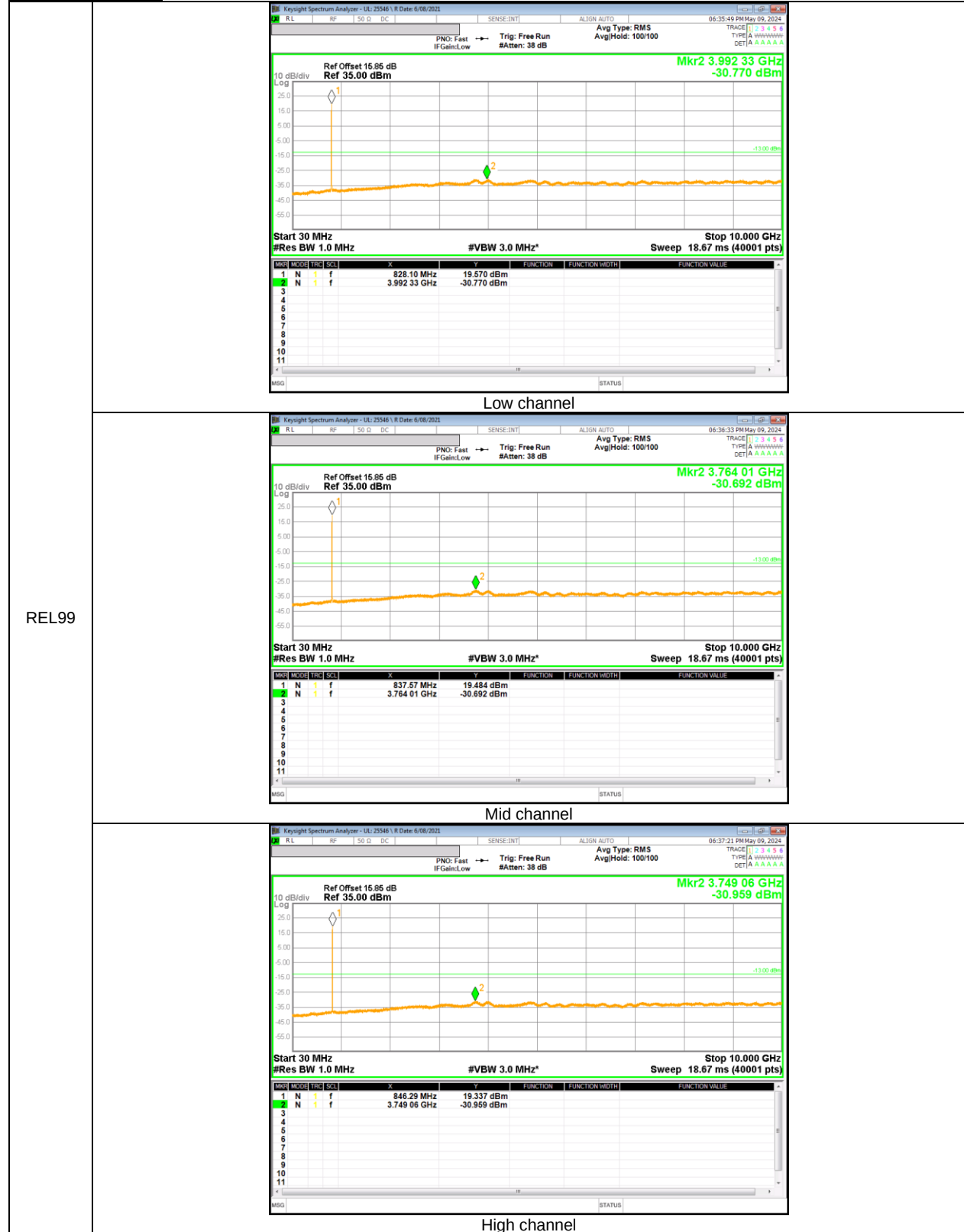
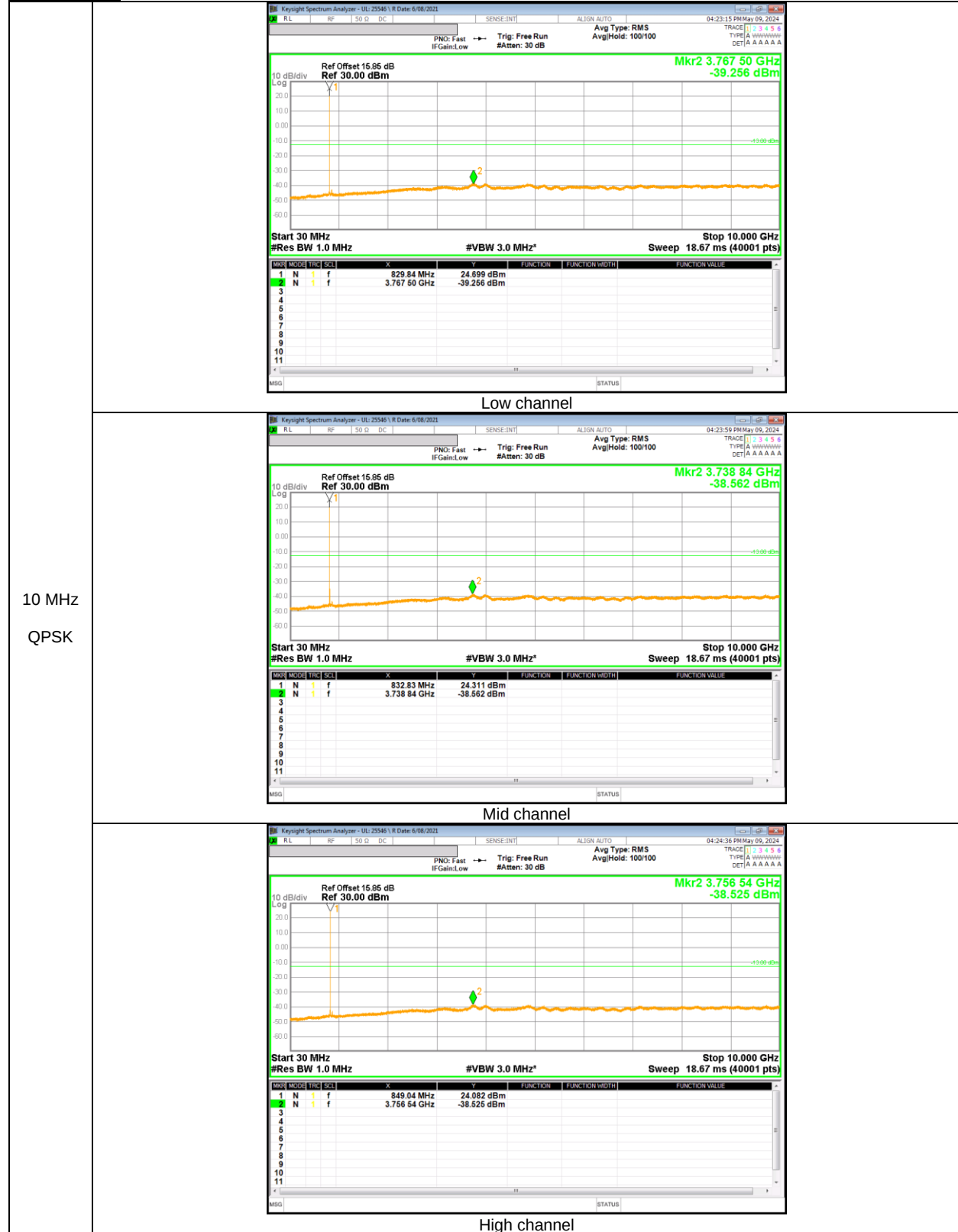


