FCC Test Report

(PART 27)

Report No.:	RF200325E02A
FCC ID:	MAD-G06RRH-46-01B
Test Model:	G06RRH-46-01B
Received Date:	Mar. 25, 2020
Test Date:	July 01 to 02, 2020
Issued Date:	July 10, 2020
Applicant:	Microelectronics Technology Inc.
Address:	No. 1, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF200325E02A	Original release.	July 10, 2020

1 Certificate of Conformity

Product:	2x40W B71 RRH
Brand:	MTI
Test Model:	G06RRH-46-01B
Sample Status:	ENGINEERING SAMPLE
Applicant:	Microelectronics Technology Inc.
Test Date:	July 01 to 02, 2020
Standards:	FCC Part 27, Subpart N FCC Part 2

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Joyce Kuo , **Date:** July 10, 2020

Joyce Kuo / Specialist

Approved by : , **Date:** July 10, 2020

Clark Lin / Technical Manager

2 Summary of Test Results

Applied Standard: FCC Part 27, Subpart N & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)(4)	Equivalent Isotropically radiated power	PASS	Meet the requirement of limit.
2.1047	Modulation characteristics	PASS	Meet the requirement
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	PASS	Meet the requirement of limit.
2.1049 27.53(g)	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	PASS	Meet the requirement of limit.
27.50(d)(5)	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -36.09dB at 92.75MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Test Site and Instruments

For radiated spurious emissions test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: July 01, 2020

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Keysight	N9030A	MY55410176	Jul 03, 2019	Jul 02, 2020
18GHz 30dB 100W Fixed Attenuator(*) woken	WATT-10018FS-30	N/A	May 19, 2020	May 18, 2021
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
Digital Multimeter FLUKE	87III	73680266	Dec. 13, 2019	Dec. 12, 2020
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. (*)The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
4. Tested Date: July 02, 2020

3 General Information

3.1 General Description of EUT

Product	2x40W B71 RRH		
Brand	MTI		
Test Model	G06RRH-46-01B		
Status of EUT	ENGINEERING SAMPLE		
Power Supply Rating	DC -40.5 to -57 V (Nominal -48Vdc)		
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM		
Modulation Technology	5G NR FDD		
Operating Frequency	Band n71	Channel Bandwidth: 5MHz	619.5MHz ~649.5MHz
		Channel Bandwidth: 10MHz	622MHz ~647MHz
		Channel Bandwidth: 15MHz	624.5MHz ~644.5MHz
		Channel Bandwidth: 20MHz	627MHz ~642MHz
Max. ERP Power	Channel Bandwidth: 5MHz		1541700.45mW (QPSK)
	Channel Bandwidth: 10MHz		1614358.56mW (QPSK)
	Channel Bandwidth: 15MHz		1566751.07mW (QPSK)
	Channel Bandwidth: 20MHz		1584893.19mW (QPSK)
Emission Designator	Channel Bandwidth: 5MHz		QPSK: 4M48G7D
			16QAM: 4M50D7W
			64QAM: 4M48D7W
			256QAM: 4M47D7W
	Channel Bandwidth: 10MHz		QPSK: 9M22G7D
			16QAM: 9M16D7W
			64QAM: 9M24D7W
			256QAM: 9M20D7W
	Channel Bandwidth: 15MHz		QPSK: 14M0G7D
			16QAM: 14M0D7W
			64QAM: 14M0D7W
			256QAM: 14M0D7W
	Channel Bandwidth: 20MHz		QPSK: 18M6G7D
			16QAM: 18M7D7W
			64QAM: 18M6D7W
			256QAM: 18M6D7W
Antenna Type	Refer to note as below		
Antenna Connector	Refer to user's manual		
Accessory Device	NA		
Data Cable Supplied	NA		

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of BV CPS report no.: RF200325E02. Difference compared with the original report is adding 5G NR band n71(Single Carrier mode / SCS=15kHz) by software upgrade. And all data were verified to meet the requirements.
2. The EUT incorporates a MIMO function.

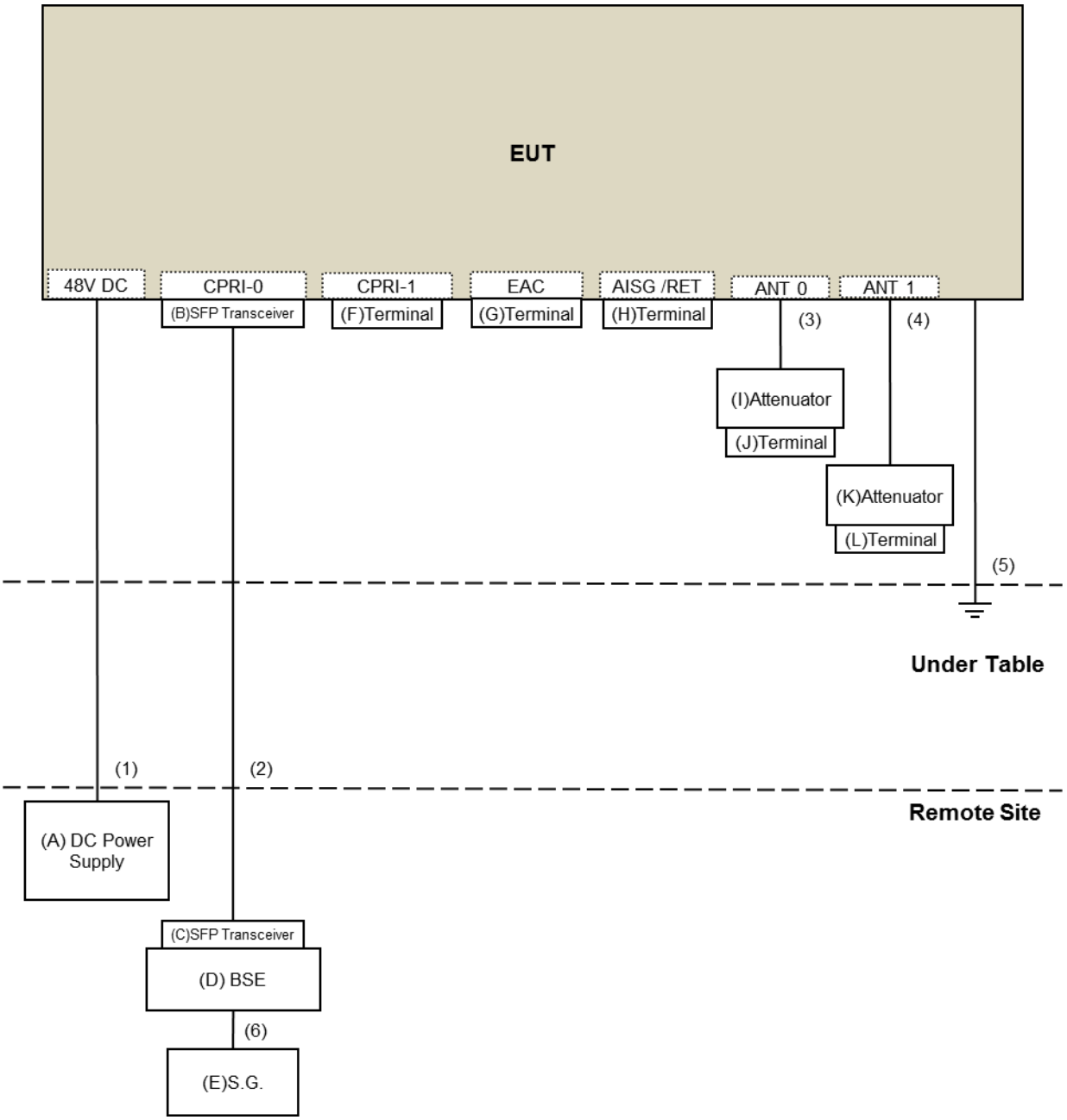
Channel Bandwidth	Modulation	TX & RX configuration	
5MHz	QPSK, 16QAM, 64QAM, 256QAM	2TX	2RX
10MHz	QPSK, 16QAM, 64QAM, 256QAM	2TX	2RX
15MHz	QPSK, 16QAM, 64QAM, 256QAM	2TX	2RX
20MHz	QPSK, 16QAM, 64QAM, 256QAM	2TX	2RX

3. The antennas provided to the EUT, please refer to the following table:

Antenna Gain (dBi)	Frequency range(MHz)	Antenna Type	Connector Type
18	617-698	Sector	4×4.3-10 Female

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	DC Power Supply	NA	NA	NA	NA	Supplied by client
B	SFP Transceiver	NA	NA	NA	NA	Supplied by client
C	SFP Transceiver	NA	NA	NA	NA	Supplied by client
D	BSE (Note 2)	NA	NA	NA	NA	Supplied by client
E	S.G	Agilent	E4438C	NA	NA	Provided by Lab
F	Terminal	NA	NA	NA	NA	Supplied by client
G	Terminal	NA	NA	NA	NA	Supplied by client
H	Terminal	NA	NA	NA	NA	Supplied by client
I	Attenuator	NA	NA	NA	NA	Supplied by client
J	Terminal	NA	NA	NA	NA	Supplied by client
K	Attenuator	NA	NA	NA	NA	Supplied by client
L	Terminal	NA	NA	NA	NA	Supplied by client

NOTE:

1. All power cords of the above support units are non-shielded (1.8 m).
2. BSE: Based Station Emulator which is to transmit/receive the waveform
3. Items B-C acted as communication partners to transfer data.

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	DC Power Cable	1	10	Yes	0	Supplied by client
2	Coaxial Cable	1	10	Yes	0	Supplied by client
3	RF Cable	1	1.5	Yes	0	Supplied by client
4	RF Cable	1	1.5	Yes	0	Supplied by client
5	GND Cable	1	3	No	0	Provided by Lab
6	RF Cable	1	3	No	0	Supplied by client

3.3 Test Mode Applicability and Tested Channel Detail

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Available Frequency (MHz)	Tested Frequency (MHz)	Channel Bandwidth	Modulation
Output Power	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		622, 634.5, 647	10MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		627, 634.5, 642	20MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
Frequency Stability	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK
		622, 634.5, 647	10MHz Single Carrier	QPSK
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK
		627, 634.5, 642	20MHz Single Carrier	QPSK
Emission Bandwidth	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		622, 634.5, 647	10MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		627, 634.5, 642	20MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
Channel Edge	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK
		622, 634.5, 647	10MHz Single Carrier	QPSK
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK
		627, 634.5, 642	20MHz Single Carrier	QPSK
Peak To Average Ratio	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		622, 634.5, 647	10MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
		627, 634.5, 642	20MHz Single Carrier	QPSK, 16QAM, 64QAM, , 256QAM
Conducted Emission	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK
		622, 634.5, 647	10MHz Single Carrier	QPSK
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK
		627, 634.5, 642	20MHz Single Carrier	QPSK

Test Item	Available Frequency (MHz)	Tested Frequency (MHz)	Channel Bandwidth	Modulation
Radiated Emission Below 1GHz	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK
		622, 634.5, 647	10MHz Single Carrier	QPSK
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK
		627, 634.5, 642	20MHz Single Carrier	QPSK
Radiated Emission Above 1GHz	619.5 to 649.5	619.5, 634.5, 649.5	5MHz Single Carrier	QPSK
		622, 634.5, 647	10MHz Single Carrier	QPSK
		624.5, 634.5, 644.5	15MHz Single Carrier	QPSK
		627, 634.5, 642	20MHz Single Carrier	QPSK

NOTE:

1. All supported modulation types were evaluated. The Worst case of QPSK was selected. Therefore, the Frequency Stability and Radiated Emission were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power (System)	Tested By
Output Power	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Modulation characteristics	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Frequency Stability	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Emission Bandwidth	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Band Edge	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Peak To Average Ratio	25deg. C, 63%RH	120Vac, 60Hz	Allen Chuang
Conducted Emission	25deg. C, 75%RH	120Vac, 60Hz	Nelson Teng
Radiated Emission	25deg. C, 75%RH	120Vac, 60Hz	Nelson Teng

Note: Above input power with the AC/DC PSU used during testing.

3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27, Subpart N

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed and recorded as per the above standards and KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

The radiated peak output power shall be according to the specific rule Part 27.50(c)(3) that are limited to ERP of 1000 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

4.1.2 Test Procedures

EIRP / ERP Measurement:

Conducted Power Measurement:

a. A spectrum analyzer was used on the output port of the EUT and recorded output power from the spectrum analyzer.
b. The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

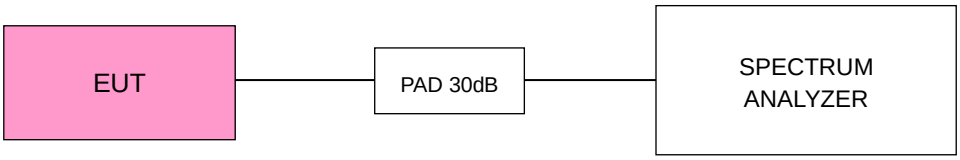
   ERP or EIRP = PMeas + GT

   Where ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, e.g., dBm or dBW)

   PMeas : measured transmitter output power or PSD, in dBm or dBW
   GT : gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

CONDUCTED POWER MEASUREMENT:



4.1.4 Test Results

Single Carrier

5MHz

Channel Number	Freq. (MHz)	QPSK								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
123900	619.5	45.72	45.85	18.00	61.57	61.70	1435489.43	1479108.39	66.99	PASS	46
126900	634.5	45.83	46.03	18.00	61.68	61.88	1472312.50	1541700.45	66.99	PASS	46
129900	649.5	45.65	45.79	18.00	61.50	61.64	1412537.54	1458814.26	66.99	PASS	46

10MHz

Channel Number	Freq. (MHz)	QPSK								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124400	622	46.19	45.95	18.00	62.04	61.80	1599558.03	1513561.25	70.00	PASS	46
126900	634.5	46.23	46.03	18.00	62.08	61.88	1614358.56	1541700.45	70.00	PASS	46
129400	647	46.08	46.05	18.00	61.93	61.90	1559552.50	1548816.62	70.00	PASS	46

15MHz

Channel Number	Freq. (MHz)	QPSK								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124900	624.5	45.92	45.88	18.00	61.77	61.73	1503141.97	1489361.08	71.76	PASS	46
126900	634.5	46.05	46.04	18.00	61.90	61.89	1548816.62	1545254.44	71.76	PASS	46
128900	644.5	46.10	46.10	18.00	61.95	61.95	1566751.07	1566751.07	71.76	PASS	46

20MHz

Channel Number	Freq. (MHz)	QPSK								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
125400	627	46.15	46.13	18.00	62.00	61.98	1584893.19	1577611.27	73.01	PASS	46
126900	634.5	46.10	46.05	18.00	61.95	61.90	1566751.07	1548816.62	73.01	PASS	46
128400	642	46.12	46.07	18.00	61.97	61.92	1573982.86	1555965.63	73.01	PASS	46

5MHz

Channel Number	Freq. (MHz)	16QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
123900	619.5	45.66	45.59	18.00	61.51	61.44	1415793.78	1393156.80	66.99	PASS	46
126900	634.5	45.70	45.79	18.00	61.55	61.64	1428893.96	1458814.26	66.99	PASS	46
129900	649.5	45.62	45.51	18.00	61.47	61.36	1402813.70	1367728.83	66.99	PASS	46

10MHz

Channel Number	Freq. (MHz)	16QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124400	622	46.05	45.85	18.00	61.90	61.70	1548816.62	1479108.39	70.00	PASS	46
126900	634.5	46.16	45.92	18.00	62.01	61.77	1588546.75	1503141.97	70.00	PASS	46
129400	647	45.97	45.89	18.00	61.82	61.74	1520547.53	1492794.41	70.00	PASS	46

15MHz

Channel Number	Freq. (MHz)	16QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124900	624.5	45.83	45.67	18.00	61.68	61.52	1472312.50	1419057.52	71.76	PASS	46
126900	634.5	45.56	45.77	18.00	61.41	61.62	1383566.38	1452111.62	71.76	PASS	46
128900	644.5	45.87	45.86	18.00	61.72	61.71	1485935.64	1482518.09	71.76	PASS	46

20MHz

Channel Number	Freq. (MHz)	16QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
125400	627	45.99	45.98	18.00	61.84	61.83	1527566.06	1524052.75	73.01	PASS	46
126900	634.5	46.00	45.96	18.00	61.85	61.81	1531087.46	1517050.37	73.01	PASS	46
128400	642	46.09	45.95	18.00	61.94	61.80	1563147.64	1513561.25	73.01	PASS	46

5MHz

Channel Number	Freq. (MHz)	64QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
123900	619.5	45.69	45.65	18.00	61.54	61.50	1425607.59	1412537.54	66.99	PASS	46
126900	634.5	45.76	45.66	18.00	61.61	61.51	1448771.85	1415793.78	66.99	PASS	46
129900	649.5	45.50	45.64	18.00	61.35	61.49	1364583.14	1409288.80	66.99	PASS	46

10MHz

Channel Number	Freq. (MHz)	64QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124400	622	45.86	45.80	18.00	61.71	61.65	1482518.09	1462177.17	70.00	PASS	46
126900	634.5	46.12	45.88	18.00	61.97	61.73	1573982.86	1489361.08	70.00	PASS	46
129400	647	45.96	45.93	18.00	61.81	61.78	1517050.37	1506607.07	70.00	PASS	46

15MHz

Channel Number	Freq. (MHz)	64QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124900	624.5	45.90	45.78	18.00	61.75	61.63	1496235.66	1455459.08	71.76	PASS	46
126900	634.5	45.98	45.85	18.00	61.83	61.70	1524052.75	1479108.39	71.76	PASS	46
128900	644.5	45.91	45.87	18.00	61.76	61.72	1499684.84	1485935.64	71.76	PASS	46

20MHz

Channel Number	Freq. (MHz)	64QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
125400	627	46.00	45.87	18.00	61.85	61.72	1531087.46	1485935.64	73.01	PASS	46
126900	634.5	45.96	45.84	18.00	61.81	61.69	1517050.37	1475706.53	73.01	PASS	46
128400	642	46.06	45.96	18.00	61.91	61.81	1552387.01	1517050.37	73.01	PASS	46

5MHz

Channel Number	Freq. (MHz)	256QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
123900	619.5	45.54	45.66	18.00	61.39	61.51	1377209.47	1415793.78	66.99	PASS	46
126900	634.5	45.62	45.53	18.00	61.47	61.38	1402813.70	1374041.98	66.99	PASS	46
129900	649.5	45.58	45.50	18.00	61.43	61.35	1389952.63	1364583.14	66.99	PASS	46

10MHz

Channel Number	Freq. (MHz)	256QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124400	622	45.83	45.84	18.00	61.68	61.69	1472312.50	1475706.53	70.00	PASS	46
126900	634.5	45.76	45.74	18.00	61.61	61.59	1448771.85	1442115.35	70.00	PASS	46
129400	647	45.62	45.77	18.00	61.47	61.62	1402813.70	1452111.62	70.00	PASS	46

15MHz

Channel Number	Freq. (MHz)	256QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
124900	624.5	45.69	45.88	18.00	61.54	61.73	1425607.59	1489361.08	71.76	PASS	46
126900	634.5	45.93	45.92	18.00	61.78	61.77	1506607.07	1503141.97	71.76	PASS	46
128900	644.5	45.68	45.93	18.00	61.53	61.78	1422328.79	1506607.07	71.76	PASS	46

20MHz

Channel Number	Freq. (MHz)	256QAM								PASS /FAIL	Setting
		Conducted Average Power (dBm)		Gain	ERP(dBm)		ERP(mW)		Limit(dBm)		
		CHAIN0	CHAIN1		CHAIN0	CHAIN1	CHAIN0	CHAIN1	Maximum		
125400	627	46.03	45.92	18.00	61.88	61.77	1541700.45	1503141.97	73.01	PASS	46
126900	634.5	45.97	45.95	18.00	61.82	61.80	1520547.53	1513561.25	73.01	PASS	46
128400	642	46.08	45.99	18.00	61.93	61.84	1559552.50	1527566.06	73.01	PASS	46

4.2 Modulation characteristics Measurement

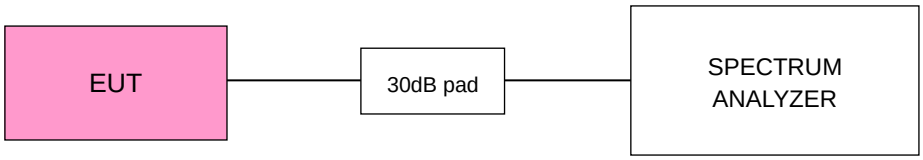
4.2.1 Limits of Modulation characteristics

N/A

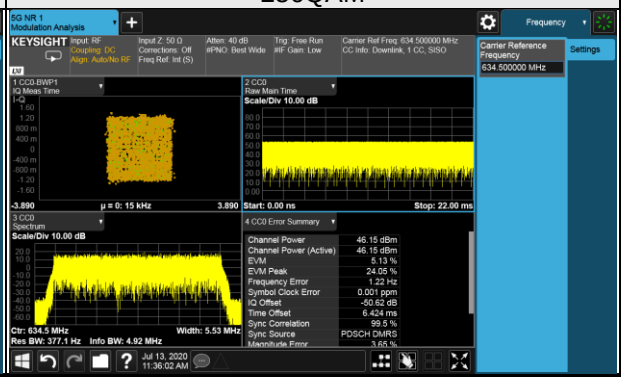
4.2.2 Test Procedure

Connect the EUT to spectrum analyzer. The frequency band is set as EUT supported modulation and channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup



4.2.4 Test Results

Spectrum Plot of Measurement Value	
QPSK	16QAM
	
64QAM	256QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -40℃ ~ 55℃.

