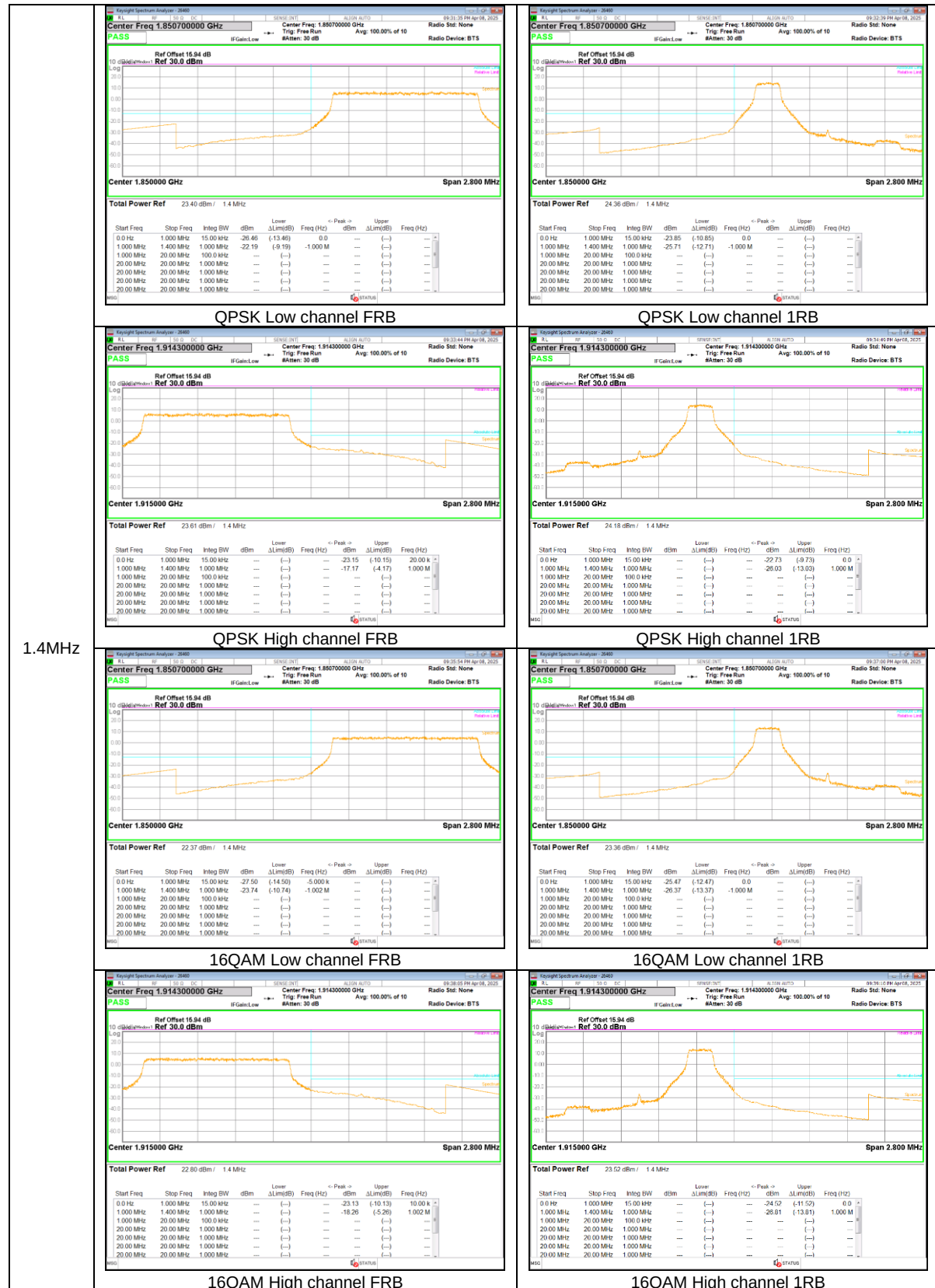
