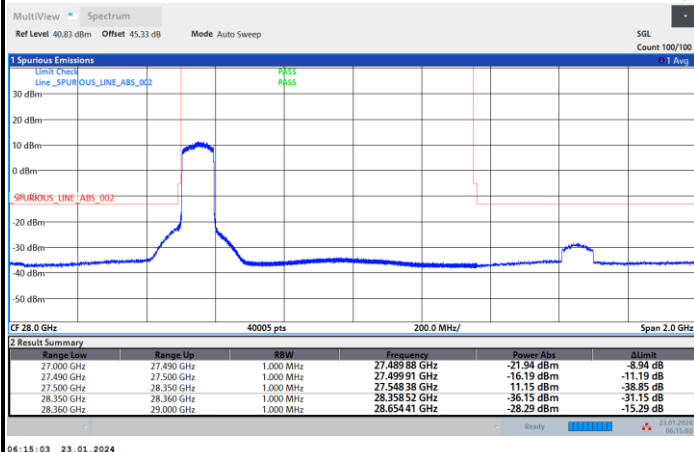




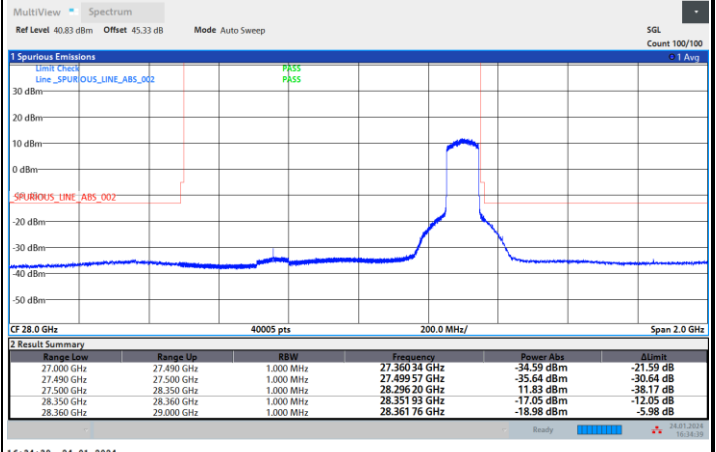
DFT-s-OFDM Module B

NR Band n261 / 100MHz / 16QAM

Lowest Band Edge / Full RB

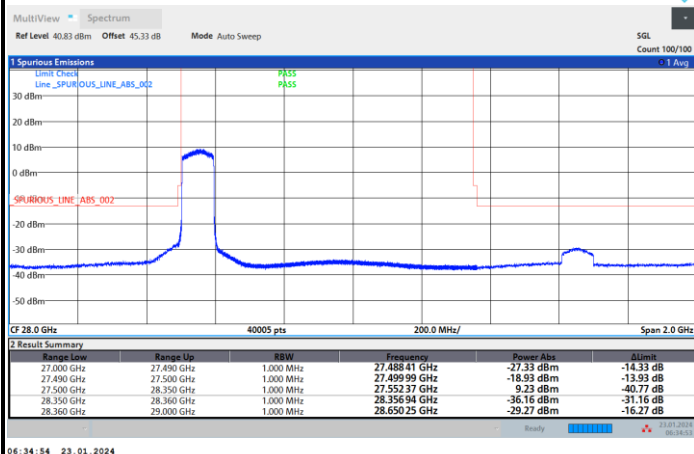


Highest Band Edge / Full RB

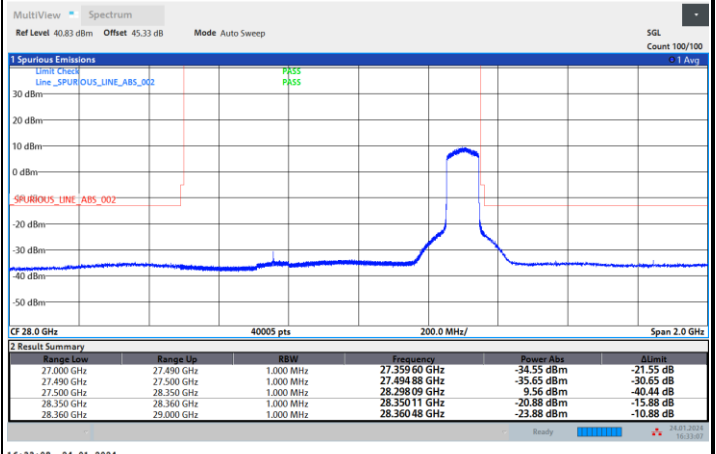


NR Band n261 / 100MHz / 64QAM

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

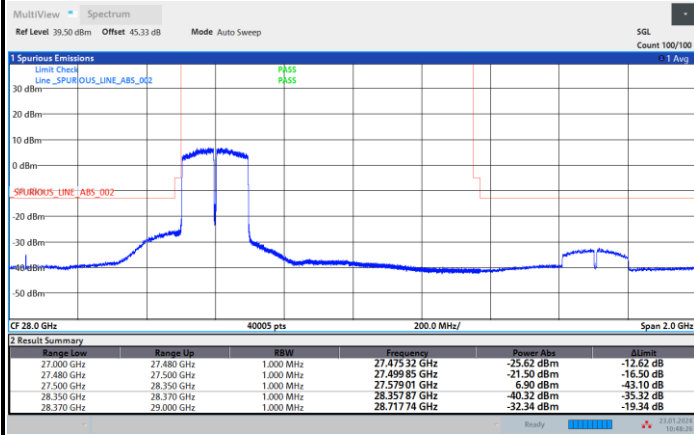




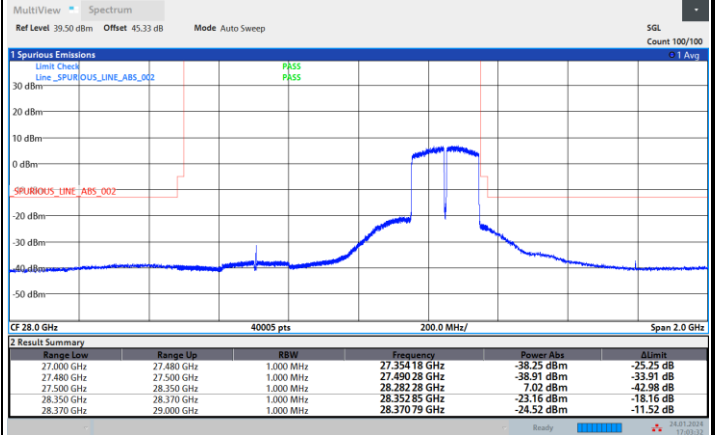
DFT-s-OFDM Module B

NR Band n261 / 200MHz / QPSK

Lowest Band Edge / Full RB

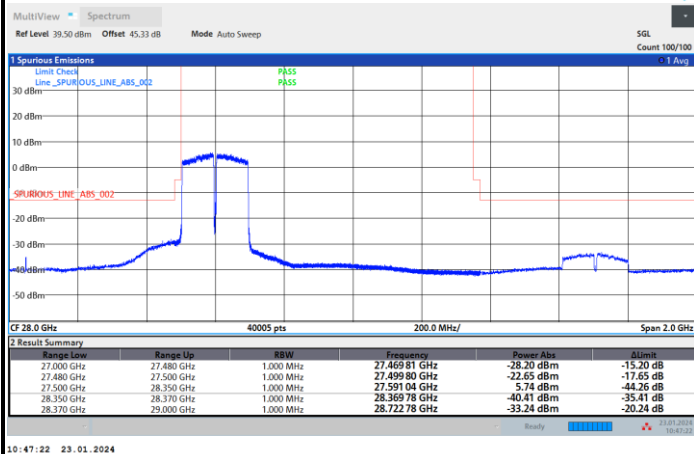


Highest Band Edge / Full RB

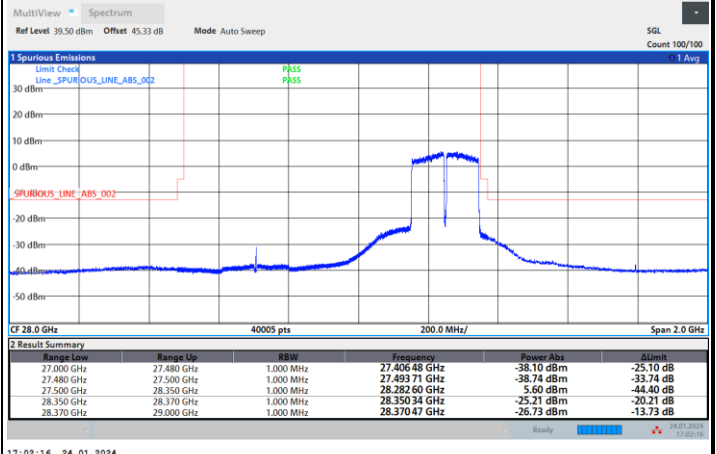


NR Band n261 / 200MHz / 16QAM

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

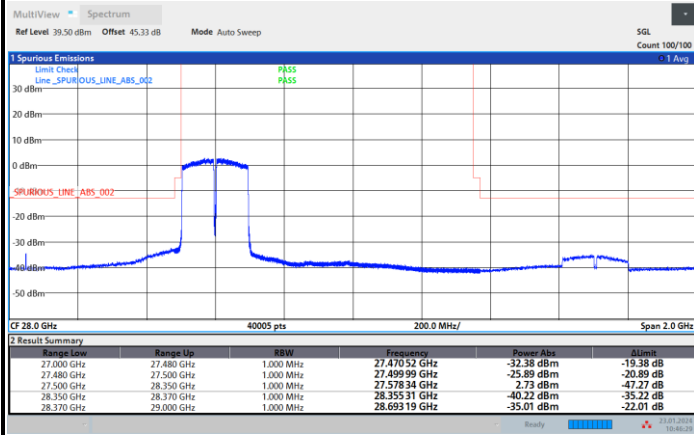




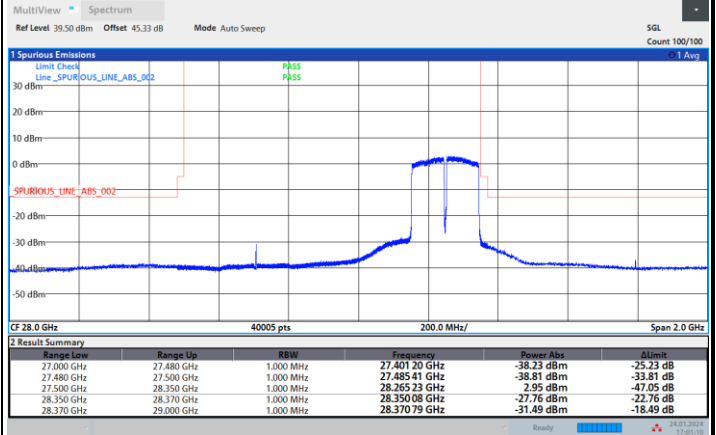
DFT-s-OFDM Module B

NR Band n261 / 200MHz / 64QAM

Lowest Band Edge / Full RB

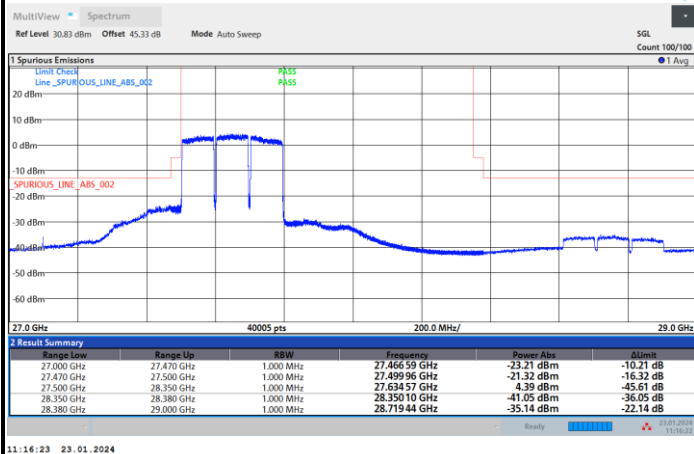


Highest Band Edge / Full RB

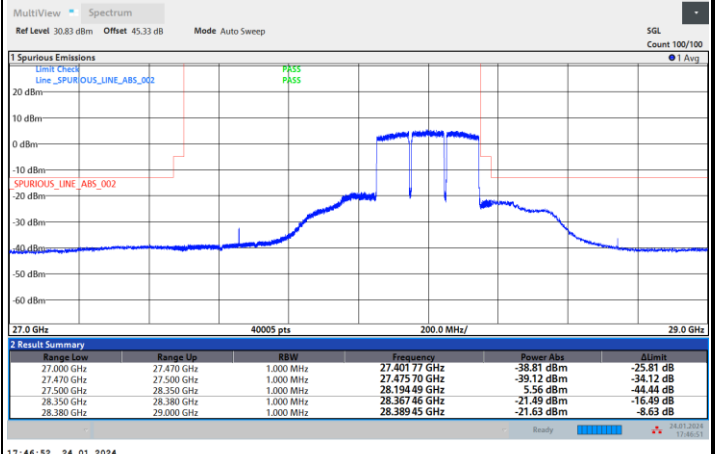


