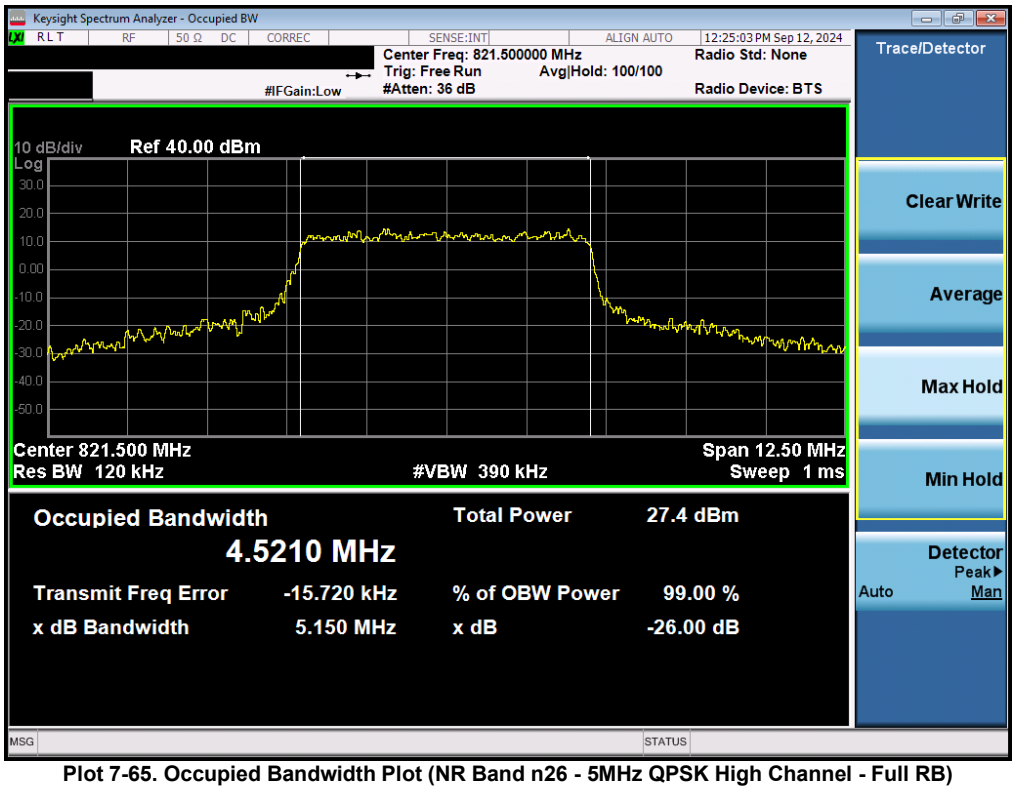
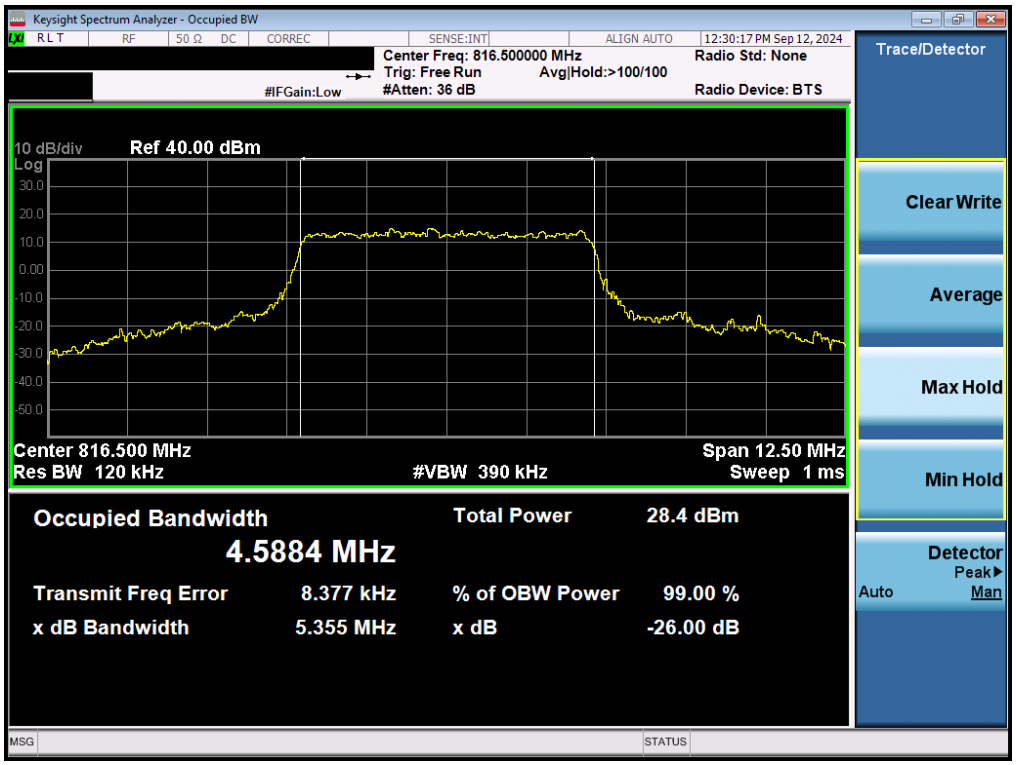
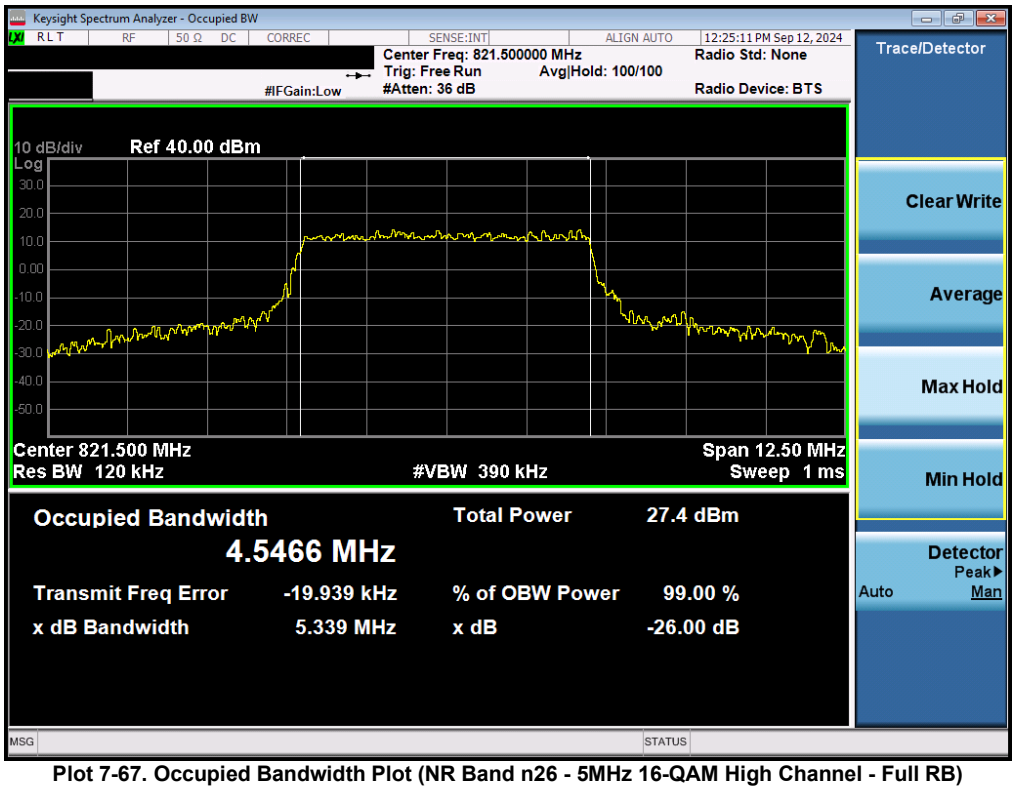


Plot 7-65. Occupied Bandwidth Plot (NR Band n26 - 5MHz QPSK High Channel - Full RB)



Plot 7-66. Occupied Bandwidth Plot (NR Band n26 - 5MHz 16-QAM Low Channel - Full RB)



Plot 7-67. Occupied Bandwidth Plot (NR Band n26 - 5MHz 16-QAM High Channel - Full RB)

7.4 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 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.

The minimum permissible attenuation level of any spurious emission is 43 + 10 $\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
2. RBW ≥ 100kHz
3. VBW ≥ 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

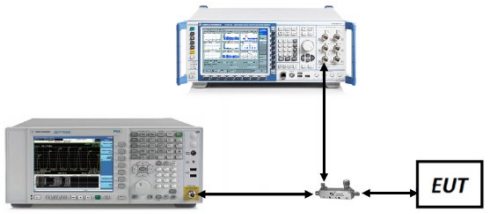


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

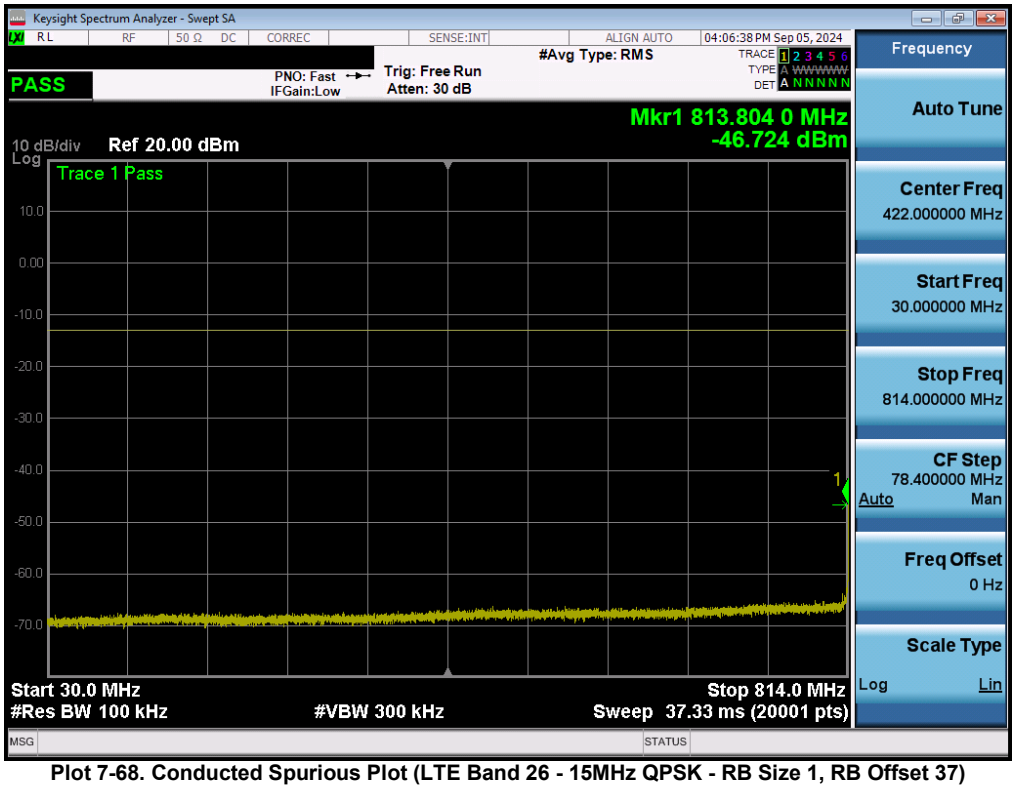
1. Per Part 22H and 90, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

