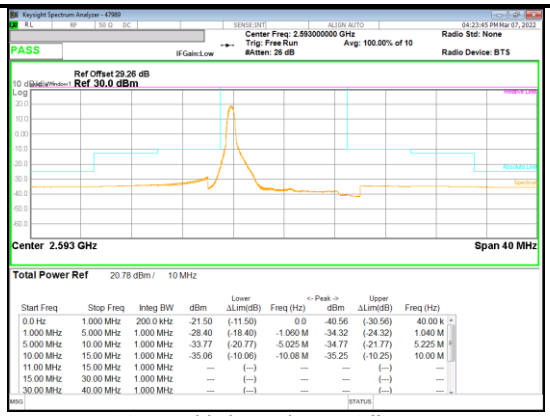
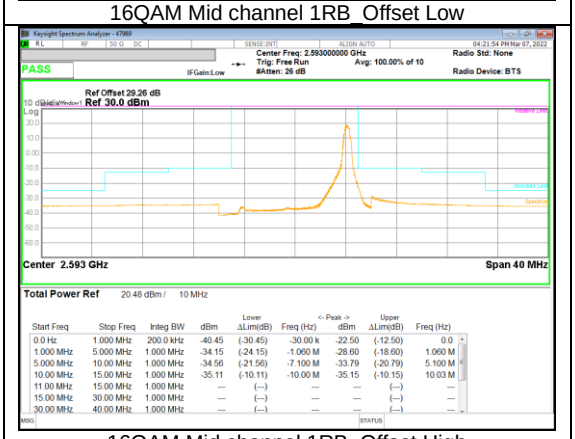
10MHz

16QAM

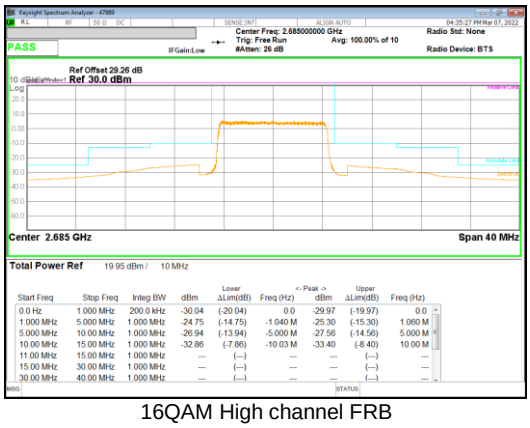
16QAM Mid channel FRB



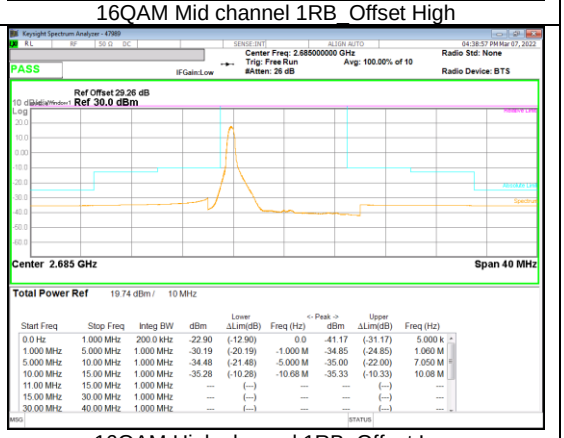
16QAM Mid channel 1RB_Offset Low



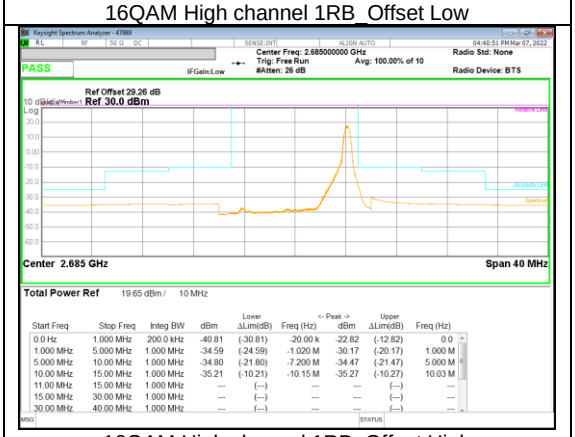
16QAM Mid channel 1RB_Offset High



16QAM High channel FRB



16QAM High channel 1RB_Offset Low



16QAM High channel 1RB_Offset High

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9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §27.53 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 27.53:

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log_{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.

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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 (Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)

b) Set VBW ≥ 3 × 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 FDD, 5G NR FDD), Max hold(GSM, LTE TDD, 5G NR TDD);

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 bands.

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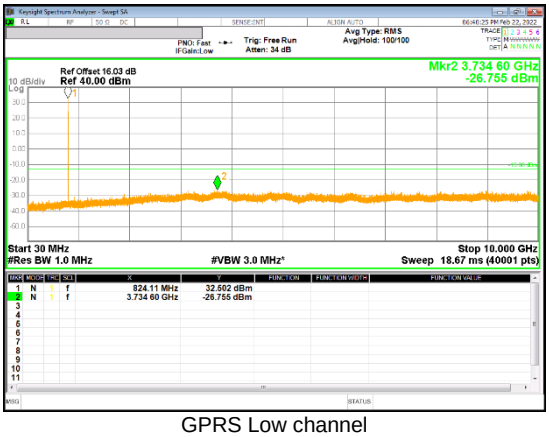
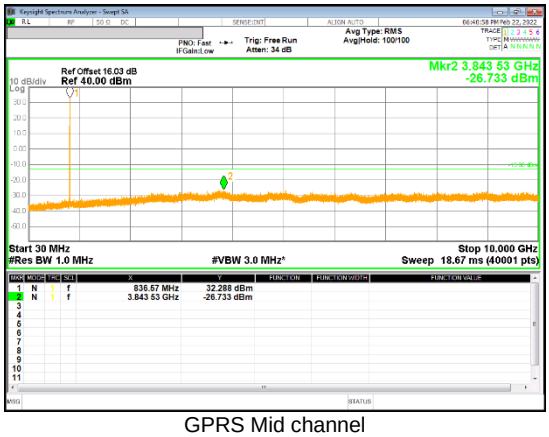
9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850

GSM 850	 GPRS Low channel	 GPRS Mid channel
	 GPRS High channel	

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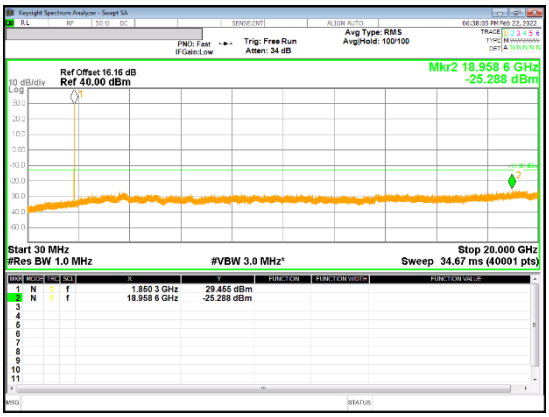
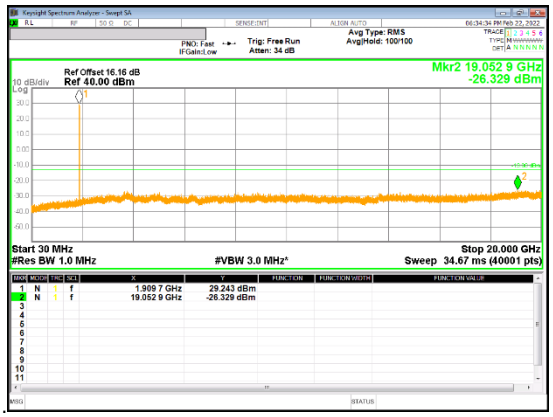
GSM 1900

GSM 1900



GPRS Low channel

GPRS Mid channel



GPRS High channel

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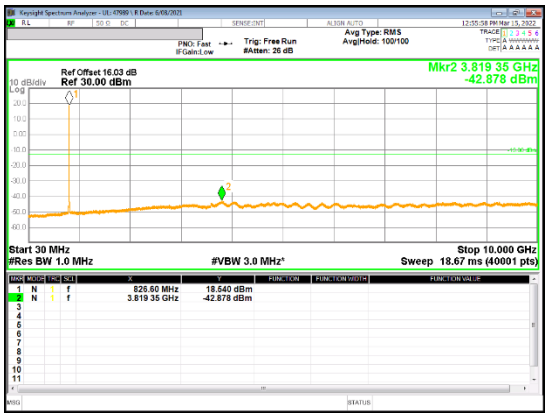
WCDMA Band 5

Band 5



REL99 Low channel

REL99 Mid channel

REL99 High channel

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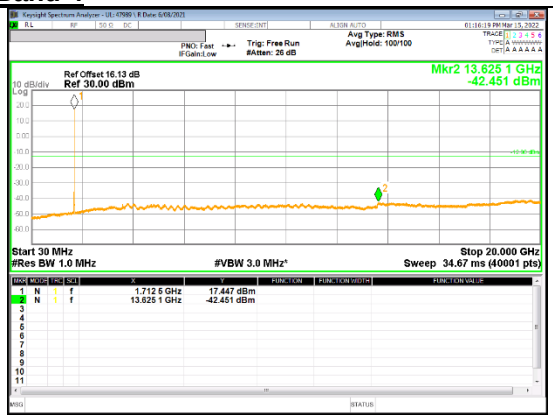
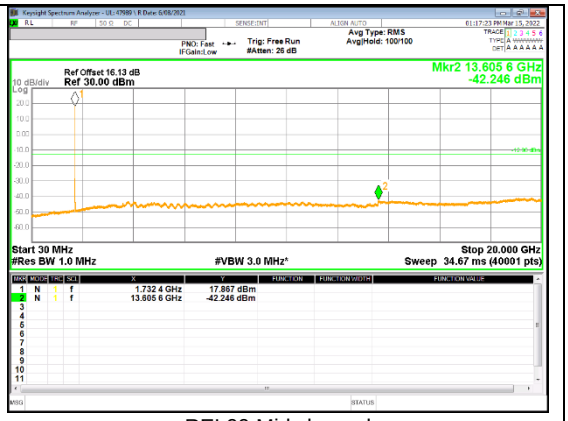
WCDMA Band 4

Band 4	 REL99 Low channel	 REL99 Mid channel
	 REL99 High channel	

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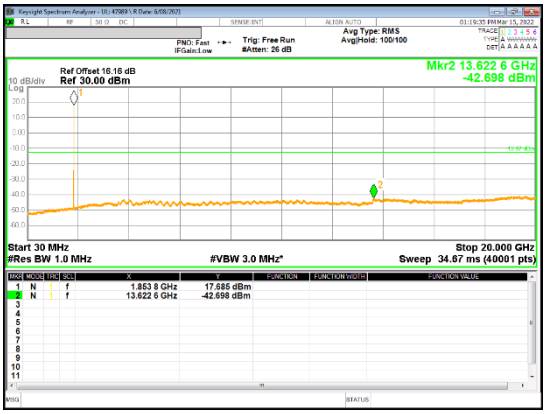
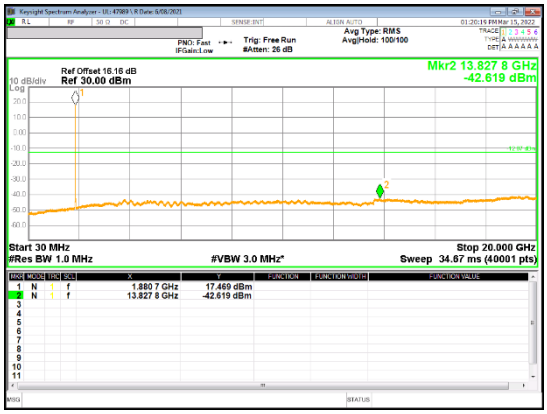
WCDMA Band 2

Band 2



REL99 Low channel



REL99 Mid channel

REL99 High channel

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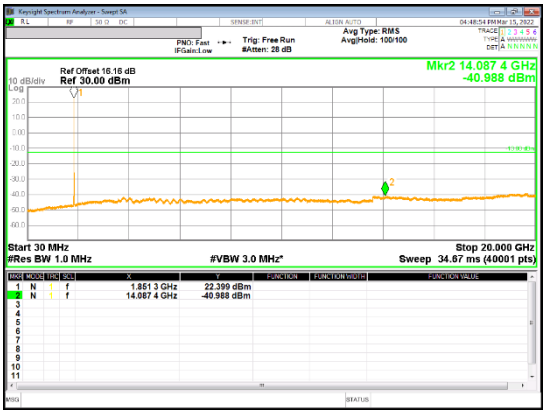
LTE Band 2

20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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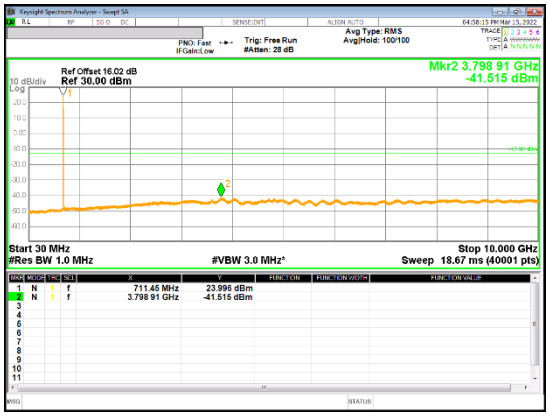
LTE Band 12

5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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LTE Band 13

5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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LTE Band 26(Part 90)

5MHz	 QPSK Low channel	 QPSK Mid channel

LTE Band 26 (Straddle)

5MHz	 QPSK High channel

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LTE Band 26 (Part 22)

5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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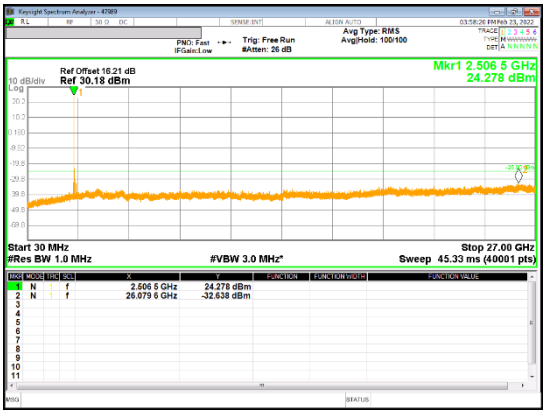
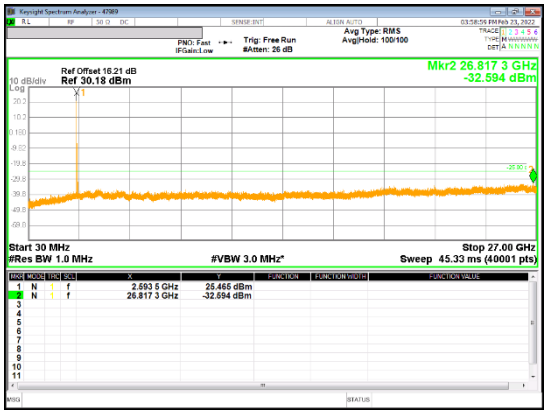
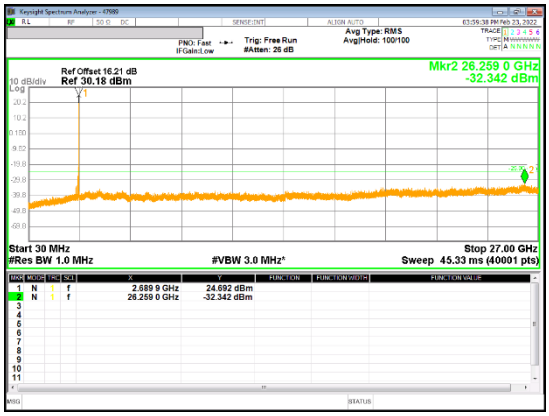
LTE Band 41