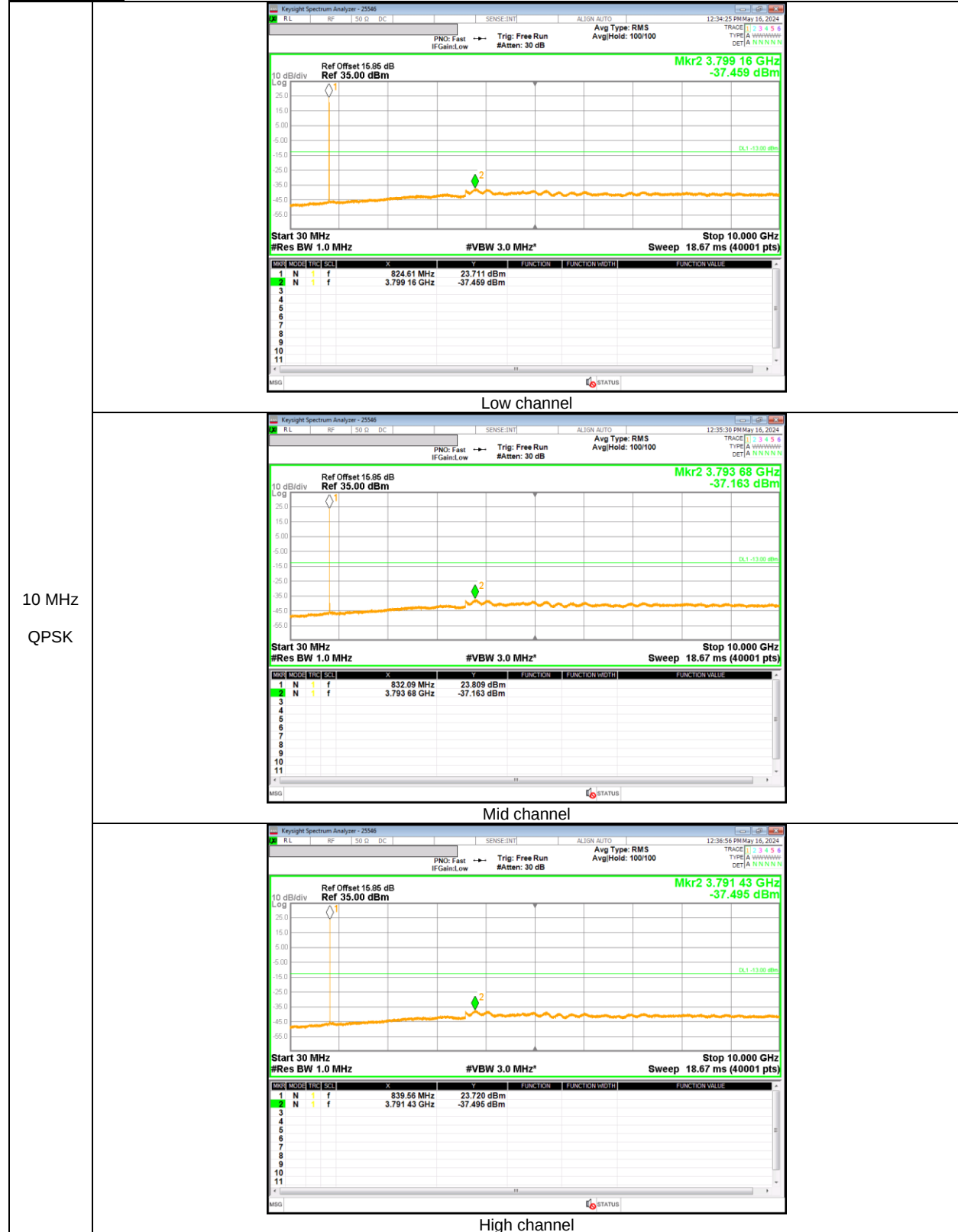
WCDMA Band 5



LTE Band 5



NR Band n5



8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355

LIMITS

§22.355 - 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	2024-05-02
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	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	824.20001326	0.004	848.80002064	-0.005	2.5
3.88	40	824.20001874	-0.003	848.80002357	-0.009	2.5
3.88	30	824.20002014	-0.004	848.80001374	0.003	2.5
3.88	20	824.20001666	0.000	848.80001598	0.000	2.5
3.88	10	824.20001265	0.005	848.80001625	0.000	2.5
3.88	0	824.20002019	-0.004	848.80002337	-0.009	2.5
3.88	-10	824.20002136	-0.006	848.80002247	-0.008	2.5
3.88	-20	824.20002018	-0.004	848.80001924	-0.004	2.5
3.88	-30	824.20001667	0.000	848.80001835	-0.003	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	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	20	824.20001666	0	848.80001598	0	2.5
4.45	20	824.20002203	-0.007	848.80002590	-0.012	2.5
3.70	20	824.20002451	-0.010	848.80002438	-0.010	2.5

WCDMA Band 5

Test Date	2024-05-03
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	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	826.40000535	0.010	846.60000841	0.003	2.5
3.88	40	826.40000887	0.005	846.60000637	0.006	2.5
3.88	30	826.40001023	0.004	846.60001347	-0.003	2.5
3.88	20	826.40001335	0.000	846.60001121	0.000	2.5
3.88	10	826.40001124	0.003	846.60001065	0.001	2.5
3.88	0	826.40000674	0.008	846.60000963	0.002	2.5
3.88	-10	826.40001631	-0.004	846.60001547	-0.005	2.5
3.88	-20	826.40002021	-0.008	846.60001567	-0.005	2.5
3.88	-30	826.40000937	0.005	846.60001342	-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	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.88	20	826.40001335	0	846.60001121	0	2.5	
4.45	20	826.40000352	0.012	846.60000352	0.009	2.5	
3.70	20	826.40000365	0.012	846.60000404	0.008	2.5	

LTE Band 5

Test Date	2024-05-07
Test Engineer	47989

Reference Frequency : Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	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]	
3.88	50	824.70001332	0.008	848.30001574	0.000	2.5
3.88	40	824.70001668	0.004	848.30001025	0.006	2.5
3.88	30	824.70002017	-0.001	848.30001368	0.002	2.5
3.88	20	824.70001965	0.000	848.30001543	0.000	2.5
