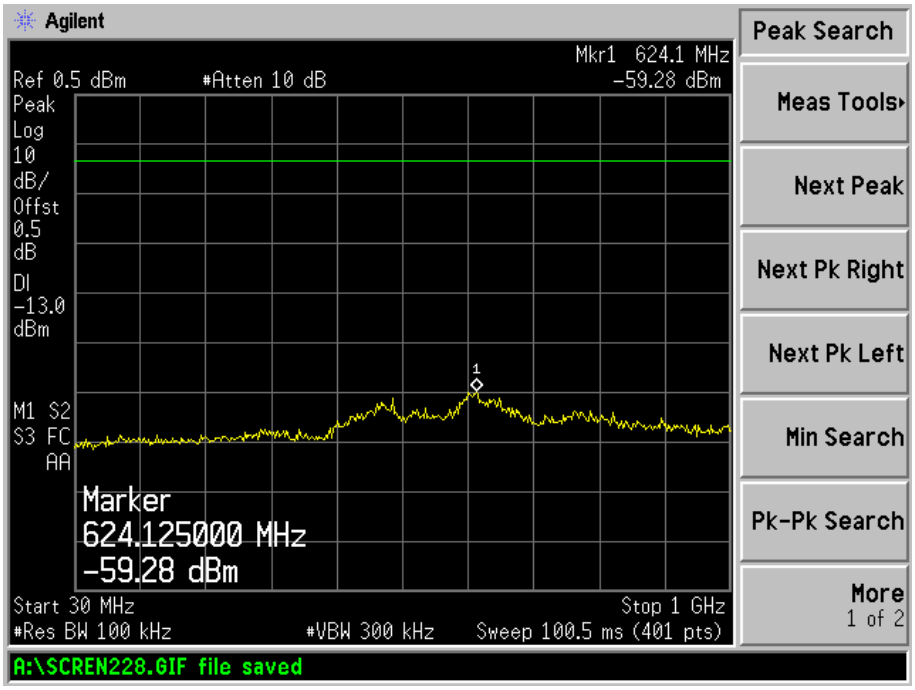


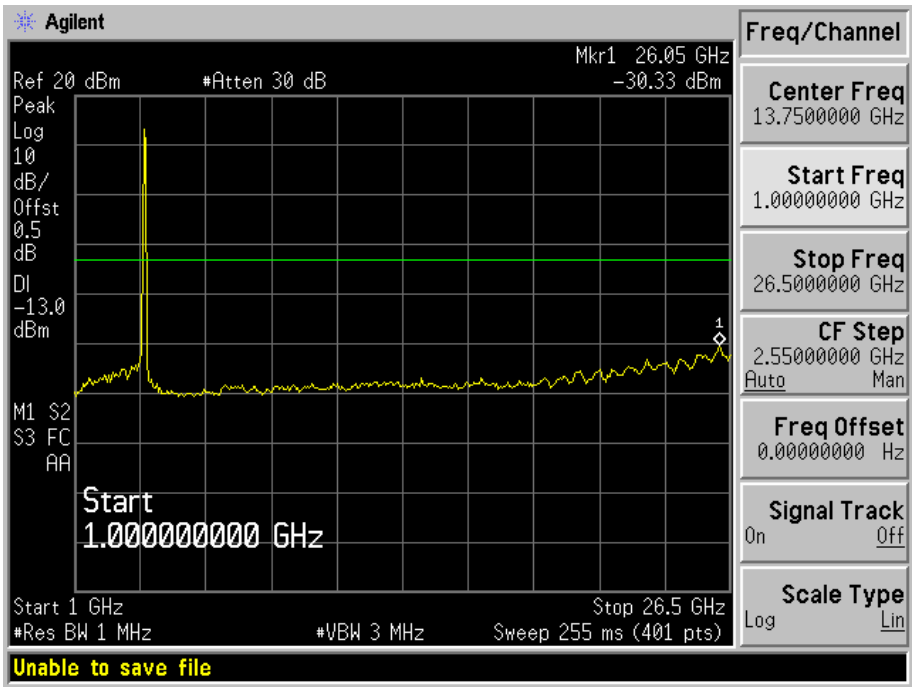
20MHz Bandwidth
Low Channel





High Channel





7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

7.2 Test Procedure

KDB 971168 D01 v02r02 Power Meas License Digital Systems v02r02 section 7.0 Field Strength of Spurious Radiation Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

7.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.4 Summary of Test Results/Plots

According to the data below, the FCC Part § 90.1323 standards, and had the worst margin of:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Spurious Emissions Above 1GHz

For 5MHz Bandwidth

Frequency	SG Reading	Angle	Height	Polar	Correct （dB）	Result dBm	Limit dBm	Margin dB
MHz	dBm	Degree	Meter	H/V				
Low Channel (3652.5MHz)								
129.92	-35.99	302	1.4	H	3.99	-32.00	-13	-19.00
129.92	-39.14	147	1.1	V	3.99	-35.15	-13	-22.15
7305.00	-41.09	198	1.5	H	14.16	-26.93	-13	-13.93
7305.00	-43.18	288	1.6	V	14.16	-29.02	-13	-16.02
10957.50	-54.04	233	1.5	H	19.54	-34.50	-13	-21.50
10957.50	-51.12	298	1.3	V	19.54	-31.58	-13	-18.58
Middle Channel (3675MHz)								
129.92	-39.81	302	1.1	H	3.99	-35.82	-13	-22.82
129.92	-38.16	147	1.4	V	3.99	-34.17	-13	-21.17
7350.00	-40.05	157	1.7	H	14.25	-25.80	-13	-12.80
7350.00	-46.49	237	1.6	V	14.25	-32.24	-13	-19.24
11025.00	-53.17	161	1.7	H	19.63	-33.54	-13	-20.54
11025.00	-52.46	206	1.7	V	19.63	-32.83	-13	-19.83
High Channel (3697.5MHz)								
129.92	-37.73	302	1.2	H	3.99	-33.74	-13	-20.74
129.92	-38.23	147	1.5	V	3.99	-34.24	-13	-21.24
7395.00	-44.31	199	1.7	H	14.29	-30.02	-13	-17.02
7395.00	-43.63	281	1.3	V	14.29	-29.34	-13	-16.34
11092.50	-52.56	228	1.7	H	19.78	-32.78	-13	-19.78
11092.50	-54.82	129	1.5	V	19.78	-35.04	-13	-22.04

For 10MHz Bandwidth

Frequency	SG Reading	Angle	Height	Polar	Correct （dB）	Result dBm	Limit dBm	Margin dB
MHz	dBm	Degree	Meter	H/V				
Low Channel (3655MHz)								
129.92	-36.84	302	1.2	H	3.99	-32.85	-13	-19.85
129.92	-38.09	147	1.2	V	3.99	-34.10	-13	-21.10
7310.00	-42.11	202	1.5	H	14.18	-27.93	-13	-14.93
7310.00	-41.31	150	1.5	V	14.18	-27.13	-13	-14.13
10965.00	-52.42	216	1.4	H	19.58	-32.84	-13	-19.84
10965.00	-53.6	255	1.4	V	19.58	-34.02	-13	-21.02
Middle Channel (3675MHz)								
129.92	-39.54	302	1.4	H	3.99	-35.55	-13	-22.55
129.92	-36.77	147	1.4	V	3.99	-32.78	-13	-19.78
7350.00	-40.74	232	1.5	H	14.25	-26.49	-13	-13.49
7350.00	-44.14	234	1.7	V	14.25	-29.89	-13	-16.89
11025.00	-54.46	139	1.3	H	19.63	-34.83	-13	-21.83
11025.00	-51.46	168	1.4	V	19.63	-31.83	-13	-18.83
High Channel (3695MHz)								
129.92	-36.39	302	1.3	H	3.99	-32.40	-13	-19.40
129.92	-35.37	147	1.3	V	3.99	-31.38	-13	-18.38
7390.00	-44.62	302	1.5	H	14.27	-30.35	-13	-17.35
7390.00	-44.94	132	1.3	V	14.27	-30.67	-13	-17.67
11085.00	-51.71	115	1.7	H	19.77	-31.94	-13	-18.94
11085.00	-53.7	241	1.5	V	19.77	-33.93	-13	-20.93

For 15MHz Bandwidth

Frequency	SG Reading	Angle	Height	Polar	Correct （dB）	Result dBm	Limit dBm	Margin dB
MHz	dBm	Degree	Meter	H/V				
Low Channel (3657.5MHz)								
129.92	-35.98	302	1.2	H	3.99	-31.99	-13	-18.99
129.92	-39.81	147	1	V	3.99	-35.82	-13	-22.82
7315.00	-38.24	145	1.7	H	14.19	-24.05	-13	-11.05
7315.00	-40.04	267	1.3	V	14.19	-25.85	-13	-12.85
10972.50	-49.81	132	1.7	H	19.6	-30.21	-13	-17.21
10972.50	-51.21	183	1.4	V	19.6	-31.61	-13	-18.61
Middle Channel (3675MHz)								
129.92	-35.34	302	1.4	H	3.99	-31.35	-13	-18.35
129.92	-37.45	147	1.2	V	3.99	-33.46	-13	-20.46
7350.00	-40.34	301	1.4	H	14.25	-26.09	-13	-13.09
7350.00	-38.83	306	1.4	V	14.25	-24.58	-13	-11.58
11025.00	-50.19	286	1.7	H	19.63	-30.56	-13	-17.56
11025.00	-47.55	117	1.4	V	19.63	-27.92	-13	-14.92
High Channel (3692.5MHz)								
129.92	-37.52	302	1.3	H	3.99	-33.53	-13	-20.53
129.92	-38.99	147	1.1	V	3.99	-35.00	-13	-22.00
7385.00	-39.81	179	1.7	H	14.25	-25.56	-13	-12.56
7385.00	-40.08	219	1.5	V	14.25	-25.83	-13	-12.83
11077.50	-51.38	136	1.4	H	19.73	-31.65	-13	-18.65
11077.50	-49.96	294	1.3	V	19.73	-30.23	-13	-17.23

For 20MHz Bandwidth

Frequency	SG Reading	Angle	Height	Polar	Correct （dB）	Result dBm	Limit dBm	Margin dB
MHz	dBm	Degree	Meter	H/V				
Low Channel (3660MHz)								
129.92	-35.72	175	1.6	H	3.99	-31.73	-13	-18.73
129.92	-34.84	196	1.2	V	3.99	-30.85	-13	-17.85
7320.00	-40.61	121	1.5	H	14.21	-26.40	-13	-13.40
7320.00	-38.67	306	1.5	V	14.21	-24.46	-13	-11.46
10980.00	-45.86	308	1.5	H	19.62	-26.24	-13	-13.24
10980.00	-48.71	171	1.3	V	19.62	-29.09	-13	-16.09
High Channel (3690MHz)								
129.92	-40.92	153	1.3	H	3.99	-36.93	-13	-23.93
129.92	-35.09	124	1.5	V	3.99	-31.10	-13	-18.10
7380.00	-42.29	257	1.4	H	14.23	-28.06	-13	-15.06
7380.00	-39.65	185	1.5	V	14.23	-25.42	-13	-12.42
11070.00	-42.81	222	1.5	H	19.70	-23.11	-13	-10.11
11070.00	-43.15	110	1.6	V	19.70	-23.45	-13	-10.45

Note: Result=Reading+ Correct, Margin= Result- Limit

Testing is carried out with frequency rang 9kHz to 37GHz, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so the data is not display.

8. Band edge

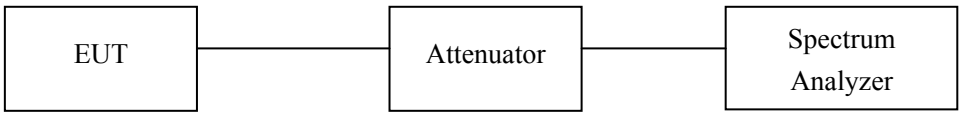
8.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

8.2 Test Procedure

According to KDB 971168 D01 v02r02 Power Meas License Digital Systems v02r02

EUT Setup:



≤ -13 dBm, in 1 MHz range outside 3650-3700 MHz.

