Nemko Korea Co., Ltd.

300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-City, Gyeonggi-Do, KOREA

TEL:+82 31 322 2333 FAX:+82 31 322 2332

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

SK telesys Co., Ltd.
10F Chorim Bldg.6-3, Sunae-Dong, Bundang-Gu,
Seongnam-Si
Seoul, Korea, (Post code : 150-871)

Dates of Issue : March 6, 2010
Test Report No. : NK-10-R-012
Test Site : Nemko Korea Co., Ltd.

FCC ID	VAWSMT-CW230
Brand Name	**SK telesys**
CONTACT PERSON	**SK telesys Co., Ltd.** **10F Chorim Bldg.6-3, Sunae-Dong, Bundang-Gu, Seongnam-Si** **Mr. Seung Moon Lee** **phone No. : +82 31 786-5764**

Applied Standard: FCC 47 CFR Part 27 & 2
EUT Type: WiMAX CPE

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Mar. 06. 2010

Tested By : Minchul Shin
Engineer

Mar. 06. 2010

Reviewed By : H.H. Kim
Manager & Chief Engineer

TABLE OF CONTENTS

1. Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC Part 2 & Part 27.

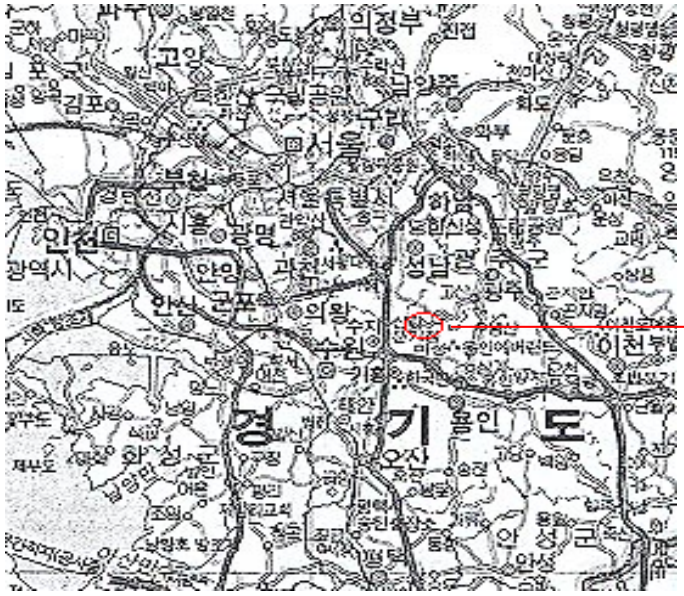
Responsible Party :	SK telesys Co., Ltd.
Contact Person :	Mr. Seung Moon Lee Tel No. : +82 31 786-5764
Manufacturer :	SK telesys Co., Ltd. 10F Chorim Bldg.6-3, Sunae-Dong, Bundang-Gu, Seongnam-Si

- FCC ID: VAWSMT-CW230
- Model: SMT-CW230
- Brand Name: SK telesys
- EUT Type: WiMAX CPE
- Electric Rating: AC/DC Adapter output 5.0Vdc
- Applied Standard: FCC 47 CFR Part 2
FCC 47 CFR Part 27
- Test Procedure(s): ANSI C63.4 (2003)
- Dates of Test: Jan. 07, 2010 ~ Mar. 04, 2010
- Place of Tests: Nemko Korea Co., Ltd.

2. Introduction (Site Description)

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from ***SK telesys Co., Ltd.***
FCC ID : ***VAWSMT-CW230***

These measurement tests were conducted at ***Nemko Korea Co., Ltd.***
The site address is 300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, KOREA
The area of Nemko Korea Corporation Ltd. Test site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of 2.948 according to ANSI C63.4 2003.



Nemko Korea Co., Ltd.
300-2,Osan-Ri, Mohyeon-Myeon,
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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. and Incheon Airport.

3. Test Conditions & EUT Information

3.1 Operating During Test

The EUT have two channels in each frequency band for 5 MHz channel bandwidth, and it has one channel only in each frequency band for 10 MHz channel bandwidth.

It was tested all channels with the maximum RF power and all test data recorded in the report. During the test, the EUT was connected to notebook PC then a test commander was executed to operate EUT continuously.

3.2 Environmental Conditions

Temperature	22 ~ 25
Relative Humidity	35% ~ 55%

3.3 Description of EUT (WiMAX part)

Frequency Band (TX/RX)	2305 MHz ~ 2315 MHz, 2350 MHz ~ 2360 MHz
Peak Output Power	5MHz BW: EIRP 1.135 W(30.55 dBm) Peak EIRP 0.179 W(22.53 dBm) Average 10MHz BW: EIRP 0.973 W(29.88 dBm) Peak EIRP 0.189 W(22.76 dBm) Average
Access / Duplex	OFDMA / TDD
Modulation	Up Link :QPSK,16QAM Down Link : QPSK,16QAM,64QAM
Channel Bandwidth	5MHz /10MHz
TX/RX type	1TX/2RX
Antenna Type	External tilt Antenna
Maximum Antenna Gain	5.9 dBi
Dimensions	246 mm X 128 mm x 43 mm
Voltage	Input :AC 100~240V output :5.0 Vdc Adapter
Weight	56.5 g (Without Adapter)
Operating Conditions	-20 ~ +50

3.4 Test Frequency

Operating Frequency Band	Modulation Bandwidth	Test frequency
2305 MHz ~ 2315 MHz	5 MHz	2307.5 MHz
		2312.5 MHz
	10 MHz	2310.0 MHz
2350 MHz ~ 2360 MHz	5 MHz	2352.5 MHz
		2357.5 MHz
	10 MHz	2355.0 MHz

4. Measuring Instrument Calibration

All measurements were made with instruments calibrated according to the recommendation by manufacturer. Measurement of radiated emissions and conducted emissions were made with instruments conforming to American National Standards Institute, ANSI C63.4-2003.
The calibration of measuring instrument, including any accessories that may affect test results, were performed according to the recommendation by manufacturer.

5. Summary of Test Results

The EUT has been tested according to the following specification:

Description of Test	FCC Rule	Result
Occupied Bandwidth	§2.1049	Complies
Band Edge	§2.1051 §27.53(a)(1)(3)	Complies
Conducted Spurious Emissions	§2.1051 §27.53(a)(1)(3)	Complies
Conducted Output Power and Equivalent Isotropic Radiated Power	§2.1051 §27.50(a)(1)	Complies
Radiated Spurious Emissions	§2.1053 §27.53(a)(1)(3)	Complies
Frequency Stability / Temperature Variation	§2.1055 §27.54	Complies

6. RECOMMENDATION/CONCLUSION

The data collected shows that the **SK telesys WiMAX CPE FCC ID: VAWSMT-CW230** is in compliance with Part 2 & Part 27 of the FCC Rules.

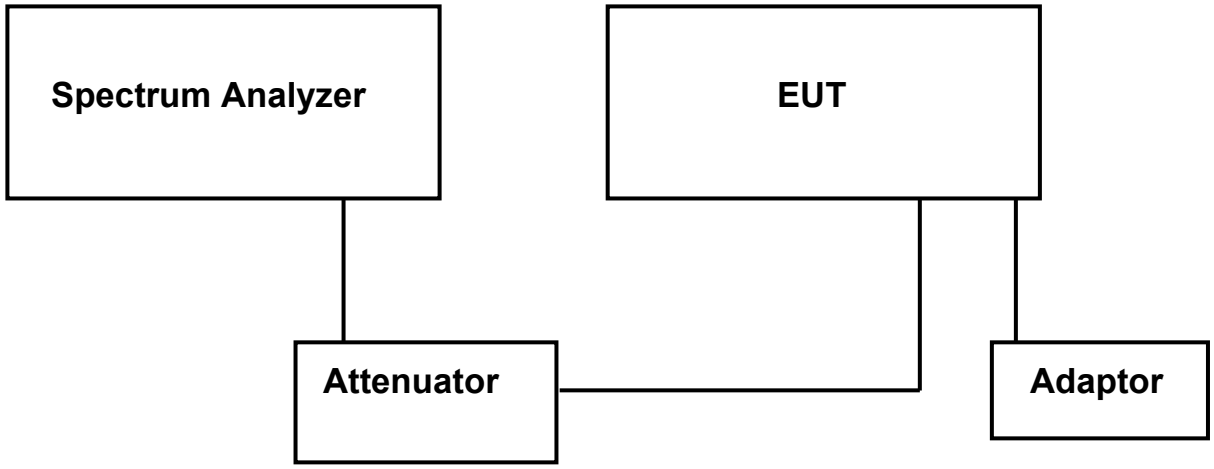
7. Test Equipment List

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESCS 30	833364/020	Mar. 28 2009	1 year
2	*Test Receiver	R & S	ESCS 30	100302	Nov. 11 2009	1 year
3	*Amplifier	HP	8447F	2805A03427	Jul. 20 2009	1 year
4	*Amplifier	Sonoma Instrument	310N	291916	Jul. 22 2009	1 year
5	*Pre Amplifier	HP	8449B	3008A00107	Feb. 03 2010	1 year
6	*Pre Amplifier	HP	8447F	2805A03406	Apr. 09 2009	1 year
7	*Pre Amplifier	Agilent	83051A	3950M00201	Jun. 15 2009	1 year
8	*Spectrum Analyzer	Agilent	E4440A	MY44303257	Jul. 20 2009	1 year
9	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Sep. 04 2009	1 year
10	*Spectrum Analyzer	R & S	FSP40	100361	Sep. 04 2009	1 year
11	*Loop Antenna	EMCO	6502	8911-2436	Jan. 11 2009	2 year
12	*Spectrum Analyzer	R & S	FSP40	100361	Sep. 04 2009	1 year
13	*Power Meter	R & S	NRVS	835360/002	Jan. 15 2010	1 year
14	*Peak Power Sensor	R & S	NRV-Z32	836019/028	Nov. 11 2009	1 year
15	*Biconical Log Antenna	ARA	LPB-2520/A	1209	Dec. 08 2008	2 year
16	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-508	Dec.11 2008	2 year
17	*Horn Antenna	SCHWARZBECK	BBHA9170	9170223	Jun. 16 2008	2 year
18	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-257	Apr. 21 2008	2 year
19	Signal Generater	R & S	SMP02	833286/003	Jul. 20 2009	1 year
20	*LISN	R & S	ESH3-Z5	833874/006	Nov. 11 2009	1 year
21	*LISN	R & S	ESH2-Z5	100227	Feb. 03 2010	1 year
22	*Position Controller	DAEIL EMC	N/A	N/A	N/A	N/A
23	*Turn Table	DAEIL EMC	N/A	N/A	N/A	N/A
24	*Antenna Mast	DAEIL EMC	N/A	N/A	N/A	N/A
25	*Anechoic Chamber	EM Eng.	N/A	N/A	N/A	N/A
26	*Shielded Room	EM Eng.	N/A	N/A	N/A	N/A
27	*Position Controller	Seo-Young EMC	N/A	N/A	N/A	N/A
28	*Turn Table	Seo-Young EMC	N/A	N/A	N/A	N/A
29	*Antenna Mast	Seo-Young EMC	N/A	N/A	N/A	N/A
30	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
31	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A

8. Description of Tests

8.1 6 Transmitter Conducted Output Power (EIRP)

Test Set-up:



Test Method:

The measurements were performed in max output power transmitting mode at all channels of the 2305 MHz ~ 2315 MHz and 2350 MHz ~ 2360 MHz frequency ranges under all data rate.

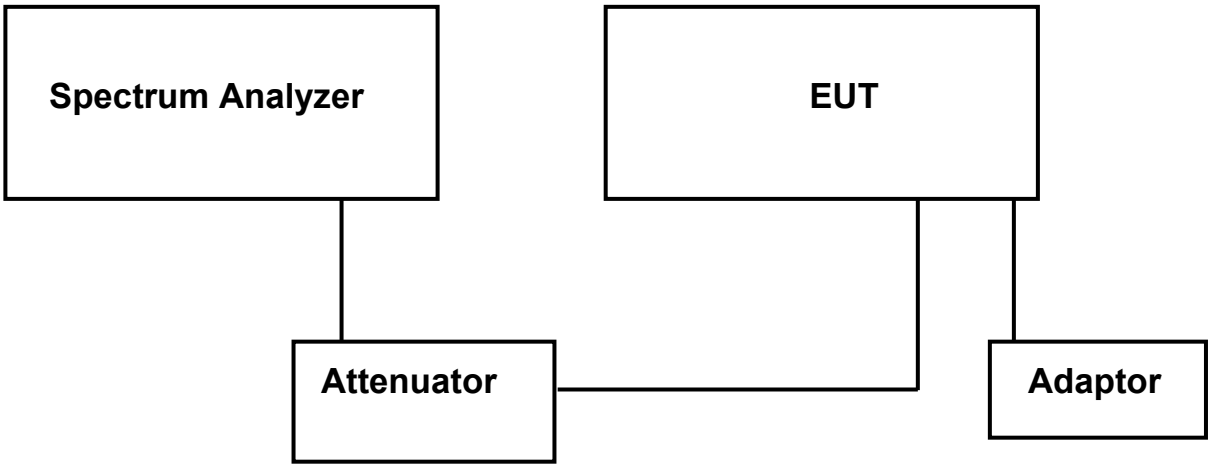
The EUT's output power was connected to the Spectrum Analyzer/peak power meter through appropriate attenuator.
The peak power was measured by peak power meter and average power was measured by spectrum analyzer with following setting.

Peak Power:
RBW, VBW = 100 kHz
Detect mode = peak
5/10 MHz channel power measurement function.

Average Power:
RBW, VBW = 100 kHz
Detect mode = average
5/10 MHz channel power measurement function.

8.2 26 dB Emission Bandwidth

Test Set-up:

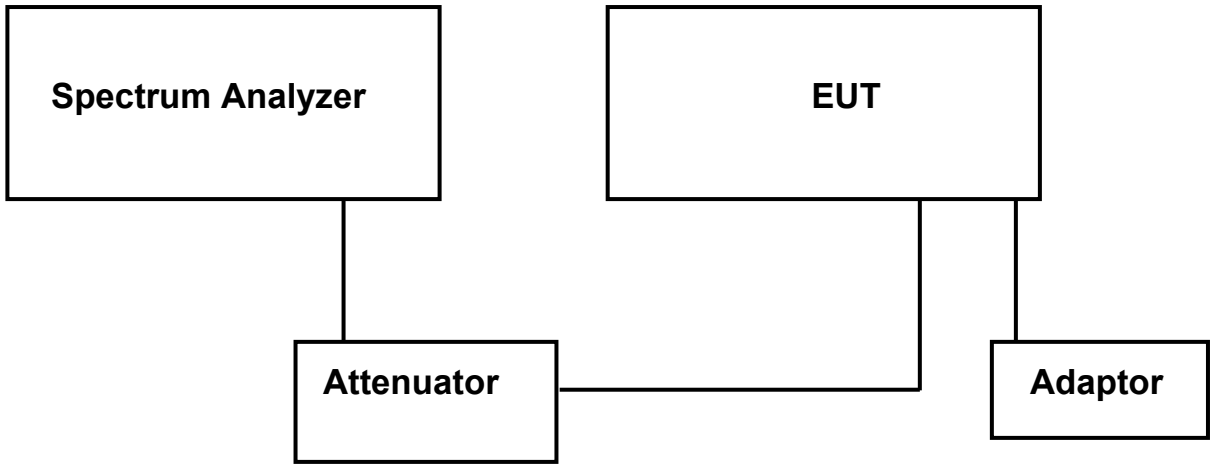


Test Method:

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer's 26 dB bandwidth function. The measurements are repeated for the other channels.
The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.3 Conducted Spurious Emission at antenna Terminal

Test Set-up:



Minimum standard:

For operation in the bands 2305 MHz ~2320 MHz and 2345 MHz ~ 2360 MHz, the power of any emissions outside the 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 the following amounts:
Below 2300 MHz and above 2370 MHz by factor not less then 70+10log(P) dB.
On all frequencies from 2300 to 2320 MHz and 2345 to 2370 MHz by factor not less then 43+10log(P) dB.
On all frequencies from 2320 to 2345 MHz by factor not less then 80+10log(P) dB

Compliance with the out-of-band emissions requirement is based on test being performed with an analyzer resolution bandwidth of 1 MHz with average detect. However in the 1 MHz band immediately outside and adjacent to the frequency block a resolution bandwidth of at least 1 % of the fundamental emissions bandwidth may be employed.

The spurious emission limit can be equivalent to the absolute power with following calculation.

43 + 10 log(P) relates to -13 dBm absolute power

70 + 10 log(P) relates to -40 dBm absolute power

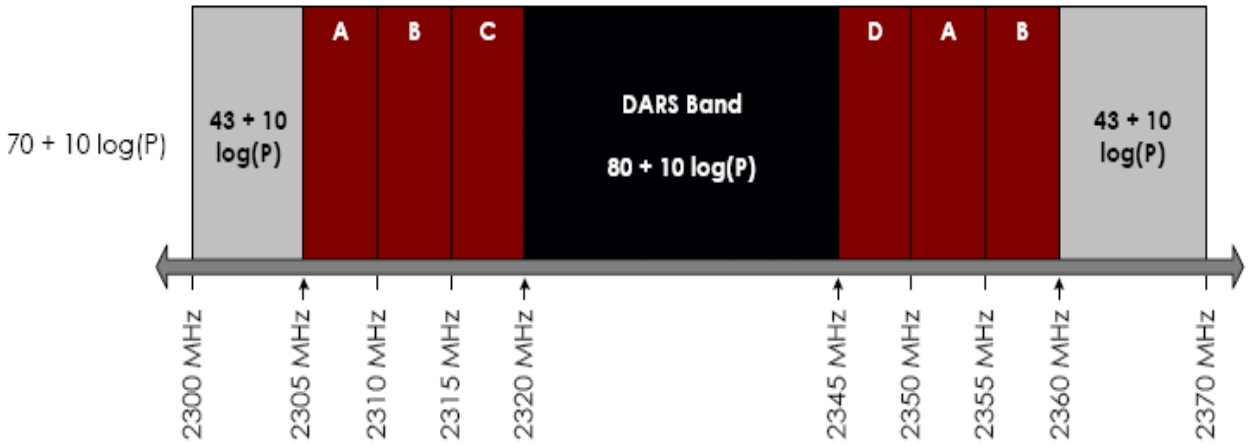
80 + 10 log(P) relates to -50 dBm absolute power

P : Average power

Test Method:

The EUT was setup to maximum output power at its lowest channel.
The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block.
The measurements are repeated for the EUT's other channels. For the Out-of-Band measurements a 1 MHz RBW was used to scan from 10 MHz to 24 GHz.

Frequency Band Blocks



Test frequency bands are A, B frequency band blocks.

8.4 Radiated Spurious & Harmonic Emission

Test Set-up:
Effective Radiated Power Output and Equivalent Isotropic Radiated Power output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2003.

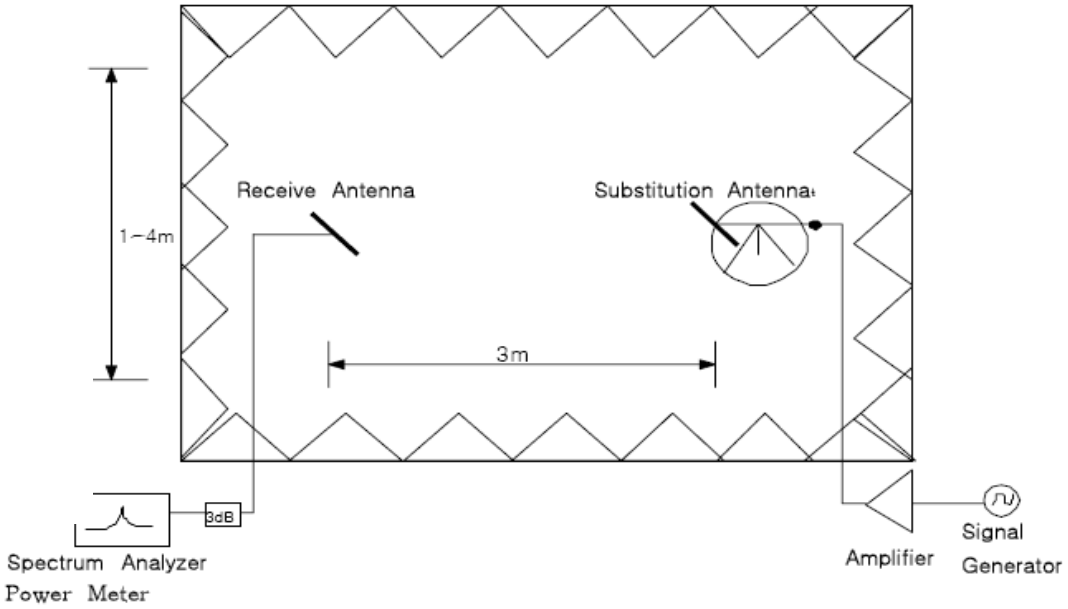


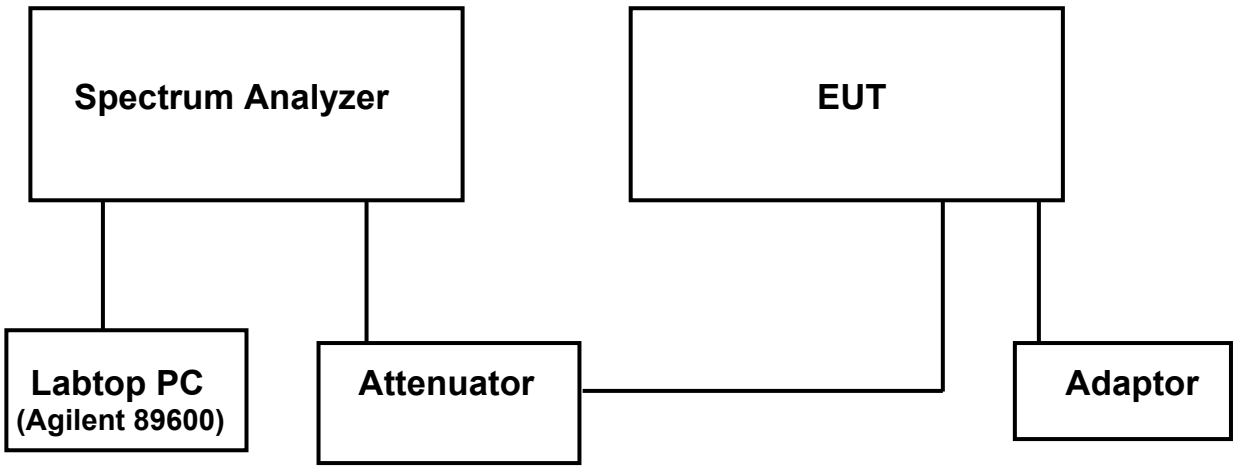
Diagram of Radiated Spurious & Harmonic test Set-up

The EUT was set on a non-conductive turntable in a semi anechoic chamber.
In the corner of the chamber there was a communication antenna, which was connected to the BS simulator located outside the chamber. The radiated power from the EUT was measured with an antenna fixed to a antenna tower.
The tower and turn table were remotely controlled to turn the EUT and change the antenna polarization. The measured signal was routed from the measuring antenna to the spectrum analyzer. The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns.
The radiated spurious and harmonic emission were measured up to 10^{th} harmonic of the fundamental frequency.

Test Method :
1. The maximum power level was searched by moving the turn table and measuring antenna and manipulating the EUT. This level (P_{EUT}) was recorded.
2. For measurements the resolution bandwidth and video bandwidth were set to 100 kHz for emissions below 1GHz and 1 MHz for emissions over 1GHz.
3. The average detection was used.
4. The EUT was replaced with a substituting antenna.
5. The substituting antenna was fed with the power (P_{Subst_TX}) giving a convenient reading on the spectrum analyzer. That reading (P_{Subst_RX}) on spectrum analyzer was recorded.

8.5 Frequency Stability / Temperature Variation

Test Set-up:



Test Method:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature(20 C to 25 C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -30 C without any power applied.
3. After the overnight “soak” at -30 C (Usually 14 ~ 16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10 C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30 C up to + 50 C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

9. Test Data

9.1 Transmitter Conducted Output Power (EIRP)

Measurement Results: 5MHz Bandwidth

Frequency (MHz)	Modulation	Coding Rate	Peak Power (dBm)	Avg. Power (dBm)	Antenna Gain (dBi)	Peak Power EIRP (dBm)	Avg. Power EIRP (dBm)
2307.5	QPSK	1/2	24.25	15.54	5.9	30.15	21.44
		3/4	23.87	16.35	5.9	29.77	22.25
	16QAM	1/2	24.02	16.40	5.9	29.92	22.30
		3/4	23.98	15.94	5.9	29.88	21.84
2312.5	QPSK	1/2	24.45	15.77	5.9	30.35	21.67
		3/4	24.48	16.59	5.9	30.38	22.49
	16QAM	1/2	24.65	16.54	5.9	30.55	22.44
		3/4	24.58	16.49	5.9	30.48	22.39
2352.5	QPSK	1/2	23.96	15.53	5.9	29.86	21.43
		3/4	23.68	16.29	5.9	29.58	22.19
	16QAM	1/2	24.06	16.30	5.9	29.96	22.20
		3/4	23.90	15.86	5.9	29.80	21.76
2357.5	QPSK	1/2	24.15	15.77	5.9	30.05	21.67
		3/4	24.01	16.63	5.9	29.91	22.53
	16QAM	1/2	24.03	16.61	5.9	29.93	22.51
		3/4	24.07	16.57	5.9	29.97	22.47

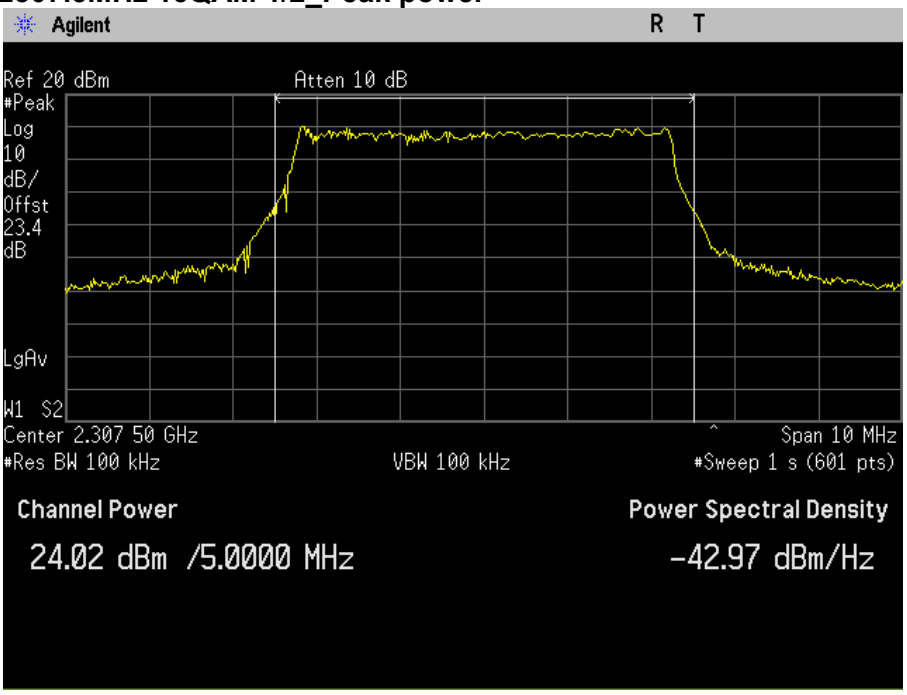
Measurement Results: 10MHz Bandwidth

Frequency (MHz)	Modulation	Coding Rate	Peak Power (dBm)	Avg. Power (dBm)	Antenna Gain (dBi)	Peak Power EIRP (dBm)	Avg. Power EIRP (dBm)
2310.0	QPSK	1/2	23.85	16.86	5.9	29.75	22.76
		3/4	23.98	16.85	5.9	29.88	22.75
	16QAM	1/2	23.97	16.80	5.9	29.87	22.70
		3/4	23.81	16.67	5.9	29.71	22.57
2355.0	QPSK	1/2	23.59	16.75	5.9	29.49	22.65
		3/4	23.89	16.67	5.9	29.79	22.57
	16QAM	1/2	23.91	16.69	5.9	29.81	22.59
		3/4	23.72	16.50	5.9	29.62	22.40

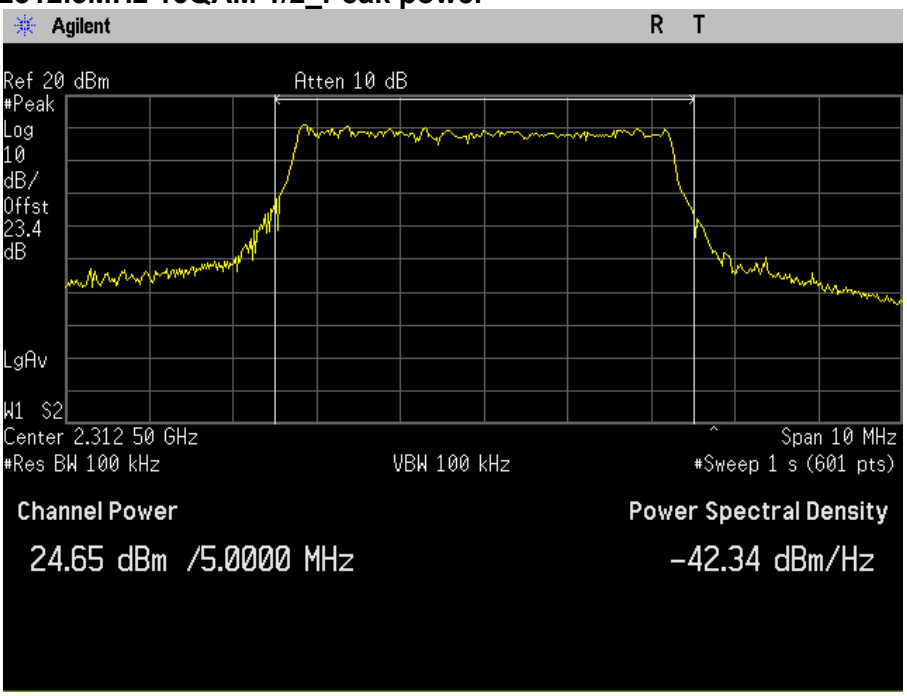
9.1.1. Test Plots (Maximum Power Mode)

5 MHz Bandwidth Peak Power

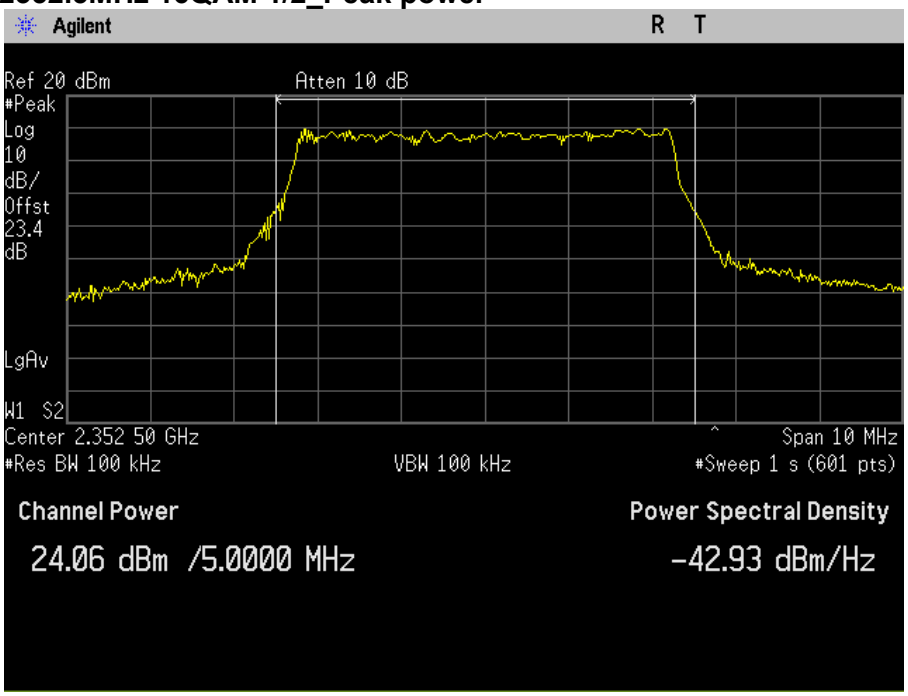
2307.5MHz 16QAM 1/2_Peak power



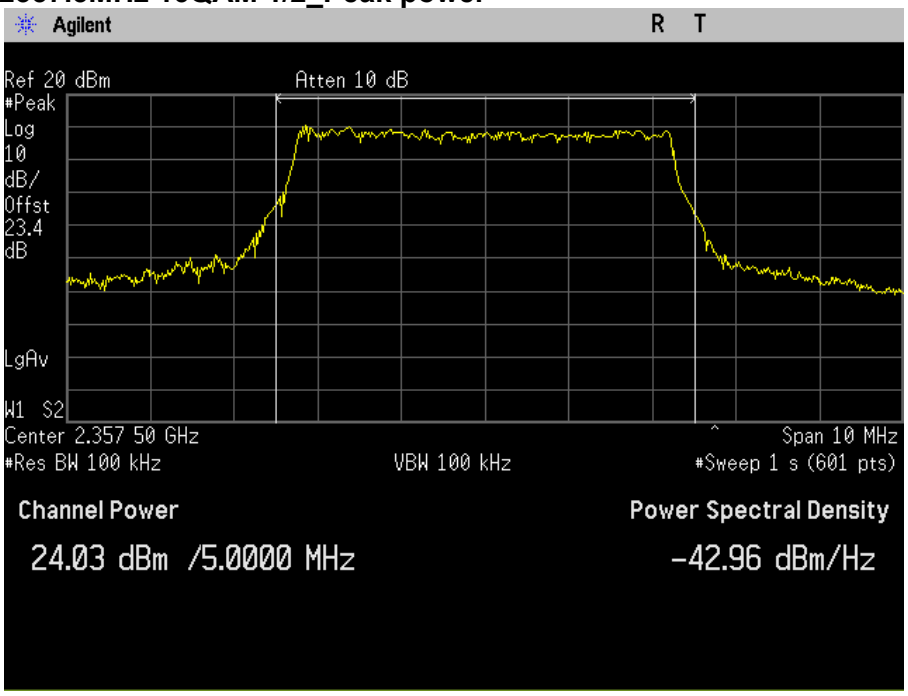
2312.5MHz 16QAM 1/2_Peak power



2352.5MHz 16QAM 1/2_Peak power

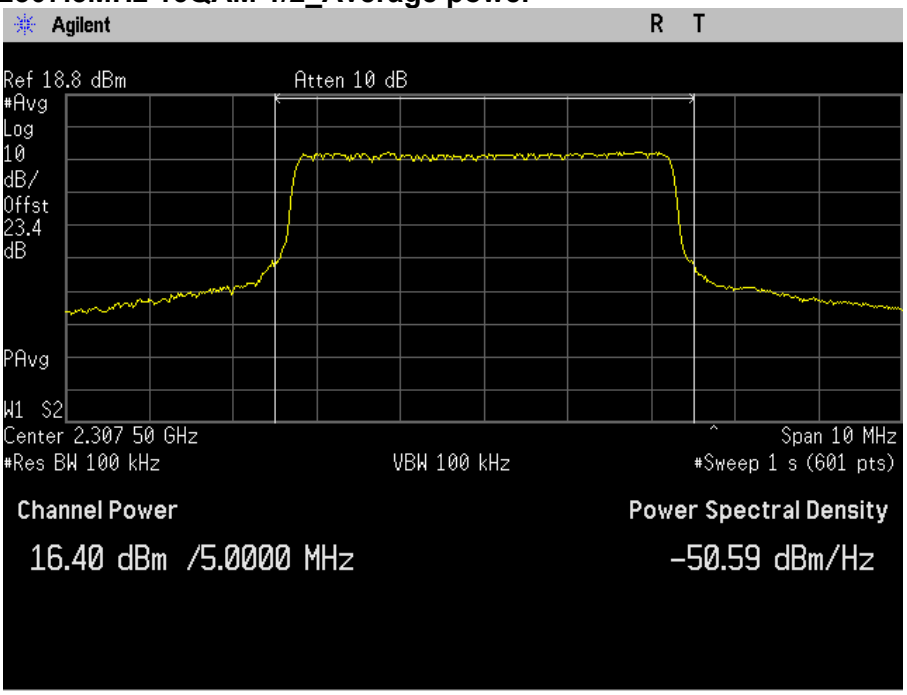


2357.5MHz 16QAM 1/2_Peak power

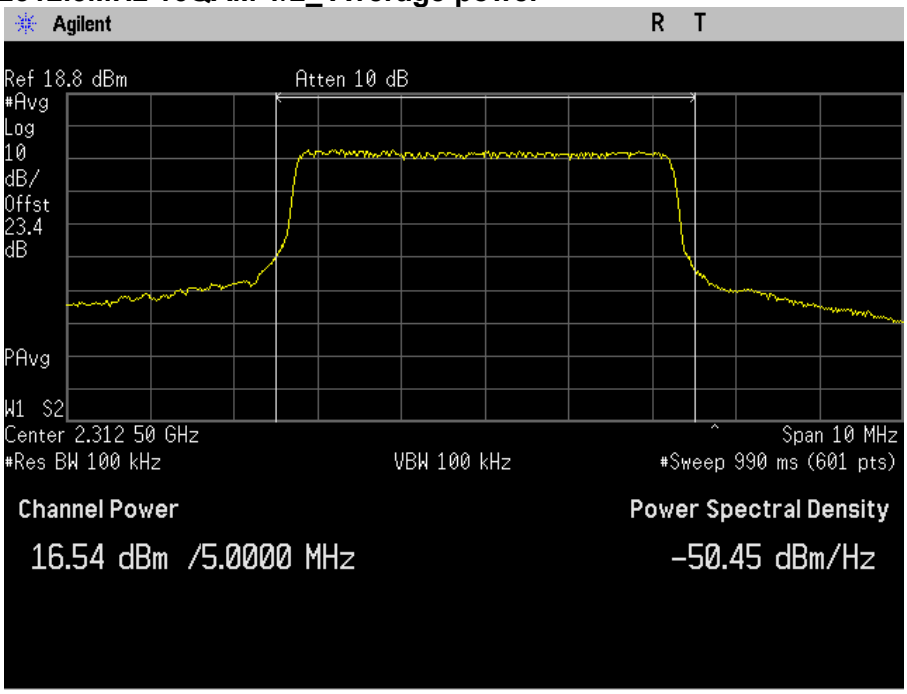


5 MHz Bandwidth_Average Power

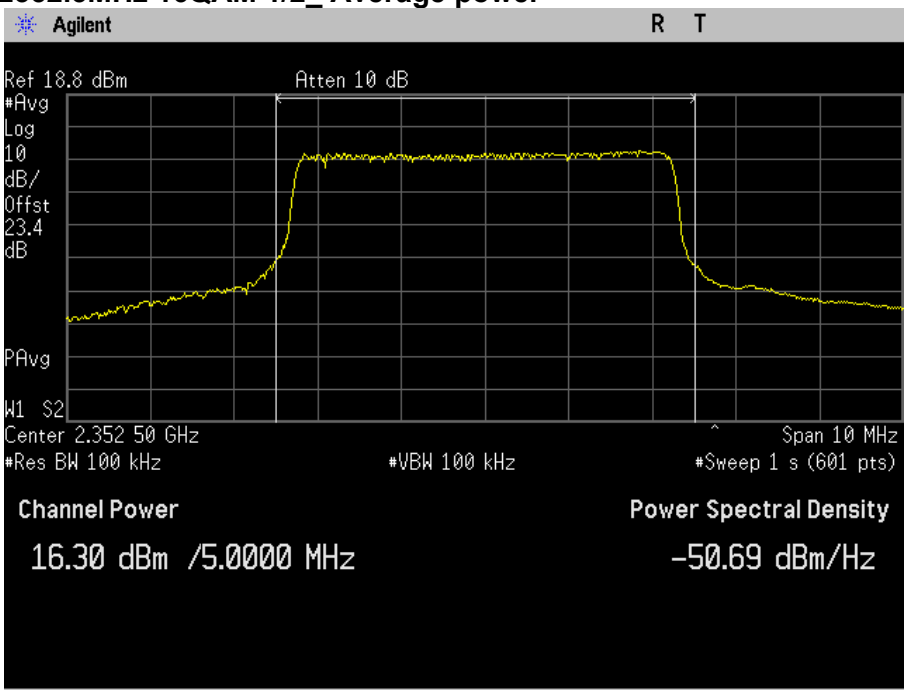
2307.5MHz 16QAM 1/2_Average power



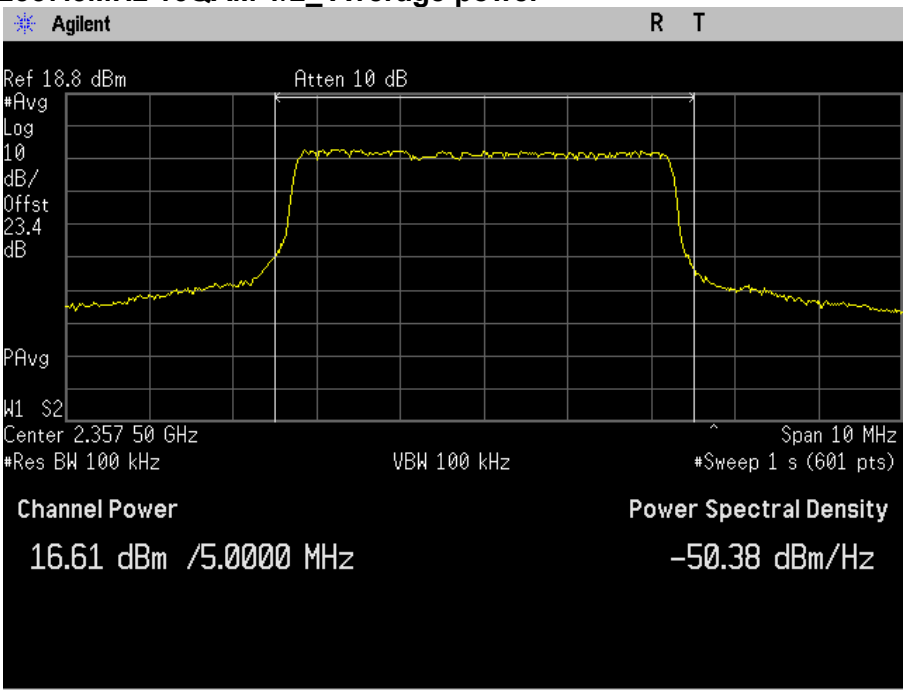
2312.5MHz 16QAM 1/2_ Average power



2352.5MHz 16QAM 1/2_ Average power

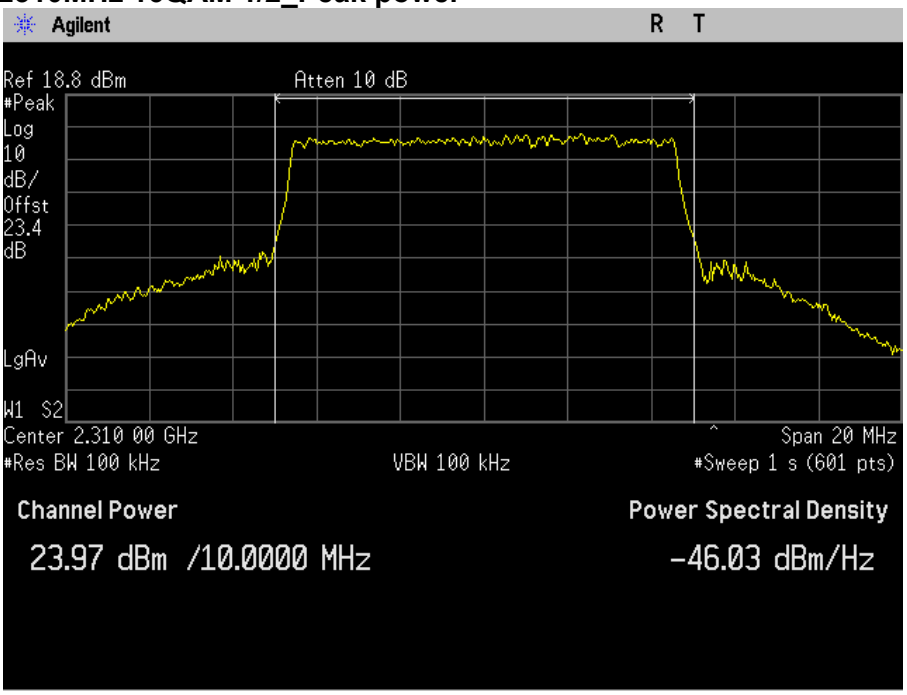


2357.5MHz 16QAM 1/2_ Average power

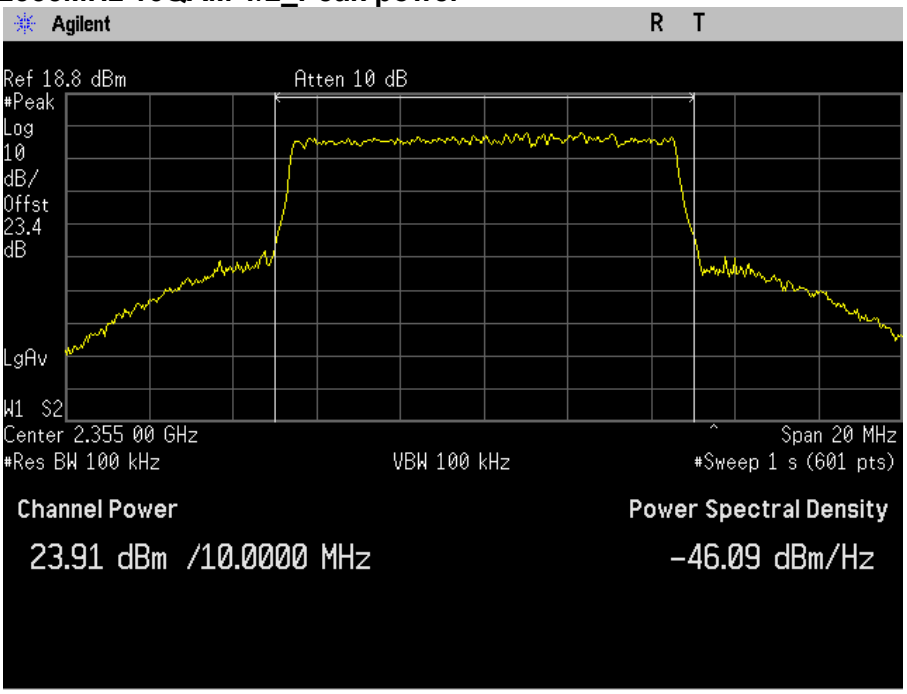


10 MHz Bandwidth_Peak Power

2310MHz 16QAM 1/2_Peak power

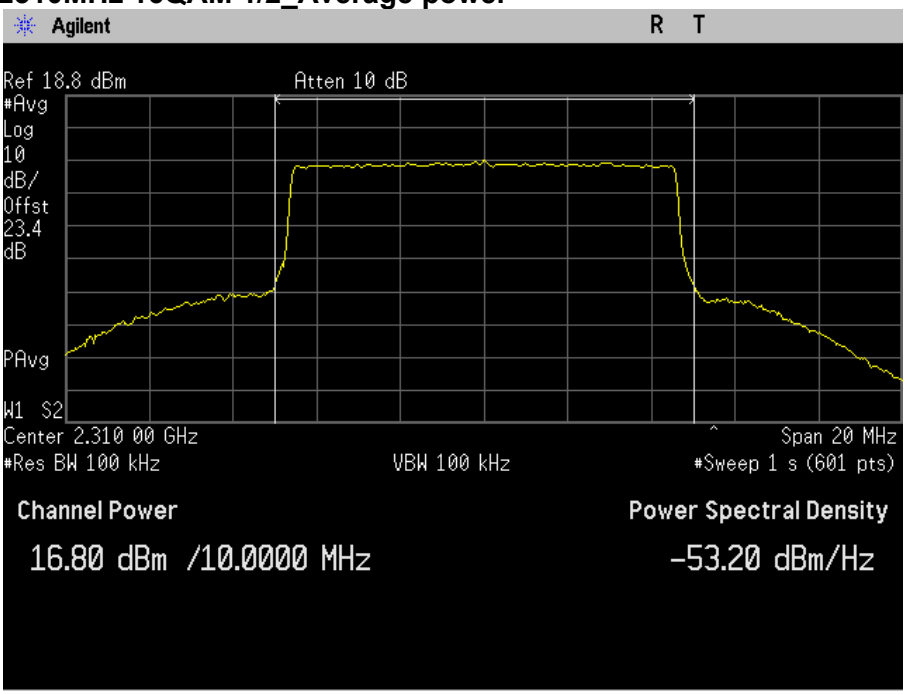


2355MHz 16QAM 1/2_Peak power

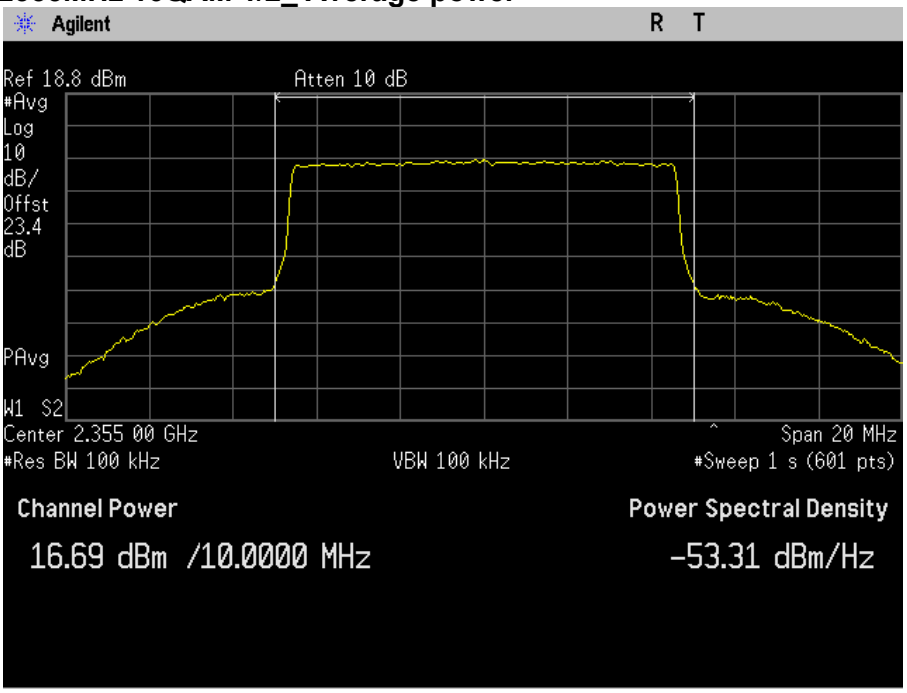


10 MHz Bandwidth Average Power

2310MHz 16QAM 1/2_Average power



2355MHz 16QAM 1/2_ Average power



9.2 26 dB Emission Bandwidth

Measurement Results : 5MHz Bandwidth

Frequency (MHz)	Modulation	Coding Rate	Occupied Bandwidth (MHz)	26dB Emission Bandwidth (MHz)
2307.5	QPSK	1/2	4.5097	5.319
		3/4	4.4761	5.092
	16QAM	1/2	4.4732	5.111
		3/4	4.4578	5.036
2312.5	QPSK	1/2	4.5080	5.311
		3/4	4.4805	5.115
	16QAM	1/2	4.4775	5.082
		3/4	4.4604	4.997
2352.5	QPSK	1/2	4.5129	5.333
		3/4	4.4722	5.090
	16QAM	1/2	4.4737	5.126
		3/4	4.4599	5.033
2357.5	QPSK	1/2	4.5099	5.318
		3/4	4.4795	5.119
	16QAM	1/2	4.4784	5.089
		3/4	4.4594	5.016

