FCC Radio Test Report

APPLICANT	:	Shenzhen Gotron Electronic CO.,LTD.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	ulefone
MODEL NAME	:	Armor 23 Ultra, GQ5005, Armor 23, Armor 23E, Armor 23S, Armor 23 Lite, Armor 23 Pro, Armor 23 Pro+, Armor 23s, Armor 23s Pro
FCC ID	:	2AOWK-5005AF1
STANDARD	:	FCC 47 CFR Part 2, and 25
CLASSIFICATION	:	Licensed Non-Broadcast Station Transmitter (TNB)
TEST DATE(S)	:	Nov. 08, 2023 ~ Nov. 30, 2023

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

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

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

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.01

Sporton International Inc. (ShenZhen)

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People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG391513	Rev. 01	Initial issue of report	Dec. 13, 2023
FG391513	Rev. 02	Update mode name and test Voltage	Jan. 03, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046)	RF Output Power	-	Report Only	-
	§25.204(a)	Equivalent Isotropic Radiated Power	40dBW(max)	PASS	-
3.2	§2.1055, §25.202(d)	Frequency Stability	within 0.001 percent of the reference frequency.	PASS	-
3.3	§2.1049	Occupied Bandwidth	-	PASS	-
3.4	§2.1051, §25.202(f)(1)(2)	Conducted Emissions Mask	§25.202(f)(1)(2)	PASS	
3.5	§2.1051, §25.202(f)(3)	Conducted Spurious Emission	§25.202(f)(3)	PASS	-
3.6	§2.1053, §25.202(f)(3)	Field Strength of Spurious Radiation	§25.202(f)(3)	PASS	Under limit 31.13 dB at 8040.000 MHz
3.7	§25.216(c)(e)(h)(i)	Additional Limits on Emissions from Mobile Earth Station	§25.216(c)(e)(h)(i)	PASS	-

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Shenzhen Gotron Electronic CO.,LTD.
7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China

1.2 Manufacturer

Shenzhen Gotron Electronic CO.,LTD.
7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	ulefone
Model Name	Armor 23 Ultra, GQ5005, Armor 23, Armor 23E, Armor 23S, Armor 23 Lite, Armor 23 Pro, Armor 23 Pro+, Armor 23s, Armor 23s Pro
FCC ID	2AOWK-5005AF1
IMEI Code	Conducted: 351525100814723/351525100814731 Radiation: 359758870004012/359758870004012
EUT Stage	Identical Prototype

Remark: The differences between model names are the model naming and appearance color

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	Band 23 : 2000 MHz ~ 2020 MHz Band 24 : 1626.5 MHz ~ 1660.5 MHz Band 255 : 1626.5 MHz ~ 1660.5 MHz
Rx Frequency	Band 23 : 2180 MHz ~ 2200 MHz Band 24 : 1525 MHz ~1559 MHz Band 255 : 1525 MHz ~1559 MHz
Sub-carrier Spacing	3.75kHz, 15kHz
Bandwidth	200kHz
Maximum Output Power to Antenna	Band 23 : 24.12 dBm Band 24 : 23.51 dBm Band 255 : 24.38 dBm
Antenna Type	PIFA Antenna
Antenna Gain	Band 23 : -2.20 dBi Band 24/255 : -2.50 dBi
Type of Modulation	BPSK / QPSK

Note:

1. This device belongs to the category of Mobile Earth Stations (MES) and does not support voice communication
2. The device does not support 1 tone start 0 & 47 for SCS 3.75kHz and 1 tone start 0 &11 for SCS 15kHz.
3. Band 255 overlaps the entire frequency range of Band 24, and B255 power > B24 power, therefore the conducted test results of B255 provided in this report cover B24.

1.5 Modification of EUT

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

1.6 Maximum EIRP and Emission Designator

Band 23		BPSK/QPSK	
SCS (kHz)	**Frequency Range (MHz)**	**Maximum EIRP(W)**	**Emission Designator (99%OBW)**
3.75	2000.1 ~ 2019.9	0.1455	52K1G7D
15	2000.1 ~ 2019.9	0.1556	182KG7D
Band 255		**BPSK/QPSK**	
SCS (kHz)	**Frequency Range (MHz)**	**Maximum EIRP(W)**	**Emission Designator (99%OBW)**
3.75	1626.6 ~ 1660.4	0.1542	52K1G7D
15	1626.6 ~ 1660.4	0.1472	180KG7D
Band 24		**BPSK/QPSK**	
SCS (kHz)	**Frequency Range (MHz)**	**Maximum EIRP(W)**	**Emission Designator (99%OBW)**
3.75	1626.6 ~ 1660.4	0.1262	52K1G7D
15	1626.6 ~ 1660.4	0.1233	180KG7D

Note: All modulations have been tested, and only the worst test results are shown in the report.

1.7 Testing Location

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

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

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		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-KS	CN1257	314309

Note: Test data subcontracted: Test case of Conduction in section 3.1~3.5 of this report

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	TH01-KS	SPORTON	EN300328_Ver 4.0 for china_210819	4.0
2.	03CH01-SZ	AUDIX	E3	6.2009-8-24

1.9 Applied Standards

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

- FCC 47 CFR Part 2, 25
- ANSI C63.26-2015
- 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

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

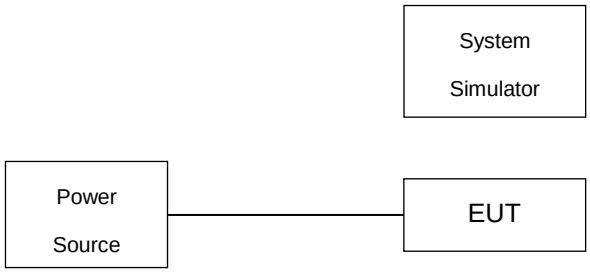
2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y-Plane)

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 Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMW500	Fcc DoC	N/A	Shielded, 1.5m
2.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

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

Example :
The spectrum analyzer offset is derived from RF cable loss.
Offset = RF cable loss.
Following shows an offset computation example with cable loss 6.10 dB.

Offset(dB) = RF cable loss(dB).
= 6.10 (dB)

2.5 Frequency List of Low/Middle/High Channels

Band 23 Channel and Frequency List				
SCS [kHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
3.75 / 15	Frequency	2000.1	2010	2019.9

Band 255 Channel and Frequency List				
SCS [kHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
3.75 / 15	Frequency	1626.6	1643.3	1660.4

3 Test Result

3.1 RF Output Power and EIRP

3.1.1 Description of the Conducted Output Power and EIRP Measurement

FCC Part 25.204 (a)

In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

- + 40 dBW in any 4 kHz band for θ ≤0°
- + 40 + 3θ dBW in any 4 kHz band for 0° <θ ≤5°

  Where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

According to KDB 412172 D01 Power Approach,

EIRP = PT + GT – LC, ERP = EIRP -2.15, where

PT = transmitter output power in dBm

GT = gain of the transmitting antenna in dBi

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

3.1.2 Test Procedures

The output power is measured by using power meter and FTM (Factory Test Mode) when the transmitter is operating at the manufacturer's rated power and modulated with signals. The maximum antenna gain of EUT for the test range will then be added to the measured conducted power to calculate the EIRP. Since the power meter can only measure the overall power, the measured result will be worse than the one measured in 4 kHz RBW. The test result will be compared to the most restricted limit: +40 dBW.

3.1.3 Test Results

Please refer to Appendix B.

3.2 Frequency Stability

3.2.1 Description of the Frequency Stability Measurement

FCC Part 25.202 (d) Frequency tolerance, Earth stations.

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

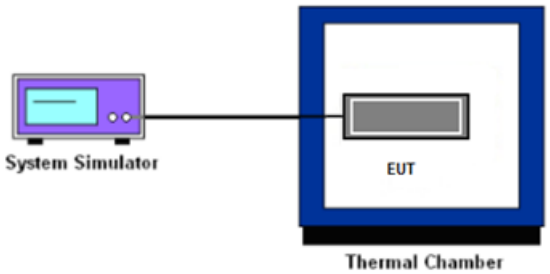
3.2.2 Test Procedures for Temperature Variation

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 steps 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.

3.2.3 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. The power supply voltage to the EUT was varied from the lowermost voltage to the uppermost voltage. The range is specified by manufacturer.
5. The variation in frequency was measured for the worst case.

3.2.4 Test Setup



3.2.5 Test Results

Please refer to Appendix B.

3.3 Occupied Bandwidth

3.3.1 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.

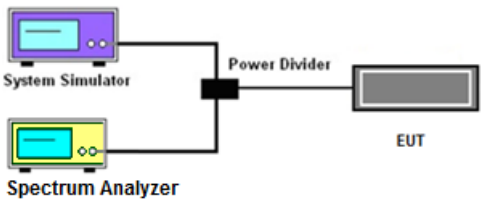
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 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. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.3.4 Test Setup



3.3.5 Test Result

Please refer to Appendix B.

3.4 Conducted Emissions Mask

3.4.1 Description of Conducted Emissions Mask Measurement

FCC Part 25.202(f) Emissions Limitations

The mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50% up to and including 100% of the authorized bandwidth: 25 decibels;

(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100% up to and including 250% of the authorized bandwidth: 35 decibels;

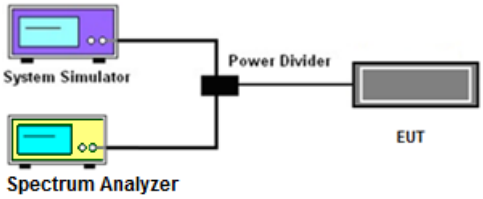
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to the spectrum analyzer.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The highest RF power within the transmitting frequency was measured.
5. Make the measurement with the spectrum analyzer's RBW = 5kHz, VBW = 20kHz, taking the record of the worst unwanted emission.
6. If the test result in Step 5 exceed the limit, the following procedure will be used:
   - 6.1. Make the measurement with the spectrum analyzer's RBW = 1kHz, VBW = 3kHz.
   - 6.2. Record all measured worst frequencies.
   - 6.3. Use the Channel Power Function of the Spectrum Analyzer.
   - 6.4. Measure the power in 1kHz bandwidth center the worst frequencies, add a correction factor of 10log*(4kHz/1kHz) to meet the 4kHz integration requirement.
7. The limit line is derived from FCC 25.202 (f) below the transmitter power P(Watts)

3.4.4 Test Setup



3.4.5 Test Result

Please refer to Appendix B.

3.5 Conducted Spurious Emission

3.5.1 Description of Conducted Spurious Emission Measurement

FCC Part 25.202(f) Emissions Limitations

The mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth: an amount equal to 43 decibels plus 10 times Logarithm (to the base 10) of the transmitter power in watts.

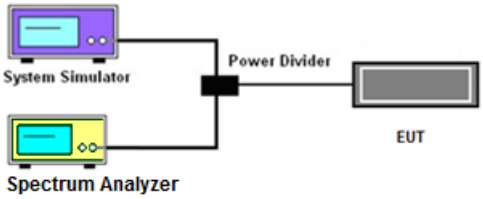
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to the spectrum analyzer.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The highest RF power within the transmitting frequency was measured.
5. Peak detector is used instead of RMS detector since the measured result of Peak detector is worse than the RMS one. If the test result of Peak detector exceed the limit, RMS detector will then be used.
6. Make the measurement with the spectrum analyzer's RBW = 100kHz, VBW = 300kHz, taking the record of the worst unwanted emission.
7. The conducted spurious emission for the whole frequency range was taken.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from FCC 25.202 (f) below the transmitter power P(Watts)

3.5.4 Test Setup



3.5.5 Test Result

Please refer to Appendix B.

3.6 Field Strength of Spurious Radiation

3.6.1 Description of Radiated Spurious Emission

FCC Part 25.202(f) Emissions Limitations

The mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth: an amount equal to 43 decibels plus 10 times Logarithm (to the base 10) of the transmitter power in watts

3.6.2 Measuring Instruments

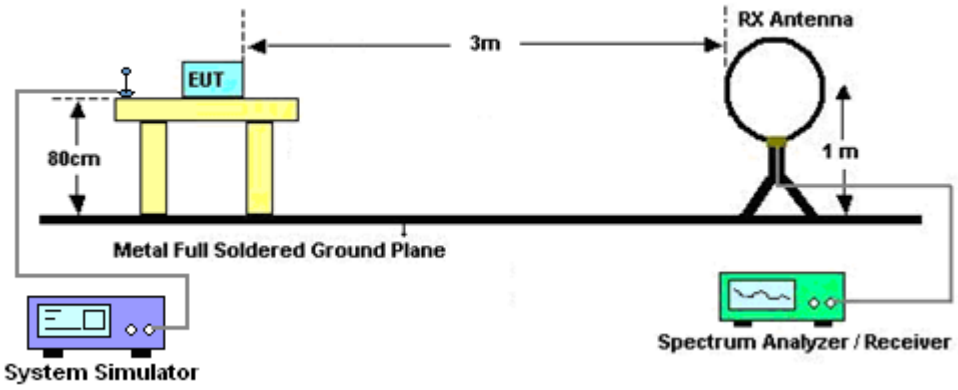
The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

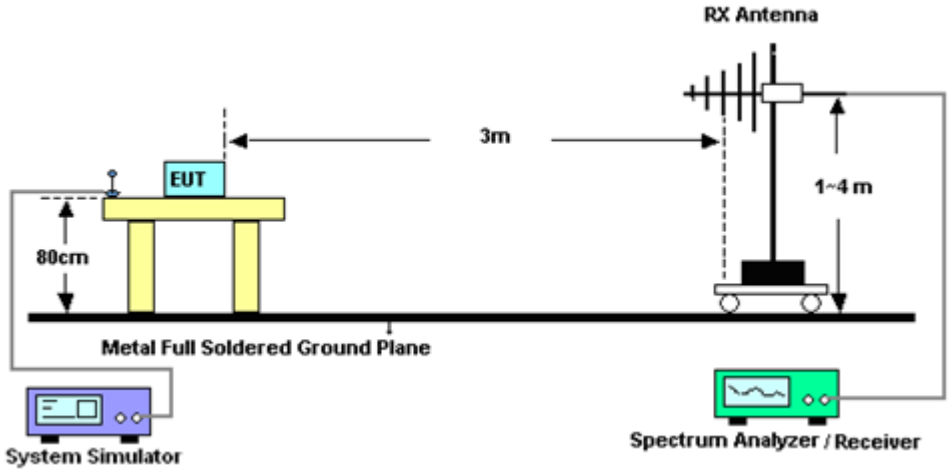
1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a rotatable table with:
   - 0.8 meter above ground for emissions under 1 GHz
   - 1.5 meter above ground for emissions above 1 GHz
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. 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 one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
6. Peak detector is used instead of RMS detector since the measured result of Peak detector is worse than the RMS one. If the test result of Peak detector exceed the limit, RMS detector will then be used.
7. Make the measurement with the spectrum analyzer's RBW = 100kHz, VBW = 300kHz, taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.6.4 Test Setup

