

TEST REPORT FOR LTE TESTING

Report No.: SRTC2019-9004(F)-19121201(C)

Product Name: LTE USB Dongle

Product Model: MF833U1

Applicant: ZTE Corporation

Manufacturer: ZTE Corporation

Specification: FCC Part 2, Part 24E, Part 22H, Part 27 (2019)

FCC ID: SRQ- MF833U1

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30, Shixing Street, Shijingshan District,

Beijing, P.R.China

Tel: 86-10-57996183 Fax: 86-10-57996388

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1. GENERAL INFORMATION

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC). The test results relate only to individual items of the samples which have been tested. The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
Contacted person:	Liu Jia
Tel:	+86 10 57996183
Fax:	+86 10 57996388
Email:	liujiaf@srtc.org.cn

1.3 Applicant's details

Company:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, P.R.China
City:	Shenzhen
Country or Region:	P.R.China
Contacted person:	Gong Yu
Tel:	'86-21-68895397
Fax:	---
Email:	gongyu@zte.com.cn

1.4 Manufacturer's details

Company:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, P.R.China
City:	Shenzhen
Country or Region:	P.R.China
Contacted person:	Gong Yu
Tel:	'86-21-68895397
Fax:	---
Email:	gongyu@zte.com.cn

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2019-12-12
Testing Start Date:	2019-12-12
Testing End Date:	2020-01-08

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	30
Maximum Extreme	55	---
Minimum Extreme	-10	---

Normal Supply Voltage (V d.c.):	5.0
Maximum Extreme Supply Voltage (V d.c.):	5.2
Minimum Extreme Supply Voltage (V d.c.):	4.8

2 DESCRIPTION OF THE EQUIPMENT UNDER TEST

2.1 Final Equipment Build Status

Frequency Range	LTE Band 2: Tx:1850~1910MHz Rx:1930~1990MHz LTE Band 5: Tx:824~849 MHz Rx:869 ~894MHz LTE Band 7: Tx:2500~2570MHz Rx:2620~2690MHz
Modulation Type	QPSK/16QAM/64QAM
Antenna Type	Fixed Internal Antenna
Antenna Gain	LTE 2: 1.0dBi/LTE 5: 0.5dBi/LTE 7: 2.0dBi/
Power Supply	DC/Laptop
Hardware Version	dwqB
Software Version	BD_HTXMF833U1V1.0.0B03
IMEI	860220040412572

2.2 Support Equipment

N/A

2.3 Summary table

FCC Rule Part	Frequency Range(MHz)	EIRP/ERP (W)	Frequency Tolerance (ppm)	Emission Designator	Emission Bandwidth (MHz)	Measured 26dBC Bandwidth (MHz)	Communication Type
LTE BAND2							
24E	1850.7-1909.3	0.198	-0.092	1M09G7D	1.4M	1.398	QPSK
	1850.7-1909.3	0.139	-0.092	1M09D7W	1.4M	1.376	16QAM
	1850.7-1909.3	0.148	-0.092	1M09W7D	1.4M	1.403	64QAM
	1851.5-1908.5	0.192	-0.098	2M70G7D	3M	3.022	QPSK
	1851.5-1908.5	0.159	-0.098	2M72D7W	3M	3.030	16QAM
	1851.5-1908.5	0.146	-0.098	2M71W7D	3M	3.018	64QAM
	1852.5-1907.5	0.177	0.094	4M50G7D	5M	5.068	QPSK
	1852.5-1907.5	0.162	0.094	4M50D7W	5M	5.090	16QAM
	1852.5-1907.5	0.163	0.094	4M50W7D	5M	5.045	64QAM
	1855-1905	0.165	-0.095	9M0G7D	10M	10.150	QPSK
	1855-1905	0.152	-0.095	9M0D7W	10M	10.210	16QAM
	1855-1905	0.156	-0.095	9M0W7D	10M	10.240	64QAM
	1857.5-1902.5	0.187	-0.091	13M5G7D	15M	15.540	QPSK
	1857.5-1902.5	0.140	-0.091	13M5D7W	15M	15.470	16QAM
	1857.5-1902.5	0.151	-0.091	13M5W7D	15M	15.530	64QAM
	1860-1900	0.180	-0.075	18M0G7D	20M	19.480	QPSK
	1860-1900	0.144	-0.075	17M9D7W	20M	19.500	16QAM
	1860-1900	0.156	-0.075	17M9W7D	20M	19.500	64QAM

LTE BAND5							
22H	824.7-848.3	0.226	-0.098	1M09G7D	1.4M	1.367	QPSK
	824.7-848.3	0.197	-0.098	1M09D7W	1.4M	1.364	16QAM
	824.7-848.3	0.194	-0.098	1M09W7D	1.4M	1.383	64QAM
	825.5-847.5	0.229	-0.100	2M71G7D	3M	3.030	QPSK
	825.5-847.5	0.173	-0.100	2M71D7W	3M	3.040	16QAM
	825.5-847.5	0.163	-0.100	2M72W7D	3M	3.038	64QAM
	826.5-846.5	0.242	-0.098	4M51G7D	5M	5.063	QPSK
	826.5-846.5	0.200	-0.098	4M50D7W	5M	5.072	16QAM
	826.5-846.5	0.190	-0.098	4M51W7D	5M	5.067	64QAM
	829-844	0.243	-0.099	9M0G7D	10M	10.150	QPSK
	829-844	0.182	-0.099	9M0D7W	10M	10.280	16QAM
	829-844	0.191	-0.099	9M0W7D	10M	10.170	64QAM
LTE BAND7							
27	2502.5-2567.5	0.212	-0.095	4M50G7D	5M	5.080	QPSK
	2502.5-2567.5	0.153	-0.095	4M49D7W	5M	5.069	16QAM
	2502.5-2567.5	0.148	-0.095	4M50W7D	5M	5.040	64QAM
	2505-2565	0.229	-0.097	9M0G7D	10M	10.370	QPSK
	2505-2565	0.151	-0.097	9M0D7W	10M	10.200	16QAM
	2505-2565	0.156	-0.097	9M0W7D	10M	10.270	64QAM
	2507.5-2562.5	0.215	0.096	13M5G7D	15M	15.480	QPSK
	2507.5-2562.5	0.159	0.096	13M5D7W	15M	15.360	16QAM
	2507.5-2562.5	0.144	0.096	13M5W7D	15M	15.450	64QAM
	2510-2560	0.219	0.081	17M9G7D	20M	19.520	QPSK
	2510-2560	0.152	0.081	18M0D7W	20M	19.480	16QAM
	2510-2560	0.150	0.081	17M9W7D	20M	19.560	64QAM

3 REFERENCE SPECIFICATION

Specification	Version	Title
FCC Part 2	2019	Frequency allocations and radio treaty matters; general rules and regulations
FCC Part 22	2019	Public mobile services
FCC Part 24	2019	Personal communications services
FCC Part 27	2019	Miscellaneous wireless communications services
ANSI C63.26	2015	American national standard for compliance testing of transmitters used in licensed radio services
KDB 971168 D01	April 9, 2018	Measurement guidance for certification of licensed digital transmitters
TIA-603-E-2016	March 2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

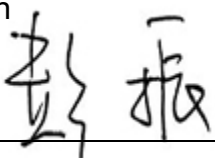
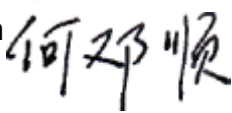
4 KEY TO NOTES AND RESULT CODES

The following are the definition of the test result.

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
NT	Normal Temperature
NV	Nominal voltage
HV	High voltage
LV	Low voltage

5 RESULT SUMMARY

No.	Test case	FCC reference	Verdict
1	RF Power Output	2.1046	Pass
2	Effective Radiated Power and Effective Isotropic Radiated Power	22.913(a)(5), 24.232(c), 27.50(b)(10), 27.50(c)(10), 27.50(h)(2), 27.50(d)(4), 27.50(a)(3)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Peak-Average Ratio	24.232(d), 27.50(d)(5)	Pass
5	Emission Bandwidth	2.1049	Pass
6	Spurious Emissions at antenna terminals	2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a)	Pass
7	Band Edges Compliance	2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a)	Pass
8	Frequency Stability	2.1055, 22.355, 24.235, 27.54	Pass
9	Radiated Spurious Emissions	2.1053, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(f), 27.53(a), 27.53(m)	Pass

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. He Dengshun 	Issued date: 20200112

6 TEST RESULT

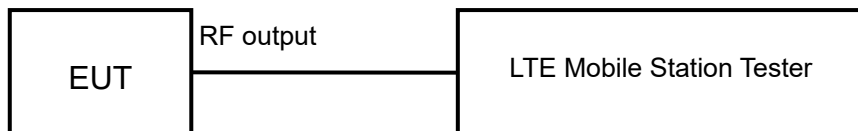
6.1 RF Power Output

Rule Part(s)
FCC: 2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

Limits: No RF Power Output requirements in part 2.1046.

Test result:

The test results are shown in Appendix A.

6.2 Effective Radiated Power and Effective Isotropic Radiated Power

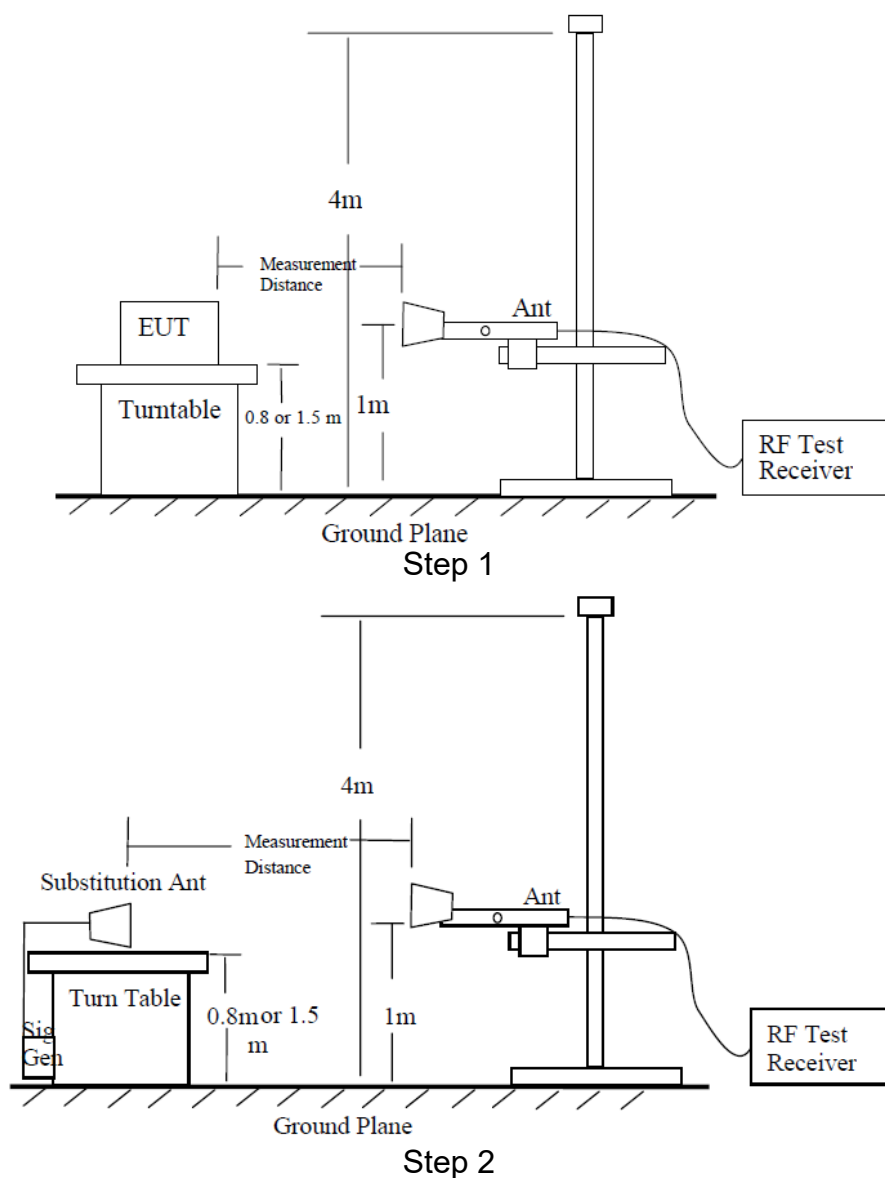
Rule Part(s)

FCC: 22.913(a) (5), 24.232(c), 27.50(b) (10), 27.50(c) (10), 27.50(h) (2), 27.50(d) (4), 27.50(a) (3)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



Test procedure:

The measurements procedures in TIA-603-E-2016 are used.

Step 1:

The measurement is carried out in the chamber. EUT was placed on a 0.8m ($f < 1\text{GHz}$)/1.5m ($f > 1\text{GHz}$) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100KHz($f < 1\text{GHz}$)/1MHz ($f > 1\text{GHz}$). The antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna.

A power (P_{mea}) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (P_{mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A "reference path loss" should be calculated after test. The attenuation of "reference path loss" is the cable loss between the Signal Source with the Substitution Antenna (P_{ca}) and the Substitution Antenna Gain (G_a).

The measurement results are obtained as described below:

Power (EIRP) = $P_{mea} + P_{ca} + G_a$

ERP/EIRP LIMIT

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15 \text{ (dB)}$.

22.913(a) (5)

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

24.232(c)

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

27.50(b) (10)

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

27.50(c) (10)

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

27.50(h) (2)

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

27.50(d) (4)

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

27.50(a) (3)

Mobile and portable stations (i) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth.

Test result:

The test results are shown in Appendix B.

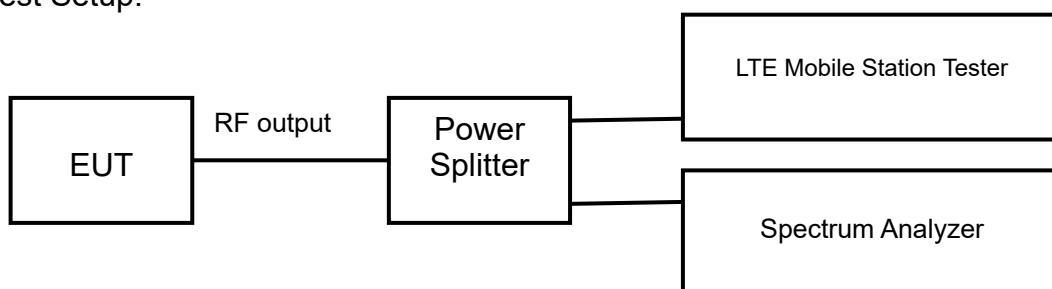
6.3 Occupied Bandwidth

Rule Part(s)
FCC: 2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 4.2

Test Setting:

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq$ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

The test results are shown in Appendix A.

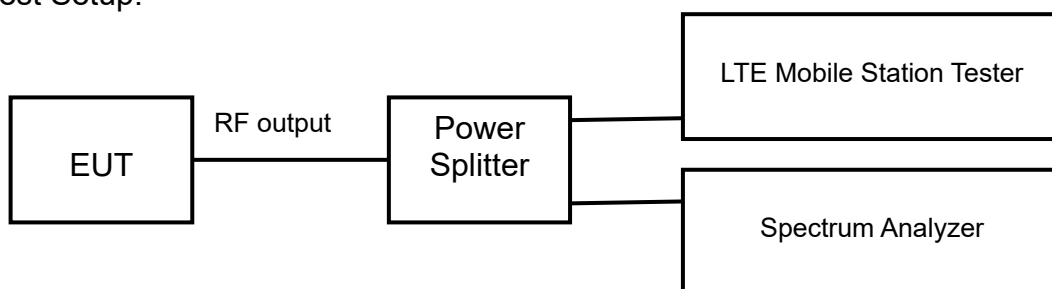
6.4 Emission Bandwidth

Rule Part(s)
FCC: 2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 4.2

Test Setting:

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq$ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of 26dB bandwidth observed in Step 7

Limits: No specific emission bandwidth requirements in part 2.1049.

Test result:
The test results are shown in Appendix A.

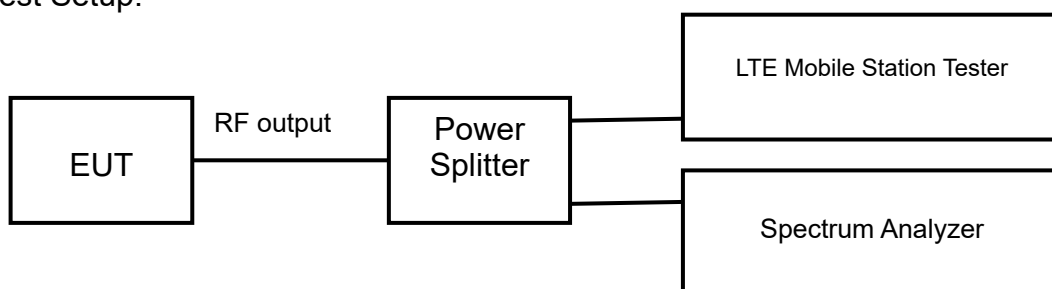
6.5 Peak-Average Ratio

Rule Part(s)
FCC: 24.232(d), 27.50(d) (5)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 5.7.1

Test Setting:

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW ≥ OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Limits

24.232(d), 27.50(d) (5)

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test result:

The test results are shown in Appendix A.

6.6 Spurious Emissions at antenna terminal

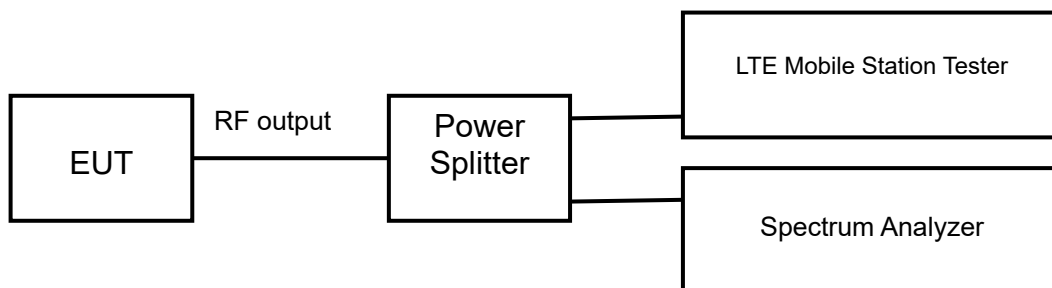
Rule Part(s)

FCC: 2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 6.0

Test Setting:

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency
2. Detector = RMS
3. RBW=1MHz
4. VBW=3MHz
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Limits

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P)$ (P [Watts]), where P is the transmitter power in Watts.

For Band 30, the minimum permissible attenuation level of any spurious emission <2288MHz and >2365MHz is $70 + \log_{10}(P)$ (P [Watts]).

For Band 7 and 41, the minimum permissible attenuation level of any spurious emission is $55 + \log_{10}(P)$ (P [Watts]).

Test result:

The test results are shown in Appendix A.

6.7 Band Edges Compliance

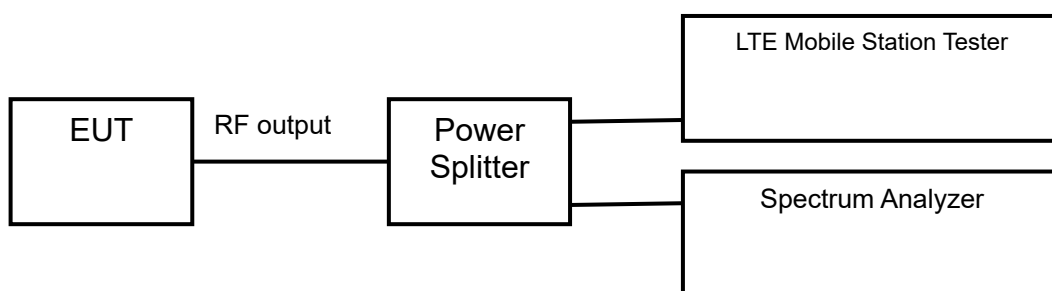
Rule Part(s)

FCC: 2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 6.0

Test Setting:

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Limits

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P)$ [Watts], where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 30 is $> 43 + 10\log_{10}(P)$ [Watts] at 2300-2305MHz & 2345-2360MHz, $> 55 + 10\log_{10}(P)$ [Watts] at 2320-2324MHz & 2341-2345MHz, $> 61 + 10\log_{10}(P)$ [Watts] at 2324-2328MHz & 2337-2341MHz, $> 67 + 10\log_{10}(P)$ [Watts] at 2288-2292MHz & 2328- 2337MHz, and $> 70 + 10\log_{10}(P)$ [Watts] at frequencies < 2288MHz & >2365MHz.

Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The 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 emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c)(4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Per 27.53(a)(5) in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). The 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 26 dB below the transmitter power.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5MHz.

Test result:

The test results are shown in Appendix A.

6.8 Frequency Stability

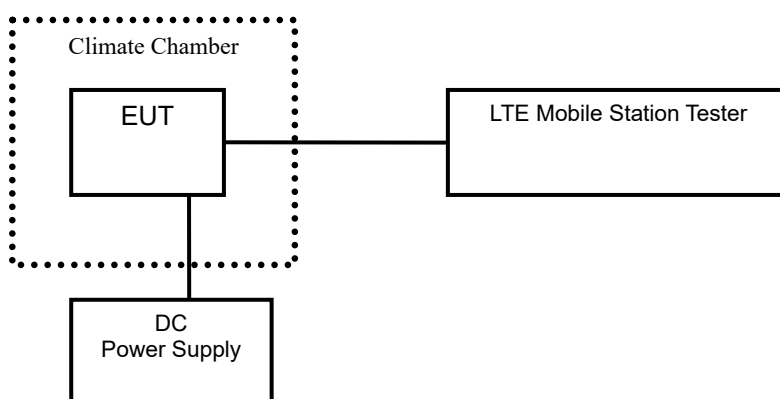
Rule Part(s)

FCC: 2.1055, 22.355, 24.235, 27.54

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



Test Procedure:

ANSI/TIA-603-E-2016

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C (The temperature range can be declared by the manufacturer). A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Limits: For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test result:

The test results are shown in Appendix A.