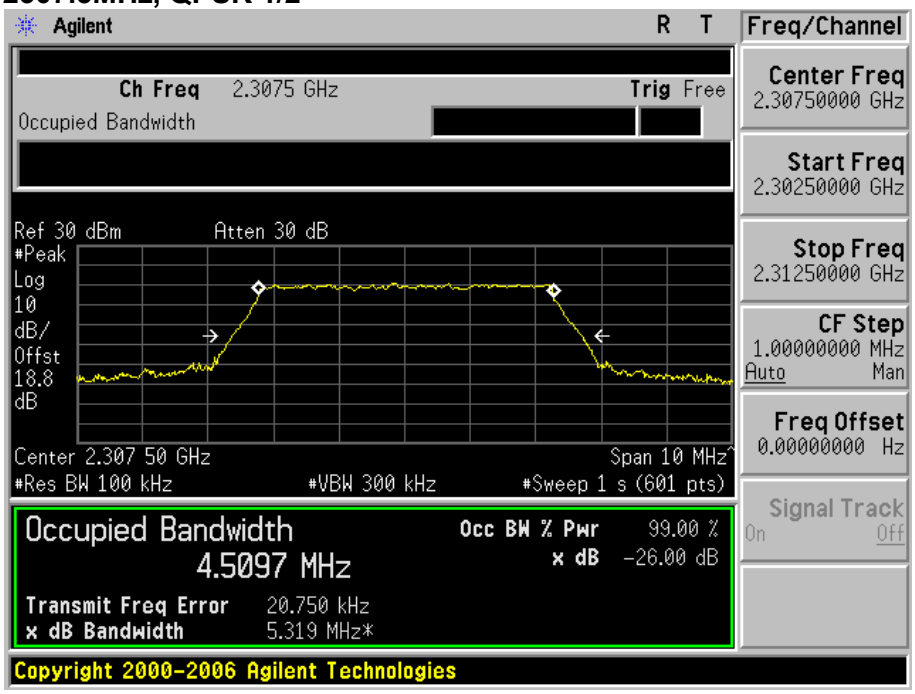
Measurement Results : 10MHz Bandwidth

Frequency (MHz)	Modulation	Coding Rate	Occupied Bandwidth (MHz)	26dB Emission Bandwidth (MHz)
2310.0	QPSK	1/2	9.0717	9.648
		3/4	9.0737	9.666
	16QAM	1/2	9.0805	9.713
		3/4	9.0835	9.683
2355.0	QPSK	1/2	9.0713	9.661
		3/4	9.0750	9.677
	16QAM	1/2	9.0805	9.735
		3/4	9.0836	9.680

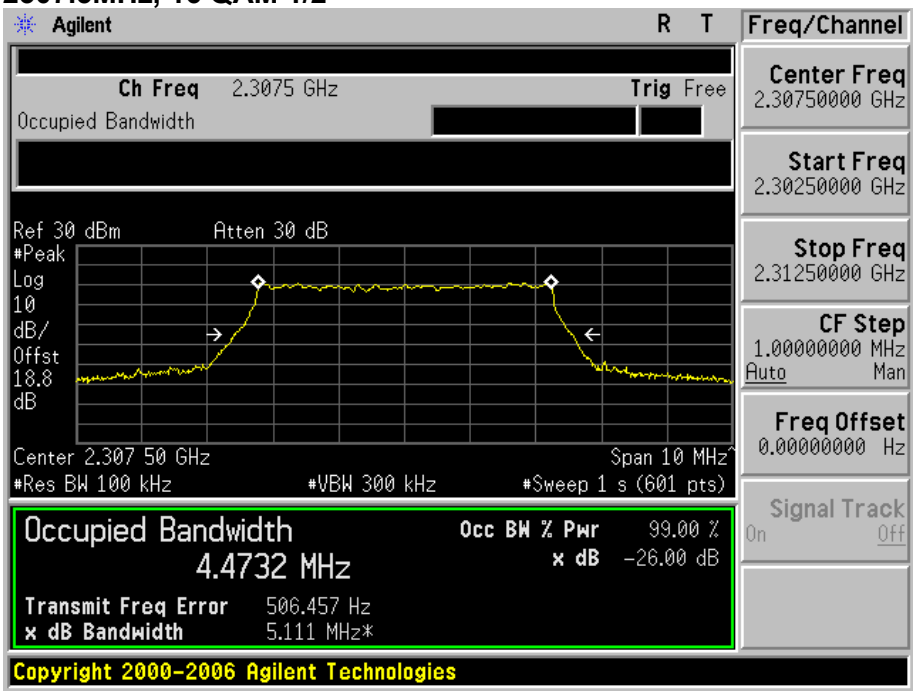
9.2.1. Test Plots

5MHz Bandwidth

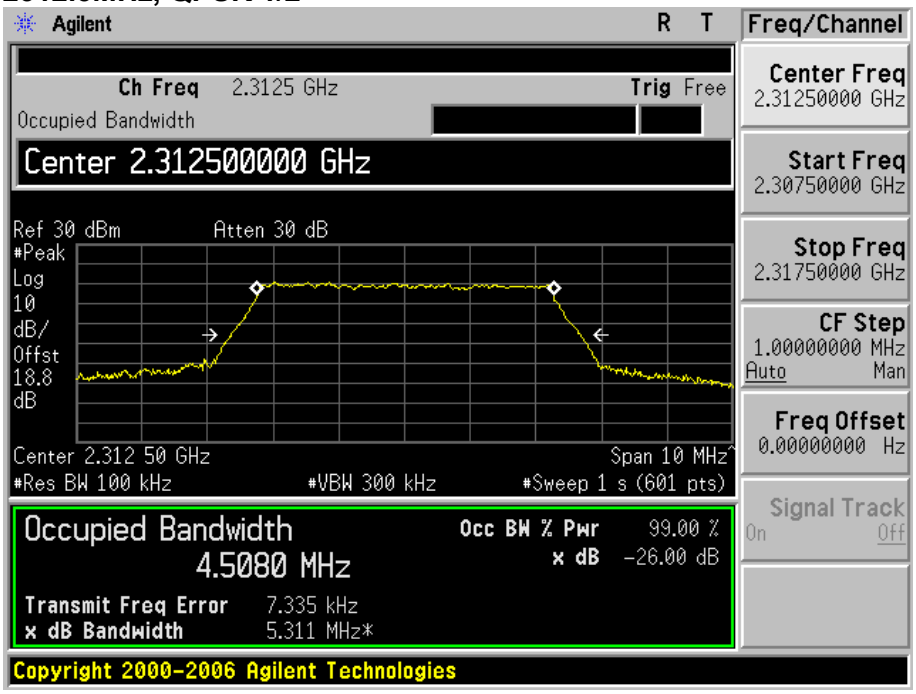
2307.5MHz, QPSK 1/2



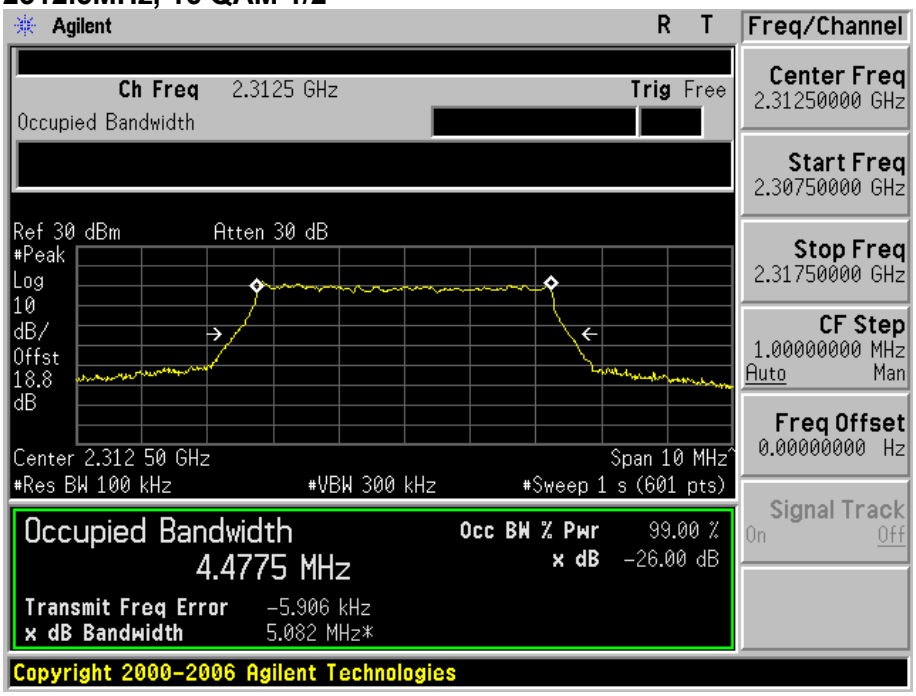
2307.5MHz, 16 QAM 1/2



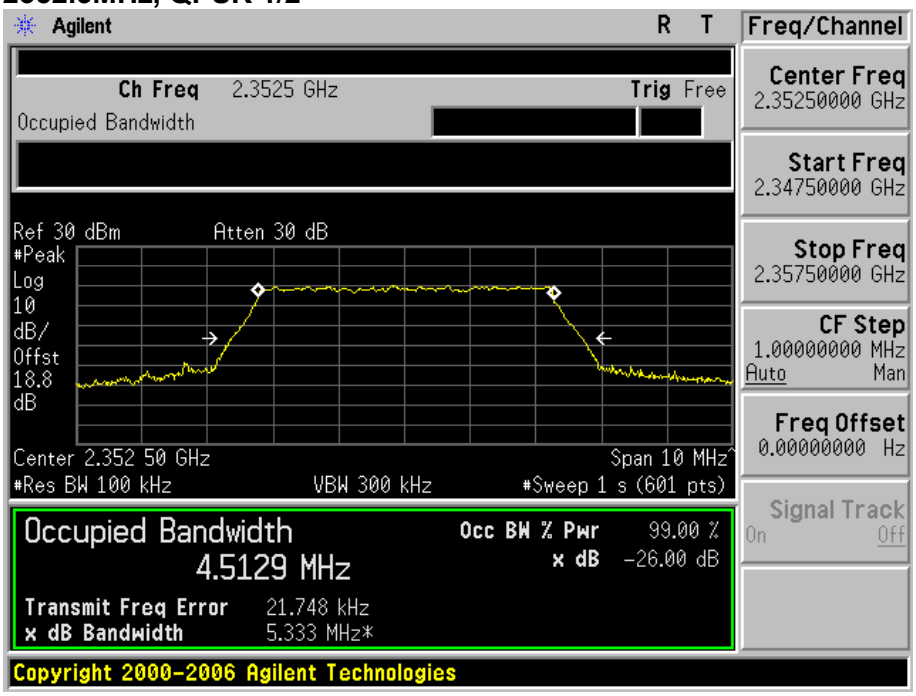
2312.5MHz, QPSK 1/2



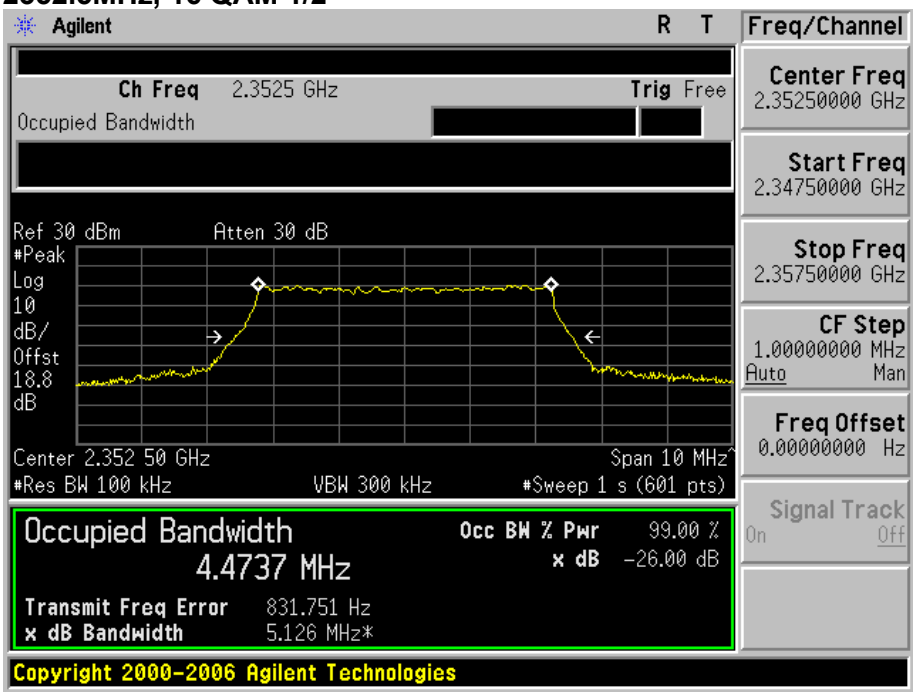
2312.5MHz, 16 QAM 1/2



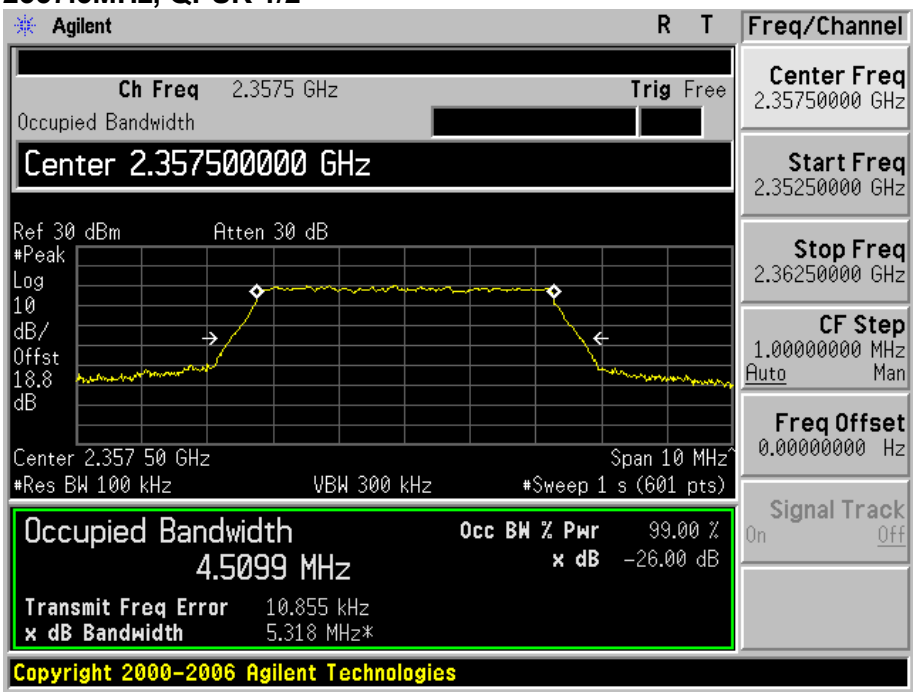
2352.5MHz, QPSK 1/2



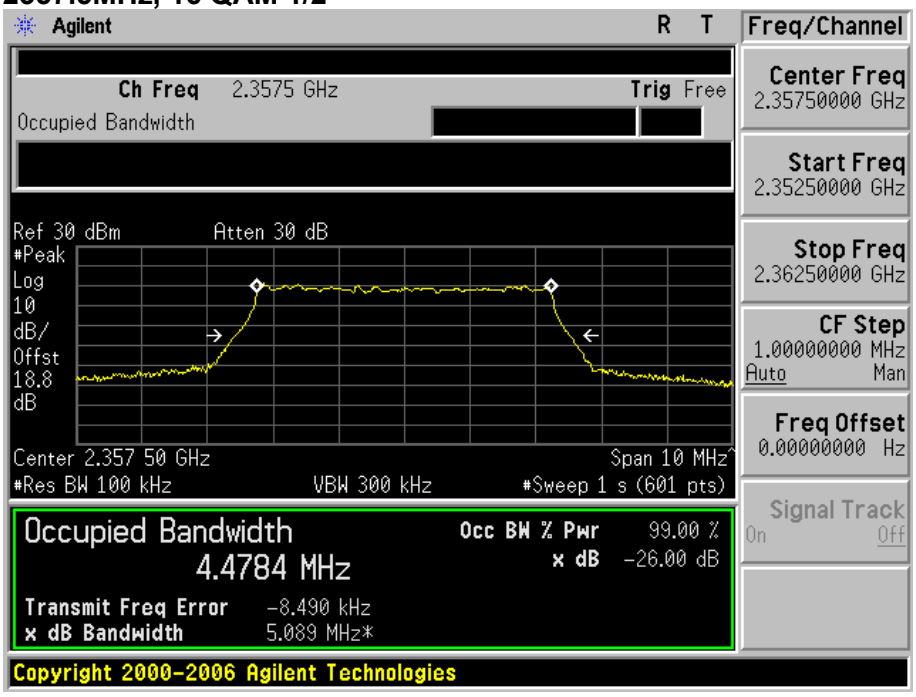
2352.5MHz, 16 QAM 1/2



2357.5MHz, QPSK 1/2

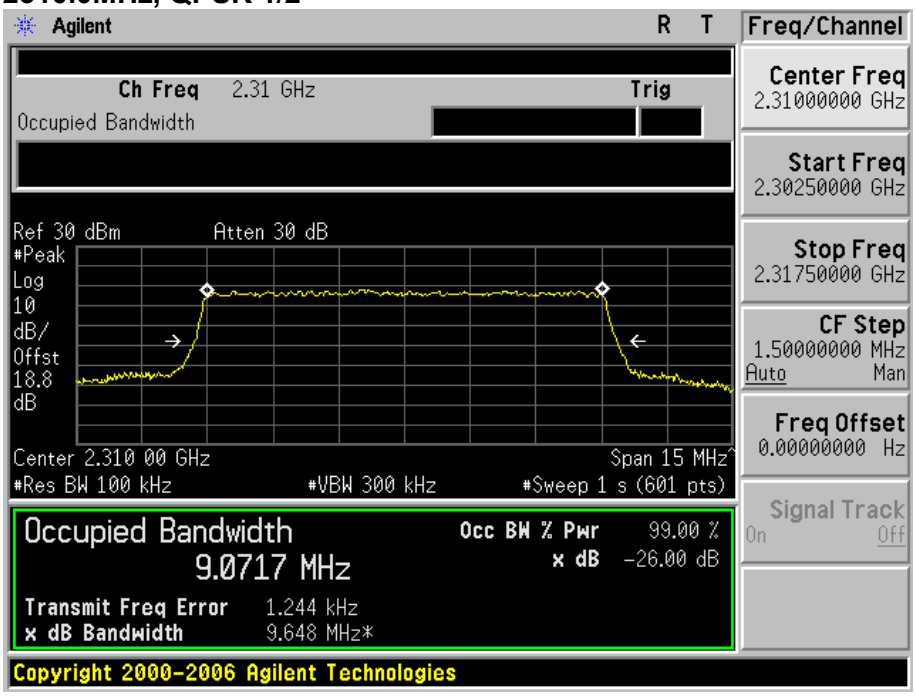


2357.5MHz, 16 QAM 1/2

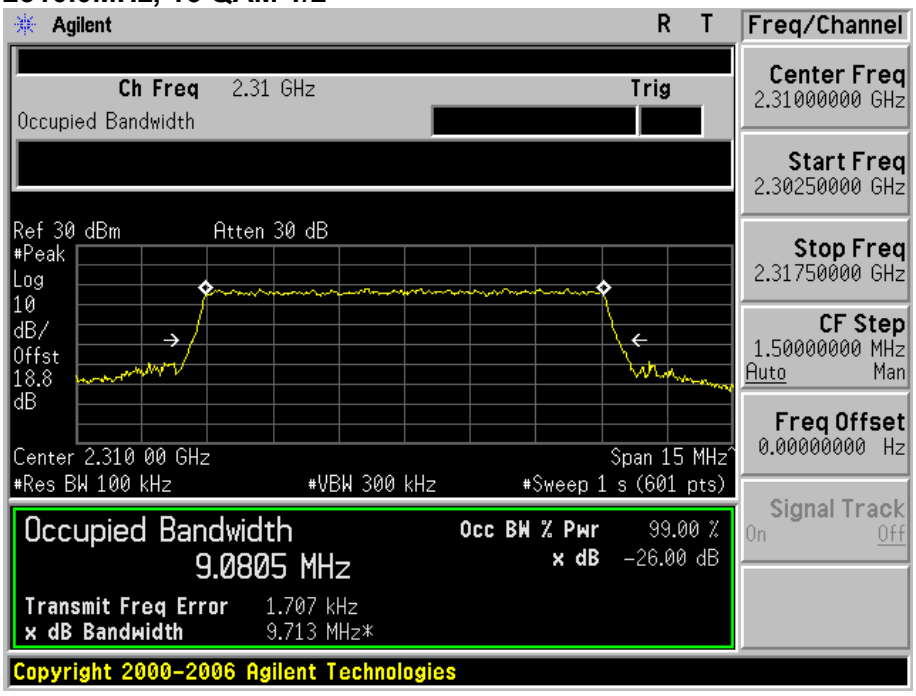


10MHz Bandwidth

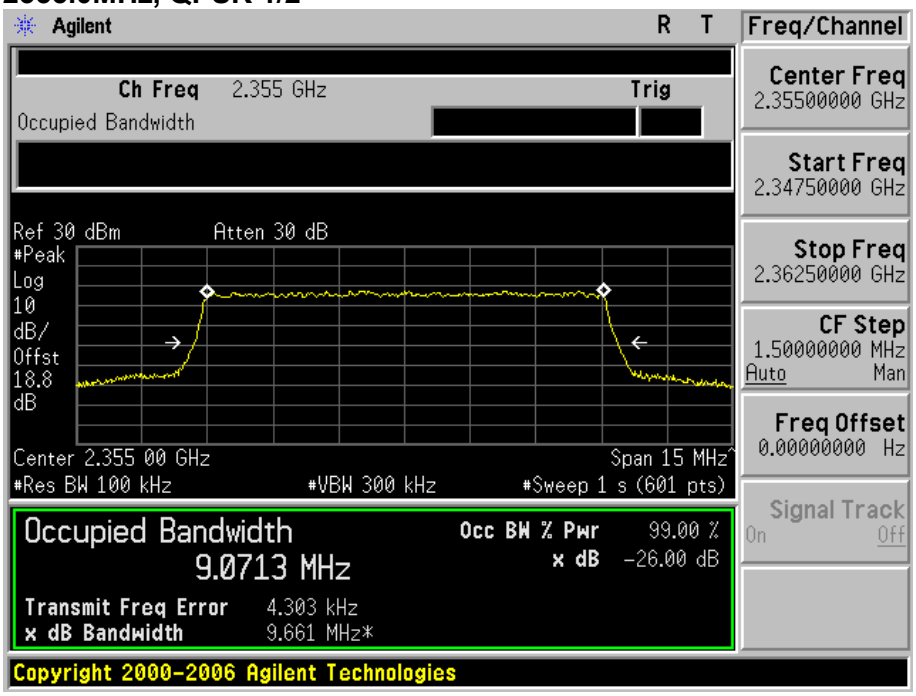
2310.0MHz, QPSK 1/2



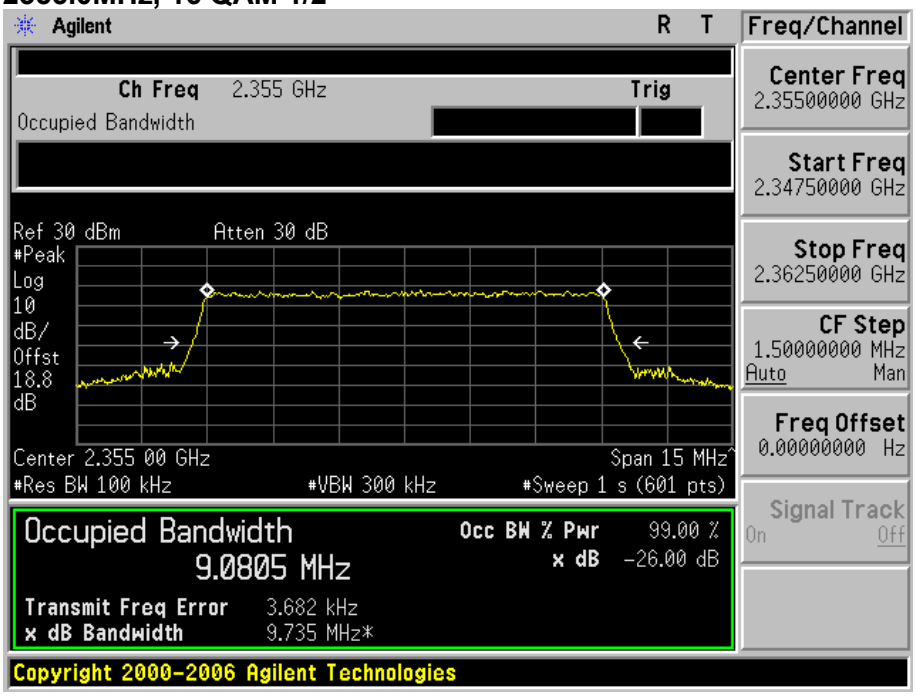
2310.0MHz, 16 QAM 1/2



2355.0MHz, QPSK 1/2



2355.0MHz, 16 QAM 1/2



9.3 Spurious Emission at antenna Terminal

5 MHz Bandwidth

Measurement Results :

Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2307.5 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 1-1,1-2,1-3
		2300~2320	Pass	Plot 1-4,1-5
		2320~2345	Pass	Plot 1-6
		2345~2370	Pass	Plot 1-7
		2370~24000	Pass	Plot 1-8
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 1-9,1-10, 1-11
		2300~2320	Pass	Plot 1-12,1-13
		2320~2345	Pass	Plot 1-14
		2345~2370	Pass	Plot 1-15
		2370~24000	Pass	Plot 1-16

Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2312.5 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 2-1,2-2
		2300~2320	Pass	Plot 2-3,2-4
		2320~2345	Pass	Plot 2-5
		2345~2370	Pass	Plot 2-6
		2370~24000	Pass	Plot 2-7
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 2-8,2-9
		2300~2320	Pass	Plot 2-10,2-11
		2320~2345	Pass	Plot 2-12
		2345~2370	Pass	Plot 2-13
		2370~24000	Pass	Plot 2-14

Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2352.5 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 3-1,3-2
		2300~2320	Pass	Plot 3-3
		2320~2345	Pass	Plot 3-4
		2345~2370	Pass	Plot 3-5,3-6
		2370~24000	Pass	Plot 3-7,3-8
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 3-9,3-10
		2300~2320	Pass	Plot 3-11
		2320~2345	Pass	Plot 3-12
		2345~2370	Pass	Plot 3-13,3-14
		2370~24000	Pass	Plot 3-15,3-16

Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2357.5 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 4-1,4-2
		2300~2320	Pass	Plot 4-3
		2320~2345	Pass	Plot 4-4
		2345~2370	Pass	Plot 4-5,4-6
		2370~24000	Pass	Plot 4-7,4-8
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 4-9,4-10
		2300~2320	Pass	Plot 4-11
		2320~2345	Pass	Plot 4-12
		2345~2370	Pass	Plot 4-13,4-14
		2370~24000	Pass	Plot 4-15,4-16

10 MHz Bandwidth

Measurement Results :

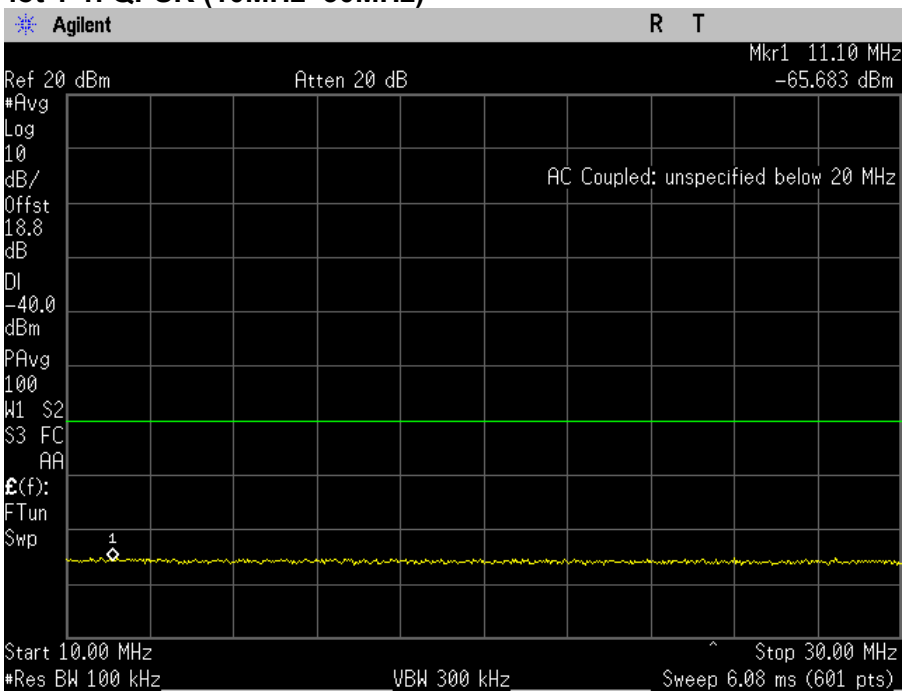
Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2310.0 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 5-1,5-2, 5-3
		2300~2320	Pass	Plot 5-4,5-5
		2320~2345	Pass	Plot 5-6
		2345~2370	Pass	Plot 5-7
		2370~24000	Pass	Plot 5-8
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 5-9, 5-10,5-11
		2300~2320	Pass	Plot 5-12,5-13
		2320~2345	Pass	Plot 5-14
		2345~2370	Pass	Plot 5-15
		2370~24000	Pass	Plot 5-16

Test Frequency	Modulation (Cording rate)	Spurious test band (MHz)	Result	Reference Plot
2355.0 MHz	QPSK (1/2)	10 ~ 2300	Pass	Plot 6-1,6-2
		2300~2320	Pass	Plot 6-3
		2320~2345	Pass	Plot 6-4
		2345~2370	Pass	Plot 6-5,6-6
		2370~24000	Pass	Plot 6-7,6-8
	16 QAM (1/2)	10 ~ 2300	Pass	Plot 6-9,6-10
		2300~2320	Pass	Plot 6-11
		2320~2345	Pass	Plot 6-12
		2345~2370	Pass	Plot 6-13,6-14
		2370~24000	Pass	Plot 6-15,6-16

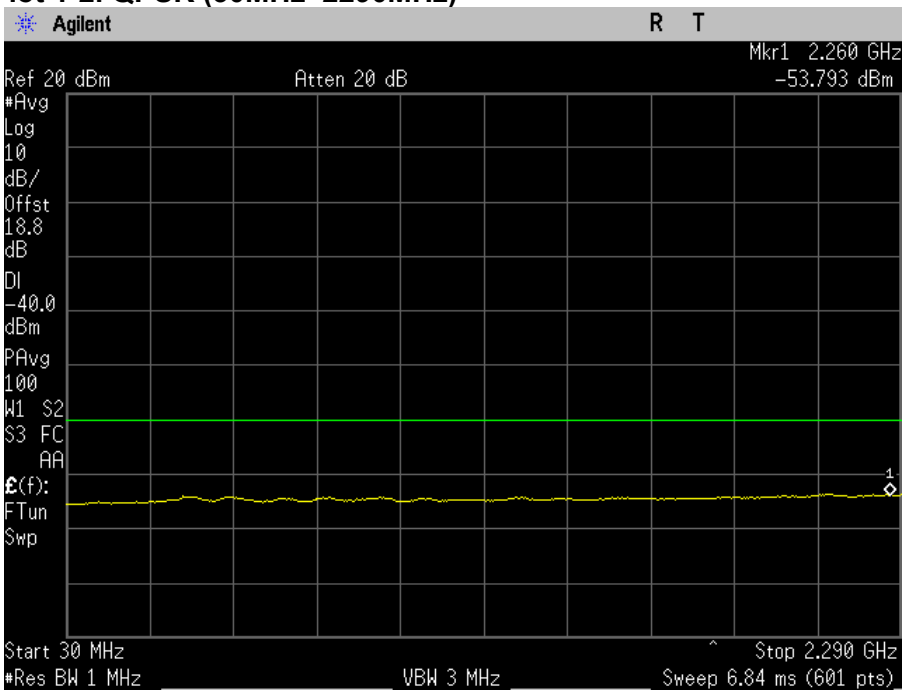
9.3.1. Test Plots (5 MHz Bandwidth)

- **2307.5 MHz_5 MHz Bandwidth**

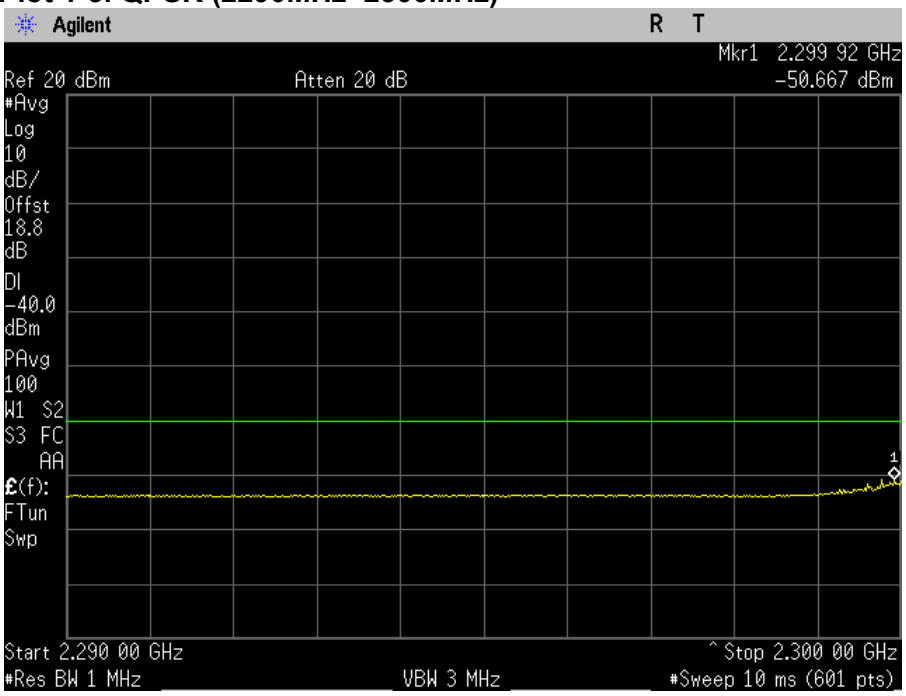
Plot 1-1. QPSK (10MHz~30MHz)



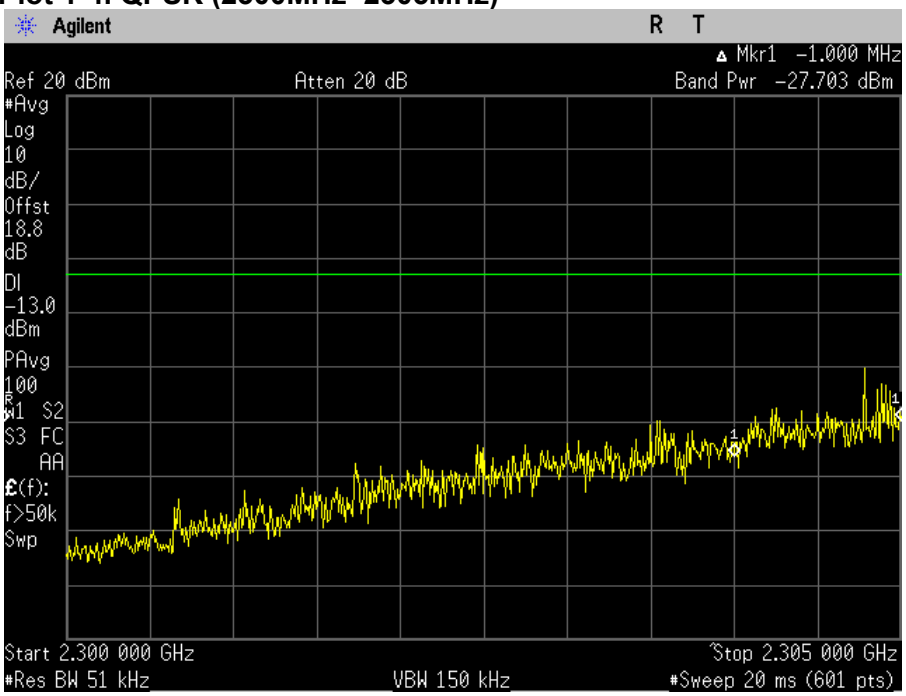
Plot 1-2. QPSK (30MHz~2290MHz)



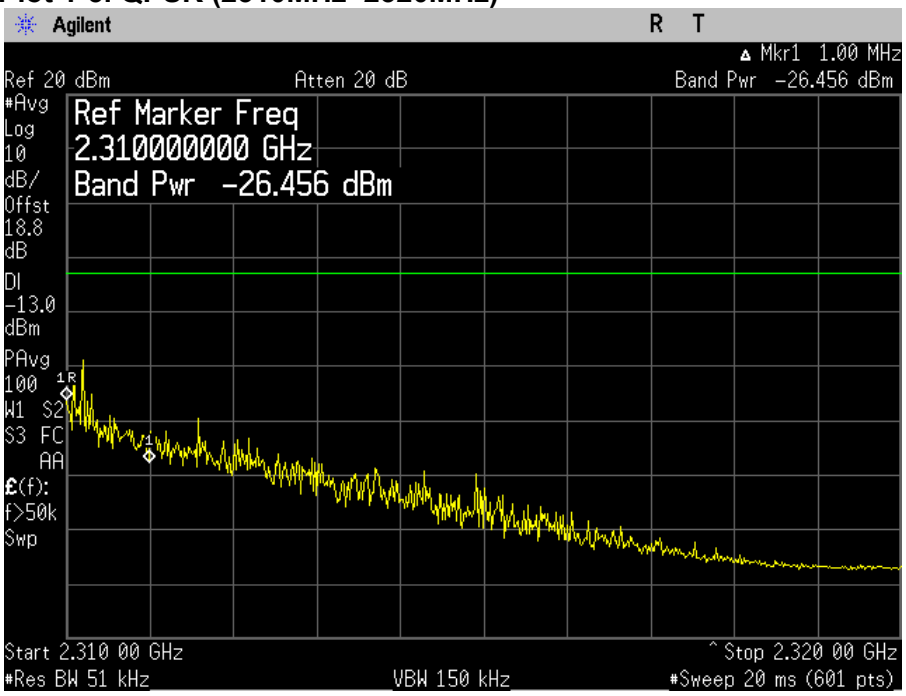
Plot 1-3. QPSK (2290MHz~2300MHz)



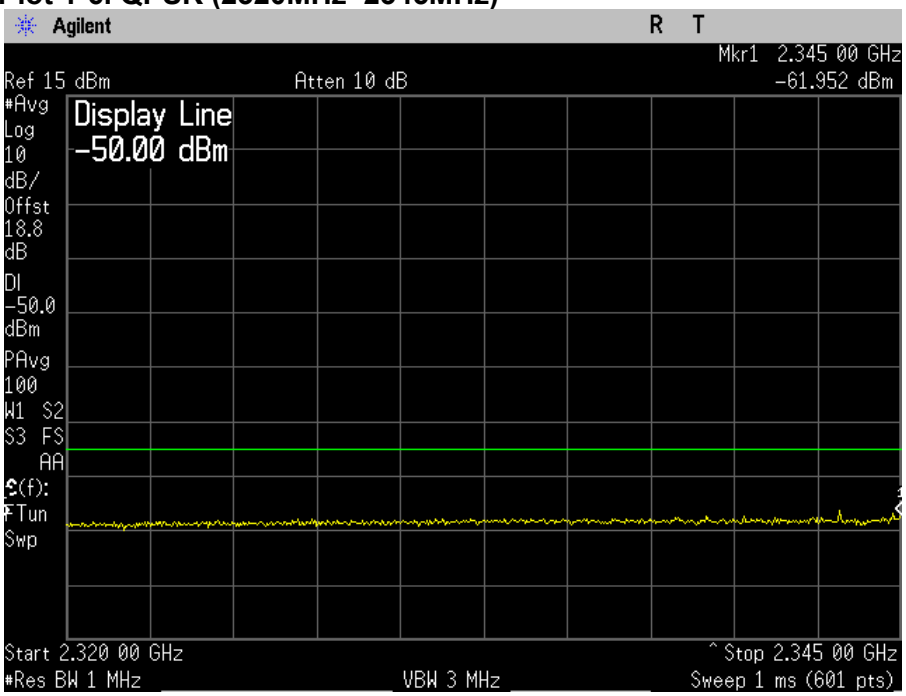
Plot 1-4. QPSK (2300MHz~2305MHz)



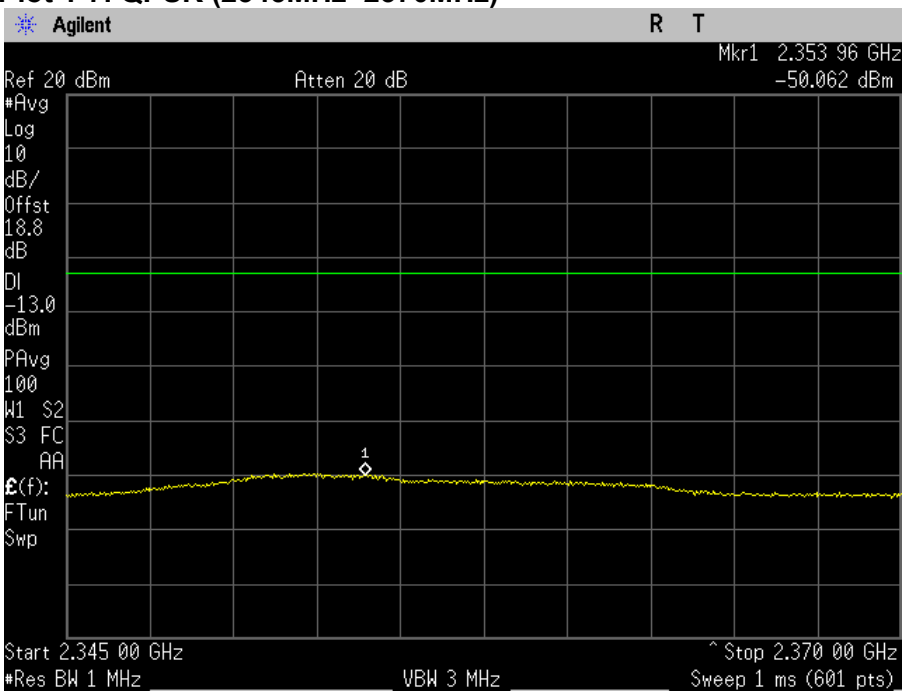
Plot 1-5. QPSK (2310MHz~2320MHz)



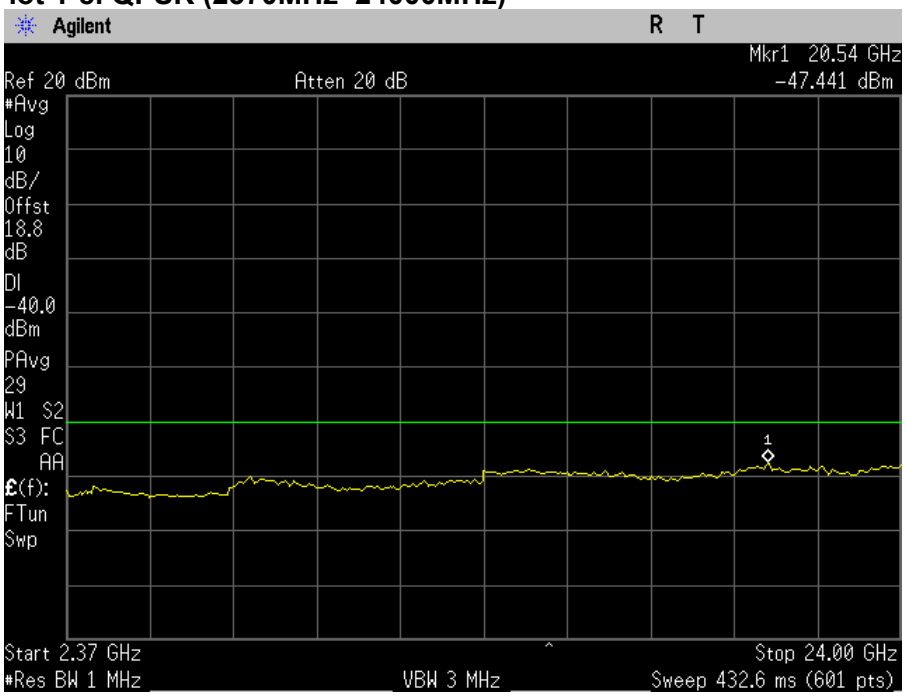
Plot 1-6. QPSK (2320MHz~2345MHz)