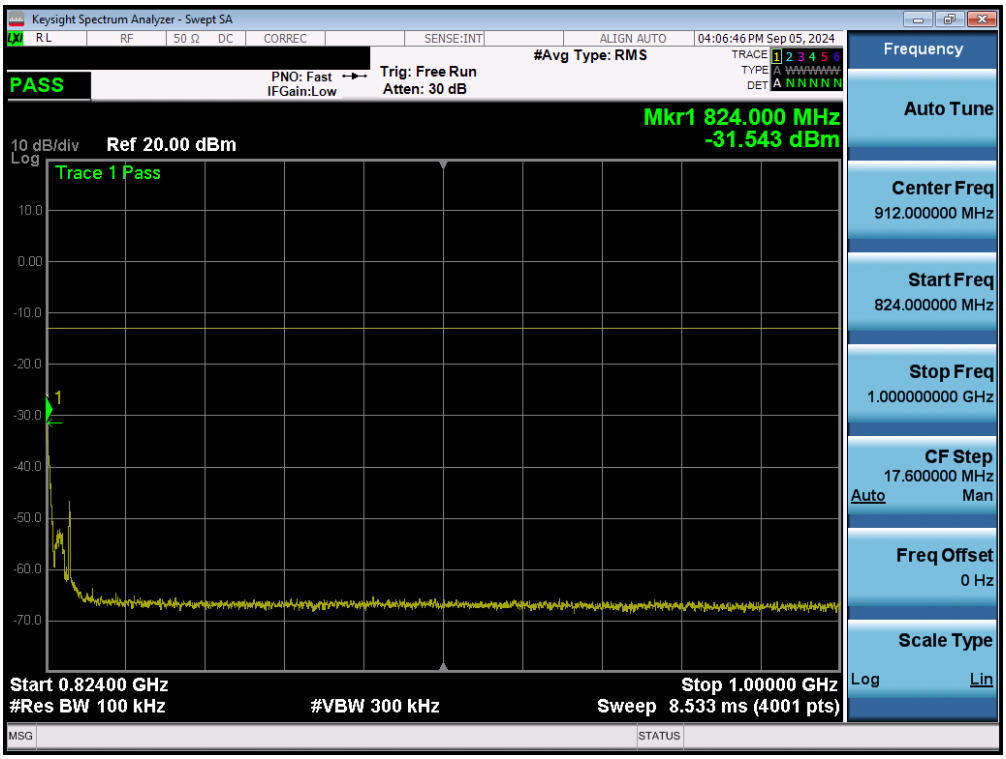
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
LTE-B26	15 MHz	Mid	30.0 - 814.0	-46.72	-13	-33.72
		Mid	824.0 - 1000.0	-31.54	-13	-18.54
		Mid	1000.0 -10000.0	-47.24	-13	-34.24
NR-n26	20 MHz	Mid	30.0 - 814.0	-60.84	-13	-47.84
		Mid	824.0 - 1000.0	-46.71	-13	-33.71
		Mid	1000.0 -10000.0	-47.54	-13	-34.54

Table 7-11. Conducted Spurious Emission Results – ANT A

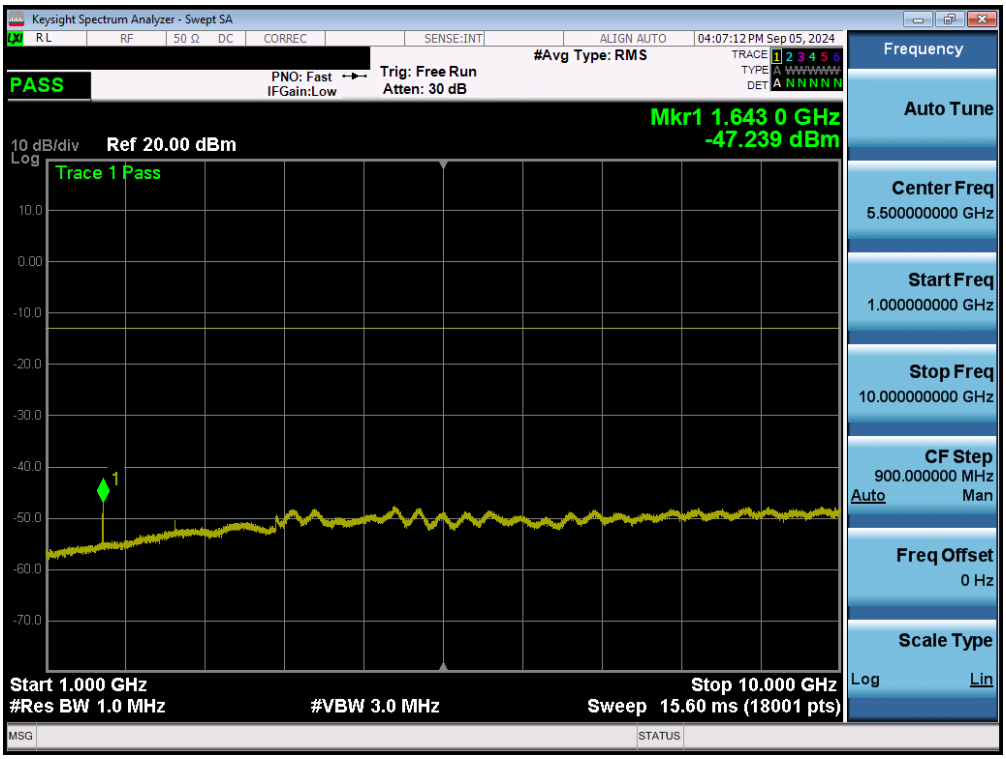
LTE Band 26 -Ant A



Plot 7-68. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

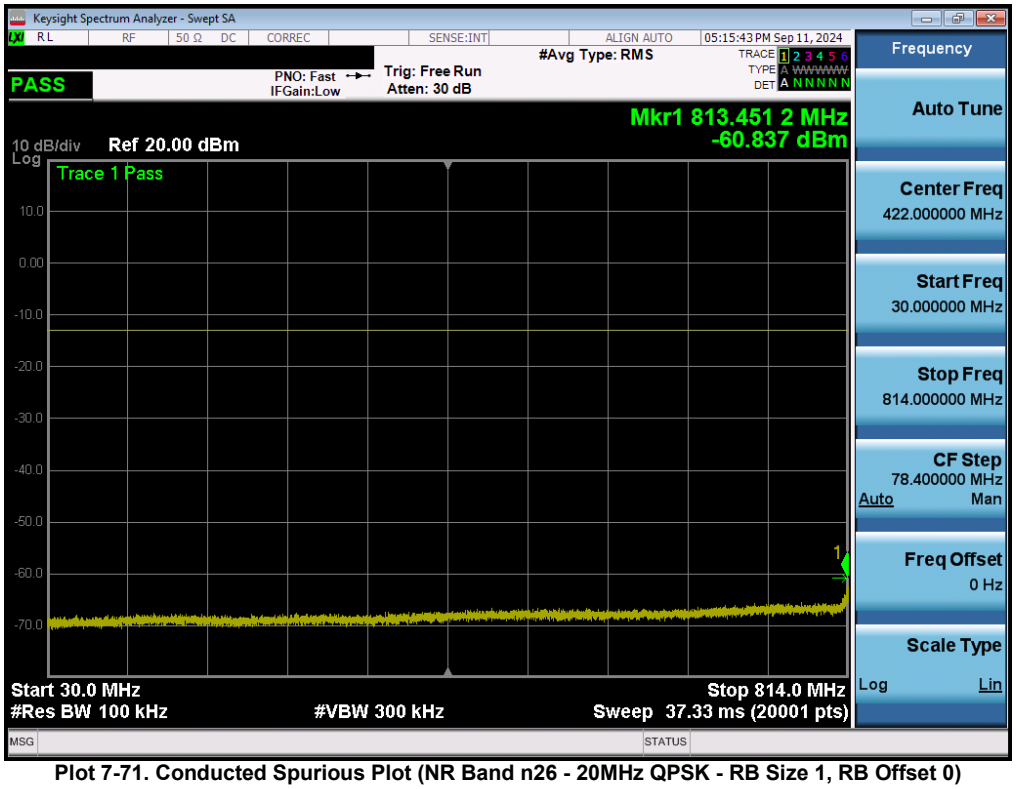


Plot 7-69. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

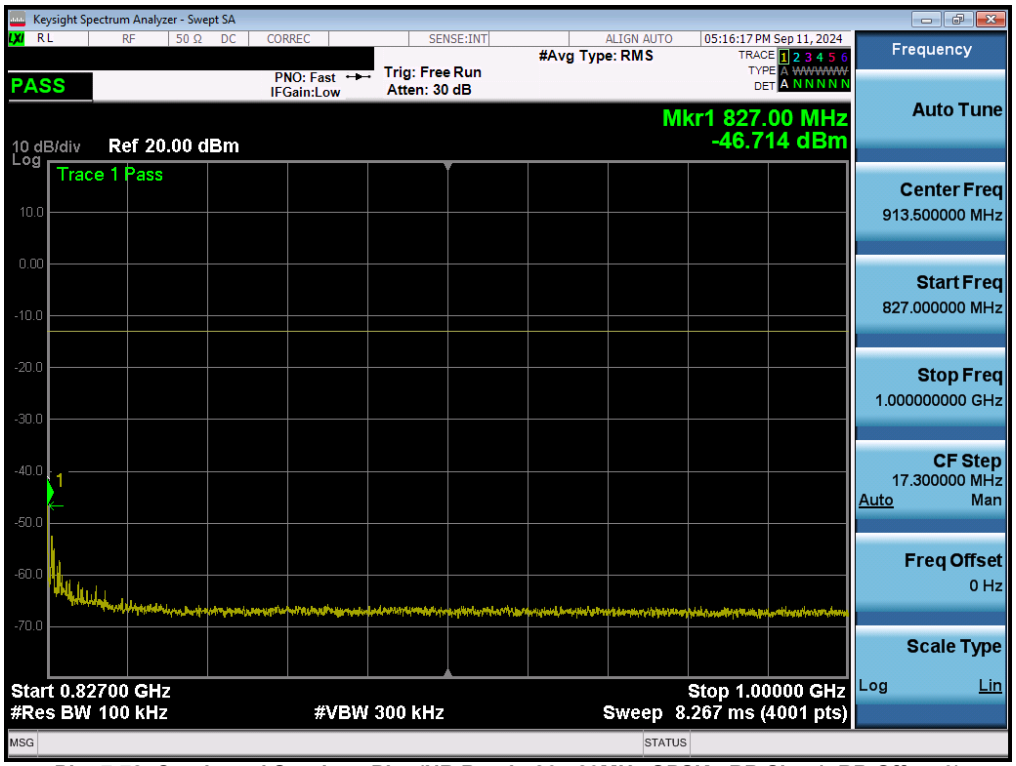


Plot 7-70. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

NR Band n26 - Ant A



Plot 7-71. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)



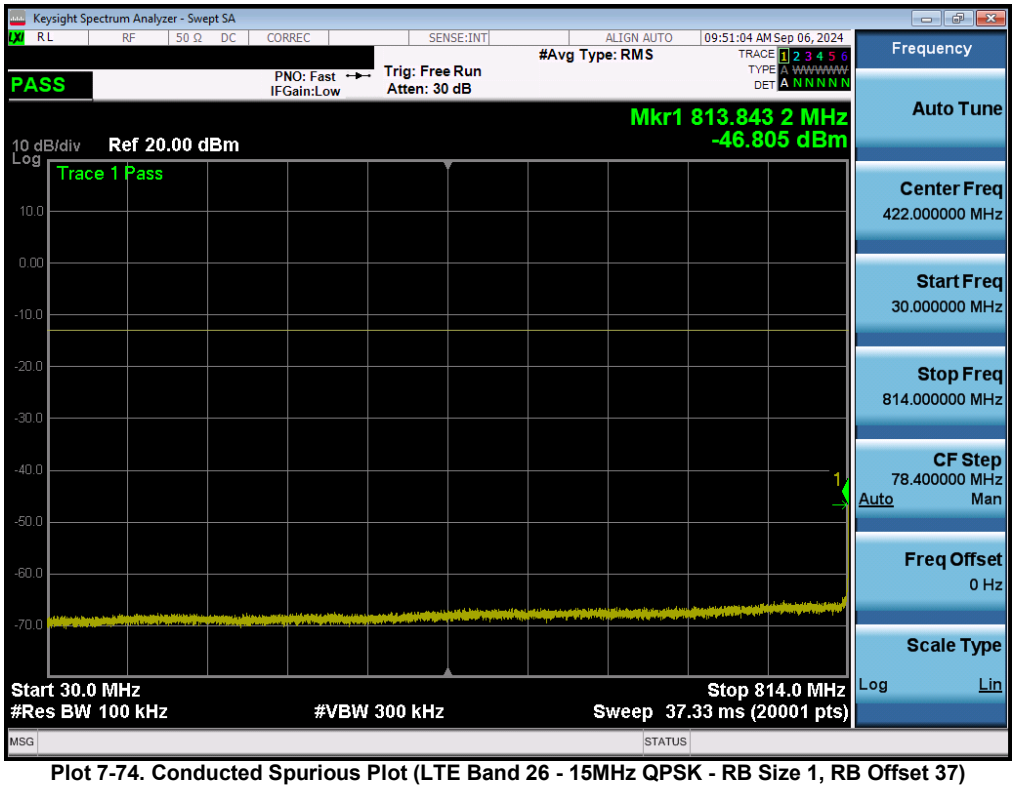
Plot 7-72. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)

