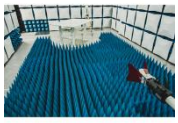
Element Suwon
(#1407) 13, Heungdeok 1-ro, Giheung-gu, Yongin-si,
Gyeonggi-do 16954, Korea
Tel. +82 31.660.7319 / Fax +82 31.660.7918
http://www.element.com



TEST REPORT
PART 96 MEASUREMENT REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
07/05/2023 – 07/20/2023
Test Site/Location:
Element Lab., Suwon,
Yongin-si, Gyeonggi-do, Korea
Test Report Serial No.:
8K23062601.A3L

FCC ID:	**A3LSOG2201**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Class II Permissive Change
Model:	SOG2201-I30
EUT Type:	Smallcell (SOG2201)
FCC Classification:	Citizens Band Category B Devices (CBD)
FCC Rule Part(s):	96
Test Procedure(s):	ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 940660 D01 v03, KDB 662911 D01 v02r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

ACCREDITED
Testing Laboratory
Certificate Number 2041.04

Prepared by Jonathan Jang
Test Engineer

Reviewed by Charles.Shin
Technical Manager

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Mode	Total Bandwidth (MHz)	Tx Frequency (MHz)	Max. PSD (dBm/1MHz)	Max. EIRP (dBm/10MHz)	Max. EIRP /Entire Band Width (dBm)	Max. EIRP /Entire Band Width (W)	Emission Designator	Modulation
n48_3C_10M +20M+10M	40	3550 - 3700	27.35	36.60	42.27	16.87	38M5G7D	QPSK
			27.68	36.97	42.48	17.70	38M6W7D	QAM
n48_3C_20M +20M+20M	60		25.54	35.04	42.06	16.07	58M2G7D	QPSK
			25.51	35.07	42.11	16.26	58M1W7D	QAM

EUT Overview

Notes:

Total Power shown in the table above are the Equivalent Isotropic Radiated Power that will appear on the Grant of Authorization.

1.0 REVISION RECORD

Issue Number	Issued Date	Revision History
8K23062601.A3L	08/01/2023	Initial Issue

2.0 INTRODUCTION

2.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

2.2 Element Test Location

These measurement tests were conducted at the Element Materials Technology Suwon. Ltd. facility located at (#1407) 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do 16954, Korea.

2.3 Test Facility / Accreditation

Measurements were performed at Element Materials Technology Suwon Lab located in Yongin-si, Gyeonggi, Korea.

- Element Materials Technology Suwon is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation(A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Materials Technology Suwon facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.

  - Designation Number / CABID: KR0169
  - Test Firm Registration Number of FCC: 417945
  - Test Firm Registration Number of IC: 26168

3.0 PRODUCT INFORMATION

3.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Smallcell (SOG2201) FCC ID: A3LSOG2201.**
Per FCC Part 96, this device is evaluated under Citizens Band Category B Devices (CBD).
A class II permissive change on the original filing is being pursued to add multi-carrier mode on 8T8R configurations.

3.2 Device Capabilities

This device supports the following conditional features and filter information:

EUT Type:	Smallcell (SOG2201)		
Model Name:	SOG2201-I30		
Test Device Serial No:	DKN2305065		
Device Capabilities:	5G NR		
Operating Band/Frequency Range:	Band	Tx (Downlink)	Rx (Uplink)
	n48:	3550 MHz to 3700 MHz	3550 MHz to 3700 MHz
Supported Modulation:	QPSK, 16QAM, 64QAM, 256QAM		
Supported Number of Carriers and Channel Bandwidth:	NR: 10, 20, 30 and 40MHz bandwidth for 5G NR n48 with 2CC aggregated of Max. Bandwidth 80 MHz and 10, 20 MHz bandwidth for 5G NR n48 with 3CC aggregated of Max. Bandwidth 60 MHz		
Supported Configurations:	Single carrier, Multi-carrier		
Maximum Output Power:	8T8R: 25 dBm/path		
RF Chain:	8T8R		
Antenna Gain:	8T8R: Max 8 dBi (7 dBi ± 1 dB tolerance) Antenna gain declared by the manufacturer.		
Input Voltage:	44 - 90 VAC (HFC)		

3.3 Test Configuration

The setup is as follows:

a) The EUT "SOG2201-I30" is powered by a 60VAC power supply.
b) The EUT is connected to a test laptop via an ethernet cable acting as backhaul.
c) An RF cable connects the signal analyzer and the EUT Ports for respective measurement.

The EUT was tested per the guidance of ANSI C63.26-2015 and KDB 971168 D01 v03r01. See Section 8.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

Distribution unit (DU) which were used in test, that authorized under the SDoC procedure.

The following information is about configurations of carrier frequency and output power per port declared by the manufacturer.

* Abbreviations:

- 3C: Contiguous 3 carriers in multi-carrier operation
- 3NC: Non-contiguous 3 carriers in multi-carrier operation

Configuration	No. of Carriers	Total Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)			Rated Conducted Power (dBm/path)
			Lowest	Middle	Highest	
n48_3C_10M+20M+10M	3	40 (10+20+10)	3555 + 3570 + 3585	3610 + 3625 + 3640	3665 + 3680 + 3695	8T8R 25 dBm/path
n48_3NC_10M+20M+10M			3555 + 3625 + 3695			
n48_3C_20M+20M+20M	3	60 (20+20+20)	3560 + 3580 + 3600	3605 + 3625 + 3645	3650 + 3670 + 3690	
n48_3NC_20M+20M+20M			3560 + 3625 + 3690			

3.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added, and no modifications were made during testing.

4.0 DESCRIPTION OF TESTS

4.1 Measurement Procedure

The measurement procedures described in the document titled “American National Standard for Compliance Testing of Transmitter Used in Licensed Radio Service” (ANSI C63.26-2015) and the guidance provided in KDB 971168 D01 v03r01, and KDB 662911 D01 v02r01 and KDB 940660 D01 v03 were used in the measurement of the EUT.

Occupied Bandwidth:
KDB 971168 D01 v03r01 – Section 4.3
ANSI C63.26-2015 – Section 5.4.4

Modulation Characteristics:
ANSI C63.26 - Section 5.3

Conducted Power Measurement and EIRP and PSD
KDB 971168 D01 v03r01 – Section 5.3
KDB 971168 D01 v03r01 – Section 5.4
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements
ANSI C63.26-2015 – Section 5.2.5
ANSI C63.26-2015 – Section 5.2.4

Peak-to-Average Power Ratio:
KDB 971168 D01 v03r01 – Section 5.7
ANSI C63.26-2015 – Section 5.2.3.4

Channel Edge Emissions at Antenna Terminal
KDB 971168 D01 v03r01 – Section 6
KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements
a) Absolute Emission Limits
iii) Measure and add 10 log(N_{ANT}) dB
ANSI C63.26-2015 – Section 5.7

Spurious and Harmonic Emissions at Antenna Terminal
KDB 971168 D01 v03r01 – Section 6
KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements
a) Absolute Emission Limits
iii) Measure and add 10 log(N_{ANT}) dB
ANSI C63.26-2015 – Section 5.7

Radiated unwanted emission
KDB 971168 D01 v03r01 – Section 7
ANSI C63.26-2015 – Section 5.8

Frequency Stability / Temperature Variation
KDB 971168 D01 v03r01 – Section 9
ANSI C63.26-2015 – Section 5.6

4.2 Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurement and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 8.5 m(L) x 6.1 m(W) x 5.6 m(H) elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1 GHz. For measurements below 1 GHz, the absorbers are removed. Measurement of spurious emissions using floor-standing method. The EUT installed and tested as described in the manufactures instruction manual.

The equipment under test was transmitting while connected to its terminated attenuator and is placed on a pole. The measurement antenna is in the far field of the EUT per formula $2D^2/\lambda$ where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, “D” is the largest dimension of the measurement antenna. The EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

4.3 Measurement Software

Test item	Name	Version
Conducted Measurement	Node B automation	1.0

4.4 Enviromental Conditions

The temperature is controlled within the range of 15°C to 35°C. The relative humidity is controlled within the range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.95
Radiated Disturbance (<1GHz)	4.10
Radiated Disturbance (<18GHz)	4.82
Radiated Disturbance (<40GHz)	4.96

6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacture	Model	Description	Cal Date	Cal interval	Cal Due	Serial Number
KEYSIGHT	N9030B	PXA Signal Analyzer	04/06/2023	Annual	04/05/2024	MY57142018
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer	04/06/2023	Annual	04/05/2024	101250
Rohde & Schwarz	ESW	EMI Test Receiver	07/05/2023	Annual	07/04/2024	101761
Rohde & Schwarz	TS-SFUNIT-Rx	Shielded Filter Unit	01/13/2023	Annual	01/12/2024	102151
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	06/01/2023	Biennial	05/30/2024	9162-217
Sunol sciences	DRH-118	Horn Antenna	01/26/2023	Biennial	01/25/2024	A060215
NARDA	180-442A-KF	Horn Antenna	11/23/2022	Biennial	11/22/2024	T058701-03
RF One	RFHB1810SC10	Attenuator	01/12/2023	Annual	01/11/2024	RFHB0001 to RFHB0010
RF One	RFHB1810SC10	Attenuator	01/12/2023	Annual	01/11/2024	RFHB0012 to RFHB0017
Reachline	RL50W40GKF-20	Attenuator	04/06/2023	Annual	04/05/2024	PK00409
WAINWRIGHT	WHW-13000-18000-40000-40CC	High Pass Filter	04/06/2023	Annual	04/05/2024	2

Table 6-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. All testing was performed before the calibration due date.

7.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 38M5G7D

Occupied Bandwidth = 38.54 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 38M6W7D

Occupied Bandwidth = 38.58 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

8.0 TEST RESULTS

8.1 Summary

Company Name: SAMSUNG Electronics Co., Ltd.

FCC ID: A3LSOG2201

Type of Radio Equipment: Citizens Band Category B Devices (CBD)

Mode(s): 5G NR

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 8.2
2.1046 96.41(a)	Modulation Characteristics	Digital modulation		PASS	Note 4
2.1046 96.41(b)	Power Spectral Density (PSD)	37 dBm/MHz (PSD)		PASS	Section 8.4
2.1046 96.41(b)	Equivalent Isotropic Radiated Power (EIRP)	47 dBm/10MHz (EIRP)		PASS	Section 8.5
96.41(g)	Peak-Average Ratio	≤ 13 dB		PASS	Section 8.6
2.1051 96.41(e)	Out of Band Emissions	Within 0 MHz to 10 MHz above and below the assigned channel ≤ −13 dBm/MHz Greater than 10 MHz above and below the assigned channel ≤ −25 dBm/MHz Any emission below 3530 MHz and above 3720 MHz ≤ −40 dBm/MHz		PASS	Section 8.7
2.1055 96.41(e)	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Note 4
2.1051 96.41(e)	Radiated unwanted emission	< −40dBm/MHz	RADIATED	PASS	Section 8.8

Table 8-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots were all taken with a correction table loaded into the analyzer.

3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

4) This is a variant report for Channel Bandwidth enabled by software without hardware change. The test item does not affect those operation. And it was performed in the original report.

5) For Class II Permissive Change test, all mode tested for worst modulation in original test report.

8.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

ANSI C63.26 - Section 5.4.4
KDB 971168 D01 v03r01 - Section 4.3

Test Setting

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

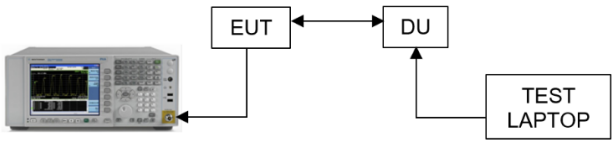


Figure 8-1. Test Instrument & Measurement Setup

Limit

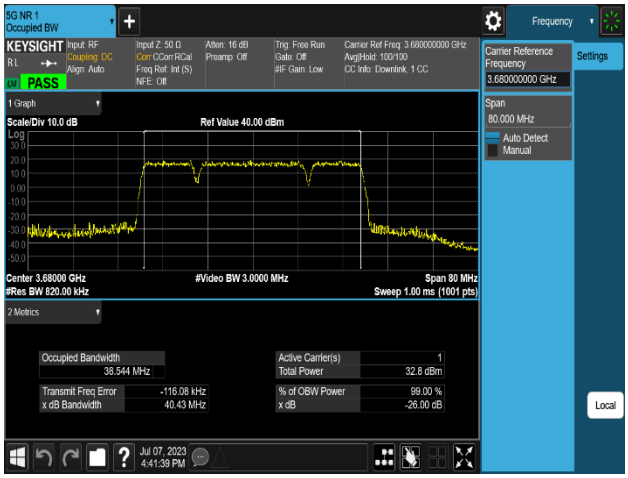
The occupied bandwidth shall not exceed the equipment's channel bandwidth, which is declared by the manufacturer.

Channel	Sector	Zone	Port	OBW (MHz)	
				QPSK	16QAM
Low	1	1	1	38.53	38.55
			2	38.43	38.46
		2	3	38.44	38.56
			4	38.53	38.53
	2	3	5	38.48	38.52
			6	38.49	38.54
		4	7	38.51	38.48
			8	38.50	38.52
Middle	1	1	1	38.47	38.50
			2	38.45	38.44
		2	3	38.47	38.53
			4	38.42	38.49
	2	3	5	38.49	38.45
			6	38.48	38.54
		4	7	38.44	38.52
			8	38.42	38.51
High	1	1	1	38.53	38.49
			2	38.53	38.48
		2	3	**38.54**	38.44
			4	38.43	38.51
	2	3	5	38.37	**38.58**
			6	38.45	38.42
		4	7	38.42	38.41
			8	38.42	38.57

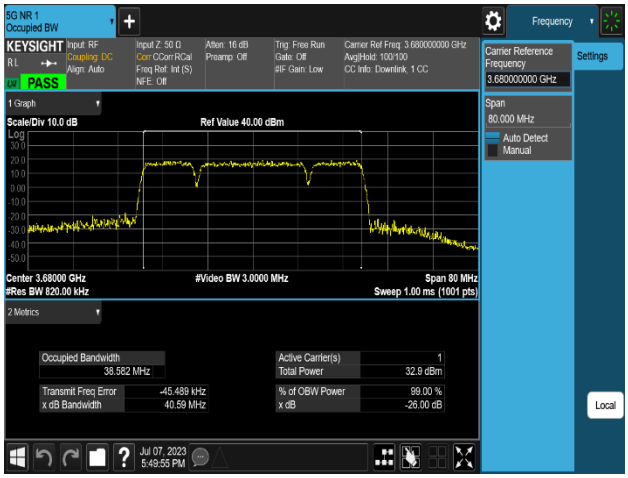
Table 8-2. Occupied Bandwidth Summary Data (n48_3C_10M+20M+10M)

Channel	Sector	Zone	Port	OBW (MHz)	
				QPSK	16QAM
Low	1	1	1	57.92	58.00
			2	57.94	57.95
		2	3	57.87	58.01
			4	57.95	57.96
	2	3	5	58.01	58.02
			6	57.99	57.90
		4	7	58.08	57.99
			8	58.03	57.98
Middle	1	1	1	58.09	57.99
			2	58.04	**58.14**
		2	3	58.07	58.02
			4	57.91	58.08
	2	3	5	57.92	58.07
			6	57.98	58.07
		4	7	57.99	57.93
			8	58.02	57.96
High	1	1	1	58.09	58.06
			2	58.03	58.04
		2	3	58.09	58.04
			4	58.15	58.05
	2	3	5	57.96	58.07
			6	**58.17**	58.12
		4	7	58.10	57.98
			8	57.91	58.12

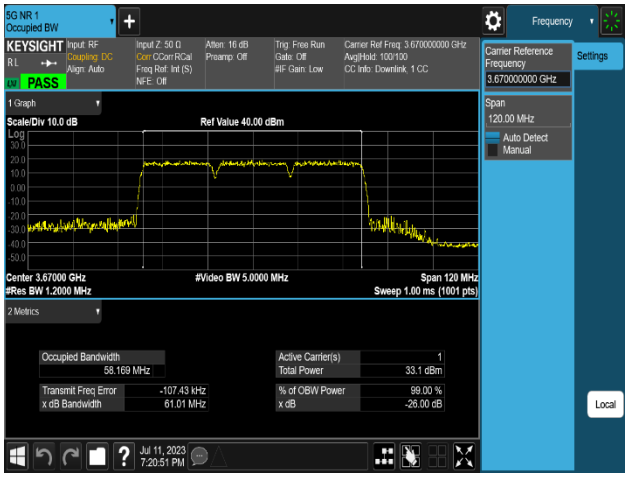
Table 8-3. Occupied Bandwidth Summary Data (n48_3C_20M+20M+20M)



