

FCC 5G mmWave REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: June 03, 2023
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	Report No.: HCT-RF-2305-FC006-R2

FCC ID:	A3LSMX818U
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model:	SM-X818U
EUT Type:	Tablet
Frequency Range:	24.25 GHz ~ 24.45 GHz, 24.75 GHz ~ 25.25 GHz, 27.5 GHz ~ 28.35 GHz, 37 GHz ~ 40 GHz
Modulation type:	PI/2 BPSK(DFT-s Only), QPSK, 16QAM, 64QAM
FCC Classification:	Part 30 Mobile Transmitter (5GM)
FCC Rule Part(s):	Part 30
Test Procedure(s):	ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 842590 D01 V01r02

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report No.: HCT-RF-2305-FC006-R2

REVIEWED BY



Report prepared by : Beom Jin Cho
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2305-FC006	May 09, 2023	- First Approval Report
HCT-RF-2305-FC006-R1	May 15, 2023	- Anchor band of n258, n260, n261 are revised. Please refer to the page 211.
HCT-RF-2305-FC006-R2	June 03, 2023	- The link to the HCT accreditation scope is added. Please refer to the page 20.

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1. EUT DESCRIPTION

Model	SM-X818U
Additional Model	-
EUT Type	Tablet
Power Supply	DC 3.88 V
Date(s) of Tests	March 27, 2023 ~ May 08, 2023
Band	n258a: 24,250 MHz ~ 24,450 MHz(TDD) n258b: 24,750 MHz ~ 25,250 MHz(TDD) n261: 27,500 MHz ~ 28,350 MHz(TDD) n260: 37,000 MHz ~ 40,000 MHz(TDD)
Channel Bandwidths	50 MHz/100 MHz
Carrier Specification	1CC, 2CC, 3CC, 4CC (EUT doesn't support 2cc, 3cc, 4cc, for 50MHz)
Multiple transmit	SISO, SISO Dual, MIMO
Channel	Low, Mid, High
SCS	120 kHz
OFDM	CP-OFDM, DFT-s-OFDM
RB size	1 RB(Offset: low, mid, high), half RB, Full RB
Modulation	PI/2 BPSK(DFT-s Only), QPSK, 16QAM, 64QAM
Antenna Specification	Antenna Designation <ul style="list-style-type: none"> - K patch: module 0 - L patch: module 1 Antenna Size <ul style="list-style-type: none"> - 23.3 mm x 3.2 mm x 2.12 mm

1.1 MAXIMUM EIRP POWER

n258a Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	K patch	50	1	24250 - 24450	0.333	25.22	46M1G7D	BPSK
SISO	K patch	50	1	24250 - 24450	0.360	25.56	46M1G7D	QPSK
SISO	K patch	50	1	24250 - 24450	0.209	23.20	45M9W7D	16QAM
SISO	K patch	50	1	24250 - 24450	0.106	20.26	46M0W7D	64QAM
SISO Dual	K patch	50	1	24250 - 24450	0.571	27.57	45M8G7D	BPSK
SISO Dual	K patch	50	1	24250 - 24450	0.557	27.46	45M9G7D	QPSK
SISO Dual	K patch	50	1	24250 - 24450	0.369	25.67	46M1W7D	16QAM
SISO Dual	K patch	50	1	24250 - 24450	0.171	22.32	45M9W7D	64QAM
SISO	K patch	100	1	24250 - 24450	0.358	25.54	91M7G7D	BPSK
SISO	K patch	100	1	24250 - 24450	0.356	25.51	94M4G7D	QPSK
SISO	K patch	100	1	24250 - 24450	0.226	23.54	94M5W7D	16QAM
SISO	K patch	100	1	24250 - 24450	0.104	20.19	94M1W7D	64QAM
SISO Dual	K patch	100	1	24250 - 24450	0.553	27.43	91M8G7D	BPSK
SISO Dual	K patch	100	1	24250 - 24450	0.526	27.21	94M3G7D	QPSK
SISO Dual	K patch	100	1	24250 - 24450	0.323	25.09	94M3W7D	16QAM
SISO Dual	K patch	100	1	24250 - 24450	0.160	22.05	94M2W7D	64QAM
SISO	K patch	100	2	24250 - 24450	0.137	21.37	190MG7D	BPSK
SISO	K patch	100	2	24250 - 24450	0.136	21.33	193MG7D	QPSK
SISO	K patch	100	2	24250 - 24450	0.084	19.23	193MW7D	16QAM
SISO	K patch	100	2	24250 - 24450	0.058	17.60	193MW7D	64QAM
SISO Dual	K patch	100	2	24250 - 24450	0.081	19.09	190MG7D	BPSK
SISO Dual	K patch	100	2	24250 - 24450	0.082	19.13	193MG7D	QPSK
SISO Dual	K patch	100	2	24250 - 24450	0.061	17.83	194MW7D	16QAM
SISO Dual	K patch	100	2	24250 - 24450	0.040	16.01	193MW7D	64QAM

n258a Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	L patch	50	1	24250 - 24450	0.462	26.65	46M1G7D	BPSK
SISO	L patch	50	1	24250 - 24450	0.354	25.49	46M1G7D	QPSK
SISO	L patch	50	1	24250 - 24450	0.299	24.75	45M9W7D	16QAM
SISO	L patch	50	1	24250 - 24450	0.146	21.65	46M1W7D	64QAM
SISO Dual	L patch	50	1	24250 - 24450	0.578	27.62	45M8G7D	BPSK
SISO Dual	L patch	50	1	24250 - 24450	0.592	27.72	46M1G7D	QPSK
SISO Dual	L patch	50	1	24250 - 24450	0.366	25.63	46M0W7D	16QAM
SISO Dual	L patch	50	1	24250 - 24450	0.172	22.35	46M0W7D	64QAM
SISO	L patch	100	1	24250 - 24450	0.447	26.50	91M4G7D	BPSK
SISO	L patch	100	1	24250 - 24450	0.325	25.12	94M5G7D	QPSK
SISO	L patch	100	1	24250 - 24450	0.233	23.68	94M3W7D	16QAM
SISO	L patch	100	1	24250 - 24450	0.124	20.94	94M3W7D	64QAM
SISO Dual	L patch	100	1	24250 - 24450	0.574	27.59	91M7G7D	BPSK
SISO Dual	L patch	100	1	24250 - 24450	0.564	27.51	94M4G7D	QPSK
SISO Dual	L patch	100	1	24250 - 24450	0.372	25.71	94M4W7D	16QAM
SISO Dual	L patch	100	1	24250 - 24450	0.163	22.12	94M3W7D	64QAM
SISO	L patch	100	2	24250 - 24450	0.126	21.02	190MG7D	BPSK
SISO	L patch	100	2	24250 - 24450	0.125	20.96	193MG7D	QPSK
SISO	L patch	100	2	24250 - 24450	0.077	18.84	193MW7D	16QAM
SISO	L patch	100	2	24250 - 24450	0.052	17.17	193MW7D	64QAM
SISO Dual	L patch	100	2	24250 - 24450	0.110	20.43	189MG7D	BPSK
SISO Dual	L patch	100	2	24250 - 24450	0.112	20.51	193MG7D	QPSK
SISO Dual	L patch	100	2	24250 - 24450	0.111	20.47	194MW7D	16QAM
SISO Dual	L patch	100	2	24250 - 24450	0.044	16.47	193MW7D	64QAM

n258b Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	K patch	50	1	24750 - 25250	0.508	27.06	46M1G7D	BPSK
SISO	K patch	50	1	24750 - 25250	0.519	27.15	46M1G7D	QPSK
SISO	K patch	50	1	24750 - 25250	0.323	25.09	46M0W7D	16QAM
SISO	K patch	50	1	24750 - 25250	0.157	21.97	46M1W7D	64QAM
SISO Dual	K patch	50	1	24750 - 25250	0.638	28.05	46M3G7D	BPSK
SISO Dual	K patch	50	1	24750 - 25250	0.605	27.82	46M4G7D	QPSK
SISO Dual	K patch	50	1	24750 - 25250	0.395	25.97	46M2W7D	16QAM
SISO Dual	K patch	50	1	24750 - 25250	0.188	22.75	46M3W7D	64QAM
SISO	K patch	100	1	24750 - 25250	0.488	26.88	91M5G7D	BPSK
SISO	K patch	100	1	24750 - 25250	0.493	26.93	94M5G7D	QPSK
SISO	K patch	100	1	24750 - 25250	0.316	24.99	94M4W7D	16QAM
SISO	K patch	100	1	24750 - 25250	0.149	21.72	94M2W7D	64QAM
SISO Dual	K patch	100	1	24750 - 25250	0.644	28.09	91M5G7D	BPSK
SISO Dual	K patch	100	1	24750 - 25250	0.638	28.05	93M7G7D	QPSK
SISO Dual	K patch	100	1	24750 - 25250	0.413	26.16	93M5W7D	16QAM
SISO Dual	K patch	100	1	24750 - 25250	0.189	22.77	94M3W7D	64QAM
SISO	K patch	100	2	24750 - 25250	0.224	23.51	191MG7D	BPSK
SISO	K patch	100	2	24750 - 25250	0.224	23.50	193MG7D	QPSK
SISO	K patch	100	2	24750 - 25250	0.139	21.44	193MW7D	16QAM
SISO	K patch	100	2	24750 - 25250	0.085	19.28	193MW7D	64QAM
SISO Dual	K patch	100	2	24750 - 25250	0.139	21.42	190MG7D	BPSK
SISO Dual	K patch	100	2	24750 - 25250	0.131	21.16	193MG7D	QPSK
SISO Dual	K patch	100	2	24750 - 25250	0.083	19.21	193MW7D	16QAM
SISO Dual	K patch	100	2	24750 - 25250	0.054	17.34	193MW7D	64QAM
SISO	K patch	100	3	24750 - 25250	0.223	23.49	291MG7D	BPSK
SISO	K patch	100	3	24750 - 25250	0.215	23.32	293MG7D	QPSK
SISO	K patch	100	3	24750 - 25250	0.135	21.29	293MW7D	16QAM
SISO	K patch	100	3	24750 - 25250	0.092	19.64	293MW7D	64QAM
SISO Dual	K patch	100	3	24750 - 25250	0.164	22.14	290MG7D	BPSK
SISO Dual	K patch	100	3	24750 - 25250	0.163	22.11	292MG7D	QPSK

n258b Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	K patch	100	3	24750 - 25250	0.102	20.07	291MW7D	16QAM
SISO Dual	K patch	100	3	24750 - 25250	0.063	18.02	293MW7D	64QAM
SISO	K patch	100	4	24750 - 25250	0.217	23.37	391MG7D	BPSK
SISO	K patch	100	4	24750 - 25250	0.216	23.35	393MG7D	QPSK
SISO	K patch	100	4	24750 - 25250	0.135	21.30	393MW7D	16QAM
SISO	K patch	100	4	24750 - 25250	0.086	19.35	392MW7D	64QAM
SISO Dual	K patch	100	4	24750 - 25250	0.152	21.81	391MG7D	BPSK
SISO Dual	K patch	100	4	24750 - 25250	0.134	21.27	392MG7D	QPSK
SISO Dual	K patch	100	4	24750 - 25250	0.085	19.28	391MW7D	16QAM
SISO Dual	K patch	100	4	24750 - 25250	0.053	17.24	392MW7D	64QAM

n258b Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	L patch	50	1	24750 - 25250	0.531	27.25	46M0G7D	BPSK
SISO	L patch	50	1	24750 - 25250	0.536	27.29	46M0G7D	QPSK
SISO	L patch	50	1	24750 - 25250	0.310	24.92	46M0W7D	16QAM
SISO	L patch	50	1	24750 - 25250	0.152	21.83	46M0W7D	64QAM
SISO Dual	L patch	50	1	24750 - 25250	0.428	26.31	45M9G7D	BPSK
SISO Dual	L patch	50	1	24750 - 25250	0.426	26.29	46M2G7D	QPSK
SISO Dual	L patch	50	1	24750 - 25250	0.266	24.25	46M3W7D	16QAM
SISO Dual	L patch	50	1	24750 - 25250	0.128	21.08	46M1W7D	64QAM
SISO	L patch	100	1	24750 - 25250	0.522	27.18	91M3G7D	BPSK
SISO	L patch	100	1	24750 - 25250	0.570	27.56	94M5G7D	QPSK
SISO	L patch	100	1	24750 - 25250	0.347	25.40	94M2W7D	16QAM
SISO	L patch	100	1	24750 - 25250	0.155	21.90	94M2W7D	64QAM
SISO Dual	L patch	100	1	24750 - 25250	0.436	26.39	91M6G7D	BPSK
SISO Dual	L patch	100	1	24750 - 25250	0.445	26.48	94M1G7D	QPSK
SISO Dual	L patch	100	1	24750 - 25250	0.265	24.24	94M3W7D	16QAM
SISO Dual	L patch	100	1	24750 - 25250	0.138	21.41	93M9W7D	64QAM
SISO	L patch	100	2	24750 - 25250	0.190	22.78	190MG7D	BPSK
SISO	L patch	100	2	24750 - 25250	0.187	22.73	193MG7D	QPSK
SISO	L patch	100	2	24750 - 25250	0.114	20.57	193MW7D	16QAM
SISO	L patch	100	2	24750 - 25250	0.069	18.39	193MW7D	64QAM
SISO Dual	L patch	100	2	24750 - 25250	0.101	20.03	191MG7D	BPSK
SISO Dual	L patch	100	2	24750 - 25250	0.102	20.07	193MG7D	QPSK
SISO Dual	L patch	100	2	24750 - 25250	0.063	18.02	193MW7D	16QAM
SISO Dual	L patch	100	2	24750 - 25250	0.040	16.07	194MW7D	64QAM
SISO	L patch	100	3	24750 - 25250	0.178	22.51	291MG7D	BPSK
SISO	L patch	100	3	24750 - 25250	0.179	22.54	293MG7D	QPSK
SISO	L patch	100	3	24750 - 25250	0.107	20.31	293MW7D	16QAM
SISO	L patch	100	3	24750 - 25250	0.065	18.14	292MW7D	64QAM
SISO Dual	L patch	100	3	24750 - 25250	0.149	21.72	291MG7D	BPSK
SISO Dual	L patch	100	3	24750 - 25250	0.153	21.86	293MG7D	QPSK

n258b Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	L patch	100	3	24750 - 25250	0.096	19.84	293MW7D	16QAM
SISO Dual	L patch	100	3	24750 - 25250	0.061	17.86	293MW7D	64QAM
SISO	L patch	100	4	24750 - 25250	0.160	22.04	391MG7D	BPSK
SISO	L patch	100	4	24750 - 25250	0.156	21.94	392MG7D	QPSK
SISO	L patch	100	4	24750 - 25250	0.095	19.78	392MW7D	16QAM
SISO	L patch	100	4	24750 - 25250	0.058	17.64	391MW7D	64QAM
SISO Dual	L patch	100	4	24750 - 25250	0.147	21.66	392MG7D	BPSK
SISO Dual	L patch	100	4	24750 - 25250	0.146	21.63	392MG7D	QPSK
SISO Dual	L patch	100	4	24750 - 25250	0.090	19.53	392MW7D	16QAM
SISO Dual	L patch	100	4	24750 - 25250	0.056	17.47	392MW7D	64QAM

n260 Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	K patch	50	1	37000 - 40000	0.800	29.03	46M0G7D	BPSK
SISO	K patch	50	1	37000 - 40000	0.871	29.40	46M2G7D	QPSK
SISO	K patch	50	1	37000 - 40000	0.515	27.12	46M2W7D	16QAM
SISO	K patch	50	1	37000 - 40000	0.252	24.02	46M1W7D	64QAM
SISO Dual	K patch	50	1	37000 - 40000	1.052	30.22	46M2G7D	BPSK
SISO Dual	K patch	50	1	37000 - 40000	1.047	30.20	46M6G7D	QPSK
SISO Dual	K patch	50	1	37000 - 40000	0.646	28.10	46M4W7D	16QAM
SISO Dual	K patch	50	1	37000 - 40000	0.310	24.91	46M5W7D	64QAM
SISO	K patch	100	1	37000 - 40000	0.748	28.74	91M6G7D	BPSK
SISO	K patch	100	1	37000 - 40000	0.759	28.80	94M5G7D	QPSK
SISO	K patch	100	1	37000 - 40000	0.468	26.70	94M4W7D	16QAM
SISO	K patch	100	1	37000 - 40000	0.226	23.55	94M9W7D	64QAM
SISO Dual	K patch	100	1	37000 - 40000	1.109	30.45	90M6G7D	BPSK
SISO Dual	K patch	100	1	37000 - 40000	1.143	30.58	94M4G7D	QPSK
SISO Dual	K patch	100	1	37000 - 40000	0.700	28.45	94M7W7D	16QAM
SISO Dual	K patch	100	1	37000 - 40000	0.328	25.16	94M6W7D	64QAM
SISO	K patch	100	2	37000 - 40000	0.244	23.88	191MG7D	BPSK
SISO	K patch	100	2	37000 - 40000	0.210	23.22	194MG7D	QPSK
SISO	K patch	100	2	37000 - 40000	0.137	21.37	195MW7D	16QAM
SISO	K patch	100	2	37000 - 40000	0.082	19.12	195MW7D	64QAM
SISO Dual	K patch	100	2	37000 - 40000	0.206	23.14	191MG7D	BPSK
SISO Dual	K patch	100	2	37000 - 40000	0.207	23.15	194MG7D	QPSK
SISO Dual	K patch	100	2	37000 - 40000	0.141	21.49	194MW7D	16QAM
SISO Dual	K patch	100	2	37000 - 40000	0.089	19.49	195MW7D	64QAM
SISO	K patch	100	3	37000 - 40000	0.206	23.13	292MG7D	BPSK
SISO	K patch	100	3	37000 - 40000	0.207	23.15	294MG7D	QPSK
SISO	K patch	100	3	37000 - 40000	0.142	21.52	295MW7D	16QAM
SISO	K patch	100	3	37000 - 40000	0.090	19.53	296MW7D	64QAM
SISO Dual	K patch	100	3	37000 - 40000	0.200	23.02	290MG7D	BPSK
SISO Dual	K patch	100	3	37000 - 40000	0.197	22.94	293MG7D	QPSK

n260 Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	K patch	100	3	37000 - 40000	0.134	21.28	294MW7D	16QAM
SISO Dual	K patch	100	3	37000 - 40000	0.084	19.25	293MW7D	64QAM
SISO	K patch	100	4	37000 - 40000	0.194	22.88	392MG7D	BPSK
SISO	K patch	100	4	37000 - 40000	0.190	22.79	394MG7D	QPSK
SISO	K patch	100	4	37000 - 40000	0.134	21.26	394MW7D	16QAM
SISO	K patch	100	4	37000 - 40000	0.090	19.52	396MW7D	64QAM
SISO Dual	K patch	100	4	37000 - 40000	0.212	23.26	392MG7D	BPSK
SISO Dual	K patch	100	4	37000 - 40000	0.206	23.14	394MG7D	QPSK
SISO Dual	K patch	100	4	37000 - 40000	0.146	21.64	393MW7D	16QAM
SISO Dual	K patch	100	4	37000 - 40000	0.092	19.62	394MW7D	64QAM

n260 Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	L patch	50	1	37000 - 40000	1.297	31.13	45M7G7D	BPSK
SISO	L patch	50	1	37000 - 40000	1.297	31.13	46M0G7D	QPSK
SISO	L patch	50	1	37000 - 40000	0.855	29.32	46M0W7D	16QAM
SISO	L patch	50	1	37000 - 40000	0.394	25.95	46M0W7D	64QAM
SISO Dual	L patch	50	1	37000 - 40000	1.321	31.21	46M1G7D	BPSK
SISO Dual	L patch	50	1	37000 - 40000	1.312	31.18	46M3G7D	QPSK
SISO Dual	L patch	50	1	37000 - 40000	0.773	28.88	46M1W7D	16QAM
SISO Dual	L patch	50	1	37000 - 40000	0.353	25.48	46M3W7D	64QAM
SISO	L patch	100	1	37000 - 40000	0.789	28.97	91M6G7D	BPSK
SISO	L patch	100	1	37000 - 40000	1.236	30.92	94M6G7D	QPSK
SISO	L patch	100	1	37000 - 40000	0.733	28.65	94M7W7D	16QAM
SISO	L patch	100	1	37000 - 40000	0.365	25.62	95M0W7D	64QAM
SISO Dual	L patch	100	1	37000 - 40000	1.247	30.96	91M3G7D	BPSK
SISO Dual	L patch	100	1	37000 - 40000	1.211	30.83	94M6G7D	QPSK
SISO Dual	L patch	100	1	37000 - 40000	0.733	28.65	94M5W7D	16QAM
SISO Dual	L patch	100	1	37000 - 40000	0.372	25.71	94M8W7D	64QAM
SISO	L patch	100	2	37000 - 40000	0.232	23.66	191MG7D	BPSK
SISO	L patch	100	2	37000 - 40000	0.218	23.39	194MG7D	QPSK
SISO	L patch	100	2	37000 - 40000	0.156	21.92	194MW7D	16QAM
SISO	L patch	100	2	37000 - 40000	0.104	20.17	195MW7D	64QAM
SISO Dual	L patch	100	2	37000 - 40000	0.269	24.30	191MG7D	BPSK
SISO Dual	L patch	100	2	37000 - 40000	0.255	24.06	194MG7D	QPSK
SISO Dual	L patch	100	2	37000 - 40000	0.177	22.48	194MW7D	16QAM
SISO Dual	L patch	100	2	37000 - 40000	0.114	20.58	194MW7D	64QAM
SISO	L patch	100	3	37000 - 40000	0.205	23.12	290MG7D	BPSK
SISO	L patch	100	3	37000 - 40000	0.205	23.12	292MG7D	QPSK
SISO	L patch	100	3	37000 - 40000	0.139	21.44	293MW7D	16QAM
SISO	L patch	100	3	37000 - 40000	0.088	19.46	293MW7D	64QAM
SISO Dual	L patch	100	3	37000 - 40000	0.225	23.53	290MG7D	BPSK
SISO Dual	L patch	100	3	37000 - 40000	0.223	23.48	293MG7D	QPSK

n260 Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	L patch	100	3	37000 - 40000	0.158	21.98	293MW7D	16QAM
SISO Dual	L patch	100	3	37000 - 40000	0.103	20.12	293MW7D	64QAM
SISO	L patch	100	4	37000 - 40000	0.181	22.57	391MG7D	BPSK
SISO	L patch	100	4	37000 - 40000	0.182	22.59	393MG7D	QPSK
SISO	L patch	100	4	37000 - 40000	0.125	20.98	393MW7D	16QAM
SISO	L patch	100	4	37000 - 40000	0.081	19.07	394MW7D	64QAM
SISO Dual	L patch	100	4	37000 - 40000	0.211	23.25	391MG7D	BPSK
SISO Dual	L patch	100	4	37000 - 40000	0.208	23.18	393MG7D	QPSK
SISO Dual	L patch	100	4	37000 - 40000	0.145	21.60	393MW7D	16QAM
SISO Dual	L patch	100	4	37000 - 40000	0.093	19.70	394MW7D	64QAM

n261 Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	K patch	50	1	27500 - 28350	0.561	27.49	46M0G7D	BPSK
SISO	K patch	50	1	27500 - 28350	0.532	27.26	46M0G7D	QPSK
SISO	K patch	50	1	27500 - 28350	0.320	25.05	46M0W7D	16QAM
SISO	K patch	50	1	27500 - 28350	0.165	22.18	45M9W7D	64QAM
SISO Dual	K patch	50	1	27500 - 28350	0.847	29.28	46M1G7D	BPSK
SISO Dual	K patch	50	1	27500 - 28350	0.841	29.25	46M2G7D	QPSK
SISO Dual	K patch	50	1	27500 - 28350	0.488	26.88	46M1W7D	16QAM
SISO Dual	K patch	50	1	27500 - 28350	0.270	24.31	46M9W7D	64QAM
SISO	K patch	100	1	27500 - 28350	0.577	27.61	91M1G7D	BPSK
SISO	K patch	100	1	27500 - 28350	0.552	27.42	94M1G7D	QPSK
SISO	K patch	100	1	27500 - 28350	0.348	25.42	94M2W7D	16QAM
SISO	K patch	100	1	27500 - 28350	0.175	22.43	94M1W7D	64QAM
SISO Dual	K patch	100	1	27500 - 28350	0.899	29.54	90M3G7D	BPSK
SISO Dual	K patch	100	1	27500 - 28350	0.875	29.42	93M9G7D	QPSK
SISO Dual	K patch	100	1	27500 - 28350	0.557	27.46	92M9W7D	16QAM
SISO Dual	K patch	100	1	27500 - 28350	0.261	24.17	93M0W7D	64QAM
SISO	K patch	100	2	27500 - 28350	0.201	23.04	191MG7D	BPSK
SISO	K patch	100	2	27500 - 28350	0.200	23.02	193MG7D	QPSK
SISO	K patch	100	2	27500 - 28350	0.128	21.07	194MW7D	16QAM
SISO	K patch	100	2	27500 - 28350	0.077	18.86	193MW7D	64QAM
SISO Dual	K patch	100	2	27500 - 28350	0.210	23.22	189MG7D	BPSK
SISO Dual	K patch	100	2	27500 - 28350	0.209	23.21	193MG7D	QPSK
SISO Dual	K patch	100	2	27500 - 28350	0.131	21.16	193MW7D	16QAM
SISO Dual	K patch	100	2	27500 - 28350	0.082	19.16	193MW7D	64QAM
SISO	K patch	100	3	27500 - 28350	0.188	22.74	290MG7D	BPSK
SISO	K patch	100	3	27500 - 28350	0.180	22.56	293MG7D	QPSK
SISO	K patch	100	3	27500 - 28350	0.115	20.62	292MW7D	16QAM
SISO	K patch	100	3	27500 - 28350	0.078	18.91	293MW7D	64QAM
SISO Dual	K patch	100	3	27500 - 28350	0.205	23.12	290MG7D	BPSK
SISO Dual	K patch	100	3	27500 - 28350	0.206	23.13	292MG7D	QPSK

n261 Band Antenna 0 (K patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	K patch	100	3	27500 - 28350	0.131	21.17	292MW7D	16QAM
SISO Dual	K patch	100	3	27500 - 28350	0.082	19.13	292MW7D	64QAM
SISO	K patch	100	4	27500 - 28350	0.202	23.05	390MG7D	BPSK
SISO	K patch	100	4	27500 - 28350	0.203	23.07	392MG7D	QPSK
SISO	K patch	100	4	27500 - 28350	0.127	21.03	392MW7D	16QAM
SISO	K patch	100	4	27500 - 28350	0.080	19.05	393MW7D	64QAM
SISO Dual	K patch	100	4	27500 - 28350	0.225	23.52	390MG7D	BPSK
SISO Dual	K patch	100	4	27500 - 28350	0.221	23.45	391MG7D	QPSK
SISO Dual	K patch	100	4	27500 - 28350	0.132	21.19	391MW7D	16QAM
SISO Dual	K patch	100	4	27500 - 28350	0.091	19.57	391MW7D	64QAM

