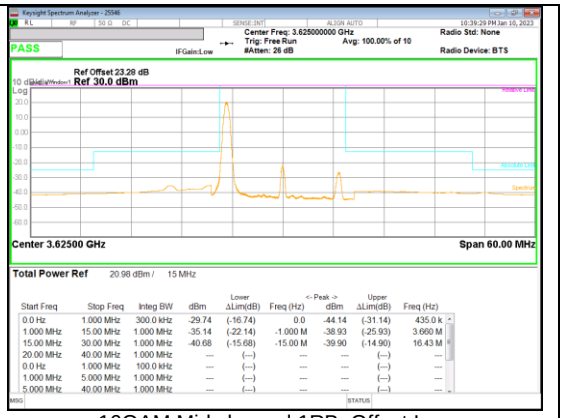
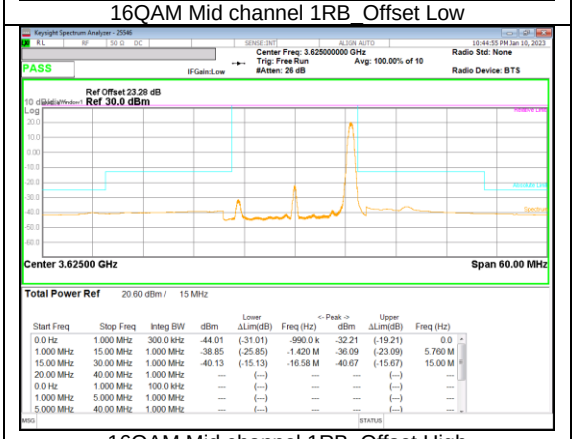
15MHz

16QAM Mid channel FRB

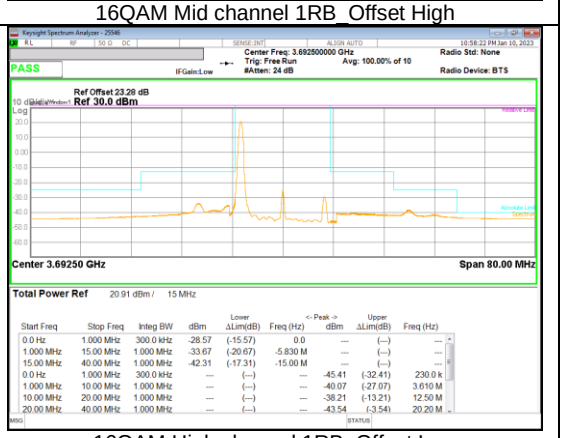


16QAM Mid channel 1RB_Offset Low

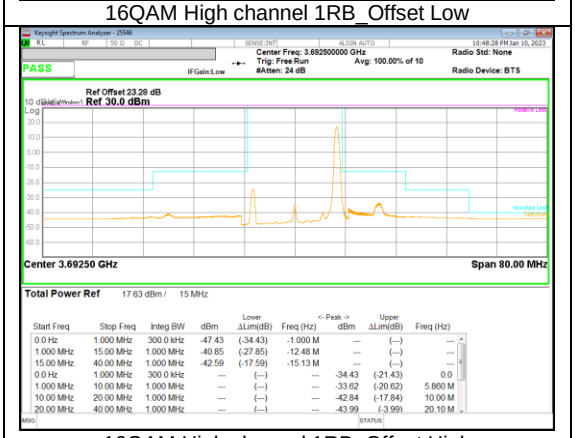


16QAM Mid channel 1RB_Offset High

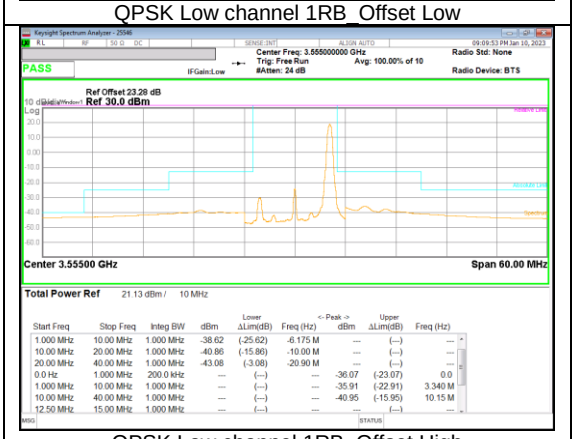
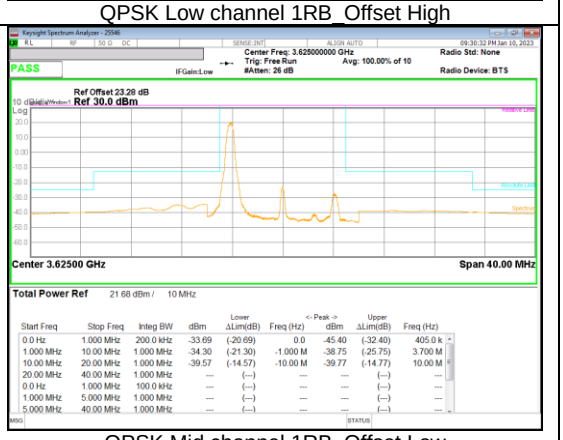
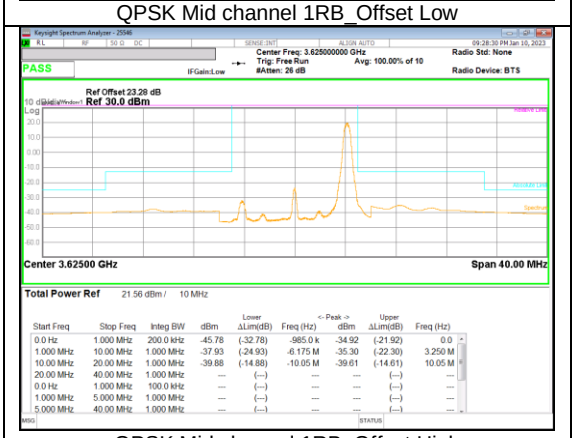
16QAM High channel FRB

