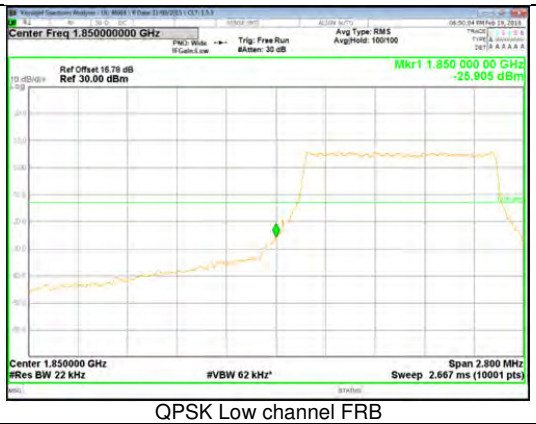
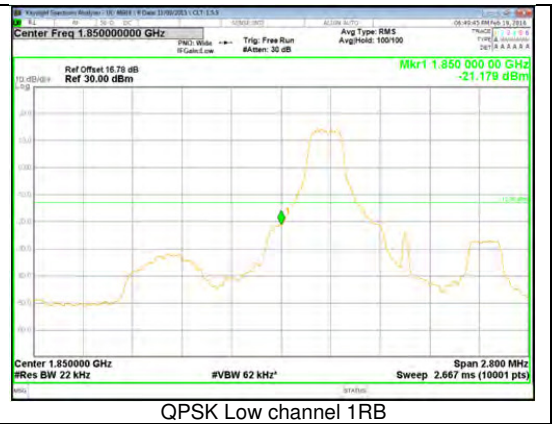
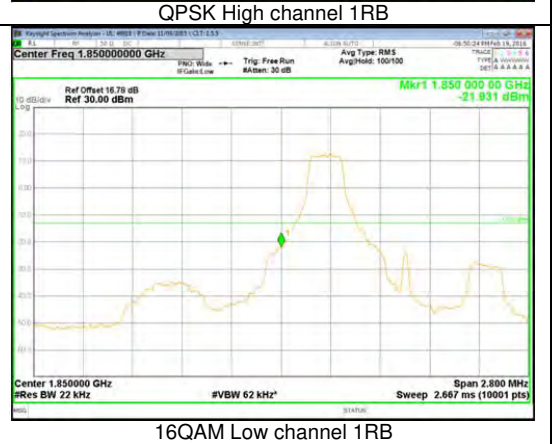
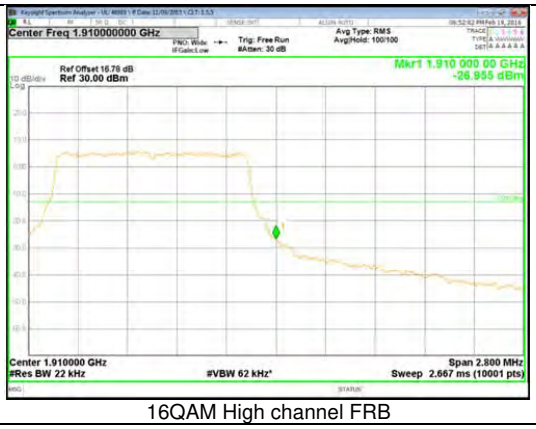
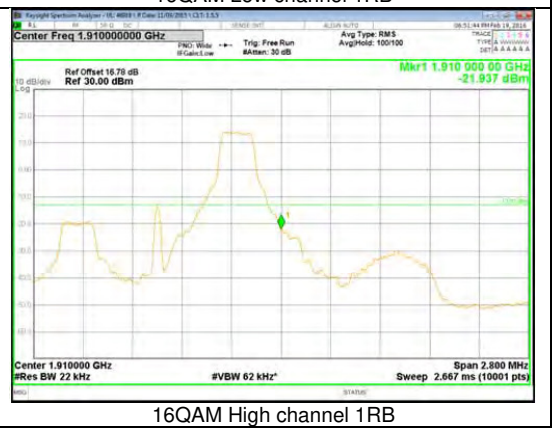
Band 2 1.4MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.3 OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27. 53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02
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.

