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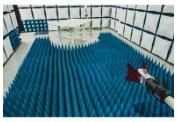

TEST REPORT
PART 27 MEASUREMENT REPORT

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

Date of Testing:
07/04/2022 - 07/22/2022
Test Site/Location:
Element Lab., Suwon,
Yongin-si, Gyeonggi-do, Korea
Test Report Serial No.:
8K22062402-00-R1.A3L

FCC ID:	**A3LRF4451D-70A**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	RF4451d-70A
EUT Type:	RRU(RF4451d)
FCC Classification:	Licensed Non-Broadcast Station Transmitter
FCC Rule Part(s):	27
Test Procedure(s):	ANSI C63.26-2015, KDB 971168 D01 v03r01, 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
CERT #2041.04

Prepared by DuJin Kim
Test Engineer

Reviewed by Charles.Shin
Technical Manager

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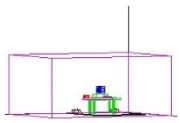
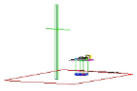


MEASUREMENT REPORT
FCC Part 27



Mode	Tx Frequency (MHz)	Total Conducted output power		Max Emission Designator	Modulation
		Max. Power (dBm)	Max. Power (W)		
NR_1C_5M	2110 to 2200	49.01	79.66	4M49G7D	QPSK
		49.13	81.86	4M52W7D	QAM
NR_1C_20M		53.68	233.43	19M0G7D	QPSK
		53.98	250.24	19M0W7D	QAM
NR_2C_5M+20M		53.87	243.89	24M1G7D	QPSK
		53.62	230.06	24M2W7D	QAM

5G NR n66 EUT Overview

Mode	Tx Frequency (MHz)	Total Conducted output power		Max Emission Designator	Modulation
		Max. Power (dBm)	Max. Power (W)		
NR_1C_25M	1995 to 2020	51.82	151.92	23M8G7D	QPSK
		51.81	151.75	23M8W7D	QAM

5G NR n70 EUT Overview

Notes:
Total Power shown in the table above are the full conducted average output power that will appear on the Grant of Authorization.

1.0 REVISION RECORD

Issue Number	Issued Date	Revision History
8K22062402-00.A3L	07/25/2022	Initial Issue
8K22062402-00-R1.A3L	08/05/2022	Revision due to updated reference KDB

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 RRU(RF4451d) FCC ID: A3LRF4451D-70A**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

3.2 Device Capabilities

This device supports the following conditional features and filter information:

EUT Type	RRU (RF4451d)	
Model Name	RF4451d-70A	
Test Device Serial No	S618618740	
Device Capabilities:	5G NR	
Operating Band/Frequency Range:	Band / Tx (Downlink) / Rx (Uplink) n66: 2110 MHz to 2200 MHz / 1710 MHz to 1780 MHz n70: 1995 MHz to 2020 MHz / 1695 MHz to 1710 MHz	
Supported Modulation	QPSK, 16QAM, 64QAM, 256QAM	
AWS n66 Supported Number of Carriers and Channel Bandwidth	NR: 5 and 20MHz bandwidth modes for 5G NR Band n66 with up to 2CC aggregated of Max. Bandwidth 25 MHz	
AWS n70 Supported Number of Carriers and Channel Bandwidth	NR: 25MHz bandwidth 1CC mode for 5G NR Band n70	
AWS Inter-Band Carrier Aggregation Supported Number of Carriers and Channel Bandwidth	n66 and n70 with up to 3CC aggregated of Max. Bandwidth 50 MHz	
Maximum Output Power	AWS n66	Total 240 W
	AWS n70	Total 160 W
	AWS n66 + n70	Total 320 W
Number of Antenna ports	4TX Configuration	
Supported Configurations	Single carrier, Multi-carrier, Inter-Band Carrier Aggregation	
Input Voltage:	-48 VDC	
Antenna:	Antenna is not provided by manufacture	

3.3 Test Configuration

The setup is as follows:

a) The EUT ("RRU(RF4451d)") and a Data Unit (DU) are each powered by -48V DC power supply.
b) The DU is connected to a test laptop via an ethernet cable acting as backhaul.
c) DU connects to the EUT through a fiber optic cable.
d) 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.

For Inter-Band Carrier Aggregation configuration, the QPSK modulation worst case was found while operating with all modulation and only the worst-case data were reported.

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

AWS n66 Single and Multi Carrier Configuration	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)			Rated Power (W/path)
			Lowest	Middle	Highest	
NR_1C_5M	1	5	2112.5	2155	2197.5	20
NR_1C_20M	1	20	2120	2155	2190	60
NR_2C_5M+20M	2	5+20	2122.5	2155	2187.5	60

AWS n70 Single Carrier Configuration	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)	Rated Power (W/path)
			Middle	
NR_1C_25M	1	25	2007.5	40

Inter-Band Carrier Aggregation	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)	Rated Power (W/path)
			Middle	
NR n70_1C_25M+ n66_1C_5M	2	25+5	2007.5 + 2197.5	60
NR n70_1C_25M+ n66_1C20M	2	25+20	2007.5 + 2190	72
NR n70_1C_25M+ n66_2C_5M+20M	3	25+20+5	2007.5 + 2185 + 2197.5	80

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 842590 D01 v01r01 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

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 Measurement Software

Test item	Name	Version
Conducted Measurement	Node B automation	1.0

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	1.37
Radiated Disturbance (<1GHz)	3.94
Radiated Disturbance (>1GHz)	4.75
Radiated Disturbance (>18GHz)	4.84

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
Rohde & Schwarz	FSW43	Signal Analyzer	07/05/2022	Annual	07/04/2023	101250
Rohde & Schwarz	ESW	EMI Test Receiver	07/04/2022	Annual	07/03/2023	101761
AC POWER KOREA	ACPD-60150	DC Power Supply	01/18/2022	Annual	01/17/2023	DC-1
SUKSAN TECHNOLOGY	SE-CT-10	Temperature Chamber	07/05/2022	Annual	07/04/2023	191021
Rohde & Schwarz	TS-SFUNIT-Rx	Shielded Filter Unit	03/02/2022	Annual	03/01/2023	102131
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	07/13/2021	Biennial	07/12/2023	9162-217
Sunol sciences	DRH-118	Horn Antenna	07/14/2021	Biennial	07/13/2023	A102416-1
Schwarzbeck	BBHA 9170	Horn Antenna	01/27/2022	Biennial	01/26/2024	1037
Reachline	250W18NN-40	Attenuator	01/19/2022	Annual	01/18/2023	PK0289
Reachline	250W18NN-40	Attenuator	01/19/2022	Annual	01/18/2023	PK0290
Reachline	250W18NN-40	Attenuator	01/19/2022	Annual	01/18/2023	PK0292
Reachline	250W18NN-40	Attenuator	01/19/2022	Annual	01/18/2023	PK0293
CentricRF	C411-20	Attenuator	05/09/2022	Annual	05/08/2023	0001
CentricRF	C411-20	Attenuator	01/09/2022	Annual	01/18/2023	0002
CentricRF	C411-20	Attenuator	01/09/2022	Annual	01/18/2023	0003
CentricRF	C411-20	Attenuator	01/09/2022	Annual	01/18/2023	0004

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 = 4M49G7D

Occupied Bandwidth = 4.49 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 4M52W7D

Occupied Bandwidth = 4.52 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: A3LRF4451D-70A

FCC Classification: Licensed Non-Broadcast Station Transmitter

Mode(s): 5G NR

FCC Part Section(s)	Test Description	Limit	Test Condition	Test Result	Reference
§ 2.1046	Conducted Average Output Power	N/A	CONDUCTED	PASS	Annex 1
§ 2.1049	Occupied Bandwidth	N/A		PASS	Section 8.2
§ 2.1046, § 27.50(d)	Equivalent Isotropic Radiated Power (Power Spectral Density)	< 1640 W/MHz		PASS	Section 8.3 (Note 4)
§ 2.1046, § 27.50(d)	Peak-to-average ratio	≤ 13 dB		PASS	Section 8.4
§ 2.1051, § 27.53(h)	Band Edge Emissions at Antenna Terminal	< 43 + log10(P[Watts]) at Band Edge and all out-of-band emissions		PASS	Section 8.5
§ 2.1051, § 27.53(h)	Spurious and Harmonic Emissions at Antenna Terminal	Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section (Note 5)		PASS	Section 8.6
§ 2.1055 § 27.54	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 8.7
§ 2.1055, § 27.53(h)	Radiated unwanted emission	< 43 + log10(P[Watts]) at Band Edge and all out-of-band emissions	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) The maximum antenna gain is determined at the time of licensing depending on the geographical location of the base station.

5) Requirements of additional protection levels are addressed at the time of licensing by the Licensing Bureau. Therefore, requirement of additional protection level is not included during equipment certification.

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 measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 4.3

ANSI C63.26-2015 – Section 5.4.4

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 and the 26dB 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.

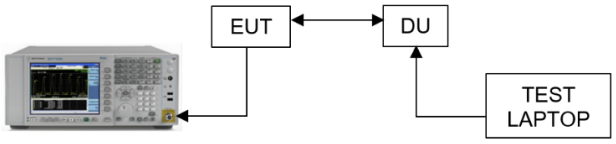


Figure 8-1. Test Instrument & Measurement Setup

Test Notes

None

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**4.49**	4.51	4.49	4.49
	1	4.48	4.51	4.50	4.48
	2	4.47	**4.52**	4.48	4.48
	3	4.48	4.50	4.49	4.49
Middle	0	4.48	4.50	4.47	4.48
	1	4.49	4.50	4.50	4.48
	2	4.49	4.49	4.48	4.48
	3	4.48	4.52	4.48	4.47
High	0	4.48	4.50	4.49	4.47
	1	4.47	4.50	4.49	4.48
	2	4.48	4.50	4.48	4.48
	3	4.47	4.50	4.49	4.47

Table 8-2. Occupied Bandwidth Summary Data (NR_n66_1C_5M)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	18.91	18.95	18.92	18.89
	1	18.94	18.97	18.97	18.90
	2	18.93	18.97	18.93	18.91
	3	18.91	19.00	18.92	18.96
Middle	0	18.96	18.99	18.91	18.96
	1	18.91	**19.01**	18.95	18.90
	2	18.92	18.94	18.89	18.92
	3	**18.98**	18.99	18.90	18.93
High	0	18.95	18.98	18.92	18.92
	1	18.91	18.97	18.91	18.95
	2	18.89	18.99	18.92	18.90
	3	18.96	18.91	18.93	18.95

Table 8-3. Occupied Bandwidth Summary Data (NR_n66_1C_20M)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	24.11	24.16	24.10	24.08
	1	24.08	24.14	24.10	24.08
	2	24.10	24.15	24.12	24.09
	3	24.13	24.15	24.08	24.10
Middle	0	24.13	24.11	24.10	24.11
	1	**24.14**	24.13	24.10	24.08
	2	24.12	24.15	24.08	24.10
	3	24.13	24.17	24.09	24.05
High	0	24.11	24.09	24.05	24.12
	1	24.08	24.14	24.09	24.11
	2	24.11	24.14	24.08	24.10
	3	24.10	**24.20**	24.08	24.09

Table 8-4. Occupied Bandwidth Summary Data (NR_n66_2C_5M+20M)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Middle	0	23.69	23.79	23.75	23.72
	1	23.70	**23.80**	23.72	23.76
	2	23.73	23.75	23.75	23.77
	3	**23.75**	23.77	23.71	23.75

Table 8-5. Occupied Bandwidth Summary Data (NR_n70_1C_25M)

Plot 8-1. Occupied Bandwidth Plot
(n66_1C_5M_QPSK - Low Channel, Port 0)

Plot 8-2. Occupied Bandwidth Plot
(n66_1C_5M_16QAM - Low Channel, Port 2)

Plot 8-3. Occupied Bandwidth Plot
(n66_1C_20M_QPSK - Mid Channel, Port 3)

Plot 8-4. Occupied Bandwidth Plot
(n66_1C_20M_16QAM - Mid Channel, Port 1)

Plot 8-5. Occupied Bandwidth Plot
(n66_2C_5M+20M_QPSK - Mid Channel, Port 1)

Plot 8-6. Occupied Bandwidth Plot
(n66_2C_5M+20M_16QAM - High Channel, Port 3)

Plot 8-7. Occupied Bandwidth Plot
(n70_1C_25M_QPSK - Mid Channel, Port 3)

Plot 8-8. Occupied Bandwidth Plot
(n70_1C_25M_16QAM - Mid Channel, Port 1)

8.3 Equivalent Isotropic Radiated Power (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

KDB 971168 D01 v03r01 – Section 5.2
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements
ANSI C63.26-2015 – Section 5.2.4

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. Conducted average output power measurements are performed using the signal analyzer's "channel power mode" measurement capability for signals with continuous operation.
2. Set span to 2 × to 3 × the OBW.
3. Set RBW = 1 – 5% of the expected OBW
4. Set VBW ≥ 3 × RBW.
5. Set number of measurement points in sweep ≥ 2 × span / RBW.
6. Sweep time: auto-couple
7. Detector = power averaging (rms).
8. Set sweep trigger to "free run.".
9. The integration bandwidth was set equal to transmission bandwidth i.e. 20MHz for 2CC and 40MHz for 1CC measurements.
10. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
11. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges.

Test Setup

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

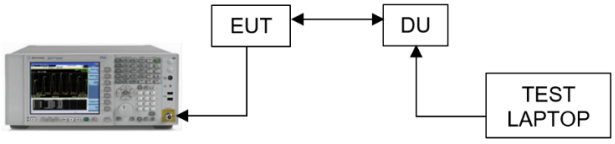


Figure 8-2. Test Instrument & Measurement Setup

Limit

N/A

Test Notes

1. The Conducted Output Power results shown below are measured based on worst case results from original test report and is within the expected measurement tolerances.

2. Consider the following factors for MIMO:
   The output power per each port is measured as dBm/MHz or dBm, the output powers are summed up in linear using the measure-and-sum technique defined in 662911 D01 v02r01- Section E) 2).

3. The output power per port (dBm/MHz or dBm) 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 output power calculations.

4. All transmit signals from different antennas are completely uncorrelated with each other. So the maximum output power shall be calculated based on the aggregate power conducted across all antennas.

5. Sample Calculation:
   Let us assume the following numbers:
   a) Total MIMO Conducted Power as 22085.45 milliWatts
   b)

Factors		Value	Unit
Summed MIMO Conducted Power (linear sum)		22085.45	mW/MHz
Summed MIMO Conducted Power (dBm)	= 10 * log (22085.45) =	43.44	dBm/MHz

Channel	Port	PSD Power (dBm/MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	36.82	36.73	36.63	36.59
	1	36.87	36.97	36.63	36.54
	2	36.79	36.91	36.66	36.80
	3	37.01	37.06	36.57	36.61
Total MIMO PSD Power (mW/MHz)		19471.18	19677.82	18379.02	18436.26
Total MIMO PSD Power (dBm/MHz)		42.89	42.94	42.64	42.66
Channel	Port	QPSK	16QAM	64QAM	256QAM
Middle	0	36.92	37.06	36.58	36.92
	1	36.94	37.22	36.74	36.92
	2	37.30	37.49	37.05	37.23
	3	37.24	37.45	37.19	37.24
Total MIMO PSD Power (mW/MHz)		20530.45	21523.42	19576.42	20421.88
Total MIMO PSD Power (dBm/MHz)		43.12	43.33	42.92	43.10
Channel	Port	QPSK	**16QAM**	64QAM	256QAM
High	0	36.76	**37.34**	37.13	37.06
	1	36.78	**37.09**	36.98	36.93
	2	37.38	**37.61**	37.45	37.53
	3	37.16	**37.62**	37.40	37.49
Total MIMO PSD Power (mW/MHz)		20176.85	**22085.45**	21207.46	21286.21
Total MIMO PSD Power (dBm/MHz)		43.05	**43.44**	43.26	43.28

Table 8-6. Peak Power Spectral Density Table (NR_n66_1C_5M)

Channel	Port	PSD Power (dBm/MHz)			
		QPSK	**16QAM**	64QAM	256QAM
Low	0	35.37	**37.56**	35.36	35.43
	1	35.41	**37.63**	35.27	35.20
	2	35.52	**37.34**	35.56	35.53
	3	35.53	**37.43**	35.49	35.56
Total MIMO PSD Power (mW/MHz)		14056.10	**22449.44**	13938.16	13972.94
Total MIMO PSD Power (dBm/MHz)		41.48	**43.51**	41.44	41.45
Channel	Port	QPSK	16QAM	64QAM	256QAM
Middle	0	35.51	37.07	35.36	35.28
	1	35.19	36.92	35.16	35.05
	2	35.67	37.18	35.59	35.58
	3	35.52	37.28	35.56	35.58
Total MIMO PSD Power (mW/MHz)		14114.30	20583.31	13936.46	13799.97
Total MIMO PSD Power (dBm/MHz)		41.50	43.14	41.44	41.40
Channel	Port	QPSK	16QAM	64QAM	256QAM
High	0	35.60	36.88	35.61	35.50
	1	35.17	36.75	35.27	35.29
	2	35.66	37.31	35.75	35.82
	3	35.62	37.28	35.63	35.69
Total MIMO PSD Power (mW/MHz)		14248.13	20335.14	14418.59	14455.03
Total MIMO PSD Power (dBm/MHz)		41.54	43.08	41.59	41.60

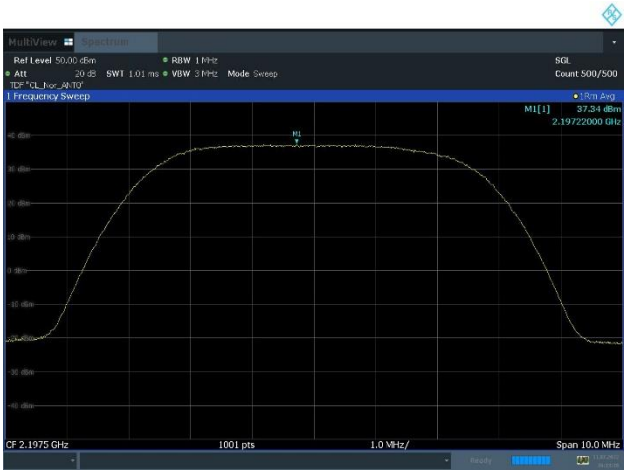
Table 8-7. Peak Power Spectral Density Table (NR_n66_1C_20M)

Channel	Port	PSD Power (dBm/MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	34.10	35.54	34.30	34.43
	1	33.87	35.55	34.03	34.15
	2	34.36	35.77	34.30	34.73
	3	34.20	35.77	34.23	34.53
Total MIMO PSD Power (mW/MHz)		10367.45	14721.63	10560.87	11183.06
Total MIMO PSD Power (dBm/MHz)		40.16	41.68	40.24	40.49
Channel	Port	QPSK	**16QAM**	64QAM	256QAM
Middle	0	34.51	**36.03**	34.57	34.54
	1	34.37	**35.91**	34.28	34.33
	2	34.66	**36.22**	34.64	34.79
	3	34.69	**36.26**	34.69	34.84
Total MIMO PSD Power (mW/MHz)		11428.72	**16322.71**	11398.49	11615.55
Total MIMO PSD Power (dBm/MHz)		40.58	**42.13**	40.57	40.65
Channel	Port	QPSK	16QAM	64QAM	256QAM
High	0	34.72	36.02	34.52	34.56
	1	34.44	35.75	34.28	34.21
	2	35.10	36.25	34.75	34.69
	3	35.07	36.26	34.78	34.64
Total MIMO PSD Power (mW/MHz)		12194.14	16201.47	11502.02	11349.06
Total MIMO PSD Power (dBm/MHz)		40.86	42.10	40.61	40.55

Table 8-8. Peak Power Spectral Density Table (NR_n66_2C_5M+20M)

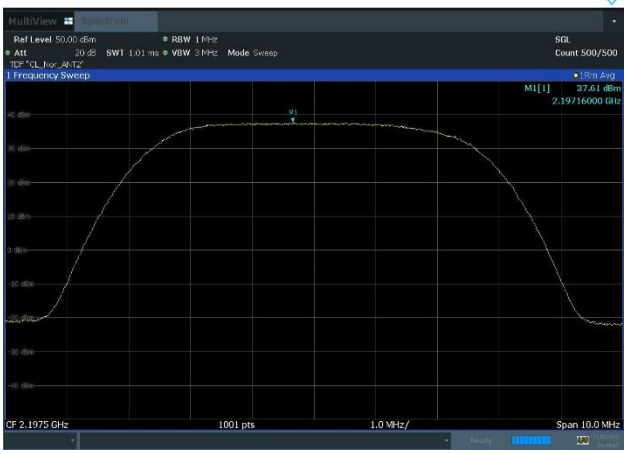
Channel	Port	PSD Power (dBm/MHz)			
		QPSK	**16QAM**	64QAM	256QAM
Middle	0	32.81	**34.27**	32.89	32.88
	1	32.47	**33.73**	32.68	32.48
	2	32.59	**33.84**	32.93	32.50
	3	32.77	**34.11**	32.98	32.59
Total MIMO PSD Power (mW)		7383.75	**10030.83**	7748.35	7304.79
Total MIMO PSD Power (dBm)		38.68	**40.01**	38.89	38.64

Table 8-9. Peak Power Spectral Density Table (NR_n70_1C_25M)

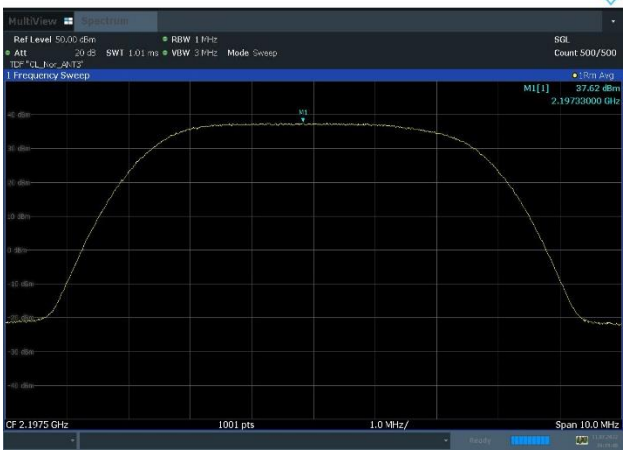


Plot 8-9. Power Spectral Density Plot
(n66_1C_5M_16QAM - High Channel, Port 0)

Plot 8-10. Power Spectral Density Plot
(n66_1C_5M_16QAM - High Channel, Port 1)



Plot 8-11. Power Spectral Density Plot
(n66_1C_5M_16QAM - High Channel, Port 2)



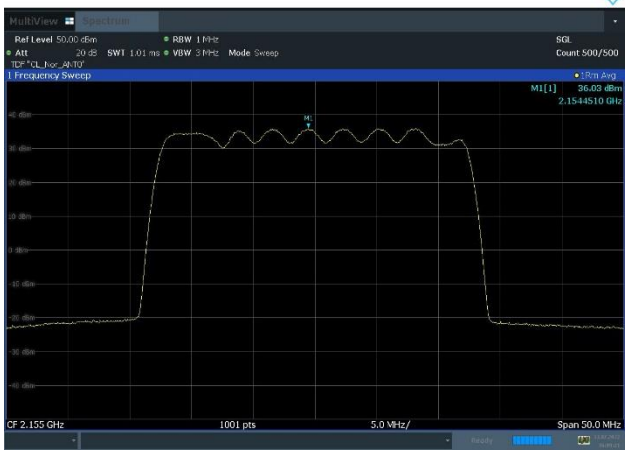
Plot 8-12. Power Spectral Density Plot
(n66_1C_5M_16QAM - High Channel, Port 3)

