



REPORT No.: SZ24030059W01

TEST REPORT

APPLICANT : Reliance Communications LLC

PRODUCT NAME : Orbic Fun Pro 5G

MODEL NAME : R678L5SLFP

BRAND NAME : Orbic

FCC ID : 2ABGH-R678L5SLFP

STANDARD(S) : 47 CFR Part 2
47 CFR Part 22
47 CFR Part 24
47 CFR Part 27

RECEIPT DATE : 2023-12-21

TEST DATE : 2023-12-27 to 2024-04-26

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DIRECTORY

1. Technical Information	3
1.1. Applicant and Manufacturer Information	3
1.2. Equipment Under Test (EUT) Description	3
1.3. Maximum E.R.P./E.I.R.P. and Emission Designator	5
1.4. Test Standards and Results	6
1.5. Environmental Conditions	9
2. Summary Test Results And Description	10
2.1. Transmitter Conducted Output Power	10
2.2. Conducted Spurious Emissions	14
2.3. Radiated Spurious Emissions	39
Annex A Test Uncertainty	72
Annex B Testing Laboratory Information	73

Change History		
Version	Date	Reason for change
1.0	2024-05-24	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	555 Wireless Blvd. Hauppauge, NY 11788, USA
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F,HBC HuiLong Center Building-II Minzhi Street,Longhua, Shenzhen, P.R. China 518110

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Fun Pro 5G	
Sample No.:	3#,9#	
Hardware Version:	V1.0	
Software Version:	R678L5SLFP_V1.0.10_BLL	
Modulation Type:	QPSK, 16QAM, 64QAM,256QAM	
Operation Band:	Uplink:2A_4A; 2A_5A; 2A_66A; 4A_5A; 5A_66A	
Frequency Range:	Band 2	Tx: 1850MHz–1910MHz
		Rx: 1930MHz–1990MHz
	Band 4	Tx: 1710MHz–1755MHz
		Rx: 2110MHz–2155MHz
	Band 5	Tx: 824MHz–849MHz
		Rx: 869MHz–894MHz
	Band 66	Tx: 1710MHz –1780MHz
		Rx: 2110MHz–2200MHz
Channel Bandwidth:	Band 2	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	Band 4	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	Band 5	1.4MHz, 3MHz, 5MHz, 10MHz
	Band 13	5 MHz, 10MHz
	Band 66	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
Antenna Type:	PIFA Antenna	
Antenna Gain:	Band 2	ANT3:2.47dBi, ANT4: 1.40dBi
	Band 4	ANT3:1.34dBi, ANT4: 2.68dBi
	Band 5	ANT1: -8.22dBi



	Band 66	ANT3:-4.04dBi, ANT4: 2.68dBi
Accessory Information:	Battery	
	Brand Name:	Orbic
	Model No.:	BTE-5004
	Serial No.:	N/A
	Capacity:	4870mAh
	Rated Voltage:	3.87V
	Charge Limit:	4.45V
	Manufacturer:	Shenzhen Aerospace Electronic Co.,Ltd.
	AC Adapter	
	Brand Name:	Orbic
	Model No.:	OACH023US1
	Serial No.:	N/A
	Rated Output:	100-240V~50/60HZ, 0.5A
	Rated Input:	5V=3A or 9V=2A or 12V=1.5A
	Manufacturer 1:	WATAI ELECTRONICS PRIVATE LIMITED
	Manufacturer 2:	KANGYIN ELECTRONIC TECHNOLOGY CO.,LTD
	USB Cable :	
	Model No.:	HX-YLMK-06
	Manufacturer:	SHENZHEN HUAWANG PRECISION ELECTRONICS CO.,LTD

Note1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note2: This is a variant report of original report (Report No.: SZ23120302W01, FCC ID: 2ABGH-R678L5SFP). Based on the similarity between before, only change the product name, model name, software version, FCC ID, appearance and antenna,enable LTE B14/17/25/26/30/41/71 and NR n25/26/41/71, the others are the same as before. No other changes, all RF parameters remain the same. The changes do not affect the test results.



1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

Channel bandwidth	Maximum ERP/EIRP (W)			
CA_2A-4A	QPSK	16QAM	64QAM	256QAM
20+20	0.310	/	/	/
CA_2A-5A	QPSK	16QAM	64QAM	256QAM
20+10	0.292	/	/	/
CA_2A-66A	QPSK	16QAM	64QAM	256QAM
20+20	0.305	/	/	/
CA_4A-5A	QPSK	16QAM	64QAM	256QAM
20+10	0.333	/	/	/
CA_5A-66A	QPSK	16QAM	64QAM	256QAM
10+20	0.361	/	/	/



1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2, Part 22, Part 24 and Part 27 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services

B2			
Item	FCC Rule No.	Requirements	Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232(c)	EIRP $\leq$ 2 W	PASS
Peak-Average Ratio	§24.232(d)	Limit $\leq$ 13 dB	PASS
Bandwidth	§2.1049	OBW: No limit EBW: No limit	PASS
Band Edges Compliance	§2.1051, §24.238(a)(b)	Refer to section 2.6	PASS
Spurious Emission at Antenna Terminals	§2.1051, §24.238(a)(b)	$\leq$ -13 dBm/1MHz	PASS
Field Strength of Spurious Radiation	§2.1053, §24.238(a)	$\leq$ -13 dBm/1MHz	PASS
Frequency Stability	§2.1055, §24.235	No limit	N/A

B4 & B66			
Item	FCC Rule No.	Requirements	Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)(4)	EIRP $\leq$ 1 W	PASS
Peak-Average Ratio	§27.50(d) (5)	Limit $\leq$ 13 dB	PASS



REPORT No.: SZ24030059W01

Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	PASS
Band Edges Compliance	§2.1051, §27.53(h)(1) §27.53(h)(3)(i)	Refer to section 2.6	PASS
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)(1)	≤ -13 dBm/1MHz	PASS
Field Strength of Spurious Radiation	§2.1053, §27.53(h)(1)	≤ -13 dBm/1MHz.	PASS
Frequency Stability	§2.1055, §27.54	No limit	N/A

B5			
Item	FCC Rule No.	Requirements	Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913(a)(5)	ERP ≤ 7 W	PASS
Peak-Average Ratio	N/A	N/A	N/A
Bandwidth	§2.1049	OBW: No limit EBW: No limit	PASS
Band Edges Compliance	§2.1051, §22.917(a)(b)	Refer to section 2.6	PASS
Spurious Emission at Antenna Terminals	§2.1051, §22.917(a)	≤ -13 dBm/1MHz	PASS
Field Strength of Spurious Radiation	§2.1053, §22.355	≤ -13 dBm/1MHz	PASS
Frequency Stability	§2.1055, §22.355	$\leq \pm 2.5$ ppm	PASS



Test detailed items/section required by FCC rules and results are as below:

Test Item	Test Engineer	Result	Method Determination /Remark
Transmitter Conducted Output Power and E.R.P./E.I.R.P.	Yu Xiaoming Li Huaijie	PASS	No deviation
Occupied Bandwidth	Gan Jing	PASS ^[5]	No deviation
Peak to Average Ratio	Gan Jing	PASS ^[5]	No deviation
Conducted Spurious Emissions	Gan Jing	PASS	No deviation
Band Edge	Gan Jing	PASS ^[5]	No deviation
Radiated Spurious Emissions	Gao Jianrou	PASS	No deviation
Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 and ANSI/TIA-603-E-2016. Note 2: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 23.5dB contains two parts that cable loss 13.5dB and Attenuator 10dB. Note 3: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals. Note 4: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table. Note 5: The test items of inter band CA were cover by LTE single carrier due to the CA power is lower than single carrier power.			



1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60

2. Summary Test Results And Description

2.1. Transmitter Conducted Output Power

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

According to FCC section 24.232 (c) for LTE Band 2, Mobile and portable stations are limited to 2 watts E.I.R.P. and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

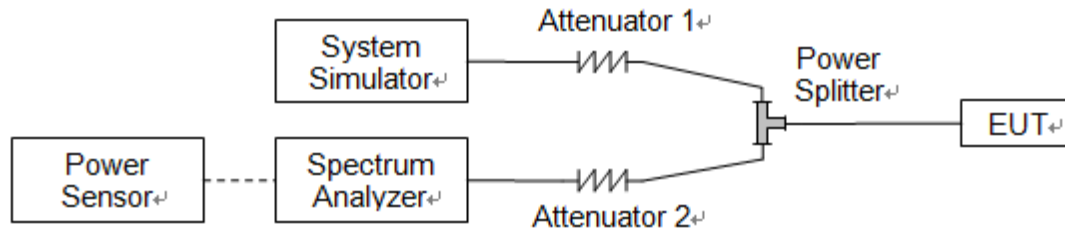
According to FCC section 27.50 (d)(4) for LTE Band 4/66, Fixed, mobile and portable (hand-held) stations in the 1710-1755MHz band are limited to 1 watt E.I.R.P.

According to FCC section 22.913 (a)(2) for LTE Band 5, the E.R.P. of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC section 96.41(b) for LTE Band 48, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph (b):

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD ¹	47	37

2.1.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.3. Test Procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

E.I.R.P. (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

E.R.P. (dBm) = E.I.R.P. (dBm) - 2.15

**2.1.4. Result****Conducted Output Power**

Configure	CA Configuration	PCC				
		Band	BW (MHz)	UL Channel	UL Fre. (MHz)	UL Mode (Modulation/RB/Offset)
Inter-band	CA_2A-4A	2	20	18700	1860	QPSK/1#0
	CA_2A-5A	2	20	18700	1860	QPSK/1#0
	CA_2A-66A	2	20	18700	1860	QPSK/1#0
	CA_4A-5A	4	20	20050	1747.5	QPSK/1#0
	CA_5A-66A	5	10	23230	1747.5	QPSK/1#0

SCC				
Band	BW (MHz)	UL Channel	UL Fre. (MHz)	Measured Power(dBm)
4	20	20300	1745	22.23
5	10	20450	829	22.18
66	20	132572	1770	22.17
5	10	20450	829	22.55
66	20	132572	1770	22.89

Effective Radiated Power and Effective Isotropic Radiated Power

Configure	CA Configuration	PCC				
		Band	BW (MHz)	UL Channel	UL Fre. (MHz)	UL Mode (Modulation/RB/Offset)
Inter-band	CA_2A-4A	2	20	18700	1860	QPSK/1#0
	CA_2A-5A	2	20	18700	1860	QPSK/1#0
	CA_2A-66A	2	20	18700	1860	QPSK/1#0
	CA_4A-5A	4	20	20050	1720	QPSK/1#0
	CA_5A-66A	5	10	20450	829	QPSK/1#0

SCC					
Band	BW (MHz)	UL Channel	UL Fre. (MHz)	Measured Power(dBm)	EIRP(W)
4	20	20300	1745	24.91	0.310



REPORT No.: SZ24030059W01

5	10	20600	844	24.65	0.292
66	20	132572	1770	24.85	0.305
5	10	20600	844	25.23	0.333
66	20	132572	1770	25.57	0.361

2.2. Conducted Spurious Emissions

2.2.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

Additional requirement for LTE Band 2:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

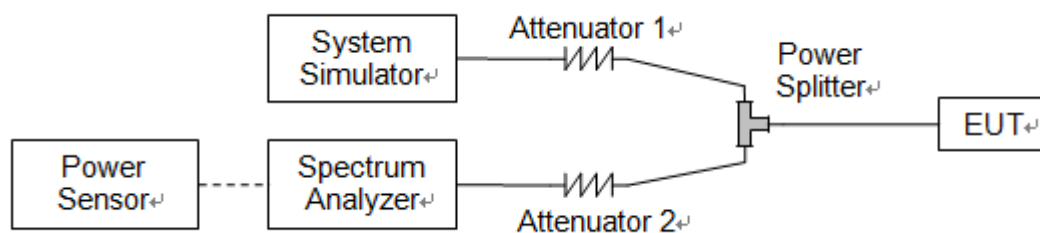
Additional requirement for LTE Band 4/66:

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB. This calculated to be -13dBm.

Additional requirement for LTE Band 5:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

2.2.2. Test Description



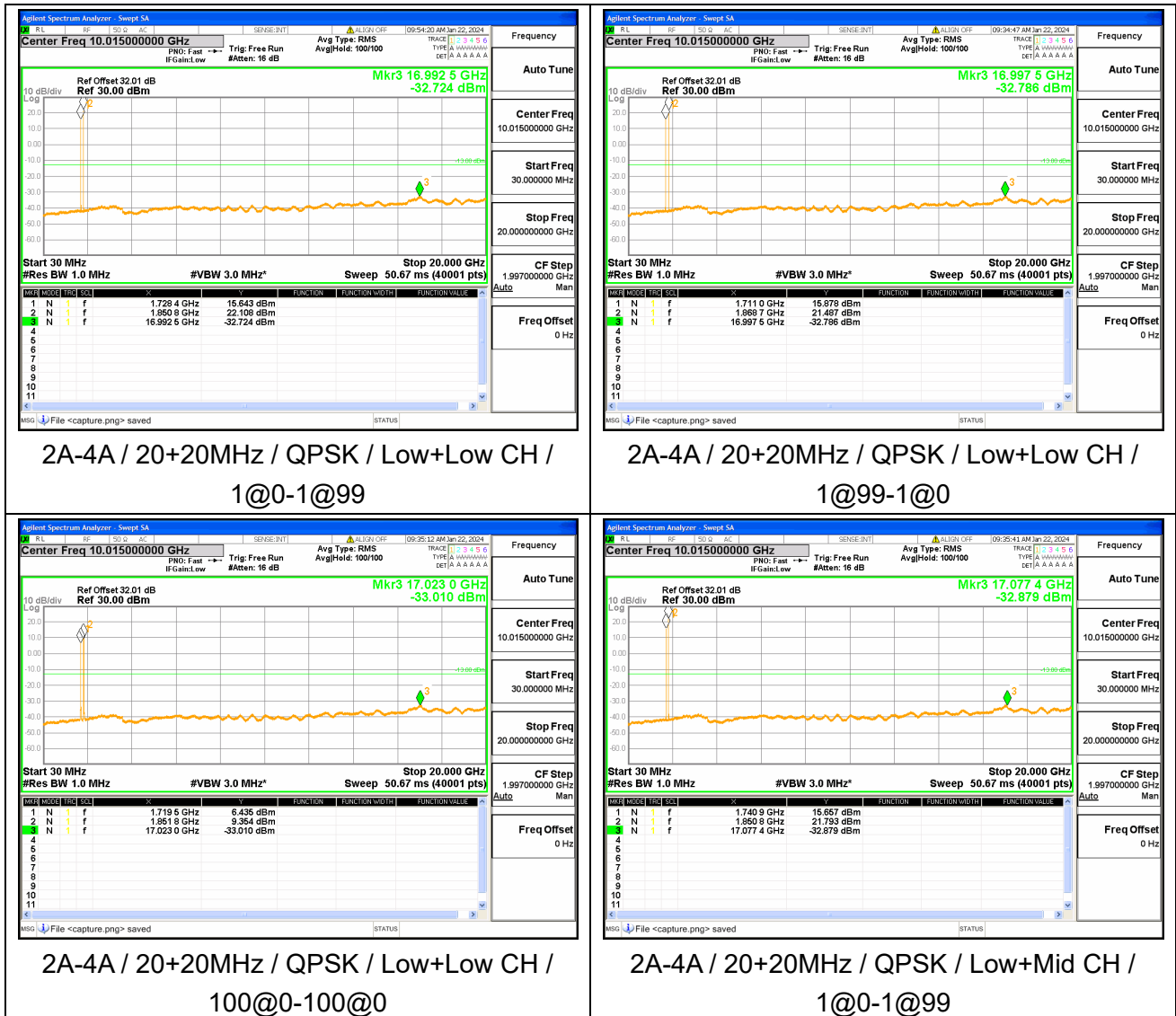
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

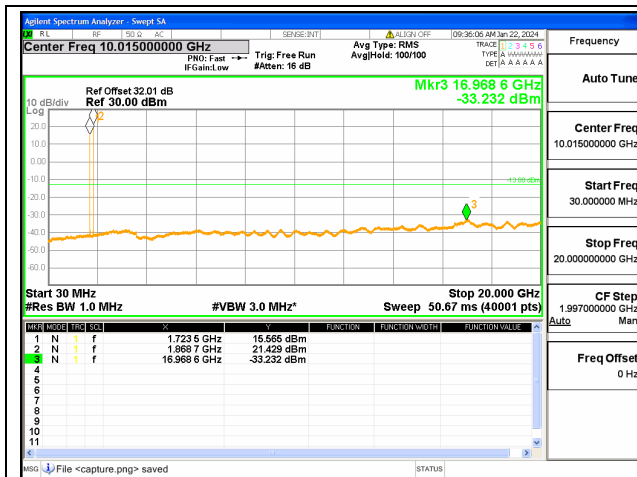
2.2.3. Test Procedure

KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.

