FCC RADIO TEST REPORT

FCC ID	:	**OJFRN610**
Equipment	:	**Corning 5G Sub-6 N77 Radio Node, Corning 5G Sub-6 N77 External Antenna Radio Node**
Brand Name		**Everon RAN**
Model Name	:	**SCRN-610-77**
Applicant	:	**Corning Optical Communications LLC 6 Concord Road, Shrewsbury, MA 01545**
Manufacturer		**Corning Optical Communications LLC 6 Concord Road, Shrewsbury, MA 01545**
Standard	:	**FCC 47 CFR Part 2, 27**

The product was received on Jun. 17, 2022 and testing was performed from Jul. 04, 2022 to Nov. 14, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FG261332	01	Initial issue of report	Nov. 17, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§27.50 (j)(3)	Equivalent Isotropic Radiated Power (n77)	Pass	
3.3	§27.50 (j)(4)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §27.53 (l)(2)	Conducted Band Edge Measurement (n77)	Pass	-
3.6	§2.1051 §27.53 (l)(2)	Conducted Spurious Emission (n77)	Pass	-
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1051 §27.53 (l)(2)	Radiated Spurious Emission (n77)	Pass	Under limit 14.12 dB at 14880.000 MHz

Declaration of Conformity:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results. 2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".
Comments and Explanations:
The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Steve Chen

Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

5G NR

Product Feature	
Sample 1	EUT with External Antenna
Sample 2	EUT with Internal Antenna
Antenna Type	External: DAM-Dipole Antenna Internal: PIFA Antenna
Antenna Gain	**External Antenna:** <Ant. 1>: 6.22 dBi <Ant. 2>: 6.22 dBi <Ant. 3>: 6.22 dBi <Ant. 4>: 6.22 dBi **Internal Antenna** <Ant. 1>: 4.32 dBi <Ant. 2>: 4.55 dBi <Ant. 3>: 4.38 dBi <Ant. 4>: 4.01 dBi

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.
2. The device support 4T4R MIMO configuration and the antenna is completely uncorrelated.

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY
Test Engineer	Hao Syu
Temperature (℃)	21.5~25.2
Relative Humidity (%)	47.6~55.2

Test Site	Sporton International Inc. Wensan Laboratory.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH12-HY (TAF Code: 3786)
Test Engineer	Jesse Fan
Temperature (℃)	20~25
Relative Humidity (%)	50~60
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

1.4 Applicable Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- FCC 47 CFR Part 2, 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

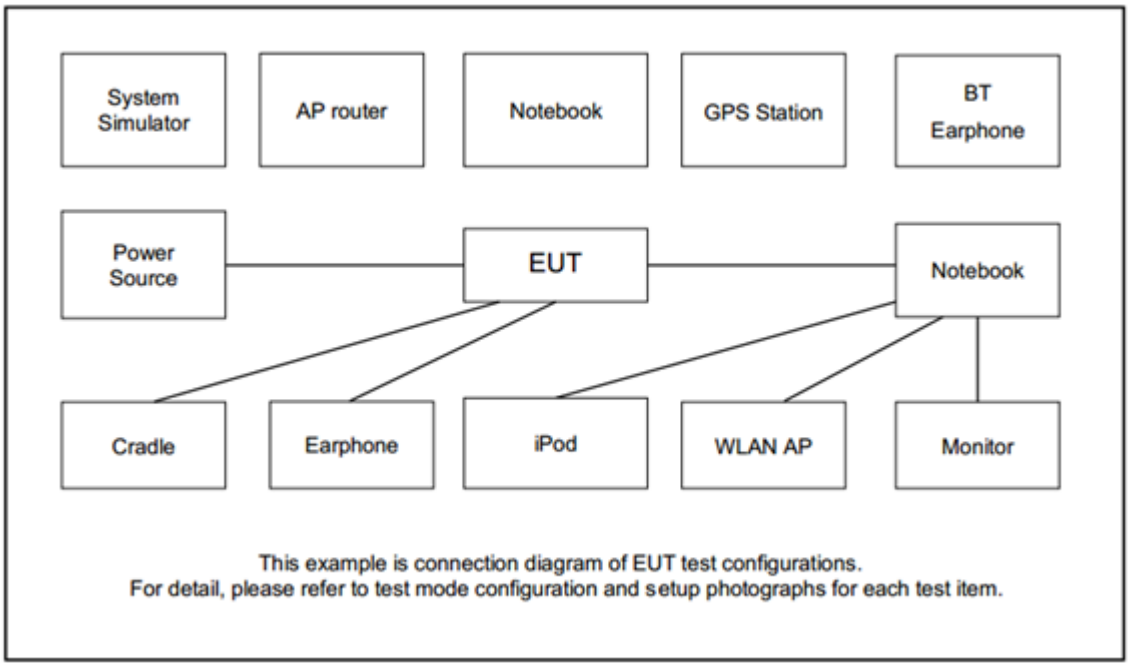
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in two config (Ant. Horizontal and Ant. Vertical), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and only the worst case emissions were reported in this report.

The conducted power for signal antenna would not exceed the conducted power for 4T4R MIMO configuration, so only MIMO configuration data is tested and reported.

Test Items	NR Band	Bandwidth (MHz)												Modulation				Test Channel		
		10	15	20	25	30	40	50	60	70	80	90	100	QPSK	16QAM	64QAM	256QAM	L	M	H
Max. Output Power	n77	-	-	-	-	-	v	-	v	-	v	-	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	n77	-	-	-	-	-	v	-		-		-		v	v	v	v		v	
26dB and 99% Bandwidth	n77	-	-	-	-	-	v	-	v	-	v	-	v	v	v	v	v		v	
Conducted Band Edge	n77	-	-	-	-	-	v	-	v	-	v	-	v	v	v	v	v	v		v
Conducted Spurious Emission	n77	-	-	-	-	-	v	-	v	-	v	-	v	v				v	v	v
Frequency Stability	n77	-	-	-	-	-	v	-		-		-		v					v	
E.I.R.P	n77	-	-	-	-	-	v	-	v	-	v	-	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n77	Worst Case																v	v	v
Remark	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. 4. All the radiated test cases were performed with Sample 1. 5. One representative bandwidth is selected to perform PAR and frequency stability.																			

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	L340	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	PoE	Cisco systems	ADH-150AR B	N/A	N/A	N/A
3.	Router	Cisco systems	N540X-12Z16G-SYS-A	N/A	N/A	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 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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n77 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	650000	656000	662000
	Frequency	3750	3840	3930
80	Channel	649334	656000	662666
	Frequency	3740.01	3840	3939.99
60	Channel	648668	656000	663332
	Frequency	3730.02	3840	3949.98
40	Channel	648000	656000	664000
	Frequency	3720	3840	3960

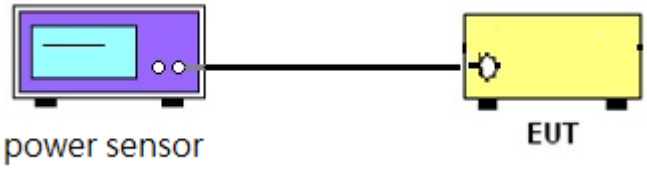
3 Conducted Test Items

3.1 Measuring Instruments

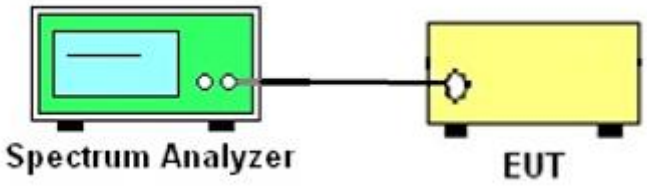
See list of measuring instruments of this test report.

3.1.1 Test Setup

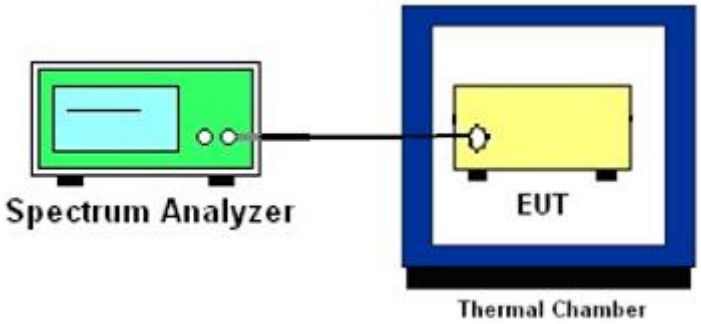
3.1.2 Conducted Output Power



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



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and EIRP

3.2.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A power sensor 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 EIRP of mobile transmitters must not exceed 1 Watts for 5G NR n77

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, 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

3.2.2 Test Procedures

1. The transmitter output port was connected to the power sensor.
2. Set EUT at maximum power.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the power sensor.
5. The measure-and-sum technique is used for measuring in-band transmit power of a device. Total power is the sum of the conducted power levels measured at the various output ports.

3.3 Peak-to-Average Ratio

3.3.1 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.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT was connected to spectrum.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Occupied Bandwidth

3.4.1 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.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer.
2. 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.
3. 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.
4. Set the detection mode to peak, and the trace mode to max hold.
5. 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)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. 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.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

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 (l)(2) 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
8. For MIMO measurement, the KDB 662911 E)2)c) is used as following:
   Measure and add 10 log(NANT) dB, where NANT is the number of outputs. With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity 10 log(NANT) dB is added to each spectrum value before comparing to the emission limit.

3.6 Conducted Spurious Emission

3.6.1 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.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
10. For MIMO measurement, the KDB 662911 E)2)c) is used as following:
    Measure and add 10 log(NANT) dB, where NANT is the number of outputs. With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity 10 log(NANT) dB is added to each spectrum value before comparing to the emission limit.

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the spectrum analyzer.
2. 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.
3. 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.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the spectrum analyzer.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

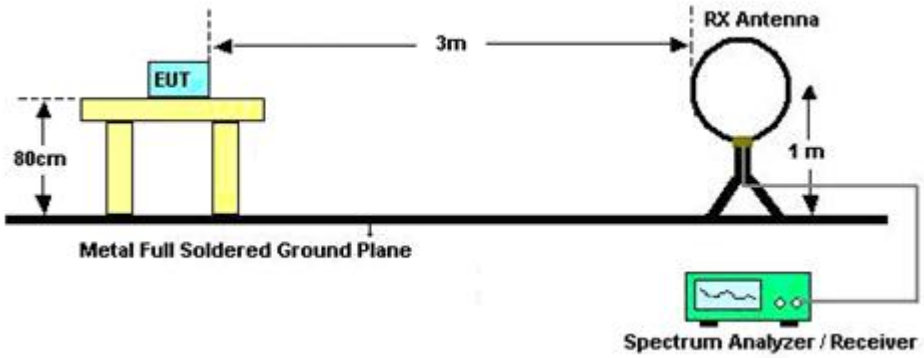
4 Radiated Test Items

4.1 Measuring Instruments

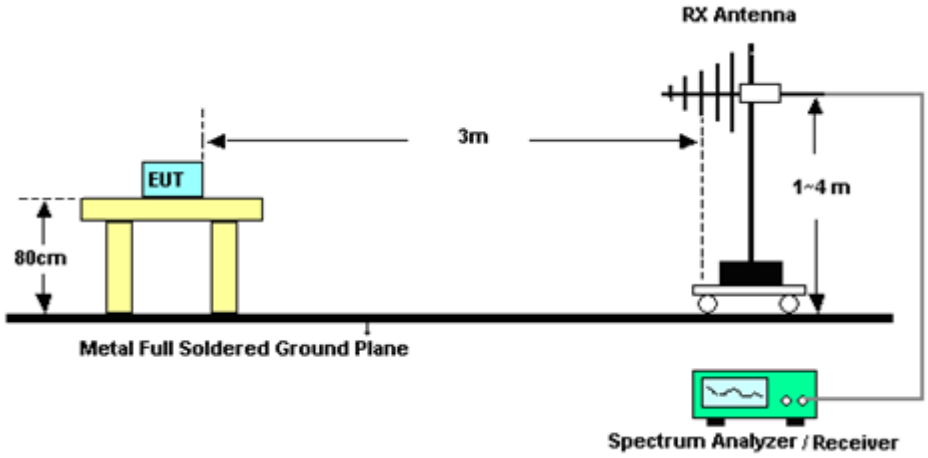
See list of measuring instruments of this test report.

