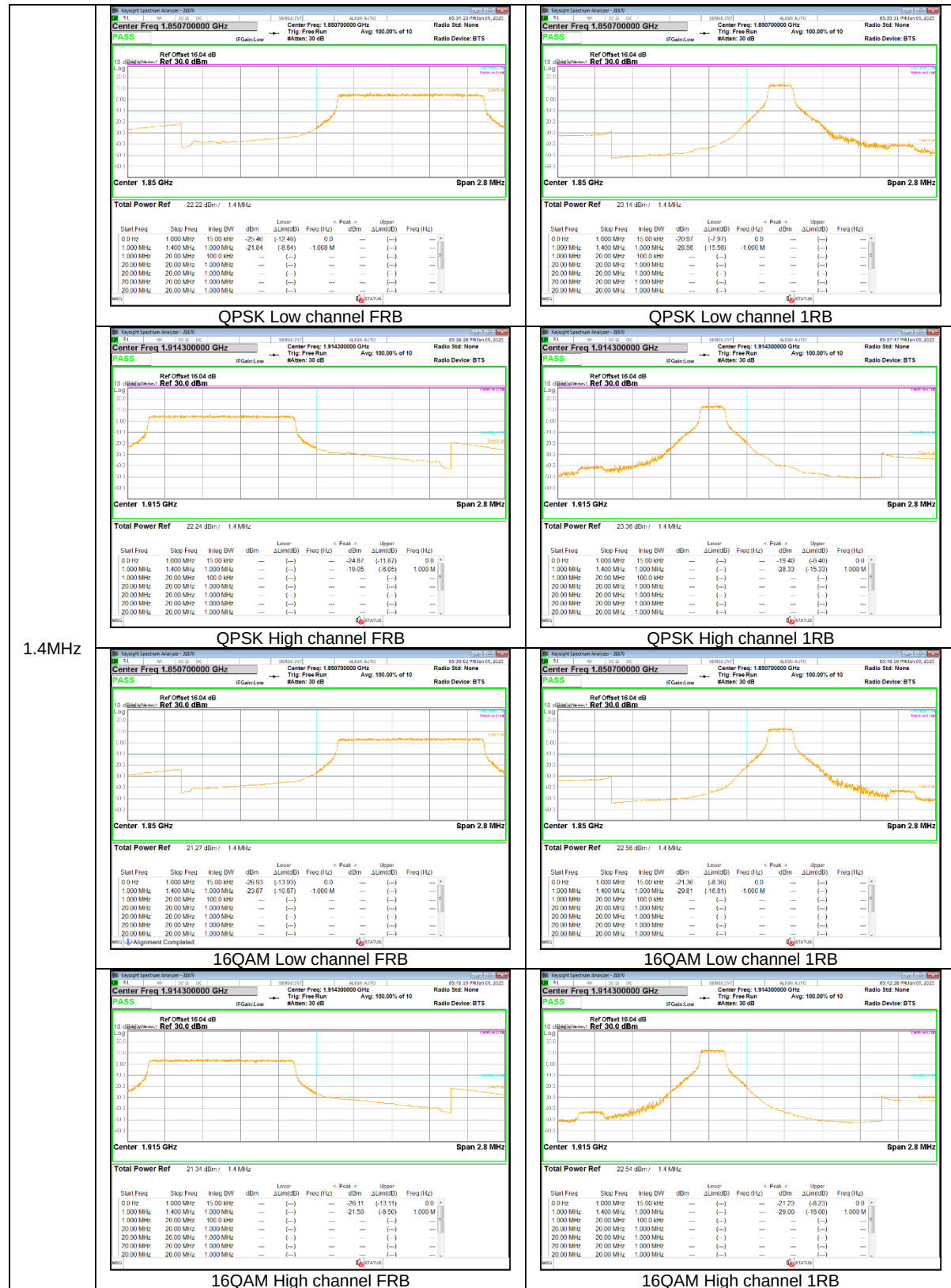
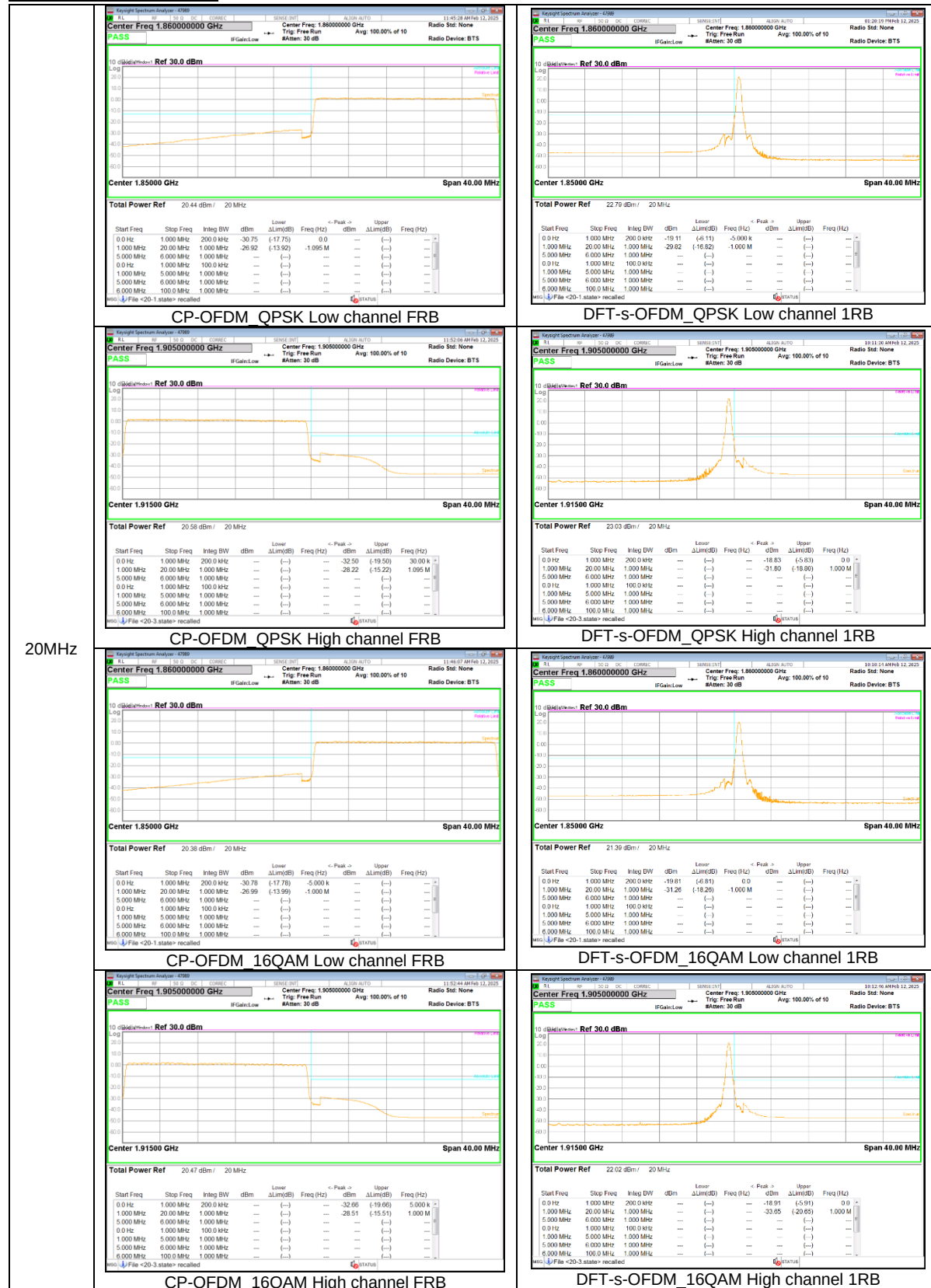
