FCC RF Test Report

APPLICANT	:	**Motorola Mobility LLC**
EQUIPMENT	:	**Mobile Cellular Phone**
BRAND NAME	:	**Motorola**
MODEL NAME	:	**XT2309-3**
FCC ID	:	**IHDT56AG9**
STANDARD	:	**47 CFR Part 2, 22, 24, 27**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**
TEST DATE(S)	:	**Dec. 07, 2022 ~ Dec. 23, 2022**

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG2O2807-01E	Rev. 01	Initial issue of report	Jan. 10, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power (5G NR n5)	ERP < 7 Watt		
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (5G NR n71)	ERP < 3 Watt		
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n2) (5G NR n41)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (5G NR n66)	EIRP < 1Watt		
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Conducted Band Edge Measurement (5G NR n5) (5G NR n2) (5G NR n66) (5G NR n71)	< 43+10log10(P[Watts])	PASS	-
	§27.53(m)(4)	Conducted Band Edge Measurement (5G NR n41)	§27.53(m)(4)		
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Conducted Spurious Emission (5G NR n5) (5G NR n2) (5G NR n66) (5G NR n71)	< 43+10log10(P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (5G NR n41)	< $55+10\log_{10}$(P[Watts])		
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§24.235 §27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Radiated Spurious Emission (5G NR n5) (5G NR n2) (5G NR n66) (5G NR n71)	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 24.92 dB at 7632.00 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (5G NR n41)	< $55+10\log_{10}$(P[Watts])		

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2309-3
FCC ID	IHDT56AG9
IMEI Code	Conducted : 351347720007731 Radiation : 351347720008168
HW Version	DVT2
SW Version	T1TB33.20
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71: 663 MHz ~ 698 MHz
Rx Frequency	5G NR n2 : 1930 MHz ~ 1990 MHz 5G NR n5 : 869 MHz ~ 894 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 2110 MHz~ 2200 MHz 5G NR n71: 617 MHz ~ 652 MHz
Bandwidth	n2/n5: 5MHz / 10MHz / 15MHz / 20MHz n41 : 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz n66 : 5MHz / 10MHz / 15MHz / 20MHz / 30MHz / 40MHz n71 : 5MHz / 10MHz / 15MHz / 20MHz
SCS	15kHz for n2/n5/n66/n71 30kHz for n41
Antenna Gain	**<Ant. 0>** n2: -1.7 dBi n5: -4.6 dBi n41: -3.3 dBi

	n66: -1.2 dBi n71: -7.1 dBi **<Ant. 1>** n2: -1.5 dBi n5: -5.1 dBi n41: -3.8 dBi n66: -2.8 dBi n71: -8.5 dBi **<Ant. 2>** n41: -6.5 dBi **<Ant. 7>** n41: -7.2 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. The maximum ERP/EIRP is calculated from max output power and max antenna gain,only the maximum ERP/EIRP are shown in the report, 5G NR n2/n5/n41/n66/n71for Ant. 0.
2. All the supported ENDC combinations are verified conducted power, only the ENDC combination with highest power are shown in the report.
3. 5G NR n2/n5/n41/n66/n71 support SA mode and NSA mode.
4. According to the maximum power between SA and NSA mode, SA covers NSA mode for n71.
5. The device supports HPUE for 5G NR n41 SA mode.
6. The device supports n41(1T4R) SRS resources on ant.0/1/2/7, only the test data of worst ant.0 is showed in the report according to the maximum power.
7. The device supports two PAs for 5G NR n2/n66/n41 (main PA for SA mode and other PA for NSA mode),only the maximum power to calculate the EIRP and show in the report.
8. The EN-DC mode combination could be referred to the product spec.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-681N
AC Adapter 2(US)	**Brand Name**	Motorola (Acbel)	**Model Name**	MC-681N
Battery	**Brand Name**	Motorola(SCUD)	**Model Name**	PB50
USB Cable 1	**Brand Name**	Motorola (Saibao)	**Model Name**	SC18D24968
USB Cable 2	**Brand Name**	Motorola (Saibao)	**Model Name**	SC18D71644
Wireless Charging dock	**Marketing Name**	TurboPower 15W Wireless Charging Stand	**Model Name**	MW - 03

1.7 Maximum ERP/EIRP Power and Emission Designator

EN DC_12A-n2A		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	1860.0 ~ 1900.0	0.1432	19M0G7D	0.1143	18M9W7D

EN DC_48A-n5A		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
20	834.0 ~ 839.0	0.0427	18M9G7D	0.0347	19M0W7D

EN DC_48A-n66A		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
40	1730.0 ~ 1760.0	0.1517	38M7G7D	0.1153	38M8W7D

5G NR n71		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
20	673.0 ~ 688.0	0.0240	19M0G7D	0.0199	18M9W7D

5G NR n41		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
100	2546.01 ~ 2640.00	0.1750	98M5G7D	0.1321	98M5W7D

Note: All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.8 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.9 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.10 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22, 24, 27
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

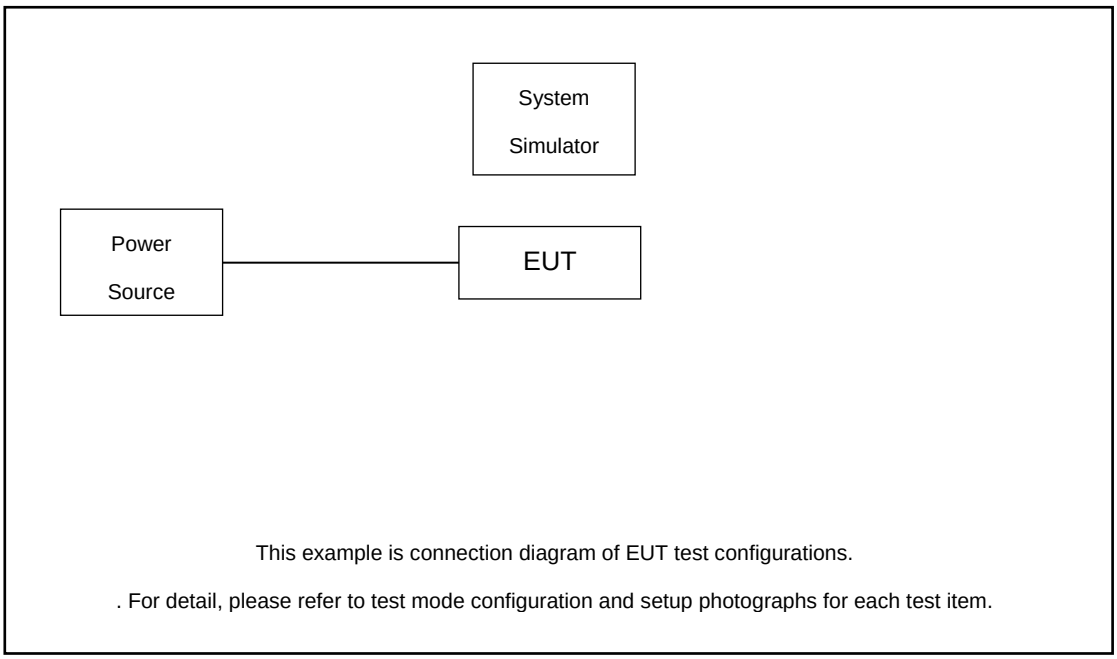
The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			

Test Items	5G NR	Bandwidth (MHz)													Modulation					RB #		Test Channel		
		5	10	15	20	25	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M	H
Max. Output Power	n2	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n5	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n66	v	v	v	v	-	v	v	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n71	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	n2				v	-	-	-	-	-	-	-	-	-	v	v					v		v	
	n5				v	-	-	-	-	-	-	-	-	-	v	v					v		v	
	n41	-	-	-	v	-								v	v	v					v		v	
	n66				v	-			-	-	-	-	-	-	v	v					v		v	
	n71				v	-	-	-	-	-	-	-	-	-	v	v					v		v	
26dB and 99% Bandwidth	n2	v	v	v	v	-	-	-	-	-	-	-	-	-		v	v	v	v		v		v	
	n5	v	v	v	v	-	-	-	-	-	-	-	-	-		v	v	v	v		v		v	
	n41	-	-	-	v	-	v	v	v	v	v	v	v	v		v	v	v	v		v		v	
	n66	v	v	v	v	-	v	v	-	-	-	-	-	-		v	v	v	v		v		v	
	n71	v	v	v	v	-	-	-	-	-	-	-	-	-		v	v	v	v		v		v	
Conducted Band Edge	n2	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v	v	v		v
	n5	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v	v	v		v

Test Items	5G NR	Bandwidth (MHz)													Modulation					RB #		Test Channel		
		5	10	15	20	25	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M	H
	n41	-	-	-	v	-				v				v	v	v				v	v	v		v
	n66	v			v	-		v	-	-	-	-	-	-	v	v				v	v	v		v
	n71	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v	v	v		v
Conducted Spurious Emission	n2	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v		v	v	v
	n5	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v		v	v	v
	n41	-	-	-	v	-				v				v	v	v				v		v	v	v
	n66	v			v	-		v	-	-	-	-	-	-	v	v				v		v	v	v
	n71	v	v		v	-	-	-	-	-	-	-	-	-	v	v				v		v	v	v
Frequency Stability	n2				v	-	-	-	-	-	-	-	-	-		v				v			v	
	n5				v	-	-	-	-	-	-	-	-	-		v				v			v	
	n41	-	-	-	v	-										v				v			v	
	n66				v	-			-	-	-	-	-	-		v				v			v	
	n71				v	-	-	-	-	-	-	-	-	-		v				v			v	
E.R.P / E.I.R.P	n2	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n5	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	n66	v	v	v	v	-	v	v	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n71	v	v	v	v	-	-	-	-	-	-	-	-	-	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n2	Worst Case																					v	
	n5	Worst Case																					v	
	n41	Worst Case																					v	
	n66	Worst Case																					v	
	n71	Worst Case																					v	
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. Frequency Stability：Normal Voltage = 3.89V ；Low Voltage =3.40V.；High Voltage =4.48V																							

2.2 Connection Diagram of Test System



The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
3.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.6 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 5.6 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n2 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	372000	376000	380000
	Frequency	1860	1880	1900
15	Channel	371500	376000	380500
	Frequency	1857.5	1880	1902.5
10	Channel	371000	376000	381000
	Frequency	1855	1880	1905
5	Channel	370500	376000	381500
	Frequency	1852.5	1880	1907.5

5G NR n5 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	166800	167300	167800
	Frequency	834	836.5	839
15	Channel	166300	167300	168300
	Frequency	831.5	836.5	841.5
10	Channel	165800	167300	168800
	Frequency	829	836.5	844
5	Channel	165300	167300	169300
	Frequency	826.5	836.5	846.5

5G NR n41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	509202	518598	528000
	Frequency	2546.01	2592.99	2640
90	Channel	508200	518598	528996
	Frequency	2541	2592.99	2644.98
80	Channel	507204	518598	529998
	Frequency	2536.02	2592.99	2649.99
70	Channel	506202	518598	531000
	Frequency	2531.01	2592.99	2655
60	Channel	505200	518598	531996
	Frequency	2526	2592.99	2659.98

50	Channel	504204	518598	532998
	Frequency	2521.02	2592.99	2664.99
40	Channel	503202	518598	534000
	Frequency	2516.01	2592.99	2670
30	Channel	502200	518598	534996
	Frequency	2511	2592.99	2674.98
20	Channel	501204	518598	535998
	Frequency	2506.02	2592.99	2679.99

5G NR n66 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
40	Channel	346000	349000	352000
	Frequency	1730	1745	1760
30	Channel	345000	349000	353000
	Frequency	1725	1745	1765
20	Channel	344000	349000	354000
	Frequency	1720	1745	1770
15	Channel	343500	349000	354500
	Frequency	1717.5	1745	1772.5
10	Channel	343000	349000	355000
	Frequency	1715	1745	1775
5	Channel	342500	349000	355500
	Frequency	1712.5	1745	1777.5

5G NR n71 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	134600	136100	137600
	Frequency	673	680.5	688
15	Channel	134100	136100	138100
	Frequency	670.5	680.5	690.5
10	Channel	133600	136100	138600
	Frequency	668	680.5	693
5	Channel	133100	136100	139100
	Frequency	665.5	680.5	695.5

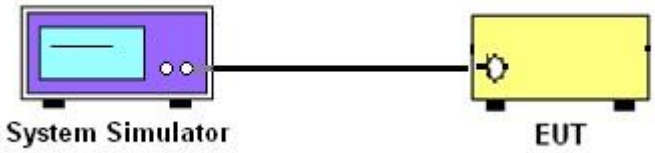
3 Conducted Test Items

3.1 Measuring Instruments

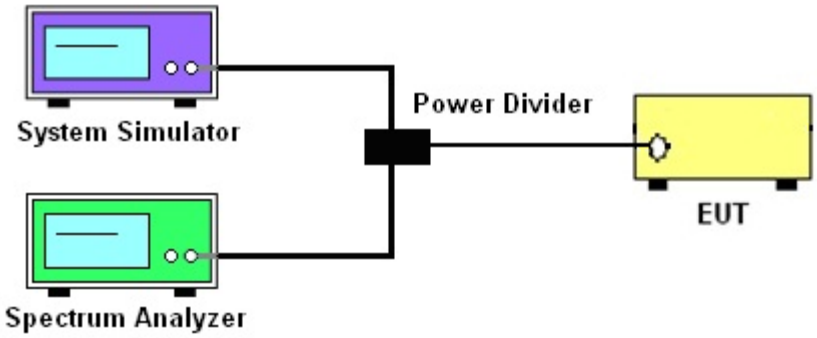
See list of measuring instruments of this test report.

3.2 Test Setup

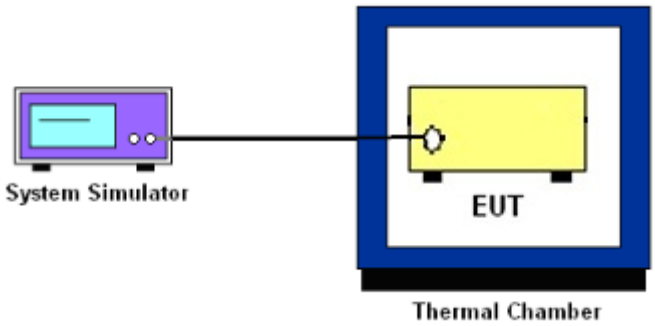
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for 5G NR n5.

The ERP of mobile transmitters must not exceed 3 Watts for 5G NR n71.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n2, n41.

The EIRP of mobile transmitters must not exceed 1 Watts for 5G NR n66.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

1. The testing follows ANSI C63.26 Section 5.2.6 (PAPR).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set EUT in maximum power output.
4. Set the RBW = 1MHz, VBW = 3MHz, Detector = Peak, Trace mode = max hold, Set span ≥ 2 × OBW in spectrum analyzer.
5. Set the RBW = 1MHz, VBW = 3MHz, Detector = power averaging, Trace mode = max hold, Set span ≥ 2 × OBW in spectrum analyzer.
6. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission.
7. PAPR (dB) = P_{Pk} (dBm) − P_{Avg} (dBm)

   where

   PAPR peak-to-average power ratio, in dB

   P_{Pk} measured peak power level, in dBm

   P_{Avg} measured average power level, in dBm
8. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

24.238 (a)

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, 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.

27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53(m)(4)

For mobile digital stations, 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 as defined in paragraph (m)(6) of this section. 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 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as

adjacent channel BRS or EBS licensees.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used (generally limited to no less than 1% of the OBW) and the measured power was integrated over the full required measurement bandwidth.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For 5G NR n41, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For 5G NR n41
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

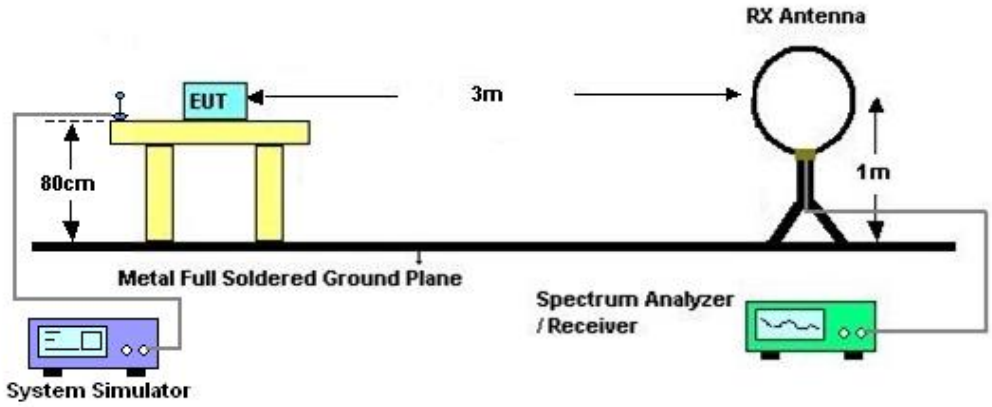
4 Radiated Test Items

4.1 Measuring Instruments

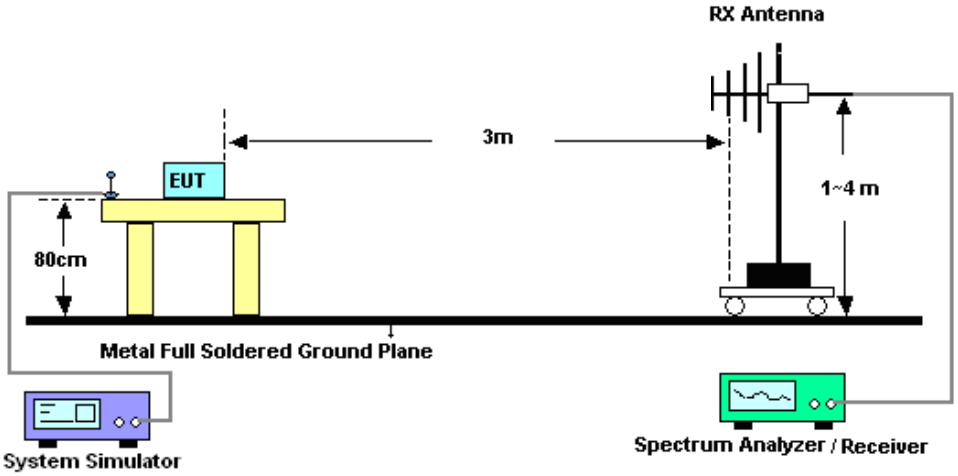
See list of measuring instruments of this test report.