6.9 Radiated Spurious Emissions

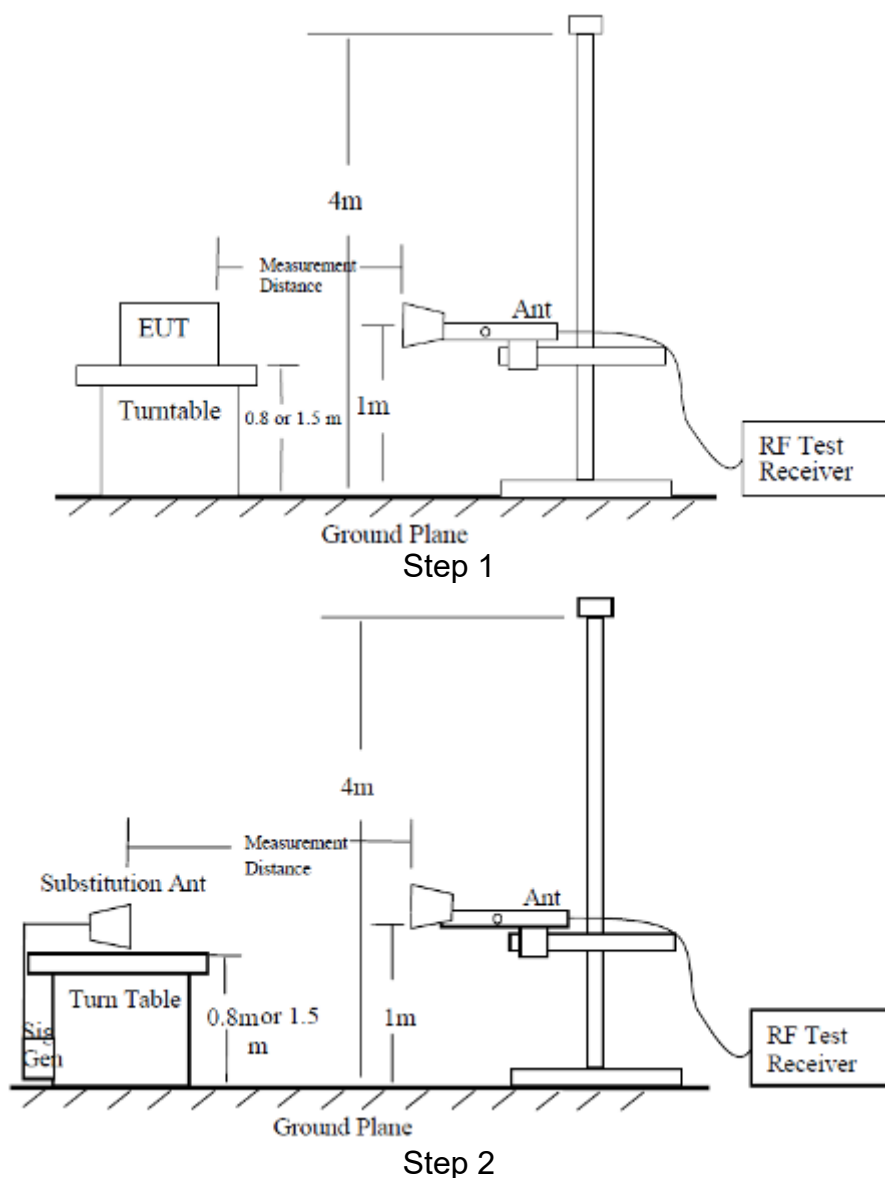
Rule Part(s)

FCC: 2.1053, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(f), 27.53(a), 27.53(m)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

The measurements procedures in TIA-603-E-2016 are used.

The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the chamber. EUT was placed on a 0.8m ($f < 1\text{GHz}$)/1.5m ($f > 1\text{GHz}$) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100 kHz ($f < 1\text{GHz}$)/1MHz ($f > 1\text{GHz}$). The antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 10th harmonic of the carrier. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power (P_{mea}) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A "reference path loss" should be calculated after test. The attenuation of "reference path loss" is the cable loss between the Signal Source with the Substitution Antenna (P_{ca}) and the Substitution Antenna Gain (G_a).

Calculation procedure:

The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_a$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15 \text{ (dB)}$.

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

$$P = P_{\text{mea}} + P_{\text{ca}} + G_a = (-20\text{dBm}) + (-30\text{dB}) + (11\text{dB}) = -39\text{dBm}$$

Test result:

The test results are shown in Appendix B.

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
RF Power Output	0.6 dB	
Occupied Bandwidth	3 kHz	
Spurious Emissions	30MHz~1GHz	2.83 dB
	1GHz~12.75GHz	2.50 dB
	12.75GHz~25GHz	2.75 dB
Band Edges Compliance	1.2dB	
Frequency Stability	4 Hz	

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	S/N	Calibration Date	Calibration Due Date
1	MT8820C Mobile Station Tester	Anritsu	6201300660	2019.08.20	2020.08.19
2	FSV40 Spectrum Analyzer	R&S	101065	2019.08.20	2020.08.19
2	N9020A Spectrum Analyzer	Agilent	MY48010771	2019.08.20	2020.08.19
3	6007 Power Divider	Weinschel	6007-GJ-1	2019.08.20	2020.08.19
4	DC Power Supply E3645A	Agilent	MY40000741	2019.03.01	2020.02.28
5	Temperature chamber SH241	ESPEC	92013758	2019.08.20	2020.08.19
6	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	----	----	----
7	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	----	----
8	Turn table Diameter:1m	FRANKONIA	----	----	----
9	Turn table Diameter:5m	FRANKONIA	----	----	----
10	Antenna master FAC(MA4.0)	MATURO	----	----	----
11	Antenna master SAC(MA4.0)	MATURO	----	----	----
12	9.080m×5.255m×3.525m Shielding room	FRANKONIA	----	----	----
13	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2019.08.20	2020.08.19
14	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100513	2019.08.20	2020.08.19
15	HL562 Ultra log antenna	R&S	100016	2019.08.20	2020.08.19
16	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2019.08.20	2020.08.19
17	ESI 40 EMI test receiver	R&S	100015	2019.08.20	2020.08.19
18	ESCS30 EMI test receiver	R&S	100029	2019.08.20	2020.08.19
19	HL562 Receive antenna	R&S	100167	2019.08.20	2020.08.19
20	ENV216 AMN	R&S	3560.6550.12	2019.08.20	2020.08.19

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

LTE Band 2

1 RF Power Output

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1850.7	18607	1.4	1	0	21.61
				1	5	21.61
				3	2	20.34
				6	0	20.28
	1880	18900		1	0	21.97
				1	5	21.91
				3	2	20.81
				6	0	20.64
	1909.3	19193		1	0	21.79
				1	5	21.71
				3	2	20.16
				6	0	20.61
16QAM	1850.7	18607	1.4	1	0	21.13
				1	5	21.02
				3	2	19.39
				6	0	19.58
	1880	18900		1	0	21.18
				1	5	21.16
				3	2	19.90
				6	0	19.89
	1909.3	19193		1	0	20.84
				1	5	20.79
				3	2	19.38
				6	0	19.98
64QAM	1850.7	18607	1.4	1	0	21.04
				1	5	21.10
				3	2	19.43
				6	0	19.47
	1880	18900		1	0	21.16
				1	5	21.03
				3	2	19.89
				6	0	19.77
	1909.3	19193		1	0	20.72
				1	5	20.70
				3	2	19.34
				6	0	19.67

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1851.5	18615	3	1	0	21.58
				1	14	21.70
				8	4	20.44
				15	0	20.20
	1880	18900		1	0	21.93
				1	14	21.93
				8	4	20.79
				15	0	20.68
	1908.5	19185		1	0	21.79
				1	14	21.74
				8	4	20.27
				15	0	20.66
16QAM	1851.5	18615	3	1	0	21.13
				1	14	21.11
				8	4	19.35
				15	0	19.59
	1880	18900		1	0	21.23
				1	14	21.18
				8	4	19.96
				15	0	19.82
	1908.5	19185		1	0	20.84
				1	14	20.78
				8	4	19.38
				15	0	19.98
64QAM	1851.5	18615	3	1	0	21.05
				1	14	21.09
				8	4	19.37
				15	0	19.41
	1880	18900		1	0	21.14
				1	14	21.18
				8	4	19.93
				15	0	19.84
	1908.5	19185		1	0	20.68
				1	14	20.77
				8	4	19.26
				15	0	19.70

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1852.5	18625	5	1	0	21.70
				1	24	21.66
				12	6	20.44
				25	0	20.33
	1880	18900		1	0	21.84
				1	24	21.98
				12	6	20.77
				25	0	20.69
	1907.5	19175		1	0	21.74
				1	24	21.76
				12	6	20.18
				25	0	20.70
16QAM	1852.5	18625	5	1	0	21.04
				1	24	21.09
				12	6	19.34
				25	0	19.58
	1880	18900		1	0	21.20
				1	24	21.20
				12	6	19.88
				25	0	19.96
	1907.5	19175		1	0	20.79
				1	24	20.72
				12	6	19.30
				25	0	20.00
64QAM	1852.5	18625	5	1	0	21.04
				1	24	21.09
				12	6	19.43
				25	0	19.37
	1880	18900		1	0	21.12
				1	24	21.05
				12	6	19.97
				25	0	19.84
	1907.5	19175		1	0	20.67
				1	24	20.79
				12	6	19.24
				25	0	19.61

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1855	18650	10	1	0	21.71
				1	49	21.63
				24	12	20.38
				50	0	20.33
	1880	18900		1	0	21.91
				1	49	21.93
				24	12	20.84
				50	0	20.65
	1905	19150		1	0	21.72
				1	49	21.72
				24	12	20.14
				50	0	20.70
16QAM	1855	18650	10	1	0	21.08
				1	49	21.07
				24	12	19.37
				50	0	19.54
	1880	18900		1	0	21.25
				1	49	21.20
				24	12	20.00
				50	0	19.83
	1905	19150		1	0	20.84
				1	49	20.73
				24	12	19.34
				50	0	19.98
64QAM	1855	18650	10	1	0	21.01
				1	49	21.00
				24	12	19.40
				50	0	19.37
	1880	18900		1	0	21.14
				1	49	21.14
				24	12	19.92
				50	0	19.85
	1905	19150		1	0	20.71
				1	49	20.70
				24	12	19.30
				50	0	19.66

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1857.5	18675	15	1	0	21.66
				1	74	21.67
				40	18	20.40
				75	0	20.30
	1880	18900		1	0	21.84
				1	74	21.91
				40	18	20.77
				75	0	20.71
	1902.5	19125		1	0	21.81
				1	74	21.80
				40	18	20.25
				75	0	20.67
16QAM	1857.5	18675	15	1	0	21.06
				1	74	21.14
				40	18	19.36
				75	0	19.60
	1880	18900		1	0	21.24
				1	74	21.25
				40	18	19.90
				75	0	19.88
	1902.5	19125		1	0	20.83
				1	74	20.79
				40	18	19.41
				75	0	19.91
64QAM	1857.5	18675	15	1	0	21.04
				1	74	21.07
				40	18	19.49
				75	0	19.47
	1880	18900		1	0	21.05
				1	74	21.09
				40	18	19.97
				75	0	19.79
	1902.5	19125		1	0	20.74
				1	74	20.74
				40	18	19.32
				75	0	19.69

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1860	18700	20	1	0	21.73
				1	99	21.73
				50	25	20.45
				100	0	20.34
	1880	18900		1	0	21.98
				1	99	21.98
				50	25	20.84
				100	0	20.75
	1900	19100		1	0	21.86
				1	99	21.86
				50	25	20.28
				100	0	20.72
16QAM	1860	18700	20	1	0	21.14
				1	99	21.14
				50	25	19.47
				100	0	19.60
	1880	18900		1	0	21.27
				1	99	21.27
				50	25	20.02
				100	0	19.96
	1900	19100		1	0	20.85
				1	99	20.85
				50	25	19.44
				100	0	20.02
64QAM	1860	18700	20	1	0	21.13
				1	99	21.13
				50	25	19.52
				100	0	19.48
	1880	18900		1	0	21.18
				1	99	21.18
				50	25	19.98
				100	0	19.86
	1900	19100		1	0	20.79
				1	99	20.79
				50	25	19.36
				100	0	19.76

2 Occupied Bandwidth

Test result

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	Bandwidth of 99% Power (MHz)					
						QPSK		16-QAM		64-QAM	
2	1850.7	18607	1.4	6	0	1.0838	Fig.1	1.0852	Fig.2	1.0851	Fig.3
	1880.0	18900		6	0	1.0841	Fig.4	1.0835	Fig.5	1.0862	Fig.6
	1909.3	19193		6	0	1.0893	Fig.7	1.0860	Fig.8	1.0866	Fig.9
	1851.5	18615	3	15	0	2.7096	Fig.10	2.7105	Fig.11	2.7009	Fig.12
	1880.0	18900		15	0	2.7058	Fig.13	2.7056	Fig.14	2.7156	Fig.15
	1908.5	19185		15	0	2.7145	Fig.16	2.7003	Fig.17	2.7102	Fig.18
	1852.5	18625	5	25	0	4.4951	Fig.19	4.4975	Fig.20	4.4843	Fig.21
	1880.0	18900		25	0	4.4847	Fig.22	4.4868	Fig.23	4.4923	Fig.24
	1907.5	19175		25	0	4.4889	Fig.25	4.5010	Fig.26	4.4991	Fig.27
	1855	18650	10	50	0	8.9807	Fig.28	8.9719	Fig.29	8.9915	Fig.30
	1880	18900		50	0	8.9740	Fig.31	8.9612	Fig.32	8.9637	Fig.33
	1905	19150		50	0	8.9578	Fig.34	8.9601	Fig.35	8.9657	Fig.36
	1857.5	18675	15	75	0	13.471	Fig.37	13.459	Fig.38	13.453	Fig.39
	1880.0	18900		75	0	13.421	Fig.40	13.451	Fig.41	13.462	Fig.42
	1902.5	19125		75	0	13.457	Fig.43	13.436	Fig.44	13.429	Fig.45
	1860	18700	20	100	0	17.903	Fig.46	17.926	Fig.47	17.940	Fig.48
	1880	18900		100	0	17.904	Fig.49	17.894	Fig.50	17.935	Fig.51
	1900	19100		100	0	17.950	Fig.52	17.879	Fig.53	17.904	Fig.54

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)					
						QPSK		16-QAM		64-QAM	
2	1850.7	18607	1.4	6	0	1.377	Fig.1	1.357	Fig.2	1.403	Fig.3
	1880.0	18900		6	0	1.363	Fig.4	1.376	Fig.5	1.346	Fig.6
	1909.3	19193		6	0	1.398	Fig.7	1.372	Fig.8	1.402	Fig.9
	1851.5	18615	3	15	0	3.018	Fig.10	3.030	Fig.11	3.012	Fig.12
	1880.0	18900		15	0	3.005	Fig.13	3.010	Fig.14	3.014	Fig.15
	1908.5	19185		15	0	3.022	Fig.16	3.016	Fig.17	3.018	Fig.18
	1852.5	18625	5	25	0	5.038	Fig.19	5.006	Fig.20	5.045	Fig.21
	1880.0	18900		25	0	5.045	Fig.22	5.090	Fig.23	5.009	Fig.24
	1907.5	19175		25	0	5.068	Fig.25	5.075	Fig.26	5.034	Fig.27
	1855	18650	10	50	0	10.13	Fig.28	10.19	Fig.29	10.19	Fig.30
	1880	18900		50	0	10.13	Fig.31	10.08	Fig.32	10.24	Fig.33
	1905	19150		50	0	10.15	Fig.34	10.21	Fig.35	10.10	Fig.36
	1857.5	18675	15	75	0	15.54	Fig.37	15.47	Fig.38	15.53	Fig.39
	1880.0	18900		75	0	15.36	Fig.40	15.30	Fig.41	15.26	Fig.42
	1902.5	19125		75	0	15.34	Fig.43	15.20	Fig.44	15.17	Fig.45
	1860	18700	20	100	0	19.48	Fig.46	19.50	Fig.47	19.26	Fig.48
	1880	18900		100	0	19.41	Fig.49	19.45	Fig.50	19.50	Fig.51
	1900	19100		100	0	19.41	Fig.52	19.41	Fig.53	19.46	Fig.54

