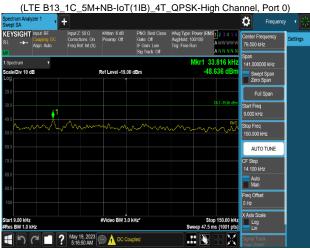




Plot 8-794. Conducted Spurious Emission Plot 756.1 MHz to 1 GHz



Plot 8-796. Conducted Spurious Emission Plot 9 kHz to 150 kHz

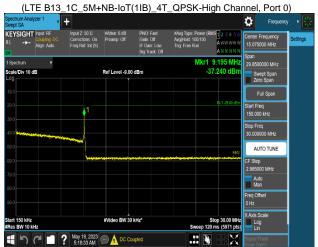
(LTE B13\_1C\_10M+NB-IoT(2GB)\_4T\_QPSK-Mid Channel, Port 0)



Plot 8-798. Conducted Spurious Emission Plot 30 MHz to 735 MHz (LTE B13 1C 10M+NB-IoT(2GB) 4T QPSK-Mid Channel, Port 0)



Plot 8-795. Conducted Spurious Emission Plot 1 GHz to 10 GHz



Plot 8-797. Conducted Spurious Emission Plot 150 kHz to 30 MHz





735 MHz to 745.9 MHz

(LTE B13\_1C\_10M+NB-IoT(2GB)\_4T\_QPSK-Mid Channel, Port 0)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dere 255 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 355 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05





Plot 8-800. Conducted Spurious Emission Plot 756.1 MHz to 1 GHz



Plot 8-802. Conducted Spurious Emission Plot 9 kHz to 150 kHz

(Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M 4T QPSK-Middle+Low Channel, Port 3)



30 MHz to 735 MHz (Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M \_4T\_QPSK-Middle+Low Channel, Port 3)

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Plot 8-801. Conducted Spurious Emission Plot 1 GHz to 10 GHz



Plot 8-803. Conducted Spurious Emission Plot 150 kHz to 30 MHz (Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M



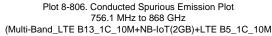
Plot 8-805. Conducted Spurious Emission Plot 735 MHz to 745.9 MHz (Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M \_4T\_QPSK-Middle+Low Channel, Port 3)

ES-QP-16-09 Rev.05

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 356 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Fage 556 01 404









Plot 8-808. Conducted Spurious Emission Plot 1 GHz to 10 GHz

(Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M \_4T\_QPSK-Middle+Low Channel, Port 3)



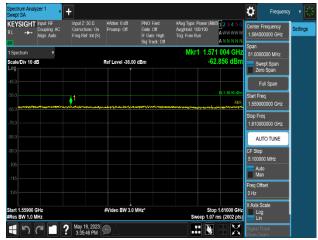
Plot 8-810. Conducted Spurious Emission Plot 1 559 MHz to 1 610 MHz (LTE B13\_1C\_10M\_4T\_QPSK-Middle Channel, Port 1)



Plot 8-807. Conducted Spurious Emission Plot 895 MHz to 1 GHz (Multi-Band\_LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M \_4T\_QPSK-Middle+Low Channel, Port 3)



Plot 8-809. Conducted Spurious Emission Plot 1 559 MHz to 1 610 MHz (LTE B13\_1C\_5M\_4T\_QPSK - Low Channel, Port 3)

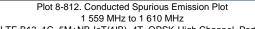


Plot 8-811. Conducted Spurious Emission Plot 1 559 MHz to 1 610 MHz (LTE B13\_2C\_5M+5M\_4T\_QPSK - Middle Channel, Port 0)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 257 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 357 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05







(LTE B13\_1C\_5M+NB-IoT(1IB)\_4T\_QPSK-High Channel, Port 3)



Plot 8-814. Conducted Spurious Emission Plot 1 559 MHz to 1 610 MHz (Multi-Band\_LTE B13\_2C\_5M+5M+DSS B(n)5\_1C\_10M+NR n5\_1C\_10M+LTE B5\_1C\_5M\_4T\_QPSK-Middle+Low Channel, Port 2)



Plot 8-813. Conducted Spurious Emission Plot 1 559 MHz to 1 610 MHz

(LTE B13\_1C\_10M+NB-IoT(1IB+1GB)\_4T\_QPSK-Middle Channel, Port 3)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 250 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 358 of 404
© 2022 Element			ES-QP-16-09 Rev.05



# 8.7 Frequency Stability

## **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 to +50°C in 10°C increments 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.

Frequency measurements are made -30°C to +50°C in 10°C increments. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

## <u>Limit</u>

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.

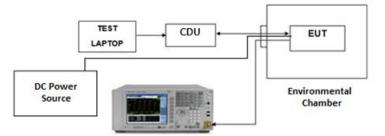


Figure 8-7. Test Instrument & Measurement Setup

### Test Notes

None.

FCC ID: A3LRF4461D-13A	element 🤤	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 250 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 359 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05



## OPERATING FREQUENCY: <u>881,500,000</u> Hz REFERENCE VOLTAGE: <u>-48.00</u> VDC

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> <b>(</b> °С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %		+ 20 (Ref)	881,500,000	0	0.0000000
100 %		- 30	881,499,998	-2	-0.0000002
100 %		- 20	881,500,000	0	0.0000000
100 %		- 10	881,500,001	1	0.0000001
100 %	-48.00	0	881,499,999	-1	-0.0000001
100 %		+ 10	881,500,000	0	0.0000000
100 %		+ 30	881,500,000	0	0.0000000
100 %		+ 40	881,500,000	0	0.0000000
100 %		+ 50	881,500,000	0	0.0000000
85 %	-40.80	+ 20	881,500,001	1	0.0000001
115 %	-55.20	+ 20	881,500,000	0	0.0000000

Table 8-310. Frequency Stability Summary Data (LTE B5\_1C\_5M)

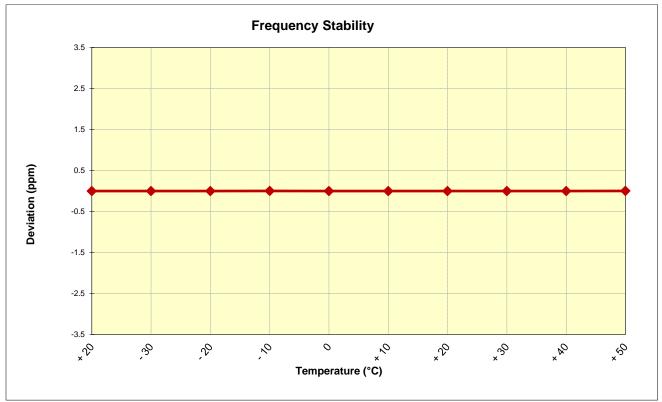


Figure 8-8. Frequency Stability Graph (LTE B5\_1C\_5M)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 260 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 360 of 404
© 2022 Element				ES-QP-16-09 Rev.05



