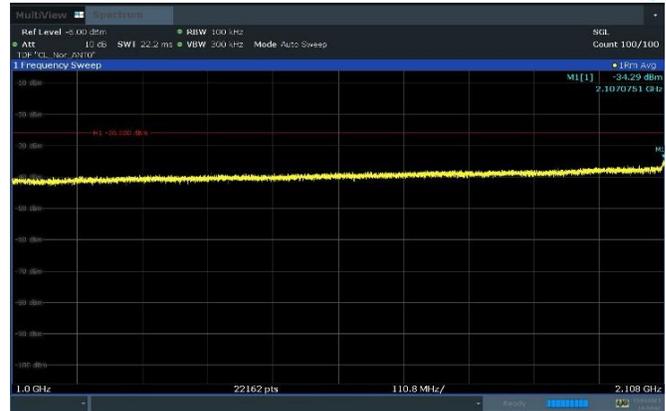


Plot 8-158. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)



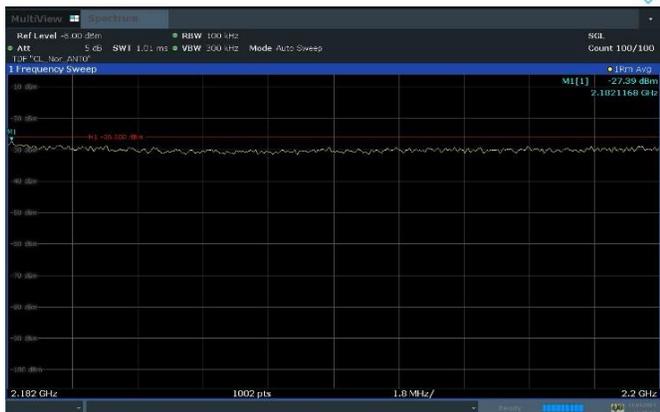
Plot 8-159. Conducted Spurious Emission Plot
1 GHz to 2.108 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)



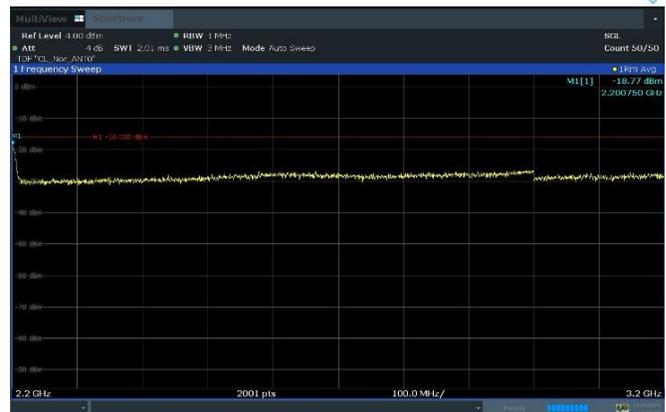
Plot 8-160. Conducted Spurious Emission Plot
2.108 MHz to 2.109 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)



Plot 8-161. Conducted Spurious Emission Plot
2.181 GHz to 2.182 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)

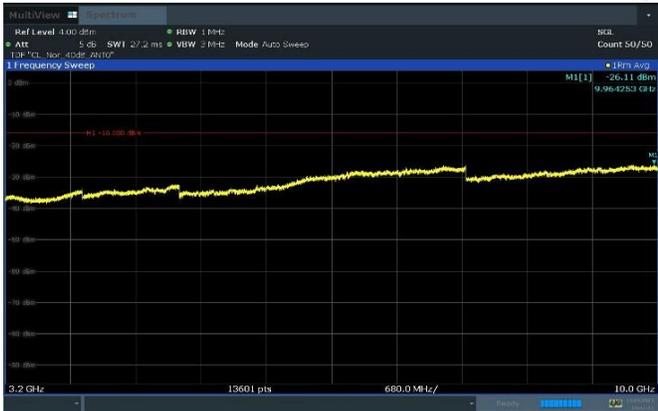


Plot 8-162. Conducted Spurious Emission Plot
2.182 MHz to 2.2 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)

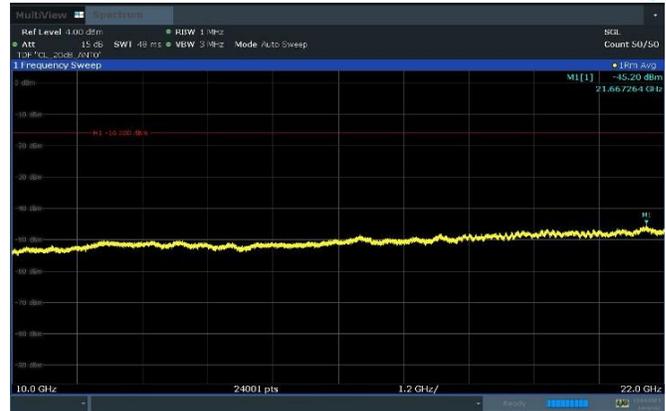


Plot 8-163. Conducted Spurious Emission Plot
2.2 GHz to 3.2 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 88 of 114



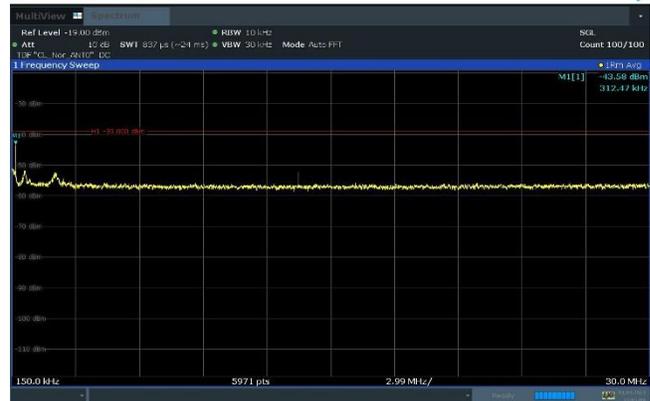
Plot 8-164. Conducted Spurious Emission Plot
3.2 GHz to 10 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)



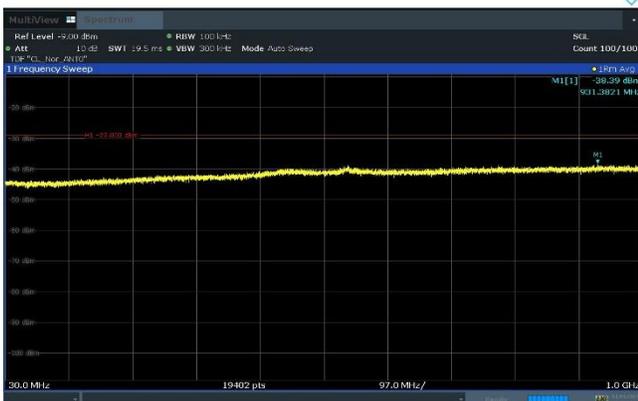
Plot 8-165. Conducted Spurious Emission Plot
10 GHz to 22 GHz
(n66/B66_3NC_NR_25M+LTE_10M+NR_5M_2T_QPSK,
Port 0)



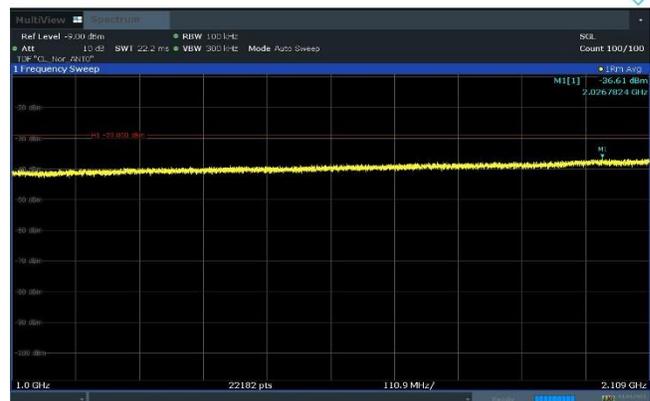
Plot 8-166. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)



Plot 8-167. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)

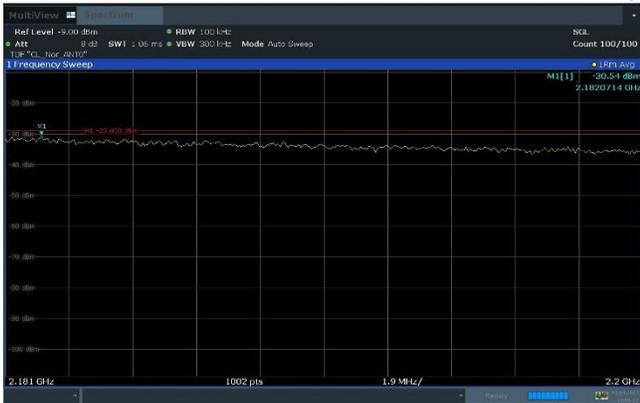


Plot 8-168. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)

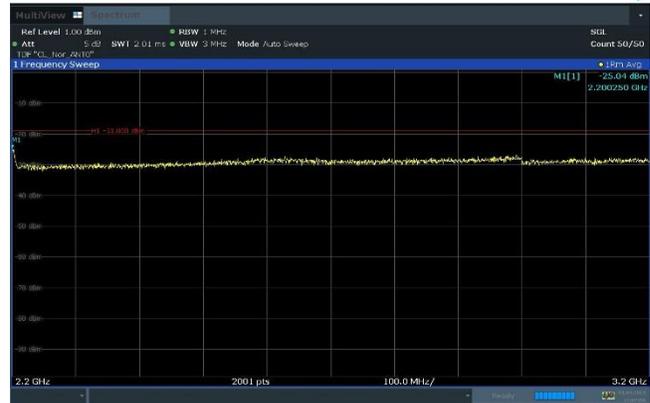


Plot 8-169. Conducted Spurious Emission Plot
1 GHz to 2.109 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: BK24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 89 of 114



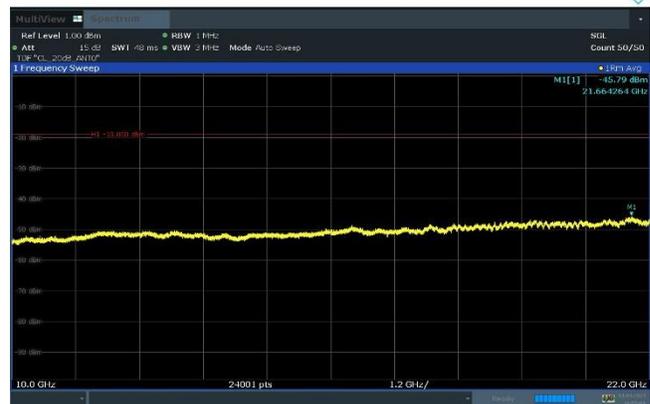
Plot 8-170. Conducted Spurious Emission Plot
2.181 MHz to 2.2 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)



Plot 8-171. Conducted Spurious Emission Plot
2.2 GHz to 3.2 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)



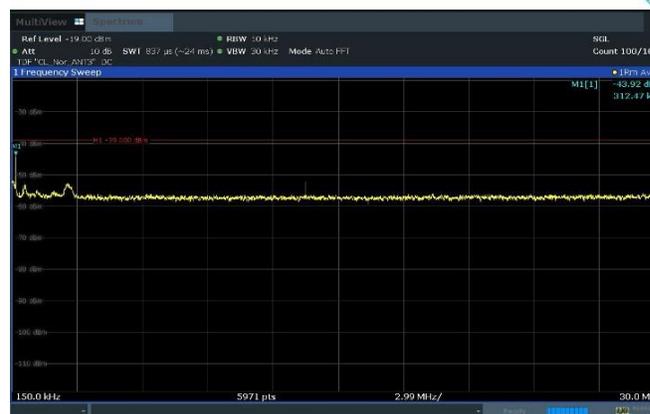
Plot 8-172. Conducted Spurious Emission Plot
3.2 GHz to 10 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)



Plot 8-173. Conducted Spurious Emission Plot
10 GHz to 22 GHz
(n66_1C_25M_4T_QPSK - High Channel, Port 0)