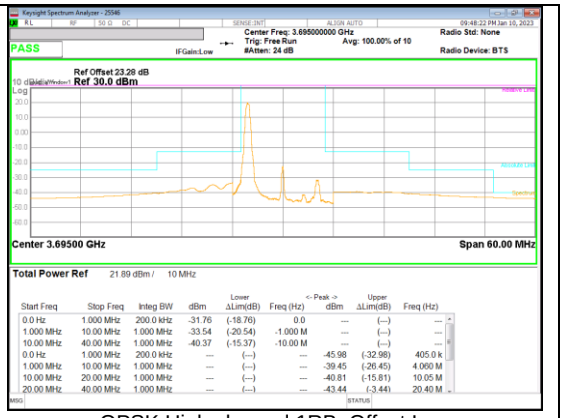
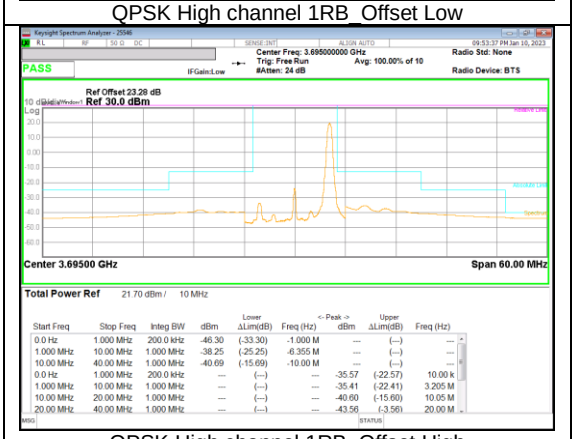
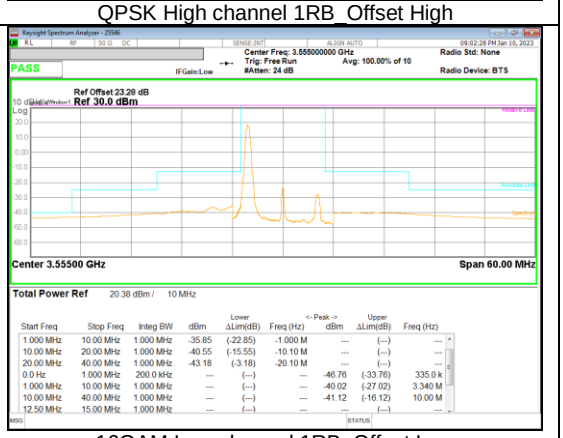
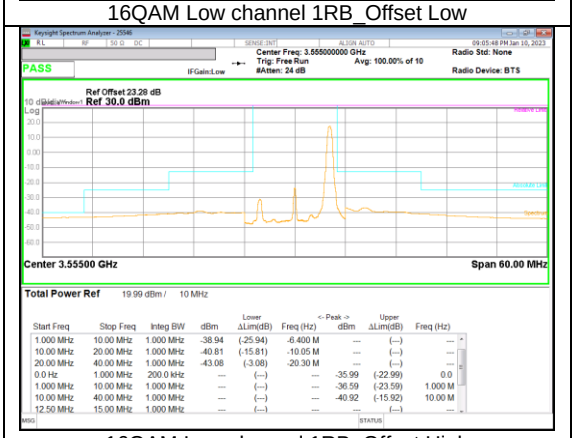


16QAM High channel 1RB_Offset Low



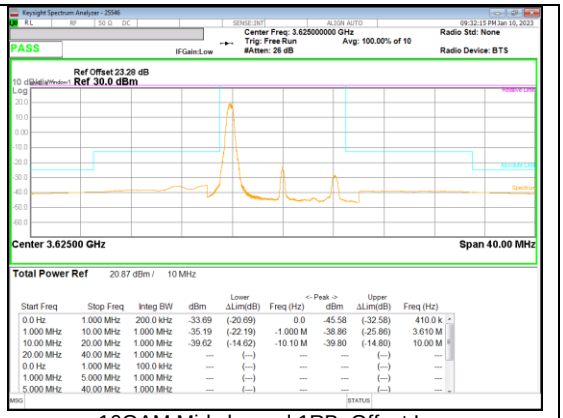
16QAM High channel 1RB_Offset High

10MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB_Offset Low
		 QPSK Low channel 1RB_Offset High
	 QPSK Mid channel FRB	 QPSK Mid channel 1RB_Offset Low
		 QPSK Mid channel 1RB_Offset High

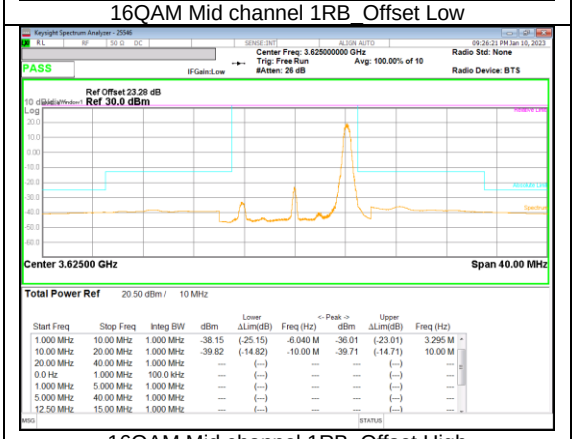
10MHz	 QPSK High channel FRB	 QPSK High channel 1RB_Offset Low
		 QPSK High channel 1RB_Offset High
10MHz	 16QAM Low channel FRB	 16QAM Low channel 1RB_Offset Low
		 16QAM Low channel 1RB_Offset High

10MHz

16QAM Mid channel FRB

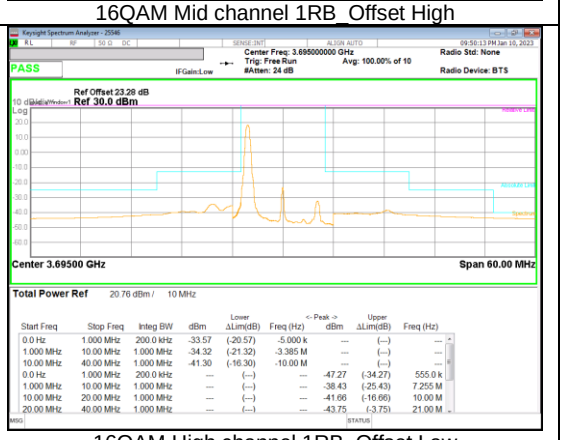


16QAM Mid channel 1RB_Offset Low

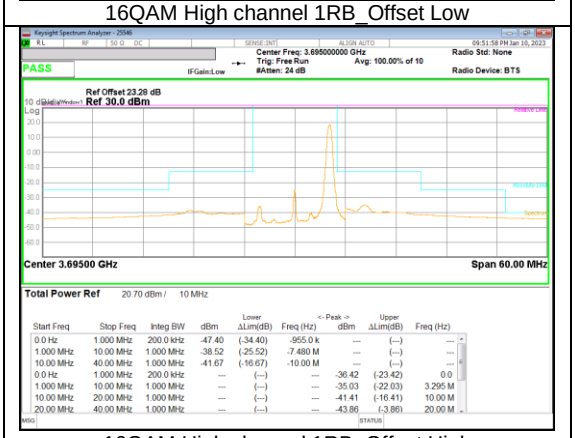


16QAM Mid channel 1RB_Offset High

16QAM High channel FRB



16QAM High channel 1RB_Offset Low



16QAM High channel 1RB_Offset High

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, and §96.41(e)

