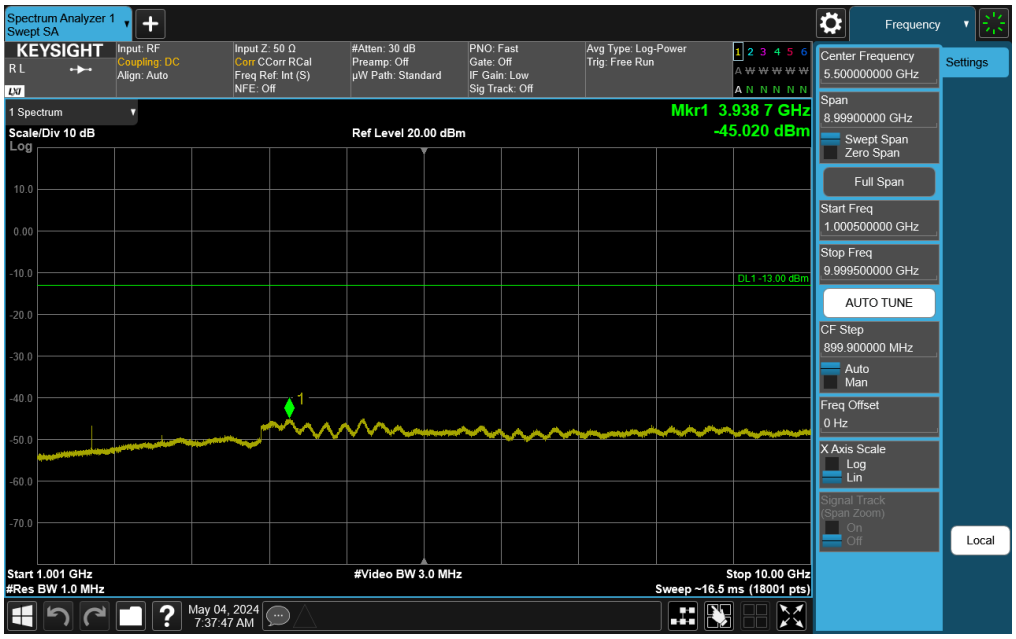
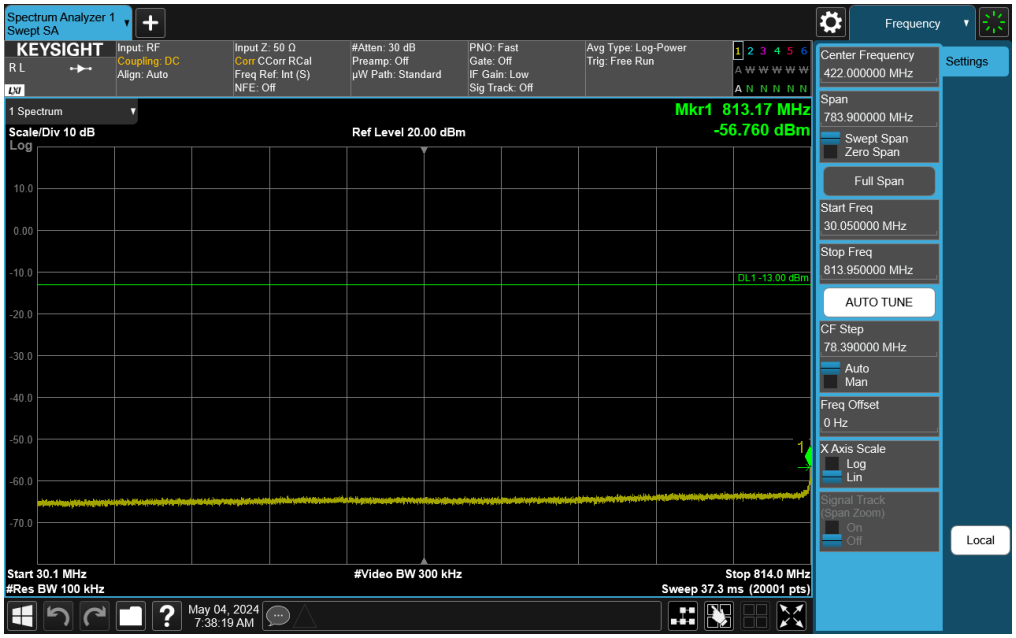


Plot 7-74. Conducted Spurious Plot (NR Band 26 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-75. Conducted Spurious Plot (NR Band 26 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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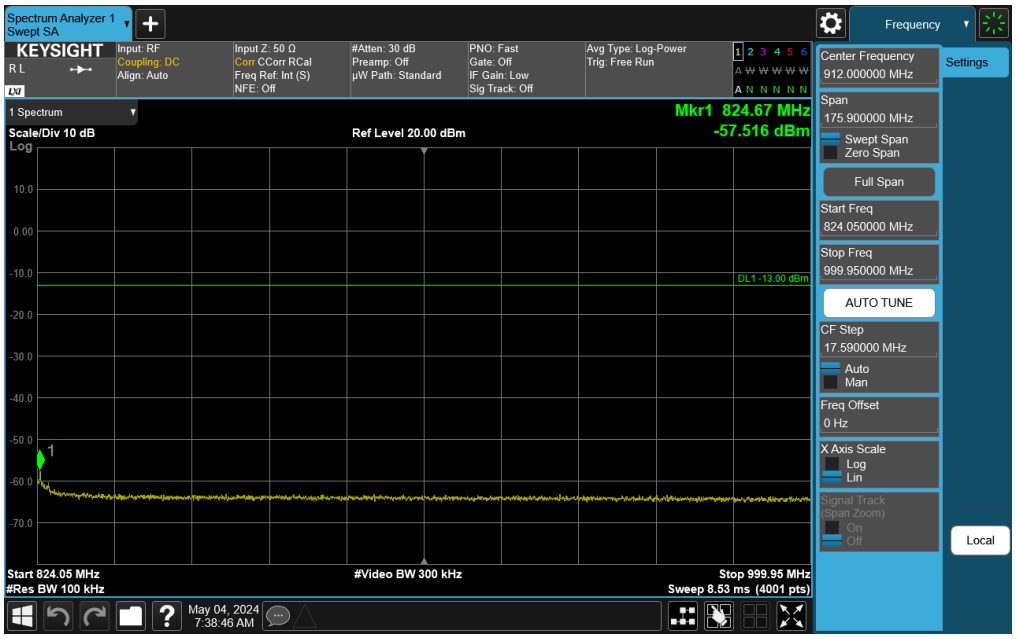
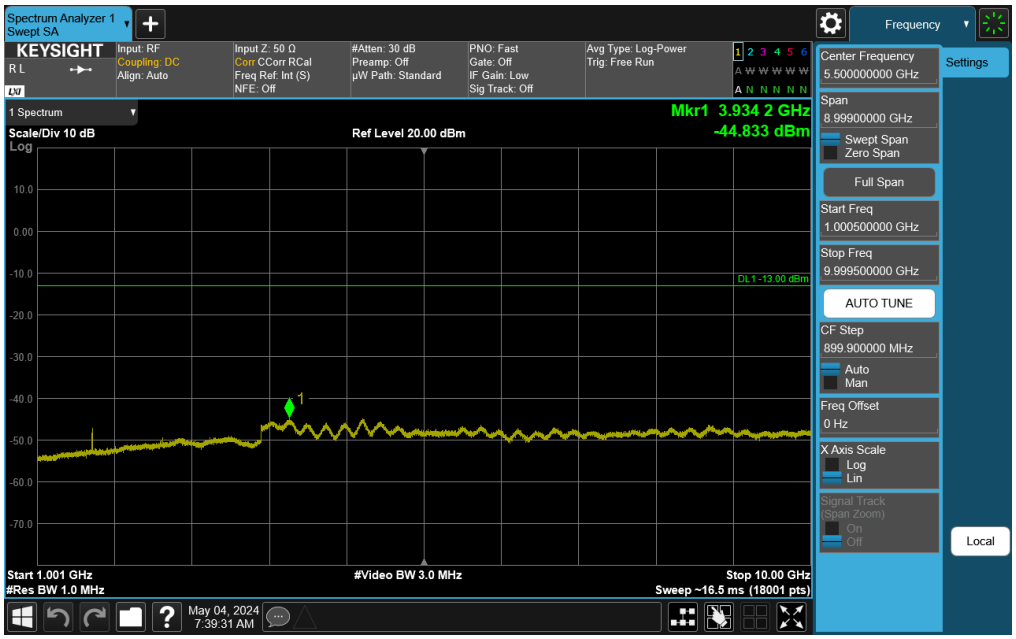


Plot 7-76. Conducted Spurious Plot (NR Band 26 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-77. Conducted Spurious Plot (NR Band 26 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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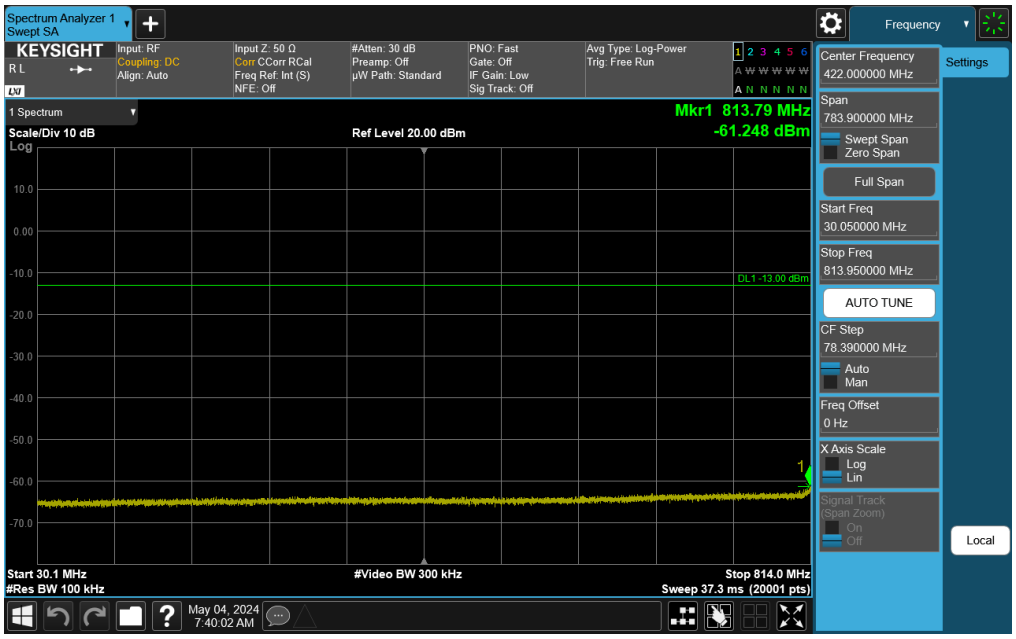
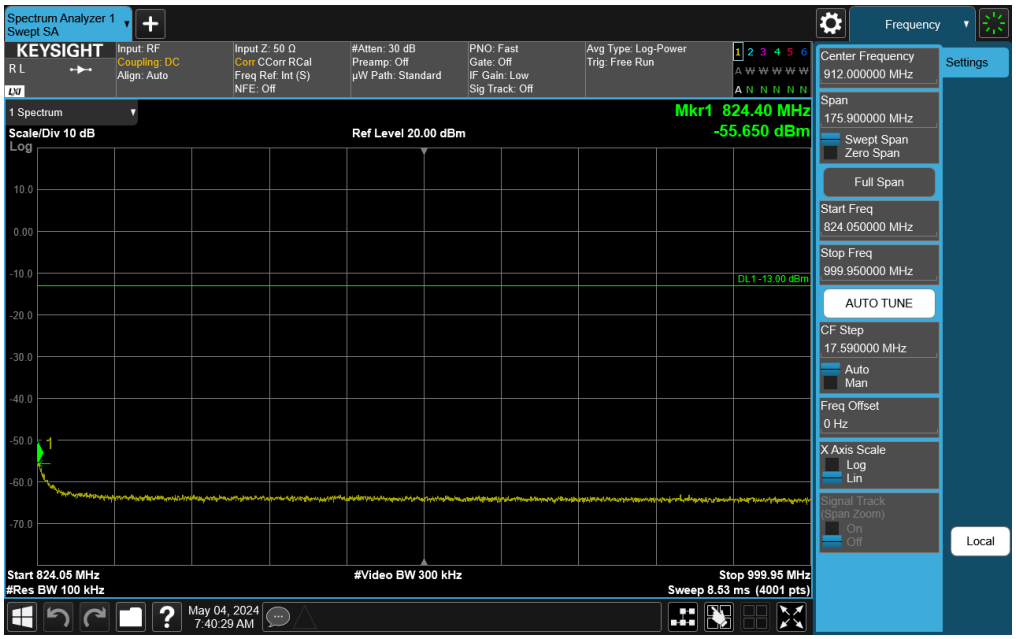


Plot 7-78. Conducted Spurious Plot (NR Band 26 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-79. Conducted Spurious Plot (NR Band 26 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

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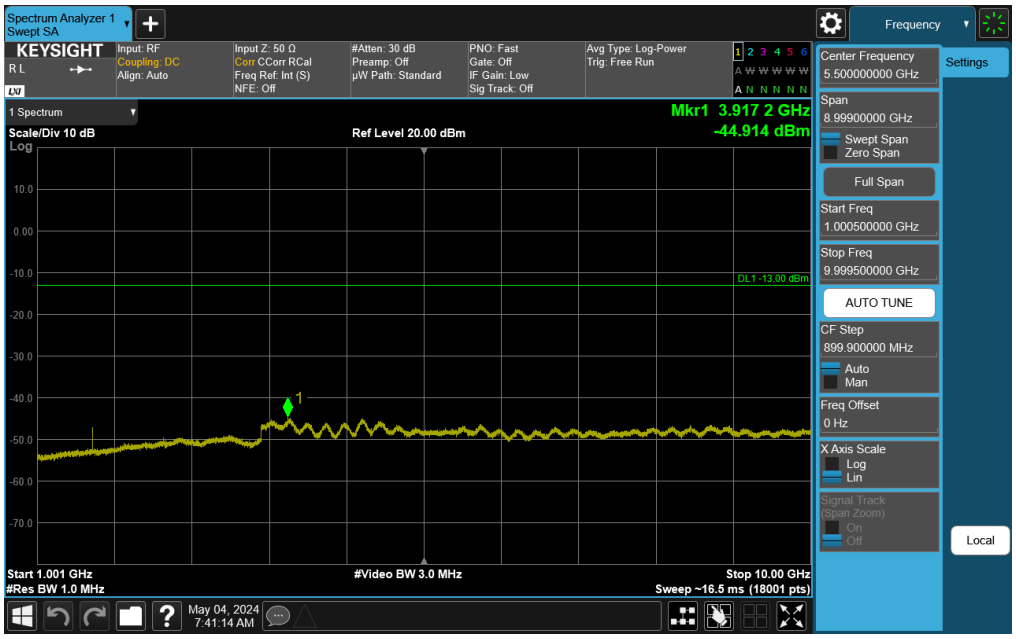

Plot 7-80. Conducted Spurious Plot (NR Band 26 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