4.1.1 Test Setup

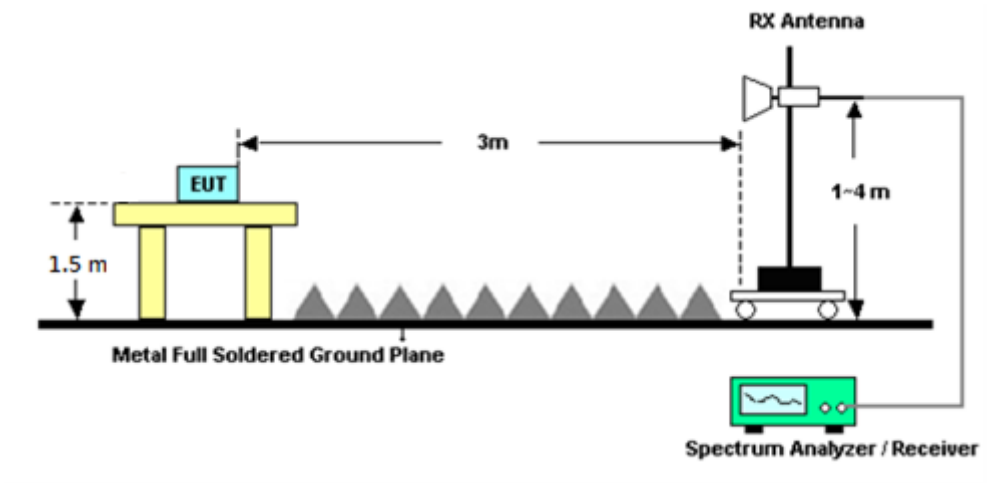
For radiated emissions below 30MHz



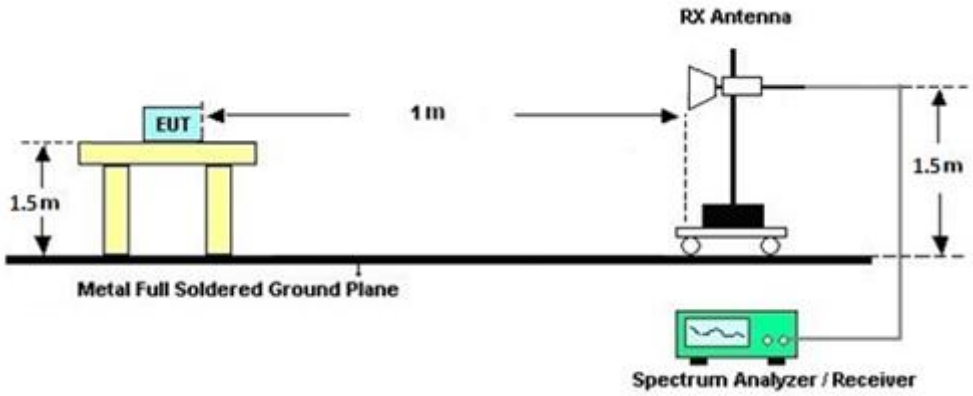
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

Note:

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.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. 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.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. 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)

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	May 13, 2022	Sep. 23, 2022	May 12, 2023	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Dec. 03, 2021	Sep. 23, 2022	Dec. 02, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	37059 & 01	30MHz~1GHz	Oct. 09, 2021	Sep. 23, 2022	Oct. 08, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 09, 2021	Sep. 23, 2022	Oct. 08, 2022	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1212	1GHz~18GHz	Mar. 10, 2022	Sep. 23, 2022	Mar. 09, 2023	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Nov. 30, 2021	Sep. 23, 2022	Nov. 29, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 14, 2022	Sep. 23, 2022	May 13, 2023	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 23, 2022	Sep. 23, 2022	Mar. 22, 2023	Radiation (03CH12-HY)
Preamplifier	Aglient	8449B	3008A02375	1GHz~26.5GHz	May 24, 2022	Sep. 23, 2022	May 23, 2023	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 24, 2021	Sep. 23, 2022	Dec. 23, 2022	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY53470118	10Hz~44GHz	Jan. 12, 2022	Sep. 23, 2022	Jan. 11, 2023	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 10, 2022	Sep. 23, 2022	Mar. 09, 2023	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 21, 2022	Sep. 23, 2022	Feb. 20, 2023	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803953/2	30MHz~40GHz	Mar. 08, 2022	Sep. 23, 2022	Mar. 07, 2023	Radiation (03CH12-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN2	6.75GHz High Pass Filter	Mar. 15, 2022	Sep. 23, 2022	Mar. 14, 2023	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Sep. 30, 2021	Sep. 23, 2022	Sep. 29, 2022	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Sep. 23, 2022	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Sep. 23, 2022	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Sep. 23, 2022	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Sep. 23, 2022	N/A	Radiation (03CH12-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101103	10Hz~44GHz	Jan. 25, 2022	Jul. 04, 2022~ Nov. 14, 2022	Jan. 24, 2023	Conducted (TH03-HY)
Hygrometer	TECPEL	DTM-303B	TP200886	Temperature & Humidity	Mar. 21, 2022	Jul. 04, 2022~ Nov. 14, 2022	Mar. 20, 2023	Conducted (TH03-HY)
USB Power Sensor	DARE	RPR3006W	13I00030SNO32 (NO:43)	9kHz~6GHz	Dec. 09, 2021	Jul. 04, 2022~ Nov. 14, 2022	Dec. 08, 2022	Conducted (TH03-HY)
Temperature Chamber	Ten Billion	TTH-D3SP	TBN-930701	Temperature	Oct. 20, 2021	Jul. 04, 2022~ Sep. 02, 2022	Oct. 19, 2022	Conducted (TH03-HY)
Temperature Chamber	Ten Billion	TTH-D3SP	TBN-930701	Temperature	Oct. 19, 2022	Nov. 09, 2022~ Nov. 14, 2022	Oct. 18, 2023	Conducted (TH03-HY)
DC Power Supply	GW Instek	GPE2323	GET910896	0V~64V ; 0A~6A	Dec. 03, 2021	Jul. 04, 2022~ Nov. 14, 2022	Dec. 02, 2022	Conducted (TH03-HY)

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.31 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.25 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.81 dB**

Appendix A. Test Results of Conducted Test

QPSK	Average Burst Power (dBm)																				
	Low Channel							Middle Channel							High Channel						
	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit
40MHz	23.70	23.60	23.70	23.60	29.67	35.89	62.15	23.70	23.10	23.50	23.50	29.48	35.70	62.15	23.40	23.20	23.70	23.50	29.47	35.69	62.15
60MHz	23.80	23.80	23.80	23.70	29.80	36.02	62.15	23.80	23.70	23.80	23.80	29.80	36.02	62.15	23.80	23.60	23.70	23.70	29.72	35.94	62.15
80MHz	23.80	23.80	23.80	23.80	29.82	36.04	62.15	23.80	23.40	23.80	23.80	29.72	35.94	62.15	23.60	23.30	23.30	23.40	29.42	35.64	62.15
100MHz	23.70	23.40	23.70	23.60	29.62	35.84	62.15	23.80	23.30	23.70	23.70	29.65	35.87	62.15	23.80	23.50	23.80	23.80	29.75	35.97	62.15
Result	Pass							Pass							Pass						

16QAM	Average Burst Power (dBm)																				
	Low Channel							Middle Channel							High Channel						
	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit
40MHz	23.80	23.70	23.70	23.70	29.75	35.97	62.15	23.90	23.30	23.80	23.60	29.68	35.90	62.15	23.70	23.40	23.80	23.60	29.65	35.87	62.15
60MHz	23.70	23.70	23.80	23.70	29.75	35.97	62.15	23.80	23.50	23.80	23.70	29.72	35.94	62.15	23.80	23.60	23.80	23.80	29.77	35.99	62.15
80MHz	23.80	23.70	23.80	23.80	29.80	36.02	62.15	23.70	23.80	23.80	23.80	29.80	36.02	62.15	23.60	23.30	23.50	23.40	29.47	35.69	62.15
100MHz	23.80	23.40	23.80	23.60	29.67	35.89	62.15	23.70	23.20	23.70	23.80	29.63	35.85	62.15	23.80	23.30	23.70	23.60	29.62	35.84	62.15
Result	Pass							Pass							Pass						

64QAM	Average Burst Power (dBm)																				
	Low Channel							Middle Channel							High Channel						
	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit
40MHz	23.80	23.70	23.80	23.80	29.80	36.02	62.15	23.70	23.30	23.70	23.50	29.57	35.79	62.15	23.70	23.50	23.80	23.70	29.70	35.92	62.15
60MHz	23.80	23.70	23.80	23.80	29.80	36.02	62.15	23.70	23.80	23.80	23.80	29.80	36.02	62.15	23.70	23.60	23.70	23.80	29.72	35.94	62.15
80MHz	23.60	23.40	23.60	23.50	29.55	35.77	62.15	23.80	23.20	23.80	23.70	29.65	35.87	62.15	23.70	23.40	23.80	23.70	29.67	35.89	62.15
100MHz	23.70	23.60	23.80	23.60	29.70	35.92	62.15	23.80	23.30	23.70	23.80	29.68	35.90	62.15	23.70	23.40	23.80	23.60	29.65	35.87	62.15
Result	Pass							Pass							Pass						

256QAM	Average Burst Power (dBm)																				
	Low Channel							Middle Channel							High Channel						
	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit	ANT1	ANT2	ANT3	ANT4	SUM	EIRP	Limit
40MHz	23.60	23.10	23.50	23.40	29.42	35.64	62.15	23.80	23.00	23.70	23.70	29.58	35.80	62.15	23.40	23.20	23.80	23.40	29.48	35.70	62.15
60MHz	23.60	23.80	23.70	23.80	29.75	35.97	62.15	23.70	23.70	23.70	23.70	29.72	35.94	62.15	23.80	23.60	23.70	23.80	29.75	35.97	62.15
80MHz	23.60	23.40	23.50	23.60	29.55	35.77	62.15	23.80	23.20	23.70	23.70	29.63	35.85	62.15	23.50	23.30	23.70	23.60	29.55	35.77	62.15
100MHz	23.80	23.70	23.70	23.80	29.77	35.99	62.15	23.80	23.20	23.80	23.70	29.65	35.87	62.15	23.70	23.50	23.80	23.70	29.70	35.92	62.15
Result	Pass							Pass							Pass						

Note:
1. 1640 W/MHz = 62.15 dBm/MHz.
2. Channel power is measured and compared to the PSD limit, since the total power is always greater than the partial power.

FR1 n77 Conducted Test Items

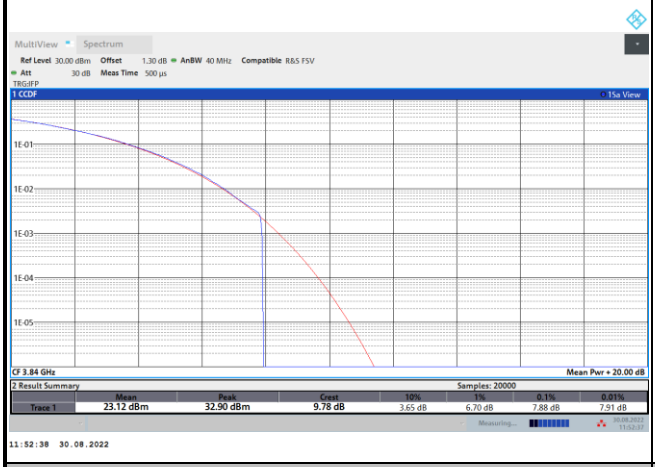
<MIMO ANT 1>

Peak-to-Average Ratio

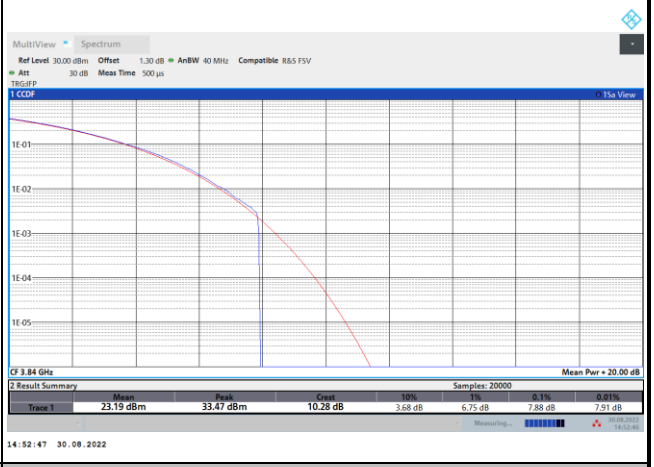
Mode	FR1 n77 / 40MHz / PAR (dB)				Limit: 13dB
Mod.	QPSK	16QAM	64QAM	256QAM	Result
Middle CH	7.88	7.88	6.58	6.70	PASS

