



Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR230300031601

Page: 1 of 46

TEST REPORT

Application No.: KSCR2303000316AT
FCC ID: WBK-RU4370
Applicant: BTI Wireless
Address of Applicant: 11205 Knott Avenue – Suite A, Cypress, CA 90630 United States
Manufacturer: BTI Wireless
Address of Manufacturer: 11205 Knott Avenue – Suite A, Cypress, CA 90630 United States
Factory: Sunwave Communications Co., Ltd.
Address of Factory: 581 Huoju Avenue, Binjiang District Hangzhou China
Equipment Under Test (EUT):
EUT Name: Remote Radio Unit
Model No.: RU4370
Trade mark:



Standard(s) : 47 CFR Part 2
47 CFR Part 96
Date of Receipt: 2023-03-01
Date of Test: 2023-03-01 to 2023-03-06
Date of Issue: 2023-03-07

Test Result:	Pass
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* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
00	Original	2023-03-07		/

Authorized for issue by:				
		cloud peng		
		Cloud Peng / Project Engineer		
		Eric Lin		
		Eric Lin / Reviewer		



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2 Test Summary

Test Item	FCC Rule No.	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §96.41	PASS
Peak-Average Ratio	§96.41	PASS
Modulation Characteristics	§2.1047	PASS
Bandwidth	§96.41	PASS
Band Edge Compliance	§2.1051, §96.41	PASS
Spurious emissions at antenna terminals	§2.1051, §96.41	PASS
Field strength of spurious radiation	§2.1051, §96.41	PASS
Frequency stability	§2.1055,	PASS
Remark: This base station supports N48, N77 and N78, and the frequency range is 3550-3700MHz. So we evaluated and tested all the band of Power and PSD, and the rest of the test items were tested based on the maximum power. EUT: In this whole report EUT means Equipment Under Test. Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver.		



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4 General Information

4.1 Details of E.U.T.

Product Name:	Remote Radio Unit
Model No.:	RU4370
Antenna Type:	External Antenna
Antenna Gain:	Max Antenna Gain 14.0 dBi(Provided by manufacturer)
Power Supply:	48V DC, $\pm 20\%$
Test Voltage	DC 48V
Sample Type:	Fixed device
Support Bandwidth:	100MHz
Type of Modulation	5G NR: CP-OFDM: QPSK, 256QAM
Frequency Band:	5GNR N48,N77,N78
Frequency Range:	3550MHz-3700MHz
Normal Output Power:	For SISO Mode: $30\pm 2\text{dBm}$ (downlink) For MIMO Mode: $32\pm 2\text{dBm}$ (downlink)
Antenna Delivery:	4T4R MIMO
Note: The feeder Loss between the RRU and the Antenna is 4dB, the Max antenna Gain is 18dBi, the final Gain is 14dBi.	

4.2 Test Frequency

5G NR Band n78 (3550-3700MHz)	SCS	Carrier	Bandwidth (MHz)	Channel		
				Low	Middle	High
	30kHz	1CC	100	3600	3625.02	3649.98



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4.3 Test Support Unit

Description	Manufacture	Model No.	S/N
Notebook	ThinkPad	K27	EB24537645

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

- 1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	MY55370209	08/22/2022	08/21/2023
2	Signal Generator	Agilent	N5182A	MY50142015	08/22/2022	08/21/2023
3	Spectrum Analyzer	Keysight	N9030B	MY61330164	02/04/2023	02/03/2024
4	Vector Signal Generator	R&S	SMW200A	110074	08/22/2022	08/21/2023
5	Radio Communication Test Station	Anritsu	MT8000A	6262012849	08/22/2022	08/21/2023
6	Radio Communication Analyzer	Anritsu	MT8821C	6201692222	04/01/2022	03/31/2023
7	Universal Radio Communication Tester	R&S	CMW500	159275	08/22/2022	08/21/2023
8	Universal Radio Communication Tester	R&S	CMW500	167239	04/01/2022	03/31/2023
9	Power Meter	Anritsu	ML2495A	1445010	04/15/2022	04/14/2023
10	Switcher	CCSRF	FY562	KUS2001M001-3	08/22/2022	08/21/2023
11	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
12	DC Power Supply	Aglient	E3632A	MY50340053	N.C.R	N.C.R
13	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
14	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
15	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
16	Conducted Test Cable	/	RF01-RF04	/	04/15/2022	04/14/2023
17	Software	BST	TST-PASS	N/A	N/A	N/A
18	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/15/2022	04/14/2023
19	Thermometer	Anymetre	RS-WS-N01-6J	1032844	04/15/2022	04/14/2023
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	101493	08/22/2022	08/21/2023
2	Signal Generator	Agilent	E8257C	MY43321570	08/22/2022	08/21/2023
3	Loop Antenna	Com-Power	AL-130R	10160008	04/13/2021	04/12/2023
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	04/02/2022	04/01/2024
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2022	02/21/2024
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/17/2023	02/16/2024
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170515	02/22/2023	02/21/2024
10	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2022	04/14/2023
11	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	01/17/2023	01/16/2024
12	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
13	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
14	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
15	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R
16	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
17	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
18	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
19	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R



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20	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
21	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
22	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
23	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
24	RE test cable	/	RE01-RE04	/	04/15/2022	04/14/2023
25	Software	Faratronic	EZ_EMC	N/A	N/A	N/A



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6 Radio Spectrum Matter Test Results

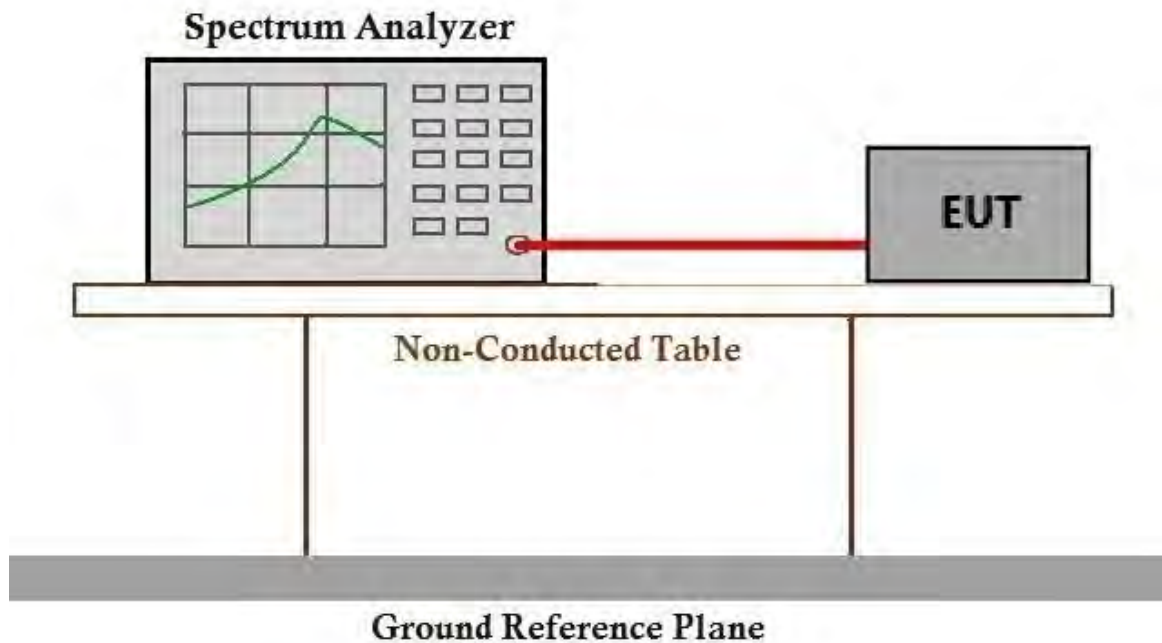
6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §96.41
 Test Method: ANSI C63.26, KDB 971168 D01 v03
 Limit: EIRP ≤ 47dBm/10MHz, PSD ≤ 37dBm/MHz