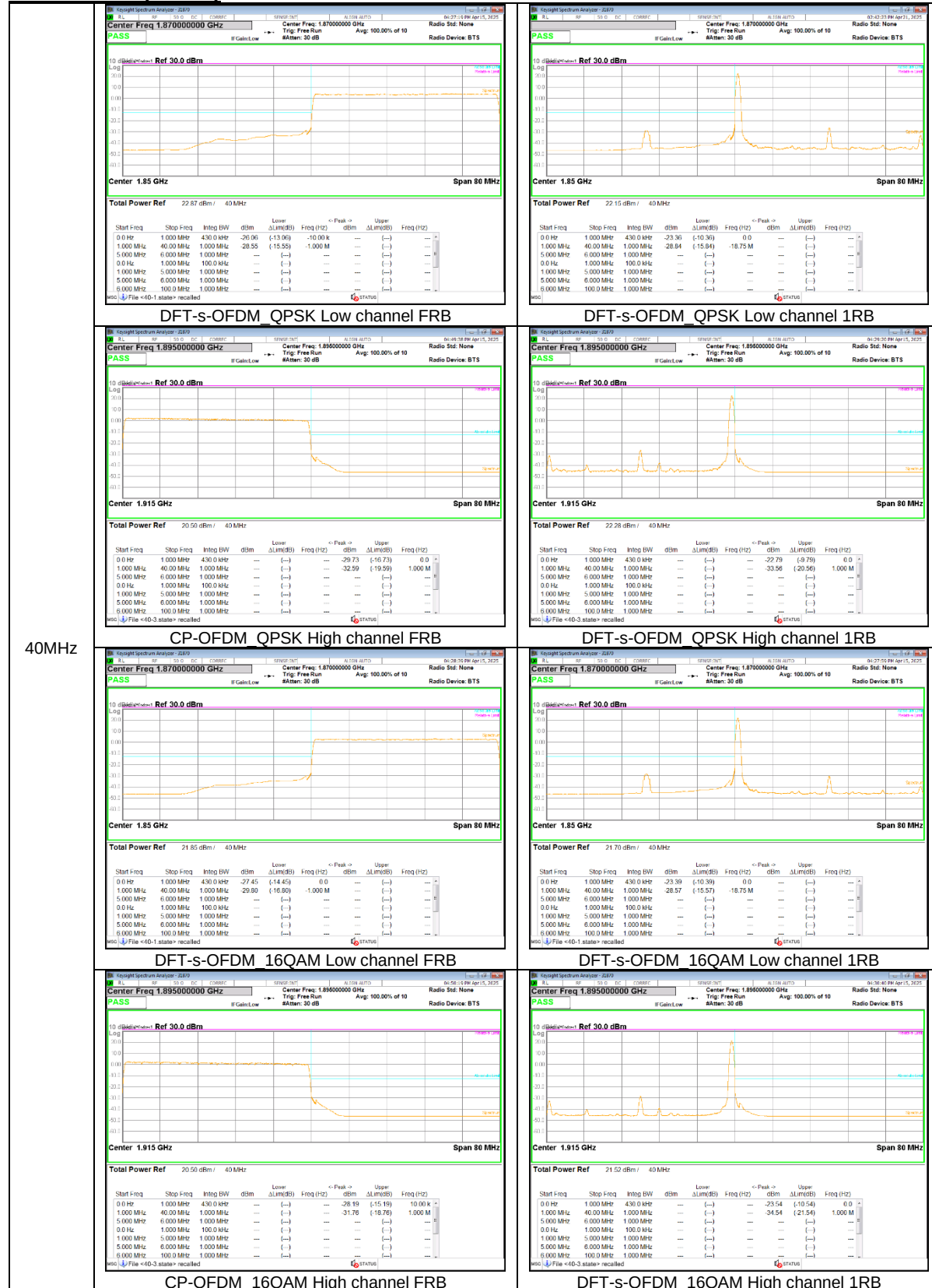
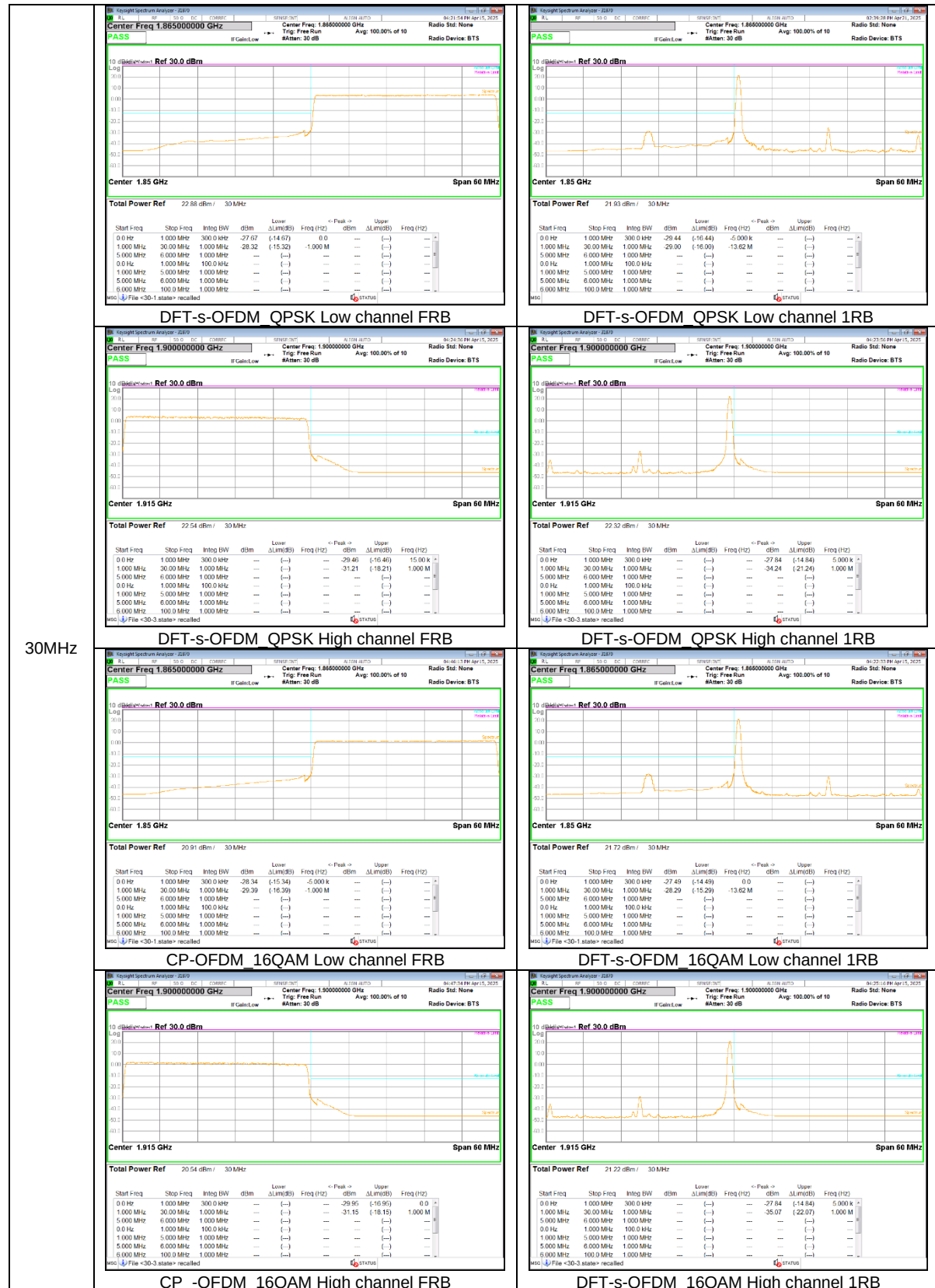