RESULTS

10.2.1. OUT OF BAND EMISSIONS RESULT

GSM

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
GSM850	GPRS	824.2	-22.87	-13.00	9.87
		836.6	-22.80		9.8
		848.8	-22.72		9.72
	EGPRS	824.2	-22.56		9.56
		836.6	-22.45		9.45
		848.8	-22.52		9.52
GSM1900	GPRS	1850.2	-22.51		9.51
		1880.0	-22.19		9.19
		1909.8	-21.96		8.96
	EGPRS	1850.2	-22.30		9.3
		1880.0	-22.41		9.41
		1909.8	-22.35		9.35

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 5	REL99	826.4	-33.18	-13.00	20.18
		836.6	-33.12		20.12
		846.6	-33.47		20.47
	HSDPA	826.4	-33.10		20.1
		836.6	-33.02		20.02
		846.6	-32.72		19.72
Band 2	REL99	1852.4	-32.32		19.32
		1880.0	-31.96		18.96
		1907.6	-32.35		19.35
	HSDPA	1852.4	-32.03		19.03
		1880.0	-32.70		19.7
		1907.6	-32.76		19.76
Band 4	REL99	1712.4	-33.13		20.13
		1732.6	-32.69		19.69
		1752.6	-32.98		19.98
	HSDPA	1712.4	-33.20		20.20
		1732.6	-32.85		19.85
		1752.6	-33.05		20.05

LTE 17

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
10 MHz	QPSK	709.0	-27.06	-13.00	14.06
		710.0	-27.29		14.29
		711.0	-26.86		13.86
	16QAM	709.0	-26.24		13.24
		710.0	-26.27		13.27
		711.0	-26.59		13.59
5 MHz	QPSK	706.5	-26.55		13.55
		710.0	-27.74		14.74
		713.5	-27.02		14.02
	16QAM	706.5	-27.25		14.25
		710.0	-26.03		13.03
		713.5	-25.93		12.93

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 5

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-27.62	-13.00	14.62
		836.5	-26.88		13.88
		844.0	-26.87		13.87
	16QAM	829.0	-26.94		13.94
		836.5	-26.38		13.38
		844.0	-27.37		14.37
5 MHz	QPSK	826.5	-27.15		14.15
		836.5	-26.85		13.85
		846.5	-26.54		13.54
	16QAM	826.5	-26.70		13.7
		836.5	-26.49		13.49
		846.5	-27.45		14.45
3 MHz	QPSK	825.5	-26.89		13.89
		836.5	-26.97		13.97
		847.5	-26.54		13.54
	16QAM	825.5	-26.26		13.26
		836.5	-26.35		13.35
		847.5	-26.69		13.69
1.4 MHz	QPSK	824.7	-26.50		13.5
		836.5	-26.05		13.05
		848.3	-27.20		14.2
	16QAM	824.7	-27.28		14.28
		836.5	-27.28		14.28
		848.3	-26.60		13.6

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 4

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
20 MHz	QPSK	1720.0	-26.28	-13.00	13.28
		1732.5	-27.06		14.06
		1745.0	-25.72		12.72
	16QAM	1720.0	-26.69		13.69
		1732.5	-26.49		13.49
		1745.0	-26.46		13.46
15 MHz	QPSK	1717.5	-26.83		13.83
		1732.5	-26.50		13.5
		1747.5	-26.80		13.8
	16QAM	1717.5	-27.08		14.08
		1732.5	-25.48		12.48
		1747.5	-27.01		14.01
10 MHz	QPSK	1715.0	-26.70		13.7
		1732.5	-26.07		13.07
		1750.0	-26.93		13.93
	16QAM	1715.0	-27.02		14.02
		1732.5	-26.35		13.35
		1750.0	-27.34		14.34
5 MHz	QPSK	1712.5	-26.40		13.4
		1732.5	-27.35		14.35
		1752.5	-25.89		12.89
	16QAM	1712.5	-26.87		13.87
		1732.5	-26.58		13.58
		1752.5	-27.15		14.15
3 MHz	QPSK	1711.5	-27.65		14.65
		1732.5	-27.05		14.05
		1753.5	-26.08		13.08
	16QAM	1711.5	-26.42		13.42
		1732.5	-27.19		14.19
		1753.5	-26.82		13.82
1.4 MHz	QPSK	1710.7	-26.45		13.45
		1732.5	-25.97		12.97
		1754.3	-26.97		13.97
	16QAM	1710.7	-26.87		13.87
		1732.5	-26.51		13.51
		1754.3	-27.40		14.4