6.1.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar
 Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data



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Compliance Certification Services (Kunshan) Inc.

Report No.: KSCR230300031601

Page: 12 of 46

Band N48 _ SCS 30kHz										
BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Conducted Power		Ant Gain (dBi)	EIRP (dBm)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
			Size	Off set	Total Power (dBm)	Channel Power (dBm/10MHz)				
100	LCH	QPSK	Full	0	42.790	32.916	14	56.790	46.916	47.00
		256QAM	Full	0	42.740	32.982	14	56.740	46.982	47.00
	MCH	QPSK	Full	0	42.780	32.784	14	56.780	46.784	47.00
		256QAM	Full	0	42.870	32.782	14	56.870	46.782	47.00
	HCH	QPSK	Full	0	42.540	32.572	14	56.540	46.572	47.00
		256QAM	Full	0	42.810	32.953	14	56.810	46.953	47.00

Band N77 _ SCS 30kHz										
BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Conducted Power		Ant Gain (dBi)	EIRP (dBm)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
			Size	Off set	Total Power (dBm)	Channel Power (dBm/10MHz)				
100	LCH	QPSK	Full	0	42.690	32.743	14	56.690	46.743	47.00
		256QAM	Full	0	42.890	32.797	14	56.890	46.797	47.00
	MCH	QPSK	Full	0	42.760	32.646	14	56.760	46.646	47.00
		256QAM	Full	0	42.930	32.765	14	56.930	46.765	47.00
	HCH	QPSK	Full	0	42.550	32.600	14	56.550	46.600	47.00
		256QAM	Full	0	42.880	32.911	14	56.880	46.911	47.00

Band N78 _ SCS 30kHz										
BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Conducted Power		Ant Gain (dBi)	EIRP (dBm)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
			Size	Off set	Total Power (dBm)	Channel Power (dBm/10MHz)				
100	LCH	QPSK	Full	0	42.920	32.816	14	56.920	46.816	47.00
		256QAM	Full	0	42.830	32.761	14	56.830	46.761	47.00
	MCH	QPSK	Full	0	42.670	32.722	14	56.670	46.722	47.00
		256QAM	Full	0	42.980	32.655	14	56.980	46.655	47.00
	HCH	QPSK	Full	0	42.570	32.595	14	56.570	46.595	47.00
		256QAM	Full	0	42.850	32.770	14	56.850	46.770	47.00



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Report No.: KSCR230300031601

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Band N48 _ SCS 30kHz								
BW Arrange	Frequency	Modulation	RB Allocation		Total PSD (dBm/MHz)	Ant Gain (dBi)	EIRP PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			Size	Off set				
100	LCH	QPSK	Full	0	22.848	14	36.848	37.00
		256QAM	Full	0	22.950	14	36.950	37.00
	MCH	QPSK	Full	0	22.753	14	36.753	37.00
		256QAM	Full	0	22.910	14	36.910	37.00
	HCH	QPSK	Full	0	22.906	14	36.906	37.00
		256QAM	Full	0	22.885	14	36.885	37.00

Band N77 _ SCS 30kHz								
BW Arrange	Frequency	Modulation	RB Allocation		Total PSD (dBm/MHz)	Ant Gain (dBi)	EIRP PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			Size	Off set				
100	LCH	QPSK	Full	0	22.804	14	36.804	37.00
		256QAM	Full	0	22.790	14	36.790	37.00
	MCH	QPSK	Full	0	22.638	14	36.638	37.00
		256QAM	Full	0	22.849	14	36.849	37.00
	HCH	QPSK	Full	0	22.888	14	36.888	37.00
		256QAM	Full	0	22.804	14	36.804	37.00

Band N78 _ SCS 30kHz								
BW Arrange	Frequency	Modulation	RB Allocation		Total PSD (dBm/MHz)	Ant Gain (dBi)	EIRP PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			Size	Off set				
100	LCH	QPSK	Full	0	22.795	14	36.795	37.00
		256QAM	Full	0	22.853	14	36.853	37.00
	MCH	QPSK	Full	0	22.673	14	36.673	37.00
		256QAM	Full	0	22.787	14	36.787	37.00
	HCH	QPSK	Full	0	22.804	14	36.804	37.00
		256QAM	Full	0	22.747	14	36.747	37.00

Note: 1.The customer claims that the RF signals output from all RF ports are identical in MIMO mode
2.Total Power= Single port power+10lg4
3.Total PSD= Single port PSD+10lg4



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Power:

5GNR Band n48 _ SCS 30K, Nominal Bandwidth: 100M

QPSK Low channel



QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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5GNR Band n77 _ SCS 30K, Nominal Bandwidth: 100M

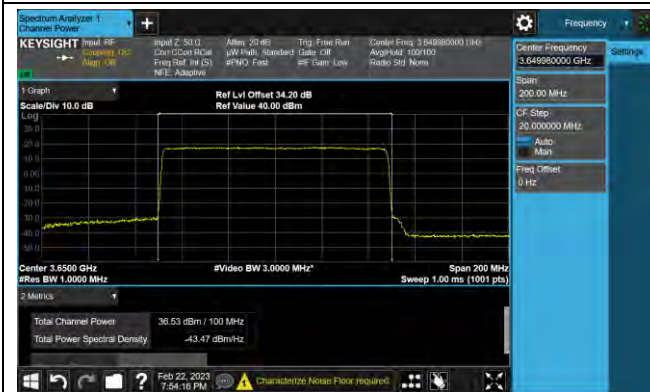
QPSK Low channel



QPSK Middle channel



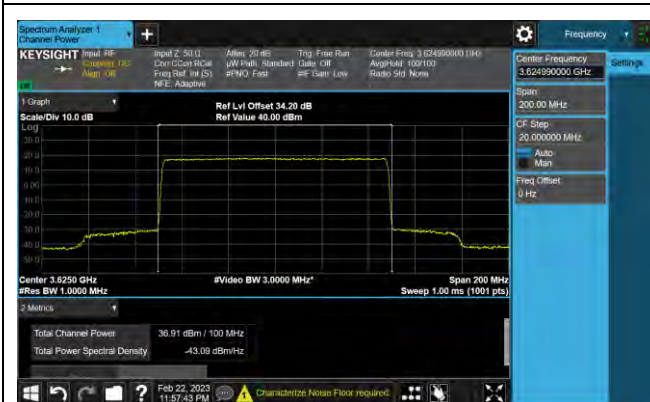
QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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5GNR Band n78 _ SCS 30K, Nominal Bandwidth: 100M