LIMITS

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

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 = 100kHz for emission below 1GHz and 1MHz for emissions above 1GHz
   A. (Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
b) Set VBW ≥ 3 × RBW
c) Sweep time = auto couple;
d) Detector = RMS;
e) Ensure that the number of measurement points = Max (40001);
f) Trace mode = Average(TDD);

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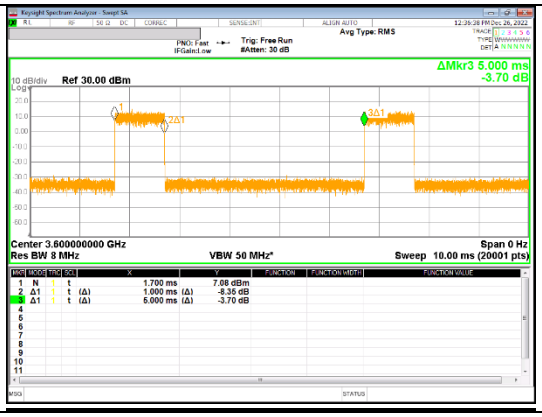
NOTE1

	
For LTE B48 CSE (Gate trigger off): RF Path Loss: 16.28 dB & DCF 2.2 dB: 10log(3/5) Measure offset: 16.28 dB+2.2 dB = 18.48 dB	For NR n48 CSE (Gate trigger off): RF Path Loss: 16.28 dB & DCF 7 dB: 10log(1/5) Measure offset: 16.28 dB+7 dB = 23.28 dB

NOTE2

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

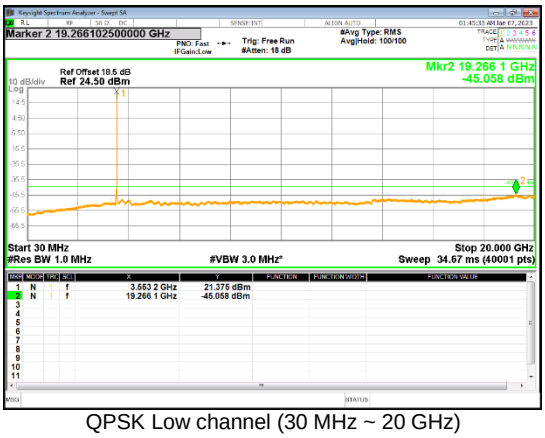
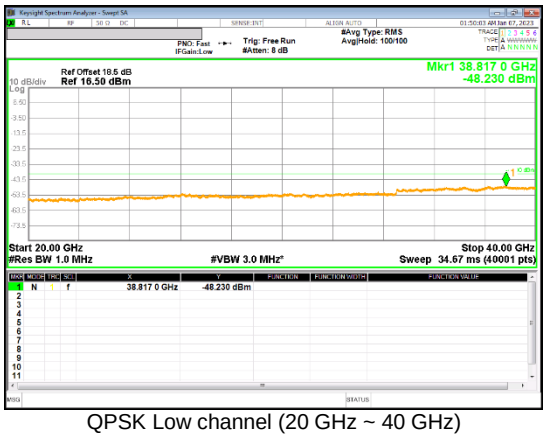
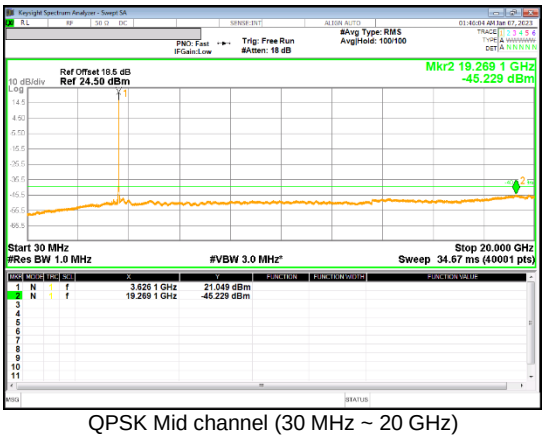
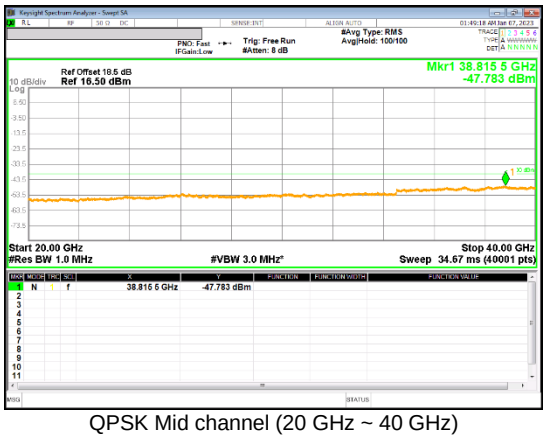
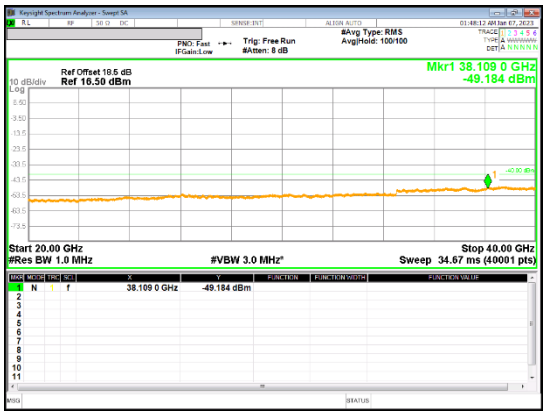
NOTE3

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations (π/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.