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

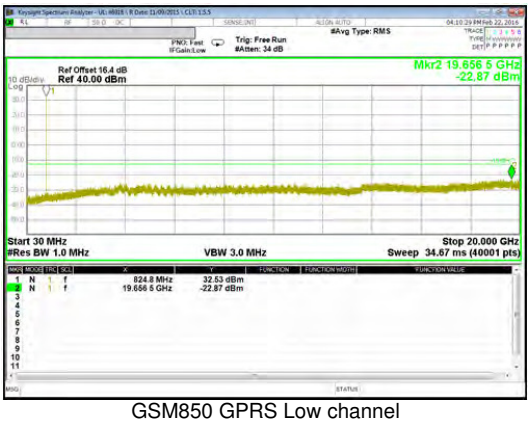
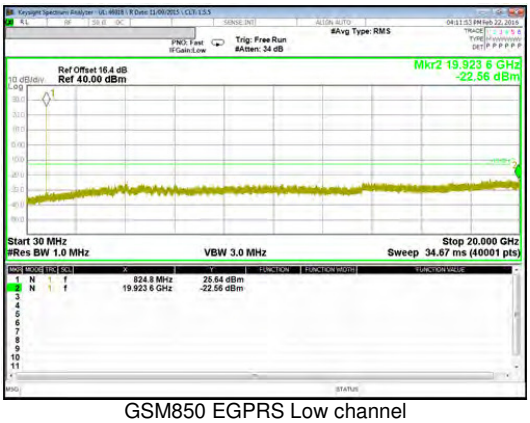
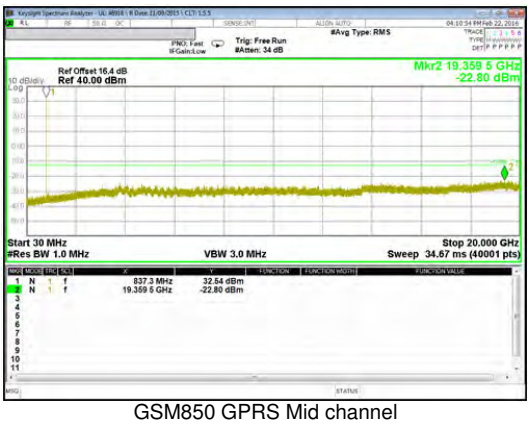
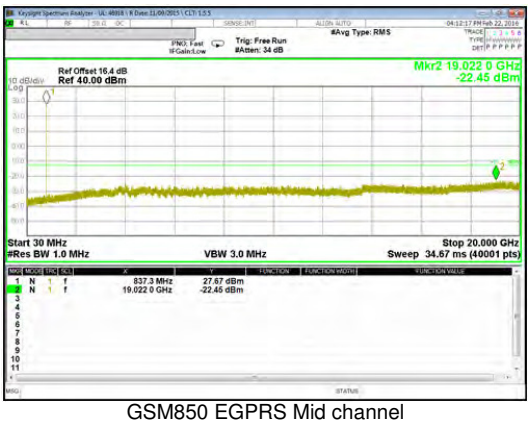
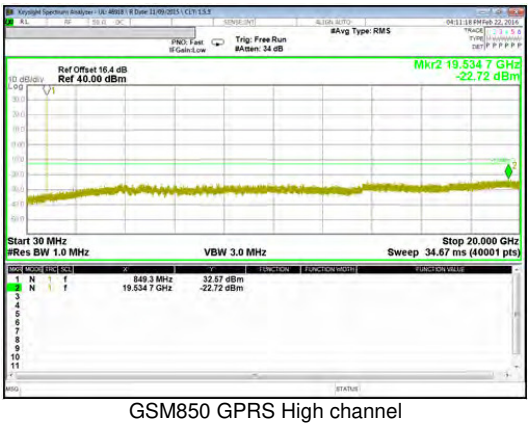
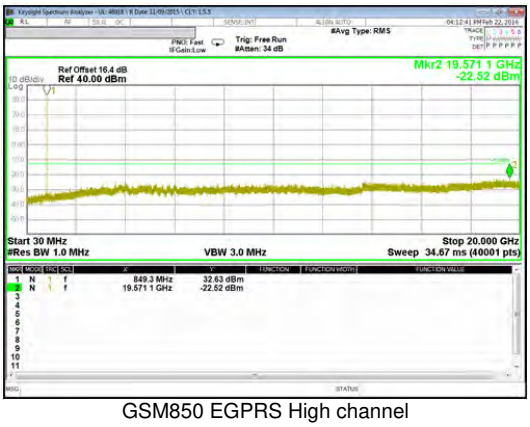
LTE 2

