FCC Test Report
(Part 96 – NR B48)

Report No.:	RFBEIH-WTW-P22110003
FCC ID:	P27-SCE5164-B48
Test Model:	SCE5164-B48
Received Date:	Nov. 03, 2022
Test Date:	Dec. 05 ~ Dec. 30, 2022
Issued Date:	Feb. 22, 2023
Applicant:	Sercomm Corp.
Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBEIH-WTW-P22110003	Original release	Feb. 22, 2023

1 Certificate of Conformity

Product:	Bridgestone
Brand:	Sercomm
Test Model:	SCE5164-B48
Sample Status:	Engineering sample
Applicant:	Sercomm Corp.
Test Date:	Dec. 05 ~ Dec. 30, 2022
Standards:	47 CFR FCC Part 96

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Feb. 22, 2023

Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** Feb. 22, 2023

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 96			
FCC Clause	Test Item	Result	Remarks
2.1046 96.41(b)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047 96.41(a)	Modulation Characteristics	Pass	Meet the requirement of limit.
2.1046 96.41(b)	Maximum Power Spectral Density	Pass	Meet the requirement of limit.
96.41(g)	Peak to Average Ration	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1055	Frequency Stability	Pass	Meet the requirement of limit.
2.1051 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 96.41(e)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.85dB at 7389.96MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Bridgestone			
Brand	Sercomm			
Test Model	SCE5164-B48			
Sample Status	Engineering sample			
Power Supply Rating	19Vdc from adapter 56Vdc from POE			
Modulation Type	QPSK, 64QAM, 256QAM			
Operating Frequency	NR Band 48 (Channel Bandwidth 10MHz)	3555.00MHz ~ 3694.98MHz		
	NR Band 48 (Channel Bandwidth 20MHz)	3560.01MHz ~ 3690.00MHz		
	NR Band 48 (Channel Bandwidth 30MHz)	3565.02MHz ~ 3684.99MHz		
	NR Band 48 (Channel Bandwidth 40MHz)	3570.00MHz ~ 3679.98MHz		
Max. EIRP Power		QPSK	64QAM	256QAM
	NR Band 48 (Channel Bandwidth 10MHz)	727.780mW (28.62dBm/10MHz)	716.143mW (28.55dBm/10MHz)	707.946mW (28.50dBm/10MHz)
	NR Band 48 (Channel Bandwidth 20MHz)	995.405mW (29.98dBm/10MHz)	981.748mW (29.92dBm/10MHz)	963.829mW (29.84dBm/10MHz)
	NR Band 48 (Channel Bandwidth 30MHz)	963.829mW (29.84dBm/10MHz)	954.993mW (29.80dBm/10MHz)	931.108mW (29.69dBm/10MHz)
	NR Band 48 (Channel Bandwidth 40MHz)	889.201mW (29.49dBm/10MHz)	822.243mW (29.15dBm/10MHz)	809.096mW (29.08dBm/10MHz)
Max. EIRP Power (Full power)		QPSK	64QAM	256QAM
	NR Band 48 (Channel Bandwidth 10MHz)	727.780mW (28.62dBm/10MHz)	716.143mW (28.55dBm/10MHz)	707.946mW (28.50dBm/10MHz)
	NR Band 48 (Channel Bandwidth 20MHz)	1803.018mW (32.56dBm/20MHz)	1778.279mW (32.50dBm/20MHz)	1745.822mW (32.42dBm/20MHz)
	NR Band 48 (Channel Bandwidth 30MHz)	2666.859mW (34.26dBm/30MHz)	2624.219mW (34.19dBm/30MHz)	2588.213mW (34.13dBm/30MHz)
	NR Band 48 (Channel Bandwidth 40MHz)	3507.519mW (35.45dBm/40MHz)	3467.369mW (35.40dBm/40MHz)	3427.678mW (35.35dBm/40MHz)
Emission Designator		QPSK	64QAM	256QAM
	NR Band 48 (Channel Bandwidth 10MHz)	8M59G7D	8M56D7W	8M57D7W
	NR Band 48 (Channel Bandwidth 20MHz)	18M2G7D	18M2D7W	18M2D7W
	NR Band 48 (Channel Bandwidth 30MHz)	27M8G7D	27M9D7W	27M9D7W
	NR Band 48 (Channel Bandwidth 40MHz)	37M8G7D	37M8D7W	37M8D7W
Antenna Type	Refer to note			
Antenna Connector	Refer to note			
Accessory Device	Adapter, GPS Antenna (Brand: INPAQ, Model: GPS13D-S6-00, Signal Line: 10m)			
Cable Supplied	1m non-shielded LAN cable without core			

Note:

1. The EUT consumes power from the following Adapters & POE. (POE for support unit only)

Adapter	
Brand	MOSO
Model	MS-Z3000R190-060B0-E
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	19Vdc, 3A, 57W
Power Line	DC Output Cable : 1.5m non-shielded without core AC power cord : 1.5m non-shielded without core

POE	
Brand	PHIHONG
Model	POE60U-BTA
Input Power	100-240Vac, 50-60Hz, 1.5A
Output Power	56Vdc, 0.535A, 30W

2. The following antennas were provided to the EUT.

No.	Type	Connector	Gain (dBi)
1	Dipole	mmcx	6.00
2	Dipole	mmcx	6.00

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3. This EUT only support full RB mode.

3.2 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna ports and wall mount/ceiling mount. The worst case was found when positioned on wall mount. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

Test Mode	Test Condition
A	Power from Adapter
B	Power from PoE

NR Band 48

Test Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
A	Maximum Output Power	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK / 64QAM / 256QAM
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK / 64QAM / 256QAM
		637668 to 646332	637668 (3565.02MHz), 641666 (3624.99MHz), 645666 (3684.99MHz)	30MHz	QPSK / 64QAM / 256QAM
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK / 64QAM / 256QAM
A	Maximum Power Spectral Density	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK
		637668 to 646332	637668 (3565.02MHz), 641666 (3624.99MHz), 645666 (3684.99MHz)	30MHz	QPSK
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK
A	Modulation Characteristics	638000 to 645332	641666 (3624.99MHz)	40MHz	QPSK / 64QAM / 256QAM
A	Frequency Stability	637000 to 646332	637000 (3555.00MHz), 646332 (3694.98MHz)	10MHz	QPSK
		637334 to 646000	637334 (3560.01MHz), 646000 (3690.00MHz)	20MHz	QPSK
		637668 to 646332	637668 (3565.02MHz), 645666 (3684.99MHz)	30MHz	QPSK
		638000 to 645332	638000 (3570.00MHz), 645332 (3679.98MHz)	40MHz	QPSK

Test Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
A	Occupied Bandwidth	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK / 64QAM / 256QAM
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK / 64QAM / 256QAM
		637668 to 646332	637668 (3565.02MHz), 641666 (3624.99MHz), 645666 (3684.99MHz)	30MHz	QPSK / 64QAM / 256QAM
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK / 64QAM / 256QAM
A	Peak to Average Ratio	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK / 64QAM / 256QAM
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK / 64QAM / 256QAM
		637668 to 646332	637668 (3565.02MHz), 641666 (3624.99MHz), 645666 (3684.99MHz)	30MHz	QPSK / 64QAM / 256QAM
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK / 64QAM / 256QAM
A	Conducted Emission	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK
		637668 to 646332	637668 (3565.02MHz), 641666 (3624.99MHz), 645666 (3684.99MHz)	30MHz	QPSK
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK
A, B	Radiated Emission Below 1GHz	637000 to 646332	646332 (3694.98MHz)	10MHz	QPSK
A	Radiated Emission Above 1GHz	637000 to 646332	637000 (3555.00MHz), 641666 (3624.99MHz), 646332 (3694.98MHz)	10MHz	QPSK
		637334 to 646000	637334 (3560.01MHz), 641666 (3624.99MHz), 646000 (3690.00MHz)	20MHz	QPSK
		638000 to 645332	638000 (3570.00MHz), 641666 (3624.99MHz), 645332 (3679.98MHz)	40MHz	QPSK

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. The output power for QPSK, 64QAM, and 256QAM, measured value of is QPSK higher than 64QAM, and 256QAM mode. Therefore, only occupied bandwidth and Peak to average ratio items had been tested under QPSK, 64QAM, and 256QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Maximum Output Power	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Maximum Power Spectral Density	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Modulation Characteristics	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Frequency Stability	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Occupied Bandwidth	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Peak To Average Ratio	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Conducted Emission	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Radiated Emission	23deg. C, 67%RH	120Vac, 60Hz 56Vdc	Adair Peng

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	ASUS	PU401L	NA	NA	Provided by manufacturer
B.	Load	NA	NA	NA	NA	-
C.	POE	PHIHONG	POE60U-BTA	NA	NA	Provided by manufacturer

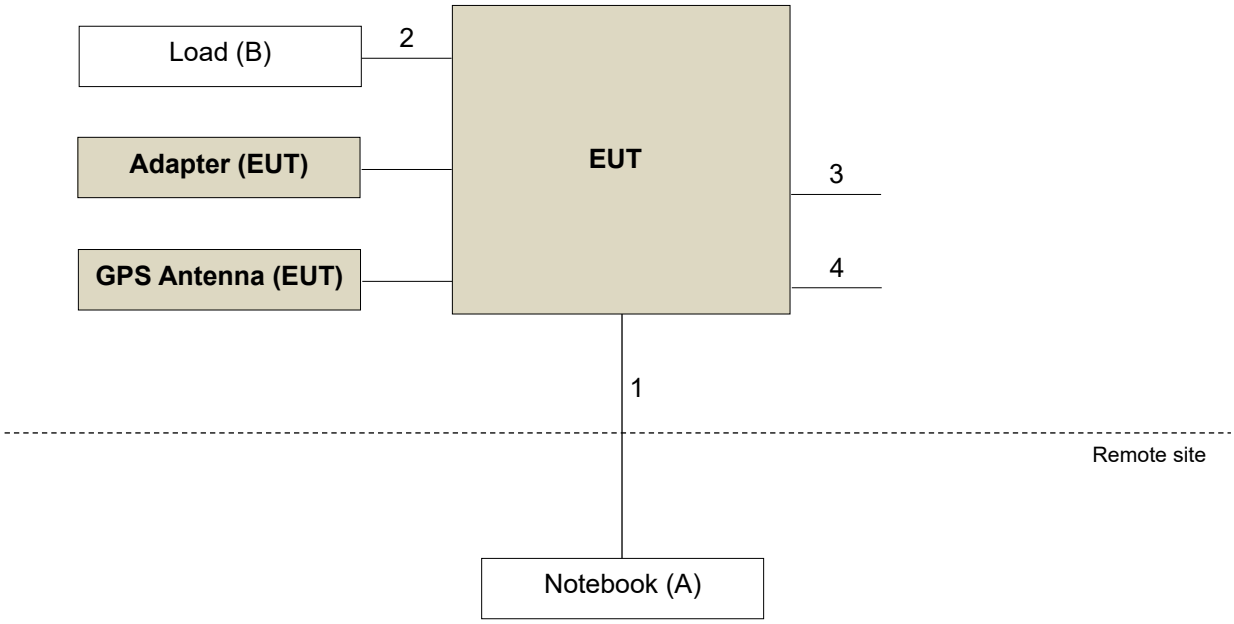
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

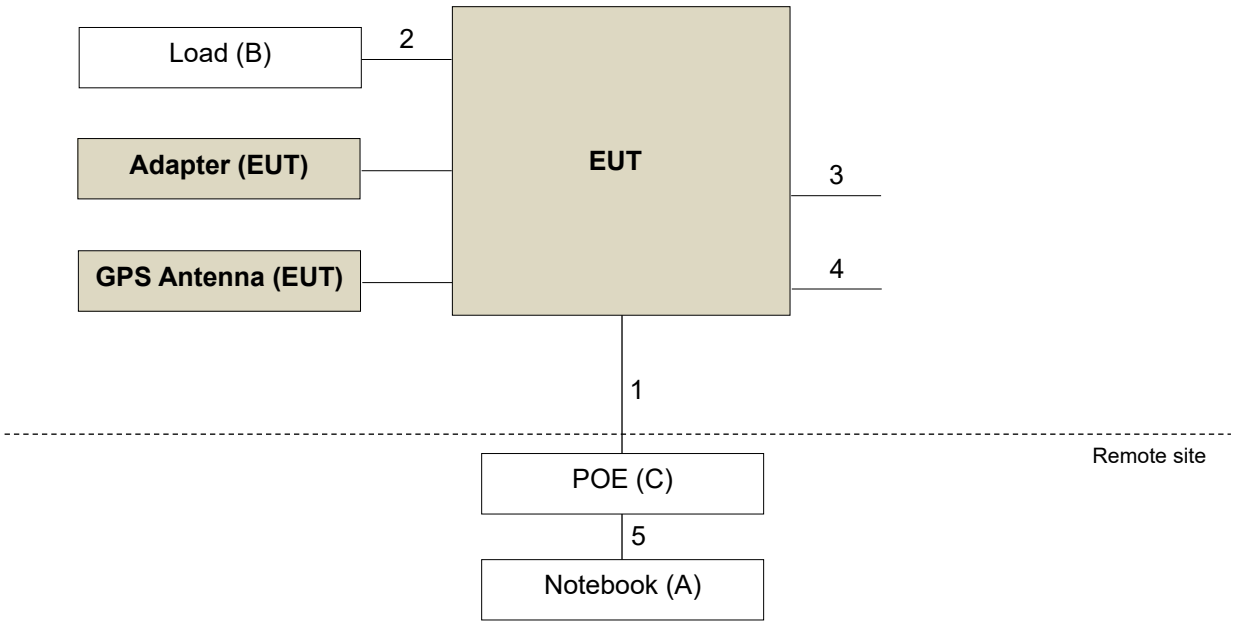
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 Cable	1	6	N	0	-
2.	RJ45 Cable	1	1	N	0	Accessory of EUT
3.	SPDIF Cable	1	10	N	0	Provided by manufacturer
4.	1PPS Cable	1	2.6	N	0	Provided by manufacturer
5.	RJ45 Cable	1	1.5	N	0	-

3.3.1 Configuration of System under Test

Test Mode A



Test Mode B



3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 96

ANSI/TIA/EIA-603-E-2016

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 940660 D01 Part 96 CBRS Eqpt v03

All test items have been performed as a reference to the above KDB test guidance.