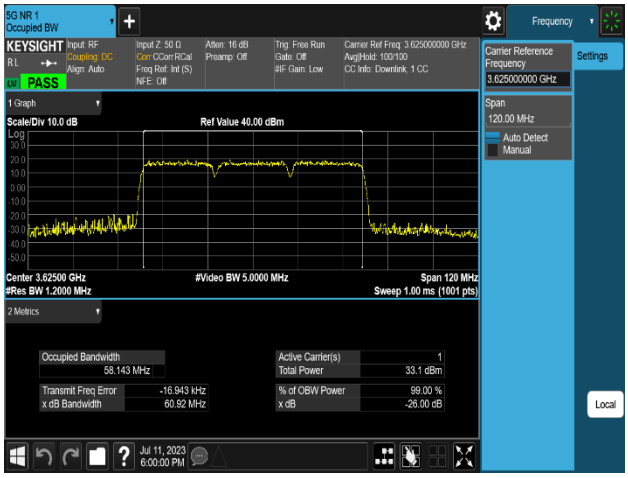
Plot 8-1. Occupied Bandwidth Plot
(n48_3C_10M+20M+10M_QPSK - High Channel, Port 3)



Plot 8-2. Occupied Bandwidth Plot
(n48_3C_10M+20M+10M 16QAM - High Channel, Port 5)



Plot 8-3. Occupied Bandwidth Plot
(n48_3C_20M+20M+20M QPSK - High Channel, Port 6)



Plot 8-4. Occupied Bandwidth Plot
(n48_3C_20M+20M+20M 16QAM - Mid Channel, Port 2)

8.3 Power Spectral Density

Test Overview

A transmitter port of EUT is connected to the input of a signal analyzer. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedure Used

ANSI C63.26 - Section 5.2.4
ANSI C63.26 - Section 5.2.5
KDB 971168 D01 v03r01 - Section 5.3

ANSI C63.26 - Section 6.4.3.2.3
KDB 662911 D01 v02r01
- Section E)2) In-Band Power Spectral Density (PSD) Measurements
b) Measure and sum spectral maxima across the outputs.

Test Setting

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

The PSD is measured following the same procedures described in 5.2.4.4 of ANSI C63.26 for measuring the total average power, but with the RBW set to the reference bandwidth specified by the applicable regulatory requirement, and by using the marker function to identify the maximum PSD instead of summing the power across the OBW. If the fundamental measurement condition cannot be realized, then one of the alternative procedures in 5.2.4.4.2 or 5.2.4.4.3 should be selected, based on whether the transmitter duty cycle is constant (variations ≤ ±2%) or non-constant (variations > ±2%), respectively.

1. Conducted power measurements are performed using the signal analyzer's "SA mode" measurement capability for signals with continuous operation.
2. Set span to 2 × to 3 × the OBW.
3. Set RBW = 1 MHz (the reference bandwidth)
4. Set VBW ≥ 3 × RBW.
5. Set number of measurement points in sweep ≥ 2 × span / RBW.
6. Sweep time:
   a) Set ≥ auto-couple, and enable trace averaging, or
   b) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] and enable a single sweep (automation-compatible) measurement. The sweep time should never be faster than the auto-coupled sweep time.
7. Detector = power averaging (rms).
8. The trace was allowed to stabilize
9. Use the peak marker function to determine the maximum amplitude level. (=P_{Meas})
10. The relevant equation for determining the maximum EIRP from the measured RF output power is given in Equation as follows:
    EIRP = P_{Meas} + G_T
    where
    GT: gain of the transmitting antenna, in dBi (EIRP).

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

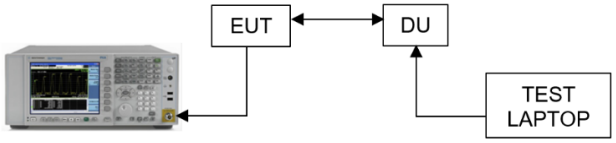


Figure 8-2. Test Instrument & Measurement Setup

Limit

Category B CBSD : 37 dBm/MHz

Test Notes

1. Consider the following factors for MIMO Power Spectral Density:
   The power spectral density is measured as dBm / MHz, with the resolution bandwidth of 1 MHz PSDs are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01 - Section E) 2).

2. All modes of operation were investigated and the worst configuration result plots are reported in each RF chain.

3. Periodic trigger was used with gating ON. Gate sweep time, Gate delay and gate length were set accordingly to capture ON time of the transmission.

4. PSD per port (dBm/MHz) is converted to a linear value (mW). A summation of linear powers for all ports gives us the total MIMO conducted Power (mW). We convert this back to logarithmic scale for further PSD calculations.

5. Antenna Gains (dBi) provided by the client.

6. Directional gain calculations were performed on the individual gains in specific direction across all directions.

7. Applied antenna gain as below:

Mode	Rated Conductive Power		Total Directional Antenna Gain(dBi)	Rated EIRP (dBm/Unit)
Active Antenna path	Path (dBm)	Unit (dBm)		
8T	25	34	7 ±1	42

8. Sample Calculation:

Let us assume the following numbers:

a) Total MIMO Conducted PSD as 86.03 mW

b) Antenna Gain = 8.00 dBi

Factors			Value	Unit
Summed MIMO Conducted PSD (linear sum)			86.03	mW
Summed MIMO Conducted PSD (dBm)	= 10 * log (86.03) =		19.35	dBm/MHz
Antenna Gain			8.00	dB
e.i.r.p PSD			27.35	dBm/MHz
Limit			37.00	dBm/MHz
Margin = Limit - e.i.r.p PSD	= 27.35 – 37.00	=	-9.65	dB

Sector	Zone	Port	QPSK	16QAM
1	1	1	10.20	**10.54**
		2	10.29	**10.67**
	2	3	10.16	**10.53**
		4	10.47	**10.76**
2	3	5	10.32	**10.63**
		6	10.36	**10.72**
	4	7	10.39	**10.70**
		8	10.34	**10.63**
Total MIMO Conducted PSD (mW/MHz)			86.03	**92.87**
Total MIMO Conducted PSD (dBm/MHz)			19.35	**19.68**
Ant. Gain (dBi)			8.00	**8.00**
e.i.r.p PSD (dBm/MHz)			27.35	**27.68**
e.i.r.p PSD Limit (dBm/MHz)			37.00	**37.00**
Margin (dB)			-9.65	**-9.32**

Table 8-4. Power Spectral Density Table (n48_3C_10M+20M+10M_Low Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	9.91	10.18
		2	10.48	10.38
	2	3	10.23	10.18
		4	10.32	10.37
2	3	5	10.14	10.41
		6	10.17	10.43
	4	7	10.12	10.45
		8	10.14	10.53
Total MIMO Conducted PSD (mW/MHz)			83.60	87.06
Total MIMO Conducted PSD (dBm/MHz)			19.22	19.40
Ant. Gain (dBi)			8.00	8.00
e.i.r.p PSD (dBm/MHz)			27.22	27.40
e.i.r.p PSD Limit (dBm/MHz)			37.00	37.00
Margin (dB)			-9.78	-9.60

Table 8-5. Power Spectral Density Table (n48_3C_10M+20M+10M_Mid Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	9.73	9.80
		2	9.84	9.98
	2	3	9.66	9.76
		4	9.93	10.06
2	3	5	9.85	9.91
		6	9.93	9.97
	4	7	9.93	9.96
		8	9.89	9.92
Total MIMO Conducted PSD (mW/MHz)			77.21	78.52
Total MIMO Conducted PSD (dBm/MHz)			18.88	18.95
Ant. Gain (dBi)			8.00	8.00
e.i.r.p PSD (dBm/MHz)			26.88	26.95
e.i.r.p PSD Limit (dBm/MHz)			37.00	37.00
Margin (dB)			-10.12	-10.05

Table 8-6. Power Spectral Density Table (n48_3C_10M+20M+10M_High Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	8.13	8.35
		2	8.27	8.49
	2	3	8.06	8.27
		4	8.47	8.62
2	3	5	8.40	8.52
		6	8.50	8.58
	4	7	8.50	8.54
		8	8.35	8.44
Total MIMO Conducted PSD (mW/MHz)			54.55	56.33
Total MIMO Conducted PSD (dBm/MHz)			17.37	17.51
Ant. Gain (dBi)			8.00	8.00
e.i.r.p PSD (dBm/MHz)			25.37	25.51
e.i.r.p PSD Limit (dBm/MHz)			37.00	37.00
Margin (dB)			-11.63	-11.49

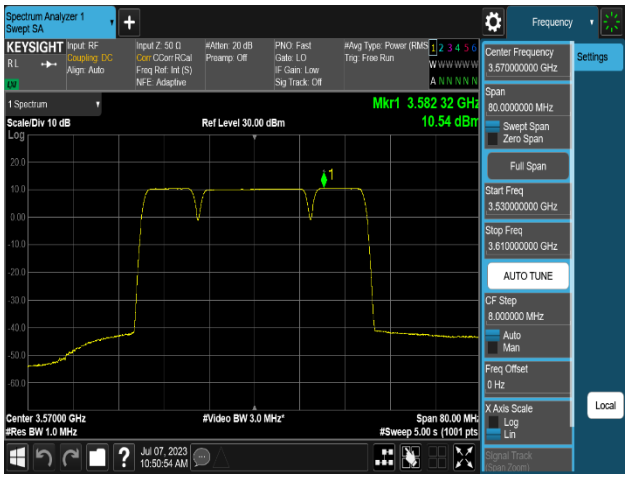
Table 8-7. Power Spectral Density Table (n48_3C_20M+20M+20M_Low Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	**8.39**	8.22
		2	**8.54**	8.40
	2	3	**8.36**	8.18
		4	**8.37**	8.28
2	3	5	**8.59**	8.26
		6	**8.62**	8.28
	4	7	**8.59**	8.26
		8	**8.58**	8.26
Total MIMO Conducted PSD (mW/MHz)			**56.70**	53.66
Total MIMO Conducted PSD (dBm/MHz)			**17.54**	17.30
Ant. Gain (dBi)			**8.00**	8.00
e.i.r.p PSD (dBm/MHz)			**25.54**	25.30
e.i.r.p PSD Limit (dBm/MHz)			**37.00**	37.00
Margin (dB)			**-11.46**	-11.70

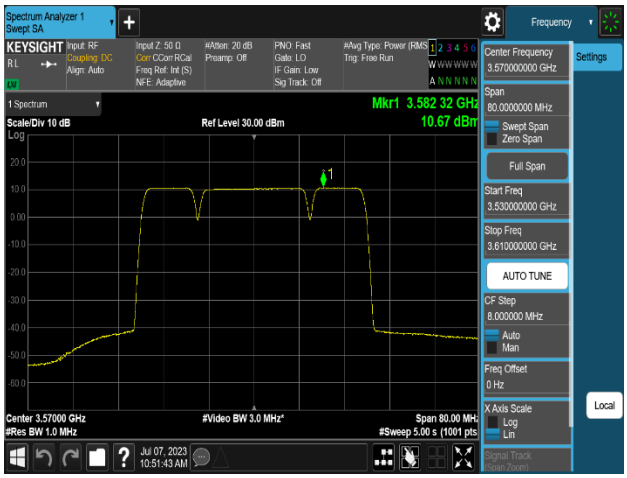
Table 8-8. Power Spectral Density Table (n48_3C_20M+20M+20M_Mid Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	7.95	7.97
		2	8.17	8.15
	2	3	7.89	7.89
		4	8.06	8.18
2	3	5	7.80	7.96
		6	7.87	8.04
	4	7	7.74	7.92
		8	7.82	7.99
Total MIMO Conducted PSD (mW/MHz)			49.49	50.60
Total MIMO Conducted PSD (dBm/MHz)			16.95	17.04
Ant. Gain (dBi)			8.00	8.00
e.i.r.p PSD (dBm/MHz)			24.95	25.04
e.i.r.p PSD Limit (dBm/MHz)			37.00	37.00
Margin (dB)			-12.05	-11.96

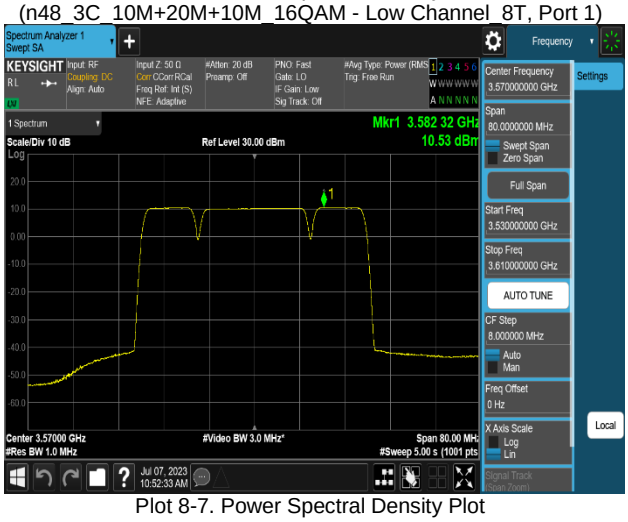
Table 8-9. Power Spectral Density Table (n48_3C_20M+20M+20M_High Channel_8T)



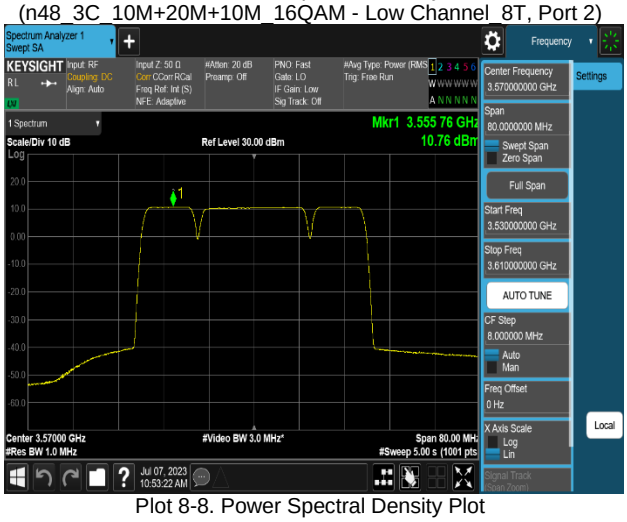
Plot 8-5. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 1)



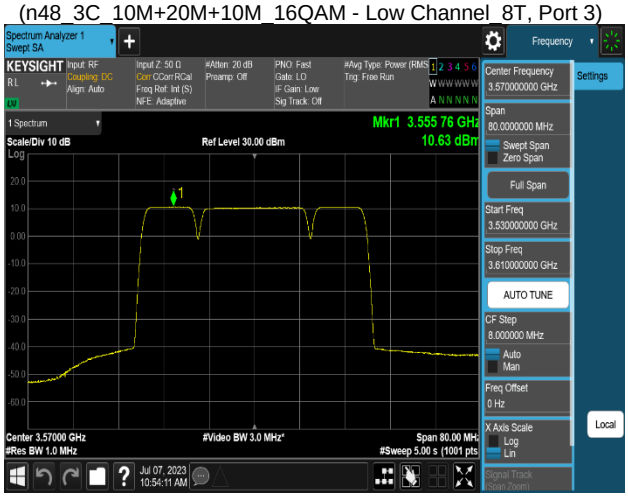
Plot 8-6. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 2)



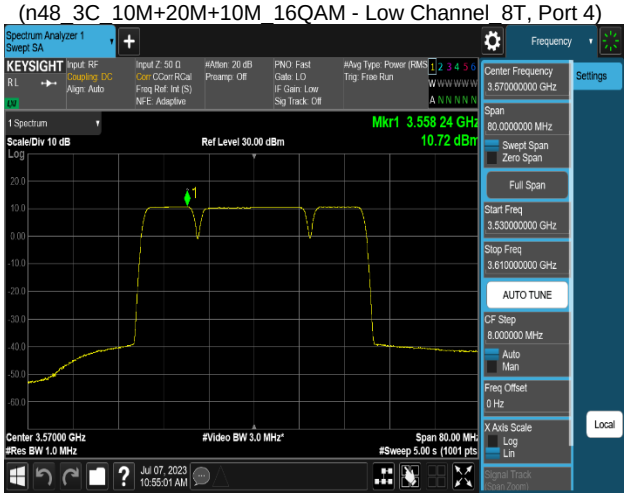
Plot 8-7. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 3)