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
20 MHz	QPSK	1860.0	-26.73	-13.00	13.73
		1880.0	-26.99		13.99
		1900.0	-26.56		13.56
	16QAM	1860.0	-26.40		13.4
		1880.0	-25.92		12.92
		1900.0	-25.80		12.8
15 MHz	QPSK	1857.5	-25.84		12.84
		1880.0	-26.14		13.14
		1902.5	-26.31		13.31
	16QAM	1857.5	-26.48		13.48
		1880.0	-26.64		13.64
		1902.5	-25.33		12.33
10 MHz	QPSK	1855.0	-25.11		12.11
		1880.0	-26.94		13.94
		1905.0	-26.08		13.08
	16QAM	1855.0	-25.96		12.96
		1880.0	-25.99		12.99
		1905.0	-25.76		12.76
5 MHz	QPSK	1852.5	-26.18		13.18
		1880.0	-26.75		13.75
		1907.5	-25.56		12.56
	16QAM	1852.5	-26.36		13.36
		1880.0	-27.33		14.33
		1907.5	-26.27		13.27
3 MHz	QPSK	1851.5	-26.51		13.51
		1880.0	-26.67		13.67
		1908.5	-26.47		13.47
	16QAM	1851.5	-27.07		14.07
		1880.0	-26.74		13.74
		1908.5	-26.60		13.6
1.4 MHz	QPSK	1850.7	-26.51		13.51
		1880.0	-27.19		14.19
		1909.3	-26.40		13.4
	16QAM	1850.7	-26.55		13.55
		1880.0	-26.47		13.47
		1909.3	-26.94		13.94

