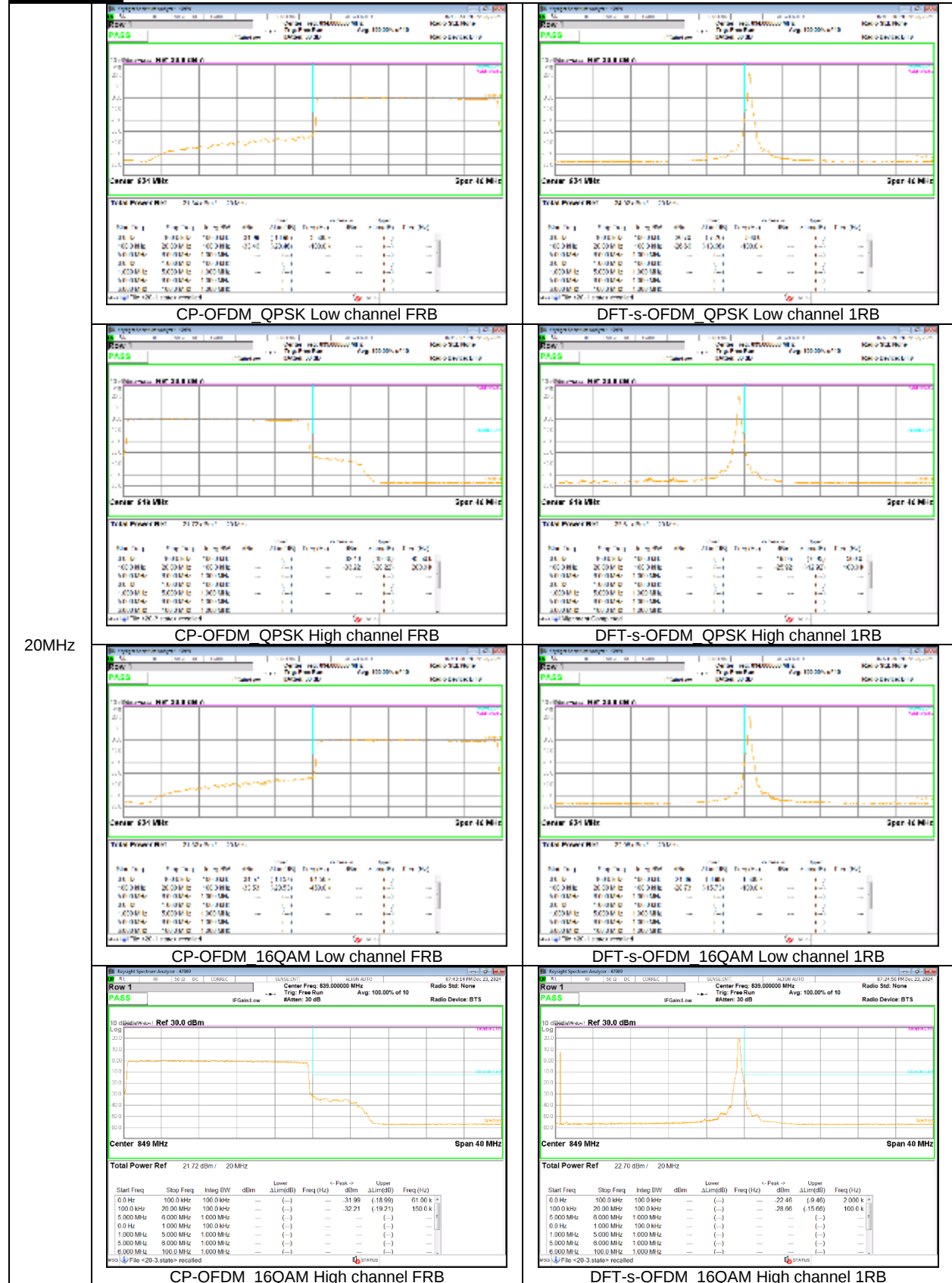
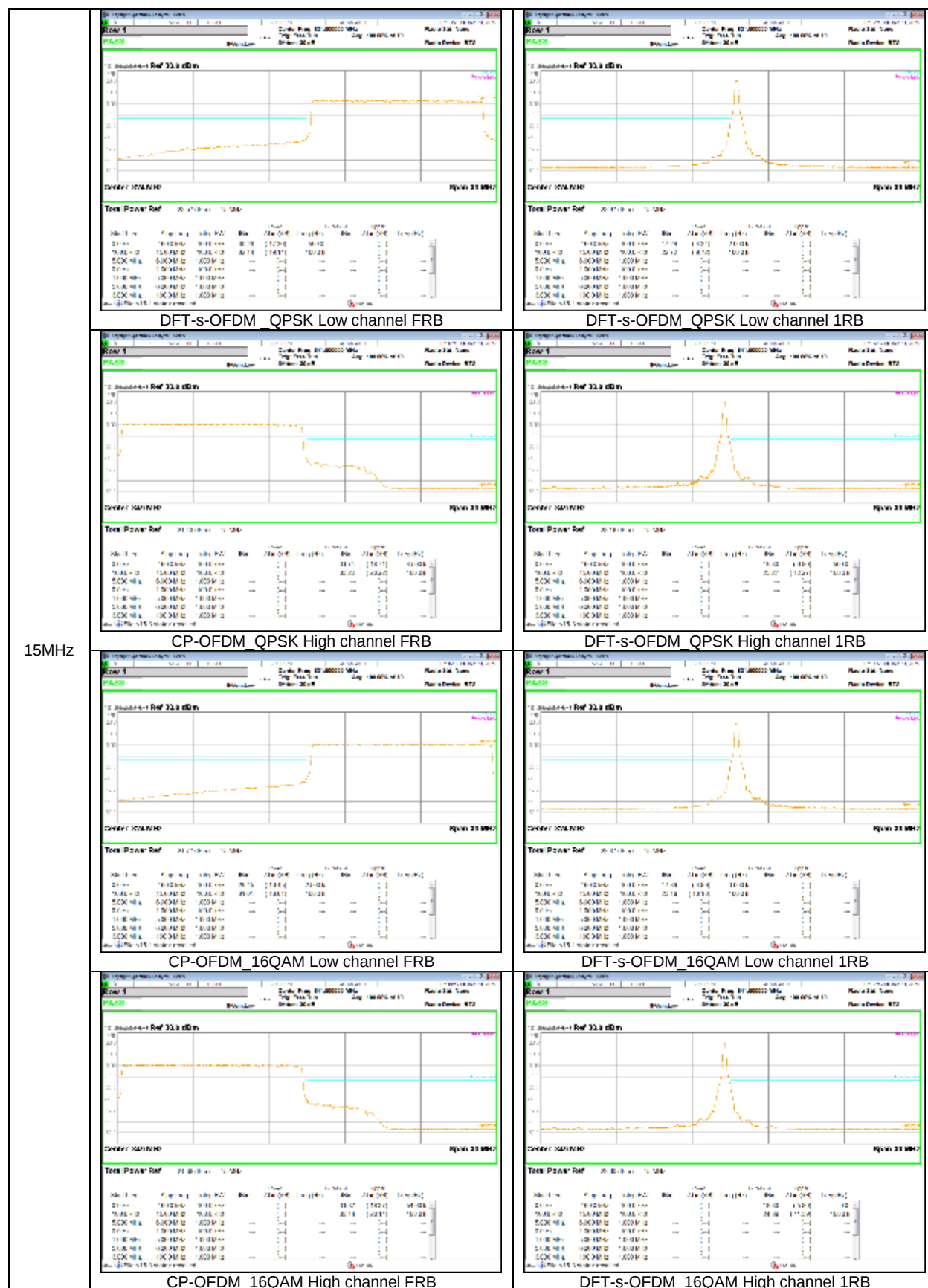