NR Band n261 / 300MHz / QPSK

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

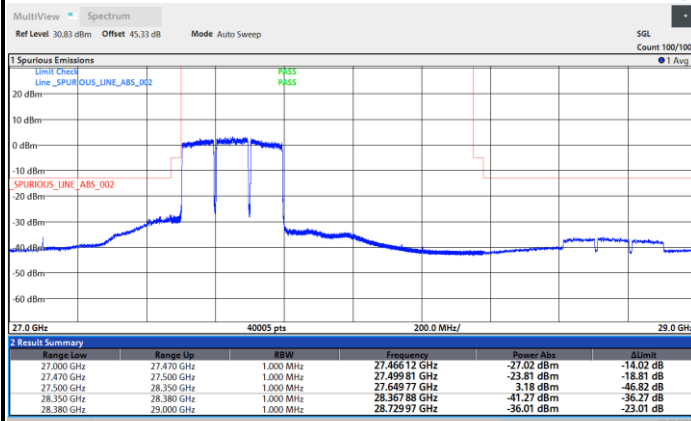




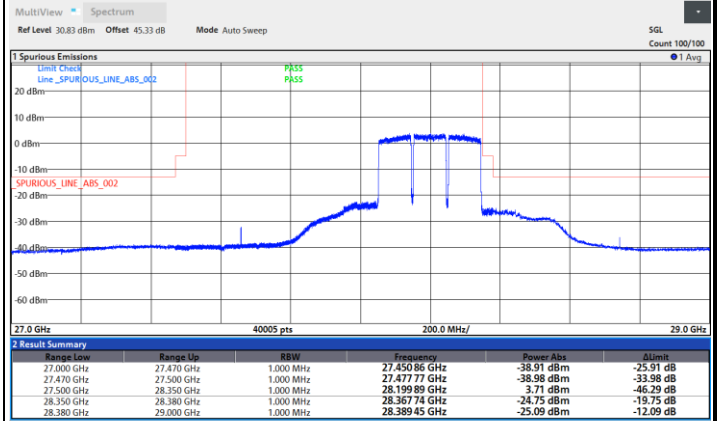
DFT-s-OFDM Module B

NR Band n261 / 300MHz / 16QAM

Lowest Band Edge / Full RB

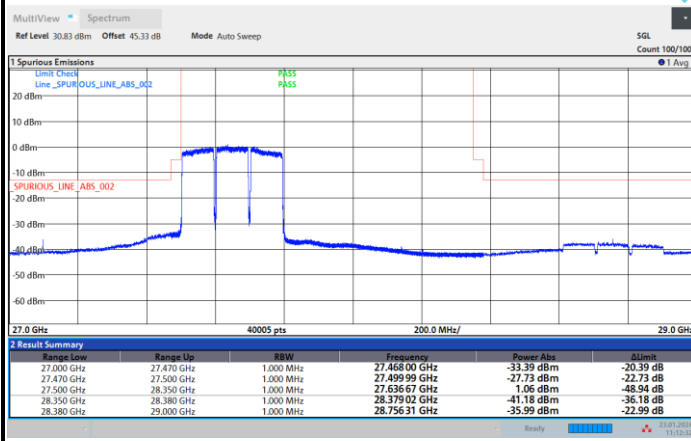


Highest Band Edge / Full RB

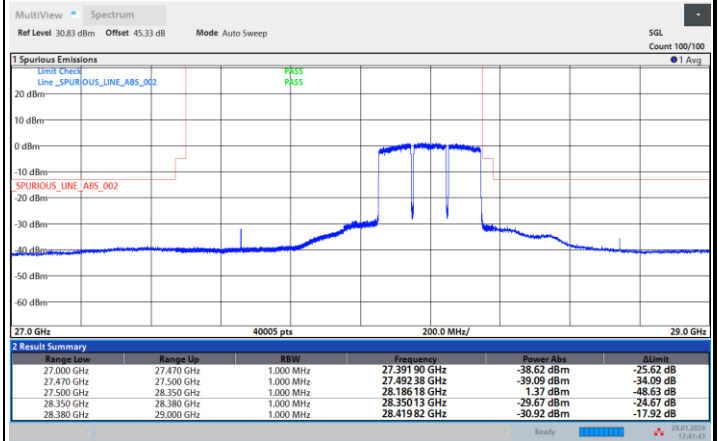


NR Band n261 / 300MHz / 64QAM

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

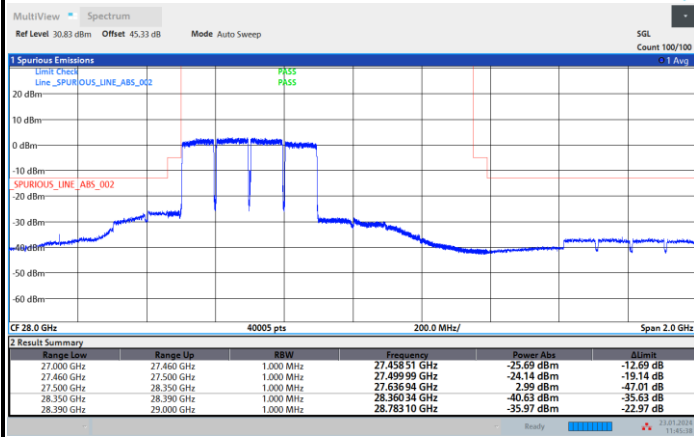




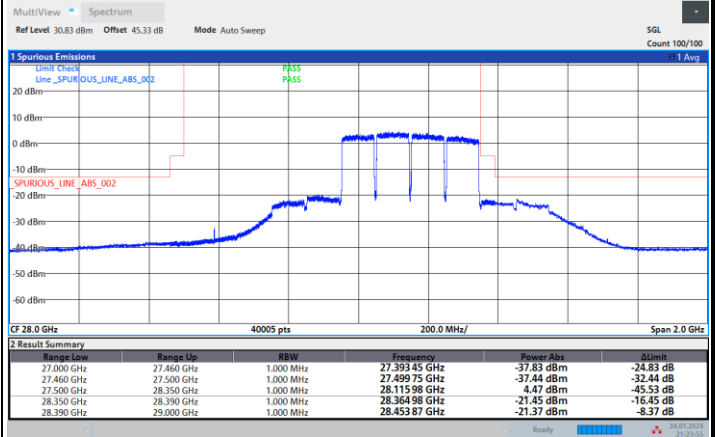
DFT-s-OFDM Module B

NR Band n261 / 400MHz / QPSK

Lowest Band Edge / Full RB

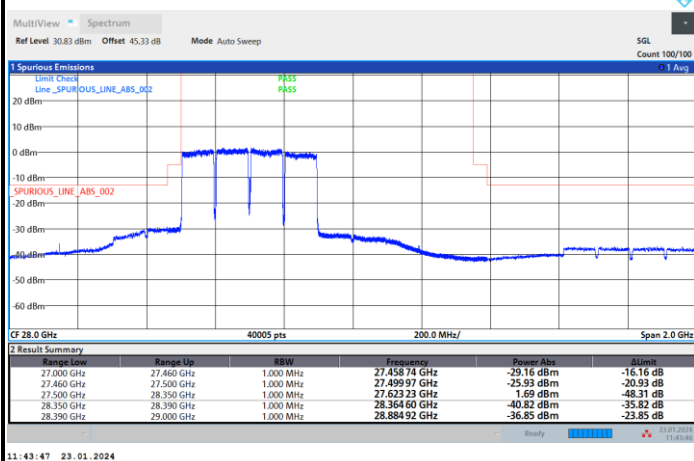


Highest Band Edge / Full RB

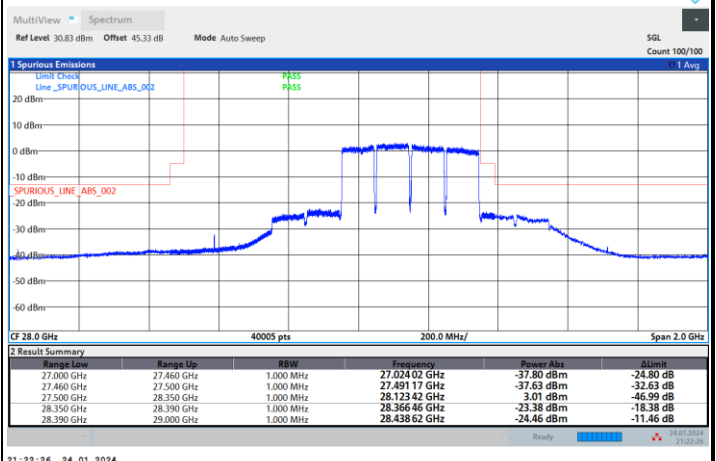


NR Band n261 / 400MHz / 16QAM

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

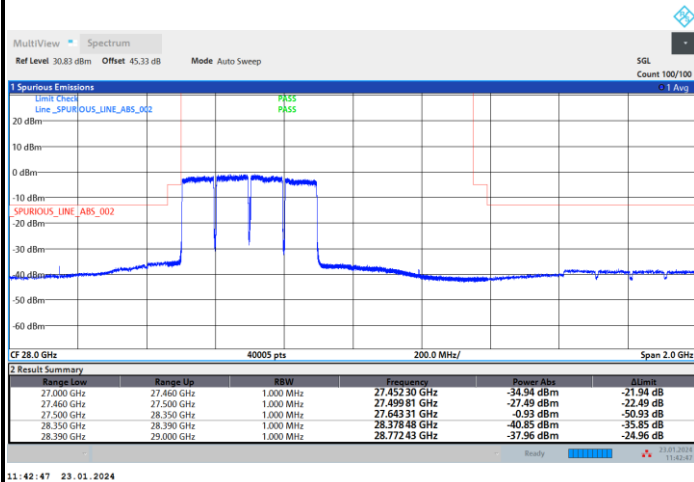




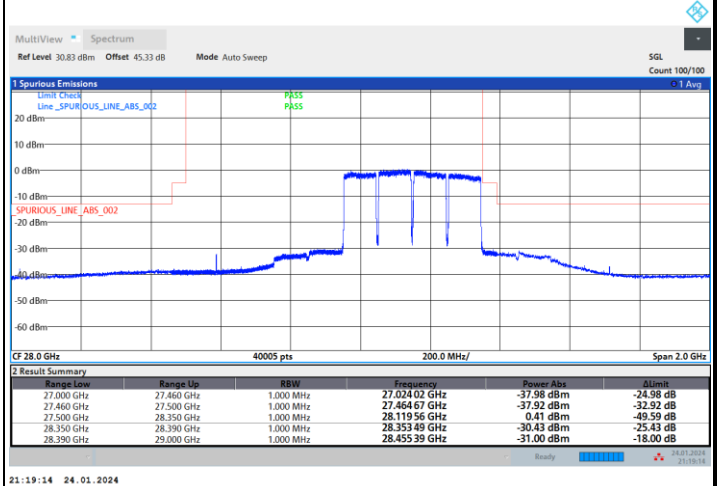
DFT-s-OFDM Module B

NR Band n261 / 400MHz / 64QAM

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

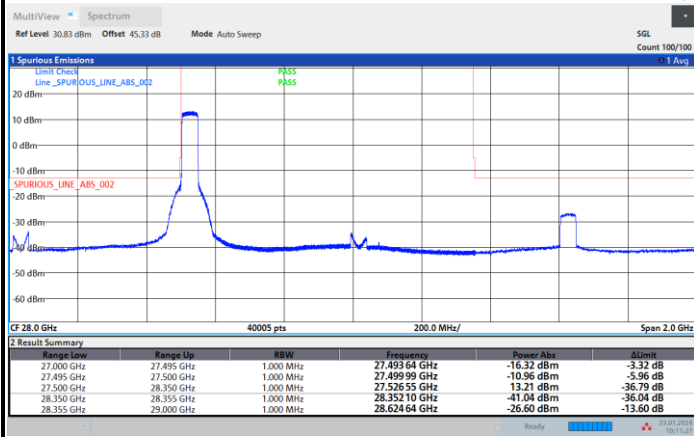




