FCC RF Test Report

APPLICANT	: Motorola Mobility LLC
EQUIPMENT	: Mobile Cellular Phone
BRAND NAME	: Motorola
MODEL NAME	: XT2131-1, XT2131-4, XT2131-3, XT2131DL
FCC ID	: IHDT56ZL1
STANDARD	: 47 CFR Part 2, 22, 24, 27
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jan. 29, 2021 and completely tested on Feb. 29, 2021. We, Sporton International (ShenZhen) Inc., 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.

This report contains data that were produced under subcontract by Laboratory Sporton International (Kunshan) Inc.

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

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager

ACCREDITED Cert #5145.01

Sporton International (ShenZhen) Inc.

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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG112907H	Rev. 01	Initial issue of report	Mar. 25, 2021

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, n26)	ERP < 7 Watt		
	§24.232(c)	Equivalent Isotropic Radiated Power (5G NR n2, n25)	EIRP < 2Watt		
	§27.50(c)(10)	Effective Radiated Power (Band 12)	ERP < 3 Watt		
3.5	§24.232(d) §27.50(j)(4)	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(g)	Conducted Band Edge Measurement (5G NR n5, n26) (5G NR n2, n25) (5G NR n12)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(g)	Conducted Spurious Emission (5G NR n5, n26) (5G NR n2, n25) (5G NR n12)	< 43+10log10(P[Watts])	PASS	-
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(g)	Radiated Spurious Emission (5G NR n5, n26) (5G NR n2, n25) (5G NR n12)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 11.42 dB at 14664.000 MHz

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,IL60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza,Chicago,IL60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2131-1, XT2131-4, XT2131-3, XT2131DL
FCC ID	IHDT56ZL1
EUT supports Radios application	CDMA/GSM/WCDMA/LTE/5G NR WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR / EDR / LE FM Receiver / GNSS
IMEI Code	Conducted : N/A Radiation : 35661128001681
HW Version	DVT
SW Version	RRE31.37
EUT Stage	Production Unit

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 n12: 699 MHz ~ 716 MHz 5G NR n25: 1850 MHz ~ 1915 MHz 5G NR n26: 814 MHz ~ 849 MHz
Rx Frequency	5G NR n2: 1930 MHz ~ 1990 MHz 5G NR n5: 869 MHz ~ 894 MHz 5G NR n12: 729 MHz ~ 746 MHz 5G NR n25: 1930 MHz ~ 1995 MHz 5G NR n26: 859 MHz ~ 894 MHz
Bandwidth	n2, n5, n26: 5MHz / 10MHz / 15MHz / 20MHz n12: 5MHz / 10MHz / 15MHz n25: 5MHz / 10MHz / 15MHz / 20MHz / 25MHz / 30MHz / 40MHz
Maximum Output Power to Antenna	**Boottom Antenna:** SA: n25 : 23.32 dBm SA: n2 : 22.99 dBm SA: n5 : 23.78 dBm SA: n26 : 23.97 dBm NSA: EN_DC 2A_n12A : 23.77 dBm;
Antenna Gain	**Top Antenna:** 5G NR n2: -5.6 dBi 5G NR n5: -7.1 dBi 5G NR n12: -7.1 dBi 5G NR n25: -5.6 dBi 5G NR n26: -7.1 dBi **Boottom Antenna:** 5G NR n2: -0.57 dBi 5G NR n5: -4.0 dBi 5G NR n25: -0.57 dBi 5G NR n26: -3.69 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

5G NR n2		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
20	1860.0 ~ 1900.0	19M4G7D	0.1746	19M6W7D	0.1306
Frequency Tolerance (ppm)		0.0040			

5G NR n5		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)
20	834.0 ~ 839.0	18M2G7D	0.0579	18M5W7D	0.0490
Frequency Tolerance (ppm)		0.0063			

5G NR n12 (EN DC_2A-n12A)		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)
15	706.5 ~ 708.5	13M5G7D	0.0283	13M5W7D	0.0245
Frequency Tolerance (ppm)		0.0099			

5G NR n25		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
40	1870.0 ~ 1895.0	38M6G7D	0.1884	38M8W7D	0.1667
Frequency Tolerance (ppm)		0.0040			

5G NR n26		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
20	834 ~ 839	18M2G7D	0.0650	18M5W7D	0.0522
Frequency Tolerance (ppm)		0.0063			

Note:

1. 5G NR Band n25 overlaps the entire frequency range of Band n2. Therefore, the conducted test results provided in this report covers Band n25 as well as Band n2.

2. 5G NR Band n26 overlaps the entire frequency range of Band n5. Therefore, the conducted test results provided in this report covers Band n26 as well as Band n5.
3. Based on engineering evaluation, only the maximum bandwidth and the worst modulation test results are shown in the report.
4. The Maximum ERP/EIRP is calculated from Max Output power and Max antenna gain, only the maximum ERP/EIRP is shown in the report.
5. 5G NR supports SA and NSA mode (refer to the Operation Description).
6. For NSA mode, according to engineering evaluation, only the worst EN-DC combination mode show in the report for 5G NR n12.
7. According to the maximum power between SA and NSA mode, SA covers NSA mode, we choose SA mode to test all test items for 5G NR n25.

1.7 Testing Location

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

Test Firm	Sporton International (Kunshan) Inc.		
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.**
	TH01-KS	CN1257	314309

Note: Test data subcontracted: Conducted items in section 3 of this report.

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	CN1256	421272

1.8 Test Software

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

1.9 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.

1.10 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-101
AC Adapter 2(US)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-101
Battery	**Brand Name**	Motorola (ATL)	**Model Name**	MD50
USB Cable 1	**Brand Name**	Motorola (Saibao)	**Model Name**	SC18C24367
USB Cable 2	**Brand Name**	Motorola (Luxshare)	**Model Name**	SC18C24368

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 (Y 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			

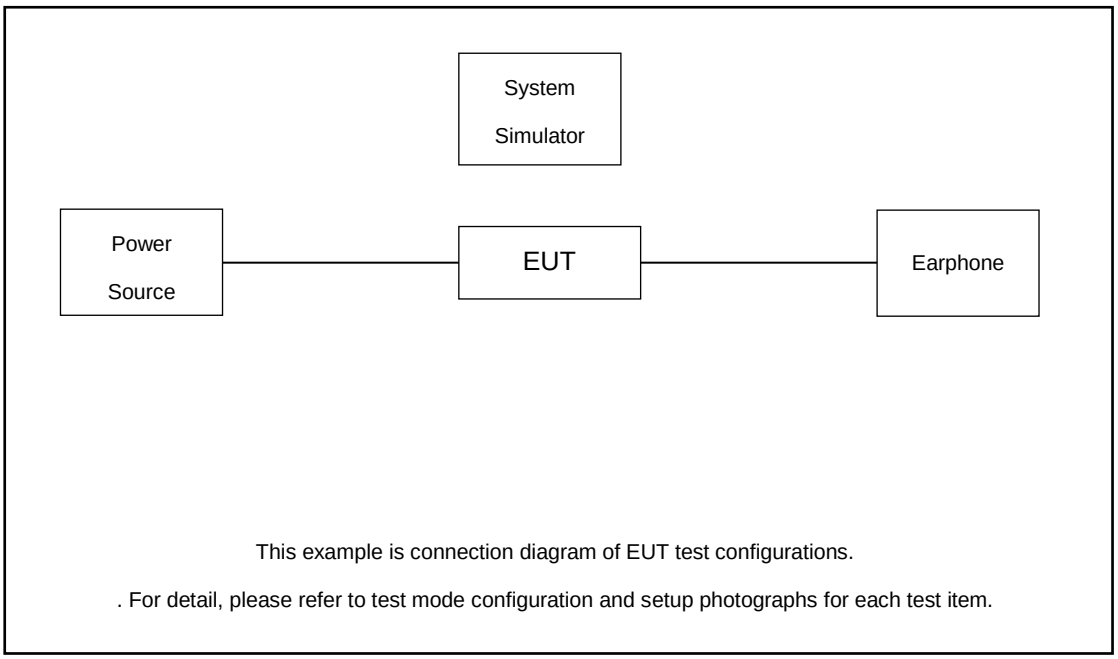
Test Items	5G NR	Bandwidth (MHz)									Modulation					RB #			Test Channel		
		5	10	15	20	25	30	40	60	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	n2	v	v	v	v		-	-	-	-	v	v	v	v	v	v		v	v	v	v
	n5	v	v	v	v				-	-	v	v	v	v	v	v		v	v	v	v
	n12	v	v	v	-		-	-	-	-	v	v	v	v	v	v		v	v	v	v
	n25	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v		v	v	v	v
	n26	v	v	v	v				-	-	v	v	v	v	v	v		v	v	v	v
Peak-to-Average Ratio	n12			v					-	-	v	v	v	v	v			v		v	
	n25				v				-	-	v	v	v	v	v			v		v	
	n26				v				-	-	v	v	v	v	v			v		v	
26dB Bandwidth	n12			v					-	-		v	v					v		v	
	n25				v			v	-	-		v	v					v		v	
	n26				v				-	-		v	v					v		v	
99% Bandwidth	n12			v					-	-		v	v					v		v	
	n25				v			v	-	-		v	v					v		v	
	n26				v				-	-		v	v					v		v	

Test Items	Band	Bandwidth (MHz)									Modulation					RB #			Test Channel		
		5	10	15	20	25	30	40	60	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Conducted Band Edge	n12	v	v	v					-	-	v	v	v	v	v	v		v	v		v
	n25	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v		v	v		v
	n26	v	v	v	v				-	-	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	n12	v	v	v					-	-		v				v			v	v	v
	n25	v	v	v	v	v	v	v	-	-		v				v			v	v	v
	n26	v	v	v	v				-	-		v				v			v	v	v
Frequency Stability	n12			v					-	-		v						v		v	
	n25				v				-	-		v						v		v	
	n26				v				-	-		v						v		v	
E.R.P / E.I.R.P	n12	v	v	v					-	-	v	v	v	v	v	v	v	v	v	v	v
	n25	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v	v	v	v	v	v
	n26	v	v	v	v				-	-	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n12	Worst Case																		v	
	n25	Worst Case																		v	
	n26	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. Based on engineering evaluation, only the worst modulation test results are shown in the report.
5. For modulation of CP-OFDM and DFT-s-OFDM , the maximum power of CP-OFDM is lower than DFT-s-OFDM modulation, therefore, we chose higher power (DFT-s-OFDM modulation) to perform all tests and show in the report.
6. All modulations (BPSK/QPSK/16QAM/64QAM/256QAM) have been tested, and only the worst test results are shown in the report .

2.2 Connection Diagram of Test System



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.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
3.	Base Station	Keysight	UXM E7515B	N/A	N/A	Shielded, 1.5m
4.	Earphone	N/A	N/A	N/A	Unshielded,1.2m	N/A

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 4.8 dB.

Example :

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

= 4.8 (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 n12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	141300	141500	141700
	Frequency	706.5	707.5	708.5
10	Channel	140800	141500	142200
	Frequency	704	707.5	711
5	Channel	140300	141500	142700
	Frequency	701.5	707.5	713.5

5G NR n25 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	374000	376500	379000
	Frequency	1870	1882.5	1895
30	Channel	373000	376500	380000
	Frequency	1865	1882.5	1900
25	Channel	372500	376500	380500
	Frequency	1862.5	1882.5	1902.5
20	Channel	372000	376500	381000
	Frequency	1860	1882.5	1905
15	Channel	371500	376500	381500
	Frequency	1857.5	1882.5	1907.5
10	Channel	371000	376500	382000
	Frequency	1855	1882.5	1910
5	Channel	370500	376500	382500
	Frequency	1852.5	1882.5	1912.5

5G NR n26 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

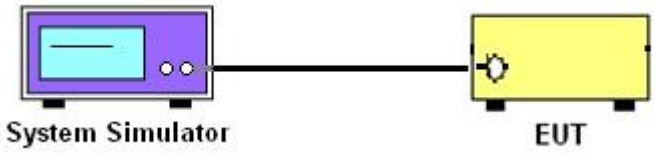
3 Conducted Test Items

3.1 Measuring Instruments

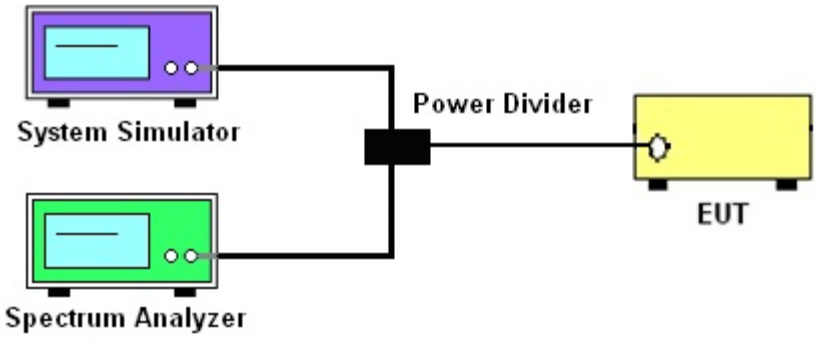
See list of measuring instruments of this test report.

3.2 Test Setup

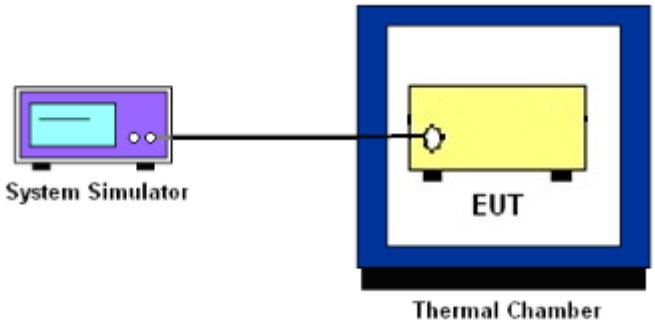
3.2.1 Conducted Output Power



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 and n26.

The ERP of mobile transmitters must not exceed 3 Watts for 5G NR n12.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n2 and n25.

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.
6. The testing follows ANSI C63.26 Section 5.2.6 (PAPR).
7. The EUT was connected to spectrum and system simulator via a power divider.
8. Set EUT in maximum power output.
9. Set the RBW = 1MHz, VBW = 3MHz, Detector = Peak, Trace mode = max hold, Set span ≥ 2 × OBW in spectrum analyzer.
10. Set the RBW = 1MHz, VBW = 3MHz, Detector = power averaging, Trace mode = max hold, Set span ≥ 2 × OBW in spectrum analyzer.
11. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission.
12. 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
13. 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 (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.

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.
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.

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.

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.

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.

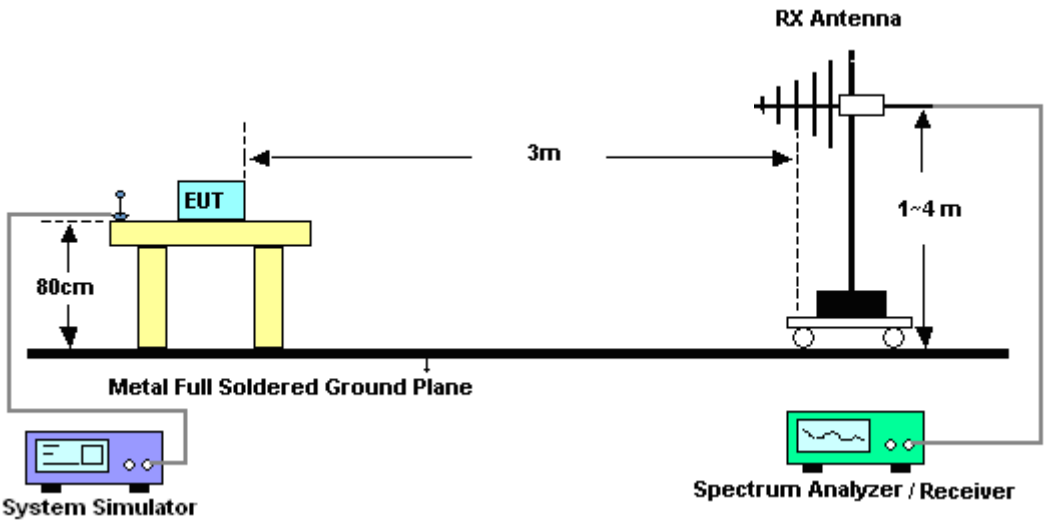
4 Radiated Test Items

4.1 Measuring Instruments

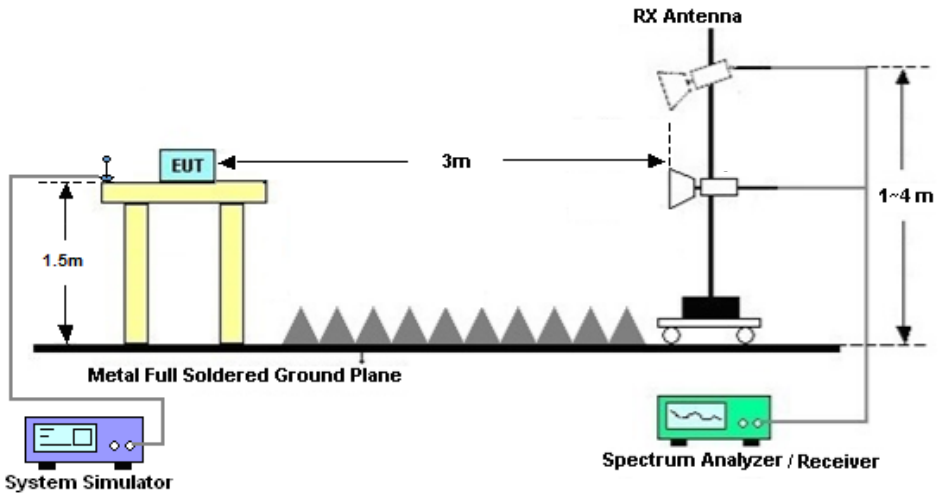
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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.

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.

