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Ericsson AB

RF TEST REPORT

Report Type:
FCC Part 27 RF report

PRODUCT NAME:
AIR 6419 B77G

REPORT NUMBER:
230600678SHA-001

ISSUE DATE:
June 16, 2023

DOCUMENT CONTROL NUMBER:
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TEST REPORT

Report no.: 230600678SHA-001

Applicant:	Ericsson AB
	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Manufacturer:	Ericsson AB
	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
FCC ID:	TA8AKRD901238

SUMMARY:

The equipment is tested according to the following standard(s) or Specification:
FCC CFR 47 Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

PREPARED BY:	**REVIEWED BY:**
Victor Yang	Jackson Huang
Project Engineer	Reviewer
Victor Yang	Jackson Huang

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TEST REPORT

Content

Revision History

Report No.	Version	Description	Issued Date
230600678SHA-001	Rev. 01	Initial issue of report	June 16, 2023

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Max Output Power and Peak to Average Power Ratio and EIRP	27.50(k) 2.1046	Pass
Occupied Bandwidth	27.53(n) 2.1049	Pass
Unwanted Emissions at Band Edge	27.53(n) 2.1051	Pass
Conducted Unwanted Emission	27.53(n) 2.1051	Pass

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Description:	Antenna Integrated Radio
Product name:	AIR 6419 B77G
Product number:	KRD 901 238/1 (with un-security software and antenna) KRD 901 238/11 (with security software and antenna) KRD 901 238/3 * (with un-security software and CAB board for testing purpose) KRD 901 238/31 (with security software and CAB board for testing purpose) Note *: This is the tested unit.
Serial Number(s)	E23D833191
Rating:	-48V DC
Software Version:	PIS: CXP2030038/7_R46A123, UP: CXP2010174/1_R72A133
Hardware Version:	R1B
Sample received date:	May 30, 2023
Date of test:	May 30, 2023 ~ June 7, 2023

1.2 Technical Specification

Frequency Range:	TX/RX: 3450-3550 MHz
Number of Antenna ports:	64 TX/RX
Supported RAT:	NR
Max RF bandwidth (IBW):	100MHz
Supported Number of Carriers:	3
Supported modulation:	QPSK, 16QAM, 64QAM, 256QAM
Supported Channel Bandwidth:	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100 MHz
Declaration output power:	4W/MHz up to max 320W for Non Rural areas 8W/MHz up to max 320W for Rural areas

1.3 Description of Test Facility

Conducted testing:

Name:	Intertek Testing Services Shanghai
Address 1:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Address 2:	No. 5 Lize East Street, Ericsson Tower, Chaoyang District, Beijing 100102 P.R.C.
Telephone:	+86 21 61278200
Telefax:	+86 21 54262353
The test facility is recognized, certified, or accredited by these organizations:	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Related documents

FCC Part 27 (2021)
FCC Part 2 (2021)
ANSI C63.26:2015
KDB 971168 D01 v03r01
KDB 662911 D01 v02r01

2.2 Product Information

The Equipment Under Test (EUT) AIR 6419 B77G is an Ericsson Radio Unit working in the wireless communication services 3450-3550MHz band which provides communication connections to 3450-3550MHz network. AIR 6419 B77G operates from a -48V DC supply.
AIR 6419 B77G has 4 variants. Their difference is listed as below, and others are same.
KRD 901 238/1 (with un-security software and antenna)
KRD 901 238/11 (with security software and antenna)
KRD 901 238/3 (with un-security software and CAB board for testing purpose)
KRD 901 238/31 (with security software and CAB board for testing purpose)
We test KRD 901 238/3 as typical model and list the worst data.
The EUT includes 64 TX/RX ports. It can be configured to transmit in MIMO mode, and MIMO mode was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.
A full technical description can be found in the Manufacturer's documentation.

2.3 Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of all applicable antenna ports. By measuring the output power of QPSK, 16QAM, 64QAM and 256QAM on one of the antenna ports, it was determined that QPSK for NR was the worst case modulation schemes and were used for all testing.

Complete testing was carried out on the worst case antenna port which was established as being the highest output power from the 64 measured ports on worst case modulation scheme. This antenna port was Port 39 for all modes.

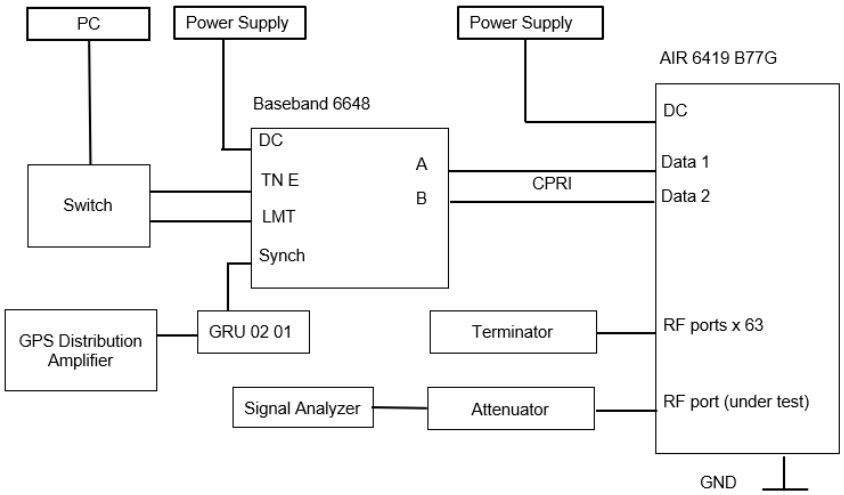
The settings below were used for all measurements unless otherwise noted:

Configuration	Carrier	NR Carrier BW (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-1C	1	15	3457.50	3500.01	3542.49
NR-2C	2	15	-	3457.50+3542.49	-
NR-3C	3	15	-	3457.50+3500.01+3542.49	-

Configuration	Carrier	NR Carrier BW (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-1C-BE	1	15	3457.50	-	3542.49
NR-2C-BE	2	15	3457.50+3472.5	-	3527.49+3542.49
NR-3C-BE	3	15	3457.50+3472.5 +3487.50	-	3512.52+3527.49 +3542.49

2.4 Test Setup

Conducted Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	PC	PowerEdge R230	-
2	DC Power Supply	N5767A/US17N6926P	-
3	DC Power Supply	N5767A/US22A1518R	-
4	Baseband 6648	KDU1370015/1	R3D
5	GRU 02 01	NCD 901 41/1	R1E
6	GPS Distribution Amplifier	58536A	-
7	Switch	LS-S5024E-CN	-
8	Terminator	HBTE-CT020-6-SM-15	-
9	Attenuator	DTS30GH-30-18G-SMAFM	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Max Output Power and Peak to Average Power Ratio and EIRP	20°C to 24°C	45%RH to 55%RH
Occupied Bandwidth		
Unwanted Emissions at Band Edge		
Conducted Unwanted Emission		

2.6 Instrument list

Intertek Testing Services Shanghai					
Used	Equipment	Manufacturer	Type	S/N	Due date
☒	PXA Signal Analyzer	Keysight	N9030A	MY54490394	2024.4.7
☐	Signal Generator	R&S	SMU200A	104834	2024.4.2
☐	Multi-meter	Fluke	117	93990470	2023.2.5
☐	Climatic Chamber	赛宝	CEEC-WR16H-50W	15-095	2023.9.19
☒	Humiture meter	托普	TPJ-20	TP161108085	2024.2.21
☐	Power sensor	R&S	NRP-Z11	107279	2023.7.14
☐	Power sensor	R&S	NRP-Z21	104785	2023.7.14
☐	Power meter	R&S	NRX	101690_BAMS-1002017384	2023. 8.9

2.7 Measurement uncertainty

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

Test item	Measurement uncertainty
Maximum output power	0.73dB
Occupied Bandwidth	0.88%
Unwanted Emissions at Band Edge	3.03dB
Conducted Unwanted Emission	3.03dB

3 Maximum Output Power and Peak to Average Power Ratio and EIRP

Test result: **Pass**

3.1 Limit

(1) The power of each fixed or base station transmitting in the 3450–3550 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.
(2) The power of each fixed or base station transmitting in the 3450–3550 MHz band and situated in any geographic location other than that described in paragraph (k)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

Peak to Average Ratio: ≤13 dB

3.2 Measurement Procedure

The EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at all antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

3.3 Measurement result

NR-1C, 4W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
1	QPSK	15	29.41	18.53	8.20	29.23	18.22	8.20	29.25	18.32	8.17
2	QPSK	15	29.35	18.49	8.18	29.40	18.40	8.18	29.23	18.42	8.17
3	QPSK	15	29.38	18.54	8.19	29.33	18.30	8.19	29.24	18.44	8.18
4	QPSK	15	29.11	18.15	8.22	29.20	18.15	8.22	29.05	18.17	8.20
5	QPSK	15	29.48	18.58	8.20	29.35	18.34	8.20	29.27	18.46	8.16
6	QPSK	15	29.35	18.51	8.18	29.33	18.44	8.19	29.26	18.43	8.16
7	QPSK	15	29.53	18.65	8.21	29.28	18.28	8.21	29.16	18.32	8.19
8	QPSK	15	29.14	18.36	8.20	29.35	18.39	8.22	29.27	18.47	8.20
9	QPSK	15	29.15	18.21	8.22	29.08	18.01	8.21	29.16	18.29	8.19
10	QPSK	15	29.32	18.36	8.22	29.28	18.32	8.23	29.27	18.36	8.19
11	QPSK	15	29.41	18.50	8.19	29.31	18.30	8.20	29.31	18.45	8.17
12	QPSK	15	29.24	18.33	8.19	29.29	18.34	8.20	29.17	18.30	8.18
13	QPSK	15	29.24	18.30	8.20	29.18	18.17	8.20	29.11	18.26	8.19
14	QPSK	15	29.30	18.38	8.18	29.09	18.00	8.19	29.08	18.28	8.16
15	QPSK	15	29.23	18.27	8.17	29.08	18.08	8.18	29.18	18.29	8.16
16	QPSK	15	29.45	18.49	8.20	29.22	18.13	8.19	29.01	18.21	8.18
17	QPSK	15	29.07	18.17	8.22	29.08	18.10	8.21	29.15	18.31	8.19
18	QPSK	15	29.13	18.26	8.28	29.07	18.08	8.28	29.03	18.17	8.30
19	QPSK	15	29.08	18.17	8.20	29.13	18.16	8.22	29.12	18.27	8.18
20	QPSK	15	29.17	18.28	8.21	29.07	18.09	8.22	29.15	18.31	8.20
21	QPSK	15	28.98	18.08	8.22	29.14	18.13	8.21	29.17	18.21	8.19
22	QPSK	15	29.07	18.33	8.17	29.27	18.38	8.21	29.11	18.32	8.18
23	QPSK	15	29.24	18.33	8.24	29.27	18.28	8.23	29.10	18.24	8.20
24	QPSK	15	29.01	18.07	8.22	29.05	18.11	8.23	28.89	18.08	8.20
25	QPSK	15	29.45	18.51	8.22	29.32	18.26	8.23	29.16	18.34	8.20
26	QPSK	15	29.36	18.45	8.22	29.15	18.24	8.22	29.12	18.32	8.20
27	QPSK	15	29.28	18.39	8.19	28.93	17.95	8.21	28.97	18.10	8.16
28	QPSK	15	29.32	18.47	8.20	29.23	18.26	8.19	29.00	18.23	8.18
29	QPSK	15	29.18	18.22	8.24	29.25	18.24	8.25	29.10	18.24	8.22
30	QPSK	15	29.32	18.45	8.24	29.29	18.27	8.22	29.14	18.39	8.20
31	QPSK	15	29.29	18.34	8.20	29.17	18.14	8.21	29.16	18.29	8.17
32	QPSK	15	29.29	18.38	8.22	29.27	18.29	8.21	29.25	18.40	8.19
33	QPSK	15	29.44	18.57	8.22	29.40	18.32	8.23	29.41	18.50	8.21
34	QPSK	15	29.22	18.30	8.22	29.32	18.30	8.20	29.47	18.50	8.17
35	QPSK	15	29.44	18.57	8.21	29.57	18.58	8.21	29.46	18.55	8.19
36	QPSK	15	29.02	18.18	8.22	29.26	18.15	8.23	29.32	18.45	8.22
37	QPSK	15	29.30	18.28	8.21	29.09	18.06	8.21	29.09	18.06	8.28

38	QPSK	15	29.41	18.52	8.22	29.27	18.30	8.22	29.28	18.42	8.19
39	QPSK	15	29.58	18.75	8.24	29.61	18.55	8.23	29.64	18.83	8.21
40	QPSK	15	29.49	18.55	8.24	29.20	18.14	8.23	29.29	18.50	8.21
41	QPSK	15	29.29	18.37	8.25	29.27	18.24	8.25	29.16	18.37	8.22
42	QPSK	15	29.21	18.28	8.25	29.13	18.17	8.25	29.07	18.22	8.22
43	QPSK	15	29.30	18.40	8.22	29.25	18.31	8.22	29.18	18.30	8.20
44	QPSK	15	29.28	18.34	8.23	29.16	18.14	8.23	29.09	18.21	8.21
45	QPSK	15	29.27	18.23	8.24	29.14	18.11	8.25	29.08	18.26	8.22
46	QPSK	15	29.33	18.38	8.22	29.37	18.34	8.24	29.28	18.43	8.20
47	QPSK	15	29.49	18.54	8.21	29.41	18.38	8.22	29.31	18.54	8.20
48	QPSK	15	29.40	18.44	8.23	29.18	18.29	8.24	29.21	18.34	8.22
49	QPSK	15	29.16	18.28	8.26	29.03	18.02	8.29	29.14	18.31	8.29
50	QPSK	15	29.45	18.56	8.28	29.13	18.13	8.28	29.19	18.29	8.25
51	QPSK	15	29.30	18.42	8.28	29.37	18.35	8.27	29.34	18.53	8.30
52	QPSK	15	29.11	18.22	8.30	29.08	18.03	8.29	29.05	18.15	8.28
53	QPSK	15	29.21	18.35	8.27	29.18	18.18	8.28	29.27	18.41	8.25
54	QPSK	15	29.21	18.30	8.26	29.28	18.28	8.25	29.37	18.45	8.25
55	QPSK	15	29.40	18.57	8.27	29.34	18.34	8.30	29.40	18.51	8.28
56	QPSK	15	29.12	18.22	8.32	29.14	18.18	8.29	29.26	18.49	8.31
57	QPSK	15	29.36	18.53	8.29	29.11	18.12	8.29	29.16	18.36	8.27
58	QPSK	15	29.27	18.35	8.29	29.20	18.15	8.29	29.03	18.15	8.29
59	QPSK	15	29.33	18.42	8.26	29.12	18.14	8.26	29.17	18.34	8.24
60	QPSK	15	29.32	18.45	8.25	29.17	18.20	8.27	29.20	18.21	8.26
61	QPSK	15	29.05	18.16	8.27	28.89	17.90	8.29	28.97	18.04	8.26
62	QPSK	15	29.17	18.26	8.28	29.17	18.12	8.27	29.13	18.12	8.25
63	QPSK	15	29.25	18.37	8.26	29.13	18.12	8.31	29.21	18.27	8.26
64	QPSK	15	29.15	18.26	8.27	29.12	18.12	8.28	29.10	18.18	8.26
Total			47.34	36.44	-	47.28	36.28	-	47.25	36.39	-
Antenna Gain			-	25.5	-	-	25.5	-	-	25.5	-
EIRP			-	61.94	-	-	61.78	-	-	61.89	-
Limit			-	62.15	-	-	62.15	-	-	62.15	-