## OPERATING FREQUENCY: <u>748,500,000</u> Hz REFERENCE VOLTAGE: <u>-48.00</u> VDC

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> <b>(</b> °С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %		+ 20 (Ref)	748,499,999	0	0.0000000
100 %		- 30	748,500,000	1	0.0000001
100 %		- 20	748,499,999	0	0.0000000
100 %		- 10	748,500,000	1	0.0000001
100 %	-48.00	0	748,500,000	1	0.0000001
100 %		+ 10	748,500,001	2	0.000003
100 %		+ 30	748,499,999	0	0.0000000
100 %		+ 40	748,500,001	2	0.000003
100 %		+ 50	748,500,000	1	0.0000001
85 %	-40.80	+ 20	748,500,000	1	0.0000001
115 %	-55.20	+ 20	748,500,000	1	0.0000001

Table 8-311. Frequency Stability Summary Data (LTE B13\_1C\_5M)

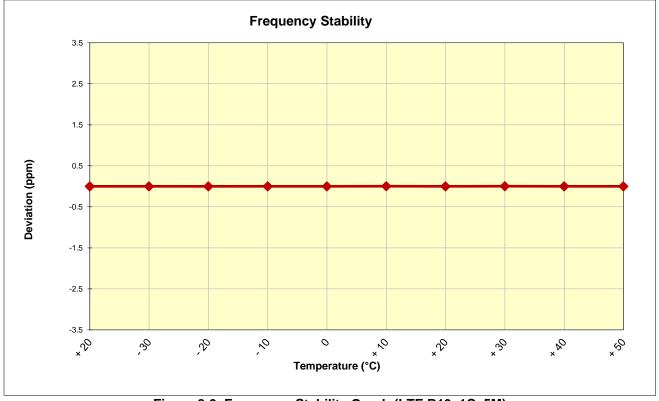


Figure 8-9. Frequency Stability Graph (LTE B13\_1C\_5M)

FCC ID: A3LRF4461D-13A	element	ent MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dara 004 at 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 361 of 404
© 2022 Element	•	•		ES-QP-16-09 Rev.05



## 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 and horizontally polarized broadband tri-log 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 x RBW
- 4. No. of sweep points  $\geq 2 \times \text{span} / \text{RBW}$
- 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.

### <u>Limit</u>

§22.917(a) §27.53(c), (f)

The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm.

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 202 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 362 of 404
© 2022 Element			ES-QP-16-09 Rev.05



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

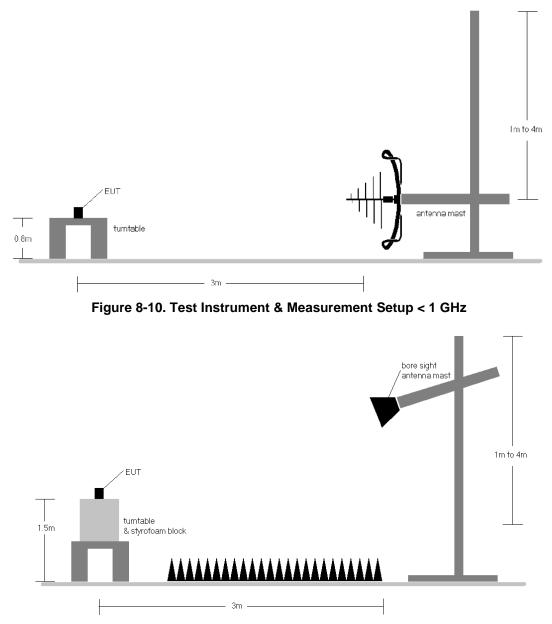


Figure 8-11. Test Instrument & Measurement Setup > 1 GHz

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 262 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 363 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05



## 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]
	= -74.28 [dBm] + 107 + 10.01 [dB/m] = 42.73 dBµV/m
e.i.r.p. [dBm]	= E[dB µV/m] + 20 log10(d[m]) - 104.8
	= 42.73 dB[µV/m] + (20*log (3)) - 104.8

= -52.53 dBm

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

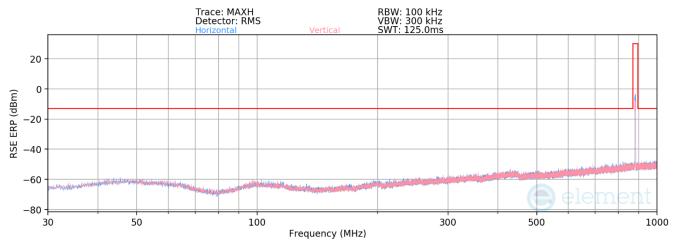
Frequency [MHz]	Antenna Factor (dB/m)	Chamber measurement cable loss + amplifier [dB]	AFCL (dB/m)
983.42	23.07	2.07	25.14
9784.35	37.64	-27.63	10.01

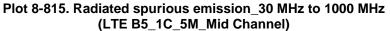
 Table 8-312. Adopted AFCL value in the calculation

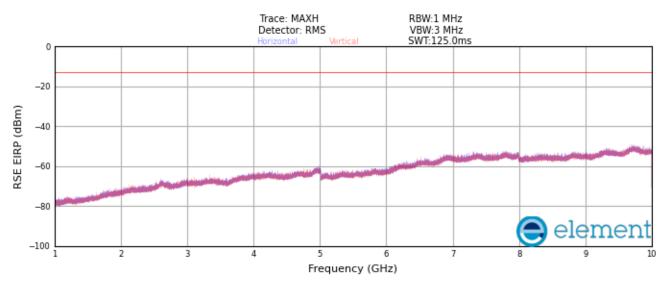
- 2. The EUT was tested in both horizontal and vertical antenna polarizations and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, channel bandwidth configurations shown in the tables below.
- 3. The spectrum is measured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

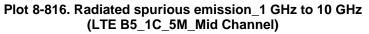
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Test Report S/N:	Test Dates:	EUT Type:		Daga 264 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 364 of 404
© 2022 Element				ES-QP-16-09 Rev.05





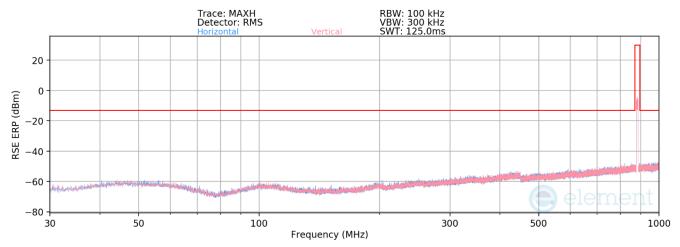


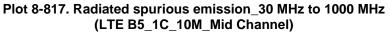


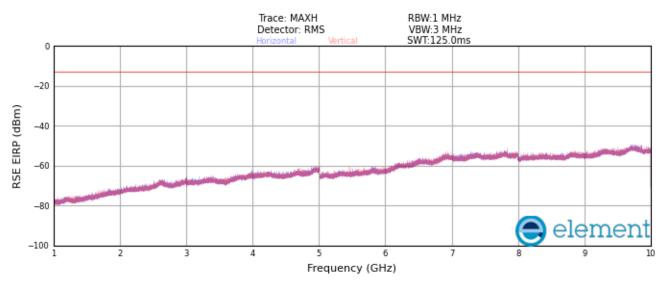


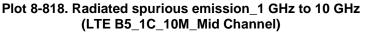
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Test Report S/N:	Test Dates:	EUT Type:	Dage 265 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 365 of 404
© 2022 Element		•	ES-OP-16-09 Rev 05