20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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LTE Band 66

20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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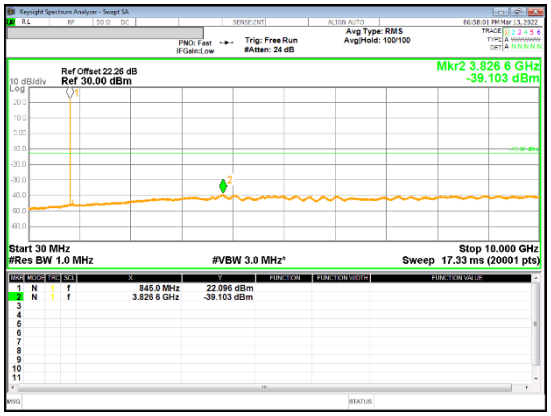
NR Band n5

5MHz	 BPSK Low channel	 BPSK Mid channel
	 BPSK High channel	

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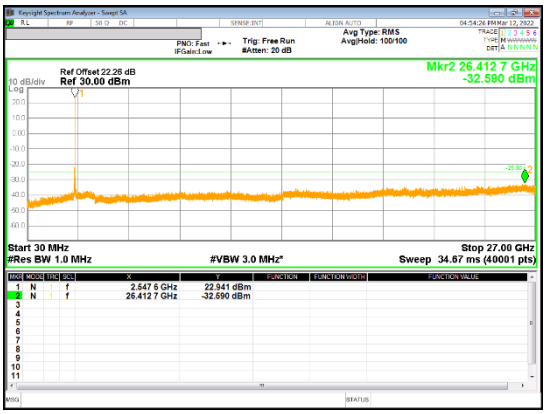
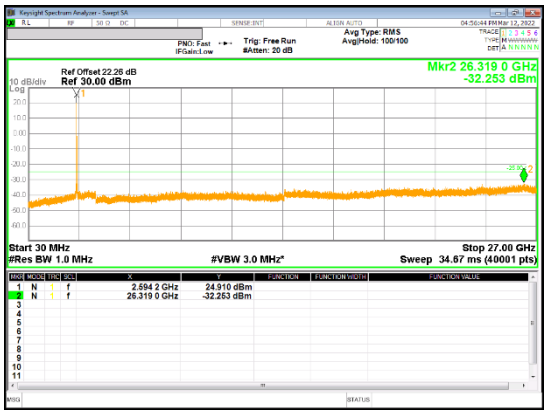
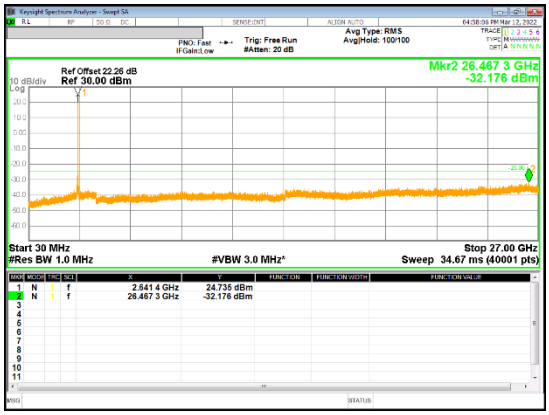
NR Band n41

100MHz	 BPSK Low channel	 BPSK Mid channel
	 BPSK High channel	

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NR Band n66

20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235,§27.54 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.

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

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

§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

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)

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9.4.1. FREQUENCY STABILITY RESULTS

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

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.20003342	-0.023	848.80003158	-0.022	2.5
3.85	40	824.20002711	-0.015	848.80002994	-0.021	2.5
3.85	30	824.20002756	-0.016	848.80002942	-0.020	2.5
3.85	***20***	***824.20001469***	***0.000***	***848.80001250***	***0.000***	***2.5***
3.85	10	824.20003545	-0.025	848.80003587	-0.028	2.5
3.85	0	824.20002480	-0.012	848.80002045	-0.009	2.5
3.85	-10	824.20001490	0.000	848.80001909	-0.008	2.5
3.85	-20	824.20002038	-0.007	848.80002061	-0.010	2.5
3.85	-30	824.20002708	-0.015	848.80002632	-0.016	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**824.20001469**	***0***	**848.80001250**	***0***	***2.5***
4.35	20	824.20001037	0.005	848.80001872	-0.007	2.5
3.65	20	824.20001064	0.005	848.80001186	0.001	2.5

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

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	1850.0751	1909.9227		
Extreme (50C)		1850.0752	1909.9227	57.6	0.031
Extreme (40C)		1850.0752	1909.9227	55.2	0.029
Extreme (30C)		1850.0752	1909.9227	39.4	0.021
Extreme (10C)		1850.0752	1909.9227	51.0	0.027
Extreme (0C)		1850.0752	1909.9227	24.0	0.013
Extreme (-10C)		1850.0752	1909.9227	31.1	0.017
Extreme (-20C)		1850.0752	1909.9227	51.4	0.027
Extreme (-30C)		1850.0752	1909.9227	55.7	0.030
20C	15%	1850.0752	1909.9227	27.9	0.015
	-15%	1850.0752	1909.9227	23.9	0.013
	End Point	1850.0752	1909.9227	29.3	0.016

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WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.40000617	0.001	846.60000486	0.000	2.5
3.85	40	826.40000492	0.002	846.60000470	0.000	2.5
3.85	30	826.40001429	-0.009	846.60001300	-0.010	2.5
3.85	***20***	***826.40000693***	***0.000***	***846.60000456***	***0.000***	***2.5***
3.85	10	826.40001260	-0.007	846.60001320	-0.010	2.5
3.85	0	826.40000571	0.001	846.60000602	-0.002	2.5
3.85	-10	826.40000456	0.003	846.60000420	0.000	2.5
3.85	-20	826.40000488	0.002	846.60000450	0.000	2.5
3.85	-30	826.40000500	0.002	846.60000429	0.000	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**826.40000693**	***0***	**846.60000456**	***0***	***2.5***
4.35	20	826.40000546	0.002	846.60000512	-0.001	2.5
3.65	20	826.40000546	0.002	846.60000528	-0.001	2.5

WCDMA Band 4 (Lowest Frequency: HSDPA/ Highest Frequency: HSDPA)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.3260	1754.6801		
Extreme (50C)		1710.3260	1754.6801	10.8	0.006
Extreme (40C)		1710.3260	1754.6801	11.1	0.006
Extreme (30C)		1710.3260	1754.6801	24.2	0.014
Extreme (10C)		1710.3260	1754.6801	8.6	0.005
Extreme (0C)		1710.3260	1754.6801	13.2	0.008
Extreme (-10C)		1710.3260	1754.6801	11.5	0.007
Extreme (-20C)		1710.3260	1754.6801	8.4	0.005
Extreme (-30C)		1710.3260	1754.6801	8.4	0.005
20C	15%	1710.3260	1754.6801	11.8	0.007
	-15%	1710.3260	1754.6801	16.5	0.010
	End Point	1710.3260	1754.6801	11.2	0.006

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

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	1850.3200	1909.6758		
Extreme (50C)		1850.3200	1909.6758	10.8	0.006
Extreme (40C)		1850.3200	1909.6758	8.6	0.005
Extreme (30C)		1850.3200	1909.6758	20.9	0.011
Extreme (10C)		1850.3200	1909.6758	12.5	0.007
Extreme (0C)		1850.3200	1909.6758	10.5	0.006
Extreme (-10C)		1850.3200	1909.6758	12.0	0.006
Extreme (-20C)		1850.3200	1909.6758	13.9	0.007
Extreme (-30C)		1850.3200	1909.6758	16.0	0.009
20C	15%	1850.3200	1909.6758	8.8	0.005
	-15%	1850.3200	1909.6758	9.5	0.005
	End Point	1850.3200	1909.6758	8.3	0.004

LTE Band 2 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

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	1850.1572	1909.8476		
Extreme (50C)		1850.1572	1909.8476	32.5	0.017
Extreme (40C)		1850.1572	1909.8476	40.1	0.021
Extreme (30C)		1850.1572	1909.8476	25.8	0.014
Extreme (10C)		1850.1572	1909.8476	21.9	0.012
Extreme (0C)		1850.1572	1909.8476	28.4	0.015
Extreme (-10C)		1850.1572	1909.8476	37.8	0.020
Extreme (-20C)		1850.1573	1909.8476	98.2	0.052
Extreme (-30C)		1850.1572	1909.8476	22.8	0.012
20C	15%	1850.1572	1909.8476	26.7	0.014
	-15%	1850.1572	1909.8476	27.1	0.014
	End Point	1850.1572	1909.8476	27.9	0.015

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LTE Band 12 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.1580	715.8469		
Extreme (50C)		699.1580	715.8469	22.7	0.032
Extreme (40C)		699.1580	715.8469	21.6	0.030
Extreme (30C)		699.1580	715.8469	28.4	0.040
Extreme (10C)		699.1580	715.8469	33.5	0.047
Extreme (0C)		699.1580	715.8469	26.4	0.037
Extreme (-10C)		699.1580	715.8469	15.1	0.021
Extreme (-20C)		699.1580	715.8469	22.0	0.031
Extreme (-30C)		699.1580	715.8469	26.3	0.037
20C	15%	699.1580	715.8469	10.9	0.015
	-15%	699.1580	715.8469	11.2	0.016
	End Point	699.1580	715.8469	10.2	0.014

LTE Band 13 (Lowest Frequency: QPSK / Highest Frequency: QPSK)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.2533	786.7385		
Extreme (50C)		777.2533	786.7385	12.0	0.015
Extreme (40C)		777.2533	786.7385	12.0	0.015
Extreme (30C)		777.2533	786.7385	25.7	0.033
Extreme (10C)		777.2533	786.7385	26.2	0.034
Extreme (0C)		777.2533	786.7385	27.1	0.035
Extreme (-10C)		777.2533	786.7385	17.0	0.022
Extreme (-20C)		777.2533	786.7385	24.1	0.031
Extreme (-30C)		777.2533	786.7385	14.6	0.019
20C	15%	777.2533	786.7385	15.4	0.020
	-15%	777.2533	786.7385	16.8	0.021
	End Point	777.2533	786.7385	16.0	0.020

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LTE Band 26

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2036.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	814.70002321	-0.017	848.30003192	-0.026	2.5
3.85	40	814.70001765	-0.010	848.30002578	-0.019	2.5
3.85	30	814.70001964	-0.013	848.30003424	-0.029	2.5
3.85	***20***	***814.70000910***	***0.000***	***848.30000990***	***0.000***	***2.5***
3.85	10	814.70002959	-0.025	848.30002127	-0.013	2.5
3.85	0	814.70002503	-0.020	848.30001943	-0.011	2.5
3.85	-10	814.69997984	0.036	848.30001835	-0.010	2.5
3.85	-20	814.70002707	-0.022	848.30001785	-0.009	2.5
3.85	-30	814.70002569	-0.020	848.30002063	-0.013	2.5

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2036.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**814.70000910**	***0***	**848.30000990**	***0***	***2.5***
4.35	20	814.70000982	-0.001	848.30000975	0.000	2.5
3.65	20	814.70001262	-0.004	848.30000994	0.000	2.5

LTE Band 41 (Lowest Frequency: QPSK / Highest Frequency: QPSK)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.2533	2689.7426		
Extreme (50C)		2496.2533	2689.7426	30.9	0.012
Extreme (40C)		2496.2533	2689.7426	38.6	0.015
Extreme (30C)		2496.2533	2689.7426	26.7	0.010
Extreme (10C)		2496.2533	2689.7426	46.6	0.018
Extreme (0C)		2496.2533	2689.7426	44.5	0.017
Extreme (-10C)		2496.2533	2689.7426	52.8	0.020
Extreme (-20C)		2496.2533	2689.7426	39.2	0.015
Extreme (-30C)		2496.2533	2689.7426	35.4	0.014
20C	15%	2496.2533	2689.7426	29.7	0.011
	-15%	2496.2533	2689.7426	33.2	0.013
	End Point	2496.2533	2689.7426	31.2	0.012

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LTE Band 66 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6995	1779.3006	30.7	0.018
Extreme (40C)		1710.6995	1779.3006	39.2	0.022
Extreme (30C)		1710.6995	1779.3006	27.9	0.016
Extreme (10C)		1710.6995	1779.3006	41.6	0.024
Extreme (0C)		1710.6995	1779.3006	46.3	0.027
Extreme (-10C)		1710.6995	1779.3006	30.6	0.018
Extreme (-20C)		1710.6995	1779.3006	32.2	0.018
Extreme (-30C)		1710.6995	1779.3006	44.5	0.025
20C	15%	1710.6995	1779.3006	31.1	0.018
	-15%	1710.6995	1779.3006	26.2	0.015
	End Point	1710.6995	1779.3006	29.5	0.017

5G NR Band n5

Reference Frequency : NR n5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC

Limit: +- 2.5 ppm = Low Channel 2061.750 Hz High Channel 2120.750 Hz

Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.70002241	-0.014	848.30003062	-0.024	2.5
3.85	40	824.70001840	-0.009	848.30002750	-0.020	2.5
3.85	30	824.70002068	-0.011	848.30003221	-0.026	2.5
3.85	***20***	***824.70001120***	***0.000***	***848.30001043***	***0.000***	***2.5***
3.85	10	824.70003187	-0.025	848.30002254	-0.014	2.5
3.85	0	824.70002687	-0.019	848.30001766	-0.009	2.5
3.85	-10	824.70002243	-0.014	848.30001998	-0.011	2.5
3.85	-20	824.70002632	-0.018	848.30001611	-0.007	2.5
3.85	-30	824.70002833	-0.021	848.30002474	-0.017	2.5

Reference Frequency : NR n5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC

Limit: +- 2.5 ppm = Low Channel 2061.750 Hz High Channel 2120.750 Hz

Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	***824.70001120***	***0***	***848.30001043***	***0***	***2.5***
4.35	20	824.70001022	0.001	848.30001142	-0.001	2.5
3.65	20	824.70001578	-0.006	848.30001054	0.000	2.5

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5G NR Band n41 (Lowest Frequency: BPSK / Highest Frequency: BPSK)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.6853	2689.2947		
Extreme (50C)		2496.6853	2689.2947	32.4	0.012
Extreme (40C)		2496.6853	2689.2947	40.2	0.016
Extreme (30C)		2496.6853	2689.2947	28.4	0.011
Extreme (10C)		2496.6853	2689.2947	43.3	0.017
Extreme (0C)		2496.6853	2689.2947	41.5	0.016
Extreme (-10C)		2496.6853	2689.2947	49.5	0.019
Extreme (-20C)		2496.6853	2689.2947	34.6	0.013
Extreme (-30C)		2496.6853	2689.2947	32.6	0.013
20C	15%	2496.6853	2689.2947	32.6	0.013
	-15%	2496.6853	2689.2947	35.7	0.014
	End Point	2496.6853	2689.2947	29.4	0.011

5G NR Band n66 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6995	1779.3006	32.5	0.019
Extreme (40C)		1710.6995	1779.3006	43.5	0.025
Extreme (30C)		1710.6995	1779.3006	28.6	0.016
Extreme (10C)		1710.6995	1779.3006	38.6	0.022
Extreme (0C)		1710.6995	1779.3006	43.2	0.025
Extreme (-10C)		1710.6995	1779.3006	32.6	0.019
Extreme (-20C)		1710.6995	1779.3006	34.5	0.020
Extreme (-30C)		1710.6995	1779.3006	43.3	0.025
20C	15%	1710.6995	1779.3006	33.5	0.019
	-15%	1710.6995	1779.3006	29.4	0.017
	End Point	1710.6995	1779.3006	31.7	0.018

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9.5. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and §90.635

LIMITS

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

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.

