FCC RF Test Report

APPLICANT	: FairPhone B.V.
EQUIPMENT	: Fairphone 4 5G
BRAND NAME	: FAIRPHONE
MODEL NAME	: FP4
FCC ID	: 2AUWUFP4
STANDARD	: 47 CFR Part 2, 22, 27
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	: Mar. 03, 2022 ~ Mar. 16, 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.

Reviewed by: Jason Jia / Supervisor

Approved by: Alex Wang / Manager

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
FG152403-02C	Rev. 01	Initial issue of report	Apr. 08, 2022

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(c)(10)	Effective Radiated Power (5G NR n71)	ERP < 3 Watt		
	§27.50(j)(3)	Equivalent Isotropic Radiated Power (5G NR n77, n78)	EIRP < 1Watt		
3.5	§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) §27.53(g) §27.53(l)(2)	Conducted Band Edge Measurement (5G NR n5) (5G NR n71) (5G NR n77, n78)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §27.53(g) §27.53(l)(2)	Conducted Spurious Emission (5G NR n5) (5G NR n71) (5G NR n77, n78)	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a) §27.53(g) §27.53(l)(2)	Radiated Spurious Emission (5G NR n5) (5G NR n71) (5G NR n77, n78)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 24.87 dB at 11112.000 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

FairPhone B.V.
Van Diemenstraat 200, 1013 CP, Amsterdam, The Netherlands

1.2 Manufacturer

FairPhone B.V.
Van Diemenstraat 200, 1013 CP, Amsterdam, The Netherlands

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Fairphone 4 5G
Brand Name	FAIRPHONE
Model Name	FP4
FCC ID	2AUWUFP4
IMEI Code	Conducted : 355870090016858/355870090016863 Radiation : 355870090012078/355870090012086
HW Version	1.0
SW Version	FP4.FC1G.A.017-userdebug.20210804
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n5 : 824 MHz ~ 849 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77 : 3700 MHz ~ 3980 MHz 5G NR n78 : 3700 MHz ~ 3800 MHz
Rx Frequency	5G NR n5 : 869 MHz ~ 894 MHz 5G NR n71 : 617 MHz ~ 652 MHz 5G NR n77 : 3700 MHz ~ 3980 MHz 5G NR n78 : 3700 MHz ~ 3800 MHz
SCS	n5, n71: 15kHz n77, n78: 30kHz
Bandwidth	n5: 5MHz / 10MHz / 15MHz / 20MHz n71: 5MHz / 10MHz / 15MHz / 20MHz n77 : 20MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz n78 : 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz
Antenna Gain	**<Ant. 0>** n5 : -2.55 dBi n71 : -5.53 dBi

	<Ant. 4> n77/n78 : 0.00 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. 5G NR n5/n71/n77/n78 support SA & NSA mode. The whole testing has assessed by referring to the higher conducted power for conducted test items.
2. For NSA mode of all EN-DC combination, we only show the combination of the maximum power among all NSA combinations in the report.
3. The EN-DC mode combination: DC_7A_n5A, DC_2A_n71A, DC_7A_n71A, DC_7A_n77A, DC_7A_n78A, DC_41A_n78A, DC_38A_n78A.
4. The device supports HPUE mode for 5G NR n78.
5. The device supports n77/n78 SRS resources on ant. 7, only the test data of worst ant.4 is showed in the report according to the maximum power.

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power and Emission Designator

5G NR n5 (EN DC_7A-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	0.0750	19M4G7D	0.0643	19M1W7D
5G NR n71 (EN DC_7A-n71A)		**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	0.0393	19M5G7D	0.0329	19M5W7D
5G NR n77 SA		**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	3750.00 ~ 3930.00	0.2333	97M7G7D	0.1750	97M7W7D
5G NR n78 SA		**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	3750.00	0.4875	97M5G7D	0.3119	96M9W7D

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

1.7 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

1.8 Test Software

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

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, 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.

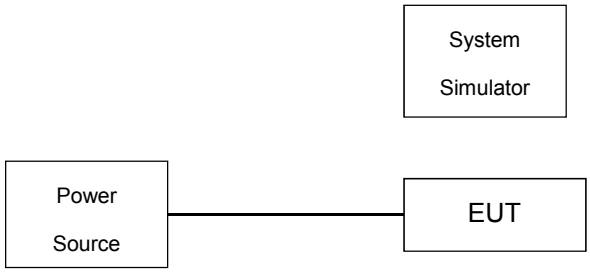
For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z and accessory configurations. The worst-cases (Y Plane with adapter) were recorded in this report.

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.

Test Items	5G NR	Bandwidth (MHz)							Modulation					RB #		Test Channel		
		5	10	15	20	30	40-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M	H
Max. Output Power	n5	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
	n77	-	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v
	n78	-	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	n5				v	-	-	-	v	v	v	v	v		v		v	
	n71				v	-	-	-	v	v	v	v	v		v		v	
	n77	-	-	-		-		v	v	v	v	v	v		v		v	
	n78	-	-	-				v	v	v	v	v	v		v		v	
26dB and 99% Bandwidth	n5				v	-	-	-		v	v				v		v	
	n71				v	-	-	-		v	v				v		v	
	n77	-	-	-		-		v		v	v				v		v	
	n78	-	-	-				v		v	v				v		v	
Conducted Band Edge	n5	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
	n77	-	-	-	v	-	v	v	v	v	v	v	v	v	v	v		v
	n78	-	-	-	v	v	v	v	v	v	v	v	v	v	v	v		v

Test Items	Band	Bandwidth (MHz)							Modulation					RB #		Test Channel		
		5	10	15	20	30	40-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M	H
Conducted Spurious Emission	n5	v	v	v	v	-	-	-		v				v		v	v	v
	n71	v	v	v	v	-	-	-		v				v		v	v	v
	n77	-	-	-	v	-	v	v		v				v		v	v	v
	n78	-	-	-	v	v	v	v		v				v		v	v	v
Frequency Stability	n5				v	-	-	-		v					v		v	
	n71				v	-	-	-		v					v		v	
	n77	-	-	-	v	-				v					v		v	
	n78	-	-	-	v										v		v	
E.R.P / E.I.R.P	n5	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
	n77	-	-	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v
	n78	-	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n5	Worst Case															v	
	n71	Worst Case															v	
	n77	Worst Case															v	
	n78	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. 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. 5. 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



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

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.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
3.	Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded,1.8m

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 and attenuator factor 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 4.6 dB.

Example :

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

= 4.6 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n5 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	175800	176300	176800
	Frequency	834	836.5	839
15	Channel	175300	176300	177300
	Frequency	831.5	836.5	841.5
10	Channel	174800	176300	177800
	Frequency	829	836.5	844
5	Channel	174300	176300	178300
	Frequency	826.5	836.5	846.5

5G NR n71 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	125400	126900	128400
	Frequency	673	680.5	688
15	Channel	124900	126900	128900
	Frequency	670.5	680.5	690.5
10	Channel	124400	126900	129400
	Frequency	668	680.5	693
5	Channel	123900	126900	129900
	Frequency	665.5	680.5	695.5

5G NR n77 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	650000	656000	662000
	Frequency	3750	3840	3930
90	Channel	649668	656000	662332
	Frequency	3745.02	3840	3934.98
80	Channel	649334	656000	662666
	Frequency	3740.01	3840	3939.99
70	Channel	649000	656000	663000
	Frequency	3735	3840	3945
60	Channel	648668	656000	663332
	Frequency	3730.02	3840	3949.98
50	Channel	648334	656000	663666
	Frequency	3725.01	3840	3954.99
40	Channel	648000	656000	664000
	Frequency	3720	3840	3960
20	Channel	647334	656000	664666
	Frequency	3710.01	3840	3969.99

5G NR n78 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel		650000	
	Frequency		3750	
90	Channel	649668	650000	650332
	Frequency	3745.02	3750	3754.98
80	Channel	649334	650000	650666
	Frequency	3740.01	3750	3759.99
70	Channel	649000	650000	651000
	Frequency	3735	3750	3765
60	Channel	648668	650000	651332
	Frequency	3730.02	3750	3769.98
50	Channel	648334	650000	651666
	Frequency	3725.01	3750	3774.99
40	Channel	648000	650000	652000
	Frequency	3720	3750	3780
30	Channel	647668	650000	652332
	Frequency	3715.02	3750	3784.98
20	Channel	647334	650000	652666
	Frequency	3710.01	3750	3789.99

3 Conducted Test Items

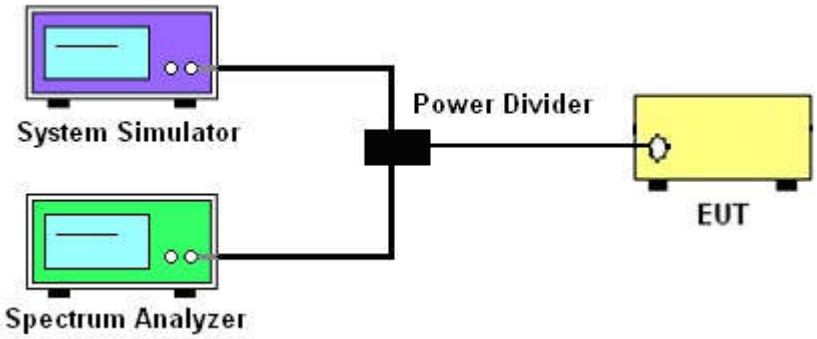
3.1 Measuring Instruments

See list of measuring instruments of this test report.

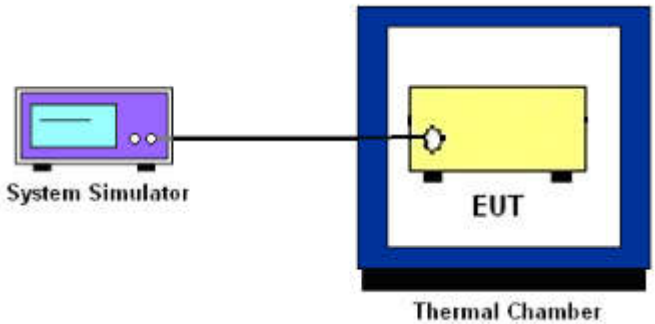
3.2 Test Setup

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 1 Watts for 5G NR n77, n78.

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.

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

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.

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.

27.53(l)(2)

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

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.
9. 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.

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.

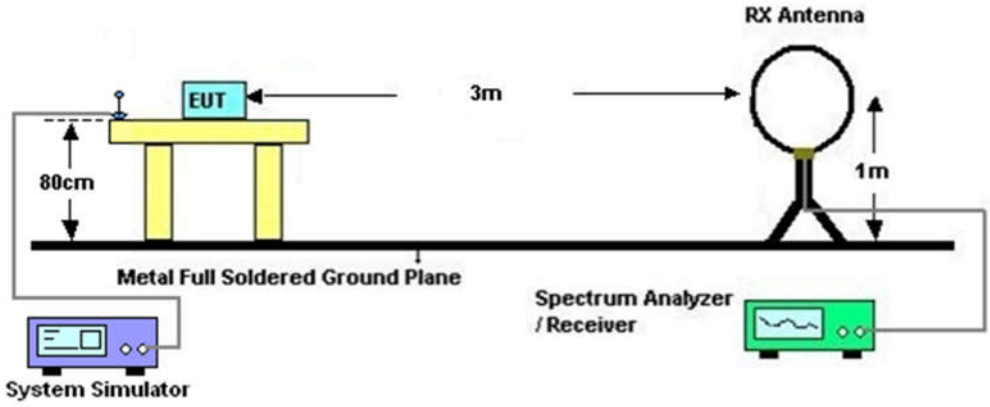
4 Radiated Test Items

4.1 Measuring Instruments

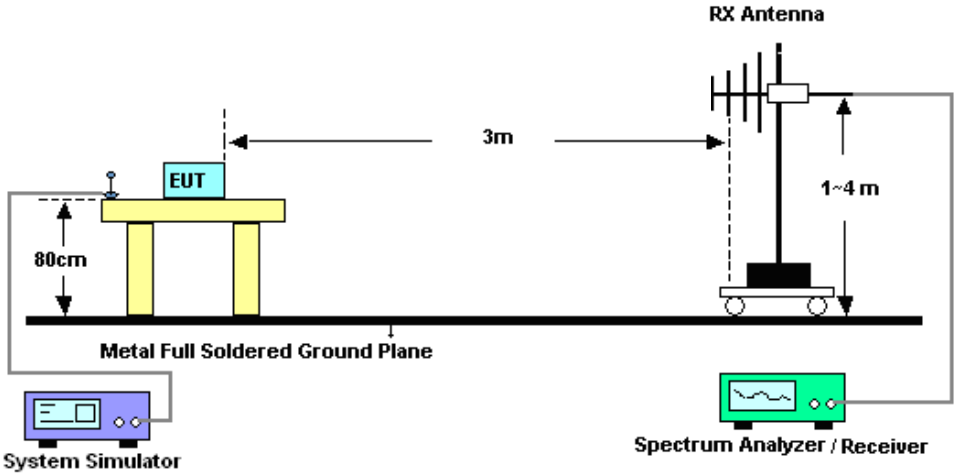
See list of measuring instruments of this test report.

4.2 Test Setup

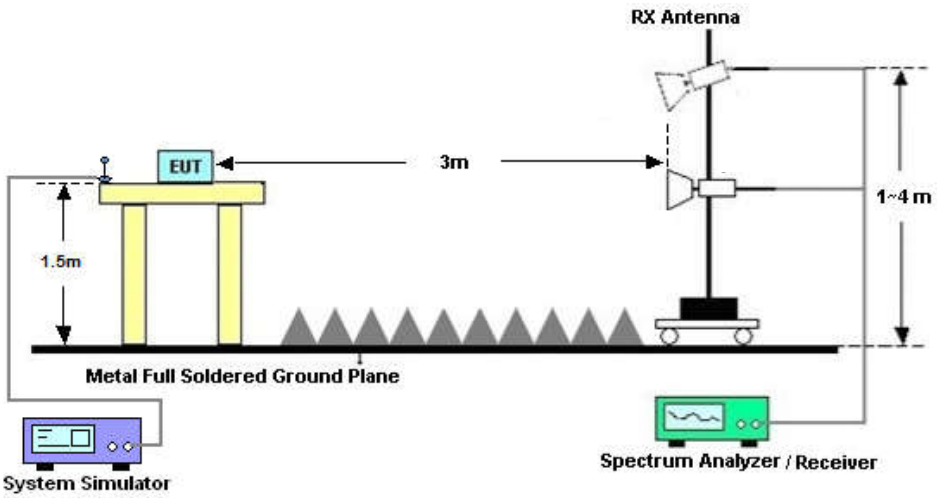
4.2.1 For radiated test below 30MHz



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.

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	Oct. 14, 2021	Mar. 03, 2022~ Mar. 05, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Mar. 03, 2022~ Mar. 05, 2022	Aug. 25, 2022	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Mar. 03, 2022~ Mar. 05, 2022	Jul. 11, 2022	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 13, 2021	Mar. 16, 2022	Apr. 12, 2022	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Mar. 16, 2022	Oct. 29, 2022	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2021	Mar. 16, 2022	May 29, 2022	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 18, 2021	Mar. 16, 2022	Apr. 17, 2022	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Mar. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 05, 2022	Mar. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Mar. 16, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Mar. 16, 2022	Jul. 29, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 13, 2021	Mar. 16, 2022	Oct. 12, 2022	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 16, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 16, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 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 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

Test Engineer :	Smile Wang	**Temperature :**	22~23℃
		Relative Humidity :	40~42%

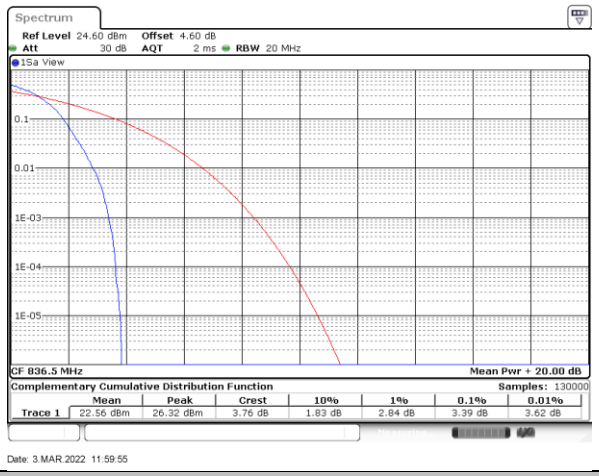
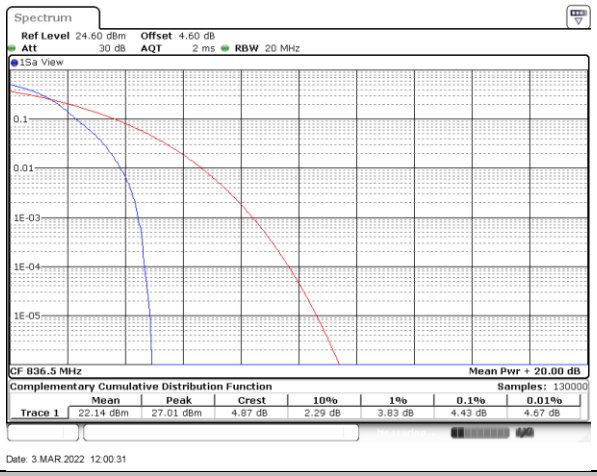
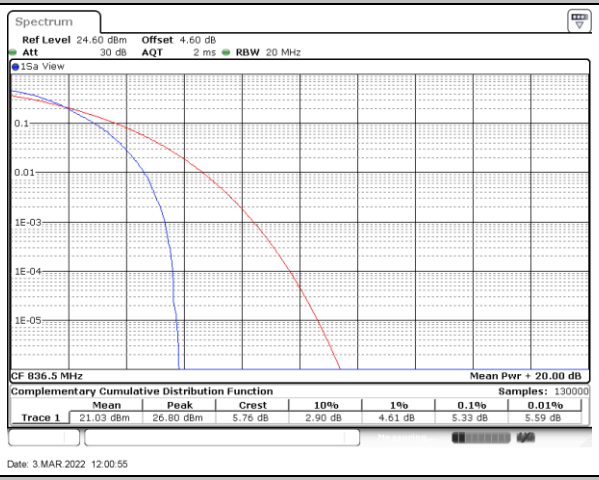
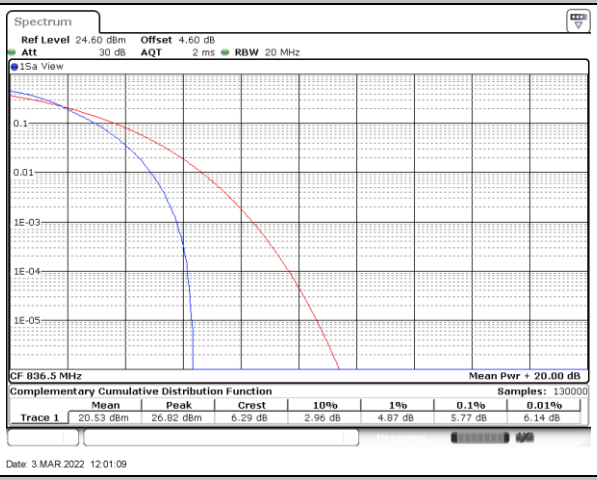
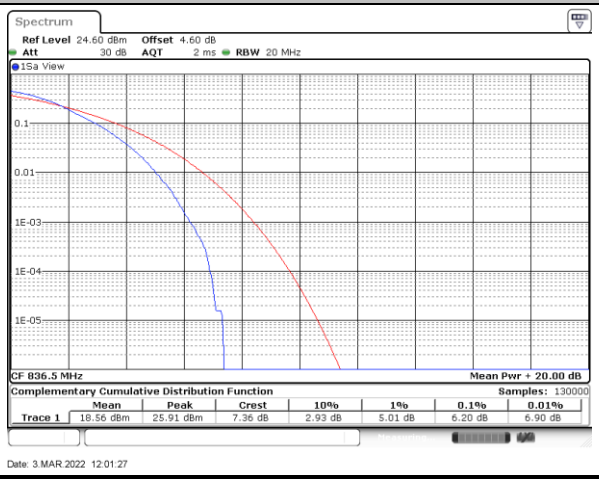
FR1 n5