4.3.2 Test Procedure

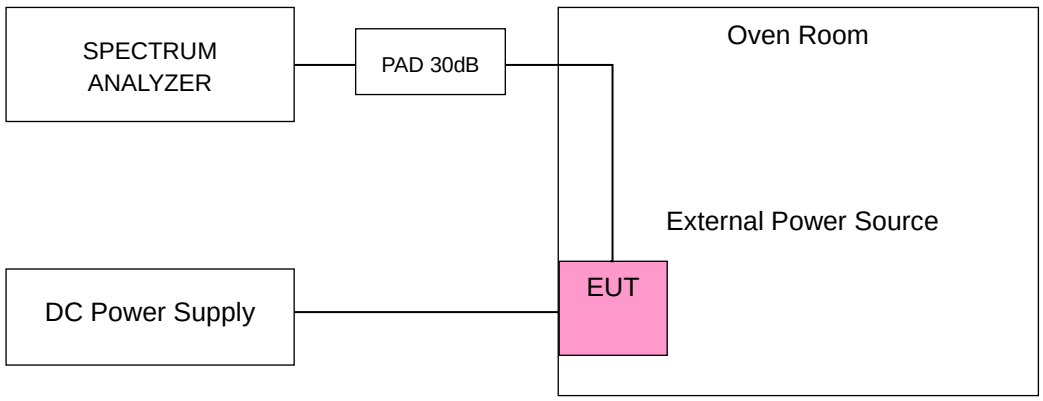
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded from the spectrum analyzer.

4.3.3 Test Setup



4.3.4 Test Results

SC Mode- Chain 0

FREQUENCY ERROR vs. VOLTAGE									Limit (MHz)		PASS/FAIL
Voltage (Volts)	Test result (MHz)										
	5MHz		10MHz		15MHz		20MHz				
	619.5MHz	649.5MHz	622MHz	647MHz	624.5MHz	644.5MHz	627MHz	642MHz	Low Edge	High Edge	
40.8	617.27	651.75	617.37	651.63	617.47	651.46	617.65	651.31	617	652	PASS
55.2	617.26	651.74	617.35	651.62	617.48	651.45	617.63	651.33	617	652	PASS

FREQUENCY ERROR vs. Temperature									Limit (MHz)		PASS/FAIL
Temp. (℃)	Test result (MHz)										
	5MHz		10MHz		15MHz		20MHz				
	619.5MHz	649.5MHz	622MHz	647MHz	624.5MHz	644.5MHz	627MHz	642MHz	Low Edge	High Edge	
55	617.26	651.74	617.36	651.62	617.48	651.46	617.64	651.32	617	652	PASS
50	617.26	651.74	617.36	651.61	617.49	651.45	617.63	651.31	617	652	PASS
40	617.25	651.76	617.36	651.63	617.47	651.47	617.64	651.31	617	652	PASS
30	617.25	651.74	617.35	651.62	617.48	651.47	617.64	651.32	617	652	PASS
20	617.26	651.76	617.35	651.63	617.48	651.46	617.63	651.32	617	652	PASS
10	617.26	651.75	617.35	651.61	617.47	651.46	617.64	651.31	617	652	PASS
0	617.25	651.74	617.37	651.61	617.48	651.46	617.64	651.33	617	652	PASS
-10	617.26	651.75	617.36	651.61	617.49	651.45	617.64	651.33	617	652	PASS
-20	617.26	651.76	617.35	651.62	617.49	651.46	617.65	651.31	617	652	PASS
-30	617.25	651.75	617.35	651.63	617.47	651.45	617.64	651.31	617	652	PASS
-40	617.26	651.75	617.35	651.62	617.49	651.47	617.63	651.33	617	652	PASS

SC Mode- Chain 1

FREQUENCY ERROR vs. VOLTAGE									Limit (MHz)		PASS/FAIL
Voltage (Volts)	Test result (MHz)										
	5MHz		10MHz		15MHz		20MHz				
	619.5MHz	649.5MHz	622MHz	647MHz	624.5MHz	644.5MHz	627MHz	642MHz	Low Edge	High Edge	
40.8	617.25	651.76	617.37	651.63	617.48	651.45	617.63	651.33	617	652	PASS
55.2	617.26	651.74	617.35	651.62	617.48	651.47	617.65	651.31	617	652	PASS

FREQUENCY ERROR vs. Temperature									Limit (MHz)		PASS/FAIL
Temp. (℃)	Test result (MHz)										
	5MHz		10MHz		15MHz		20MHz				
	619.5MHz	649.5MHz	622MHz	647MHz	624.5MHz	644.5MHz	627MHz	642MHz	Low Edge	High Edge	
55	617.26	651.75	617.36	651.62	617.48	651.46	617.64	651.32	617	652	PASS
50	617.27	651.76	617.36	651.62	617.49	651.47	617.64	651.31	617	652	PASS
40	617.25	651.74	617.36	651.63	617.47	651.47	617.63	651.33	617	652	PASS
30	617.26	651.75	617.37	651.63	617.48	651.46	617.64	651.32	617	652	PASS
20	617.25	651.76	617.37	651.62	617.49	651.45	617.64	651.33	617	652	PASS
10	617.26	651.75	617.36	651.61	617.49	651.46	617.64	651.32	617	652	PASS
0	617.26	651.74	617.36	651.61	617.47	651.46	617.63	651.31	617	652	PASS
-10	617.26	651.74	617.37	651.63	617.48	651.46	617.64	651.33	617	652	PASS
-20	617.25	651.75	617.35	651.63	617.49	651.46	617.65	651.31	617	652	PASS
-30	617.26	651.75	617.35	651.62	617.47	651.46	617.64	651.31	617	652	PASS
-40	617.27	651.74	617.37	651.61	617.49	651.45	617.64	651.32	617	652	PASS

4.4 Emission Bandwidth Measurement

4.4.1 Limits of Emission Bandwidth Measurement

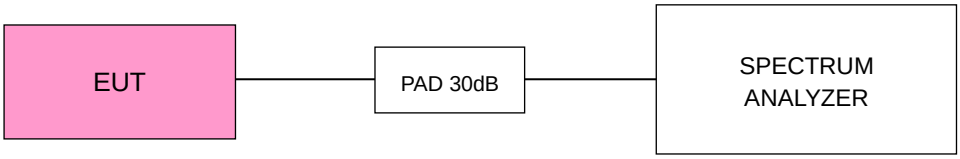
-26dBc Bandwidth
According to FCC 27.53(h)(3) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

Occupied Bandwidth
All measurements were done at low, middle and high operational frequency range. EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51kHz and VBW = 160kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 150kHz and VBW = 470kHz (Channel Bandwidth: 15MHz), RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

4.4.3 Test Setup



4.4.4 Test Results (-26dBc Bandwidth)

Single Carrier

5MHz

Channel Number	Freq. (MHz)	26dB DOWN BANDWIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
123900	619.5	4.81	4.79	4.79	4.76	4.81	4.79	4.79	4.79
126900	634.5	4.81	4.76	4.79	4.76	4.81	4.76	4.79	4.78
129900	649.5	4.79	4.77	4.78	4.74	4.80	4.77	4.76	4.78

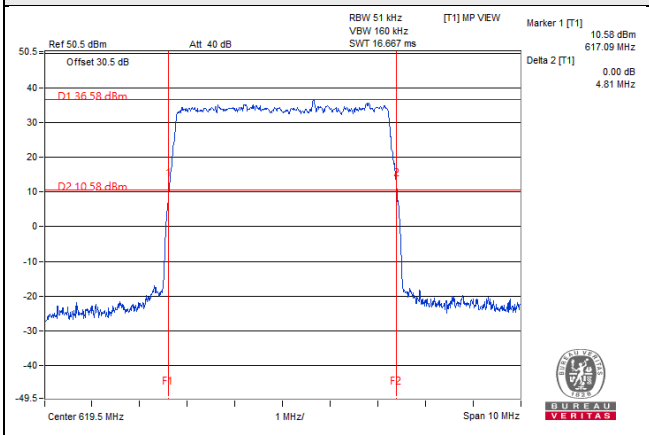
Chain 0

Spectrum Plot of Worst Value

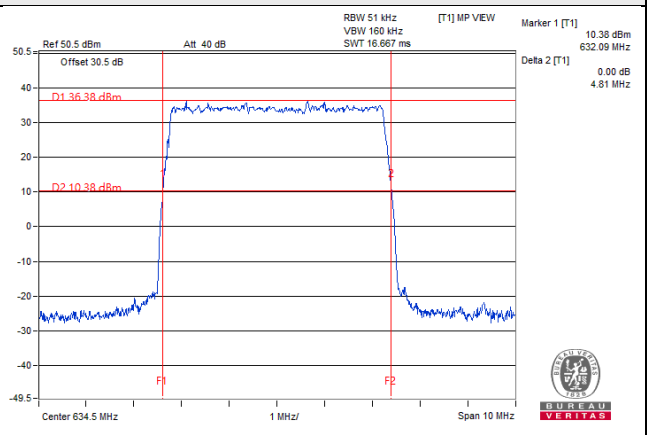
-26dBc Bandwidth

QPSK

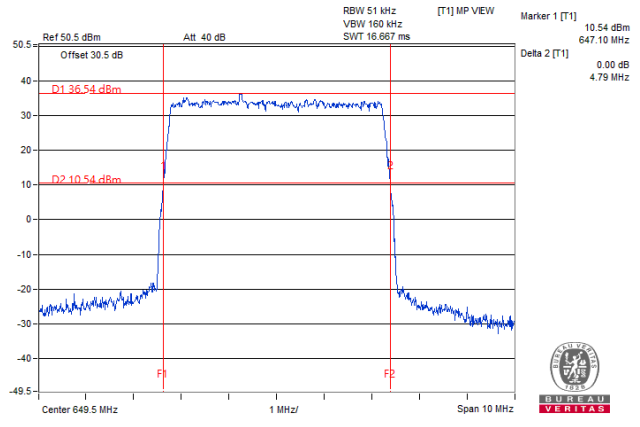
Channel: 123900

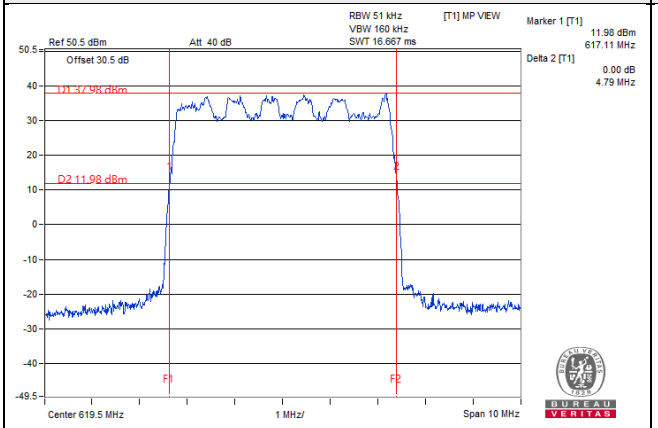
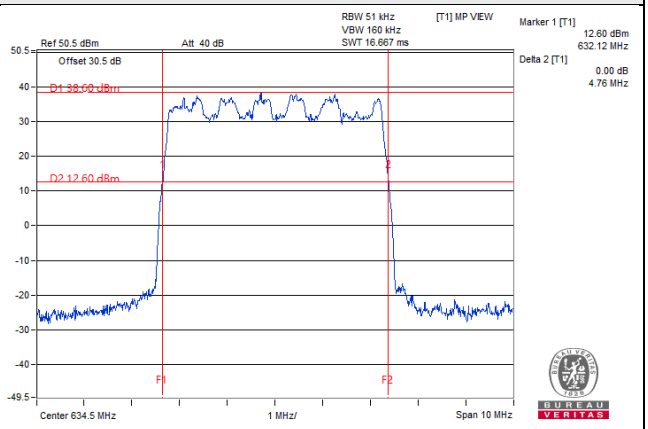
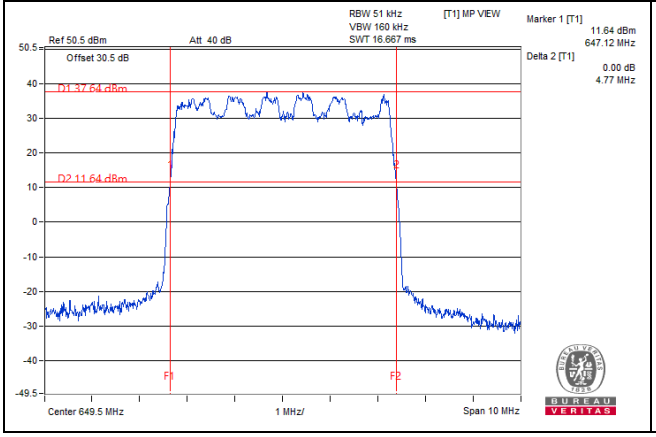


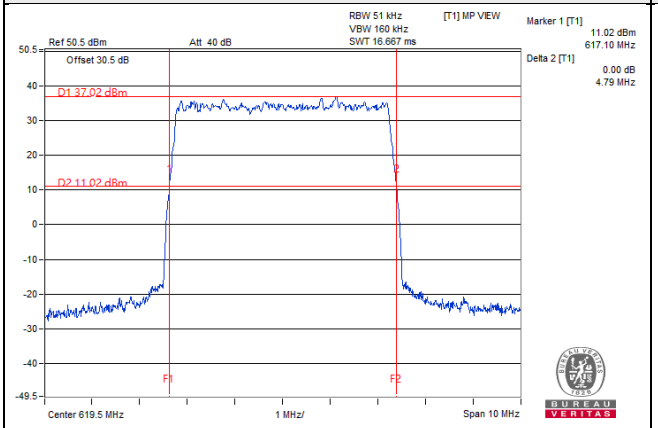
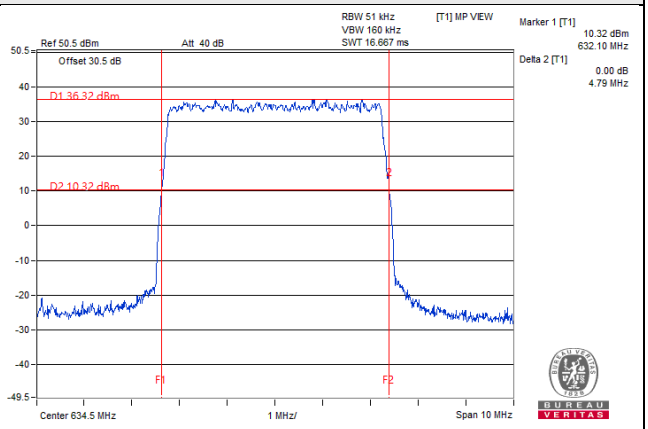
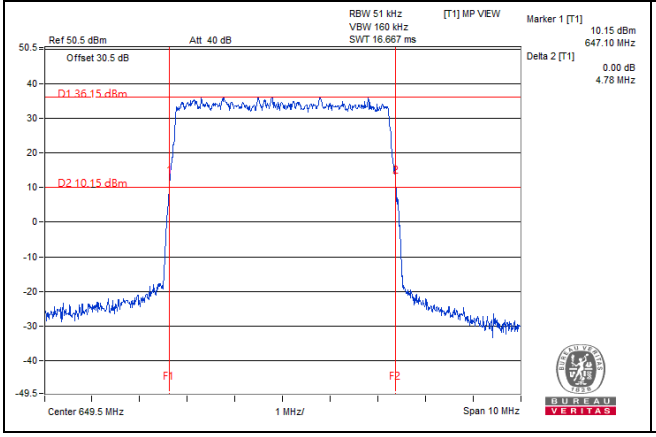
Channel: 126900