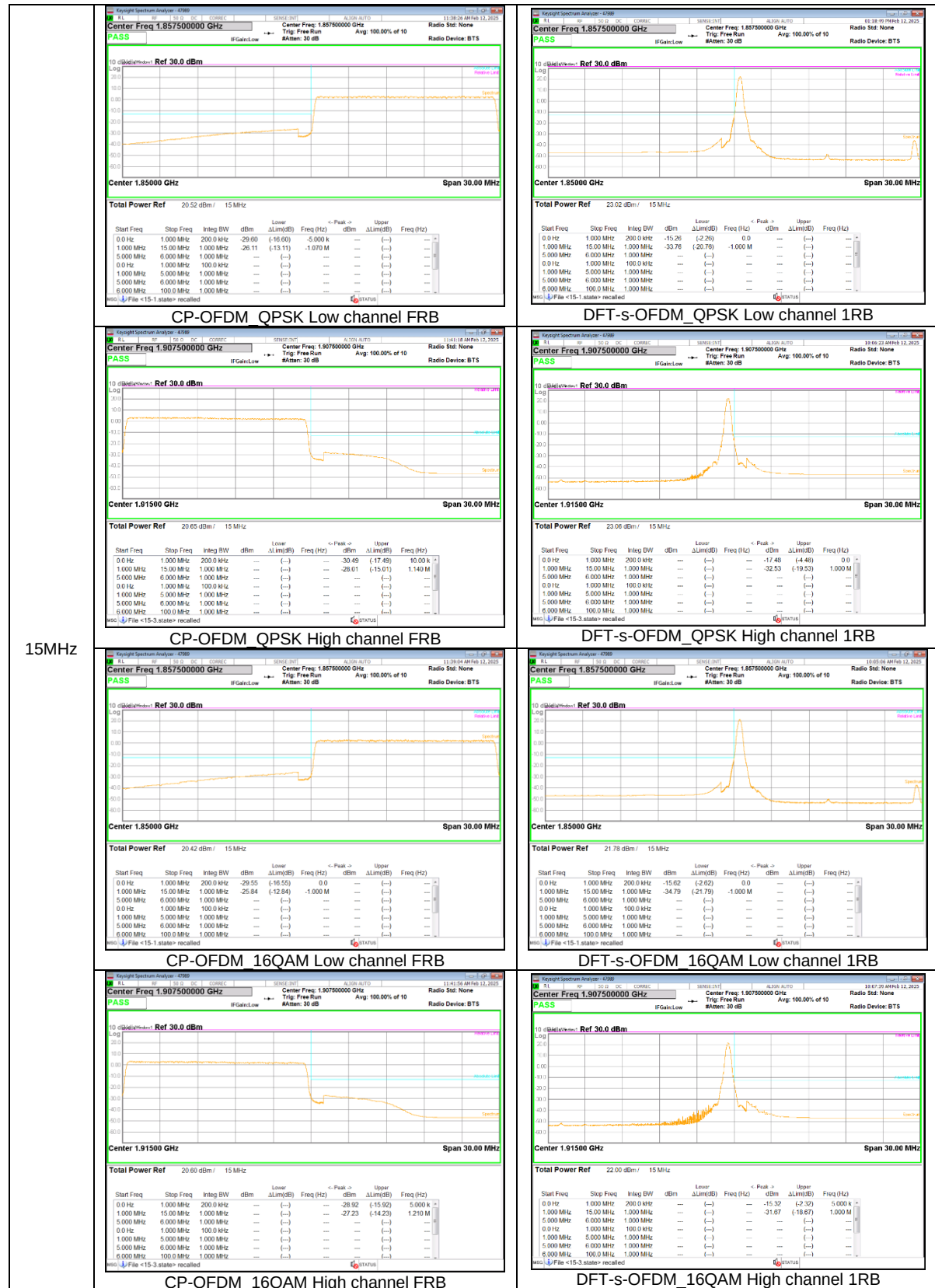
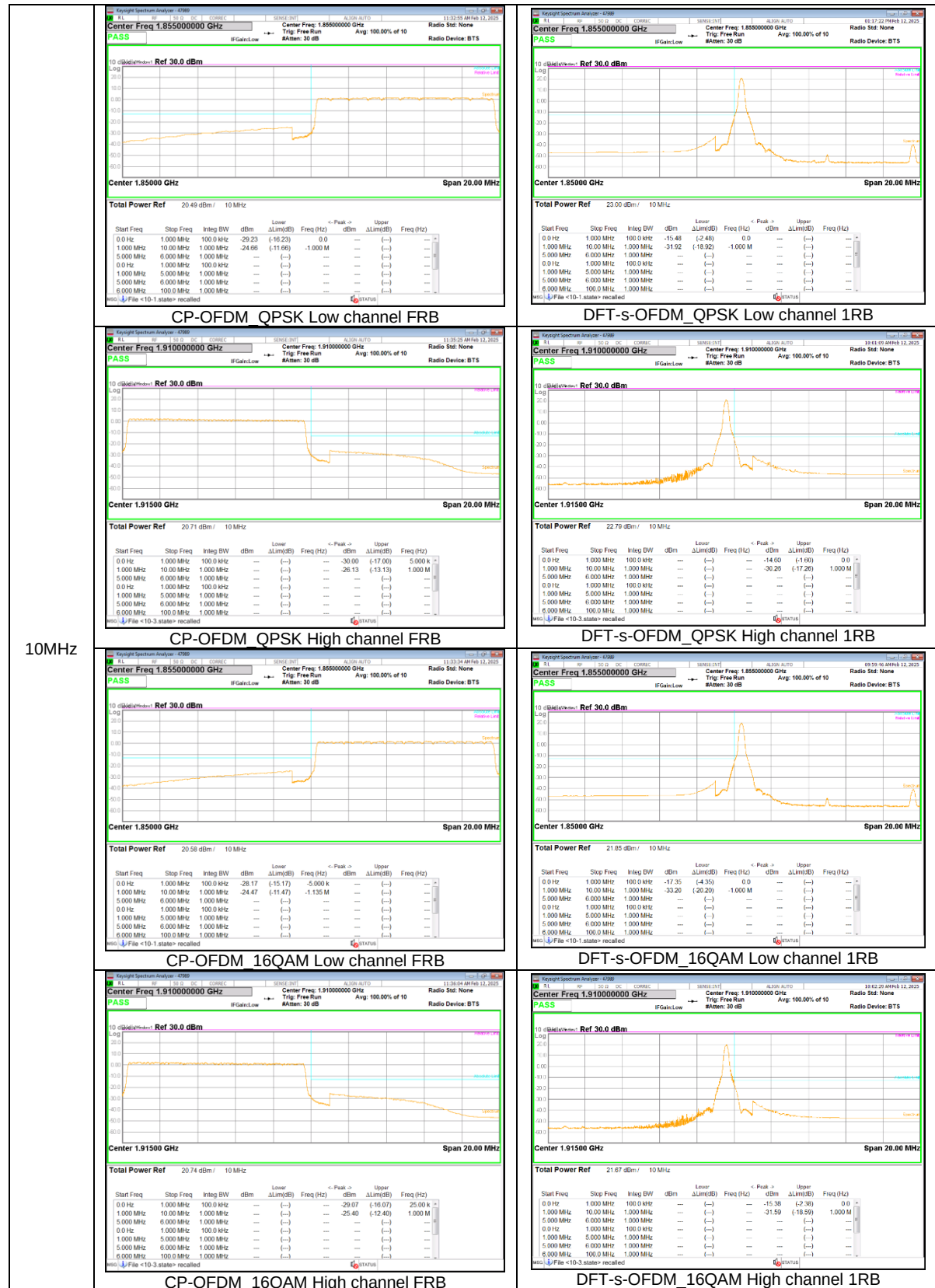