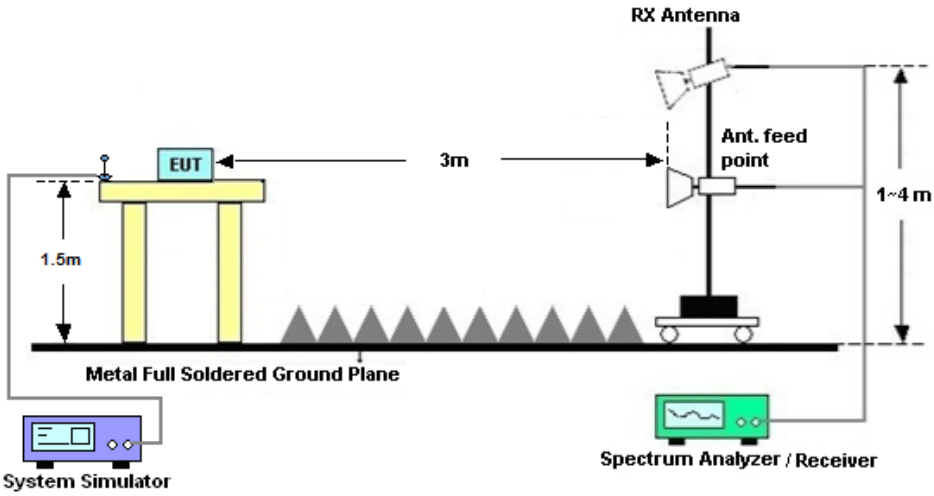
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.6.5 Test Results

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 C.

3.7 Additional Limits on Emissions from Mobile Earth Station

Additional Limits on emissions from mobile earth stations for protection of aeronautical radionavigation-satellite service and Special requirements for ancillary terrestrial components operating in the 1626.5-1660.5 MHz and 2000-2020 MHz bands.

3.7.1 Description of Additional Limits on Emissions from Mobile Earth Station

FCC Part 25.216 Emissions Limitations:

(c) The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed −70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed −80 dBW, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band.

(e) The e.i.r.p density of emissions from mobile earth stations with assigned uplink frequencies between 1990 MHz and 2025 MHz shall not exceed −70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in frequencies between 1559 MHz and 1610 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations between 1559 MHz and 1605 MHz shall not exceed −80 dBW, averaged over any 2 millisecond active transmission interval. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations between 1605 MHz and 1610 MHz manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 shall not exceed −80 dBW, averaged over any 2 millisecond active transmission interval.

(h) Mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1626.5-1660.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from −70 dBW/MHz at 1605 MHz to −46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. The e.i.r.p of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from −80 dBW at 1605 MHz to −56 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

(i) The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed −80 dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.

(j) A Root-Mean-Square detector shall be used for all power density measurements.

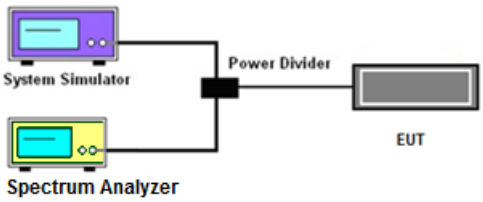
3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to the spectrum analyzer.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The highest RF power within the transmitting frequency was measured.
5. Use the spectrum analyzer with RBW = 1kHz for discrete emissions and RBW = 1MHz for broadband emissions, and set VBW to 3 times the RBW. Record the maximum spurious emission detected.

3.7.4 Test Setup



3.7.5 Test Results

Please refer to Appendix B.

4 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. 11, 2023	Nov. 08, 2023~ Nov. 15, 2023	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Nov. 08, 2023~ Nov. 15, 2023	NCR	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 06, 2023	Nov. 08, 2023~ Nov. 15, 2023	Jul. 05, 2024	Conducted (TH01-KS)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 26, 2022	Nov. 29, 2023~ Nov. 30, 2023	Dec. 25, 2023	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Nov. 29, 2023~ Nov. 30, 2023	Jul. 27, 2024	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 18, 2023	Nov. 29, 2023~ Nov. 30, 2023	Oct. 17, 2024	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Oct. 24, 2023	Nov. 29, 2023~ Nov. 30, 2023	Oct. 23, 2024	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 08, 2023	Nov. 29, 2023~ Nov. 30, 2023	Jul. 07, 2024	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 08, 2023	Nov. 29, 2023~ Nov. 30, 2023	Apr. 07, 2024	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 04, 2023	Nov. 29, 2023~ Nov. 30, 2023	Apr. 03, 2024	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Nov. 29, 2023~ Nov. 30, 2023	Oct. 17, 2024	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 07, 2023	Nov. 29, 2023~ Nov. 30, 2023	Jul. 06, 2024	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	Oct. 18, 2023	Nov. 29, 2023~ Nov. 30, 2023	Oct. 17, 2024	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Nov. 29, 2023~ Nov. 30, 2023	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Nov. 29, 2023~ Nov. 30, 2023	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required

5 Measurement Uncertainty

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±2.26 dB
Occupied Channel Bandwidth	±0.1 %

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.48dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.53dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.02dB

Appendix B. Test Results of Conducted Test

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

Band 23

Conducted Output Power (Average power) and EIRP

Band 23 SCS 3.75kHz							Limit
Test Frequency (MHz)	SC Size	Conducted Power (dBm)		Antenna Gain (dBi)	EIRP Power (dBm)		Result
		BPSK	QPSK		BPSK	QPSK	
2000.1	1SC1	23.67	23.70	-2.2	21.47	21.50	PASS
	1SC46	23.77	23.83	-2.2	21.57	21.63	
2010	1SC1	23.18	23.50	-2.2	20.98	21.30	
	1SC46	23.13	23.16	-2.2	20.93	20.96	
2019.9	1SC1	23.29	23.23	-2.2	21.09	21.03	
	1SC46	23.16	23.22	-2.2	20.96	21.02	

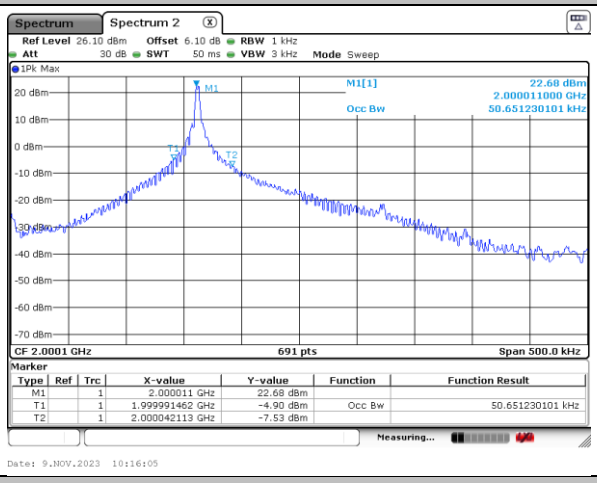
Band 23 SCS 15kHz							Limit
Test Frequency (MHz)	SC Size	Conducted Power (dBm)		Antenna Gain (dBi)	EIRP Power (dBm)		Result
		BPSK	QPSK		BPSK	QPSK	
2000.1	1SC1	23.97	24.01	-2.2	21.77	21.81	PASS
	1SC10	23.94	24.12	-2.2	21.74	21.92	
	3SC0	-	23.92	-2.2	-	21.72	
	3SC9	-	24.09	-2.2	-	21.89	
	6SC0	-	23.41	-2.2	-	21.21	
	6SC6	-	23.50	-2.2	-	21.30	
	12SC0	-	22.54	-2.2	-	20.34	
2010	1SC1	23.49	23.58	-2.2	21.29	21.38	
	1SC10	23.51	23.67	-2.2	21.31	21.47	
	3SC0	-	23.29	-2.2	-	21.09	
	3SC9	-	23.52	-2.2	-	21.32	
	6SC0	-	22.85	-2.2	-	20.65	
	6SC6	-	23.01	-2.2	-	20.81	
	12SC0	-	21.94	-2.2	-	19.74	
2019.9	1SC1	23.20	23.36	-2.2	21.00	21.16	
	1SC10	23.27	23.41	-2.2	21.07	21.21	
	3SC0	-	23.02	-2.2	-	20.82	
	3SC9	-	23.28	-2.2	-	21.08	
	6SC0	-	22.62	-2.2	-	20.42	
	6SC6	-	22.77	-2.2	-	20.57	
	12SC0	-	21.76	-2.2	-	19.56	

Occupied Bandwidth

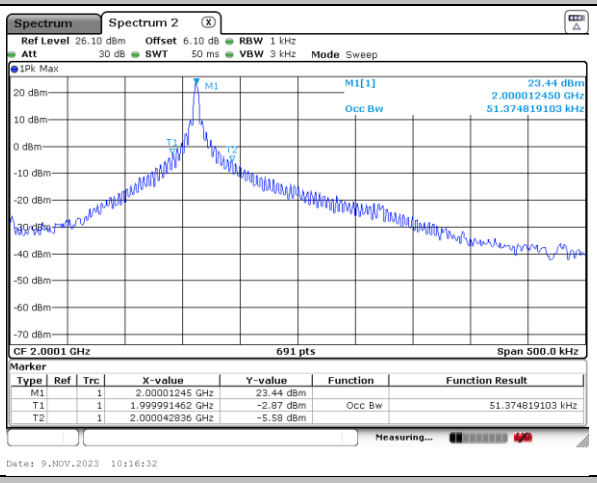
Mode	LTE Band 23 : 99%OBW(kHz)												
SCS	3.75kHz				15kHz								
Mod.	BPSK	QPSK	BPSK	QPSK	BPSK	BPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
SC Size	1SC1	1SC1	1SC46	1SC46	1SC1	1SC10	1SC1	1SC10	3SC0	3SC9	6SC0	6SC6	12SC0
Lowest CH	50.651	51.375	50.651	52.098	115.051	115.051	108.538	112.156	108.538	110.709	140.376	137.482	180.897
Middle CH	49.928	50.651	50.651	50.651	113.603	112.880	105.644	116.498	108.538	104.920	137.482	128.799	180.174
Highest CH	51.375	50.651	52.098	52.098	112.156	116.498	111.433	112.156	112.156	113.603	154.124	160.637	182.344