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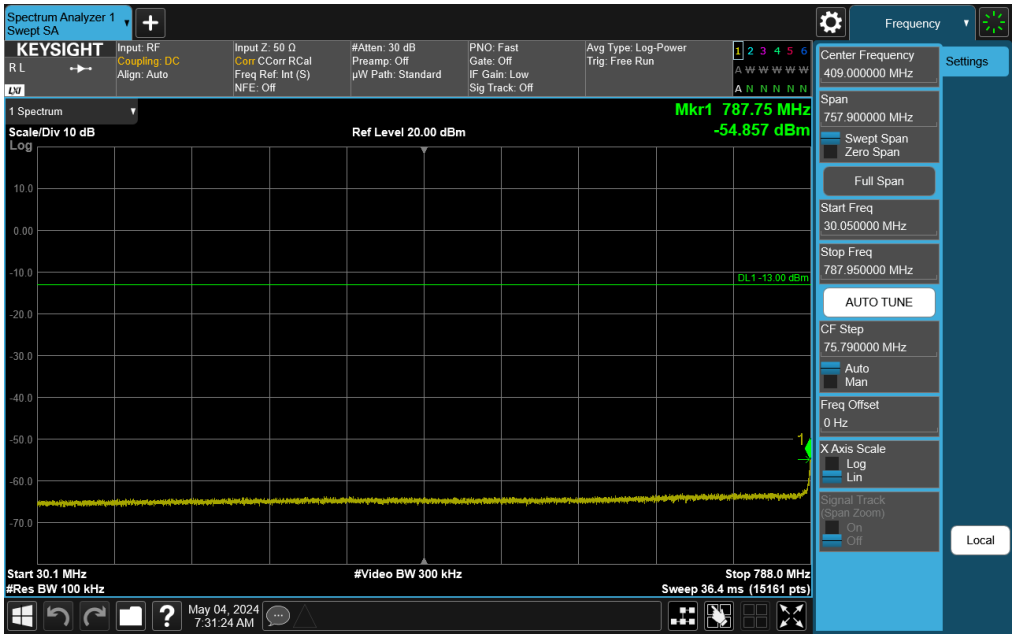
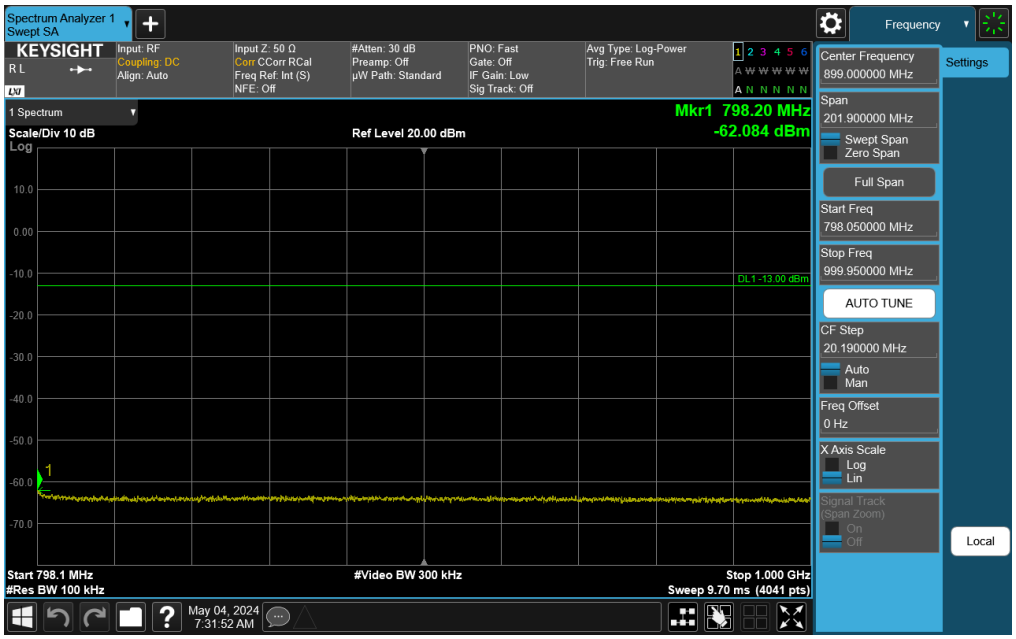
NR Band 14



Plot 7-81. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-82. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)

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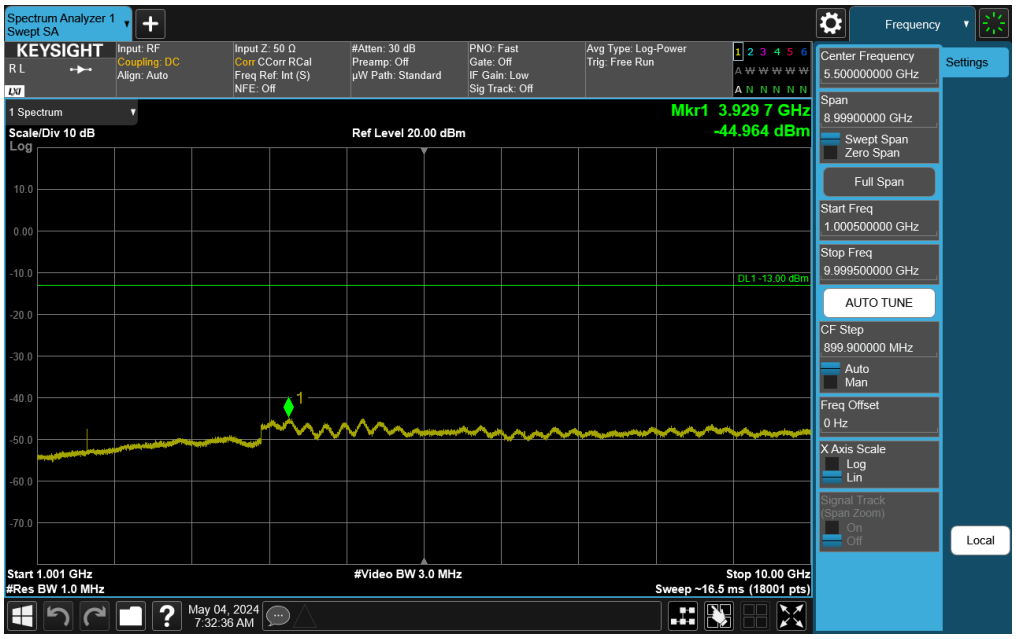
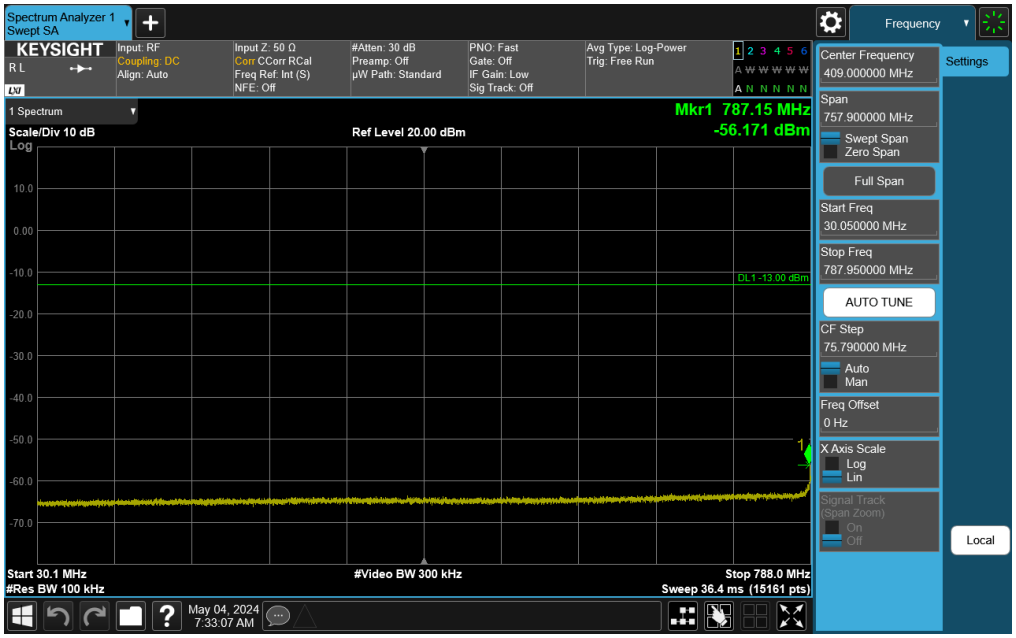


Plot 7-83. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-84. Conducted Spurious Plot (NR Band 14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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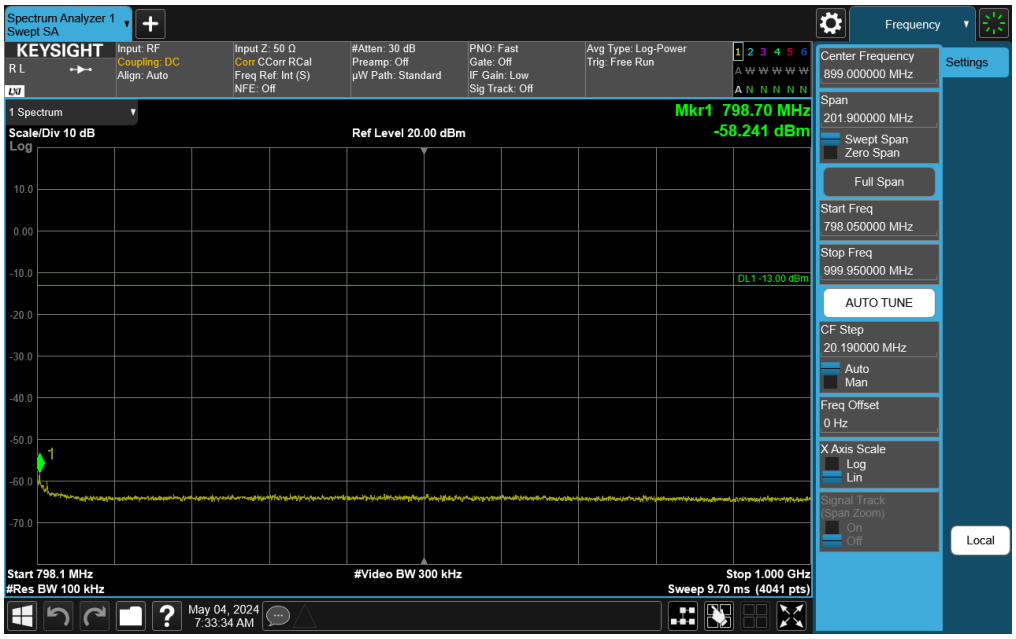
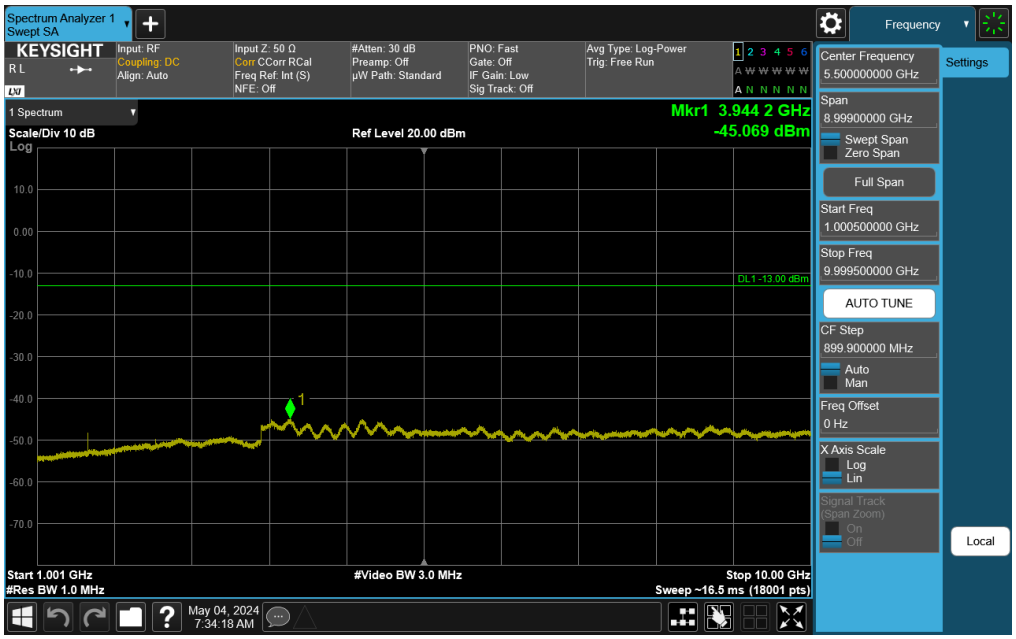


Plot 7-85. Conducted Spurious Plot (NR Band 14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-86. Conducted Spurious Plot (NR Band 14 - 10MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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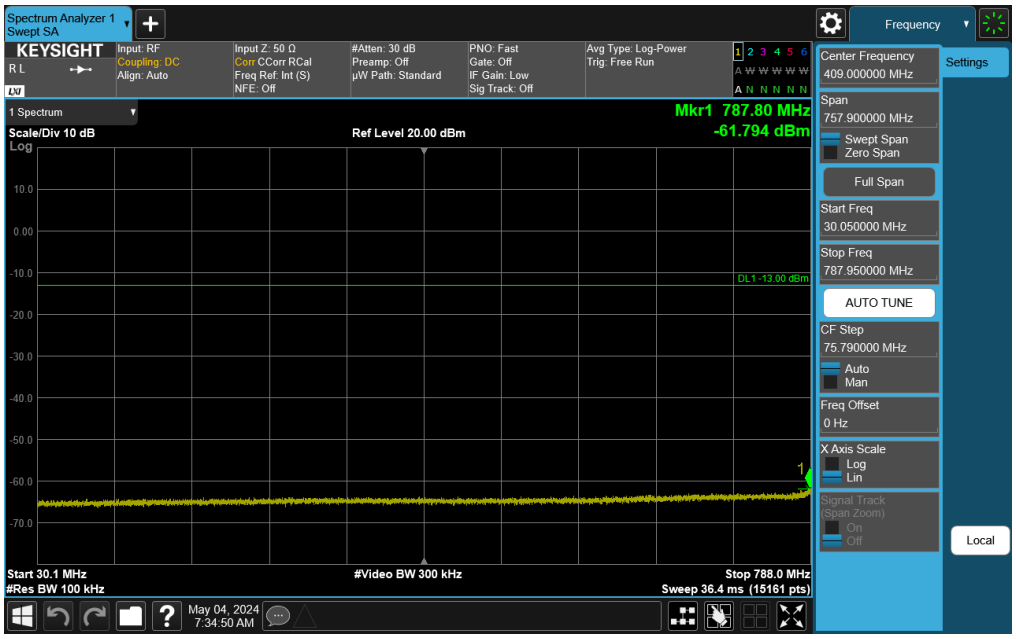
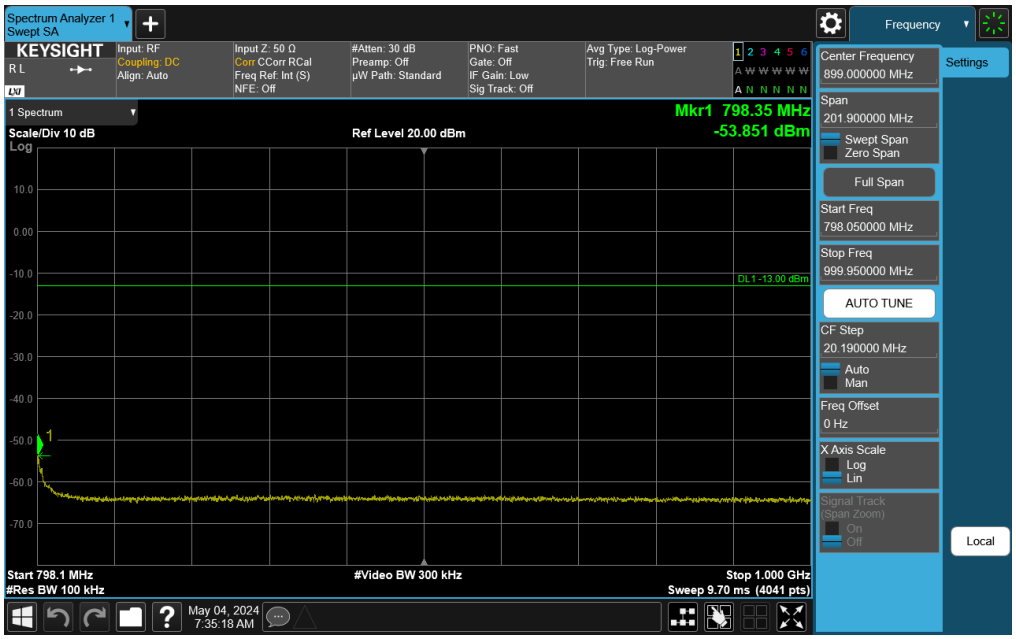


Plot 7-87. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-88. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

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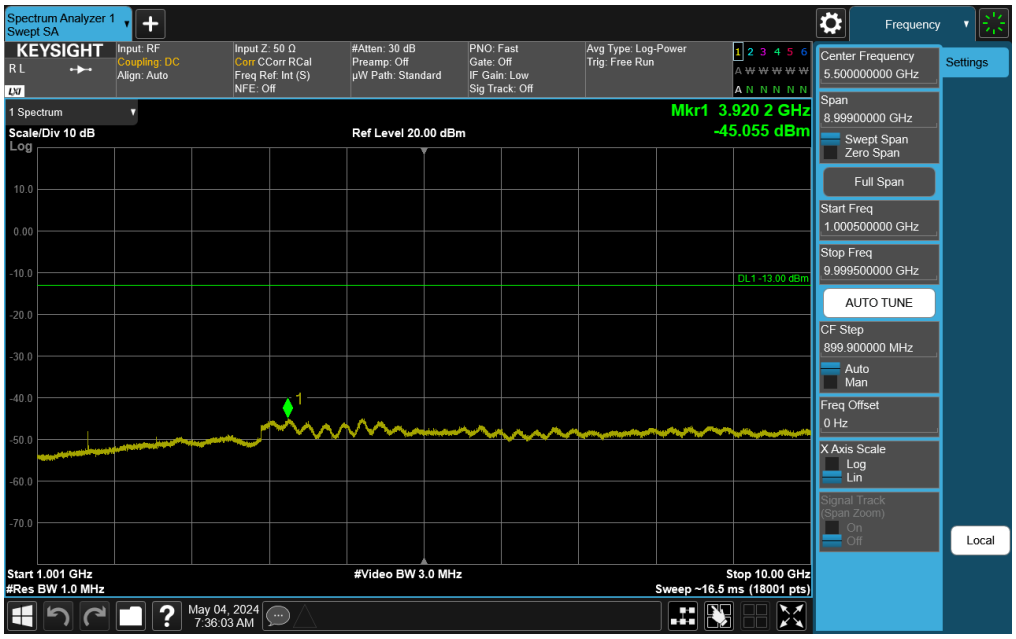

Plot 7-89. Conducted Spurious Plot (NR Band 14 - 5MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

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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. All ports were tested and only the worst case data were reported.