NR Band n25 (ANT F)









8.5. CONDUCTED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §24.238

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic.

Multiple sweeps were recorded in maximum hold Mode using a peak detector to ensure that the worst-case emissions were caught.

- a) Set the RBW = 1 MHz for emissions above 1 GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace Mode = average(WCDMA, LTE, 5G NR), Max hold(GSM);

NOTE1

GSM : It was tested at GPRS as worst case (the highest output power and density).

UMTS: It was tested at REL 99 as worst case (the highest output power and density).

LTE: It was tested at 1RB QPSK as worst case (the highest output power and density).

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) 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.

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

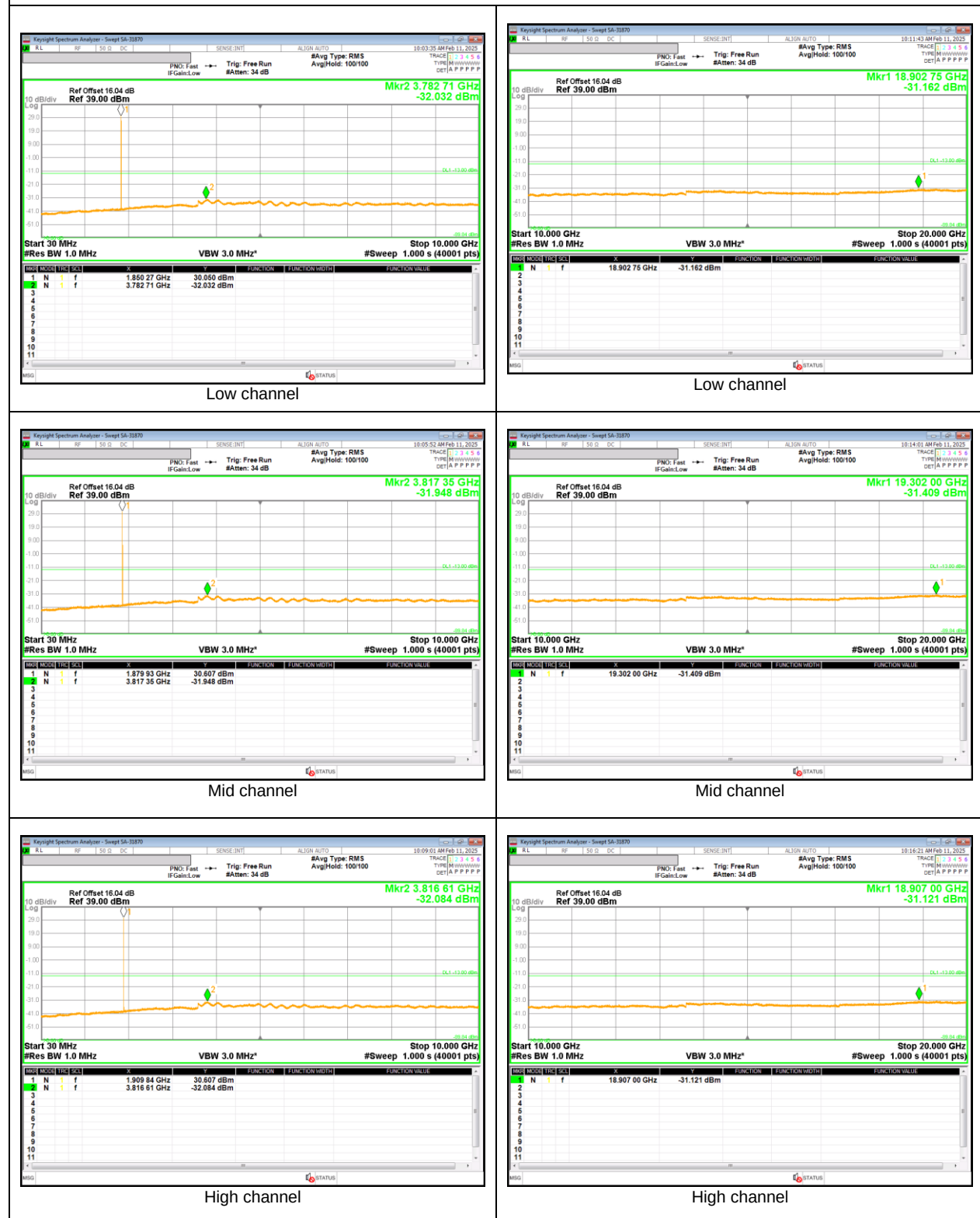
RESULTS

See the following pages.

8.5.1. OUT OF BAND EMISSIONS RESULT

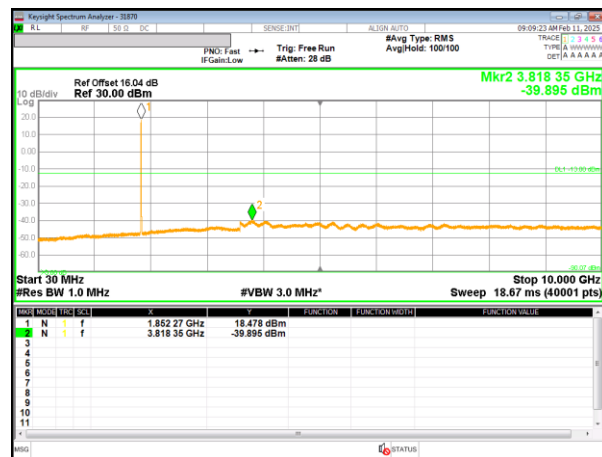
GSM 1900 (ANT A)

GPRS

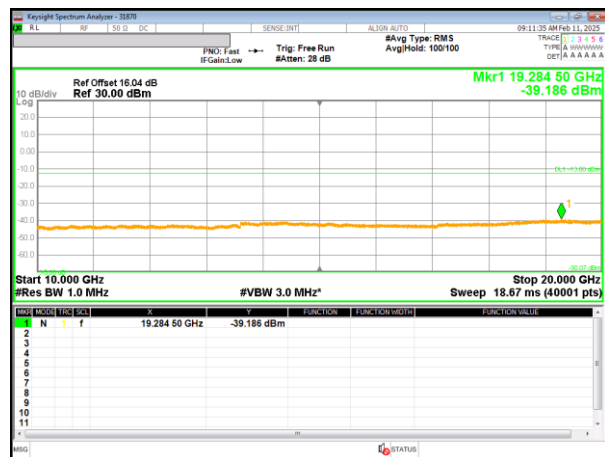


WCDMA Band 2 (ANT A)