27.50:

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(d) (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

(h) The following power limits shall apply in the BRS and EBS:

(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

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 ≥ OBW;

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 2 x RBW;

d) Sweep time = auto couple or 1 second;

e) Detector = rms;

f) Ensure that the number of measurement points ≥ span/RBW;

g) Trace mode = max hold(GSM, WCDMA), average(LTE, 5G NR);

TEST RESULTS

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9.5.1. ERP/EIRP Results

GSM

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
GSM 850	GPRS	824.20	28.44	V	3.01	-1.33	24.10	257.17	38.50	-14.40
		824.20	32.11	H	3.01	-1.33	27.77	598.07	38.50	-10.73
		836.60	27.10	V	3.03	-1.22	22.85	192.86	38.50	-15.65
		836.60	31.74	H	3.03	-1.22	27.49	561.26	38.50	-11.01
		848.80	26.33	V	3.05	-1.11	22.17	164.93	38.50	-16.33
		848.80	31.90	H	3.05	-1.11	27.74	594.48	38.50	-10.76
	EGPRS	824.20	20.06	V	3.01	-1.33	15.72	37.34	38.50	-22.78
		824.20	24.68	H	3.01	-1.33	20.34	108.08	38.50	-18.16
		836.60	19.29	V	3.03	-1.22	15.04	31.93	38.50	-23.46
		836.60	24.82	H	3.03	-1.22	20.57	114.07	38.50	-17.93
		848.80	19.59	V	3.05	-1.11	15.43	34.94	38.50	-23.07
		848.80	25.10	H	3.05	-1.11	20.94	124.21	38.50	-17.56

Band	Mode	f (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	13.20	V	4.47	9.64	18.37	68.78	33.00	-14.63
		1850.20	23.72	H	4.47	9.64	28.90	776.39	33.00	-4.10
		1880.00	13.76	V	4.50	9.37	18.63	72.87	33.00	-14.37
		1880.00	24.93	H	4.50	9.37	29.80	955.23	33.00	-3.20
		1909.80	11.83	V	4.54	9.07	16.36	43.25	33.00	-16.64
		1909.80	24.40	H	4.54	9.07	28.93	780.94	33.00	-4.07
	EGPRS	1850.20	13.01	V	4.47	9.64	18.18	65.84	33.00	-14.82
		1850.20	23.67	H	4.47	9.64	28.85	767.50	33.00	-4.15
		1880.00	13.33	V	4.50	9.37	18.20	66.00	33.00	-14.80
		1880.00	24.66	H	4.50	9.37	29.53	897.65	33.00	-3.47
		1909.80	11.59	V	4.54	9.07	16.12	40.93	33.00	-16.88
		1909.80	24.26	H	4.54	9.07	28.79	756.17	33.00	-4.21

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WCDMA

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)
Band 5	REL99	826.40	20.03	V	3.01	-1.31	15.71	37.24	38.50	-22.79
		826.40	24.04	H	3.01	-1.31	19.72	93.71	38.50	-18.78
		836.60	18.60	V	3.03	-1.22	14.35	27.24	38.50	-24.15
		836.60	23.36	H	3.03	-1.22	19.11	81.50	38.50	-19.39
		846.60	17.82	V	3.05	-1.13	13.65	23.16	38.50	-24.85
		846.60	23.60	H	3.05	-1.13	19.42	87.54	38.50	-19.08
	HSDPA	826.40	19.13	V	3.01	-1.31	14.81	30.27	38.50	-23.69
		826.40	23.10	H	3.01	-1.31	18.78	75.47	38.50	-19.72
		836.60	17.63	V	3.03	-1.22	13.38	21.79	38.50	-25.12
		836.60	22.44	H	3.03	-1.22	18.19	65.94	38.50	-20.31
		846.60	16.78	V	3.05	-1.13	12.61	18.23	38.50	-25.89
		846.60	22.53	H	3.05	-1.13	18.35	68.42	38.50	-20.15

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
Band 4	REL99	1712.40	17.86	V	4.30	9.57	23.14	206.03	30.00	-6.86
		1712.40	13.88	H	4.30	9.57	19.16	82.32	30.00	-10.84
		1732.60	17.74	V	4.32	9.64	23.06	202.29	30.00	-6.94
		1732.60	14.78	H	4.32	9.64	20.10	102.31	30.00	-9.90
		1752.60	18.41	V	4.34	9.69	23.76	237.60	30.00	-6.24
		1752.60	13.78	H	4.34	9.69	19.13	81.93	30.00	-10.87
	HSDPA	1712.40	17.17	V	4.30	9.57	22.45	175.76	30.00	-7.55
		1712.40	13.07	H	4.30	9.57	18.35	68.31	30.00	-11.65
		1732.60	16.85	V	4.32	9.64	22.17	164.81	30.00	-7.83
		1732.60	13.67	H	4.32	9.64	18.99	79.24	30.00	-11.01
		1752.60	17.49	V	4.34	9.69	22.84	192.25	30.00	-7.16
		1752.60	12.97	H	4.34	9.69	18.32	67.99	30.00	-11.68

Band	Mode	f (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	15.14	V	4.47	9.58	20.25	105.98	33.00	-12.75
		1852.40	17.99	H	4.47	9.58	23.10	204.09	33.00	-9.90
		1880.00	16.51	V	4.50	9.39	21.39	137.59	33.00	-11.61
		1880.00	18.26	H	4.50	9.39	23.14	205.93	33.00	-9.86
		1907.60	15.47	V	4.54	9.15	20.08	101.85	33.00	-12.92
		1907.60	18.38	H	4.54	9.15	22.99	199.26	33.00	-10.01
	HSDPA	1852.40	15.43	V	4.47	9.58	20.54	113.30	33.00	-12.46
		1852.40	18.79	H	4.47	9.58	23.90	245.37	33.00	-9.10
		1880.00	17.24	V	4.50	9.39	22.12	162.77	33.00	-10.88
		1880.00	19.49	H	4.50	9.39	24.37	273.35	33.00	-8.63
		1907.60	15.69	V	4.54	9.15	20.30	107.14	33.00	-12.70
		1907.60	18.80	H	4.54	9.15	23.41	219.50	33.00	-9.59

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LTE Band 2

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
1.4	QPSK	1850.70	17.03	H	4.47	9.64	22.20	166.00	33.00	-10.80	1/3
		1880.00	17.85	H	4.50	9.37	22.72	187.11	33.00	-10.28	1/3
		1909.30	18.29	H	4.54	9.07	22.83	191.76	33.00	-10.17	1/5
	16-QAM	1850.70	16.30	H	4.47	9.64	21.47	140.32	33.00	-11.53	1/0
		1880.00	17.00	H	4.50	9.37	21.87	153.85	33.00	-11.13	1/5
		1909.30	17.48	H	4.54	9.07	22.02	159.13	33.00	-10.98	1/5
3	QPSK	1851.50	17.42	H	4.47	9.63	22.58	181.08	33.00	-10.42	1/8
		1880.00	17.72	H	4.50	9.37	22.59	181.60	33.00	-10.41	1/0
		1908.50	17.88	H	4.54	9.08	22.43	174.95	33.00	-10.57	1/14
	16-QAM	1851.50	16.70	H	4.47	9.63	21.86	153.41	33.00	-11.14	1/8
		1880.00	17.00	H	4.50	9.37	21.87	153.85	33.00	-11.13	1/8
		1908.50	17.11	H	4.54	9.08	21.66	146.53	33.00	-11.34	1/8
5	QPSK	1852.50	17.38	H	4.47	9.62	22.53	179.10	33.00	-10.47	1/0
		1880.00	17.70	H	4.50	9.37	22.57	180.76	33.00	-10.43	1/0
		1907.50	17.97	H	4.54	9.10	22.53	179.08	33.00	-10.47	1/24
	16-QAM	1852.50	16.72	H	4.47	9.62	21.87	153.85	33.00	-11.13	1/0
		1880.00	16.89	H	4.50	9.37	21.76	150.01	33.00	-11.24	1/24
		1907.50	17.17	H	4.54	9.10	21.73	148.95	33.00	-11.27	1/12
10	QPSK	1855.00	17.67	H	4.48	9.60	22.79	190.31	33.00	-10.21	1/0
		1880.00	18.00	H	4.50	9.37	22.87	193.69	33.00	-10.13	1/25
		1905.00	17.75	H	4.53	9.13	22.34	171.38	33.00	-10.66	1/49
	16-QAM	1855.00	16.88	H	4.48	9.60	22.00	158.66	33.00	-11.00	1/0
		1880.00	17.15	H	4.50	9.37	22.02	159.26	33.00	-10.98	1/25
		1905.00	16.99	H	4.53	9.13	21.58	143.87	33.00	-11.42	1/49
15	QPSK	1857.50	17.87	H	4.48	9.58	22.97	198.30	33.00	-10.03	1/0
		1880.00	18.50	H	4.50	9.37	23.37	217.32	33.00	-9.63	1/0
		1902.50	18.33	H	4.53	9.16	22.96	197.72	33.00	-10.04	1/37
	16-QAM	1857.50	17.03	H	4.48	9.58	22.13	163.43	33.00	-10.87	1/0
		1880.00	17.59	H	4.50	9.37	22.46	176.24	33.00	-10.54	1/0
		1902.50	18.15	H	4.53	9.16	22.78	189.70	33.00	-10.22	1/37
20	QPSK	1860.00	18.15	H	4.48	9.55	23.22	209.84	33.00	-9.78	1/0
		1880.00	18.68	H	4.50	9.37	23.55	226.52	33.00	-9.45	1/49
		1900.00	18.97	H	4.53	9.19	23.63	230.51	33.00	-9.37	1/0
	16-QAM	1860.00	17.03	H	4.48	9.55	22.10	162.14	33.00	-10.90	1/49
		1880.00	17.04	H	4.50	9.37	21.91	155.28	33.00	-11.09	1/49
		1900.00	16.76	H	4.53	9.19	21.42	138.58	33.00	-11.58	1/99

LTE Band 12

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
1.4	QPSK	699.70	23.21	V	2.78	-1.35	19.08	80.83	34.77	-15.69	1/0
		707.50	23.54	V	2.80	-1.37	19.38	86.65	34.77	-15.39	1/3
		715.30	23.74	V	2.81	-1.38	19.55	90.10	34.77	-15.22	1/0
	16-QAM	699.70	22.08	V	2.78	-1.35	17.95	62.31	34.77	-16.82	1/3
		707.50	22.10	V	2.80	-1.37	17.94	62.19	34.77	-16.83	1/5
		715.30	22.21	V	2.81	-1.38	18.02	63.35	34.77	-16.75	1/3
3	QPSK	700.50	23.17	V	2.78	-1.35	19.03	80.02	34.77	-15.74	1/14
		707.50	23.44	V	2.80	-1.37	19.28	84.67	34.77	-15.49	1/0
		714.50	23.59	V	2.81	-1.38	19.40	87.02	34.77	-15.37	1/8
	16-QAM	700.50	22.30	V	2.78	-1.35	18.16	65.50	34.77	-16.61	1/14
		707.50	22.59	V	2.80	-1.37	18.43	69.62	34.77	-16.34	1/8
		714.50	22.96	V	2.81	-1.38	18.77	75.27	34.77	-16.00	1/0
5	QPSK	701.50	23.73	V	2.78	-1.35	19.60	91.10	34.77	-15.17	1/12
		707.50	24.19	V	2.80	-1.37	20.03	100.63	34.77	-14.74	1/0
		713.50	23.65	V	2.81	-1.38	19.46	88.39	34.77	-15.31	1/0
	16-QAM	701.50	22.52	V	2.78	-1.35	18.39	68.95	34.77	-16.38	1/12
		707.50	22.44	V	2.80	-1.37	18.28	67.26	34.77	-16.49	1/12
		713.50	22.72	V	2.81	-1.38	18.53	71.35	34.77	-16.24	1/12
10	QPSK	704.00	23.83	V	2.79	-1.36	19.68	92.98	34.77	-15.09	1/25
		707.50	23.65	V	2.80	-1.37	19.49	88.87	34.77	-15.28	1/0
		711.00	23.73	V	2.80	-1.37	19.56	90.28	34.77	-15.21	1/0
	16-QAM	704.00	23.19	V	2.79	-1.36	19.04	80.24	34.77	-15.73	1/25
		707.50	22.61	V	2.80	-1.37	18.45	69.94	34.77	-16.32	1/0
		711.00	22.98	V	2.80	-1.37	18.81	75.96	34.77	-15.96	1/0

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LTE Band 13

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
5	QPSK	779.50	25.59	H	2.93	-1.51	21.16	130.48	34.77	-13.61	1/24
		782.00	26.27	H	2.93	-1.51	21.82	151.99	34.77	-12.95	1/12
		784.50	24.54	H	2.94	-1.52	20.08	101.95	34.77	-14.69	1/24
	16-QAM	779.50	23.70	H	2.93	-1.51	19.27	84.44	34.77	-15.50	1/24
		782.00	24.73	H	2.93	-1.51	20.28	106.61	34.77	-14.49	1/24
		784.50	23.46	H	2.94	-1.52	19.00	79.51	34.77	-15.77	1/24
10	QPSK	782.00	25.22	H	2.93	-1.51	20.77	119.34	34.77	-14.00	1/0
	16-QAM	782.00	24.27	H	2.93	-1.51	19.82	95.90	34.77	-14.95	1/25