3.88	10	824.70001524	0.005	848.30001333	0.002	2.5
3.88	0	824.70001635	0.004	848.30001554	0.000	2.5
3.88	-10	824.70001865	0.001	848.30000965	0.007	2.5
3.88	-20	824.70001137	0.010	848.30000575	0.011	2.5
3.88	-30	824.70001305	0.008	848.30000868	0.008	2.5

Reference Frequency : Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	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]	
3.88	3.85	824.70001965	0	848.30001543	0	2.5
4.45	4.4	824.70001153	0.010	848.30001203	0.004	2.5
3.70	3.65	824.70001611	0.004	848.30000461	0.013	2.5

NR Band n5

Test Date	2024-05-09
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]	
3.88	50	826.50001123	0.006	846.50001036	0.000	2.5
3.88	40	826.50001333	0.003	846.50001511	-0.006	2.5
3.88	30	826.50002034	-0.005	846.50001632	-0.007	2.5
3.88	20	826.50001603	0.000	846.50001010	0.000	2.5
3.88	10	826.50001836	-0.003	846.50001241	-0.003	2.5
3.88	0	826.50002334	-0.009	846.50002036	-0.012	2.5
3.88	-10	826.50001530	0.001	846.50001665	-0.008	2.5
3.88	-20	826.50001141	0.006	846.50000835	0.002	2.5
3.88	-30	826.50001036	0.007	846.50000967	0.001	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]	
3.88	20	826.50001603	0	846.50001010	0	2.5
4.45	20	826.50002036	-0.005	846.50002334	-0.016	2.5
3.70	20	826.50001943	-0.004	846.50001865	-0.010	2.5

9. RADIATED RESULTS

9.1. RADIATED POWER (ERP)

RULE PART(S)

FCC: §2.1046, §22.913

LIMITS

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

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 (ANT A+B)

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	33.88	H	3.01	-1.03	29.84	963.83	38.50	-8.66
		836.60	33.45	H	3.03	-0.97	29.46	883.08	38.50	-9.04
		848.80	33.94	H	3.05	-0.91	29.98	995.41	38.50	-8.52
	EGPRS	824.20	28.41	H	3.01	-1.03	24.37	273.53	38.50	-14.13
		836.60	28.68	H	3.03	-0.97	24.69	294.44	38.50	-13.81
		848.80	29.26	H	3.05	-0.91	25.30	338.84	38.50	-13.20

GSM (ANT A)

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	27.09	V	3.01	-1.03	23.05	201.84	38.50	-15.45
		836.60	24.41	V	3.03	-0.97	20.42	110.15	38.50	-18.08
		848.80	24.03	V	3.05	-0.91	20.07	101.62	38.50	-18.43
	EGPRS	824.20	22.76	V	3.01	-1.03	18.72	74.47	38.50	-19.78
		836.60	19.60	V	3.03	-0.97	15.61	36.39	38.50	-22.89
		848.80	19.21	V	3.05	-0.91	15.25	33.50	38.50	-23.25

WCDMA (ANT A+B)