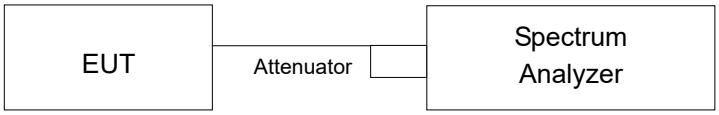
4 Test Types and Results

4.1 Maximum Output Power Measurement

4.1.1 Limits of Maximum Output Power Measurement

Device		Maximum EIRP (dBm/10 MHz)
☐	End User Device	23
☒	Category A CBSD	30
☐	Category B CBSD	47

4.1.2 Test Setup



4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer KEYSIGHT	N9030B	MY57140953	Jul. 01, 2022	Jun. 30, 2023
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Mar. 03, 2022	Mar. 02, 2023
RF cable	JB200	Cable-OVEN-02	NA	NA
DC-6GHz 20dB 50W Fixed attenuator Woken	MDC9331N-20	0724	Jul. 01, 2022	Jun. 30, 2024
STANDARD TEMPERATURE &HUMIDITY CHAMBER TERCHY	MHU-225AU	911033	Nov. 08, 2022	Nov. 07, 2023
AC Power Supply Extech	CFW-105	E000603	NA	NA
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2022	Jun. 22, 2023

Note: The calibration interval of the above test instruments is 12/24 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1.4 Test Procedures

Conducted output power measurement

a. Connect the DUT transmitter output to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
b. Set span to at least 1.5 times the OBW.
c. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
d. Set VBW ≥ 3 × RBW.
e. Set number of points in sweep ≥ 2 × span / RBW.
f. Sweep time = auto-couple.
g. Detector = RMS (power averaging).
h. If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
i. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
j. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
k. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
l. For per 10MHz method, channel power integrating bandwidth 10MHz is used for bandwidth 10M, 20M, 30M and 40M. For full power method, channel power integrating bandwidth 10MHz is used for bandwidth 10M, integrating bandwidth 20MHz is used for bandwidth 20M, integrating bandwidth 30MHz is used for bandwidth 30M, integrating bandwidth 40MHz is used for bandwidth 40M.

Maximum EIRP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

ERP or EIRP = $P_{Meas} + G_T$
where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)
P_{Meas} measured transmitter output power or PSD, in dBm or dBW
G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

Conducted Output Power and EIRP Power (dBm/10MHz)

NR Band 48						
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
40	638000	3570.00	0	17.46	17.11	17.04
			1	17.47	17.15	17.08
			Total	20.48	20.14	20.07
			E.I.R.P.	29.49	29.15	29.08
	641666	3624.99	0	16.72	16.66	16.59
			1	16.29	16.28	16.21
			Total	19.52	19.48	19.41
			E.I.R.P.	28.53	28.49	28.42
	645332	3679.98	0	15.85	15.82	15.80
			1	15.87	15.77	15.74
			Total	18.87	18.81	18.78
			E.I.R.P.	27.88	27.82	27.79
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
30	637668	3565.02	0	18.10	18.03	17.88
			1	17.52	17.51	17.45
			Total	20.83	20.79	20.68
			E.I.R.P.	29.84	29.80	29.69
	641666	3624.99	0	16.95	16.85	16.81
			1	16.26	16.22	16.20
			Total	19.63	19.56	19.53
			E.I.R.P.	28.64	28.57	28.54
	645666	3684.99	0	16.56	16.44	16.42
			1	16.70	16.68	16.60
			Total	19.64	19.57	19.52
			E.I.R.P.	28.65	28.58	28.53

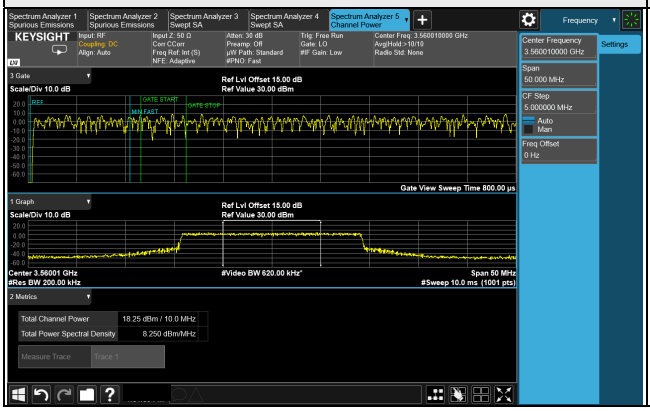
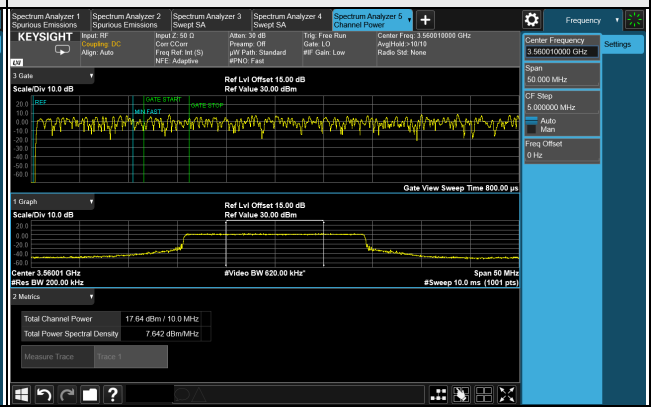
Note:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP (dBm/10MHz) = Total Conducted Output Power (dBm/10MHz) + Directional Gain

NR Band 48						
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
20	637334	3560.01	0	18.25	18.21	18.12
			1	17.64	17.56	17.50
			Total	20.97	20.91	20.83
			E.I.R.P.	29.98	29.92	29.84
	641666	3624.99	0	17.20	17.09	17.03
			1	17.02	17.01	17.05
			Total	20.12	20.06	20.05
			E.I.R.P.	29.13	29.07	29.06
	646000	3690.00	0	16.12	16.10	16.14
			1	16.73	16.62	16.48
			Total	19.45	19.38	19.32
			E.I.R.P.	28.46	28.39	28.33
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
10	637000	3555.00	0	16.85	16.77	16.70
			1	16.33	16.28	16.24
			Total	19.61	19.54	19.49
			E.I.R.P.	28.62	28.55	28.50
	641666	3624.99	0	16.09	16.03	15.96
			1	15.36	15.30	15.22
			Total	18.75	18.69	18.62
			E.I.R.P.	27.76	27.70	27.63
	646332	3694.98	0	15.37	15.33	15.24
			1	15.11	15.08	15.00
			Total	18.25	18.22	18.13
			E.I.R.P.	27.26	27.23	27.14

Note:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP (dBm/10MHz) = Total Conducted Output Power (dBm/10MHz) + Directional Gain

Spectrum Plot of Worst Value	
20MHz / QPSK	
Chain 0	Chain 1
	

Full Conducted Output Power and Full EIRP Power (dBm/Channel Bandwidth)

NR Band 48						
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
40	638000	3570.00	0	23.48	23.41	23.33
			1	23.38	23.34	23.32
			Total	26.44	26.39	26.34
			E.I.R.P.	35.45	35.40	35.35
	641666	3624.99	0	22.45	22.33	22.25
			1	22.26	22.21	22.21
			Total	25.37	25.28	25.24
			E.I.R.P.	34.38	34.29	34.25
	645332	3679.98	0	21.71	21.68	21.65
			1	21.79	21.70	21.64
			Total	24.76	24.70	24.66
			E.I.R.P.	33.77	33.71	33.67
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
30	637668	3565.02	0	22.69	22.61	22.52
			1	21.73	21.69	21.66
			Total	25.25	25.18	25.12
			E.I.R.P.	34.26	34.19	34.13
	641666	3624.99	0	21.49	21.40	21.29
			1	20.31	20.29	20.22
			Total	23.95	23.89	23.80
			E.I.R.P.	32.96	32.90	32.81
	645666	3684.99	0	20.55	20.48	20.45
			1	20.91	20.87	20.78
			Total	23.74	23.69	23.63
			E.I.R.P.	32.75	32.70	32.64

Note:

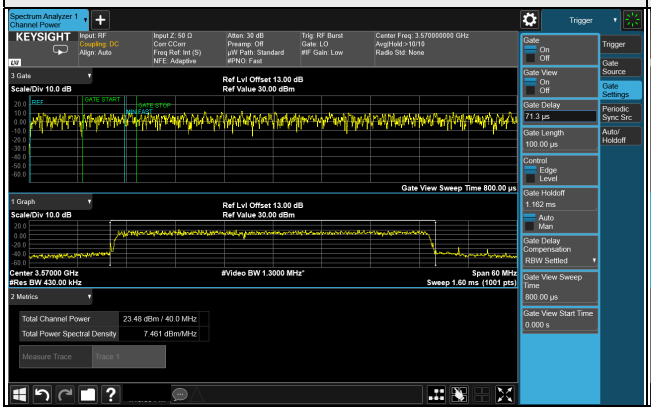
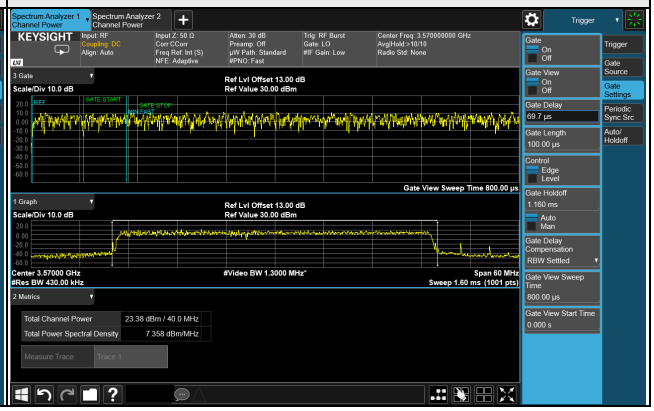
1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP (dBm/Channel Bandwidth) = Total Conducted Output Power (dBm/Channel Bandwidth) + Directional Gain

NR Band 48						
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
20	637334	3560.01	0	20.74	20.66	20.54
			1	20.32	20.30	20.25
			Total	23.55	23.49	23.41
			E.I.R.P.	32.56	32.50	32.42
	641666	3624.99	0	19.55	19.46	19.37
			1	19.35	19.32	19.28
			Total	22.46	22.40	22.34
			E.I.R.P.	31.47	31.41	31.35
	646000	3690.00	0	18.46	18.40	18.38
			1	18.76	18.72	18.62
			Total	21.62	21.57	21.51
			E.I.R.P.	30.63	30.58	30.52
BW	Channel	Freq. (MHz)	Chain	QPSK	64QAM	256QAM
10	637000	3555.00	0	16.85	16.77	16.70
			1	16.33	16.28	16.24
			Total	19.61	19.54	19.49
			E.I.R.P.	28.62	28.55	28.50
	641666	3624.99	0	16.09	16.03	15.96
			1	15.36	15.30	15.22
			Total	18.75	18.69	18.62
			E.I.R.P.	27.76	27.70	27.63
	646332	3694.98	0	15.37	15.33	15.24
			1	15.11	15.08	15.00
			Total	18.25	18.22	18.13
			E.I.R.P.	27.26	27.23	27.14

Note:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP (dBm/Channel Bandwidth) = Total Conducted Output Power (dBm/Channel Bandwidth) + Directional Gain

The spectrogram for worst value (full power) is the same as for worst value (power per 10 MHz).