Conducted Output Power(Average power) and ERP

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	23.21	23.18	23.25	-2.55	0.0710	0.0705	0.0716
20	QPSK	1	1	23.34	23.15	23.18	-2.55	0.0731	0.0700	0.0705
20	QPSK	1	53	23.31	23.14	23.21	-2.55	0.0726	0.0698	0.0710
20	QPSK	1	104	23.22	23.12	23.14	-2.55	0.0711	0.0695	0.0698
20	QPSK	50	0	22.53	22.44	22.52	-2.55	0.0607	0.0594	0.0605
20	QPSK	50	28	23.35	23.43	23.45	-2.55	0.0733	0.0746	0.0750
20	QPSK	50	56	22.49	22.51	22.50	-2.55	0.0601	0.0604	0.0603
20	QPSK	100	0	22.53	22.56	22.57	-2.55	0.0607	0.0611	0.0612
20	16QAM	1	1	22.78	22.64	22.62	-2.55	0.0643	0.0622	0.0619
20	64QAM	1	1	21.15	20.78	21.01	-2.55	0.0442	0.0406	0.0428
20	256QAM	1	1	18.76	18.73	18.72	-2.55	0.0255	0.0253	0.0252
Channel				166300	167300	168300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	QPSK	1	1	23.15	23.24	23.17	-2.55	0.0700	0.0714	0.0703
15	16QAM	1	1	22.82	22.68	22.72	-2.55	0.0649	0.0628	0.0634
Channel				165800	167300	168800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	QPSK	1	1	23.16	23.18	23.13	-2.55	0.0701	0.0705	0.0697
10	16QAM	1	1	22.81	22.76	22.79	-2.55	0.0647	0.0640	0.0644
Channel				165300	167300	169300	Gain	ERP	ERP	ERP
Frequency (MHz)				826.5	836.5	846.5				
5	QPSK	1	1	23.24	23.34	23.23	-2.55	0.0714	0.0731	0.0713
5	16QAM	1	1	22.95	22.96	22.73	-2.55	0.0668	0.0670	0.0635

Peak-to-Average Ratio

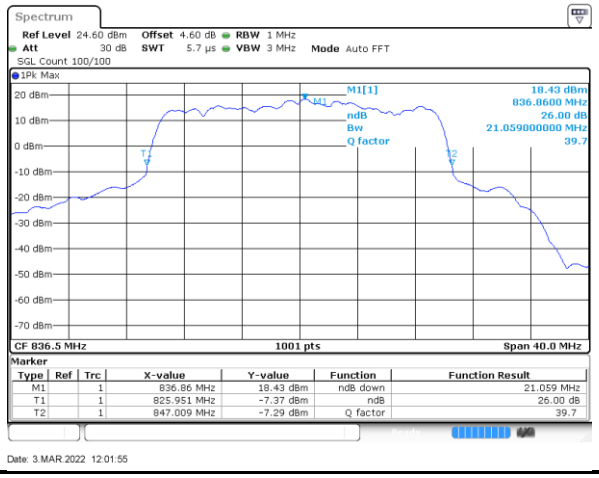
Mode	FR1 n5 / 20MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
					PASS
Middle CH	3.39	4.43	5.33	5.77	
Mode	FR1 n12 / 15MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
					PASS
Middle CH	6.20				

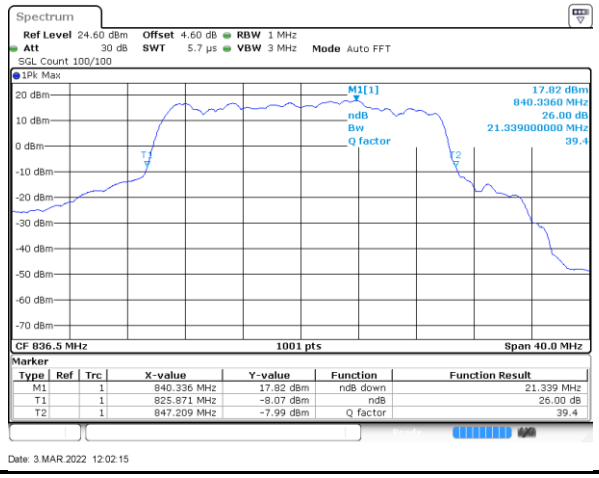
FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel / Full RB	**Middle Channel / Full RB**
PI/2 BPSK	**QPSK**
	
16QAM	**64QAM**
	
256QAM	
	

26dB Bandwidth

Mode	FR1 n5: 26dB BW(MHz) / DFT-S OFDM							
BW	20MHz							
Mod.	QPSK	16QAM						
Middle CH	21.06	21.34						

FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel	
QPSK	16QAM

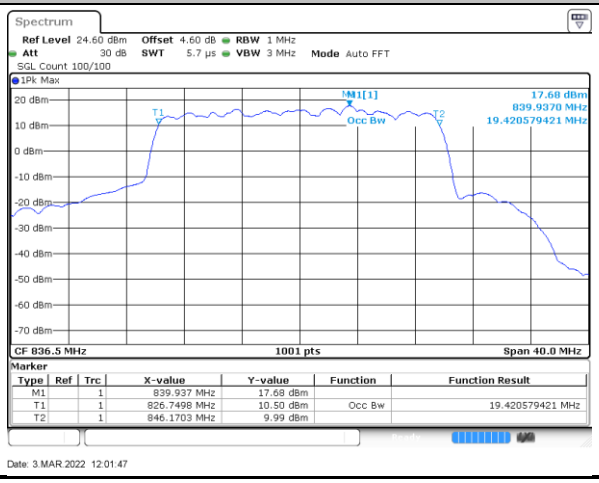


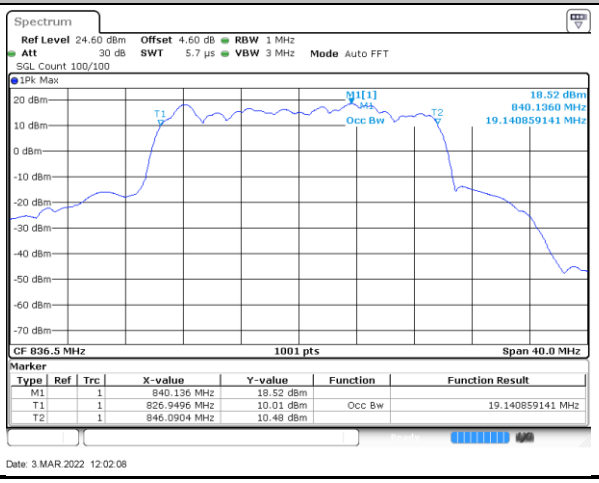


Occupied Bandwidth

Mode	FR1 n5 : 99%OBW(MHz) / DFT-S OFDM	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	19.42	19.14

FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel	
QPSK	16QAM

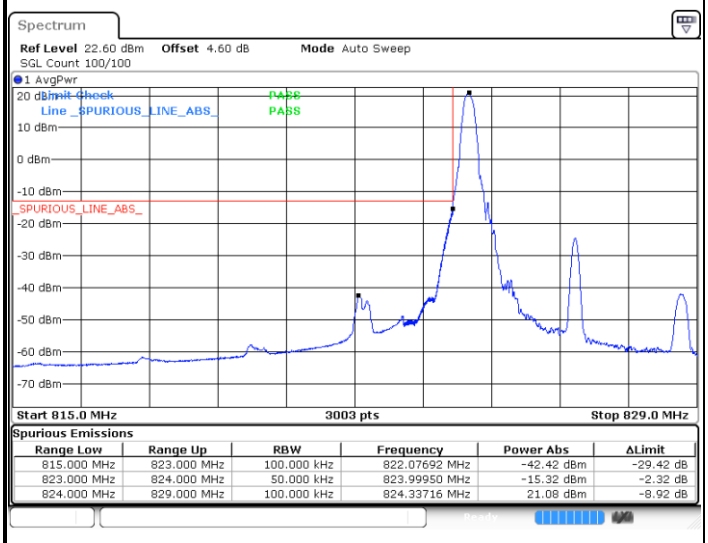




Conducted Band Edge

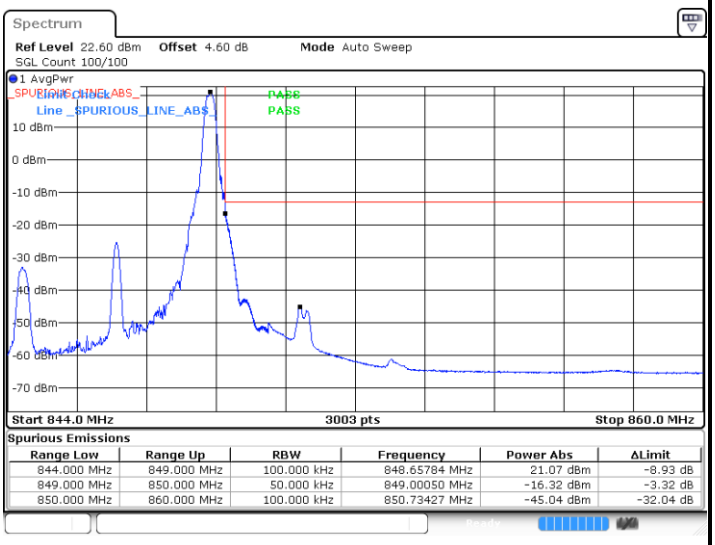
FR1 n5 / 5MHz / DFT-S OFDM / PI/2 BPSK

Lowest Band Edge / 1RB0



Date: 3.MAR.2022 10:29:08

Highest Band Edge / 1RBMAX



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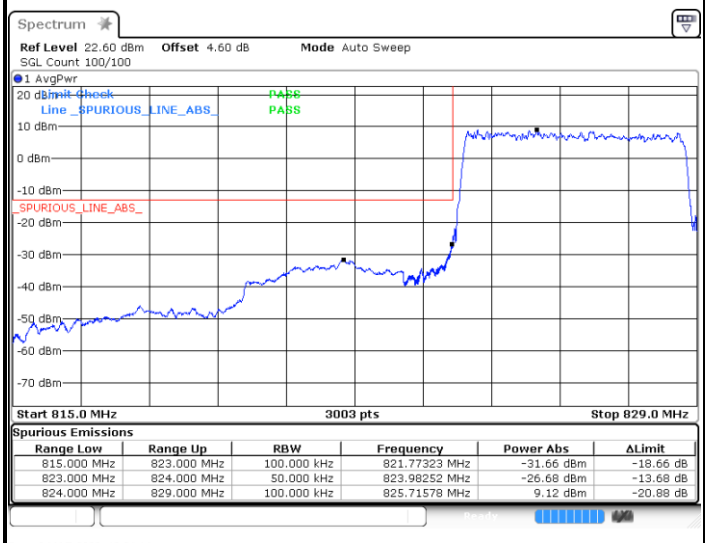
Lowest Band Edge / Full RB



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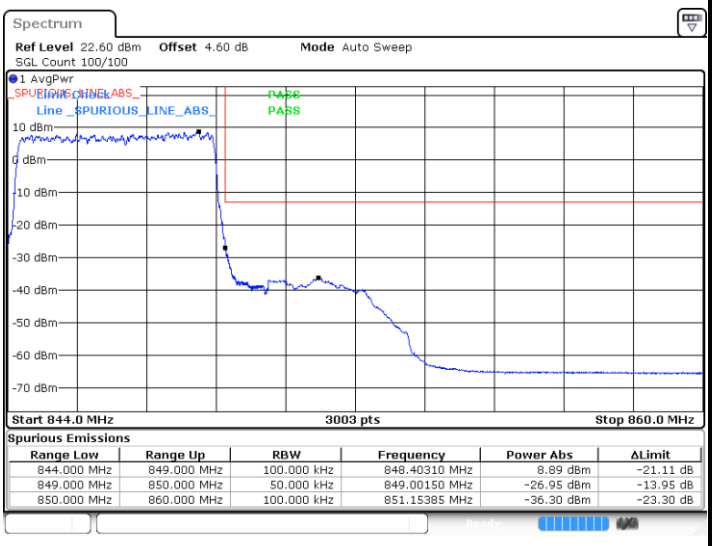
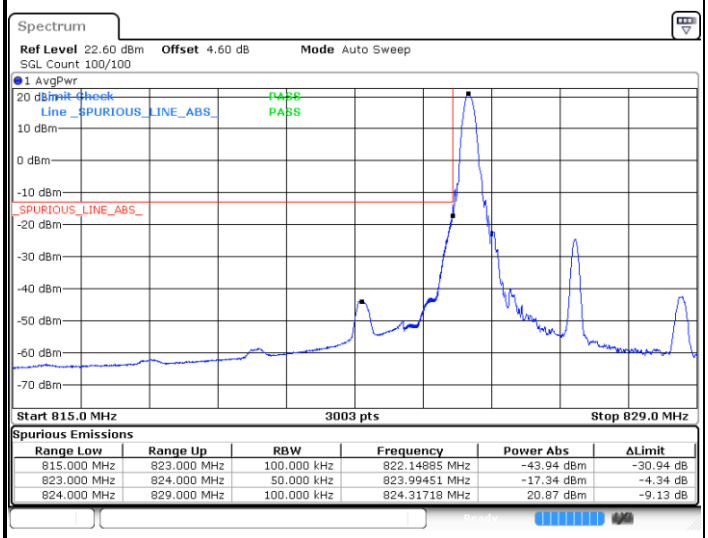
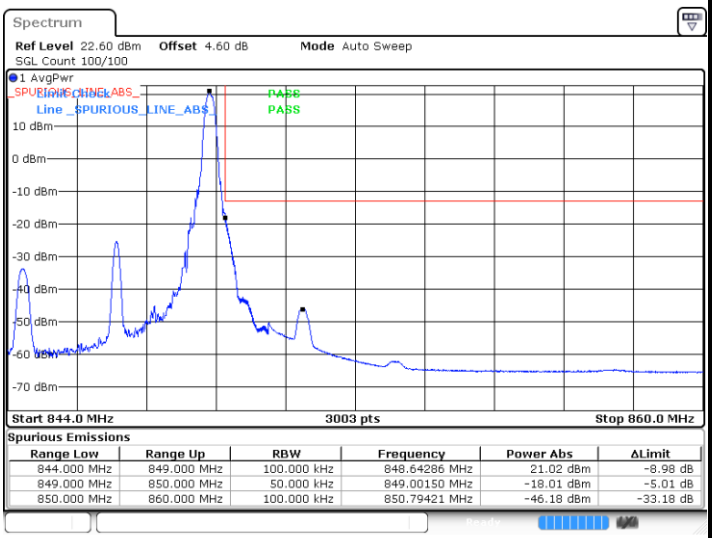
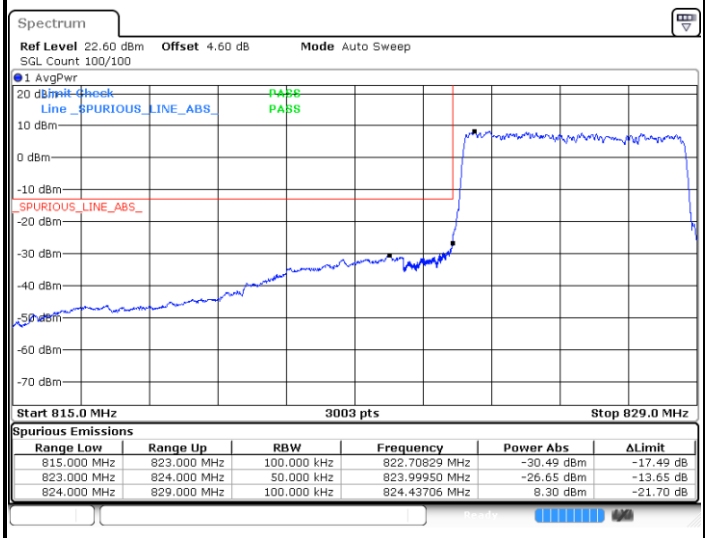
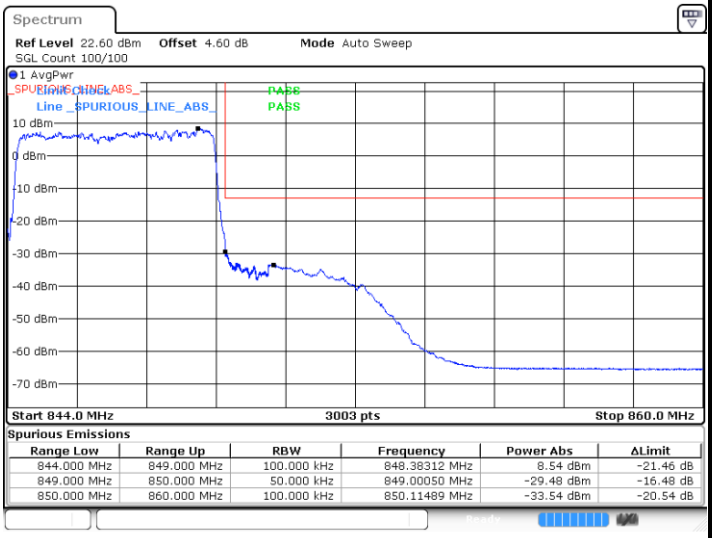
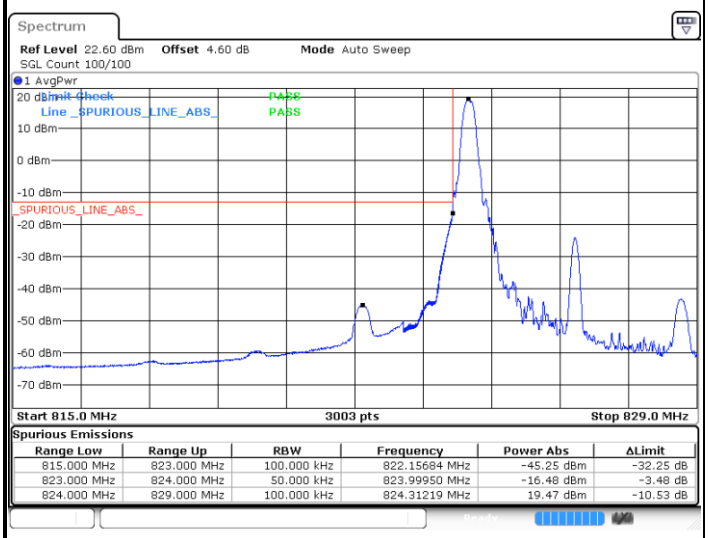
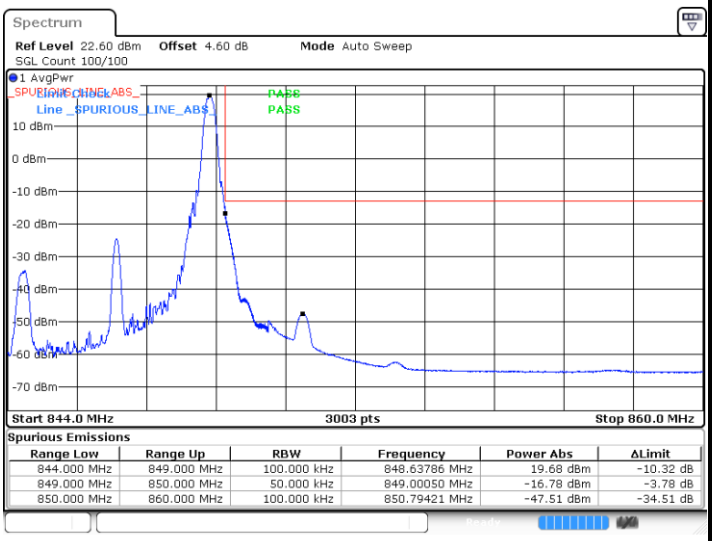
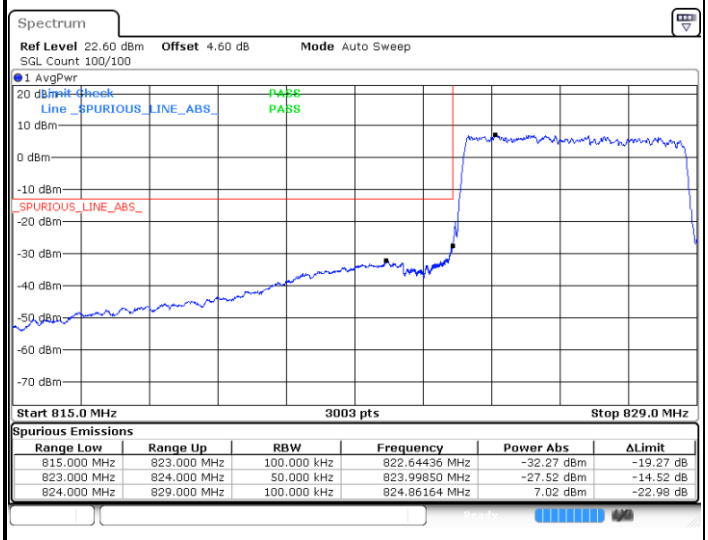
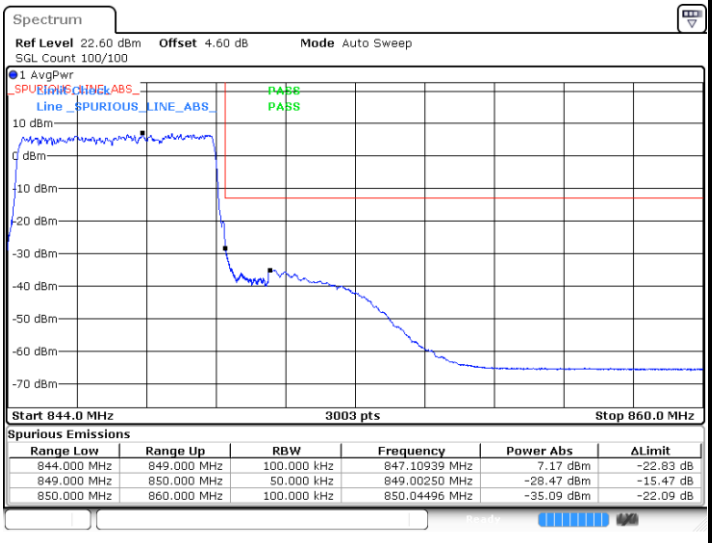
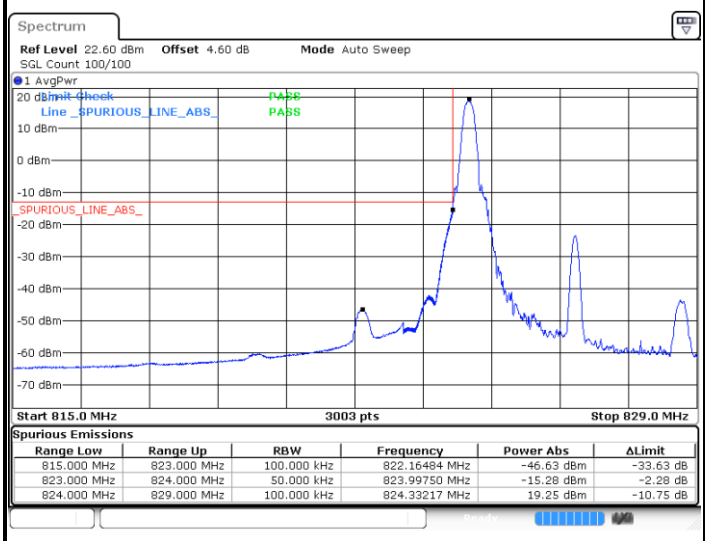
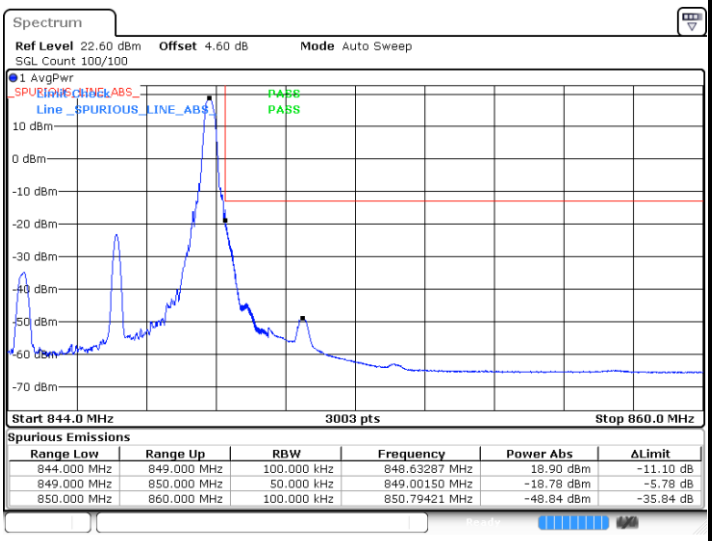
Highest Band Edge / Full RB



