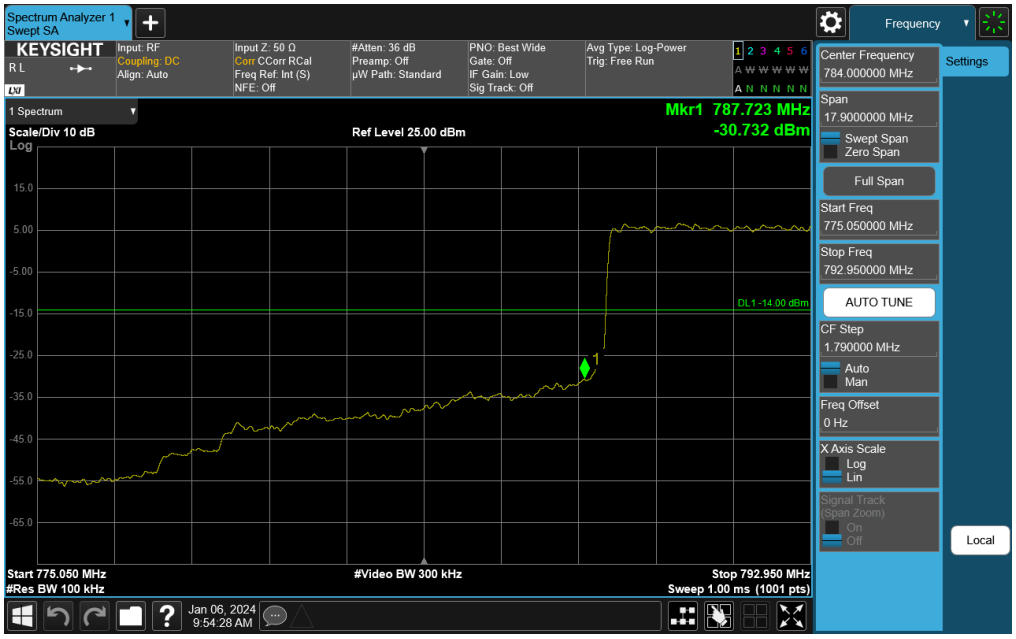
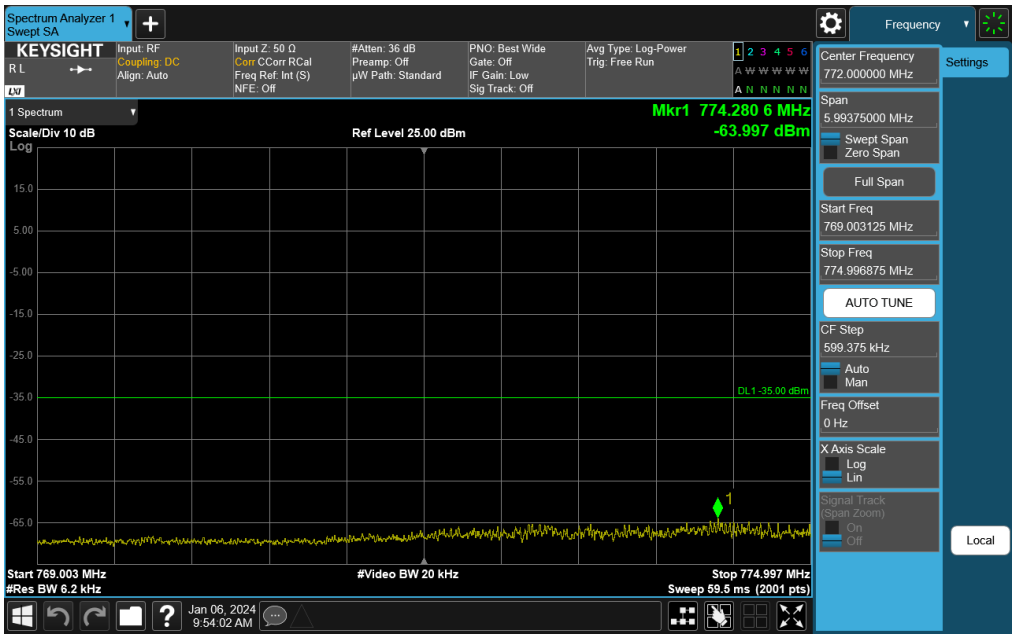
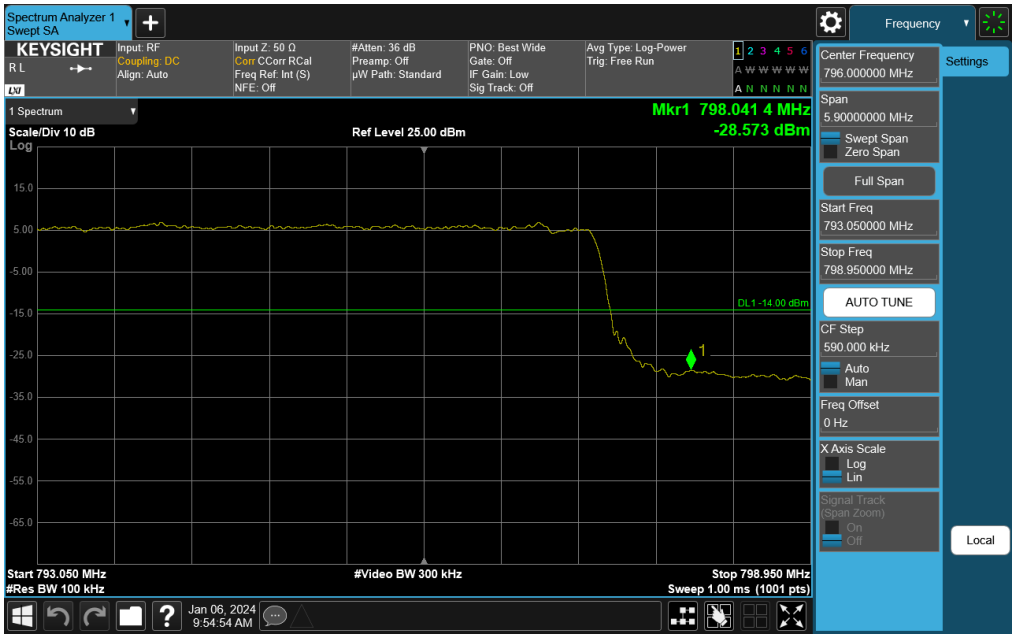


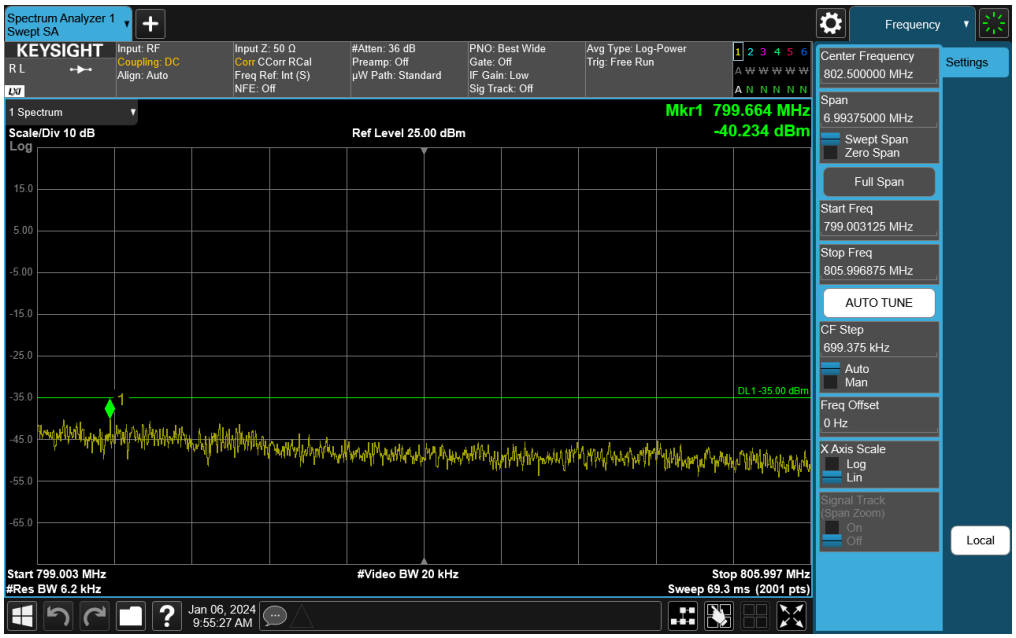
Plot 7-110. Lower Band Edge Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – RB Size 50)