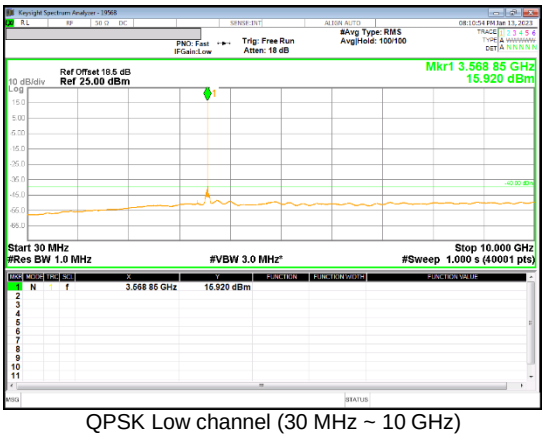
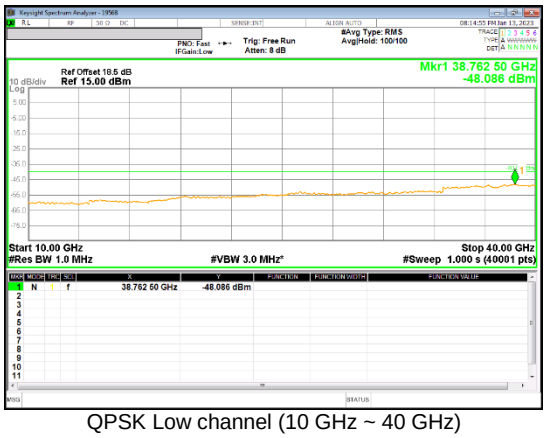
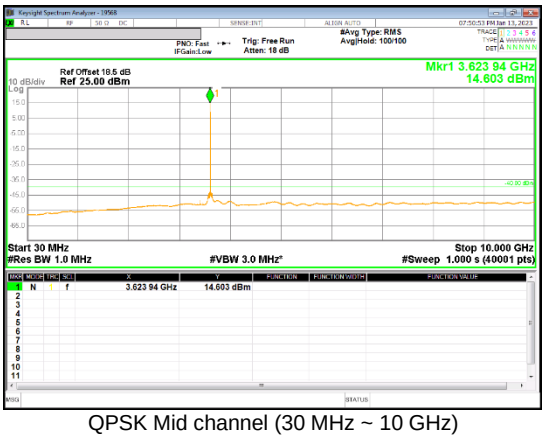
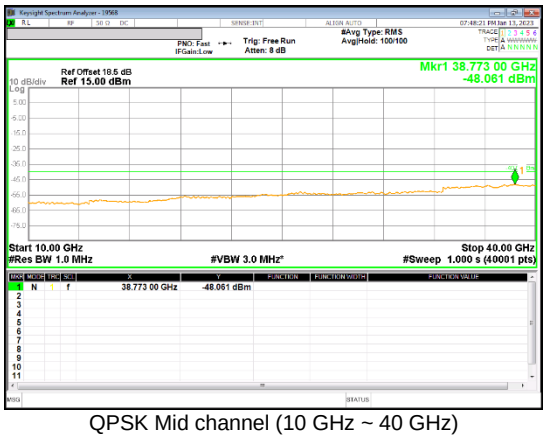
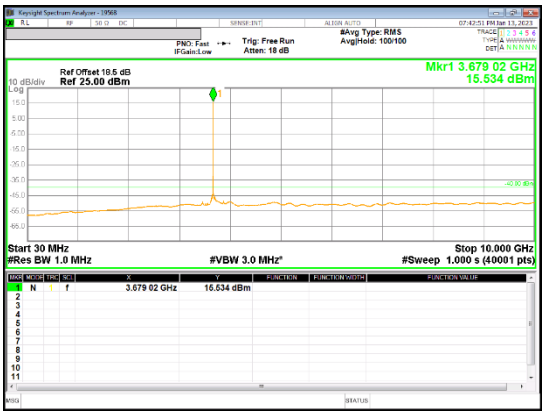
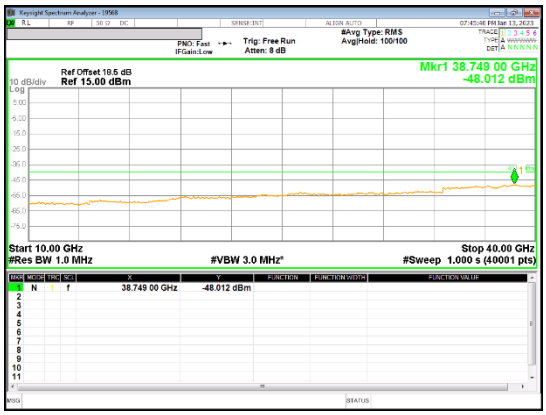
RESULTS

See the following pages.

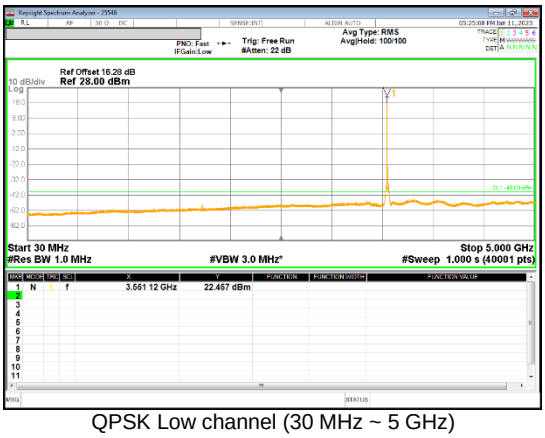
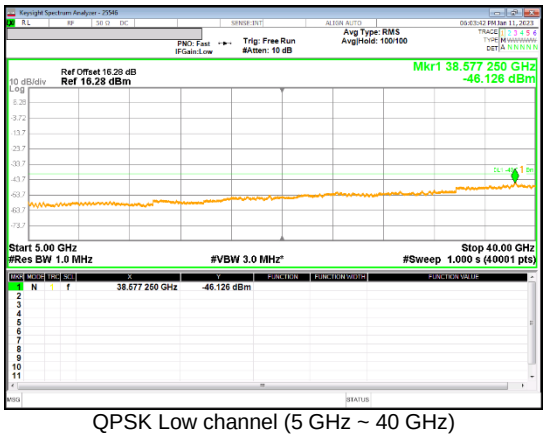
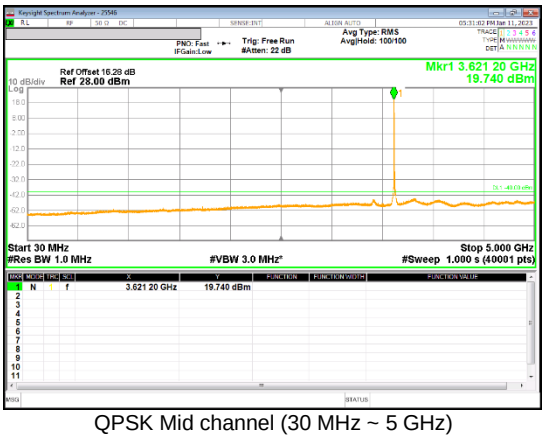
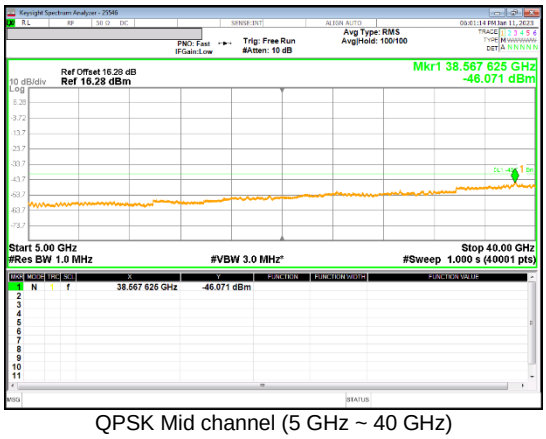
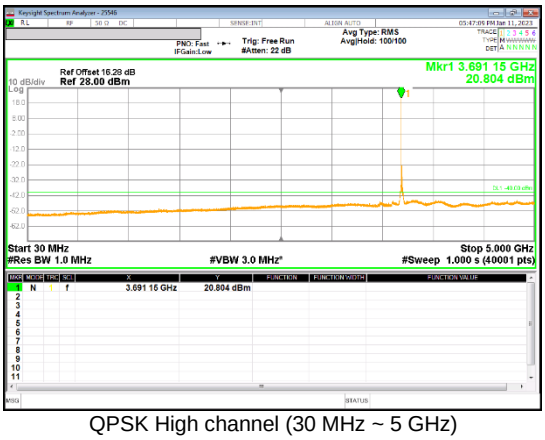
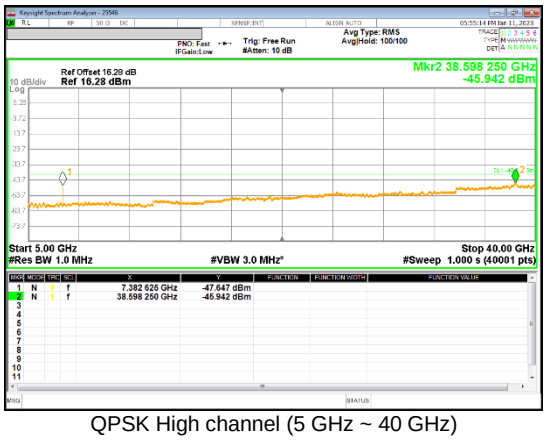
LTE Band 48