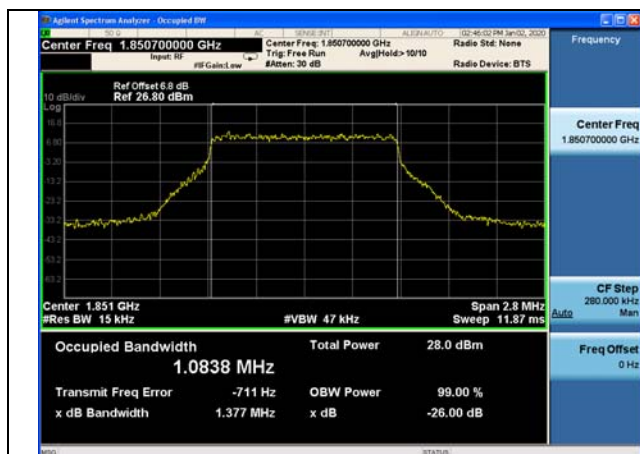


Fig.1

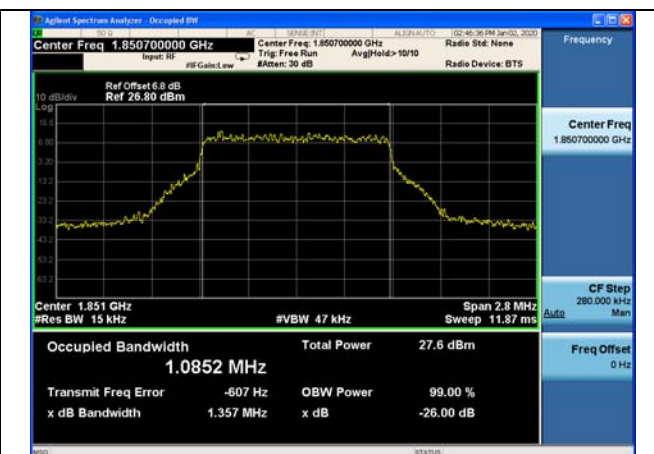


Fig.2

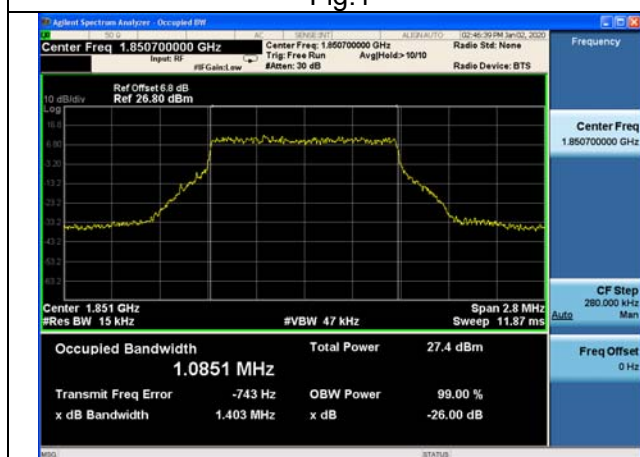


Fig.3

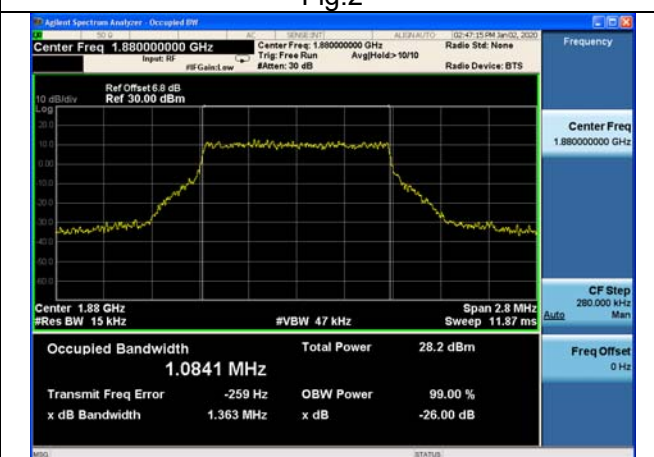


Fig.4

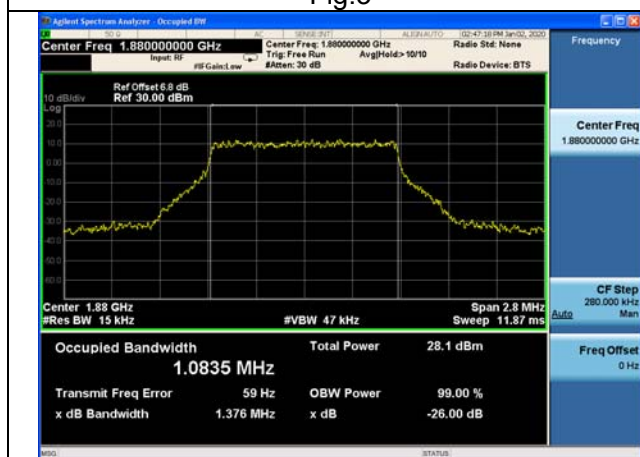


Fig.5

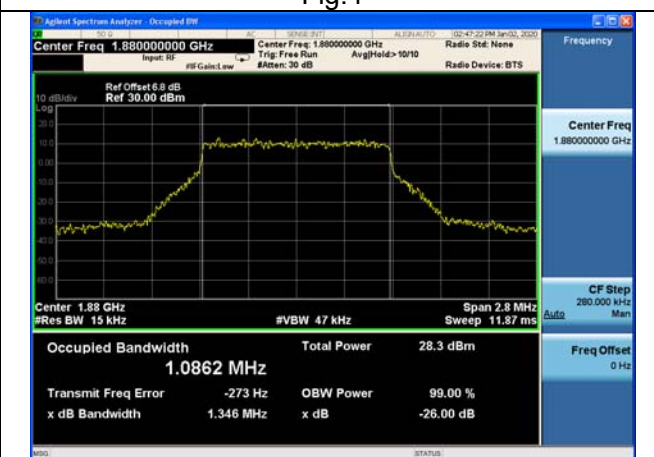


Fig.6

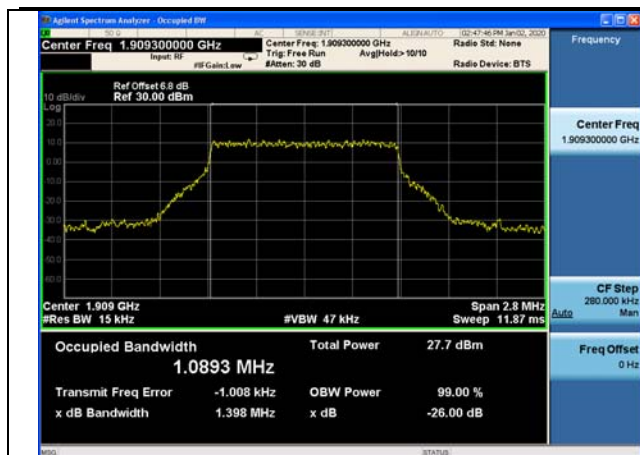


Fig.7

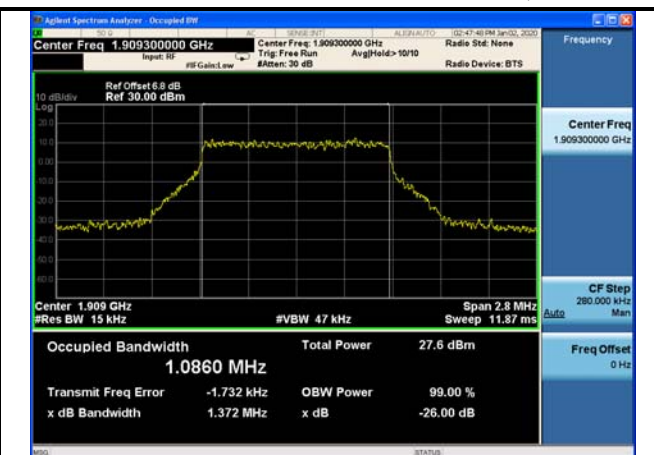


Fig.8



Fig.9

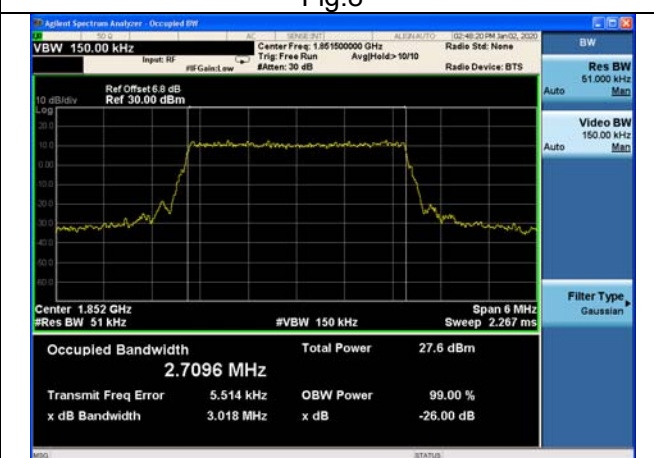


Fig.10

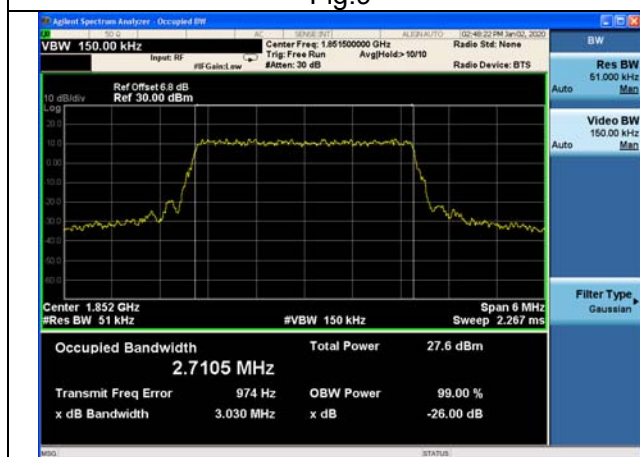


Fig.11

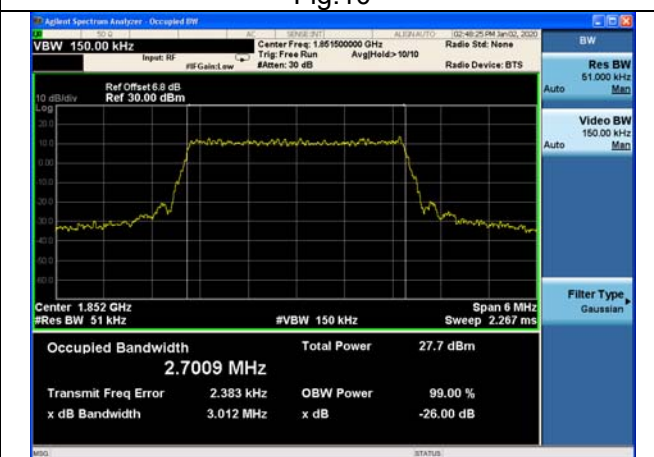


Fig.12

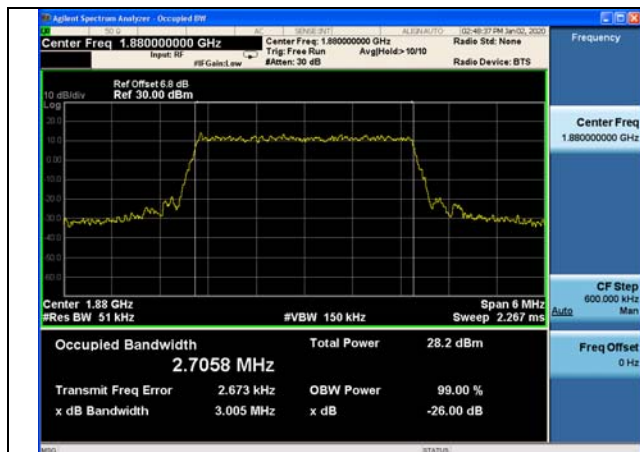


Fig.13

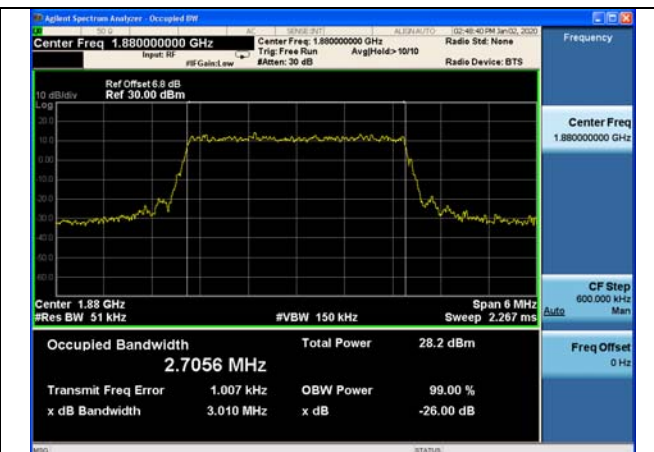


Fig.14

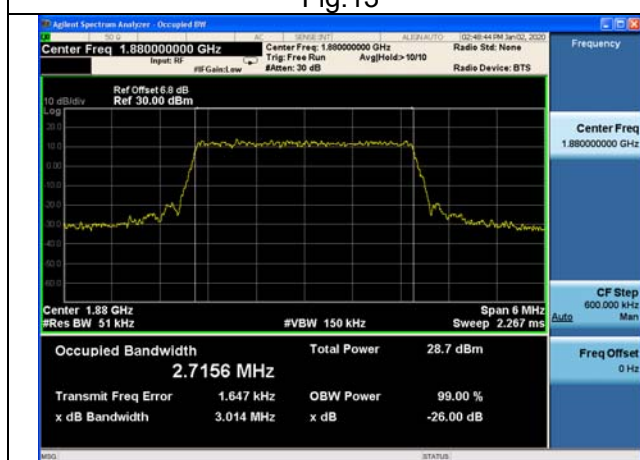


Fig.15

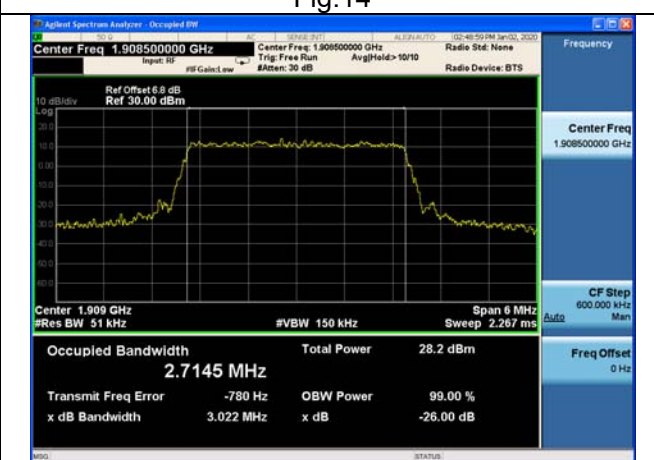


Fig.16

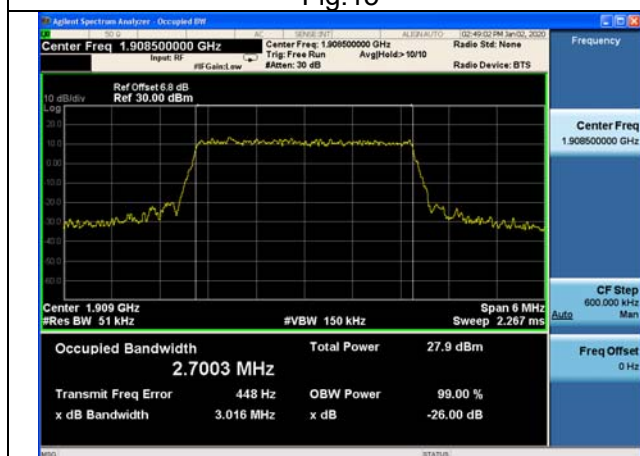


Fig.17

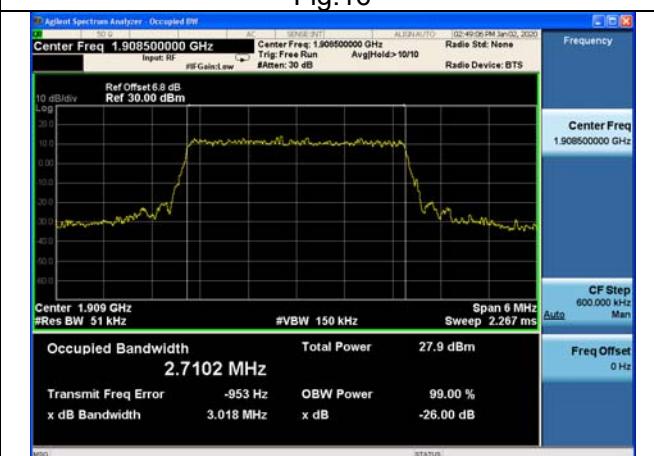


Fig.18

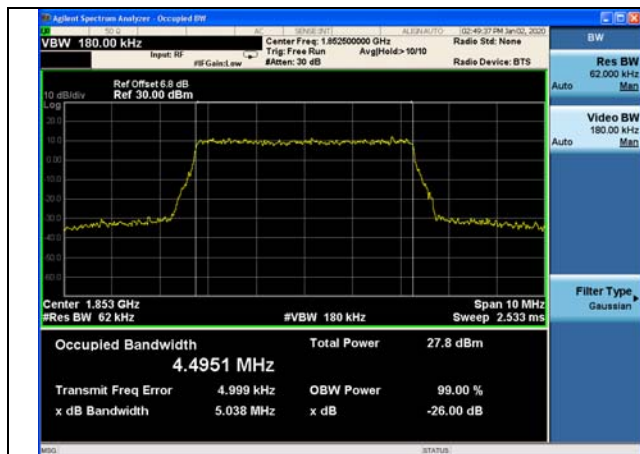


Fig.19

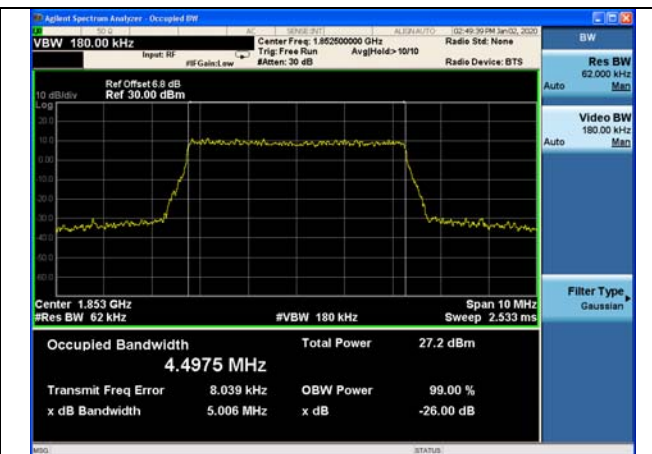


Fig.20

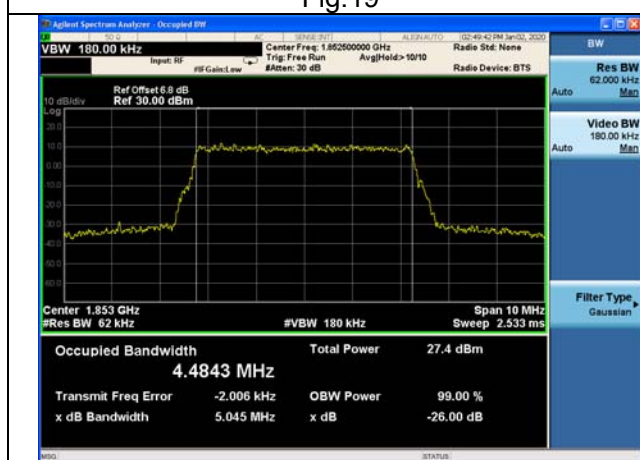


Fig.21

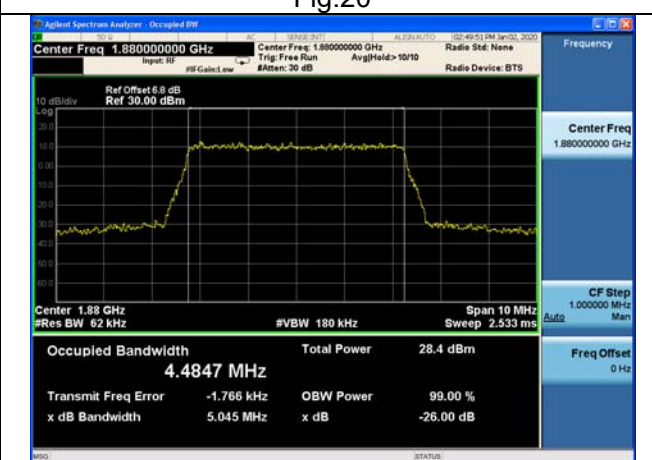


Fig.22

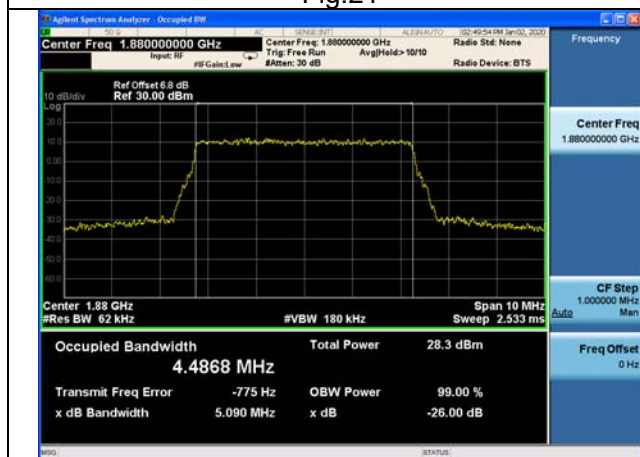


Fig.23

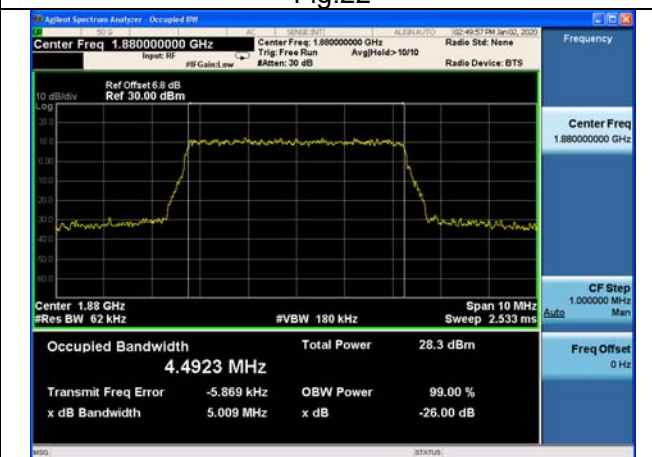


Fig.24

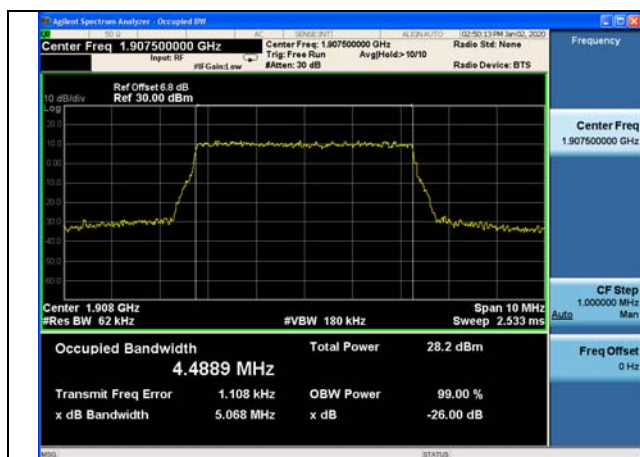


Fig.25

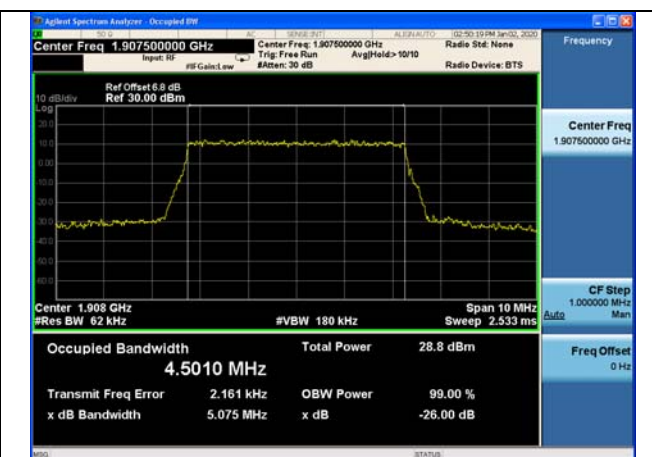


Fig.26

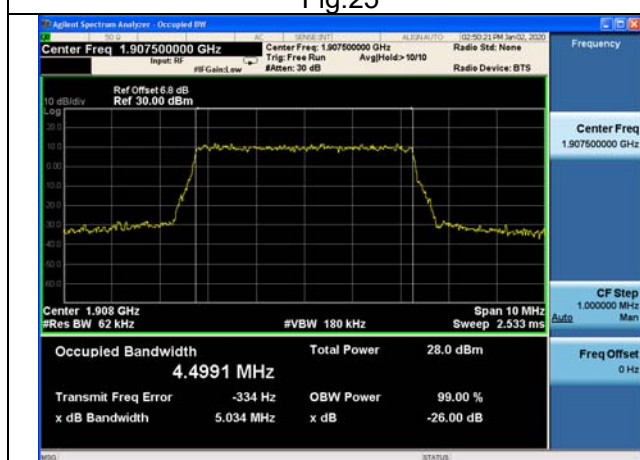


Fig.27

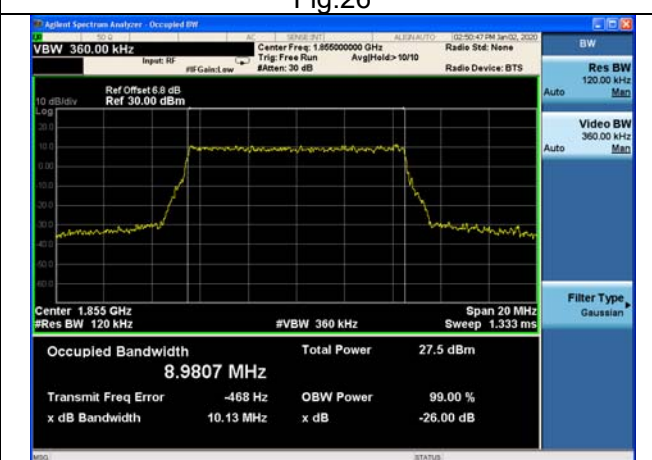


Fig.28

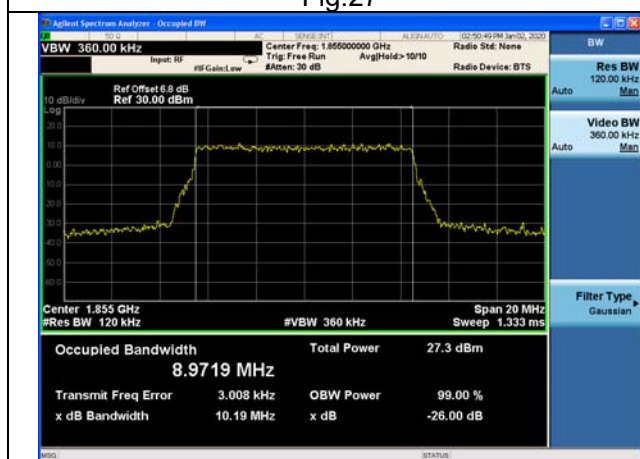


Fig.29