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	Nov. 02, 2020	Feb. 13, 2021~ Feb. 26, 2021	Nov. 01, 2021	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 03, 2020	Feb. 13, 2021~ Feb. 26, 2021	Jul. 02, 2021	Conducted (TH01-KS)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 21, 2020	Feb. 28, 2021	Jul. 20, 2021	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Nov. 07, 2020	Feb. 28, 2021	Nov. 06, 2021	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	May 23, 2020	Feb. 28, 2021	May 22, 2021	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 26, 2020	Feb. 28, 2021	Jul. 25, 2021	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 16, 2020	Feb. 28, 2021	Oct. 15, 2021	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 17, 2020	Feb. 28, 2021	Oct. 16, 2021	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 21, 2020	Feb. 28, 2021	Jul. 20, 2021	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Oct. 17, 2020	Feb. 28, 2021	Oct. 16, 2021	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Feb. 28, 2021	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 28, 2021	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 28, 2021	NCR	Radiation (03CH04-SZ)

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 Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.1dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power and 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	22.81	22.83	22.89	-0.57	0.1675	0.1683	0.1706
20	QPSK	1	1	22.89	22.93	22.99	-0.57	0.1706	0.1722	0.1746
20	QPSK	1	53	22.73	22.74	22.81	-0.57	0.1644	0.1648	0.1675
20	QPSK	1	104	22.69	22.81	22.83	-0.57	0.1629	0.1675	0.1683
20	QPSK	50	0	21.68	21.72	21.87	-0.57	0.1291	0.1303	0.1349
20	QPSK	50	28	22.67	22.81	22.89	-0.57	0.1622	0.1675	0.1706
20	QPSK	50	56	21.70	21.93	21.99	-0.57	0.1297	0.1368	0.1387
20	QPSK	100	0	21.93	21.94	21.97	-0.57	0.1368	0.1371	0.1380
20	16QAM	1	1	21.58	21.63	21.73	-0.57	0.1262	0.1276	0.1306
20	64QAM	1	1	20.10	20.09	20.21	-0.57	0.0897	0.0895	0.0920
20	256QAM	1	1	18.00	18.03	18.23	-0.57	0.0553	0.0557	0.0583
Channel				371500	376000	380500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1857.5	1880	1902.5				
15	QPSK	1	1	22.79	22.80	22.81	-0.57	0.1667	0.1671	0.1675
15	16QAM	1	1	21.53	21.60	21.67	-0.57	0.1247	0.1268	0.1288
Channel				371000	376000	381000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1855	1880	1905				
10	QPSK	1	1	22.75	22.75	22.79	-0.57	0.1652	0.1652	0.1667
10	16QAM	1	1	21.51	21.62	21.68	-0.57	0.1242	0.1274	0.1291
Channel				370500	376000	381500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1852.5	1880	1907.5				
5	QPSK	1	1	22.77	22.74	22.83	-0.57	0.1660	0.1648	0.1683
5	16QAM	1	1	21.55	21.58	21.61	-0.57	0.1253	0.1262	0.1271

5G NR n25:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				374000	376500	379000		L	M	H
Frequency (MHz)				1870	1882.5	1895				
40	PI/2 BPSK	1	1	23.12	23.03	23.11	-0.57	0.1799	0.1762	0.1795
40	QPSK	1	1	23.16	23.08	23.32	-0.57	0.1816	0.1782	0.1884
40	QPSK	1	108	23.07	22.99	23.15	-0.57	0.1778	0.1746	0.1811
40	QPSK	1	214	23.10	22.98	22.98	-0.57	0.1791	0.1742	0.1742
40	QPSK	108	0	22.25	22.15	22.40	-0.57	0.1472	0.1439	0.1524
40	QPSK	108	54	23.11	23.05	23.09	-0.57	0.1795	0.1770	0.1786
40	QPSK	108	108	22.25	22.34	22.30	-0.57	0.1472	0.1503	0.1489
40	QPSK	216	0	22.15	21.93	22.04	-0.57	0.1439	0.1368	0.1403
40	16QAM	1	1	22.69	22.42	22.79	-0.57	0.1629	0.1531	0.1667
40	64QAM	1	1	20.73	20.50	20.61	-0.57	0.1038	0.0984	0.1009
40	256QAM	1	1	18.43	18.41	18.45	-0.57	0.0611	0.0608	0.0614
Channel				373000	376500	380000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1865	1882.5	1900				
30	QPSK	1	1	23.08	22.92	23.04	-0.57	0.1782	0.1718	0.1766
30	16QAM	1	1	22.51	22.03	22.45	-0.57	0.1563	0.1400	0.1542
Channel				372500	376500	380500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1862.5	1882.5	1902.5				
25	QPSK	1	1	22.98	22.99	23.02	-0.57	0.1742	0.1746	0.1758
25	16QAM	1	1	22.51	22.03	22.61	-0.57	0.1563	0.1400	0.1600
Channel				372000	376500	381000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1860	1882.5	1905				
20	QPSK	1	1	22.97	22.89	23.07	-0.57	0.1738	0.1706	0.1778
20	16QAM	1	1	22.51	22.32	22.50	-0.57	0.1563	0.1496	0.1560
Channel				371500	376500	381500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1857.5	1882.5	1907.5				
15	QPSK	1	1	23.06	23.01	23.11	-0.57	0.1774	0.1754	0.1795
15	16QAM	1	1	22.62	22.38	22.56	-0.57	0.1603	0.1517	0.1581
Channel				371000	376500	382000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1855	1882.5	1910				
10	QPSK	1	1	23.13	23.06	23.12	-0.57	0.1803	0.1774	0.1799
10	16QAM	1	1	22.54	22.42	22.63	-0.57	0.1574	0.1531	0.1607
Channel				370500	376500	382500	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				1852.5	1882.5	1912.5				
5	QPSK	1	1	23.04	23.11	23.01	-0.57	0.1766	0.1795	0.1754
5	16QAM	1	1	22.54	22.31	22.45	-0.57	0.1574	0.1493	0.1542

EN-DC_2A-n12A

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				141300	141500	141700		L	M	H
Frequency (MHz)				706.5	707.5	708.5				
15	PI/2 BPSK	1	1	23.62	23.75	23.65	-7.1	0.0274	0.0282	0.0275
15	QPSK	1	1	23.71	23.77	23.68	-7.1	0.0279	0.0283	0.0277
15	QPSK	1	40	23.57	23.61	23.63	-7.1	0.0270	0.0273	0.0274
15	QPSK	1	77	23.52	23.57	23.43	-7.1	0.0267	0.0270	0.0262
15	QPSK	36	0	22.86	22.83	22.78	-7.1	0.0230	0.0228	0.0225
15	QPSK	36	22	23.60	23.72	23.61	-7.1	0.0272	0.0280	0.0273
15	QPSK	36	43	22.84	22.74	22.79	-7.1	0.0229	0.0223	0.0226
15	QPSK	75	0	22.81	22.90	22.88	-7.1	0.0227	0.0232	0.0231
15	16QAM	1	1	23.12	23.10	23.15	-7.1	0.0244	0.0243	0.0245
15	64QAM	1	1	21.27	21.22	21.14	-7.1	0.0159	0.0157	0.0155
15	256QAM	1	1	19.22	19.15	19.18	-7.1	0.0099	0.0098	0.0098
Channel				140800	141500	142200	Gain	ERP	ERP	ERP
Frequency (MHz)				704	707.5	711				
10	QPSK	1	1	23.51	23.67	23.59	-7.1	0.0267	0.0277	0.0272
10	16QAM	1	1	23.01	23.02	23.12	-7.1	0.0238	0.0238	0.0244
Channel				140300	141500	142700	Gain	ERP	ERP	ERP
Frequency (MHz)				701.5	707.5	713.5				
5	QPSK	1	1	23.59	23.51	23.54	-7.1	0.0272	0.0267	0.0269
5	16QAM	1	1	23.11	23.05	23.01	-7.1	0.0243	0.0240	0.0238

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	23.41	23.52	23.33	-4.0	0.0532	0.0546	0.0522
20	QPSK	1	1	23.43	23.78	23.41	-4.0	0.0535	0.0579	0.0532
20	QPSK	1	53	23.20	23.21	23.19	-4.0	0.0507	0.0508	0.0506
20	QPSK	1	104	23.11	23.11	23.08	-4.0	0.0497	0.0497	0.0493
20	QPSK	50	0	22.64	22.65	22.58	-4.0	0.0446	0.0447	0.0440
20	QPSK	50	28	23.32	23.26	23.30	-4.0	0.0521	0.0514	0.0519
20	QPSK	50	56	22.40	22.43	22.30	-4.0	0.0422	0.0425	0.0412
20	QPSK	100	0	22.56	22.50	22.52	-4.0	0.0438	0.0432	0.0434
20	16QAM	1	1	23.05	23.01	22.99	-4.0	0.0490	0.0485	0.0483
20	64QAM	1	1	21.05	21.00	20.88	-4.0	0.0309	0.0305	0.0297
20	256QAM	1	1	18.99	19.01	18.87	-4.0	0.0192	0.0193	0.0187
Channel				166300	167300	168300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	QPSK	1	1	23.33	23.38	23.31	-4.0	0.0522	0.0528	0.0520
15	16QAM	1	1	23.03	22.98	22.83	-4.0	0.0488	0.0482	0.0466
Channel				165800	167300	168800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	QPSK	1	1	23.35	23.34	23.32	-4.0	0.0525	0.0524	0.0521
10	16QAM	1	1	23.01	22.95	22.60	-4.0	0.0485	0.0479	0.0442
Channel				165300	167300	169300	Gain	ERP	ERP	ERP
Frequency (MHz)				826.5	836.5	846.5				
5	QPSK	1	1	23.39	23.36	23.29	-4.0	0.0530	0.0526	0.0518
5	16QAM	1	1	23.04	22.95	22.90	-4.0	0.0489	0.0479	0.0473

5G NR n26

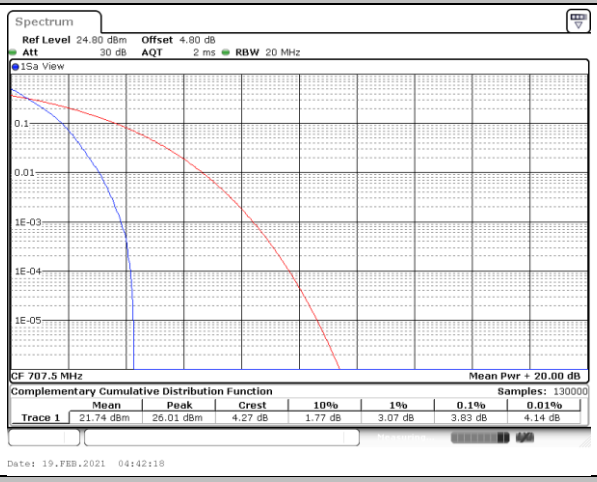
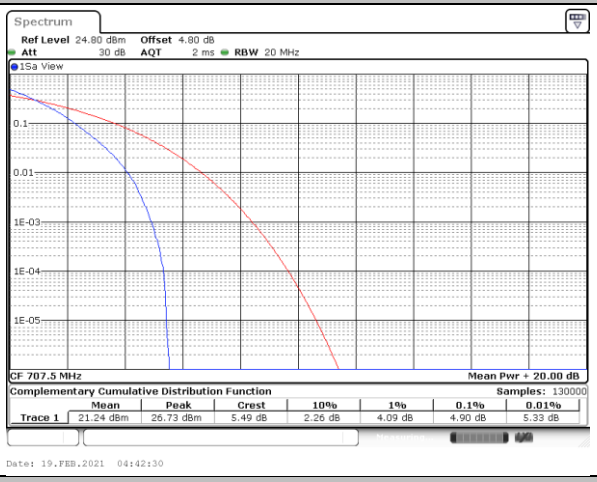
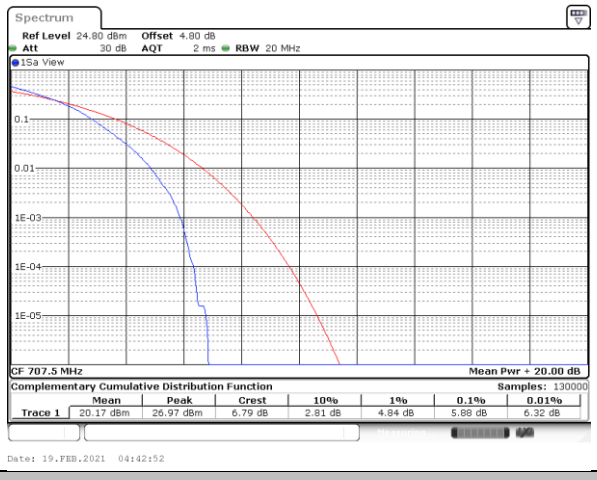
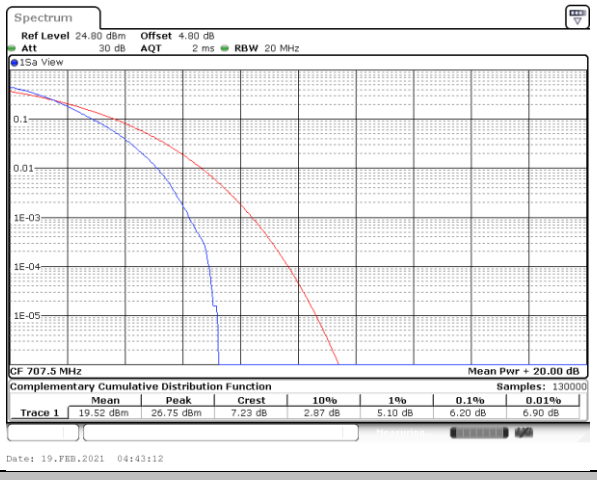
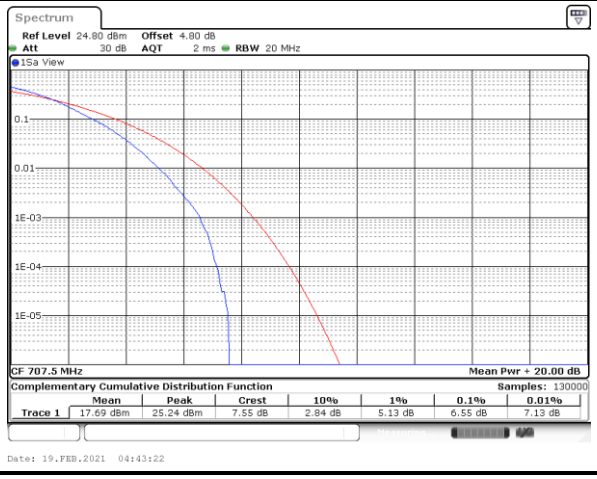
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				166800	167300	167800		L	M	H
Frequency (MHz)				834	836.5	839				
20	PI/2 BPSK	1	1	23.72	23.82	23.77	-3.69	0.0614	0.0628	0.0621
20	PI/2 BPSK	1	53	23.61	23.65	23.69	-3.69	0.0598	0.0604	0.0610
20	PI/2 BPSK	1	104	23.55	23.47	23.58	-3.69	0.0590	0.0579	0.0594
20	PI/2 BPSK	50	0	23.33	23.02	23.36	-3.69	0.0561	0.0522	0.0565
20	PI/2 BPSK	50	28	23.72	23.69	23.69	-3.69	0.0614	0.0610	0.0610
20	PI/2 BPSK	50	56	23.27	22.71	23.17	-3.69	0.0553	0.0486	0.0541
20	PI/2 BPSK	100	0	23.29	22.89	23.22	-3.69	0.0556	0.0507	0.0547
20	QPSK	1	1	23.97	23.89	23.93	-3.69	0.0650	0.0638	0.0644
20	QPSK	1	53	23.78	23.67	23.71	-3.69	0.0622	0.0607	0.0612
20	QPSK	1	104	23.64	23.51	23.59	-3.69	0.0603	0.0585	0.0596
20	QPSK	50	0	23.13	22.98	23.05	-3.69	0.0536	0.0518	0.0526
20	QPSK	50	28	23.82	23.72	23.72	-3.69	0.0628	0.0614	0.0614
20	QPSK	50	56	23.75	22.76	22.98	-3.69	0.0618	0.0492	0.0518
20	QPSK	100	0	23.02	22.86	22.40	-3.69	0.0522	0.0504	0.0452
20	16QAM	1	1	22.73	23.02	22.98	-3.69	0.0489	0.0522	0.0518
20	64QAM	1	1	20.78	21.01	20.87	-3.69	0.0312	0.0329	0.0318
20	256QAM	1	1	19.13	19.09	19.19	-3.69	0.0213	0.0211	0.0216
Channel				166300	167300	168300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	QPSK	1	1	23.65	23.59	23.41	-3.69	0.0604	0.0596	0.0571
15	16QAM	1	1	22.63	22.98	22.88	-3.69	0.0478	0.0518	0.0506
Channel				165800	167300	168800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	QPSK	1	1	23.45	23.63	23.45	-3.69	0.0577	0.0601	0.0577
10	16QAM	1	1	22.59	22.68	22.77	-3.69	0.0473	0.0483	0.0493
Channel				165300	167300	169300	Gain	ERP	ERP	ERP
Frequency (MHz)				826.5	836.5	846.5				
5	QPSK	1	1	23.82	23.71	23.65	-3.69	0.0628	0.0612	0.0604
5	16QAM	1	1	22.44	22.63	22.75	-3.69	0.0457	0.0478	0.0491

FR1 n12

NSA

Peak-to-Average Ratio

Mode	FR1 n12 / 15MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
Middle CH	3.83	4.90	5.88	6.20	PASS
Mode	FR1 n12 / 15MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
Middle CH	6.55				PASS

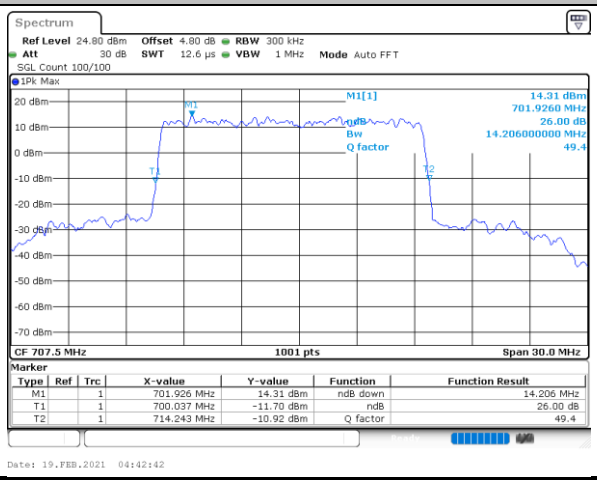
FR1 n12 / 15MHz / DFT-S OFDM / Middle Channel / Full RB	
PI/2 BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

26dB Bandwidth

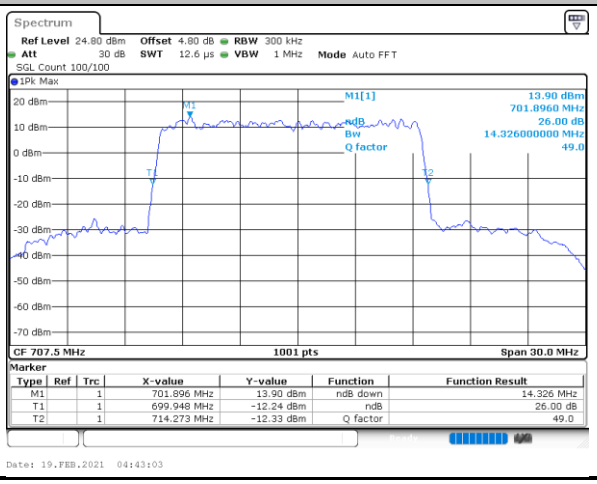
Mode	FR1 n12 : 26dB BW(MHz) / DFT-S OFDM							
BW	15MHz							
Mod.				QPSK	16QAM			
Middle CH				14.206	14.326			

FR1 n12 / 15MHz / DFT-S OFDM / Middle Channel

QPSK



16QAM

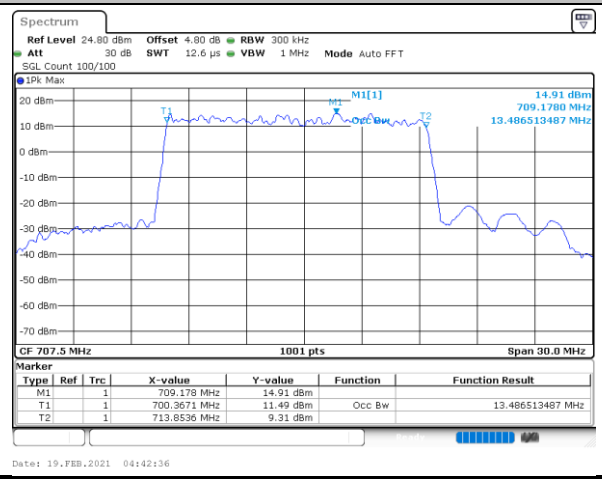


Occupied Bandwidth

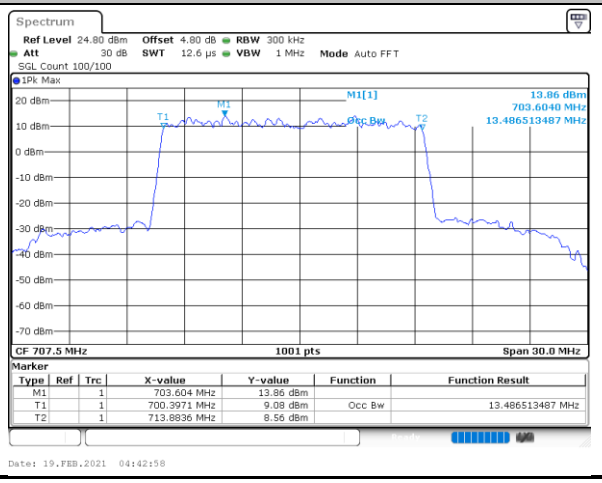
Mode	FR1 n12 : 99%OBW(MHz) / DFT-S OFDM							
BW	15MHz							
Mod.				QPSK	16QAM			
Middle CH				13.487	13.487			