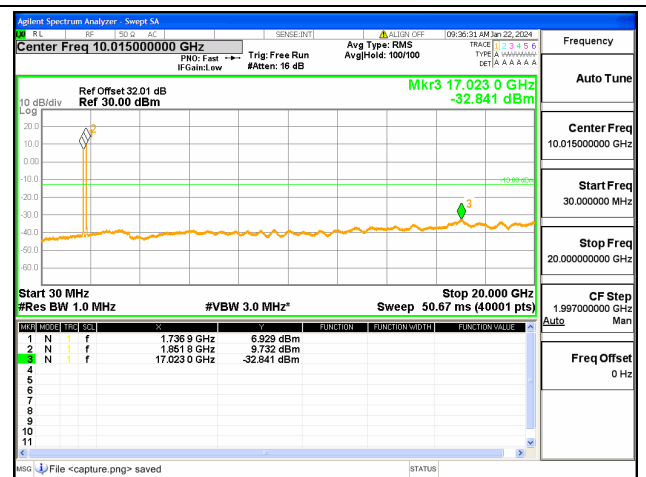


2.2.4. Test Result

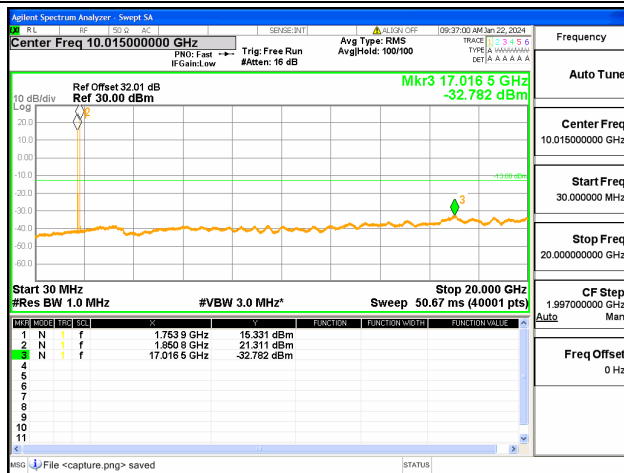




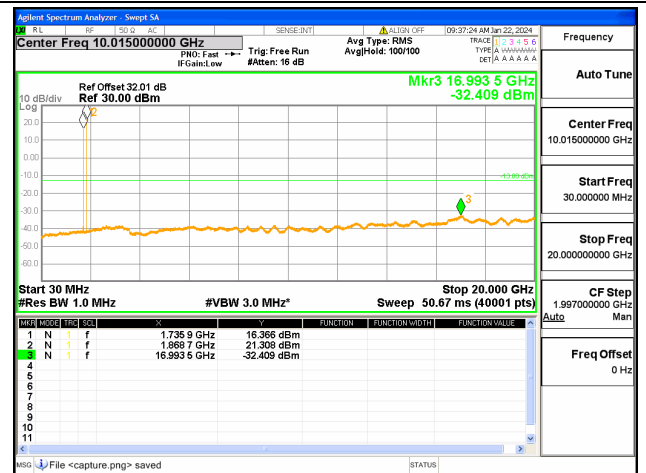
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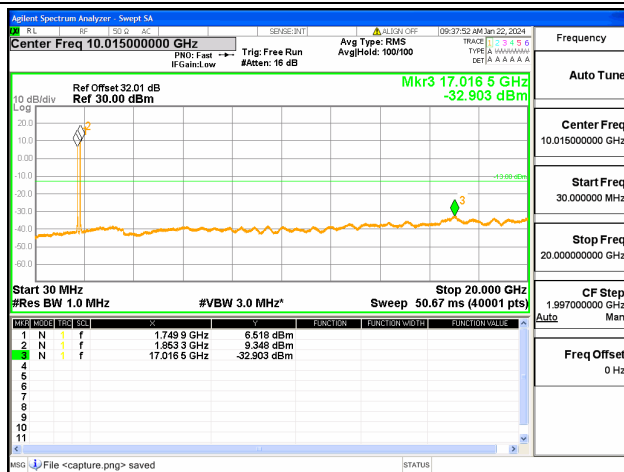
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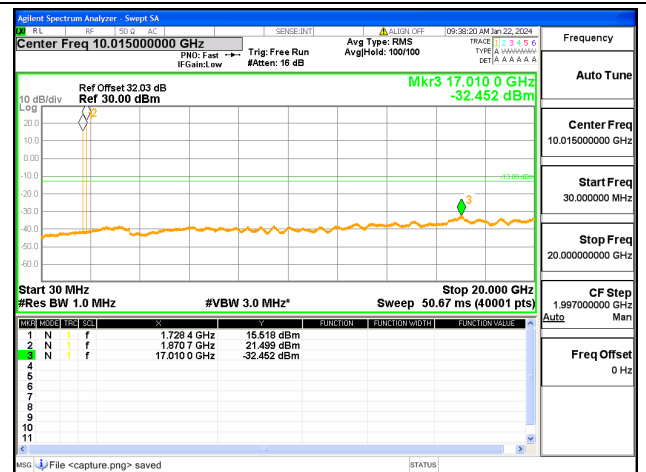
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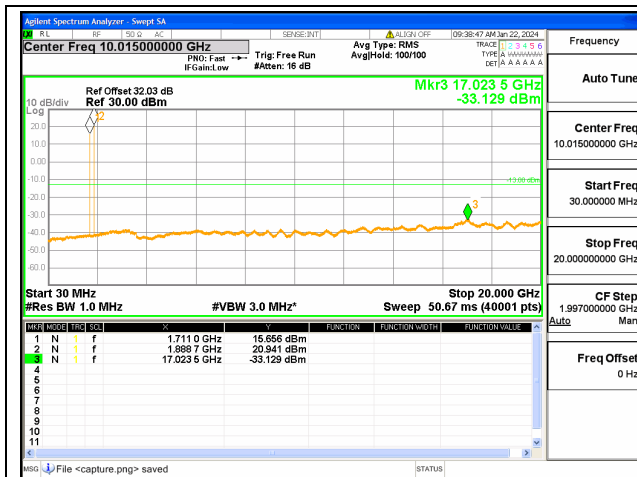
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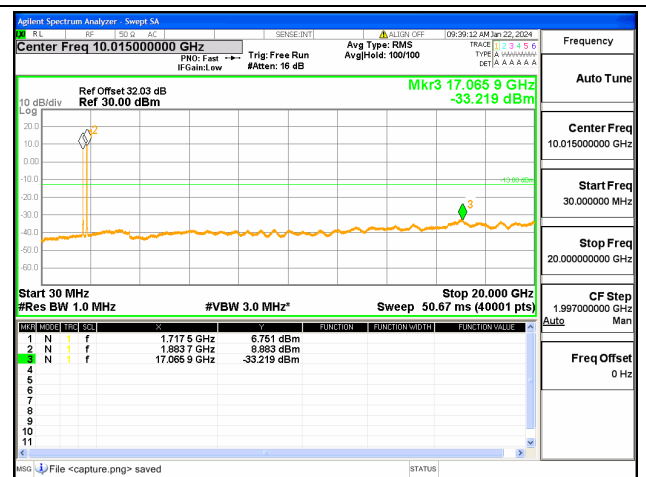
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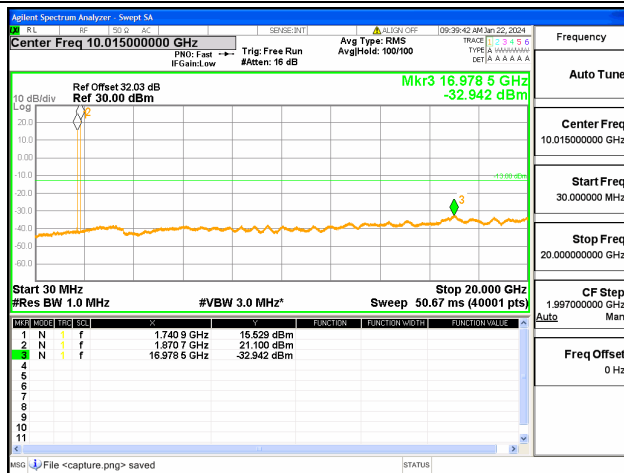
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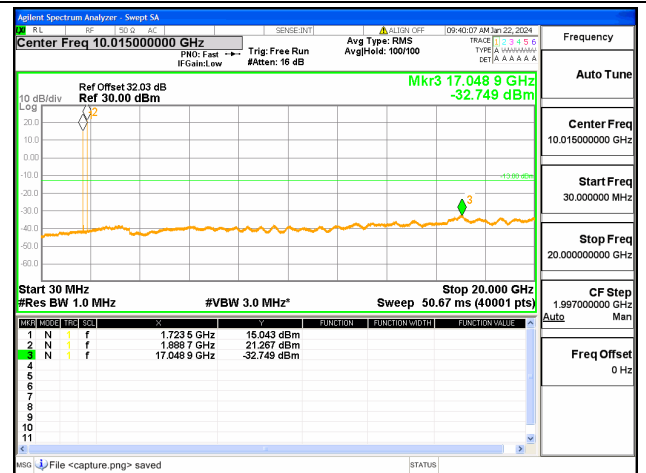
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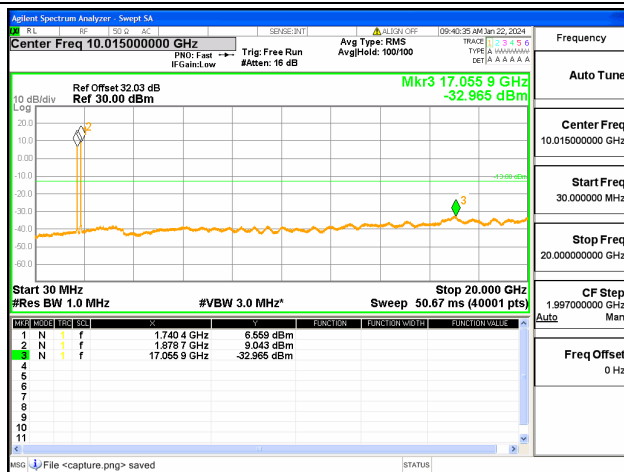
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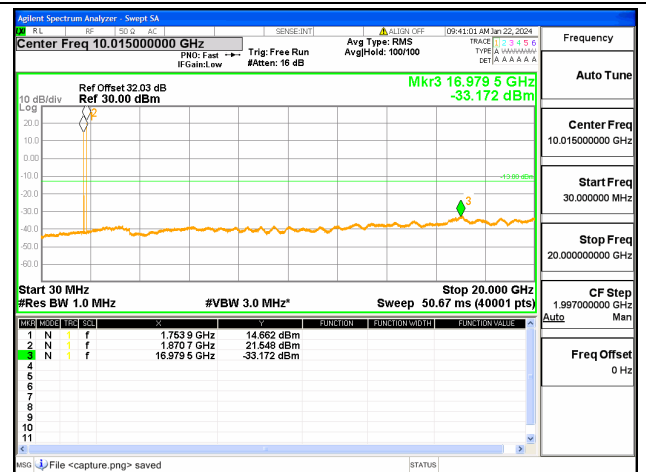
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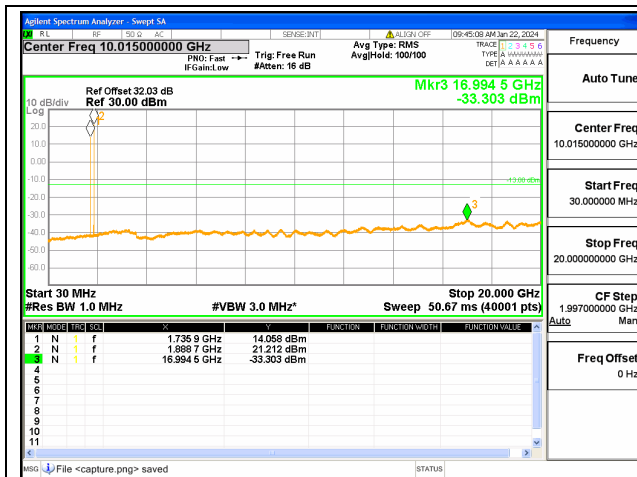
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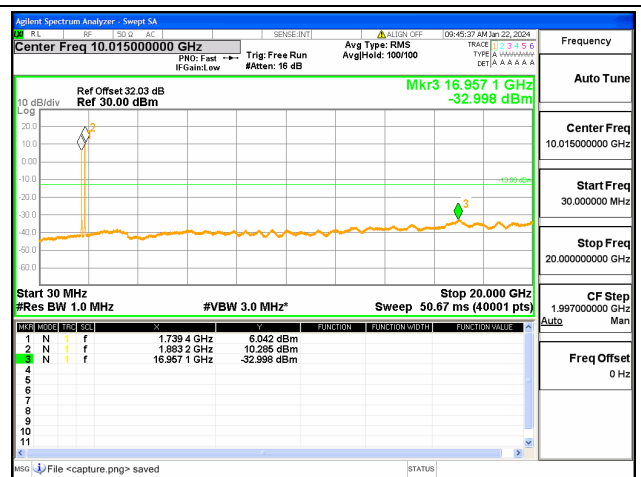
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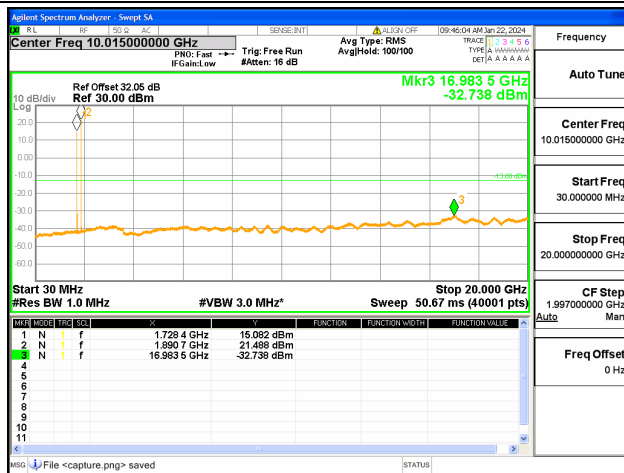
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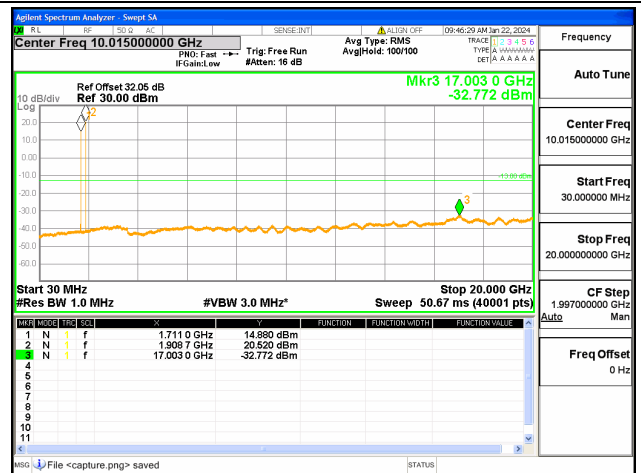
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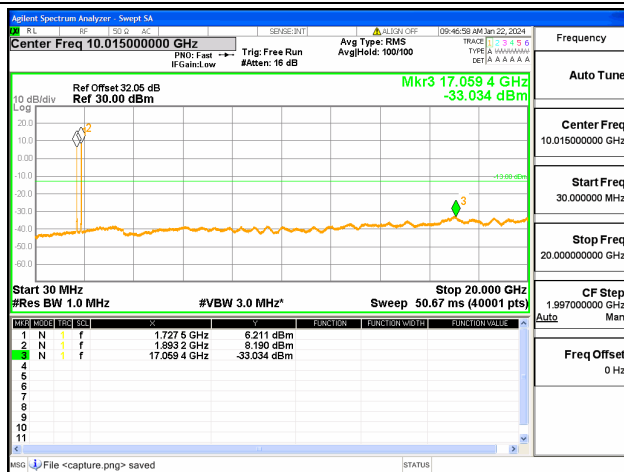
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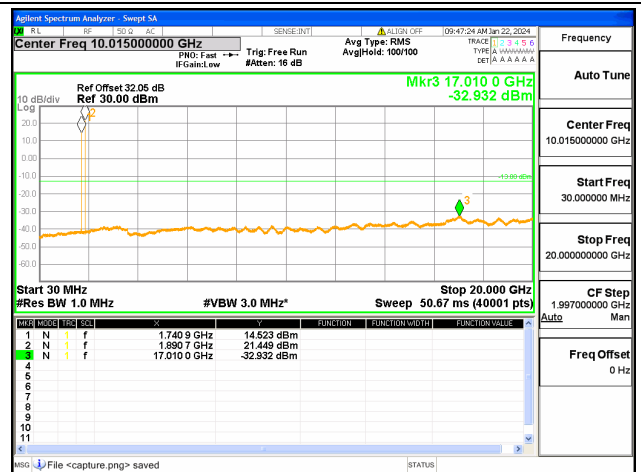
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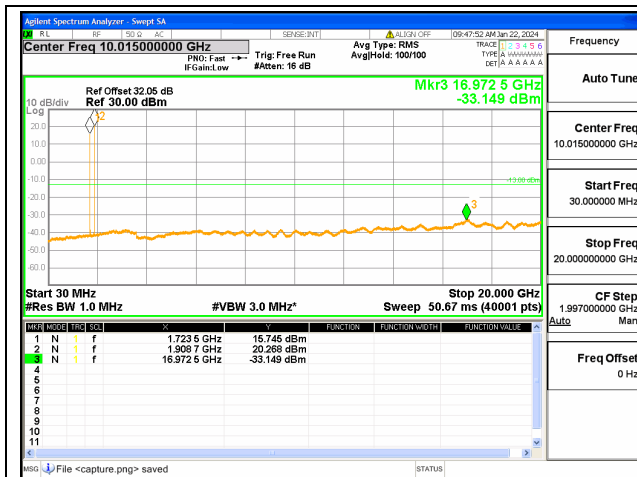
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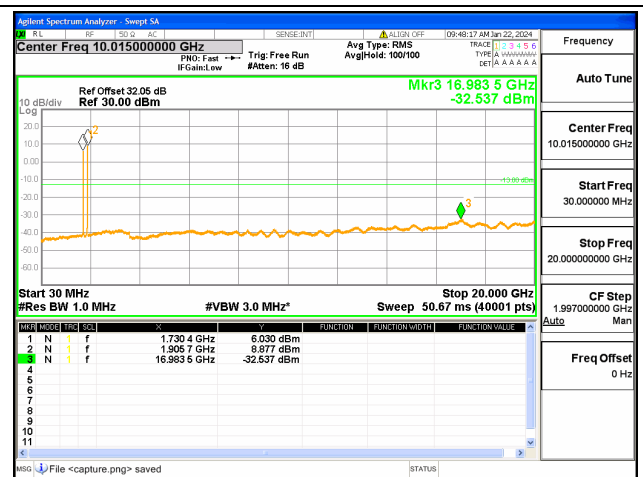
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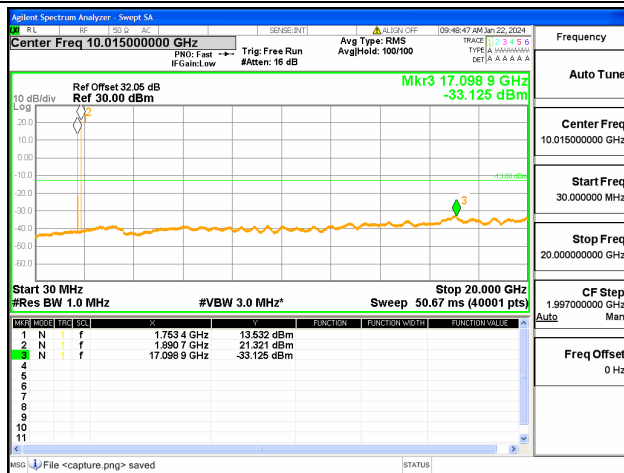
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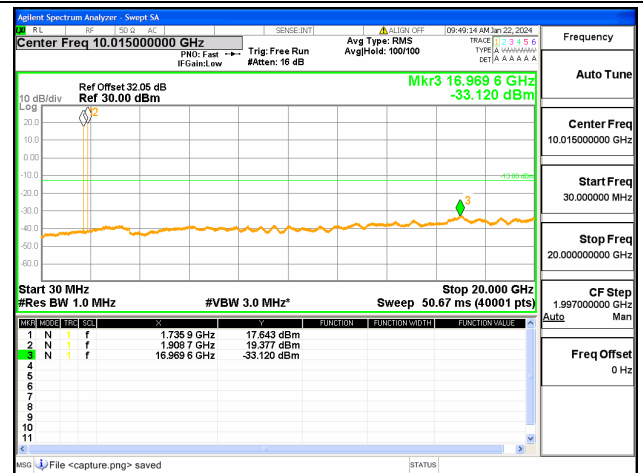
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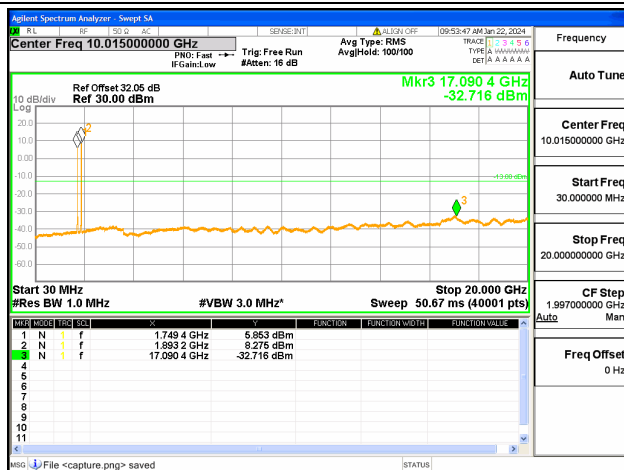
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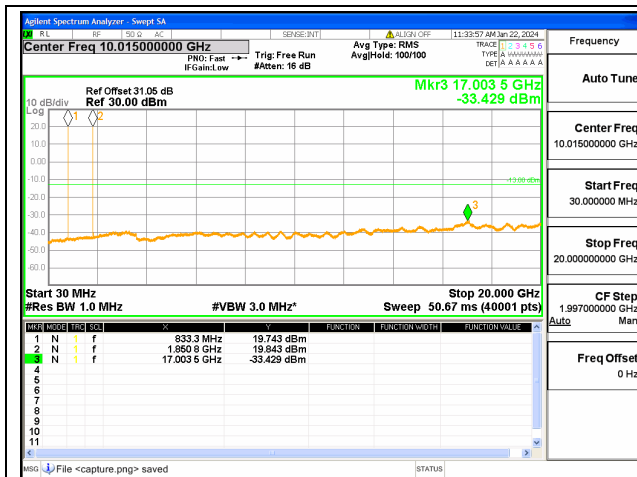
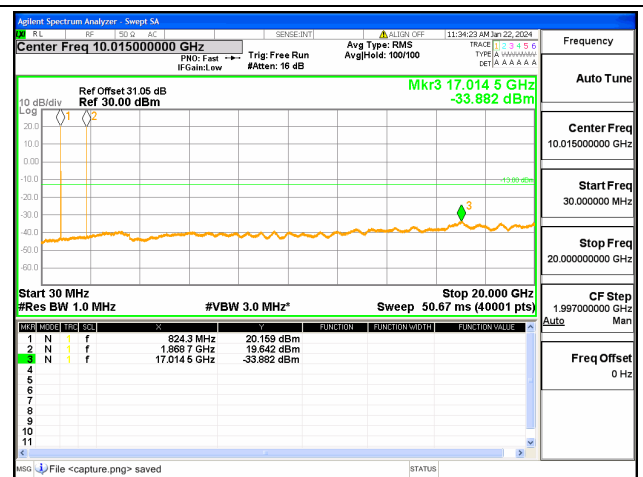
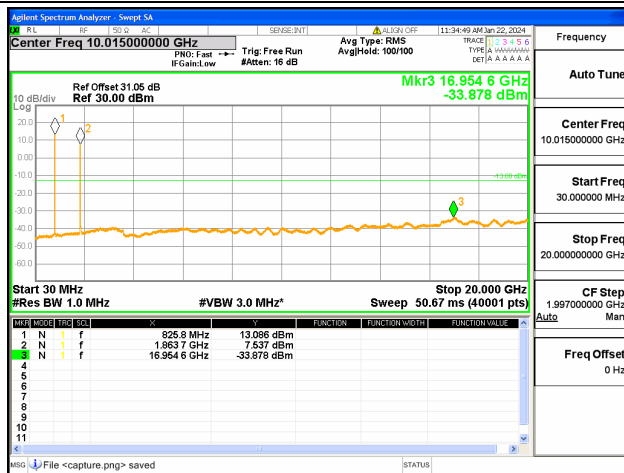
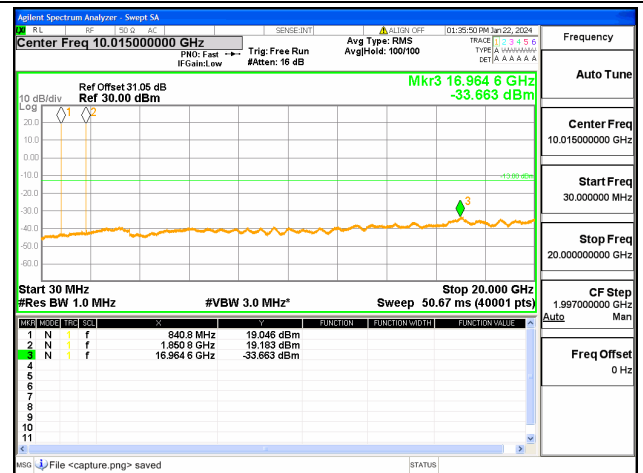
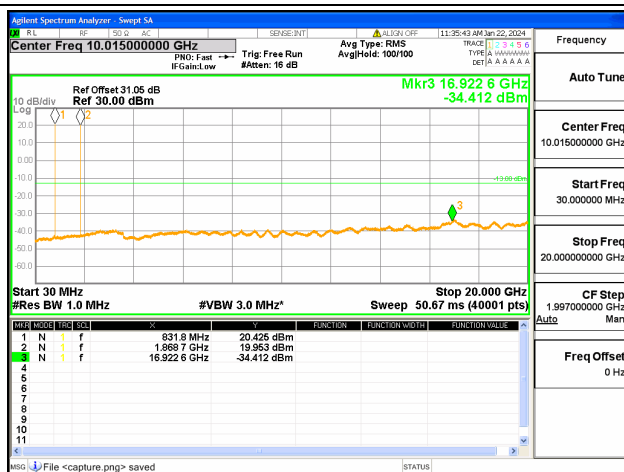
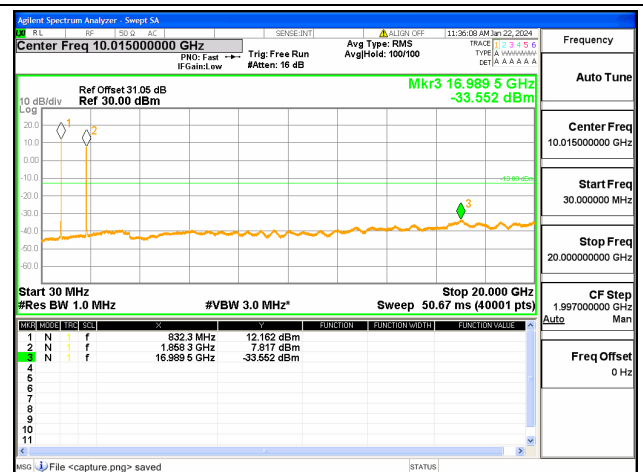