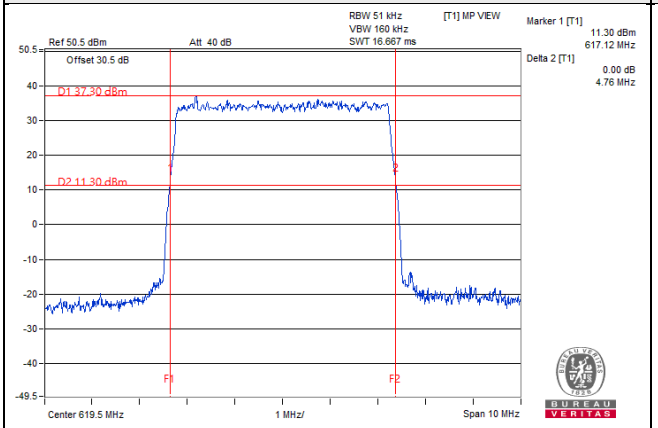
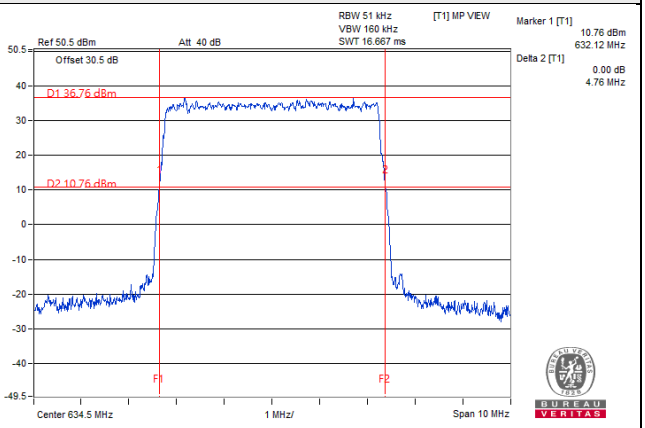
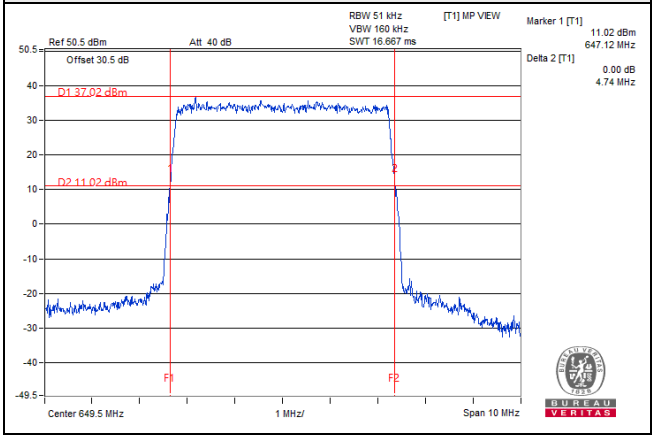


Channel: 129900

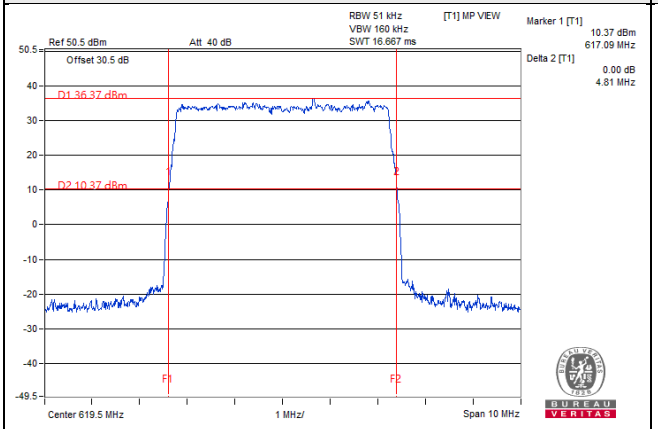
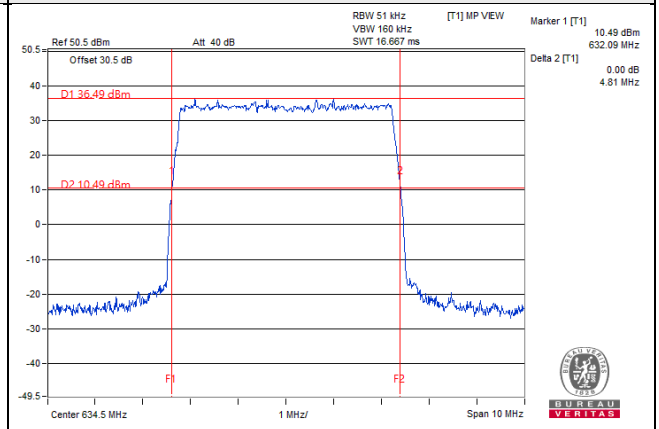
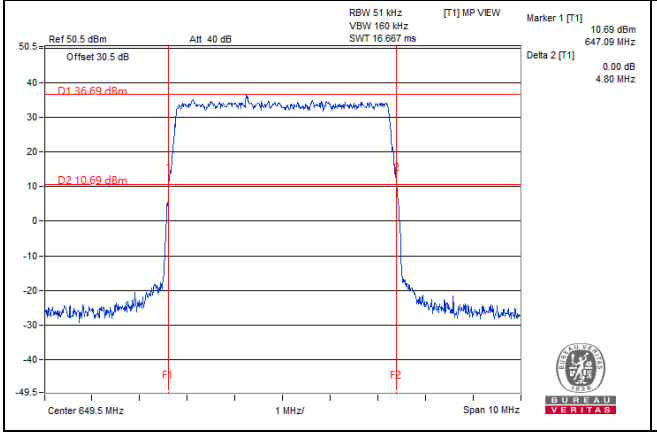


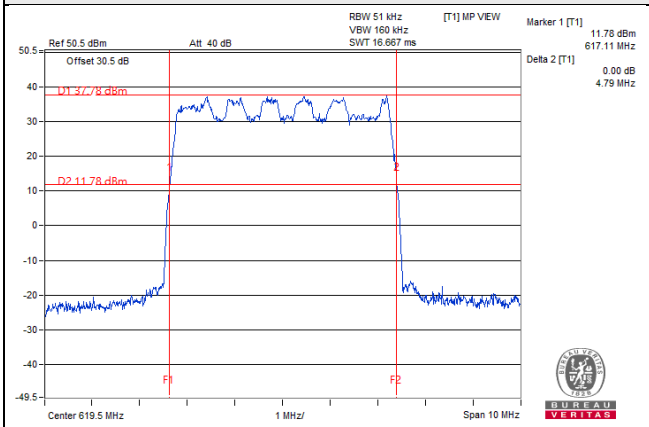
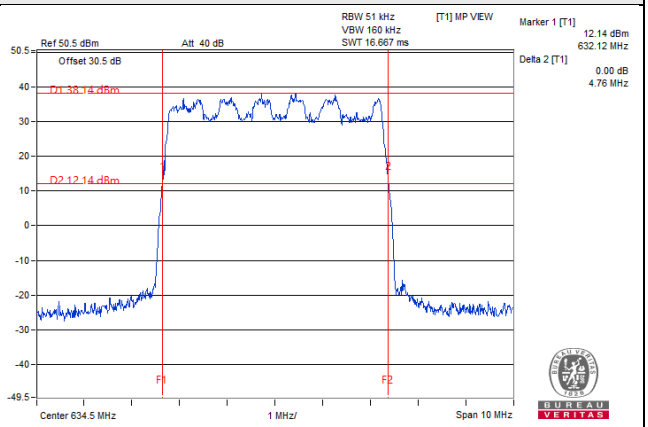
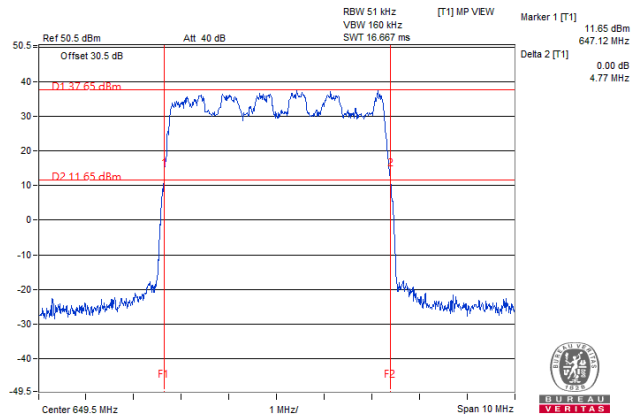
16QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

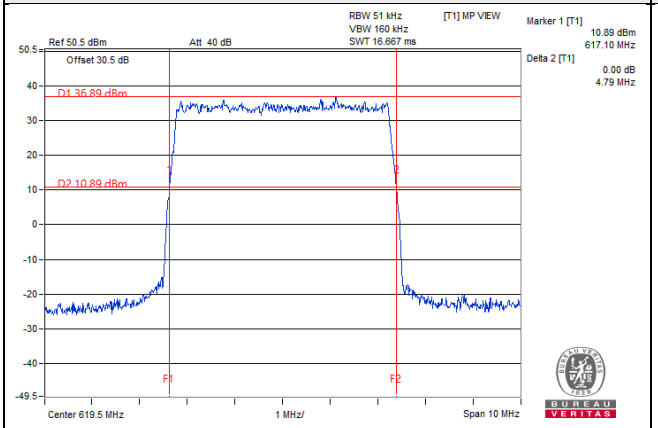
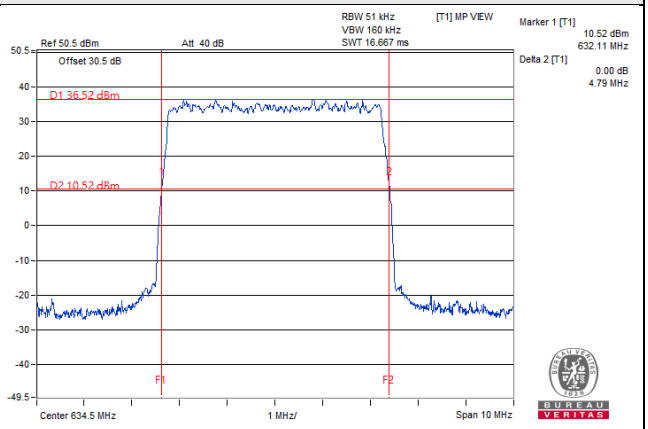
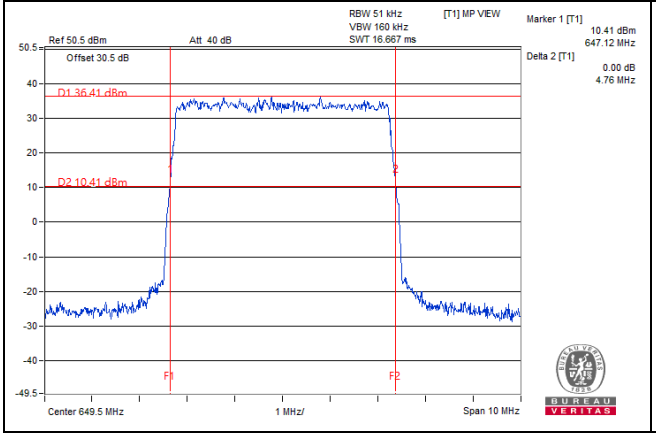
64QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

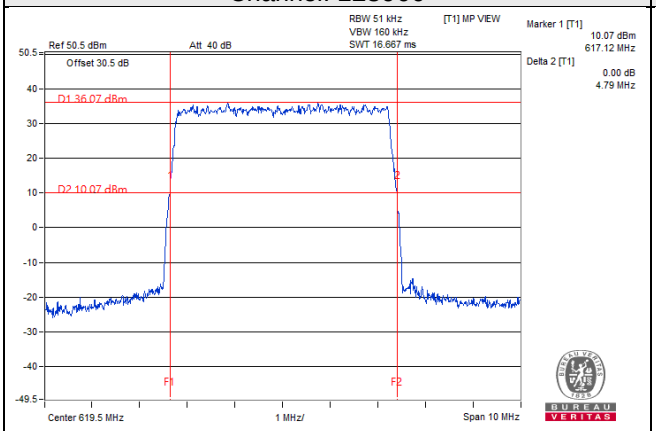
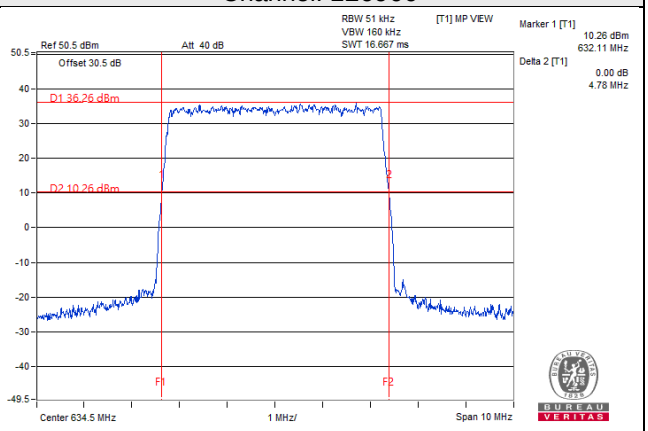
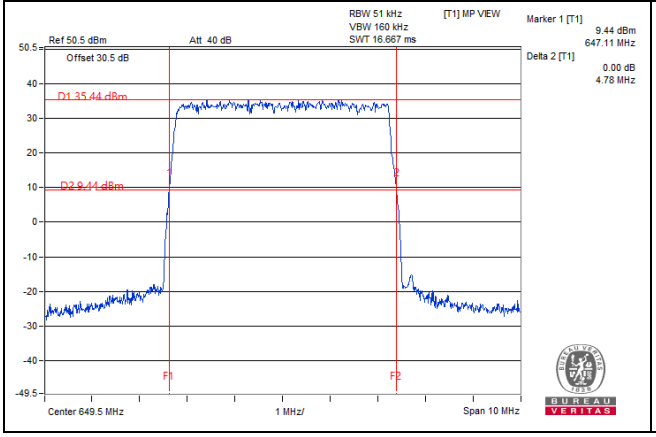
256QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

Chain 1

Spectrum Plot of Worst Value	
-26dBc Bandwidth	
QPSK	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

16QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

64QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

256QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

10MHz

Channel Number	Freq. (MHz)	26dB DOWN BANDWIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
124400	622	9.69	9.61	9.66	9.69	9.66	9.60	9.67	9.69
126900	634.5	9.68	9.61	9.68	9.70	9.67	9.62	9.67	9.70
129400	647	9.67	9.63	9.65	9.70	9.71	9.62	9.67	9.69

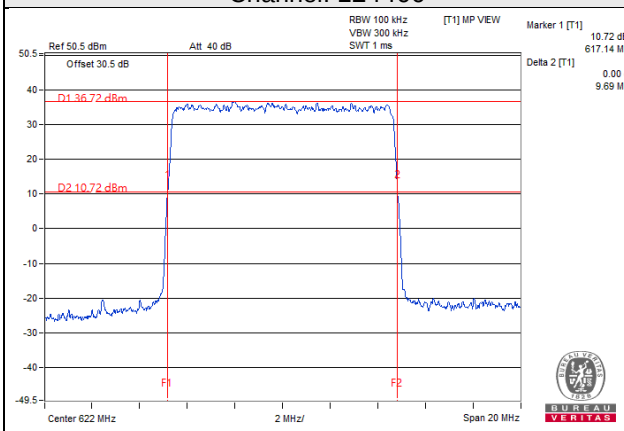
Chain 0

Spectrum Plot of Worst Value

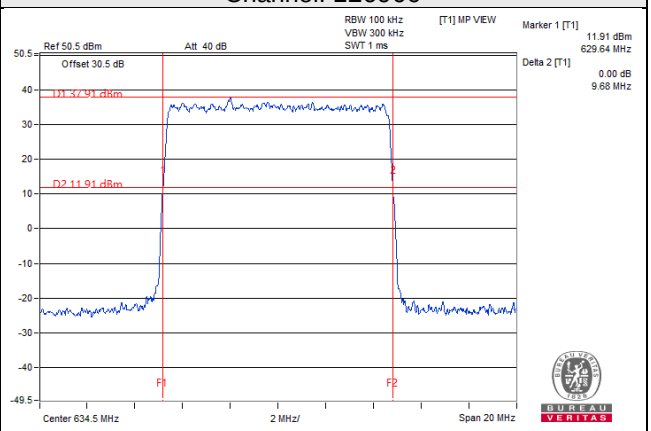
-26dBc Bandwidth

QPSK

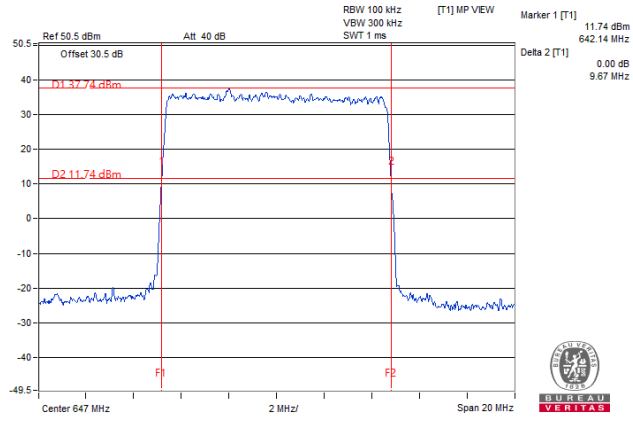
Channel: 124400

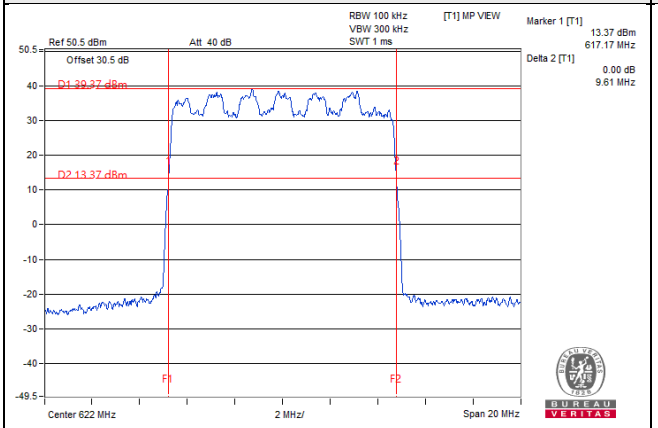
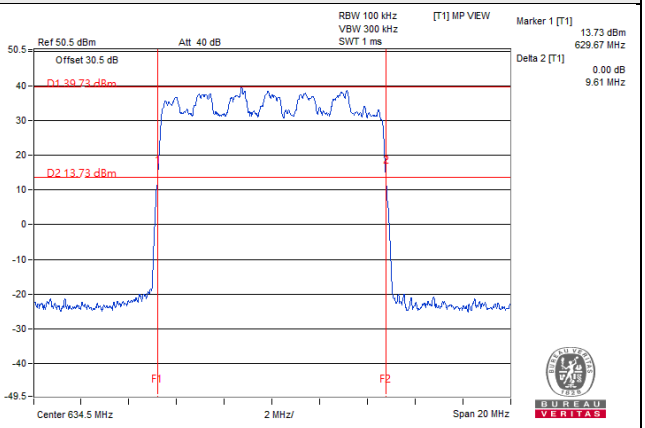
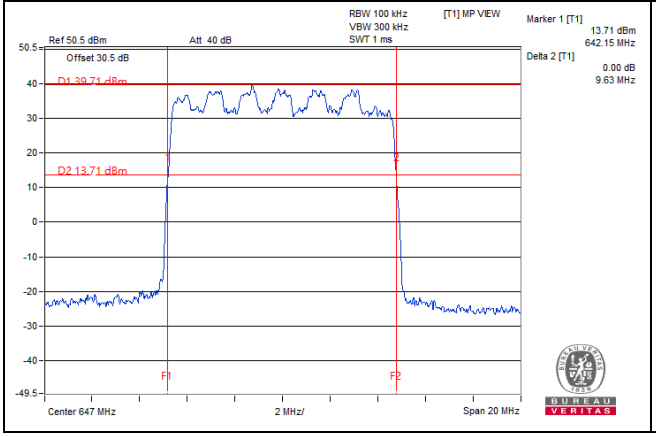