FR1 n12 / 15MHz / DFT-S OFDM Middle Channel

QPSK



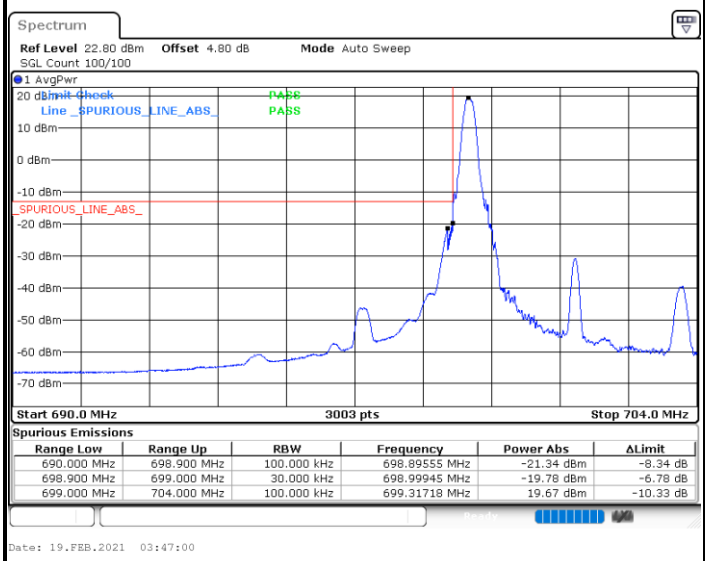
16QAM



Conducted Band Edge

FR1 n12 / 5MHz / DFT-S OFDM / PI/2 BPSK

Lowest Band Edge / 1RB0

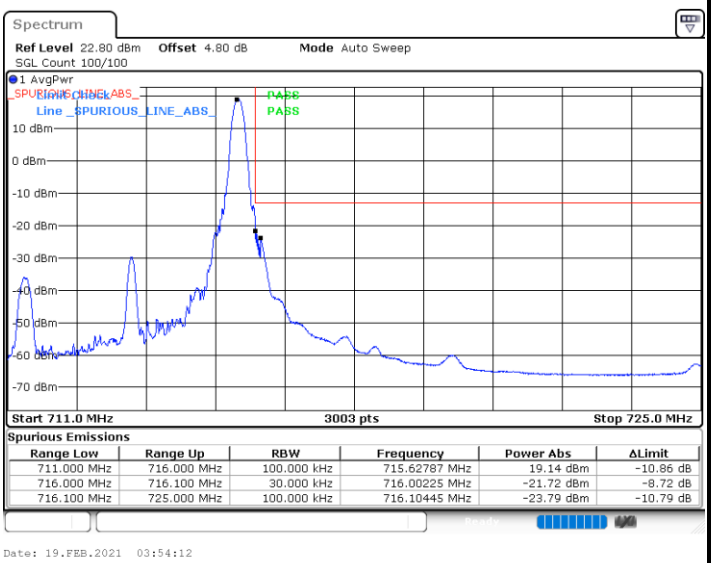


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-21.34 dBm	-8.34 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99945 MHz	-19.78 dBm	-6.78 dB
699.000 MHz	704.000 MHz	100.000 kHz	699.31718 MHz	19.67 dBm	-10.33 dB

Date: 19.FEB.2021 03:47:00

Highest Band Edge / 1RBmax

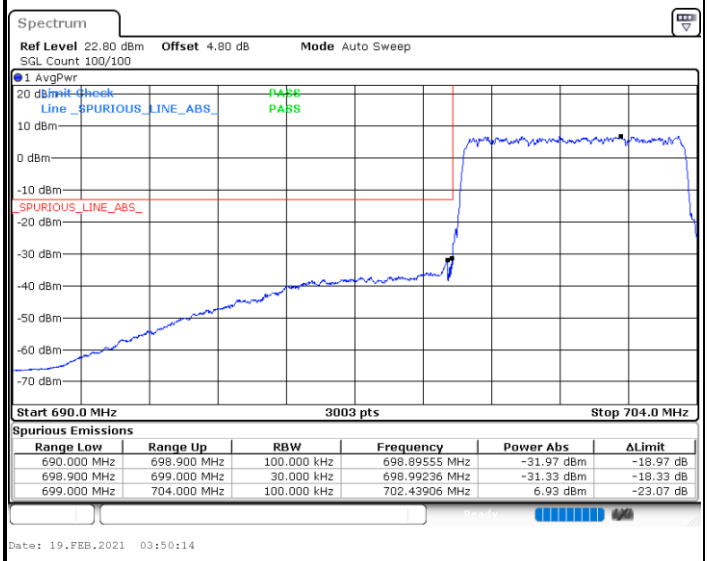


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
711.000 MHz	716.000 MHz	100.000 kHz	715.62787 MHz	19.14 dBm	-10.86 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00225 MHz	-21.72 dBm	-8.72 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-23.79 dBm	-10.79 dB

Date: 19.FEB.2021 03:54:12

Lowest Band Edge / Full RB

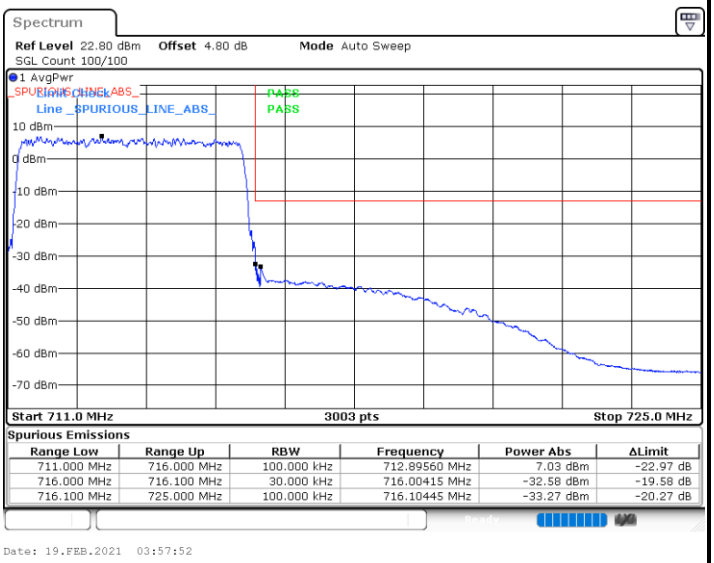


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-31.97 dBm	-18.97 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99236 MHz	-31.33 dBm	-18.33 dB
699.000 MHz	704.000 MHz	100.000 kHz	702.43906 MHz	6.93 dBm	-23.07 dB

Date: 19.FEB.2021 03:50:14

Highest Band Edge / Full RB



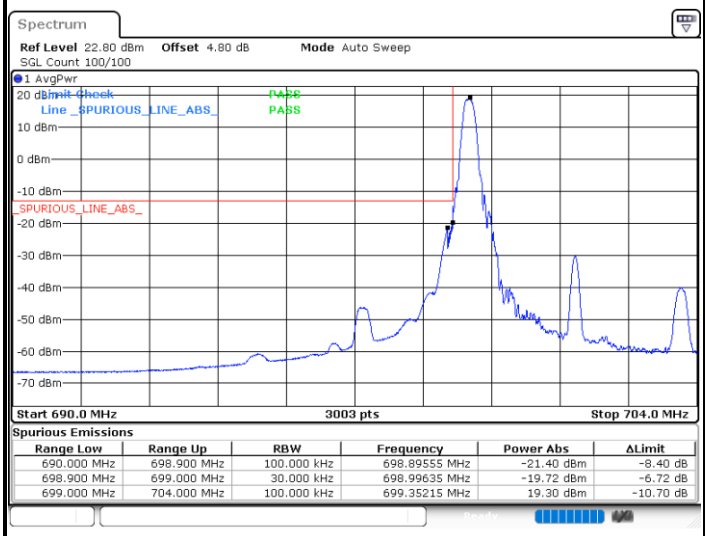
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
711.000 MHz	716.000 MHz	100.000 kHz	712.89560 MHz	7.03 dBm	-22.97 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00415 MHz	-32.58 dBm	-19.58 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-33.27 dBm	-20.27 dB

Date: 19.FEB.2021 03:57:52

FR1 n12 / 5MHz / DFT-S OFDM / QPSK

Lowest Band Edge / 1RB0

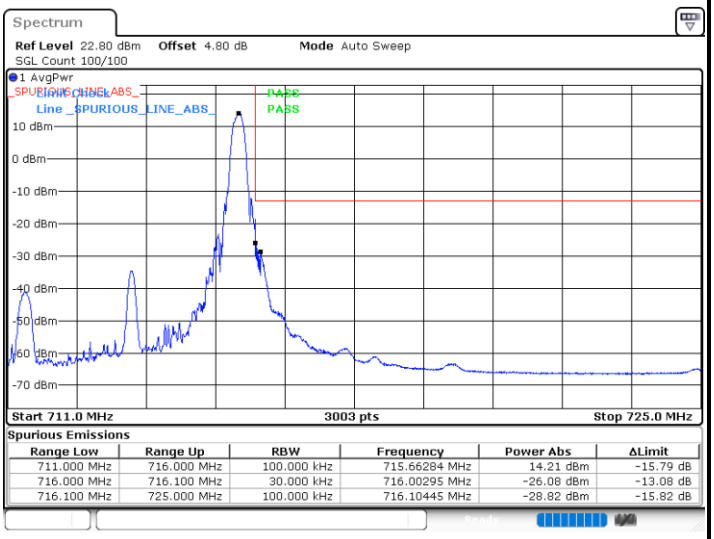


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-21.40 dBm	-8.40 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99635 MHz	-19.72 dBm	-6.72 dB
699.000 MHz	704.000 MHz	100.000 kHz	699.35215 MHz	19.30 dBm	-10.70 dB

Date: 19.FEB.2021 03:47:37

Highest Band Edge / 1RBmax

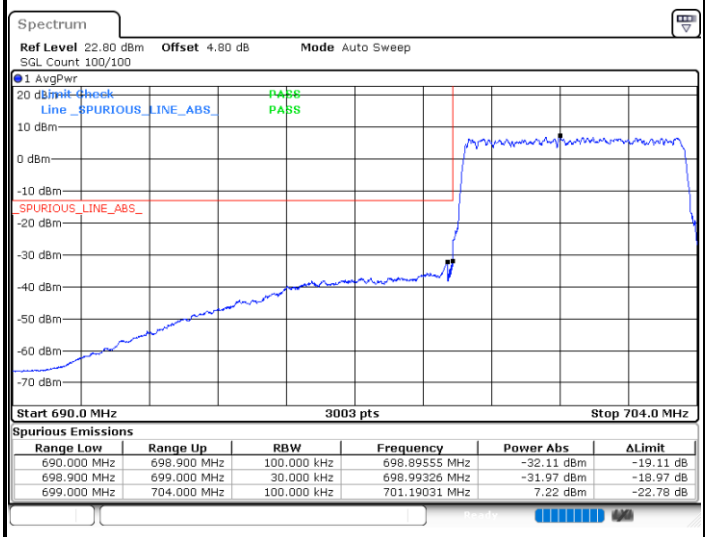


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
711.000 MHz	716.000 MHz	100.000 kHz	715.66284 MHz	14.21 dBm	-15.79 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00295 MHz	-26.08 dBm	-13.08 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-28.82 dBm	-15.82 dB

Date: 19.FEB.2021 03:54:44

Lowest Band Edge / Full RB

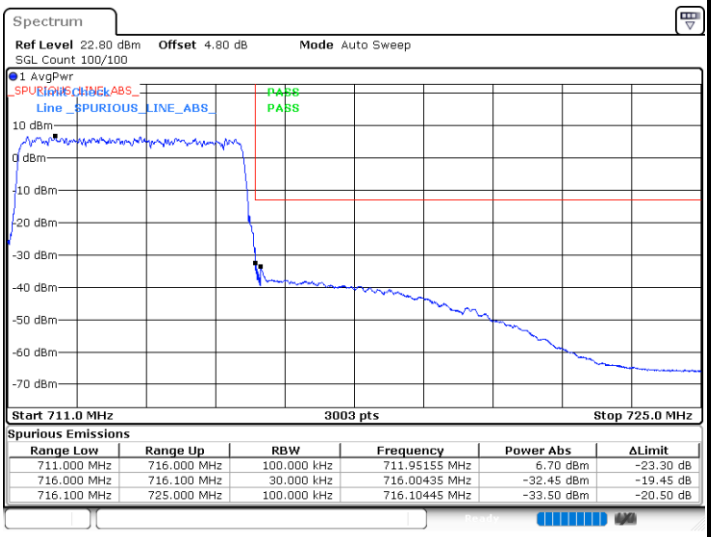


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-32.11 dBm	-19.11 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99326 MHz	-31.97 dBm	-18.97 dB
699.000 MHz	704.000 MHz	100.000 kHz	701.19031 MHz	7.22 dBm	-22.78 dB

Date: 19.FEB.2021 03:50:46

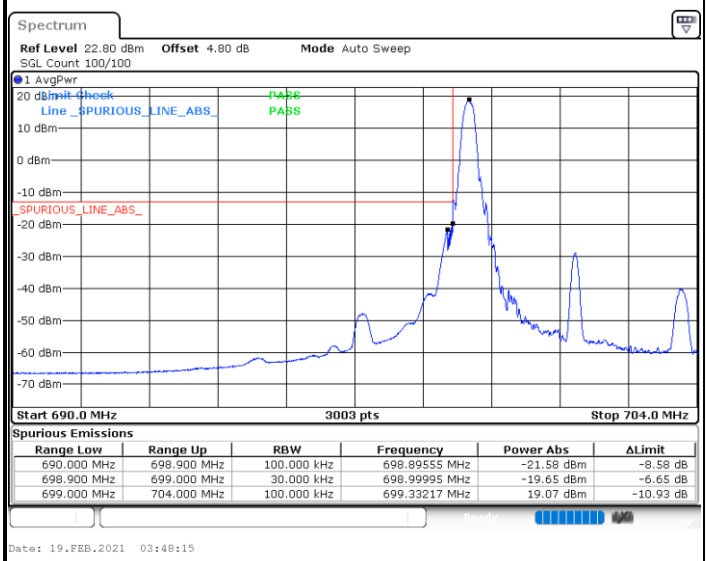
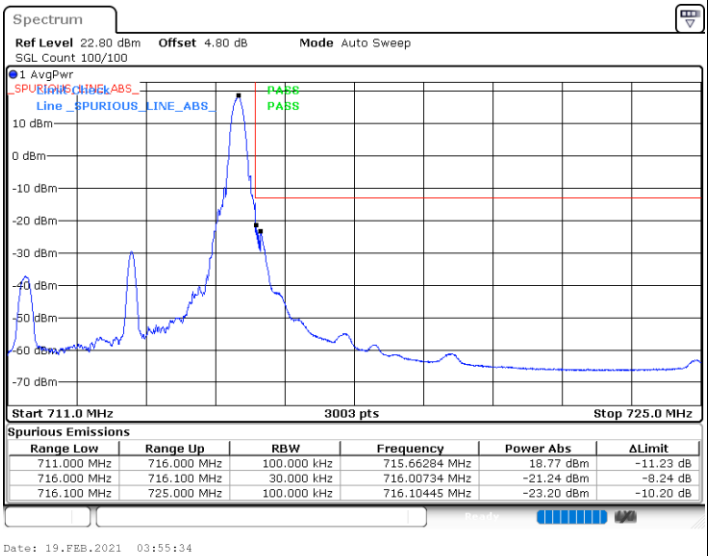
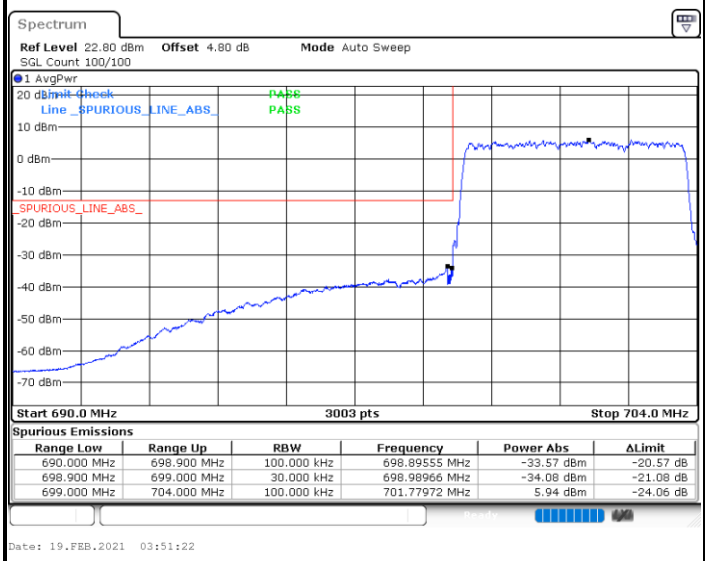
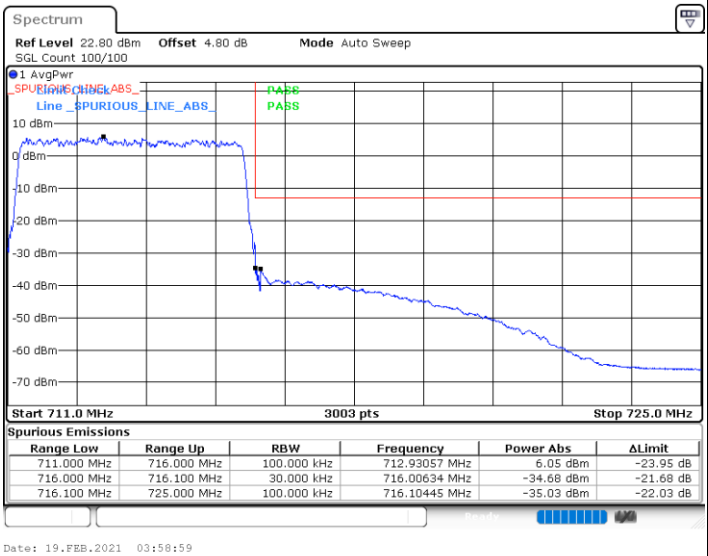
Highest Band Edge / Full RB