n261 Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO	L patch	50	1	27500 - 28350	0.605	27.82	46M0G7D	BPSK
SISO	L patch	50	1	27500 - 28350	0.579	27.63	46M1G7D	QPSK
SISO	L patch	50	1	27500 - 28350	0.372	25.71	46M0W7D	16QAM
SISO	L patch	50	1	27500 - 28350	0.177	22.47	45M9W7D	64QAM
SISO Dual	L patch	50	1	27500 - 28350	0.317	25.01	46M0G7D	BPSK
SISO Dual	L patch	50	1	27500 - 28350	0.310	24.91	46M1G7D	QPSK
SISO Dual	L patch	50	1	27500 - 28350	0.192	22.84	46M1W7D	16QAM
SISO Dual	L patch	50	1	27500 - 28350	0.089	19.50	46M4W7D	64QAM
SISO	L patch	100	1	27500 - 28350	0.628	27.98	91M4G7D	BPSK
SISO	L patch	100	1	27500 - 28350	0.598	27.77	94M3G7D	QPSK
SISO	L patch	100	1	27500 - 28350	0.399	26.01	94M2W7D	16QAM
SISO	L patch	100	1	27500 - 28350	0.192	22.83	94M2W7D	64QAM
SISO Dual	L patch	100	1	27500 - 28350	0.305	24.84	90M5G7D	BPSK
SISO Dual	L patch	100	1	27500 - 28350	0.319	25.04	93M4G7D	QPSK
SISO Dual	L patch	100	1	27500 - 28350	0.195	22.90	93M1W7D	16QAM
SISO Dual	L patch	100	1	27500 - 28350	0.096	19.83	93M9W7D	64QAM
SISO	L patch	100	2	27500 - 28350	0.192	22.84	191MG7D	BPSK
SISO	L patch	100	2	27500 - 28350	0.193	22.86	193MG7D	QPSK
SISO	L patch	100	2	27500 - 28350	0.122	20.86	193MW7D	16QAM
SISO	L patch	100	2	27500 - 28350	0.078	18.91	193MW7D	64QAM
SISO Dual	L patch	100	2	27500 - 28350	0.121	20.83	191MG7D	BPSK
SISO Dual	L patch	100	2	27500 - 28350	0.113	20.53	193MG7D	QPSK
SISO Dual	L patch	100	2	27500 - 28350	0.067	18.27	193MW7D	16QAM
SISO Dual	L patch	100	2	27500 - 28350	0.041	16.14	193MW7D	64QAM
SISO	L patch	100	3	27500 - 28350	0.185	22.66	291MG7D	BPSK
SISO	L patch	100	3	27500 - 28350	0.185	22.67	293MG7D	QPSK
SISO	L patch	100	3	27500 - 28350	0.115	20.59	293MW7D	16QAM
SISO	L patch	100	3	27500 - 28350	0.075	18.74	293MW7D	64QAM
SISO Dual	L patch	100	3	27500 - 28350	0.120	20.80	290MG7D	BPSK
SISO Dual	L patch	100	3	27500 - 28350	0.110	20.43	292MG7D	QPSK

n261 Band Antenna 1 (L patch)								
Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
					(W)	(dBm)		
SISO Dual	L patch	100	3	27500 - 28350	0.067	18.28	292MW7D	16QAM
SISO Dual	L patch	100	3	27500 - 28350	0.042	16.19	293MW7D	64QAM
SISO	L patch	100	4	27500 - 28350	0.192	22.83	392MG7D	BPSK
SISO	L patch	100	4	27500 - 28350	0.188	22.74	394MG7D	QPSK
SISO	L patch	100	4	27500 - 28350	0.117	20.68	392MW7D	16QAM
SISO	L patch	100	4	27500 - 28350	0.073	18.61	393MW7D	64QAM
SISO Dual	L patch	100	4	27500 - 28350	0.116	20.65	390MG7D	BPSK
SISO Dual	L patch	100	4	27500 - 28350	0.118	20.71	391MG7D	QPSK
SISO Dual	L patch	100	4	27500 - 28350	0.072	18.56	391MW7D	16QAM
SISO Dual	L patch	100	4	27500 - 28350	0.044	16.47	392MW7D	64QAM

2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 (Version: 2014) and CISPR Publication 22.

Seoicheon-ro
<input checked="" type="checkbox"/> Semi Chamber 1
<input type="checkbox"/> Semi Chamber 2
<input type="checkbox"/> Semi Chamber 3
<input checked="" type="checkbox"/> mmWave Chamber

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary for radiated emissions measurements in the spurious domain. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the table to bring the total table height to 1.5m for measurements above 1GHz.

Radiated spurious emission measurements from 30MHz - 18GHz were performed in a semi anechoic chamber (SAC) conforming to the site validation requirements.

Radiated power (EIRP) measurements were performed according to ANSI C63.26_2015 in a full anechoic chamber (FAC).

* The test facility has been recognised by the FCC under registration number KR0032. The full scope of recognition can be viewed at

https://apps.fcc.gov/oetcf/eas/reports/ViewTestFirmAccredScopes.cfm?calledFromFrame=N&RequestTimeout=500®num_specified=N&test_firm_id=5749.

* The highest frequency is 325GHz and ISO 17025 accreditation letter can be viewed by searching for HCT at https://www.knab.go.kr/en/Testing_Search.do

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

3. TEST SPECIFICATIONS

FCC Rule Parts	47 CFR FCC Part2, Part 30
Measurement standards	ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 662911 D01 v02r01, KDB 662911 D02 v01, KDB 842590 D01 v01r02

Note:

The EUT was tested per the guidance of ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 842590 D01 v01r02

EIRP Simulation data for all Beam IDs was used to determine the worst case Beam ID for SISO operation and Beam ID pair for SISO Dual operation. These Beam ID's was used for final measurements.

All testing was performed using FTM software at continuous Tx operation(100 % duty cycle).

Each of the patch antennas is comprised of two separate antenna feeds(H/V).

All modulations, RB size, CP-OFDM, DFT-s-OFDM and SCS were investigated and the worst case configuration results are reported.

In cases of SISO, SISO Dual, MIMO, CP-OFDM is supported.

In cases of SISO, SISO Dual, DFT-s-OFDM mode is supported.

Per 2.1057(a)(2), spurious emissions were investigated up to 200 GHz.(up to 100 GHz for n258, n261 band)

The radiated RF output power, band edge and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.

In case of band edge, if the band edge results does not comply the EIRP limit, the band edge results are converted to an equivalent conductive power by subtracting the known antenna gain from the EIRP measured at each frequency of interest. These emissions are compared to the 30.203 spurious emission limits as conductive power levels.

Beam IDs were selected based on which Beam ID produces the highest EIRP during EIRP simulation.

The radiated spurious emission was investigated in three orthogonal orientation x, y and z.
(worst case: y for n258a, y for n258b, y for n261, y for n260)

3.1. STANDARDS & TEST SUMMARY

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 30

Description	Test Limit	Reference	Results
Occupied Bandwidth	N/A	§2.1049	Compliant
Equivalent Isotropic Radiated Power	43 dBm	§30.202 §30.202	Compliant
Out-of-Band Emissions at the Band Edge	-13 dBm/MHz for all out-of-band emissions, -5 dBm/MHz from the band edge up to 10 % of the channel BW	§2.1051, §30.203	Compliant
Radiated Spurious Emissions	-13 dBm/MHz for all out-of-band emissions	§2.1051, §30.203	Compliant
Frequency Stability	Fundamental emissions stay within authorized frequency block	§2.1055	Compliant

3.2. HIGHEST E.I.R.P POSITION

Antenna 0(K patch) SISO

Band	CH	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)
n258a	Low	155	H	H	32	106	36	V	H	15	163
	Mid	155	H	H	28	107	25	V	V	17	257
	High	165	H	H	28	88	25	V	V	14	255
n258b	Low	155	H	H	17	104	25	V	V	16	257
	Mid	155	H	H	29	106	36	V	V	14	105
	High	155	H	H	32	105	34	V	V	31	257
n261	Low	164	H	V	15	181	26	V	H	2	195
	Mid	154	H	V	1	29	26	V	H	2	194
	High	154	H	V	16	1	27	V	V	32	271
n260	Low	26	H	V	1	167	154	V	H	15	346
	Mid	36	H	H	16	269	154	V	H	1	182
	High	36	H	H	17	269	163	V	V	17	44

Antenna 0(K patch) SISO Dual, MIMO

Band	CH	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)
n258a	Low	36/164	H+V	H	16	149	36/164	H+V	V	17	60
	Mid	36/164	H+V	H	17	148	36/164	H+V	V	14	44
	High	34/162	H+V	H	31	285	34/162	H+V	V	14	29
n258b	Low	27/155	H+V	H	17	107	27/155	H+V	V	31	77
	Mid	36/164	H+V	H	13	103	36/164	H+V	V	14	31
	High	27/155	H+V	H	43	134	27/155	H+V	V	28	60
n261	Low	36/164	H+V	H	32	302	36/164	H+V	V	14	209
	Mid	26/154	H+V	H	2	317	26/154	H+V	V	0	60
	High	27/155	H+V	H	28	302	27/155	H+V	V	43	256
n260	Low	35/163	H+V	H	15	76	35/163	H+V	V	31	31
	Mid	25/153	H+V	H	28	74	25/153	H+V	V	30	45
	High	36/164	H+V	H	17	254	36/164	H+V	V	14	316

Antenna 1(L patch) SISO

Band	CH	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)
n258a	Low	159	H	V	14	256	38	V	H	59	298
	Mid	159	H	V	28	180	33	V	V	46	77
	High	159	H	V	2	149	38	V	H	62	298
n258b	Low	159	H	V	29	329	38	V	H	59	298
	Mid	167	H	H	30	257	33	V	V	44	74
	High	159	H	V	1	13	38	V	H	60	317
n261	Low	159	H	H	0	58	38	V	H	60	315
	Mid	167	H	V	13	210	41	V	V	47	77
	High	167	H	H	13	302	41	V	V	46	88
n260	Low	31	H	V	2	195	159	V	H	16	195
	Mid	31	H	H	2	104	167	V	V	32	30
	High	31	H	V	1	2	167	V	V	17	58

Antenna 1(L patch) SISO Dual, MIMO

Band	CH	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)	Beam ID	Beam Pol.	Ant. Pol.	Azimuth(°)	Roll(°)
n258a	Low	38/166	H+V	H	62	302	38/166	H+V	V	45	256
	Mid	38/166	H+V	H	47	300	38/166	H+V	V	43	254
	High	38/166	H+V	H	31	269	38/166	H+V	V	47	255
n258b	Low	29/157	H+V	H	46	285	29/157	H+V	V	61	302
	Mid	29/157	H+V	H	28	268	29/157	H+V	V	62	302
	High	29/157	H+V	H	30	268	29/157	H+V	V	59	302
n261	Low	41/169	H+V	H	44	58	41/169	H+V	V	44	119
	Mid	41/169	H+V	H	43	58	41/169	H+V	V	46	104
	High	41/169	H+V	H	76	59	41/169	H+V	V	45	121
n260	Low	31/159	H+V	H	1	76	31/159	H+V	V	1	166
	Mid	31/159	H+V	H	2	268	31/159	H+V	V	1	178
	High	31/159	H+V	H	0	272	31/159	H+V	V	2	347

3.3. MAXIMUM MEASUREMENT UNCERTAINTY

The value of the measurement uncertainty for the measurement of each parameter.

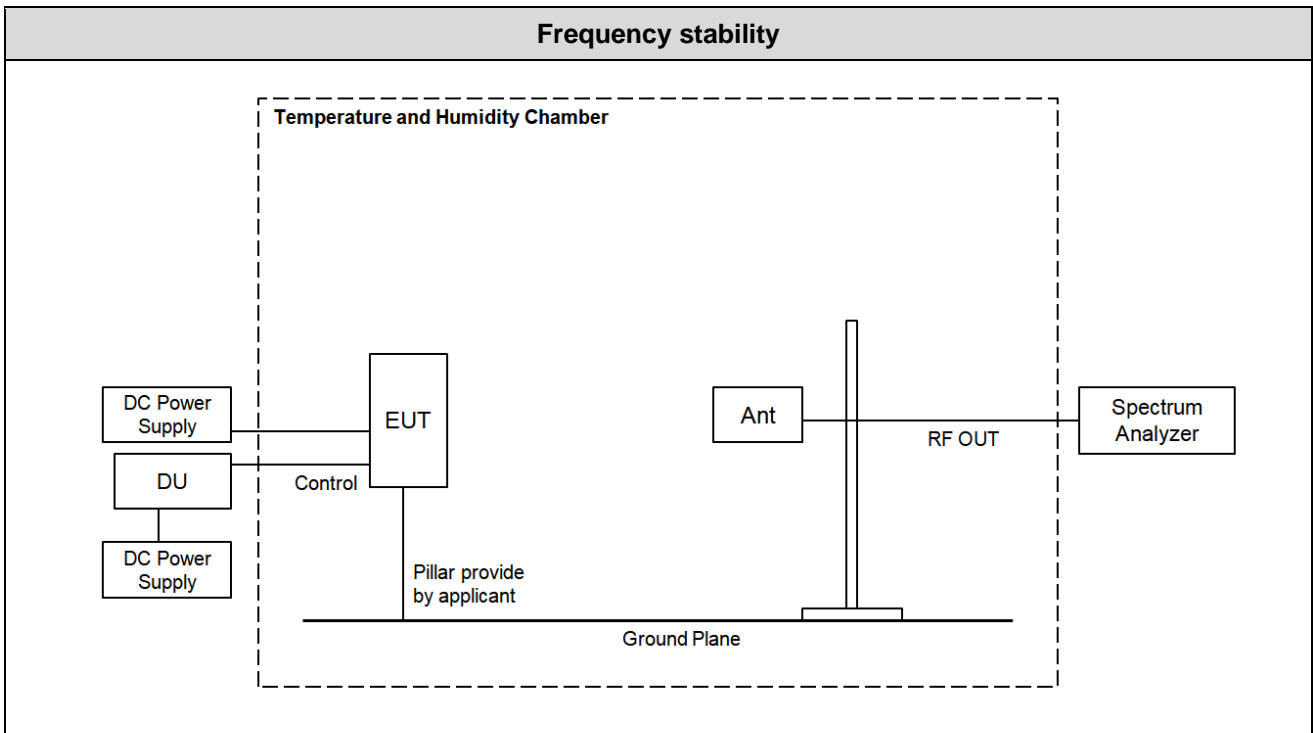
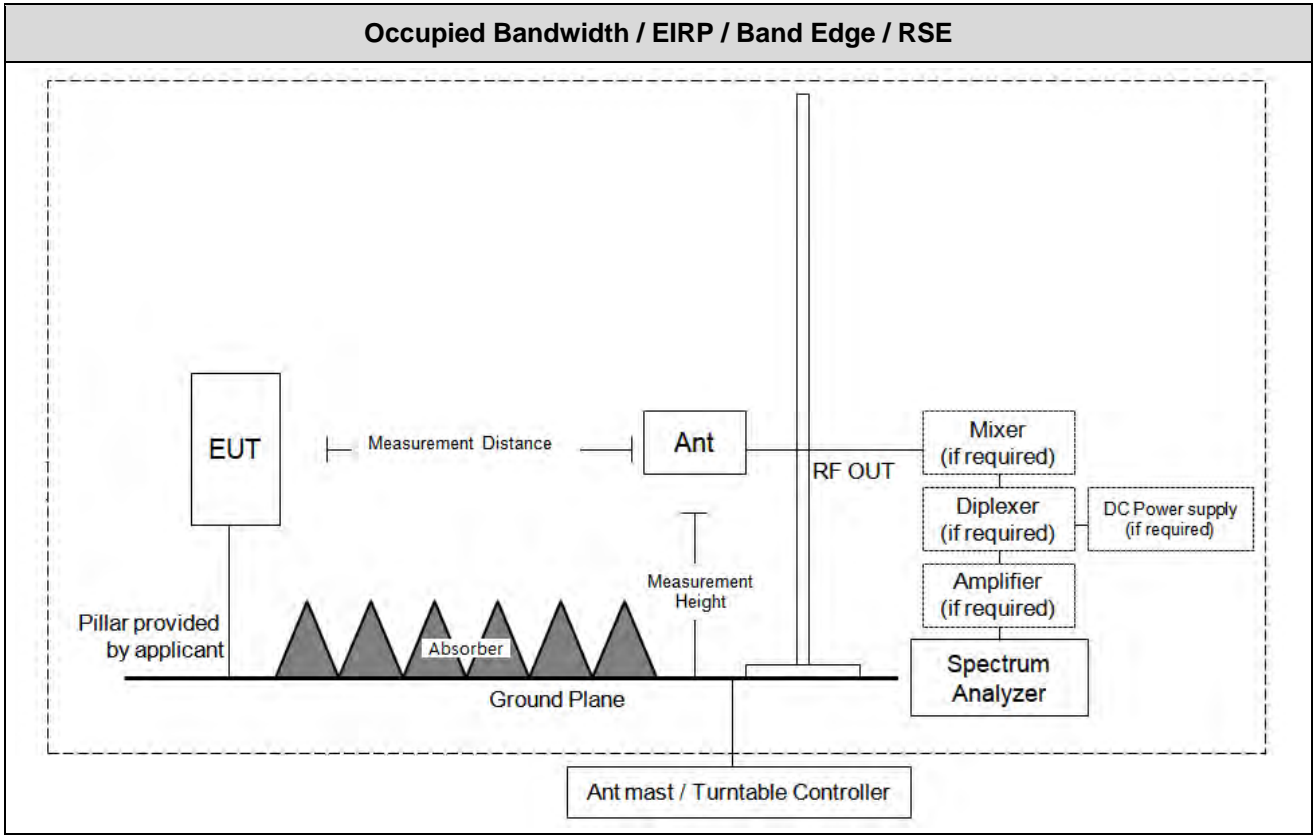
Coverage factor k = 2, Confidence levels of 95 %

Description	Condition	Uncertainty
Occupied Bandwidth	-	± 0.31 MHz
Equivalent Isotropic Radiated Power	23.75 GHz ~ 25.70 GHz	± 5.76 dB
Band Edge	27.00 GHz ~ 28.80 GHz, 36.60 GHz ~ 40.02 GHz	
Radiated Spurious Emissions	9 kHz ~ 30 MHz	± 4.14 dB
	30 MHz ~ 1 GHz	± 5.82 dB
	1 GHz ~ 18 GHz	± 5.74 dB
	18 GHz ~ 40 GHz	± 5.76 dB
	40 GHz ~ 200 GHz	± 5.52 dB
Frequency Stability	-	69.61 kHz

3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature:	+15 °C to +35 °C
Relative humidity:	30 % to 60 %
Air pressure:	860 mbar to 1 060 mbar

3.5. TEST DIAGRAMS



3.6. ADDITIONAL DESCRIPTIONS ABOUT TEST

- All tests is performed by radiated measurement and applied below conditions.

: Used measurement distance with far field of test such as EIRP, OBW and Band edge are as follow.

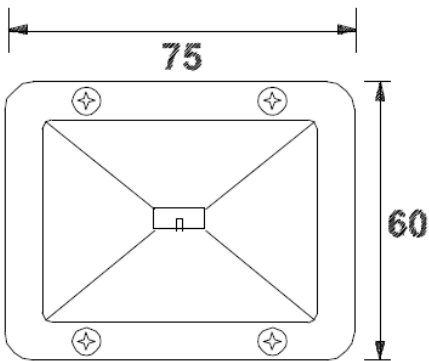
$$\text{Wavelength} = \text{Speed of light} / \text{Measurement frequency} = 30 / 4\ 000 = 0.0075$$

$$(2 \times (\text{Max measured antenna dimension})^2) / \text{Wavelength} = (2 \times (0.09604686)^2) / 0.0075 = \mathbf{2.46\ m}$$

: Spurious emissions measurement distance is shown in table below(Reference : Measurement Antenna Dimension).

Frequency Rage (GHz)	Wavelength (cm)	Far Field Distance (m)	Measurement Distance(m)
18 ~ 40	0.75	2.46	3.00
40 ~ 60	0.50	1.354	1.50
60 ~90	0.33	0.856	1.00
90 ~ 140	0.214	0.572	1.00
140 ~ 200	0.15	0.332	0.50

- Unwanted radiated emissions test was performed on state of all EUT antenna path is operated with a maximum output power level.
- In case of far-field distance for fundamental, we applied the measured antenna dimension because the measured antenna is bigger than the antenna of EUT.
- Dimension of measured(BBHA 9170) antenna: 0.096046 m



- Dimension of EUT antenna: 0.023614 m
- Below 18 GHz, measurement distance is 3.00 m.

4. TEST EQUIPMENTS

Manufacturer	Model / Equipment	Due to Calibration	Calibration Interval	Serial No.
Agilent	N9030A / PXA Signal Analyzer	03/07/2024	Annual	US51350313
Agilent	N9030B / PXA Signal Analyzer	10/19/2023	Annual	MY60070602
Schwarzbeck	BBHA 9170 / Horn Antenna	11/16/2023	Biennial	BBHA9170541
KIKUSUI	PWR800L / DC Power Supply	07/22/2023	Annual	RE002047
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Rohde&Schwarz	FSW / Spectrum Analyzer	10/31/2023	Annual	101256
Rohde&Schwarz	FSP / Spectrum Analyzer	09/06/2023	Annual	836650/016
Schwarzbeck	Loop Antenna	01/16/2025	Biennial	1513-175
Emco	2090 / Controller	N/A	N/A	060520
Ets	Turn Table	N/A	N/A	N/A
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/16/2024	Biennial	9168-0895
Schwarzbeck	BBHA 9120D / Horn Antenna	01/18/2024	Biennial	9120D-1300
OML INC.	WR-19 / Horn Antenna	03/14/2024	Annual	M19RH-180423-1
OML INC.	WR-19 / Horn Antenna	03/14/2024	Annual	M19RH-180423-2
OML INC.	WR-12 / Horn Antenna	03/14/2024	Annual	M12RH-180423-1
OML INC.	WR-12 / Horn Antenna	03/14/2024	Annual	M12RH-180423-2
OML INC.	WR-08 / Horn Antenna	03/15/2024	Annual	M08RH-180501-1
OML INC.	WR-08 / Horn Antenna	03/15/2024	Annual	M08RH-180501-2
OML INC.	WR-05 / Horn Antenna	03/15/2024	Annual	M05RH-180501-1
OML INC.	WR-05 / Horn Antenna	03/15/2024	Annual	M05RH-180501-2
VDI	WR19SAX / Spectrum Analyzer Extension Module	03/14/2024	Annual	SAX771
VDI	WR12SAX / Spectrum Analyzer Extension Module	03/22/2024	Annual	SAX773
VDI	WR8.0SAX / Spectrum Analyzer Extension Module	03/14/2024	Annual	SAX779
VDI	WR5.1SAX / Spectrum Analyzer Extension Module	03/14/2024	Annual	SAX774
OML INC.	WR-19 / Source Module	07/19/2023	Annual	S19MS-A-160516-1
OML INC.	WR-12 / Source Module	07/19/2023	Annual	S12MS-A-160419-1
OML INC.	WR-08 / Source Module	09/05/2023	Annual	S08MS-A-160419-1
OML INC.	WR-05 / Source Module	07/19/2023	Annual	S05MS-A-160419-1
NANGYEUL CO., LTD.	NY-THR18750 / Temperature and Humidity Chamber	01/26/2024	Annual	NY-200912201A
Rohde & Schwarz	SMV100A / Signal Generator	07/05/2023	Annual	177633
Keysight	E7515B / UXM 5G Wireless Test Platform	12/28/2023	Annual	MY58300756
T&M SYSTEM	FBSR-04C / LNA1 thru(100M-18G)	08/23/2023	Annual	NONE

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

5. TEST RESULT

5.1. OCCUPIED BANDWIDTH

FCC Rules

Test Requirements:

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedures:

The measurement is performed in accordance with Section 5.4.3 and 5.4.4 of ANSI C63.26.