NR-2C, 4W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
39	QPSK	15	-	-	-	32.03	18.33	-	-	-	-
10LOG64			-	-	-	-	18.06	-	-	-	-
Antenna Gain			-	-	-	-	25.5	-	-	-	-
EIRP			-	-	-	-	61.89	-	-	-	-
Limit			-	-	-	-	62.15	-	-	-	-

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NR-3C, 4W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
39	QPSK	15	-	-	-	34.02	18.41	-	-	-	-
10LOG64			-	-	-	-	18.06	-	-	-	-
Antenna Gain			-	-	-	-	25.5	-	-	-	-
EIRP			-	-	-	-	61.97	-	-	-	-
Limit			-	-	-	-	62.15	-	-	-	-

NR-1C, 8W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
1	QPSK	15	32.25	21.35	8.17	32.17	21.19	8.19	32.14	21.29	8.17
2	QPSK	15	32.07	21.21	8.16	32.15	21.20	8.18	32.04	21.26	8.15
3	QPSK	15	32.13	21.26	8.18	32.17	21.20	8.19	32.02	21.15	8.17
4	QPSK	15	31.96	21.09	8.20	32.02	21.03	8.21	31.91	21.11	8.18
5	QPSK	15	32.20	21.29	8.18	32.10	21.02	8.18	32.05	21.20	8.16
6	QPSK	15	32.10	21.24	8.17	32.15	21.17	8.18	32.09	21.21	8.15
7	QPSK	15	32.11	21.24	8.20	32.10	21.08	8.21	32.13	21.30	8.17
8	QPSK	15	32.24	21.27	8.19	32.18	21.28	8.20	32.07	21.27	8.18
9	QPSK	15	32.13	21.14	8.19	32.14	21.14	8.21	32.17	21.25	8.17
10	QPSK	15	32.10	21.24	8.19	32.15	21.19	8.20	32.18	21.35	8.18
11	QPSK	15	32.21	21.30	8.17	32.29	21.29	8.18	32.31	21.46	8.14
12	QPSK	15	32.18	21.39	8.18	32.17	21.19	8.19	32.12	21.24	8.16
13	QPSK	15	32.05	21.12	8.20	31.97	20.93	8.19	32.13	21.23	8.16
14	QPSK	15	32.20	21.29	8.16	32.10	21.04	8.18	32.16	21.30	8.16
15	QPSK	15	32.14	21.26	8.16	32.07	21.08	8.16	32.15	21.29	8.14
16	QPSK	15	32.16	21.24	8.18	32.12	21.09	8.18	32.06	21.16	8.17
17	QPSK	15	31.90	21.05	8.19	31.88	21.05	8.20	31.96	21.15	8.17
18	QPSK	15	32.02	21.18	8.25	32.09	21.60	8.28	32.10	21.15	8.24
19	QPSK	15	31.95	21.10	8.18	32.04	21.05	8.20	32.12	21.23	8.17
20	QPSK	15	32.08	21.20	8.21	32.03	21.04	8.22	32.06	21.17	8.19
21	QPSK	15	31.94	21.10	8.19	31.99	20.99	8.20	32.02	21.16	8.17
22	QPSK	15	32.15	21.32	8.18	32.31	21.38	8.20	32.11	21.39	8.18
23	QPSK	15	32.03	21.18	8.21	32.13	21.20	8.21	32.06	21.22	8.20
24	QPSK	15	31.98	21.19	8.21	32.02	21.06	8.22	31.90	21.15	8.20
25	QPSK	15	32.36	21.47	8.19	32.26	21.31	8.21	32.25	21.41	8.18

26	QPSK	15	32.26	21.42	8.20	32.21	21.23	8.20	32.19	21.34	8.18
27	QPSK	15	32.30	21.36	8.17	32.09	21.06	8.18	32.09	21.22	8.15
28	QPSK	15	32.31	21.55	8.18	32.35	21.48	8.18	32.25	21.45	8.16
29	QPSK	15	32.23	21.38	8.21	32.16	21.18	8.22	32.18	21.31	8.19
30	QPSK	15	32.27	21.42	8.20	32.27	21.29	8.21	32.26	21.41	8.18
31	QPSK	15	32.15	21.25	8.16	32.14	21.12	8.20	32.18	21.25	8.16
32	QPSK	15	32.22	21.29	8.20	32.27	21.24	8.21	32.23	21.40	8.18
33	QPSK	15	32.36	21.46	8.21	32.34	21.32	8.21	32.35	21.47	8.19
34	QPSK	15	32.29	21.37	8.19	32.28	21.27	8.18	32.19	21.32	8.16
35	QPSK	15	32.48	21.61	8.21	32.50	21.52	8.21	32.39	21.57	8.18
36	QPSK	15	32.06	21.11	8.21	32.21	21.17	8.22	32.27	21.40	8.20
37	QPSK	15	32.21	21.27	8.17	32.20	21.10	8.20	32.04	21.18	8.26
38	QPSK	15	32.49	21.62	8.19	32.53	21.45	8.21	32.52	21.57	8.18
39	QPSK	15	32.50	21.66	8.26	32.49	21.51	8.22	32.60	21.79	8.20
40	QPSK	15	32.44	21.57	8.23	32.40	21.34	8.27	32.51	21.72	8.21
41	QPSK	15	32.22	21.24	8.26	32.23	21.25	8.24	32.26	21.43	8.24
42	QPSK	15	32.18	21.28	8.24	32.20	21.14	8.24	32.17	21.29	8.23
43	QPSK	15	32.47	21.40	8.22	32.42	21.35	8.22	32.28	21.42	8.21
44	QPSK	15	32.12	21.31	8.21	32.23	21.27	8.21	32.27	21.40	8.22
45	QPSK	15	32.24	21.33	8.26	32.15	21.15	8.27	32.20	21.38	8.21
46	QPSK	15	32.32	21.38	8.20	32.34	21.28	8.25	32.39	21.45	8.24
47	QPSK	15	32.39	21.52	8.22	32.33	21.36	8.21	32.41	21.57	8.19
48	QPSK	15	32.09	21.15	8.28	31.90	20.79	8.21	32.04	21.16	8.21
49	QPSK	15	32.08	21.25	8.25	32.05	21.07	8.33	32.23	21.38	8.27
50	QPSK	15	32.38	21.53	8.26	32.19	21.23	8.26	32.40	21.49	8.26
51	QPSK	15	32.30	21.36	8.27	32.31	21.33	8.28	32.33	21.51	8.29
52	QPSK	15	32.08	21.18	8.33	32.20	21.19	8.29	32.15	21.25	8.24
53	QPSK	15	32.24	21.39	8.26	32.24	21.28	8.31	32.30	21.42	8.26
54	QPSK	15	32.03	21.16	8.25	32.10	21.06	8.27	32.08	21.34	8.29
55	QPSK	15	32.39	21.48	8.28	32.40	21.44	8.26	32.47	21.63	8.25
56	QPSK	15	32.30	21.44	8.25	32.38	21.41	8.27	32.41	21.54	8.23
57	QPSK	15	32.32	21.43	8.26	32.15	21.14	8.27	32.28	21.49	8.24
58	QPSK	15	32.11	21.20	8.30	32.10	21.15	8.29	32.13	21.33	8.29
59	QPSK	15	32.22	21.32	8.23	32.07	21.08	8.29	32.15	21.30	8.24
60	QPSK	15	32.18	21.33	8.24	32.11	21.12	8.28	32.13	21.21	8.22
61	QPSK	15	32.00	21.12	8.30	32.03	20.92	8.28	32.07	21.20	8.29
62	QPSK	15	32.10	21.26	8.28	32.15	21.12	8.27	32.07	21.21	8.25
63	QPSK	15	32.18	21.34	8.26	32.13	21.08	8.28	32.17	21.29	8.28
64	QPSK	15	32.08	21.17	8.25	32.08	21.04	8.28	32.09	21.19	8.29
Total			50.26	39.37	-	50.25	39.26	-	50.25	39.40	-
Antenna Gain			-	25.5	-	-	25.5	-	-	25.5	-
EIRP			-	64.87	-	-	64.76	-	-	64.90	-
Limit			-	65.15	-	-	65.15	-	-	65.15	-

TEST REPORT

NR-2C, 8W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
39	QPSK	15	-	-	-	34.98	21.22	-	-	-	-
10LOG64			-	-	-	-	18.06	-	-	-	-
Antenna Gain			-	-	-	-	25.5	-	-	-	-
EIRP			-	-	-	-	64.78	-	-	-	-
Limit			-	-	-	-	65.15	-	-	-	-

NR-3C, 8W/MHz

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
39	QPSK	15	-	-	-	36.10	20.47	-	-	-	-
10LOG64			-	-	-	-	18.06	-	-	-	-
Antenna Gain			-	-	-	-	25.5	-	-	-	-
EIRP			-	-	-	-	64.03	-	-	-	-
Limit			-	-	-	-	65.15	-	-	-	-

4 Occupied Bandwidth

Test result: Pass

4.1 Measurement Procedure

The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The measurement method is from KDB 971168 4.2:
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 product s including the emission skirts (i.e., two to five times the OBW).
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.
d) Set the detection mode to peak, and the trace mode to max hold.
e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

4.2 Measurement result

NR-1C, 8W/MHz

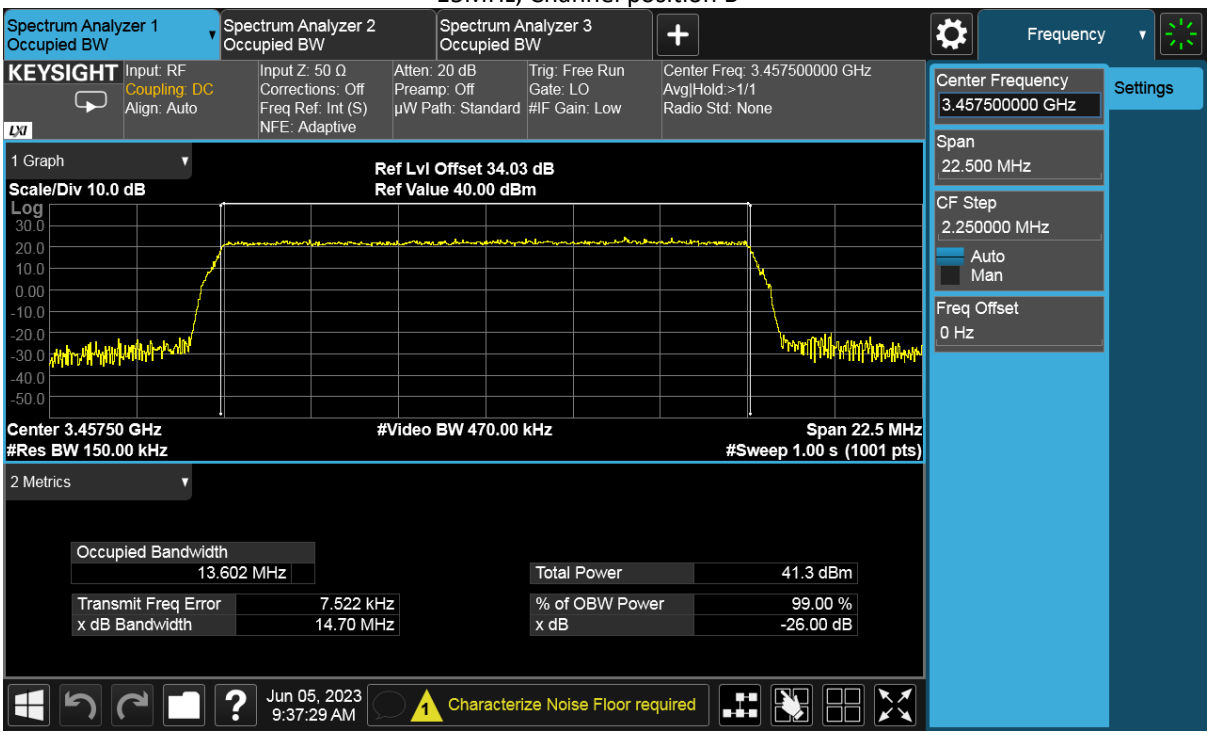
99% Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
39	QPSK	15MHz	13.602	13.592	13.601