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.

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.

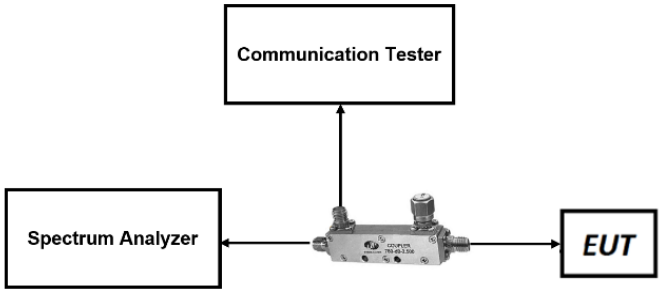

Figure 7-5. LTE Instrument & Measurement Setup

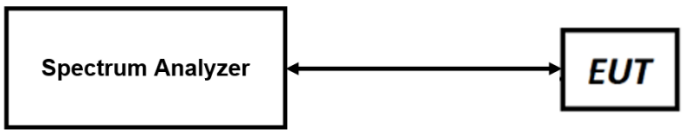

Figure 7-6. FR1 Instrument & Measurement Setup

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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 and NR Band n14 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.

3. Additionally, for LTE Band 14 and NR Band n14 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.

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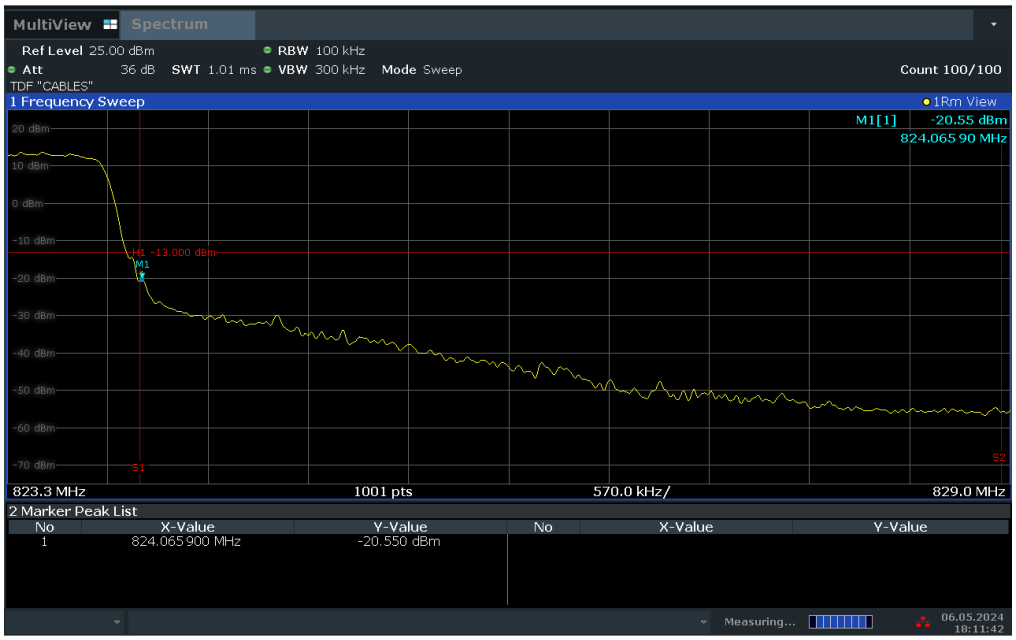
LTE Band 26

Peak

18:11:11 06.05.2024

Plot 7-90. Channel Edge Plot (LTE Band 26 – 1.4MHz QPSK – Low Channel)

Peak



18:11:43 06.05.2024

Plot 7-91. Channel Edge Plot (LTE Band 26 – 1.4MHz QPSK – High Channel)

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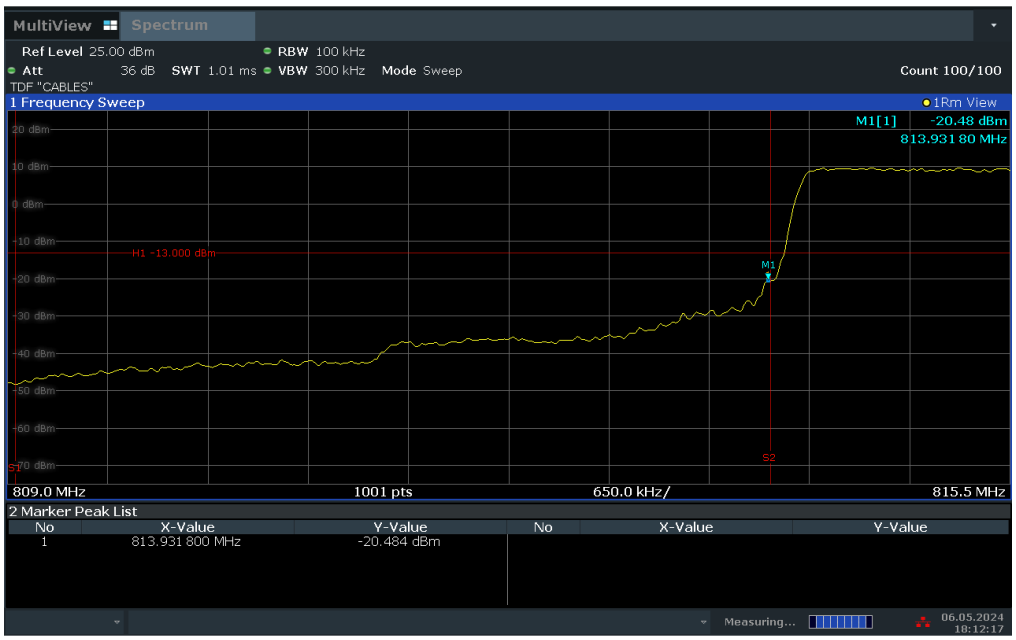
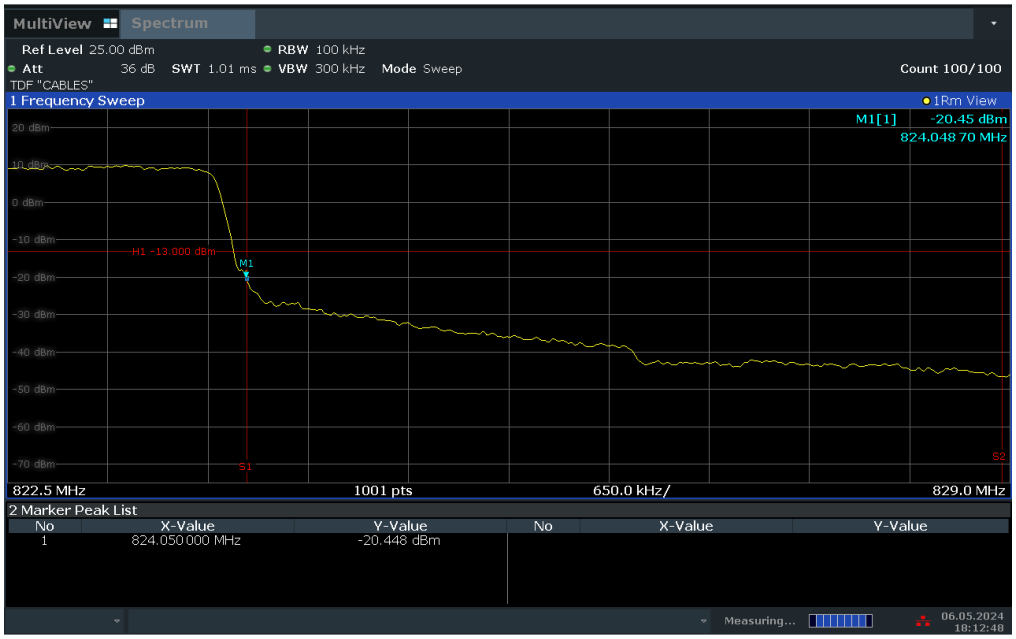
Peak



18:12:17 06.05.2024

Plot 7-92. Channel Edge Plot (LTE Band 26 - 3MHz QPSK – Low Channel)

Peak



18:12:49 06.05.2024

Plot 7-93. Channel Edge Plot (LTE Band 26 - 3MHz QPSK – High Channel)

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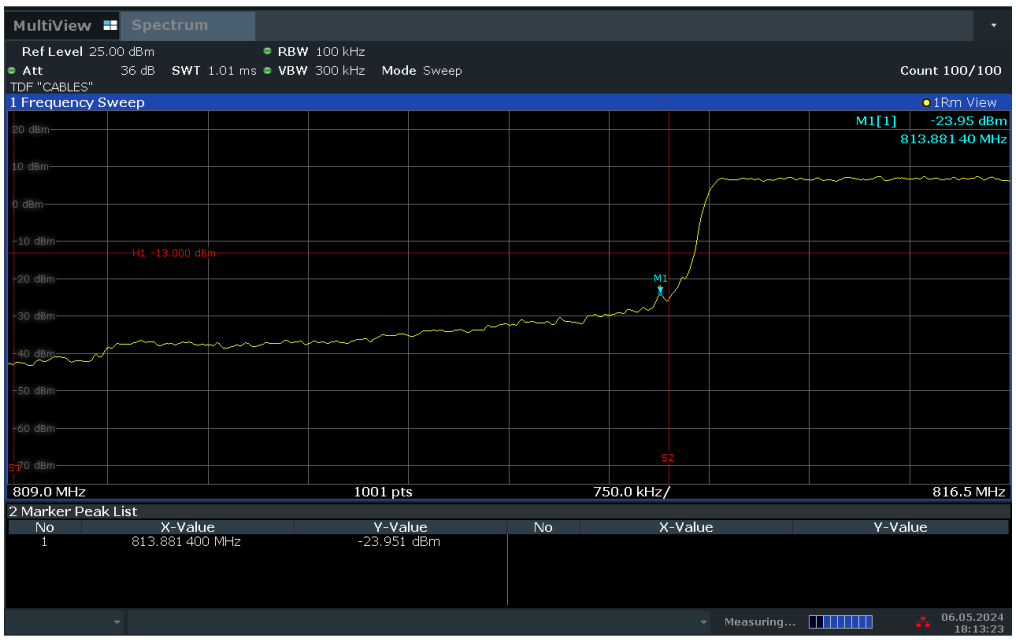
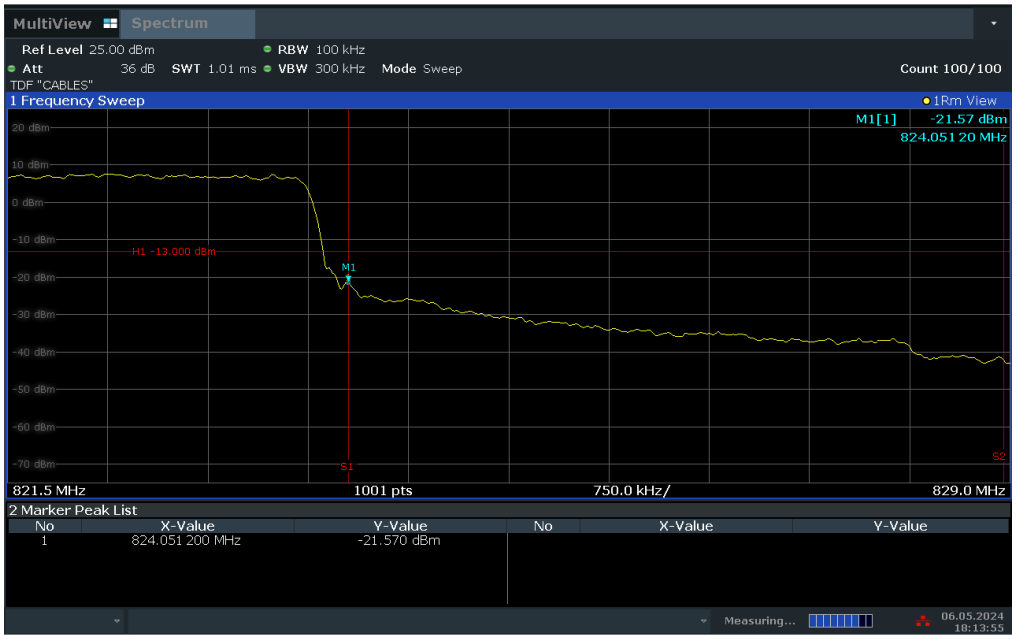
Peak



18:13:23 06.05.2024

Plot 7-94. Channel Edge Plot (LTE Band 26 - 5MHz QPSK – Low Channel)

Peak



18:13:56 06.05.2024

Plot 7-95. Channel Edge Plot (LTE Band 26 - 5MHz QPSK – High Channel)

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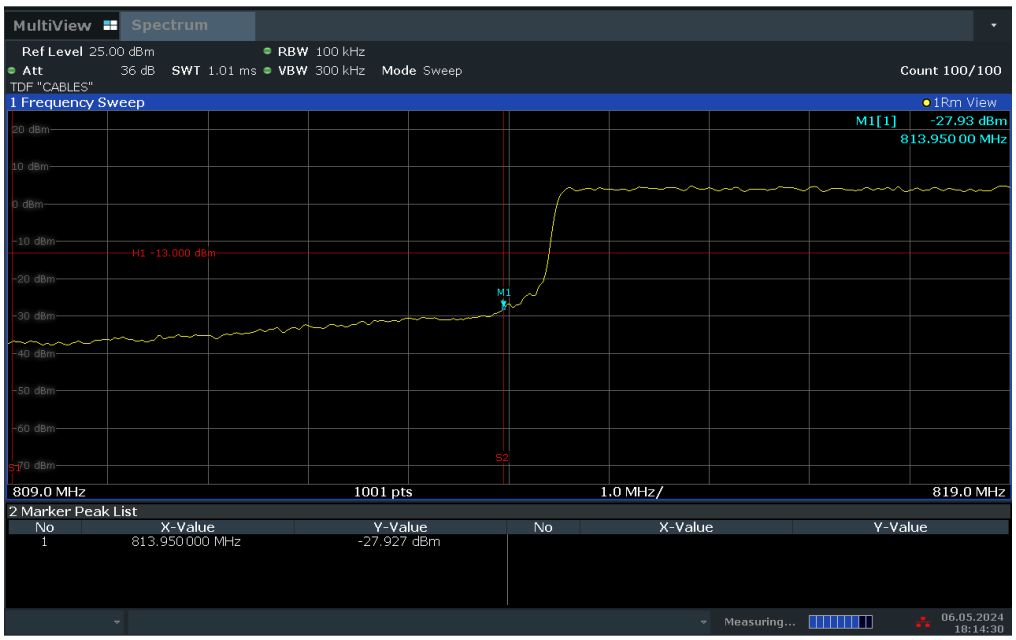
Peak



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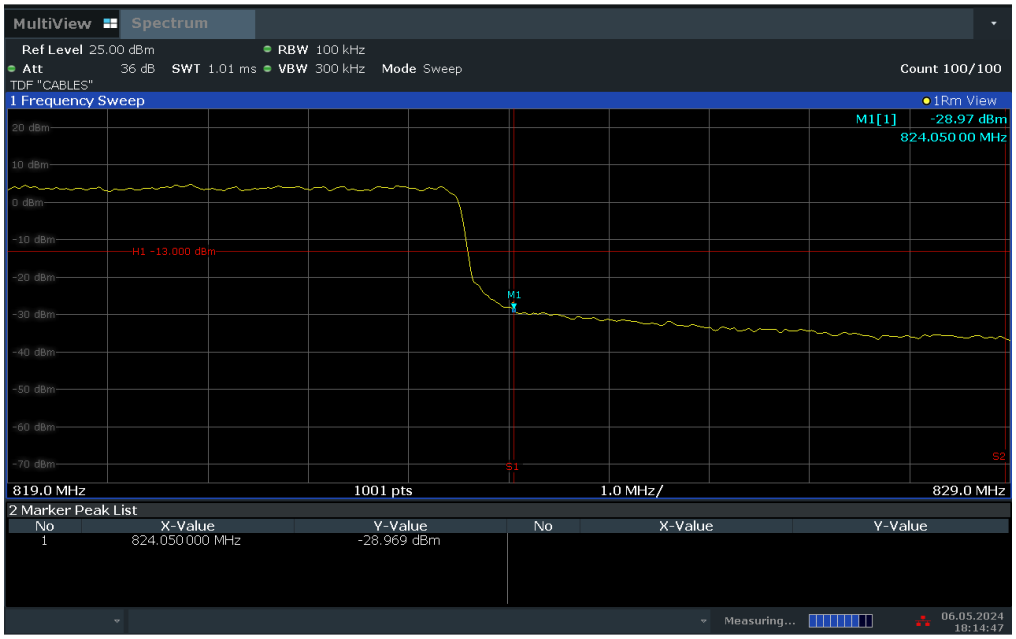
Plot 7-96. Channel Edge Plot (LTE Band 26 - 10MHz QPSK – Low Channel)