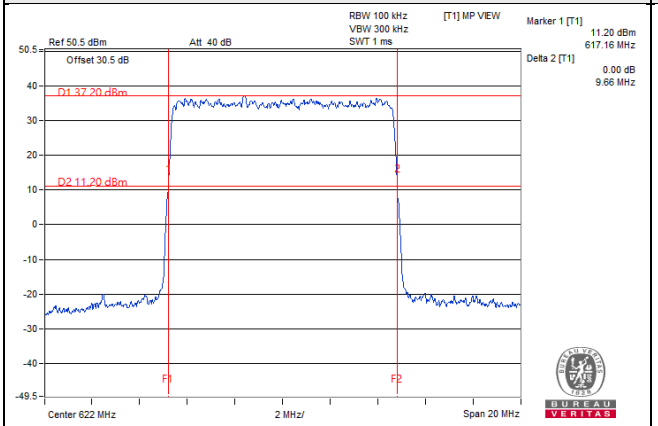
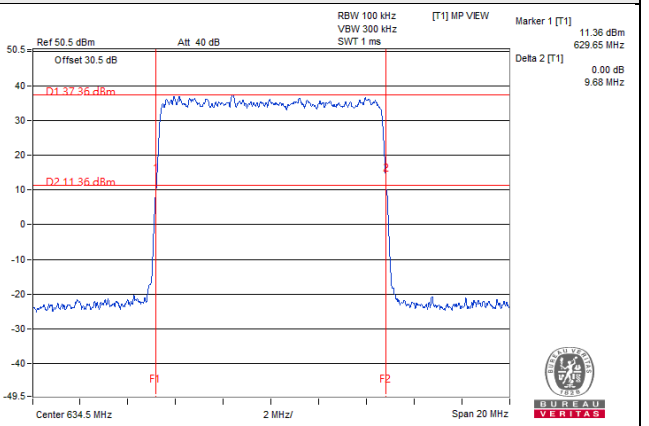
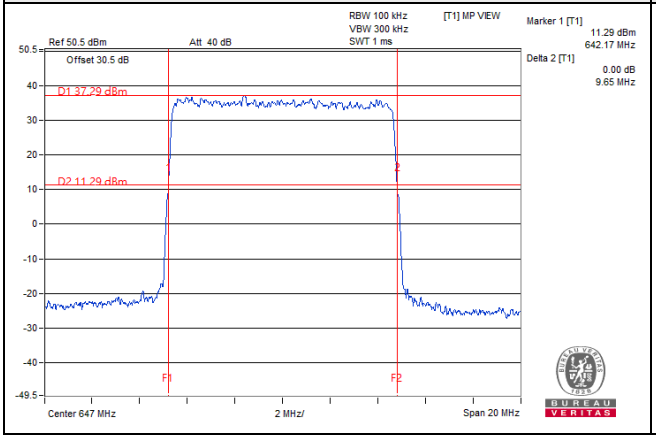
Channel: 126900

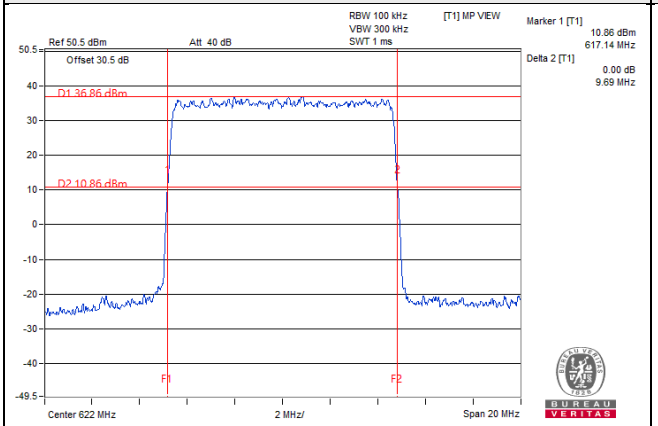
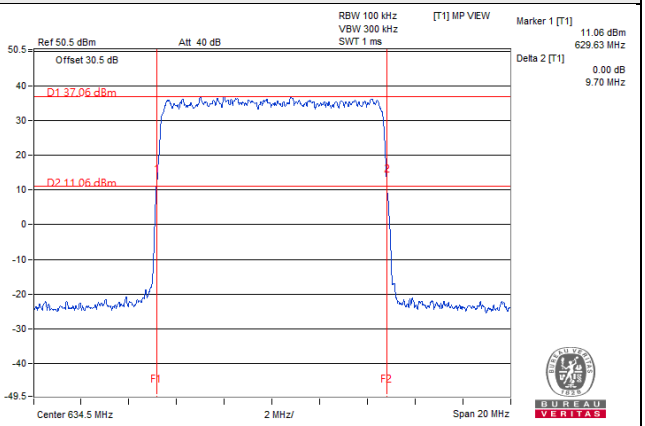
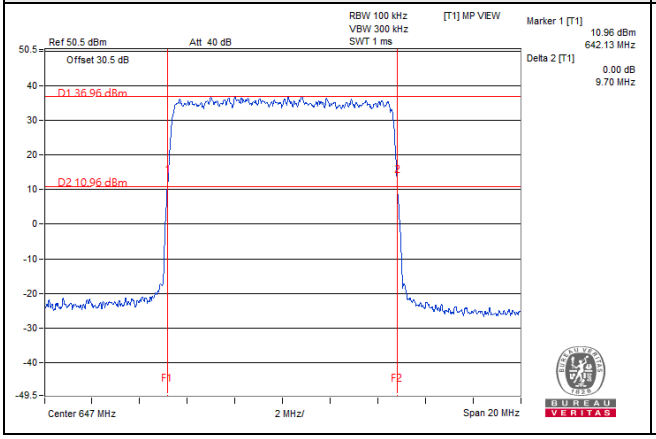


Channel: 129400

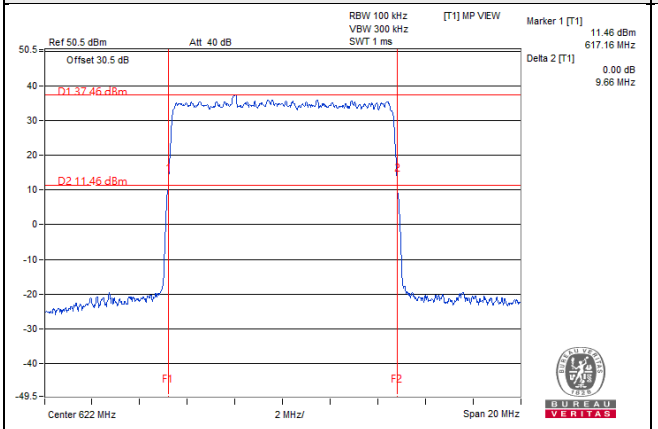
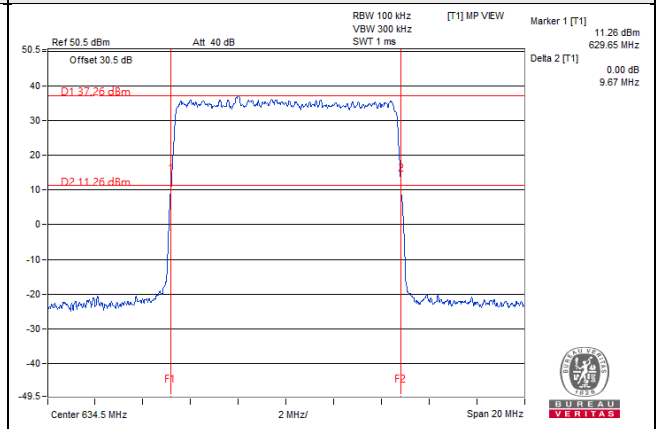
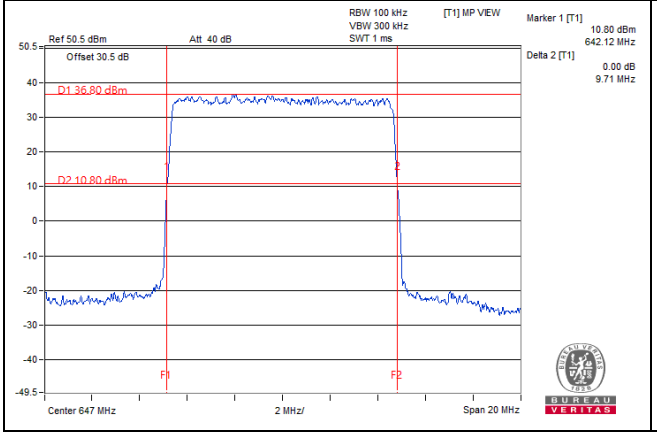


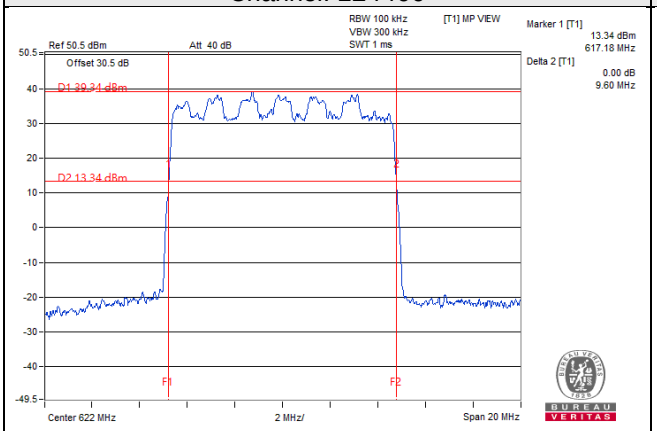
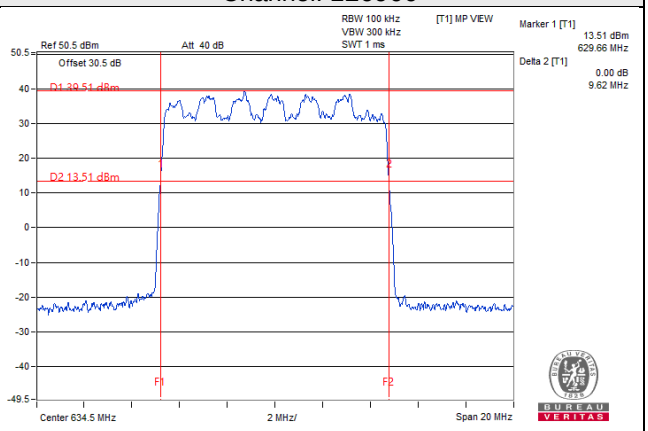
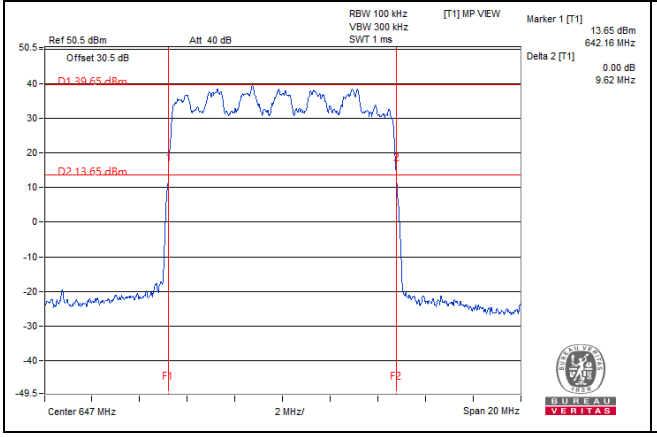
16QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

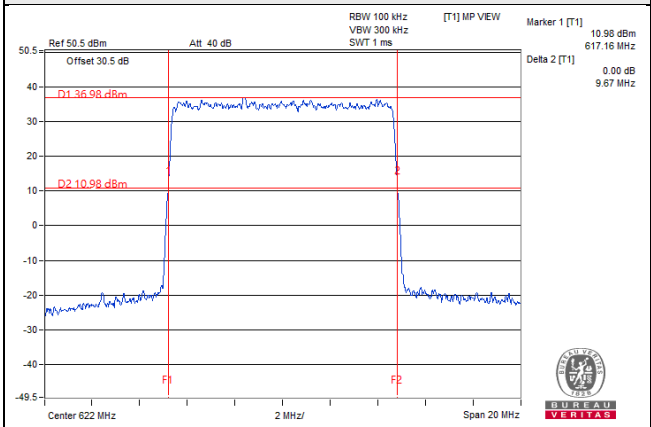
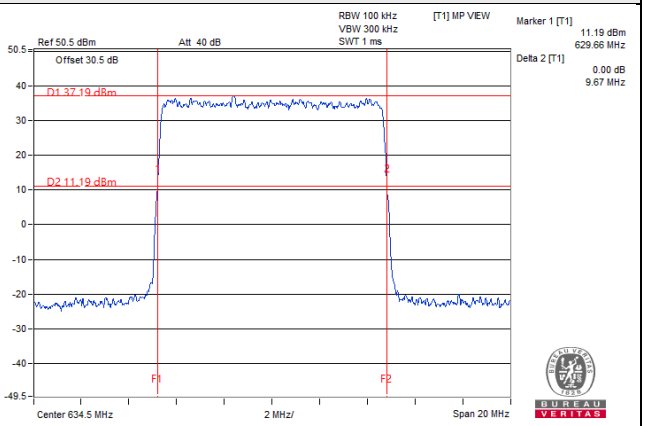
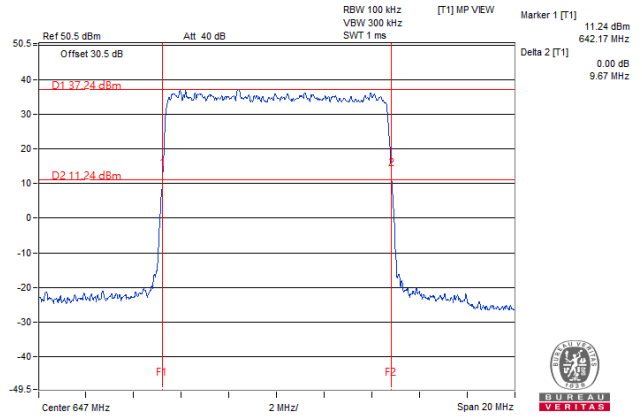
64QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

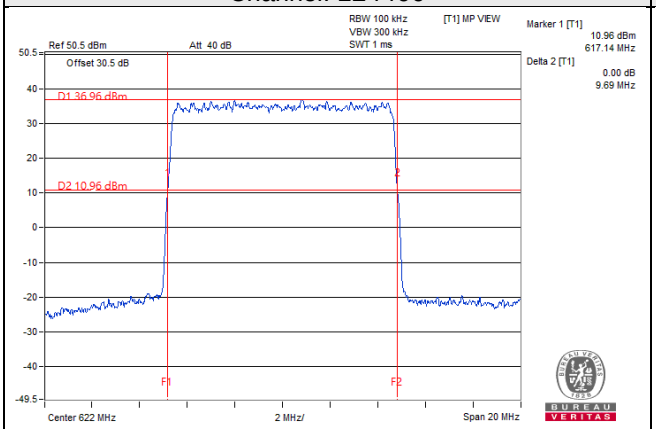
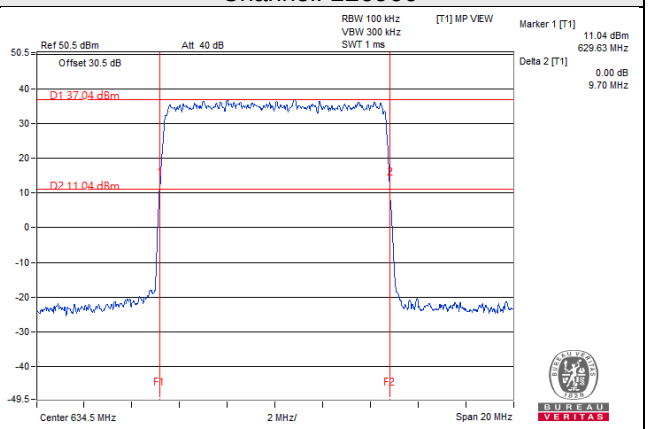
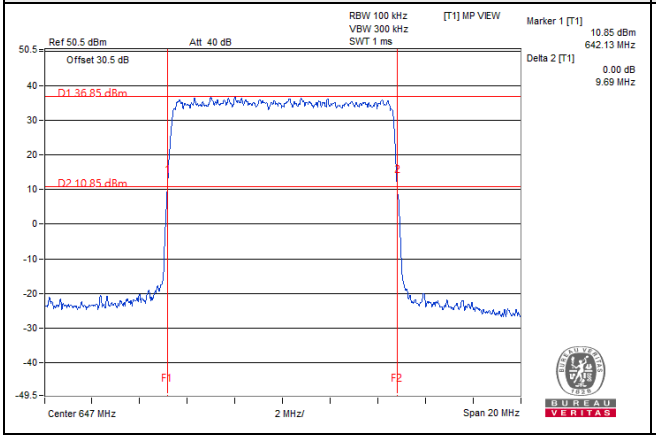
256QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

Chain 1

Spectrum Plot of Worst Value	
-26dBc Bandwidth	
QPSK	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

16QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

64QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

256QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

15MHz

Channel Number	Freq. (MHz)	26dB DOWN BANDWIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
124900	624.5	14.73	14.61	14.68	14.62	14.76	14.64	14.67	14.62
126900	634.5	14.63	14.71	14.67	14.68	14.66	14.68	14.67	14.64
128900	644.5	14.72	14.66	14.66	14.60	14.72	14.68	14.67	14.62