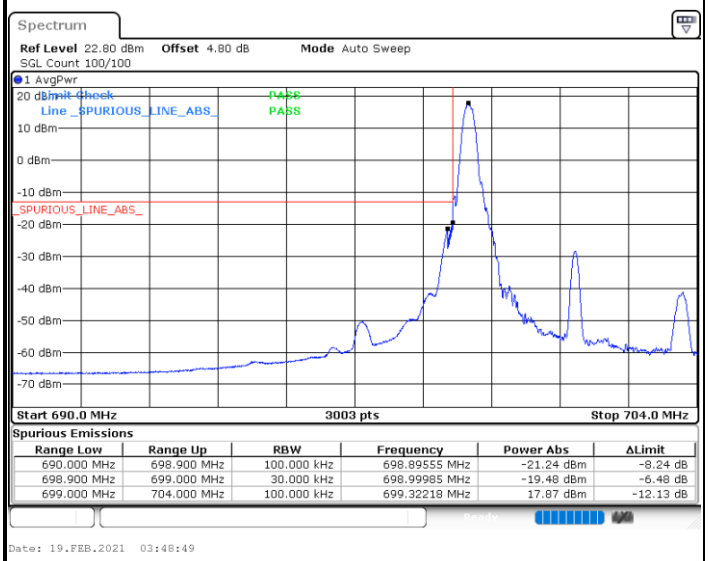
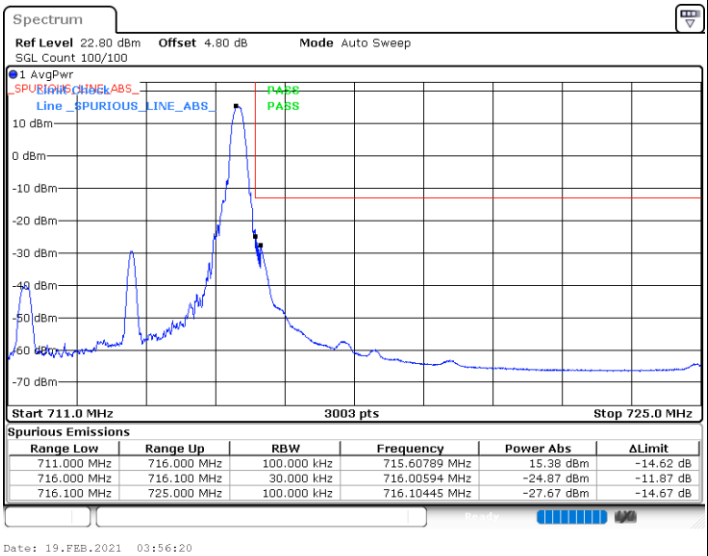
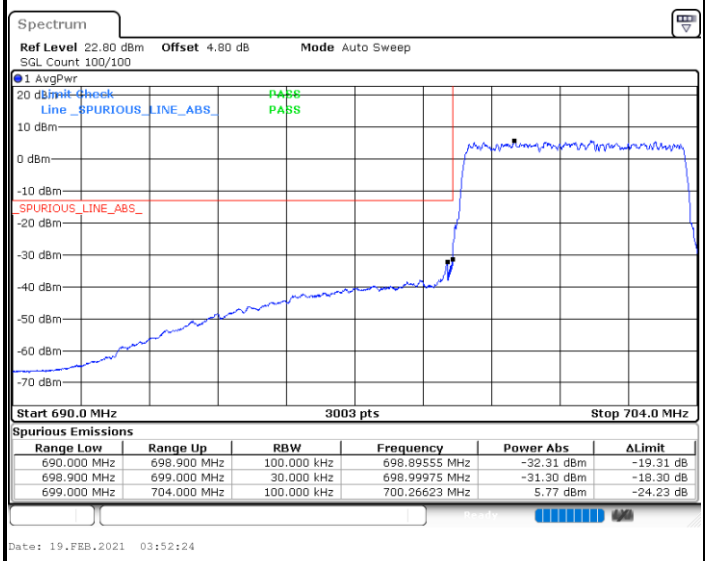
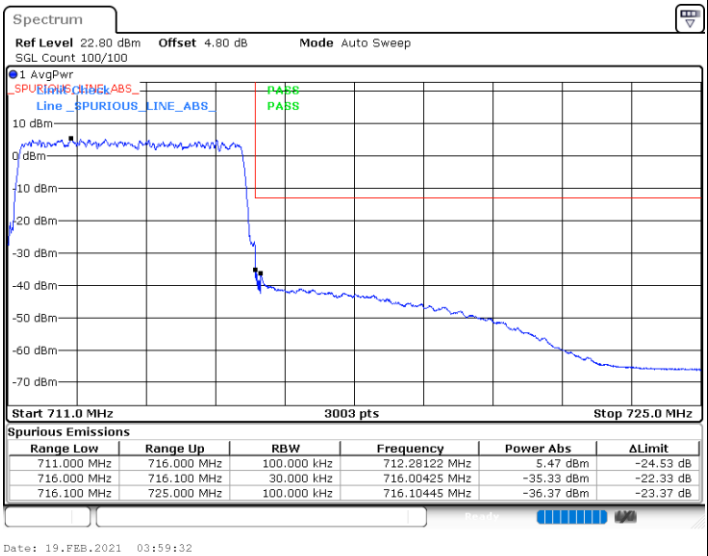


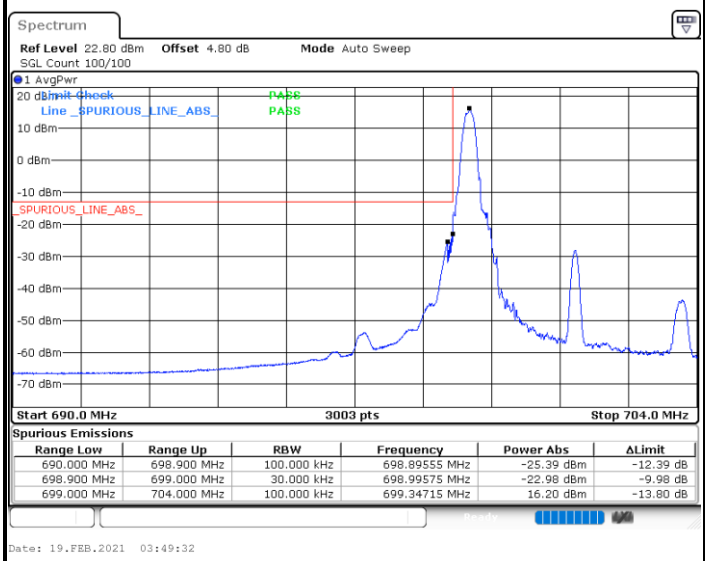
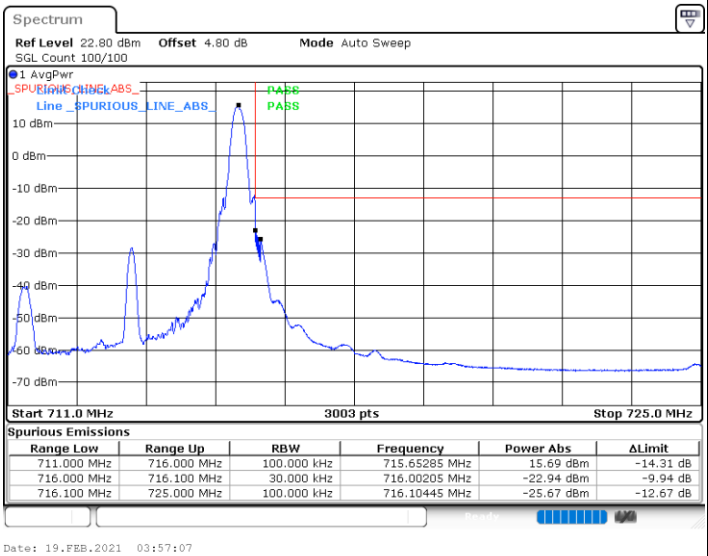
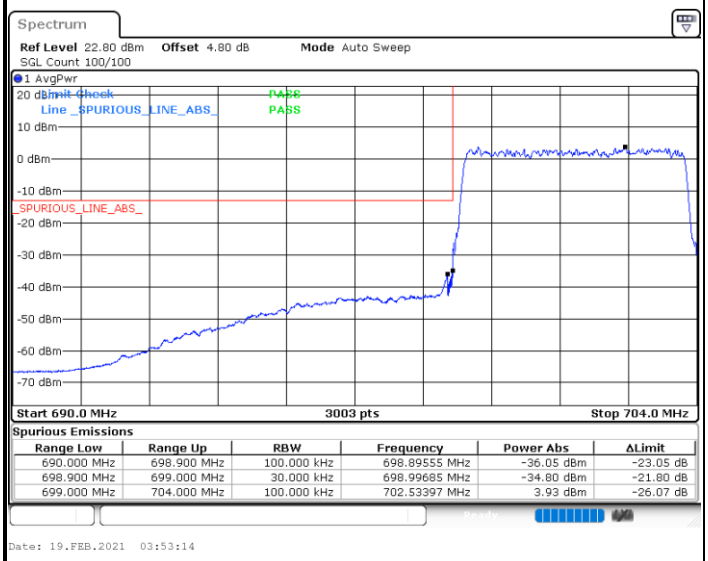
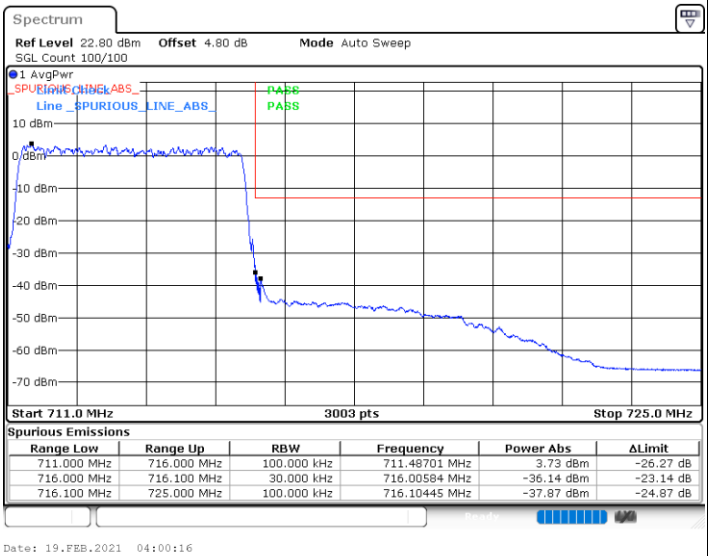
Spurious Emissions

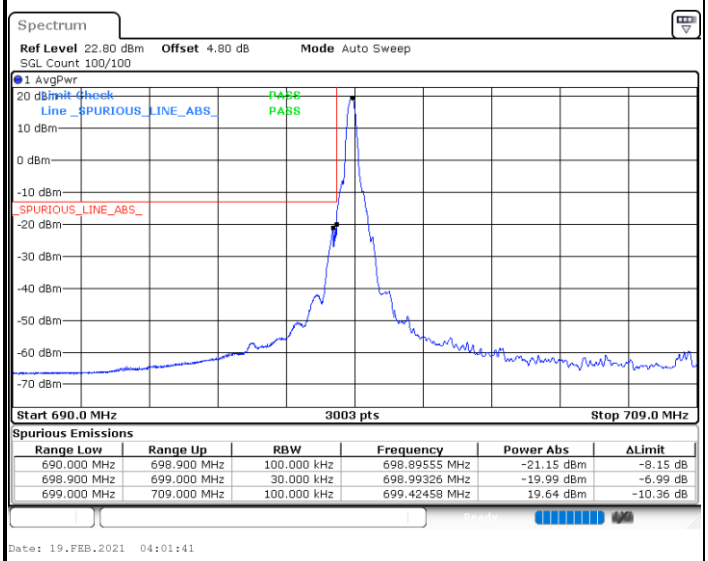
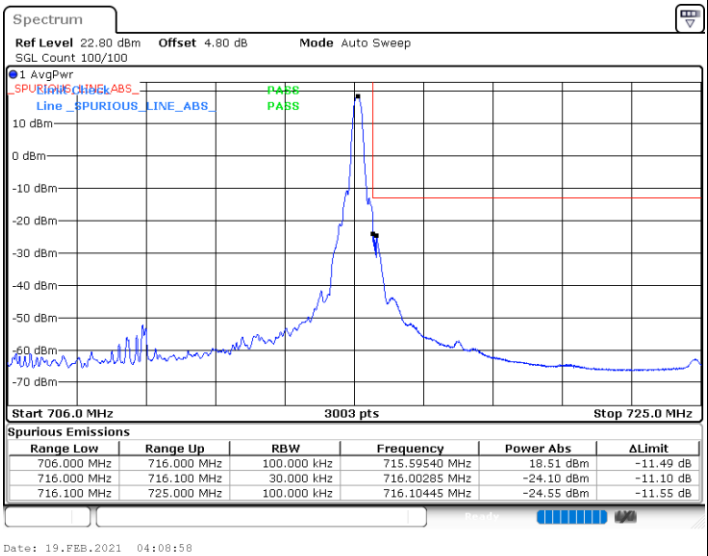
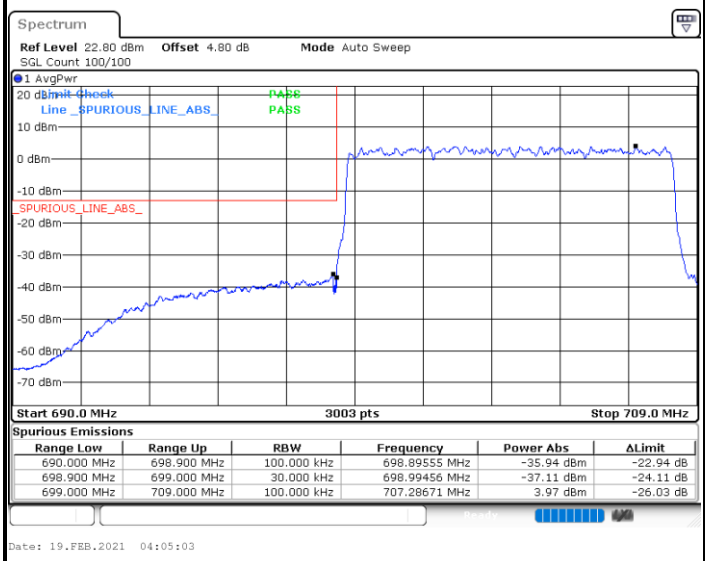
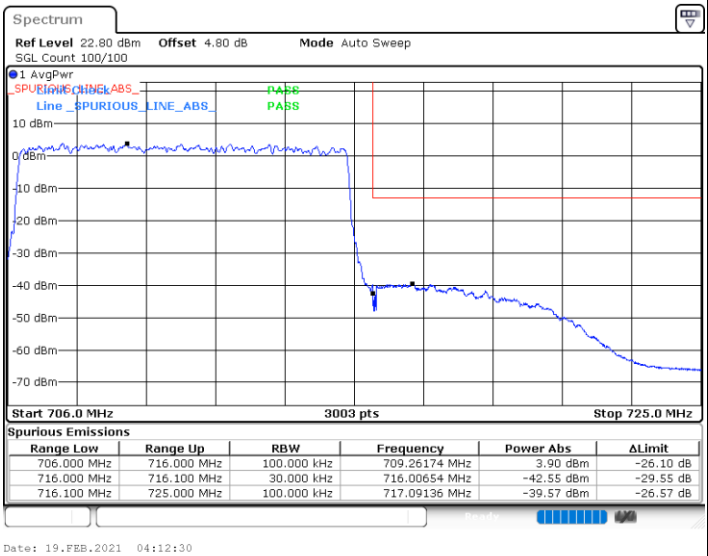
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
711.000 MHz	716.000 MHz	100.000 kHz	711.95155 MHz	6.70 dBm	-23.30 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00435 MHz	-32.45 dBm	-19.45 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-33.50 dBm	-20.50 dB

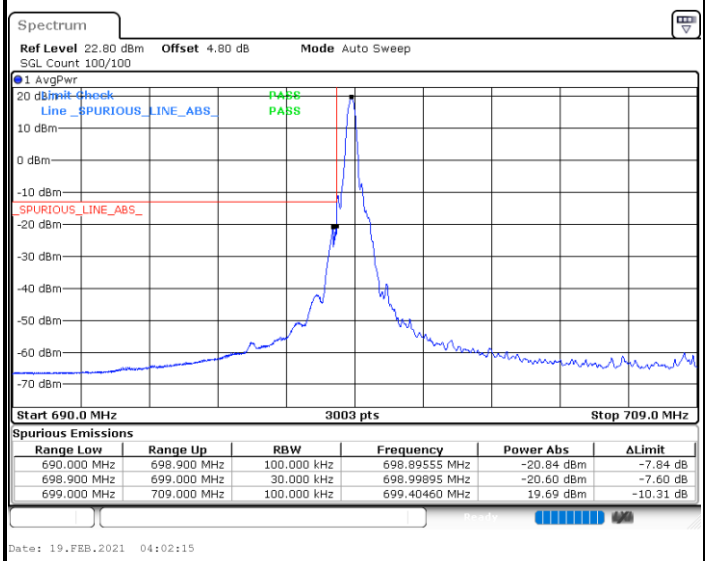
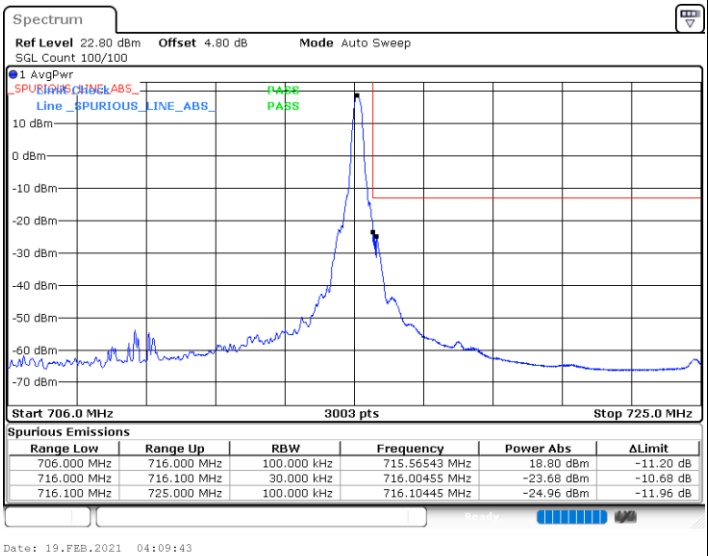
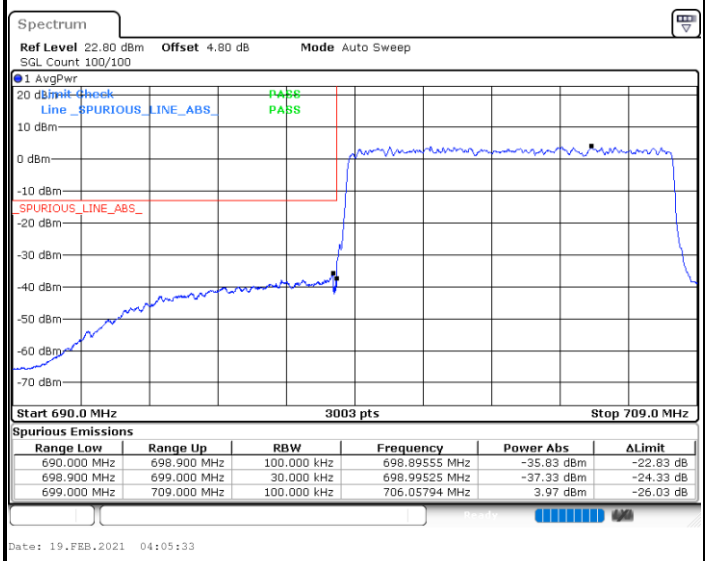
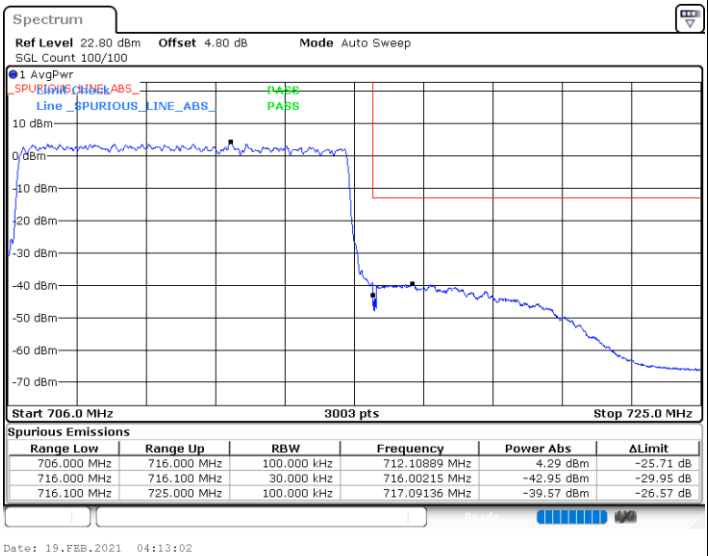
Date: 19.FEB.2021 03:58:25