Peak



18:14:48 06.05.2024

Plot 7-97. Channel Edge Plot (LTE Band 26 - 10MHz QPSK – High Channel)

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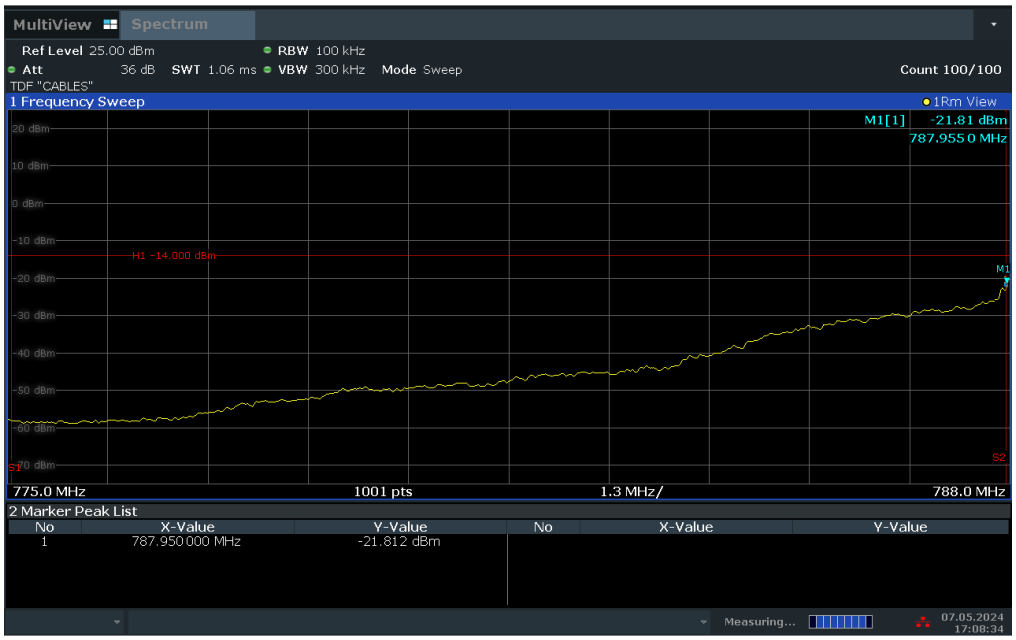
LTE Band 14

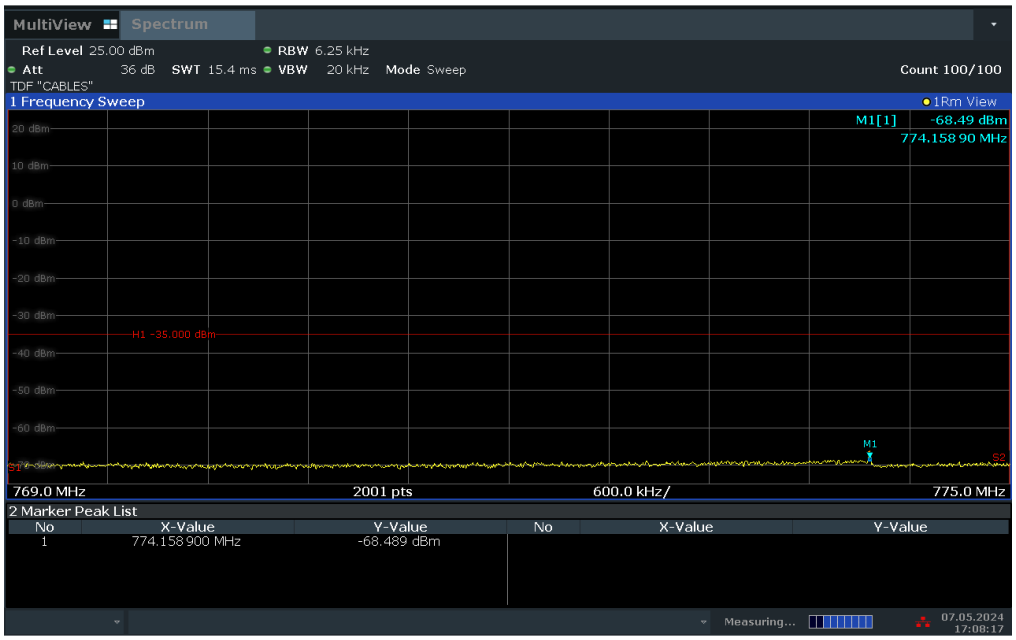
Peak



17:08:35 07.05.2024

Plot 7-98. Lower Band Edge Plot (LTE Band 14 - 5MHz QPSK – RB Size 25)

Peak



17:08:18 07.05.2024

Plot 7-99. Lower Emission Mask Plot (LTE Band 14 - 5MHz QPSK – RB Size 25)

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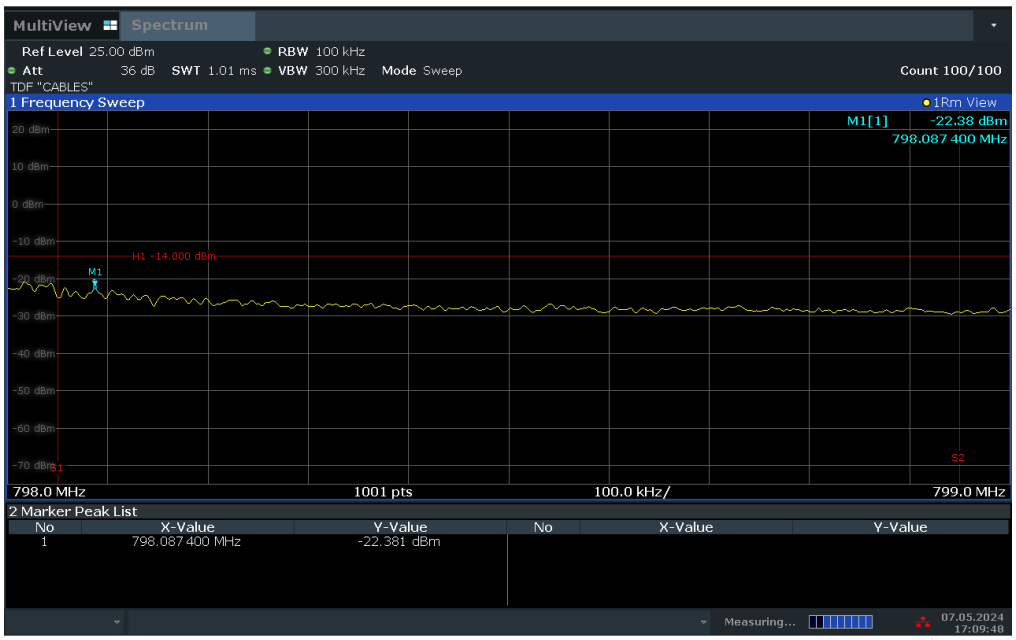
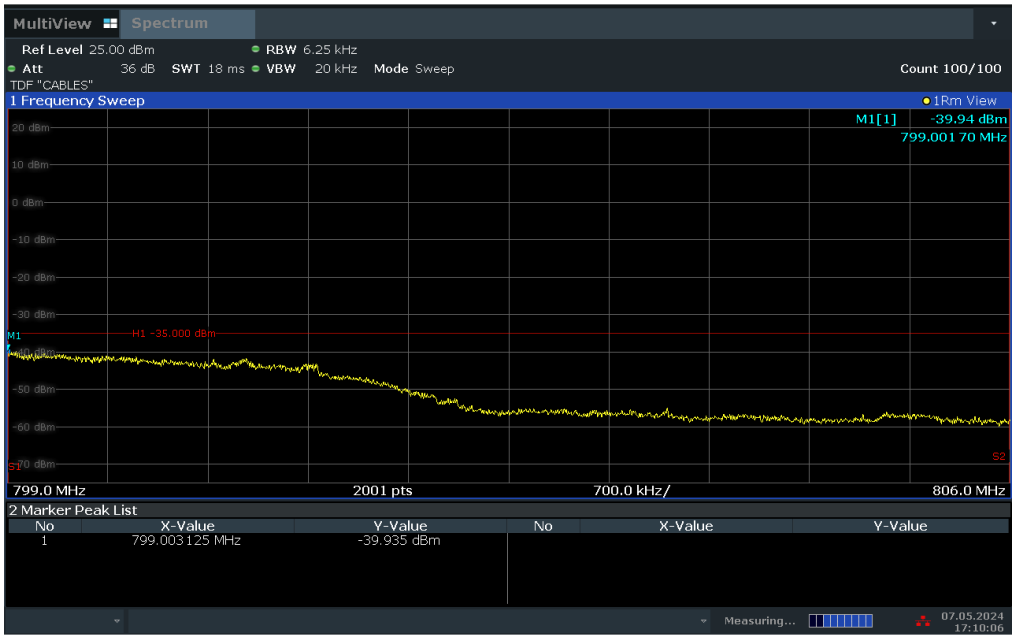


17:09:49 07.05.2024

Plot 7-100. Upper Band Edge Plot (LTE Band 14 - 5MHz QPSK – RB Size 25)

Peak



17:10:06 07.05.2024

Plot 7-101. Upper Emission Mask Plot (LTE Band 14 - 5MHz QPSK – RB Size 25)

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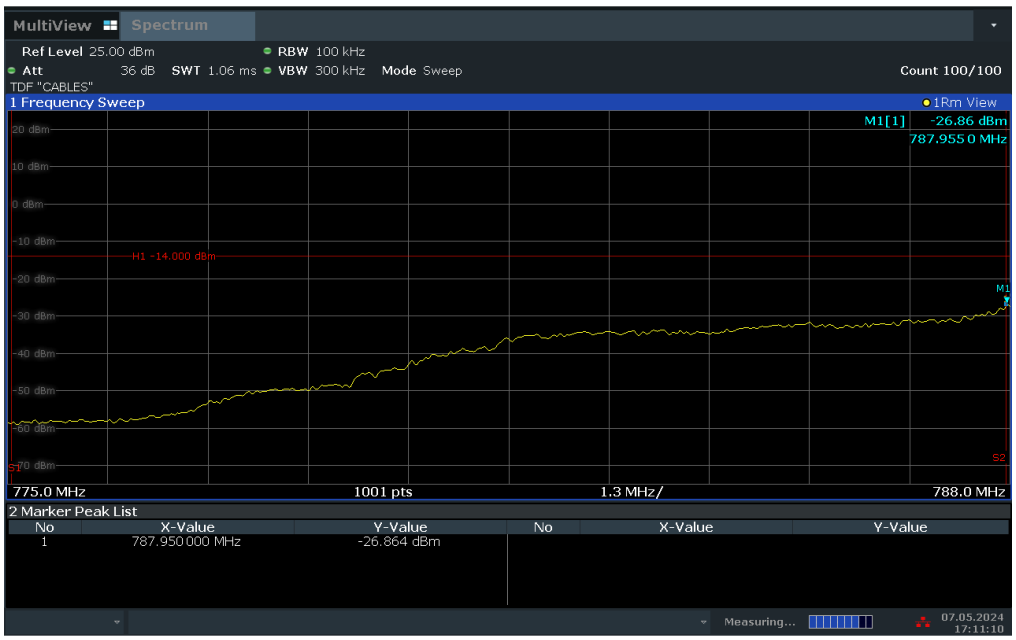
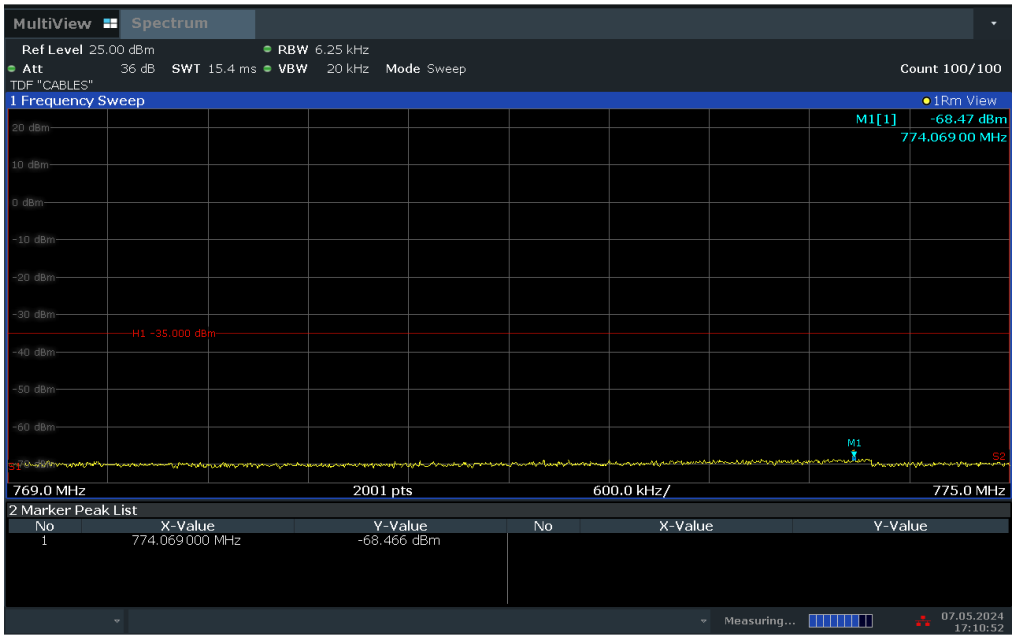


17:11:10 07.05.2024

Plot 7-102. Lower Band Edge Plot (LTE Band 14 - 10MHz QPSK – RB Size 50)

Peak



17:10:53 07.05.2024

Plot 7-103. Lower Emission Mask Plot (LTE Band 14 - 10MHz QPSK – RB Size 50)

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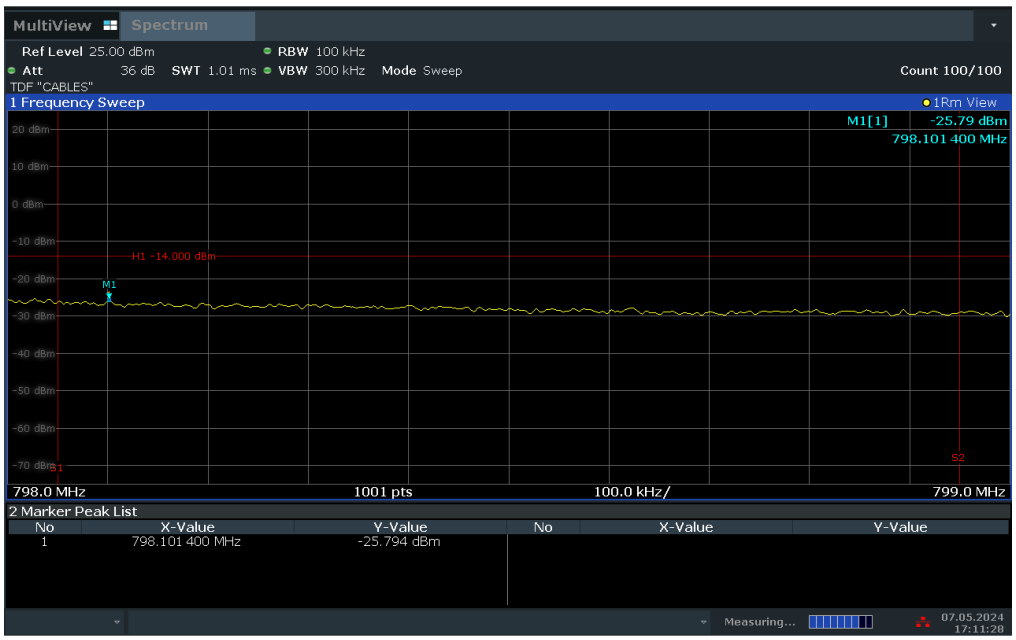
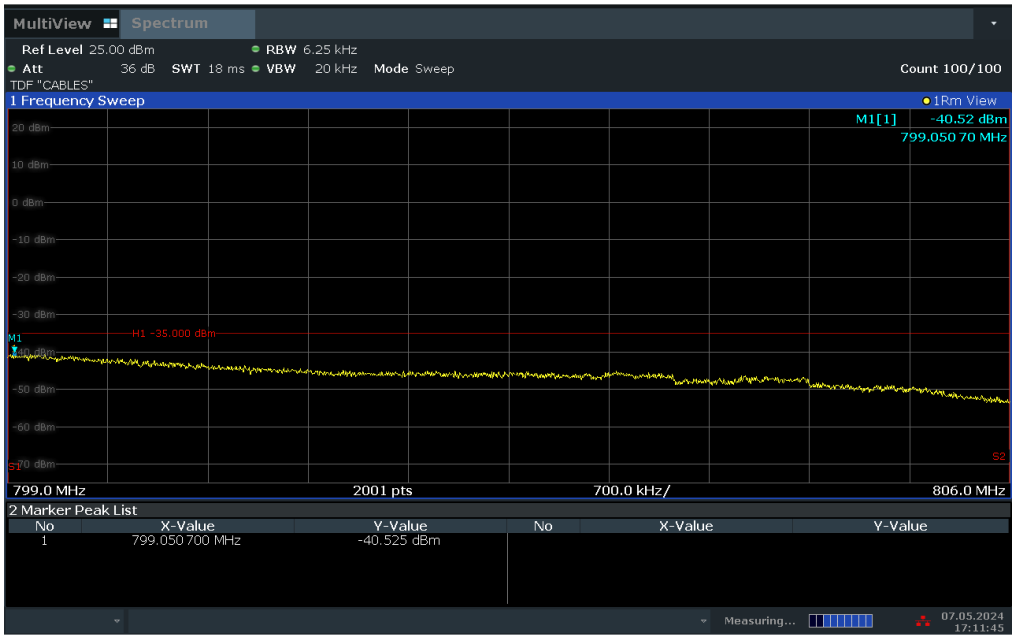
Peak