4.2 Test Setup

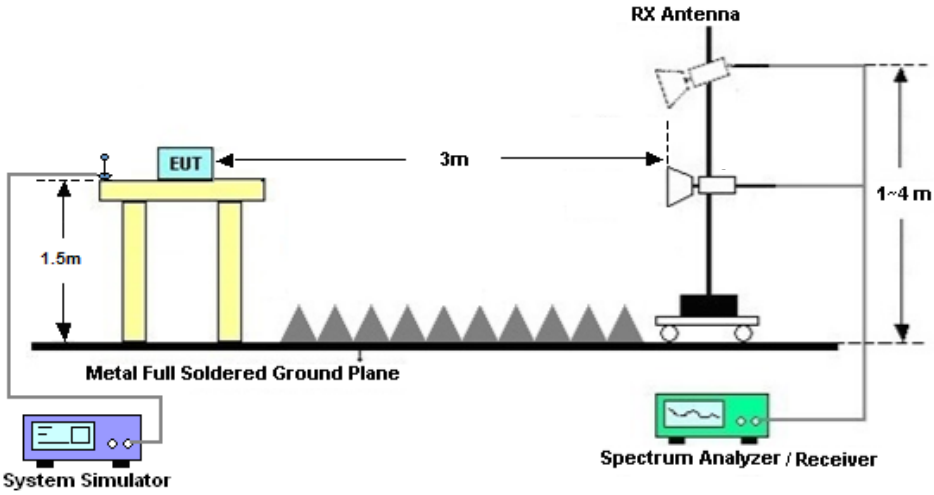
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For 5G NR n41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Dec. 07, 2022~ Dec. 23, 2022	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2022	Dec. 07, 2022~ Dec. 23, 2022	Aug. 25, 2023	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Dec. 07, 2022~ Dec. 23, 2022	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Dec. 16, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 29, 2021	Dec. 16, 2022	Oct. 28, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Dec. 16, 2022	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Jan. 05, 2022	Dec. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Dec. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 05, 2022	Dec. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Dec. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Dec. 16, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Dec. 16, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 16, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 16, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 16, 2022	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.1 %

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power and ERP/EIRP)

5G NR n2:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				372000	376000	380000		L	M	H
Frequency (MHz)				1860	1880	1900				
20	PI/2 BPSK	1	1	22.12	22.78	23.21	-1.7	0.1102	0.1282	0.1416
20	QPSK	1	1	22.06	22.89	23.20	-1.7	0.1086	0.1315	0.1413
20	QPSK	1	53	22.72	22.63	23.26	-1.7	0.1265	0.1239	0.1432
20	QPSK	1	104	22.94	23.15	23.06	-1.7	0.1330	0.1396	0.1368
20	QPSK	50	0	21.29	21.92	22.35	-1.7	0.0910	0.1052	0.1161
20	QPSK	50	28	22.56	22.79	23.26	-1.7	0.1219	0.1285	0.1432
20	QPSK	50	56	21.97	21.97	22.12	-1.7	0.1064	0.1064	0.1102
20	QPSK	100	0	21.69	21.80	22.28	-1.7	0.0998	0.1023	0.1143
20	16QAM	1	1	21.11	21.97	22.28	-1.7	0.0873	0.1064	0.1143
20	64QAM	1	1	19.88	20.69	20.97	-1.7	0.0658	0.0793	0.0845
20	256QAM	1	1	17.38	18.15	18.46	-1.7	0.0370	0.0442	0.0474
Channel				371500	376000	380500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1857.5	1880	1902.5				
15	PI/2 BPSK	1	1	22.37	22.85	23.01	-1.7	0.1167	0.1303	0.1352
15	QPSK	1	1	22.30	22.80	23.15	-1.7	0.1148	0.1288	0.1396
Channel				371000	376000	381000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1855	1880	1905				
10	PI/2 BPSK	1	1	22.20	22.68	22.84	-1.7	0.1122	0.1253	0.1300
10	QPSK	1	1	22.08	22.76	22.94	-1.7	0.1091	0.1276	0.1330
Channel				370500	376000	381500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1852.5	1880	1907.5				
5	PI/2 BPSK	1	1	22.15	22.65	22.80	-1.7	0.1109	0.1245	0.1288
5	QPSK	1	1	22.20	22.60	22.65	-1.7	0.1122	0.1230	0.1245

5G NR n5:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				166800	167300	167800		L	M	H
Frequency (MHz)				834	836.5	839				
20	PI/2 BPSK	1	1	22.80	23.05	22.83	-4.6	0.0403	0.0427	0.0406
20	QPSK	1	1	22.86	22.95	22.80	-4.6	0.0408	0.0417	0.0403
20	QPSK	1	53	22.75	22.82	22.73	-4.6	0.0398	0.0405	0.0396
20	QPSK	1	104	22.64	22.81	22.55	-4.6	0.0388	0.0404	0.0380
20	QPSK	50	0	22.03	22.05	21.90	-4.6	0.0337	0.0339	0.0327
20	QPSK	50	28	22.84	22.89	22.75	-4.6	0.0406	0.0411	0.0398
20	QPSK	50	56	21.92	21.88	21.94	-4.6	0.0329	0.0326	0.0330

20	QPSK	100	0	21.90	21.94	22.04	-4.6	0.0327	0.0330	0.0338
20	16QAM	1	1	22.10	21.85	22.15	-4.6	0.0343	0.0324	0.0347
20	64QAM	1	1	20.45	20.50	20.45	-4.6	0.0234	0.0237	0.0234
20	256QAM	1	1	18.22	18.09	18.24	-4.6	0.0140	0.0136	0.0141
Channel				166300	167300	168300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	PI/2 BPSK	1	1	23.01	23.00	22.91	-4.6	0.0423	0.0422	0.0413
15	QPSK	1	1	22.91	22.90	22.88	-4.6	0.0413	0.0412	0.0410
Channel				165800	167300	168800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	PI/2 BPSK	1	1	22.98	22.87	22.68	-4.6	0.0420	0.0409	0.0392
10	QPSK	1	1	22.88	22.71	22.63	-4.6	0.0410	0.0394	0.0387
Channel				165300	167300	169300	Gain	ERP	ERP	ERP
Frequency (MHz)				826.5	836.5	846.5				
5	PI/2 BPSK	1	1	22.95	22.85	22.64	-4.6	0.0417	0.0407	0.0388
5	QPSK	1	1	22.93	22.81	22.52	-4.6	0.0415	0.0404	0.0378

5G NR n41:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				509202	518598	528000		L	M	H
Frequency (MHz)				2546.01	2592.99	2640				
100	PI/2 BPSK	1	1	25.55	25.36	25.30	-3.30	0.1679	0.1607	0.1585
100	QPSK	1	1	25.34	25.24	25.21	-3.30	0.1600	0.1563	0.1552
100	QPSK	1	137	25.41	25.22	25.38	-3.30	0.1626	0.1556	0.1614
100	QPSK	1	271	25.52	25.61	25.73	-3.30	0.1667	0.1702	0.1750
100	QPSK	135	0	24.40	24.26	24.29	-3.30	0.1288	0.1247	0.1256
100	QPSK	135	69	25.43	25.34	25.47	-3.30	0.1633	0.1600	0.1648
100	QPSK	135	138	24.46	24.48	24.53	-3.30	0.1306	0.1312	0.1327
100	QPSK	270	0	24.46	24.41	24.44	-3.30	0.1306	0.1291	0.1300
100	16QAM	1	1	24.51	24.21	24.16	-3.30	0.1321	0.1233	0.1219
100	64QAM	1	1	22.57	22.59	22.50	-3.30	0.0845	0.0849	0.0832
100	256QAM	1	1	20.84	20.69	20.61	-3.30	0.0568	0.0548	0.0538
Channel				508200	518598	528996	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2541	2592.99	2644.98				
90	PI/2 BPSK	1	1	25.34	25.26	25.20	-3.30	0.1600	0.1570	0.1549
90	QPSK	1	1	25.31	25.16	25.14	-3.30	0.1589	0.1535	0.1528
Channel				507204	518598	529998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2536.02	2592.99	2649.99				
80	PI/2 BPSK	1	1	25.36	25.23	25.26	-3.30	0.1607	0.1560	0.1570
80	QPSK	1	1	25.43	25.11	25.21	-3.30	0.1633	0.1517	0.1552
Channel				506202	518598	531000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2531.01	2592.99	2565				
70	PI/2 BPSK	1	1	25.47	25.24	25.40	-3.30	0.1648	0.1563	0.1622
70	QPSK	1	1	25.38	25.19	25.34	-3.30	0.1614	0.1545	0.1600
Channel				505200	518598	531996	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2526	2592.99	2659.98				
60	PI/2 BPSK	1	1	25.52	25.35	25.55	-3.30	0.1667	0.1603	0.1679

60	QPSK	1	1	25.54	25.33	25.48	-3.30	0.1675	0.1596	0.1652
Channel				504204	518598	532998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2521.02	2592.99	2664.99				
50	PI/2 BPSK	1	1	25.36	25.41	25.49	-3.30	0.1607	0.1626	0.1656
50	QPSK	1	1	25.52	25.31	25.46	-3.30	0.1667	0.1589	0.1644
Channel				503202	518598	534000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2516.01	2592.99	2670				
40	PI/2 BPSK	1	1	25.51	25.47	25.50	-3.30	0.1663	0.1648	0.1660
40	QPSK	1	1	25.54	25.49	25.67	-3.30	0.1675	0.1656	0.1726
Channel				502200	518598	534996	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2511	2592.99	2674.98				
30	PI/2 BPSK	1	1	25.49	25.47	25.42	-3.30	0.1656	0.1648	0.1629
30	QPSK	1	1	25.49	25.44	25.55	-3.30	0.1656	0.1637	0.1679
Channel				501204	518598	535998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2506.02	2592.99	2679.99				
20	PI/2 BPSK	1	1	25.40	25.48	25.47	-3.30	0.1622	0.1652	0.1648
20	QPSK	1	1	25.49	25.42	25.52	-3.30	0.1656	0.1629	0.1667

5G NR n66:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				346000	349000	352000		L	M	H
Frequency (MHz)				1730	1745	1760				
40	PI/2 BPSK	1	1	22.62	22.89	22.74	-1.20	0.1387	0.1476	0.1426
40	QPSK	1	1	22.78	22.76	22.56	-1.20	0.1439	0.1432	0.1368
40	QPSK	1	108	22.69	22.61	22.70	-1.20	0.1409	0.1384	0.1413
40	QPSK	1	214	22.72	22.72	23.01	-1.20	0.1419	0.1419	0.1517
40	QPSK	108	0	21.41	21.45	21.43	-1.20	0.1050	0.1059	0.1054
40	QPSK	108	54	22.54	22.51	22.68	-1.20	0.1361	0.1352	0.1406
40	QPSK	108	108	21.49	21.51	21.69	-1.20	0.1069	0.1074	0.1119
40	QPSK	216	0	21.36	21.44	21.53	-1.20	0.1038	0.1057	0.1079
40	16QAM	1	1	21.82	21.68	21.68	-1.20	0.1153	0.1117	0.1117
40	64QAM	1	1	20.36	20.38	20.33	-1.20	0.0824	0.0828	0.0818
40	256QAM	1	1	17.06	16.96	16.99	-1.20	0.0385	0.0377	0.0379
Channel				345000	349000	353000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1725	1745	1765				
30	PI/2 BPSK	1	1	22.84	22.60	22.68	-1.20	0.1459	0.1380	0.1406
30	QPSK	1	1	22.82	22.69	22.70	-1.20	0.1452	0.1409	0.1413
Channel				344000	349000	354000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1720	1745	1770				
20	PI/2 BPSK	1	1	22.85	22.75	22.75	-1.20	0.1462	0.1429	0.1429
20	QPSK	1	1	22.94	22.69	22.80	-1.20	0.1493	0.1409	0.1445
Channel				343500	349000	354500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1717.5	1745	1772.5				
15	PI/2 BPSK	1	1	22.80	22.67	22.83	-1.20	0.1445	0.1403	0.1455
15	QPSK	1	1	22.90	22.68	22.79	-1.20	0.1479	0.1406	0.1442
Channel				343000	349000	355000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1715	1745	1775				

10	PI/2 BPSK	1	1	22.82	22.63	22.81	-1.20	0.1452	0.1390	0.1449
10	QPSK	1	1	22.76	22.62	22.78	-1.20	0.1432	0.1387	0.1439
Channel				342500	349000	355500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1712.5	1745	1777.5				
5	PI/2 BPSK	1	1	22.82	22.70	22.70	-1.20	0.1452	0.1413	0.1413
5	QPSK	1	1	22.75	22.61	22.68	-1.20	0.1429	0.1384	0.1406

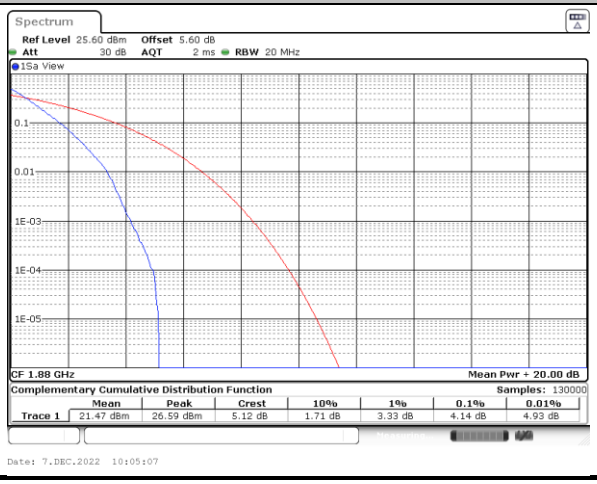
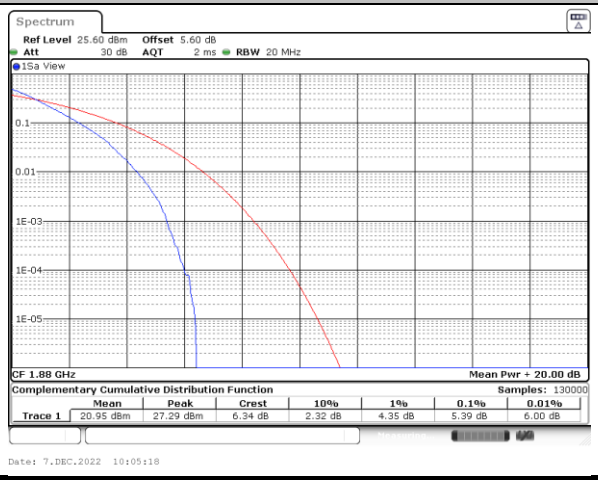
5G NR n71:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				134600	136100	137600		L	M	H
Frequency (MHz)				673	680.5	688				
20	PI/2 BPSK	1	1	22.96	22.94	22.75	-7.10	0.0235	0.0234	0.0224
20	QPSK	1	1	22.76	23.06	22.82	-7.10	0.0224	0.0240	0.0228
20	QPSK	1	53	22.91	22.82	22.73	-7.10	0.0232	0.0228	0.0223
20	QPSK	1	104	22.69	22.65	22.59	-7.10	0.0221	0.0219	0.0216
20	QPSK	50	0	21.98	21.94	21.86	-7.10	0.0187	0.0186	0.0182
20	QPSK	50	28	22.87	22.80	22.64	-7.10	0.0230	0.0226	0.0218
20	QPSK	50	56	21.86	21.77	21.72	-7.10	0.0182	0.0179	0.0177
20	QPSK	100	0	21.93	21.87	21.79	-7.10	0.0185	0.0183	0.0179
20	16QAM	1	1	22.24	22.16	21.98	-7.10	0.0199	0.0195	0.0187
20	64QAM	1	1	20.66	20.64	20.42	-7.10	0.0138	0.0138	0.0131
20	256QAM	1	1	18.42	18.29	18.17	-7.10	0.0083	0.0080	0.0078
Channel				134100	136100	138100	Gain	ERP	ERP	ERP
Frequency (MHz)				670.5	680.5	690.5				
15	PI/2 BPSK	1	1	22.92	22.77	22.69	-7.10	0.0233	0.0225	0.0221
15	QPSK	1	1	22.78	22.91	22.72	-7.10	0.0225	0.0232	0.0222
Channel				133600	136100	138600	Gain	ERP	ERP	ERP
Frequency (MHz)				668	680.5	693				
10	PI/2 BPSK	1	1	22.84	22.71	22.51	-7.10	0.0229	0.0222	0.0212
10	QPSK	1	1	22.93	22.76	22.56	-7.10	0.0233	0.0224	0.0214
Channel				133100	136100	139100	Gain	ERP	ERP	ERP
Frequency (MHz)				665.5	680.5	695.5				
5	PI/2 BPSK	1	1	22.90	22.62	22.37	-7.10	0.0232	0.0217	0.0205
5	QPSK	1	1	23.01	22.69	22.54	-7.10	0.0238	0.0221	0.0213