5 MHz	 QPSK Low channel (30 MHz ~ 20 GHz)	 QPSK Low channel (20 GHz ~ 40 GHz)
	 QPSK Mid channel (30 MHz ~ 20 GHz)	 QPSK Mid channel (20 GHz ~ 40 GHz)
	 QPSK High channel (30 MHz ~ 20 GHz)	 QPSK High channel (20 GHz ~ 40 GHz)

LTE Band 48(UL CA)

20+20 MHz	 QPSK Low channel (30 MHz ~ 10 GHz)	 QPSK Low channel (10 GHz ~ 40 GHz)
	 QPSK Mid channel (30 MHz ~ 10 GHz)	 QPSK Mid channel (10 GHz ~ 40 GHz)
	 QPSK High channel (30 MHz ~ 10 GHz)	 QPSK High channel (10 GHz ~ 40 GHz)

NR Band n48

40 MHz	 QPSK Low channel (30 MHz ~ 5 GHz)	 QPSK Low channel (5 GHz ~ 40 GHz)
	 QPSK Mid channel (30 MHz ~ 5 GHz)	 QPSK Mid channel (5 GHz ~ 40 GHz)
	 QPSK High channel (30 MHz ~ 5 GHz)	 QPSK High channel (5 GHz ~ 40 GHz)

9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055

LIMITS

For Part 96, 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

RESULTS

See the following pages.

NOTE

Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

LTE Band 48(Lowest Frequency: 16QAM / Highest Frequency: 16QAM)

Test Date	2022-12-07
Test Engineer	19568

Limit		3550	3700	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	3550.2513	3699.7320		
Extreme (50C)		3550.2513	3699.7320	33.2	0.009
Extreme (40C)		3550.2513	3699.7320	30.2	0.008
Extreme (30C)		3550.2513	3699.7320	25.4	0.007
Extreme (10C)		3550.2513	3699.7320	28.0	0.008
Extreme (0C)		3550.2513	3699.7320	30.2	0.008
Extreme (-10C)		3550.2513	3699.7320	31.3	0.009
Extreme (-20C)		3550.2513	3699.7320	35.5	0.010
Extreme (-30C)		3550.2513	3699.7320	27.5	0.008
20C	15%	3550.2513	3699.7320	30.3	0.008
	-15%	3550.2513	3699.7320	32.7	0.009
	End Point	3550.2513	3699.7320	33.5	0.009

NR Band n48(Lowest Frequency: QPSK / Highest Frequency: QPSK)

Test Date	2022-12-09
Test Engineer	19568

Limit		3550	3700	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	3548.1976	3701.8048		
Extreme (50C)		3548.1976	3701.8048	20.4	0.006
Extreme (40C)		3548.1976	3701.8048	21.6	0.006
Extreme (30C)		3548.1976	3701.8048	22.5	0.006
Extreme (10C)		3548.1976	3701.8048	19.3	0.005
Extreme (0C)		3548.1976	3701.8048	15.8	0.004
Extreme (-10C)		3548.1976	3701.8048	16.6	0.005
Extreme (-20C)		3548.1976	3701.8048	13.5	0.004
Extreme (-30C)		3548.1976	3701.8048	22.8	0.006
20C	15%	3548.1976	3701.8048	23.7	0.007
	-15%	3548.1976	3701.8048	21.7	0.006
	End Point	3548.1976	3701.8048	19.5	0.005

9.5. END USER DEVICE(CBSD PROTOCOL)

RULE PART(S)

FCC: §96.47

LIMITS

End user devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

An end user device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

TEST PROCEDURE

Per KDB 940660 D01 Part 96 CBRS Eqpt v03

RESULTS

Not performed.
Please refer to LTE B48 & n48 CBSD test report.

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9.6. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §96.41(b)

LIMITS

FCC: §96.41(b)

(b) Unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table.

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a

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 ≥ OBW;
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 2 x RBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ 2 x span/RBW;
g) Trace mode = Average;

TEST RESULTS

RF Output Power(total power) EIRP results meets Maximum EIRP limit (23 dBm/10MHz) of End User Device.

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NOTE1

LTE Band 48 A-MPR is implemented in this EUT per the A-MPR specification in 3GPP TS 36.101 (Table 6.2.4-22). Conducted output power verification data are shown Appendix A. Also only Emission mask test item were performd A-MPR condition. Also only Emission mask test item were performd A-MPR condition

LTE Band 48C A-MPR is implemented in this EUT per the A-MPR specification in 3GPP TS 36.101 (Table 6.2.4A,10-1, Table 6.2.4A,10-2). Conducted output power verification data are shown Appendix A. Also only Emission mask test item were performd A-MPR condition. Also only Emission mask test item were performd A-MPR condition

NR Band n48 A-MPR is implemented in this EUT per the A-MPR specification in 3GPP TS 36.101 (Table 6.2.4-22). Conducted output power verification data are shown Appendix A. Also only Emission mask test item were performd A-MPR condition. Also only Emission mask test item were performd A-MPR condition

NOTE2

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations (π/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.