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	25.98	H	3.01	-1.02	21.95	156.68	38.50	-16.55
		836.60	25.63	H	3.03	-0.97	21.64	145.88	38.50	-16.86
		846.60	26.13	H	3.05	-0.92	22.17	164.82	38.50	-16.33
	HSDPA	826.40	24.64	H	3.01	-1.02	20.61	115.08	38.50	-17.89
		836.60	24.52	H	3.03	-0.97	20.53	112.98	38.50	-17.97
		846.60	24.99	H	3.05	-0.92	21.03	126.77	38.50	-17.47

WCDMA (ANT A)

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	19.65	V	3.01	-1.02	15.62	36.48	38.50	-22.88
		836.60	21.18	V	3.03	-0.97	17.19	52.36	38.50	-21.31
		846.60	22.14	V	3.05	-0.92	18.17	65.61	38.50	-20.33
	HSDPA	826.40	19.60	V	3.01	-1.02	15.57	36.06	38.50	-22.93
		836.60	20.59	V	3.03	-0.97	16.60	45.71	38.50	-21.90
		846.60	21.09	V	3.05	-0.92	17.12	51.52	38.50	-21.38

LTE Band 5 (ANT A+B)

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
10	QPSK	829.00	26.18	H	3.02	-1.01	22.16	164.44	38.50	-16.34	1/25
		836.50	25.95	H	3.03	-0.97	21.96	157.04	38.50	-16.54	1/0
		844.00	25.83	H	3.04	-0.93	21.86	153.46	38.50	-16.64	1/49
	16-QAM	829.00	25.27	H	3.02	-1.01	21.25	133.35	38.50	-17.25	1/0
		836.50	25.09	H	3.03	-0.97	21.10	128.82	38.50	-17.40	1/25
		844.00	24.93	H	3.04	-0.93	20.96	124.74	38.50	-17.54	1/25
5	QPSK	826.50	26.17	H	3.01	-1.02	22.14	163.68	38.50	-16.36	1/0
		836.50	26.03	H	3.03	-0.97	22.04	159.96	38.50	-16.46	1/0
		846.50	26.05	H	3.05	-0.92	22.09	161.81	38.50	-16.41	1/12
	16-QAM	826.50	25.19	H	3.01	-1.02	21.16	130.62	38.50	-17.34	1/0
		836.50	25.12	H	3.03	-0.97	21.13	129.72	38.50	-17.37	1/0
		846.50	25.32	H	3.05	-0.92	21.36	136.77	38.50	-17.14	1/12
3	QPSK	825.50	25.90	H	3.01	-1.02	21.87	153.82	38.50	-16.63	1/8
		836.50	25.87	H	3.03	-0.97	21.88	154.17	38.50	-16.62	1/0
		847.50	25.86	H	3.05	-0.91	21.89	154.53	38.50	-16.61	1/8
	16-QAM	825.50	25.00	H	3.01	-1.02	20.97	125.03	38.50	-17.53	1/0
		836.50	24.94	H	3.03	-0.97	20.95	124.45	38.50	-17.55	1/8
		847.50	24.96	H	3.05	-0.91	20.99	125.60	38.50	-17.51	1/8
1.4	QPSK	824.70	26.09	H	3.01	-1.03	22.05	160.32	38.50	-16.45	1/0
		836.50	25.66	H	3.03	-0.97	21.67	146.89	38.50	-16.83	1/3
		848.30	25.71	H	3.05	-0.91	21.74	149.28	38.50	-16.76	1/0
	16-QAM	824.70	25.17	H	3.01	-1.03	21.13	129.72	38.50	-17.37	1/0
		836.50	24.58	H	3.03	-0.97	20.59	114.55	38.50	-17.91	1/3
		848.30	24.77	H	3.05	-0.91	20.80	120.23	38.50	-17.70	1/5

LTE Band 5 (ANT A)

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
10	QPSK	829.00	21.69	V	3.02	-1.01	17.66	58.34	38.50	-20.84	1/25
		836.50	22.37	V	3.03	-0.97	18.37	68.71	38.50	-20.13	1/0
		844.00	22.17	V	3.04	-0.93	18.20	66.07	38.50	-20.30	1/49
	16-QAM	829.00	20.65	V	3.02	-1.01	16.62	45.92	38.50	-21.88	1/0
		836.50	21.54	V	3.03	-0.97	17.54	56.75	38.50	-20.96	1/25
		844.00	21.27	V	3.04	-0.93	17.30	53.70	38.50	-21.20	1/25
5	QPSK	826.50	21.68	V	3.01	-1.02	17.65	58.21	38.50	-20.85	1/0
		836.50	22.56	V	3.03	-0.97	18.56	71.78	38.50	-19.94	1/0
		846.50	23.09	V	3.05	-0.92	19.12	81.66	38.50	-19.38	1/12
	16-QAM	826.50	20.81	V	3.01	-1.02	16.78	47.64	38.50	-21.72	1/0
		836.50	21.67	V	3.03	-0.97	17.67	58.48	38.50	-20.83	1/0
		846.50	22.17	V	3.05	-0.92	18.20	66.07	38.50	-20.30	1/12
3	QPSK	825.50	21.46	V	3.01	-1.02	17.42	55.21	38.50	-21.08	1/8
		836.50	22.51	V	3.03	-0.97	18.51	70.96	38.50	-19.99	1/0
		847.50	22.83	V	3.05	-0.91	18.87	77.09	38.50	-19.63	1/8
	16-QAM	825.50	20.80	V	3.01	-1.02	16.76	47.42	38.50	-21.74	1/0
		836.50	21.54	V	3.03	-0.97	17.54	56.75	38.50	-20.96	1/8
		847.50	21.94	V	3.05	-0.91	17.98	62.81	38.50	-20.52	1/8
1.4	QPSK	824.70	21.03	V	3.01	-1.03	16.99	50.00	38.50	-21.51	1/0
		836.50	22.43	V	3.03	-0.97	18.43	69.66	38.50	-20.07	1/3
		848.30	22.76	V	3.05	-0.91	18.80	75.86	38.50	-19.70	1/0
	16-QAM	824.70	20.30	V	3.01	-1.03	16.26	42.27	38.50	-22.24	1/0
		836.50	21.42	V	3.03	-0.97	17.42	55.21	38.50	-21.08	1/3
		848.30	21.78	V	3.05	-0.91	17.82	60.53	38.50	-20.68	1/5