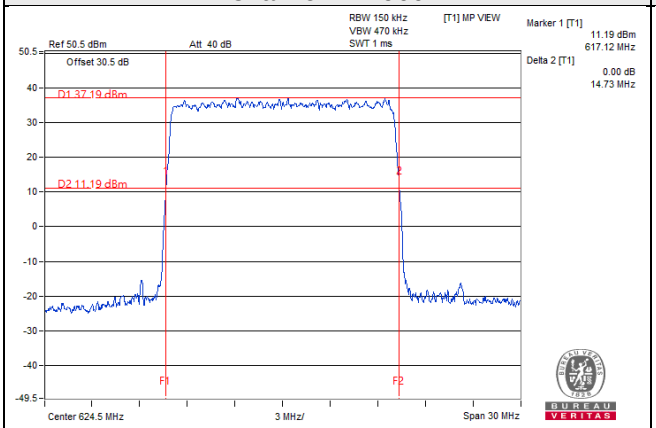
Chain 0

Spectrum Plot of Worst Value

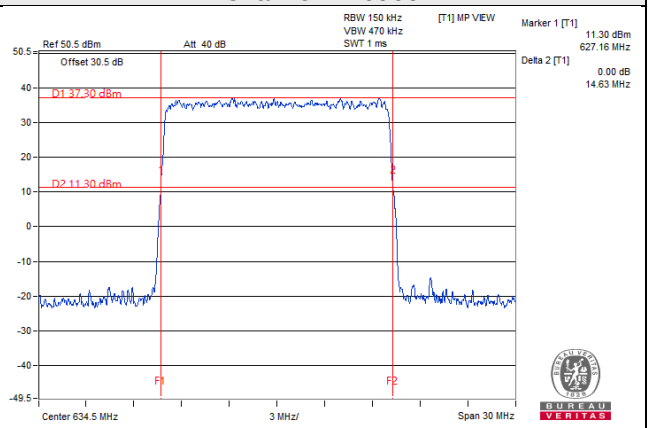
-26dBc Bandwidth

QPSK

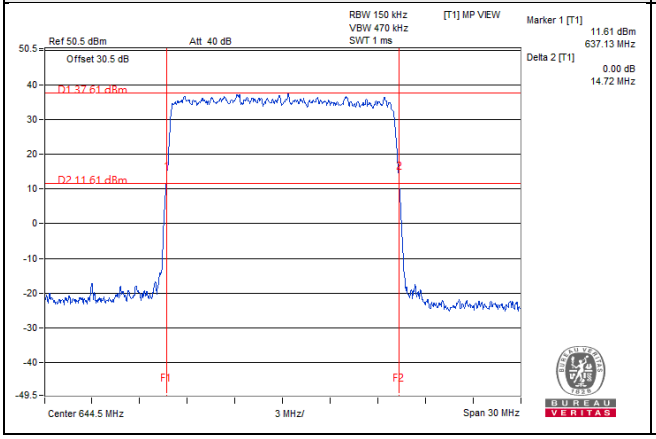
Channel: 124900

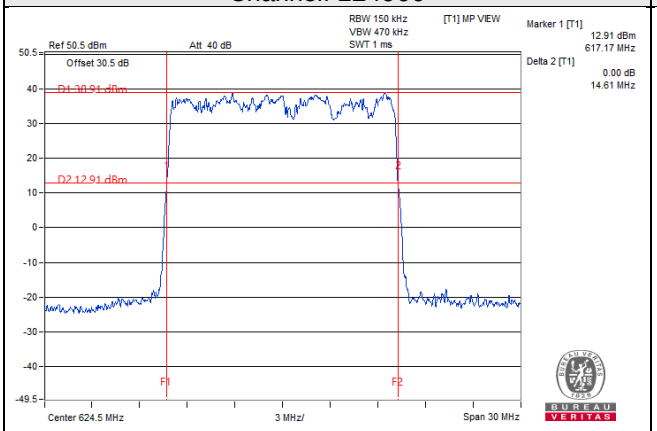
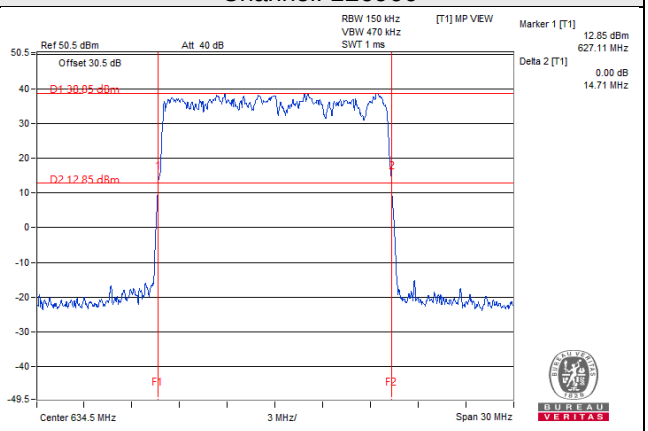
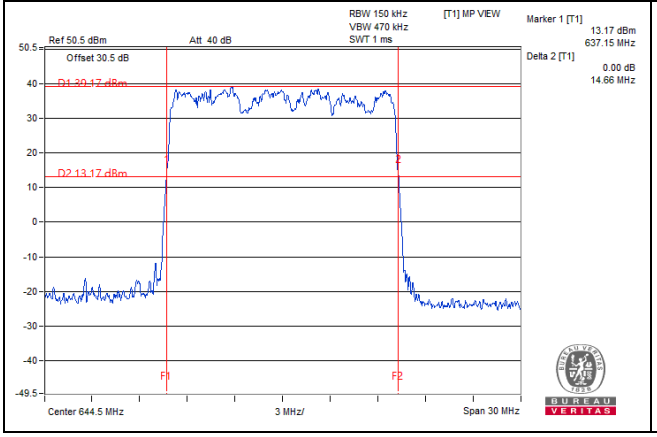


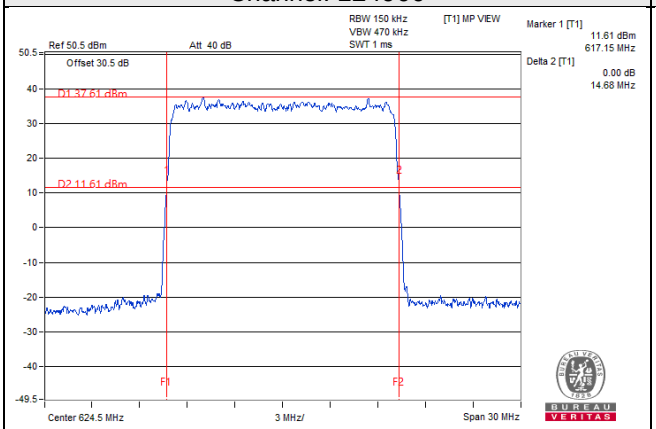
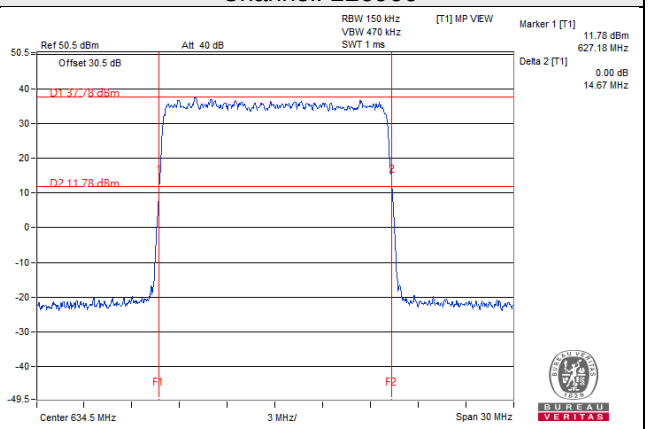
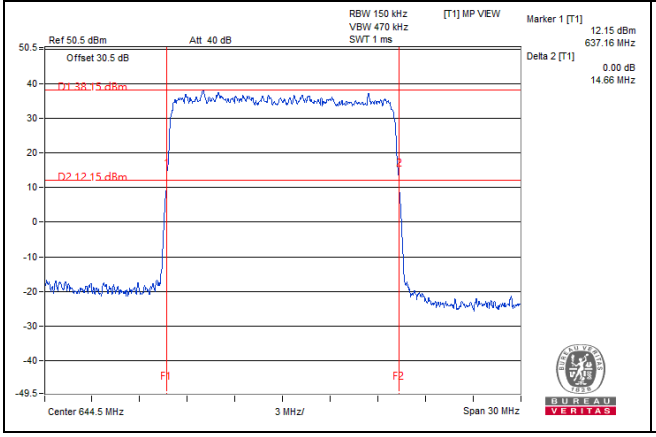
Channel: 126900

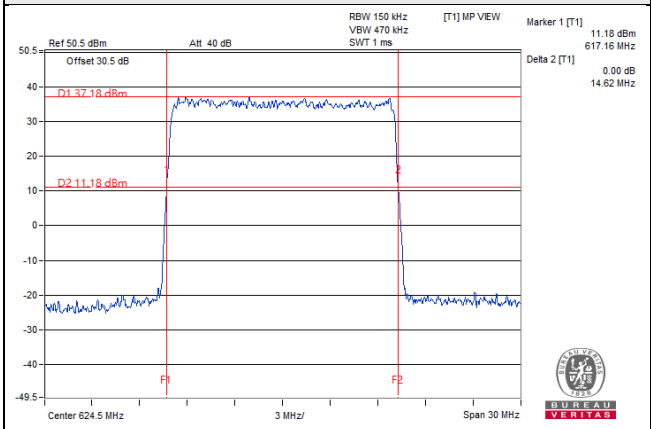
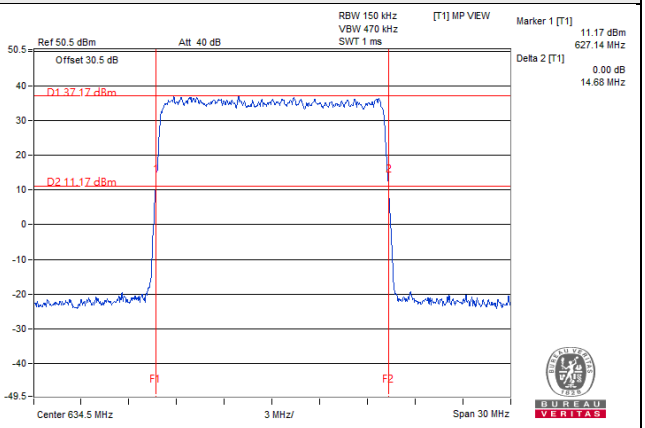
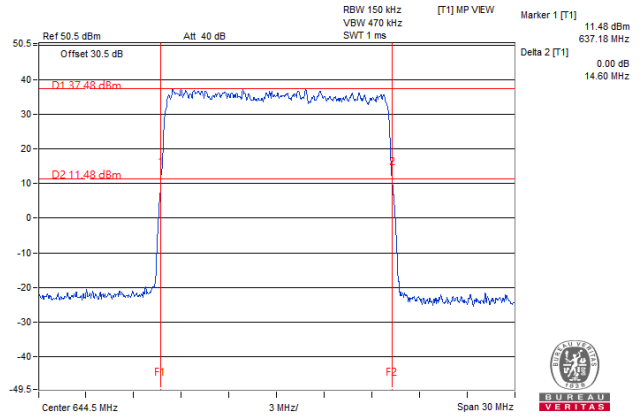


Channel: 128900

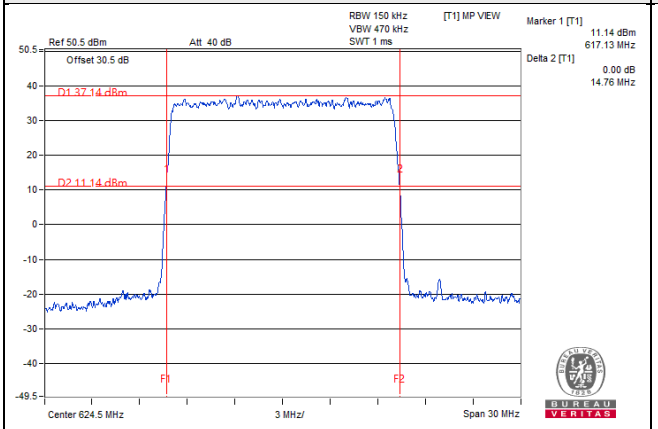
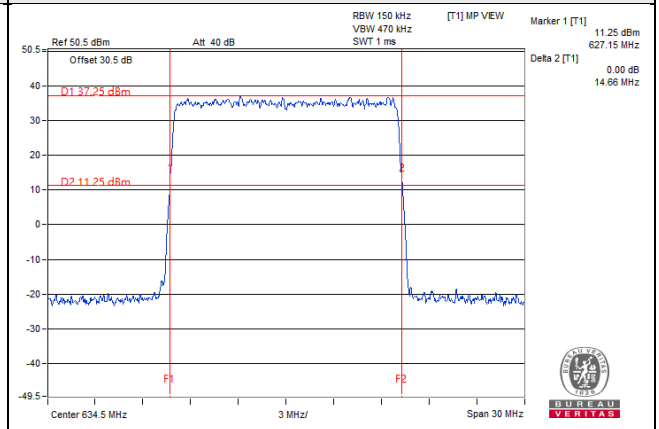
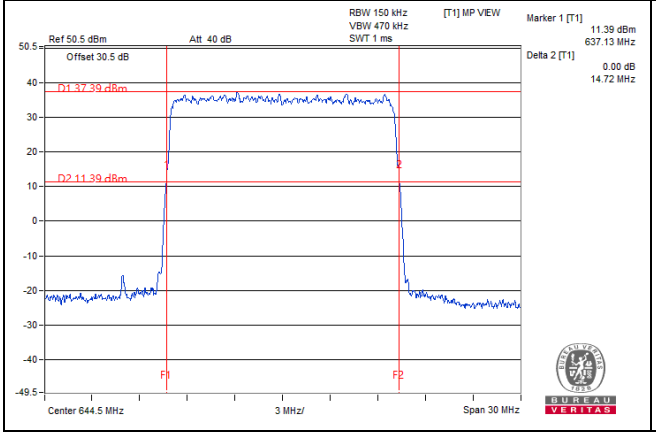


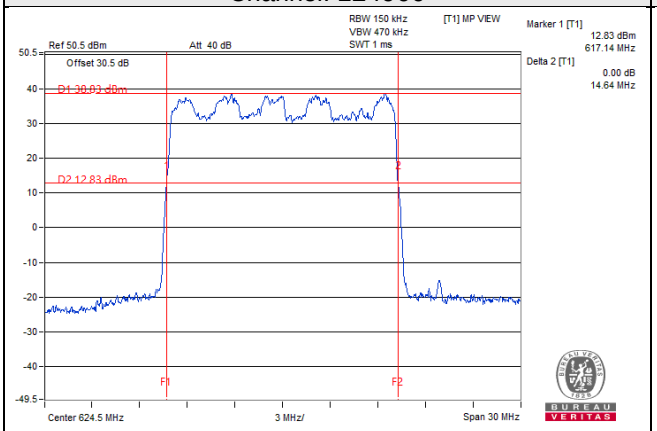
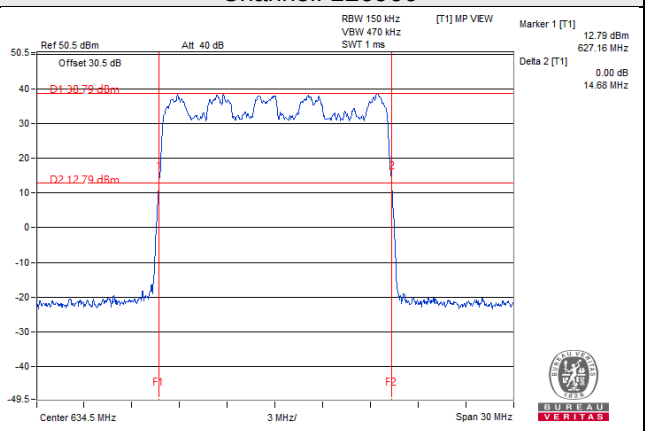
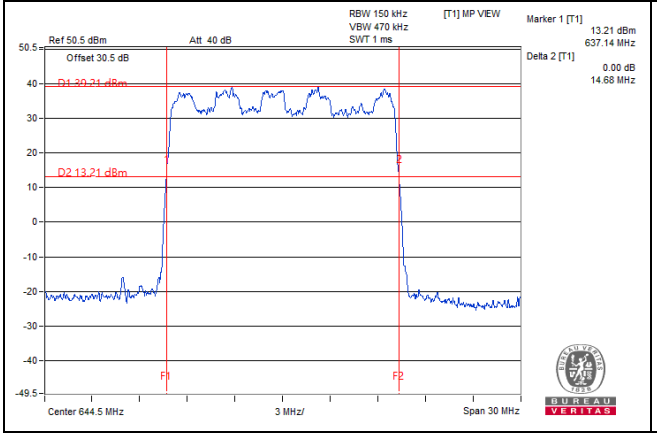
16QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

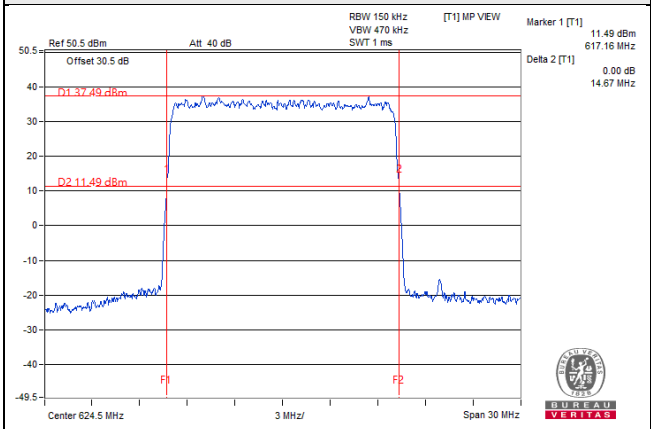
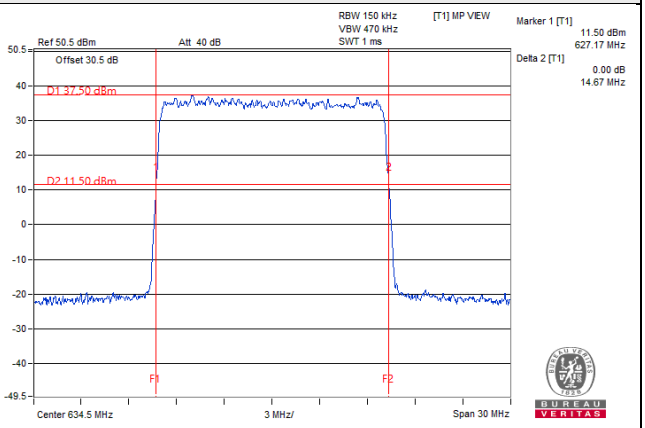
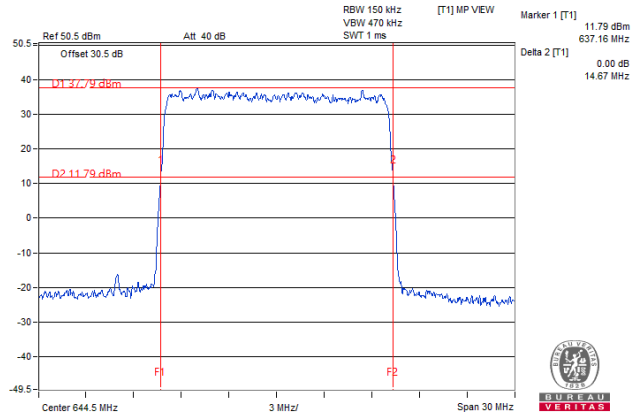
64QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