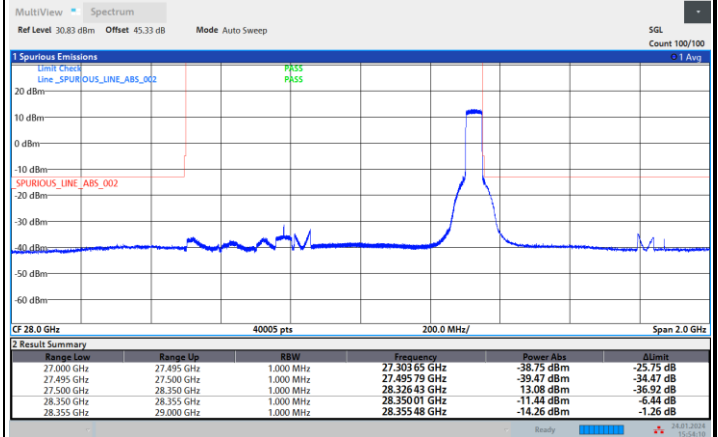
CP-OFDM Module B

NR Band n261 / 50MHz / QPSK

Lowest Band Edge / Full RB

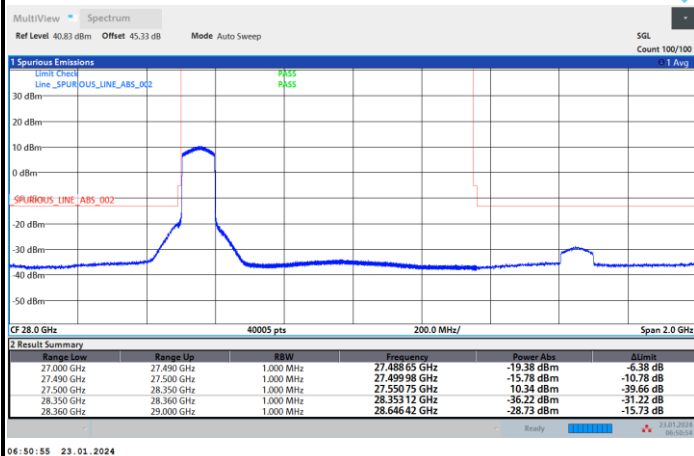


Highest Band Edge / Full RB

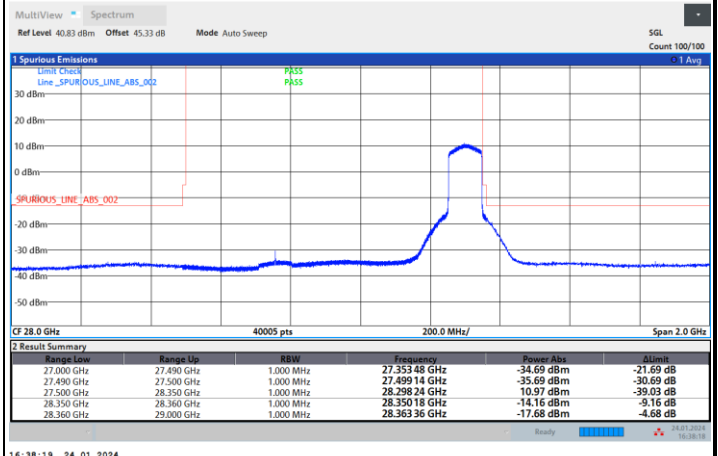


NR Band n261 / 100MHz / QPSK

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

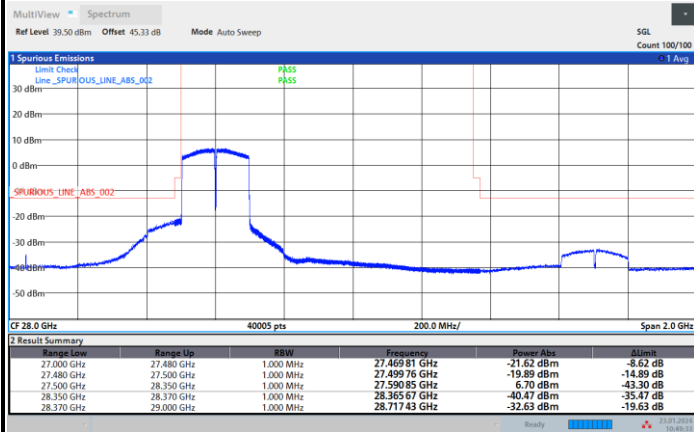




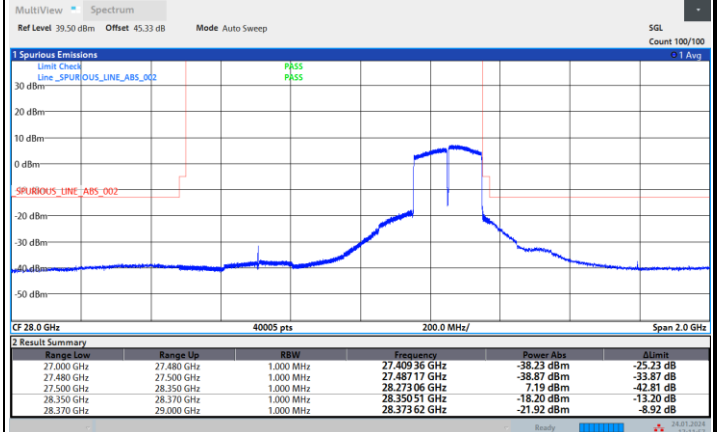
CP-OFDM Module B

NR Band n261 / 200MHz / QPSK

Lowest Band Edge / Full RB

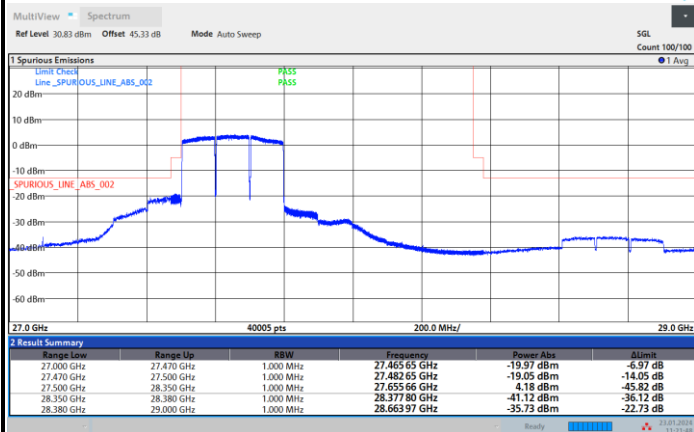


Highest Band Edge / Full RB

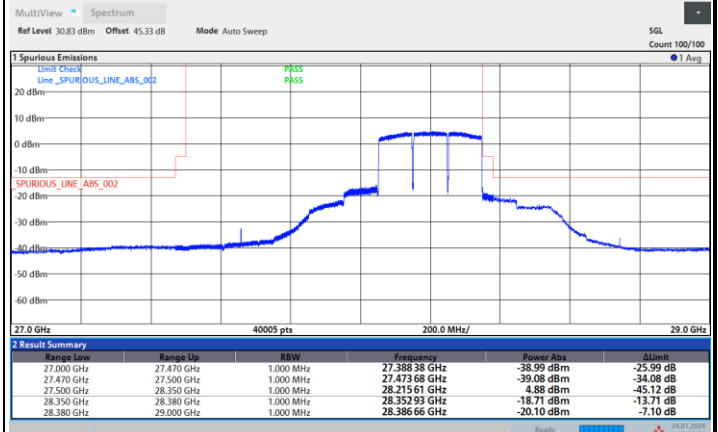


NR Band n261 / 300MHz / QPSK

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

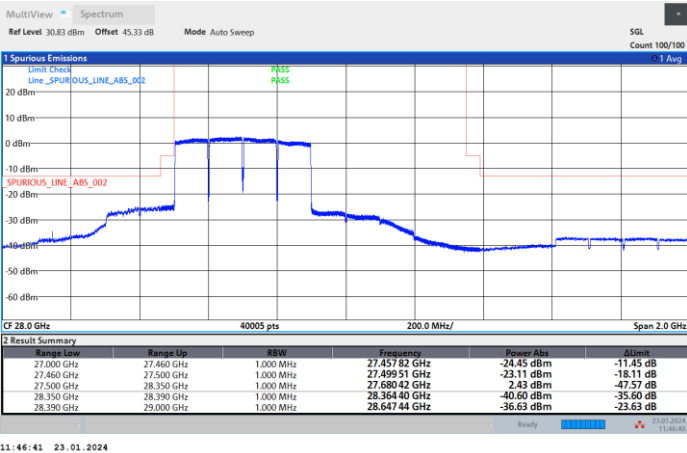




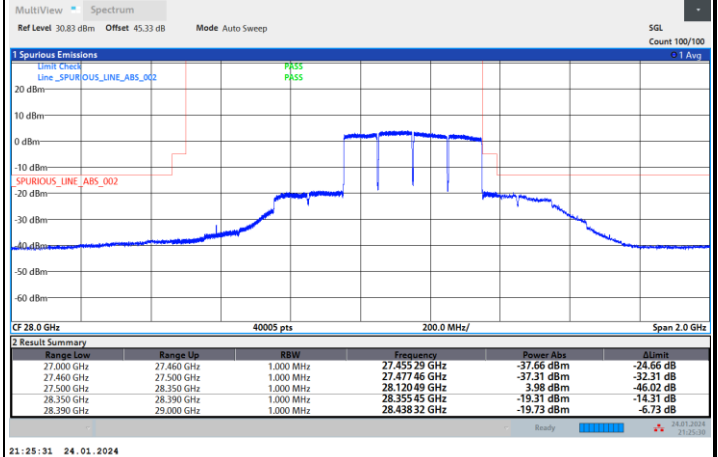
CP-OFDM Module B

NR Band n261 / 400MHz / QPSK

Lowest Band Edge / Full RB



Highest Band Edge / Full RB

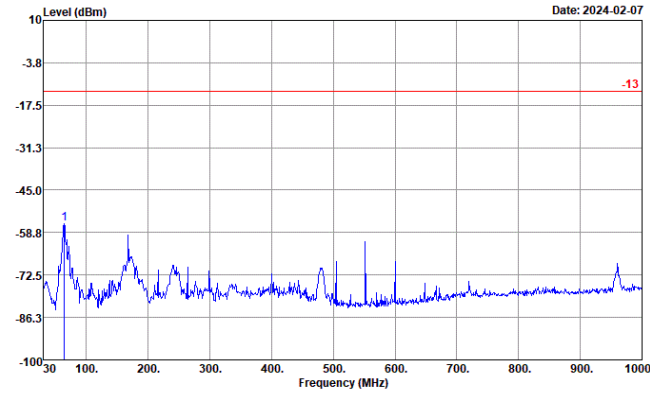




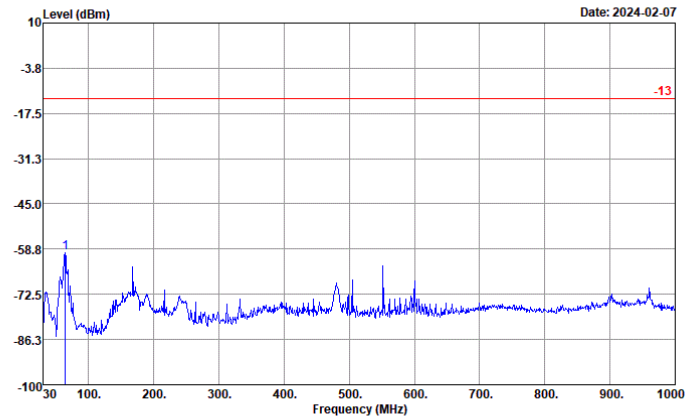
Spurious Emission

NR Band n261 (30MHz-1GHz)