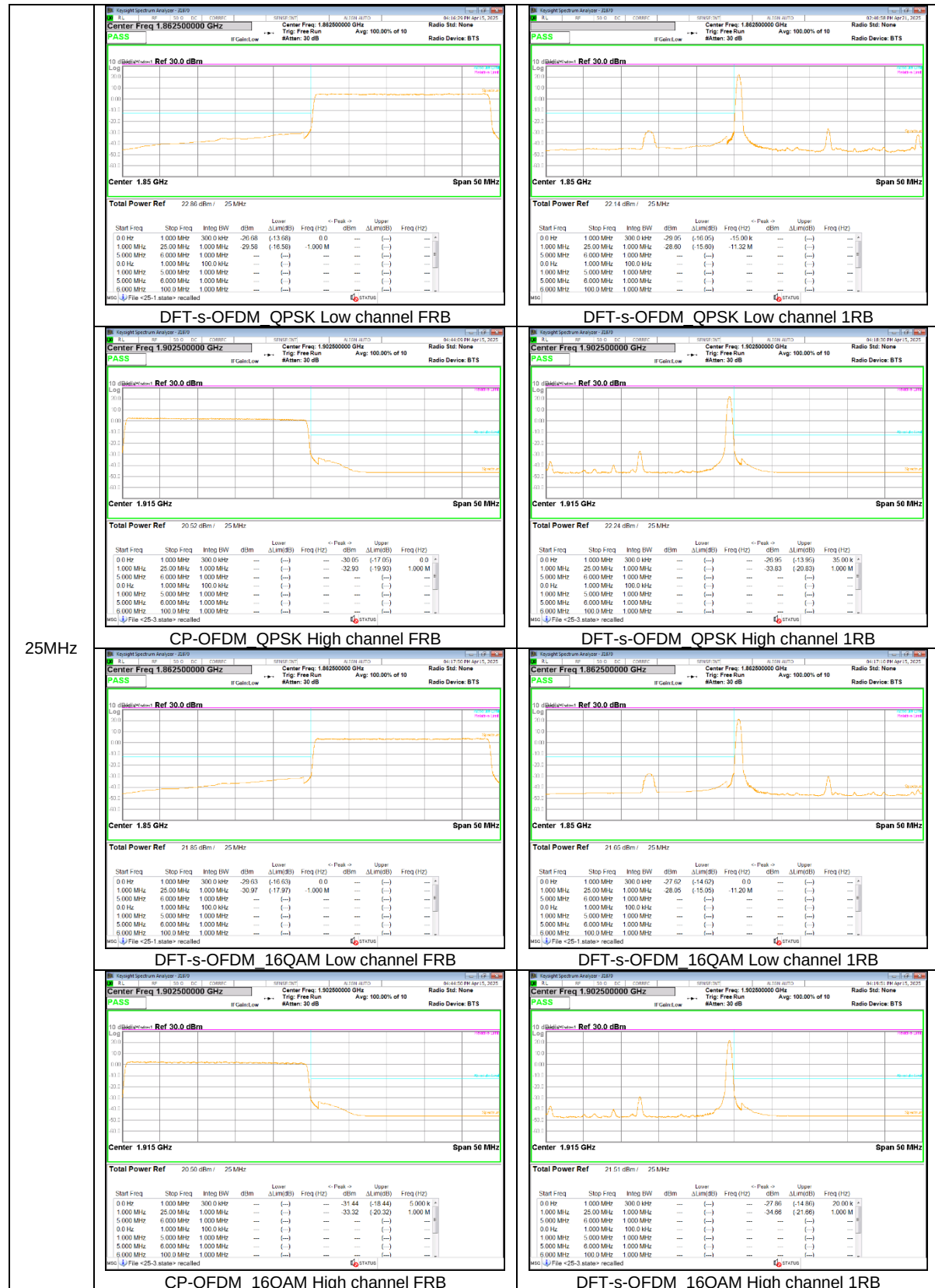