LTE Band 26

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
1.4	QPSK	814.70	22.88	H	2.99	-1.42	18.47	70.38	50.00	-31.53	1/5
		823.30	23.09	H	3.01	-1.34	18.74	74.86	50.00	-31.26	1/3
		824.70	23.30	H	3.01	-1.33	18.97	78.82	38.50	-19.53	1/3
		831.50	23.25	H	3.02	-1.27	18.96	78.71	38.50	-19.54	1/0
		848.30	23.17	H	3.05	-1.12	19.00	79.47	38.50	-19.50	1/5
	16-QAM	814.70	21.80	H	2.99	-1.42	17.39	54.89	50.00	-32.61	1/5
		823.30	21.80	H	3.01	-1.34	17.45	55.62	50.00	-32.55	1/3
		824.70	21.84	H	3.01	-1.33	17.51	56.32	38.50	-20.99	1/3
		831.50	22.18	H	3.02	-1.27	17.89	61.52	38.50	-20.61	1/3
		848.30	22.05	H	3.05	-1.12	17.88	61.40	38.50	-20.62	1/5
3	QPSK	815.50	22.70	H	2.99	-1.41	18.30	67.59	50.00	-31.70	1/8
		822.50	22.63	H	3.01	-1.35	18.27	67.19	50.00	-31.73	1/0
		825.50	23.16	H	3.01	-1.32	18.83	76.40	38.50	-19.67	1/14
		831.50	23.13	H	3.02	-1.27	18.84	76.57	38.50	-19.66	1/8
		847.50	23.21	H	3.05	-1.12	19.04	80.21	38.50	-19.46	1/8
	16-QAM	815.50	21.73	H	2.99	-1.41	17.33	54.06	50.00	-32.67	1/8
		822.50	21.85	H	3.01	-1.35	17.49	56.15	50.00	-32.51	1/0
		825.50	22.02	H	3.01	-1.32	17.69	58.76	38.50	-20.81	1/8
		831.50	22.30	H	3.02	-1.27	18.01	63.25	38.50	-20.49	1/0
		847.50	22.07	H	3.05	-1.12	17.90	61.69	38.50	-20.60	1/8
5	QPSK	816.50	22.80	H	3.00	-1.40	18.40	69.17	50.00	-31.60	1/24
		821.50	22.94	H	3.01	-1.36	18.57	72.02	50.00	-31.43	1/24
		826.50	23.41	H	3.01	-1.31	19.08	80.98	38.50	-19.42	1/0
		831.50	23.77	H	3.02	-1.27	19.48	88.72	38.50	-19.02	1/0
		846.50	23.00	H	3.05	-1.13	18.82	76.23	38.50	-19.68	1/0
	16-QAM	816.50	21.74	H	3.00	-1.40	17.34	54.19	50.00	-32.66	1/24
		821.50	21.68	H	3.01	-1.36	17.31	53.88	50.00	-32.69	1/12
		826.50	22.39	H	3.01	-1.31	18.06	64.03	38.50	-20.44	1/0
		831.50	22.03	H	3.02	-1.27	17.74	59.44	38.50	-20.76	1/24
		846.50	21.87	H	3.05	-1.13	17.69	58.77	38.50	-20.81	1/24
10	QPSK	819.00	22.89	H	3.00	-1.38	18.51	70.91	50.00	-31.49	1/25
		829.00	23.11	H	3.02	-1.29	18.80	75.88	38.50	-19.70	1/25
		831.50	23.12	H	3.02	-1.27	18.83	76.39	38.50	-19.67	1/0
		844.00	23.37	H	3.04	-1.15	19.17	82.60	38.50	-19.33	1/0
	16-QAM	819.00	21.61	H	3.00	-1.38	17.23	52.81	50.00	-32.77	1/25
		829.00	21.74	H	3.02	-1.29	17.43	55.35	38.50	-21.07	1/0
		831.50	22.15	H	3.02	-1.27	17.86	61.10	38.50	-20.64	1/0
		844.00	22.12	H	3.04	-1.15	17.92	61.94	38.50	-20.58	1/0
15	QPSK	821.50	22.74	H	3.01	-1.36	18.37	68.78	50.00	-31.63	1/37
		831.50	23.16	H	3.02	-1.27	18.87	77.10	38.50	-19.63	1/0
		841.50	23.15	H	3.04	-1.18	18.94	78.34	38.50	-19.56	1/0
	16-QAM	821.50	21.80	H	3.01	-1.36	17.43	55.39	50.00	-32.57	1/0
		831.50	22.15	H	3.02	-1.27	17.86	61.10	38.50	-20.64	1/0
		841.50	21.91	H	3.04	-1.18	17.70	58.88	38.50	-20.80	1/0

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
1.4	QPSK	824.00	23.13	H	3.01	-1.33	18.79	75.65	38.50	-19.71	1/3
	16-QAM		21.75	H	3.01	-1.33	17.41	55.06	38.50	-21.09	1/5
3	QPSK		22.92	H	3.01	-1.33	18.58	72.08	38.50	-19.92	1/8
	16-QAM		21.74	H	3.01	-1.33	17.40	54.93	38.50	-21.10	1/0
5	QPSK		23.31	H	3.01	-1.33	18.97	78.86	38.50	-19.53	1/0
	16-QAM		22.14	H	3.01	-1.33	17.80	60.23	38.50	-20.70	1/0
10	QPSK		22.95	H	3.01	-1.33	18.61	72.58	38.50	-19.89	1/0
	16-QAM		21.88	H	3.01	-1.33	17.54	56.73	38.50	-20.96	1/0
15	QPSK		23.32	H	3.01	-1.33	18.98	79.02	38.50	-19.52	1/37
	16-QAM		21.97	H	3.01	-1.33	17.63	57.91	38.50	-20.87	1/0

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LTE Band 41

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	2498.50	18.90	H	5.23	10.18	23.84	242.19	33.00	-9.16	1/12
		2593.00	16.75	H	5.34	10.03	21.44	139.47	33.00	-11.56	1/0
		2687.50	18.07	H	5.44	10.05	22.69	185.82	33.00	-10.31	1/24
	16-QAM	2498.50	18.16	H	5.23	10.18	22.10	162.24	33.00	-10.90	1/0
		2593.00	15.95	H	5.34	10.03	20.64	116.01	33.00	-12.36	1/0
		2687.50	17.25	H	5.44	10.05	21.87	153.85	33.00	-11.13	1/24
10	QPSK	2501.00	18.54	H	5.24	10.17	23.48	222.63	33.00	-9.52	1/25
		2593.00	17.69	H	5.34	10.03	22.38	173.17	33.00	-10.62	1/25
		2685.00	17.84	H	5.43	10.05	22.46	176.13	33.00	-10.54	1/49
	16-QAM	2501.00	18.12	H	5.24	10.17	22.06	160.54	33.00	-10.94	1/25
		2593.00	16.95	H	5.34	10.03	21.64	146.04	33.00	-11.36	1/25
		2685.00	17.18	H	5.43	10.05	21.80	151.30	33.00	-11.20	1/49
15	QPSK	2503.50	18.59	H	5.24	10.17	23.52	23.52	33.00	-9.48	1/37
		2593.00	17.56	H	5.34	10.03	22.25	22.25	33.00	-10.75	1/37
		2682.50	18.28	H	5.43	10.05	22.90	22.90	33.00	-10.10	1/74
	16-QAM	2503.50	17.97	H	5.24	10.17	22.40	173.84	33.00	-10.60	1/37
		2593.00	17.06	H	5.34	10.03	21.75	149.79	33.00	-11.25	1/37
		2682.50	17.48	H	5.43	10.05	22.10	162.13	33.00	-10.90	1/74
20	QPSK	2506.00	18.70	H	5.24	10.16	23.42	220.03	33.00	-9.58	1/49
		2593.00	17.83	H	5.34	10.03	22.52	178.85	33.00	-10.48	1/49
		2680.00	18.16	H	5.43	10.05	22.78	189.53	33.00	-10.22	1/99
	16-QAM	2506.00	17.98	H	5.24	10.16	22.40	173.97	33.00	-10.60	1/49
		2593.00	17.03	H	5.34	10.03	21.72	148.76	33.00	-11.28	1/49
		2680.00	17.54	H	5.43	10.05	22.16	164.31	33.00	-10.84	1/99

LTE Band 66

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
1.4	QPSK	1710.70	15.45	H	4.30	9.58	20.73	118.35	30.00	-9.27	1/5
		1745.00	16.96	H	4.33	9.69	22.31	170.13	30.00	-7.69	1/3
		1779.30	15.67	H	4.38	9.71	21.00	126.04	30.00	-9.00	1/0
	16-QAM	1710.70	14.35	H	4.30	9.58	19.63	91.87	30.00	-10.37	1/5
		1745.00	16.10	H	4.33	9.69	21.45	139.56	30.00	-8.55	1/0
		1779.30	14.94	H	4.38	9.71	20.27	106.54	30.00	-9.73	1/5
3	QPSK	1711.50	17.78	H	4.30	9.58	23.07	202.56	30.00	-6.93	1/8
		1745.00	16.86	H	4.33	9.69	22.21	166.25	30.00	-7.79	1/8
		1778.50	15.33	H	4.37	9.71	20.66	116.54	30.00	-9.34	1/14
	16-QAM	1711.50	17.08	H	4.30	9.58	22.37	172.40	30.00	-7.63	1/8
		1745.00	16.14	H	4.33	9.69	21.49	140.85	30.00	-8.51	1/8
		1778.50	14.92	H	4.37	9.71	20.25	106.04	30.00	-9.75	1/8
5	QPSK	1712.50	17.90	H	4.30	9.58	23.19	208.37	30.00	-6.81	1/24
		1745.00	16.90	H	4.33	9.69	22.25	167.79	30.00	-7.75	1/12
		1777.50	15.42	H	4.37	9.71	20.75	118.90	30.00	-9.25	1/24
	16-QAM	1712.50	17.05	H	4.30	9.58	22.34	171.33	30.00	-7.66	1/24
		1745.00	16.00	H	4.33	9.69	21.35	136.39	30.00	-8.65	1/12
		1777.50	15.00	H	4.37	9.71	20.33	107.94	30.00	-9.67	1/24
10	QPSK	1715.00	17.84	H	4.30	9.59	23.13	205.74	30.00	-6.87	1/49
		1745.00	16.63	H	4.33	9.69	21.98	157.68	30.00	-8.02	1/49
		1775.00	15.64	H	4.37	9.71	20.97	125.12	30.00	-9.03	1/49
	16-QAM	1715.00	16.99	H	4.30	9.59	22.28	169.17	30.00	-7.72	1/49
		1745.00	15.70	H	4.33	9.69	21.05	127.28	30.00	-8.95	1/49
		1775.00	15.16	H	4.37	9.71	20.49	112.03	30.00	-9.51	1/25
15	QPSK	1717.50	17.70	H	4.30	9.60	22.99	199.28	30.00	-7.01	1/74
		1745.00	16.73	H	4.33	9.69	22.08	161.35	30.00	-7.92	1/37
		1772.50	15.99	H	4.37	9.71	21.32	135.66	30.00	-8.68	1/37
	16-QAM	1717.50	16.69	H	4.30	9.60	21.98	157.93	30.00	-8.02	1/74
		1745.00	15.86	H	4.33	9.69	21.21	132.06	30.00	-8.79	1/37
		1772.50	14.74	H	4.37	9.71	20.07	101.73	30.00	-9.93	1/37
20	QPSK	1720.00	17.44	H	4.31	9.61	22.75	188.15	30.00	-7.25	1/99
		1745.00	16.86	H	4.33	9.69	22.21	166.25	30.00	-7.79	1/49
		1770.00	15.65	H	4.37	9.71	20.99	125.59	30.00	-9.01	1/49
	16-QAM	1720.00	16.87	H	4.31	9.61	22.18	165.01	30.00	-7.82	1/99
		1745.00	15.81	H	4.33	9.69	21.16	130.55	30.00	-8.84	1/49
		1770.00	14.80	H	4.37	9.71	20.14	103.26	30.00	-9.86	1/49

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5G NR Band n5

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (dBm)	Delta (dB)	RB
5	BPSK	826.50	23.42	H	3.01	-1.31	19.09	81.17	38.50	-19.41	1/1
		836.50	23.12	H	3.03	-1.22	18.87	77.00	38.50	-19.63	1/1
		846.50	23.12	H	3.05	-1.13	18.94	78.37	38.50	-19.56	1/1
	16-QAM	826.50	22.03	H	3.01	-1.31	17.70	58.94	38.50	-20.80	1/1
		836.50	21.63	H	3.03	-1.22	17.38	54.64	38.50	-21.12	1/1
		846.50	21.58	H	3.05	-1.13	17.40	54.97	38.50	-21.10	1/1
10	BPSK	829.00	23.38	H	3.02	-1.29	19.07	80.70	38.50	-19.43	1/1
		836.50	23.12	H	3.03	-1.22	18.87	77.00	38.50	-19.63	1/1
		844.00	22.65	H	3.04	-1.15	18.45	69.98	38.50	-20.05	1/1
	16-QAM	829.00	22.04	H	3.02	-1.29	17.73	59.27	38.50	-20.77	1/1
		836.50	21.74	H	3.03	-1.22	17.49	56.04	38.50	-21.01	1/1
		844.00	21.34	H	3.04	-1.15	17.14	51.76	38.50	-21.36	1/1
15	BPSK	831.50	23.36	H	3.02	-1.27	19.07	80.73	38.50	-19.43	1/1
		836.50	23.27	H	3.03	-1.22	19.02	79.71	38.50	-19.48	1/1
		841.50	23.34	H	3.04	-1.18	19.13	81.84	38.50	-19.37	1/1
	16-QAM	831.50	21.85	H	3.02	-1.27	17.56	57.02	38.50	-20.94	1/1
		836.50	22.23	H	3.03	-1.22	17.98	62.74	38.50	-20.52	1/1
		841.50	21.67	H	3.04	-1.18	17.46	55.72	38.50	-21.04	1/1
20	BPSK	834.00	23.26	H	3.03	-1.24	18.99	79.23	38.50	-19.51	1/1
		836.50	23.32	H	3.03	-1.22	19.07	80.63	38.50	-19.43	1/1
		839.00	22.86	H	3.04	-1.20	18.63	72.92	38.50	-19.87	1/1
	16-QAM	834.00	21.91	H	3.03	-1.24	17.64	58.06	38.50	-20.86	1/1
		836.50	21.91	H	3.03	-1.22	17.66	58.28	38.50	-20.84	1/1
		839.00	21.69	H	3.04	-1.20	17.46	55.70	38.50	-21.04	1/1