17:11:28 07.05.2024

Plot 7-104. Upper Band Edge Plot (LTE Band 14 - 10MHz QPSK – RB Size 50)

Peak



17:11:46 07.05.2024

Plot 7-105. Upper Emission Mask Plot (LTE Band 14 - 10MHz QPSK – RB Size 50)

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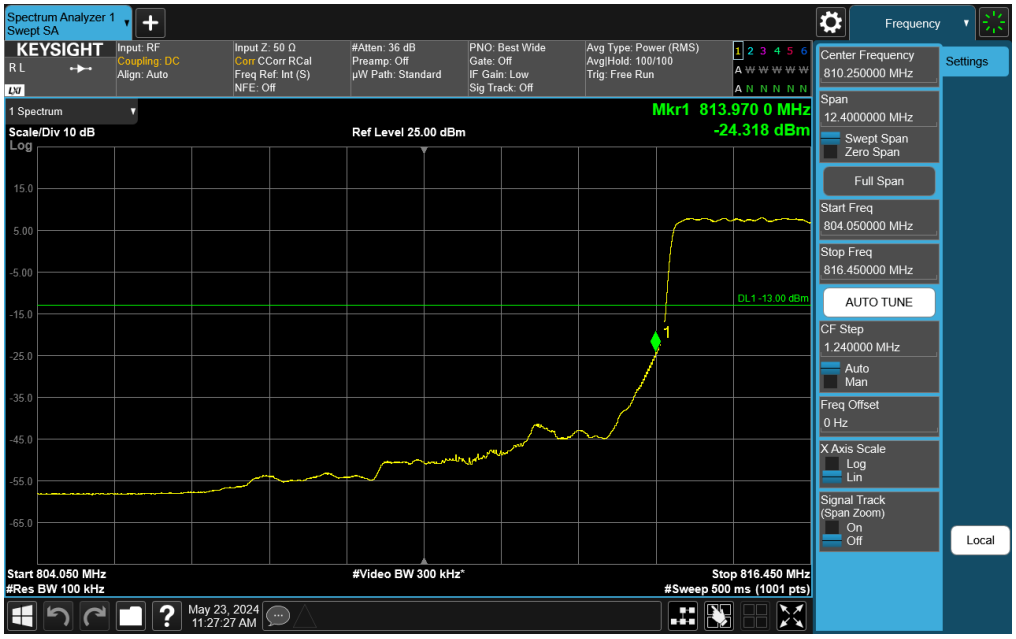
NR Band n26



Plot 7-106. Lower Band Edge Plot (NR Band n26 - 5MHz DFT-s-OFDM π/2 BPSK – Low Channel)

Plot 7-107. Upper Band Edge Plot (NR Band n26 - 5MHz DFT-s-OFDM π/2 BPSK – High Channel)

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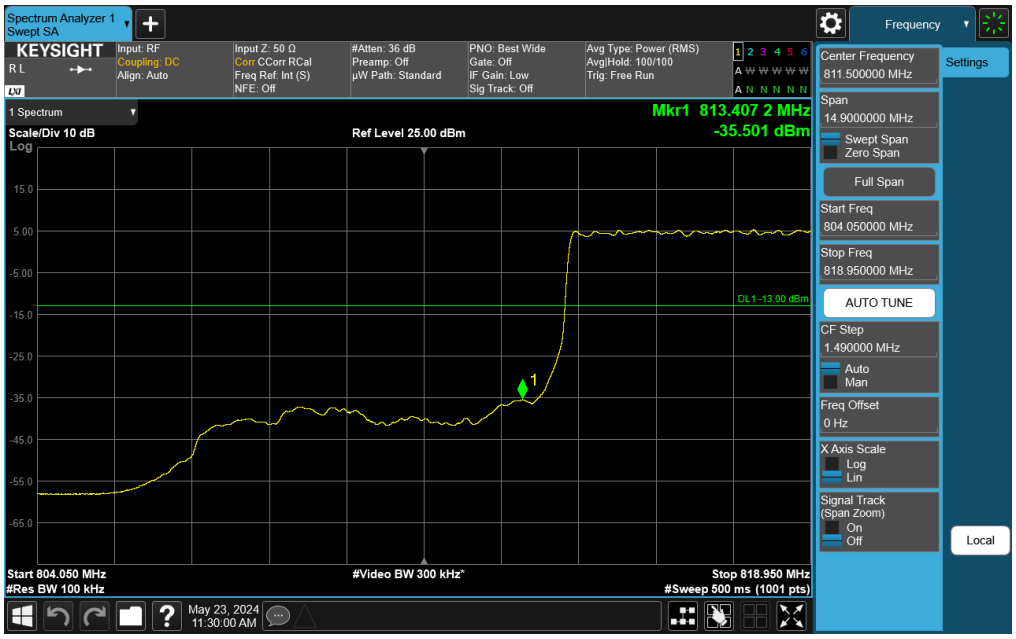

Plot 7-108. Lower Band Edge Plot (NR Band n26 - 10MHz DFT-s-OFDM π/2 BPSK – Mid Channel)

Plot 7-109. Upper Band Edge Plot (NR Band n26 - 10MHz DFT-s-OFDM π/2 BPSK – High Channel)

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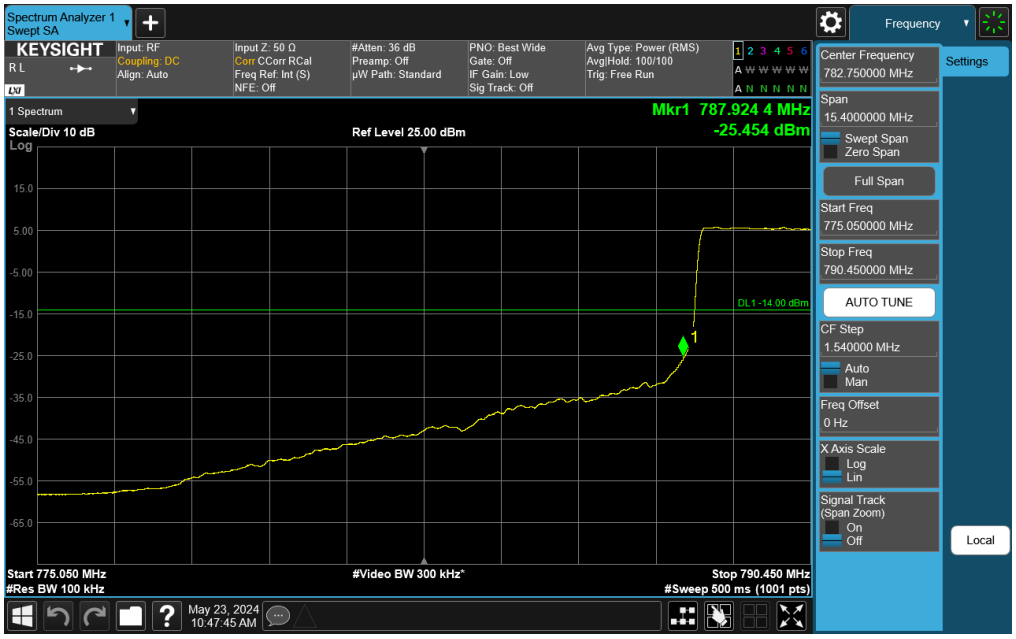
NR Band n14



Plot 7-110. Lower Band Edge Plot (NR Band n14 - 5MHz CP-OFDM QPSK – RB Size 25)

Plot 7-111. Lower Emission Mask Plot (NR Band n14 - 5MHz CP-OFDM QPSK – RB Size 25)

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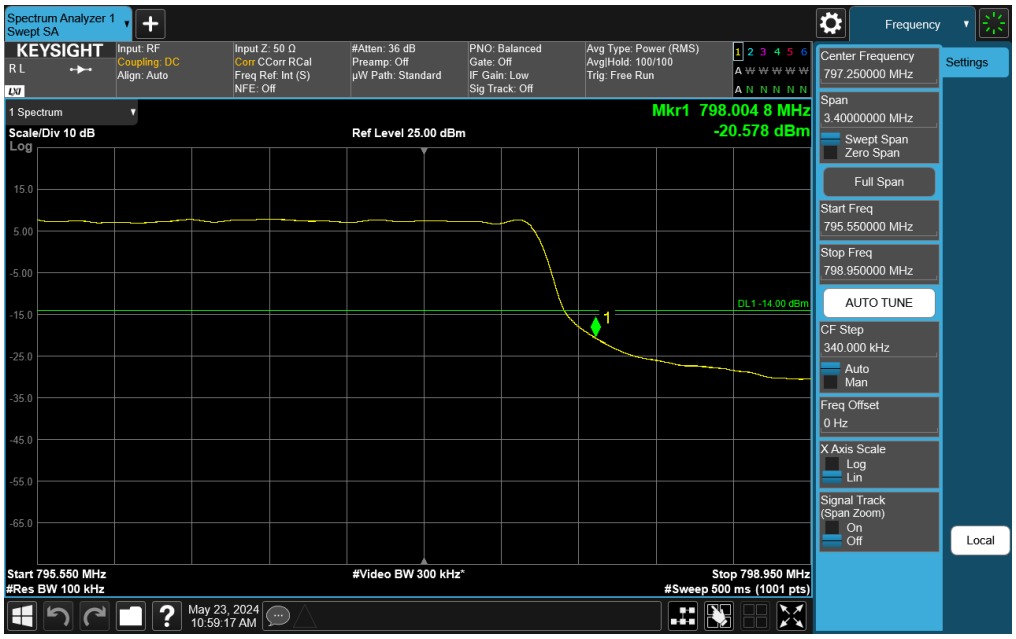
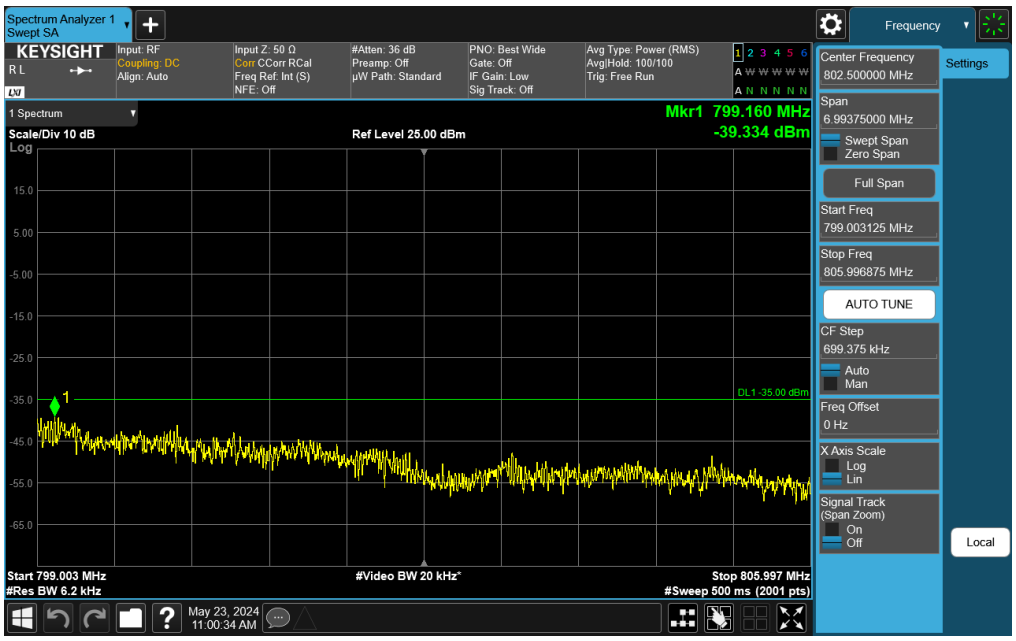


Plot 7-112. Upper Band Edge Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK – RB Size 25)



Plot 7-113. Upper Emission Mask Plot (NR Band n14 - 5MHz DFT-s-OFDM QPSK – RB Size 25)

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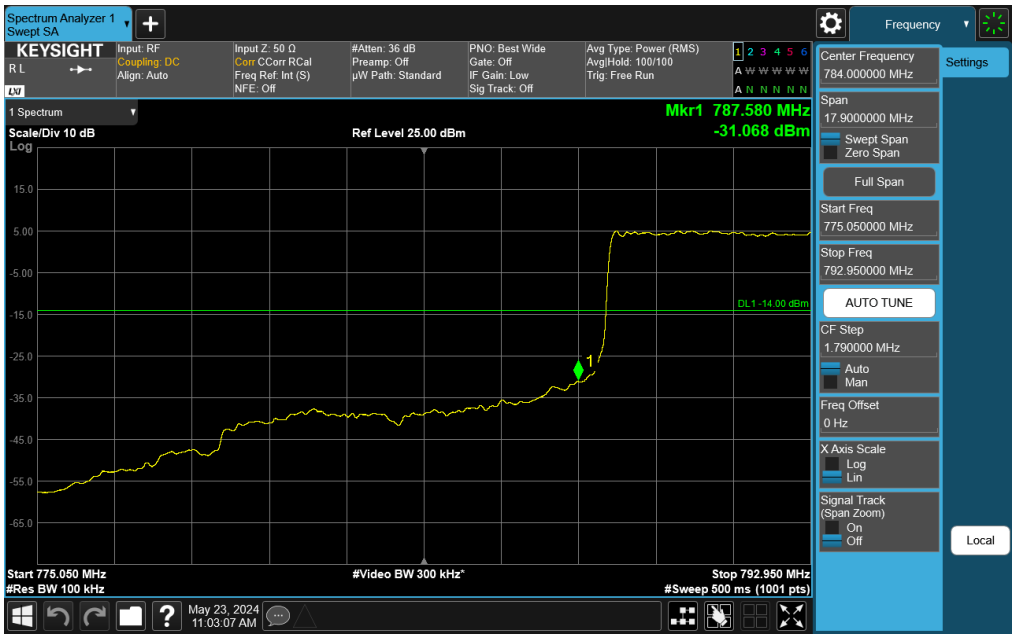

Plot 7-114. Lower Band Edge Plot (NR Band n14 - 10MHz QPSK – RB Size 50)

Plot 7-115. Lower Emission Mask Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – RB Size 50)