NR Band n5 (ANT A+B)

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
20	QPSK	834.00	25.54	H	3.03	-0.98	21.54	142.56	38.50	-16.96	1/1
		836.50	25.55	H	3.03	-0.97	21.56	143.22	38.50	-16.94	1/1
		839.00	25.45	H	3.03	-0.96	21.46	139.96	38.50	-17.04	1/1
	16-QAM	834.00	24.48	H	3.03	-0.98	20.48	111.69	38.50	-18.02	1/1
		836.50	24.25	H	3.03	-0.97	20.26	106.17	38.50	-18.24	1/1
		839.00	24.59	H	3.03	-0.96	20.60	114.82	38.50	-17.90	1/1
15	QPSK	831.50	25.46	H	3.02	-0.99	21.45	139.64	38.50	-17.05	1/1
		836.50	25.20	H	3.03	-0.97	21.21	132.13	38.50	-17.29	1/1
		841.50	24.42	H	3.04	-0.94	20.44	110.66	38.50	-18.06	1/1
	16-QAM	831.50	24.97	H	3.02	-0.99	20.96	124.74	38.50	-17.54	1/1
		836.50	24.57	H	3.03	-0.97	20.58	114.29	38.50	-17.92	1/1
		841.50	23.60	H	3.04	-0.94	19.62	91.62	38.50	-18.88	1/1
10	QPSK	829.00	25.03	H	3.02	-1.01	21.01	126.18	38.50	-17.49	1/1
		836.50	25.32	H	3.03	-0.97	21.33	135.83	38.50	-17.17	1/1
		844.00	25.11	H	3.04	-0.93	21.14	130.02	38.50	-17.36	1/1
	16-QAM	829.00	24.01	H	3.02	-1.01	19.99	99.77	38.50	-18.51	1/26
		836.50	24.22	H	3.03	-0.97	20.23	105.44	38.50	-18.27	1/1
		844.00	24.54	H	3.04	-0.93	20.57	114.02	38.50	-17.93	1/26
5	QPSK	826.50	25.46	H	3.01	-1.02	21.43	139.00	38.50	-17.07	1/1
		836.50	25.25	H	3.03	-0.97	21.26	133.66	38.50	-17.24	1/1
		846.50	25.19	H	3.05	-0.92	21.23	132.74	38.50	-17.27	1/13
	16-QAM	826.50	24.61	H	3.01	-1.02	20.58	114.29	38.50	-17.92	1/1
		836.50	24.24	H	3.03	-0.97	20.25	105.93	38.50	-18.25	1/1
		846.50	24.10	H	3.05	-0.92	20.14	103.28	38.50	-18.36	1/1

NR Band n5 (ANT A)

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
20	QPSK	834.00	21.01	V	3.03	-0.98	17.00	50.12	38.50	-21.50	1/1
		836.50	21.13	V	3.03	-0.97	17.13	51.64	38.50	-21.37	1/1
		839.00	20.80	V	3.03	-0.96	16.81	47.97	38.50	-21.69	1/1
	16-QAM	834.00	19.89	V	3.03	-0.98	15.88	38.73	38.50	-22.62	1/1
		836.50	20.14	V	3.03	-0.97	16.14	41.11	38.50	-22.36	1/1
		839.00	19.75	V	3.03	-0.96	15.76	37.67	38.50	-22.74	1/1
15	QPSK	831.50	20.92	V	3.02	-0.99	16.90	48.98	38.50	-21.60	1/1
		836.50	21.26	V	3.03	-0.97	17.26	53.21	38.50	-21.24	1/1
		841.50	21.16	V	3.04	-0.94	17.18	52.24	38.50	-21.32	1/1
	16-QAM	831.50	19.89	V	3.02	-0.99	15.87	38.64	38.50	-22.63	1/1
		836.50	20.45	V	3.03	-0.97	16.45	44.16	38.50	-22.05	1/1
		841.50	20.13	V	3.04	-0.94	16.15	41.21	38.50	-22.35	1/1
10	QPSK	829.00	20.49	V	3.02	-1.01	16.46	44.26	38.50	-22.04	1/1
		836.50	20.94	V	3.03	-0.97	16.94	49.43	38.50	-21.56	1/1
		844.00	20.74	V	3.04	-0.93	16.77	47.53	38.50	-21.73	1/1
	16-QAM	829.00	20.16	V	3.02	-1.01	16.13	41.02	38.50	-22.37	1/26
		836.50	20.30	V	3.03	-0.97	16.30	42.66	38.50	-22.20	1/1
		844.00	19.56	V	3.04	-0.93	15.59	36.22	38.50	-22.91	1/26
5	QPSK	826.50	20.40	V	3.01	-1.02	16.37	43.35	38.50	-22.13	1/1
		836.50	20.56	V	3.03	-0.97	16.56	45.29	38.50	-21.94	1/1
		846.50	21.26	V	3.05	-0.92	17.29	53.58	38.50	-21.21	1/13
	16-QAM	826.50	18.94	V	3.01	-1.02	14.91	30.97	38.50	-23.59	1/1
		836.50	19.25	V	3.03	-0.97	15.25	33.50	38.50	-23.25	1/1
		846.50	20.30	V	3.05	-0.92	16.33	42.95	38.50	-22.17	1/1

9.2. RADIATED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1053, §22.917

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.