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

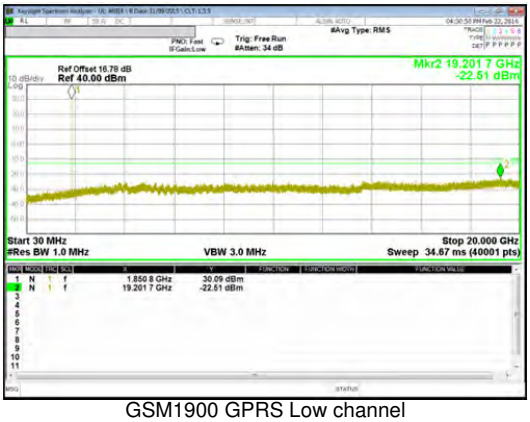
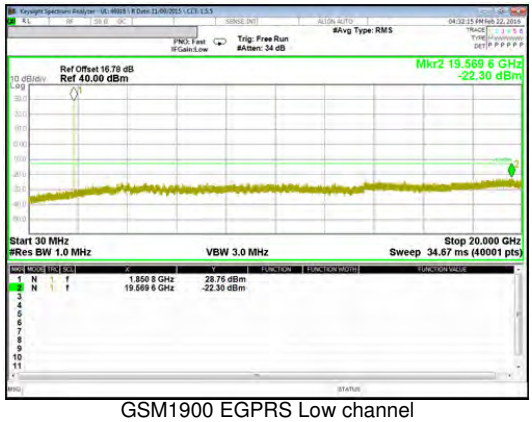
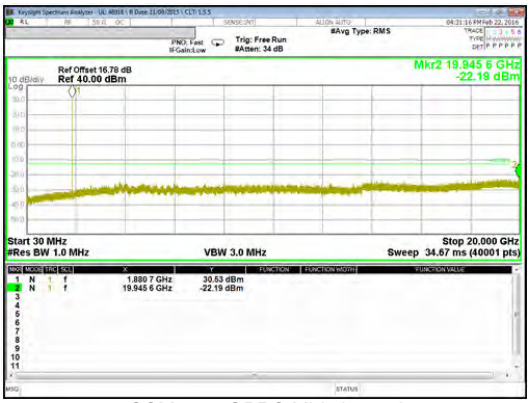
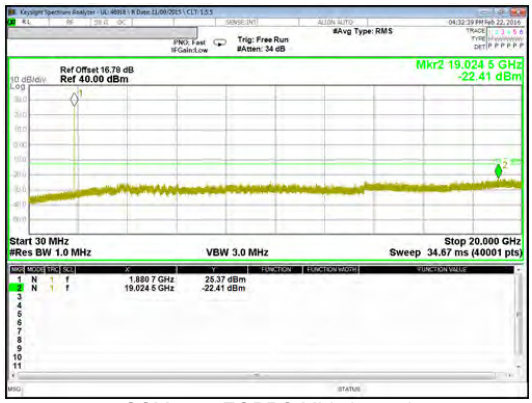
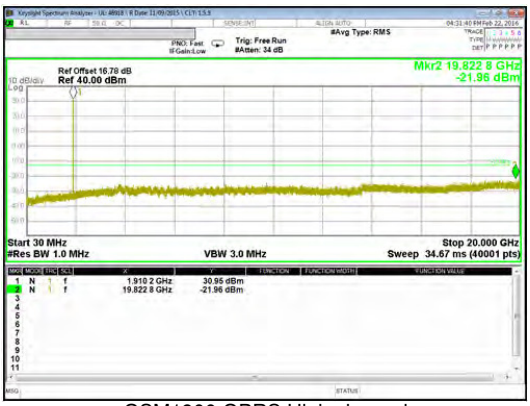
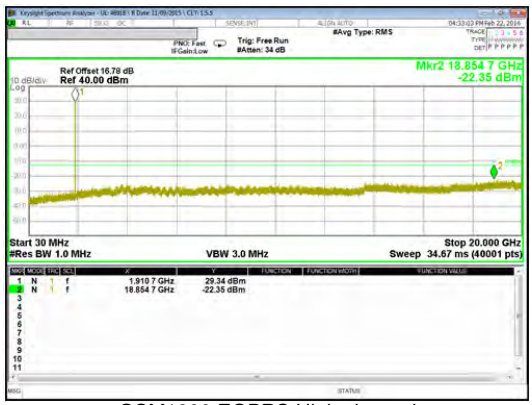
10.2.2. OUT OF BAND EMISSIONS PLOTS

GSM 850

GSM 850	 GSM850 GPRS Low channel	 GSM850 EGPRS Low channel
	 GSM850 GPRS Mid channel	 GSM850 EGPRS Mid channel
	 GSM850 GPRS High channel	 GSM850 EGPRS High channel