8.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

8.4 Summary of Test Results/Plots

Limit: 43 + 10log (P) below the channel transmitter power = -13 dBm/MHz
All the Plots is below -13dBm/MHz
Test Result: Pass

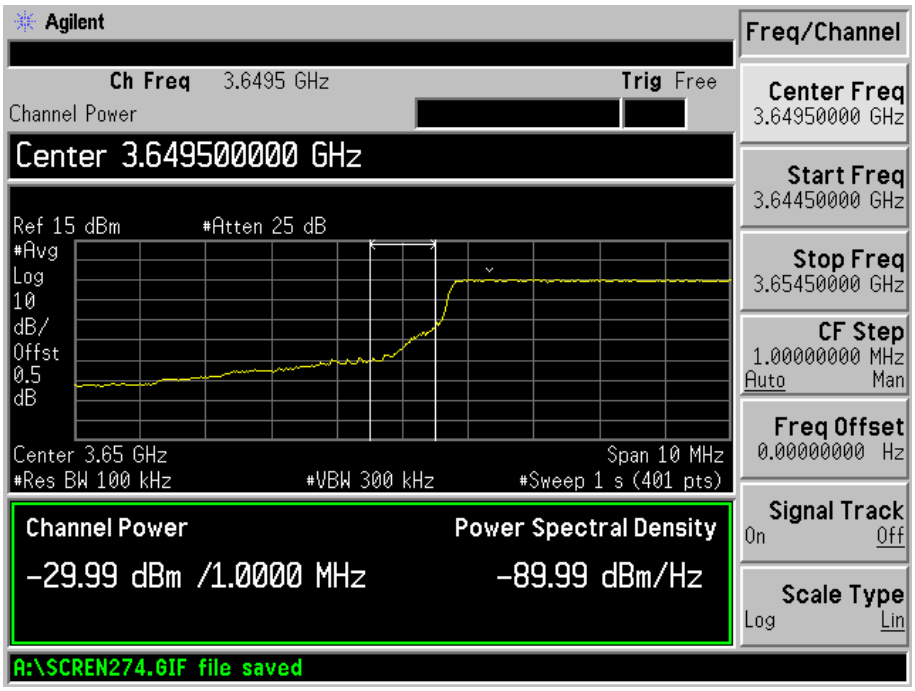
Band-edge Antenna Port 0

Test Mode	Channel	Band edge	Maximum Emission [dBm]	Limit [dBm]
5MHz Bandwidth	Low Channel	Left Side	-29.99	-13
		Right Side	-30.28	-13
	Middle Channel	Left Side	-28.87	-13
		Right Side	-29.65	-13
	High Channel	Left Side	-30.21	-13
		Right Side	-29.98	-13
10MHz Bandwidth	Low Channel	Left Side	-34.81	-13
		Right Side	-35.65	-13
	Middle Channel	Left Side	-35.30	-13
		Right Side	-34.79	-13
	High Channel	Left Side	-35.46	-13
		Right Side	-34.97	-13
15MHz Bandwidth	Low Channel	Left Side	-36.76	-13
		Right Side	-34.38	-13
	Middle Channel	Left Side	-34.96	-13
		Right Side	-35.27	-13
	High Channel	Left Side	-35.43	-13
		Right Side	-35.59	-13
20MHz Bandwidth	Low Channel	Left Side	-37.92	-13
		Right Side	-38.05	-13
	High Channel	Left Side	-38.34	-13
		Right Side	-38.02	-13

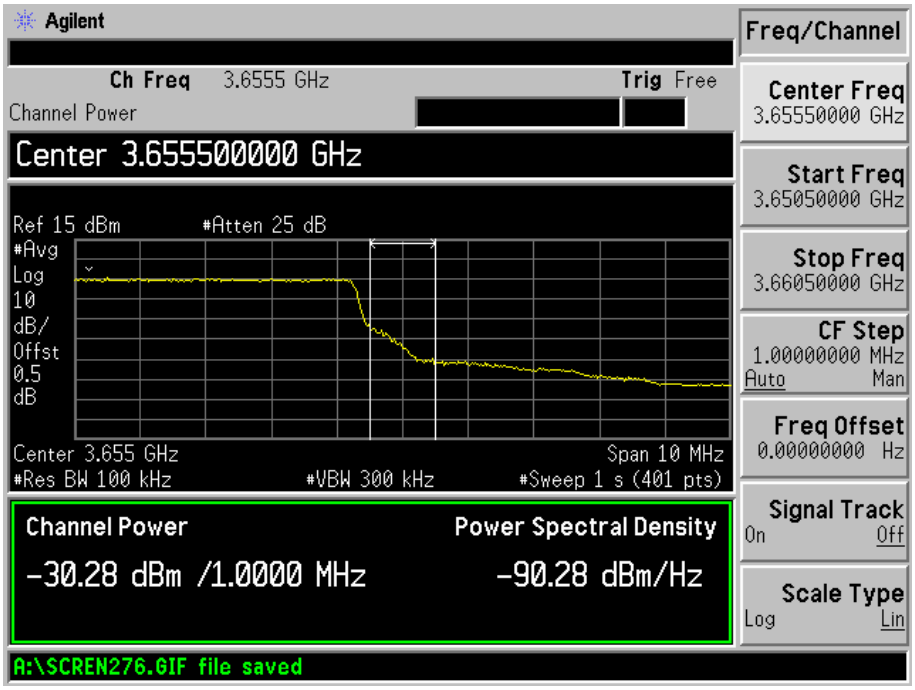
Band-edge Antenna Port 1

Test Mode	Channel	Band edge	Maximum Emission [dBm]	Limit [dBm]
5MHz Bandwidth	Low Channel	Left Side	-31.43	-13
		Right Side	-29.99	-13
	Middle Channel	Left Side	-29.39	-13
		Right Side	-30.15	-13
	High Channel	Left Side	-29.45	-13
		Right Side	-29.70	-13
10MHz Bandwidth	Low Channel	Left Side	-34.56	-13
		Right Side	-35.33	-13
	Middle Channel	Left Side	-34.28	-13
		Right Side	-35.80	-13
	High Channel	Left Side	-35.45	-13
		Right Side	-35.63	-13
15MHz Bandwidth	Low Channel	Left Side	-35.09	-13
		Right Side	-35.14	-13
	Middle Channel	Left Side	-35.14	-13
		Right Side	-35.24	-13
	High Channel	Left Side	-35.02	-13
		Right Side	-35.57	-13
20MHz Bandwidth	Low Channel	Left Side	-38.55	-13
		Right Side	-38.12	-13
	High Channel	Left Side	-38.02	-13
		Right Side	-38.09	-13

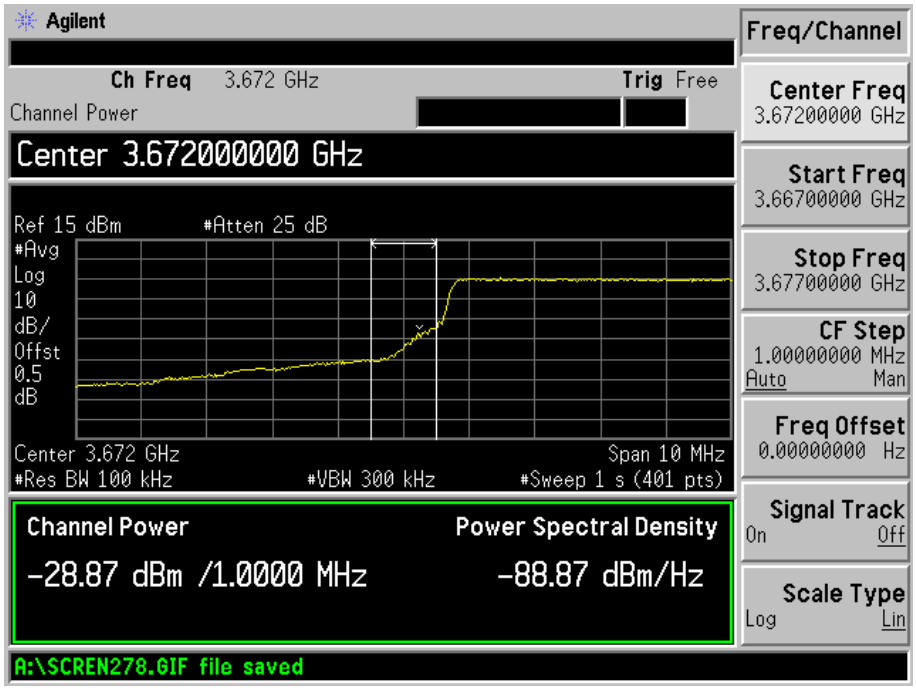
Ant Port 0
For 5 MHz Bandwidth
Low Channel Left Side