Date: 3.MAR.2022 10:33:36

FR1 n5 / 5MHz / DFT-S OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
 Date: 3.MAR.2022 10:28:03	 Date: 3.MAR.2022 10:40:04
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
 Date: 3.MAR.2022 10:22:16	 Date: 3.MAR.2022 10:34:23

FR1 n5 / 5MHz / DFT-S OFDM / 16Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5/ 5MHz / DFT-S OFDM / 64Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
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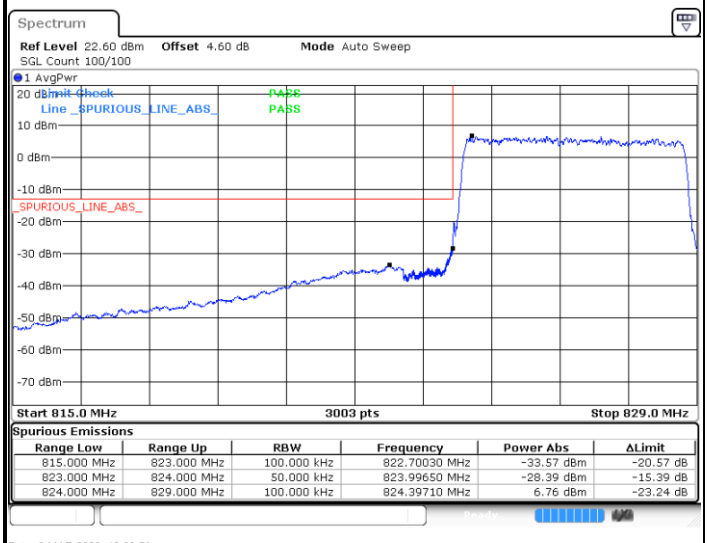
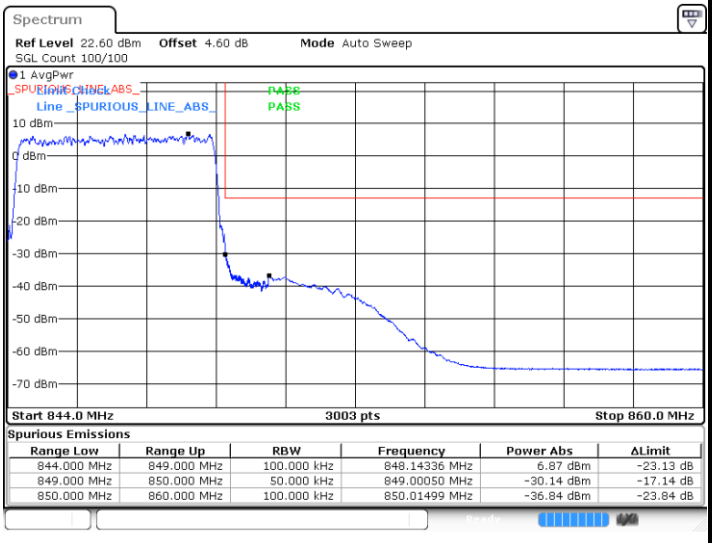
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	
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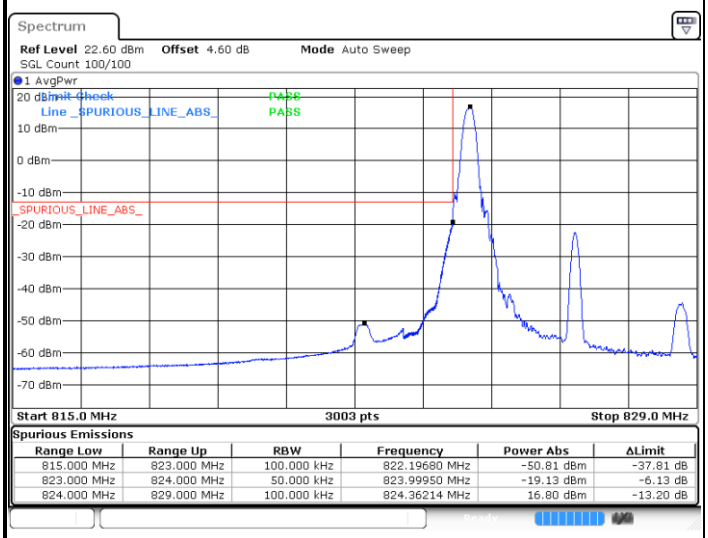
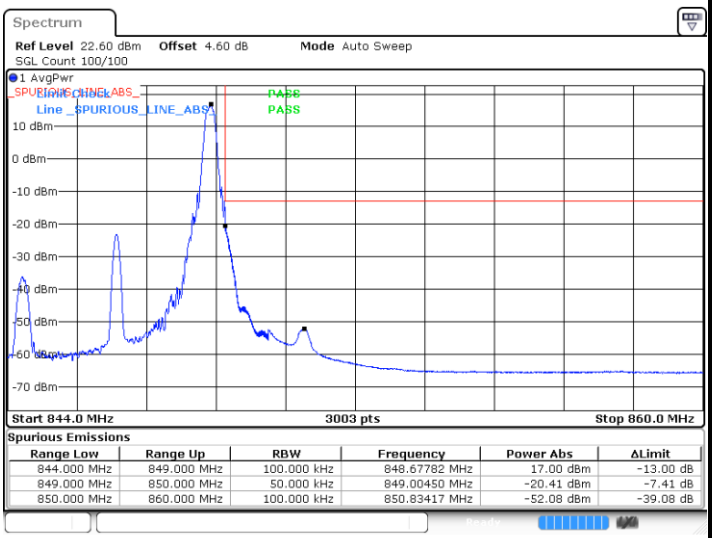
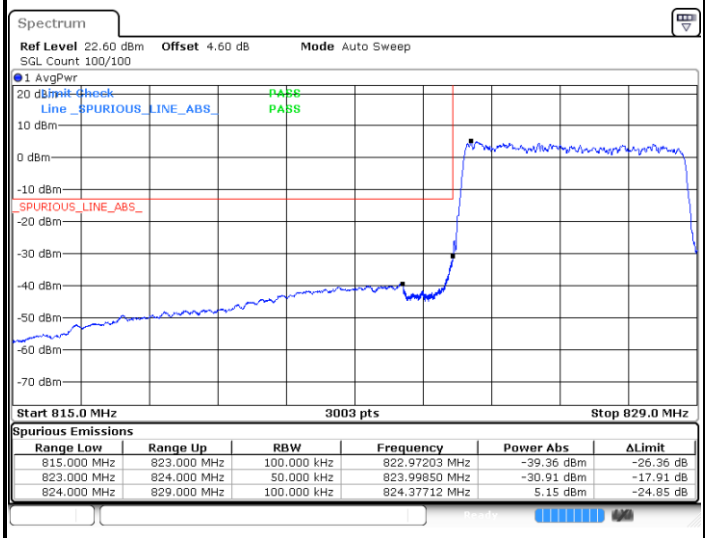
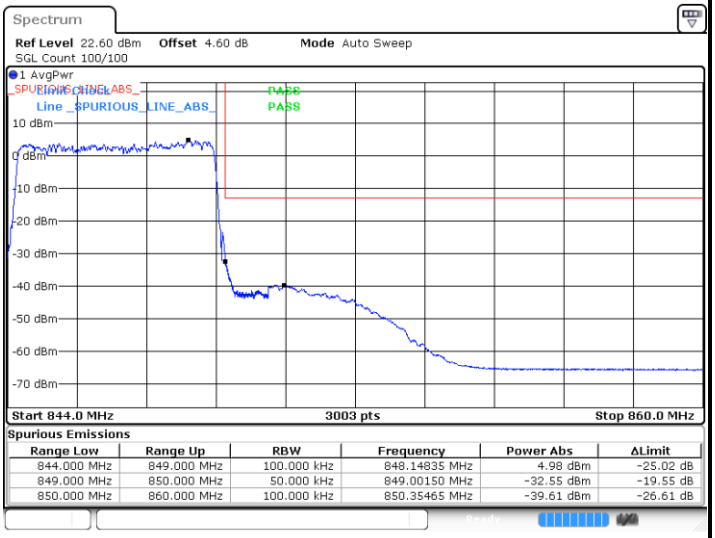
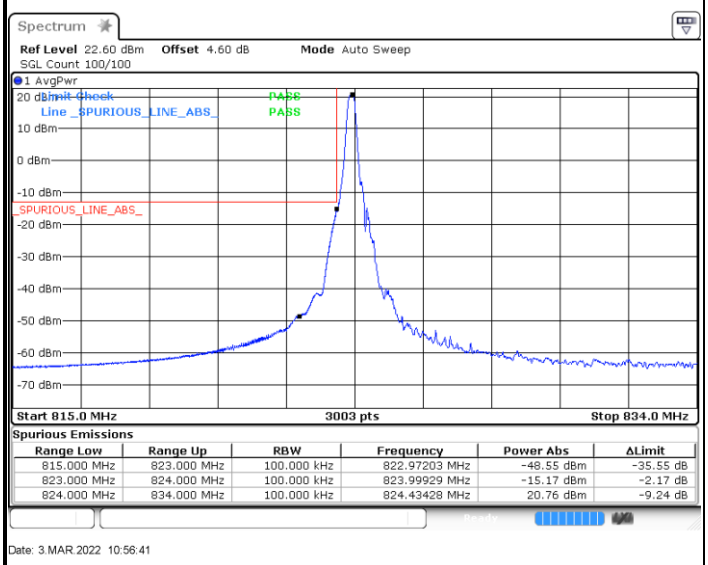
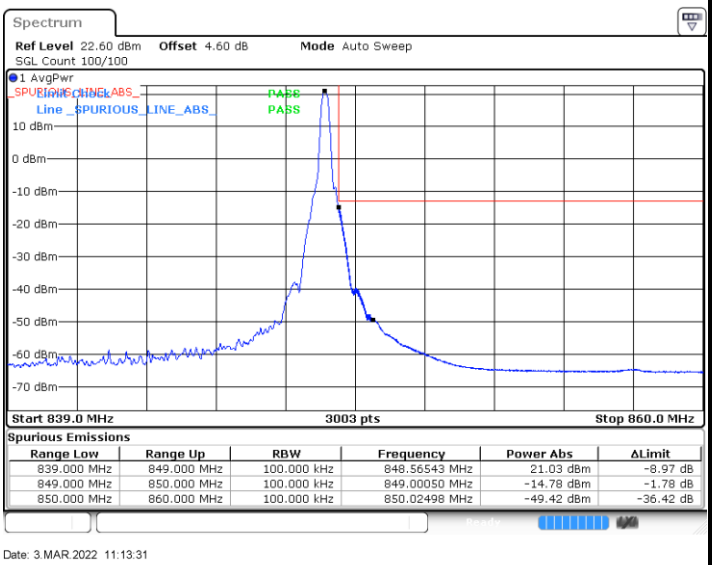
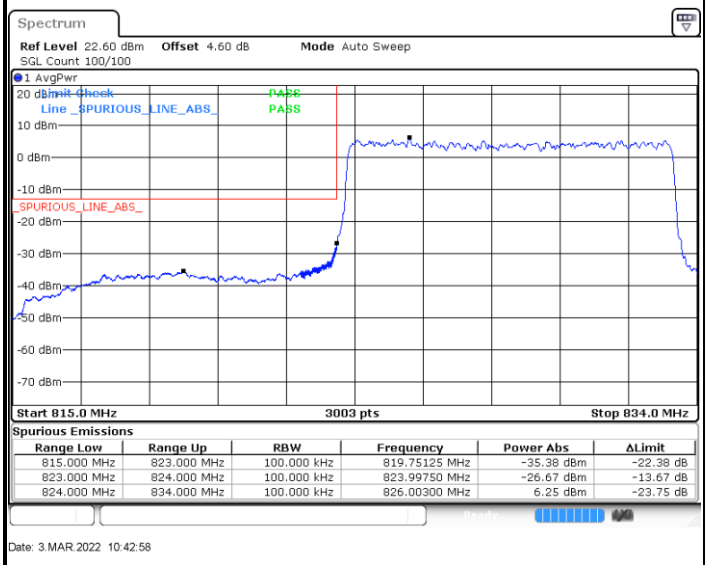