Plot 7-111. Lower Emission Mask Plot (NR Band n14 - 10MHz DFT-s-OFDM π/2 BPSK – RB Size 50)

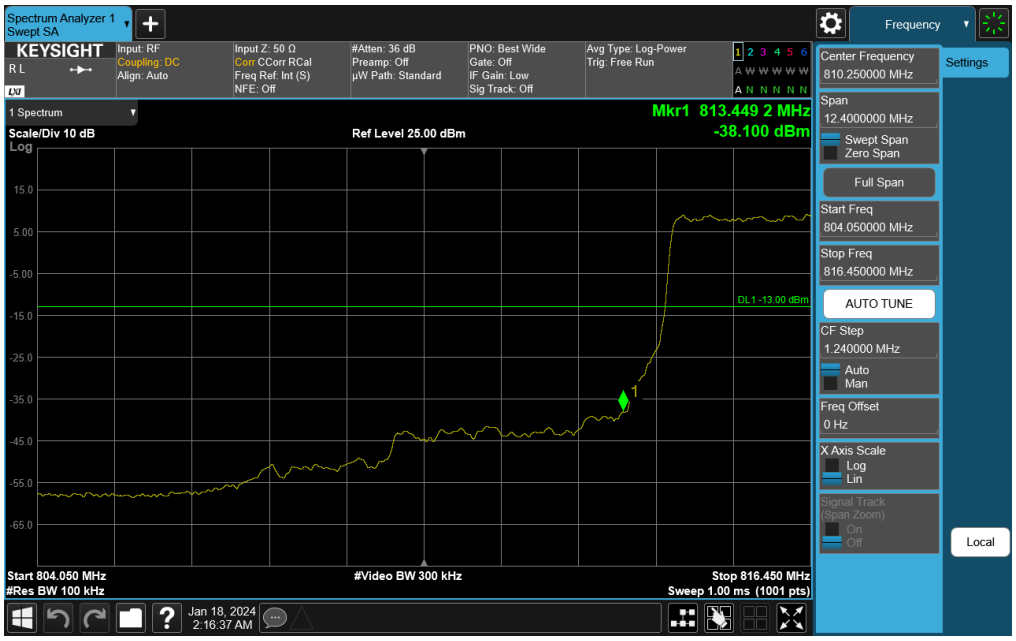


Plot 7-112. Upper Band Edge Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – RB Size 50)



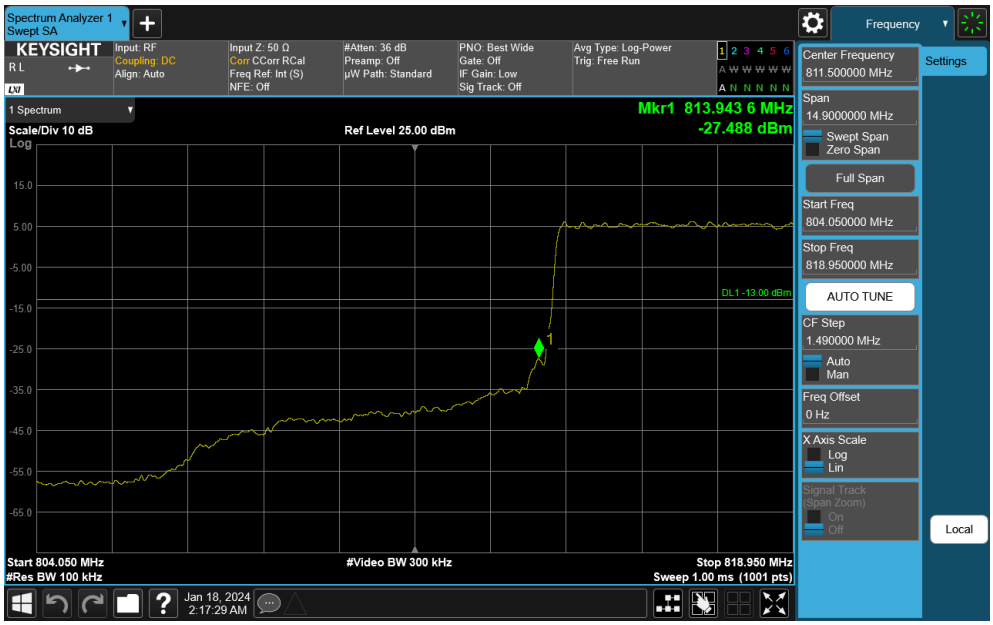
Plot 7-113. Upper Emission Mask Plot (NR Band n14 - 10MHz DFT-s-OFDM QPSK – RB Size 50)

NR Band n26

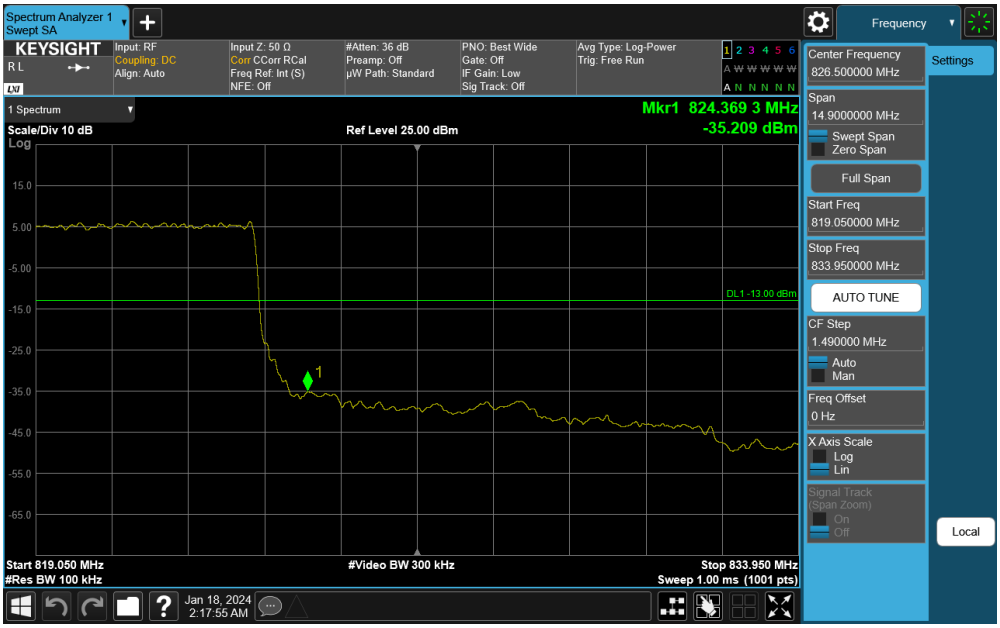


Plot 7-114. Lower Band Edge Plot (NR Band n26 - 5MHz DFT-s-OFDM π/2 BPSK – Low Channel)

Plot 7-115. Upper Band Edge Plot (NR Band n26 - 5MHz DFT-s-OFDM QPSK – High Channel)



Plot 7-116. Lower Band Edge Plot (NR Band n26 - 10MHz DFT-s-OFDM π/2 BPSK – Mid Channel)



Plot 7-117. Upper Band Edge Plot (NR Band n26 - 10MHz DFT-s-OFDM π/2 BPSK – Mid Channel)

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.