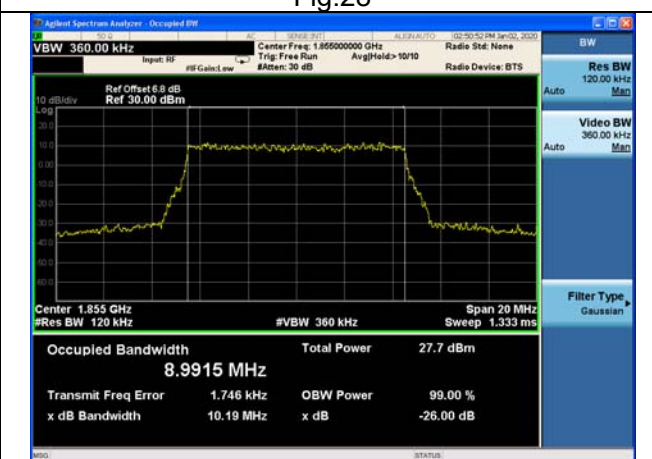


Fig.30

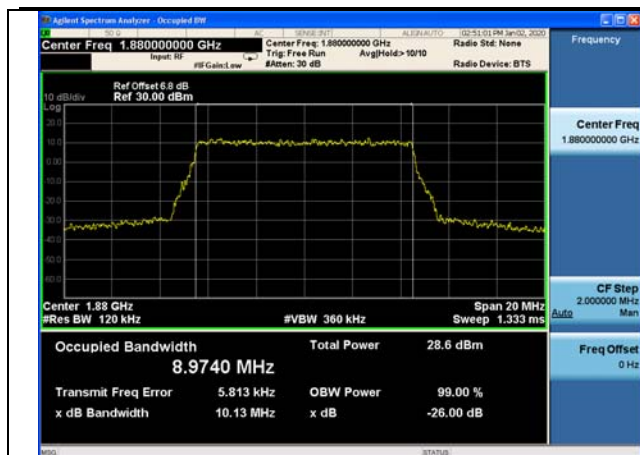


Fig.31

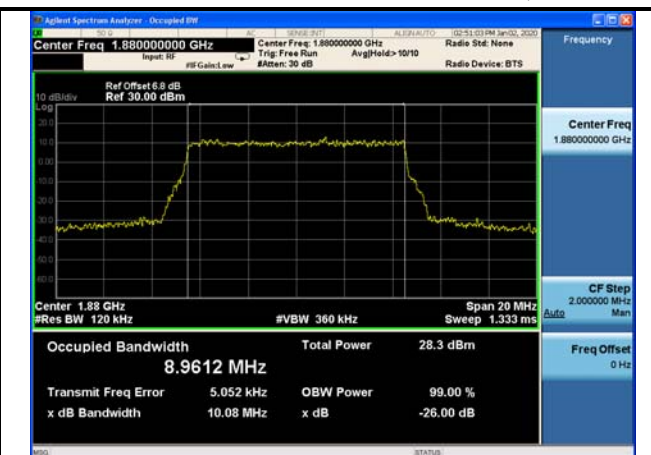


Fig.32

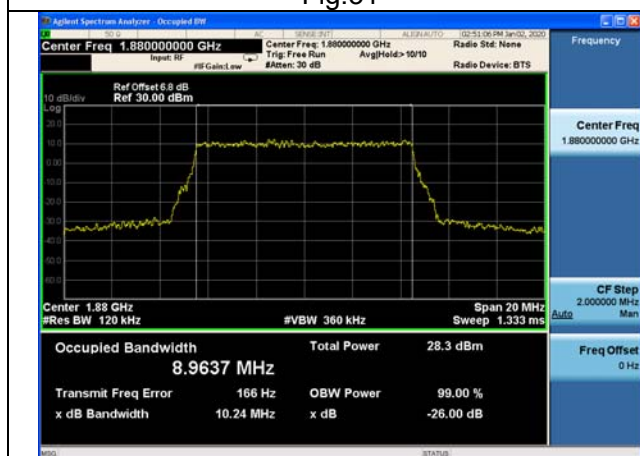


Fig.33

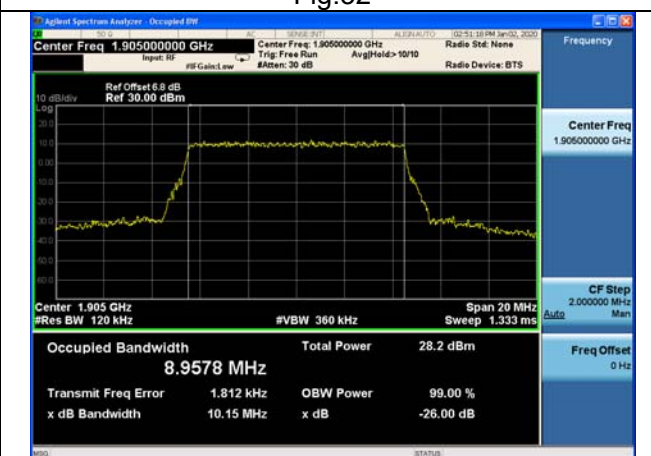


Fig.34

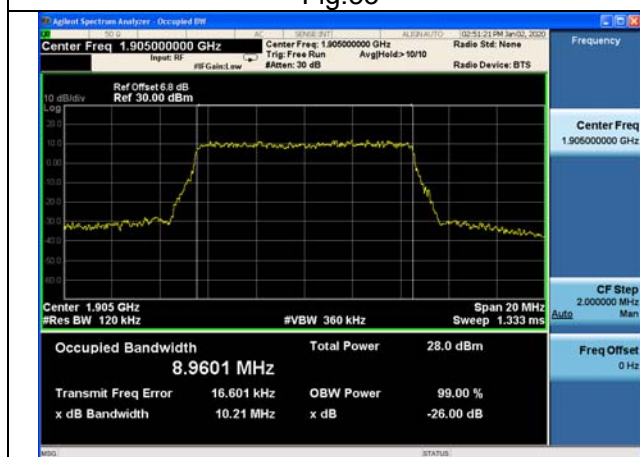


Fig.35

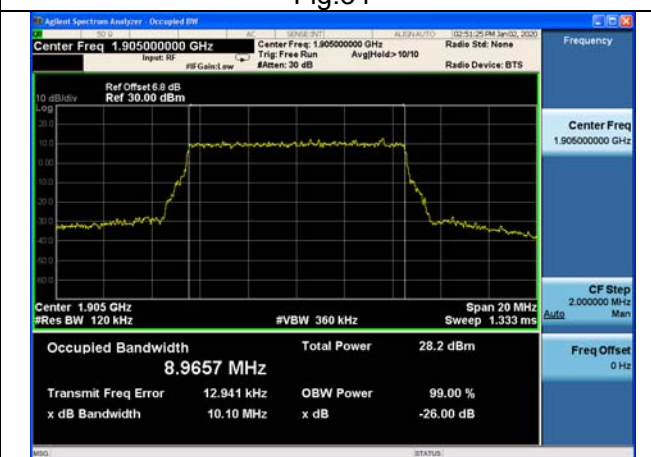


Fig.36

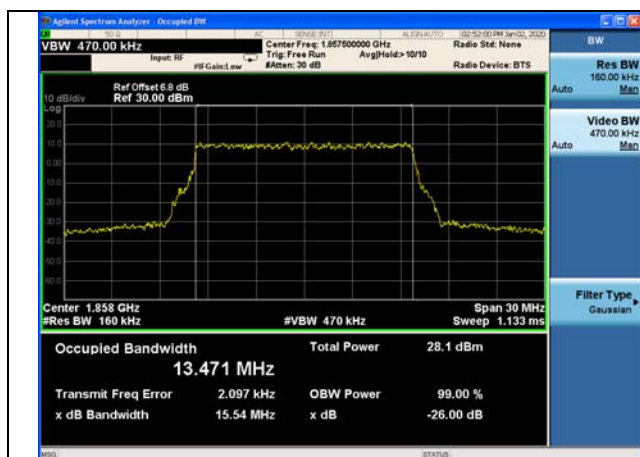


Fig.37

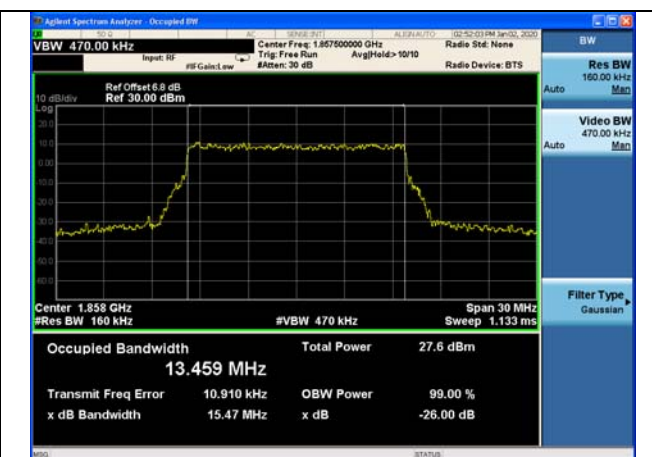


Fig.38

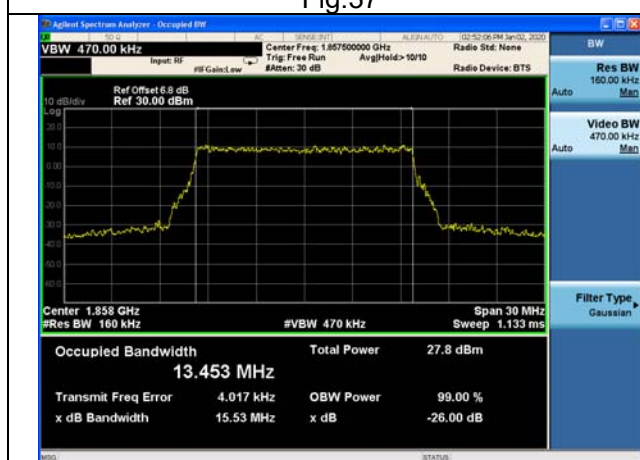


Fig.39

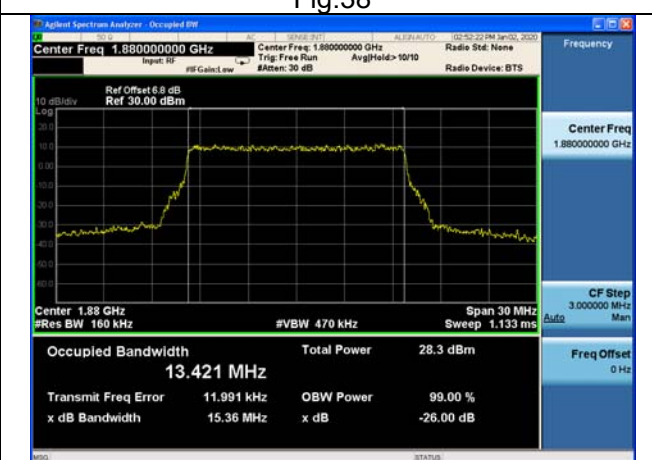


Fig.40

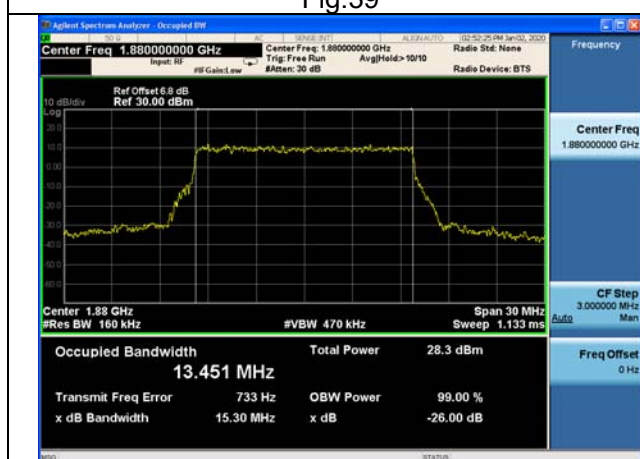


Fig.41

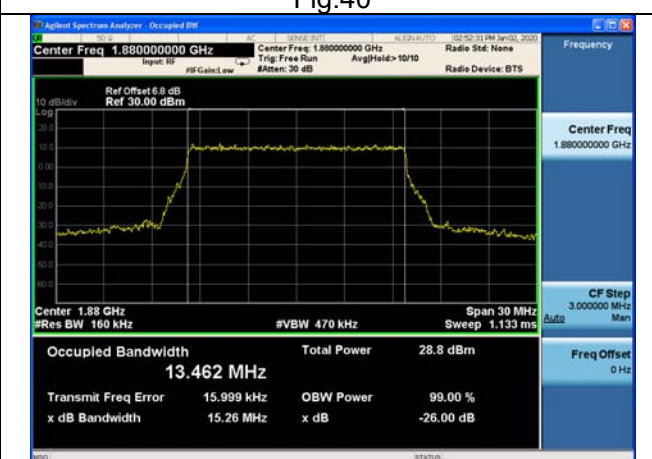


Fig.42

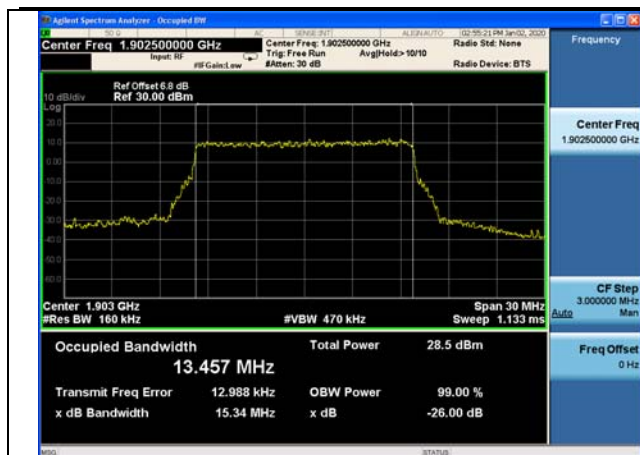


Fig.43

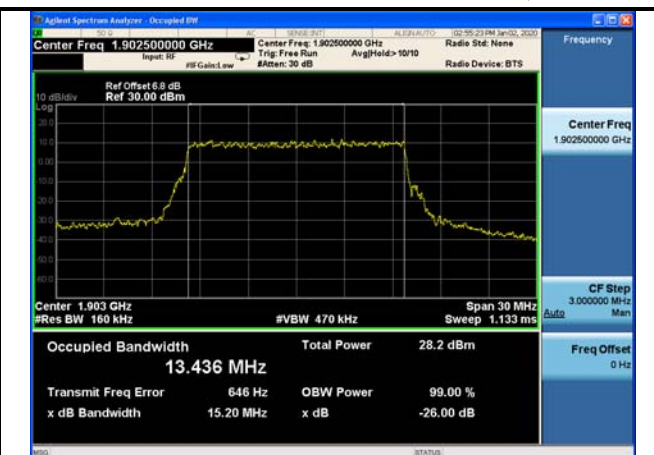


Fig.44



Fig.45

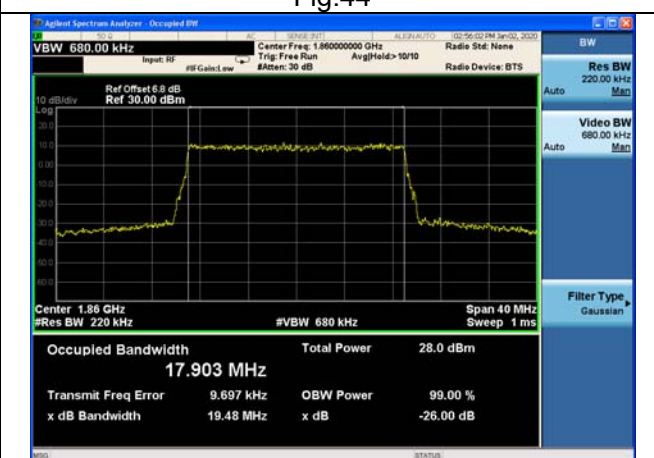


Fig.46

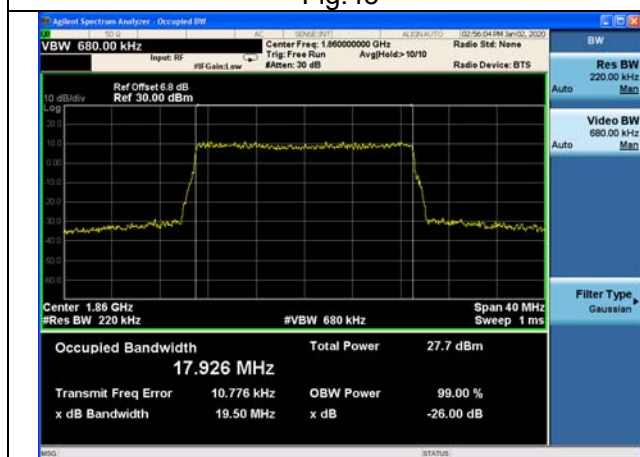


Fig.47

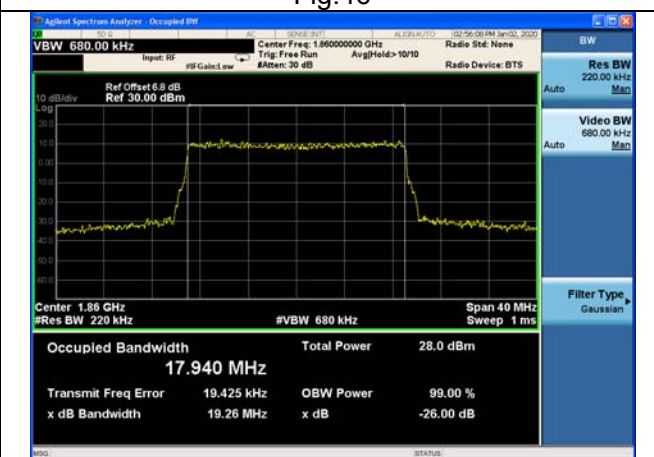


Fig.48

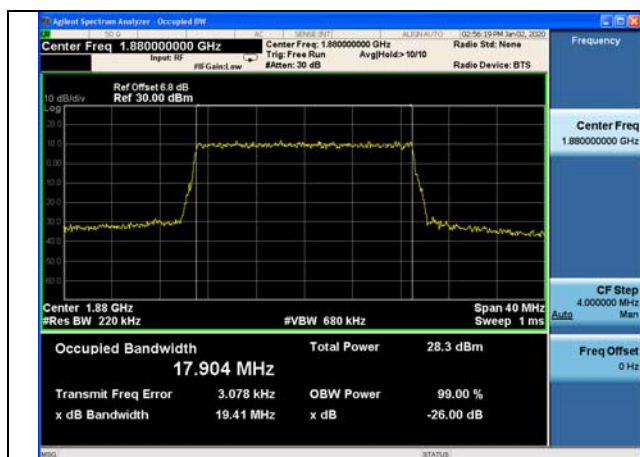


Fig.49

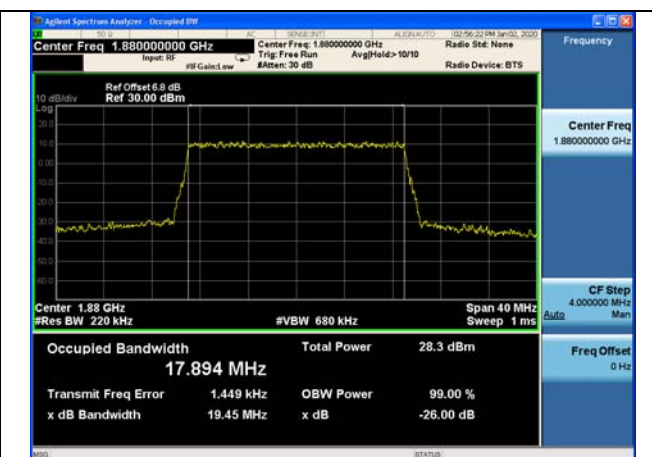


Fig.50

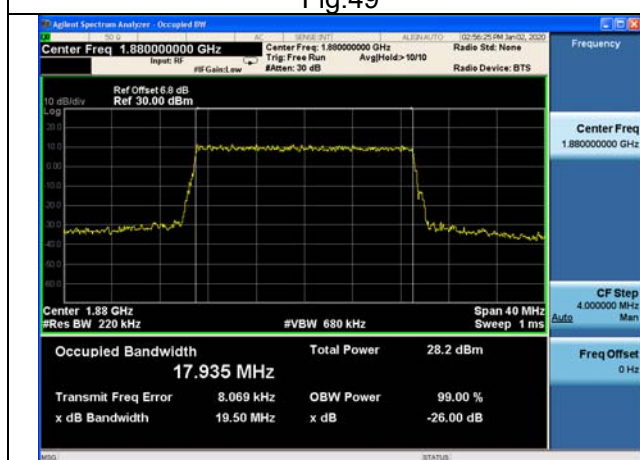


Fig.51



Fig.52

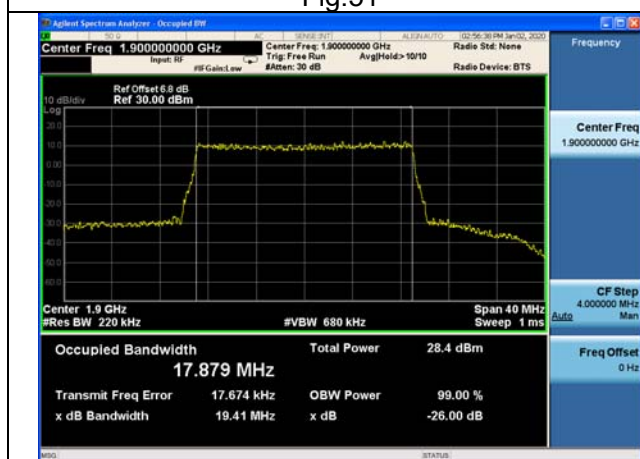


Fig.53

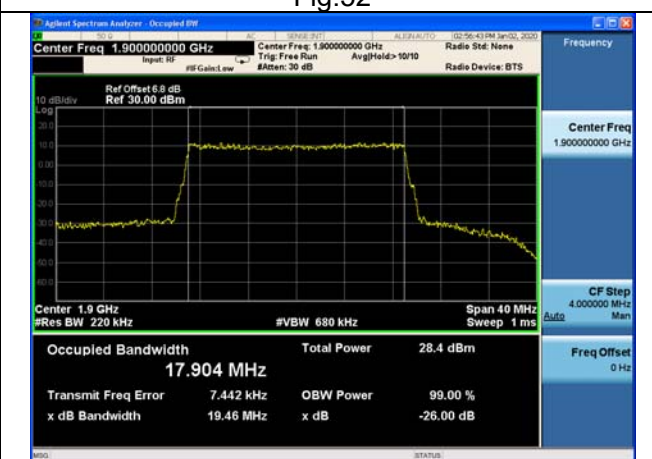


Fig.54

3 Peak-Average Ratio

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	QPSK	16-QAM	64-QAM
2	1880.0	18900	1.4	1	0	Fig.1	Fig.2	Fig.3
			3	1	0	Fig.4	Fig.5	Fig.6
			5	1	0	Fig.7	Fig.8	Fig.9
			10	1	0	Fig.10	Fig.11	Fig.12
			15	1	0	Fig.13	Fig.14	Fig.15
			20	1	0	Fig.16	Fig.17	Fig.18