FR1 n77 / 40MHz / Middle Channel / PAR

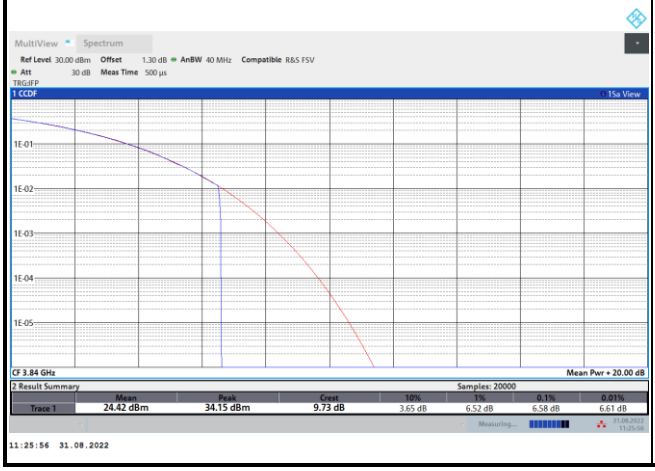
QPSK



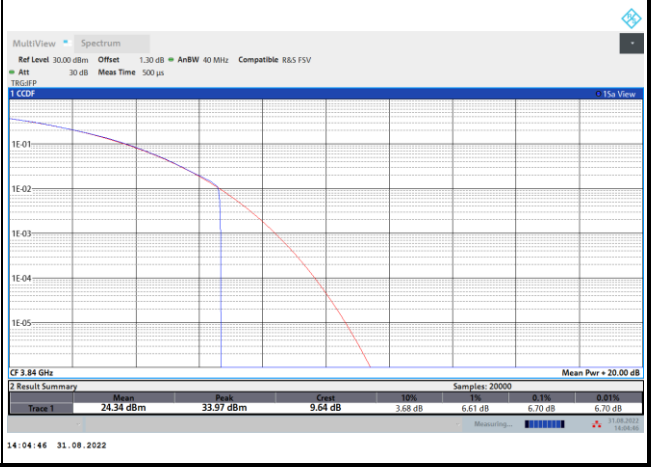
16QAM



64QAM



256QAM

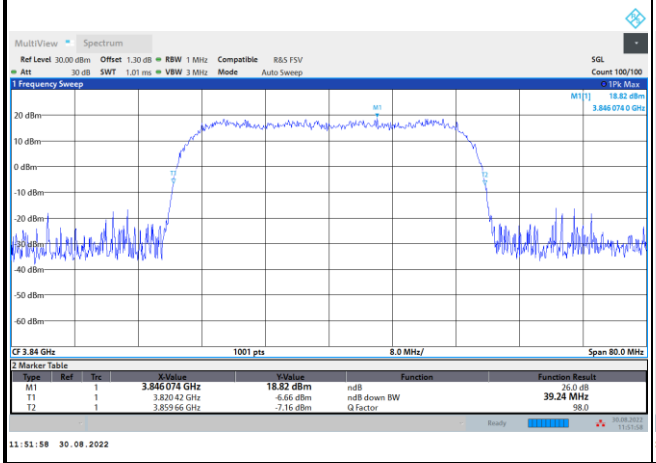


26dB Bandwidth

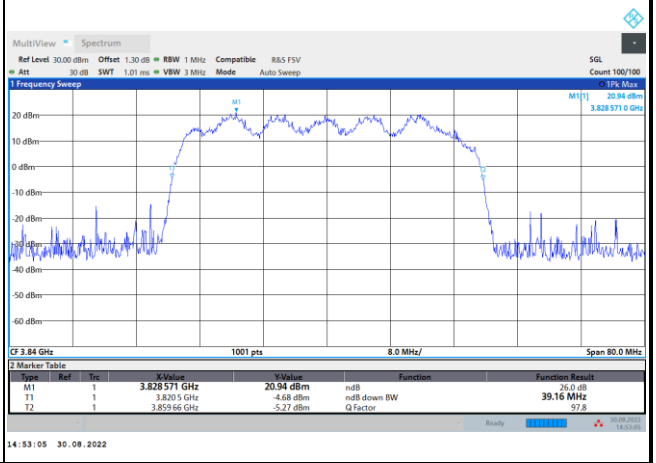
Mode	FR1 n77 : 26dB BW(MHz)					
BW	40MHz		60MHz		80MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	39.24	39.16	59.34	59.34	79.44	79.44
Mod.	64QAM	256QAM	64QAM	256QAM	64QAM	256QAM
Middle CH	39.40	39.32	59.34	59.46	79.60	79.60
BW	100MHz					
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	99.50	99.70				
Mod.	64QAM	256QAM	64QAM	256QAM	64QAM	256QAM
Middle CH	99.50	99.50				

FR1 n77 / 40MHz / Middle Channel / 26dB BW

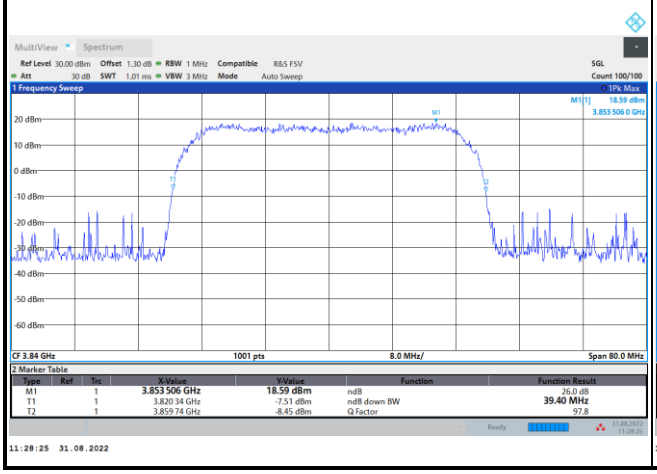
QPSK



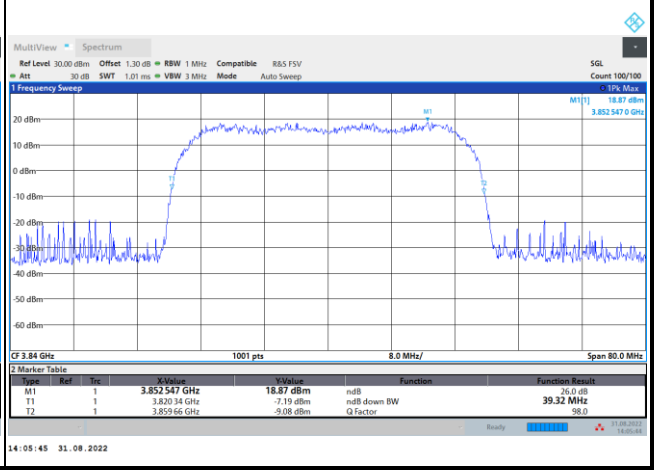
16QAM

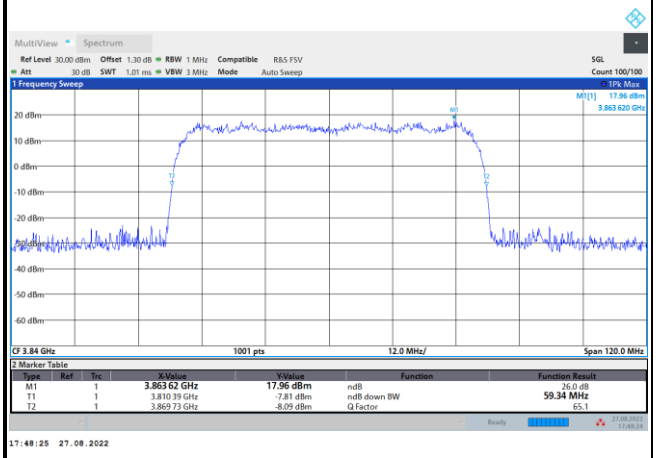
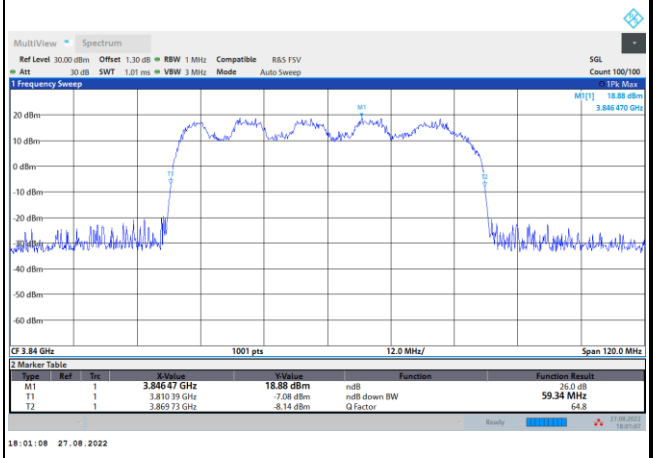
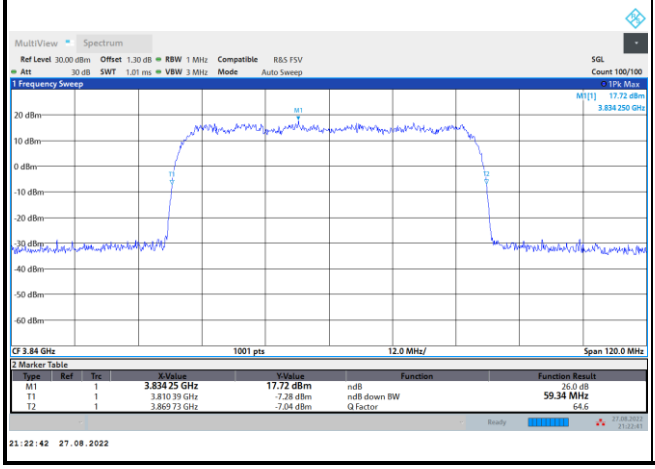
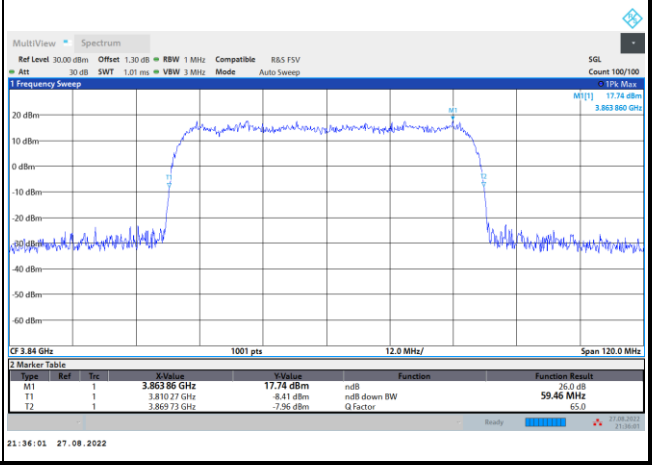


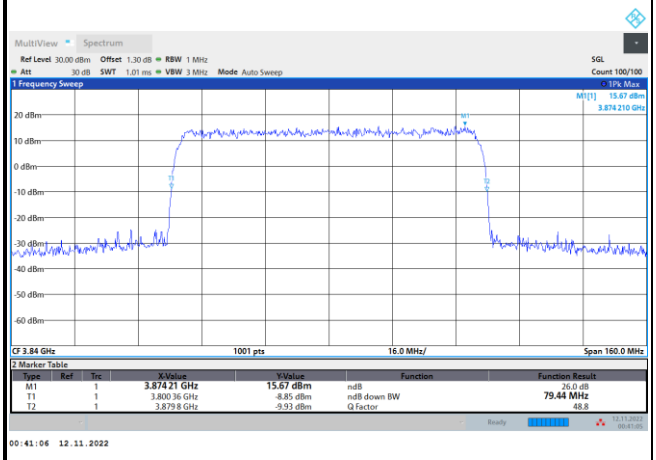
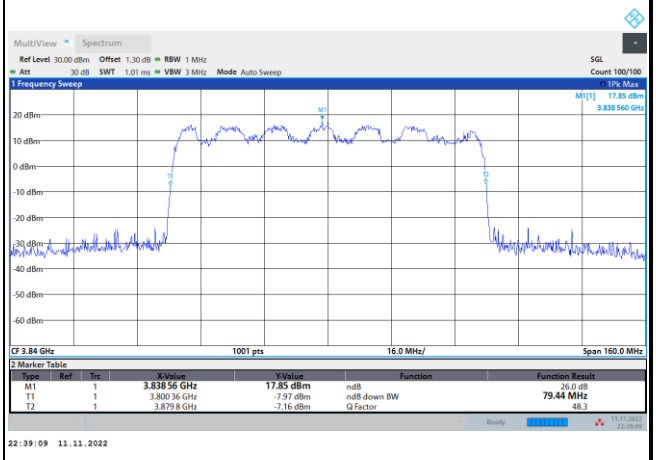
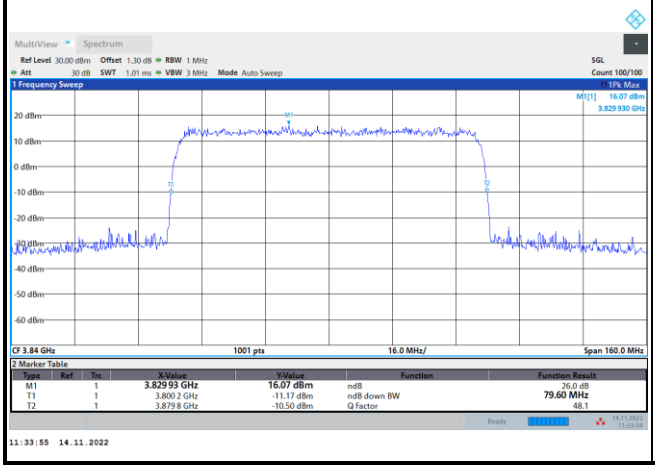
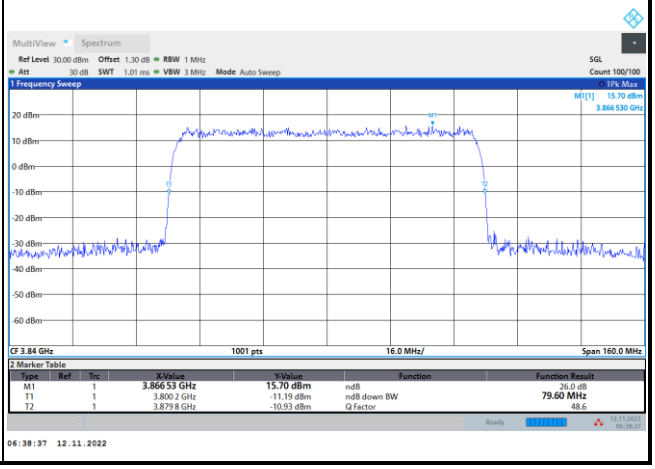
64QAM

