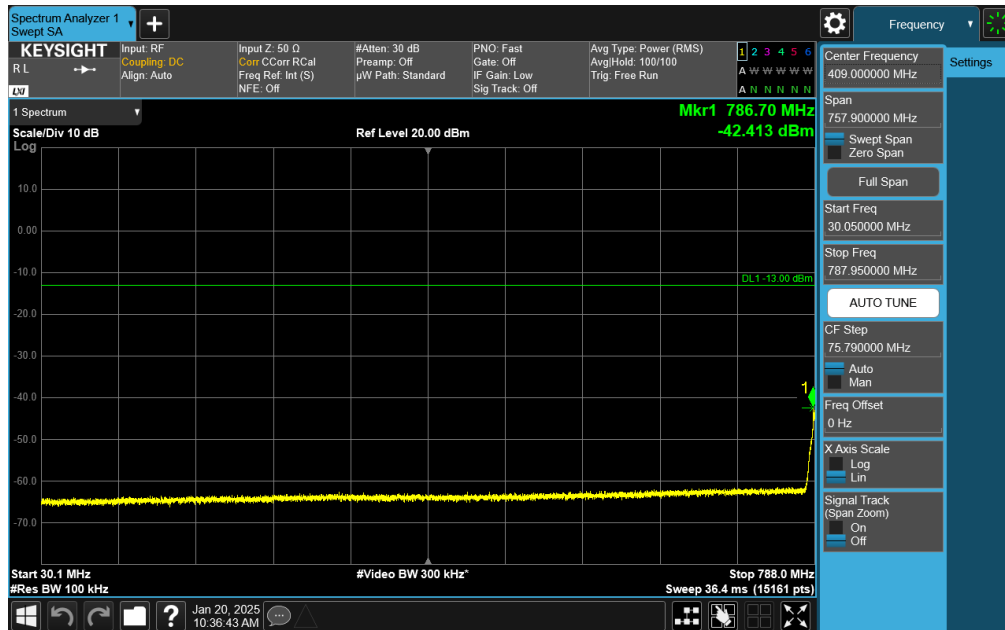
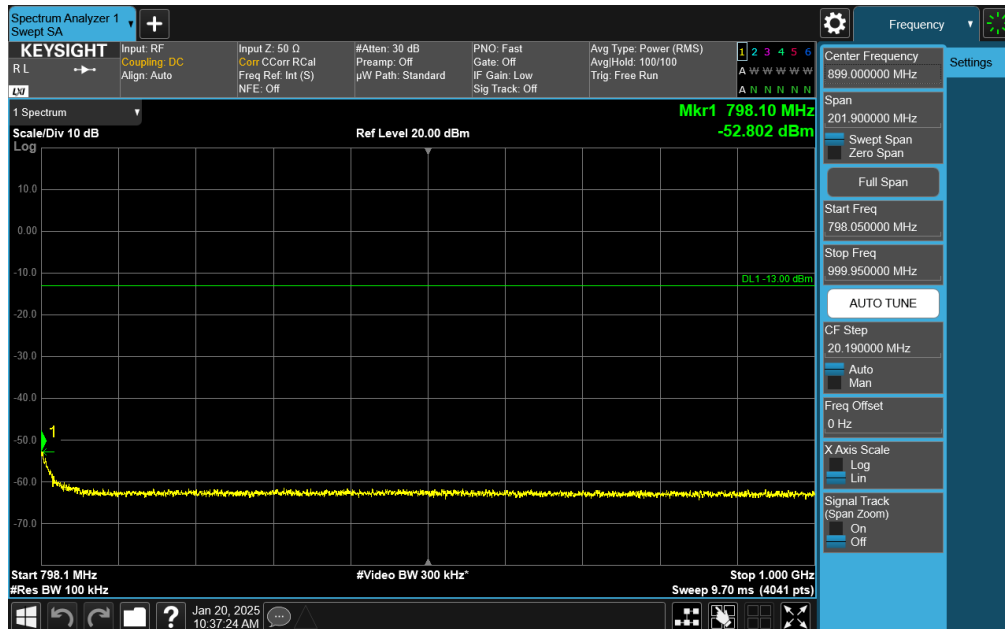



NR Band n14



Plot 7-56. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - Low Channel)

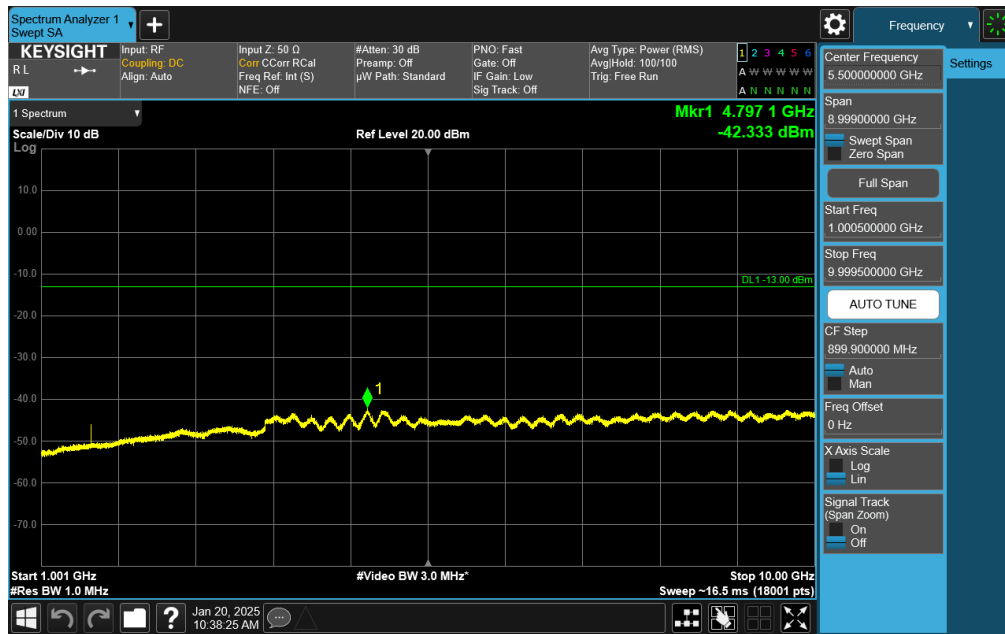


Plot 7-57. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - Low Channel)

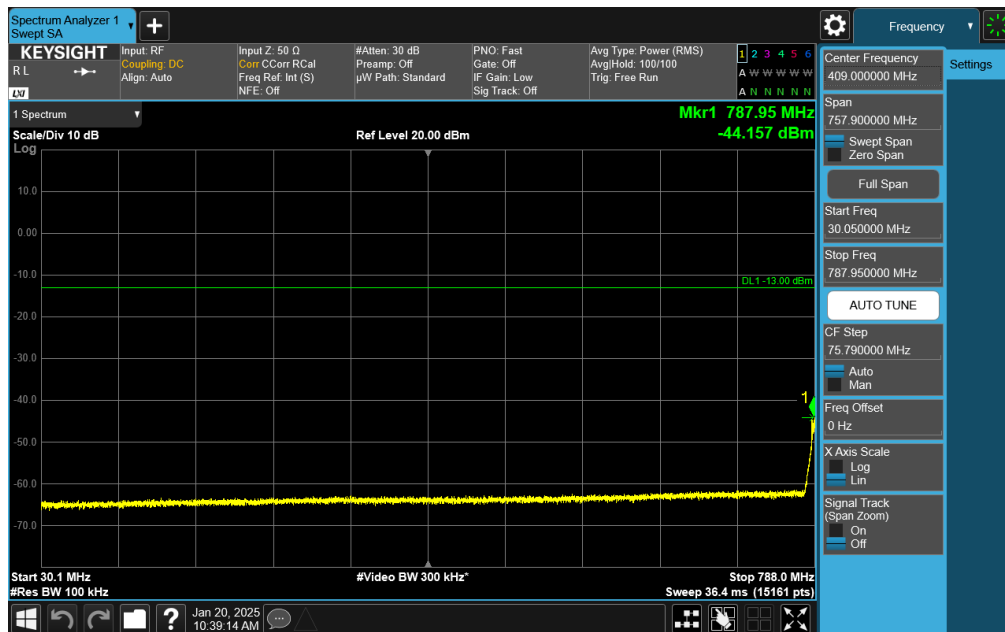
FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-58. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - Low Channel)

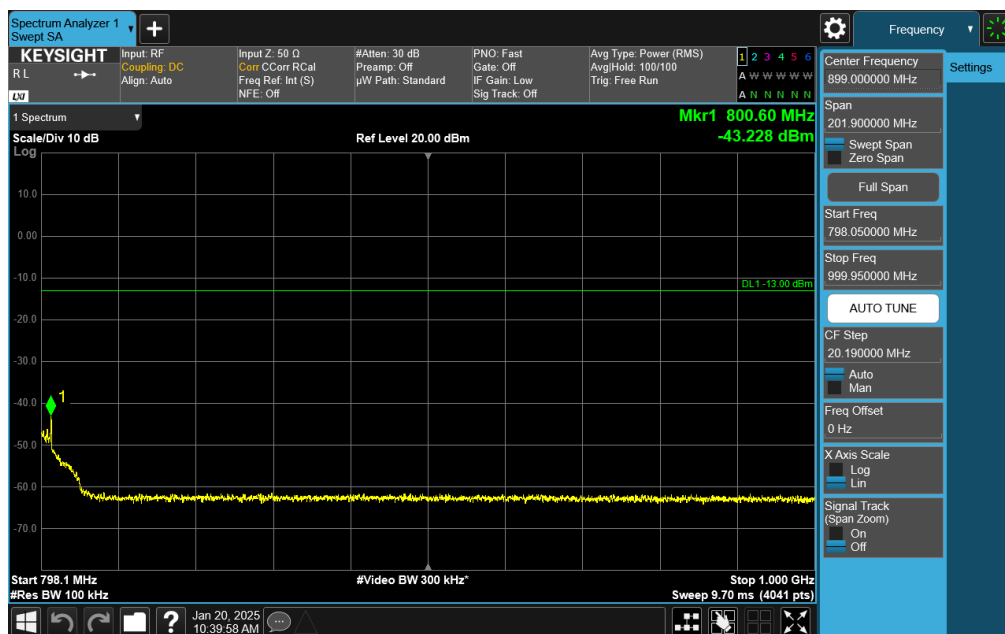


Plot 7-59. Conducted Spurious Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 25 - Mid Channel)

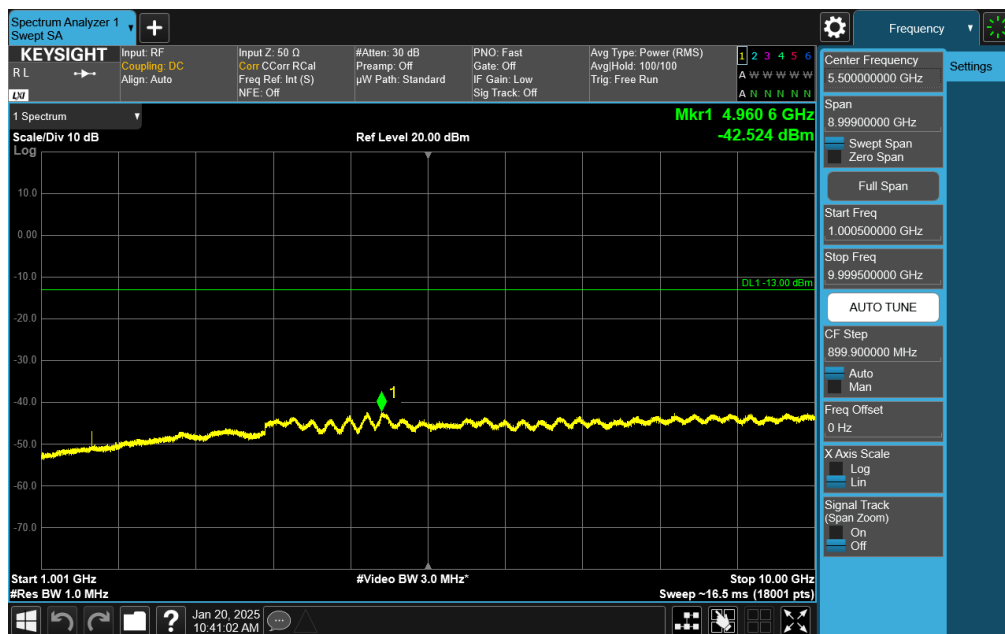
FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-60. Conducted Spurious Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 25 – Mid Channel)

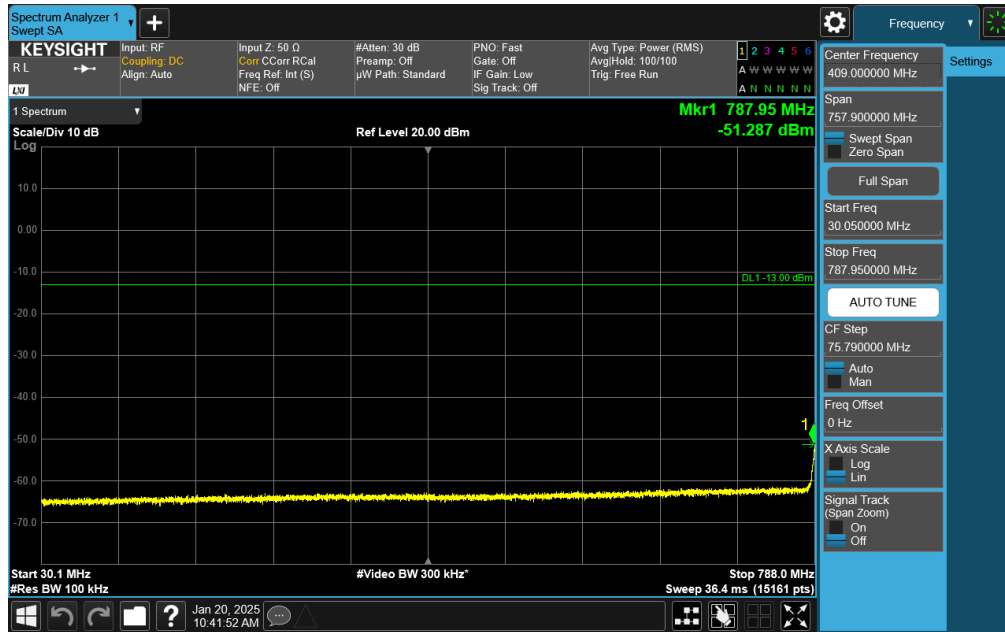


Plot 7-61. Conducted Spurious Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 25 – Mid Channel)

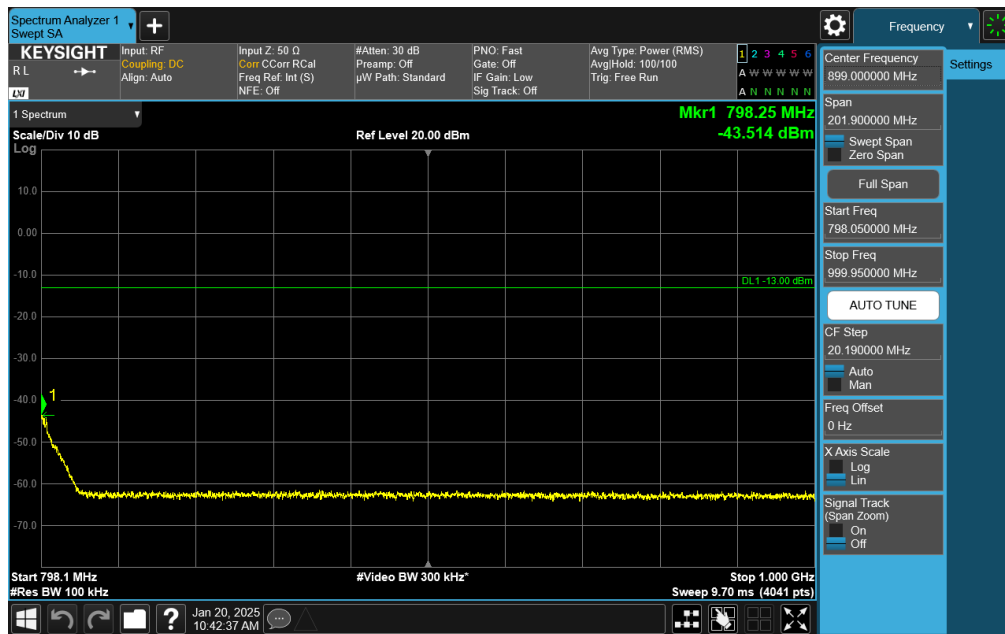
FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-62. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - High Channel)