Plot 8-13. Power Spectral Density Plot
(n66_1C_20M_16QAM - High Channel, Port 0)

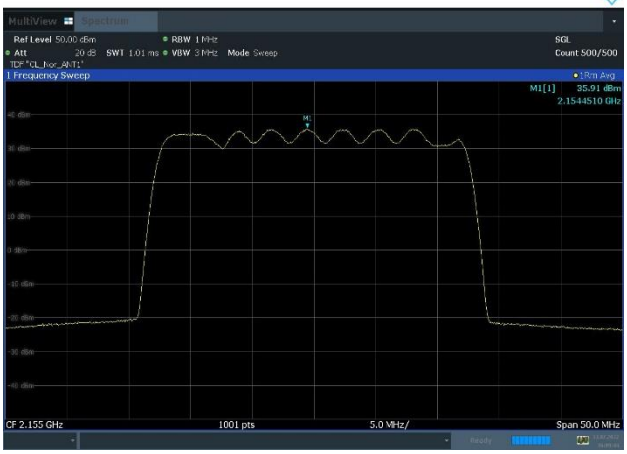
Plot 8-14. Power Spectral Density Plot
(n66_1C_20M_16QAM - High Channel, Port 1)

Plot 8-15. Power Spectral Density Plot
(n66_1C_20M_16QAM - High Channel, Port 2)

Plot 8-16. Power Spectral Density Plot
(n66_1C_20M_16QAM - High Channel, Port 3)



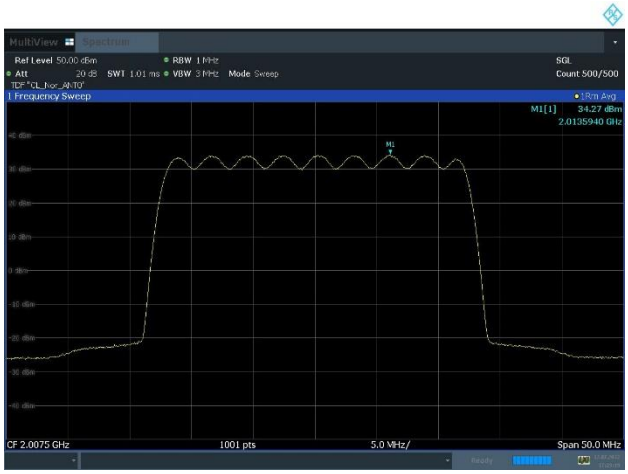
Plot 8-17. Power Spectral Density Plot
(n66_2C_5M+20M_16QAM - Mid Channel, Port 0)



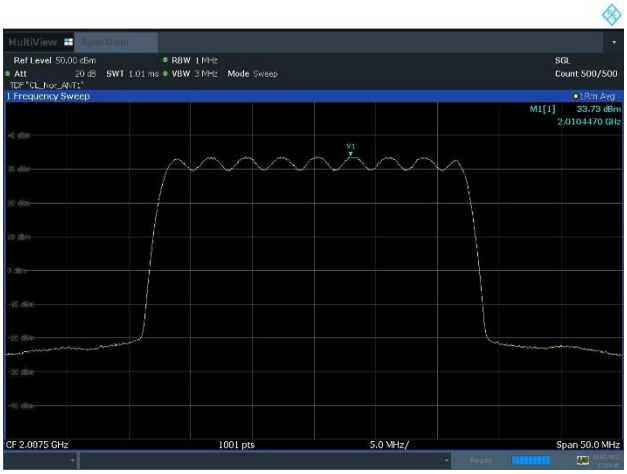
Plot 8-18. Power Spectral Density Plot
(n66_2C_5M+20M_16QAM - Mid Channel, Port 1)

Plot 8-19. Power Spectral Density Plot
(n66_2C_5M+20M_16QAM - Mid Channel, Port 2)

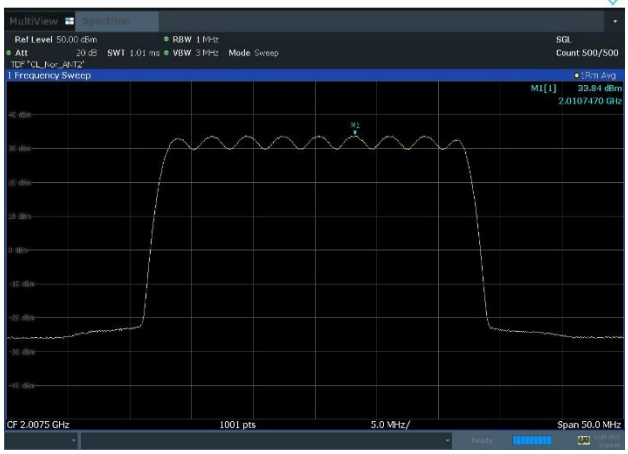
Plot 8-20. Power Spectral Density Plot
(n66_2C_5M+20M_16QAM - Mid Channel, Port 3)



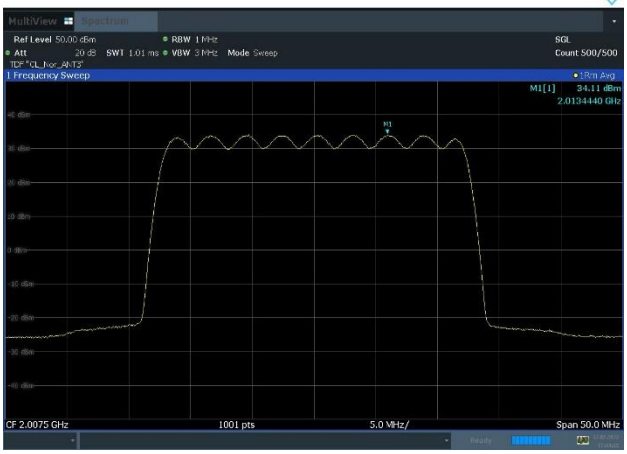
Plot 8-21. Power Spectral Density Plot
(n70_NR _1C_25M_16QAM - Mid Channel, Port 0)



Plot 8-22. Power Spectral Density Plot
(n70_NR _1C_25M_16QAM - Mid Channel, Port 1)



Plot 8-23. Power Spectral Density Plot
(n70_NR _1C_25M_16QAM - Mid Channel, Port 2)



Plot 8-24. Power Spectral Density Plot
(n70_NR _1C_25M_16QAM - Mid Channel, Port 3)

8.4 Peak To Average Ratio

Test Overview

The 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

KDB 971168 D01 v03r01 – Section 5.7

ANSI C63.26-2015 – Section 5.2.3.4

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.

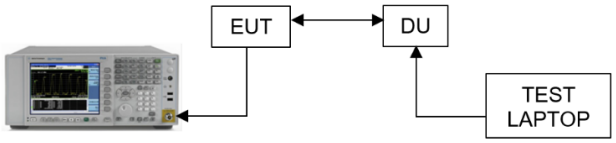


Figure 8-3. Test Instrument & Measurement Setup

Limit

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

Channel	Port	PAPR (dB)				Limit (dB)
		QPSK	16QAM	64QAM	256QAM	
Low	0	**8.04**	8.08	8.00	8.04	≤ 13
	1	8.04	8.08	8.02	8.04	
	2	8.04	8.08	8.02	8.04	
	3	8.04	8.06	8.02	8.04	
Middle	0	8.00	8.04	**8.16**	8.02	
	1	8.00	8.02	8.00	8.04	
	2	8.00	8.04	8.00	8.04	
	3	8.02	8.04	8.00	8.04	
High	0	8.02	8.08	8.04	8.04	
	1	8.02	8.04	8.04	8.04	
	2	8.02	8.04	8.02	8.04	
	3	8.02	8.06	8.04	8.04	

Table 8-10. Peak To Average Power Ratio Summary Data (NR_n66_1C_5M)

Channel	Port	PAPR (dB)				Limit (dB)
		QPSK	16QAM	64QAM	256QAM	
Low	0	7.96	7.96	7.96	7.96	≤ 13
	1	7.96	7.96	7.96	7.96	
	2	7.96	7.96	7.96	7.96	
	3	7.98	7.96	7.96	7.96	
Middle	0	7.98	7.98	7.98	8.00	
	1	7.98	7.98	7.98	8.00	
	2	8.00	7.98	7.96	7.98	
	3	**8.08**	8.16	8.16	**8.20**	
High	0	7.94	7.92	7.94	7.96	
	1	7.94	7.92	7.92	7.96	
	2	7.96	7.94	7.96	7.98	
	3	7.96	7.94	7.96	7.98	

Table 8-11. Peak To Average Power Ratio Summary Data (NR_n66_1C_20M)

Channel	Port	PAPR (dB)				Limit (dB)
		QPSK	16QAM	64QAM	256QAM	
Low	0	7.96	8.00	7.98	8.02	≤ 13
	1	7.98	8.00	7.98	7.98	
	2	8.00	8.02	7.98	8.02	
	3	8.02	8.02	8.00	8.02	
Middle	0	8.04	**8.04**	8.04	8.04	
	1	8.04	8.02	8.02	8.02	
	2	**8.06**	8.02	8.04	8.04	
	3	8.04	8.02	8.02	8.04	
High	0	7.98	7.98	7.98	8.00	
	1	7.96	7.98	7.98	8.00	
	2	7.96	7.98	7.96	7.94	
	3	7.96	7.96	7.96	7.94	

Table 8-12. Peak To Average Power Ratio Summary Data (NR_n66_2C_5M+20M)

Channel	Port	PAPR (dB)				Limit (dB)
		QPSK	16QAM	64QAM	256QAM	
Middle	0	**8.06**	8.06	8.06	8.06	≤ 13
	1	8.06	8.06	8.04	8.04	
	2	8.06	**8.08**	8.08	8.08	
	3	8.06	8.06	8.08	8.08	

Table 8-13. Peak To Average Power Ratio Summary Data (NR_n70_1C_25M)

Plot 8-25. Peak To Average Power Ratio Plot
(n66_1C_5M_QPSK - Low Channel, Port 0)

Plot 8-26. Peak To Average Power Ratio Plot
(n66_1C_5M_64QAM - Mid Channel, Port 0)

Plot 8-27. Peak To Average Power Ratio Plot
(n66_1C_20M_QPSK - Mid Channel, Port 3)

Plot 8-28. Peak To Average Power Ratio Plot
(n66_1C_20M_256QAM- Mid Channel, Port 3)

Plot 8-29. Peak To Average Power Ratio Plot
(n66_2C_5M+20M_QPSK-Low Channel, Port 2)

Plot 8-30. Peak To Average Power Ratio Plot
(n66_2C_5M+20M_16QAM-Mid Channel, Port 0)

Plot 8-31. Peak To Average Power Ratio Plot
(n70_1C_25M_QPSK-Mid Channel, Port 0)

Plot 8-32. Peak To Average Power Ratio Plot
(n70_1C_25M_16QAM-Mid Channel, Port 2)

8.5 Band 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

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 5.7.3

Test Setting

1. Start and stop frequency were set such that the band 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 band edge
3. RBW: Please see test notes below.
4. VBW $\geq$ 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

The minimum permissible attenuation level of any spurious emission is 43 + $\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.
The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm.

Test Setup

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

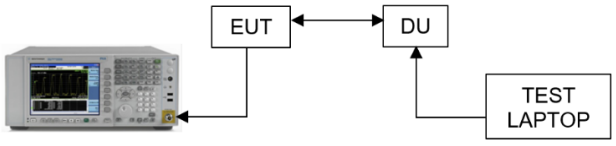


Figure 8-4. Test Instrument & Measurement Setup

Test Notes

1. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

2. All the measurement has been tested but test plots are referred from the highest of value of each of modulation of each antenna ports.

3. When the channel edge detect with a margin of under 1dB to Limit, That used to integration method was performed using the spectrum analyzer's band power functions according to ANSI C63.26-2015 – Section 5.7. The spectrum analyzer marker was placed at one-half of the RBW away from the band edge. 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.

4. The limits were adjusted by a factor of [-10*log (4)] dB to account for the device operation as a 4 port MIMO transmitter, as per FCC KDB 622911. MIMO Factor calculation as below:
   MIMO Factor = 10*log (4) = 6.02 dB

Frequency range	Basic Limit (dBm/MHz)	4Tx MIMO Factor (dB)	RBW Factor (dB)	Adjusted limit (dBm)
Low Frequency block – 2MHz	-13	6.02	0	-19.02
High Frequency block + 2MHz	-13	6.02	0	-19.02
Note: Adjusted limit (dBm/MHz) = Basic limit (dBm/1MHz) - MIMO Factor - RBW Factor				

Channel	Port	Measured Range (MHz)	Max. Value (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Low	0	2109 to 2110	-26.60	-27.32	-24.77	-26.23	-19.02
	0	2108 to 2109	-21.17	-20.89	**-20.28**	-20.92	
	1	2109 to 2110	-26.44	-27.53	-25.30	-26.01	
	1	2108 to 2109	-21.85	-21.13	-20.77	-20.95	
	2	2109 to 2110	-26.72	-26.62	-24.62	-26.08	
	2	2108 to 2109	-21.27	-20.47	-20.45	-20.58	
	3	2109 to 2110	-27.34	-27.39	-25.23	-25.80	
	3	2108 to 2109	-21.20	-20.54	-20.47	-20.97	
High	0	2200 to 2201	-26.97	-26.38	-25.95	-26.55	
	0	2201 to 2202	-22.97	**-22.48**	-22.49	-22.70	
	1	2200 to 2201	-27.76	-27.10	-26.16	-26.66	
	1	2201 to 2202	-23.44	-23.20	-23.19	-23.16	
	2	2200 to 2201	-26.32	-25.42	-25.13	-25.57	
	2	2201 to 2202	-22.88	-22.66	-22.62	-22.71	
	3	2200 to 2201	-26.33	-25.40	-25.81	-25.65	
	3	2201 to 2202	-22.71	-22.59	-22.52	-22.70	

Table 8-14. Band Edge Emission Summary Data (NR_n66_1C_5M)

Channel	Port	Measured Range (MHz)	Max. Value (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Low	0	2109 to 2110	-23.29	-22.63	-23.58	-22.93	-19.02
	0	2108 to 2109	-20.40	-20.66	-20.05	-21.33	
	1	2109 to 2110	-23.49	-22.80	-24.18	-23.21	
	1	2108 to 2109	-20.63	-20.16	-20.41	-20.52	
	2	2109 to 2110	-22.55	-22.41	-23.53	-22.92	
	2	2108 to 2109	-20.15	-20.34	**-20.04**	-21.32	
	3	2109 to 2110	-23.85	-23.07	-24.71	-22.59	
	3	2108 to 2109	-20.61	-20.39	-20.47	-20.84	
High	0	2200 to 2201	-24.08	-24.14	-23.38	-23.94	
	0	2201 to 2202	-22.27	-21.91	-21.91	-22.03	
	1	2200 to 2201	-24.04	-24.47	-24.48	-24.64	
	1	2201 to 2202	-22.61	-22.97	-22.81	-22.64	
	2	2200 to 2201	-23.56	-23.72	-23.28	-24.09	
	2	2201 to 2202	-21.05	-20.80	**-20.40**	-20.53	
	3	2200 to 2201	-23.06	-24.18	-24.21	-24.19	
	3	2201 to 2202	-21.86	-21.44	-21.37	-21.31	

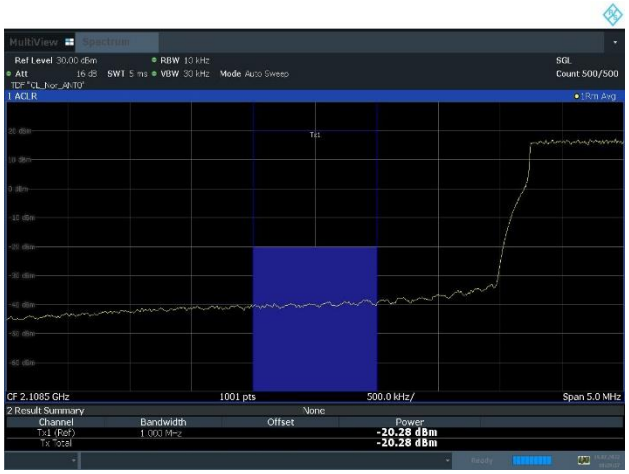
Table 8-15. Band Edge Emission Summary Data (NR_n66_1C_20M)

Channel	Port	Measured Range (MHz)	Max. Value (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Low	0	2109 to 2110	-24.87	-24.80	-24.61	-23.53	-19.02
	0	2108 to 2109	-21.02	**-20.03**	-21.18	-20.28	
	1	2109 to 2110	-24.72	-25.43	-24.21	-23.57	
	1	2108 to 2109	-20.14	-20.52	-20.35	-20.35	
	2	2109 to 2110	-24.89	-25.23	-24.29	-23.40	
	2	2108 to 2109	-21.07	-20.62	-20.88	-20.34	
	3	2109 to 2110	-25.53	-25.29	-25.16	-24.57	
	3	2108 to 2109	-21.32	-20.19	-20.94	-20.36	
High	0	2200 to 2201	-23.80	-24.97	-24.79	-25.26	
	0	2201 to 2202	-21.51	-21.61	-21.52	-22.36	
	1	2200 to 2201	-24.85	-25.29	-25.93	-25.02	
	1	2201 to 2202	-21.92	-21.98	-22.19	-22.28	
	2	2200 to 2201	-23.99	-24.33	-24.62	-23.54	
	2	2201 to 2202	**-20.49**	-20.97	-21.11	-21.75	
	3	2200 to 2201	-24.79	-24.94	-25.53	-24.88	
	3	2201 to 2202	-21.22	-21.87	-21.64	-22.22	

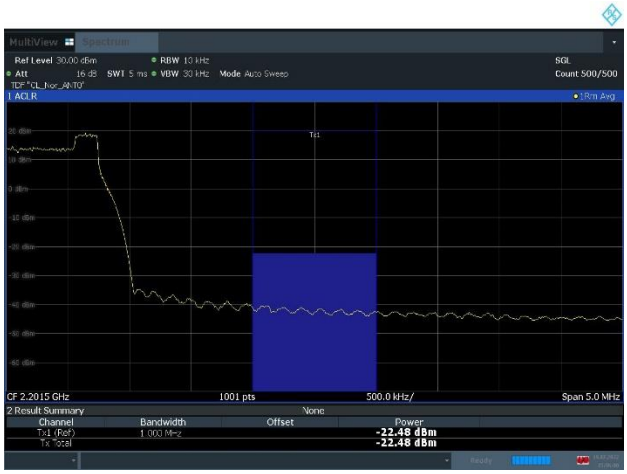
Table 8-16. Band Edge Emission Summary Data (NR_n66_2C_5M+20M)

Channel	Port	Measured Range (MHz)	Max. Value (dBm)				Limit (dBm)
			QPSK	16QAM	64QAM	256QAM	
Low	0	1994 to 1995	-26.60	-27.67	-27.94	-27.60	-19.02
	0	1993 to 1994	-23.30	-23.14	-23.47	**-22.90**	
	1	1994 to 1995	-27.32	-28.33	-27.84	-28.54	
	1	1993 to 1994	-24.15	-24.40	-23.79	-23.98	
	2	1994 to 1995	-28.10	-30.06	-28.93	-29.17	
	2	1993 to 1994	-24.77	-25.08	-24.62	-24.97	
	3	1994 to 1995	-28.67	-29.12	-29.12	-28.74	
	3	1993 to 1994	-24.75	-24.61	-24.61	-24.44	
High	0	2020 to 2021	-28.18	-27.24	-27.65	-27.26	
	0	2021 to 2022	-22.88	-23.03	-22.99	**-22.83**	
	1	2020 to 2021	-29.13	-28.43	-28.48	-28.15	
	1	2021 to 2022	-24.52	-25.29	-24.29	-24.37	
	2	2020 to 2021	-28.99	-29.72	-29.21	-29.21	
	2	2021 to 2022	-25.18	-25.57	-24.70	-24.83	
	3	2020 to 2021	-29.34	-28.78	-29.86	-28.93	
	3	2021 to 2022	-25.10	-25.02	-25.15	-25.09	

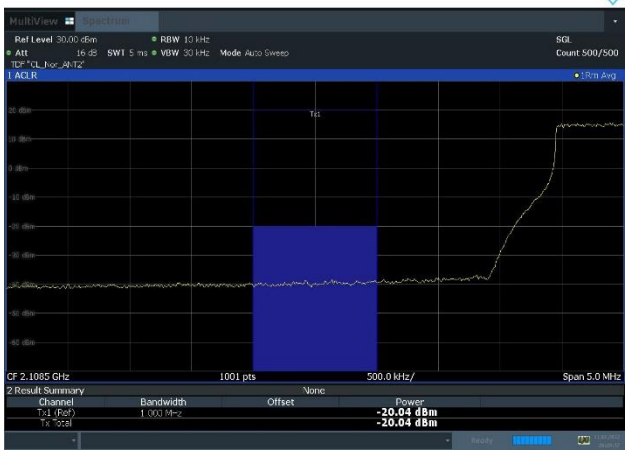
Table 8-17. Band Edge Emission Summary Data (NR_n70_1C_25M)



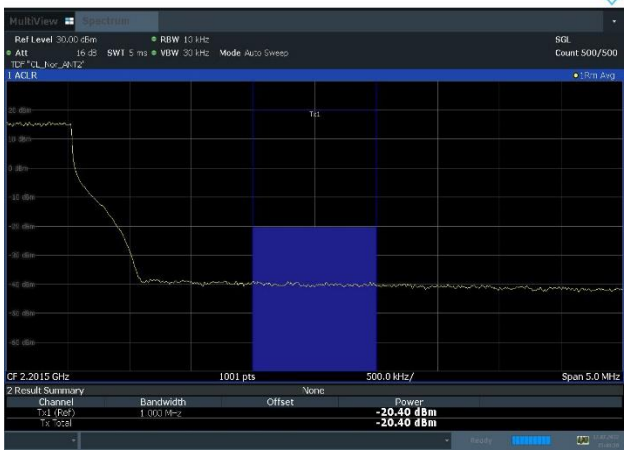
Plot 8-33. Band Edge Emission Plot
(n66_1C_5M_64QAM - Low Channel, Port 0)



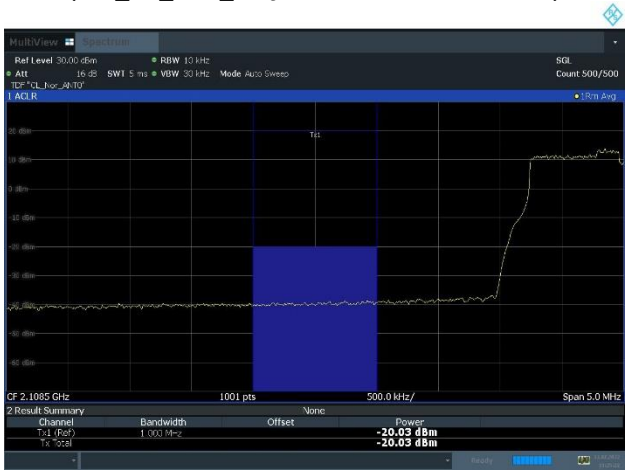
Plot 8-34. Band Edge Emission Plot
(n66 _1C_5M_16QAM - High Channel, Port 0)