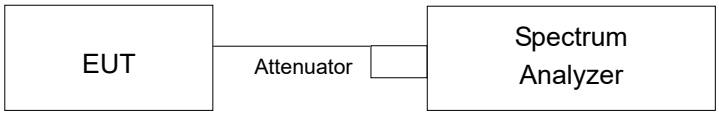
Spectrum Plot of Worst Value	
40MHz / QPSK	
Chain 0	Chain 1
	

4.2 Maximum Power Spectral Density Measurement

4.2.1 Limits of Maximum Power Spectral Density Measurement

Device		Maximum PSD (dBm/MHz)
☐	End User Device	n/a
☒	Category A CBSD	20
☐	Category B CBSD	37

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.2.4 Test Procedure

a. Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
b. Set instrument center frequency to OBW center frequency.
c. Set span to 2 × to 3 × the OBW.
d. Set the RBW to the specified reference bandwidth (often 1 MHz).
e. Set VBW ≥ 3 × RBW.
f. Detector = RMS (power averaging).
g. Ensure that the number of measurement points in the sweep ≥ 2 × span/RBW.
h. Sweep time = auto couple.
i. Employ trace averaging (RMS) mode over a minimum of 100 traces.
j. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 Test Results

Power Spectral Density (dBm/MHz)

NR Band 48				
BW	Channel	Freq. (MHz)	Chain	QPSK
40	638000	3570.00	0	7.69
			1	7.52
			Total	10.62
			E.I.R.P.	19.63
	641666	3624.99	0	7.65
			1	7.61
			Total	10.64
			E.I.R.P.	19.65
	645332	3679.98	0	7.66
			1	7.63
			Total	10.66
			E.I.R.P.	19.67
BW	Channel	Freq. (MHz)	Chain	QPSK
30	637668	3565.02	0	8.13
			1	7.78
			Total	10.97
			E.I.R.P.	19.98
	641666	3624.99	0	7.64
			1	7.86
			Total	10.76
			E.I.R.P.	19.77
	645666	3684.99	0	7.61
			1	7.69
			Total	10.66
			E.I.R.P.	19.67

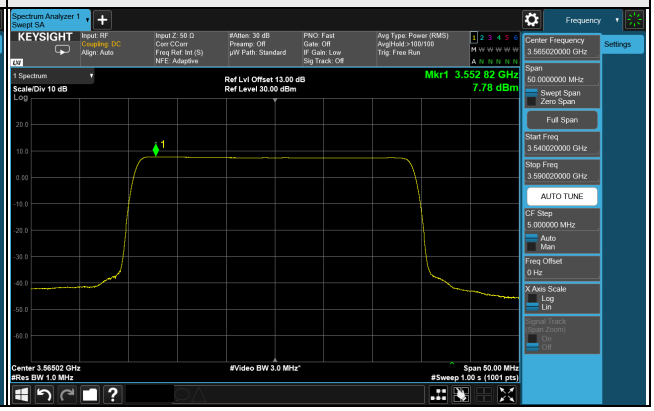
Note:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP Power Spectral Density (dBm/MHz) = Total Power Spectral Density (dBm/MHz) + Directional Gain

NR Band 48				
BW	Channel	Freq. (MHz)	Chain	QPSK
20	637334	3560.01	0	7.71
			1	7.40
			Total	10.57
			E.I.R.P.	19.58
	641666	3624.99	0	7.58
			1	7.62
			Total	10.61
			E.I.R.P.	19.62
	646000	3690.00	0	7.77
			1	7.50
			Total	10.65
			E.I.R.P.	19.66
BW	Channel	Freq. (MHz)	Chain	QPSK
10	637000	3555.00	0	7.89
			1	7.75
			Total	10.83
			E.I.R.P.	19.84
	641666	3624.99	0	7.92
			1	7.23
			Total	10.60
			E.I.R.P.	19.61
	646332	3694.98	0	7.60
			1	7.56
			Total	10.59
			E.I.R.P.	19.60

Note:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 9.01dBi
2. EIRP Power Spectral Density (dBm/MHz) = Total Power Spectral Density (dBm/MHz) + Directional Gain

Spectrum Plot of Worst Value	
30MHz / QPSK	
Chain 0	Chain 1
	

4.3 Modulation Characteristics Measurement

4.3.1 Limits of Modulation Characteristics

N/A

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

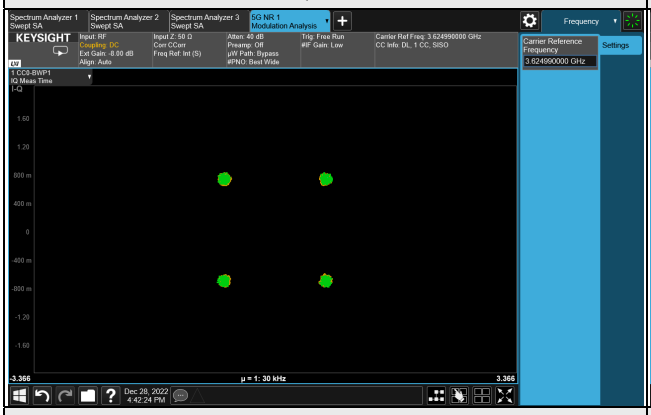
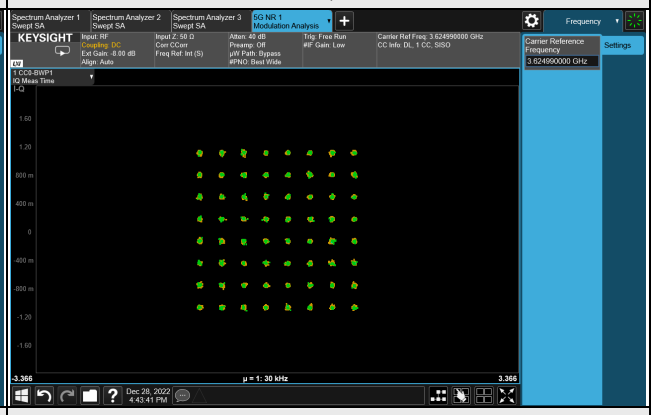
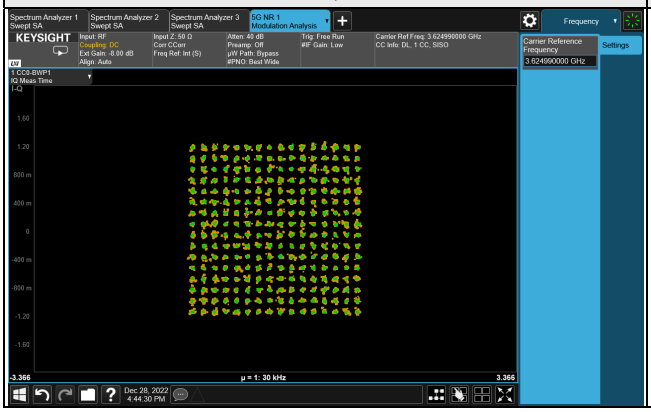
4.3.4 Deviation fromTest Standard

No deviation.

4.3.5 EUT Operating Conditions

Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.3.6 Test Results

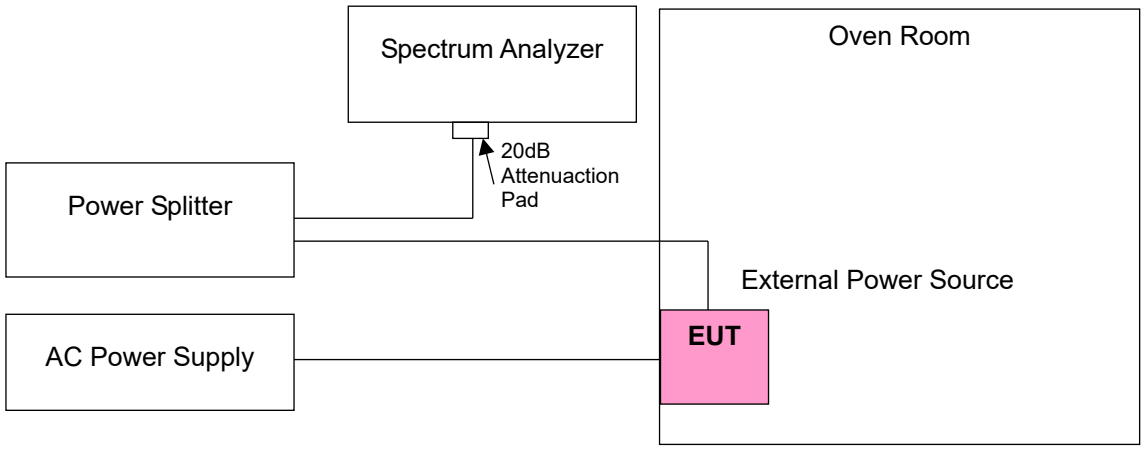
Spectrum Plot of Measurement Value	
Channel: 641666 (3624.99MHz)	
QPSK	64QAM
	
256QAM	
	

4.4 Frequency Stability Measurement

4.4.1 Limits of Frequency Stabiliity Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Mar. 03, 2022	Mar. 02, 2023
STANDARD TEMPERATURE &HUMIDITY CHAMBER TERCHY	MHU-225AU	911033	Nov. 08, 2022	Nov. 07, 2023
Three-phase coupling / decoupling network TESEQ	CDN 3063	4006	Mar. 08, 2022	Mar. 07, 2023
AC Power Supply Extech	CFW-105	E000603	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.4 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.4.5 Test Results

Chain 0

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3554.999996	-0.001125	3694.979999	-0.000271
102	3555.000004	0.001125	3694.980004	0.001083
138	3554.999996	-0.001125	3694.979997	-0.000812

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3554.999996	-0.001125	3694.980002	0.000541
-20	3555.000001	0.000281	3694.980002	0.000541
-10	3555.000003	0.000844	3694.980003	0.000812
0	3555.000004	0.001125	3694.980003	0.000812
10	3555.000002	0.000563	3694.979996	-0.001083
20	3555.000003	0.000844	3694.980004	0.001083
30	3555.000003	0.000844	3694.979998	-0.000541
40	3555.000003	0.000844	3694.980001	0.000271
50	3555.000002	0.000563	3694.980001	0.000271

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3560.010001	0.000281	3689.999996	-0.001084
102	3560.009996	-0.001124	3689.999996	-0.001084
138	3560.010004	0.001124	3689.999998	-0.000542

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.010002	0.000562	3690.000004	0.001084
-20	3560.010003	0.000843	3689.999997	-0.000813
-10	3560.010004	0.001124	3690.000002	0.000542
0	3560.010002	0.000562	3690.000001	0.000271
10	3560.010001	0.000281	3690.000001	0.000271
20	3560.009998	-0.000562	3690.000001	0.000271
30	3560.010003	0.000843	3689.999997	-0.000813
40	3560.009997	-0.000843	3689.999999	-0.000271
50	3560.009998	-0.000562	3689.999997	-0.000813

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 30MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3565.020003	0.000842	3684.989996	-0.001085
102	3565.019996	-0.001122	3684.989999	-0.000271
138	3565.019998	-0.000561	3684.990002	0.000543

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 30MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3565.019997	-0.000842	3684.989998	-0.000543
-20	3565.019999	-0.000281	3684.989997	-0.000814
-10	3565.019996	-0.001122	3684.990002	0.000543
0	3565.019996	-0.001122	3684.990001	0.000271
10	3565.019996	-0.001122	3684.990001	0.000271
20	3565.020002	0.000561	3684.989996	-0.001085
30	3565.020003	0.000842	3684.989998	-0.000543
40	3565.019996	-0.001122	3684.989997	-0.000814
50	3565.019997	-0.000842	3684.989998	-0.000543

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 40MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3569.999999	0.000842	3679.979999	-0.001085
102	3569.999996	-0.001122	3679.979999	-0.000271
138	3569.999999	-0.000561	3679.979999	0.000543

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 40MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3570.000002	-0.000842	3679.979999	-0.000543
-20	3569.999997	-0.000842	3679.980002	0.000543
-10	3569.999996	-0.001122	3679.979998	-0.000543
0	3570.000002	0.000561	3679.980001	0.000271
10	3570.000003	0.000842	3679.979996	-0.001085
20	3569.999997	-0.000842	3679.980001	0.000271
30	3570.000003	0.000842	3679.980003	0.000814
40	3570.000002	0.000561	3679.980001	0.000271
50	3570.000003	0.000842	3679.979999	-0.000271

Chain 1

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3555.000003	0.000844	3694.979998	-0.000541
102	3554.999997	-0.000844	3694.979998	-0.000541
138	3554.999996	-0.001125	3694.979998	-0.000541

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3554.999998	-0.000563	3694.979997	-0.000812
-20	3555.000003	0.000844	3694.979996	-0.001083
-10	3554.999998	-0.000563	3694.980004	0.001083
0	3555.000003	0.000844	3694.980001	0.000271
10	3555.000004	0.001125	3694.980003	0.000812
20	3554.999999	-0.000281	3694.980003	0.000812
30	3554.999999	-0.000281	3694.980004	0.001083
40	3555.000003	0.000844	3694.979997	-0.000812
50	3555.000003	0.000844	3694.980004	0.001083

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3560.009999	-0.000281	3690.000004	0.001084
102	3560.009999	-0.000281	3689.999998	-0.000542
138	3560.010004	0.001124	3689.999998	-0.000542

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.009996	-0.001124	3689.999998	-0.000542
-20	3560.009999	-0.000281	3689.999997	-0.000813
-10	3560.010004	0.001124	3689.999997	-0.000813
0	3560.010001	0.000281	3690.000001	0.000271
10	3560.010002	0.000562	3689.999999	-0.000271
20	3560.009999	-0.000281	3689.999999	-0.000271
30	3560.009999	-0.000281	3690.000003	0.000813
40	3560.009997	-0.000843	3689.999998	-0.000542
50	3560.009999	-0.000281	3690.000001	0.000271

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 30MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3565.020001	0.000281	3684.989996	-0.001085
102	3565.020004	0.001122	3684.990002	0.000543
138	3565.019996	-0.001122	3684.989997	-0.000814

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	NR Band 48, Channel Bandwidth: 30MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3565.019996	-0.001122	3684.990004	0.001085
-20	3565.019996	-0.001122	3684.990002	0.000543
-10	3565.019997	-0.000842	3684.990004	0.001085
0	3565.019996	-0.001122	3684.990003	0.000814
10	3565.020003	0.000842	3684.990002	0.000543
20	3565.020002	0.000561	3684.990001	0.000271
30	3565.020004	0.001122	3684.990002	0.000543
40	3565.019997	-0.000842	3684.989997	-0.000814
50	3565.020004	0.001122	3684.989999	-0.000271

Frequency Error vs. Voltage

Voltage (Vac)	NR Band 48, Channel Bandwidth: 40MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	3569.999999	0.000281	3679.980004	-0.001085
102	3569.999996	0.001122	3679.980002	0.000543
138	3569.999999	-0.001122	3679.979997	-0.000814

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

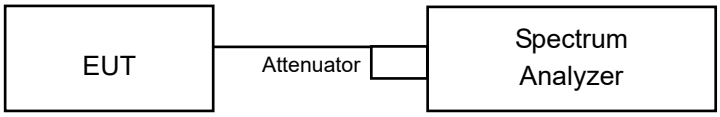
Temp. (℃)	NR Band 48, Channel Bandwidth: 40MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3569.999998	-0.001122	3679.980002	0.001085
-20	3569.999997	-0.000842	3679.980002	0.000543
-10	3569.999997	-0.000842	3679.979998	-0.000543
0	3570.000001	0.000281	3679.980003	0.000814
10	3569.999999	-0.000281	3679.980003	0.000814
20	3569.999997	-0.000842	3679.980002	0.000543
30	3570.000001	0.000281	3679.979996	-0.001085
40	3570.000002	0.000561	3679.979997	-0.000814
50	3570.000002	0.000561	3679.979999	-0.000271

4.5 Emission Bandwidth Measurement

4.5.1 Limits of Emission Bandwidth Measurement

According to FCC 47 CFR part 2.1049, 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% of the total mean power radiated by a given emission.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.5.4 Test Procedure

Occupied Bandwdith & 26dBc Bandwidth

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 ≥ 3 × 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.
NOTE—Step 1), step 2), and step 3) 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:
a) 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).
b) 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.