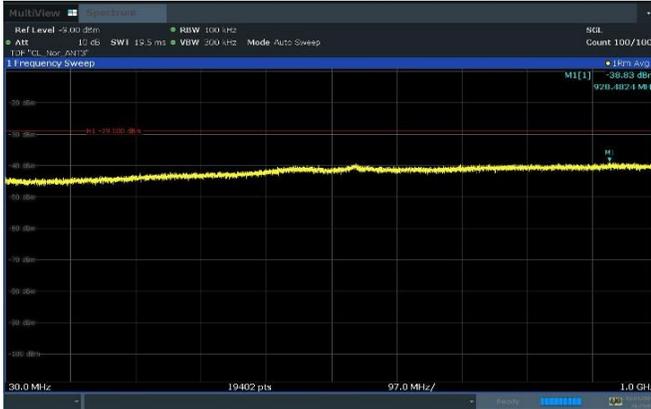


Plot 8-174. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)

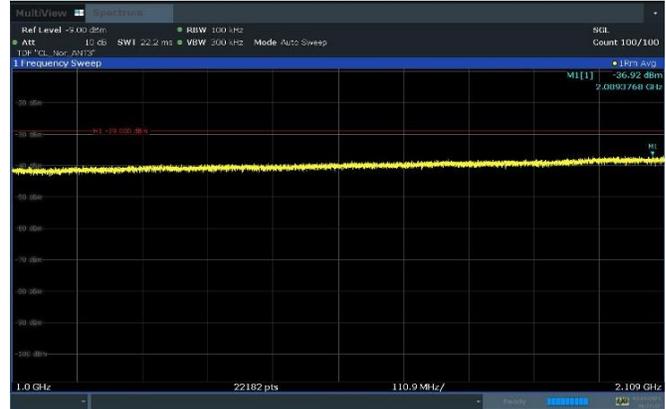


Plot 8-175. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)

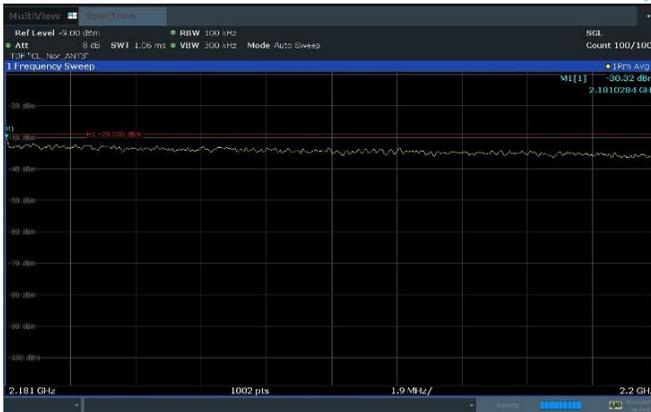
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 90 of 114



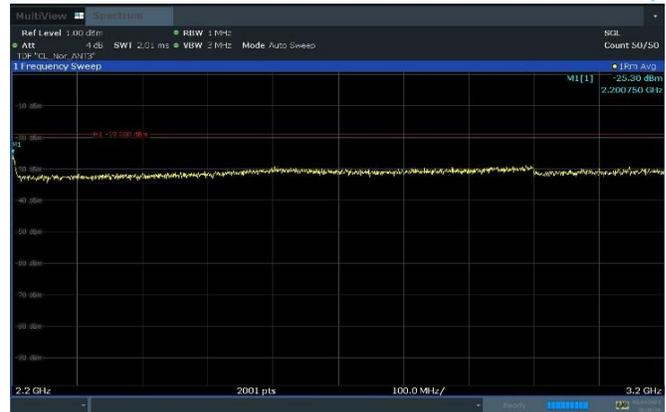
Plot 8-176. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)



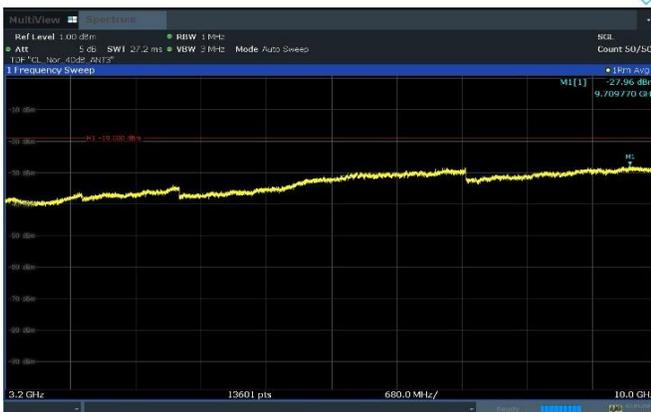
Plot 8-177. Conducted Spurious Emission Plot
1 GHz to 2.109 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)



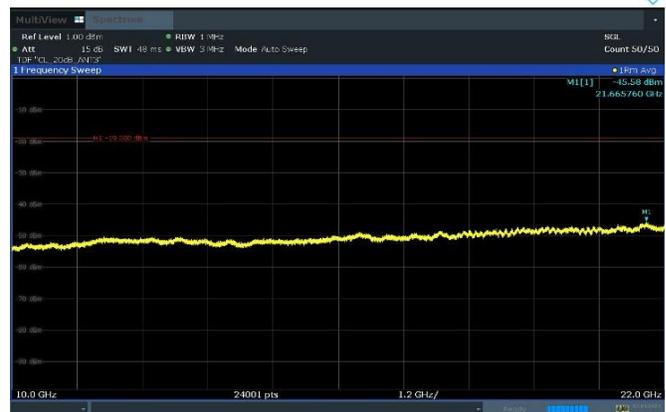
Plot 8-178. Conducted Spurious Emission Plot
2.181 MHz to 2.2 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)



Plot 8-179. Conducted Spurious Emission Plot
2.2 GHz to 3.2 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)



Plot 8-180. Conducted Spurious Emission Plot
3.2 GHz to 10 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)

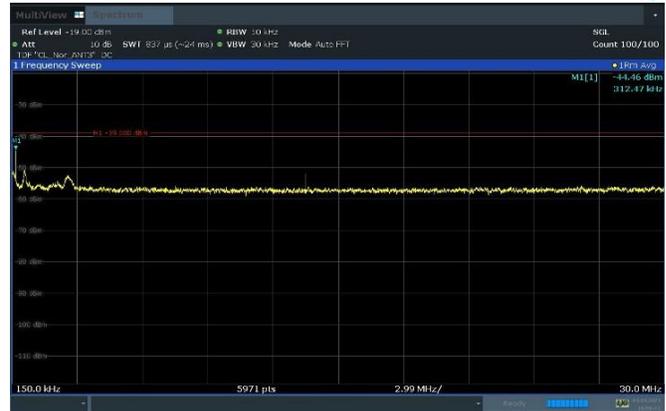


Plot 8-181. Conducted Spurious Emission Plot
10 GHz to 22 GHz
(n66_1C_30M_4T_QPSK - High Channel, Port 3)

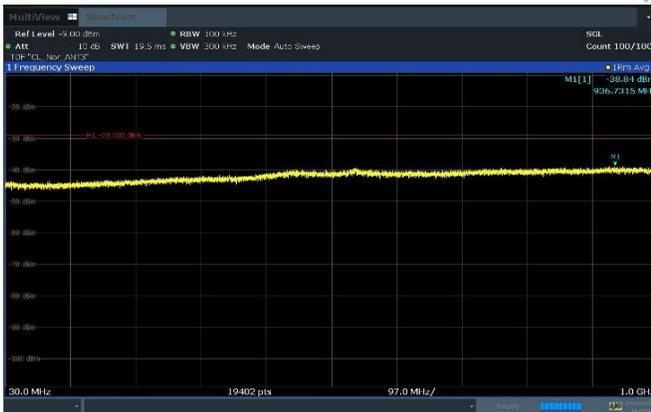
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 91 of 114



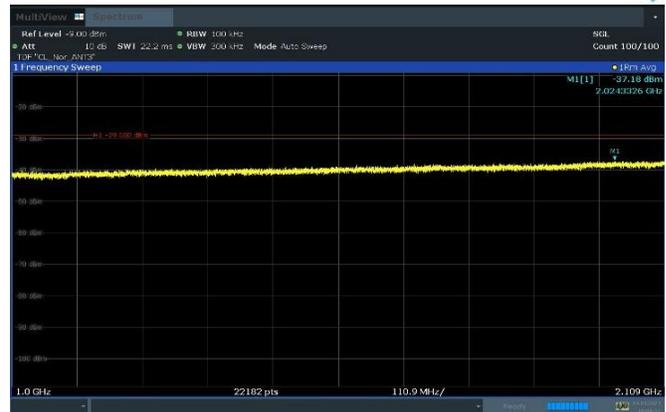
Plot 8-182. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



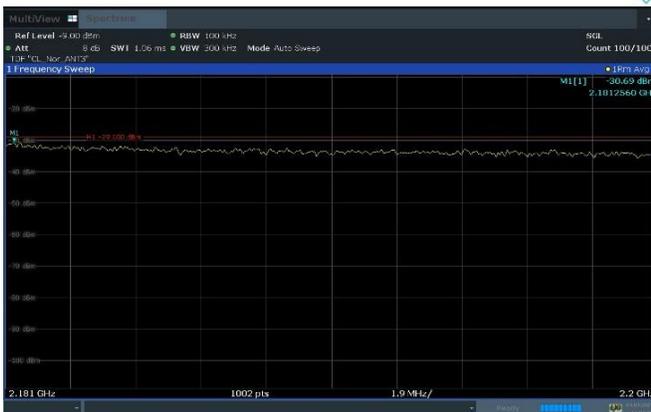
Plot 8-183. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



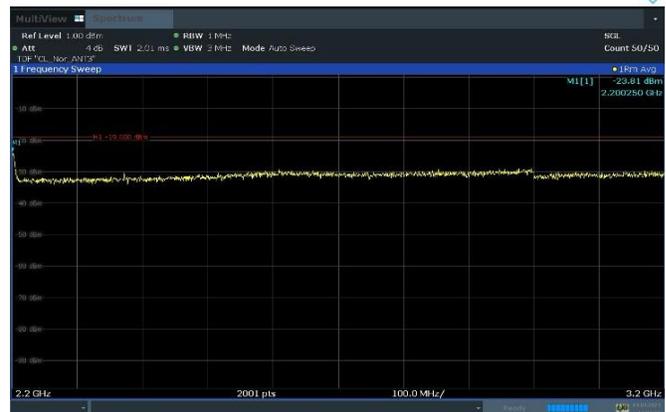
Plot 8-184. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



Plot 8-185. Conducted Spurious Emission Plot
1 GHz to 2.109 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



Plot 8-186. Conducted Spurious Emission Plot
2.181 MHz to 2.2 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)

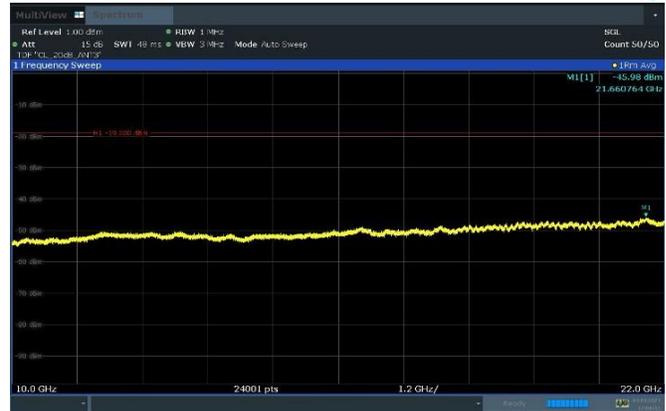


Plot 8-187. Conducted Spurious Emission Plot
2.2 GHz to 3.2 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)

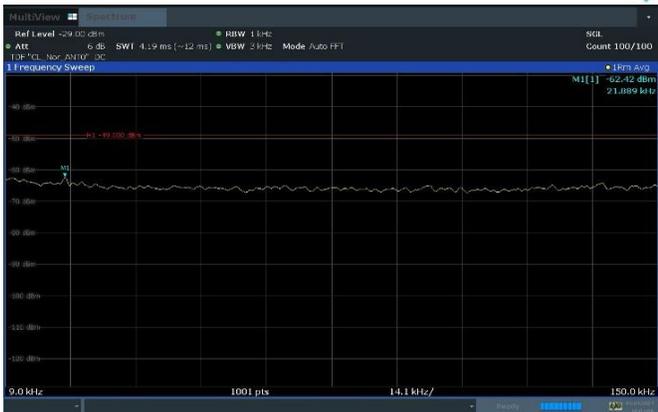
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 92 of 114