Plot 7-73. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)

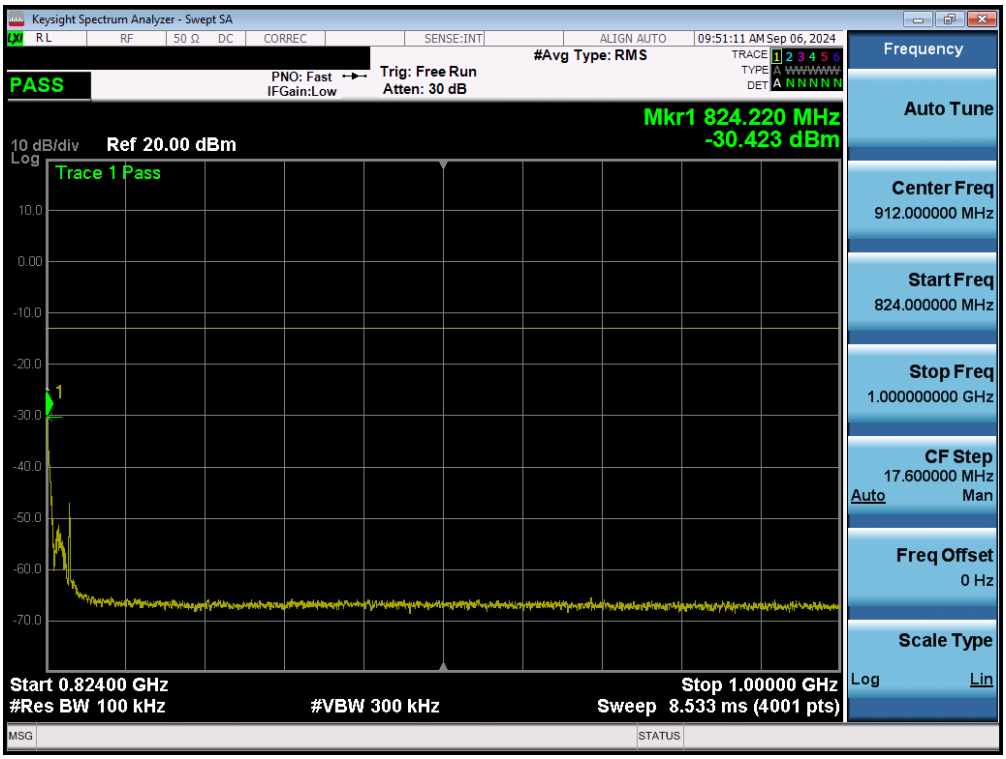
Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
LTE-B26	15 MHz	Mid	30.0 - 814.0	-46.81	-13	-33.81
		Mid	824.0 - 1000.0	-30.42	-13	-17.42
		Mid	1000.0 -10000.0	-47.32	-13	-34.32
NR-n26	20 MHz	Mid	30.0 - 814.0	-61.61	-13	-48.61
		Mid	824.0 - 1000.0	-51.37	-13	-38.37
		Mid	1000.0 -10000.0	-46.22	-13	-33.22

Table 7-12. Conducted Spurious Emission Results – ANT E

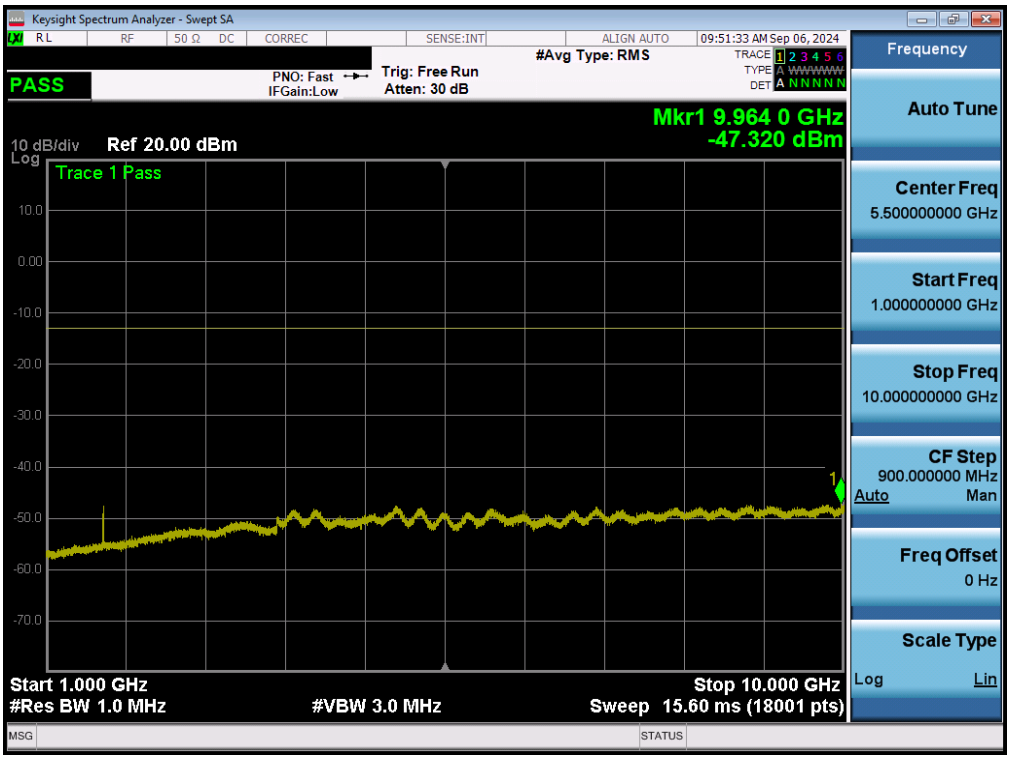
LTE Band 26 -Ant E



Plot 7-74. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

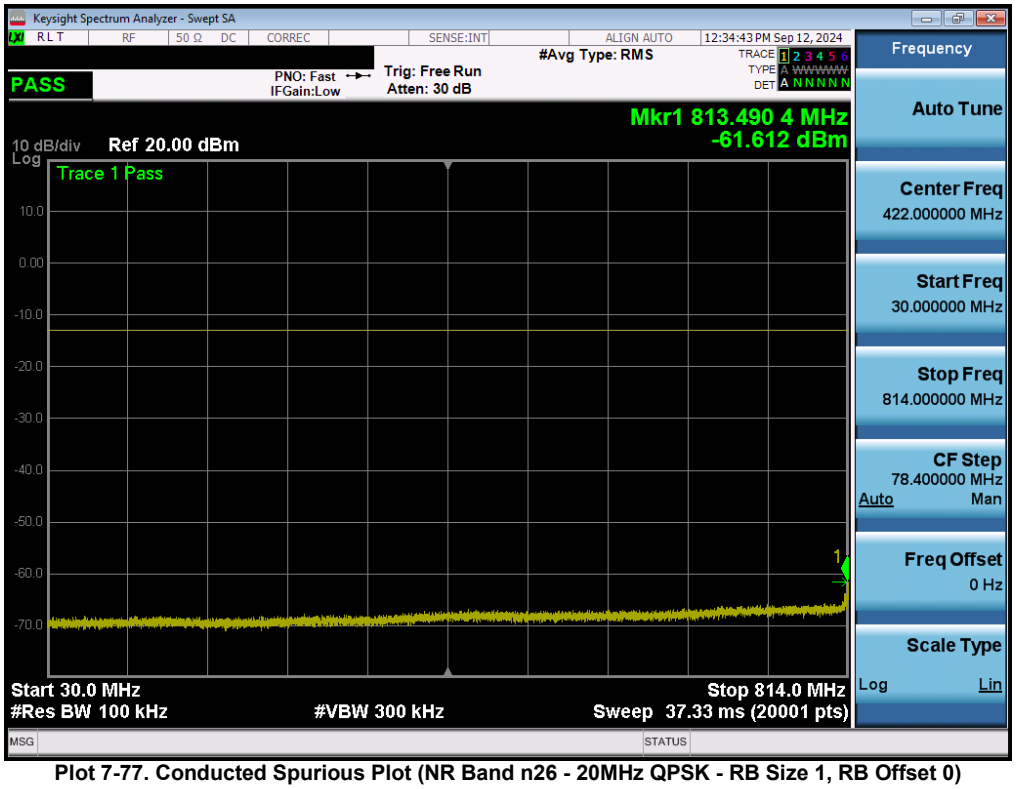


Plot 7-75. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

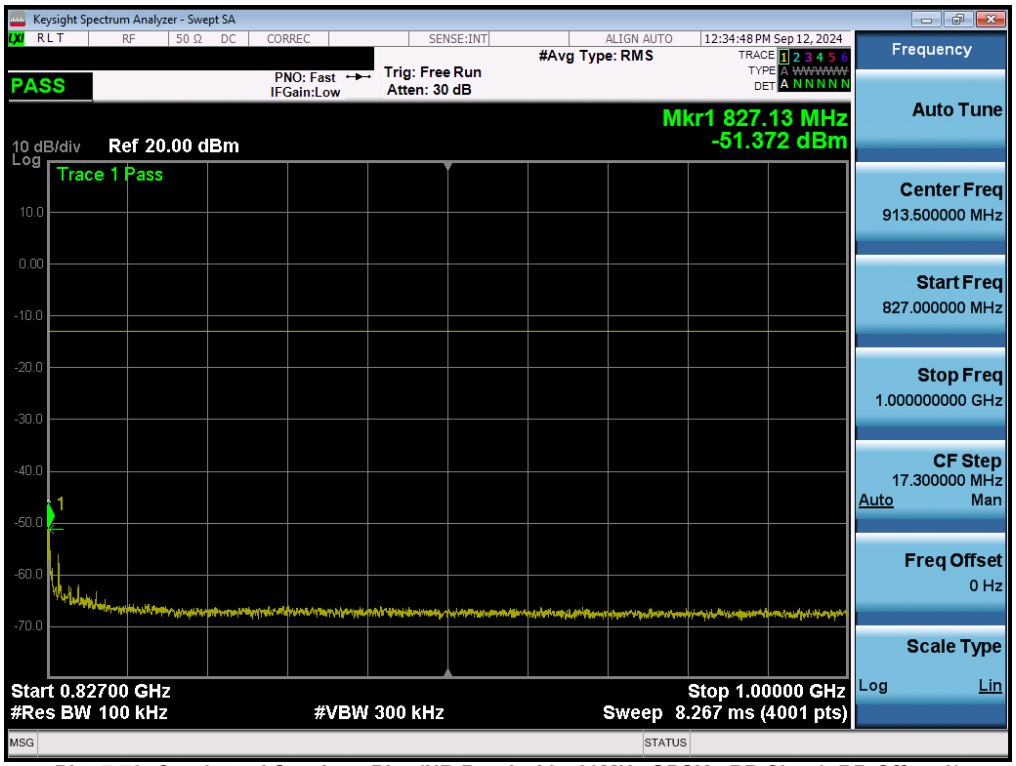


Plot 7-76. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 37)

NR Band n26 - Ant E



Plot 7-77. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)



Plot 7-78. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)

Plot 7-79. Conducted Spurious Plot (NR Band n26 - 20MHz QPSK - RB Size 1, RB Offset 0)

7.5 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 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.

For LTE B26 operation under Part 90.691, the minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by greater than 37.5 kHz is 43 + 10log$_{10}$(P$_{[Watts]}$), where P is the transmitter power in Watts. The minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by up to and including 37.5 kHz is 50 + 10log$_{10}$(P$_{[Watts]}$), where P is the transmitter power in Watts.

For LTE Band 14 operation under Part 90.543, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

Additionally, for LTE Band 14 operation, on all frequencies between 769-775 MHz and 799-805 MHz, the power of any emission shall be attenuated by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

Test Settings

1. Span was set large enough so as to capture all out of band emissions near the band edge
2. RBW = 100 kHz
3. VBW = 300 kHz
4. Detector = RMS
5. Trace mode = trace average
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

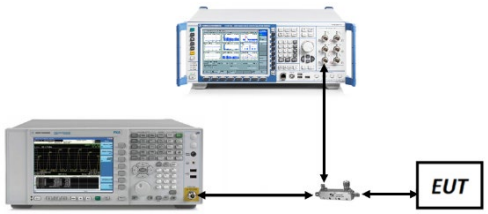


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1. For channel edge emission, the signal analyzer's "ACP" measurement capability is used.