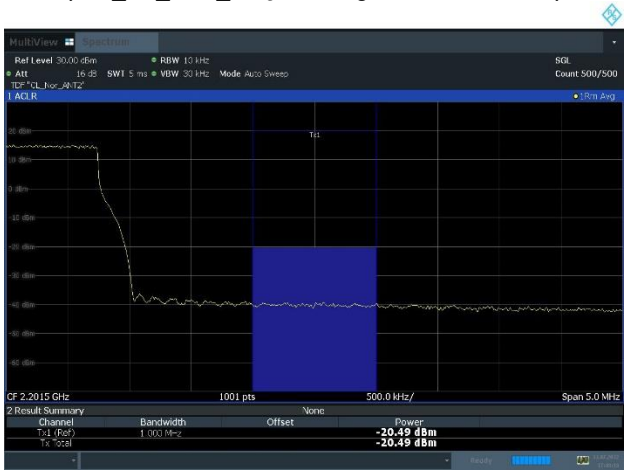
Plot 8-35. Band Edge Emission Plot
(n66_1C_20M_64QAM - Low Channel, Port 2)



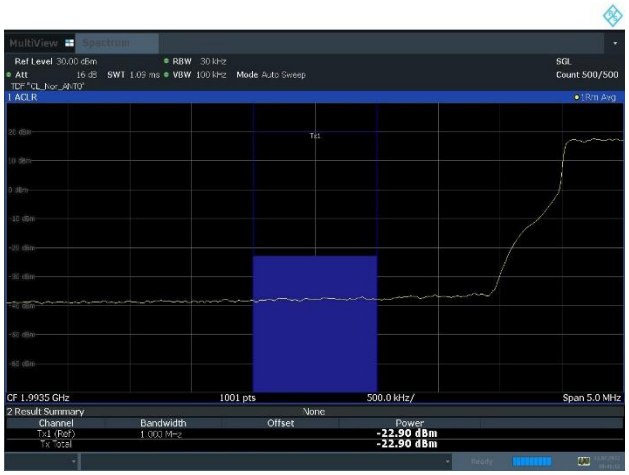
Plot 8-36. Band Edge Emission Plot
(n66_1C_20M_64QAM - High Channel, Port 2)



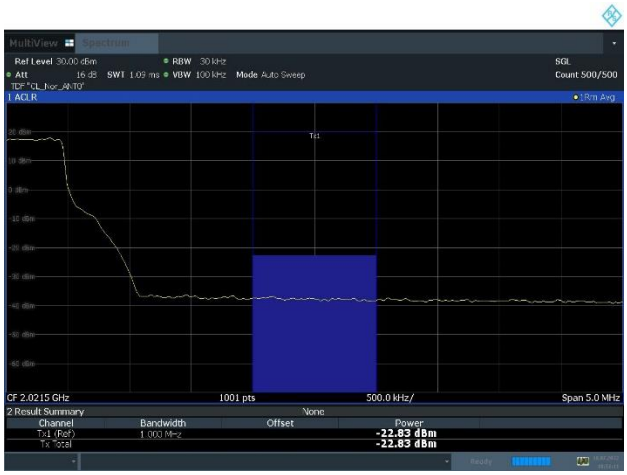
Plot 8-37. Band Edge Emission Plot
(n66_2C_5M+20M_16QAM - Low Channel, Port 0)



Plot 8-38. Band Edge Emission Plot
(n66_2C_5M+20M_QPSK - High Channel, Port 2)



Plot 8-39. Band Edge Emission Plot
(n66_1C_25M_256QAM - Low Channel, Port 0)



Plot 8-40. Band Edge Emission Plot
(n66_1C_25M_256QAM - High Channel, Port 0)

8.6 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

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

Test Setting

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10 * the fundamental frequency excluding the frequency range of the band edge measurement.
2. RBW: Please see test notes below.
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

The minimum permissible attenuation level of any spurious emission is 43 + $\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.
The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm.

Test Setup

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

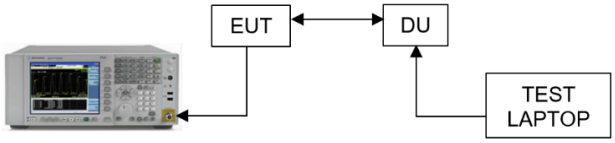


Figure 8-5. Test Instrument & Measurement Setup

Test Notes

1. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

2. All the measurement has been tested but test plots are referred from the highest of value of each of modulation of each antenna ports.

3. The limits were adjusted by a factor of [-10*log (4)] dB to account for the device operation as a 4 port MIMO transmitter, as per FCC KDB 622911. MIMO Factor calculation as below:
   MIMO Factor = 10*log (4) = 6.02 dB

4. Narrower RBW parameter is applied according to Section 5.7 of ANSI C63.26-2015 for some edge channels due to improving measurement accuracy. RBW Factor calculation as below:
   - RBW Factor = 10*log (1/0.001) = 30 dB for the measurement range from 9 kHz to 150 kHz.
   - RBW Factor = 10*log (1/0.01) = 20 dB for the measurement range from 150 kHz to 30 MHz.
   - RBW Factor = 10*log (1/0.1) = 10 dB for the measurement range from 30 MHz to 1 GHz.

Frequency range	Basic Limit (dBm/MHz)	4 TX MIMO Factor (dB)	RBW Factor (dB)	Adjusted limit (dBm)
9 kHz to 150 kHz	-13	6.02	30	-49.02
150 kHz to 30 MHz	-13	6.02	20	-39.02
30 MHz to 1 GHz	-13	6.02	10	-29.02
1 GHz to 22 GHz	-13	6.02	0	-19.02
Note: Adjusted limit (dBm/MHz) = Basic limit (dBm/1MHz) - MIMO Factor - RBW Factor				

Channel	Port	Measurement Range	Level (dBm)				Limit (dBm)	Margin (dB)
			QPSK	16QAM	64QAM	256QAM		
Low	0	9 kHz to 150 kHz	-72.45	-73.08	-72.98	-72.96	-49.02	-23.43
		150 kHz to 30 MHz	-50.87	-50.88	-50.59	-50.99	-39.02	-11.57
		30 MHz to 1 GHz	-44.46	-44.41	-44.45	-44.38	-29.02	-15.36
		1 GHz to 2.108 GHz	-22.38	-21.88	-21.75	-22.48	-19.02	-2.73
		2.202 GHz to 6 GHz	-25.86	-26.07	-26.21	-26.04	-19.02	-6.84
		6 GHz to 18 GHz	-28.32	-28.14	-28.40	-28.36	-19.02	-9.12
		18 GHz to 22 GHz	-36.83	-36.75	-36.67	-36.62	-19.02	-17.60
	1	9 kHz to 150 kHz	-72.24	-72.34	-72.39	-72.11	-49.02	-23.09
		150 kHz to 30 MHz	-50.57	-50.23	-50.32	-50.62	-39.02	-11.21
		30 MHz to 1 GHz	-44.64	-44.68	-44.49	-44.81	-29.02	-15.47
		1 GHz to 2.108 GHz	-23.52	-22.21	-22.92	-22.34	-19.02	-3.19
		2.202 GHz to 6 GHz	-26.14	-26.08	-26.18	-26.15	-19.02	-7.06
		6 GHz to 18 GHz	-30.47	-30.32	-30.30	-30.51	-19.02	-11.28
		18 GHz to 22 GHz	-36.69	-36.66	-36.64	-36.67	-19.02	-17.62
	2	9 kHz to 150 kHz	-71.81	**-72.04**	-72.39	-72.37	-49.02	-22.79
		150 kHz to 30 MHz	-49.83	**-50.32**	-49.69	-50.02	-39.02	-10.67
		30 MHz to 1 GHz	-44.57	**-44.32**	-44.46	-44.35	-29.02	-15.30
		1 GHz to 2.108 GHz	-22.98	**-21.21**	-22.25	-21.74	-19.02	**-2.19**
		2.202 GHz to 6 GHz	-26.17	**-26.22**	-25.73	-25.73	-19.02	-6.71
		6 GHz to 18 GHz	-29.85	**-29.82**	-29.85	-29.85	-19.02	-10.80
		18 GHz to 22 GHz	-36.73	**-36.64**	-36.73	-36.76	-19.02	-17.62
	3	9 kHz to 150 kHz	-71.59	-72.08	-71.77	-71.94	-49.02	-22.57
		150 kHz to 30 MHz	-49.97	-49.91	-50.27	-49.18	-39.02	-10.16
		30 MHz to 1 GHz	-44.36	-44.25	-44.27	-44.29	-29.02	-15.23
		1 GHz to 2.108 GHz	-22.42	-22.95	-23.24	-21.35	-19.02	-2.33
		2.202 GHz to 6 GHz	-25.41	-25.82	-25.58	-25.37	-19.02	-6.35
		6 GHz to 18 GHz	-27.60	-27.61	-27.57	-27.77	-19.02	-8.55
		18 GHz to 22 GHz	-36.73	-36.87	-36.70	-36.60	-19.02	-17.58
Middle	0	9 kHz to 150 kHz	-73.03	-72.85	-72.99	-72.81	-49.02	-23.79
		150 kHz to 30 MHz	-50.49	-51.24	-50.51	-50.90	-39.02	-11.47
		30 MHz to 1 GHz	-44.46	-44.37	-44.50	-44.45	-29.02	-15.35
		1 GHz to 2.108 GHz	-28.28	-28.55	-28.18	-28.40	-19.02	-9.16
		2.202 GHz to 6 GHz	-26.20	-26.21	-26.20	-25.99	-19.02	-6.97
		6 GHz to 18 GHz	-28.11	-28.20	-28.45	-28.54	-19.02	-9.09
		18 GHz to 22 GHz	-36.73	-36.61	-36.78	-36.73	-19.02	-17.59
	1	9 kHz to 150 kHz	-72.35	-72.67	-72.72	-72.23	-49.02	-23.21
		150 kHz to 30 MHz	-50.51	-50.83	-50.08	-50.70	-39.02	-11.06
		30 MHz to 1 GHz	-44.51	-44.45	-44.71	-44.55	-29.02	-15.43
		1 GHz to 2.108 GHz	-27.75	-27.95	-27.92	-27.92	-19.02	-8.73
		2.202 GHz to 6 GHz	-25.95	-26.39	-25.95	-26.24	-19.02	-6.93
		6 GHz to 18 GHz	-30.52	-30.31	-30.56	-30.65	-19.02	-11.29
		18 GHz to 22 GHz	-36.80	-36.82	-36.90	-36.73	-19.02	-17.71

	2	9 kHz to 150 kHz	-71.86	-72.28	-71.92	-72.22	-49.02	-22.84
		150 kHz to 30 MHz	-49.64	-50.26	-49.96	-49.99	-39.02	-10.62
		30 MHz to 1 GHz	-44.41	-44.18	-44.50	-44.33	-29.02	-15.16
		1 GHz to 2.108 GHz	-27.97	-28.11	-28.05	-28.10	-19.02	-8.95
		2.202 GHz to 6 GHz	-25.96	-25.89	-26.01	-25.85	-19.02	-6.83
		6 GHz to 18 GHz	-29.85	-29.90	-29.99	-29.85	-19.02	-10.83
		18 GHz to 22 GHz	-36.72	-36.63	-36.42	-36.82	-19.02	-17.40
	3	9 kHz to 150 kHz	-71.82	-72.10	-71.37	-72.30	-49.02	-22.35
		150 kHz to 30 MHz	-49.67	-50.02	-50.17	-50.66	-39.02	-10.65
		30 MHz to 1 GHz	-44.31	-44.27	-44.38	-44.39	-29.02	-15.25
		1 GHz to 2.108 GHz	-27.40	-27.37	-27.74	-27.62	-19.02	-8.35
		2.202 GHz to 6 GHz	-25.73	-25.61	-25.59	-25.45	-19.02	-6.43
		6 GHz to 18 GHz	-27.83	-27.79	-27.74	-27.50	-19.02	-8.48
		18 GHz to 22 GHz	-36.74	-36.46	-36.60	-36.76	-19.02	-17.44
High	0	9 kHz to 150 kHz	-72.79	-72.80	-72.43	-73.21	-49.02	-23.41
		150 kHz to 30 MHz	-51.74	-51.14	-51.11	-51.39	-39.02	-12.09
		30 MHz to 1 GHz	-44.38	-44.53	-44.21	-44.66	-29.02	-15.19
		1 GHz to 2.108 GHz	-28.37	-27.72	-28.16	-28.10	-19.02	-8.70
		2.202 GHz to 6 GHz	-23.47	-23.06	-24.46	-24.70	-19.02	-4.04
		6 GHz to 18 GHz	-28.30	-28.49	-28.33	-28.37	-19.02	-9.28
		18 GHz to 22 GHz	-36.65	-36.66	-36.78	-36.82	-19.02	-17.63
	1	9 kHz to 150 kHz	-72.43	-72.18	-72.21	-72.29	-49.02	-23.16
		150 kHz to 30 MHz	-50.60	-50.26	-49.96	-50.43	-39.02	-10.94
		30 MHz to 1 GHz	-44.67	-44.62	-44.43	-44.61	-29.02	-15.41
		1 GHz to 2.108 GHz	-27.28	-27.28	-26.96	-26.96	-19.02	-7.94
		2.202 GHz to 6 GHz	-22.63	-23.95	-25.21	-24.85	-19.02	-3.61
		6 GHz to 18 GHz	-30.37	-30.64	-30.76	-30.60	-19.02	-11.35
		18 GHz to 22 GHz	-36.76	-36.55	-36.78	-36.77	-19.02	-17.53
	2	9 kHz to 150 kHz	-72.12	-71.98	-72.70	-71.80	-49.02	-22.78
		150 kHz to 30 MHz	-50.30	-50.43	-50.21	-50.57	-39.02	-11.19
		30 MHz to 1 GHz	-44.43	-44.58	-44.47	-44.48	-29.02	-15.41
		1 GHz to 2.108 GHz	-27.96	-27.64	-27.88	-27.55	-19.02	-8.53
		2.202 GHz to 6 GHz	-23.93	-23.00	-22.78	-21.78	-19.02	-2.76
		6 GHz to 18 GHz	-29.53	-29.93	-30.01	-29.71	-19.02	-10.51
		18 GHz to 22 GHz	-36.50	-36.69	-36.76	-36.53	-19.02	-17.48
	3	9 kHz to 150 kHz	-71.68	-71.78	-71.61	-72.17	-49.02	-22.59
		150 kHz to 30 MHz	-50.75	-50.31	-50.28	-50.06	-39.02	-11.04
		30 MHz to 1 GHz	-44.32	-43.91	-44.42	-44.44	-29.02	-14.89
		1 GHz to 2.108 GHz	-27.05	-26.94	-26.96	-26.56	-19.02	-7.54
		2.202 GHz to 6 GHz	-22.65	-23.65	-23.97	-24.40	-19.02	-3.63
		6 GHz to 18 GHz	-27.64	-27.90	-27.63	-27.93	-19.02	-8.61
		18 GHz to 22 GHz	-36.77	-36.72	-36.78	-36.61	-19.02	-17.59

Table 8-18. Conducted Spurious Emission Summary Data (n66_1C_5M)

Channel	Port	Measurement Range	Level (dBm)				Limit (dBm)	Margin (dB)
			QPSK	16QAM	64QAM	256QAM		
Low	0	9 kHz to 150 kHz	-73.18	-73.12	-72.96	-72.99	-49.02	-23.94
		150 kHz to 30 MHz	-51.40	-51.42	-51.24	-51.85	-39.02	-12.22
		30 MHz to 1 GHz	-44.47	-44.48	-44.62	-44.35	-29.02	-15.33
		1 GHz to 2.108 GHz	-21.09	-20.27	-20.89	-23.05	-19.02	-1.25
		2.202 GHz to 6 GHz	-25.76	-26.04	-25.85	-26.05	-19.02	-6.74
		6 GHz to 18 GHz	-28.47	-28.14	-28.39	-28.38	-19.02	-9.12
		18 GHz to 22 GHz	-36.72	-36.74	-36.83	-36.69	-19.02	-17.67
	1	9 kHz to 150 kHz	-72.75	-72.75	-72.17	-72.26	-49.02	-23.15
		150 kHz to 30 MHz	-51.03	-50.39	-49.99	-50.46	-39.02	-10.97
		30 MHz to 1 GHz	-44.58	-44.45	-44.65	-44.53	-29.02	-15.43
		1 GHz to 2.108 GHz	-20.90	-21.24	-20.77	-21.54	-19.02	-1.75
		2.202 GHz to 6 GHz	-26.40	-26.03	-26.27	-26.36	-19.02	-7.01
		6 GHz to 18 GHz	-30.54	-30.48	-30.76	-30.75	-19.02	-11.46
		18 GHz to 22 GHz	-36.79	-36.85	-36.71	-36.68	-19.02	-17.66
	2	9 kHz to 150 kHz	-72.49	-72.03	-72.09	-72.59	-49.02	-23.01
		150 kHz to 30 MHz	-50.92	-50.28	-50.44	-50.21	-39.02	-11.19
		30 MHz to 1 GHz	-44.57	-44.52	-44.22	-44.52	-29.02	-15.20
		1 GHz to 2.108 GHz	-20.68	-22.79	-20.82	-22.27	-19.02	-1.66
		2.202 GHz to 6 GHz	-25.92	-26.04	-26.04	-25.86	-19.02	-6.84
		6 GHz to 18 GHz	-29.87	-29.56	-29.86	-29.82	-19.02	-10.54
		18 GHz to 22 GHz	-36.68	-36.76	-36.62	-36.78	-19.02	-17.60
	3	9 kHz to 150 kHz	-71.47	**-72.34**	-71.92	-72.28	-49.02	-22.45
		150 kHz to 30 MHz	-49.61	**-50.16**	-51.25	-49.78	-39.02	-10.59
		30 MHz to 1 GHz	-44.33	**-44.38**	-44.41	-44.51	-29.02	-15.31
		1 GHz to 2.108 GHz	-21.19	**-20.09**	-20.98	-21.64	-19.02	**-1.07**
		2.202 GHz to 6 GHz	-25.50	**-25.82**	-25.29	-25.33	-19.02	-6.27
		6 GHz to 18 GHz	-27.94	**-27.77**	-27.71	-27.76	-19.02	-8.69
		18 GHz to 22 GHz	-36.82	**-36.79**	-36.77	-36.78	-19.02	-17.75
Middle	0	9 kHz to 150 kHz	-73.39	-73.53	-72.69	-72.95	-49.02	-23.67
		150 kHz to 30 MHz	-50.94	-51.21	-51.00	-51.25	-39.02	-11.92
		30 MHz to 1 GHz	-44.49	-44.50	-44.45	-44.33	-29.02	-15.31
		1 GHz to 2.108 GHz	-28.36	-28.45	-28.55	-28.45	-19.02	-9.34
		2.202 GHz to 6 GHz	-25.79	-26.08	-26.10	-25.81	-19.02	-6.77
		6 GHz to 18 GHz	-28.13	-28.57	-28.44	-28.21	-19.02	-9.11
		18 GHz to 22 GHz	-36.87	-36.78	-36.66	-36.83	-19.02	-17.64
	1	9 kHz to 150 kHz	-71.81	-72.15	-71.90	-72.18	-49.02	-22.79
		150 kHz to 30 MHz	-50.26	-50.66	-49.99	-50.87	-39.02	-10.97
		30 MHz to 1 GHz	-44.66	-44.73	-44.71	-44.75	-29.02	-15.64
		1 GHz to 2.108 GHz	-28.38	-28.31	-27.95	-28.24	-19.02	-8.93
		2.202 GHz to 6 GHz	-25.83	-26.17	-26.05	-26.19	-19.02	-6.81
		6 GHz to 18 GHz	-30.44	-30.60	-30.34	-30.53	-19.02	-11.32
		18 GHz to 22 GHz	-36.71	-36.78	-36.66	-36.72	-19.02	-17.64

	2	9 kHz to 150 kHz	-71.77	-72.17	-71.93	-72.56	-49.02	-22.75
		150 kHz to 30 MHz	-50.76	-51.14	-50.12	-50.56	-39.02	-11.10
		30 MHz to 1 GHz	-44.51	-44.51	-44.29	-44.49	-29.02	-15.27
		1 GHz to 2.108 GHz	-28.09	-28.23	-28.32	-28.09	-19.02	-9.07
		2.202 GHz to 6 GHz	-25.89	-25.98	-25.79	-25.97	-19.02	-6.77
		6 GHz to 18 GHz	-29.81	-29.91	-29.76	-29.88	-19.02	-10.74
		18 GHz to 22 GHz	-36.66	-36.82	-36.81	-36.77	-19.02	-17.64
	3	9 kHz to 150 kHz	-71.72	-71.81	-72.15	-71.87	-49.02	-22.70
		150 kHz to 30 MHz	-49.96	-50.10	-49.87	-49.71	-39.02	-10.69
		30 MHz to 1 GHz	-44.17	-44.44	-44.31	-44.27	-29.02	-15.15
		1 GHz to 2.108 GHz	-27.93	-27.98	-28.00	-27.86	-19.02	-8.84
		2.202 GHz to 6 GHz	-25.56	-25.47	-25.32	-25.50	-19.02	-6.30
		6 GHz to 18 GHz	-27.57	-27.76	-27.49	-27.65	-19.02	-8.47
		18 GHz to 22 GHz	-36.73	-36.80	-36.65	-36.65	-19.02	-17.63
High	0	9 kHz to 150 kHz	-73.00	-73.39	-73.04	-73.14	-49.02	-23.98
		150 kHz to 30 MHz	-50.96	-50.84	-51.49	-51.40	-39.02	-11.82
		30 MHz to 1 GHz	-44.21	-44.55	-44.59	-44.49	-29.02	-15.19
		1 GHz to 2.108 GHz	-28.57	-28.84	-28.82	-28.86	-19.02	-9.55
		2.202 GHz to 6 GHz	-21.15	-22.63	-22.22	-23.51	-19.02	-2.13
		6 GHz to 18 GHz	-28.61	-28.53	-28.26	-28.09	-19.02	-9.07
		18 GHz to 22 GHz	-36.90	-36.76	-36.77	-36.64	-19.02	-17.62
	1	9 kHz to 150 kHz	-71.97	-71.97	-71.93	-71.63	-49.02	-22.61
		150 kHz to 30 MHz	-50.17	-51.15	-50.60	-50.68	-39.02	-11.15
		30 MHz to 1 GHz	-44.81	-44.53	-44.53	-44.41	-29.02	-15.39
		1 GHz to 2.108 GHz	-27.64	-27.72	-27.86	-27.89	-19.02	-8.62
		2.202 GHz to 6 GHz	-22.06	-23.01	-23.47	-23.31	-19.02	-3.04
		6 GHz to 18 GHz	-30.21	-30.74	-30.54	-30.61	-19.02	-11.19
		18 GHz to 22 GHz	-36.46	-36.49	-36.68	-36.77	-19.02	-17.44
	2	9 kHz to 150 kHz	-72.19	-72.17	-71.77	-71.72	-49.02	-22.70
		150 kHz to 30 MHz	-49.97	-50.50	-50.44	-49.72	-39.02	-10.70
		30 MHz to 1 GHz	-44.43	-44.13	-44.59	-44.49	-29.02	-15.11
		1 GHz to 2.108 GHz	-28.45	-28.51	-28.60	-28.61	-19.02	-9.43
		2.202 GHz to 6 GHz	-21.99	-23.02	-21.71	-21.03	-19.02	-2.01
		6 GHz to 18 GHz	-29.73	-29.87	-29.79	-29.96	-19.02	-10.71
		18 GHz to 22 GHz	-36.66	-36.80	-36.70	-36.74	-19.02	-17.64
	3	9 kHz to 150 kHz	-71.43	-71.35	-70.76	-71.68	-49.02	-21.74
		150 kHz to 30 MHz	-49.67	-49.67	-50.47	-50.28	-39.02	-10.65
		30 MHz to 1 GHz	-44.27	-44.32	-44.07	-44.49	-29.02	-15.05
		1 GHz to 2.108 GHz	-27.73	-27.43	-27.64	-27.91	-19.02	-8.41
		2.202 GHz to 6 GHz	-22.04	-22.40	-22.44	-22.80	-19.02	-3.02
		6 GHz to 18 GHz	-27.75	-27.86	-27.75	-27.63	-19.02	-8.61
		18 GHz to 22 GHz	-36.86	-36.82	-36.62	-36.62	-19.02	-17.60