FR1 n2(Main PA)

Peak-to-Average Ratio

Mode	FR1 n2 / 20MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK			Limit: 13dB
RB Size	Full RB	Full RB			Result
Middle CH	4.14	5.39			PASS

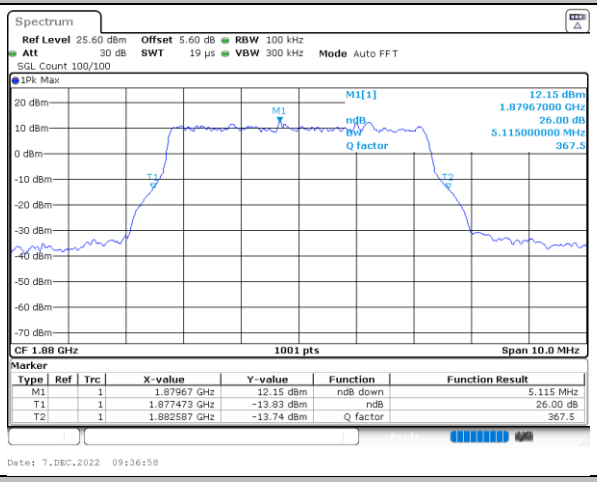
FR1 n2 / 20MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	QPSK
	

26dB Bandwidth

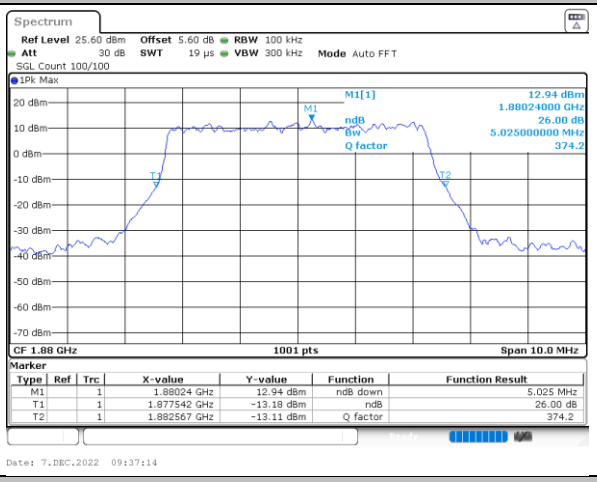
Mode	FR1 n2 : 26dBW (MHz) / DFT OFDM			
BW	5MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	5.12	5.03	5.17	5.26
BW	10MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	10.19	10.31	10.11	10.17
BW	15MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	14.93	15.11	15.02	15.02
BW	20MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	19.94	20.14	19.98	20.14

FR1 n2 / 5MHz / CP OFDM / Middle Channel / Full RB

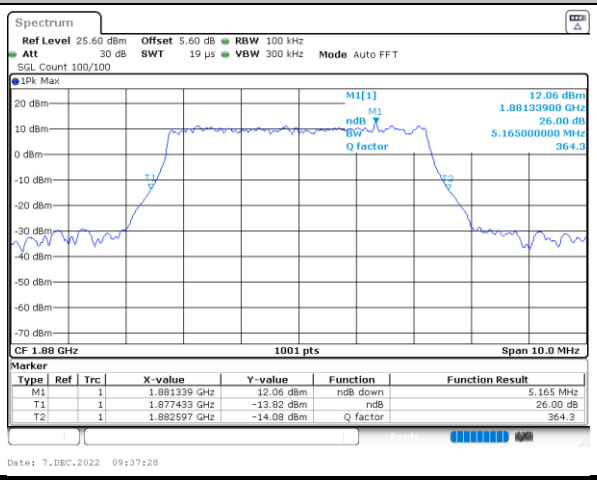
QPSK



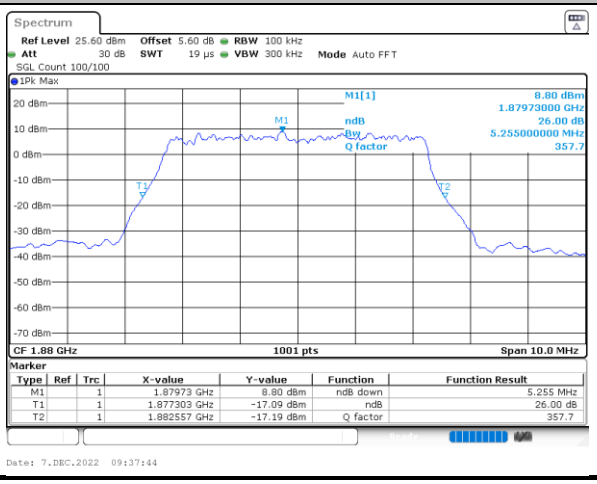
16QAM

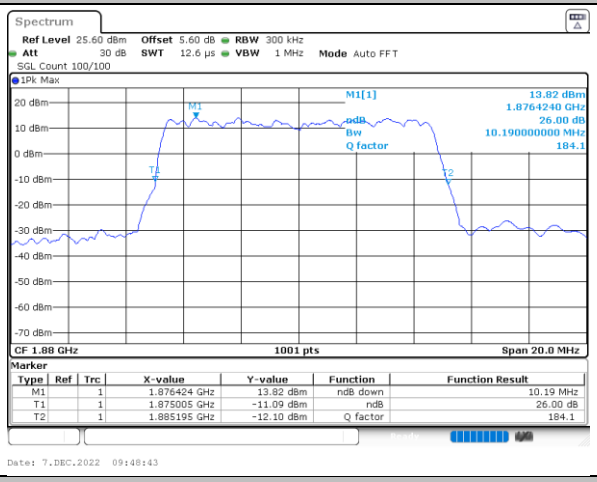
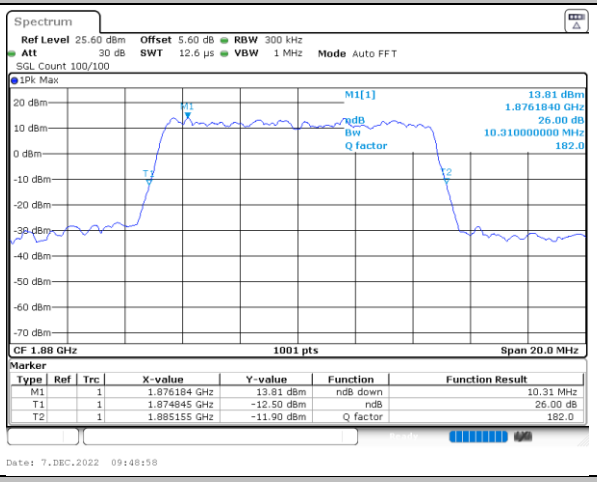
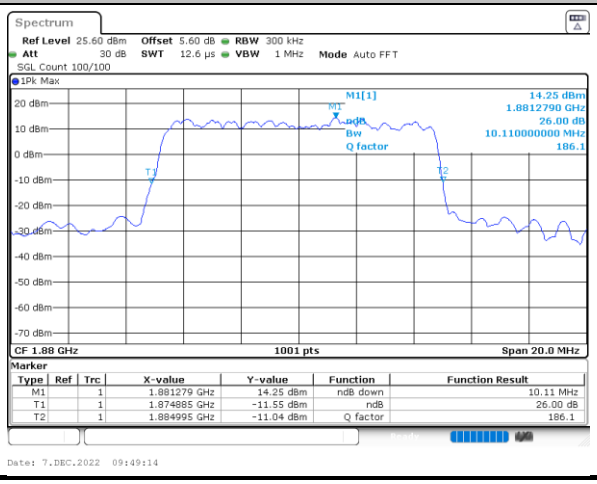
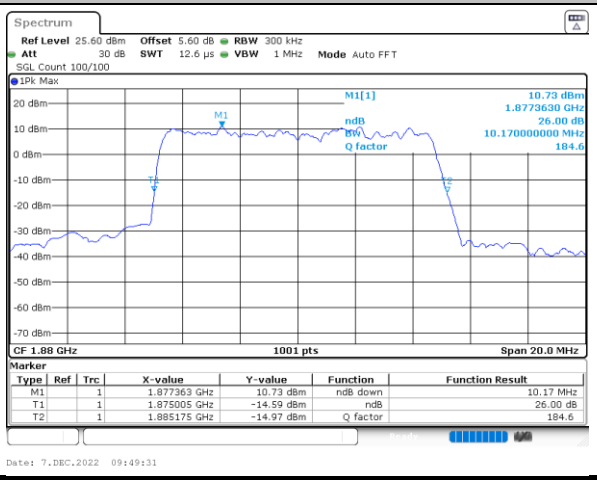


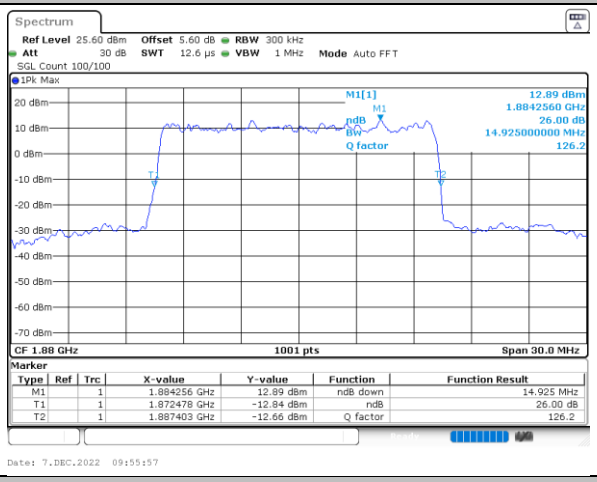
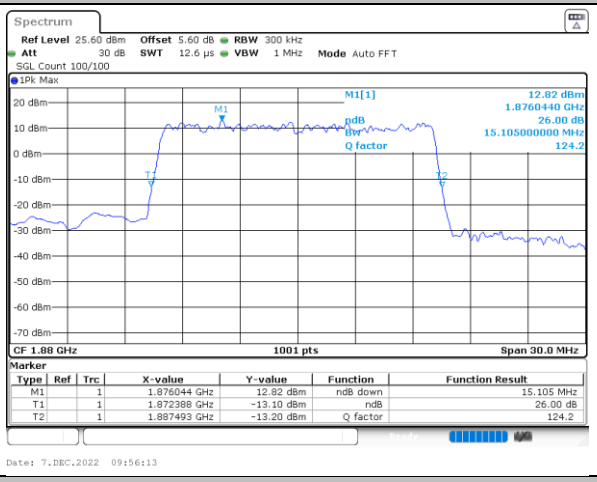
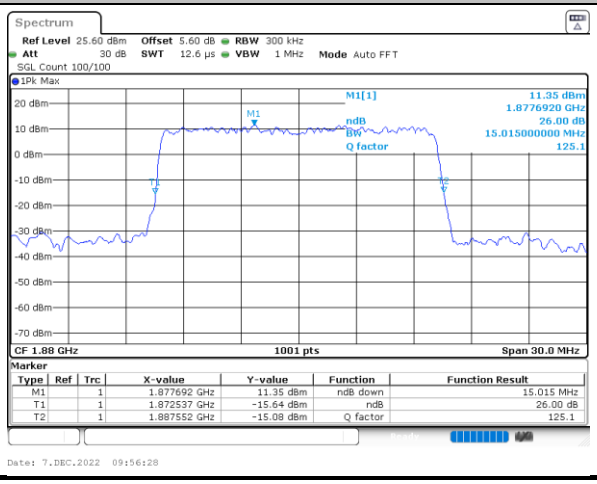
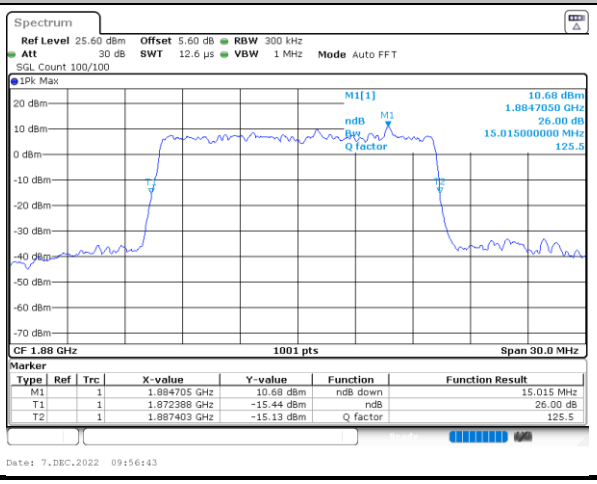
64QAM

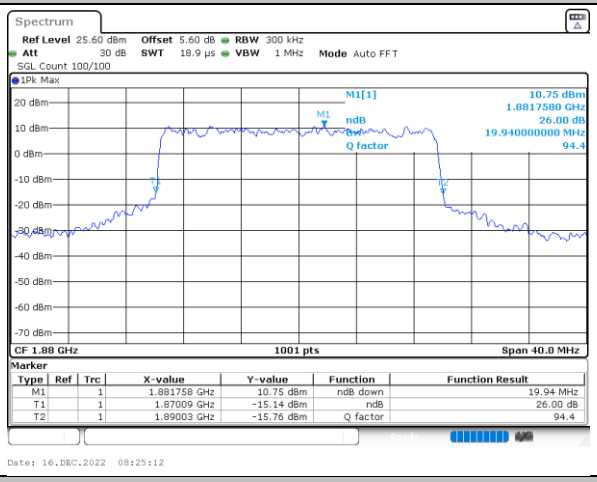
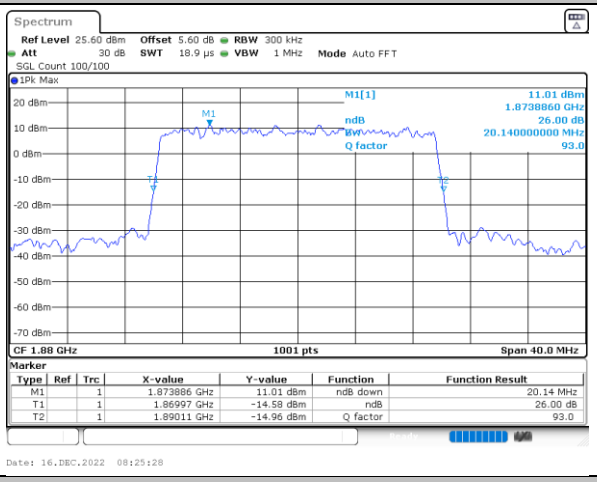
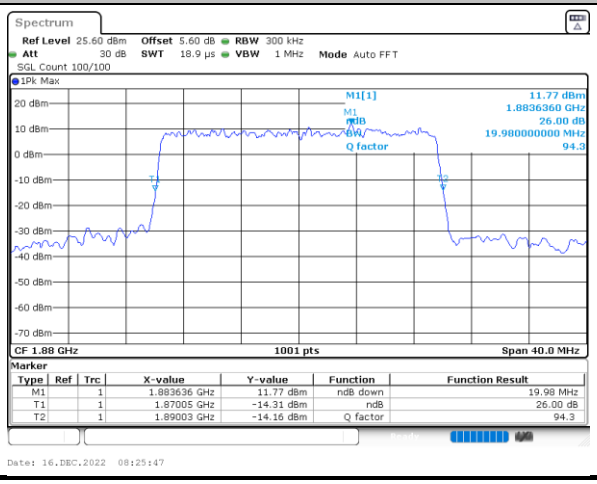
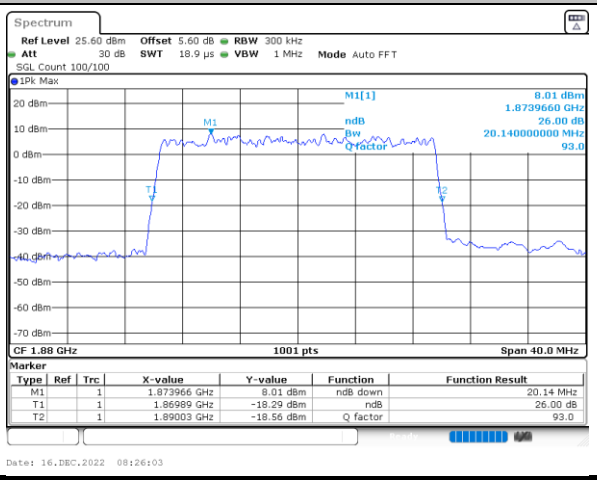