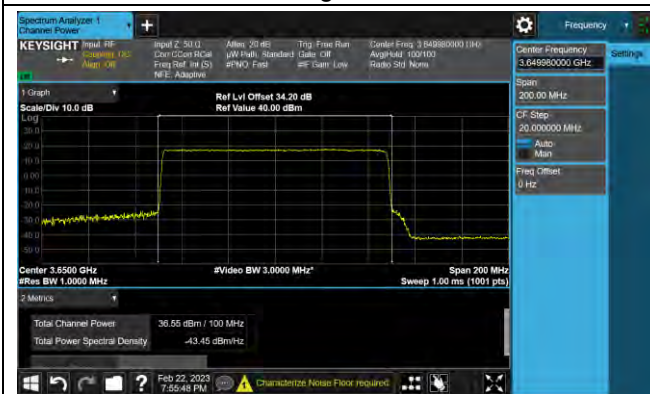
QPSK Low channel



QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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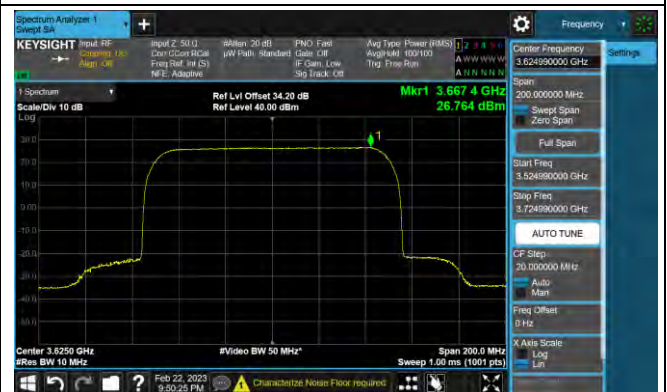
PSD(dBm/10MHz):

5GNR Band n48 _ SCS 30K, Nominal Bandwidth: 100M

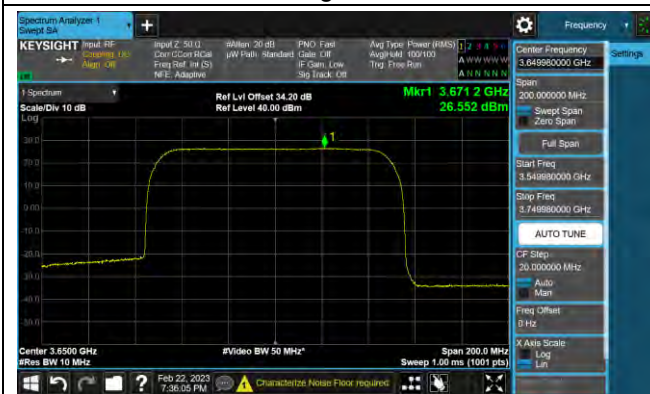
QPSK Low channel



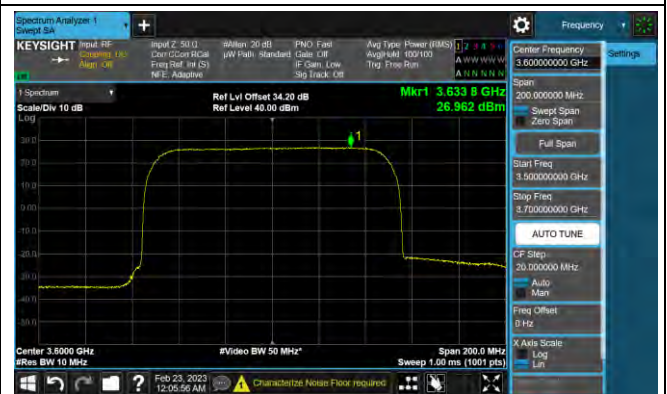
QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



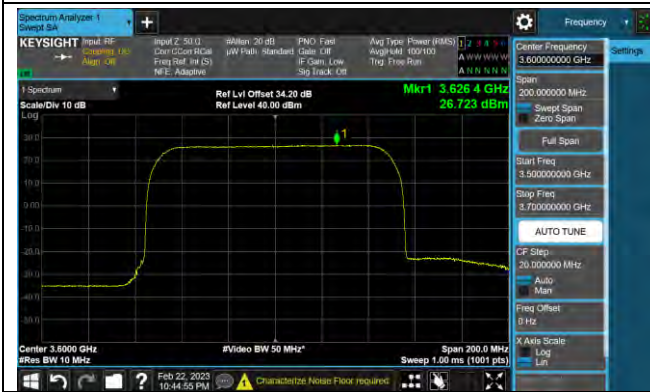
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5GNR Band n77 _ SCS 30K, Nominal Bandwidth: 100M