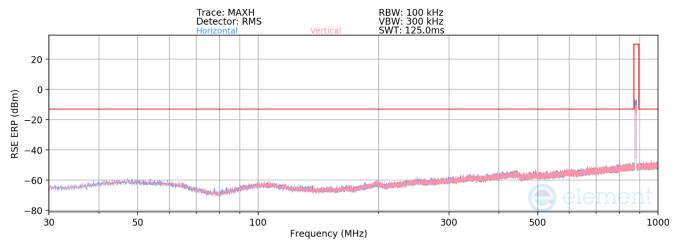


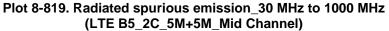


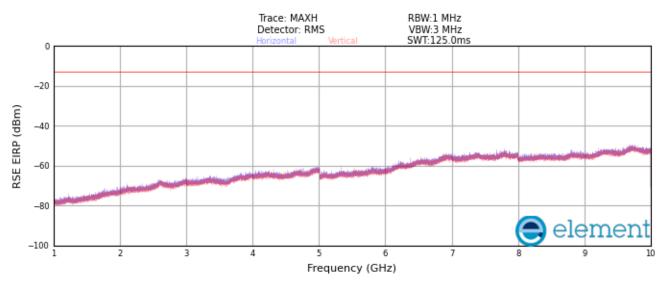


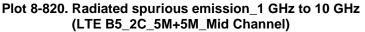
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Test Report S/N:	Test Dates:	EUT Type:	Dage 266 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 366 of 404
© 2022 Element	•	•	ES-OP-16-09 Rev 05





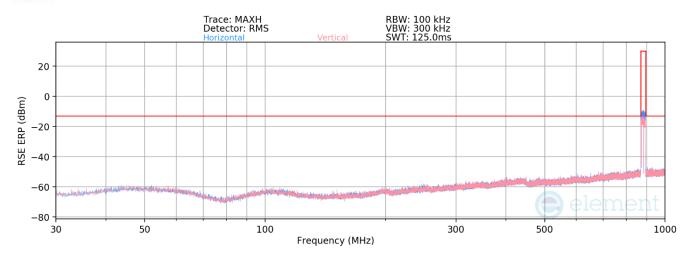


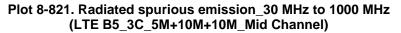


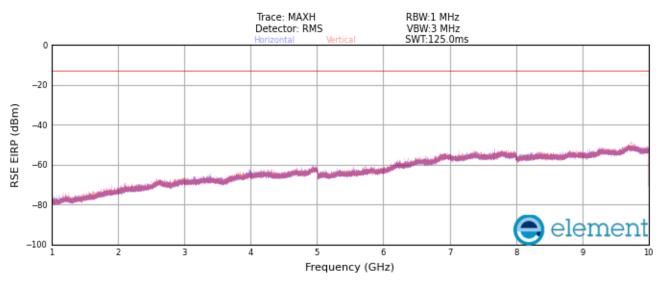


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Test Report S/N:	Test Dates:	EUT Type:	Daga 267 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 367 of 404
© 2022 Element		•	ES-OP-16-09 Rev 05





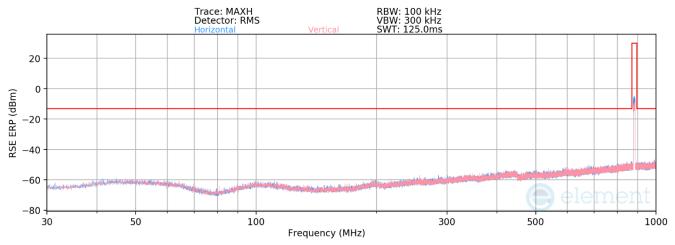




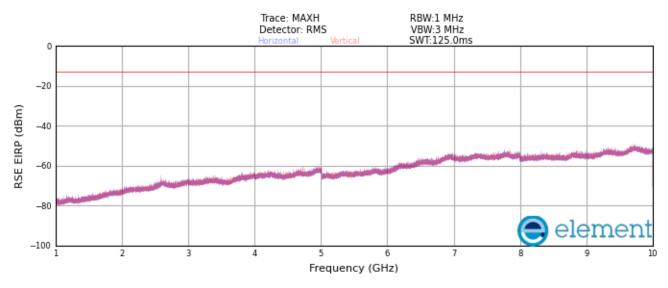
Plot 8-822. Radiated spurious emission\_1 GHz to 10 GHz (LTE B5\_3C\_5M+10M+10M\_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dawa 000 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 368 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05





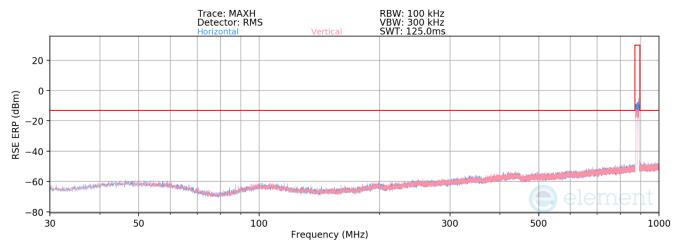


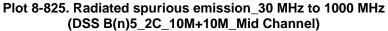


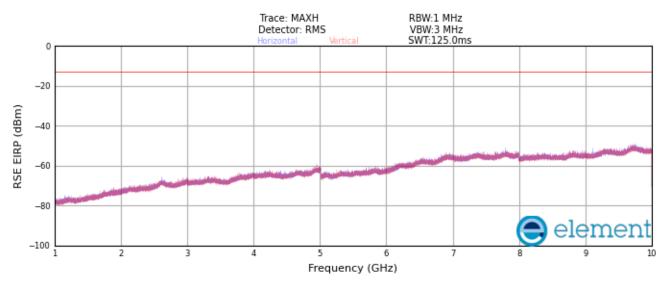


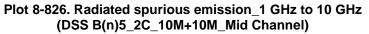
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Test Report S/N:	Test Dates:	EUT Type:	Dage 200 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 369 of 404
© 2022 Element			ES-QP-16-09 Rev.05





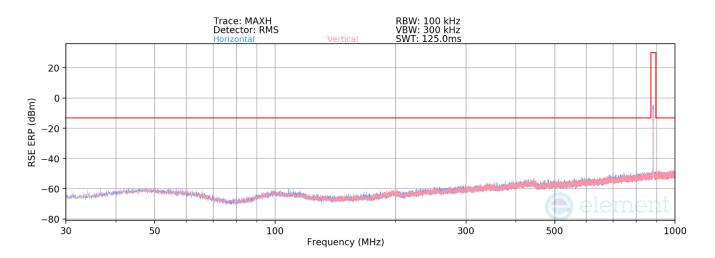


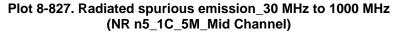


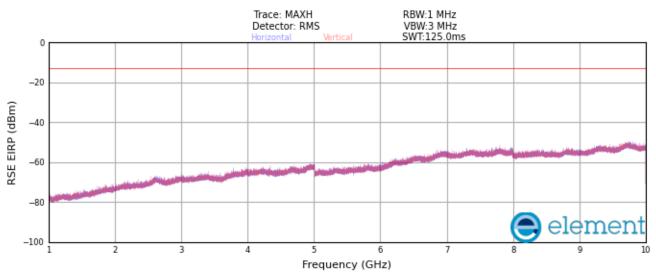


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Test Report S/N:	Test Dates:	EUT Type:		Dega 270 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 370 of 404
© 2022 Element	•	•		ES-OP-16-09 Rev 05