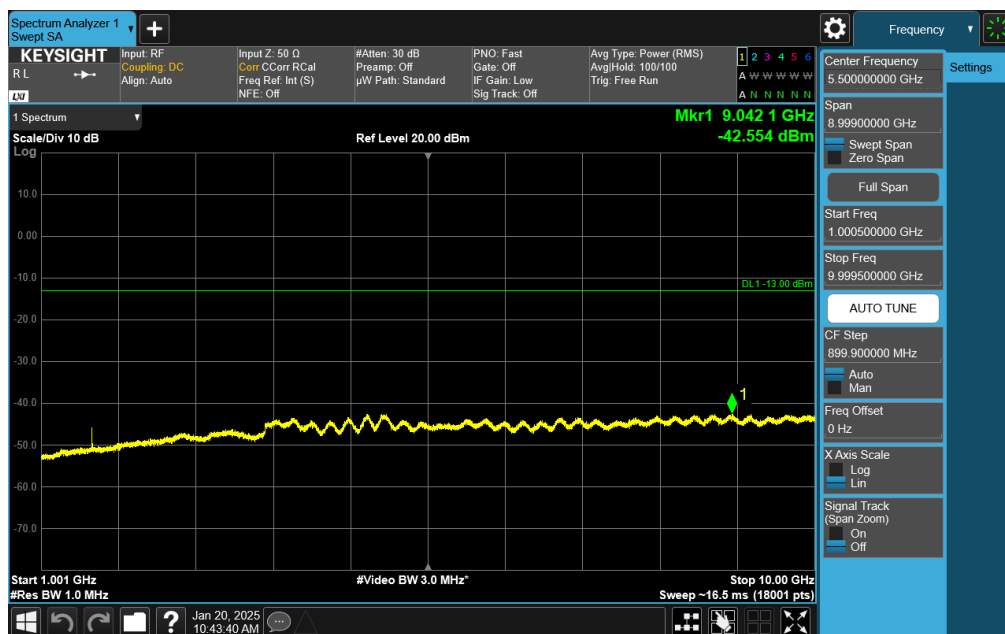


Plot 7-63. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - High Channel)


FCC ID: BCG-A3281	element	PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-64. Conducted Spurious Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 12 - High Channel)

FCC ID: BCG-A3281		PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §90.691(a) §90.543(e)

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 $43 + 10\log_{10}(P_{\text{Watts}})$, 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 $50 + 10\log_{10}(P_{\text{Watts}})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

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.

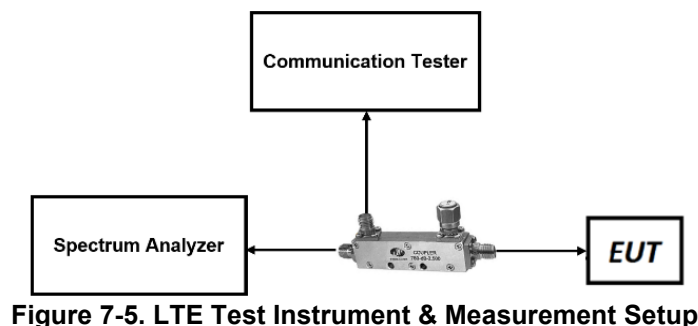


Figure 7-5. LTE Test Instrument & Measurement Setup

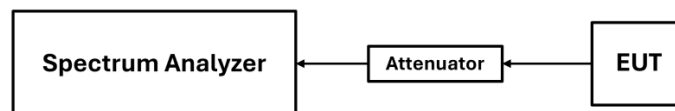




Figure 7-6. FR1 Instrument & Measurement Setup

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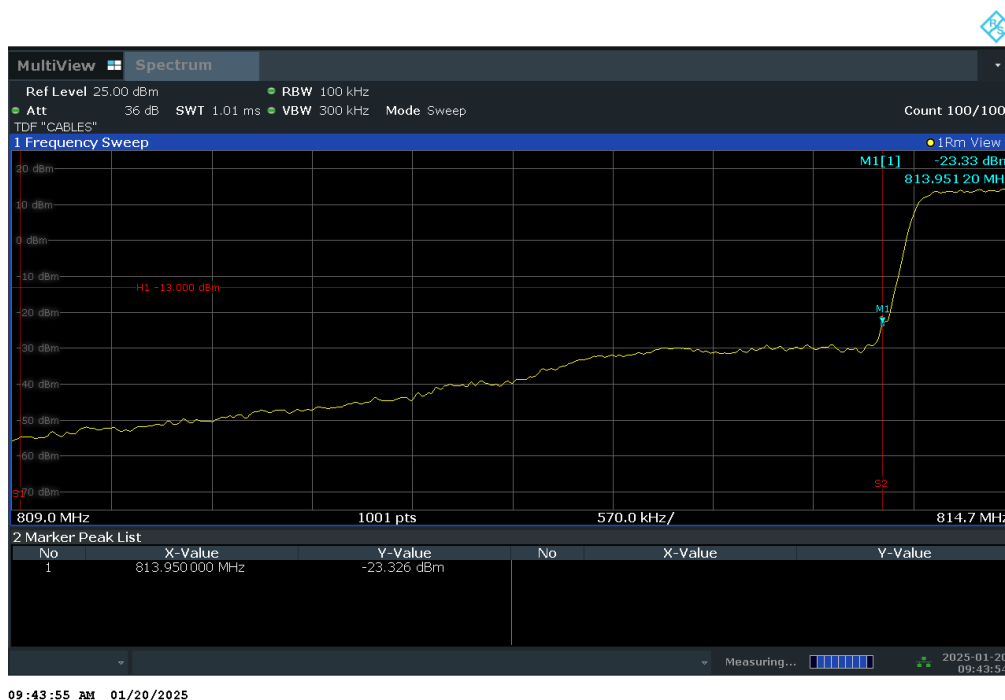
Test Notes

1. Per Part 90, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz 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.
2. 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 $43 + 10\log(P)$ 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.
3. 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.
4. 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.

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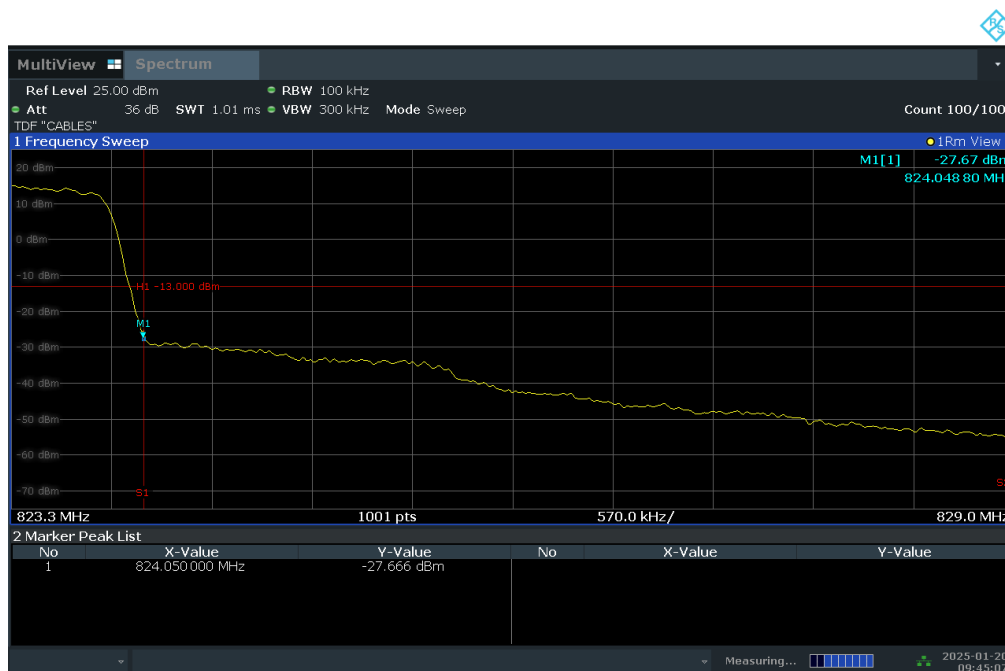
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LTE Band 26




09:43:55 AM 01/20/2025

Plot 7-65. Channel Edge Plot (LTE Band 26 - 1.4MHz QPSK - Lower Channel)



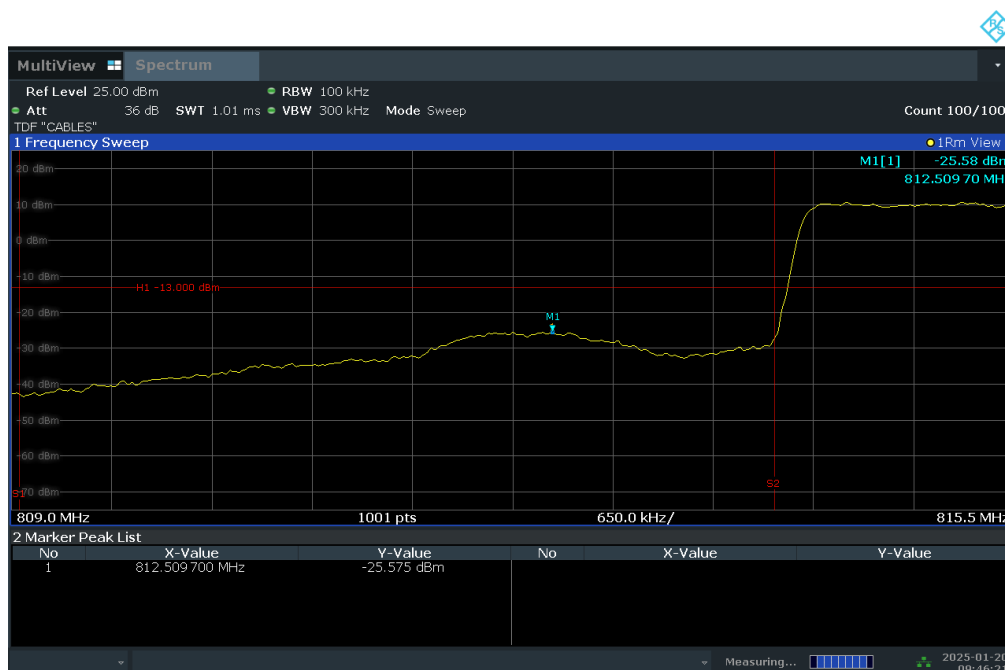
09:45:08 AM 01/20/2025

Plot 7-66. Channel Edge Plot (LTE Band 26 - 1.4MHz QPSK - Upper Channel)

FCC ID: BCG-A3281		PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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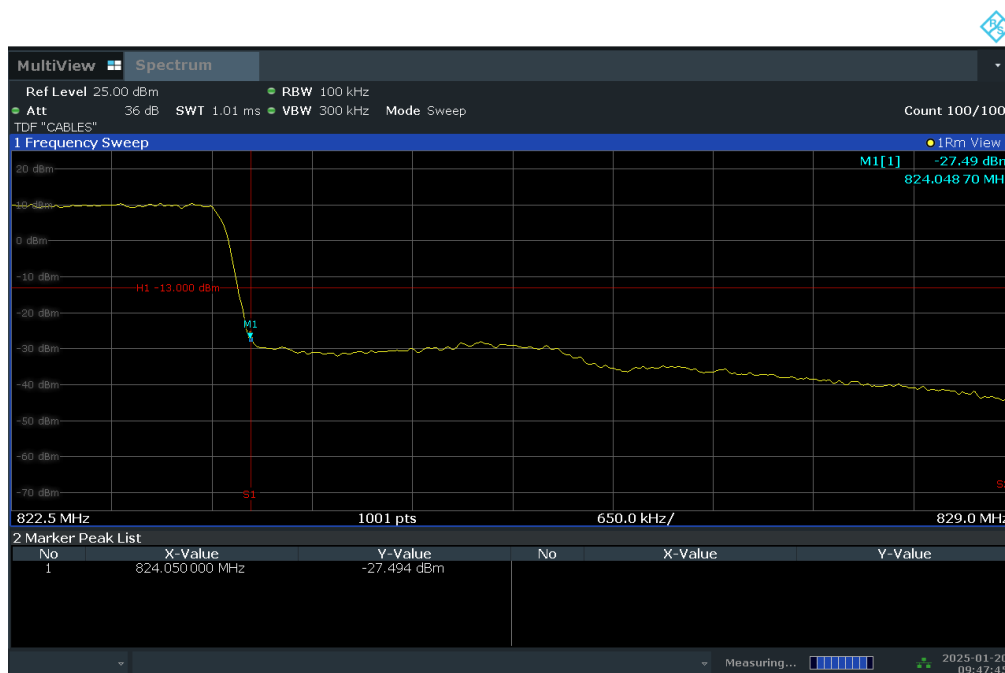
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09:46:22 AM 01/20/2025

Plot 7-67. Channel Edge Plot (LTE Band 26 - 3MHz QPSK - Lower Channel)



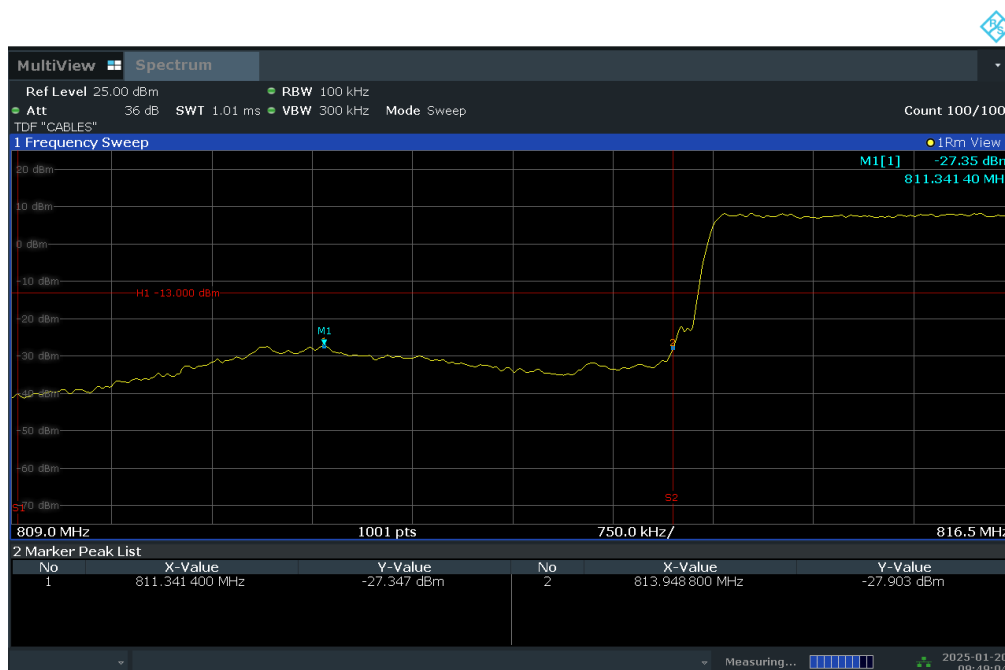
09:47:46 AM 01/20/2025

Plot 7-68. Channel Edge Plot (LTE Band 26 - 3MHz QPSK - Upper Channel)

FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT		Approved by: Technical Manager
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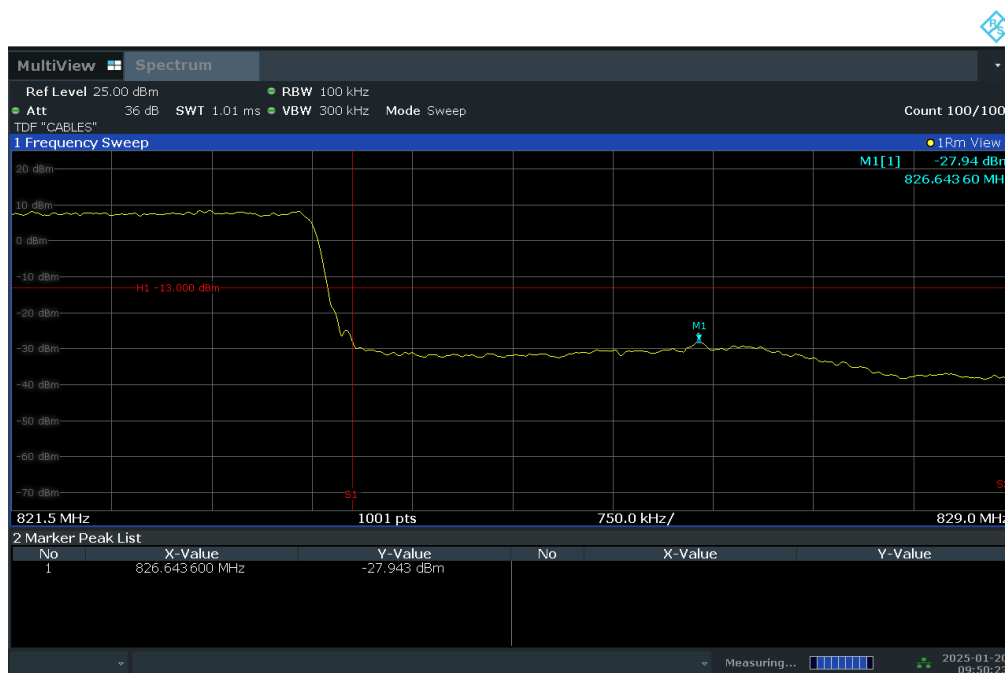
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09:49:05 AM 01/20/2025

Plot 7-69. Channel Edge Plot (LTE Band 26 - 5MHz QPSK - Lower Channel)



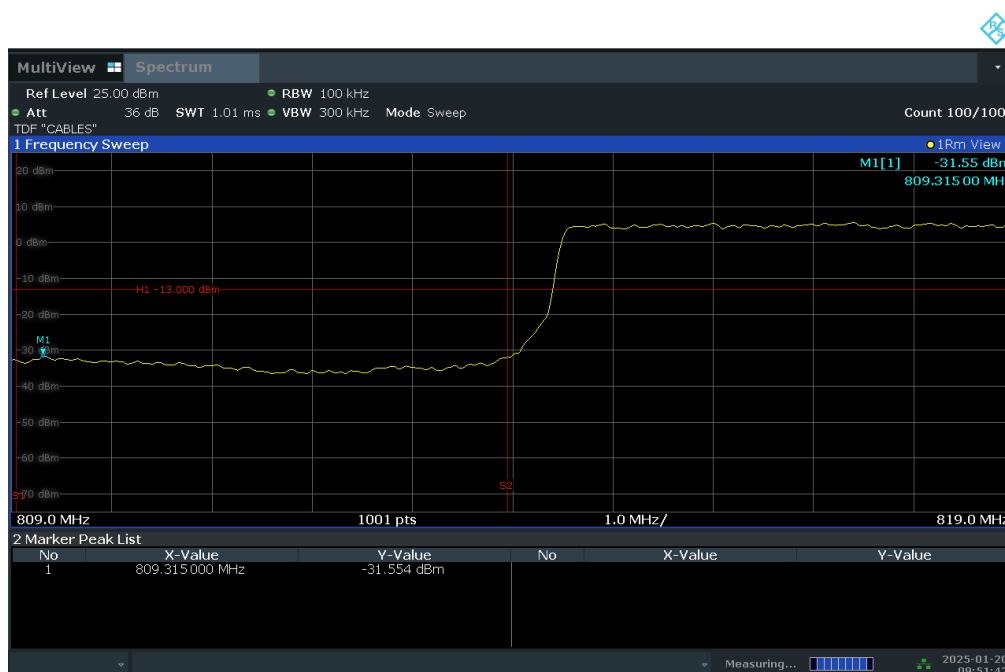
09:50:24 AM 01/20/2025

Plot 7-70. Channel Edge Plot (LTE Band 26 - 5MHz QPSK - Upper Channel)

FCC ID: BCG-A3281		PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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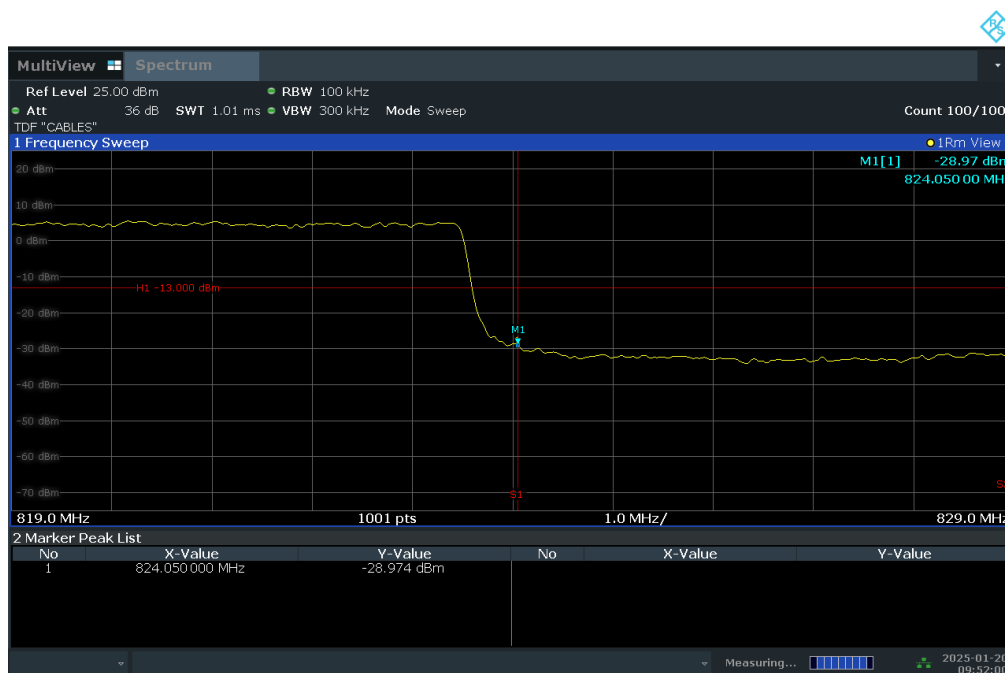
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09:51:43 AM 01/20/2025

Plot 7-71. Channel Edge Plot (LTE Band 26 - 10MHz QPSK - Lower Channel)



09:52:01 AM 01/20/2025

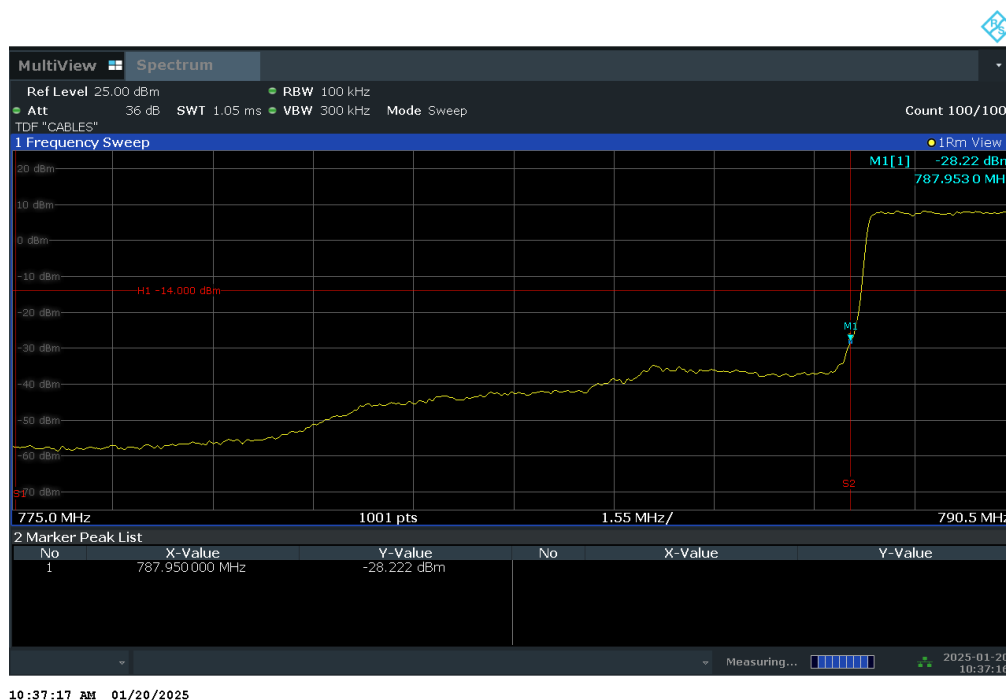
Plot 7-72. Channel Edge Plot (LTE Band 26 - 10MHz QPSK - Upper Channel)

FCC ID: BCG-A3281		PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2503270029-07.BCG	Test Dates: 01/17/2025 - 07/14/2025	EUT Type: Watch	Page 57 of 90

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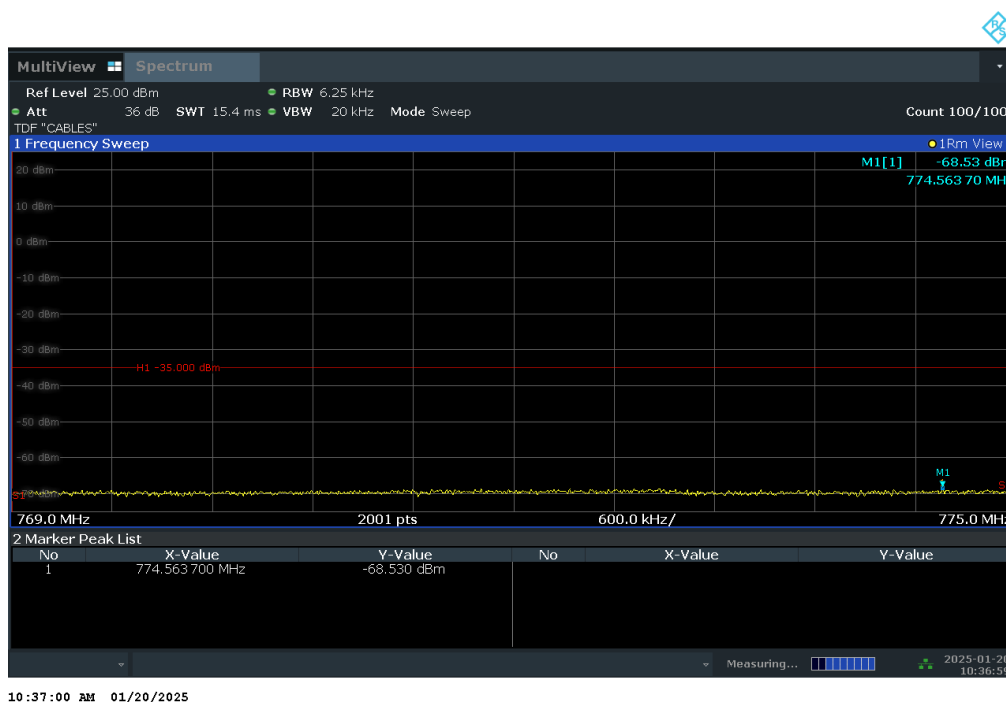
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LTE Band 14




10:37:17 AM 01/20/2025

Plot 7-73. Lower Band Edge Plot (LTE Band 14, 5MHz QPSK - RB Size 25)



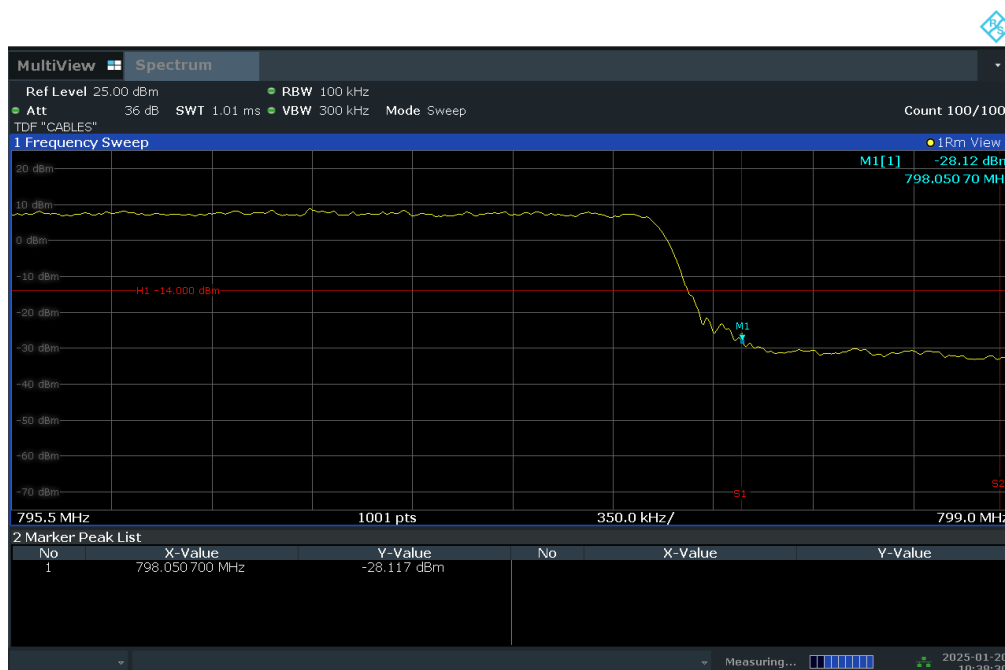
10:37:00 AM 01/20/2025

Plot 7-74. Lower Emission Mask Plot (LTE Band 14, 5MHz QPSK - RB Size 25)

FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT		Approved by: Technical Manager
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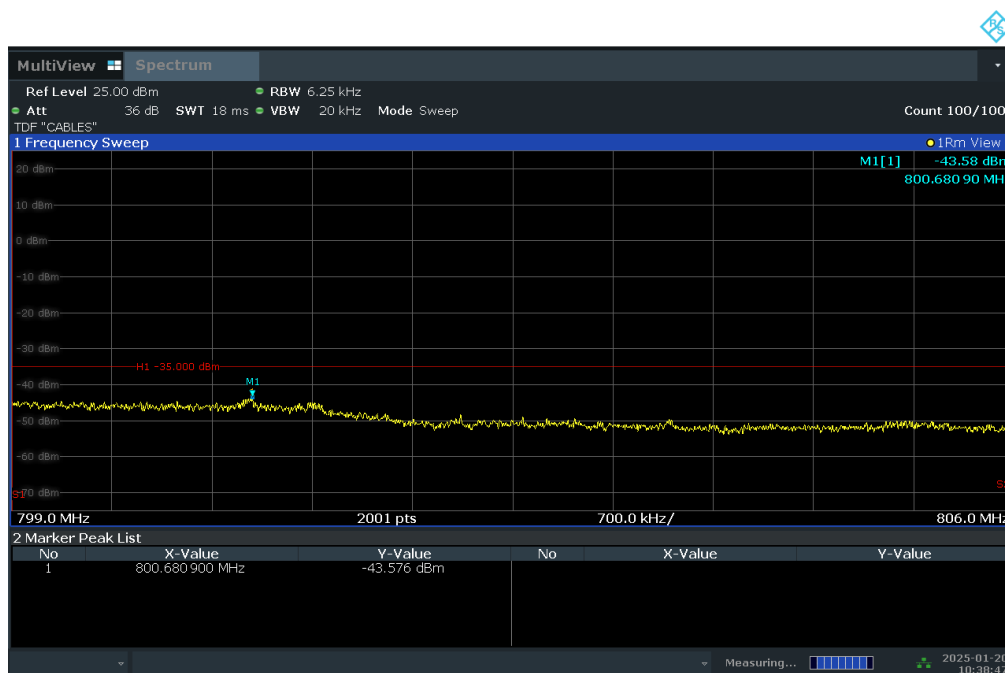
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10:38:31 AM 01/20/2025

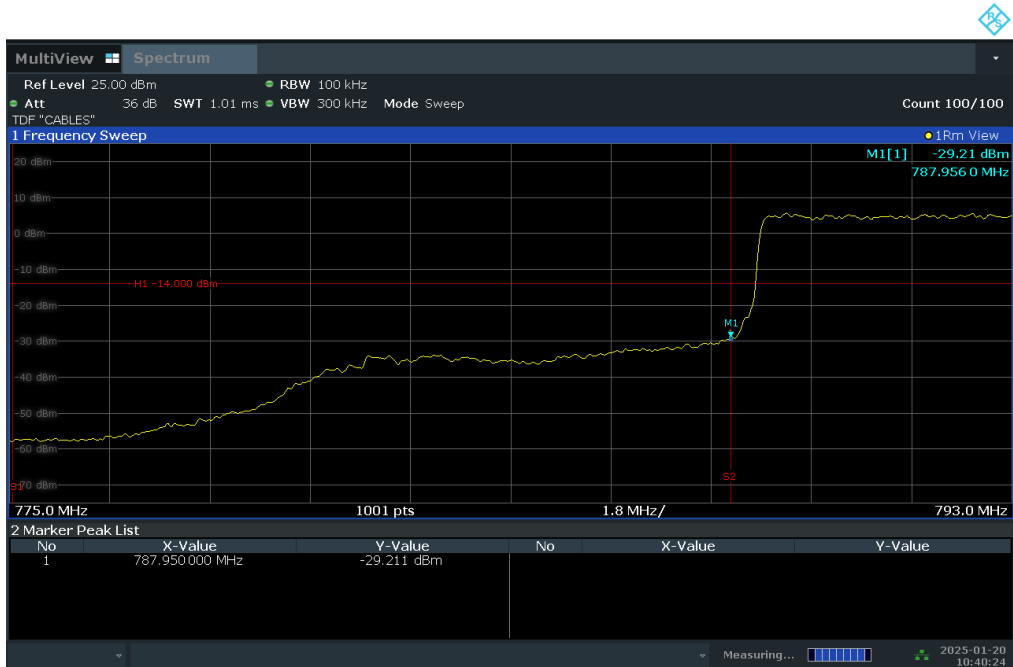
Plot 7-75. Upper Band Edge Plot (LTE Band 14, 5MHz QPSK - RB Size 25)



10:38:48 AM 01/20/2025

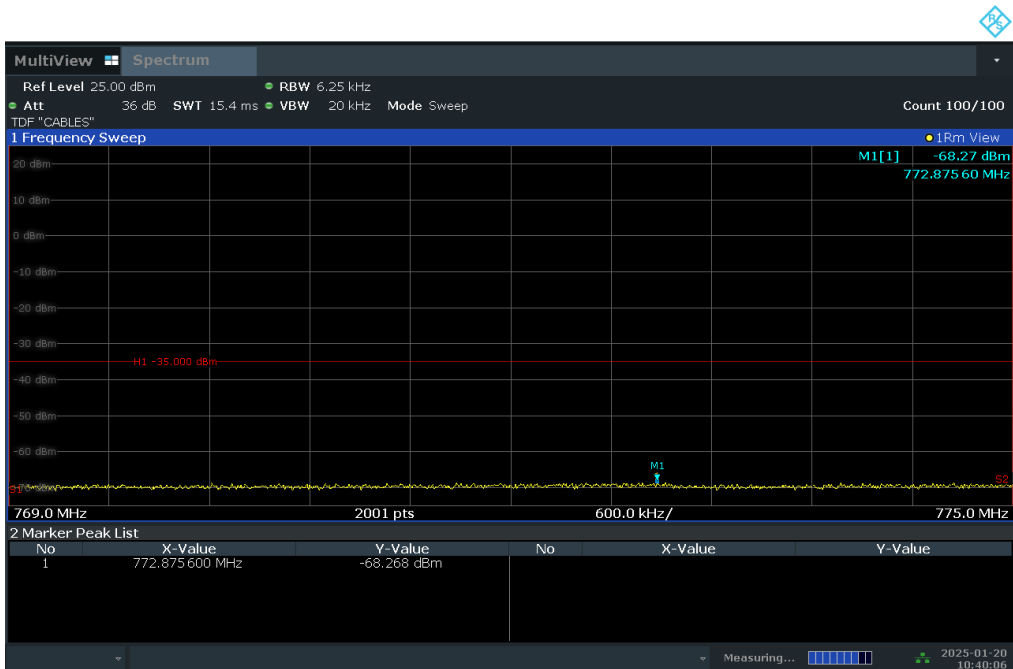
Plot 7-76. Upper Emission Mask Plot (LTE Band 14, 5MHz QPSK - RB Size 25)

FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT		Approved by: Technical Manager
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10:40:25 AM 01/20/2025

Plot 7-77. Lower Band Edge Plot (LTE Band 14, 10MHz QPSK - RB Size 50)



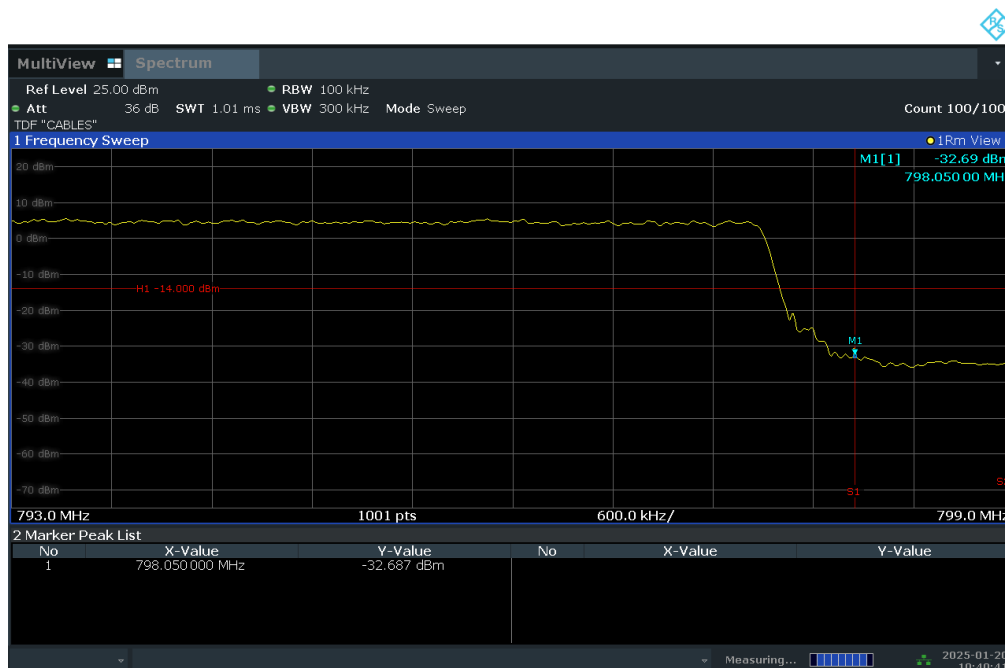
10:40:07 AM 01/20/2025

Plot 7-78. Lower Emission Mask Plot (LTE Band 14, 10MHz QPSK - RB Size 50)

FCC ID: BCG-A3281	element	PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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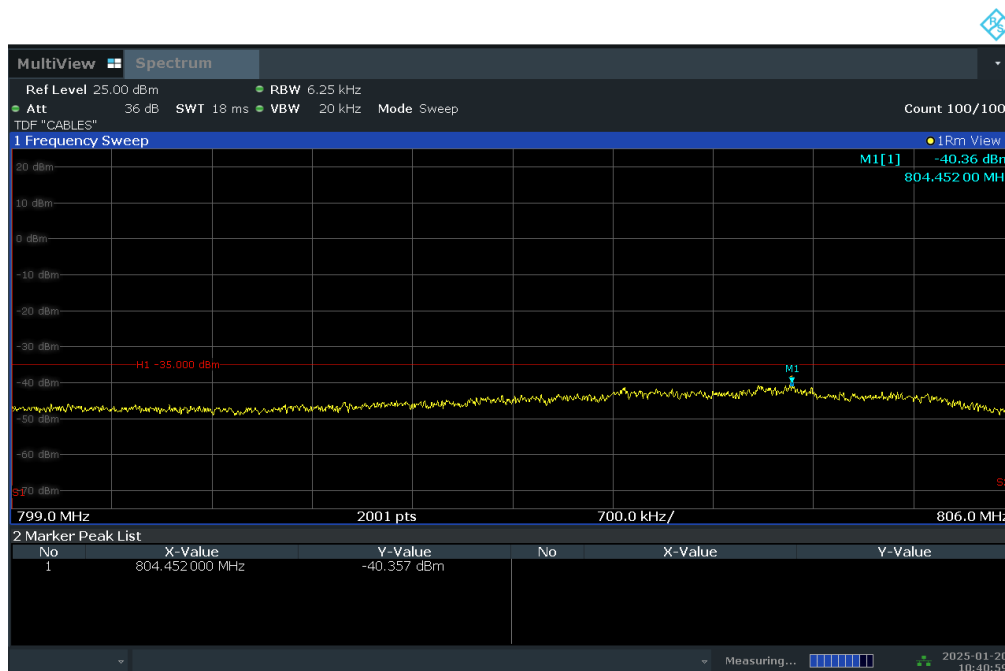
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10:40:42 AM 01/20/2025

Plot 7-79. Upper Band Edge Plot (LTE Band 14, 10MHz QPSK - RB Size 50)



10:41:00 AM 01/20/2025

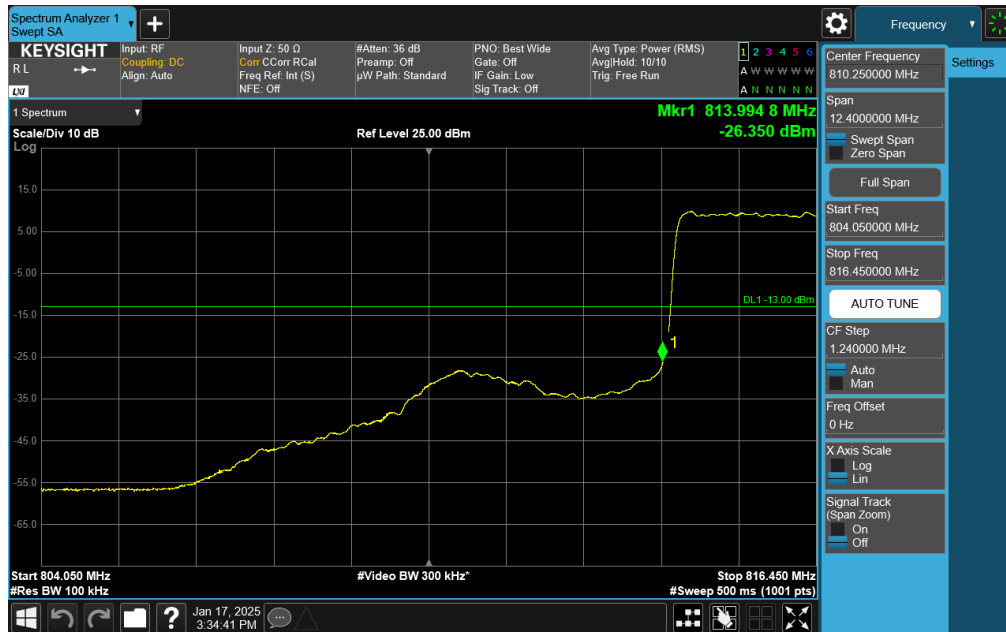
Plot 7-80. Upper Emission Mask Plot (LTE Band 14, 10MHz QPSK - RB Size 50)


FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT		Approved by: Technical Manager
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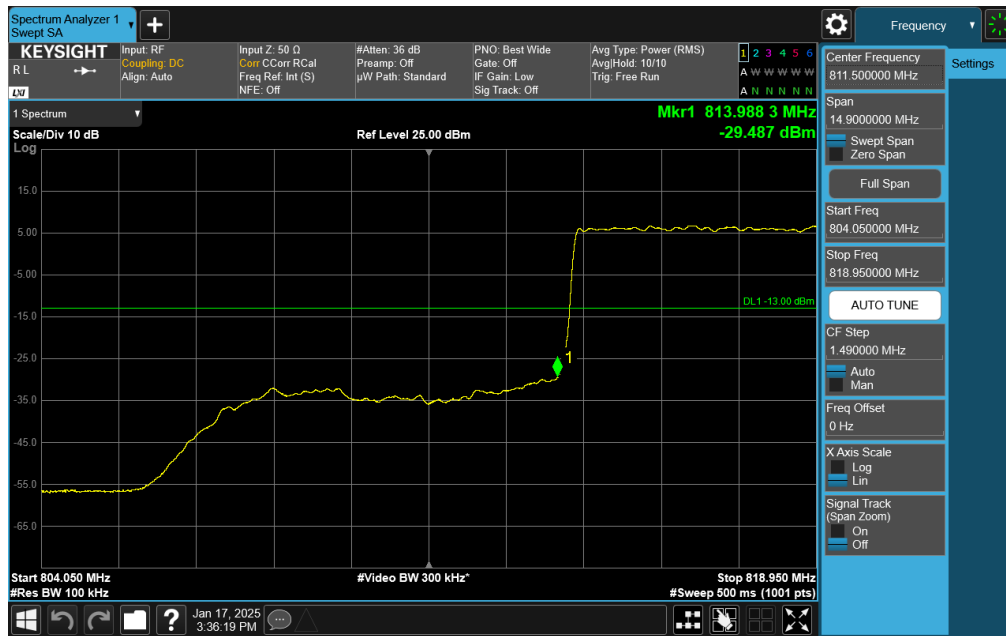
NR Band n26