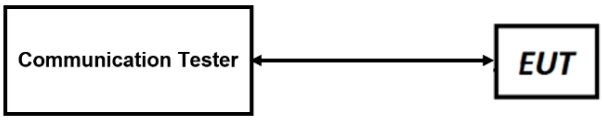


Figure 7-4. Conducted Power Measurement Setup

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.

Antenna 3

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [W]	Conducted Power Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	814.7	1 / 3	25.62	0.365	50.00	-24.38
		823.3	1 / 0	25.68	0.370	50.00	-24.32
	16-QAM	823.3	1 / 0	24.68	0.294	50.00	-25.32
	64-QAM	823.3	1 / 0	23.61	0.230	50.00	-26.39
	256-QAM	823.3	1 / 3	20.77	0.119	50.00	-29.23
3 MHz	QPSK	815.5	1 / 14	25.57	0.361	50.00	-24.43
		822.5	1 / 0	25.59	0.362	50.00	-24.41
	16-QAM	822.5	1 / 14	24.69	0.294	50.00	-25.31
	64-QAM	822.5	1 / 7	23.59	0.229	50.00	-26.41
	256-QAM	815.5	1 / 7	20.77	0.119	50.00	-29.23
5 MHz	QPSK	816.5	1 / 12	25.56	0.360	50.00	-24.44
		821.5	1 / 0	25.70	0.372	50.00	-24.30
	16-QAM	821.5	1 / 12	24.67	0.293	50.00	-25.33
	64-QAM	821.5	1 / 12	23.77	0.238	50.00	-26.23
	256-QAM	821.5	1 / 0	20.86	0.122	50.00	-29.14
10 MHz	QPSK	819.0	1 / 49	25.55	0.359	50.00	-24.45
	16-QAM	819.0	1 / 0	24.68	0.294	50.00	-25.32
	64-QAM	819.0	1 / 25	23.69	0.234	50.00	-26.31
	256-QAM	819.0	1 / 49	20.73	0.118	50.00	-29.27

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

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [W]	Conducted Power Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	816.5	1 / 23	25.50	0.355	50.00	-24.50
		819.0	1 / 23	25.61	0.364	50.00	-24.39
		821.5	1 / 1	25.58	0.361	50.00	-24.42
	QPSK	816.5	1 / 1	25.70	0.372	50.00	-24.30
		819.0	1 / 1	25.58	0.361	50.00	-24.42
		821.5	1 / 23	25.49	0.354	50.00	-24.51
	16-QAM	816.5	1 / 23	24.67	0.293	50.00	-25.33
	64-QAM	821.5	1 / 23	23.65	0.232	50.00	-26.35
	256-QAM	816.5	1 / 12	20.82	0.121	50.00	-29.18
10 MHz	π/2 BPSK	819.0	1 / 25	25.63	0.366	50.00	-24.37
	QPSK	819.0	1 / 25	25.59	0.362	50.00	-24.41
	16-QAM	819.0	1 / 25	24.71	0.296	50.00	-25.29
	64-QAM	819.0	1 / 50	23.71	0.235	50.00	-26.29
	256-QAM	819.0	1 / 1	20.82	0.121	50.00	-29.18

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

Antenna 1

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [W]	Conducted Power Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	814.7	1 / 3	23.86	0.243	50.00	-26.14
		823.3	1 / 0	23.90	0.245	50.00	-26.10
	16-QAM	814.7	1 / 0	22.93	0.196	50.00	-27.07
	64-QAM	814.7	1 / 5	21.90	0.155	50.00	-28.10
	256-QAM	823.3	1 / 0	19.04	0.080	50.00	-30.96
3 MHz	QPSK	815.5	1 / 0	23.84	0.242	50.00	-26.16
		822.5	1 / 0	23.84	0.242	50.00	-26.16
	16-QAM	822.5	1 / 0	22.84	0.192	50.00	-27.16
	64-QAM	815.5	1 / 14	21.87	0.154	50.00	-28.13
	256-QAM	815.5	1 / 14	19.00	0.079	50.00	-31.00
5 MHz	QPSK	816.5	1 / 12	23.77	0.238	50.00	-26.23
		821.5	1 / 24	23.86	0.243	50.00	-26.14
	16-QAM	816.5	1 / 0	22.73	0.187	50.00	-27.27
	64-QAM	816.5	1 / 12	21.86	0.153	50.00	-28.14
	256-QAM	816.5	1 / 0	18.85	0.077	50.00	-31.15
10 MHz	QPSK	819.0	1 / 0	23.86	0.243	50.00	-26.14
	16-QAM	819.0	1 / 0	22.79	0.190	50.00	-27.21
	64-QAM	819.0	1 / 25	21.88	0.154	50.00	-28.12
	256-QAM	819.0	1 / 25	18.88	0.077	50.00	-31.12

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

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [W]	Conducted Power Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	816.5	1 / 23	23.87	0.244	50.00	-26.13
		819.0	1 / 12	23.79	0.239	50.00	-26.21
		821.5	1 / 1	23.84	0.242	50.00	-26.16
	QPSK	816.5	1 / 1	23.90	0.245	50.00	-26.10
		819.0	1 / 12	23.86	0.243	50.00	-26.14
		821.5	1 / 1	23.70	0.234	50.00	-26.30
	16-QAM	819.0	1 / 23	22.87	0.194	50.00	-27.13
	64-QAM	821.5	1 / 1	21.90	0.155	50.00	-28.10
	256-QAM	821.5	1 / 1	19.00	0.079	50.00	-31.00
10 MHz	π/2 BPSK	819.0	1 / 1	23.88	0.244	50.00	-26.12
	QPSK	819.0	1 / 50	23.66	0.232	50.00	-26.34
	16-QAM	819.0	1 / 25	22.86	0.193	50.00	-27.14
	64-QAM	819.0	1 / 50	21.91	0.155	50.00	-28.09
	256-QAM	819.0	1 / 50	18.85	0.077	50.00	-31.15

Table 7-5. Conducted Output Data (NR Band n26)

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:

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)

Test Setup

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

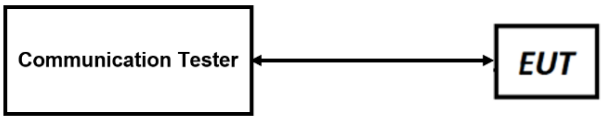


Figure 7-5. ERP Measurement Setup

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.

Antenna 3

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [W]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	790.5	-2.40	1 / 12	25.69	21.14	0.130	34.77	-13.63
		793.0	-2.40	1 / 0	25.70	**21.15**	0.130	34.77	-13.62
		795.5	-2.40	1 / 12	25.59	21.04	0.127	34.77	-13.73
	16-QAM	790.5	-2.40	1 / 0	24.69	20.14	0.103	34.77	-14.63
		795.5	-2.40	1 / 24	24.69	20.14	0.103	34.77	-14.63
	64-QAM	795.5	-2.40	1 / 24	23.70	19.15	0.082	34.77	-15.62
	256-QAM	790.5	-2.40	1 / 12	20.79	16.24	0.042	34.77	-18.53
10 MHz	QPSK	793.0	-2.40	1 / 49	25.52	**20.97**	0.125	34.77	-13.80
	16-QAM	793.0	-2.40	1 / 0	24.51	19.96	0.099	34.77	-14.81
	64-QAM	793.0	-2.40	1 / 49	23.60	19.05	0.080	34.77	-15.72
	256-QAM	793.0	-2.40	1 / 0	20.76	16.21	0.042	34.77	-18.56