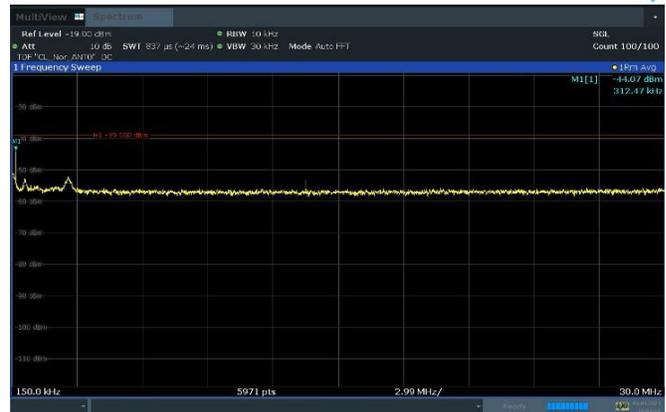
Plot 8-188. Conducted Spurious Emission Plot
3.2 GHz to 10 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



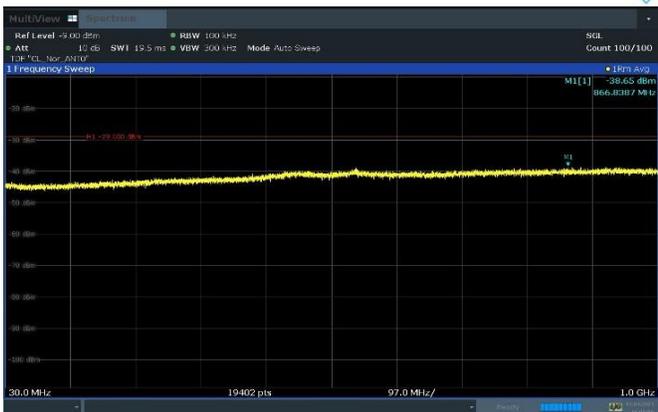
Plot 8-189. Conducted Spurious Emission Plot
10 GHz to 22 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_QAM -
High Channel, Port 3)



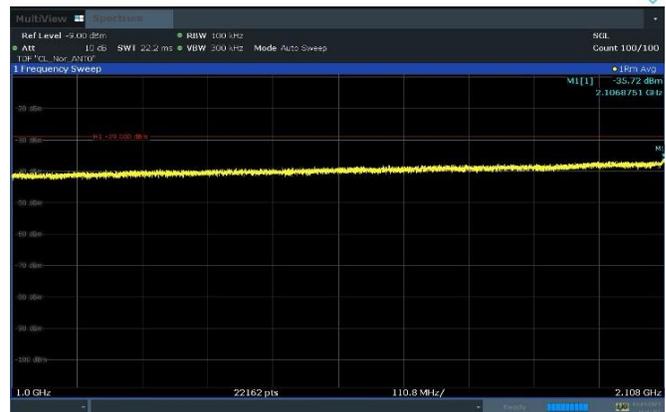
Plot 8-190. Conducted Spurious Emission Plot
9 kHz to 150 kHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



Plot 8-191. Conducted Spurious Emission Plot
150 kHz to 30 MHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)

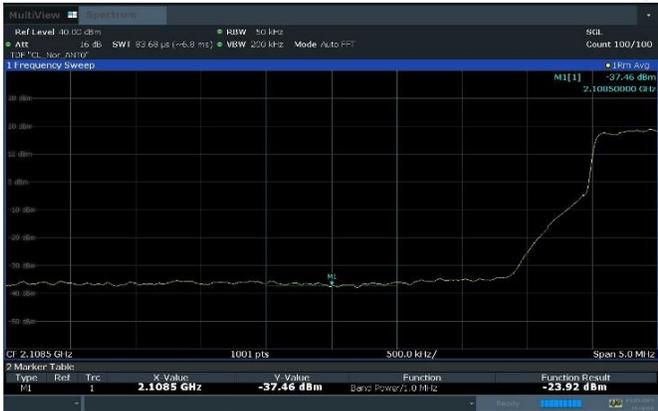


Plot 8-192. Conducted Spurious Emission Plot
30 MHz to 1 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



Plot 8-193. Conducted Spurious Emission Plot
1 GHz to 2.108 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 93 of 114



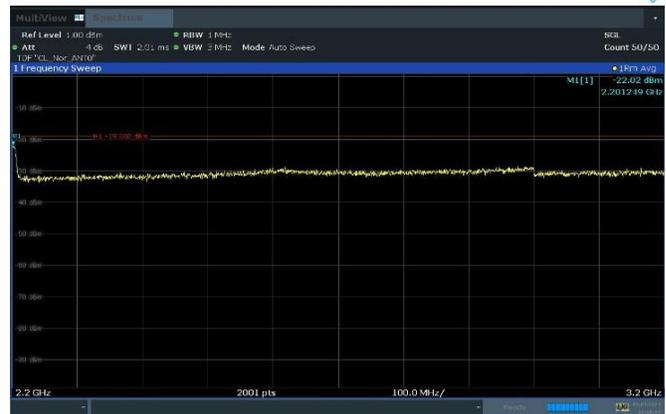
Plot 8-194. Conducted Spurious Emission Plot
2.108 MHz to 2.109 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



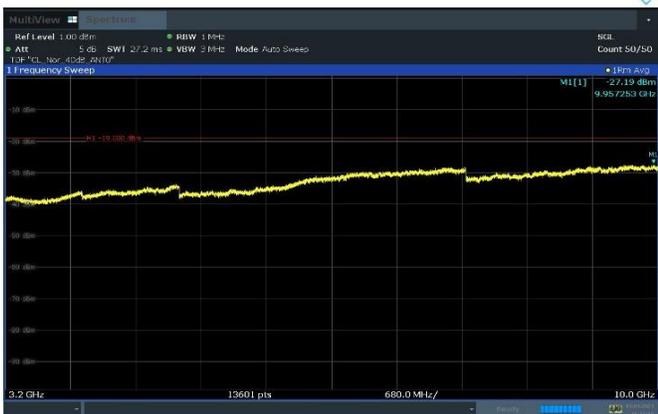
Plot 8-195. Conducted Spurious Emission Plot
2.181 GHz to 2.182 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



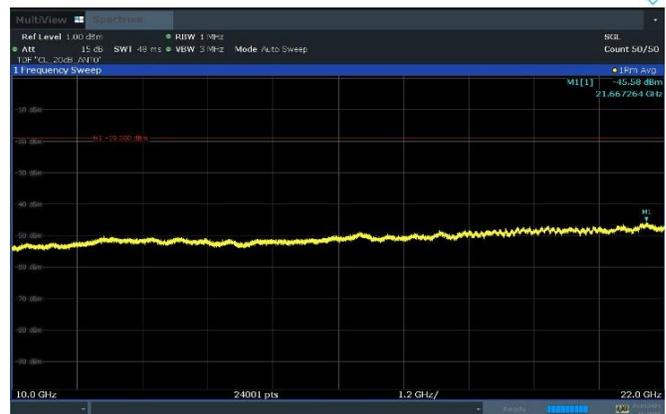
Plot 8-196. Conducted Spurious Emission Plot
2.182 MHz to 2.2 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



Plot 8-197. Conducted Spurious Emission Plot
2.2 GHz to 3.2 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



Plot 8-198. Conducted Spurious Emission Plot
3.2 GHz to 10 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)



Plot 8-199. Conducted Spurious Emission Plot
10 GHz to 22 GHz
(n66/B66_3NC_NR_25M+10M+5M_4T_QPSK , Port 0)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 94 of 114

8.7 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 $\geq 3 \times$ RBW
4. No. of sweep points $\geq 2 \times$ 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

Band(n) 2 operation under Part 24

§ 24.238

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

Band(n) 66 operation under Part 27

§ 27.53

(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 95 of 114

Test Setup

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

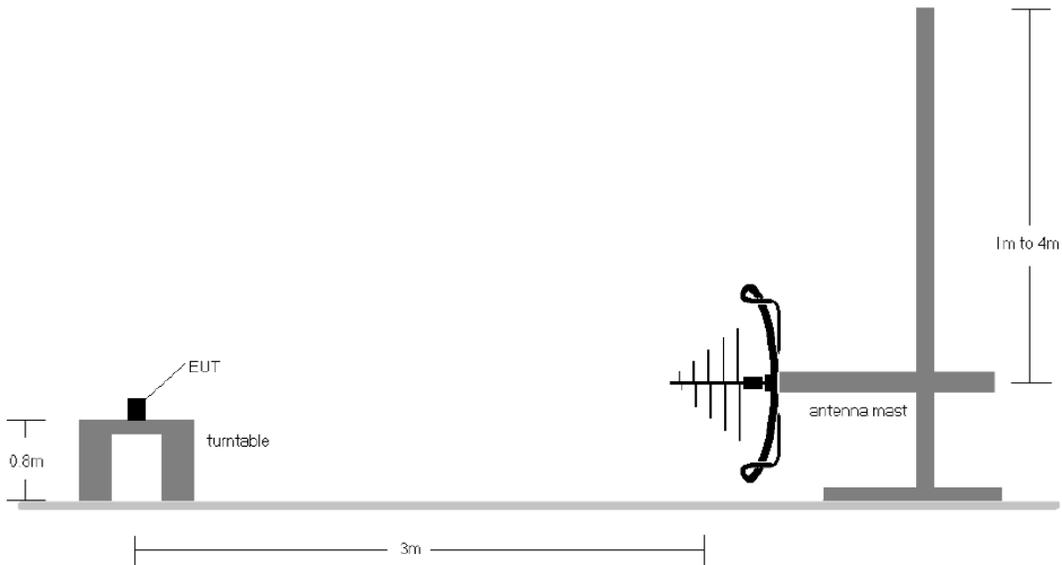


Figure 8-6. Test Instrument & Measurement Setup < 1 GHz

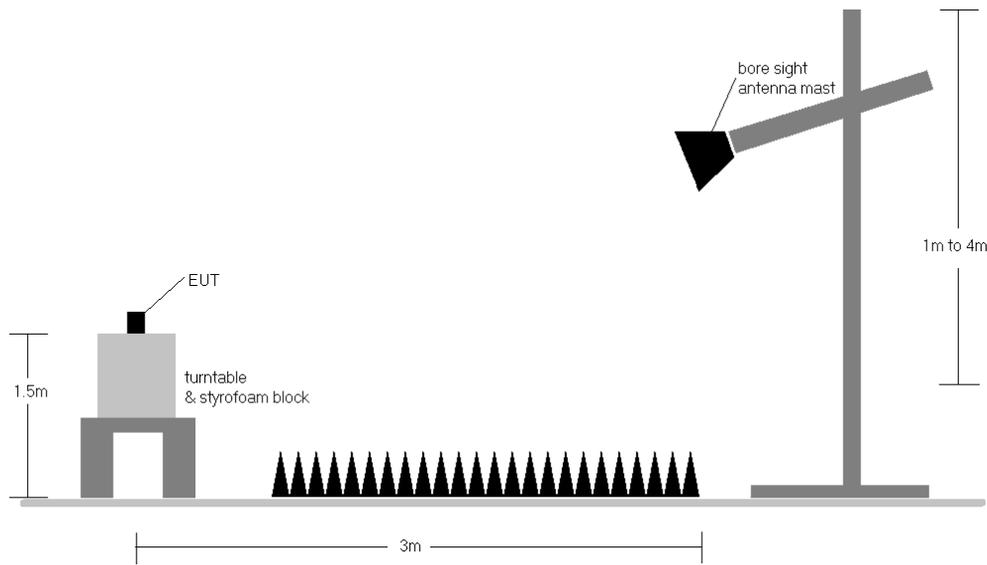


Figure 8-7. Test Instrument & Measurement Setup > 1 GHz

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 96 of 114

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]
 = -74.71 [dBm] + 107 + 24.92 [dB/m] = 57.21 dBμV/m

e.i.r.p. [dBm] = E[dB μV/m] + 20 log₁₀(d[m]) - 104.8
 = 57.21 dB[μV/m] + (20*log (3)) - 104.8
 = -38.05 dBm