256QAM



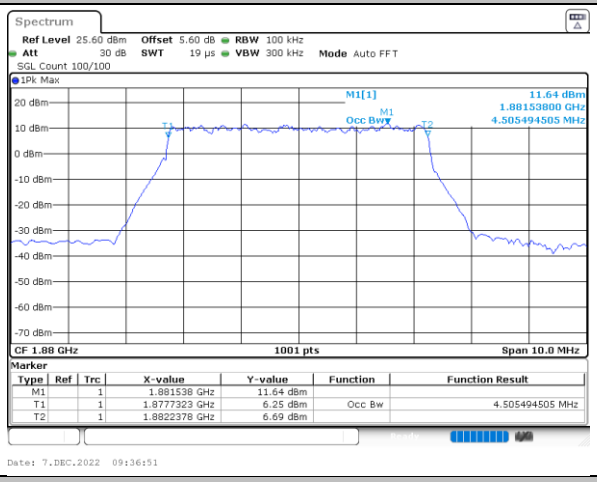
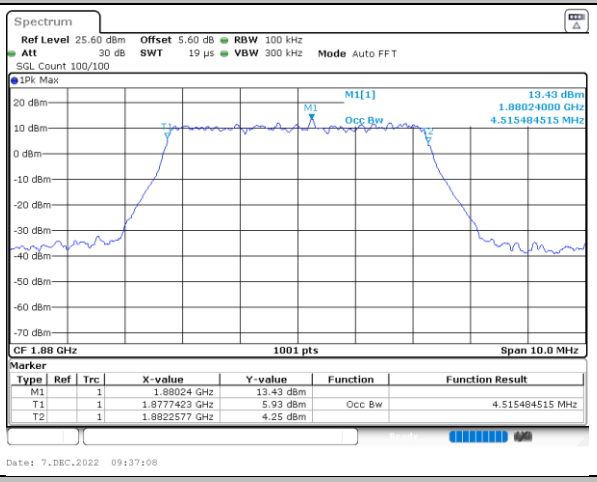
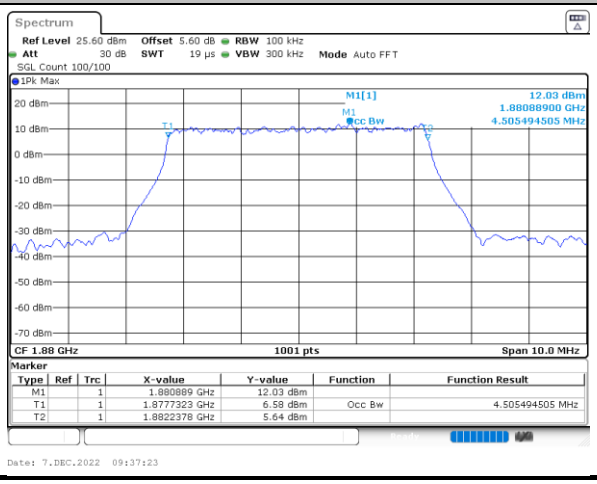
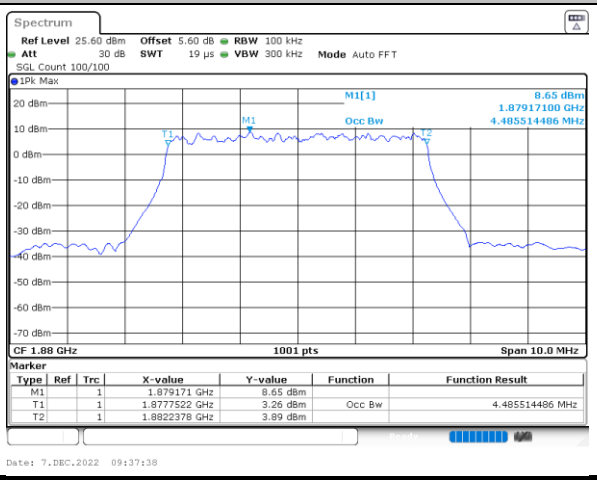
FR1 n2 / 10MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

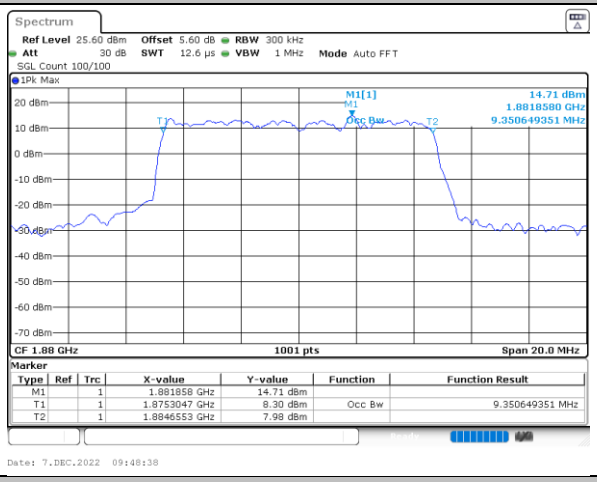
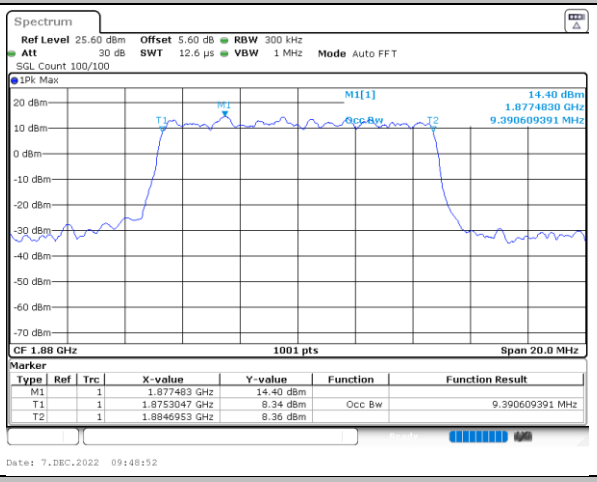
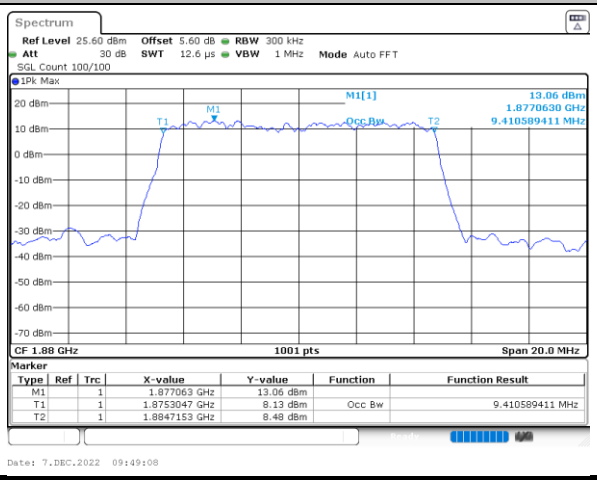
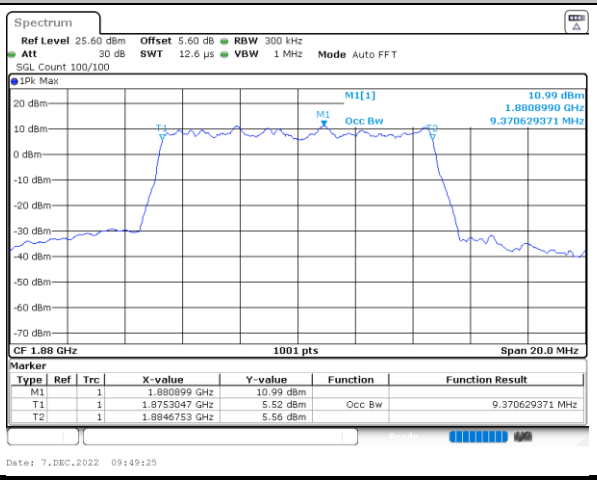
FR1 n2 / 15MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

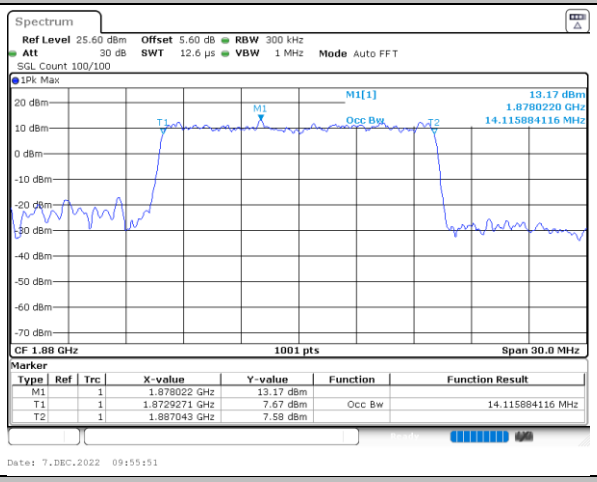
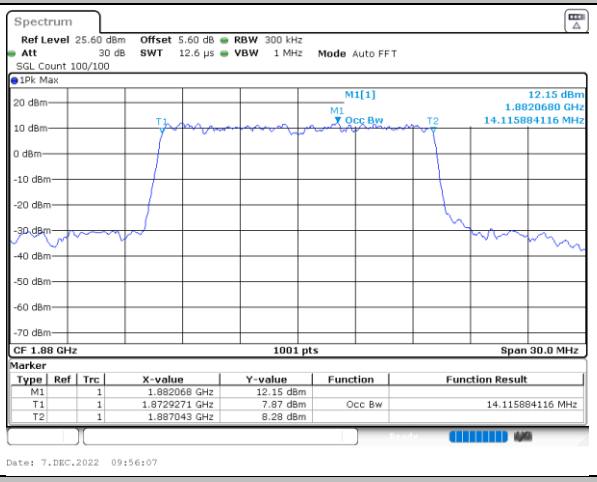
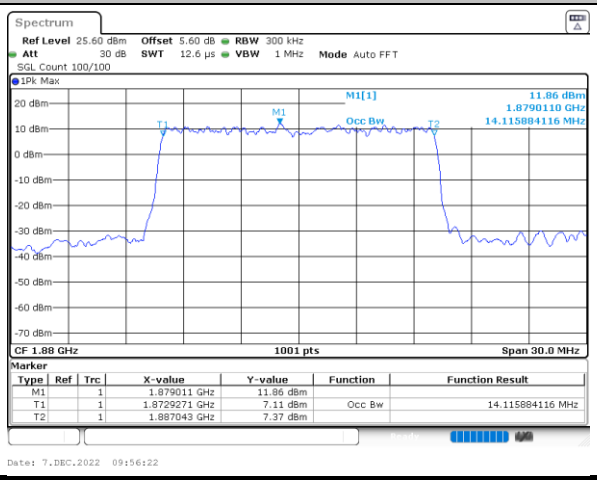
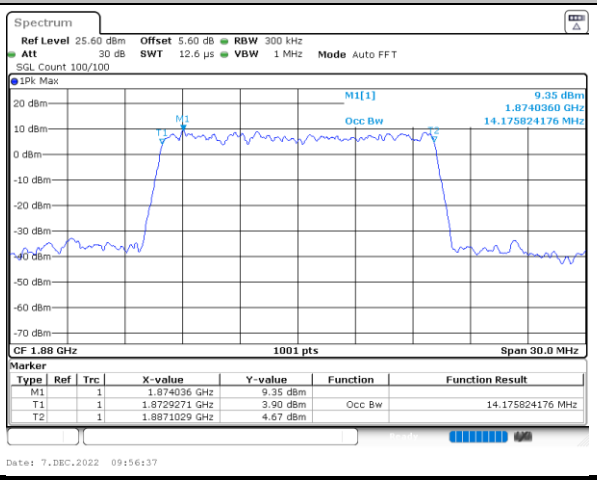
FR1 n2 / 20MHz / DFT-S OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

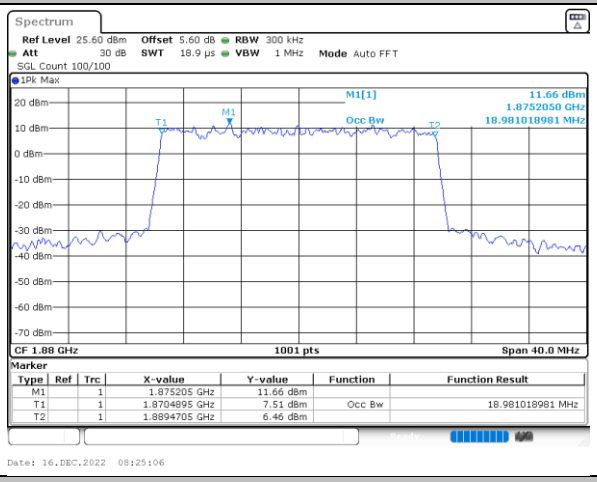
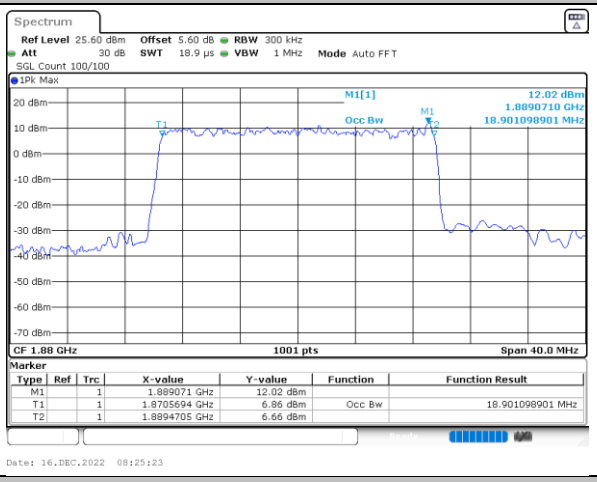
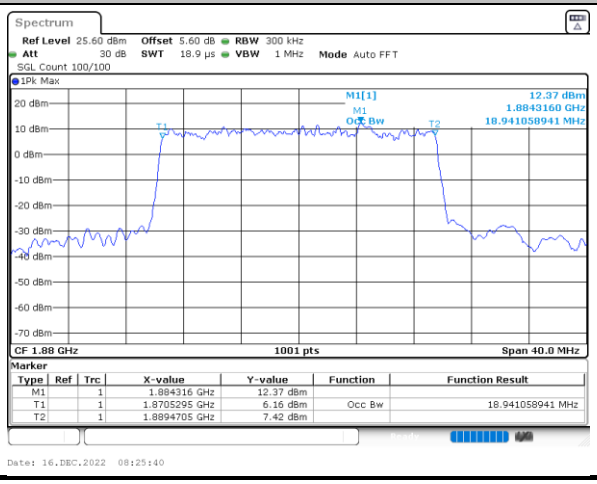
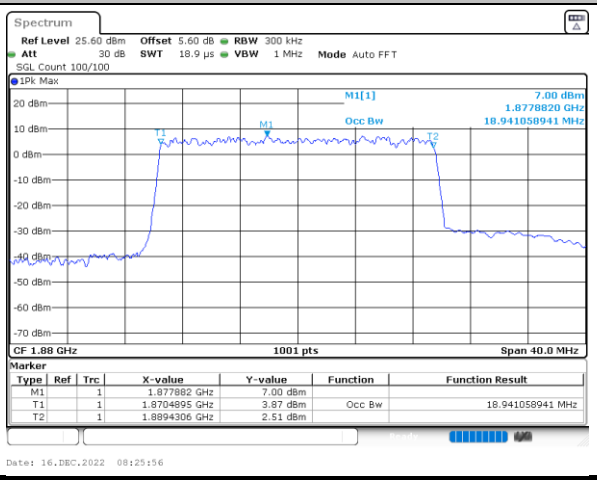
Occupied Bandwidth

Mode	FR1 n2 : 99%OBW (MHz) / CP OFDM			
BW	5MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	4.51	4.52	4.51	4.49
BW				
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	9.35	9.39	9.41	9.37
BW	15MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	14.12	14.12	14.12	14.18
BW	20MHz			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	18.98	18.90	18.94	18.94

FR1 n2 / 5MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n2 / 10MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

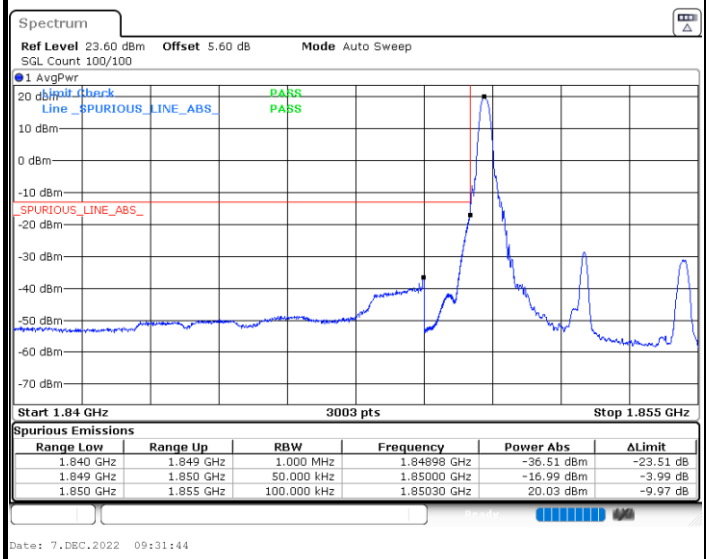
FR1 n2 / 15MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n2 / 20MHz / DFT-S OFDM / Middle Channel / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