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 [W]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	790.5	-2.40	1 / 23	25.62	**21.07**	0.128	34.77	-13.70
		793.0	-2.40	1 / 23	25.59	21.04	0.127	34.77	-13.73
		795.5	-2.40	1 / 12	25.61	21.06	0.128	34.77	-13.71
	QPSK	790.5	-2.40	1 / 1	25.69	21.14	0.130	34.77	-13.63
		793.0	-2.40	1 / 23	25.70	**21.15**	0.130	34.77	-13.62
		795.5	-2.40	1 / 1	25.47	20.92	0.124	34.77	-13.85
	16-QAM	790.5	-2.40	1 / 23	24.65	20.10	0.102	34.77	-14.67
	64-QAM	793.0	-2.40	1 / 12	23.74	19.19	0.083	34.77	-15.58
	256-QAM	795.5	-2.40	1 / 12	20.81	16.26	0.042	34.77	-18.51
10 MHz	π/2 BPSK	793.0	-2.40	1 / 50	25.64	**21.09**	0.129	34.77	-13.68
	QPSK	793.0	-2.40	1 / 1	25.70	**21.15**	0.130	34.77	-13.62
	16-QAM	793.0	-2.40	1 / 1	24.35	19.80	0.095	34.77	-14.97
	64-QAM	793.0	-2.40	1 / 25	23.61	19.06	0.081	34.77	-15.71
	256-QAM	793.0	-2.40	1 / 50	20.80	16.25	0.042	34.77	-18.52

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

Antenna 1

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [W]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	790.5	-2.60	1 / 12	23.90	**19.15**	0.082	34.77	-15.62
		793.0	-2.60	1 / 12	23.74	18.99	0.079	34.77	-15.78
		795.5	-2.60	1 / 24	23.74	18.99	0.079	34.77	-15.78
	16-QAM	793.0	-2.60	1 / 12	22.74	17.99	0.063	34.77	-16.78
	64-QAM	793.0	-2.60	1 / 0	21.79	17.04	0.051	34.77	-17.73
	256-QAM	790.5	-2.60	1 / 0	18.99	14.24	0.027	34.77	-20.53
10 MHz	QPSK	793.0	-2.60	1 / 25	23.78	**19.03**	0.080	34.77	-15.74
	16-QAM	793.0	-2.60	1 / 25	22.93	18.18	0.066	34.77	-16.59
	64-QAM	793.0	-2.60	1 / 0	21.84	17.09	0.051	34.77	-17.68
	256-QAM	793.0	-2.60	1 / 0	19.05	14.30	0.027	34.77	-20.47

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 [W]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	790.5	-2.60	1 / 1	23.86	19.11	0.081	34.77	-15.66
		793.0	-2.60	1 / 1	23.71	18.96	0.079	34.77	-15.81
		795.5	-2.60	1 / 1	23.89	**19.14**	0.082	34.77	-15.63
	QPSK	790.5	-2.60	1 / 12	23.89	19.14	0.082	34.77	-15.63
		793.0	-2.60	1 / 23	23.90	**19.15**	0.082	34.77	-15.62
		795.5	-2.60	1 / 12	23.68	18.93	0.078	34.77	-15.84
	16-QAM	795.5	-2.60	1 / 1	22.90	18.15	0.065	34.77	-16.62
	64-QAM	790.5	-2.60	1 / 23	21.83	17.08	0.051	34.77	-17.69
	256-QAM	795.5	-2.60	1 / 12	19.01	14.26	0.027	34.77	-20.51
10 MHz	π/2 BPSK	793.0	-2.60	1 / 25	23.87	**19.12**	0.082	34.77	-15.65
	QPSK	793.0	-2.60	1 / 25	23.83	**19.08**	0.081	34.77	-15.69
	16-QAM	793.0	-2.60	1 / 1	22.83	18.08	0.064	34.77	-16.69
	64-QAM	793.0	-2.60	1 / 50	21.84	17.09	0.051	34.77	-17.68
	256-QAM	793.0	-2.60	1 / 25	19.01	14.26	0.027	34.77	-20.51

Table 7-9. Conducted Output Data (NR Band n14)

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

Test Setup

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

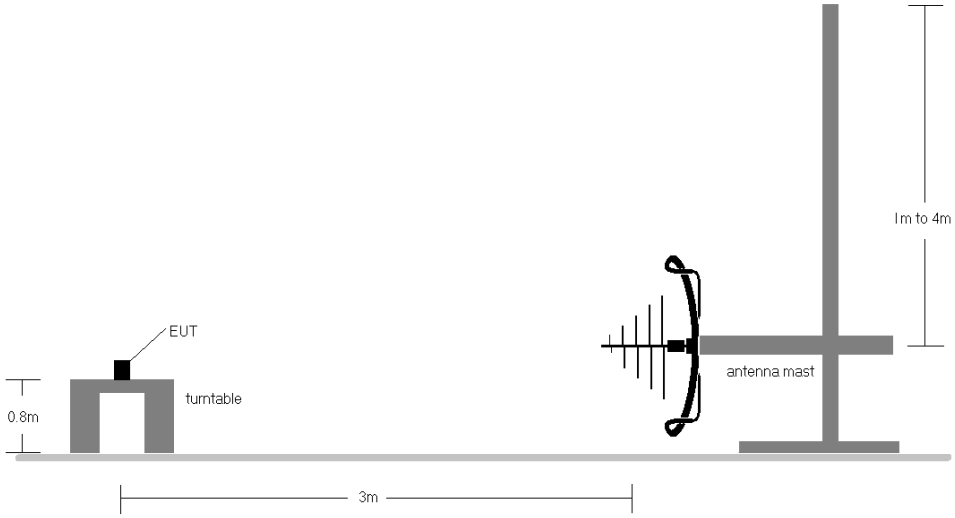


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

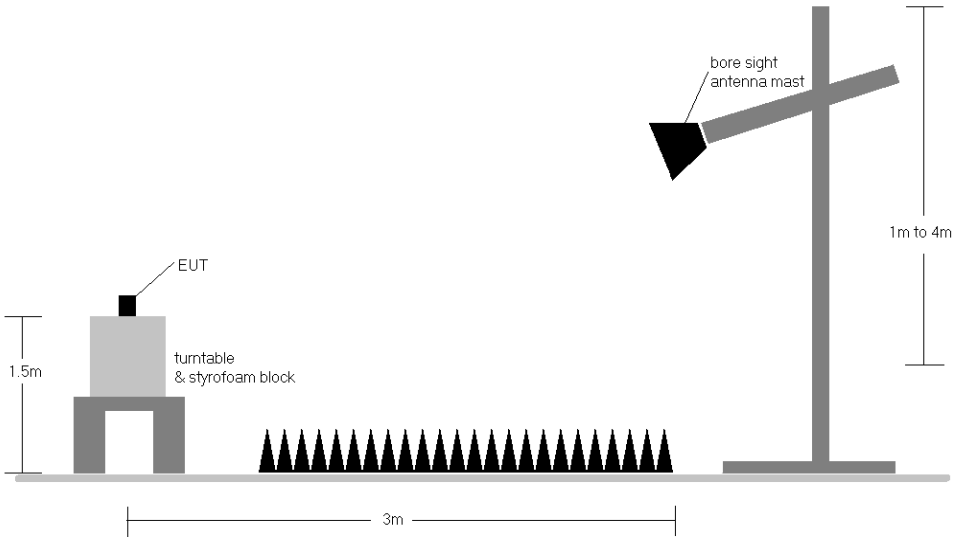


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

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.