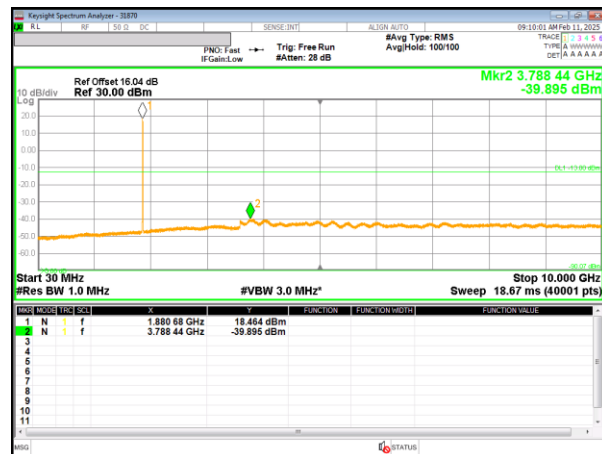
REL99



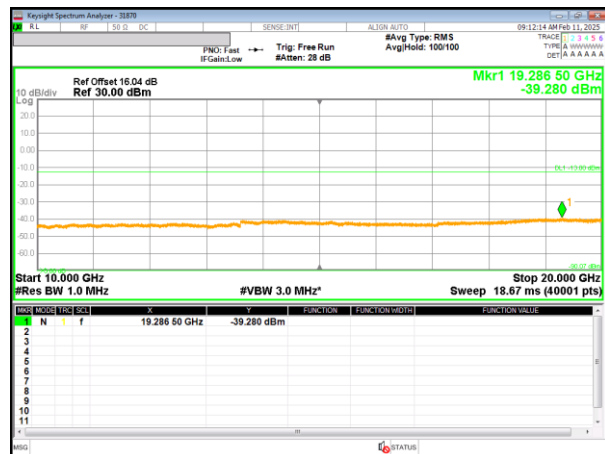
Low channel



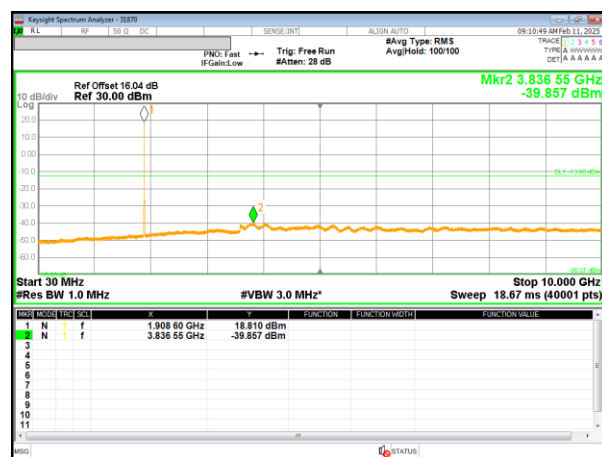
Low channel



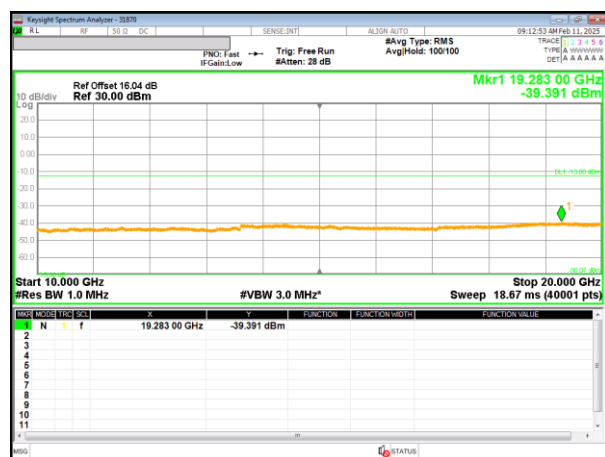
Mid channel



Mid channel



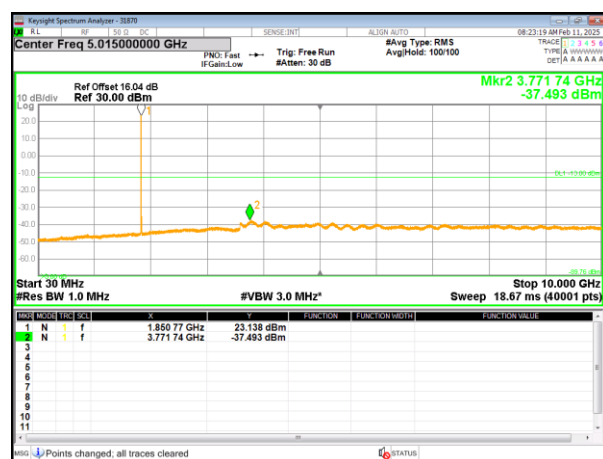
High channel



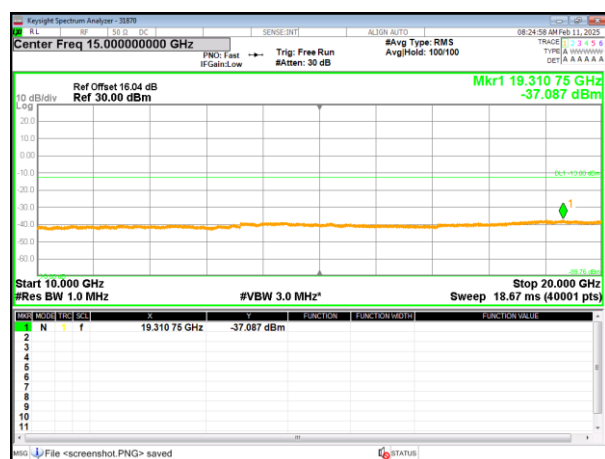
High channel

LTE Band 25 (ANT A)

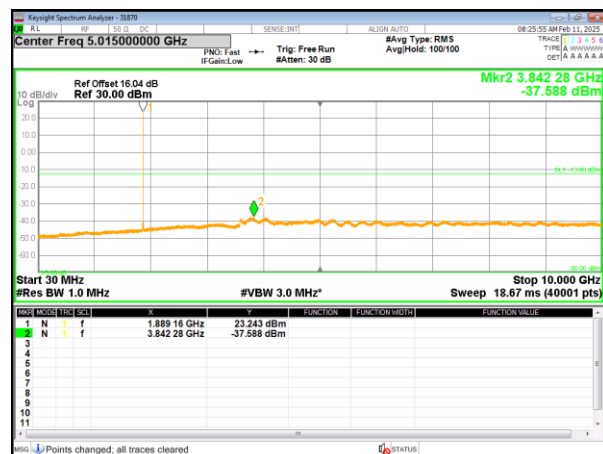
15MHz QPSK



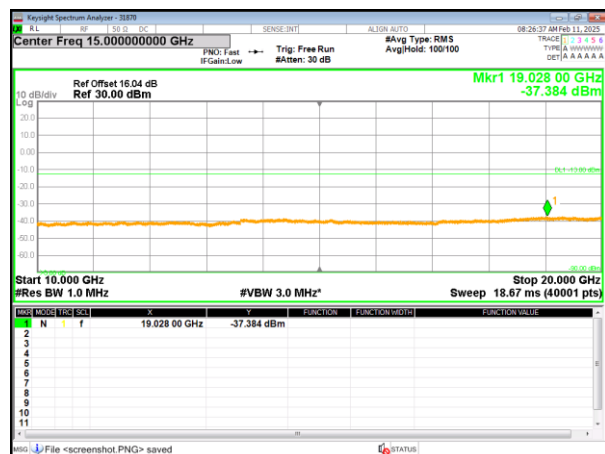
Low channel



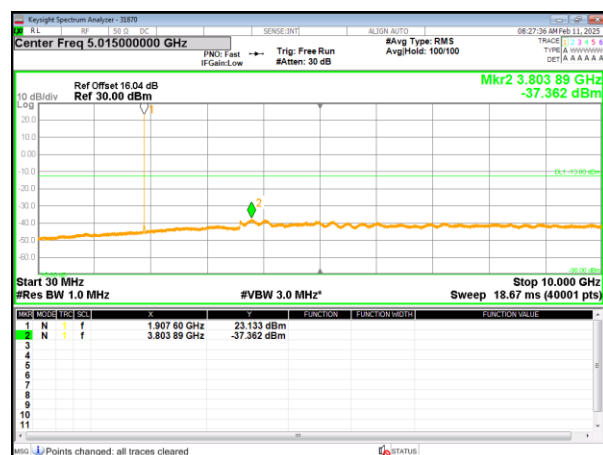
Low channel



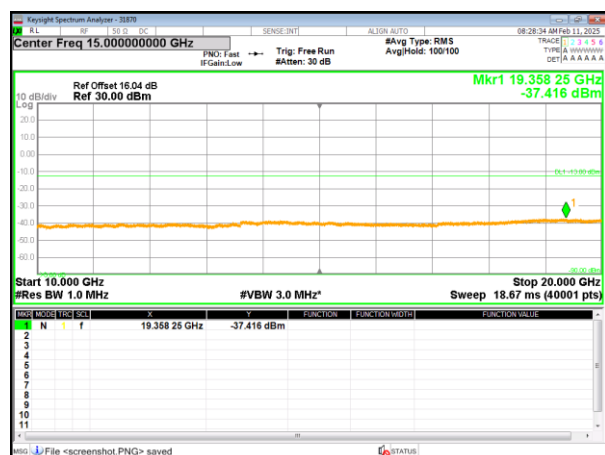
Mid channel



Mid channel



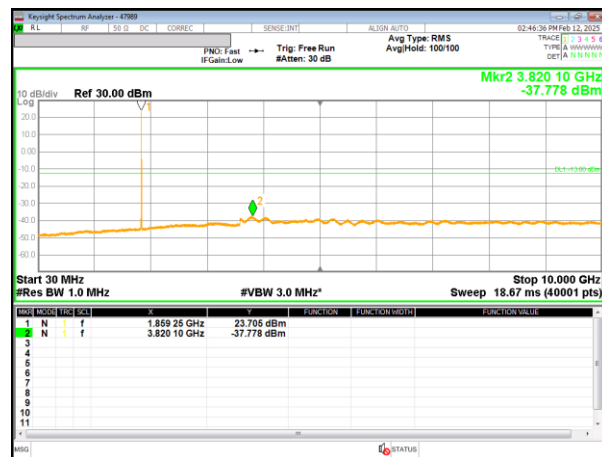
High channel



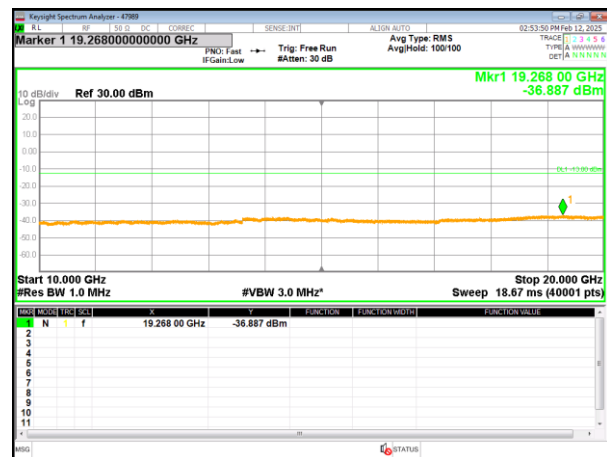
High channel

NR Band n25 DFT-s OFDM (ANT F)