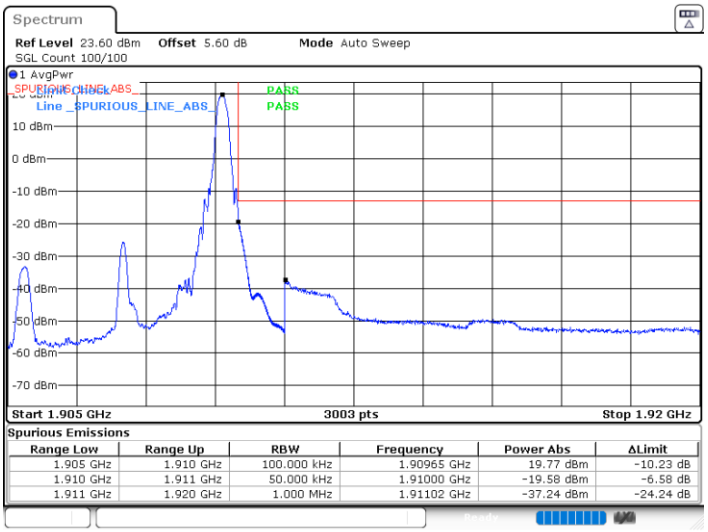
Conducted Band Edge

FR1 n2 / 5MHz / DFT-S OFDM / PI/2 BPSK

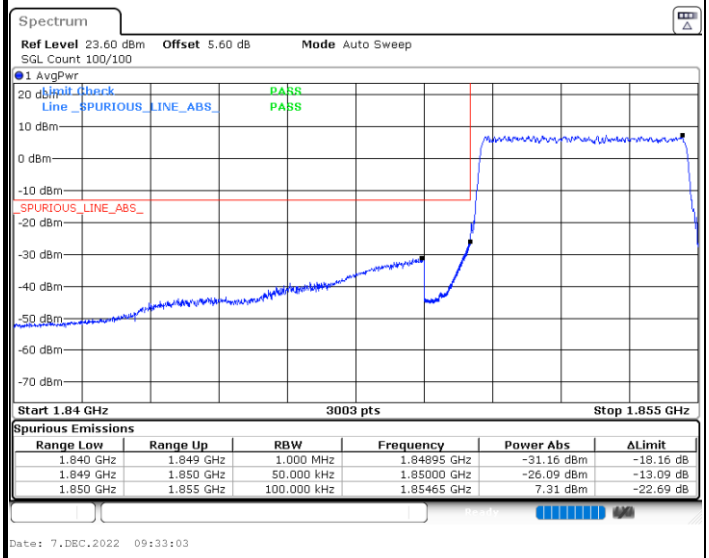
Lowest Band Edge / 1RB0



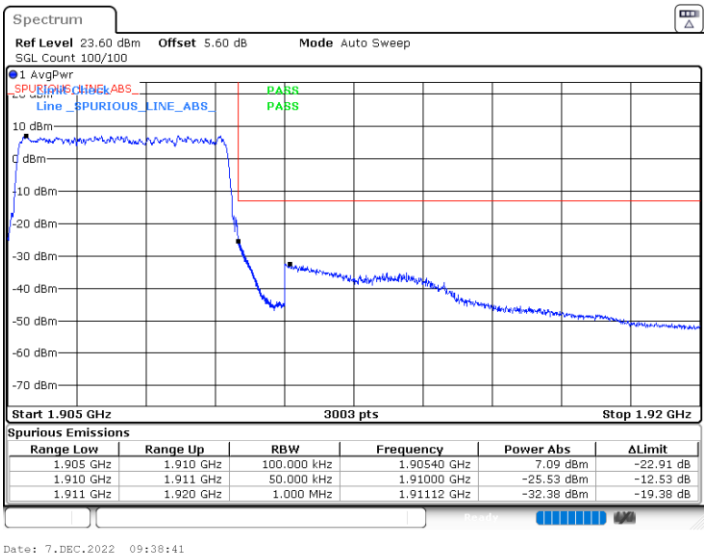
Highest Band Edge / 1RBmax

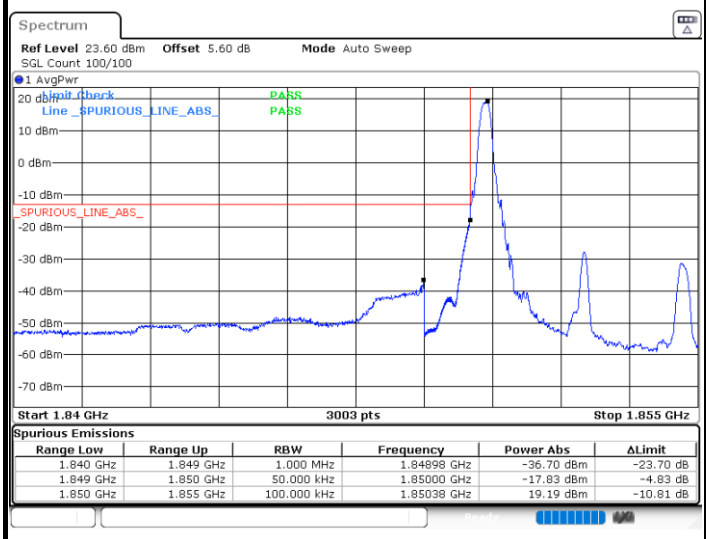
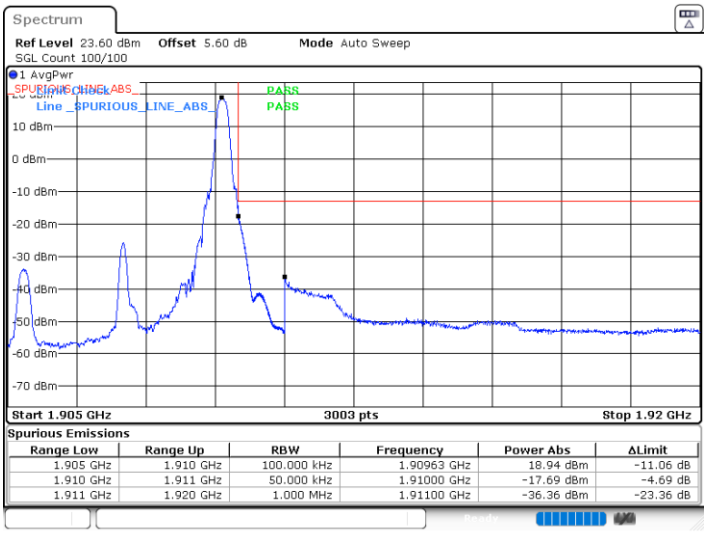
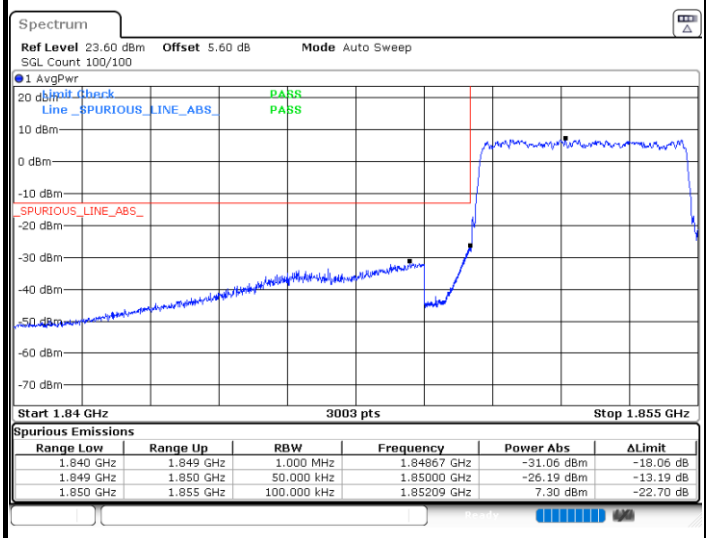
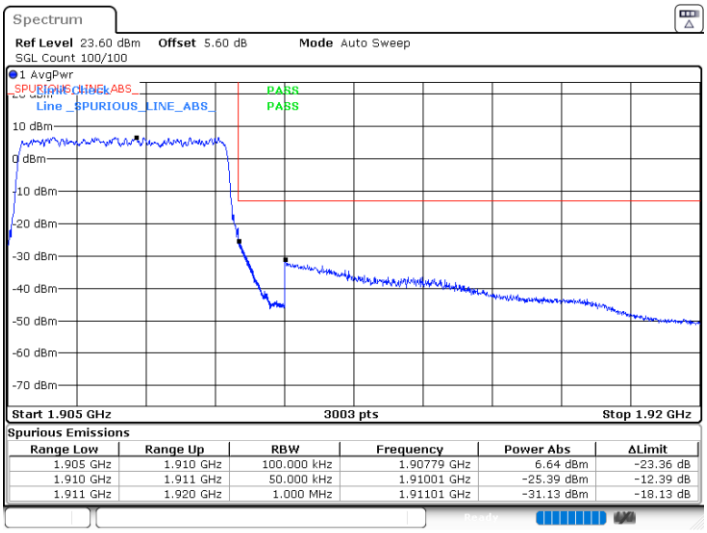


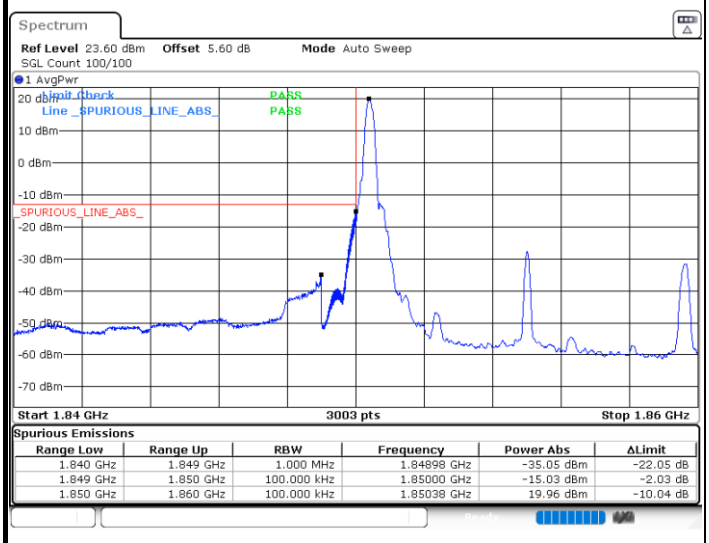
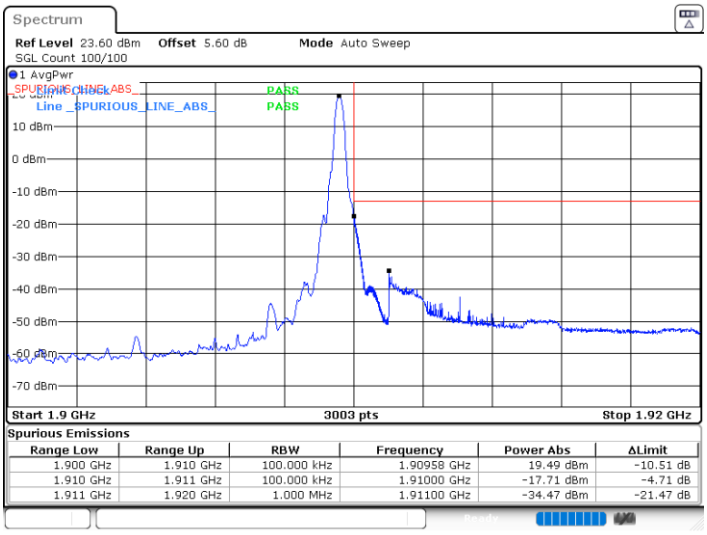
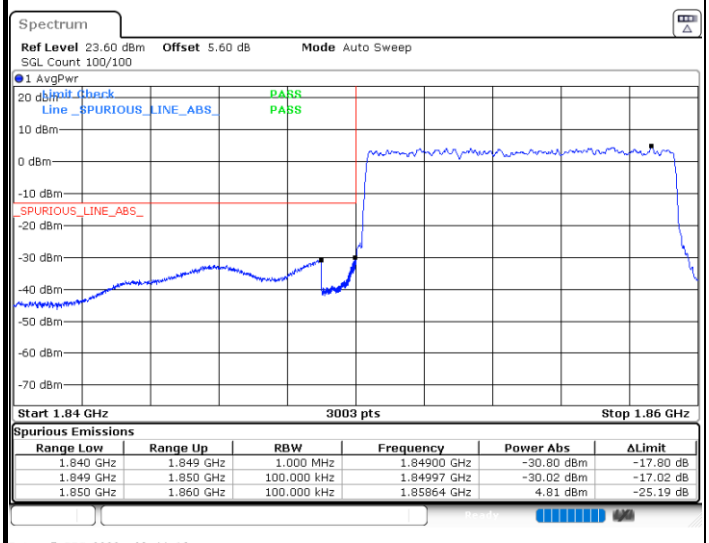
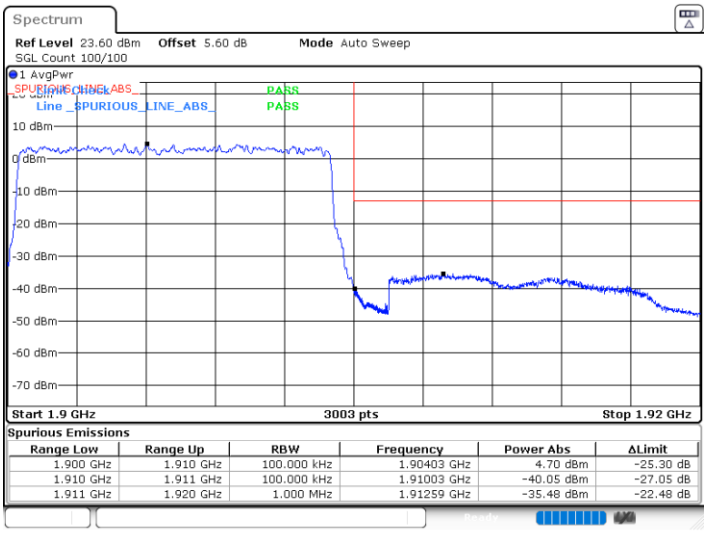
Lowest Band Edge / Full RB

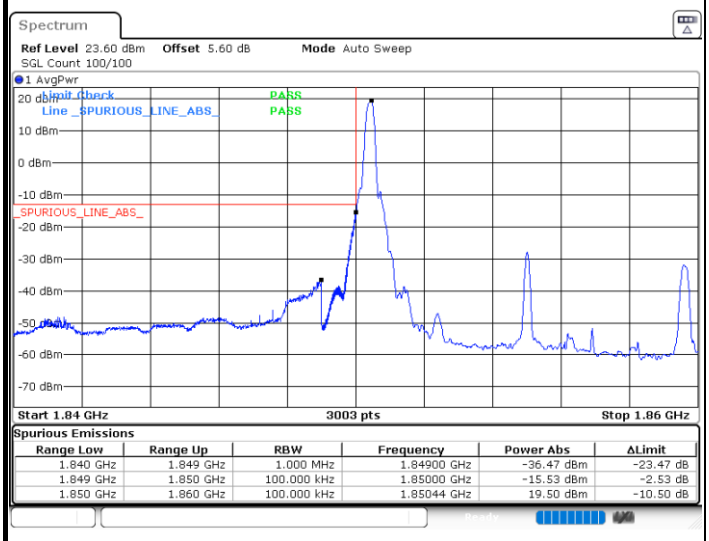
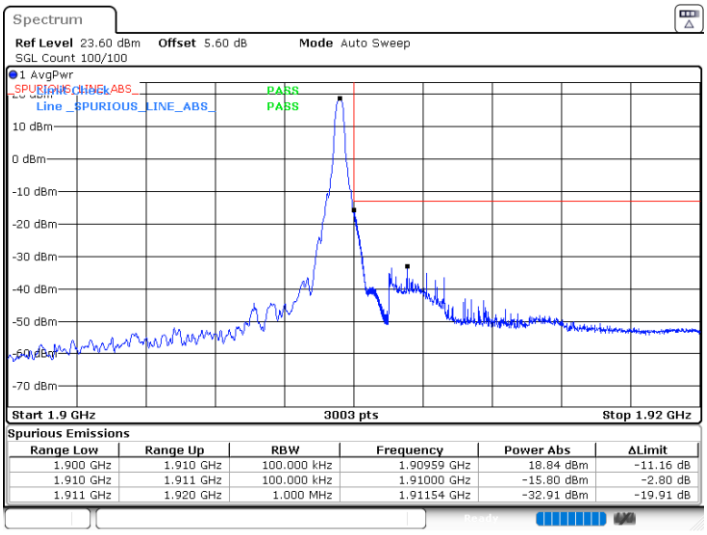
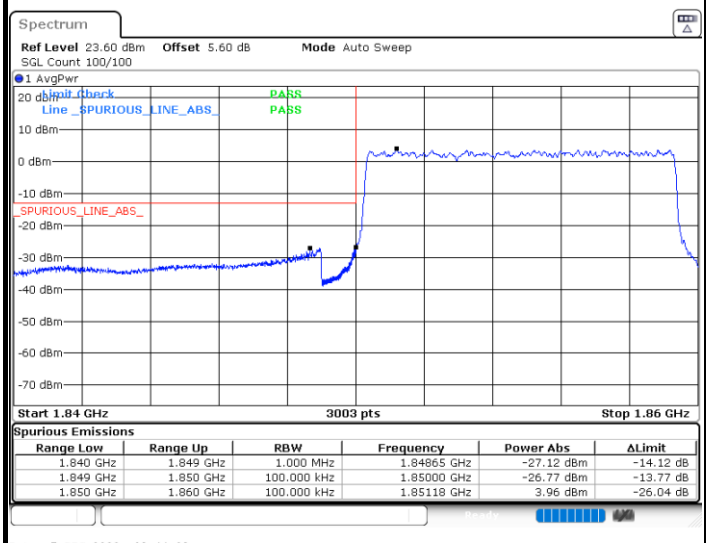
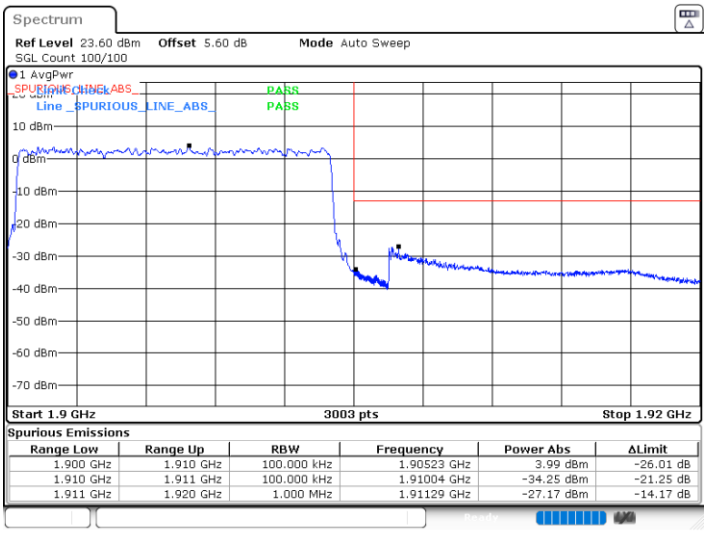