Table 8-19. Conducted Spurious Emission Summary Data (n66_1C_20M)

Channel	Port	Measurement Range	Level (dBm)				Limit (dBm)	Margin (dB)
			QPSK	16QAM	64QAM	256QAM		
Mid	0	9 kHz to 150 kHz	-73.03	-73.23	-72.82	**-72.38**	-49.02	-23.36
		150 kHz to 30 MHz	-51.04	-51.44	-50.53	**-51.38**	-39.02	-11.51
		30 MHz to 1 GHz	-44.54	-44.42	-44.52	**-44.48**	-29.02	-15.40
		1 GHz to 1.993 GHz	-24.37	-24.26	-24.36	**-23.95**	-19.02	-4.93
		2.022 GHz to 6 GHz	-23.43	-24.11	-23.63	**-23.19**	-19.02	**-4.17**
		6 GHz to 18 GHz	-28.52	-28.42	-28.45	**-28.28**	-19.02	-9.26
		18 GHz to 22 GHz	-36.79	-36.22	-36.83	**-36.45**	-19.02	-17.20
	1	9 kHz to 150 kHz	-70.90	-70.99	-70.77	-70.89	-49.02	-21.75
		150 kHz to 30 MHz	-50.37	-50.57	-50.93	-50.86	-39.02	-11.35
		30 MHz to 1 GHz	-44.88	-44.69	-44.72	-44.67	-29.02	-15.65
		1 GHz to 1.993 GHz	-25.49	-25.76	-25.92	-25.90	-19.02	-6.47
		2.022 GHz to 6 GHz	-25.12	-25.97	-26.16	-25.45	-19.02	-6.10
		6 GHz to 18 GHz	-30.27	-30.43	-30.50	-30.64	-19.02	-11.25
		18 GHz to 22 GHz	-36.87	-36.82	-36.91	-36.72	-19.02	-17.70
	2	9 kHz to 150 kHz	-71.89	-71.85	-71.56	-72.46	-19.02	-52.54
		150 kHz to 30 MHz	-50.74	-50.76	-50.24	-50.97	-19.02	-31.22
		30 MHz to 1 GHz	-44.26	-44.24	-44.44	-44.40	-19.02	-25.22
		1 GHz to 1.993 GHz	-25.31	-25.76	-26.04	-25.60	-19.02	-6.29
		2.022 GHz to 6 GHz	-25.73	-26.03	-25.89	-25.70	-19.02	-6.68
		6 GHz to 18 GHz	-29.67	-29.92	-29.96	-29.90	-19.02	-10.65
		18 GHz to 22 GHz	-36.75	-36.61	-36.69	-36.60	-19.02	-17.58
	3	9 kHz to 150 kHz	-70.43	-71.70	-71.64	-72.20	-19.02	-51.41
		150 kHz to 30 MHz	-50.54	-49.70	-50.16	-50.39	-19.02	-30.68
		30 MHz to 1 GHz	-44.38	-44.10	-44.37	-44.29	-19.02	-25.08
		1 GHz to 1.993 GHz	-25.45	-25.56	-25.83	-25.33	-19.02	-6.31
		2.022 GHz to 6 GHz	-25.67	-25.15	-25.56	-25.50	-19.02	-6.13
		6 GHz to 18 GHz	-27.68	-27.50	-27.73	-27.81	-19.02	-8.48
		18 GHz to 22 GHz	-36.78	-36.49	-36.66	-36.52	-19.02	-17.47

Table 8-20. Conducted Spurious Emission Summary Data (n70_1C_25M)

Channel	Port	Measurement Range	Level (dBm)				Limit (dBm)	Margin (dB)
			QPSK	16QAM	64QAM	256QAM		
Low	0	9 kHz to 150 kHz	-72.98	-73.04	-73.36	-72.95	-49.02	-23.93
		150 kHz to 30 MHz	-51.43	-51.46	-51.19	-50.81	-39.02	-11.79
		30 MHz to 1 GHz	-44.34	-44.47	-44.19	-44.32	-29.02	-15.17
		1 GHz to 2.108 GHz	-21.68	-22.00	-22.02	-22.04	-19.02	-2.66
		2.202 GHz to 6 GHz	-26.13	-25.73	-25.72	-26.09	-19.02	-6.70
		6 GHz to 18 GHz	-28.54	-28.48	-28.39	-28.26	-19.02	-9.24
		18 GHz to 22 GHz	-36.19	-36.78	-36.65	-36.73	-19.02	-17.17
	1	9 kHz to 150 kHz	-71.85	**-72.50**	-71.55	-72.38	-49.02	-22.53
		150 kHz to 30 MHz	-50.67	**-50.57**	-50.67	-50.52	-39.02	-11.50
		30 MHz to 1 GHz	-44.63	**-44.49**	-44.53	-44.58	-29.02	-15.47
		1 GHz to 2.108 GHz	-21.15	**-20.92**	-21.17	-21.13	-19.02	**-1.90**
		2.202 GHz to 6 GHz	-26.03	**-26.15**	-26.28	-25.82	-19.02	-6.80
		6 GHz to 18 GHz	-30.64	**-30.71**	-30.66	-30.50	-19.02	-11.48
		18 GHz to 22 GHz	-36.77	**-36.64**	-36.14	-36.72	-19.02	-17.12
	2	9 kHz to 150 kHz	-71.71	-72.40	-71.83	-72.26	-49.02	-22.69
		150 kHz to 30 MHz	-50.39	-50.33	-50.81	-49.80	-39.02	-10.78
		30 MHz to 1 GHz	-44.23	-44.53	-44.41	-44.14	-29.02	-15.12
		1 GHz to 2.108 GHz	-22.24	-21.29	-22.01	-21.93	-19.02	-2.27
		2.202 GHz to 6 GHz	-25.47	-26.12	-26.12	-26.14	-19.02	-6.45
		6 GHz to 18 GHz	-29.92	-29.98	-29.81	-29.75	-19.02	-10.73
		18 GHz to 22 GHz	-36.84	-36.90	-36.86	-36.56	-19.02	-17.54
	3	9 kHz to 150 kHz	-72.11	-71.85	-72.21	-71.87	-49.02	-22.83
		150 kHz to 30 MHz	-49.60	-49.94	-49.80	-49.57	-39.02	-10.55
		30 MHz to 1 GHz	-44.24	-44.33	-44.24	-44.22	-29.02	-15.20
		1 GHz to 2.108 GHz	-22.49	-21.40	-21.97	-21.59	-19.02	-2.38
		2.202 GHz to 6 GHz	-25.54	-25.41	-25.76	-25.85	-19.02	-6.39
		6 GHz to 18 GHz	-27.72	-27.57	-27.75	-27.69	-19.02	-8.55
		18 GHz to 22 GHz	-36.62	-36.85	-36.58	-36.76	-19.02	-17.56
Middle	0	9 kHz to 150 kHz	-73.08	-72.52	-72.72	-72.31	-49.02	-23.29
		150 kHz to 30 MHz	-51.78	-50.97	-51.07	-51.08	-39.02	-11.95
		30 MHz to 1 GHz	-44.41	-44.47	-44.22	-44.58	-29.02	-15.20
		1 GHz to 2.108 GHz	-27.60	-27.89	-27.99	-27.79	-19.02	-8.58
		2.202 GHz to 6 GHz	-26.22	-25.91	-26.24	-25.74	-19.02	-6.72
		6 GHz to 18 GHz	-28.63	-28.32	-28.54	-28.58	-19.02	-9.30
		18 GHz to 22 GHz	-36.64	-36.62	-36.81	-36.70	-19.02	-17.60
	1	9 kHz to 150 kHz	-72.27	-72.71	-71.73	-71.92	-49.02	-22.71
		150 kHz to 30 MHz	-50.13	-50.84	-50.36	-50.79	-39.02	-11.11
		30 MHz to 1 GHz	-44.59	-44.64	-44.39	-44.66	-29.02	-15.37
		1 GHz to 2.108 GHz	-27.62	-27.46	-27.82	-27.76	-19.02	-8.44
		2.202 GHz to 6 GHz	-26.38	-26.20	-26.15	-26.19	-19.02	-7.13
		6 GHz to 18 GHz	-30.35	-30.71	-30.47	-30.53	-19.02	-11.33
		18 GHz to 22 GHz	-36.63	-36.71	-36.77	-36.80	-19.02	-17.61

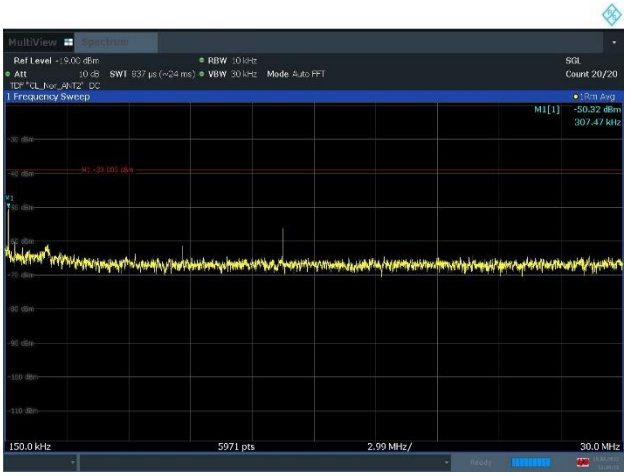
	2	9 kHz to 150 kHz	-71.94	-72.80	-71.28	-71.85	-49.02	-22.26
		150 kHz to 30 MHz	-49.79	-50.22	-49.87	-50.75	-39.02	-10.77
		30 MHz to 1 GHz	-44.44	-44.56	-44.56	-44.55	-29.02	-15.42
		1 GHz to 2.108 GHz	-27.93	-27.90	-27.37	-27.65	-19.02	-8.35
		2.202 GHz to 6 GHz	-26.14	-26.15	-25.99	-25.85	-19.02	-6.83
		6 GHz to 18 GHz	-29.80	-29.81	-29.94	-29.83	-19.02	-10.78
		18 GHz to 22 GHz	-36.75	-36.74	-36.61	-36.82	-19.02	-17.59
	3	9 kHz to 150 kHz	-71.72	-71.32	-72.23	-71.28	-49.02	-22.26
		150 kHz to 30 MHz	-49.84	-49.95	-50.40	-50.25	-39.02	-10.82
		30 MHz to 1 GHz	-44.17	-44.39	-44.46	-43.66	-29.02	-14.64
		1 GHz to 2.108 GHz	-27.15	-27.60	-27.30	-27.50	-19.02	-8.13
		2.202 GHz to 6 GHz	-25.52	-25.34	-25.42	-25.39	-19.02	-6.32
		6 GHz to 18 GHz	-27.72	-27.60	-27.75	-27.68	-19.02	-8.58
		18 GHz to 22 GHz	-36.60	-36.61	-36.82	-36.66	-19.02	-17.58
High	0	9 kHz to 150 kHz	-72.83	-73.15	-73.09	-72.11	-49.02	-23.09
		150 kHz to 30 MHz	-51.72	-50.83	-50.73	-50.65	-39.02	-11.63
		30 MHz to 1 GHz	-44.46	-44.33	-44.44	-44.22	-29.02	-15.20
		1 GHz to 2.108 GHz	-28.90	-29.14	-28.70	-28.56	-19.02	-9.54
		2.202 GHz to 6 GHz	-22.10	-22.69	-23.26	-22.10	-19.02	-3.08
		6 GHz to 18 GHz	-28.33	-28.34	-28.44	-28.13	-19.02	-9.11
		18 GHz to 22 GHz	-36.75	-36.63	-36.76	-36.60	-19.02	-17.58
	1	9 kHz to 150 kHz	-72.76	-72.26	-72.14	-71.74	-49.02	-22.72
		150 kHz to 30 MHz	-50.60	-50.15	-50.12	-50.57	-39.02	-11.10
		30 MHz to 1 GHz	-44.59	-44.78	-44.33	-44.50	-29.02	-15.31
		1 GHz to 2.108 GHz	-28.34	-28.35	-27.96	-28.22	-19.02	-8.94
		2.202 GHz to 6 GHz	-23.23	-22.59	-23.44	-23.24	-19.02	-3.57
		6 GHz to 18 GHz	-30.47	-30.75	-30.58	-30.50	-19.02	-11.45
		18 GHz to 22 GHz	-36.63	-36.60	-36.78	-36.64	-19.02	-17.58
	2	9 kHz to 150 kHz	-72.38	-71.99	-72.24	-71.86	-49.02	-22.84
		150 kHz to 30 MHz	-50.93	-49.90	-49.98	-49.84	-39.02	-10.82
		30 MHz to 1 GHz	-44.47	-44.34	-44.44	-44.47	-29.02	-15.32
		1 GHz to 2.108 GHz	-28.19	-28.04	-27.99	-28.26	-19.02	-8.97
		2.202 GHz to 6 GHz	-21.92	-21.91	-22.71	-22.10	-19.02	-2.89
		6 GHz to 18 GHz	-29.75	-30.00	-29.91	-29.89	-19.02	-10.73
		18 GHz to 22 GHz	-36.84	-36.61	-36.69	-36.89	-19.02	-17.59
	3	9 kHz to 150 kHz	-71.54	-72.35	-72.24	-72.00	-49.02	-22.52
		150 kHz to 30 MHz	-50.00	-50.47	-50.06	-49.80	-39.02	-10.78
		30 MHz to 1 GHz	-44.16	-44.38	-44.20	-44.29	-29.02	-15.14
		1 GHz to 2.108 GHz	-27.94	-27.72	-27.45	-27.34	-19.02	-8.32
		2.202 GHz to 6 GHz	-22.77	-22.85	-23.00	-23.25	-19.02	-3.75
		6 GHz to 18 GHz	-27.59	-27.70	-27.70	-27.56	-19.02	-8.54
		18 GHz to 22 GHz	-36.84	-36.65	-36.83	-36.76	-19.02	-17.63

Table 8-21. Conducted Spurious Emission Summary Data (n66_2C_5M+20M)

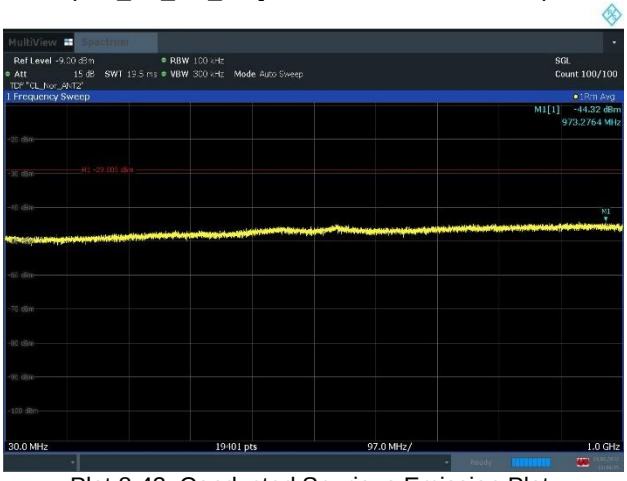
Channel	Configuration	Measurement Range	Level (dBm)	Limit (dBm)	Margin (dB)
			QPSK		
Middle	n66+n70_2C_5M+25M	9 kHz to 150 kHz	**-71.73**	-49.02	-22.71
		150 kHz to 30 MHz	**-49.95**	-39.02	-10.93
		30 MHz to 1 GHz	**-44.29**	-29.02	-15.27
		1 GHz to 1.993 GHz	**-25.99**	-19.02	-6.97
		2.022 GHz to 2.108 GHz	**-25.81**	-19.02	-6.79
		2.202 GHz to 6 GHz	**-20.87**	-19.02	**-1.85**
		6 GHz to 18 GHz	**-29.70**	-19.02	-10.68
		18 GHz to 22 GHz	**-36.71**	-19.02	-17.69
	n66+n70_2C_20M+25M	9 kHz to 150 kHz	-72.43	-49.02	-23.41
		150 kHz to 30 MHz	-51.11	-39.02	-12.09
		30 MHz to 1 GHz	-44.43	-29.02	-15.41
		1 GHz to 1.993 GHz	-24.27	-19.02	-5.25
		2.022 GHz to 2.108 GHz	-23.60	-19.02	-4.58
		2.202 GHz to 6 GHz	-24.63	-19.02	-5.61
		6 GHz to 18 GHz	-28.54	-19.02	-9.52
		18 GHz to 22 GHz	-36.76	-19.02	-17.74
	n66+n70_3C_5M+20M+25M	9 kHz to 150 kHz	-72.78	-49.02	-23.76
		150 kHz to 30 MHz	-50.21	-39.02	-11.19
		30 MHz to 1 GHz	-44.30	-29.02	-15.28
		1 GHz to 1.993 GHz	-25.77	-19.02	-6.75
		2.022 GHz to 2.108 GHz	-26.18	-19.02	-7.16
		2.202 GHz to 6 GHz	-23.73	-19.02	-4.71
		6 GHz to 18 GHz	-30.04	-19.02	-11.02
		18 GHz to 22 GHz	-36.86	-19.02	-17.84

Table 8-22. Conducted Spurious Emission Summary Data (n66+n70_Inter-Band Carrier Aggregation)

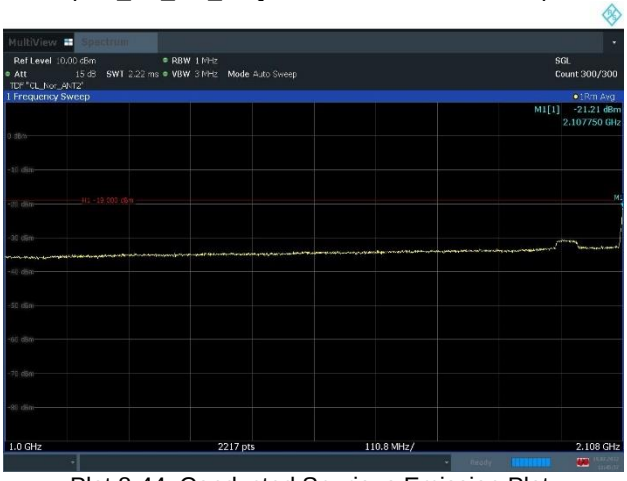
Plot 8-41. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66_1C_5M_16QAM - Low Channel, Port 2)



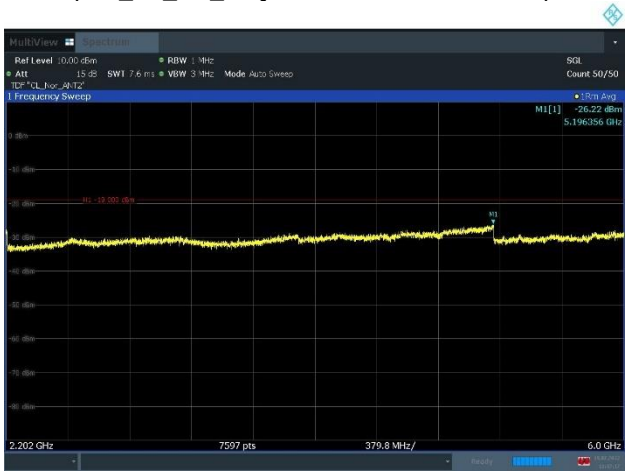
Plot 8-42. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66_1C_5M_16QAM - Low Channel, Port 2)



Plot 8-43. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66_1C_5M_16QAM - Low Channel, Port 2)

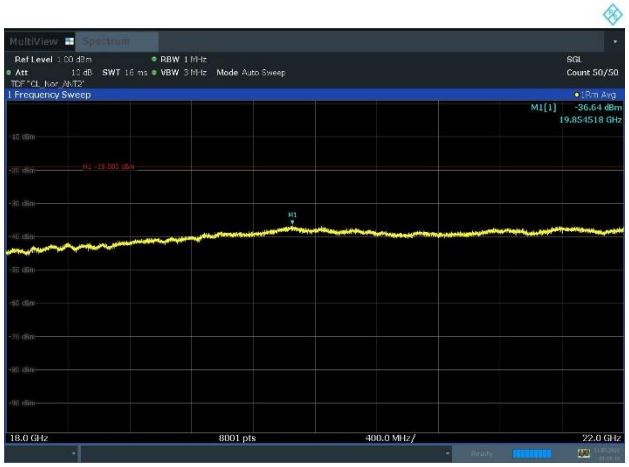


Plot 8-44. Conducted Spurious Emission Plot
1 GHz to 2.108 GHz
(n66_1C_5M_16QAM - Low Channel, Port 2)



Plot 8-45. Conducted Spurious Emission Plot
2.202 GHz to 6 GHz
(n66_1C_5M_16QAM - Low Channel, Port 2)

Plot 8-46. Conducted Spurious Emission Plot
6 GHz to 18 GHz
(n66_1C_5M_16QAM - Low Channel, Port 2)



Plot 8-47. Conducted Spurious Emission Plot
18 GHz to 22 GHz
(n66_1C_5M_16QAM - Low Channel, Port 2)

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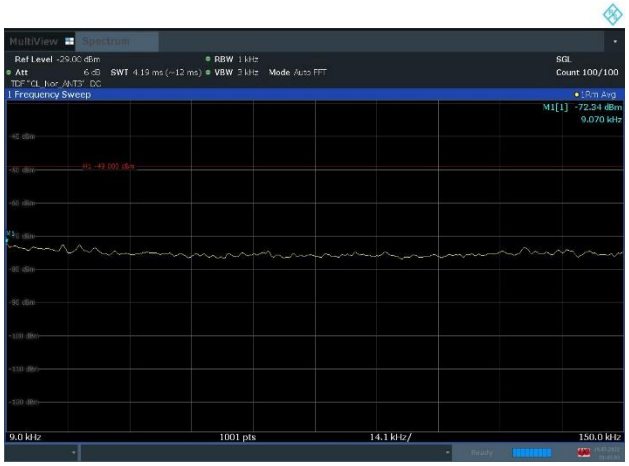
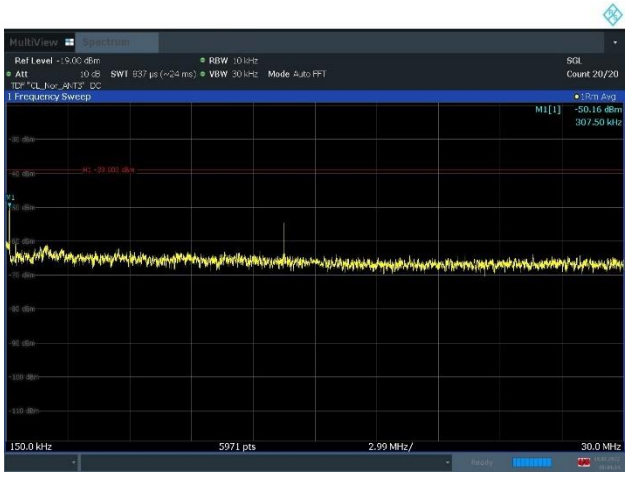
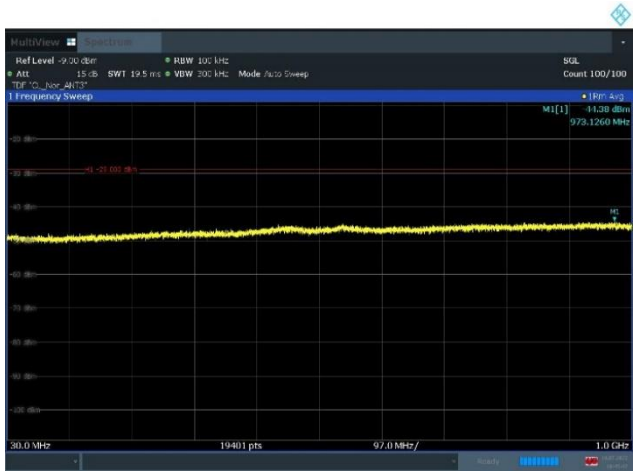