Horizontal



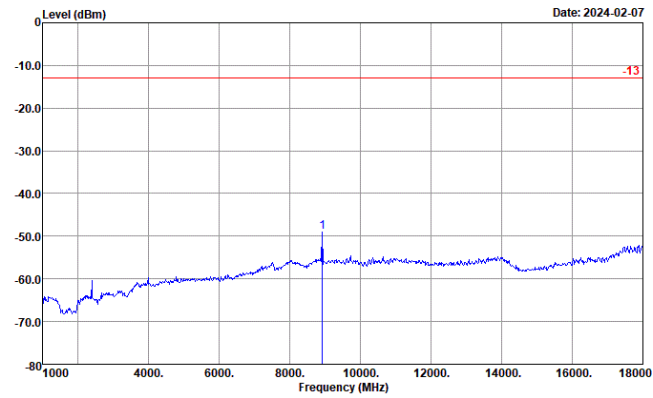
Vertical





NR Band n261 (1GHz-18GHz)

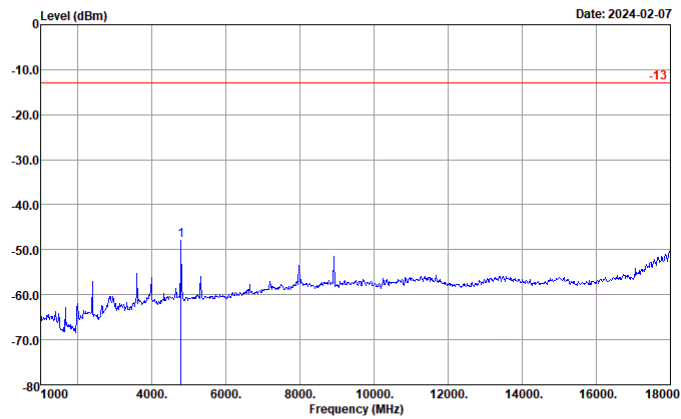
Horizontal



Site : 03CH10-HY
Condition : -13 EIRP_WO HORIZONTAL
Project : 3N2326
 : n261 MB

Freq	Level	Over	Limit
MHz	dBm	Limit	Line
1	8922.00	-48.94	-35.94 -13.00

Vertical



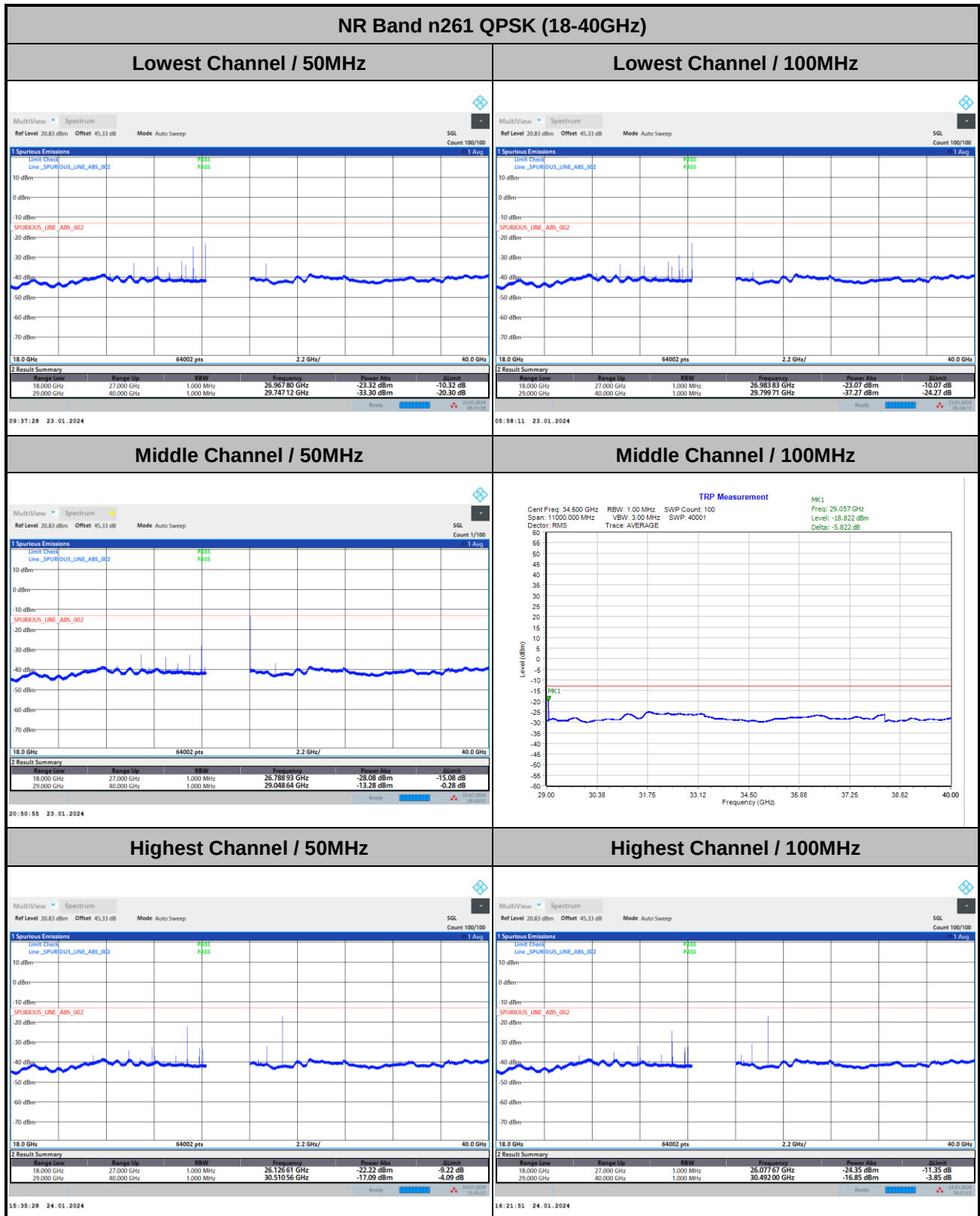
Site : 03CH10-HY
Condition : -13 EIRP_WO VERTICAL
Project : 3N2326
 : n261 MB

Freq	Level	Over	Limit
MHz	dBm	Limit	Line
1	4791.00	-47.86	-34.86 -13.00



Spurious emission between 18GHz to 40GHz worst case plot is reported as following.

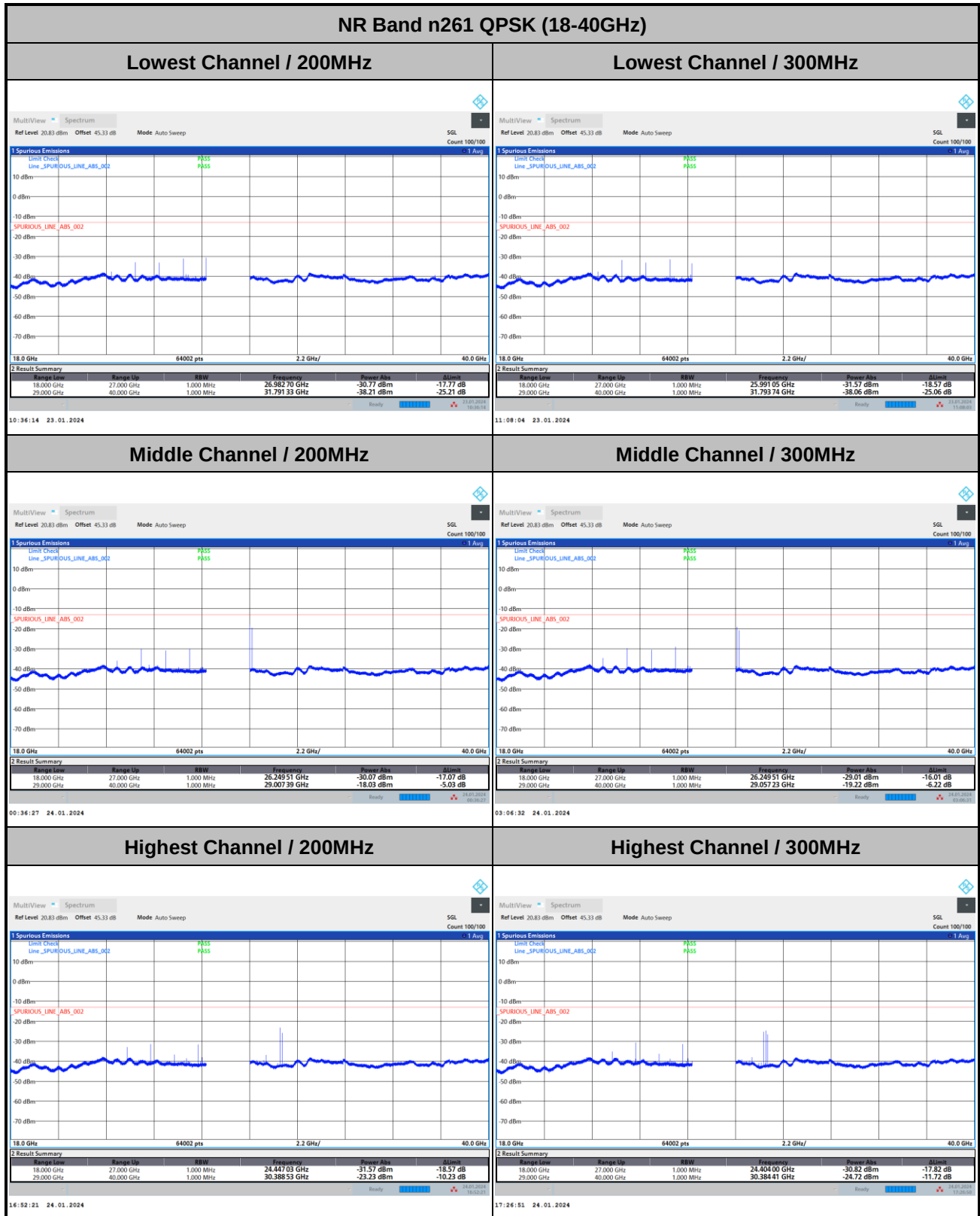
DFT-s-OFDM Module B



Remark: In band and out of band frequencies are omitted.