Fig.1

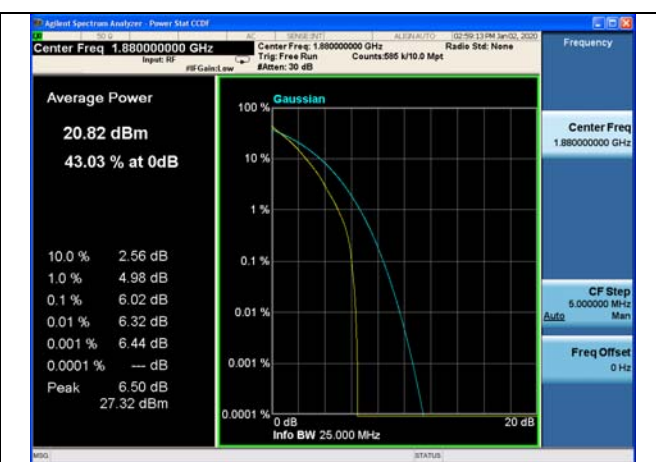


Fig.2



Fig.3



Fig.4



Fig.5



Fig.6



Fig.7



Fig.8



Fig.9



Fig.10



Fig.11



Fig.12



Fig.13



Fig.14



Fig.15



Fig.16

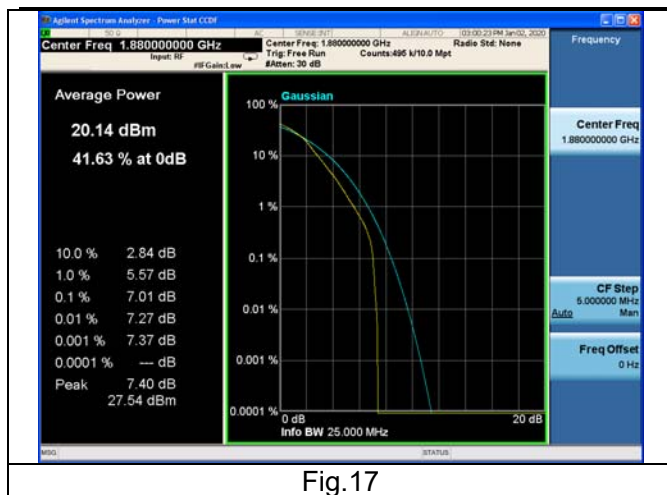


Fig.17

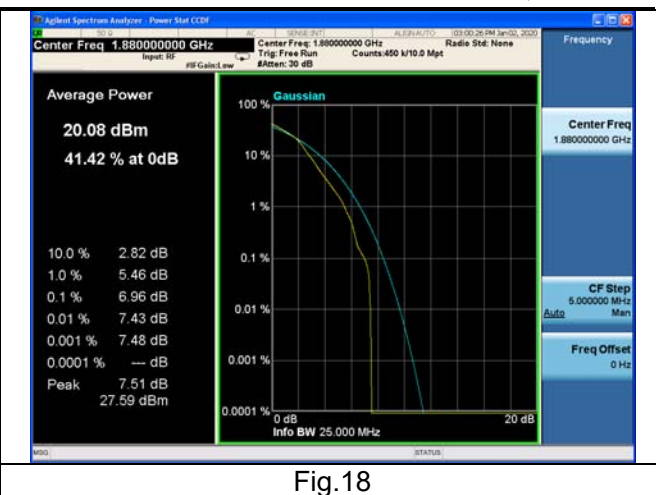


Fig.18

4 Spurious Emissions at antenna terminal

Band	Carrier frequency (MHz)	Channel	BW	RB Size	RB Offset	Conducted Spurious Plot
						QPSK
2	1860	18700	20	1	0	Fig.1-2
	1880	18900	20	1	0	Fig.3-4
	1900	19100	20	1	0	Fig.5-6

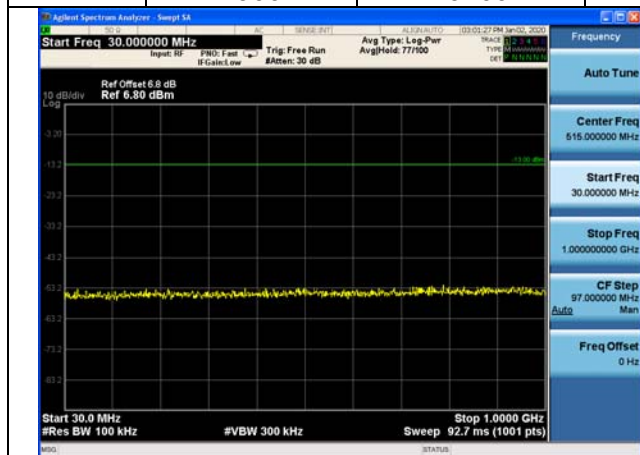


Fig.1

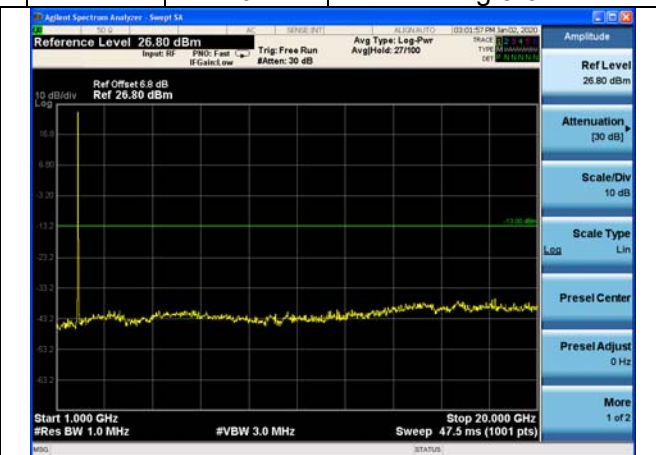


Fig.2

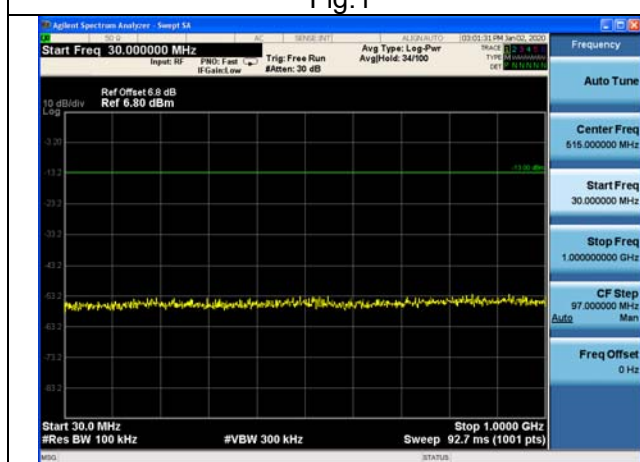


Fig3

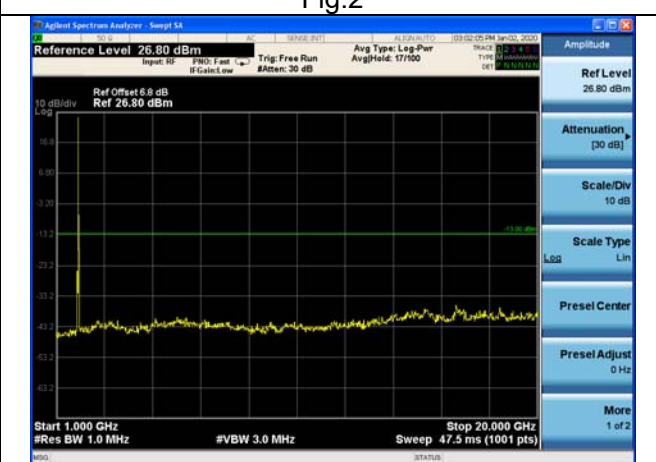


Fig4

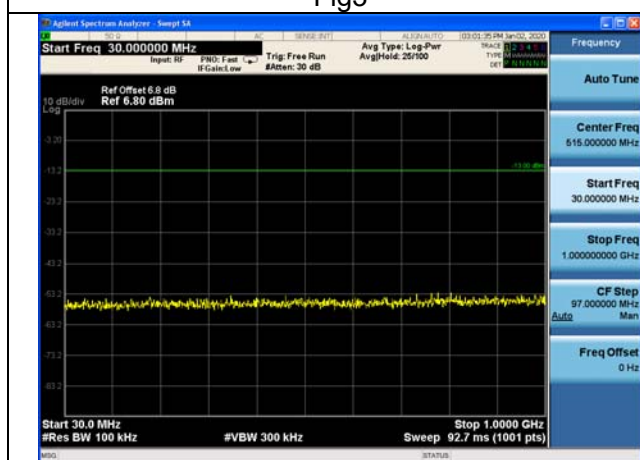


Fig5

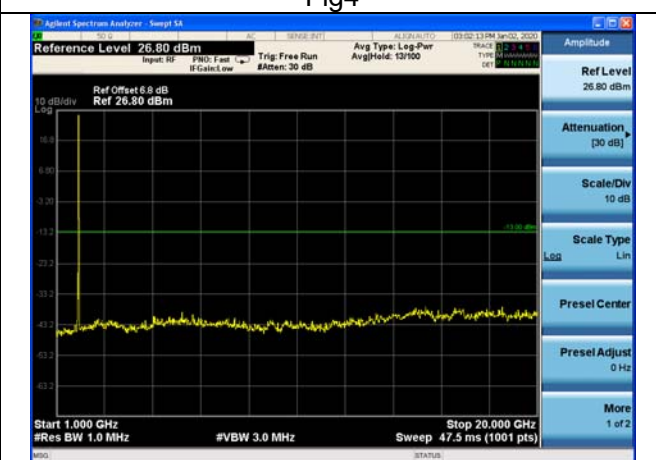


Fig6

5 Band Edges Compliance

Test result

Band	Carrier frequency (MHz)	Channel	BW	RB Size	RB Offset	Band Edges Plot
						QPSK
2	1850.7	18607	1.4	1	0	Fig.1
				6	0	Fig.2
	1909.3	19193		1	5	Fig.3
				6	0	Fig.4
	1851.5	18615	3	1	0	Fig.5
				15	0	Fig.6
	1908.5	19185		1	14	Fig.7
				15	0	Fig.8
	1852.5	18625	5	1	0	Fig.9
				25	0	Fig.10
	1907.5	19175		1	24	Fig.11
				25	0	Fig.12
	1855	18650	10	1	0	Fig.13
				50	0	Fig.14
	1905	19150		1	49	Fig.15
				50	0	Fig.16
	1857.5	18675	15	1	0	Fig.17
				75	0	Fig.18
	1902.5	19125		1	74	Fig.19
				75	0	Fig.20
	1860	18700	20	1	0	Fig.21
				100	0	Fig.22
	1900	19100		1	99	Fig.23
				100	0	Fig.24