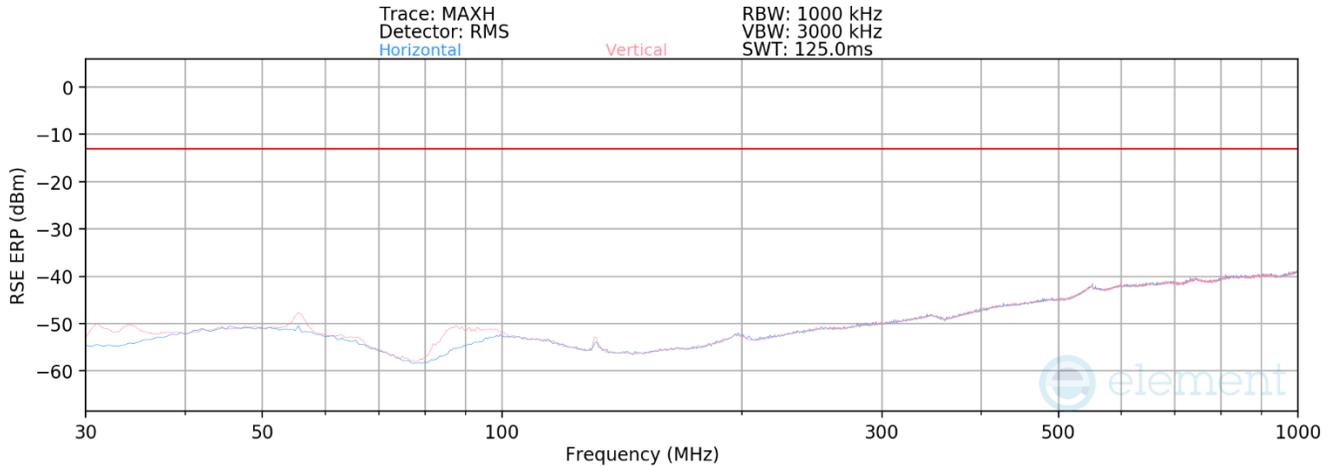
*AFCL (dB/m) contains measurement antenna factor(dB/m) and cable loss(dB) as below:

Frequency [MHz]	Antenna Factor (dB/m)	Chamber measurement cable loss + amplifier [dB]	AFCL (dB/m)
994.32	29.09	2.09	31.18
17897.75	48.15	-23.23	24.92

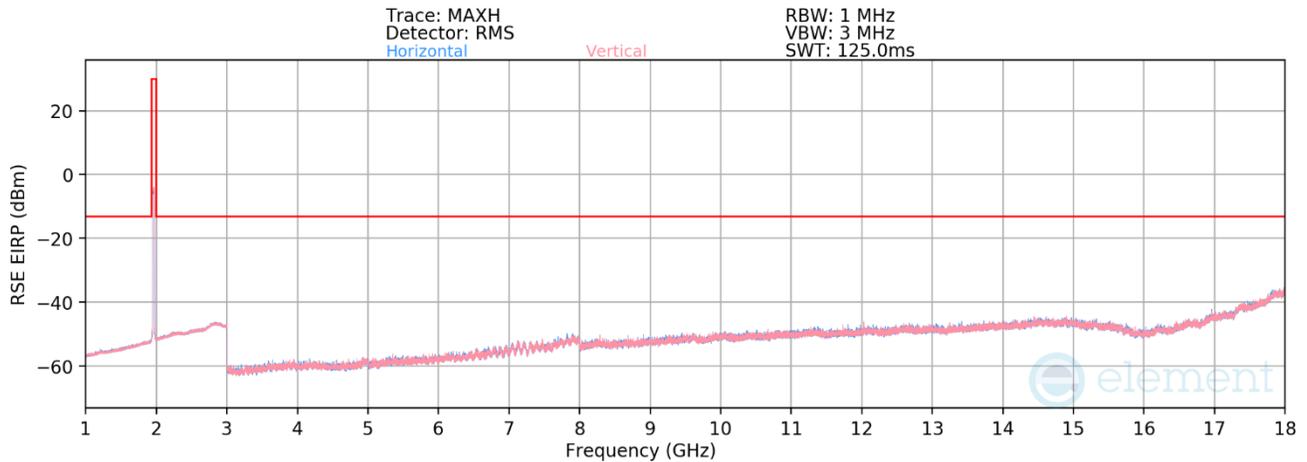
Table 8-60. Adopted AFCL value in the calculation

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.
8. For below 1 GHz and above 18 GHz, the result of spurious emissions are attenuated more than 20 dB below the permissible value. So, all value does not reported.

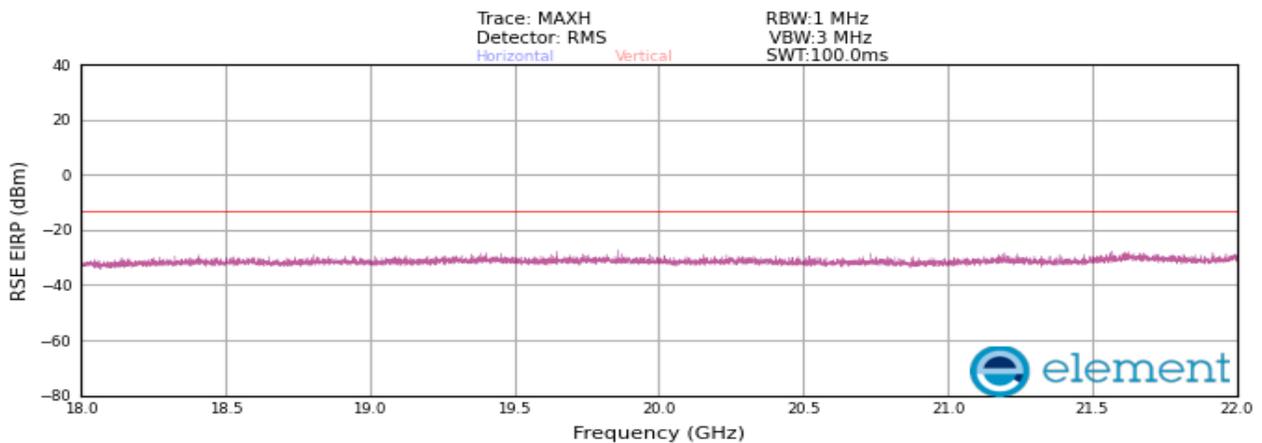
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)	Page 97 of 114	



**Plot 8-200. Radiated spurious emission_30 MHz to 1000 MHz
(n2_1C_25M_2T_Mid Channel)**

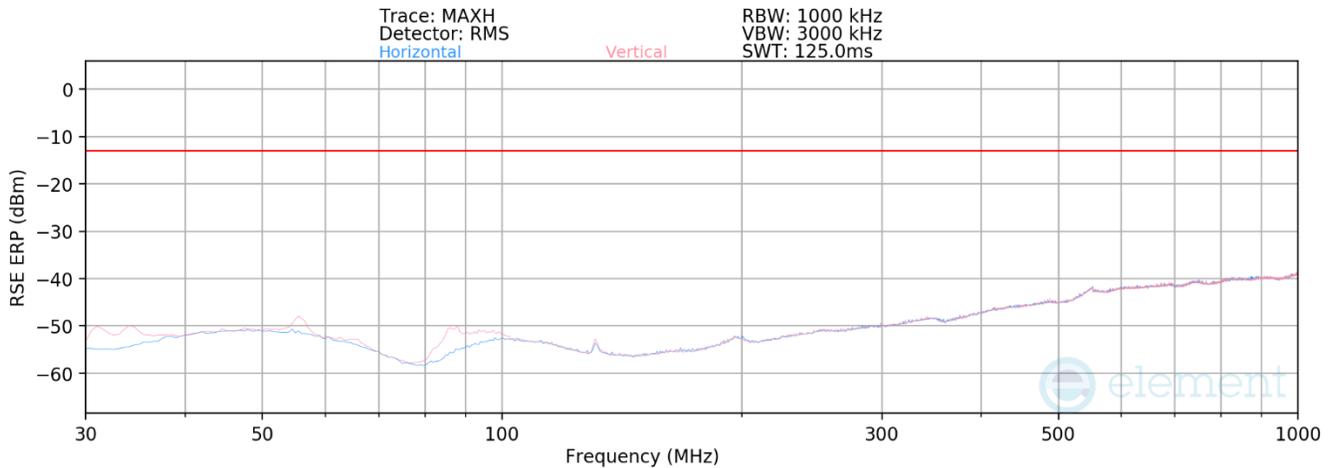


**Plot 8-201. Radiated spurious emission_1 GHz to 18 GHz
(n2_1C_25M_2T_Mid Channel)**

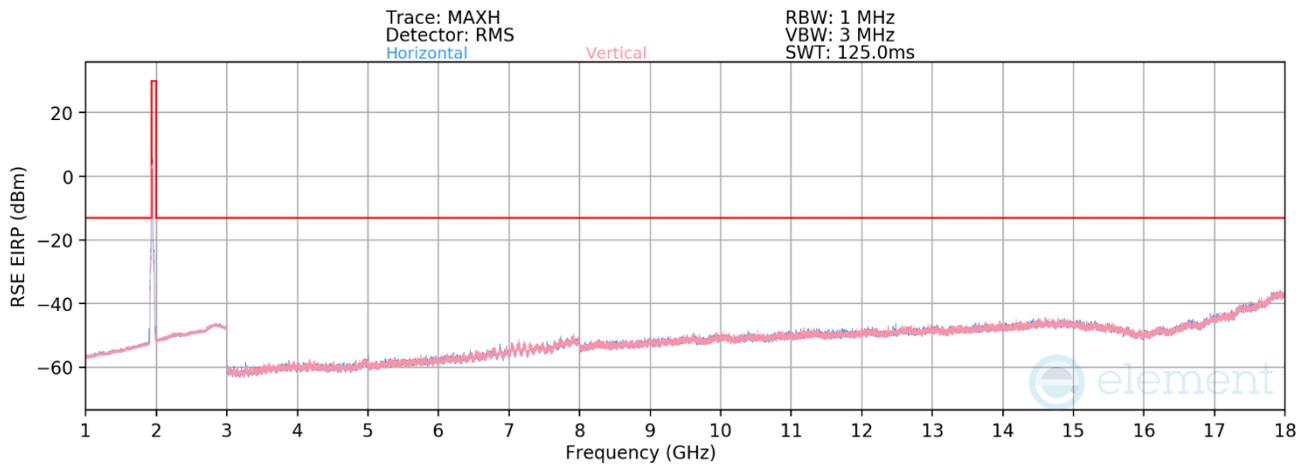


**Plot 8-202. Radiated spurious emission_18 GHz to 22 GHz
(n2_1C_25M_2T_Mid Channel)**

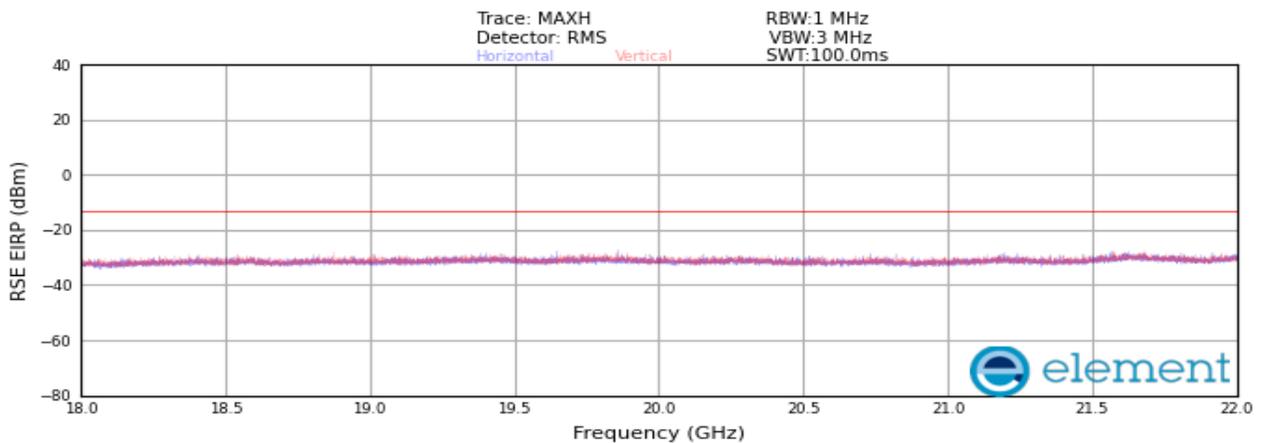
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 98 of 114