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5G NR Band n41

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	BPSK	2501.01	16.96	H	5.24	10.17	21.90	154.77	33.00	-11.10	1/12
		2592.99	16.87	H	5.34	10.03	21.56	143.38	33.00	-11.44	1/12
		2685.00	17.02	H	5.43	10.05	21.64	145.83	33.00	-11.36	1/12
	16-QAM	2501.01	16.56	H	5.24	10.17	21.50	141.15	33.00	-11.50	1/12
		2592.99	16.67	H	5.34	10.03	21.36	136.93	33.00	-11.64	1/12
		2685.00	15.33	H	5.43	10.05	19.95	98.82	33.00	-13.05	1/12
15	BPSK	2503.51	17.68	H	5.24	10.17	22.61	182.44	33.00	-10.39	1/19
		2592.99	17.43	H	5.34	10.03	22.12	163.11	33.00	-10.88	1/19
		2682.50	16.76	H	5.43	10.05	21.38	137.36	33.00	-11.62	1/19
	16-QAM	2503.51	16.50	H	5.24	10.17	21.43	139.03	33.00	-11.57	1/19
		2592.99	16.27	H	5.34	10.03	20.96	124.88	33.00	-12.04	1/19
		2682.50	15.67	H	5.43	10.05	20.29	106.87	33.00	-12.71	1/19
20	BPSK	2506.01	17.87	H	5.24	10.16	22.79	190.27	33.00	-10.21	1/49
		2592.99	17.68	H	5.34	10.03	22.37	172.78	33.00	-10.63	1/26
		2680.00	17.36	H	5.43	10.05	21.98	157.64	33.00	-11.02	1/49
	16-QAM	2506.01	16.86	H	5.24	10.16	21.78	150.79	33.00	-11.22	1/49
		2592.99	16.77	H	5.34	10.03	21.46	140.12	33.00	-11.54	1/26
		2680.00	16.40	H	5.43	10.05	21.02	126.38	33.00	-11.98	1/49
30	BPSK	2511.01	17.42	H	5.25	10.16	22.33	170.82	33.00	-10.67	1/39
		2592.99	17.18	H	5.34	10.03	21.87	153.99	33.00	-11.13	1/39
		2675.00	17.09	H	5.42	10.05	21.72	148.57	33.00	-11.28	1/39
	16-QAM	2511.01	16.78	H	5.25	10.16	21.69	147.42	33.00	-11.31	1/39
		2592.99	16.37	H	5.34	10.03	21.06	127.79	33.00	-11.94	1/39
		2675.00	15.40	H	5.42	10.05	20.03	100.68	33.00	-12.97	1/39
40	BPSK	2516.01	17.22	H	5.25	10.15	22.11	162.44	33.00	-10.89	1/53
		2592.99	17.40	H	5.34	10.03	22.09	161.99	33.00	-10.91	1/53
		2670.00	17.09	H	5.42	10.04	21.72	148.45	33.00	-11.28	1/53
	16-QAM	2516.01	16.47	H	5.25	10.15	21.36	136.68	33.00	-11.64	1/53
		2592.99	16.57	H	5.34	10.03	21.26	133.81	33.00	-11.74	1/53
		2670.00	16.43	H	5.42	10.04	21.06	127.52	33.00	-11.94	1/53
50	BPSK	2521.01	17.32	H	5.26	10.14	22.19	165.61	33.00	-10.81	1/131
		2592.99	17.43	H	5.34	10.03	22.12	163.11	33.00	-10.88	1/67
		2665.00	17.45	H	5.41	10.04	22.07	161.20	33.00	-10.93	1/131
	16-QAM	2521.01	16.68	H	5.26	10.14	21.55	142.92	33.00	-11.45	1/131
		2592.99	16.57	H	5.34	10.03	21.26	133.81	33.00	-11.74	1/67
		2665.00	16.40	H	5.41	10.04	21.02	126.58	33.00	-11.98	1/131
60	BPSK	2526.01	17.94	H	5.26	10.13	22.80	190.76	33.00	-10.20	1/160
		2592.99	17.73	H	5.34	10.03	22.42	174.78	33.00	-10.58	1/81
		2660.00	17.56	H	5.40	10.04	22.20	165.93	33.00	-10.80	1/1
	16-QAM	2526.01	16.22	H	5.26	10.13	21.08	128.38	33.00	-11.92	1/160
		2592.99	16.77	H	5.34	10.03	21.46	140.12	33.00	-11.54	1/81
		2660.00	15.85	H	5.40	10.04	20.49	111.92	33.00	-12.51	1/1
80	BPSK	2536.01	17.69	H	5.28	10.11	22.52	178.78	33.00	-10.48	1/215
		2592.99	17.32	H	5.34	10.03	22.01	159.03	33.00	-10.99	1/109
		2650.00	16.65	H	5.39	10.03	21.29	134.58	33.00	-11.71	1/1
	16-QAM	2536.01	16.20	H	5.28	10.11	21.03	126.86	33.00	-11.97	1/215
		2592.99	16.97	H	5.34	10.03	21.66	146.72	33.00	-11.34	1/109
		2650.00	14.98	H	5.39	10.03	19.62	91.62	33.00	-13.38	1/1
90	BPSK	2541.01	17.64	H	5.28	10.10	22.46	33.00	33.00	-10.54	1/123
		2592.99	17.78	H	5.34	10.03	22.47	176.80	33.00	-10.53	1/123
		2645.00	17.75	H	5.39	10.03	22.39	173.55	33.00	-10.61	1/1
	16-QAM	2541.01	16.11	H	5.28	10.10	20.93	123.95	33.00	-12.07	1/123
		2592.99	16.27	H	5.34	10.03	20.96	124.88	33.00	-12.04	1/123
		2645.00	16.32	H	5.39	10.03	20.96	124.86	33.00	-12.04	1/1
100	BPSK	2546.01	17.93	H	5.29	10.09	22.74	187.95	33.00	-10.26	1/137
		2592.99	17.23	H	5.34	10.03	21.92	155.77	33.00	-11.08	1/137
		2640.00	16.51	H	5.38	10.03	21.16	130.73	33.00	-11.84	1/137
	16-QAM	2546.01	16.22	H	5.29	10.09	21.03	126.78	33.00	-11.97	1/137
		2592.99	16.32	H	5.34	10.03	21.01	126.32	33.00	-11.99	1/137
		2640.00	15.98	H	5.38	10.03	20.63	115.71	33.00	-12.37	1/137

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5G NR Band n66

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	1712.50	17.53	H	4.30	9.57	22.81	190.82	30.00	-7.19	1/23
		1745.00	16.02	H	4.33	9.68	21.37	136.94	30.00	-8.63	1/1
		1777.50	16.49	H	4.37	9.70	21.82	151.92	30.00	-8.18	1/13
	16-QAM	1712.50	16.47	H	4.30	9.57	21.75	149.50	30.00	-8.25	1/1
		1745.00	15.64	H	4.33	9.68	20.99	125.47	30.00	-9.01	1/1
		1777.50	15.33	H	4.37	9.70	20.66	116.31	30.00	-9.34	1/1
10	QPSK	1715.00	17.87	H	4.30	9.58	23.15	206.68	30.00	-6.85	1/26
		1745.00	16.63	H	4.33	9.68	21.98	157.59	30.00	-8.02	1/1
		1775.00	15.76	H	4.37	9.70	21.09	128.43	30.00	-8.91	1/26
	16-QAM	1715.00	16.68	H	4.30	9.58	21.96	157.14	30.00	-8.04	1/1
		1745.00	15.50	H	4.33	9.68	20.85	121.49	30.00	-9.15	1/1
		1775.00	14.45	H	4.37	9.70	19.78	94.99	30.00	-10.22	1/1
15	QPSK	1717.50	18.16	H	4.30	9.59	23.45	221.22	30.00	-6.55	1/40
		1745.00	16.19	H	4.33	9.68	21.54	142.40	30.00	-8.46	1/40
		1772.50	16.53	H	4.37	9.70	21.86	153.50	30.00	-8.14	1/40
	16-QAM	1717.50	17.01	H	4.30	9.59	22.30	169.75	30.00	-7.70	1/1
		1745.00	15.61	H	4.33	9.68	20.96	124.60	30.00	-9.04	1/1
		1772.50	15.26	H	4.37	9.70	20.59	114.58	30.00	-9.41	1/1
20	QPSK	1720.00	17.43	H	4.31	9.60	22.72	187.13	30.00	-7.28	1/104
		1745.00	16.67	H	4.33	9.68	22.02	159.05	30.00	-7.98	1/104
		1770.00	15.90	H	4.37	9.70	21.24	132.99	30.00	-8.76	1/53
	16-QAM	1720.00	16.16	H	4.31	9.60	21.45	139.68	30.00	-8.55	1/104
		1745.00	15.64	H	4.33	9.68	20.99	125.47	30.00	-9.01	1/104
		1770.00	15.11	H	4.37	9.70	20.45	110.87	30.00	-9.55	1/53

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9.6. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27. 53 and §90.691

LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(h) 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 27.53:
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log_{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.

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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) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ span/RBW;
g) Trace mode = average(WCDMA, LTE FDD, 5G NR FDD), Maxhold(GSM, LTE TDD, 5G NR TDD);

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 bands.

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9.6.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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

Company:	Samsung
Project #:	4790302419
Date:	2/24/2022
Test Engineer:	19227
Configuration:	EUT / AC Adapter, X-Position
Location:	Chamber 1
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	-6.1	V	3.0	45.6	1.0	-50.7	-13.0	-37.7	
2472.60	-4.4	V	3.0	45.4	1.0	-48.9	-13.0	-35.9	
3296.80	-4.4	V	3.0	45.7	1.0	-49.1	-13.0	-36.1	
4121.00	-7.2	V	3.0	45.9	1.0	-52.1	-13.0	-39.1	
4945.20	-6.2	V	3.0	45.8	1.0	-51.0	-13.0	-38.0	
1648.40	-1.2	H	3.0	45.6	1.0	-45.9	-13.0	-32.9	
2472.60	-3.4	H	3.0	45.4	1.0	-47.9	-13.0	-34.9	
3296.80	-4.0	H	3.0	45.7	1.0	-48.6	-13.0	-35.6	
4121.00	-6.9	H	3.0	45.9	1.0	-51.8	-13.0	-38.8	
4945.20	-4.2	H	3.0	45.8	1.0	-49.0	-13.0	-36.0	
Mid Ch, 836.6MHz									
1673.20	-3.3	V	3.0	45.6	1.0	-47.9	-13.0	-34.9	
2509.80	-1.1	V	3.0	45.5	1.0	-45.5	-13.0	-32.5	
3346.40	-4.4	V	3.0	45.7	1.0	-49.1	-13.0	-36.1	
4183.00	-7.0	V	3.0	45.9	1.0	-51.9	-13.0	-38.9	
5019.60	-5.1	V	3.0	45.8	1.0	-49.9	-13.0	-36.9	
1673.20	-3.4	H	3.0	45.6	1.0	-48.0	-13.0	-35.0	
2509.80	1.5	H	3.0	45.5	1.0	-42.9	-13.0	-29.9	
3346.40	-4.1	H	3.0	45.7	1.0	-48.8	-13.0	-35.8	
4183.00	-6.9	H	3.0	45.9	1.0	-51.8	-13.0	-38.8	
5019.60	-3.5	H	3.0	45.8	1.0	-48.3	-13.0	-35.3	
High Ch, 848.8MHz									
1697.60	-5.8	V	3.0	45.6	1.0	-50.4	-13.0	-37.4	
2546.40	2.6	V	3.0	45.5	1.0	-41.9	-13.0	-28.9	
3395.20	-4.0	V	3.0	45.7	1.0	-48.7	-13.0	-35.7	
4244.00	-7.1	V	3.0	45.9	1.0	-52.0	-13.0	-39.0	
5092.80	-4.8	V	3.0	45.8	1.0	-49.6	-13.0	-36.6	
1697.60	-2.9	H	3.0	45.6	1.0	-47.5	-13.0	-34.5	
2546.40	3.8	H	3.0	45.5	1.0	-40.7	-13.0	-27.7	
3395.20	-3.7	H	3.0	45.7	1.0	-48.4	-13.0	-35.4	
4244.00	-6.5	H	3.0	45.9	1.0	-51.4	-13.0	-38.4	
5092.80	-3.4	H	3.0	45.8	1.0	-48.2	-13.0	-35.2	

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

Company:	Samsung
Project #:	4790302419
Date:	2/24/2022
Test Engineer:	19227
Configuration:	EUT / AC Adapter, X-Position
Location:	Chamber 1
Mode:	EGPRS 850 MHz Harmonics
Test Votage:	AC 120 V, 60 Hz

GSM850

EGPRS

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	-6.6	V	3.0	45.6	1.0	-51.2	-13.0	-38.2	
2472.60	-6.1	V	3.0	45.4	1.0	-50.5	-13.0	-37.5	
3296.80	-5.0	V	3.0	45.7	1.0	-49.7	-13.0	-36.7	
4121.00	-7.3	V	3.0	45.9	1.0	-52.2	-13.0	-39.2	
4945.20	-6.4	V	3.0	45.8	1.0	-51.2	-13.0	-38.2	
1648.40	-4.0	H	3.0	45.6	1.0	-48.6	-13.0	-35.6	
2472.60	-5.3	H	3.0	45.4	1.0	-49.8	-13.0	-36.8	
3296.80	-4.3	H	3.0	45.7	1.0	-49.0	-13.0	-36.0	
4121.00	-7.3	H	3.0	45.9	1.0	-52.2	-13.0	-39.2	
4945.20	-5.2	H	3.0	45.8	1.0	-50.0	-13.0	-37.0	
Mid Ch, 836.6MHz									
1673.20	-4.8	V	3.0	45.6	1.0	-49.4	-13.0	-36.4	
2509.80	-1.7	V	3.0	45.5	1.0	-46.1	-13.0	-33.1	
3346.40	-4.3	V	3.0	45.7	1.0	-49.0	-13.0	-36.0	
4183.00	-7.1	V	3.0	45.9	1.0	-52.0	-13.0	-39.0	
5019.60	-6.1	V	3.0	45.8	1.0	-50.9	-13.0	-37.9	
1673.20	-5.6	H	3.0	45.6	1.0	-50.2	-13.0	-37.2	
2509.80	-3.9	H	3.0	45.5	1.0	-48.4	-13.0	-35.4	
3346.40	-4.2	H	3.0	45.7	1.0	-48.8	-13.0	-35.8	
4183.00	-6.8	H	3.0	45.9	1.0	-51.6	-13.0	-38.6	
5019.60	-4.4	H	3.0	45.8	1.0	-49.2	-13.0	-36.2	
High Ch, 848.8MHz									
1697.60	-8.7	V	3.0	45.6	1.0	-53.3	-13.0	-40.3	
2546.40	-6.0	V	3.0	45.5	1.0	-50.5	-13.0	-37.5	
3395.20	-4.1	V	3.0	45.7	1.0	-48.8	-13.0	-35.8	
4244.00	-7.3	V	3.0	45.9	1.0	-52.1	-13.0	-39.1	
5092.80	-6.2	V	3.0	45.8	1.0	-51.0	-13.0	-38.0	
1697.60	-5.8	H	3.0	45.6	1.0	-50.4	-13.0	-37.4	
2546.40	0.6	H	3.0	45.5	1.0	-43.9	-13.0	-30.9	
3395.20	-3.9	H	3.0	45.7	1.0	-48.6	-13.0	-35.6	
4244.00	-6.9	H	3.0	45.9	1.0	-51.8	-13.0	-38.8	
5092.80	-4.5	H	3.0	45.8	1.0	-49.3	-13.0	-36.3	

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GSM1900

GSM1900

GPRS

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

Company: Samsung
Project #: 4790302419
Date: 2/24/2022
Test Engineer: 19568
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: GPRS 1900 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, 1850.2MHz									
3700.40	-4.0	V	3.0	45.8	1.0	-48.8	-13.0	-35.8	
5550.60	-3.7	V	3.0	45.7	1.0	-48.4	-13.0	-35.4	
7400.80	-2.5	V	3.0	44.6	1.0	-46.1	-13.0	-33.1	
3700.40	-3.5	H	3.0	45.8	1.0	-48.3	-13.0	-35.3	
5550.60	-5.7	H	3.0	45.7	1.0	-50.4	-13.0	-37.4	
7400.80	-2.6	H	3.0	44.6	1.0	-46.1	-13.0	-33.1	
Mid Ch, 1880MHz									
3760.00	-2.3	V	3.0	45.8	1.0	-47.2	-13.0	-34.2	
5640.00	-2.9	V	3.0	45.7	1.0	-47.7	-13.0	-34.7	
7520.00	-2.9	V	3.0	44.5	1.0	-46.4	-13.0	-33.4	
3760.00	-0.8	H	3.0	45.8	1.0	-45.7	-13.0	-32.7	
5640.00	-5.2	H	3.0	45.7	1.0	-50.0	-13.0	-37.0	
7520.00	-2.7	H	3.0	44.5	1.0	-46.2	-13.0	-33.2	
High Ch, 1909.8MHz									
3819.60	-1.4	V	3.0	45.8	1.0	-46.2	-13.0	-33.2	
5729.40	-4.1	V	3.0	45.7	1.0	-48.8	-13.0	-35.8	
7639.20	-2.8	V	3.0	44.4	1.0	-46.2	-13.0	-33.2	
3819.60	0.6	H	3.0	45.8	1.0	-44.2	-13.0	-31.2	
5729.40	-5.4	H	3.0	45.7	1.0	-50.1	-13.0	-37.1	
7639.20	-2.4	H	3.0	44.4	1.0	-45.9	-13.0	-32.9	