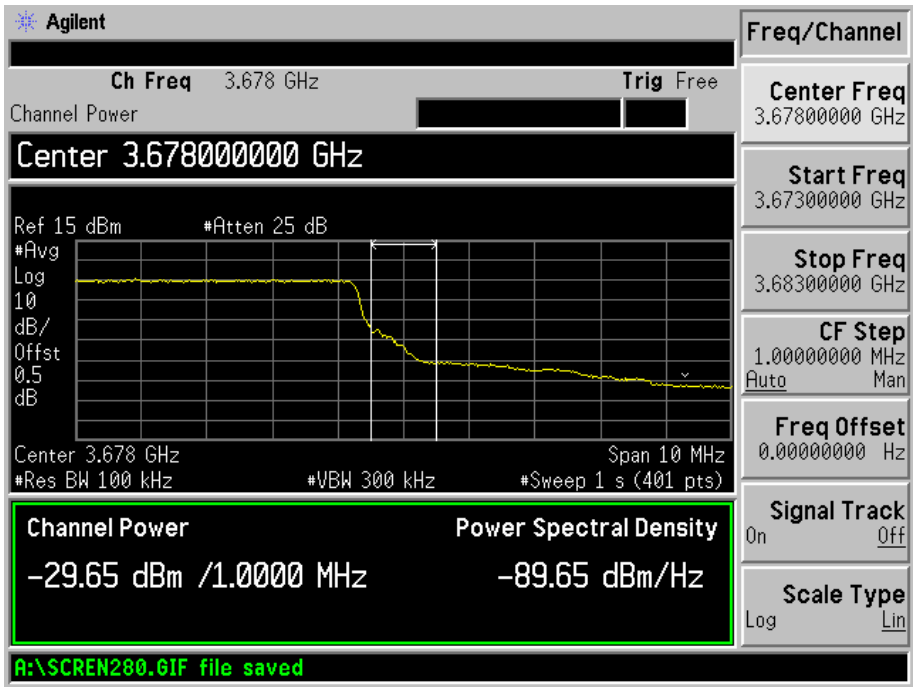
Low Channel Right Side



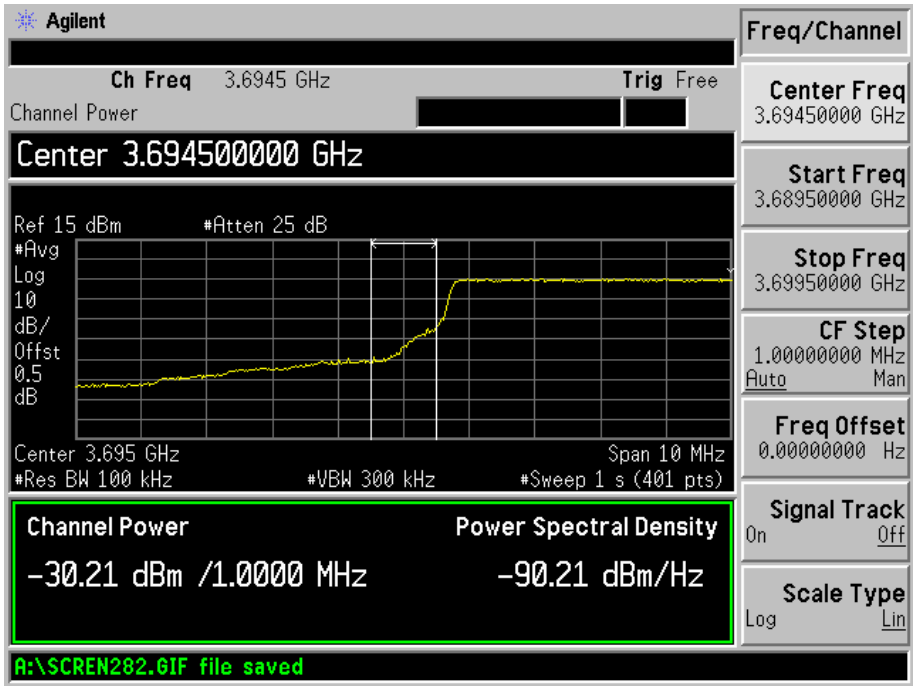
Middle Channel Left Side



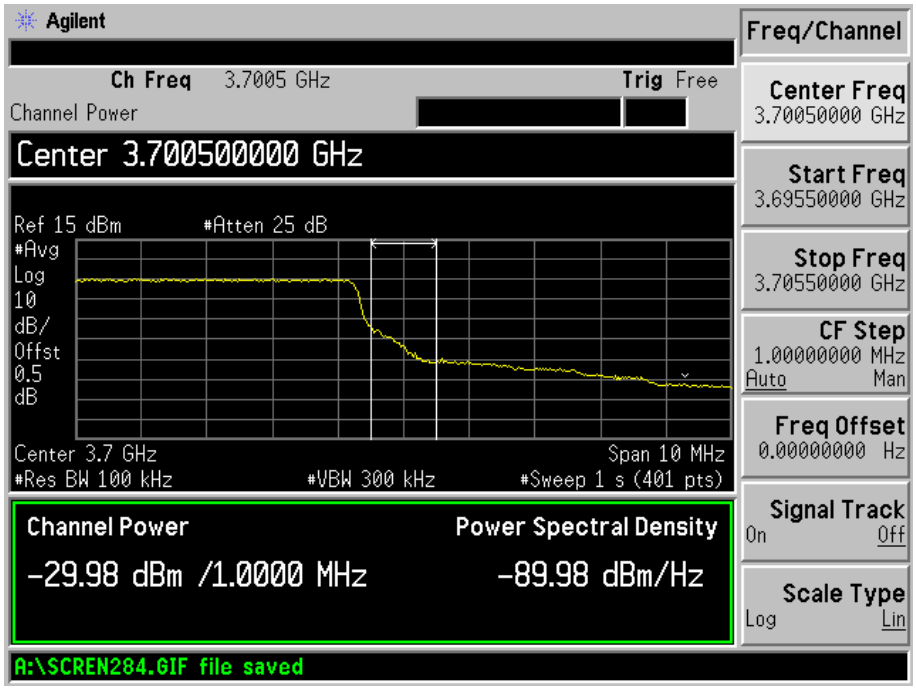
Middle Channel Right Side



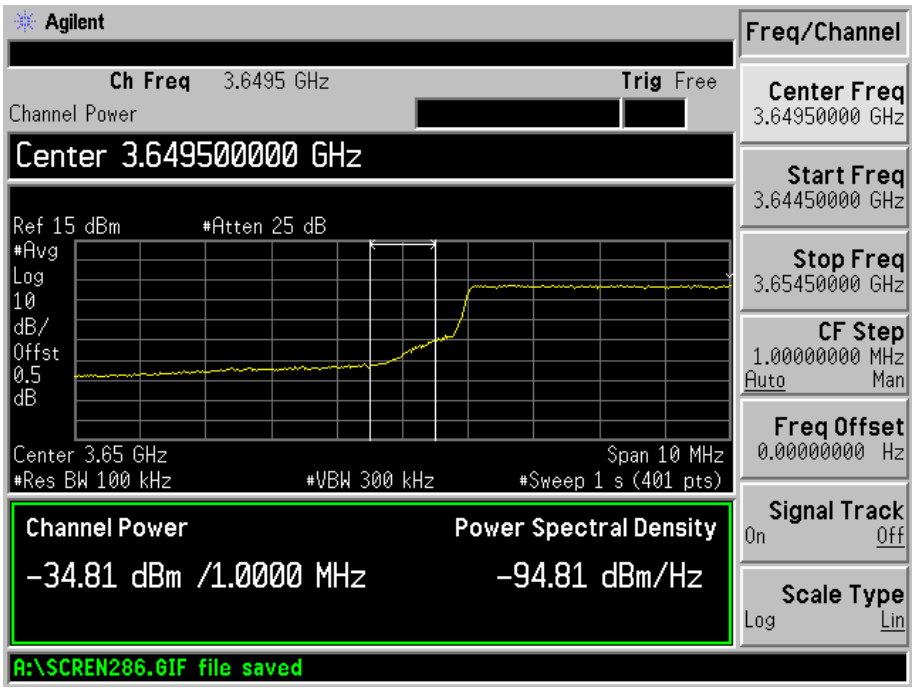
High Channel Left Side



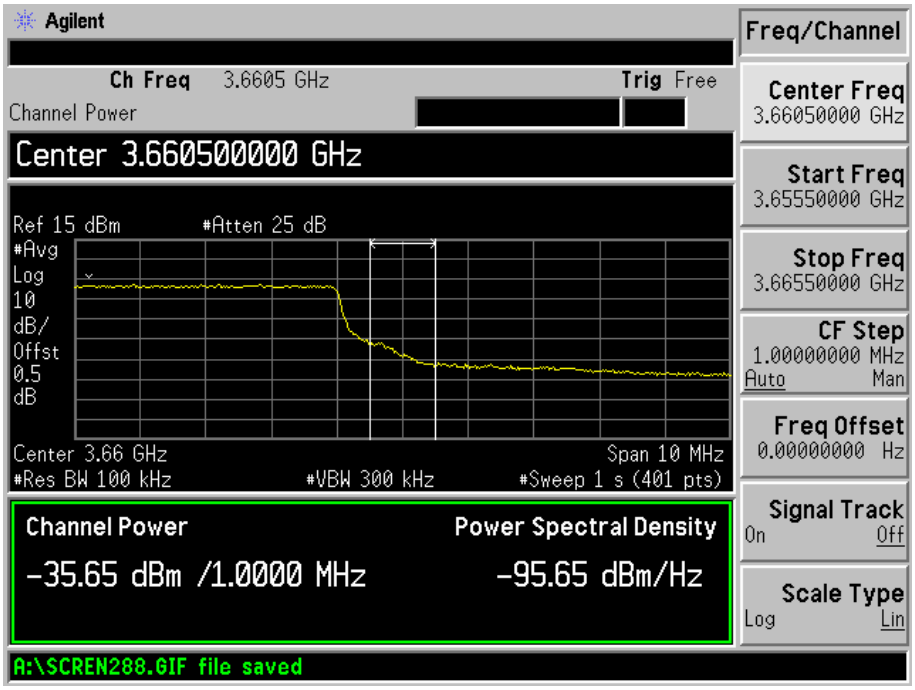
High Channel Right Side



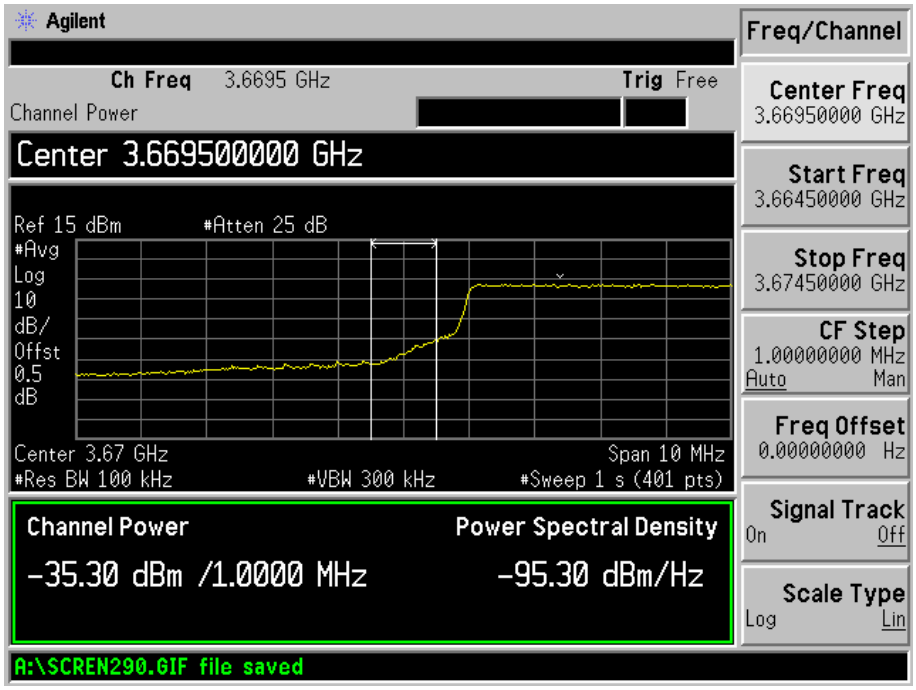
For 10 MHz Bandwidth
Low Channel Left Side