4.5.5 Deviation fromTest Standard

No deviation.

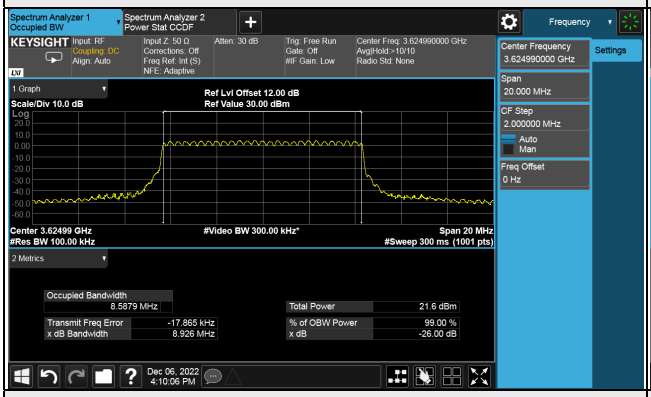
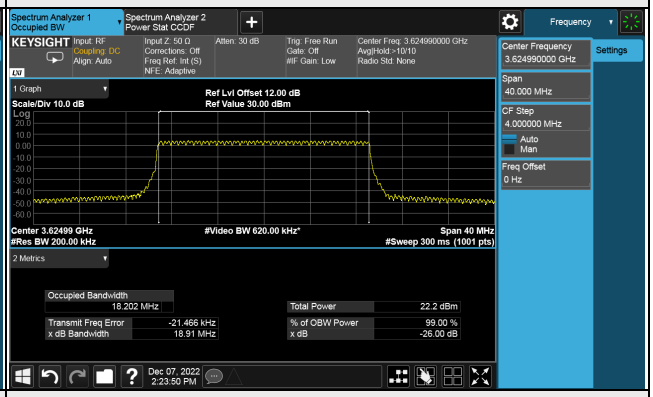
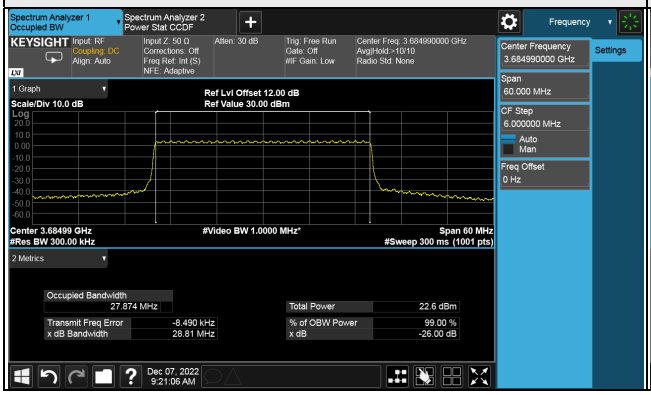
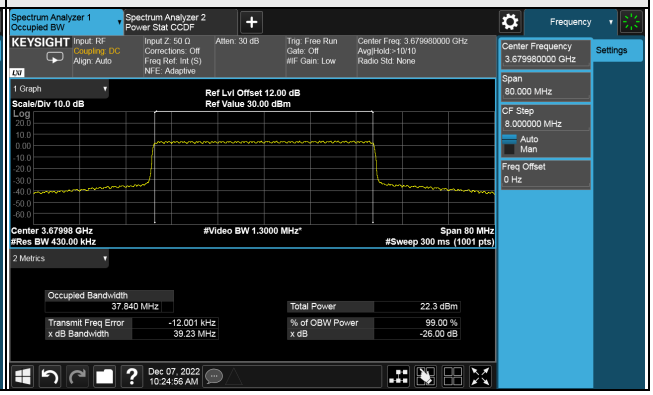
4.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Result

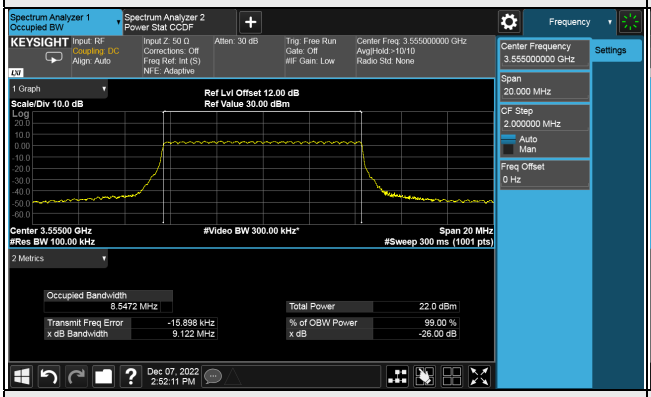
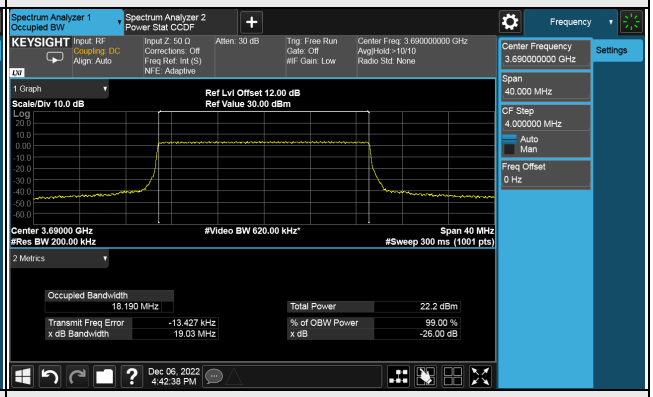
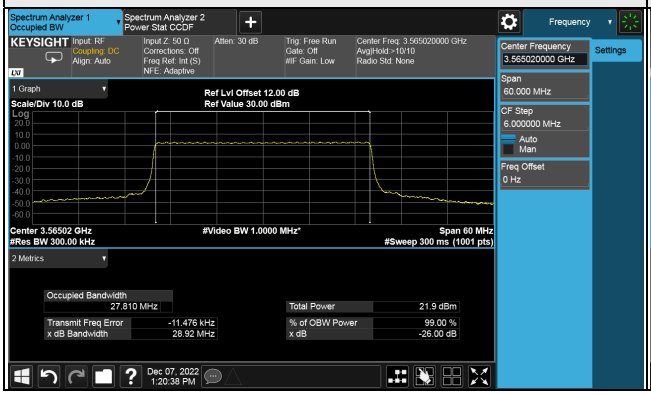
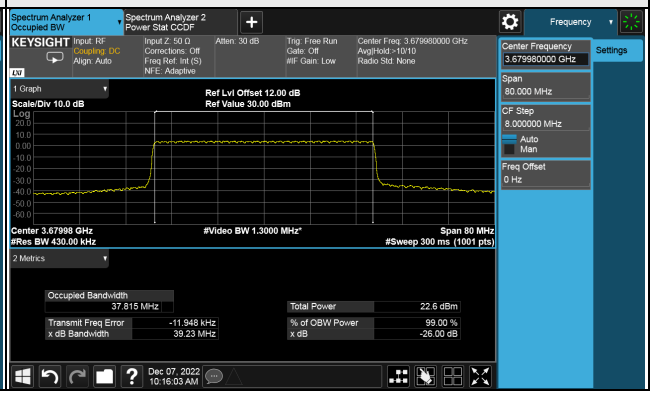
Occupied Bandwidth

NR Band 48, Channel Bandwidth 10MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637000	3555.00	8.55	8.56	8.56	8.55	8.55	8.57
641666	3624.99	8.59	8.55	8.57	8.56	8.55	8.56
646332	3694.98	8.56	8.55	8.57	8.56	8.54	8.55
NR Band 48, Channel Bandwidth 20MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637334	3560.01	18.17	18.18	18.17	18.19	18.17	18.18
641666	3624.99	18.17	18.17	18.17	18.18	18.18	18.20
646000	3690.00	18.18	18.19	18.19	18.19	18.18	18.19
NR Band 48, Channel Bandwidth 30MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637668	3565.02	27.83	27.81	27.78	27.80	27.79	27.81
641666	3624.99	27.78	27.78	27.84	27.84	27.81	27.82
645666	3684.99	27.84	27.81	27.87	27.79	27.86	27.78
NR Band 48, Channel Bandwidth 40MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
638000	3570.00	37.80	37.80	37.77	37.81	37.82	37.80
641666	3624.99	37.81	37.82	37.83	37.80	37.78	37.79
645332	3679.98	37.79	37.82	37.82	37.84	37.84	37.78

Spectrum Plot of Worst Value	
10MHz / Chain 0 / QPSK	20MHz / Chain 1 / 256QAM
	
30MHz / Chain 0 / 256QAM	40MHz / Chain 1 / 64QAM
	

26dB Bandwidth

NR Band 48, Channel Bandwidth 10MHz							
Channel	Frequency (MHz)	26dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637000	3555.00	9.09	9.08	8.96	9.10	9.12	9.11
641666	3624.99	8.93	9.07	8.99	9.11	9.09	9.10
646332	3694.98	9.02	9.08	9.00	9.11	9.12	9.12
NR Band 48, Channel Bandwidth 20MHz							
Channel	Frequency (MHz)	26dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637334	3560.01	18.91	18.93	18.91	18.95	18.95	18.94
641666	3624.99	18.92	18.92	18.91	18.96	18.94	18.91
646000	3690.00	18.99	19.03	19.00	19.00	19.01	19.01
NR Band 48, Channel Bandwidth 30MHz							
Channel	Frequency (MHz)	26dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637668	3565.02	28.87	28.88	28.88	28.91	28.92	28.92
641666	3624.99	28.84	28.85	28.81	28.88	28.85	28.86
645666	3684.99	28.83	28.87	28.81	28.92	28.91	28.90
NR Band 48, Channel Bandwidth 40MHz							
Channel	Frequency (MHz)	26dB Bandwidth (MHz)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
638000	3570.00	39.20	39.21	39.19	39.20	39.21	39.22
641666	3624.99	39.20	39.22	39.17	39.21	39.19	39.20
645332	3679.98	39.21	39.22	39.23	39.20	39.23	39.19

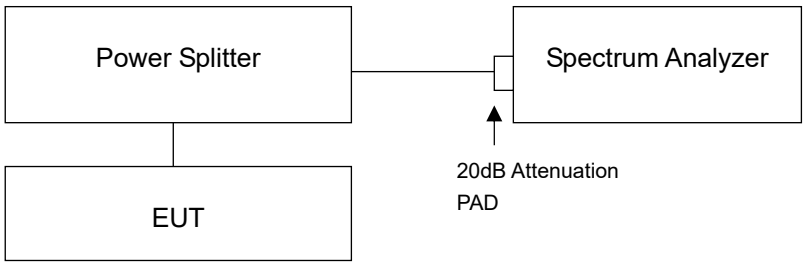
Spectrum Plot of Worst Value	
10MHz / Chain 1 / 64QAM	20MHz / Chain 0 / 64QAM
	
30MHz / Chain 1 / 256QAM	40MHz / Chain 0 / 256QAM
	

4.6 Peak to Average Ratio Measurement

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.6.4 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.5 Deviation from Test Standard

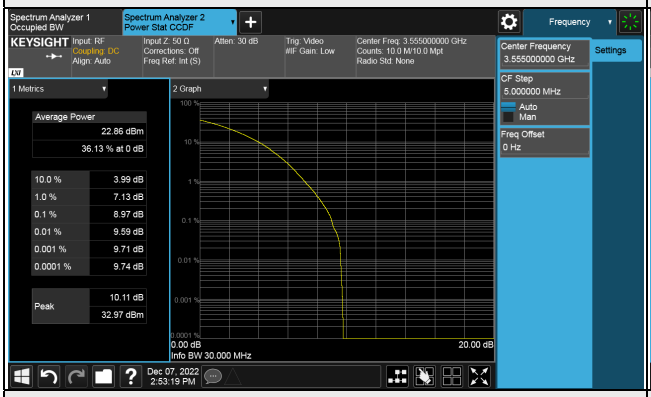
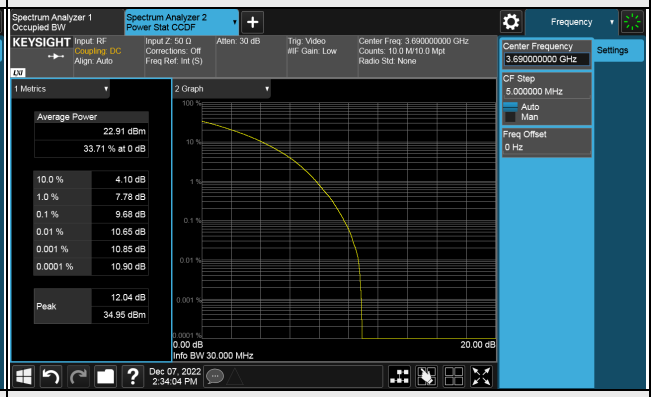
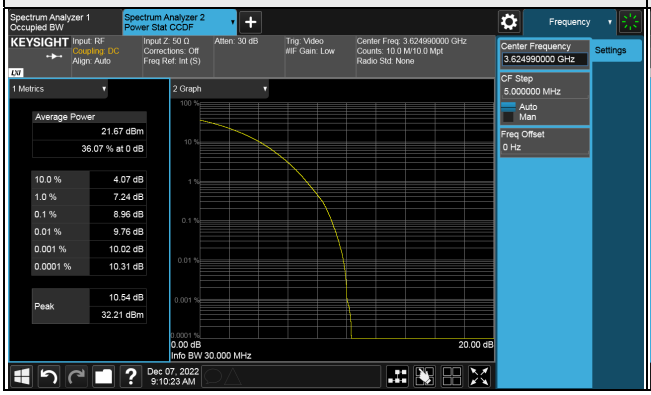
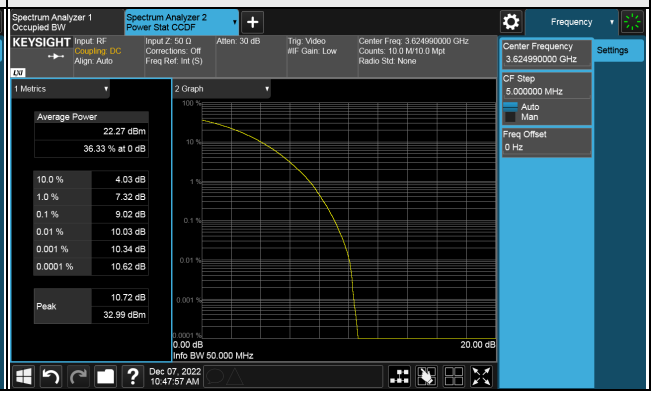
No deviation.