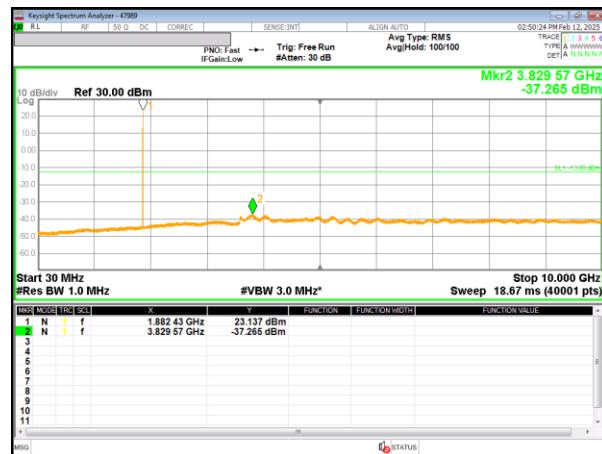
10MHz QPSK



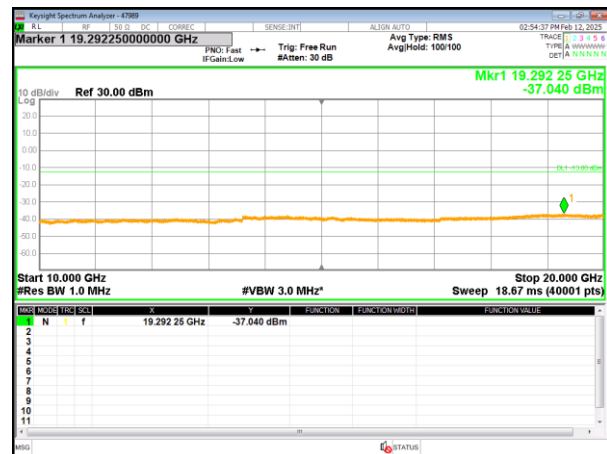
Low channel



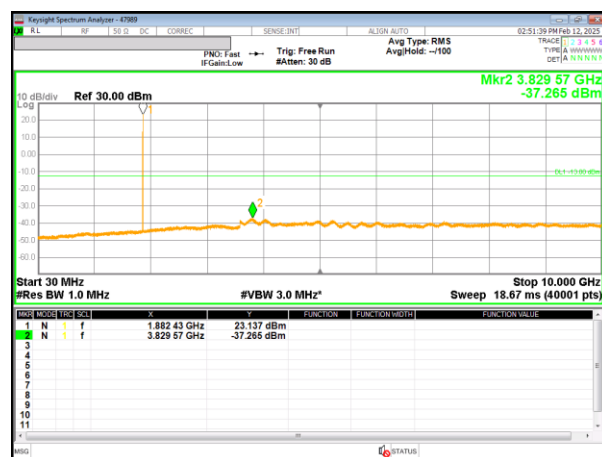
Low channel



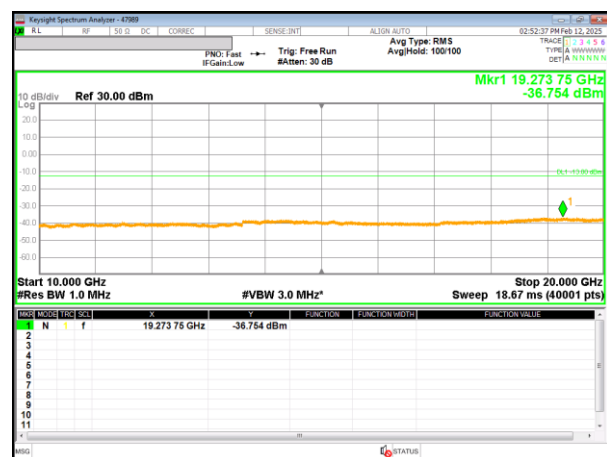
Mid channel



Mid channel



High channel



High channel

8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §24.235

LIMITS

§24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

NOTE

Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to OBW results)

RESULTS

See the following pages.

8.6.1. FREQUENCY STABILITY RESULT

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz (ANT A)
(Lowest Frequency: GPRS / Highest Frequency: GPRS)

Test Date	2025-01-27
Test Engineer	47989

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0794	1909.9220		
Extreme (50C)		1850.0795	1909.9220	38.1	0.020
Extreme (40C)		1850.0795	1909.9220	33.9	0.018
Extreme (30C)		1850.0795	1909.9220	29.4	0.016
Extreme (10C)		1850.0795	1909.9220	25.5	0.014
Extreme (0C)		1850.0795	1909.9220	26.8	0.014
Extreme (-10C)		1850.0795	1909.9220	24.2	0.013
Extreme (-20C)		1850.0795	1909.9220	22.1	0.012
Extreme (-30C)		1850.0795	1909.9220	20.8	0.011
20C	15%	1850.0795	1909.9220	36.8	0.020
	-15%	1850.0795	1909.9220	18.5	0.010
	End Point	1850.0795	1909.9220	12.3	0.007

WCDMA Band 2 (Lowest Frequency: HSDPA / Highest Frequency: REL99) (ANT A)

Test Date	2025-02-03
Test Engineer	47989

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3215	1909.6786		
Extreme (50C)		1850.3215	1909.6786	41.8	0.022
Extreme (40C)		1850.3215	1909.6786	39.5	0.021
Extreme (30C)		1850.3215	1909.6786	33.1	0.018
Extreme (10C)		1850.3215	1909.6786	25.6	0.014
Extreme (0C)		1850.3215	1909.6786	28.4	0.015
Extreme (-10C)		1850.3215	1909.6786	24.3	0.013
Extreme (-20C)		1850.3215	1909.6786	23.4	0.012
Extreme (-30C)		1850.3215	1909.6786	21.5	0.011
20C	15%	1850.3215	1909.6786	29.4	0.016
	-15%	1850.3215	1909.6786	13.6	0.007
	End Point	1850.3215	1909.6786	15.1	0.008

LTE Band 25 (Lowest Frequency: QPSK / Highest Frequency: QPSK) (ANT A)

Test Date	2025-01-13
Test Engineer	47989

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1535	1914.8453		
Extreme (50C)		1850.1535	1914.8453	48.6	0.026
Extreme (40C)		1850.1535	1914.8453	45.2	0.024
Extreme (30C)		1850.1535	1914.8453	41.6	0.022
Extreme (10C)		1850.1535	1914.8453	38.5	0.020
Extreme (0C)		1850.1535	1914.8453	33.7	0.018
Extreme (-10C)		1850.1535	1914.8453	34.2	0.018
Extreme (-20C)		1850.1535	1914.8453	30.6	0.016
Extreme (-30C)		1850.1535	1914.8453	29.5	0.016
20C	15%	1850.1535	1914.8453	40.8	0.022
	-15%	1850.1535	1914.8453	22.3	0.012
	End Point	1850.1535	1914.8453	18.5	0.010

NR Band n25 (Lowest Frequency: QPSK / Highest Frequency: 16QAM) (ANT F)

Test Date	2025-01-20
Test Engineer	47989

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.2491	1914.7433		
Extreme (50C)		1850.2491	1914.7433	52.1	0.028
Extreme (40C)		1850.2491	1914.7433	48.8	0.026
Extreme (30C)		1850.2491	1914.7433	43.6	0.023
Extreme (10C)		1850.2491	1914.7433	39.5	0.021
Extreme (0C)		1850.2491	1914.7433	36.6	0.019
Extreme (-10C)		1850.2491	1914.7433	32.8	0.017
Extreme (-20C)		1850.2491	1914.7433	30.7	0.016
Extreme (-30C)		1850.2491	1914.7433	28.1	0.015
20C	15%	1850.2491	1914.7433	48.5	0.026
	-15%	1850.2491	1914.7433	21.6	0.011
	End Point	1850.2491	1914.7433	23.1	0.012

9. RADIATED RESULTS

9.1. RADIATED POWER (EIRP)

RULE PART(S)

FCC: §2.1046, §24.232

LIMITS

§24.232(c)

Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW $\geq$ OBW;
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span $\geq 2 \times$ OBW;
- d) Sweep time = auto couple or 1 second;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq$ span/RBW;
- g) Trace Mode = max hold(GSM,WCDMA), average(LTE, 5G NR);

TEST RESULTS

See the following pages.

9.1.1. EIRP RESULT

GSM

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
GSM 1900	GPRS	1850.20	24.92	H	4.50	9.48	29.91	979.49	33.00	-3.09
		1880.00	26.48	H	4.53	9.20	31.15	1303.17	33.00	-1.85
		1909.80	27.63	H	4.57	8.86	31.93	1559.55	33.00	-1.07
	EGPRS	1850.20	20.87	H	4.50	9.48	25.86	385.48	33.00	-7.14
		1880.00	22.56	H	4.53	9.20	27.23	528.45	33.00	-5.77
		1909.80	23.82	H	4.57	8.86	28.12	648.63	33.00	-4.88

WCDMA Band 2

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
Band 5	REL99	1852.40	18.83	H	4.50	9.46	23.79	239.33	33.00	-9.21
		1880.00	20.31	H	4.53	9.20	24.98	314.77	33.00	-8.02
		1907.60	21.37	H	4.56	8.89	25.70	371.54	33.00	-7.30
	HSDPA	1852.40	17.91	H	4.50	9.46	22.87	193.64	33.00	-10.13
		1880.00	19.35	H	4.53	9.20	24.02	252.35	33.00	-8.98
		1907.60	20.34	H	4.56	8.89	24.67	293.09	33.00	-8.33