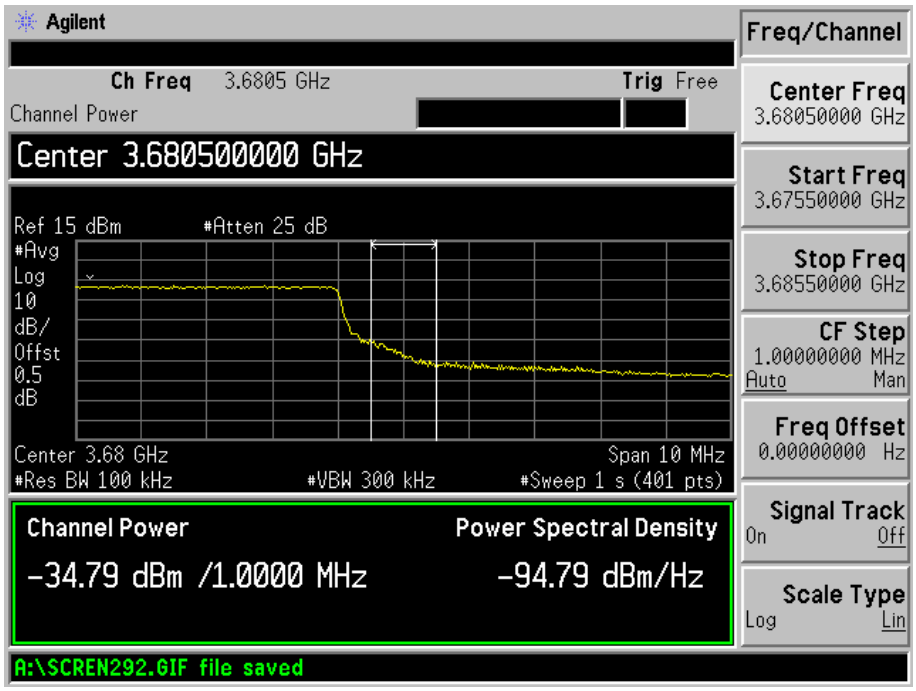
Low Channel Right Side



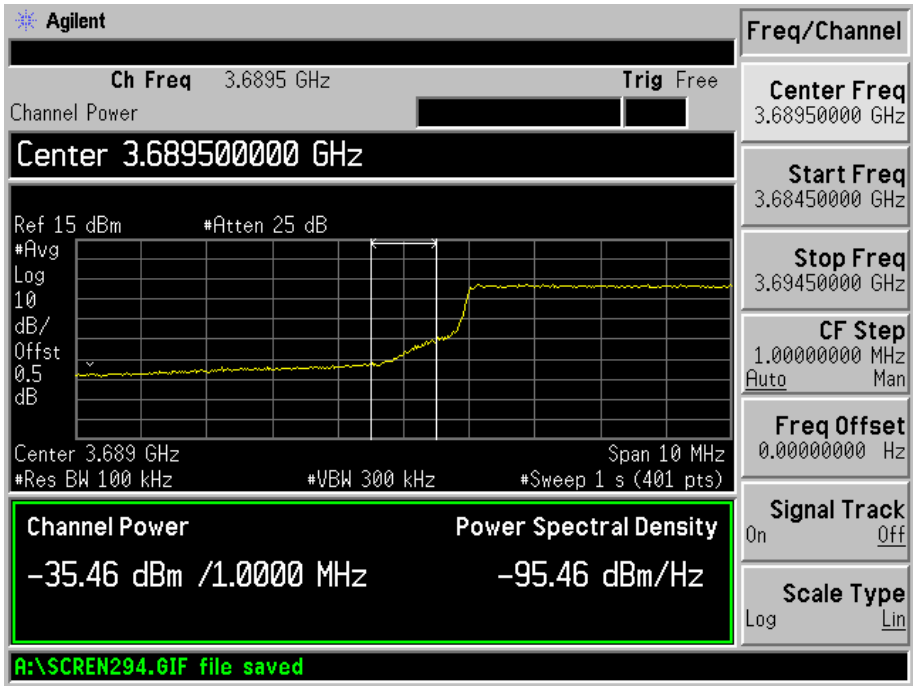
Middle Channel Left Side



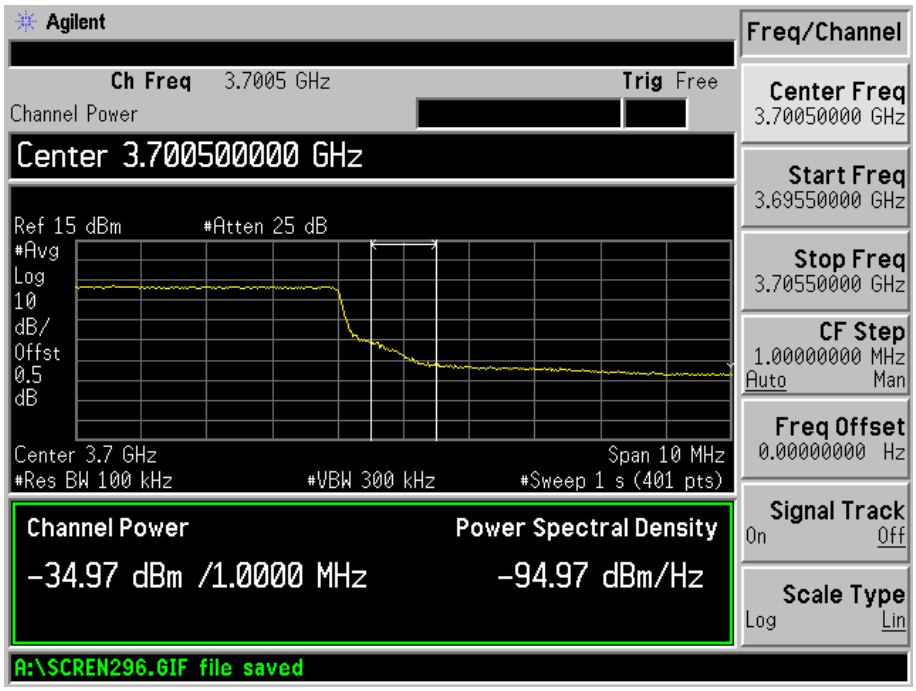
Middle Channel Right Side



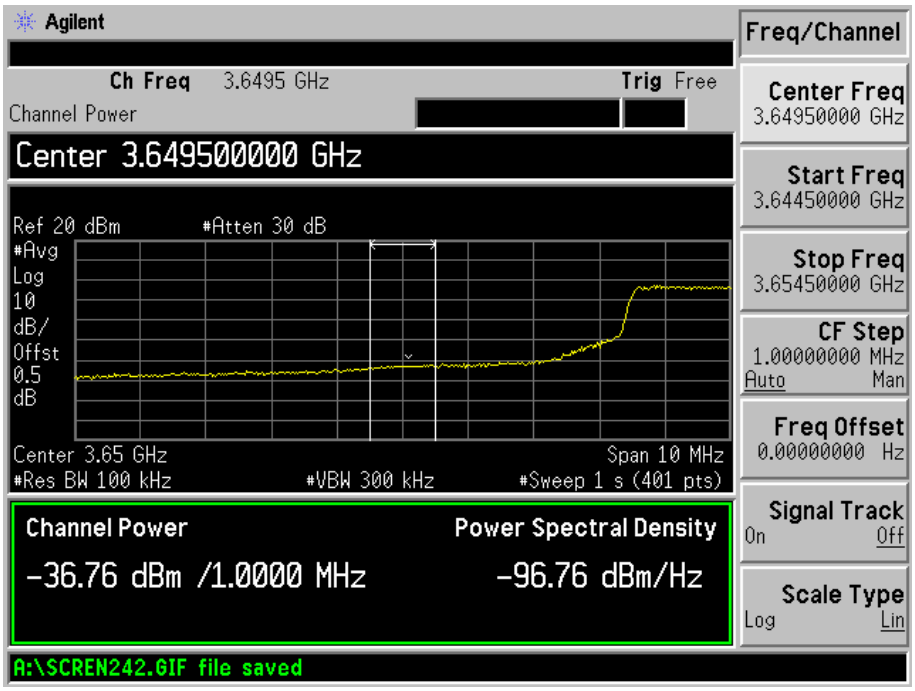
High Channel Left Side



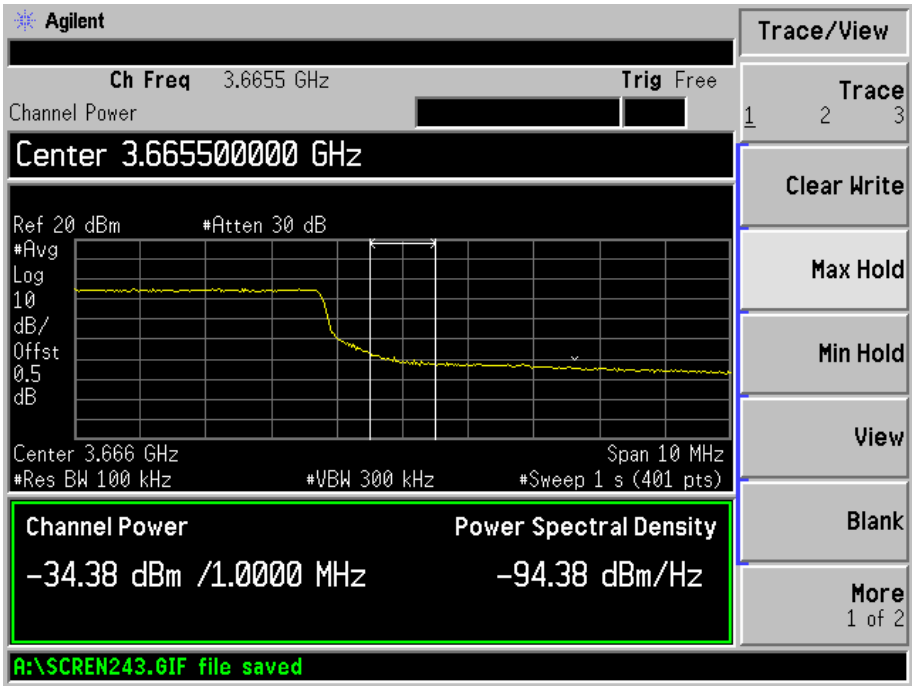
High Channel Right Side



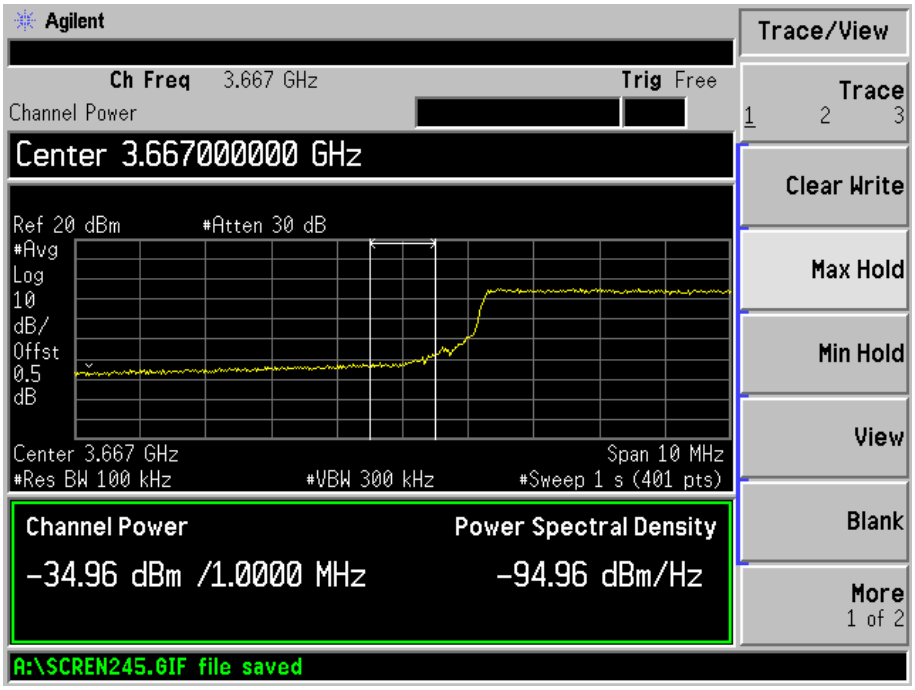
For 15 MHz Bandwidth
Low Channel Left Side