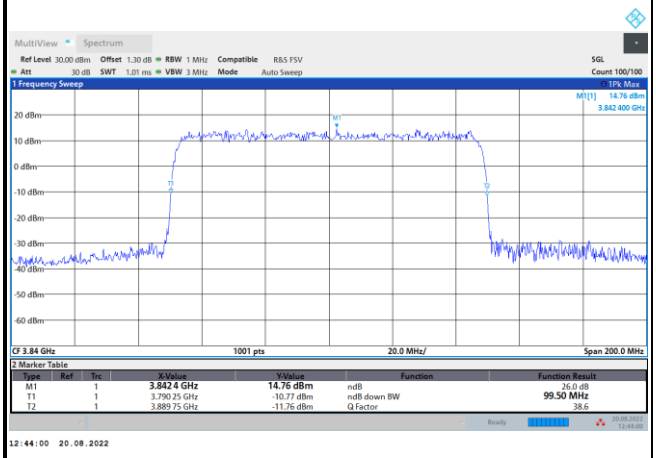
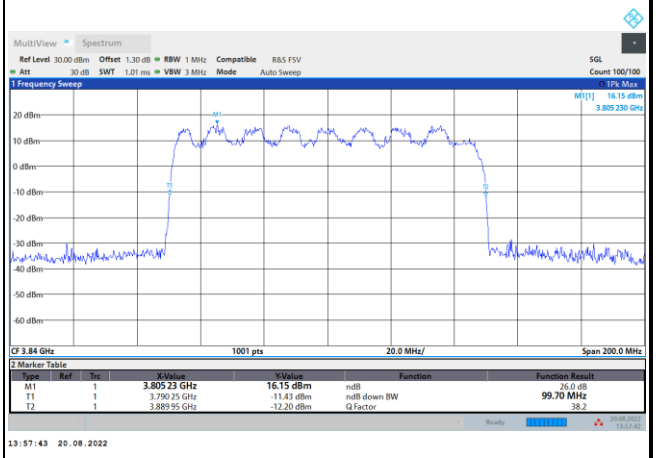
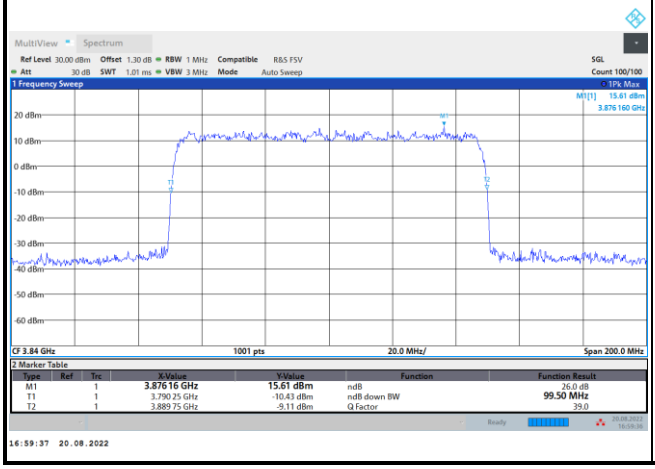
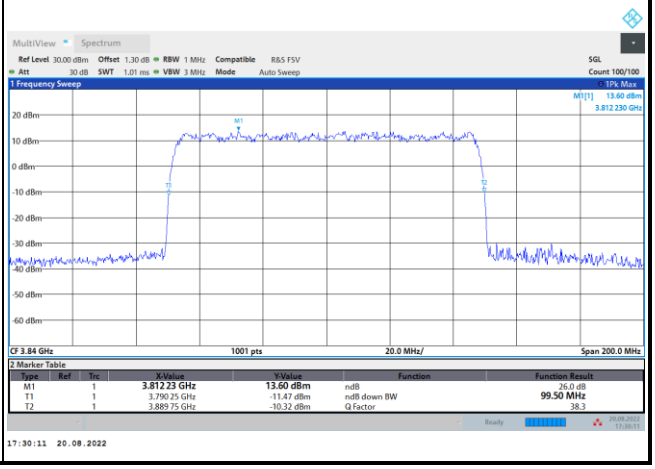


256QAM



FR1 n77 / 60MHz / Middle Channel / 26dB BW	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n77 / 80MHz / Middle Channel / 26dB BW	
QPSK	16QAM
	
64QAM	256QAM
	

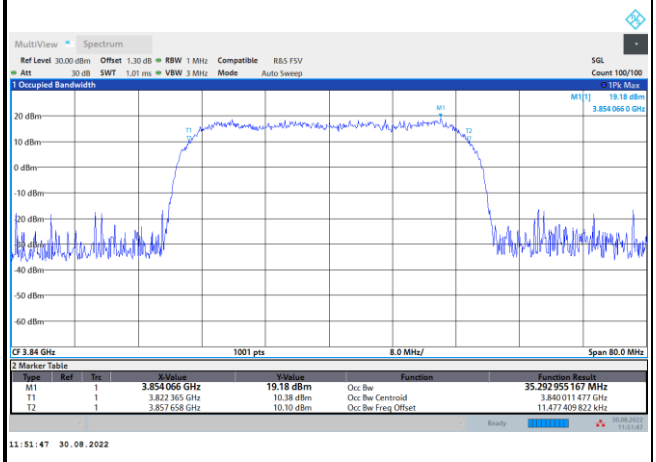
FR1 n77 / 100MHz / Middle Channel / 26dB BW	
QPSK	16QAM
	
64QAM	256QAM
	

Occupied Bandwidth

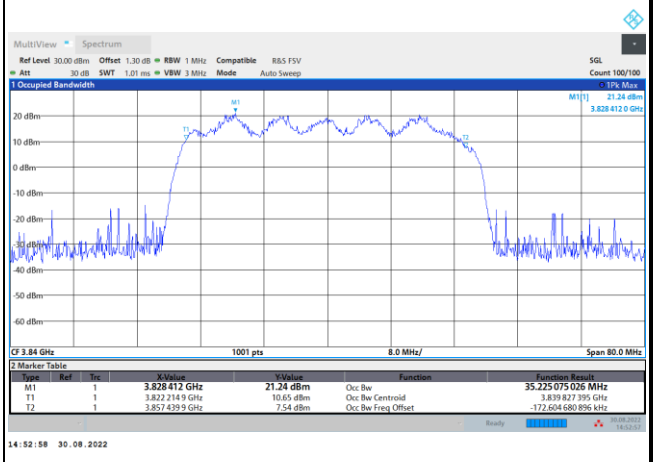
Mode	FR1 n77 : 99%OBW (MHz)					
BW	40MHz		60MHz		80MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	35.29	35.22	55.19	54.79	74.96	75.57
Mod.	64QAM	256QAM	64QAM	256QAM	64QAM	256QAM
Middle CH	35.42	35.27	54.76	54.91	75.06	75.25
BW	100MHz					
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	94.28	93.94				
Mod.	64QAM	256QAM	64QAM	256QAM	64QAM	256QAM
Middle CH	94.44	94.35				

FR1 n77 / 40MHz / Middle Channel / 99%OBW

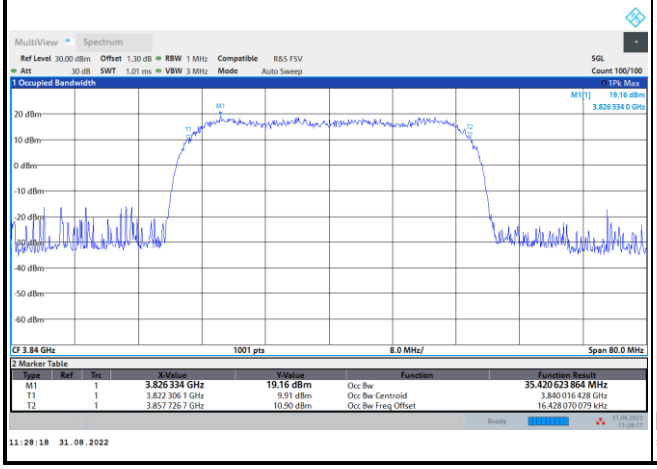
QPSK



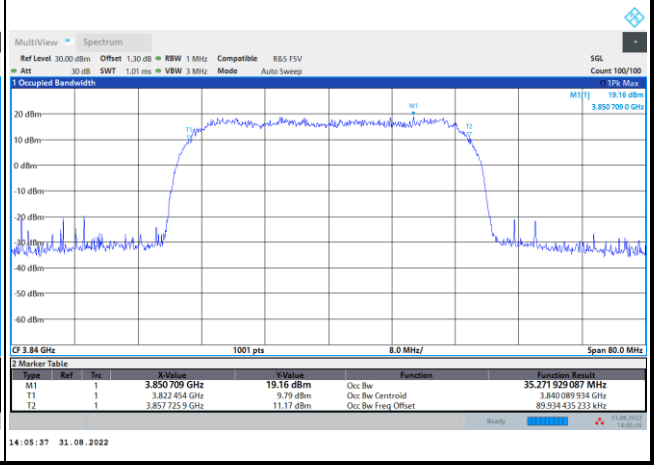
16QAM

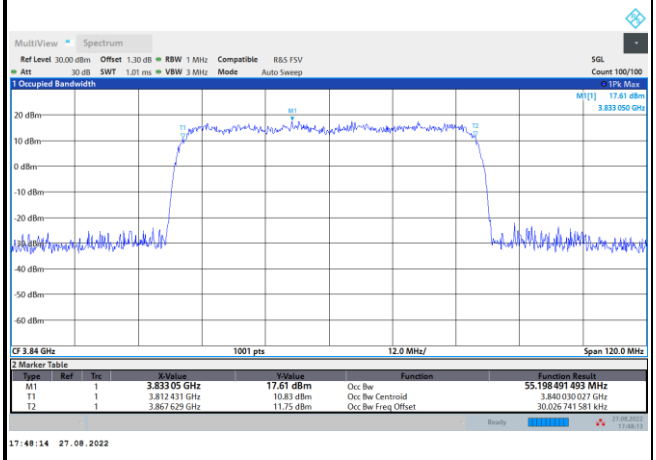
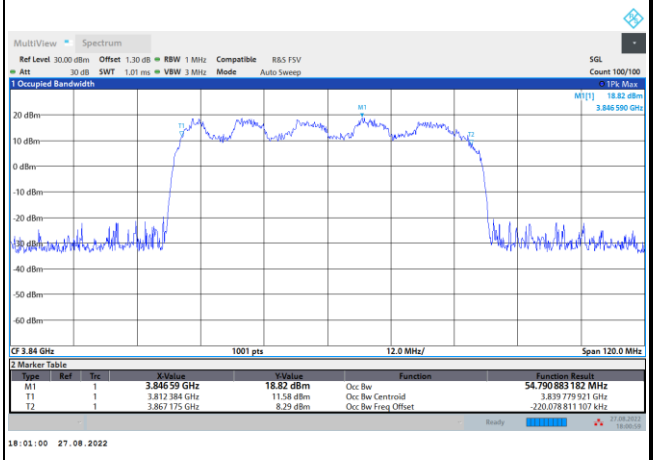
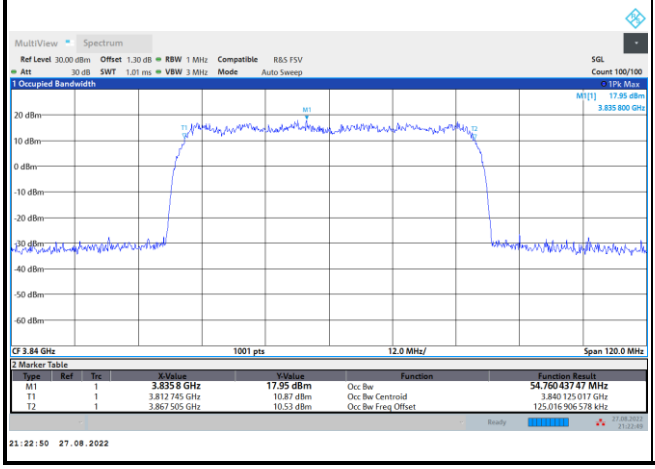
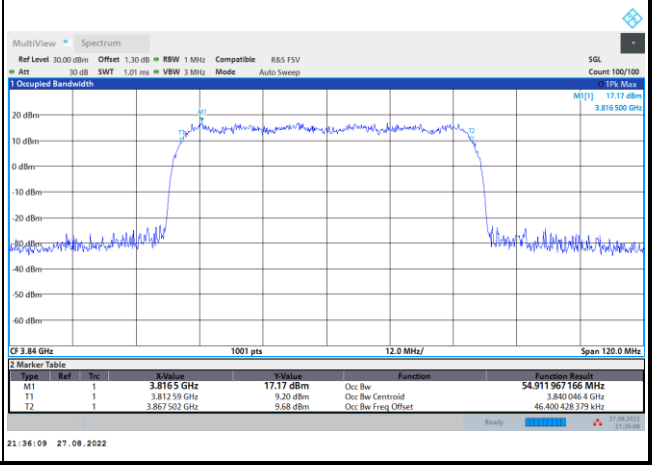