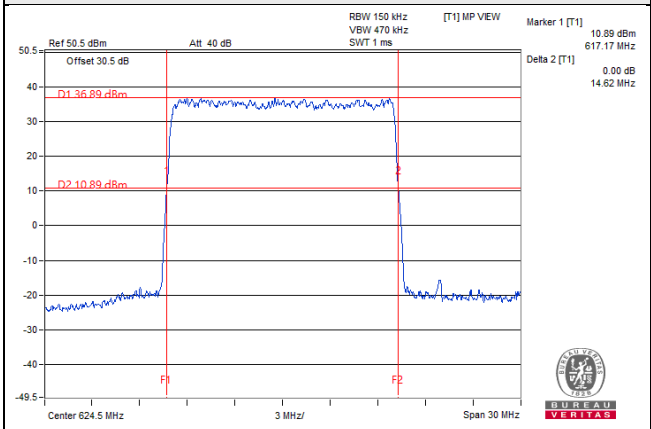
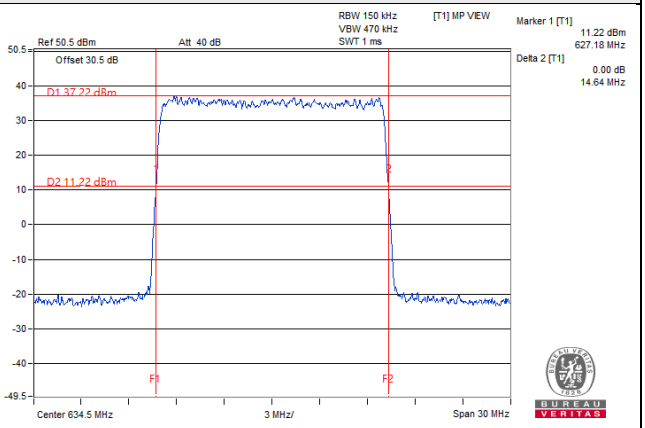
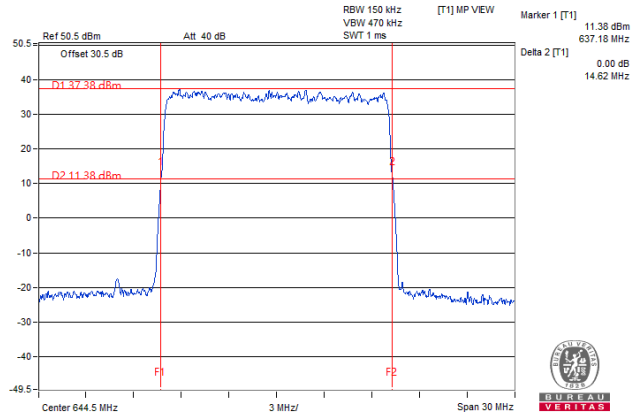
256QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

Chain 1

Spectrum Plot of Worst Value	
-26dBc Bandwidth	
QPSK	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

16QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

64QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

256QAM	
Channel: 124900	Channel: 126900
	
Channel: 128900	
	

20MHz

Channel Number	Freq. (MHz)	26dB DOWN BANDWIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
125400	627	19.53	19.50	19.54	19.55	19.50	19.49	19.54	19.55
126900	634.5	19.54	19.47	19.54	19.53	19.51	19.47	19.53	19.54
128400	642	19.49	19.46	19.54	19.54	19.50	19.44	19.51	19.54

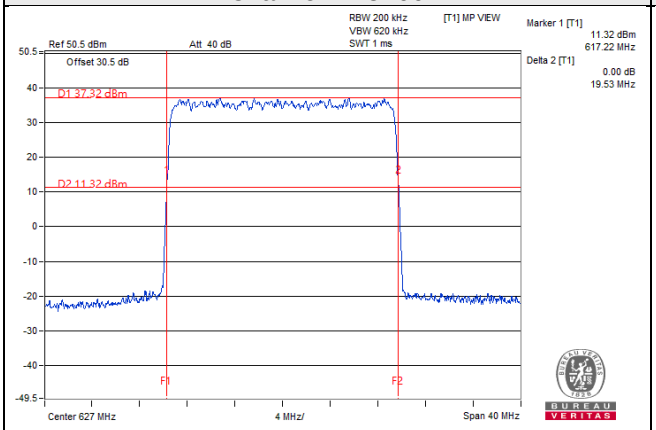
Chain 0

Spectrum Plot of Worst Value

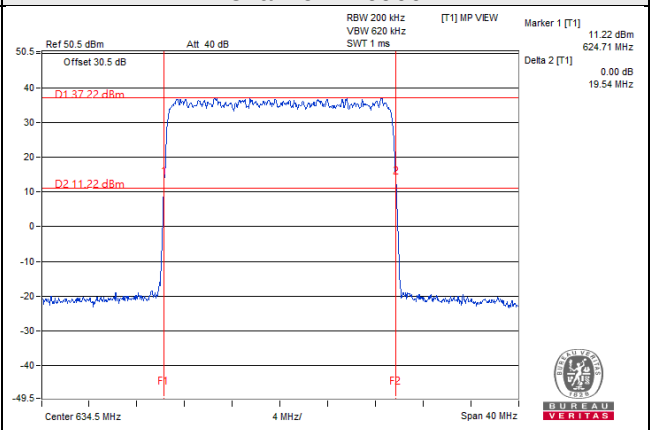
-26dBc Bandwidth

QPSK

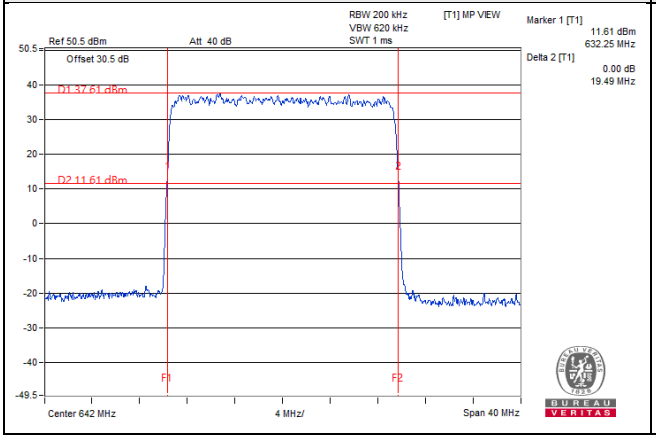
Channel: 125400

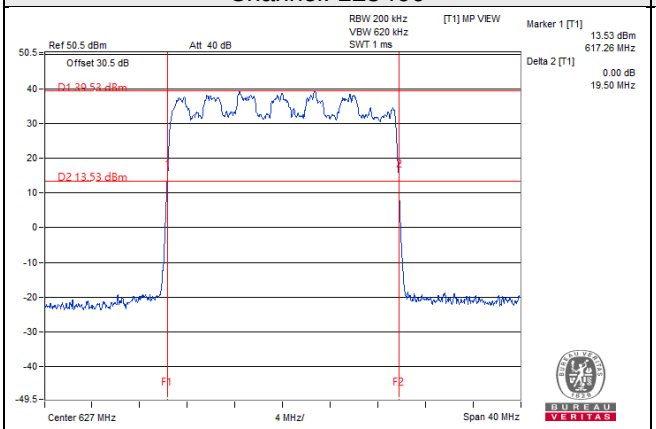
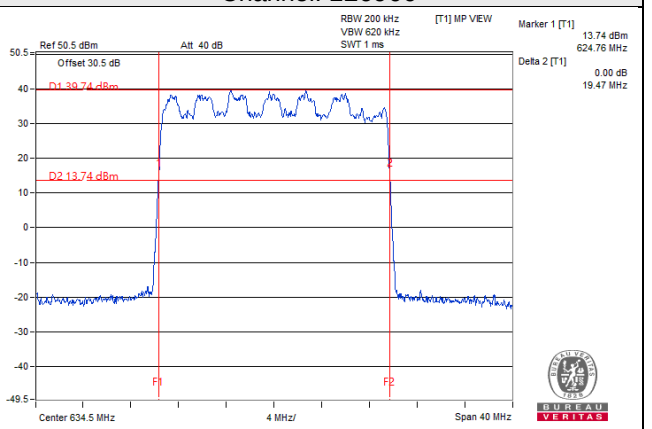
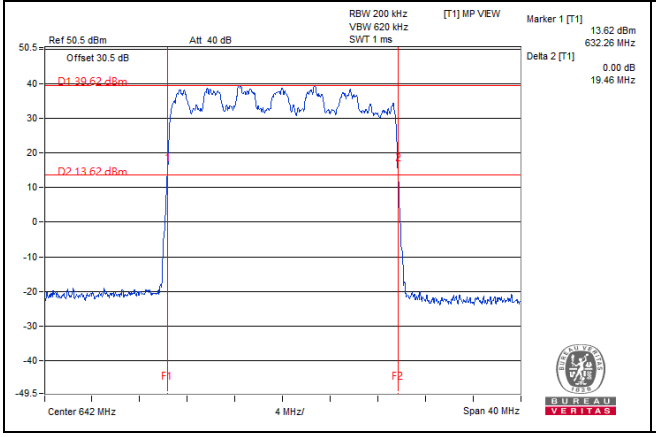


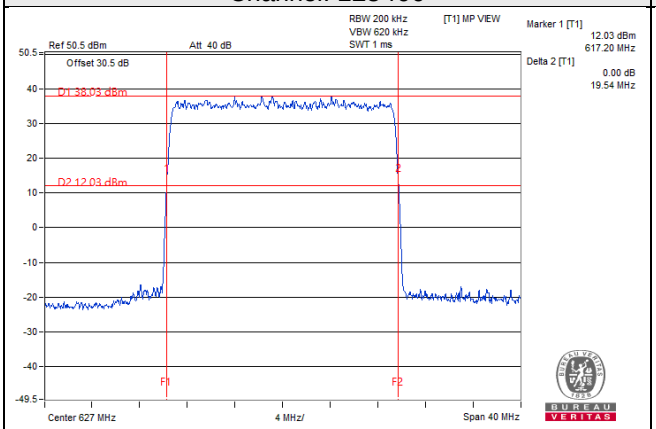
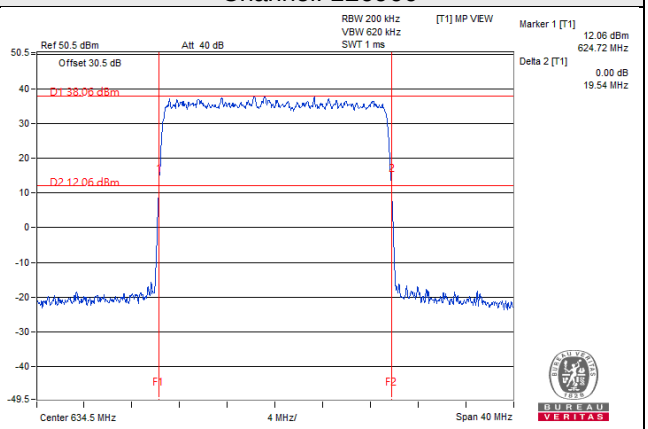
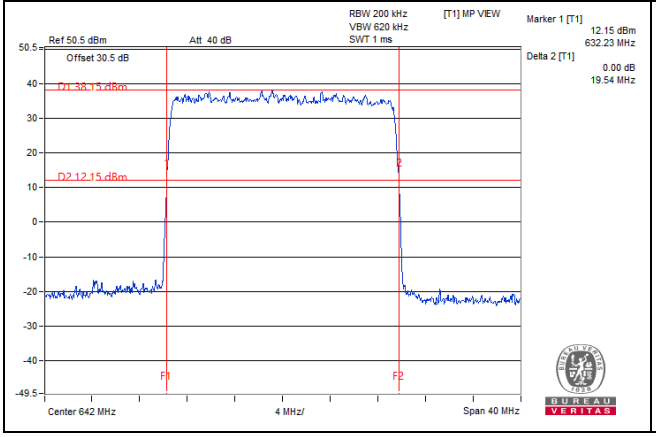
Channel: 126900

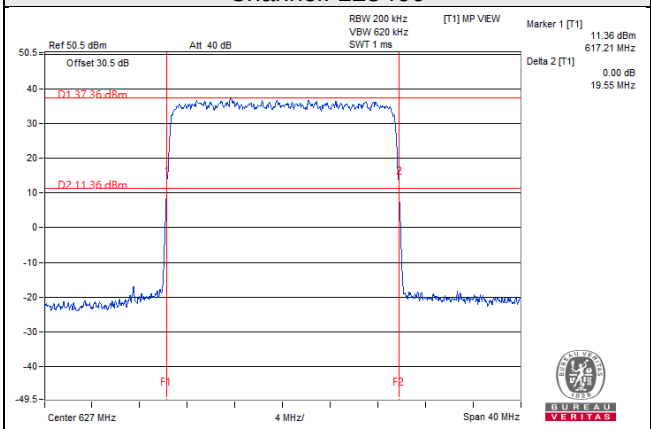
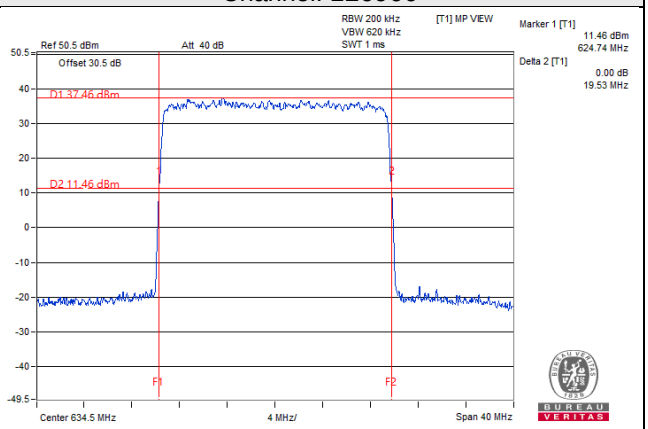
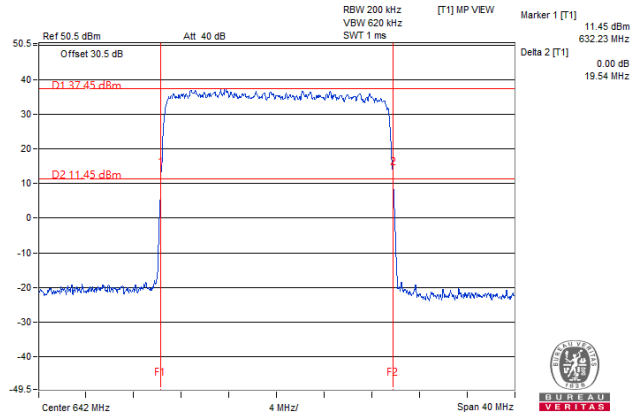


Channel: 128400

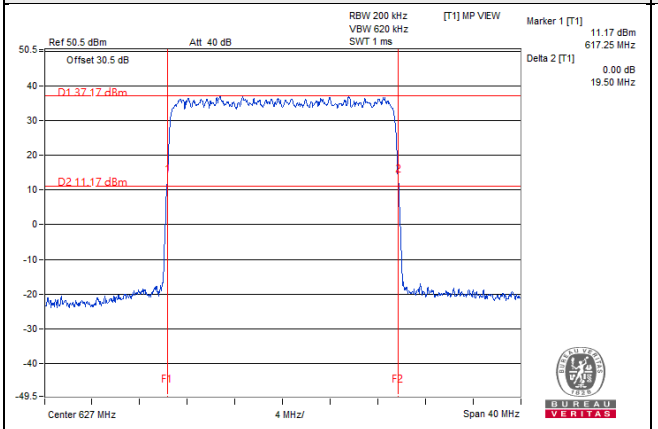
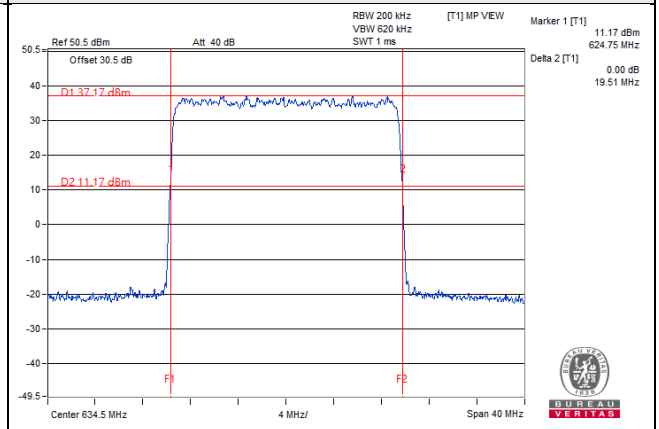
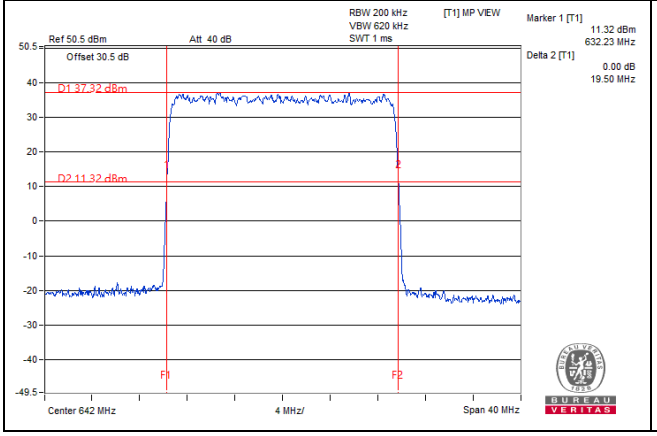


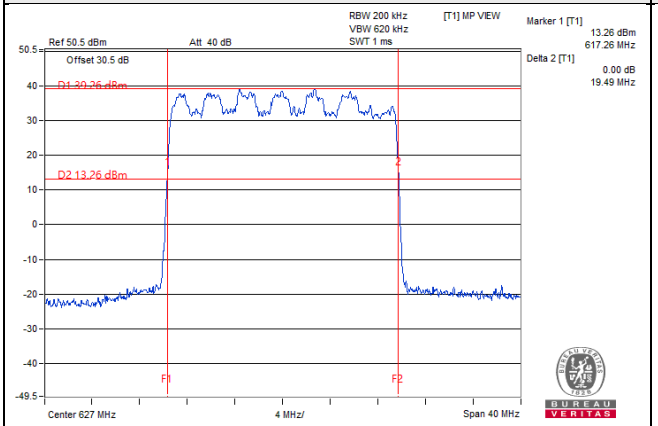
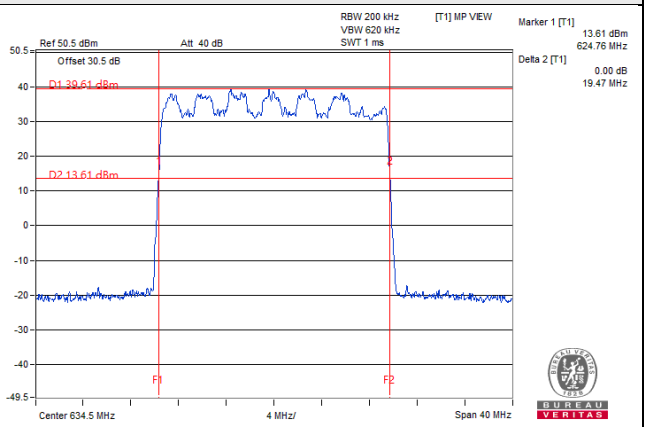
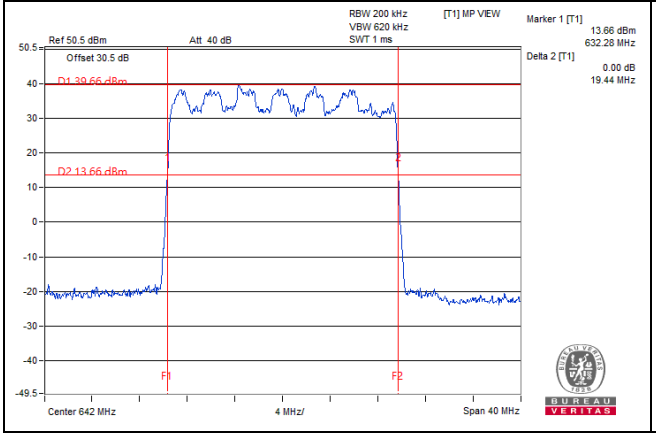
16QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