RESULTS

See the following pages

9.6.1. ERP/EIRP Results

LTE Band 48

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
5	QPSK	3552.50	17.43	H	6.40	10.76	21.79	151.01	23.00	-1.21	1/12
		3625.00	17.02	H	6.48	10.80	21.35	136.46	23.00	-1.65	1/12
		3697.50	17.21	H	6.54	10.75	21.42	138.68	23.00	-1.58	1/12
	16-QAM	3552.50	16.95	H	6.40	10.76	21.31	135.21	23.00	-1.69	1/12
		3625.00	16.69	H	6.48	10.80	21.02	126.47	23.00	-1.98	1/12
		3697.50	16.90	H	6.54	10.75	21.11	129.12	23.00	-1.89	1/12
10	QPSK	3555.00	17.23	H	6.41	10.76	21.59	144.21	23.00	-1.41	1/49
		3625.00	16.84	H	6.48	10.80	21.17	130.92	23.00	-1.83	1/0
		3695.00	17.30	H	6.54	10.76	21.52	141.91	23.00	-1.48	1/0
	16-QAM	3555.00	16.73	H	6.41	10.76	21.09	128.53	23.00	-1.91	1/49
		3625.00	16.36	H	6.48	10.80	20.69	117.22	23.00	-2.31	1/25
		3695.00	16.88	H	6.54	10.76	21.10	128.82	23.00	-1.90	1/25
15	QPSK	3557.50	17.42	H	6.40	10.77	21.78	150.66	23.00	-1.22	1/37
		3625.00	16.70	H	6.48	10.80	21.02	126.47	23.00	-1.98	1/37
		3692.50	16.64	H	6.53	10.76	20.86	121.90	23.00	-2.14	1/37
	16-QAM	3557.50	17.06	H	6.40	10.77	21.42	138.68	23.00	-1.58	1/37
		3625.00	16.22	H	6.48	10.80	20.55	113.50	23.00	-2.45	1/74
		3692.50	16.35	H	6.53	10.76	20.57	114.02	23.00	-2.43	1/37
20	QPSK	3560.00	17.27	H	6.41	10.77	21.63	145.51	23.00	-1.37	1/0
		3625.00	16.75	H	6.48	10.80	21.08	128.23	23.00	-1.92	1/99
		3690.00	17.14	H	6.53	10.76	21.37	137.09	23.00	-1.63	1/0
	16-QAM	3560.00	16.81	H	6.41	10.77	21.17	130.92	23.00	-1.83	1/0
		3625.00	16.53	H	6.48	10.80	20.86	121.90	23.00	-2.14	1/49
		3690.00	16.77	H	6.53	10.76	21.00	125.89	23.00	-2.00	1/99

NR Band n48

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
10	QPSK	3555.00	14.70	H	6.41	10.76	19.05	80.35	23.00	-3.95	1/1
		3624.99	15.14	H	6.48	10.80	19.46	88.31	23.00	-3.54	1/1
		3694.98	17.70	H	6.54	10.76	21.91	155.24	23.00	-1.09	1/1
	16-QAM	3555.00	13.63	H	6.41	10.80	18.02	63.39	23.00	-4.98	1/1
		3624.99	14.30	H	6.48	10.73	18.55	71.61	23.00	-4.45	1/1
		3694.98	16.65	H	6.54	10.58	20.69	117.22	23.00	-2.31	1/1
15	QPSK	3575.52	16.05	H	6.40	10.77	20.41	109.90	23.00	-2.59	1/1
		3624.99	14.58	H	6.48	10.80	18.90	77.62	23.00	-4.10	1/1
		3692.49	17.69	H	6.53	10.76	21.92	155.60	23.00	-1.08	1/1
	16-QAM	3575.52	15.29	H	6.40	10.80	19.69	93.11	23.00	-3.31	1/1
		3624.99	13.45	H	6.48	10.73	17.70	58.88	23.00	-5.30	1/1
		3692.49	16.43	H	6.53	10.59	20.49	111.94	23.00	-2.51	1/1
20	QPSK	3560.00	16.51	H	6.41	10.80	20.90	123.03	23.00	-2.10	1/26
		3624.99	14.68	H	6.48	10.73	18.93	78.16	23.00	-4.07	1/26
		3690.00	16.67	H	6.53	10.59	20.73	118.30	23.00	-2.27	1/26
	16-QAM	3560.00	15.79	H	6.41	10.80	20.18	104.23	23.00	-2.82	1/26
		3624.00	14.27	H	6.48	10.73	18.52	71.12	23.00	-4.48	1/26
		3690.00	16.34	H	6.53	10.59	20.40	109.65	23.00	-2.60	1/26
40	QPSK	3570.00	16.22	H	6.41	10.80	20.60	114.82	23.00	-2.40	1/1
		3624.99	15.02	H	6.48	10.73	19.27	84.53	23.00	-3.73	1/53
		3679.98	17.16	H	6.52	10.61	21.25	133.35	23.00	-1.75	1/104
	16-QAM	3570.00	15.12	H	6.41	10.80	19.50	89.13	23.00	-3.50	1/1
		3624.99	14.20	H	6.48	10.73	18.45	69.98	23.00	-4.55	1/53
		3679.98	16.39	H	6.52	10.61	20.48	111.69	23.00	-2.52	1/104

NR Band n48(SRS1)

BW (MHz)	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
10	3555.00								
	3624.99								
	3694.98								
15	3575.52								
	3624.99								
	3692.49								
20	3560.00	9.38	H	6.41	10.77	13.74	23.64	23.00	-9.26
	3624.99	11.05	H	6.48	10.80	15.38	34.53	23.00	-7.62
	3690.00	11.43	H	6.53	10.76	15.66	36.81	23.00	-7.34
40	3570.00								
	3624.99								
	3679.98								

NR Band n48(SRS2)

BW (MHz)	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
10	3555.00								
	3624.99								
	3694.98								
15	3575.52								
	3624.99								
	3692.49								
20	3560.00	15.12	H	6.41	10.77	19.48	88.65	23.00	-3.52
	3624.99	13.15	H	6.48	10.80	17.48	56.00	23.00	-5.52
	3690.00	12.42	H	6.53	10.76	16.65	46.21	23.00	-6.35
40	3570.00								
	3624.99								
	3679.98								

NR Band n48(SRS3)

BW (MHz)	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
10	3555.00								
	3624.99								
	3694.98								
15	3575.52	6.61	H	6.40	10.77	10.98	12.52	23.00	-12.02
	3624.99	6.70	H	6.48	10.80	11.03	12.68	23.00	-11.97
	3692.49	6.91	H	6.53	10.76	11.13	12.98	23.00	-11.87
20	3560.00								
	3624.99								
	3690.00								
40	3570.00								
	3624.99								
	3679.98								

9.7. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053 and §96.41(e)

LIMIT

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

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 1GHz and 1MHz for emissions above 1GHz
b) Set VBW ≥ 3 × RBW;
c) Sweep time = auto couple;
d) Detector = rms;
e) Ensure that the number of measurement points ≥ span/RBW;
f) Trace mode = Average;

RESULTS

See the following pages.