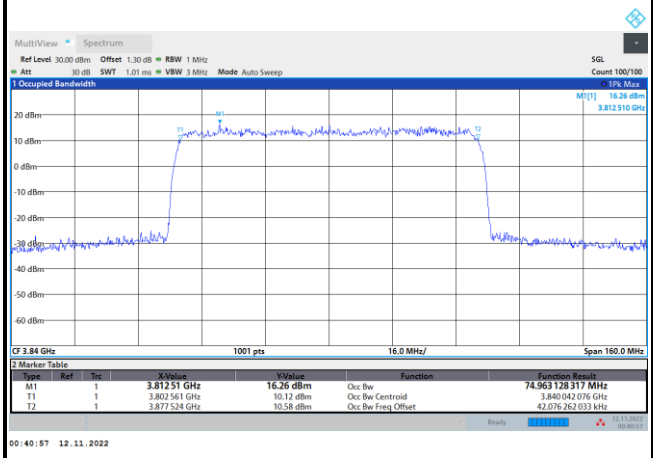
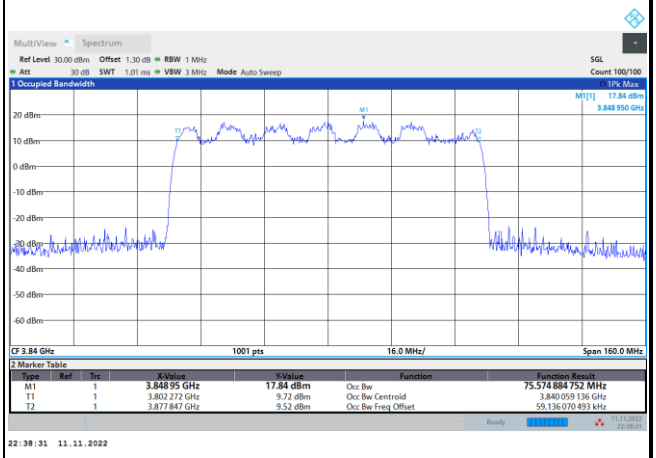
64QAM



256QAM



FR1 n77 / 60MHz / Middle Channel / 99%OBW	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n77 / 80MHz / Middle Channel / 99%OBW	
QPSK	16QAM
	
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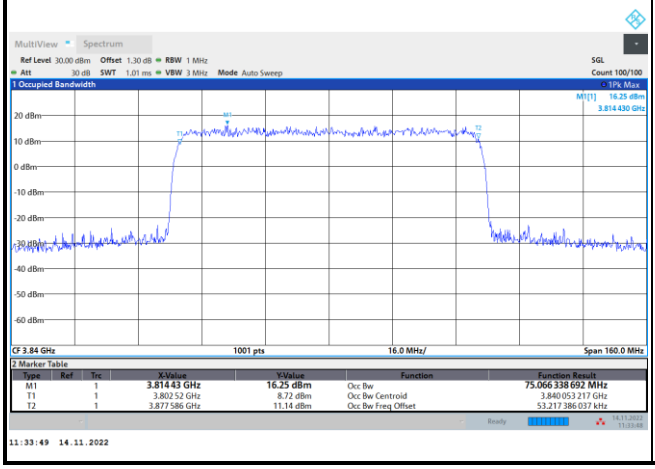
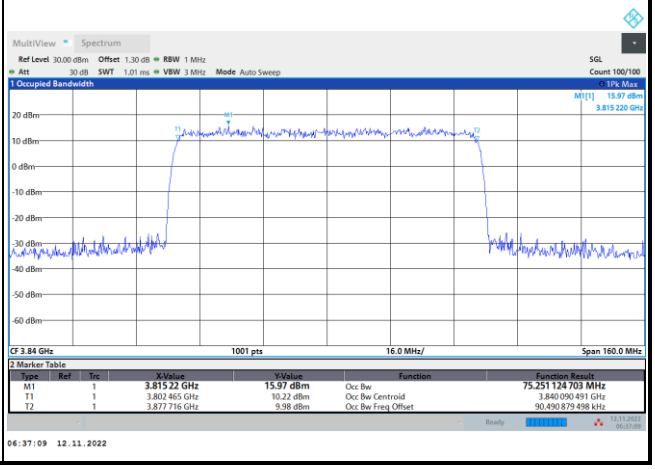
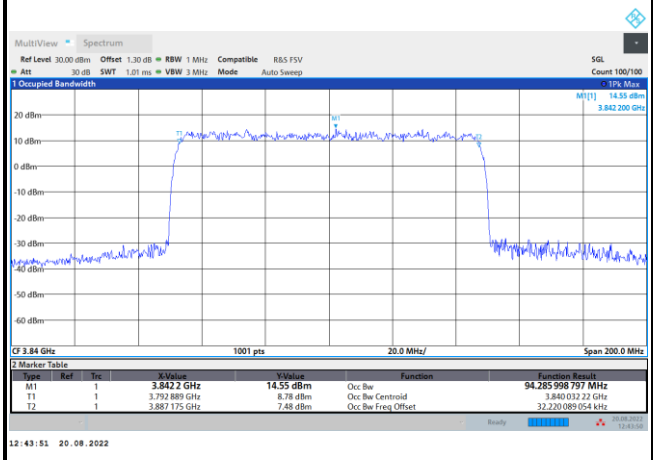
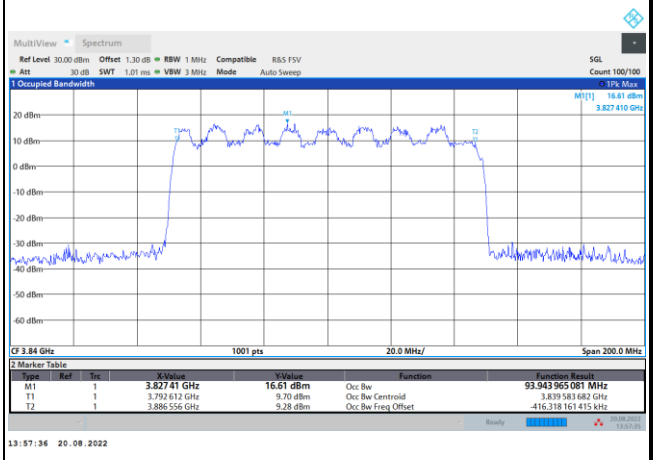
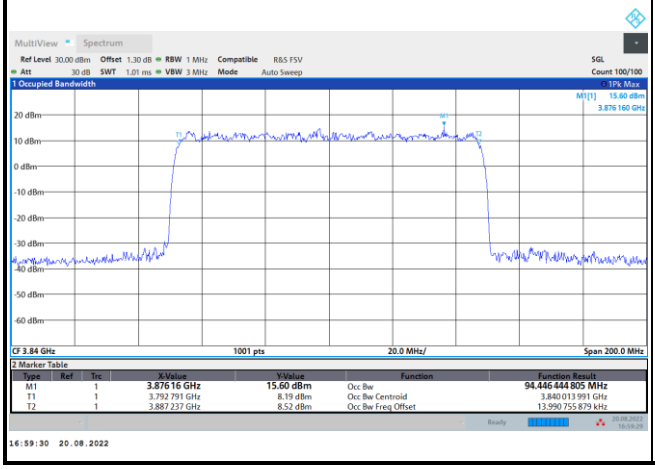
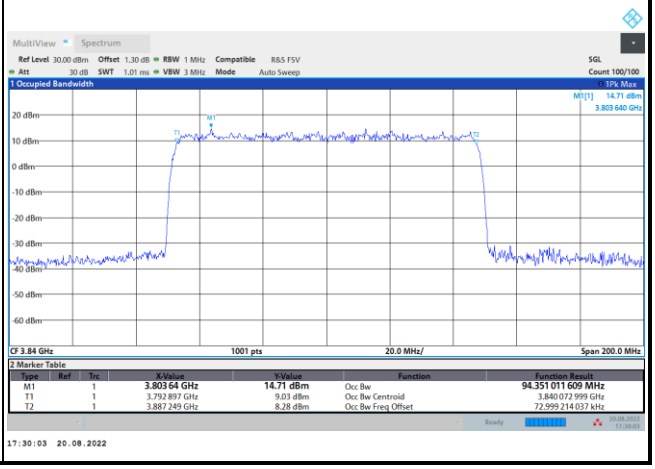
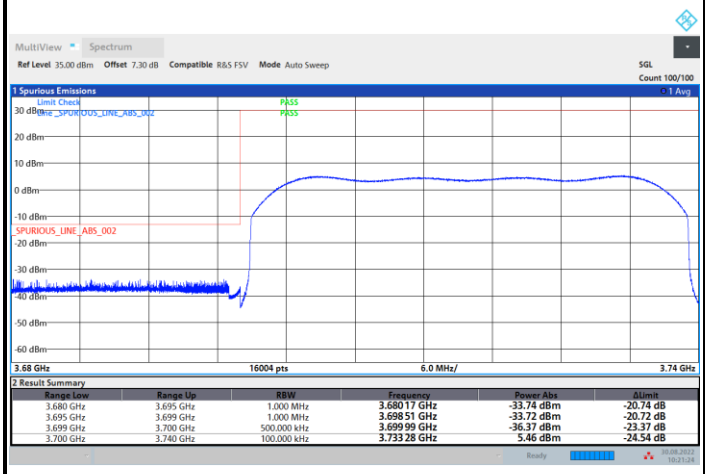
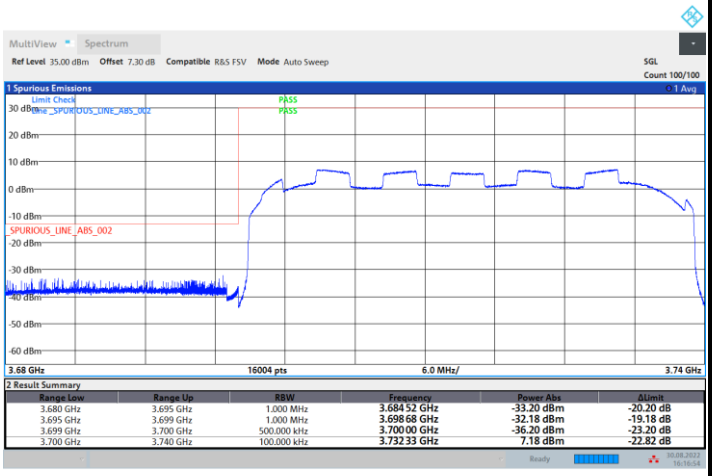
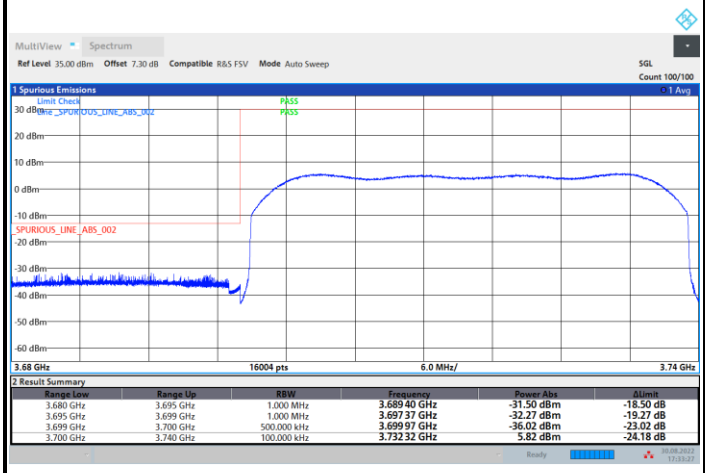
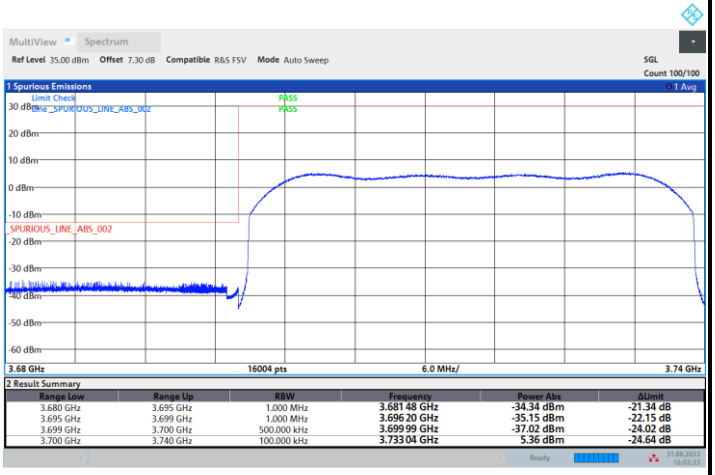
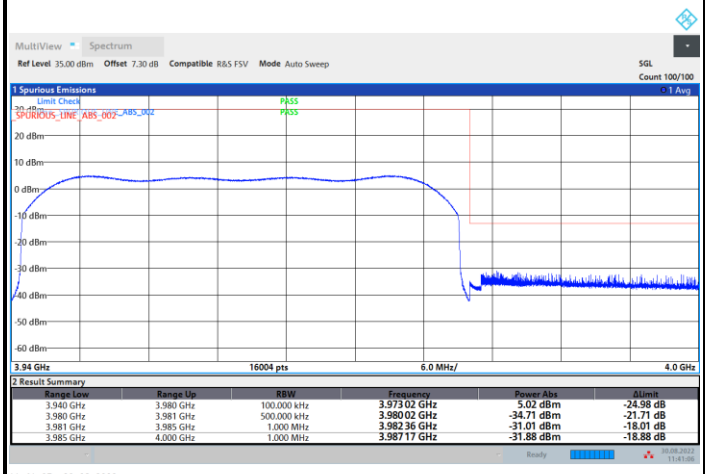
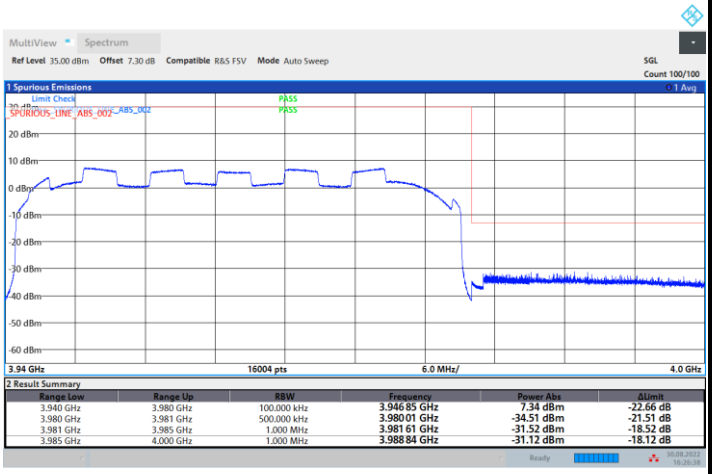
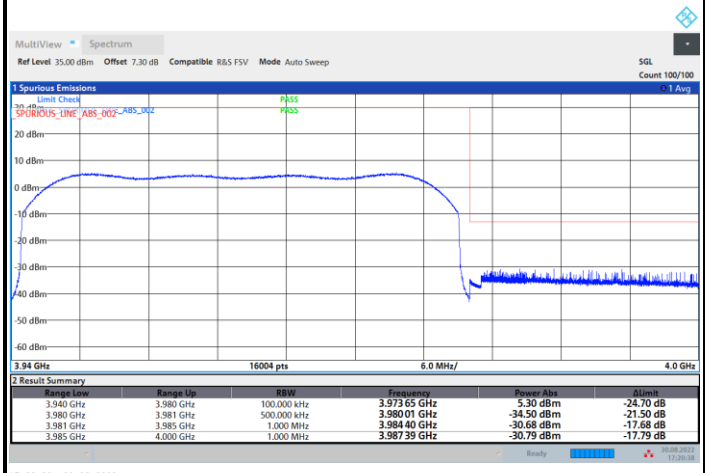
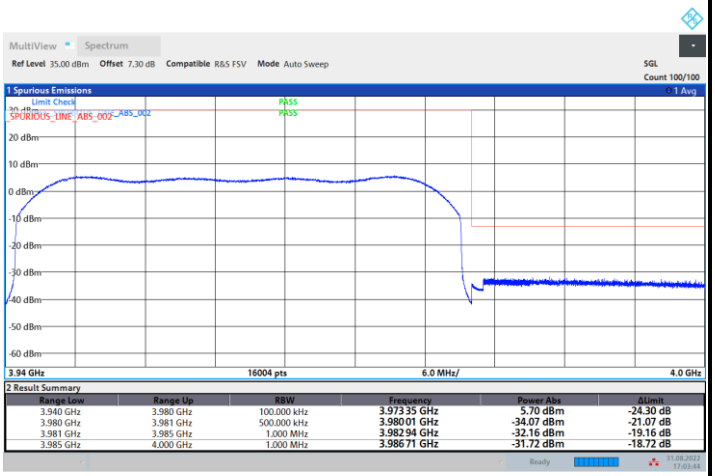
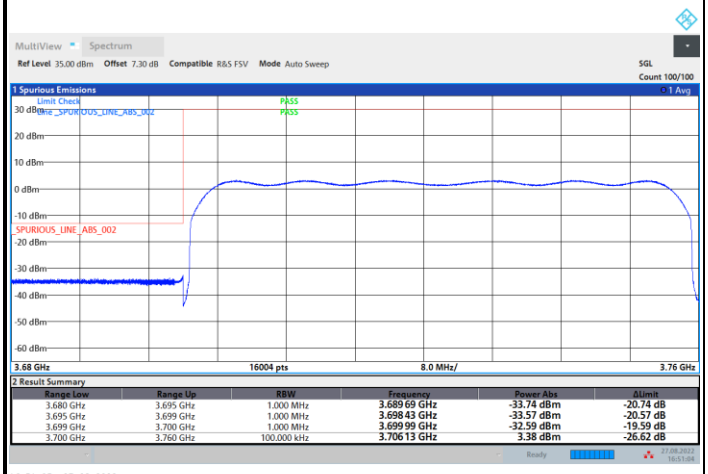
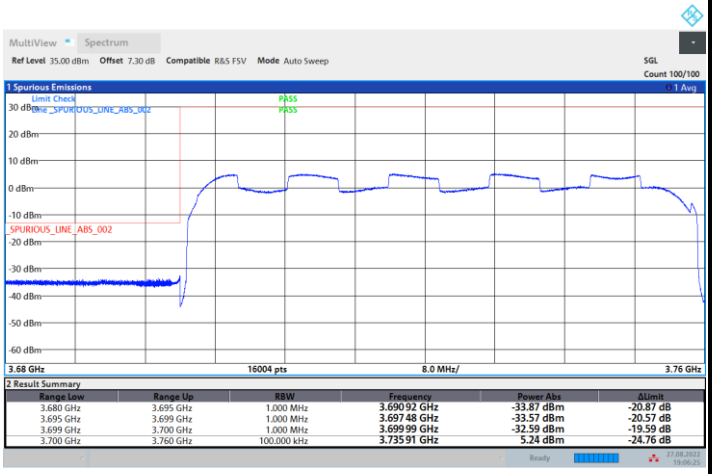
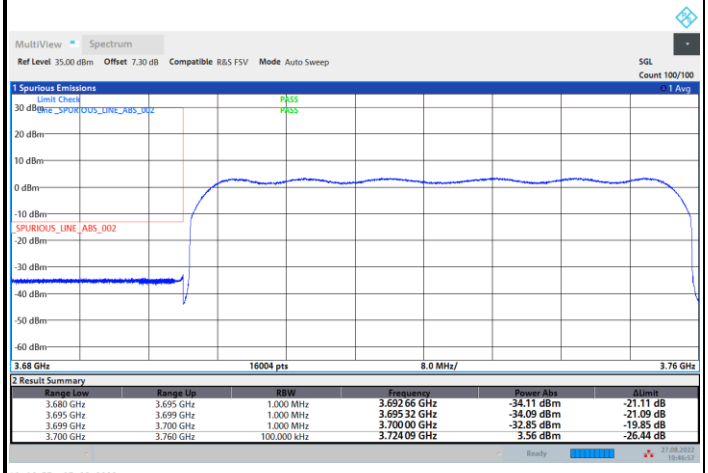
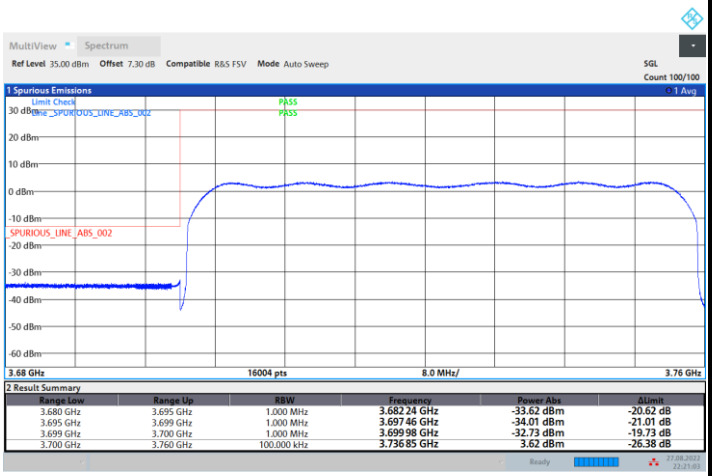
	