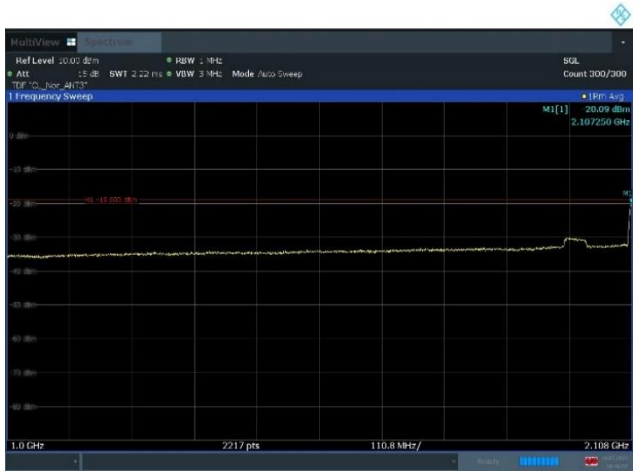
Plot 8-48. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66_1C_20M_16QAM - Low Channel, Port 3)



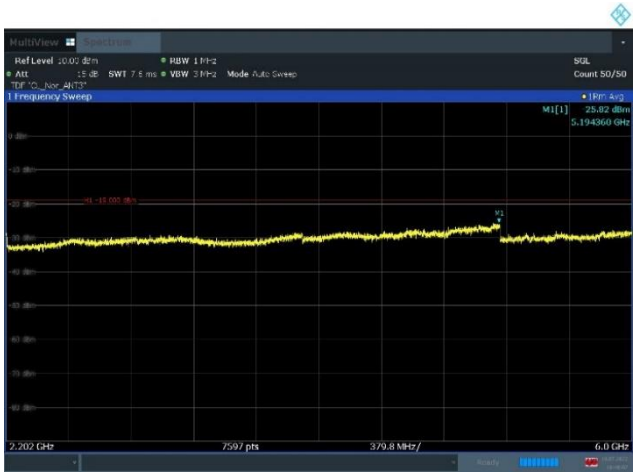
Plot 8-49. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66_1C_20M_16QAM - Low Channel, Port 3



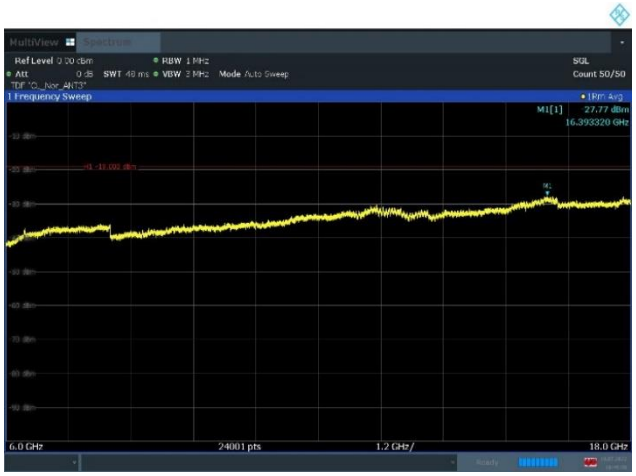
Plot 8-50. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66_1C_20M_16QAM - Low Channel, Port 3)



Plot 8-51. Conducted Spurious Emission Plot
1 GHz to 2.108 GHz
(n66_1C_20M_16QAM - Low Channel, Port 3)



Plot 8-52. Conducted Spurious Emission Plot
2.202 GHz to 6 GHz
(n66_1C_20M_16QAM - Low Channel, Port 3)

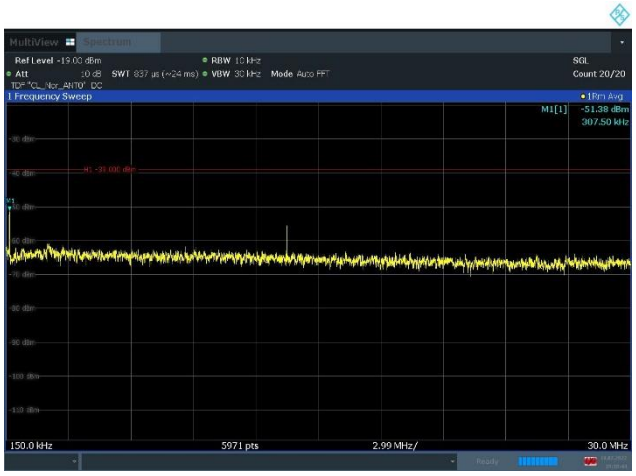


Plot 8-53. Conducted Spurious Emission Plot
6 GHz to 18 GHz
(n66_1C_20M_16QAM - Low Channel, Port 3)

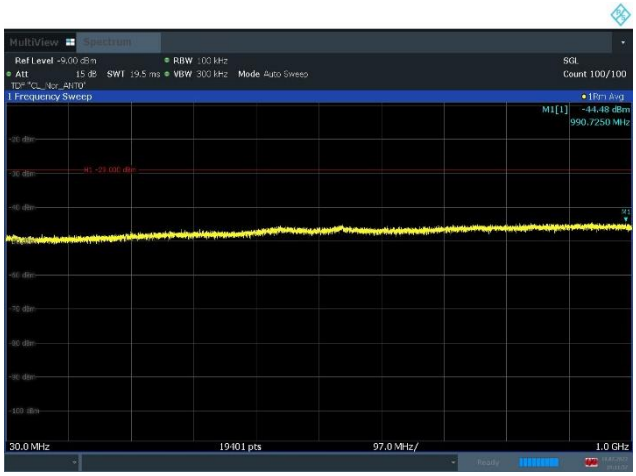
Plot 8-54. Conducted Spurious Emission Plot
18 GHz to 22 GHz
(n66_1C_20M_16QAM - Low Channel, Port 3)

-

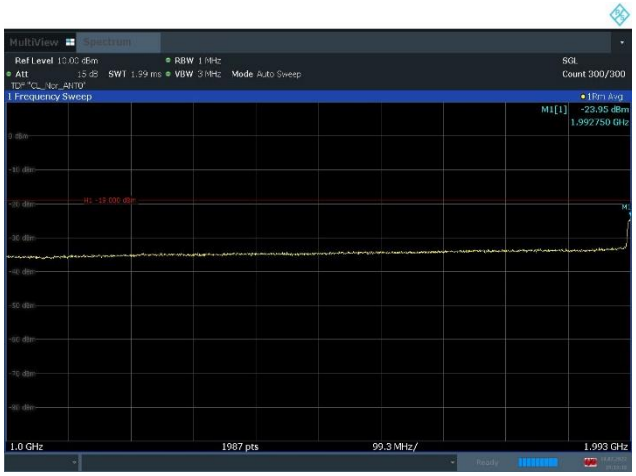
Plot 8-55. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)



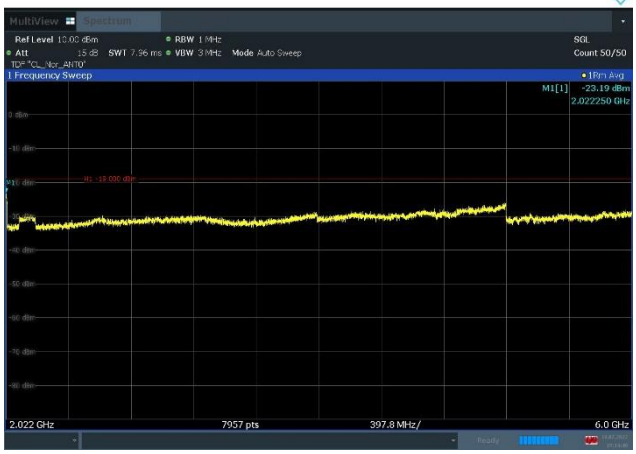
Plot 8-56. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)



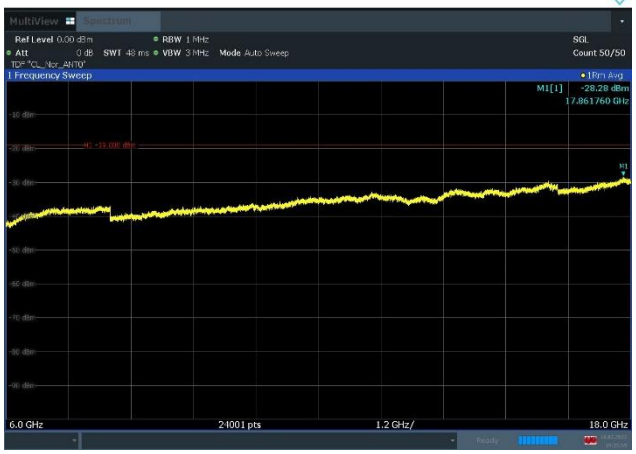
Plot 8-57. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)



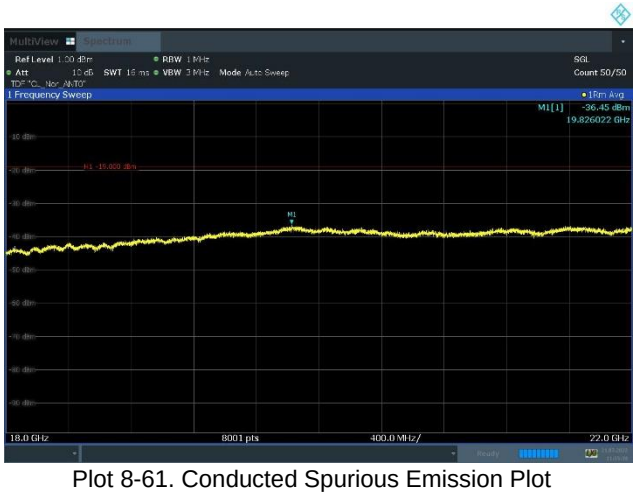
Plot 8-58. Conducted Spurious Emission Plot
1 GHz to 1.993 GHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)



Plot 8-59. Conducted Spurious Emission Plot
2.022 GHz to 6 GHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)

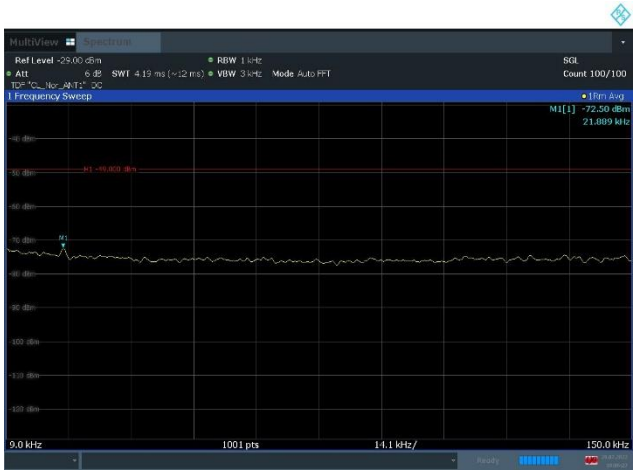


Plot 8-60. Conducted Spurious Emission Plot
6 GHz to 18 GHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)



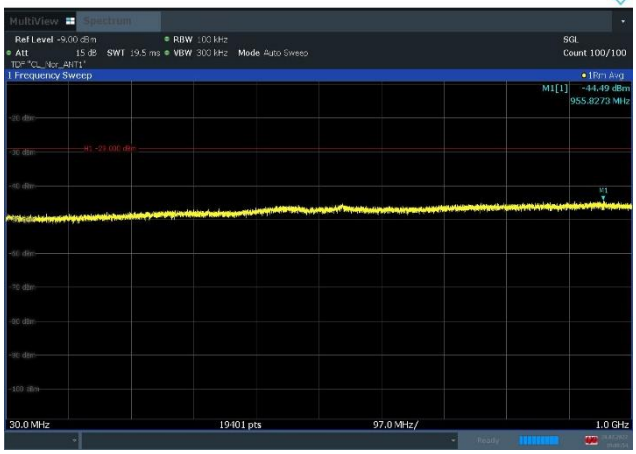
Plot 8-61. Conducted Spurious Emission Plot
18 GHz to 22 GHz
(n70_1C_25M_256QAM - Mid Channel, Port 0)

-

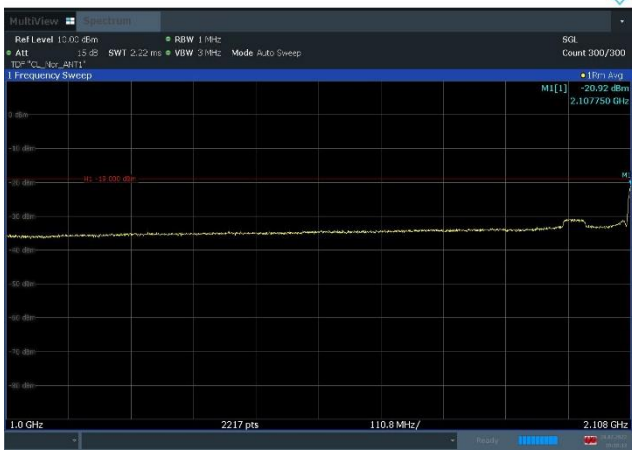


Plot 8-62. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)

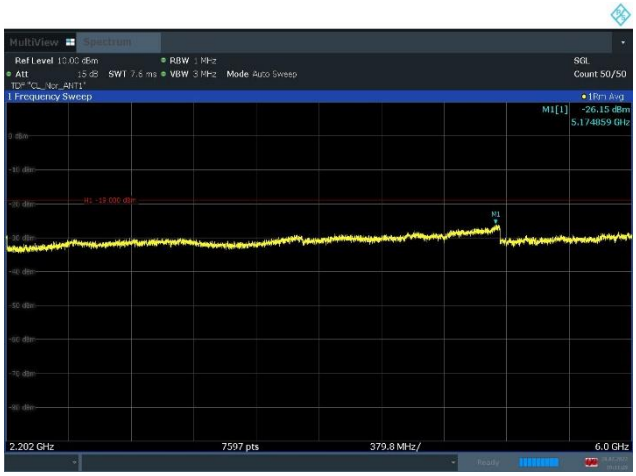
Plot 8-63. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)



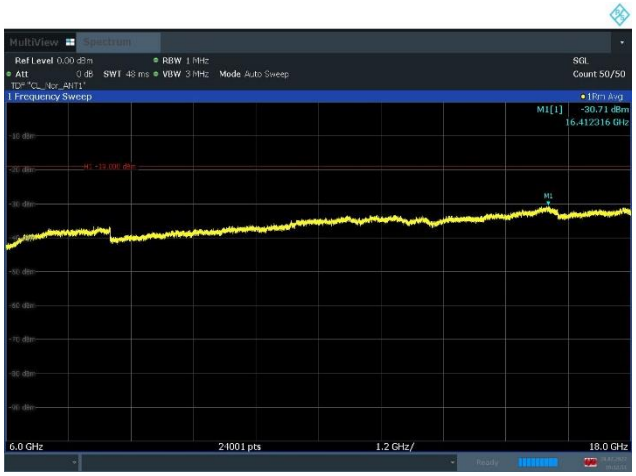
Plot 8-64. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)



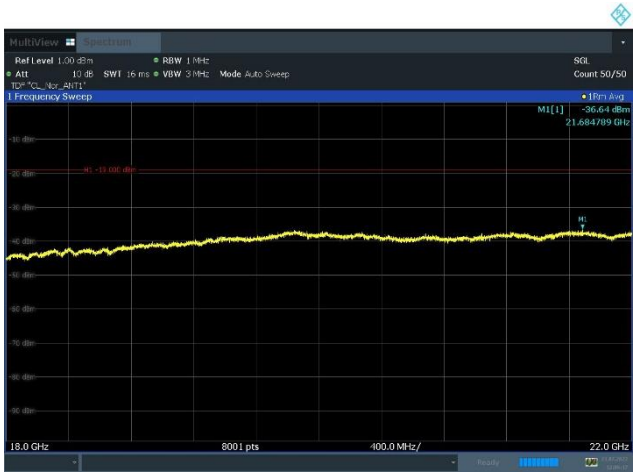
Plot 8-65. Conducted Spurious Emission Plot
1 GHz to 2.108 GHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)



Plot 8-66. Conducted Spurious Emission Plot
2.202 GHz to 6 GHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)

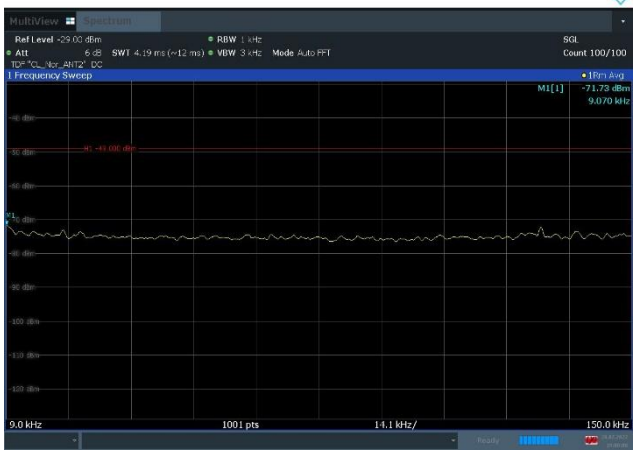


Plot 8-67. Conducted Spurious Emission Plot
6 GHz to 18 GHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)



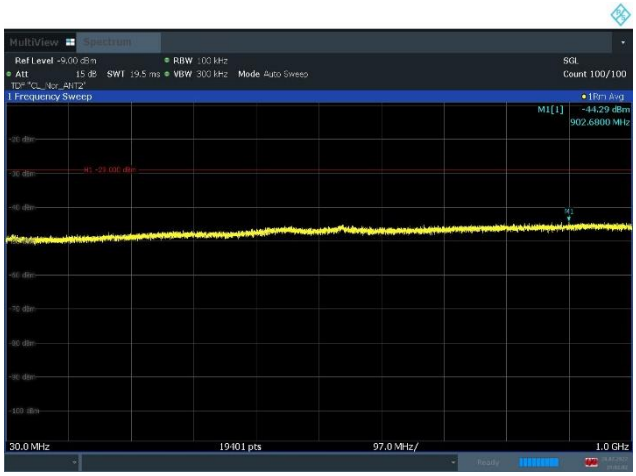
Plot 8-68. Conducted Spurious Emission Plot
18 GHz to 22 GHz
(n66_2C_5M+20M_16QAM - Low Channel, Port 1)

-

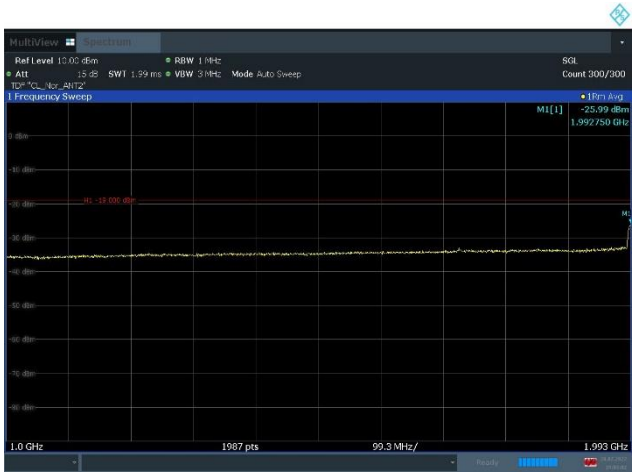


Plot 8-69. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)

Plot 8-70. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)

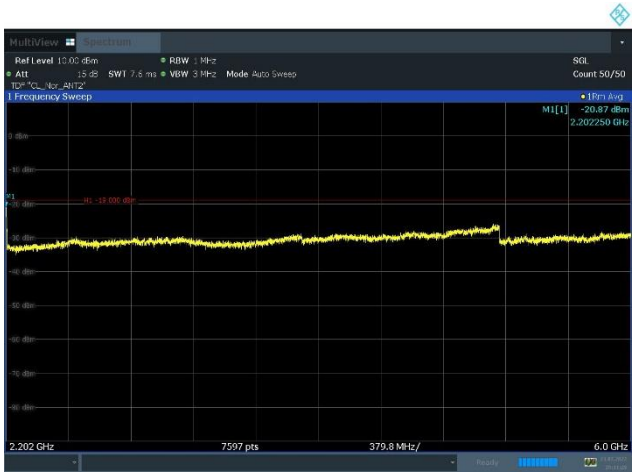


Plot 8-71. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)

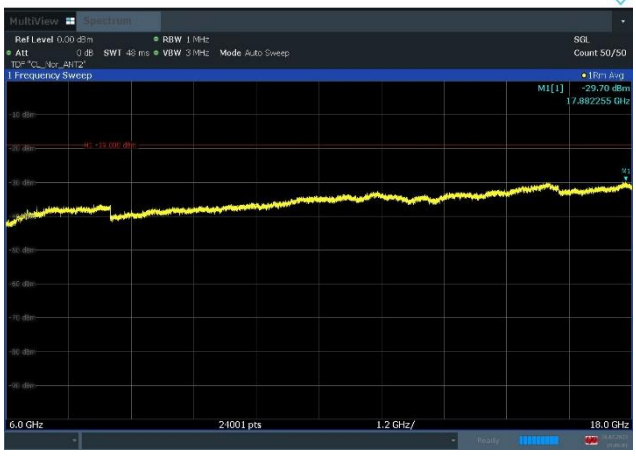


Plot 8-72. Conducted Spurious Emission Plot
1 GHz to 1.993 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)

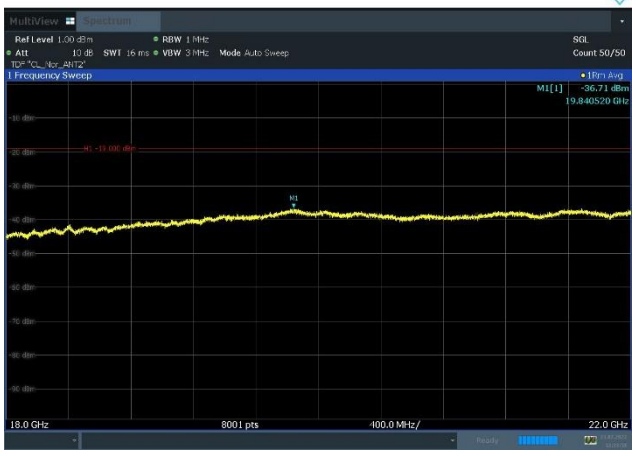
Plot 8-73. Conducted Spurious Emission Plot
2.022 GHz to 2.108 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)



Plot 8-74. Conducted Spurious Emission Plot
2.202 GHz to 6 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)



Plot 8-75. Conducted Spurious Emission Plot
6 GHz to 18 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)



Plot 8-76. Conducted Spurious Emission Plot
18 GHz to 22 GHz
(n70+n66_2C_25M+5M_QPSK - Inter-Band CA, Port 2)

8.7 Frequency Stability

§ 2.1055

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of KDB 971168 D01 v03r01.
The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C, +20°C and +50°C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for DC powered equipment.