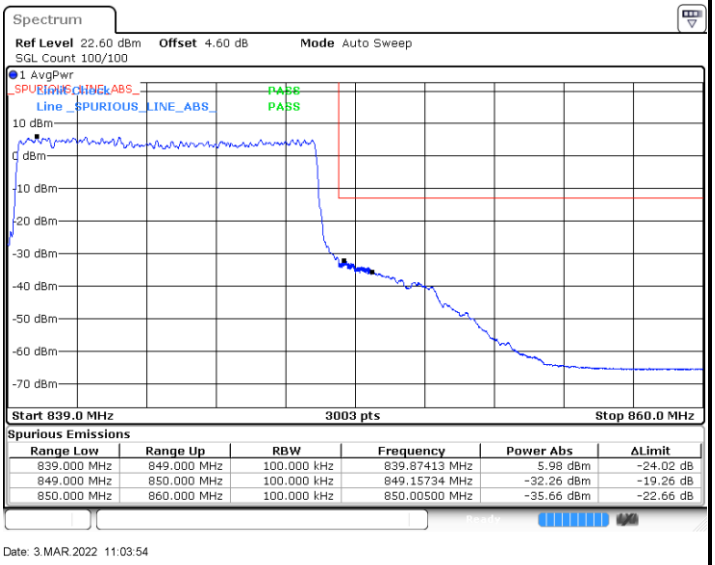
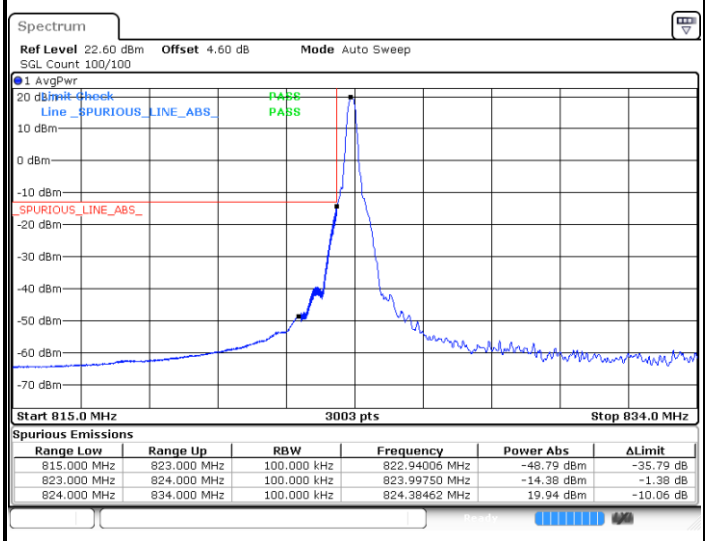
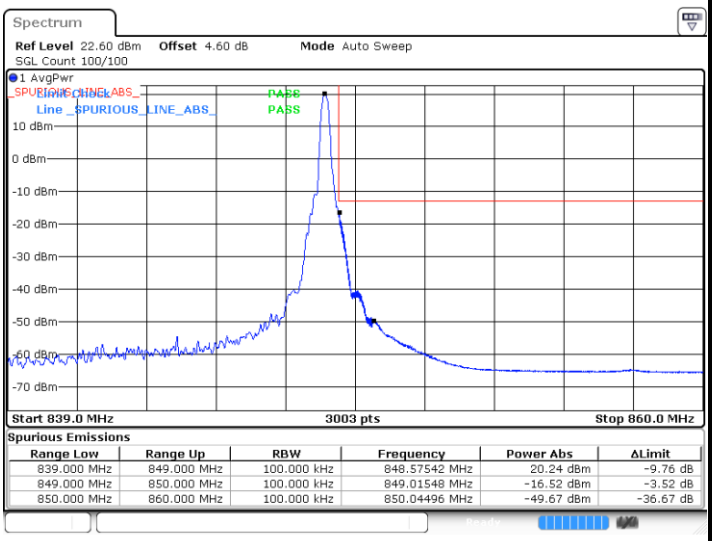
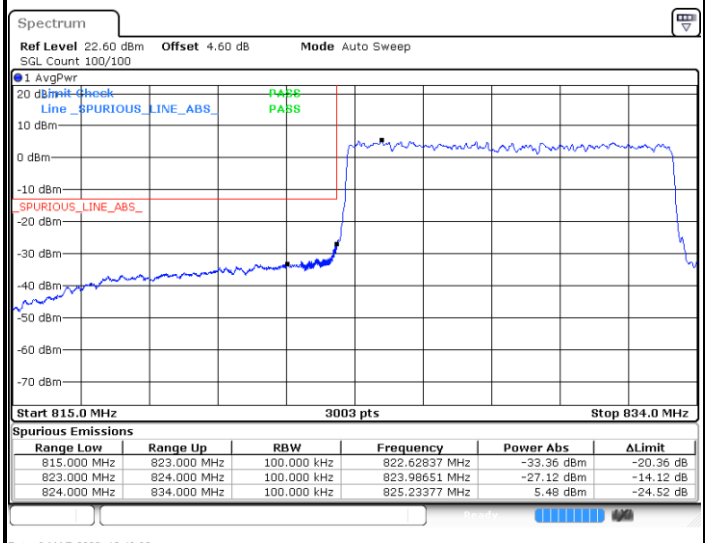
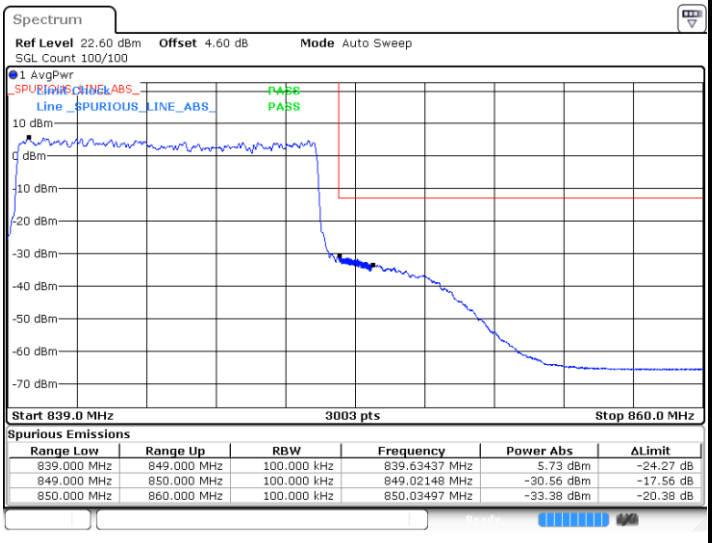
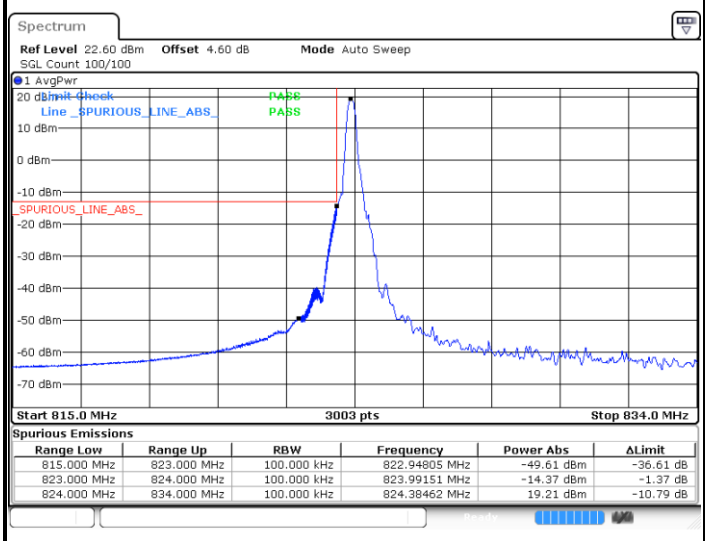
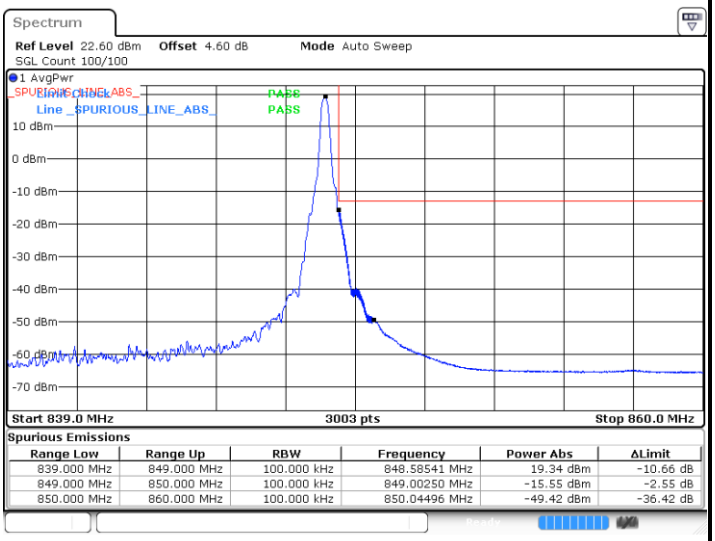
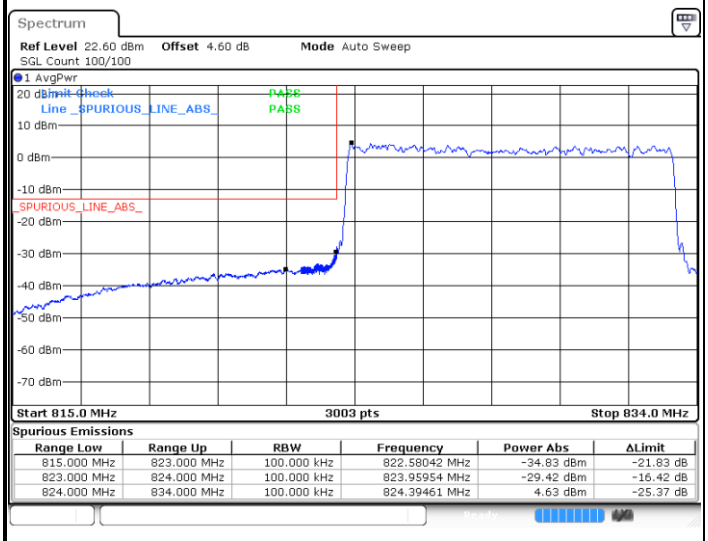
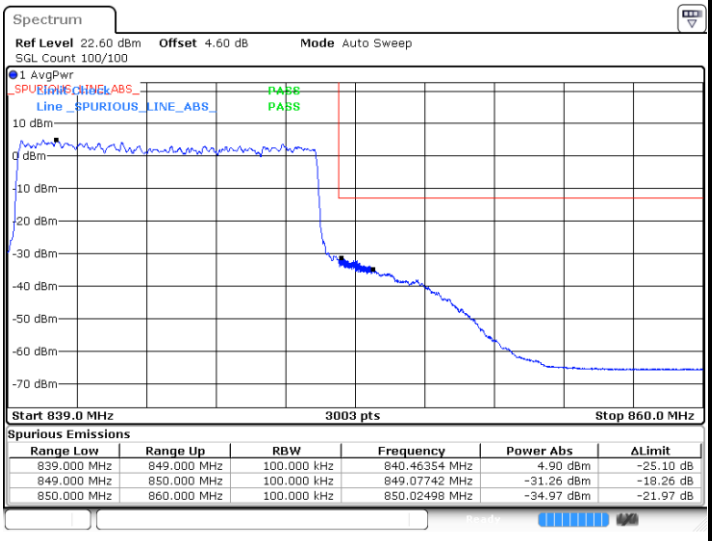
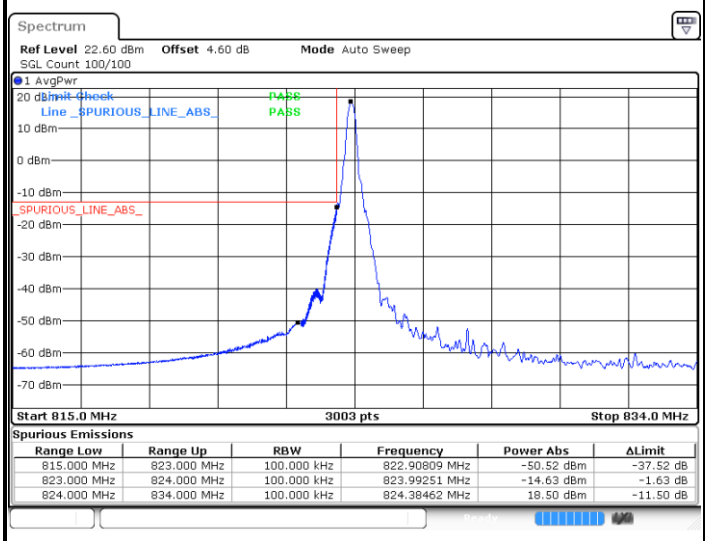
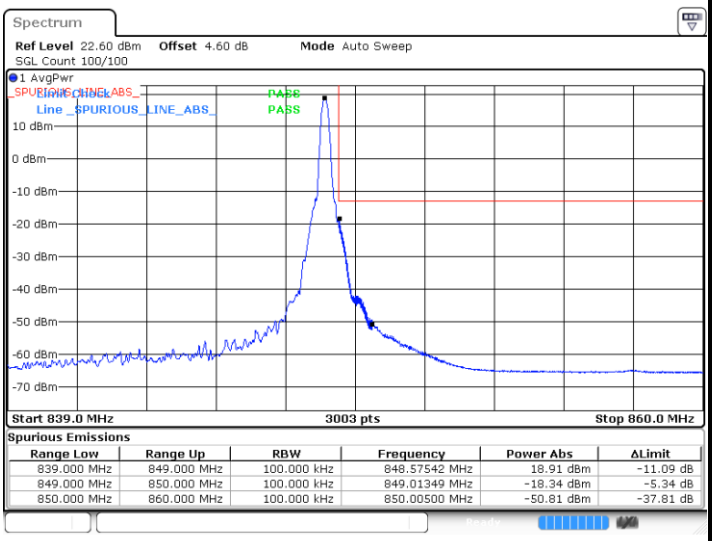
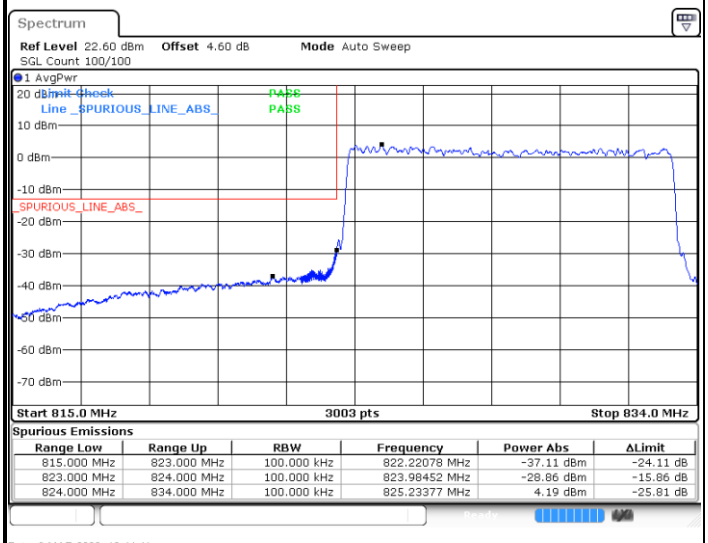
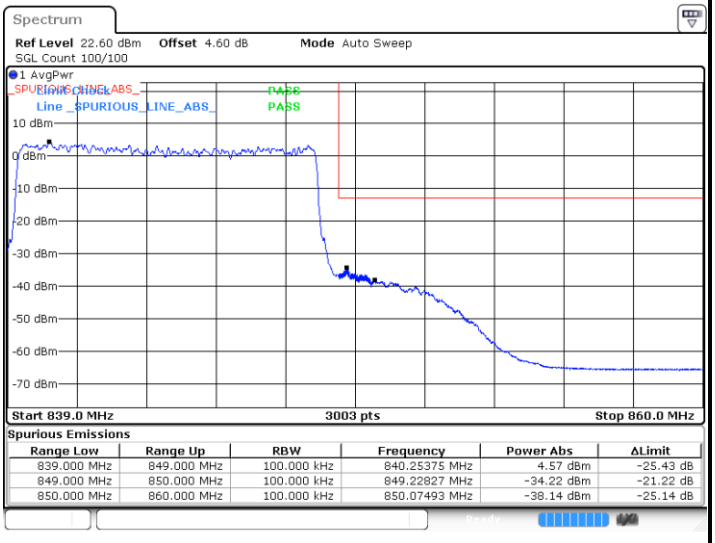
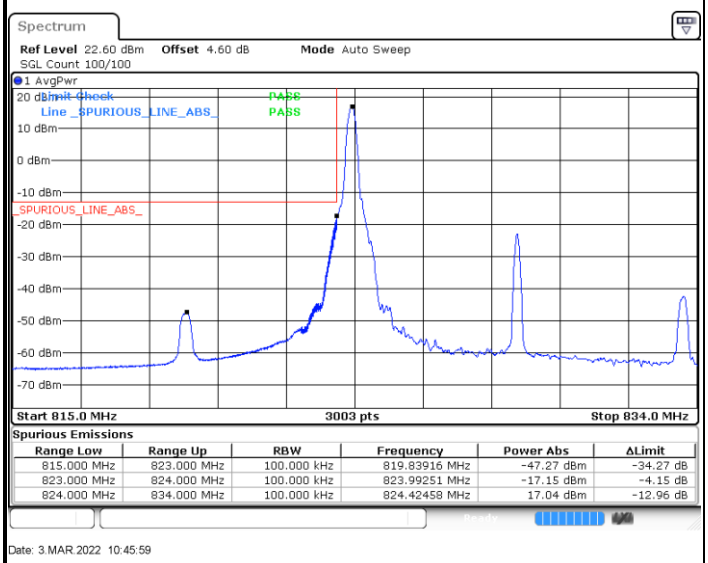
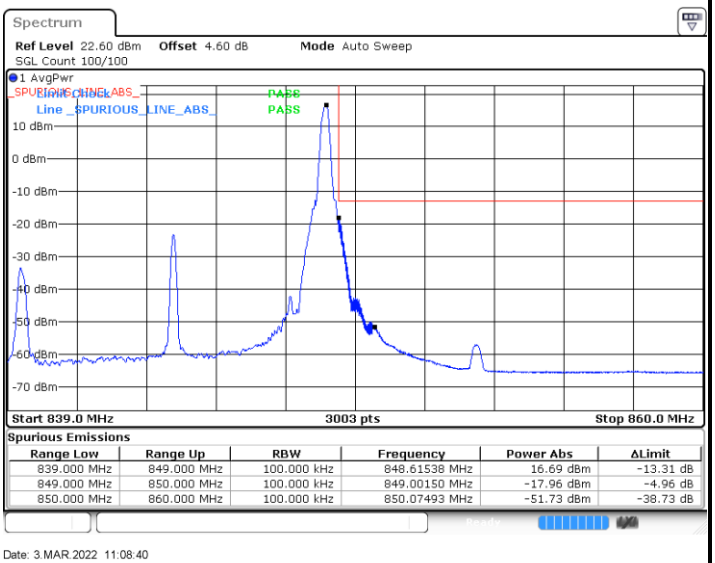
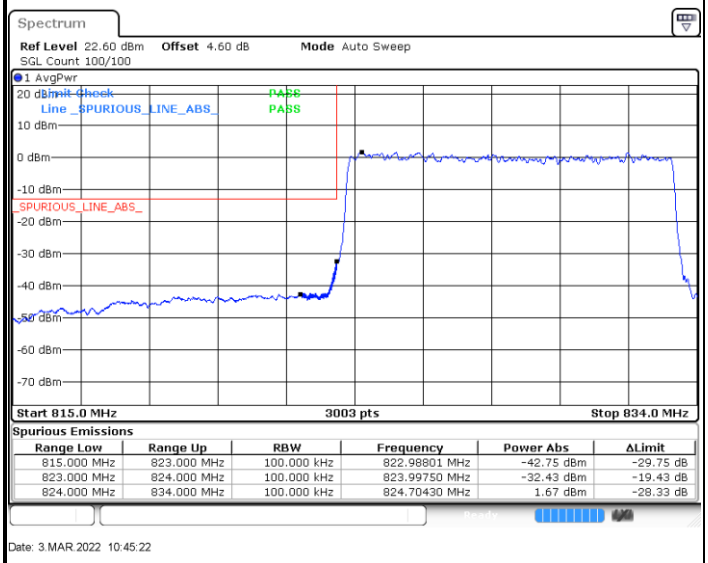
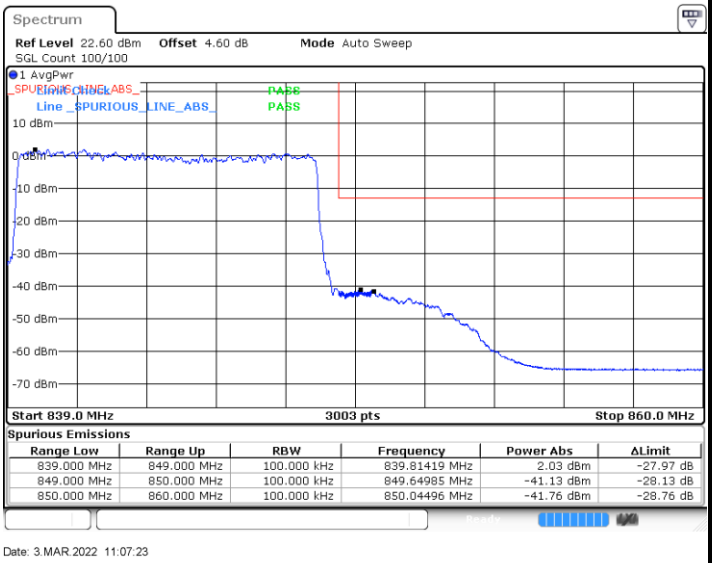
FR1 n5 / 5MHz / DFT-S OFDM / 256Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
 Date: 3.MAR.2022 10:25:47	 Date: 3.MAR.2022 10:37:49
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
 Date: 3.MAR.2022 10:24:56	 Date: 3.MAR.2022 10:36:43