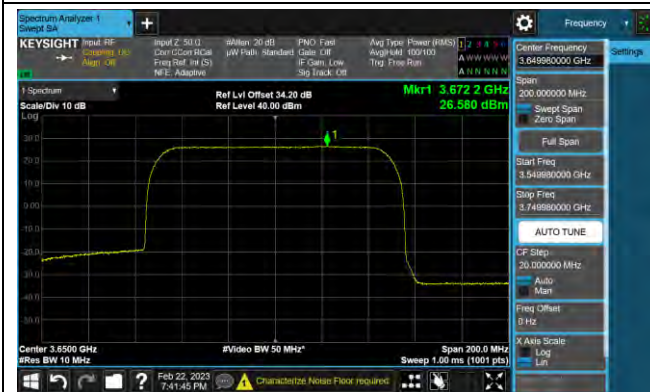
QPSK Low channel



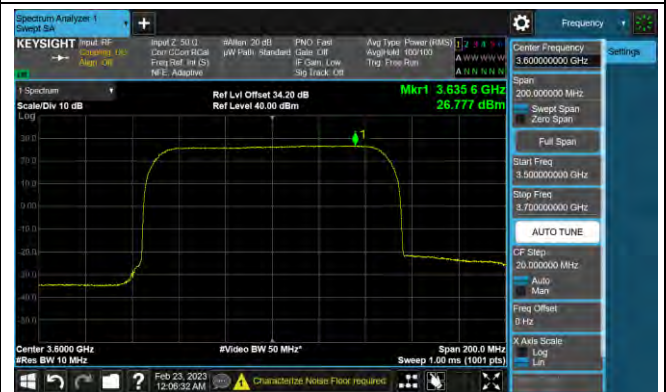
QPSK Middle channel



QPSK High channel



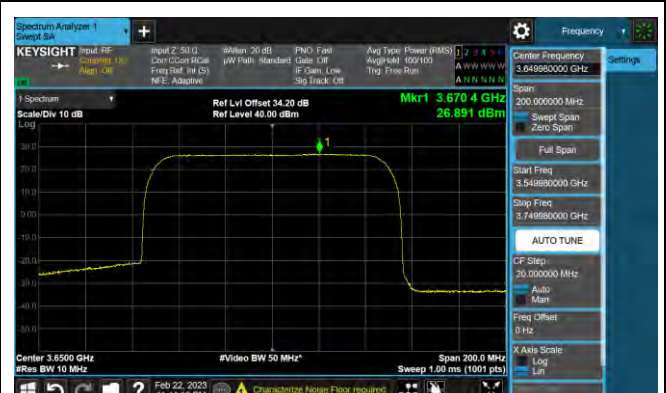
256QAM Low channel



256QAM Middle channel



256QAM High channel



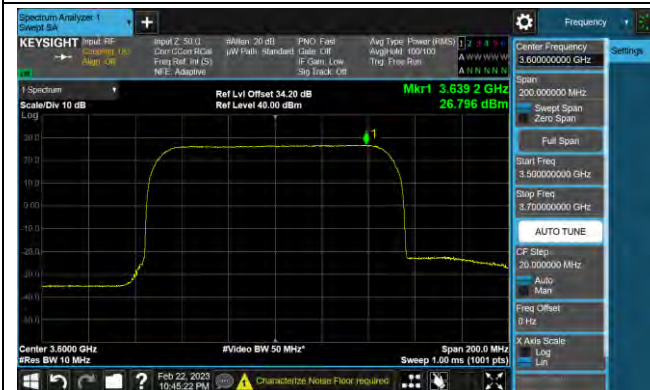
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5GNR Band n78 _ SCS 30K, Nominal Bandwidth: 100M

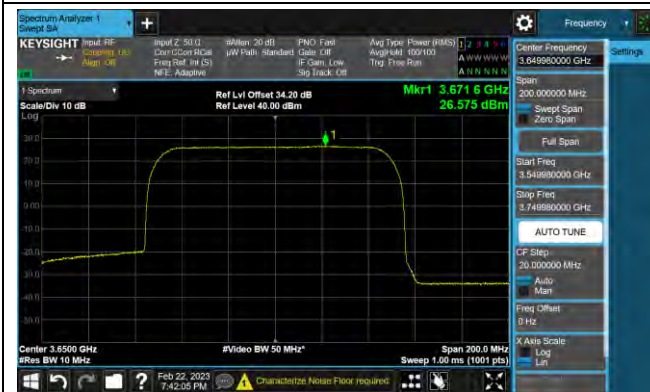
QPSK Low channel



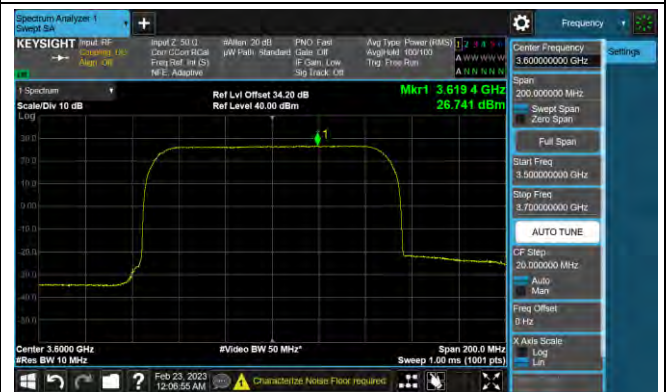
QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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PSD(dBm/MHz):

5GNR Band n48 _ SCS 30K, Nominal Bandwidth: 100M

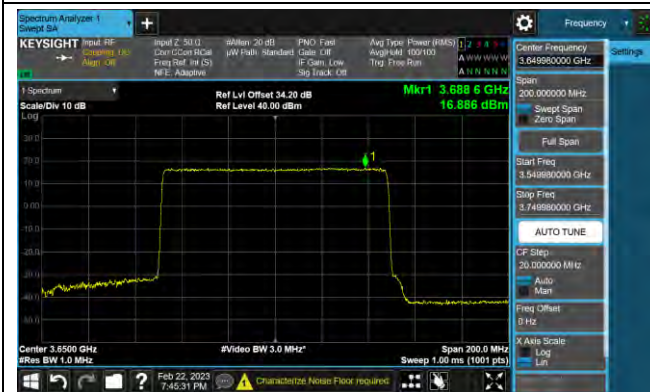
QPSK Low channel



QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



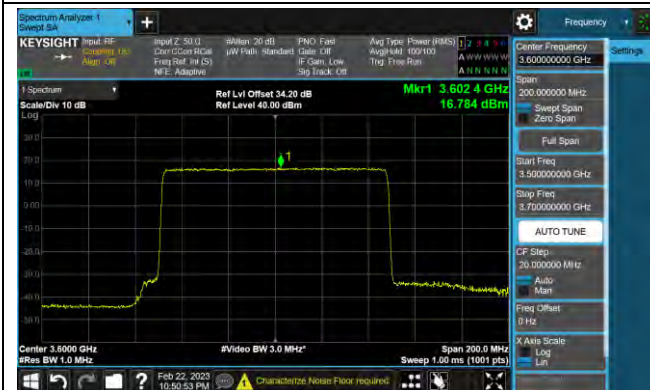
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5GNR Band n77 _ SCS 30K, Nominal Bandwidth: 100M

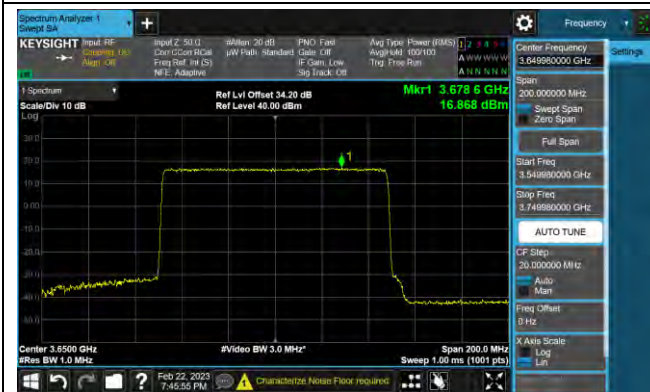
QPSK Low channel



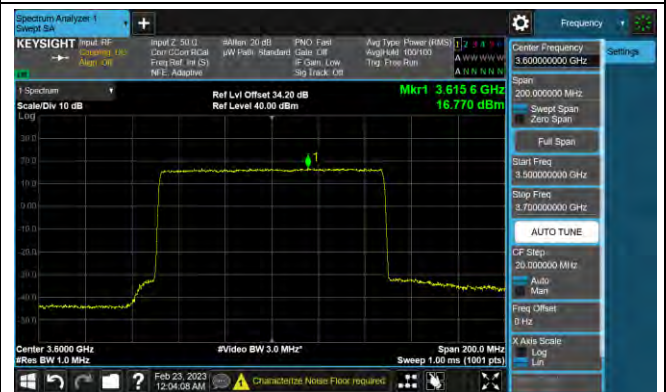
QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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5GNR Band n78 _ SCS 30K, Nominal Bandwidth: 100M