5.4.3 Occupied bandwidth—Relative measurement procedure

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- f) Determine the reference value by either of the following:
 - 1) 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).
 - 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
- g) Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).
- i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a

marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the “-X dB amplitude” at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the “-X dB amplitude.”

j) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

5.4.4 Occupied bandwidth—Power bandwidth (99%) measurement procedure

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Test Results:

Tabular Data of Occupied Bandwidth

n258a Band Antenna 0 (K patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
K patch	50	1	BPSK	46.078
			QPSK	46.079
			16QAM	46.101
			64QAM	45.984
	100	1	BPSK	91.839
			QPSK	94.425
			16QAM	94.537
			64QAM	94.218
	100	2	BPSK	190.11
			QPSK	193.35
			16QAM	193.65
			64QAM	193.43

n258a Band Antenna 1 (L patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
L patch	50	1	BPSK	46.106
			QPSK	46.054
			16QAM	46.043
			64QAM	46.052
	100	1	BPSK	91.661
			QPSK	94.537
			16QAM	94.363
			64QAM	94.345
	100	2	BPSK	189.97
			QPSK	193.46
			16QAM	193.58
			64QAM	193.41

n258b Band Antenna 0 (K patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
K patch	50	1	BPSK	46.283
			QPSK	46.359
			16QAM	46.232
			64QAM	46.323
	100	1	BPSK	91.532
			QPSK	94.464
			16QAM	94.381
			64QAM	94.263
	100	2	BPSK	190.63
			QPSK	193.34
			16QAM	193.35
			64QAM	193.28
	100	3	BPSK	290.98
			QPSK	293.14
			16QAM	293.46
			64QAM	293.22
100	4	BPSK	391.02	
		QPSK	392.56	
		16QAM	392.52	
		64QAM	392.05	

n258b Band Antenna 1 (L patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
L patch	50	1	BPSK	46.021
			QPSK	46.223
			16QAM	46.309
			64QAM	46.138
	100	1	BPSK	91.571
			QPSK	94.518
			16QAM	94.300
			64QAM	94.232
	100	2	BPSK	190.80
			QPSK	193.41
			16QAM	193.32
			64QAM	193.71
	100	3	BPSK	290.91
			QPSK	293.41
			16QAM	293.27
			64QAM	292.90
100	4	BPSK	392.32	
		QPSK	392.38	
		16QAM	392.23	
		64QAM	392.28	

n260 Band Antenna 0 (K patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
K patch	50	1	BPSK	46.159
			QPSK	46.592
			16QAM	46.395
			64QAM	46.471
	100	1	BPSK	91.638
			QPSK	94.450
			16QAM	94.710
			64QAM	94.884
	100	2	BPSK	191.33
			QPSK	194.44
			16QAM	194.50
			64QAM	195.14
	100	3	BPSK	291.81
			QPSK	294.39
			16QAM	294.81
			64QAM	296.01
100	4	BPSK	391.66	
		QPSK	394.22	
		16QAM	394.06	
		64QAM	395.69	

n260 Band Antenna 1 (L patch)

Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
L patch	50	1	BPSK	46.101
			QPSK	46.313
			16QAM	46.135
			64QAM	46.286
	100	1	BPSK	91.564
			QPSK	94.611
			16QAM	94.704
			64QAM	95.007
	100	2	BPSK	191.05
			QPSK	194.18
			16QAM	194.42
			64QAM	194.64
	100	3	BPSK	290.35
			QPSK	292.76
			16QAM	293.46
			64QAM	293.41
100	4	BPSK	390.96	
		QPSK	392.80	
		16QAM	393.10	
		64QAM	394.41	

n261 Band Antenna 0 (K patch)

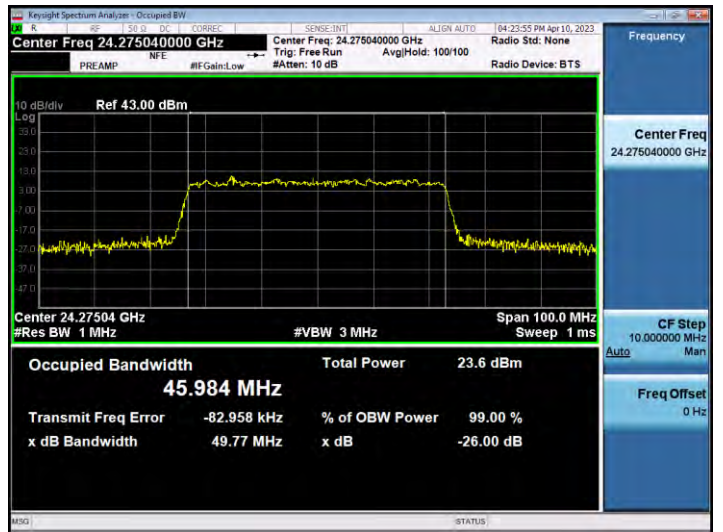
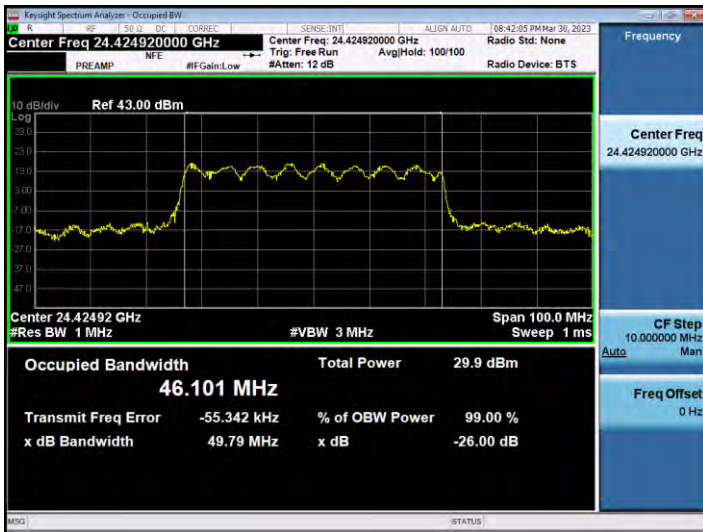
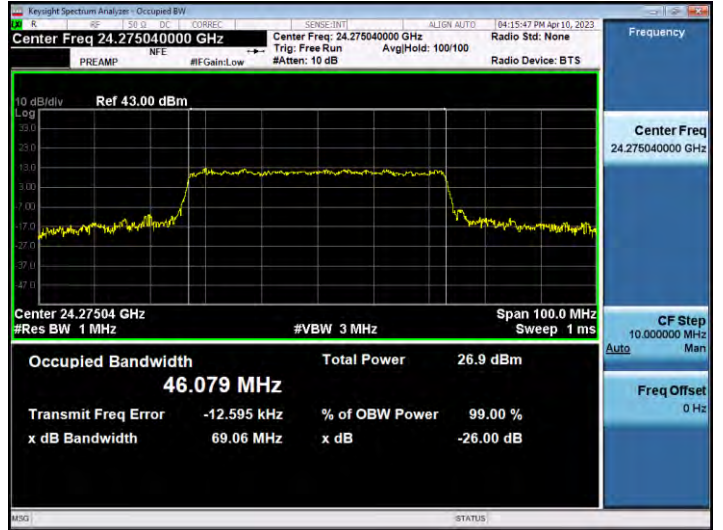
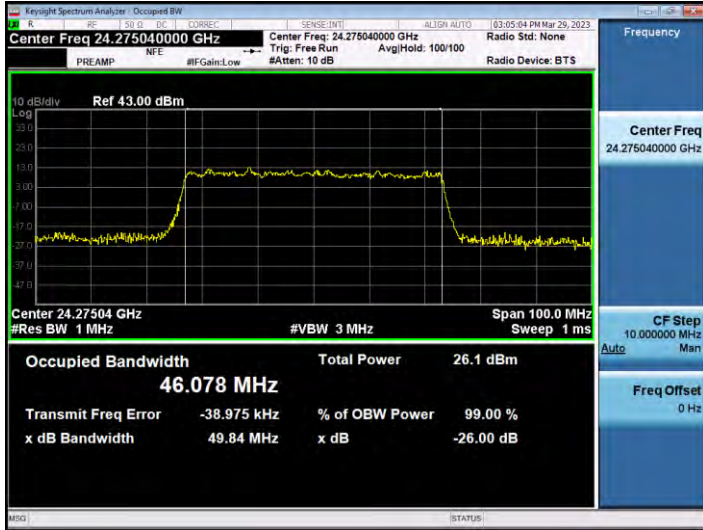
Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
K patch	50	1	BPSK	46.100
			QPSK	46.204
			16QAM	46.095
			64QAM	46.873
	100	1	BPSK	91.129
			QPSK	94.097
			16QAM	94.176
			64QAM	94.109
	100	2	BPSK	190.55
			QPSK	193.44
			16QAM	193.63
			64QAM	193.15
	100	3	BPSK	289.77
			QPSK	292.59
			16QAM	292.40
			64QAM	292.89
100	4	BPSK	390.41	
		QPSK	392.25	
		16QAM	392.21	
		64QAM	392.57	

n261 Band Antenna 1 (L patch)

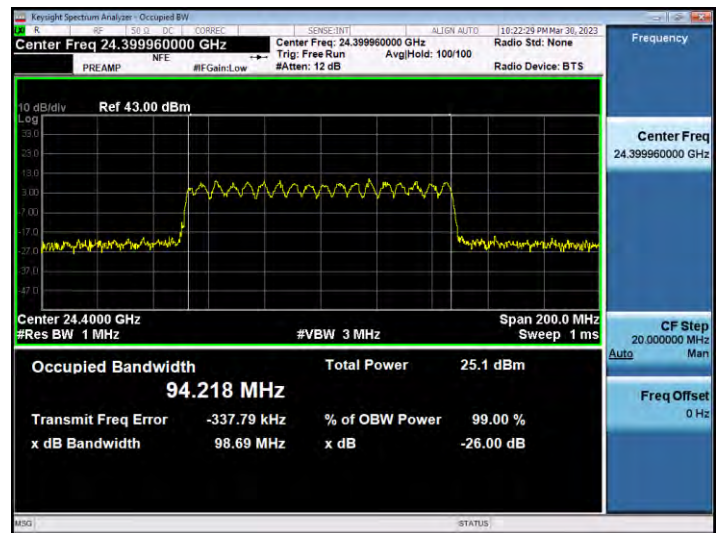
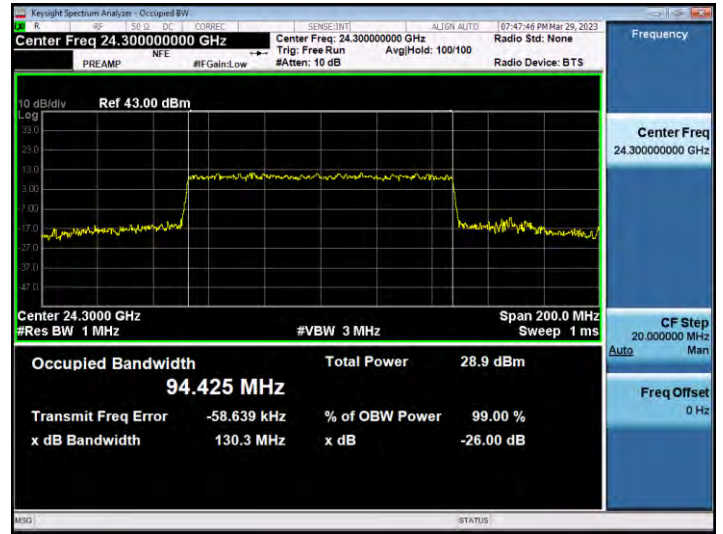
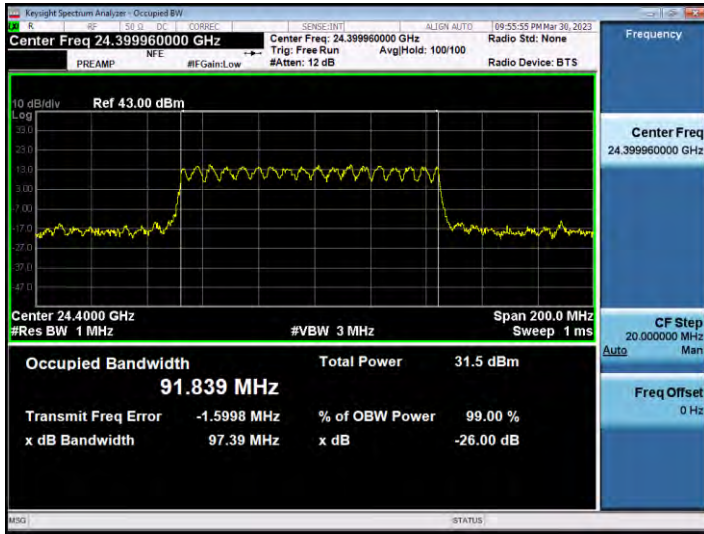
Antenna	Bandwidth [MHz]	CCs active	Modulation	OBW [MHz]
L patch	50	1	BPSK	46.046
			QPSK	46.149
			16QAM	46.123
			64QAM	46.417
	100	1	BPSK	91.355
			QPSK	94.295
			16QAM	94.234
			64QAM	94.171
	100	2	BPSK	190.98
			QPSK	193.02
			16QAM	193.21
			64QAM	193.05
	100	3	BPSK	290.57
			QPSK	292.52
			16QAM	292.84
			64QAM	292.82
100	4	BPSK	391.83	
		QPSK	393.50	
		16QAM	392.40	
		64QAM	392.79	

Plot Data of RF Occupied Bandwidth
n258a Band Antenna 0 (K patch)

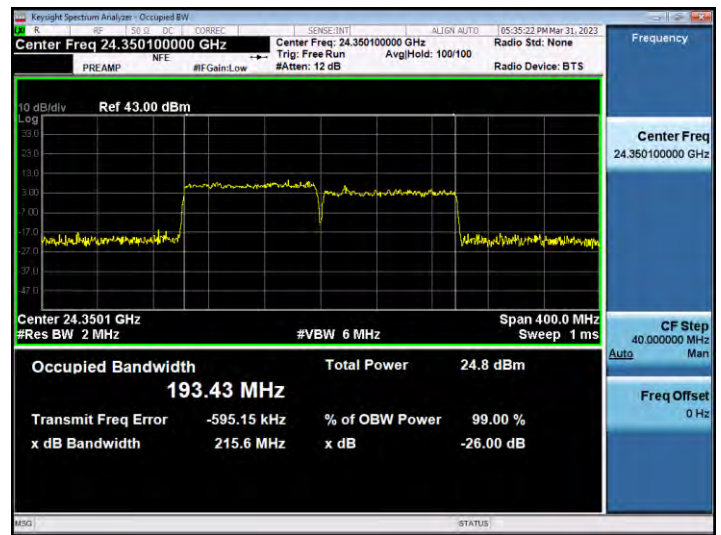
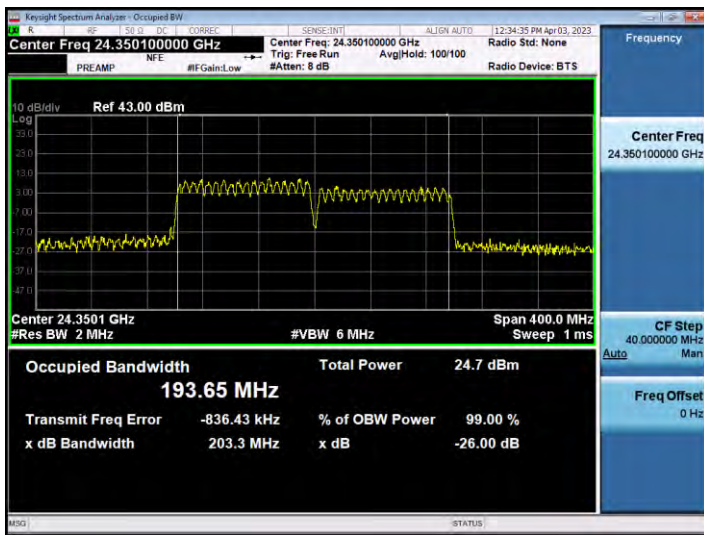
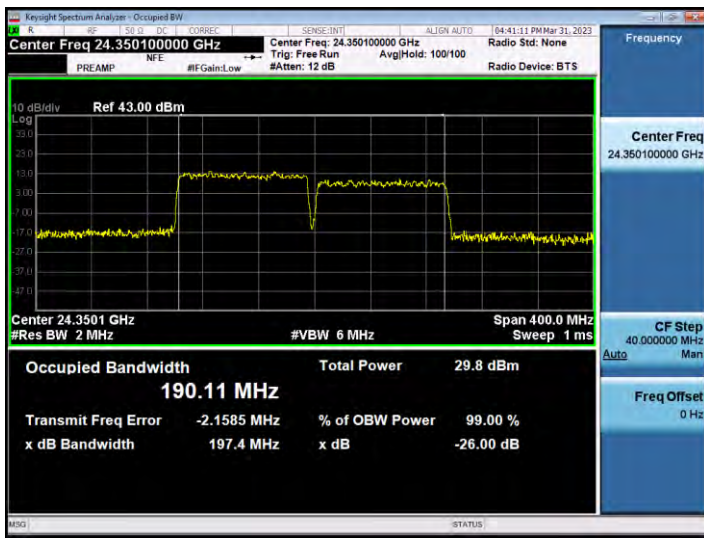
50 MHz, 1CC



100 MHz, 1CC

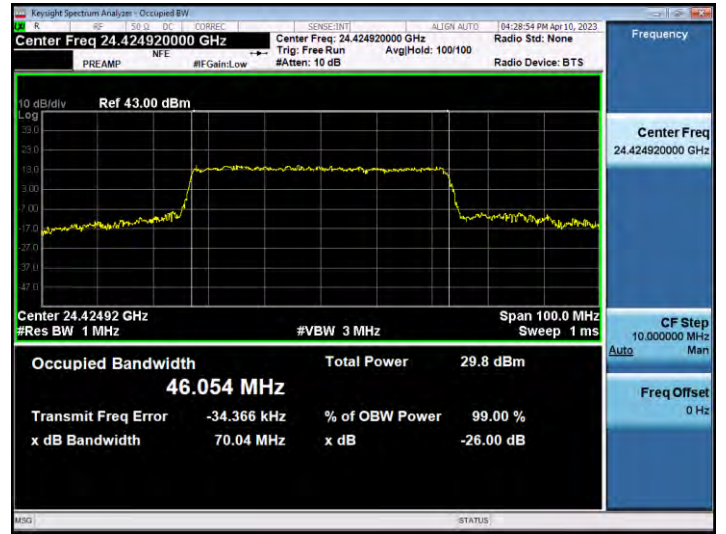
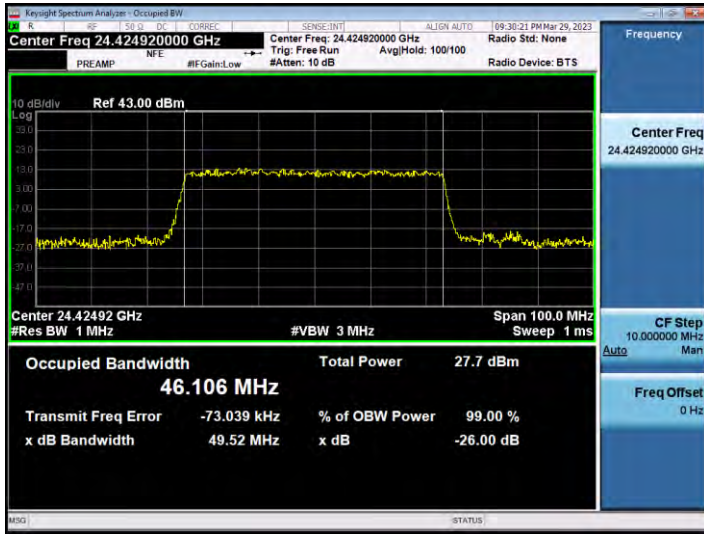


100 MHz, 2CC

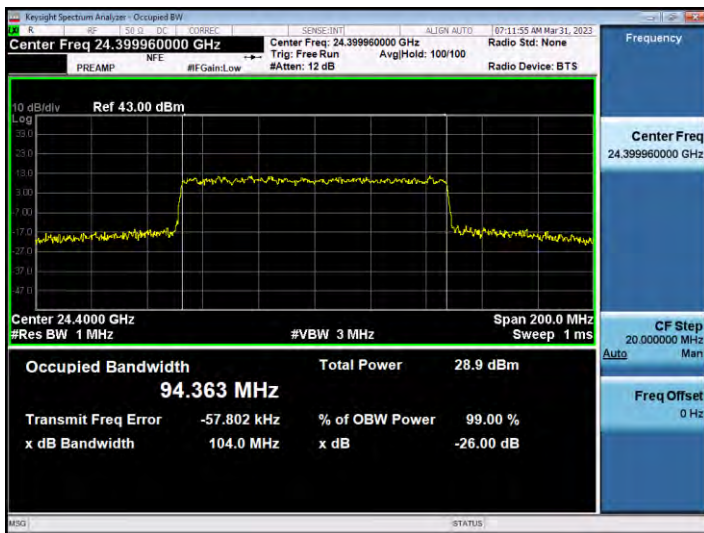
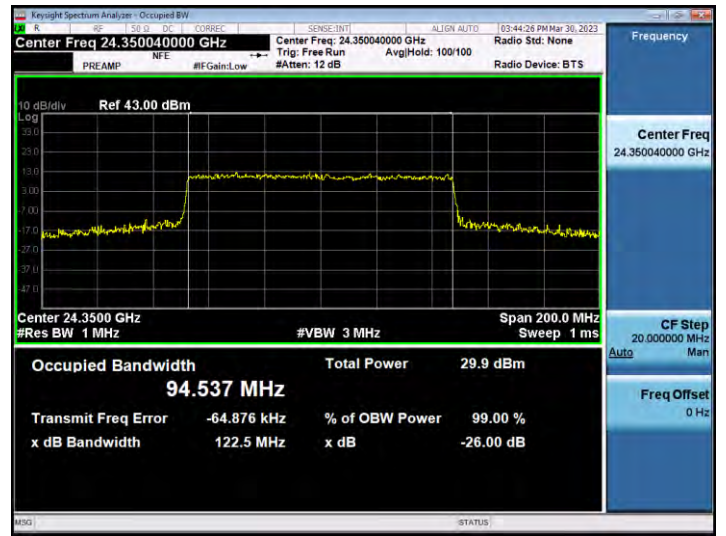
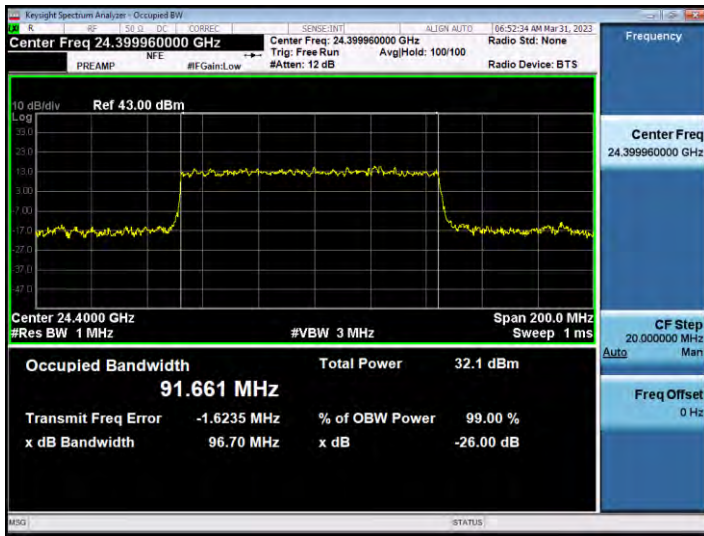


n258a Band Antenna 1 (L patch)

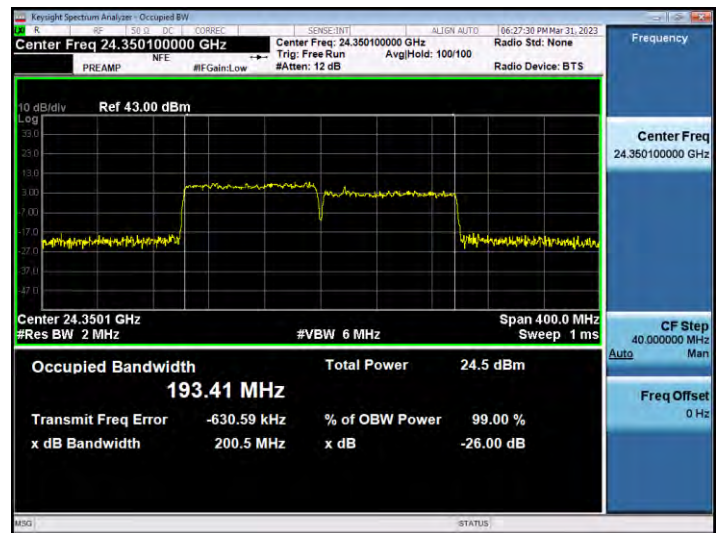
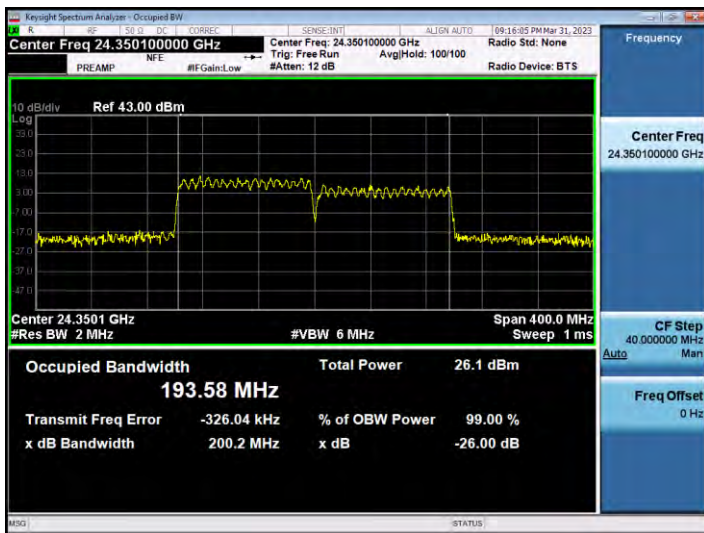
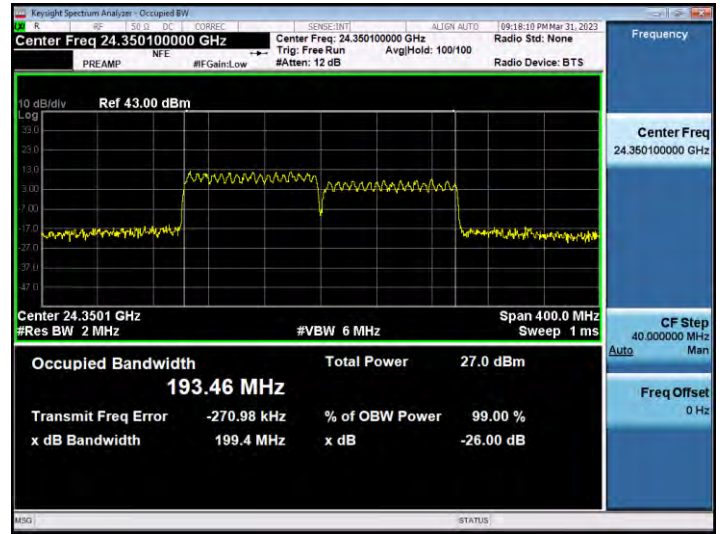
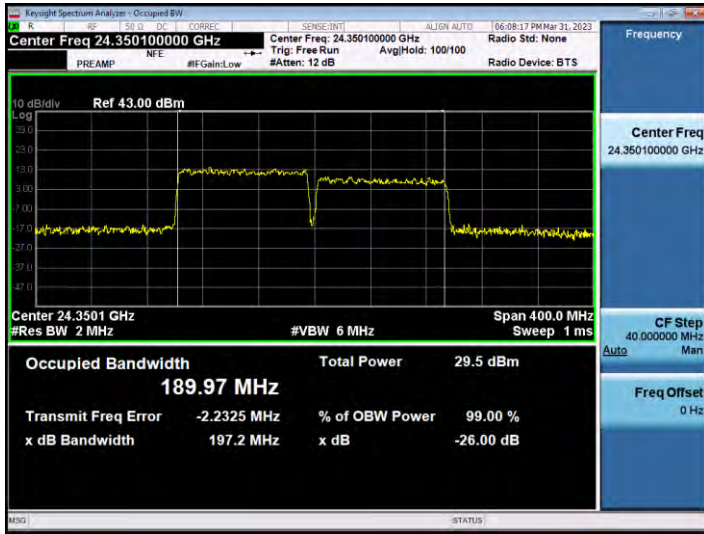
50 MHz, 1CC