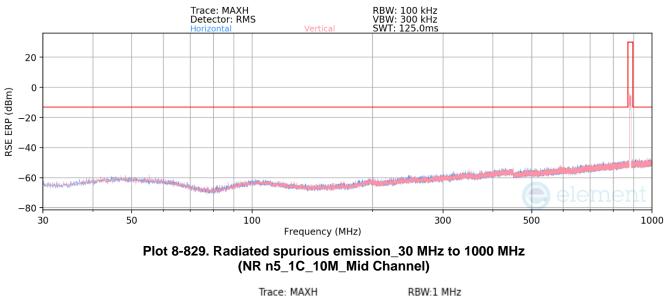


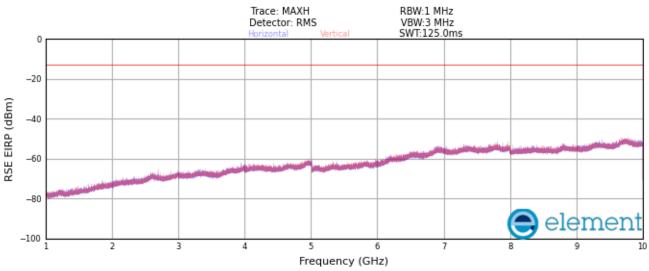




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Test Report S/N:	Test Dates:	EUT Type:	Dara 074 af 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 371 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05



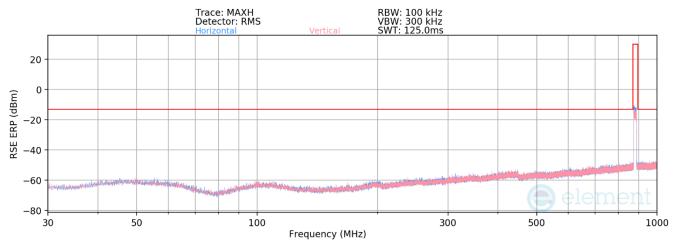


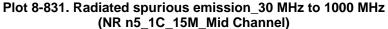


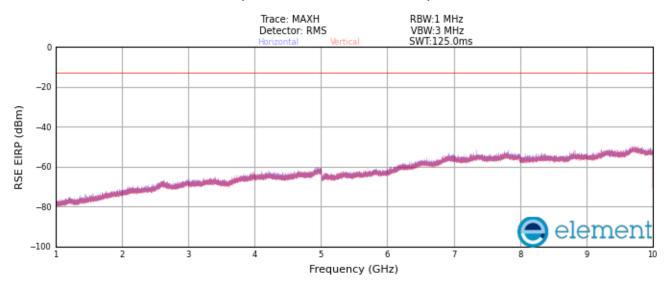


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Test Report S/N:	Test Dates:	EUT Type:	Dama 070 af 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 372 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05





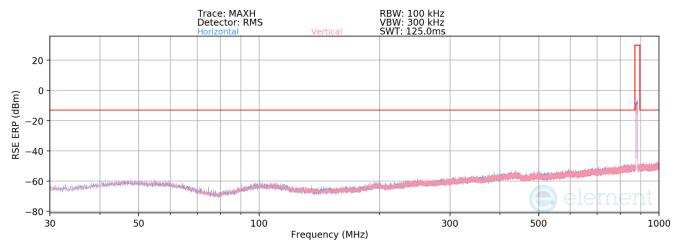


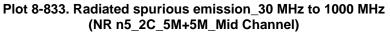


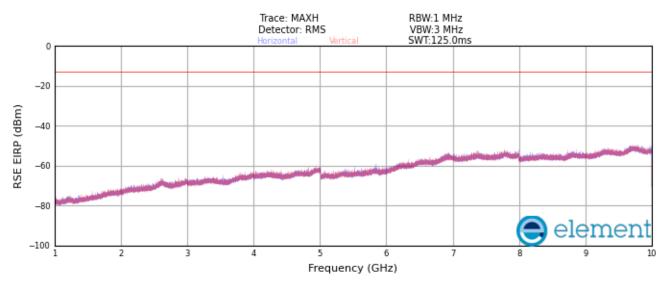
Plot 8-832. Radiated spurious emission\_1 GHz to 10 GHz (NR n5\_1C\_15M\_Mid Channel)

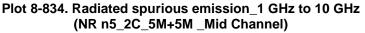
FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 070 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 373 of 404
© 2022 Element		·	ES-QP-16-09 Rev.05





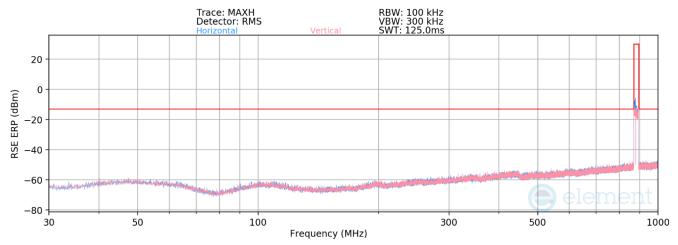


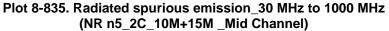


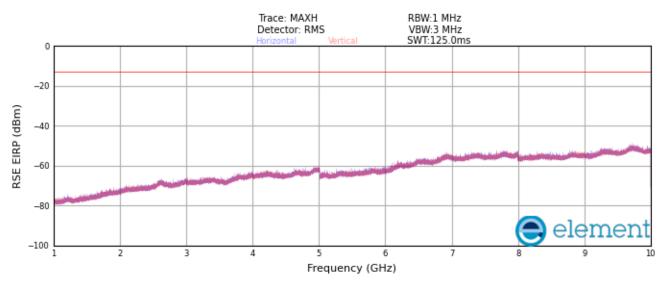


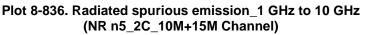
FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 274 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 374 of 404
© 2022 Element	•	•		ES-0P-16-09 Rev 05





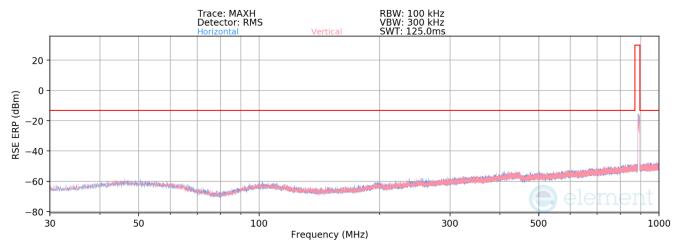


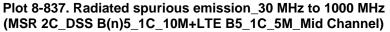


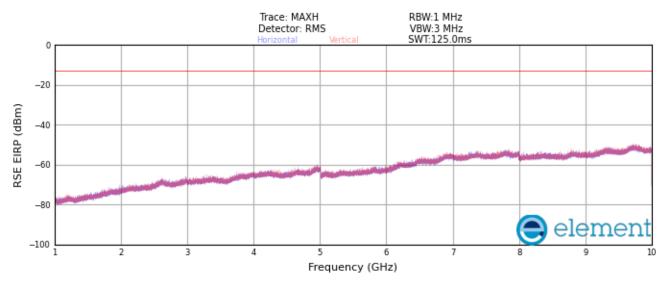


FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 275 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 375 of 404
© 2022 Element	•	•		ES-0P-16-09 Rev 05