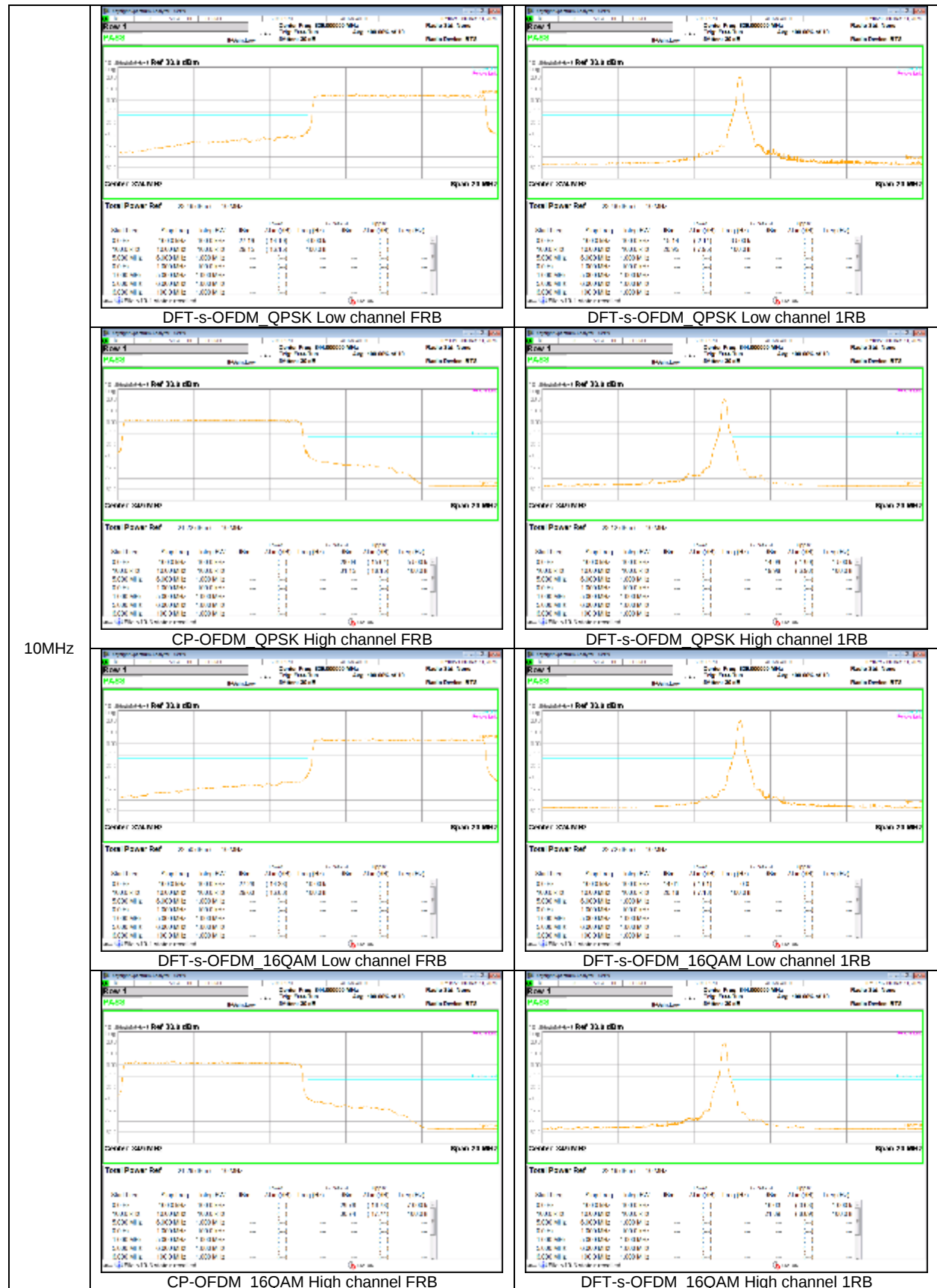
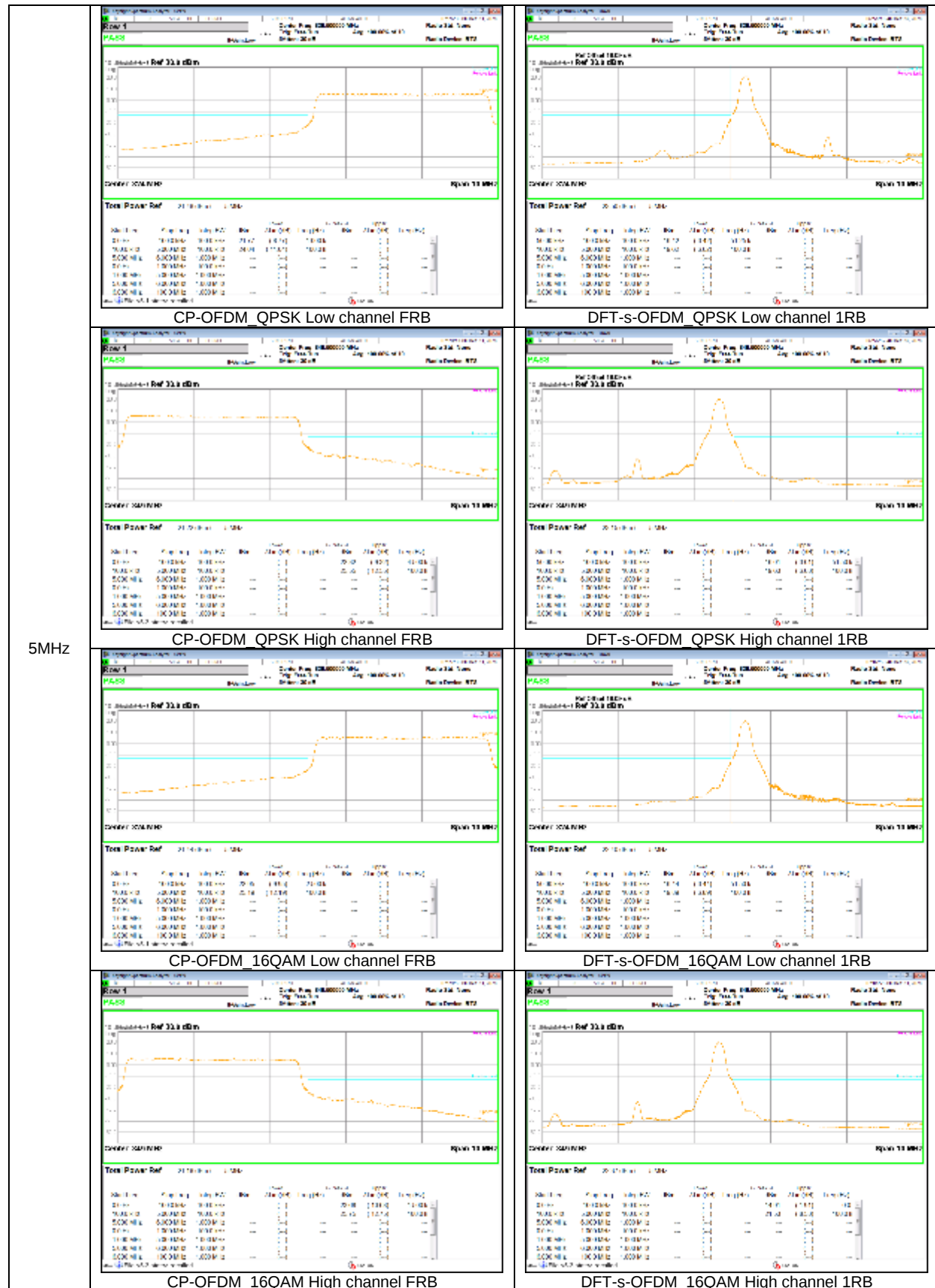