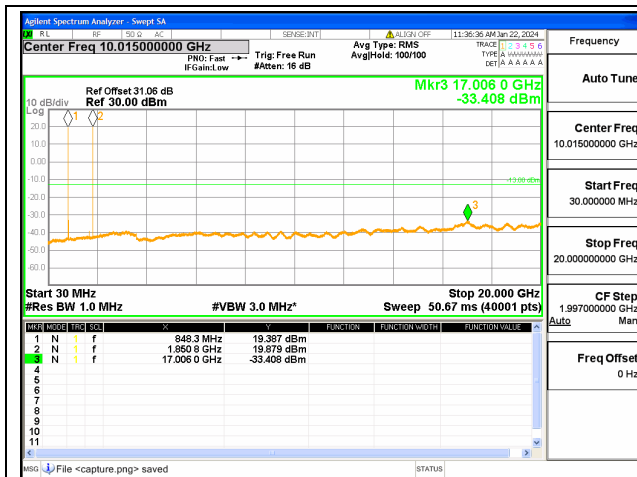
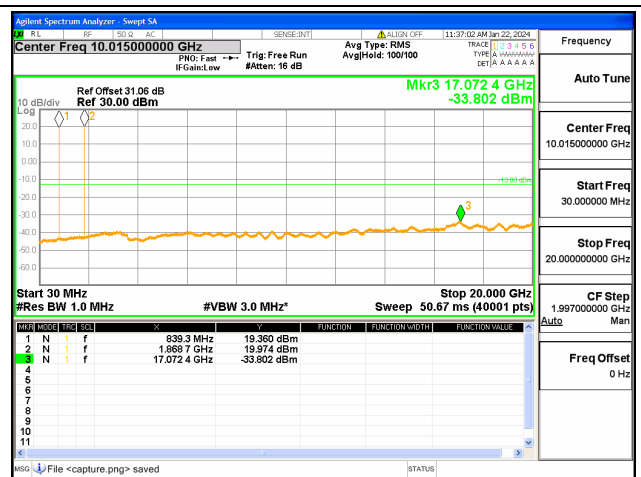
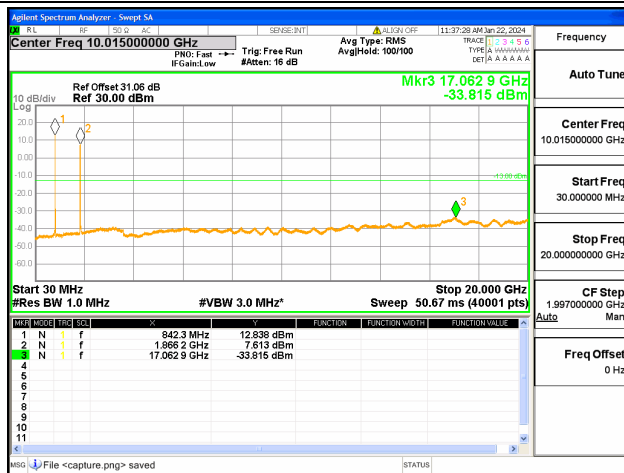
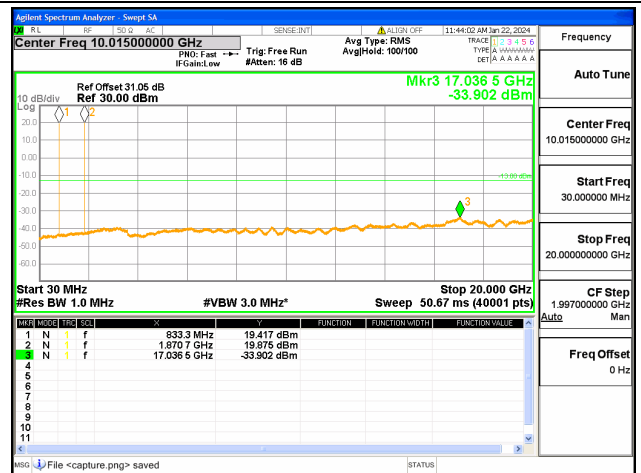
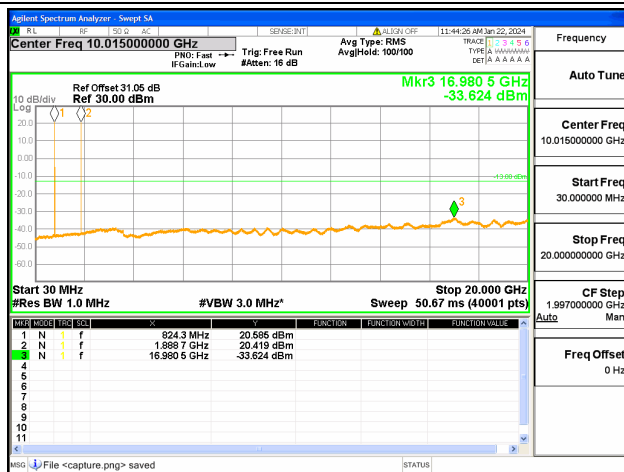
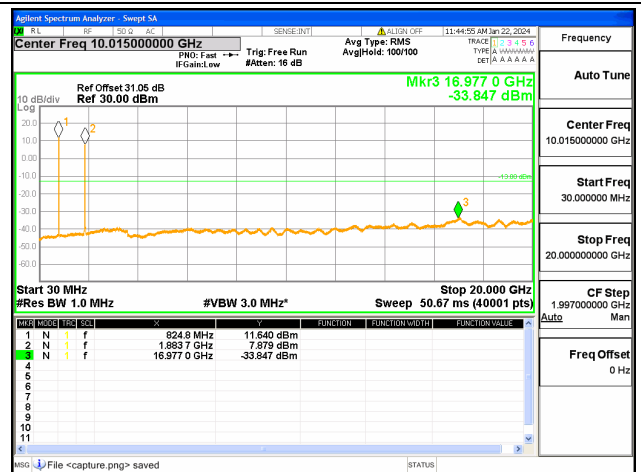
2A-4A / 20+20MHz / QPSK / High+High CH /
1@99-1@0

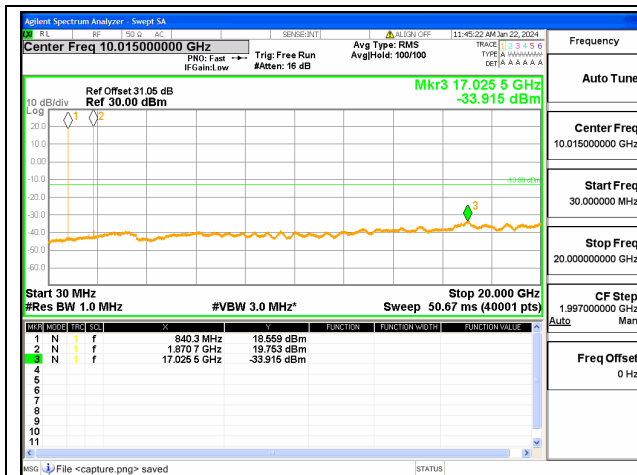


2A-4A / 20+20MHz / QPSK / High+High CH /
100@0-100@0

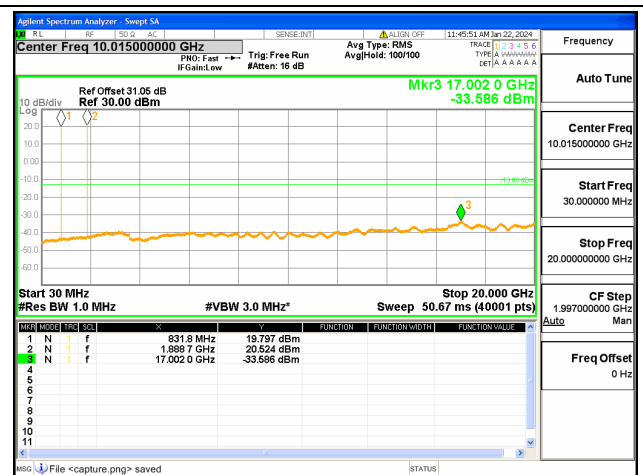
N/A

2A-5A / 20+10MHz / QPSK / Low+Low CH /
1@0-1@492A-5A / 20+10MHz / QPSK / Low+Low CH /
1@99-1@02A-5A / 20+10MHz / QPSK / Low+Low CH /
100@0-50@02A-5A / 20+10MHz / QPSK / Low+Mid CH /
1@0-1@492A-5A / 20+10MHz / QPSK / Low+Mid CH /
1@99-1@02A-5A / 20+10MHz / QPSK / Low+Mid CH /
100@0-50@0

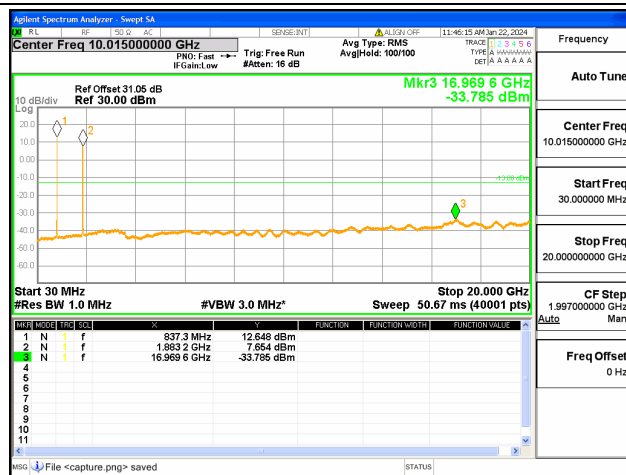
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1@0-1@492A-5A / 20+10MHz / QPSK / Low+High CH /
1@99-1@02A-5A / 20+10MHz / QPSK / Low+High CH /
100@0-50@02A-5A / 20+10MHz / QPSK / Mid+Low CH /
1@0-1@492A-5A / 20+10MHz / QPSK / Mid+Low CH /
1@99-1@02A-5A / 20+10MHz / QPSK / Mid+Low CH /
100@0-50@0



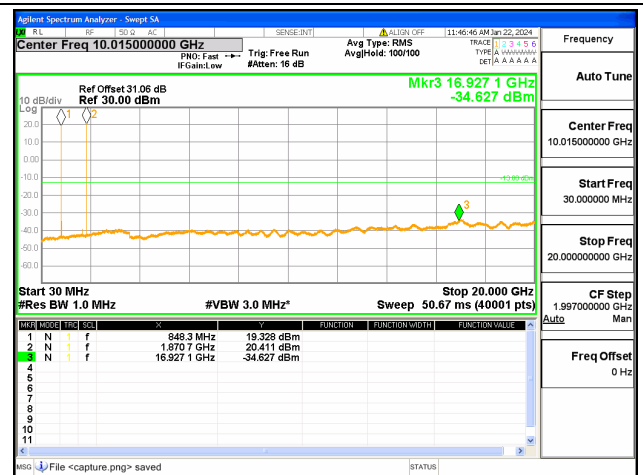
2A-5A / 20+10MHz / QPSK / Mid+Mid CH /
1@0-1@49



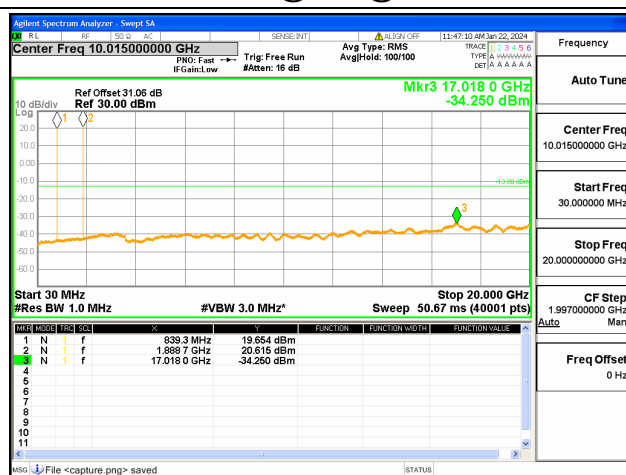
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1@99-1@0



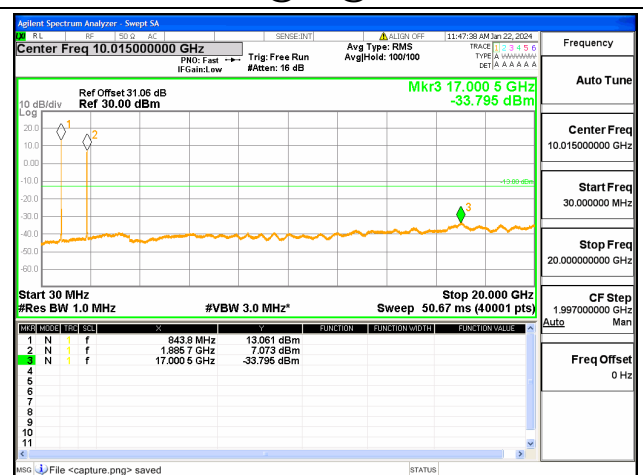
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100@0-50@0



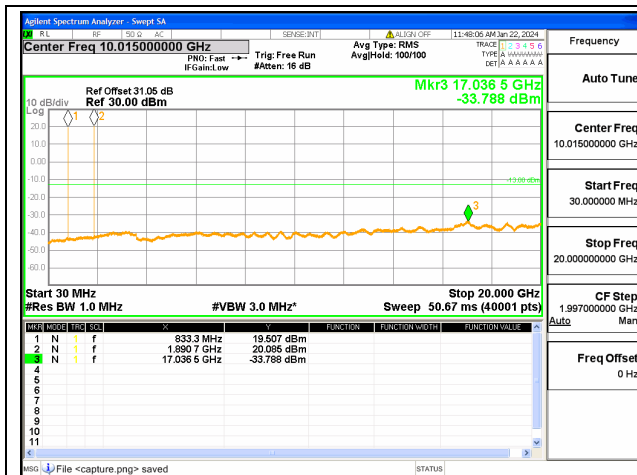
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1@0-1@49



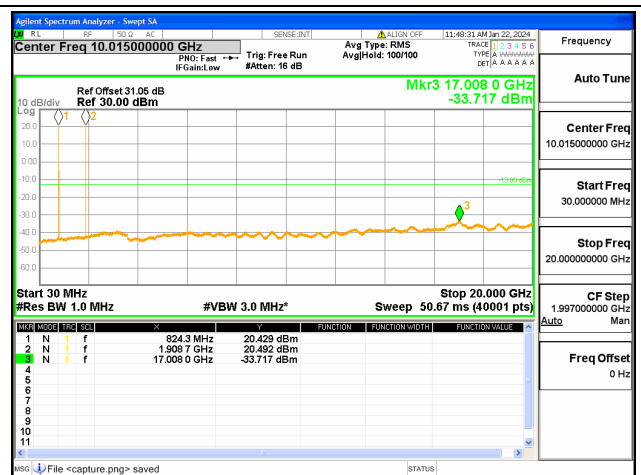
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1@99-1@0



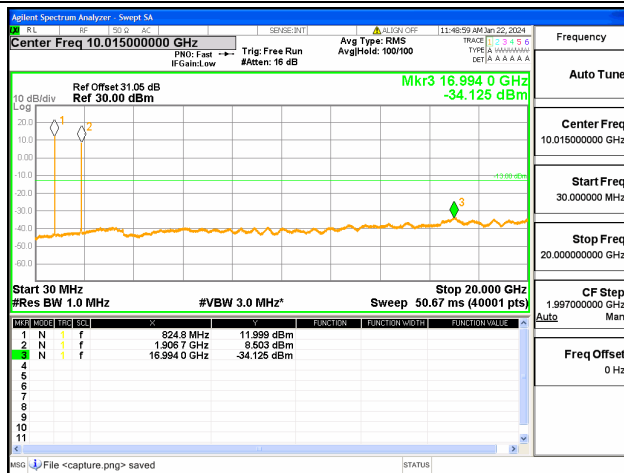
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100@0-50@0



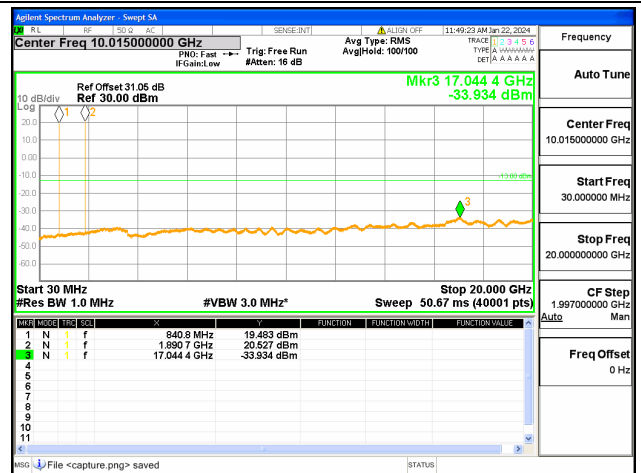
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1@0-1@49



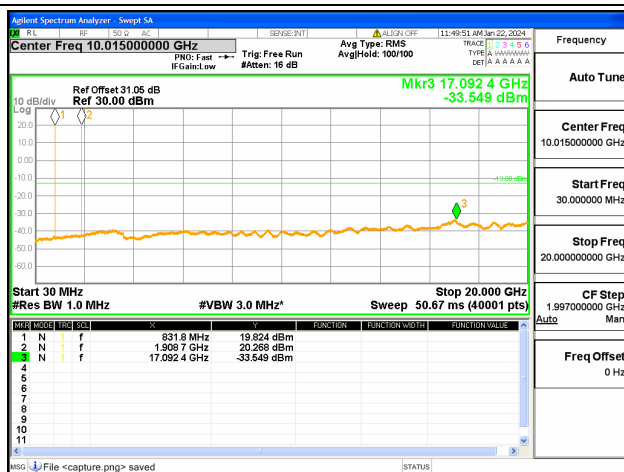
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1@99-1@0



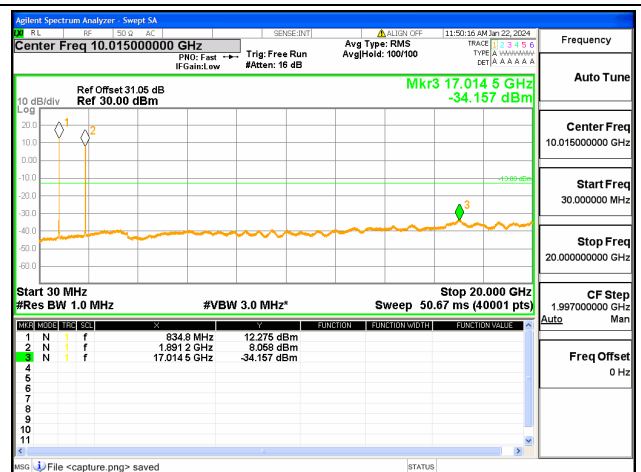
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100@0-50@0



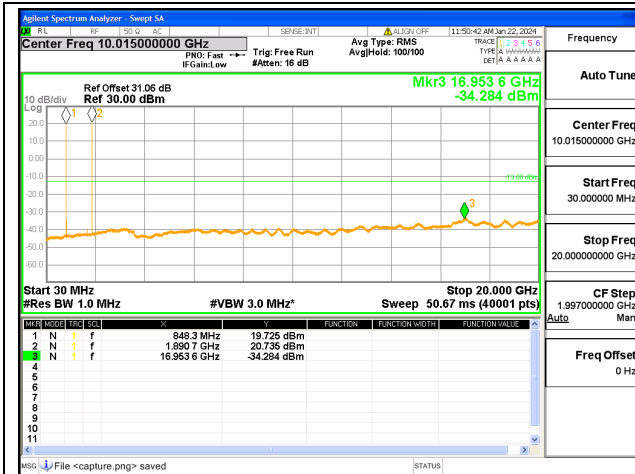
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1@0-1@49