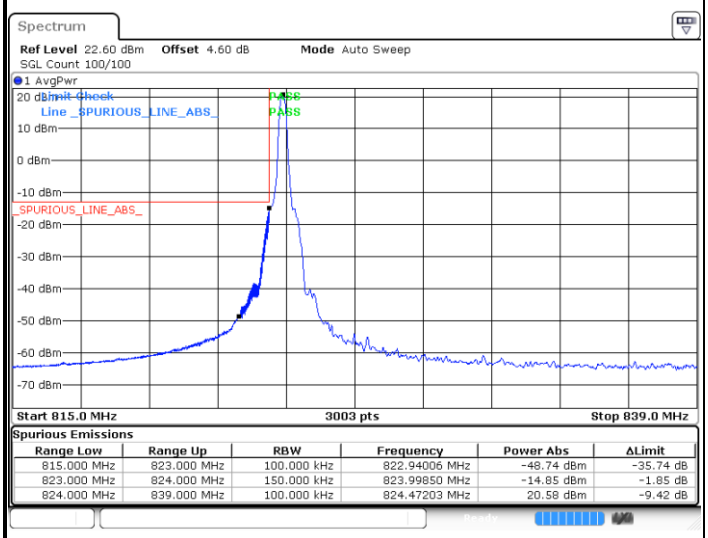
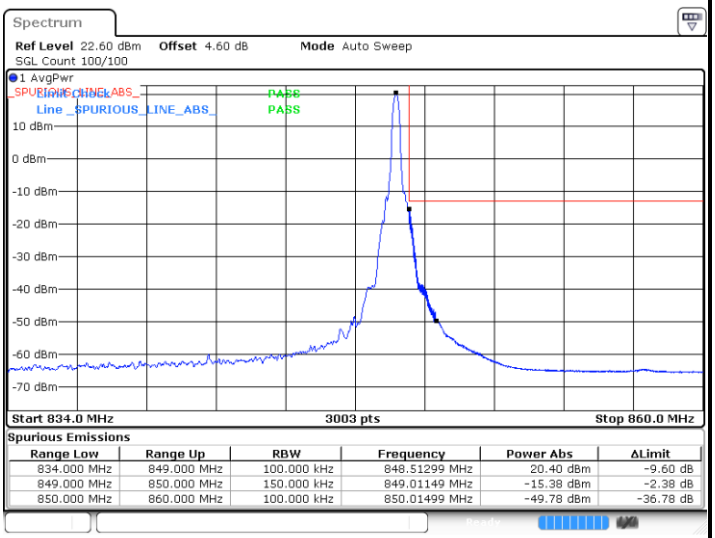
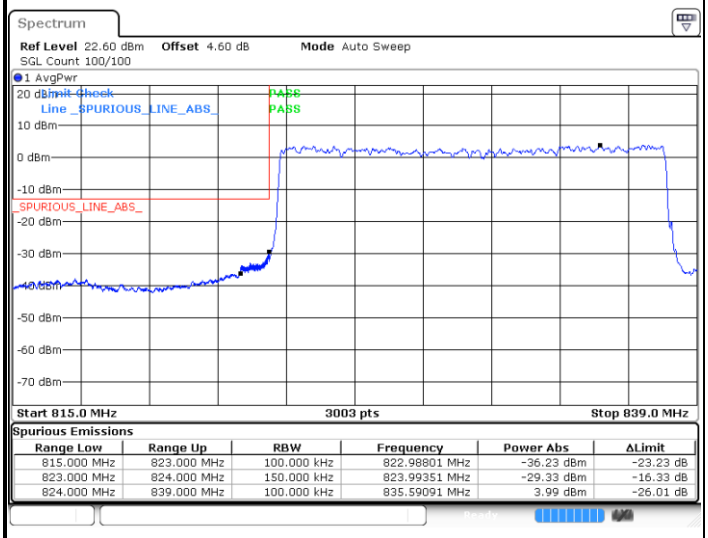
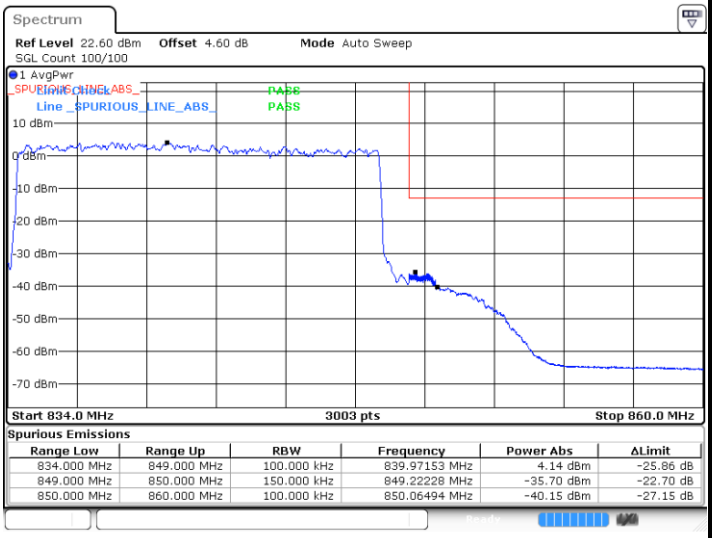
FR1 n5 / 10MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

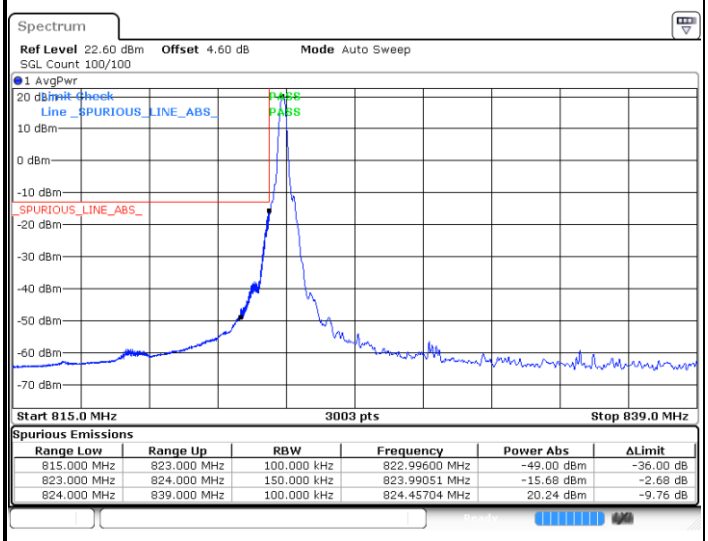
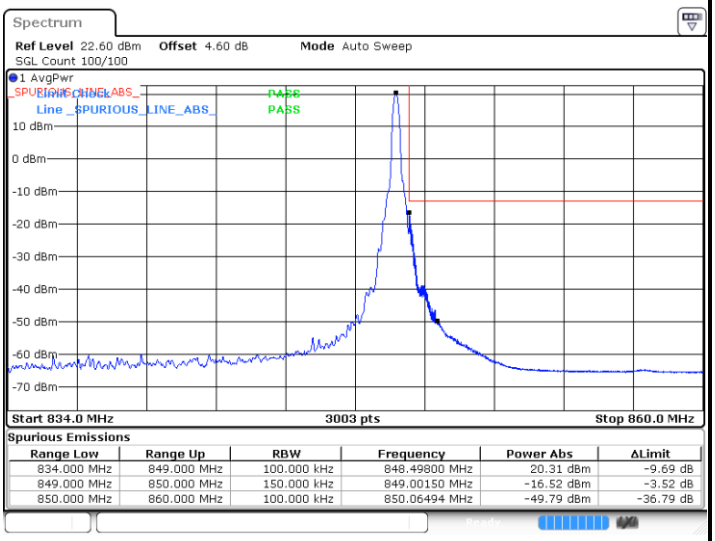
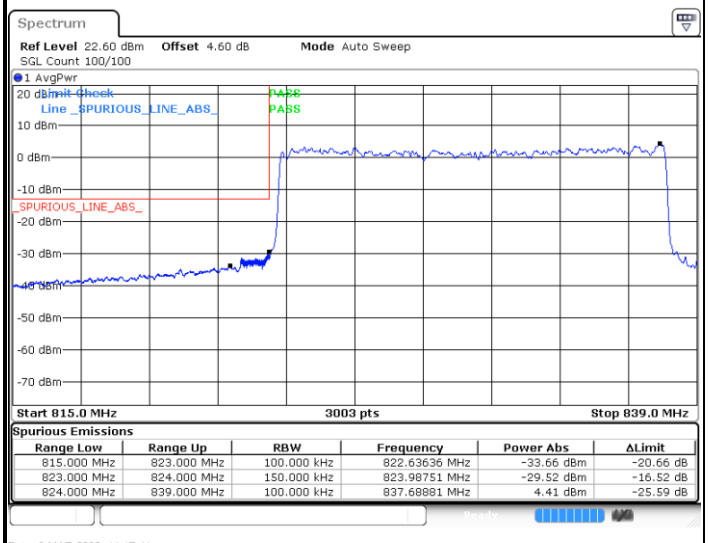
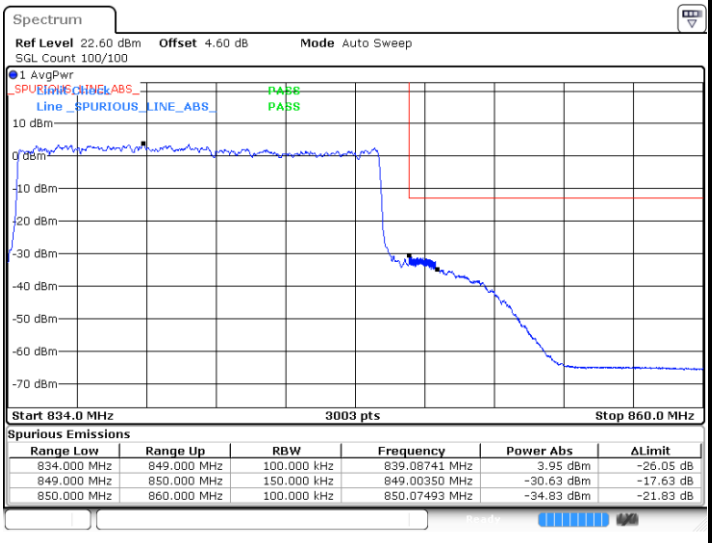
FR1 n5 / 10MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

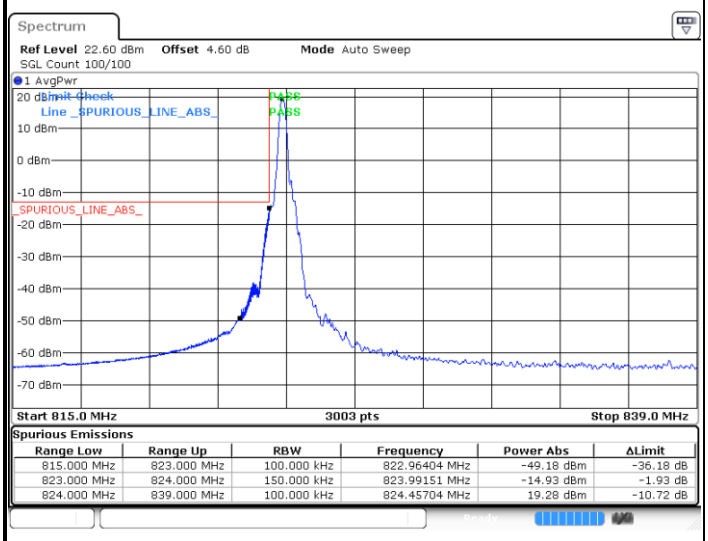
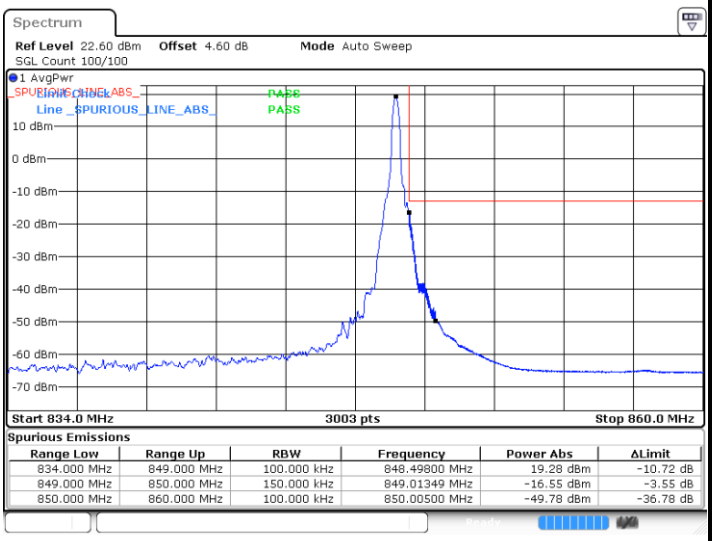
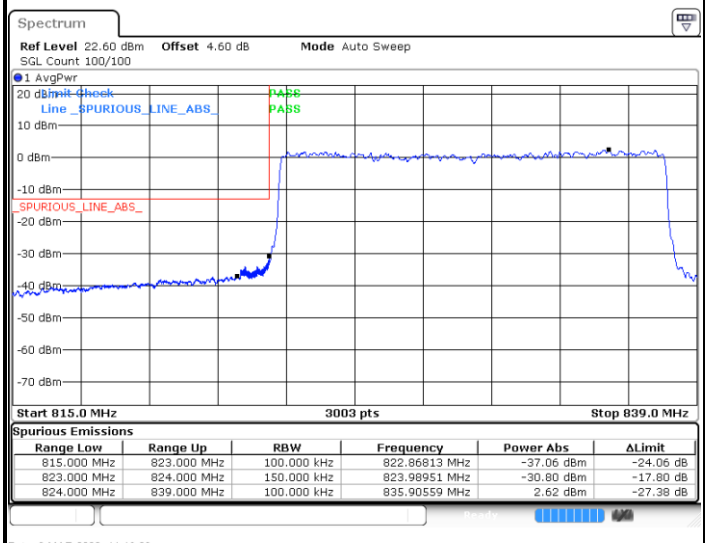
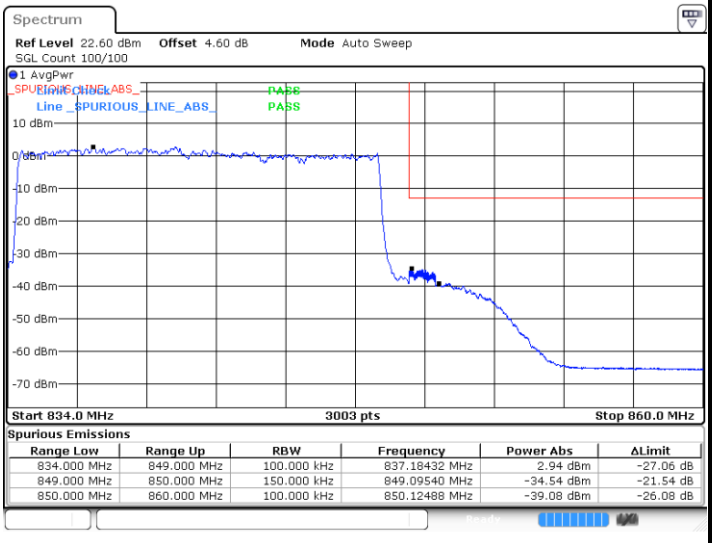
FR1 n5/ 10MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

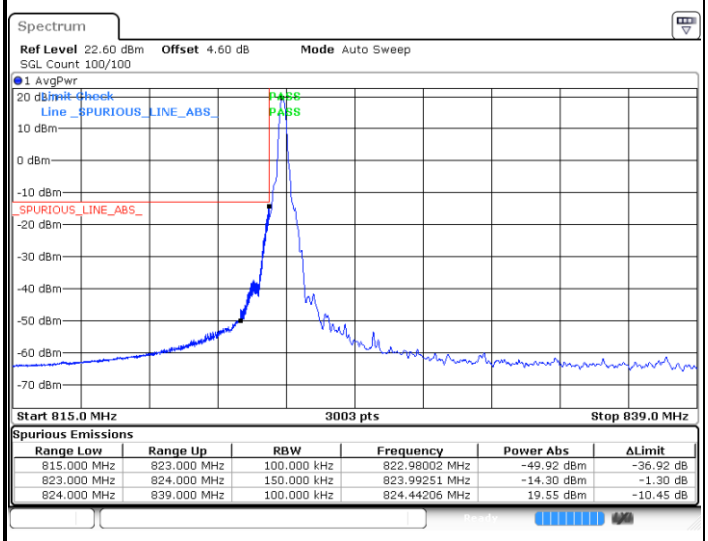
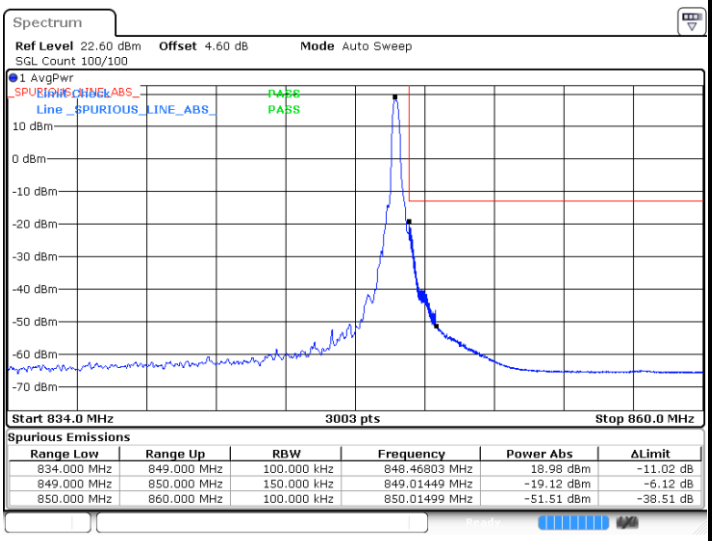
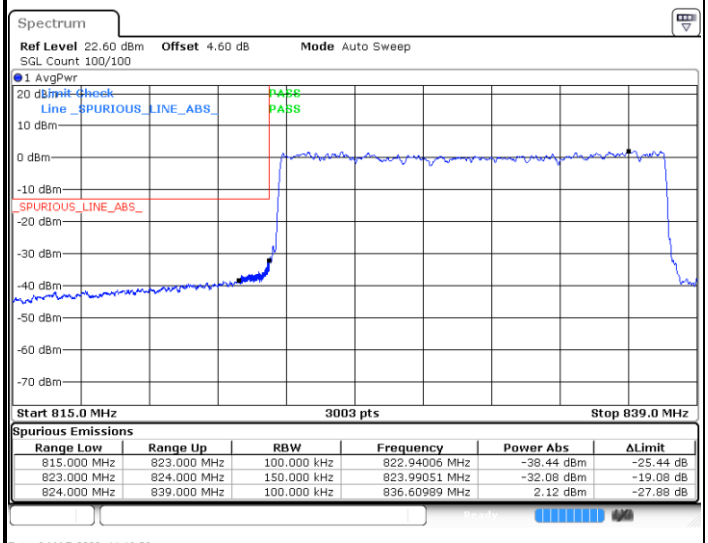
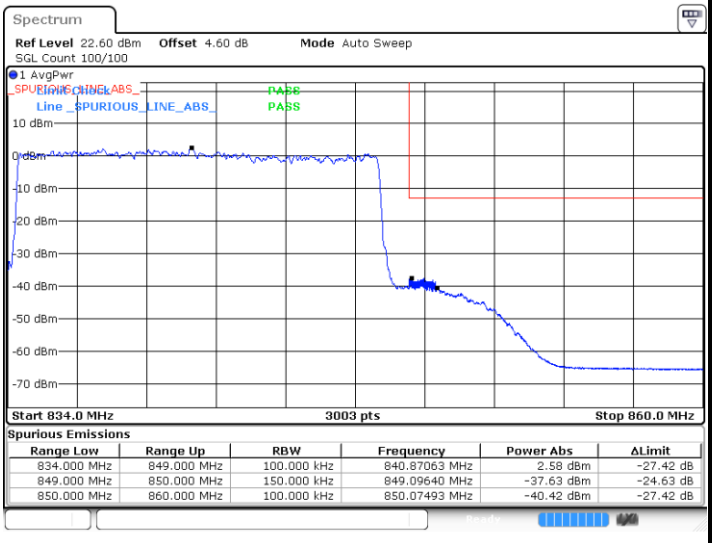
FR1 n5 / 10MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