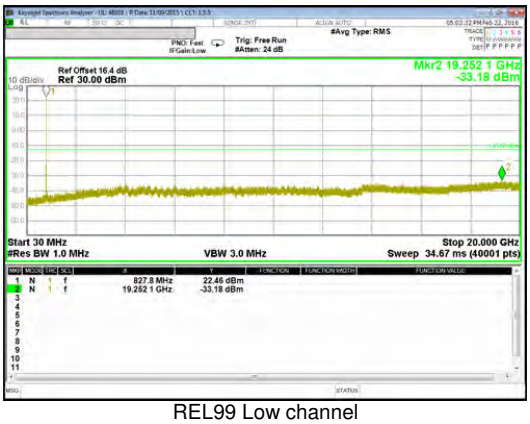
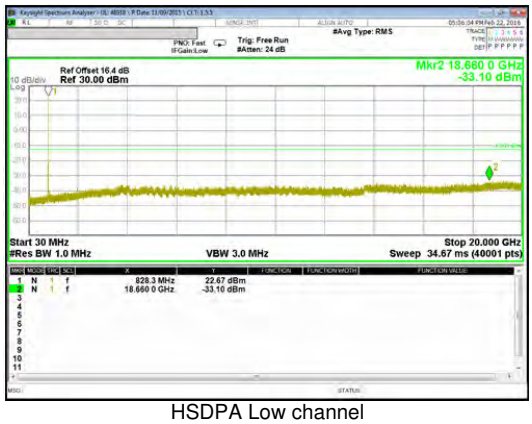
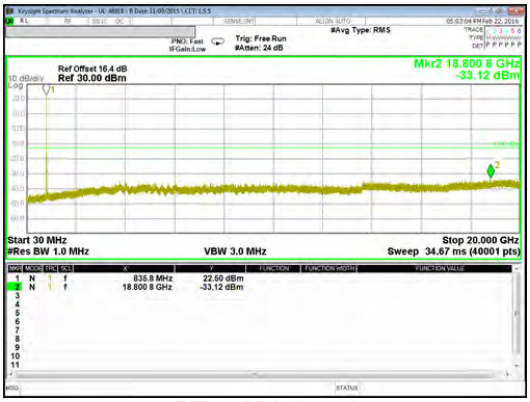
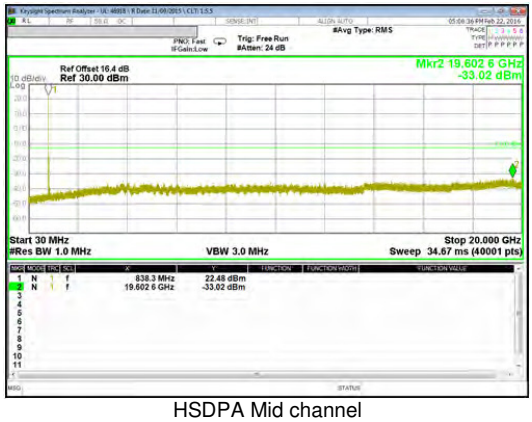
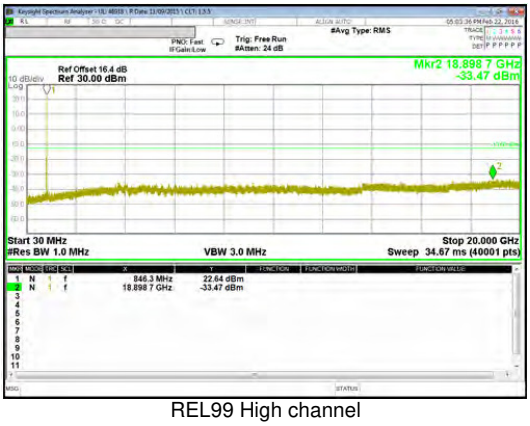
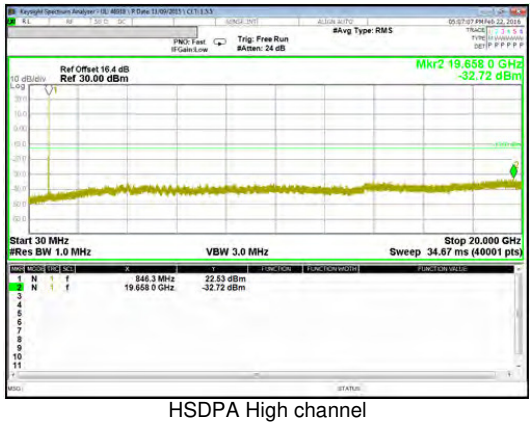
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

GSM 1900	 GSM1900 GPRS Low channel	 GSM1900 EGPRS Low channel
	 GSM1900 GPRS Mid channel	 GSM1900 EGPRS Mid channel
	 GSM1900 GPRS High channel	 GSM1900 EGPRS High channel