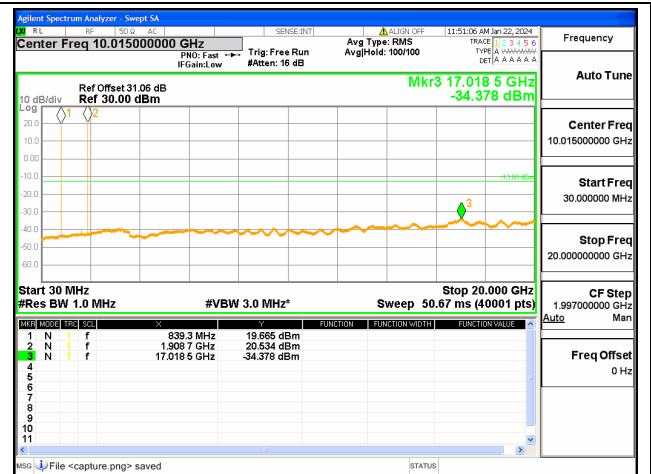
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1@99-1@0



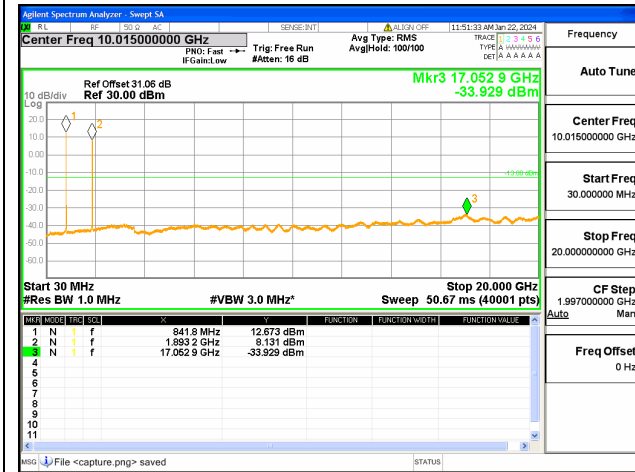
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100@0-50@0



2A-5A / 20+10MHz / QPSK / High+High CH /
1@0-1@49

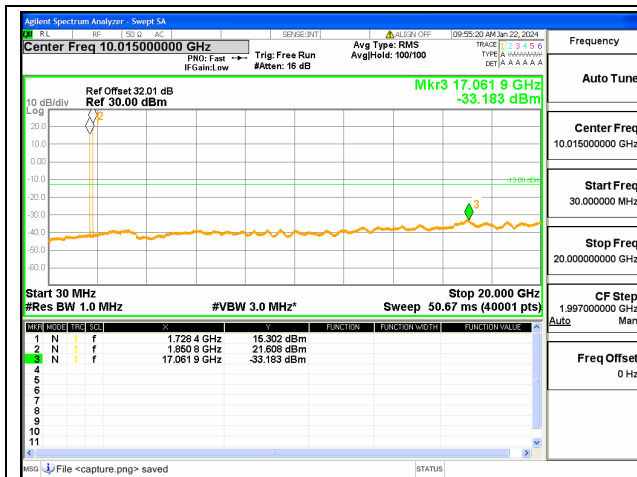


2A-5A / 20+10MHz / QPSK / High+High CH /
1@99-1@0

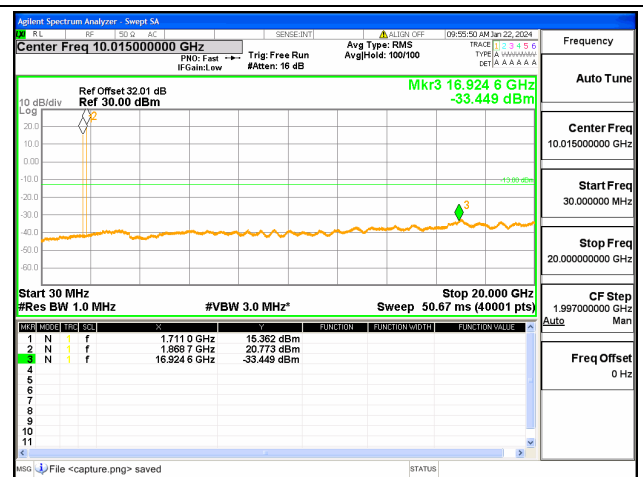


2A-5A / 20+10MHz / QPSK / High+High CH /
100@0-50@0

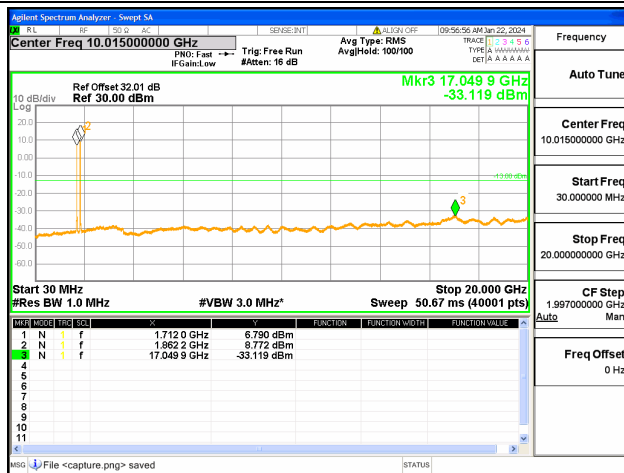
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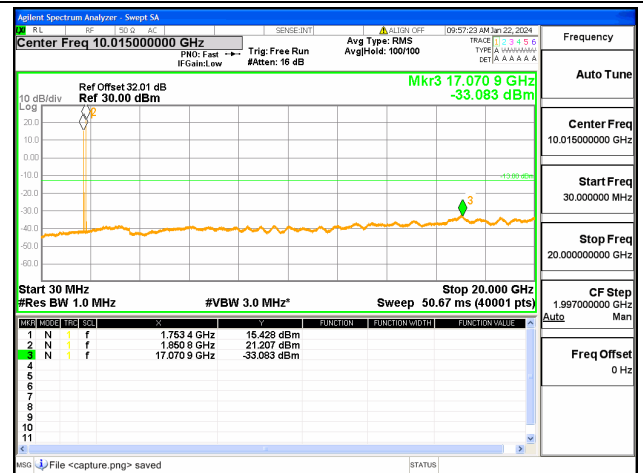
2A-66A / 20+20MHz / QPSK / Low+Low CH /
1@0-1@99



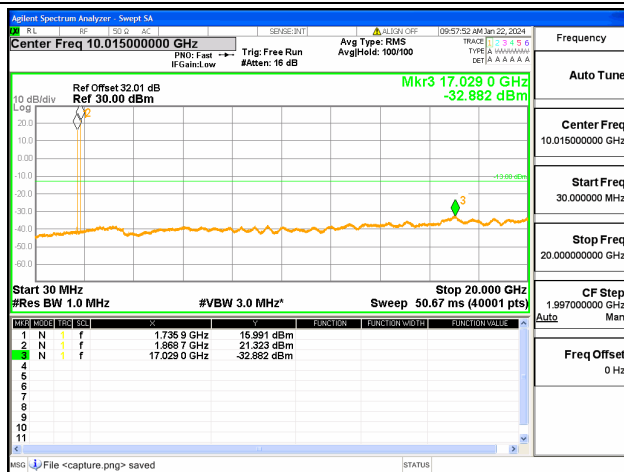
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1@99-1@0



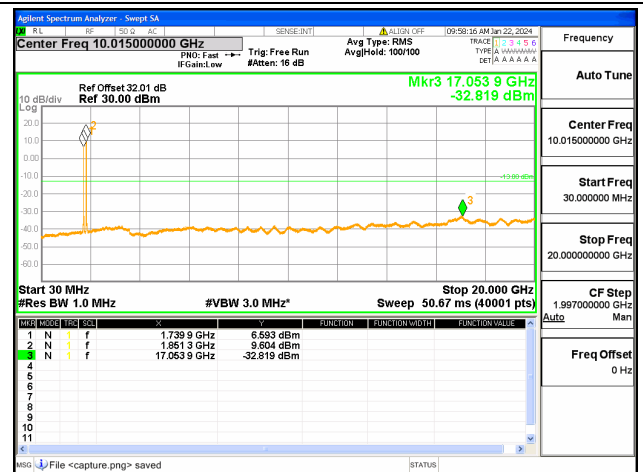
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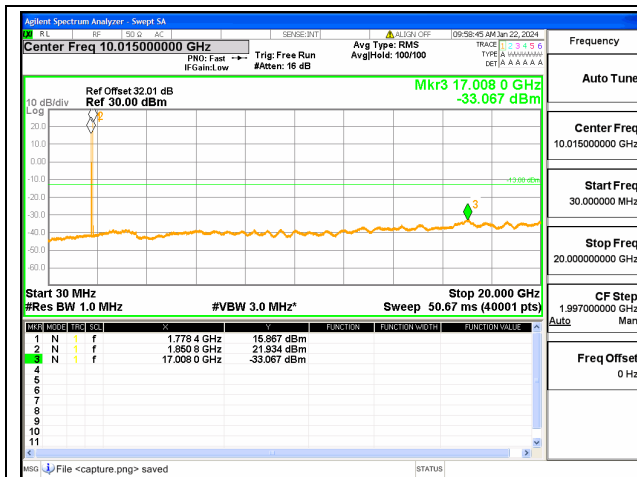
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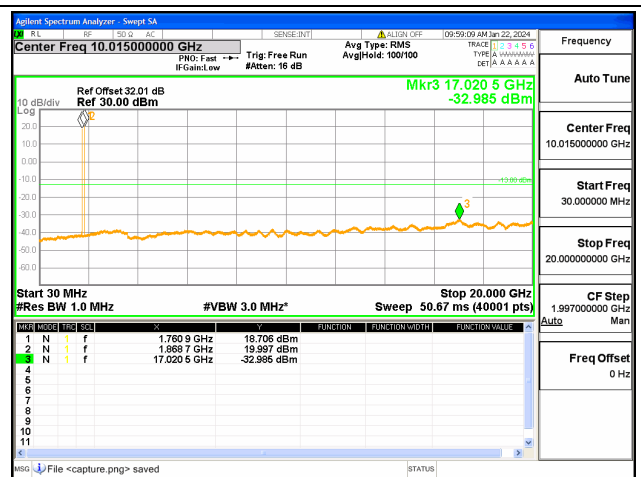
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1@99-1@0



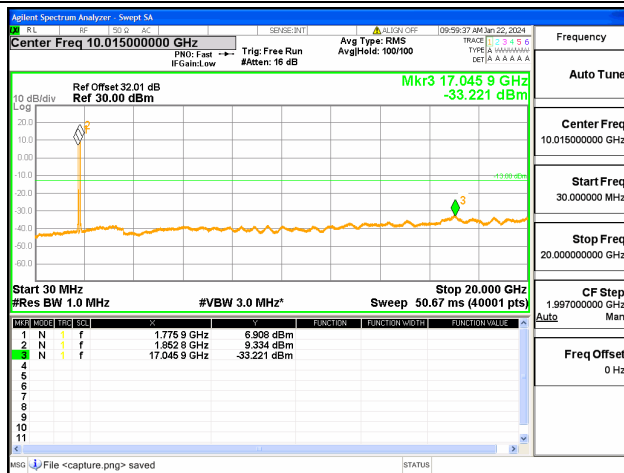
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100@0-100@0



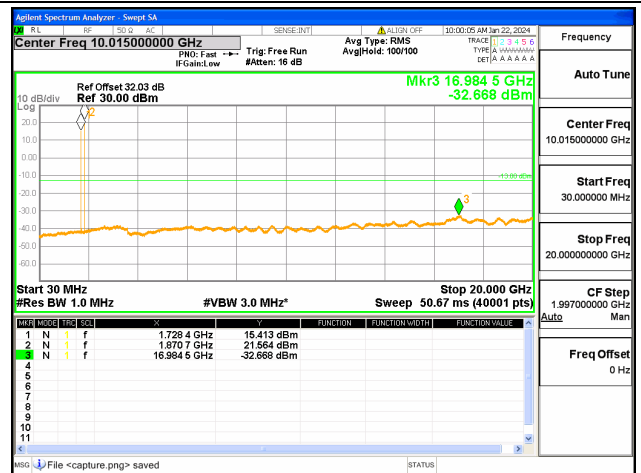
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1@0-1@99



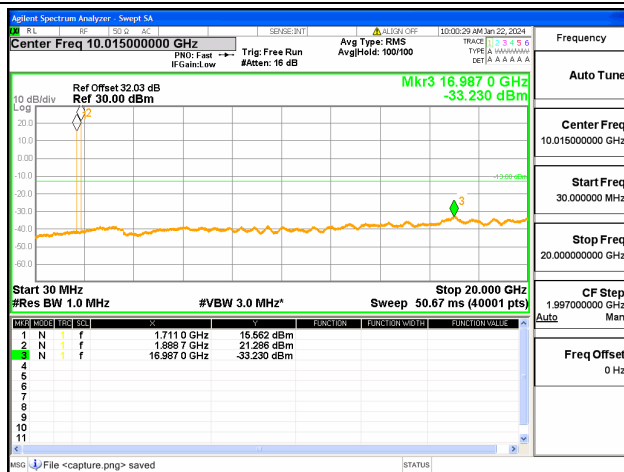
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1@99-1@0



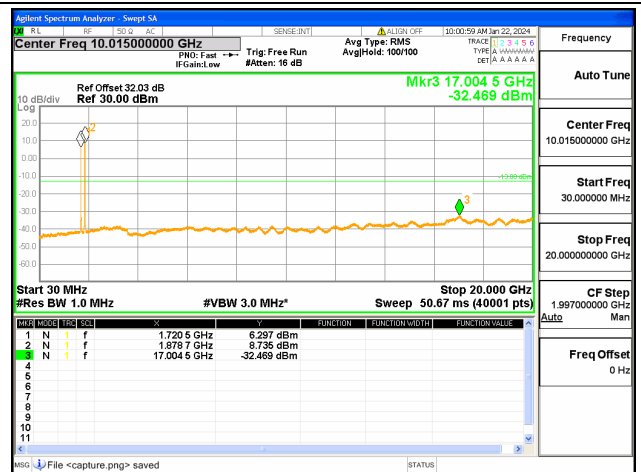
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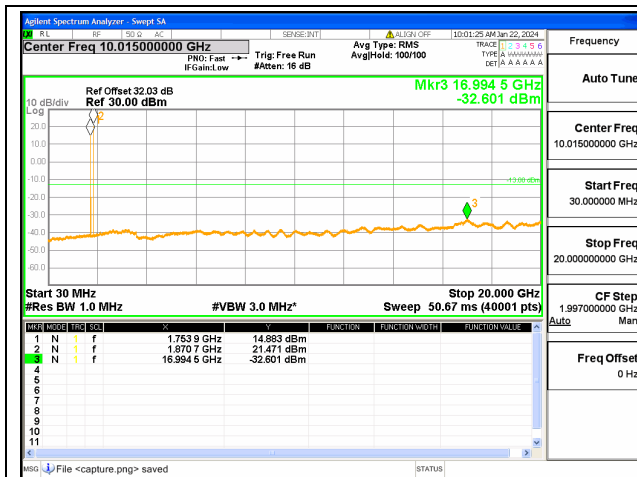
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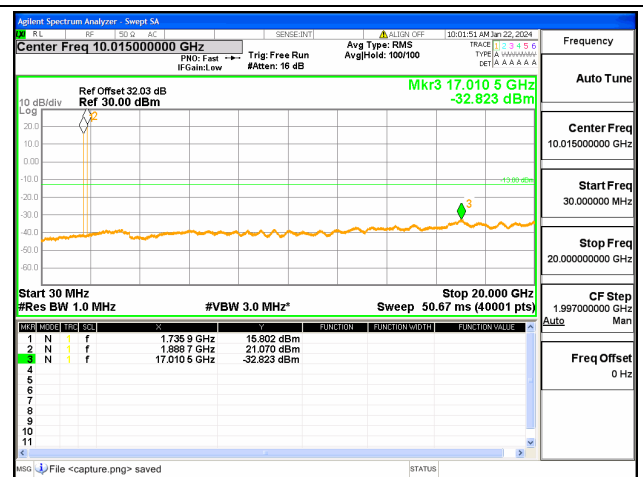
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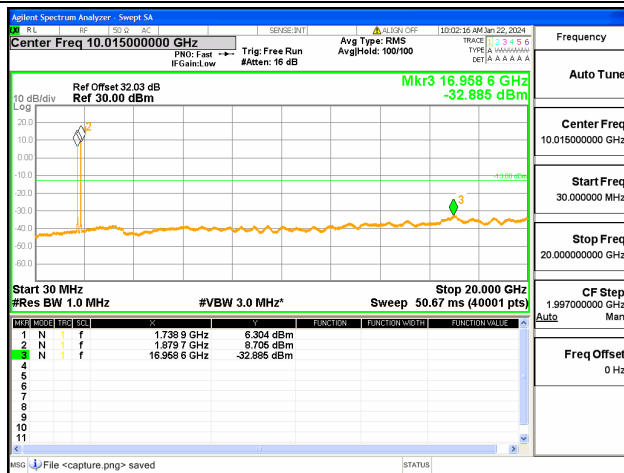
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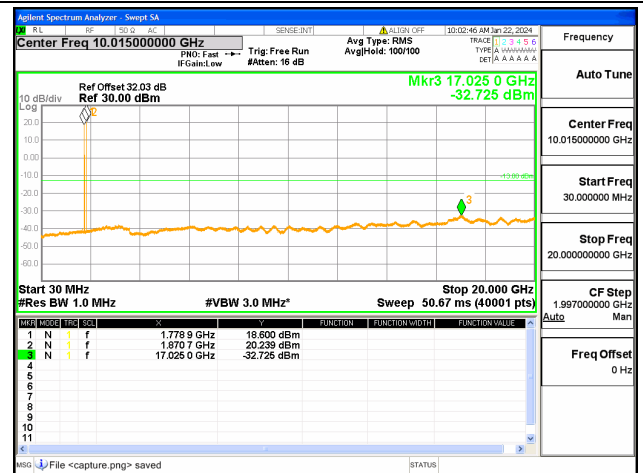
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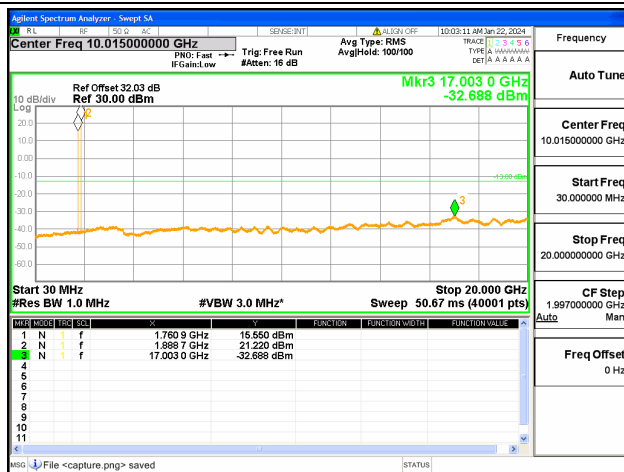
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1@99-1@0



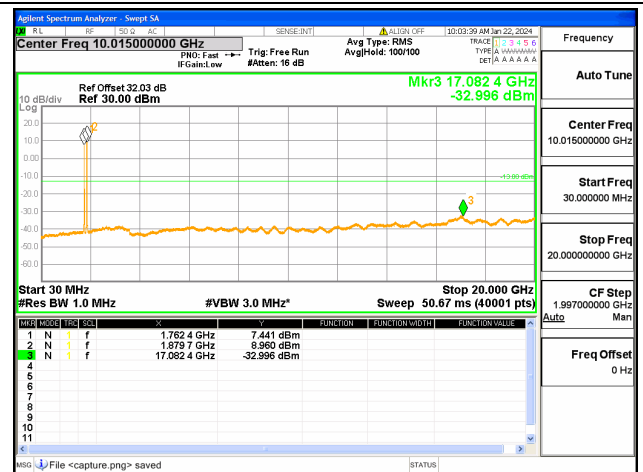
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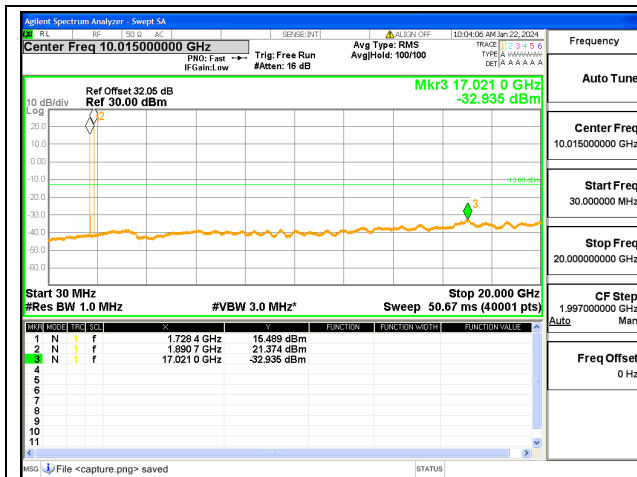
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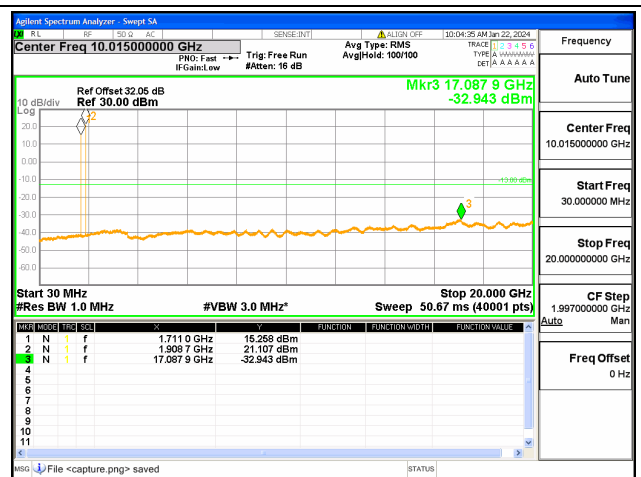
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1@99-1@0