NOTE1

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations (π/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 band.

9.7.1. SPURIOUS RADIATION PLOTS

LTE Band 48

5MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	4790632299
Date:	2022-12-27
Test Engineer:	26087
Configuration:	EUT, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 48 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, 3552.5MHz									
7105.00	-18.7	V	3.0	42.9	1.0	-60.6	-40.0	-20.6	
10657.50	-18.9	V	3.0	41.4	1.0	-59.3	-40.0	-19.3	
14210.00	-15.3	V	3.0	43.4	1.0	-57.7	-40.0	-17.7	
7105.00	-19.3	H	3.0	42.9	1.0	-61.2	-40.0	-21.2	
10657.50	-19.0	H	3.0	41.4	1.0	-59.4	-40.0	-19.4	
14210.00	-15.0	H	3.0	43.4	1.0	-57.4	-40.0	-17.4	
Mid Ch, 3625MHz									
7250.00	-8.0	V	3.0	42.8	1.0	-49.8	-40.0	-9.8	
10875.00	-18.3	V	3.0	41.5	1.0	-58.8	-40.0	-18.8	
14500.00	-15.7	V	3.0	43.6	1.0	-58.3	-40.0	-18.3	
7250.00	-7.8	H	3.0	42.8	1.0	-49.6	-40.0	-9.6	
10875.00	-18.2	H	3.0	41.5	1.0	-58.7	-40.0	-18.7	
14500.00	-15.2	H	3.0	43.6	1.0	-57.8	-40.0	-17.8	
High Ch, 3697.5MHz									
7395.00	-10.1	V	3.0	42.7	1.0	-51.8	-40.0	-11.8	
11092.50	-17.2	V	3.0	41.6	1.0	-57.7	-40.0	-17.7	
14790.00	-14.8	V	3.0	43.8	1.0	-57.6	-40.0	-17.6	
7395.00	-12.2	H	3.0	42.7	1.0	-53.9	-40.0	-13.9	
11092.50	-17.4	H	3.0	41.6	1.0	-58.0	-40.0	-18.0	
14790.00	-14.5	H	3.0	43.8	1.0	-57.2	-40.0	-17.2	

LTE Band 48(UL CA)

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4790632229
Date: 2023-01-04
Test Engineer: 26087
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 48 Harmonics, 20+20MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

20+20 MHz

QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, PCC : 3560MHz SCC : 3579.8MHz									
7139.80	-13.2	V	3.0	42.9	1.0	-55.1	-40.0	-15.1	
10709.70	-18.2	V	3.0	41.4	1.0	-58.6	-40.0	-18.6	
14279.60	-15.6	V	3.0	43.5	1.0	-58.0	-40.0	-18.0	
7139.80	-12.5	H	3.0	42.9	1.0	-54.3	-40.0	-14.3	
10709.70	-18.4	H	3.0	41.4	1.0	-58.8	-40.0	-18.8	
14279.60	-15.4	H	3.0	43.5	1.0	-57.9	-40.0	-17.9	
Mid Ch, PCC : 3615.1MHz SCC : 3634.9MHz									
7250.00	-3.2	V	3.0	42.8	1.0	-45.0	-40.0	-5.0	
10875.00	-20.4	V	3.0	41.5	1.0	-60.9	-40.0	-20.9	
14500.00	-17.5	V	3.0	43.6	1.0	-60.1	-40.0	-20.1	
7250.00	-9.0	H	3.0	42.8	1.0	-50.8	-40.0	-10.8	
10875.00	-20.1	H	3.0	41.5	1.0	-60.6	-40.0	-20.6	
14500.00	-17.4	H	3.0	43.6	1.0	-60.0	-40.0	-20.0	
High Ch, PCC : 3670.2MHz SCC : 3690MHz									
7660.20	-21.2	V	3.0	42.6	1.0	-62.8	-40.0	-22.8	
11490.30	-17.7	V	3.0	41.7	1.0	-58.5	-40.0	-18.5	
15320.40	-15.4	V	3.0	43.8	1.0	-58.2	-40.0	-18.2	
7660.20	-21.0	H	3.0	42.6	1.0	-62.6	-40.0	-22.6	
11490.30	-17.5	H	3.0	41.7	1.0	-58.2	-40.0	-18.2	
15320.40	-15.1	H	3.0	43.8	1.0	-58.0	-40.0	-18.0	

NR Band n48

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4790632299
Date: 2023-01-03
Test Engineer: 25770
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: 5G NR_QPSK NR n48 Harmonics, 15MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

15MHz

QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3557.5MHz									
7115.00	-14.9	V	3.0	42.9	1.0	-56.7	-40.0	-16.7	
10672.50	-18.7	V	3.0	41.4	1.0	-59.1	-40.0	-19.1	
14230.00	-15.5	V	3.0	43.4	1.0	-57.9	-40.0	-17.9	
7115.00	-14.8	H	3.0	42.9	1.0	-56.7	-40.0	-16.7	
10672.50	-18.7	H	3.0	41.4	1.0	-59.1	-40.0	-19.1	
14230.00	-15.3	H	3.0	43.4	1.0	-57.7	-40.0	-17.7	
Mid Ch, 3625MHz									
7250.00	-8.0	V	3.0	42.8	1.0	-49.8	-40.0	-9.8	
10875.00	-18.7	V	3.0	41.5	1.0	-59.2	-40.0	-19.2	
14500.00	-15.3	V	3.0	43.6	1.0	-57.9	-40.0	-17.9	
7250.00	-16.7	H	3.0	42.8	1.0	-58.5	-40.0	-18.5	
10875.00	-18.8	H	3.0	41.5	1.0	-59.3	-40.0	-19.3	
14500.00	-15.2	H	3.0	43.6	1.0	-57.8	-40.0	-17.8	
High Ch, 3692.5MHz									
7385.00	-11.6	V	3.0	42.7	1.0	-53.3	-40.0	-13.3	
11077.50	-17.4	V	3.0	41.6	1.0	-58.0	-40.0	-18.0	
14770.00	-14.8	V	3.0	43.8	1.0	-57.6	-40.0	-17.6	
7385.00	-13.3	H	3.0	42.7	1.0	-55.0	-40.0	-15.0	
11077.50	-17.6	H	3.0	41.6	1.0	-58.1	-40.0	-18.1	
14770.00	-14.6	H	3.0	43.8	1.0	-57.4	-40.0	-17.4	