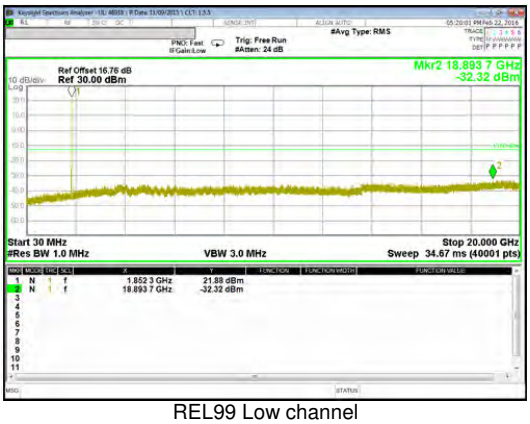
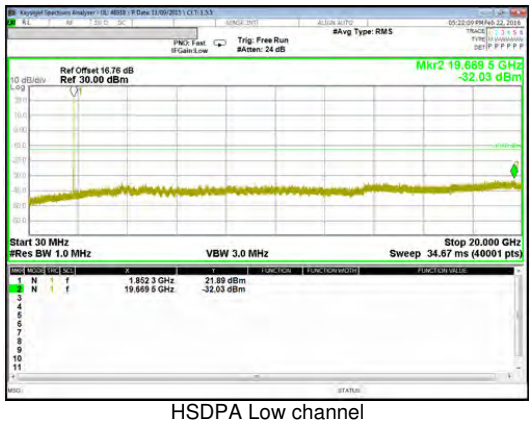
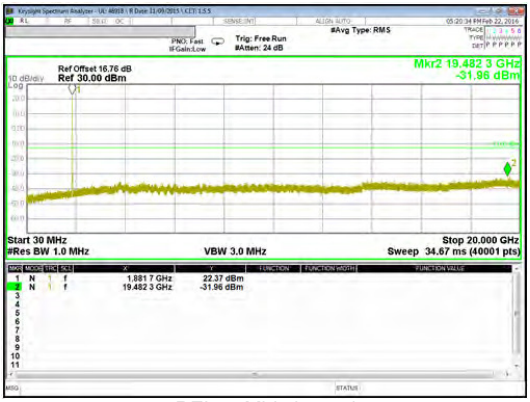
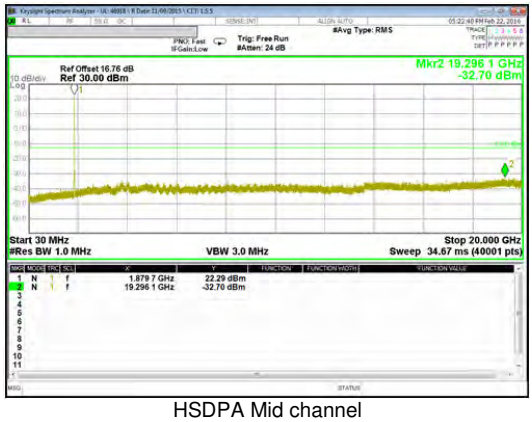
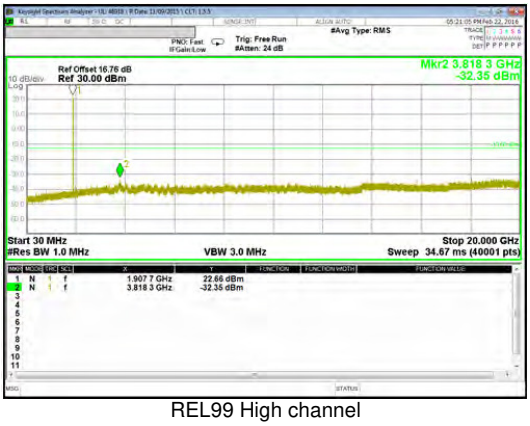
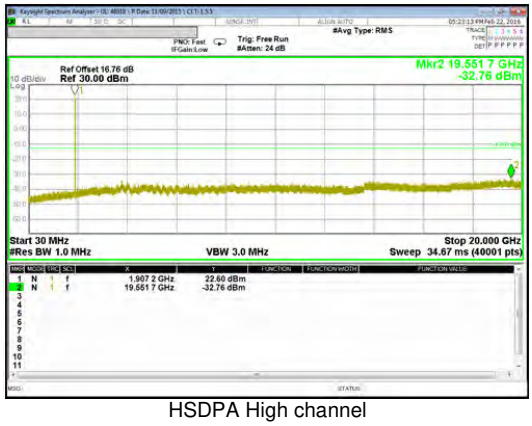
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