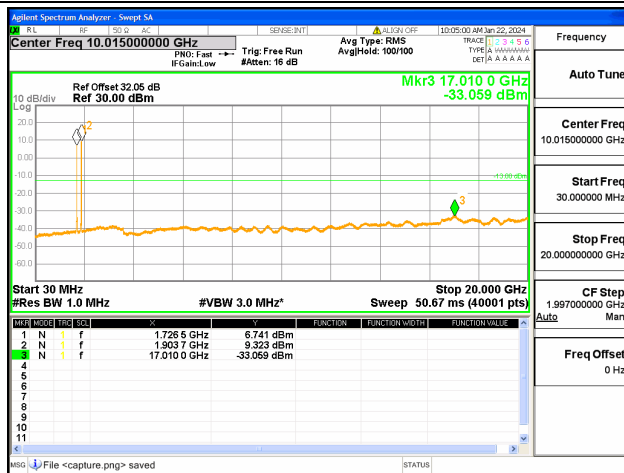
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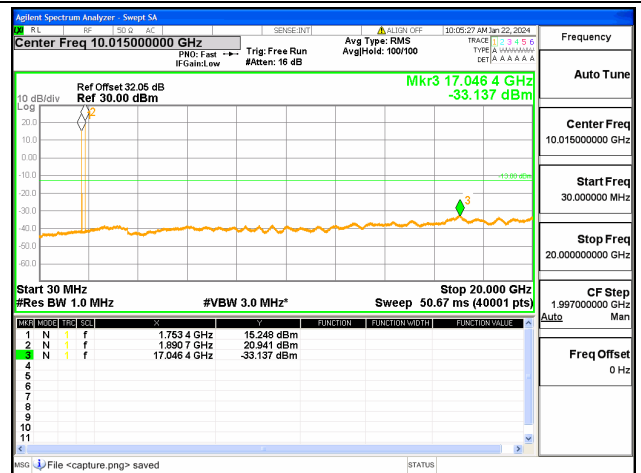
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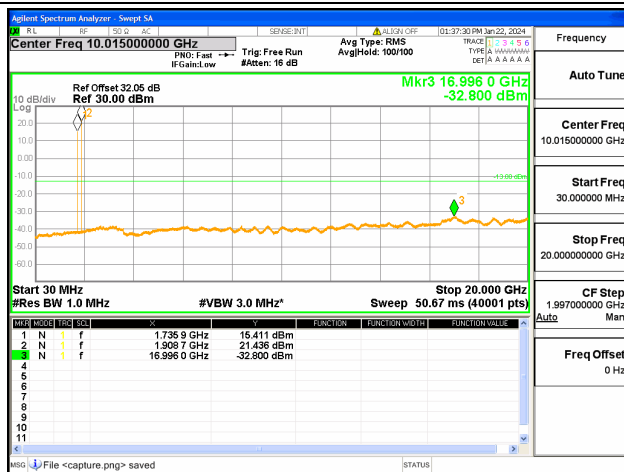
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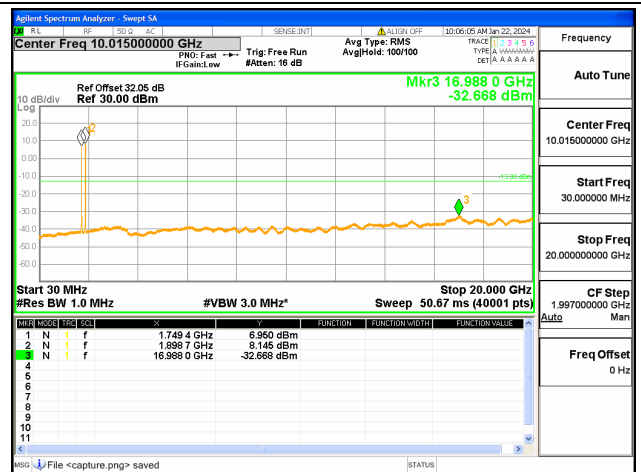
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100@0-100@0



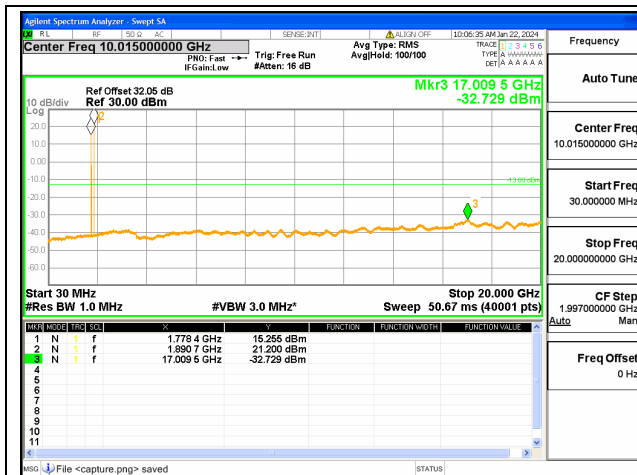
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1@0-1@99



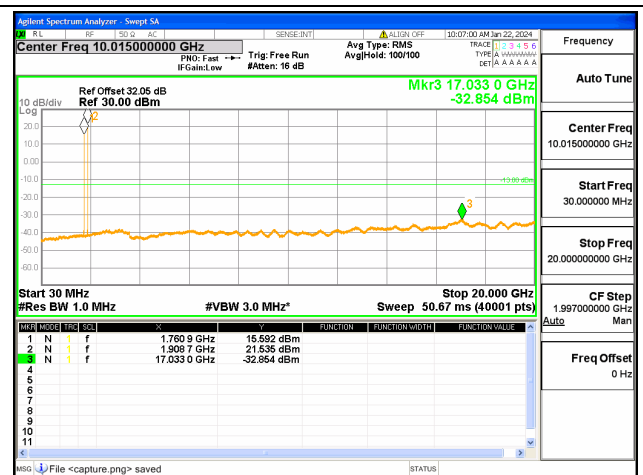
2A-66A / 20+20MHz / QPSK / High+Mid CH /
1@99-1@0



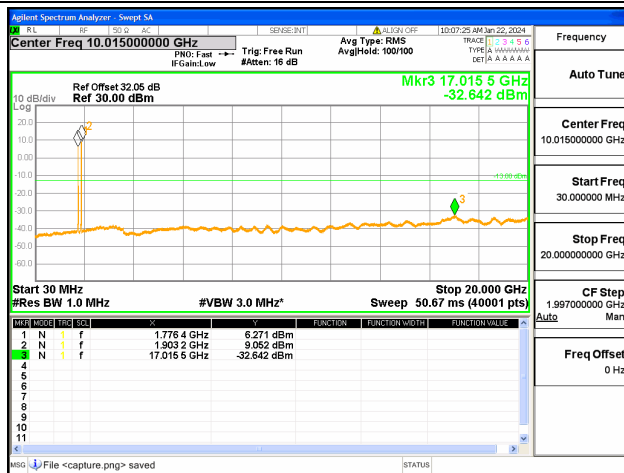
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100@0-100@0



2A-66A / 20+20MHz / QPSK / High+High CH /
1@0-1@99

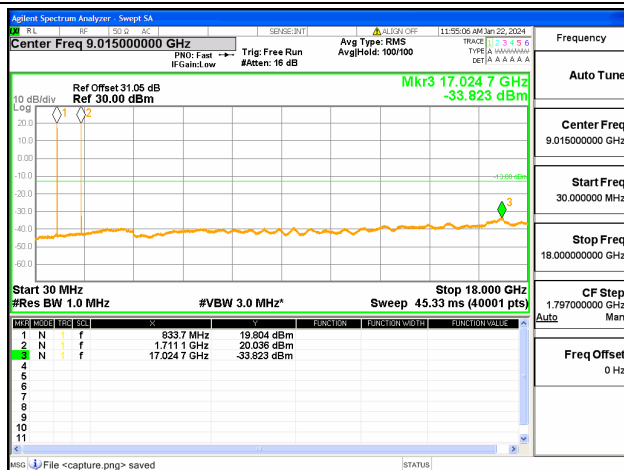


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1@99-1@0

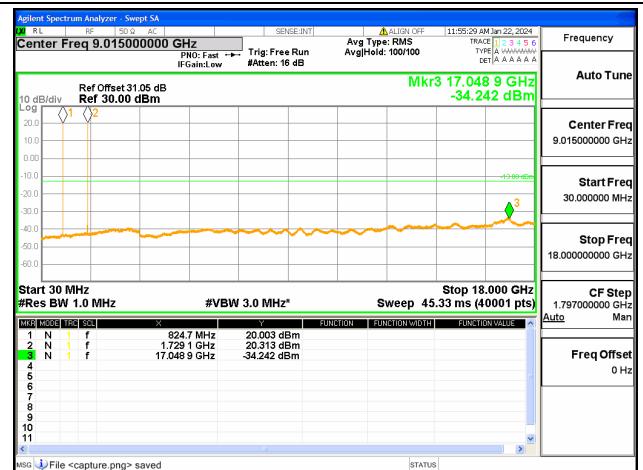


2A-66A / 20+20MHz / QPSK / High+High CH /
100@0-100@0

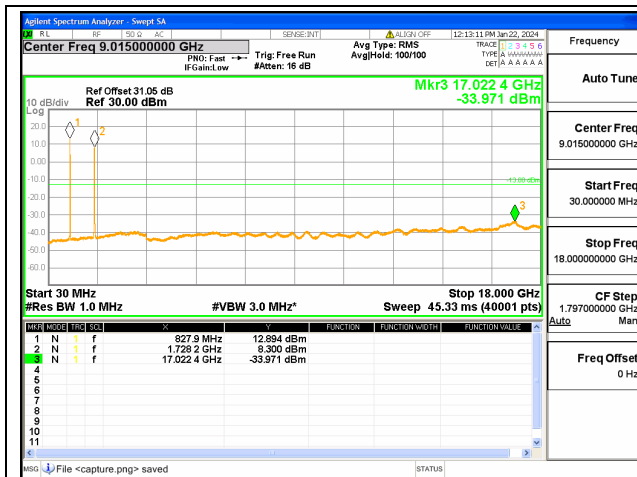
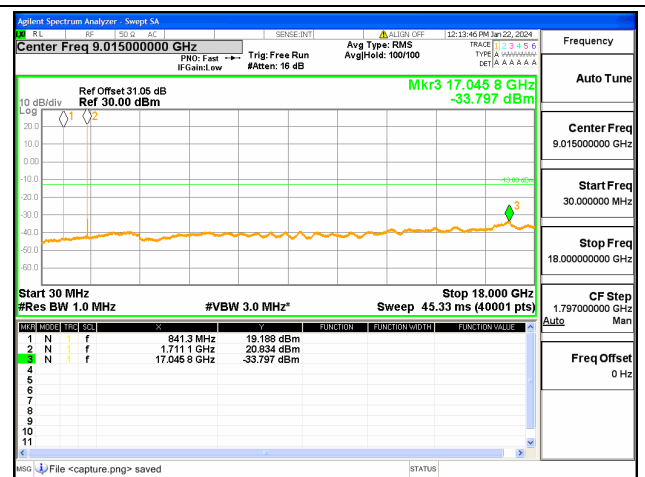
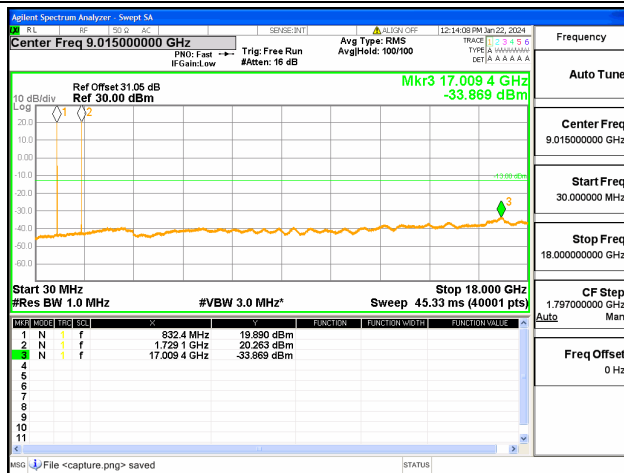
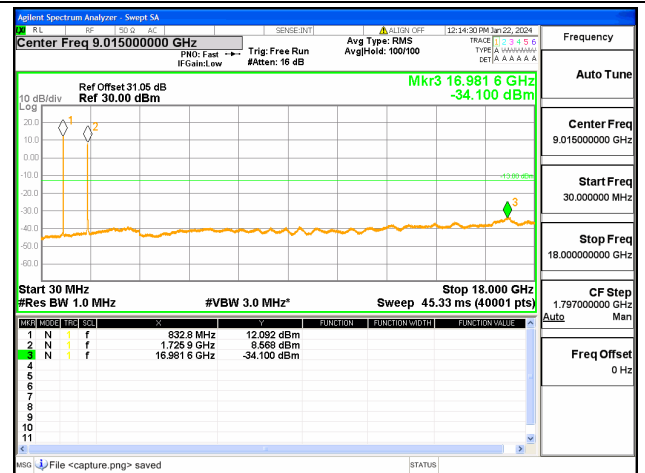
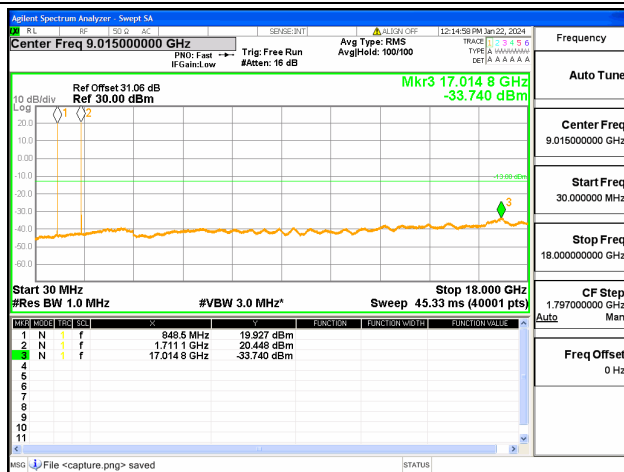
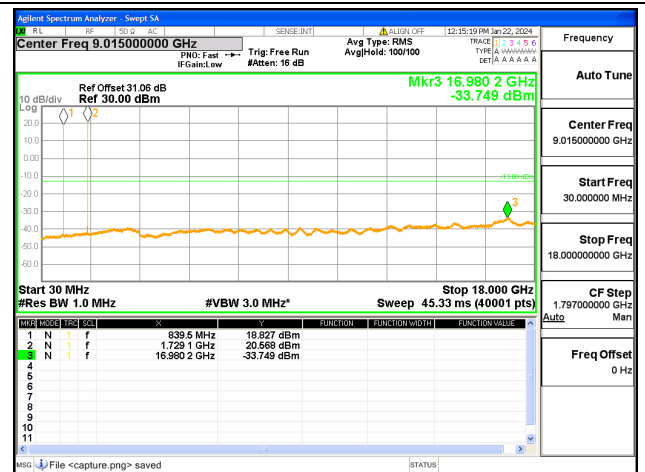
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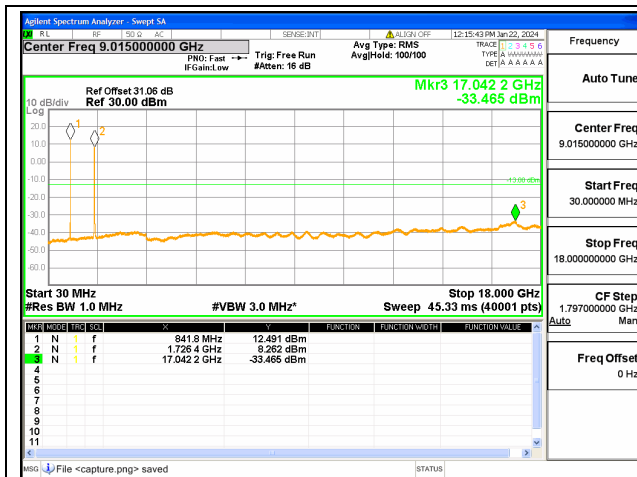
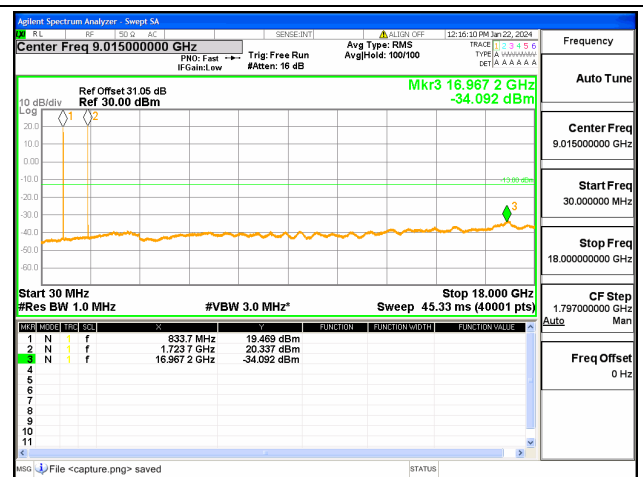
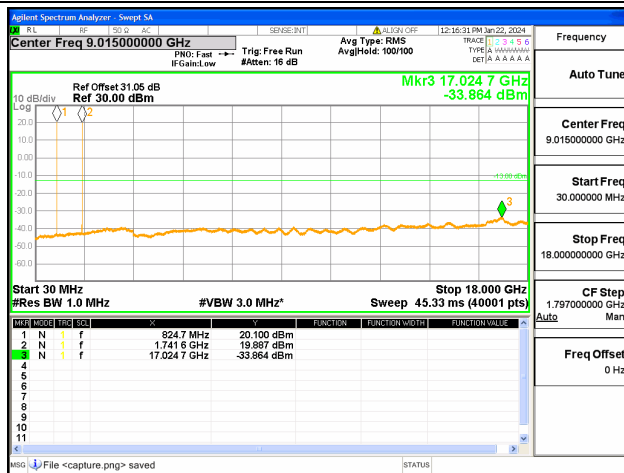
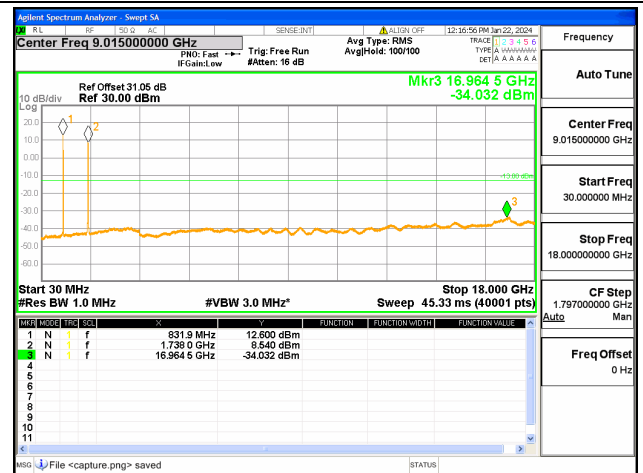
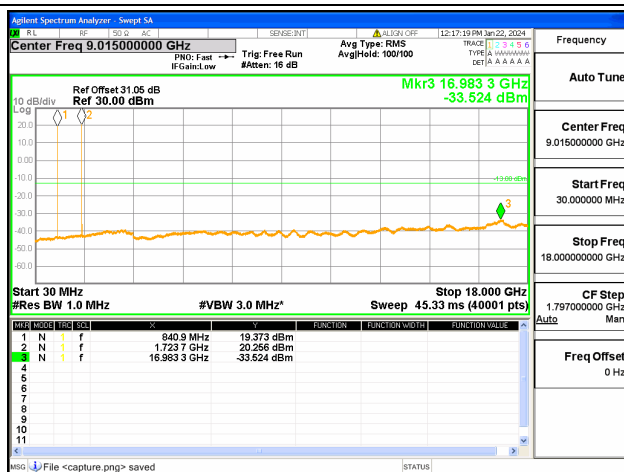
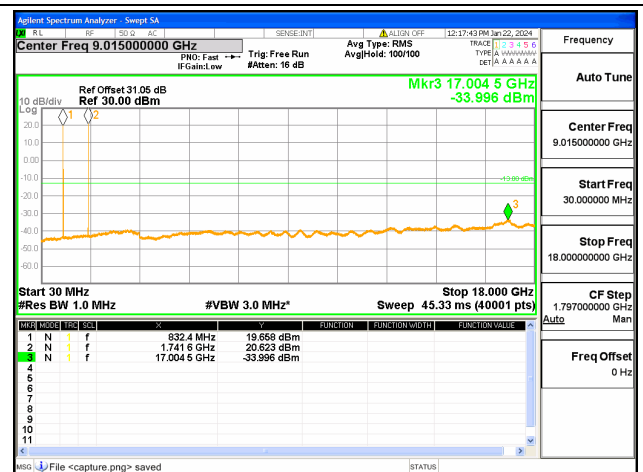