LTE Band 25 (ANT A)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	19.30	H	4.51	9.39	24.18	261.82	33.00	-8.82	1/99
		1882.50	19.49	H	4.53	9.17	24.13	258.82	33.00	-8.87	1/49
		1905.00	20.44	H	4.56	8.93	24.81	302.69	33.00	-8.19	1/99
	16-QAM	1860.00	18.51	H	4.51	9.39	23.39	218.27	33.00	-9.61	1/99
		1882.50	18.62	H	4.53	9.17	23.26	211.84	33.00	-9.74	1/49
		1905.00	19.73	H	4.56	8.93	24.10	257.04	33.00	-8.90	1/99
15	QPSK	1857.50	19.12	H	4.50	9.41	24.03	252.93	33.00	-8.97	1/0
		1882.50	19.51	H	4.53	9.17	24.15	260.02	33.00	-8.85	1/74
		1907.50	20.84	H	4.56	8.89	25.17	328.85	33.00	-7.83	1/37
	16-QAM	1857.50	18.94	H	4.50	9.41	23.85	242.66	33.00	-9.15	1/0
		1882.50	18.77	H	4.53	9.17	23.41	219.28	33.00	-9.59	1/74
		1907.50	19.17	H	4.56	8.89	23.50	223.87	33.00	-9.50	1/37
10	QPSK	1855.00	19.24	H	4.50	9.43	24.17	261.22	33.00	-8.83	1/0
		1882.50	19.63	H	4.53	9.17	24.27	267.30	33.00	-8.73	1/25
		1910.00	20.52	H	4.57	8.85	24.81	302.69	33.00	-8.19	1/0
	16-QAM	1855.00	18.62	H	4.50	9.43	23.55	226.46	33.00	-9.45	1/0
		1882.50	18.73	H	4.53	9.17	23.37	217.27	33.00	-9.63	1/25
		1910.00	19.11	H	4.57	8.85	23.40	218.78	33.00	-9.60	1/0
5	QPSK	1852.50	19.16	H	4.50	9.46	24.12	258.23	33.00	-8.88	1/24
		1882.50	19.59	H	4.53	9.17	24.23	264.85	33.00	-8.77	1/12
		1912.50	20.80	H	4.57	8.82	25.04	319.15	33.00	-7.96	1/12
	16-QAM	1852.50	18.58	H	4.50	9.46	23.54	225.94	33.00	-9.46	1/24
		1882.50	18.77	H	4.53	9.17	23.41	219.28	33.00	-9.59	1/12
		1912.50	19.61	H	4.57	8.82	23.85	242.66	33.00	-9.15	1/12
3	QPSK	1851.50	19.26	H	4.50	9.47	24.23	264.85	33.00	-8.77	1/14
		1882.50	19.28	H	4.53	9.20	23.95	248.31	33.00	-9.05	1/14
		1913.50	20.62	H	4.57	8.88	24.93	311.17	33.00	-8.07	1/8
	16-QAM	1851.50	18.93	H	4.50	9.47	23.90	245.47	33.00	-9.10	1/14
		1882.50	18.62	H	4.53	9.20	23.29	213.30	33.00	-9.71	1/14
		1913.50	19.78	H	4.57	8.88	24.09	256.45	33.00	-8.91	1/8
1.4	QPSK	1850.70	19.22	H	4.50	9.48	24.20	263.03	33.00	-8.80	1/3
		1882.50	19.39	H	4.53	9.20	24.06	254.68	33.00	-8.94	1/3
		1914.30	20.58	H	4.57	8.87	24.87	306.90	33.00	-8.13	1/0
	16-QAM	1850.70	18.61	H	4.50	9.48	23.59	228.56	33.00	-9.41	1/3
		1882.50	18.68	H	4.53	9.20	23.35	216.27	33.00	-9.65	1/3
		1914.30	19.70	H	4.57	8.87	23.99	250.61	33.00	-9.01	1/0

LTE Band 25 (ANT F)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	16.75	H	4.51	9.39	21.64	145.88	33.00	-11.36	1/0
		1882.50	17.22	H	4.53	9.17	21.86	153.46	33.00	-11.14	1/0
		1905.00	17.43	H	4.56	8.93	21.79	151.01	33.00	-11.21	1/0
	16-QAM	1860.00	15.78	H	4.51	9.39	20.67	116.68	33.00	-12.33	1/0
		1882.50	16.05	H	4.53	9.17	20.69	117.22	33.00	-12.31	1/0
		1905.00	16.32	H	4.56	8.93	20.69	117.22	33.00	-12.31	1/0
15	QPSK	1857.50	16.69	H	4.50	9.41	21.60	144.54	33.00	-11.40	1/37
		1882.50	17.46	H	4.53	9.17	22.10	162.18	33.00	-10.90	1/74
		1907.50	17.31	H	4.56	8.89	21.64	145.88	33.00	-11.36	1/0
	16-QAM	1857.50	15.64	H	4.50	9.41	20.55	113.50	33.00	-12.45	1/37
		1882.50	15.87	H	4.53	9.17	20.51	112.46	33.00	-12.49	1/74
		1907.50	16.80	H	4.56	8.89	21.13	129.72	33.00	-11.87	1/0
10	QPSK	1855.00	16.70	H	4.50	9.43	21.63	145.55	33.00	-11.37	1/0
		1882.50	17.29	H	4.53	9.17	21.93	155.96	33.00	-11.07	1/25
		1910.00	17.56	H	4.57	8.85	21.85	153.11	33.00	-11.15	1/0
	16-QAM	1855.00	15.73	H	4.50	9.43	20.66	116.41	33.00	-12.34	1/0
		1882.50	16.03	H	4.53	9.17	20.67	116.68	33.00	-12.33	1/25
		1910.00	16.55	H	4.57	8.85	20.84	121.34	33.00	-12.16	1/0
5	QPSK	1852.50	16.77	H	4.50	9.46	21.73	148.94	33.00	-11.27	1/12
		1882.50	17.32	H	4.53	9.17	21.96	157.04	33.00	-11.04	1/12
		1912.50	17.79	H	4.57	8.82	22.03	159.59	33.00	-10.97	1/12
	16-QAM	1852.50	15.77	H	4.50	9.46	20.73	118.30	33.00	-12.27	1/12
		1882.50	15.69	H	4.53	9.17	20.33	107.89	33.00	-12.67	1/12
		1912.50	16.58	H	4.57	8.82	20.82	120.78	33.00	-12.18	1/12
3	QPSK	1851.50	16.66	H	4.50	9.47	21.63	145.55	33.00	-11.37	1/14
		1882.50	17.15	H	4.53	9.20	21.82	152.05	33.00	-11.18	1/8
		1913.50	17.65	H	4.57	8.88	21.96	157.04	33.00	-11.04	1/8
	16-QAM	1851.50	15.68	H	4.50	9.47	20.65	116.14	33.00	-12.35	1/14
		1882.50	15.95	H	4.53	9.20	20.62	115.35	33.00	-12.38	1/8
		1913.50	16.74	H	4.57	8.88	21.05	127.35	33.00	-11.95	1/8
1.4	QPSK	1850.70	16.64	H	4.50	9.48	21.62	145.21	33.00	-11.38	1/3
		1882.50	17.14	H	4.53	9.20	21.81	151.71	33.00	-11.19	1/0
		1914.30	17.75	H	4.57	8.87	22.04	159.96	33.00	-10.96	1/5
	16-QAM	1850.70	15.81	H	4.50	9.48	20.79	119.95	33.00	-12.21	1/3
		1882.50	15.82	H	4.53	9.20	20.49	111.94	33.00	-12.51	1/0
		1914.30	16.45	H	4.57	8.87	20.74	118.58	33.00	-12.26	1/5

NR Band n25 DFT-s OFDM (ANT A)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
20	π/2 BPSK	1860.00	19.67	H	4.51	9.39	24.55	285.10	33.00	-8.45	1/1
		1882.50	19.80	H	4.53	9.17	24.44	277.97	33.00	-8.56	1/104
		1905.00	20.93	H	4.56	8.93	25.30	338.84	33.00	-7.70	1/1
	16-QAM	1860.00	18.73	H	4.51	9.39	23.61	229.61	33.00	-9.39	1/1
		1882.50	18.98	H	4.53	9.17	23.62	230.14	33.00	-9.38	1/104
		1905.00	19.95	H	4.56	8.93	24.32	270.40	33.00	-8.68	1/1
15	π/2 BPSK	1857.50	19.57	H	4.50	9.41	24.48	280.54	33.00	-8.52	1/1
		1882.50	19.75	H	4.53	9.17	24.39	274.79	33.00	-8.61	1/1
		1907.50	21.15	H	4.56	8.89	25.48	353.18	33.00	-7.52	1/1
	16-QAM	1857.50	18.22	H	4.50	9.41	23.13	205.59	33.00	-9.87	1/1
		1882.50	18.53	H	4.53	9.17	23.17	207.49	33.00	-9.83	1/1
		1907.50	19.58	H	4.56	8.89	23.91	246.04	33.00	-9.09	1/1
10	π/2 BPSK	1855.00	19.52	H	4.50	9.43	24.45	278.61	33.00	-8.55	1/1
		1882.50	19.82	H	4.53	9.17	24.46	279.25	33.00	-8.54	1/25
		1910.00	21.50	H	4.57	8.85	25.79	379.31	33.00	-7.21	1/50
	16-QAM	1855.00	18.05	H	4.50	9.43	22.98	198.61	33.00	-10.02	1/1
		1882.50	18.54	H	4.53	9.17	23.18	207.97	33.00	-9.82	1/25
		1910.00	19.69	H	4.57	8.85	23.98	250.03	33.00	-9.02	1/50
5	π/2 BPSK	1852.50	19.56	H	4.50	9.46	24.52	283.14	33.00	-8.48	1/12
		1880.00	19.83	H	4.53	9.17	24.48	280.54	33.00	-8.52	1/1
		1907.50	21.37	H	4.56	8.82	25.62	364.75	33.00	-7.38	1/12
	16-QAM	1852.50	18.27	H	4.50	9.46	23.23	210.38	33.00	-9.77	1/12
		1880.00	18.49	H	4.53	9.17	23.14	206.06	33.00	-9.86	1/1
		1907.50	19.92	H	4.56	8.82	24.17	261.22	33.00	-8.83	1/12