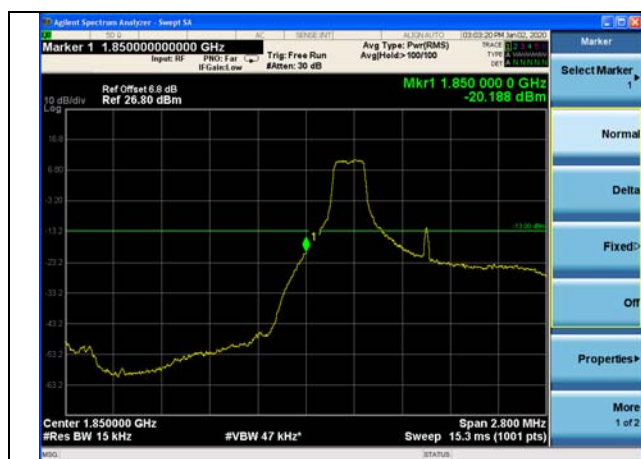


Fig.1



Fig.2

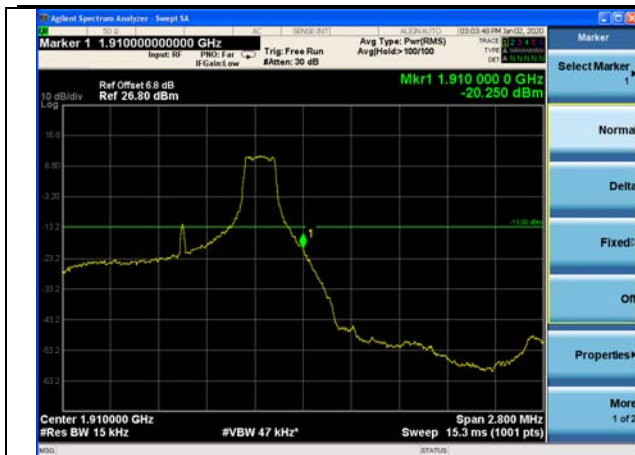


Fig.3



Fig.4

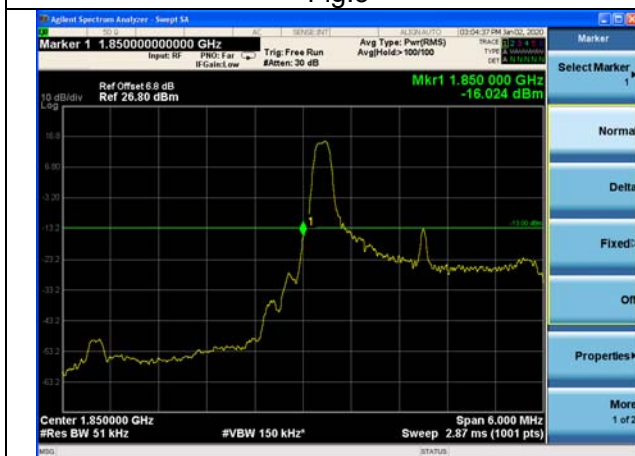


Fig.5



Fig.6

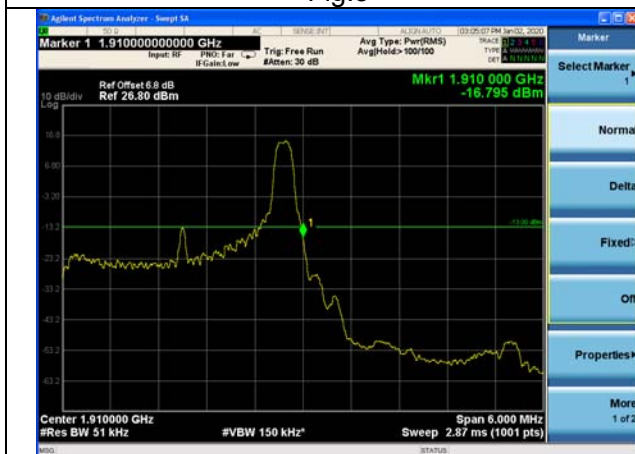


Fig.7



Fig.8

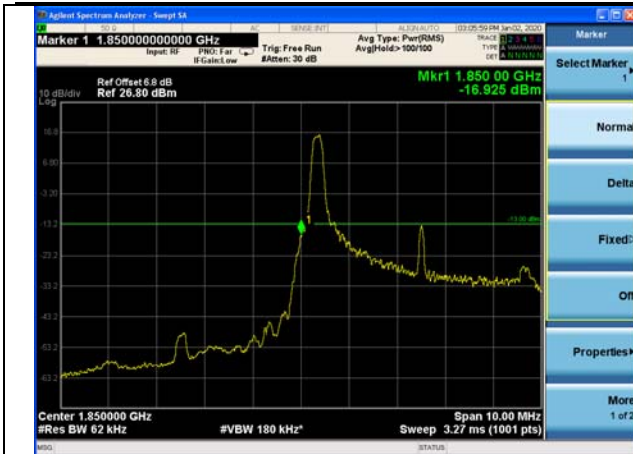


Fig.9



Fig.10

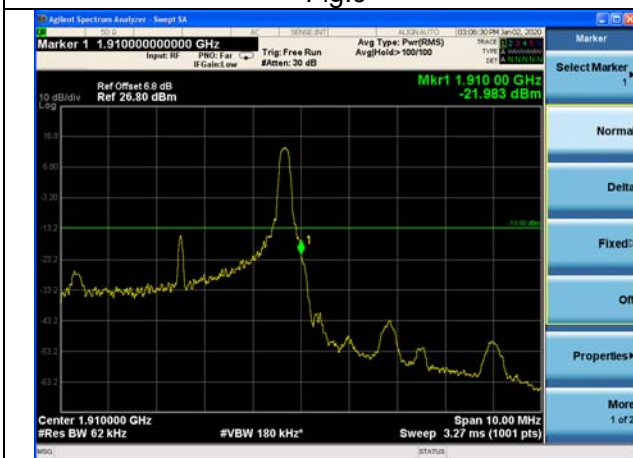


Fig.11



Fig.12



Fig.13

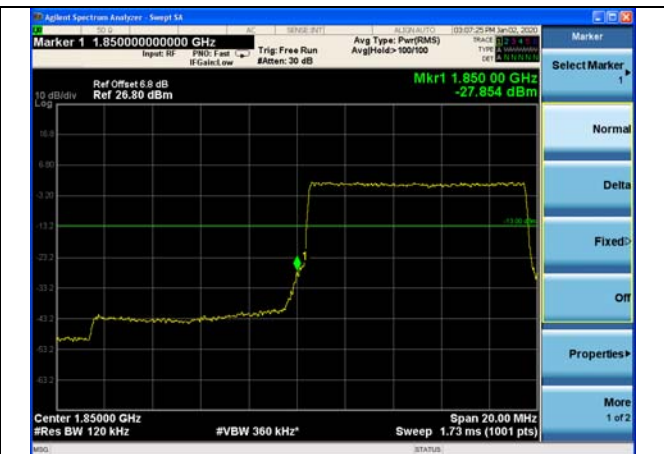


Fig.14

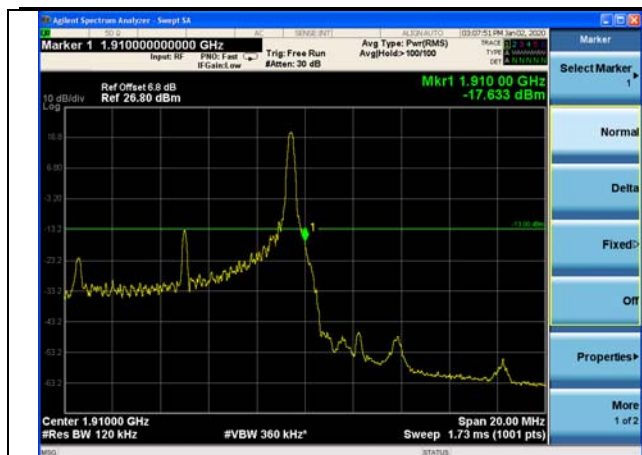


Fig.15



Fig.16

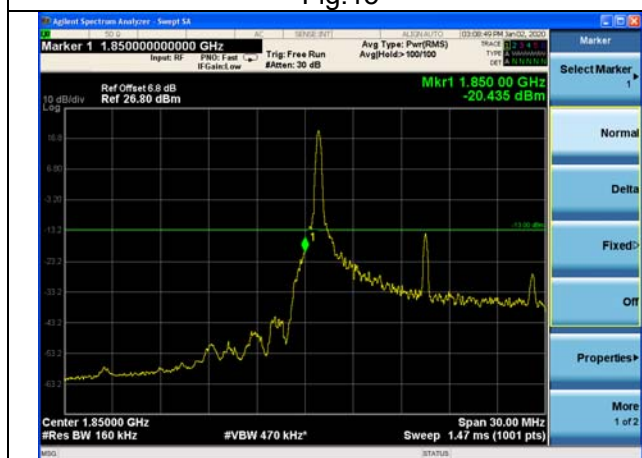


Fig.17



Fig.18

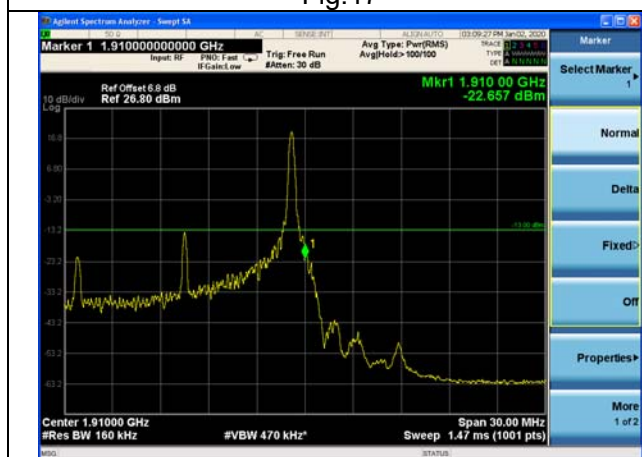


Fig.19



Fig.20

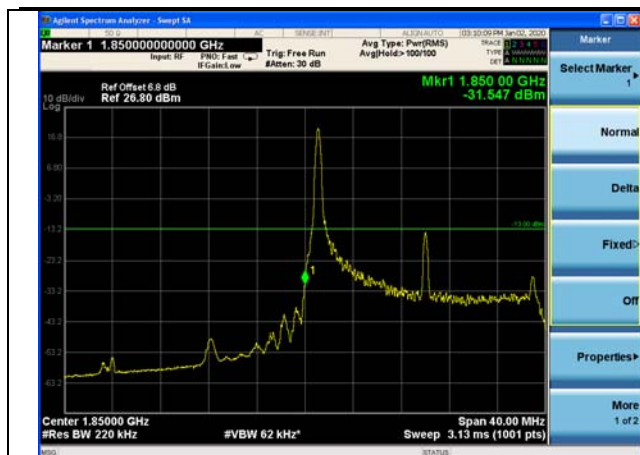


Fig.21

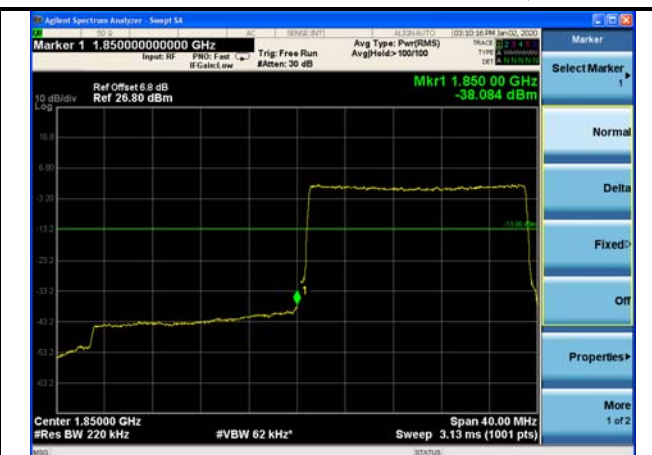


Fig.22

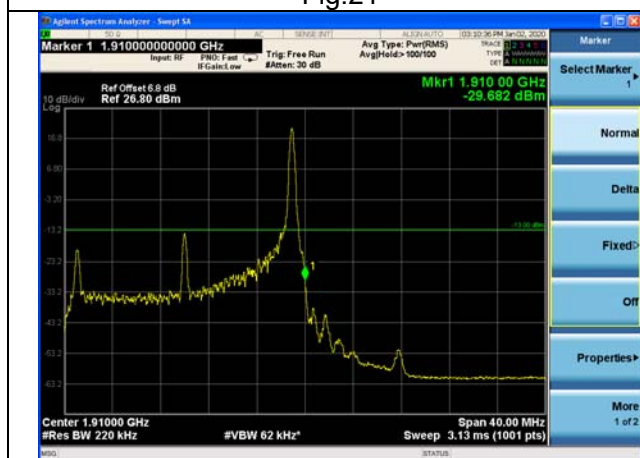


Fig.23



Fig.24

6 Frequency Stability

Test result:

Temperature(°C)	Voltage	Test Result (ppm) Band2 Low Channel					
		1.4M	3M	5M	10M	15M	20M
-10	NV	-0.024	0.036	0.042	-0.019	0.056	-0.075
0	NV	-0.001	-0.049	-0.074	-0.041	0.010	-0.008
+10	NV	-0.034	-0.074	-0.001	0.049	0.037	-0.069
+20	NV	0.000	0.000	0.000	0.000	0.000	0.000
+30	NV	0.062	0.092	0.014	0.069	-0.036	0.046
+40	NV	0.018	-0.098	-0.025	0.018	0.015	0.037
+50	NV	-0.050	-0.005	0.091	-0.085	-0.057	-0.003
+55	NV	0.000	0.061	0.090	-0.004	0.051	0.008
+20	LV	-0.016	-0.093	-0.037	-0.027	0.087	-0.003
+20	HV	0.047	0.068	-0.022	0.068	-0.091	0.030

Temperature(°C)	Voltage	Test Result (ppm) Band2 High Channel					
		1.4M	3M	5M	10M	15M	20M
-10	NV	0.009	-0.086	-0.061	0.037	0.019	0.028
0	NV	0.059	-0.046	-0.068	-0.024	-0.031	-0.011
+10	NV	0.010	0.015	0.073	-0.073	0.029	-0.029
+20	NV	0.000	0.000	0.000	0.000	0.000	0.000
+30	NV	0.029	0.033	0.048	-0.024	0.095	-0.011
+40	NV	0.070	-0.020	-0.023	-0.086	0.074	0.038
+50	NV	0.059	-0.064	0.094	-0.095	-0.051	-0.051
+55	NV	0.037	0.064	-0.056	-0.092	-0.041	0.070
+20	LV	-0.065	-0.069	-0.071	0.023	-0.089	0.019
+20	HV	-0.092	-0.009	-0.048	-0.043	0.028	-0.050

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

LTE Band 5

1 RF Power Output

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	824.7	20407	1.4	1	0	23.57
				1	5	23.51
				3	2	21.71
				6	0	21.23
	836.5	20525		1	0	22.35
				1	5	22.48
				3	2	20.64
				6	0	21.19
	848.3	20643		1	0	23.51
				1	5	23.52
				3	2	21.79
				6	0	21.63
16QAM	824.7	20407	1.4	1	0	22.53
				1	5	22.62
				3	2	20.89
				6	0	20.42
	836.5	20525		1	0	21.34
				1	5	21.38
				3	2	19.91
				6	0	20.41
	848.3	20643		1	0	22.64
				1	5	22.74
				3	2	21.07
				6	0	20.85
64QAM	824.7	20407	1.4	1	0	22.52
				1	5	22.40
				3	2	20.82
				6	0	20.51
	836.5	20525		1	0	21.32
				1	5	21.37
				3	2	19.90
				6	0	20.41
	848.3	20643		1	0	22.51
				1	5	22.56
				3	2	21.09
				6	0	20.78

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	825.5	20415	3	1	0	23.46
				1	14	23.51
				8	4	21.62
				15	0	21.14
	836.5	20525		1	0	22.48
				1	14	22.47
				8	4	20.59
				15	0	21.11
	847.5	20635		1	0	23.56
				1	14	23.61
				8	4	21.78
				15	0	21.59
16QAM	825.5	20415	3	1	0	22.51
				1	14	22.56
				8	4	20.86
				15	0	20.47
	836.5	20525		1	0	21.33
				1	14	21.42
				8	4	19.85
				15	0	20.38
	847.5	20635		1	0	22.74
				1	14	22.65
				8	4	21.06
				15	0	20.87
64QAM	825.5	20415	3	1	0	22.43
				1	14	22.39
				8	4	20.92
				15	0	20.44
	836.5	20525		1	0	21.41
				1	14	21.35
				8	4	19.93
				15	0	20.37
	847.5	20635		1	0	22.51
				1	14	22.52
				8	4	21.11
				15	0	20.86

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	826.5	20425	5	1	0	23.47
				1	24	23.50
				12	6	21.62
				25	0	21.20
	836.5	20525		1	0	22.46
				1	24	22.45
				12	6	20.63
				25	0	21.16
	846.5	20625		1	0	23.64
				1	24	23.59
				12	6	21.89
				25	0	21.57
16QAM	826.5	20425	5	1	0	22.55
				1	24	22.52
				12	6	20.84
				25	0	20.37
	836.5	20525		1	0	21.38
				1	24	21.47
				12	6	19.87
				25	0	20.40
	846.5	20625		1	0	22.75
				1	24	22.74
				12	6	21.15
				25	0	20.90
64QAM	826.5	20425	5	1	0	22.48
				1	24	22.41
				12	6	20.82
				25	0	20.51
	836.5	20525		1	0	21.31
				1	24	21.34
				12	6	19.82
				25	0	20.47
	846.5	20625		1	0	22.57
				1	24	22.61
				12	6	21.12
				25	0	20.88

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	829	20450	10	1	0	23.58
				1	49	23.58
				24	12	21.71
				50	0	21.27
	836.5	20525		1	0	22.49
				1	49	22.49
				24	12	20.65
				50	0	21.22
	844	20600		1	0	23.64
				1	49	23.64
				24	12	21.91
				50	0	21.64
16QAM	829	20450	10	1	0	22.65
				1	49	22.65
				24	12	20.92
				50	0	20.51
	836.5	20525		1	0	21.48
				1	49	21.48
				24	12	19.93
				50	0	20.49
	844	20600		1	0	22.75
				1	49	22.75
				24	12	21.17
				50	0	20.91
64QAM	829	20450	10	1	0	22.53
				1	49	22.53
				24	12	20.95
				50	0	20.52
	836.5	20525		1	0	21.41
				1	49	21.41
				24	12	19.93
				50	0	20.48
	844	20600		1	0	22.64
				1	49	22.64
				24	12	21.16
				50	0	20.91

2 Occupied Bandwidth

Test result

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	Bandwidth of 99% Power (MHz)					
						QPSK		16-QAM		64-QAM	
5	824.7	20407	1.4	6	0	1.0849	Fig.1	1.0882	Fig.2	1.0833	Fig.3
	836.5	20525		6	0	1.0878	Fig.4	1.0896	Fig.5	1.0834	Fig.6
	848.3	20643		6	0	1.0861	Fig.7	1.0861	Fig.8	1.0852	Fig.9
	825.5	20415	3	15	0	2.7022	Fig.10	2.7104	Fig.11	2.6957	Fig.12
	836.5	20525		15	0	2.7111	Fig.13	2.7085	Fig.14	2.7050	Fig.15
	847.5	20635		15	0	2.6977	Fig.16	2.7103	Fig.17	2.7148	Fig.18
	826.5	20425	5	25	0	4.4909	Fig.19	4.4958	Fig.20	4.4986	Fig.21
	836.5	20525		25	0	4.5008	Fig.22	4.4968	Fig.23	4.5087	Fig.24
	846.5	20625		25	0	4.5059	Fig.25	4.4976	Fig.26	4.5021	Fig.27
	829	20450	10	50	0	8.9691	Fig.28	8.9817	Fig.29	8.9805	Fig.30
	836.5	20525		50	0	8.9880	Fig.31	8.9968	Fig.32	9.0086	Fig.33
	844	20600		50	0	8.9814	Fig.34	8.9746	Fig.35	8.9732	Fig.36

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)					
						QPSK		16-QAM		64-QAM	
5	824.7	20407	1.4	6	0	1.332	Fig.1	1.353	Fig.2	1.383	Fig.3
	836.5	20525		6	0	1.362	Fig.4	1.364	Fig.5	1.346	Fig.6
	848.3	20643		6	0	1.367	Fig.7	1.360	Fig.8	1.285	Fig.9
	825.5	20415	3	15	0	3.030	Fig.10	3.040	Fig.11	3.015	Fig.12
	836.5	20525		15	0	3.013	Fig.13	3.016	Fig.14	3.038	Fig.15
	847.5	20635		15	0	3.021	Fig.16	3.003	Fig.17	3.011	Fig.18
	826.5	20425	5	25	0	5.063	Fig.19	5.072	Fig.20	5.067	Fig.21
	836.5	20525		25	0	5.032	Fig.22	5.047	Fig.23	5.037	Fig.24
	846.5	20625		25	0	5.005	Fig.25	5.066	Fig.26	5.023	Fig.27
	829	20450	10	50	0	10.15	Fig.28	10.20	Fig.29	10.13	Fig.30
	836.5	20525		50	0	10.05	Fig.31	10.28	Fig.32	10.17	Fig.33
	844	20600		50	0	10.15	Fig.34	10.15	Fig.35	10.15	Fig.36

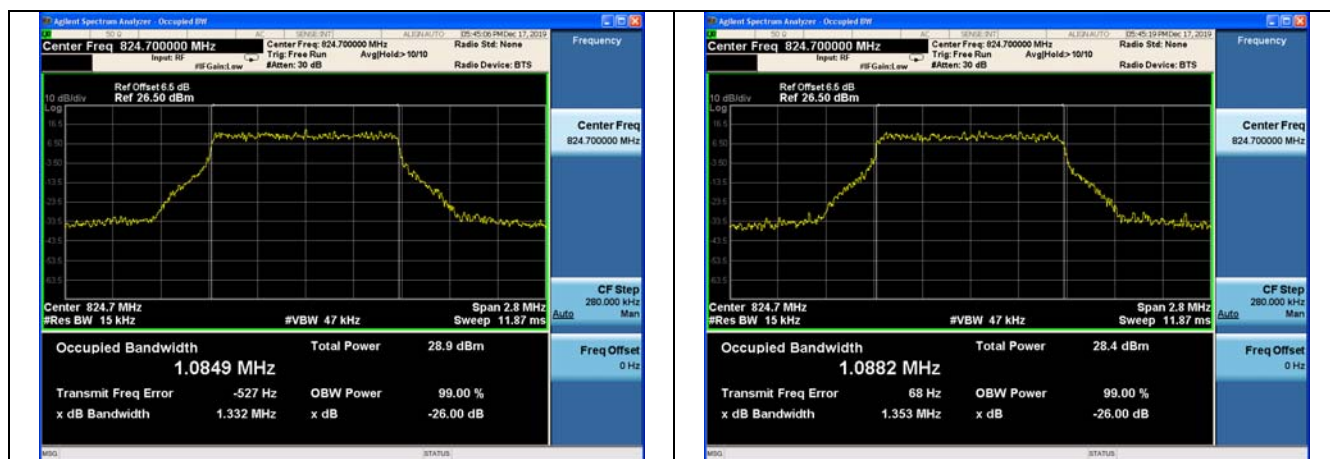


Fig.1

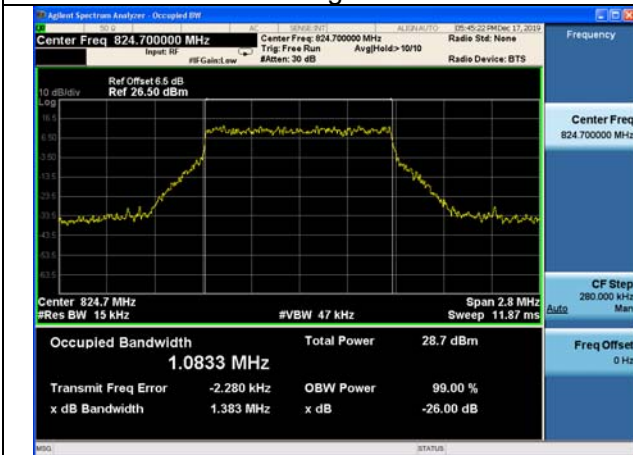


Fig.2

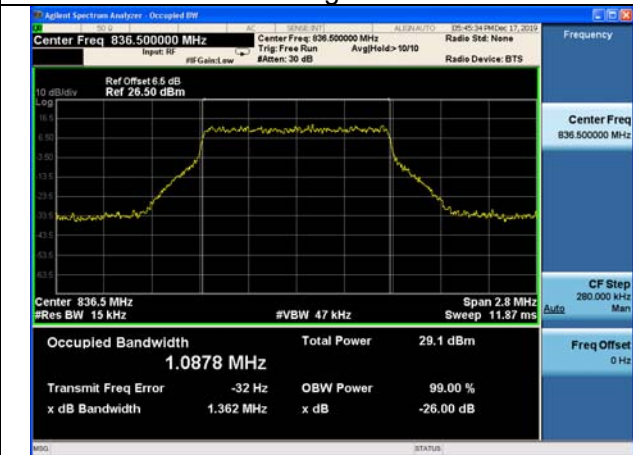


Fig.3

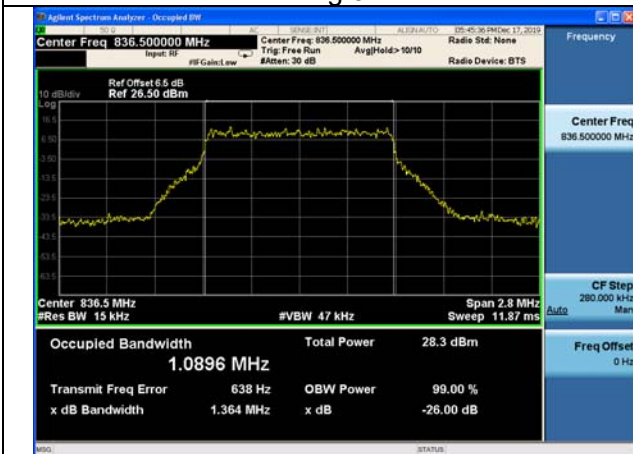


Fig.4

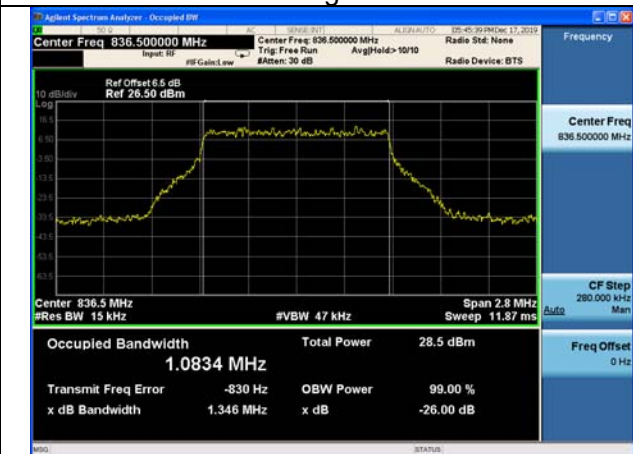


Fig.5

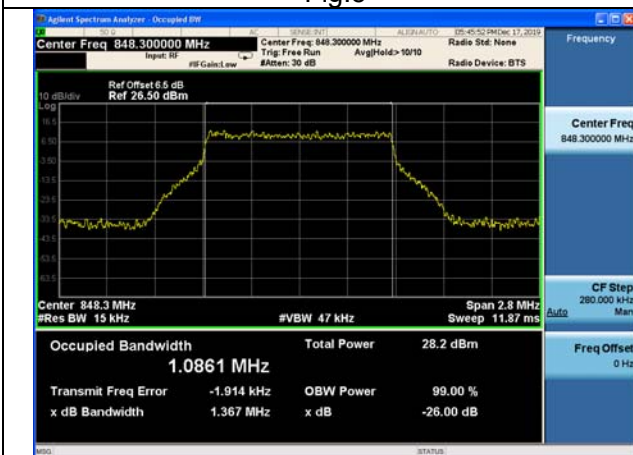


Fig.6

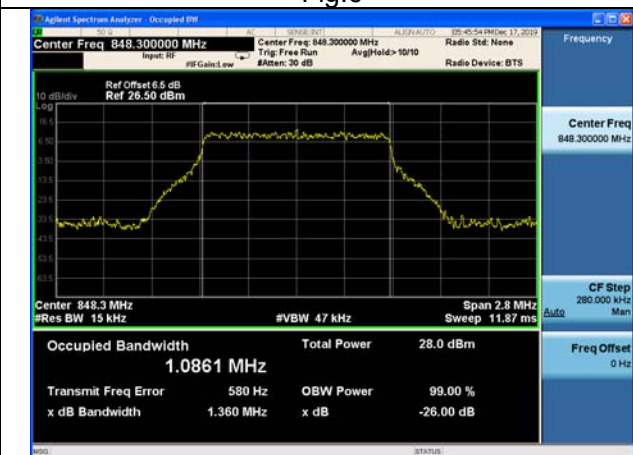


Fig.7

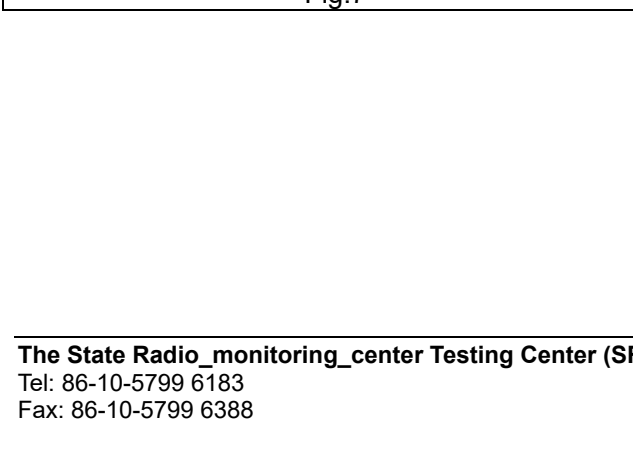
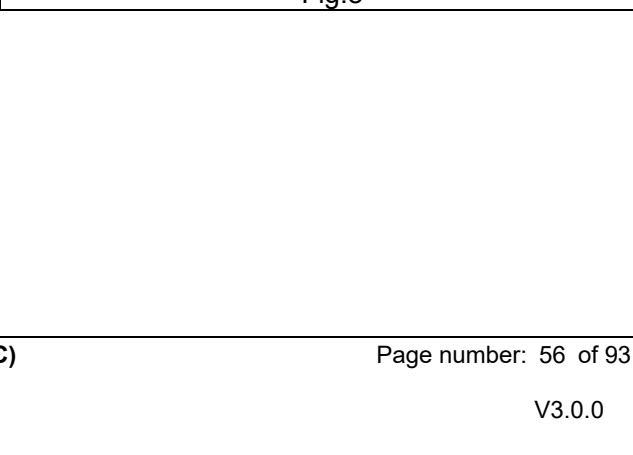