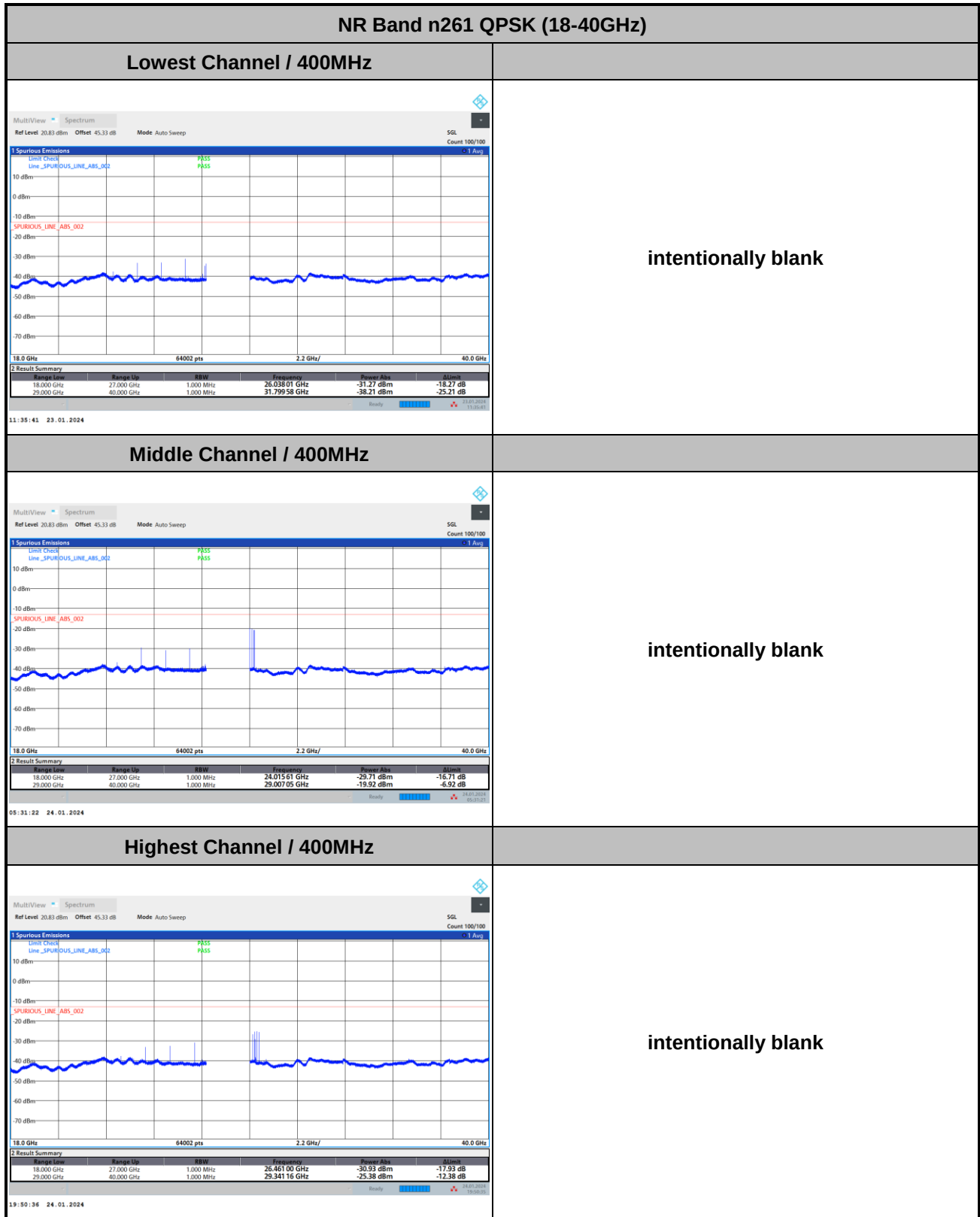
DFT-s-OFDM Module B



Remark: In band and out of band frequencies are omitted.



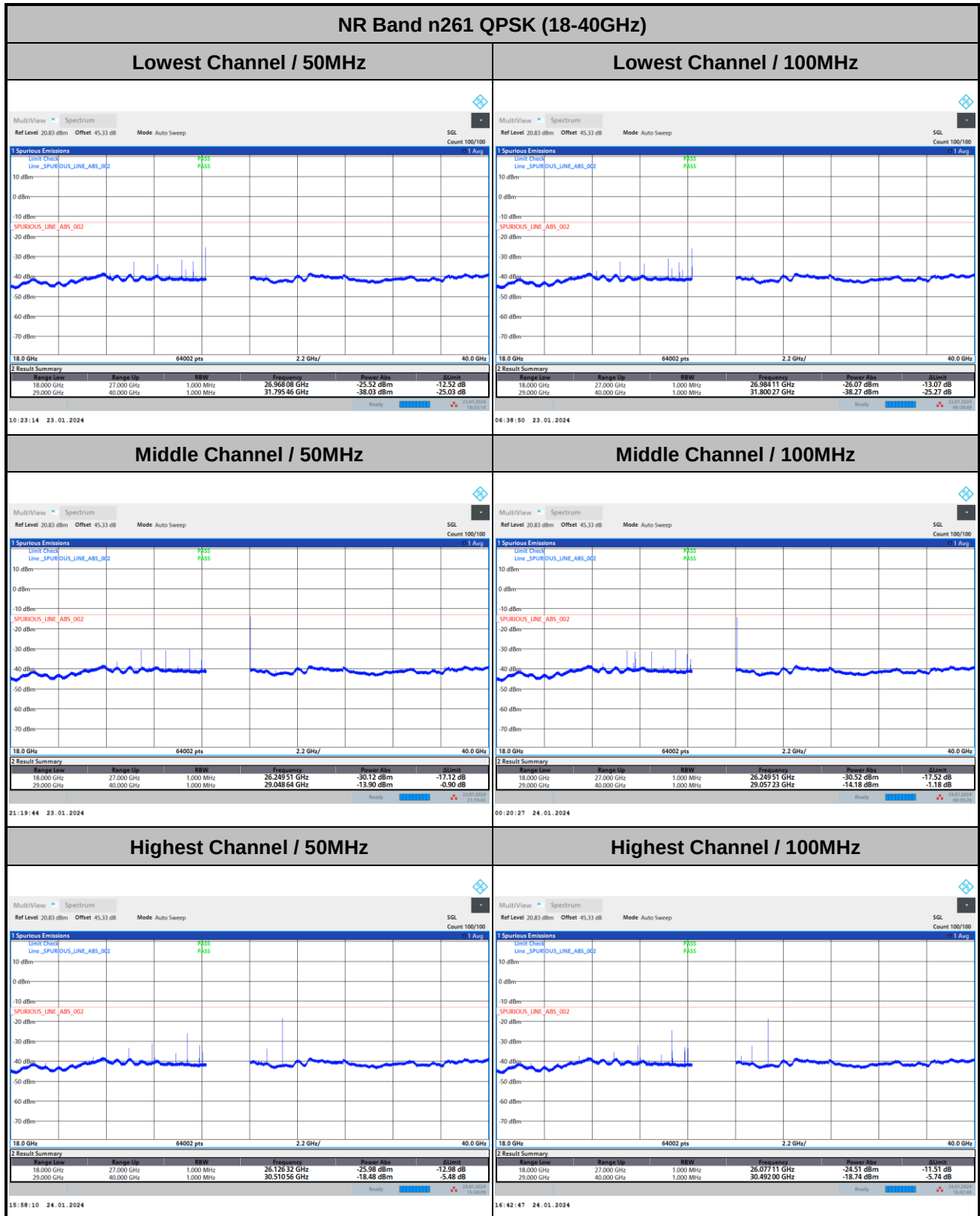
DFT-s-OFDM Module B



Remark: In band and out of band frequencies are omitted.



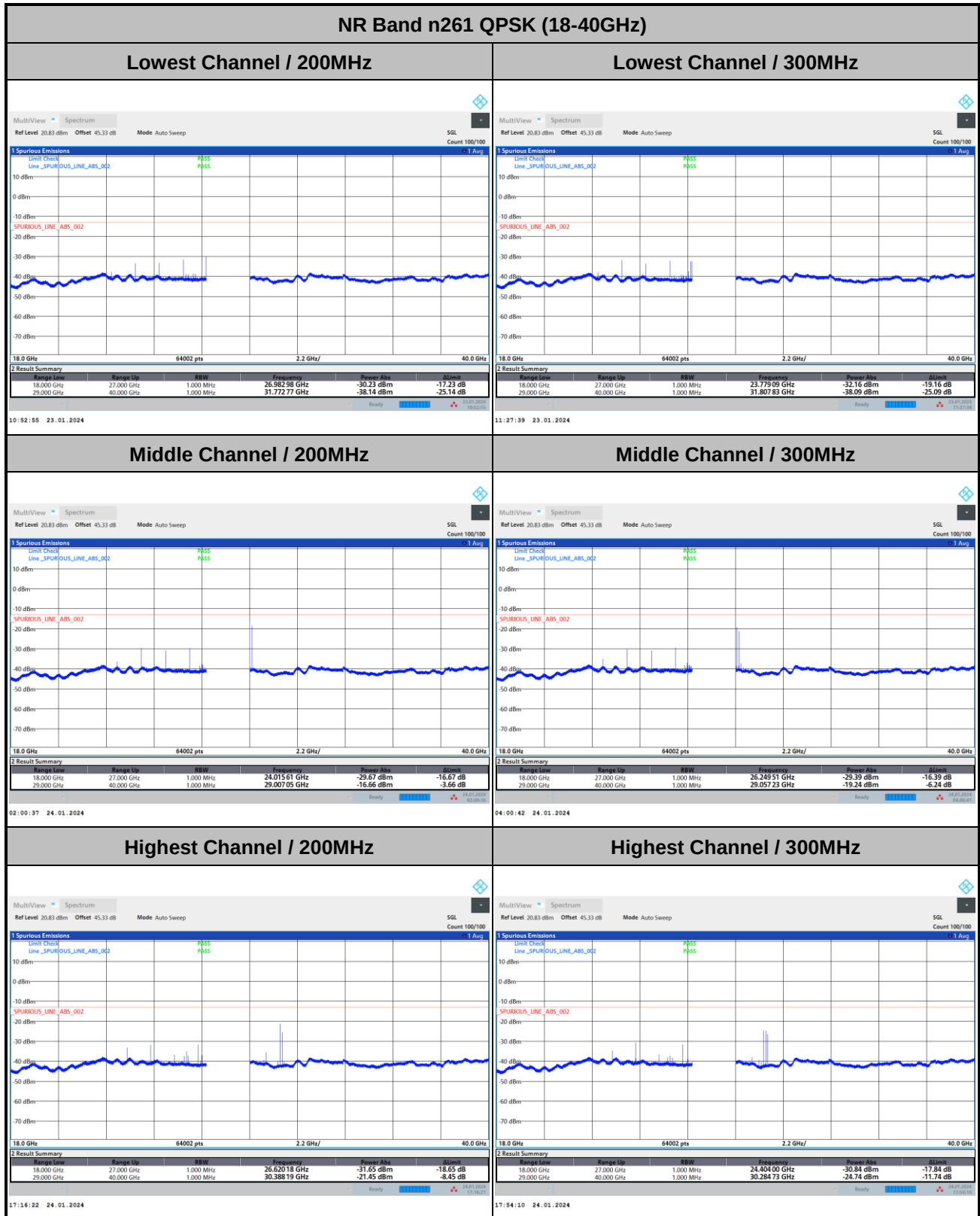
CP-OFDM Module B



Remark: In band and out of band frequencies are omitted.