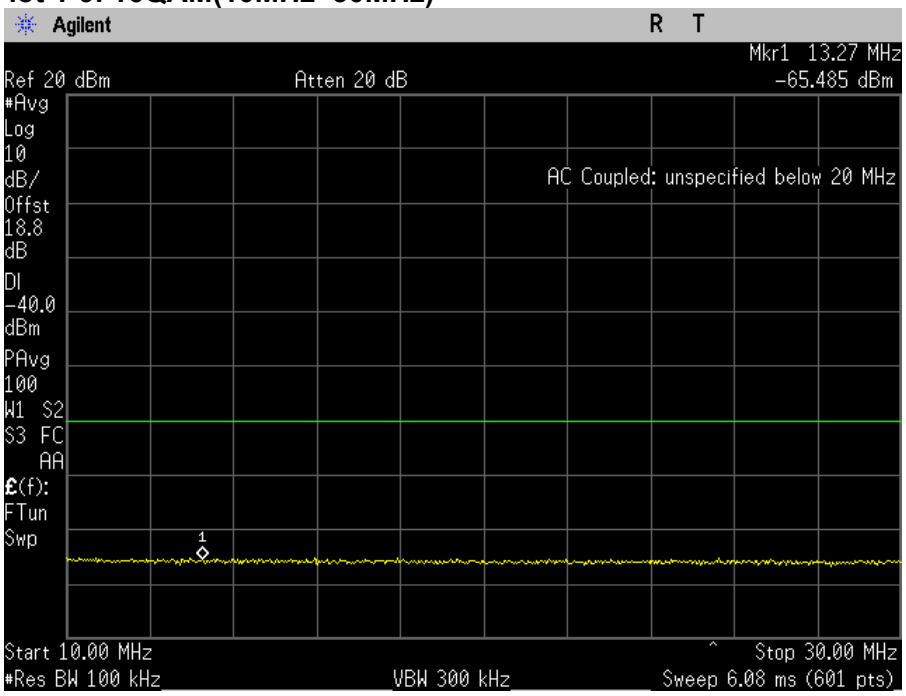
Plot 1-7. QPSK (2345MHz~2370MHz)



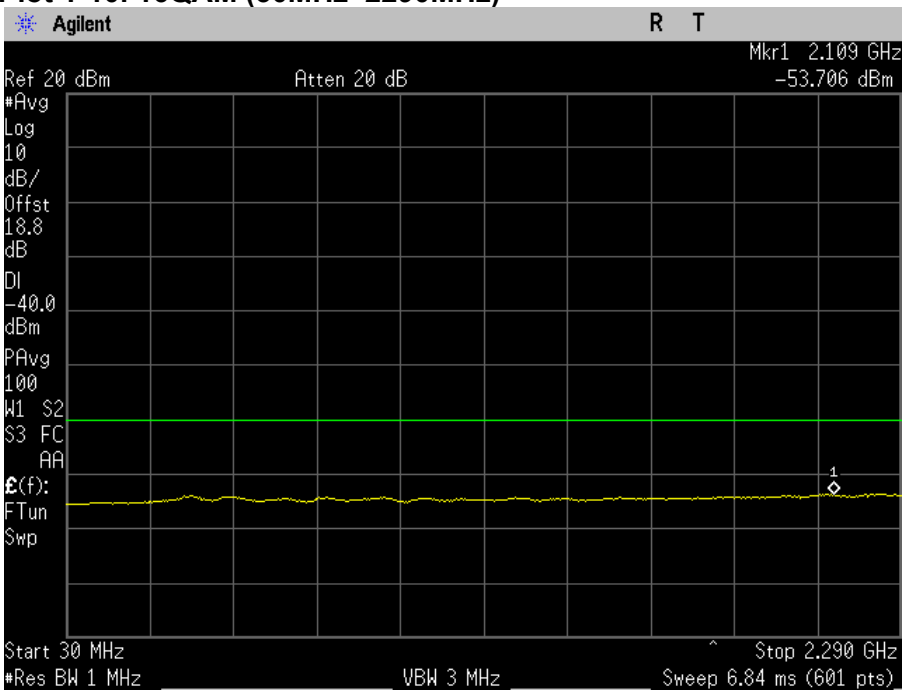
Plot 1-8. QPSK (2370MHz~24000MHz)



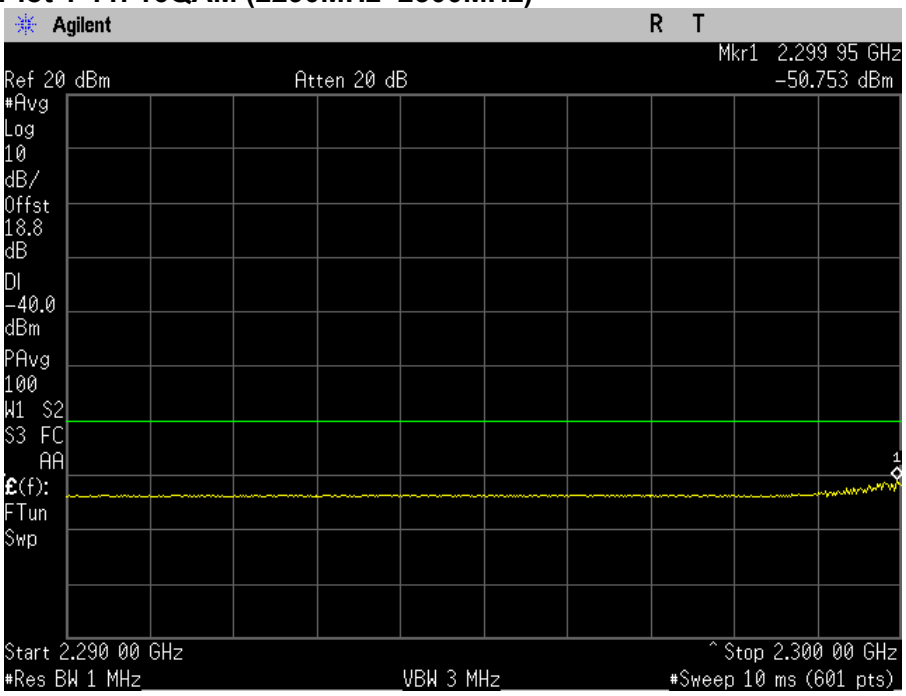
Plot 1-9. 16QAM(10MHz~30MHz)



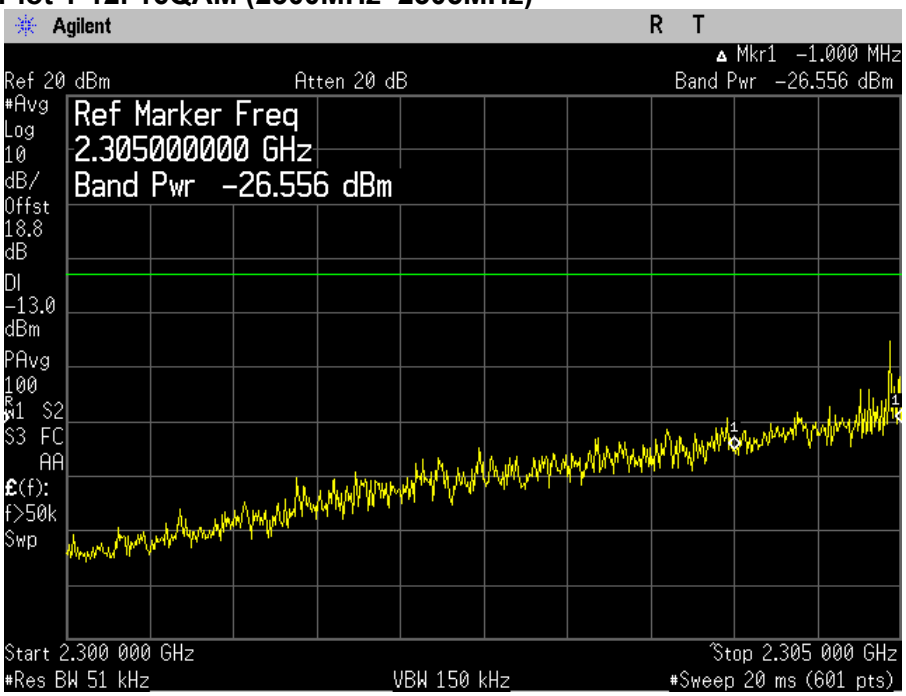
Plot 1-10. 16QAM (30MHz~2290MHz)



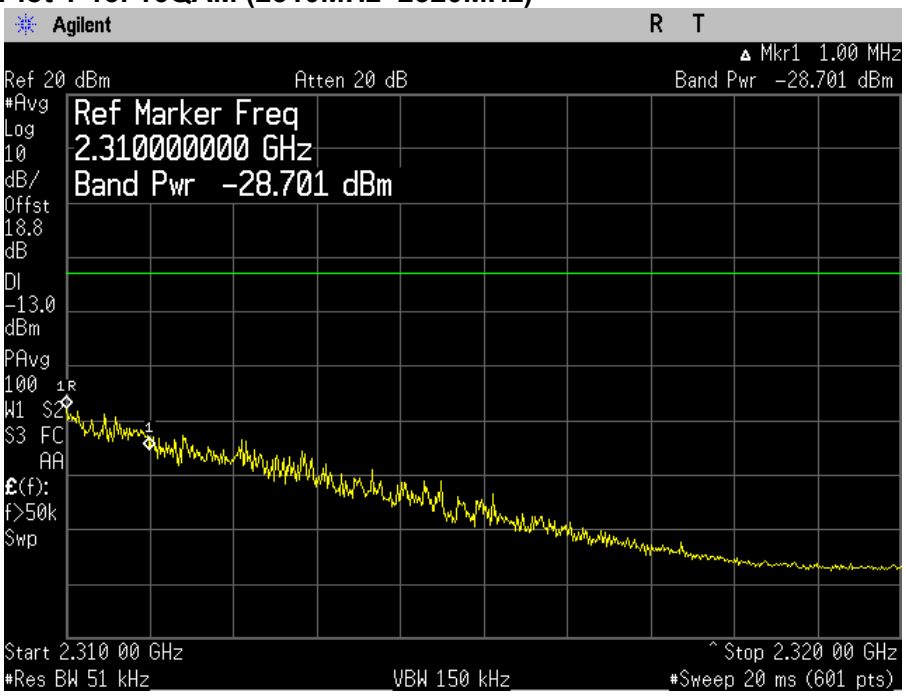
Plot 1-11. 16QAM (2290MHz~2300MHz)



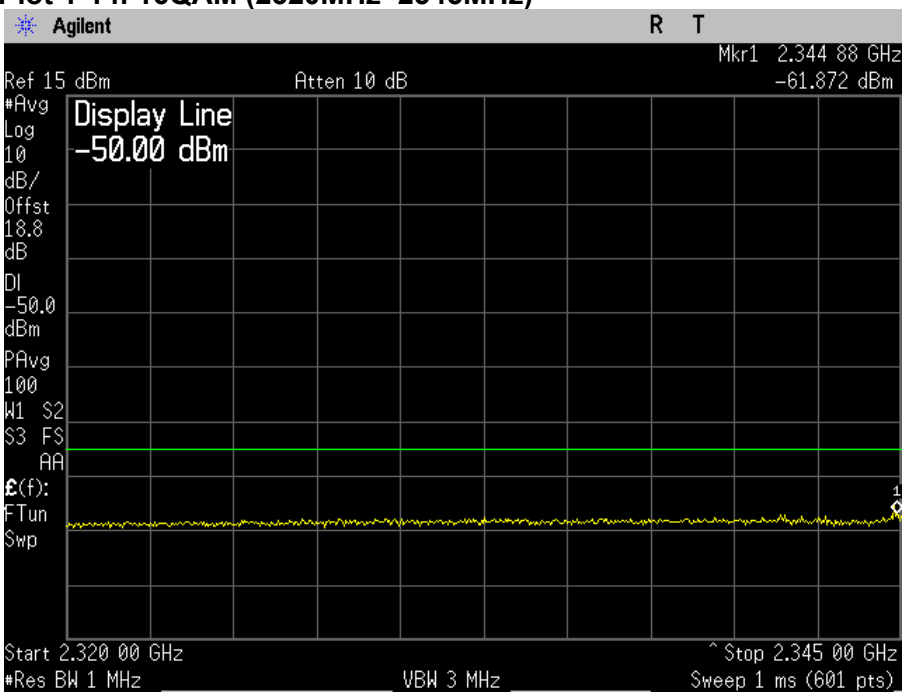
Plot 1-12. 16QAM (2300MHz~2305MHz)



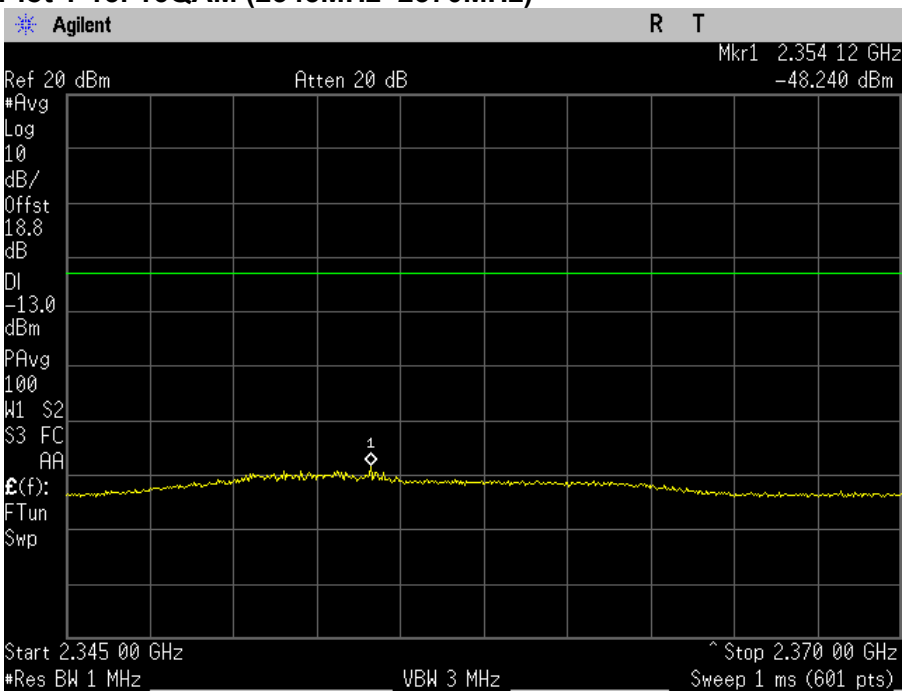
Plot 1-13. 16QAM (2310MHz~2320MHz)



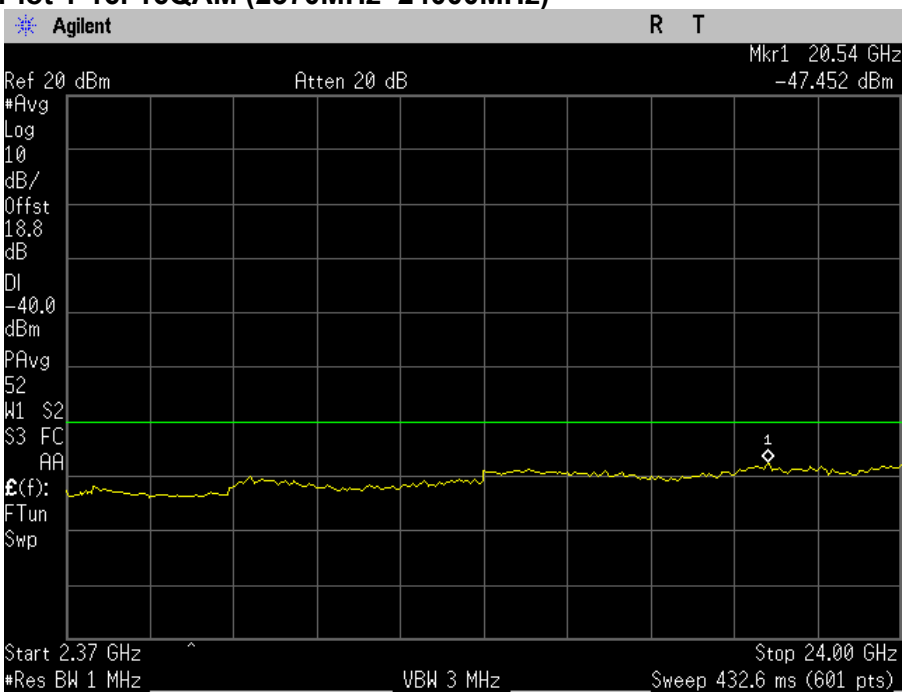
Plot 1-14. 16QAM (2320MHz~2345MHz)



Plot 1-15. 16QAM (2345MHz~2370MHz)

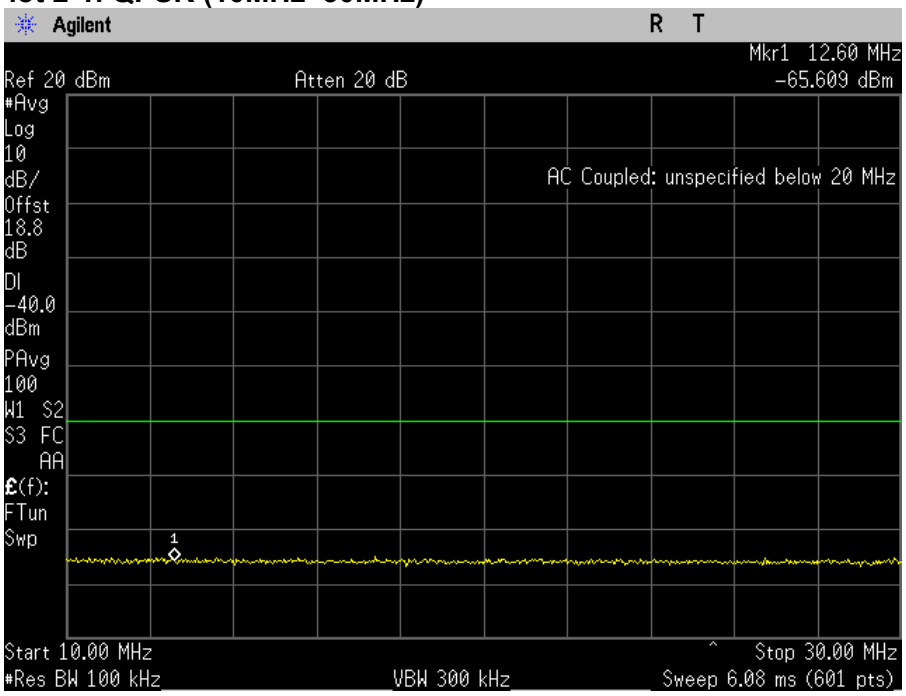


Plot 1-16. 16QAM (2370MHz~24000MHz)

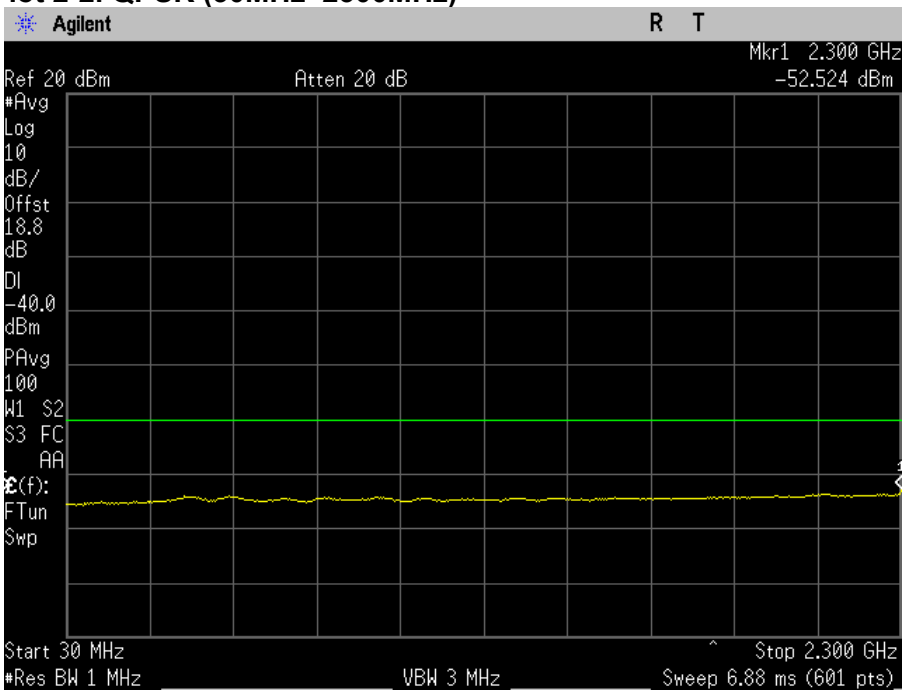


- **2312.5 MHz_5 MHz Bandwidth**

Plot 2-1. QPSK (10MHz~30MHz)

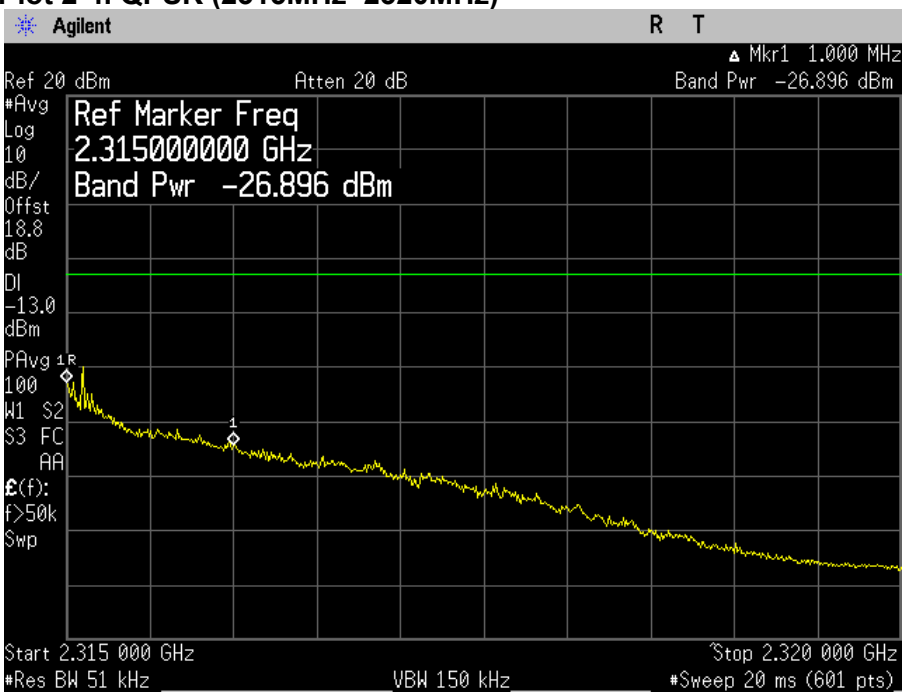


Plot 2-2. QPSK (30MHz~2300MHz)

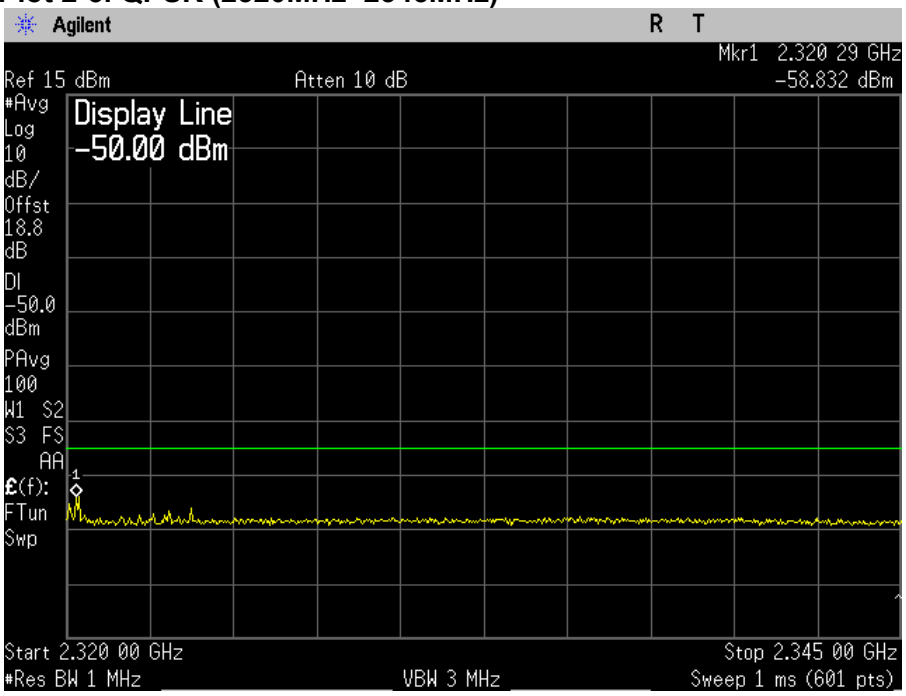


Plot 2-3. QPSK (2300MHz~2310MHz)

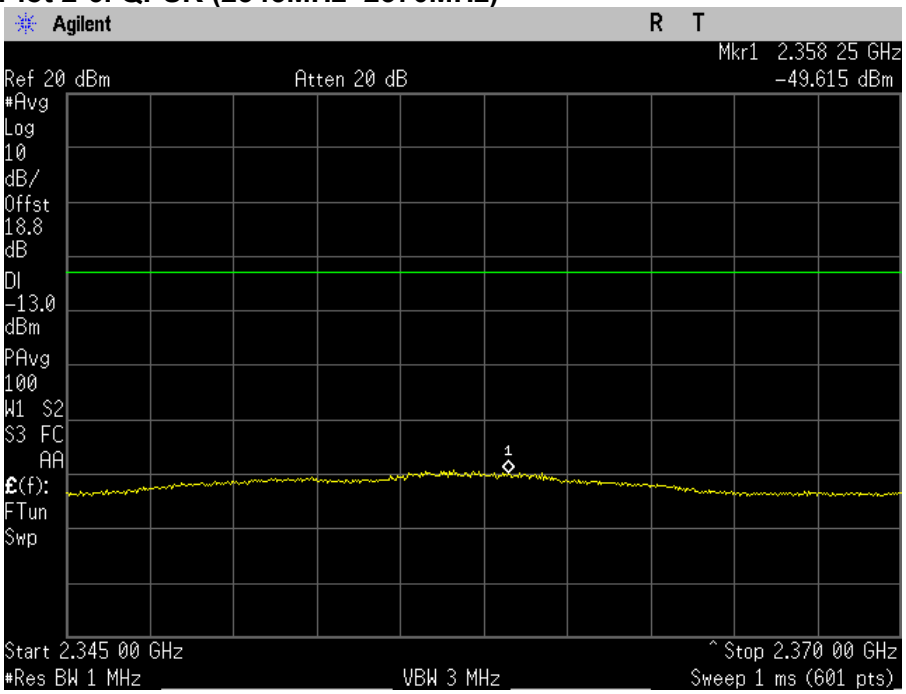
Plot 2-4. QPSK (2315MHz~2320MHz)



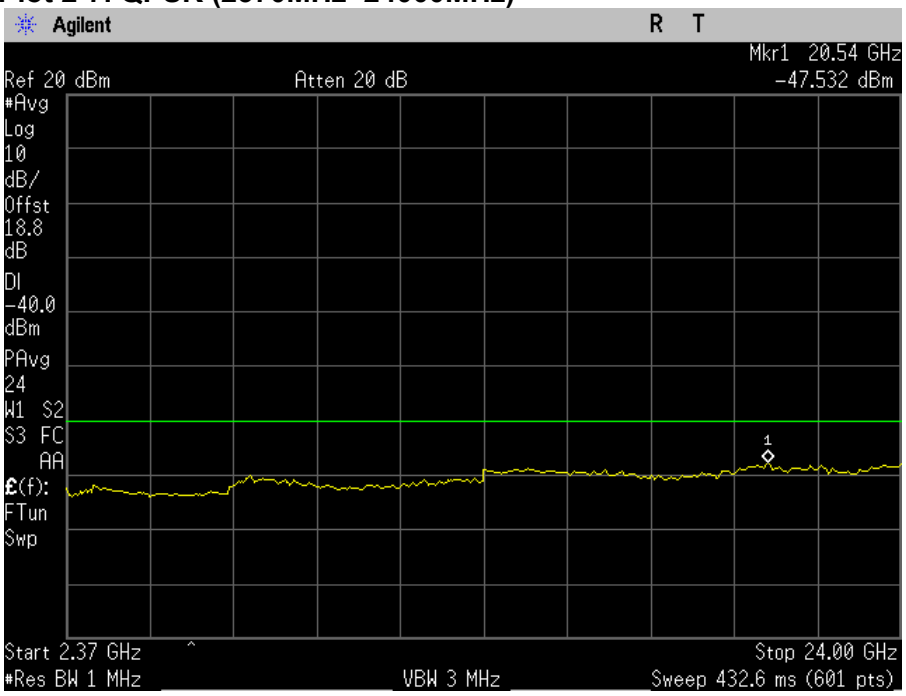
Plot 2-5. QPSK (2320MHz~2345MHz)



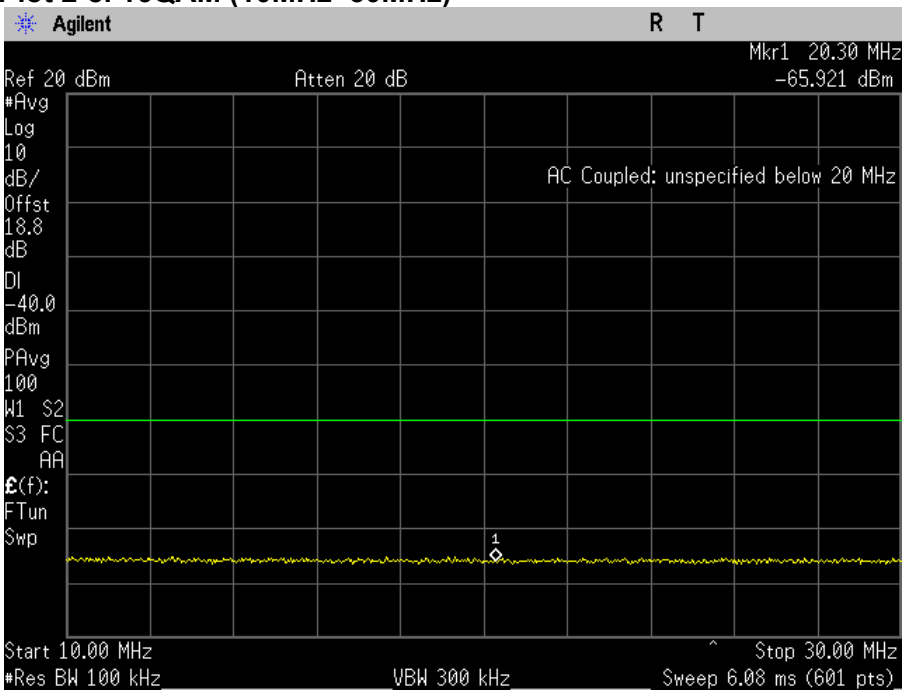
Plot 2-6. QPSK (2345MHz~2370MHz)



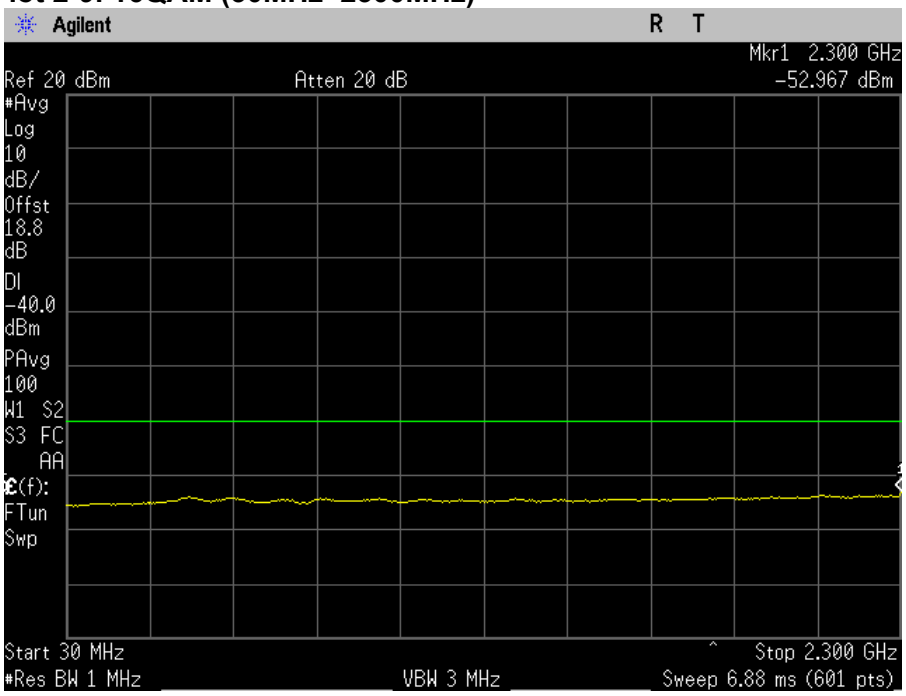
Plot 2-7. QPSK (2370MHz~24000MHz)



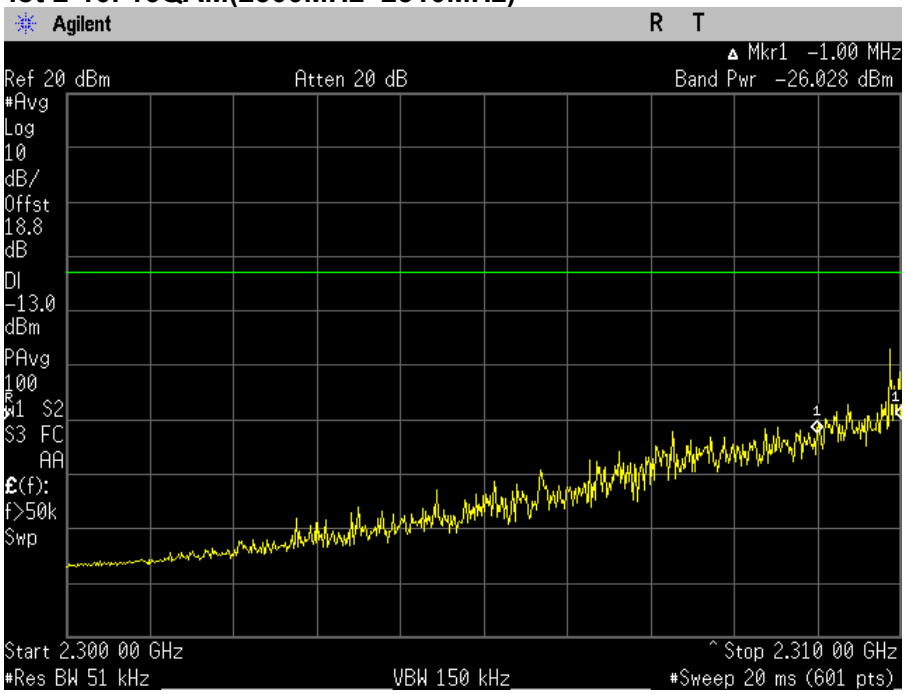
Plot 2-8. 16QAM (10MHz~30MHz)



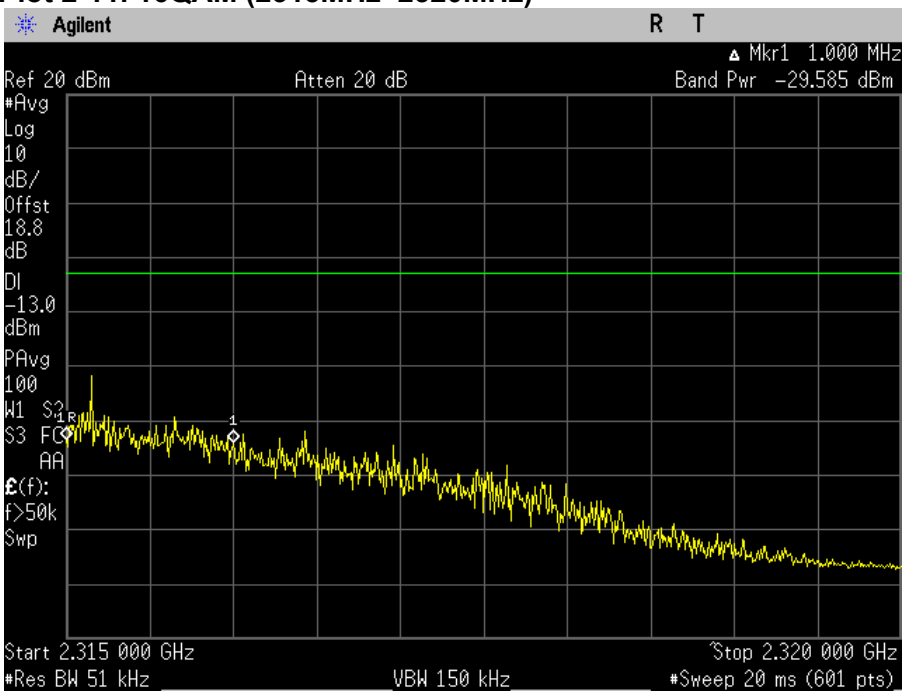
Plot 2-9. 16QAM (30MHz~2300MHz)



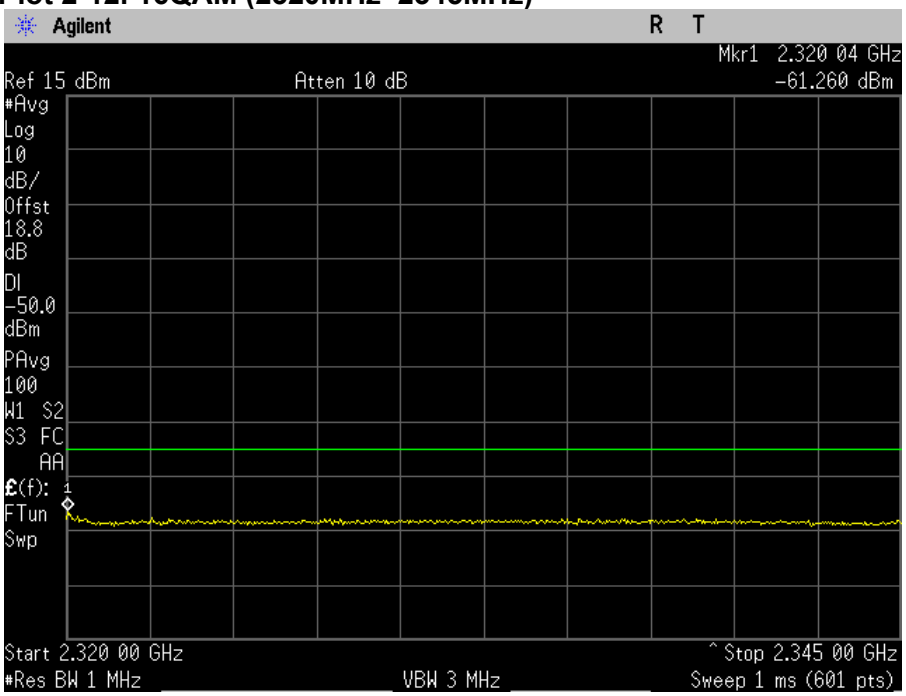
Plot 2-10. 16QAM(2300MHz~2310MHz)



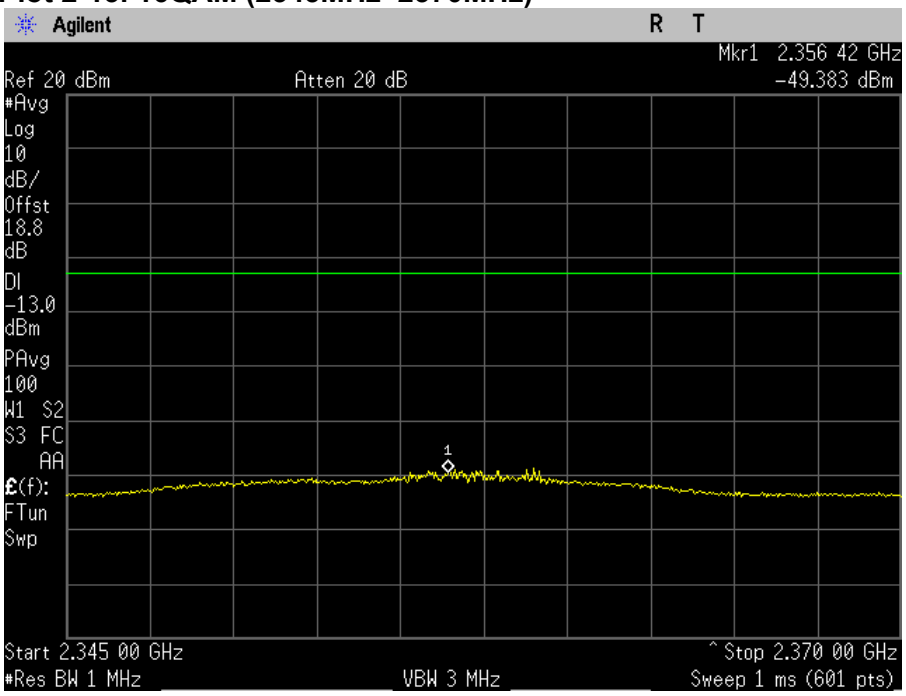
Plot 2-11. 16QAM (2315MHz~2320MHz)



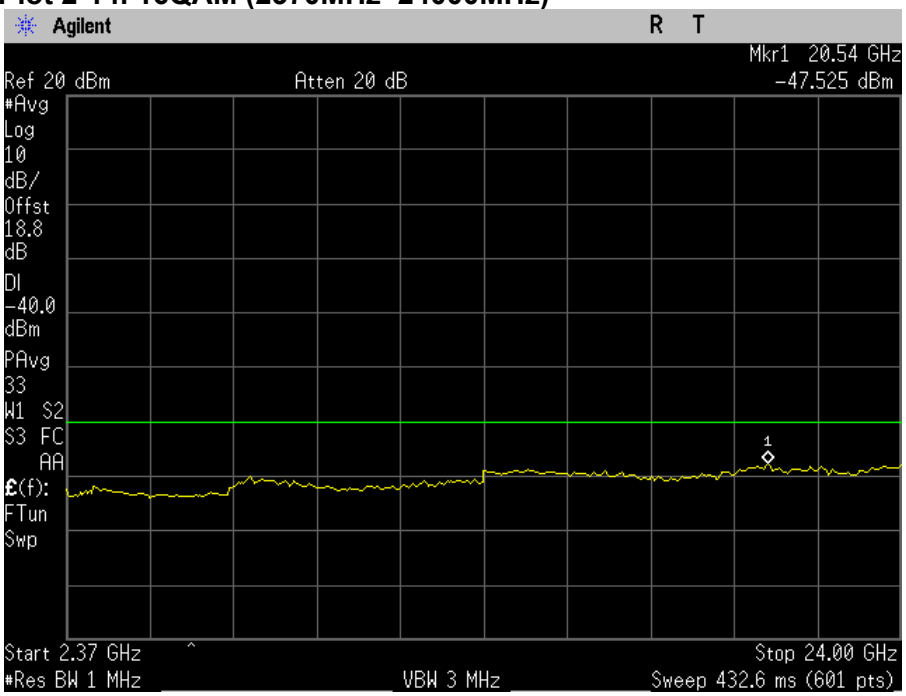
Plot 2-12. 16QAM (2320MHz~2345MHz)



Plot 2-13. 16QAM (2345MHz~2370MHz)

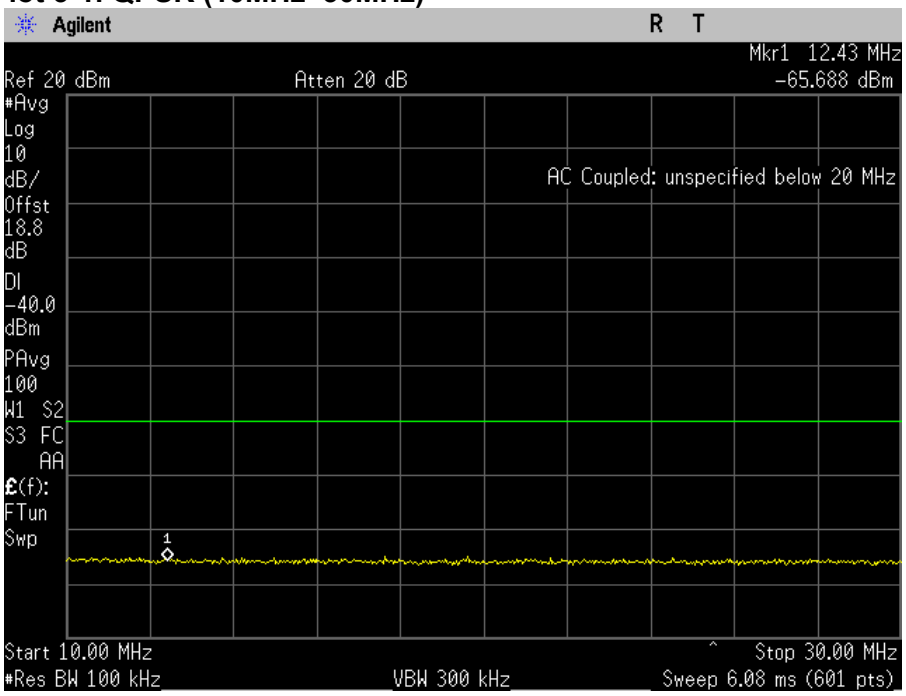


Plot 2-14. 16QAM (2370MHz~24000MHz)

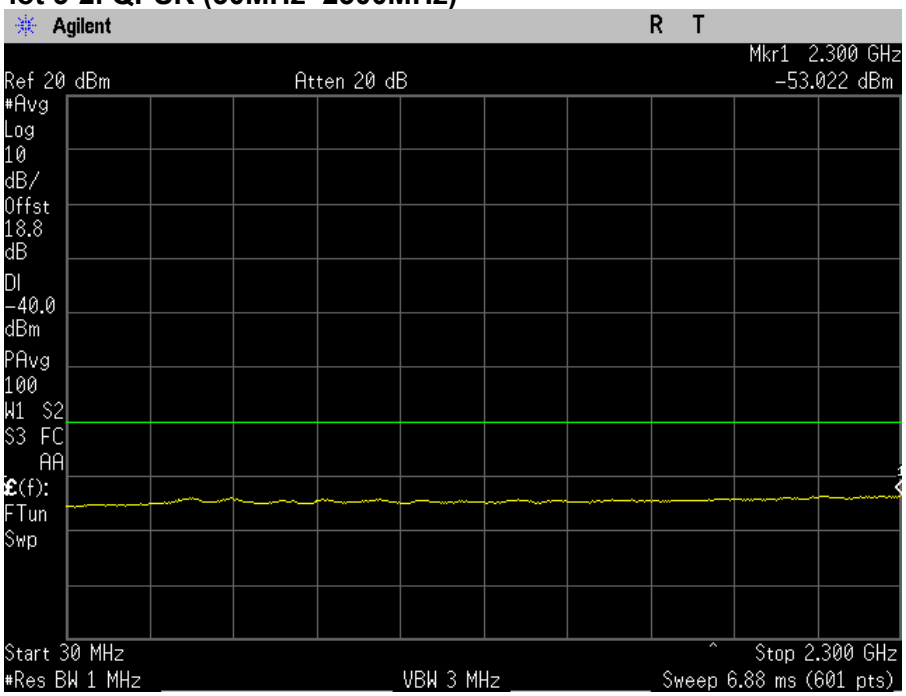


- **2352.5 MHz_5 MHz Bandwidth**

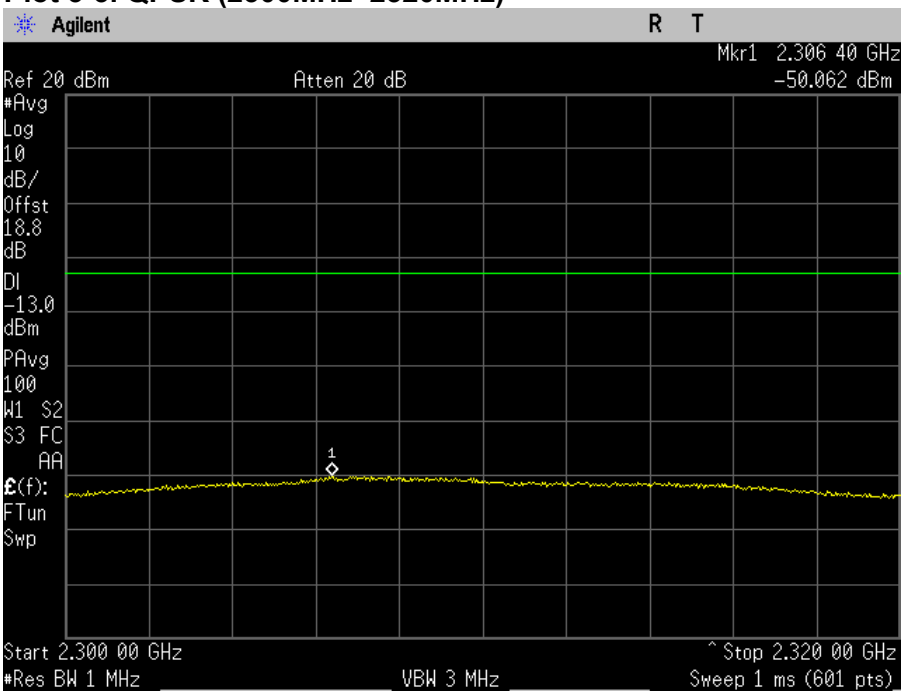
Plot 3-1. QPSK (10MHz~30MHz)