7.7.1 Antenna 3 – 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	-	-	-72.77	-5.49	28.75	-66.51	-13.00	-53.51
2449.5	H	-	-	-74.41	-0.70	31.89	-63.37	-13.00	-50.37
3266.0	H	-	-	-75.56	1.07	32.51	-62.75	-13.00	-49.75

Table 7-10. Antenna 3 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	-	-	-72.74	-5.49	28.77	-66.49	-13.00	-53.49
2457.0	H	-	-	-74.53	-0.70	31.77	-63.49	-13.00	-50.49
3276.0	H	-	-	-75.61	1.21	32.61	-62.65	-13.00	-49.65

Table 7-11. Antenna 3 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	-	-	-72.63	-5.49	28.88	-66.38	-13.00	-53.38
2464.5	H	-	-	-74.25	-0.86	31.89	-63.37	-13.00	-50.37
3286.0	H	-	-	-75.62	1.21	32.59	-62.67	-13.00	-49.67

Table 7-12. Antenna 3 Radiated Spurious Data (LTE Band 26 – High Channel)

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	-	-	-72.80	-5.46	28.75	-66.51	-40.00	-26.51
2371.5	H	-	-	-74.29	-0.34	32.37	-62.89	-13.00	-49.89
3162.0	H	-	-	-75.63	1.18	32.55	-62.71	-13.00	-49.71

Table 7-13. Antenna 3 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	-	-	-72.88	-5.53	28.58	-66.67	-40.00	-26.67
2379.0	H	-	-	-74.22	-0.31	32.47	-62.79	-13.00	-49.79
3172.0	H	-	-	-75.78	1.16	32.38	-62.88	-13.00	-49.88

Table 7-14. Antenna 3 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	-	-	-72.77	-5.53	28.70	-66.56	-40.00	-26.56
2386.5	H	-	-	-74.21	-0.31	32.48	-62.78	-13.00	-49.78
3182.0	H	-	-	-75.68	1.01	32.33	-62.93	-13.00	-49.93

Table 7-15. Antenna 3 Radiated Spurious Data (LTE Band 14 – High Channel)

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	H	-	-	-72.45	-5.46	29.09	-66.17	-40.00	-26.17
2371.5	H	-	-	-73.74	-0.34	32.93	-62.33	-13.00	-49.33
3162.0	H	-	-	-75.06	1.37	33.30	-61.95	-13.00	-48.95

Table 7-16. Antenna 3 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	-	-	-72.43	-5.53	29.04	-66.22	-40.00	-26.22
2379.0	H	-	-	-73.82	-0.31	32.87	-62.38	-13.00	-49.38
3172.0	H	-	-	-75.49	1.16	32.67	-62.59	-13.00	-49.59

Table 7-17. Antenna 3 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	-	-	-72.25	-5.53	29.21	-66.05	-40.00	-26.05
2386.5	H	-	-	-73.88	-0.39	32.73	-62.53	-13.00	-49.53
3182.0	H	-	-	-75.37	0.93	32.56	-62.70	-13.00	-49.70

Table 7-18. Antenna 3 Radiated Spurious Data (NR Band n14 – High Channel)

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 [dBm]	Limit [dBm]	Margin [dB]
1633.0	H	-	-	-72.16	-5.49	29.35	-65.91	-13.00	-52.91
2449.5	H	-	-	-74.16	-0.70	32.14	-63.12	-13.00	-50.12
3266.0	H	-	-	-75.40	1.07	32.66	-62.60	-13.00	-49.60

Table 7-19. Antenna 3 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 [dBm]	Limit [dBm]	Margin [dB]
1638.0	H	-	-	-72.56	-5.07	29.37	-65.89	-13.00	-52.89
2457.0	H	-	-	-73.78	-0.86	32.35	-62.90	-13.00	-49.90
3276.0	H	-	-	-75.48	1.42	32.94	-62.32	-13.00	-49.32

Table 7-20. Antenna 3 Radiated Spurious Data (NR Band n26 – Mid Channel)

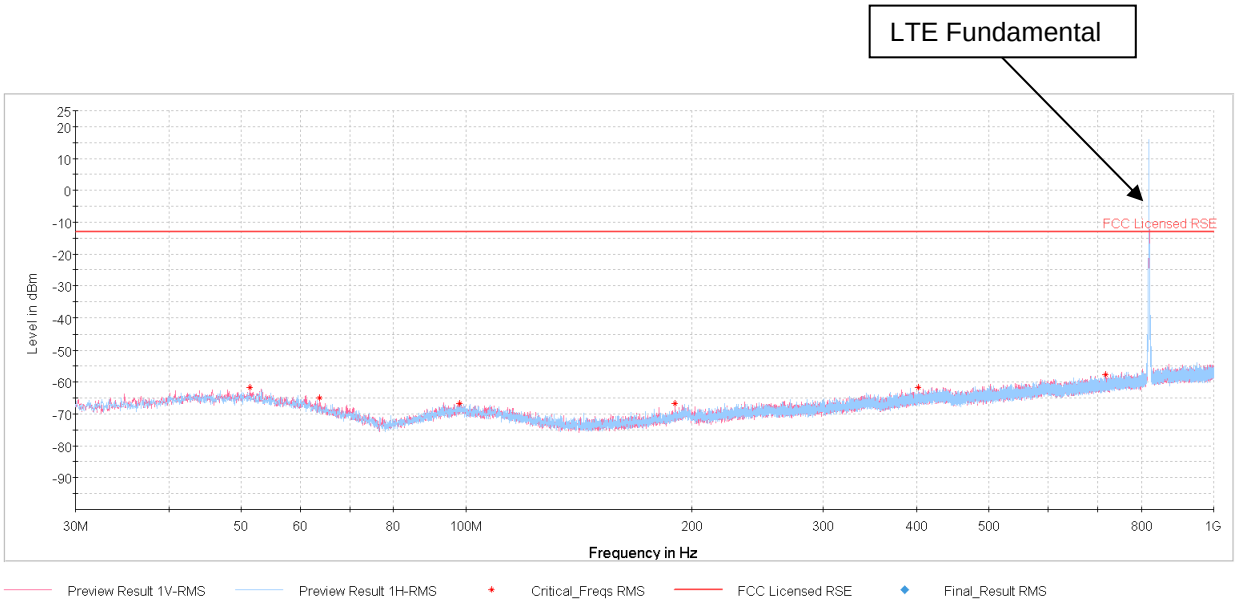
Bandwidth (MHz):	5
Frequency (MHz):	821.5
Modulation Signal:	QPSK
RB / Offset:	1 / 12

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 [dBm]	Limit [dBm]	Margin [dB]
1643.0	H	-	-	-71.95	-5.53	29.52	-65.74	-13.00	-52.74
2464.5	H	-	-	-74.16	-0.63	32.21	-63.05	-13.00	-50.05
3286.0	H	-	-	-75.37	1.21	32.85	-62.41	-13.00	-49.41

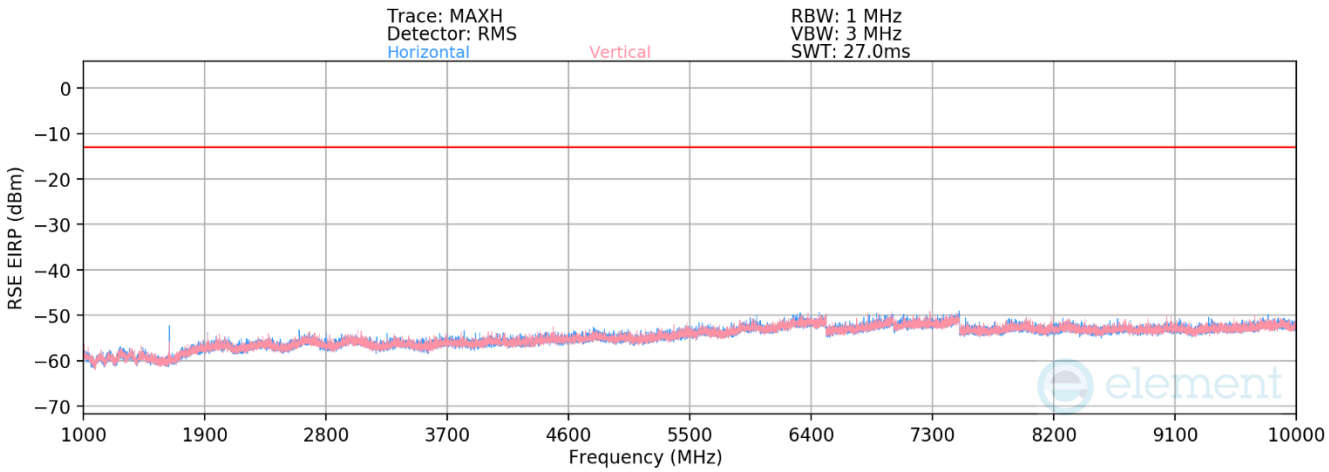
Table 7-21. Antenna 3 Radiated Spurious Data (NR Band n26 – High Channel)