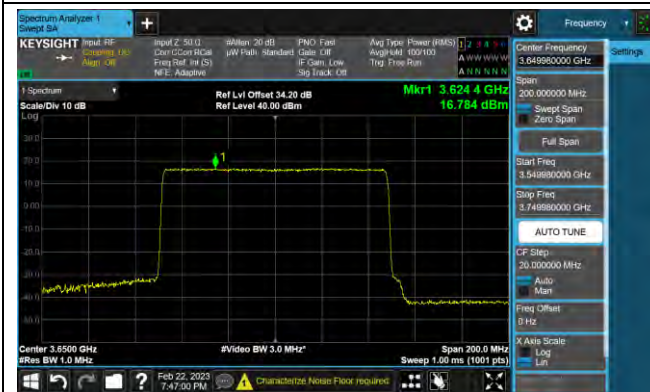
QPSK Low channel



QPSK Middle channel



QPSK High channel



256QAM Low channel



256QAM Middle channel



256QAM High channel



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Compliance Certification Services (Kunshan) Inc.

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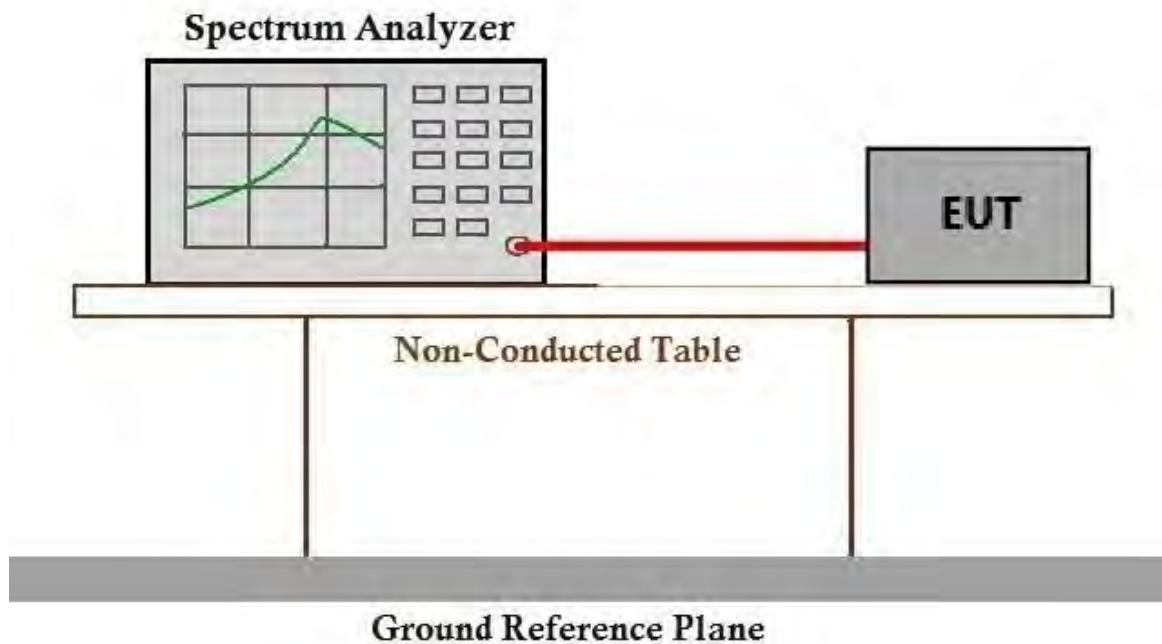
6.2 Peak-Average Ratio

Test Requirement: §96.41
 Test Method: ANSI C63.26, KDB 971168 D01 v03
 Limit: ≤13dB

6.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar
 Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data



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5GNR Band n78 _ SCS 30K Nominal Bandwidth: 100M						
Modulation	Channel	RB Configuration		Test result (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	Full	0	9.81	13	Pass
	MCH	Full	0	9.68	13	Pass
	HCH	Full	0	9.75	13	Pass

Note: We have tested and evaluated all modulation modes, and only the worst mode is given in the data.



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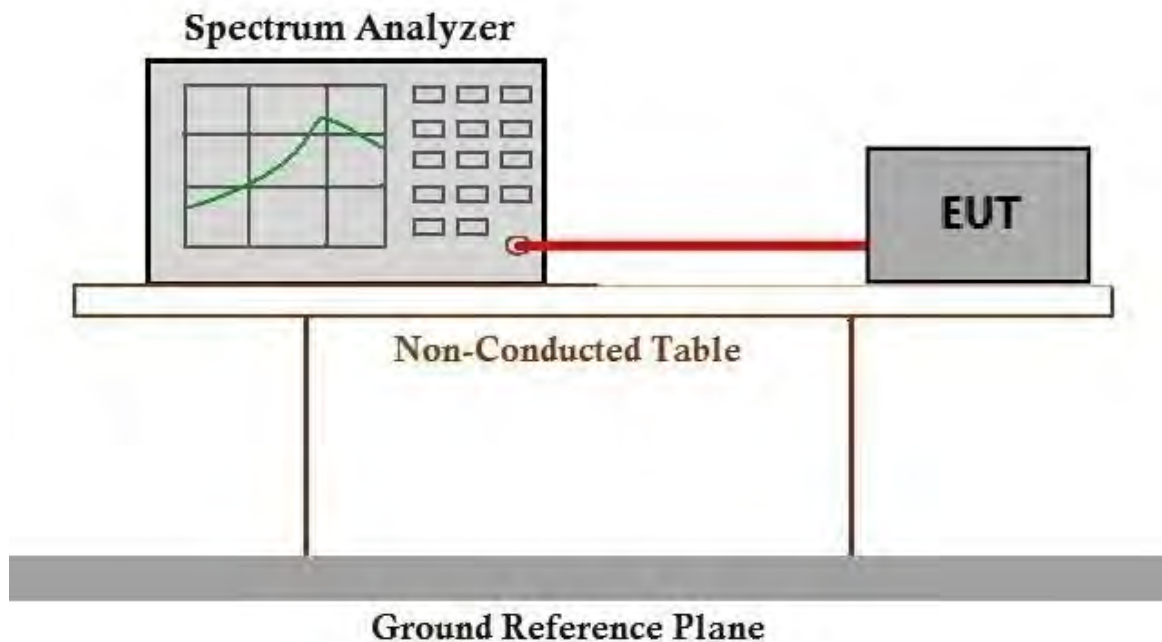
6.3 Bandwidth

Test Requirement: §2.1049(h)
 Test Method: ANSI C63.26, KDB 971168 D01 v03
 Limit: OBW: No limit
 EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar
 Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data



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5GNR Band n48 _ SCS 30K Intra-band Continuous CA						
Nominal Bandwidth	Test result (MHz)					
	99% OBW			26dB bandwidth		
	LCH	MCH	HCH	LCH	MCH	HCH
100	94.978	94.961	94.964	98.120	98.140	98.040

Note: We have tested and evaluated all modulation modes, and only the worst mode is given in the data.