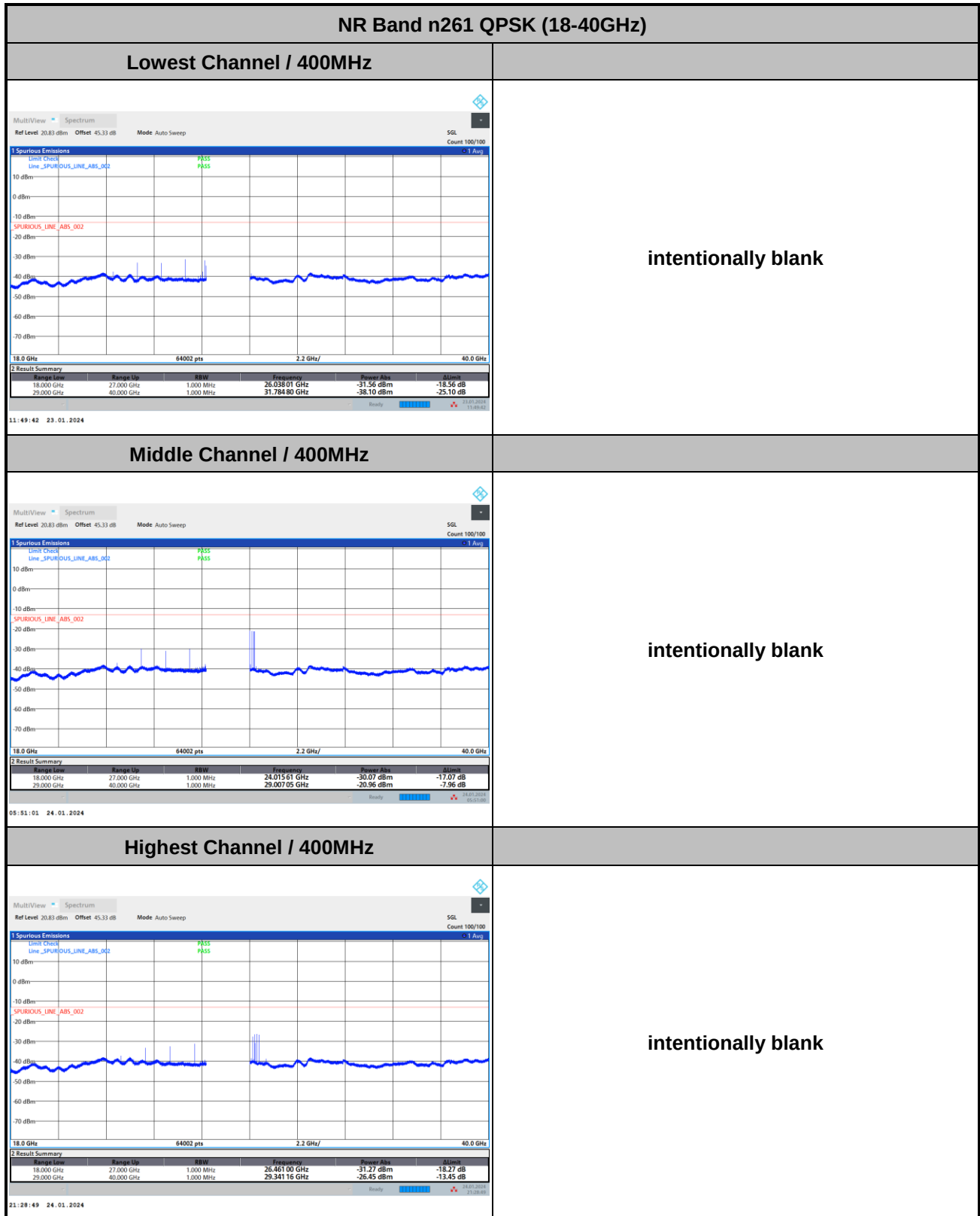
CP-OFDM Module B



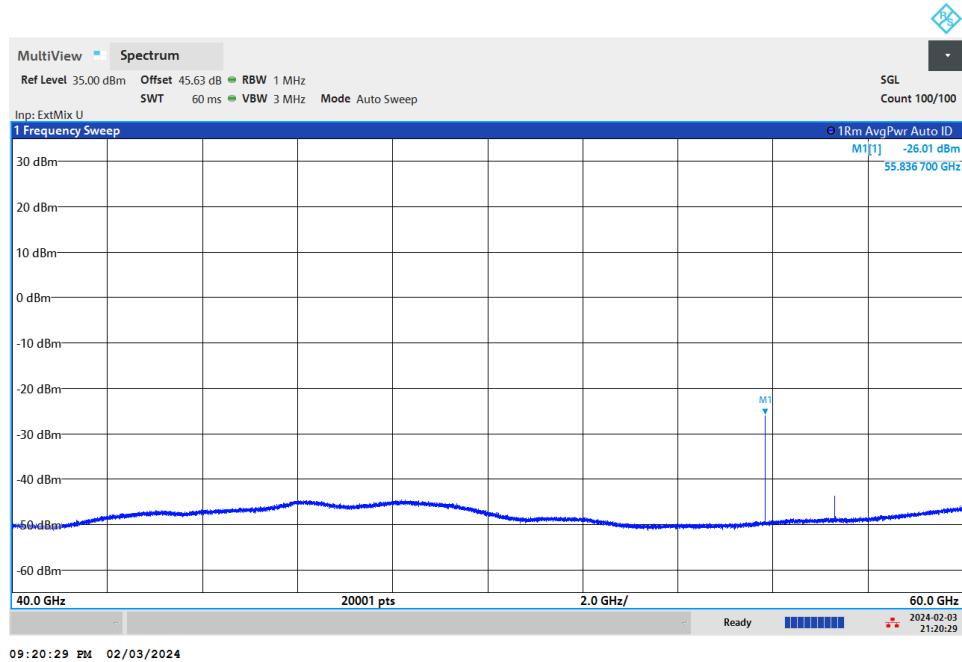
Remark: In band and out of band frequencies are omitted.



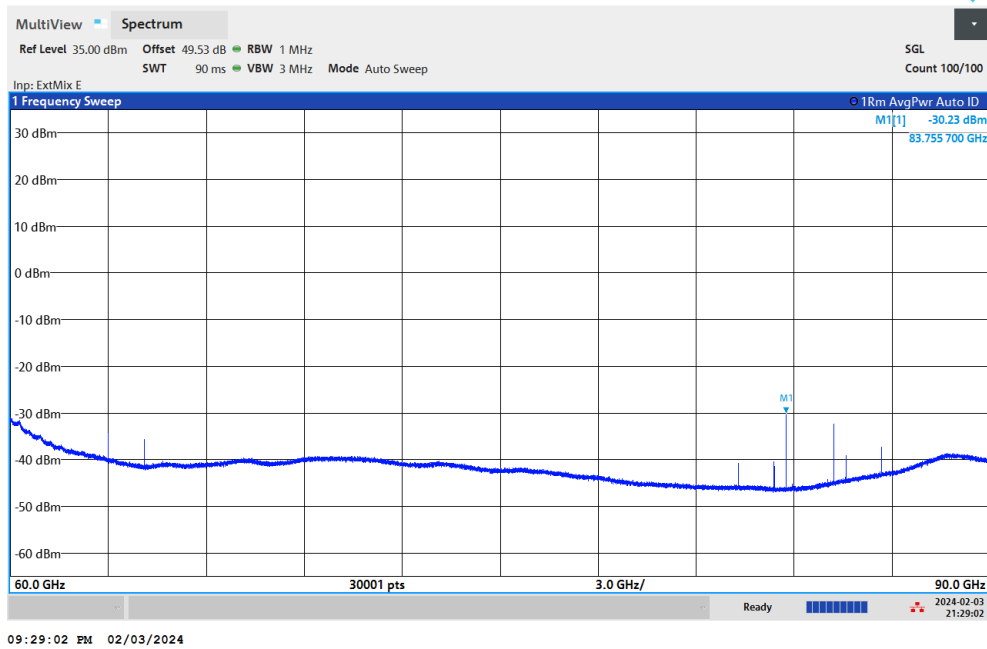
CP-OFDM Module B



Remark: In band and out of band frequencies are omitted.

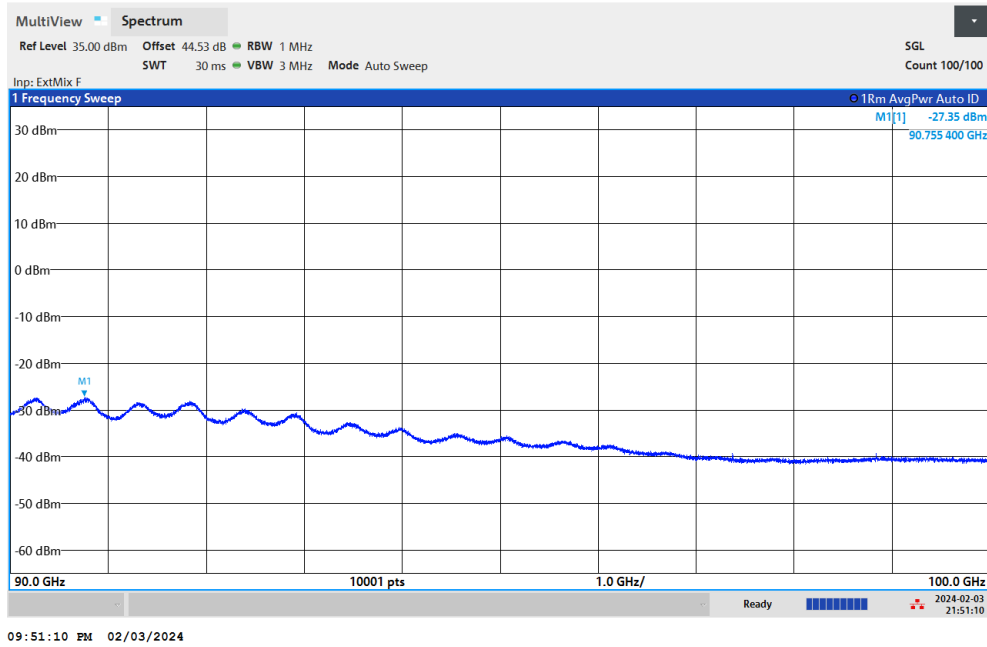
NR Band n261
(40GHz-60GHz)


$$\begin{aligned} \text{Offset} &= \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + 107 + 20\log(D) - 104.8 \\ &= 43 + 0.43 + 107 + 20\log(1) - 104.8 = 45.63(\text{dB}) \end{aligned}$$

NR Band n261
(60GHz-90GHz)


$$\text{Offset} = \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + 107 + 20\log(D) - 104.8$$

$$= 46.9 + 0.43 + 107 + 20\log(1) - 104.8 = 49.53 \text{ (dB)}$$

NR Band n261
(90GHz-100GHz)


$$\text{Offset} = \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + 107 + 20\log(D) - 104.8$$

$$= 47.92 + 0.43 + 107 + 20\log(0.5) - 104.8 = 44.53 \text{ (dB)}$$

Frequency Stability

Test Conditions		NR Band n261 / Middle Channel			Limit
Temperature (°C)	Voltage (Volt)	CW tone			Note 2.
		Frequency (GHz)	Deviation (kHz)	Deviation (ppm)	Result
50	Normal Voltage	27.9249491	17.900	0.641	Pass
40	Normal Voltage	27.9249241	42.900	1.536	
30	Normal Voltage	27.9249321	34.900	1.250	
20(Ref.)	Normal Voltage	27.924967	0.000	0.000	
10	Normal Voltage	27.925036	-69.000	2.471	
0	Normal Voltage	27.9251089	-141.900	5.081	
-10	Normal Voltage	27.9251189	-151.900	5.440	
-20	Normal Voltage	27.9250709	-103.900	3.721	
-30	Normal Voltage	27.9250709	-103.900	3.721	
20	Maximum Voltage	27.924969	-2.000	0.072	
20	Normal Voltage	27.924966	1.000	0.036	
20	Battery End Point	27.924964	3.000	0.107	

Note:

1. Normal Voltage = 3.89 V. ; Battery End Point (BEP) = 3.6 V. ; Maximum Voltage = 4.4 V.
2. The frequency fundamental emissions stay within the operation band.