GSM1900

EGPRS

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

Company: Samsung
Project #: 4790302419
Date: 2/24/2022
Test Engineer: 19568
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: EGPRS 1900 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, 1850.2MHz									
3700.40	-4.5	V	3.0	45.8	1.0	-49.3	-13.0	-36.3	
5550.60	-4.0	V	3.0	45.7	1.0	-48.7	-13.0	-35.7	
7400.80	-3.0	V	3.0	44.6	1.0	-46.5	-13.0	-33.5	
3700.40	-4.1	H	3.0	45.8	1.0	-48.9	-13.0	-35.9	
5550.60	-5.9	H	3.0	45.7	1.0	-50.6	-13.0	-37.6	
7400.80	-2.8	H	3.0	44.6	1.0	-46.4	-13.0	-33.4	
Mid Ch, 1880MHz									
3760.00	-2.6	V	3.0	45.8	1.0	-47.4	-13.0	-34.4	
5640.00	-3.6	V	3.0	45.7	1.0	-48.4	-13.0	-35.4	
7520.00	-3.5	V	3.0	44.5	1.0	-47.0	-13.0	-34.0	
3760.00	-1.7	H	3.0	45.8	1.0	-46.5	-13.0	-33.5	
5640.00	-5.5	H	3.0	45.7	1.0	-50.2	-13.0	-37.2	
7520.00	-3.1	H	3.0	44.5	1.0	-46.6	-13.0	-33.6	
High Ch, 1909.8MHz									
3819.60	-1.7	V	3.0	45.8	1.0	-46.6	-13.0	-33.6	
5729.40	-5.0	V	3.0	45.7	1.0	-49.8	-13.0	-36.8	
7639.20	-3.2	V	3.0	44.4	1.0	-46.6	-13.0	-33.6	
3819.60	0.0	H	3.0	45.8	1.0	-44.8	-13.0	-31.8	
5729.40	-5.7	H	3.0	45.7	1.0	-50.4	-13.0	-37.4	
7639.20	-2.9	H	3.0	44.4	1.0	-46.3	-13.0	-33.3	

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WCDMA Band 5

Band 5 REL99

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

Company: Samsung
Project #: 4790302419
Date: 2/28/2022
Test Engineer: 25546
Configuration: EUT / AC Adapter, X-Position
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	-14.3	V	3.0	45.6	1.0	-58.9	-13.0	-45.9	
2479.20	-12.0	V	3.0	45.5	1.0	-56.5	-13.0	-43.5	
3305.60	-9.6	V	3.0	45.7	1.0	-54.3	-13.0	-41.3	
1652.80	-14.7	H	3.0	45.6	1.0	-59.3	-13.0	-46.3	
2479.20	-12.6	H	3.0	45.5	1.0	-57.1	-13.0	-44.1	
3305.60	-9.7	H	3.0	45.7	1.0	-54.4	-13.0	-41.4	
Mid Ch, 836.6MHz									
1673.20	-14.6	V	3.0	45.6	1.0	-59.2	-13.0	-46.2	
2509.80	-10.9	V	3.0	45.5	1.0	-55.4	-13.0	-42.4	
3346.40	-9.5	V	3.0	45.7	1.0	-54.2	-13.0	-41.2	
1673.20	-14.9	H	3.0	45.6	1.0	-59.5	-13.0	-46.5	
2509.80	-10.3	H	3.0	45.5	1.0	-54.8	-13.0	-41.8	
3346.40	-9.4	H	3.0	45.7	1.0	-54.1	-13.0	-41.1	
High Ch, 846.6MHz									
1693.20	-15.0	V	3.0	45.6	1.0	-59.6	-13.0	-46.6	
2539.80	-12.1	V	3.0	45.5	1.0	-56.5	-13.0	-43.5	
3386.40	-9.2	V	3.0	45.7	1.0	-53.9	-13.0	-40.9	
1693.20	-14.7	H	3.0	45.6	1.0	-59.3	-13.0	-46.3	
2539.80	-12.3	H	3.0	45.5	1.0	-56.8	-13.0	-43.8	
3386.40	-9.2	H	3.0	45.7	1.0	-53.9	-13.0	-40.9	

Band 5 HSDPA

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

Company: Samsung
Project #: 4790302419
Date: 2/28/2022
Test Engineer: 25546
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: HSDPA 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	-14.8	V	3.0	45.6	1.0	-59.4	-13.0	-46.4	
2479.20	-12.1	V	3.0	45.5	1.0	-56.6	-13.0	-43.6	
3305.60	-9.8	V	3.0	45.7	1.0	-54.4	-13.0	-41.4	
1652.80	-15.6	H	3.0	45.6	1.0	-60.2	-13.0	-47.2	
2479.20	-12.6	H	3.0	45.5	1.0	-57.1	-13.0	-44.1	
3305.60	-9.8	H	3.0	45.7	1.0	-54.5	-13.0	-41.5	
Mid Ch, 836.6MHz									
1673.20	-14.8	V	3.0	45.6	1.0	-59.4	-13.0	-46.4	
2509.80	-12.2	V	3.0	45.5	1.0	-56.6	-13.0	-43.6	
3346.40	-9.6	V	3.0	45.7	1.0	-54.2	-13.0	-41.2	
1673.20	-15.4	H	3.0	45.6	1.0	-60.0	-13.0	-47.0	
2509.80	-12.6	H	3.0	45.5	1.0	-57.0	-13.0	-44.0	
3346.40	-9.5	H	3.0	45.7	1.0	-54.2	-13.0	-41.2	
High Ch, 846.6MHz									
1693.20	-15.2	V	3.0	45.6	1.0	-59.8	-13.0	-46.8	
2539.80	-12.1	V	3.0	45.5	1.0	-56.6	-13.0	-43.6	
3386.40	-9.2	V	3.0	45.7	1.0	-53.9	-13.0	-40.9	
1693.20	-15.2	H	3.0	45.6	1.0	-59.7	-13.0	-46.7	
2539.80	-12.4	H	3.0	45.5	1.0	-56.9	-13.0	-43.9	
3386.40	-9.3	H	3.0	45.7	1.0	-54.0	-13.0	-41.0	

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WCDMA Band 4

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

Company:	Samsung
Project #:	4790302419
Date:	2/28/2022
Test Engineer:	25546
Configuration:	EUT, Z-Position
Location:	Chamber 1
Mode:	Rel99 Band 4 Harmonics
Test Votage:	AC 120 V, 60 Hz

Band 4
REL99

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3424.80	-8.7	V	3.0	45.7	1.0	-53.4	-13.0	-40.4	
5137.20	-4.3	V	3.0	45.8	1.0	-49.1	-13.0	-36.1	
6849.60	4.7	V	3.0	44.9	1.0	-39.3	-13.0	-26.3	
8562.00	-1.7	V	3.0	43.8	1.0	-44.6	-13.0	-31.6	
10274.40	-1.4	V	3.0	42.7	1.0	-43.0	-13.0	-30.0	
3424.80	-8.9	H	3.0	45.7	1.0	-53.6	-13.0	-40.6	
5137.20	-6.3	H	3.0	45.8	1.0	-51.1	-13.0	-38.1	
6849.60	-2.4	H	3.0	44.9	1.0	-46.3	-13.0	-33.3	
8562.00	0.2	H	3.0	43.8	1.0	-42.6	-13.0	-29.6	
10274.40	-1.5	H	3.0	42.7	1.0	-43.1	-13.0	-30.1	
Mid Ch, 1732.6MHz									
3465.20	-8.6	V	3.0	45.7	1.0	-53.3	-13.0	-40.3	
5197.80	-4.5	V	3.0	45.8	1.0	-49.3	-13.0	-36.3	
6930.40	2.3	V	3.0	44.8	1.0	-41.6	-13.0	-28.6	
8663.00	-3.7	V	3.0	43.8	1.0	-46.4	-13.0	-33.4	
10395.60	-1.2	V	3.0	42.7	1.0	-42.9	-13.0	-29.9	
3465.20	-8.5	H	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5197.80	-6.2	H	3.0	45.8	1.0	-51.0	-13.0	-38.0	
6930.40	-2.0	H	3.0	44.8	1.0	-45.9	-13.0	-32.9	
8663.00	-2.5	H	3.0	43.8	1.0	-45.3	-13.0	-32.3	
10395.60	-1.2	H	3.0	42.7	1.0	-43.0	-13.0	-30.0	
High Ch, 1752.6MHz									
3505.20	-8.5	V	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5257.80	-4.0	V	3.0	45.8	1.0	-48.8	-13.0	-35.8	
7010.40	3.0	V	3.0	44.8	1.0	-40.8	-13.0	-27.8	
8763.00	-3.5	V	3.0	43.7	1.0	-46.2	-13.0	-33.2	
10515.60	-0.6	V	3.0	42.8	1.0	-42.4	-13.0	-29.4	
3505.20	-8.4	H	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5257.80	-4.9	H	3.0	45.8	1.0	-49.7	-13.0	-36.7	
7010.40	-1.5	H	3.0	44.8	1.0	-45.3	-13.0	-32.3	
8763.00	-3.5	H	3.0	43.7	1.0	-46.2	-13.0	-33.2	
10515.60	-0.7	H	3.0	42.8	1.0	-42.5	-13.0	-29.5	

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

Company:	Samsung
Project #:	4790302419
Date:	2/28/2022
Test Engineer:	25546
Configuration:	EUT, Z-Position
Location:	Chamber 1
Mode:	HSDPA Band 4 Harmonics
Test Votage:	AC 120 V, 60 Hz

Band 4 HSDPA

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3424.80	-8.8	V	3.0	45.7	1.0	-53.5	-13.0	-40.5	
5137.20	-4.8	V	3.0	45.8	1.0	-49.6	-13.0	-36.6	
6849.60	3.8	V	3.0	44.9	1.0	-40.1	-13.0	-27.1	
8562.00	-2.3	V	3.0	43.8	1.0	-45.1	-13.0	-32.1	
10274.40	-1.4	V	3.0	42.7	1.0	-43.0	-13.0	-30.0	
3424.80	-8.9	H	3.0	45.7	1.0	-53.6	-13.0	-40.6	
5137.20	-7.0	H	3.0	45.8	1.0	-51.8	-13.0	-38.8	
6849.60	-2.9	H	3.0	44.9	1.0	-46.8	-13.0	-33.8	
8562.00	-0.6	H	3.0	43.8	1.0	-43.4	-13.0	-30.4	
10274.40	-1.5	H	3.0	42.7	1.0	-43.2	-13.0	-30.2	
Mid Ch, 1732.6MHz									
3465.20	-8.6	V	3.0	45.7	1.0	-53.3	-13.0	-40.3	
5197.80	-4.9	V	3.0	45.8	1.0	-49.7	-13.0	-36.7	
6930.40	0.5	V	3.0	44.8	1.0	-43.4	-13.0	-30.4	
8663.00	-4.3	V	3.0	43.8	1.0	-47.1	-13.0	-34.1	
10395.60	-1.2	V	3.0	42.7	1.0	-42.9	-13.0	-29.9	
3465.20	-8.5	H	3.0	45.7	1.0	-53.3	-13.0	-40.3	
5197.80	-6.7	H	3.0	45.8	1.0	-51.5	-13.0	-38.5	
6930.40	-3.1	H	3.0	44.8	1.0	-46.9	-13.0	-33.9	
8663.00	-3.1	H	3.0	43.8	1.0	-45.9	-13.0	-32.9	
10395.60	-1.3	H	3.0	42.7	1.0	-43.0	-13.0	-30.0	
High Ch, 1752.6MHz									
3505.20	-8.5	V	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5257.80	-5.3	V	3.0	45.8	1.0	-50.0	-13.0	-37.0	
7010.40	1.8	V	3.0	44.8	1.0	-42.0	-13.0	-29.0	
8763.00	-4.0	V	3.0	43.7	1.0	-46.7	-13.0	-33.7	
10515.60	-1.1	V	3.0	42.8	1.0	-42.8	-13.0	-29.8	
3505.20	-8.5	H	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5257.80	-5.9	H	3.0	45.8	1.0	-50.7	-13.0	-37.7	
7010.40	-2.5	H	3.0	44.8	1.0	-46.3	-13.0	-33.3	
8763.00	-4.0	H	3.0	43.7	1.0	-46.7	-13.0	-33.7	
10515.60	-1.2	H	3.0	42.8	1.0	-43.0	-13.0	-30.0	

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WCDMA Band 2

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

Company:	Samsung
Project #:	4790302419
Date:	2/25/2022
Test Engineer:	19227
Configuration:	EUT, Z-Position
Location:	Chamber 1
Mode:	Rel99 Band 2 Harmonics
Test Votage:	AC 120 V, 60 Hz

Band 2
REL99

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-10.9	V	3.0	45.8	1.0	-55.7	-13.0	-42.7	
5557.20	-5.5	V	3.0	45.7	1.0	-50.3	-13.0	-37.3	
7409.60	3.5	V	3.0	44.6	1.0	-40.1	-13.0	-27.1	
9262.00	-3.8	V	3.0	43.3	1.0	-46.1	-13.0	-33.1	
11114.40	-0.1	V	3.0	42.9	1.0	-42.0	-13.0	-29.0	
3704.80	-11.0	H	3.0	45.8	1.0	-55.8	-13.0	-42.8	
5557.20	-5.3	H	3.0	45.7	1.0	-50.1	-13.0	-37.1	
7409.60	-0.4	H	3.0	44.6	1.0	-44.0	-13.0	-31.0	
9262.00	-3.8	H	3.0	43.3	1.0	-46.1	-13.0	-33.1	
11114.40	0.0	H	3.0	42.9	1.0	-42.0	-13.0	-29.0	
Mid Ch, 1880MHz									
3760.00	-10.7	V	3.0	45.8	1.0	-55.6	-13.0	-42.6	
5640.00	-3.6	V	3.0	45.7	1.0	-48.3	-13.0	-35.3	
7520.00	2.3	V	3.0	44.5	1.0	-41.2	-13.0	-28.2	
9400.00	-3.2	V	3.0	43.2	1.0	-45.4	-13.0	-32.4	
11280.00	0.0	V	3.0	43.0	1.0	-42.0	-13.0	-29.0	
3760.00	-10.8	H	3.0	45.8	1.0	-55.6	-13.0	-42.6	
5640.00	-4.3	H	3.0	45.7	1.0	-49.0	-13.0	-36.0	
7520.00	0.1	H	3.0	44.5	1.0	-43.4	-13.0	-30.4	
9400.00	-3.1	H	3.0	43.2	1.0	-45.2	-13.0	-32.2	
11280.00	0.1	H	3.0	43.0	1.0	-41.9	-13.0	-28.9	
High Ch, 1907.6MHz									
3815.20	-10.7	V	3.0	45.8	1.0	-55.5	-13.0	-42.5	
5722.80	-2.2	V	3.0	45.7	1.0	-46.9	-13.0	-33.9	
7630.40	0.2	V	3.0	44.4	1.0	-43.2	-13.0	-30.2	
9538.00	-2.8	V	3.0	43.0	1.0	-44.9	-13.0	-31.9	
11445.60	0.0	V	3.0	43.1	1.0	-42.0	-13.0	-29.0	
3815.20	-10.7	H	3.0	45.8	1.0	-55.6	-13.0	-42.6	
5722.80	-5.1	H	3.0	45.7	1.0	-49.8	-13.0	-36.8	
7630.40	-0.9	H	3.0	44.4	1.0	-44.4	-13.0	-31.4	
9538.00	-2.9	H	3.0	43.0	1.0	-44.9	-13.0	-31.9	
11445.60	0.1	H	3.0	43.1	1.0	-41.9	-13.0	-28.9	