**Plot 8-203. Radiated spurious emission_30 MHz to 1000 MHz
(n2_1C_25M_4T_Low Channel)**

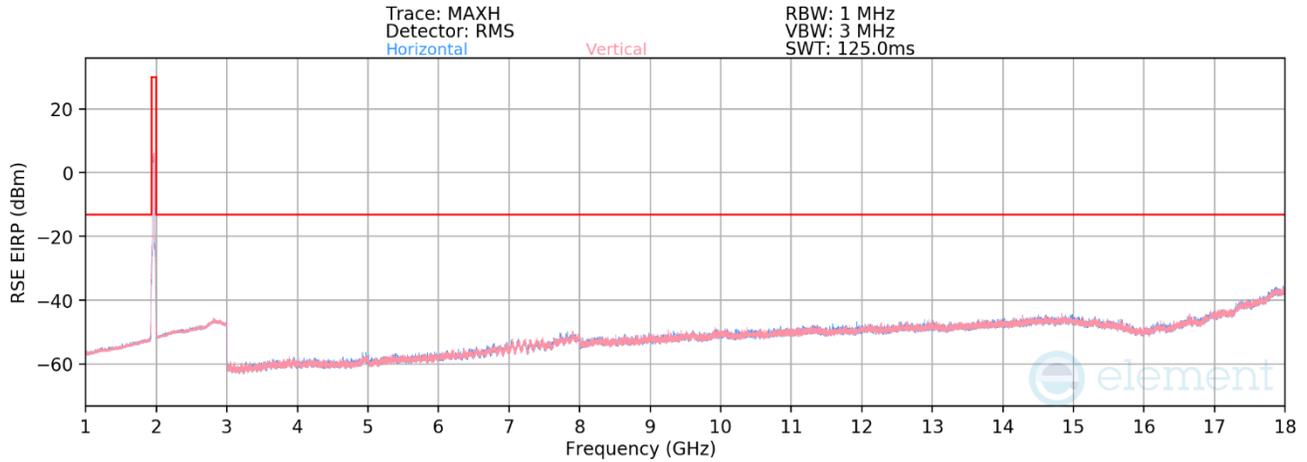


**Plot 8-204. Radiated spurious emission_1 GHz to 18 GHz
(n2_1C_25M_4T_Low Channel)**

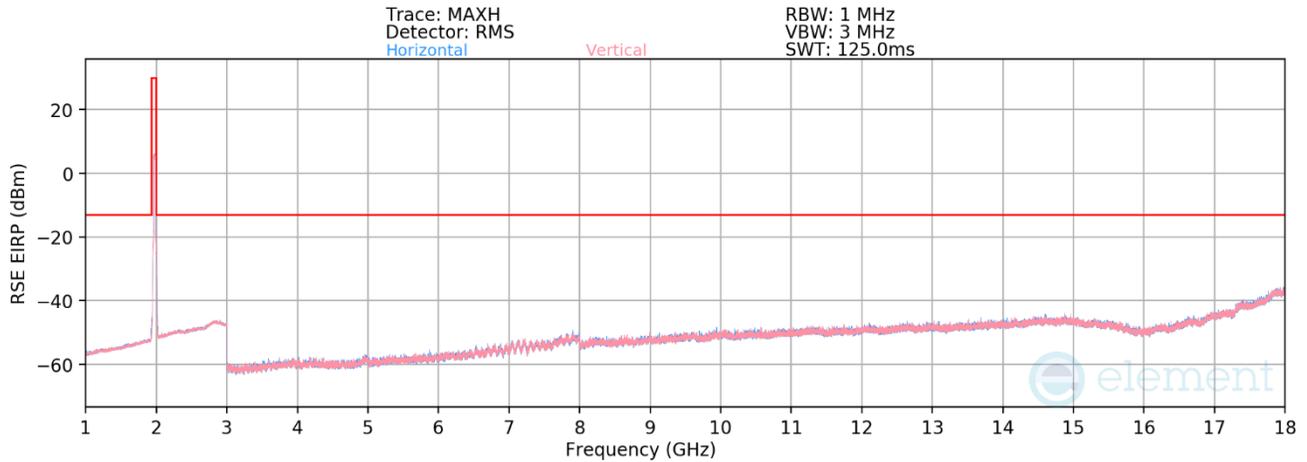


**Plot 8-205. Radiated spurious emission_18 GHz to 22 GHz
(n2_1C_25M_4T_Low Channel)**

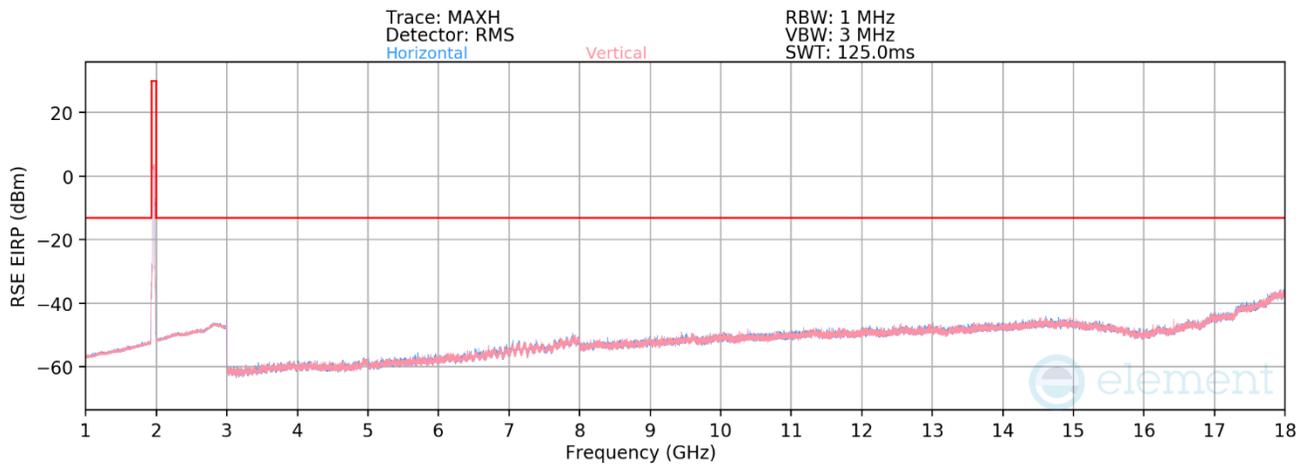
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)	Page 99 of 114	