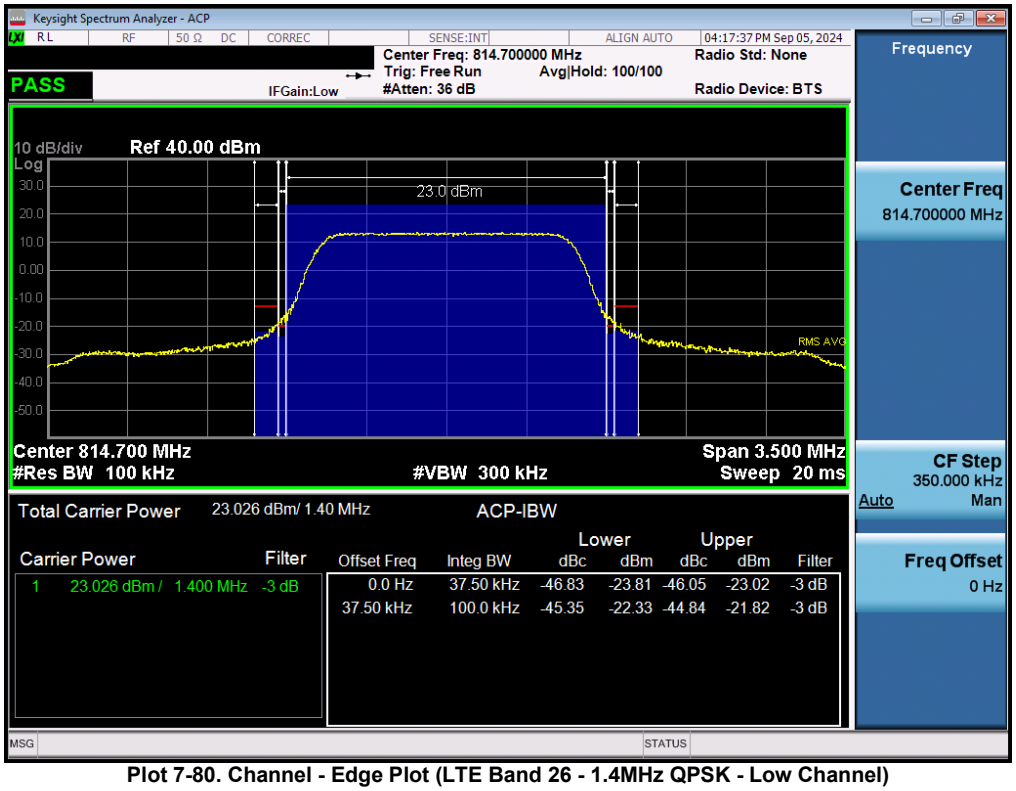
2. Per 22.917(b) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission 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 emission are attenuated at least 26 dB below the transmitter power.

3. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

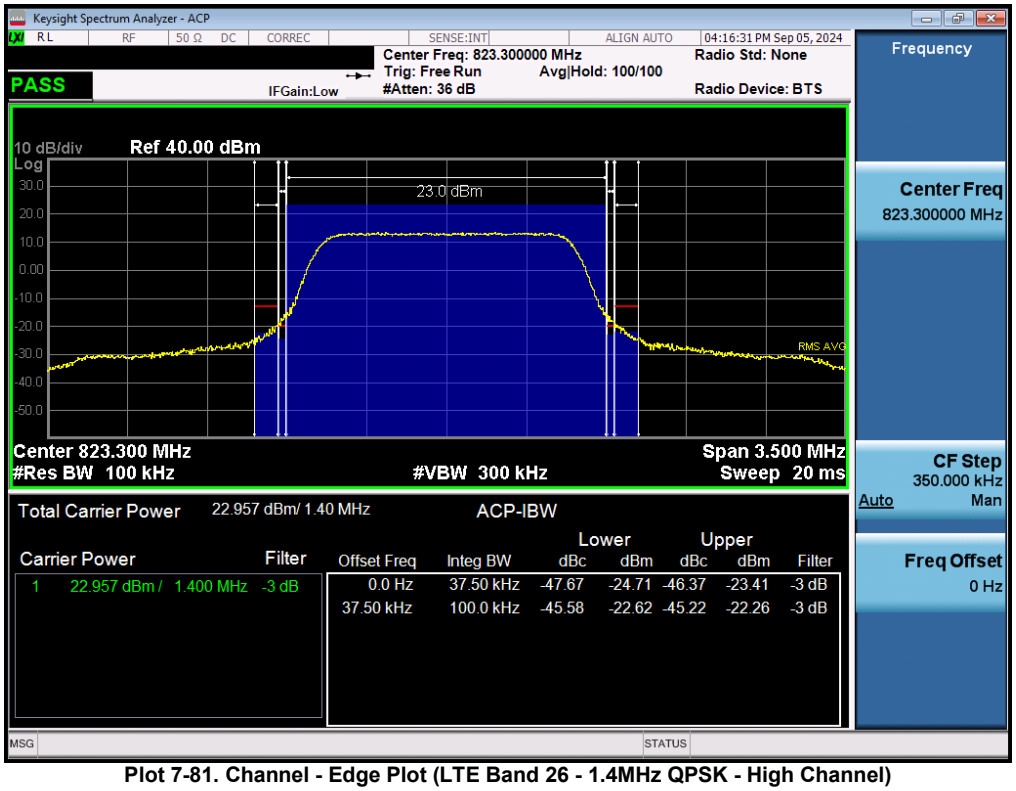
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
LTE-B26	15 MHz	Mid	Band Edge	-34.32	-20	-14.32
	10 MHz	Mid	Band Edge	-30.86	-20	-10.86
	5 MHz	Low	Band Edge	-26.75	-20	-6.75
		High	Band Edge	-25.92	-20	-5.92
	3 MHz	Low	Band Edge	-23.41	-20	-3.41
		High	Band Edge	-23.05	-20	-3.05
	1.4 MHz	Low	Band Edge	-23.02	-20	-3.02
		High	Band Edge	-23.41	-20	-3.41
NR-n26	20 MHz	Mid	Band Edge	-37.84	-20	-17.84
	15 MHz	Mid	Band Edge	-36.83	-20	-16.83
	10 MHz	Mid	Band Edge	-36.17	-20	-16.17
	5 MHz	Low	Band Edge	-32.56	-20	-12.56
		High	Band Edge	-32.82	-20	-12.82

Table 7-13. Band Edge Test Results – Ant A

LTE Band 26 – Ant A

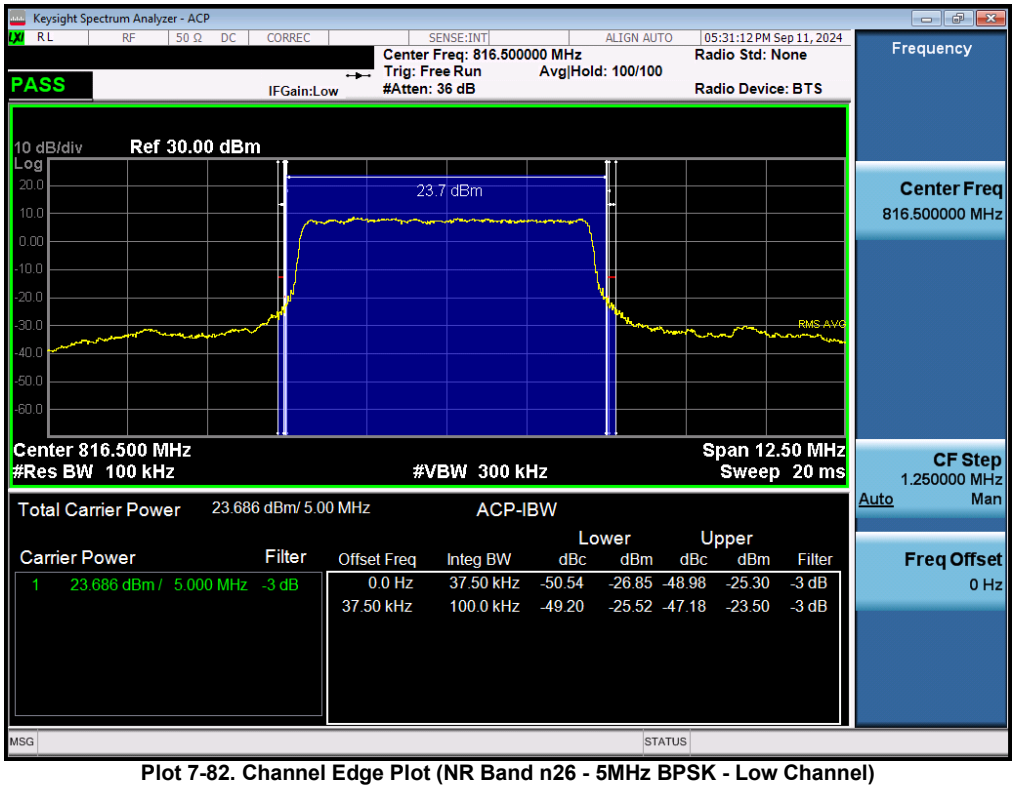


Plot 7-80. Channel - Edge Plot (LTE Band 26 - 1.4MHz QPSK - Low Channel)

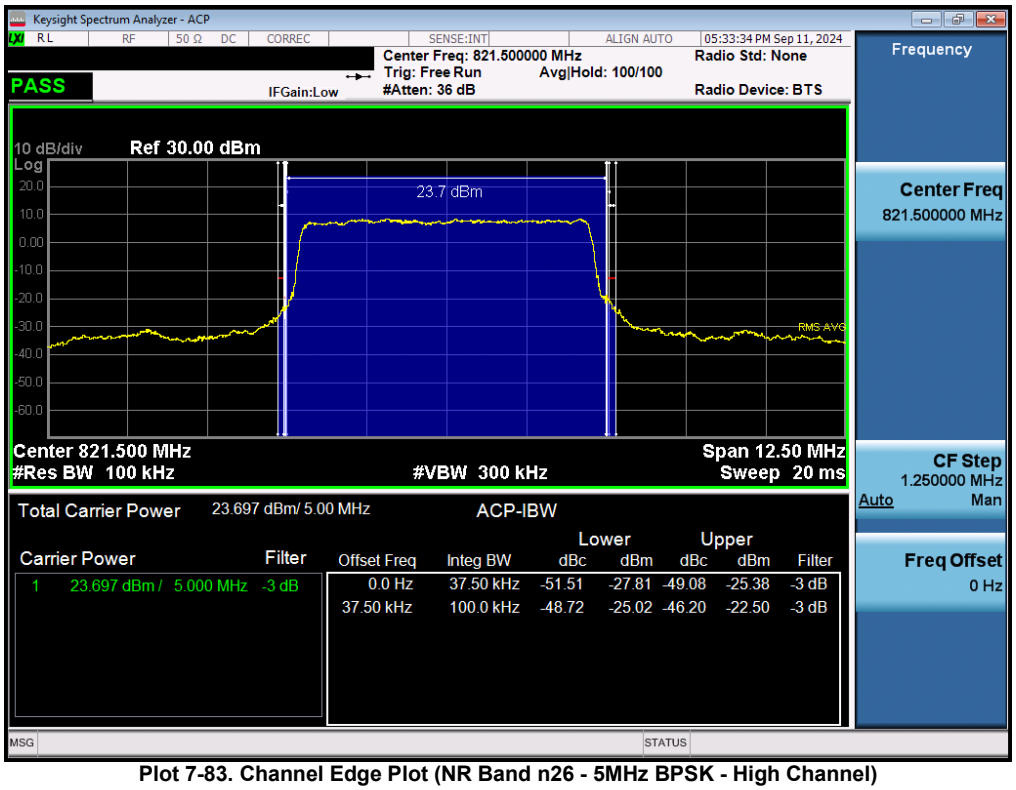


Plot 7-81. Channel - Edge Plot (LTE Band 26 - 1.4MHz QPSK - High Channel)

NR Band n26 -Ant A



Plot 7-82. Channel Edge Plot (NR Band n26 - 5MHz BPSK - Low Channel)