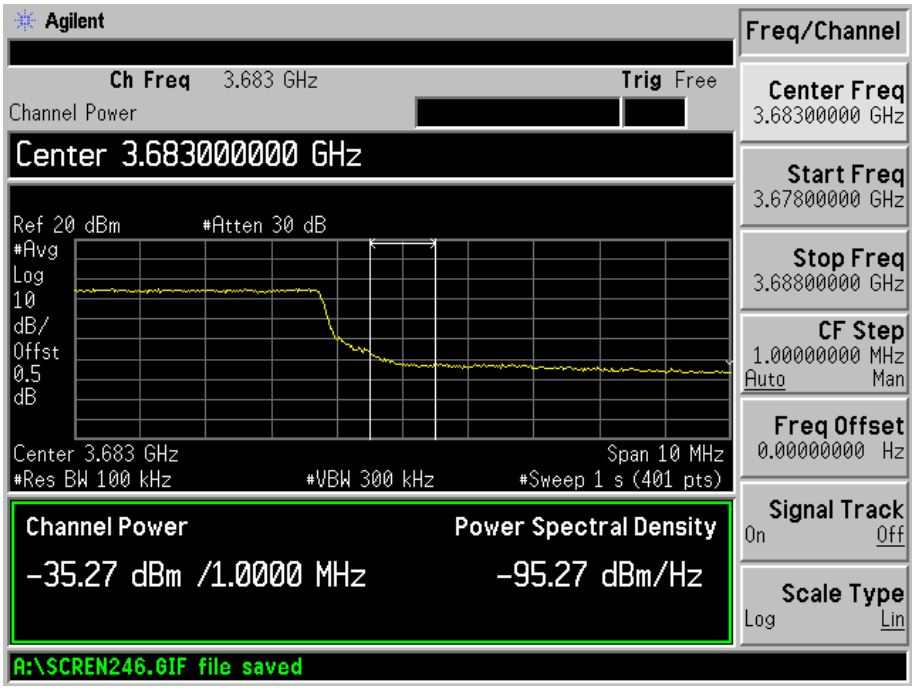
Low Channel Right Side



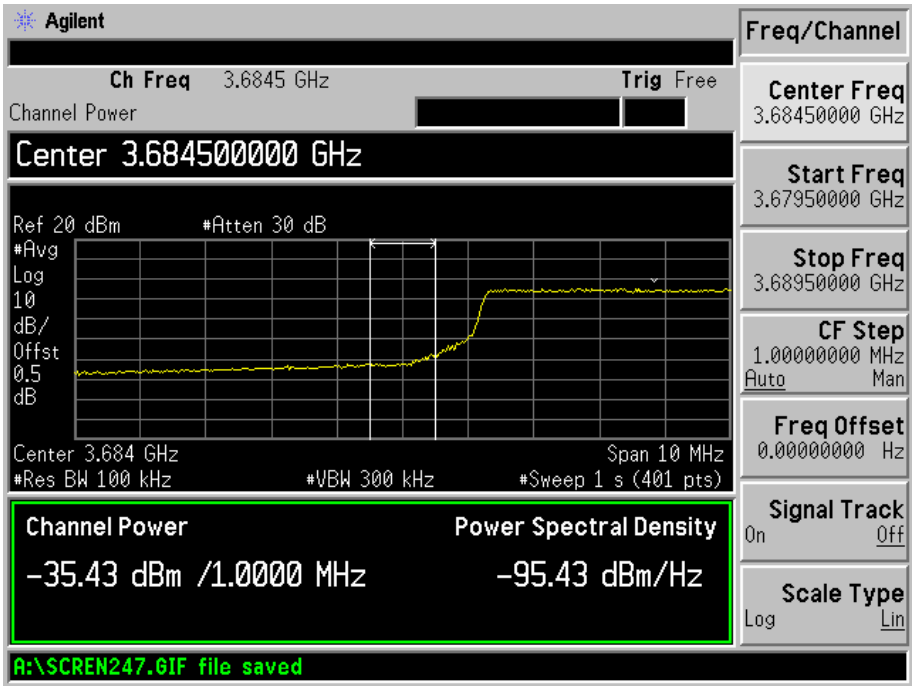
Middle Channel Left Side



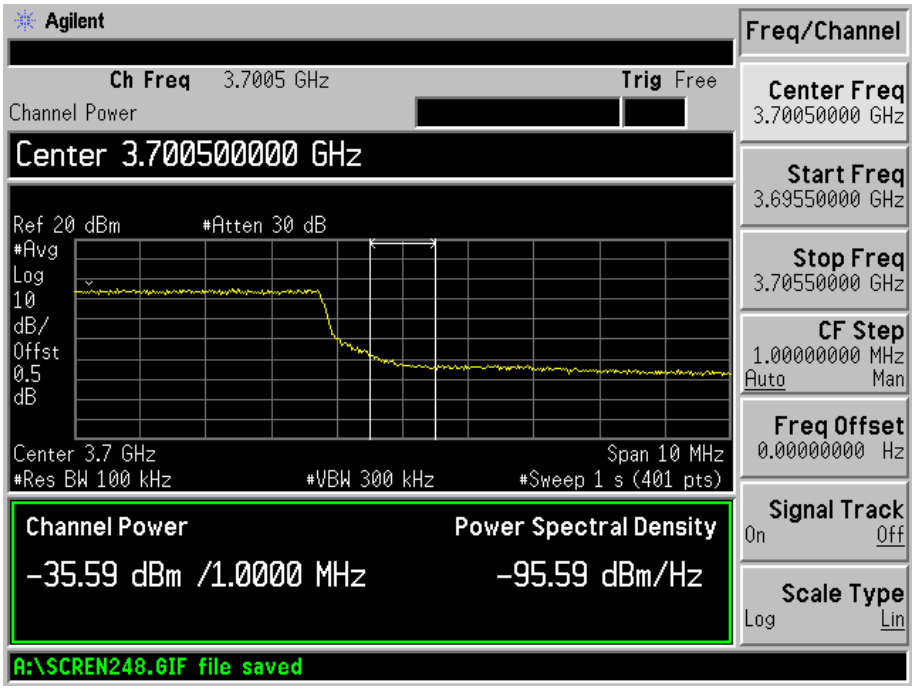
Middle Channel Right Side



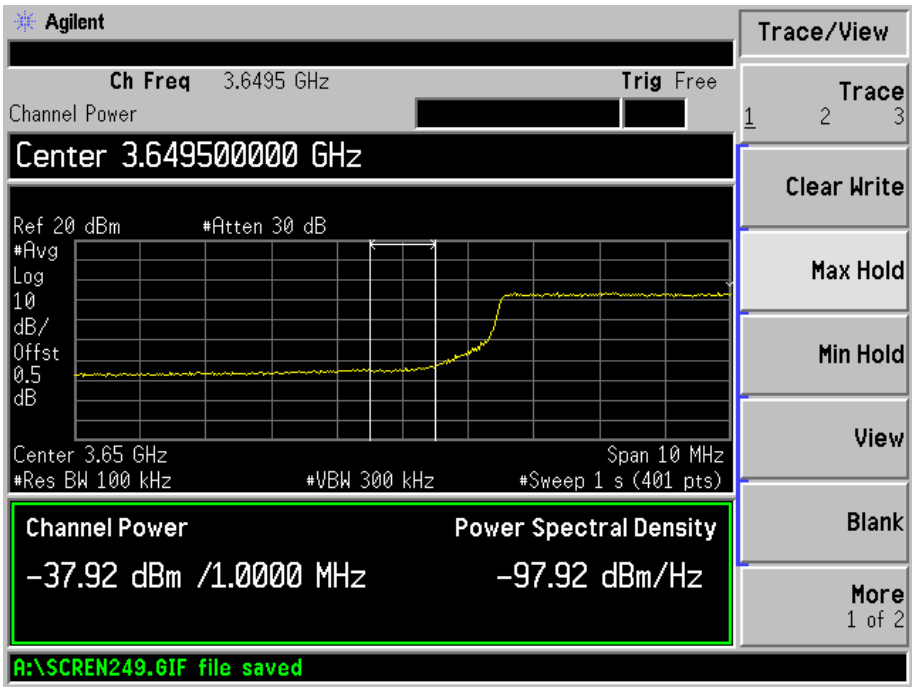
High Channel Left Side



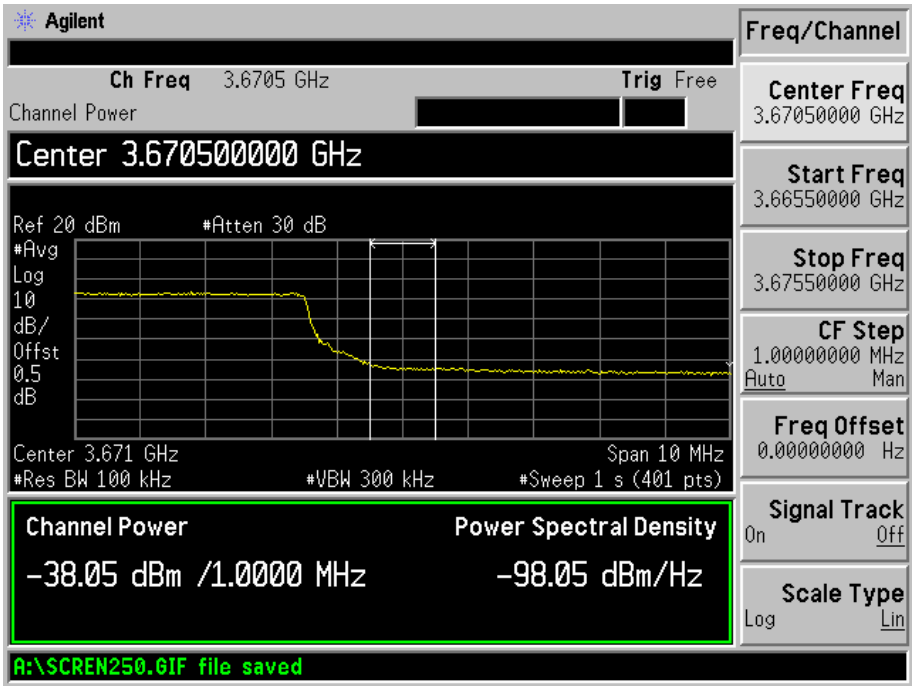
High Channel Right Side



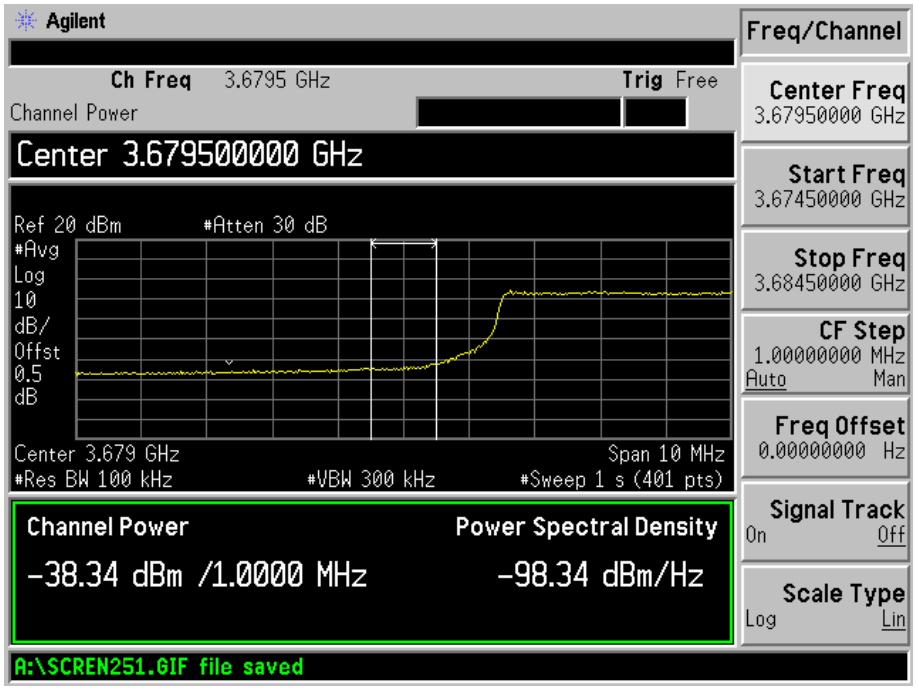
For 20 MHz Bandwidth
Low Channel Left Side



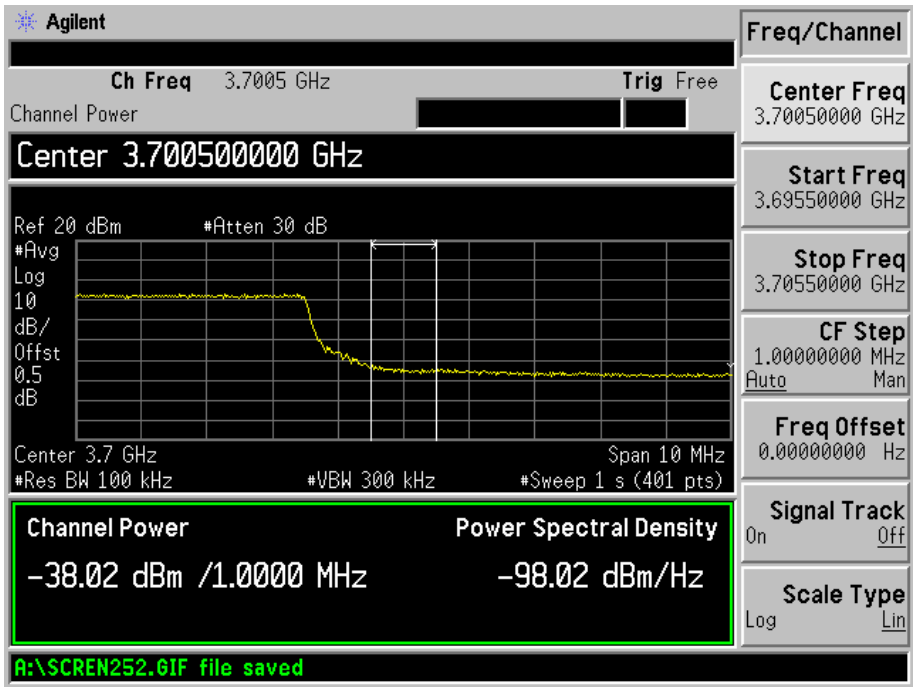
Low Channel Right Side



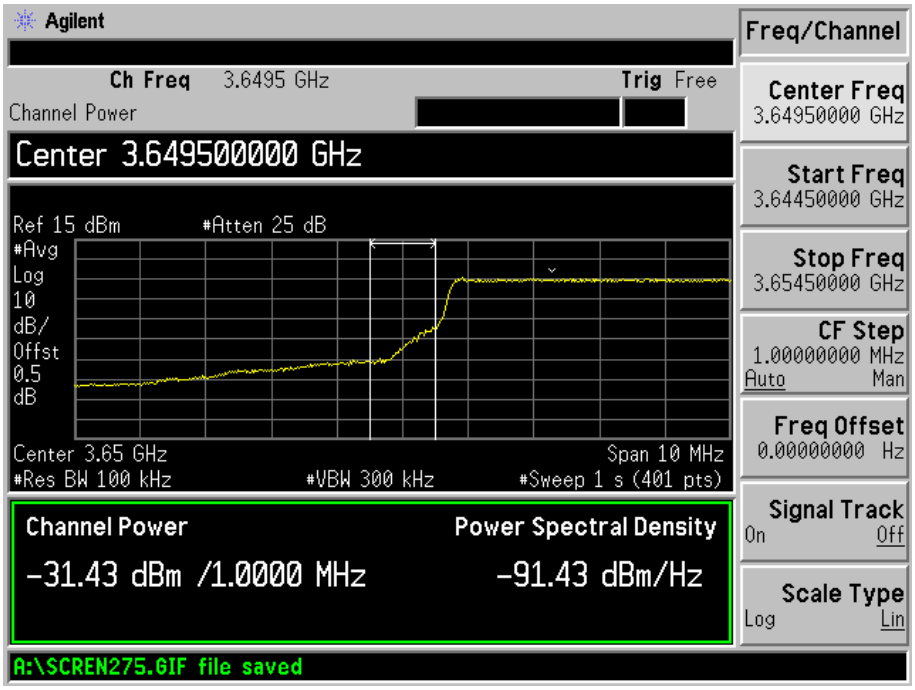
High Channel Left Side



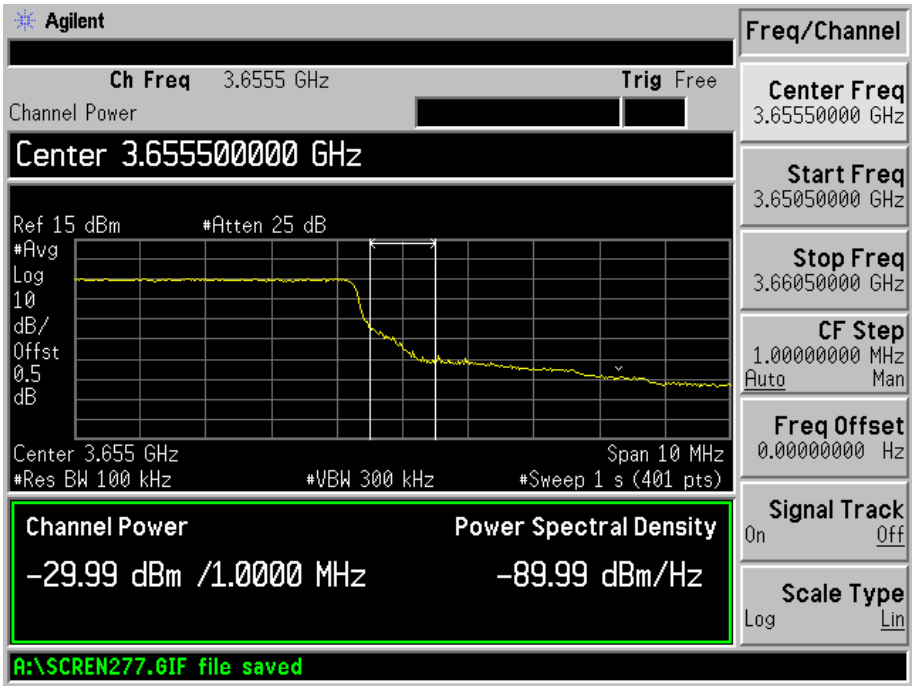
High Channel Right Side



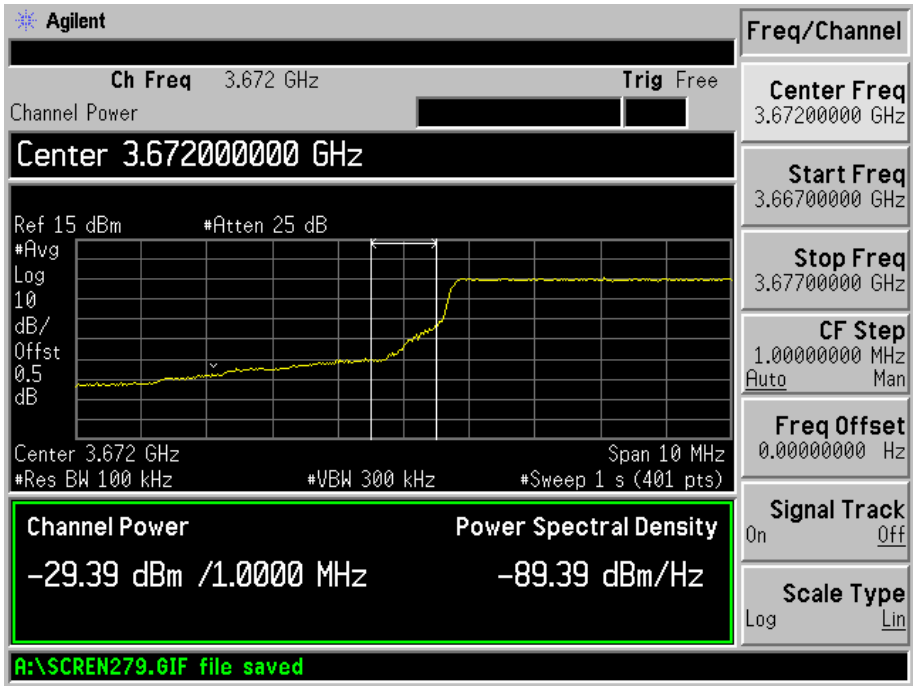
Ant Port 1
For 5 MHz Bandwidth
Low Channel Left Side