**Plot 8-206. Radiated spurious emission_1 GHz to 18 GHz
(n2_1C_25M_4T_Mid Channel)**

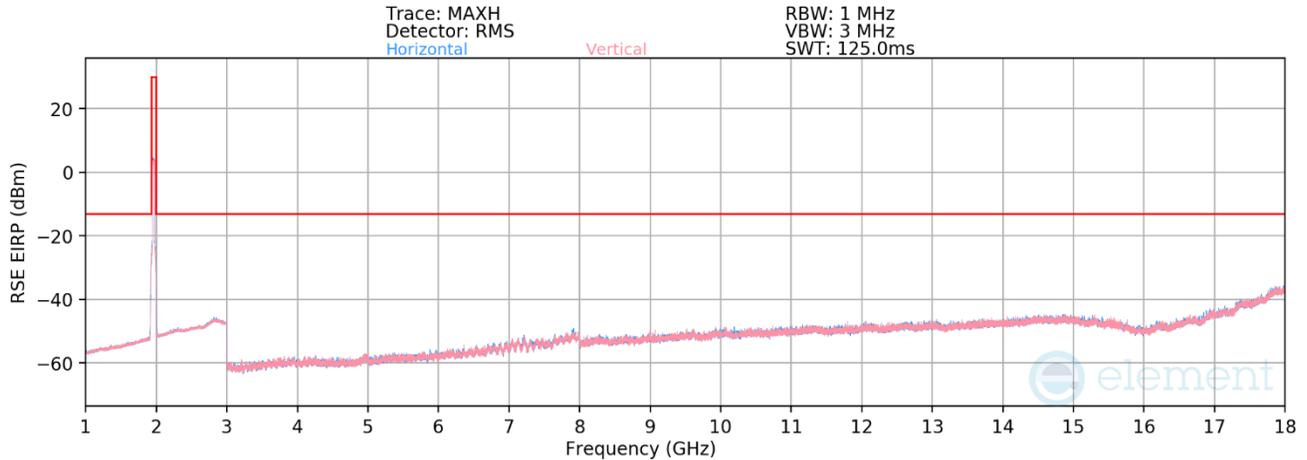


**Plot 8-207. Radiated spurious emission_1 GHz to 18 GHz
(n2_1C_25M_4T_High Channel)**

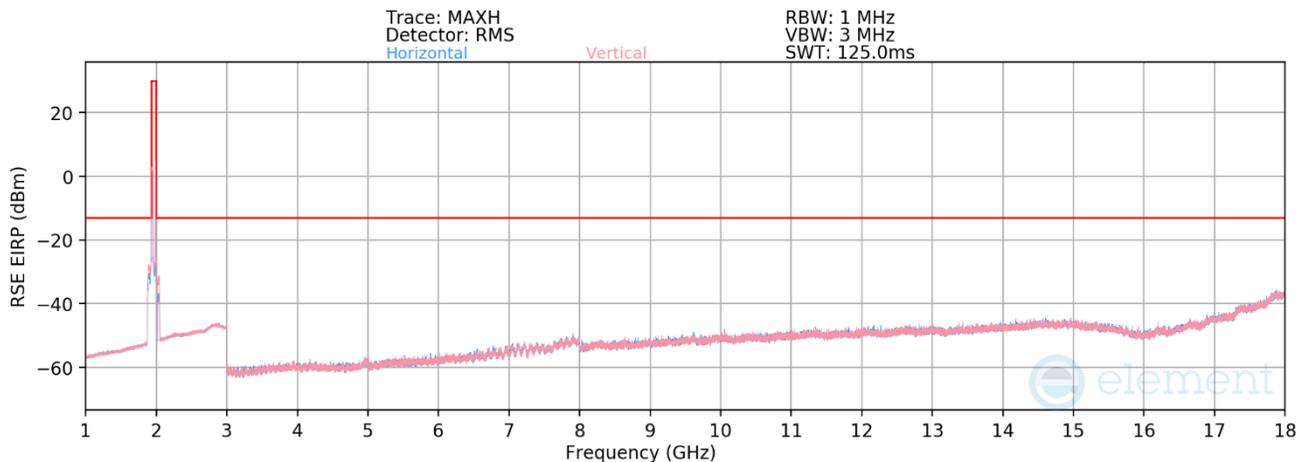


**Plot 8-208. Radiated spurious emission_1 GHz to 18 GHz
(n2_2C_25M+5M_4T_Mid Channel)**

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 100 of 114

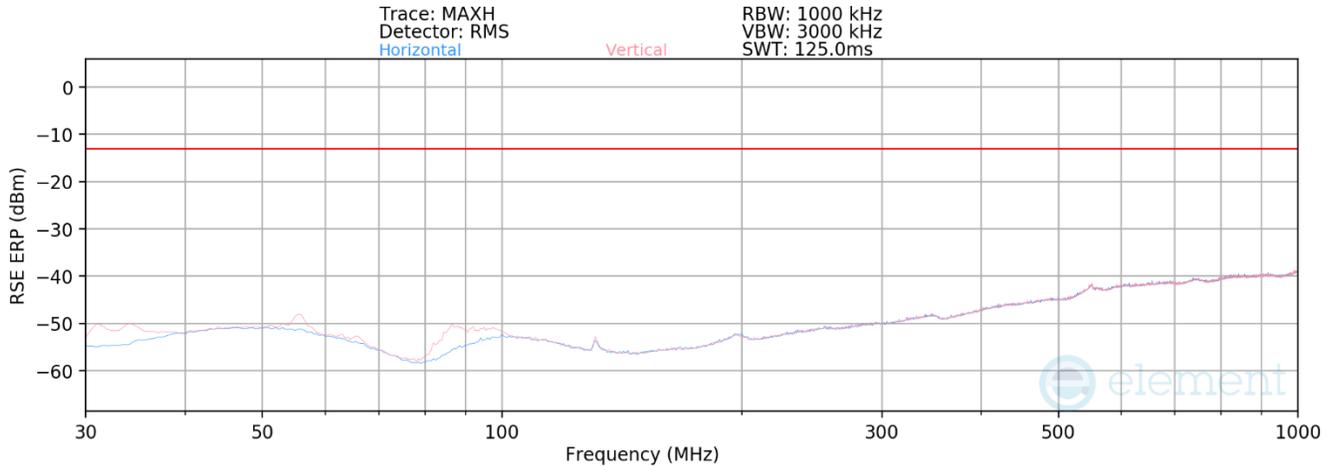


**Plot 8-209. Radiated spurious emission_1 GHz to 18 GHz
(n2/B2_2C_NR_25M+LTE_5M_4T_Mid Channel)**

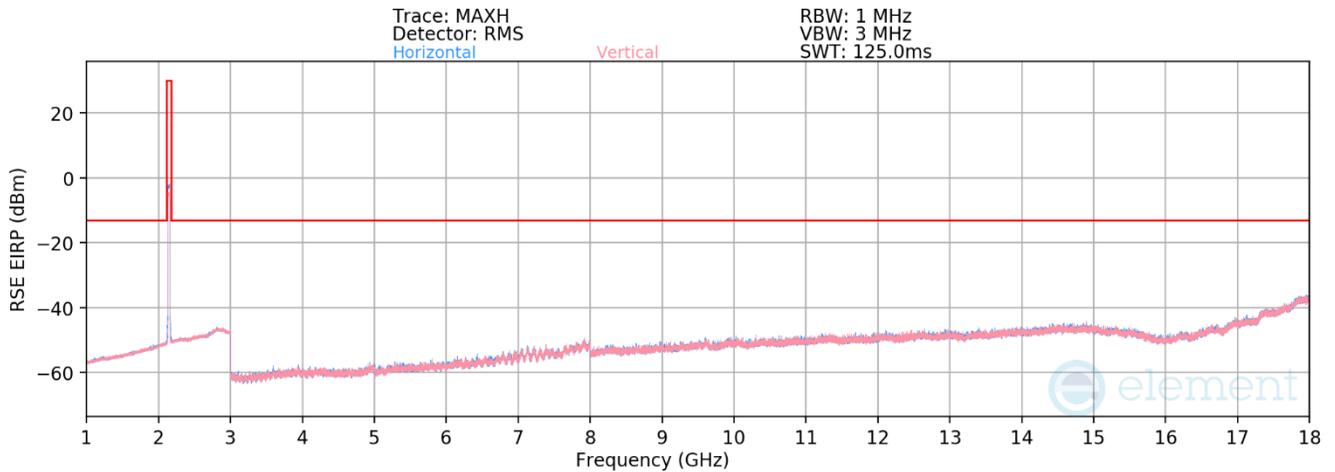


**Plot 8-210. Radiated spurious emission_1 GHz to 18 GHz
(n2/B2_2NC_NR_25M+LTE_5M_4T_Mid Channel)**

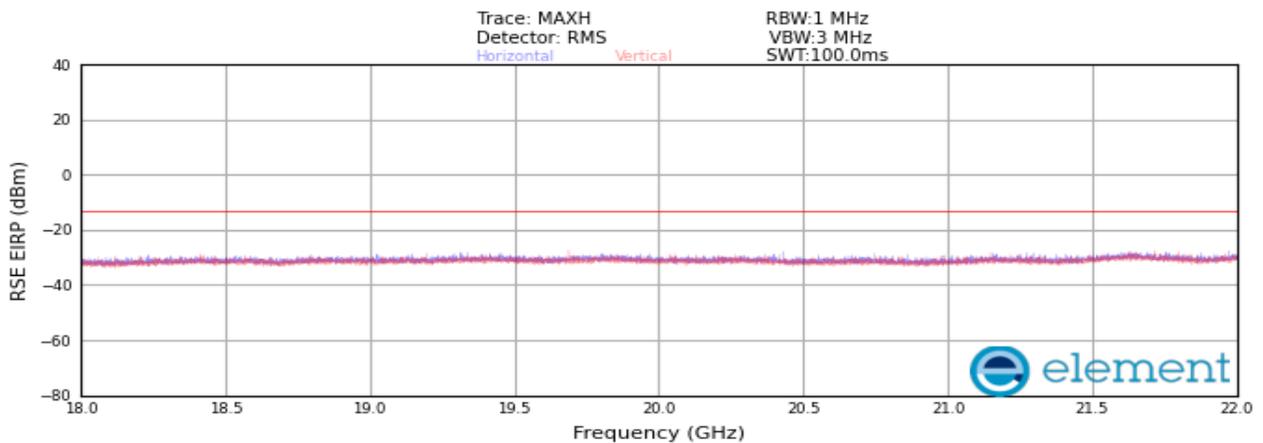
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)	Page 101 of 114	



**Plot 8-211. Radiated spurious emission_30 MHz to 1000 MHz
(n66_1C_25M_2T_Mid Channel)**

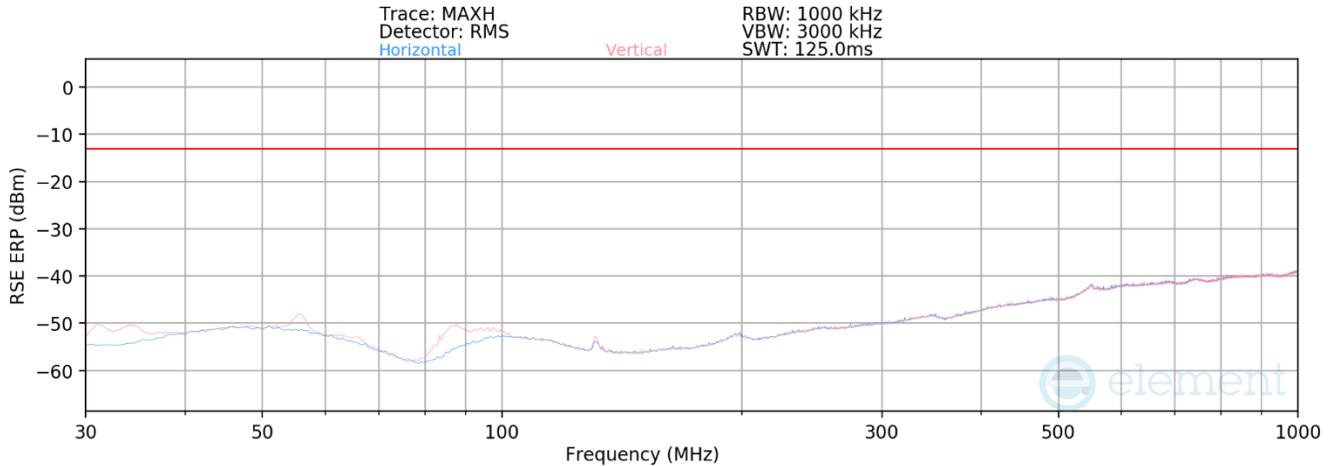


**Plot 8-212. Radiated spurious emission_1 GHz to 18 GHz
(n66_1C_25M_2T_Mid Channel)**

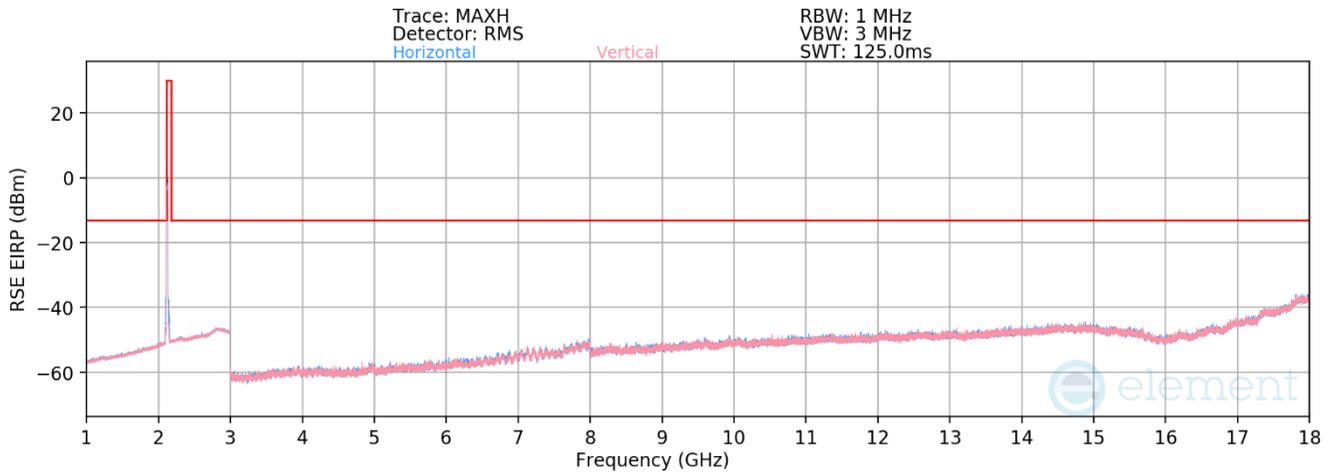


**Plot 8-213. Radiated spurious emission_18 GHz to 22 GHz
(n66_1C_25M_2T_Mid Channel)**

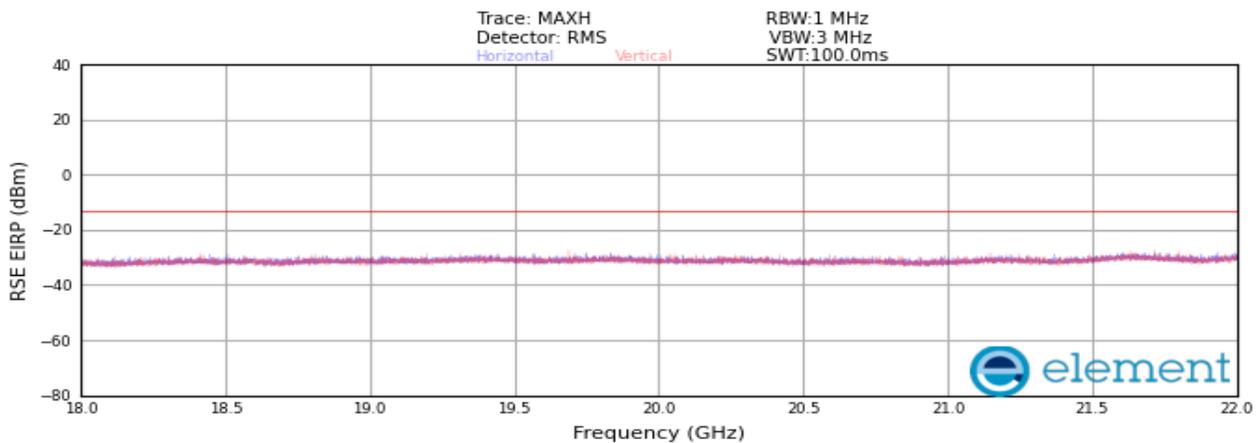
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 102 of 114