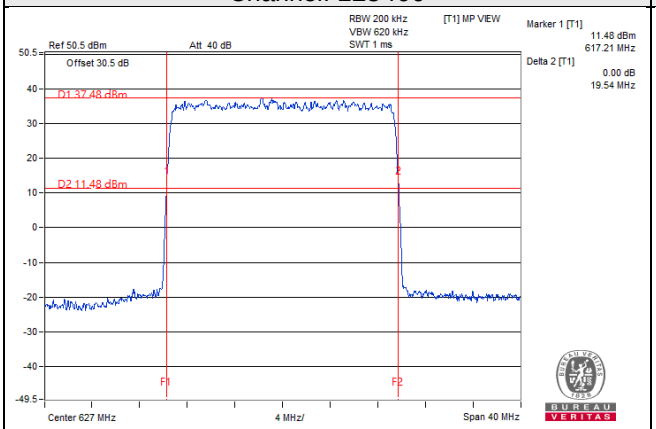
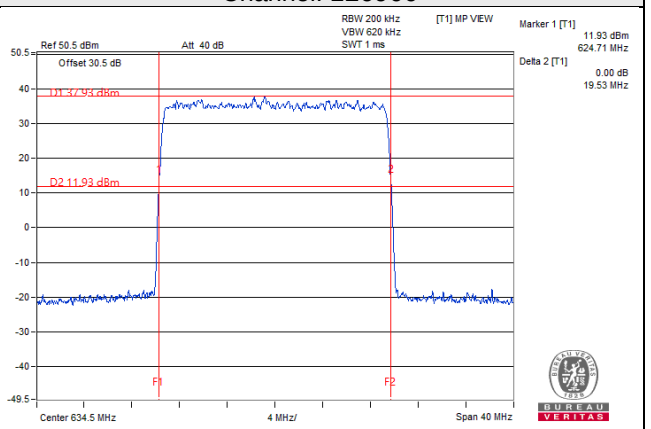
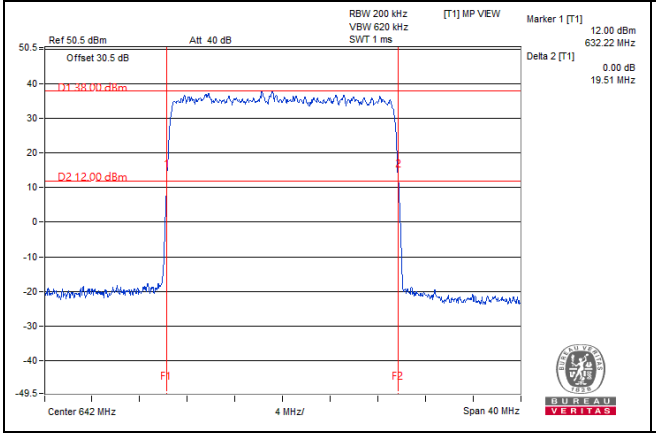
64QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

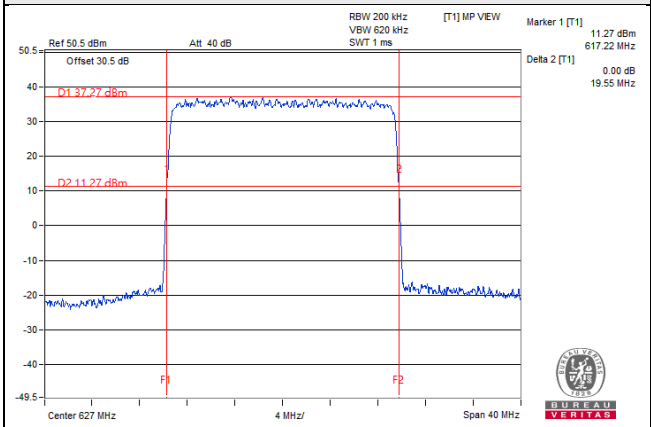
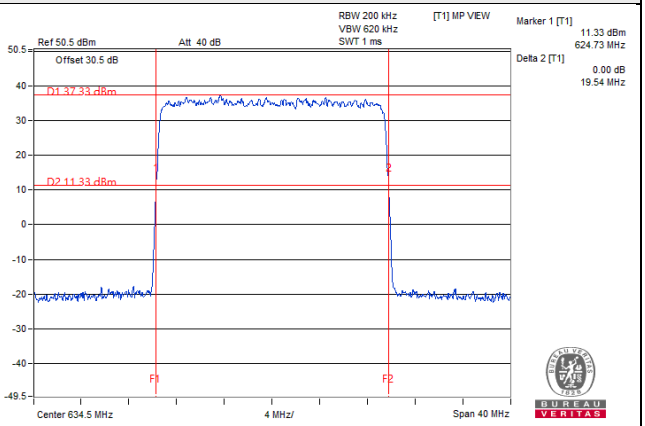
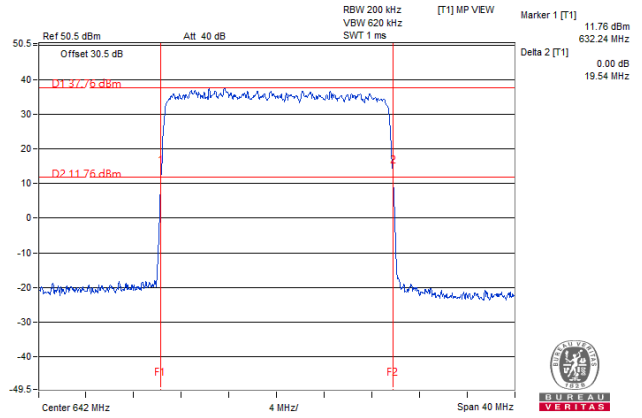
256QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

Chain 1

Spectrum Plot of Worst Value	
-26dBc Bandwidth	
QPSK	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

16QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

64QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

256QAM	
Channel: 125400	Channel: 126900
	
Channel: 128400	
	

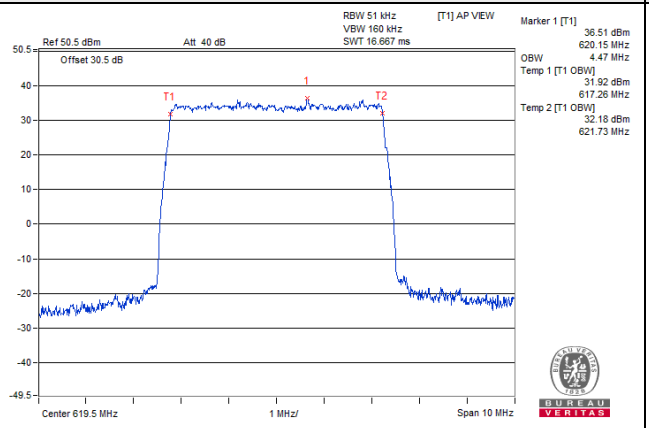
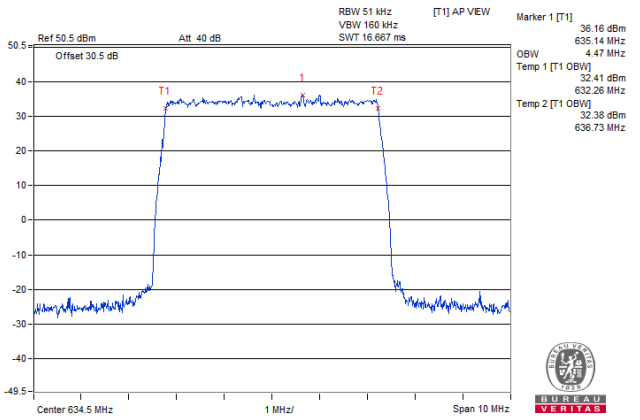
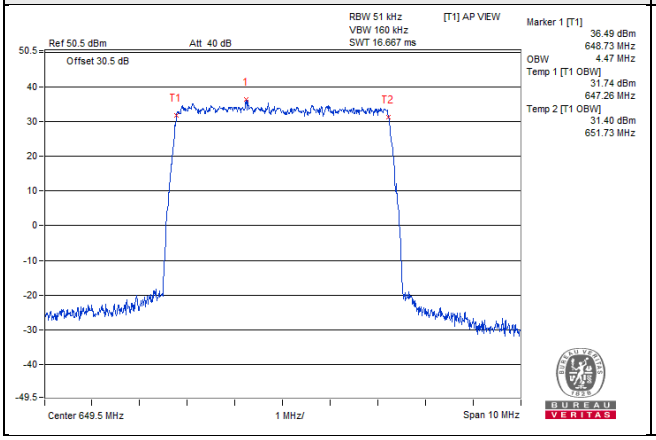
4.4.5 Test Results (Occupied Bandwidth)

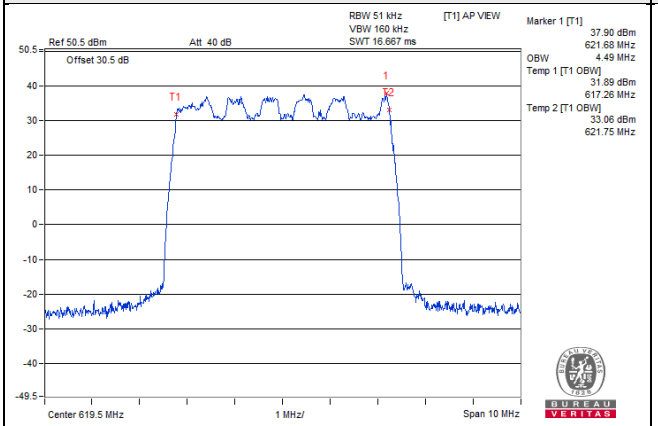
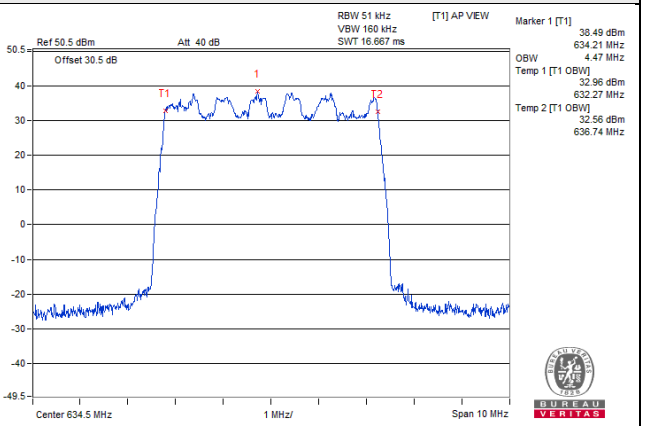
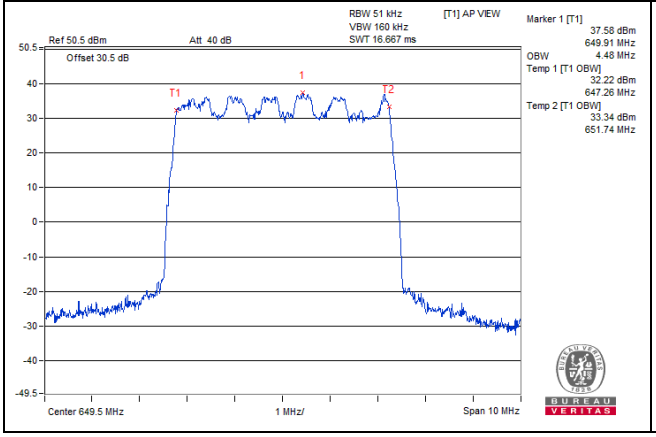
Single Carrier

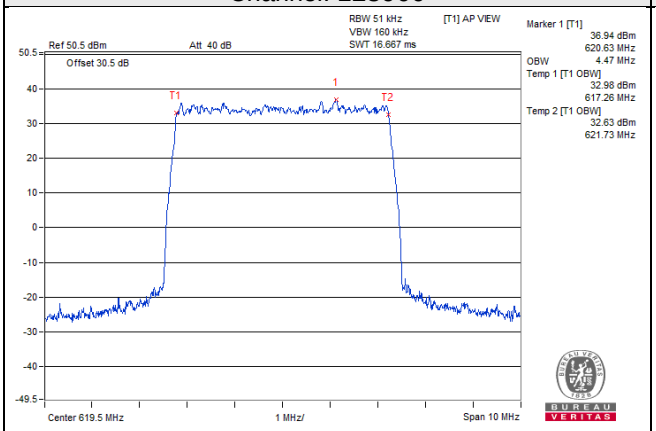
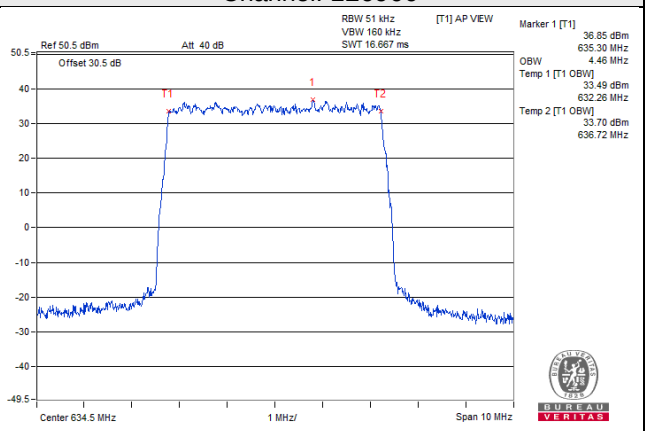
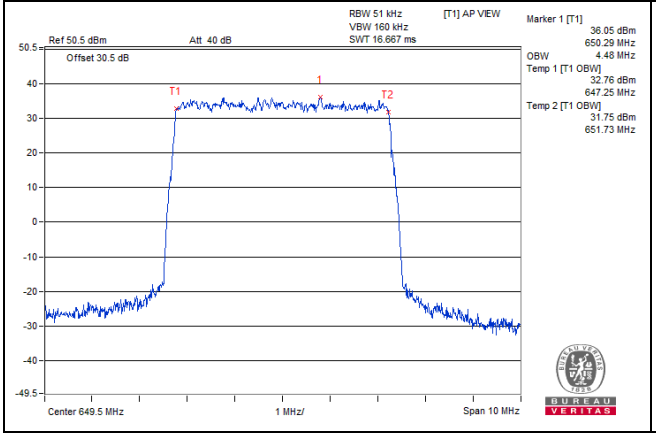
5MHz

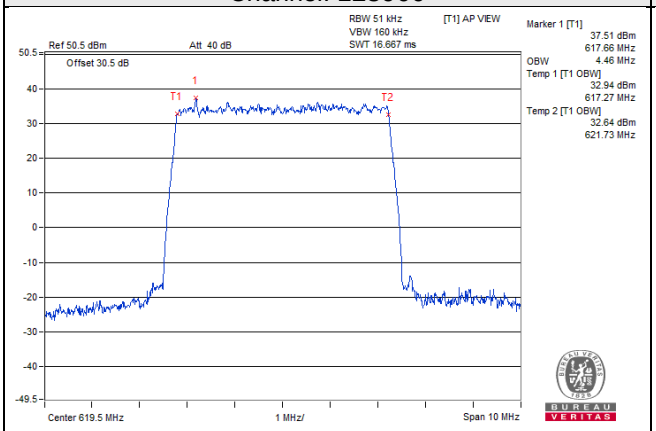
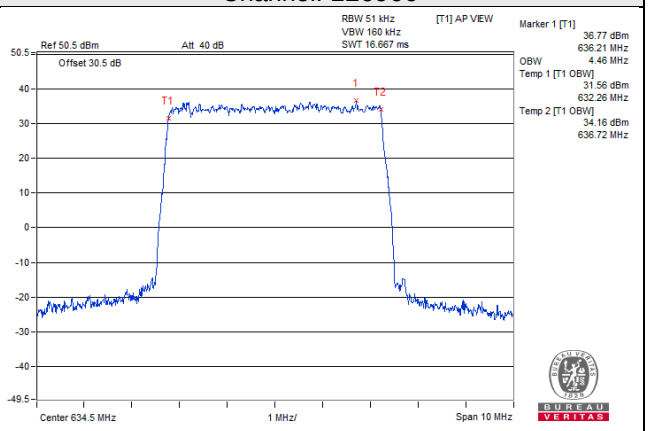
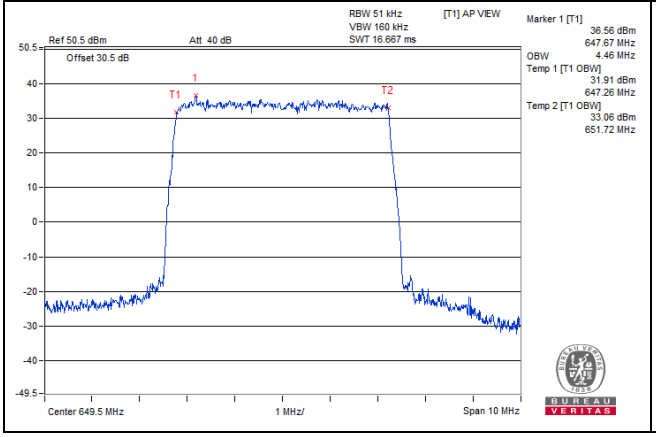
Channel Number	Freq. (MHz)	OCP 99 BAND WIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
123900	619.5	4.47	4.49	4.47	4.46	4.47	4.50	4.47	4.46
126900	634.5	4.47	4.47	4.46	4.46	4.47	4.47	4.47	4.47
129900	649.5	4.47	4.48	4.48	4.46	4.48	4.49	4.46	4.47