NR Band n5









8.4.1. EMISSION MASK RESULT

LTE Band 26 (Part 90) Full RB









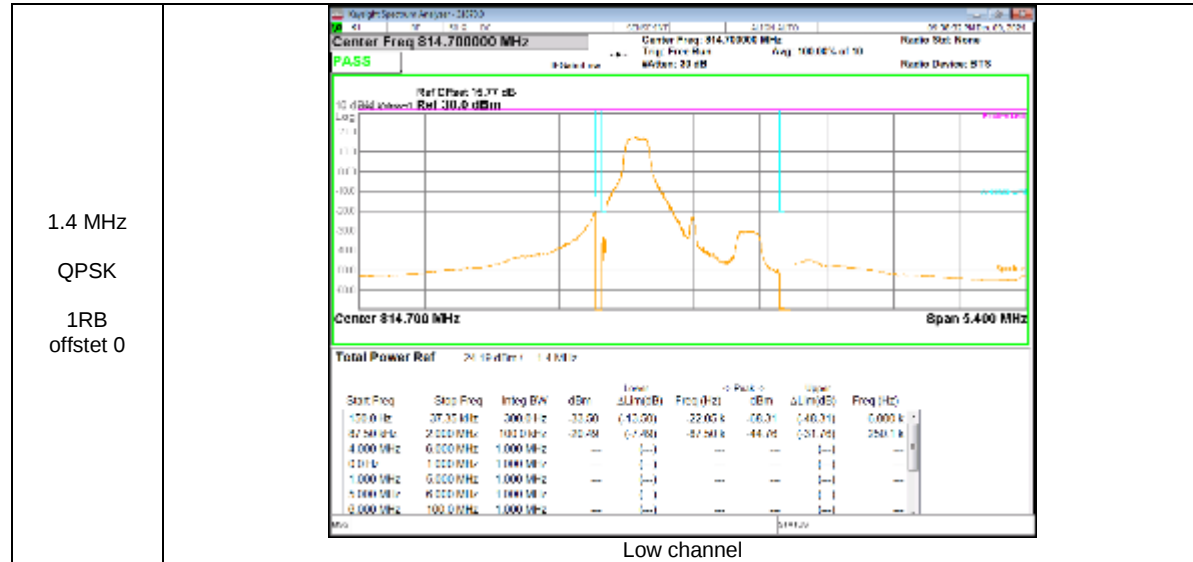








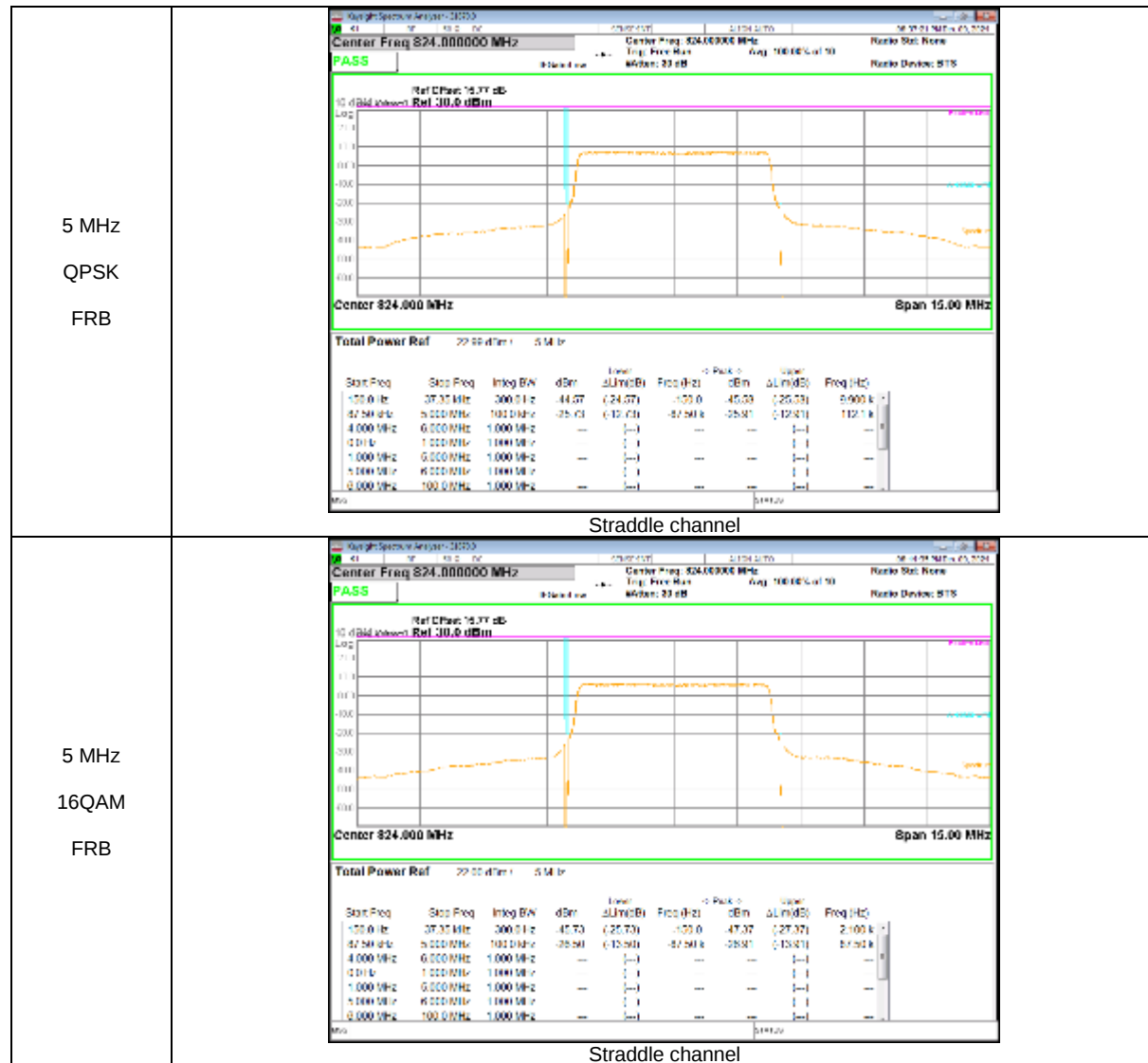
LTE Band 26 (Part 90) 1 RB (Worst Case)