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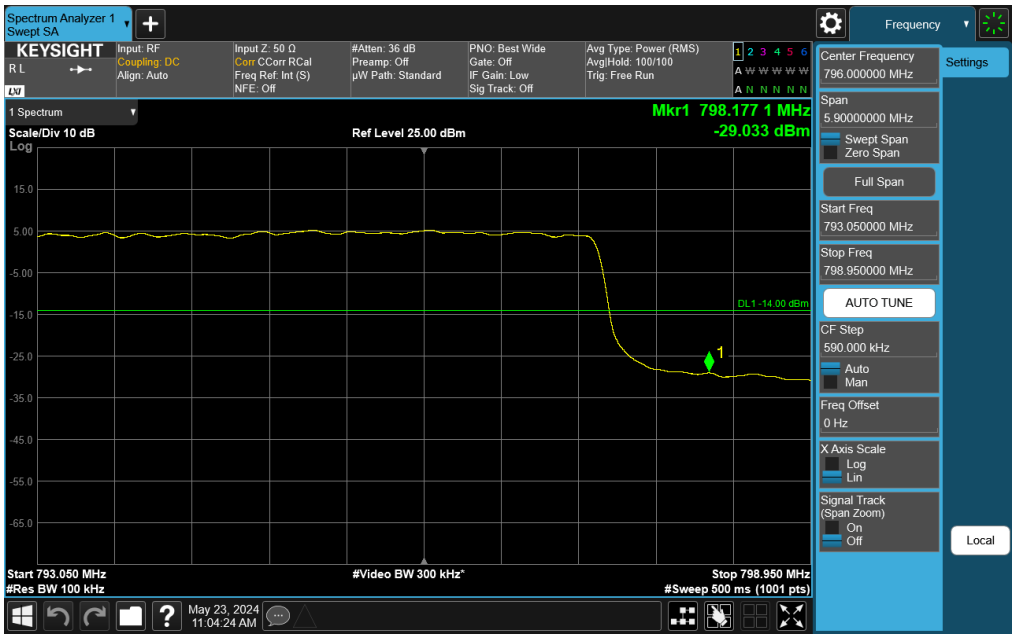
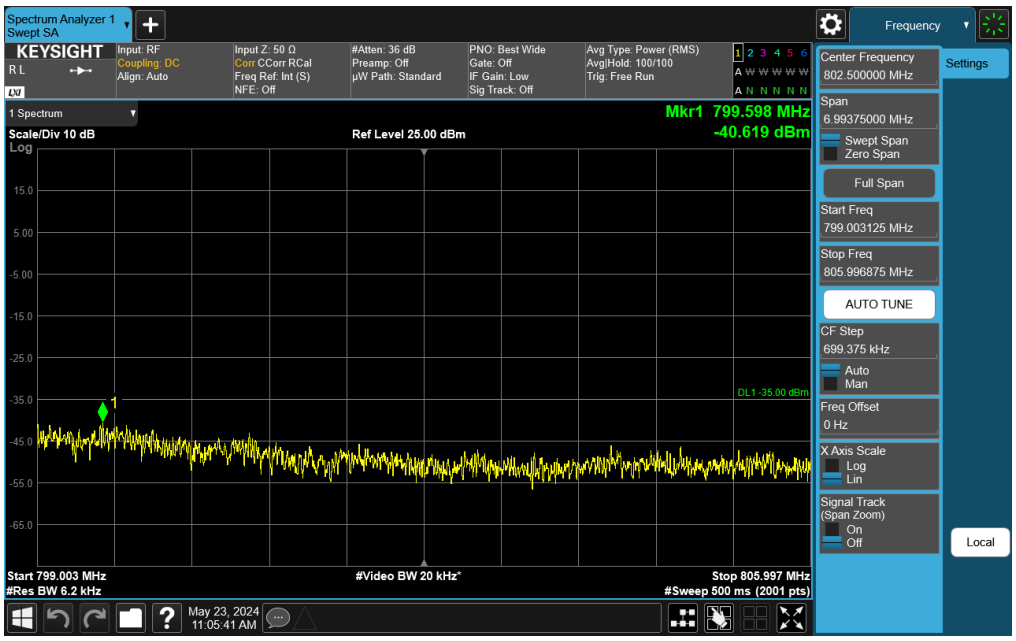


Plot 7-116. Upper Band Edge Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – RB Size 50)



Plot 7-117. Upper Emission Mask Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – 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.

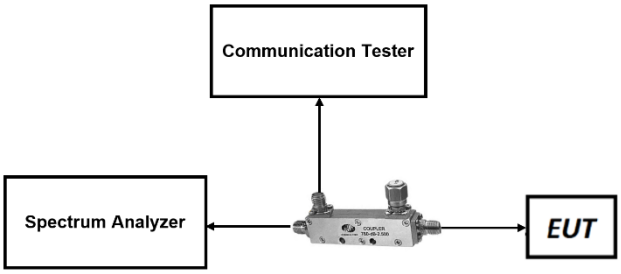

Figure 7-7. LTE Conducted Power Measurement Setup

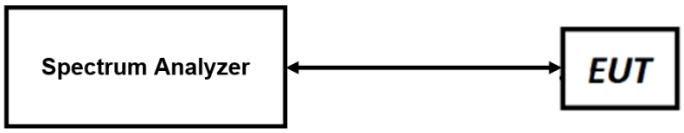

Figure 7-8. FR1 Test Instrument & Measurement Setup

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.

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Antenna 4

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	814.7	1 / 5	25.10	0.324	50.00	-24.90
		823.3	1 / 5	25.28	0.337	50.00	-24.72
	16-QAM	814.7	1 / 0	24.27	0.267	50.00	-25.73
	64-QAM	814.7	1 / 3	23.30	0.214	50.00	-26.70
	256-QAM	814.7	1 / 3	20.50	0.112	50.00	-29.50
3 MHz	QPSK	815.5	1 / 7	25.40	0.347	50.00	-24.60
		822.5	1 / 7	25.30	0.339	50.00	-24.70
	16-QAM	822.5	1 / 7	24.26	0.267	50.00	-25.74
	64-QAM	822.5	1 / 7	23.39	0.218	50.00	-26.61
	256-QAM	822.5	1 / 14	20.44	0.111	50.00	-29.56
5 MHz	QPSK	816.5	1 / 24	25.20	0.331	50.00	-24.80
		821.5	1 / 0	25.29	0.338	50.00	-24.71
	16-QAM	816.5	1 / 24	24.30	0.269	50.00	-25.70
	64-QAM	816.5	1 / 24	23.39	0.218	50.00	-26.61
	256-QAM	816.5	1 / 12	20.50	0.112	50.00	-29.50
10 MHz	QPSK	819.0	1 / 49	25.18	0.330	50.00	-24.82
	16-QAM	819.0	1 / 0	24.38	0.274	50.00	-25.62
	64-QAM	819.0	1 / 25	23.26	0.212	50.00	-26.74
	256-QAM	819.0	1 / 25	20.42	0.110	50.00	-29.58

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

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	816.5	25 / 0	24.29	0.269	50.00	-25.71
		819.0	1 / 24	25.40	0.347	50.00	-24.60
		821.5	1 / 12	25.33	0.341	50.00	-24.67
	QPSK	816.5	25 / 0	24.26	0.267	50.00	-25.74
		819.0	1 / 24	25.38	0.345	50.00	-24.62
		821.5	1 / 1	25.15	0.327	50.00	-24.85
	16-QAM	819.0	1 / 1	24.33	0.271	50.00	-25.67
	64-QAM	821.5	1 / 12	23.40	0.219	50.00	-26.60
	256-QAM	821.5	1 / 12	20.45	0.111	50.00	-29.55
10 MHz	π/2 BPSK	819.0	1 / 25	25.40	0.347	50.00	-24.60
	QPSK	819.0	1 / 1	25.26	0.336	50.00	-24.74
	16-QAM	819.0	1 / 25	24.24	0.265	50.00	-25.76
	64-QAM	819.0	1 / 50	23.38	0.218	50.00	-26.62
	256-QAM	819.0	1 / 1	20.16	0.104	50.00	-29.84

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

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Antenna 2

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	814.7	1 / 3	24.58	0.287	50.00	-25.42
		823.3	1 / 3	24.64	0.291	50.00	-25.36
	16-QAM	823.3	1 / 5	23.66	0.232	50.00	-26.34
	64-QAM	823.3	1 / 3	22.67	0.185	50.00	-27.33
	256-QAM	814.7	1 / 0	19.77	0.095	50.00	-30.23
3 MHz	QPSK	815.5	1 / 0	24.59	0.288	50.00	-25.41
		822.5	1 / 14	24.70	0.295	50.00	-25.30
	16-QAM	815.5	1 / 0	23.72	0.236	50.00	-26.28
	64-QAM	822.5	1 / 0	22.61	0.182	50.00	-27.39
	256-QAM	822.5	1 / 0	19.82	0.096	50.00	-30.18
5 MHz	QPSK	816.5	1 / 24	24.45	0.279	50.00	-25.55
		821.5	1 / 0	24.54	0.284	50.00	-25.46
	16-QAM	816.5	1 / 0	23.70	0.234	50.00	-26.30
	64-QAM	821.5	1 / 0	22.64	0.184	50.00	-27.36
	256-QAM	821.5	1 / 0	19.58	0.091	50.00	-30.42
10 MHz	QPSK	819.0	1 / 0	24.66	0.292	50.00	-25.34
	16-QAM	819.0	1 / 25	23.70	0.234	50.00	-26.30
	64-QAM	819.0	1 / 0	22.62	0.183	50.00	-27.38
	256-QAM	819.0	1 / 0	19.58	0.091	50.00	-30.42

Table 7-4. Conducted Output Data (LTE Band 26)

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	816.5	25 / 0	23.59	0.229	50.00	-26.41
		819.0	1 / 1	24.68	0.294	50.00	-25.32
		821.5	1 / 24	24.70	0.295	50.00	-25.30
	QPSK	816.5	25 / 0	23.46	0.222	50.00	-26.54
		819.0	1 / 1	24.59	0.288	50.00	-25.41
		821.5	1 / 24	24.62	0.290	50.00	-25.38
	16-QAM	819.0	1 / 1	23.57	0.228	50.00	-26.43
	64-QAM	821.5	1 / 12	22.63	0.183	50.00	-27.37
	256-QAM	819.0	1 / 1	19.84	0.096	50.00	-30.16
10 MHz	π/2 BPSK	819.0	1 / 25	24.70	0.295	50.00	-25.30
	QPSK	819.0	1 / 1	24.61	0.289	50.00	-25.39
	16-QAM	819.0	1 / 50	23.56	0.227	50.00	-26.44
	64-QAM	819.0	1 / 1	22.52	0.179	50.00	-27.48
	256-QAM	819.0	1 / 50	19.62	0.092	50.00	-30.38

Table 7-5. Conducted 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

Test Settings

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

ERP = PMeas – LC + 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.

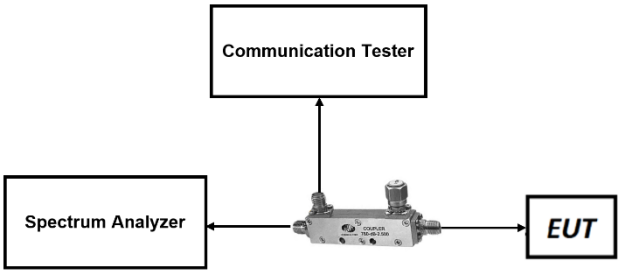

Figure 7-9. LTE ERP Measurement Setup

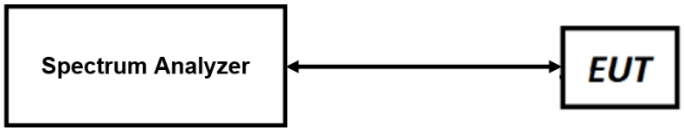

Figure 7-10. FR1 ERP Measurement Setup

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.

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Antenna 4

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	790.5	-2.10	1 / 24	25.40	**21.15**	0.130	34.77	-13.62
		793.0	-2.10	1 / 12	25.30	21.05	0.127	34.77	-13.72
		795.5	-2.10	1 / 12	25.04	20.79	0.120	34.77	-13.98
	16-QAM	795.5	-2.10	1 / 24	24.36	20.11	0.103	34.77	-14.66
	64-QAM	793.0	-2.10	1 / 24	23.38	19.13	0.082	34.77	-15.64
	256-QAM	793.0	-2.10	1 / 0	20.53	16.28	0.042	34.77	-18.49
10 MHz	QPSK	793.0	-2.10	1 / 25	25.30	**21.05**	0.127	34.77	-13.72
	16-QAM	793.0	-2.10	1 / 49	24.06	19.81	0.096	34.77	-14.96
	64-QAM	793.0	-2.10	1 / 0	23.18	18.93	0.078	34.77	-15.84
	256-QAM	793.0	-2.10	1 / 0	20.39	16.14	0.041	34.77	-18.63

Table 7-6. Conducted Output Data (LTE Band 14)

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	790.5	-2.10	1 / 1	25.26	21.01	0.126	34.77	-13.76
		793.0	-2.10	1 / 12	25.05	20.80	0.120	34.77	-13.97
		795.5	-2.10	1 / 24	25.37	**21.12**	0.129	34.77	-13.65
	QPSK	790.5	-2.10	1 / 1	25.35	21.10	0.129	34.77	-13.67
		793.0	-2.10	1 / 12	25.29	21.04	0.127	34.77	-13.73
		795.5	-2.10	1 / 24	25.40	**21.15**	0.130	34.77	-13.62
	16-QAM	795.5	-2.10	1 / 24	24.39	20.14	0.103	34.77	-14.63
	64-QAM	795.5	-2.10	1 / 24	23.40	19.15	0.082	34.77	-15.62
	256-QAM	795.5	-2.10	1 / 12	20.44	16.19	0.042	34.77	-18.58
10 MHz	π/2 BPSK	793.0	-2.10	1 / 50	25.27	**21.02**	0.126	34.77	-13.75
	QPSK	793.0	-2.10	1 / 25	25.19	**20.94**	0.124	34.77	-13.83
	16-QAM	793.0	-2.10	1 / 1	24.44	20.19	0.104	34.77	-14.58
	64-QAM	793.0	-2.10	1 / 50	23.34	19.09	0.081	34.77	-15.68
	256-QAM	793.0	-2.10	1 / 25	20.41	16.16	0.041	34.77	-18.61

Table 7-7. Conducted Output Data (NR Band n14)

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Antenna 2

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	790.5	-3.30	1 / 0	24.58	19.13	0.082	34.77	-15.64
		793.0	-3.30	1 / 0	24.47	19.02	0.080	34.77	-15.75
		795.5	-3.30	1 / 24	24.70	**19.25**	0.084	34.77	-15.52
	16-QAM	795.5	-3.30	1 / 0	23.70	18.25	0.067	34.77	-16.52
	64-QAM	790.5	-3.30	1 / 12	22.64	17.19	0.052	34.77	-17.58
	256-QAM	795.5	-3.30	1 / 0	19.79	14.34	0.027	34.77	-20.43
10 MHz	QPSK	793.0	-3.30	1 / 25	24.59	**19.14**	0.082	34.77	-15.63
	16-QAM	793.0	-3.30	1 / 0	23.51	18.06	0.064	34.77	-16.71
	64-QAM	793.0	-3.30	1 / 25	22.57	17.12	0.052	34.77	-17.65
	256-QAM	793.0	-3.30	1 / 25	19.68	14.23	0.026	34.77	-20.54

Table 7-8. Conducted Output Data (LTE Band 14)

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	790.5	-3.30	1 / 1	24.61	19.16	0.082	34.77	-15.61
		793.0	-3.30	1 / 1	24.70	**19.25**	0.084	34.77	-15.52
		795.5	-3.30	1 / 24	24.64	19.19	0.083	34.77	-15.58
	QPSK	790.5	-3.30	1 / 24	24.61	**19.16**	0.082	34.77	-15.61
		793.0	-3.30	1 / 12	24.60	19.15	0.082	34.77	-15.62
		795.5	-3.30	1 / 1	24.48	19.03	0.080	34.77	-15.74
	16-QAM	790.5	-3.30	1 / 1	23.68	18.23	0.067	34.77	-16.54
	64-QAM	795.5	-3.30	1 / 12	22.70	17.25	0.053	34.77	-17.52
	256-QAM	795.5	-3.30	1 / 12	19.80	14.35	0.027	34.77	-20.42
10 MHz	π/2 BPSK	793.0	-3.30	1 / 1	24.46	**19.01**	0.080	34.77	-15.76
	QPSK	793.0	-3.30	1 / 50	24.65	**19.20**	0.083	34.77	-15.57
	16-QAM	793.0	-3.30	1 / 25	23.66	18.21	0.066	34.77	-16.56
	64-QAM	793.0	-3.30	1 / 1	22.62	17.17	0.052	34.77	-17.60
	256-QAM	793.0	-3.30	1 / 25	19.75	14.30	0.027	34.77	-20.47

Table 7-9. Conducted Output 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

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

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Test Setup

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

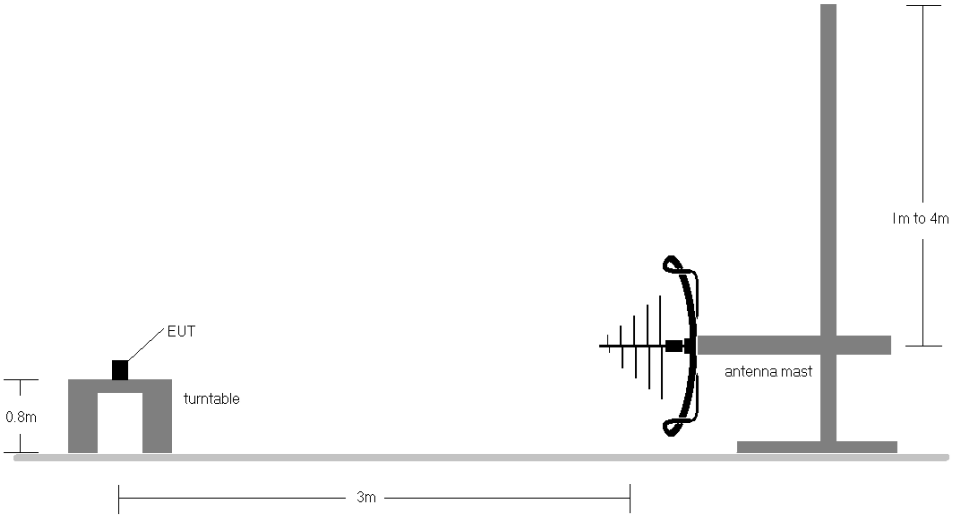

Figure 7-11. Test Instrument & Measurement Setup < 1GHz

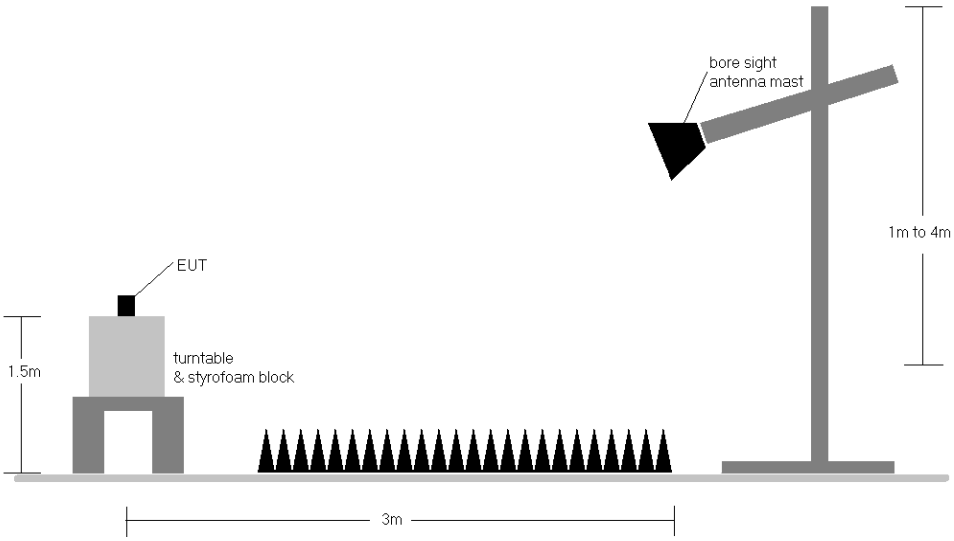

Figure 7-12. Test Instrument & Measurement Setup >1 GHz

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Test Notes

1. Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
    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 device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.