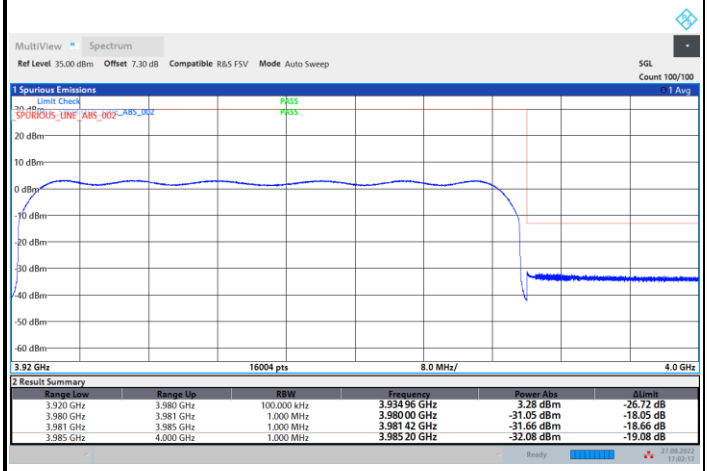
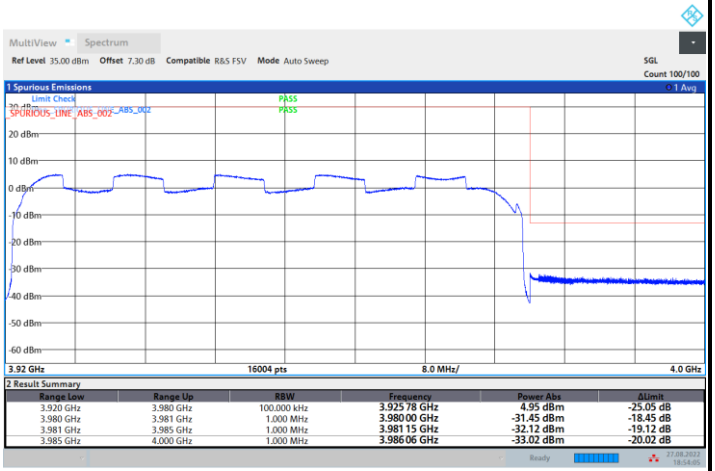
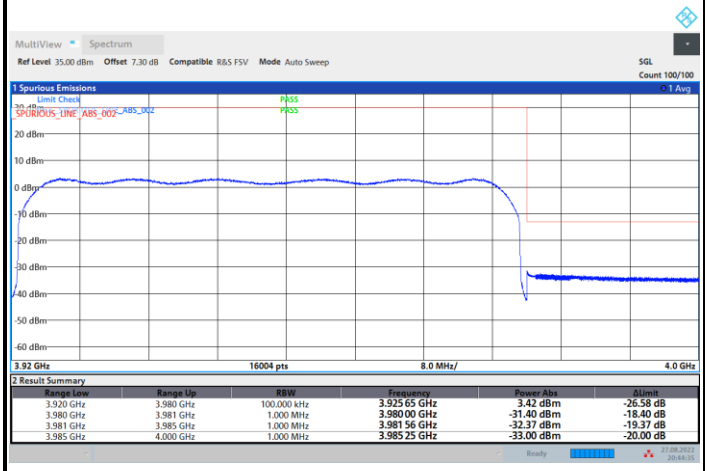
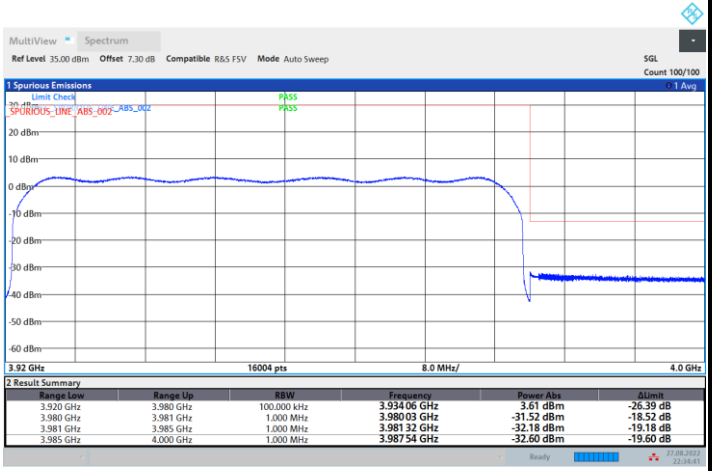
FR1 n77 / 100MHz / Middle Channel / 99%OBW	
QPSK	16QAM
	