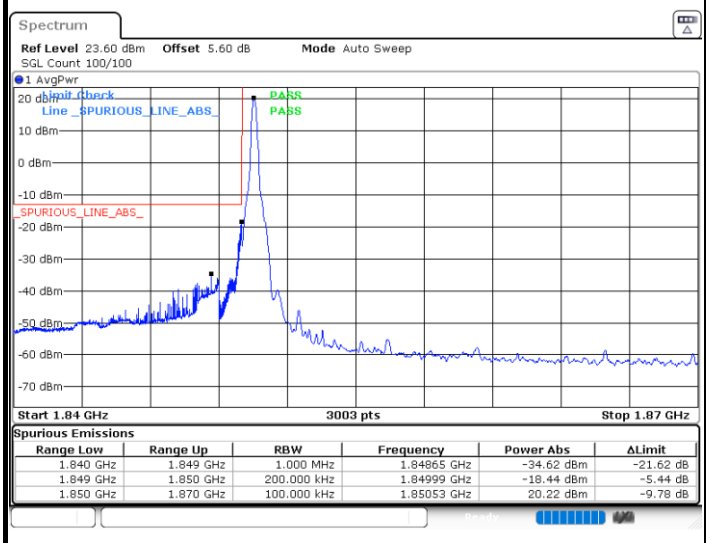
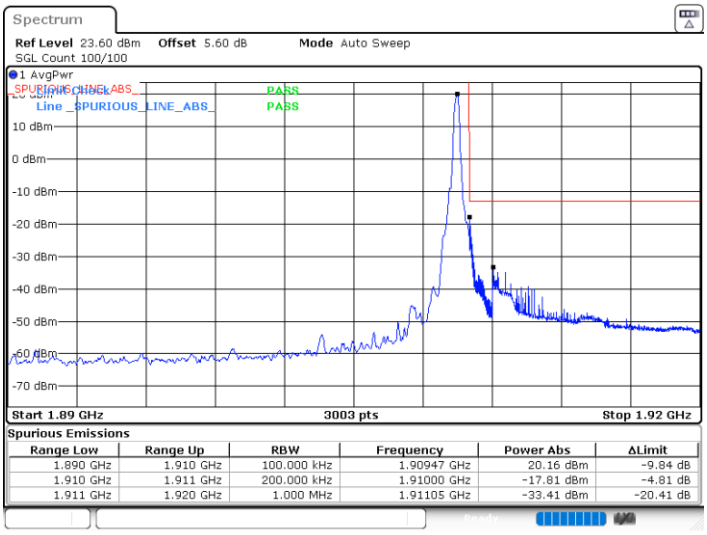
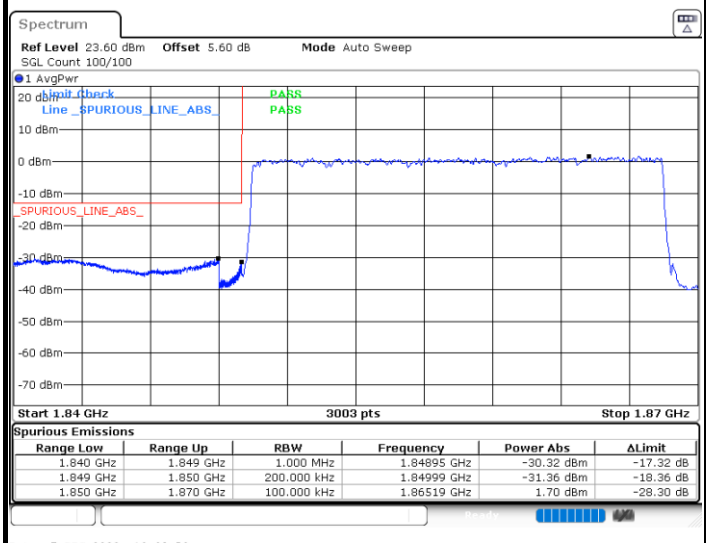
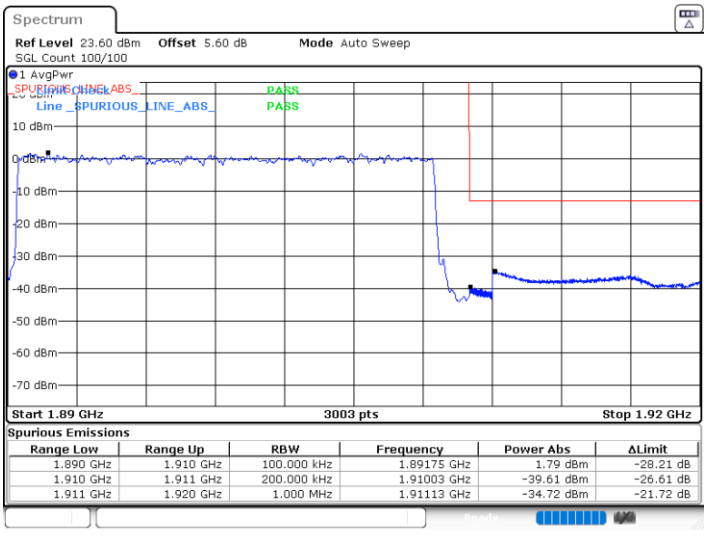
Highest Band Edge / Full RB

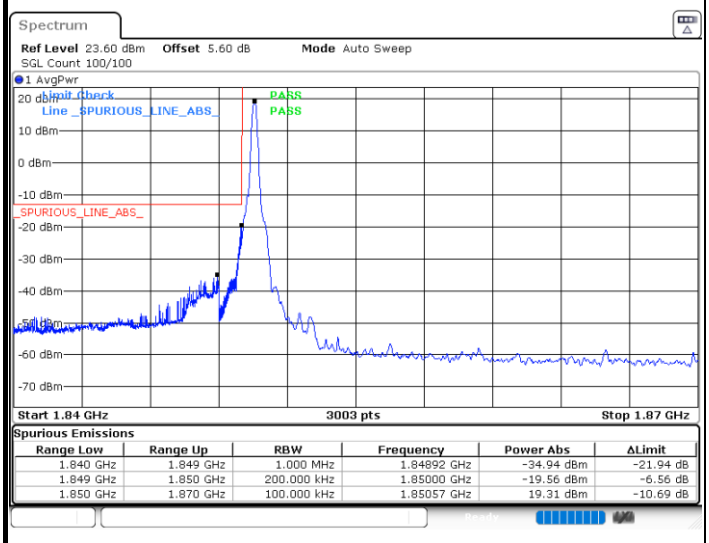
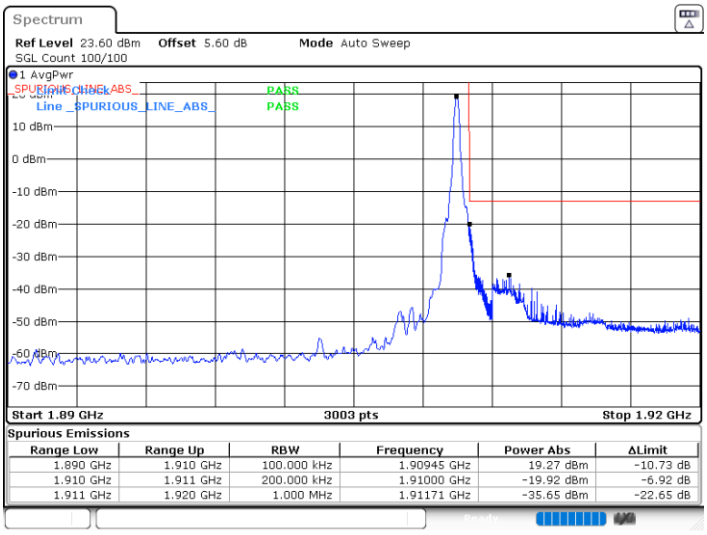
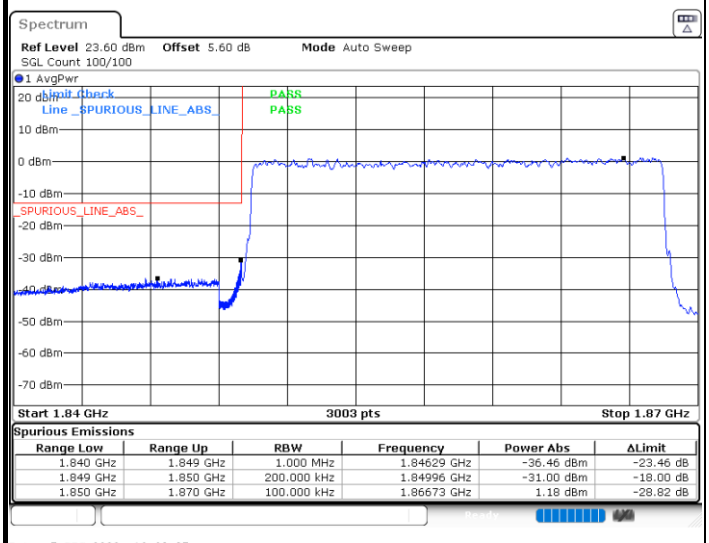
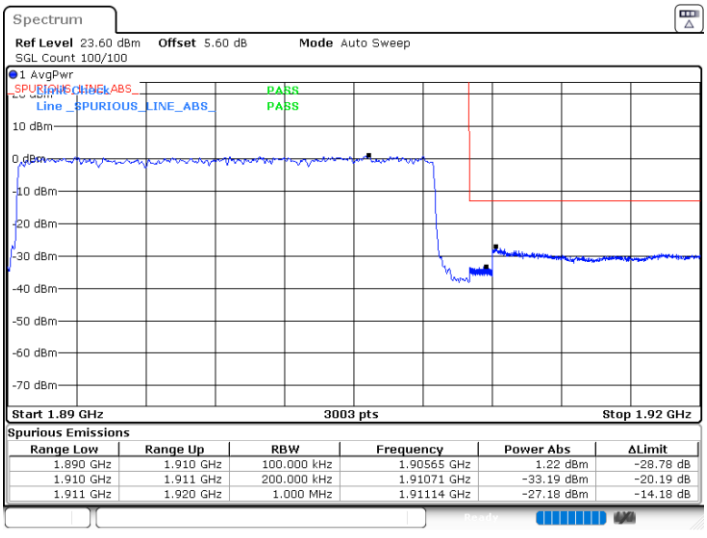


FR1 n2 / 5MHz / DFT-S OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n2 / 10MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n2 / 10MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

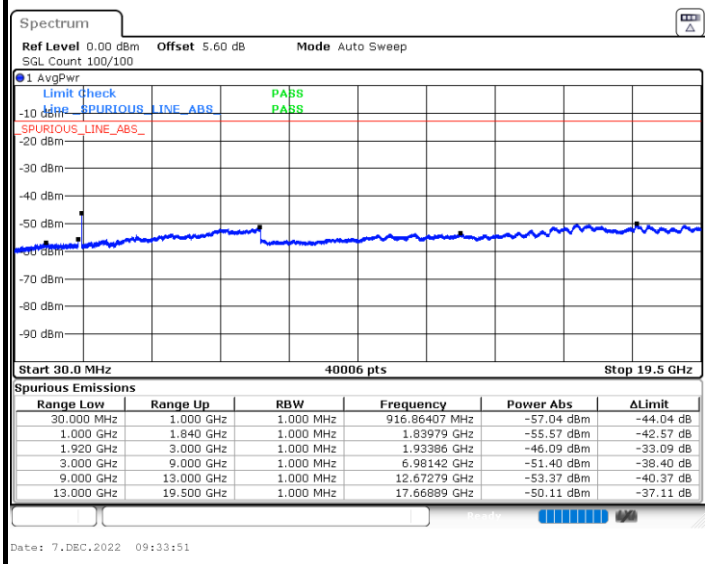
FR1 n2 / 20MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n2 / 20MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

Conducted Spurious Emission

FR1 n2 / 5MHz / DFT-S OFDM / BPSK

Lowest Channel / 1RB1

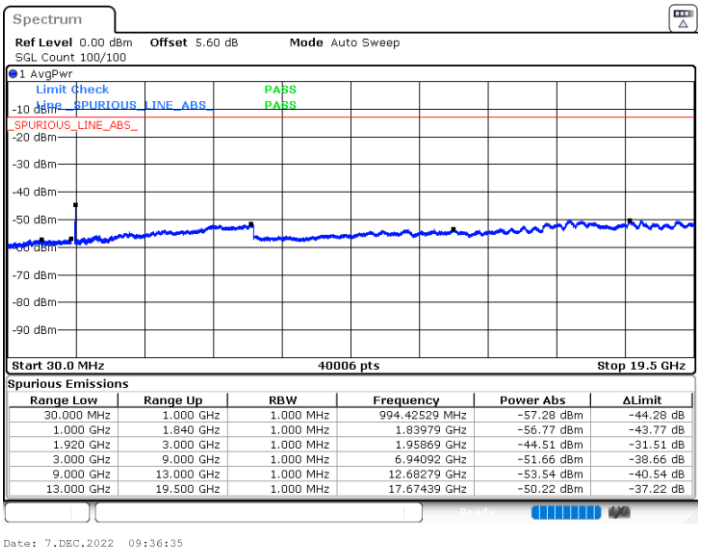


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	916.86407 MHz	-57.04 dBm	-44.04 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83979 GHz	-55.57 dBm	-42.57 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.93386 GHz	-46.09 dBm	-33.09 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.98142 GHz	-51.40 dBm	-38.40 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.67279 GHz	-53.37 dBm	-40.37 dB
13.000 GHz	19.500 GHz	1.000 MHz	17.66889 GHz	-50.11 dBm	-37.11 dB

Date: 7.DEC.2022 09:33:51

Middle Channel / 1RB1

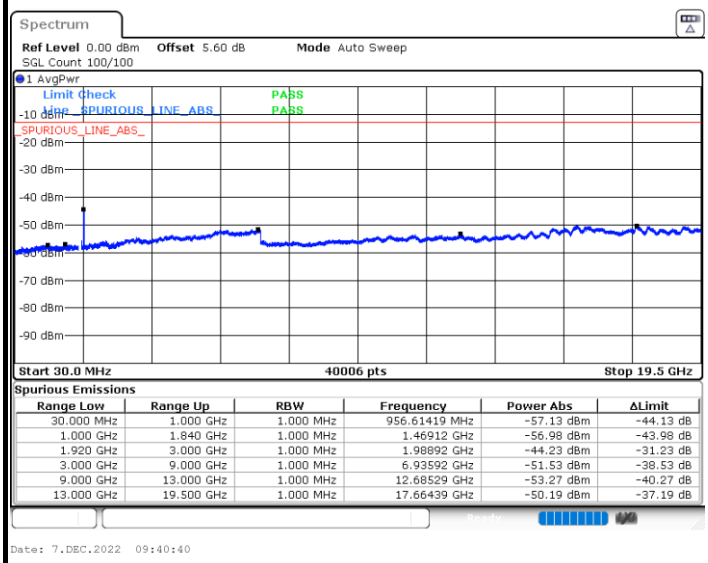


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	994.42529 MHz	-57.28 dBm	-44.28 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83979 GHz	-56.77 dBm	-43.77 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.95869 GHz	-44.51 dBm	-31.51 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.94092 GHz	-51.66 dBm	-38.66 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.68279 GHz	-53.54 dBm	-40.54 dB
13.000 GHz	19.500 GHz	1.000 MHz	17.67439 GHz	-50.22 dBm	-37.22 dB