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 and 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

GSM850

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4791196642							
Date:		2024-05-02							
Test Engineer:		28183							
Configuration:		EUT / AC Adapter, Z-Position, Open							
Location:		Chamber 2							
Mode:		GPRS 850 MHz Harmonics							
Test Votage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamplifier (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-13.6	V	3.0	40.8	1.0	-53.4	-13.0	-40.4	
2472.60	-8.0	V	3.0	41.4	1.0	-48.5	-13.0	-35.5	
3296.80	-7.9	V	3.0	42.2	1.0	-49.1	-13.0	-36.1	
4121.00	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
4945.20	-7.6	V	3.0	42.9	1.0	-49.4	-13.0	-36.4	
1648.40	-14.0	H	3.0	40.8	1.0	-53.8	-13.0	-40.8	
2472.60	-5.3	H	3.0	41.4	1.0	-45.7	-13.0	-32.7	
3296.80	-7.0	H	3.0	42.2	1.0	-48.2	-13.0	-35.2	
4121.00	-9.2	H	3.0	42.3	1.0	-50.5	-13.0	-37.5	
4945.20	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
Mid Ch, 836.6MHz									
1673.20	-13.6	V	3.0	40.8	1.0	-53.4	-13.0	-40.4	
2509.80	1.9	V	3.0	41.5	1.0	-38.6	-13.0	-25.6	
3346.40	-7.8	V	3.0	42.2	1.0	-49.0	-13.0	-36.0	
4183.00	-8.6	V	3.0	42.3	1.0	-49.9	-13.0	-36.9	
5019.60	-7.6	V	3.0	42.9	1.0	-49.5	-13.0	-36.5	
1673.20	-14.4	H	3.0	40.8	1.0	-54.2	-13.0	-41.2	
2509.80	2.6	H	3.0	41.5	1.0	-37.9	-13.0	-24.9	
3346.40	-6.8	H	3.0	42.2	1.0	-48.0	-13.0	-35.0	
4183.00	-9.1	H	3.0	42.3	1.0	-50.5	-13.0	-37.5	
5019.60	-7.5	H	3.0	42.9	1.0	-49.4	-13.0	-36.4	
High Ch, 848.8MHz									
1697.60	-13.4	V	3.0	40.8	1.0	-53.2	-13.0	-40.2	
2546.40	-7.1	V	3.0	41.5	1.0	-47.7	-13.0	-34.7	
3395.20	-7.6	V	3.0	42.2	1.0	-48.8	-13.0	-35.8	
4244.00	-8.5	V	3.0	42.4	1.0	-49.9	-13.0	-36.9	
5092.80	-7.8	V	3.0	42.9	1.0	-49.7	-13.0	-36.7	
1697.60	-13.1	H	3.0	40.8	1.0	-52.9	-13.0	-39.9	
2546.40	-5.5	H	3.0	41.5	1.0	-46.0	-13.0	-33.0	
3395.20	-7.1	H	3.0	42.2	1.0	-48.3	-13.0	-35.3	
4244.00	-8.9	H	3.0	42.4	1.0	-50.3	-13.0	-37.3	
5092.80	-7.8	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	

GPRS
ANT A+B

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
GPRS ANT A	Company: Samsung Project #: 4791196642 Date: 2024-05-08 Test Engineer: 28183 Configuration: EUT / AC Adapter, Y-Position, FF Location: Chamber 2 Mode: GPRS 850 MHz 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, 824.2MHz									
	1648.40	-13.5	V	3.0	40.8	1.0	-53.3	-13.0	-40.3	
	2472.60	-5.1	V	3.0	41.4	1.0	-45.6	-13.0	-32.6	
	3296.80	-7.8	V	3.0	42.2	1.0	-49.0	-13.0	-36.0	
	4121.00	-8.8	V	3.0	42.3	1.0	-50.1	-13.0	-37.1	
	4945.20	-7.8	V	3.0	42.9	1.0	-49.7	-13.0	-36.7	
	1648.40	-14.2	H	3.0	40.8	1.0	-54.0	-13.0	-41.0	
	2472.60	-8.2	H	3.0	41.4	1.0	-48.6	-13.0	-35.6	
	3296.80	-7.7	H	3.0	42.2	1.0	-48.9	-13.0	-35.9	
	4121.00	-9.3	H	3.0	42.3	1.0	-50.6	-13.0	-37.6	
	4945.20	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	Mid Ch, 836.6MHz									
	1673.20	-13.4	V	3.0	40.8	1.0	-53.2	-13.0	-40.2	
	2509.80	-3.2	V	3.0	41.5	1.0	-43.7	-13.0	-30.7	
	3346.40	-6.8	V	3.0	42.2	1.0	-48.0	-13.0	-35.0	
	4183.00	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
	5019.60	-7.7	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	1673.20	-14.1	H	3.0	40.8	1.0	-53.9	-13.0	-40.9	
	2509.80	-4.3	H	3.0	41.5	1.0	-44.7	-13.0	-31.7	
	3346.40	-7.2	H	3.0	42.2	1.0	-48.4	-13.0	-35.4	
	4183.00	-9.0	H	3.0	42.3	1.0	-50.3	-13.0	-37.3	
	5019.60	-7.6	H	3.0	42.9	1.0	-49.5	-13.0	-36.5	
	High Ch, 848.8MHz									
	1697.60	-13.5	V	3.0	40.8	1.0	-53.3	-13.0	-40.3	
	2546.40	-7.5	V	3.0	41.5	1.0	-48.1	-13.0	-35.1	
	3395.20	-7.5	V	3.0	42.2	1.0	-48.7	-13.0	-35.7	
	4244.00	-8.5	V	3.0	42.4	1.0	-49.9	-13.0	-36.9	
	5092.80	-7.8	V	3.0	42.9	1.0	-49.8	-13.0	-36.8	
	1697.60	-13.9	H	3.0	40.8	1.0	-53.7	-13.0	-40.7	
	2546.40	-6.1	H	3.0	41.5	1.0	-46.7	-13.0	-33.7	
	3395.20	-7.1	H	3.0	42.2	1.0	-48.3	-13.0	-35.3	
	4244.00	-8.8	H	3.0	42.4	1.0	-50.2	-13.0	-37.2	
	5092.80	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	