64QAM	256QAM
	

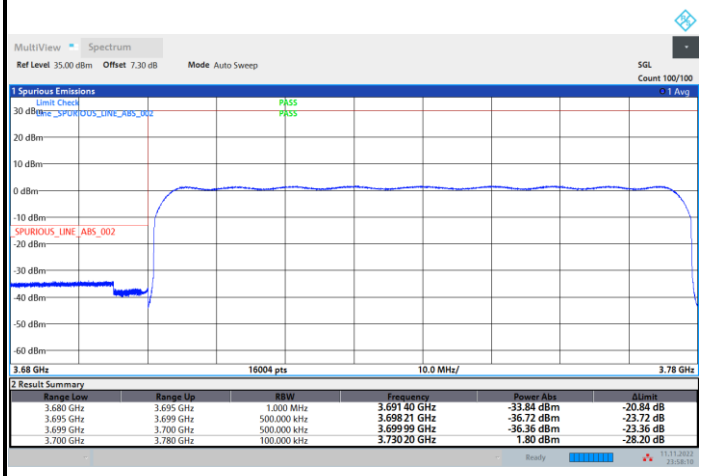
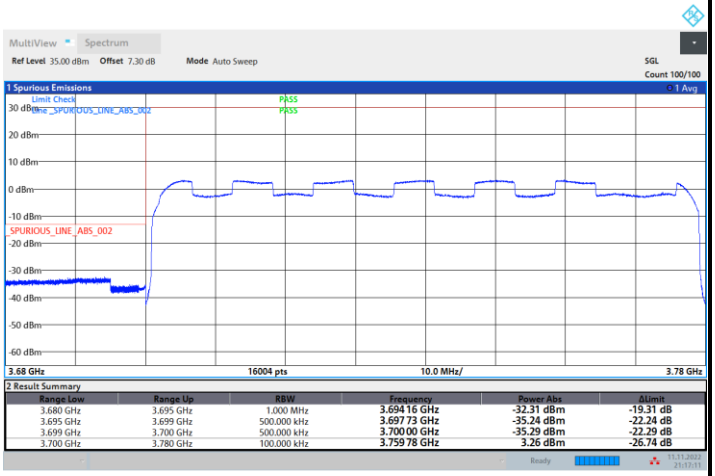
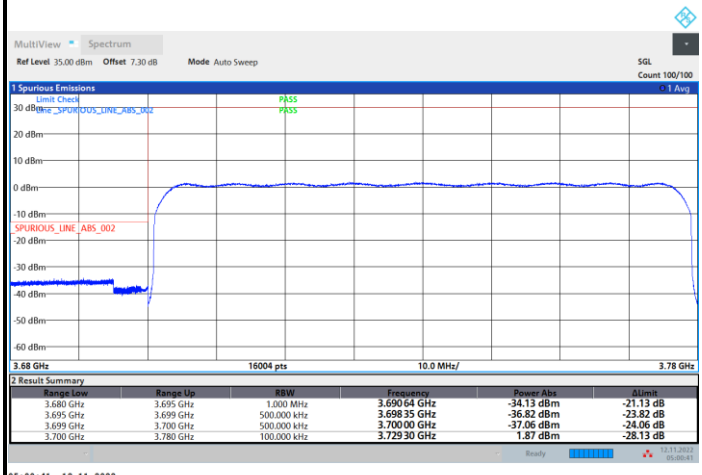
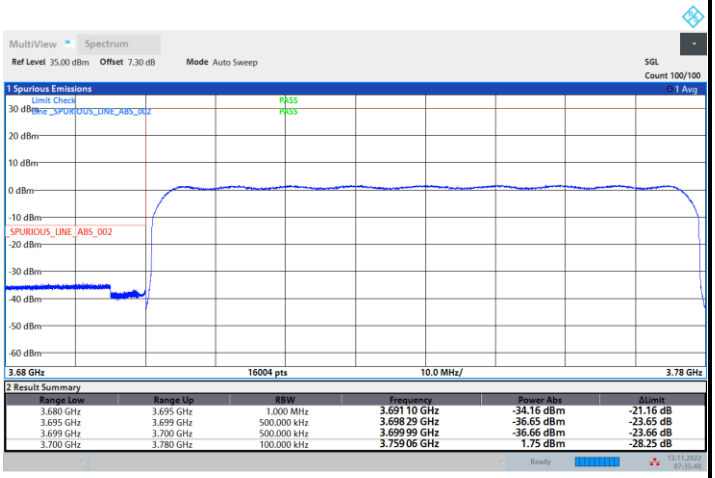
Conducted Band Edge

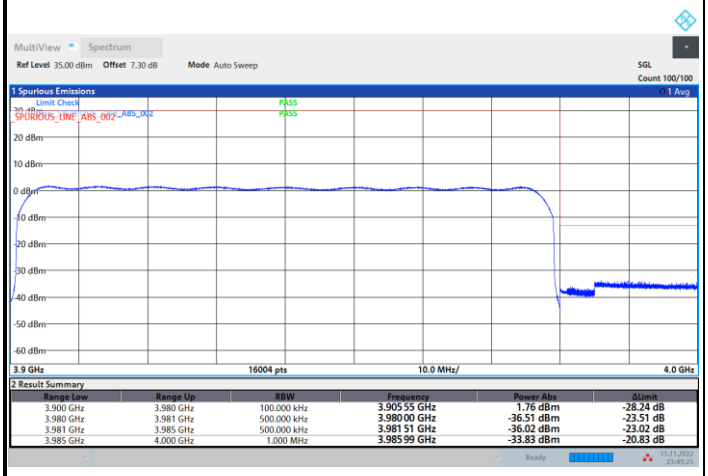
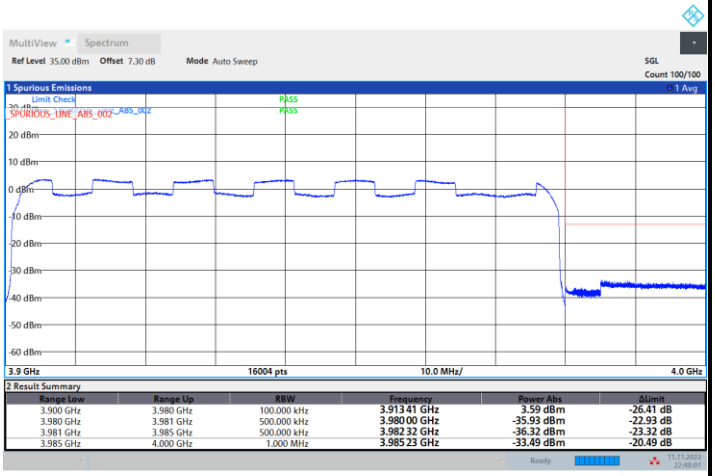
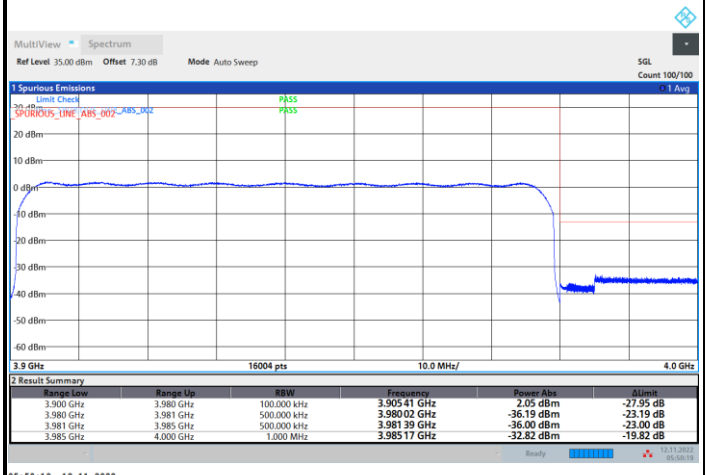
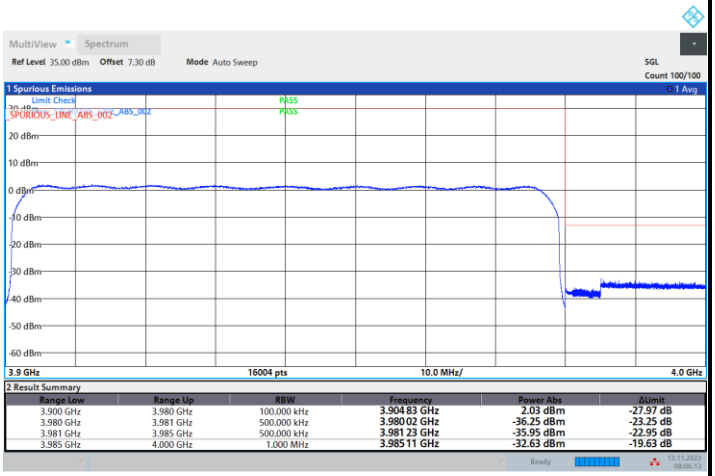
FR1 n77 / 40MHz / Lowest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

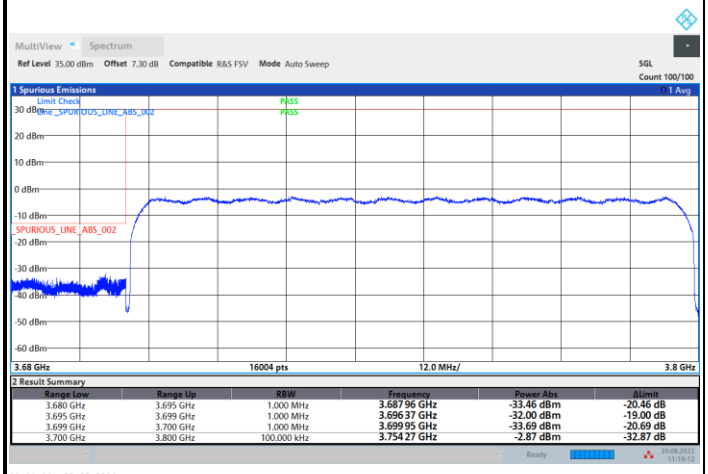
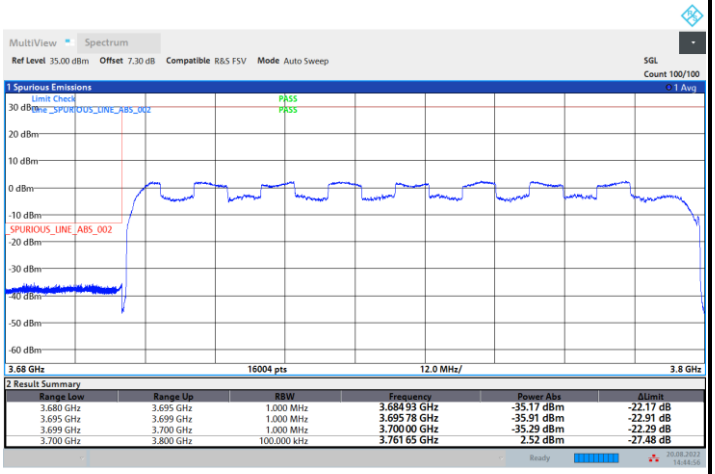
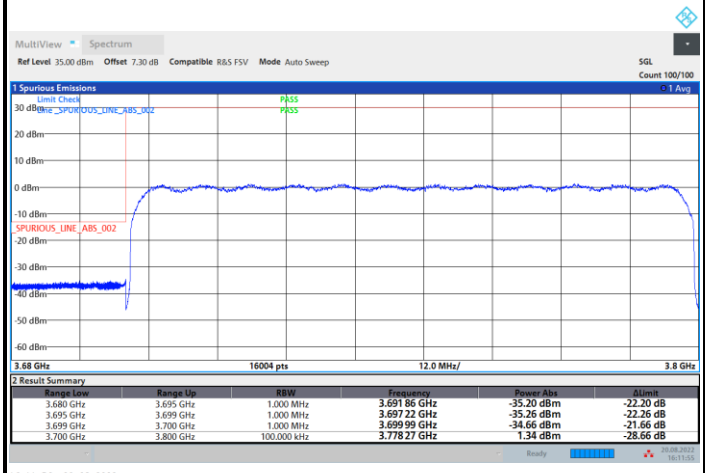
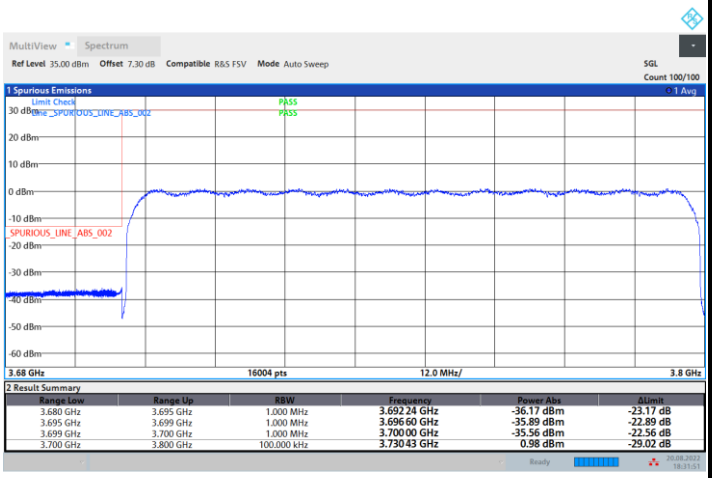
FR1 n77 / 40MHz / Highest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