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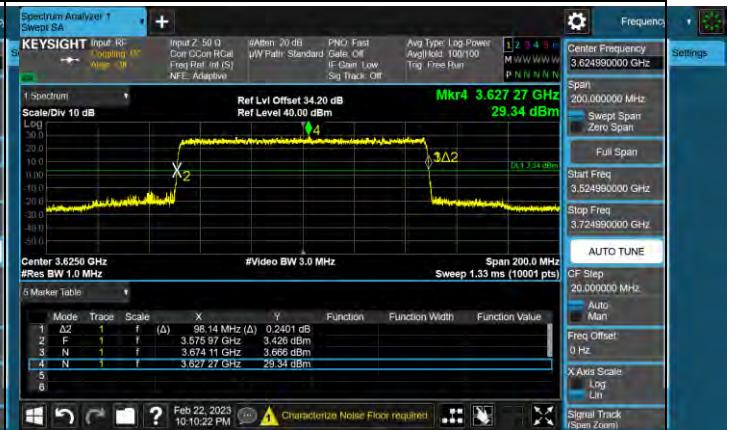
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26dB OBW

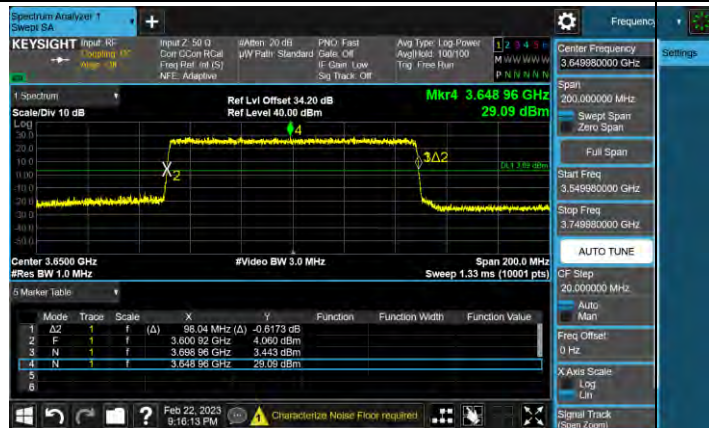
5GNR Band n78 _ SCS 30K, Nominal Bandwidth: 100M

QPSK Low channel

QPSK Middle channel



QPSK High channel



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6.4 Band Edge Compliance

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

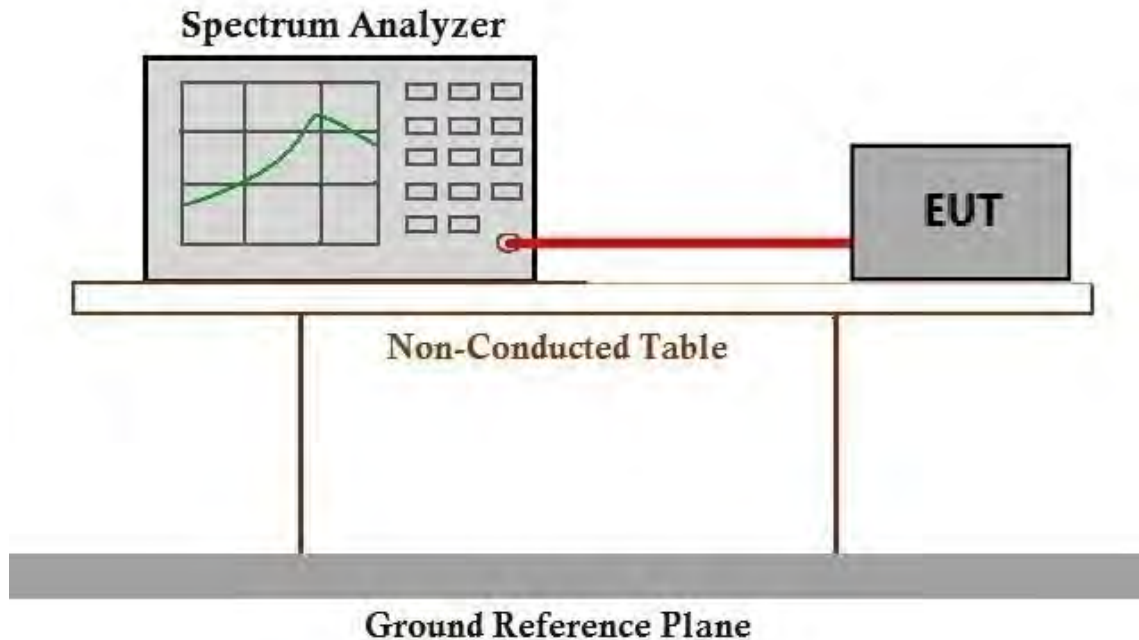


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6.4.2 Test Setup Diagram



6.4.3 Measurement Data



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BW Arrange	SCS (kHz)	Frequency	Modulation	RB Allocation		Test Result
				Size	Offset	
Single Carrier						
100M	30	LCH / MCH / HCH	QPSK	Full	0	Pass

Note: 1. We have tested and evaluated all modulation modes, and only the worst mode is given in the data.
2. We tested single port data, so the limit value was subtracted by 10lg4.



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6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

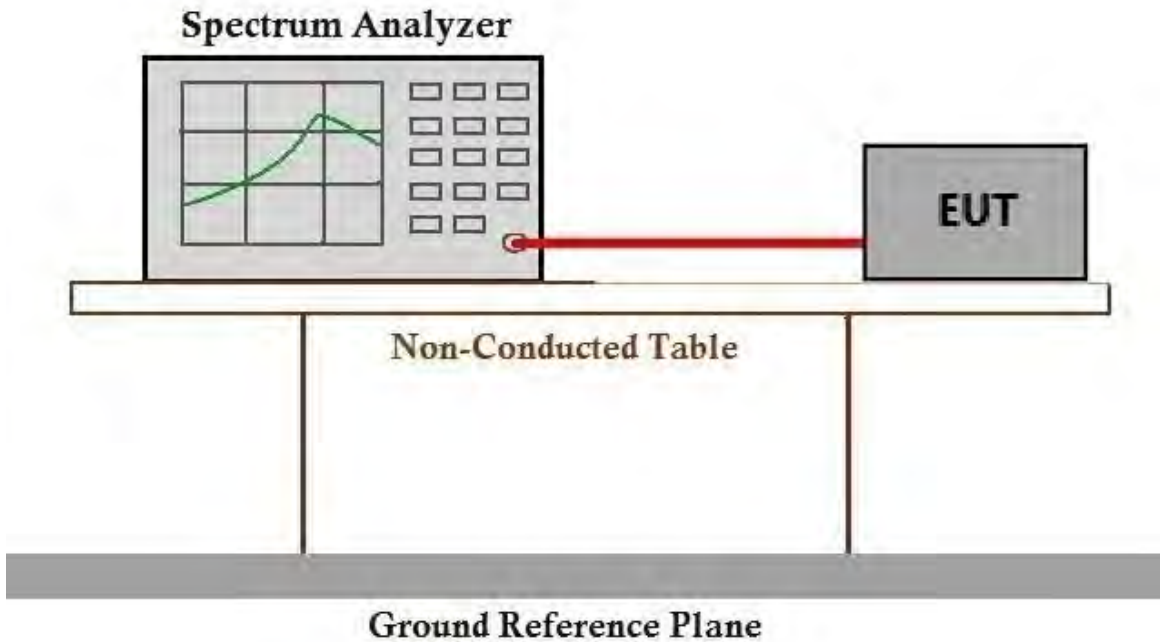


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6.5.2 Test Setup Diagram



6.5.3 Measurement Data



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Note: We have tested and evaluated all modulation modes, and only the worst mode is given in the data.