7.7.2 Antenna 1 – Radiated Spurious Emission Measurements

LTE Band 26



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



Plot 7-119. Antenna 1 Radiated Spurious Plot Above 1GHz (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	235	171	-64.40	-5.49	37.11	-58.15	-13.00	-45.15
2449.5	H	-	-	-74.42	-0.70	31.88	-63.38	-13.00	-50.38
3266.0	H	-	-	-75.40	1.07	32.66	-62.59	-13.00	-49.59
4082.5	H	-	-	-76.97	3.14	33.17	-62.09	-13.00	-49.09

Table 7-22. Antenna 1 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	250	182	-63.66	-5.49	37.85	-57.41	-13.00	-44.41
2457.0	H	-	-	-74.45	-0.70	31.85	-63.41	-13.00	-50.41
3276.0	H	-	-	-75.56	1.21	32.65	-62.61	-13.00	-49.61
4095.0	H	-	-	-77.15	3.16	33.01	-62.25	-13.00	-49.25

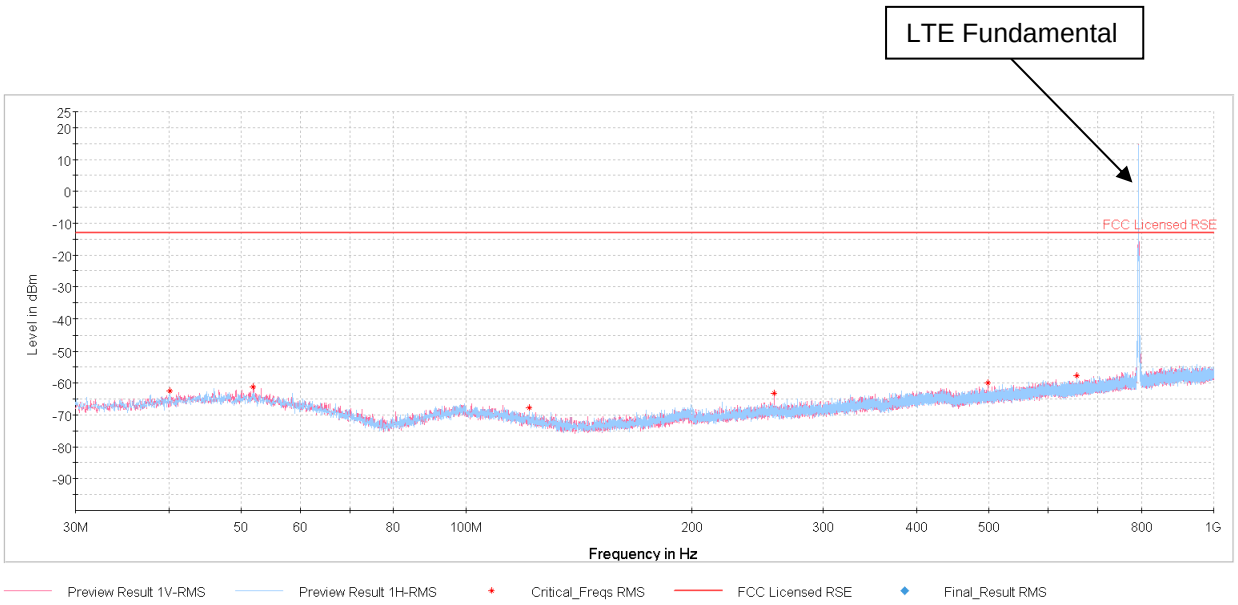
Table 7-23. Antenna 1 Radiated Spurious Data (LTE Band 26 – Mid Channel)

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

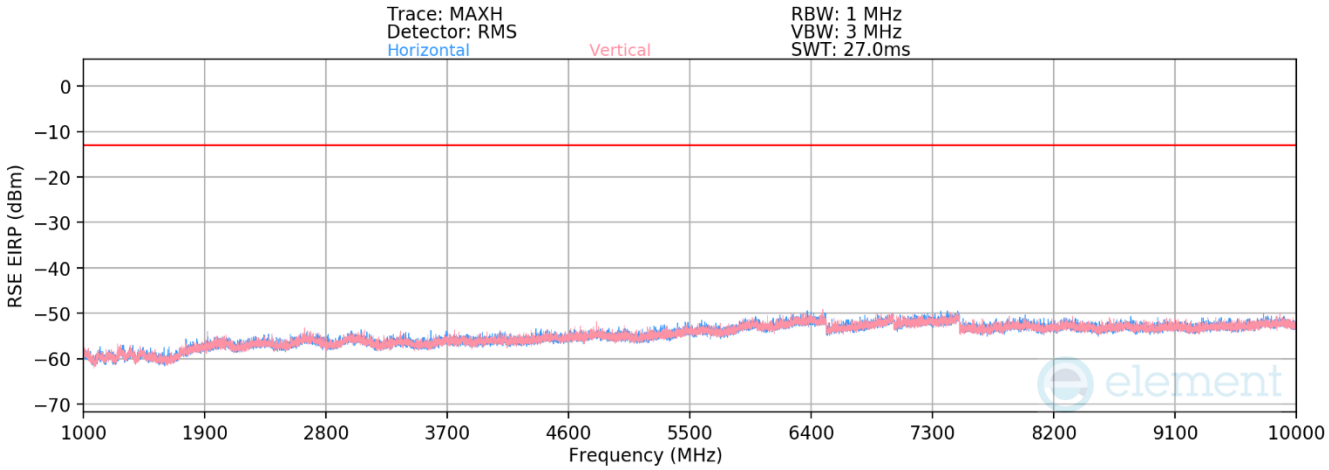
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1643.0	H	326	298	-69.49	-5.49	32.02	-63.24	-13.00	-50.24
2464.5	H	-	-	-74.30	-0.86	31.84	-63.42	-13.00	-50.42
3286.0	H	-	-	-75.57	1.21	32.64	-62.62	-13.00	-49.62
4107.5	H	-	-	-77.18	3.04	32.87	-62.39	-13.00	-49.39

Table 7-24. Antenna 1 Radiated Spurious Data (LTE Band 26 – High Channel)

LTE Band 14



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



Plot 7-121. Antenna 1 Radiated Spurious Plot Above 1GHz (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	-	-	-72.84	-5.46	28.71	-66.55	-40.00	-26.55
2371.5	H	-	-	-74.38	-0.34	32.28	-62.98	-13.00	-49.98
3162.0	H	-	-	-75.76	1.18	32.42	-62.84	-13.00	-49.84

Table 7-25. Antenna 1 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	-	-	-72.97	-5.46	28.57	-66.68	-40.00	-26.68
2379.0	H	-	-	-74.28	-0.31	32.41	-62.85	-13.00	-49.85
3172.0	H	-	-	-75.74	1.01	32.26	-63.00	-13.00	-50.00