100 MHz, 1CC

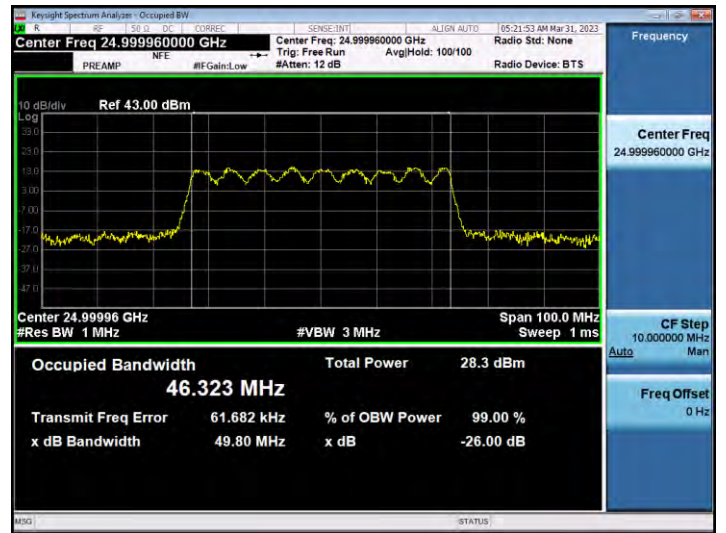
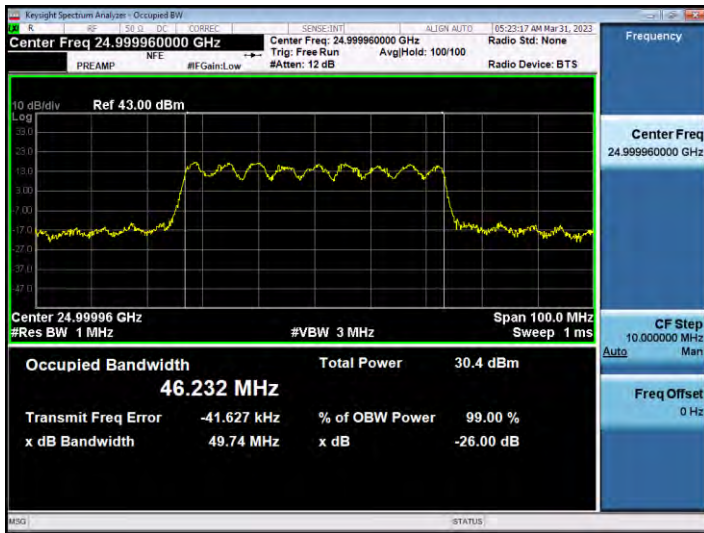
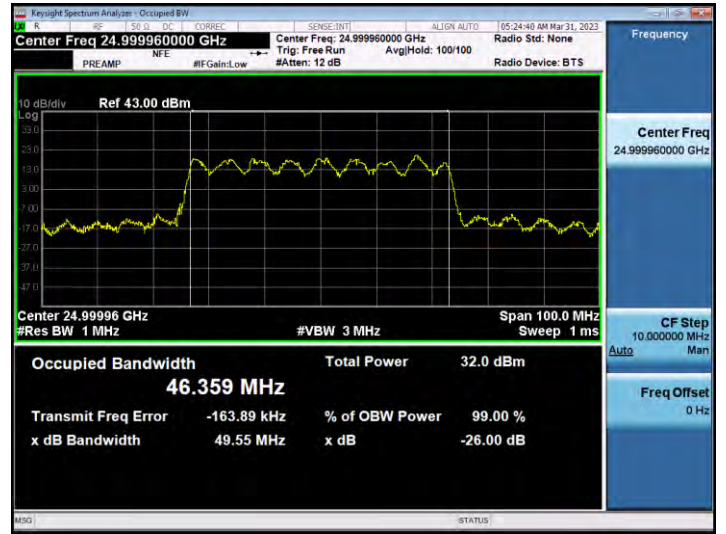
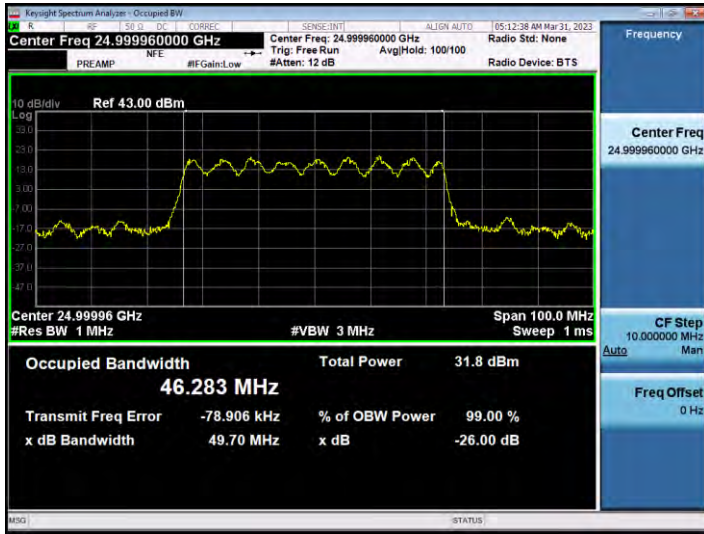


100 MHz, 2CC

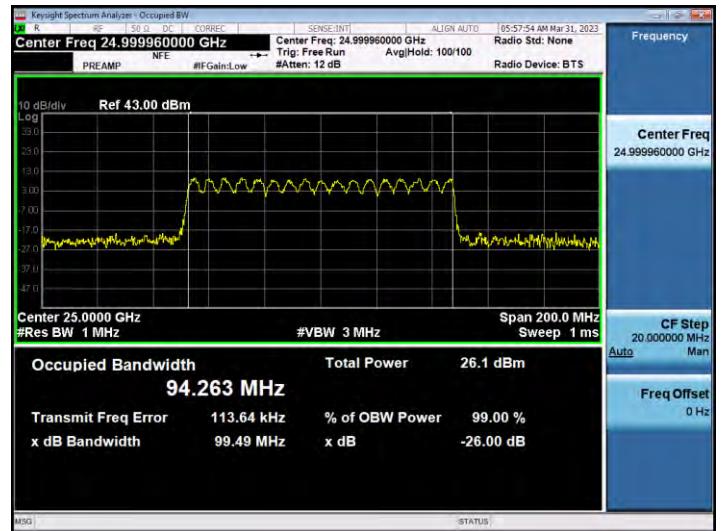
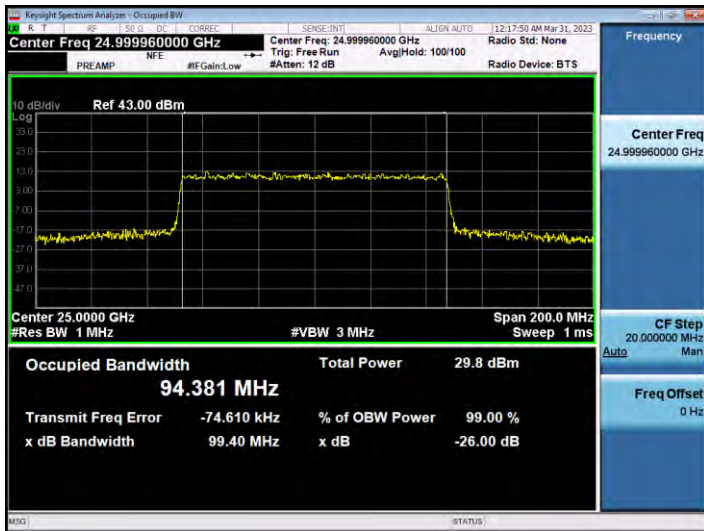
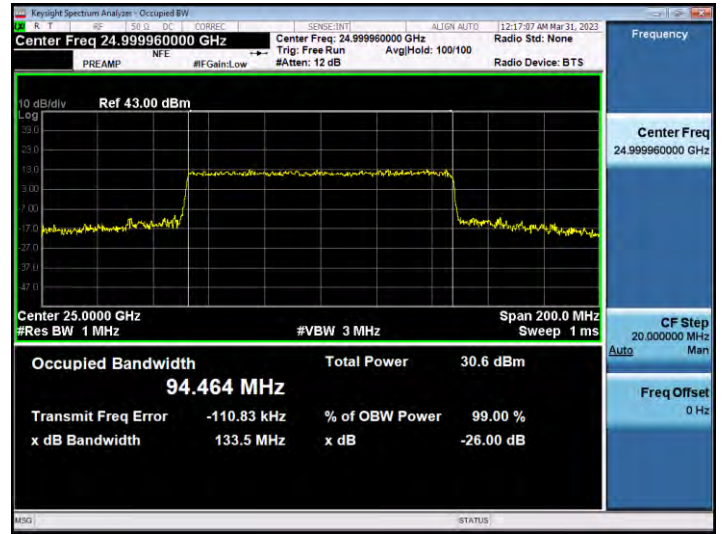
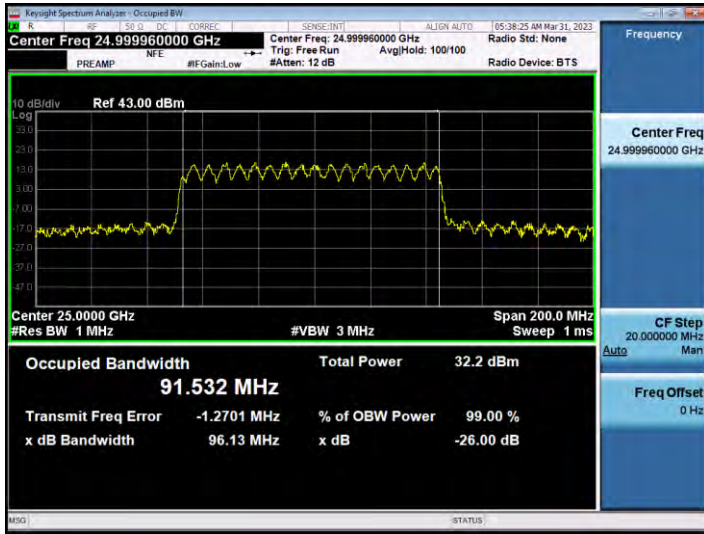


n258b Band Antenna 0 (K patch)

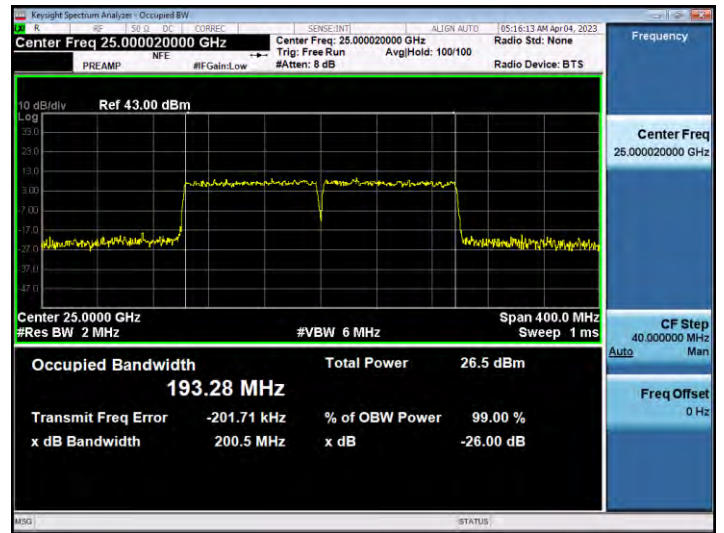
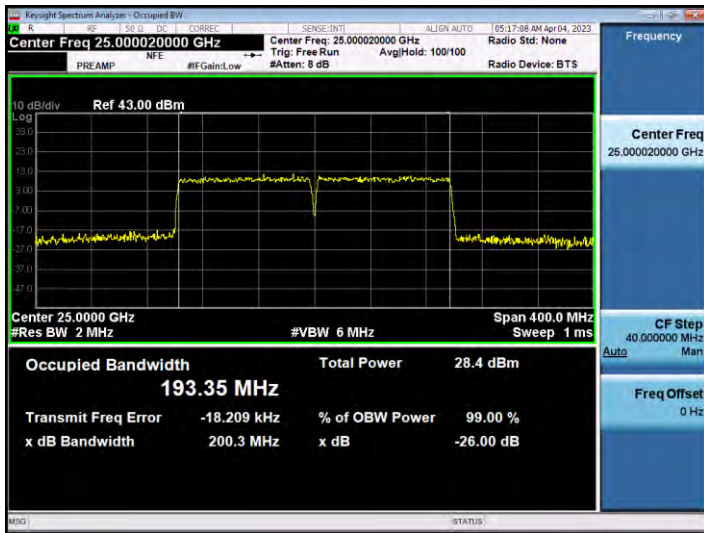
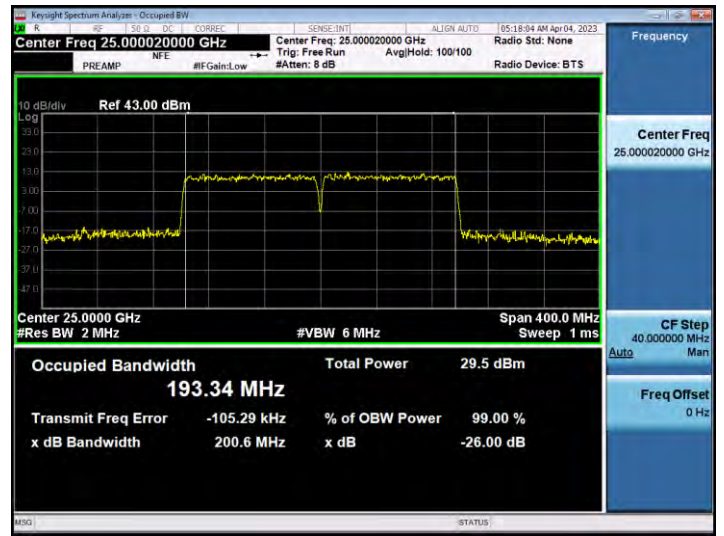
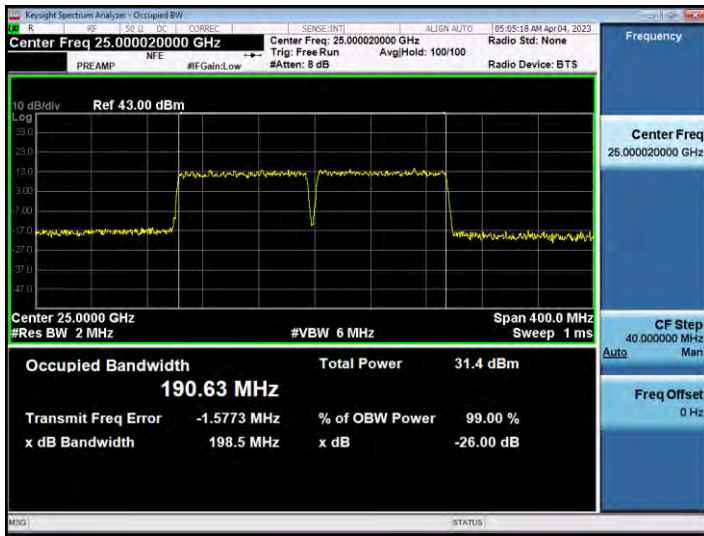
50 MHz, 1CC



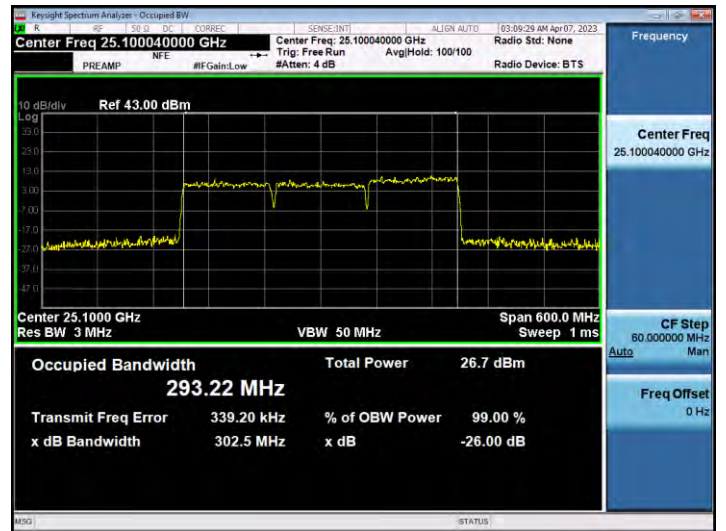
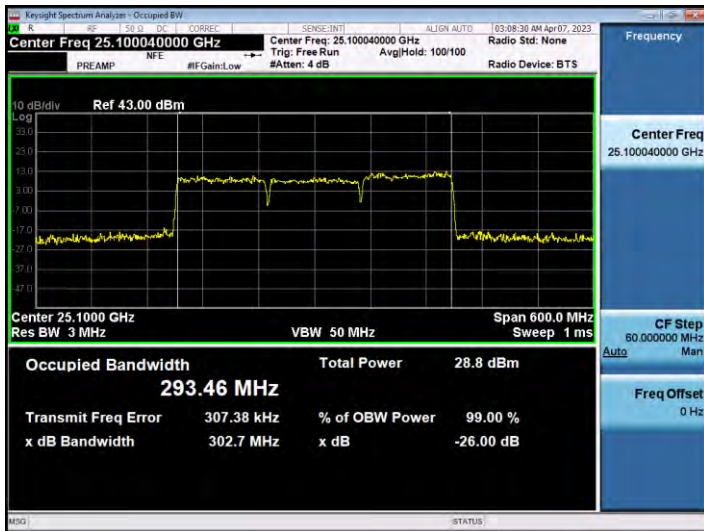
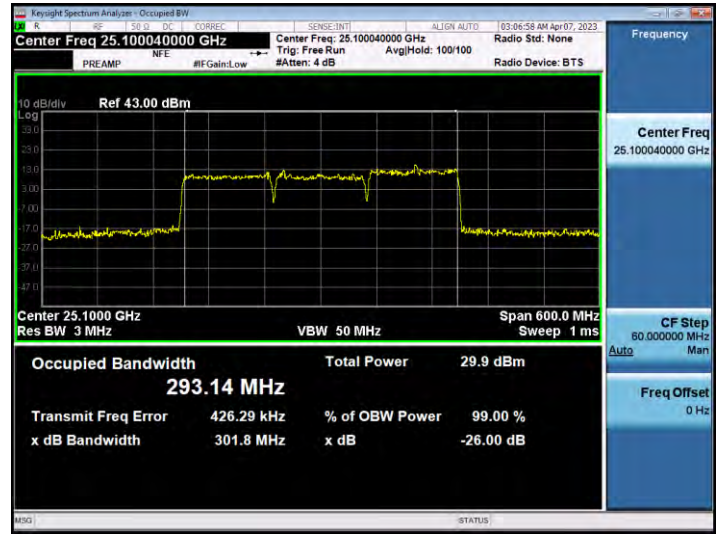
100 MHz, 1CC



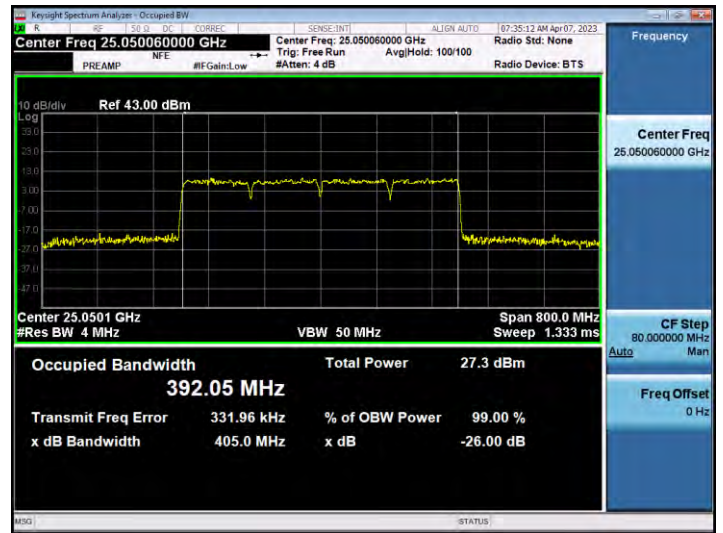
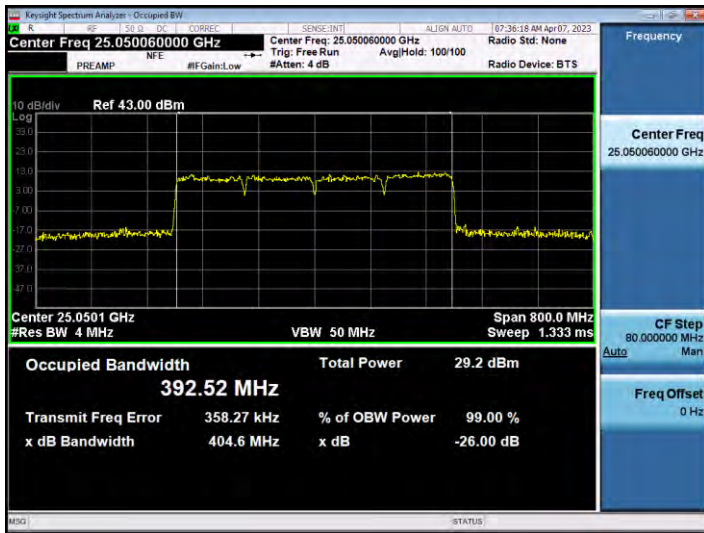
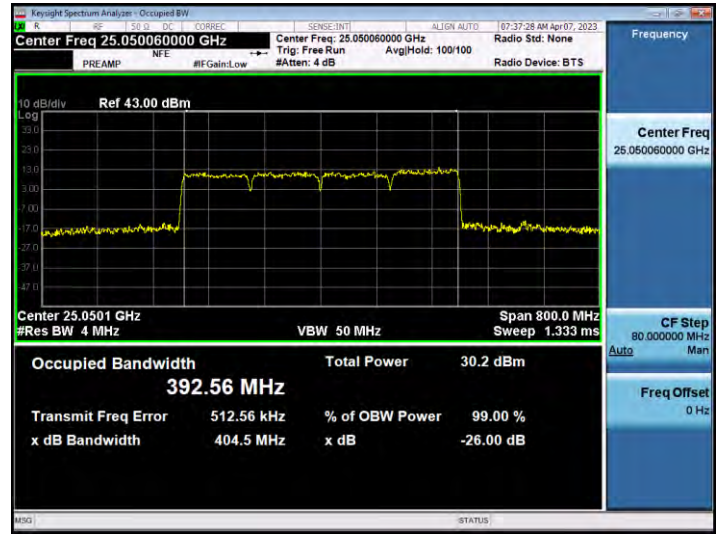
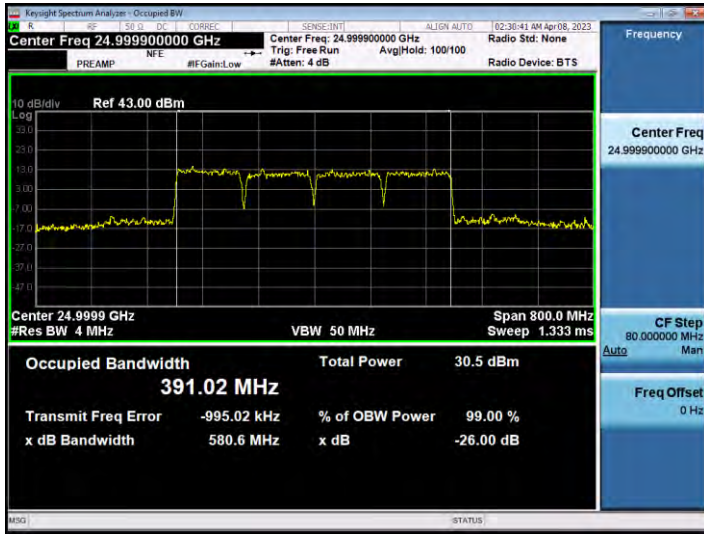
100 MHz, 2CC



100 MHz, 3CC

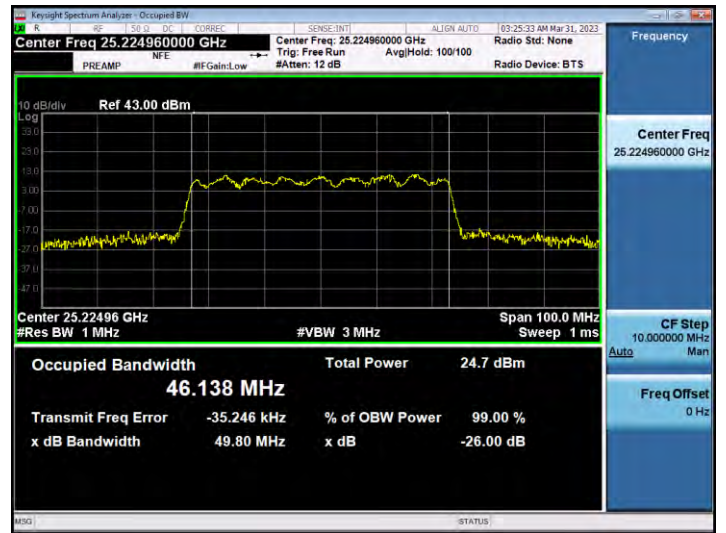
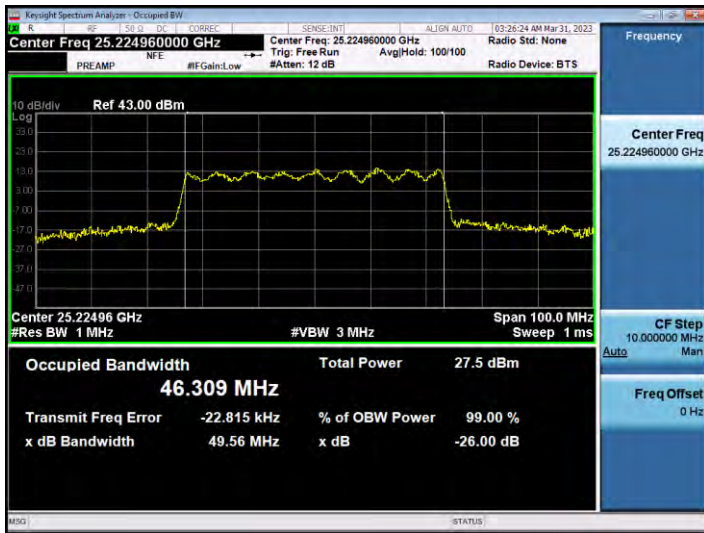
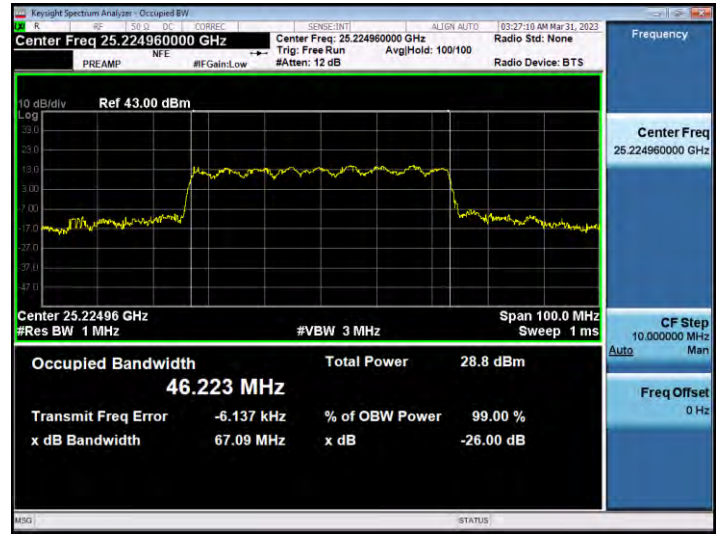
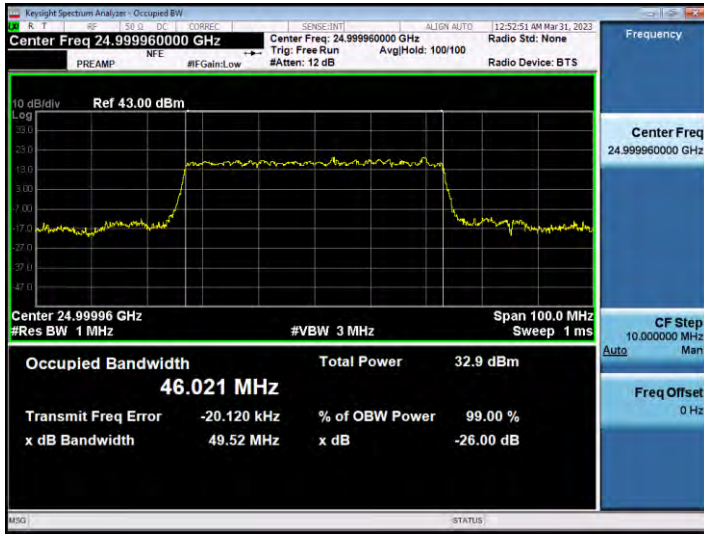