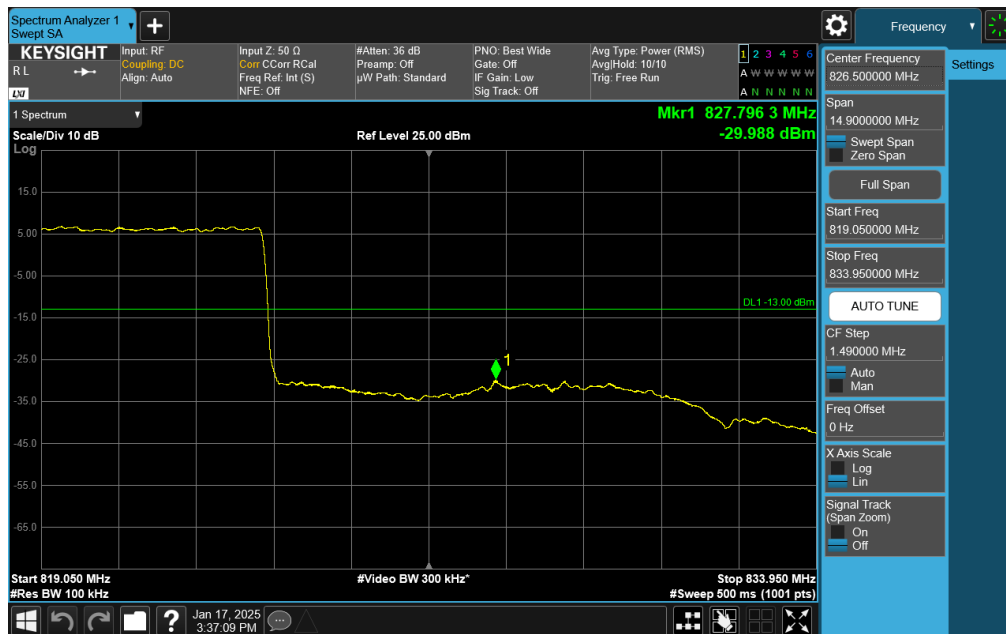
FCC ID: BCG-A3281		PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-83. Lower Band Edge Plot (NR Band n26, 10MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 50)



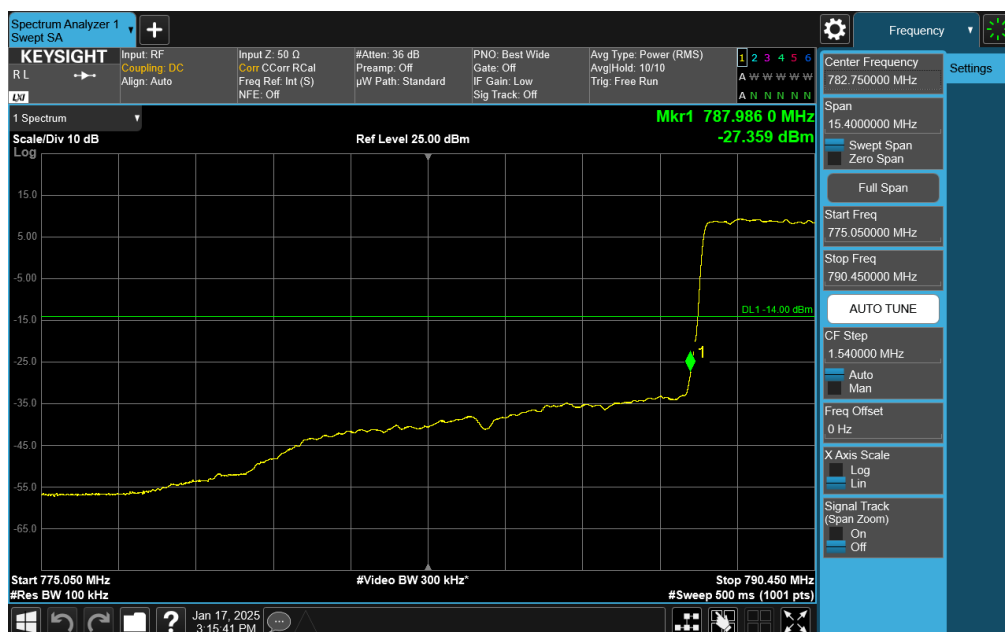
Plot 7-84. Upper Band Edge Plot (NR Band n26, 10MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 50)

FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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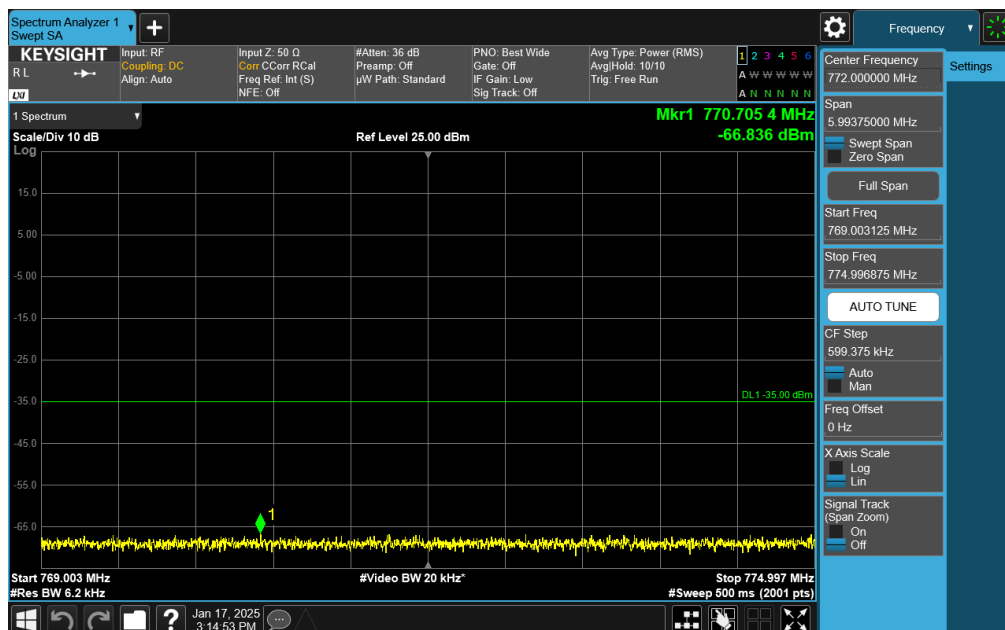
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NR Band n14



Plot 7-85. Lower Band Edge Plot (NR Band n14, 5MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 25)

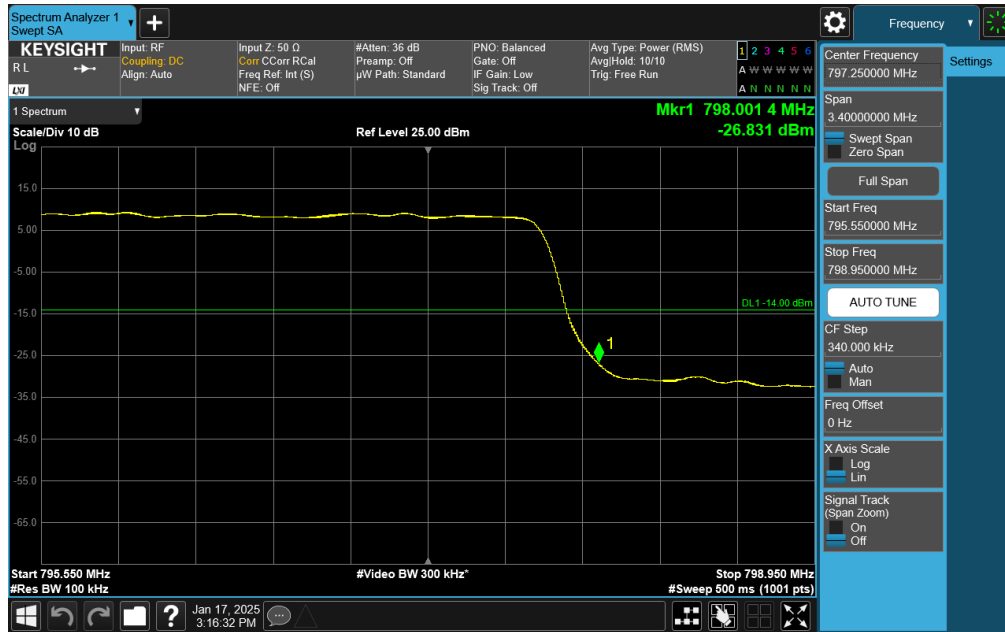


Plot 7-86. Lower Emission Mask Plot (NR Band n14, 5MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 25)

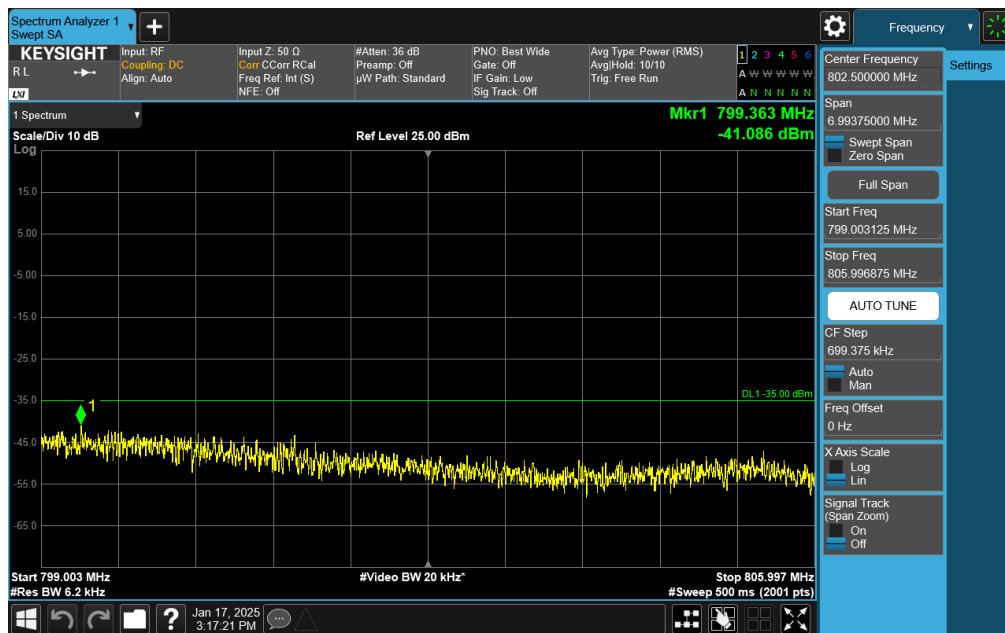
FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-87. Upper Band Edge Plot (NR Band n14, 5MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 25)

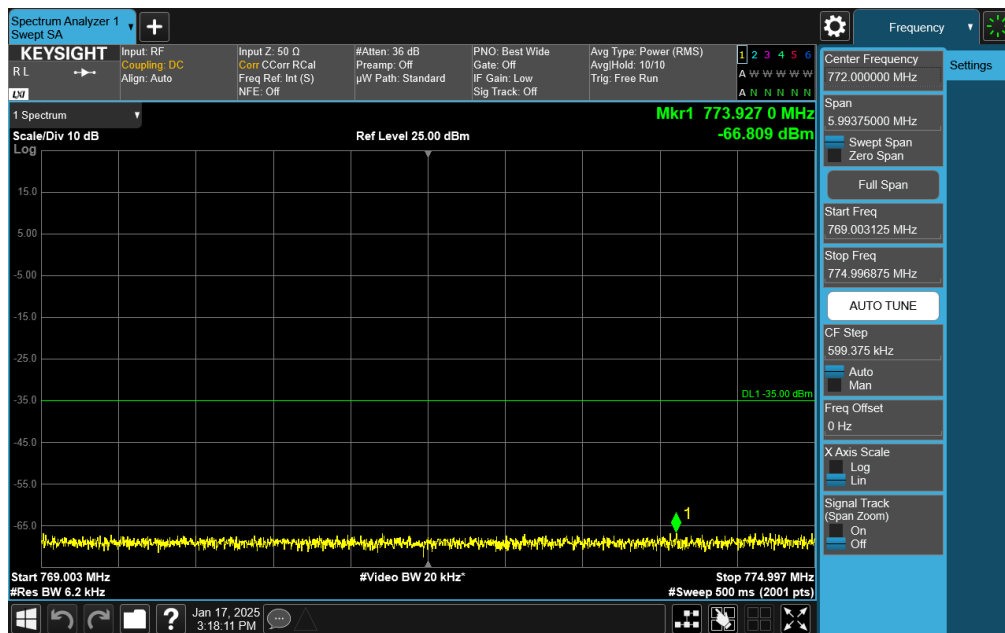
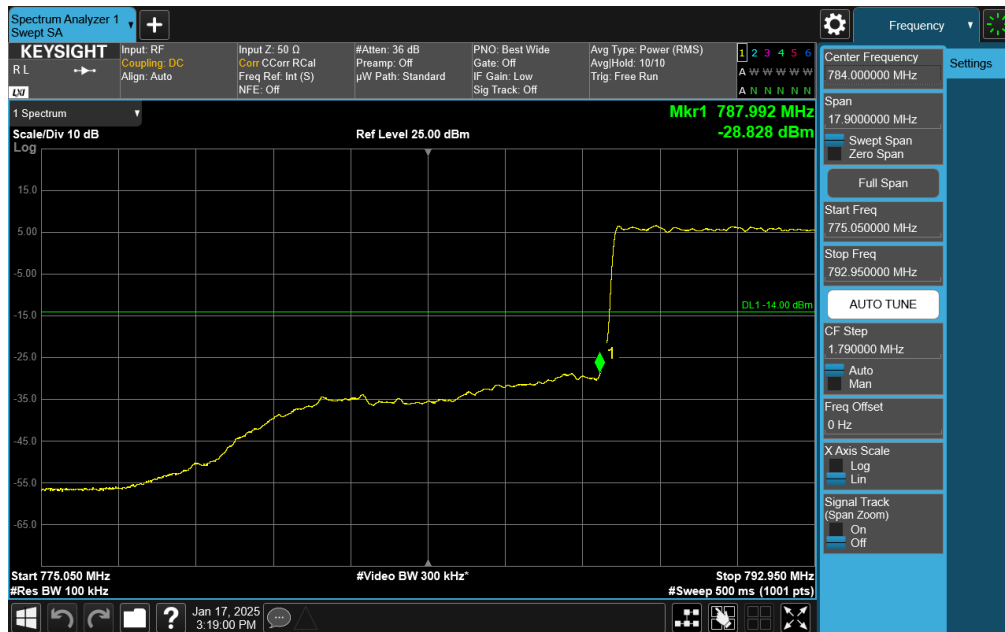



Plot 7-88. Upper Emission Mask Plot (NR Band n14, 5MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 25)