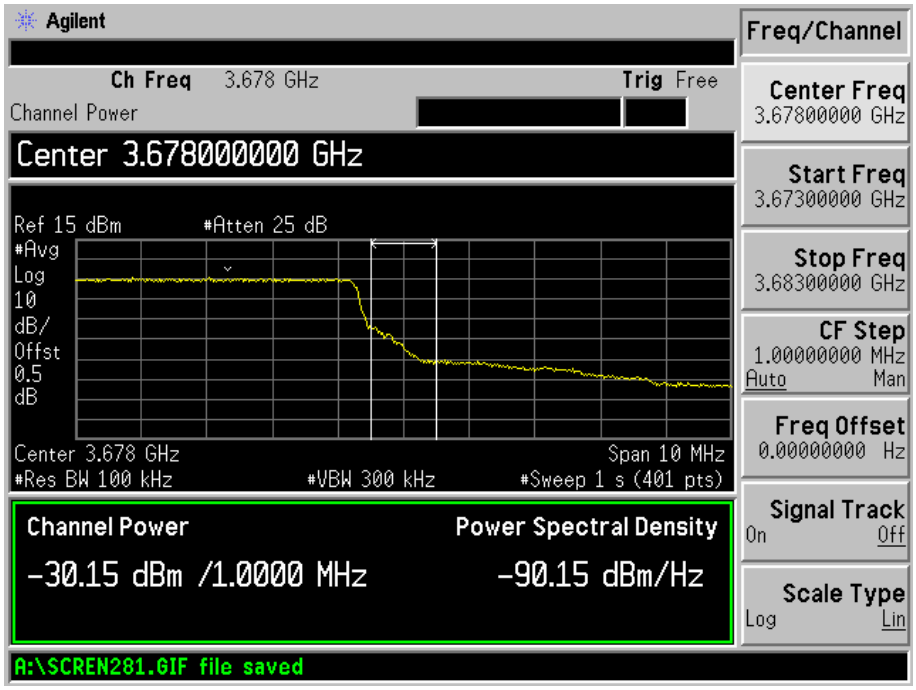
Low Channel Right Side



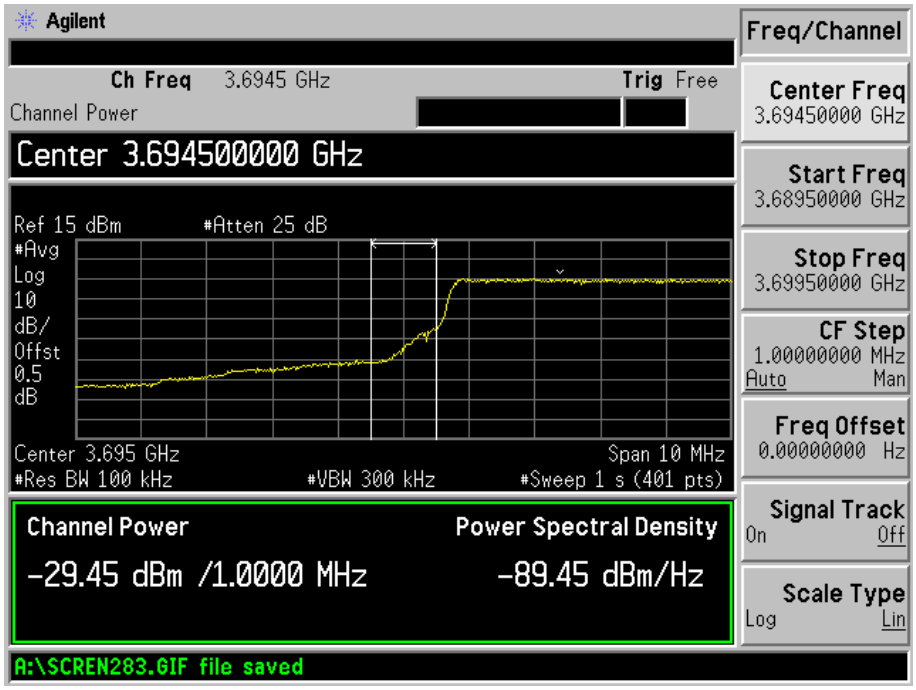
Middle Channel Left Side



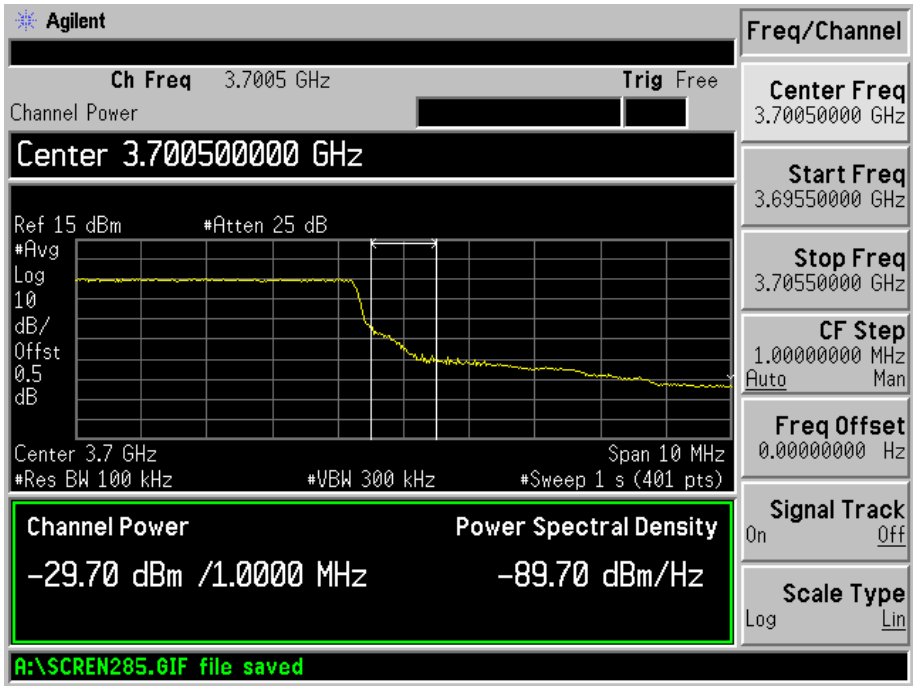
Middle Channel Right Side



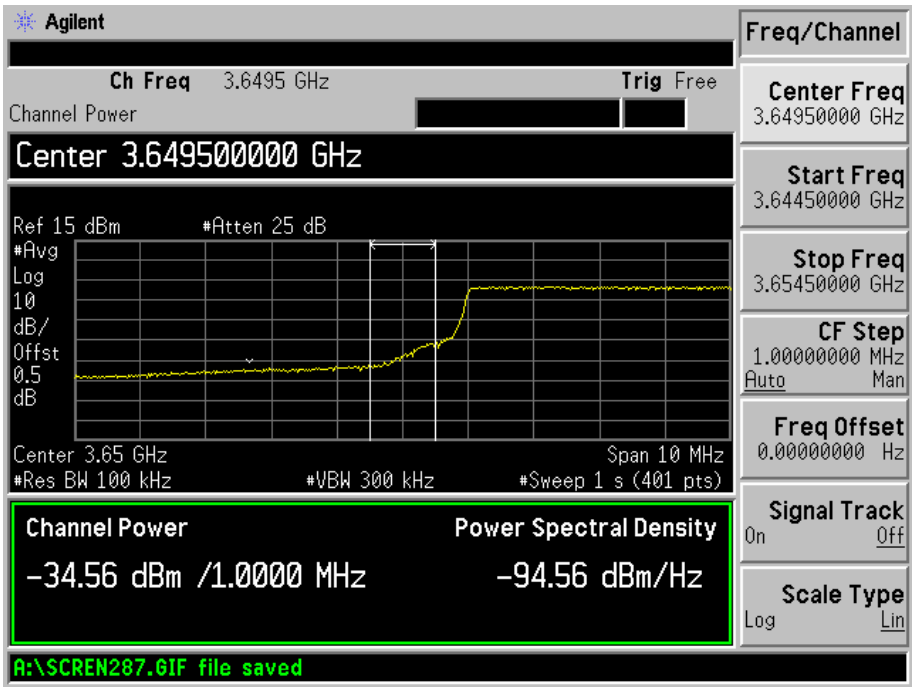
High Channel Left Side



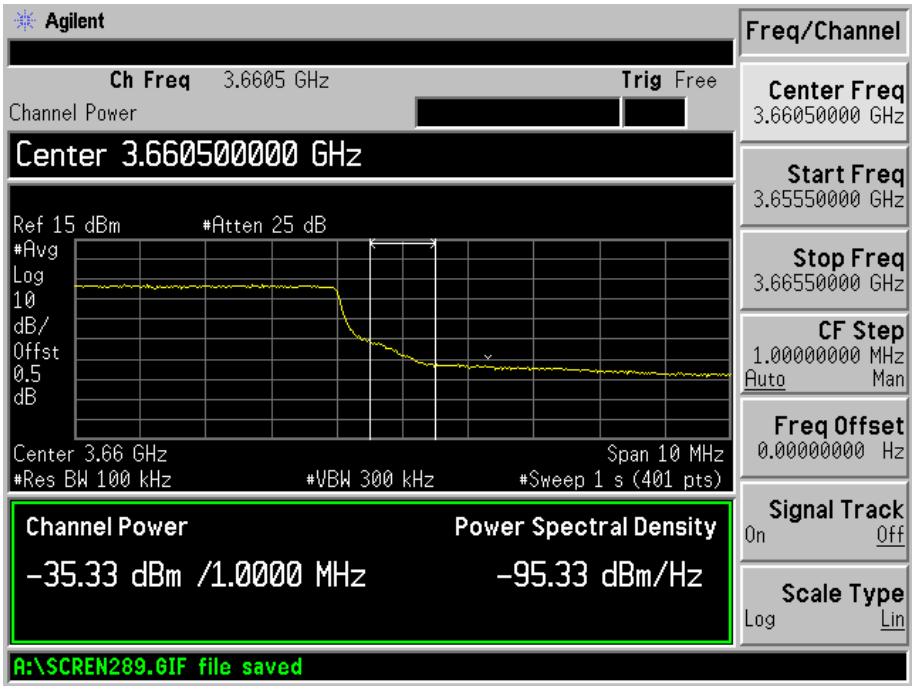
High Channel Right Side



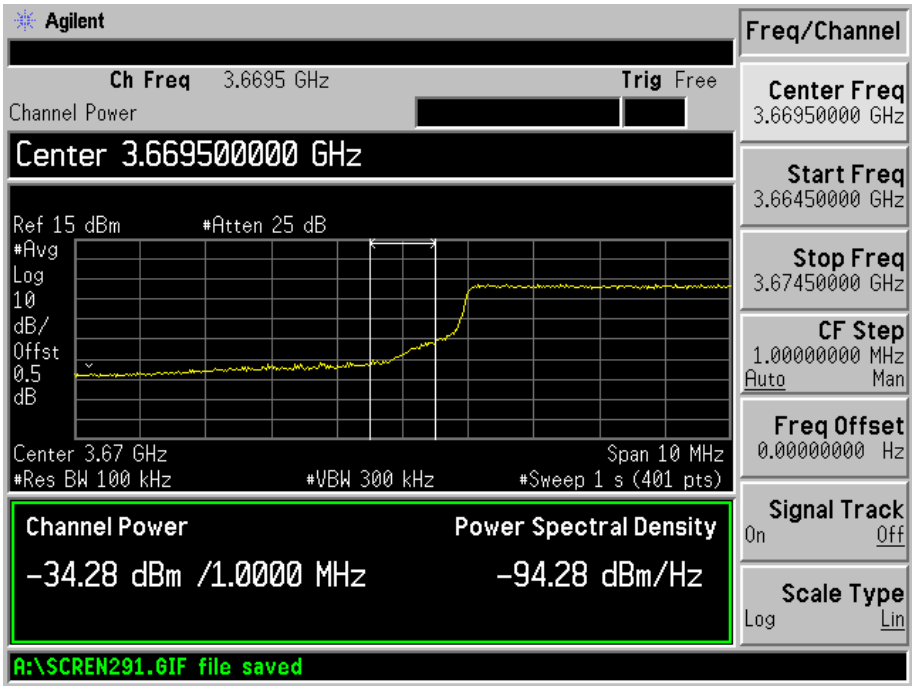
For 10 MHz Bandwidth
Low Channel Left Side