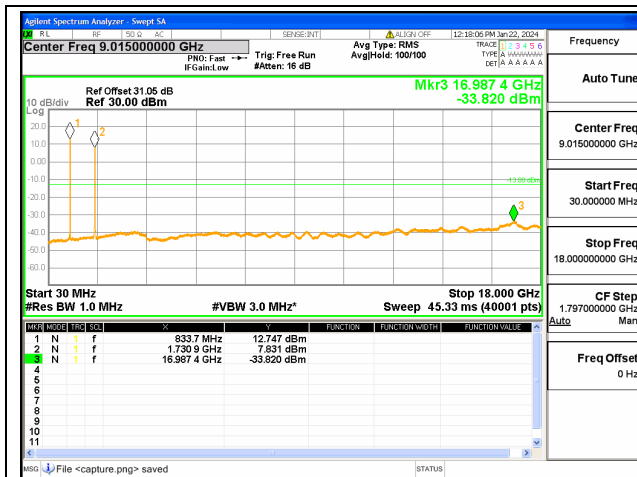
4A-5A / 20+10MHz / QPSK / Low+Low CH /
1@0-1@49



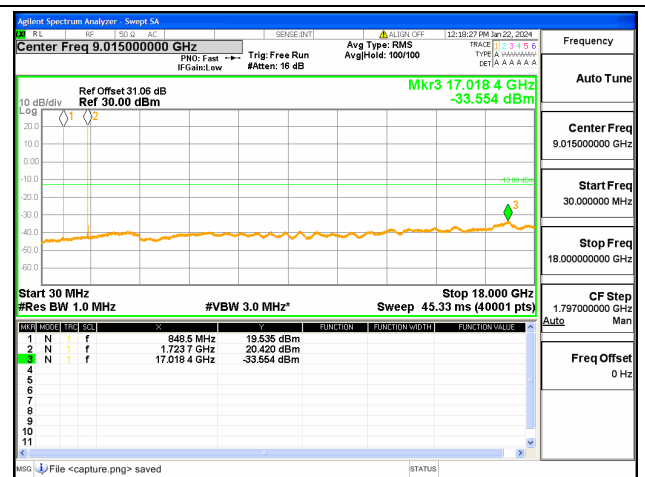
4A-5A / 20+10MHz / QPSK / Low+Low CH /
1@99-1@0

4A-5A / 20+10MHz / QPSK / Low+Low CH /
100@0-50@04A-5A / 20+10MHz / QPSK / Low+Mid CH /
1@0-1@494A-5A / 20+10MHz / QPSK / Low+Mid CH /
1@99-1@04A-5A / 20+10MHz / QPSK / Low+Mid CH /
100@0-50@04A-5A / 20+10MHz / QPSK / Low+High CH /
1@0-1@494A-5A / 20+10MHz / QPSK / Low+High CH /
1@99-1@0

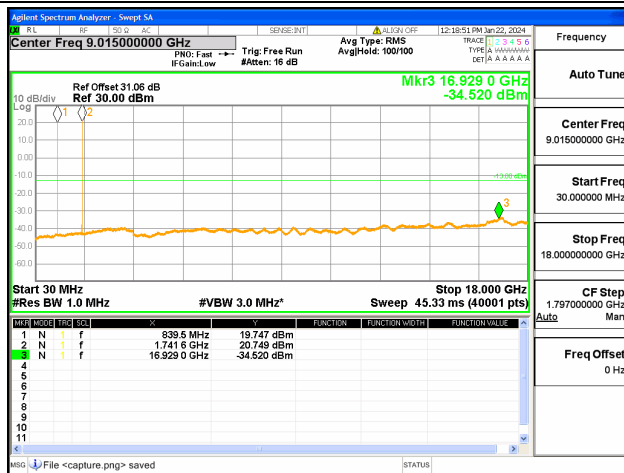
4A-5A / 20+10MHz / QPSK / Low+High CH /
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1@0-1@494A-5A / 20+10MHz / QPSK / Mid+Low CH /
1@99-1@04A-5A / 20+10MHz / QPSK / Mid+Low CH /
100@0-50@04A-5A / 20+10MHz / QPSK / Mid+Mid CH /
1@0-1@494A-5A / 20+10MHz / QPSK / Mid+Mid CH /
1@99-1@0



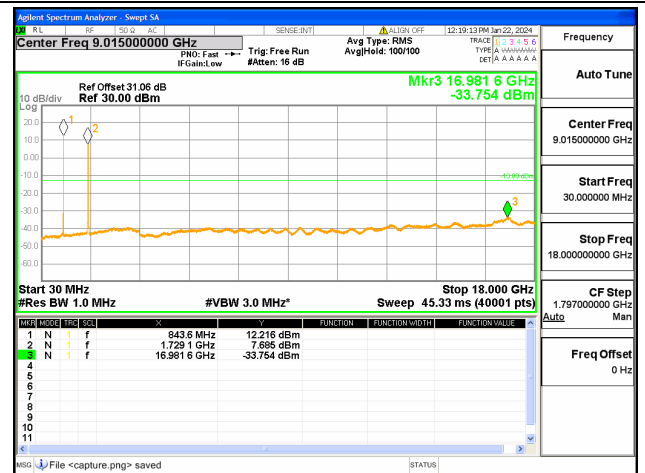
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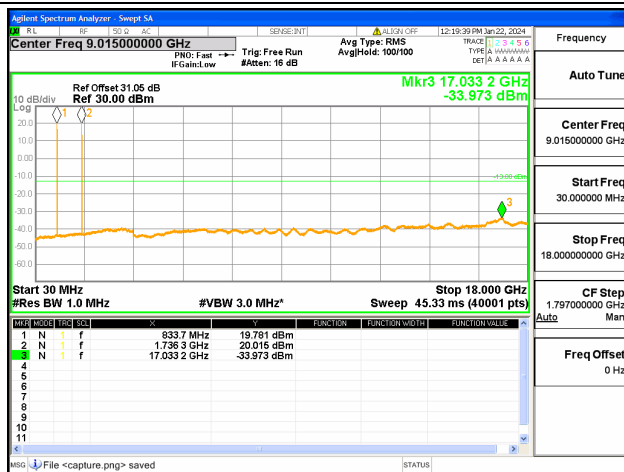
4A-5A / 20+10MHz / QPSK / Mid+High CH /
1@0-1@49



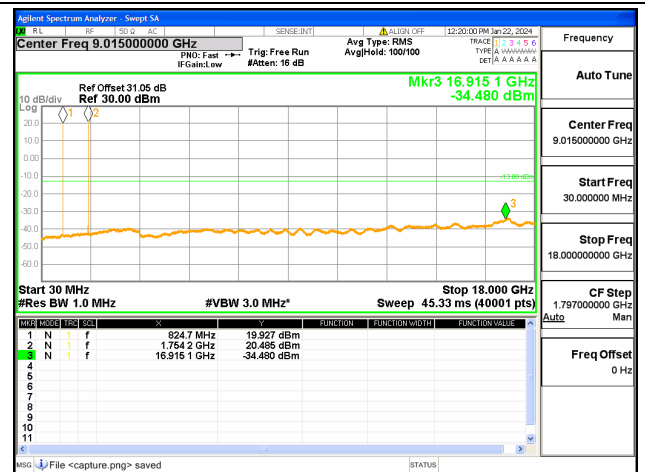
4A-5A / 20+10MHz / QPSK / Mid+High CH /
1@99-1@0



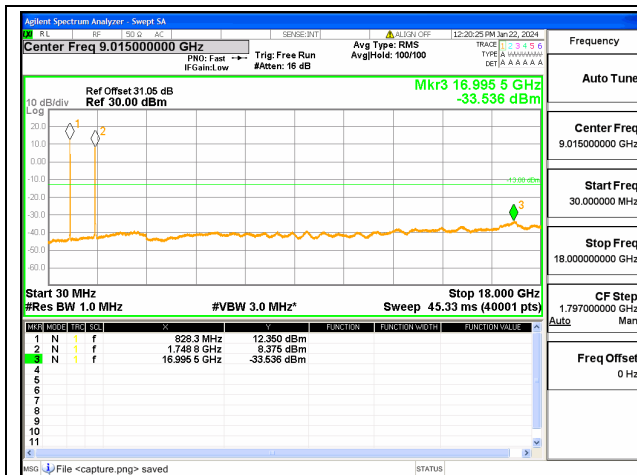
4A-5A / 20+10MHz / QPSK / Mid+High CH /
100@0-50@0



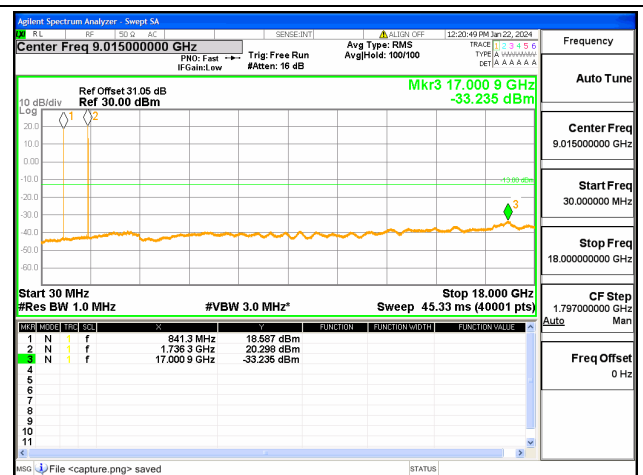
4A-5A / 20+10MHz / QPSK / High+Low CH /
1@0-1@49



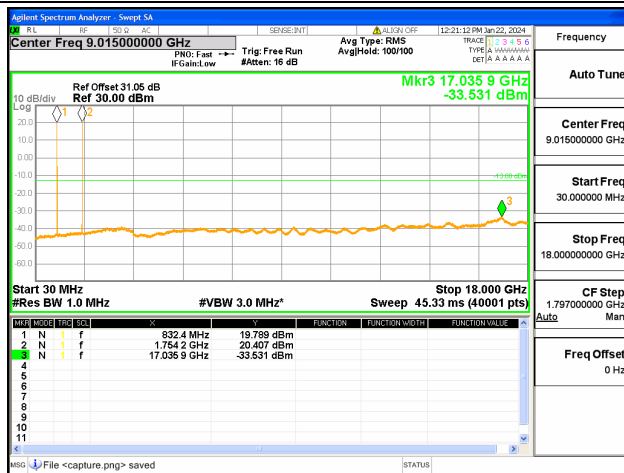
4A-5A / 20+10MHz / QPSK / High+Low CH /
1@99-1@0



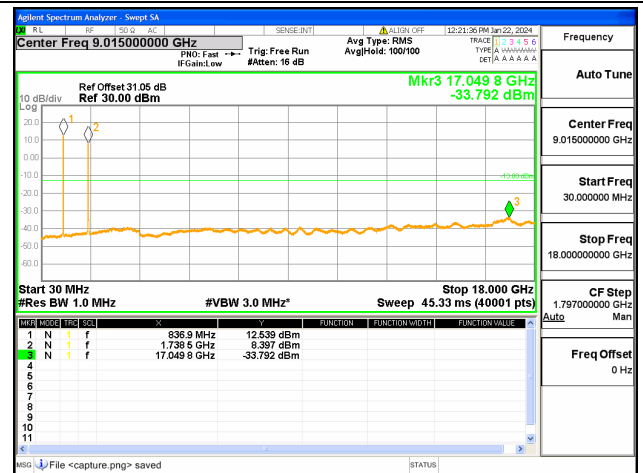
4A-5A / 20+10MHz / QPSK / High+Low CH /
100@0-50@0



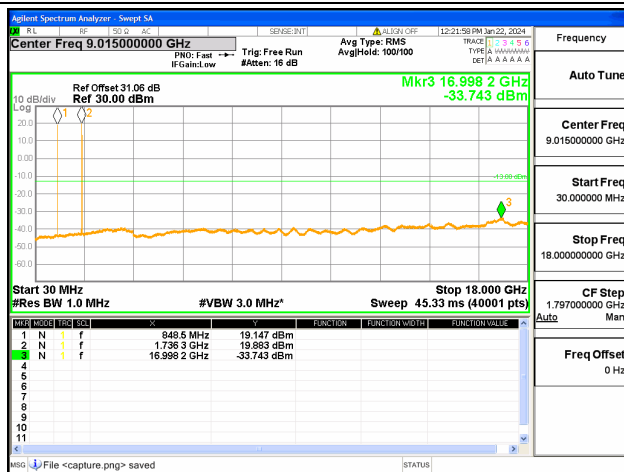
4A-5A / 20+10MHz / QPSK / High+Mid CH /
1@0-1@49



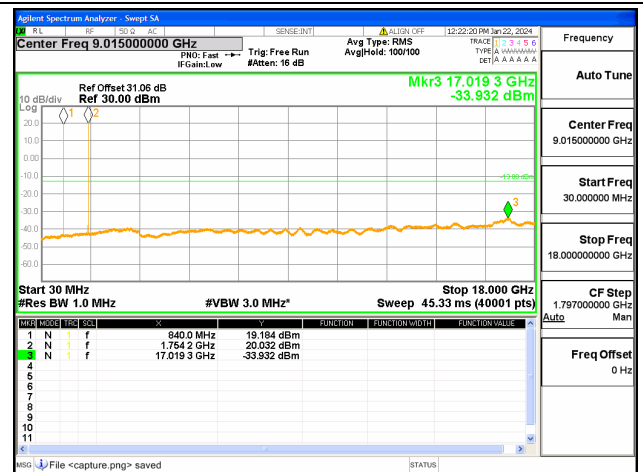
4A-5A / 20+10MHz / QPSK / High+Mid CH /
1@99-1@0



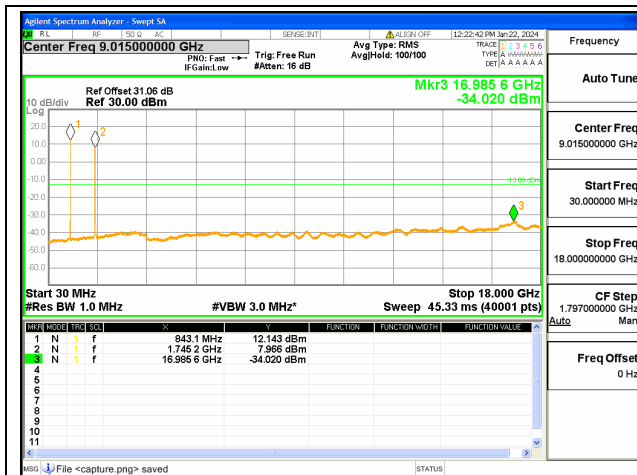
4A-5A / 20+10MHz / QPSK / High+Mid CH /
100@0-50@0



4A-5A / 20+10MHz / QPSK / High+High CH /
1@0-1@49

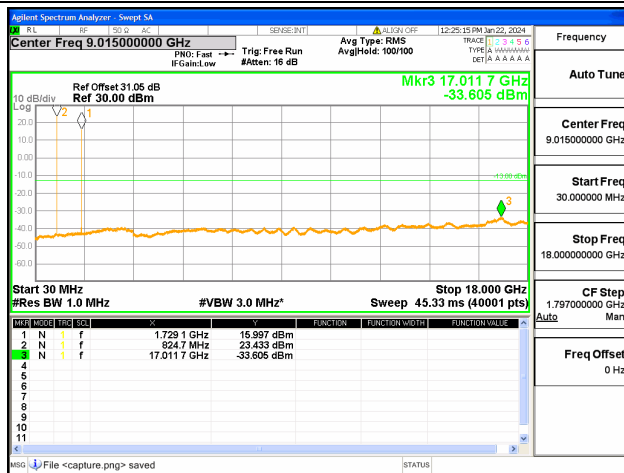


4A-5A / 20+10MHz / QPSK / High+High CH /
1@99-1@0

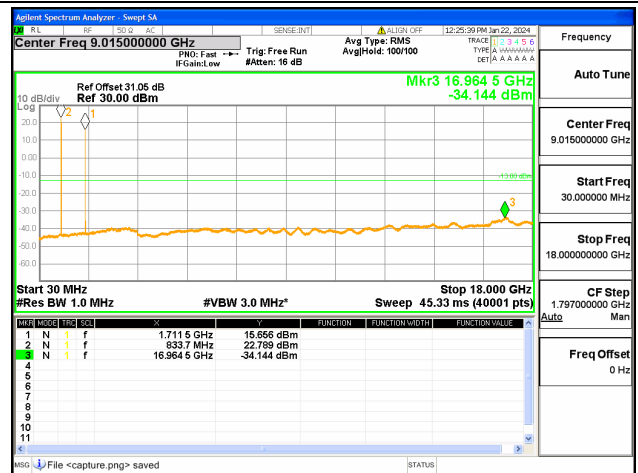


4A-5A / 20+10MHz / QPSK / High+High CH /
100@0-50@0

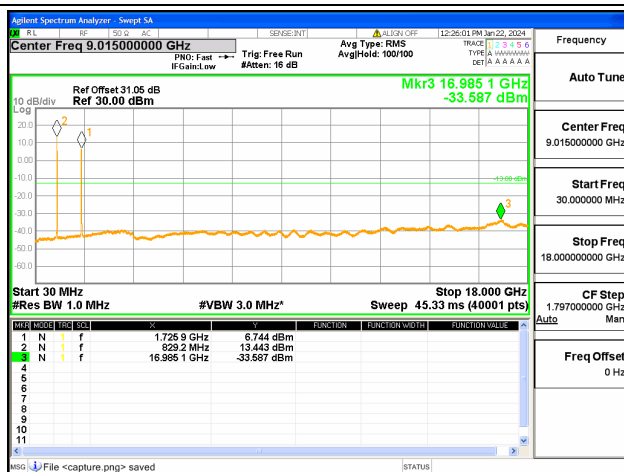
N/A



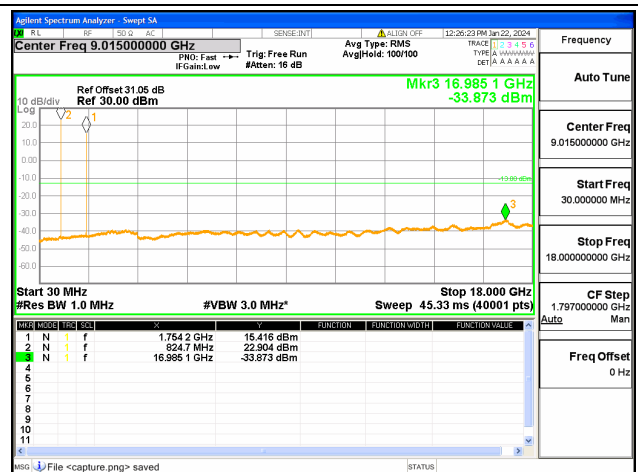
5A-66A / 10+20MHz / QPSK / Low+Low CH /
1@0-1@99