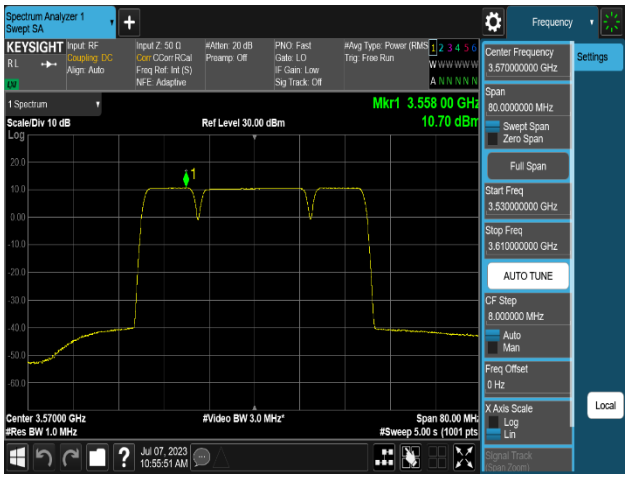
Plot 8-8. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 4)



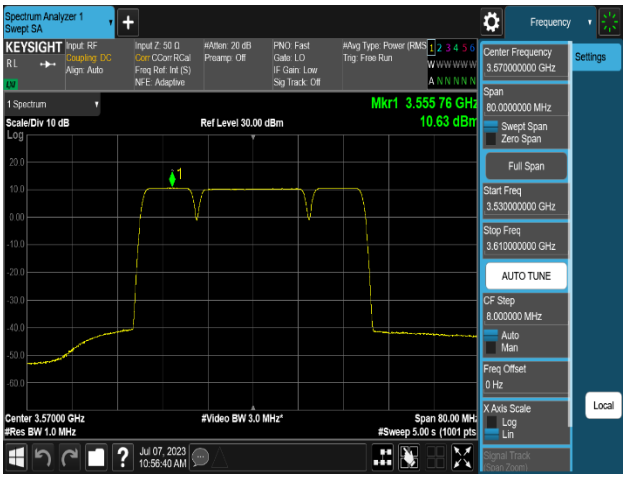
Plot 8-9. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 5)



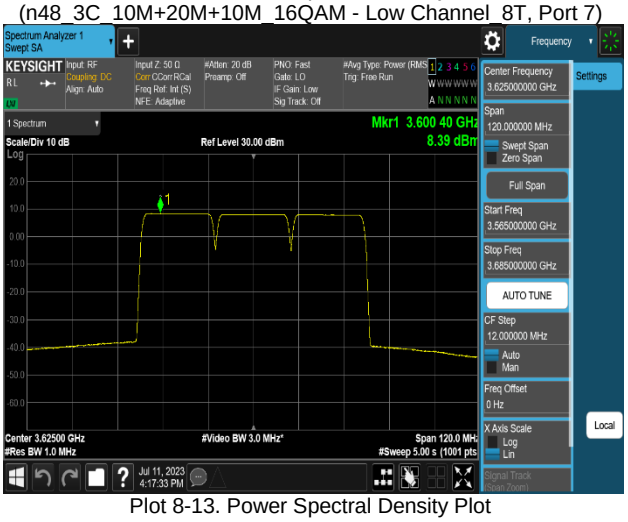
Plot 8-10. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 6)



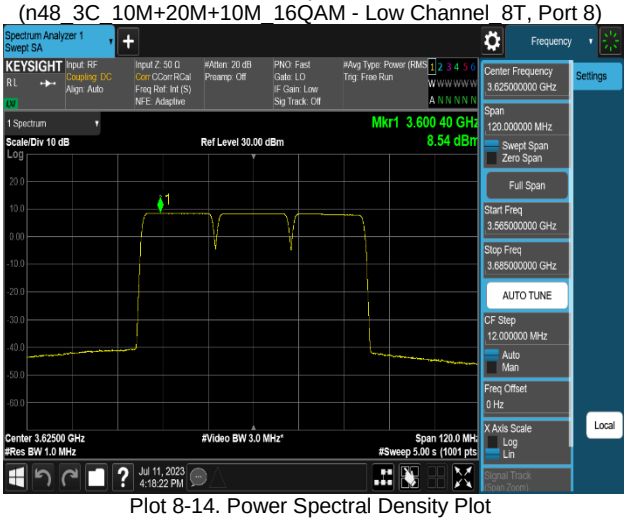
Plot 8-11. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 7)



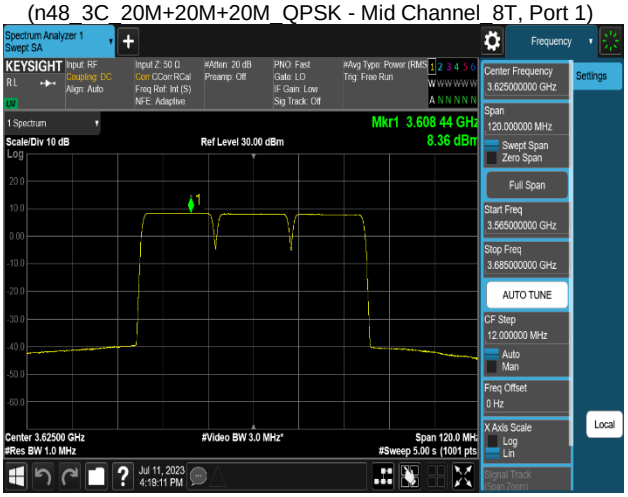
Plot 8-12. Power Spectral Density Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 8)



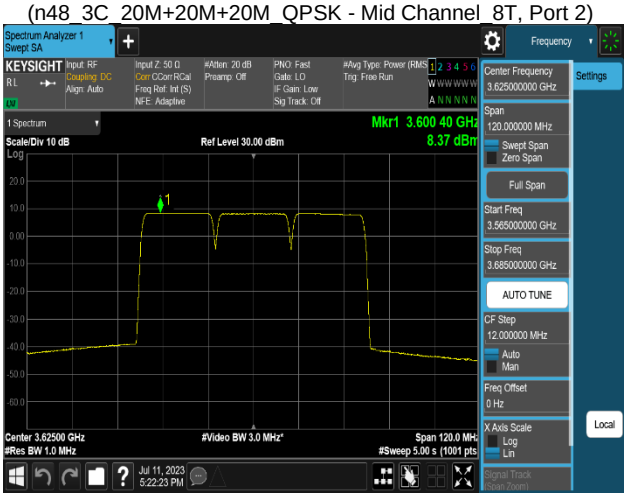
Plot 8-13. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 1)



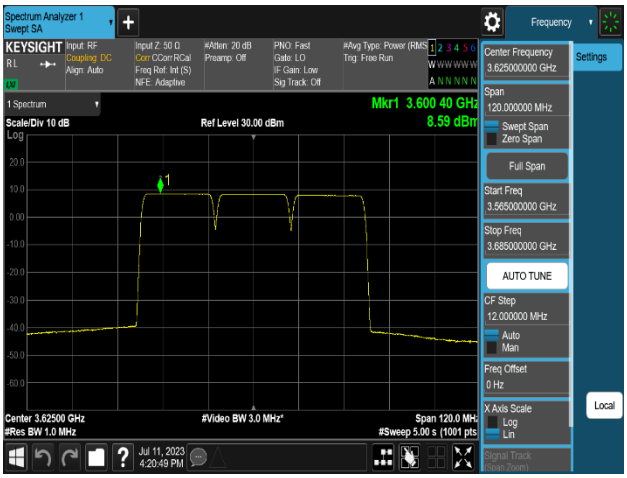
Plot 8-14. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 2)



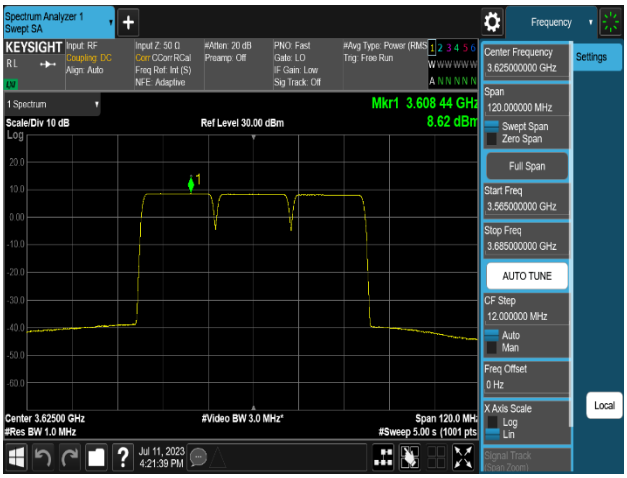
Plot 8-15. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 3)



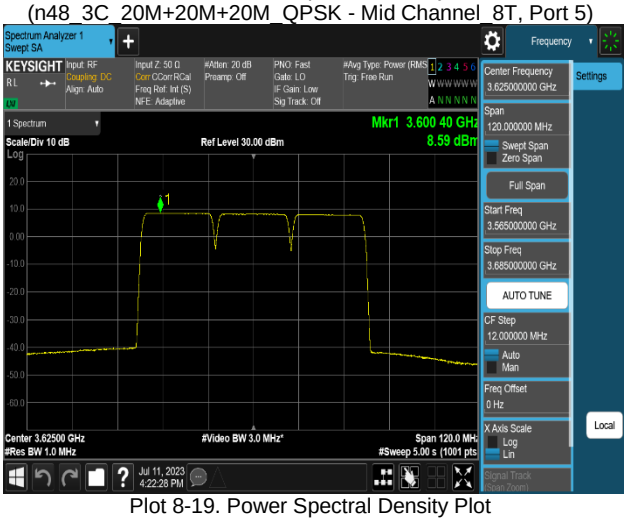
Plot 8-16. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 4)



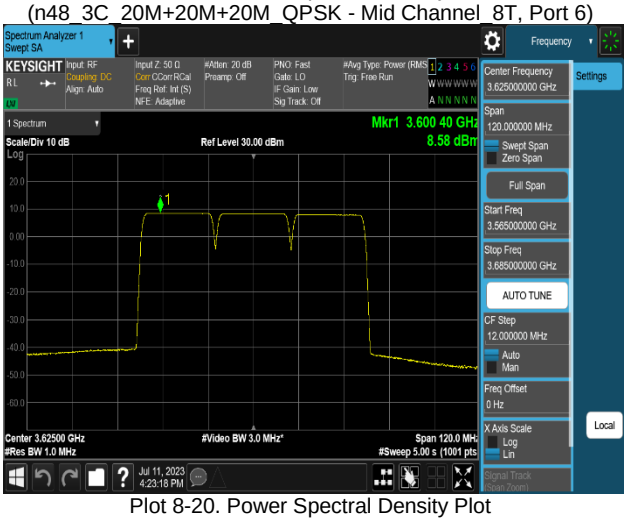
Plot 8-17. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 5)



Plot 8-18. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 6)



Plot 8-19. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 7)



Plot 8-20. Power Spectral Density Plot
(n48_3C_20M+20M+20M_QPSK - Mid Channel_8T, Port 8)

8.4 Equivalent Isotropic Radiated Power (EIRP)

Test Overview

A transmitter port of EUT is connected to the input of a signal analyzer. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Description

KDB 971168 D01 v03r01 – Section 5.4

KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements

ANSI C63.26-2015 – Section 5.2.4

ANSI C63.26 - Section 5.2.5

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

1. Conducted power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. IBW = 10 MHz (the reference bandwidth)
3. RBW = 1 ~ 5% of the expected OBW
4. VBW ≥ 3 x RBW
5. Span = 2 ~ 3 x OBW
6. No. of sweep points ≥ 2 x span / RBW
7. Detector = RMS
8. Trace mode = Trace-Averaging (RMS) set to average over 100 sweeps
9. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

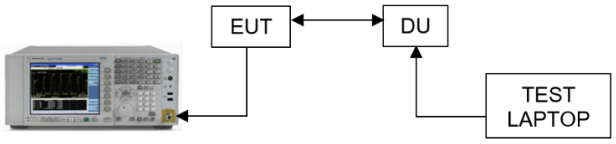


Figure 8-3. Test Instrument & Measurement Setup

Limit

Category B CBSD: 47dBm/10 MHz

Note

1. Periodic trigger was used with gating ON. Gate sweep time, Gate delay and gate length were set accordingly to capture ON time of the transmission.

2. For Multi carriers, conducted power for each carrier is measured to compare the 1st carrier result and the result of 2nd carrier. After compared, worst measured value is listed on report.

3. MIMO Calculations are done considering output channel power for all ports and respective margins are calculated according to procedures in section 6.4 of ANSI C63.26 and section D of KDB 971168 D01 v03r01.

4. All modes of operation were investigated and the worst configuration result plots are reported in each RF chain.

5. Consider the following factors for MIMO Power:
   c) Conducted power for each port is measured in dBm.
   d) Powers are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01- Section D.
   e) Conducted power per port (dBm) is converted to a linear value (mW). A summation of linear powers for all ports gives us the total MIMO conducted power in milliWatts (mW).

6. Antenna Gains (dBi) control value provided by the client.

7. Directional gain calculations were performed on the individual gains in specific direction across all directions.

8. Applied antenna gain as below:

Mode	Rated Conductive Power		Total Directional Antenna Gain(dBi)	Rated EIRP (dBm/Unit)
Active Antenna path	Path (dBm)	Unit (dBm)		
8T	25	34	7 ±1	42

9. Sample Calculation:
   Let us assume the following numbers:
   a) Total MIMO Conducted Power as 711.01 mW
   b) Antenna Gain = 8.00 dBi

Factors			Value	Unit
Summed MIMO Conducted Power (linear sum)			711.01	mW
Summed MIMO Conducted Power (dBm)	= 10 * log (711.01) =		28.52	dBm/10MHz
Antenna Gain			8.00	dBi
e.i.r.p			36.52	dBm/10MHz
Limit			47.00	dBm/10 MHz
Margin = Limit - e.i.r.p	= 36.52 - 47.00	=	-10.48	dB

Sector	Zone	Port	QPSK	**16QAM**
1	1	1	19.31	**20.04**
		2	19.54	**19.84**
	2	3	19.42	**19.58**
		4	19.73	**19.91**
2	3	5	19.51	**19.87**
		6	19.53	**20.05**
	4	7	19.47	**20.12**
		8	19.38	**20.10**
Total MIMO Conducted power (mW/10MHz)			711.01	**789.38**
Total MIMO Conducted power (dBm/10MHz)			28.52	**28.97**
Ant. Gain (dBi)			8.00	**8.00**
e.i.r.p (dBm/10MHz)			36.52	**36.97**
e.i.r.p Limit (dBm/10MHz)			47.00	**47.00**
Margin (dB)			-10.48	**-10.03**

Table 8-10. Equivalent Isotropic Radiated Power Table (n48_3C_10M+20M+10M_Low Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	19.27	19.42
		2	19.73	19.68
	2	3	19.62	19.46
		4	19.95	19.67
2	3	5	19.51	19.59
		6	19.52	19.67
	4	7	19.41	19.50
		8	19.54	19.67
Total MIMO Conducted power (mW/10MHz)			725.09	726.87
Total MIMO Conducted power (dBm/10MHz)			28.60	28.61
Ant. Gain (dBi)			8.00	8.00
e.i.r.p (dBm/10MHz)			36.60	36.61
e.i.r.p Limit (dBm/10MHz)			47.00	47.00
Margin (dB)			-10.40	-10.39

Table 8-11. Equivalent Isotropic Radiated Power Table (n48_3C_10M+20M+10M_Mid Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	19.15	19.51
		2	19.30	19.60
	2	3	19.08	19.31
		4	19.47	19.61
2	3	5	19.38	19.57
		6	19.38	19.60
	4	7	19.40	19.52
		8	19.44	19.49
Total MIMO Conducted power (mW/10MHz)			685.15	717.48
Total MIMO Conducted power (dBm/10MHz)			28.36	28.56
Ant. Gain (dBi)			8.00	8.00
e.i.r.p (dBm/10MHz)			36.36	36.56
e.i.r.p Limit (dBm/10MHz)			47.00	47.00
Margin (dB)			-10.64	-10.44