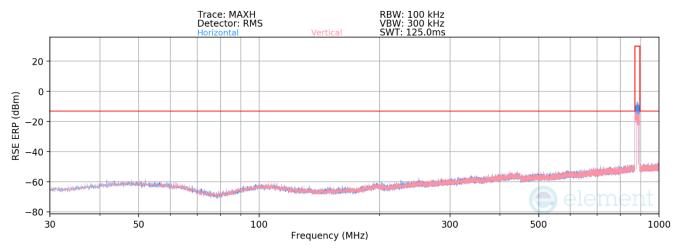


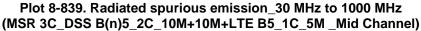


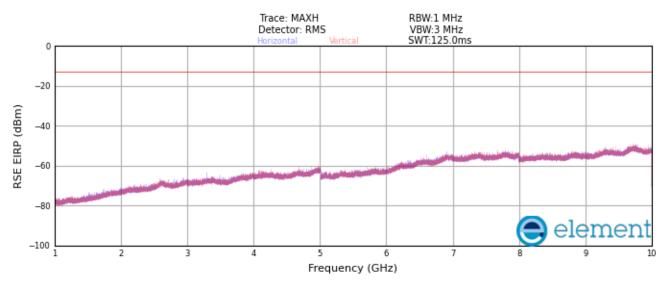
Plot 8-838. Radiated spurious emission\_1 GHz to 10 GHz (MSR 2C\_DSS B(n)5\_1C\_10M+LTE B5\_1C\_5M\_ Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dece 276 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 376 of 404
© 2022 Element			ES-QP-16-09 Rev.05





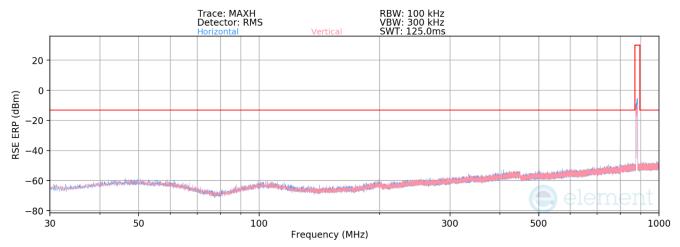


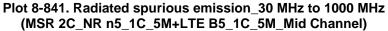


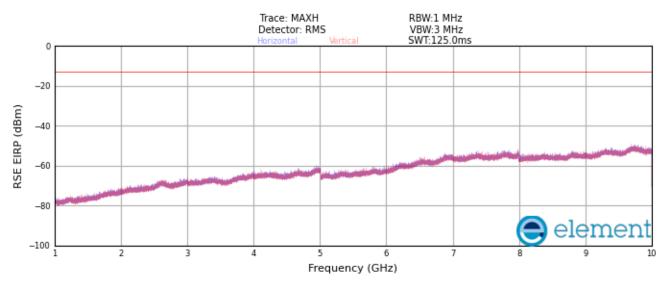
Plot 8-840. Radiated spurious emission\_1 GHz to 10 GHz (MSR 3C\_DSS B(n)5\_2C\_10M+10M+LTE B5\_1C\_5M \_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dana 077 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 377 of 404
© 2022 Element			ES-QP-16-09 Rev.05





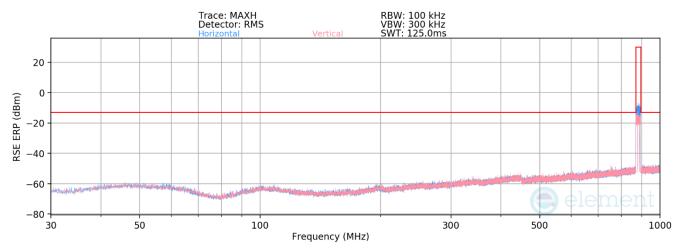


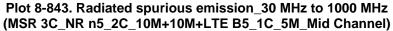


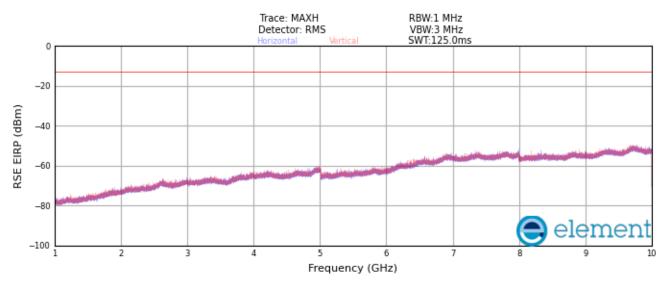


FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 270 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 378 of 404
© 2022 Element		•		ES-OP-16-09 Rev 05





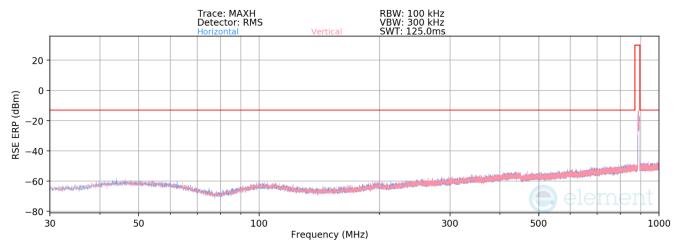


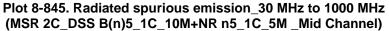


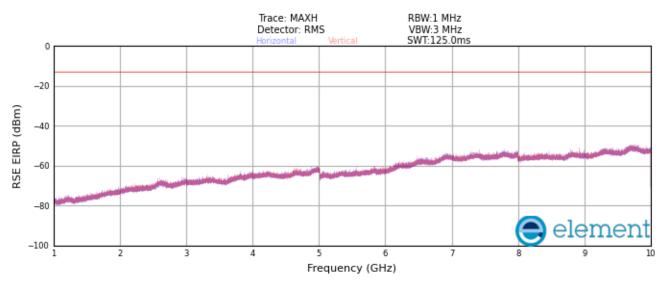
Plot 8-844. Radiated spurious emission\_1 GHz to 10 GHz (MSR 3C\_NR n5\_2C\_10M+10M+LTE B5\_1C\_5M\_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 270 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 379 of 404
© 2022 Element		•		ES-OP-16-09 Rev 05





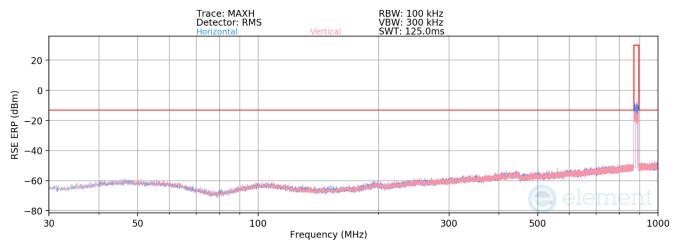


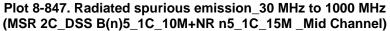


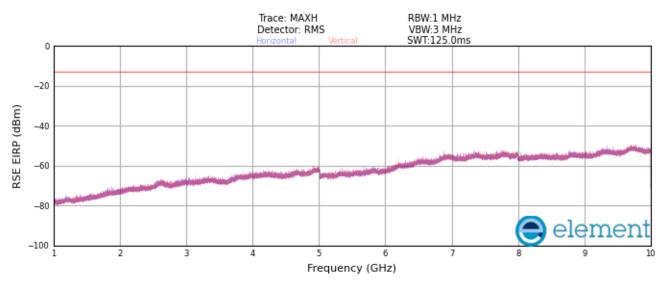
Plot 8-846. Radiated spurious emission\_1 GHz to 10 GHz (MSR 2C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_5M \_Mid Channel)