100 MHz, 4CC

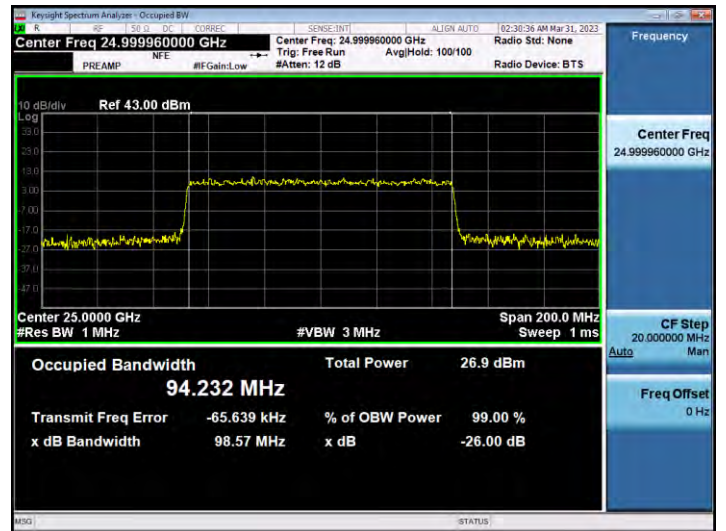
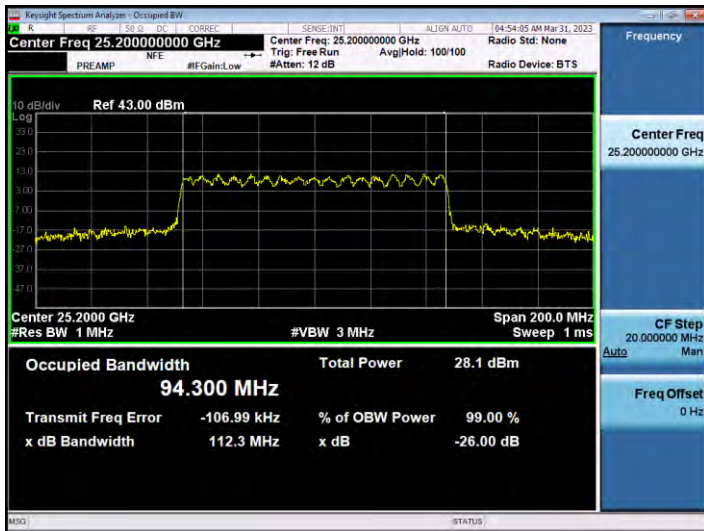
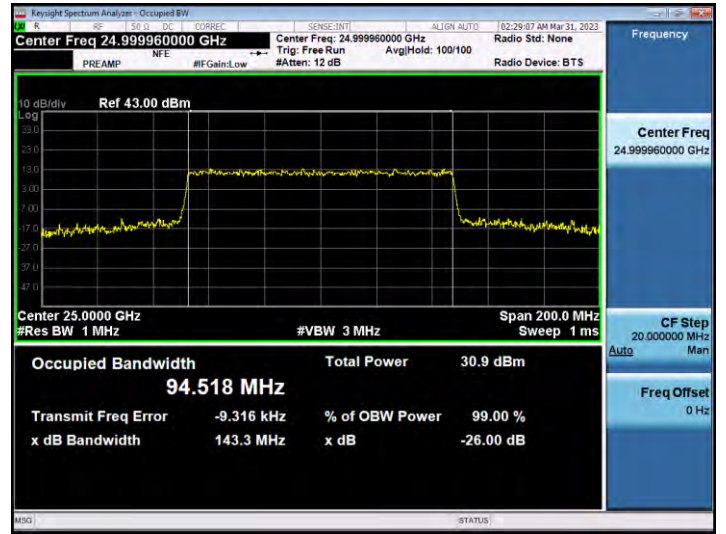
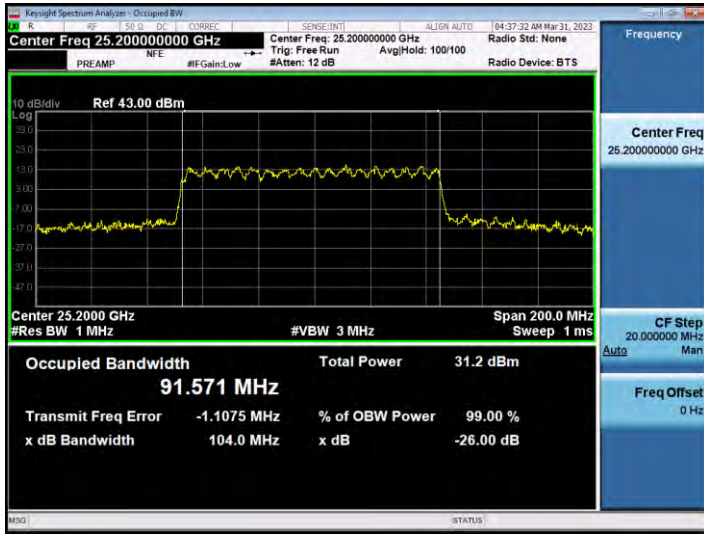


n258b Band Antenna 1 (L patch)

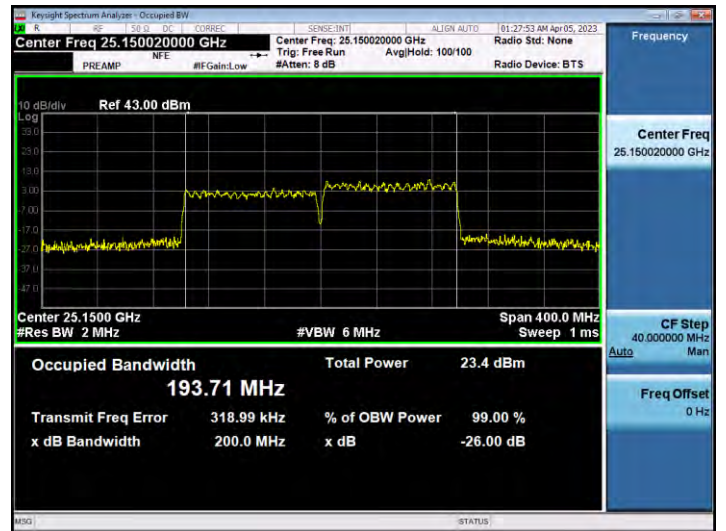
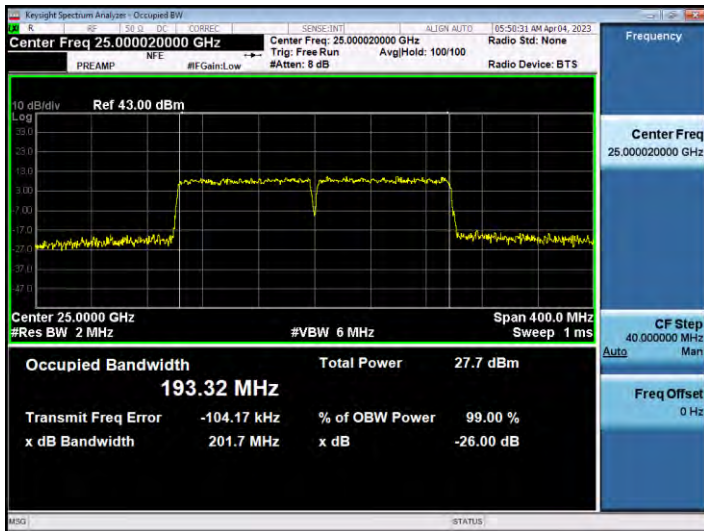
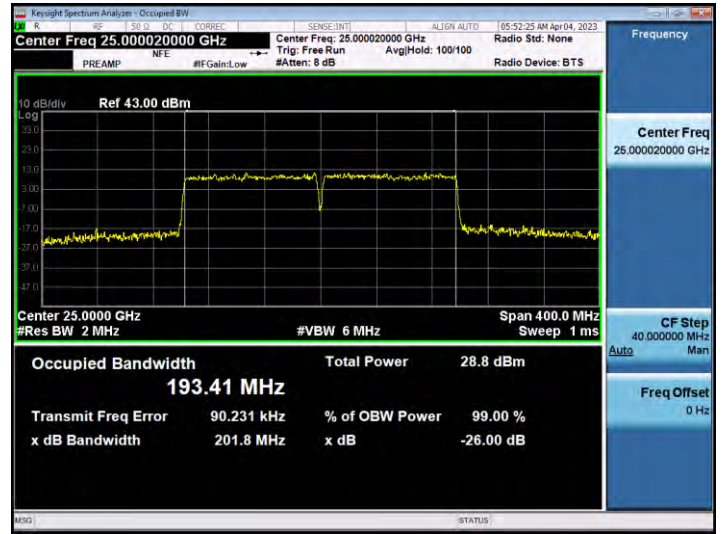
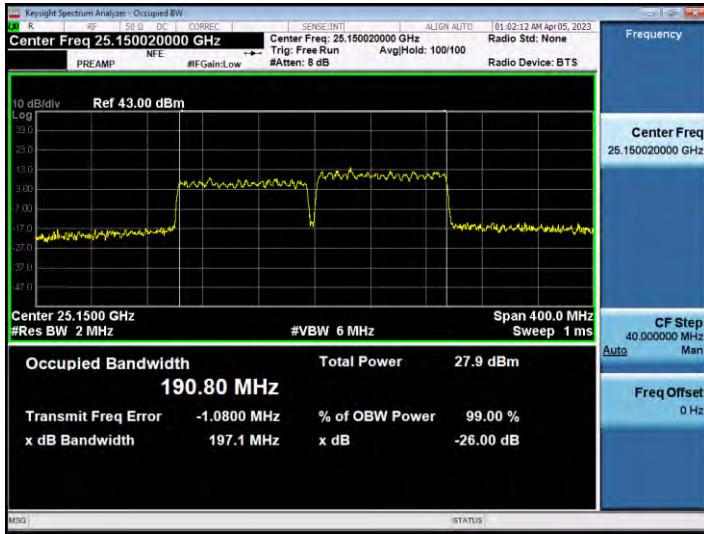
50 MHz, 1CC



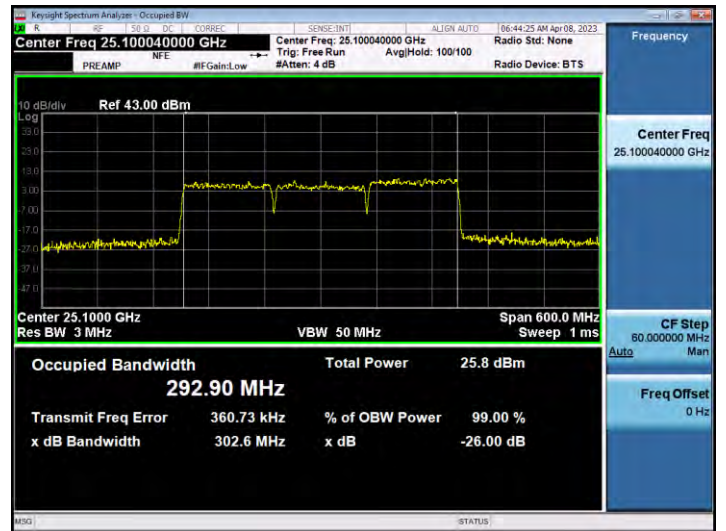
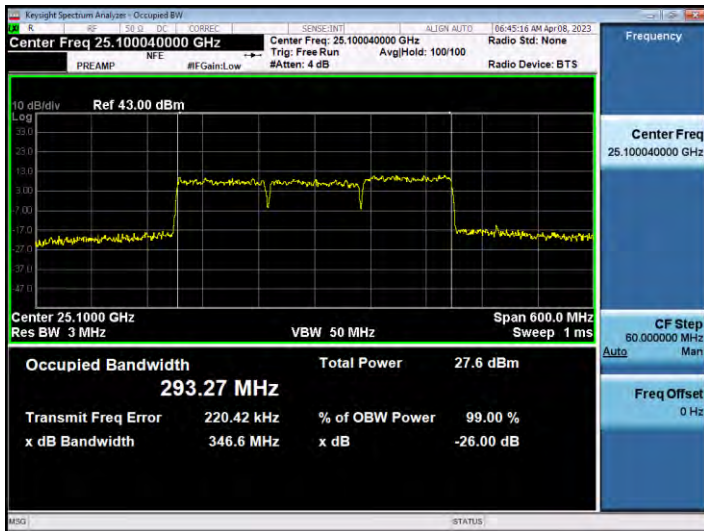
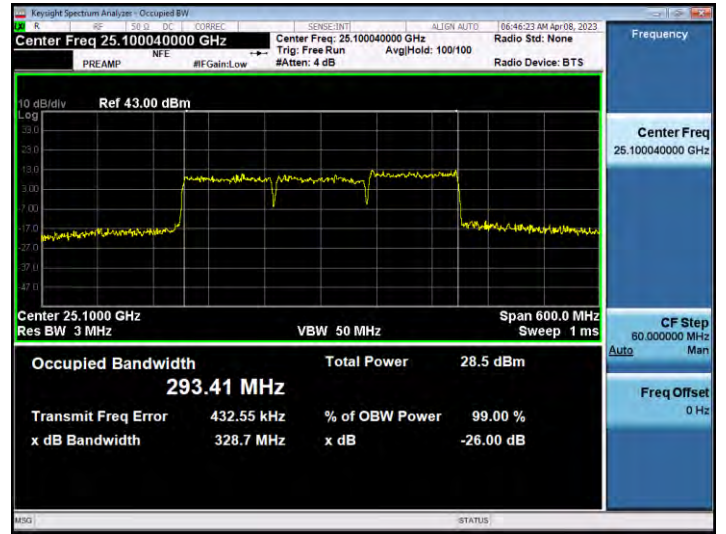
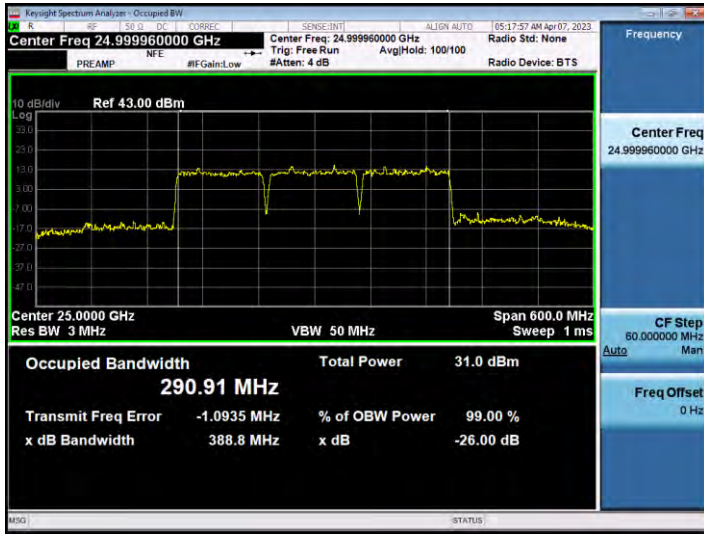
100 MHz, 1CC



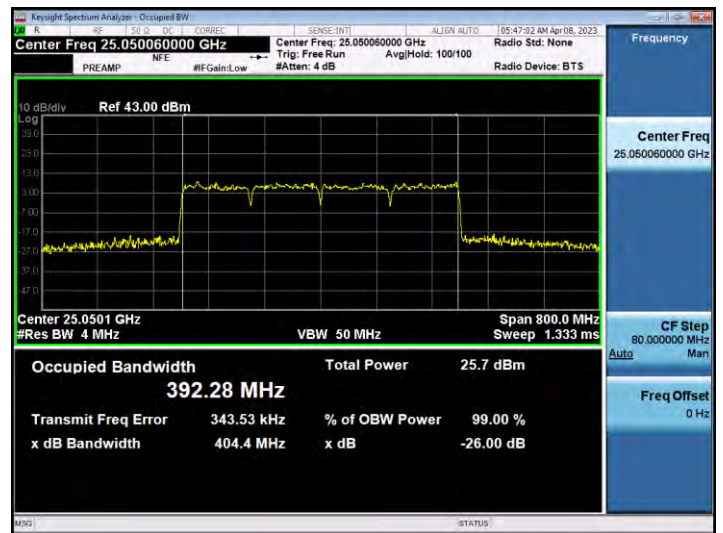
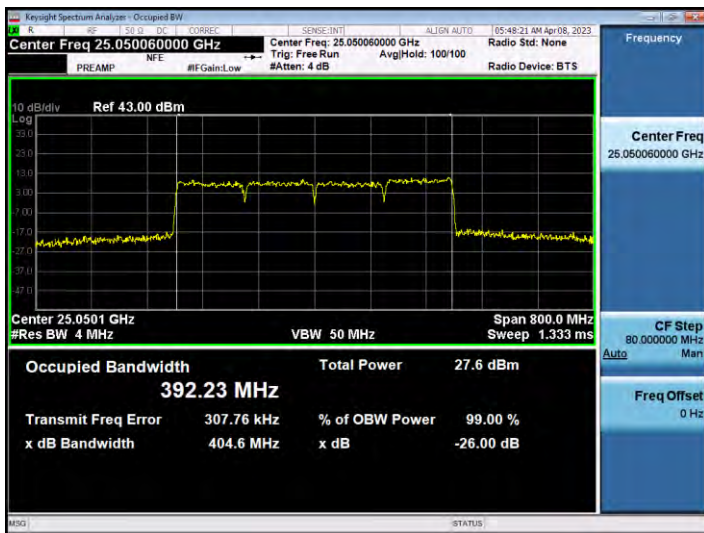
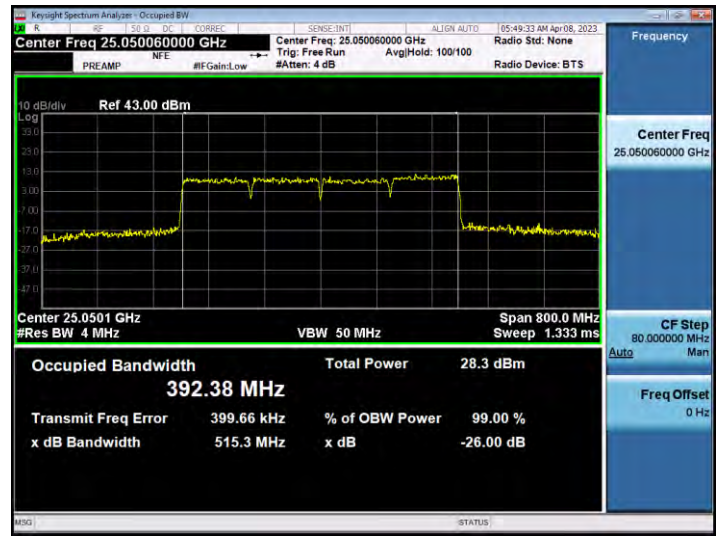
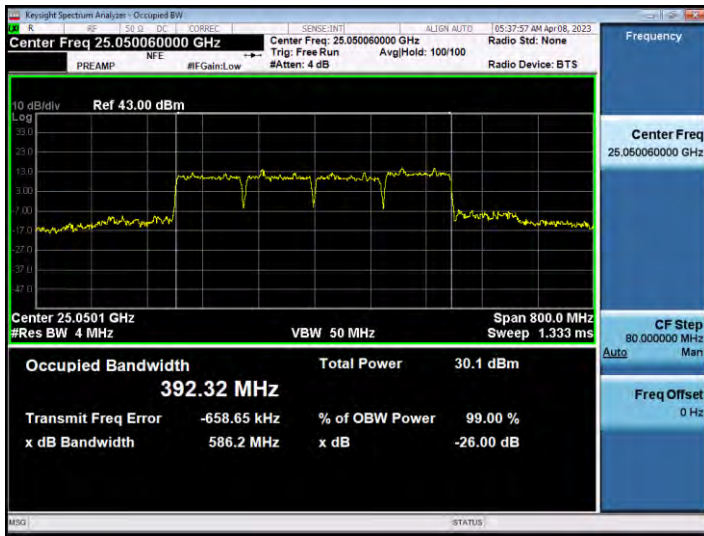
100 MHz, 2CC



100 MHz, 3CC

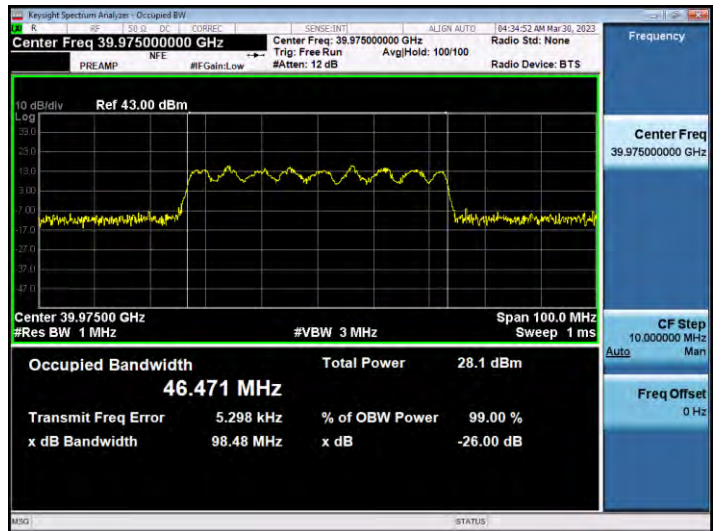
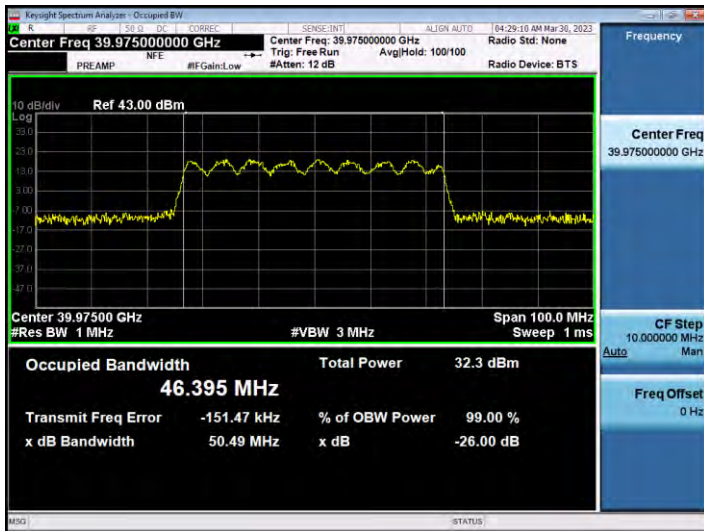
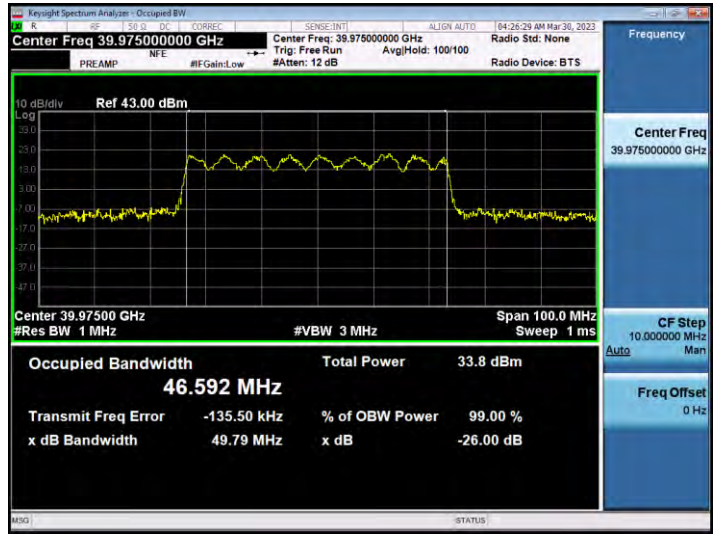
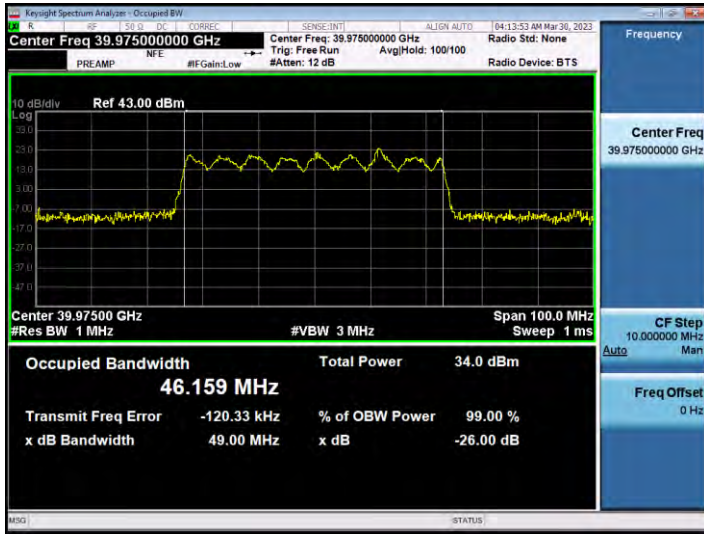