Table 8-12. Equivalent Isotropic Radiated Power Table (n48_3C_10M+20M+10M_High Channel_8T)

Sector	Zone	Port	QPSK	**16QAM**
1	1	1	17.20	**17.96**
		2	17.32	**18.12**
	2	3	17.13	**17.91**
		4	17.41	**18.18**
2	3	5	17.31	**17.99**
		6	17.39	**18.04**
	4	7	17.38	**18.08**
		8	17.27	**18.00**
Total MIMO Conducted power (mW/10MHz)			429.84	**508.94**
Total MIMO Conducted power (dBm/10MHz)			26.33	**27.07**
Ant. Gain (dBi)			8.00	**8.00**
e.i.r.p (dBm/10MHz)			34.33	**35.07**
e.i.r.p Limit (dBm/10MHz)			47.00	**47.00**
Margin (dB)			-12.67	**-11.93**

Table 8-13. Equivalent Isotropic Radiated Power Table (n48_3C_20M+20M+20M_Low Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	17.90	17.87
		2	18.07	18.06
	2	3	17.88	17.84
		4	18.06	18.10
2	3	5	18.06	18.02
		6	18.09	18.05
	4	7	18.00	17.99
		8	18.03	18.02
Total MIMO Conducted power (mW/10MHz)			506.15	504.14
Total MIMO Conducted power (dBm/10MHz)			27.04	27.03
Ant. Gain (dBi)			8.00	8.00
e.i.r.p (dBm/10MHz)			35.04	35.03
e.i.r.p Limit (dBm/10MHz)			47.00	47.00
Margin (dB)			-11.96	-11.97

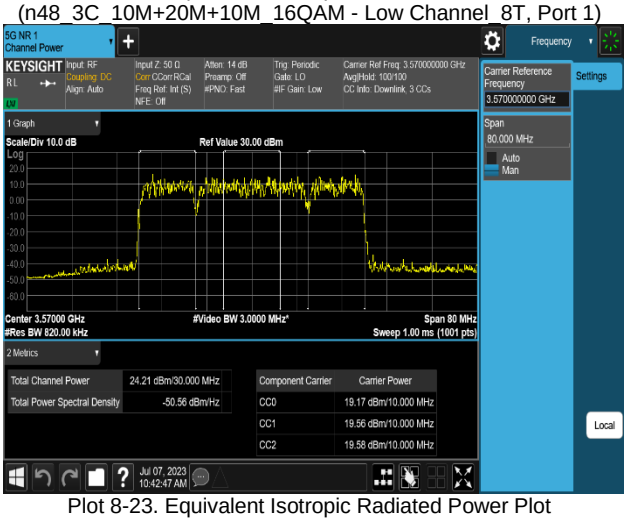
Table 8-14. Equivalent Isotropic Radiated Power Table (n48_3C_20M+20M+20M_Mid Channel_8T)

Sector	Zone	Port	QPSK	16QAM
1	1	1	17.42	17.64
		2	17.59	17.81
	2	3	17.35	17.60
		4	17.98	17.89
2	3	5	17.46	17.77
		6	17.60	17.83
	4	7	17.48	17.69
		8	17.57	17.76
Total MIMO Conducted power (mW/10MHz)			456.14	476.50
Total MIMO Conducted power (dBm/10MHz)			26.59	26.78
Ant. Gain (dBi)			8.00	8.00
e.i.r.p (dBm/10MHz)			34.59	34.78
e.i.r.p Limit (dBm/10MHz)			47.00	47.00
Margin (dB)			-12.41	-12.22

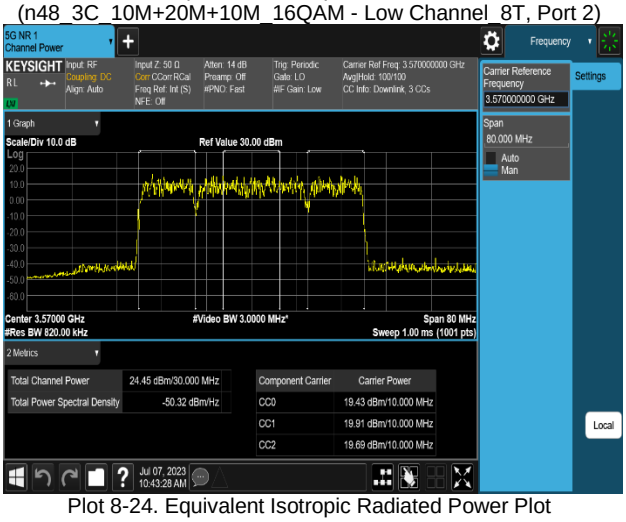
Table 8-15. Equivalent Isotropic Radiated Power Table (n48_3C_20M+20M+20M_High Channel_8T)

Plot 8-21. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 1)

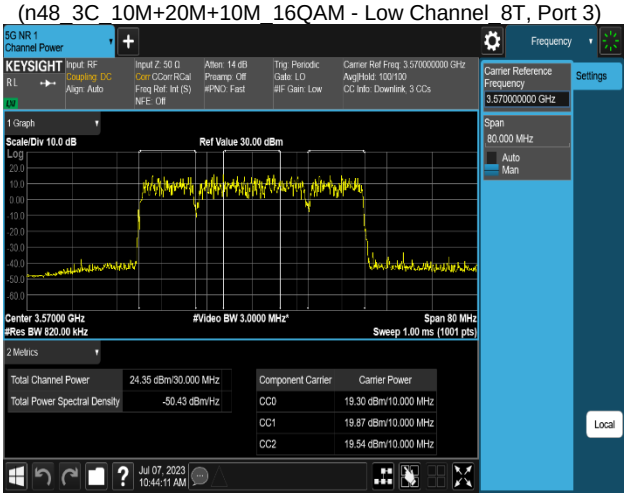
Plot 8-22. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 2)



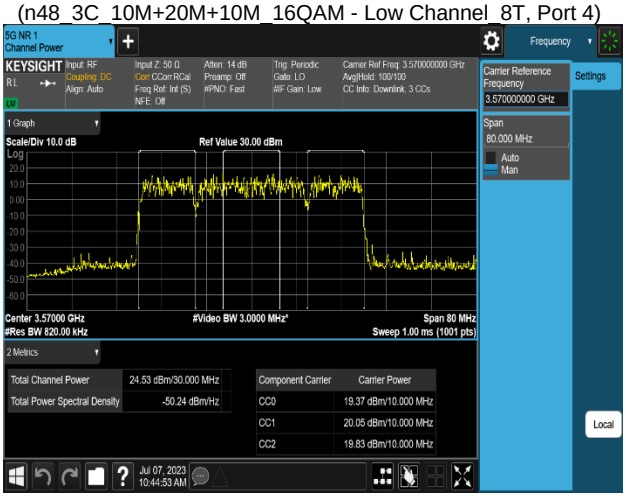
Plot 8-23. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 3)



Plot 8-24. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 4)



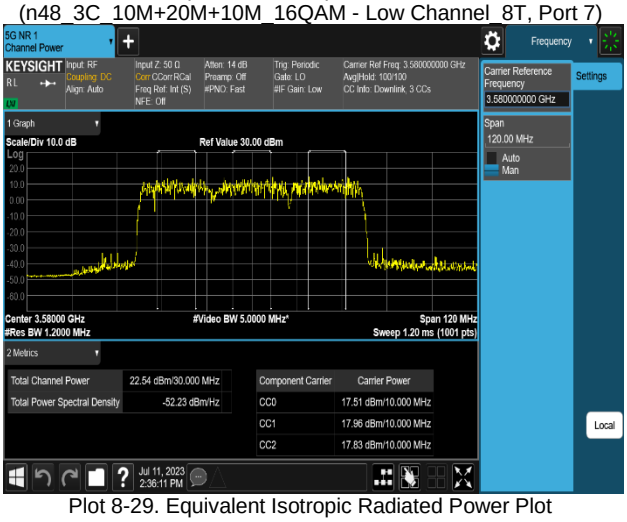
Plot 8-25. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 5)



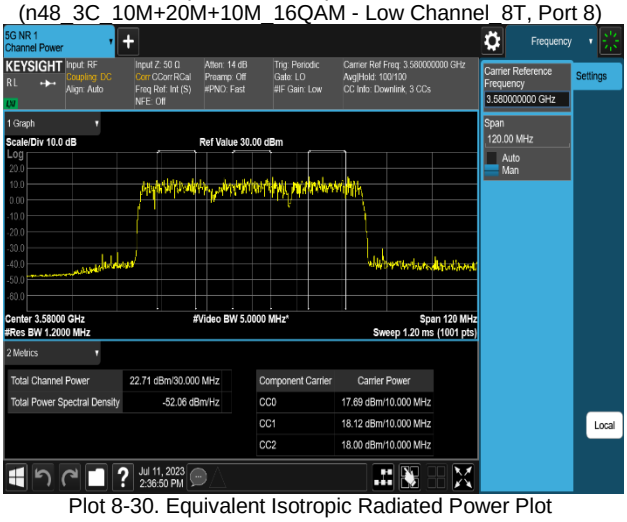
Plot 8-26. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 6)

Plot 8-27. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 7)

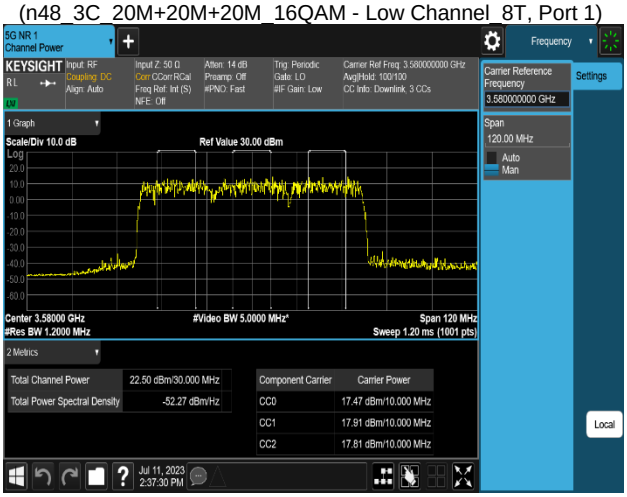
Plot 8-28. Equivalent Isotropic Radiated Power Plot (n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 8)



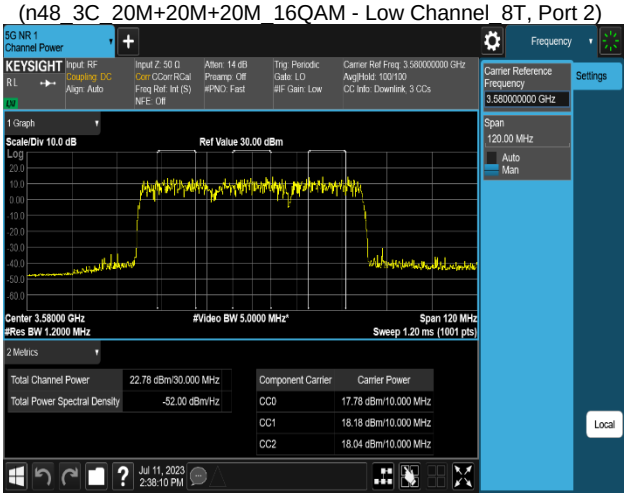
Plot 8-29. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 1)



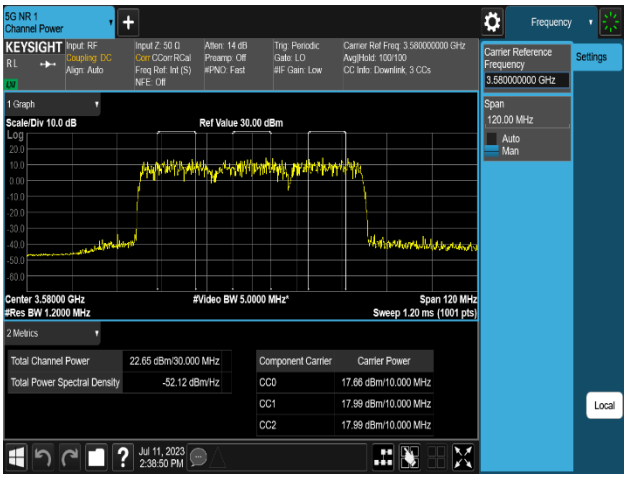
Plot 8-30. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 2)



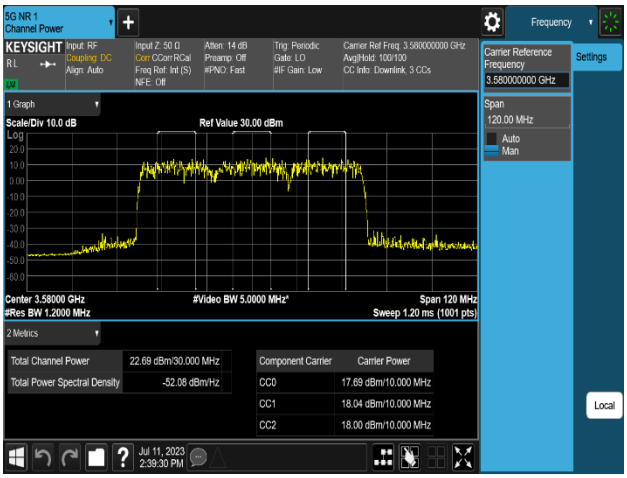
Plot 8-31. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 3)



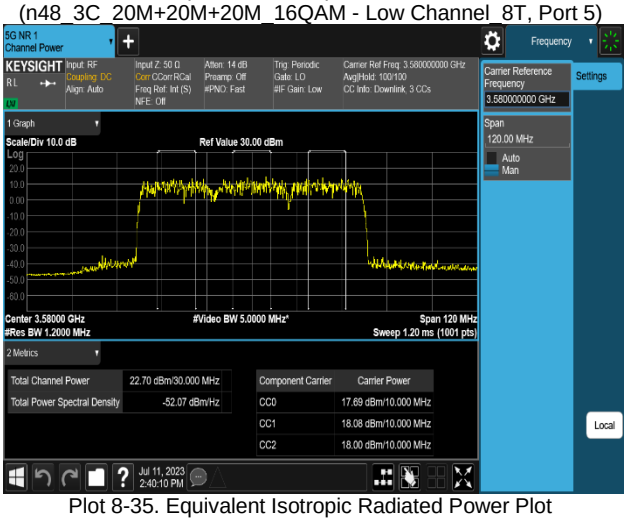
Plot 8-32. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 4)



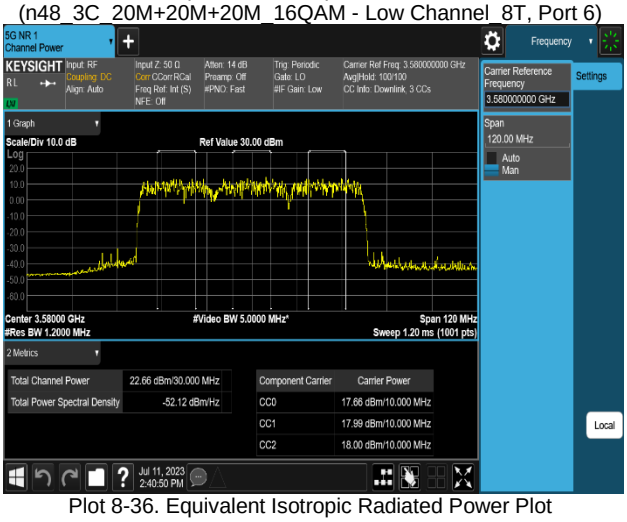
Plot 8-33. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 5)



Plot 8-34. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 6)



Plot 8-35. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 7)



Plot 8-36. Equivalent Isotropic Radiated Power Plot (n48_3C_20M+20M+20M_16QAM - Low Channel_8T, Port 8)

8.5 Peak To Average Power Ratio (PAPR)

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how
much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

ANSI C63.26 - Section 5.2.3.4.
KDB 971168 D01 v03r01 - Section 5.7

Test Setting

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

1. The signal analyzer's CCDF function is enabled.
2. Frequency = carrier center frequency
3. Measurement BW ≥ OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed.
   For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

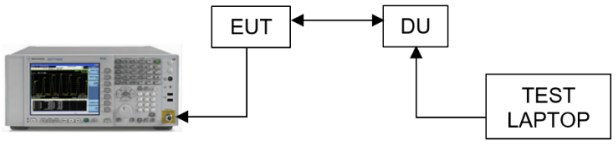


Figure 8-4. Test Instrument & Measurement Setup

Limit

Peak-to-average power ratio (PAPR) limit shall not exceed 13 dB for more than 0.1% of the time.