FCC ID: BCG-A3281	PART 90 MEASUREMENT REPORT		Approved by: Technical Manager
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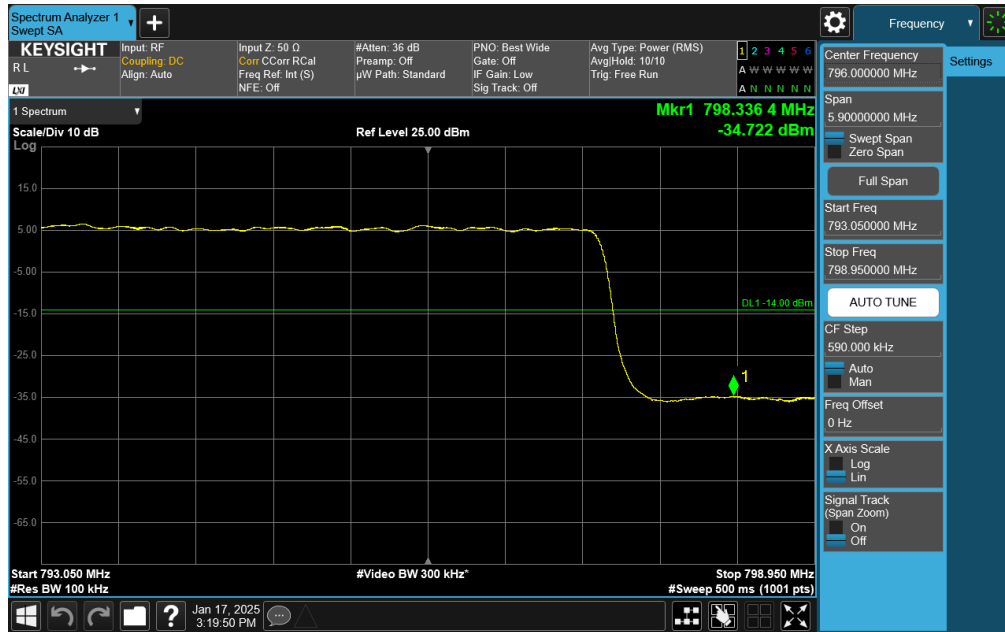
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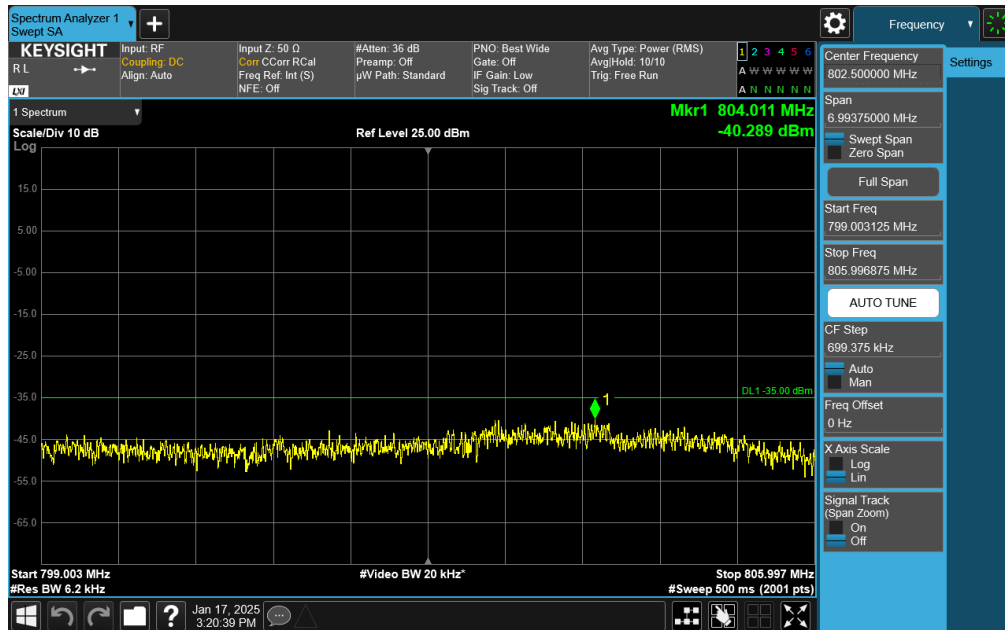
FCC ID: BCG-A3281	 PART 90 MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-91. Upper Band Edge Plot (NR Band n14, 10MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 50)



Plot 7-92. Upper Emission Mask Plot (NR Band n14, 10MHz DFT-s-OFDM $\pi/2$ BPSK - RB Size 50)

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7.5 Conducted Power Output Data

§2.1046 §90.635

Test Overview

Conducted power measurements are performed to measure the average output power of the EUT. The averaging is to be performed only over duration of active transmissions at maximum output power level. The average measurements do not include averaging over periods when the transmitter is quiescent or when operating at reduced power level.

Test Procedures Used

KDB 971168 D01 v03r01

Test Setup

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

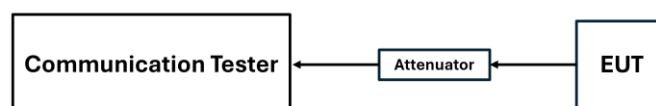


Figure 7-7. LTE Conducted Power Measurement Setup

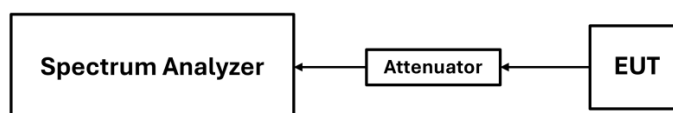



Figure 7-8. FR1 Test Instrument & Measurement Setup

Test Notes

1. The EUT was tested in all possible test configurations. The worst case emissions are reported with the EUT modulations and channel bandwidth configurations shown in the tables below.
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.

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7.5.1 Antenna BCM – Conducted Power

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [mW]	Conducted Power Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	814.7	1 / 0	25.41	347.536	50.00	-24.59
		823.3	1 / 0	25.28	337.287	50.00	-24.72
	16-QAM	823.3	1 / 0	24.70	295.121	50.00	-25.30
3 MHz	QPSK	815.5	1 / 7	25.41	347.536	50.00	-24.59
		822.5	1 / 14	25.34	341.979	50.00	-24.66
	16-QAM	822.5	1 / 0	24.61	289.068	50.00	-25.39
5 MHz	QPSK	816.5	1 / 0	25.36	343.558	50.00	-24.64
		821.5	1 / 0	25.33	341.193	50.00	-24.67
	16-QAM	821.5	1 / 12	24.60	288.403	50.00	-25.40
10 MHz	QPSK	819.0	1 / 25	25.31	339.625	50.00	-24.69
	16-QAM	819.0	1 / 49	24.70	295.121	50.00	-25.30

Table 7-2. Antenna BCM Conducted Power Output Data (LTE Band 26)

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [mW]	Conducted Power Limit [dBm]	Margin [dB]
5 MHz	$\pi/2$ BPSK	816.5	1 / 18	25.67	368.978	50.00	-24.33
		819.0	1 / 6	25.65	367.282	50.00	-24.35
		821.5	1 / 18	25.41	347.536	50.00	-24.59
	QPSK	816.5	1 / 18	25.70	371.535	50.00	-24.30
		819.0	1 / 12	25.60	363.078	50.00	-24.40
		821.5	1 / 12	25.53	357.273	50.00	-24.47
	16-QAM	816.5	1 / 12	24.71	295.801	50.00	-25.29
	64-QAM	821.5	1 / 18	23.70	234.423	50.00	-26.30
	$\pi/2$ BPSK	819.0	1 / 13	25.53	357.273	50.00	-24.47
10 MHz	QPSK	819.0	1 / 13	25.70	371.535	50.00	-24.30
	16-QAM	819.0	1 / 38	24.55	285.102	50.00	-25.45
	64-QAM	819.0	1 / 13	23.70	234.423	50.00	-26.30

Table 7-3. Antenna BCM Conducted Power Output Data (NR Band n26)

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7.6 Radiated Power (ERP)

§90.542(a)(7)

Test Overview

Effective Radiated Power (ERP) measurements are calculated by adding highest antenna gain to maximum measured conducted output power. 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 Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1
ANSI C63.26-2015
TIA-603-E-2016 – Section 2.2.17

Test Settings

The relevant equation for determining the ERP from the conducted RF output power measured is:

$$\text{ERP} = \text{PMeas} - \text{LC} + \text{GT}$$


Where:

ERP = Effective Radiated Power (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP)

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Test Setup

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

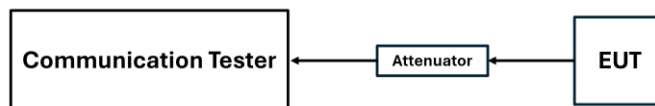


Figure 7-9. LTE ERP Measurement Setup

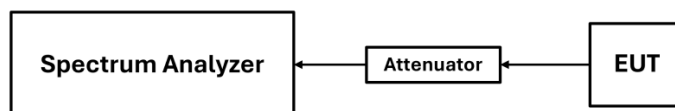



Figure 7-10. FR1 ERP Measurement Setup

Test Notes

- 1) The worst case emissions are reported with the modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The Level (dBm) readings in the table were taken with a correction table loaded into the base station simulator. The correction table was used to account for the signal attenuation in the connecting cable between the transmitter and antenna.
- 4) The Ant. Gains (GT) are listed in dBi.
- 5) 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.

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7.6.1 Antenna BCM – ERP

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [mW]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	790.5	-25.60	1 / 0	25.20	-2.55	0.556	34.77	-37.32
		793.0	-25.60	1 / 0	25.15	-2.60	0.550	34.77	-37.37
		795.5	-25.60	1 / 12	25.12	-2.63	0.546	34.77	-37.40
10 MHz	16-QAM	790.5	-25.60	1 / 0	24.22	-3.53	0.444	34.77	-38.30
	QPSK	793.0	-25.60	1 / 0	25.53	-2.22	0.600	34.77	-36.99
	16-QAM	793.0	-25.60	1 / 0	24.68	-3.07	0.493	34.77	-37.84

Table 7-4. Antenna BCM ERP Data (LTE Band 14)

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [mW]	ERP Limit [dBm]	Margin [dB]
5 MHz	$\pi/2$ BPSK	790.5	-25.60	1 / 6	25.08	-2.67	0.541	34.77	-37.44
		793.0	-25.60	1 / 12	25.20	-2.55	0.556	34.77	-37.32
		795.5	-25.60	1 / 6	25.10	-2.65	0.543	34.77	-37.42
	QPSK	790.5	-25.60	1 / 12	25.01	-2.74	0.532	34.77	-37.51
		793.0	-25.60	1 / 12	25.12	-2.63	0.546	34.77	-37.40
		795.5	-25.60	1 / 18	25.06	-2.69	0.538	34.77	-37.46
10 MHz	16-QAM	793.0	-25.60	1 / 6	24.03	-3.72	0.425	34.77	-38.49
	64-QAM	790.5	-25.60	1 / 12	23.21	-4.54	0.352	34.77	-39.31
	$\pi/2$ BPSK	793.0	-25.60	1 / 38	25.20	-2.55	0.556	34.77	-37.32
	QPSK	793.0	-25.60	1 / 26	25.13	-2.62	0.547	34.77	-37.39
	16-QAM	793.0	-25.60	1 / 13	24.18	-3.57	0.440	34.77	-38.34
	64-QAM	793.0	-25.60	1 / 13	22.93	-4.82	0.330	34.77	-39.59

Table 7-5. Antenna BCM ERP Data (NR Band n14)

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7.7 Radiated Spurious Emissions

§2.1053 §90.691(a) §90.543(e)

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized broadband hybrid antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed while the EUT is operating at maximum power and at the appropriate frequencies.