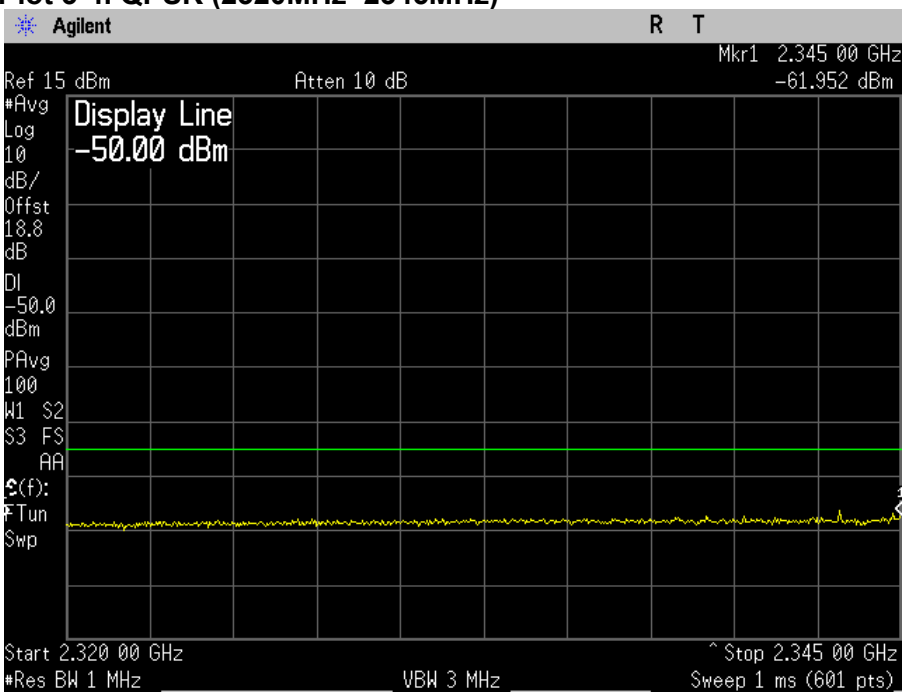
Plot 3-2. QPSK (30MHz~2300MHz)



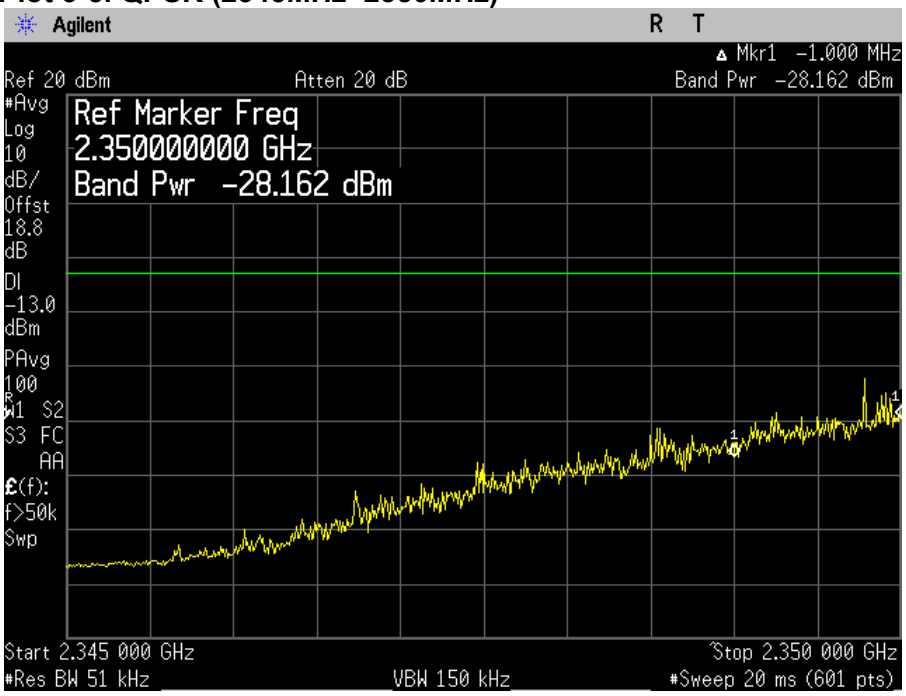
Plot 3-3. QPSK (2300MHz~2320MHz)



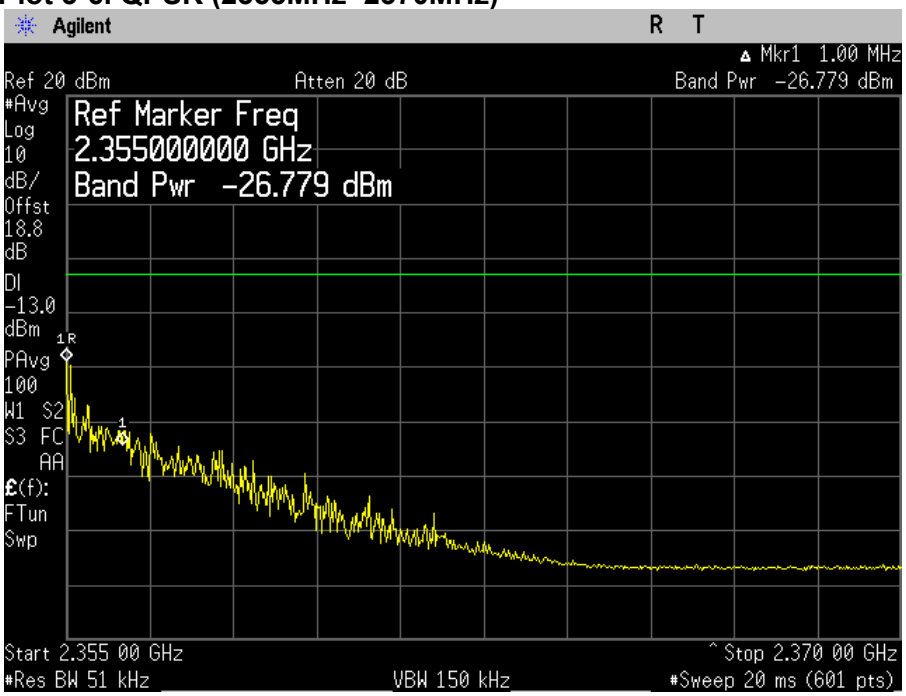
Plot 3-4. QPSK (2320MHz~2345MHz)



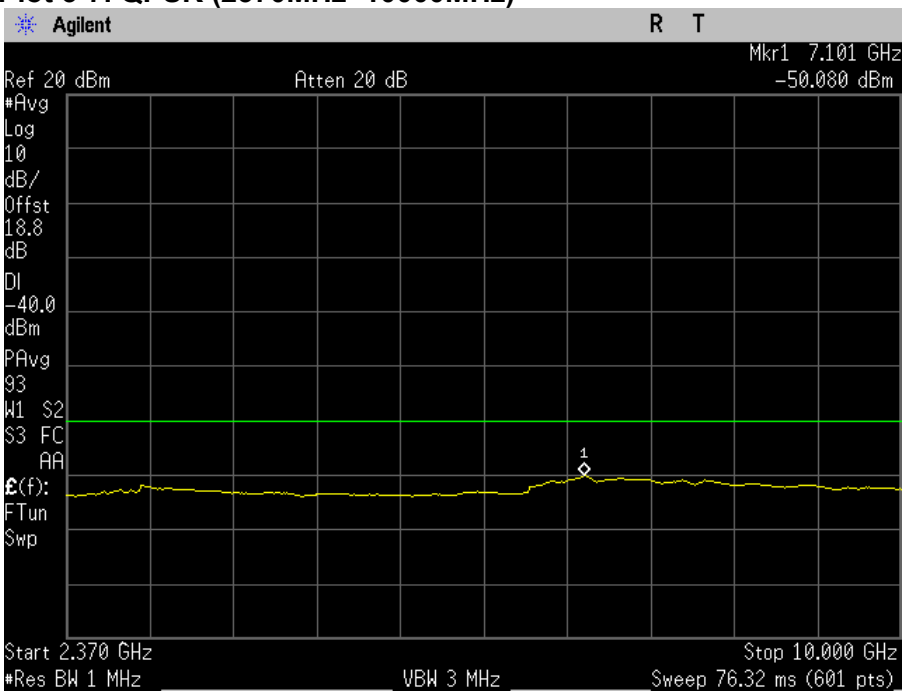
Plot 3-5. QPSK (2345MHz~2350MHz)



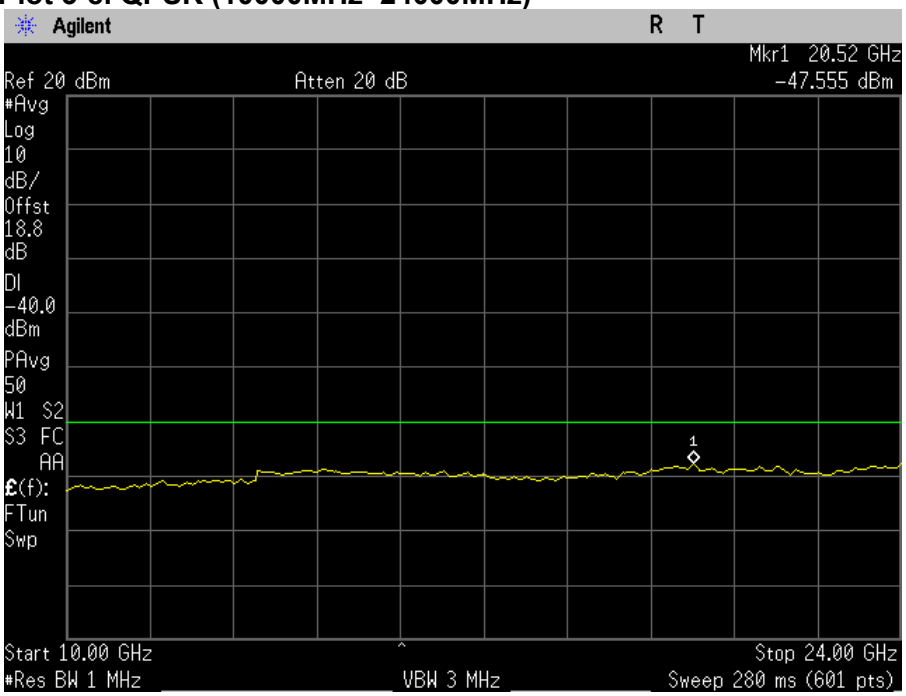
Plot 3-6. QPSK (2355MHz~2370MHz)



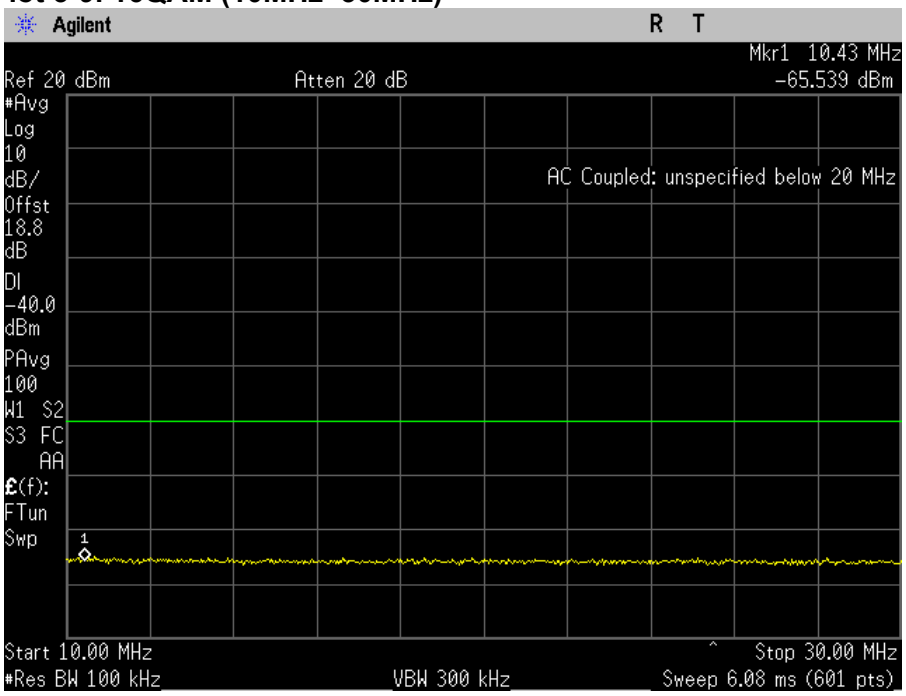
Plot 3-7. QPSK (2370MHz~10000MHz)



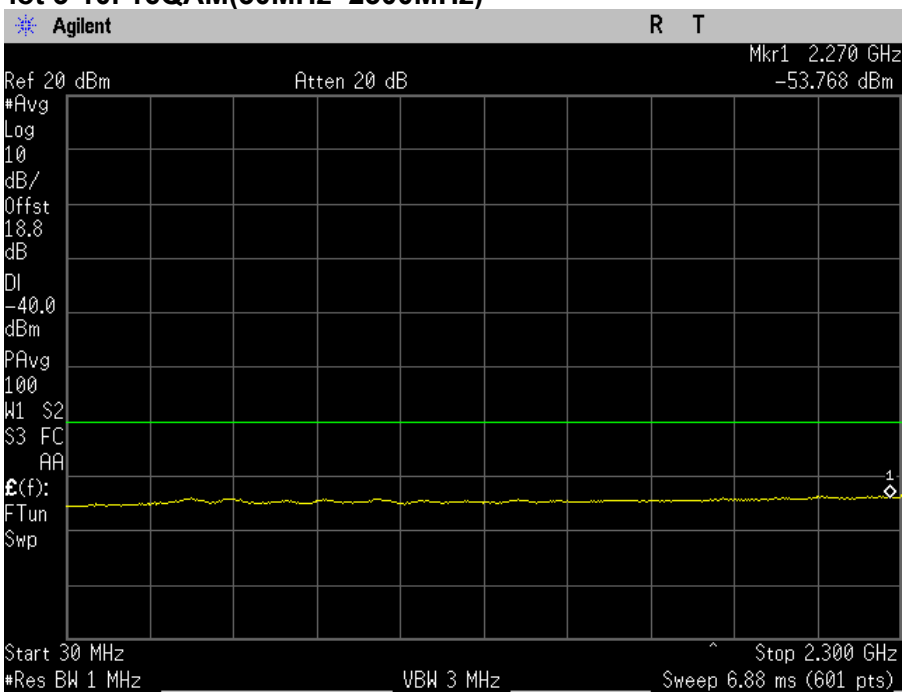
Plot 3-8. QPSK (10000MHz~24000MHz)



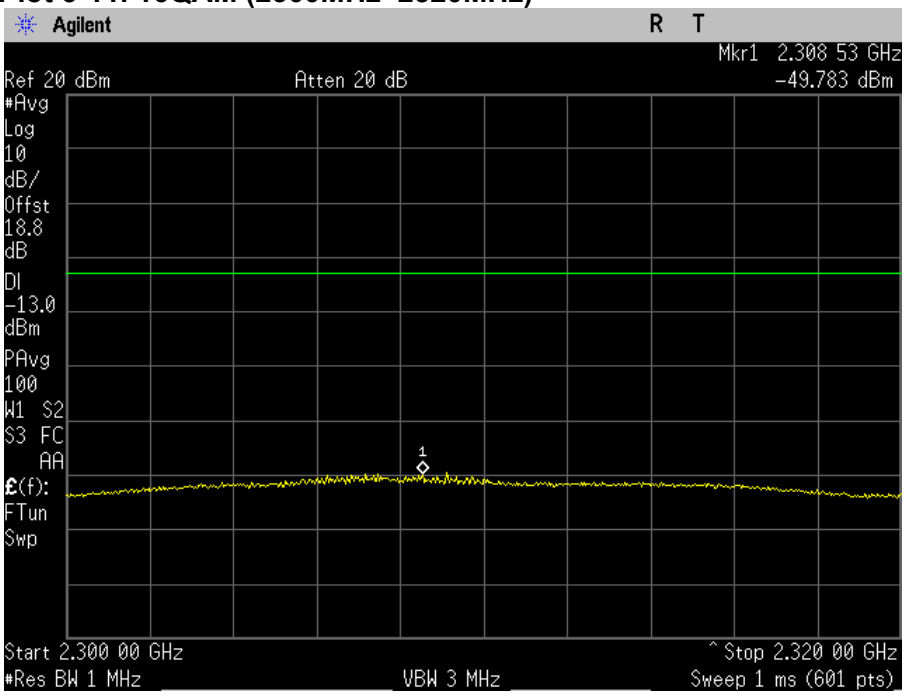
Plot 3-9. 16QAM (10MHz~30MHz)



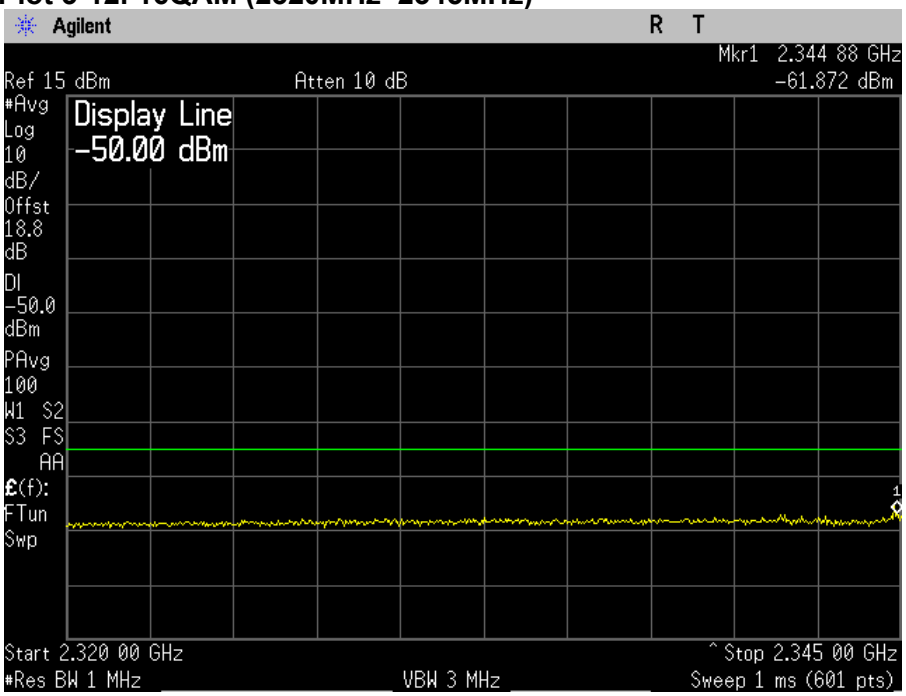
Plot 3-10. 16QAM(30MHz~2300MHz)



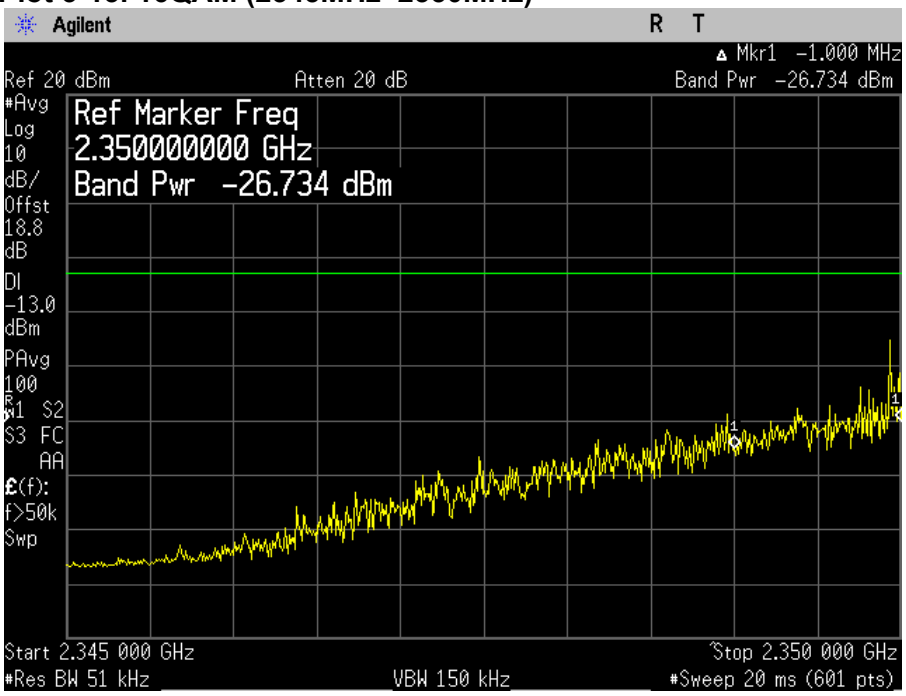
Plot 3-11. 16QAM (2300MHz~2320MHz)



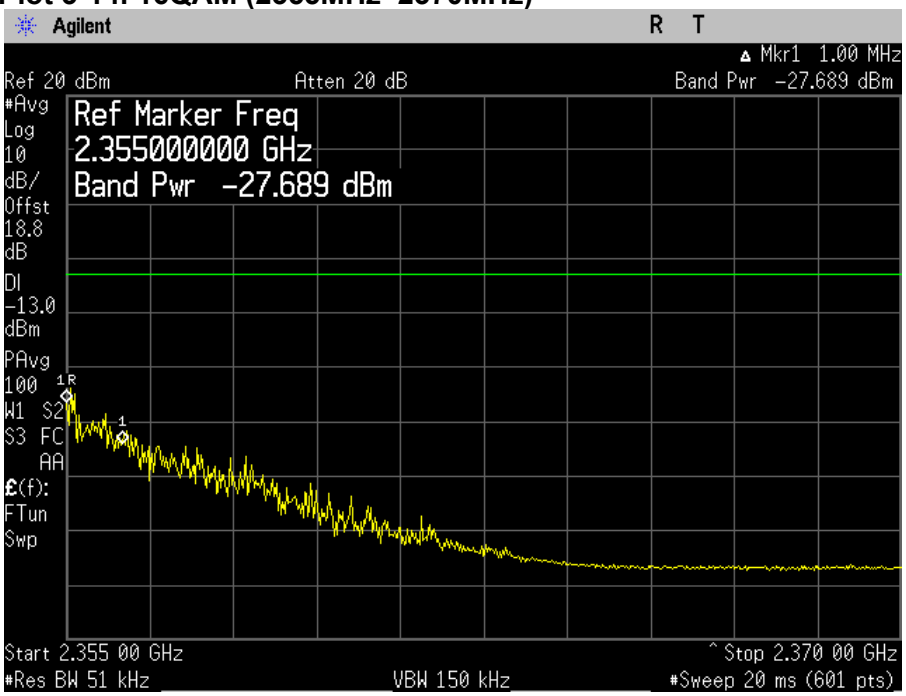
Plot 3-12. 16QAM (2320MHz~2345MHz)



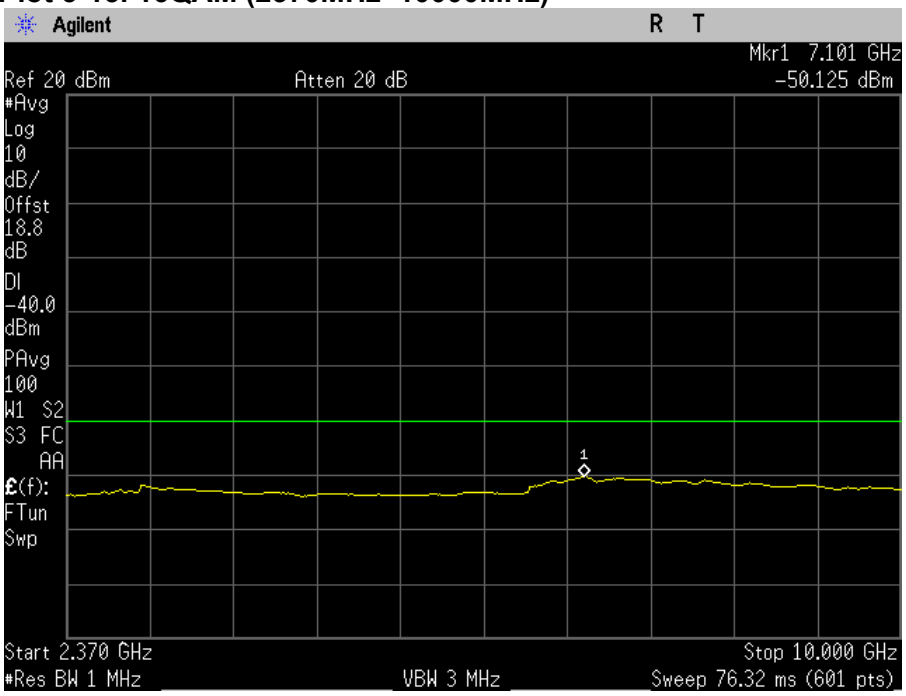
Plot 3-13. 16QAM (2345MHz~2350MHz)



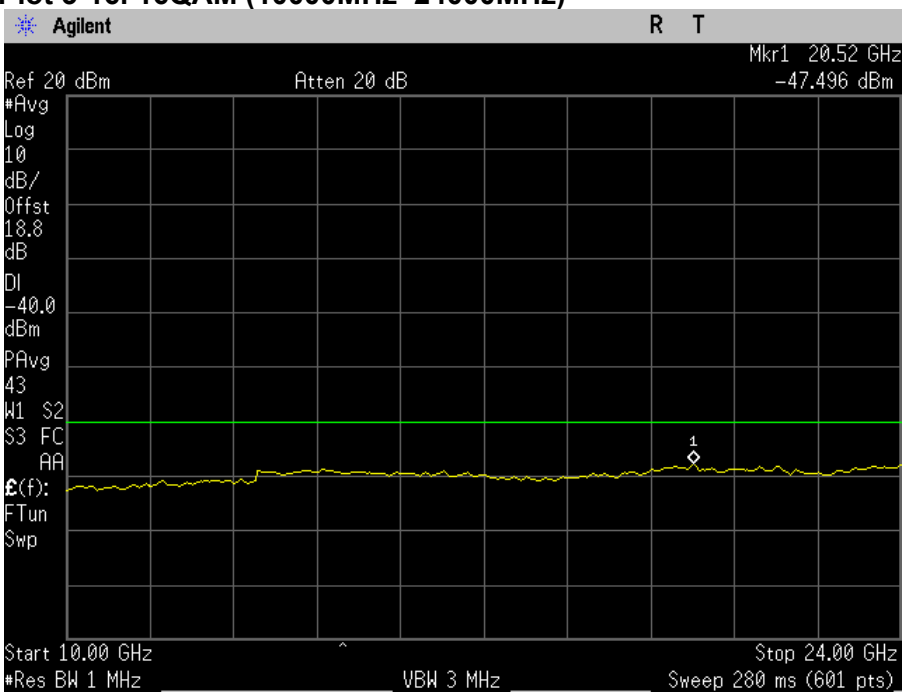
Plot 3-14. 16QAM (2355MHz~2370MHz)



Plot 3-15. 16QAM (2370MHz~10000MHz)

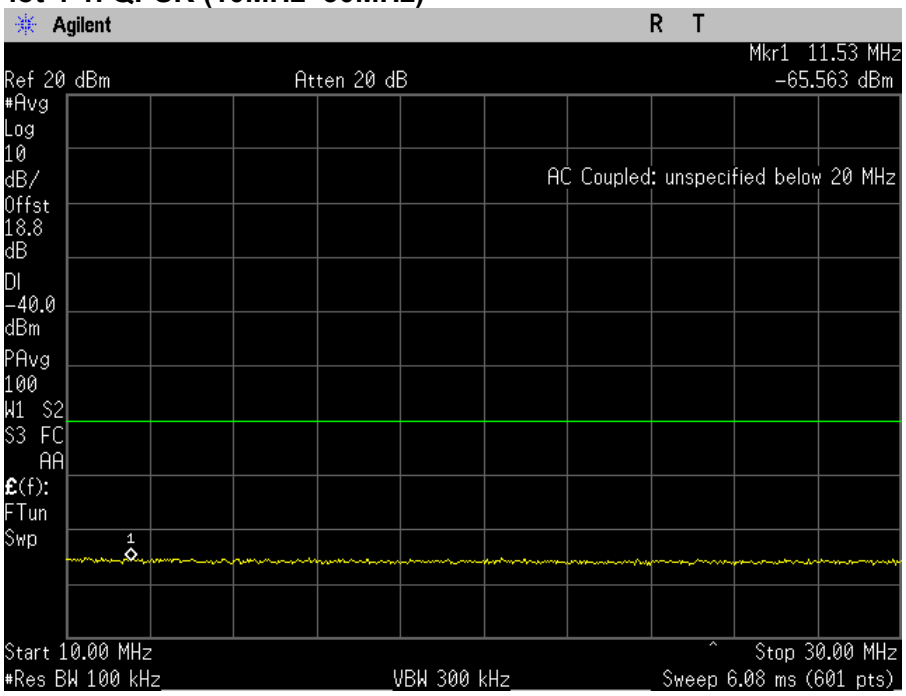


Plot 3-16. 16QAM (10000MHz~24000MHz)

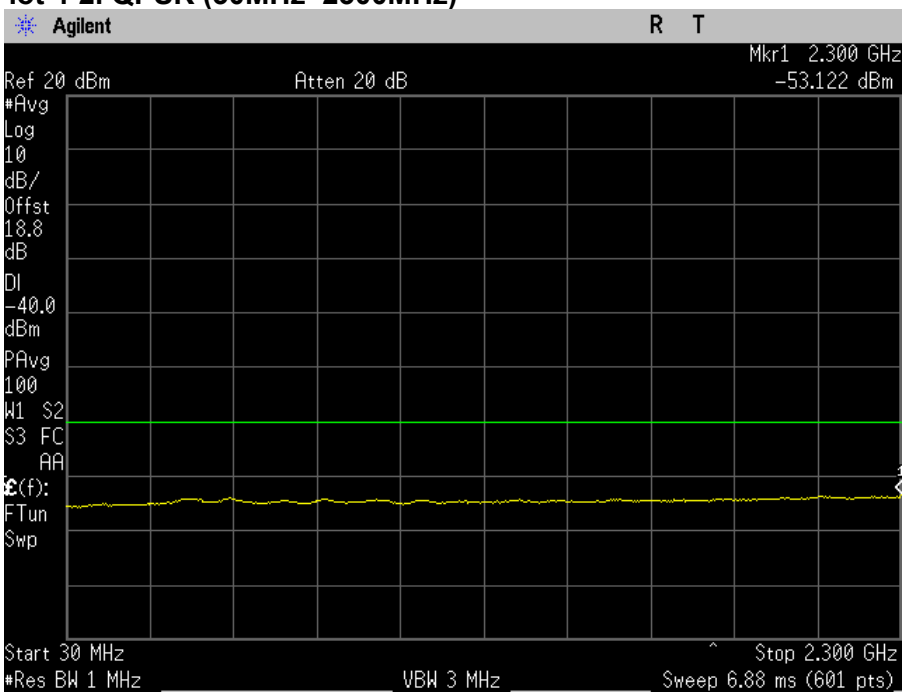


- **2357.5 MHz_5 MHz Bandwidth**

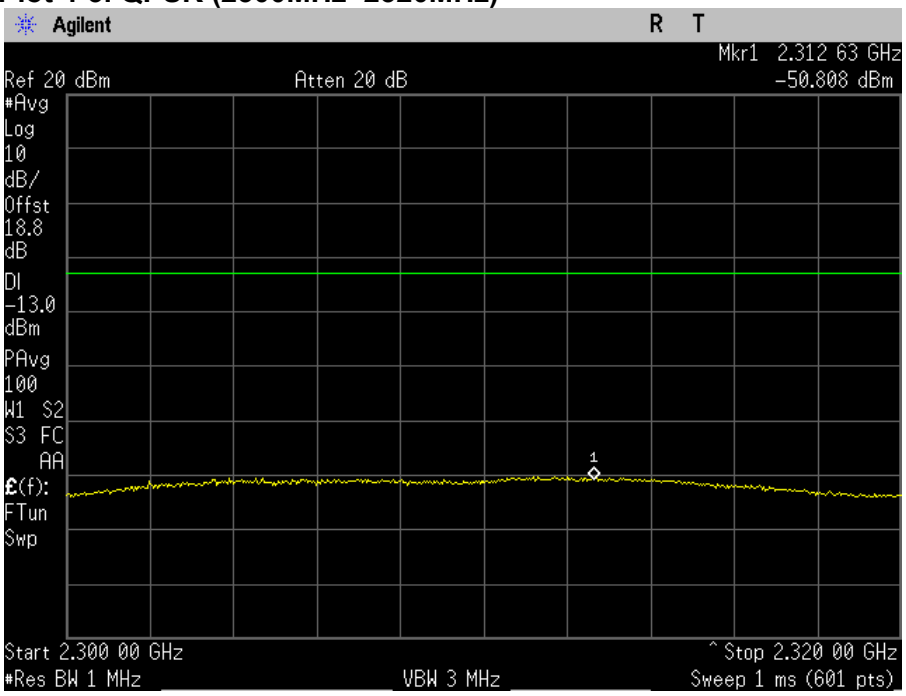
Plot 4-1. QPSK (10MHz~30MHz)



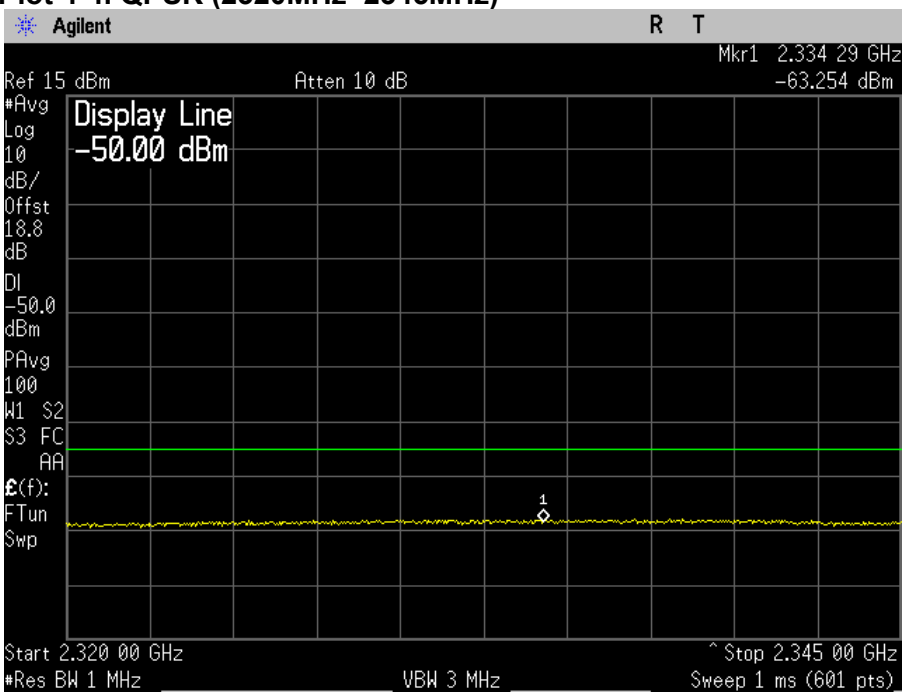
Plot 4-2. QPSK (30MHz~2300MHz)



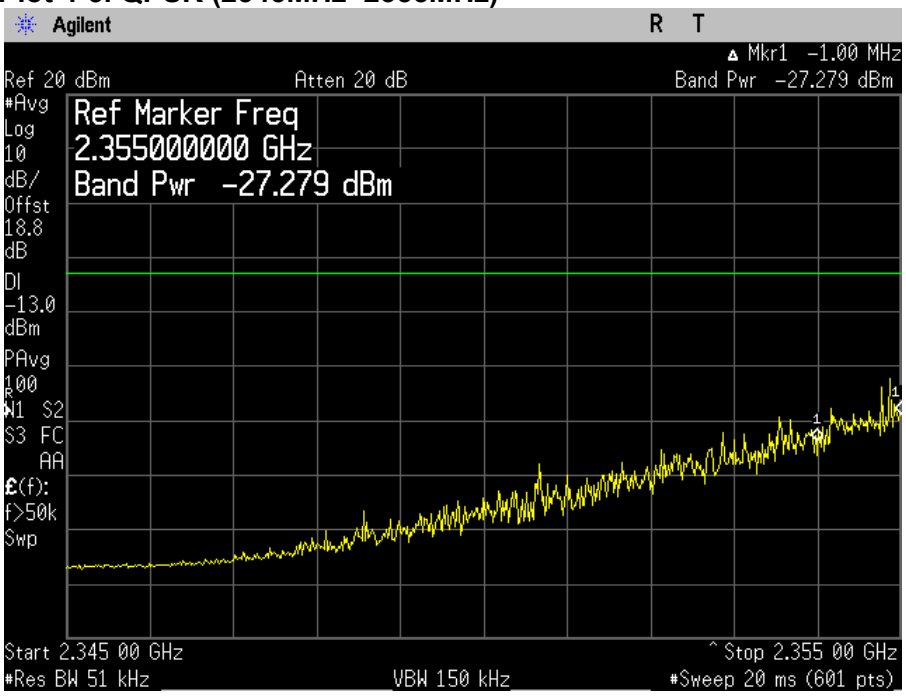
Plot 4-3. QPSK (2300MHz~2320MHz)



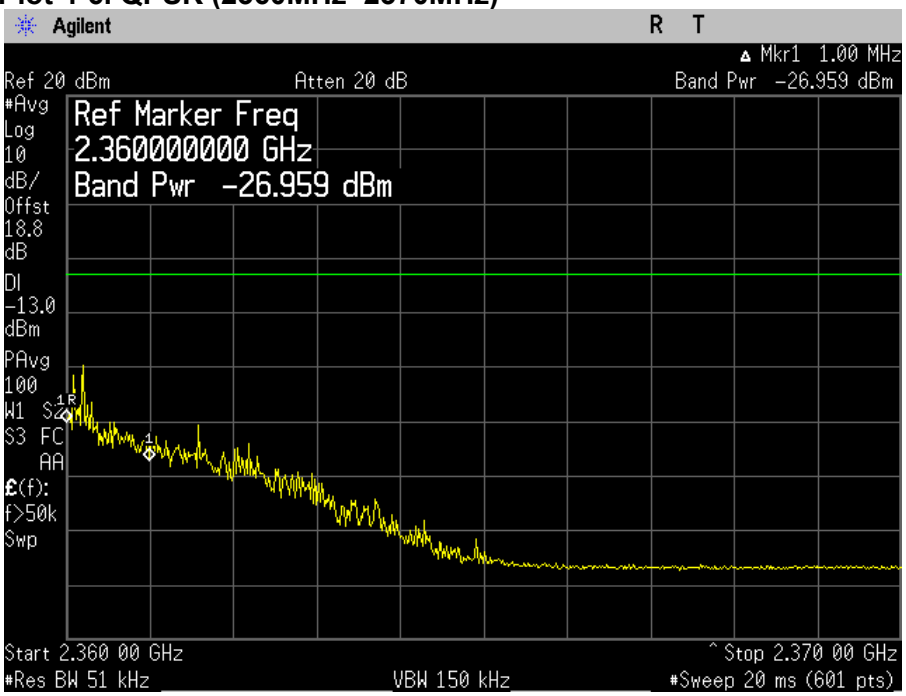
Plot 4-4. QPSK (2320MHz~2345MHz)



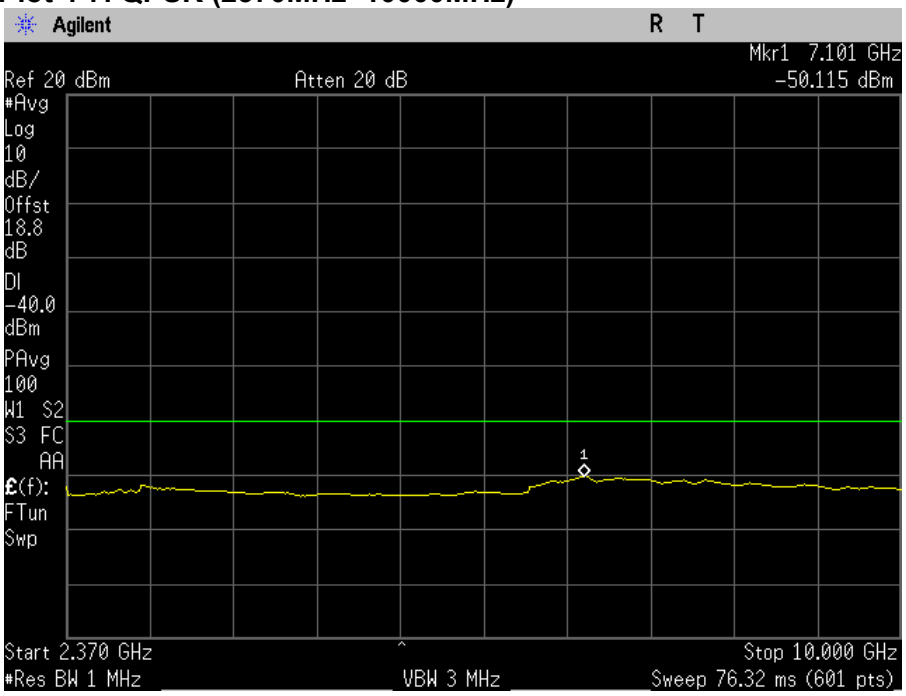
Plot 4-5. QPSK (2345MHz~2355MHz)



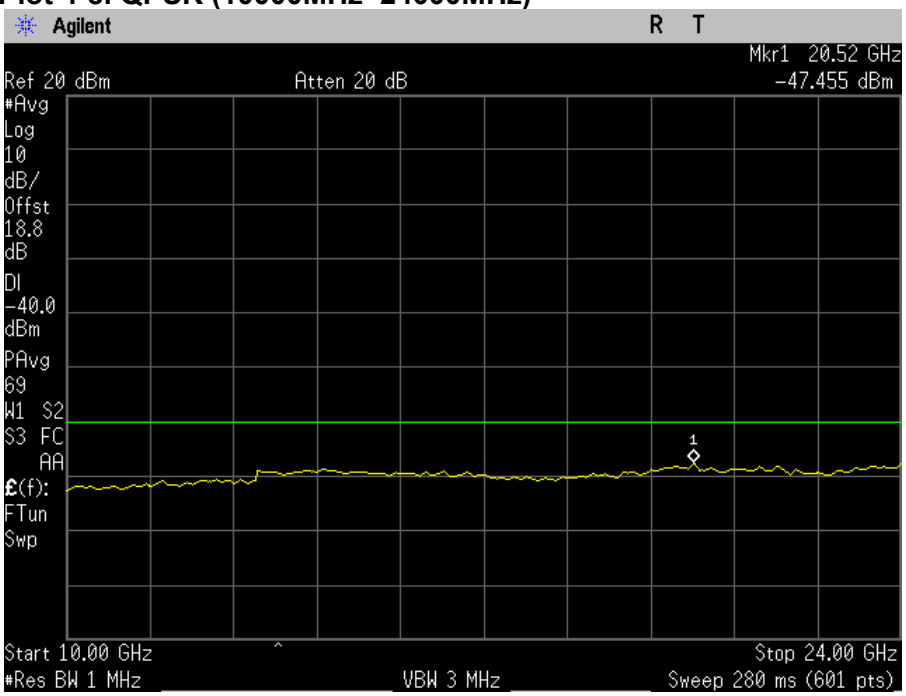
Plot 4-6. QPSK (2360MHz~2370MHz)



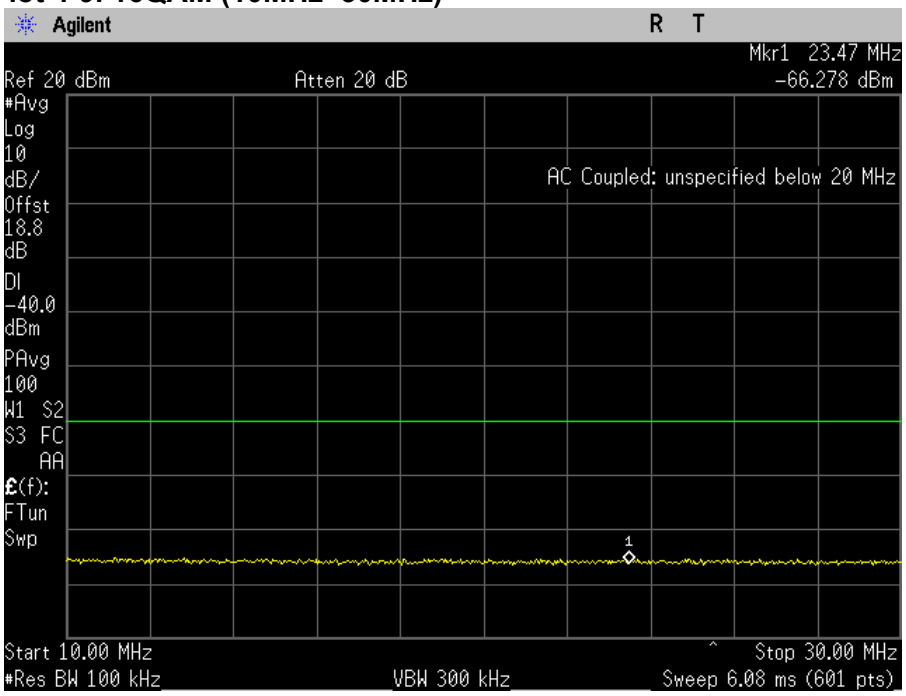
Plot 4-7. QPSK (2370MHz~10000MHz)



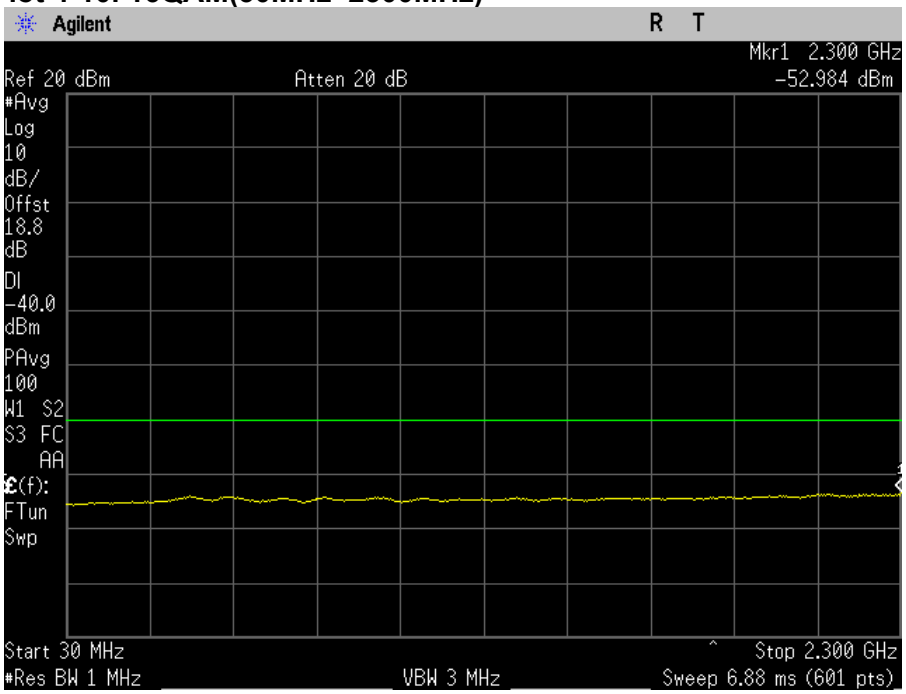
Plot 4-8. QPSK (10000MHz~24000MHz)



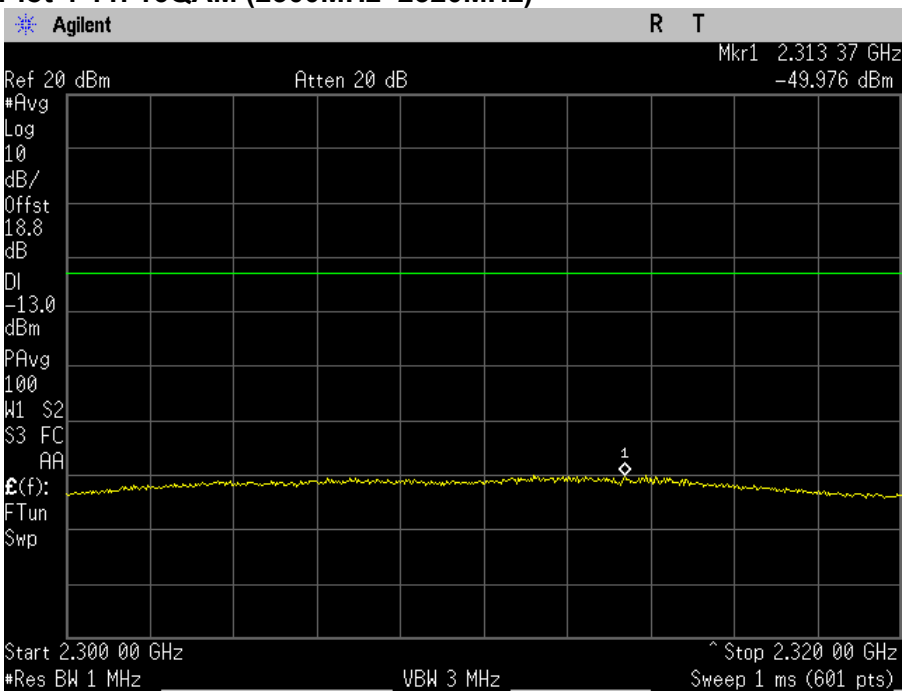
Plot 4-9. 16QAM (10MHz~30MHz)