Test Notes

All modes of operation were investigated and the worst configuration result plots are reported in each RF chain.

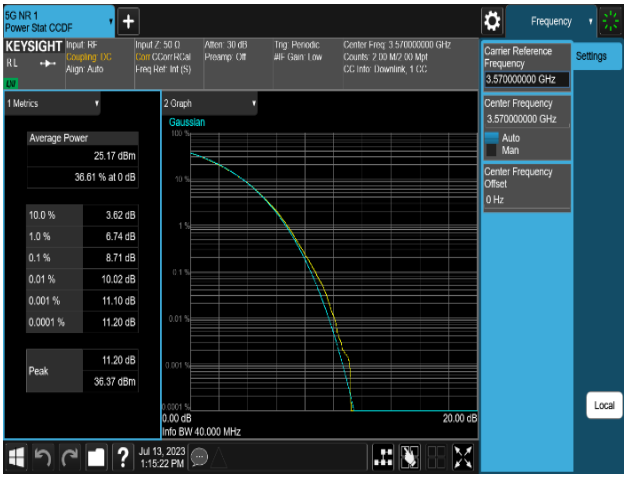
Channel	Sector	Zone	Port	PAPR (dB)		Limit (dB)
				QPSK	16QAM	
Low	1	1	1	8.44	8.70	≤ 13
			2	8.40	8.70	
		2	3	8.40	8.68	
			4	8.43	8.68	
	2	3	5	8.52	8.69	
			6	8.39	8.70	
		4	7	8.52	**8.71**	
			8	8.45	8.68	
Middle	1	1	1	8.33	8.54	
			2	8.42	8.63	
		2	3	8.35	8.56	
			4	7.83	7.83	
	2	3	5	8.41	8.60	
			6	8.41	8.63	
		4	7	8.40	8.61	
			8	8.39	8.61	
High	1	1	1	8.59	8.56	
			2	8.65	8.56	
		2	3	8.62	8.57	
			4	8.64	8.62	
	2	3	5	8.66	8.60	
			6	8.65	8.61	
		4	7	**8.67**	8.57	
			8	8.65	8.61	

Table 8-16. Peak To Average Power Ratio Summary Data (n48_3C_10M+20M+10M)

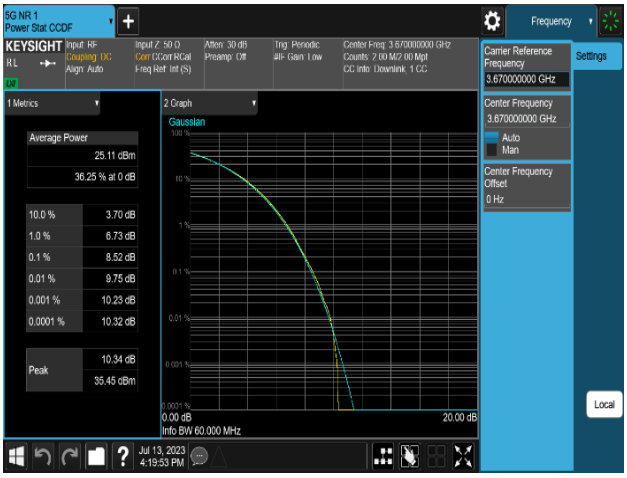
Channel	Sector	Zone	Port	PAPR (dB)		Limit (dB)
				QPSK	16QAM	
Low	1	1	1	8.46	8.45	≤ 13
			2	8.48	8.47	
		2	3	8.46	7.51	
			4	8.48	8.45	
	2	3	5	8.46	8.47	
			6	8.47	8.45	
		4	7	8.47	8.45	
			8	8.46	8.39	
Middle	1	1	1	8.38	8.31	
			2	8.41	8.31	
		2	3	8.39	8.31	
			4	8.38	8.27	
	2	3	5	8.39	8.32	
			6	8.39	8.28	
		4	7	8.42	8.29	
			8	8.42	8.34	
High	1	1	1	8.40	8.41	
			2	**8.52**	**8.61**	
		2	3	8.39	8.39	
			4	8.43	8.54	
	2	3	5	8.42	8.50	
			6	8.42	8.39	
		4	7	8.40	8.49	
			8	8.45	8.42	

Table 8-17. Peak To Average Power Ratio Summary Data (n48_3C_20M+20M+20M)

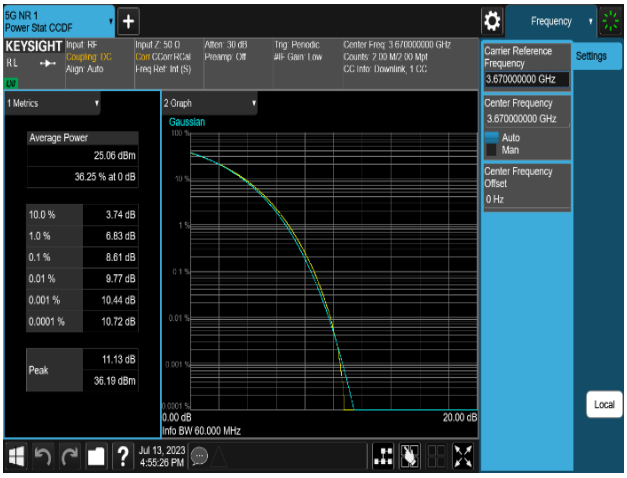
Plot 8-37. Peak To Average Power Ratio Plot
(n48_3C_10M+20M+10M_QPSK - High Channel_8T, Port 7)



Plot 8-38. Peak To Average Power Ratio Plot
(n48_3C_10M+20M+10M_16QAM - Low Channel_8T, Port 7)



Plot 8-39. Peak To Average Power Ratio Plot
(n48_3C_20M+20M+20M_QPSK - High Channel_8T, Port 2)



Plot 8-40. Peak To Average Power Ratio Plot
(n48_3C_20M+20M+20M_16QAM - High Channel_8T, Port 2)

8.6 Channel Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated, and the worst case configuration results are reported in this section.

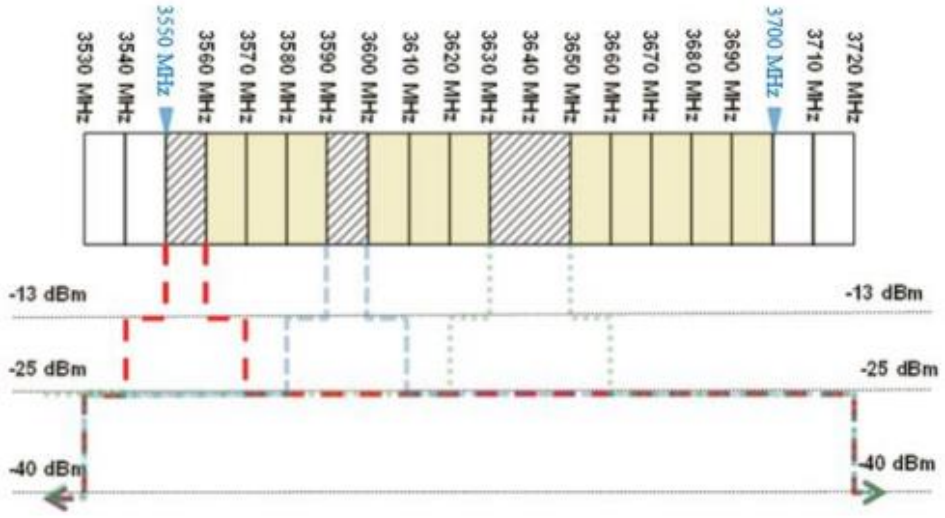
Test Procedure Used

ANSI C63.26 - Section 5.2.3.4.
KDB 971168 D01 v03r01 - Section 5.7
KDB 662911 D01 v02r01 - Section E)3)

Test Setting

1. Start and stop frequency were set such that the Channel Edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the Channel Edge
3. RBW: 1% of fundamental for measurements within 1 MHz immediately outside the authorized channel
   1 MHz for beyond 1 MHz outside the authorized channel.
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Limit



- Within 0 MHz to 10 MHz above and below the assigned channel ≤ −13 dBm/MHz
- Greater than 10 MHz above and below the assigned channel ≤ −25 dBm/MHz
- Any emission below 3530 MHz and above 3720 MHz ≤ −40 dBm/MHz

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

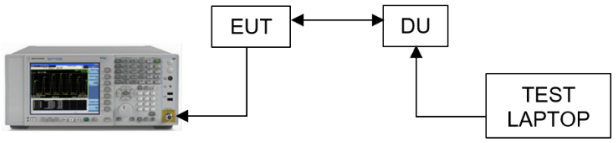


Figure 8-5. Test Instrument & Measurement Setup

Test Notes

1. All modes of operation were investigated and the worst configuration result plots are reported in each RF chain.

2. When detected Emission, this value has been applied as reference offset in the spectrum analyzer.

   Duty cycle correction factor was added to spectrum analyzer.
   Duty cycle = transmit on-time / transmitter period = 3.72 ms / 5.00 ms = 0.74
   Duty cycle correction factor = 10*log (1/duty cycle) =10*log (1/0.74) = 1.28 dB

3. Per Section 96.41(e)(3)—resolution bandwidth 1% of fundamental for measurements within 1 MHz immediately outside the authorized channel; and 1 MHz for beyond 1 MHz outside the authorized channel.

4. The limits were adjusted by a factor of [-10*log (n)] dB to account for the device operation as a n port MIMO transmitter, as per FCC KDB 622911. MIMO Factor calculation as below:

5. When the spurious emissions performed using the method KDB 971168 D01 v03r01 - Section E) 3) iii) detect with a margin of under 1dB to limit, the integration method was performed using the spectrum analyzer's band power functions according to ANSI C63.26-2015 – Section 5.7 and using the method KDB 971168 D01 v03r01 - Section E) 3) ii). The integration value was set to a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter.

Frequency range	Basic Limit (dBm/MHz)	MIMO Factor (dB)	Adjusted limit (dBm)
		8T	8T
0 MHz to 10 MHz above and below the assigned channel	-13.00	9.03	- 22.03
10 MHz above and below the assigned channel	-25.00	9.03	- 34.03
below 3530 MHz and above 3720 MHz	-40.00	9.03	- 49.03
Note: Adjusted limit (dBm/MHz) = Basic limit (dBm/1MHz) - MIMO Factor			

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.540	-48.89	-48.50	-34.03	-14.47
			3.540 to 3.549	-39.52	-40.16	-22.03	-17.49
			3.549 to 3.550	-24.48	-24.40	-22.03	-2.37
			3.590 to 3.591	-24.72	-25.24	-22.03	-2.69
			3.591 to 3.600	-40.38	-39.93	-22.03	-17.90
			3.600 to 3.720	-43.69	-42.48	-34.03	-8.45
		2	3.530 to 3.540	-47.94	-47.94	-34.03	-13.91
			3.540 to 3.549	-38.88	-39.29	-22.03	-16.85
			3.549 to 3.550	-25.49	-24.06	-22.03	-2.03
			3.590 to 3.591	-25.81	-24.68	-22.03	-2.65
			3.591 to 3.600	-39.92	-40.07	-22.03	-17.89
			3.600 to 3.720	-42.84	-42.99	-34.03	-8.81
	2	3	3.530 to 3.540	-48.86	-49.51	-34.03	-14.83
			3.540 to 3.549	-39.70	-40.31	-22.03	-17.67
			3.549 to 3.550	-24.77	-24.26	-22.03	-2.23
			3.590 to 3.591	-24.75	-25.12	-22.03	-2.72
			3.591 to 3.600	-40.26	-40.54	-22.03	-18.23
			3.600 to 3.720	-43.15	-43.55	-34.03	-9.12
		4	3.530 to 3.540	-46.22	-47.79	-34.03	-12.19
			3.540 to 3.549	-38.40	-38.67	-22.03	-16.37
			3.549 to 3.550	-24.34	-24.30	-22.03	-2.27
			3.590 to 3.591	-24.64	-24.36	-22.03	-2.33
			3.591 to 3.600	-39.34	-40.07	-22.03	-17.31
			3.600 to 3.720	-41.59	-42.84	-34.03	-7.56
2	3	5	3.530 to 3.540	-47.88	-47.54	-34.03	-13.51
			3.540 to 3.549	-39.68	-39.10	-22.03	-17.07
			3.549 to 3.550	-25.17	-25.07	-22.03	-3.04
			3.590 to 3.591	-24.47	-24.60	-22.03	-2.44
			3.591 to 3.600	-40.44	-40.17	-22.03	-18.14
			3.600 to 3.720	-42.81	-42.83	-34.03	-8.78
		6	3.530 to 3.540	-46.85	-47.39	-34.03	-12.82
			3.540 to 3.549	-39.40	-38.96	-22.03	-16.93
			3.549 to 3.550	-24.84	-25.00	-22.03	-2.81
			3.590 to 3.591	-25.15	-24.38	-22.03	-2.35
			3.591 to 3.600	-39.37	-39.80	-22.03	-17.34
			3.600 to 3.720	-41.63	-42.37	-34.03	-7.60
	4	7	3.530 to 3.540	-46.70	-47.28	-34.03	-12.67
			3.540 to 3.549	-39.66	-39.37	-22.03	-17.34
			3.549 to 3.550	-24.97	-24.48	-22.03	-2.45
			3.590 to 3.591	**-24.11**	-25.52	-22.03	-2.08
			3.591 to 3.600	-40.13	-40.39	-22.03	-18.10
			3.600 to 3.720	-42.33	-42.98	-34.03	-8.30
		8	3.530 to 3.540	-47.47	-47.93	-34.03	-13.44
			3.540 to 3.549	-39.67	-39.82	-22.03	-17.64
			3.549 to 3.550	-25.85	-24.71	-22.03	-2.68
			3.590 to 3.591	-25.33	-25.47	-22.03	-3.30
			3.591 to 3.600	-40.82	-40.66	-22.03	-18.63
			3.600 to 3.720	-43.29	-42.56	-34.03	-8.53

Table 8-18. Channel Edge Emission Summary Data (n48_3C_10M+20M+10M_Low Channel_8T)