FCC ID: A3LRF4461D-13A	element)	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 200 of 101
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 380 of 404
© 2022 Element			ES-QP-16-09 Rev.05





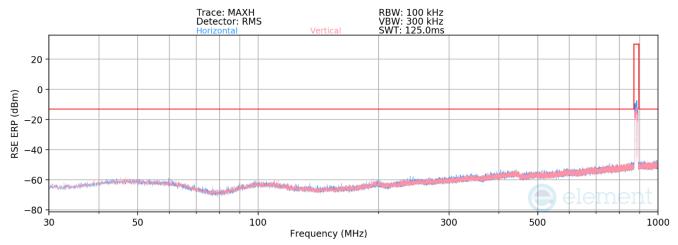




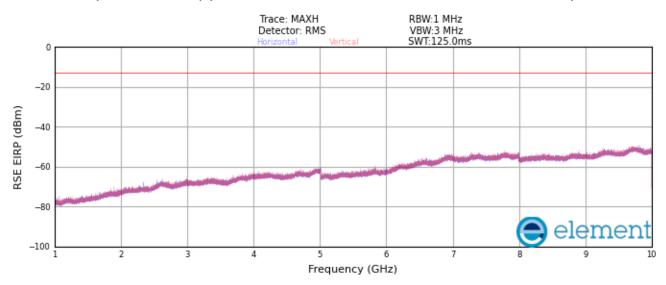
Plot 8-848. Radiated spurious emission\_1 GHz to 10 GHz (MSR 2C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_15M \_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 004 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 381 of 404
© 2022 Element			ES-QP-16-09 Rev.05





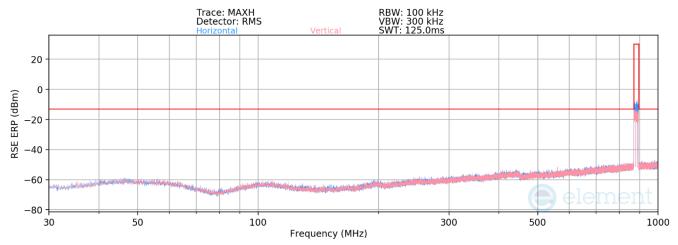
Plot 8-849. Radiated spurious emission\_30 MHz to 1000 MHz (MSR 3C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_5M+LTE B5\_1C\_5M \_Mid Channel)



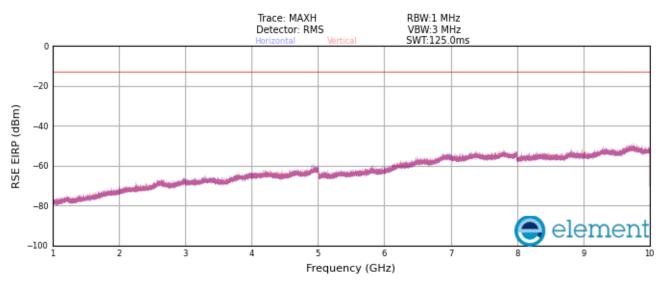
Plot 8-850. Radiated spurious emission\_1 GHz to 10 GHz (MSR 3C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_5M+LTE B5\_1C\_5M \_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 282 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 382 of 404
© 2022 Element			ES OB 16 00 Boy 05





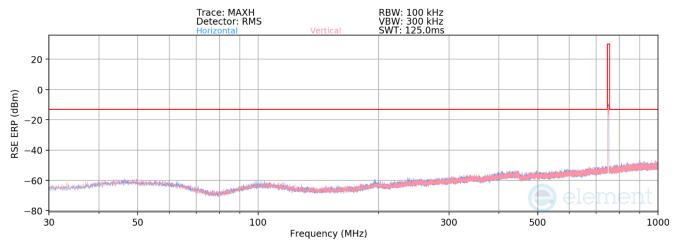
Plot 8-851. Radiated spurious emission\_30 MHz to 1000 MHz (MSR 3C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_10M+LTE B5\_1C\_5M \_Mid Channel)

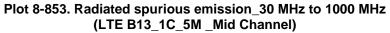


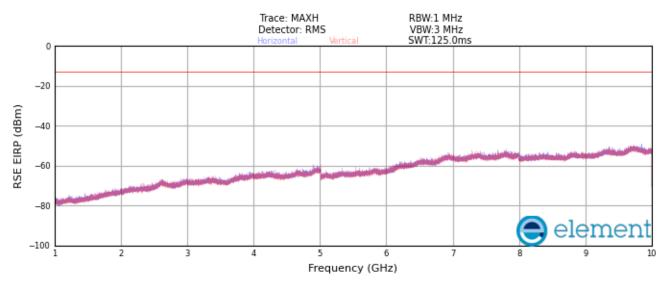
Plot 8-852. Radiated spurious emission\_1 GHz to 10 GHz (MSR 3C\_DSS B(n)5\_1C\_10M+NR n5\_1C\_10M+LTE B5\_1C\_5M \_Mid Channel)

FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SUNG Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 282 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 383 of 404
© 2022 Element			ES OB 16 00 Boy 05





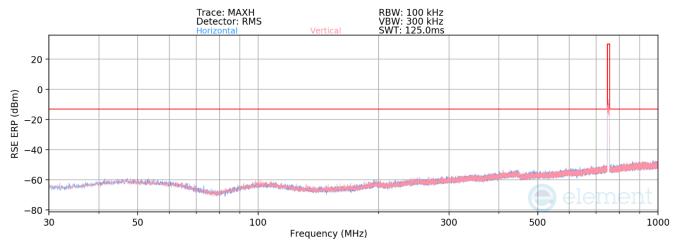


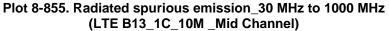


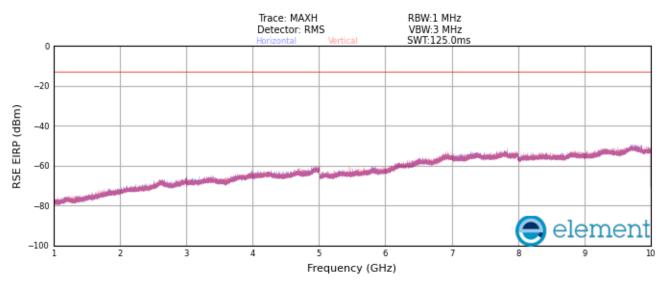


FCC ID: A3LRF4461D-13A	element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 204 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 384 of 404
© 2022 Element	•	•		ES-0P-16-09 Rev 05