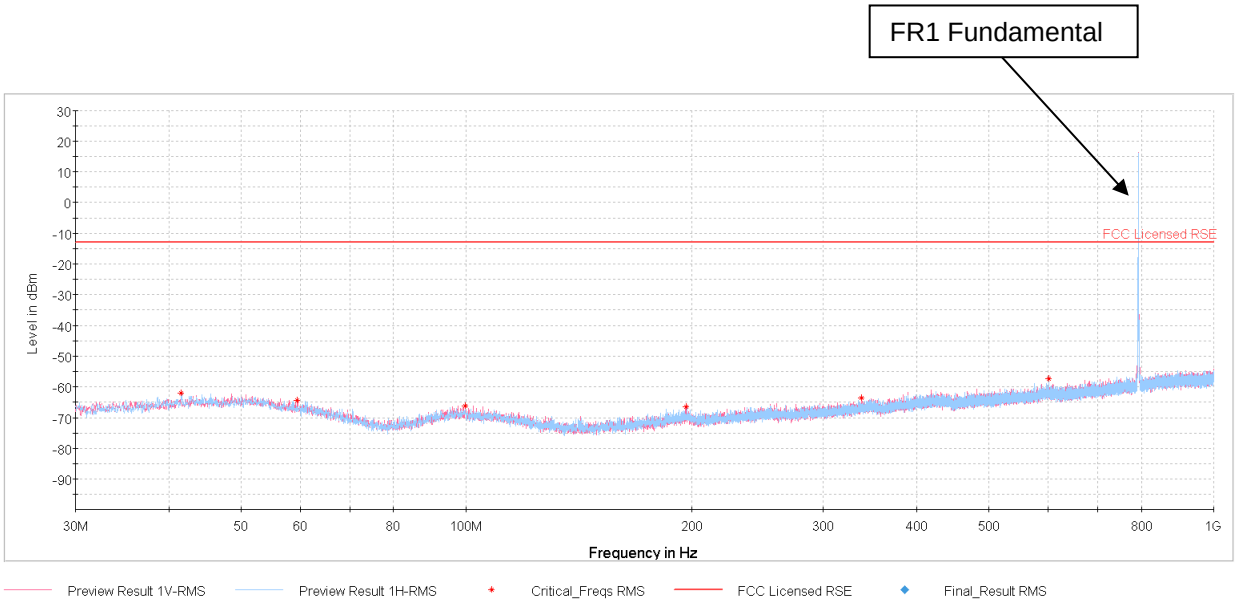
Table 7-26. Antenna 1 Radiated Spurious Data (LTE Band 14 – Mid Channel)

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

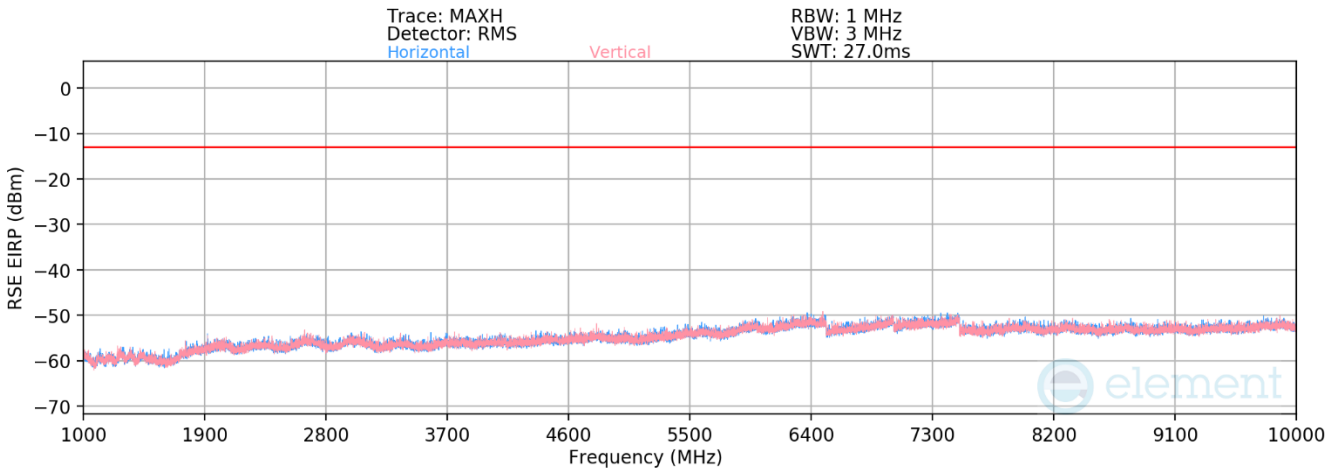
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1591.0	H	-	-	-72.46	-5.53	29.00	-66.26	-40.00	-26.26
2386.5	H	-	-	-74.45	-0.31	32.24	-63.02	-13.00	-50.02
3182.0	H	-	-	-75.73	1.01	32.28	-62.98	-13.00	-49.98

Table 7-27. Antenna 1 Radiated Spurious Data (LTE Band 14 – High Channel)

NR Band n14



Plot 7-122. Antenna 1 Radiated Spurious Plot Below 1GHz (NR Band n14)



Plot 7-123. Antenna 1 Radiated Spurious Plot Above 1GHz (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	H	-	-	-72.34	-5.46	29.20	-66.05	-40.00	-26.05
2371.5	H	-	-	-73.71	-0.34	32.95	-62.31	-13.00	-49.31
3162.0	H	-	-	-75.35	1.37	33.01	-62.24	-13.00	-49.24

Table 7-28. Antenna 1 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	-	-	-72.14	-5.53	29.32	-65.93	-40.00	-25.93
2379.0	H	-	-	-73.82	-0.31	32.87	-62.39	-13.00	-49.39
3172.0	H	-	-	-75.53	1.16	32.64	-62.62	-13.00	-49.62

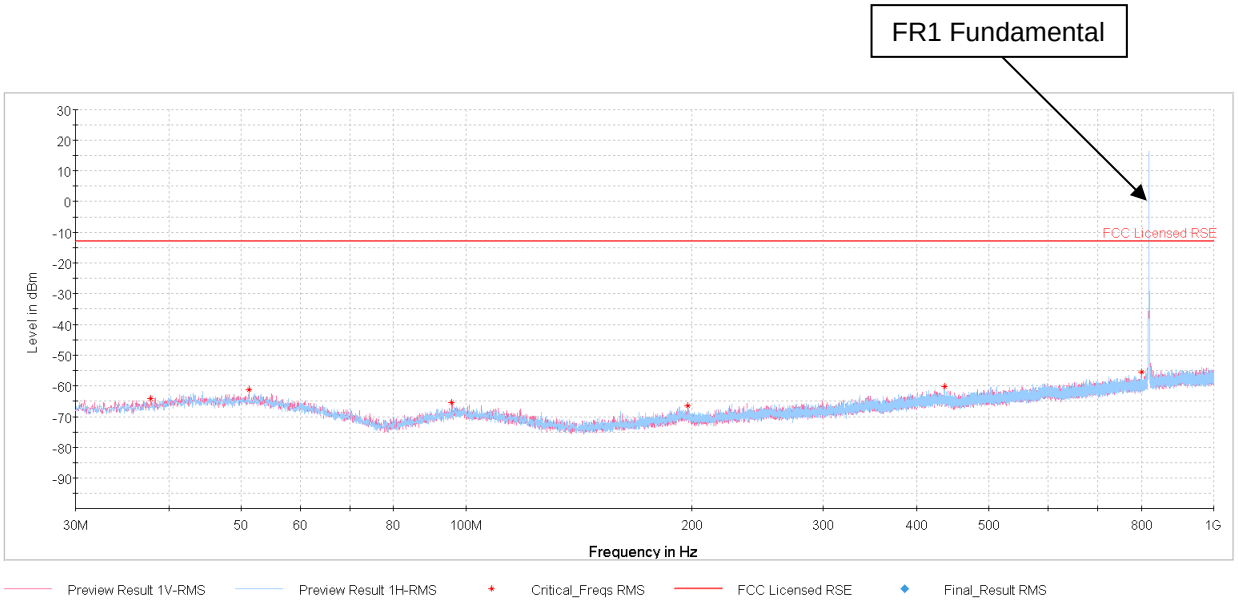
Table 7-29. Antenna 1 Radiated Spurious Data (NR Band n14 – Mid Channel)