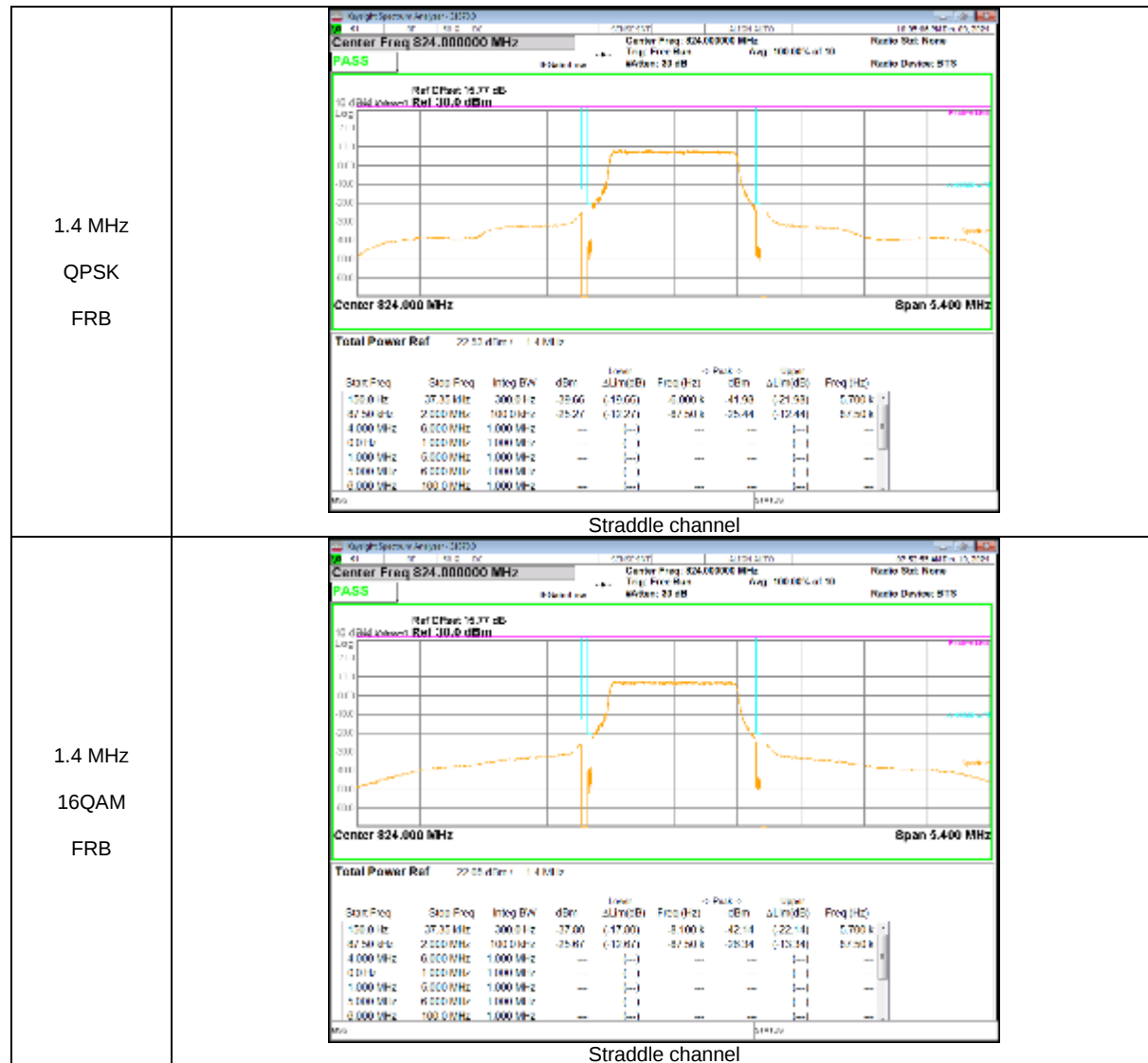
LTE Band 26 (Straddle) Full RB



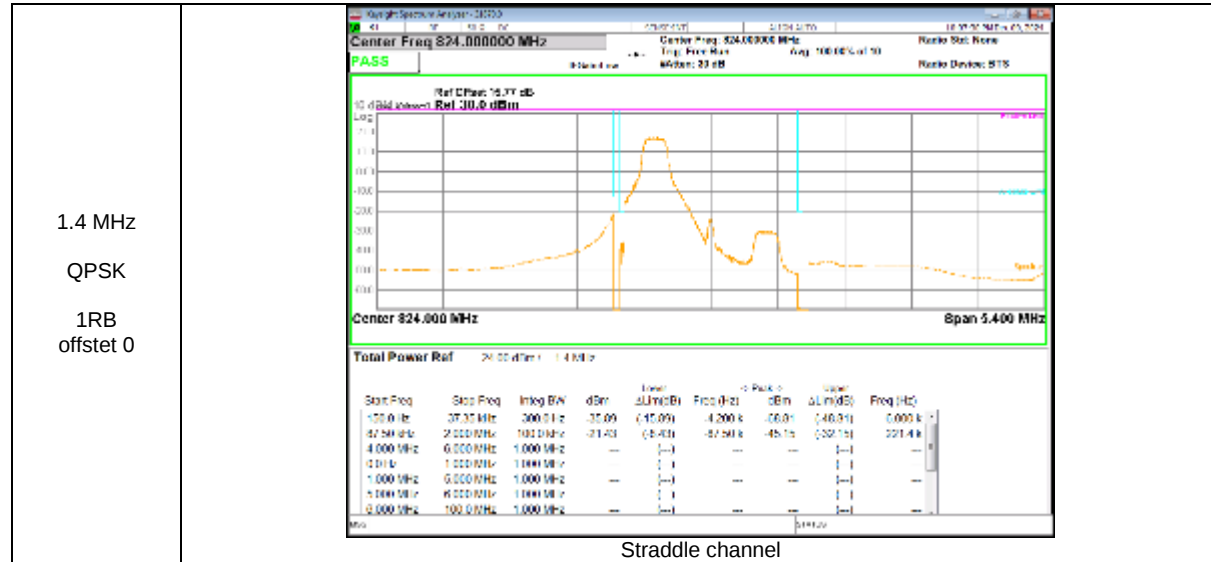








LTE Band 26 (Straddle) 1 RB (Worst Case)



8.5. CONDUCTED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917 and §90.691.

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.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 = 100 kHz for emission below 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.