**Plot 8-214. Radiated spurious emission_30 MHz to 1000 MHz
(n66_1C_25M_4T_Low Channel)**

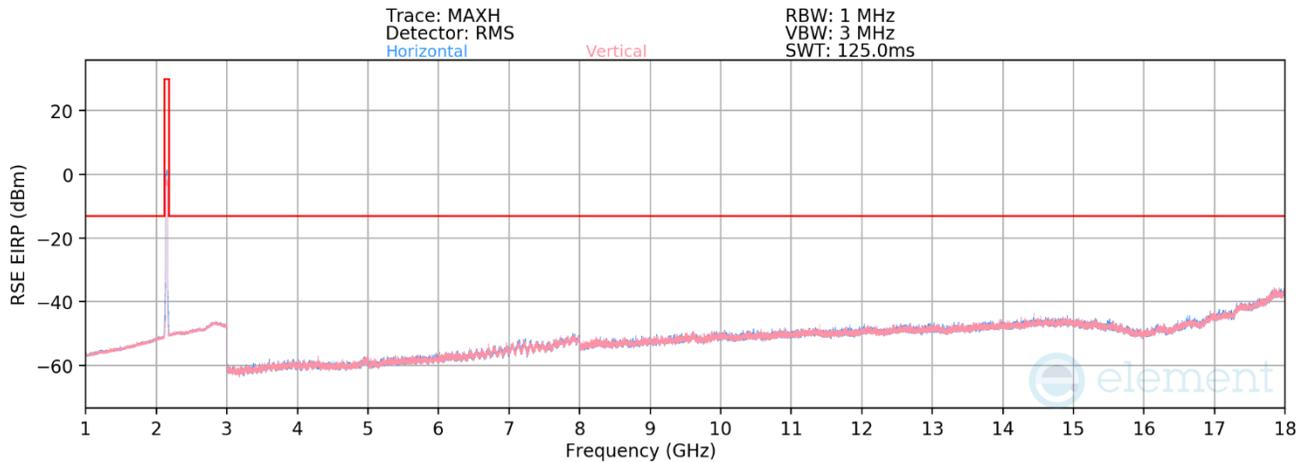


**Plot 8-215. Radiated spurious emission_1 GHz to 18 GHz
(n66_1C_25M_4T_Low Channel)**

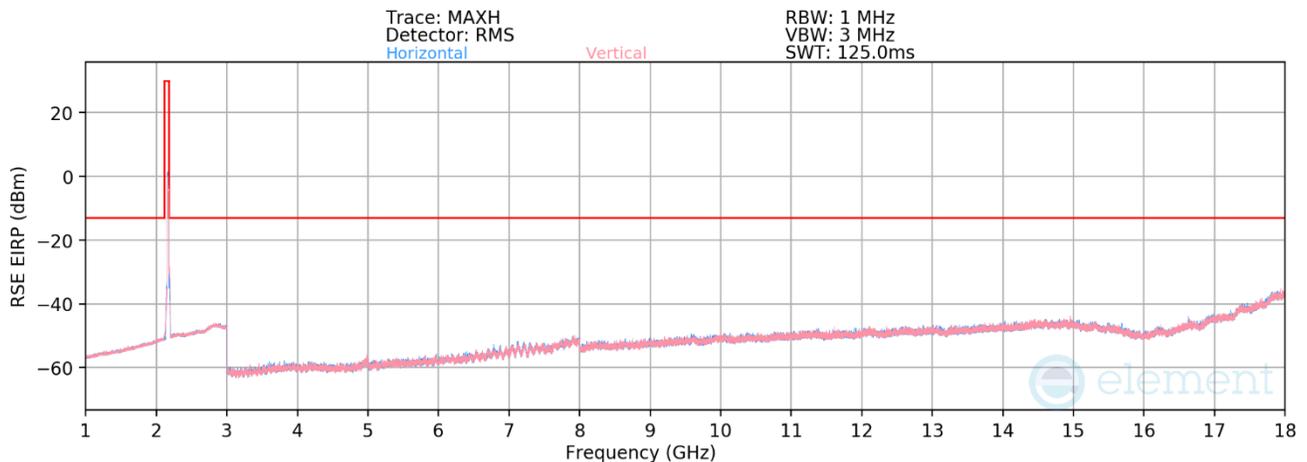


**Plot 8-216. Radiated spurious emission_18 GHz to 22 GHz
(n66_1C_25M_4T_Low Channel)**

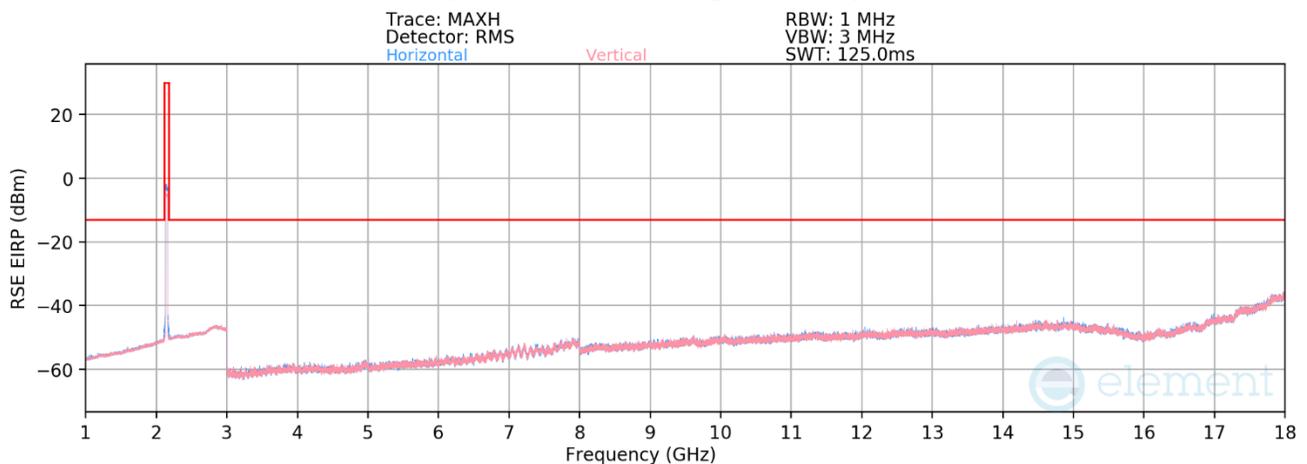
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 103 of 114



**Plot 8-217. Radiated spurious emission_1 GHz to 18 GHz
(n66_1C_25M_4T_Mid Channel)**

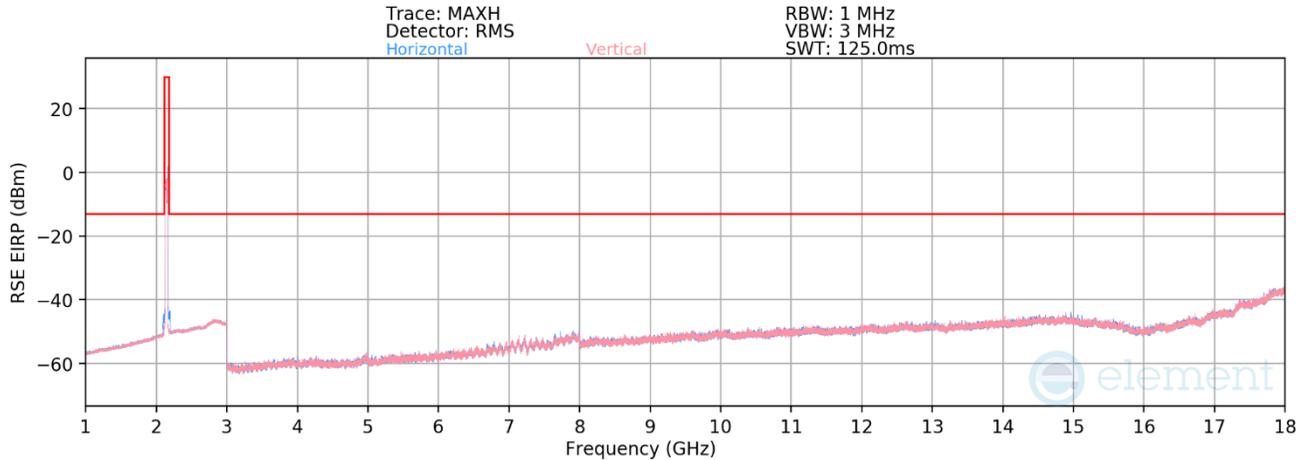


**Plot 8-218. Radiated spurious emission_1 GHz to 18 GHz
(n66_1C_25M_4T_High Channel)**

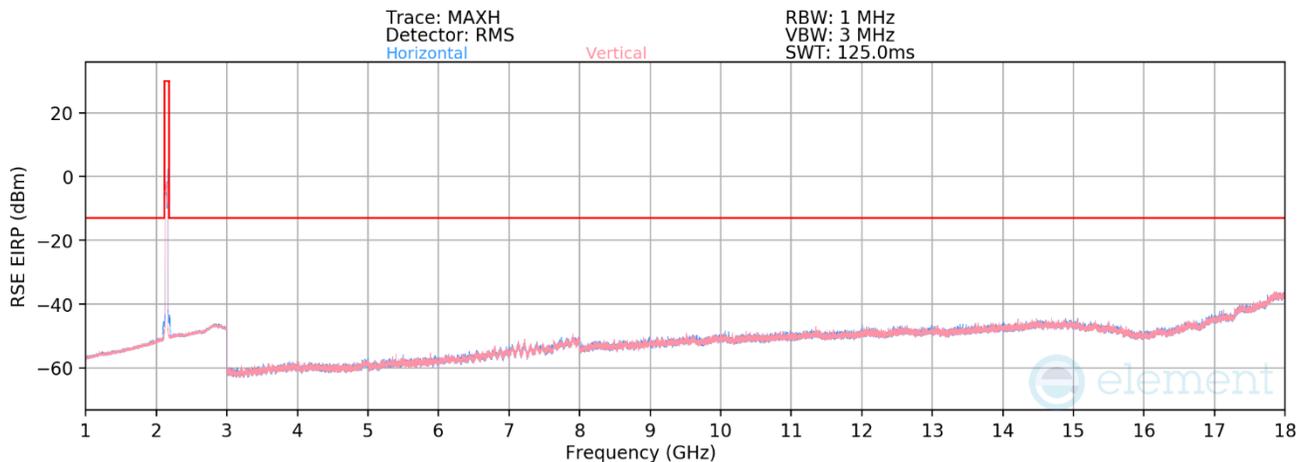


**Plot 8-219. Radiated spurious emission_1 GHz to 18 GHz
(n66_1C_30M_4T_Mid Channel)**

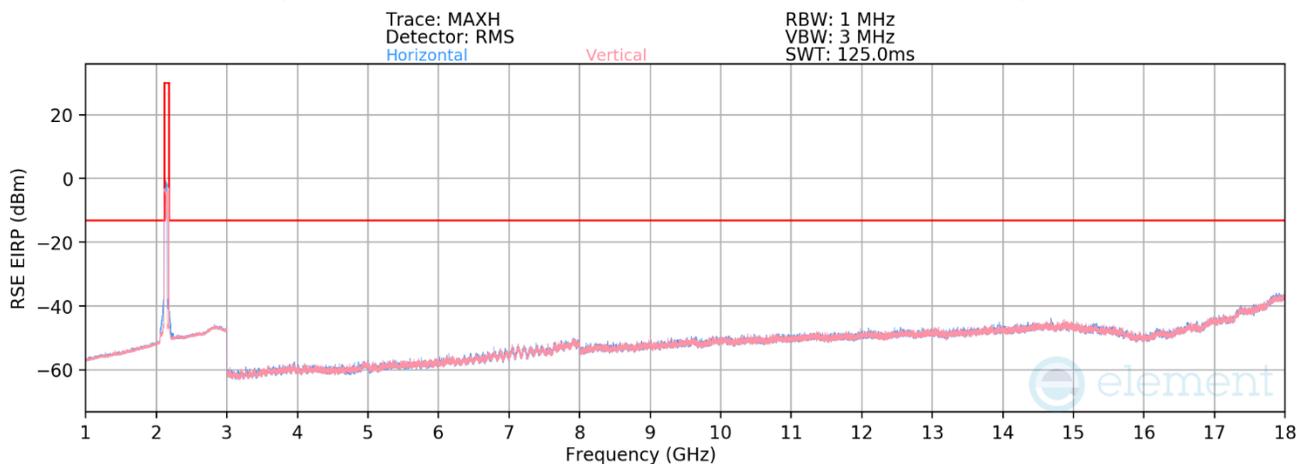
FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 104 of 114



**Plot 8-220. Radiated spurious emission_1 GHz to 18 GHz
(n66_3C_25M+10M+5M_4T_Mid Channel)**



**Plot 8-221. Radiated spurious emission_1 GHz to 18 GHz
(n66/B66_3C_NR_25M+ LTE_10M+NR_5M_4T_Mid Channel)**



**Plot 8-222. Radiated spurious emission_1 GHz to 18 GHz
(n66/B66_3NC_NR_30M+ LTE_10M+NR_5M_4T_Mid Channel)**

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 105 of 114

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable azimuth [degree]	Analyzer Level [dBm/MHz]	AFCL [dBm]	Field Strength [dB μ V/m]	RSE EIRP [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]
994.32	H	112	88	-82.25	31.18	55.93	-39.33	-13.00	-26.33
989.73	V	127	112	-81.74	31.08	56.34	-38.91	-13.00	-25.91
17983.2	H	162	152	-75.29	25.89	57.60	-37.65	-13.00	-24.65
17897.8	V	145	173	-74.71	24.92	57.21	-38.05	-13.00	-25.05

**Table 8-61. Radiated spurious emission Worst case Summary Data
(n66_1C_25M_4T_Low Channel)**

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 106 of 114

9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung RRU(RF4439d) FCC ID: A3LRF4439D-25A** complies with all of the requirements of Part 24, 27 FCC Rules.

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)	Page 107 of 114	

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 \geq 3 x RBW
4. Span = 2 ~ 3 x OBW
5. No. of sweep points \geq 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.