Fig.8



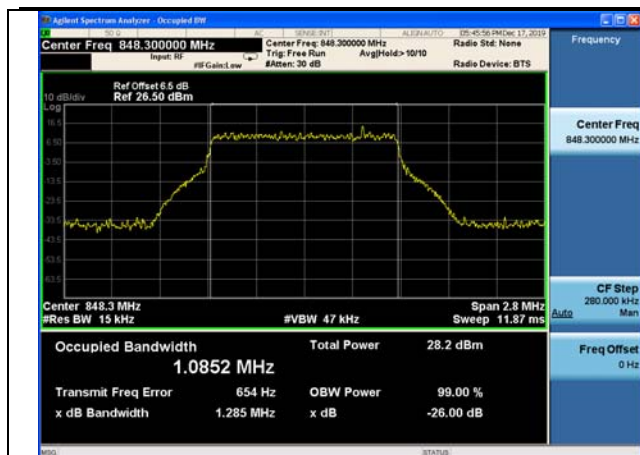


Fig.9

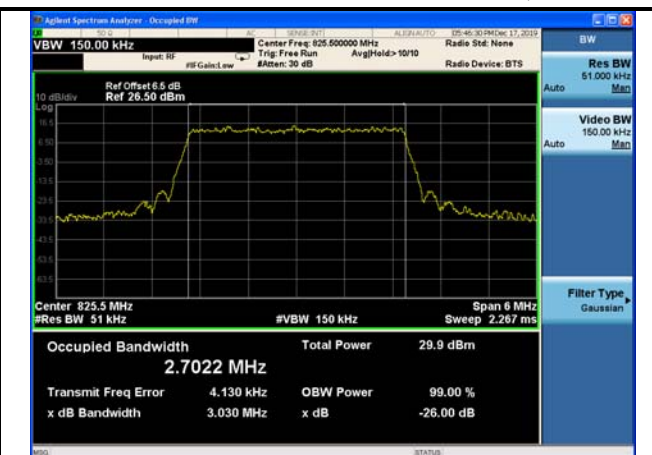


Fig.10

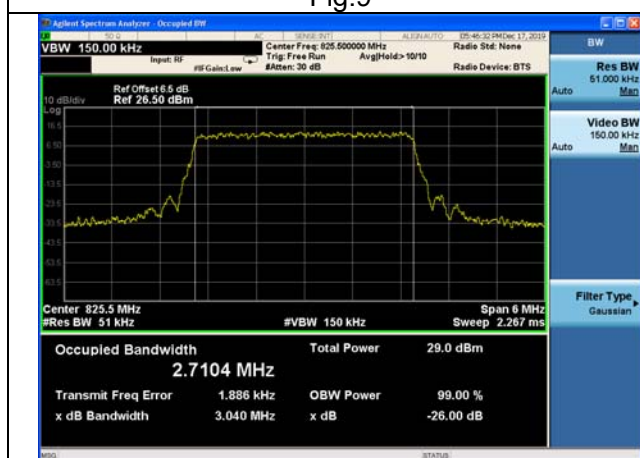


Fig.11

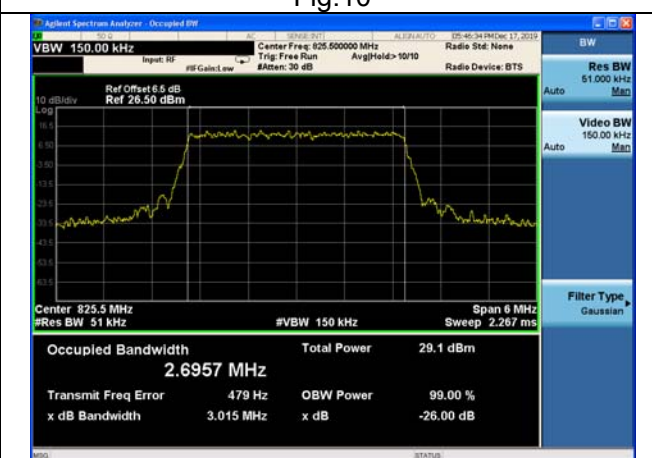


Fig.12

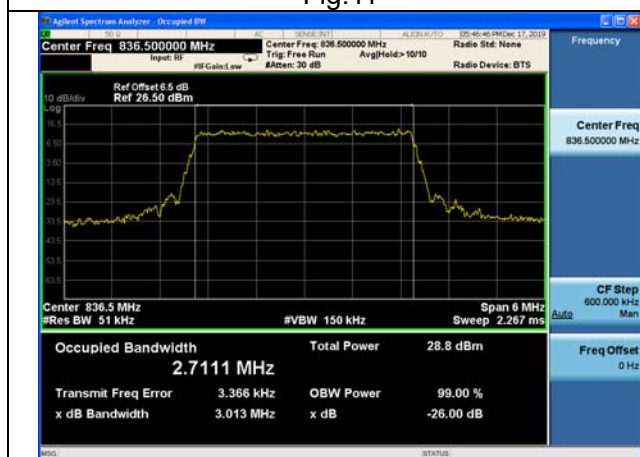


Fig.13

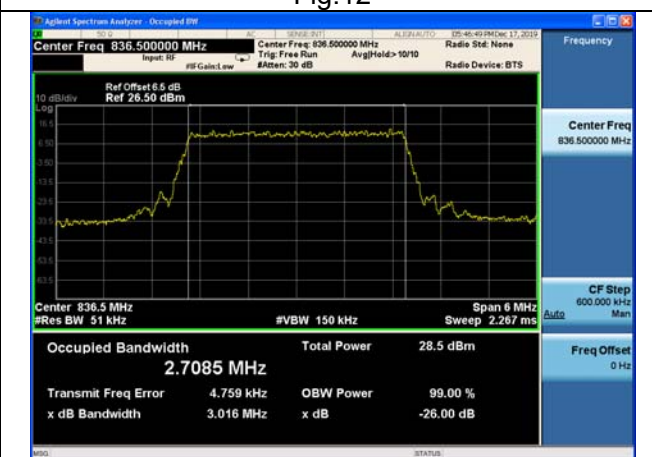


Fig.14

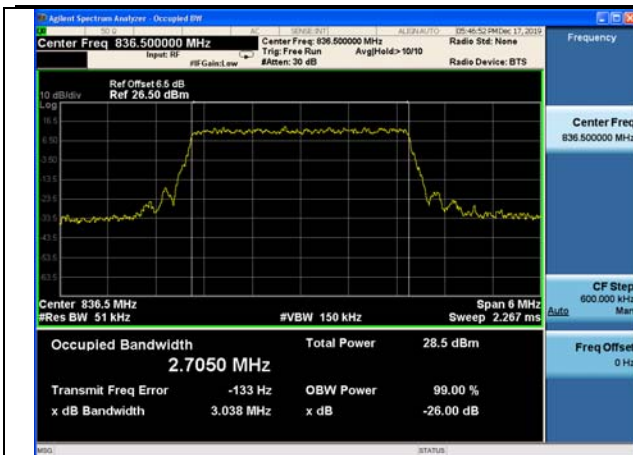


Fig.15

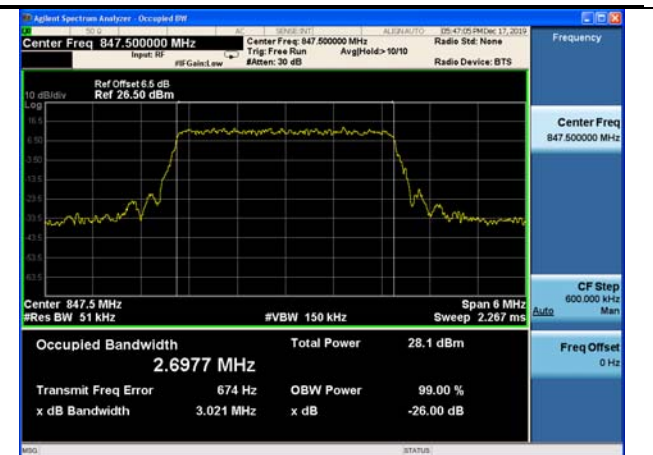


Fig.16

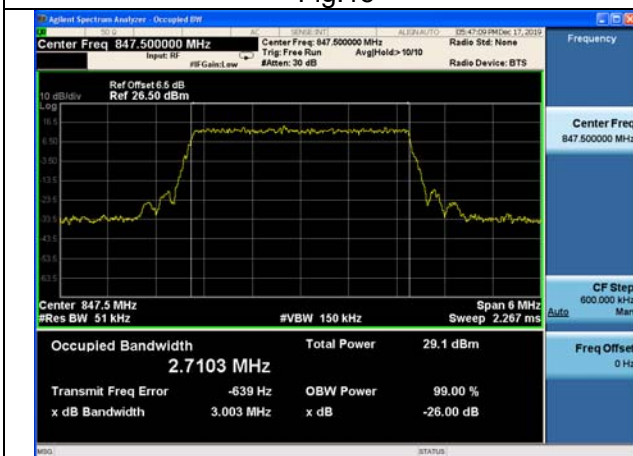


Fig.17

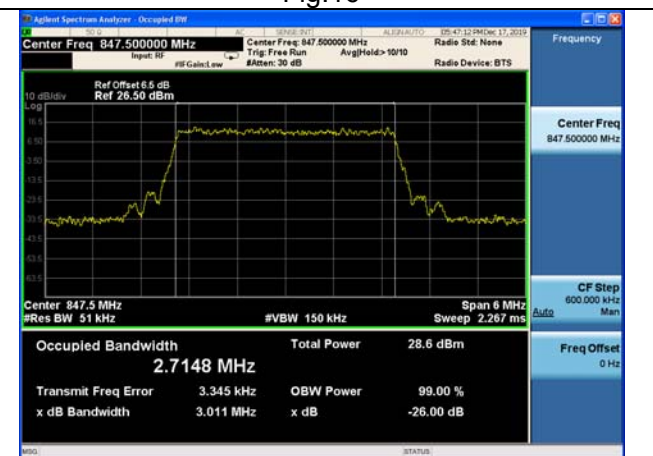


Fig.18

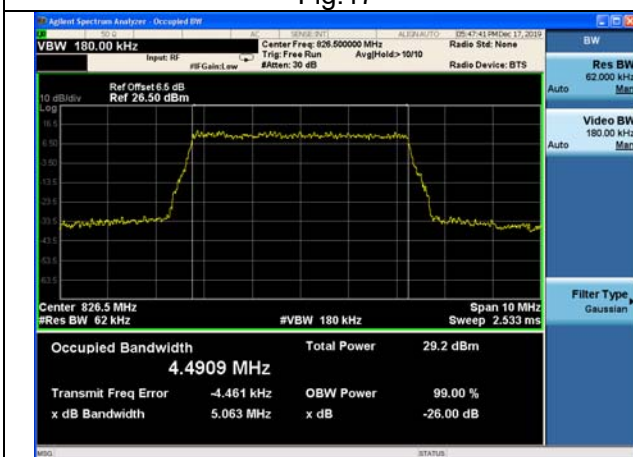


Fig.19

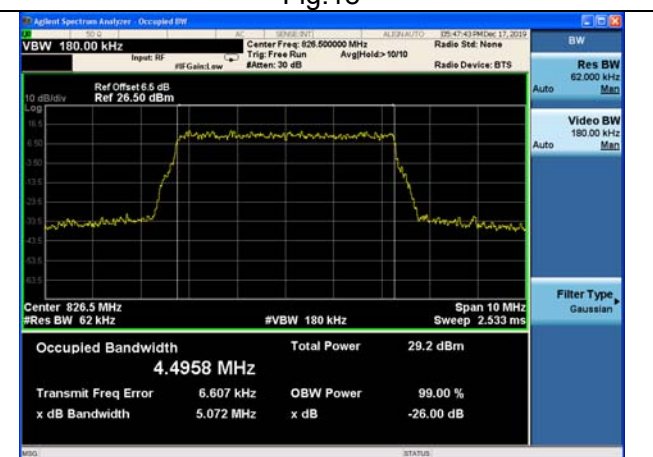


Fig.20

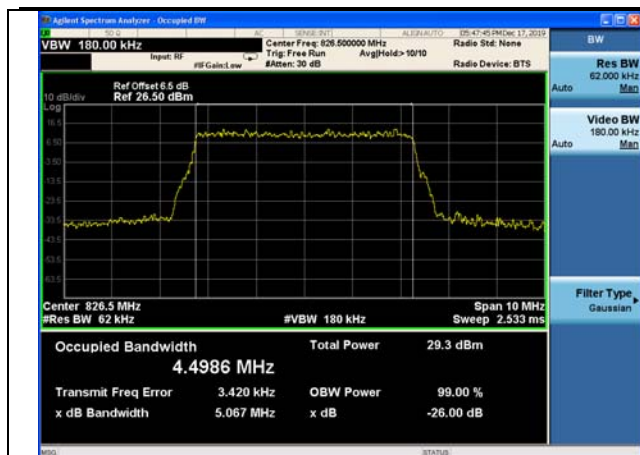


Fig.21

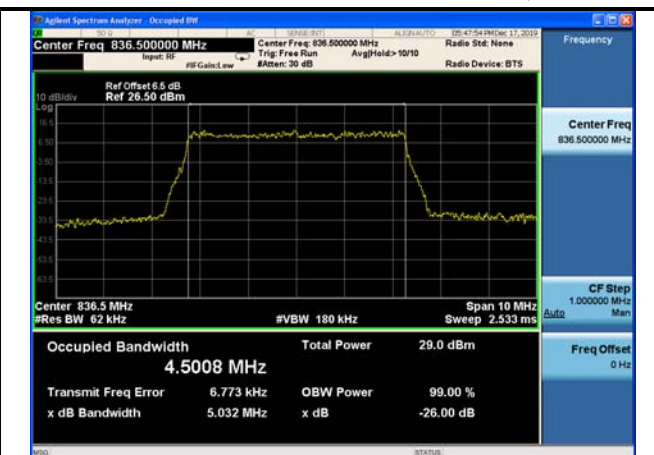


Fig.22

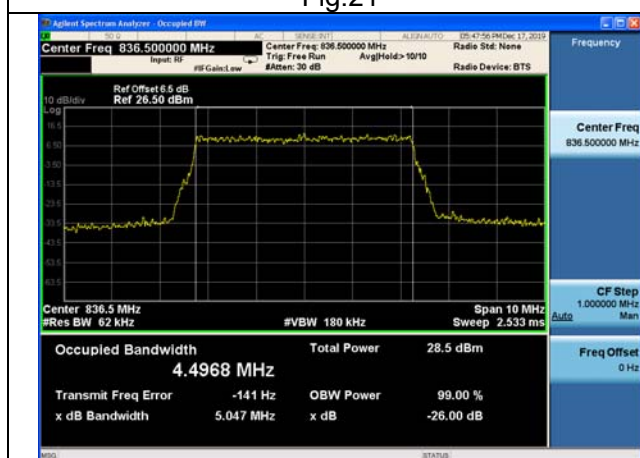


Fig.23

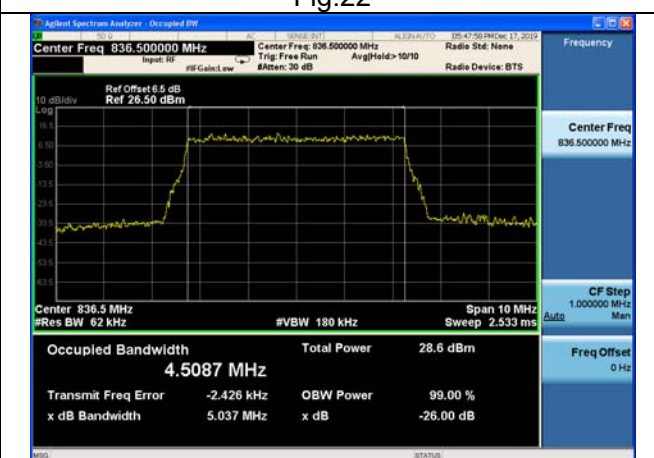


Fig.24

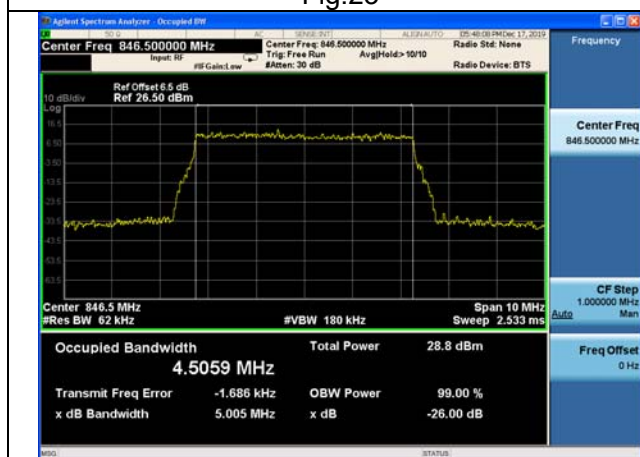


Fig.25

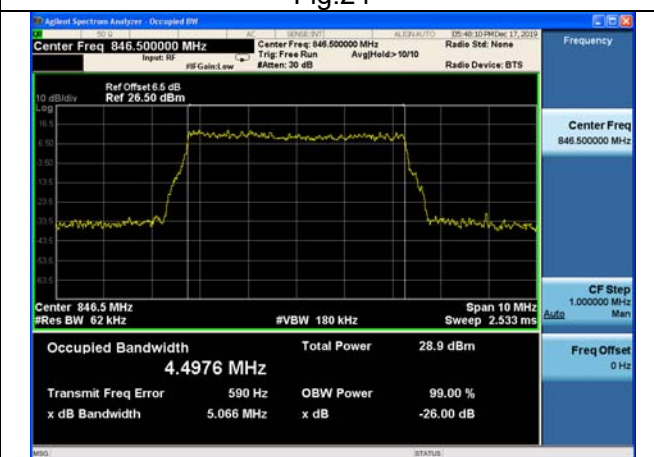


Fig.26

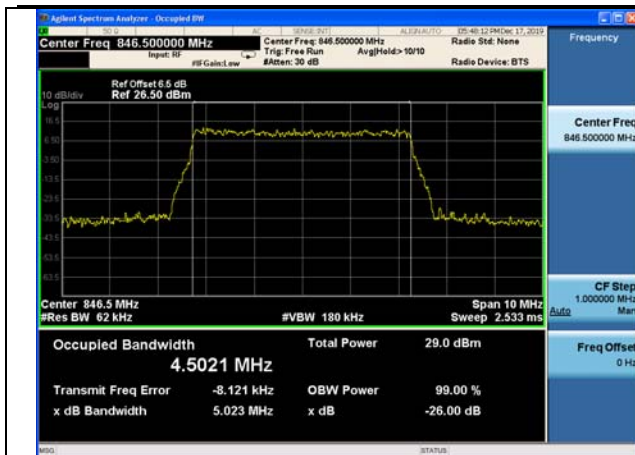


Fig.27

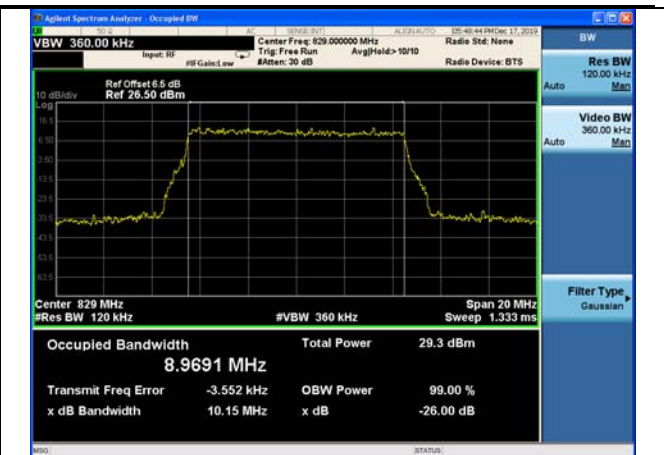


Fig.28

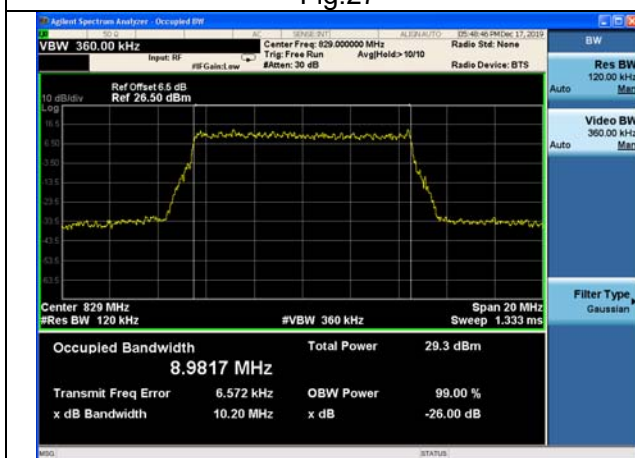


Fig.29

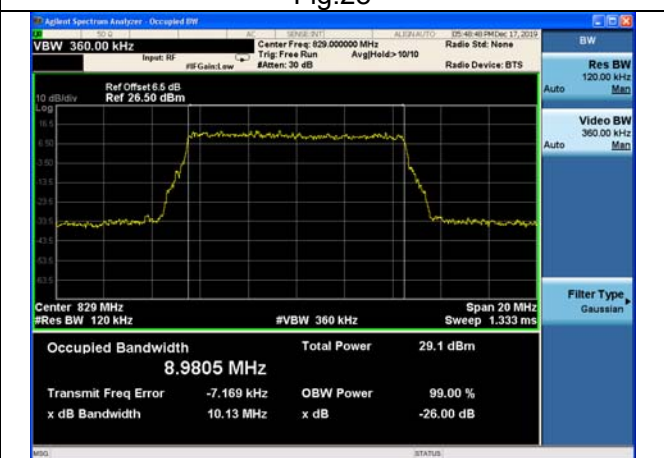


Fig.30

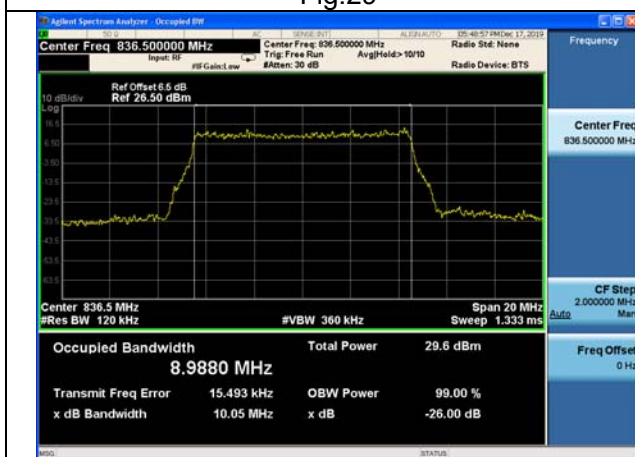


Fig.31

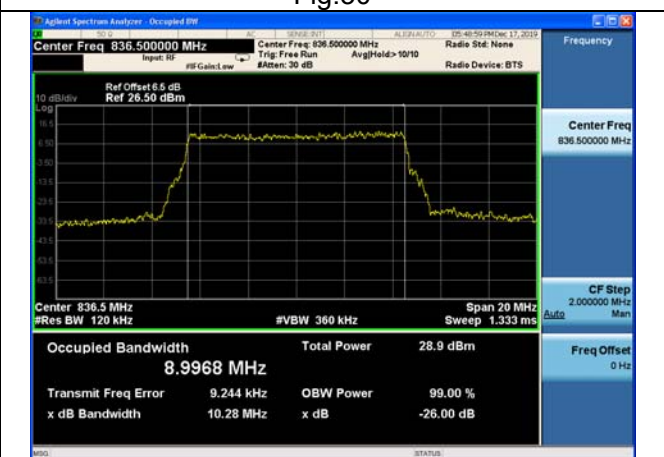


Fig.32

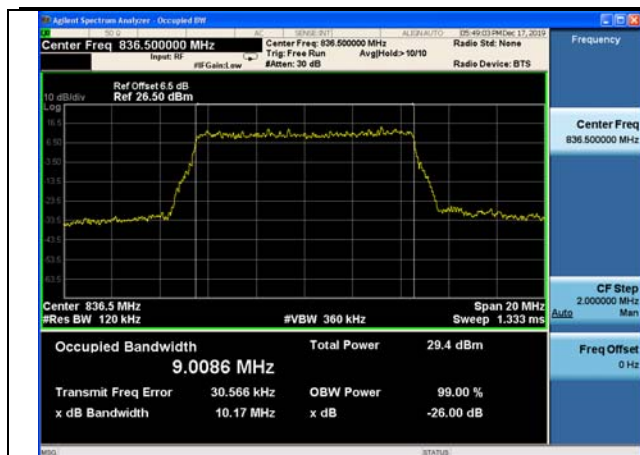


Fig.33

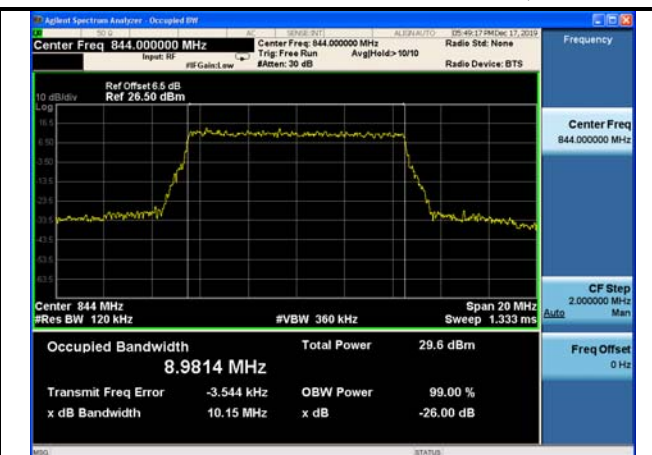


Fig.34

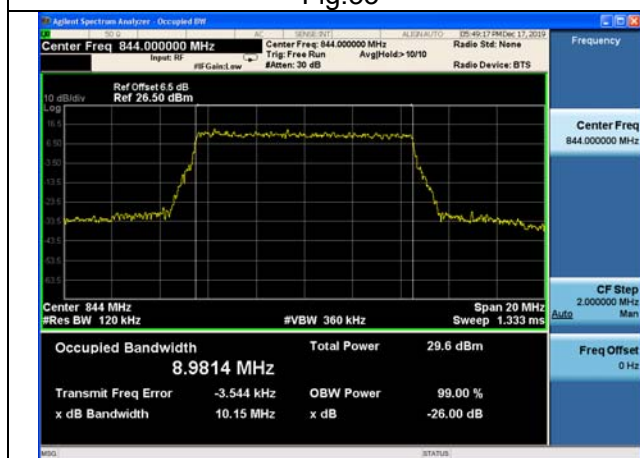


Fig.35

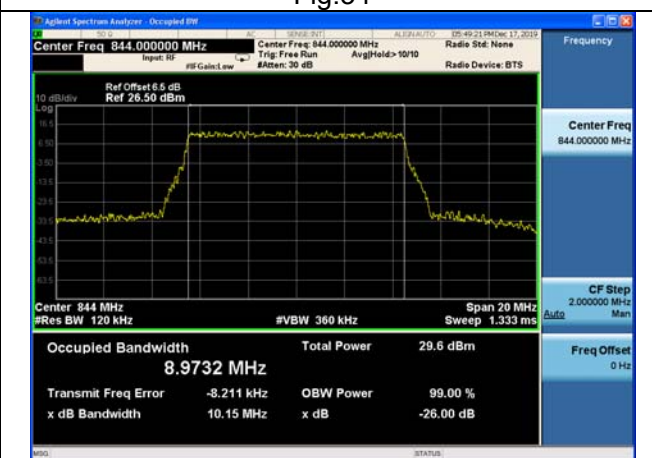


Fig.36

3 Peak-Average Ratio