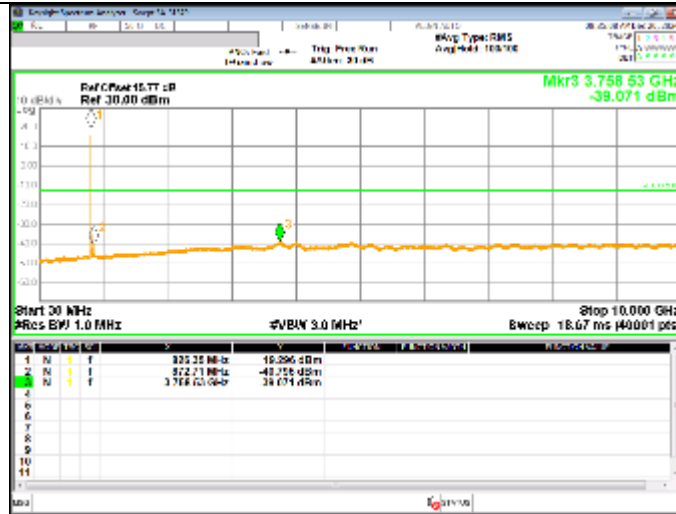
8.5.1. OUT OF BAND EMISSIONS RESULT

GSM 850

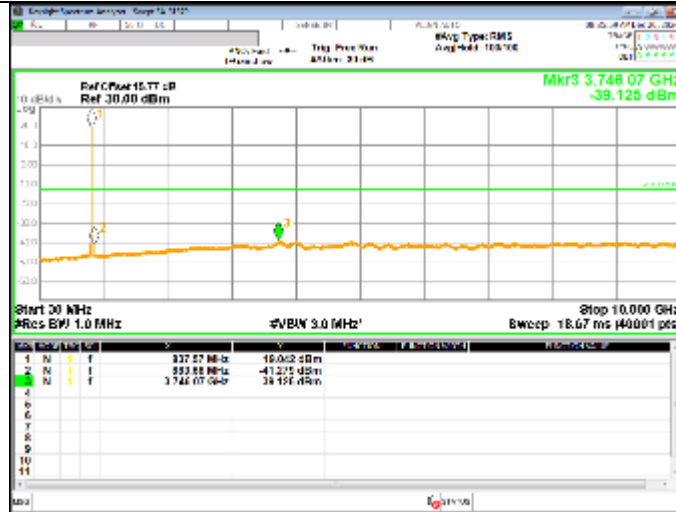


WCDMA Band 5

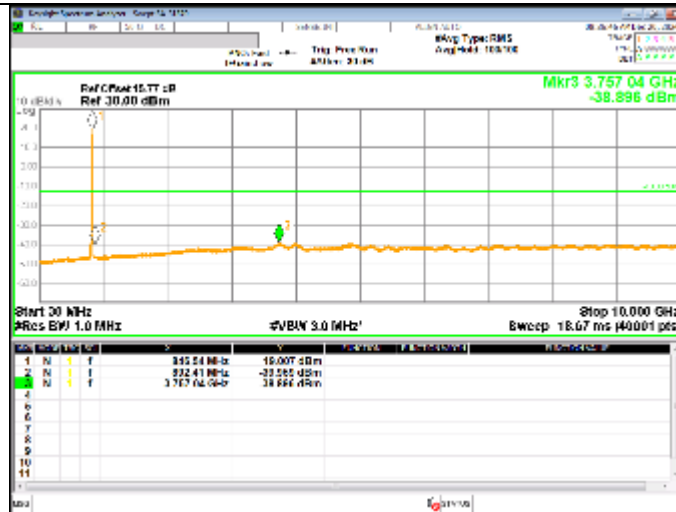
REL99



Low channel



Mid channel

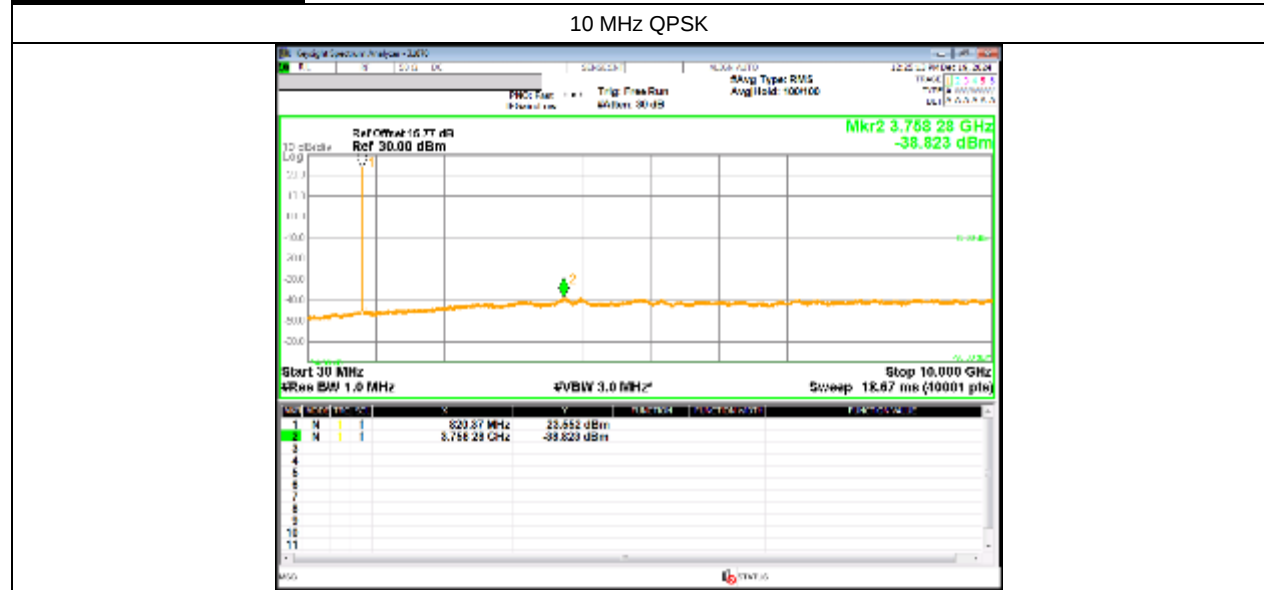


High channel

LTE Band 26 (Part 90)



LTE Band 26 (Straddle)

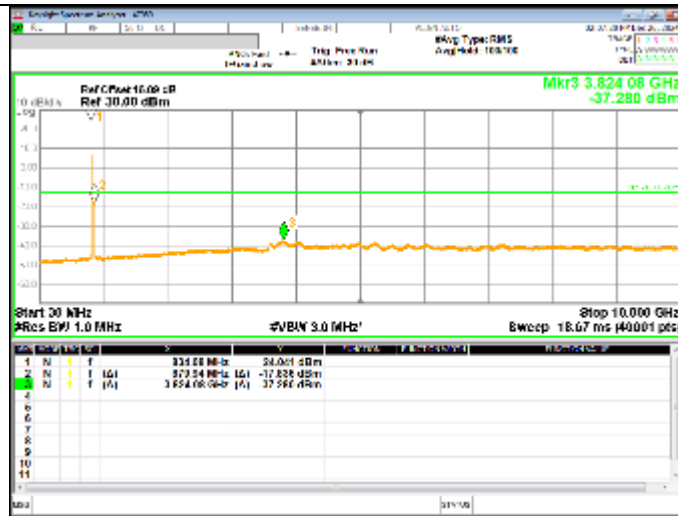


LTE Band 26 (Part 22)

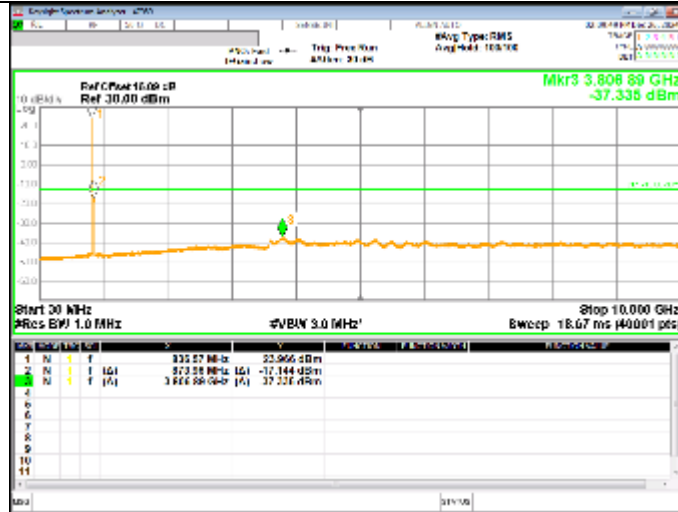


NR Band n5

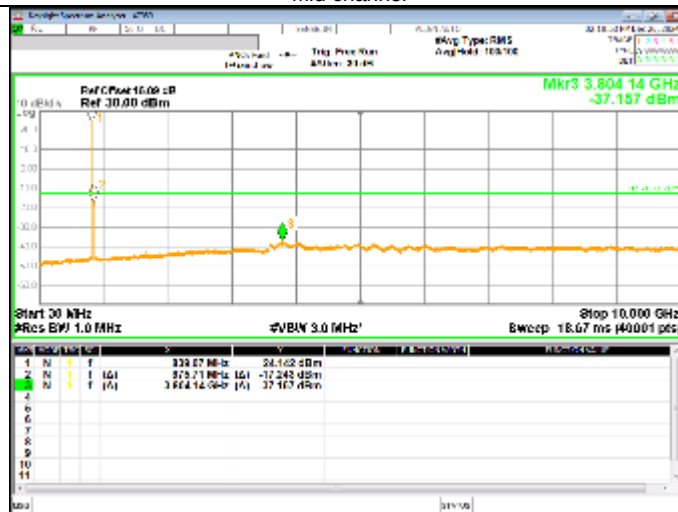
20 MHz QPSK



Low channel



Mid channel



High channel

8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355 and §90.213

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

§90.213 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

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 850, Channel 128/251, Frequency 824.2/848.8 MHz

Test Date	2024-12-23
Test Engineer	47989

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	50	824.20003093	-0.003	848.80002959	0.003	2.5
4.20	40	824.20003091	-0.003	848.80002822	0.005	2.5
4.20	30	824.20002911	-0.001	848.80003288	-0.001	2.5
4.20	20	824.20002839	0.000	848.80003216	0.000	2.5
4.20	10	824.20003244	-0.005	848.80003040	0.002	2.5
4.20	0	824.20003136	-0.004	848.80003212	0.000	2.5
4.20	-10	824.20003108	-0.003	848.80002849	0.004	2.5
4.20	-20	824.20003104	-0.003	848.80002834	0.005	2.5
4.20	-30	824.20002926	-0.001	848.80002807	0.005	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	20	824.20002839	0	848.80003216	0	2.5
4.40	20	824.20003205	-0.004	848.80003054	0.002	2.5
3.80	20	824.20003055	-0.003	848.80002776	0.005	2.5