4.6.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

NR Band 48, Channel Bandwidth 10MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637000	3555.00	8.65	8.93	8.89	8.87	8.97	8.95
641666	3624.99	8.78	8.86	8.74	8.85	8.92	8.95
646332	3694.98	8.67	8.84	8.67	8.81	8.88	8.73
NR Band 48, Channel Bandwidth 20MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637334	3560.01	8.77	8.29	8.54	8.80	8.86	8.72
641666	3624.99	8.61	8.54	8.77	8.71	8.89	8.81
646000	3690.00	8.89	8.93	9.15	9.68	8.87	8.72
NR Band 48, Channel Bandwidth 30MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
637668	3565.02	8.70	8.77	8.77	8.76	8.87	8.77
641666	3624.99	8.64	8.71	8.96	8.73	8.76	8.74
645666	3684.99	8.78	8.80	8.86	8.85	8.73	8.72
NR Band 48, Channel Bandwidth 40MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		Chain 0			Chain 1		
		QPSK	64QAM	256QAM	QPSK	64QAM	256QAM
638000	3570.00	8.73	8.83	8.68	8.73	8.83	8.77
641666	3624.99	8.80	8.73	8.76	8.88	8.79	9.02
645332	3679.98	8.83	8.74	8.80	8.76	8.70	8.86

Spectrum Plot of Worst Value	
10MHz / Chain 1 / 64QAM	20MHz / Chain 1 / QPSK
	
30MHz / Chain 0 / 256QAM	40MHz / Chain 1 / 256QAM
	

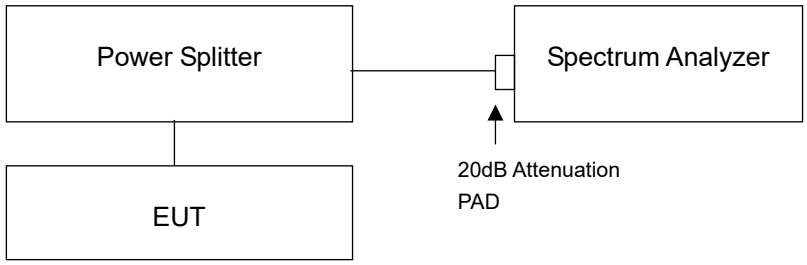
4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

Note: This device can be impelement MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 guidance.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.4 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range are from 9 kHz to 40GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.
c. Measuring frequency band edge, 20dB attenuation pad is connected with spectrum. 1% of the fundamental emission bandwidth is used for conducted emission measurement.

4.7.5 Deviation fromTest Standard

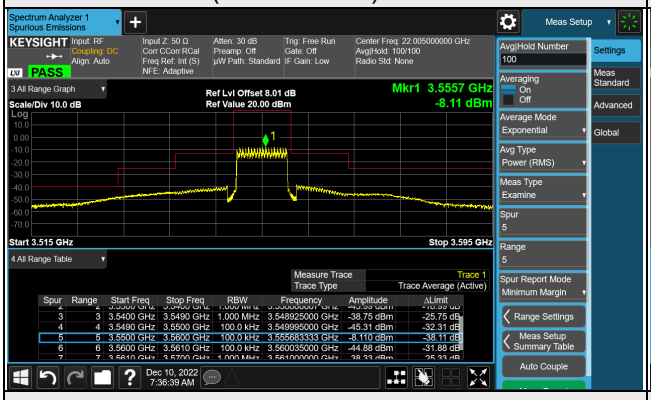
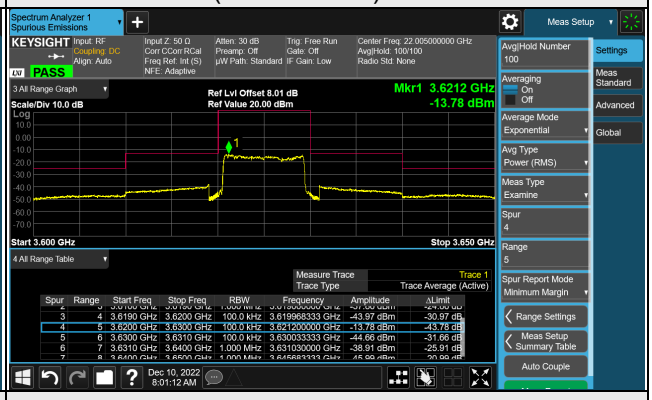
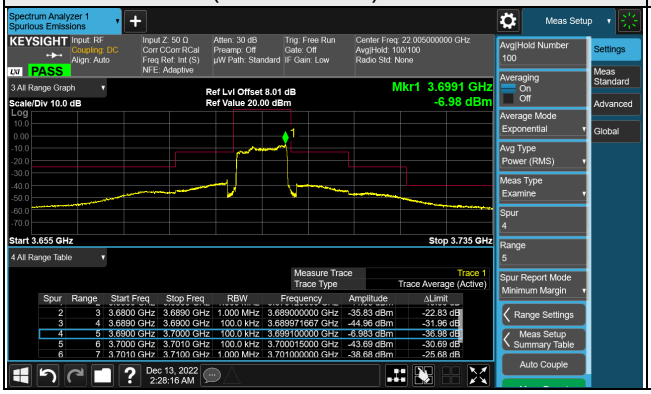
No deviation.

4.7.6 EUT Operating Conditions

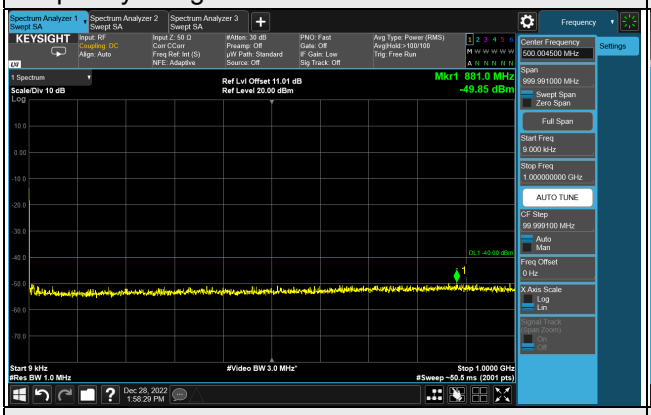
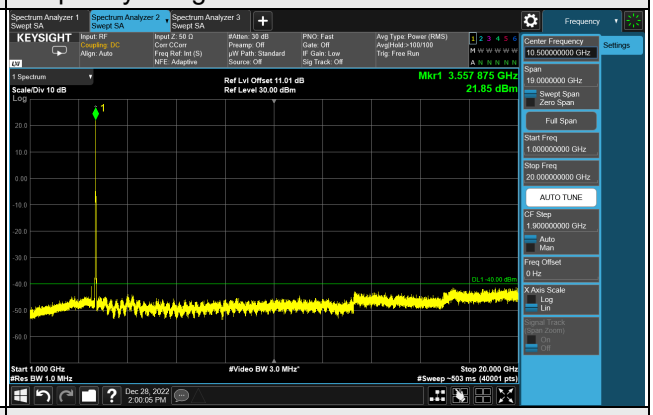
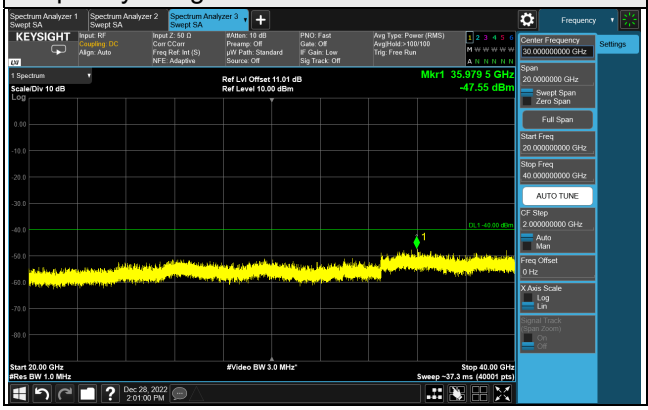
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

Chain 0

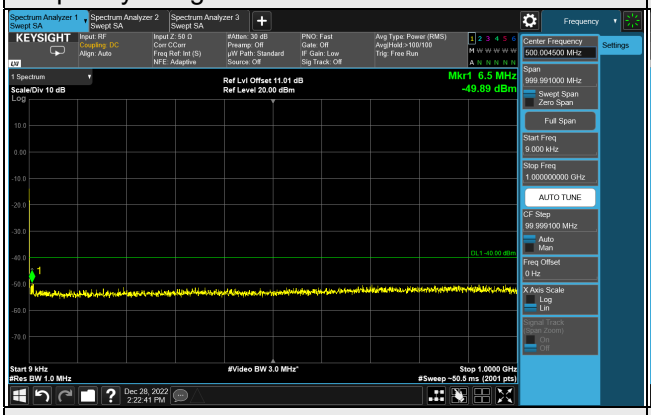
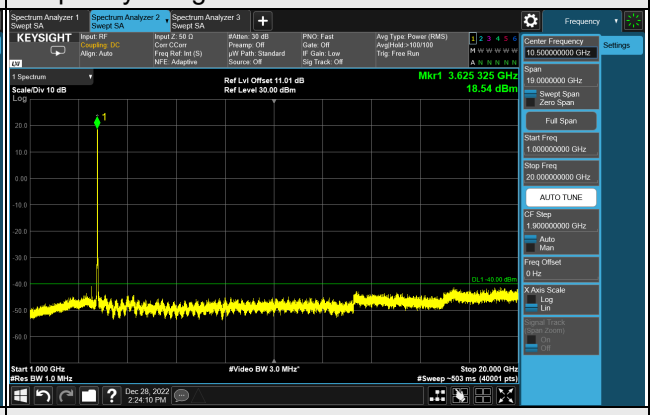
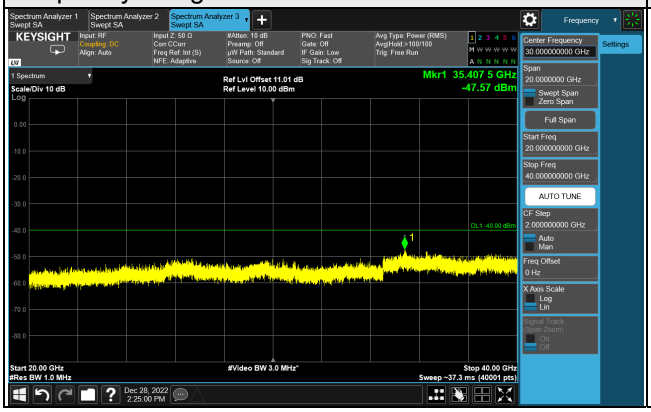
NR Band 48, Channel Bandwidth 10MHz	
Channel 637000 (3555.00MHz)	Channel 641666 (3624.99MHz)
	
Channel 646332 (3694.98MHz)	
	

Ref Lvl Offset = Attenuator (3dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 8.01dB

NR Band 48, Channel Bandwidth 10MHz	
Channel 637000 (3555.00MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

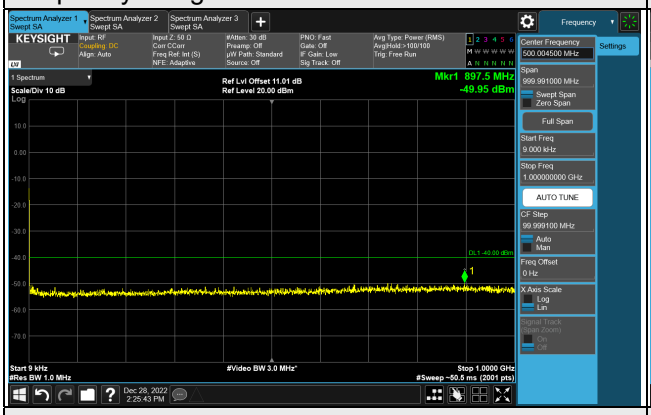
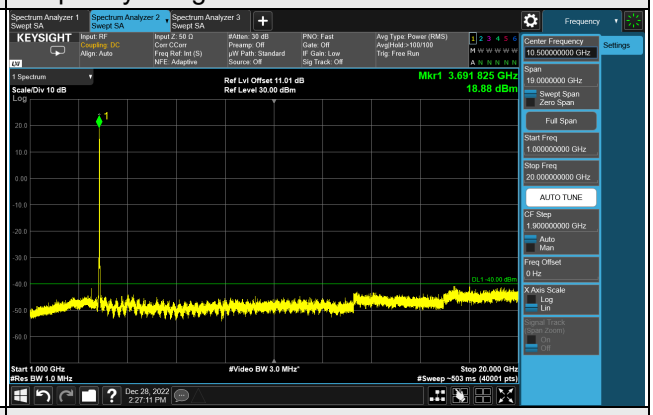
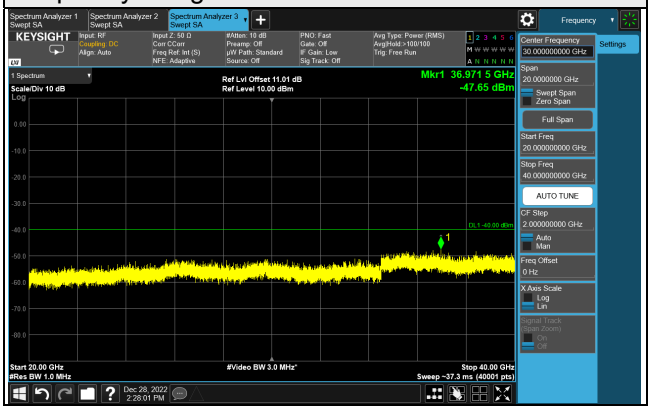
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