100 MHz, 4CC

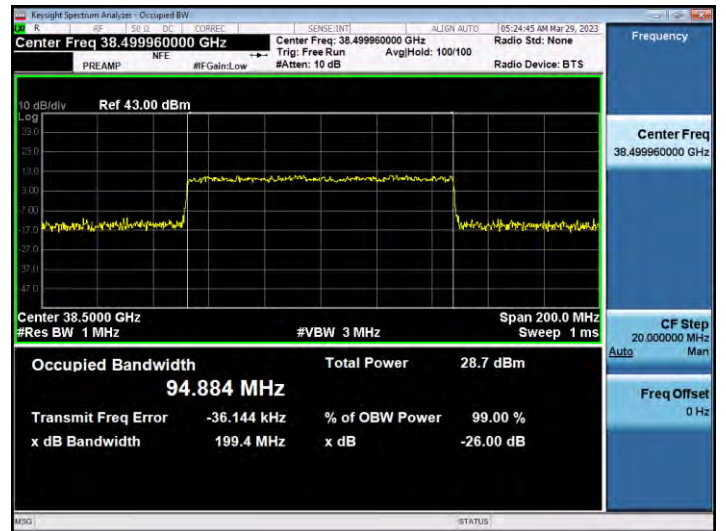
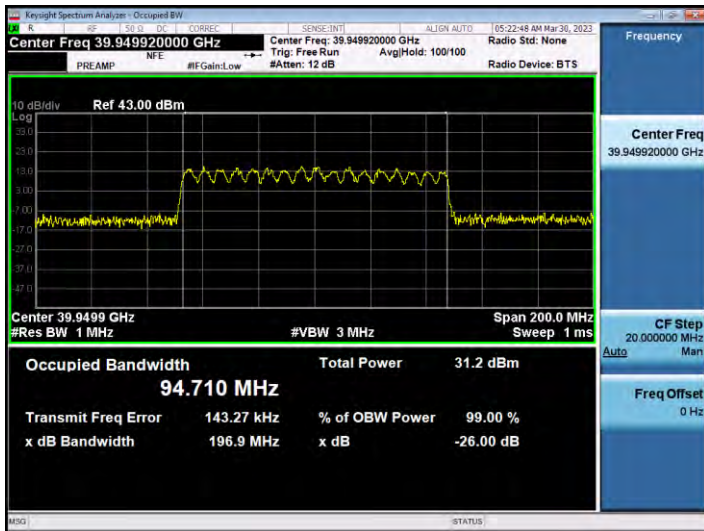
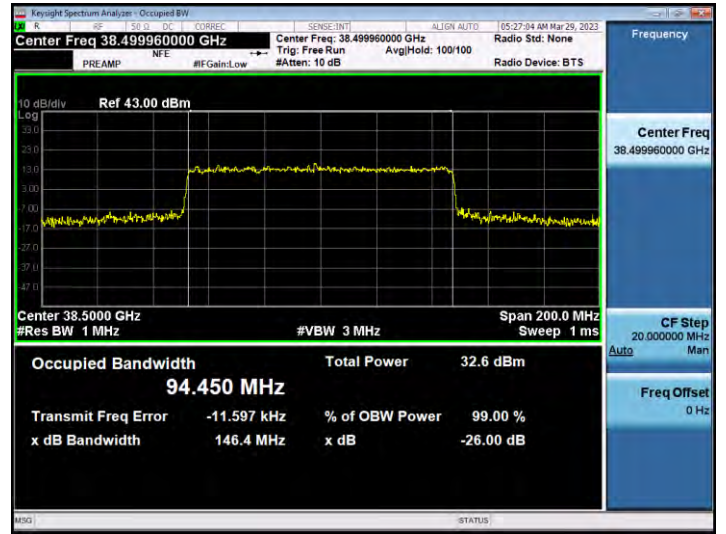
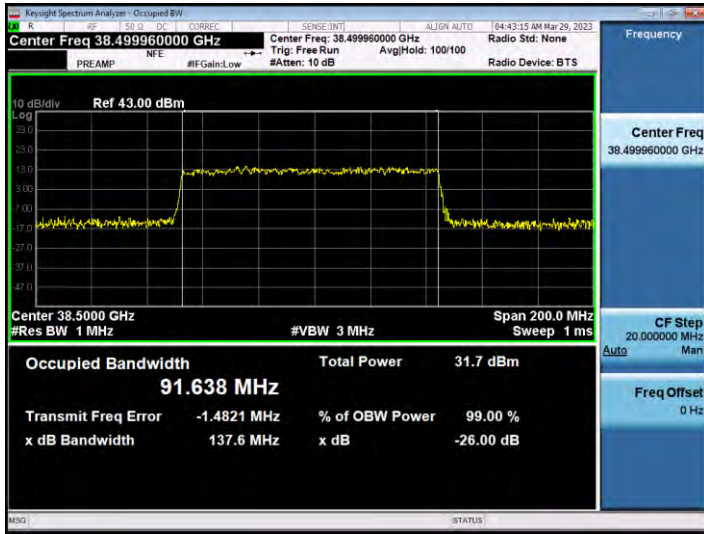


n260 Band Antenna 0 (K patch)

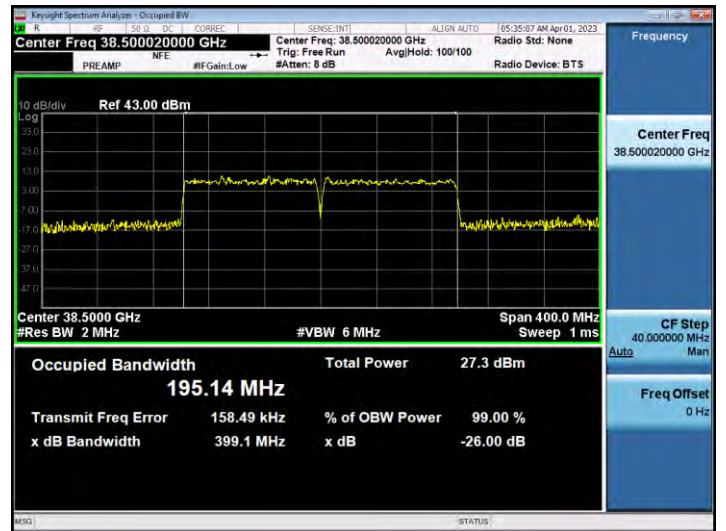
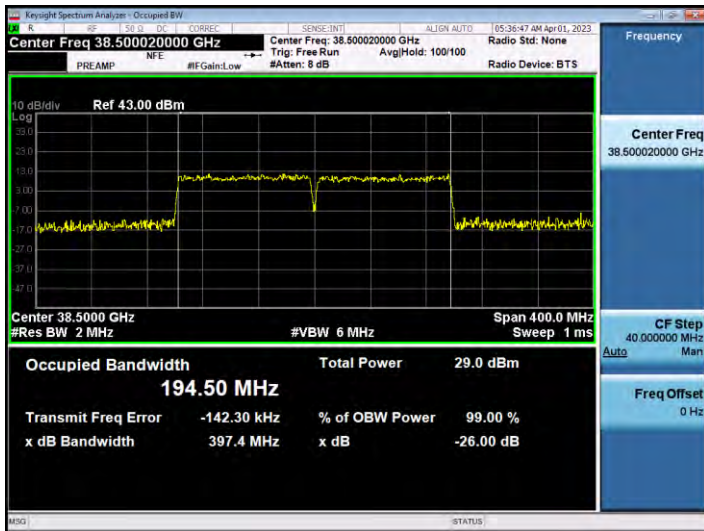
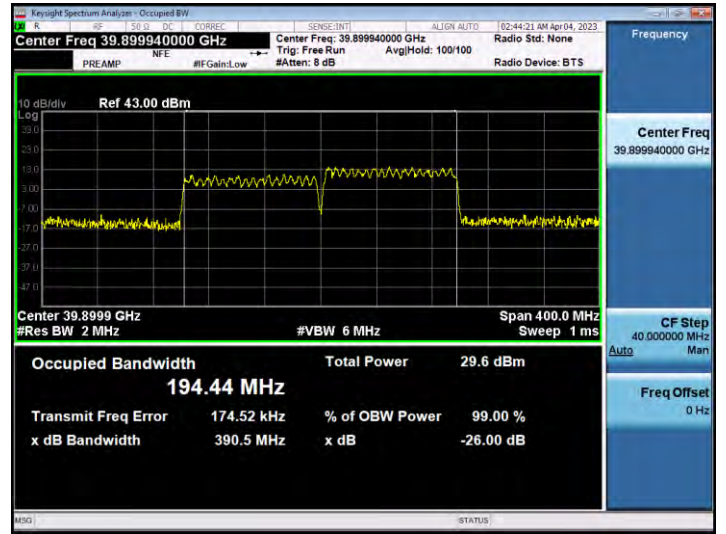
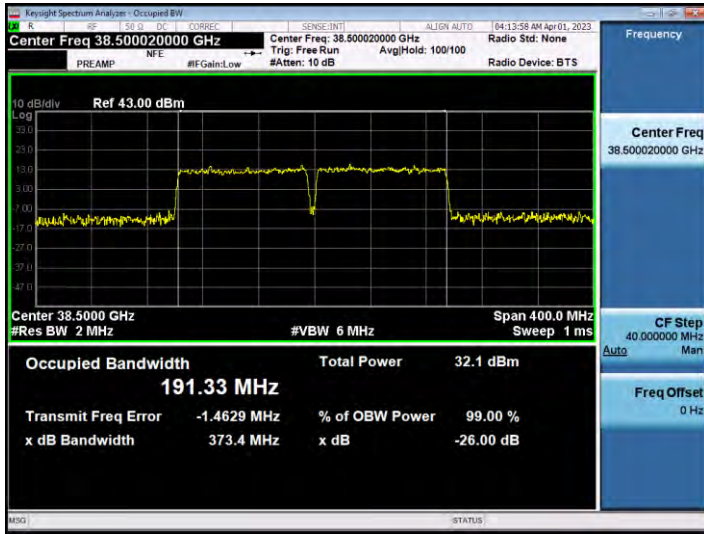
50 MHz, 1CC



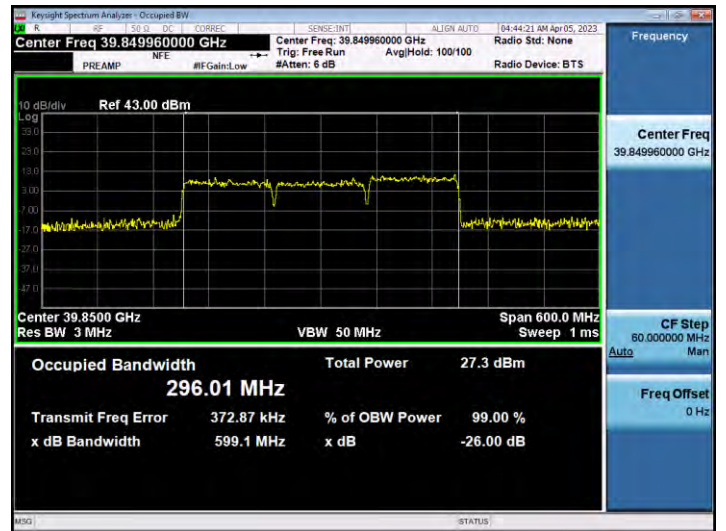
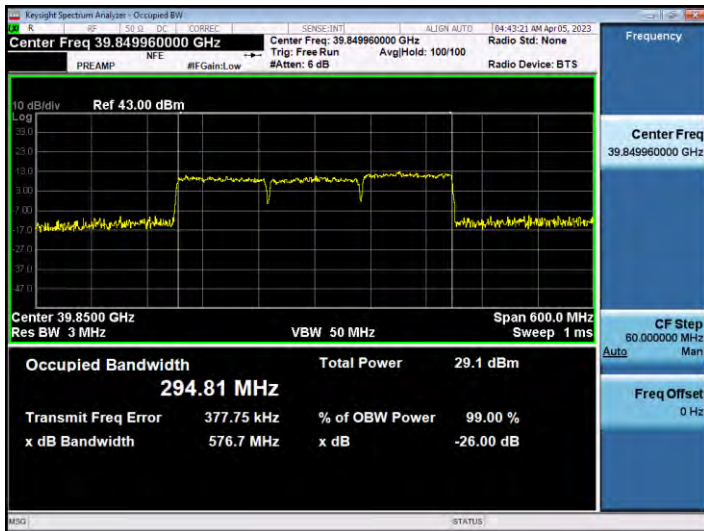
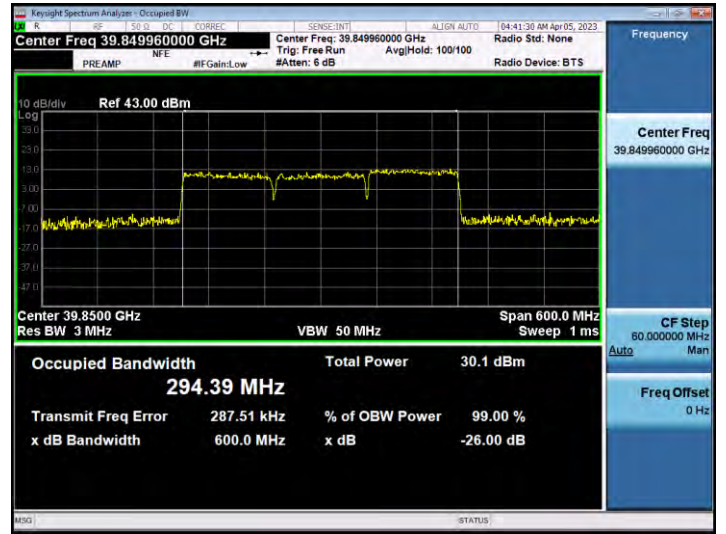
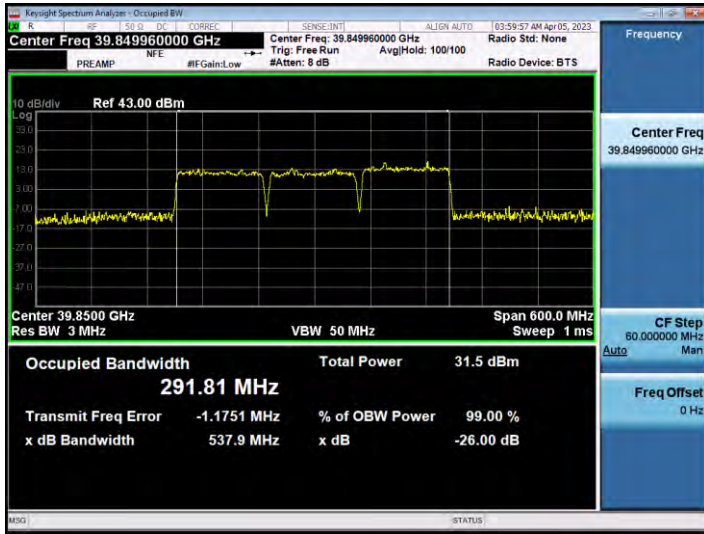
100 MHz, 1CC



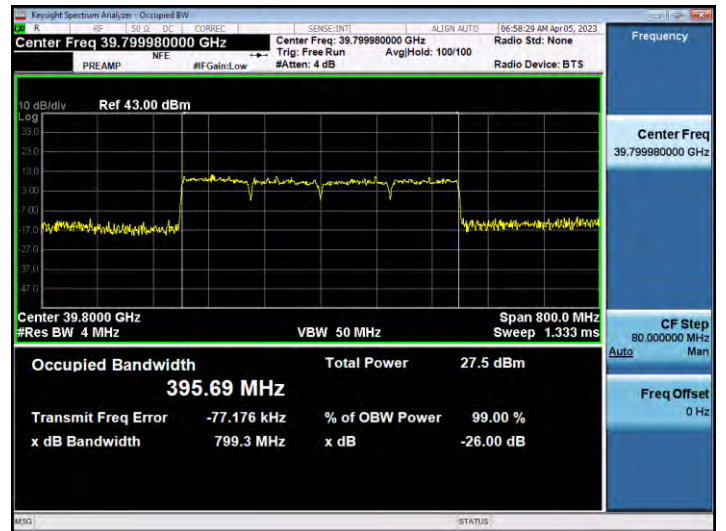
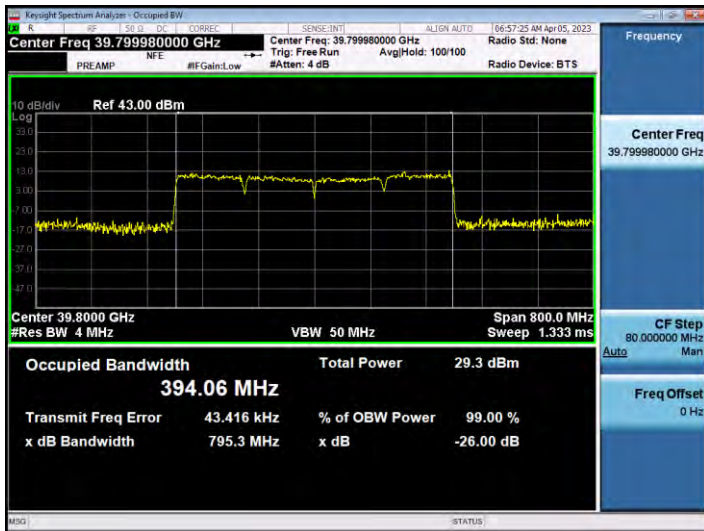
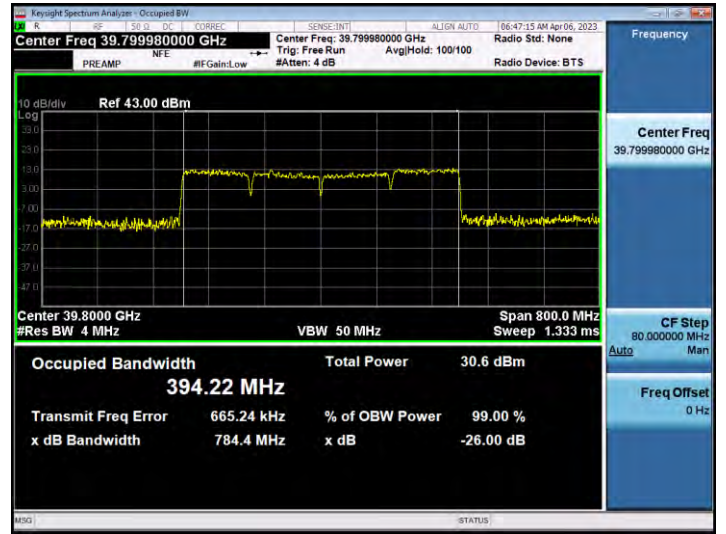
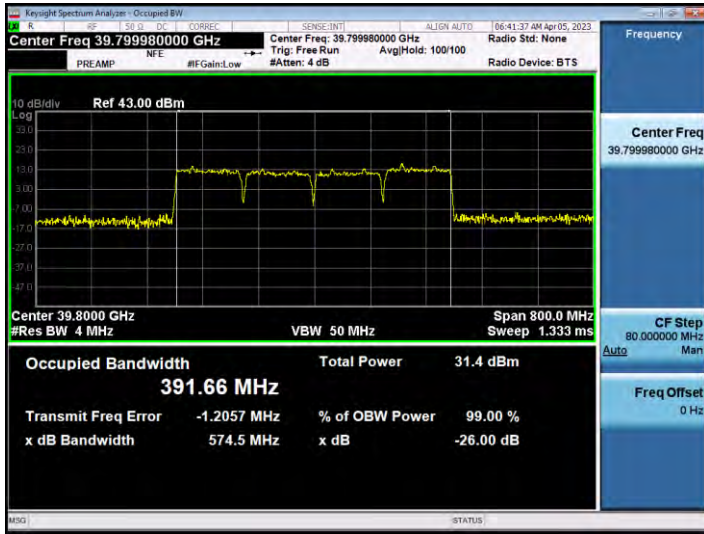
100 MHz, 2CC



100 MHz, 3CC

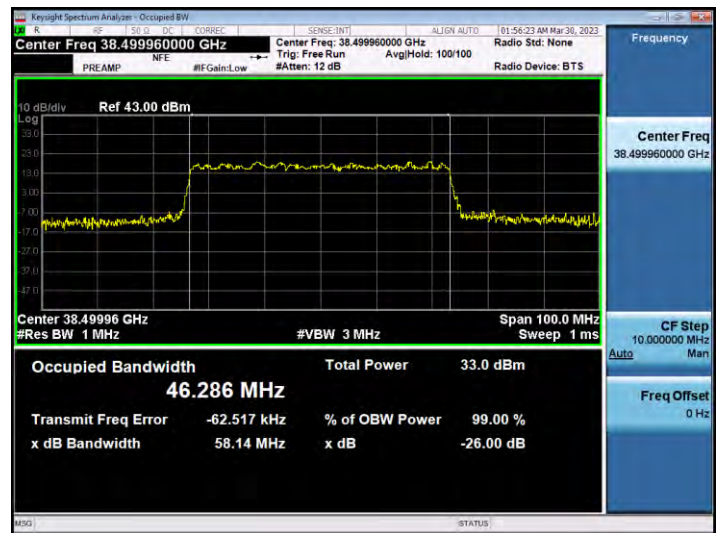
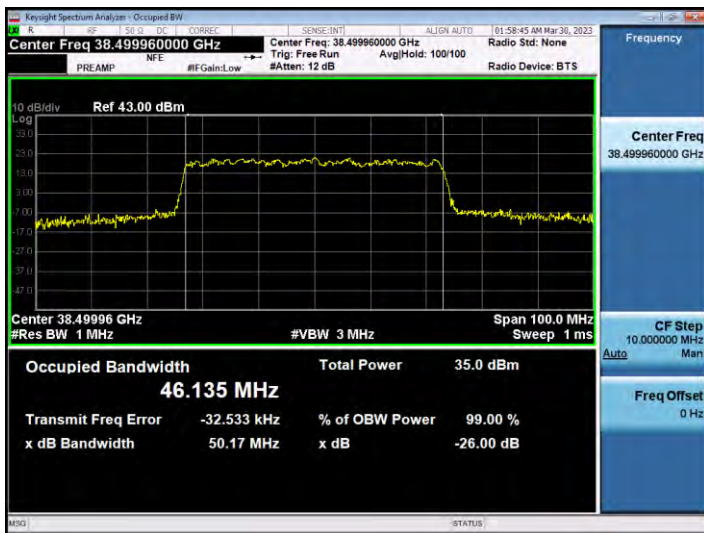
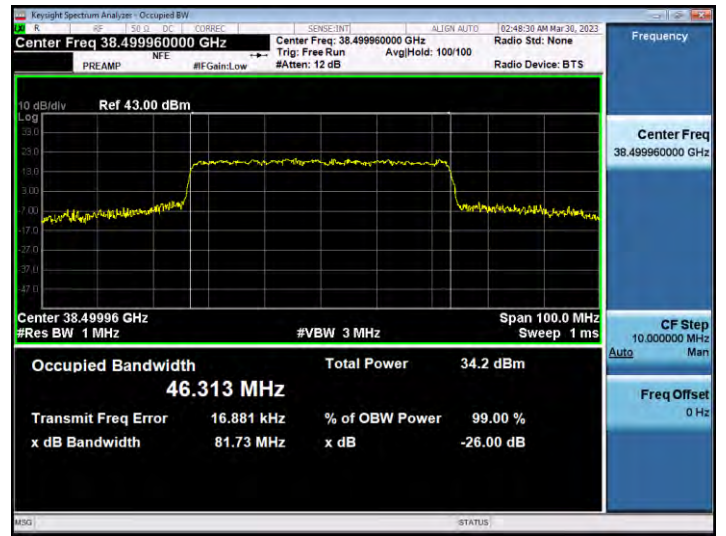
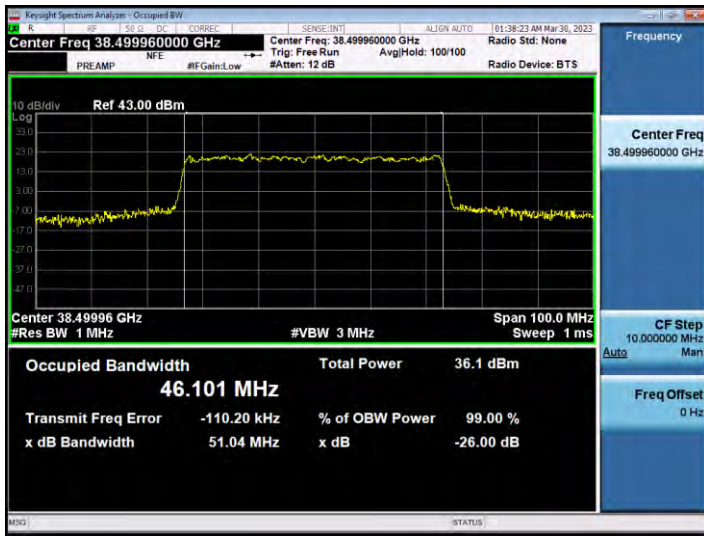