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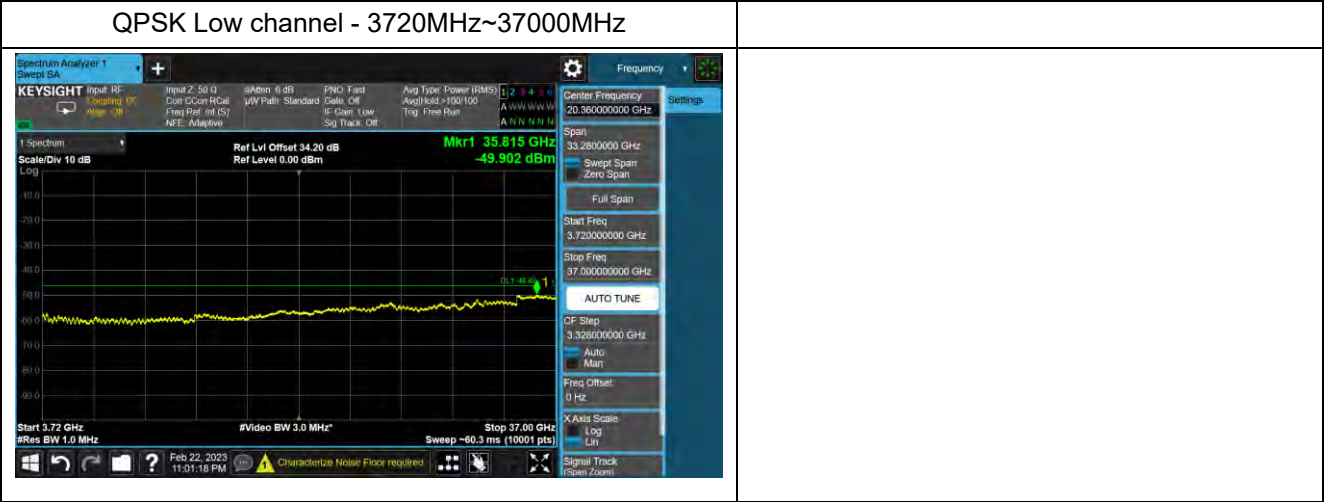
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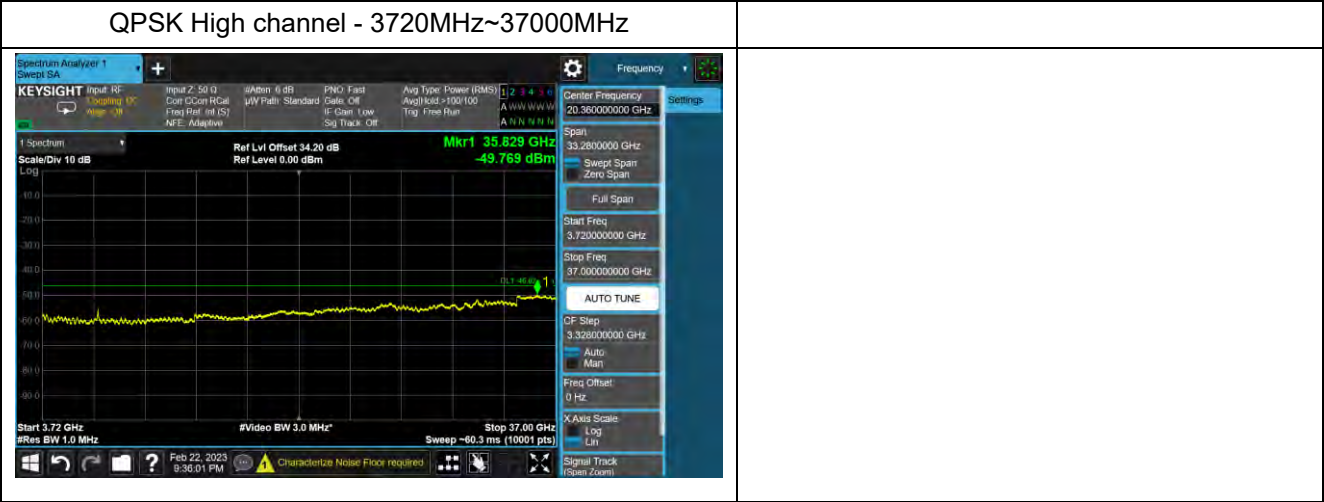
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6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

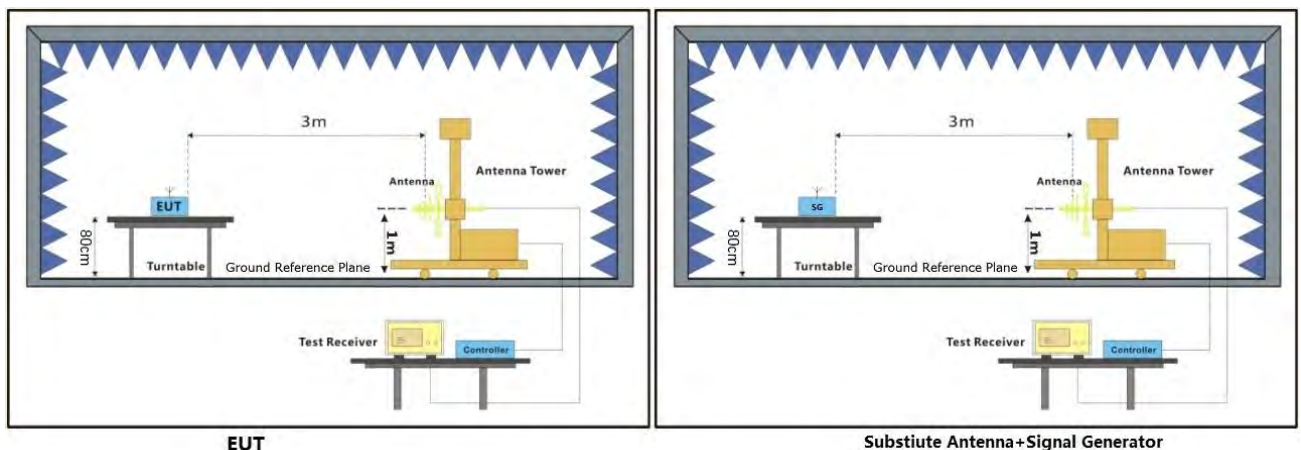
6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.6.2 Test Setup Diagram



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6.6.3 Measurement Procedure and Data

Test Procedure:

- (1) On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.