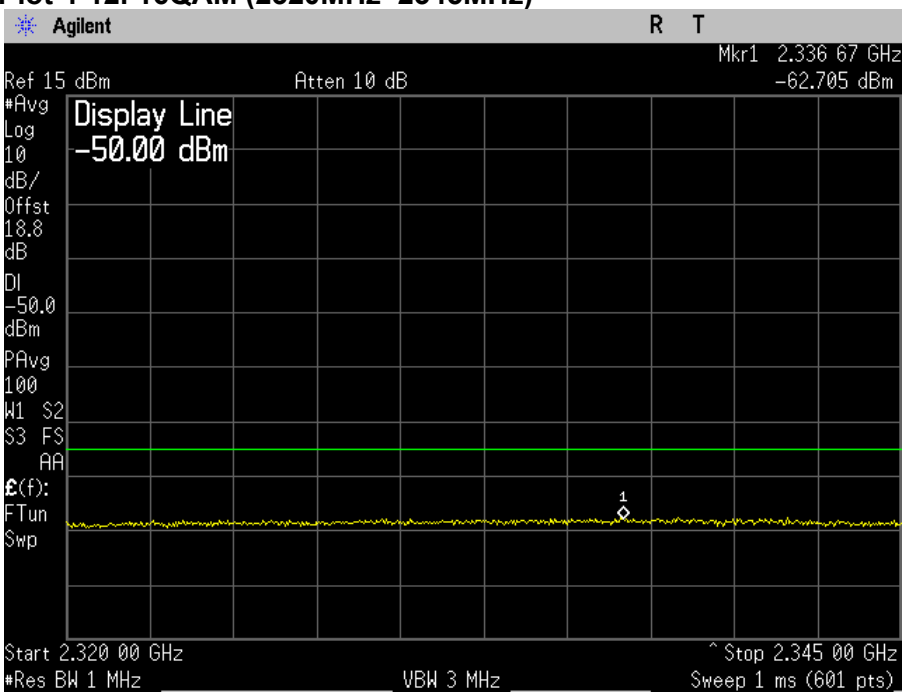
Plot 4-10. 16QAM(30MHz~2300MHz)



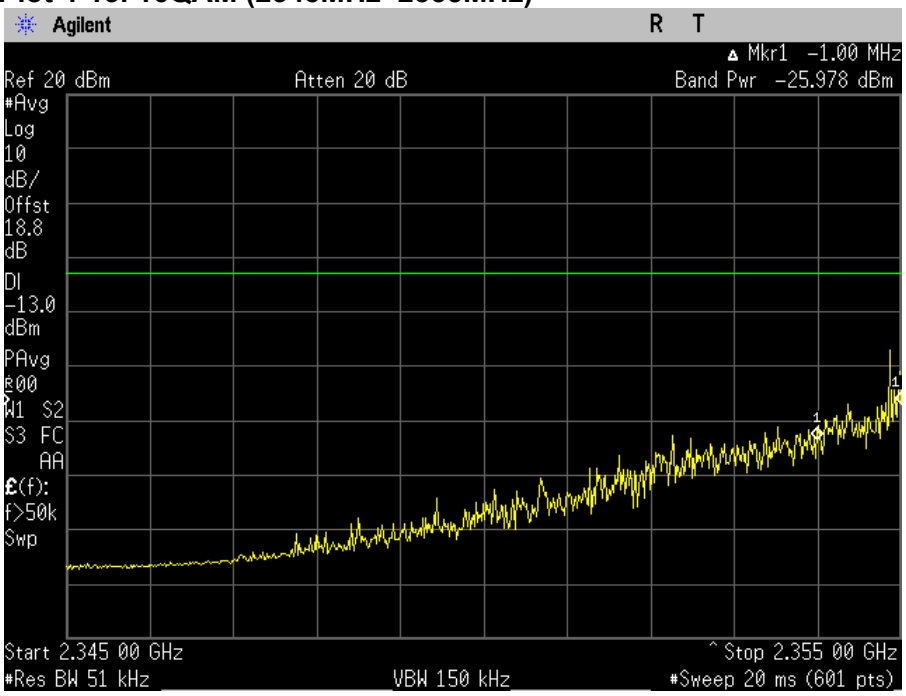
Plot 4-11. 16QAM (2300MHz~2320MHz)



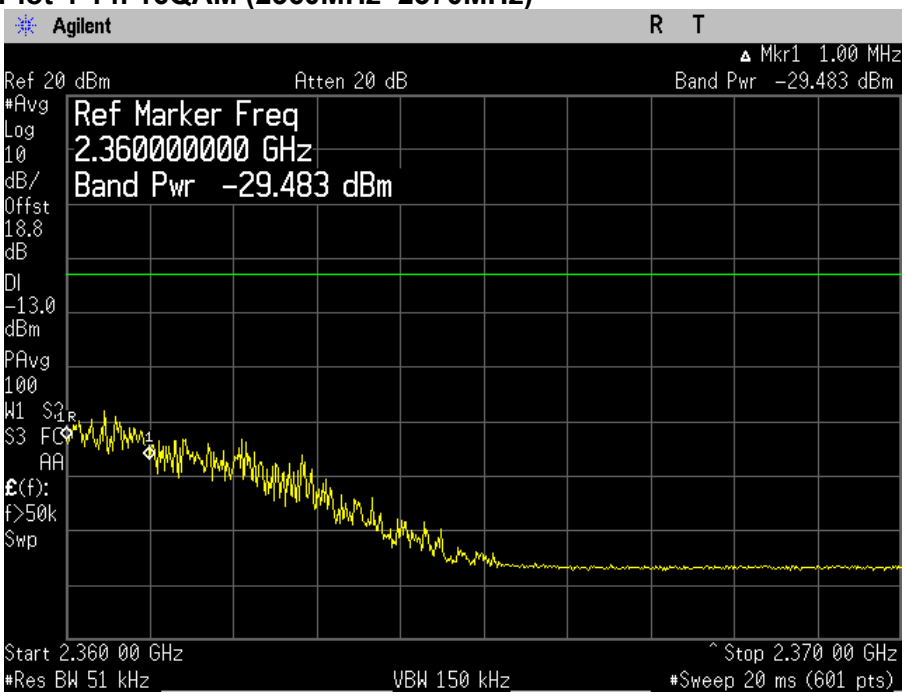
Plot 4-12. 16QAM (2320MHz~2345MHz)



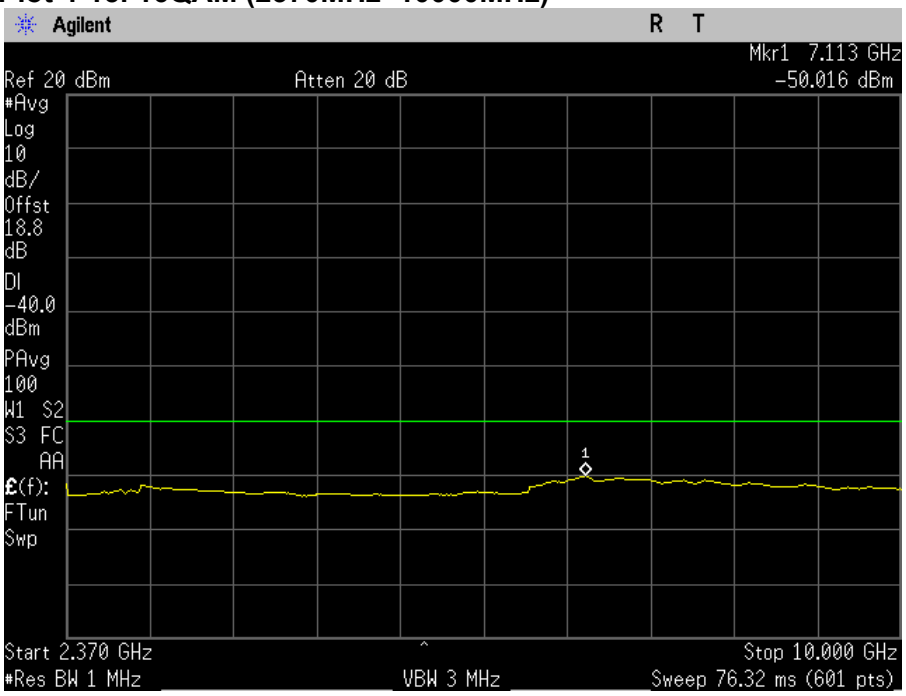
Plot 4-13. 16QAM (2345MHz~2355MHz)



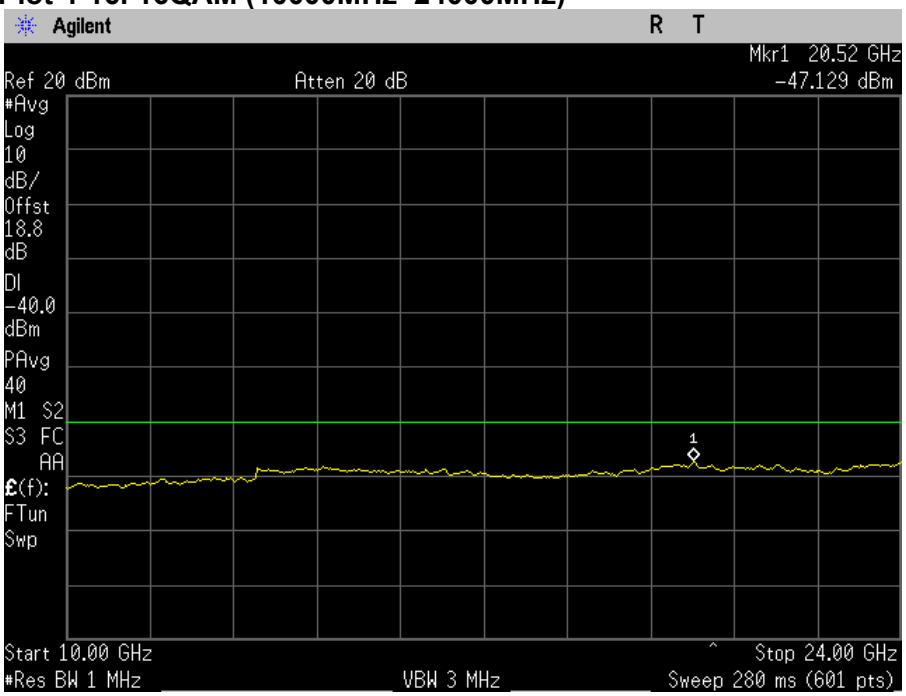
Plot 4-14. 16QAM (2360MHz~2370MHz)



Plot 4-15. 16QAM (2370MHz~10000MHz)



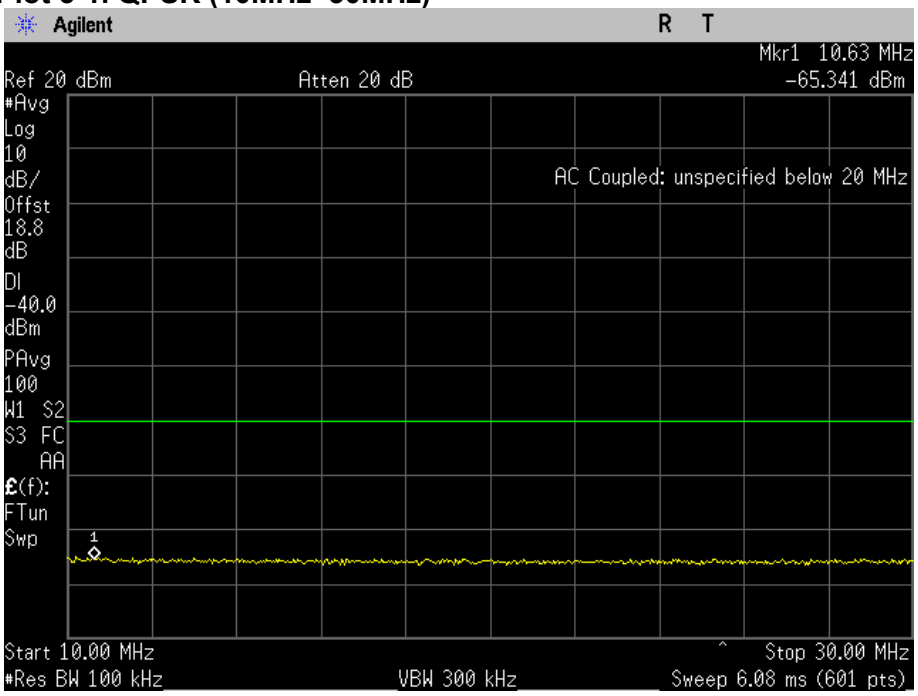
Plot 4-16. 16QAM (10000MHz~24000MHz)



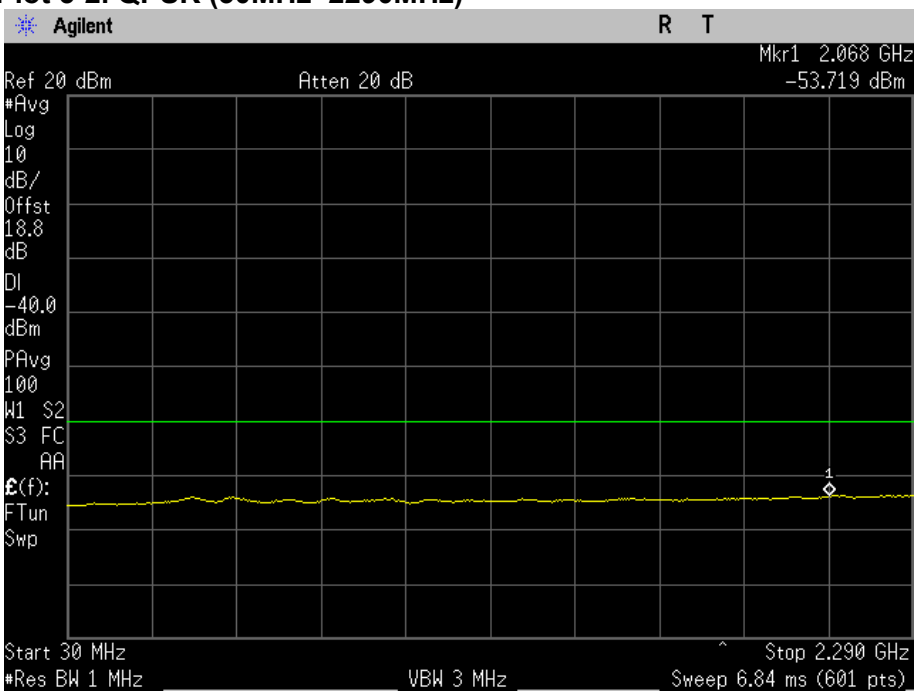
9.3.2. Test Plots (10 MHz Bandwidth)

- **2310.0 MHz_10 MHz Bandwidth**

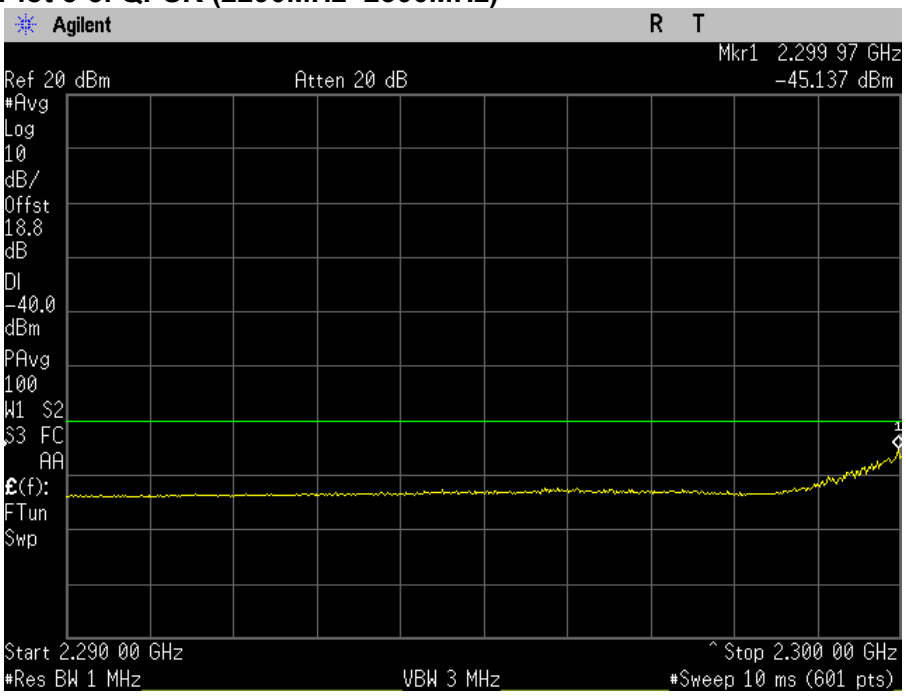
Plot 5-1. QPSK (10MHz~30MHz)



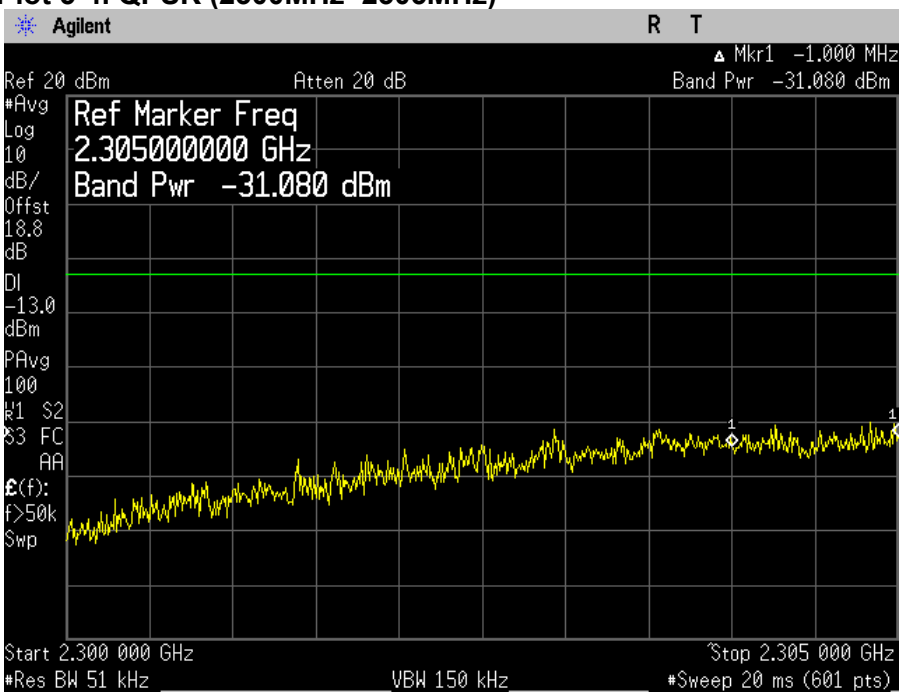
Plot 5-2. QPSK (30MHz~2290MHz)



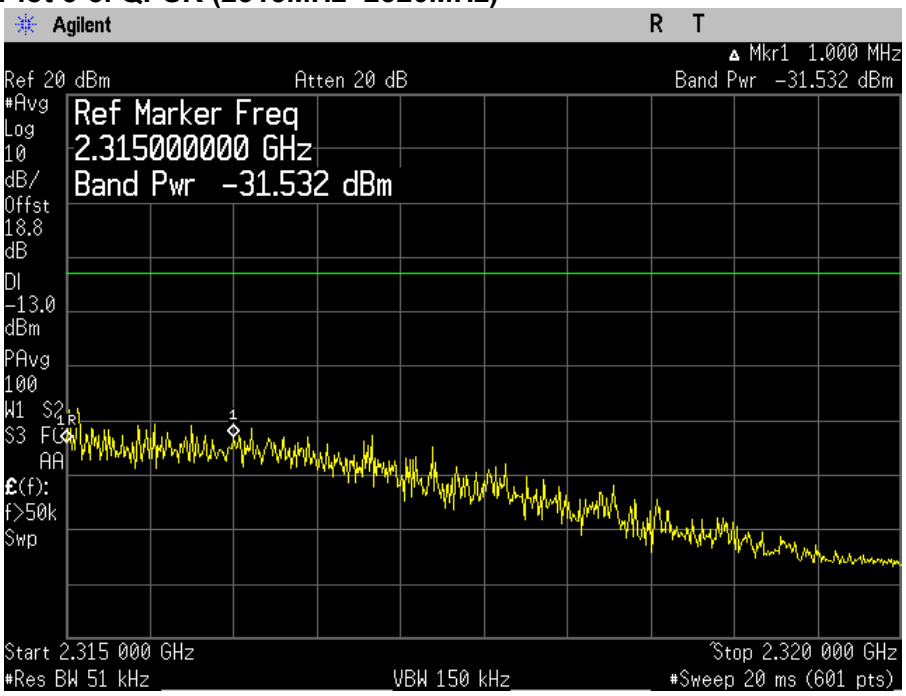
Plot 5-3. QPSK (2290MHz~2300MHz)



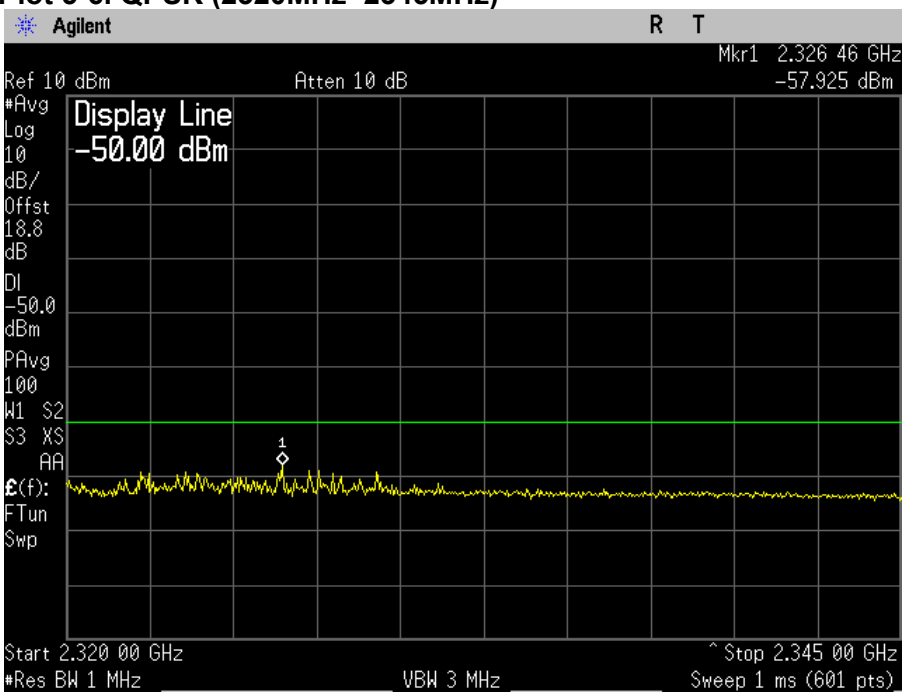
Plot 5-4. QPSK (2300MHz~2305MHz)



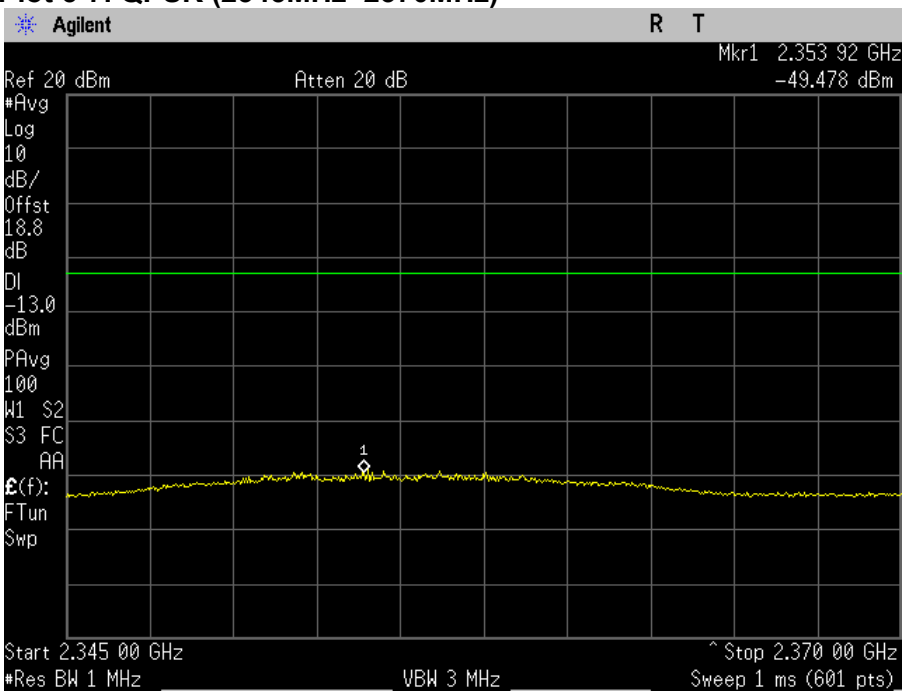
Plot 5-5. QPSK (2315MHz~2320MHz)



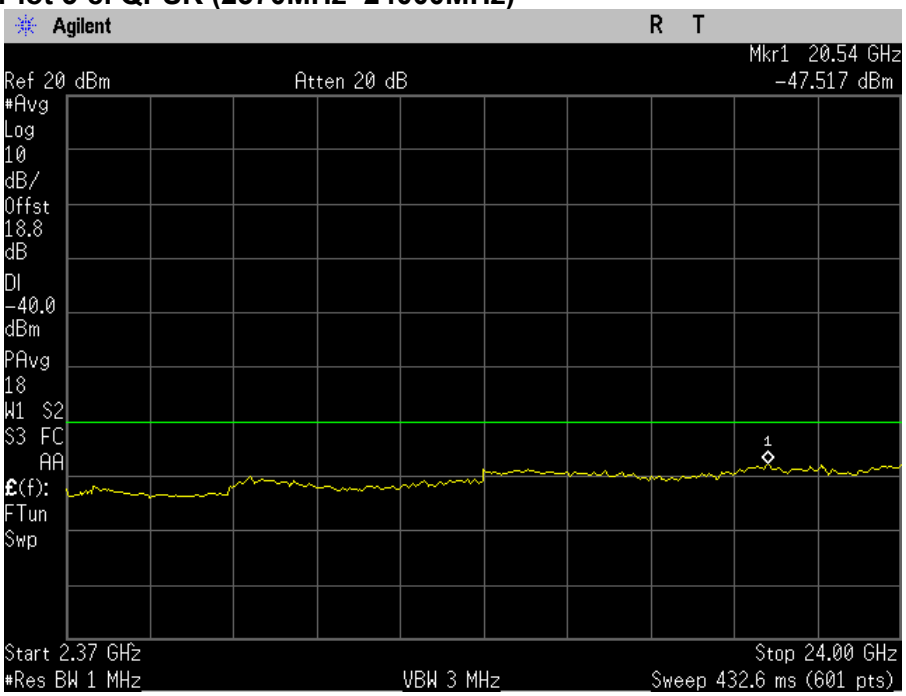
Plot 5-6. QPSK (2320MHz~2345MHz)



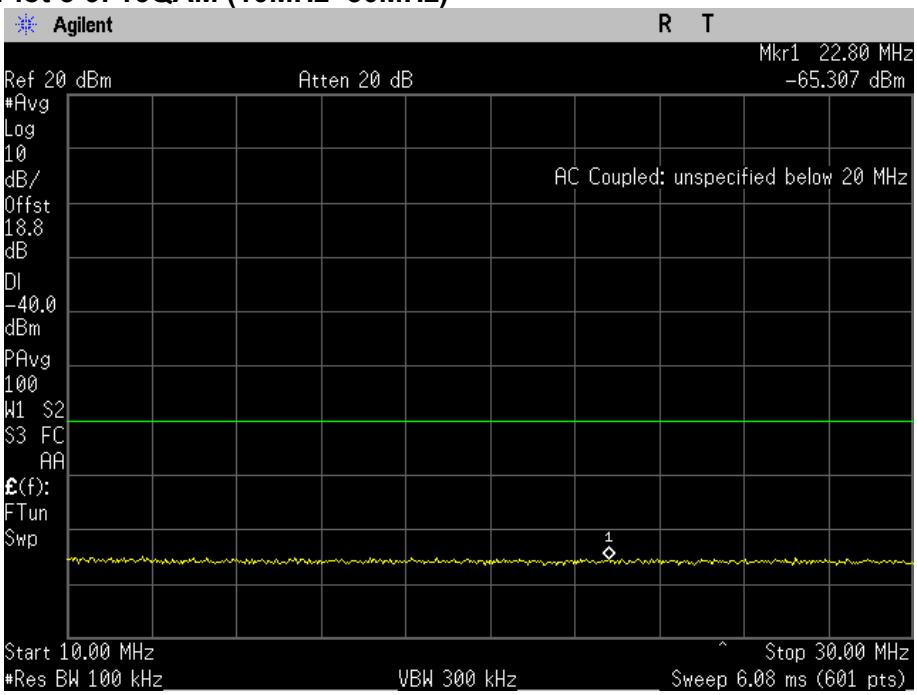
Plot 5-7. QPSK (2345MHz~2370MHz)



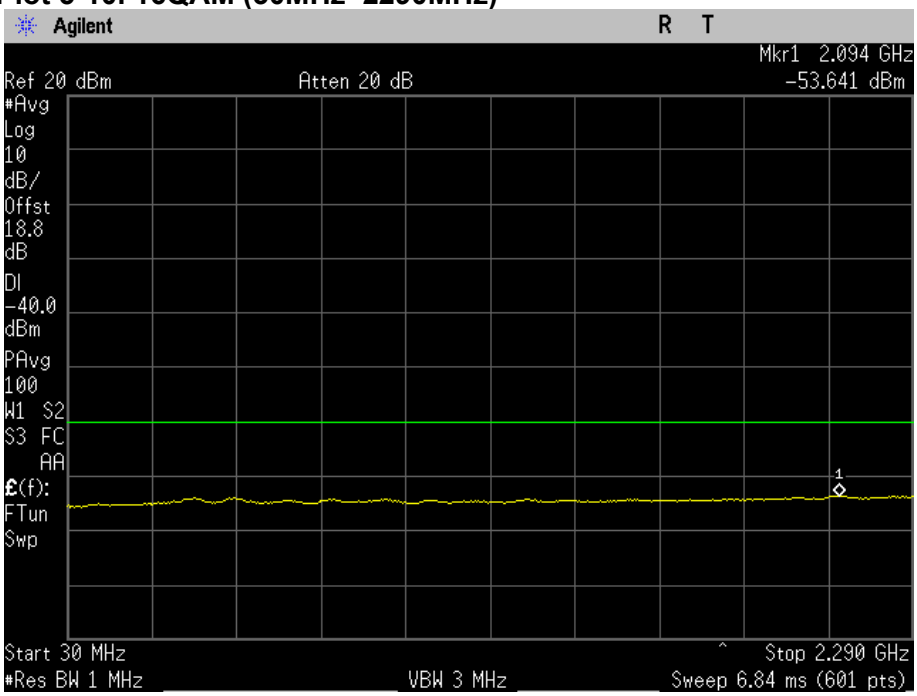
Plot 5-8. QPSK (2370MHz~24000MHz)



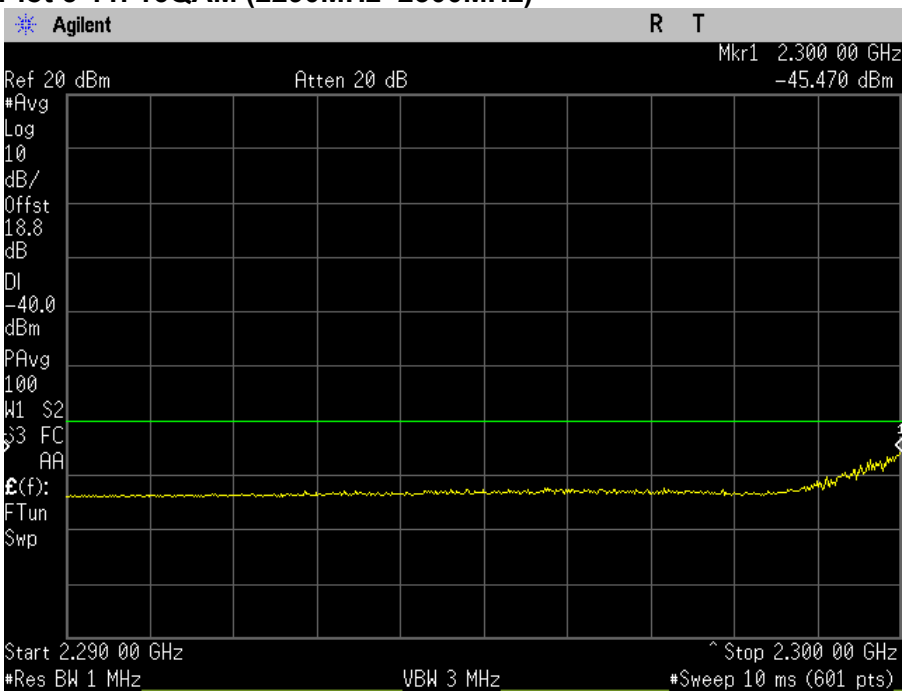
Plot 5-9. 16QAM (10MHz~30MHz)



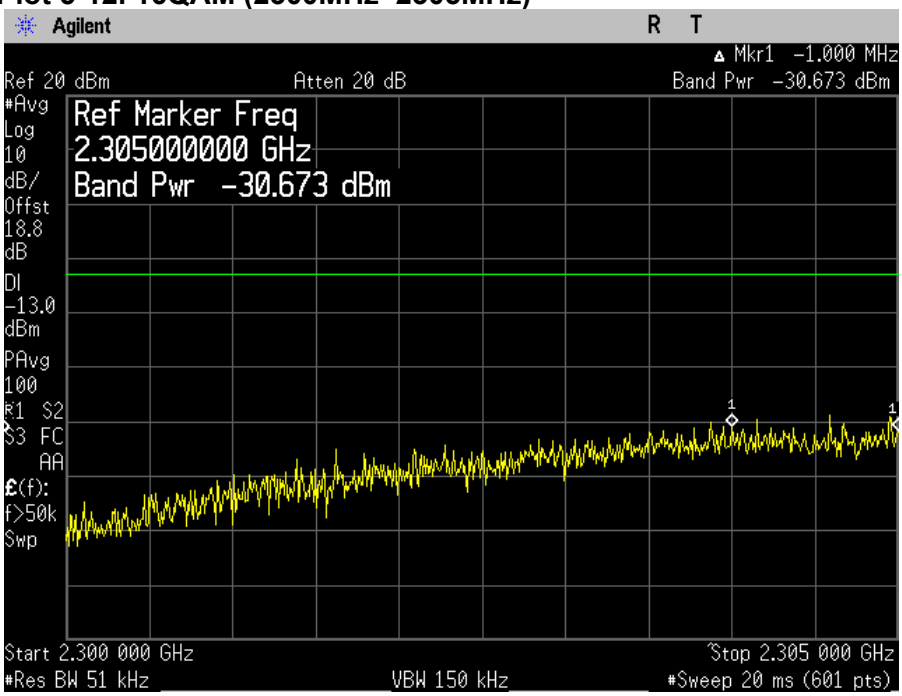
Plot 5-10. 16QAM (30MHz~2290MHz)



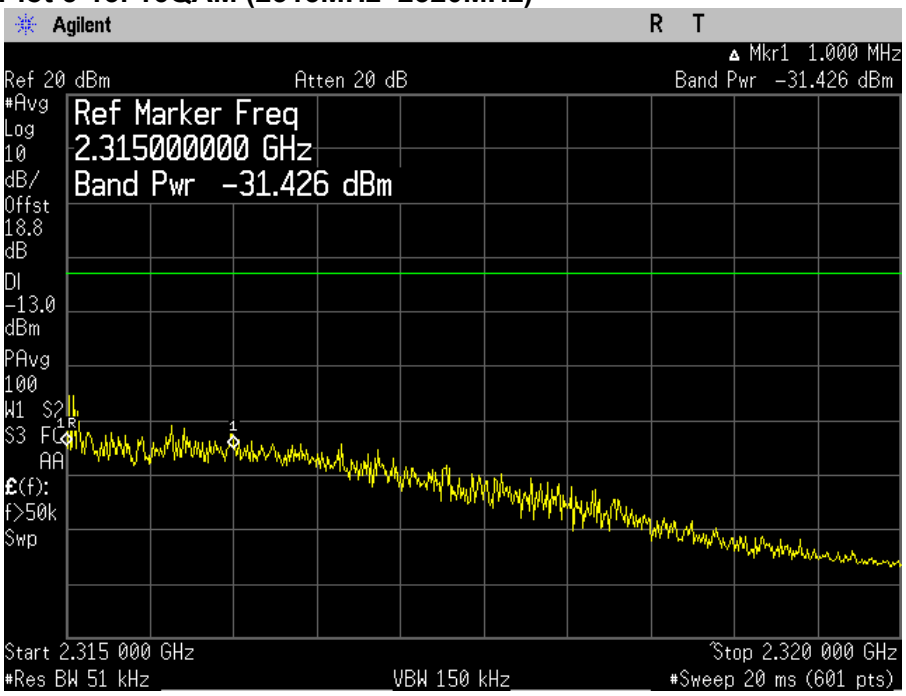
Plot 5-11. 16QAM (2290MHz~2300MHz)



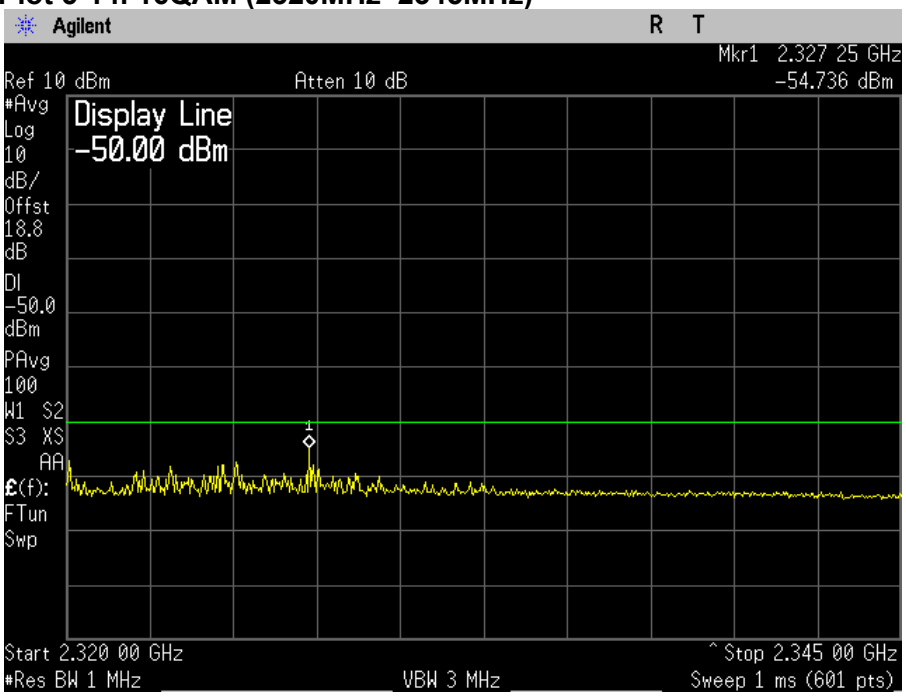
Plot 5-12. 16QAM (2300MHz~2305MHz)



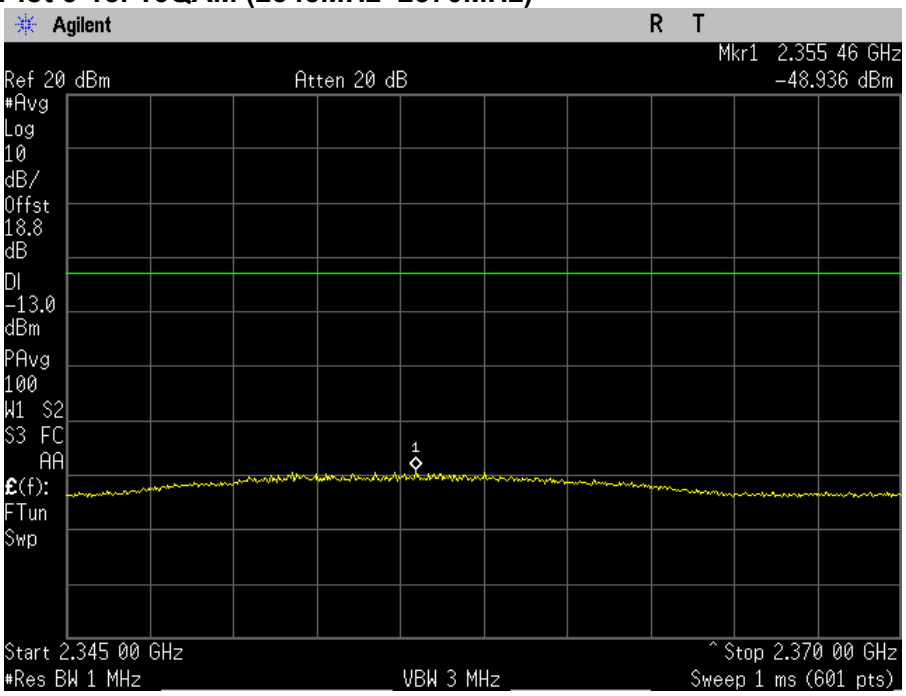
Plot 5-13. 16QAM (2315MHz~2320MHz)



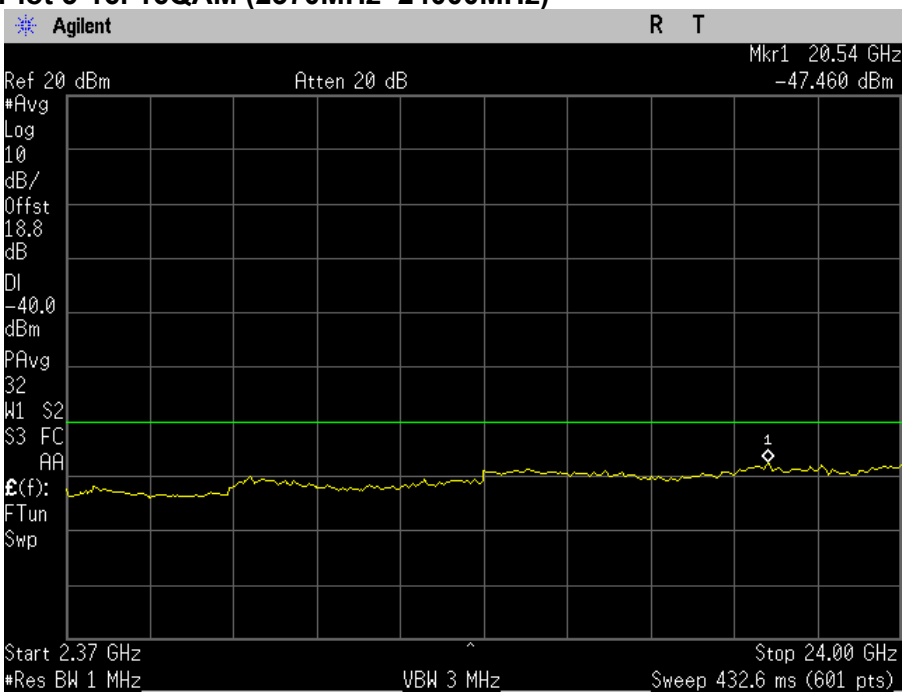
Plot 5-14. 16QAM (2320MHz~2345MHz)



Plot 5-15. 16QAM (2345MHz~2370MHz)

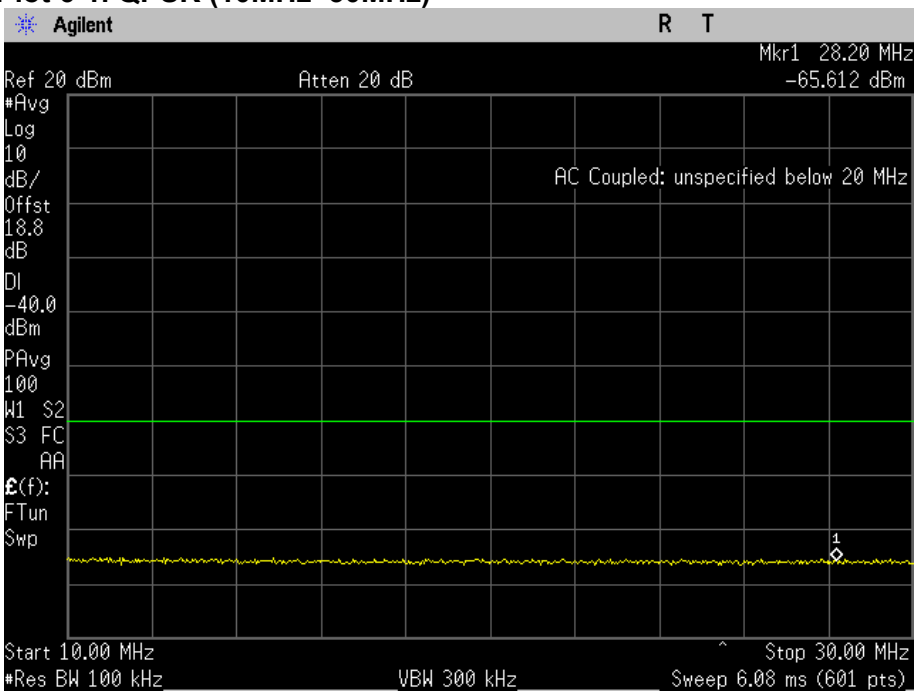


Plot 5-16. 16QAM (2370MHz~24000MHz)

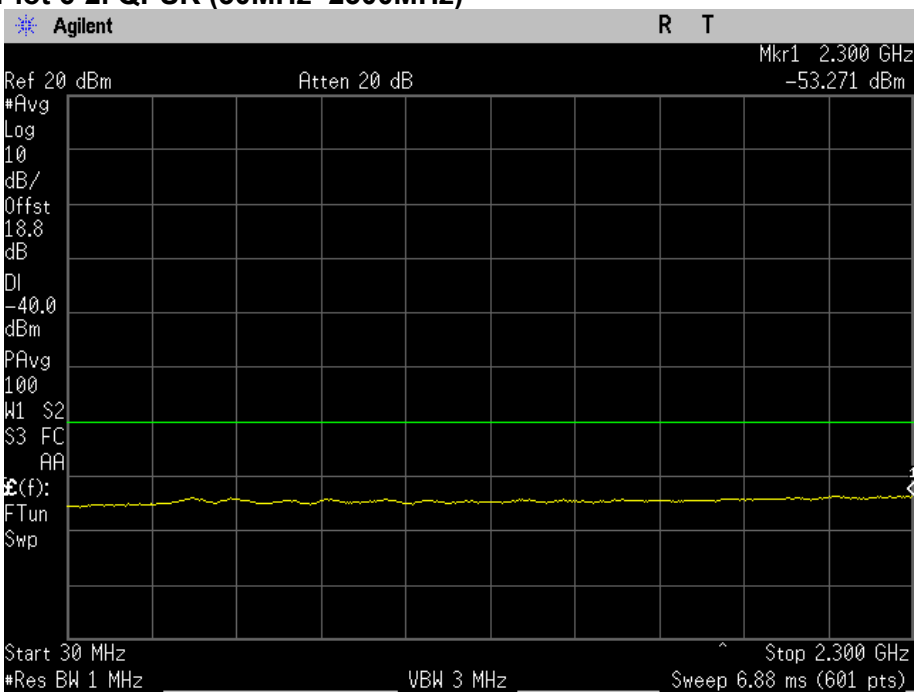


- **2355.0 MHz_10 MHz Bandwidth**

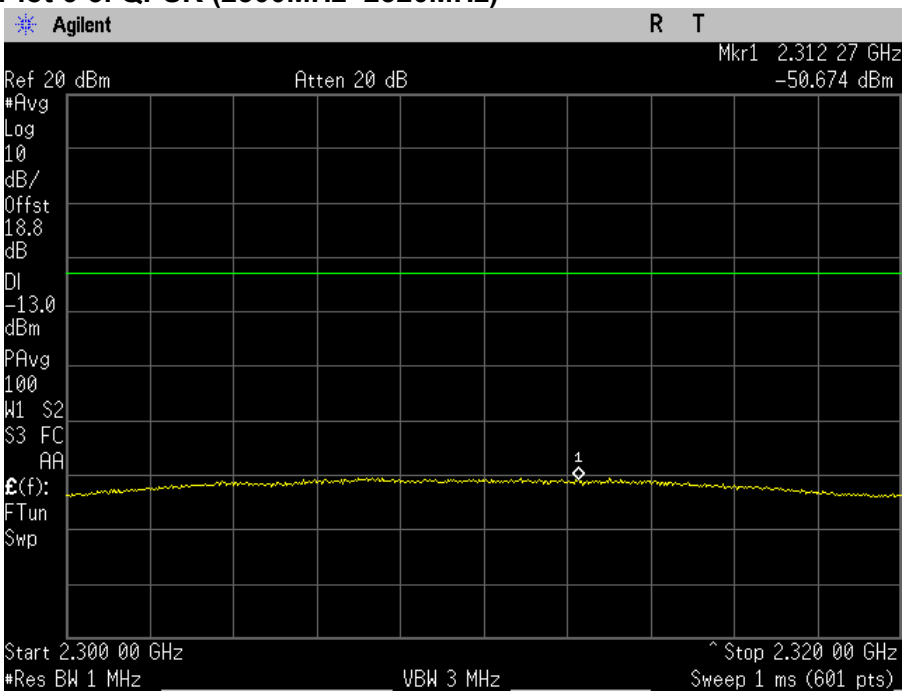
Plot 6-1. QPSK (10MHz~30MHz)