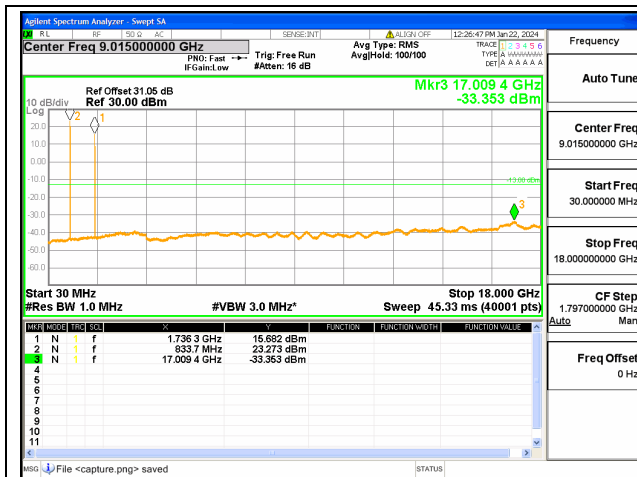
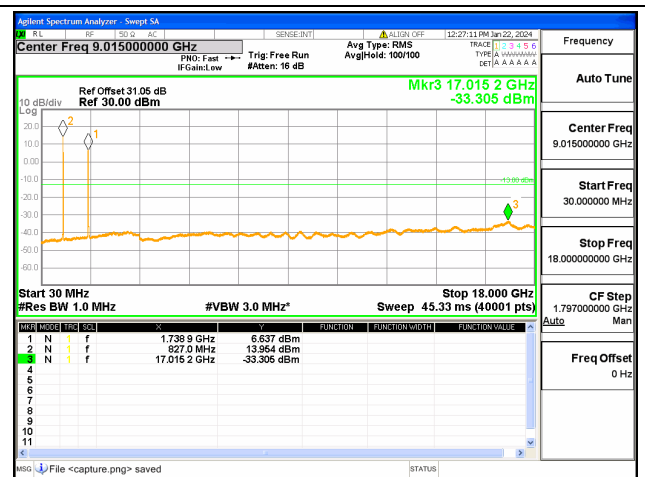
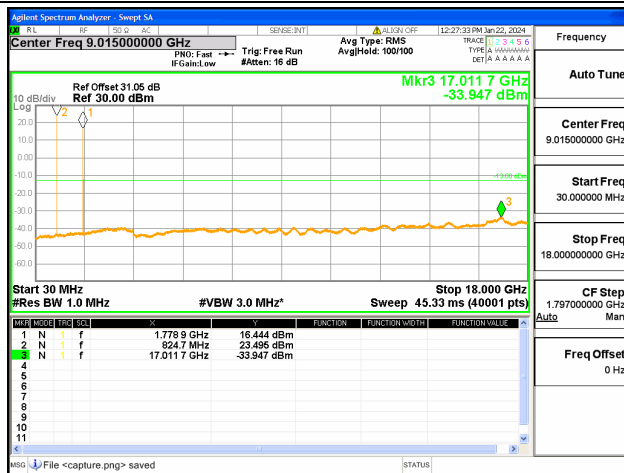
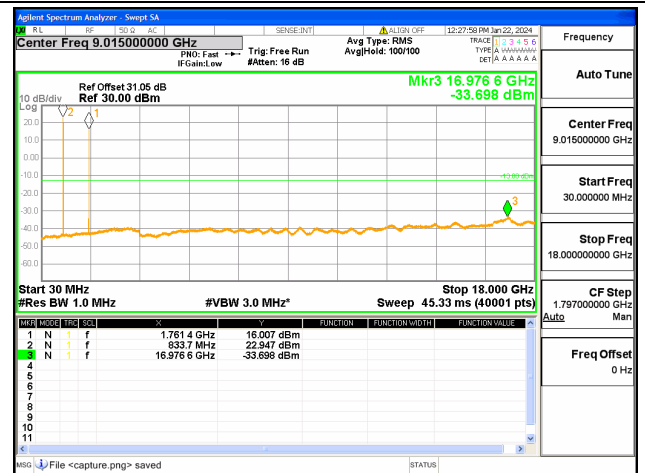
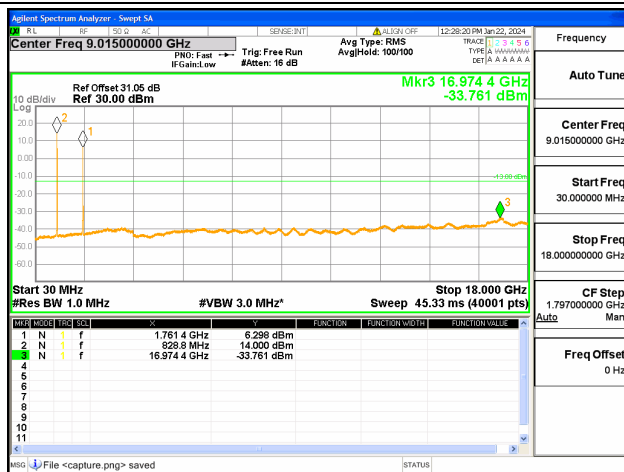
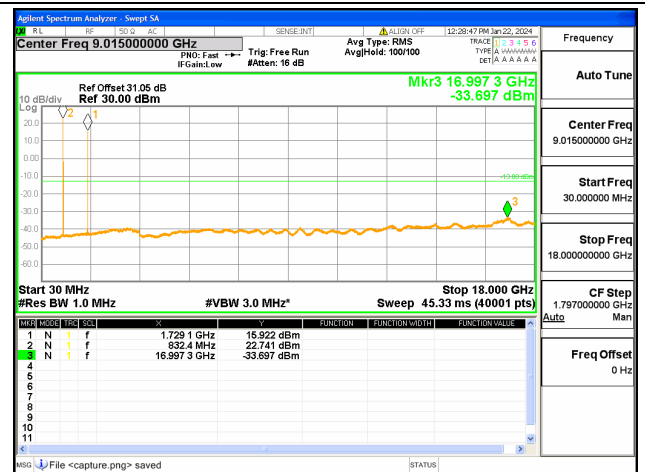
5A-66A / 10+20MHz / QPSK / Low+Low CH /
1@49-1@0

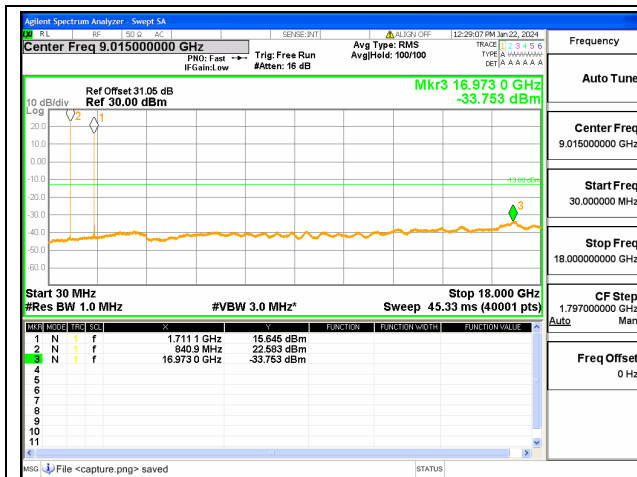


5A-66A / 10+20MHz / QPSK / Low+Low CH /
50@0-100@0

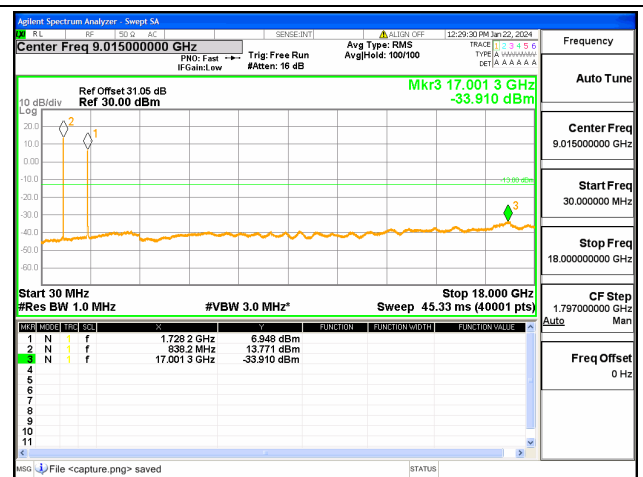


5A-66A / 10+20MHz / QPSK / Low+Mid CH /
1@0-1@99

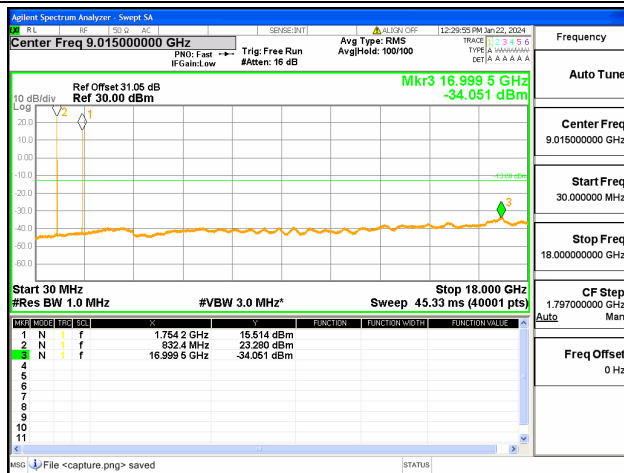
5A-66A / 10+20MHz / QPSK / Low+Mid CH /
1@49-1@05A-66A / 10+20MHz / QPSK / Low+Mid CH /
50@0-100@05A-66A / 10+20MHz / QPSK / Low+High CH /
1@0-1@995A-66A / 10+20MHz / QPSK / Low+High CH /
1@49-1@05A-66A / 10+20MHz / QPSK / Low+High CH /
50@0-100@05A-66A / 10+20MHz / QPSK / Mid+Low CH /
1@0-1@99



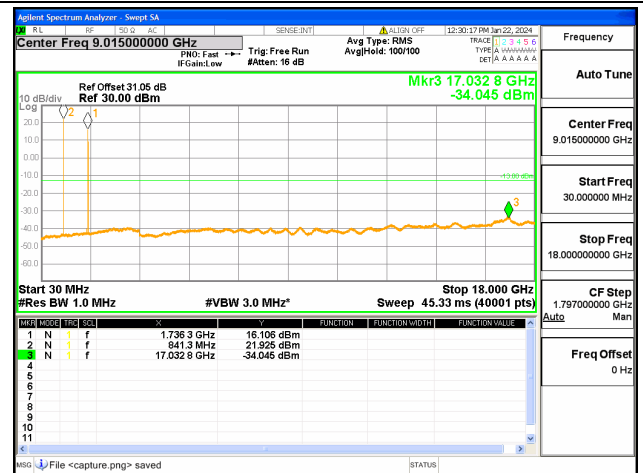
5A-66A / 10+20MHz / QPSK / Mid+Low CH /
1@49-1@0



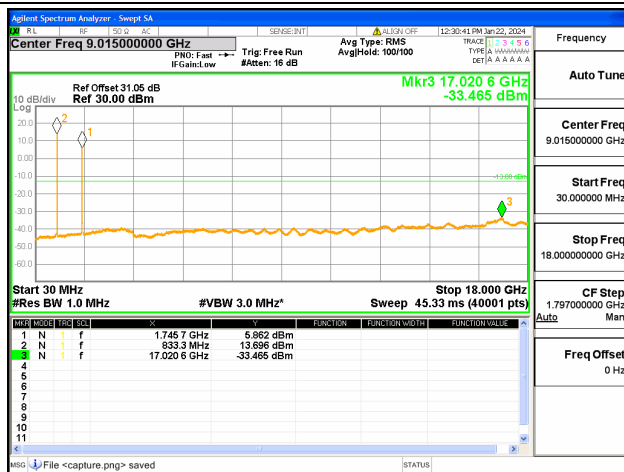
5A-66A / 10+20MHz / QPSK / Mid+Low CH /
50@0-100@0



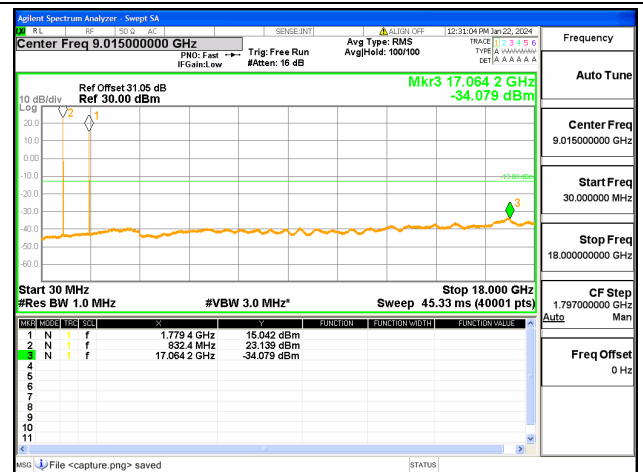
5A-66A / 10+20MHz / QPSK / Mid+Mid CH /
1@0-1@99



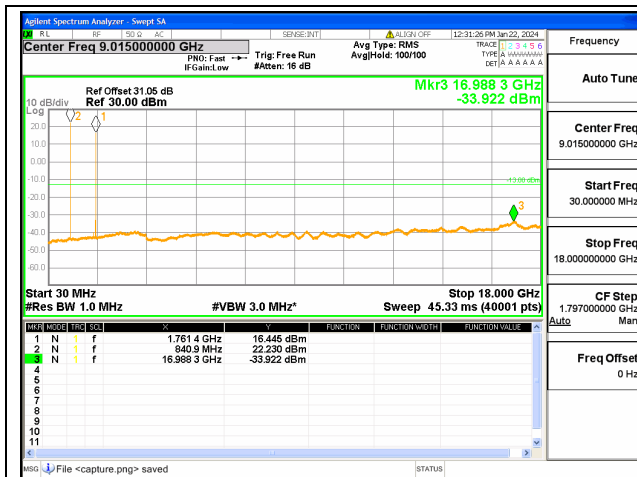
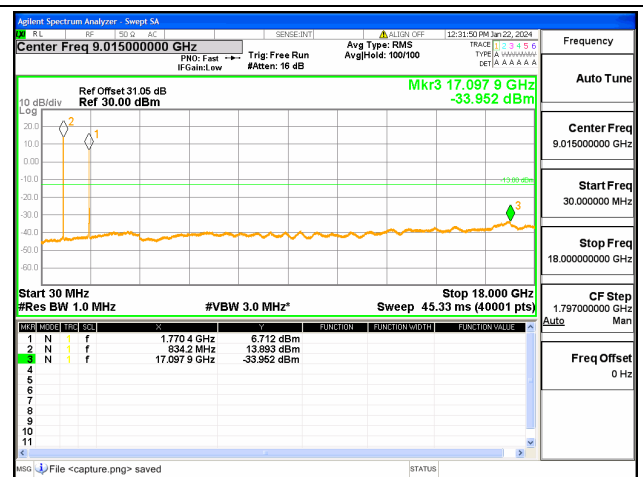
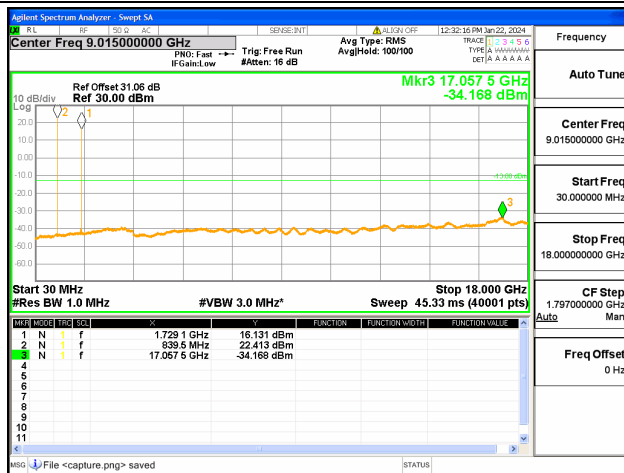
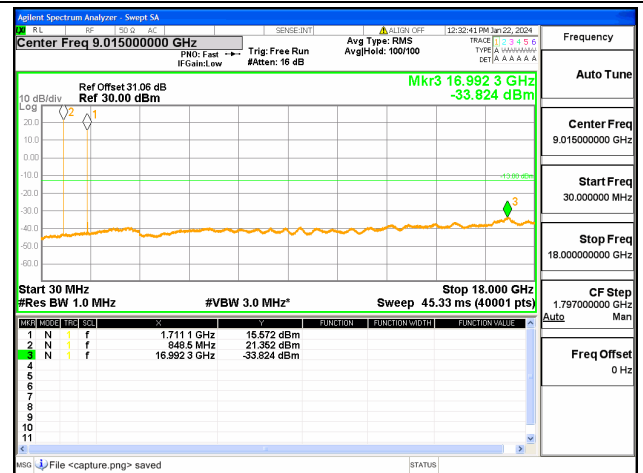
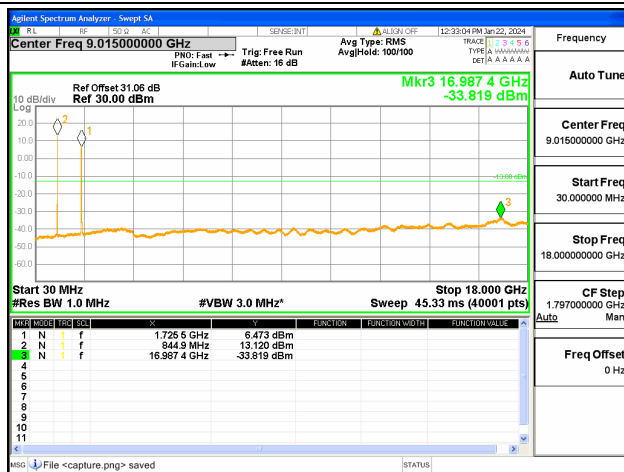
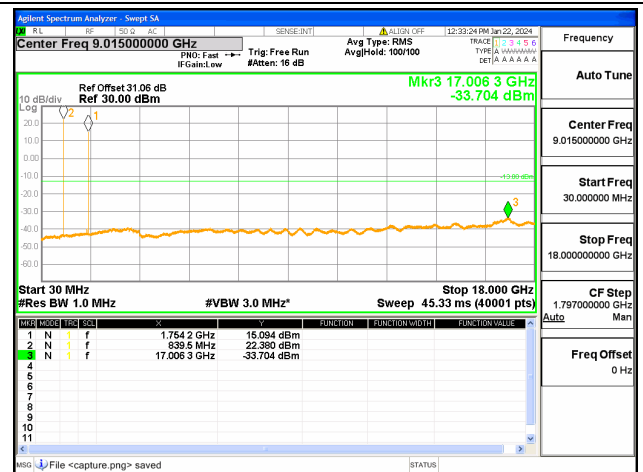
5A-66A / 10+20MHz / QPSK / Mid+Mid CH /
1@49-1@0

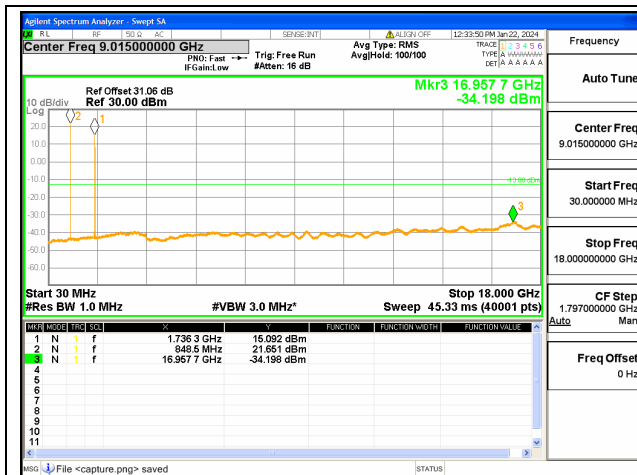


5A-66A / 10+20MHz / QPSK / Mid+Mid CH /
50@0-100@0

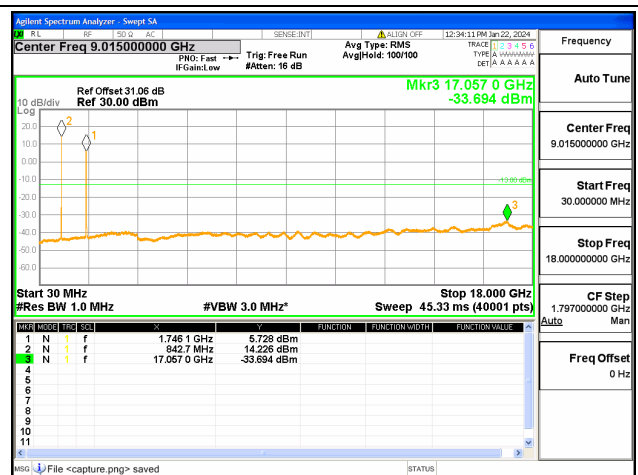


5A-66A / 10+20MHz / QPSK / Mid+High CH /
1@0-1@99

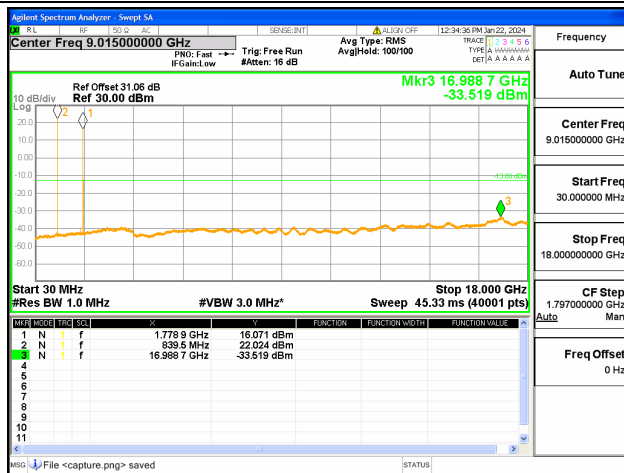
5A-66A / 10+20MHz / QPSK / Mid+High CH /
1@49-1@05A-66A / 10+20MHz / QPSK / Mid+High CH /
50@0-100@05A-66A / 10+20MHz / QPSK / High+Low CH /
1@0-1@995A-66A / 10+20MHz / QPSK / High+Low CH /
1@49-1@05A-66A / 10+20MHz / QPSK / High+Low CH /
50@0-100@05A-66A / 10+20MHz / QPSK / High+Mid CH /
1@0-1@99



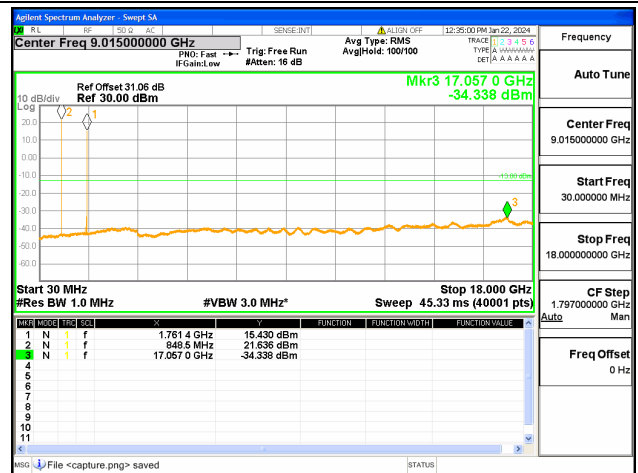
5A-66A / 10+20MHz / QPSK / High+Mid CH /
1@49-1@0



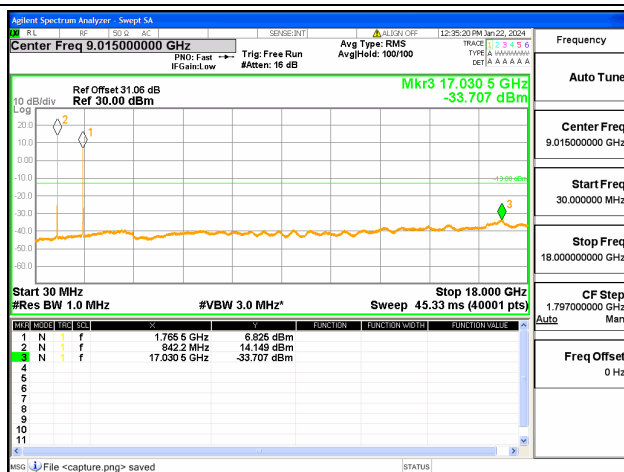
5A-66A / 10+20MHz / QPSK / High+Mid CH /
50@0-100@0



5A-66A / 10+20MHz / QPSK / High+High CH /
1@0-1@99



5A-66A / 10+20MHz / QPSK / High+High CH /
1@49-1@0



5A-66A / 10+20MHz / QPSK / High+High CH /
50@0-100@0

N/A

2.3. Radiated Spurious Emissions

2.3.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

Additional requirement for LTE Band 2:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

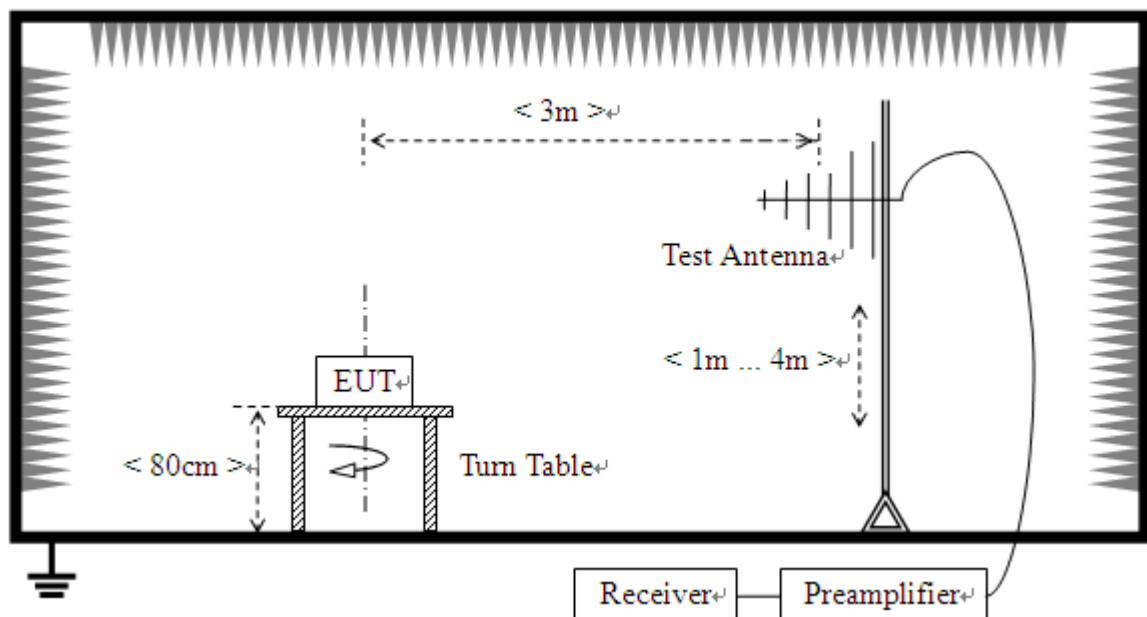
Additional requirement for LTE Band 4/66:

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB. This calculated to be -13dBm.