Test Description

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made -30°C, +20°C and +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Limit

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

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

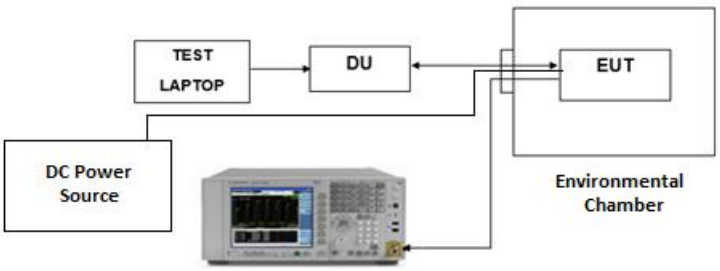


Figure 8-6. Test Instrument & Measurement Setup

Test Notes

None.

OPERATING FREQUENCY: 2,155,000,000 Hz

REFERENCE VOLTAGE: -48.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	-48.00	+ 20 (Ref)	2,154,999,997	0	0.0000000
100 %		- 30	2,154,999,995	-2	-0.0000001
100 %		- 20	2,155,000,004	7	0.0000003
100 %		- 10	2,154,999,997	0	0.0000000
100 %		0	2,154,999,999	2	0.0000001
100 %		+ 10	2,155,000,000	3	0.0000001
100 %		+ 30	2,154,999,997	0	0.0000000
100 %		+ 40	2,155,000,004	7	0.0000003
100 %		+ 50	2,154,999,978	-19	-0.0000009
85 %	-40.80	+ 20	2,154,999,999	2	0.0000001
115 %	-55.20	+ 20	2,155,000,007	10	0.0000005

Table 8-23. Frequency Stability Summary Data (NR_n66_1C_20M)

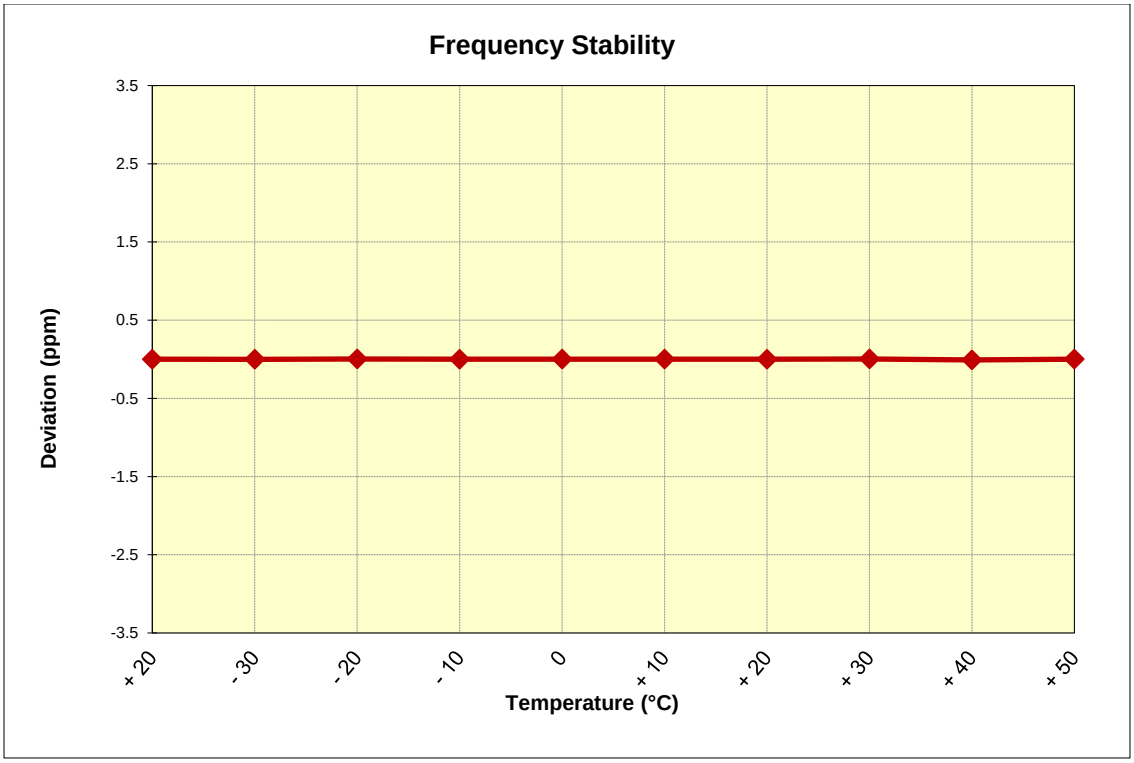


Figure 8-7. Frequency Stability Graph (NR_n66_1C_20M)

OPERATING FREQUENCY: 2,007,500,000 Hz

REFERENCE VOLTAGE: -48.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	-48.00	+ 20 (Ref)	2,007,500,000	0	0.0000000
100 %		- 30	2,007,500,016	16	0.0000008
100 %		- 20	2,007,499,997	-3	-0.0000001
100 %		- 10	2,007,499,996	-4	-0.0000002
100 %		0	2,007,499,998	-2	-0.0000001
100 %		+ 10	2,007,499,998	-2	-0.0000001
100 %		+ 30	2,007,500,000	0	0.0000000
100 %		+ 40	2,007,500,004	4	0.0000002
100 %		+ 50	2,007,499,994	-6	-0.0000003
85 %	-40.80	+ 20	2,007,500,001	1	0.0000000
115 %	-55.20	+ 20	2,007,499,999	-1	0.0000000

Table 8-24. Frequency Stability Summary Data (NR_n70_1C_25M)

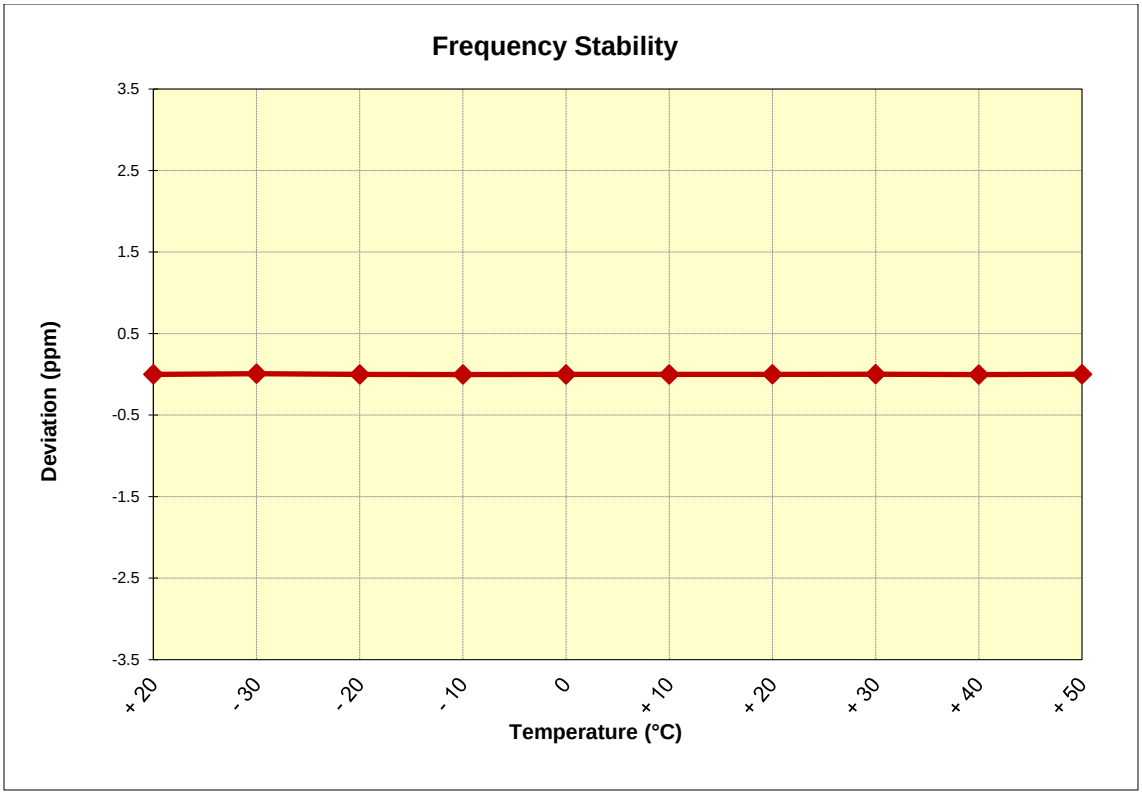


Figure 8-8. Frequency Stability Graph (NR_n70_1C_25M)

8.8 Radiated spurious emission

Test Overview

Radiated spurious emissions measurements are performed using the field strength method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized broadband tri-log antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedure Used

ANSI C63.26 - Section 5.5.3.2

Test Setting

1. Start frequency was set to 30 MHz and stop frequency was set to at least 10 * the fundamental frequency
2. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1GHz
3. VBW ≥ 3 x RBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = Peak for the pre-scan, (In cases where the level is within 2 dB of the limit, the final measurement is taken using RMS detector.)
6. Trace mode = Max Hold (In cases where the level is within 2 dB of the limit, the final measurement is taken using triggering/gating and trace averaging.)
7. The trace was allowed to stabilize.

Limit

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.
The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm.

Test Setup

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

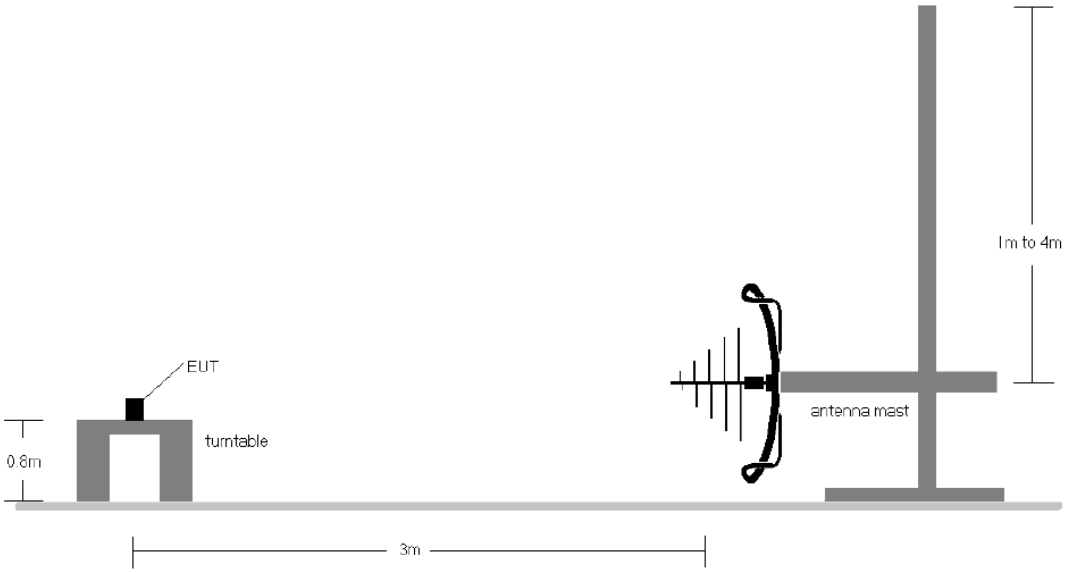


Figure 8-9. Test Instrument & Measurement Setup < 1 GHz

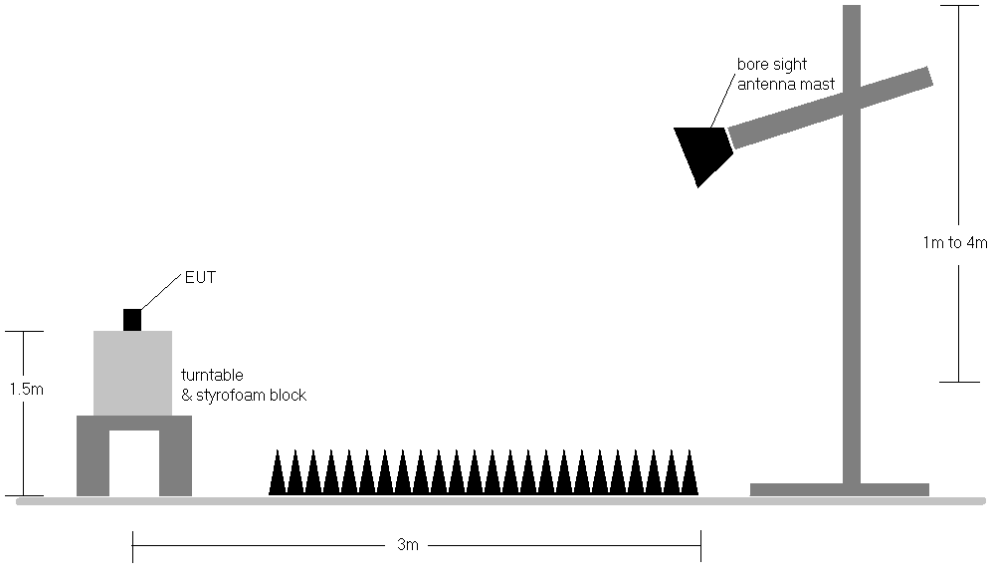


Figure 8-10. Test Instrument & Measurement Setup > 1 GHz

Test Notes

1. The average EIRP reported below is calculated per 5.2.7 of ANSI C63.26-2015 which states:

   The measured e.i.r.p is converted to E-field in V/m. Then the distance correction is applied before converted back to calculated e.i.r.p.as explained in KDB 971168 D01 D01 v03r01.

Effective Isotropic Radiated Power Sample Calculation

Field Strength [dBµV/m] = Measured Value [dBm] + 107 + AFCL [dB/m]

= -77.28 [dBm] + 107 + 34.07 [dB/m] = 63.79 dBµV/m

e.i.r.p. [dBm] = E[dB μV/m] + 20 $\log_{10}$(d[m]) - 104.8

= 63.79 dB[μV/m] + (20*log (3)) - 104.8

= -31.47 dBm

*AFCL (dB/m) contains measurement antenna factor(dB/m) and cable loss(dB) as below:

Frequency [MHz]	Antenna Factor (dB/m)	Chamber measurement cable loss + amplifier [dB]	AFCL (dB/m)
928.74	22.84	2.60	25.44
17881.88	46.80	-12.66	34.14

Table 8-25. Adopted AFCL value in the calculation

2. The EUT was tested in both horizontal and vertical antenna polarizations and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, channel bandwidth configurations shown in the tables below.

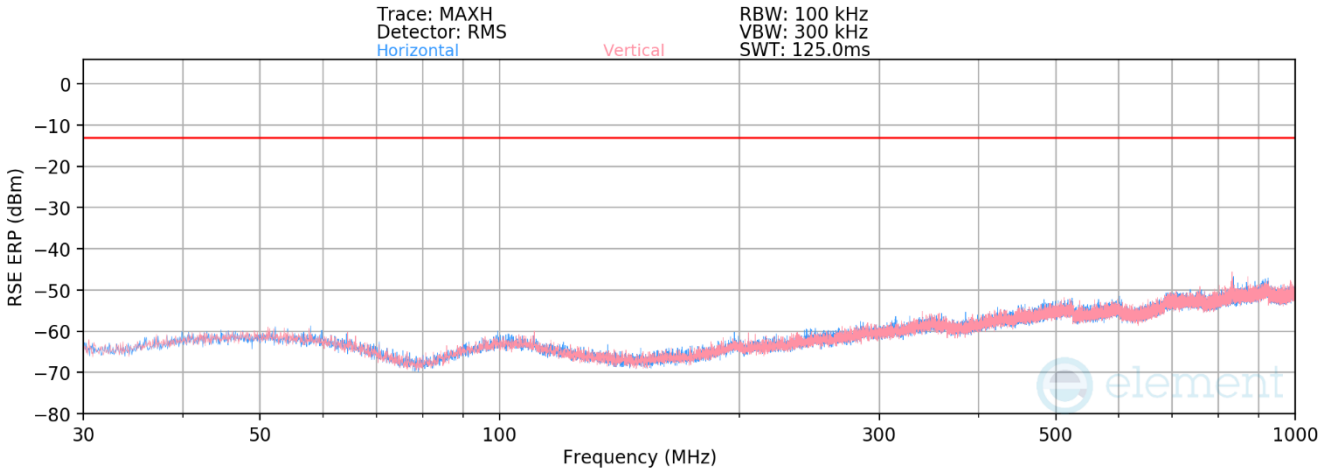
3. The spectrum is measured from 30 MHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4. All emissions were measured at a 3-meter test distance.

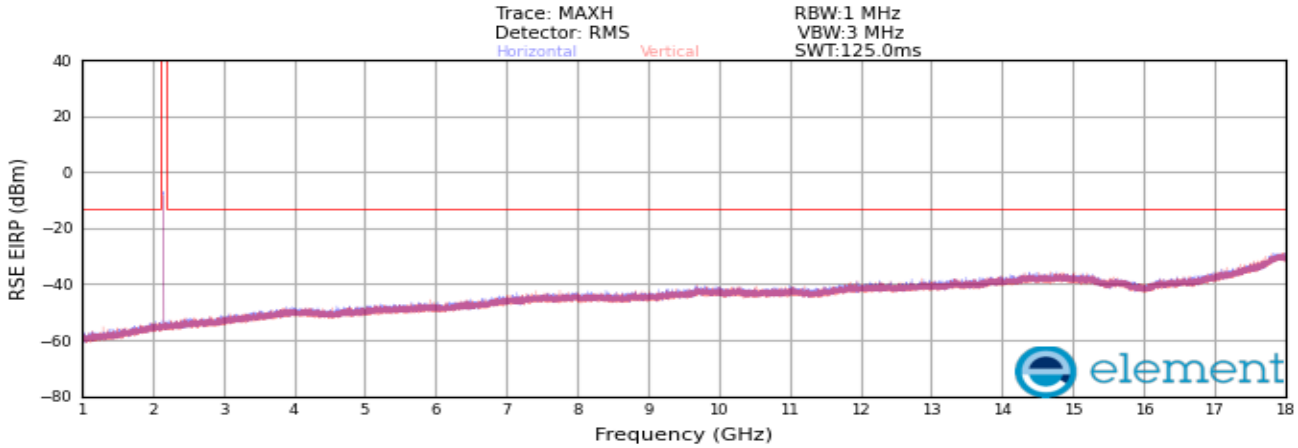
5. Spurious emissions were measured with all EUT antennas transmitting simultaneously and all antenna ports terminated.

6. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

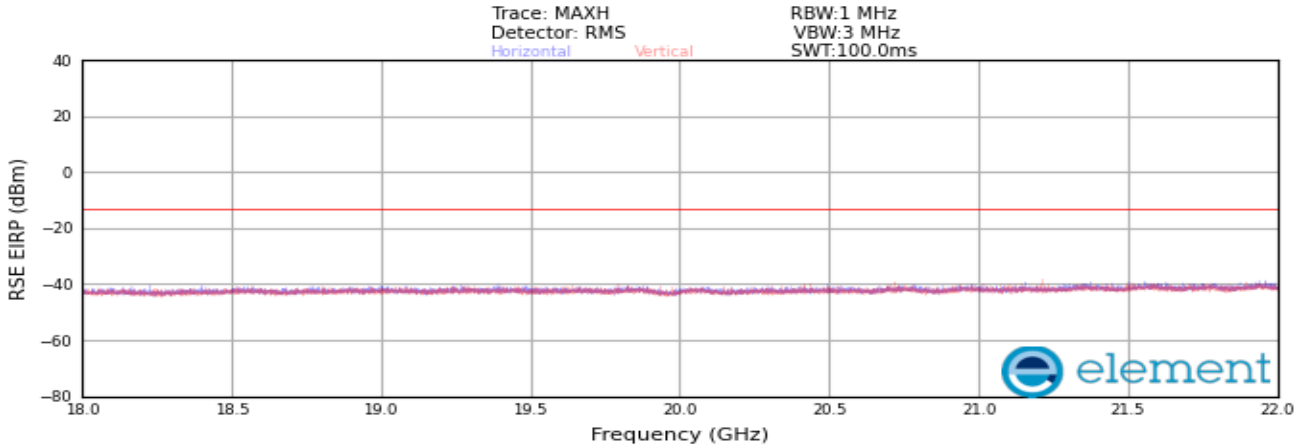
7. All modes of operation were investigated and the worst case configuration results are reported in this section.