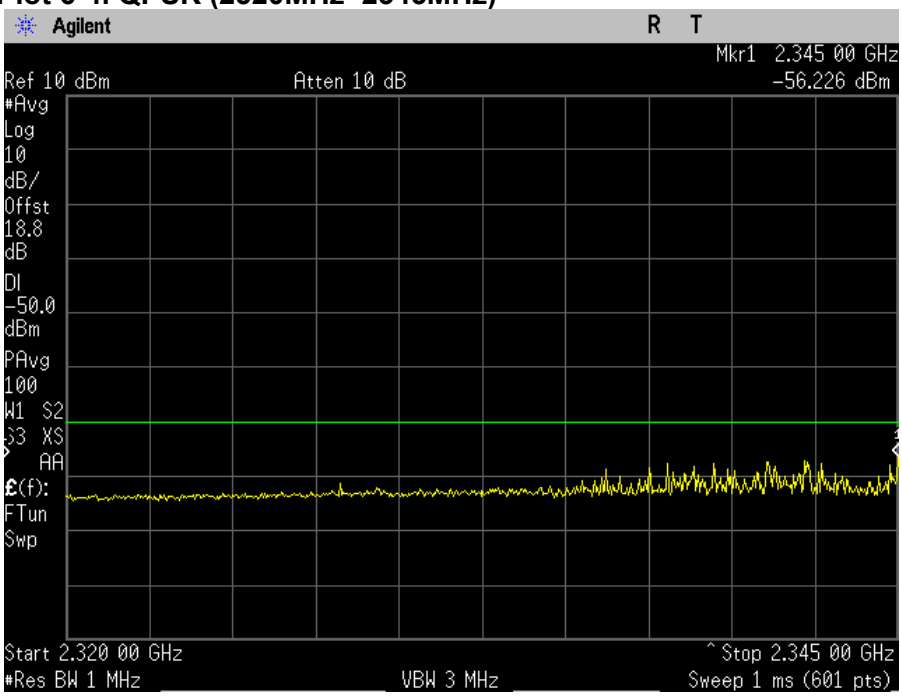
Plot 6-2. QPSK (30MHz~2300MHz)



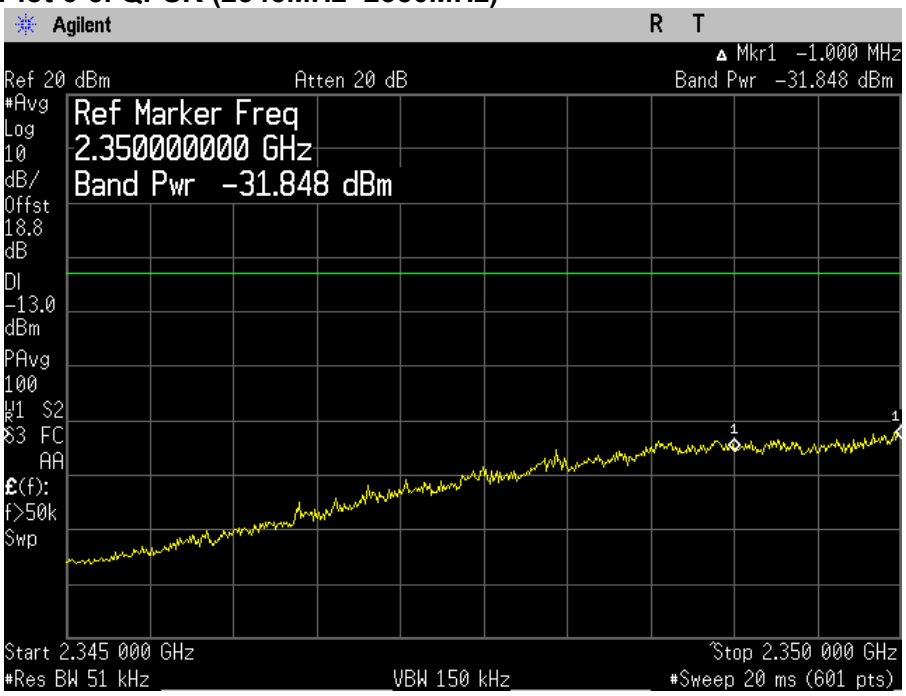
Plot 6-3. QPSK (2300MHz~2320MHz)



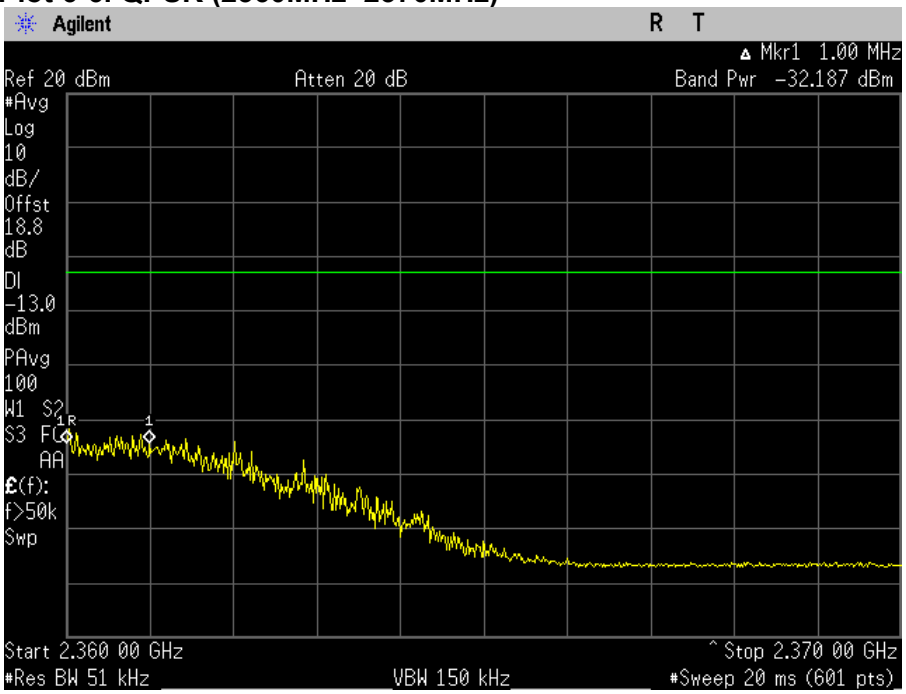
Plot 6-4. QPSK (2320MHz~2345MHz)



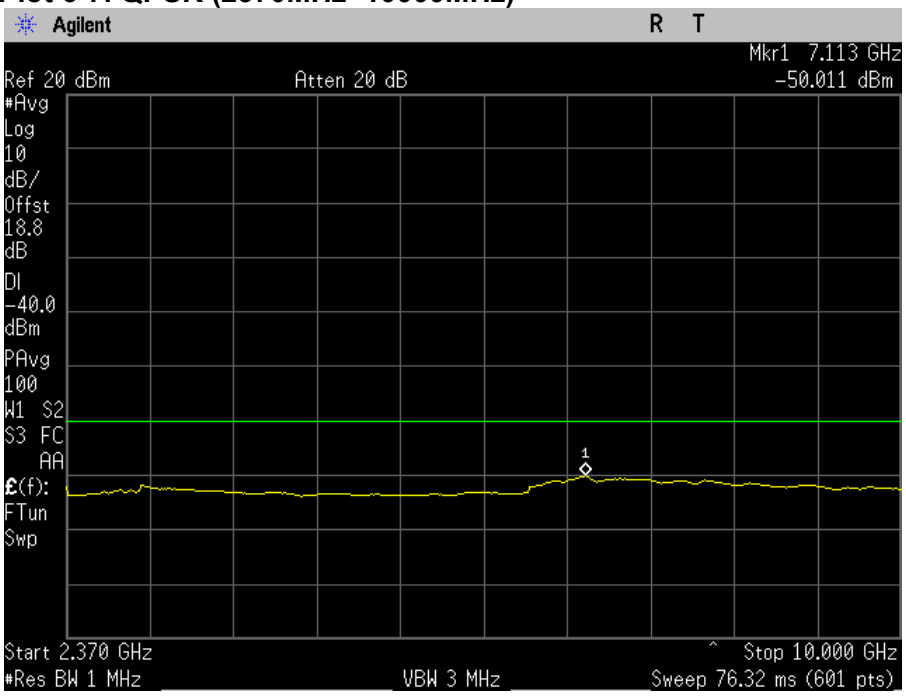
Plot 6-5. QPSK (2345MHz~2350MHz)



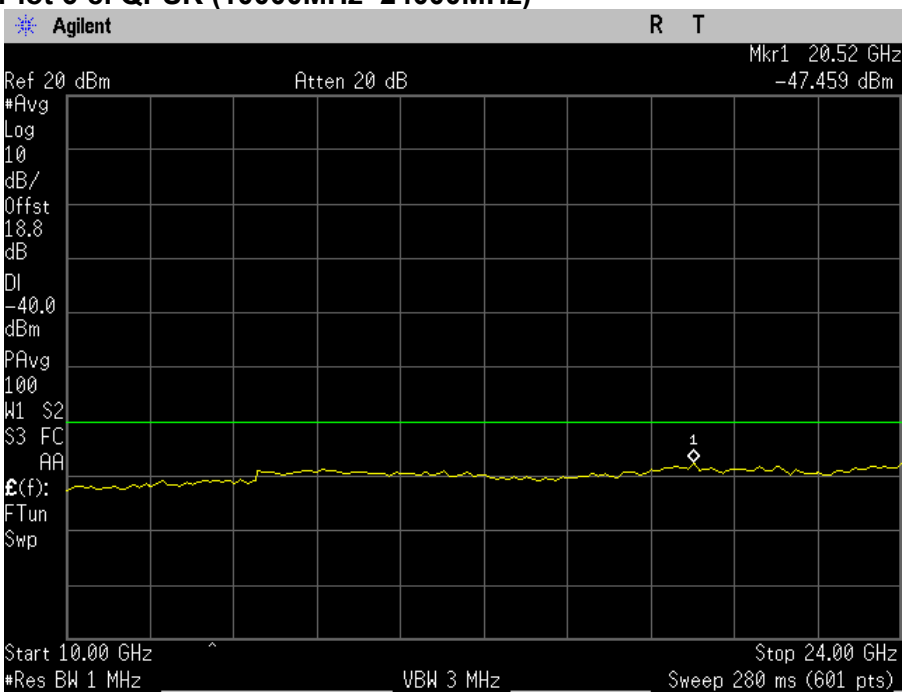
Plot 6-6. QPSK (2360MHz~2370MHz)



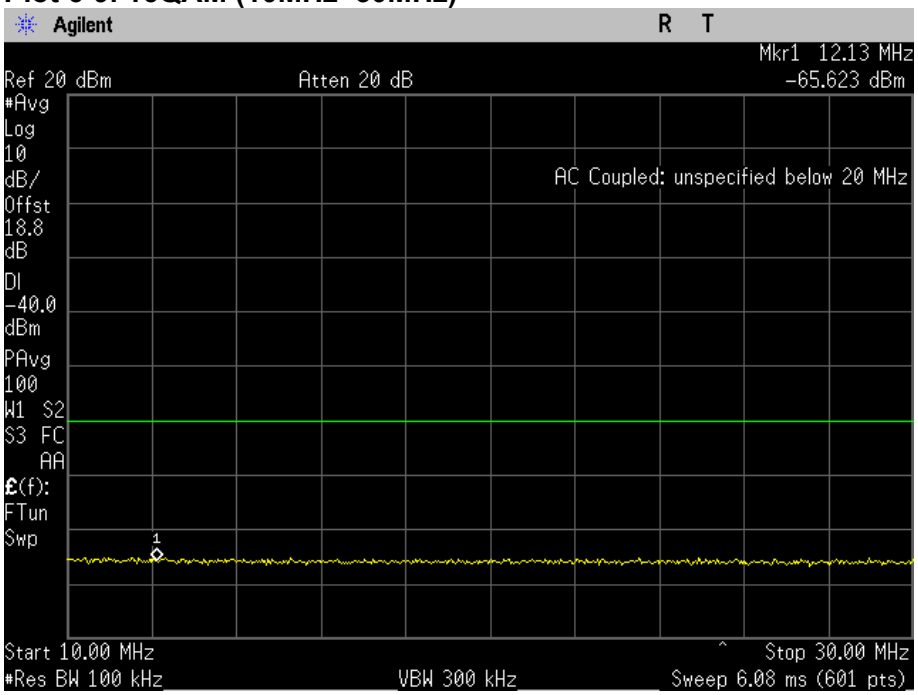
Plot 6-7. QPSK (2370MHz~10000MHz)



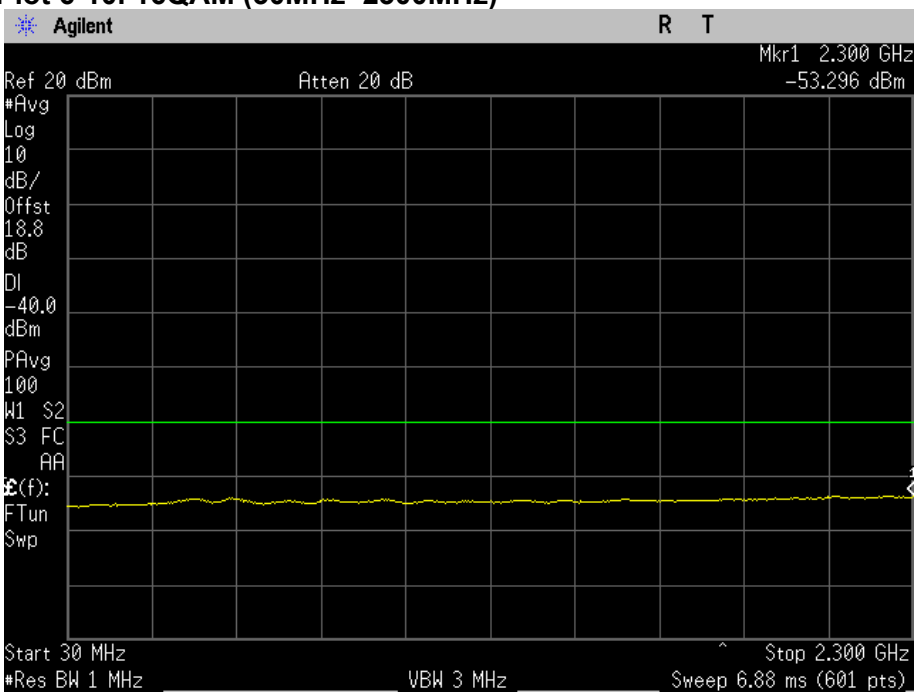
Plot 6-8. QPSK (10000MHz~24000MHz)



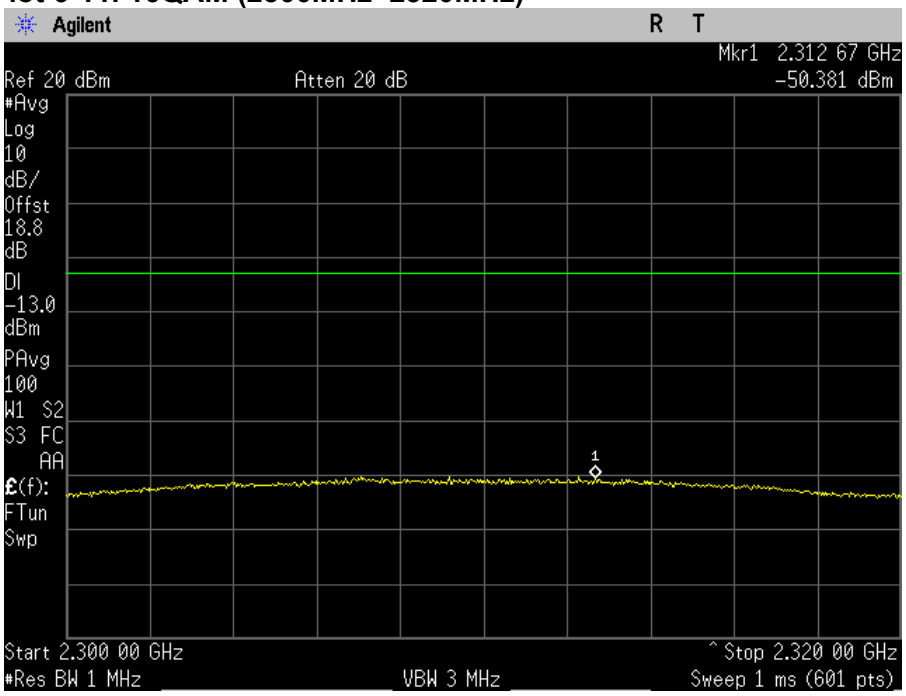
Plot 6-9. 16QAM (10MHz~30MHz)



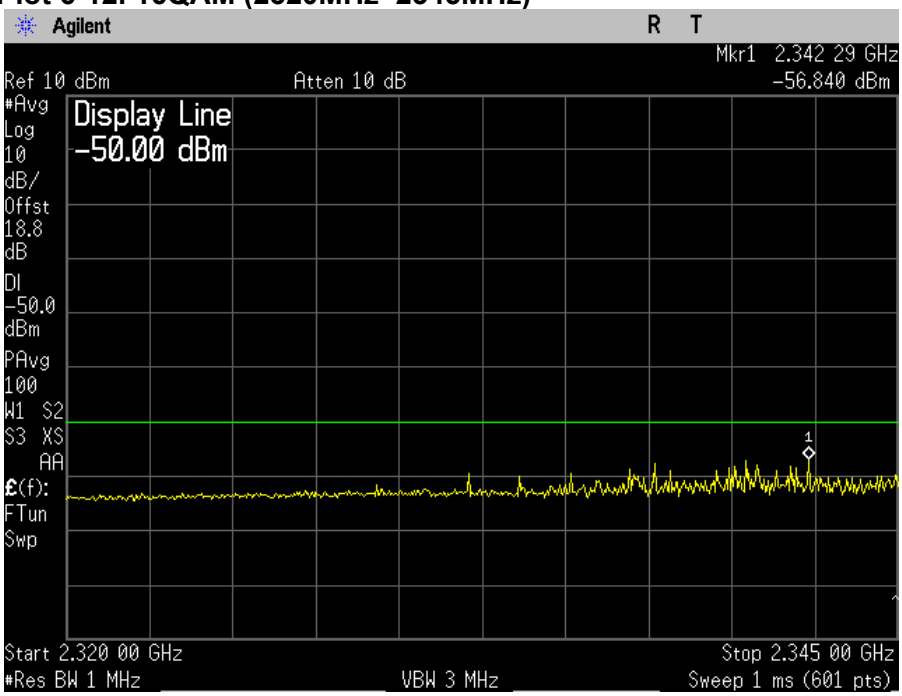
Plot 6-10. 16QAM (30MHz~2300MHz)



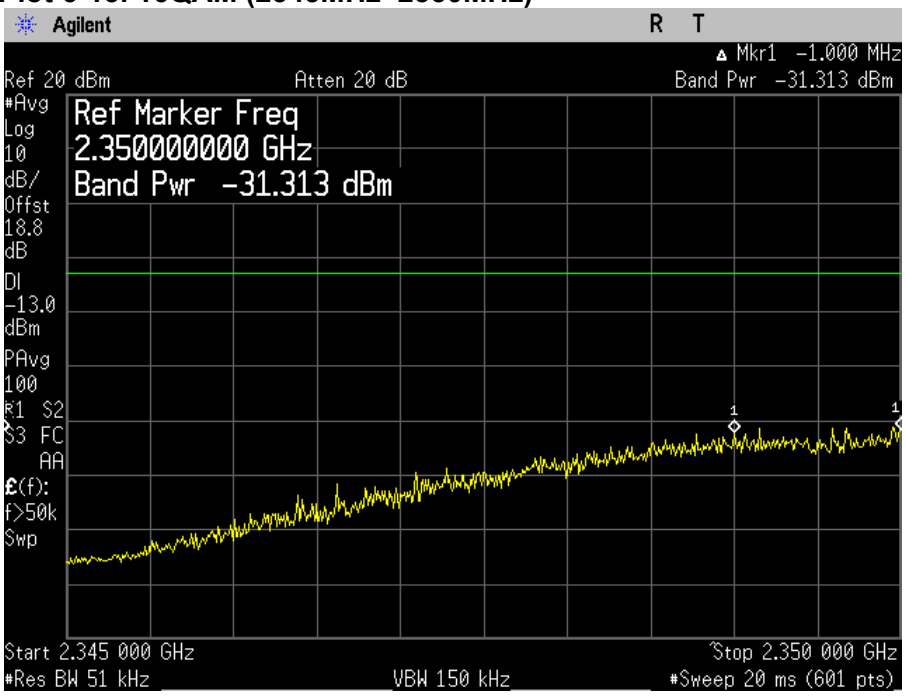
Plot 6-11. 16QAM (2300MHz~2320MHz)



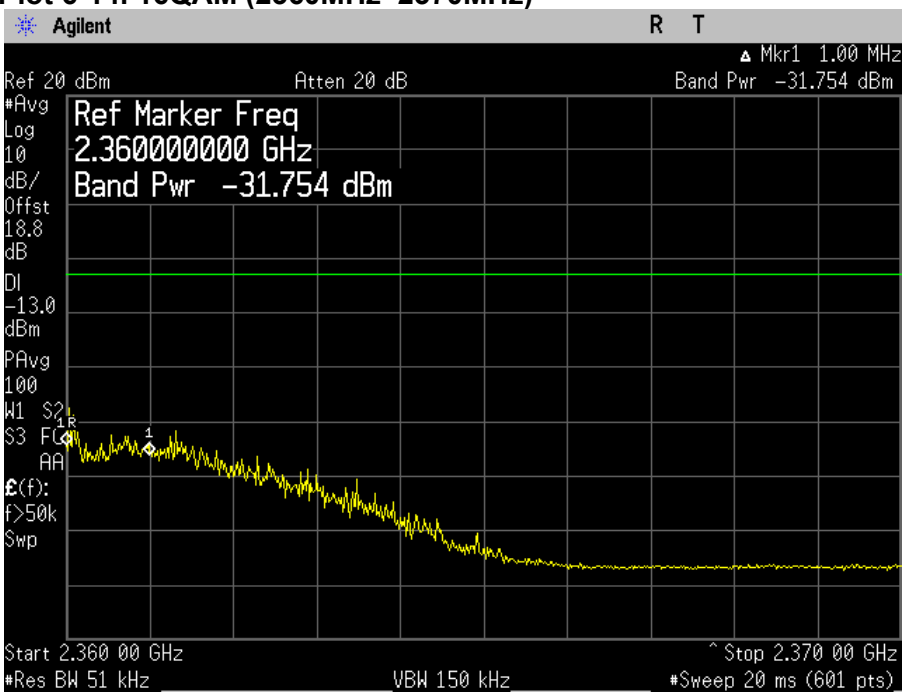
Plot 6-12. 16QAM (2320MHz~2345MHz)



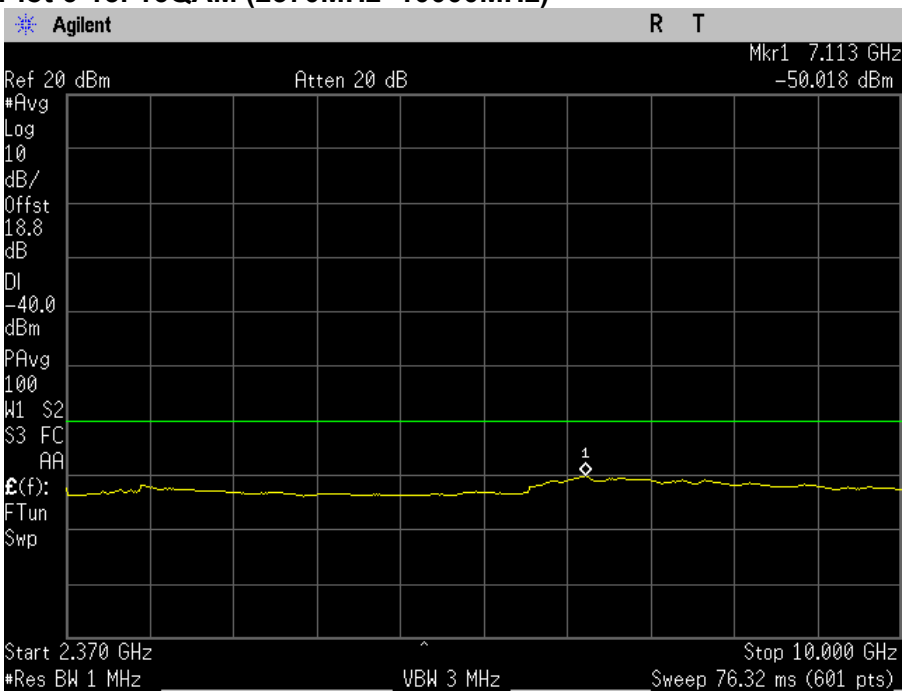
Plot 6-13. 16QAM (2345MHz~2350MHz)



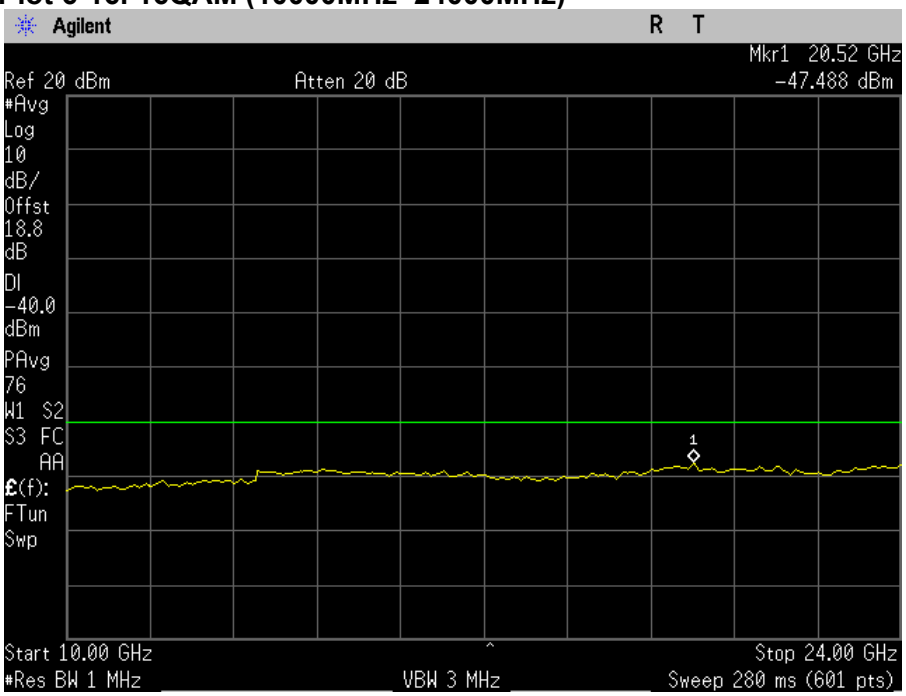
Plot 6-14. 16QAM (2360MHz~2370MHz)



Plot 6-15. 16QAM (2370MHz~10000MHz)



Plot 6-16. 16QAM (10000MHz~24000MHz)



9.4 Radiated Spurious & Harmonic Emissions

5 MHz Bandwidth

Measurement Results : 2307.5MHz_5 MHz Bandwidth

Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1500	H	-64.5	-40	24.5
	V	-62.1		22.1
2297	H	-60.3		20.3
	V	-58.9		18.9
2320	H	-64.6	-50	14.6
	V	-63.2		13.2
2346	H	-45.1	-13	32.1
	V	-44.0		31.0
2371	H	-59.2	-40	19.2
	V	-58.3		18.3
4608	H	-60.1		20.1
	V	-55.2		15.2

Measurement Results : 2312.5MHz_5 MHz Bandwidth

Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1734	H	-65.1	-40	25.1
1500	V	-62.7		22.7
2176	H	-60.6		20.6
	V	-58.7		18.7
2320	H	-64.0	-50	14.0
	V	-59.4		9.4
2350	H	-45.2	-13	32.2
	V	-44.0		31.0
2371	H	-59.3	-40	19.3
	V	-58.4		18.4
4618	H	-60.1		20.1
	V	-55.4		15.4

Measurement Results : 2352.5MHz_5 MHz Bandwidth

Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1500	H	-65.4	-40	25.4
	V	-62.3		22.3
2176	H	-60.7		20.7
	V	-59.0		19.0
2298	H	-60.2		20.2
	V	-59.2		19.2
2345	H	-64.6	-50	14.6
	V	-61.9		11.9
2371	H	-59.3	-40	19.3
	V	-58.4		18.4
4606	H	-58.8		18.8
	V	-55.5		15.5

Measurement Results : 2357.5MHz_5 MHz Bandwidth

Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1500	H	-65.5	-40	25.5
	V	-62.2		22.2
2279	H	-60.2		20.2
	V	-59.2		19.2
2320	H	-64.7	-50	14.7
	V	-63.5		13.5
2370	H	-58.9	-13	45.9
	V	-53.8		40.8
2371	H	-59.3	-40	19.3
	V	-58.3		18.3
4716	H	-58.9		18.9
	V	-53.4		13.4

10 MHz Bandwidth

Measurement Results : 2310.0MHz_10 MHz Bandwidth

Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1500	H	-65.5	-40	25.5
	V	-62.4		22.4
2176	H	-60.6		20.6
	V	-58.8		18.8
2320	H	-63.6	-50	13.6
	V	-58.5		8.5
2370	H	-45.8	-40	5.8
	V	-44.9		4.9
4619	H	-60.0		20.0
	V	-54.4		14.4

Center Frequency 2355.0MHz_10 MHz Bandwidth

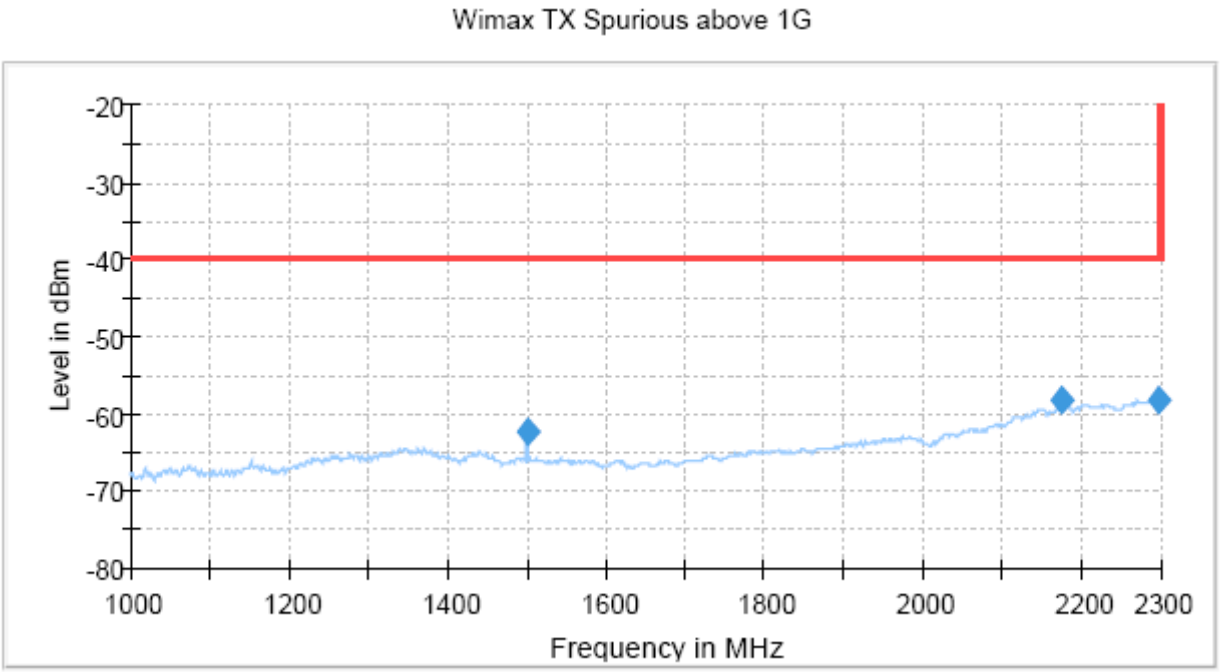
Frequency (MHz)	Polarity	ERP(dBm)	Limit (dBm)	Margin (dB)
1500	H	-65.3	-40	25.3
	V	-62.3		22.3
2176	H	-60.6		20.6
	V	-59.1		19.1
2296	H	-60.2		20.2
	V	-59.2		19.2
2345	H	-63.4	-50	13.4
2343	V	-58.6		8.6
4706	H	-58.4	-40	18.4
	V	-53.3		13.3