NR Band 48, Channel Bandwidth 10MHz	
Channel 641666 (3624.99MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

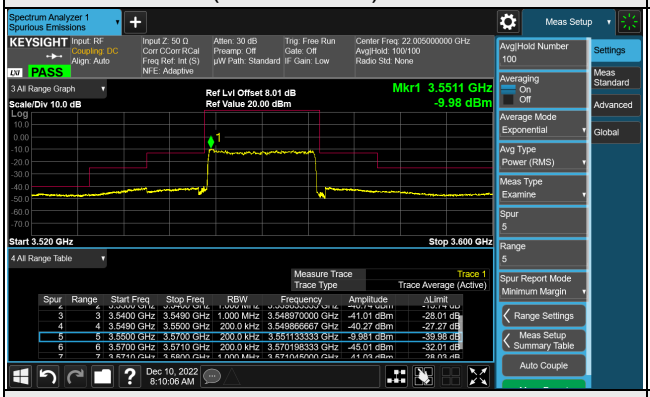
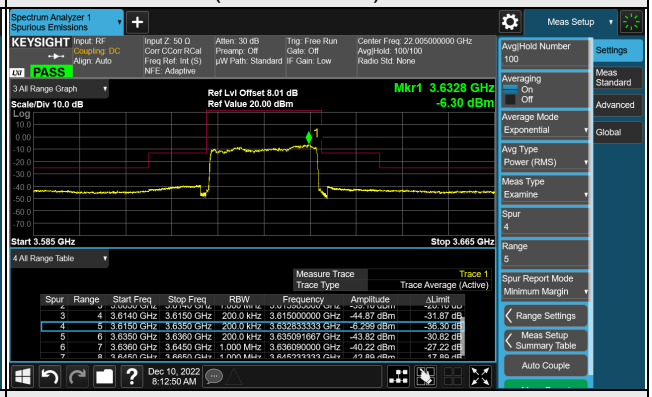
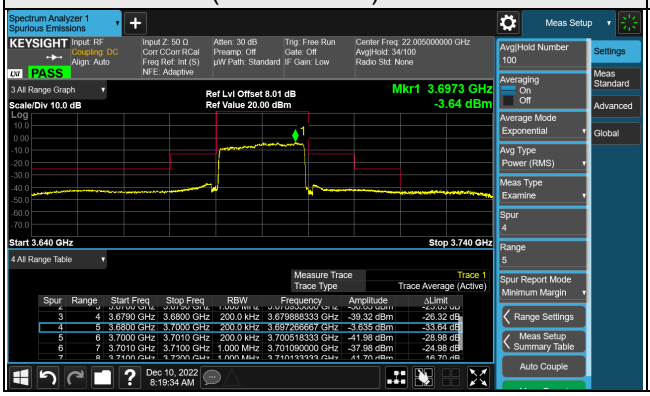
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 11.01dB

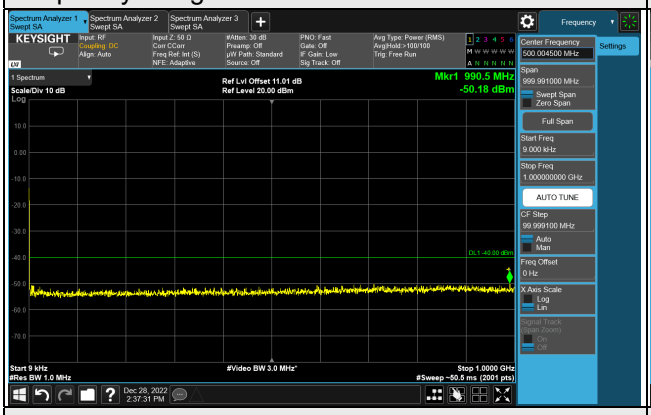
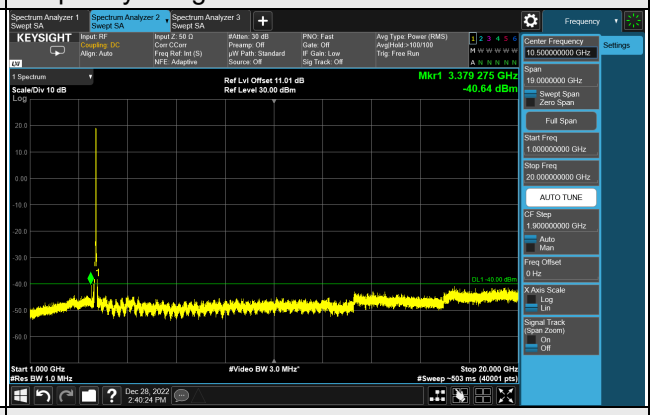
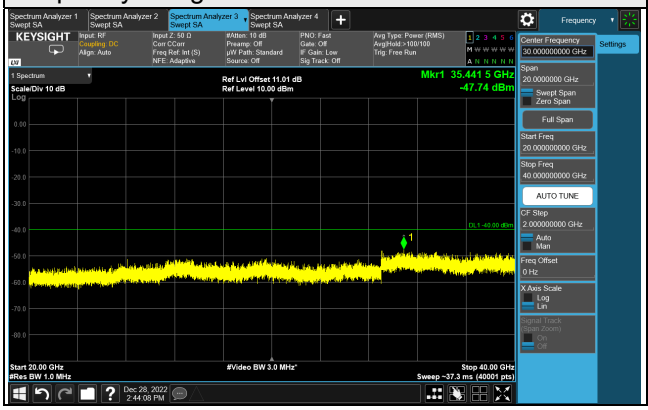
NR Band 48, Channel Bandwidth 10MHz	
Channel 646332 (3694.98MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

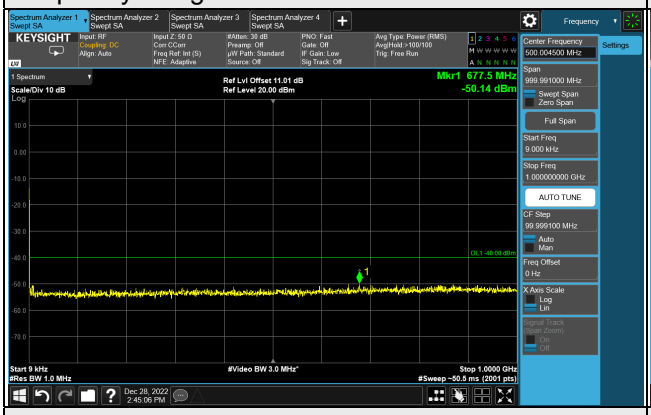
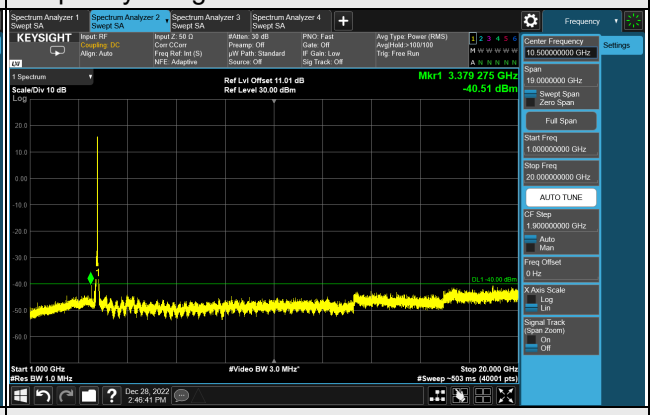
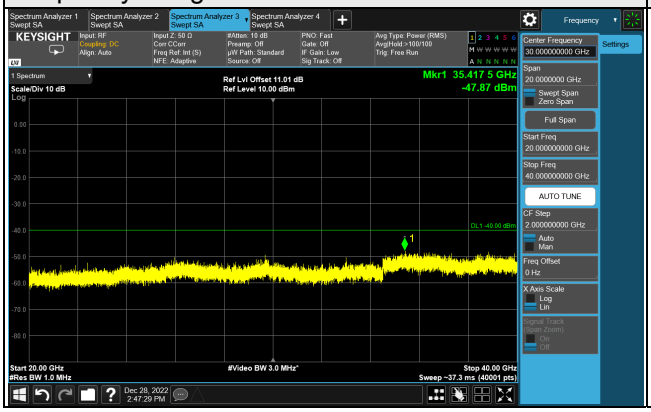
NR Band 48, Channel Bandwidth 20MHz	
Channel 637334 (3560.01MHz)	Channel 641666 (3624.99MHz)
	
Channel 646000 (3690.00MHz)	
	

Ref Lvl Offset = Attenuator (3dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 8.01dB

NR Band 48, Channel Bandwidth 20MHz	
Channel 637334 (3560.01MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

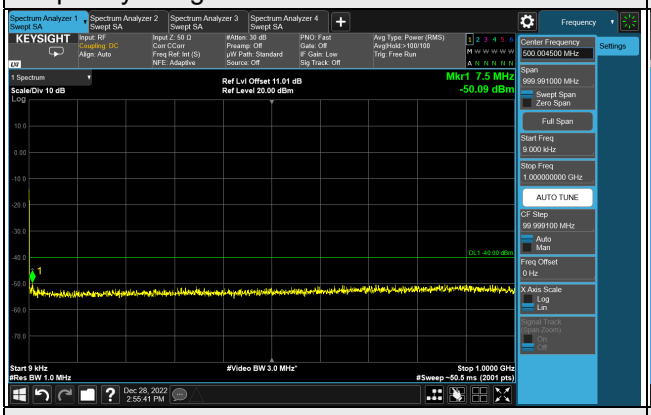
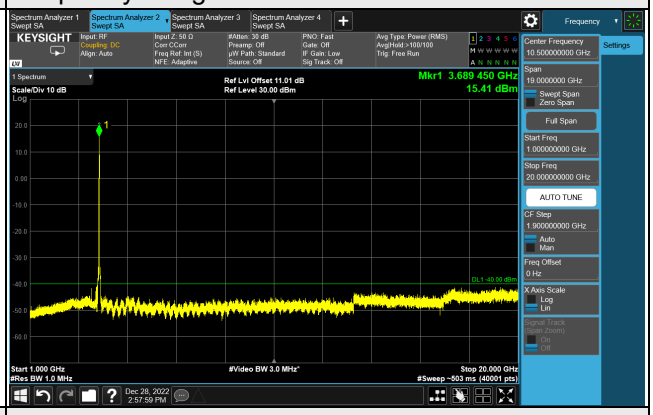
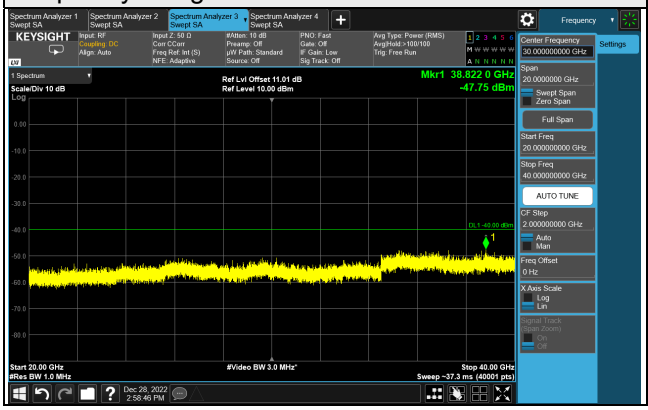
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

NR Band 48, Channel Bandwidth 20MHz	
Channel 641666 (3624.99MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