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.595	-41.87	-41.37	-34.03	-7.34
			3.595 to 3.604	-39.27	-39.17	-22.03	-17.14
			3.604 to 3.605	-25.04	-24.61	-22.03	-2.58
			3.645 to 3.646	-25.99	-24.63	-22.03	-2.60
			3.646 to 3.655	-39.38	-40.05	-22.03	-17.35
			3.655 to 3.720	-40.65	-43.59	-34.03	-6.62
		2	3.530 to 3.595	-42.19	-43.56	-34.03	-8.16
			3.595 to 3.604	-39.66	-38.79	-22.03	-16.76
			3.604 to 3.605	-25.02	-25.28	-22.03	-2.99
			3.645 to 3.646	-24.84	-24.67	-22.03	-2.64
			3.646 to 3.655	-39.28	-40.03	-22.03	-17.25
			3.655 to 3.720	-43.58	-43.38	-34.03	-9.35
	2	3	3.530 to 3.595	-42.29	-42.42	-34.03	-8.26
			3.595 to 3.604	-39.38	-38.63	-22.03	-16.60
			3.604 to 3.605	-24.75	-24.88	-22.03	-2.72
			3.645 to 3.646	-25.87	-25.64	-22.03	-3.61
			3.646 to 3.655	-39.94	-39.54	-22.03	-17.51
			3.655 to 3.720	-42.47	-43.38	-34.03	-8.44
		4	3.530 to 3.595	-42.19	-42.40	-34.03	-8.16
			3.595 to 3.604	-38.63	-38.67	-22.03	-16.60
			3.604 to 3.605	-24.28	**-24.04**	-22.03	-2.01
			3.645 to 3.646	-24.12	-24.24	-22.03	-2.09
			3.646 to 3.655	-39.78	-39.74	-22.03	-17.71
			3.655 to 3.720	-42.65	-43.58	-34.03	-8.62
2	3	5	3.530 to 3.595	-39.87	-40.10	-34.03	-5.84
			3.595 to 3.604	-38.81	-37.49	-22.03	-15.46
			3.604 to 3.605	-24.85	-24.53	-22.03	-2.50
			3.645 to 3.646	-24.51	-24.88	-22.03	-2.48
			3.646 to 3.655	-39.41	-39.67	-22.03	-17.38
			3.655 to 3.720	-40.81	-42.73	-34.03	-6.78
		6	3.530 to 3.595	-41.47	-42.96	-34.03	-7.44
			3.595 to 3.604	-38.64	-38.36	-22.03	-16.33
			3.604 to 3.605	-24.58	-24.22	-22.03	-2.19
			3.645 to 3.646	-24.71	-25.70	-22.03	-2.68
			3.646 to 3.655	-39.11	-39.35	-22.03	-17.08
			3.655 to 3.720	-41.71	-42.31	-34.03	-7.68
	4	7	3.530 to 3.595	-42.21	-42.96	-34.03	-8.18
			3.595 to 3.604	-38.93	-39.21	-22.03	-16.90
			3.604 to 3.605	-24.48	-24.19	-22.03	-2.16
			3.645 to 3.646	-24.14	-25.18	-22.03	-2.11
			3.646 to 3.655	-39.37	-39.87	-22.03	-17.34
			3.655 to 3.720	-41.65	-42.92	-34.03	-7.62
		8	3.530 to 3.595	-41.29	-42.80	-34.03	-7.26
			3.595 to 3.604	-39.39	-39.71	-22.03	-17.36
			3.604 to 3.605	-24.28	-24.62	-22.03	-2.25
			3.645 to 3.646	-25.85	-24.68	-22.03	-2.65
			3.646 to 3.655	-39.81	-40.10	-22.03	-17.78
			3.655 to 3.720	-43.75	-43.66	-34.03	-9.63

Table 8-19. Channel Edge Emission Summary Data (n48_3C_10M+20M+10M_Mid Channel_8T)

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.650	-41.87	-41.37	-34.03	-5.41
			3.650 to 3.659	-39.27	-39.17	-22.03	-16.95
			3.659 to 3.660	-25.04	-24.61	-22.03	-2.10
			3.700 to 3.701	-25.99	-24.63	-22.03	-3.21
			3.701 to 3.710	-39.38	-40.05	-22.03	-17.92
			3.710 to 3.720	-40.65	-43.59	-34.03	-13.01
		2	3.530 to 3.650	-42.19	-43.56	-34.03	-5.84
			3.650 to 3.659	-39.66	-38.79	-22.03	-16.54
			3.659 to 3.660	-25.02	-25.28	-22.03	-2.87
			3.700 to 3.701	-24.84	-24.67	-22.03	-2.21
			3.701 to 3.710	-39.28	-40.03	-22.03	-17.48
			3.710 to 3.720	-43.58	-43.38	-34.03	-12.80
	2	3	3.530 to 3.650	-42.29	-42.42	-34.03	-6.94
			3.650 to 3.659	-39.38	-38.63	-22.03	-16.68
			3.659 to 3.660	-24.75	-24.88	-22.03	-2.35
			3.700 to 3.701	-25.87	-25.64	-22.03	-3.19
			3.701 to 3.710	-39.94	-39.54	-22.03	-17.74
			3.710 to 3.720	-42.47	-43.38	-34.03	-12.08
		4	3.530 to 3.650	-42.19	-42.40	-34.03	-6.34
			3.650 to 3.659	-38.63	-38.67	-22.03	-16.65
			3.659 to 3.660	-24.28	-24.04	-22.03	-2.31
			3.700 to 3.701	-24.12	-24.24	-22.03	-2.65
			3.701 to 3.710	-39.78	-39.74	-22.03	-18.12
			3.710 to 3.720	-42.65	-43.58	-34.03	-13.70
2	3	5	3.530 to 3.650	-39.87	-40.10	-34.03	-5.59
			3.650 to 3.659	-38.81	-37.49	-22.03	-16.58
			3.659 to 3.660	-24.85	-24.53	-22.03	-2.17
			3.700 to 3.701	-24.51	-24.88	-22.03	-2.81
			3.701 to 3.710	-39.41	-39.67	-22.03	-17.79
			3.710 to 3.720	-40.81	-42.73	-34.03	-12.33
		6	3.530 to 3.650	-41.47	-42.96	-34.03	-3.83
			3.650 to 3.659	-38.64	-38.36	-22.03	-15.48
			3.659 to 3.660	-24.58	-24.22	-22.03	-2.37
			3.700 to 3.701	-24.71	-25.70	-22.03	-2.29
			3.701 to 3.710	-39.11	-39.35	-22.03	-17.98
			3.710 to 3.720	-41.71	-42.31	-34.03	-11.94
	4	7	3.530 to 3.650	-42.21	-42.96	-34.03	-6.47
			3.650 to 3.659	-38.93	-39.21	-22.03	-16.88
			3.659 to 3.660	-24.48	-24.19	-22.03	-2.51
			3.700 to 3.701	-24.14	-25.18	-22.03	-3.11
			3.701 to 3.710	-39.37	-39.87	-22.03	-18.50
			3.710 to 3.720	-41.65	-42.92	-34.03	-14.14
		8	3.530 to 3.650	-41.29	-42.80	-34.03	-5.88
			3.650 to 3.659	-39.39	-39.71	-22.03	-16.94
			3.659 to 3.660	-24.28	-24.62	-22.03	-2.46
			3.700 to 3.701	-25.85	-24.68	-22.03	-2.99
			3.701 to 3.710	-39.81	-40.10	-22.03	-18.21
			3.710 to 3.720	-43.75	-43.66	-34.03	-12.71

Table 8-20. Channel Edge Emission Summary Data (n48_3C_10M+20M+10M_High Channel_8T)

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.540	-47.00	-47.81	-34.03	-12.97
			3.540 to 3.549	-42.66	-43.66	-22.03	-20.63
			3.549 to 3.550	-23.93	-24.07	-22.03	-1.90
			3.610 to 3.611	**-23.11**	-23.32	-22.03	-1.08
			3.611 to 3.620	-42.29	-42.43	-22.03	-20.26
			3.620 to 3.720	-43.65	-42.69	-34.03	-8.66
		2	3.530 to 3.540	-47.70	-47.87	-34.03	-13.67
			3.540 to 3.549	-43.77	-43.71	-22.03	-21.68
			3.549 to 3.550	-23.69	-23.39	-22.03	-1.36
			3.610 to 3.611	-24.40	-23.69	-22.03	-1.66
			3.611 to 3.620	-42.34	-42.27	-22.03	-20.24
			3.620 to 3.720	-42.56	-42.14	-34.03	-8.11
	2	3	3.530 to 3.540	-49.57	-48.96	-34.03	-14.93
			3.540 to 3.549	-44.31	-43.66	-22.03	-21.63
			3.549 to 3.550	-23.46	-23.23	-22.03	-1.20
			3.610 to 3.611	-24.22	-24.21	-22.03	-2.18
			3.611 to 3.620	-42.07	-41.46	-22.03	-19.43
			3.620 to 3.720	-42.72	-41.61	-34.03	-7.58
		4	3.530 to 3.540	-47.42	-47.23	-34.03	-13.20
			3.540 to 3.549	-43.27	-43.57	-22.03	-21.24
			3.549 to 3.550	-23.19	-23.34	-22.03	-1.16
			3.610 to 3.611	-23.78	-23.39	-22.03	-1.36
			3.611 to 3.620	-42.25	-42.08	-22.03	-20.05
			3.620 to 3.720	-42.97	-42.61	-34.03	-8.58
2	3	5	3.530 to 3.540	-48.07	-47.86	-34.03	-13.83
			3.540 to 3.549	-44.03	-42.77	-22.03	-20.74
			3.549 to 3.550	-23.51	-23.18	-22.03	-1.15
			3.610 to 3.611	-23.52	-24.62	-22.03	-1.49
			3.611 to 3.620	-41.46	-41.49	-22.03	-19.43
			3.620 to 3.720	-41.79	-41.88	-34.03	-7.76
		6	3.530 to 3.540	-47.80	-47.78	-34.03	-13.75
			3.540 to 3.549	-43.61	-43.39	-22.03	-21.36
			3.549 to 3.550	-23.14	-23.49	-22.03	-1.11
			3.610 to 3.611	-24.00	**-23.06**	-22.03	-1.03
			3.611 to 3.620	-42.24	-41.63	-22.03	-19.60
			3.620 to 3.720	-42.12	-42.27	-34.03	-8.09
	4	7	3.530 to 3.540	-47.10	-46.47	-34.03	-12.44
			3.540 to 3.549	-44.05	-42.97	-22.03	-20.94
			3.549 to 3.550	-23.12	-23.65	-22.03	-1.09
			3.610 to 3.611	-23.69	-23.23	-22.03	-1.20
			3.611 to 3.620	-42.51	-42.24	-22.03	-20.21
			3.620 to 3.720	-43.17	-42.75	-34.03	-8.72
		8	3.530 to 3.540	-47.49	-47.79	-34.03	-13.46
			3.540 to 3.549	-43.27	-43.03	-22.03	-21.00
			3.549 to 3.550	-23.13	-23.80	-22.03	-1.10
			3.610 to 3.611	-23.24	-23.18	-22.03	-1.15
			3.611 to 3.620	-42.33	-42.65	-22.03	-20.30
			3.620 to 3.720	-42.71	-43.03	-34.03	-8.68

Table 8-21. Channel Edge Emission Summary Data (n48_3C_20M+20M+20M_Low Channel_8T)

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.585	-41.66	-43.24	-34.03	-7.63
			3.585 to 3.594	-42.86	-43.73	-22.03	-20.83
			3.594 to 3.595	-23.14	-24.09	-22.03	-1.11
			3.655 to 3.656	-23.63	-23.89	-22.03	-1.60
			3.656 to 3.665	-42.94	-43.06	-22.03	-20.91
			3.665 to 3.720	-42.37	-43.74	-34.03	-8.34
		2	3.530 to 3.585	-42.44	-42.44	-34.03	-8.41
			3.585 to 3.594	-43.96	-43.02	-22.03	-20.99
			3.594 to 3.595	-23.46	-23.55	-22.03	-1.43
			3.655 to 3.656	-24.68	-25.04	-22.03	-2.65
			3.656 to 3.665	-42.98	-43.50	-22.03	-20.95
			3.665 to 3.720	-44.06	-44.09	-34.03	-10.03
	2	3	3.530 to 3.585	-42.89	-43.10	-34.03	-8.86
			3.585 to 3.594	-42.80	-43.09	-22.03	-20.77
			3.594 to 3.595	-23.17	-24.43	-22.03	-1.14
			3.655 to 3.656	-23.79	-24.42	-22.03	-1.76
			3.656 to 3.665	-42.51	-42.59	-22.03	-20.48
			3.665 to 3.720	-42.62	-44.23	-34.03	-8.59
		4	3.530 to 3.585	-42.66	-40.98	-34.03	-6.95
			3.585 to 3.594	-43.15	-42.30	-22.03	-20.27
			3.594 to 3.595	-23.14	-23.91	-22.03	-1.11
			3.655 to 3.656	-23.77	-25.25	-22.03	-1.74
			3.656 to 3.665	-43.08	-43.30	-22.03	-21.05
			3.665 to 3.720	-43.77	-43.84	-34.03	-9.74
2	3	5	3.530 to 3.585	-41.52	-41.04	-34.03	-7.01
			3.585 to 3.594	-41.55	-42.14	-22.03	-19.52
			3.594 to 3.595	-23.46	-23.87	-22.03	-1.43
			3.655 to 3.656	-23.80	-24.73	-22.03	-1.77
			3.656 to 3.665	-42.81	-42.69	-22.03	-20.66
			3.665 to 3.720	-43.39	-42.42	-34.03	-8.39
		6	3.530 to 3.585	-42.75	-40.72	-34.03	-6.69
			3.585 to 3.594	-43.68	-42.13	-22.03	-20.10
			3.594 to 3.595	-23.46	-23.31	-22.03	-1.28
			3.655 to 3.656	-23.67	-24.58	-22.03	-1.64
			3.656 to 3.665	-42.77	-42.52	-22.03	-20.49
			3.665 to 3.720	-42.85	-42.71	-34.03	-8.68
	4	7	3.530 to 3.585	-43.15	-42.47	-34.03	-8.44
			3.585 to 3.594	-43.69	-43.66	-22.03	-21.63
			3.594 to 3.595	-23.49	-24.28	-22.03	-1.46
			3.655 to 3.656	-25.01	-25.20	-22.03	-2.98
			3.656 to 3.665	-43.94	-44.19	-22.03	-21.91
			3.665 to 3.720	-43.69	-43.57	-34.03	-9.54
		8	3.530 to 3.585	-42.53	-42.39	-34.03	-8.36
			3.585 to 3.594	-42.85	-43.34	-22.03	-20.82
			3.594 to 3.595	-23.82	-23.86	-22.03	-1.79
			3.655 to 3.656	-24.66	-24.99	-22.03	-2.63
			3.656 to 3.665	-43.86	-44.27	-22.03	-21.83
			3.665 to 3.720	-44.10	-44.85	-34.03	-10.07

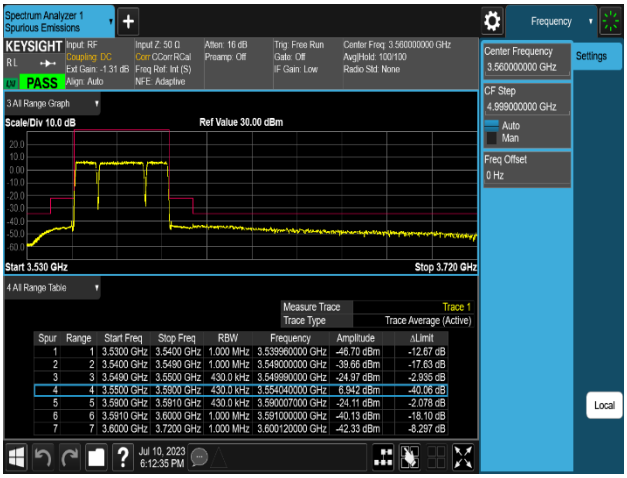
Table 8-22. Channel Edge Emission Summary Data (n48_3C_20M+20M+20M_Mid Channel_8T)