NR Band n25 DFT-s OFDM (ANT F)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	16.53	H	4.51	9.39	21.41	138.36	33.00	-11.59	1/1
		1882.50	17.14	H	4.53	9.17	21.78	150.66	33.00	-11.22	1/108
		1905.00	16.72	H	4.56	8.93	21.09	128.53	33.00	-11.91	1/1
	16-QAM	1860.00	15.35	H	4.51	9.39	20.23	105.44	33.00	-12.77	1/108
		1882.50	16.15	H	4.53	9.17	20.79	119.95	33.00	-12.21	1/108
		1905.00	15.68	H	4.56	8.93	20.05	101.16	33.00	-12.95	1/1
15	QPSK	1857.50	16.43	H	4.50	9.41	21.34	136.14	33.00	-11.66	1/1
		1882.50	17.09	H	4.53	9.17	21.73	148.94	33.00	-11.27	1/1
		1907.50	16.95	H	4.56	8.89	21.28	134.28	33.00	-11.72	1/77
	16-QAM	1857.50	14.84	H	4.50	9.41	19.75	94.41	33.00	-13.25	1/1
		1882.50	15.70	H	4.53	9.17	20.34	108.14	33.00	-12.66	1/1
		1907.50	15.31	H	4.56	8.89	19.64	92.04	33.00	-13.36	1/77
10	QPSK	1855.00	16.38	H	4.50	9.43	21.31	135.21	33.00	-11.69	1/50
		1882.50	17.16	H	4.53	9.17	21.80	151.36	33.00	-11.20	1/25
		1910.00	17.30	H	4.57	8.85	21.59	144.21	33.00	-11.41	1/25
	16-QAM	1855.00	14.67	H	4.50	9.43	19.60	91.20	33.00	-13.40	1/50
		1882.50	15.71	H	4.53	9.17	20.35	108.39	33.00	-12.65	1/25
		1910.00	15.42	H	4.57	8.85	19.71	93.54	33.00	-13.29	1/25
5	QPSK	1852.50	16.42	H	4.50	9.46	21.38	137.40	33.00	-11.62	1/23
		1880.00	17.17	H	4.53	9.17	21.82	152.05	33.00	-11.18	1/12
		1907.50	17.17	H	4.56	8.82	21.42	138.68	33.00	-11.58	1/12
	16-QAM	1852.50	14.89	H	4.50	9.46	19.85	96.61	33.00	-13.15	1/23
		1880.00	15.66	H	4.53	9.17	20.31	107.40	33.00	-12.69	1/12
		1907.50	15.65	H	4.56	8.82	19.90	97.72	33.00	-13.10	1/12

9.2. RADIATED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1053, §24.238

LIMIT

24.238(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 1 MHz for emissions above 1 GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq$ span/RBW;
- g) Trace Mode = average(WCDMA, LTE, 5G NR), Maxhold(GSM);

NOTE1

GSM : It was tested at GPRS as worst case (the highest output power and density).

UMTS: It was tested at REL 99 as worst case (the highest output power and density).

LTE: It was tested at 1RB QPSK as worst case (the highest output power and density).

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) 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.

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

RESULTS

See the following pages.

9.2.1. SPURIOUS RADIATION RESULT

GSM1900

GPRS

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 4791615638

Date: 2025-01-15

Test Engineer: 26087

Configuration: EUT / AC Adapter, Z-Position

Location: Chamber 2

Mode: GPRS 1900 MHz Harmonics

Test Voltage: AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-8.6	V	3.0	43.1	1.0	-50.6	-13.0	-37.6	
5550.60	-4.7	V	3.0	43.4	1.0	-47.1	-13.0	-34.1	
7400.80	-3.4	V	3.0	43.0	1.0	-45.4	-13.0	-32.4	
3700.40	-8.3	H	3.0	43.1	1.0	-50.4	-13.0	-37.4	
5550.60	-5.4	H	3.0	43.4	1.0	-47.8	-13.0	-34.8	
7400.80	-2.6	H	3.0	43.0	1.0	-44.6	-13.0	-31.6	
Mid Ch, 1880MHz									
3760.00	-8.4	V	3.0	43.1	1.0	-50.5	-13.0	-37.5	
5640.00	-4.8	V	3.0	43.4	1.0	-47.3	-13.0	-34.3	
7520.00	-3.2	V	3.0	42.9	1.0	-45.2	-13.0	-32.2	
3760.00	-8.0	H	3.0	43.1	1.0	-50.1	-13.0	-37.1	
5640.00	-4.5	H	3.0	43.4	1.0	-46.9	-13.0	-33.9	
7520.00	-3.3	H	3.0	42.9	1.0	-45.2	-13.0	-32.2	
High Ch, 1909.8MHz									
3819.60	-8.2	V	3.0	43.1	1.0	-50.3	-13.0	-37.3	
5729.40	-5.1	V	3.0	43.4	1.0	-47.6	-13.0	-34.6	
7639.20	-3.3	V	3.0	42.9	1.0	-45.2	-13.0	-32.2	
3819.60	-7.8	H	3.0	43.1	1.0	-49.9	-13.0	-36.9	
5729.40	-5.1	H	3.0	43.4	1.0	-47.5	-13.0	-34.5	
7639.20	-3.1	H	3.0	42.9	1.0	-45.0	-13.0	-32.0	

WCDMA Band 2

REL99

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Voltage:

Samsung

4791615638

2025-02-10

26087

EUT / AC Adapter, Z-Position

Chamber 1

Rel99 Band 2 Harmonics

AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-9.0	V	3.0	44.2	1.0	-52.3	-13.0	-39.3	
5557.20	-6.8	V	3.0	44.6	1.0	-50.4	-13.0	-37.4	
7409.60	-4.1	V	3.0	44.8	1.0	-47.9	-13.0	-34.9	
3704.80	-8.9	H	3.0	44.2	1.0	-52.2	-13.0	-39.2	
5557.20	-6.6	H	3.0	44.6	1.0	-50.3	-13.0	-37.3	
7409.60	-4.0	H	3.0	44.8	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1880MHz									
3760.00	-8.7	V	3.0	44.3	1.0	-52.0	-13.0	-39.0	
5640.00	-6.9	V	3.0	44.7	1.0	-50.5	-13.0	-37.5	
7520.00	-4.1	V	3.0	44.7	1.0	-47.8	-13.0	-34.8	
3760.00	-8.6	H	3.0	44.3	1.0	-51.9	-13.0	-38.9	
5640.00	-7.0	H	3.0	44.7	1.0	-50.6	-13.0	-37.6	
7520.00	-4.1	H	3.0	44.7	1.0	-47.8	-13.0	-34.8	
High Ch, 1907.6MHz									
3815.20	-8.7	V	3.0	44.4	1.0	-52.1	-13.0	-39.1	
5722.80	-6.7	V	3.0	44.7	1.0	-50.3	-13.0	-37.3	
7630.40	-3.9	V	3.0	44.6	1.0	-47.6	-13.0	-34.6	
3815.20	-8.6	H	3.0	44.4	1.0	-52.0	-13.0	-39.0	
5722.80	-6.7	H	3.0	44.7	1.0	-50.3	-13.0	-37.3	
7630.40	-4.0	H	3.0	44.6	1.0	-47.6	-13.0	-34.6	