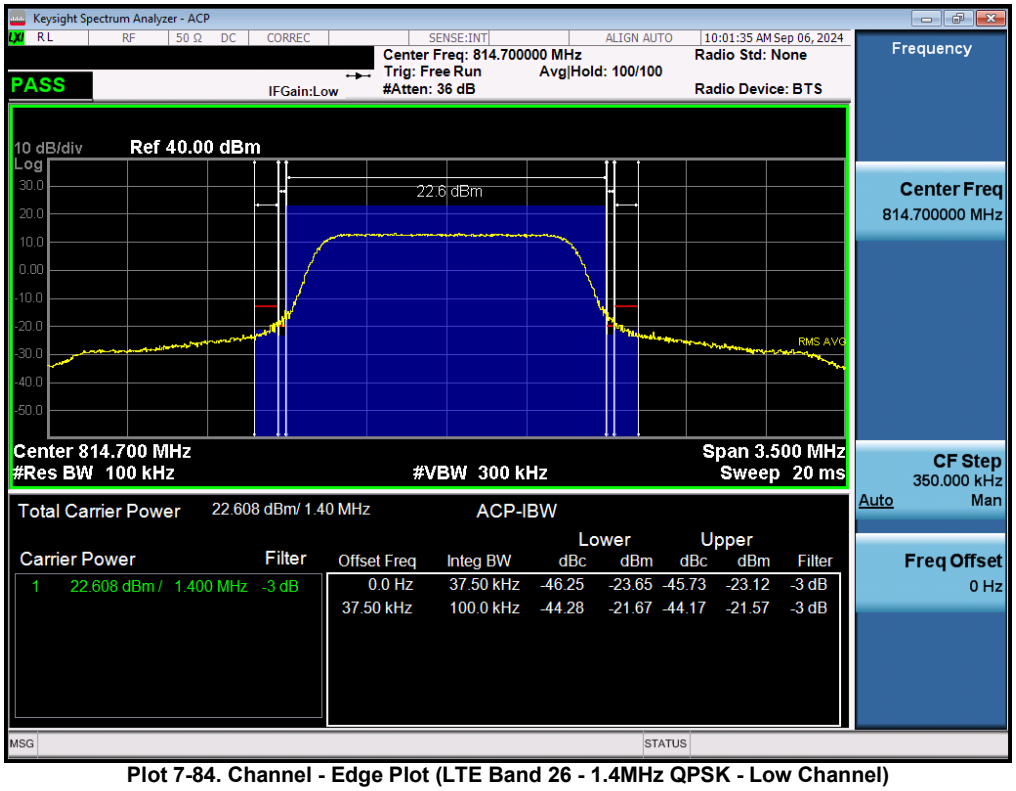


Plot 7-83. Channel Edge Plot (NR Band n26 - 5MHz BPSK - High Channel)

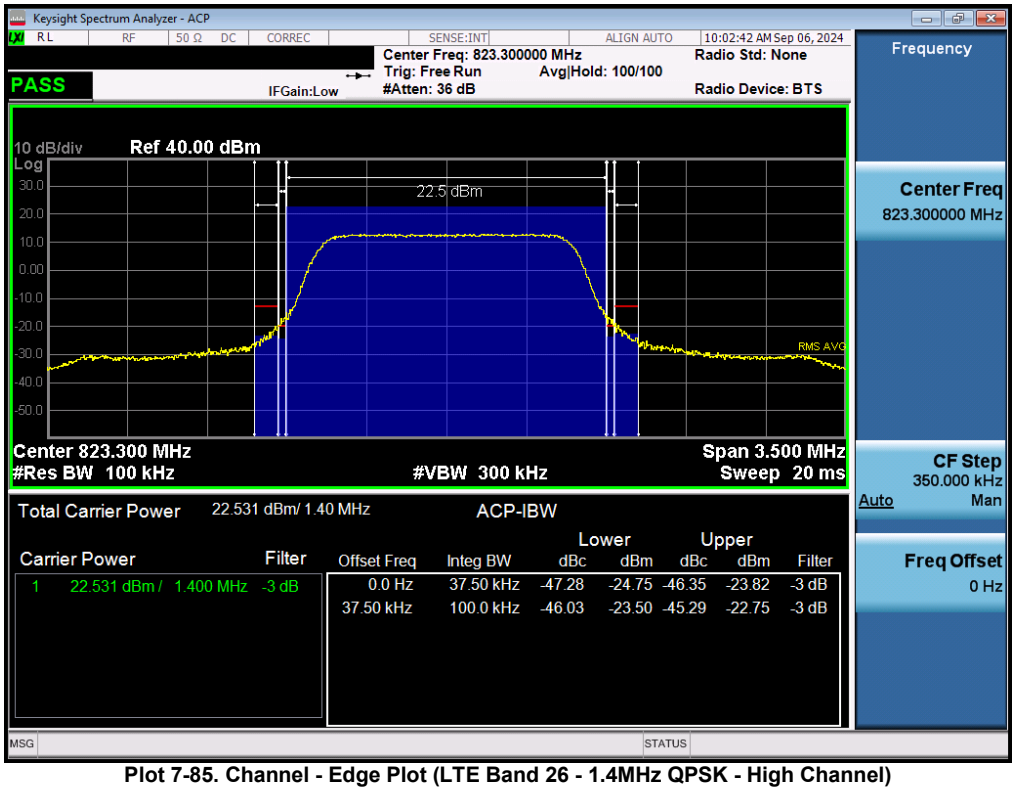
Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
LTE-B26	15 MHz	Mid	Band Edge	-33.69	-20	-13.69
	10 MHz	Mid	Band Edge	-30.65	-20	-10.65
	5 MHz	Low	Band Edge	-26.80	-20	-6.80
		High	Band Edge	-27.60	-20	-7.60
	3 MHz	Low	Band Edge	-23.79	-20	-3.79
		High	Band Edge	-24.36	-20	-4.36
	1.4 MHz	Low	Band Edge	-23.12	-20	-3.12
		High	Band Edge	-23.82	-20	-3.82
NR-n26	20 MHz	Mid	Band Edge	-37.84	-20	-17.84
	15 MHz	Mid	Band Edge	-36.83	-20	-16.83
	10 MHz	Mid	Band Edge	-36.17	-20	-16.17
	5 MHz	Low	Band Edge	-32.56	-20	-12.56
		High	Band Edge	-32.82	-20	-12.82

Table 7-14. Band Edge Test Results – Ant E

LTE Band 26 – Ant E

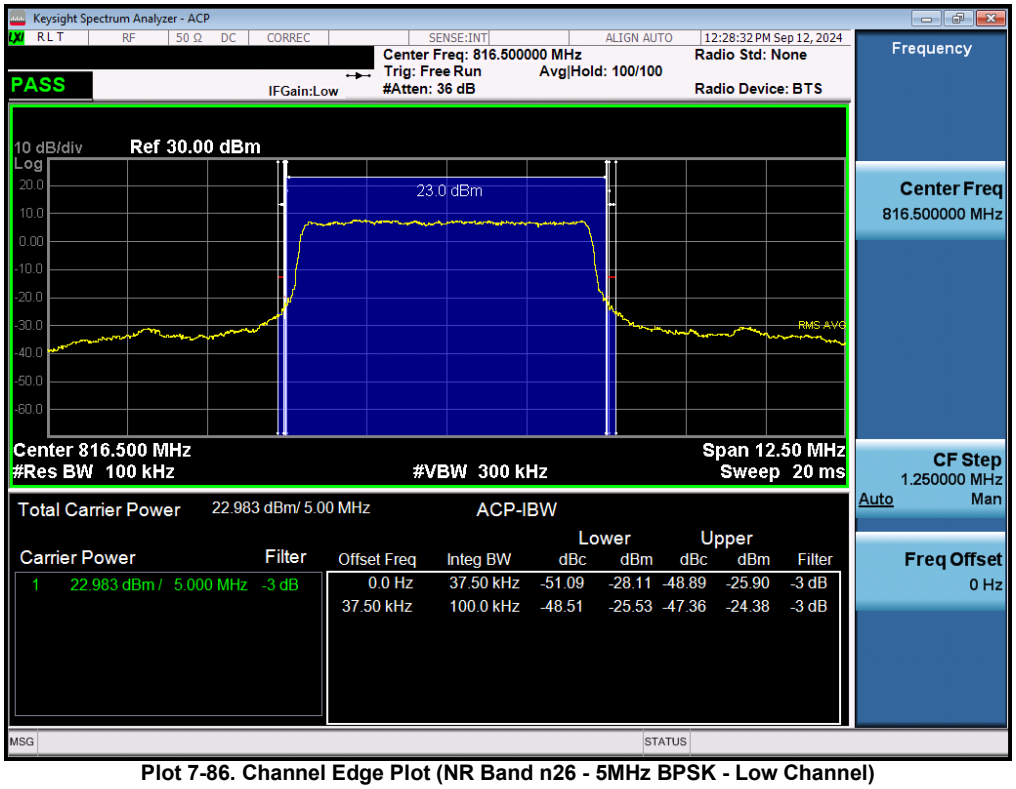


Plot 7-84. Channel - Edge Plot (LTE Band 26 - 1.4MHz QPSK - Low Channel)

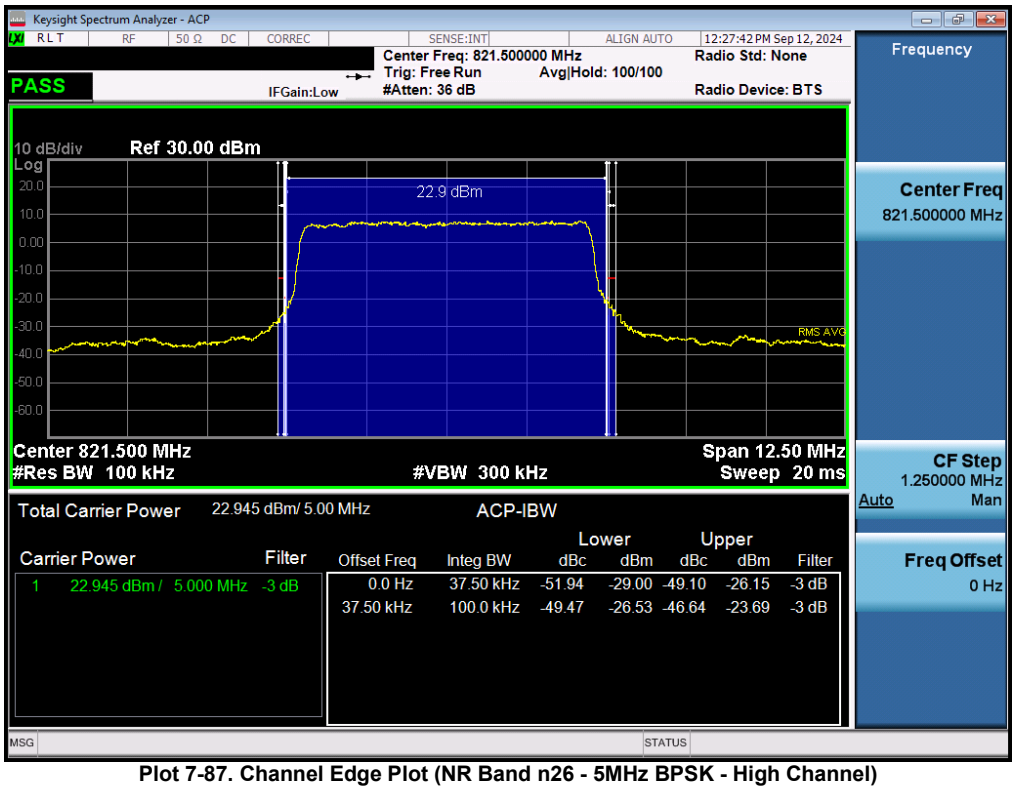


Plot 7-85. Channel - Edge Plot (LTE Band 26 - 1.4MHz QPSK - High Channel)

NR Band n26 -Ant E



Plot 7-86. Channel Edge Plot (NR Band n26 - 5MHz BPSK - Low Channel)



Plot 7-87. Channel Edge Plot (NR Band n26 - 5MHz BPSK - High Channel)

7.6 Radiated Power (ERP)

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.2.4.4

Test Settings

1. Radiated 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 = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize.