100 MHz, 4CC

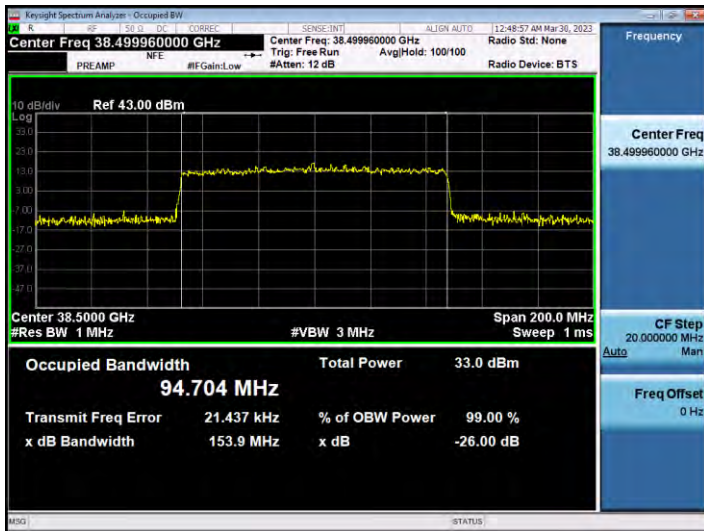
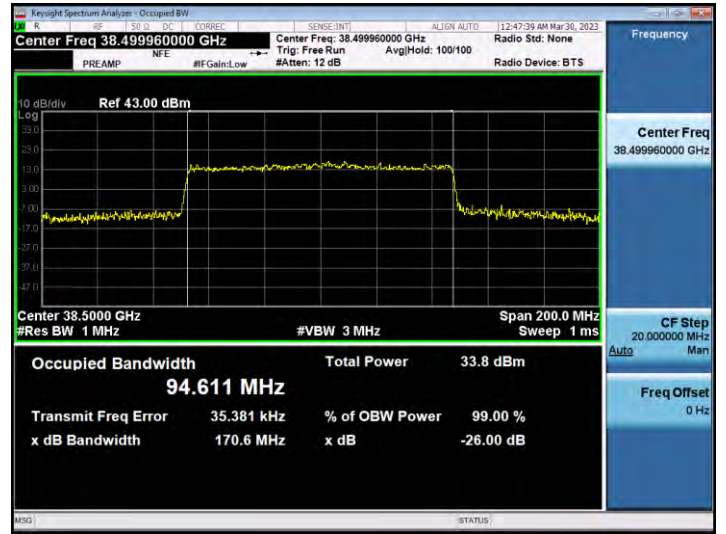
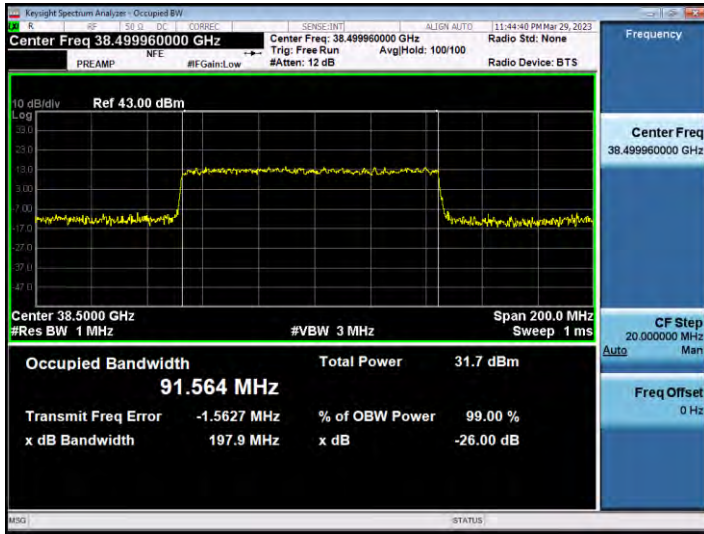


n260 Band Antenna 1 (L patch)

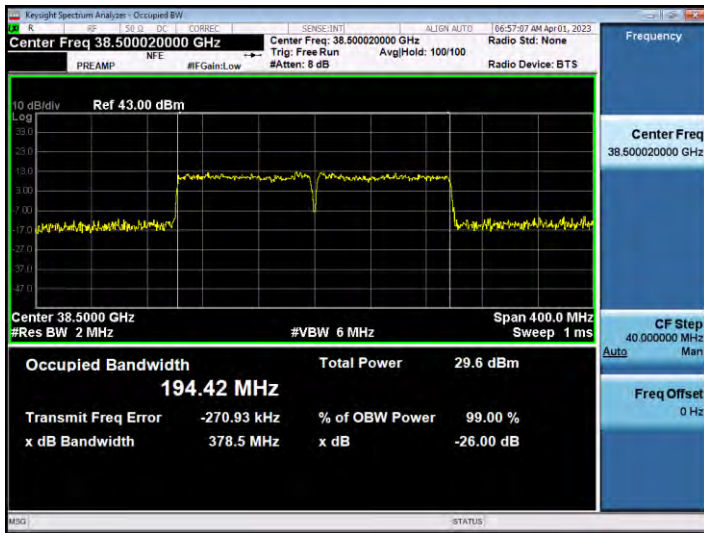
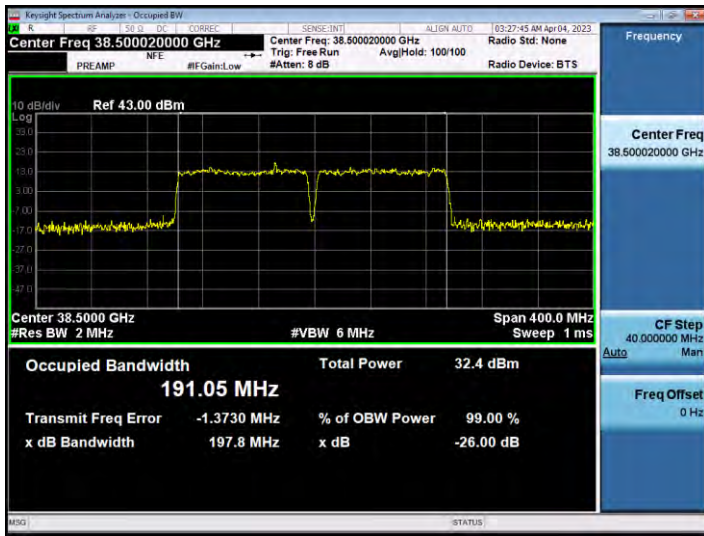
50 MHz, 1CC



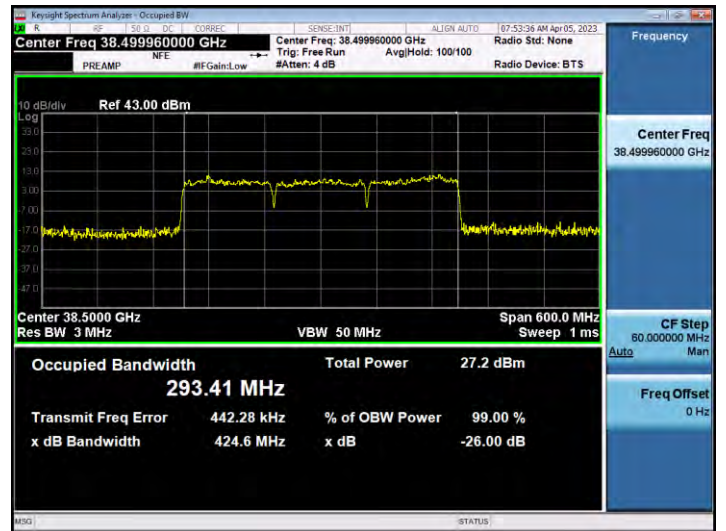
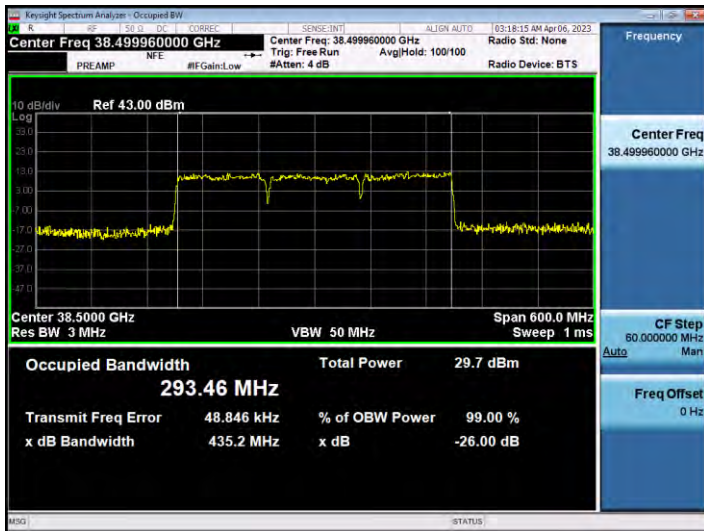
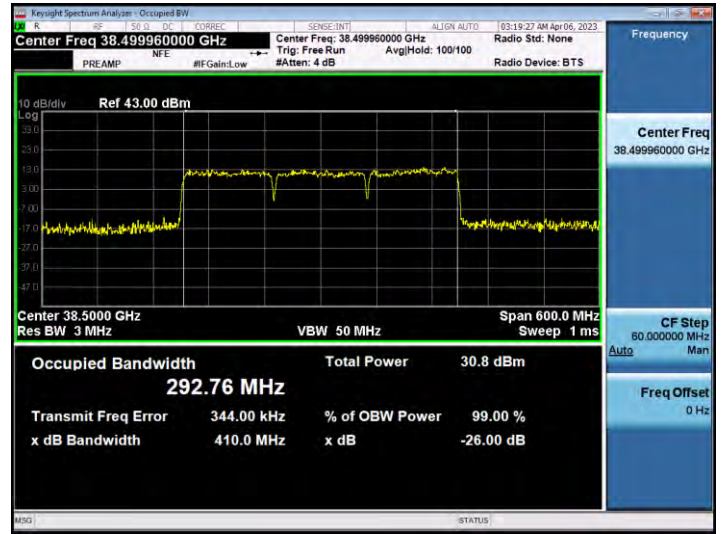
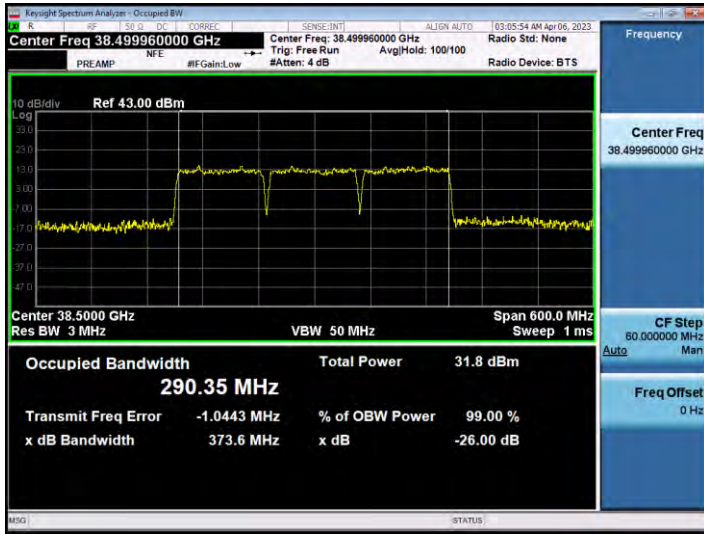
100 MHz, 1CC



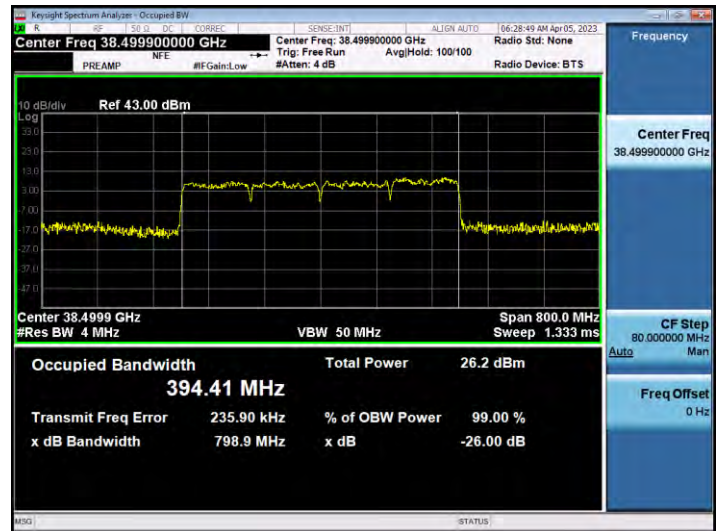
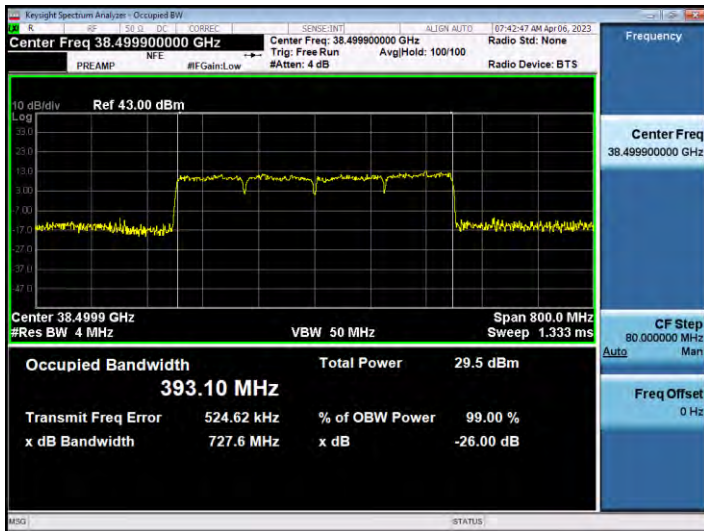
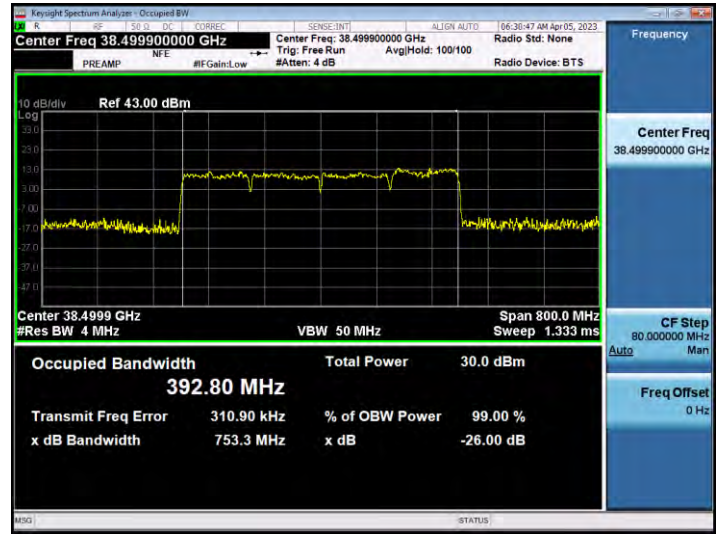
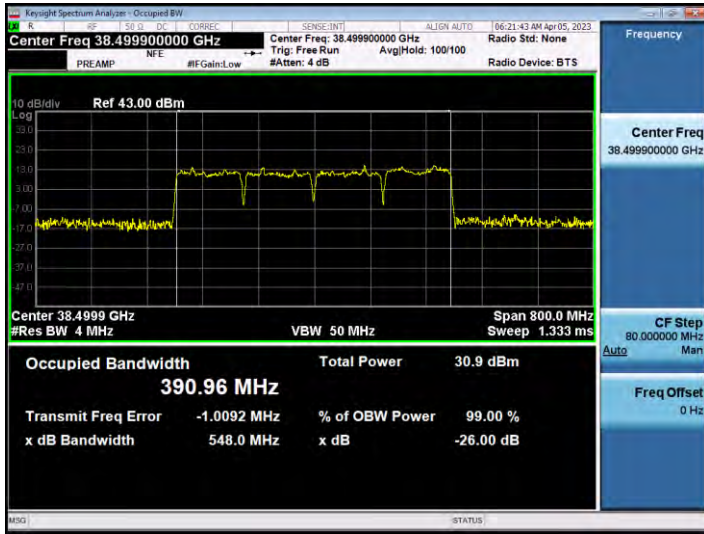
100 MHz, 2CC



100 MHz, 3CC

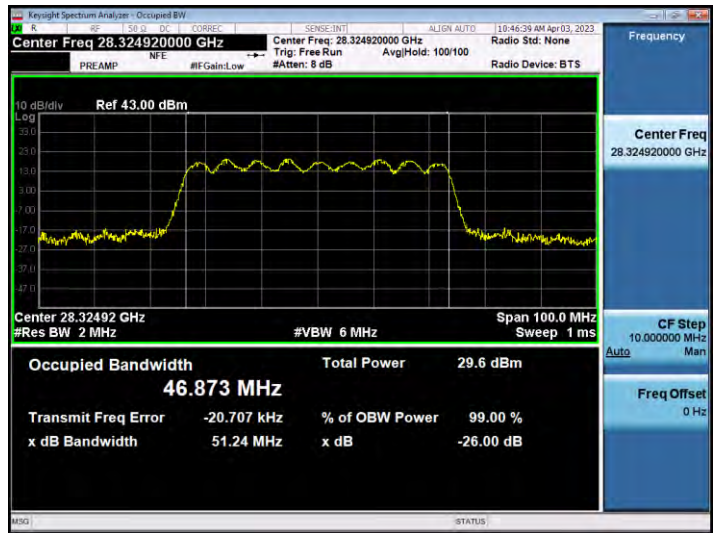
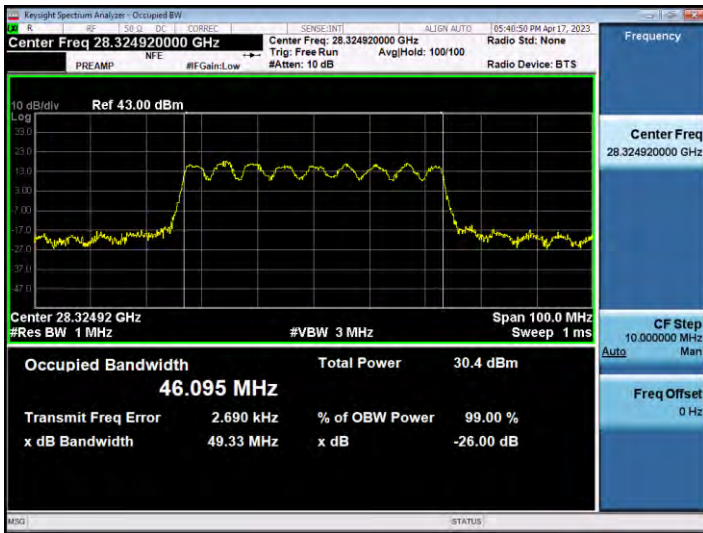
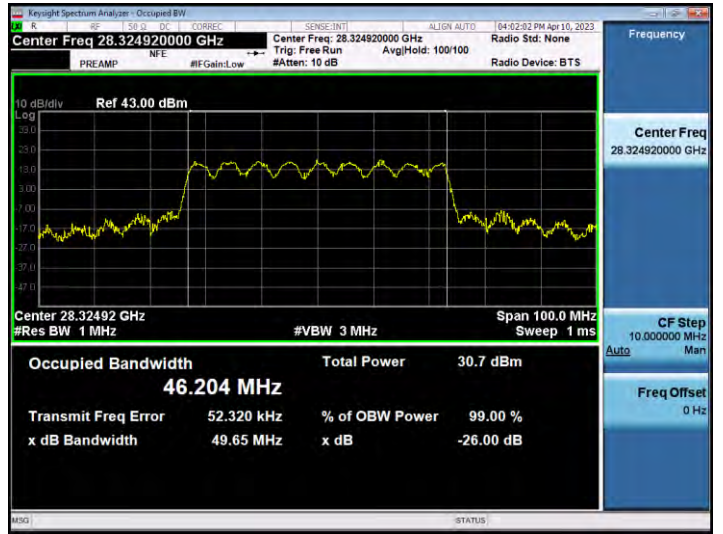
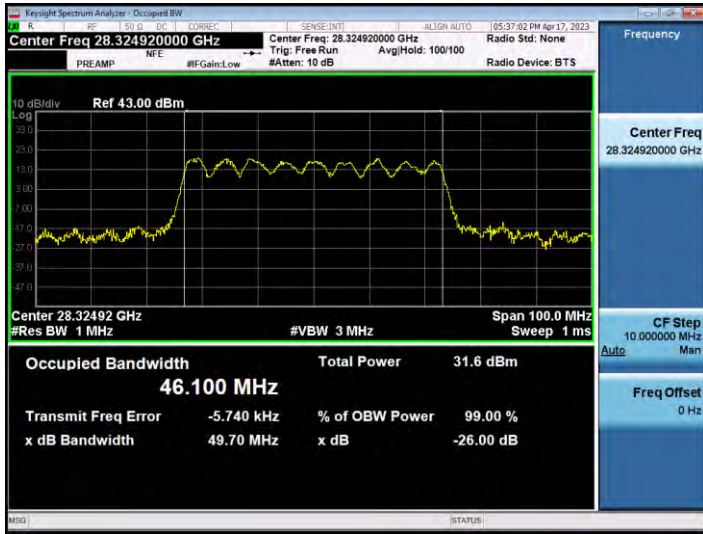


100 MHz, 4CC

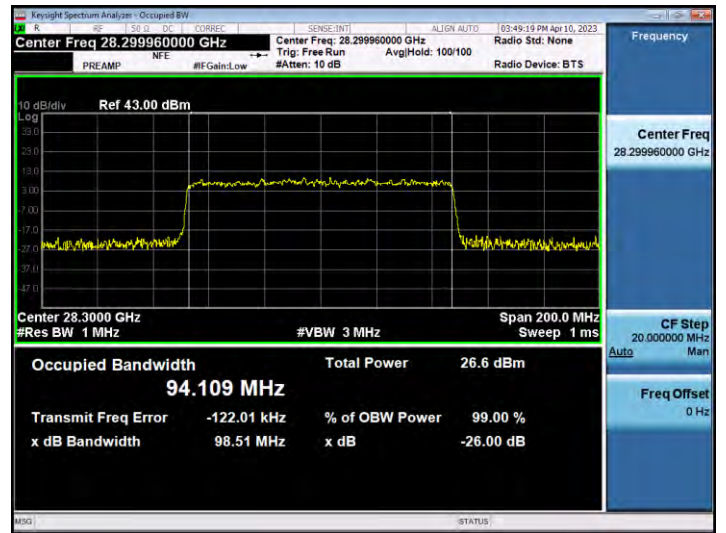
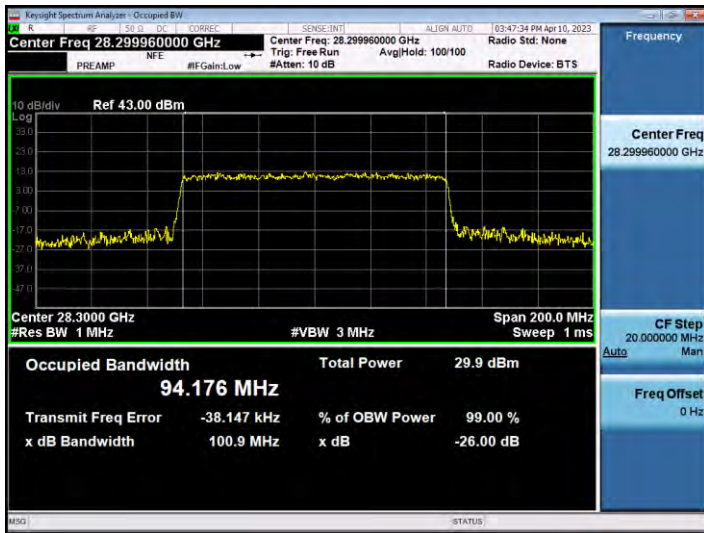
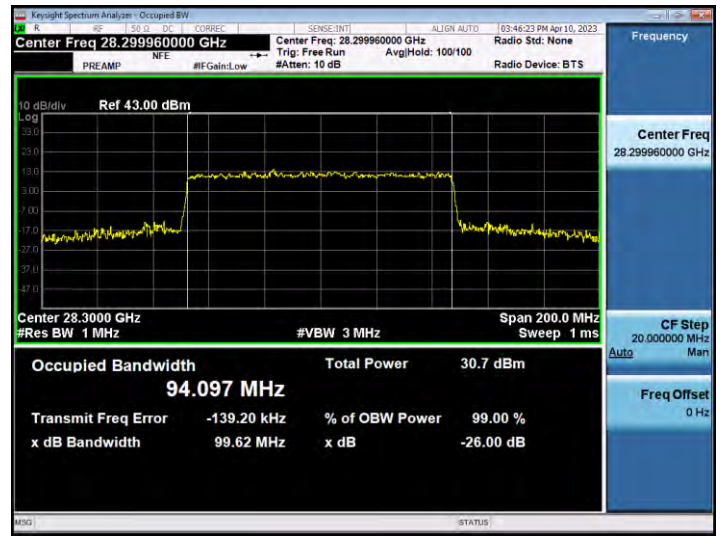
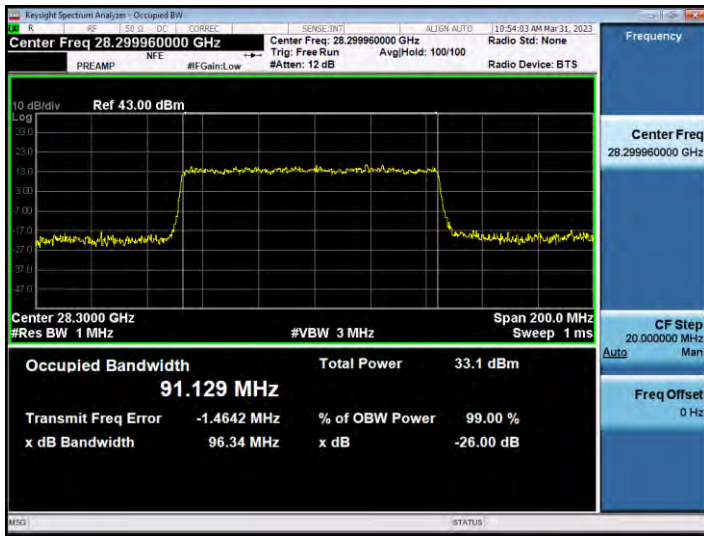


n261 Band Antenna 0 (K patch)