15 MHz QPSK ANT A	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4791615638									
	Date: 2025-02-06									
	Test Engineer: 28775									
	Configuration: EUT / AC Adapter, Z-Position									
	Location: Chamber 1									
	Mode: LTE_QPSK Band 25 Harmonics, 15MHz Bandwidth									
	Test Votage: AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1857.5MHz									
	3715.00	-8.7	V	3.0	44.3	1.0	-52.0	-13.0	-39.0	
	5572.50	-6.2	V	3.0	44.6	1.0	-49.8	-13.0	-36.8	
	7430.00	-3.8	V	3.0	44.8	1.0	-47.6	-13.0	-34.6	
	3715.00	-8.6	H	3.0	44.3	1.0	-51.8	-13.0	-38.8	
	5572.50	-6.4	H	3.0	44.6	1.0	-50.0	-13.0	-37.0	
	7430.00	-3.7	H	3.0	44.8	1.0	-47.5	-13.0	-34.5	
	Mid Ch, 1882.5MHz									
	3765.00	-8.9	V	3.0	44.3	1.0	-52.2	-13.0	-39.2	
	5647.50	-5.4	V	3.0	44.7	1.0	-49.0	-13.0	-36.0	
	7530.00	-3.5	V	3.0	44.7	1.0	-47.3	-13.0	-34.3	
	3765.00	-8.7	H	3.0	44.3	1.0	-52.1	-13.0	-39.1	
	5647.50	-5.2	H	3.0	44.7	1.0	-48.9	-13.0	-35.9	
	7530.00	-3.4	H	3.0	44.7	1.0	-47.1	-13.0	-34.1	
	High Ch, 1907.5MHz									
	3815.00	-8.7	V	3.0	44.4	1.0	-52.1	-13.0	-39.1	
	5722.50	-6.2	V	3.0	44.7	1.0	-49.9	-13.0	-36.9	
	7630.00	-3.5	V	3.0	44.7	1.0	-47.2	-13.0	-34.2	
3815.00	-8.5	H	3.0	44.4	1.0	-51.9	-13.0	-38.9		
5722.50	-6.2	H	3.0	44.7	1.0	-49.9	-13.0	-36.9		
7630.00	-3.5	H	3.0	44.7	1.0	-47.1	-13.0	-34.1		
15 MHz QPSK ANT F	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4791615638									
	Date: 2025-02-05									
	Test Engineer: 26087									
	Configuration: EUT / Z-Position									
	Location: Chamber 1									
	Mode: LTE_QPSK Band 25 Harmonics, 15MHz Bandwidth									
	Test Votage: AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1857.5MHz									
	3715.00	-8.8	V	3.0	44.3	1.0	-52.1	-13.0	-39.1	
	5572.50	-6.8	V	3.0	44.6	1.0	-50.4	-13.0	-37.4	
	7430.00	-2.9	V	3.0	44.8	1.0	-46.7	-13.0	-33.7	
	3715.00	-8.8	H	3.0	44.3	1.0	-52.0	-13.0	-39.0	
	5572.50	-6.8	H	3.0	44.6	1.0	-50.4	-13.0	-37.4	
	7430.00	-3.5	H	3.0	44.8	1.0	-47.3	-13.0	-34.3	
	Mid Ch, 1882.5MHz									
	3765.00	-8.7	V	3.0	44.3	1.0	-52.0	-13.0	-39.0	
	5647.50	-6.4	V	3.0	44.7	1.0	-50.0	-13.0	-37.0	
	7530.00	-3.0	V	3.0	44.7	1.0	-46.7	-13.0	-33.7	
	3765.00	-8.6	H	3.0	44.3	1.0	-51.9	-13.0	-38.9	
	5647.50	-6.3	H	3.0	44.7	1.0	-50.0	-13.0	-37.0	
	7530.00	-3.4	H	3.0	44.7	1.0	-47.1	-13.0	-34.1	
	High Ch, 1907.5MHz									
	3815.00	-8.6	V	3.0	44.4	1.0	-52.0	-13.0	-39.0	
	5722.50	-6.6	V	3.0	44.7	1.0	-50.3	-13.0	-37.3	
	7630.00	-3.1	V	3.0	44.7	1.0	-46.7	-13.0	-33.7	
3815.00	-8.5	H	3.0	44.4	1.0	-51.9	-13.0	-38.9		
5722.50	-6.6	H	3.0	44.7	1.0	-50.2	-13.0	-37.2		
7630.00	-3.2	H	3.0	44.7	1.0	-46.9	-13.0	-33.9		

NR Band n25 DFT-s OFDM

10 MHz QPSK ANT A	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
	Company: Ssmsung Project #: 4791615638 Date: 2025-01-17 Test Engineer: 26087 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 2 Mode: 5G NR_QPSK NR n25 Harmonics, 10MHz Bandwidth Test Votage: AC 120 V, 60 Hz										
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch, 1855MHz										
	3710.00	-9.7	V	3.0	43.1	1.0	-51.8	-13.0	-38.8		
	5565.00	-6.7	V	3.0	43.4	1.0	-49.1	-13.0	-36.1		
	7420.00	-4.7	V	3.0	43.0	1.0	-46.7	-13.0	-33.7		
	3710.00	-9.5	H	3.0	43.1	1.0	-51.5	-13.0	-38.5		
	5565.00	-6.8	H	3.0	43.4	1.0	-49.2	-13.0	-36.2		
	7420.00	-4.9	H	3.0	43.0	1.0	-46.9	-13.0	-33.9		
	Mid Ch, 1882.5MHz										
	3765.00	-9.6	V	3.0	43.1	1.0	-51.7	-13.0	-38.7		
	5647.50	-6.7	V	3.0	43.4	1.0	-49.1	-13.0	-36.1		
	7530.00	-4.3	V	3.0	42.9	1.0	-46.3	-13.0	-33.3		
	3765.00	-9.3	H	3.0	43.1	1.0	-51.4	-13.0	-38.4		
	5647.50	-6.9	H	3.0	43.4	1.0	-49.3	-13.0	-36.3		
	7530.00	-4.5	H	3.0	42.9	1.0	-46.4	-13.0	-33.4		
	High Ch, 1910MHz										
	3820.00	-9.5	V	3.0	43.1	1.0	-51.6	-13.0	-38.6		
	5730.00	-6.8	V	3.0	43.4	1.0	-49.3	-13.0	-36.3		
	7640.00	-4.4	V	3.0	42.9	1.0	-46.2	-13.0	-33.2		
	3820.00	-9.2	H	3.0	43.1	1.0	-51.3	-13.0	-38.3		
	5730.00	-6.9	H	3.0	43.4	1.0	-49.4	-13.0	-36.4		
	7640.00	-4.5	H	3.0	42.9	1.0	-46.4	-13.0	-33.4		
	5 MHz QPSK ANT F	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		Company: Ssmsung Project #: 4791615638 Date: 2025-01-17 Test Engineer: 26087 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 2 Mode: 5G NR_QPSK NR n25 Harmonics, 5MHz Bandwidth Test Votage: AC 120 V, 60 Hz									
f MHz		SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.5MHz											
3705.00		-9.7	V	3.0	43.1	1.0	-51.7	-13.0	-38.7		
5557.50		-6.7	V	3.0	43.4	1.0	-49.1	-13.0	-36.1		
7410.00		-4.4	V	3.0	43.0	1.0	-46.4	-13.0	-33.4		
3705.00		-9.4	H	3.0	43.1	1.0	-51.5	-13.0	-38.5		
5557.50		-6.8	H	3.0	43.4	1.0	-49.2	-13.0	-36.2		
7410.00		-4.6	H	3.0	43.0	1.0	-46.7	-13.0	-33.7		
Mid Ch, 1882.5MHz											
3765.00		-9.5	V	3.0	43.1	1.0	-51.6	-13.0	-38.6		
5647.50		-6.6	V	3.0	43.4	1.0	-49.0	-13.0	-36.0		
7530.00		-4.3	V	3.0	42.9	1.0	-46.2	-13.0	-33.2		
3765.00		-9.1	H	3.0	43.1	1.0	-51.2	-13.0	-38.2		
5647.50		-6.7	H	3.0	43.4	1.0	-49.2	-13.0	-36.2		
7530.00		-4.6	H	3.0	42.9	1.0	-46.5	-13.0	-33.5		
High Ch, 1912.5MHz											
3825.00		-9.4	V	3.0	43.1	1.0	-51.5	-13.0	-38.5		
5737.50		-6.8	V	3.0	43.5	1.0	-49.2	-13.0	-36.2		
7650.00		-4.2	V	3.0	42.9	1.0	-46.0	-13.0	-33.0		
3825.00		-9.1	H	3.0	43.1	1.0	-51.2	-13.0	-38.2		
5737.50		-6.9	H	3.0	43.5	1.0	-49.4	-13.0	-36.4		
7650.00		-4.4	H	3.0	42.9	1.0	-46.3	-13.0	-33.3		

END OF REPORT