Band 23 SCS3.75KHz

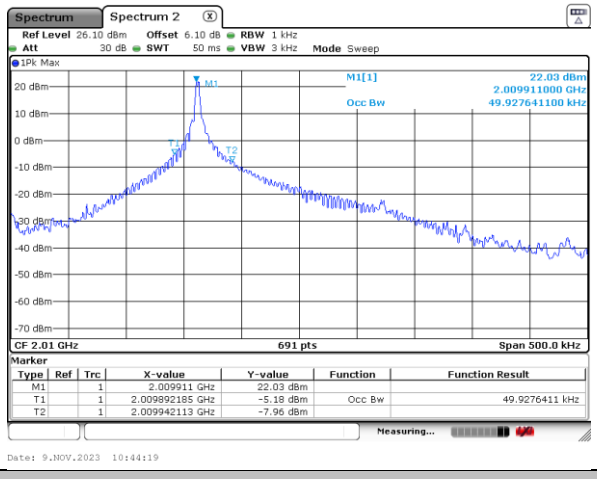
Lowest Channel / 1SC1/ BPSK



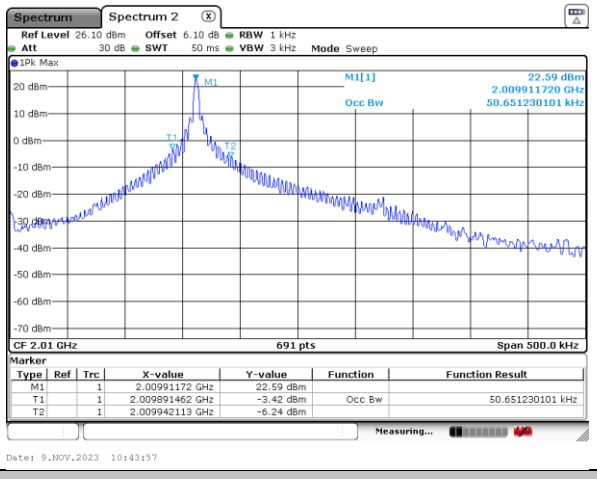
Lowest Channel / 1SC1 / QPSK



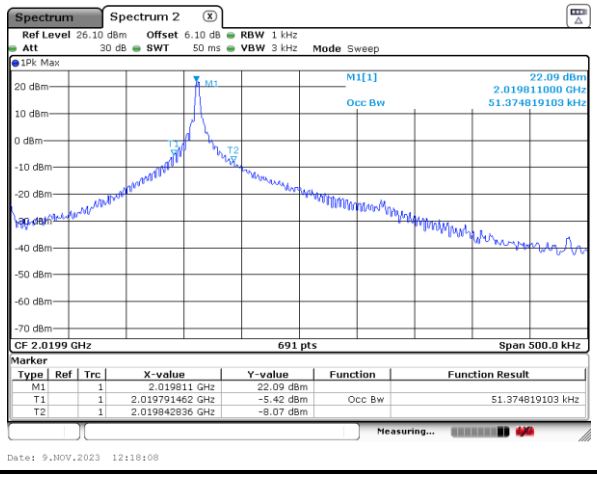
Middle Channel / 1SC1/ BPSK



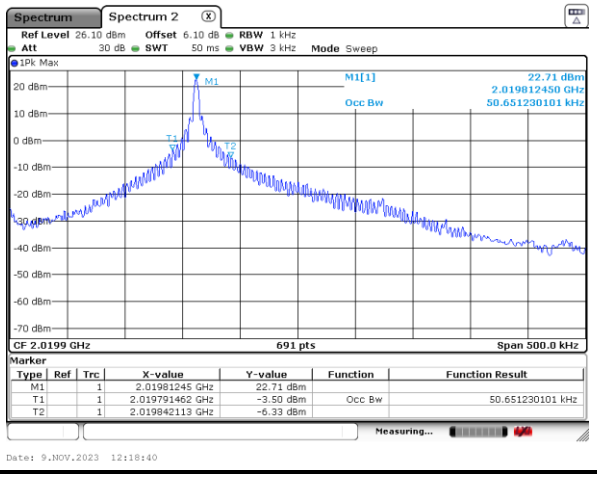
Middle Channel / 1SC1 / QPSK



Highest Channel / 1SC1/ BPSK

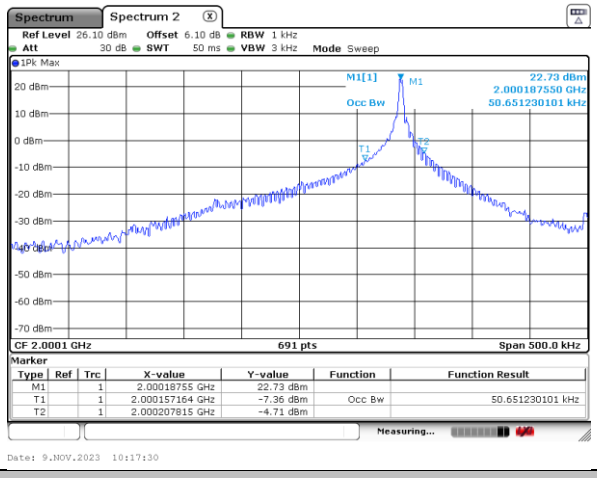


Highest Channel / 1SC1 / QPSK

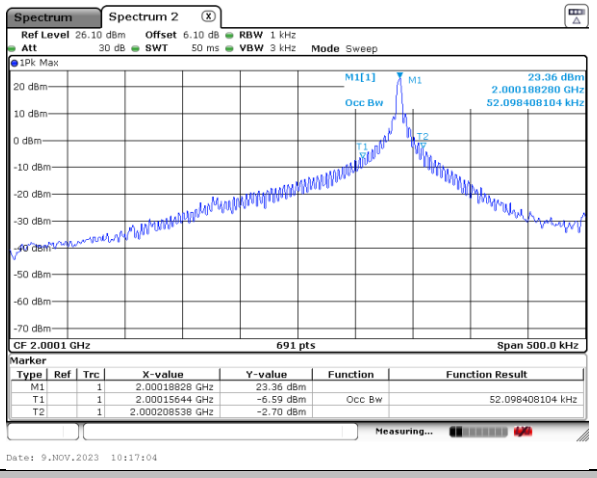


Band 23 SCS3.75KHz

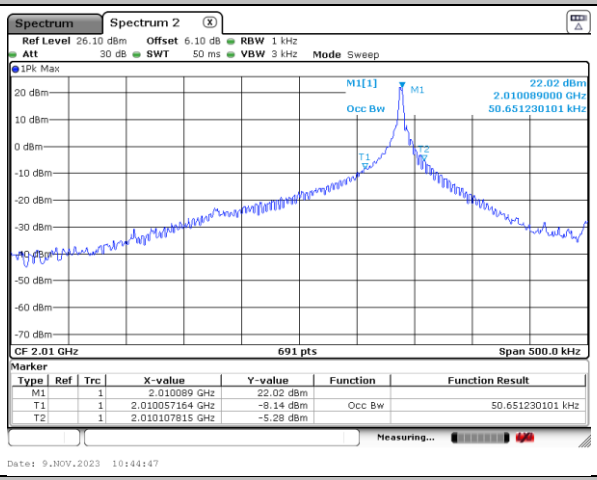
Lowest Channel / 1SC46/ BPSK



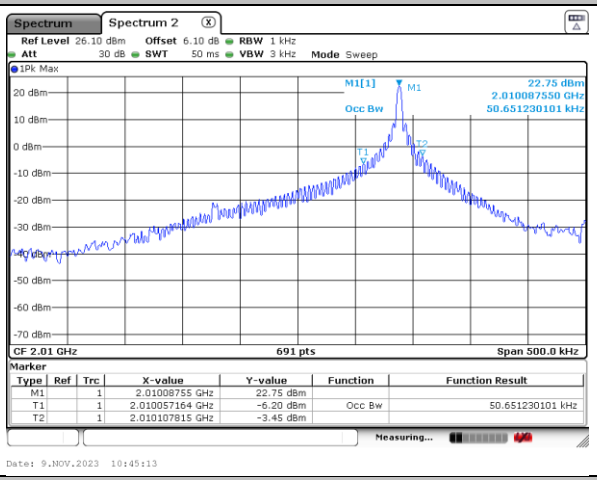
Lowest Channel / 1SC46 / QPSK



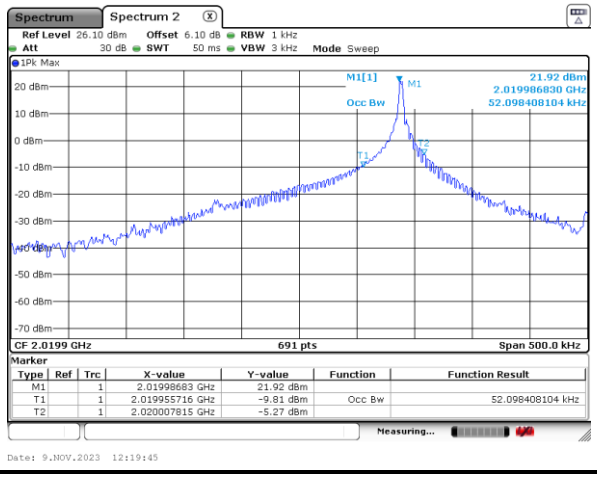
Middle Channel / 1SC46/ BPSK



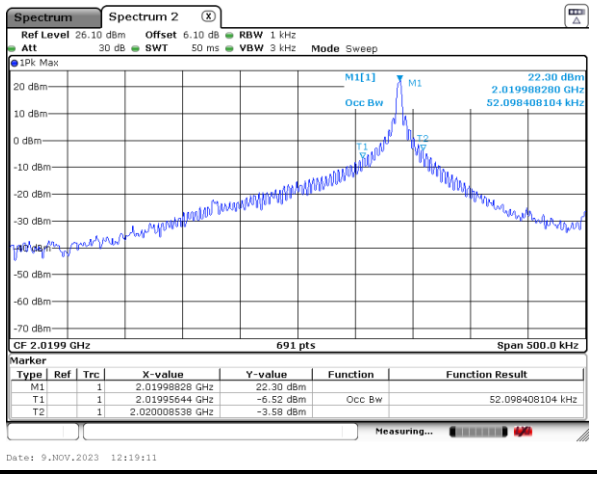
Middle Channel / 1SC46 / QPSK



Highest Channel / 1SC46/ BPSK

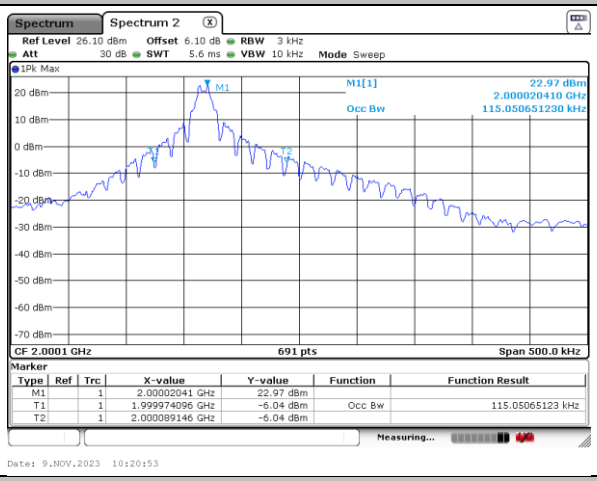


Highest Channel / 1SC46 / QPSK

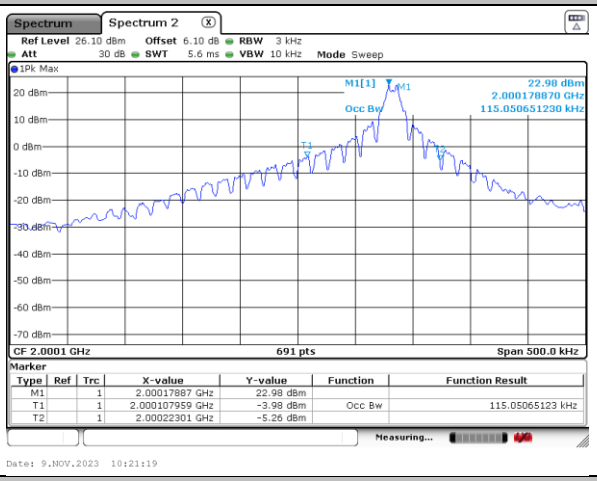