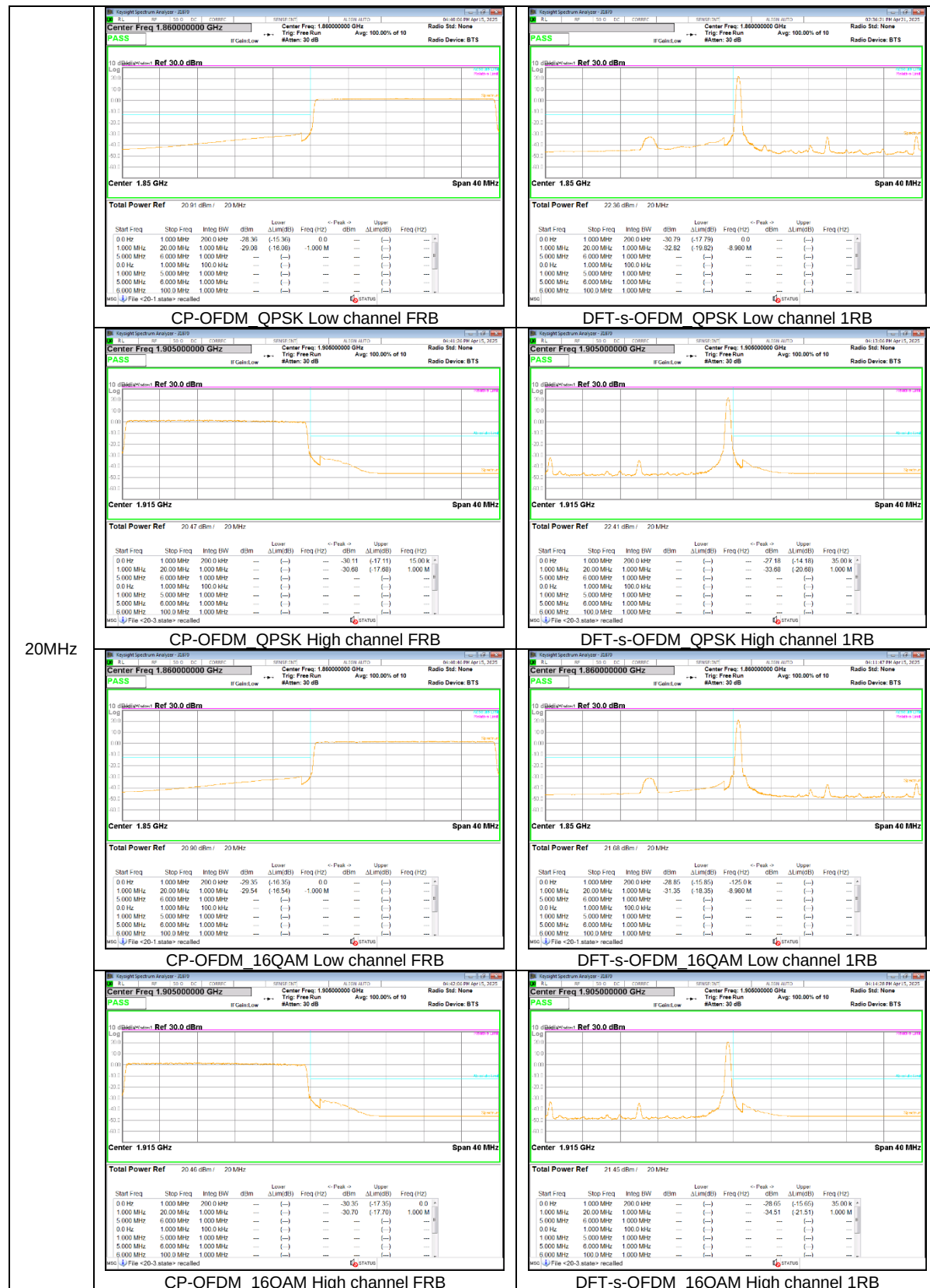


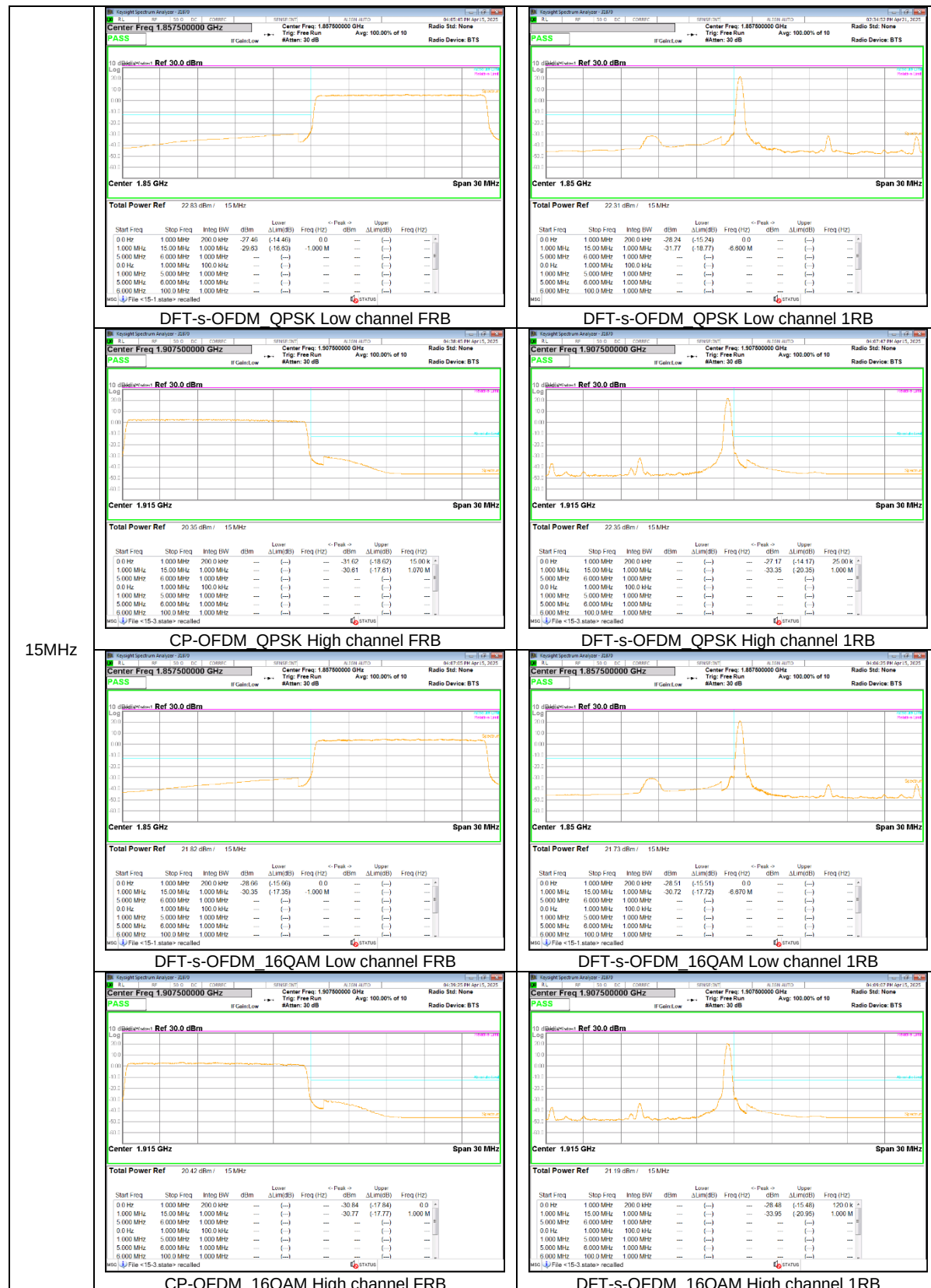
NR Band n25 (ANT B)