Test Procedures Used


KDB 971168 D01 v03r01 – Section 5.8

ANSI C63.26-2015

TIA-603-E-2016 – Section 2.2.12

Test Settings

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

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Test Setup

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

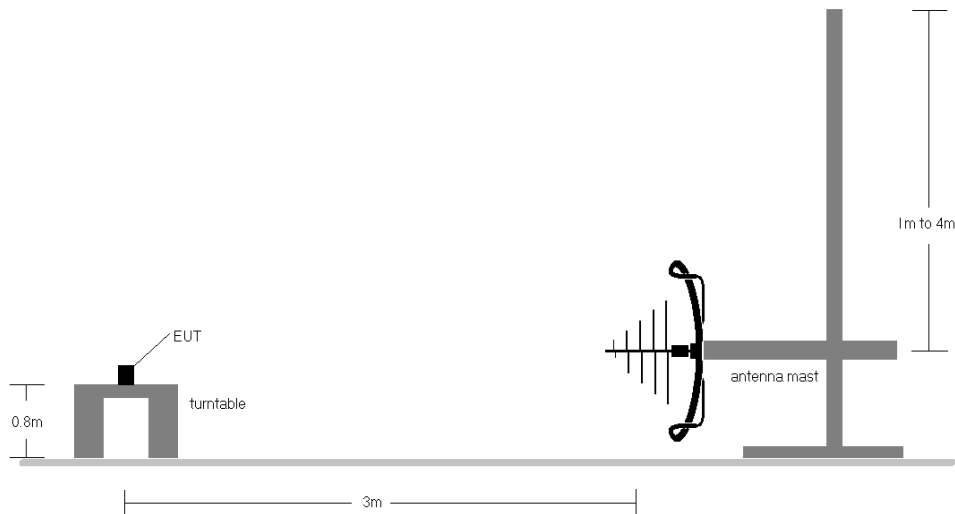


Figure 7-11. Test Instrument & Measurement Setup < 1GHz

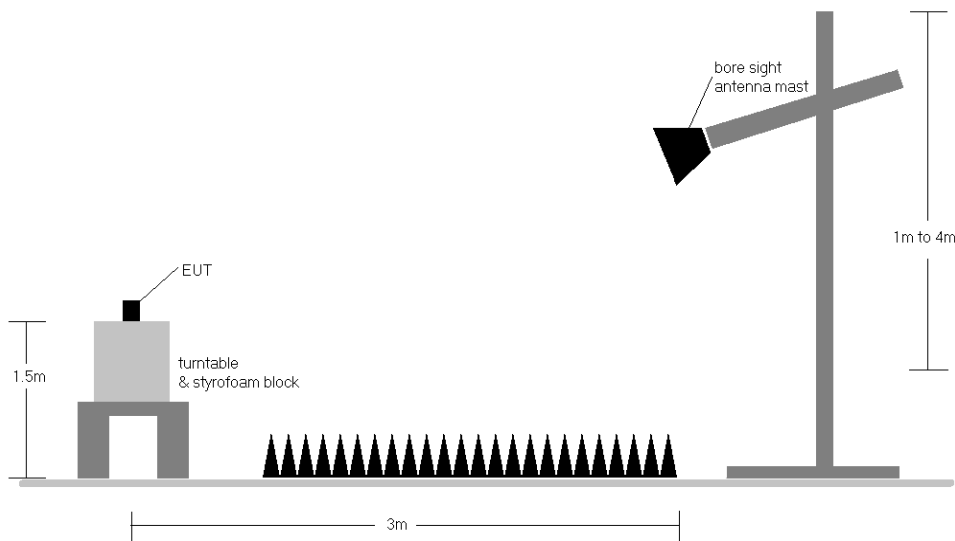




Figure 7-12. Test Instrument & Measurement Setup >1 GHz

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Test Notes

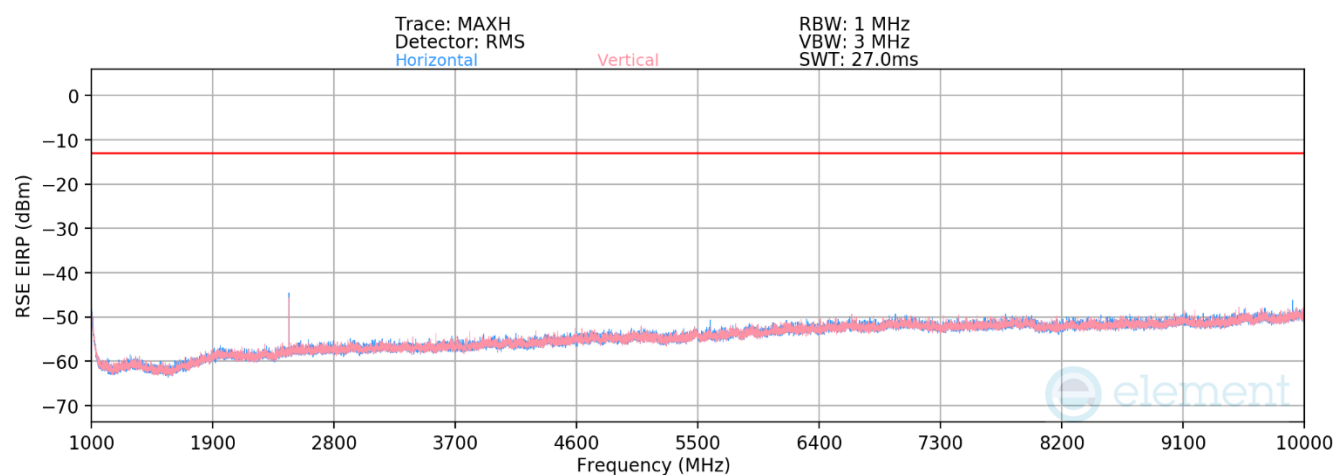
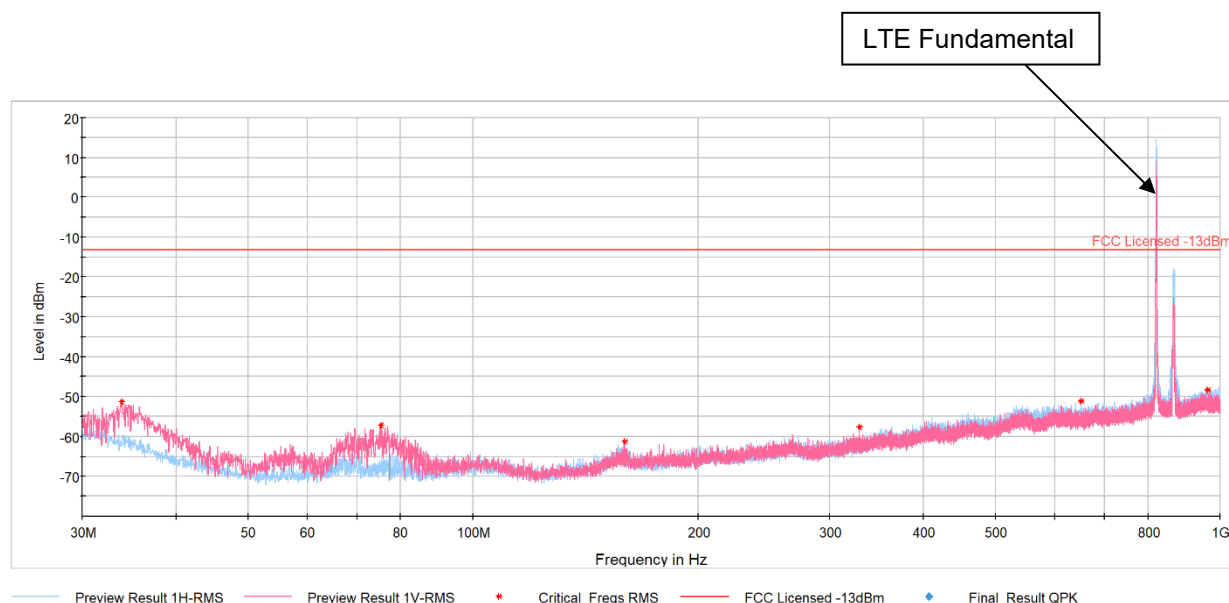
2. Field strengths are calculated using the Measurement quantity conversions in KDB 971168 v03r01 Section 5.8.4.
 - a. $E(\text{dB}\mu\text{V}/\text{m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - b. $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V}/\text{m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
3. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
4. This unit was tested with its standard battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
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.


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7.7.1 Antenna BCM – Radiated Spurious Emission Measurements

LTE Band 26



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Bandwidth (MHz):	5
Frequency (MHz):	816.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

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]
1633.0	V	-	-	-77.43	-1.62	27.95	-67.31	-13.00	-54.31
2449.5	V	139	282	-69.84	1.99	39.15	-56.10	-13.00	-43.10
3266.0	V	-	-	-79.23	4.38	32.15	-63.11	-13.00	-50.11
4082.5	V	-	-	-79.48	6.11	33.62	-61.64	-13.00	-48.64
4899.0	V	-	-	-80.90	8.03	34.13	-61.12	-13.00	-48.12

Table 7-6. Antenna BCM Radiated Spurious Data (LTE Band 26 – Low Channel)

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	-	-	-77.36	-1.62	28.01	-67.24	-13.00	-54.24
2457.0	V	325	134	-64.46	2.31	44.85	-50.41	-13.00	-37.41
3276.0	V	-	-	-79.26	4.47	32.21	-63.05	-13.00	-50.05
4095.0	V	-	-	-79.92	6.52	33.60	-61.66	-13.00	-48.66
4914.0	V	-	-	-80.85	8.03	34.19	-61.07	-13.00	-48.07

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

Bandwidth (MHz):	5
Frequency (MHz):	821.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

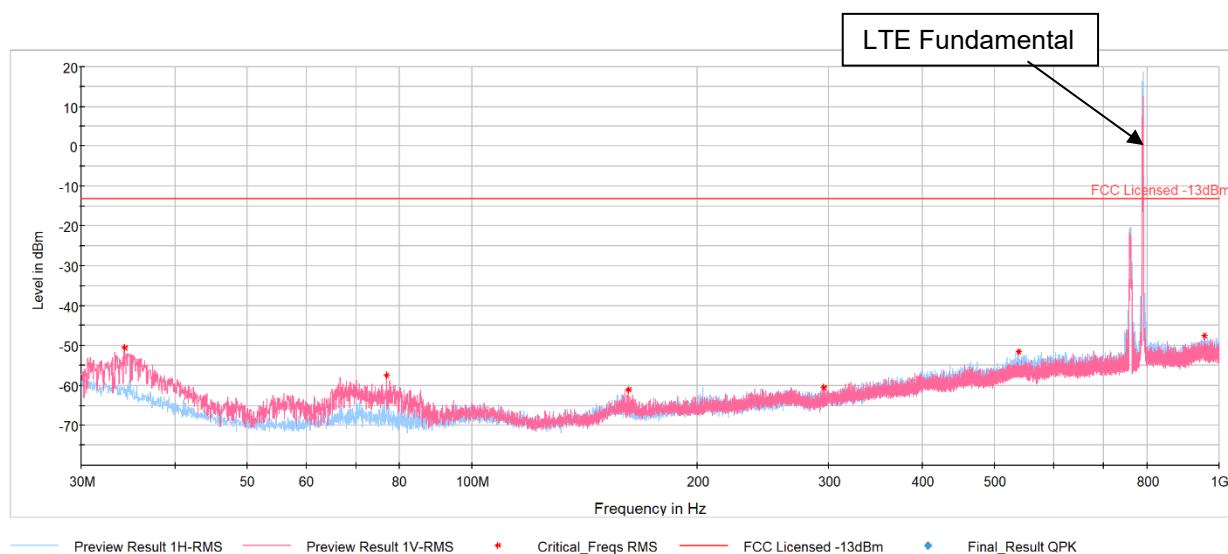
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1643.0	V	-	-	-77.37	-1.54	28.09	-67.17	-13.00	-54.17
2464.5	H	100	71	-64.43	2.47	45.04	-50.22	-13.00	-37.22
3286.0	V	-	-	-78.96	4.36	32.40	-62.86	-13.00	-49.86
4107.5	V	-	-	-79.69	6.52	33.83	-61.43	-13.00	-48.43
4929.0	V	-	-	-80.71	7.99	34.28	-60.98	-13.00	-47.98

Table 7-8. Antenna BCM Radiated Spurious Data (LTE Band 26 – High Channel)

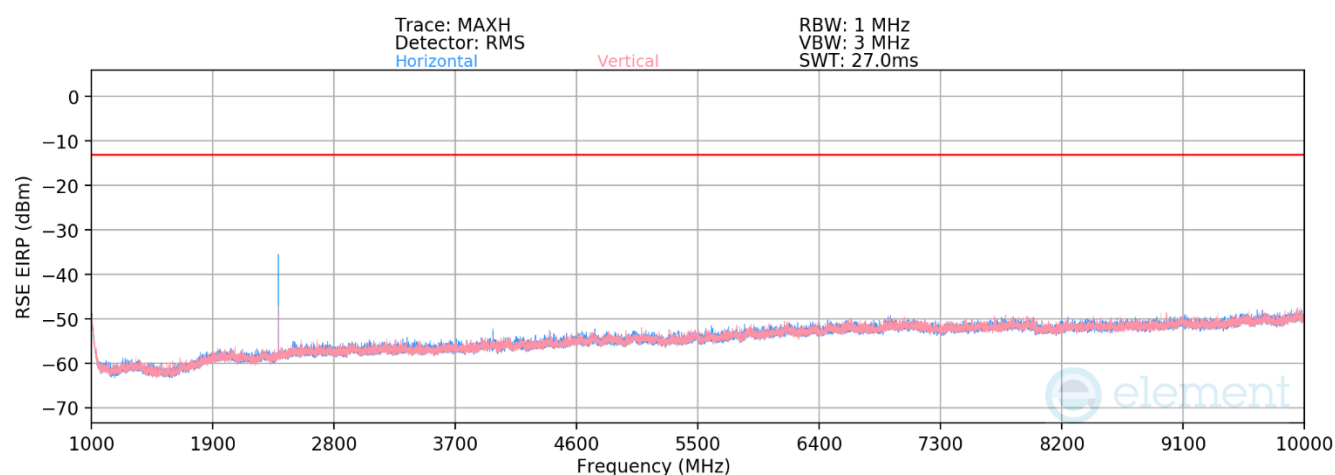
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LTE Band 14



Plot 7-95. Antenna BCM Radiated Spurious Plot Below 1GHz (LTE Band 14)



Plot 7-96. Antenna BCM Radiated Spurious Plot Above 1GHz (LTE Band 14)

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Bandwidth (MHz):	5
Frequency (MHz):	790.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

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]
1581.0	H	148	299	-76.11	-2.41	28.48	-66.78	-40.00	-26.78
2371.5	V	129	339	-55.88	1.60	52.72	-42.54	-13.00	-29.54
3162.0	V	-	-	-78.77	4.39	32.62	-62.63	-13.00	-49.63
3952.5	V	-	-	-79.60	5.85	33.26	-62.00	-13.00	-49.00
4743.0	V	-	-	-80.43	7.77	34.34	-60.92	-13.00	-47.92

Table 7-9. Antenna BCM Radiated Spurious Data (LTE Band 14 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	793.0
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]
1586.0	H	-	-	-77.41	-2.37	27.22	-68.04	-40.00	-28.04
2379.0	V	181	173	-63.98	1.56	44.58	-50.67	-13.00	-37.67
3172.0	V	-	-	-78.97	4.38	32.41	-62.84	-13.00	-49.84
3965.0	V	-	-	-79.90	6.11	33.21	-62.05	-13.00	-49.05
4758.0	V	-	-	-80.56	7.92	34.36	-60.90	-13.00	-47.90

Table 7-10. Antenna BCM Radiated Spurious Data (LTE Band 14 – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	795.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

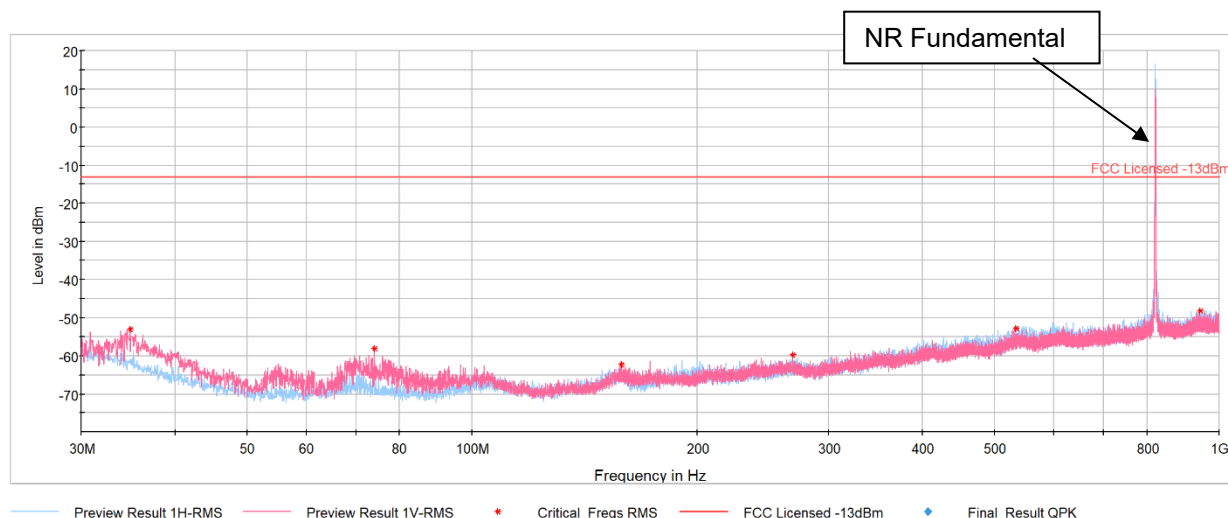
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1591.0	V	-	-	-77.43	-2.36	27.21	-68.04	-40.00	-28.04
2386.5	H	109	351	-55.00	1.56	53.56	-41.69	-13.00	-28.69
3182.0	V	-	-	-78.95	4.39	32.44	-62.82	-13.00	-49.82
3977.5	V	310	34	-79.07	6.11	34.04	-61.21	-13.00	-48.21
4773.0	V	-	-	-80.81	7.85	34.04	-61.21	-13.00	-48.21
5568.5	V	-	-	-81.47	9.51	35.05	-60.21	-13.00	-47.21
6364.0	V	-	-	-81.59	10.90	36.31	-58.95	-13.00	-45.95

Table 7-11. Antenna BCM Radiated Spurious Data (LTE Band 14 – High Channel)

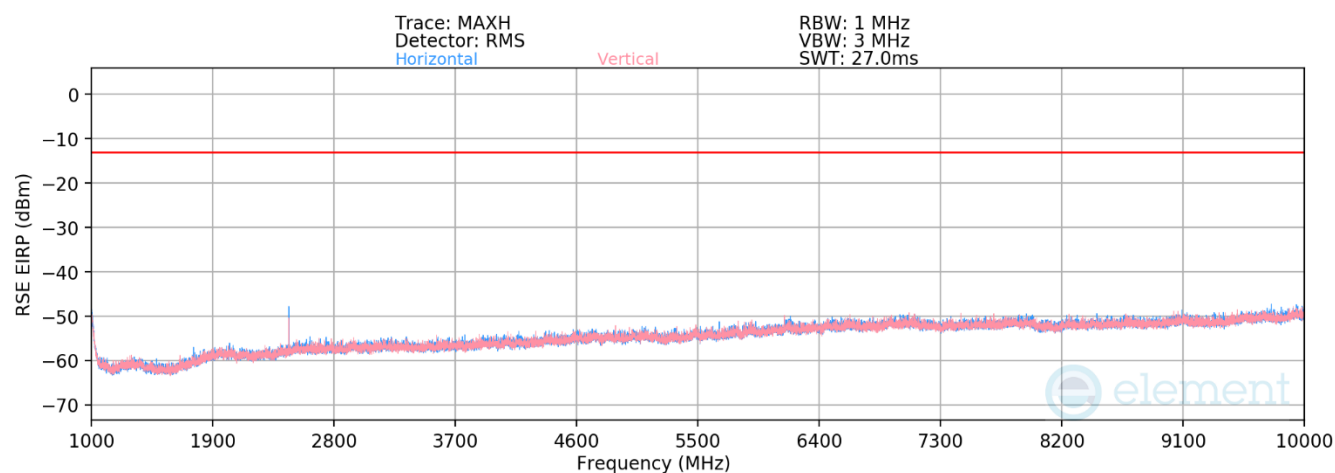
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NR Band 26