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

Company:	Samsung
Project #:	4790302419
Date:	2/25/2022
Test Engineer:	19227
Configuration:	EUT, Z-Position
Location:	Chamber 1
Mode:	HSDPA Band 2 Harmonics
Test Votage:	AC 120 V, 60 Hz

Band 2
HSDPA

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-10.9	V	3.0	45.8	1.0	-55.7	-13.0	-42.7	
5557.20	-5.7	V	3.0	45.7	1.0	-50.4	-13.0	-37.4	
7409.60	2.5	V	3.0	44.6	1.0	-41.1	-13.0	-28.1	
9262.00	-3.8	V	3.0	43.3	1.0	-46.1	-13.0	-33.1	
11114.40	-0.1	V	3.0	42.9	1.0	-42.0	-13.0	-29.0	
3704.80	-11.0	H	3.0	45.8	1.0	-55.8	-13.0	-42.8	
5557.20	-5.4	H	3.0	45.7	1.0	-50.1	-13.0	-37.1	
7409.60	-0.5	H	3.0	44.6	1.0	-44.1	-13.0	-31.1	
9262.00	-3.8	H	3.0	43.3	1.0	-46.1	-13.0	-33.1	
11114.40	-0.1	H	3.0	42.9	1.0	-42.0	-13.0	-29.0	
Mid Ch, 1880MHz									
3760.00	-10.8	V	3.0	45.8	1.0	-55.6	-13.0	-42.6	
5640.00	-5.2	V	3.0	45.7	1.0	-50.0	-13.0	-37.0	
7520.00	0.9	V	3.0	44.5	1.0	-42.6	-13.0	-29.6	
9400.00	-3.2	V	3.0	43.2	1.0	-45.4	-13.0	-32.4	
11280.00	0.0	V	3.0	43.0	1.0	-42.0	-13.0	-29.0	
3760.00	-10.9	H	3.0	45.8	1.0	-55.7	-13.0	-42.7	
5640.00	-6.4	H	3.0	45.7	1.0	-51.2	-13.0	-38.2	
7520.00	-1.7	H	3.0	44.5	1.0	-45.2	-13.0	-32.2	
9400.00	-3.2	H	3.0	43.2	1.0	-45.4	-13.0	-32.4	
11280.00	0.0	H	3.0	43.0	1.0	-42.0	-13.0	-29.0	
High Ch, 1907.6MHz									
3815.20	-10.7	V	3.0	45.8	1.0	-55.5	-13.0	-42.5	
5722.80	-2.3	V	3.0	45.7	1.0	-47.0	-13.0	-34.0	
7630.40	0.2	V	3.0	44.4	1.0	-43.2	-13.0	-30.2	
9538.00	-2.9	V	3.0	43.0	1.0	-44.9	-13.0	-31.9	
11445.60	0.0	V	3.0	43.1	1.0	-42.0	-13.0	-29.0	
3815.20	-10.7	H	3.0	45.8	1.0	-55.6	-13.0	-42.6	
5722.80	-5.3	H	3.0	45.7	1.0	-50.0	-13.0	-37.0	
7630.40	-1.0	H	3.0	44.4	1.0	-44.4	-13.0	-31.4	
9538.00	-2.9	H	3.0	43.0	1.0	-45.0	-13.0	-32.0	
11445.60	0.1	H	3.0	43.1	1.0	-42.0	-13.0	-29.0	

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LTE Band 2

LTE Band 2

20MHz

QPSK

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

Company: Samsung
Project #: 4790302419
Date: 2/24/2022
Test Engineer: 19227
Configuration: EUT / AC Adapter, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 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, 1860MHz									
3720.00	-10.0	V	3.0	45.8	1.0	-54.9	-13.0	-41.9	
5580.00	0.6	V	3.0	45.7	1.0	-44.2	-13.0	-31.2	
7440.00	14.0	V	3.0	44.5	1.0	-29.5	-13.0	-16.5	
9300.00	-1.5	V	3.0	43.3	1.0	-43.7	-13.0	-30.7	
11160.00	-0.1	V	3.0	43.0	1.0	-42.1	-13.0	-29.1	
3720.00	-10.2	H	3.0	45.8	1.0	-55.0	-13.0	-42.0	
5580.00	2.4	H	3.0	45.7	1.0	-42.3	-13.0	-29.3	
7440.00	9.3	H	3.0	44.5	1.0	-34.3	-13.0	-21.3	
9300.00	-1.7	H	3.0	43.3	1.0	-43.9	-13.0	-30.9	
11160.00	-0.3	H	3.0	43.0	1.0	-42.3	-13.0	-29.3	
Mid Ch, 1880MHz									
3760.00	-10.0	V	3.0	45.8	1.0	-54.9	-13.0	-41.9	
5640.00	-1.4	V	3.0	45.7	1.0	-46.1	-13.0	-33.1	
7520.00	8.9	V	3.0	44.5	1.0	-34.6	-13.0	-21.6	
9400.00	-1.8	V	3.0	43.2	1.0	-44.0	-13.0	-31.0	
11280.00	0.1	V	3.0	43.0	1.0	-41.9	-13.0	-28.9	
3760.00	-9.8	H	3.0	45.8	1.0	-54.6	-13.0	-41.6	
5640.00	0.9	H	3.0	45.7	1.0	-43.8	-13.0	-30.8	
7520.00	4.3	H	3.0	44.5	1.0	-39.2	-13.0	-26.2	
9400.00	-2.0	H	3.0	43.2	1.0	-44.2	-13.0	-31.2	
11280.00	0.1	H	3.0	43.0	1.0	-41.9	-13.0	-28.9	
High Ch, 1900MHz									
3800.00	-9.3	V	3.0	45.8	1.0	-54.2	-13.0	-41.2	
5700.00	2.1	V	3.0	45.7	1.0	-42.6	-13.0	-29.6	
7600.00	9.0	V	3.0	44.5	1.0	-34.5	-13.0	-21.5	
9500.00	-1.7	V	3.0	43.1	1.0	-43.7	-13.0	-30.7	
11400.00	0.0	V	3.0	43.0	1.0	-42.1	-13.0	-29.1	
3800.00	-8.9	H	3.0	45.8	1.0	-53.7	-13.0	-40.7	
5700.00	0.8	H	3.0	45.7	1.0	-43.9	-13.0	-30.9	
7600.00	4.6	H	3.0	44.5	1.0	-38.8	-13.0	-25.8	
9500.00	-2.0	H	3.0	43.1	1.0	-44.0	-13.0	-31.0	
11400.00	0.1	H	3.0	43.0	1.0	-41.9	-13.0	-28.9	

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LTE Band 12

LTE
Band 12

5MHz

QPSK

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

Company:	Samsung
Project #:	4790302419
Date:	2/23/2022
Test Engineer:	19227
Configuration:	EUT / AC Adapter, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 12 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, 701.5MHz									
1403.00	-16.9	V	3.0	45.8	1.0	-61.7	-13.0	-48.7	
2104.50	-12.0	V	3.0	45.4	1.0	-56.3	-13.0	-43.3	
2806.00	-11.2	V	3.0	45.5	1.0	-55.8	-13.0	-42.8	
1403.00	-17.9	H	3.0	45.8	1.0	-62.7	-13.0	-49.7	
2104.50	-13.0	H	3.0	45.4	1.0	-57.4	-13.0	-44.4	
2806.00	-11.3	H	3.0	45.5	1.0	-55.8	-13.0	-42.8	
Mid Ch, 707.5MHz									
1415.00	-16.9	V	3.0	45.8	1.0	-61.7	-13.0	-48.7	
2122.50	-8.4	V	3.0	45.4	1.0	-52.8	-13.0	-39.8	
2830.00	-11.3	V	3.0	45.5	1.0	-55.8	-13.0	-42.8	
1415.00	-17.8	H	3.0	45.8	1.0	-62.6	-13.0	-49.6	
2122.50	-12.0	H	3.0	45.4	1.0	-56.4	-13.0	-43.4	
2830.00	-11.3	H	3.0	45.5	1.0	-55.8	-13.0	-42.8	
High Ch, 713.5MHz									
1427.00	-16.7	V	3.0	45.8	1.0	-61.5	-13.0	-48.5	
2140.50	-11.5	V	3.0	45.4	1.0	-55.8	-13.0	-42.8	
2854.00	-11.1	V	3.0	45.5	1.0	-55.7	-13.0	-42.7	
1427.00	-17.8	H	3.0	45.8	1.0	-62.6	-13.0	-49.6	
2140.50	-12.3	H	3.0	45.4	1.0	-56.7	-13.0	-43.7	
2854.00	-11.3	H	3.0	45.5	1.0	-55.8	-13.0	-42.8	

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LTE Band 13

LTE
Band 13

5MHz

QPSK

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

Company:	Samsung
Project #:	4790302422
Date:	4/4/2022
Test Engineer:	19568
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 13 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, 779.5MHz									
1559.00	-16.0	V	3.0	45.7	1.0	-60.7	-13.0	-47.7	
2338.50	-12.4	V	3.0	45.4	1.0	-56.9	-13.0	-43.9	
3118.00	-10.5	V	3.0	45.6	1.0	-55.1	-13.0	-42.1	
1559.00	-15.8	H	3.0	45.7	1.0	-60.5	-13.0	-47.5	
2338.50	-13.1	H	3.0	45.4	1.0	-57.5	-13.0	-44.5	
3118.00	-10.5	H	3.0	45.6	1.0	-55.1	-13.0	-42.1	
Mid Ch, 782MHz									
1564.00	-15.1	V	3.0	45.7	1.0	-59.8	-13.0	-46.8	
2346.00	-12.4	V	3.0	45.4	1.0	-56.8	-13.0	-43.8	
3128.00	-10.4	V	3.0	45.6	1.0	-55.0	-13.0	-42.0	
1564.00	-15.6	H	3.0	45.7	1.0	-60.3	-13.0	-47.3	
2346.00	-13.1	H	3.0	45.4	1.0	-57.5	-13.0	-44.5	
3128.00	-10.4	H	3.0	45.6	1.0	-55.0	-13.0	-42.0	
High Ch, 784.5MHz									
1569.00	-15.6	V	3.0	45.7	1.0	-60.2	-13.0	-47.2	
2353.50	-12.5	V	3.0	45.4	1.0	-56.9	-13.0	-43.9	
3138.00	-10.4	V	3.0	45.6	1.0	-55.0	-13.0	-42.0	
1569.00	-15.8	H	3.0	45.7	1.0	-60.5	-13.0	-47.5	
2353.50	-13.0	H	3.0	45.4	1.0	-57.4	-13.0	-44.4	
3138.00	-10.3	H	3.0	45.6	1.0	-54.9	-13.0	-41.9	

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LTE Band 26 (Part 90)

LTE Band 26

5MHz

QPSK

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

Company: Samsung
Project #: 4790302419
Date: 3/2/2022
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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, 816.5MHz									
1633.00	-14.1	V	3.0	45.6	1.0	-58.7	-13.0	-45.7	
2449.50	-12.1	V	3.0	45.4	1.0	-56.6	-13.0	-43.6	
3266.00	-9.9	V	3.0	45.7	1.0	-54.6	-13.0	-41.6	
1633.00	-11.7	H	3.0	45.6	1.0	-56.3	-13.0	-43.3	
2449.50	-12.6	H	3.0	45.4	1.0	-57.1	-13.0	-44.1	
3266.00	-9.7	H	3.0	45.7	1.0	-54.4	-13.0	-41.4	
Mid Ch, 821.5MHz									
1643.00	-13.2	V	3.0	45.6	1.0	-57.8	-13.0	-44.8	
2464.50	-12.1	V	3.0	45.4	1.0	-56.6	-13.0	-43.6	
3286.00	-9.8	V	3.0	45.7	1.0	-54.5	-13.0	-41.5	
1643.00	-11.6	H	3.0	45.6	1.0	-56.2	-13.0	-43.2	
2464.50	-12.5	H	3.0	45.4	1.0	-57.0	-13.0	-44.0	
3286.00	-9.6	H	3.0	45.7	1.0	-54.2	-13.0	-41.2	

LTE Band 26 (Straddle)

LTE Band 26

5MHz

QPSK

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

Company: Samsung
Project #: 4790302419
Date: 3/2/2022
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
Straddle Ch, 824MHz									
1648.00	-14.3	V	3.0	45.6	1.0	-58.9	-13.0	-45.9	
2472.00	-12.1	V	3.0	45.4	1.0	-56.6	-13.0	-43.6	
3296.00	-9.7	V	3.0	45.7	1.0	-54.4	-13.0	-41.4	
1648.00	-10.6	H	3.0	45.6	1.0	-55.2	-13.0	-42.2	
2472.00	-11.5	H	3.0	45.4	1.0	-55.9	-13.0	-42.9	
3296.00	-9.6	H	3.0	45.7	1.0	-54.3	-13.0	-41.3	

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LTE Band 26 (Part 22)

LTE Band 26

5MHz

QPSK

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

Company:	Samsung
Project #:	4790302419
Date:	3/2/2022
Test Engineer:	19568
Configuration:	EUT, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 26 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	-13.6	V	3.0	45.6	1.0	-58.2	-13.0	-45.2	
2479.50	-10.6	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
3306.00	-9.7	V	3.0	45.7	1.0	-54.4	-13.0	-41.4	
1653.00	-16.0	H	3.0	45.6	1.0	-60.7	-13.0	-47.7	
2479.50	-12.6	H	3.0	45.5	1.0	-57.1	-13.0	-44.1	
3306.00	-9.8	H	3.0	45.7	1.0	-54.4	-13.0	-41.4	
Mid Ch, 831.5MHz									
1663.00	-13.3	V	3.0	45.6	1.0	-57.9	-13.0	-44.9	
2494.50	-10.6	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
3326.00	-9.6	V	3.0	45.7	1.0	-54.3	-13.0	-41.3	
1663.00	-16.2	H	3.0	45.6	1.0	-60.8	-13.0	-47.8	
2494.50	-12.6	H	3.0	45.5	1.0	-57.1	-13.0	-44.1	
3326.00	-10.0	H	3.0	45.7	1.0	-54.7	-13.0	-41.7	
High Ch, 846.5MHz									
1693.00	-13.2	V	3.0	45.6	1.0	-57.8	-13.0	-44.8	
2539.50	-9.9	V	3.0	45.5	1.0	-54.3	-13.0	-41.3	
3386.00	-9.3	V	3.0	45.7	1.0	-54.0	-13.0	-41.0	
1693.00	-15.2	H	3.0	45.6	1.0	-59.8	-13.0	-46.8	
2539.50	-12.5	H	3.0	45.5	1.0	-57.0	-13.0	-44.0	
3386.00	-9.3	H	3.0	45.7	1.0	-54.0	-13.0	-41.0	