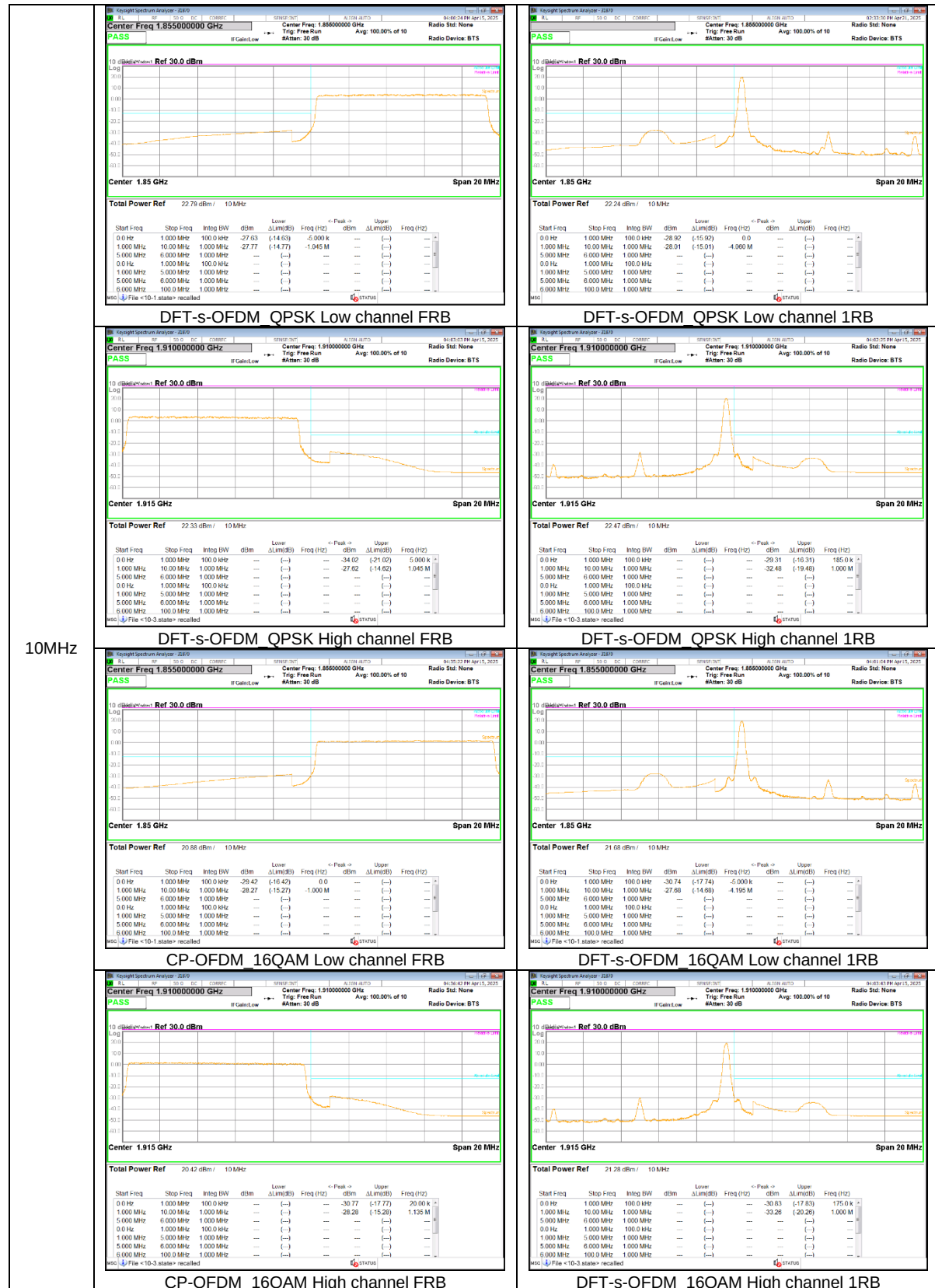








15MHz





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;

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 B)

GPRS



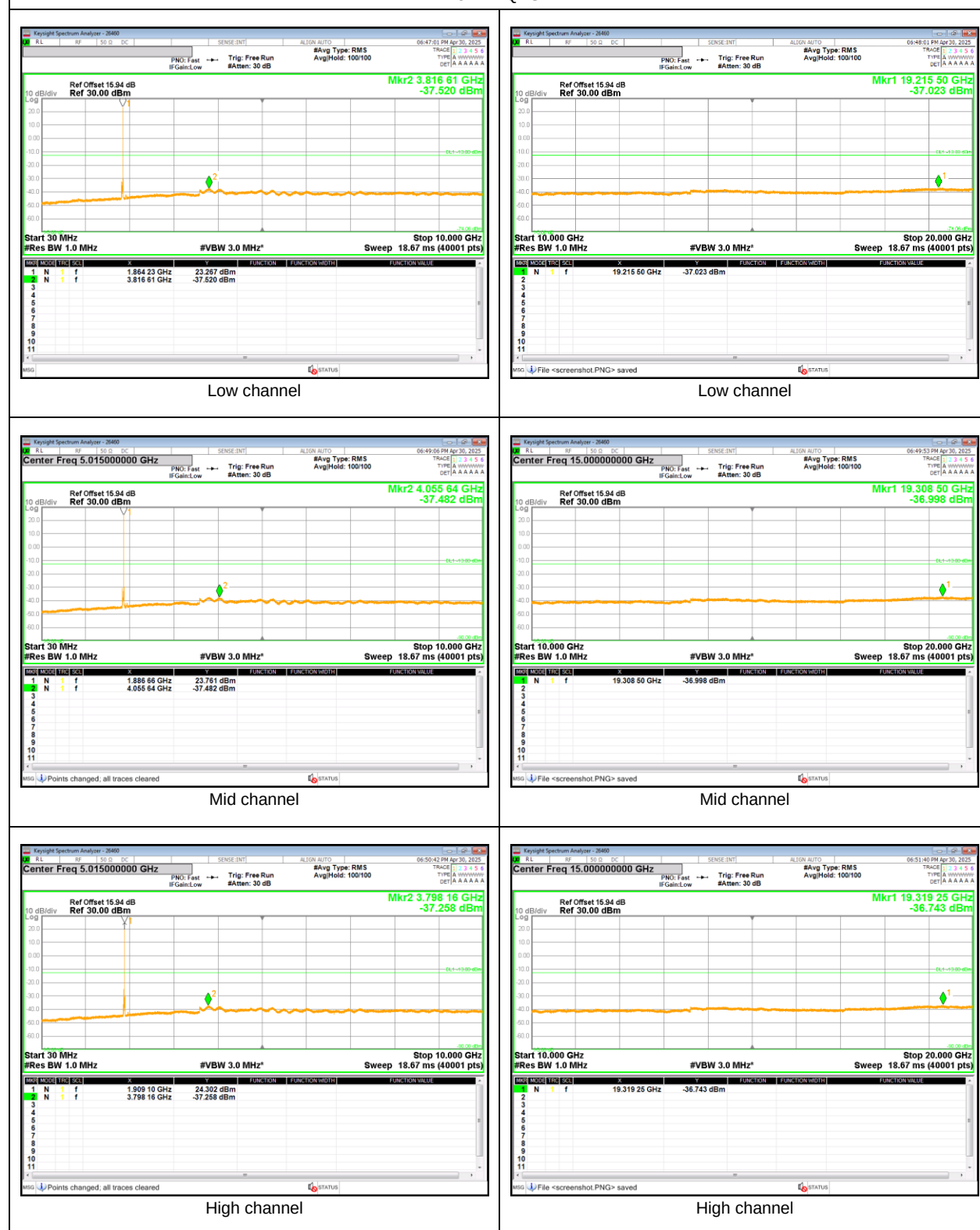
WCDMA Band 2 (ANT B)

REL99



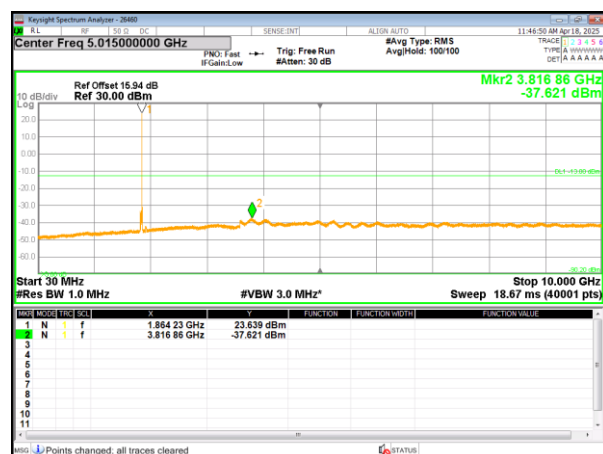
LTE Band 2 (ANT B)