Chain 0

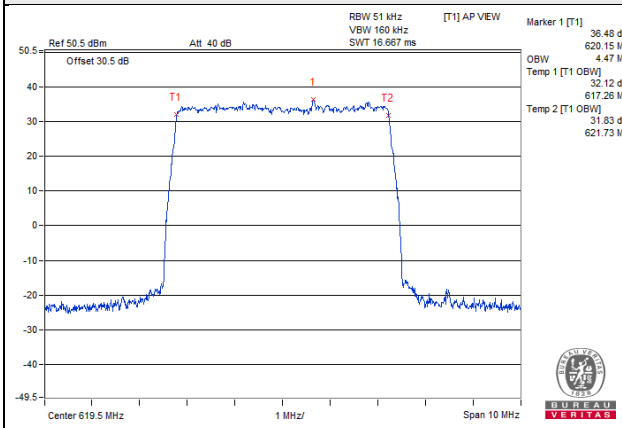
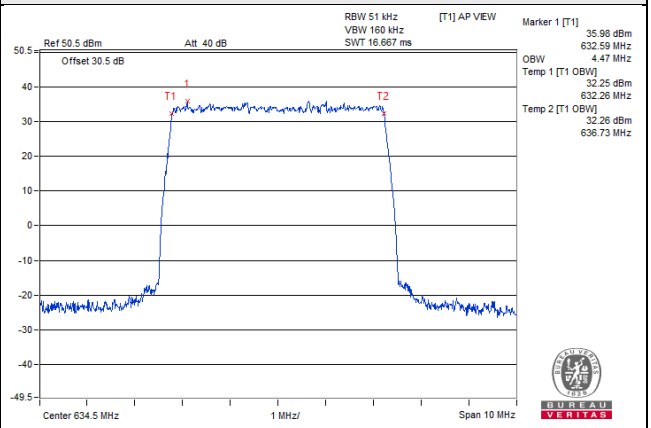
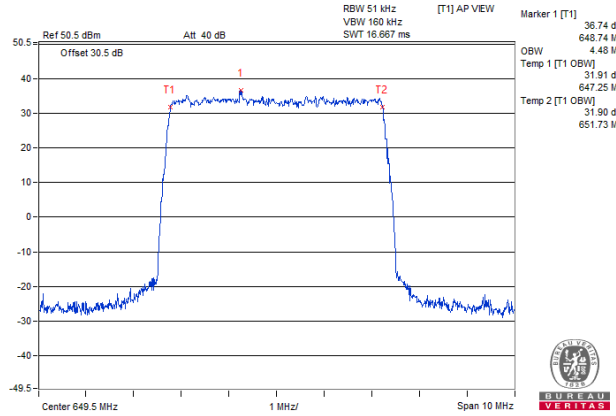
Spectrum Plot of Worst Value	
Occupied Bandwidth	
QPSK	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

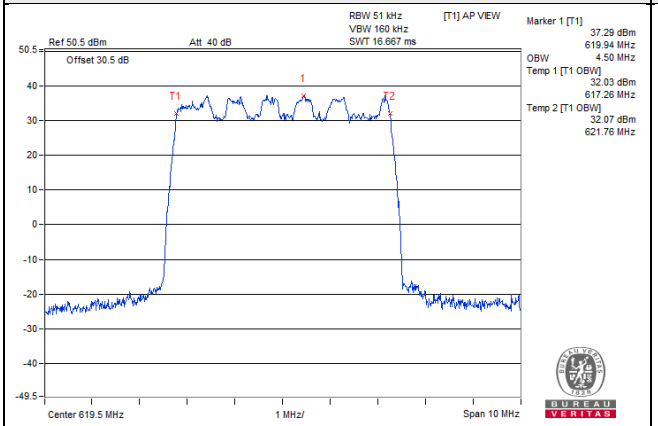
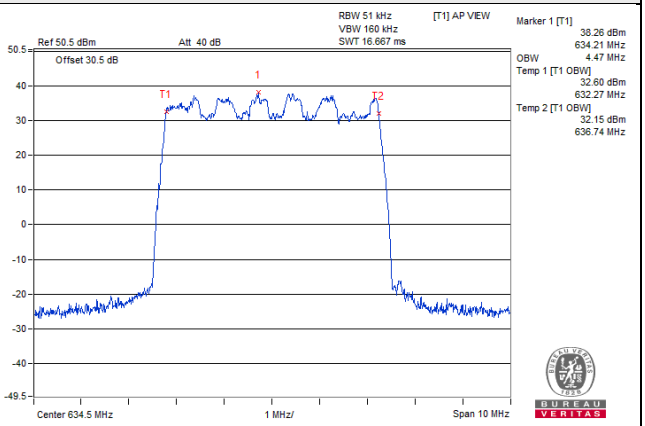
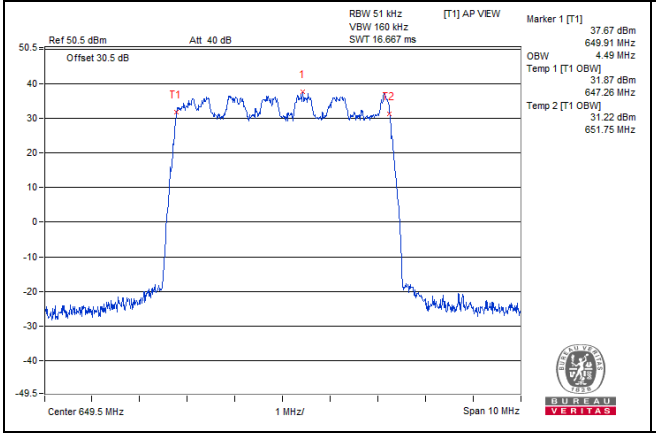
16QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

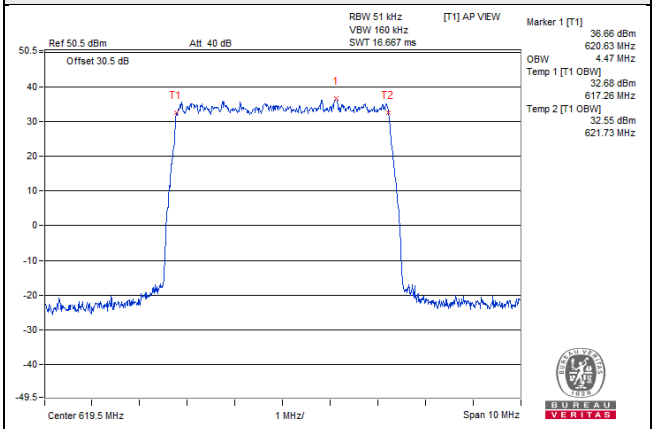
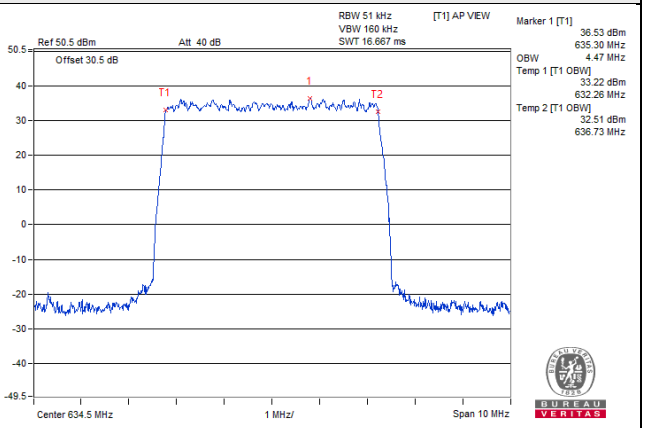
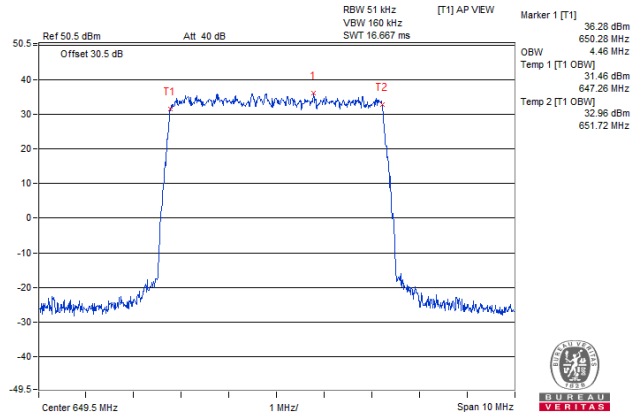
64QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

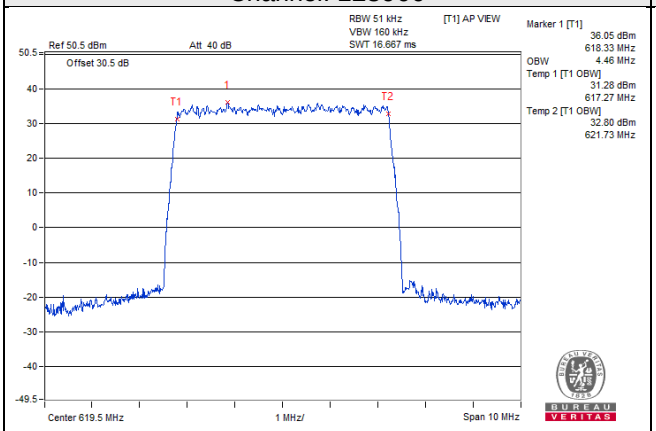
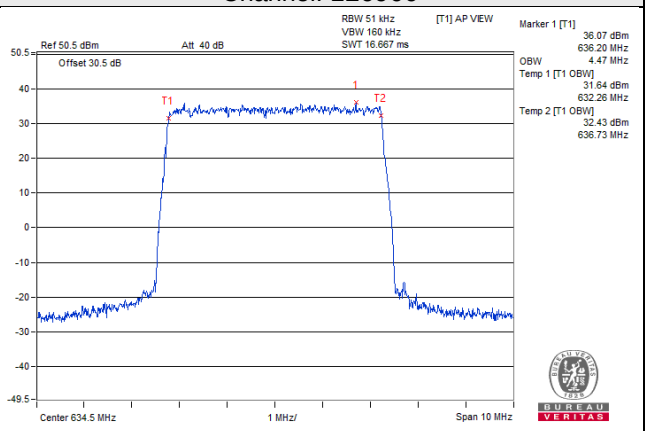
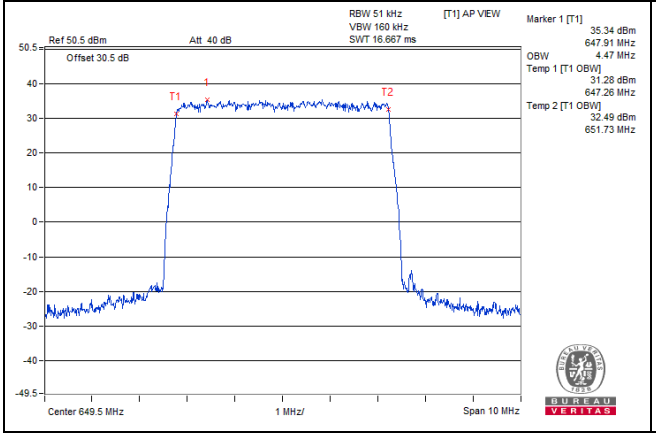
256QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

Chain 1

Spectrum Plot of Worst Value	
Occupied Bandwidth	
QPSK	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

16QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

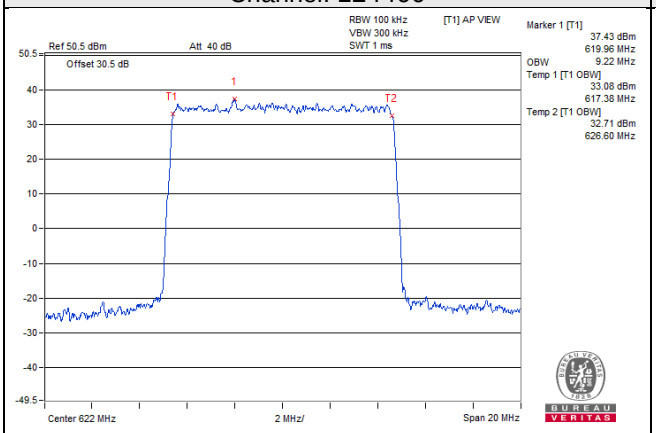
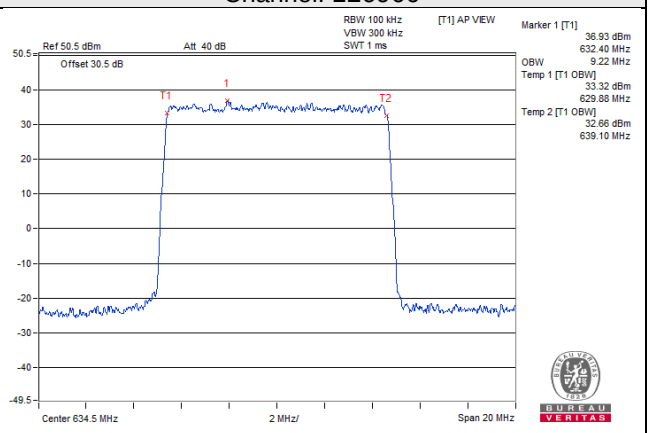
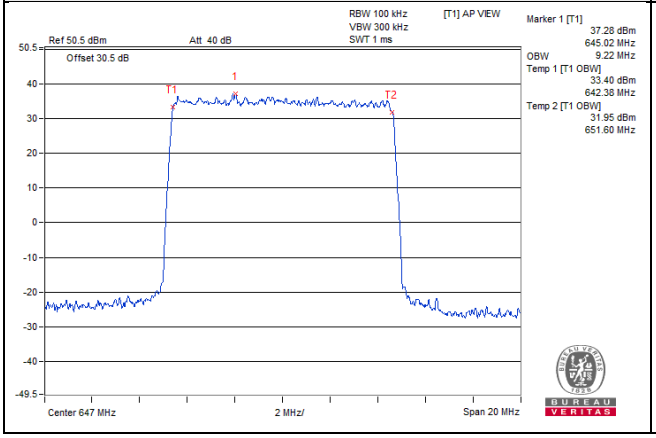
64QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

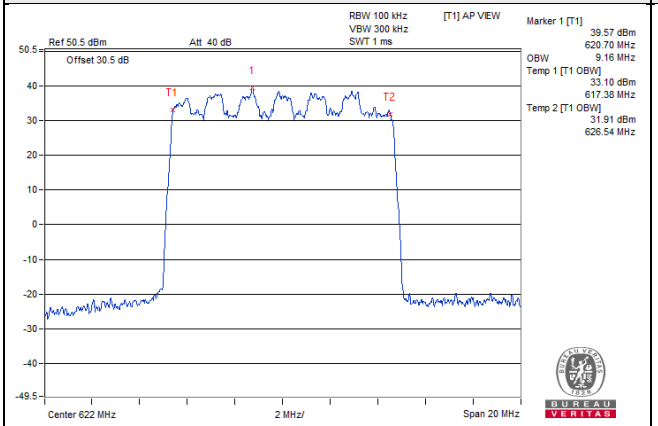
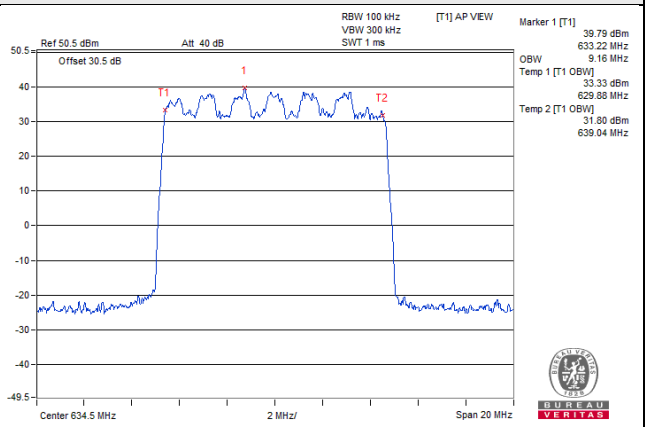
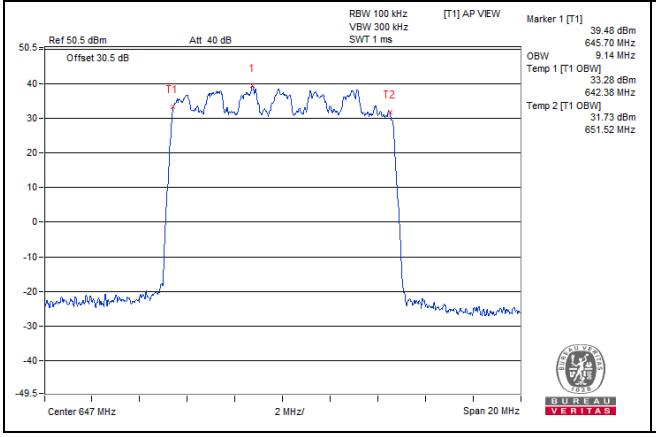
256QAM	
Channel: 123900	Channel: 126900
	
Channel: 129900	
	

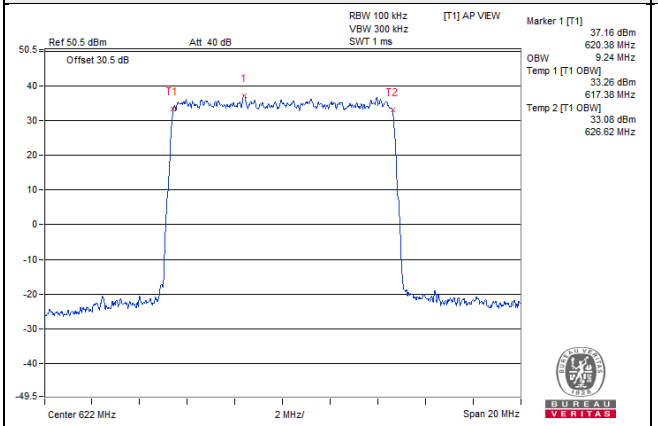
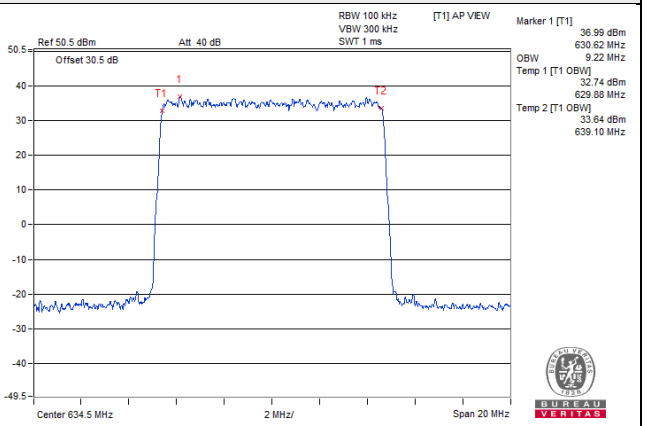
10MHz

Channel Number	Freq. (MHz)	OCP 99 BAND WIDTH (MHz)							
		Chain0				Chain1			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
124400	622	9.22	9.16	9.24	9.20	9.20	9.16	9.22	9.20
126900	634.5	9.22	9.16	9.22	9.20	9.22	9.16	9.22	9.20
129400	647	9.22	9.14	9.22	9.20	9.22	9.16	9.22	9.20

Chain 0

Spectrum Plot of Worst Value	
Occupied Bandwidth	
QPSK	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

16QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400	
	

64QAM	
Channel: 124400	Channel: 126900
	
Channel: 129400