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

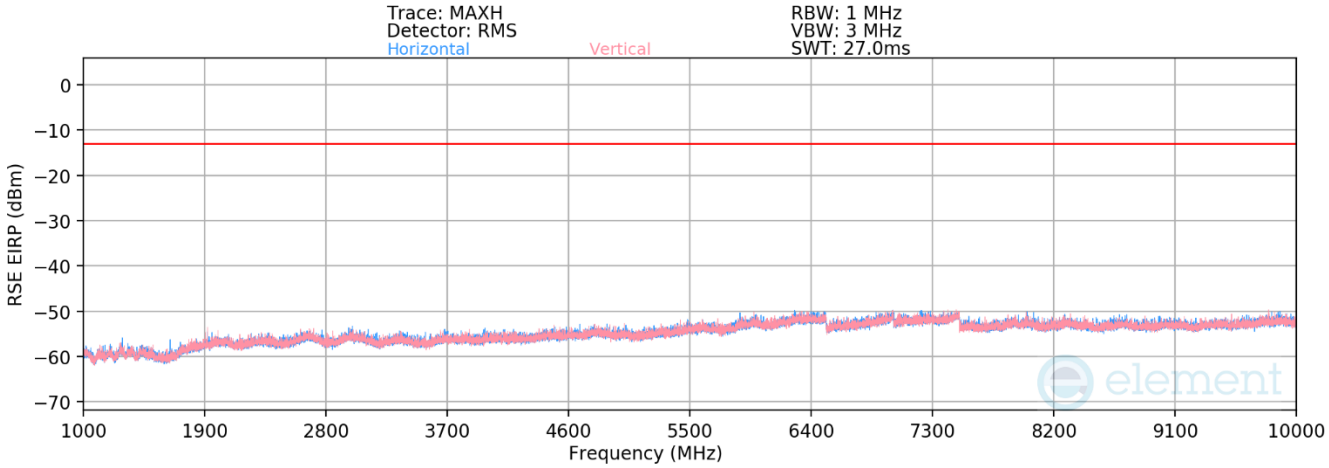
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1591.0	H	180	140	-68.90	-5.63	32.47	-62.79	-40.00	-22.79
2386.5	H	-	-	-73.83	-0.39	32.78	-62.48	-13.00	-49.48
3182.0	H	-	-	-75.44	0.93	32.49	-62.77	-13.00	-49.77
3977.5	H	-	-	-76.38	2.66	33.27	-61.98	-13.00	-48.98

Table 7-30. Antenna 1 Radiated Spurious Data (NR Band n14 – High Channel)

NR Band n26



Plot 7-124. Antenna 1 Radiated Spurious Plot Below 1GHz (NR Band n26)



Plot 7-125. Antenna 1 Radiated Spurious Plot Above 1GHz (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 [dBm]	Limit [dBm]	Margin [dB]
1633.0	H	181	147	-66.07	-5.49	35.44	-59.82	-13.00	-46.82
2449.5	H	-	-	-74.15	-0.70	32.15	-63.11	-13.00	-50.11
3266.0	H	-	-	-75.47	1.21	32.74	-62.51	-13.00	-49.51
4082.5	H	-	-	-76.77	3.14	33.37	-61.89	-13.00	-48.89

Table 7-31. Antenna 1 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 [dBm]	Limit [dBm]	Margin [dB]
1638.0	H	208	144	-65.45	-5.49	36.06	-59.19	-13.00	-46.19
2457.0	H	-	-	-74.10	-0.70	32.20	-63.06	-13.00	-50.06
3276.0	H	-	-	-75.36	1.21	32.86	-62.40	-13.00	-49.40
4095.0	H	-	-	-76.87	3.16	33.29	-61.97	-13.00	-48.97

Table 7-32. Antenna 1 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 [dBm]	Limit [dBm]	Margin [dB]
1643.0	H	201	147	-64.55	-5.49	36.97	-58.29	-13.00	-45.29
2464.5	H	-	-	-74.03	-0.63	32.34	-62.92	-13.00	-49.92
3286.0	H	-	-	-75.21	1.21	33.01	-62.25	-13.00	-49.25
4107.5	H	-	-	-76.72	3.16	33.45	-61.81	-13.00	-48.81

Table 7-33. Antenna 1 Radiated Spurious Data (NR Band n26 – High Channel)

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 ±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.

Test Setup

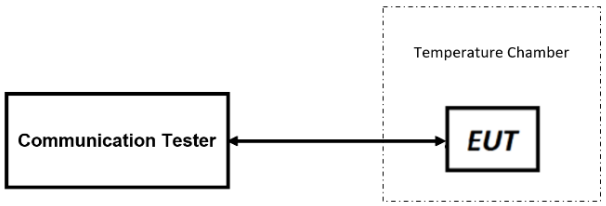


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

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

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)	Freq. Dev. (GHz)	Deviation (%)
100 %	3.80	- 30	0.000000020	0.000002442
		- 20	-0.000000015	-0.000001832
		- 10	0.000000037	0.000004518
		0	-0.000000025	-0.000003053
		+ 10	0.000000013	0.000001587
		+ 20 (Ref)	0.000000000	0.000000000
		+ 30	-0.000000036	-0.000004396
		+ 40	0.000000027	0.000003297
		+ 50	0.000000035	0.000004274
Battery Endpoint	3.40	+ 20	0.000000040	0.000004884

Table 7-34. LTE Band 26 Frequency Stability Data

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	0.788377452	-0.000377452
		- 20	0.788378116	-0.000378116
		- 10	0.788378547	-0.000378547
		0	0.788378144	-0.000378144
		+ 10	0.788377236	-0.000377236
		+ 20 (Ref)	0.788377158	-0.000377158
		+ 30	0.788376598	-0.000376597
		+ 40	0.788378565	-0.000378565
		+ 50	0.788378150	-0.000378150
Battery Endpoint	3.40	+ 20	0.788378134	-0.000378133

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	0.797675745	-0.000324255
		- 20	0.797674782	-0.000325218
		- 10	0.797678154	-0.000321846
		0	0.797675244	-0.000324756
		+ 10	0.797678952	-0.000321048
		+ 20 (Ref)	0.797679327	-0.000320673
		+ 30	0.797677459	-0.000322541
		+ 40	0.797679542	-0.000320458
		+ 50	0.797676789	-0.000323211
Battery Endpoint	3.40	+ 20	0.797677216	-0.000322784

Table 7-36. LTE Band 14 Upper Boundary Frequency Stability Data

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	0.788475156	-0.000475156
		- 20	0.788477879	-0.000477879
		- 10	0.788478157	-0.000478157
		0	0.788475494	-0.000475494
		+ 10	0.788476599	-0.000476599
		+ 20 (Ref)	0.788478795	-0.000478795
		+ 30	0.788476690	-0.000476690
		+ 40	0.788475198	-0.000475198
		+ 50	0.788473495	-0.000473495
Battery Endpoint	3.40	+ 20	0.788475565	-0.000475565

Table 7-37. 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	0.797895602	-0.000104398
		- 20	0.797894595	-0.000105405
		- 10	0.797894795	-0.000105205
		0	0.797895365	-0.000104635
		+ 10	0.797895168	-0.000104832
		+ 20 (Ref)	0.797894651	-0.000105349
		+ 30	0.797894189	-0.000105811
		+ 40	0.797895365	-0.000104635
		+ 50	0.797896550	-0.000103450
Battery Endpoint	3.40	+ 20	0.797895216	-0.000104784

Table 7-38. NR Band n14 Upper Boundary Frequency Stability Data

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)	Freq. Dev. (GHz)	Deviation (%)
100 %	3.80	- 30	-0.000000025	-0.000003053
		- 20	0.000000033	0.000004029
		- 10	0.000000019	0.000002320
		0	0.000000015	0.000001832
		+ 10	-0.000000018	-0.000002198
		+ 20 (Ref)	0.000000000	0.000000000
		+ 30	-0.000000045	-0.000005495
		+ 40	-0.000000022	-0.000002686
		+ 50	0.000000051	0.000006227
Battery Endpoint	3.40	+ 20	0.000000020	0.000002442

Table 7-39. NR Band n26 Frequency Stability Data

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2926** complies with all the requirements of Part 90 of the FCC rules.