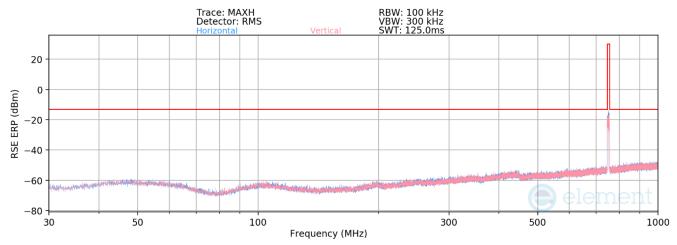


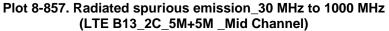


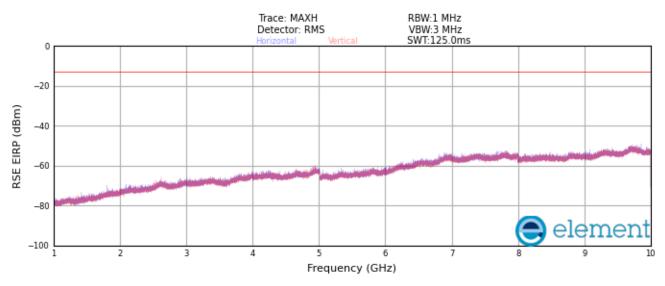


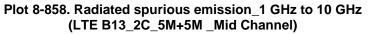
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Test Report S/N:	Test Dates:	EUT Type:		Dega 285 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 385 of 404
© 2022 Element	•	•		ES-OP-16-09 Rev 05





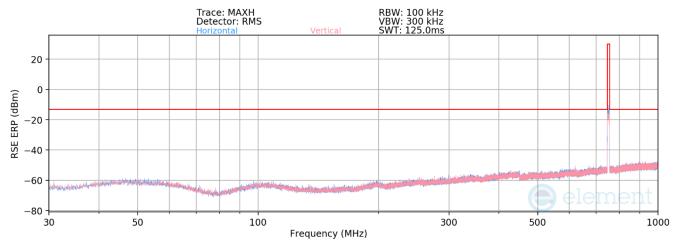


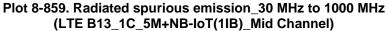


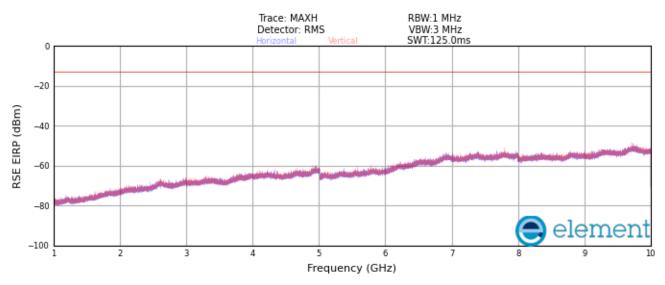


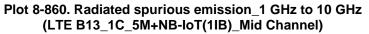
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Test Report S/N:	Test Dates:	EUT Type:		Dage 286 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 386 of 404
© 2022 Element	•	•		ES-0P-16-09 Rev 05





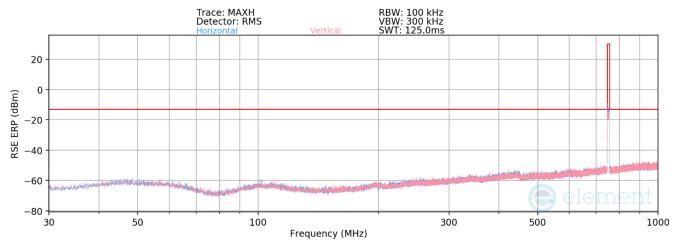


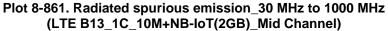


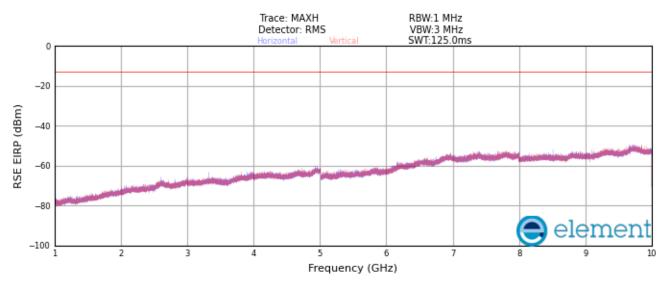


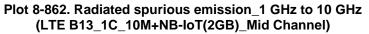
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Test Report S/N:	Test Dates:	EUT Type:	Dara 007 at 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 387 of 404
© 2022 Element			ES-QP-16-09 Rev.05





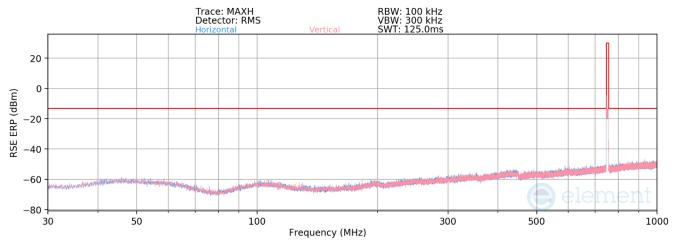


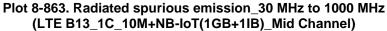


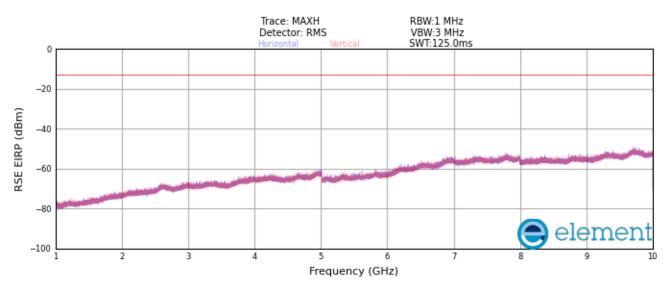


FCC ID: A3LRF4461D-13A	element MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	
Test Report S/N:	Test Dates:	EUT Type:		Dage 200 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 388 of 404
© 2022 Element	•	•		ES-OP-16-09 Rev 05





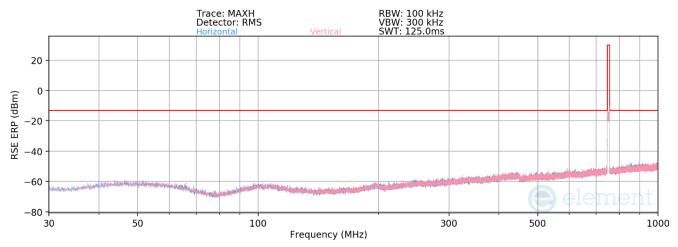


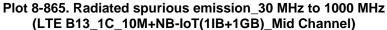


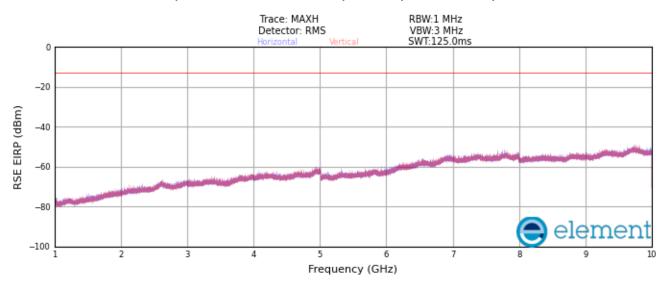
Plot 8-864. Radiated spurious emission\_1 GHz to 10 GHz (LTE B13\_1C\_10M+NB-IoT(1GB+1IB)\_Mid Channel)