WCDMA Band 5

REL99 ANT A+B	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4791196642 Date: 2024-05-03 Test Engineer: 28775 Configuration: EUT / AC Adapter, X-Position, HF Location: Chamber 1 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	-15.2	V	3.0	43.3	1.0	-57.5	-13.0	-44.5		
2479.20	-11.9	V	3.0	43.6	1.0	-54.5	-13.0	-41.5		
3305.60	-9.2	V	3.0	43.9	1.0	-52.1	-13.0	-39.1		
1652.80	-16.4	H	3.0	43.3	1.0	-58.7	-13.0	-45.7		
2479.20	-12.1	H	3.0	43.6	1.0	-54.7	-13.0	-41.7		
3305.60	-9.2	H	3.0	43.9	1.0	-52.1	-13.0	-39.1		
Mid Ch, 836.6MHz										
1673.20	-15.1	V	3.0	43.3	1.0	-57.4	-13.0	-44.4		
2509.80	-11.7	V	3.0	43.6	1.0	-54.3	-13.0	-41.3		
3346.40	-9.2	V	3.0	43.9	1.0	-52.1	-13.0	-39.1		
1673.20	-16.3	H	3.0	43.3	1.0	-58.6	-13.0	-45.6		
2509.80	-12.1	H	3.0	43.6	1.0	-54.7	-13.0	-41.7		
3346.40	-8.8	H	3.0	43.9	1.0	-51.8	-13.0	-38.8		
High Ch, 846.6MHz										
1693.20	-15.2	V	3.0	43.3	1.0	-57.5	-13.0	-44.5		
2539.80	-11.9	V	3.0	43.6	1.0	-54.5	-13.0	-41.5		
3386.40	-9.1	V	3.0	44.0	1.0	-52.0	-13.0	-39.0		
1693.20	-16.3	H	3.0	43.3	1.0	-58.6	-13.0	-45.6		
2539.80	-12.1	H	3.0	43.6	1.0	-54.7	-13.0	-41.7		
3386.40	-8.8	H	3.0	44.0	1.0	-51.7	-13.0	-38.7		

	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4791196642 Date: 2024-05-09 Test Engineer: 28775 Configuration: EUT / AC Adapter, Y-Position, FF 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
REL99 ANT A	Low Ch, 826.4MHz									
	1652.80	-14.8	V	3.0	40.8	1.0	-54.6	-13.0	-41.6	
	2479.20	-11.6	V	3.0	41.4	1.0	-52.0	-13.0	-39.0	
	3305.60	-9.1	V	3.0	42.2	1.0	-50.3	-13.0	-37.3	
	1652.80	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6	
	2479.20	-11.5	H	3.0	41.4	1.0	-51.9	-13.0	-38.9	
	3305.60	-8.7	H	3.0	42.2	1.0	-49.9	-13.0	-36.9	
	Mid Ch, 836.6MHz									
	1673.20	-14.8	V	3.0	40.8	1.0	-54.6	-13.0	-41.6	
	2509.80	-10.2	V	3.0	41.5	1.0	-50.7	-13.0	-37.7	
	3346.40	-8.6	V	3.0	42.2	1.0	-49.8	-13.0	-36.8	
	1673.20	-15.7	H	3.0	40.8	1.0	-55.5	-13.0	-42.5	
	2509.80	-11.1	H	3.0	41.5	1.0	-51.6	-13.0	-38.6	
	3346.40	-8.3	H	3.0	42.2	1.0	-49.5	-13.0	-36.5	
	High Ch, 846.6MHz									
	1693.20	-14.7	V	3.0	40.8	1.0	-54.5	-13.0	-41.5	
	2539.80	-11.4	V	3.0	41.5	1.0	-51.9	-13.0	-38.9	
	3386.40	-8.7	V	3.0	42.2	1.0	-49.9	-13.0	-36.9	
	1693.20	-15.5	H	3.0	40.8	1.0	-55.3	-13.0	-42.3	
	2539.80	-11.2	H	3.0	41.5	1.0	-51.7	-13.0	-38.7	
	3386.40	-8.3	H	3.0	42.2	1.0	-49.5	-13.0	-36.5	

LTE Band 5

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4791196642							
Date:		2024-05-02							
Test Engineer:		24542							
Configuration:		EUT / AC Adapter, Y-Position, HF							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 5 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
10 MHz									
QPSK									
ANT A+B									
Low Ch, 829MHz									
1658.00	-15.1	V	3.0	43.3	1.0	-57.4	-13.0	-44.4	
2487.00	-11.3	V	3.0	43.6	1.0	-53.8	-13.0	-40.8	
3316.00	-9.4	V	3.0	43.9	1.0	-52.3	-13.0	-39.3	
1658.00	-16.3	H	3.0	43.3	1.0	-58.6	-13.0	-45.6	
2487.00	-11.5	H	3.0	43.6	1.0	-54.1	-13.0	-41.1	
3316.00	-8.9	H	3.0	43.9	1.0	-51.8	-13.0	-38.8	
Mid Ch, 836.5MHz									
1673.00	-15.0	V	3.0	43.3	1.0	-57.3	-13.0	-44.3	
2509.50	-11.3	V	3.0	43.6	1.0	-53.8	-13.0	-40.8	
3346.00	-9.0	V	3.0	43.9	1.0	-52.0	-13.0	-39.0	
1673.00	-16.3	H	3.0	43.3	1.0	-58.7	-13.0	-45.7	
2509.50	-12.0	H	3.0	43.6	1.0	-54.6	-13.0	-41.6	
3346.00	-8.9	H	3.0	43.9	1.0	-51.8	-13.0	-38.8	
High Ch, 844MHz									
1688.00	-15.0	V	3.0	43.3	1.0	-57.3	-13.0	-44.3	
2532.00	-11.0	V	3.0	43.6	1.0	-53.6	-13.0	-40.6	
3376.00	-9.0	V	3.0	44.0	1.0	-51.9	-13.0	-38.9	
1688.00	-16.0	H	3.0	43.3	1.0	-58.4	-13.0	-45.4	
2532.00	-10.3	H	3.0	43.6	1.0	-52.9	-13.0	-39.9	
3376.00	-8.7	H	3.0	44.0	1.0	-51.7	-13.0	-38.7	