Appendix B. R&S Mixer and Horn Antenna Calibration Reports



CALIBRATION CERTIFICATE



Kalibrierschein

Certificate Number
Zertifikatsnummer

0001A300718726

General Data	
Item Gegenstand	FS-Z60 HARMONIC MIXER 40-60GHZ
Manufacturer Hersteller	ROHDE & SCHWARZ
Type Typ	FS-Z60
Material Number Materialnummer	1048.0171.02
Serial Number Seriennummer	100986
Order Number Bestellnummer	Q786007
Asset Number Inventarnummer	
Customer Auftraggeber	Sporton International Inc. 6F., Sec. 1, Hsin Tai Wu Rd 106 221 New Taipei City TW
Performance	
Place and Date of Calibration Ort und Datum der Kalibrierung	87700 Memmingen, Rohde-und-Schwarz-Str. 1 2023-10-31
Statement of Compliance (Incoming) Konformitätsaussage (Anlieferung)	All measured values are within the data sheet specifications.
Statement of Compliance (Outgoing) Konformitätsaussage (Auslieferung)	All measured values are within the data sheet specifications.
Customers due Interval Kalibrierintervall des Kunden	
Extent of Calibration Document Umfang des Kalibrierdokuments	3 Pages Certificate 6 Pages Outgoing Results 6 Pages Incoming Results
Date of Issue Ausstellungsdatum	Approval of the certificate by Freigabe des Kalibrierscheins durch
2023-11-08	Dr. Gerhard Rösel Johannes Negele
Laboratory management Labormanagement	Person responsible Bearbeiter

Calibration Mark Kalibrierzeichen

300718726
D-K- 15195-01-00
2023-10

Member of Deutscher Kalibrierdienst
Mitglied im Deutschen Kalibrierdienst



This calibration certificate documents the metrological traceability to national standards, which realize the units of measurement according to the International System of Units (SI). The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The user is obliged to have the object recalibrated at appropriate intervals. This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates with the full name of the approval responsible person are valid without signature.

Dieser Kalibrierschein dokumentiert die metrologische Rückführbarkeit auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European cooperation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich. Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine sind bei Nennung des für die Freigabe Verantwortlichen in Klarschrift auch ohne Unterschrift gültig.



Material No 1048.0171.02 **Serial No** 100986 **Certificate** 0001A300718726
Page 2/3 **Number**

Calibration Procedure

The measuring object is an RF harmonic mixer, which converts an RF signal at one frequency into a signal at another frequency (here: IF). The conversion loss was measured using a vector network analyzer. The RF output power as well as the IF input power of the corresponding ports of the VNA were traced back to a power sensor. The conversion loss is defined as the ratio of the power at the IF frequency to the power at the RF frequency with a given LO power. (IF: Intermediate frequency; LO: Local Oscillator)
 The traceability is represented in the table Working Standards used.

Working Standards used

Item	Type	Serial Number	Calibration Certificate Number	Cal. Due
Therm.Power Sensor DC-40GHz	NRP-Z55	130179	0001A300682928	2025-01-31
Thermal Power Sensor	NRP67T	100977	0001A300658977	2025-07-31
Vector Network Analyzer 4 Port	ZVA67	101100	0001A300698540	2024-05-31

Remarks

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Material No 1048.0171.02 **Serial No** 100986 **Certificate** 0001A300718726
Page 3/3 **Number**

Environmental Conditions			
Ambient Temperature	(23 ± 1) °C	Relative Humidity	20%-70%

Comments on Measurement Results
The reported results apply only to those items specifically listed on this calibration certificate and have been tested for compliance with the specifications. The associated uncertainty of measurement has been taken into account if not otherwise stated. The non-binary decision rule with guard band is used according to ILAC G8:09/2019 'Guidelines on Decision Rules and Statements of Conformity'. Pass is normally not marked. Conditional Pass is marked with UGB1, Conditional Fail with UGB2 and Fail with Fail. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. It is consistent with the EA-4/02 M:2022. In addition to the calibration results, the calibration certificate includes functional measurements that might have an influence on the measurement uncertainty of the calibration results. The functional measurement results are marked and are not intended to be used to support the further dissemination of metrological traceability. They are intended to verify the requirements on the measurement object according to manufacturer specifications and technical standards.

Outgoing Results

Designation:	HARMONIC MIXER
Type:	FS-Z60
Material No.:	1048.0171.02
Serial No.:	100986
Certificate No.:	0001A300718726
Referring to Test Documentation:	5038.8581.01-PB-02.00

Test Department:	3MM-P
Name:	see certificate
Date:	2023-10-31



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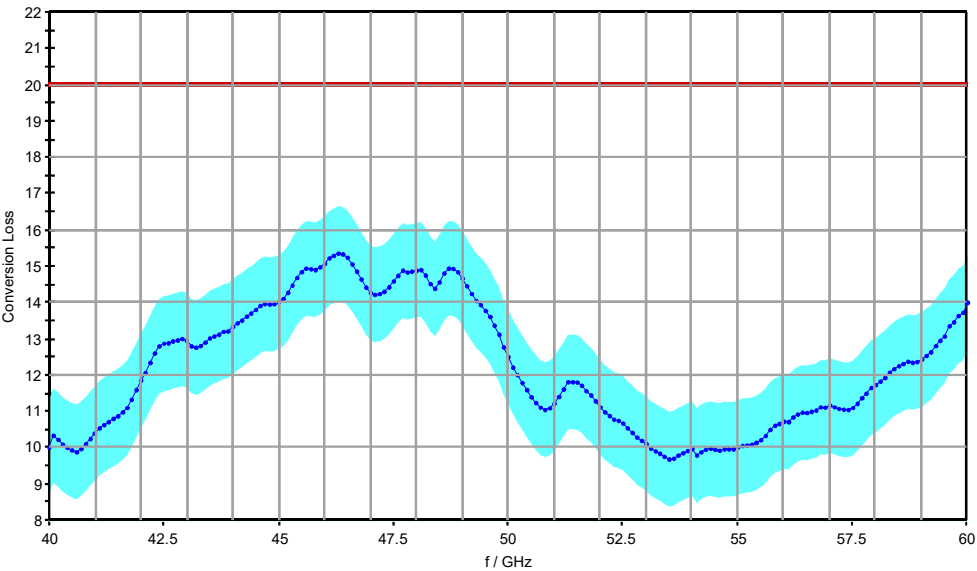
1.4 Continuity response within 1 GHz 6

Software used for measurement			
Item	Type	Version	Remark
Suite	Setup	V12.37.04	Test Management Software G5
Test Program (7012.8706.00_)	Component	V01.05	

1. Conversion Loss (4. Harmonic)

1.1 Conversion Loss (IF = 404.4 MHz)

IF = 404.4 MHz, 4. Harmonic

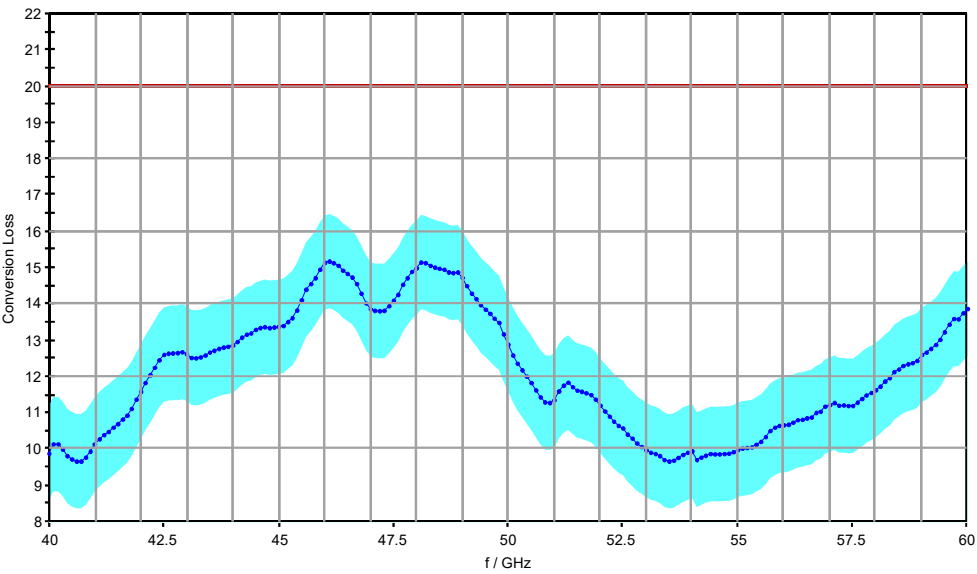


Conversion Loss (IF = 404.4 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	10.0	±1.3
41.0	10.4	±1.3
42.0	11.9	±1.3
43.0	13.0	±1.3
44.0	13.3	±1.3
45.0	14.0	±1.3
46.0	15.1	±1.3
47.0	14.3	±1.3
48.0	14.9	±1.3
49.0	14.7	±1.3
50.0	12.5	±1.3
51.0	11.2	±1.3
52.0	11.1	±1.3
53.0	10.1	±1.3
54.0	10.0	±1.3
55.0	10.0	±1.3
56.0	10.7	±1.3
57.0	11.2	±1.3
58.0	11.7	±1.3
59.0	12.5	±1.3
60.0	14.0	±1.3

1.2 Conversion Loss (IF = 729 MHz)

IF = 729 MHz, 4. Harmonic

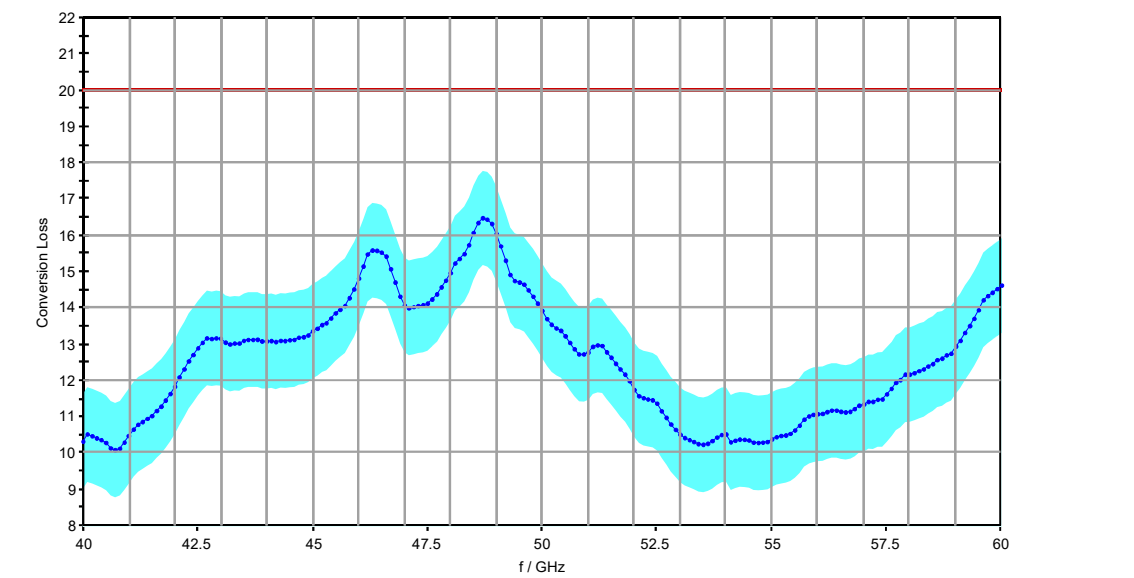


Conversion Loss (IF = 729 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	9.9	±1.3
41.0	10.2	±1.3
42.0	11.6	±1.3
43.0	12.6	±1.3
44.0	12.9	±1.3
45.0	13.4	±1.3
46.0	15.1	±1.3
47.0	13.9	±1.3
48.0	15.0	±1.3
49.0	14.7	±1.3
50.0	12.9	±1.3
51.0	11.4	±1.3
52.0	11.2	±1.3
53.0	10.0	±1.3
54.0	10.0	±1.3
55.0	10.0	±1.3
56.0	10.7	±1.3
57.0	11.2	±1.3
58.0	11.6	±1.3
59.0	12.6	±1.3
60.0	13.9	±1.3