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Low Channel					
Frequency	Spurious Emission Level			Limit	Over limit
(MHz)	(Deg)	Polaxis	(dBm)	dBm	(dB)
235.6	65	Horizontal	-49.6	-40	-9.6
574.3	78	Horizontal	-43.8	-40	-3.8
882.5	153	Horizontal	-40.9	-40	-0.9
2472.9	29	Horizontal	-45.4	-40	-5.4
6284.7	149	Horizontal	-41.5	-40	-1.5
11289.3	203	Horizontal	-40.8	-40	-0.8
186.6	69	Vertical	-48.1	-40	-8.1
455.6	207	Vertical	-41.9	-40	-1.9
727.1	306	Vertical	-43.2	-40	-3.2
2502.0	238	Vertical	-40.3	-40	-0.3
6300.4	275	Vertical	-41.6	-40	-1.6
11935.1	231	Vertical	-40.7	-40	-0.7

Middle Channel					
Frequency	Spurious Emission Level			Limit	Over limit
(MHz)	(Deg)	Polaxis	(dBm)	dBm	(dB)
274.8	69	Horizontal	-50.4	-40	-10.4
629.7	86	Horizontal	-43.3	-40	-3.3
958.8	152	Horizontal	-41.0	-40	-1.0
2569.9	45	Horizontal	-47.2	-40	-7.2
6378.6	145	Horizontal	-42.4	-40	-2.4
11431.2	196	Horizontal	-39.9	-40	0.1
258.4	64	Vertical	-49.9	-40	-9.9
546.7	195	Vertical	-43.2	-40	-3.2
878.7	288	Vertical	-45.3	-40	-5.3
2530.7	222	Vertical	-42.1	-40	-2.1
6422.7	259	Vertical	-42.4	-40	-2.4
11993.7	216	Vertical	-42.0	-40	-2.0



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High Channel					
Frequency	Spurious Emission Level			Limit	Over limit
(MHz)	(Deg)	Polaxis	(dBm)	dBm	(dB)
243.9	71	Horizontal	-49.8	-40	-9.8
723.9	82	Horizontal	-44.8	-40	-4.8
986.9	161	Horizontal	-42.1	-40	-2.1
2593.5	46	Horizontal	-46.9	-40	-6.9
6466.5	154	Horizontal	-43.7	-40	-3.7
11476.6	200	Horizontal	-41.9	-40	-1.9
276.9	68	Vertical	-49.0	-40	-9.0
687.9	194	Vertical	-43.8	-40	-3.8
885.6	291	Vertical	-46.2	-40	-6.2
2541.2	226	Vertical	-44.2	-40	-4.2
6515.7	258	Vertical	-41.7	-40	-1.7
12015.5	223	Vertical	-41.6	-40	-1.6

Remark:

- 1) Pretest with normal and extreme conditions, only the worst case data was showed in the test report.
- 2) We have tested all modulation and all Channel, but only the worst case data displayed in this report.



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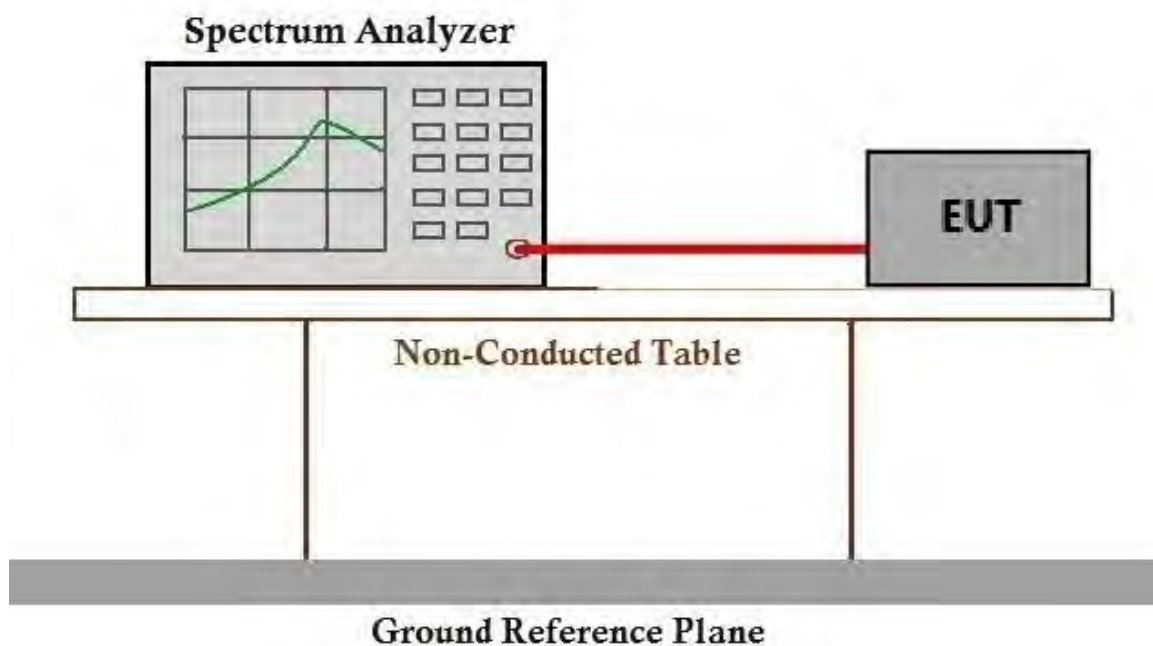
6.7 Frequency stability

Test Requirement: §2.1055
 Test Method: ANSI C63.26, KDB 971168 D01 v03
 Limit: Fundamental emission stays within authorized frequency block

6.7.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar
 Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



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6.7.3 Measurement Data

Frequency Stability vs temperature:

1. Test for 5G NR Band n78 Downlink (Middle Channel 3625.02MHz)

Temperature(°C)	Voltage (V dc)	Frequency Error (Hz)	Tolerance(ppm)
50	48.00	46	0.013
40	48.00	51	0.014
30	48.00	58	0.016
20	48.00	60	0.017
10	48.00	62	0.017
0	48.00	64	0.018
-10	48.00	65	0.018
-20	48.00	69	0.019
-30	48.00	73	0.020



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Frequency Stability vs voltage:

1. Test for 5G NR Band n78 Downlink (Middle Channel 3625.02MHz)

Voltage (V dc)	Temperature(°C)	Frequency Error (Hz)	Tolerance(ppm)
43.20	25	53	0.015
48.00	25	57	0.016
52.80	25	65	0.018

Remark:

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7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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