Test Setup

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

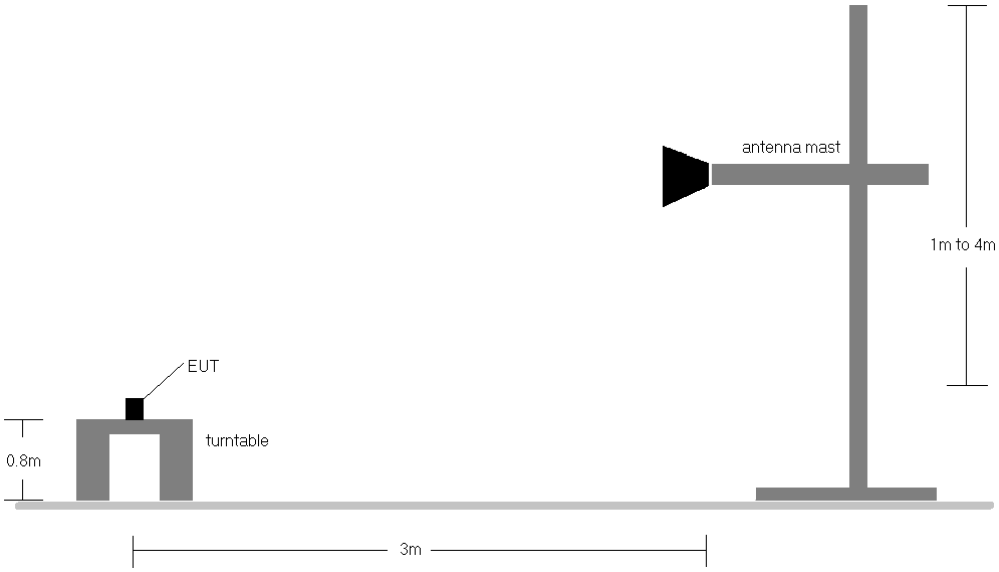


Figure 7-5. Radiated Test Setup <1GHz

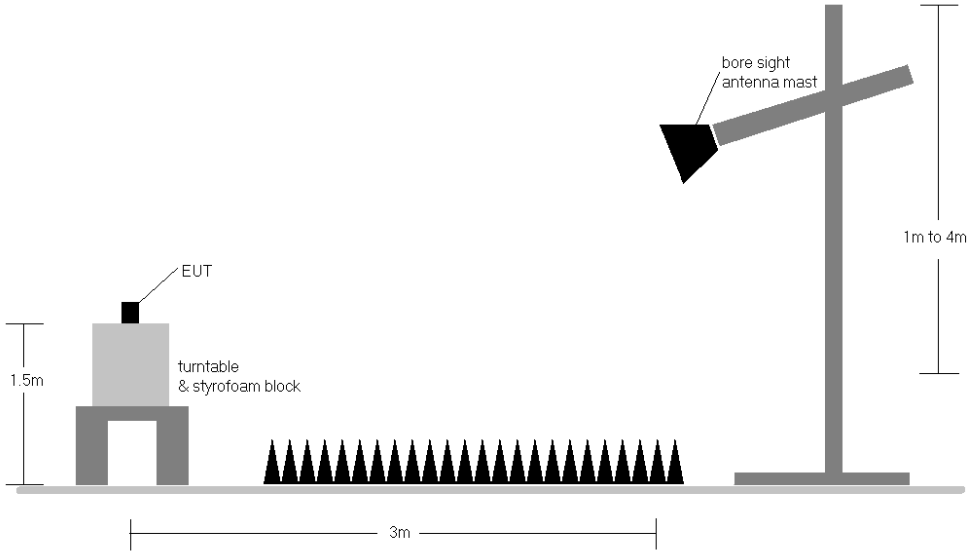


Figure 7-6. Radiated Test Setup > 1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15 MHz	QPSK	821.50	V	137	248	1.04	1 / 0	18.53	**17.42**	0.055	38.45	-21.03
	16-QAM	821.50	V	137	248	1.04	1 / 0	17.45	16.34	0.043	38.45	-22.11
15 MHz	QPSK (WCP)	821.50	V	187	175	1.04	1 / 37	9.90	8.79	0.008	38.45	-29.66

Table 7-15. ERP Data (LTE Band 26 – Ant A)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	824.00	H	238	248	1.34	1 / 1	21.01	20.20	0.105	38.45	-18.25
	QPSK	824.00	H	238	248	1.34	1 / 1	20.81	20.00	0.100	38.45	-18.45
	16-QAM	824.00	H	238	248	1.34	1 / 1	19.66	18.85	0.077	38.45	-19.60
15 MHz	π/2 BPSK	821.50	H	238	248	1.30	1 / 1	21.17	**20.32**	0.108	38.45	-18.13
	QPSK	821.50	H	238	248	1.30	1 / 1	20.74	19.89	0.097	38.45	-18.57
	16-QAM	821.50	H	238	248	1.30	1 / 1	19.78	18.93	0.078	38.45	-19.52
20 MHz	QPSK (CP-OFDM)	824.00	H	235	256	1.34	1 / 1	19.56	18.75	0.075	38.45	-19.70
	QPSK (WCP)	824.00	H	232	247	1.34	1 / 1	18.84	18.03	0.064	38.45	-20.42

Table 7-16. ERP Data (NR Band n26 – Ant A)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15 MHz	QPSK	821.50	V	130	301	1.04	1 / 0	20.58	**19.47**	0.088	38.45	-18.98
	16-QAM	821.50	V	130	301	1.04	1 / 0	20.02	18.91	0.078	38.45	-19.54
15 MHz	QPSK (WCP)	821.50	V	124	81	1.04	1 / 37	11.40	10.29	0.011	38.45	-28.16

Table 7-17. ERP Data (LTE Band 26 – Ant E)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	824.00	V	143	255	1.09	1 / 104	17.94	16.88	0.049	38.45	-21.57
	QPSK	824.00	V	143	255	1.09	1 / 104	18.04	16.98	0.050	38.45	-21.47
	16-QAM	824.00	V	143	255	1.09	1 / 104	16.84	15.78	0.038	38.45	-22.67
15 MHz	π/2 BPSK	821.50	V	143	255	1.04	1 / 77	18.19	**17.08**	0.051	38.45	-21.38
	QPSK	821.50	V	143	255	1.04	1 / 1	18.12	17.01	0.050	38.45	-21.44
	16-QAM	821.50	V	143	255	1.04	1 / 77	16.75	15.64	0.037	38.45	-22.81
20 MHz	QPSK (CP-OFDM)	824.00	V	136	255	1.09	1 / 53	16.46	15.40	0.035	38.45	-23.05
	QPSK (WCP)	824.00	V	143	267	1.09	1 / 53	4.72	3.66	0.002	38.45	-34.79

Table 7-18. ERP Data (NR Band n26 – Ant E)

7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

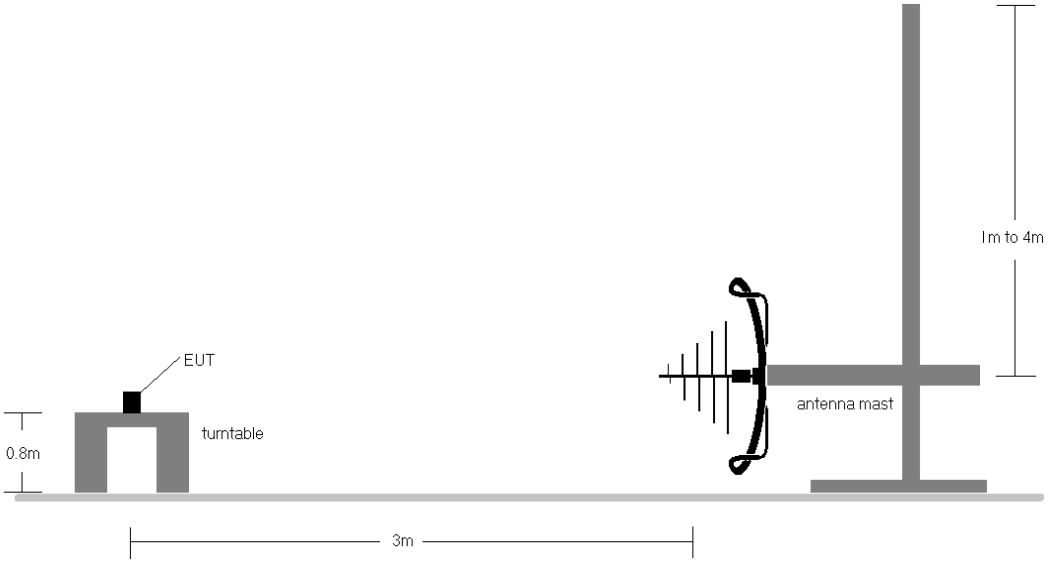


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

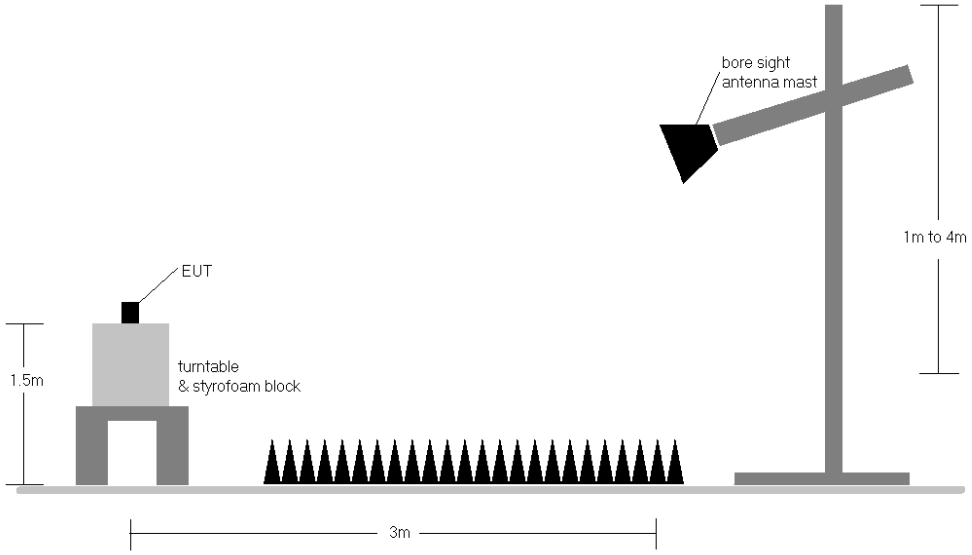


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

3) This unit was tested with its standard battery.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

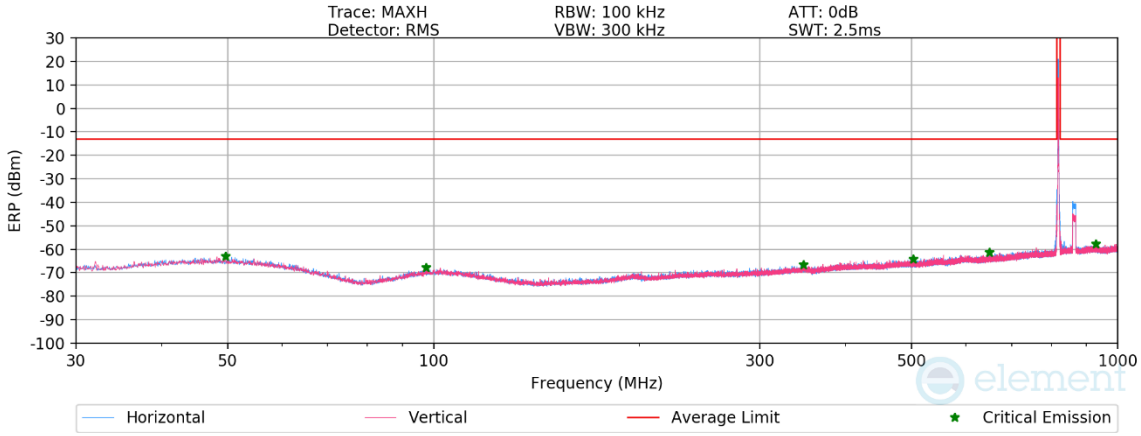
5) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.

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

7) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

8) Spurious emission in EN-DC Operating mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor) has been checked and was found to not to be the worst case. Spurious emissions from the NR carrier device are subject to the rules under which the NR carrier operates. Spurious emissions caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates..