WCDMA Band 5

Test Date	2024-12-26
Test Engineer	47989

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	50	826.40003099	0.001	846.60003183	-0.005	2.5
4.20	40	826.40003222	-0.001	846.60003048	-0.003	2.5
4.20	30	826.40003139	0.000	846.60003259	-0.006	2.5
4.20	20	826.40003162	0.000	846.60002770	0.000	2.5
4.20	10	826.40003054	0.001	846.60003000	-0.003	2.5
4.20	0	826.40003284	-0.001	846.60002993	-0.003	2.5
4.20	-10	826.40002855	0.004	846.60002929	-0.002	2.5
4.20	-20	826.40003172	0.000	846.60002805	0.000	2.5
4.20	-30	826.40002907	0.003	846.60003008	-0.003	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	20	826.40003162	0	846.60002770	0	2.5
4.40	20	826.40003294	-0.002	846.60002824	-0.001	2.5
3.80	20	826.40002933	0.003	846.60003107	-0.004	2.5

LTE Band 26

Test Date	2024-12-17
Test Engineer	47989

Reference Frequency : Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2036.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	50	814.70004691	-0.003	848.30004470	-0.006	2.5
4.20	40	814.70004209	0.003	848.30004796	-0.009	2.5
4.20	30	814.70005086	-0.008	848.30005115	-0.013	2.5
4.20	20	814.70004425	0.000	848.30004000	0.000	2.5
4.20	10	814.70004163	0.003	848.30004053	-0.001	2.5
4.20	0	814.70004008	0.005	848.30004306	-0.004	2.5
4.20	-10	814.70004962	-0.007	848.30004823	-0.010	2.5
4.20	-20	814.70004342	0.001	848.30004691	-0.008	2.5
4.20	-30	814.70004750	-0.004	848.30004952	-0.011	2.5

Reference Frequency : Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2036.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	20	814.70004425	0	848.30004000	0	2.5
4.40	20	814.70004636	-0.003	848.30004020	0.000	2.5
3.80	20	814.70004437	0.000	848.30004497	-0.006	2.5

NR Band n5

Test Date	2024-12-20
Test Engineer	47989

Reference Frequency : Low Channel 826.5 MHz / High Channel 846.5 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.250	Hz	High Channel	2116.250
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	50	826.50098895	-0.066	846.50088337	0.110	2.5
4.20	40	826.50089246	0.051	846.50099031	-0.016	2.5
4.20	30	826.50096085	-0.032	846.50093035	0.054	2.5
4.20	20	826.50093476	0.000	846.50097635	0.000	2.5
4.20	10	826.50098936	-0.066	846.50095111	0.030	2.5
4.20	0	826.50097981	-0.055	846.50088254	0.111	2.5
4.20	-10	826.50093486	0.000	846.50090693	0.082	2.5
4.20	-20	826.50093401	0.001	846.50092898	0.056	2.5
4.20	-30	826.50089775	0.045	846.50097491	0.002	2.5

Reference Frequency : Low Channel 826.5 MHz / High Channel 846.5 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.250	Hz	High Channel	2116.250
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
4.20	20	826.50093476	0	846.50097635	0	2.5
4.40	20	826.50092116	0.016	846.50098528	-0.011	2.5
3.80	20	826.50091704	0.021	846.50091585	0.071	2.5

9. RADIATED RESULTS

9.1. RADIATED POWER (ERP)

RULE PART(S)

FCC: §2.1046, §22.913 and §90.635

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

90.542(a)(7) - Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

90.635(b) The maximum output power of the transmitter for mobile stations is 100 watts (20dBw).

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

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 $\geq 2 \times$ RBW;
- 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. ERP RESULT

GSM

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
GSM 850	GPRS	824.20	31.46	V	3.02	-1.03	27.42	552.08	38.50	-11.08
		836.60	33.28	V	3.04	-0.97	29.27	845.28	38.50	-9.23
		848.80	32.35	V	3.06	-0.91	28.38	688.65	38.50	-10.12
	EGPRS	824.20	25.40	V	3.02	-1.03	21.36	136.77	38.50	-17.14
		836.60	27.23	V	3.04	-0.97	23.22	209.89	38.50	-15.28
		848.80	26.14	V	3.06	-0.91	22.17	164.82	38.50	-16.33

WCDMA

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
Band 5	REL99	826.40	22.18	V	3.02	-1.02	18.14	65.16	38.50	-20.36
		836.60	23.58	V	3.04	-0.97	19.57	90.57	38.50	-18.93
		846.60	22.81	V	3.06	-0.92	18.83	76.38	38.50	-19.67
	HSDPA	826.40	20.24	V	3.02	-1.02	16.20	41.69	38.50	-22.30
		836.60	22.57	V	3.04	-0.97	18.56	71.78	38.50	-19.94
		846.60	21.80	V	3.06	-0.92	17.82	60.53	38.50	-20.68