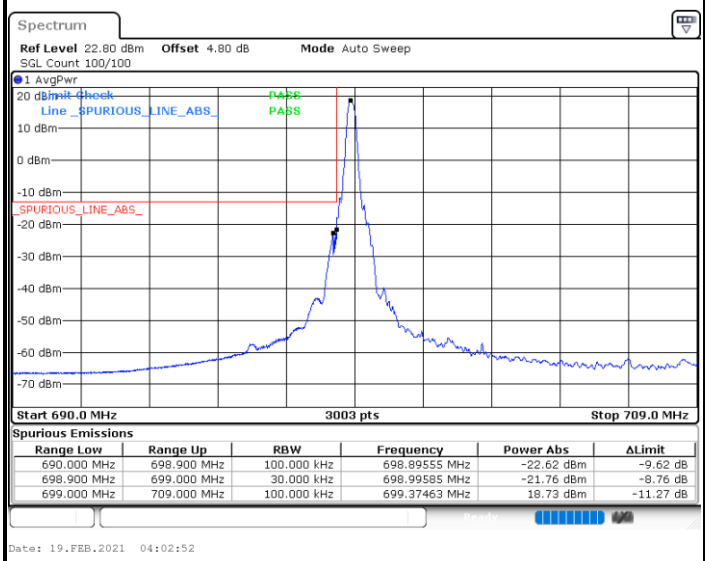
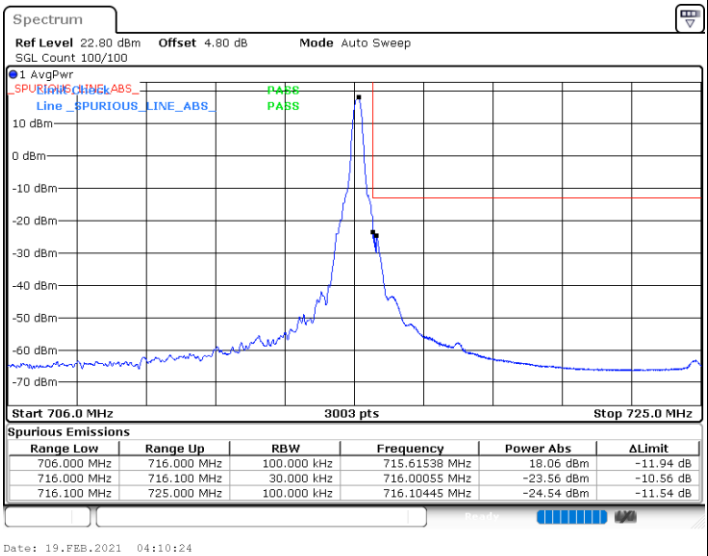
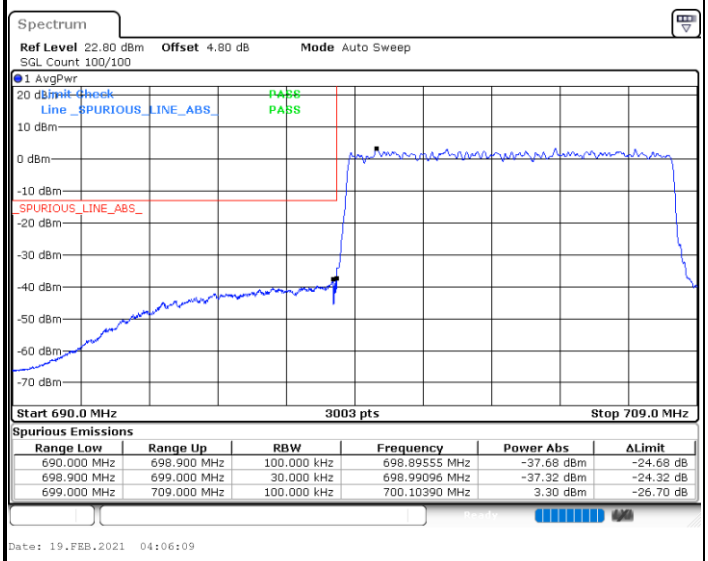
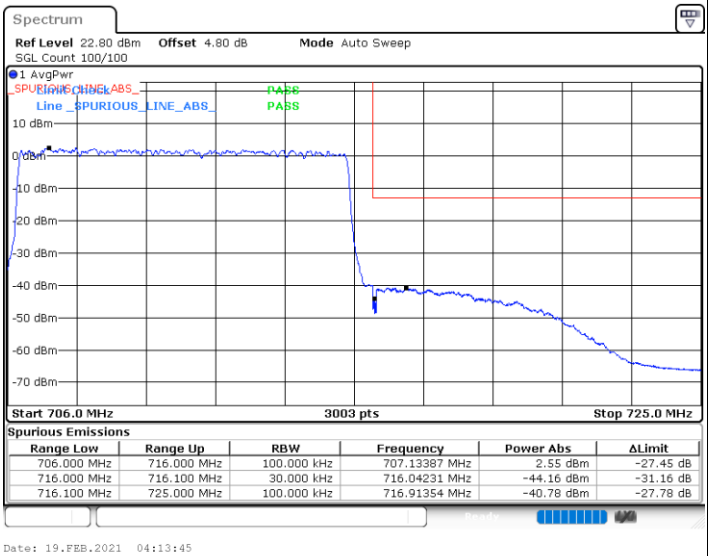
FR1 n12 / 5MHz / DFT-S OFDM / 16Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 5MHz / DFT-S OFDM / 64Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 5MHz / DFT-S OFDM / 256Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

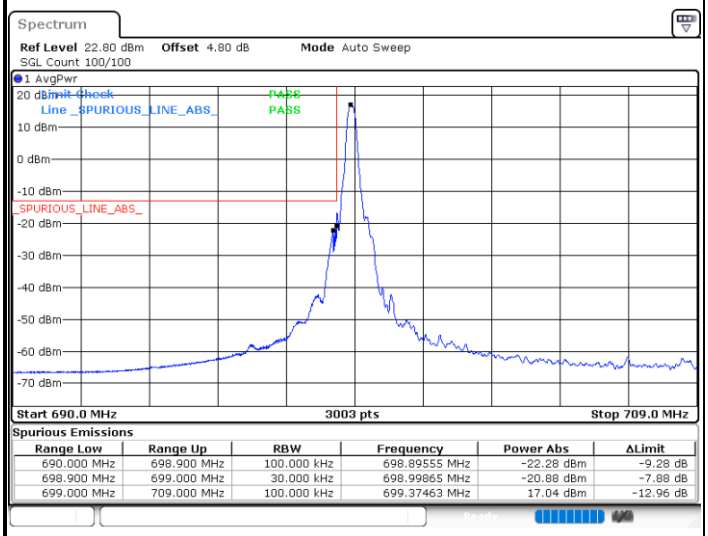
FR1 n12 / 10MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 10MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 10MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 10MHz / DFT-s-OFDM / 64QAM

Lowest Band Edge / 1RB0

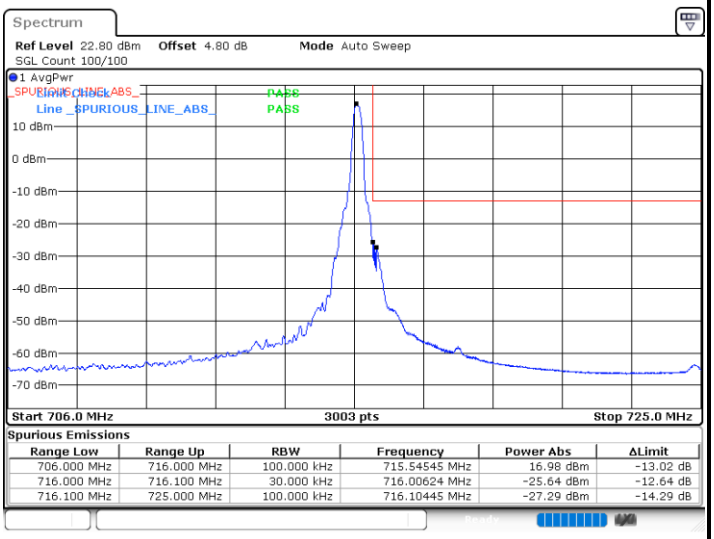


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-22.28 dBm	-9.28 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99865 MHz	-20.88 dBm	-7.88 dB
699.000 MHz	709.000 MHz	100.000 kHz	699.37463 MHz	17.04 dBm	-12.96 dB

Date: 19.FEB.2021 04:03:27

Highest Band Edge / 1RBmax

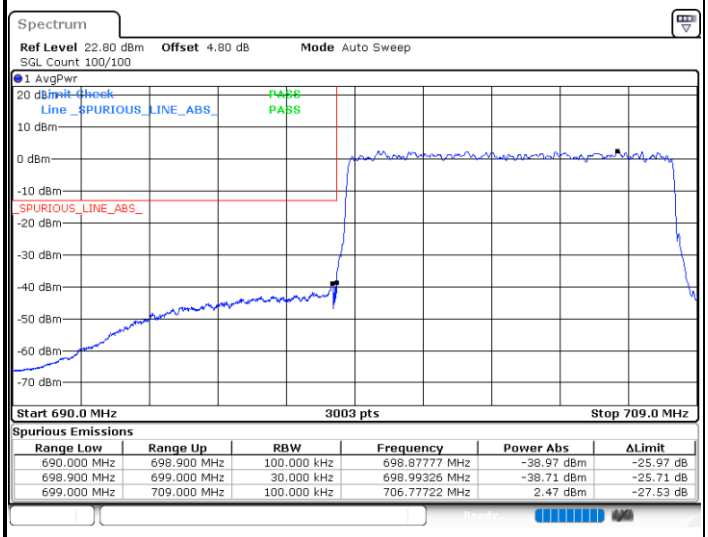


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
706.000 MHz	716.000 MHz	100.000 kHz	715.54545 MHz	16.98 dBm	-13.02 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00624 MHz	-25.64 dBm	-12.64 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-27.29 dBm	-14.29 dB

Date: 19.FEB.2021 04:10:59

Lowest Band Edge / Full RB

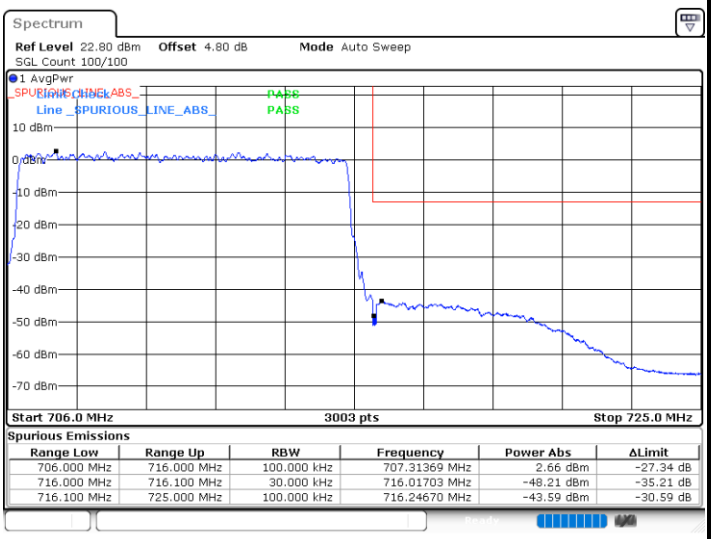


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.87777 MHz	-38.97 dBm	-25.97 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99326 MHz	-38.71 dBm	-25.71 dB
699.000 MHz	709.000 MHz	100.000 kHz	706.77722 MHz	2.47 dBm	-27.53 dB

Date: 19.FEB.2021 04:06:55

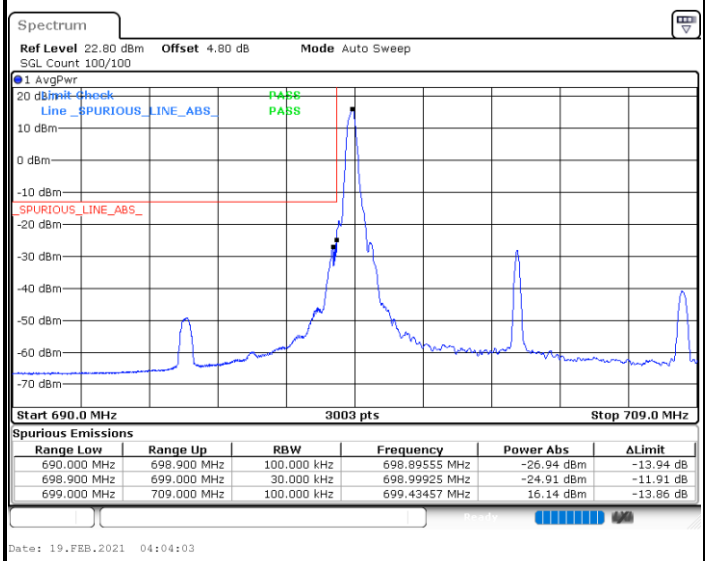
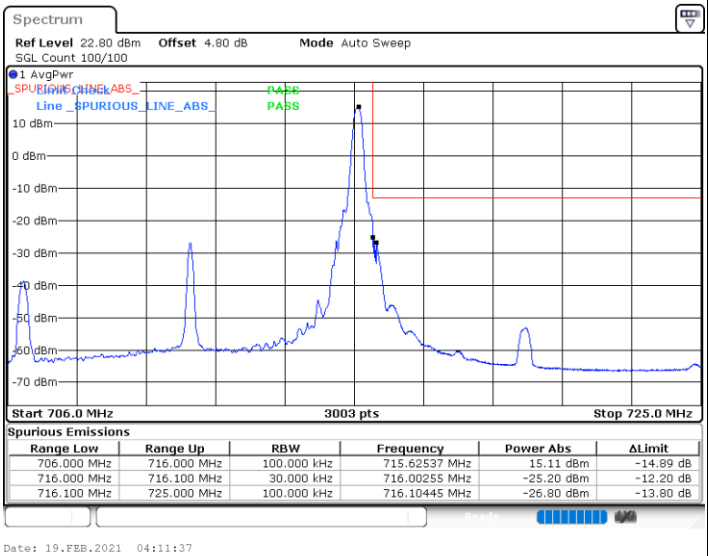
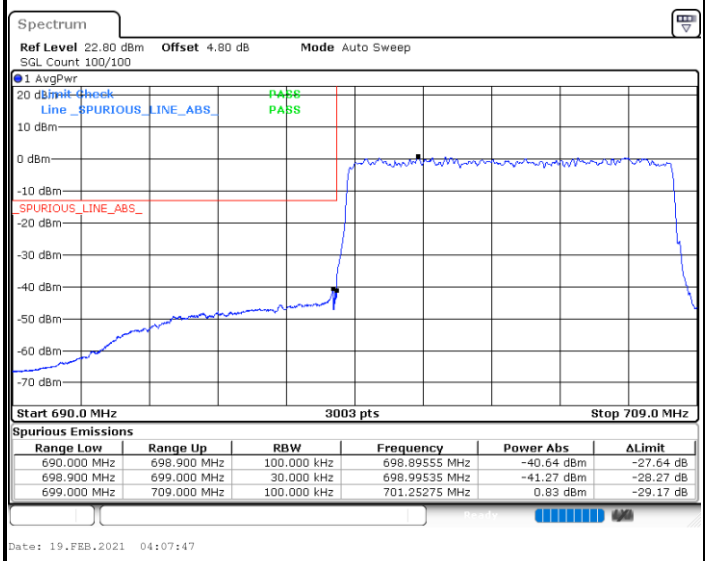
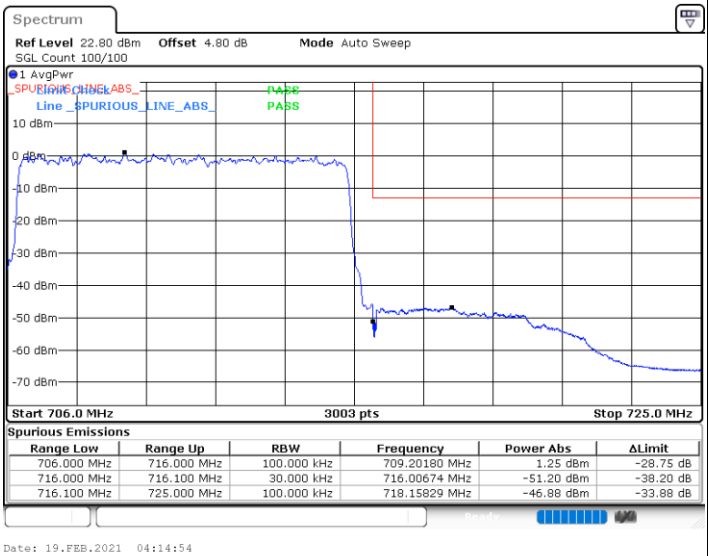
Highest Band Edge / Full RB

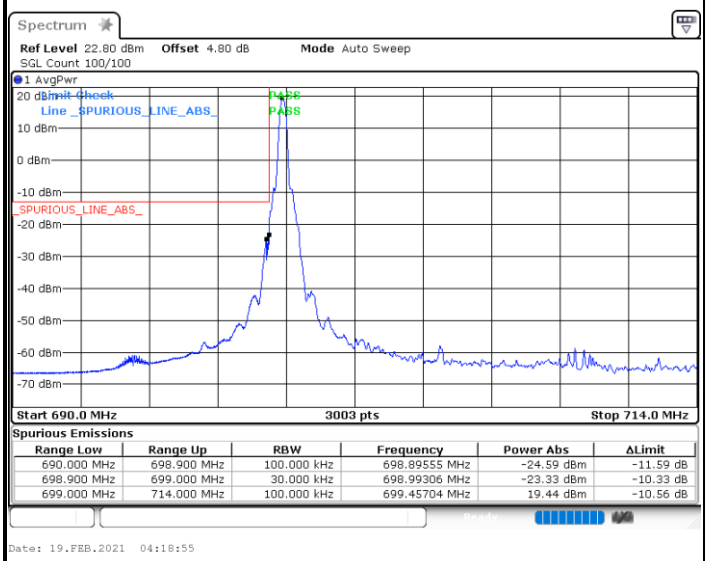
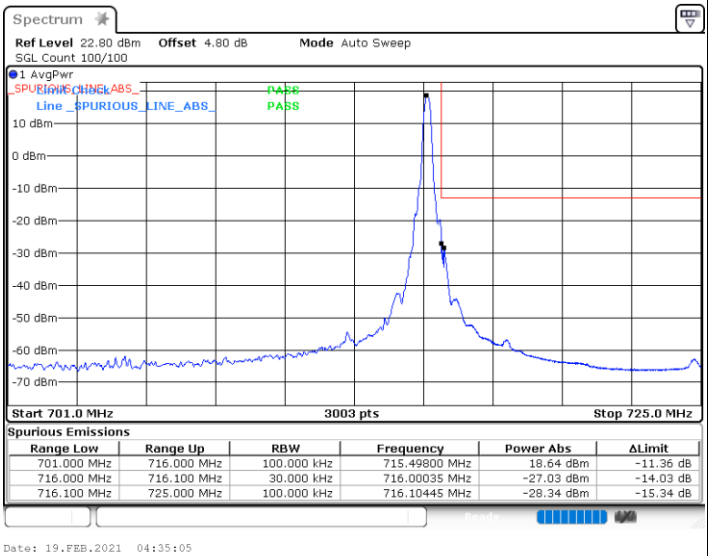
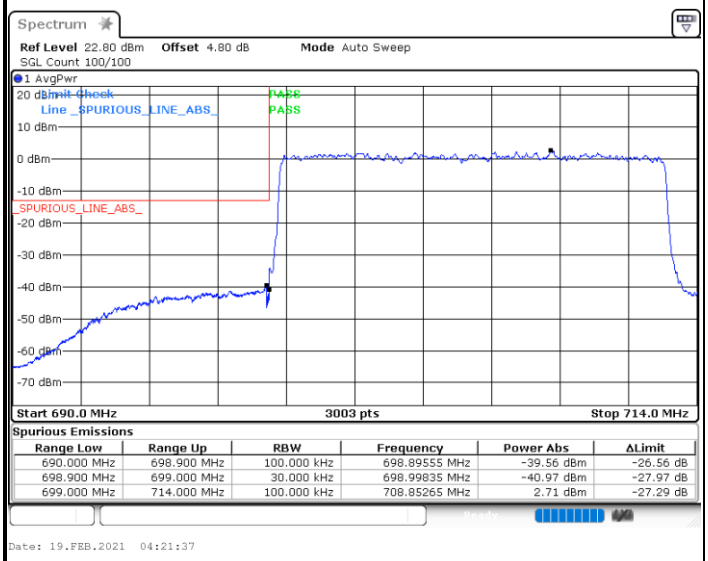
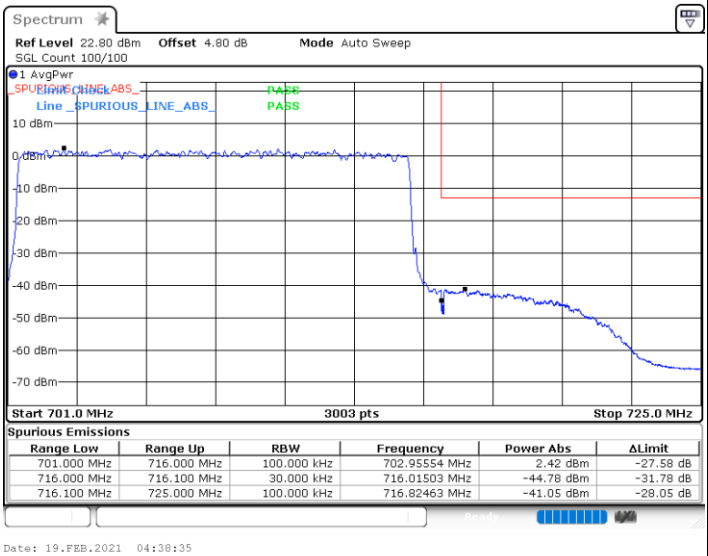