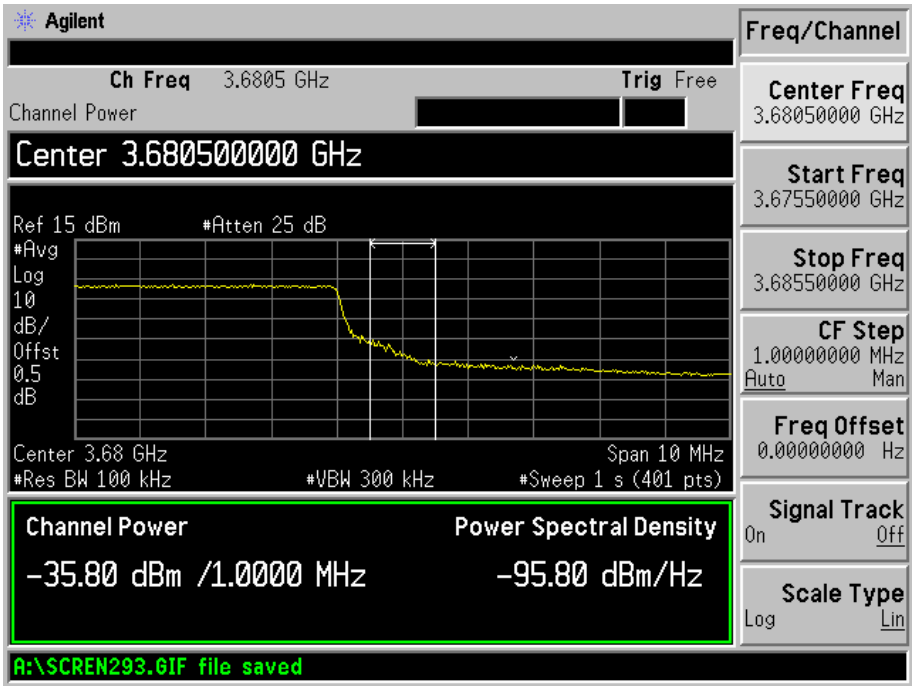
Low Channel Right Side



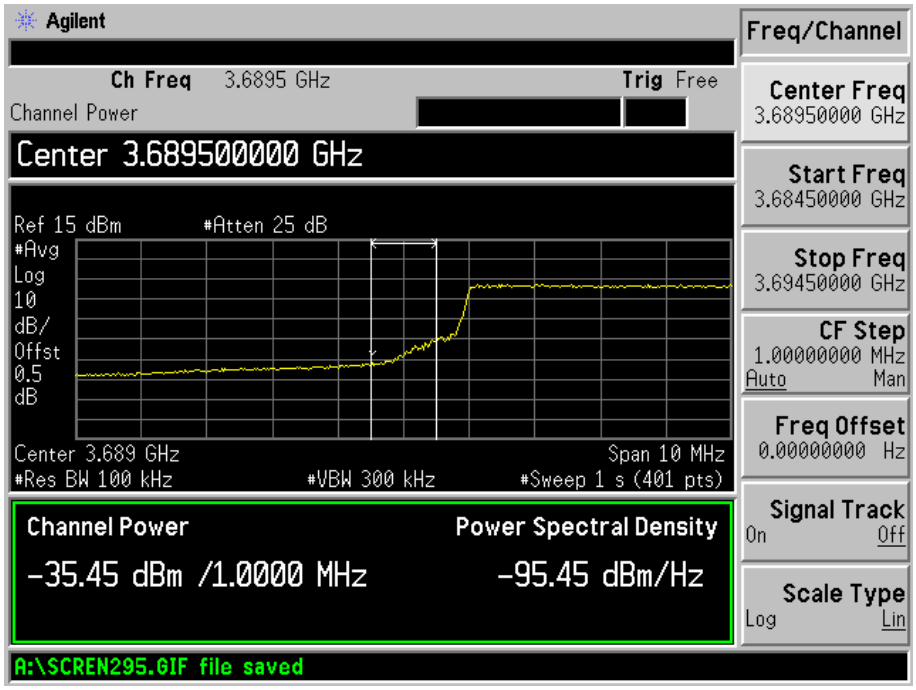
Middle Channel Left Side



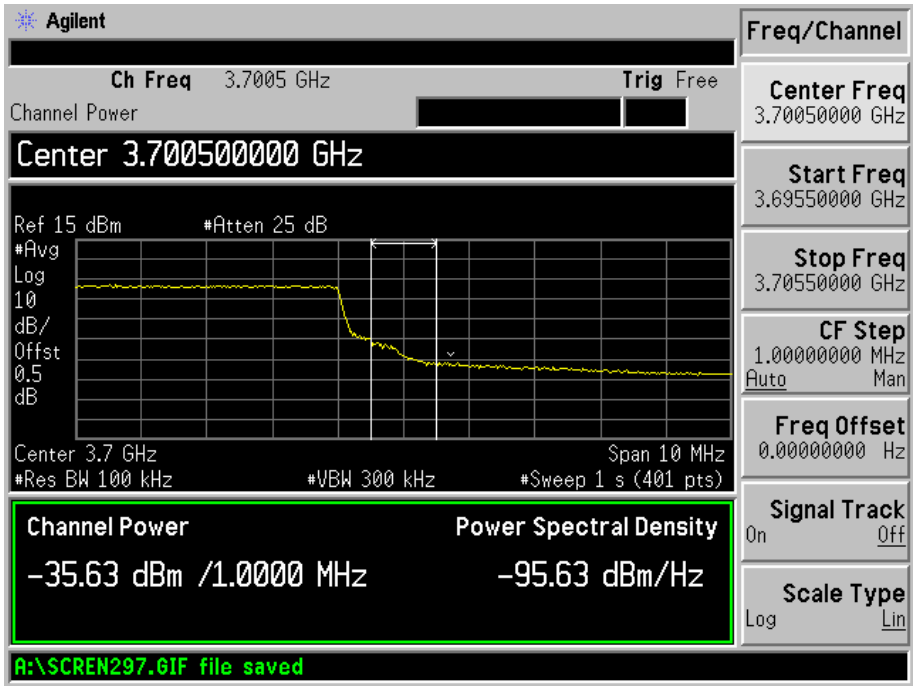
Middle Channel Right Side



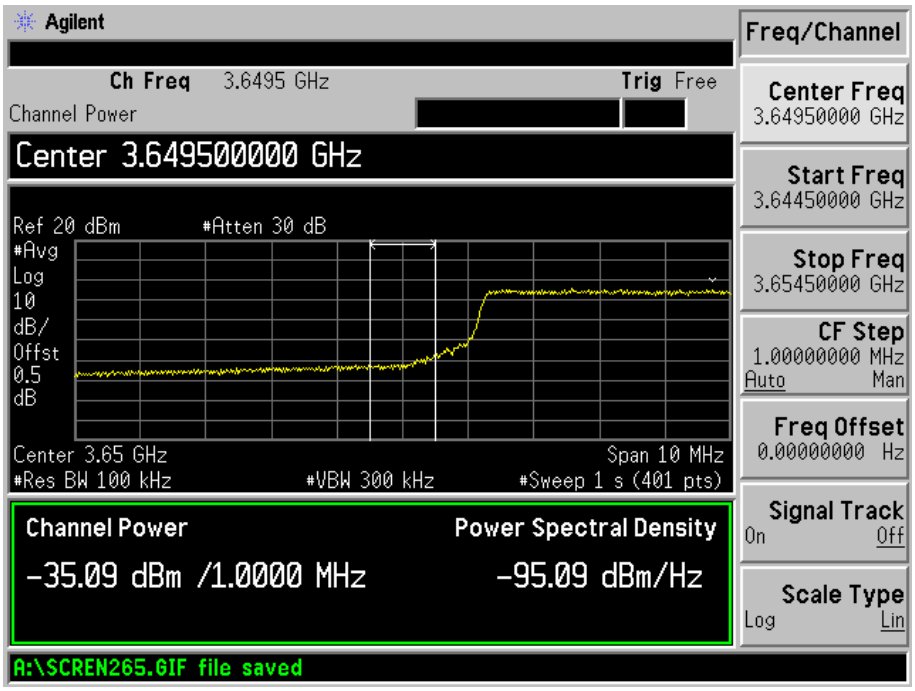
High Channel Left Side



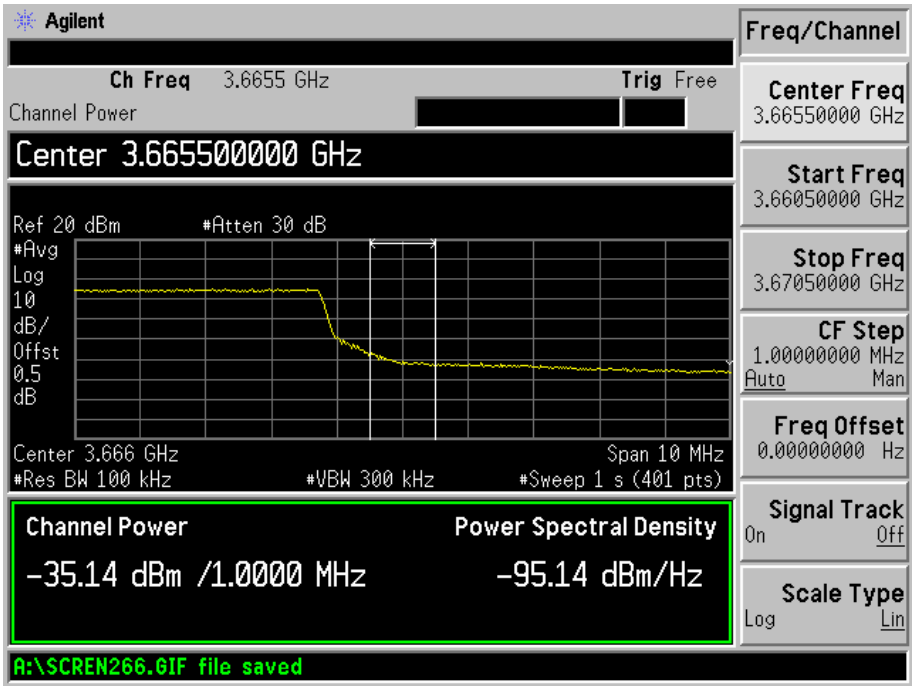
High Channel Right Side



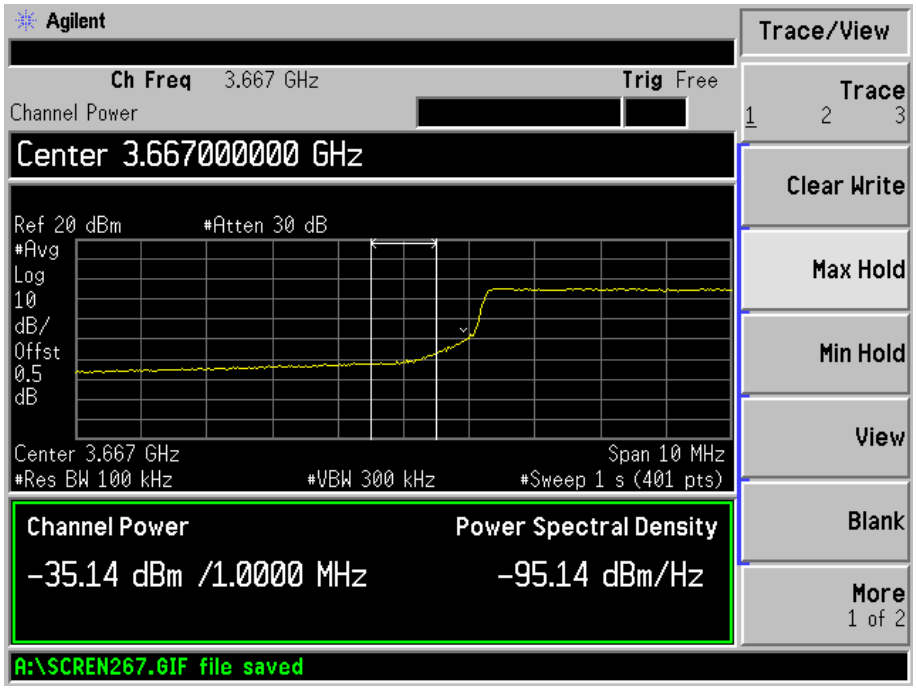
For 15 MHz Bandwidth
Low Channel Left Side