15MHz QPSK

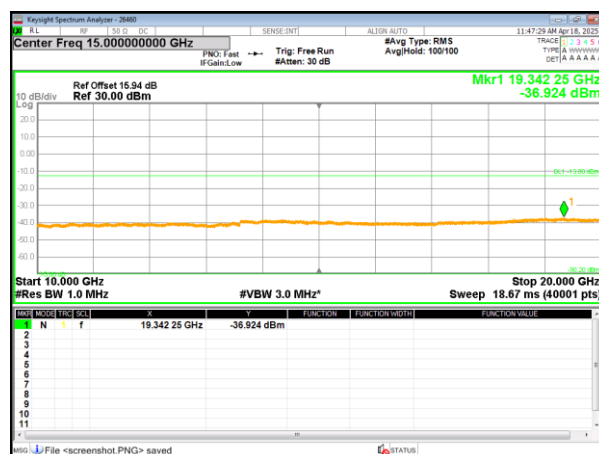


LTE Band 25 (ANT B)

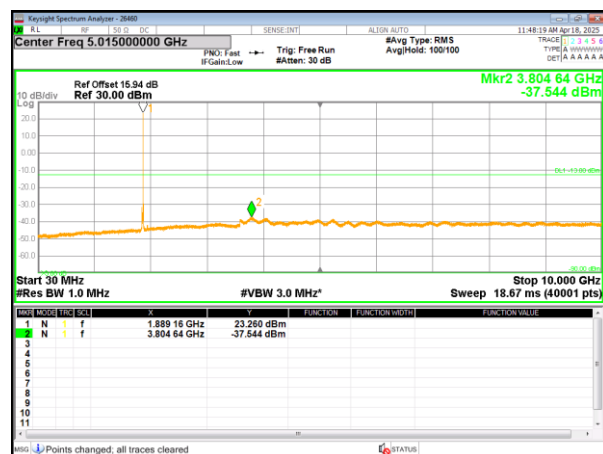
15MHz QPSK



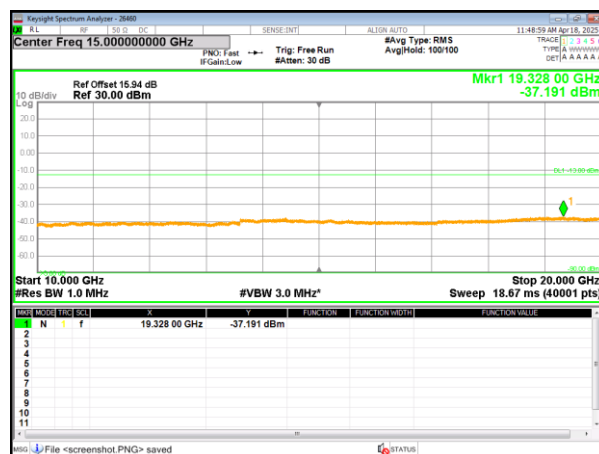
Low channel



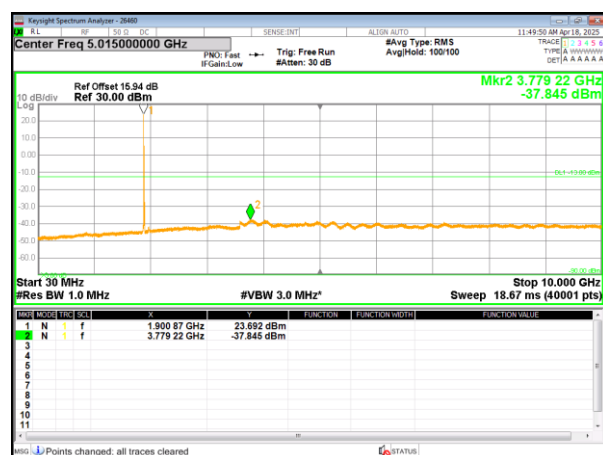
Low channel



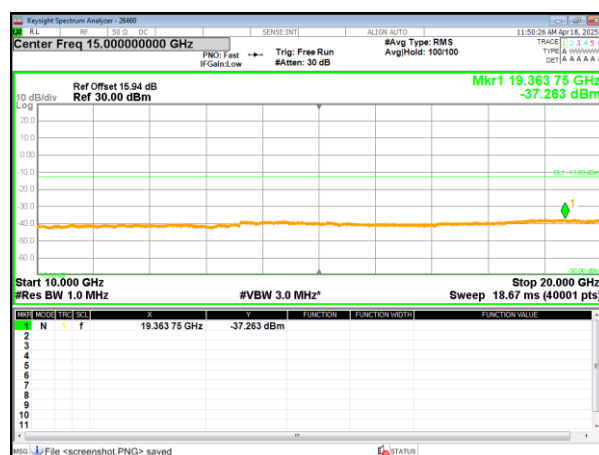
Mid channel



Mid channel



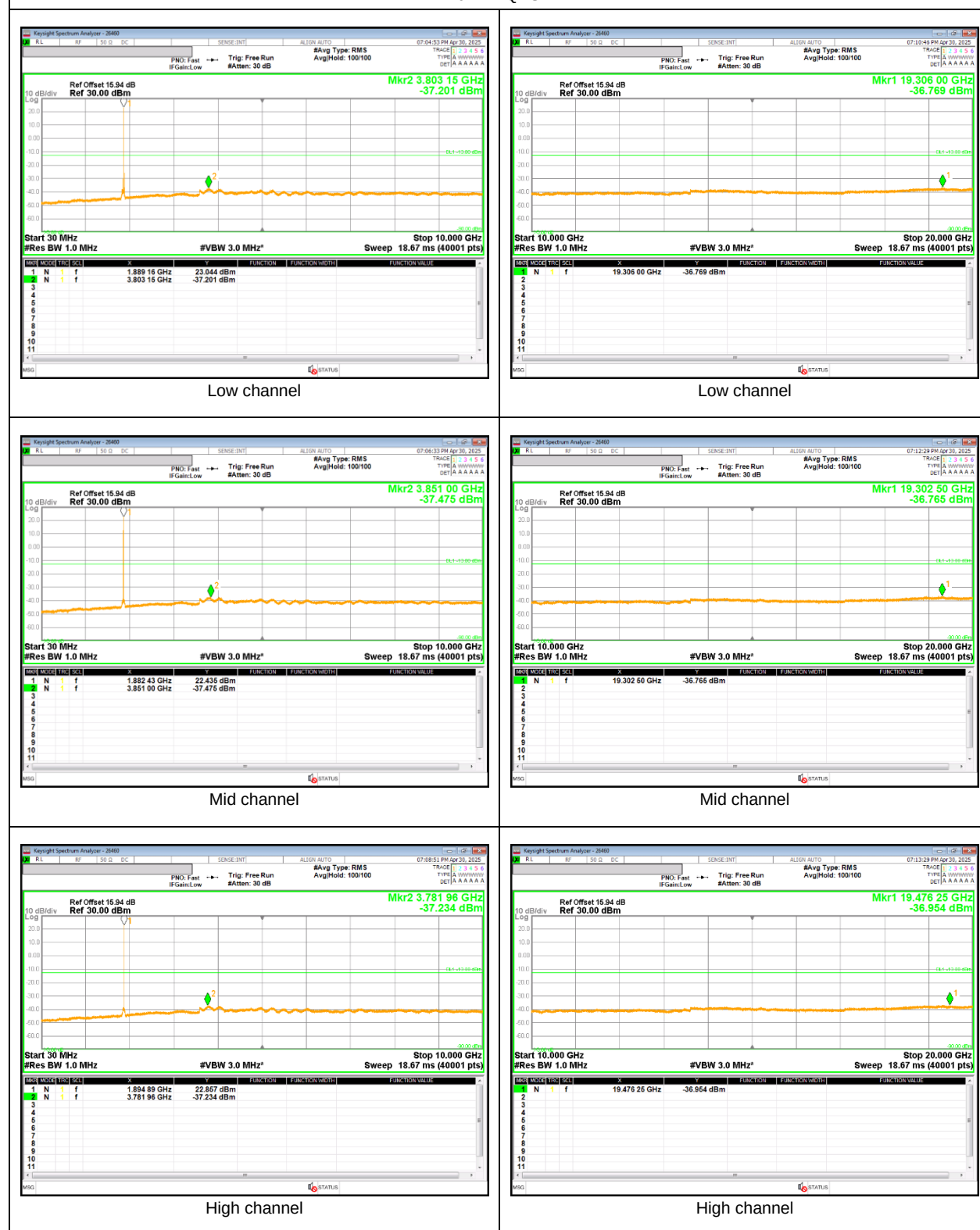
High channel



High channel

NR Band n25 DFT-s OFDM (ANT B)

40MHz QPSK



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
(Lowest Frequency: EGPRS / Highest Frequency: EGPRS)

Test Date	2025-04-14
Test Engineer	31870

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	1850.0745	1909.9263		
Extreme (50C)		1850.0745	1909.9263	13.1	0.007
Extreme (40C)		1850.0745	1909.9263	18.5	0.010
Extreme (30C)		1850.0745	1909.9263	21.3	0.011
Extreme (10C)		1850.0745	1909.9263	26.5	0.014
Extreme (0C)		1850.0745	1909.9264	31.3	0.017
Extreme (-10C)		1850.0745	1909.9263	28.3	0.015
Extreme (-20C)		1850.0745	1909.9264	33.5	0.018
Extreme (-30C)		1850.0745	1909.9263	29.1	0.015
20C	15%	1850.0745	1909.9264	41.3	0.022
	-15%	1850.0745	1909.9263	15.5	0.008
	End Point	1850.0745	1909.9263	12.3	0.007

WCDMA Band 2 (Lowest Frequency: HSUPA / Highest Frequency: Rel99)

Test Date	2025-04-16
Test Engineer	31870

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	1850.3125	1909.6955		
Extreme (50C)		1850.3125	1909.6955	18.3	0.010
Extreme (40C)		1850.3125	1909.6955	17.5	0.009
Extreme (30C)		1850.3125	1909.6955	19.5	0.010
Extreme (10C)		1850.3125	1909.6955	21.3	0.011
Extreme (0C)		1850.3125	1909.6955	23.9	0.013
Extreme (-10C)		1850.3125	1909.6955	25.3	0.013
Extreme (-20C)		1850.3125	1909.6955	31.4	0.017
Extreme (-30C)		1850.3125	1909.6955	29.4	0.016
20C	15%	1850.3125	1909.6955	31.1	0.017
	-15%	1850.3125	1909.6955	15.3	0.008
	End Point	1850.3125	1909.6955	13.7	0.007

LTE Band 25 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)

Test Date	2025-04-22
Test Engineer	31870

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	1914.8425		