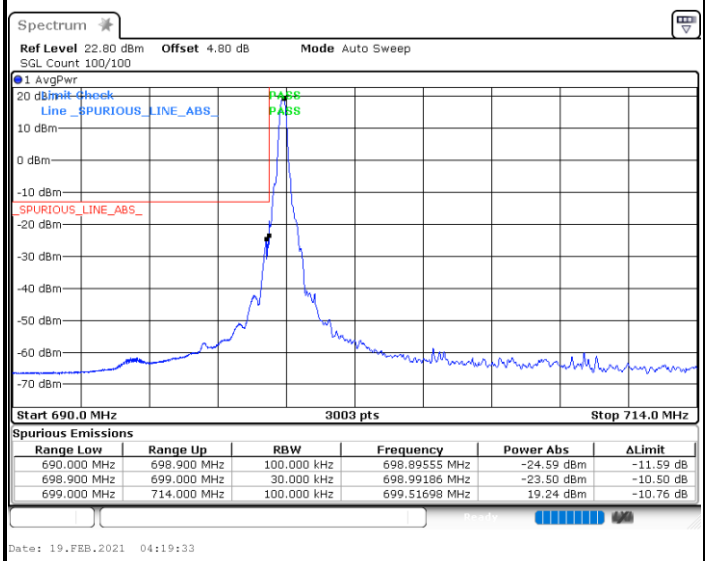
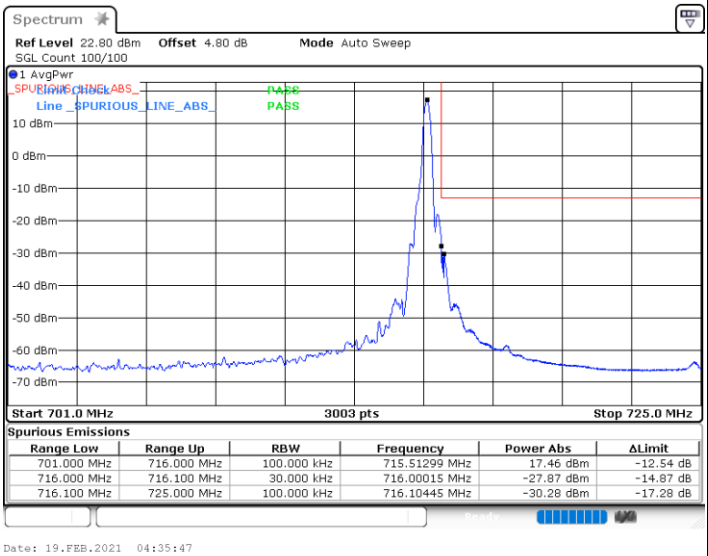
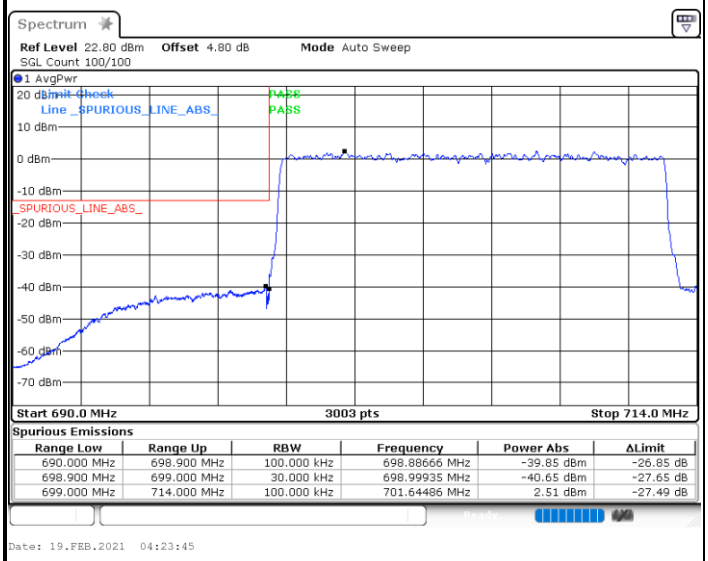
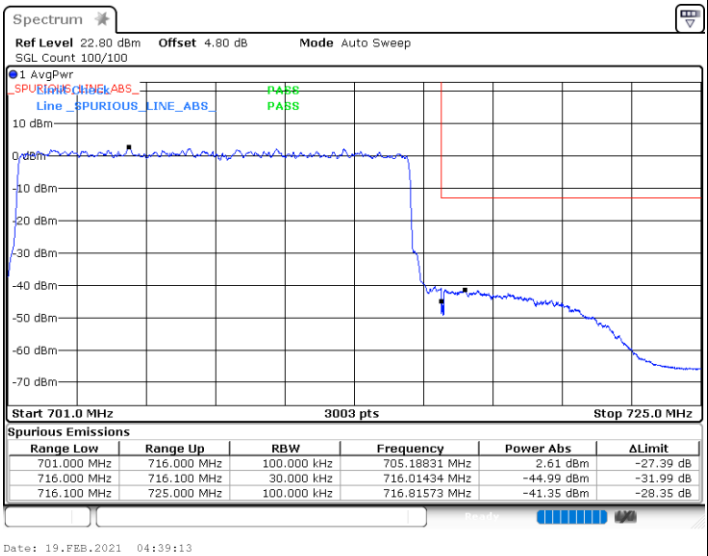
Spurious Emissions

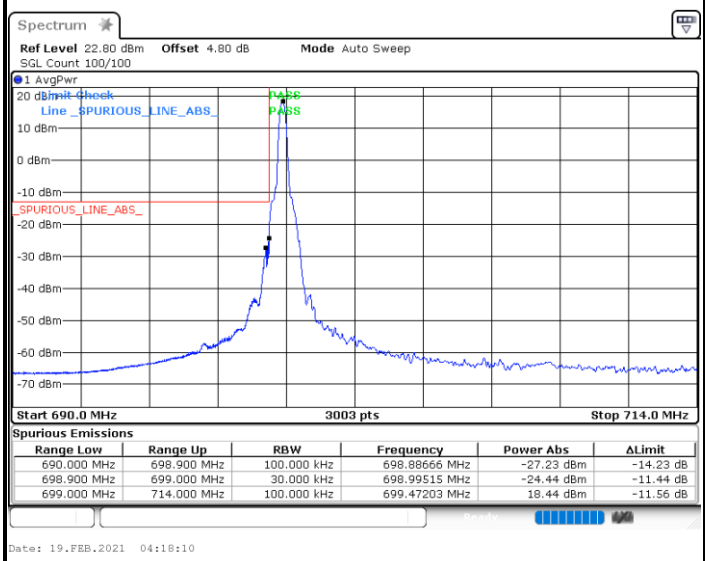
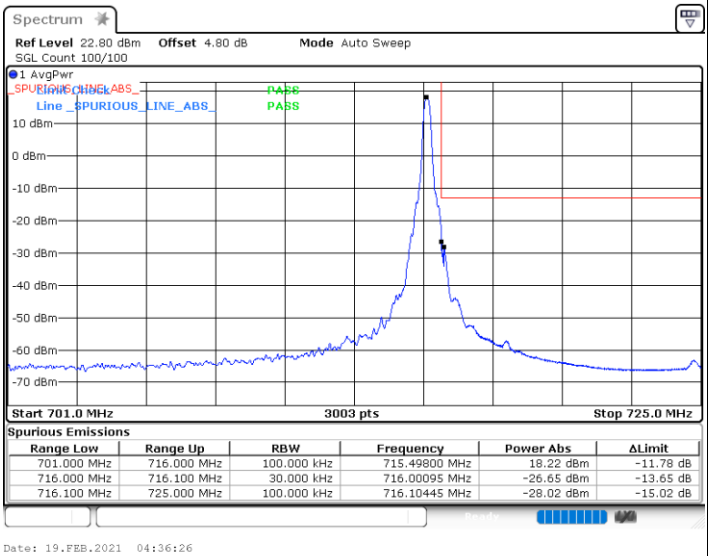
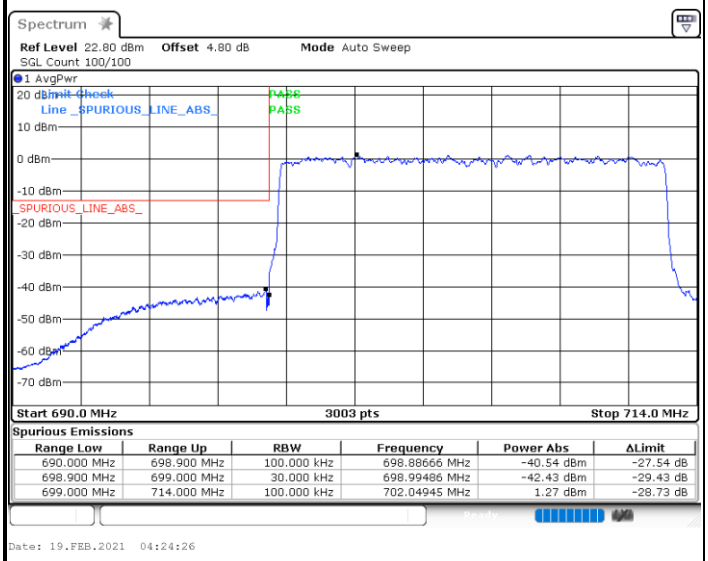
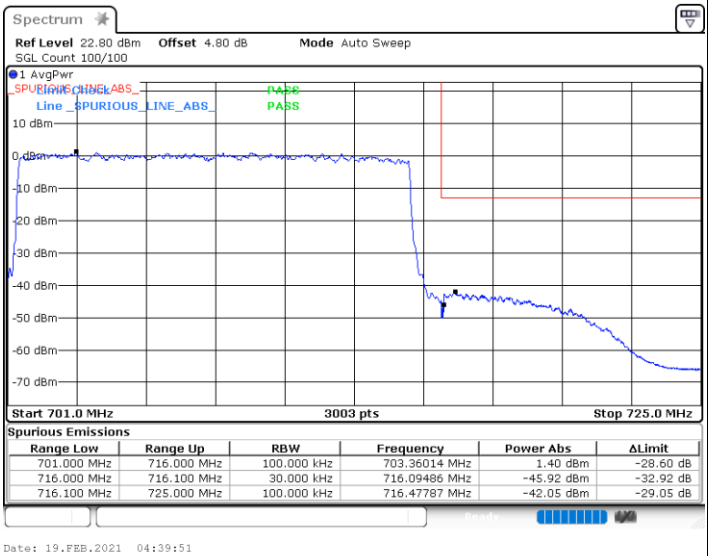
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
706.000 MHz	716.000 MHz	100.000 kHz	707.31369 MHz	2.66 dBm	-27.34 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.01703 MHz	-48.21 dBm	-35.21 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.24670 MHz	-43.59 dBm	-30.59 dB

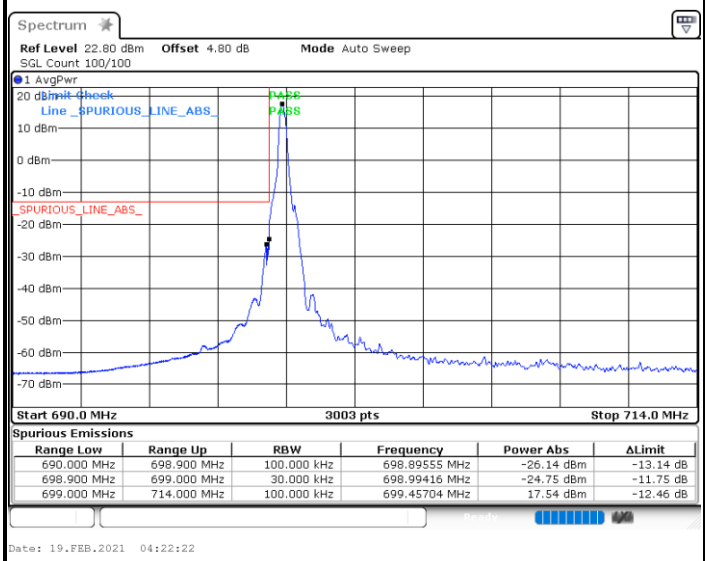
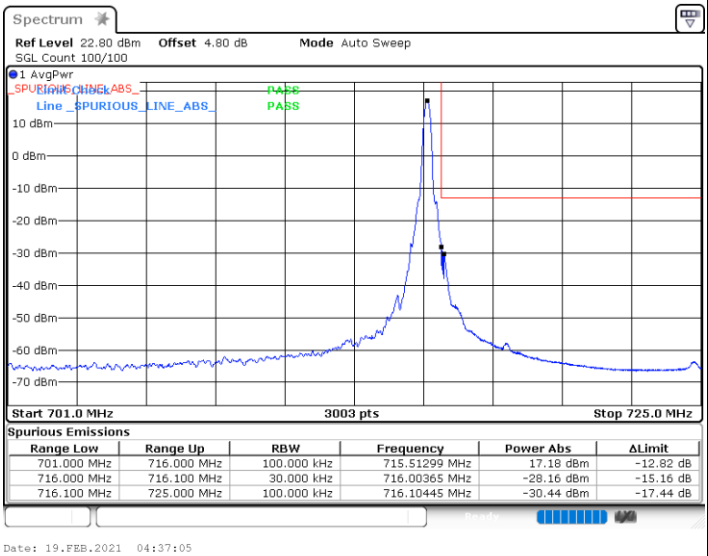
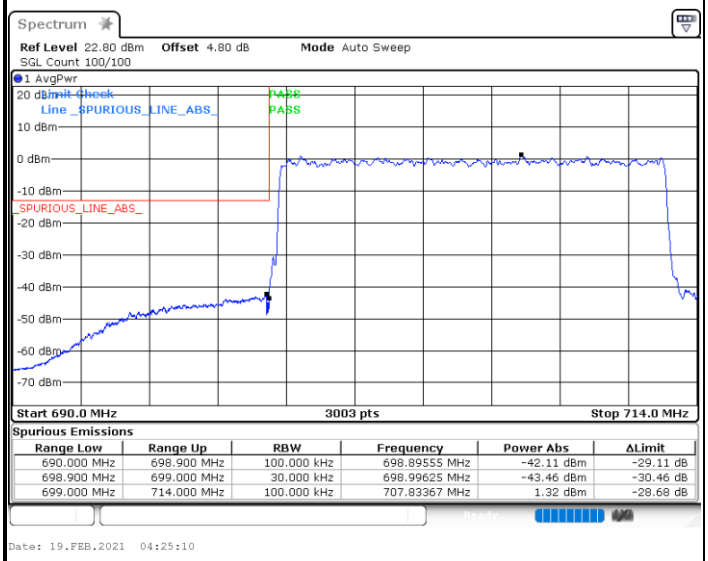
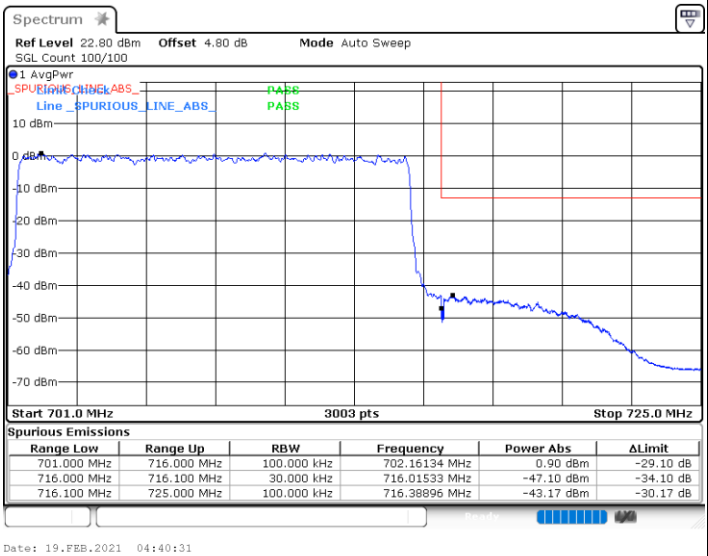
Date: 19.FEB.2021 04:14:19