-26dBc Occupied Bandwidth

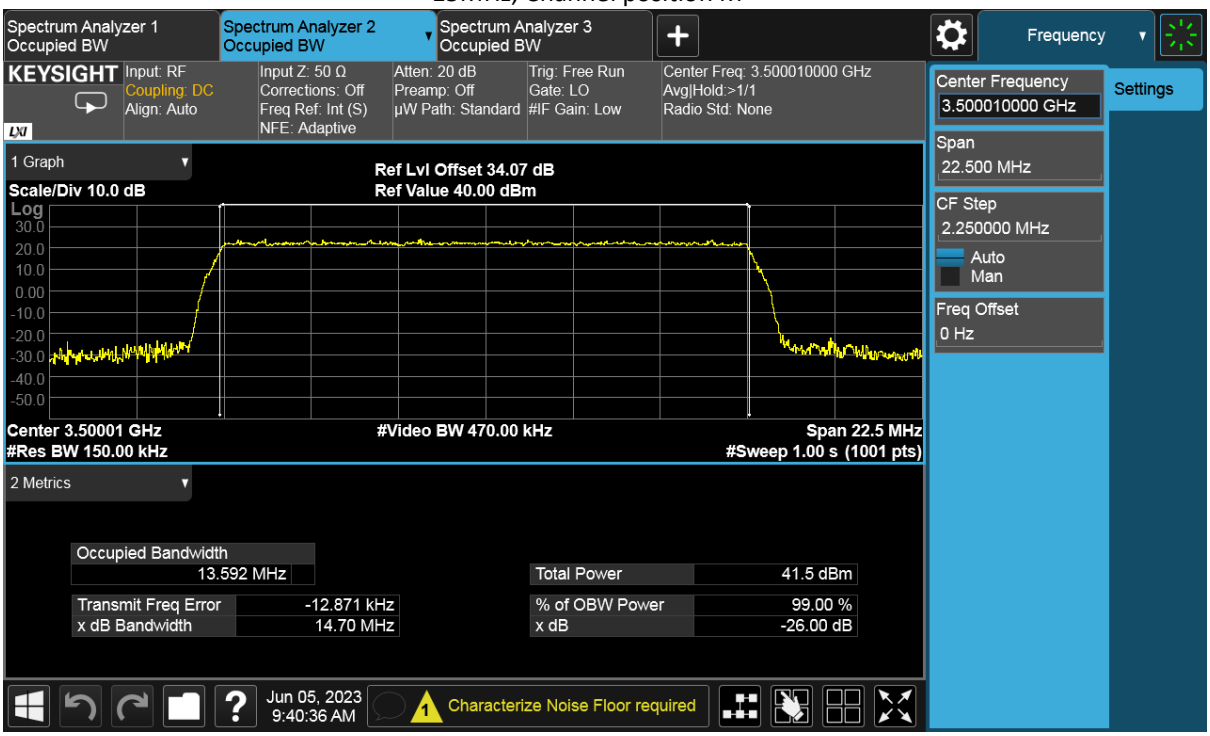
Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
39	QPSK	15MHz	14.70	14.70	14.65

15MHz, Channel position B

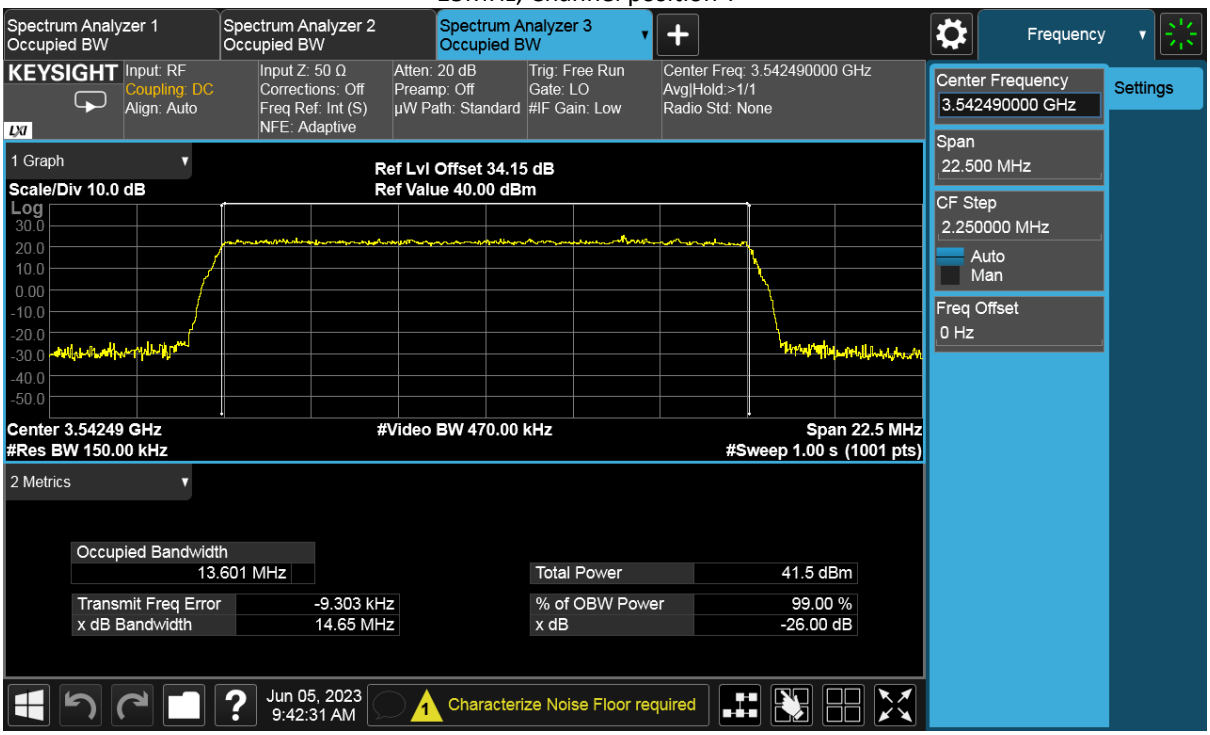


TEST REPORT

15MHz, Channel position M



15MHz, Channel position T



5 Unwanted Emissions at Band Edge

Test result: **Pass**

5.1 Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

5.2 Measurement Procedure

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

For MIMO mode configurations, the limit was adjusted with a correction of -18.06dB [10Log(1/64)] by using the Measure and Add 10Log(N) dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports . Then the limit was adjusted to -31.06dBm.

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges.

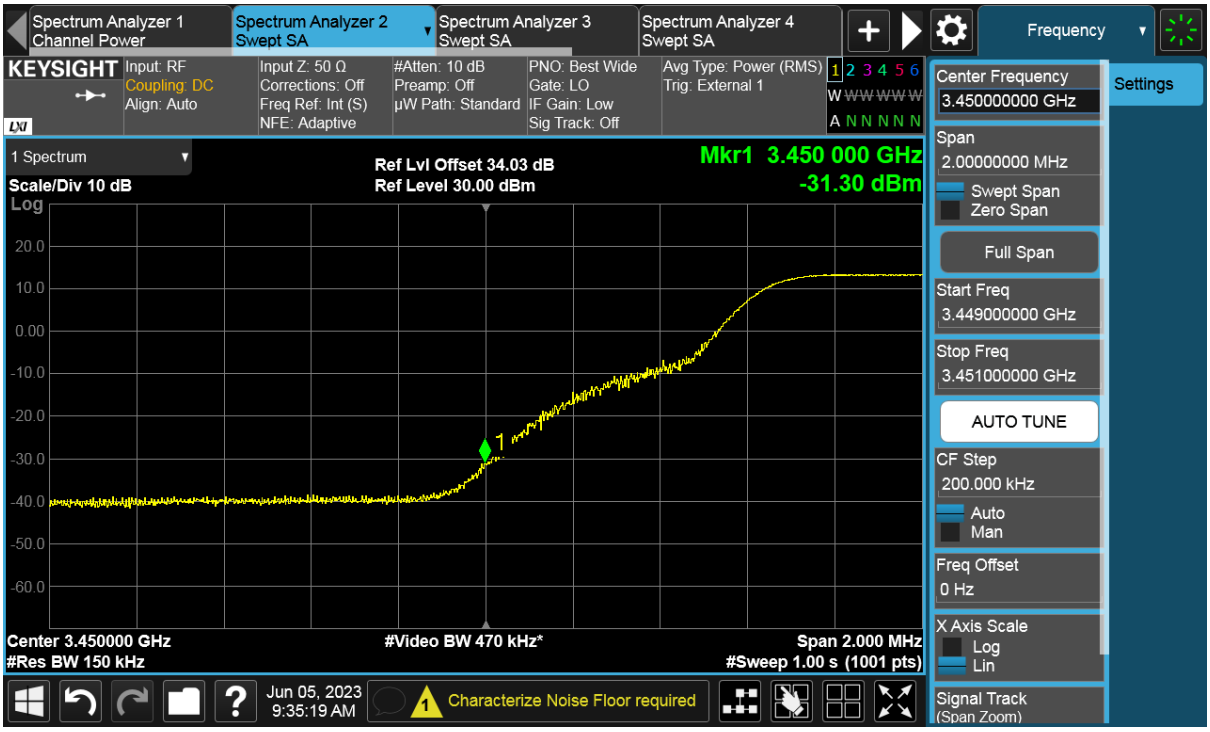
Spectrum analyzer detector was set as RMS.

5.3 Measurement result

NR-1C-BE, 8W/MHz

Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	B	QPSK	15	150	-31.06
39	T	QPSK	15	150	-31.06

Channel Position B



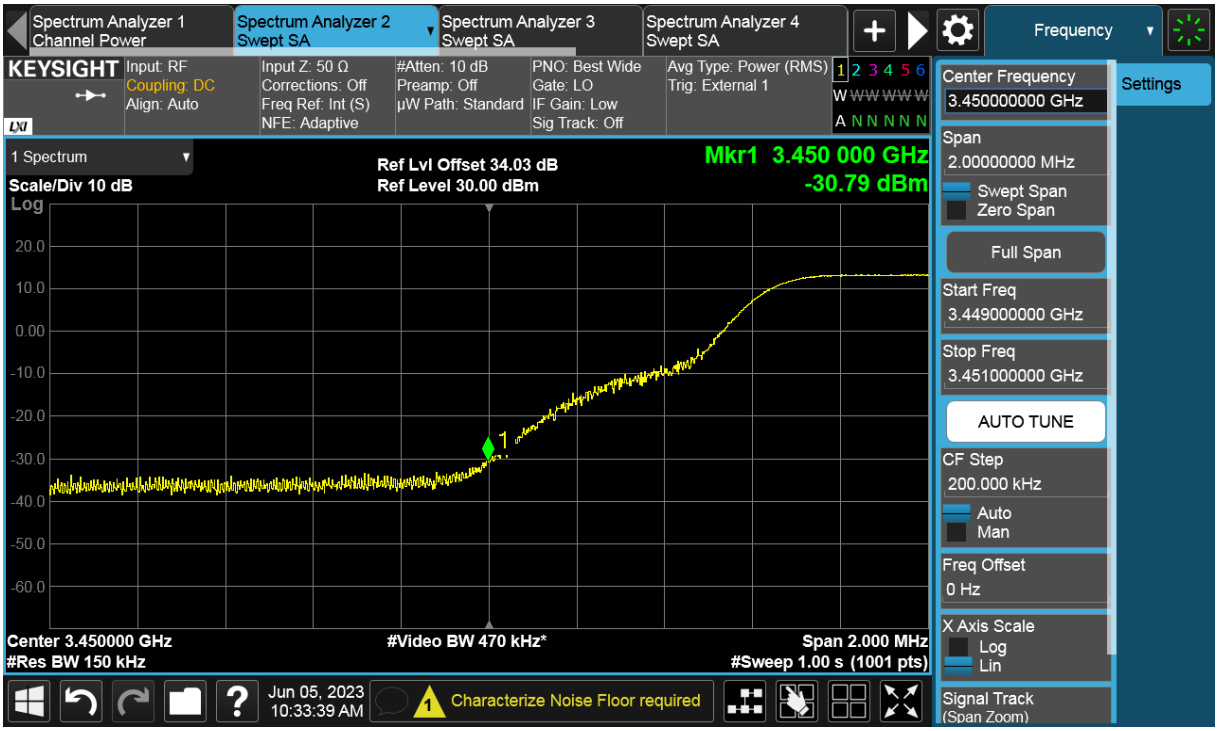
TEST REPORT

Channel Position T

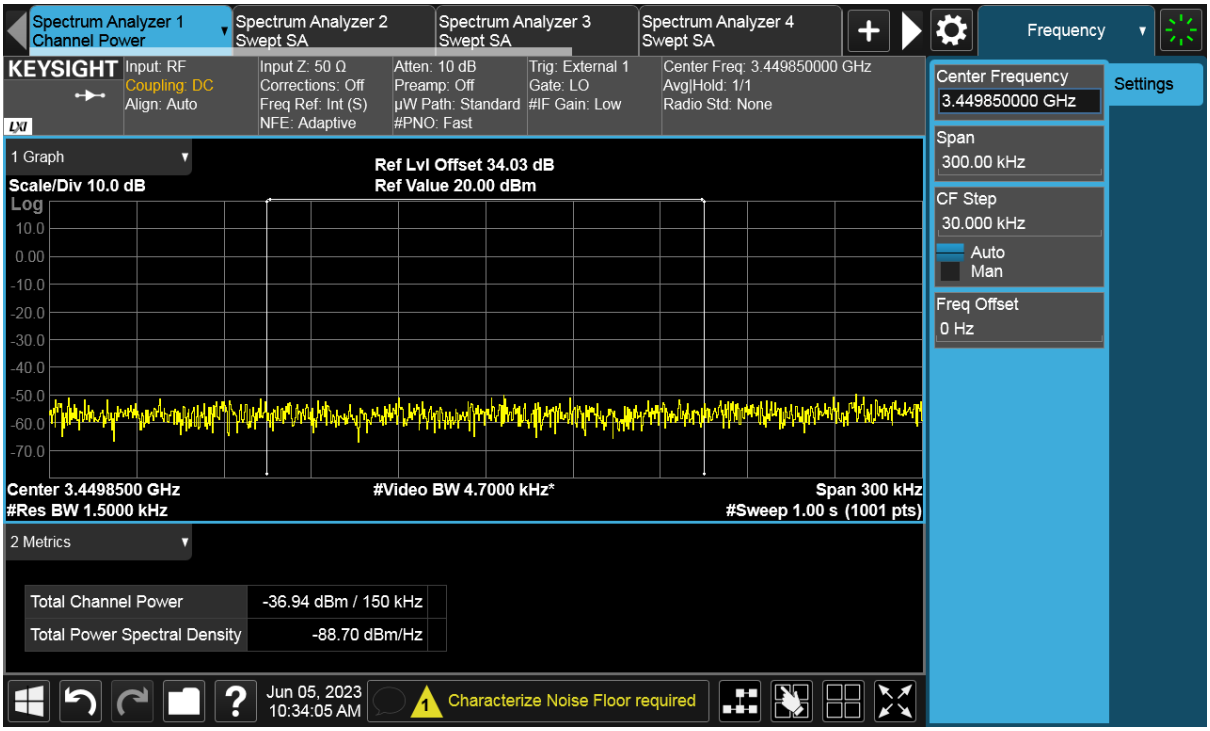
NR-2C-BE, 8W/MHz

Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	B	QPSK	15	150	-31.06
39	T	QPSK	15	150	-31.06