3. This unit was tested with its standard battery.

4. 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.

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

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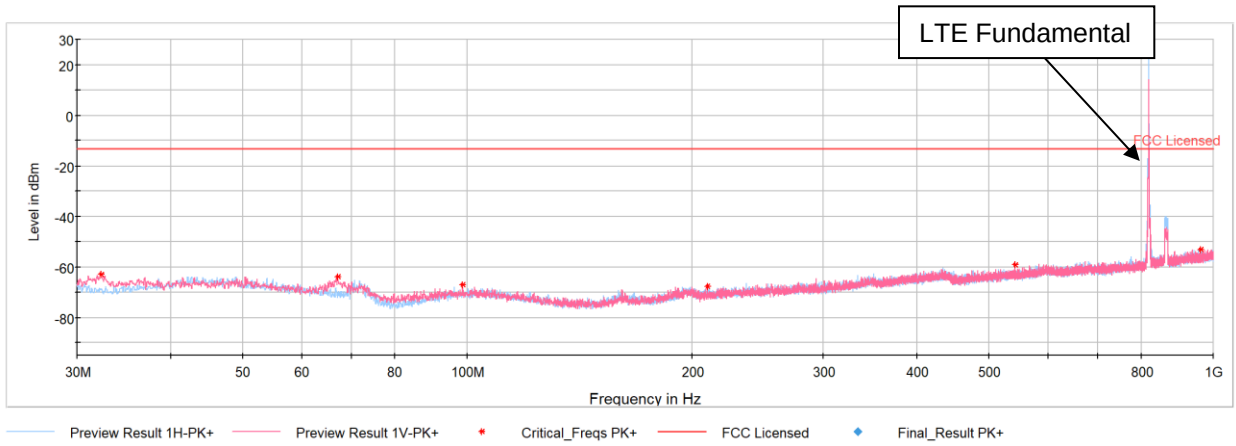
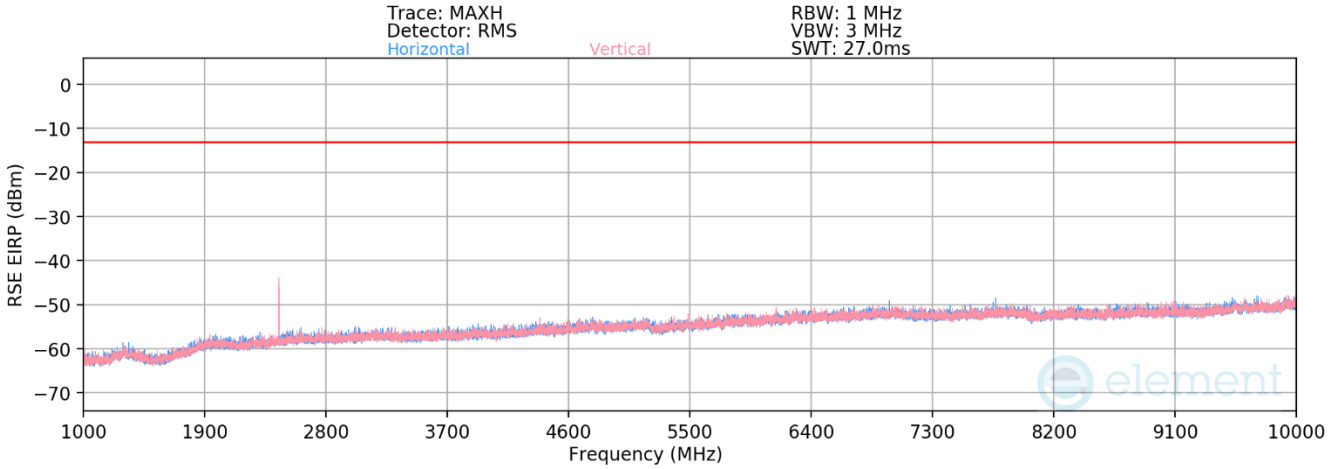
7.7.1 Antenna 4 – Radiated Spurious Emission Measurements

LTE Band 26



Plot 7-118. Antenna 4 Radiated Spurious Plot Below 1GHz (LTE Band 26)



Plot 7-119. Antenna 4 Radiated Spurious Plot Above 1GHz (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	H	184	345	-74.41	-2.10	30.49	-64.77	-13.00	-51.77
2449.5	H	357	186	-63.74	2.01	45.27	-49.99	-13.00	-36.99
3266.0	H	-	-	-78.82	3.82	32.00	-63.25	-13.00	-50.25
4082.5	H	-	-	-79.56	5.28	32.72	-62.54	-13.00	-49.54
4899.0	H	-	-	-80.39	7.32	33.93	-61.33	-13.00	-48.33

Table 7-10. Antenna 4 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	H	214	350	-76.23	-2.01	28.76	-66.50	-13.00	-53.50
2457.0	H	264	185	-71.36	2.01	37.65	-57.61	-13.00	-44.61
3276.0	H	-	-	-78.68	3.77	32.09	-63.17	-13.00	-50.17
4095.0	H	-	-	-79.60	5.50	32.90	-62.36	-13.00	-49.36
4914.0	H	-	-	-80.17	7.01	33.84	-61.42	-13.00	-48.42

Table 7-11. Antenna 4 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	H	217	350	-76.21	-1.92	28.87	-66.38	-13.00	-53.38
2464.5	H	324	175	-71.57	2.01	37.44	-57.81	-13.00	-44.81
3286.0	H	-	-	-78.69	3.77	32.08	-63.18	-13.00	-50.18
4107.5	H	-	-	-79.46	5.43	32.97	-62.28	-13.00	-49.28
4929.0	H	-	-	-80.25	7.02	33.77	-61.49	-13.00	-48.49

Table 7-12. Antenna 4 Radiated Spurious Data (LTE Band 26 – High Channel)

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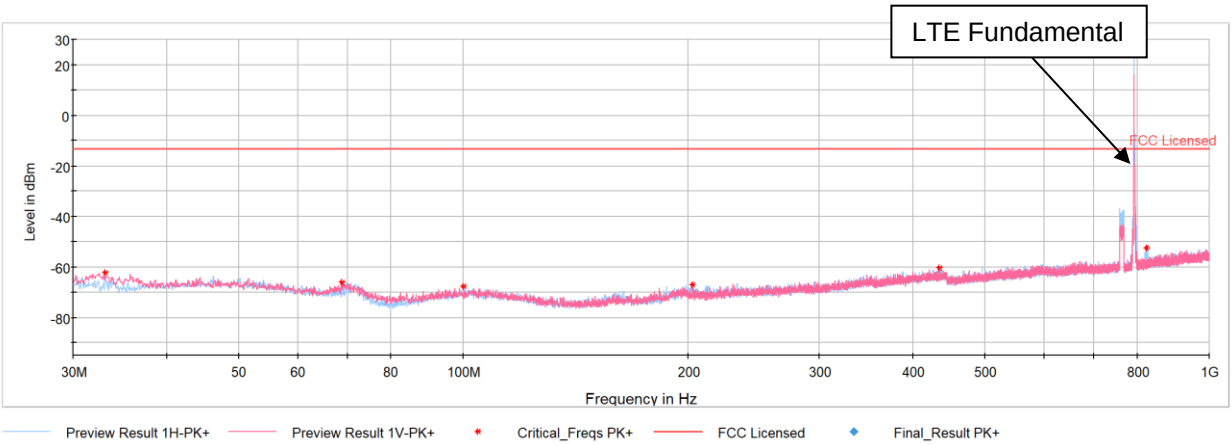
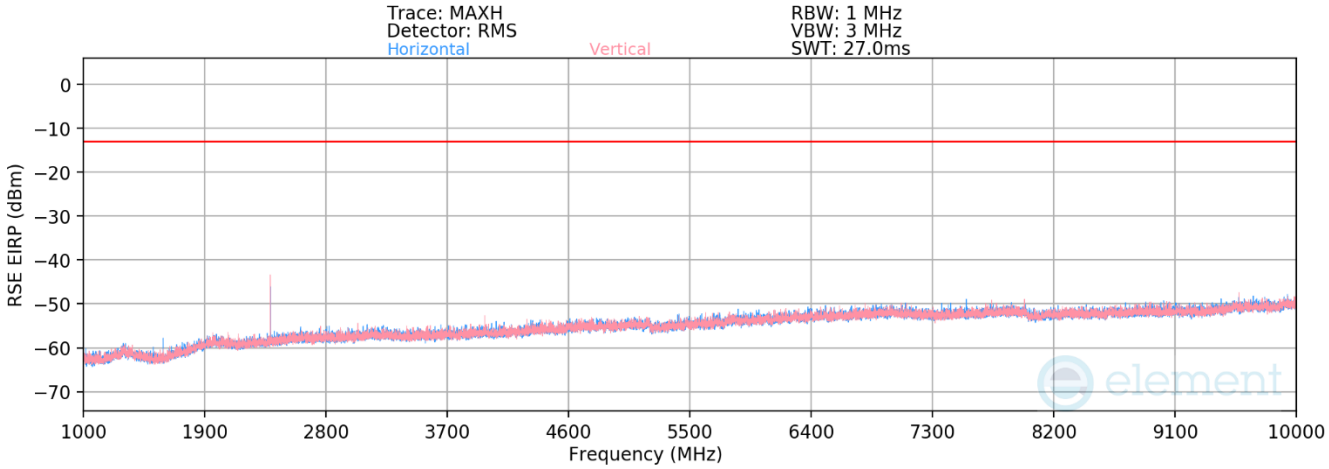
LTE Band 14



Plot 7-120. Antenna 4 Radiated Spurious Plot Below 1GHz (LTE Band 14)



Plot 7-121. Antenna 4 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	132	131	-70.59	-2.56	33.85	-61.41	-40.00	-21.41
2371.5	H	327	175	-63.37	1.69	45.32	-49.94	-13.00	-36.94
3162.0	H	-	-	-78.55	3.76	32.21	-63.04	-13.00	-50.04
3952.5	H	-	-	-79.88	5.35	32.47	-62.79	-13.00	-49.79
4743.0	H	-	-	-80.19	7.09	33.90	-61.36	-13.00	-48.36

Table 7-13. Antenna 4 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	132	166	-70.89	-2.55	33.56	-61.70	-40.00	-21.70
2379.0	H	357	181	-64.02	1.74	44.72	-50.54	-13.00	-37.54
3172.0	H	-	-	-78.56	3.71	32.15	-63.11	-13.00	-50.11
3965.0	H	-	-	-79.65	5.35	32.70	-62.56	-13.00	-49.56
4758.0	H	-	-	-80.51	7.12	33.61	-61.65	-13.00	-48.65

Table 7-14. Antenna 4 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	H	130	164	-70.30	-2.54	34.16	-61.10	-40.00	-21.10
2386.5	H	391	177	-62.08	1.75	46.67	-48.58	-13.00	-35.58
3182.0	H	-	-	-78.55	3.67	32.12	-63.14	-13.00	-50.14
3977.5	H	-	-	-79.11	5.19	33.08	-62.17	-13.00	-49.17
4773.0	H	-	-	-80.26	7.55	34.29	-60.96	-13.00	-47.96

Table 7-15. Antenna 4 Radiated Spurious Data (LTE Band 14 – High Channel)

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NR Band n14

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	V	387	86	-74.79	-2.69	29.52	-65.74	-40.00	-25.74
2371.5	H	-	-	-78.00	1.59	30.59	-64.67	-13.00	-51.67
3162.0	H	-	-	-78.95	3.88	31.93	-63.33	-13.00	-50.33
3952.5	H	-	-	-79.87	5.45	32.58	-62.68	-13.00	-49.68

Table 7-16. Antenna 4 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	238	291	-74.53	-2.79	29.68	-65.58	-40.00	-25.58
2379.0	H	-	-	-77.97	1.59	30.62	-64.64	-13.00	-51.64
3172.0	H	-	-	-78.88	3.77	31.89	-63.37	-13.00	-50.37
3965.0	H	-	-	-79.58	5.00	32.42	-62.84	-13.00	-49.84

Table 7-17. Antenna 4 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	202	246	-77.71	-2.51	26.78	-68.48	-40.00	-28.48
2386.5	H	-	-	-78.05	1.80	30.75	-64.51	-13.00	-51.51
3182.0	H	-	-	-78.88	3.81	31.93	-63.32	-13.00	-50.32
3977.5	H	-	-	-79.73	5.21	32.48	-62.78	-13.00	-49.78

Table 7-18. Antenna 4 Radiated Spurious Data (NR Band n14 – High Channel)

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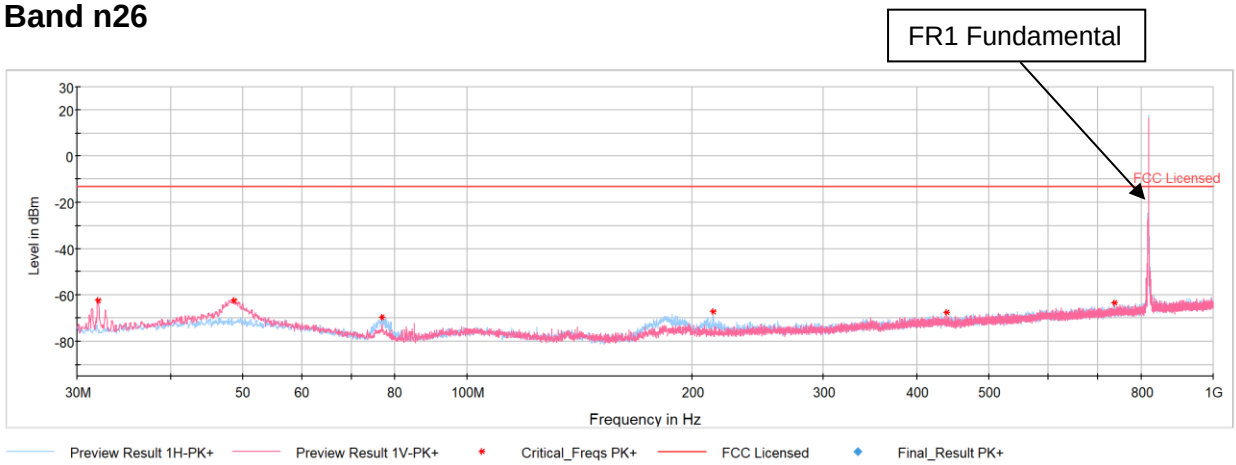
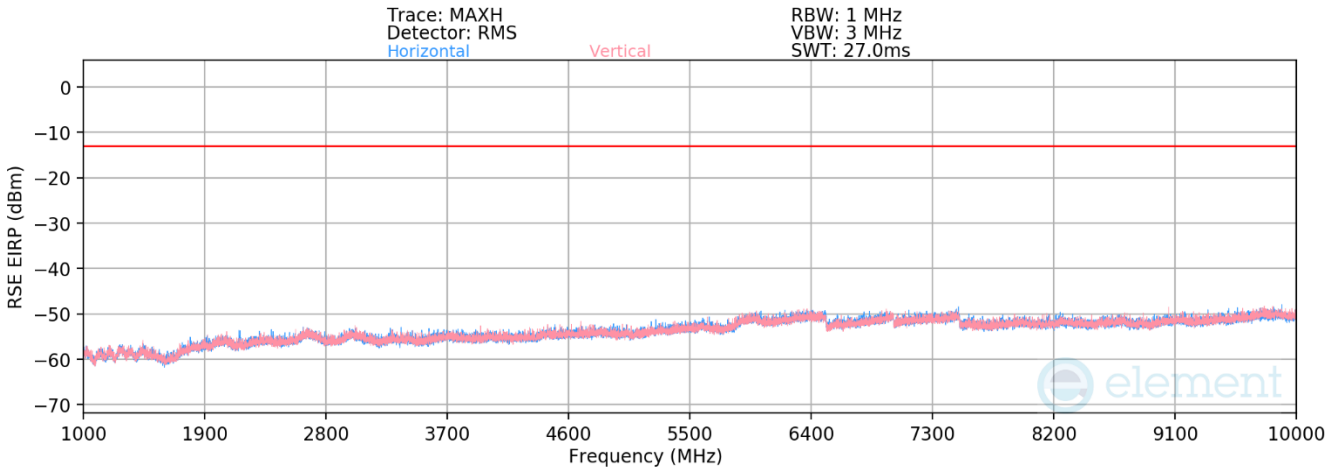
NR Band n26