Band	Carrier frequency (MHz)	Channel	BW (MHz)	RB Size	RB Offset	QPSK	16-QAM	64-QAM
5	836.5	20525	1.4	1	0	Fig.1	Fig.2	Fig.3
			3	1	0	Fig.4	Fig.5	Fig.6
			5	1	0	Fig.7	Fig.8	Fig.9
			10	1	0	Fig.10	Fig.11	Fig.12



Fig.1

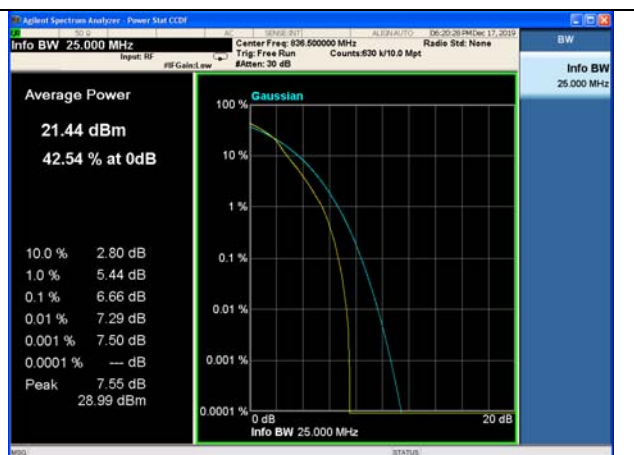


Fig.2



Fig.3



Fig.4

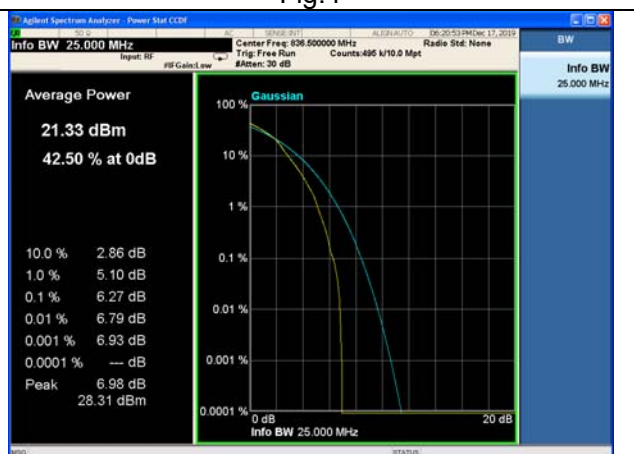


Fig.5



Fig.6



Fig.7



Fig.8



Fig.9



Fig.10



Fig.11

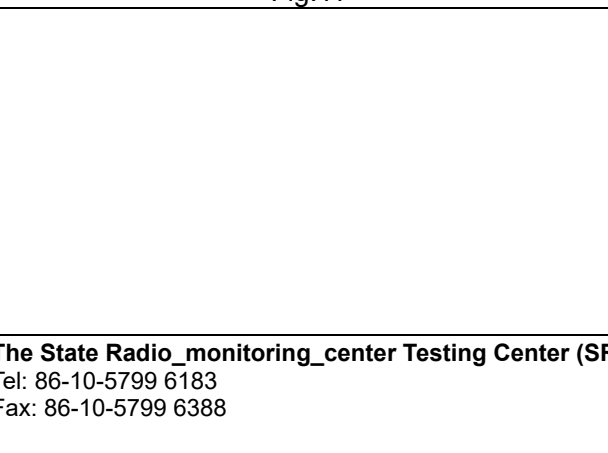
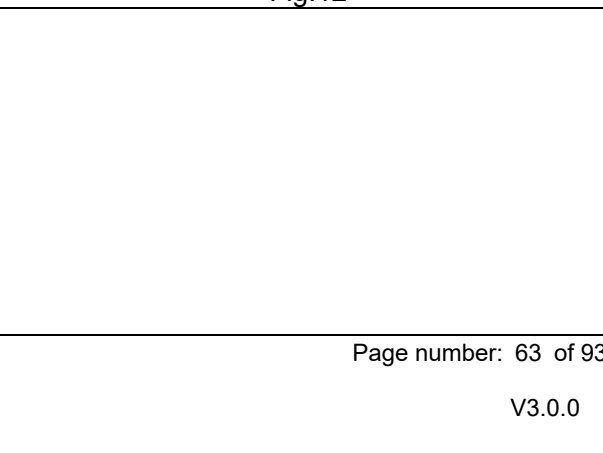


Fig.12



4 Spurious Emissions at antenna terminal

Band	Carrier frequency (MHz)	Channel	BW	RB Size	RB Offset	Conducted Spurious Plot
						QPSK
5	829	20450	10	1	0	Fig.1-2
	836.5	20525	10	1	0	Fig.3-4
	844	20600	10	1	0	Fig.4-5

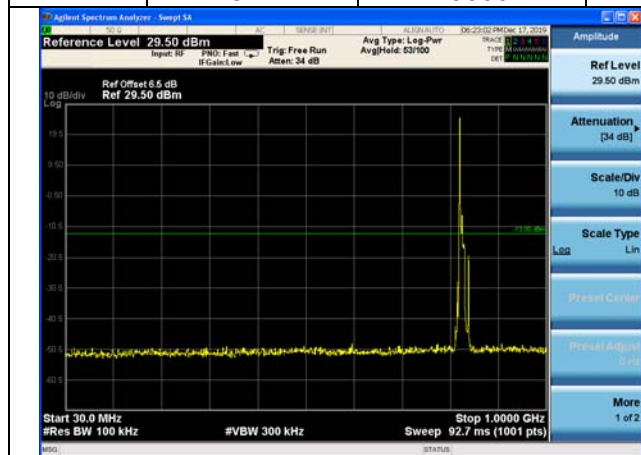


Fig.1

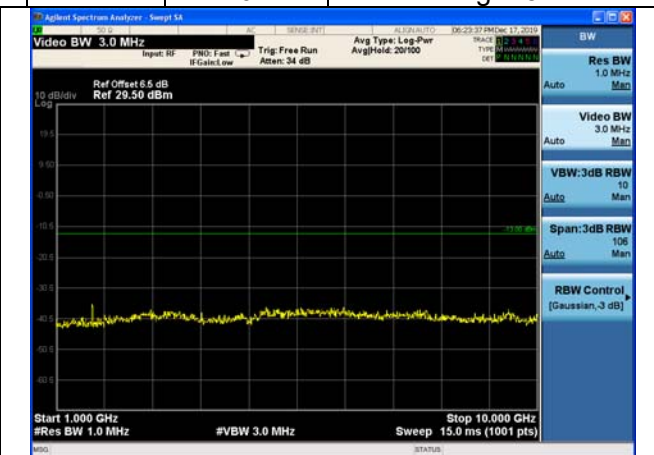


Fig.2

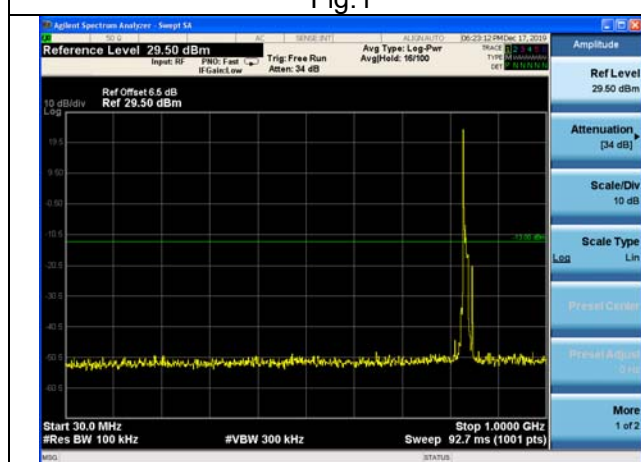


Fig3

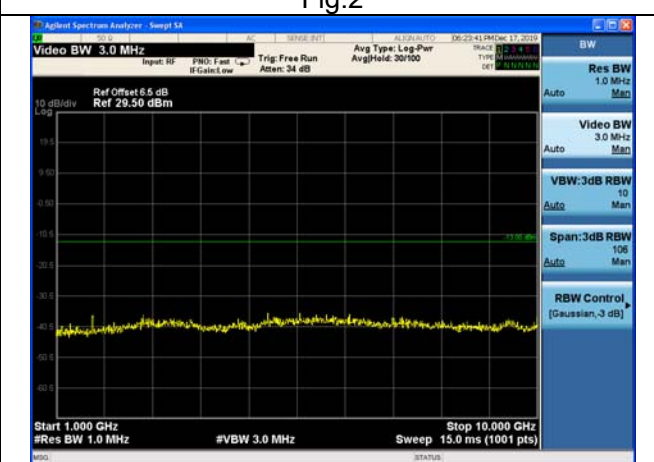


Fig4

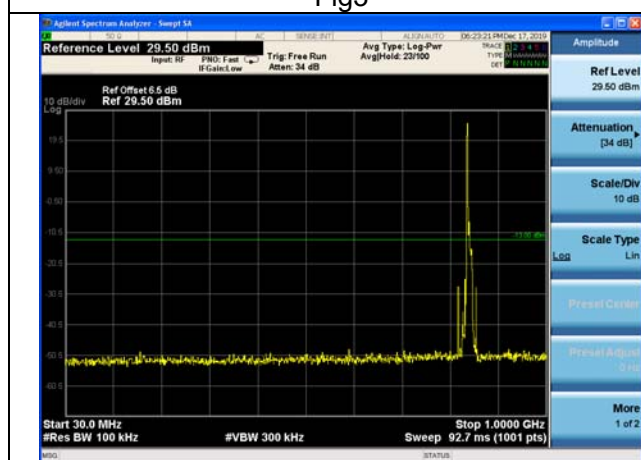


Fig5

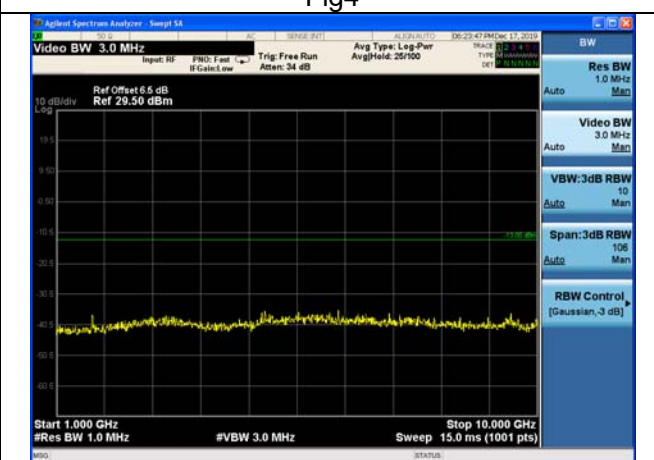


Fig6

5 Band Edges Compliance

Test result

Band	Carrier frequency (MHz)	Channel	BW	RB Size	RB Offset	Band Edges Plot
						QPSK
5	824.7	20407	1.4	1	0	Fig.1
				6	0	Fig.2
	848.3	20643		1	5	Fig.3
				6	0	Fig.4
	825.5	20415	3	1	0	Fig.5
				15	0	Fig.6
	847.5	20635		1	14	Fig.7
				15	0	Fig.8
	826.5	20425	5	1	0	Fig.9
				25	0	Fig.10
	846.5	20625		1	24	Fig.11
				25	0	Fig.12
	829	20450	10	1	0	Fig.13
				50	0	Fig.14
	844	20600		1	49	Fig.15
				50	0	Fig.16

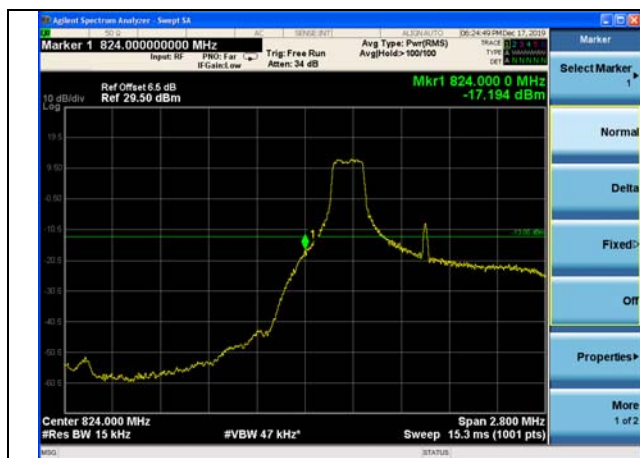


Fig.1



Fig.2