Channel Position B



TEST REPORT



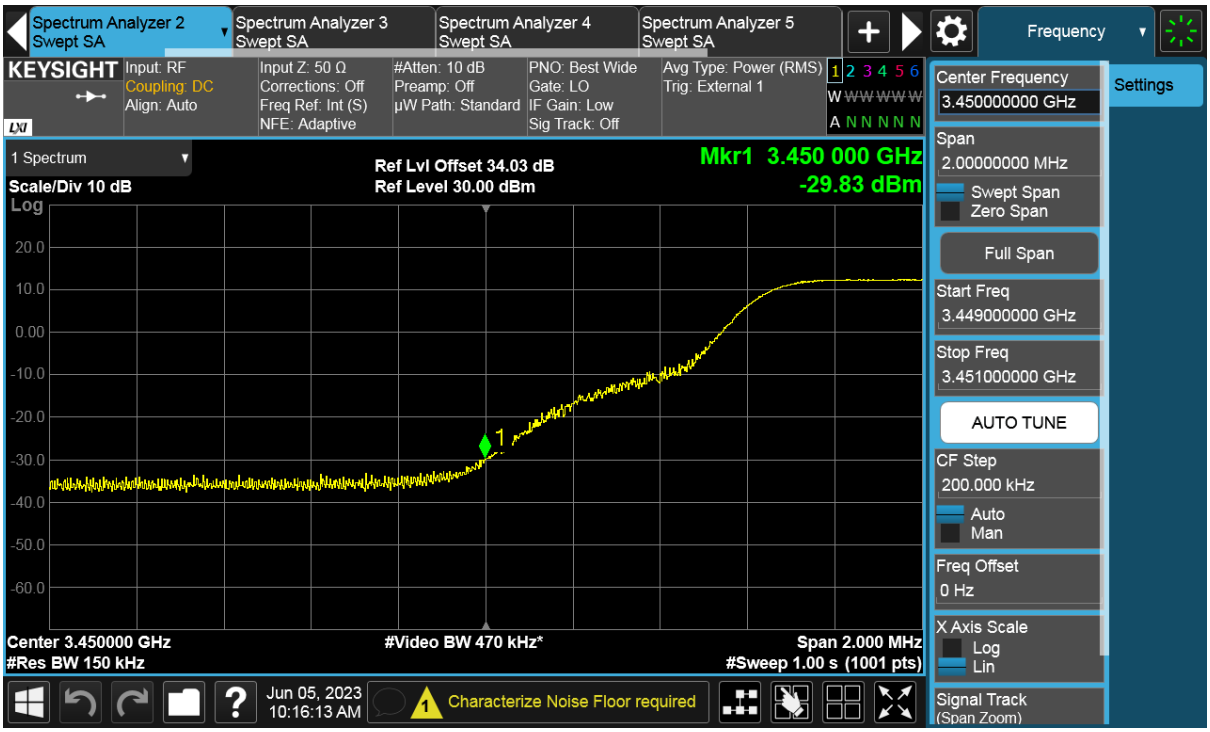
Channel Position T

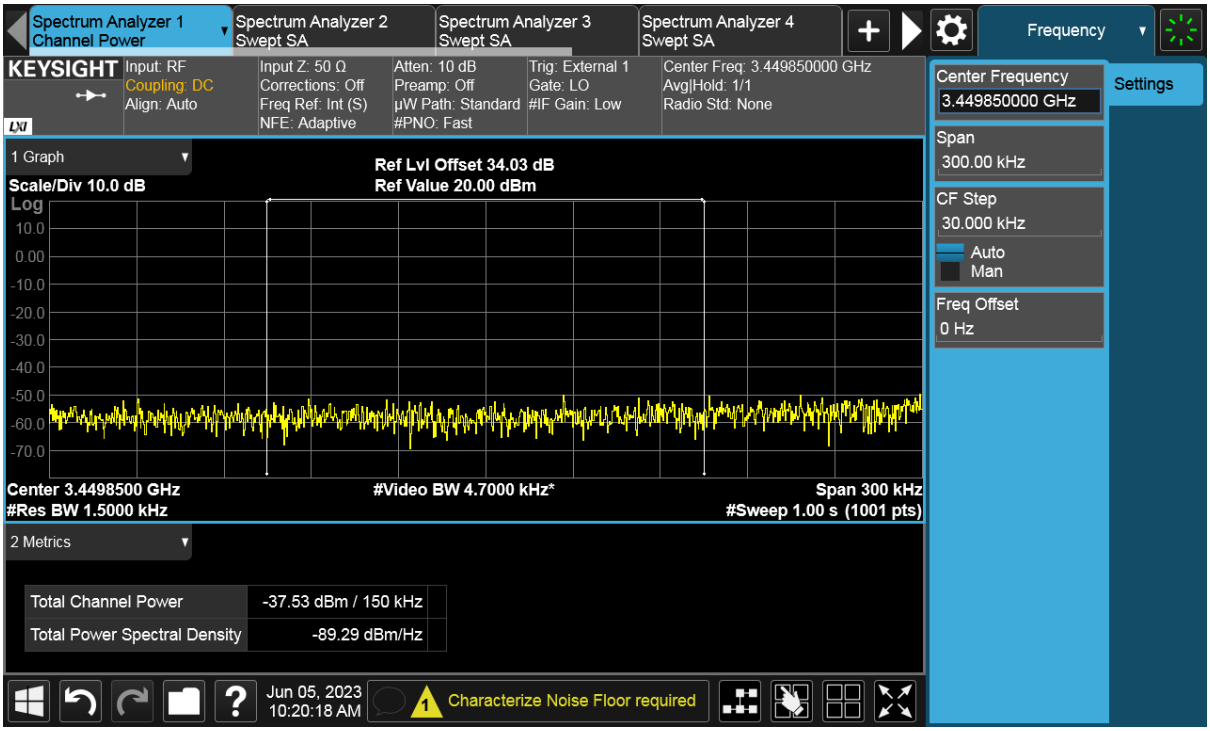
TEST REPORT

NR-3C-BE, 8W/MHz

Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	B	QPSK	15	150	-31.06
39	T	QPSK	15	150	-31.06

Channel Position B





TEST REPORT

Channel Position T

6 Conducted Unwanted Emission

Test result: **Pass**

6.1 Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

6.2 Measurement Procedure

In accordance with FCC rules, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 35.5GHz. The resolution bandwidth of 1MHz was employed for frequency band 9kHz to 40GHz. The spectrum analyzer detector was set to RMS.

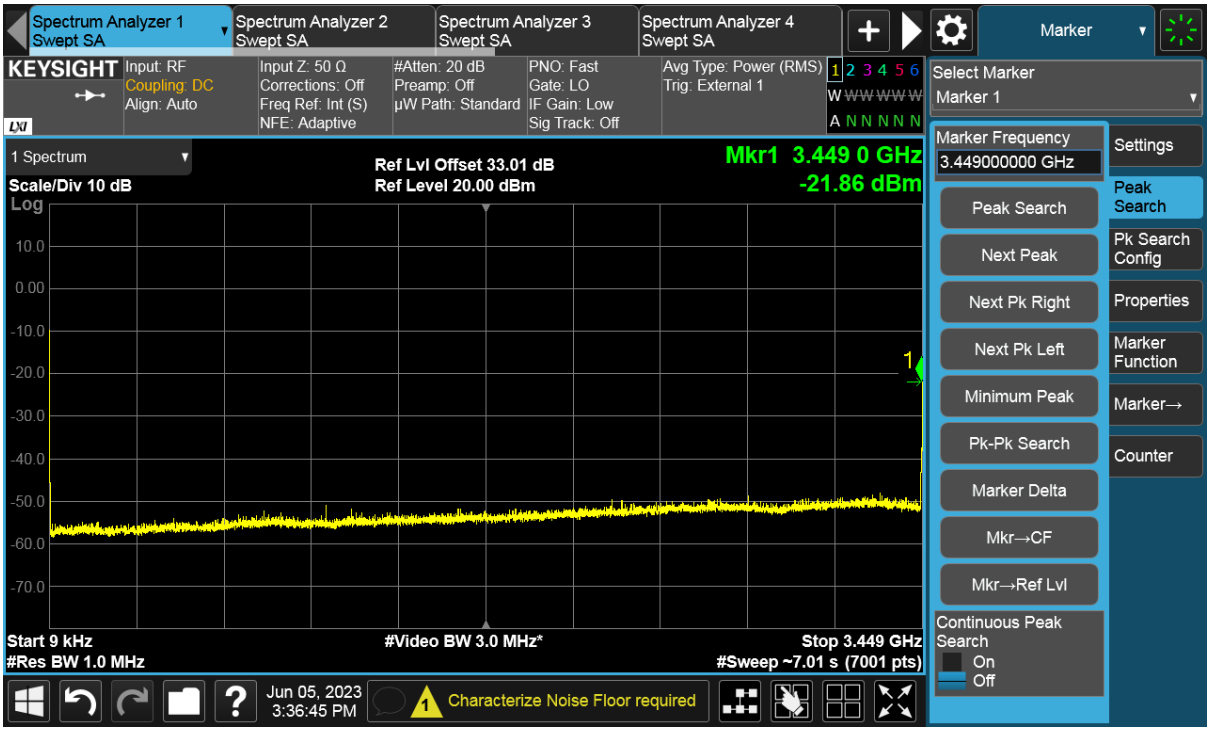
For MIMO mode configurations, the limit was adjusted with a correction of -18.06dB [10Log(1/64)] by using the Measure and Add 10Log(N) dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports. Then the limit was adjusted to -31.06dBm.