Plot 7-122. Antenna 4 Radiated Spurious Plot Below 1GHz (NR Band n26)



Plot 7-123. Antenna 4 Radiated Spurious Plot Above 1GHz (NR Band n26)

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Bandwidth (MHz):	5
Frequency (MHz):	816.5
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	Limit [dBm]	Margin [dB]
1633.0	H	-	-	-77.10	-2.50	27.41	-67.85	-13.00	-54.85
2449.5	H	-	-	-78.03	1.75	30.73	-64.53	-13.00	-51.53
3266.0	H	-	-	-78.89	3.84	31.95	-63.31	-13.00	-50.31

Table 7-19. Antenna 4 Radiated Spurious Data (NR Band n26 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	819.0
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	Limit [dBm]	Margin [dB]
1638.0	H	-	-	-77.21	-2.50	27.29	-67.97	-13.00	-54.97
2457.0	H	-	-	-78.15	1.96	30.80	-64.45	-13.00	-51.45
3276.0	H	-	-	-78.79	3.96	32.17	-63.09	-13.00	-50.09

Table 7-20. Antenna 4 Radiated Spurious Data (NR Band n26 – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	821.5
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	Limit [dBm]	Margin [dB]
1643.0	H	-	-	-77.62	-1.84	27.54	-67.72	-13.00	-54.72
2464.5	H	-	-	-77.86	1.70	30.84	-64.42	-13.00	-51.42
3286.0	H	-	-	-79.03	3.84	31.81	-63.45	-13.00	-50.45

Table 7-21. Antenna 4 Radiated Spurious Data (NR Band n26 – High Channel)

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7.7.2 Antenna 2 – Radiated Spurious Emission Measurements

LTE Band 26

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	253	55	-63.76	-2.50	40.75	-54.51	-13.00	-41.51
2449.5	H	130	224	-73.82	1.70	34.88	-60.38	-13.00	-47.38
3266.0	V	-	-	-79.05	3.96	31.90	-63.35	-13.00	-50.35
4082.5	V	277	189	-77.59	5.12	34.53	-60.73	-13.00	-47.73
4899.0	H	-	-	-80.08	7.30	34.22	-61.04	-13.00	-48.04
5715.5	H	-	-	-81.16	9.12	34.96	-60.30	-13.00	-47.30
6532.0	H	-	-	-81.52	10.57	36.05	-59.21	-13.00	-46.21

Table 7-22. Antenna 2 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	H	252	53	-66.90	-2.50	37.61	-57.65	-13.00	-44.65
2457.0	H	200	214	-75.28	2.04	33.75	-61.51	-13.00	-48.51
3276.0	H	-	-	-79.18	3.96	31.78	-63.48	-13.00	-50.48
4095.0	H	-	-	-79.96	5.42	32.46	-62.80	-13.00	-49.80
4914.0	H	-	-	-80.49	7.30	33.81	-61.45	-13.00	-48.45

Table 7-23. Antenna 2 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	H	249	53	-68.14	-2.50	36.37	-58.89	-13.00	-45.89
2464.5	H	158	172	-74.24	1.96	34.71	-60.54	-13.00	-47.54
3286.0	H	-	-	-78.87	3.84	31.97	-63.29	-13.00	-50.29
4107.5	H	-	-	-79.88	5.42	32.54	-62.72	-13.00	-49.72
4929.0	H	-	-	-80.33	7.09	33.76	-61.50	-13.00	-48.50

Table 7-24. Antenna 2 Radiated Spurious Data (LTE Band 26 – High Channel)

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LTE Band 14

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	-	-	-77.43	-2.56	27.01	-68.25	-40.00	-28.25
2371.5	H	-	-	-78.10	1.69	30.59	-64.67	-13.00	-51.67
3162.0	H	-	-	-78.57	3.76	32.19	-63.06	-13.00	-50.06

Table 7-25. Antenna 2 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	-	-	-77.46	-2.55	26.99	-68.27	-40.00	-28.27
2379.0	H	-	-	-78.13	1.74	30.61	-64.65	-13.00	-51.65
3172.0	H	-	-	-78.34	3.71	32.37	-62.89	-13.00	-49.89

Table 7-26. Antenna 2 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	H	-	-	-77.64	-2.54	26.82	-68.44	-40.00	-28.44
2386.5	H	-	-	-78.23	1.75	30.52	-64.73	-13.00	-51.73
3182.0	H	-	-	-78.42	3.67	32.25	-63.01	-13.00	-50.01

Table 7-27. Antenna 2 Radiated Spurious Data (LTE Band 14 – High Channel)

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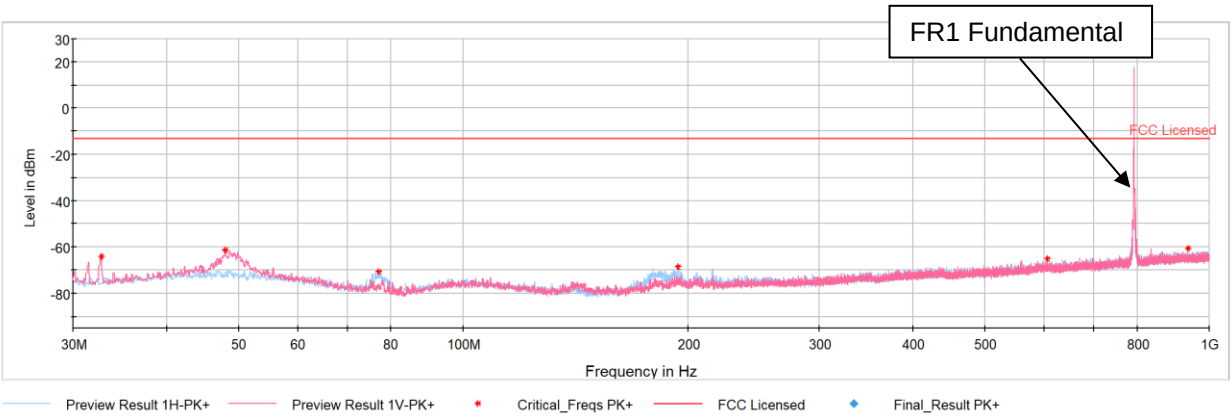
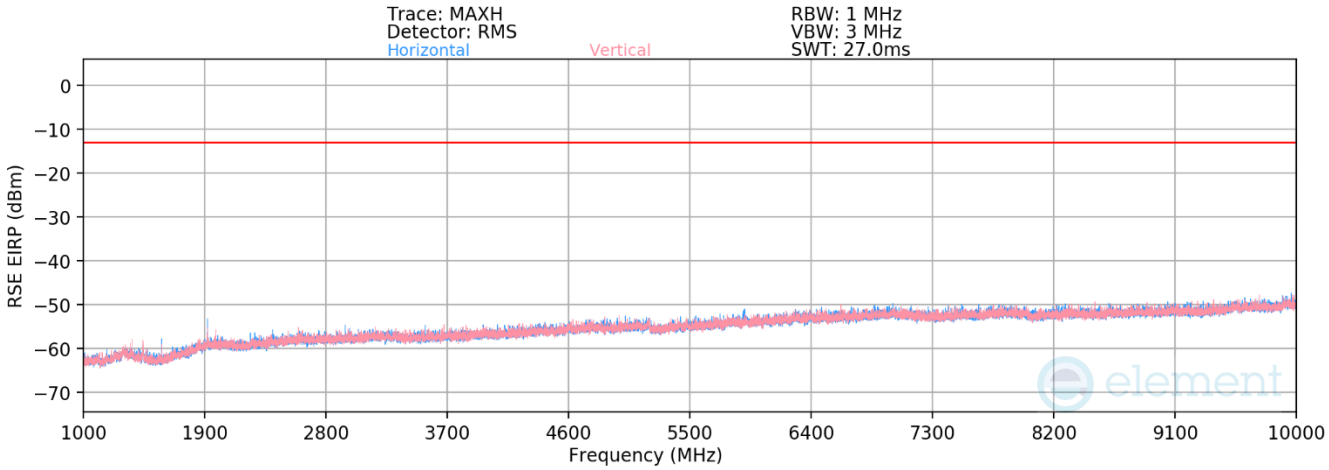
NR Band n14



Plot 7-124. Antenna 2 Radiated Spurious Plot Below 1GHz (NR Band n14)



Plot 7-125. Antenna 2 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	233	325	-72.78	-2.69	31.53	-63.73	-40.00	-23.73
2371.5	H	-	-	-77.85	1.59	30.74	-64.52	-13.00	-51.52
3162.0	H	-	-	-78.87	3.81	31.95	-63.31	-13.00	-50.31
3952.5	H	-	-	-79.70	5.14	32.44	-62.81	-13.00	-49.81

Table 7-28. Antenna 2 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	255	231	-74.85	-2.79	29.36	-65.90	-40.00	-25.90
2379.0	H	-	-	-77.80	1.59	30.79	-64.47	-13.00	-51.47
3172.0	H	-	-	-78.91	3.77	31.86	-63.40	-13.00	-50.40
3965.0	H	-	-	-79.60	5.00	32.40	-62.86	-13.00	-49.86

Table 7-29. Antenna 2 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	260	224	-77.29	-2.51	27.20	-68.06	-40.00	-28.06
2386.5	H	-	-	-78.04	1.59	30.55	-64.71	-13.00	-51.71
3182.0	H	-	-	-78.87	3.81	31.94	-63.32	-13.00	-50.32
3977.5	H	-	-	-79.69	5.14	32.45	-62.81	-13.00	-49.81

Table 7-30. Antenna 2 Radiated Spurious Data (NR Band n14 – High Channel)

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NR Band n26

Bandwidth (MHz):	5
Frequency (MHz):	816.5
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	Limit [dBm]	Margin [dB]
1633.0	H	-	-	-72.69	-5.31	29.00	-66.26	-13.00	-53.26
2449.5	H	-	-	-74.19	-0.39	32.42	-62.84	-13.00	-49.84
3266.0	H	-	-	-75.55	1.90	33.35	-61.90	-13.00	-48.90

Table 7-31. Antenna 2 Radiated Spurious Data (NR Band n26 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	819.0
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	Limit [dBm]	Margin [dB]
1638.0	H	-	-	-72.50	-5.31	29.19	-66.06	-13.00	-53.06
2457.0	H	-	-	-74.26	-0.39	32.35	-62.90	-13.00	-49.90
3276.0	H	-	-	-75.38	1.90	33.52	-61.73	-13.00	-48.73

Table 7-32. Antenna 2 Radiated Spurious Data (NR Band n26 – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	821.5
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	Limit [dBm]	Margin [dB]
1643.0	H	-	-	-72.14	-5.82	29.05	-66.21	-13.00	-53.21
2464.5	H	-	-	-74.25	-0.39	32.36	-62.90	-13.00	-49.90
3286.0	H	-	-	-75.64	2.11	33.46	-61.79	-13.00	-48.79

Table 7-33. Antenna 2 Radiated Spurious Data (NR Band n26 – 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. 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 ±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

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

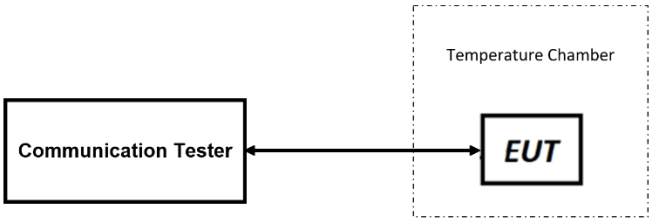

Figure 7-13. LTE Test Instrument & Measurement Setup

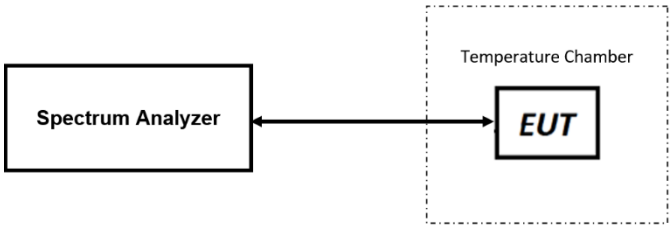

Figure 7-14. FR1 Test Instrument & Measurement Setup

Test Notes

All ports were tested and only the worst case data were reported.

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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	0.818999903	-0.000000109	-0.000013309
		- 20	0.818999917	-0.000000095	-0.000011600
		- 10	0.819000084	0.000000072	0.000008791
		0	0.819000108	0.000000096	0.000011722
		+ 10	0.818999969	-0.000000043	-0.000005250
		+ 20 (Ref)	0.819000012	0.000000000	0.000000000
		+ 30	0.818999965	-0.000000047	-0.000005739
		+ 40	0.819000071	0.000000059	0.000007204
		+ 50	0.819000086	0.000000074	0.000009035
Battery Endpoint	3.40	+ 20	0.818999947	-0.000000065	-0.000007937

Table 7-34. 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	0.788499275	-0.000499275
		- 20	0.788289503	-0.000289503
		- 10	0.788456805	-0.000456805
		0	0.788820708	-0.000820708
		+ 10	0.788977638	-0.000977638
		+ 20 (Ref)	0.788426200	-0.000426200
		+ 30	0.788358571	-0.000358571
		+ 40	0.788205537	-0.000205537
		+ 50	0.788607398	-0.000607398
Battery Endpoint	3.40	+ 20	0.788618212	-0.000618212

Table 7-35. 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	0.797361360	-0.000638640
		- 20	0.797023325	-0.000976675
		- 10	0.797104795	-0.000895205
		0	0.797922383	-0.000077617
		+ 10	0.797459796	-0.000540204
		+ 20 (Ref)	0.797304886	-0.000695114
		+ 30	0.797226168	-0.000773832
		+ 40	0.797070337	-0.000929663
		+ 50	0.797246645	-0.000753355
Battery Endpoint	3.40	+ 20	0.797955188	-0.000044812

Table 7-36. 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	0.819000134	0.000000092	0.000011233
		- 20	0.819000097	0.000000055	0.000006716
		- 10	0.819000111	0.000000069	0.000008425
		0	0.819000006	-0.000000036	-0.000004396
		+ 10	0.819000027	-0.000000015	-0.000001832
		+ 20 (Ref)	0.819000042	0.000000000	0.000000000
		+ 30	0.818999944	-0.000000098	-0.000011966
		+ 40	0.818999940	-0.000000102	-0.000012454
		+ 50	0.819000000	-0.000000042	-0.000005128
Battery Endpoint	3.40	+ 20	0.818999974	-0.000000068	-0.000008303

Table 7-37. 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	0.788203864	-0.000203864
		- 20	0.788081613	-0.000081613
		- 10	0.788020182	-0.000020182
		0	0.788661186	-0.000661186
		+ 10	0.788297071	-0.000297071
		+ 20 (Ref)	0.788277495	-0.000277495
		+ 30	0.788274389	-0.000274389
		+ 40	0.788734909	-0.000734909
		+ 50	0.788767893	-0.000767893
Battery Endpoint	3.40	+ 20	0.788142996	-0.000142996

Table 7-38. 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	0.797564119	-0.000435881
		- 20	0.797438530	-0.000561470
		- 10	0.797205038	-0.000794962
		0	0.797174013	-0.000825987
		+ 10	0.797339791	-0.000660209
		+ 20 (Ref)	0.797925205	-0.000074795
		+ 30	0.797757226	-0.000242774
		+ 40	0.797814453	-0.000185547
		+ 50	0.797355943	-0.000644057
Battery Endpoint	3.40	+ 20	0.797091501	-0.000908499

Table 7-39. 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 Tablet Device FCC ID: BCGA2995** complies with all the requirements of Part 90 of the FCC rules.

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