LTE Band 26 – Ant A

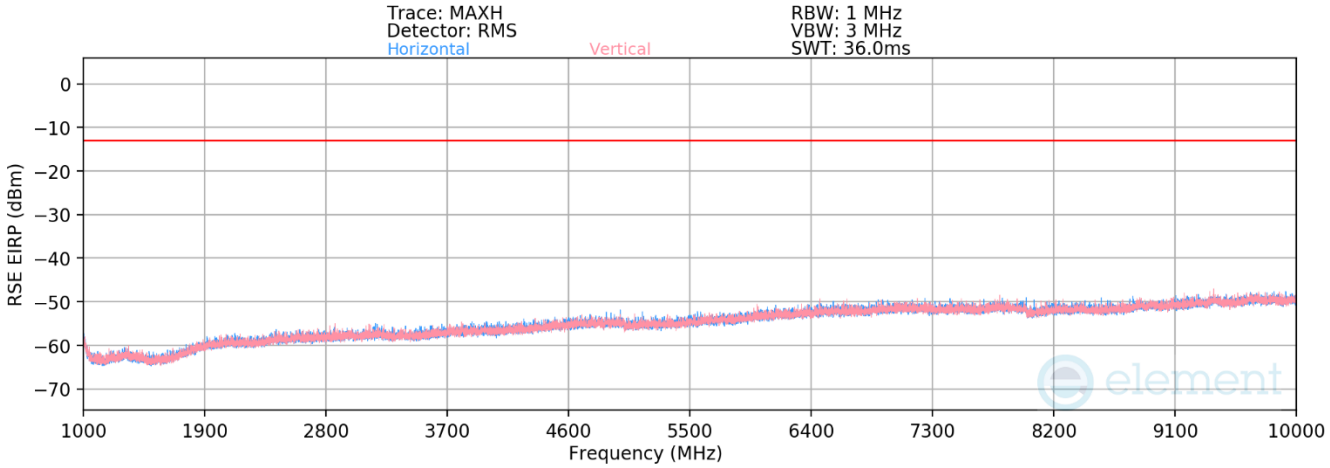


Plot 7-88. Radiated Spurious Plot Below 1GHz (LTE Band 26)

Bandwidth (MHz):	10
Frequency (MHz):	819.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
45.4	V	-	-	-71.61	-0.95	34.44	-62.97	-13.00	-49.97
118.1	V	-	-	-73.75	-3.61	29.65	-67.76	-13.00	-54.76
185.2	V	-	-	-77.61	1.52	30.91	-66.50	-13.00	-53.50
337.4	V	-	-	-78.08	4.38	33.30	-64.11	-13.00	-51.11
477.3	H	-	-	-78.06	7.15	36.09	-61.31	-13.00	-48.31
948.2	H	-	-	-79.00	11.70	39.70	-57.71	-13.00	-44.71

Table 7-19. Radiated Spurious Data (LTE Band 26)



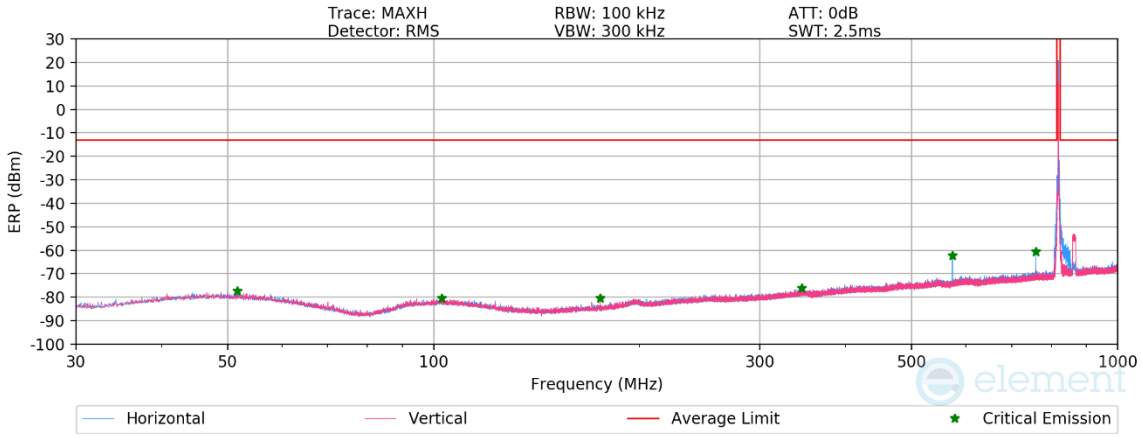
Plot 7-89. Radiated Spurious Plot Above 1GHz (LTE Band 26)

Bandwidth (MHz):	10
Frequency (MHz):	819.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1638.0	V	-	-	-79.12	-0.73	27.15	-68.10	-13.00	-55.10
2457.0	H	-	-	-79.56	3.97	31.41	-63.85	-13.00	-50.85
3276.0	H	-	-	-80.33	5.62	32.29	-62.97	-13.00	-49.97

Table 7-20. Radiated Spurious Data (LTE Band 26 – Mid Channel)

NR Band n26 – Ant A

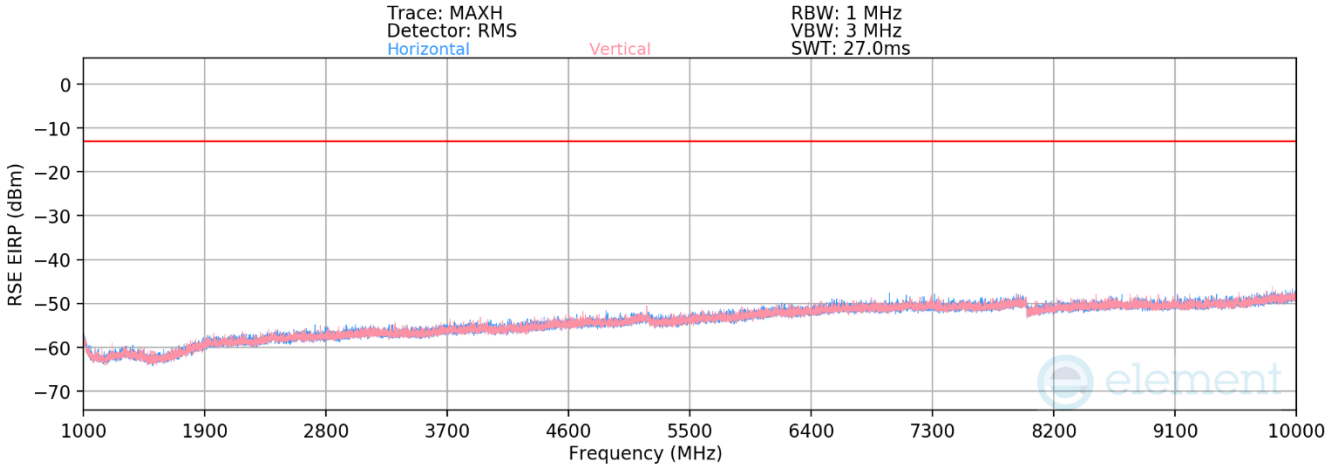


Plot 7-90. Radiated Spurious Plot Below 1GHz (NR Band n26)

Bandwidth (MHz):	20
Frequency (MHz):	824
Modulation Signal:	QPSK
RB / Offset:	1 / 80
Mode:	Stand Alone

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
51.60	V	-	-	-80.78	-5.88	20.34	-77.06	-13.00	-64.06
102.65	V	-	-	-81.88	-7.79	17.34	-80.07	-13.00	-67.07
175.10	V	-	-	-80.05	-9.65	17.30	-80.11	-13.00	-67.11
345.50	H	-	-	-82.33	-2.99	21.68	-75.73	-13.00	-62.73
573.35	H	-	-	-73.29	1.73	35.44	-61.96	-13.00	-48.96
758.80	H	-	-	-75.42	5.63	37.21	-60.20	-13.00	-47.20

Table 7-21. Radiated Spurious Data (NR Band n26 – Mid Channel)



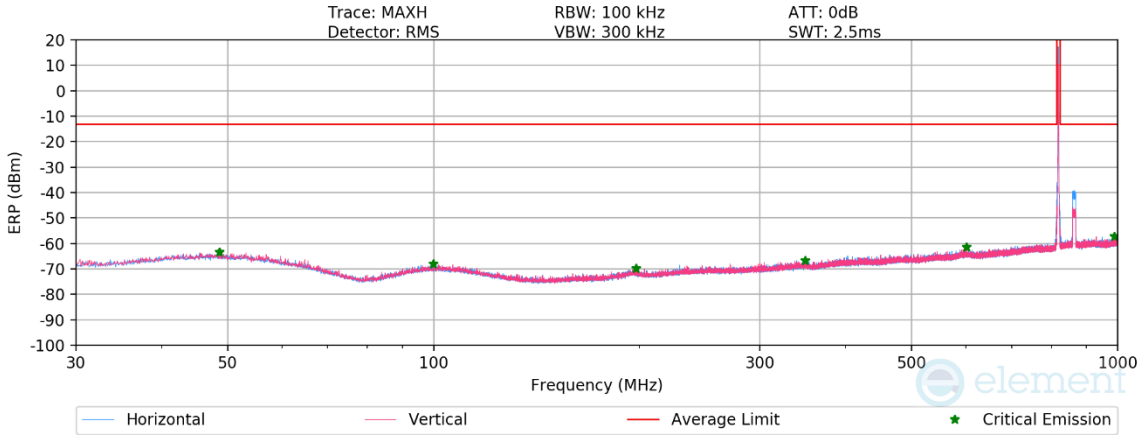
Plot 7-91. Radiated Spurious Plot Above 1GHz (NR Band n26)

Bandwidth (MHz):	20
Frequency (MHz):	824
Modulation Signal:	QPSK
RB / Offset:	1 / 80
Mode:	Stand Alone

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1660.08	H	-	-	-78.95	-0.73	27.33	-67.93	-13.00	-54.93
2477.73	H	-	-	-79.70	4.03	31.33	-63.93	-13.00	-50.93
3258.37	V	-	-	-80.53	5.60	32.08	-63.18	-13.00	-50.18

Table 7-22. Radiated Spurious Data (NR Band n26 – Mid Channel)

LTE Band 26 – Ant E

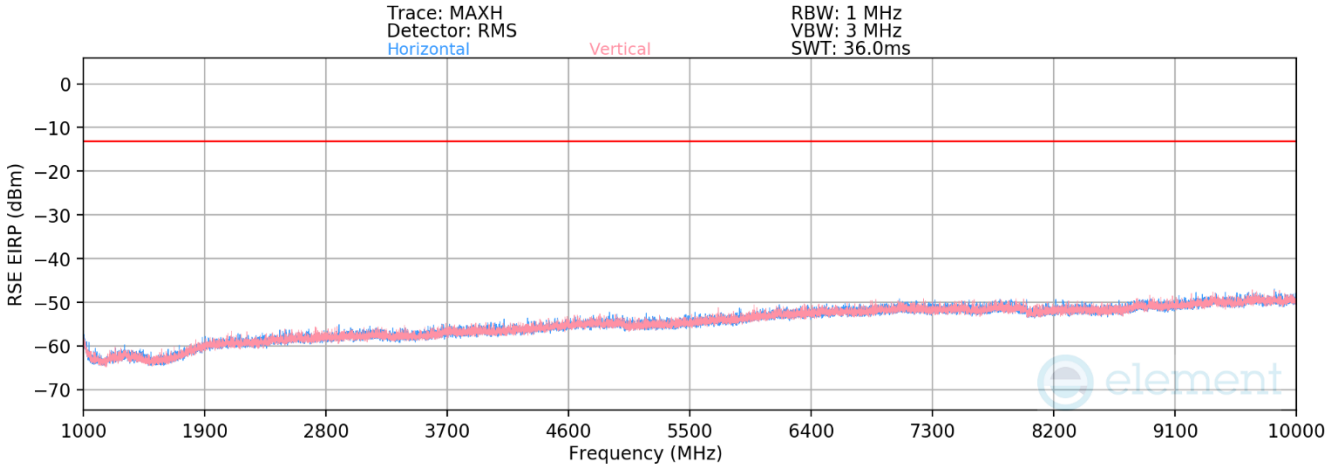


Plot 7-92. Radiated Spurious Plot Below 1GHz (LTE Band 26)