Band 23 SCS15KHz

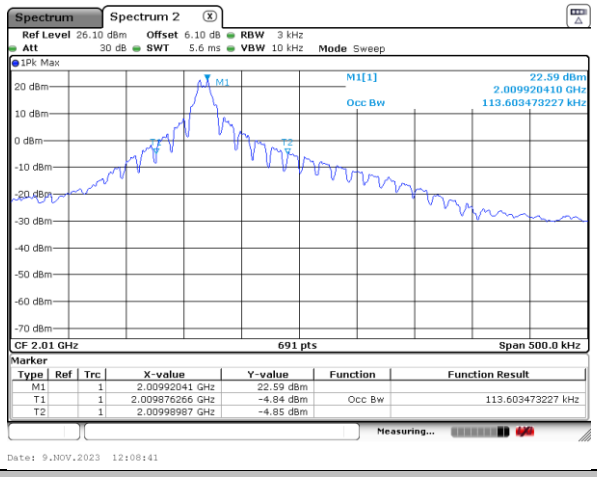
Lowest Channel / 1SC1/ BPSK



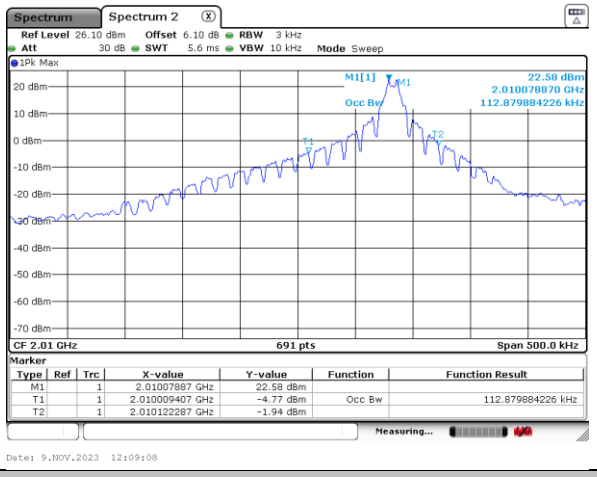
Lowest Channel / 1SC10/ BPSK



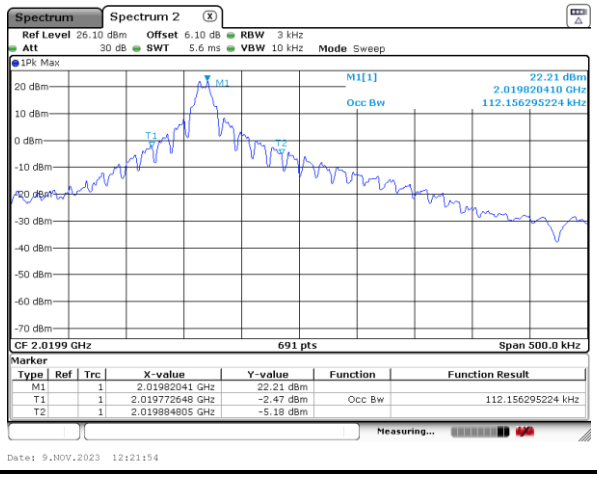
Middle Channel / 1SC1/ BPSK



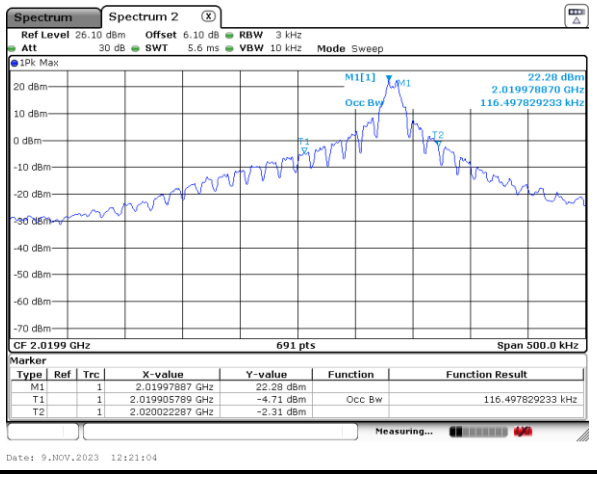
Middle Channel / 1SC10 / BPSK



Highest Channel / 1SC1/ BPSK

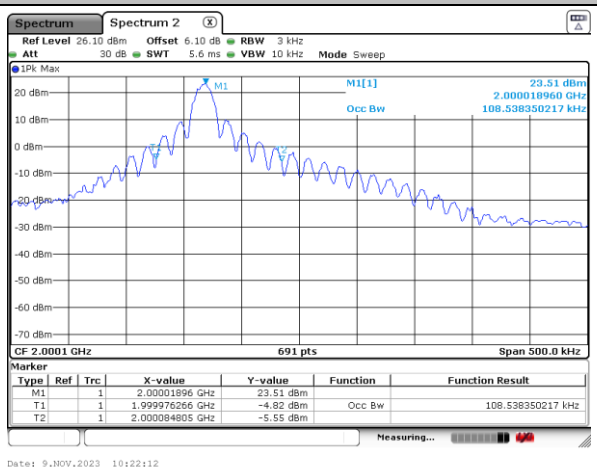


Highest Channel / 1SC10/ BPSK

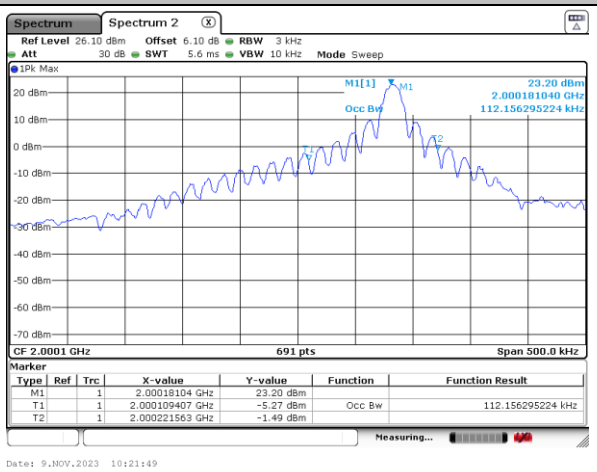


Band 23 SCS15KHz

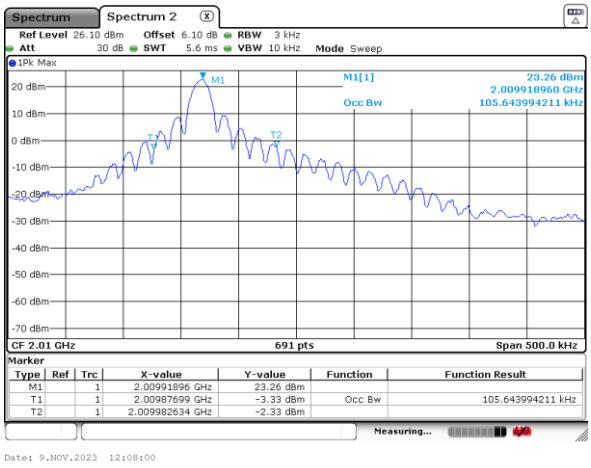
Lowest Channel / 1SC1/ QPSK



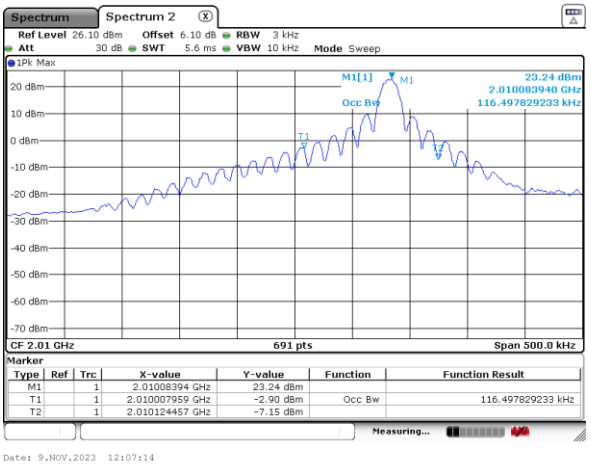
Lowest Channel / 1SC10 / QPSK



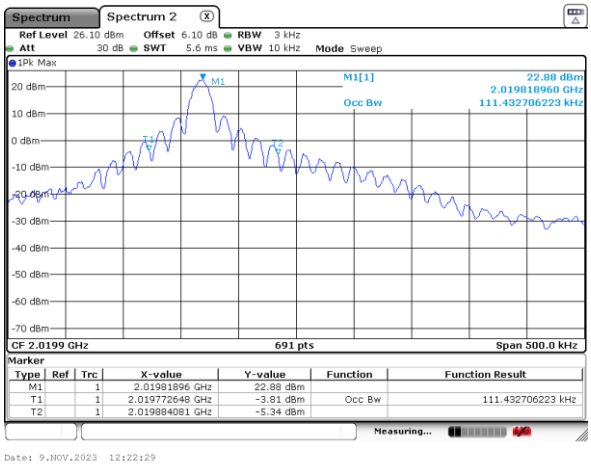
Middle Channel / 1SC1/ QPSK



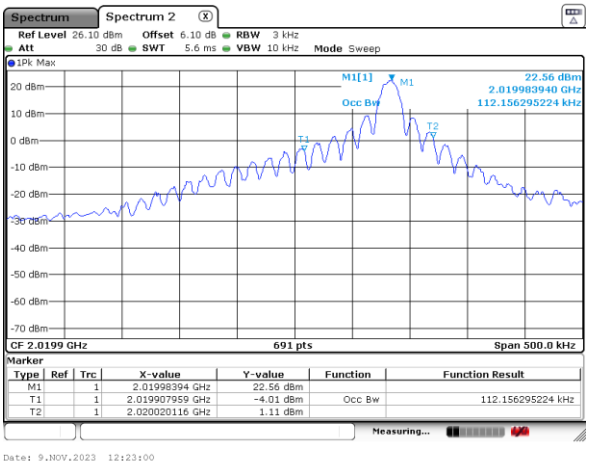
Middle Channel / 1SC10 / QPSK



Highest Channel / 1SC1/ QPSK

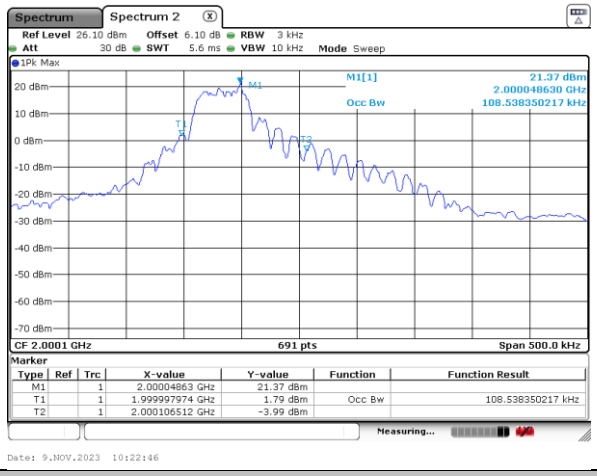


Highest Channel / 1SC10/ QPSK

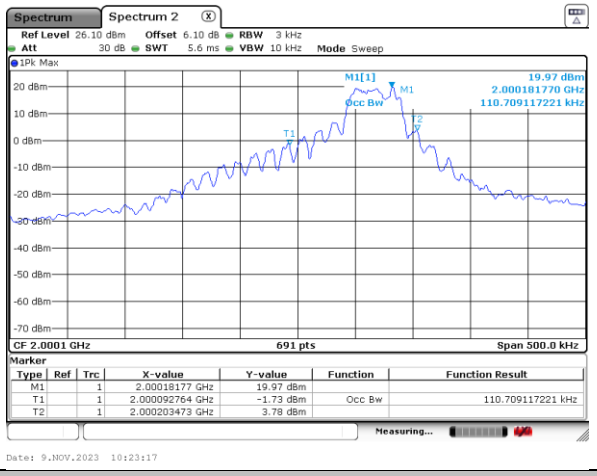