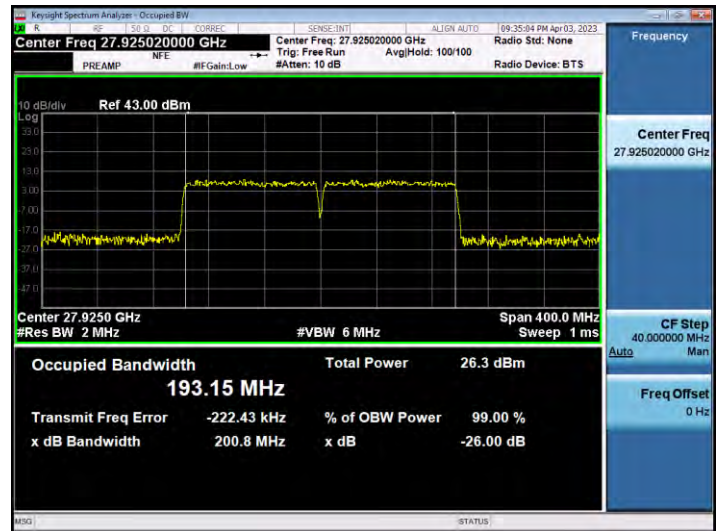
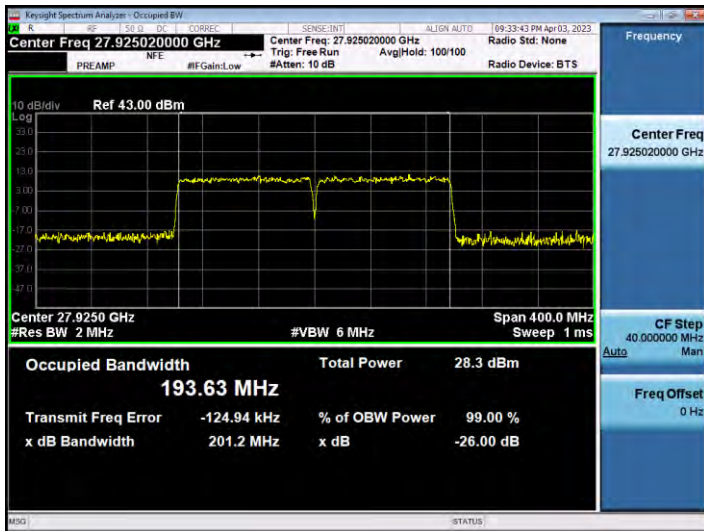
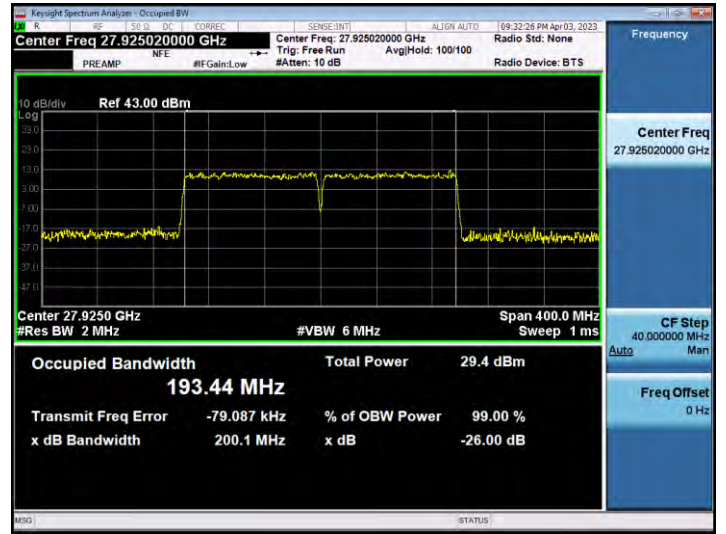
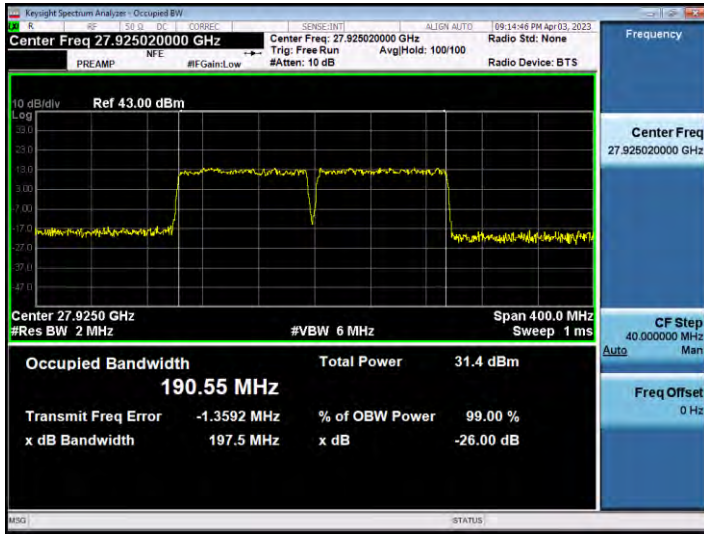
50 MHz, 1CC



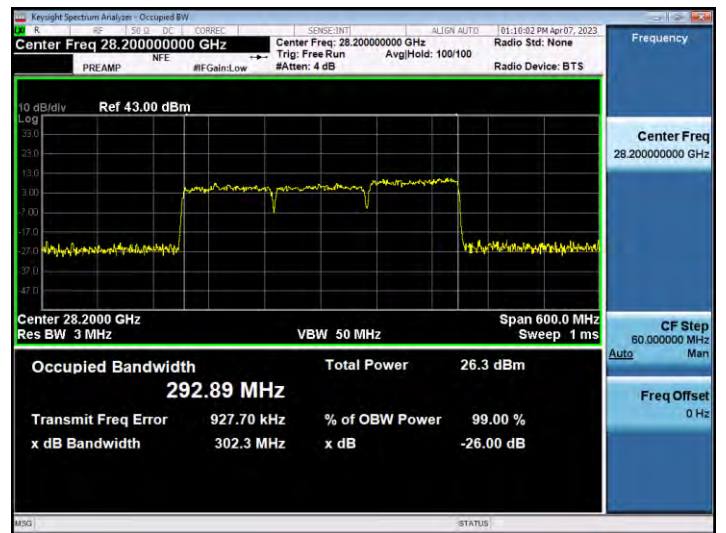
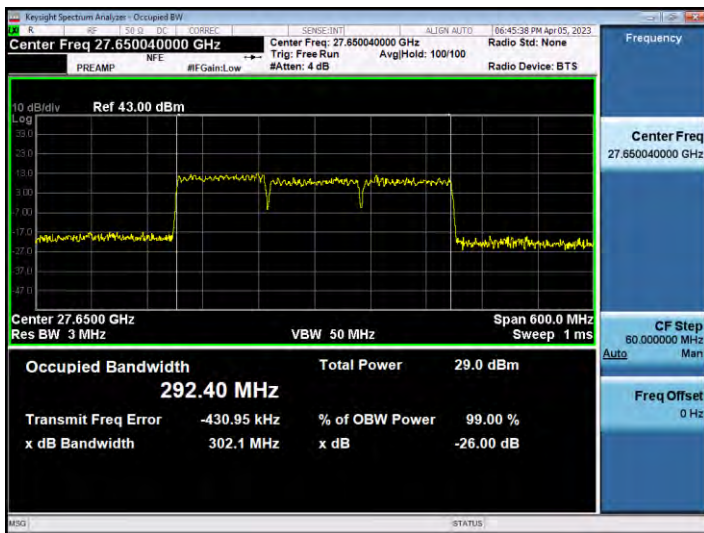
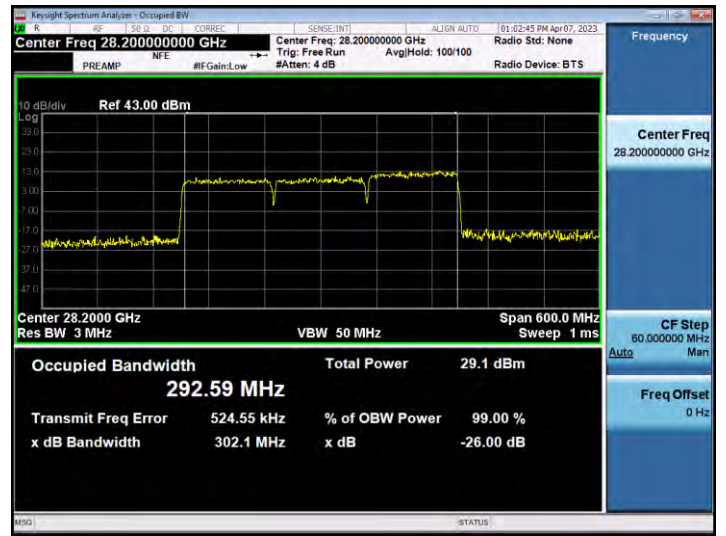
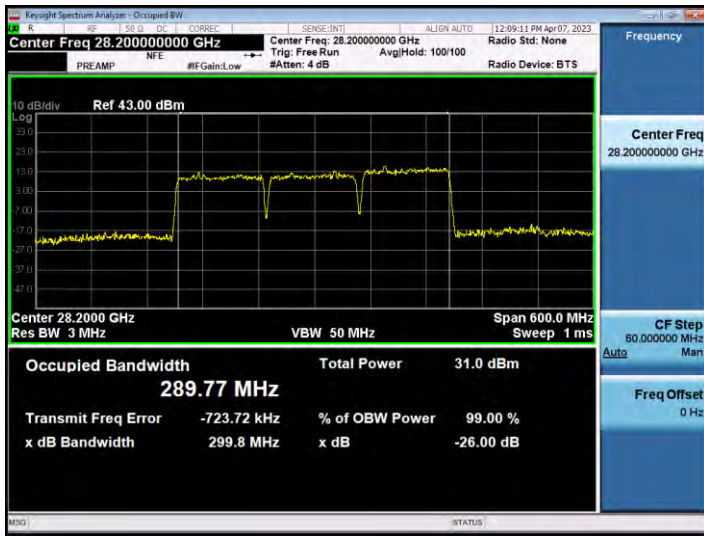
100 MHz, 1CC



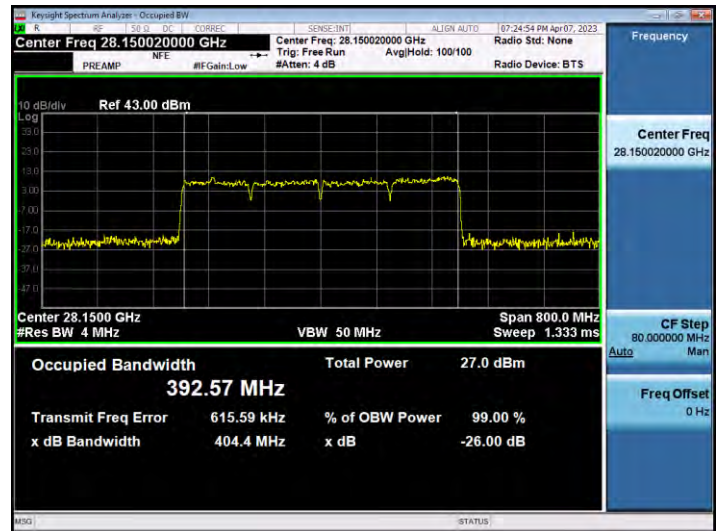
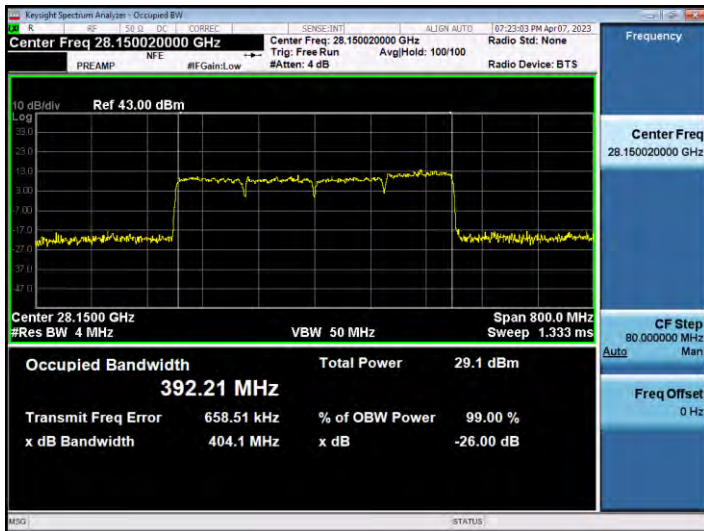
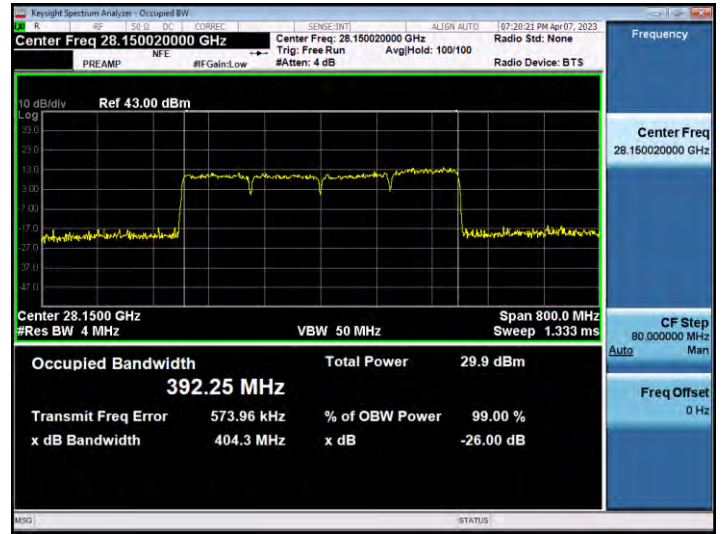
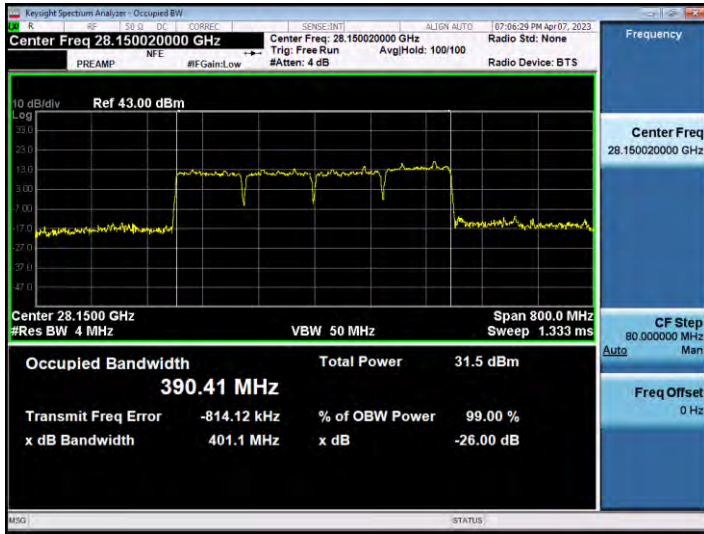
100 MHz, 2CC



100 MHz, 3CC

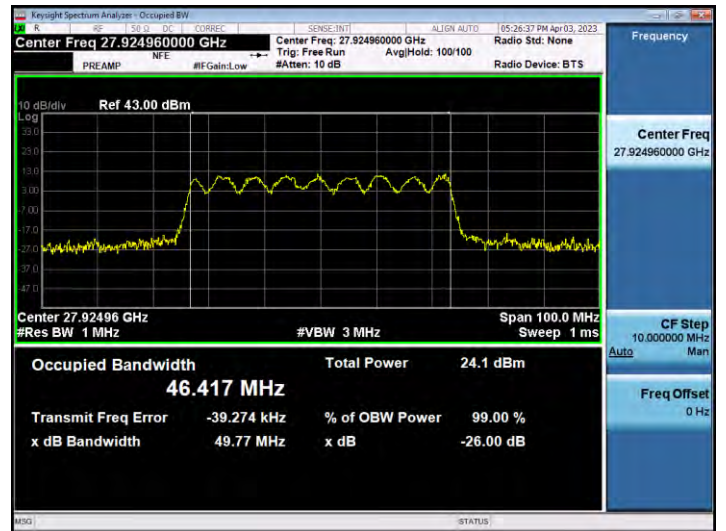
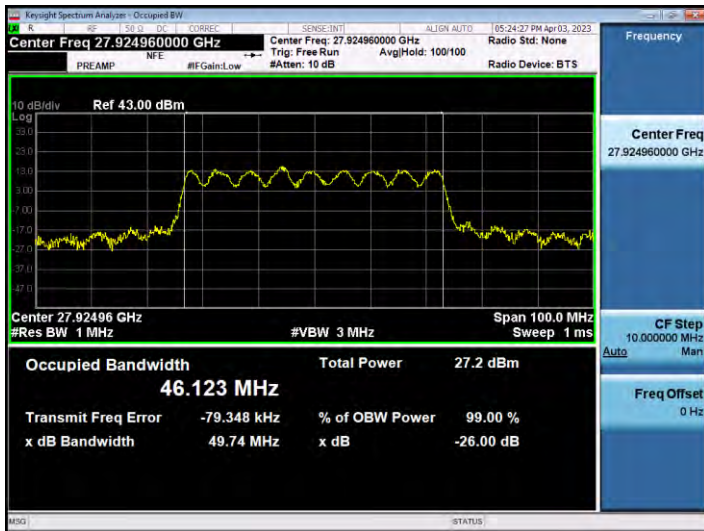
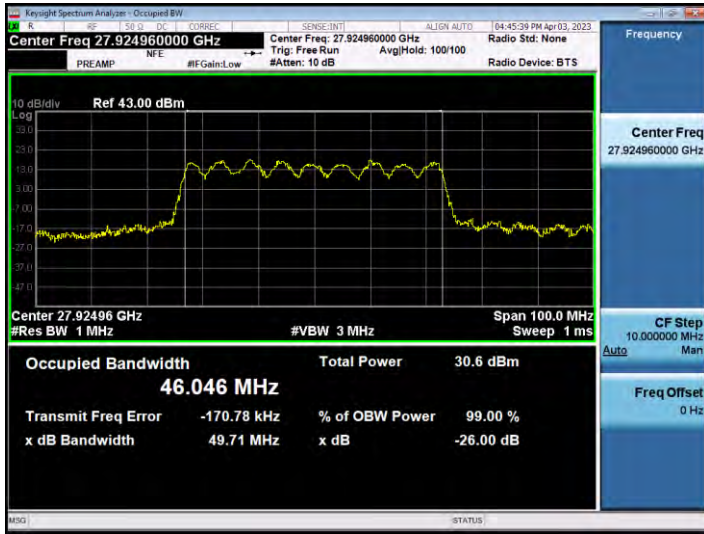


100 MHz, 4CC

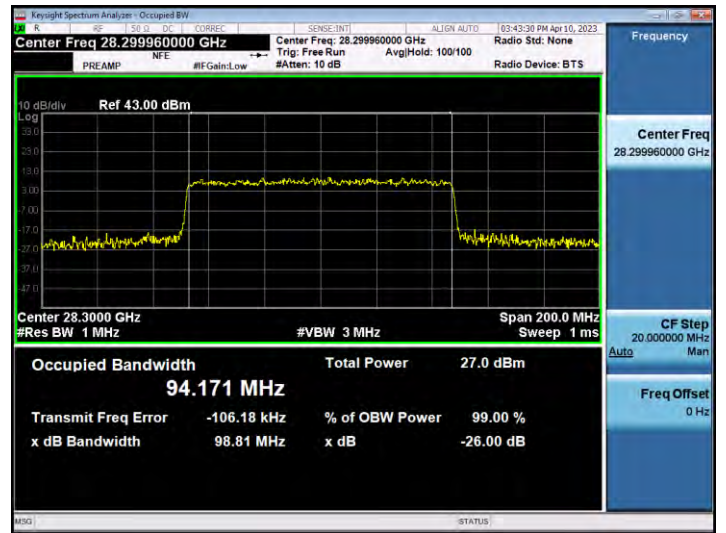
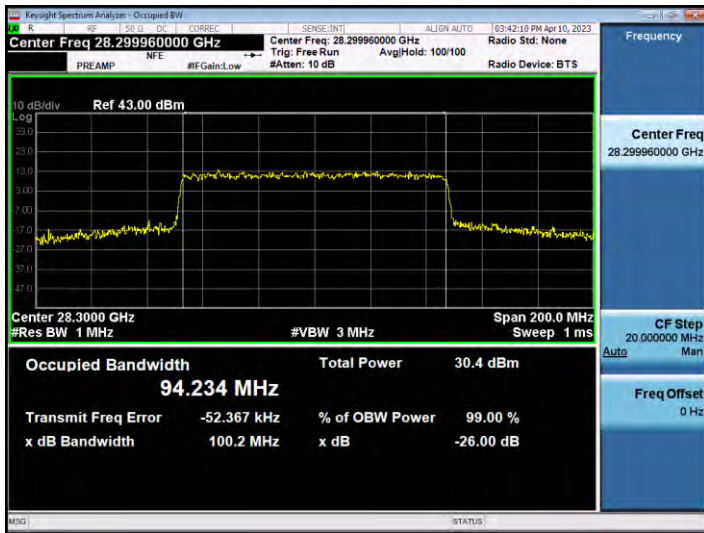
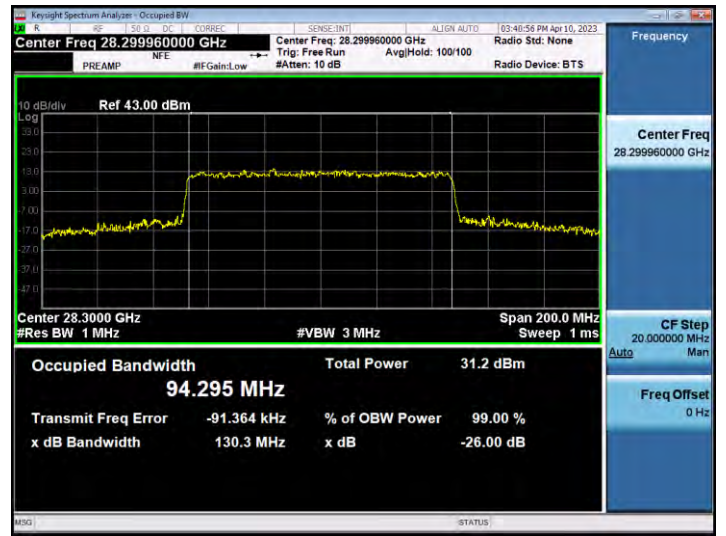
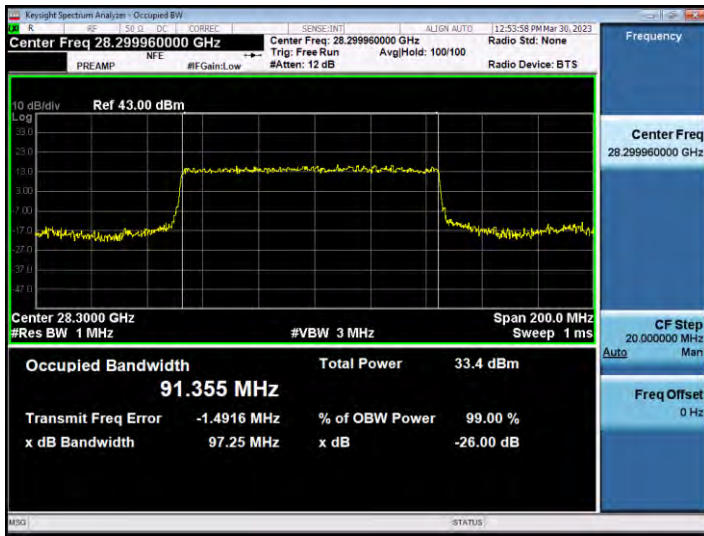


n261 Band Antenna 1 (L patch)

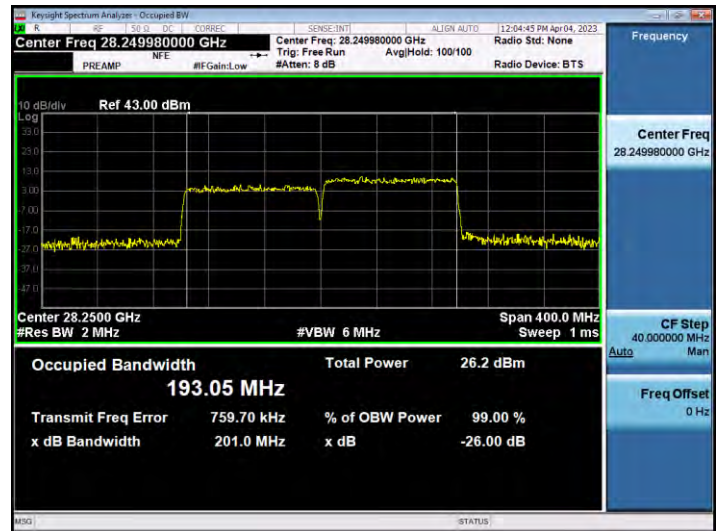
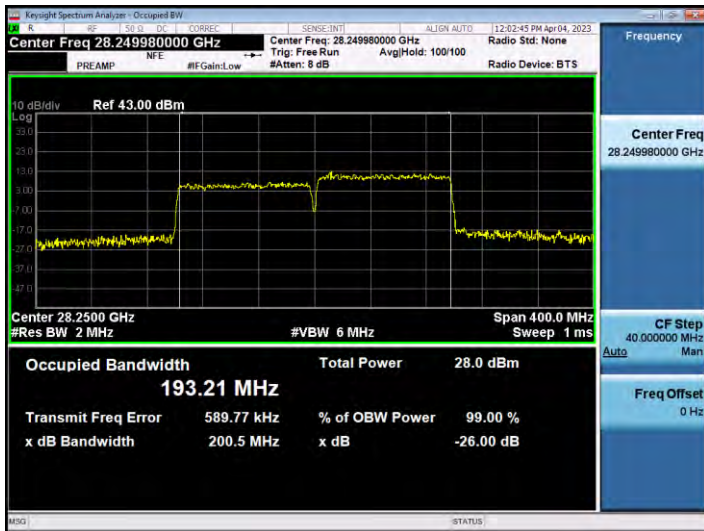
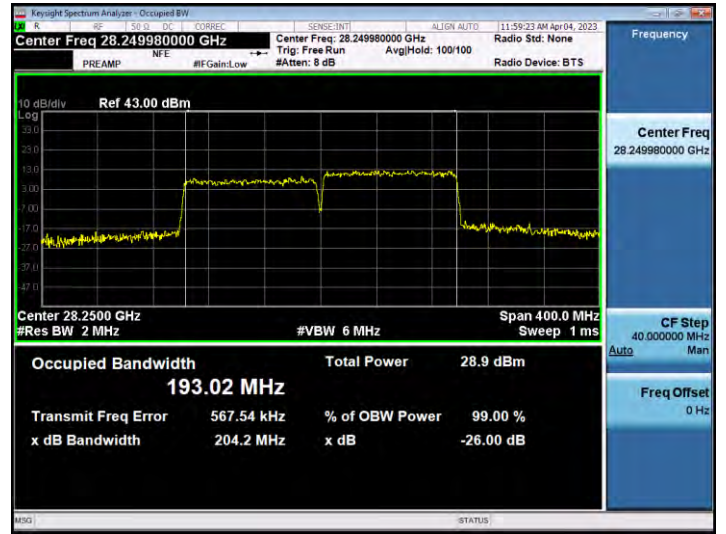
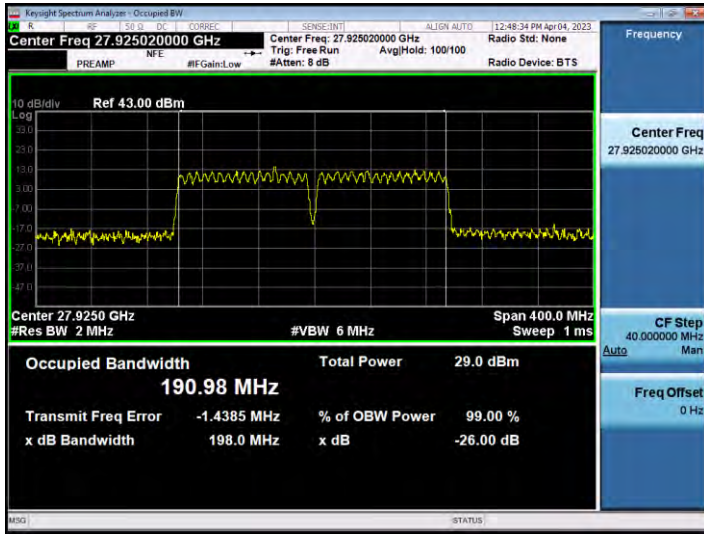
50 MHz, 1CC



100 MHz, 1CC



100 MHz, 2CC



100 MHz, 3CC