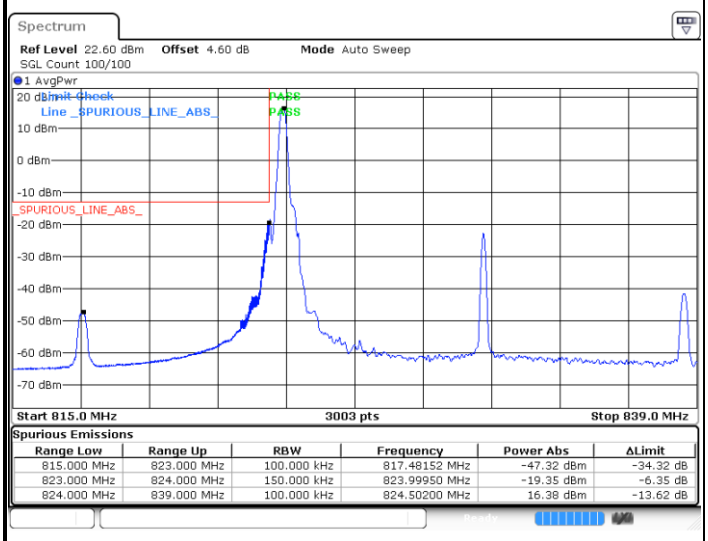
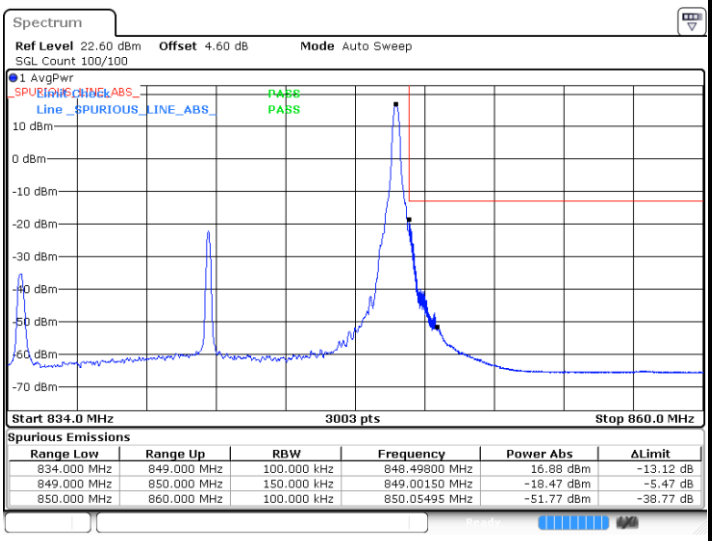
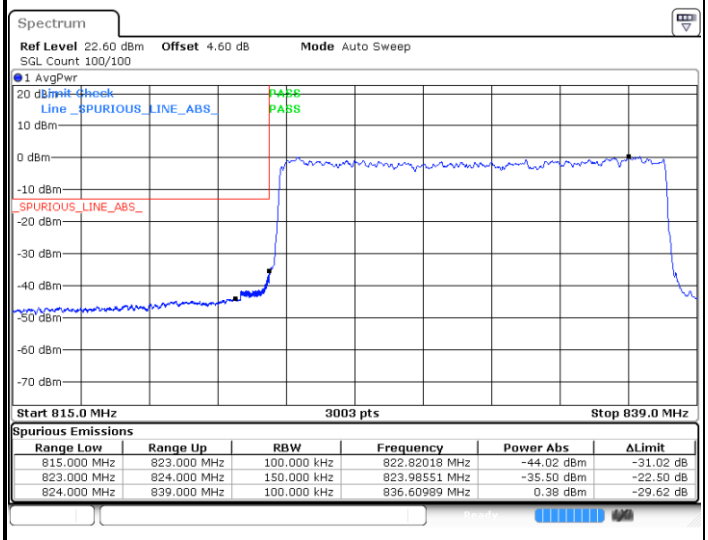
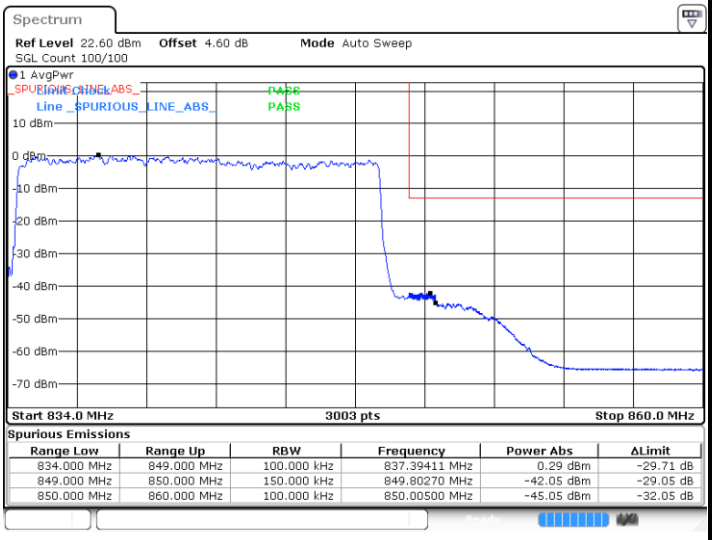
FR1 n5 / 10MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
 Spurious Emissions Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit 815.000 MHz | 823.000 MHz | 100.000 kHz | 819.83916 MHz | -47.27 dBm | -34.27 dB 823.000 MHz | 824.000 MHz | 100.000 kHz | 823.99251 MHz | -17.15 dBm | -4.15 dB 824.000 MHz | 834.000 MHz | 100.000 kHz | 824.42458 MHz | 17.04 dBm | -12.96 dB Date: 3.MAR.2022 10:45:59	 Spurious Emissions Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit 839.000 MHz | 849.000 MHz | 100.000 kHz | 848.61538 MHz | 16.69 dBm | -13.31 dB 849.000 MHz | 850.000 MHz | 100.000 kHz | 849.00150 MHz | -17.96 dBm | -4.96 dB 850.000 MHz | 860.000 MHz | 100.000 kHz | 850.07493 MHz | -51.73 dBm | -38.73 dB Date: 3.MAR.2022 11:08:40
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
 Spurious Emissions Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit 815.000 MHz | 823.000 MHz | 100.000 kHz | 822.98801 MHz | -42.75 dBm | -29.75 dB 823.000 MHz | 824.000 MHz | 100.000 kHz | 823.99750 MHz | -32.43 dBm | -19.43 dB 824.000 MHz | 834.000 MHz | 100.000 kHz | 824.70430 MHz | 1.67 dBm | -28.33 dB Date: 3.MAR.2022 10:45:22	 Spurious Emissions Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit 839.000 MHz | 849.000 MHz | 100.000 kHz | 839.81419 MHz | 2.03 dBm | -27.97 dB 849.000 MHz | 850.000 MHz | 100.000 kHz | 849.64985 MHz | -41.13 dBm | -28.13 dB 850.000 MHz | 860.000 MHz | 100.000 kHz | 850.04496 MHz | -41.76 dBm | -28.76 dB Date: 3.MAR.2022 11:07:23

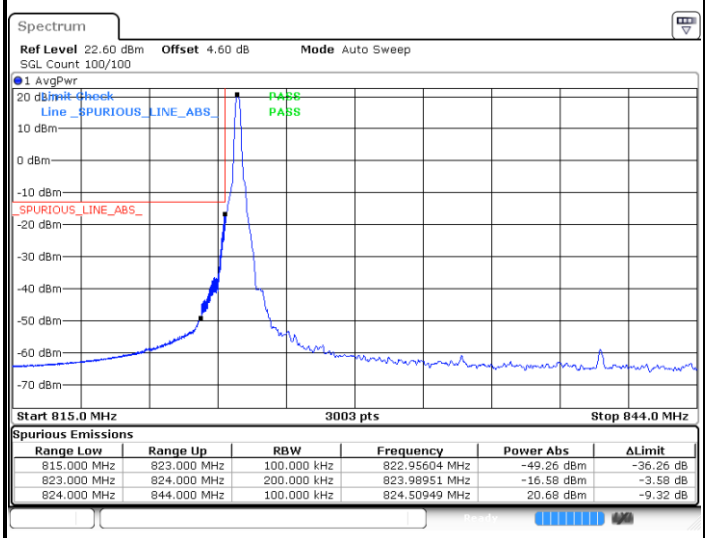
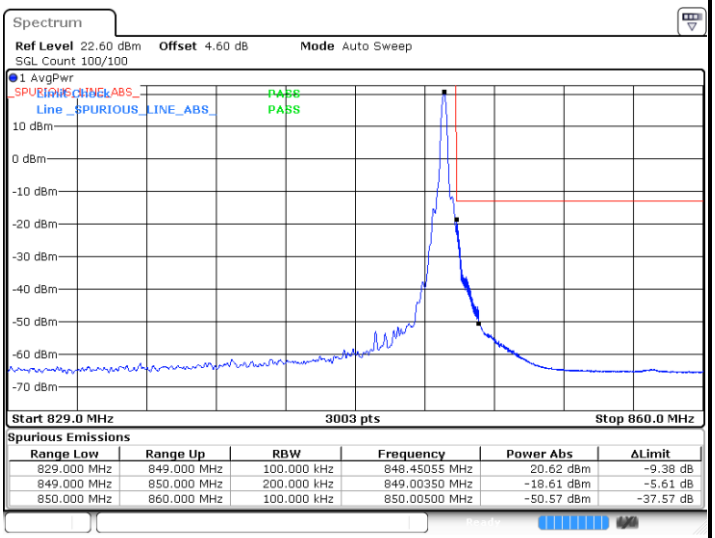
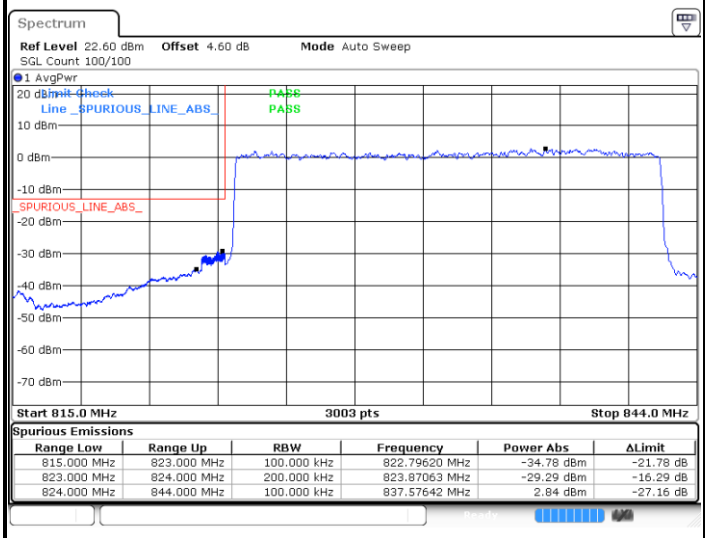
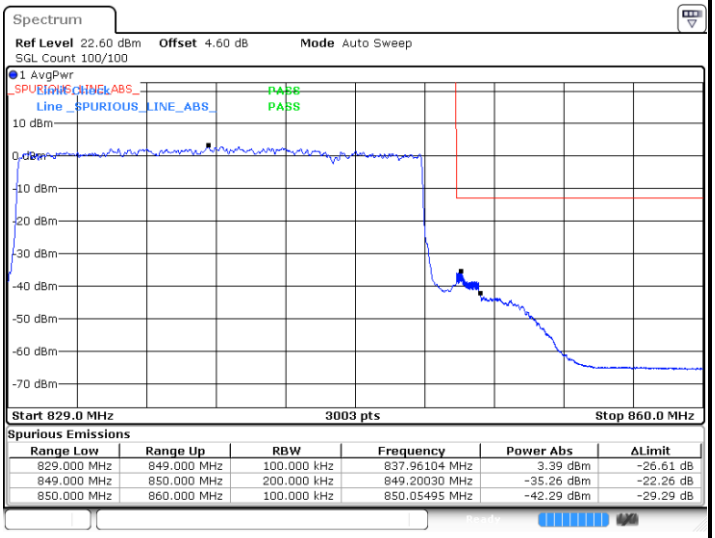
FR1 n5 / 15MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

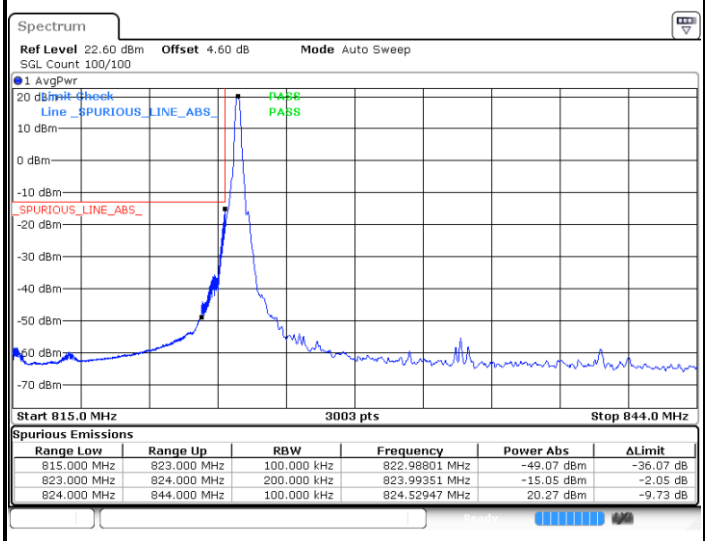
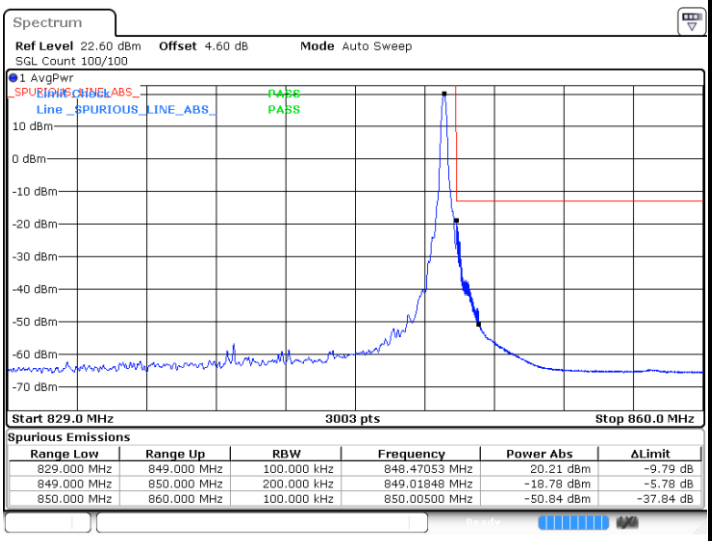
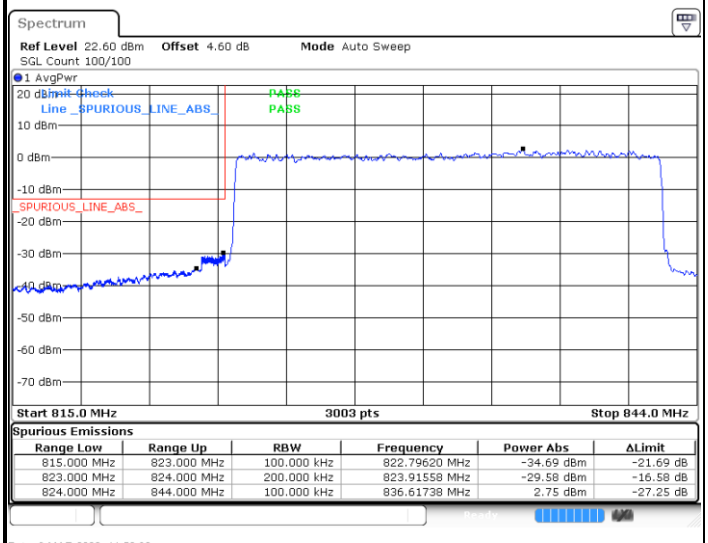
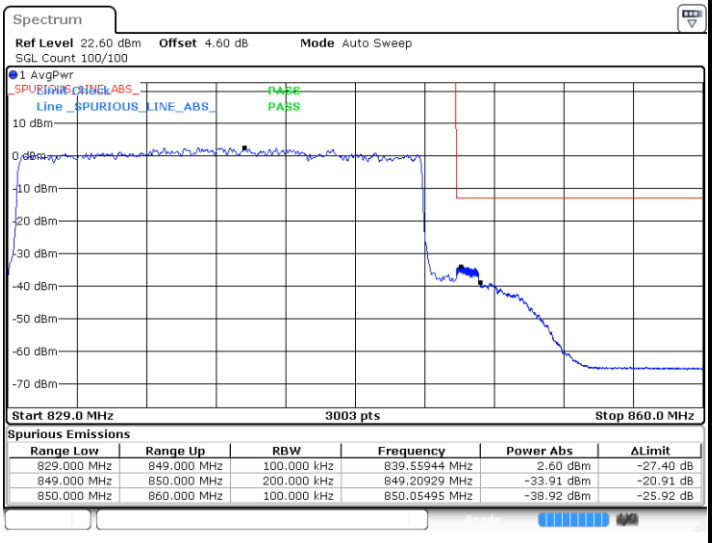
FR1 n5/ 15MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