Band 23 SCS15KHz

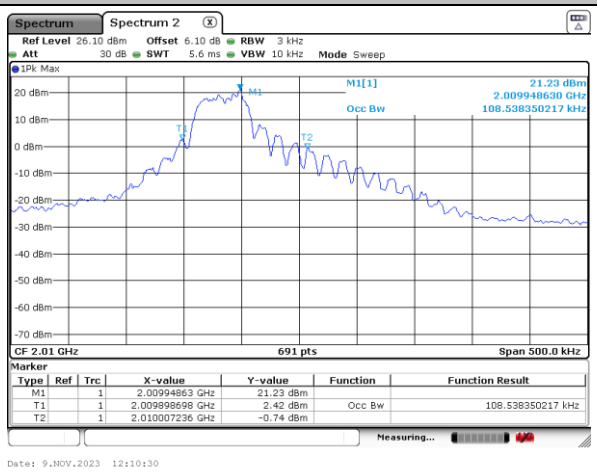
Lowest Channel / 3SC0 / QPSK



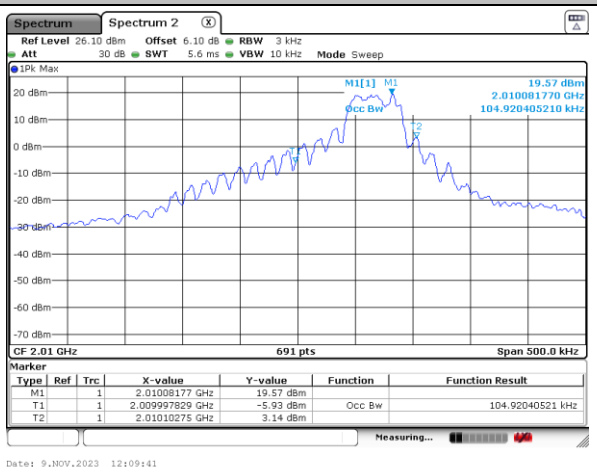
Lowest Channel / 3SC9 / QPSK



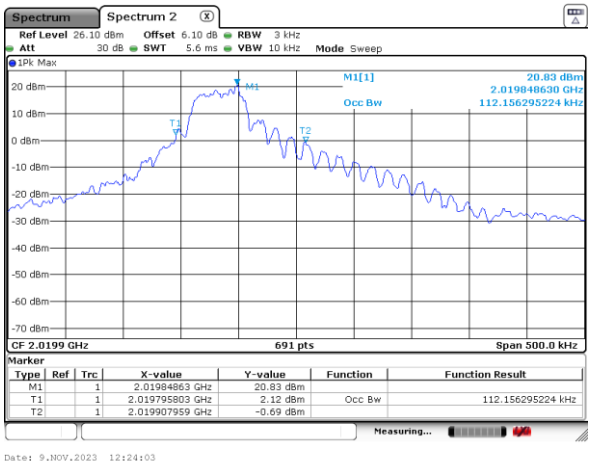
Middle Channel / 3SC0 / QPSK



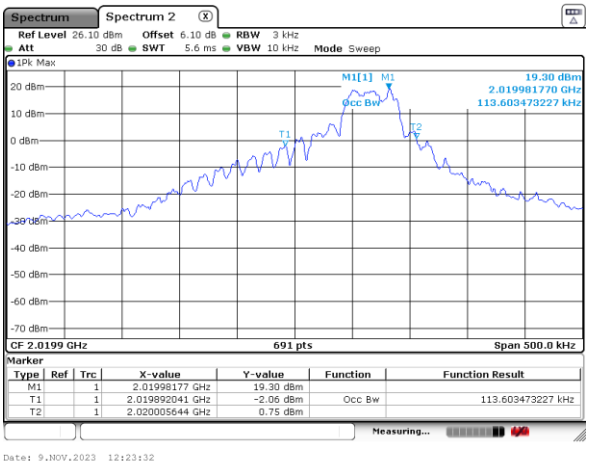
Middle Channel / 3SC9 / QPSK



Highest Channel / 3SC0 / QPSK

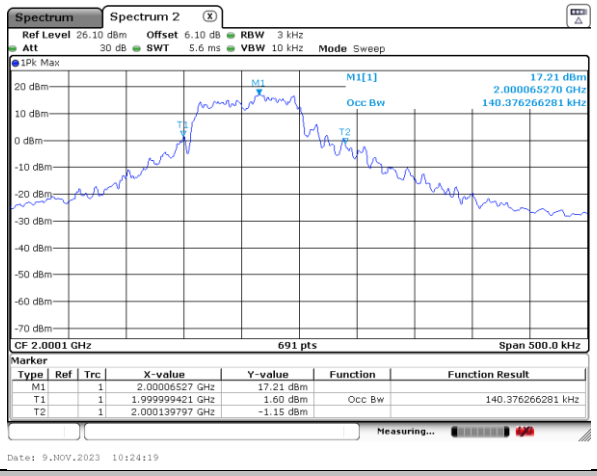


Highest Channel / 3SC9 / QPSK

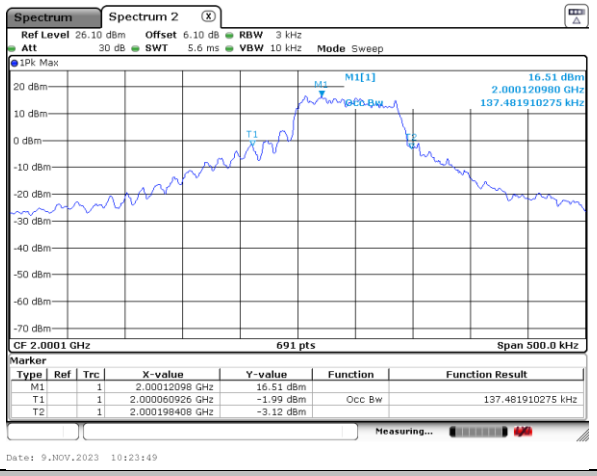


Band 23 SCS15KHz

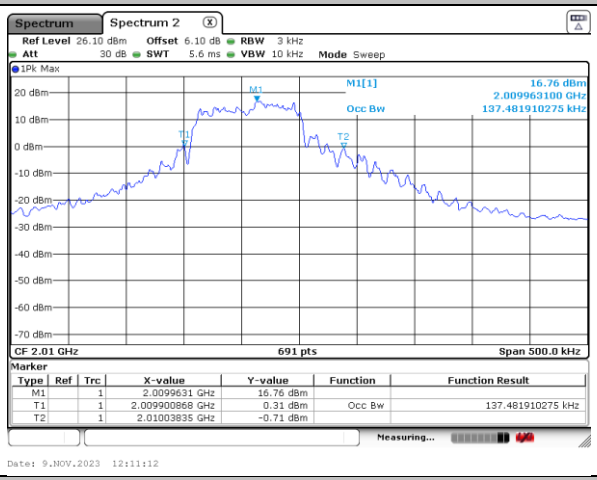
Lowest Channel / 6SC0/ QPSK



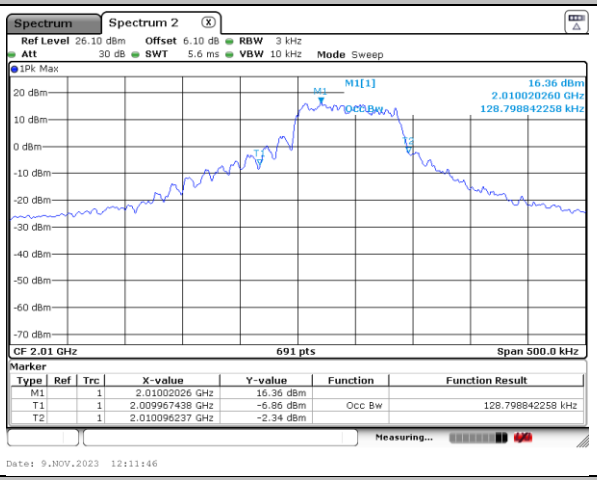
Lowest Channel / 6SC6 / QPSK



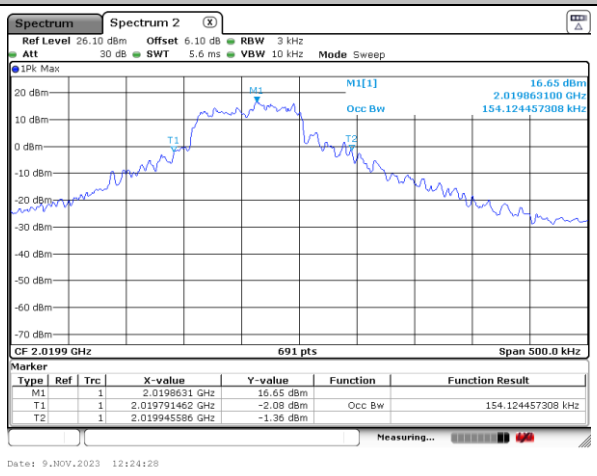
Middle Channel / 6SC0/ QPSK



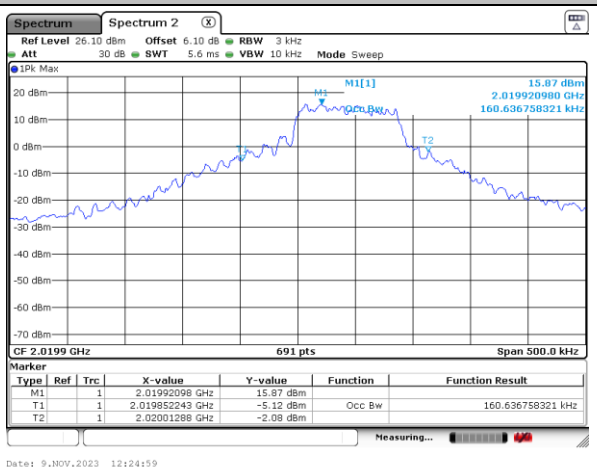
Middle Channel / 6SC6 / QPSK

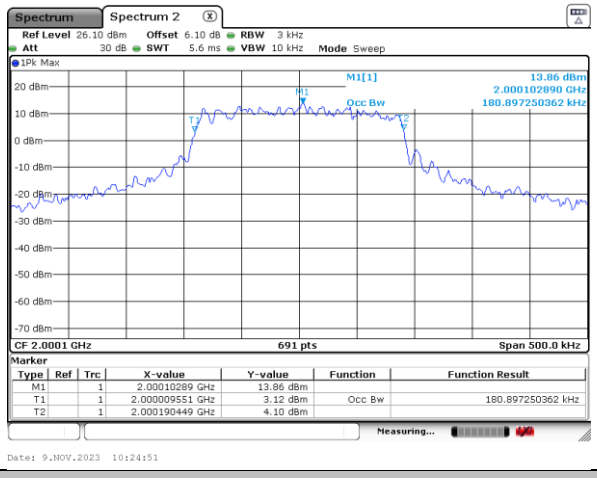
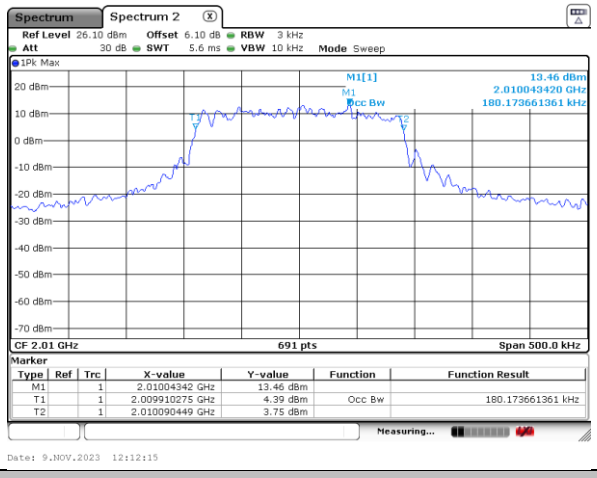
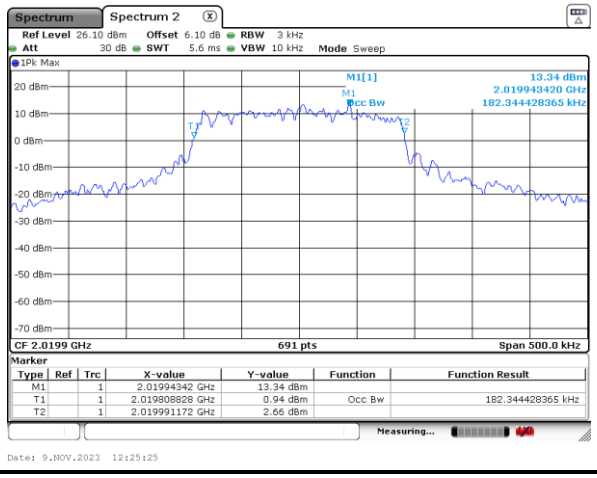