LTE Band 26

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
15	QPSK	821.50	23.41	H	3.01	-1.04	19.36	86.30	50.00	-30.64	1/0
		824.00	20.18	V	3.02	-1.03	16.13	41.02	38.50	-22.37	1/25
		831.50	20.22	V	3.03	-0.99	16.20	41.69	38.50	-22.30	1/25
		836.50	20.64	V	3.04	-0.97	16.64	46.13	38.50	-21.86	1/74
		841.50	22.81	V	3.05	-0.94	18.82	76.21	38.50	-19.68	1/25
	16-QAM	821.50	22.36	H	3.01	-1.04	18.31	67.76	50.00	-31.69	1/0
		824.00	19.75	V	3.02	-1.03	15.70	37.15	38.50	-22.80	1/25
		831.50	19.16	V	3.03	-0.99	15.14	32.66	38.50	-23.36	1/25
		836.50	19.45	V	3.04	-0.97	15.45	35.08	38.50	-23.05	1/74
		841.50	21.56	V	3.05	-0.94	17.57	57.15	38.50	-20.93	1/25
10	QPSK	819.00	23.64	H	3.01	-1.06	19.58	90.78	50.00	-30.42	1/0
		824.00	20.70	V	3.02	-1.03	16.65	46.24	38.50	-21.85	1/0
		829.00	20.45	V	3.03	-1.01	16.42	43.85	38.50	-22.08	1/0
		831.50	20.30	V	3.03	-0.99	16.28	42.46	38.50	-22.22	1/0
		844.00	23.37	V	3.05	-0.93	19.39	86.90	38.50	-19.11	1/25
	16-QAM	819.00	22.51	H	3.01	-1.06	18.45	69.98	50.00	-31.55	1/0
		824.00	18.74	V	3.02	-1.03	14.69	29.44	38.50	-23.81	1/0
		829.00	18.61	V	3.03	-1.01	14.58	28.71	38.50	-23.92	1/0
		831.50	19.45	V	3.03	-0.99	15.43	34.91	38.50	-23.07	1/0
		844.00	22.24	V	3.05	-0.93	18.26	66.99	38.50	-20.24	1/25
5	QPSK	816.50	23.56	H	3.00	-1.07	19.49	88.92	50.00	-30.44	1/0
		821.50	23.61	H	3.01	-1.04	19.56	90.36	50.00	-34.01	1/0
		824.00	20.04	V	3.02	-1.03	15.99	39.72	38.50	-22.55	1/12
		826.50	19.99	V	3.02	-1.02	15.95	39.36	38.50	-22.36	1/12
		831.50	20.16	V	3.03	-0.99	16.14	41.11	38.50	-19.04	1/12
	16-QAM	846.50	23.44	V	3.06	-0.92	19.46	88.31	38.50	-20.04	1/12
		816.50	22.53	H	3.00	-1.07	18.46	70.15	50.00	-31.48	1/0
		821.50	22.57	H	3.01	-1.04	18.52	71.12	50.00	-34.72	1/0
		824.00	19.33	V	3.02	-1.03	15.28	33.73	38.50	-23.62	1/12
		826.50	18.92	V	3.02	-1.02	14.88	30.76	38.50	-23.78	1/12
3	QPSK	831.50	18.74	V	3.03	-0.99	14.72	29.65	38.50	-19.83	1/12
		846.50	22.65	V	3.06	-0.92	18.67	73.62	38.50	-19.83	1/12
	16-QAM	815.50	23.69	H	3.00	-1.07	19.61	91.41	50.00	-30.39	1/0
		822.50	23.24	H	3.01	-1.04	19.19	82.99	50.00	-30.81	1/0
		824.00	19.90	V	3.02	-1.03	15.85	38.46	38.50	-22.65	1/8
1.4	QPSK	825.50	19.65	V	3.02	-1.02	15.61	36.39	38.50	-22.89	1/8
		831.50	20.02	V	3.03	-0.99	16.00	39.81	38.50	-22.50	1/0
		847.50	23.55	V	3.06	-0.91	19.57	90.57	38.50	-18.93	1/0
	16-QAM	815.50	22.61	H	3.00	-1.07	18.53	71.29	50.00	-31.47	1/0
		822.50	22.28	H	3.01	-1.04	18.23	66.53	50.00	-31.77	1/0
1.4	QPSK	824.00	18.64	V	3.02	-1.03	14.59	28.77	38.50	-23.91	1/8
		825.50	18.82	V	3.02	-1.02	14.78	30.06	38.50	-23.72	1/8
		831.50	19.89	V	3.03	-0.99	15.87	38.64	38.50	-22.63	1/0
		847.50	22.58	V	3.06	-0.91	18.60	72.44	38.50	-19.90	1/0
	16-QAM	814.70	23.49	H	3.00	-1.08	19.41	87.30	50.00	-30.59	1/0
		823.30	23.30	H	3.01	-1.03	19.25	84.14	50.00	-30.75	1/0
		824.00	19.89	V	3.02	-1.03	15.84	38.37	38.50	-22.66	1/3
		824.70	20.05	V	3.02	-1.03	16.01	39.90	38.50	-22.49	1/3
		831.50	20.06	V	3.03	-0.99	16.04	40.18	38.50	-22.46	1/0
1.4	QPSK	848.30	23.39	V	3.06	-0.91	19.42	87.50	38.50	-19.08	1/0
	16-QAM	814.70	22.61	H	3.00	-1.07	18.53	71.29	50.00	-31.47	1/0
		823.30	22.28	H	3.01	-1.04	18.23	66.53	50.00	-31.77	1/0
		824.00	18.99	V	3.02	-1.03	14.94	31.19	38.50	-23.56	1/3
		824.70	18.90	V	3.02	-1.03	14.86	30.62	38.50	-23.64	1/3
	16-QAM	831.50	19.03	V	3.03	-0.99	15.01	31.70	38.50	-23.49	1/0
		848.30	22.30	V	3.06	-0.91	18.33	68.08	38.50	-20.17	1/0

NR Band n5

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	834.00	22.85	H	3.04	-0.98	18.84	76.56	38.50	-19.66	1/1
		836.50	22.73	H	3.04	-0.97	18.72	74.47	38.50	-19.78	1/1
		839.00	22.76	H	3.04	-0.96	18.76	75.16	38.50	-19.74	1/1
	16-QAM	834.00	21.79	H	3.04	-0.98	17.78	59.98	38.50	-20.72	1/1
		836.50	17.49	H	3.04	-0.97	13.48	22.28	38.50	-25.02	1/1
		839.00	21.94	H	3.04	-0.96	17.94	62.23	38.50	-20.56	1/1
15	QPSK	831.50	20.93	H	3.03	-0.99	16.91	49.09	38.50	-21.59	1/1
		836.50	21.68	H	3.04	-0.97	17.67	58.48	38.50	-20.83	1/77
		841.50	22.21	H	3.05	-0.94	18.22	66.37	38.50	-20.28	1/77
	16-QAM	831.50	19.77	H	3.03	-0.99	15.75	37.58	38.50	-22.75	1/1
		836.50	20.48	H	3.04	-0.97	16.47	44.36	38.50	-22.03	1/77
		841.50	21.42	H	3.05	-0.94	17.43	55.34	38.50	-21.07	1/77
10	QPSK	829.00	20.18	H	3.03	-1.01	16.15	41.21	38.50	-22.35	1/26
		836.50	21.76	H	3.04	-0.97	17.75	59.57	38.50	-20.75	1/26
		844.00	21.93	H	3.05	-0.93	17.95	62.37	38.50	-20.55	1/50
	16-QAM	829.00	19.33	H	3.03	-1.01	15.30	33.88	38.50	-23.20	1/26
		836.50	20.50	H	3.04	-0.97	16.49	44.57	38.50	-22.01	1/26
		844.00	20.49	H	3.05	-0.93	16.51	44.77	38.50	-21.99	1/50
5	QPSK	826.50	20.29	H	3.02	-1.02	16.25	42.17	38.50	-22.25	1/1
		836.50	21.62	H	3.04	-0.97	17.61	57.68	38.50	-20.89	1/23
		846.50	21.87	H	3.06	-0.92	17.90	61.66	38.50	-20.60	1/23
	16-QAM	826.50	19.03	H	3.02	-1.02	14.99	31.55	38.50	-23.51	1/1
		836.50	21.02	H	3.04	-0.97	17.01	50.23	38.50	-21.49	1/23
		846.50	21.15	H	3.06	-0.92	17.18	52.24	38.50	-21.32	1/23

9.2. RADIATED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1053, §22.917 and §90.691

LIMIT

§22.917(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.

§90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 = 100 kHz for emission below 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

GSM850

GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4791547073 Date: 2024-11-15 Test Engineer: 24542 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 2 Mode: GPRS 850 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, 824.2MHz									
	1648.40	-6.3	V	3.0	42.0	1.0	-47.3	-13.0	-34.3	
	2472.60	-5.2	V	3.0	42.3	1.0	-46.5	-13.0	-33.5	
	3296.80	-4.3	V	3.0	42.9	1.0	-46.2	-13.0	-33.2	
	1648.40	-7.3	H	3.0	42.0	1.0	-48.3	-13.0	-35.3	
	2472.60	-4.9	H	3.0	42.3	1.0	-46.3	-13.0	-33.3	
	3296.80	-4.5	H	3.0	42.9	1.0	-46.4	-13.0	-33.4	
	Mid Ch, 836.6MHz									
	1673.20	-6.0	V	3.0	42.0	1.0	-47.0	-13.0	-34.0	
	2509.80	-0.5	V	3.0	42.4	1.0	-41.9	-13.0	-28.9	
	3346.40	-9.0	V	3.0	42.9	1.0	-50.9	-13.0	-37.9	
	1673.20	-8.5	H	3.0	42.0	1.0	-49.4	-13.0	-36.4	
	2509.80	-3.4	H	3.0	42.4	1.0	-44.7	-13.0	-31.7	
	3346.40	-4.0	H	3.0	42.9	1.0	-46.0	-13.0	-33.0	
	High Ch, 848.8MHz									
	1697.60	-7.5	V	3.0	42.0	1.0	-48.5	-13.0	-35.5	
	2546.40	-1.5	V	3.0	42.4	1.0	-43.0	-13.0	-30.0	
	3395.20	-4.1	V	3.0	42.9	1.0	-46.0	-13.0	-33.0	
	1697.60	-8.8	H	3.0	42.0	1.0	-49.8	-13.0	-36.8	
	2546.40	-3.3	H	3.0	42.4	1.0	-44.8	-13.0	-31.8	
	3395.20	-3.9	H	3.0	42.9	1.0	-45.8	-13.0	-32.8	