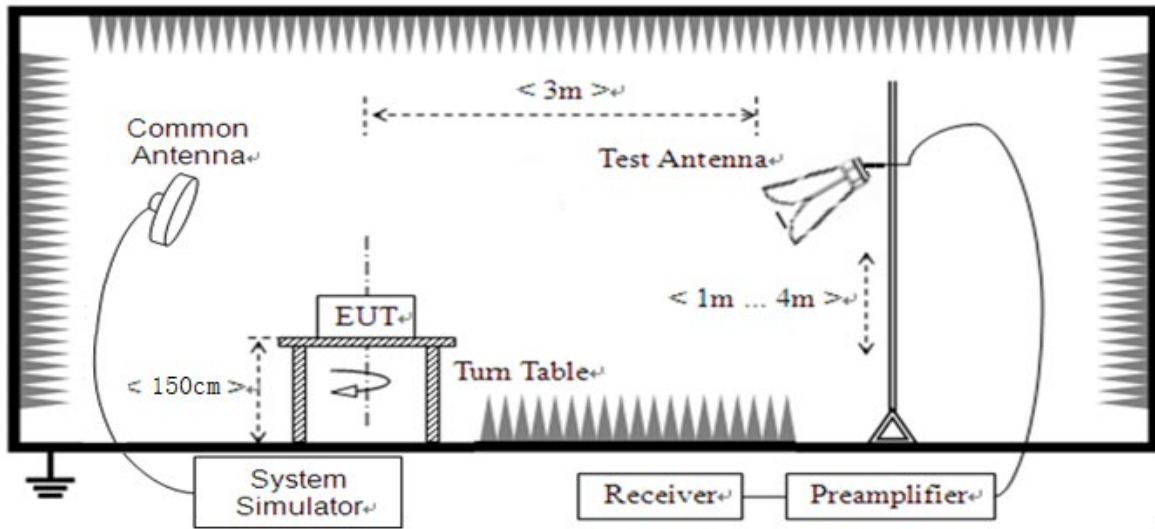
Additional requirement for LTE Band 5:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

2.3.2. Test Description



(For the test frequency from 30MHz to 1GHz)



(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading. A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360° to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.

Note: When doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.3.3. Test Procedure

KDB 971168 D01v03 Section 5.8 and ANSI/TIA-603-E-2016.

2.3.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest,



middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$$A_{\text{SUBST}} = P_{\text{SUBST_TX}} - P_{\text{SUBST_RX}} - L_{\text{SUBST_CABLES}} + G_{\text{SUBST_TX_ANT}}$$

$$A_{\text{TOT}} = L_{\text{CABLES}} + A_{\text{SUBST}}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

$P_{\text{SUBST_TX}}$ is signal generator level,

$P_{\text{SUBST_RX}}$ is receiver level,

$L_{\text{SUBST_CABLES}}$ is cable losses including TX cable,

$G_{\text{SUBST_TX_ANT}}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

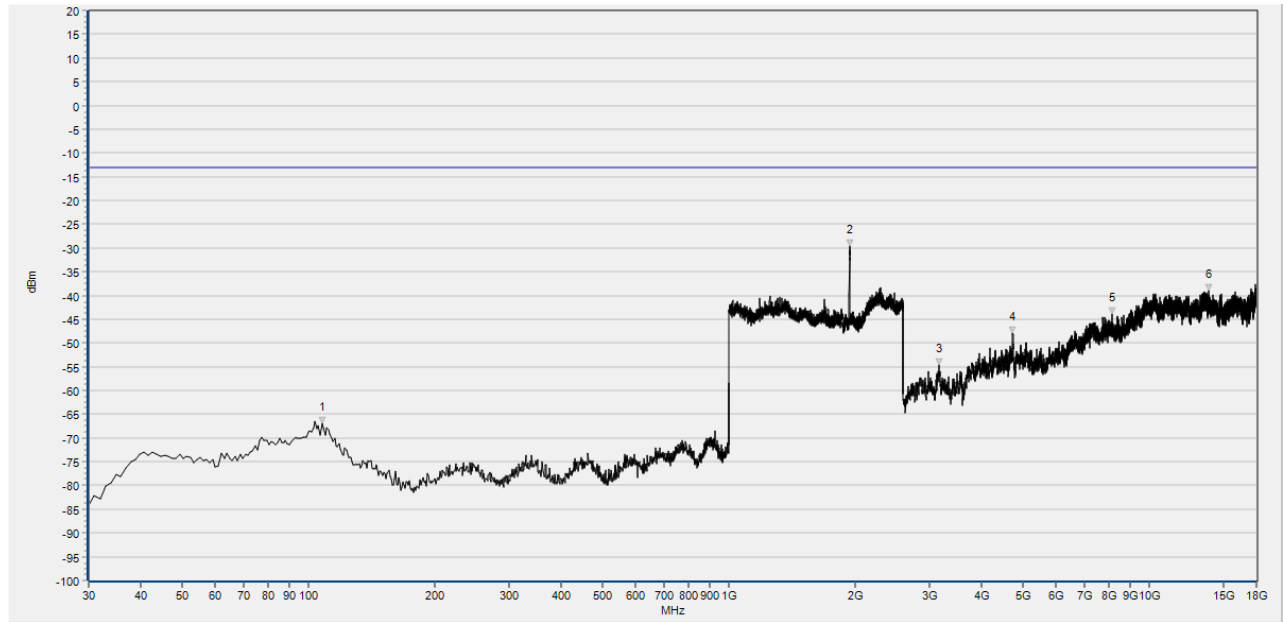
During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT} .

Note1: The power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

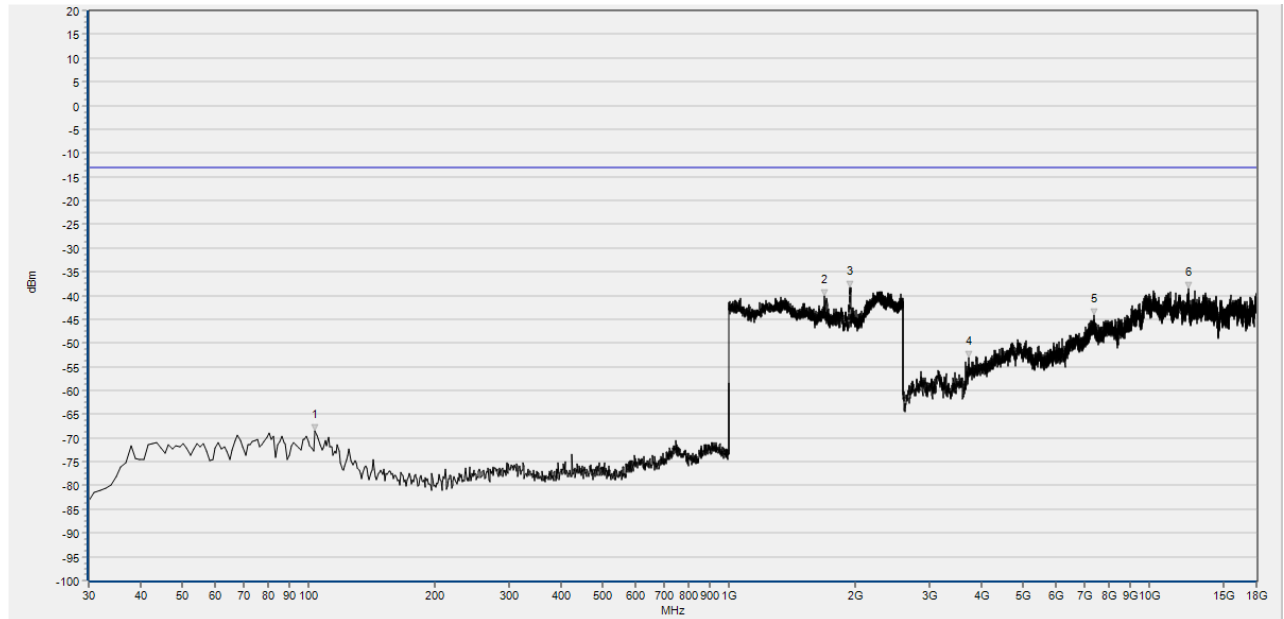
Note3: All bandwidth and modulation were considered and evaluated respectively by performing full test for each band; only the worst cases (Max Bandwidth and QPSK mode) were recorded in this test report.

Note 4: N/A means the frequency is the basic frequency or the base station frequency; they are no need to verdict.



Num	Freq(MHz)	PK	limit PK	Degree	Antenna	Verdict
1	107.600	-66.83	-13.00	360.0	H	PASS
2	1939.256	-29.53	-13.00	352.5	H	N/A
3	3157.301	-54.60	-13.00	261.1	H	PASS
4	4736.789	-47.89	-13.00	171.5	H	PASS
5	8175.814	-43.84	-13.00	154.7	H	PASS
6	13874.850	-38.99	-13.00	50.6	H	PASS

2A-4A Low 30M-18G H

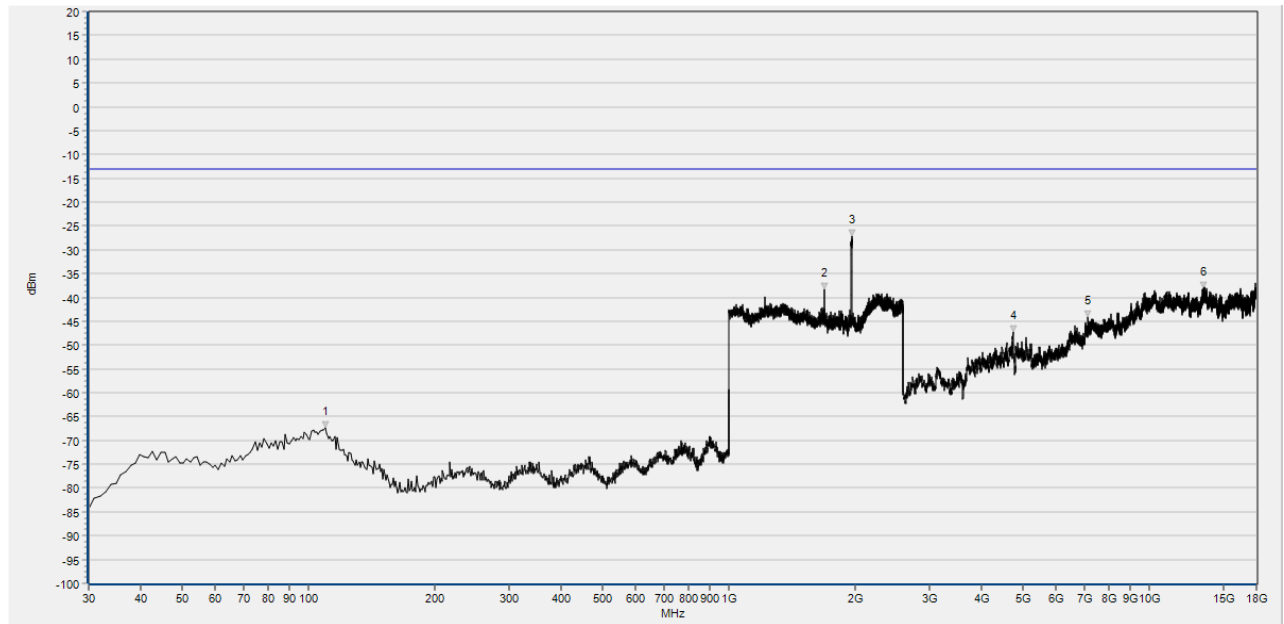


Num	Freq(MHz)	PK	limit PK	Degree	Antenna	Verdict
1	103.720	-68.48	-13.00	330.6	V	PASS
2	1691.477	-40.16	-13.00	236.4	V	N/A
3	1943.097	-38.32	-13.00	254.4	V	N/A
4	3728.605	-53.07	-13.00	147.9	V	PASS
5	7402.873	-44.22	-13.00	183.2	V	PASS
6	12412.984	-38.64	-13.00	63.5	V	PASS

2A-4A Low 30M-18G V

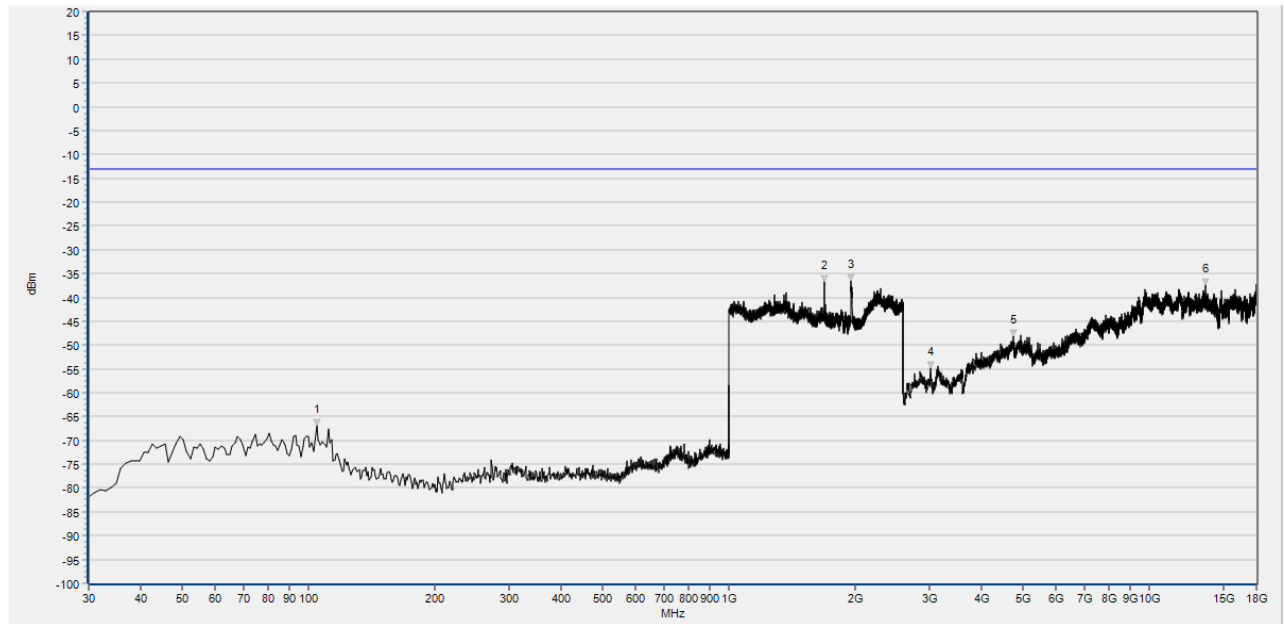


REPORT No.: SZ24030059W01



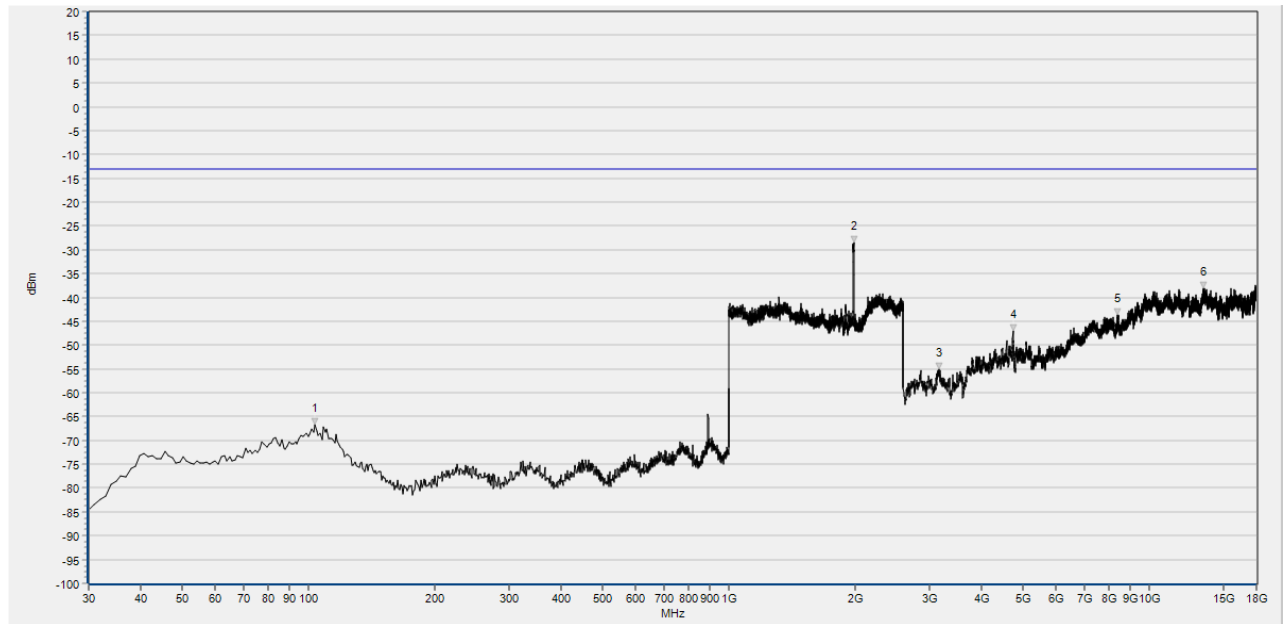
Num	Freq(MHz)	PK	limit PK	Degree	Antenna	Verdict
1	109.540	-67.39	-13.00	360.0	H	PASS
2	1686.995	-38.29	-13.00	360.0	H	PASS
3	1959.744	-27.22	-13.00	360.0	H	PASS
4	4739.589	-47.21	-13.00	151.7	H	PASS
5	7159.229	-44.06	-13.00	326.0	H	PASS
6	13488.380	-38.03	-13.00	256.0	H	PASS

2A-4A Mid 30M-18G H



Num	Freq(MHz)	PK	limit PK	Degree	Antenna	Verdict
1	104.690	-66.82	-13.00	360.0	V	PASS
2	1690.836	-36.71	-13.00	360.0	V	N/A
3	1951.421	-36.57	-13.00	360.0	V	N/A
4	3022.877	-54.75	-13.00	45.9	V	PASS
5	4750.791	-48.20	-13.00	125.2	V	PASS
6	13591.999	-37.40	-13.00	195.9	V	PASS

2A-4A Mid 30M-18G V



Num	Freq(MHz)	PK	limit PK	Degree	Antenna	Verdict
1	103.720	-66.63	-13.00	0.0	H	PASS
2	1980.872	-28.60	-13.00	0.0	H	NA
3	3154.501	-55.17	-13.00	271.5	H	PASS
4	4739.589	-47.10	-13.00	322.8	H	PASS
5	8419.458	-43.79	-13.00	360.0	H	PASS
6	13496.781	-38.04	-13.00	105.0	H	PASS

2A-4A High 30M-18G H