NR Band n48(SRS1)

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4790632299
Date: 2023-01-16
Test Engineer: 26087
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 1
Mode: 5G NR_QPSK NR n48 Harmonics, 20MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

20MHz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz									
7120.00	-5.4	V	3.0	45.5	1.0	-49.9	-40.0	-9.9	
10680.00	-9.0	V	3.0	46.1	1.0	-54.1	-40.0	-14.1	
14240.00	-10.5	V	3.0	46.4	1.0	-55.9	-40.0	-15.9	
7120.00	-6.9	H	3.0	45.5	1.0	-51.4	-40.0	-11.4	
10680.00	-9.0	H	3.0	46.1	1.0	-54.1	-40.0	-14.1	
14240.00	-10.3	H	3.0	46.4	1.0	-55.8	-40.0	-15.8	
Mid Ch, 3625MHz									
7250.00	-4.6	V	3.0	45.5	1.0	-49.1	-40.0	-9.1	
10875.00	-8.7	V	3.0	46.3	1.0	-54.0	-40.0	-14.0	
14500.00	-11.7	V	3.0	46.3	1.0	-57.0	-40.0	-17.0	
7250.00	-6.5	H	3.0	45.5	1.0	-51.0	-40.0	-11.0	
10875.00	-8.5	H	3.0	46.3	1.0	-53.8	-40.0	-13.8	
14500.00	-11.8	H	3.0	46.3	1.0	-57.2	-40.0	-17.2	
High Ch, 3690MHz									
7380.00	-3.3	V	3.0	45.5	1.0	-47.8	-40.0	-7.8	
11070.00	-8.7	V	3.0	46.5	1.0	-54.2	-40.0	-14.2	
14760.00	-10.0	V	3.0	46.2	1.0	-55.3	-40.0	-15.3	
7380.00	-7.8	H	3.0	45.5	1.0	-52.4	-40.0	-12.4	
11070.00	-9.0	H	3.0	46.5	1.0	-54.5	-40.0	-14.5	
14760.00	-9.8	H	3.0	46.2	1.0	-55.0	-40.0	-15.0	

NR Band n48(SRS2)

10MHz

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4790632299
Date: 2023-01-13
Test Engineer: 26087
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: 5G NR_QPSK NR n48 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, 3560MHz									
7120.00	-8.3	V	3.0	45.5	1.0	-52.8	-40.0	-12.8	
10680.00	-5.9	V	3.0	46.1	1.0	-51.0	-40.0	-11.0	
14240.00	-10.5	V	3.0	46.4	1.0	-55.9	-40.0	-15.9	
7120.00	-6.1	H	3.0	45.5	1.0	-50.6	-40.0	-10.6	
10680.00	-5.9	H	3.0	46.1	1.0	-51.0	-40.0	-11.0	
14240.00	-10.6	H	3.0	46.4	1.0	-56.1	-40.0	-16.1	
Mid Ch, 3625MHz									
7250.00	-7.0	V	3.0	45.5	1.0	-51.5	-40.0	-11.5	
10875.00	-8.5	V	3.0	46.3	1.0	-53.8	-40.0	-13.8	
14500.00	-12.2	V	3.0	46.3	1.0	-57.5	-40.0	-17.5	
7250.00	-5.7	H	3.0	45.5	1.0	-50.2	-40.0	-10.2	
10875.00	-8.5	H	3.0	46.3	1.0	-53.8	-40.0	-13.8	
14500.00	-11.6	H	3.0	46.3	1.0	-57.0	-40.0	-17.0	
High Ch, 3690MHz									
7380.00	-9.5	V	3.0	45.5	1.0	-54.1	-40.0	-14.1	
11070.00	-8.6	V	3.0	46.5	1.0	-54.1	-40.0	-14.1	
14760.00	-10.2	V	3.0	46.2	1.0	-55.5	-40.0	-15.5	
7380.00	-7.3	H	3.0	45.5	1.0	-51.8	-40.0	-11.8	
11070.00	-8.3	H	3.0	46.5	1.0	-53.7	-40.0	-13.7	
14760.00	-10.3	H	3.0	46.2	1.0	-55.5	-40.0	-15.5	

NR Band n48(SRS3)

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4790632299
Date: 2023-01-13
Test Engineer: 26087
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: 5G NR_QPSK NR n48 Harmonics, 15MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

10MHz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3557.5MHz									
7115.00	-12.7	V	3.0	45.5	1.0	-57.2	-40.0	-17.2	
10672.50	-8.1	V	3.0	46.1	1.0	-53.3	-40.0	-13.3	
14230.00	-10.6	V	3.0	46.4	1.0	-56.1	-40.0	-16.1	
7115.00	-12.7	H	3.0	45.5	1.0	-57.2	-40.0	-17.2	
10672.50	-8.8	H	3.0	46.1	1.0	-53.9	-40.0	-13.9	
14230.00	-10.3	H	3.0	46.4	1.0	-55.7	-40.0	-15.7	
Mid Ch, 3625MHz									
7250.00	-12.1	V	3.0	45.5	1.0	-56.6	-40.0	-16.6	
10875.00	-8.8	V	3.0	46.3	1.0	-54.1	-40.0	-14.1	
14500.00	-12.2	V	3.0	46.3	1.0	-57.5	-40.0	-17.5	
7250.00	-12.3	H	3.0	45.5	1.0	-56.8	-40.0	-16.8	
10875.00	-8.6	H	3.0	46.3	1.0	-53.9	-40.0	-13.9	
14500.00	-12.0	H	3.0	46.3	1.0	-57.4	-40.0	-17.4	
High Ch, 3692.5MHz									
7385.00	-12.1	V	3.0	45.5	1.0	-56.6	-40.0	-16.6	
11077.50	-8.5	V	3.0	46.5	1.0	-54.0	-40.0	-14.0	
14770.00	-10.2	V	3.0	46.2	1.0	-55.4	-40.0	-15.4	
7385.00	-12.0	H	3.0	45.5	1.0	-56.6	-40.0	-16.6	
11077.50	-8.9	H	3.0	46.5	1.0	-54.4	-40.0	-14.4	
14770.00	-10.1	H	3.0	46.2	1.0	-55.4	-40.0	-15.4	

END OF TEST REPORT

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