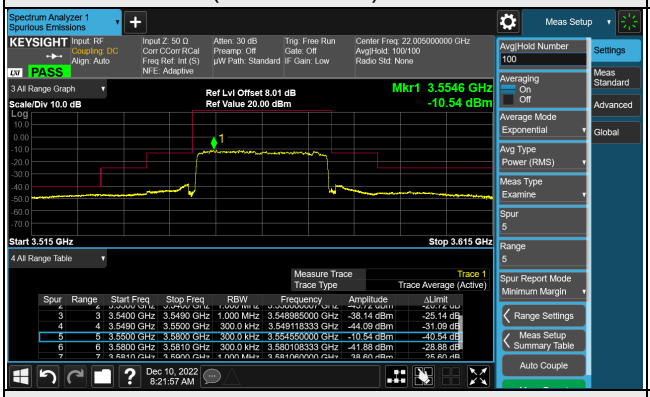
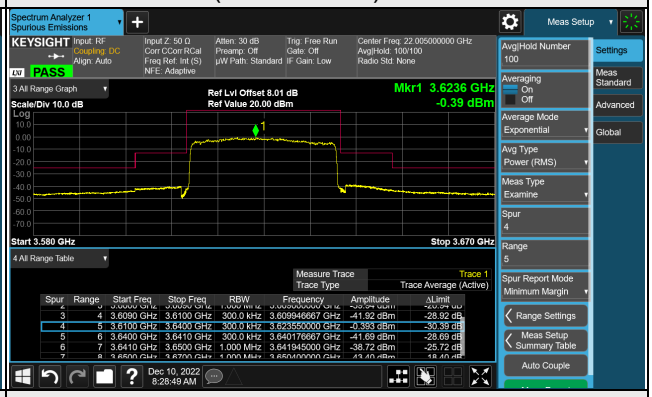
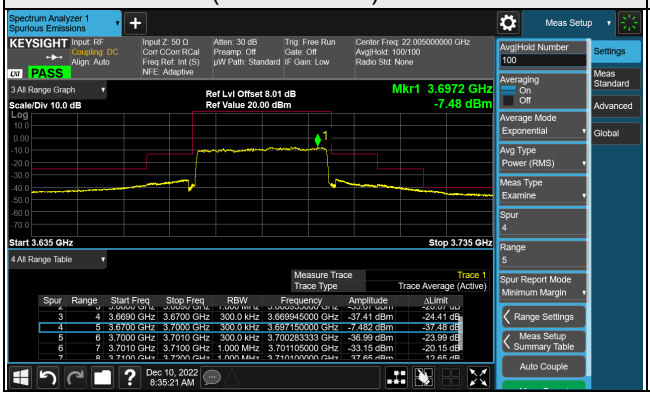
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 11.01dB

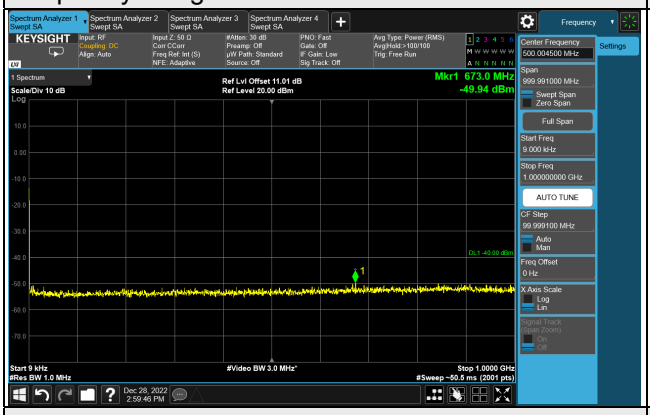
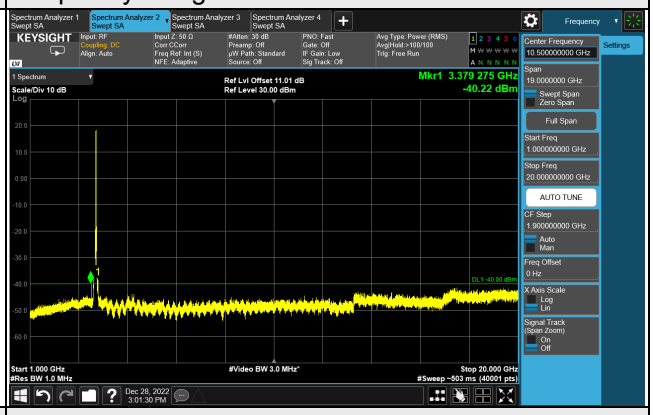
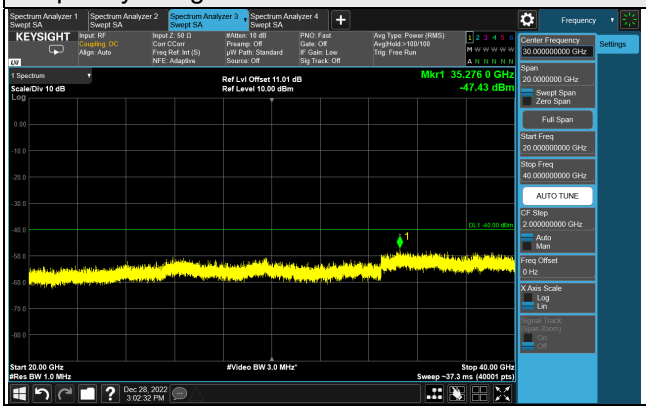
NR Band 48, Channel Bandwidth 20MHz	
Channel 646000 (3690.00MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

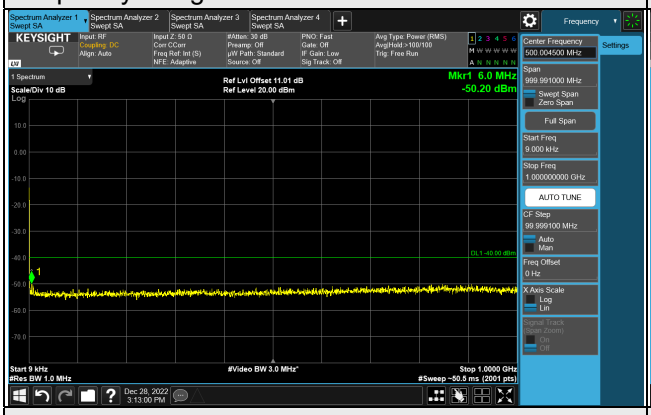
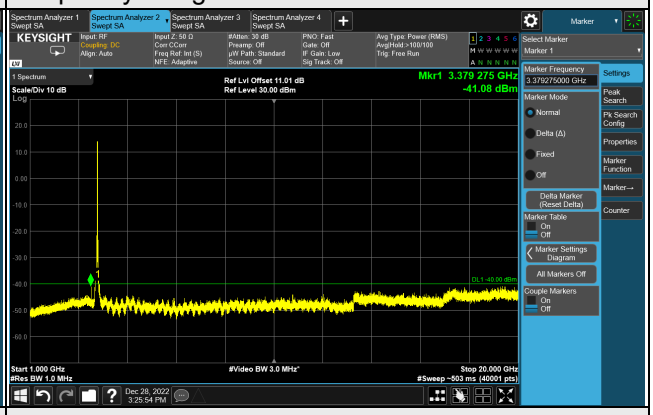
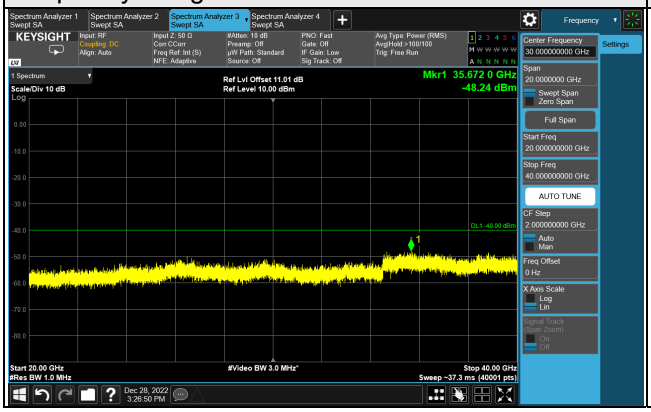
NR Band 48, Channel Bandwidth 30MHz	
Channel 637668 (3565.02MHz)	Channel 641666 (3624.99MHz)
	
Channel 645666 (3684.99MHz)	
	

Ref Lvl Offset = Attenuator (3dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 8.01dB

NR Band 48, Channel Bandwidth 30MHz	
Channel 637668 (3565.02MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

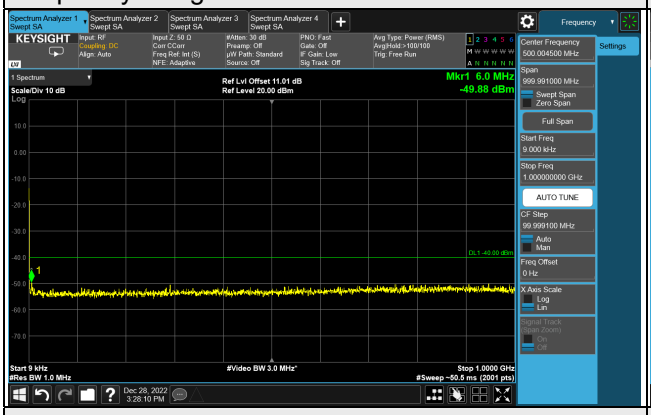
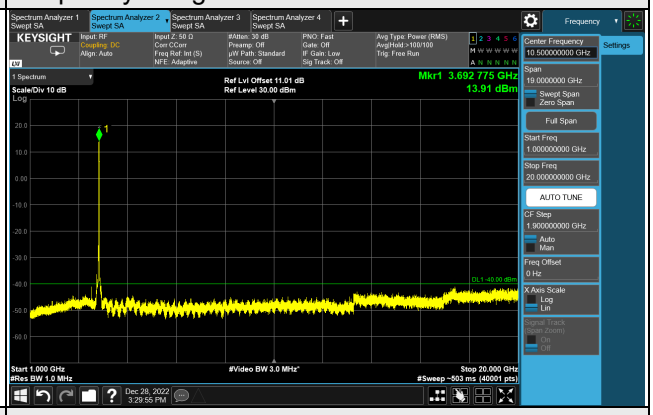
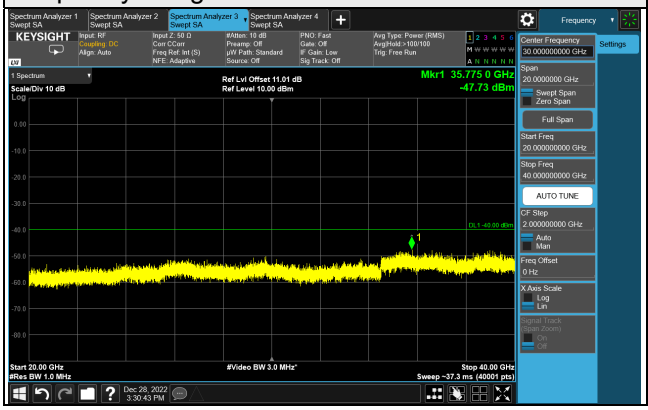
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

NR Band 48, Channel Bandwidth 30MHz	
Channel 641666 (3624.99MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

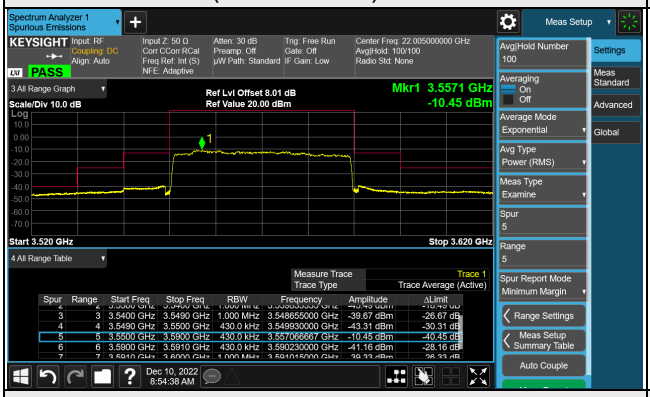
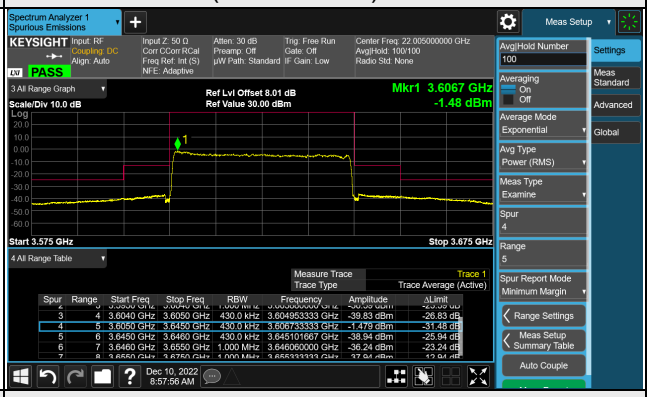
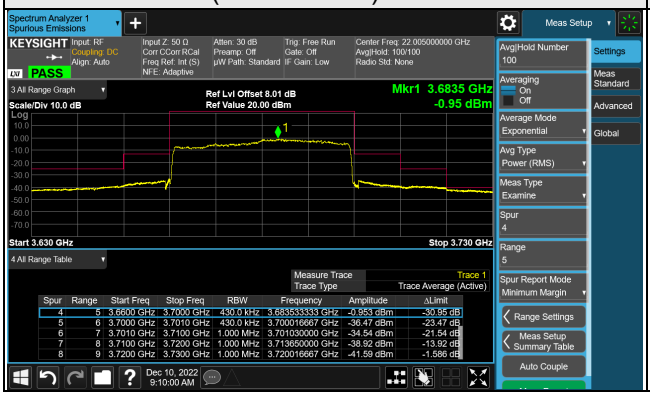
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 11.01dB