Bandwidth (MHz):	10
Frequency (MHz):	819
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
48.57	V	-	-	-71.64	-0.95	34.41	-63.00	-13.00	-50.00
99.92	H	-	-	-73.88	-3.33	29.79	-67.62	-13.00	-54.62
197.82	H	-	-	-76.33	-2.65	28.02	-69.39	-13.00	-56.39
349.51	V	-	-	-77.41	1.53	31.12	-66.29	-13.00	-53.29
601.55	V	-	-	-77.31	6.75	36.44	-60.97	-13.00	-47.97
988.73	V	-	-	-78.69	12.16	40.46	-56.94	-13.00	-43.94

Table 7-23. Radiated Spurious Data (LTE Band 26)



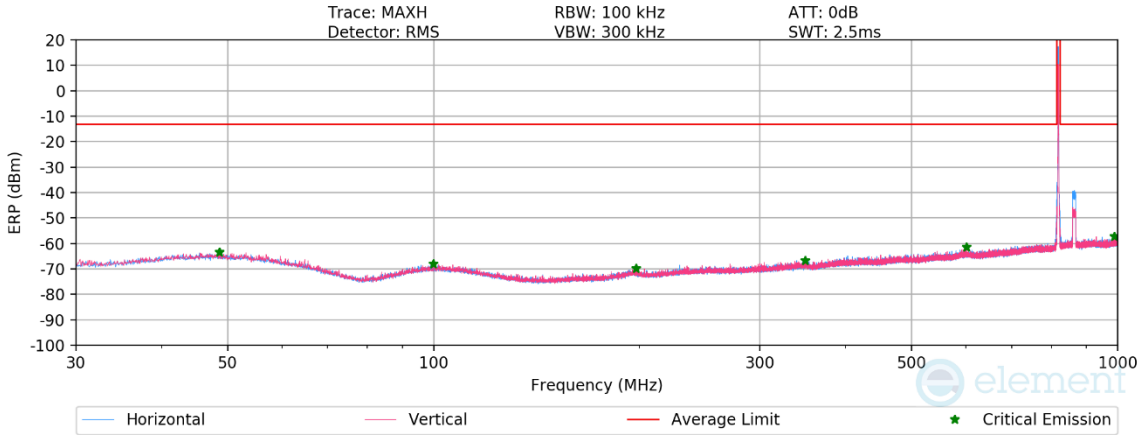
Plot 7-93. Radiated Spurious Plot Above 1GHz (LTE Band 26)

Bandwidth (MHz):	10
Frequency (MHz):	819
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1623.71	V	-	-	-78.50	-1.14	27.36	-67.90	-13.00	-54.90
2461.45	H	-	-	-79.49	3.97	31.48	-63.78	-13.00	-50.78
3279.90	V	-	-	-80.36	5.62	32.26	-62.99	-13.00	-49.99

Table 7-24. Radiated Spurious Data (LTE Band 26 – Mid Channel)

NR Band n26 – Ant E

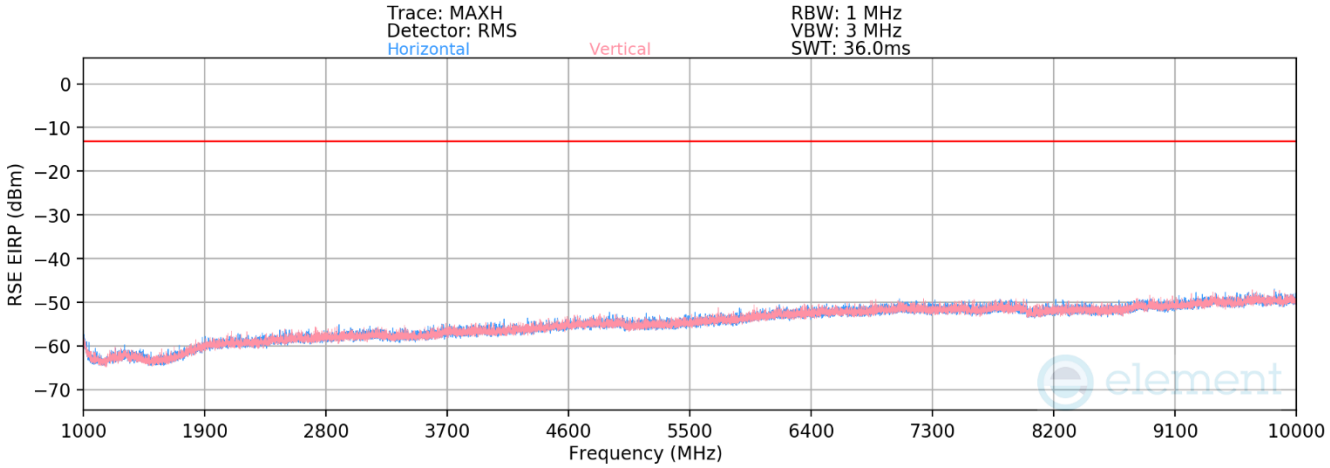


Plot 7-94. Radiated Spurious Plot Below 1GHz (NR Band n26)

Bandwidth (MHz):	20
Frequency (MHz):	824
Modulation Signal:	QPSK
RB / Offset:	1 / 80
Mode:	Stand Alone

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
48.57	V	-	-	-71.64	-0.95	34.41	-63.00	-13.00	-50.00
99.92	H	-	-	-73.88	-3.33	29.79	-67.62	-13.00	-54.62
197.82	H	-	-	-76.33	-2.65	28.02	-69.39	-13.00	-56.39
349.51	V	-	-	-77.41	1.53	31.12	-66.29	-13.00	-53.29
601.55	V	-	-	-77.31	6.75	36.44	-60.97	-13.00	-47.97
988.73	V	-	-	-78.69	12.16	40.46	-56.94	-13.00	-43.94

Table 7-25. Radiated Spurious Data (NR Band n26 – Mid Channel)



Plot 7-95. Radiated Spurious Plot Above 1GHz (NR Band n26)

Bandwidth (MHz):	20
Frequency (MHz):	824
Modulation Signal:	QPSK
RB / Offset:	1 / 80
Mode:	Stand Alone

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1661.63	H	-	-	-79.15	-0.73	27.12	-68.14	-13.00	-55.14
2464.89	H	-	-	-79.73	4.03	31.30	-63.96	-13.00	-50.96
3250.92	H	-	-	-80.62	5.60	31.99	-63.27	-13.00	-50.27

Table 7-26. Radiated Spurious Data (NR Band n26 – Mid Channel)

7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. 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 non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

Test Settings

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 at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

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

Test Notes

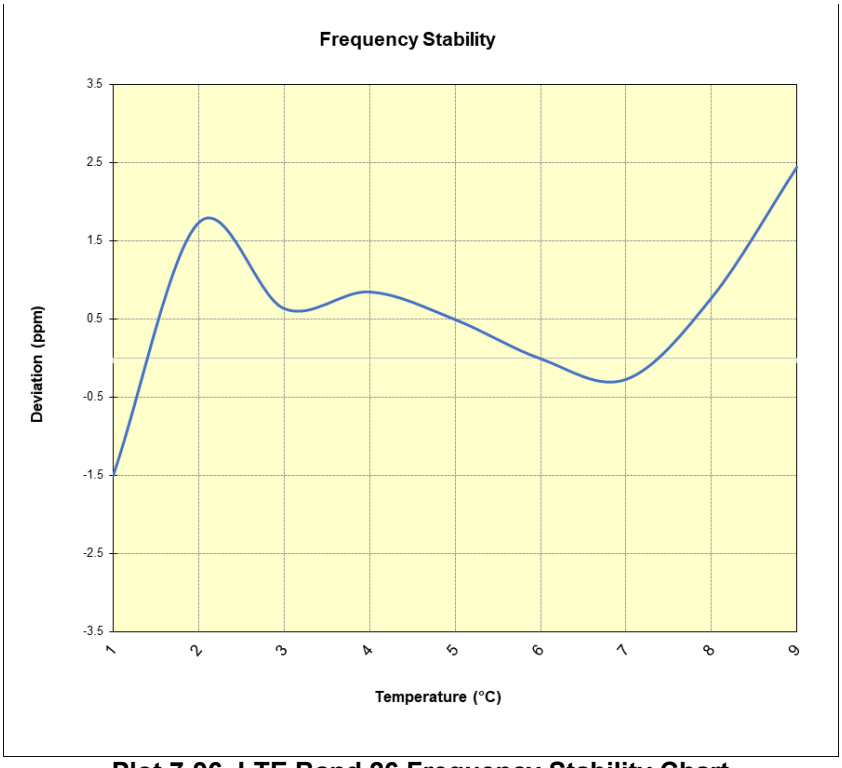
None

LTE Band 26

Operating Frequency (Hz):	819,000,000
Ref. Voltage (VDC):	3.863
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	819,012,989	-1,222	-0.0001492
		- 20	819,015,634	1,423	0.0001737
		- 10	819,014,735	524	0.0000640
		0	819,014,910	699	0.0000853
		+ 10	819,014,621	410	0.0000501
		+ 20 (Ref)	819,014,211	0	0.0000000
		+ 30	819,013,994	-217	-0.0000265
		+ 40	819,014,844	633	0.0000773
		+ 50	819,016,212	2,001	0.0002443
Battery Endpoint	3.174	+ 20	819,015,102	891	0.0001088

Table 7-27. LTE Band 26 Frequency Stability Data



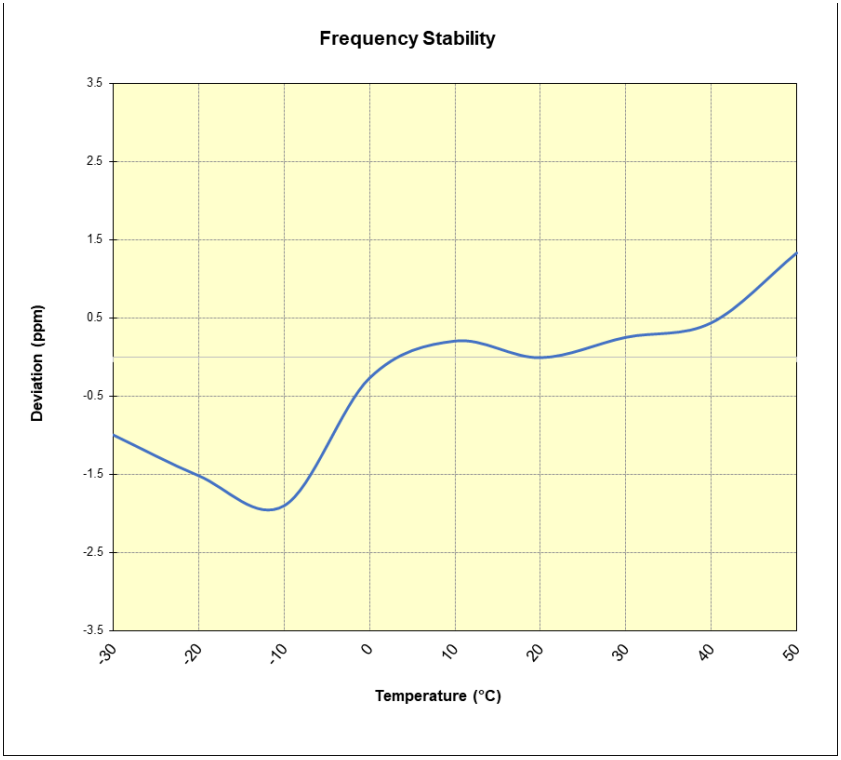
Plot 7-96. LTE Band 26 Frequency Stability Chart

NR Band n26

Operating Frequency (Hz):	819,000,000
Ref. Voltage (VDC):	3.863
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.863	- 30	819,000,644	-811	-0.0000990
		- 20	819,000,216	-1,239	-0.0001513
		- 10	818,999,901	-1,554	-0.0001897
		0	819,001,241	-214	-0.0000261
		+ 10	819,001,630	175	0.0000214
		+ 20 (Ref)	819,001,455	0	0.0000000
		+ 30	819,001,669	214	0.0000261
		+ 40	819,001,821	366	0.0000447
		+ 50	819,002,554	1,099	0.0001342
Battery Endpoint	3.174	+ 20	819,002,296	841	0.0001027

Table 7-28. NR Band n26 Frequency Stability Data



Plot 7-97. NR Band n26 Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMS936B** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.