Sector	Zone	Port	Measured Range (GHz)	Max. Value (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	3.530 to 3.630	-40.10	-40.29	-34.03	-6.07
			3.630 to 3.639	-41.90	-42.24	-22.03	-19.87
			3.639 to 3.640	-23.30	-23.26	-22.03	-1.23
			3.700 to 3.701	-23.51	-24.10	-22.03	-1.48
			3.701 to 3.710	-42.32	-42.98	-22.03	-20.29
			3.710 to 3.720	-47.73	-47.36	-34.03	-13.33
		2	3.530 to 3.630	-40.34	-40.86	-34.03	-6.31
			3.630 to 3.639	-41.69	-42.16	-22.03	-19.66
			3.639 to 3.640	-23.21	-23.13	-22.03	-1.10
			3.700 to 3.701	-23.54	-24.24	-22.03	-1.51
			3.701 to 3.710	-45.59	-42.85	-22.03	-20.82
			3.710 to 3.720	-47.24	-47.26	-34.03	-13.21
	2	3	3.530 to 3.630	-40.59	-40.84	-34.03	-6.56
			3.630 to 3.639	-41.96	-42.06	-22.03	-19.93
			3.639 to 3.640	-23.67	-23.22	-22.03	-1.19
			3.700 to 3.701	-24.70	-23.87	-22.03	-1.84
			3.701 to 3.710	-43.02	-43.38	-22.03	-20.99
			3.710 to 3.720	-46.98	-46.74	-34.03	-12.71
		4	3.530 to 3.630	-40.69	-40.79	-34.03	-6.66
			3.630 to 3.639	-42.12	-42.21	-22.03	-20.09
			3.639 to 3.640	-23.26	-23.36	-22.03	-1.23
			3.700 to 3.701	-24.31	-24.25	-22.03	-2.22
			3.701 to 3.710	-43.31	-43.55	-22.03	-21.28
			3.710 to 3.720	-48.59	-48.52	-34.03	-14.49
2	3	5	3.530 to 3.630	-39.95	-40.73	-34.03	-5.92
			3.630 to 3.639	-41.83	-41.93	-22.03	-19.80
			3.639 to 3.640	-23.84	-23.98	-22.03	-1.81
			3.700 to 3.701	-24.20	-24.88	-22.03	-2.17
			3.701 to 3.710	-42.53	-43.26	-22.03	-20.50
			3.710 to 3.720	-47.08	-47.31	-34.03	-13.05
		6	3.530 to 3.630	-39.66	-39.81	-34.03	-5.63
			3.630 to 3.639	-41.99	-42.23	-22.03	-19.96
			3.639 to 3.640	-23.90	-23.75	-22.03	-1.72
			3.700 to 3.701	-24.91	-23.90	-22.03	-1.87
			3.701 to 3.710	-42.29	-41.75	-22.03	-19.72
			3.710 to 3.720	-46.41	-45.73	-34.03	-11.70
	4	7	3.530 to 3.630	-40.41	-41.26	-34.03	-6.38
			3.630 to 3.639	-42.34	-42.99	-22.03	-20.31
			3.639 to 3.640	-23.39	-23.13	-22.03	-1.10
			3.700 to 3.701	-24.23	-23.91	-22.03	-1.88
			3.701 to 3.710	-43.36	-43.84	-22.03	-21.33
			3.710 to 3.720	-48.86	-48.69	-34.03	-14.66
		8	3.530 to 3.630	-39.10	-40.90	-34.03	-5.07
			3.630 to 3.639	-41.58	-43.07	-22.03	-19.55
			3.639 to 3.640	-23.30	-23.53	-22.03	-1.27
			3.700 to 3.701	-23.49	-24.30	-22.03	-1.46
			3.701 to 3.710	-43.49	-43.52	-22.03	-21.46
			3.710 to 3.720	-47.78	-47.96	-34.03	-13.75

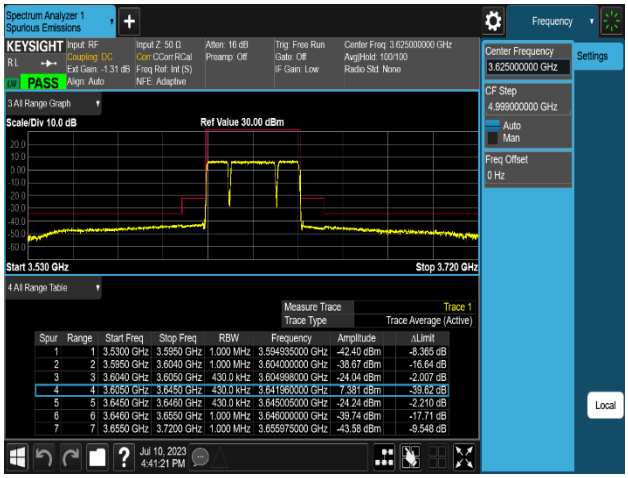
Table 8-23. Channel Edge Emission Summary Data (n48_3C_20M+20M+20M_High Channel_8T)

Configuration	Measured Range (GHz)	Max. Value (dBm)	Limit (dBm)	Margin (dB)
NR_3C_10M+20M+10M Non-Contiguous	3530 to 3540	-46.89	-34.03	-12.86
	3540 to 3549	-38.18	-22.03	-16.15
	3549 to 3550	-44.34	-22.03	-22.31
	3560 to 3561	-45.27	-22.03	-23024
	3561 to 3570	-38.50	-22.03	-16.47
	3570 to 3605	**-39.86**	-34.03	-5.83
	3605 to 3614	-40.09	-22.03	-18.06
	3614 to 3615	-42.79	-22.03	-20.76
	3635 to 3636	-41.66	-22.03	-19.63
	3636 to 3645	-40.41	-22.03	-18.38
	3645 to 3670	-41.87	-34.03	-7.84
	3670 to 3680	-42.45	-34.03	-8.42
	3680 to 3689	-37.76	-22.03	-15.73
	3689 to 3690	-44.25	-22.03	-22.22
	3700 to 3701	-44.12	-22.03	-22.09
	3701 to 3710	-39.61	-22.03	-17.58
	3710 to 3720	-48.55	-34.03	-14.52
NR_3C_20M+20M+20M Non-Contiguous	3530 to 3540	-46.75	-34.03	-12.72
	3540 to 3549	-39.50	-22.03	-17.47
	3549 to 3550	-43.01	-22.03	-20.98
	3570 to 3571	-43.73	-22.03	-21.70
	3571 to 3580	-39.92	-22.03	-17.89
	3580 to 3605	**-38.46**	-34.03	-4.43
	3605 to 3614	-38.29	-22.03	-16.26
	3614 to 3615	-40.30	-22.03	-18.27
	3635 to 3636	-41.45	-22.03	-19.42
	3636 to 3645	-39.21	-22.03	-17.18
	3645 to 3660	-40.88	-34.03	-6.85
	3660 to 3670	-44.87	-34.03	-10.84
	3670 to 3679	-41.06	-22.03	-19.03
	3679 to 3680	-42.75	-22.03	-20.72
	3700 to 3701	-43.76	-22.03	-21.73
	3701 to 3710	-42.59	-22.03	-20.56
	3710 to 3720	-48.11	-34.03	-14.08

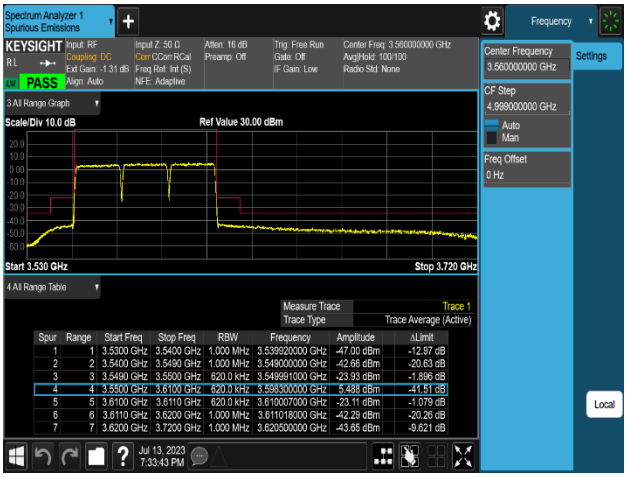
Table 8-24. Channel Edge Emission Summary Data (n48_NC_Multi Carrier_8T)



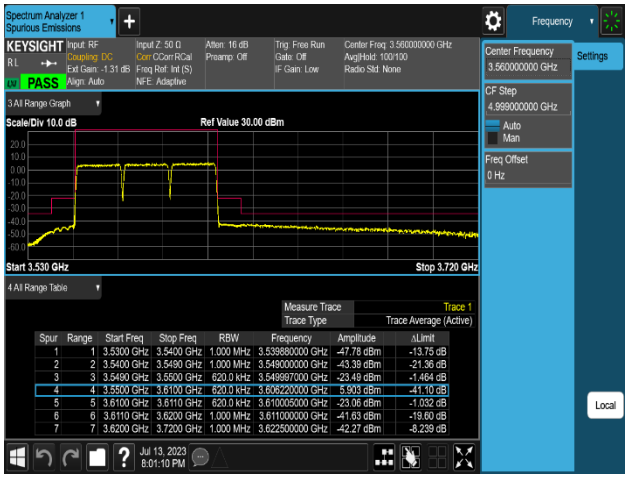
Plot 8-41. Channel Edge Emission Plot
(n48_3C_10M+20M+10M_QPSK – Low Channel_8T, Port 7)



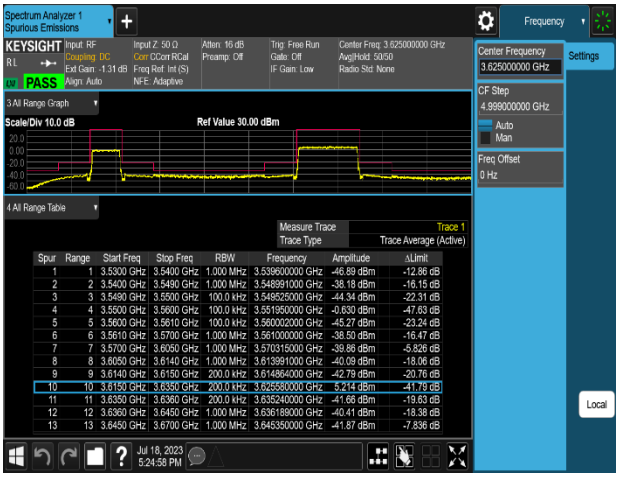
Plot 8-42. Channel Edge Emission Plot
(n48_3C_10M+20M+10M_16QAM – Mid Channel_8T, Port 4)



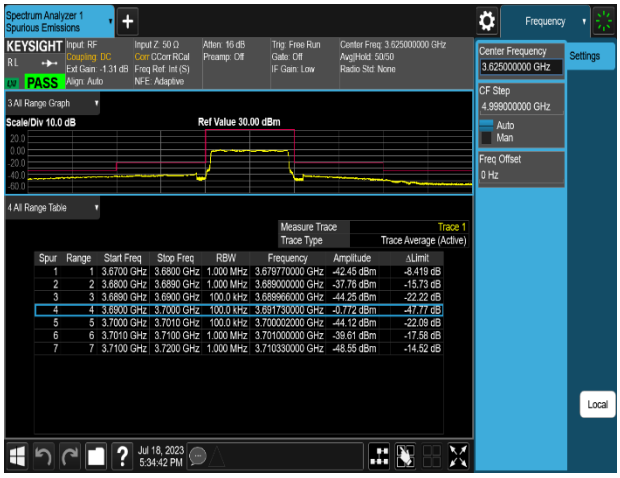
Plot 8-43. Channel Edge Emission Plot
(n48_3C_20M+20M+20M_QPSK – Low Channel_8T, Port 1)



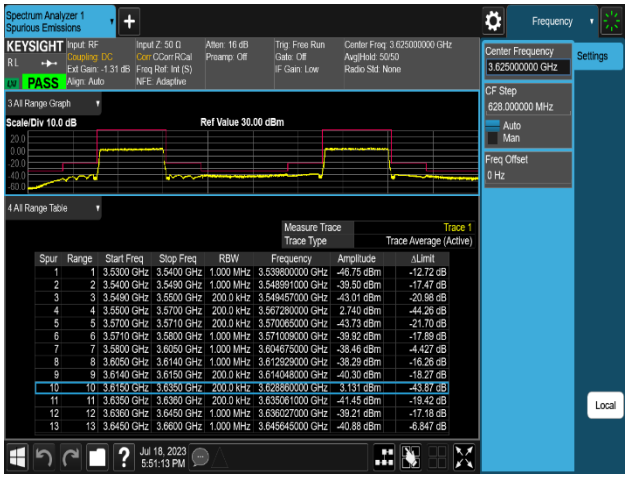
Plot 8-44. Channel Edge Emission Plot
(n48_3C_20M+20M+20M_16QAM – Low Channel_8T, Port 6)



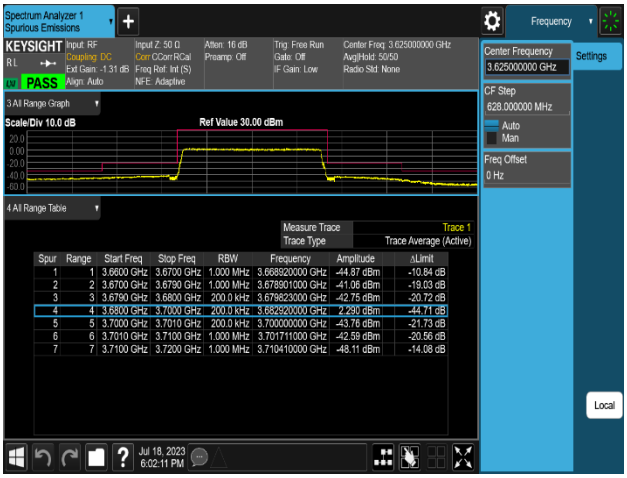
Plot 8-45. Channel Edge Emission Plot
(n48_3C_10M+20M+10M_QPSK – Non-Contiguous_8T, Port 5)



Plot 8-46. Channel Edge Emission Plot
(n48_3C_10M+20M+10M_QPSK – Non-Contiguous_8T, Port 5)



Plot 8-47. Channel Edge Emission Plot
(n48_3C_20M+20M+20M_QPSK – Non-Contiguous_8T, Port 5)



Plot 8-48. Channel Edge Emission Plot
(n48_3C_20M+20M+20M_QPSK – Non-Contiguous_8T, Port 5)

8.7 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

ANSI C63.26 - Section 5.2.3.4.
KDB 971168 D01 v03r01 - Section 6
KDB 662911 D01 v02r01 - Section E)3)

Test Setting

1. Start frequency was set to 30 MHz and stop frequency was set to at least 10 * the fundamental frequency excluding the frequency range of the Channel Edge measurement.
2. RBW: 1 MHz
3. VBW ≥ 3 x RBW
4. Detector = RMS
5. Number of sweep points ≥ 2 x Span/RBW
6. Trace mode = trace average
7. Sweep time = auto couple
8. The trace was allowed to stabilize

Limit

- Any emission below 3530 MHz and above 3720 MHz ≤ −40 dBm/MHz

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

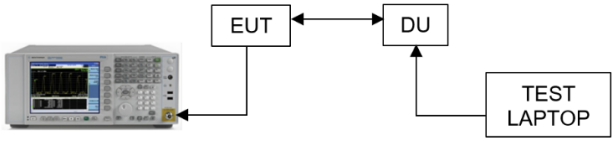


Figure 8-6. Test Instrument & Measurement Setup

Test Notes

1. All modes of operation were investigated and the worst configuration result plots are reported in each RF chain.

2. When detected Emission, this value has been applied as reference offset in the spectrum analyzer.
   Duty cycle correction factor was added to spectrum analyzer.
   Duty cycle = transmit on-time / transmitter period = 3.72 ms / 5.00 ms = 0.74
   Duty cycle correction factor = 10*log (1/duty cycle) =10*log (1/0.74) = 1.28 dB

3. The limits were adjusted by a factor of [-10*log (n)] dB to account for the device operation as a n port MIMO transmitter, as per FCC KDB 622911. MIMO Factor calculation as below:

4. When the spurious emissions performed using the method KDB 971168 D01 v03r01 - Section E) 3) iii) detect with a margin of under 1dB to limit, the integration method was performed using the spectrum analyzer's band power functions according to ANSI C63.26-2015 – Section 5.7 and using the method KDB 971168 D01 v03r01 - Section E) 3) ii). The integration value was set to a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter.