1.3 Conversion Loss (IF = 1330 MHz)

IF = 1330 MHz, 4. Harmonic



Conversion Loss (IF = 1330 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	10.3	±1.3
41.0	10.5	±1.3
42.0	11.9	±1.3
43.0	13.2	±1.3
44.0	13.1	±1.3
45.0	13.4	±1.3
46.0	14.8	±1.3
47.0	14.1	±1.3
48.0	15.0	±1.3
49.0	16.1	±1.3
50.0	13.9	±1.3
51.0	12.8	±1.3
52.0	11.8	±1.3
53.0	10.5	±1.3
54.0	10.5	±1.3
55.0	10.4	±1.3
56.0	11.1	±1.3
57.0	11.4	±1.3
58.0	12.2	±1.3
59.0	13.0	±1.3
60.0	14.6	±1.3

1.4 Continuity response within 1 GHz

Continuity response within any 1 GHz Band, 4. Harmonic

	DUL /dB	Continuity /dB
max. at IF = 404.4 MHz:	6.0	2.37
max. at IF = 729 MHz:	6.0	2.19
max. at IF = 1330 MHz:	6.0	2.19

Incoming Results

Designation:	HARMONIC MIXER
Type:	FS-Z60
Material No.:	1048.0171.02
Serial No.:	100986
Certificate No.:	0001A300718726
Referring to Test Documentation:	5038.8581.01-PB-02.00

Test Department:	3MM-P
Name:	see certificate
Date:	2023-10-31



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1.4 Continuity response within 1 GHz	6

Incoming Results

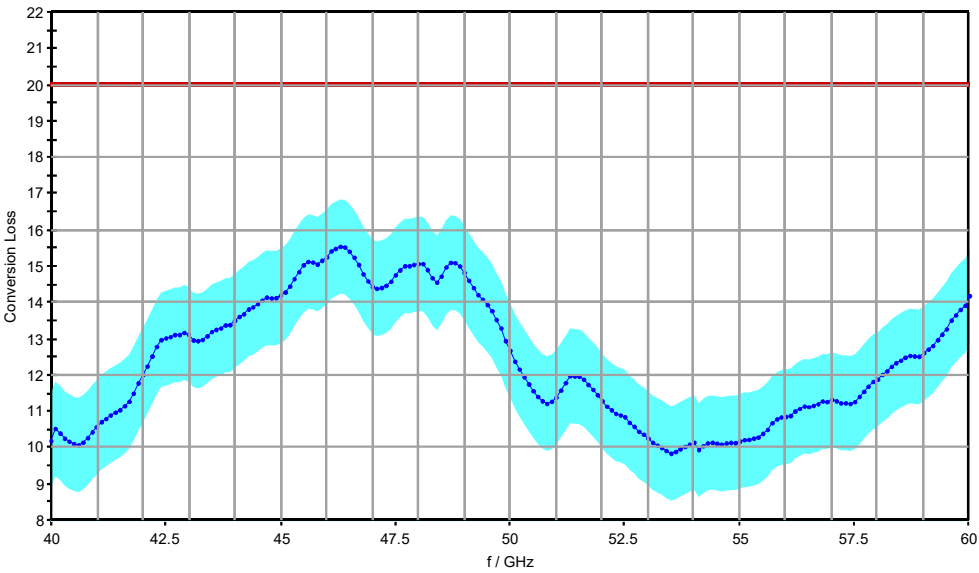
Software used for measurement			
Item	Type	Version	Remark
Suite	Setup	V12.37.04	Test Management Software G5
Test Program (7012.8706.00_)	Component	V01.05	

Incoming Results

1. Conversion Loss (4. Harmonic)

1.1 Conversion Loss (IF = 404.4 MHz)

IF = 404.4 MHz, 4. Harmonic



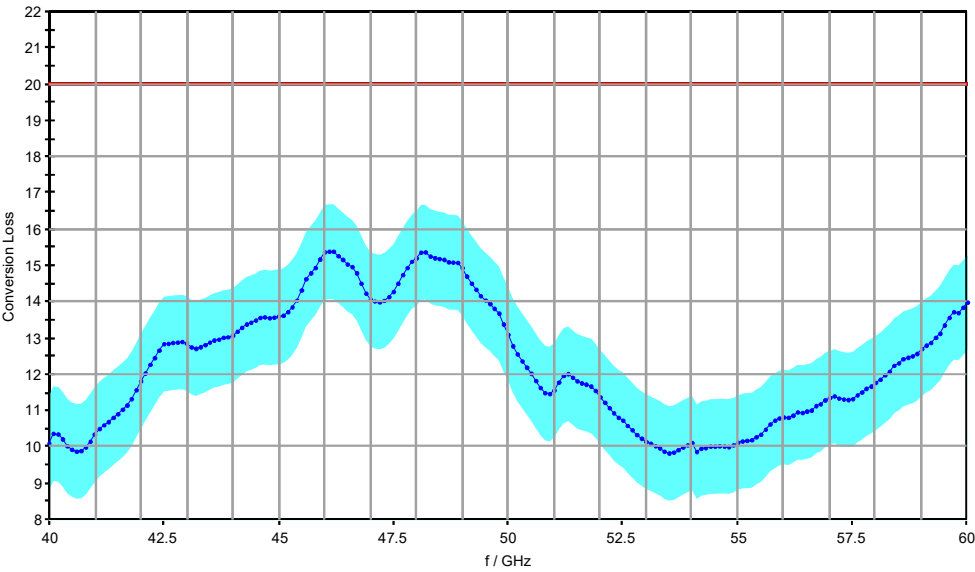
Conversion Loss (IF = 404.4 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	10.2	±1.3
41.0	10.6	±1.3
42.0	12.0	±1.3
43.0	13.1	±1.3
44.0	13.5	±1.3
45.0	14.2	±1.3
46.0	15.3	±1.3
47.0	14.4	±1.3
48.0	15.1	±1.3
49.0	14.8	±1.3
50.0	12.7	±1.3
51.0	11.4	±1.3
52.0	11.3	±1.3
53.0	10.3	±1.3
54.0	10.2	±1.3
55.0	10.2	±1.3
56.0	10.9	±1.3
57.0	11.3	±1.3
58.0	11.9	±1.3
59.0	12.6	±1.3
60.0	14.2	±1.3

Incoming Results

1.2 Conversion Loss (IF = 729 MHz)

IF = 729 MHz, 4. Harmonic



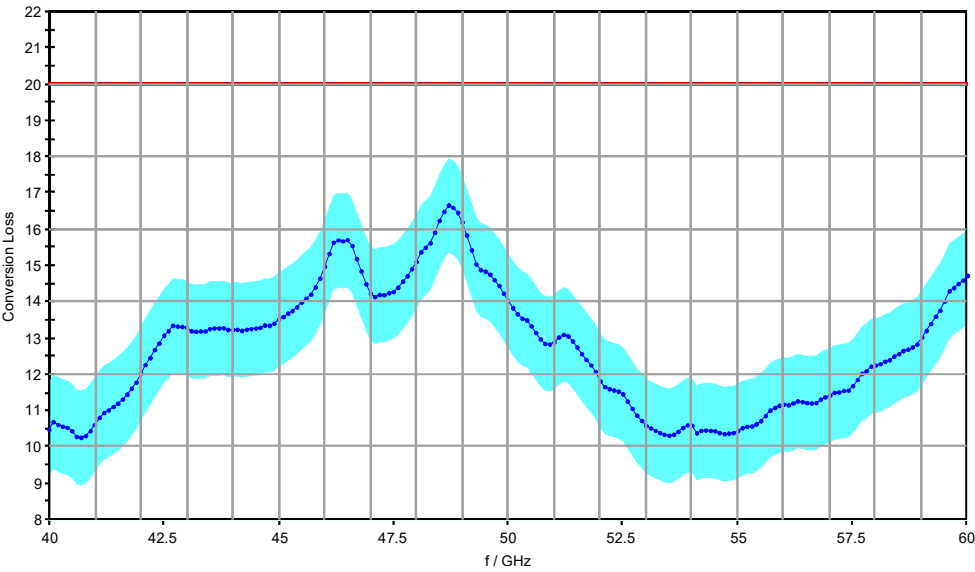
Conversion Loss (IF = 729 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	10.1	±1.3
41.0	10.4	±1.3
42.0	11.8	±1.3
43.0	12.9	±1.3
44.0	13.1	±1.3
45.0	13.6	±1.3
46.0	15.4	±1.3
47.0	14.1	±1.3
48.0	15.2	±1.3
49.0	14.9	±1.3
50.0	13.1	±1.3
51.0	11.6	±1.3
52.0	11.4	±1.3
53.0	10.2	±1.3
54.0	10.1	±1.3
55.0	10.1	±1.3
56.0	10.8	±1.3
57.0	11.4	±1.3
58.0	11.8	±1.3
59.0	12.7	±1.3
60.0	14.0	±1.3

Incoming Results

1.3 Conversion Loss (IF = 1330 MHz)

IF = 1330 MHz, 4. Harmonic



Conversion Loss (IF = 1330 MHz)

Frequency /GHz	Conversion Loss /dB	Uncertainty /dB
40.0	10.5	±1.3
41.0	10.6	±1.3
42.0	12.1	±1.3
43.0	13.3	±1.3
44.0	13.2	±1.3
45.0	13.5	±1.3
46.0	15.0	±1.3
47.0	14.2	±1.3
48.0	15.1	±1.3
49.0	16.2	±1.3
50.0	14.0	±1.3
51.0	12.9	±1.3
52.0	11.8	±1.3
53.0	10.6	±1.3
54.0	10.6	±1.3
55.0	10.5	±1.3
56.0	11.2	±1.3
57.0	11.4	±1.3
58.0	12.3	±1.3
59.0	13.0	±1.3
60.0	14.7	±1.3

1.4 Continuity response within 1 GHz

Continuity response within any 1 GHz Band, 4. Harmonic

	DUL /dB	Continuity /dB
max. at IF = 404.4 MHz:	6.0	2.35
max. at IF = 729 MHz:	6.0	2.18
max. at IF = 1330 MHz:	6.0	2.22

Incoming Results



CALIBRATION CERTIFICATE



Kalibrierschein

Certificate Number
Zertifikatsnummer

0001A300718729

General Data	
Item Gegenstand	FS-Z90 HARMONIC MIXER 60-90GHZ
Manufacturer Hersteller	ROHDE & SCHWARZ
Type Typ	FS-Z90
Material Number Materialnummer	1048.0371.02
Serial Number Seriennummer	101811
Order Number Bestellnummer	Q786007
Asset Number Inventarnummer	
Customer Auftraggeber	Sporton International Inc. 6F., Sec. 1, Hsin Tai Wu Rd 106 221 New Taipei City TW
Performance	
Place and Date of Calibration Ort und Datum der Kalibrierung	87700 Memmingen, Rohde-und-Schwarz-Str. 1 2023-10-31
Statement of Compliance (Incoming) Konformitätsaussage (Anlieferung)	All measured values are within the data sheet specifications.
Statement of Compliance (Outgoing) Konformitätsaussage (Auslieferung)	All measured values are within the data sheet specifications.
Customers due Interval Kalibrierintervall des Kunden	
Extent of Calibration Document Umfang des Kalibrierdokuments	3 Pages Certificate 7 Pages Outgoing Results 7 Pages Incoming Results
Date of Issue Ausstellungsdatum	Approval of the certificate by Freigabe des Kalibrierscheins durch
2023-11-08	Dr. Gerhard Rösel Johannes Negele
 Laboratory management Labormanagement  Person responsible Bearbeiter	

Calibration Mark Kalibrierzeichen

300718729
D-K- 15195-01-00
2023-10

Member of Deutscher Kalibrierdienst
Mitglied im Deutschen Kalibrierdienst



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