6.3 Measurement result

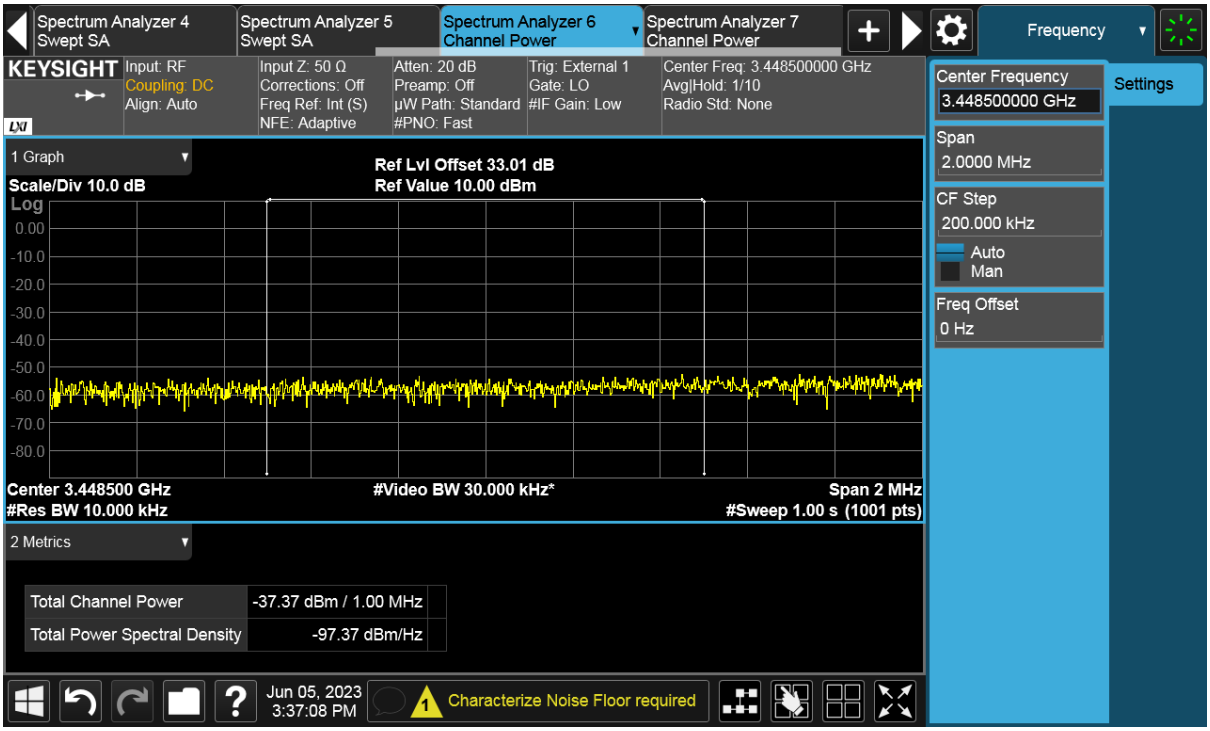
NR-1C, 8W/MHz

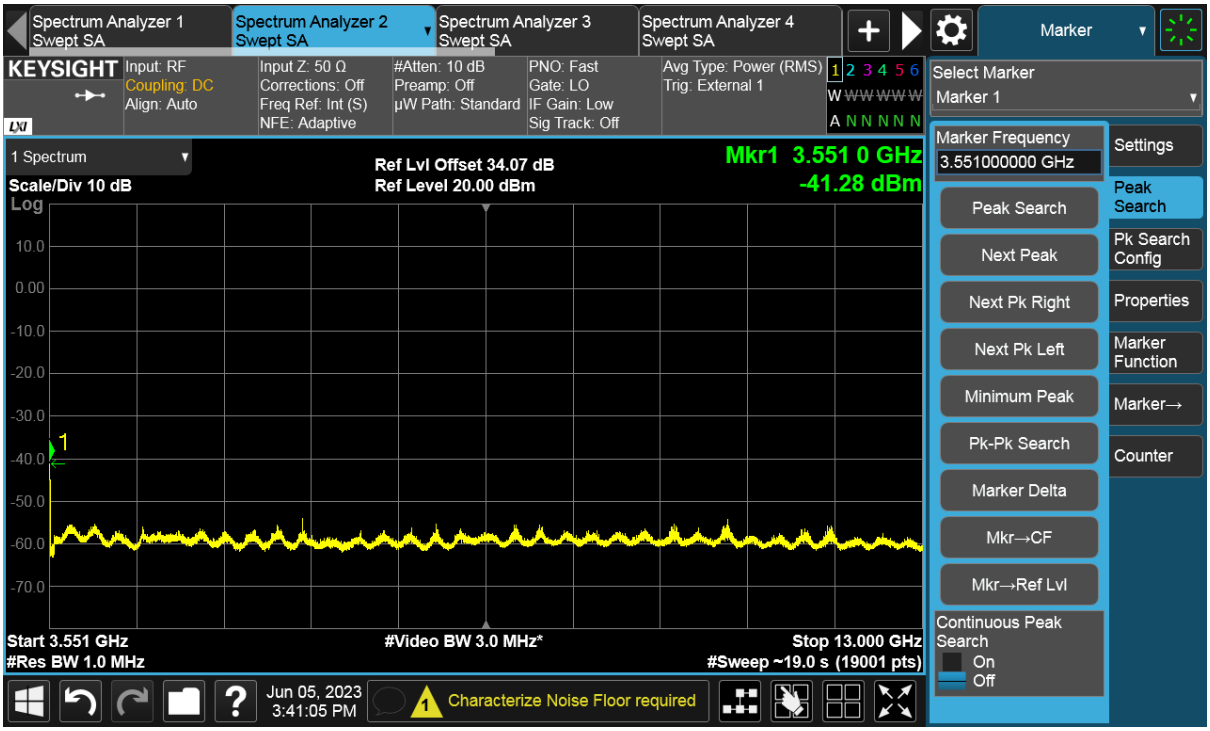
Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	B	QPSK	15	1000	-31.06
39	M	QPSK	15	1000	-31.06
39	T	QPSK	15	1000	-31.06

Channel Position B

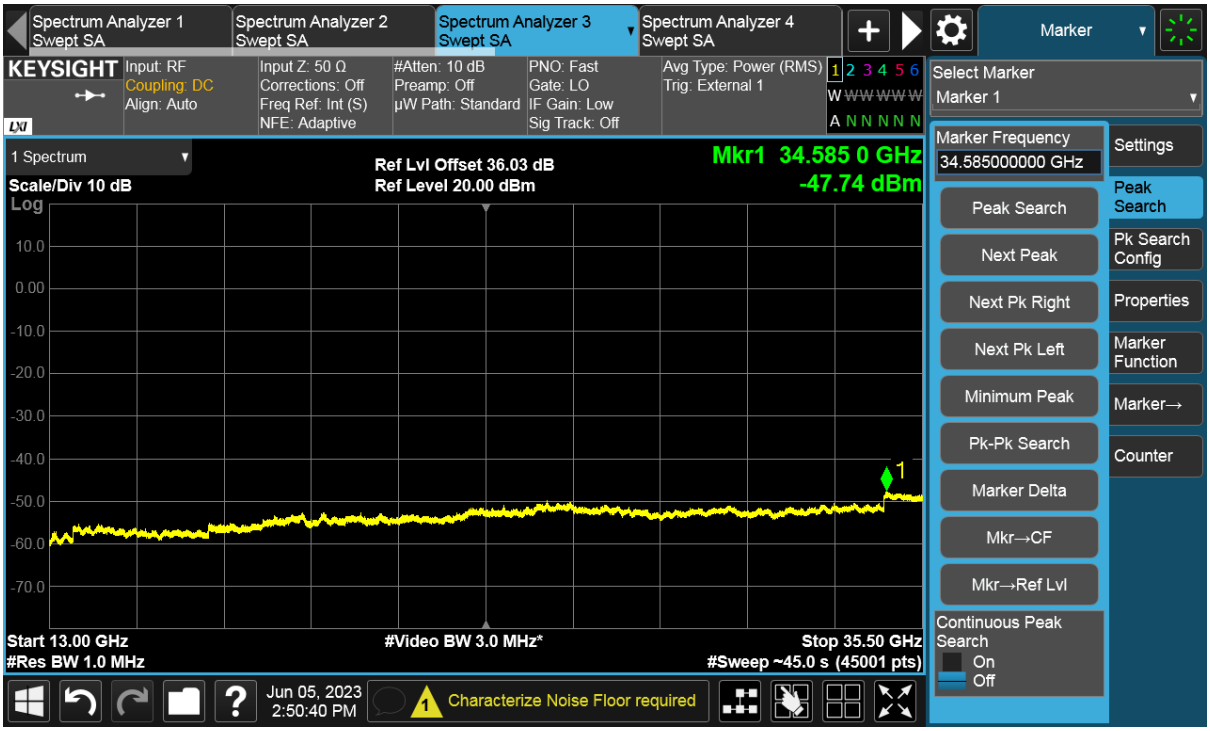


TEST REPORT


Spectrum Analyzer 4 Swept SA
Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Channel Power
Spectrum Analyzer 7 Channel Power
Frequency
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
Atten: 20 dB
Preamp: Off
µW Path: Standard
#PNO: Fast
Trig: External 1
Gate: LO
#IF Gain: Low
Center Freq: 3.448500000 GHz
Avg|Hold: 1/10
Radio Std: None
Center Frequency
3.448500000 GHz
Settings
Span
2.0000 MHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
1 Graph
Ref Lvl Offset 33.01 dB
Scale/Div 10.0 dB
Ref Value 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 3.448500 GHz
#Res BW 10.000 kHz
#Video BW 30.000 kHz*
Span 2 MHz
#Sweep 1.00 s (1001 pts)
2 Metrics
Total Channel Power
-37.37 dBm / 1.00 MHz
Total Power Spectral Density
-97.37 dBm/Hz
Jun 05, 2023
3:37:08 PM
Characterize Noise Floor required

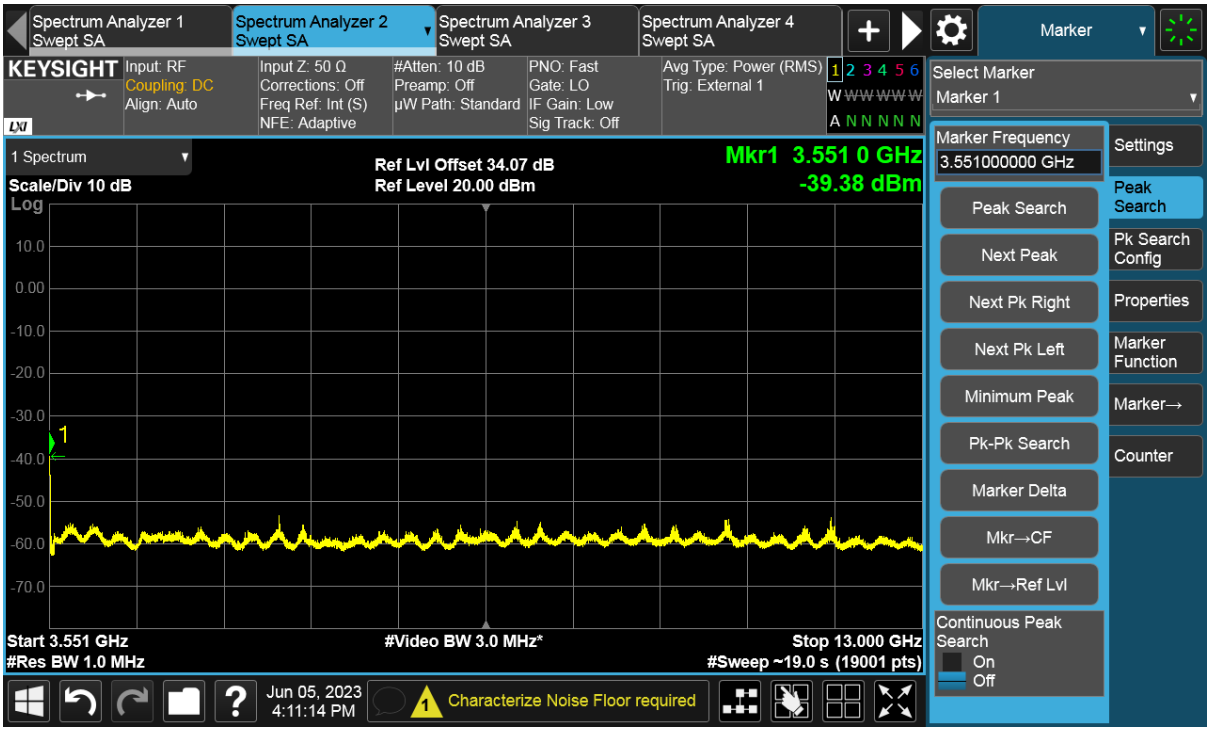

Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
Marker Frequency
3.551000000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
1 Spectrum
Ref Lvl Offset 34.07 dB
Scale/Div 10 dB
Ref Level 20.00 dBm
Mkr1 3.551 0 GHz
-41.28 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 3.551 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~19.0 s (19001 pts)
Jun 05, 2023
3:41:05 PM
Characterize Noise Floor required