9.4.1. Test Plots

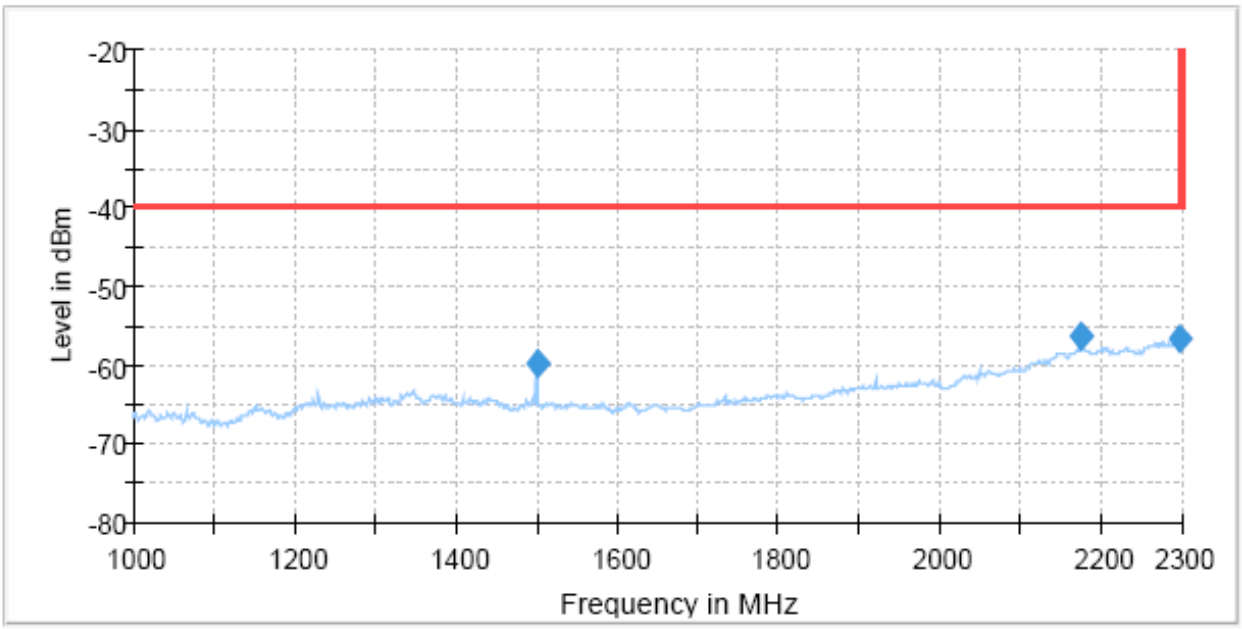
5 MHz Bandwidth

- **2307.5 MHz_5 MHz Bandwidth**

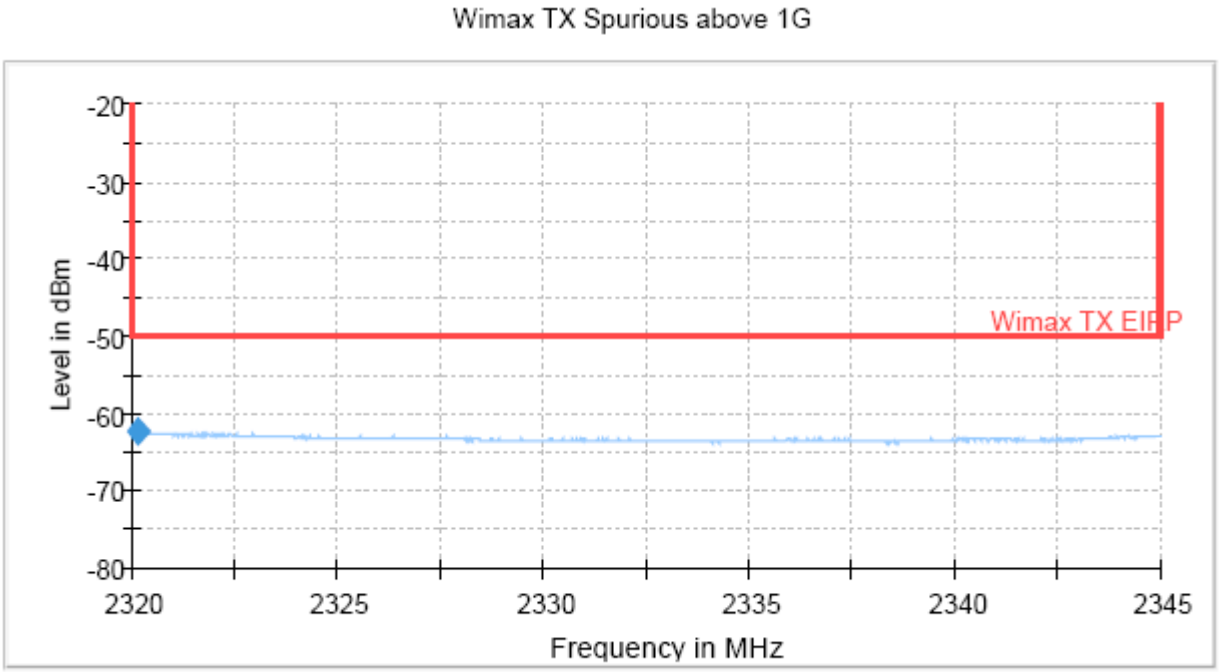
Horizontal



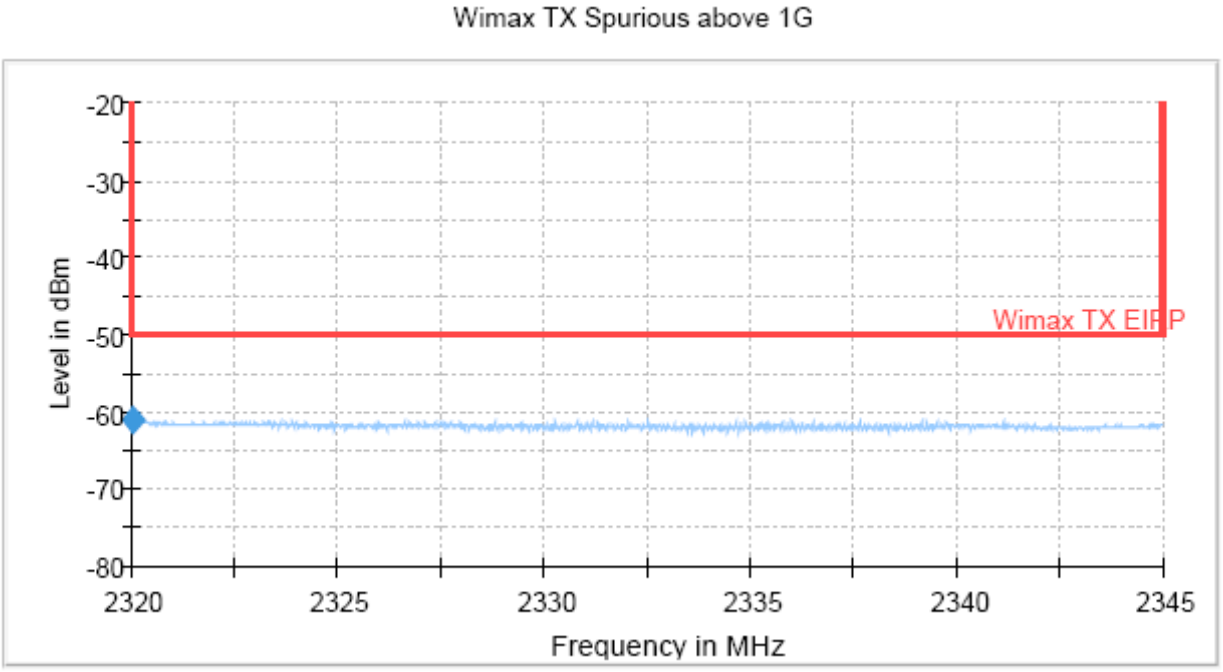
Vertical



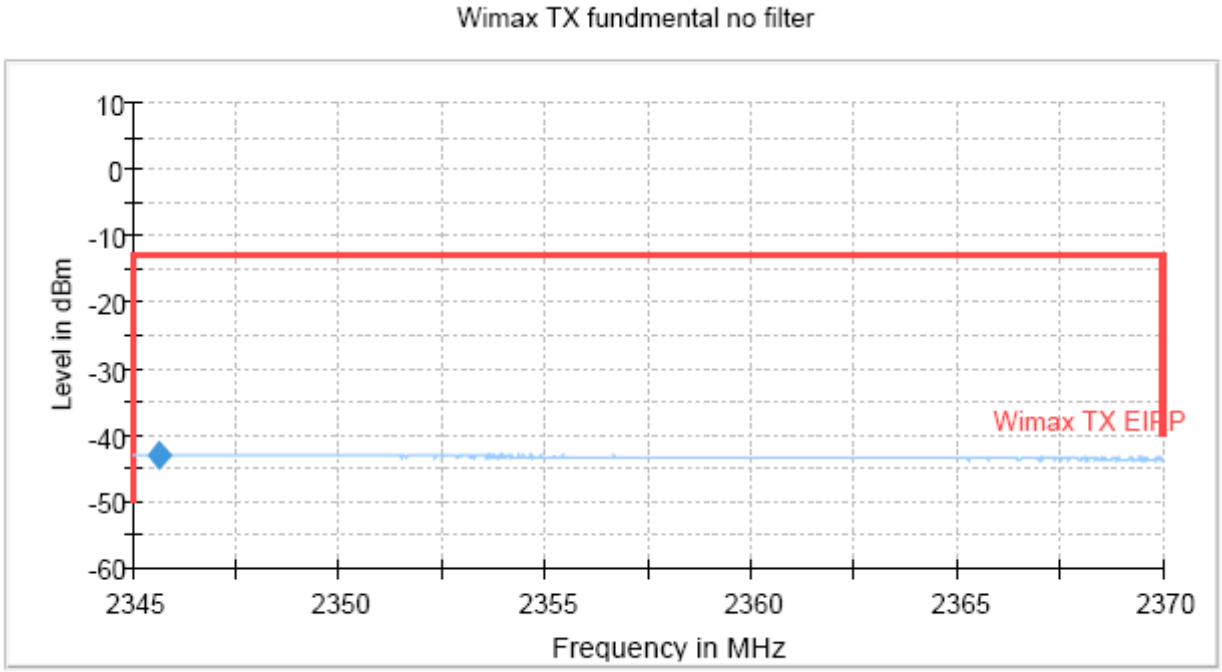
Horizontal



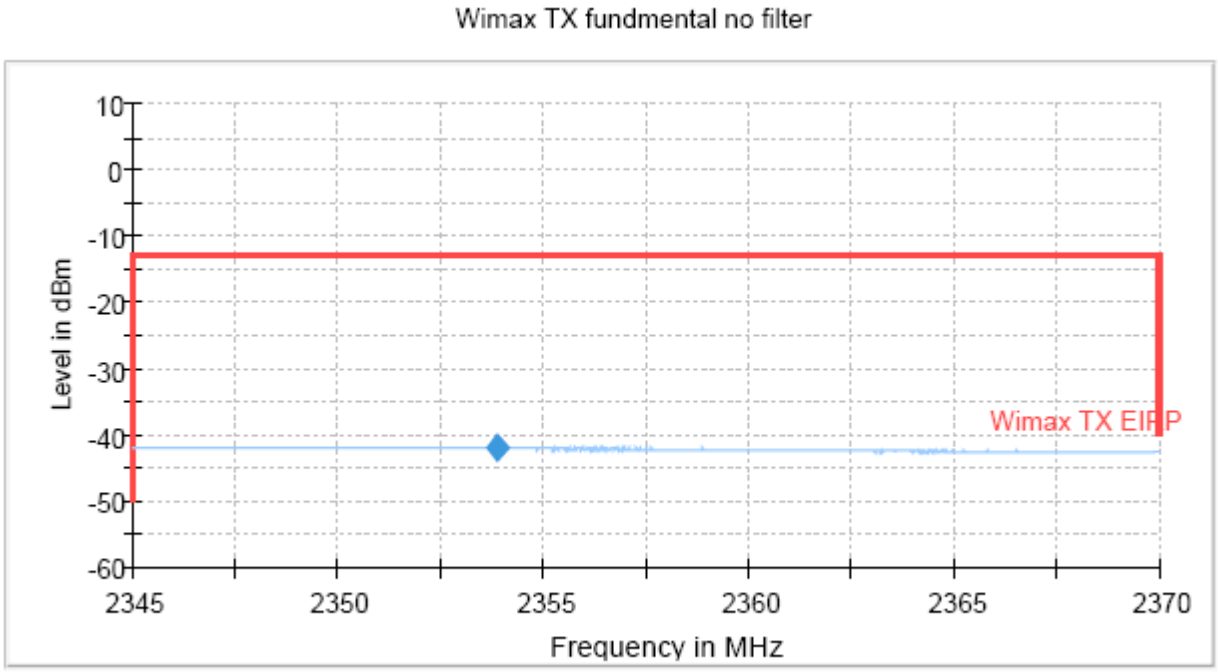
Vertical



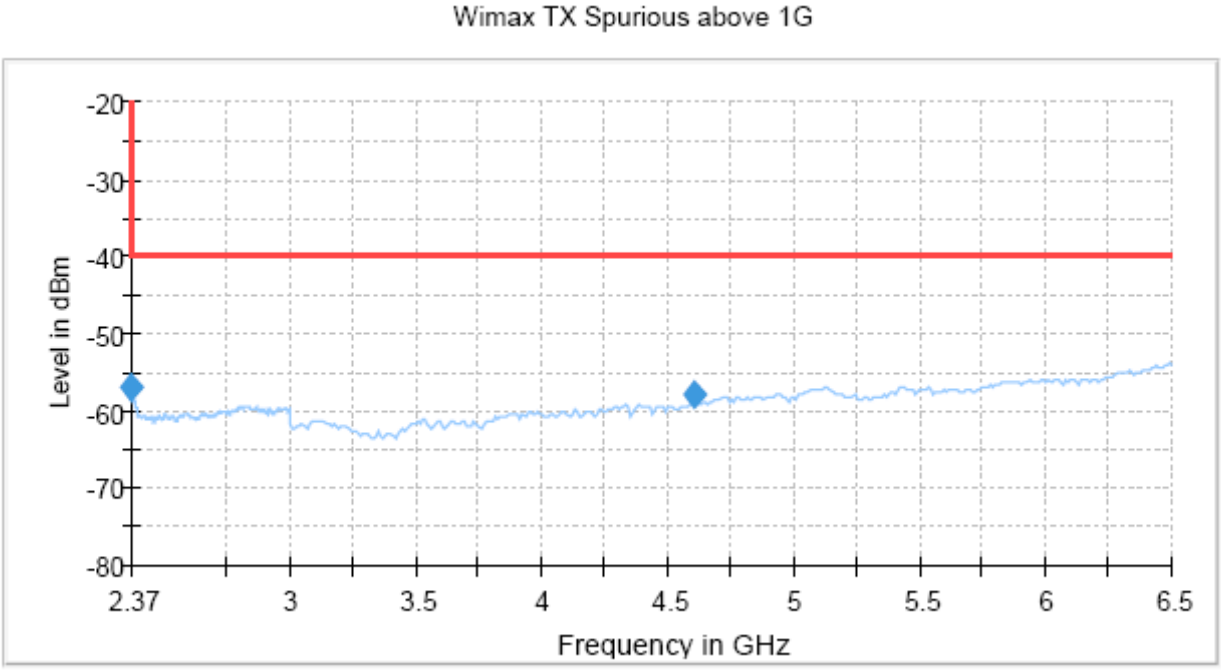
Horizontal



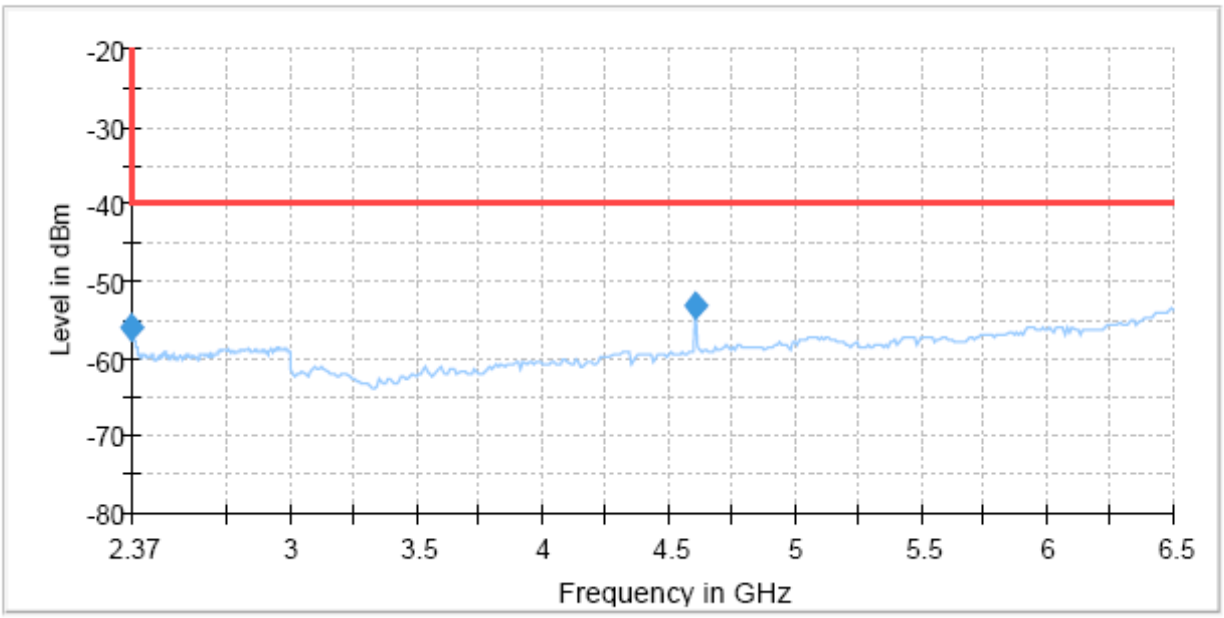
Vertical



Horizontal

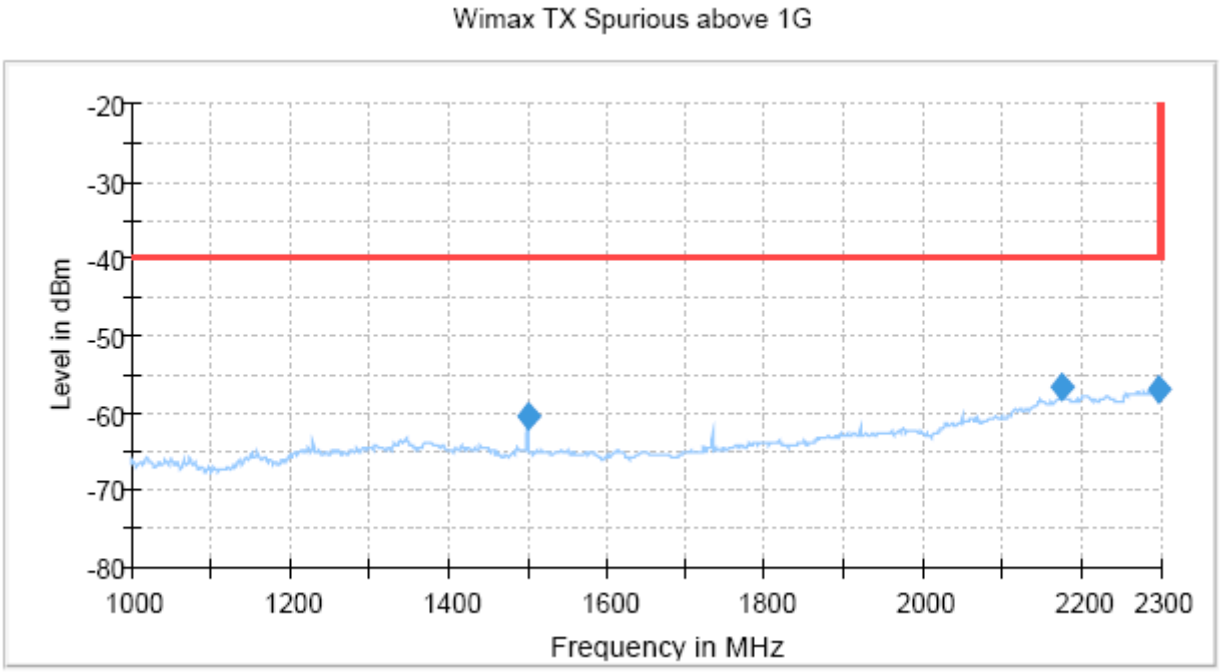


Vertical

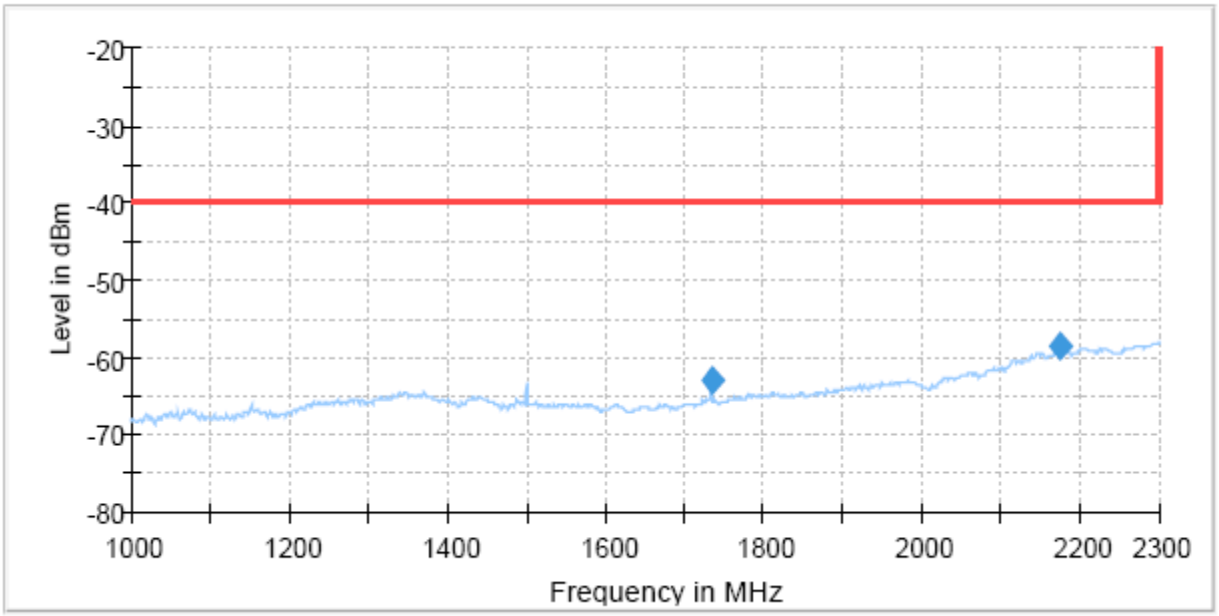


- **2312.5 MHz_5 MHz Bandwidth**

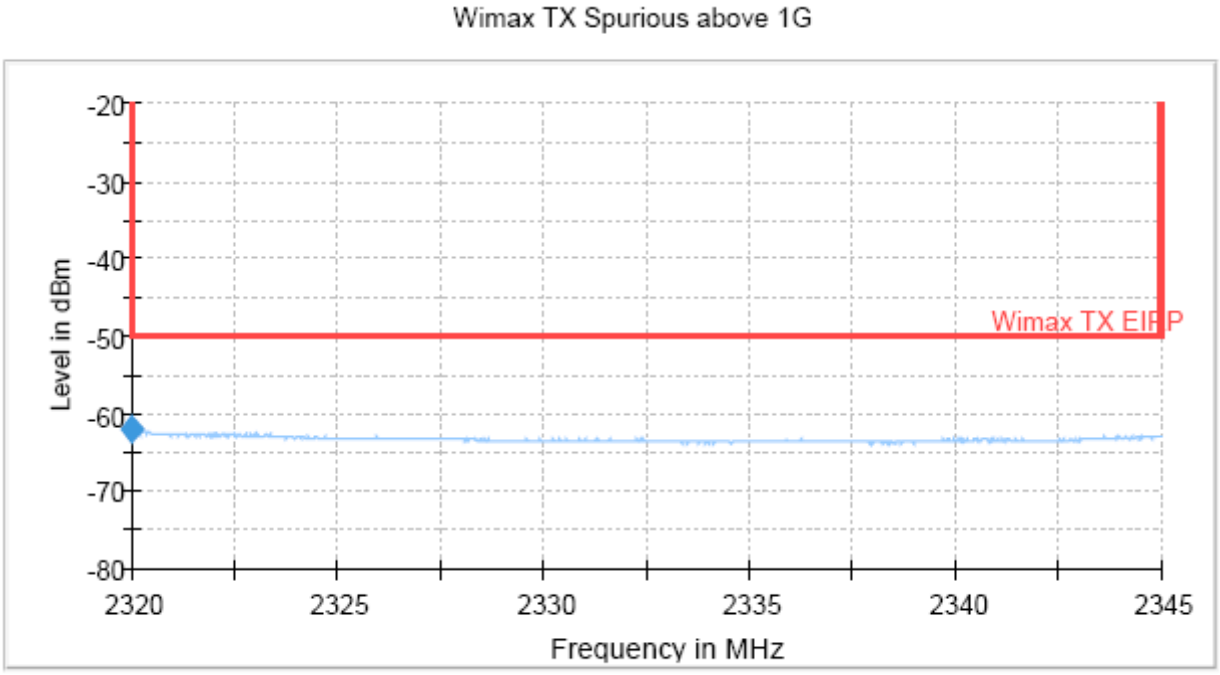
Horizontal



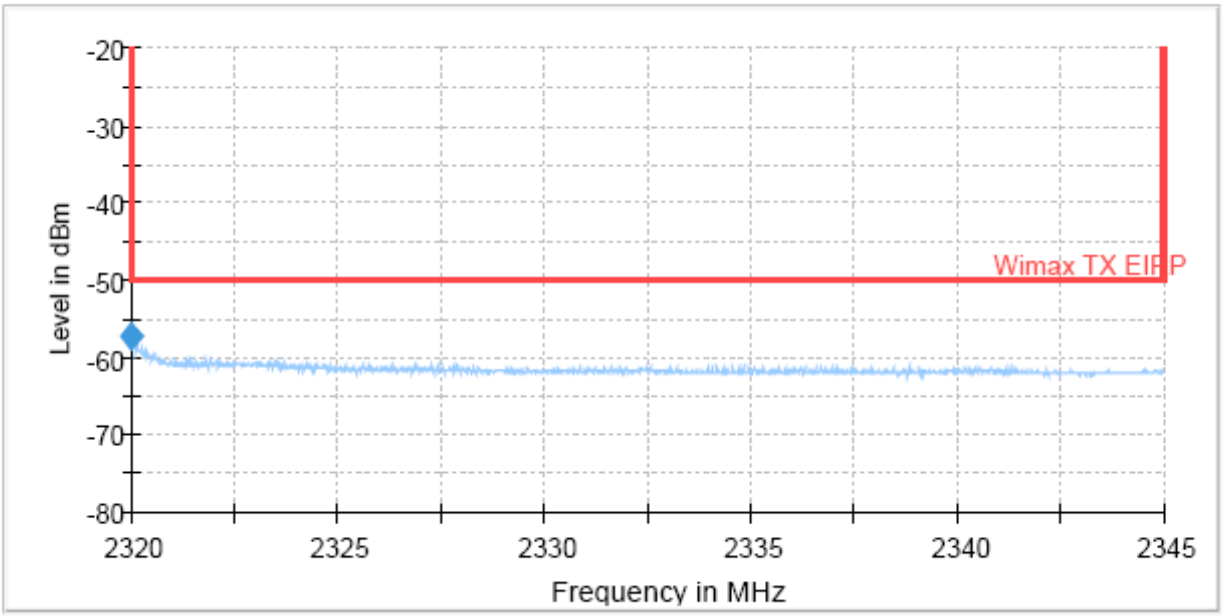
Vertical



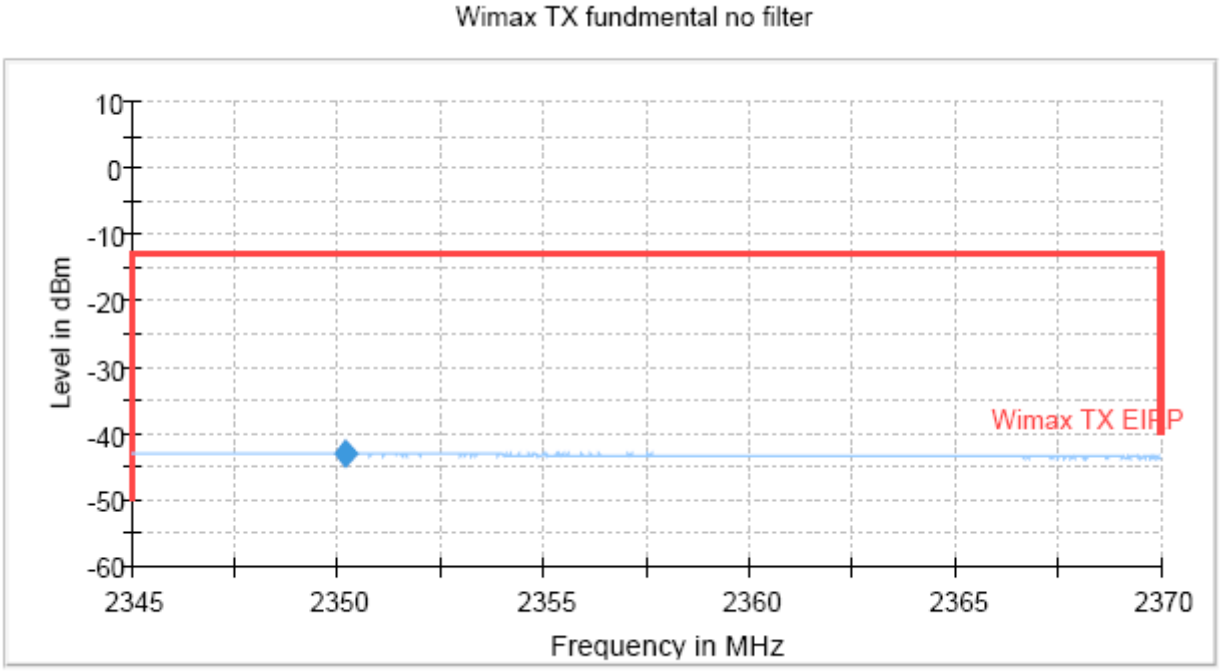
Horizontal



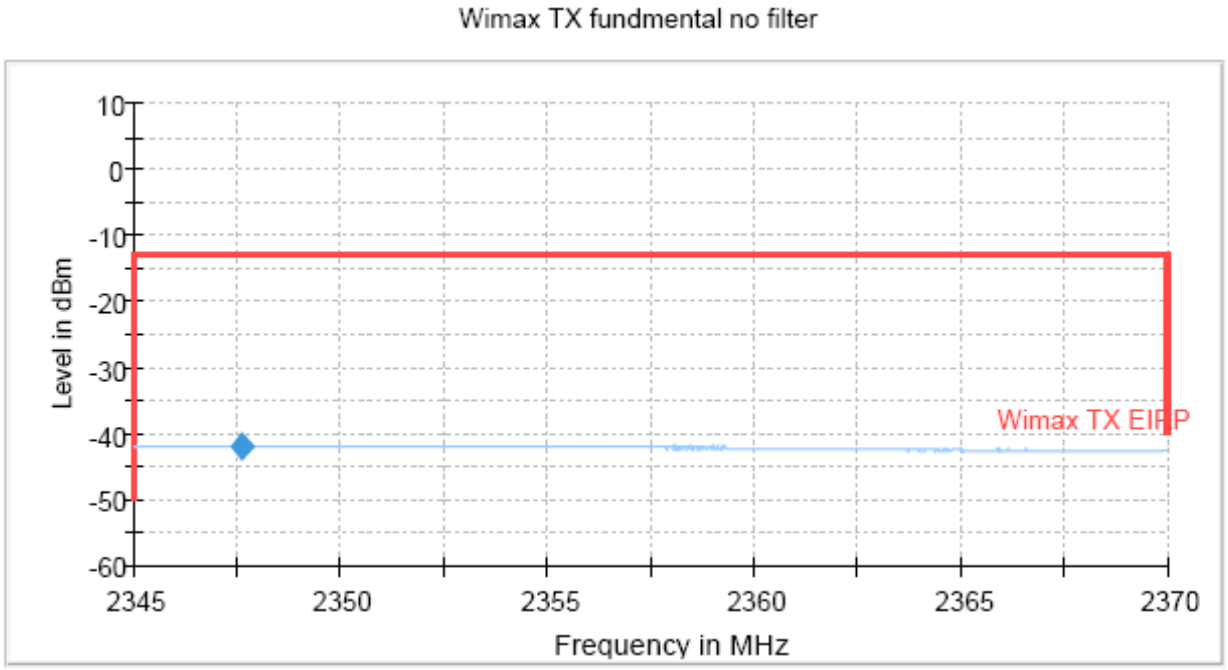
Vertical



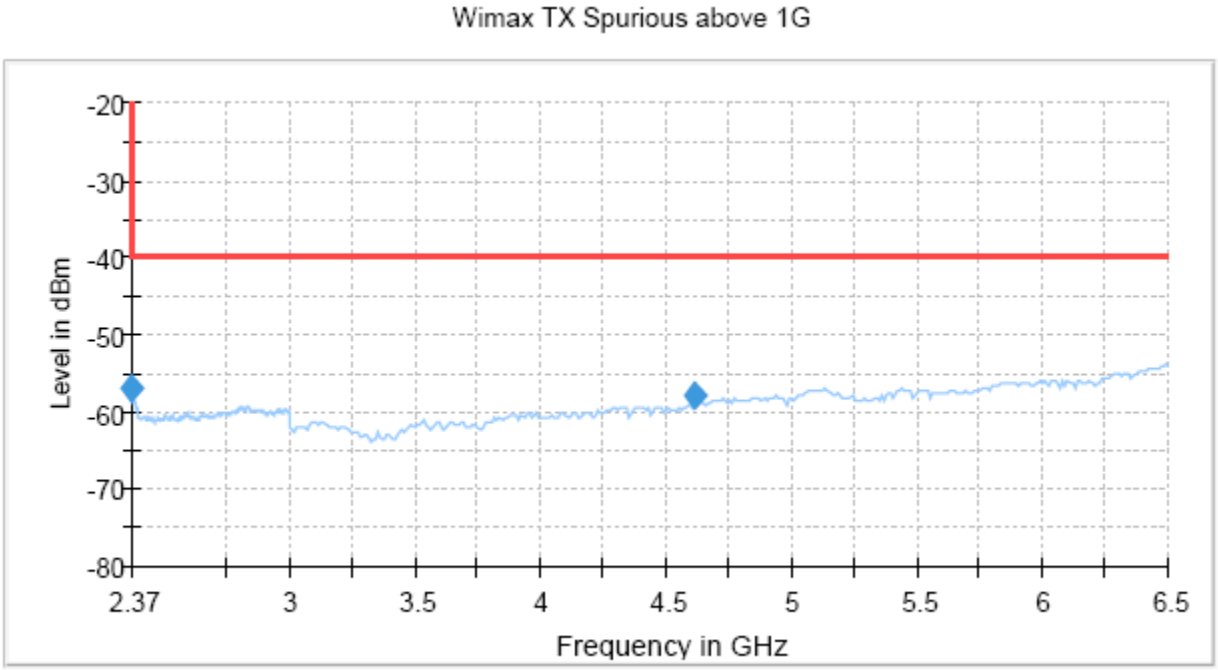
Horizontal



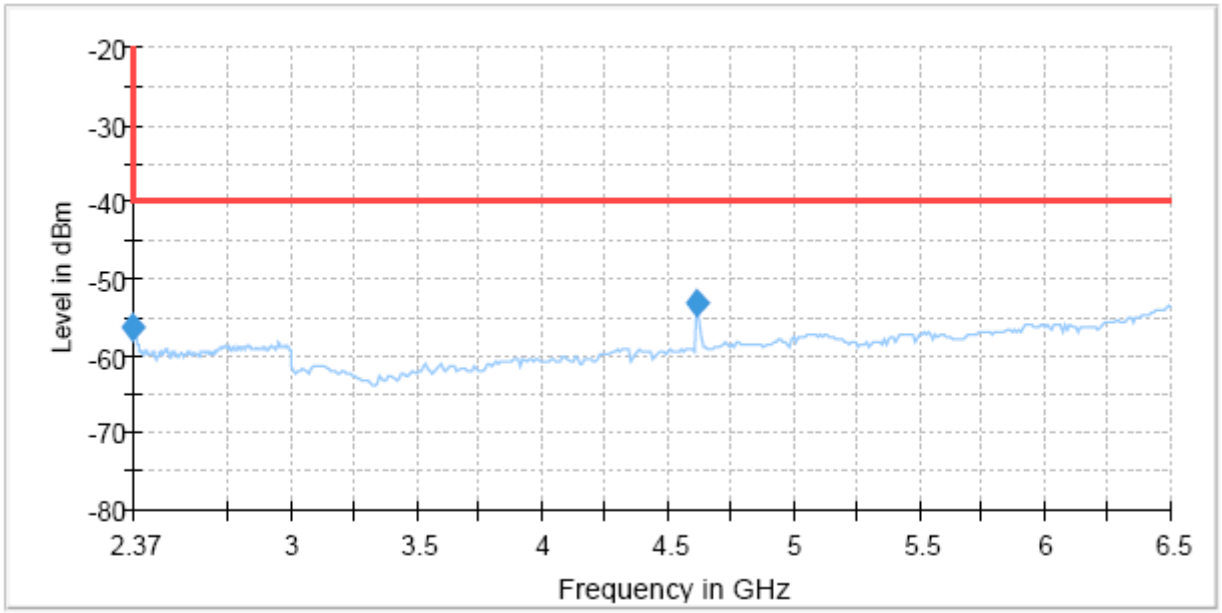
Vertical



Horizontal

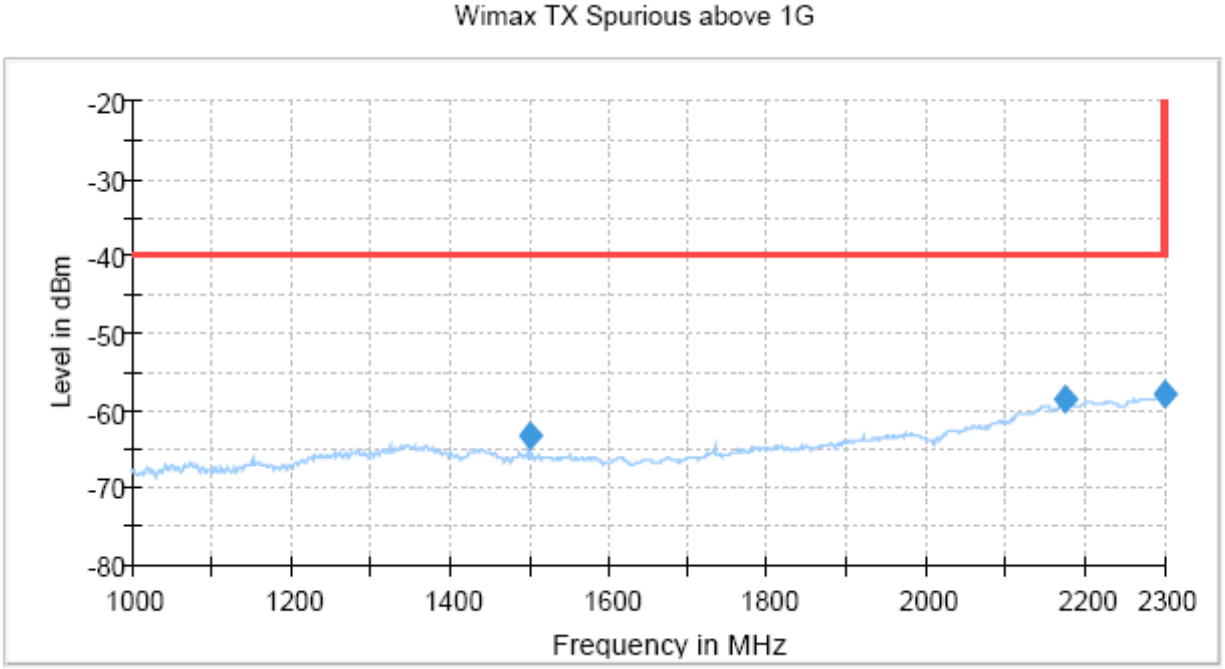


Vertical

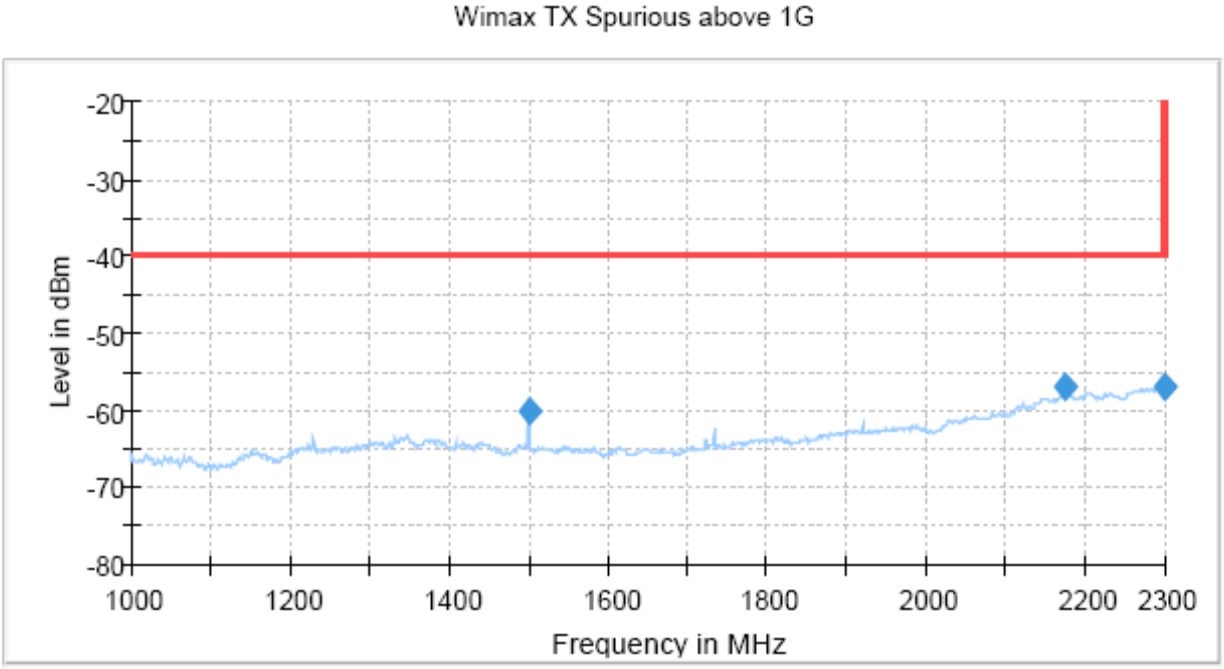


- **2352.5 MHz_5 MHz Bandwidth**

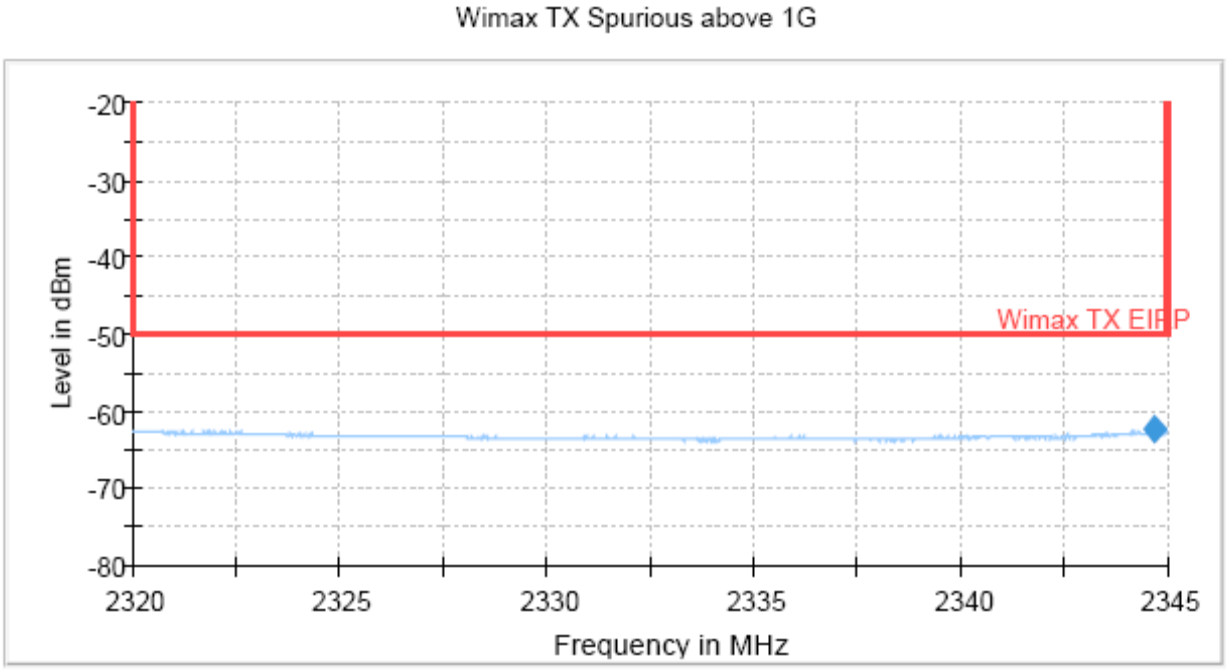
Horizontal



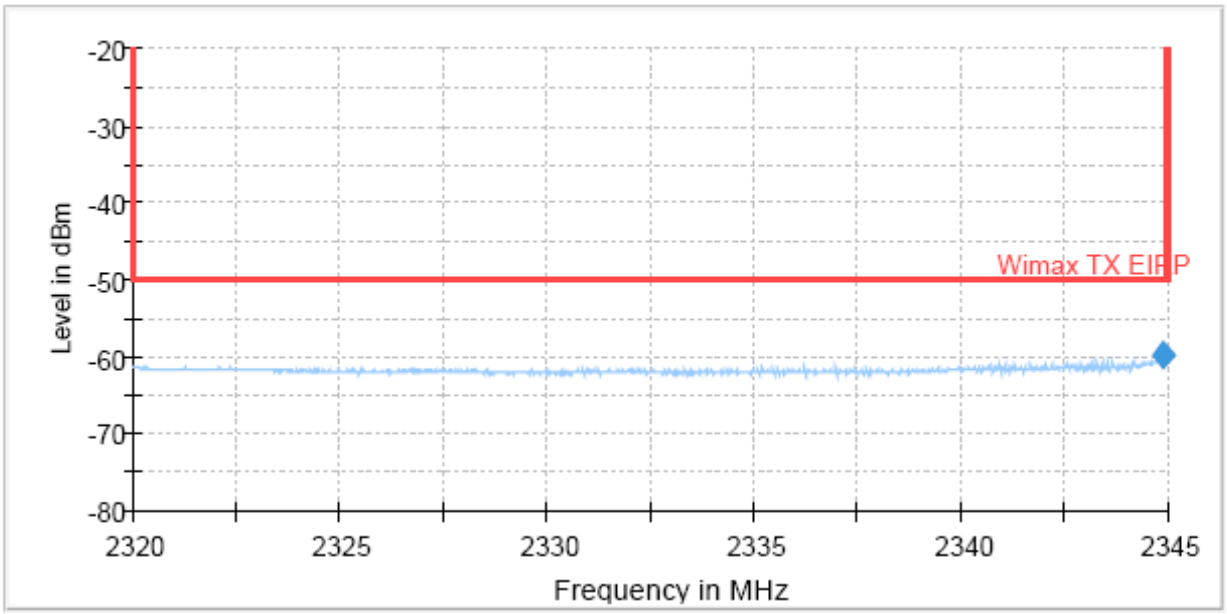
Vertical



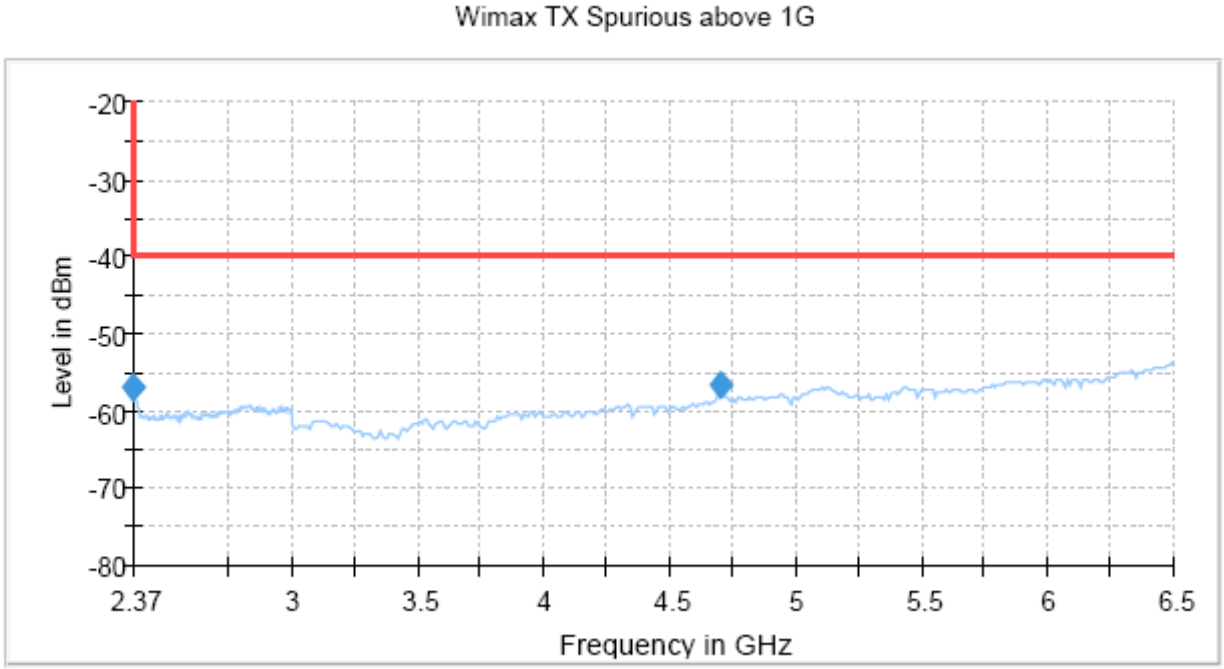
Horizontal



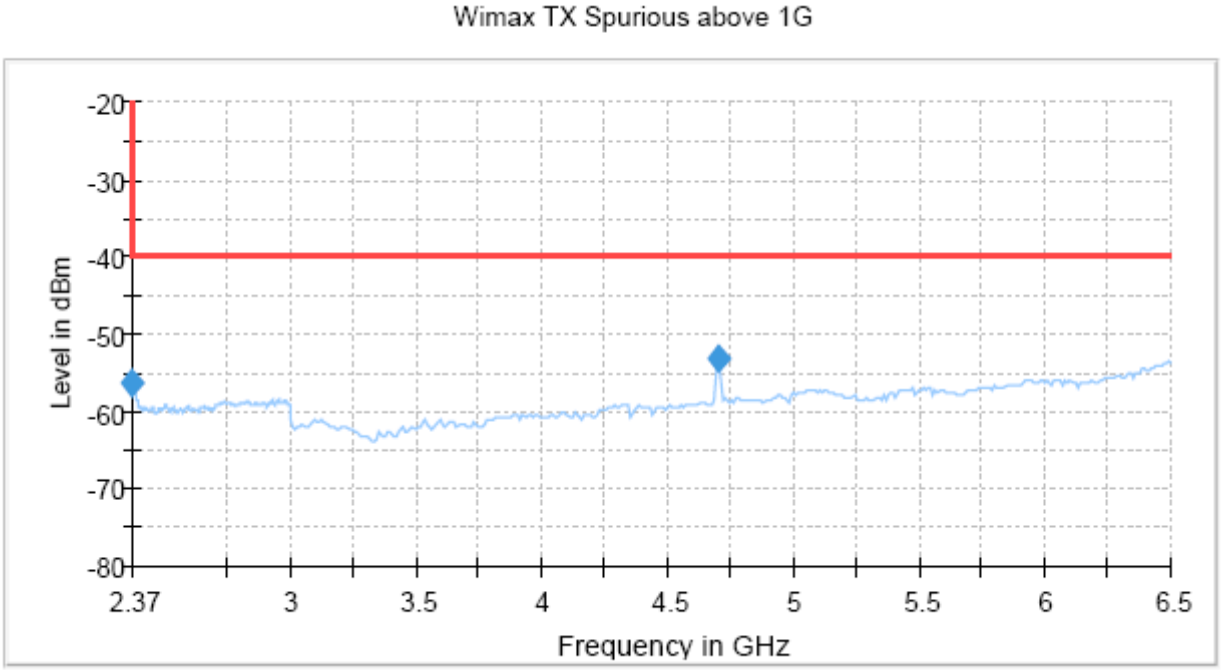
Vertical



Horizontal

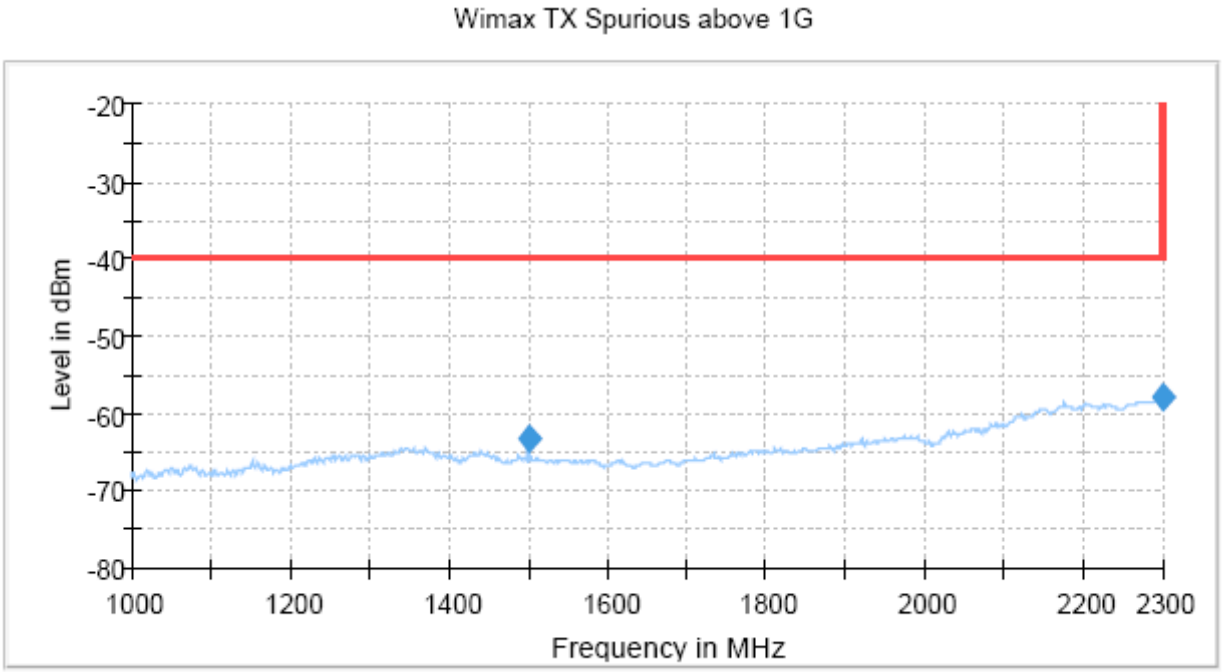


Vertical

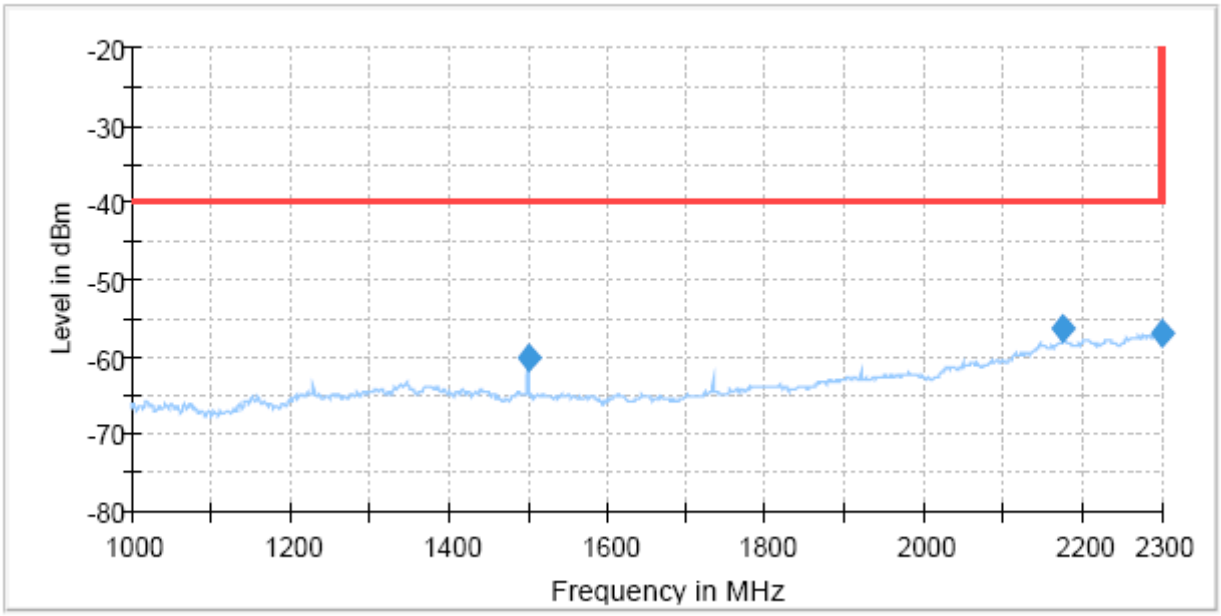


- **2357.5 MHz_5 MHz Bandwidth**

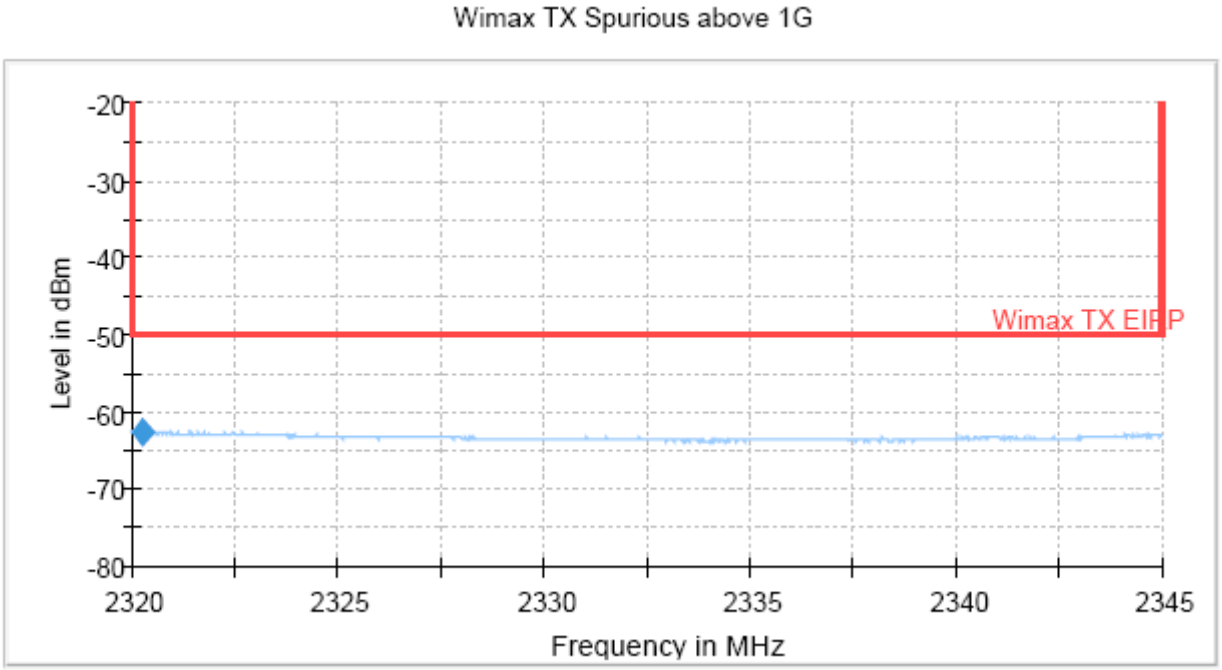
Horizontal



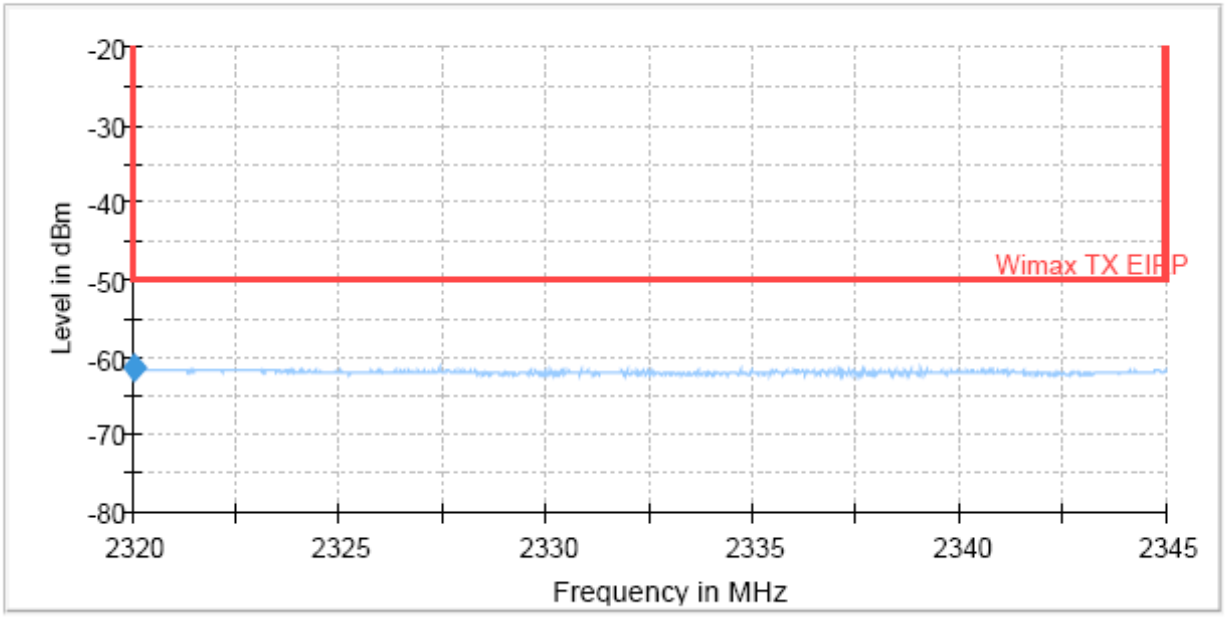
Vertical



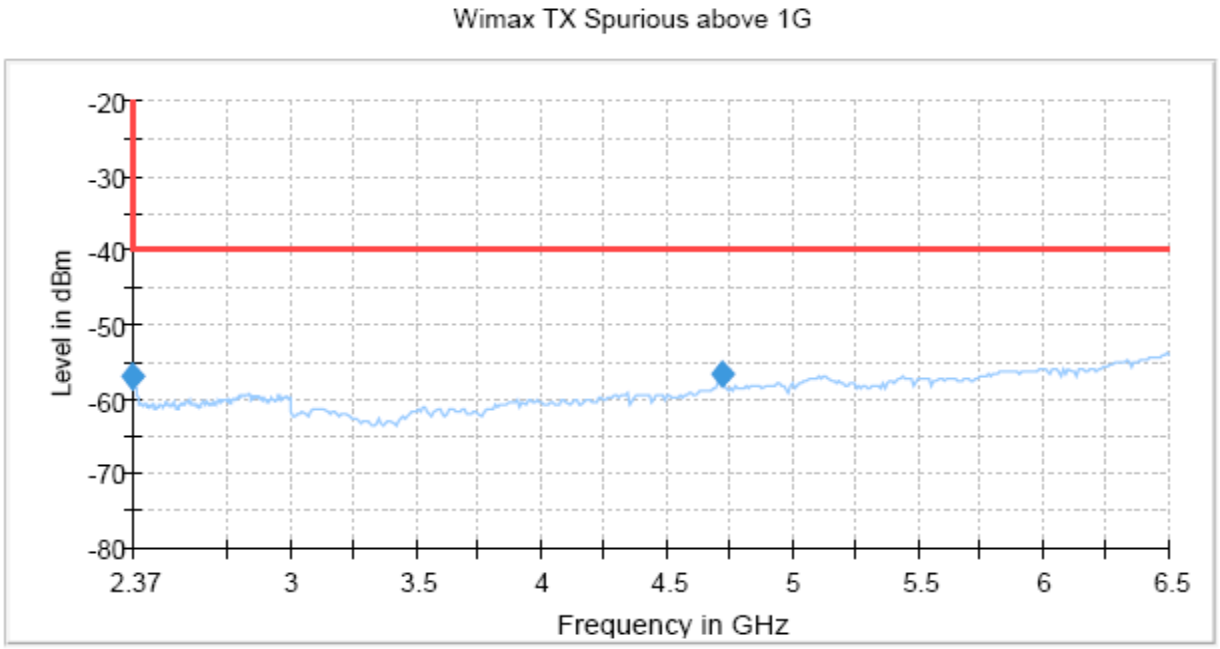
Horizontal



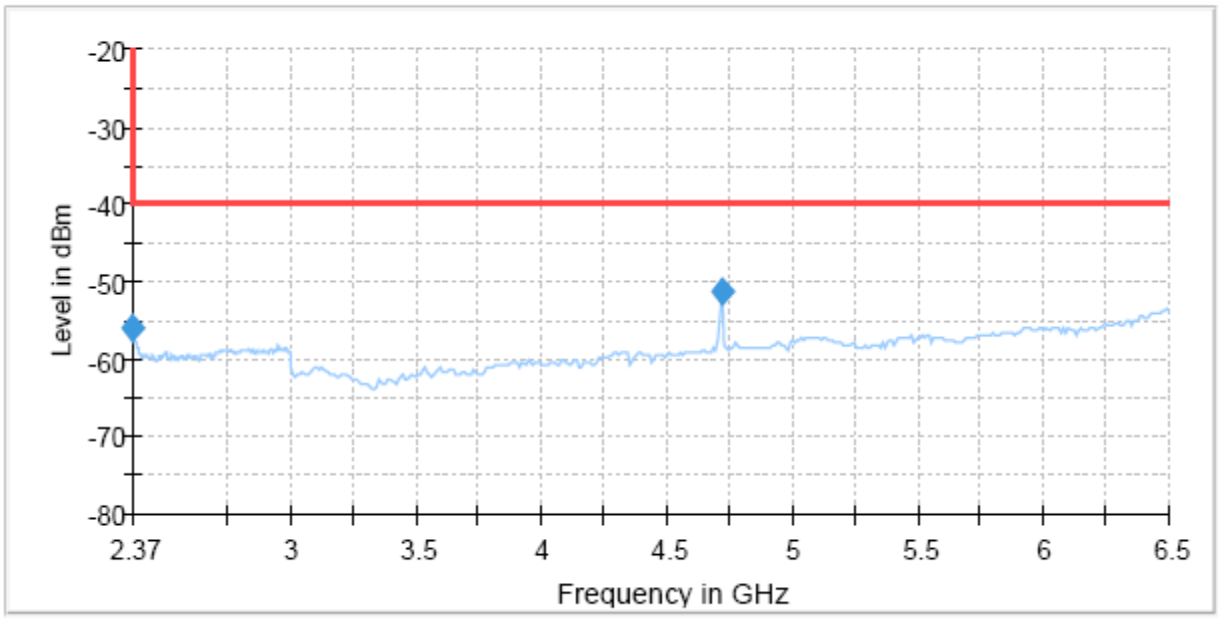
Vertical



Horizontal



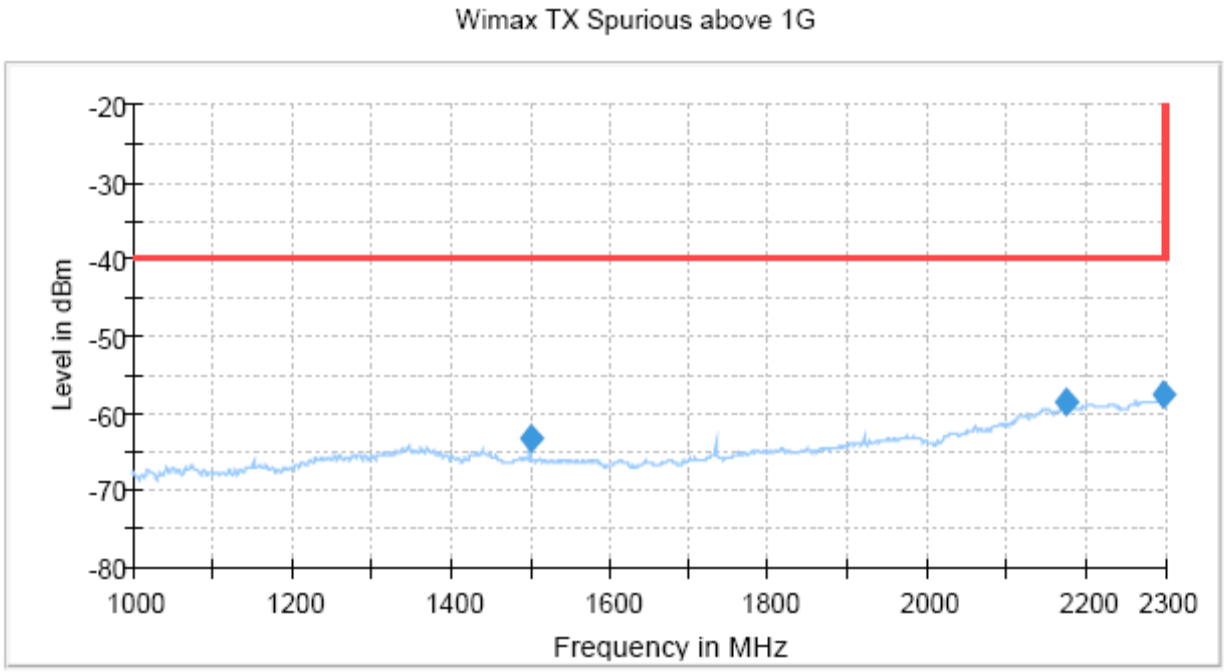
Vertical



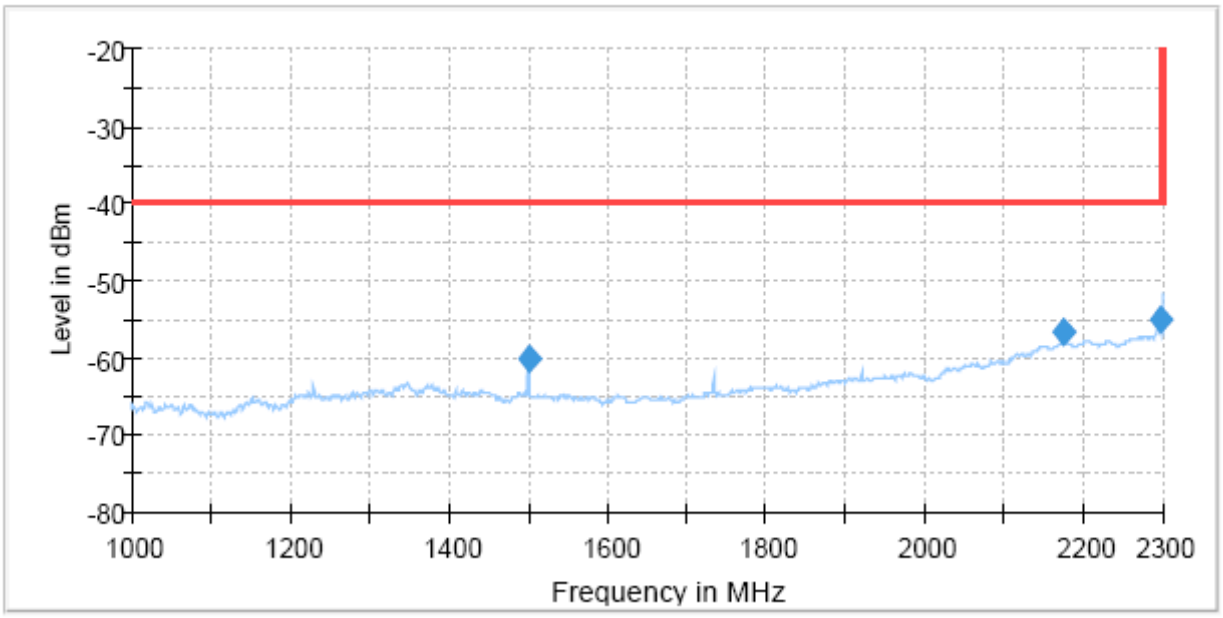
10 MHz Bandwidth

- **2310.0 MHz_10 MHz Bandwidth**

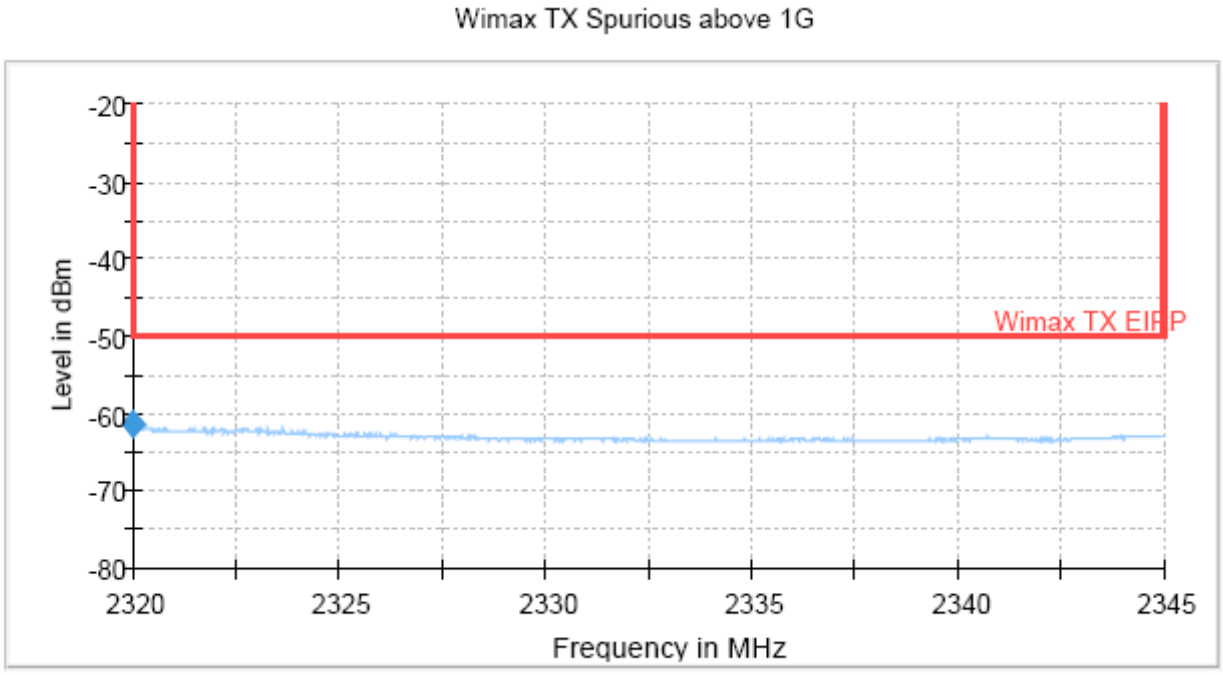
Horizontal



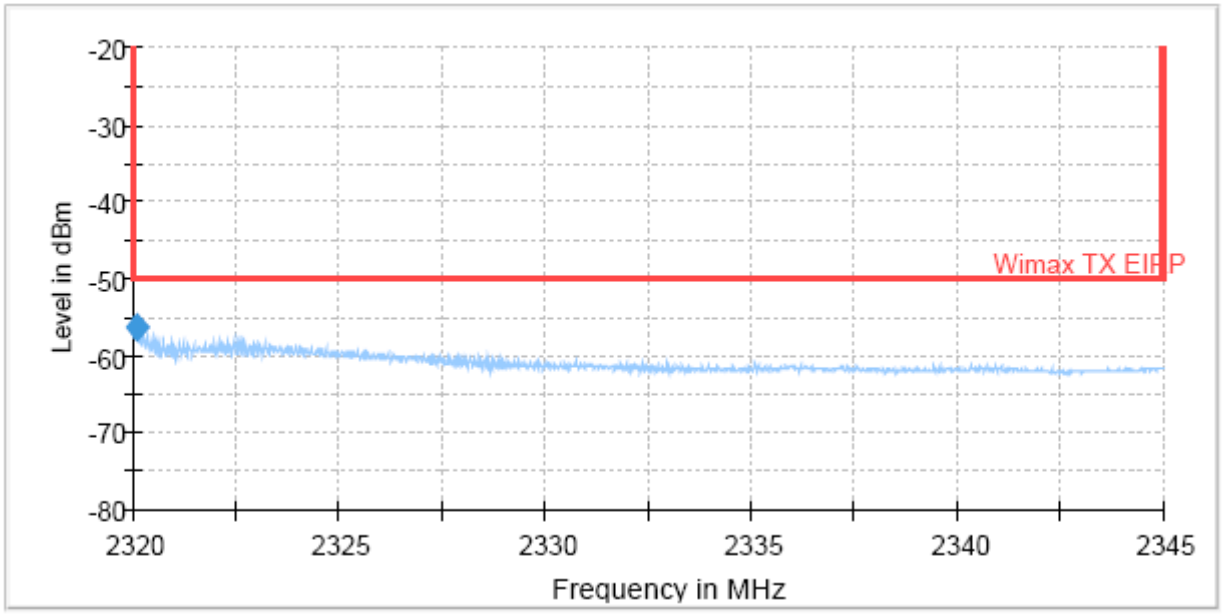
Vertical



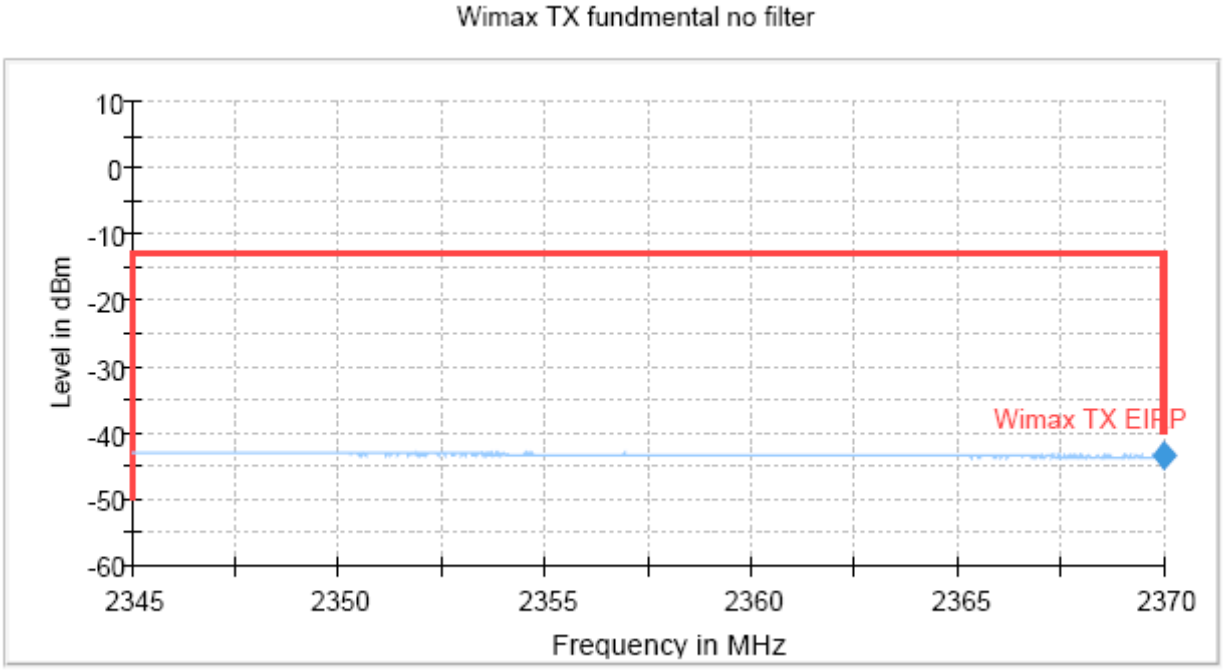
Horizontal



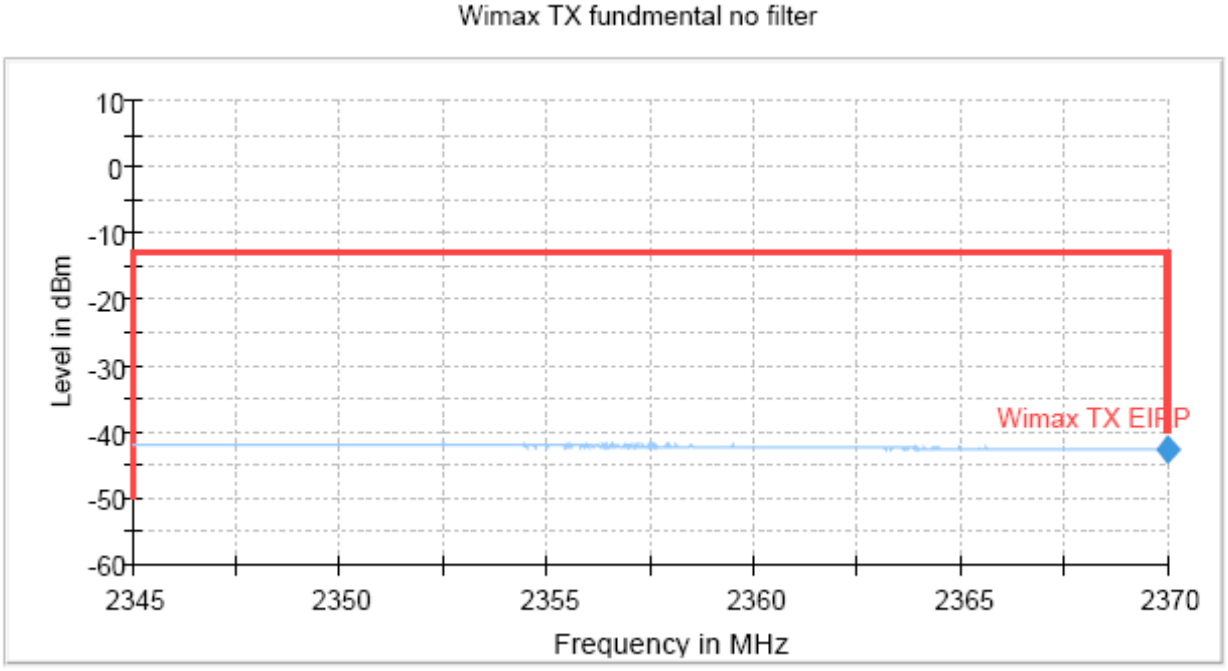
Vertical



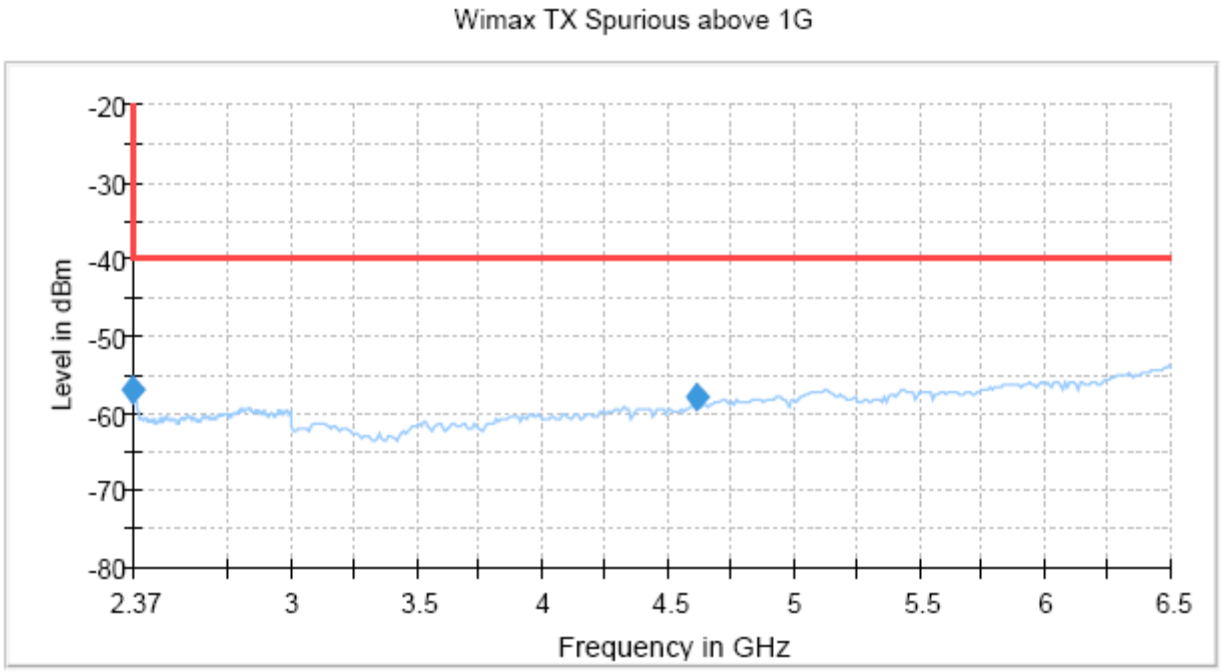
Horizontal



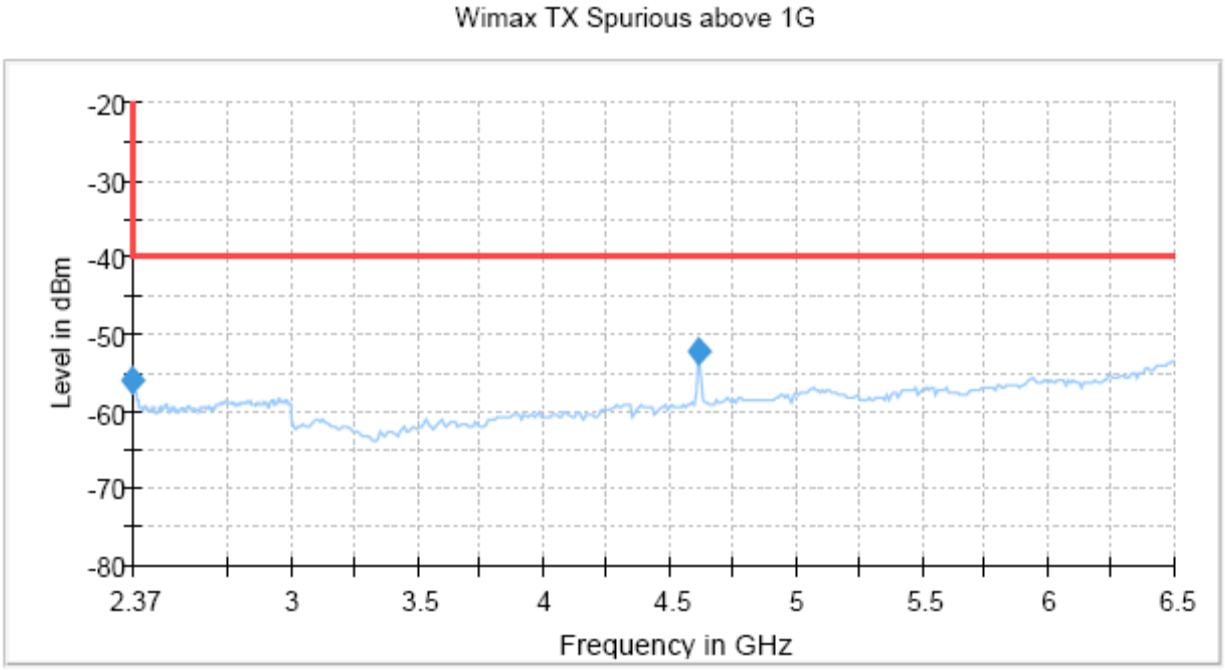
Vertical



Horizontal

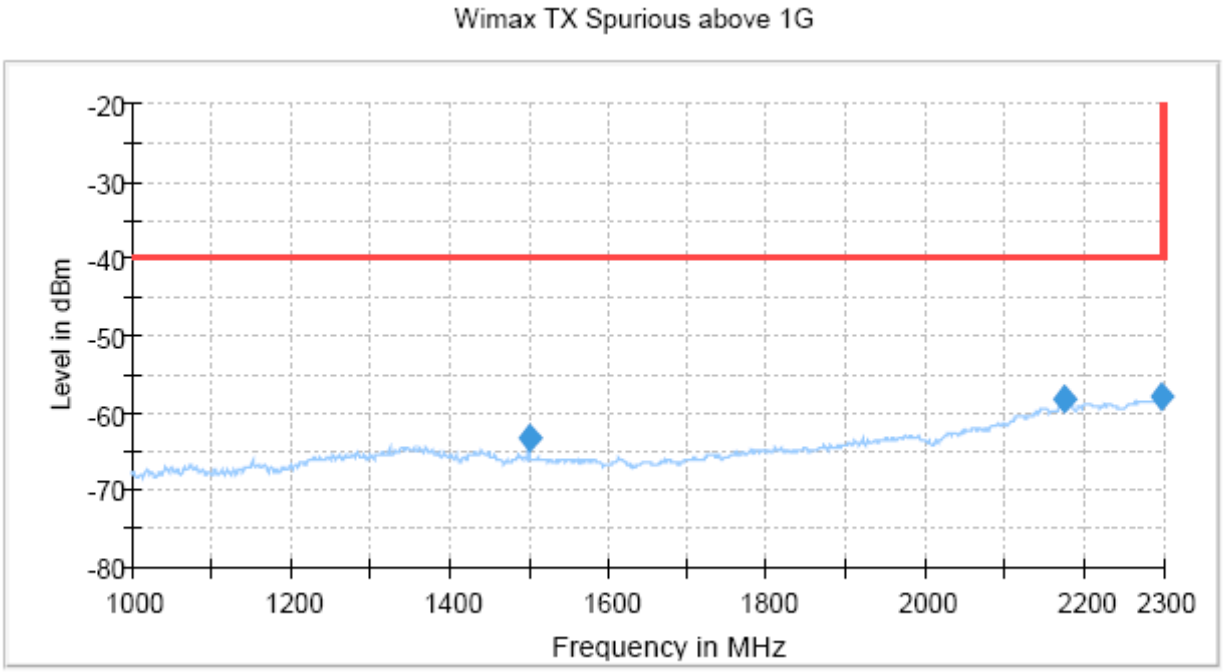


Vertical

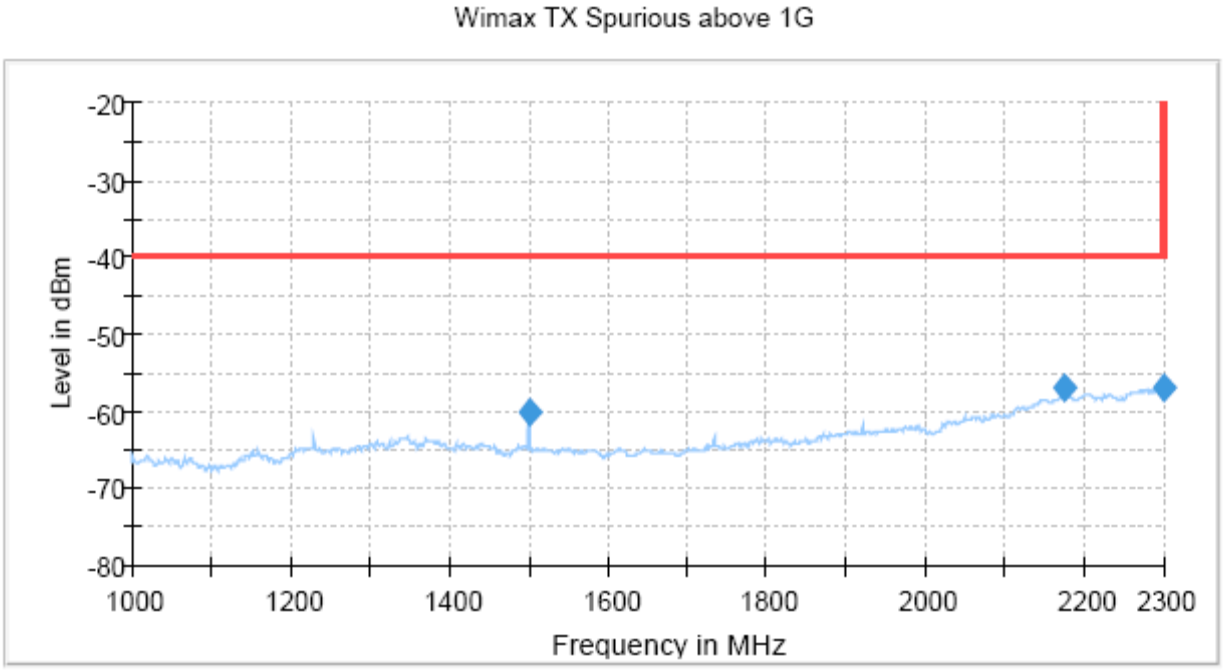


- **2355.0MHz_10 MHz Bandwidth**

Horizontal



Vertical



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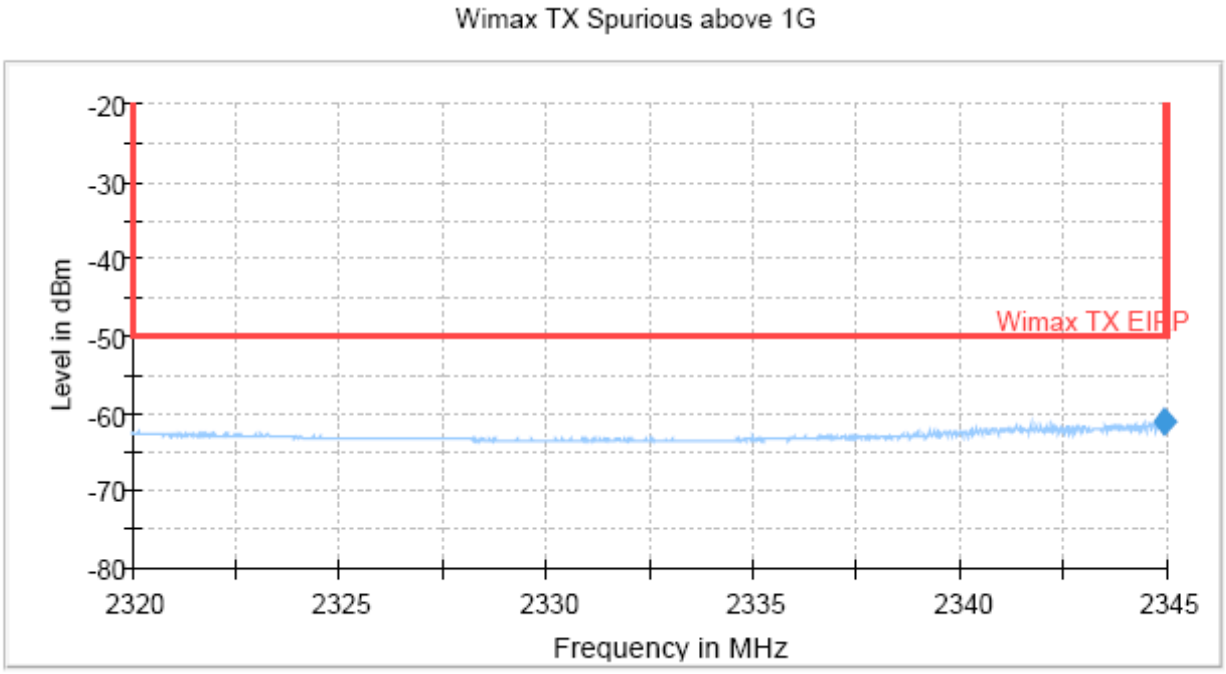

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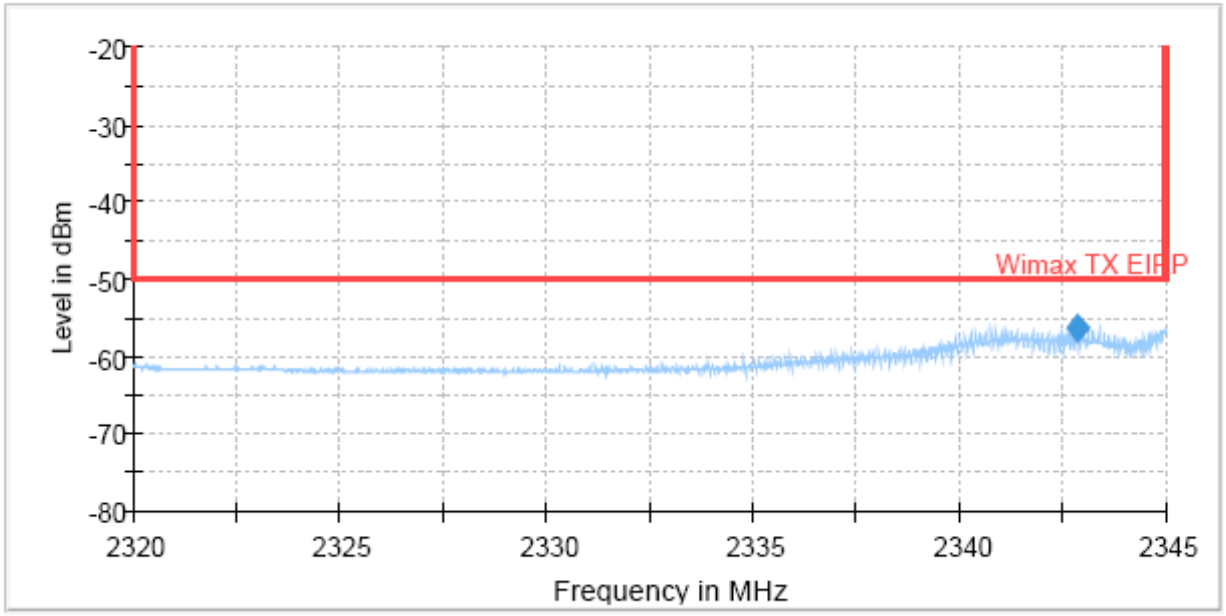

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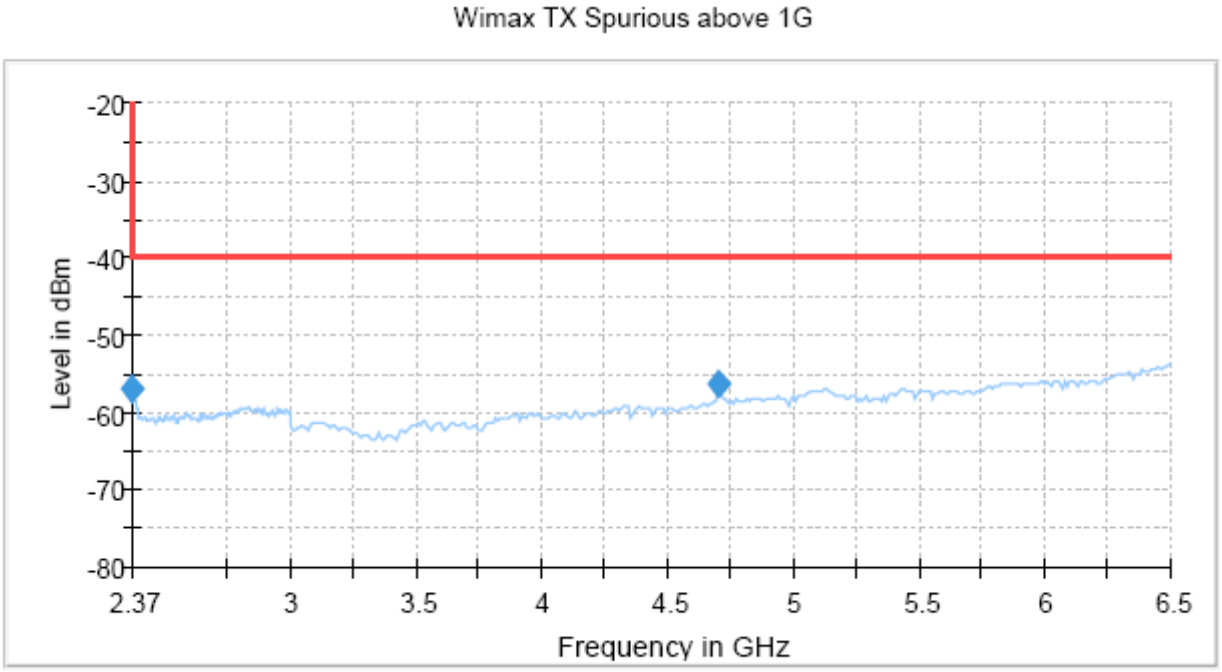
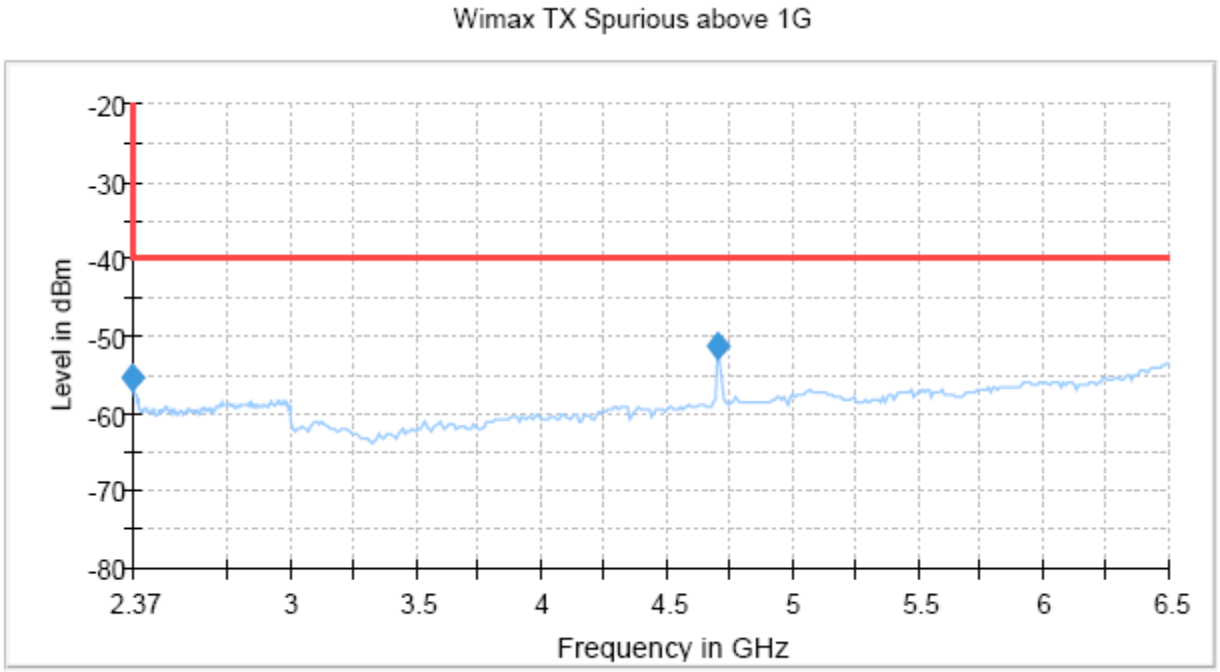


Vertical



9.5 Frequency Stability / Temperature Variation

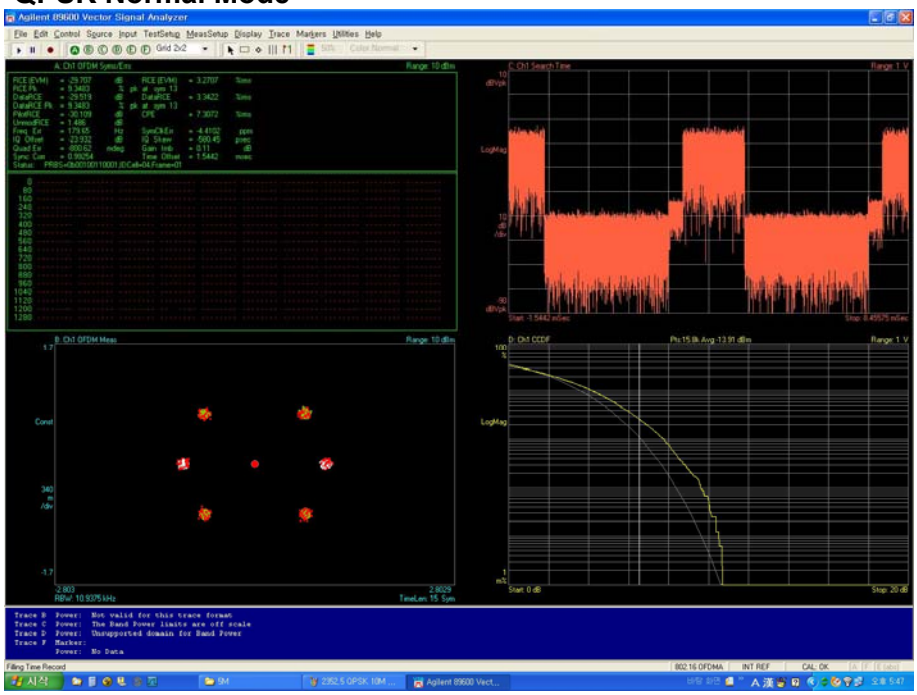
Test Mode : Center Frequency (2312.5 MHz)

Measurement Result :

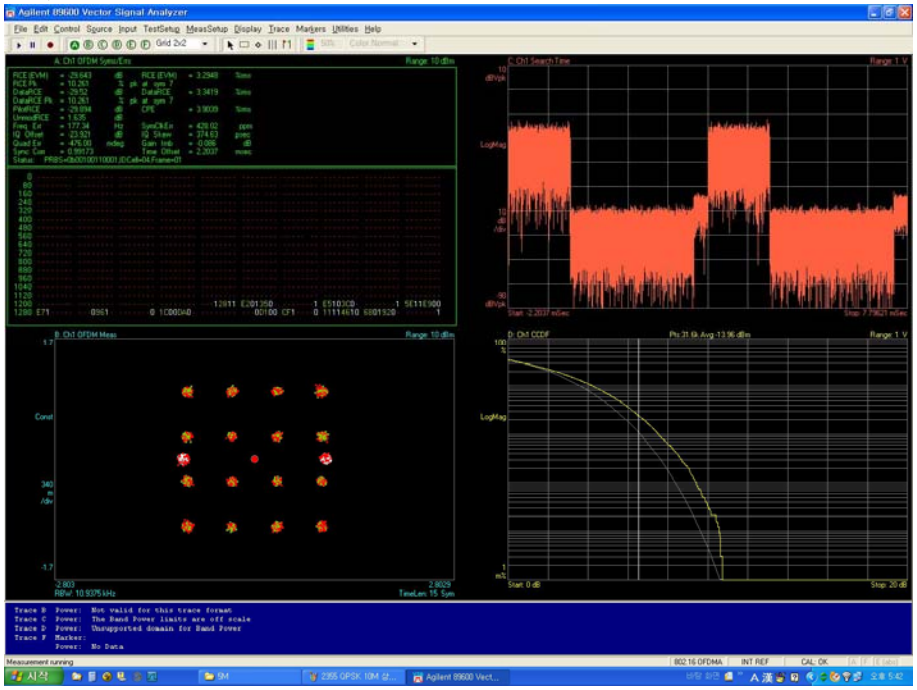
Voltage (%)	Power (Vac)	Temp. (	Frequency (Hz)	Frequency Error (Hz)
100%	120	+23(Ref.)	2,312,500,179	179
100%		-30	2,312,500,154	154
100%		-20	2,312,500,165	165
100%		-10	2,312,499,865	-135
100%		0	2,312,499,861	-139
100%		10	2,312,499,833	-167
100%		20	2,312,500,059	59