Highest Channel / 6SC0/ QPSK



Highest Channel /6SC6 / QPSK

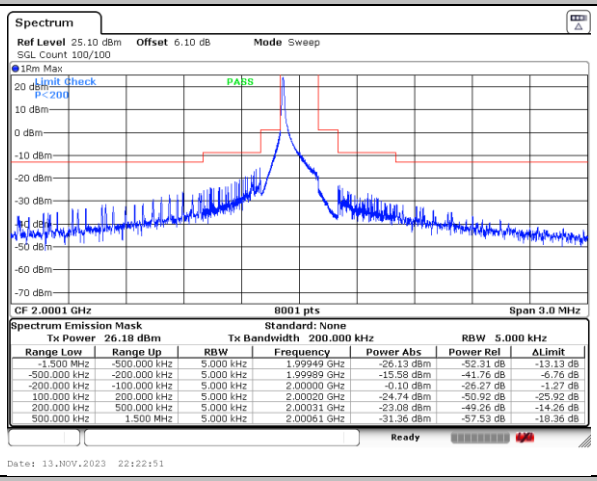


Band 23 SCS15KHz	
Lowest Channel / 12SC0 / QPSK	**N/A**
	
Middle Channel /12SC0 / QPSK	**N/A**
	
Highest Channel /12SC0 / QPSK	**N/A**
	

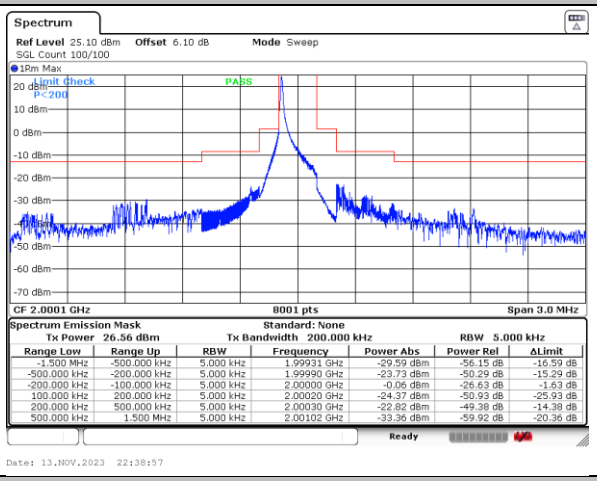
Conducted Emissions Mask

Band 23 SCS3.75KHz

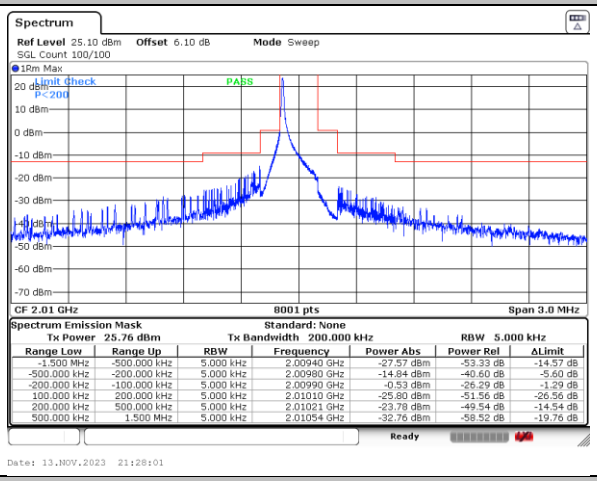
Lowest Channel / 1SC1/ BPSK



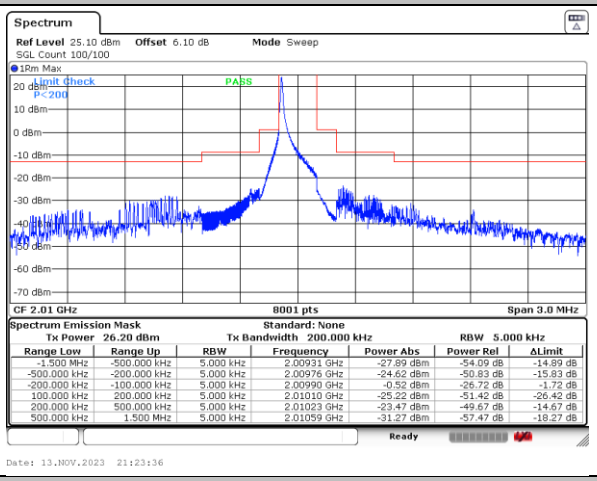
Lowest Channel / 1SC1 / QPSK



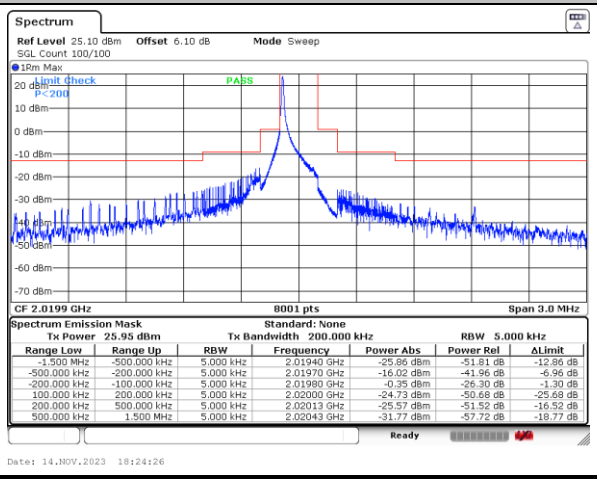
Middle Channel / 1SC1/ BPSK



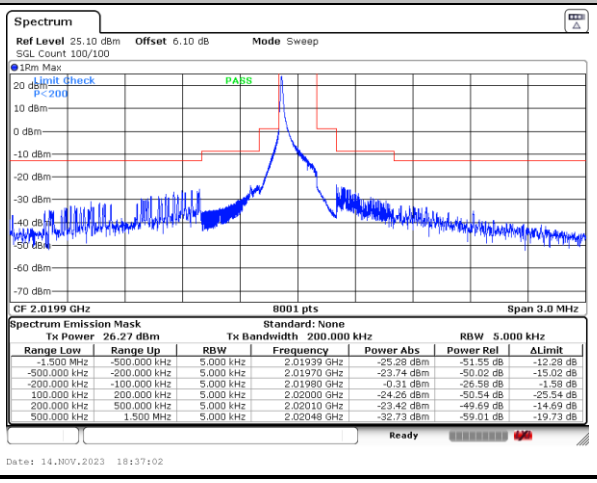
Middle Channel / 1SC1 / QPSK



Highest Channel / 1SC1/ BPSK

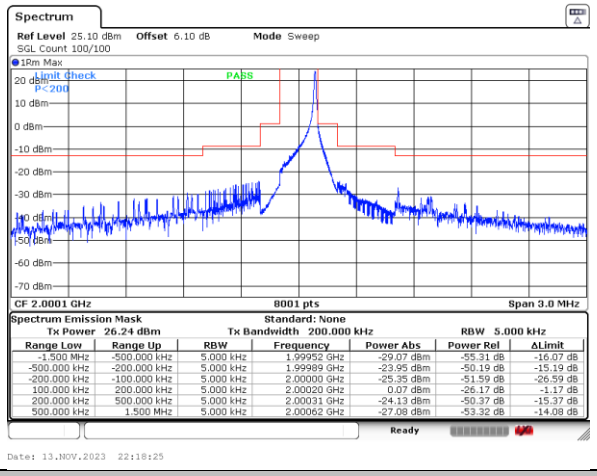


Highest Channel / 1SC1 / QPSK

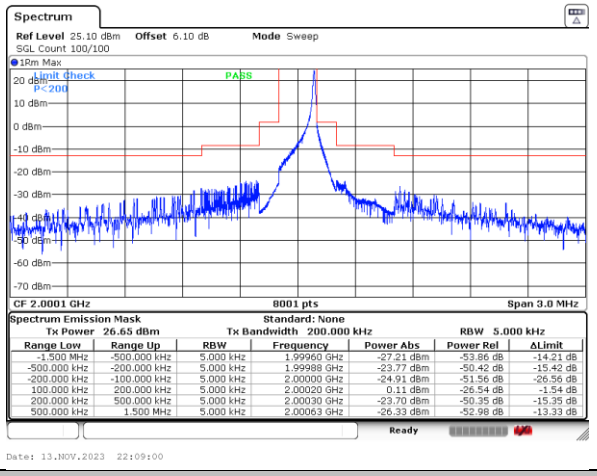


Band 23 SCS3.75KHz

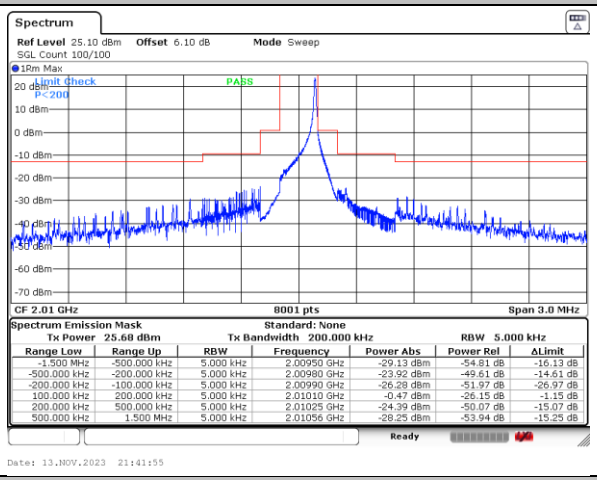
Lowest Channel / 1SC46/ BPSK



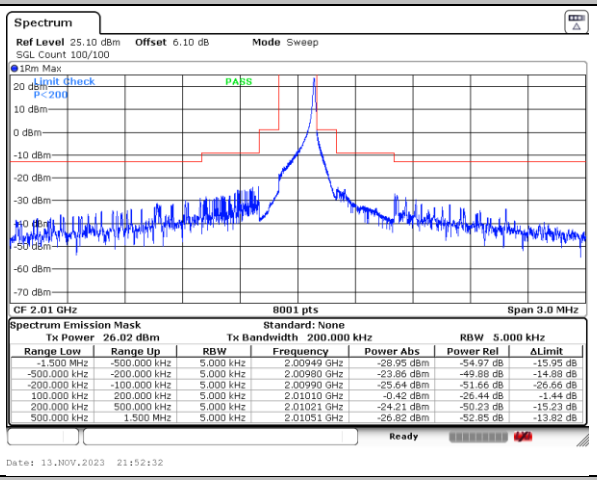
Lowest Channel / 1SC46 / QPSK



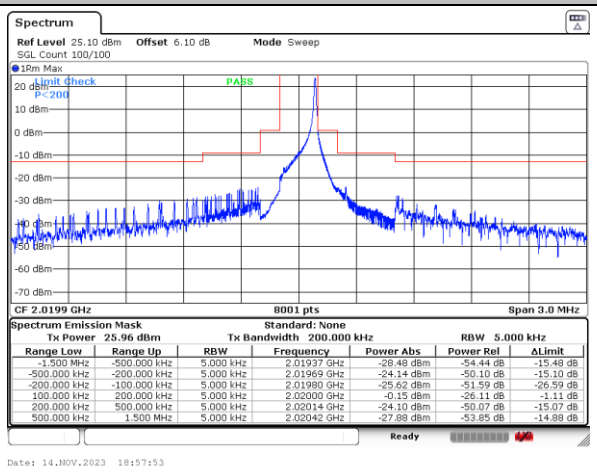
Middle Channel / 1SC46/ BPSK



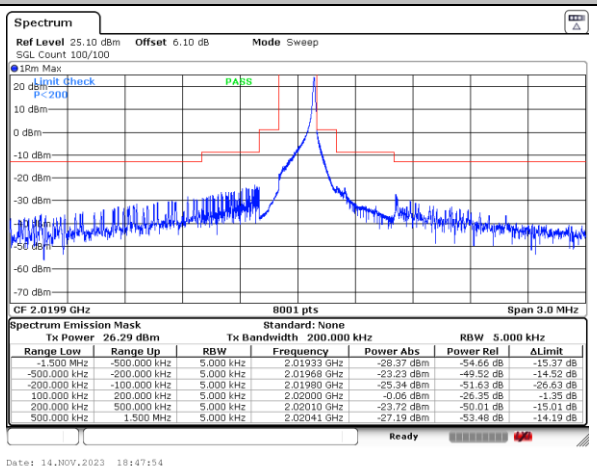
Middle Channel / 1SC46 / QPSK



Highest Channel / 1SC46/ BPSK

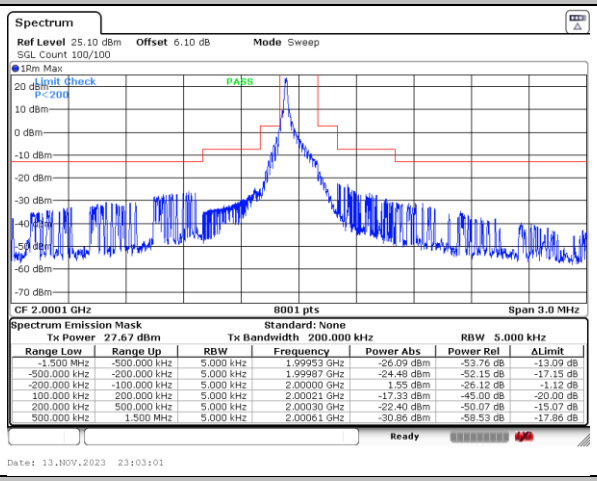


Highest Channel / 1SC46 / QPSK

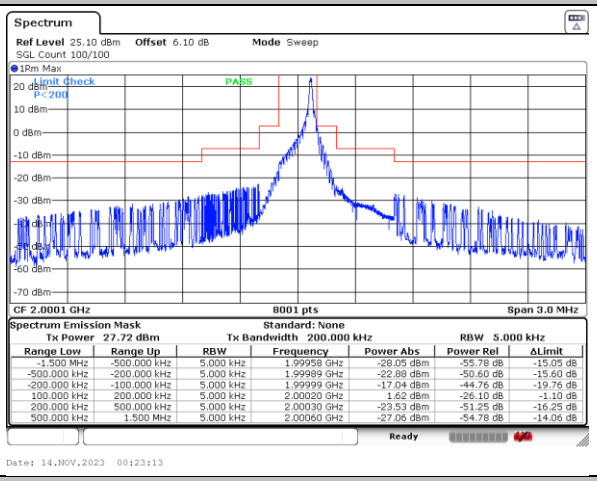


Band 23 SCS15KHz

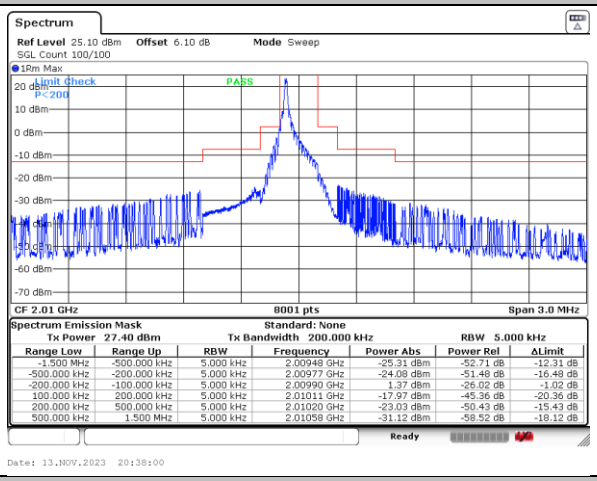
Lowest Channel / 1SC1/ BPSK



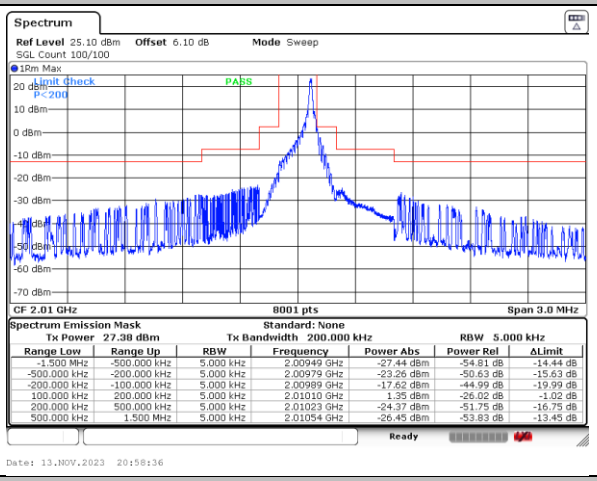