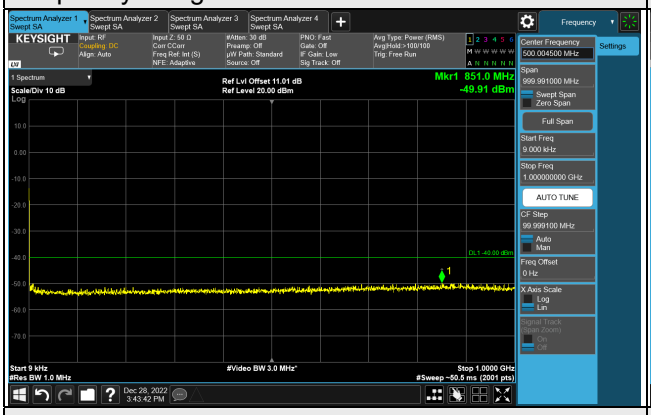
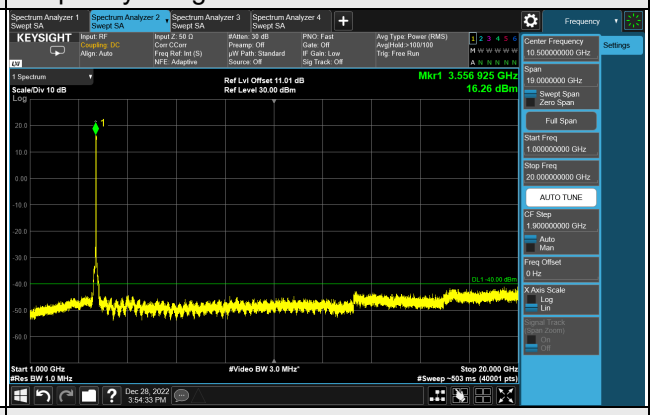
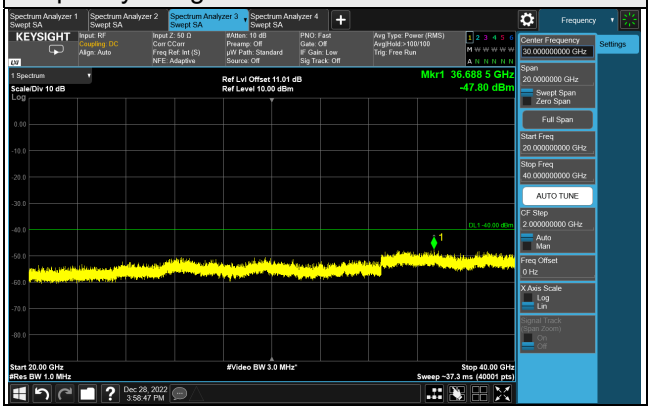
NR Band 48, Channel Bandwidth 30MHz	
Channel 645666 (3684.99MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

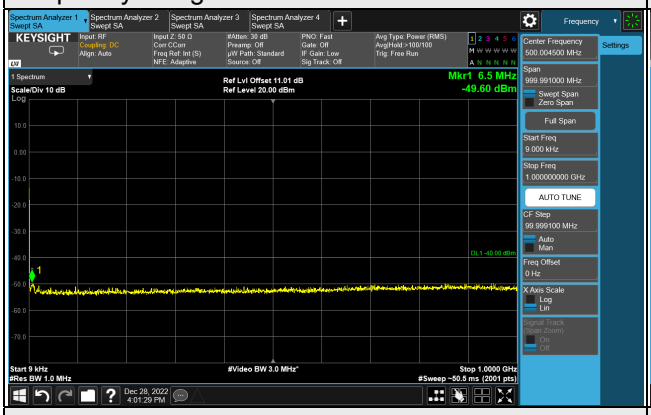
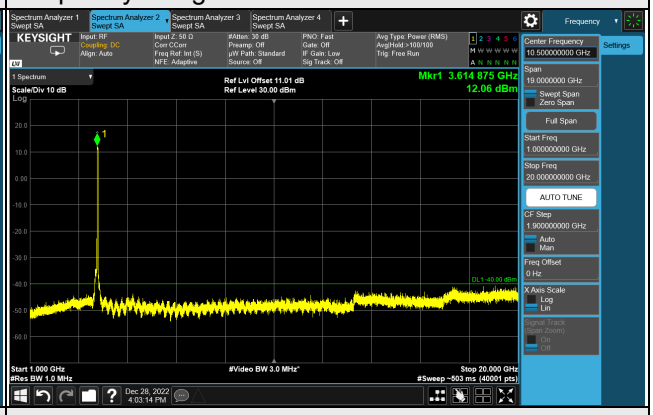
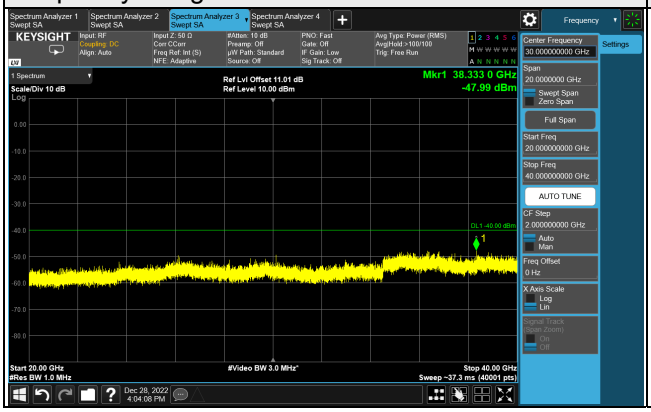
NR Band 48, Channel Bandwidth 40MHz	
Channel 638000 (3570.00MHz)	Channel 641666 (3624.99MHz)
	
Channel 645332 (3679.98MHz)	
	

Ref Lvl Offset = Attenuator (3dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 8.01dB

NR Band 48, Channel Bandwidth 40MHz	
Channel 638000 (3570.00MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

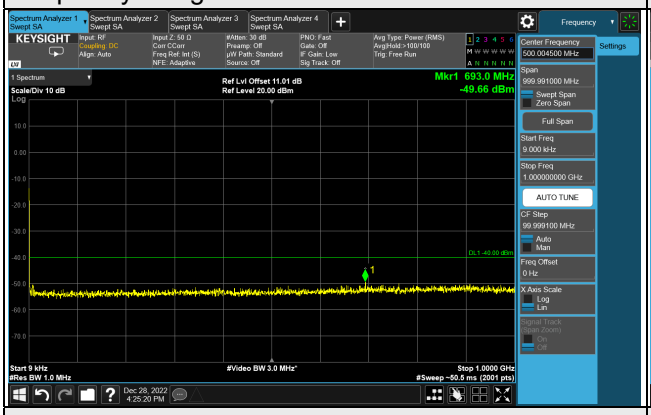
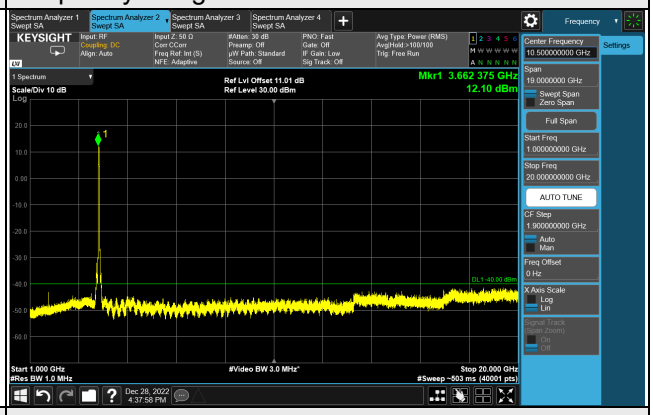
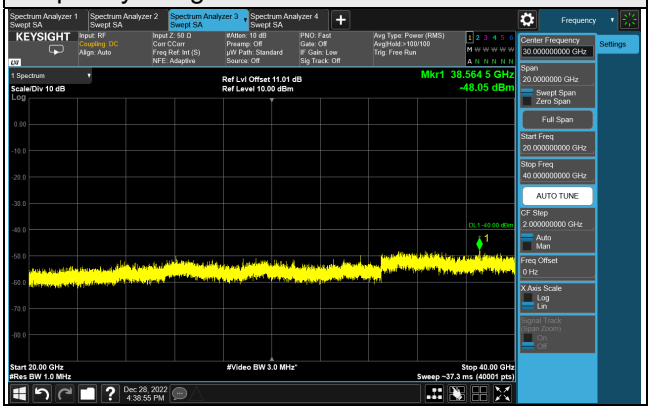
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

NR Band 48, Channel Bandwidth 40MHz	
Channel 641666 (3624.99MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

Note:

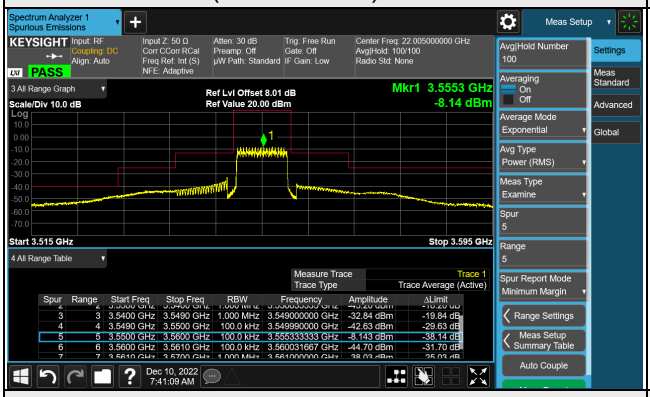
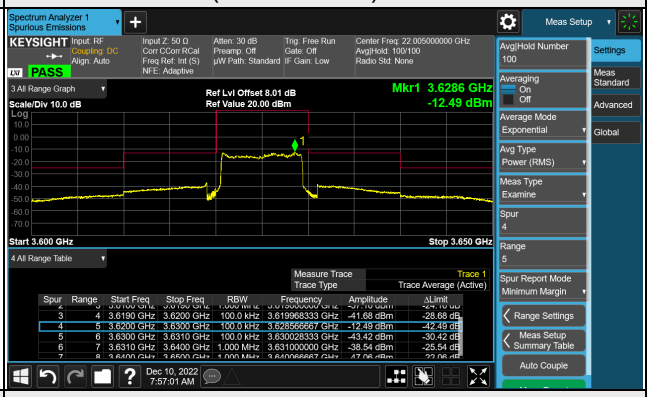
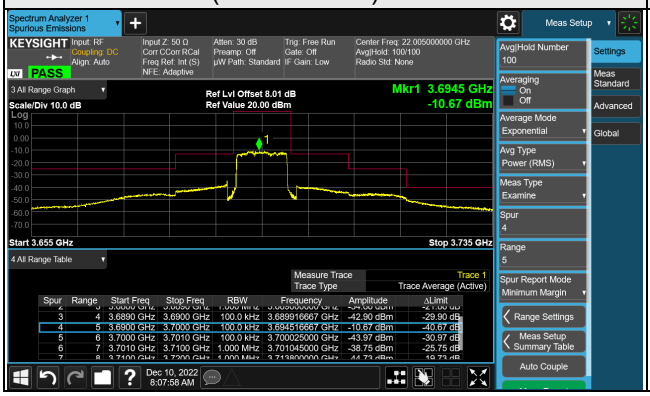
1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 11.01dB

NR Band 48, Channel Bandwidth 40MHz	
Channel 645332 (3679.98MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

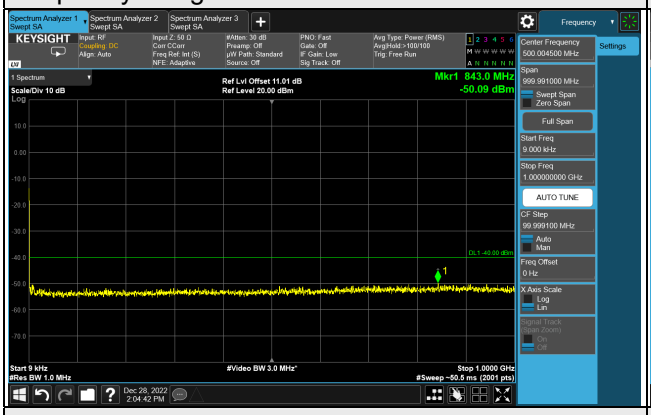
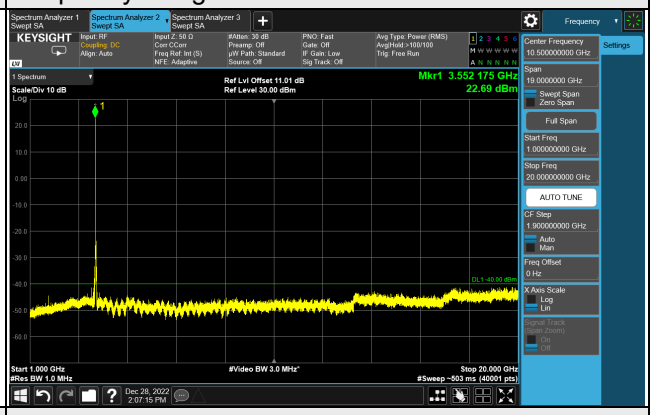
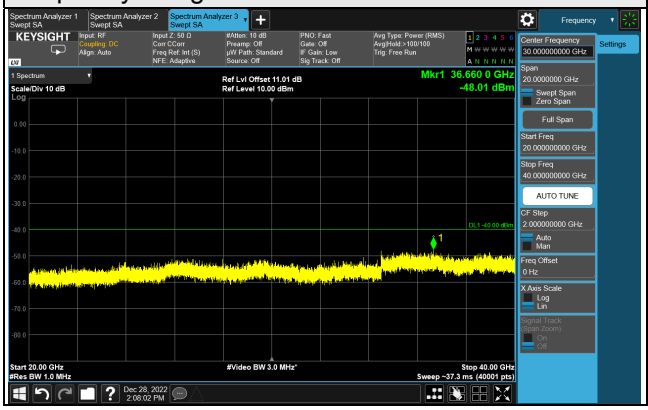
Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB

Chain 1

NR Band 48, Channel Bandwidth 10MHz	
Channel 637000 (3555.00MHz)	Channel 641666 (3624.99MHz)
	
Channel 646332 (3694.98MHz)	
	

Ref Lvl Offset = Attenuator (3dB) + Cable loss (2dB) + 10log($Numbers_{Ant}$) (3.01dB) = 8.01dB

NR Band 48, Channel Bandwidth 10MHz	
Channel 637000 (3555.00MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 20GHz
	
Frequency Range : 20GHz ~ 40GHz	
	

Note:

1. The signal at 9 kHz is IF signal from spectrum analyzer.
2. Ref Lvl Offset = Attenuator (6dB) + Cable loss (2dB) + 10log(Numbers$_{Ant}$) (3.01dB) = 11.01dB