Extreme (50C)		1850.1535	1914.8425	15.5	0.008
Extreme (40C)		1850.1535	1914.8425	18.3	0.010
Extreme (30C)		1850.1535	1914.8425	21.1	0.011
Extreme (10C)		1850.1535	1914.8425	23.9	0.013
Extreme (0C)		1850.1535	1914.8425	25.7	0.014
Extreme (-10C)		1850.1535	1914.8425	28.3	0.015
Extreme (-20C)		1850.1535	1914.8425	33.5	0.018
Extreme (-30C)		1850.1535	1914.8425	32.5	0.017
20C	15%	1850.1535	1914.8425	36.1	0.019
	-15%	1850.1535	1914.8425	23.3	0.012
	End Point	1850.1535	1914.8425	19.5	0.010

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

Test Date	2025-04-22
Test Engineer	31870

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	1850.2565	1914.7390		
Extreme (50C)		1850.2565	1914.7390	13.8	0.007
Extreme (40C)		1850.2565	1914.7390	15.4	0.008
Extreme (30C)		1850.2565	1914.7390	17.2	0.009
Extreme (10C)		1850.2565	1914.7390	19.8	0.011
Extreme (0C)		1850.2565	1914.7390	21.5	0.011
Extreme (-10C)		1850.2565	1914.7390	23.6	0.013
Extreme (-20C)		1850.2565	1914.7390	24.8	0.013
Extreme (-30C)		1850.2565	1914.7390	26.1	0.014
20C	15%	1850.2565	1914.7390	31.3	0.017
	-15%	1850.2565	1914.7390	15.1	0.008
	End Point	1850.2565	1914.7390	12.6	0.007

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 $\geq 1\%$ to 5% of the OBW;
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span $\geq 2 \times$ to $3 \times$ the OBW.;
- d) Sweep time = auto couple or Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq 2 \times \text{span/RBW}$;
- g) Trace mode = average;
- h) If the EUT can be configured to transmit continuously, then set the trigger to free run.
- i) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
- j) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.
- k) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

NOTE

LTE, 5G NR : The OBW value corresponding to the total channel bandwidth is the OBW of FullRB. Measurements were made with a 1RB configuration (Worst case) over the entire channel bandwidth, and FRB configurations were also reported for the worst BW.