100%		30	2,312,499,893	-107
100%		40	2,312,499,868	-132
100%		50	2,312,500,126	126
100%		60	2,312,500,129	129
85%	102	23	2,312,500,152	152
115%	138	23	2,312,500,179	173

***The temperature is varied from -30 C to +60 C using an environmental chamber.**

QPSK Normal Mode



16QAM Normal Mode



10. Accuracy of Measurement

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	*Xi*	Uncertainty of *Xi*		Coverage factor *k*	*u(Xi)* (dB)	*Ci*	*Ci u(Xi)* (dB)
		Value (dB)	Probability Distribution				
Receiver reading	***RI***	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	***LC***	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	***LAMN***	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	***dVSW***	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	***dVPA***	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	***dVPR***	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	***dVNF***	± 0.00	-	-	0.00	1	0.00
AMN Impedance	***dZ***	± 1.80	triangular	2.449	0.73	1	0.73
Mismatch	***M***	+ 0.70	U-Shaped	1.414	0.49	1	0.49
Mismatch	***M***	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	***RS***	0.05	normal 1	1.000	0.05	1	0.05
Remark	: AMN-Receiver Mismatch : + : AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expended Uncertainty U	Normal (*k* = 2)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Receiver reading	***RI***	± 0.10	normal 1	1.000	0.10	1	0.10
Sine wave voltage	***dVsw***	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	***dVpa***	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	***dVpr***	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	***dVnf***	± 0.50	normal 2	2.000	0.25	1	0.25
Antenna Factor Calibration	***AF***	± 1.50	normal 2	2.000	0.75	1	0.75
Attenuation Antenna-receiver	***CL***	± 0.52	normal 2	2.000	0.26	1	0.26
Antenna Directivity	***AD***	± 1.00	rectangular	1.732	0.58	1	0.58
Antenna Factor Height Dependence	***AH***	± 0.50	rectangular	1.732	0.29	1	0.29
Antenna Phase Centre Variation	***AP***	± 0.30	rectangular	1.732	0.17	1	0.17
Antenna Factor Frequency Interpolation	***AI***	± 0.30	rectangular	1.732	0.17	1	0.17
Site Imperfections	***SI***	± 4.00	triangular	2.449	1.63	1	1.63
Measurement Distance Variation	***DV***	± 0.10	rectangular	1.732	0.06	1	0.06
Antenna Balance	***Dbal***	± 0.90	rectangular	1.732	0.52	1	0.52
Cross Polarisation	***DCross***	± 0.90	rectangular	1.732	0.52	1	0.52
Mismatch	***M***	+ 0.25	U-Shaped	1.414	0.18	1	0.18
Mismatch	***M***	- 0.26	U-Shaped	1.414	- 0.18	1	- 0.18
Mismatch	***M***	+ 0.98	U-Shaped	1.414	0.69	1	0.69
Mismatch	***M***	- 1.11	U-Shaped	1.414	- 0.79	1	- 0.79
Measurement System Repeatability	***RS***	0.09	normal 1	1.000	0.09	1	0.09
Remark	: Biconical Antenna-receiver Mismatch : + (< 200 MHz) : Biconical Antenna-receiver Mismatch : - (< 200 MHz) : Log Periodic Antenna-receiver Mismatch : + (≧ 200 MHz) : Log Periodic Antenna-receiver Mismatch : - (≧ 200 MHz)						
Combined Standard Uncertainty	Normal			± 2.63 (< 200 MHz) ± 2.74 (≧200 MHz)			
Expended Uncertainty U	Normal (k = 2)			± 5.26 (< 200 MHz) ± 5.48 (≧200 MHz)			