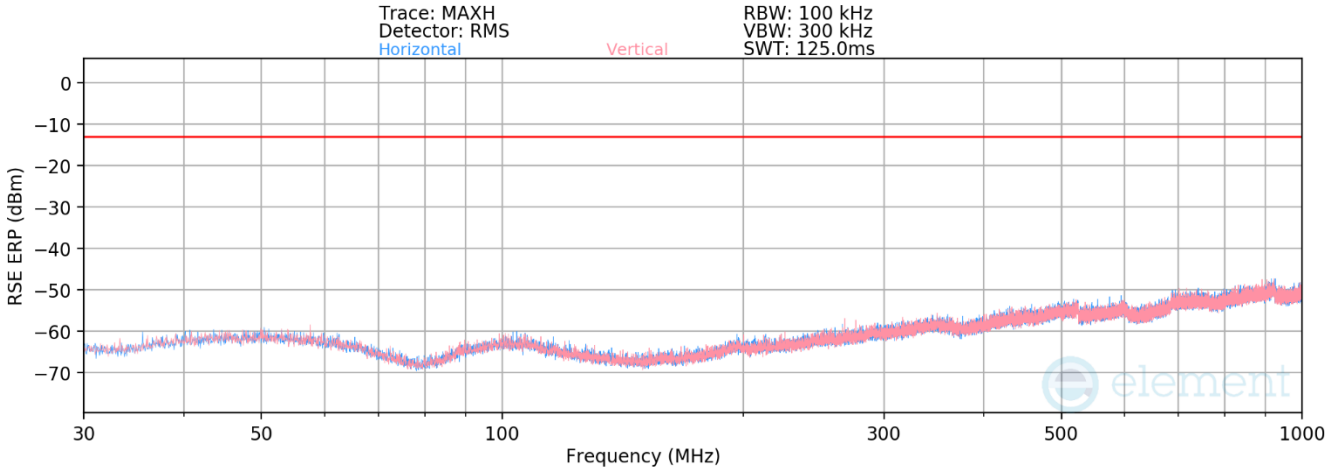
Plot 8-77. Radiated spurious emission_30 MHz to 1000 MHz (n66_1C_5M_Mid Channel)



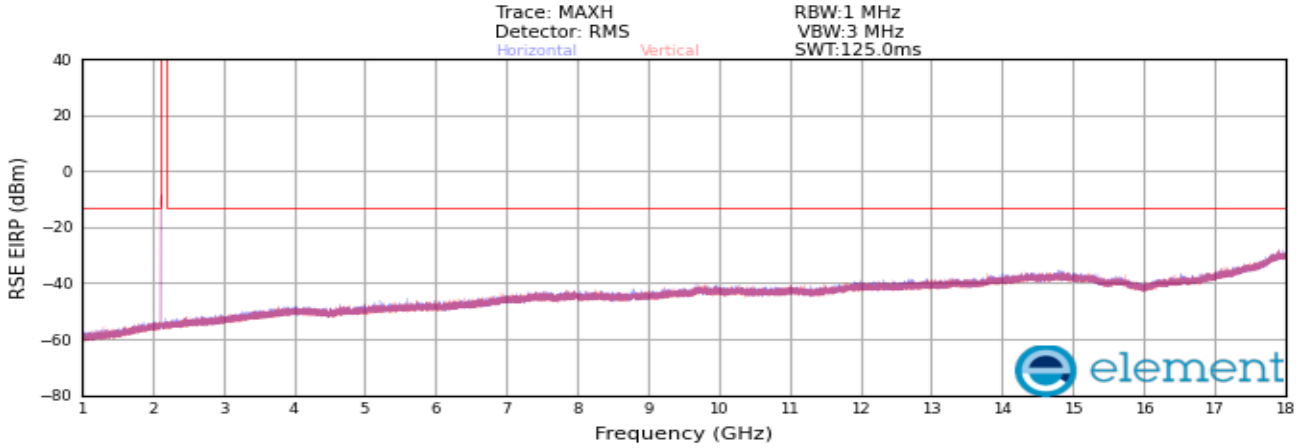
Plot 8-78. Radiated spurious emission_1 GHz to 18 GHz (n66_1C_5M_Mid Channel)



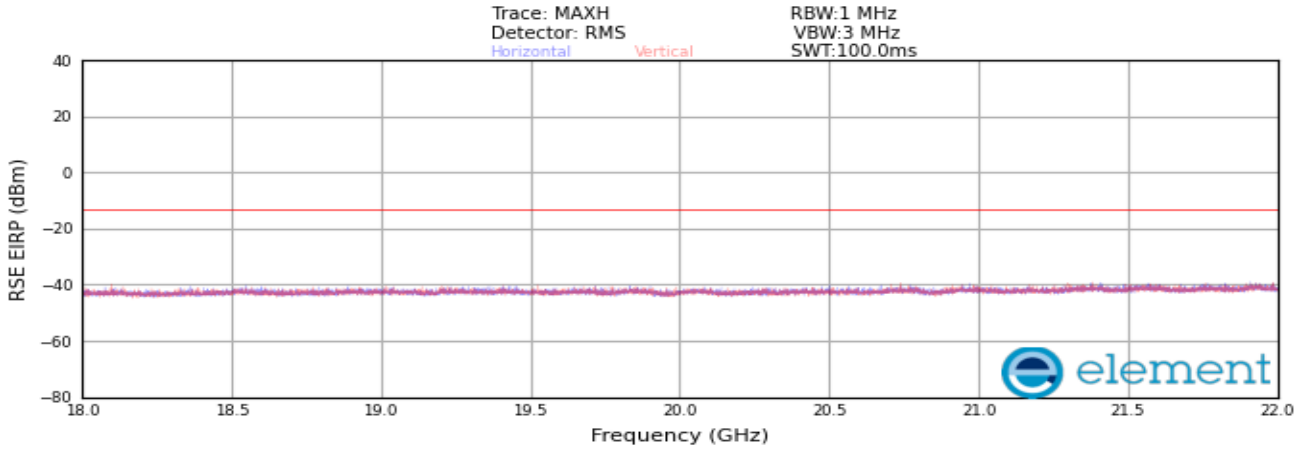
Plot 8-79. Radiated spurious emission_18 GHz to 22 GHz (n66_1C_5M_Mid Channel)



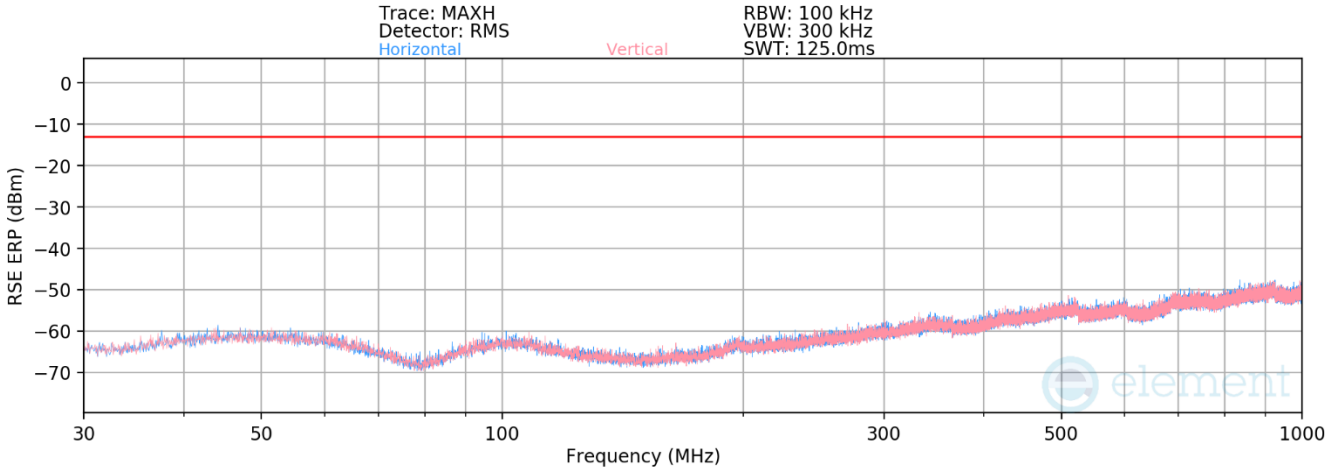
Plot 8-80. Radiated spurious emission_30 MHz to 1000 MHz (n66_1C_20M_Low Channel)



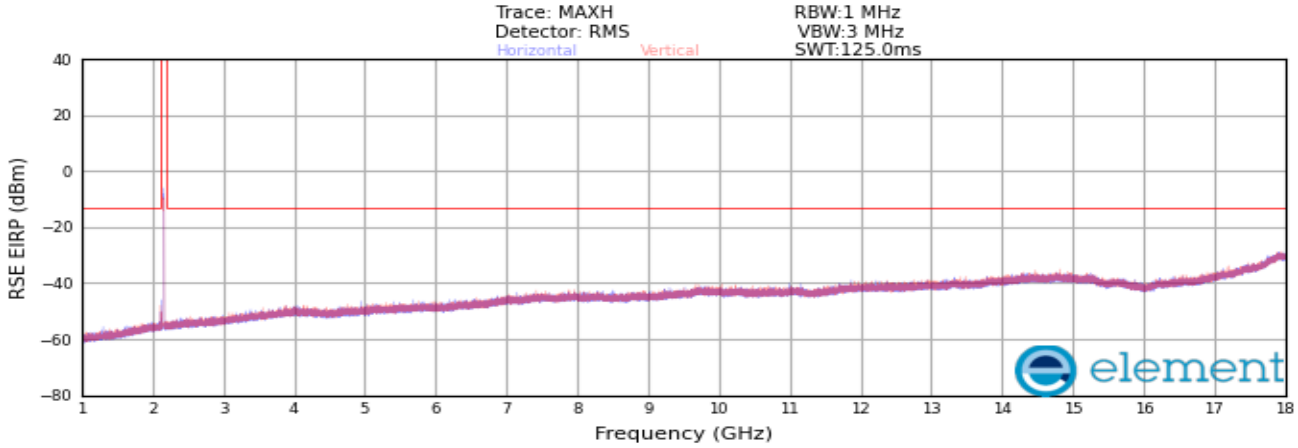
Plot 8-81. Radiated spurious emission Plot_1 GHz to 18 GHz (n66_1C_20M_Low Channel)



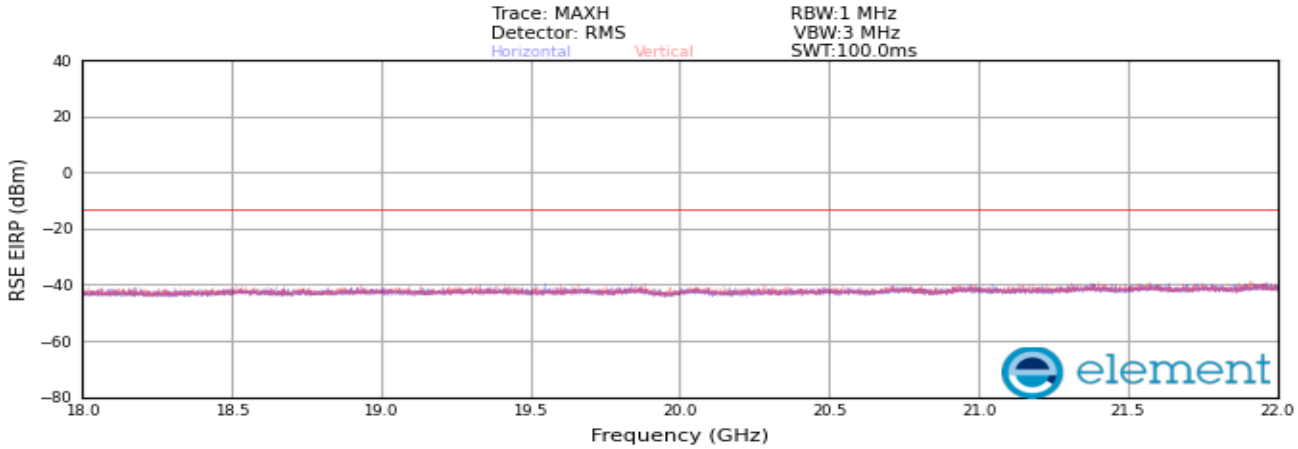
Plot 8-82. Radiated spurious emission Plot_18 GHz to 22 GHz (n66_1C_20M_Low Channel)



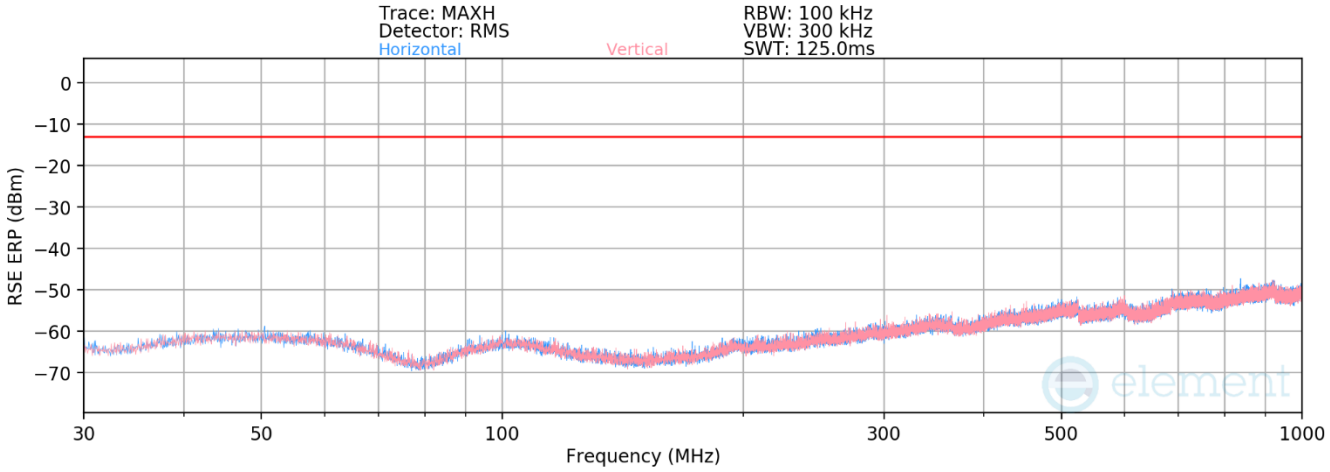
Plot 8-83. Radiated spurious emission_30 MHz to 1000 MHz (n66_1C_20M_Mid Channel)



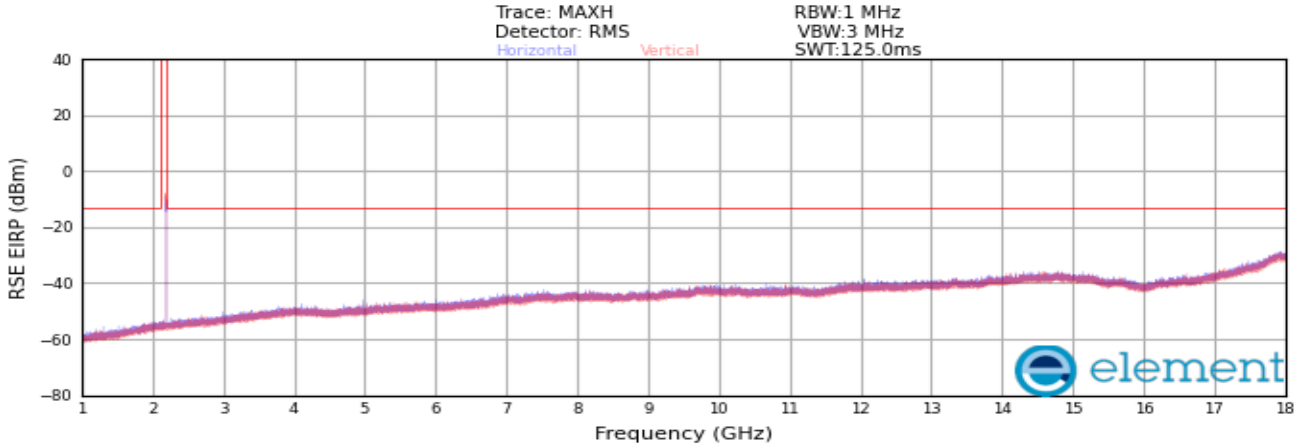
Plot 8-84. Radiated spurious emission Plot_1 GHz to 18 GHz (n66_1C_20M_Mid Channel)



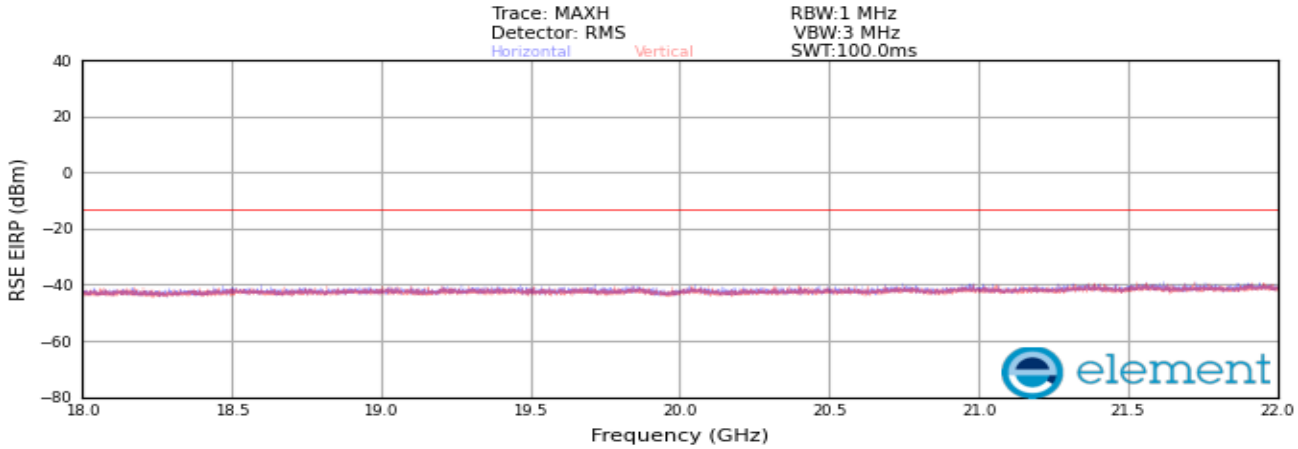
Plot 8-85. Radiated spurious emission Plot_18 GHz to 22 GHz (n66_1C_20M_Mid Channel)



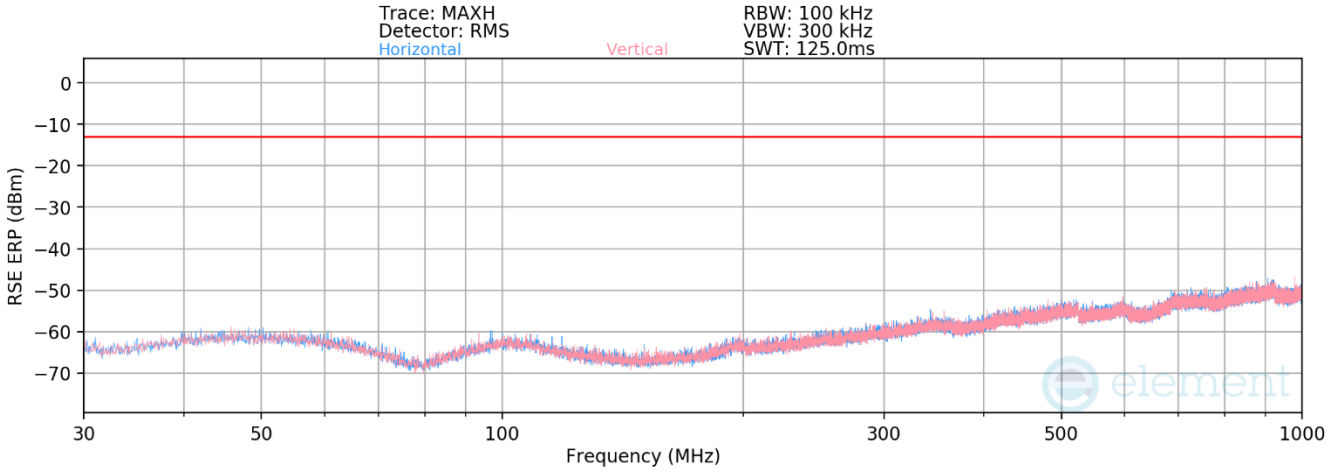
Plot 8-86. Radiated spurious emission_30 MHz to 1000 MHz (n66_1C_20M_High Channel)



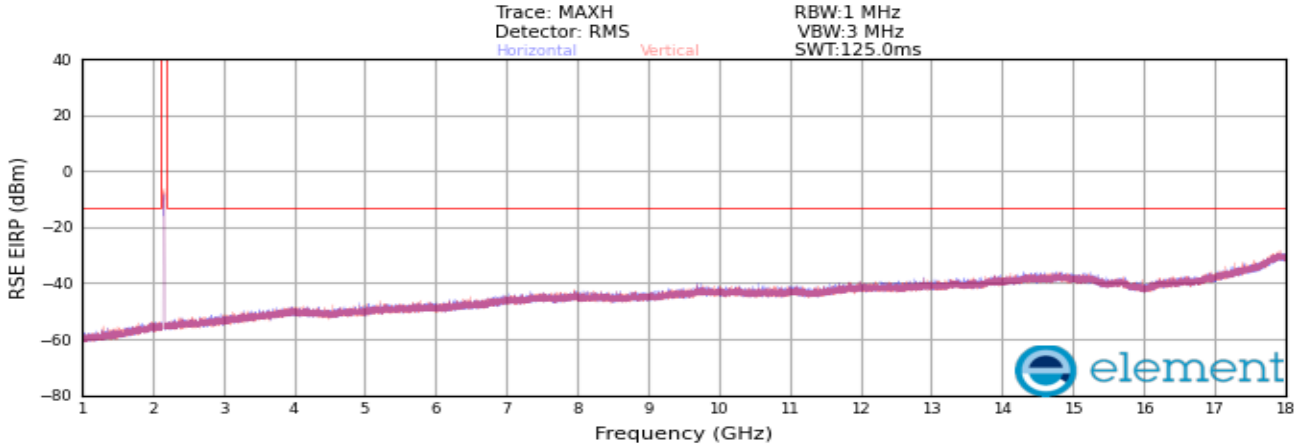
Plot 8-87. Radiated spurious emission Plot_1 GHz to 18 GHz (n66_1C_20M_High Channel)



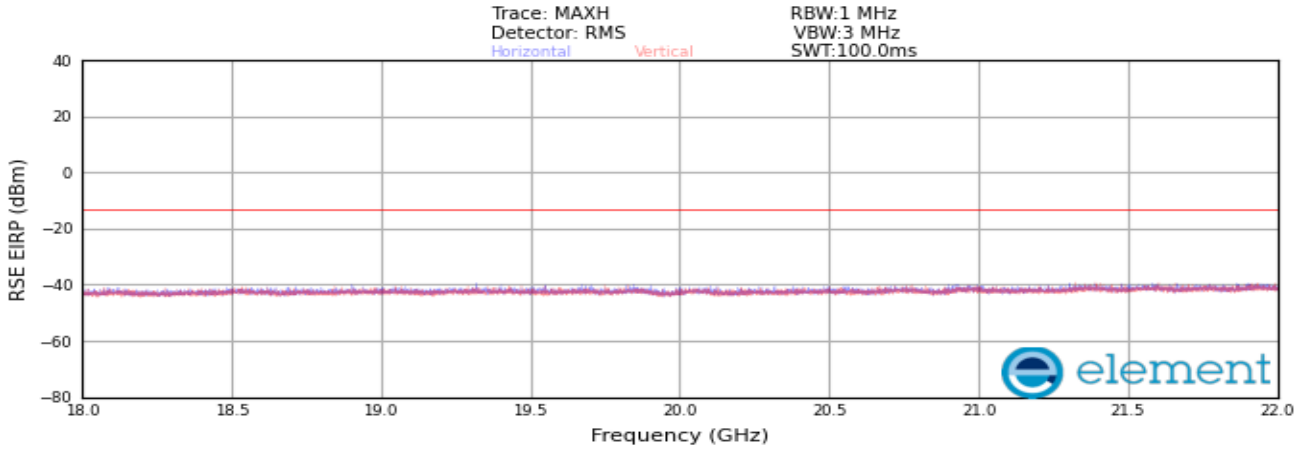
Plot 8-88. Radiated spurious emission Plot_18 GHz to 22 GHz (n66_1C_20M_High Channel)



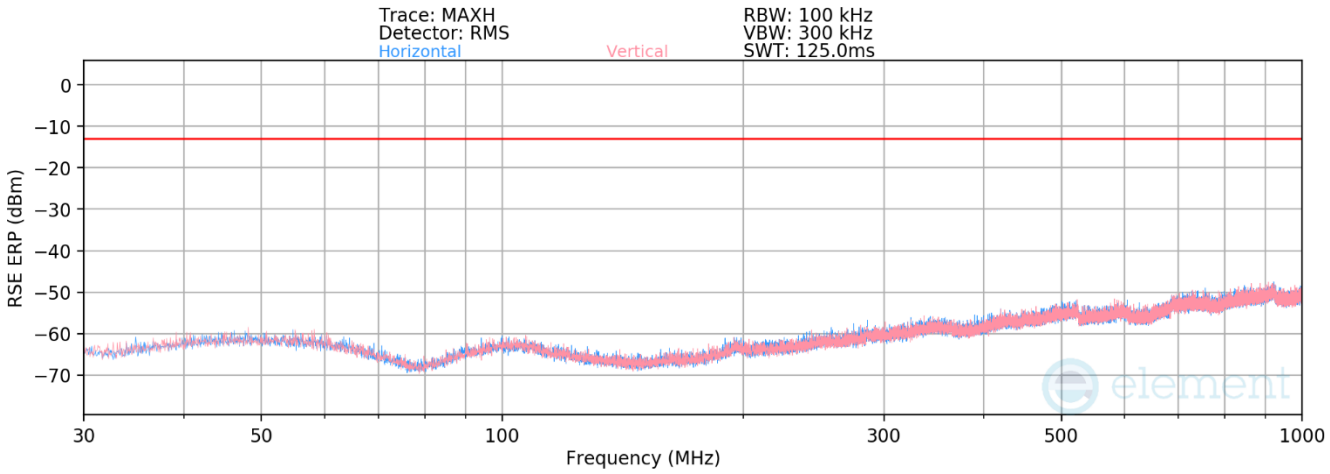
Plot 8-89. Radiated spurious emission_30 MHz to 1000 MHz (n66_2C_5M+20M_Mid Channel)