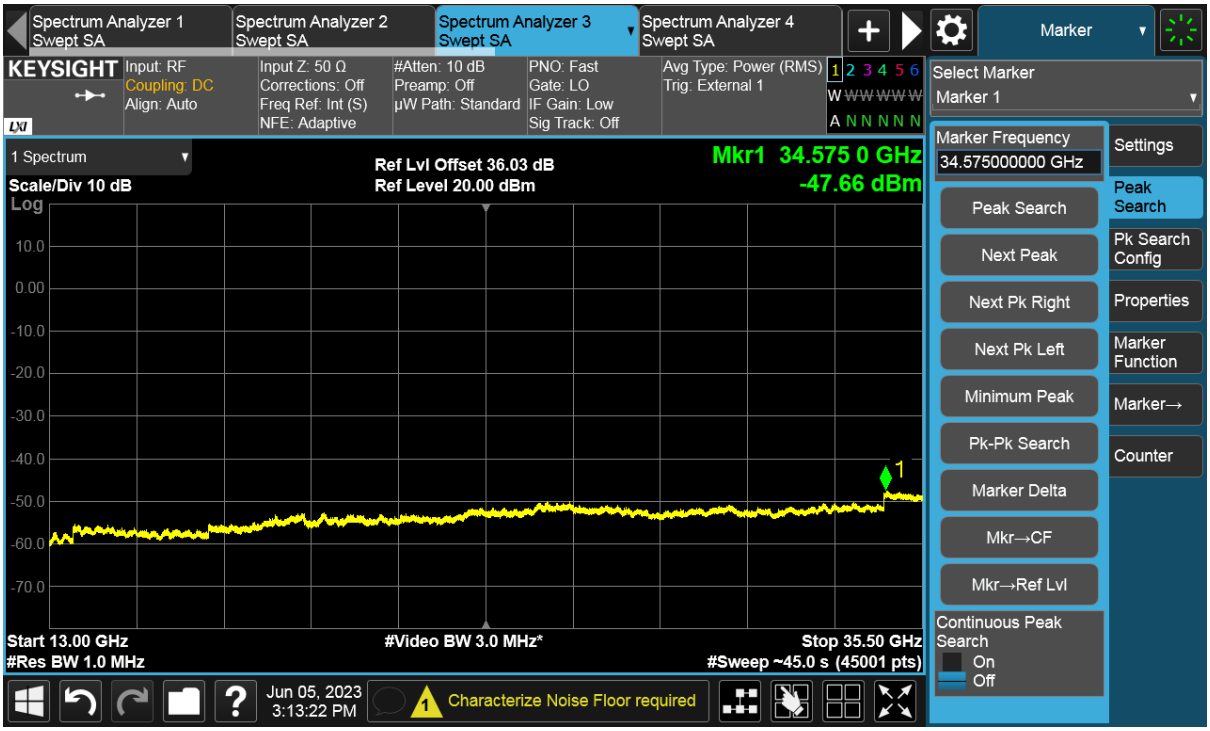
TEST REPORT



Channel Position M

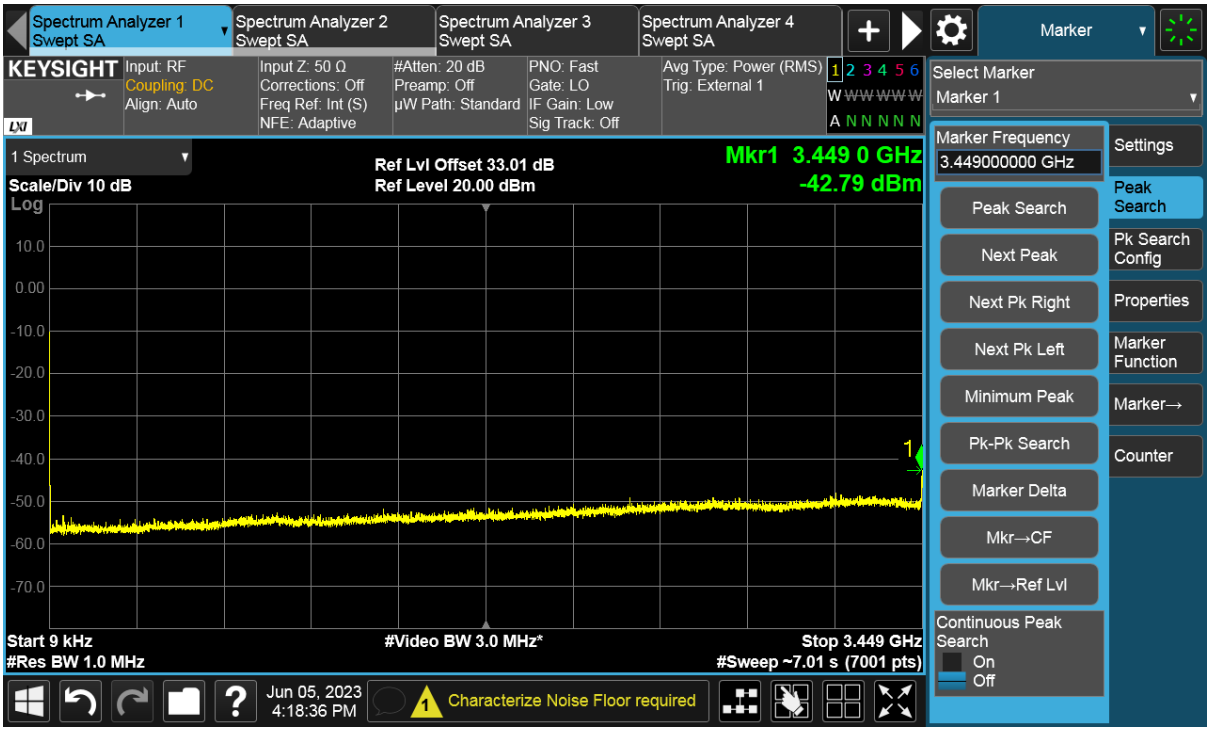
TEST REPORT

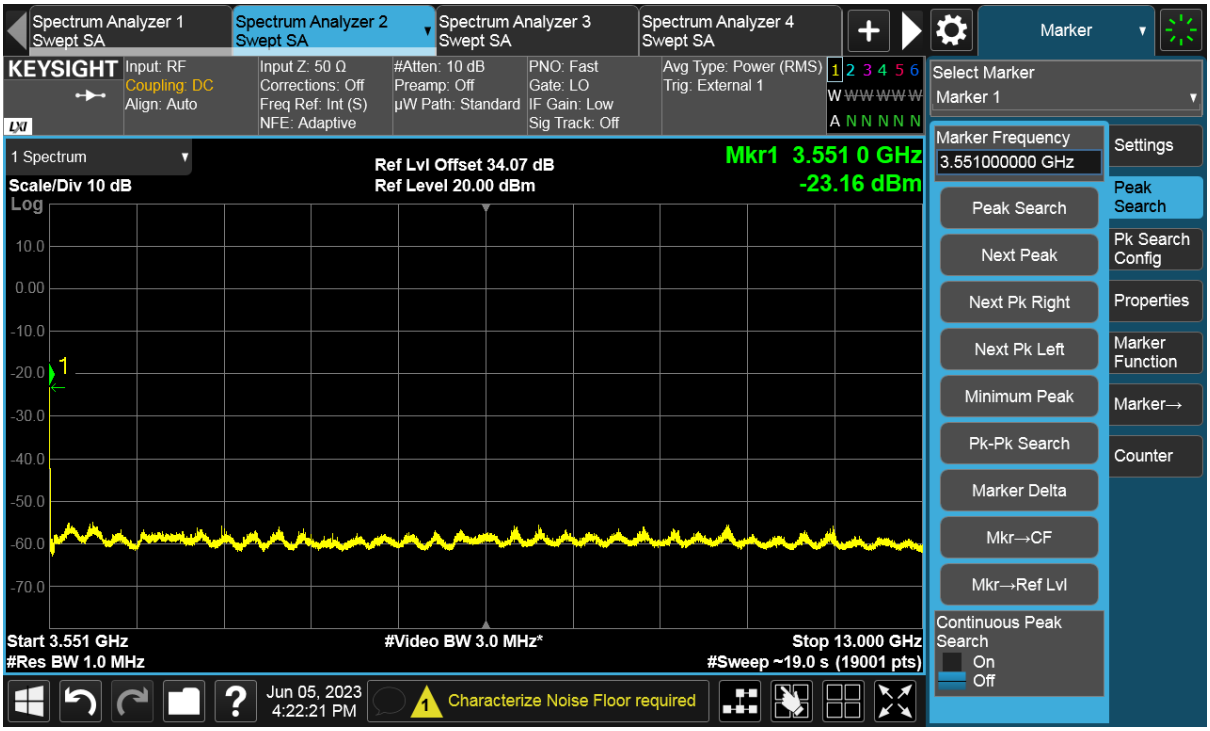

Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 34.07 dB
Ref Level 20.00 dBm
Mkr1 3.551 0 GHz
-39.38 dBm
Scale/Div 10 dB
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 3.551 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~19.0 s (19001 pts)
Marker Frequency
3.551000000 GHz
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Continuous Peak Search
On
Off
Settings
Peak Search
Pk Search Config
Properties
Marker Function
Marker→
Counter
Jun 05, 2023
4:11:14 PM
Characterize Noise Floor required


Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 36.03 dB
Ref Level 20.00 dBm
Mkr1 34.575 0 GHz
-47.66 dBm
Scale/Div 10 dB
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 13.00 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 35.50 GHz
#Sweep ~45.0 s (45001 pts)
Marker Frequency
34.575000000 GHz
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Continuous Peak Search
On
Off
Settings
Peak Search
Pk Search Config
Properties
Marker Function
Marker→
Counter
Jun 05, 2023
3:13:22 PM
Characterize Noise Floor required

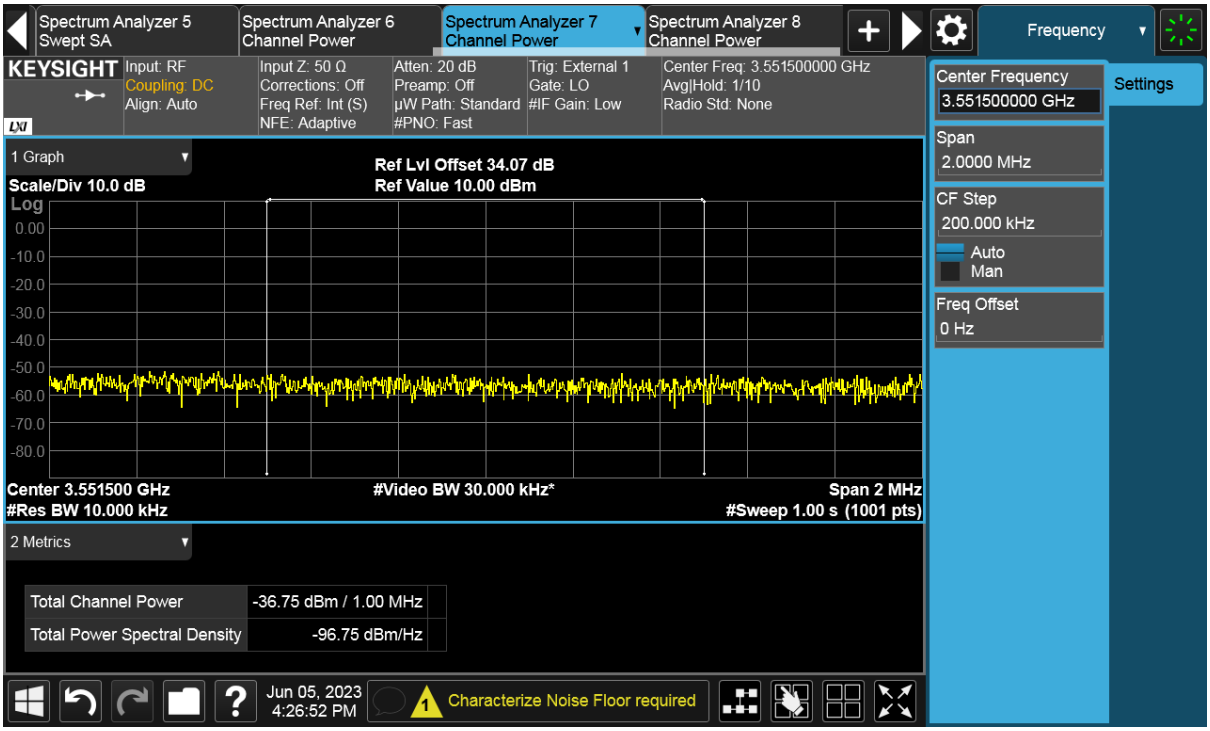
TEST REPORT

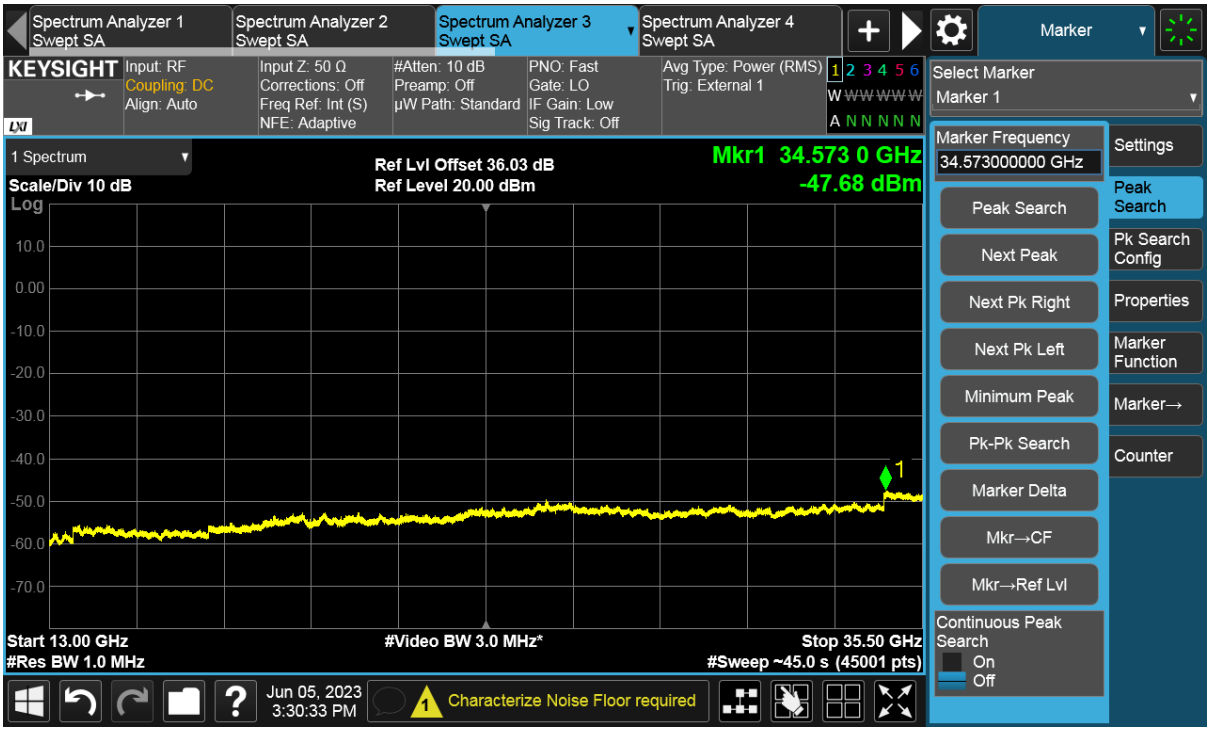
Channel Position T





TEST REPORT


Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Channel Power
Spectrum Analyzer 7 Channel Power
Spectrum Analyzer 8 Channel Power
Frequency
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
Atten: 20 dB
Preamp: Off
µW Path: Standard
#PNO: Fast
Trig: External 1
Gate: LO
#IF Gain: Low
Center Freq: 3.551500000 GHz
Avg|Hold: 1/10
Radio Std: None
1 Graph
Ref Lvl Offset 34.07 dB
Ref Value 10.00 dBm
Scale/Div 10.0 dB
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 3.551500 GHz
#Res BW 10.000 kHz
#Video BW 30.000 kHz*
Span 2 MHz
#Sweep 1.00 s (1001 pts)
2 Metrics
Total Channel Power
-36.75 dBm / 1.00 MHz
Total Power Spectral Density
-96.75 dBm/Hz
Jun 05, 2023
4:26:52 PM
Characterize Noise Floor required
Center Frequency
3.551500000 GHz
Span
2.0000 MHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
Settings

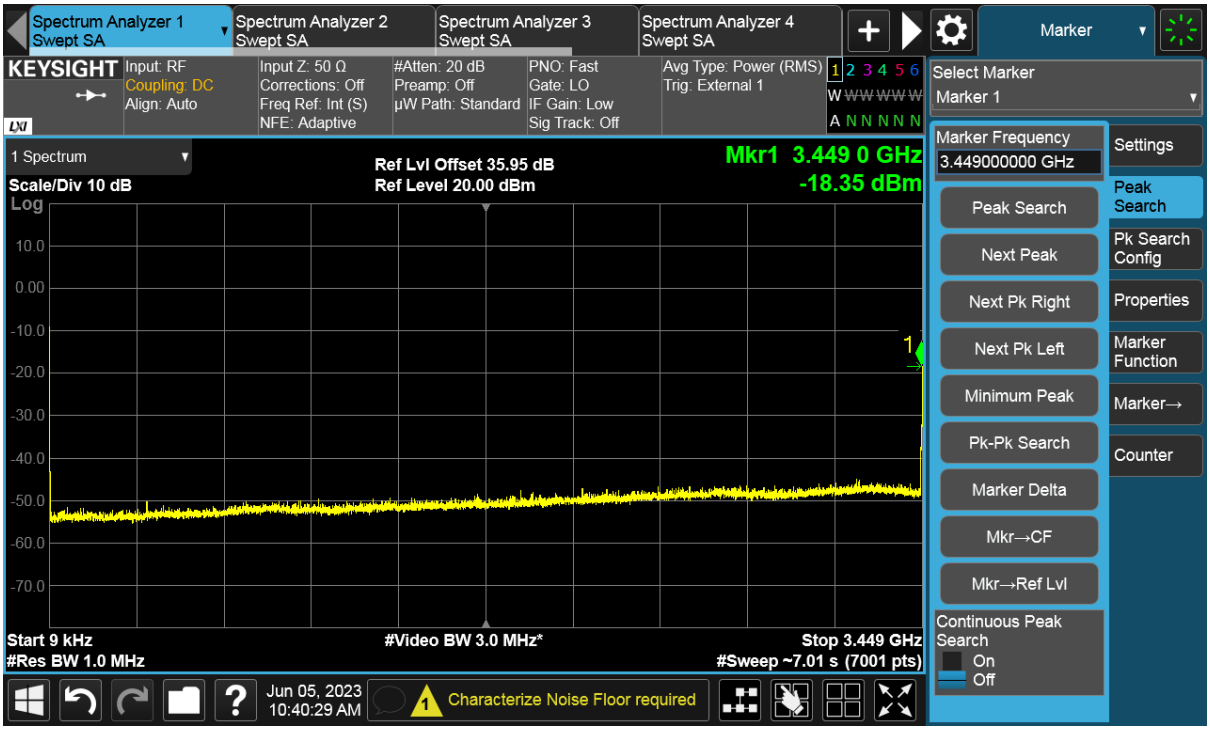

Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
1 Spectrum
Ref Lvl Offset 36.03 dB
Ref Level 20.00 dBm
Mkr1 34.573 0 GHz
-47.68 dBm
Scale/Div 10 dB
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 13.00 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 35.50 GHz
#Sweep ~45.0 s (45001 pts)
Jun 05, 2023
3:30:33 PM
Characterize Noise Floor required
Select Marker
Marker 1
Marker Frequency
34.573000000 GHz
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Continuous Peak Search
On
Off
Settings
Peak Search
Pk Search Config
Properties
Marker Function
Marker→
Counter