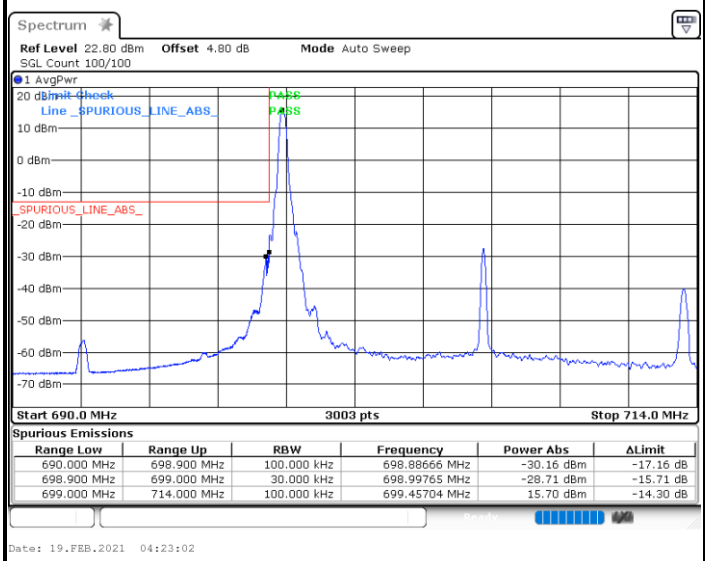
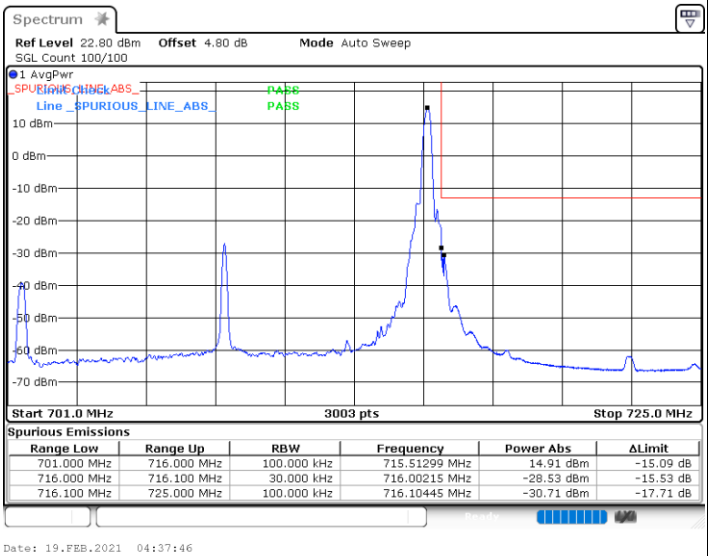
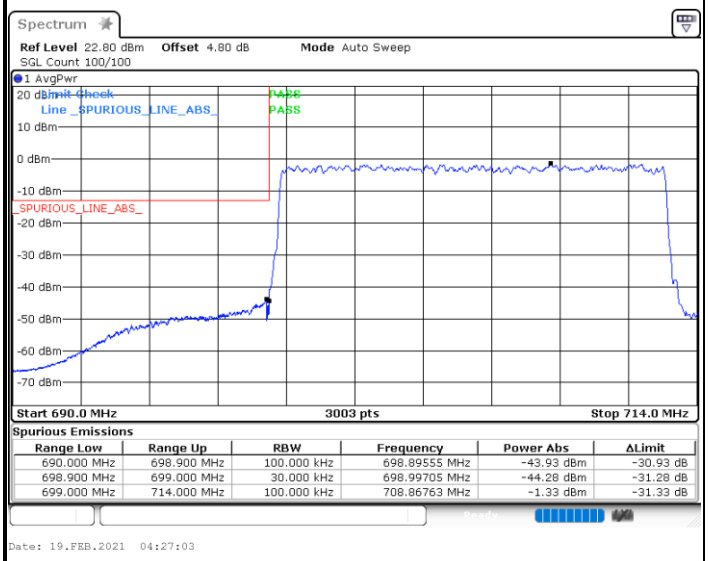
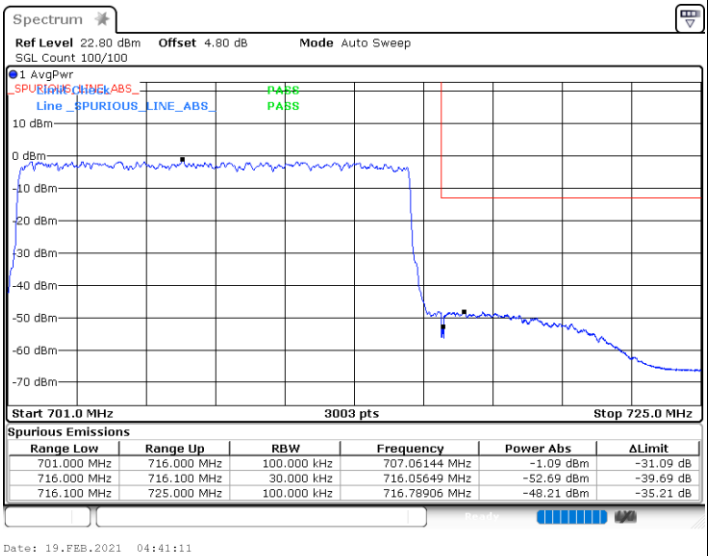
FR1 n12 / 10MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 15MHz / 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 n12 / 15MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 15MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

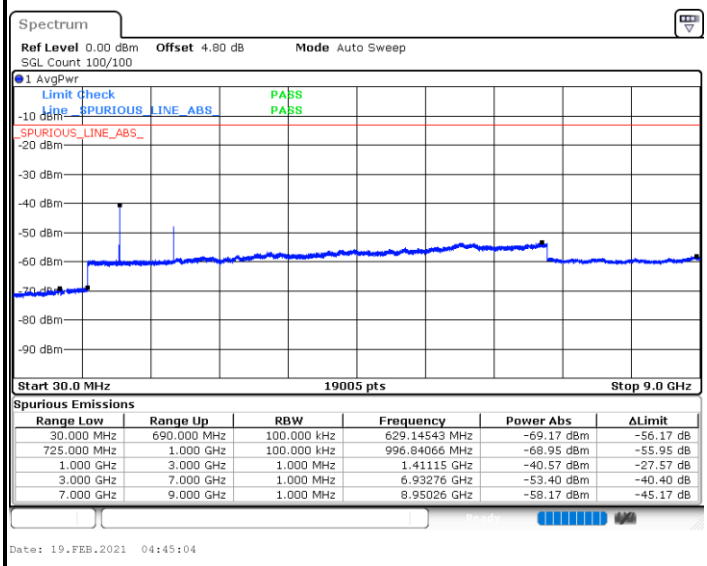
FR1 n12 / 15MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n12 / 15MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

Conducted Spurious Emission

FR1 n12 / 5MHz / DFT-S OFDM / QPSK

Lowest Channel / 1RB1



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	690.000 MHz	100.000 kHz	629.14543 MHz	-69.17 dBm	-56.17 dB
725.000 MHz	1.000 GHz	100.000 kHz	996.84066 MHz	-68.95 dBm	-55.95 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.41115 GHz	-40.57 dBm	-27.57 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.93276 GHz	-53.40 dBm	-40.40 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.95026 GHz	-58.17 dBm	-45.17 dB

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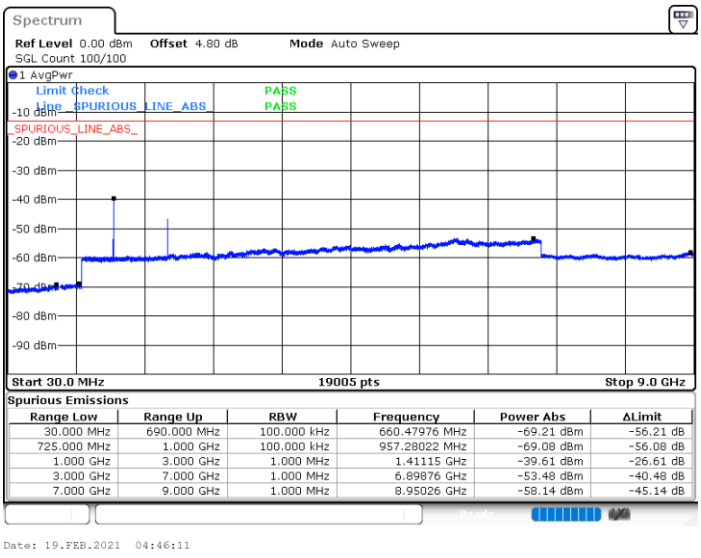
Middle Channel / 1RB1



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	690.000 MHz	100.000 kHz	660.47976 MHz	-69.21 dBm	-56.21 dB
725.000 MHz	1.000 GHz	100.000 kHz	957.28022 MHz	-69.08 dBm	-56.08 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.41115 GHz	-39.61 dBm	-26.61 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.89876 GHz	-53.48 dBm	-40.48 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.95026 GHz	-58.14 dBm	-45.14 dB

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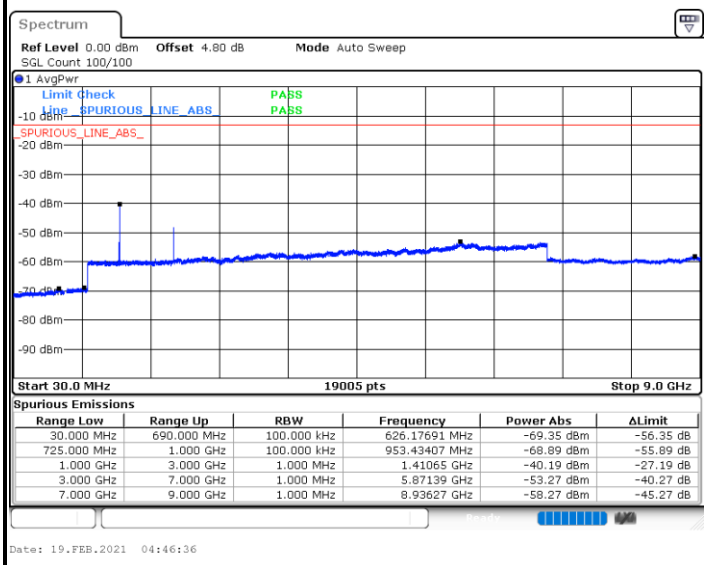
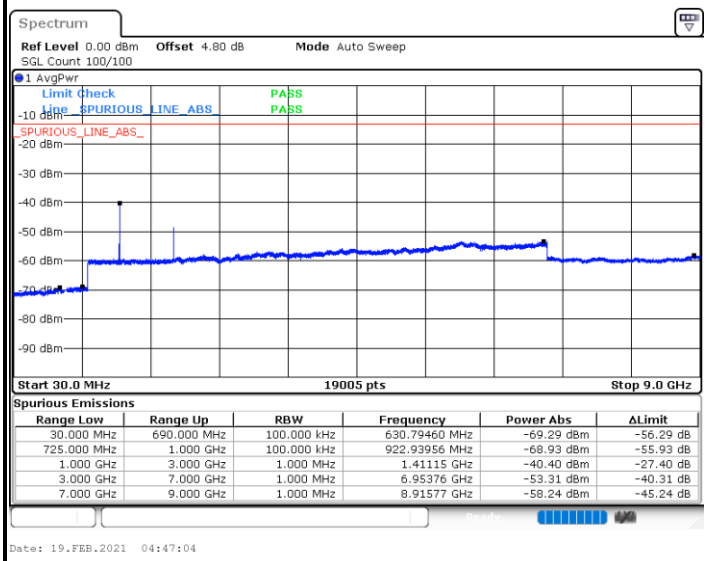
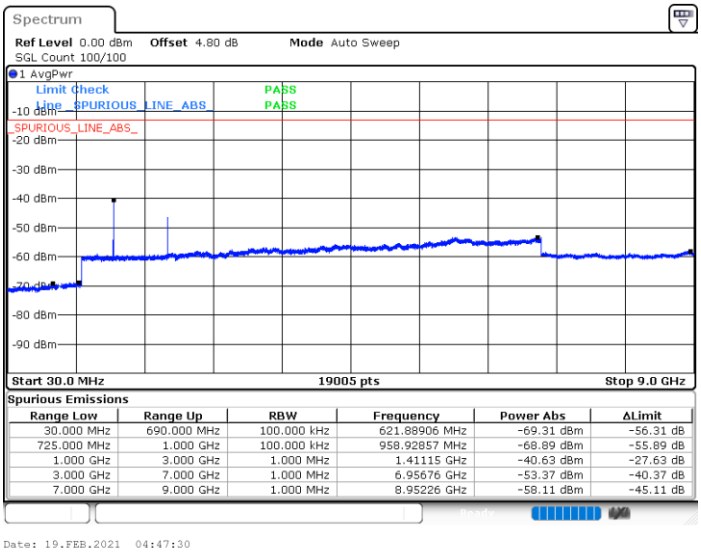
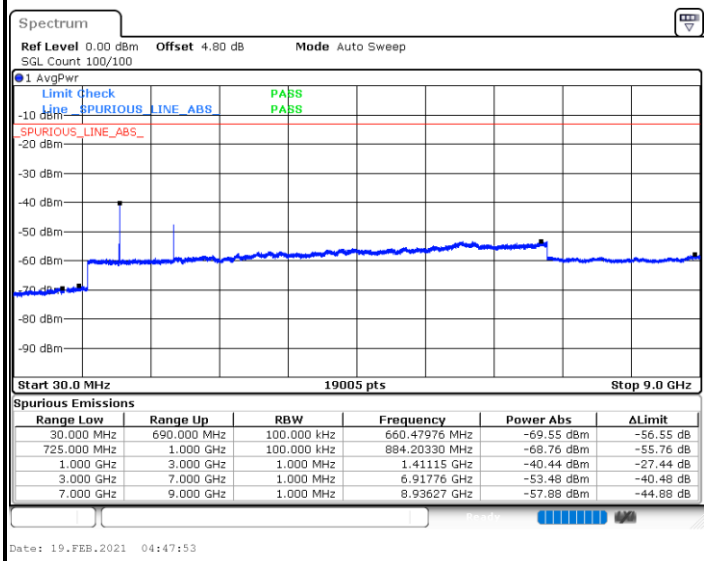
Highest Channel / 1RB1

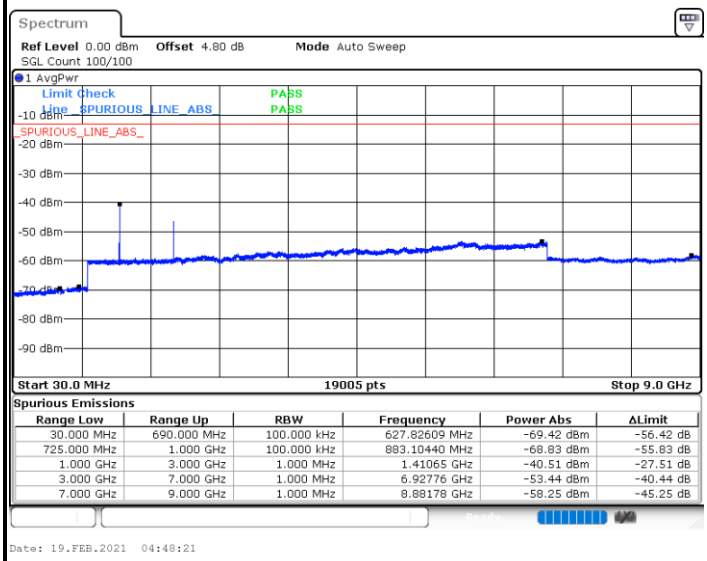
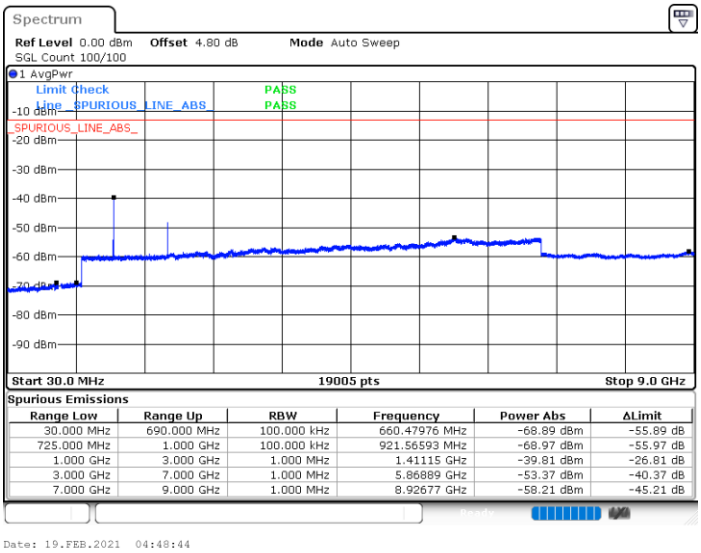
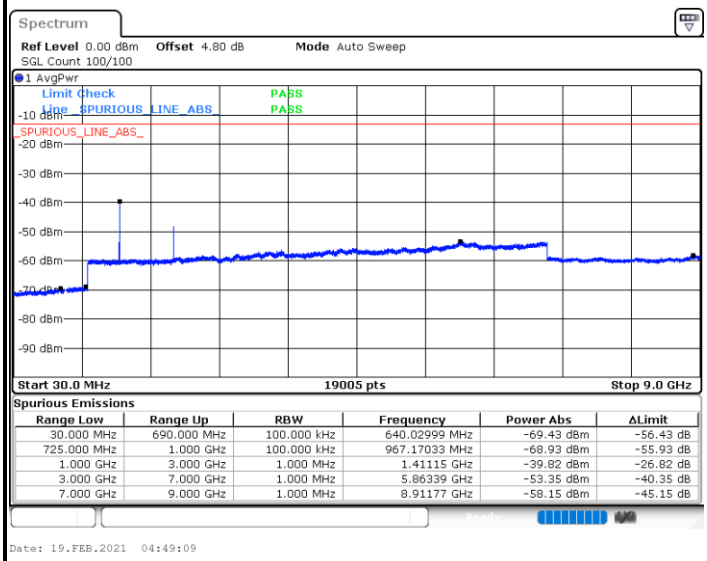


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	690.000 MHz	100.000 kHz	626.17691 MHz	-69.35 dBm	-56.35 dB
725.000 MHz	1.000 GHz	100.000 kHz	953.43407 MHz	-68.89 dBm	-55.89 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.41065 GHz	-40.19 dBm	-27.19 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.87139 GHz	-53.27 dBm	-40.27 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.93627 GHz	-58.27 dBm	-45.27 dB

Date: 19.FEB.2021 04:46:36

FR1 n12 / 10MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

FR1 n12 / 15MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

Frequency Stability

Test Conditions		FR1 n12 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 20MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0083	PASS
40	Normal Voltage	0.0035	
30	Normal Voltage	0.0068	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0001	
0	Normal Voltage	0.0073	
-10	Normal Voltage	0.0017	
-20	Normal Voltage	0.0079	
-30	Normal Voltage	0.0057	
20	Maximum Voltage	0.0088	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0099	

Note:

1. Normal Voltage =3.87 V.；Battery End Point (BEP) =3.40 V.；Maximum Voltage =4.45 V.

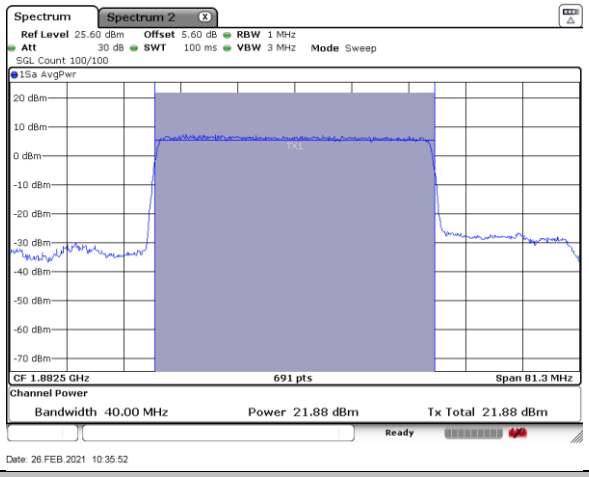
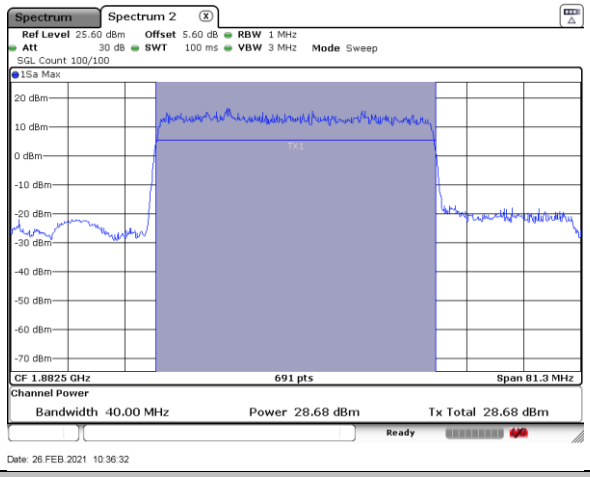
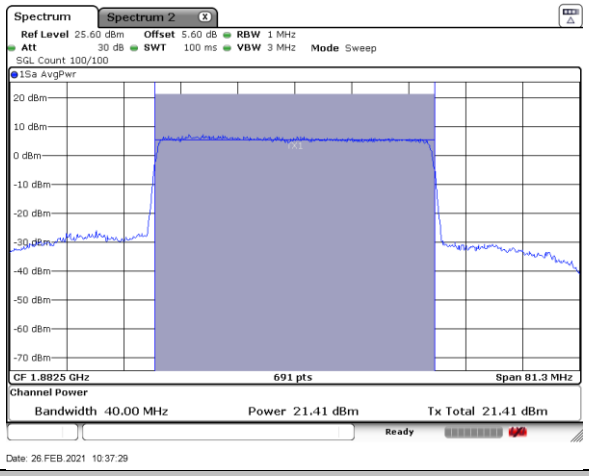
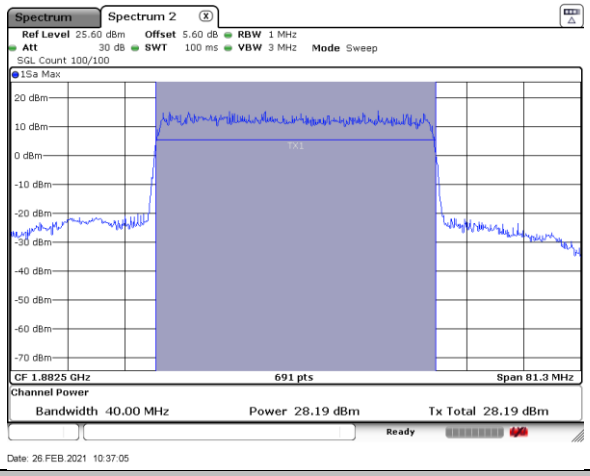
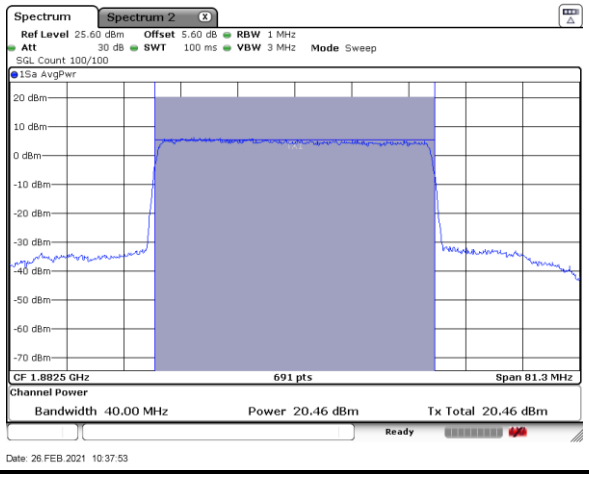
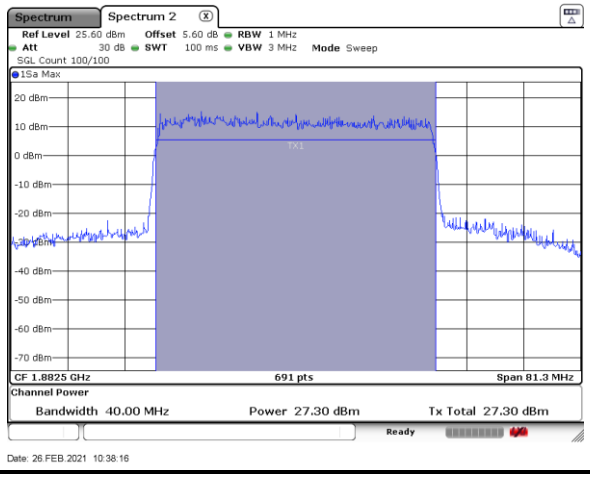
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

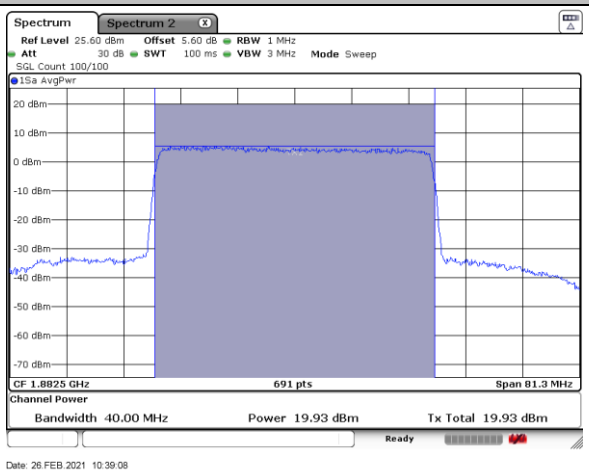
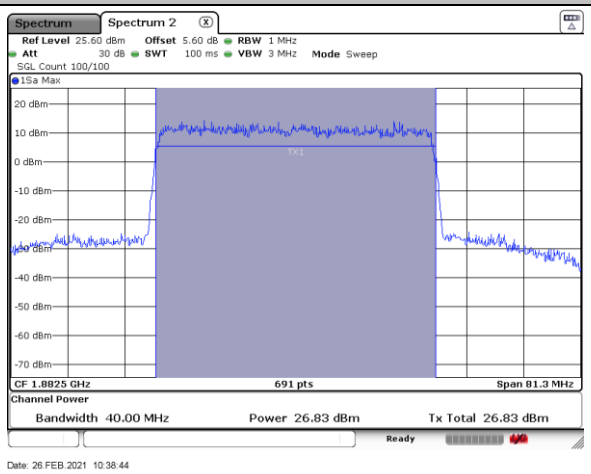
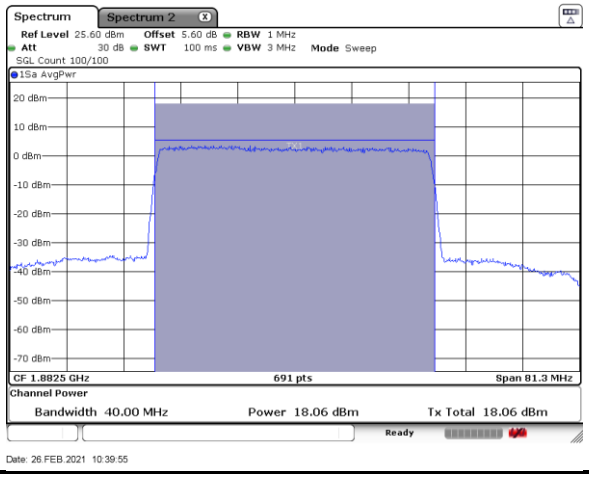
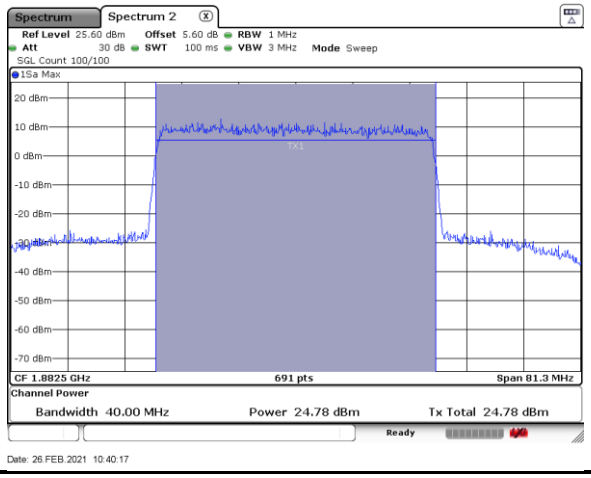
FR1 n25

SA

Peak-to-Average Ratio

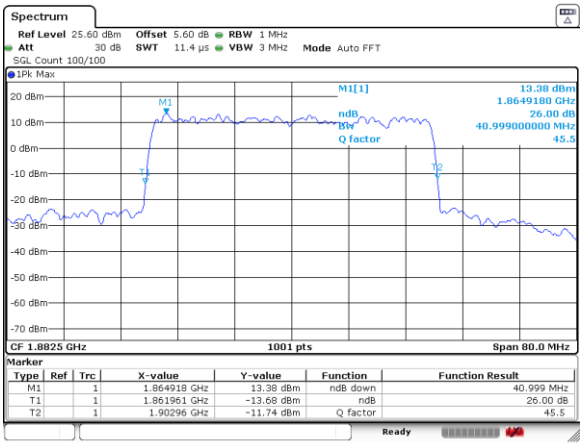
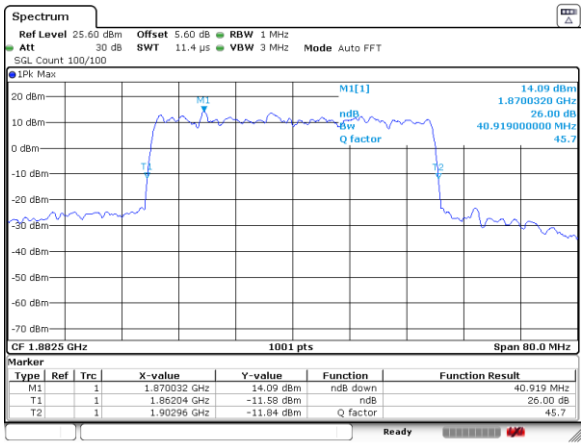
Mode	FR1 n25 / 20MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
					PASS
Middle CH	6.8	7.5	6.84	6.9	
Mode	FR1 n25 / 20MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
					PASS
Middle CH	6.72				

Middle Channel / Full RB	Middle Channel / Full RB
BPSK-A	**BPSK-P**
	
QPSK-A	**QPSK-P**
	
16QAM-A	**16QAM-P**
	

64QAM-A	64QAM-P
	
256QAM-A	**256QAM-P**
	

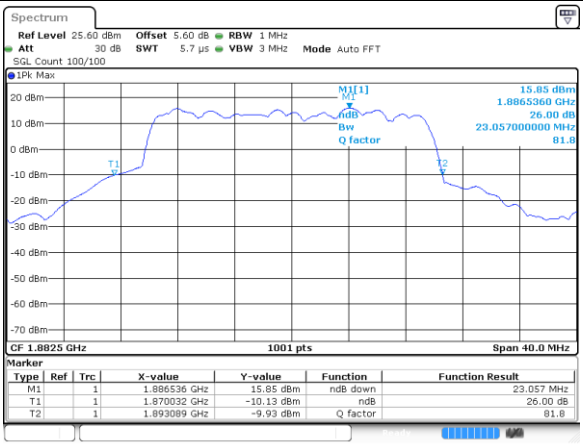
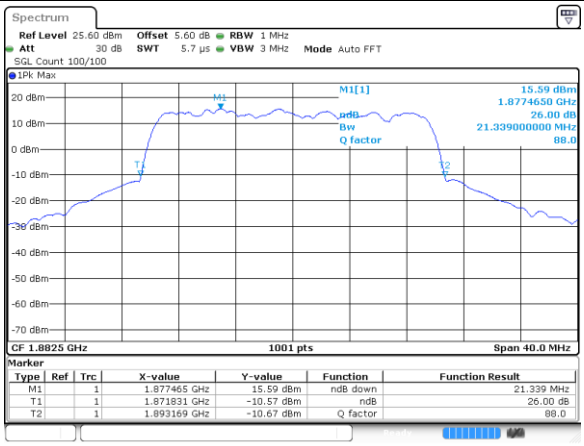
26dB Bandwidth

Mode	FR1 n25 : 26dB BW(MHz) / DFT-S OFDM							
BW	40MHz							
Mod.	QPSK	16QAM						
Middle CH	41.00	40.92						

QPSK	16QAM
	

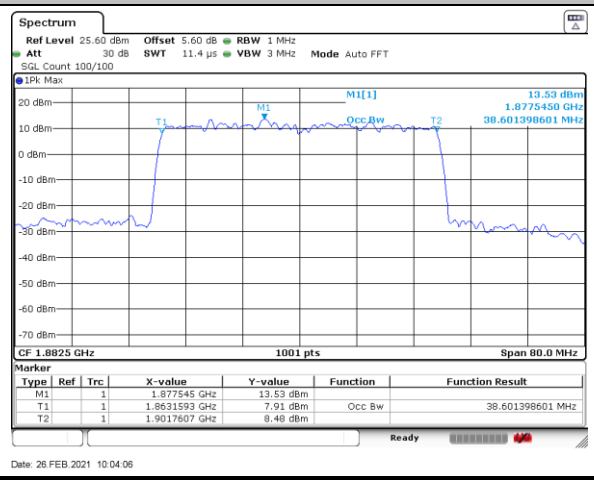
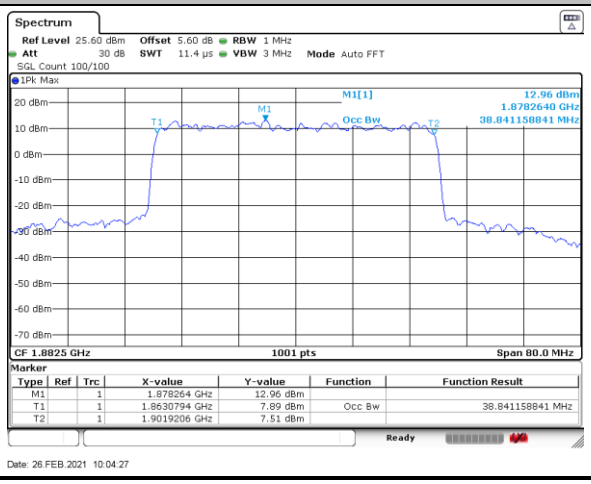
26dB Bandwidth

Mode	FR1 n25 : 26dB BW(MHz) / DFT-S OFDM							
BW	20MHz							
Mod.	QPSK	16QAM						
Middle CH	23.06	21.34						

QPSK	16QAM
	

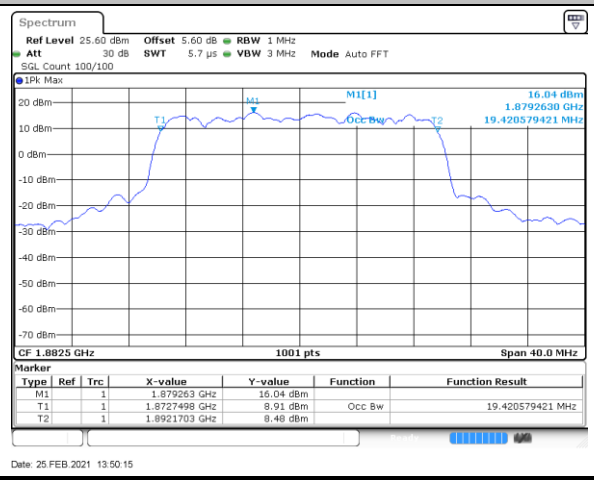
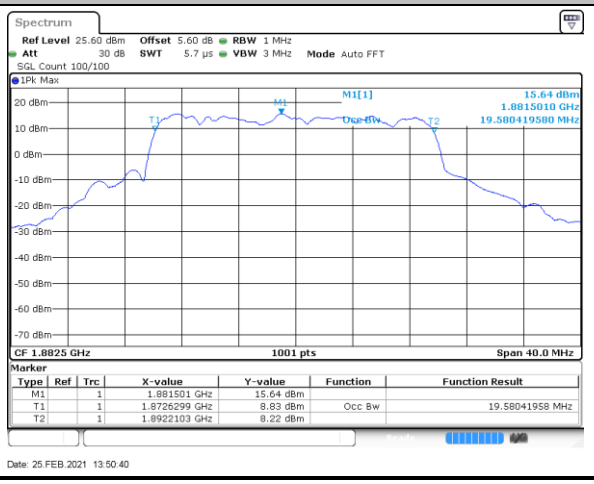
Occupied Bandwidth

Mode	FR1 n25 99%OBW(MHz) / DFT-S OFDM							
BW	40MHz							
Mod.	QPSK	16QAM						
Middle CH	38.60	38.84						

QPSK	16QAM
	

Occupied Bandwidth

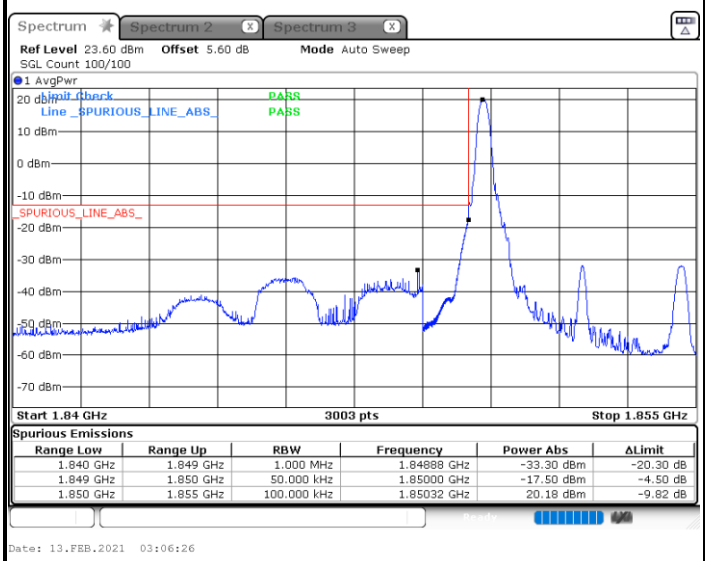
Mode	FR1 n25 99%OBW(MHz) / DFT-S OFDM							
BW	20MHz							
Mod.	QPSK	16QAM						
Middle CH	19.42	19.58						

QPSK	16QAM
	

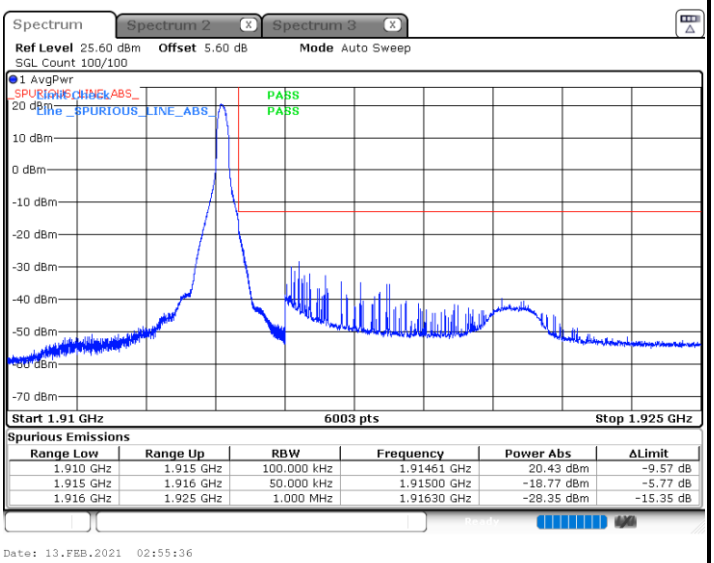
Conducted Band Edge

FR1 n25 / 5MHz / DFT-S OFDM / PI/2 BPSK

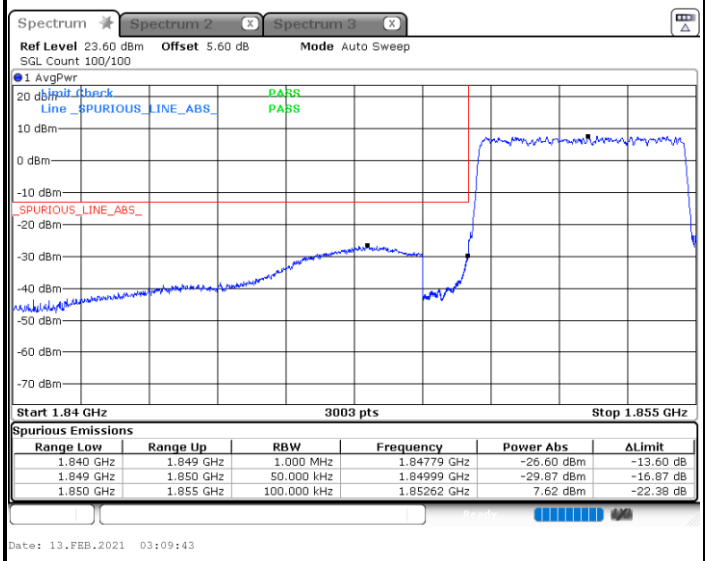
Lowest Band Edge / 1RB0



Highest Band Edge / 1RBMAX



Lowest Band Edge / Full RB



Highest Band Edge / Full RB