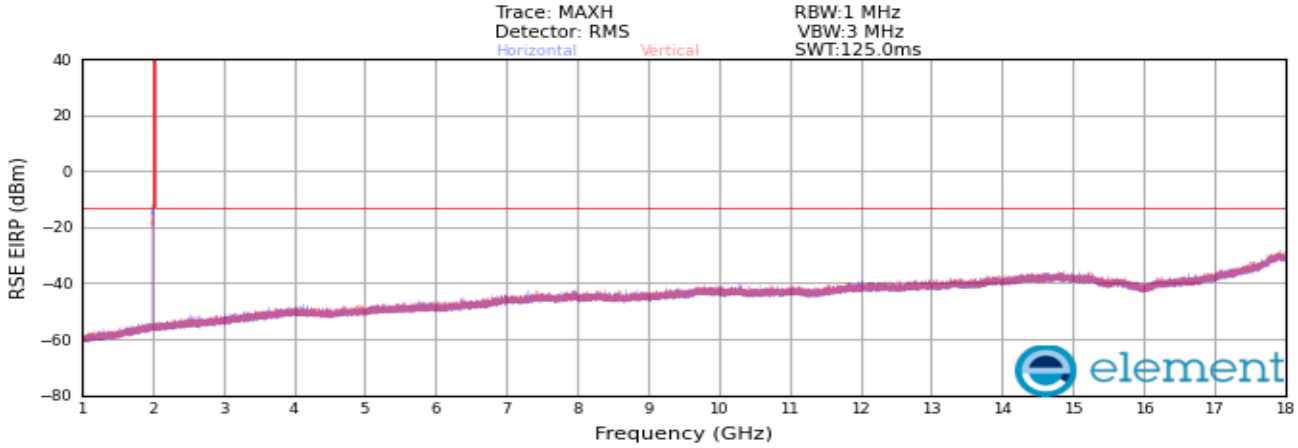
Plot 8-90. Radiated spurious emission Plot_1 GHz to 18 GHz (n66_2C_5M+20M_Mid Channel)



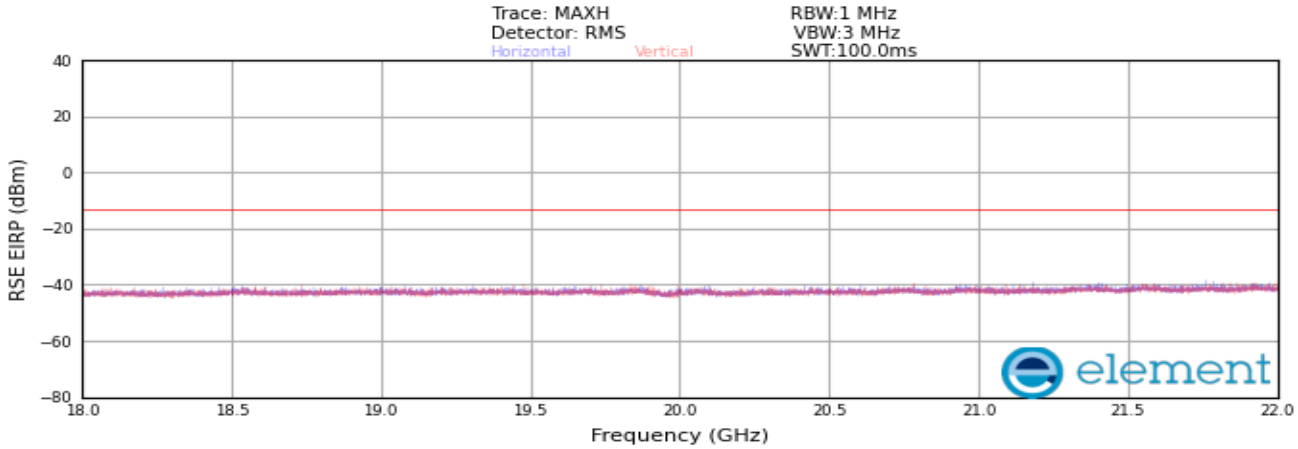
Plot 8-91. Radiated spurious emission Plot_18 GHz to 22 GHz (n66_2C_5M+20M_Mid Channel)



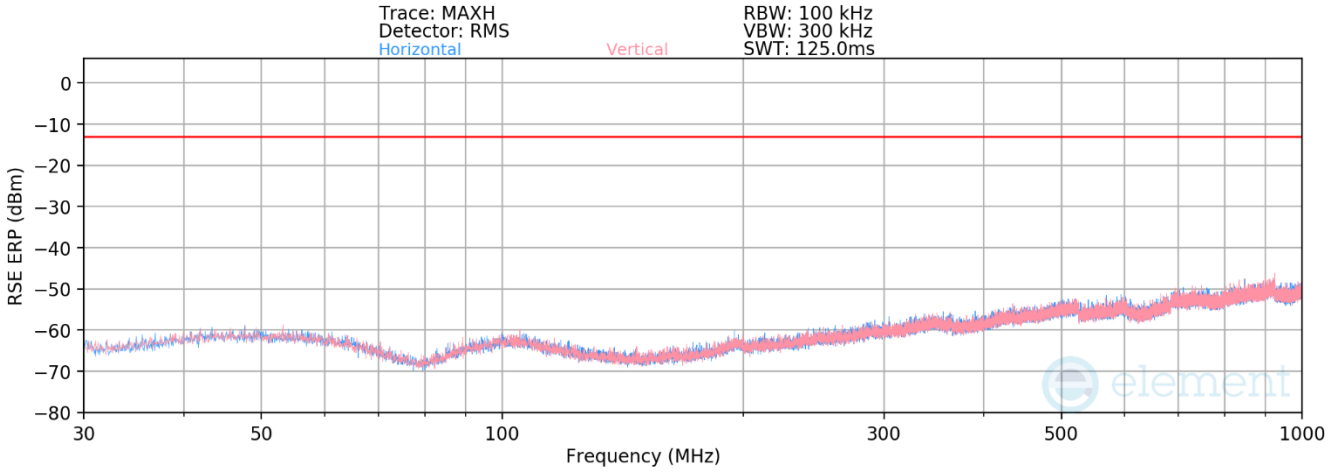
Plot 8-92. Radiated spurious emission_30 MHz to 1000 MHz (n70_1C_25M_Mid Channel)



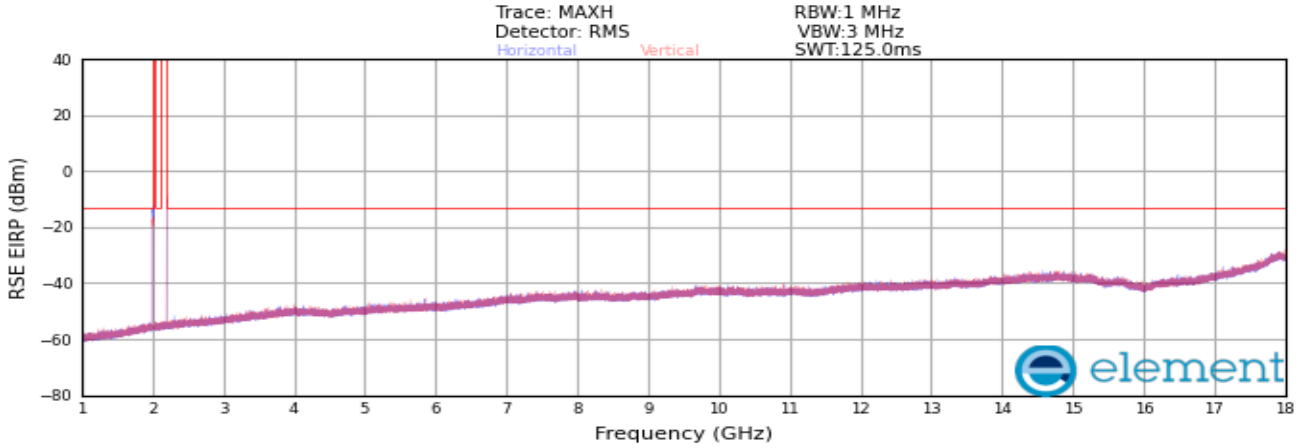
Plot 8-93. Radiated spurious emission Plot_1 GHz to 18 GHz (n70_1C_25M_Mid Channel)



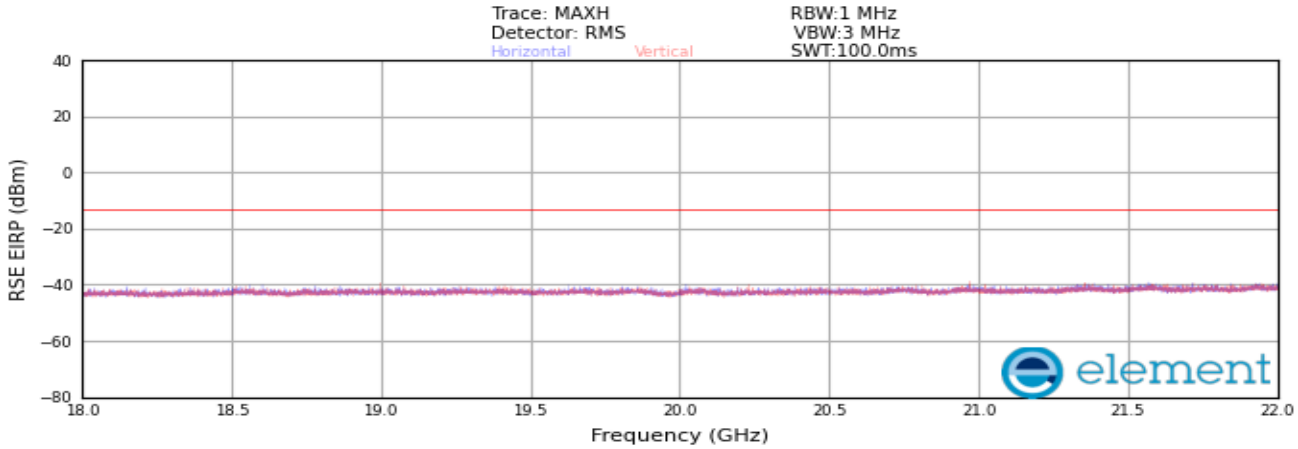
Plot 8-94. Radiated spurious emission Plot_18 GHz to 22 GHz (n70_1C_25M_Mid Channel)



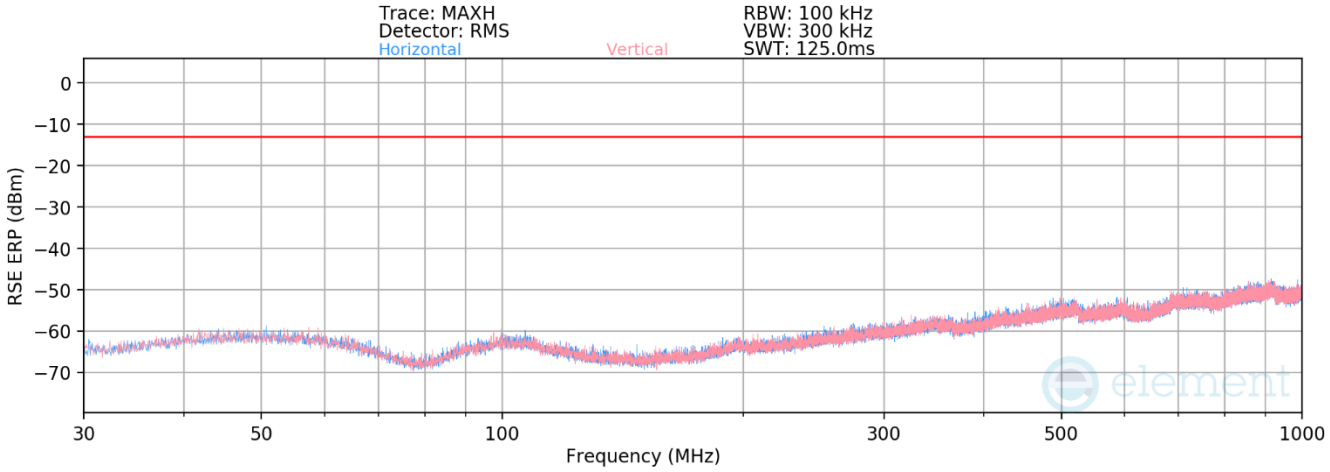
Plot 8-95. Radiated spurious emission_30 MHz to 1000 MHz (n70+n66_2C_25M+5M_Inter-Band Carrier Aggregation)



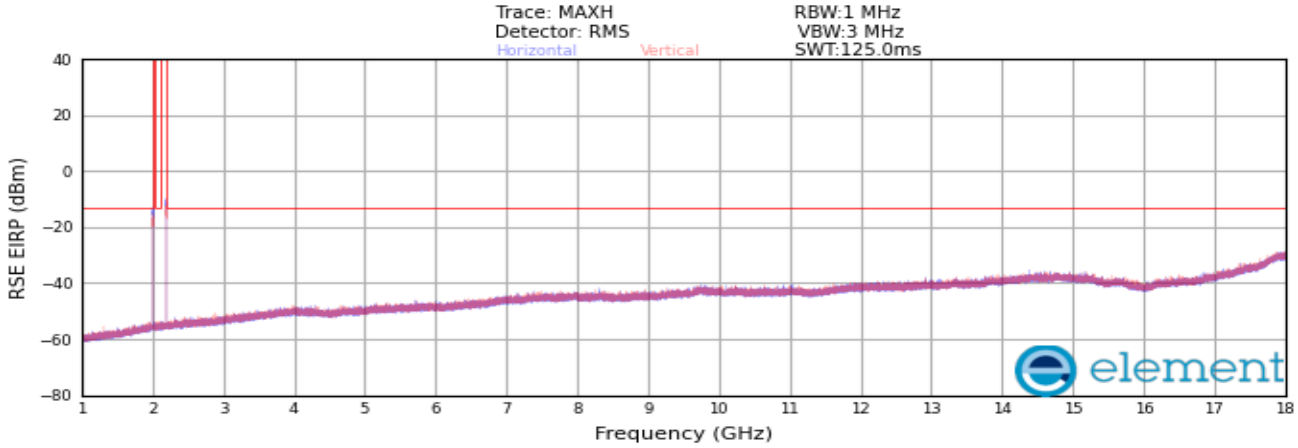
Plot 8-96. Radiated spurious emission Plot_1 GHz to 18 GHz (n70+n66_2C_25M+5M_Inter-Band Carrier Aggregation)



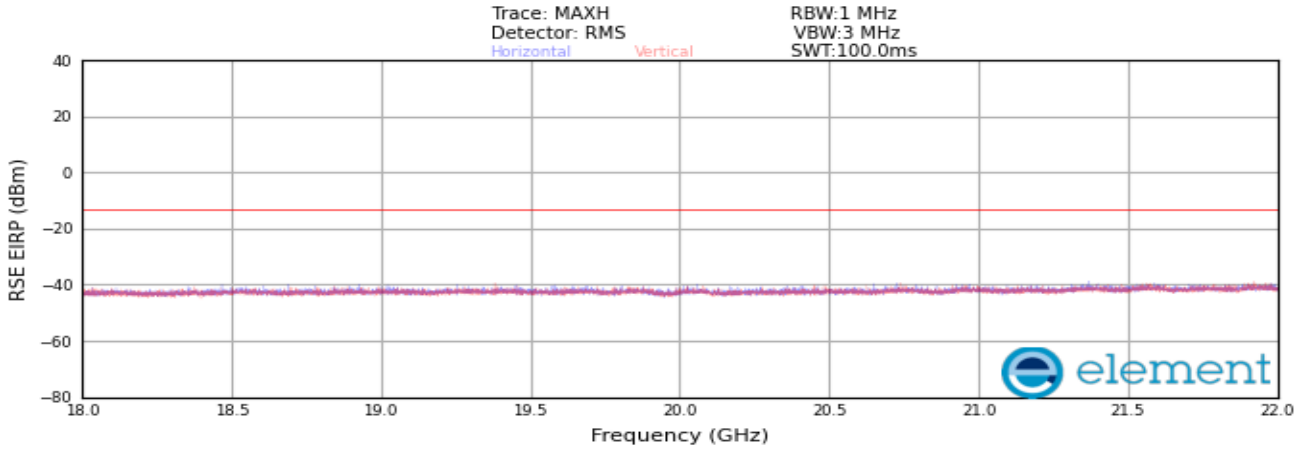
Plot 8-97. Radiated spurious emission Plot_18 GHz to 22 GHz (n70+n66_2C_25M+5M_Inter-Band Carrier Aggregation)



Plot 8-98. Radiated spurious emission_30 MHz to 1000 MHz (n70+n66_2C_25M+20M_Inter-Band Carrier Aggregation)



Plot 8-99. Radiated spurious emission Plot_1 GHz to 18 GHz (n70+n66_2C_25M+20M_Inter-Band Carrier Aggregation)



Plot 8-100. Radiated spurious emission Plot_18 GHz to 22 GHz (n70+n66_2C_25M+20M_Inter-Band Carrier Aggregation)

Bandwidth (MHz):	n70+n66_2C_25 MHz + 5 MHz
Center Frequency (MHz):	2007.5 MHz + 2197.5 MHz
Modulation Signal:	QPSK

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Heigh [cm]	Turntable azimuth [degree]	Analyzer Level [dBm/MHz]	AFCL [dBm]	Field Strength [dBµV/m]	RSE EIRP [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]
928.74	H	100	10	-85.29	25.44	47.15	-48.11	-13	-35.11
929.91	V	100	340	-86.65	25.45	45.80	-49.45	-13	-36.45
17881.88	H	200	50	-76.92	34.14	64.22	-31.04	-13	-18.04
17883.47	V	150	200	-76.38	34.14	64.76	-30.49	-13	-17.49

Table 8-26. Radiated spurious emission Worst case Summary Data (n70+n66_2C_25M+5M_Inter-Band Carrier Aggregation)

9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung RRU(RF4451d) FCC ID: A3LRF4451D-70A** complies with all of the requirements of Part 27 FCC Rules.

10.0 APPENDIX. A

10.1 Conducted Average Output Power

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
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements
ANSI C63.26-2015 – Section 5.2.4.4.1

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. RBW = 1 ~ 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Span = 2 ~ 3 x OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger Settings is set to "RF Power" for signals with non-continuous operation with the sweep times set to "auto". Refer test note 3 for details.
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.

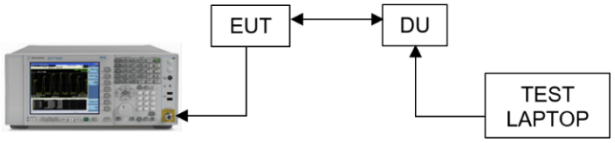


Figure 10-1. Test Instrument & Measurement Setup

Limit

N/A

Note

1. Conducted Average Output Power test result used to Grant of Authorization power and MPE.

2. 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.

3. Consider the following factors for MIMO Power:
   Conducted power for each port is measured in dBm.
   Powers are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01-Section D.
   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).

4. Sample Calculation:
   Let us assume the following numbers:
   a) Total MIMO Conducted Power as 81863.59 mW
   b)

Factors		Value	Unit
Summed MIMO Conducted Power (linear sum)		81863.59	mW
Summed MIMO Conducted Power (dBm)	= 10 * log (81863.59) =	49.13	dBm

Channel	Port	QPSK	16QAM	64QAM	256QAM
Low	0	42.59	42.46	42.55	42.50
	1	42.78	42.65	42.47	42.43
	2	42.73	42.58	42.49	42.57
	3	42.80	42.70	42.46	42.49
	Total Conducted Power (mW)	74926.77	72761.75	71010.74	71094.90
	Total Conducted Power(dBm)	48.75	48.62	48.51	48.52
Mid	0	**42.86**	42.65	42.42	42.86
	1	**42.90**	42.84	42.68	42.86
	2	**43.03**	43.07	42.80	43.04
	3	**43.17**	43.15	42.92	43.11
	Total Conducted Power (mW)	**79658.19**	78569.27	74636.59	79241.06
	Total Conducted Power(dBm)	**49.01**	48.95	48.73	48.99
High	0	42.67	42.95	43.00	**42.96**
	1	42.61	42.83	42.84	**42.83**
	2	43.18	43.35	43.31	**43.31**
	3	43.05	43.26	43.23	**43.32**
	Total Conducted Power (mW)	77712.27	81721.71	81650.23	**81863.59**
	Total Conducted Power(dBm)	48.90	49.12	49.12	**49.13**

Table 10-1. Conducted Average Output Power Table (NR_n66_1C_5M)

Channel	Port	QPSK	16QAM	64QAM	256QAM
Low	0	47.44	**47.90**	47.49	47.54
	1	47.45	**47.95**	47.27	47.20
	2	47.53	**47.94**	47.62	47.66
	3	47.50	**48.06**	47.61	47.60
	Total Conducted Power (mW)	223911.06	**250236.50**	224924.54	225123.71
	Total Conducted Power(dBm)	53.50	**53.98**	53.52	53.52
Mid	0	47.50	47.52	47.52	47.38
	1	47.34	47.33	47.31	47.22
	2	47.67	47.66	47.64	47.65
	3	47.81	47.70	47.68	47.67
	Total Conducted Power (mW)	229308.09	227798.01	227010.93	224113.91
	Total Conducted Power(dBm)	53.60	53.58	53.56	53.50
High	0	**47.66**	47.68	47.70	47.70
	1	**47.38**	47.39	47.34	47.39
	2	**47.85**	47.91	47.90	47.92
	3	**47.74**	47.76	47.81	47.85
	Total Conducted Power (mW)	**233429.01**	234946.68	235138.82	236609.86
	Total Conducted Power(dBm)	**53.68**	53.71	53.71	53.74

Table 10-2. Conducted Average Output Power Table (NR_n66_1C_20M)

Channel	Port	QPSK	16QAM	64QAM	256QAM
Low	0	47.59	47.61	47.48	47.43
	1	47.22	47.26	47.15	47.14
	2	47.62	47.65	47.29	47.65
	3	47.58	47.59	47.26	47.57
	Total Conducted Power (mW)	225223.84	226509.44	214646.26	222453.88
	Total Conducted Power(dBm)	53.53	53.55	53.32	53.47
Mid	0	47.42	47.45	47.48	47.46
	1	47.24	47.27	47.27	47.24
	2	47.71	47.67	47.67	47.81
	3	47.76	47.65	47.65	47.83
	Total Conducted Power (mW)	226897.72	225613.25	225998.58	229753.42
	Total Conducted Power(dBm)	53.56	53.53	53.54	53.61
High	0	**47.78**	47.59	**47.61**	47.39
	1	**47.41**	47.27	**47.24**	47.21
	2	**48.08**	47.80	**47.82**	47.51
	3	**48.10**	47.68	**47.70**	47.48
	Total Conducted Power (mW)	**243894.07**	229614.91	**230061.44**	219768.95
	Total Conducted Power(dBm)	**53.87**	53.61	**53.62**	53.42

Table 10-3. Conducted Average Output Power Table (NR_n66_2C_5M+20M)

Channel	Port	QPSK	16QAM	64QAM	256QAM
Mid	0	**46.03**	45.99	**46.03**	46.05
	1	**45.65**	45.59	**45.63**	45.68
	2	**45.63**	45.62	**45.64**	45.56
	3	**45.86**	45.81	**45.85**	45.69
	Total Conducted Power (mW)	**151922.22**	150525.43	**151749.09**	150297.53
	Total Conducted Power(dBm)	**51.82**	51.78	**51.81**	51.77

Table 10-4. Conducted Average Output Power Table (NR_n70_1C_25M)