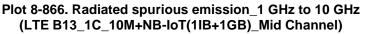
FCC ID: A3LRF4461D-13A	Certification)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 280 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 389 of 404
© 2022 Element			ES-QP-16-09 Rev.05





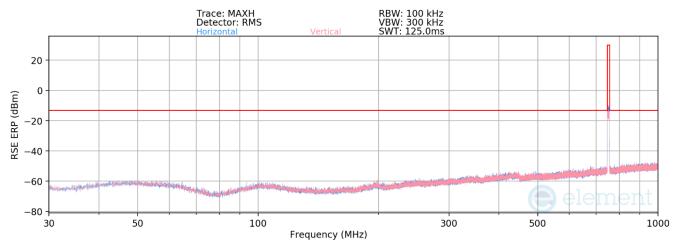


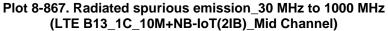


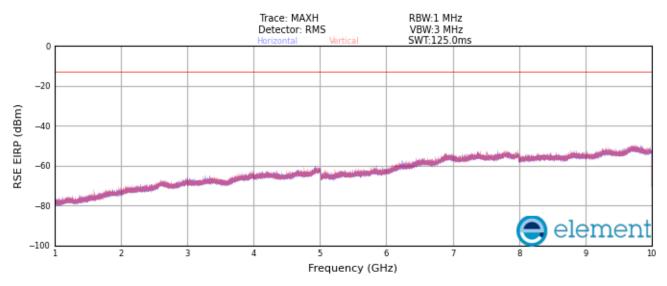


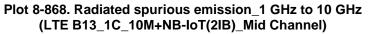
FCC ID: A3LRF4461D-13A	element	lement MEASUREMENT REPORT A (CERTIFICATION) A	
Test Report S/N:	Test Dates:	EUT Type:	Baga 200 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 390 of 404
© 2022 Element		•	ES-OP-16-09 Rev 05





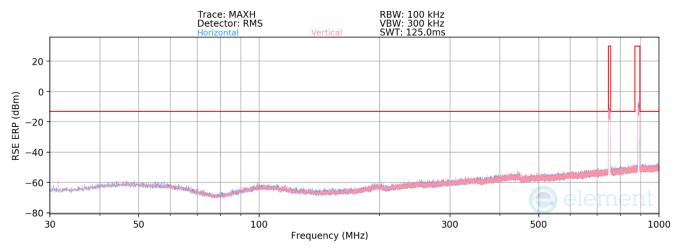




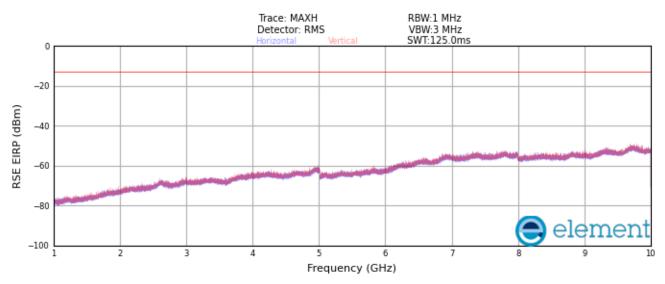


FCC ID: A3LRF4461D-13A	CERTIFICATION)		SAMSUNG	
Test Report S/N:	Test Dates:	EUT Type:		Dage 201 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)		Page 391 of 404
© 2022 Element	•	•		ES-0P-16-09 Rev 05





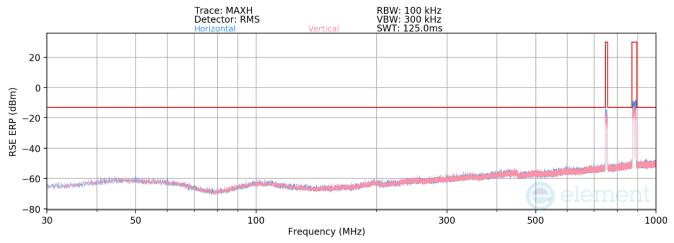
Plot 8-869. Radiated spurious emission\_30 MHz to 1000 MHz (LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M\_Mid Channel\_2T)

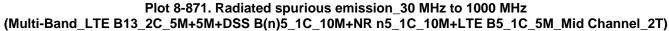


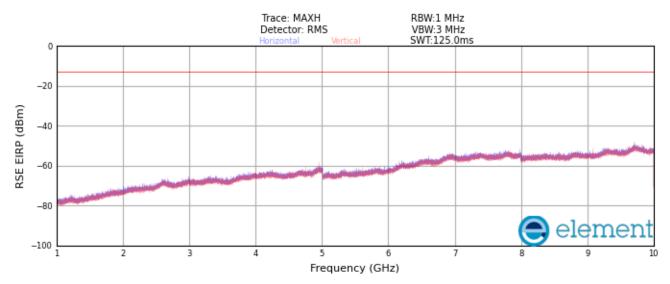
Plot 8-870. Radiated spurious emission\_1 GHz to 10 GHz (LTE B13\_1C\_10M+NB-IoT(2GB)+LTE B5\_1C\_10M\_Mid Channel\_2T)

FCC ID: A3LRF4461D-13A	CERTIFICATION)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 202 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 392 of 404
© 2022 Element			ES-QP-16-09 Rev.05









Plot 8-872. Radiated spurious emission\_1 GHz to 10 GHz (Multi-Band\_LTE B13\_2C\_5M+5M+DSS B(n)5\_1C\_10M+NR n5\_1C\_10M+LTE B5\_1C\_5M\_Mid Channel\_2T)

FCC ID: A3LRF4461D-13A	element	lement MEASUREMENT REPORT (CERTIFICATION)	
Test Report S/N:	Test Dates:	EUT Type:	Daga 202 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 393 of 404
© 2022 Element			ES-OP-16-00 Pov 05



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Heigh [cm]	Turntable azimuth [degree]	Analyzer Level [dBm/MHz]	AFCL [dBm]	Field Strength [ <sup>dB</sup> #//m]	RSE EIRP [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]
983.42	Н	100	30	-83.31	25.14	48.83	-46.43	-13.00	-33.43
954.37	V	100	60	-84.42	24.63	47.21	-48.05	-13.00	-35.05
9792.51	Н	150	20	-75.25	10.06	45.96	-53.45	-13.00	-40.45
9784.35	V	150	110	-74.28	10.01	47.03	-52.53	-13.00	-39.53

Table 8-313. Radiated spurious emission Worst case Summary Data (Multi-Band\_LTE B13\_2C\_5M+5M+DSS B(n)5\_1C\_10M+NR n5\_1C\_10M+LTE B5\_1C\_5M\_Mid Channel)

FCC ID: A3LRF4461D-13A	element)	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 204 of 404
8K23073101-00.A3L	04/12/2023 - 08/03/2023	RRU(RF4461d)	Page 394 of 404
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