NR Band n5

20 MHz	DFT-s-OFDM	QPSK	ANT A+B	UL Verification Services, Inc.													
				Above 1GHz High Frequency Substitution Measurement													
				Company: Samsung Project #: 4791196642 Date: 2024-05-08 Test Engineer: 27089 Configuration: EUT / AC Adapter, Y-Position, Open Location: Chamber 1 Mode: 5G NR_QPSK NR n5 Harmonics, 20MHz 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, 834MHz													
				1668.00	-15.1	V	3.0	43.3	1.0	-57.4	-13.0	-44.4					
				2502.00	-10.3	V	3.0	43.6	1.0	-52.9	-13.0	-39.9					
				3336.00	-9.3	V	3.0	43.9	1.0	-52.2	-13.0	-39.2					
				1668.00	-16.3	H	3.0	43.3	1.0	-58.7	-13.0	-45.7					
				2502.00	-10.8	H	3.0	43.6	1.0	-53.4	-13.0	-40.4					
				3336.00	-9.1	H	3.0	43.9	1.0	-52.0	-13.0	-39.0					
				Mid Ch, 836.5MHz													
				1673.00	-15.2	V	3.0	43.3	1.0	-57.5	-13.0	-44.5					
				2509.50	1.4	V	3.0	43.6	1.0	-41.2	-13.0	-28.2					
				3346.00	-9.3	V	3.0	43.9	1.0	-52.2	-13.0	-39.2					
				1673.00	-16.4	H	3.0	43.3	1.0	-58.7	-13.0	-45.7					
				2509.50	-3.1	H	3.0	43.6	1.0	-45.7	-13.0	-32.7					
				3346.00	-9.8	H	3.0	43.9	1.0	-52.8	-13.0	-39.8					
				High Ch, 839MHz													
				1678.00	-15.2	V	3.0	43.3	1.0	-57.5	-13.0	-44.5					
				2517.00	-10.2	V	3.0	43.6	1.0	-52.8	-13.0	-39.8					
				3356.00	-9.2	V	3.0	43.9	1.0	-52.1	-13.0	-39.1					
				1678.00	-16.3	H	3.0	43.3	1.0	-58.6	-13.0	-45.6					
				2517.00	-10.6	H	3.0	43.6	1.0	-53.2	-13.0	-40.2					
				3356.00	-9.0	H	3.0	43.9	1.0	-51.9	-13.0	-38.9					
				5 MHz	DFT-s-OFDM	QPSK	ANT A	UL Verification Services, Inc.									
								Above 1GHz High Frequency Substitution Measurement									
								Company: Samsung Project #: 4791196642 Date: 2024-05-10 Test Engineer: 28775 Configuration: EUT / Y-Position, FF Location: Chamber 2 Mode: 5G NR_QPSK NR n5 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, 826.5MHz									
								1653.00	-14.8	V	3.0	40.8	1.0	-54.7	-13.0	-41.7	
								2479.50	-11.6	V	3.0	41.4	1.0	-52.0	-13.0	-39.0	
3306.00	-9.2	V	3.0					42.2	1.0	-50.4	-13.0	-37.4					
1653.00	-15.8	H	3.0					40.8	1.0	-55.6	-13.0	-42.6					
2479.50	-11.5	H	3.0					41.4	1.0	-52.0	-13.0	-39.0					
3306.00	-8.7	H	3.0					42.2	1.0	-49.9	-13.0	-36.9					
Mid Ch, 836.5MHz																	
1673.00	-14.9	V	3.0					40.8	1.0	-54.7	-13.0	-41.7					
2509.50	-11.4	V	3.0					41.5	1.0	-51.9	-13.0	-38.9					
3346.00	-8.7	V	3.0					42.2	1.0	-49.9	-13.0	-36.9					
1673.00	-15.8	H	3.0					40.8	1.0	-55.6	-13.0	-42.6					
2509.50	-11.3	H	3.0					41.5	1.0	-51.8	-13.0	-38.8					
3346.00	-8.4	H	3.0					42.2	1.0	-49.6	-13.0	-36.6					
High Ch, 846.5MHz																	
1693.00	-14.7	V	3.0					40.8	1.0	-54.5	-13.0	-41.5					
2539.50	-11.5	V	3.0					41.5	1.0	-52.0	-13.0	-39.0					
3386.00	-8.7	V	3.0					42.2	1.0	-49.9	-13.0	-36.9					
1693.00	-15.6	H	3.0					40.8	1.0	-55.4	-13.0	-42.4					
2539.50	-11.3	H	3.0					41.5	1.0	-51.8	-13.0	-38.8					
3386.00	-8.3	H	3.0					42.2	1.0	-49.5	-13.0	-36.5					

END OF REPORT