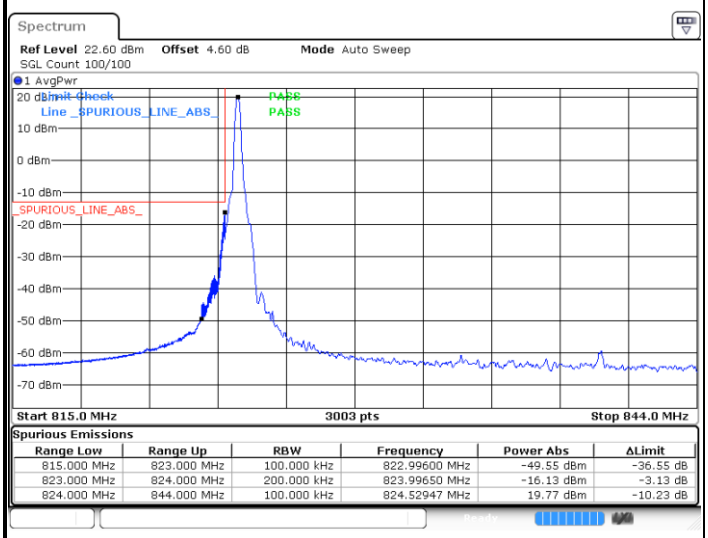
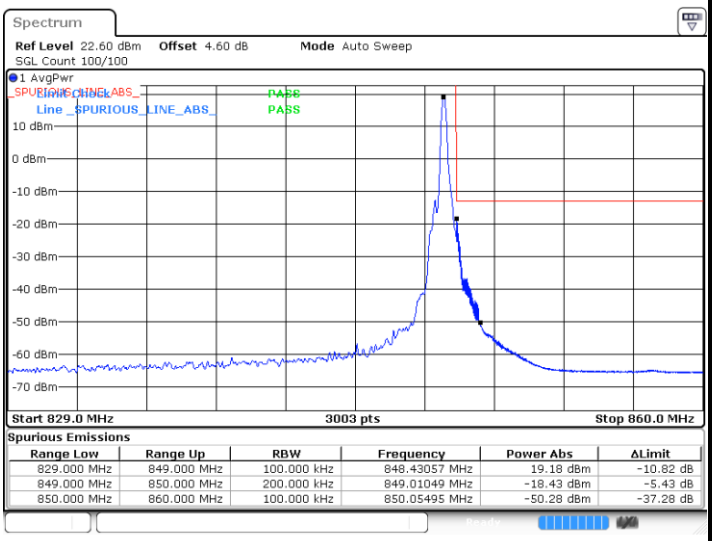
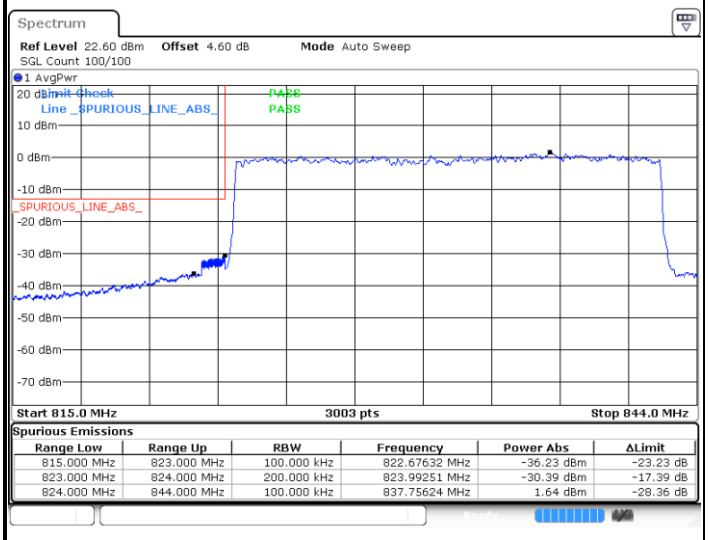
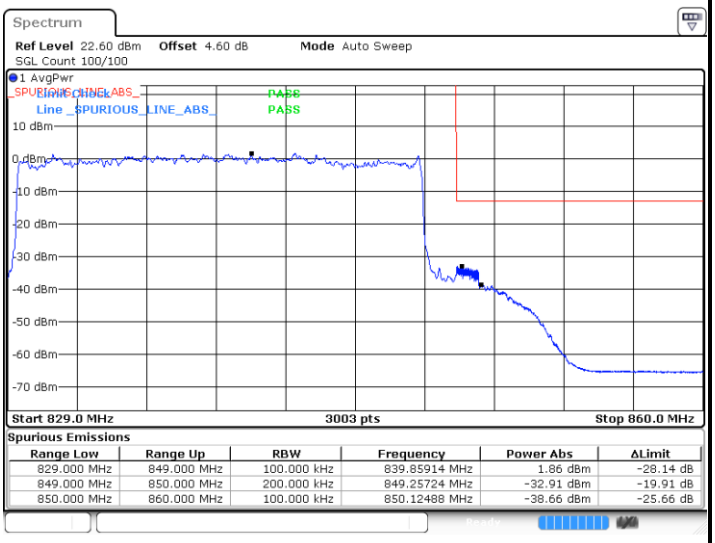
FR1 n5 / 15MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

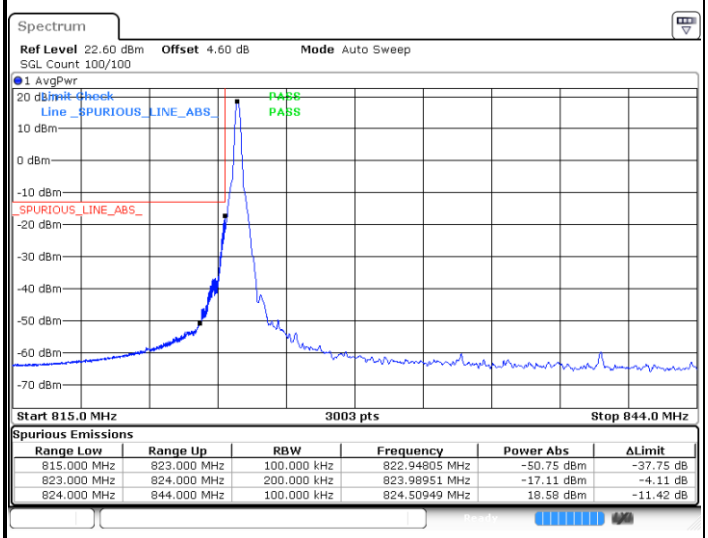
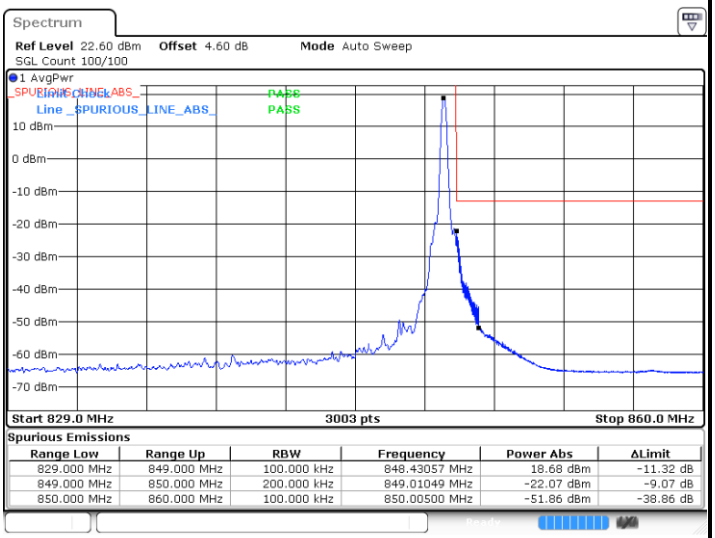
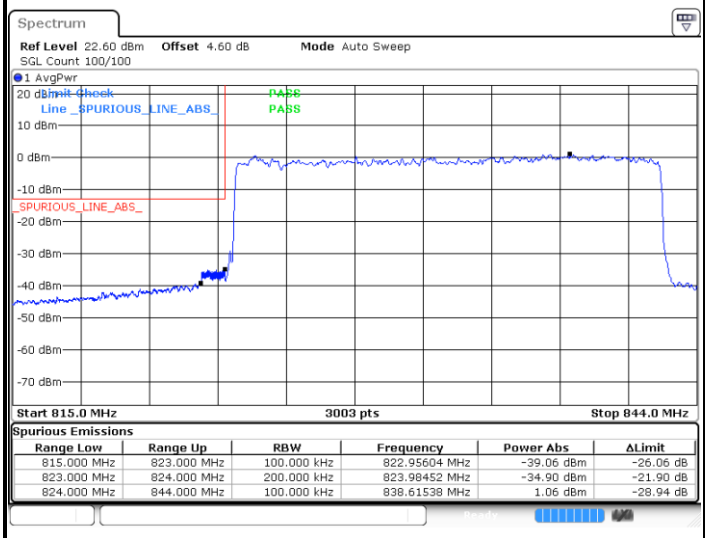
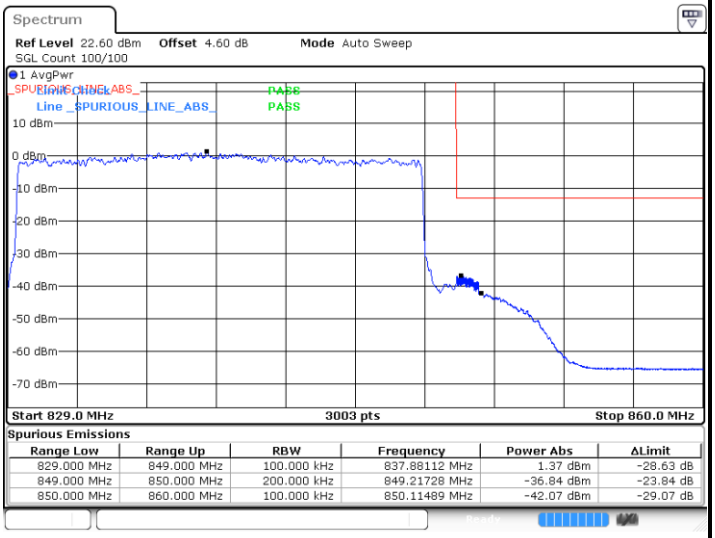
FR1 n5 / 15MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

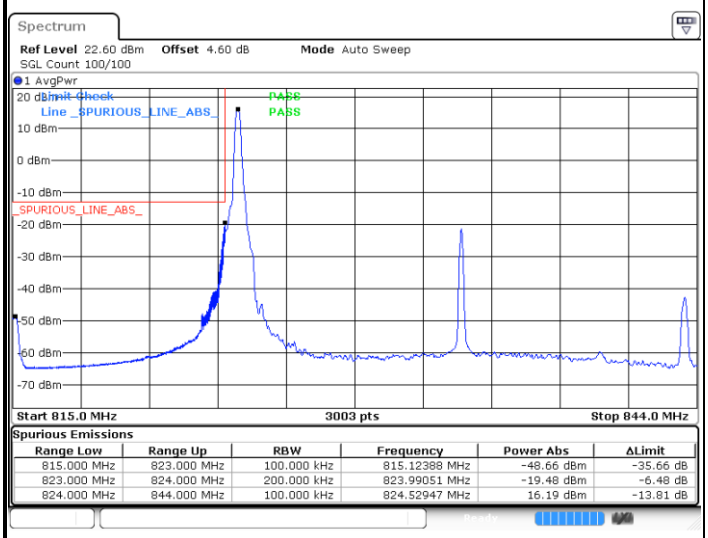
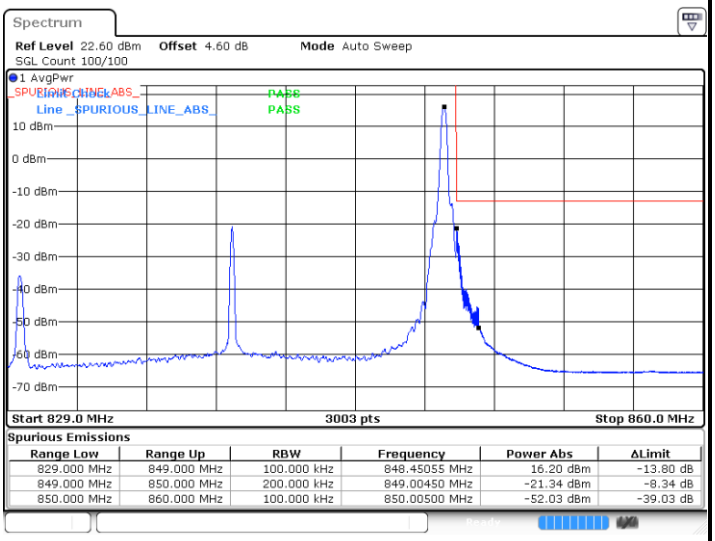
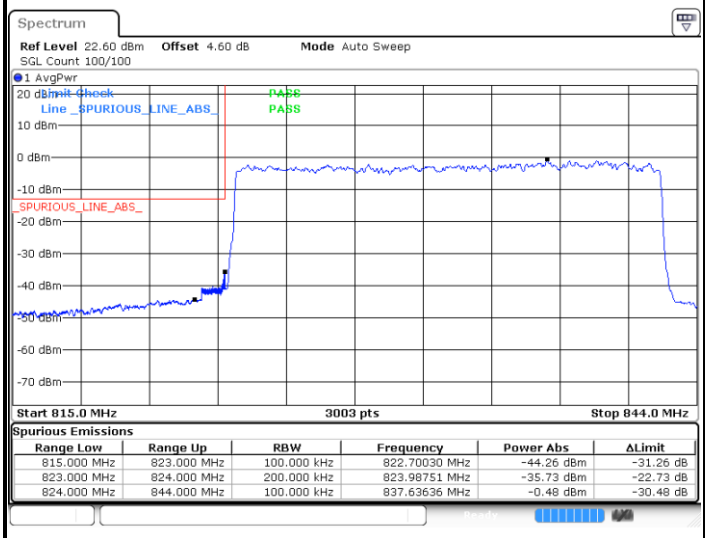
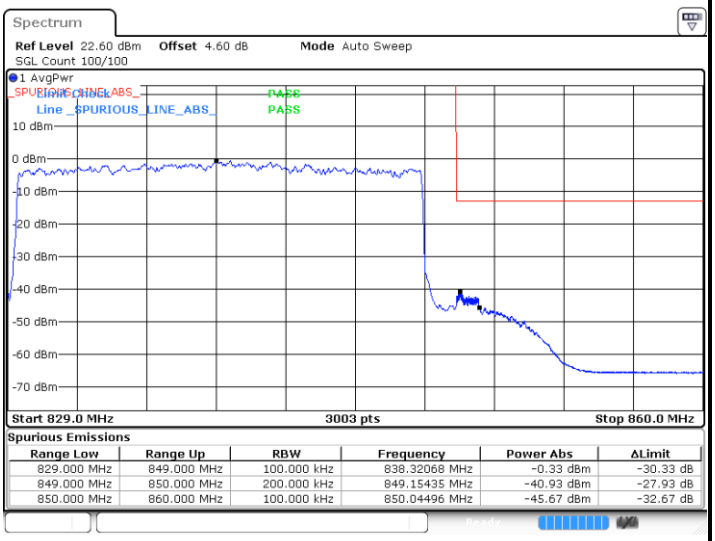
FR1 n5/ 15MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
 Date: 3.MAR.2022 11:20:18	 Date: 3.MAR.2022 11:32:23
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
 Date: 3.MAR.2022 11:19:41	 Date: 3.MAR.2022 11:29:47

FR1 n5 / 20MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Date: 3.MAR.2022 11:57:47	Date: 3.MAR.2022 12:26:59
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	
Date: 3.MAR.2022 11:51:23	Date: 3.MAR.2022 12:07:19

FR1 n5/ 20MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 20MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

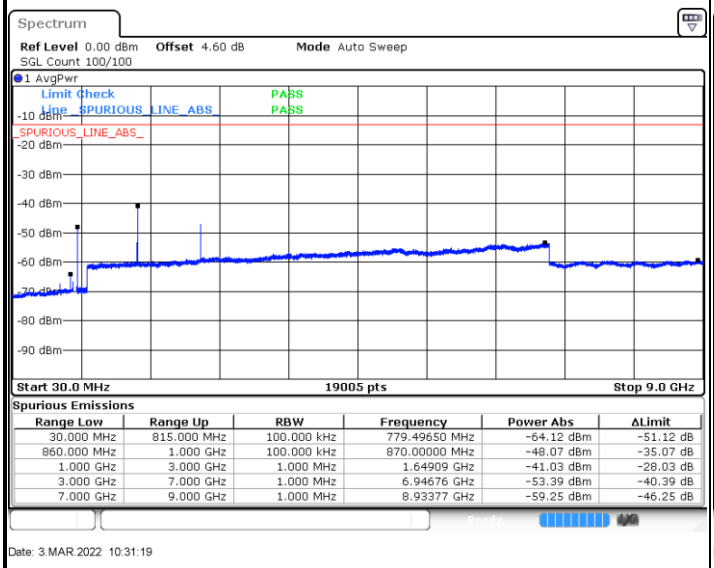
FR1 n5 / 20MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5/ 20MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
 Spurious Emissions Range Low / Range Up / RBW / Frequency / Power Abs / ΔLimit 815.000 MHz / 823.000 MHz / 100.000 kHz / 815.12388 MHz / -48.66 dBm / -35.66 dB 823.000 MHz / 824.000 MHz / 200.000 kHz / 823.99051 MHz / -19.48 dBm / -6.48 dB 824.000 MHz / 844.000 MHz / 100.000 kHz / 824.52947 MHz / 16.19 dBm / -13.81 dB Date: 3.MAR.2022 11:55:16	 Spurious Emissions Range Low / Range Up / RBW / Frequency / Power Abs / ΔLimit 829.000 MHz / 849.000 MHz / 100.000 kHz / 848.45055 MHz / 16.20 dBm / -13.80 dB 849.000 MHz / 850.000 MHz / 200.000 kHz / 849.00450 MHz / -21.34 dBm / -8.34 dB 850.000 MHz / 860.000 MHz / 100.000 kHz / 850.00500 MHz / -52.03 dBm / -39.03 dB Date: 3.MAR.2022 12:11:16
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
 Spurious Emissions Range Low / Range Up / RBW / Frequency / Power Abs / ΔLimit 815.000 MHz / 823.000 MHz / 100.000 kHz / 822.70030 MHz / -44.26 dBm / -31.26 dB 823.000 MHz / 824.000 MHz / 200.000 kHz / 823.98751 MHz / -35.73 dBm / -22.73 dB 824.000 MHz / 844.000 MHz / 100.000 kHz / 837.63636 MHz / -0.48 dBm / -30.48 dB Date: 3.MAR.2022 11:54:42	 Spurious Emissions Range Low / Range Up / RBW / Frequency / Power Abs / ΔLimit 829.000 MHz / 849.000 MHz / 100.000 kHz / 838.32068 MHz / -0.33 dBm / -30.33 dB 849.000 MHz / 850.000 MHz / 200.000 kHz / 849.15435 MHz / -40.93 dBm / -27.93 dB 850.000 MHz / 860.000 MHz / 100.000 kHz / 850.04496 MHz / -45.67 dBm / -32.67 dB Date: 3.MAR.2022 12:10:14