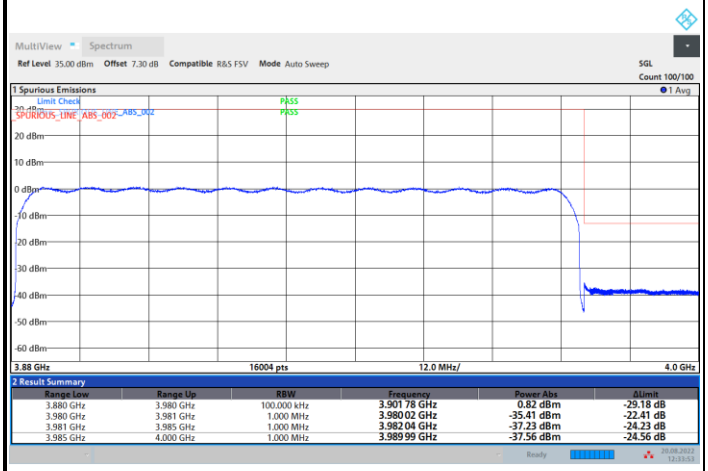
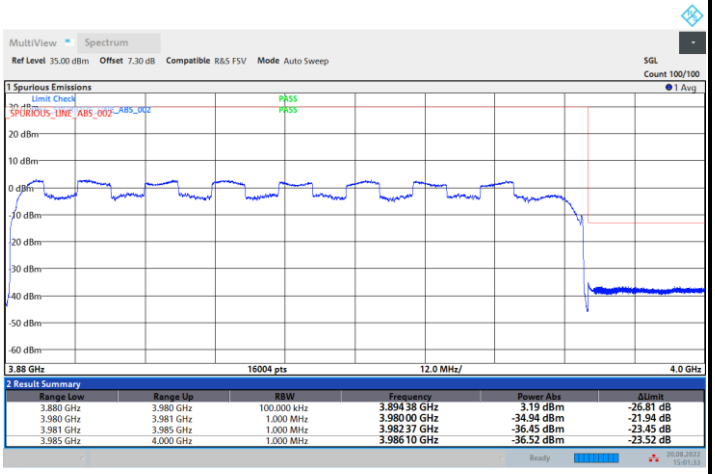
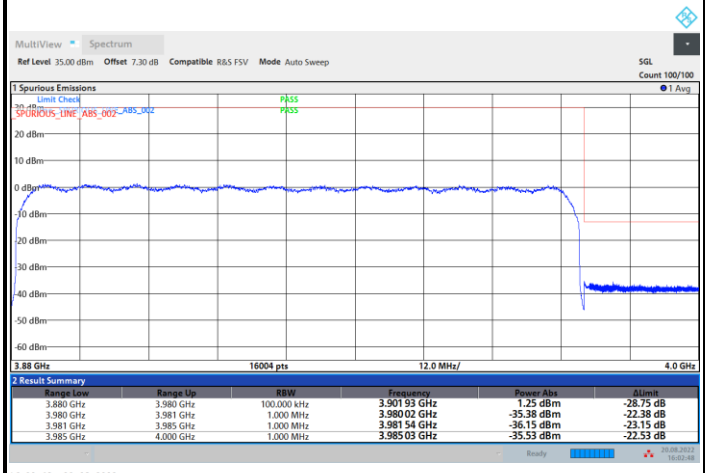
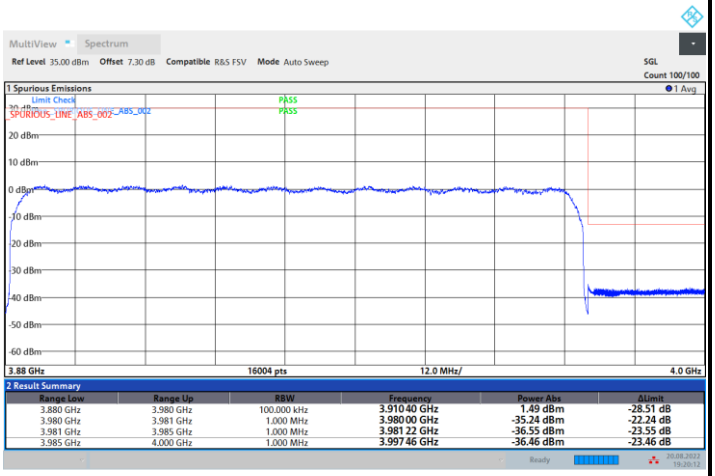
FR1 n77 / 60MHz / Lowest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n77 / 60MHz / Highest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

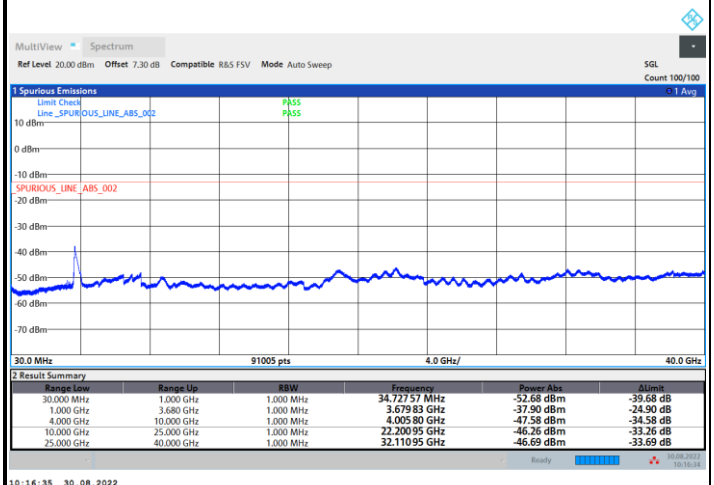
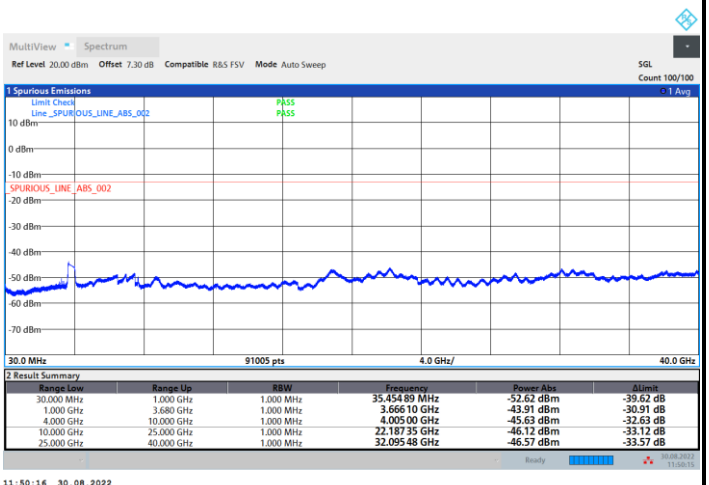
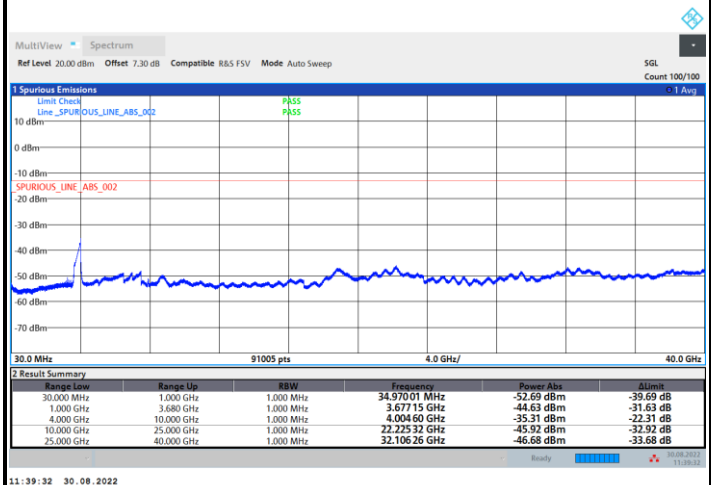
FR1 n77 / 80MHz / Lowest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

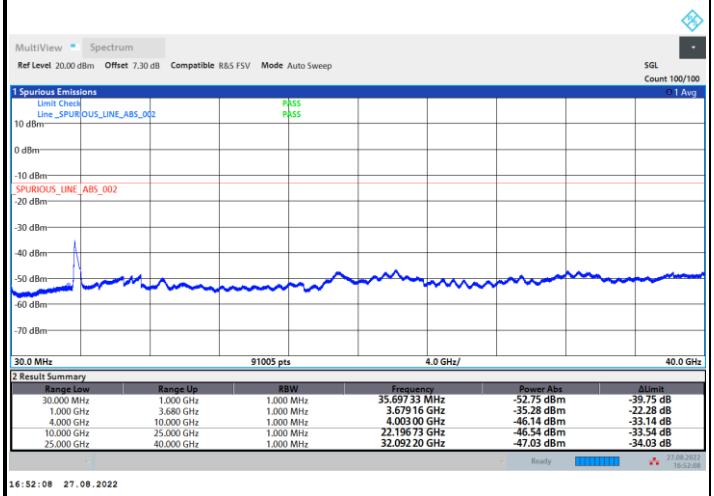
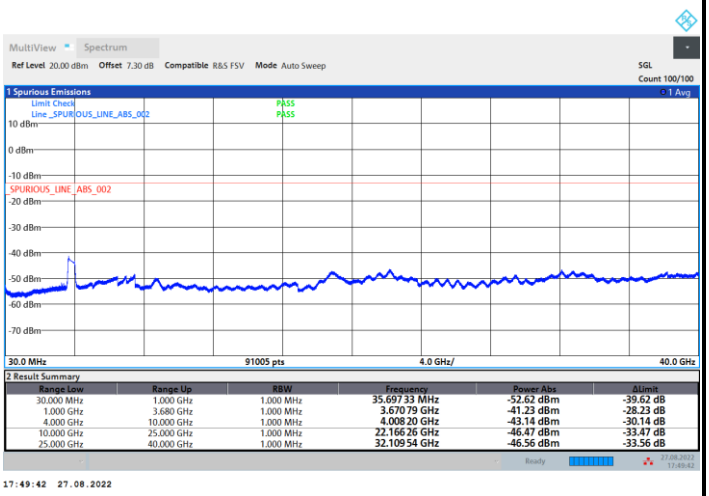
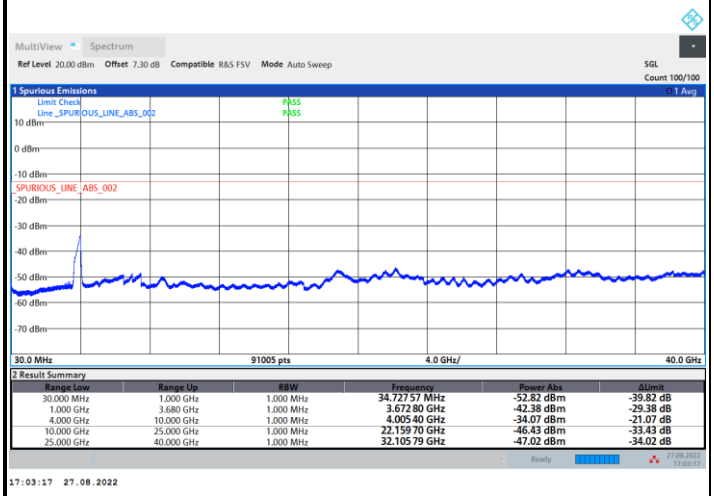
FR1 n77 / 80MHz / Highest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

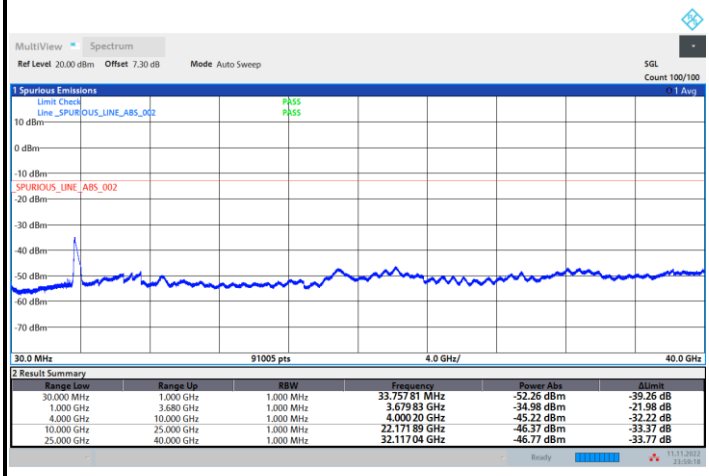
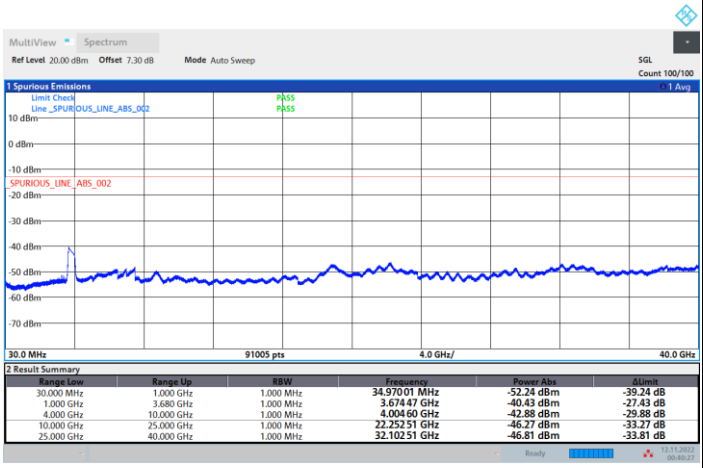
FR1 n77 / 100MHz / Lowest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

FR1 n77 / 100MHz / Highest Band Edge / Full RB	
QPSK	16QAM
	
64QAM	256QAM
	

Emission Limit

FR1 n77 / 40MHz / QPSK / CSE Emission Limit	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	

FR1 n77 / 60MHz / QPSK / CSE Emission Limit	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	

FR1 n77 / 80MHz / QPSK / Emission Limit	
Lowest Channel	**Middle Channel**
	
Highest Channel