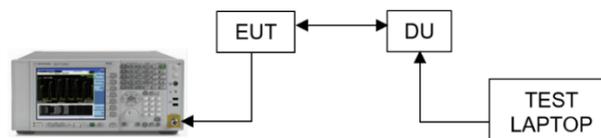


Figure 10-1. Test Instrument & Measurement Setup

Limit

N/A

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 108 of 114

Note

1. Result for reference maximum average power level of Band 2 and 66 is under section 8.3.
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).
5. Sample Calculation:
 Let us assume the following numbers:
 - c) Total MIMO Conducted Power as 117637.17 milliWatts
 - d)

Factors	Value	Unit
Summed MIMO Conducted Power (linear sum)	117637.17	mW
Summed MIMO Conducted Power (dBm) = $10 * \log (117637.17) =$	50.71	dBm

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 109 of 114

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.72	47.60	47.55	47.76
	1	47.64	47.81	47.41	47.62
Total MIMO Power (mW)		117234.61	117940.86	111968.06	117515.13
Total MIMO Power (dBm)		50.69	50.72	50.49	50.70
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.56	47.56	47.61	47.61
	1	47.65	47.49	47.50	47.47
Total MIMO Power (mW)		115228.75	113123.22	113912.78	113525.67
Total MIMO Power (dBm)		50.62	50.54	50.57	50.55
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.67	47.78	47.82	47.76
	1	47.72	47.80	47.72	47.53
Total MIMO Power (mW)		117637.17	120237.07	119692.25	116329.46
Total MIMO Power (dBm)		50.71	50.80	50.78	50.66

Table 10-1. Conducted Average Output Power Table (n2_1C_25M_2T)

Low Channel	Port	n2_2C_25M+5M_2T		n2/B2_2C_NR_25M+LTE_5M_2T	
		QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	47.96	47.93	47.94	47.94
	1	47.89	47.88	47.79	47.77
Total MIMO Power (mW)		124036.96	123465.10	122349.40	122073.19
Total MIMO Power (dBm)		50.94	50.92	50.88	50.87
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.70	47.75	47.70	47.67
	1	47.64	47.67	47.48	47.52
Total MIMO Power (mW)		116962.81	118047.22	114862.13	114974.71
Total MIMO Power (dBm)		50.68	50.72	50.60	50.61
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.73	47.76	47.78	47.70
	1	47.66	47.71	47.60	47.57
Total MIMO Power (mW)		117639.04	118725.64	117525.10	116034.23
Total MIMO Power (dBm)		50.71	50.75	50.70	50.65

Table 10-2. Conducted Average Output Power Table (n2/B2_Multi-carrier_2T)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 110 of 114	

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	45.73	45.71	45.72	45.80
	1	45.67	45.54	45.65	45.67
	2	45.81	45.72	45.89	45.84
	3	45.93	45.80	45.86	45.89
Total MIMO Power (mW)		151589.59	148392.77	151416.12	152102.46
Total MIMO Power (dBm)		51.81	51.71	51.80	51.82
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	45.87	45.94	45.92	45.88
	1	45.81	45.79	45.80	45.66
	2	45.68	45.74	45.73	45.74
	3	45.82	45.84	45.82	45.71
Total MIMO Power (mW)		151920.53	153064.02	152708.52	150275.13
Total MIMO Power (dBm)		51.82	51.85	51.84	51.77
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	46.02	46.01	45.98	45.99
	1	46.04	45.87	45.77	45.78
	2	45.77	45.90	45.79	45.71
	3	45.94	45.92	45.84	45.82
Total MIMO Power (mW)		157195.27	156527.79	153687.25	152997.01
Total MIMO Power (dBm)		51.96	51.95	51.87	51.85

Table 10-3. Conducted Average Output Power Table (n2_1C_25M_4T)

Low Channel	Port	n2_2C_25M+5M_2T		n2/B2_2C_NR_25M+LTE_5M_2T	
		QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	45.91	45.95	46.13	45.71
	1	45.85	45.87	45.79	45.63
	2	45.83	45.90	46.13	45.74
	3	45.93	45.89	46.06	45.81
Total MIMO Power (mW)		154910.04	155711.26	160336.86	149402.53
Total MIMO Power (dBm)		51.90	51.92	52.05	51.74
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	45.89	46.01	45.98	45.68
	1	45.64	45.79	45.74	45.70
	2	45.76	45.75	45.93	45.56
	3	45.76	45.80	46.03	45.65
Total MIMO Power (mW)		150799.55	153436.67	156385.96	146839.50
Total MIMO Power (dBm)		51.78	51.86	51.94	51.67
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	46.04	46.02	45.97	45.81
	1	45.83	45.86	45.74	45.75
	2	45.61	45.75	45.73	45.52
	3	45.82	45.78	45.90	45.71
Total MIMO Power (mW)		153047.49	153970.31	153349.54	148574.61
Total MIMO Power (dBm)		51.85	51.87	51.86	51.72

Table 10-4. Conducted Average Output Power Table (n2/B2_Multi-carrier_4T)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 111 of 114	

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.40	49.38	49.25	49.11
	1	49.16	49.18	49.01	48.95
Total MIMO Power (mW)		169512.17	169492.40	163757.45	159995.99
Total MIMO Power (dBm)		52.29	52.29	52.14	52.04
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.23	49.28	49.16	49.27
	1	49.05	49.13	48.91	49.01
Total MIMO Power (mW)		164107.54	166571.22	160219.47	164145.82
Total MIMO Power (dBm)		52.15	52.22	52.05	52.15
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.33	49.19	49.12	49.12
	1	49.06	48.95	48.89	48.92
Total MIMO Power (mW)		166243.63	161510.64	159106.42	159643.25
Total MIMO Power (dBm)		52.21	52.08	52.02	52.03

Table 10-5. Conducted Average Output Power Table (n66_1C_25M_2T)

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.27	49.32	49.35	49.33
	1	48.91	48.94	49.11	49.08
Total MIMO Power (mW)		162333.54	163851.64	167571.80	166615.37
Total MIMO Power (dBm)		52.10	52.14	52.24	52.22
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.25	49.45	49.29	49.26
	1	48.98	48.94	48.94	49.01
Total MIMO Power (mW)		163209.38	166449.85	163263.01	163951.41
Total MIMO Power (dBm)		52.13	52.21	52.13	52.15
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	49.12	49.24	49.12	48.98
	1	48.79	48.86	48.90	48.87
Total MIMO Power (mW)		157343.53	160861.04	159284.95	156160.21
Total MIMO Power (dBm)		51.97	52.06	52.02	51.94

Table 10-6. Conducted Average Output Power Table (n66_1C_30M_2T)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 112 of 114	

Low Channel	Port	n66_3C_25M+10M+5M_4T		n66/B66_3C_NR_25M+LTE_10M+NR_5M_4T		n66/B66_3C_NR_30M+LTE_10M+NR_5M_4T	
		QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	49.27	49.38	49.45	49.52	49.24	49.40
	1	49.17	49.21	49.35	49.37	49.12	49.21
Total MIMO Power (mW)		167133.68	170066.31	174206.26	176035.27	165606.24	170466.48
Total MIMO Power (dBm)		52.23	52.31	52.41	52.46	52.19	52.32
Middle Channel	Port	QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	49.21	49.41	49.33	49.38	49.21	49.28
	1	49.03	49.16	49.12	49.19	49.08	49.11
Total MIMO Power (mW)		163353.54	169712.95	167364.02	169683.26	164279.71	166195.17
Total MIMO Power (dBm)		52.13	52.30	52.24	52.30	52.16	52.21
High Channel	Port	QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	49.18	49.29	49.23	49.20	49.12	49.19
	1	48.92	49.10	49.10	49.06	48.99	48.94
Total MIMO Power (mW)		160779.23	166203.10	165037.98	163716.22	160910.37	161330.04
Total MIMO Power (dBm)		52.06	52.21	52.18	52.14	52.07	52.08

Table 10-7. Conducted Average Output Power Table (n66/B66_Multi-carrier_2T)

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.72	47.87	47.88	48.07
	1	47.37	47.56	47.41	47.60
	2	47.71	47.77	47.70	47.89
	3	47.78	47.86	47.82	47.96
Total MIMO Power (mW)		232731.17	239186.83	235875.42	245699.91
Total MIMO Power (dBm)		53.67	53.79	53.73	53.90
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.85	48.04	48.09	48.23
	1	47.47	47.61	47.60	47.63
	2	47.59	47.78	47.84	47.94
	3	47.75	47.87	47.83	47.95
Total MIMO Power (mW)		233778.57	242570.35	243448.05	249073.70
Total MIMO Power (dBm)		53.69	53.85	53.86	53.96
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	47.81	48.03	48.02	48.21
	1	47.33	47.48	47.44	47.56
	2	47.53	47.80	47.87	47.95
	3	47.67	47.82	47.79	47.92
Total MIMO Power (mW)		229573.23	240298.90	240201.96	247555.67
Total MIMO Power (dBm)		53.61	53.81	53.81	53.94

Table 10-8. Conducted Average Output Power Table (n66_1C_25M_4T)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 113 of 114	

Low Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	48.04	47.83	47.89	48.06
	1	47.91	47.95	47.93	47.93
	2	47.88	47.77	47.79	48.07
	3	47.94	47.94	47.86	48.02
Total MIMO Power (mW)		249087.42	245118.30	244816.17	253568.32
Total MIMO Power (dBm)		53.96	53.89	53.89	54.04
Middle Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	48.24	48.07	48.03	48.13
	1	48.00	48.01	48.07	48.05
	2	47.79	47.72	47.82	48.01
	3	47.91	47.82	47.84	47.90
Total MIMO Power (mW)		251695.43	247052.39	249001.64	253740.00
Total MIMO Power (dBm)		54.01	53.93	53.96	54.04
High Channel	Port	QPSK	16QAM	64QAM	256QAM
Conducted Average Power (dBm)	0	48.25	48.17	48.01	48.17
	1	48.02	47.99	48.06	48.04
	2	47.78	47.86	47.80	47.94
	3	47.87	47.86	47.74	47.81
Total MIMO Power (mW)		251435.51	250753.55	246899.84	251918.97
Total MIMO Power (dBm)		54.00	53.99	53.93	54.01

Table 10-9. Conducted Average Output Power Table (n66_1C_30M_4T)

Low Channel	Port	n66_3C_25M+10M+5M_4T		n66/B66_3C_NR_25M+LTE_10M+NR_5M_4T		n66/B66_3C_NR_30M+LTE_10M+NR_5M_4T	
		QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	47.74	47.88	48.09	47.92	48.13	48.19
	1	47.63	47.94	47.97	47.63	47.87	47.59
	2	47.58	47.95	47.94	48.07	47.98	48.19
	3	47.61	48.14	48.16	48.12	48.20	48.33
Total MIMO Power (mW)		232328.33	251142.55	254771.96	248871.38	255123.19	257323.36
Total MIMO Power (dBm)		53.66	54.00	54.06	53.96	54.07	54.10
Middle Channel	Port	QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	47.74	47.88	48.10	47.90	48.14	48.24
	1	47.57	47.95	47.95	47.62	47.91	47.85
	2	47.54	47.91	47.90	48.10	47.87	47.76
	3	47.51	48.00	48.02	48.24	48.07	47.96
Total MIMO Power (mW)		229695.31	248647.06	251985.38	250715.20	252320.48	249855.16
Total MIMO Power (dBm)		53.61	53.96	54.01	53.99	54.02	53.98
High Channel	Port	QPSK	QAM	QPSK	QAM	QPSK	QAM
Conducted Average Power (dBm)	0	47.73	47.88	48.10	48.10	47.92	47.96
	1	47.55	47.86	47.91	47.75	47.61	47.64
	2	47.51	47.82	47.89	47.76	47.84	47.96
	3	47.51	47.94	47.94	47.94	47.95	48.00
Total MIMO Power (mW)		228905.36	245234.52	250114.78	246065.19	242807.74	246206.71
Total MIMO Power (dBm)		53.60	53.90	53.98	53.91	53.85	53.91

Table 10-10. Conducted Average Output Power Table (66/B66_Multi-carrier_4T)

FCC ID: A3LRF4439D-25A		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Technical Manager
Test Report S/N: 8K24022601-00.A3L	Test Dates: 03/18/2024 - 04/29/2024	EUT Type: RRU(RF4439d)		Page 114 of 114	