WCDMA Band 5

REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4791547073 Date: 2024-11-15 Test Engineer: 24542 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Harmonics 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, 826.4MHz 1652.80 -15.3 V 3.0 42.0 1.0 -56.2 -13.0 -43.2 2479.20 -12.1 V 3.0 42.4 1.0 -53.5 -13.0 -40.5 3305.60 -9.3 V 3.0 42.9 1.0 -51.2 -13.0 -38.2 1652.80 -15.6 H 3.0 42.0 1.0 -56.6 -13.0 -43.6 2479.20 -12.6 H 3.0 42.4 1.0 -53.9 -13.0 -40.9 3305.60 -9.5 H 3.0 42.9 1.0 -51.4 -13.0 -38.4 Mid Ch, 836.6MHz 1673.20 -15.5 V 3.0 42.0 1.0 -56.5 -13.0 -43.5 2509.80 -12.1 V 3.0 42.4 1.0 -53.5 -13.0 -40.5 3346.40 -8.7 V 3.0 42.9 1.0 -50.6 -13.0 -37.6 1673.20 -15.9 H 3.0 42.0 1.0 -56.8 -13.0 -43.8 2509.80 -12.4 H 3.0 42.4 1.0 -53.8 -13.0 -40.8 3346.40 -9.0 H 3.0 42.9 1.0 -50.9 -13.0 -37.9 High Ch, 846.6MHz 1693.20 -15.3 V 3.0 42.0 1.0 -56.2 -13.0 -43.2 2539.80 -12.0 V 3.0 42.4 1.0 -53.4 -13.0 -40.4 3386.40 -9.0 V 3.0 42.9 1.0 -50.9 -13.0 -37.9 1693.20 -15.8 H 3.0 42.0 1.0 -56.7 -13.0 -43.7 2539.80 -12.4 H 3.0 42.4 1.0 -53.8 -13.0 -40.8 3386.40 -8.9 H 3.0 42.9 1.0 -50.8 -13.0 -37.8									

LTE Band 26 (Part 90)

10 MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4791547073 Date: 2024-12-24 Test Engineer: 27089 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 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, 819MHz									
	1638.00	-14.8	V	3.0	43.4	1.0	-57.2	-13.0	-44.2	
	2457.00	-11.7	V	3.0	43.8	1.0	-54.5	-13.0	-41.5	
	3276.00	-9.1	V	3.0	43.7	1.0	-51.8	-13.0	-38.8	
	1638.00	-15.9	H	3.0	43.4	1.0	-58.3	-13.0	-45.3	
	2457.00	-11.8	H	3.0	43.8	1.0	-54.6	-13.0	-41.6	
	3276.00	-9.3	H	3.0	43.7	1.0	-52.0	-13.0	-39.0	

LTE Band 26 (Straddle)

10 MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4791547073 Date: 2024-11-16 Test Engineer: 27089 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 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
	Straddle Ch, 824 MHz									
	1648.00	-15.4	V	3.0	43.5	1.0	-57.9	-13.0	-44.9	
	2472.00	-12.2	V	3.0	43.8	1.0	-55.0	-13.0	-42.0	
	3296.00	-9.6	V	3.0	43.8	1.0	-52.4	-13.0	-39.4	
	1648.00	-16.3	H	3.0	43.5	1.0	-58.7	-13.0	-45.7	
	2472.00	-12.7	H	3.0	43.8	1.0	-55.4	-13.0	-42.4	
	3296.00	-9.7	H	3.0	43.8	1.0	-52.5	-13.0	-39.5	

LTE Band 26 (Part 22)

3 MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4791547073 Date: 2024-11-16 Test Engineer: 27089 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Harmonics, 3MHz 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, 825.5MHz									
	1651.00	-15.5	V	3.0	43.5	1.0	-57.9	-13.0	-44.9	
	2476.50	-12.1	V	3.0	43.8	1.0	-54.9	-13.0	-41.9	
	3302.00	-9.7	V	3.0	43.8	1.0	-52.4	-13.0	-39.4	
	1651.00	-16.4	H	3.0	43.5	1.0	-58.9	-13.0	-45.9	
	2476.50	-12.7	H	3.0	43.8	1.0	-55.5	-13.0	-42.5	
	3302.00	-9.4	H	3.0	43.8	1.0	-52.2	-13.0	-39.2	
	Mid Ch, 831.5MHz									
	1663.00	-15.1	V	3.0	43.5	1.0	-57.6	-13.0	-44.6	
	2494.50	-12.1	V	3.0	43.8	1.0	-54.8	-13.0	-41.8	
	3326.00	-9.6	V	3.0	43.8	1.0	-52.4	-13.0	-39.4	
	1663.00	-16.5	H	3.0	43.5	1.0	-59.0	-13.0	-46.0	
	2494.50	-12.1	H	3.0	43.8	1.0	-54.9	-13.0	-41.9	
	3326.00	-9.6	H	3.0	43.8	1.0	-52.4	-13.0	-39.4	
	High Ch, 847.5MHz									
	1695.00	-15.3	V	3.0	43.5	1.0	-57.8	-13.0	-44.8	
	2542.50	-12.1	V	3.0	43.7	1.0	-54.8	-13.0	-41.8	
	3390.00	-9.2	V	3.0	43.9	1.0	-52.1	-13.0	-39.1	
	1695.00	-16.2	H	3.0	43.5	1.0	-58.7	-13.0	-45.7	
	2542.50	-12.5	H	3.0	43.7	1.0	-55.2	-13.0	-42.2	
	3390.00	-9.2	H	3.0	43.9	1.0	-52.1	-13.0	-39.1	

NR Band n5

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4791547073							
Date:		2024-11-26							
Test Engineer:		26087							
Configuration:		EUT / AC Adapter, Y-Position							
Location:		Chamber 1							
Mode:		5G NR_QPSK NR n5 Harmonics, 20MHz Bandwidth							
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
20 MHz									
DFT-s-OFDM									
QPSK									
Low Ch, 834MHz									
1668.00	-15.3	V	3.0	43.5	1.0	-57.8	-13.0	-44.8	
2502.00	-12.0	V	3.0	43.8	1.0	-54.7	-13.0	-41.7	
3336.00	-9.4	V	3.0	43.8	1.0	-52.2	-13.0	-39.2	
1668.00	-16.1	H	3.0	43.5	1.0	-58.6	-13.0	-45.6	
2502.00	-12.3	H	3.0	43.8	1.0	-55.1	-13.0	-42.1	
3336.00	-9.3	H	3.0	43.8	1.0	-52.1	-13.0	-39.1	
Mid Ch, 836.5MHz									
1673.00	-14.9	V	3.0	43.5	1.0	-57.4	-13.0	-44.4	
2509.50	-11.9	V	3.0	43.7	1.0	-54.7	-13.0	-41.7	
3346.00	-9.4	V	3.0	43.8	1.0	-52.2	-13.0	-39.2	
1673.00	-16.2	H	3.0	43.5	1.0	-58.7	-13.0	-45.7	
2509.50	-12.2	H	3.0	43.7	1.0	-55.0	-13.0	-42.0	
3346.00	-9.5	H	3.0	43.8	1.0	-52.3	-13.0	-39.3	
High Ch, 839MHz									
1678.00	-15.3	V	3.0	43.5	1.0	-57.8	-13.0	-44.8	
2517.00	-12.0	V	3.0	43.7	1.0	-54.8	-13.0	-41.8	
3356.00	-9.4	V	3.0	43.8	1.0	-52.3	-13.0	-39.3	
1678.00	-16.2	H	3.0	43.5	1.0	-58.7	-13.0	-45.7	
2517.00	-12.4	H	3.0	43.7	1.0	-55.1	-13.0	-42.1	
3356.00	-9.4	H	3.0	43.8	1.0	-52.2	-13.0	-39.2	

END OF REPORT

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