Plot 7-97. Antenna BCM Radiated Spurious Plot Below 1GHz (NR Band n26)



Plot 7-98. Antenna BCM Radiated Spurious Plot Above 1GHz (NR Band n26)

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Bandwidth (MHz):	5
Frequency (MHz):	816.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

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]
1633.0	H	184	114	-77.66	-1.62	27.72	-67.54	-13.00	-54.54
2449.5	V	138	340	-72.25	1.99	36.74	-58.52	-13.00	-45.52
3266.0	V	-	-	-78.96	4.38	32.42	-62.83	-13.00	-49.83
4082.5	V	-	-	-79.11	6.11	34.00	-61.26	-13.00	-48.26
4899.0	V	-	-	-80.99	8.16	34.17	-61.08	-13.00	-48.08

Table 7-12. Antenna BCM Radiated Spurious Data (NR Band n26 – Low Channel)

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	159	305	-77.54	-1.62	27.84	-67.41	-13.00	-54.41
2457.0	V	148	210	-66.76	2.31	42.54	-52.71	-13.00	-39.71
3276.0	V	-	-	-78.94	4.38	32.44	-62.81	-13.00	-49.81
4095.0	V	-	-	-79.60	6.47	33.87	-61.39	-13.00	-48.39
4914.0	V	-	-	-80.70	8.17	34.47	-60.78	-13.00	-47.78

Table 7-13. Antenna BCM Radiated Spurious Data (NR Band n26 – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	821.5
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 12

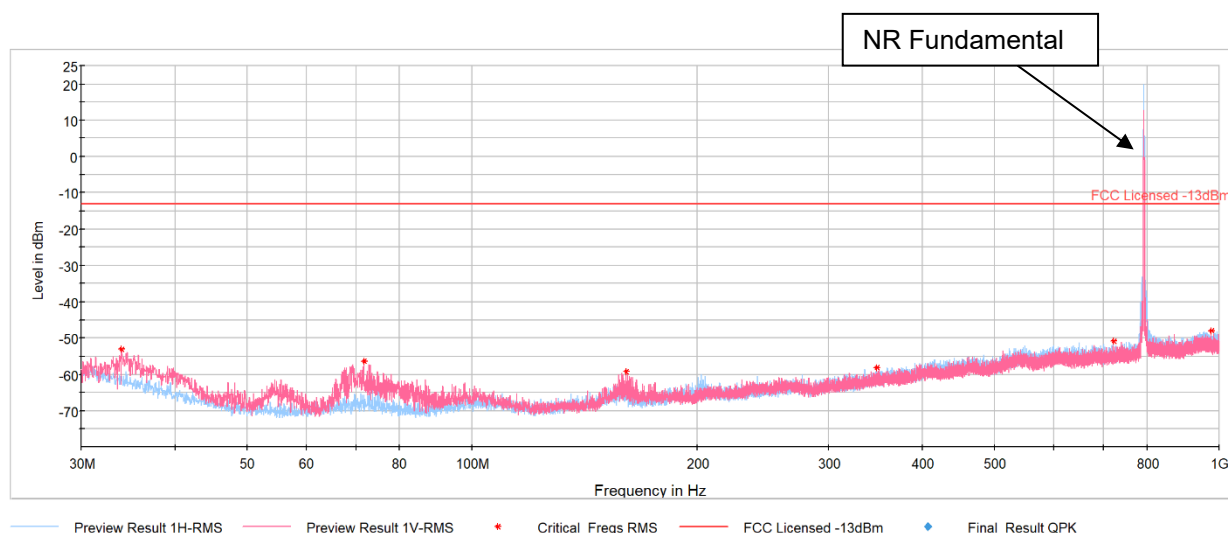
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1643.0	V	-	-	-77.53	-1.54	27.93	-67.33	-13.00	-54.33
2464.5	H	115	320	-54.67	2.47	54.80	-40.45	-13.00	-27.45
3286.0	V	-	-	-78.97	4.47	32.50	-62.76	-13.00	-49.76
4107.5	V	-	-	-79.82	6.52	33.70	-61.56	-13.00	-48.56
4929.0	V	-	-	-80.86	8.03	34.17	-61.09	-13.00	-48.09

Table 7-14. Antenna BCM Radiated Spurious Data (NR Band n26 – High Channel)

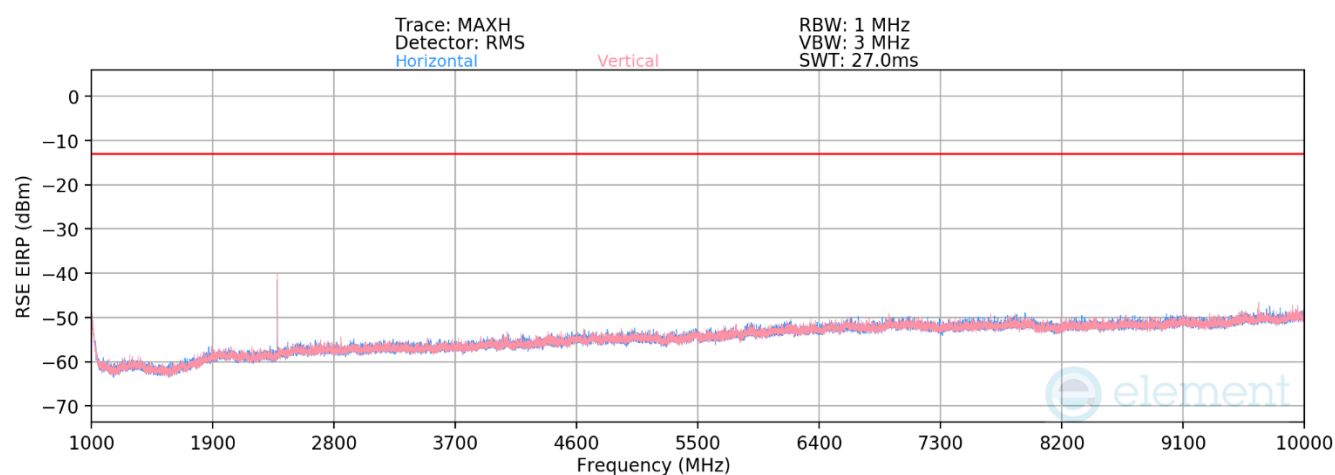
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NR Band n14



Plot 7-99. Antenna BCM Radiated Spurious Plot Below 1GHz (NR Band n14)



Plot 7-100. Antenna BCM Radiated Spurious Plot Above 1GHz (NR Band n14)

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Bandwidth (MHz):	5
Frequency (MHz):	790.5
Modulation Signal:	QPSK
RB / Offset:	1 / 12

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]
1581.0	H	140	308	-76.88	-2.41	27.70	-67.55	-40.00	-27.55
2371.5	H	205	17	-66.23	1.60	42.37	-52.88	-13.00	-39.88
3162.0	H	-	-	-78.82	4.38	32.56	-62.70	-13.00	-49.70
3952.5	H	-	-	-79.86	6.11	33.25	-62.00	-13.00	-49.00
4743.0	H	-	-	-80.34	7.77	34.44	-60.82	-13.00	-47.82

Table 7-15. Antenna BCM Radiated Spurious Data (NR Band n14 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	793.0
Modulation Signal:	QPSK
RB / 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]
1586.0	H	103	336	-76.26	-2.41	28.33	-66.93	-40.00	-26.93
2379.0	H	100	42	-60.09	1.56	48.47	-46.78	-13.00	-33.78
3172.0	H	-	-	-78.97	4.39	32.42	-62.83	-13.00	-49.83
3965.0	H	-	-	-79.99	6.11	33.12	-62.14	-13.00	-49.14
4758.0	H	-	-	-80.88	7.85	33.98	-61.28	-13.00	-48.28

Table 7-16. Antenna BCM Radiated Spurious Data (NR Band n14 – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	795.5
Modulation Signal:	QPSK
RB / Offset:	1 / 12

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]
1591.0	H	-	-	-77.42	-2.41	27.16	-68.09	-40.00	-28.09
2386.5	H	103	314	-61.03	1.56	47.54	-47.72	-13.00	-34.72
3182.0	H	-	-	-78.70	4.44	32.73	-62.52	-13.00	-49.52
3977.5	H	311	14	-78.82	6.11	34.29	-60.97	-13.00	-47.97
4773.0	H	-	-	-80.63	7.85	34.22	-61.04	-13.00	-48.04
5568.5	H	-	-	-81.58	9.60	35.02	-60.24	-13.00	-47.24
6364.0	H	-	-	-81.79	11.02	36.24	-59.02	-13.00	-46.02

Table 7-17. Antenna BCM Radiated Spurious Data (NR Band n14 – High Channel)

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7.8 Frequency Stability / Temperature Variation

~~§2.1055~~ ~~§90.213~~

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015 and TIA-603-E-2016. 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.

For Band 26, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Band 14 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.


Test Procedure Used

ANSI C63.26-2015

TIA-603-E-2016

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.

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Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber. For LTE testing, in addition, the EUT was connected to a communication tester via an attenuated RF coupler.

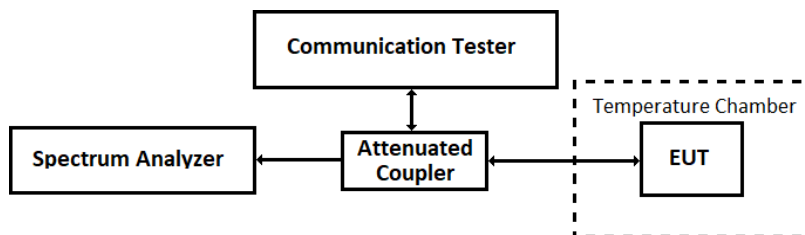


Figure 7-13. LTE Test Instrument & Measurement Setup

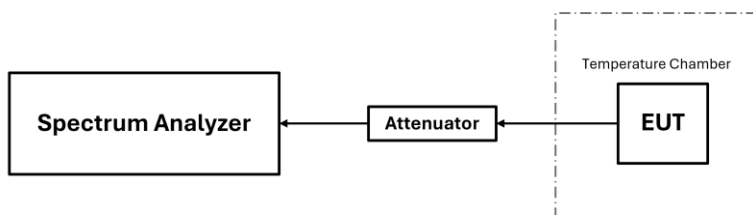



Figure 7-14. FR1 Test Instrument & Measurement Setup

Test Notes

None

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Frequency Stability / Temperature Variation

LTE Band 26					
		Operating Frequency (GHz):		0.819	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (GHz)	Freq. Dev. (GHz)	Deviation (%)
100 %	3.80	- 30	0.818999908	-0.000000165	-0.000020147
		- 20	0.818999984	-0.000000089	-0.000010867
		- 10	0.819000148	0.000000075	0.000009158
		0	0.819000157	0.000000084	0.000010256
		+ 10	0.819000138	0.000000065	0.000007937
		+ 20 (Ref)	0.819000073	0.000000000	0.000000000
		+ 30	0.818999961	-0.000000112	-0.000013675
		+ 40	0.819000171	0.000000098	0.000011966
		+ 50	0.818999919	-0.000000154	-0.000018803
Battery Endpoint	3.40	+ 20	0.818999995	-0.000000078	-0.000009524

Table 7-18. LTE Band 26 Frequency Stability Data

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Frequency Stability / Temperature Variation

LTE Band 14				
Operating Band Lower Boundary (GHz)			0.788	
Ref. Voltage (VDC):			3.80	
Voltage (%)	Power (VDC)	Temp (°C)	Measured Freq. (GHz)	Freq. Delta from Operating Range (GHz)
100 %	3.80	- 30	0.788352600	-0.000352600
		- 20	0.788891200	-0.000891200
		- 10	0.788523800	-0.000523800
		0	0.788851200	-0.000851200
		+ 10	0.788563300	-0.000563300
		+ 20 (Ref)	0.788545000	-0.000545000
		+ 30	0.788980200	-0.000980200
		+ 40	0.788175900	-0.000175900
		+ 50	0.788432300	-0.000432300
Battery Endpoint	3.40	+ 20	0.788224200	-0.000224200

Table 7-19. LTE Band 14 Lower Boundary Frequency Stability Data

LTE Band 14				
Operating Band Upper Boundary (GHz)			0.798	
Ref. Voltage (VDC):			3.80	
Voltage (%)	Power (VDC)	Temp (°C)	Measured Freq. (GHz)	Freq. Delta from Operating Range (GHz)
100 %	3.80	- 30	0.797440200	-0.000559800
		- 20	0.797335100	-0.000664900
		- 10	0.797623600	-0.000376400
		0	0.797435500	-0.000564500
		+ 10	0.797546900	-0.000453100
		+ 20 (Ref)	0.797788400	-0.000211600
		+ 30	0.797404200	-0.000595800
		+ 40	0.797524400	-0.000475600
		+ 50	0.797226200	-0.000773800
Battery Endpoint	3.40	+ 20	0.797368300	-0.000631700

Table 7-20. LTE Band 14 Upper Boundary Frequency Stability Data


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Frequency Stability / Temperature Variation

NR Band n26					
		Operating Frequency (GHz):		0.819	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (GHz)	Freq. Dev. (GHz)	Deviation (%)
100 %	3.80	- 30	0.819000180	0.000000112	0.000013675
		- 20	0.818999973	-0.000000095	-0.000011600
		- 10	0.819000140	0.000000072	0.000008791
		0	0.819000141	0.000000073	0.000008913
		+ 10	0.819000014	-0.000000054	-0.000006593
		+ 20 (Ref)	0.819000068	0.000000000	0.000000000
		+ 30	0.818999984	-0.000000084	-0.000010256
		+ 40	0.818999955	-0.000000113	-0.000013797
		+ 50	0.818999994	-0.000000074	-0.000009035
Battery Endpoint	3.40	+ 20	0.819000150	0.000000082	0.000010012

Table 7-21. NR Band n26 Frequency Stability Data

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Frequency Stability / Temperature Variation

NR Band n14				
Operating Band Lower Boundary (GHz)			0.788	
Ref. Voltage (VDC):			3.80	
Voltage (%)	Power (VDC)	Temp (°C)	Measured Freq. (GHz)	Freq. Delta from Operating Range (GHz)
100 %	3.80	- 30	0.788625500	-0.000625500
		- 20	0.788272900	-0.000272900
		- 10	0.788392100	-0.000392100
		0	0.788655100	-0.000655100
		+ 10	0.788464800	-0.000464800
		+ 20 (Ref)	0.788240300	-0.000240300
		+ 30	0.788949300	-0.000949300
		+ 40	0.788130500	-0.000130500
		+ 50	0.788304600	-0.000304600
Battery Endpoint	3.40	+ 20	0.788943900	-0.000943900

Table 7-22. NR Band n14 Lower Boundary Frequency Stability Data

NR Band n14				
Operating Band Upper Boundary (GHz)			0.798	
Ref. Voltage (VDC):			3.80	
Voltage (%)	Power (VDC)	Temp (°C)	Measured Freq. (GHz)	Freq. Delta from Operating Range (GHz)
100 %	3.80	- 30	0.797358500	-0.000641500
		- 20	0.797410400	-0.000589600
		- 10	0.797500300	-0.000499700
		0	0.797916700	-0.000083300
		+ 10	0.797862800	-0.000137200
		+ 20 (Ref)	0.797803300	-0.000196700
		+ 30	0.797242400	-0.000757600
		+ 40	0.797323700	-0.000676300
		+ 50	0.797139200	-0.000860800
Battery Endpoint	3.40	+ 20	0.797100400	-0.000899600


Table 7-23. NR Band n14 Upper Boundary Frequency Stability Data

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Watch** **FCC ID: BCG-A3281** complies with all the requirements of Part 90 of the FCC rules.

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