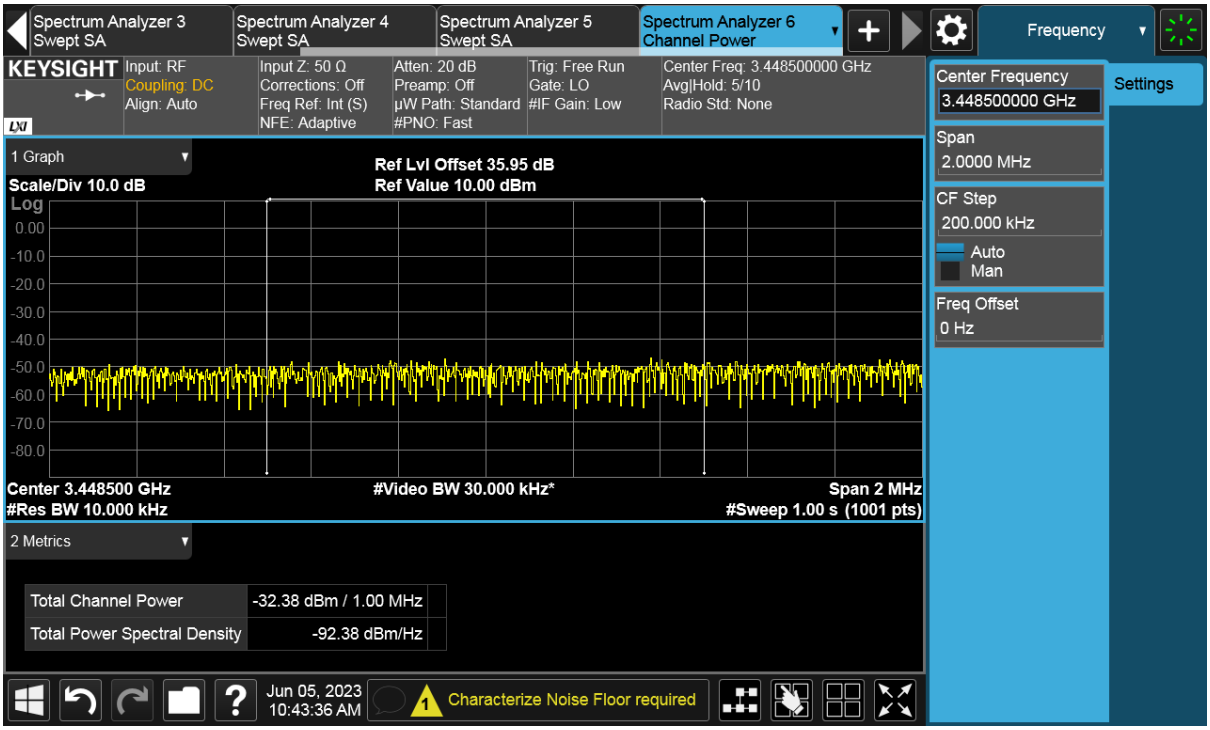
TEST REPORT

NR-2C, 8W/MHz

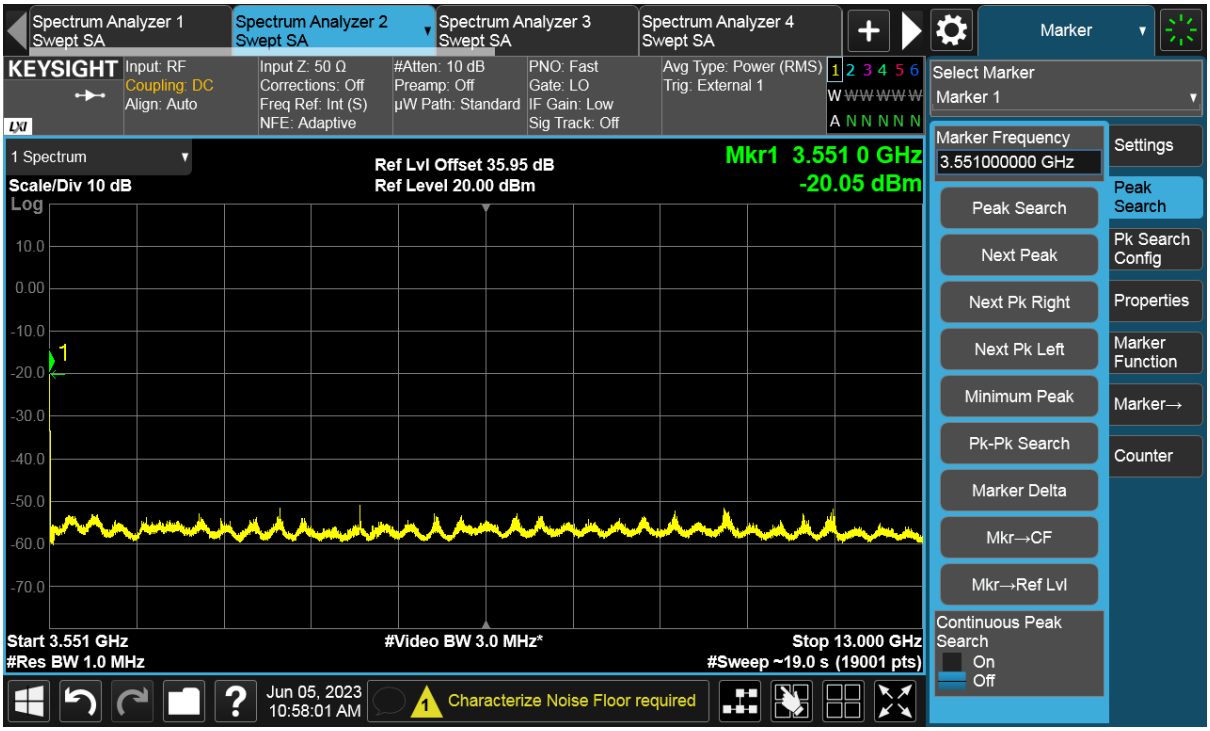
Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	M	QPSK	15	1000	-31.06

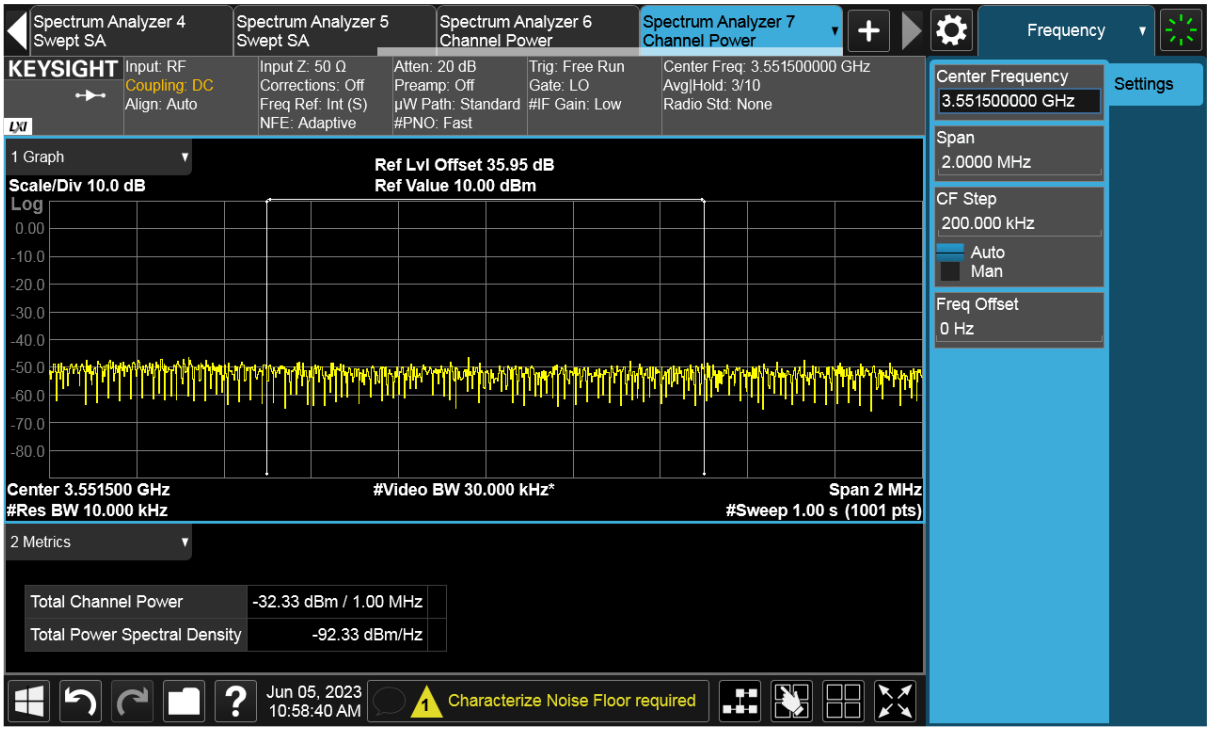
Channel Position M



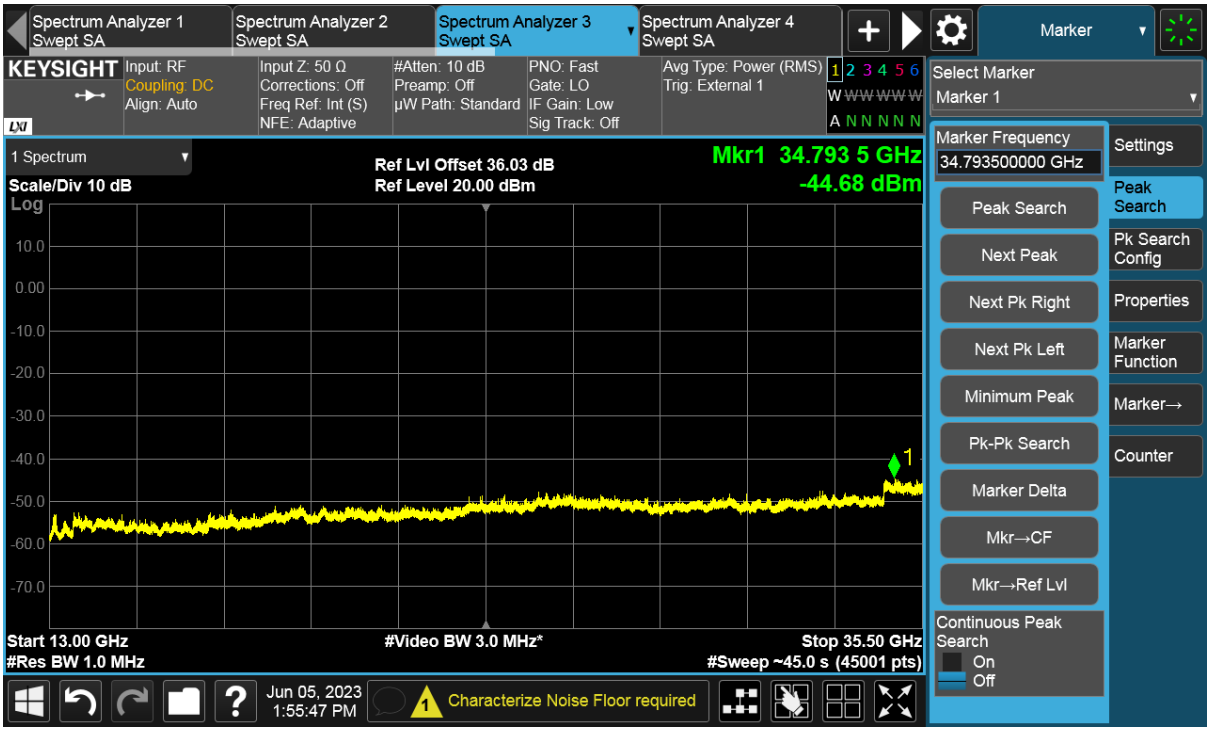


TEST REPORT


Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 35.95 dB
Ref Level 20.00 dBm
Mkr1 3.551 0 GHz
-20.05 dBm
Scale/Div 10 dB
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 3.551 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~19.0 s (19001 pts)
Marker Frequency
3.551000000 GHz
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Continuous Peak Search
On
Off
Settings
Peak Search
Pk Search Config
Properties
Marker Function
Marker→
Counter
Jun 05, 2023
10:58:01 AM
Characterize Noise Floor required