Lowest Channel / 1SC10 / BPSK



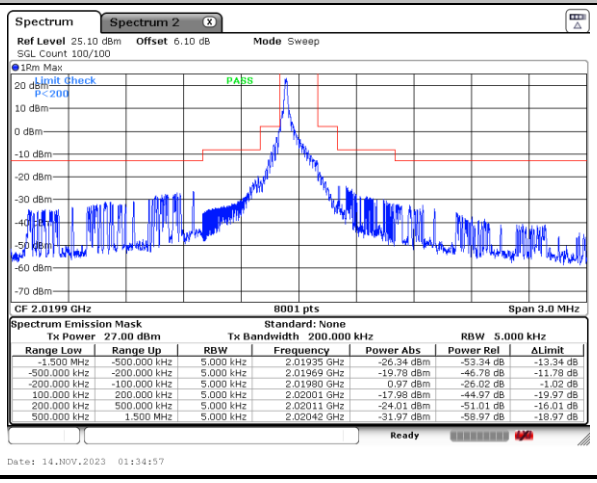
Middle Channel / 1SC1/ BPSK



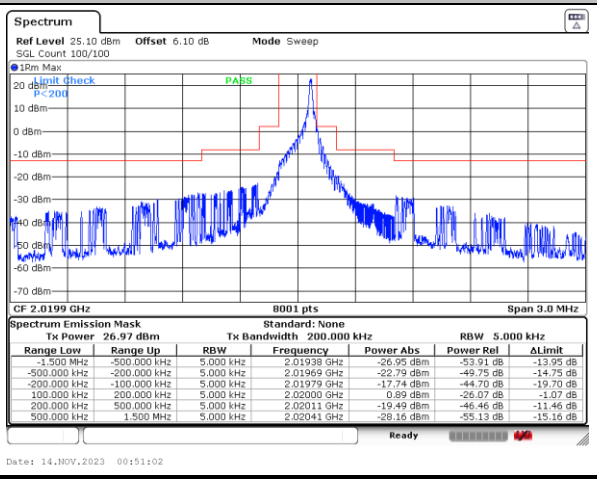
Middle Channel / 1SC10 / BPSK



Highest Channel / 1SC1/ BPSK

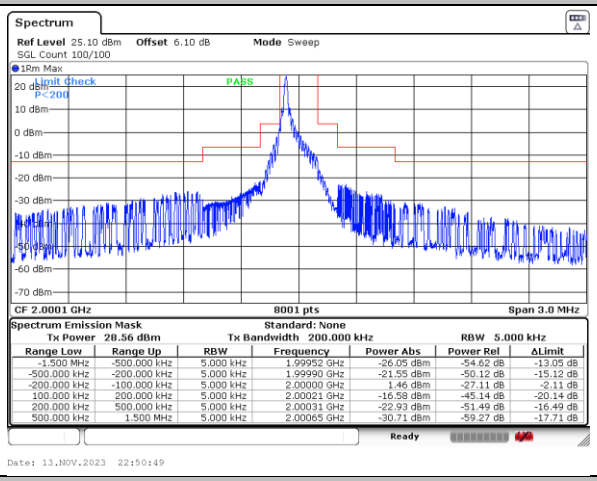


Highest Channel / 1SC10/ BPSK

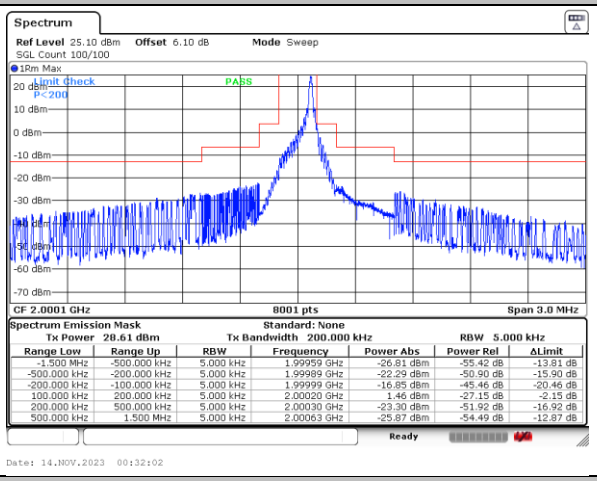


Band 23 SCS15KHz

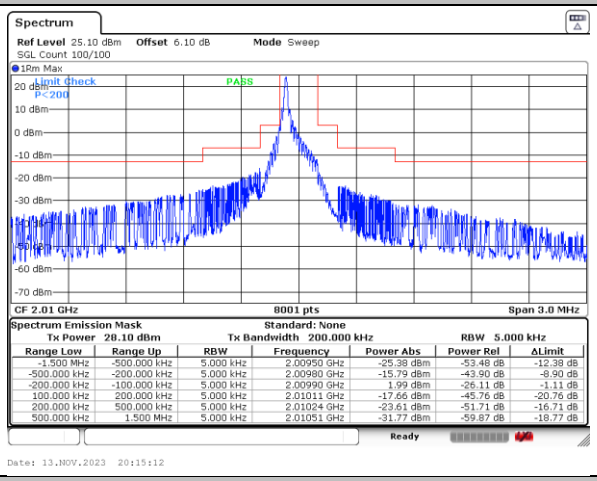
Lowest Channel / 1SC1/ QPSK



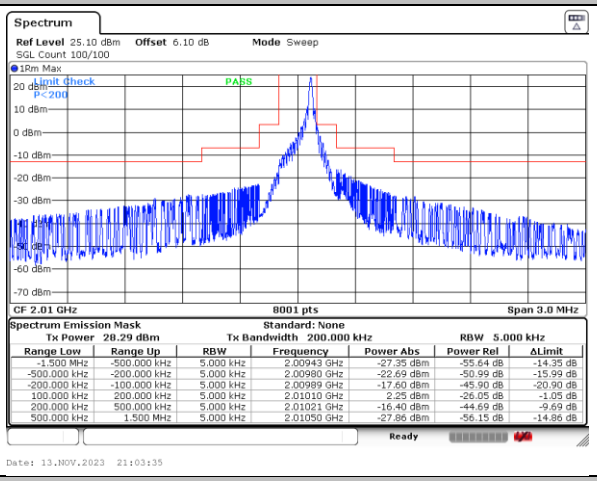
Lowest Channel / 1SC10 / QPSK



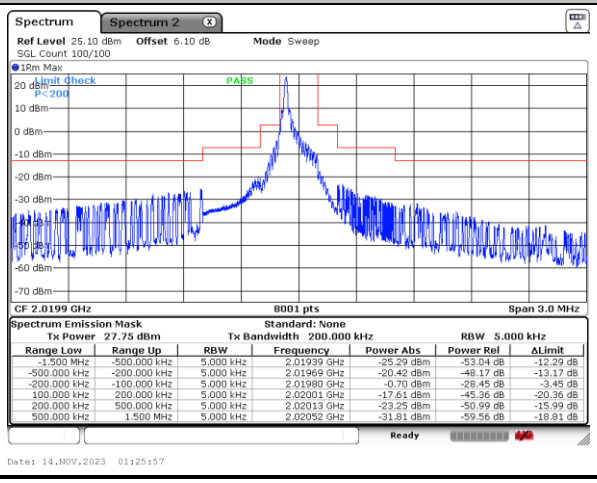
Middle Channel / 1SC1/ QPSK



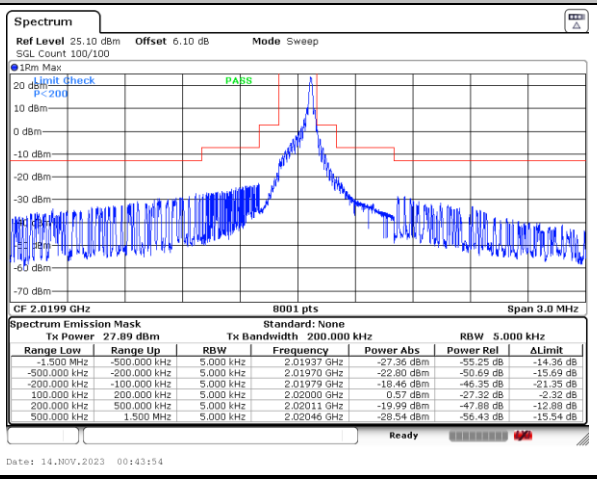
Middle Channel / 1SC10 / QPSK



Highest Channel / 1SC1/ QPSK

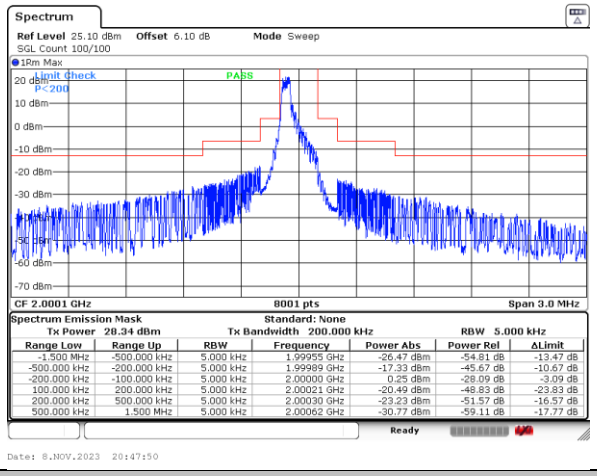


Highest Channel / 1SC10/ QPSK

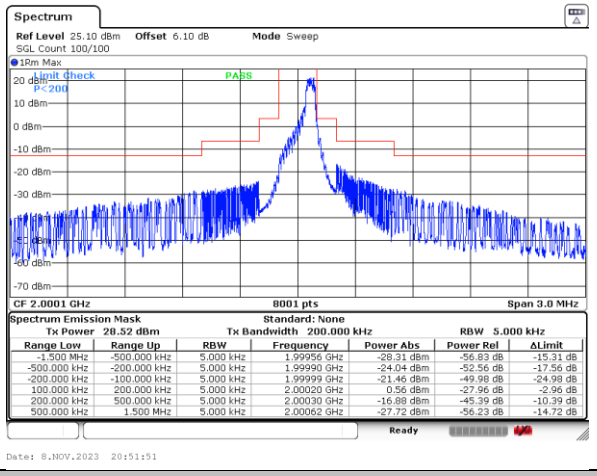


Band 23 SCS15KHz

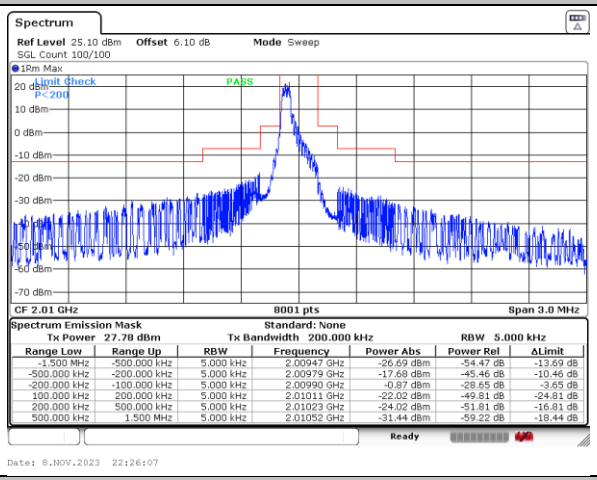
Lowest Channel / 3SC0 / QPSK



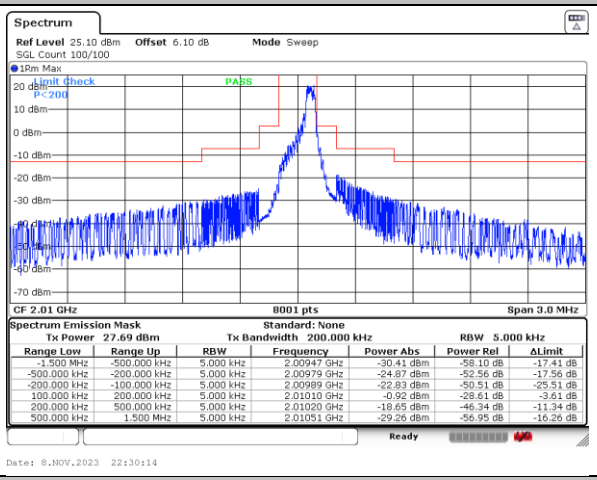
Lowest Channel / 3SC9 / QPSK



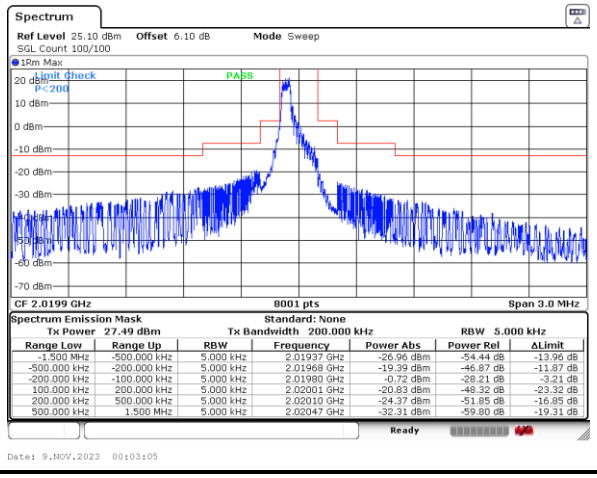
Middle Channel / 3SC0 / QPSK



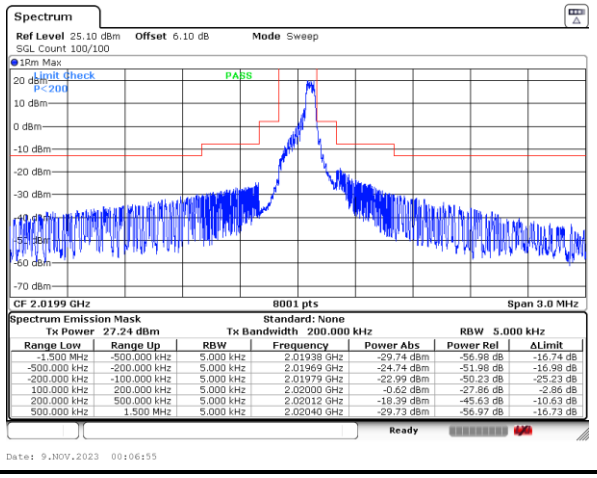
Middle Channel / 3SC9 / QPSK



Highest Channel / 3SC0 / QPSK

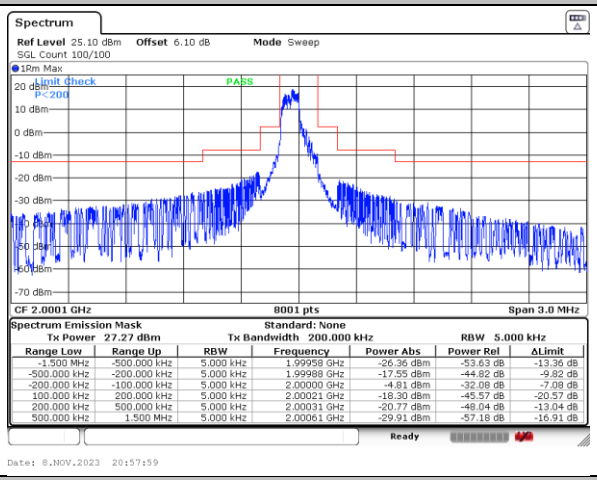


Highest Channel / 3SC9 / QPSK

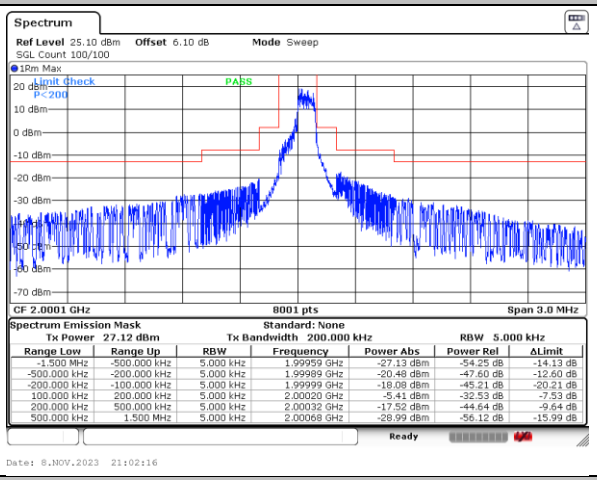


Band 23 SCS15KHz

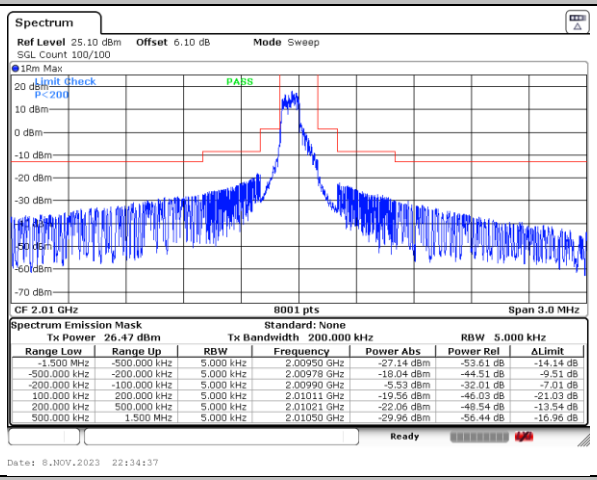
Lowest Channel / 6SC0/ QPSK



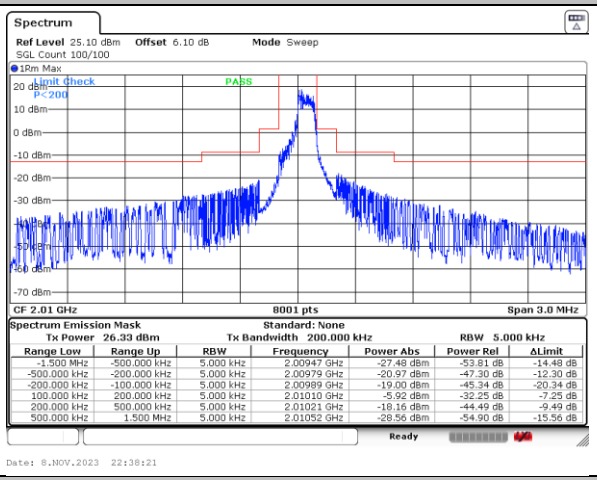