Frequency range	Basic Limit (dBm/MHz)	MIMO Factor (dB)	Adjusted limit (dBm)
		8T	8T
below 3530 MHz and above 3720 MHz	-40.00	9.03	-49.03
Note: Adjusted limit (dBm/MHz) = Basic limit (dBm/1MHz) - MIMO Factor			

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-59.49	-58.92	-49.03	-9.89
			3.72 GHz to 10 GHz	-57.27	-56.95	-49.03	-7.92
			10 GHz to 18 GHz	-56.79	-56.00	-49.03	-6.97
			18 GHz to 40 GHz	-70.20	-70.34	-49.03	-21.17
		2	30 MHz to 3.53 GHz	-59.00	-58.11	-49.03	-9.07
			3.72 GHz to 10 GHz	-55.01	-55.41	-49.03	-5.98
			10 GHz to 18 GHz	-55.74	-54.93	-49.03	-5.90
			18 GHz to 40 GHz	-70.37	-70.26	-49.03	-21.23
	2	3	30 MHz to 3.53 GHz	-58.95	-58.24	-49.03	-9.21
			3.72 GHz to 10 GHz	-56.99	-56.03	-49.03	-7.00
			10 GHz to 18 GHz	-55.83	-56.33	-49.03	-6.79
			18 GHz to 40 GHz	-70.04	-69.03	-49.03	-20.00
		4	30 MHz to 3.53 GHz	-58.56	-58.43	-49.03	-9.40
			3.72 GHz to 10 GHz	-55.72	-55.95	-49.03	-6.69
			10 GHz to 18 GHz	-55.01	-55.17	-49.03	-5.98
			18 GHz to 40 GHz	-70.14	-68.83	-49.03	-19.80
2	3	5	30 MHz to 3.53 GHz	-58.57	-58.63	-49.03	-9.53
			3.72 GHz to 10 GHz	-54.29	-54.54	-49.03	-5.26
			10 GHz to 18 GHz	-52.79	-52.71	-49.03	-3.68
			18 GHz to 40 GHz	-69.76	-69.58	-49.03	-20.55
		6	30 MHz to 3.53 GHz	-58.12	-58.00	-49.03	-8.97
			3.72 GHz to 10 GHz	-54.44	-55.44	-49.03	-5.41
			10 GHz to 18 GHz	-54.10	-53.30	-49.03	-4.27
			18 GHz to 40 GHz	-69.98	-69.64	-49.03	-20.61
	4	7	30 MHz to 3.53 GHz	-57.94	-58.43	-49.03	-8.91
			3.72 GHz to 10 GHz	-55.23	-55.50	-49.03	-6.20
			10 GHz to 18 GHz	-54.48	-54.09	-49.03	-5.06
			18 GHz to 40 GHz	-69.60	-69.78	-49.03	-20.57
		8	30 MHz to 3.53 GHz	-57.73	-58.05	-49.03	-8.70
			3.72 GHz to 10 GHz	-54.43	-55.30	-49.03	-5.40
			10 GHz to 18 GHz	-54.51	-53.77	-49.03	-4.74
			18 GHz to 40 GHz	-70.70	-69.53	-49.03	-20.50

Table 8-25. Conducted Spurious Emission Summary Data (n48_3C_10M+20M+10M_Low Channel_8T)

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-59.01	-58.82	-49.03	-9.79
			3.72 GHz to 10 GHz	-56.39	-56.16	-49.03	-7.13
			10 GHz to 18 GHz	-55.29	-55.03	-49.03	-6.00
			18 GHz to 40 GHz	-69.86	-69.16	-49.03	-20.12
		2	30 MHz to 3.53 GHz	-57.95	-58.95	-49.03	-8.92
			3.72 GHz to 10 GHz	-55.88	-55.51	-49.03	-6.48
			10 GHz to 18 GHz	-55.07	-55.14	-49.03	-6.04
			18 GHz to 40 GHz	-70.12	-69.18	-49.03	-20.15
	2	3	30 MHz to 3.53 GHz	-58.92	-59.26	-49.03	-9.89
			3.72 GHz to 10 GHz	-56.19	-56.74	-49.03	-7.16
			10 GHz to 18 GHz	-55.67	-55.60	-49.03	-6.57
			18 GHz to 40 GHz	-70.15	-69.84	-49.03	-20.80
		4	30 MHz to 3.53 GHz	-58.05	-58.46	-49.03	-9.02
			3.72 GHz to 10 GHz	-55.45	-55.96	-49.03	-6.42
			10 GHz to 18 GHz	-55.75	-55.09	-49.03	-6.06
			18 GHz to 40 GHz	-69.91	-70.21	-49.03	-20.87
2	3	5	30 MHz to 3.53 GHz	-58.88	-58.49	-49.03	-9.46
			3.72 GHz to 10 GHz	-54.95	-54.42	-49.03	-5.39
			10 GHz to 18 GHz	-52.87	-52.71	-49.03	-3.68
			18 GHz to 40 GHz	-69.40	-70.04	-49.03	-20.37
		6	30 MHz to 3.53 GHz	-57.25	-58.76	-49.03	-8.22
			3.72 GHz to 10 GHz	-54.38	-54.97	-49.03	-5.35
			10 GHz to 18 GHz	-53.08	-53.77	-49.03	-4.05
			18 GHz to 40 GHz	-69.82	-69.88	-49.03	-20.79
	4	7	30 MHz to 3.53 GHz	-57.76	-58.04	-49.03	-8.73
			3.72 GHz to 10 GHz	-55.38	-55.36	-49.03	-6.33
			10 GHz to 18 GHz	-54.60	-54.15	-49.03	-5.12
			18 GHz to 40 GHz	-68.47	-70.39	-49.03	-19.44
		8	30 MHz to 3.53 GHz	-58.14	-58.41	-49.03	-9.10
			3.72 GHz to 10 GHz	-54.66	-55.03	-49.03	-5.62
			10 GHz to 18 GHz	-53.11	-53.58	-49.03	-4.08
			18 GHz to 40 GHz	-70.44	-69.38	-49.03	-20.35

Table 8-26. Conducted Spurious Emission Summary Data (n48_3C_10M+20M+10M_Mid Channel_8T)

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-59.22	-58.79	-49.03	-9.76
			3.72 GHz to 10 GHz	-56.56	-56.47	-49.03	-7.44
			10 GHz to 18 GHz	-54.54	-56.09	-49.03	-5.51
			18 GHz to 40 GHz	-70.02	-69.58	-49.03	-20.55
		2	30 MHz to 3.53 GHz	-58.95	-59.21	-49.03	-9.92
			3.72 GHz to 10 GHz	-56.02	-56.69	-49.03	-6.99
			10 GHz to 18 GHz	-55.13	-54.98	-49.03	-5.95
			18 GHz to 40 GHz	-69.76	-70.39	-49.03	-20.73
	2	3	30 MHz to 3.53 GHz	-59.18	-58.06	-49.03	-9.03
			3.72 GHz to 10 GHz	-56.44	-56.15	-49.03	-7.12
			10 GHz to 18 GHz	-55.70	-55.46	-49.03	-6.43
			18 GHz to 40 GHz	-70.02	-69.95	-49.03	-20.92
		4	30 MHz to 3.53 GHz	-58.26	-58.84	-49.03	-9.22
			3.72 GHz to 10 GHz	-55.51	-55.98	-49.03	-6.48
			10 GHz to 18 GHz	-55.31	-54.72	-49.03	-5.69
			18 GHz to 40 GHz	-68.69	-69.92	-49.03	-19.66
2	3	5	30 MHz to 3.53 GHz	**-58.22**	-57.77	-49.03	-8.73
			3.72 GHz to 10 GHz	**-54.80**	-54.86	-49.03	-5.77
			10 GHz to 18 GHz	**-52.17**	-53.21	-49.03	**-3.14**
			18 GHz to 40 GHz	**-69.96**	-69.18	-49.03	-20.15
		6	30 MHz to 3.53 GHz	-58.27	-58.38	-49.03	-9.23
			3.72 GHz to 10 GHz	-54.69	-54.86	-49.03	-5.66
			10 GHz to 18 GHz	-53.45	-54.11	-49.03	-4.42
			18 GHz to 40 GHz	-69.74	-69.58	-49.03	-20.55
	4	7	30 MHz to 3.53 GHz	-58.18	-57.88	-49.03	-8.85
			3.72 GHz to 10 GHz	-55.36	-55.07	-49.03	-6.04
			10 GHz to 18 GHz	-54.67	-54.46	-49.03	-5.43
			18 GHz to 40 GHz	-69.93	-70.32	-49.03	-20.89
		8	30 MHz to 3.53 GHz	-59.02	-58.80	-49.03	-9.77
			3.72 GHz to 10 GHz	-54.62	-54.83	-49.03	-5.59
			10 GHz to 18 GHz	-52.75	-53.90	-49.03	-3.72
			18 GHz to 40 GHz	-70.67	-69.86	-49.03	-20.83

Table 8-27. Conducted Spurious Emission Summary Data (n48_3C_10M+20M+10M_High Channel_8T)

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-58.53	-58.61	-49.03	-9.50
			3.72 GHz to 10 GHz	-55.75	-57.03	-49.03	-6.72
			10 GHz to 18 GHz	-55.43	-56.44	-49.03	-6.40
			18 GHz to 40 GHz	-69.62	-69.94	-49.03	-20.59
		2	30 MHz to 3.53 GHz	-59.46	-57.70	-49.03	-8.66
			3.72 GHz to 10 GHz	-56.04	-56.03	-49.03	-7.00
			10 GHz to 18 GHz	-55.77	-55.70	-49.03	-6.67
			18 GHz to 40 GHz	-69.71	-69.90	-49.03	-20.68
	2	3	30 MHz to 3.53 GHz	-59.08	-58.12	-49.03	-9.09
			3.72 GHz to 10 GHz	-55.77	-56.12	-49.03	-6.74
			10 GHz to 18 GHz	-55.84	-56.10	-49.03	-6.81
			18 GHz to 40 GHz	-68.71	-69.15	-49.03	-19.68
		4	30 MHz to 3.53 GHz	-58.73	-58.33	-49.03	-9.30
			3.72 GHz to 10 GHz	-55.54	-56.17	-49.03	-6.51
			10 GHz to 18 GHz	-55.68	-55.48	-49.03	-6.45
			18 GHz to 40 GHz	-69.81	-69.60	-49.03	-20.57
2	3	5	30 MHz to 3.53 GHz	-57.76	-58.48	-49.03	-8.73
			3.72 GHz to 10 GHz	-55.33	-54.77	-49.03	-5.74
			10 GHz to 18 GHz	-53.09	-53.41	-49.03	-4.06
			18 GHz to 40 GHz	-69.55	-69.25	-49.03	-20.21
		6	30 MHz to 3.53 GHz	-57.83	-58.79	-49.03	-8.80
			3.72 GHz to 10 GHz	-54.63	-54.40	-49.03	-5.37
			10 GHz to 18 GHz	-53.84	-53.48	-49.03	-4.45
			18 GHz to 40 GHz	-70.88	-70.70	-49.03	-21.67
	4	7	30 MHz to 3.53 GHz	-58.48	-58.69	-49.03	-9.45
			3.72 GHz to 10 GHz	-55.47	-55.66	-49.03	-6.44
			10 GHz to 18 GHz	-54.91	-54.02	-49.03	-4.99
			18 GHz to 40 GHz	-69.20	-70.04	-49.03	-20.17
		8	30 MHz to 3.53 GHz	-58.66	-58.70	-49.03	-9.63
			3.72 GHz to 10 GHz	-55.23	-54.51	-49.03	-5.48
			10 GHz to 18 GHz	-54.00	-54.33	-49.03	-4.97
			18 GHz to 40 GHz	-69.85	-70.27	-49.03	-20.82

Table 8-28. Conducted Spurious Emission Summary Data (n48_3C_20M+20M+20M_Low Channel_8T)

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-59.13	-59.00	-49.03	-9.97
			3.72 GHz to 10 GHz	-56.40	-56.32	-49.03	-7.29
			10 GHz to 18 GHz	-56.37	-55.85	-49.03	-6.81
			18 GHz to 40 GHz	-70.13	-70.13	-49.03	-21.10
		2	30 MHz to 3.53 GHz	-59.47	-58.94	-49.03	-9.91
			3.72 GHz to 10 GHz	-56.42	-56.49	-49.03	-7.39
			10 GHz to 18 GHz	-55.84	-55.31	-49.03	-6.28
			18 GHz to 40 GHz	-69.52	-68.22	-49.03	-19.19
	2	3	30 MHz to 3.53 GHz	-59.31	-57.33	-49.03	-8.30
			3.72 GHz to 10 GHz	-56.60	-56.49	-49.03	-7.46
			10 GHz to 18 GHz	-55.45	-56.08	-49.03	-6.42
			18 GHz to 40 GHz	-70.08	-69.54	-49.03	-20.51
		4	30 MHz to 3.53 GHz	-57.31	-59.30	-49.03	-8.28
			3.72 GHz to 10 GHz	-55.47	-55.99	-49.03	-6.44
			10 GHz to 18 GHz	-54.75	-54.02	-49.03	-4.99
			18 GHz to 40 GHz	-69.71	-70.27	-49.03	-20.68
2	3	5	30 MHz to 3.53 GHz	-58.20	-58.72	-49.03	-9.17
			3.72 GHz to 10 GHz	-54.47	-54.45	-49.03	-5.42
			10 GHz to 18 GHz	-53.01	-53.57	-49.03	-3.98
			18 GHz to 40 GHz	-69.16	-70.08	-49.03	-20.13
		6	30 MHz to 3.53 GHz	**-58.94**	-58.86	-49.03	-9.83
			3.72 GHz to 10 GHz	**-54.69**	-54.81	-49.03	-5.66
			10 GHz to 18 GHz	**-52.43**	-53.96	-49.03	**-3.40**
			18 GHz to 40 GHz	**-69.73**	-69.96	-49.03	-20.69
	4	7	30 MHz to 3.53 GHz	-57.67	-58.49	-49.03	-8.64
			3.72 GHz to 10 GHz	-55.04	-54.30	-49.03	-5.26
			10 GHz to 18 GHz	-54.46	-54.19	-49.03	-5.16
			18 GHz to 40 GHz	-71.05	-68.03	-49.03	-19.00
		8	30 MHz to 3.53 GHz	-58.18	-58.35	-49.03	-9.15
			3.72 GHz to 10 GHz	-54.65	-55.03	-49.03	-5.62
			10 GHz to 18 GHz	-53.37	-52.75	-49.03	-3.72
			18 GHz to 40 GHz	-69.34	-69.55	-49.03	-20.31

Table 8-29. Conducted Spurious Emission Summary Data (n48_3C_20M+20M+20M_Mid Channel_8T)

Sector	Zone	Port	Measurement Range	Level (dBm)		Limit (dBm)	Worst Margin (dB)
				QPSK	16QAM		
1	1	1	30 MHz to 3.53 GHz	-59.03	-59.49	-49.03	-10.00
			3.72 GHz to 10 GHz	-55.68	-57.21	-49.03	-6.65
			10 GHz to 18 GHz	-55.81	-56.14	-49.03	-6.78
			18 GHz to 40 GHz	-69.42	-69.99	-49.03	-20.39
		2	30 MHz to 3.53 GHz	-58.90	-59.52	-49.03	-9.87
			3.72 GHz to 10 GHz	-55.67	-56.04	-49.03	-6.64
			10 GHz to 18 GHz	-55.77	-55.28	-49.03	-6.25
			18 GHz to 40 GHz	-70.56	-68.27	-49.03	-19.24
	2	3	30 MHz to 3.53 GHz	-58.84	-58.95	-49.03	-9.81
			3.72 GHz to 10 GHz	-56.72	-56.35	-49.03	-7.32
			10 GHz to 18 GHz	-56.57	-55.73	-49.03	-6.70
			18 GHz to 40 GHz	-69.81	-69.52	-49.03	-20.49
		4	30 MHz to 3.53 GHz	-58.80	-59.09	-49.03	-9.77
			3.72 GHz to 10 GHz	-53.42	-55.17	-49.03	-4.39
			10 GHz to 18 GHz	-55.28	-55.00	-49.03	-5.97
			18 GHz to 40 GHz	-69.30	-69.87	-49.03	-20.27
2	3	5	30 MHz to 3.53 GHz	-58.86	-58.75	-49.03	-9.72
			3.72 GHz to 10 GHz	-54.53	-55.04	-49.03	-5.50
			10 GHz to 18 GHz	-53.23	-53.28	-49.03	-4.20
			18 GHz to 40 GHz	-69.79	-69.52	-49.03	-20.49
		6	30 MHz to 3.53 GHz	-58.94	-57.18	-49.03	-8.15
			3.72 GHz to 10 GHz	-55.52	-55.42	-49.03	-6.38
			10 GHz to 18 GHz	-54.42	-54.73	-49.03	-5.39
			18 GHz to 40 GHz	-70.35	-70.26	-49.03	-21.23
	4	7	30 MHz to 3.53 GHz	-58.14	-58.21	-49.03	-9.11
			3.72 GHz to 10 GHz	-55.03	-54.66	-49.03	-5.62
			10 GHz to 18 GHz	-53.69	-53.31	-49.03	-4.28
			18 GHz to 40 GHz	-70.19	-70.24	-49.03	-21.16
		8	30 MHz to 3.53 GHz	-58.69	-58.44	-49.03	-9.40
			3.72 GHz to 10 GHz	-54.46	-54.95	-49.03	-5.43
			10 GHz to 18 GHz	-54.30	-53.86	-49.03	-4.83
			18 GHz to 40 GHz	-69.54	-70.16	-49.03	-20.51

Table 8-30. Conducted Spurious Emission Summary Data (n48_3C_20M+20M+20M_High Channel_8T)