Spectrum Analyzer 4 Swept SA
Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Channel Power
Spectrum Analyzer 7 Channel Power
Frequency
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
Atten: 20 dB
Preamp: Off
µW Path: Standard
#PNO: Fast
Trig: Free Run
Gate: LO
#IF Gain: Low
Center Freq: 3.551500000 GHz
Avg|Hold: 3/10
Radio Std: None
1 Graph
Ref Lvl Offset 35.95 dB
Ref Value 10.00 dBm
Scale/Div 10.0 dB
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 3.551500 GHz
#Res BW 10.000 kHz
#Video BW 30.000 kHz*
Span 2 MHz
#Sweep 1.00 s (1001 pts)
2 Metrics
Total Channel Power
-32.33 dBm / 1.00 MHz
Total Power Spectral Density
-92.33 dBm/Hz
Center Frequency
3.551500000 GHz
Span
2.0000 MHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
Settings
Jun 05, 2023
10:58:40 AM
Characterize Noise Floor required

TEST REPORT

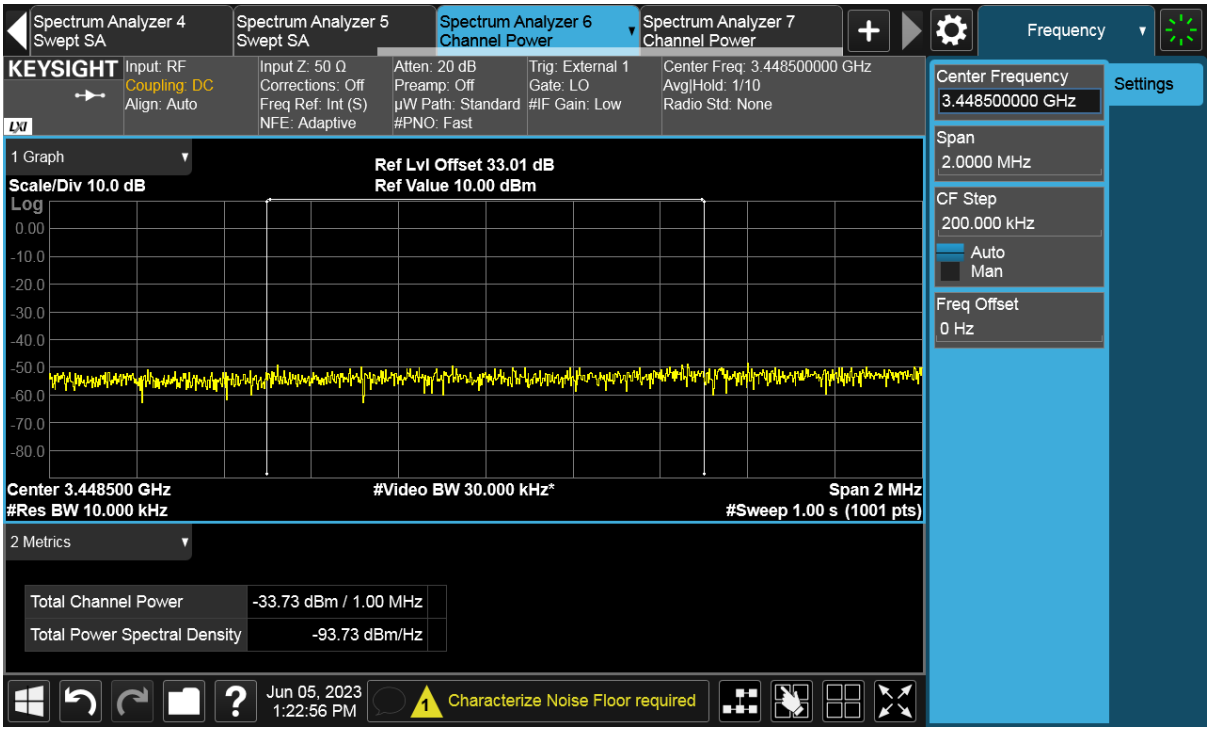


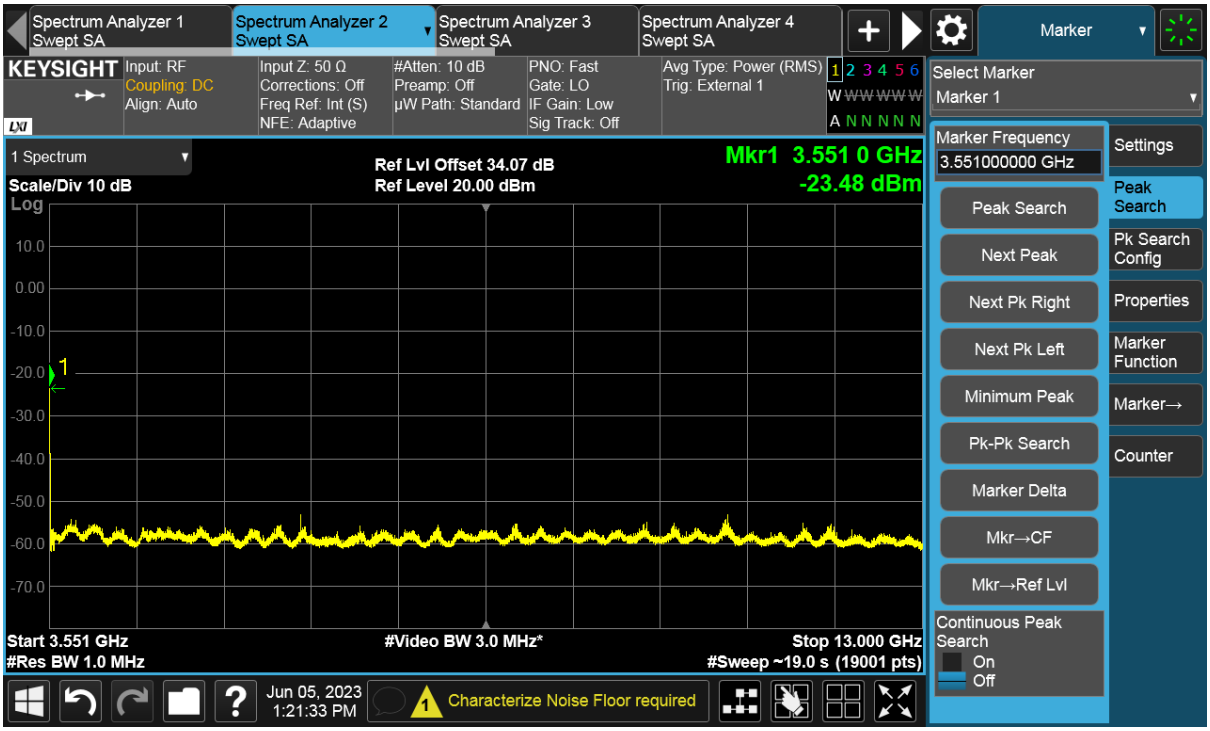
NR-3C, 8W/MHz

Antenna Port	Channel Position	Modulation	Channel BW (MHz)	RBW (kHz)	Limit (dBm)
39	M	QPSK	15	1000	-31.06

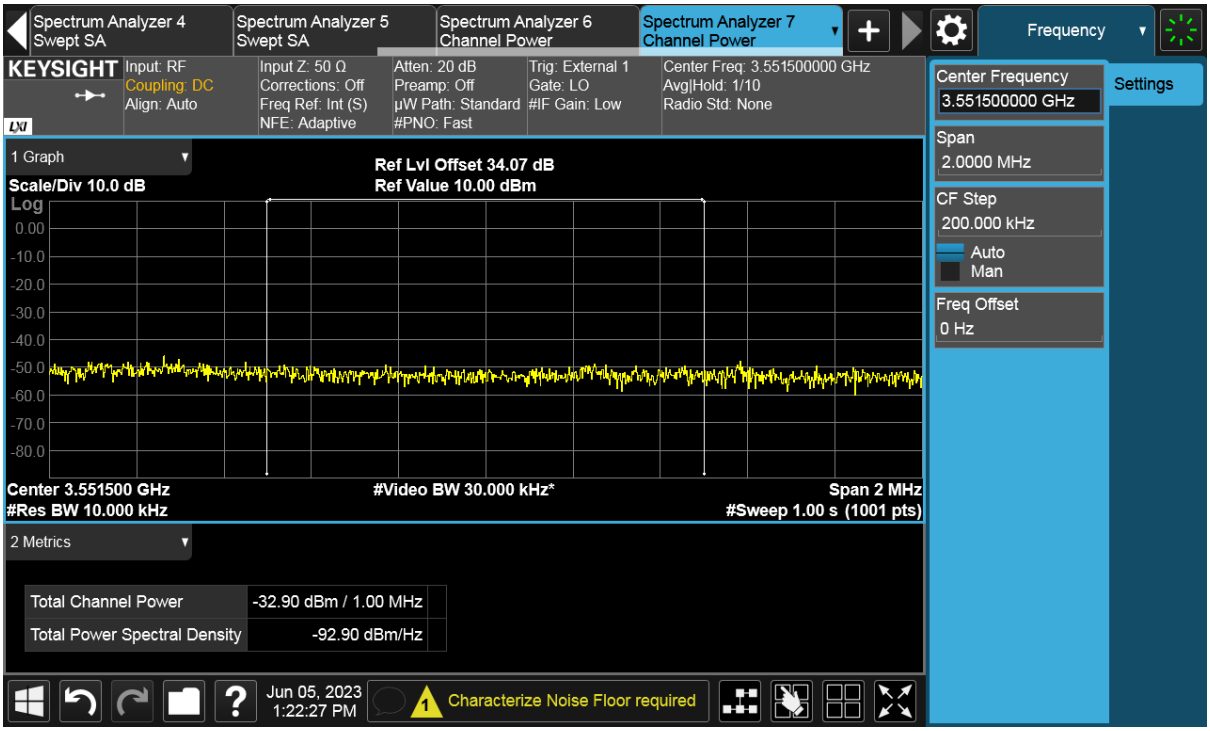
Channel Position M

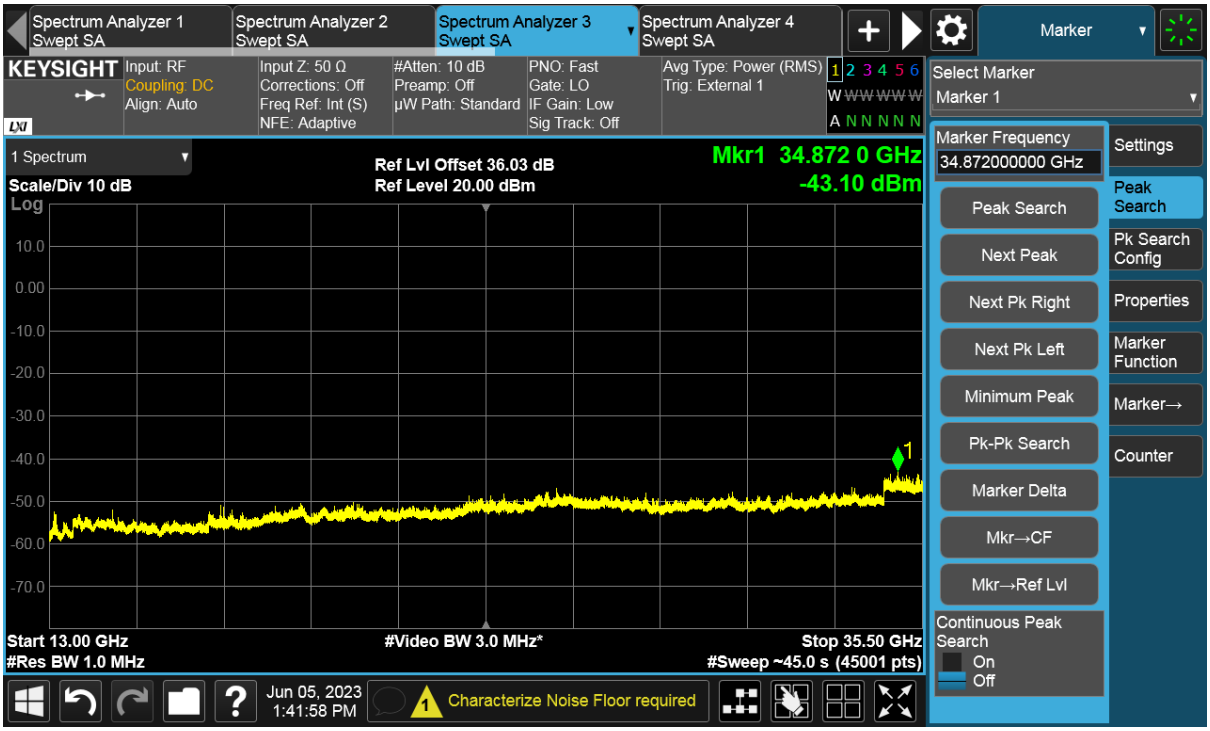
TEST REPORT


Spectrum Analyzer 4 Swept SA
Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Channel Power
Spectrum Analyzer 7 Channel Power
Frequency
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
Atten: 20 dB
Preamp: Off
µW Path: Standard
#PNO: Fast
Trig: External 1
Gate: LO
#IF Gain: Low
Center Freq: 3.448500000 GHz
Avg|Hold: 1/10
Radio Std: None
Center Frequency
3.448500000 GHz
Settings
Span
2.0000 MHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
1 Graph
Ref Lvl Offset 33.01 dB
Scale/Div 10.0 dB
Ref Value 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 3.448500 GHz
#Res BW 10.000 kHz
#Video BW 30.000 kHz*
Span 2 MHz
#Sweep 1.00 s (1001 pts)
2 Metrics
Total Channel Power
-33.73 dBm / 1.00 MHz
Total Power Spectral Density
-93.73 dBm/Hz
Jun 05, 2023
1:22:56 PM
Characterize Noise Floor required


Spectrum Analyzer 1 Swept SA
Spectrum Analyzer 2 Swept SA
Spectrum Analyzer 3 Swept SA
Spectrum Analyzer 4 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
Marker Frequency
3.551000000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
1 Spectrum
Ref Lvl Offset 34.07 dB
Scale/Div 10 dB
Ref Level 20.00 dBm
Mkr1 3.551 0 GHz
-23.48 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 3.551 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~19.0 s (19001 pts)
Jun 05, 2023
1:21:33 PM
Characterize Noise Floor required

TEST REPORT





********** END **********