Lowest Channel / 6SC6 / QPSK



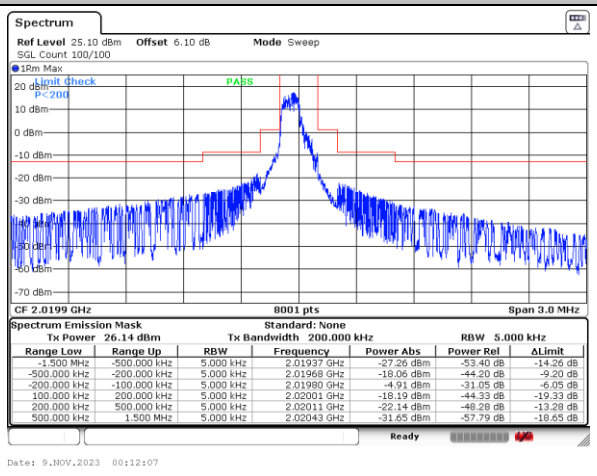
Middle Channel / 6SC0/ QPSK



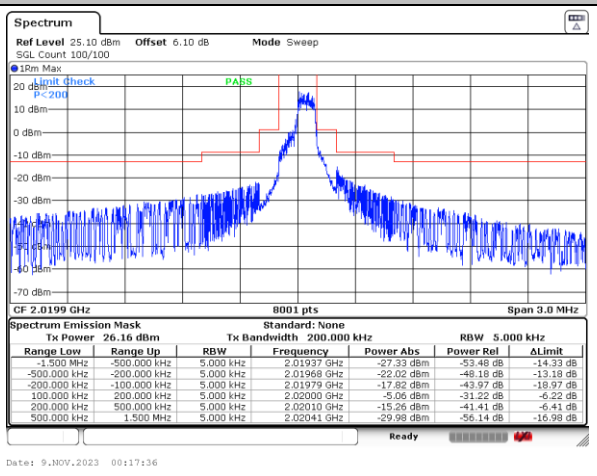
Middle Channel / 6SC6 / QPSK

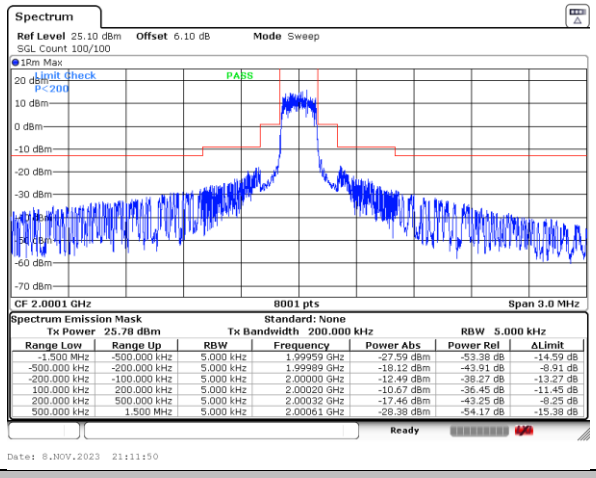
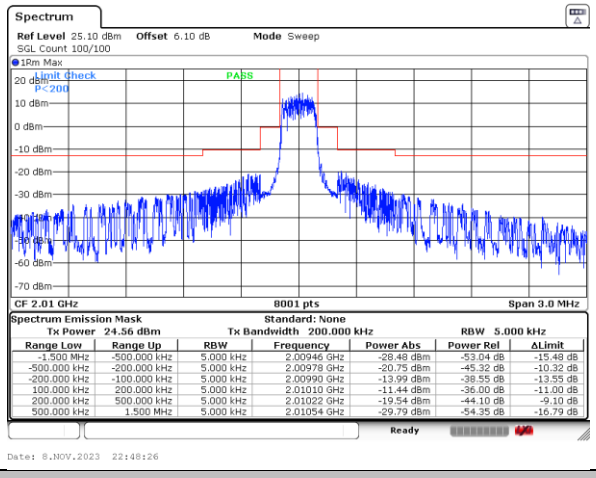
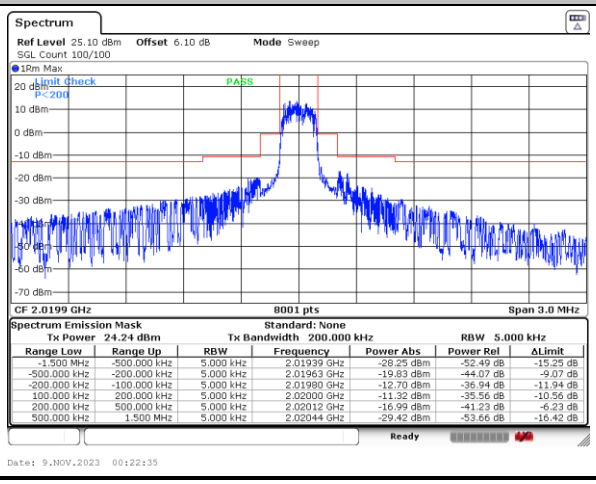


Highest Channel / 6SC0/ QPSK



Highest Channel /6SC6 / QPSK

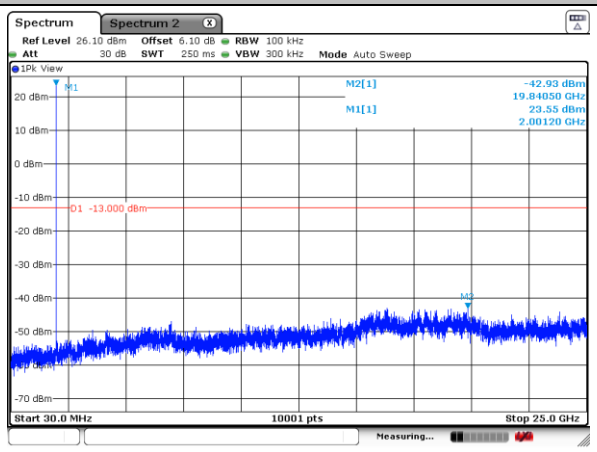


Band 23 SCS15KHz	
Lowest Channel / 12SC0 / QPSK	**N/A**
	
Middle Channel /12SC0 / QPSK	**N/A**
	
Highest Channel /12SC0 / QPSK	**N/A**
	

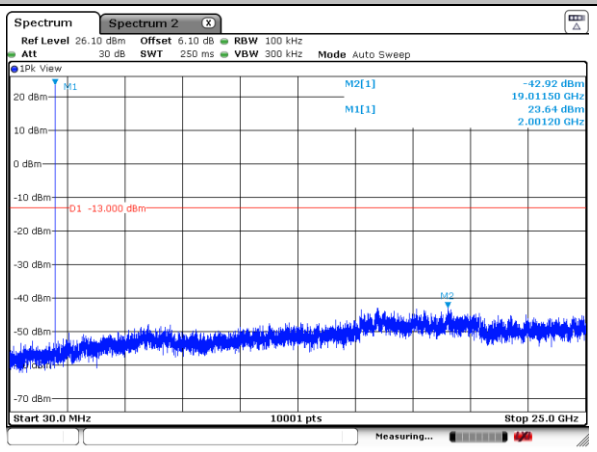
Conducted Spurious Emission

Band 23 SCS3.75KHz

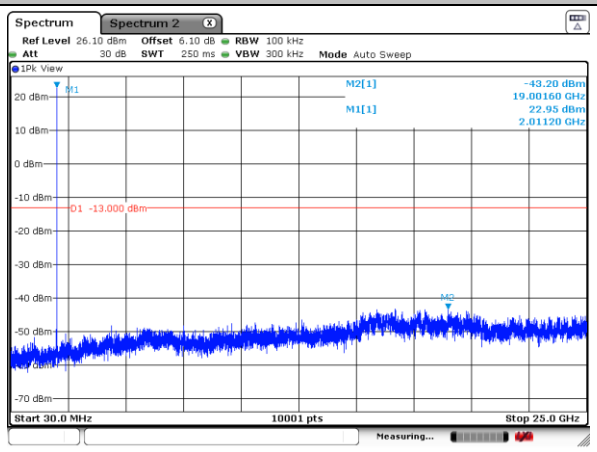
Lowest Channel / 1SC1/ BPSK



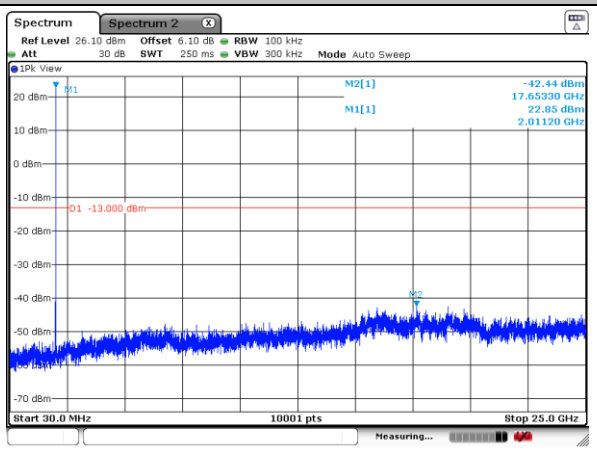
Lowest Channel / 1SC1 / QPSK



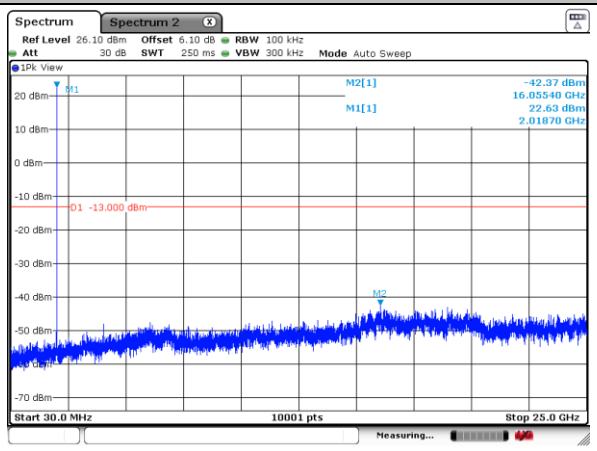
Middle Channel / 1SC1/ BPSK



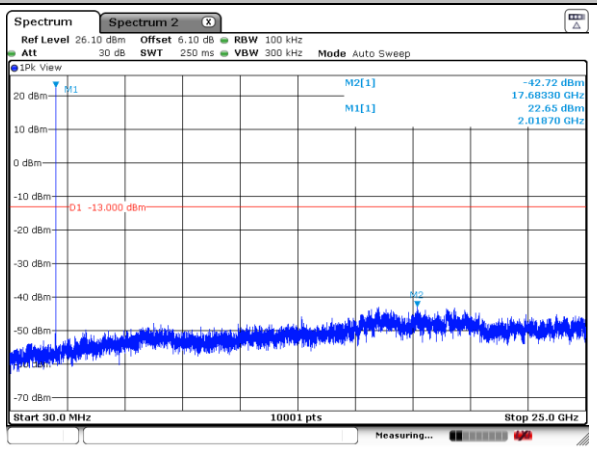
Middle Channel / 1SC1 / QPSK

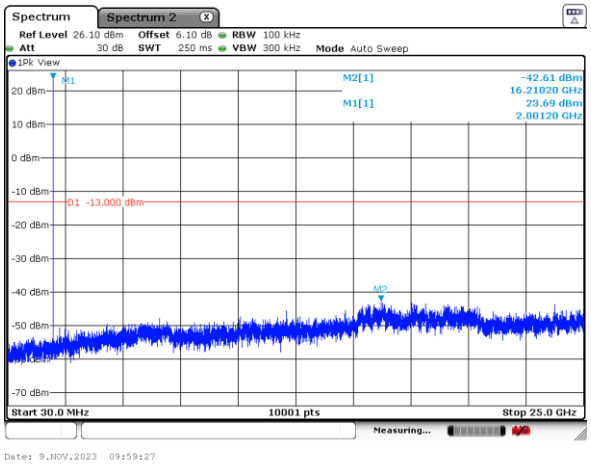
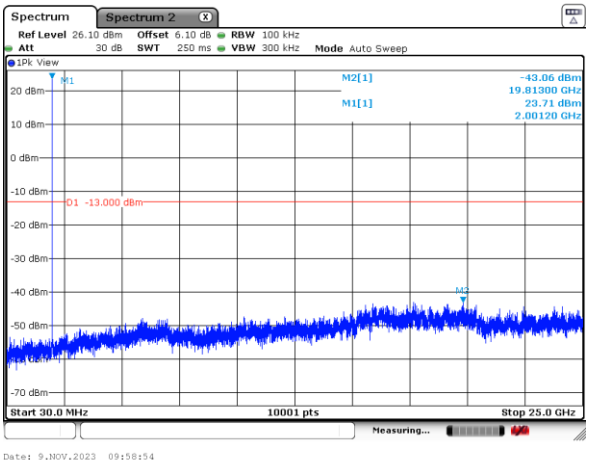
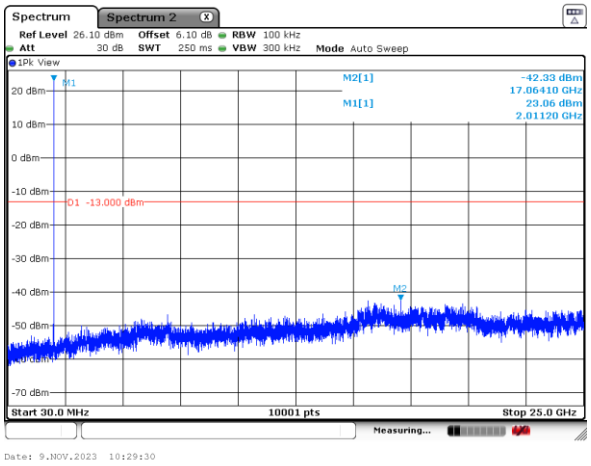
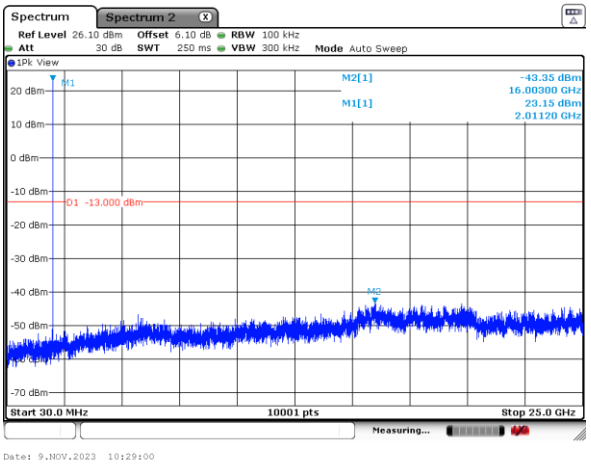


Highest Channel / 1SC1/ BPSK



Highest Channel / 1SC1 / QPSK



Band 23 SCS15KHz	
Lowest Channel / 1SC1/ BPSK	Lowest Channel / 1SC1 / QPSK
	
Middle Channel / 1SC1/ BPSK	Middle Channel / 1SC1 / QPSK
	
Highest Channel / 1SC1/ BPSK	Highest Channel / 1SC1 / QPSK