TEST RESULTS

See the following pages.

9.1.1. EIRP RESULT

GSM (ANT B)

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	25.08	V	4.50	9.48	30.06	1013.91	33.00	-2.94
		1880.00	25.58	V	4.53	9.20	30.25	1059.25	33.00	-2.75
		1909.80	24.85	V	4.57	8.86	29.14	820.35	33.00	-3.86
	EGPRS	1850.20	20.61	V	4.50	9.48	25.59	362.24	33.00	-7.41
		1880.00	20.56	V	4.53	9.20	25.23	333.43	33.00	-7.77
		1909.80	20.51	V	4.57	8.86	24.80	302.00	33.00	-8.20

WCDMA Band 2 (ANT B)

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 2	REL99	1852.40	18.26	V	4.50	9.46	23.22	209.89	33.00	-9.78
		1880.00	18.31	V	4.53	9.20	22.98	198.61	33.00	-10.02
		1907.60	18.95	V	4.56	8.89	23.27	212.32	33.00	-9.73
	HSUPA	1852.40	16.89	V	4.50	9.46	21.85	153.11	33.00	-11.15
		1880.00	16.81	V	4.53	9.20	21.48	140.60	33.00	-11.52
		1907.60	17.24	V	4.56	8.89	21.56	143.22	33.00	-11.44

LTE Band 2 (ANT B)

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	18.73	H	4.51	9.39	23.62	230.14	33.00	-9.38	1/99
		1880.00	19.17	H	4.53	9.20	23.84	242.10	33.00	-9.16	1/0
		1900.00	19.15	H	4.55	9.01	23.60	229.09	33.00	-9.40	1/49
	16-QAM	1860.00	17.22	H	4.51	9.39	22.11	162.55	33.00	-10.89	1/99
		1880.00	18.30	H	4.53	9.20	22.97	198.15	33.00	-10.03	1/0
		1900.00	18.21	H	4.55	9.01	22.66	184.50	33.00	-10.34	1/49
15	QPSK	1857.50	18.95	H	4.50	9.41	23.86	243.22	33.00	-9.14	1/74
		1880.00	19.70	H	4.53	9.20	24.37	273.53	33.00	-8.63	1/74
		1902.50	19.68	H	4.56	8.97	24.09	256.45	33.00	-8.91	1/74
	16-QAM	1857.50	17.49	H	4.50	9.41	22.40	173.78	33.00	-10.60	1/37
		1880.00	18.62	H	4.53	9.20	23.29	213.30	33.00	-9.71	1/74
		1902.50	18.68	H	4.56	8.97	23.09	203.70	33.00	-9.91	1/37
10	QPSK	1855.00	18.79	H	4.50	9.43	23.72	235.50	33.00	-9.28	1/49
		1880.00	19.58	H	4.53	9.20	24.25	266.07	33.00	-8.75	1/25
		1905.00	19.33	H	4.56	8.93	23.70	234.42	33.00	-9.30	1/49
	16-QAM	1855.00	17.41	H	4.50	9.43	22.34	171.40	33.00	-10.66	1/25
		1880.00	18.63	H	4.53	9.20	23.30	213.80	33.00	-9.70	1/25
		1905.00	18.62	H	4.56	8.93	22.99	199.07	33.00	-10.01	1/0
5	QPSK	1852.50	18.67	H	4.50	9.46	23.63	230.67	33.00	-9.37	1/12
		1880.00	19.36	H	4.53	9.20	24.03	252.93	33.00	-8.97	1/24
		1907.50	19.34	H	4.56	8.89	23.67	232.81	33.00	-9.33	1/24
	16-QAM	1852.50	16.52	H	4.50	9.46	21.48	140.60	33.00	-11.52	1/12
		1880.00	18.77	H	4.53	9.20	23.44	220.80	33.00	-9.56	1/24
		1907.50	18.60	H	4.56	8.89	22.93	196.34	33.00	-10.07	1/12
3	QPSK	1851.50	18.44	H	4.50	9.47	23.41	219.28	33.00	-9.59	1/0
		1880.00	18.98	H	4.53	9.20	23.65	231.74	33.00	-9.35	1/14
		1908.50	18.98	H	4.56	8.88	23.29	213.30	33.00	-9.71	1/14
	16-QAM	1851.50	16.62	H	4.50	9.47	21.59	144.21	33.00	-11.41	1/8
		1880.00	18.19	H	4.53	9.20	22.86	193.20	33.00	-10.14	1/8
		1908.50	18.06	H	4.56	8.88	22.37	172.58	33.00	-10.63	1/8
1.4	QPSK	1850.70	18.46	H	4.50	9.48	23.44	220.80	33.00	-9.56	1/3
		1880.00	18.94	H	4.53	9.20	23.61	229.61	33.00	-9.39	1/3
		1909.30	18.86	H	4.57	8.87	23.16	207.01	33.00	-9.84	1/5
	16-QAM	1850.70	16.59	H	4.50	9.48	21.57	143.55	33.00	-11.43	1/5
		1880.00	17.72	H	4.53	9.20	22.39	173.38	33.00	-10.61	1/5
		1909.30	17.51	H	4.57	8.87	21.81	151.71	33.00	-11.19	1/3
15	QPSK	1857.50	18.07	H	4.50	9.41	22.98	198.61	33.00	-10.02	75/0
		1880.00	18.86	H	4.53	9.20	23.53	225.42	33.00	-9.47	75/0
		1902.50	18.67	H	4.56	8.97	23.08	203.24	33.00	-9.92	75/0
5	16-QAM	1852.50	15.55	H	4.50	9.47	20.52	112.72	33.00	-12.48	15/0
		1880.00	17.18	H	4.53	9.20	21.85	153.11	33.00	-11.15	15/0
		1907.50	17.09	H	4.56	8.88	21.40	138.04	33.00	-11.60	15/0