Conducted Spurious Emission

FR1 n5 / 5MHz / DFT-S OFDM / QPSK

Lowest Channel / 1RB1

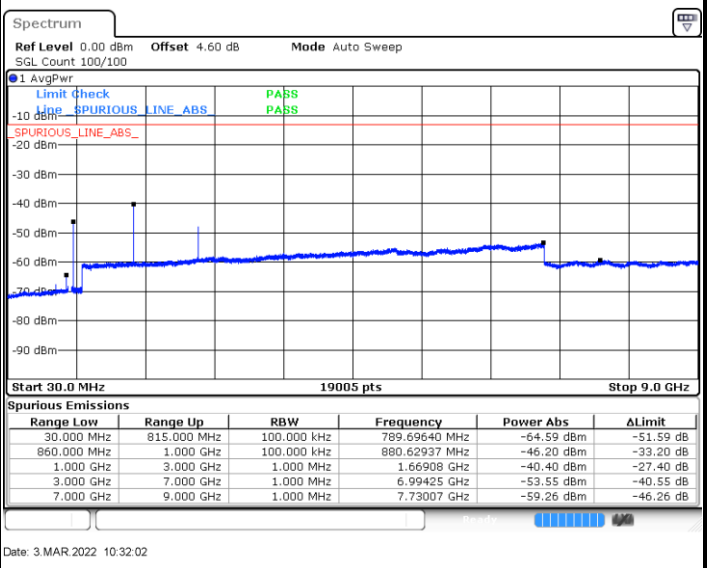


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	815.000 MHz	100.000 kHz	779.49650 MHz	-64.12 dBm	-51.12 dB
860.000 MHz	1.000 GHz	100.000 kHz	870.00000 MHz	-48.07 dBm	-35.07 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.64909 GHz	-41.03 dBm	-28.03 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94676 GHz	-53.39 dBm	-40.39 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.93377 GHz	-59.25 dBm	-46.25 dB

Date: 3.MAR.2022 10:31:19

Middle Channel / 1RB1

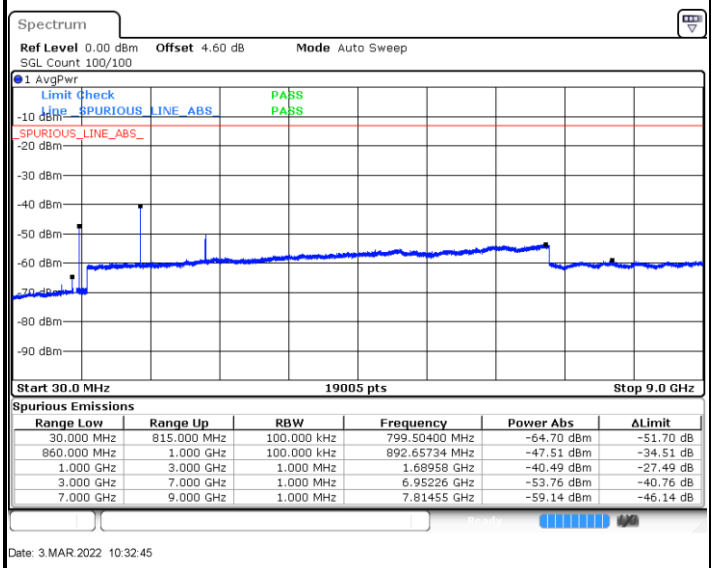


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	815.000 MHz	100.000 kHz	789.69640 MHz	-64.59 dBm	-51.59 dB
860.000 MHz	1.000 GHz	100.000 kHz	880.62937 MHz	-46.20 dBm	-33.20 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.66908 GHz	-40.40 dBm	-27.40 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.99425 GHz	-53.55 dBm	-40.55 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.73007 GHz	-59.26 dBm	-46.26 dB

Date: 3.MAR.2022 10:32:02

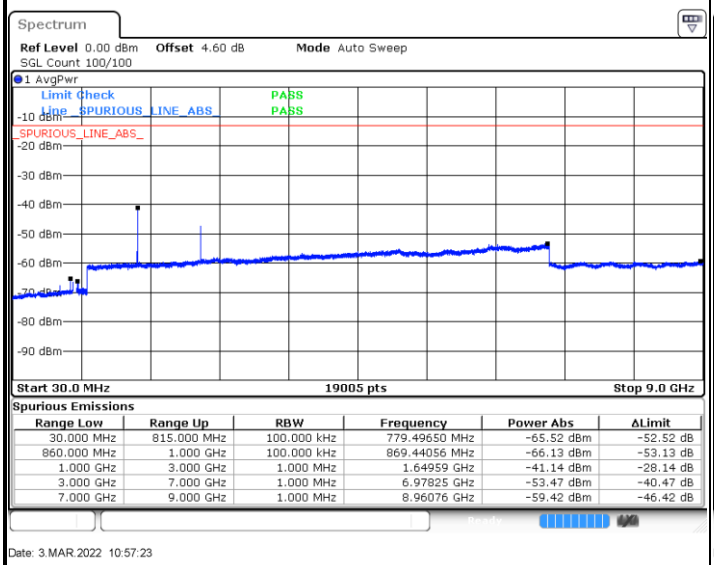
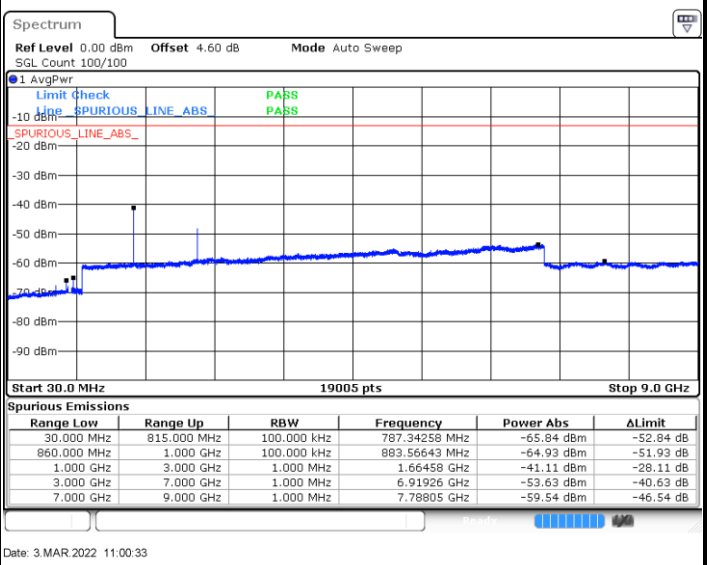
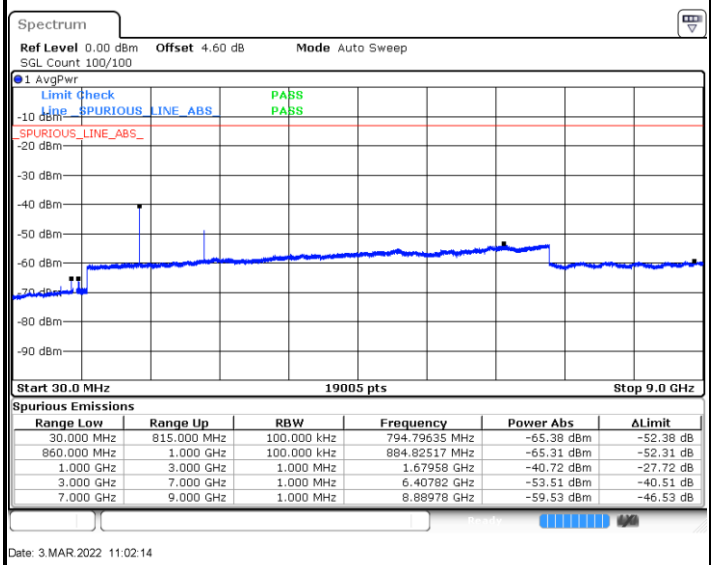
Highest Channel / 1RB1

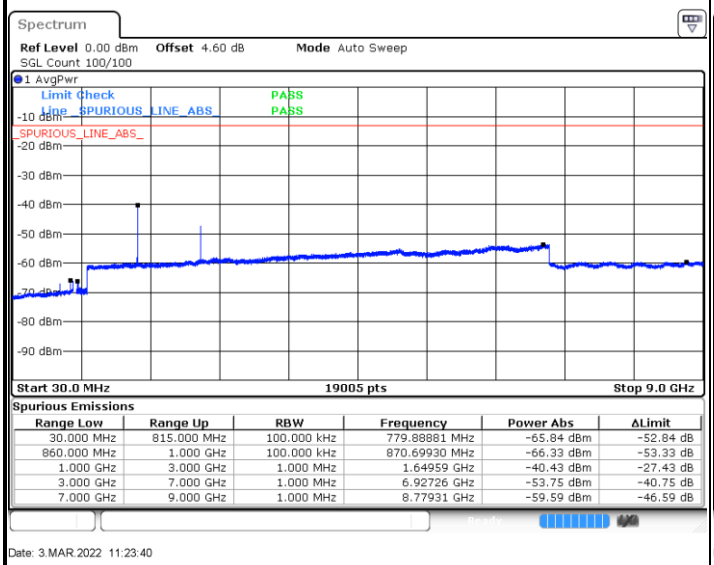
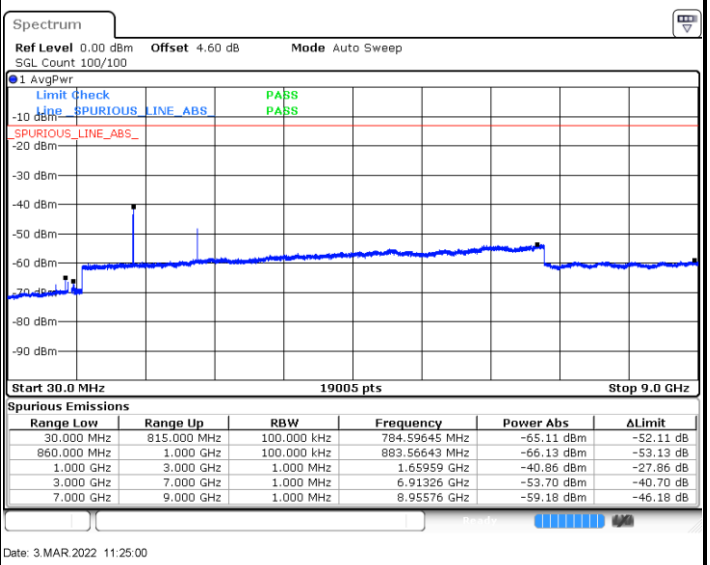
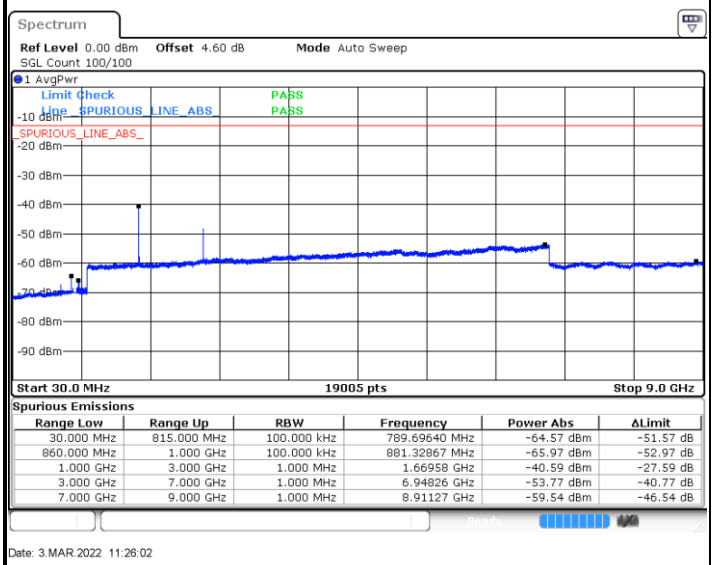


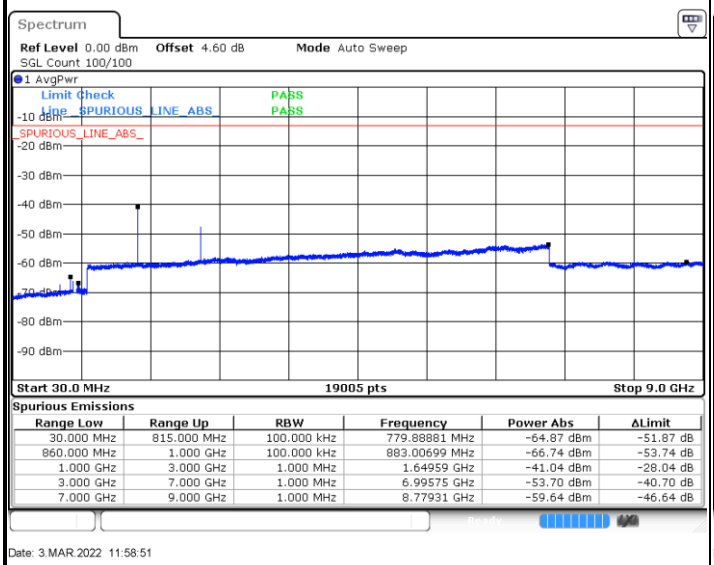
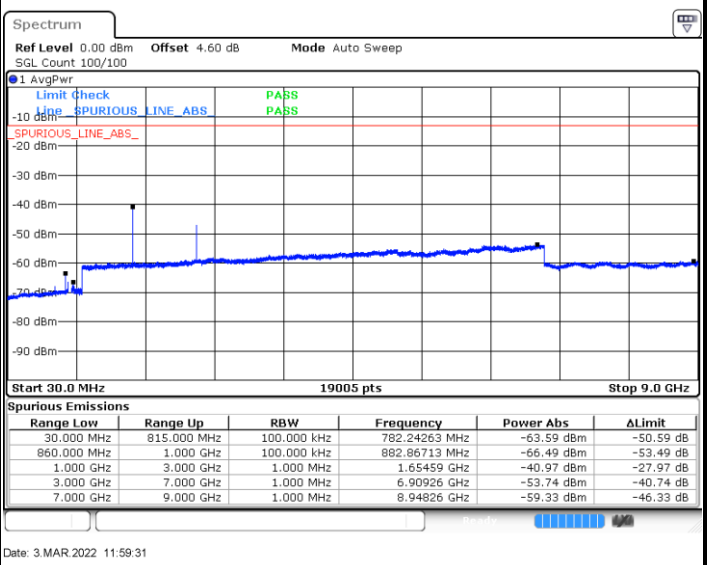
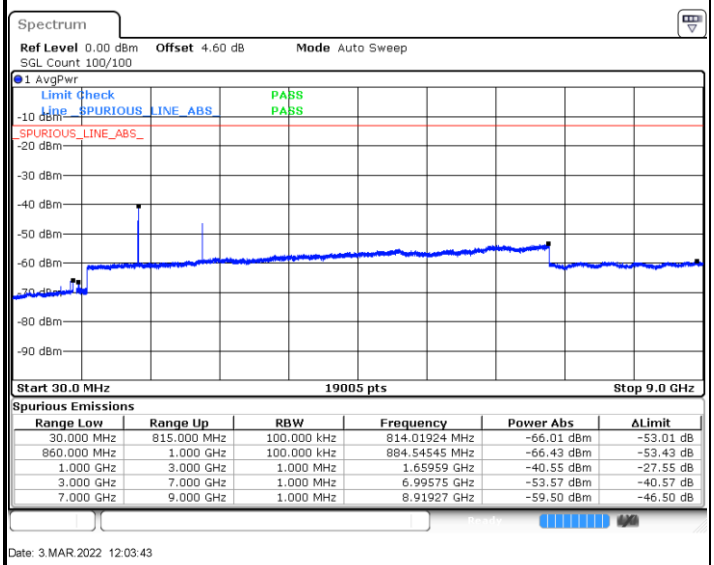
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	815.000 MHz	100.000 kHz	799.50400 MHz	-64.70 dBm	-51.70 dB
860.000 MHz	1.000 GHz	100.000 kHz	892.65734 MHz	-47.51 dBm	-34.51 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.68958 GHz	-40.49 dBm	-27.49 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.95226 GHz	-53.76 dBm	-40.76 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.81455 GHz	-59.14 dBm	-46.14 dB

Date: 3.MAR.2022 10:32:45

FR1 n5/ 10MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

FR1 n5 / 15MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

FR1 n5 / 20MHz / DFT-S OFDM / QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**
	
Highest Channel / 1RB1	
	

Frequency Stability

Test Conditions		FR1 n5 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 20MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0025	PASS
40	Normal Voltage	0.0021	
30	Normal Voltage	0.0021	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0022	
0	Normal Voltage	0.0055	
-10	Normal Voltage	0.0001	
-20	Normal Voltage	0.0055	
-30	Normal Voltage	0.0014	
20	Maximum Voltage	0.0022	
20	Normal Voltage	0.0032	
20	Battery End Point	0.0065	

Note:

1. Normal Voltage =3.85 V. ; Battery End Point (BEP) =3.5V. ; Maximum Voltage =4.4 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

FR1 n71

Conducted Output Power(Average power) and ERP

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	23.59	23.38	23.52	-5.53	0.0390	0.0372	0.0384
20	QPSK	1	1	23.50	23.33	23.46	-5.53	0.0382	0.0367	0.0378
20	QPSK	1	53	23.35	23.39	23.47	-5.53	0.0369	0.0372	0.0379
20	QPSK	1	104	23.34	23.38	23.28	-5.53	0.0368	0.0372	0.0363
20	QPSK	50	0	22.61	22.67	22.63	-5.53	0.0311	0.0316	0.0313
20	QPSK	50	28	23.62	23.57	23.62	-5.53	0.0393	0.0388	0.0393
20	QPSK	50	56	22.68	22.65	22.64	-5.53	0.0316	0.0314	0.0313
20	QPSK	100	0	22.73	22.69	22.61	-5.53	0.0320	0.0317	0.0311
20	16QAM	1	1	22.82	22.73	22.85	-5.53	0.0327	0.0320	0.0329
20	64QAM	1	1	21.17	21.35	20.97	-5.53	0.0223	0.0233	0.0213
20	256QAM	1	1	18.89	18.79	18.83	-5.53	0.0132	0.0129	0.0130
Channel				134100	136100	138100	Gain	ERP	ERP	ERP
Frequency (MHz)				670.5	680.5	690.5				
15	QPSK	1	1	23.54	23.45	23.46	-5.53	0.0385	0.0378	0.0378
15	16QAM	1	1	22.93	22.73	22.98	-5.53	0.0335	0.0320	0.0339
Channel				133600	136100	138600	Gain	ERP	ERP	ERP
Frequency (MHz)				668	680.5	693				
10	QPSK	1	1	23.59	23.54	23.63	-5.53	0.0390	0.0385	0.0394
10	16QAM	1	1	22.99	22.85	23.03	-5.53	0.0340	0.0329	0.0343
Channel				133100	136100	139100	Gain	ERP	ERP	ERP
Frequency (MHz)				665.5	680.5	695.5				
5	QPSK	1	1	23.61	23.48	23.52	-5.53	0.0392	0.0380	0.0384
5	16QAM	1	1	23.12	22.99	23.02	-5.53	0.0350	0.0340	0.0342

Peak-to-Average Ratio

Mode	FR1 n71 / 20MHz / 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	3.77	4.61	5.83	5.83	PASS
Mode	FR1 n71 / 20MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
Middle CH	6.29				PASS