Date: 7.DEC.2022 09:36:35

Highest Channel / 1RB1



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	956.61419 MHz	-57.13 dBm	-44.13 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.46912 GHz	-56.98 dBm	-43.98 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.98892 GHz	-44.23 dBm	-31.23 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.93592 GHz	-51.53 dBm	-38.53 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.68529 GHz	-53.27 dBm	-40.27 dB
13.000 GHz	19.500 GHz	1.000 MHz	17.66439 GHz	-50.19 dBm	-37.19 dB

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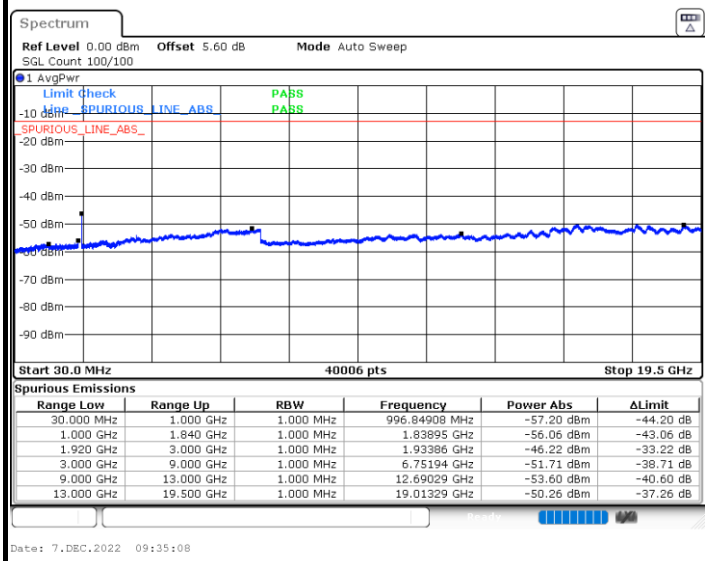
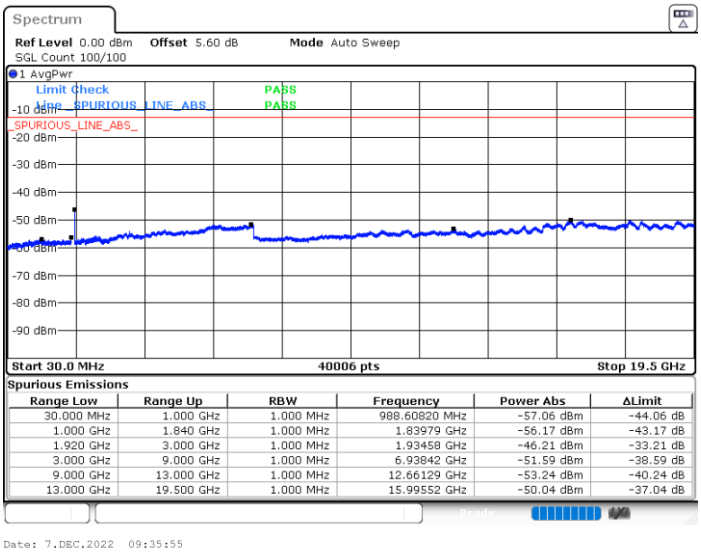
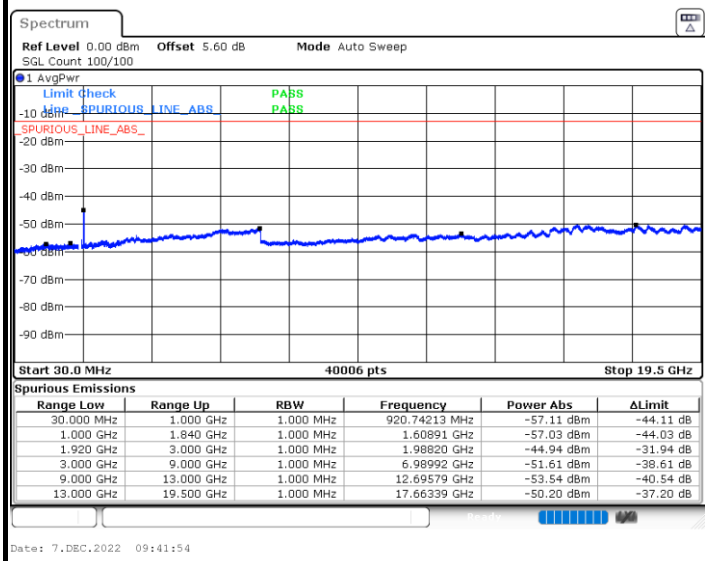
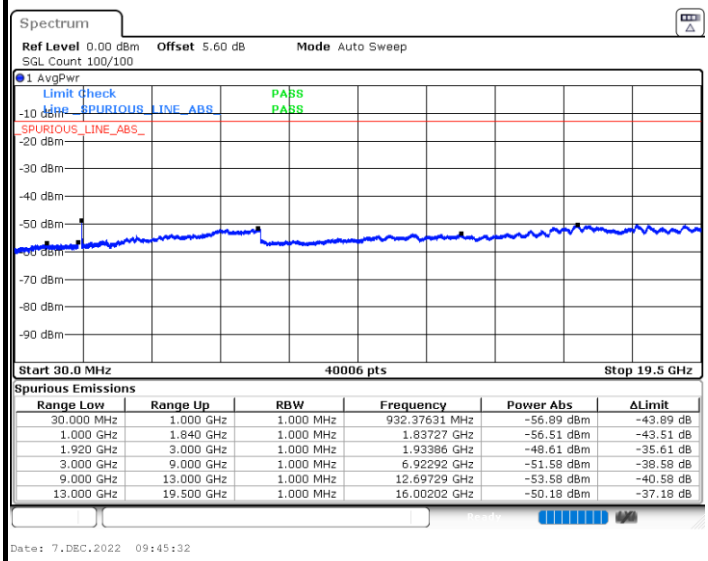
FR1 n2 / 5MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

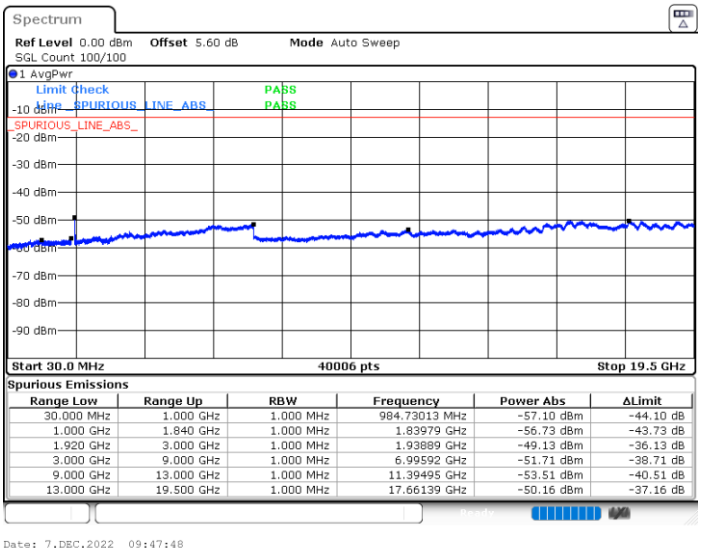
FR1 n2 / 10MHz / DFT-S OFDM / BPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
Highest Channel / 1RB1	



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	932.37631 MHz	-56.89 dBm	-43.89 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83727 GHz	-56.51 dBm	-43.51 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.93386 GHz	-48.61 dBm	-35.61 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.92292 GHz	-51.58 dBm	-38.58 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.69729 GHz	-53.58 dBm	-40.58 dB
13.000 GHz	19.500 GHz	1.000 MHz	16.00202 GHz	-50.18 dBm	-37.18 dB

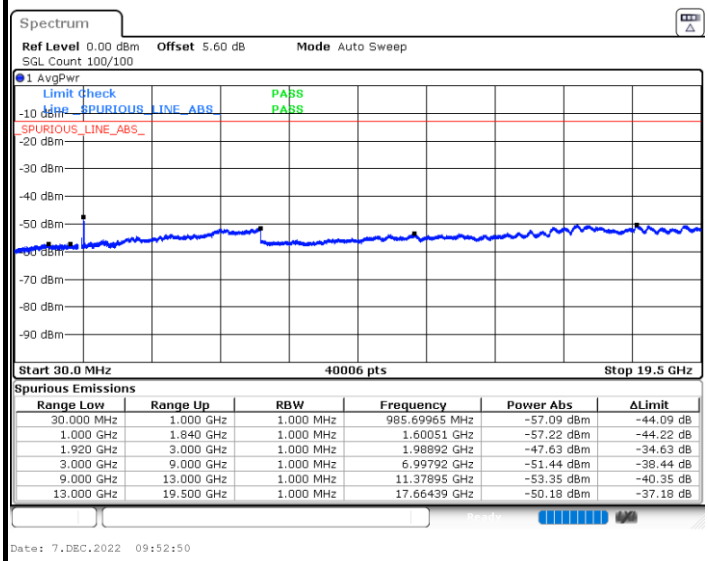
Date: 7.DEC.2022 09:45:32



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	984.73013 MHz	-57.10 dBm	-44.10 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83979 GHz	-56.73 dBm	-43.73 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.93889 GHz	-49.13 dBm	-36.13 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.99592 GHz	-51.71 dBm	-38.71 dB
9.000 GHz	13.000 GHz	1.000 MHz	11.39495 GHz	-53.51 dBm	-40.51 dB
13.000 GHz	19.500 GHz	1.000 MHz	17.66139 GHz	-50.16 dBm	-37.16 dB

Date: 7.DEC.2022 09:47:48



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	985.69965 MHz	-57.09 dBm	-44.09 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.60051 GHz	-57.22 dBm	-44.22 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.98892 GHz	-47.63 dBm	-34.63 dB
3.000 GHz	9.000 GHz	1.000 MHz	6.99792 GHz	-51.44 dBm	-38.44 dB
9.000 GHz	13.000 GHz	1.000 MHz	11.37895 GHz	-53.35 dBm	-40.35 dB
13.000 GHz	19.500 GHz	1.000 MHz	17.66439 GHz	-50.18 dBm	-37.18 dB

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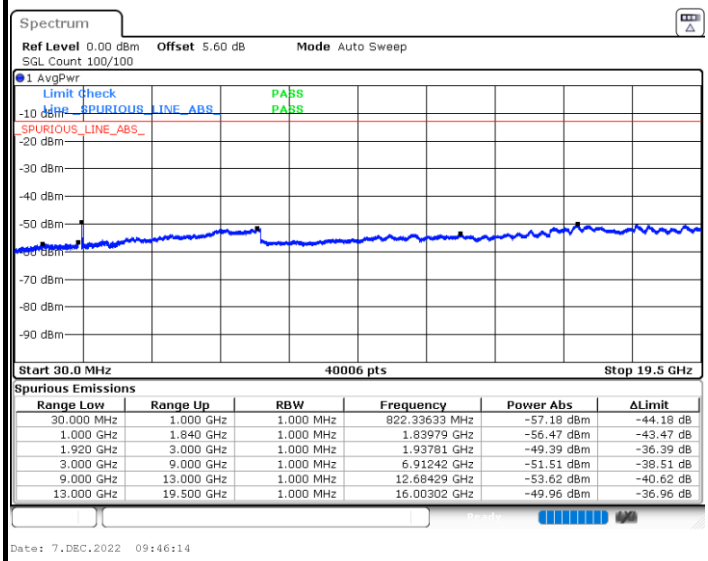
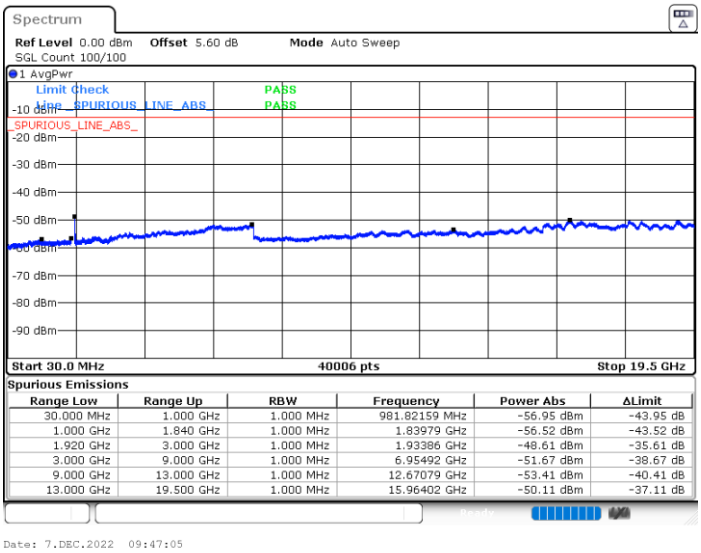
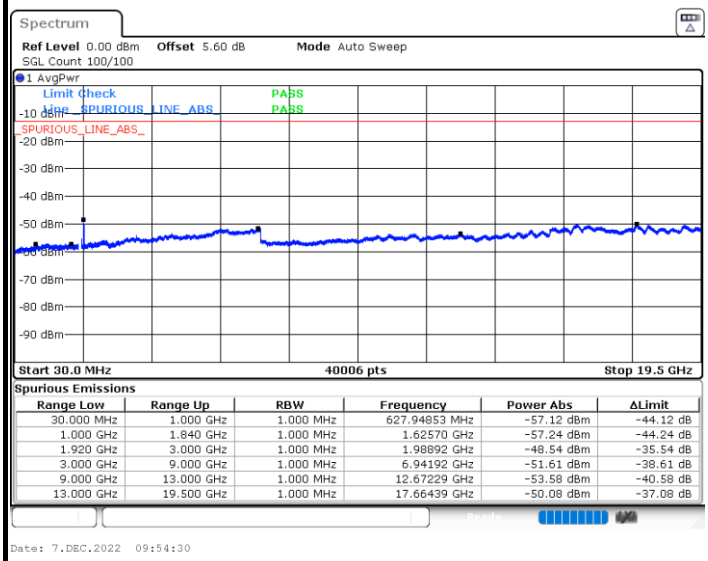
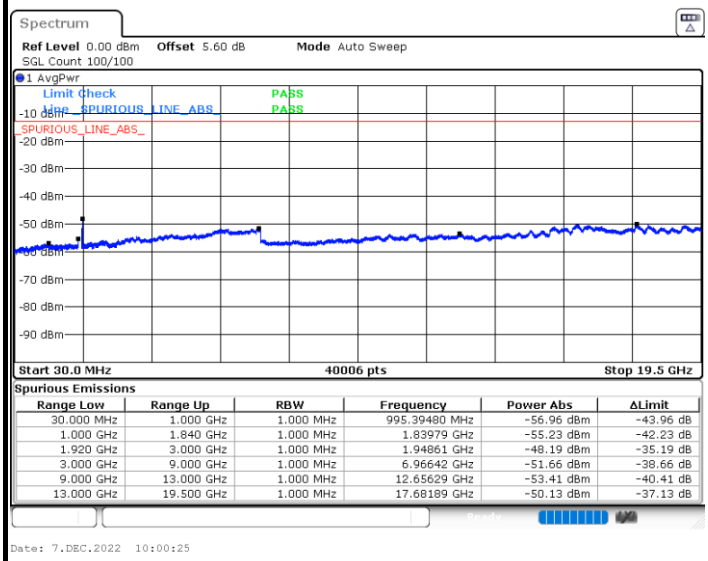
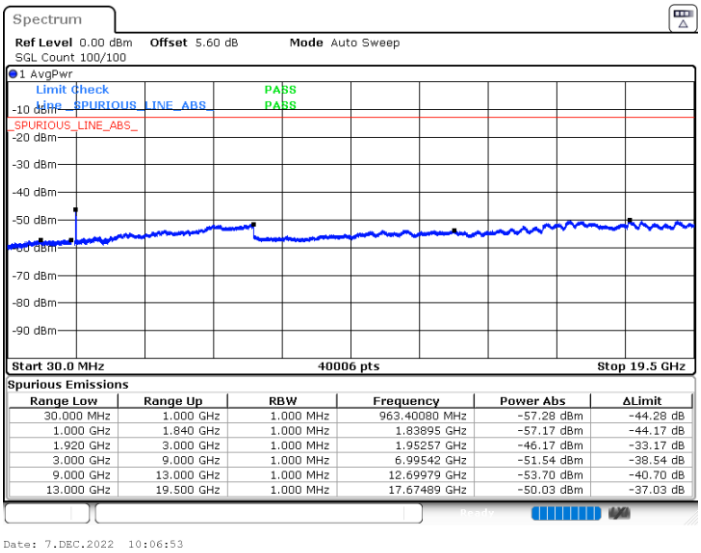
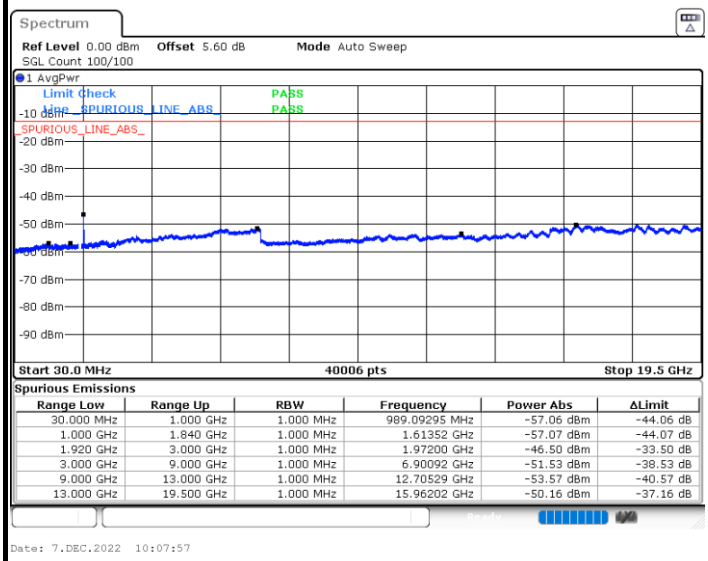
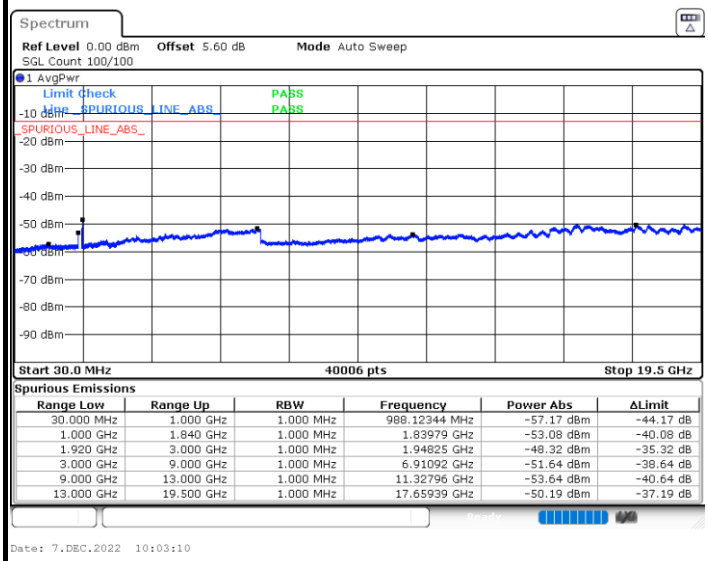
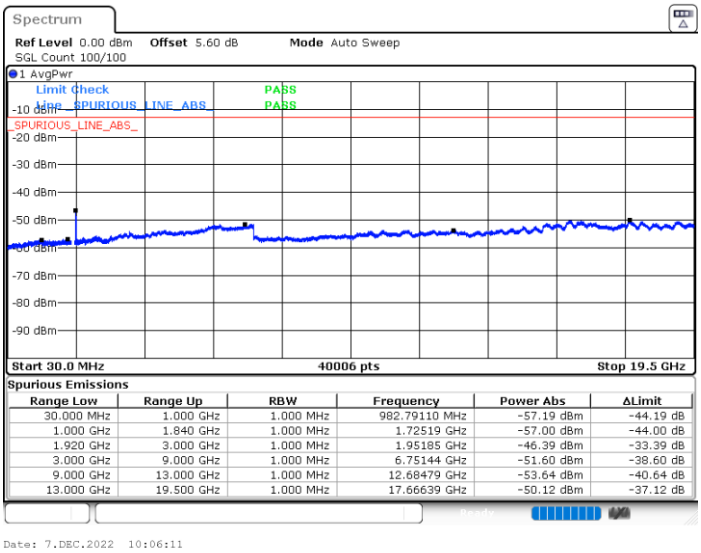
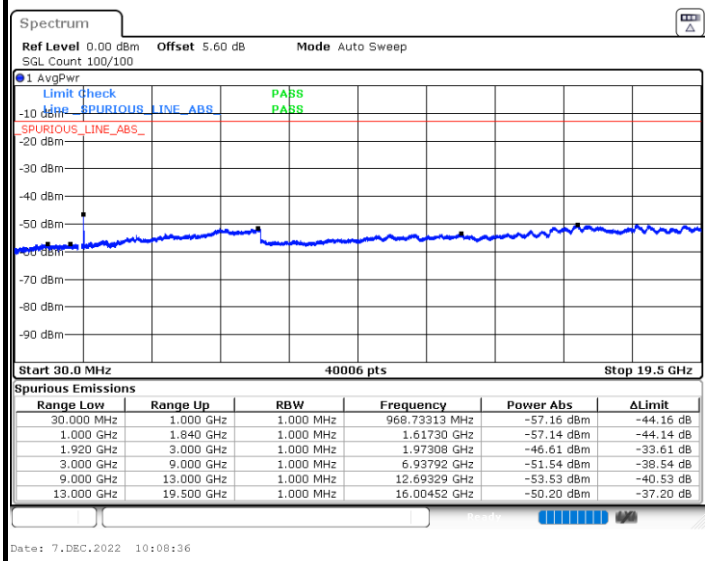
FR1 n2 / 10MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