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LTE Band 41

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

Company:	Samsung
Project #:	4790302419
Date:	2/25/2022
Test Engineer:	19568
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 41 Harmonics, 20MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

LTE Band 41

20MHz

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, 2506MHz									
5012.00	-15.7	V	3.0	45.8	1.0	-60.5	-25.0	-35.5	
7518.00	-7.3	V	3.0	44.5	1.0	-50.8	-25.0	-25.8	
10024.00	-7.1	V	3.0	42.6	1.0	-48.7	-25.0	-23.7	
12530.00	-0.4	V	3.0	43.7	1.0	-43.1	-25.0	-18.1	
15036.00	-6.5	V	3.0	45.7	1.0	-51.2	-25.0	-26.2	
5012.00	-15.7	H	3.0	45.8	1.0	-60.6	-25.0	-35.6	
7518.00	-7.1	H	3.0	44.5	1.0	-50.6	-25.0	-25.6	
10024.00	-9.0	H	3.0	42.6	1.0	-50.6	-25.0	-25.6	
12530.00	-0.2	H	3.0	43.7	1.0	-42.9	-25.0	-17.9	
15036.00	-6.3	H	3.0	45.7	1.0	-51.0	-25.0	-26.0	
Mid Ch, 2593MHz									
5186.00	-15.2	V	3.0	45.8	1.0	-60.0	-25.0	-35.0	
7779.00	-8.1	V	3.0	44.4	1.0	-51.5	-25.0	-26.5	
10372.00	-5.9	V	3.0	42.7	1.0	-47.6	-25.0	-22.6	
12965.00	-2.5	V	3.0	44.0	1.0	-45.5	-25.0	-20.5	
15558.00	-5.8	V	3.0	45.1	1.0	-49.9	-25.0	-24.9	
5186.00	-15.0	H	3.0	45.8	1.0	-59.8	-25.0	-34.8	
7779.00	-7.9	H	3.0	44.4	1.0	-51.3	-25.0	-26.3	
10372.00	-8.7	H	3.0	42.7	1.0	-50.4	-25.0	-25.4	
12965.00	-2.7	H	3.0	44.0	1.0	-45.7	-25.0	-20.7	
15558.00	-5.7	H	3.0	45.1	1.0	-49.8	-25.0	-24.8	
High Ch, 2680MHz									
5360.00	-13.7	V	3.0	45.8	1.0	-58.4	-25.0	-33.4	
8040.00	-3.4	V	3.0	44.2	1.0	-46.6	-25.0	-21.6	
10720.00	-4.2	V	3.0	42.8	1.0	-46.0	-25.0	-21.0	
13400.00	-7.3	V	3.0	44.4	1.0	-50.7	-25.0	-25.7	
16080.00	-5.4	V	3.0	44.5	1.0	-48.8	-25.0	-23.8	
5360.00	-13.2	H	3.0	45.8	1.0	-58.0	-25.0	-33.0	
8040.00	-1.2	H	3.0	44.2	1.0	-44.4	-25.0	-19.4	
10720.00	-9.1	H	3.0	42.8	1.0	-51.0	-25.0	-26.0	
13400.00	-6.5	H	3.0	44.4	1.0	-49.9	-25.0	-24.9	
16080.00	-5.4	H	3.0	44.5	1.0	-48.8	-25.0	-23.8	

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LTE Band 66

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

Company:	Samsung
Project #:	4790302419
Date:	2/24/2022
Test Engineer:	19227
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 66 Harmonics, 20MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

LTE Band 66

20MHz

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, 1720MHz									
3440.00	-7.7	V	3.0	45.7	1.0	-52.4	-13.0	-39.4	
5160.00	0.8	V	3.0	45.8	1.0	-44.0	-13.0	-31.0	
6880.00	11.1	V	3.0	44.9	1.0	-32.8	-13.0	-19.8	
8600.00	3.2	V	3.0	43.8	1.0	-39.6	-13.0	-26.6	
10320.00	-1.2	V	3.0	42.7	1.0	-42.8	-13.0	-29.8	
3440.00	-8.1	H	3.0	45.7	1.0	-52.8	-13.0	-39.8	
5160.00	-0.8	H	3.0	45.8	1.0	-45.6	-13.0	-32.6	
6880.00	4.8	H	3.0	44.9	1.0	-39.0	-13.0	-26.0	
8600.00	4.1	H	3.0	43.8	1.0	-38.7	-13.0	-25.7	
10320.00	-1.4	H	3.0	42.7	1.0	-43.1	-13.0	-30.1	
Mid Ch, 1745MHz									
3490.00	-8.3	V	3.0	45.7	1.0	-53.0	-13.0	-40.0	
5235.00	1.4	V	3.0	45.8	1.0	-43.4	-13.0	-30.4	
6980.00	14.0	V	3.0	44.8	1.0	-29.8	-13.0	-16.8	
8725.00	1.6	V	3.0	43.7	1.0	-41.1	-13.0	-28.1	
10470.00	-1.2	V	3.0	42.7	1.0	-43.0	-13.0	-30.0	
3490.00	-8.4	H	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5235.00	0.3	H	3.0	45.8	1.0	-44.5	-13.0	-31.5	
6980.00	8.5	H	3.0	44.8	1.0	-35.3	-13.0	-22.3	
8725.00	3.2	H	3.0	43.7	1.0	-39.6	-13.0	-26.6	
10470.00	-1.2	H	3.0	42.7	1.0	-42.9	-13.0	-29.9	
High Ch, 1770MHz									
3540.00	-8.0	V	3.0	45.8	1.0	-52.8	-13.0	-39.8	
5310.00	0.6	V	3.0	45.8	1.0	-44.2	-13.0	-31.2	
7080.00	10.5	V	3.0	44.7	1.0	-33.2	-13.0	-20.2	
8850.00	-1.3	V	3.0	43.6	1.0	-43.9	-13.0	-30.9	
10620.00	-0.9	V	3.0	42.8	1.0	-42.6	-13.0	-29.6	
3540.00	-8.1	H	3.0	45.8	1.0	-52.8	-13.0	-39.8	
5310.00	1.0	H	3.0	45.8	1.0	-43.8	-13.0	-30.8	
7080.00	6.3	H	3.0	44.7	1.0	-37.4	-13.0	-24.4	
8850.00	-0.3	H	3.0	43.6	1.0	-42.9	-13.0	-29.9	
10620.00	-1.0	H	3.0	42.8	1.0	-42.8	-13.0	-29.8	

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NR Band n5

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

Company: Samsung
Project #: 4790302419
Date: 3/4/2022
Test Engineer: 19568
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 1
Mode: 5G NR_BPSK NR n5 Harmonics, 5MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

5MHz

BPSK

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	-10.9	V	3.0	45.6	1.0	-55.5	-13.0	-42.5	
2479.50	-12.0	V	3.0	45.5	1.0	-56.4	-13.0	-43.4	
3306.00	-9.7	V	3.0	45.7	1.0	-54.4	-13.0	-41.4	
1653.00	-13.1	H	3.0	45.6	1.0	-57.7	-13.0	-44.7	
2479.50	-12.2	H	3.0	45.5	1.0	-56.6	-13.0	-43.6	
3306.00	-9.8	H	3.0	45.7	1.0	-54.4	-13.0	-41.4	
Mid Ch, 836.5MHz									
1673.00	-11.7	V	3.0	45.6	1.0	-56.3	-13.0	-43.3	
2509.50	-12.0	V	3.0	45.5	1.0	-56.5	-13.0	-43.5	
3346.00	-9.5	V	3.0	45.7	1.0	-54.1	-13.0	-41.1	
1673.00	-14.2	H	3.0	45.6	1.0	-58.8	-13.0	-45.8	
2509.50	-12.2	H	3.0	45.5	1.0	-56.7	-13.0	-43.7	
3346.00	-9.6	H	3.0	45.7	1.0	-54.3	-13.0	-41.3	
High Ch, 846.5MHz									
1693.00	-11.4	V	3.0	45.6	1.0	-56.0	-13.0	-43.0	
2539.50	-10.3	V	3.0	45.5	1.0	-54.8	-13.0	-41.8	
3386.00	-9.2	V	3.0	45.7	1.0	-53.9	-13.0	-40.9	
1693.00	-10.3	H	3.0	45.6	1.0	-54.9	-13.0	-41.9	
2539.50	-12.7	H	3.0	45.5	1.0	-57.2	-13.0	-44.2	
3386.00	-9.4	H	3.0	45.7	1.0	-54.1	-13.0	-41.1	

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NR Band n41

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

Company: Samsung
Project #: 4790302419
Date: 3/8/2022
Test Engineer: 19227
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: 5G NR_BPSK NR n41 Harmonics, 100MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

100MHz

BPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2546.01MHz									
5092.02	-16.9	V	3.0	45.8	1.0	-61.7	-25.0	-36.7	
7638.03	-8.7	V	3.0	44.4	1.0	-52.1	-25.0	-27.1	
10184.04	-11.9	V	3.0	42.6	1.0	-53.6	-25.0	-28.6	
12730.05	-3.7	V	3.0	43.8	1.0	-46.5	-25.0	-21.5	
15276.06	-6.4	V	3.0	45.4	1.0	-50.8	-25.0	-25.8	
5092.02	-16.9	H	3.0	45.8	1.0	-61.7	-25.0	-36.7	
7638.03	-8.0	H	3.0	44.4	1.0	-51.5	-25.0	-26.5	
10184.04	-12.1	H	3.0	42.6	1.0	-53.8	-25.0	-28.8	
12730.05	-2.7	H	3.0	43.8	1.0	-45.6	-25.0	-20.6	
15276.06	-6.3	H	3.0	45.4	1.0	-50.7	-25.0	-25.7	
Mid Ch, 2592.99MHz									
5185.98	-16.7	V	3.0	45.8	1.0	-61.5	-25.0	-36.5	
7778.97	-8.0	V	3.0	44.4	1.0	-51.4	-25.0	-26.4	
10371.96	-11.5	V	3.0	42.7	1.0	-53.2	-25.0	-28.2	
12964.95	-3.6	V	3.0	44.0	1.0	-46.6	-25.0	-21.6	
15557.94	-6.1	V	3.0	45.1	1.0	-50.2	-25.0	-25.2	
5185.98	-16.5	H	3.0	45.8	1.0	-61.3	-25.0	-36.3	
7778.97	-8.9	H	3.0	44.4	1.0	-52.3	-25.0	-27.3	
10371.96	-10.4	H	3.0	42.7	1.0	-52.1	-25.0	-27.1	
12964.95	-1.3	H	3.0	44.0	1.0	-44.3	-25.0	-19.3	
15557.94	-6.1	H	3.0	45.1	1.0	-50.2	-25.0	-25.2	
High Ch, 2640MHz									
5280.00	-16.4	V	3.0	45.8	1.0	-61.2	-25.0	-36.2	
7920.00	-8.2	V	3.0	44.3	1.0	-51.5	-25.0	-26.5	
10560.00	-10.6	V	3.0	42.8	1.0	-52.4	-25.0	-27.4	
13200.00	-6.2	V	3.0	44.2	1.0	-49.4	-25.0	-24.4	
15840.00	-5.7	V	3.0	44.7	1.0	-49.4	-25.0	-24.4	
5280.00	-18.5	H	3.0	45.8	1.0	-63.2	-25.0	-38.2	
7920.00	-8.3	H	3.0	44.3	1.0	-51.6	-25.0	-26.6	
10560.00	-10.8	H	3.0	42.8	1.0	-52.6	-25.0	-27.6	
13200.00	-5.6	H	3.0	44.2	1.0	-48.8	-25.0	-23.8	
15840.00	-5.9	H	3.0	44.7	1.0	-49.7	-25.0	-24.7	

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NR Band n66

5MHz

QPSK

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

Company:	Samsung
Project #:	4790302422
Date:	4/8/2022
Test Engineer:	19227
Configuration:	EUT / AC Adapter / Earphone, Y-Position
Location:	Chamber 2
Mode:	5G NR_QPSK NR n66 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, 1712.5MHz									
3425.00	-9.5	V	3.0	42.3	1.0	-50.8	-13.0	-37.8	
5137.50	-9.4	V	3.0	43.1	1.0	-51.4	-13.0	-38.4	
6850.00	-6.6	V	3.0	43.0	1.0	-48.5	-13.0	-35.5	
8562.50	-3.7	V	3.0	42.2	1.0	-44.9	-13.0	-31.9	
3425.00	-9.5	H	3.0	42.3	1.0	-50.8	-13.0	-37.8	
5137.50	-9.2	H	3.0	43.1	1.0	-51.2	-13.0	-38.2	
6850.00	-6.5	H	3.0	43.0	1.0	-48.4	-13.0	-35.4	
8562.50	-4.7	H	3.0	42.2	1.0	-45.9	-13.0	-32.9	
Mid Ch, 1745MHz									
3490.00	-9.2	V	3.0	42.3	1.0	-50.5	-13.0	-37.5	
5235.00	-9.1	V	3.0	43.1	1.0	-51.2	-13.0	-38.2	
6980.00	-6.3	V	3.0	42.9	1.0	-48.3	-13.0	-35.3	
8725.00	-2.9	V	3.0	42.1	1.0	-44.1	-13.0	-31.1	
3490.00	-9.1	H	3.0	42.3	1.0	-50.4	-13.0	-37.4	
5235.00	-9.0	H	3.0	43.1	1.0	-51.1	-13.0	-38.1	
6980.00	-6.3	H	3.0	42.9	1.0	-48.3	-13.0	-35.3	
8725.00	-3.4	H	3.0	42.1	1.0	-44.5	-13.0	-31.5	
High Ch, 1777.5MHz									
3555.00	-8.1	V	3.0	42.3	1.0	-49.5	-13.0	-36.5	
5332.50	-8.6	V	3.0	43.1	1.0	-50.7	-13.0	-37.7	
7110.00	-6.4	V	3.0	42.9	1.0	-48.2	-13.0	-35.2	
8887.50	-4.9	V	3.0	42.1	1.0	-46.0	-13.0	-33.0	
3555.00	-8.1	H	3.0	42.3	1.0	-49.4	-13.0	-36.4	
5332.50	-8.5	H	3.0	43.1	1.0	-50.6	-13.0	-37.6	
7110.00	-6.2	H	3.0	42.9	1.0	-48.1	-13.0	-35.1	
8887.50	-5.2	H	3.0	42.1	1.0	-46.3	-13.0	-33.3	

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