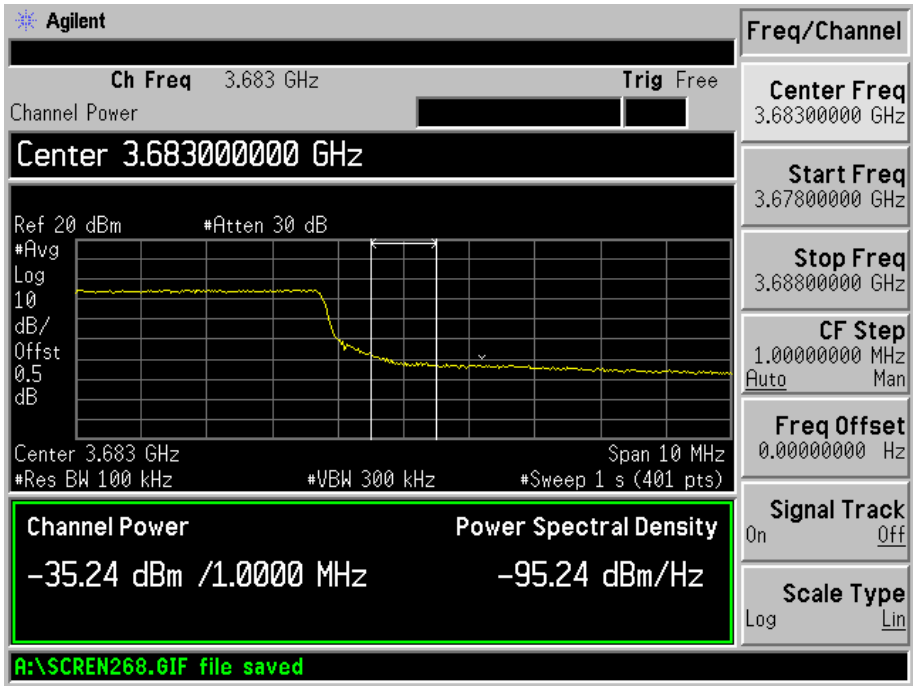
Low Channel Right Side



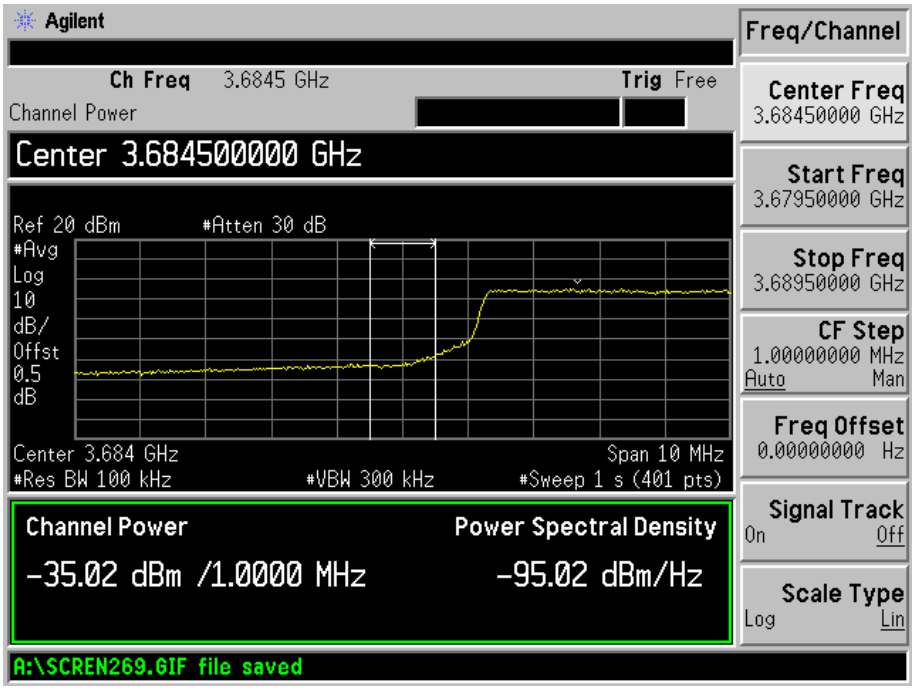
Middle Channel Left Side



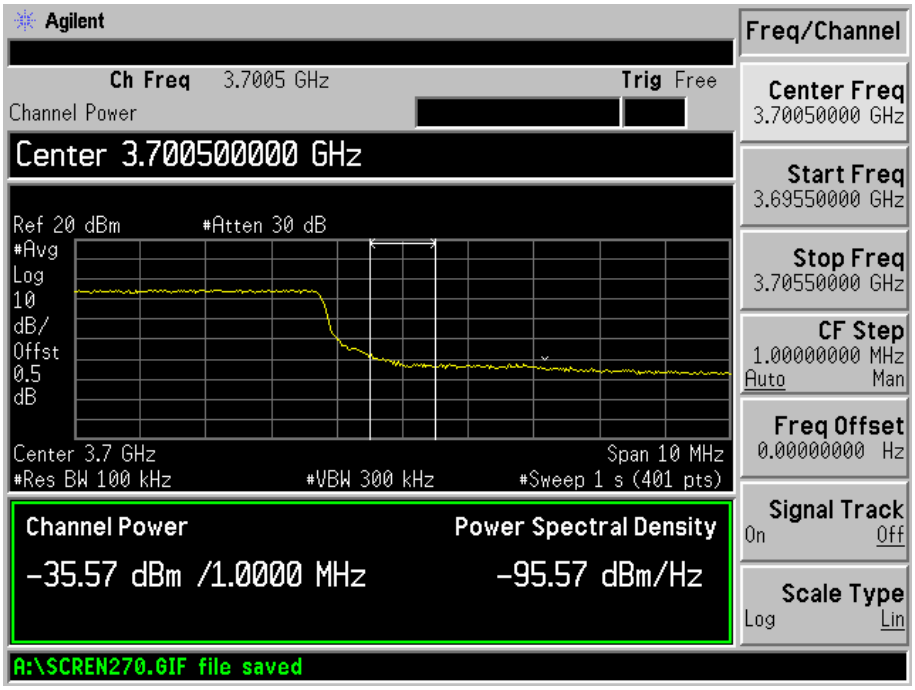
Middle Channel Right Side



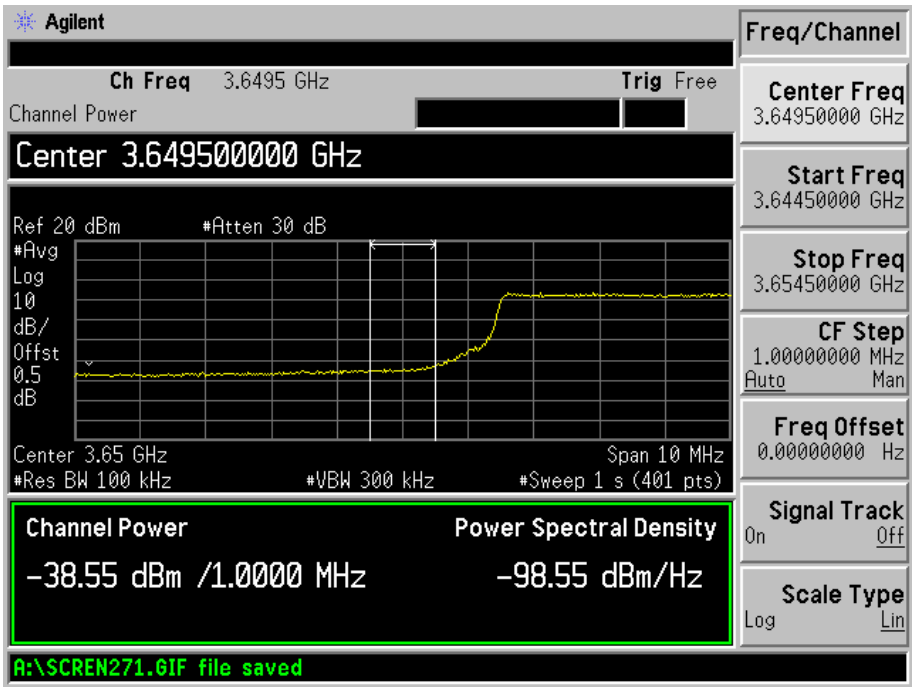
High Channel Left Side



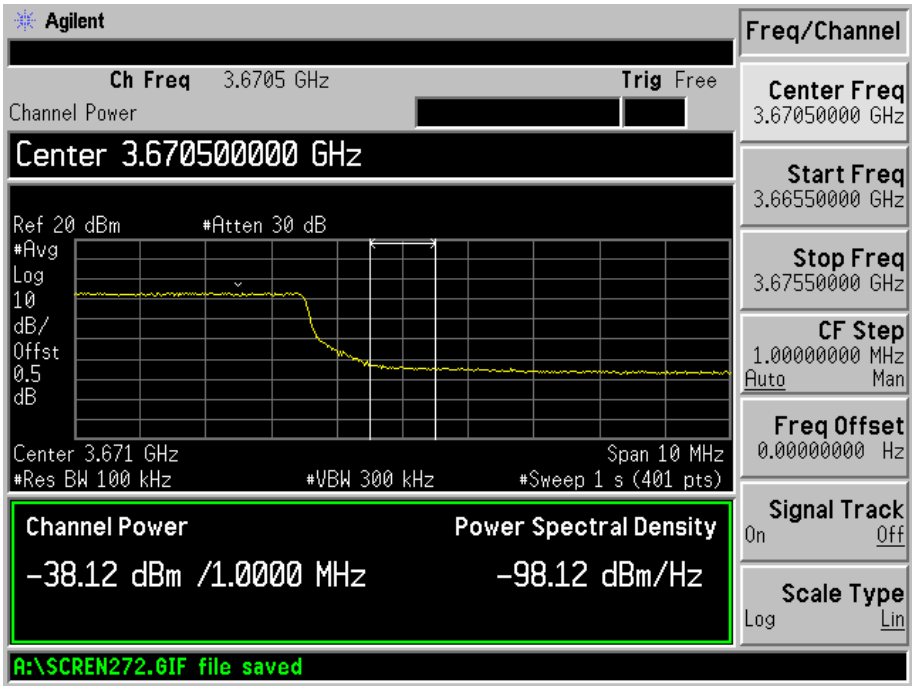
High Channel Right Side



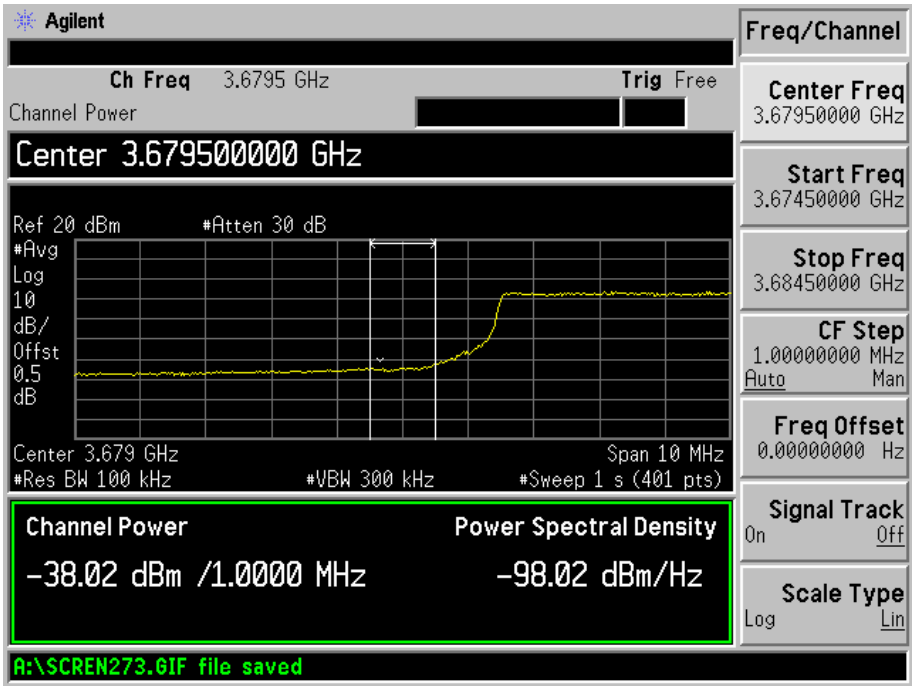
For 20 MHz Bandwidth
Low Channel Left Side



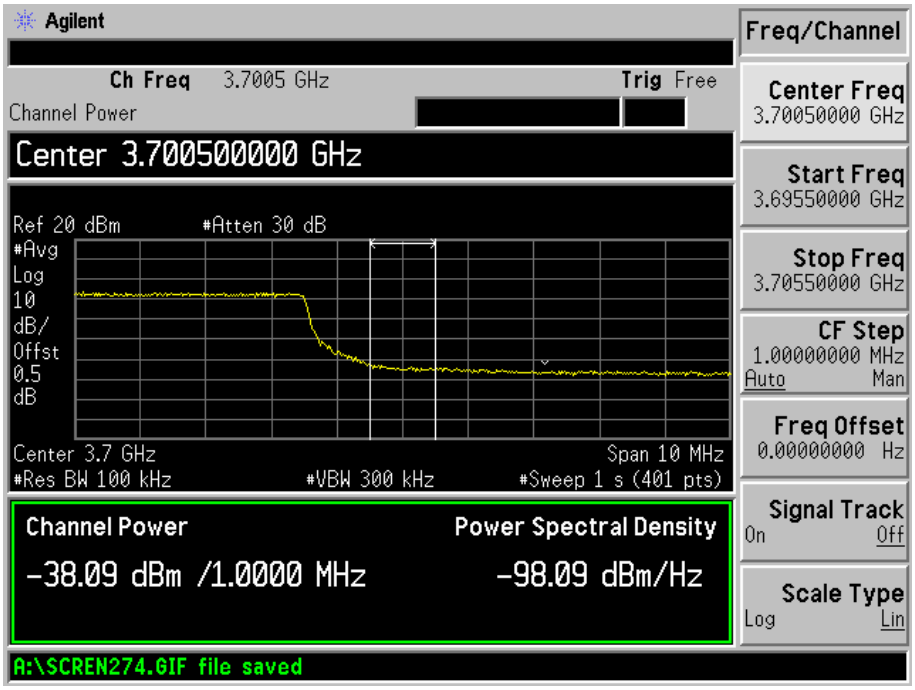
Low Channel Right Side



High Channel Left Side



High Channel Right Side



9. Frequency Stability

9.1 Standard Applicable

According to §90.213, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Minimum Frequency Stability for Fixed and base station

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	[1][2][3]100	100	200
25-50	20	20	50
72-76	5		50
150-174	[5][11]5	[6]5	[4][6]50
216-220	1.0		1.0
220-222[12]	0.1	1.5	1.5
421-512	[7][11][14]2.5	[8]5	[8]5
806-809	[14]1.0	1.5	1.5
809-824	[14]1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	[14]0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928[13]	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	[9]300	300	300
Above 2450[10]			

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-30°C to +50°C	Normal

9.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

For 5MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	108	0.0294
40	120	123	0.0335
30	120	114	0.0310
20	120	113	0.0307
10	120	113	0.0307
0	120	106	0.0288
-10	120	105	0.0286
-20	120	106	0.0288
-30	120	126	0.0343

For 10MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	109	0.0297
40	120	112	0.0305
30	120	118	0.0321
20	120	104	0.0283
10	120	104	0.0283
0	120	113	0.0307
-10	120	110	0.0299
-20	120	120	0.0327
-30	120	105	0.0286

For 15MHz Bandwidth

Reference Frequency(High Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	130	0.0354
40	120	118	0.0321
30	120	111	0.0302
20	120	115	0.0313
10	120	112	0.0305
0	120	101	0.0275
-10	120	126	0.0343
-20	120	125	0.0340
-30	120	129	0.0351

For 20MHz Bandwidth

Reference Frequency(High Channel): 3690 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	107	0.0290
40	120	130	0.0352
30	120	111	0.0301
20	120	122	0.0331
10	120	118	0.0320
0	120	120	0.0325
-10	120	106	0.0287
-20	120	103	0.0279
-30	120	105	0.0285

So, Frequency Stability Versus Input Voltage is:

For 5MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	85%	106	0.0288
	100%	113	0.0307
	115%	130	0.0354

For 10MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	85%	126	0.0343
	100%	104	0.0283
	115%	136	0.0370

For 15MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	85%	112	0.0305
	100%	115	0.0313
	115%	103	0.0280

For 20MHz Bandwidth

Reference Frequency(High Channel): 3690 MHz			
Environment Temperature (°C)	Power Supplied	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	85%	139	0.0377
	100%	122	0.0331
	115%	169	0.0458

10. Contention-based protocol

10.1 Standard Applicable

A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.

10.2 Test Procedure

All tests were performed as conducted measurements; the antenna ports gave independent access to horizontal and vertical antenna connections.

1) Power on EUT, set LBT state including Channel on Threshold level and Channel off Threshold level (these two levels can be configured by operator)
2) Adjust output power of signal generator to act as an interference at the antenna port
3) Monitor EUT state on the control computer

10.3 Test Results

Pi: interference power level
P1: channel off threshold power level
P2: channel on threshold power level
DL: down link
Concurrent: clock alignment between interference signal and wanted signal
Non-concurrent: no clock alignment between interference signal and wanted signal

Note: CW signal was used as interference for unlike systems; Interference power level at antenna port can be detected by EUT and observed on the control computer.

LBT State	Channel BW	Channel off Threshold Level	Channel on Threshold Level	Interference Signal	Result
On	20MHz	-80dBm	-84dBm	Same frequency concurrent	Observed P_i>P1: DL off; Observed P_i<P2: DL on
On	20MHz	-80dBm	-84dBm	Adjacent channel concurrent	Observed P_i>P1: DL off; Observed P_i<P2: DL on
On	20MHz	-80dBm	-84dBm	Same frequency Non-concurrent	Observed P_i>P1: DL off; Observed P_i<P2: DL on
On	20MHz	-80dBm	-84dBm	Different frequency Non-concurrent	Observed P_i>P1: DL off; Observed P_i<P2: DL on
Off	20MHz	-80dBm	-84dBm	Same frequency concurrent	Observed P_i>P1: (Long term) DL always on

******* END OF REPORT *******