FR1 n2 / 20MHz / DFT-S OFDM / BPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

FR1 n2 / 20MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

Frequency Stability

Test Conditions		FR1 n2 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 20MHz	Note 2.
		Deviation (ppm)	Result
20	Normal Voltage	0.0025	PASS
40	Normal Voltage	0.0036	
30	Normal Voltage	0.0008	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0016	
0	Normal Voltage	0.0029	
-10	Normal Voltage	0.0038	
-20	Normal Voltage	0.0030	
-30	Normal Voltage	0.0004	
20	Maximum Voltage	0.0001	
20	Normal Voltage	0.0012	
20	Battery End Point	0.0024	

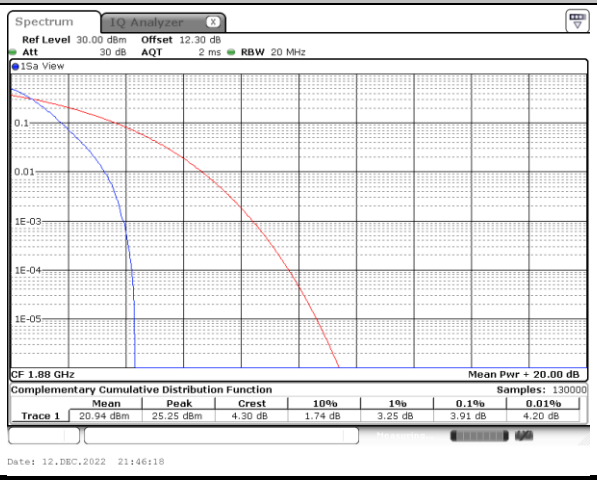
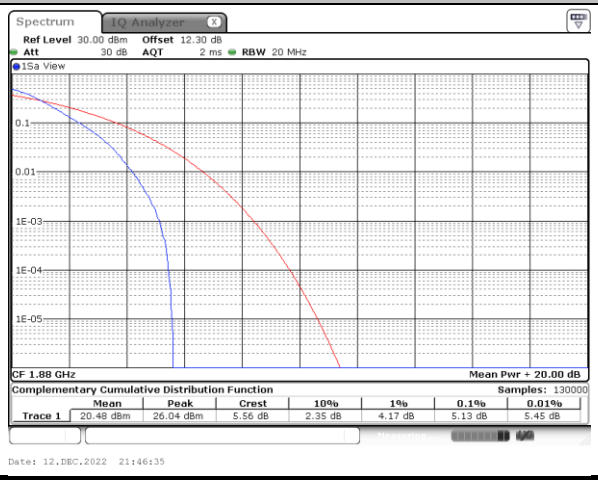
Note:

1. Normal Voltage =3.89V. ; Battery End Point (BEP) =3. 4V. ; Maximum Voltage =4.48 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

FR1 n2(other PA)

Peak-to-Average Ratio

Mode	FR1 n2 / 20MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK			Limit: 13dB
RB Size	Full RB	Full RB			Result
Middle CH	3.91	5.13			PASS

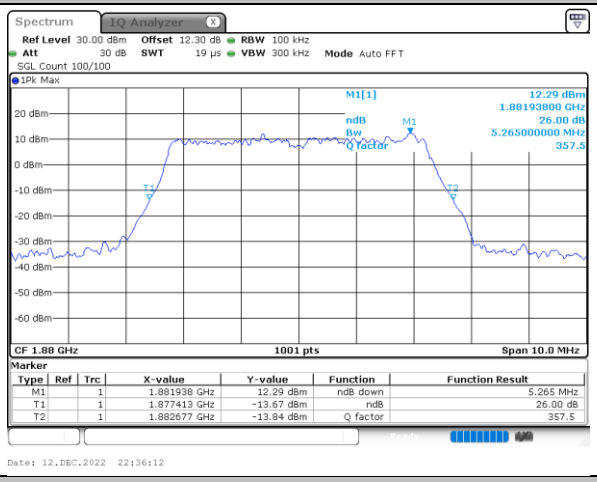
FR1 n2 / 20MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	QPSK
	

26dB Bandwidth

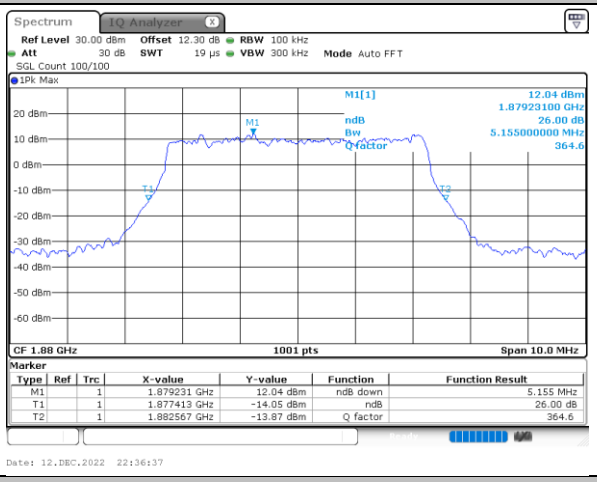
Mode	FR1 n2 : 26dBW (MHz) / DFT OFDM			
BW	5MHz	5MHz	5MHz	5MHz
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	5.27	5.16	5.14	5.15
BW	10MHz	10MHz	10MHz	10MHz
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	10.37	10.23	10.19	10.39
BW	15MHz	15MHz	15MHz	15MHz
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	14.99	15.08	15.14	15.11
BW	20MHz	20MHz	20MHz	20MHz
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	19.98	19.9	20.1	19.86

FR1 n2 / 5MHz / CP OFDM / Middle Channel / Full RB

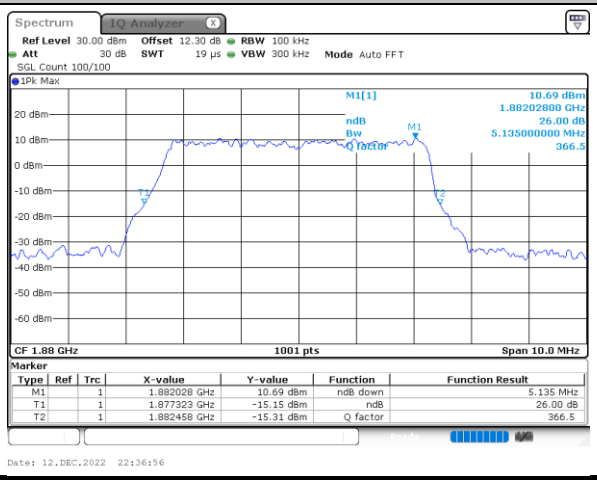
QPSK



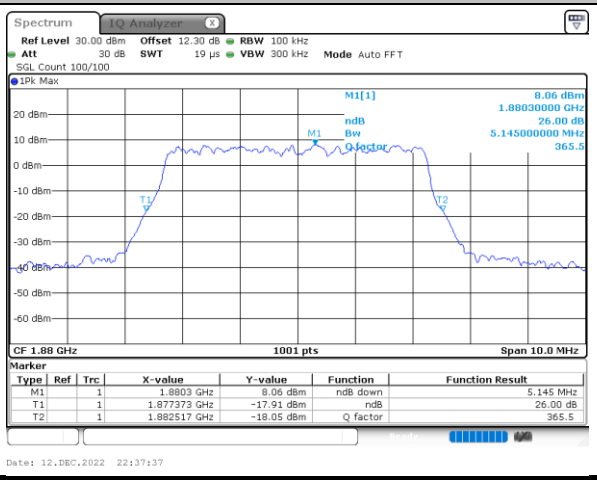
16QAM



64QAM

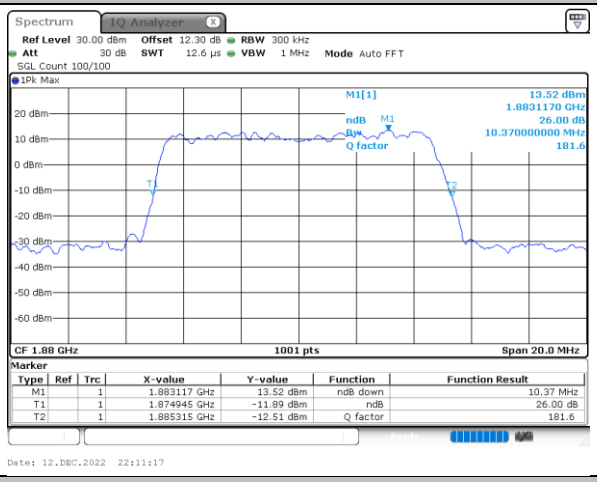


256QAM

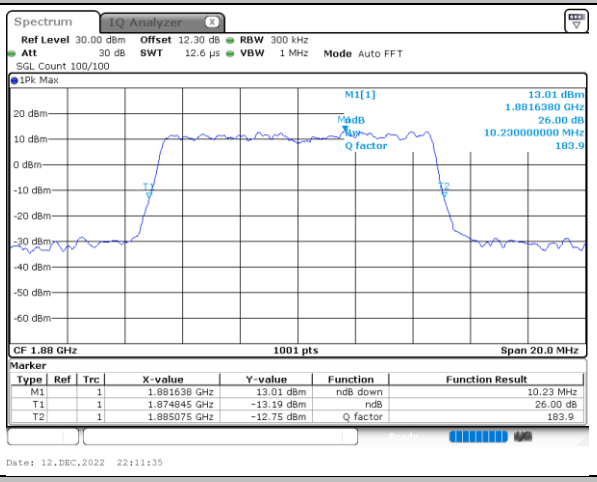


FR1 n2 / 10MHz / CP OFDM / Middle Channel / Full RB

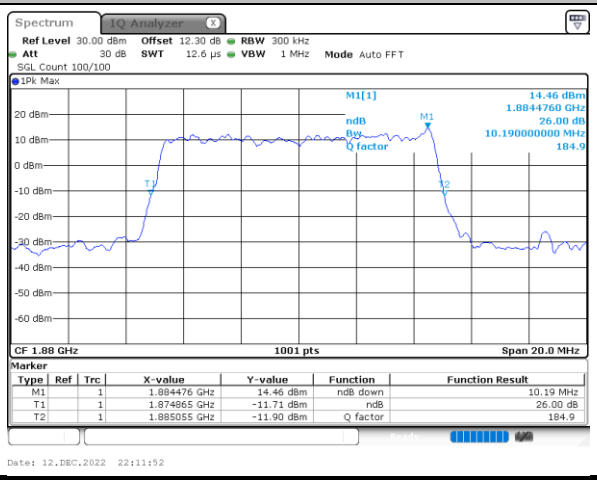
QPSK



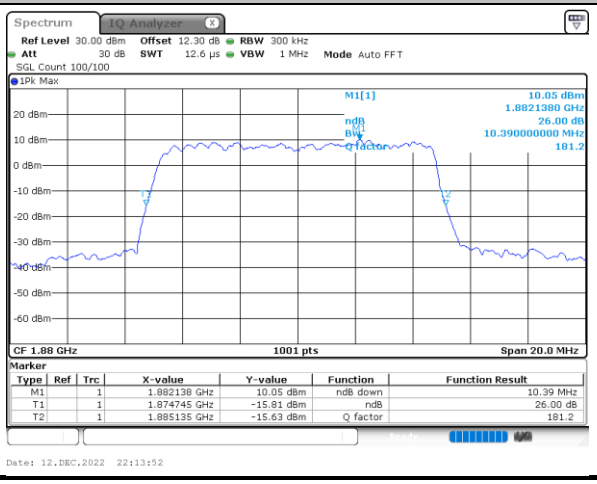
16QAM



64QAM



256QAM



FR1 n2 / 15MHz / CP OFDM / Middle Channel / Full RB	
QPSK	16QAM
64QAM	256QAM