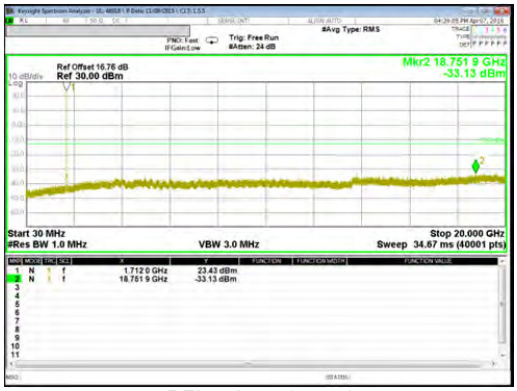
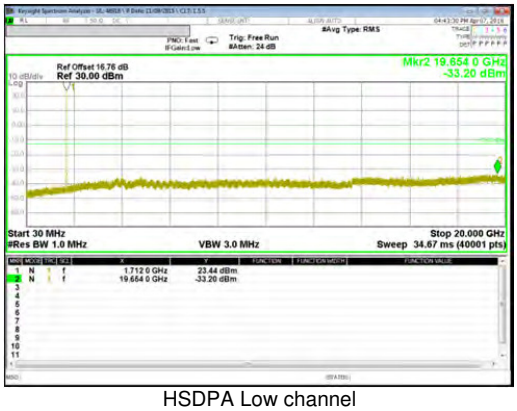
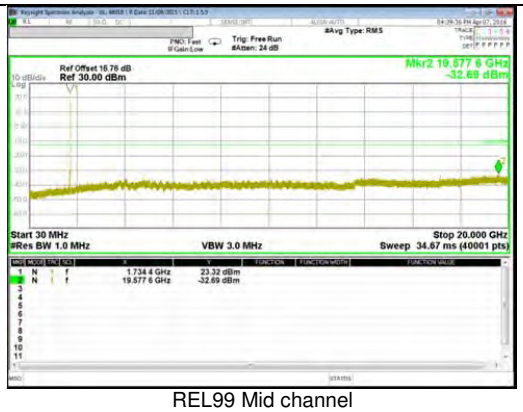
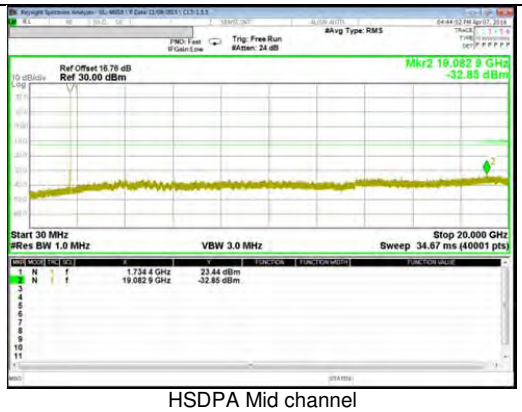
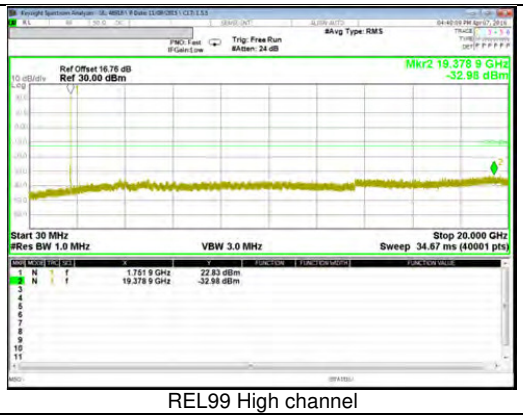
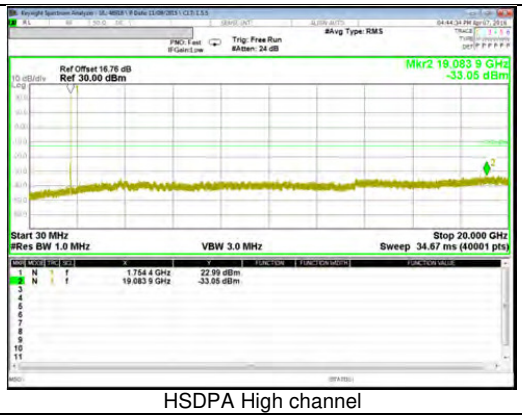
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

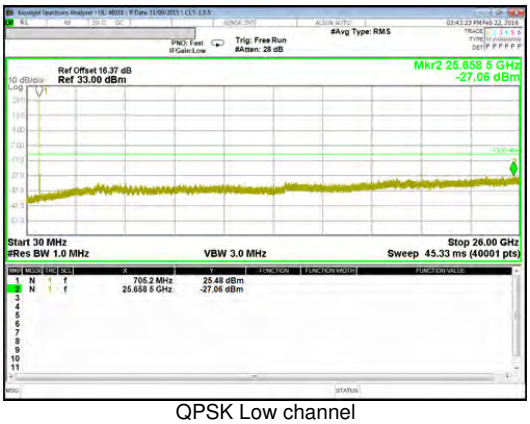
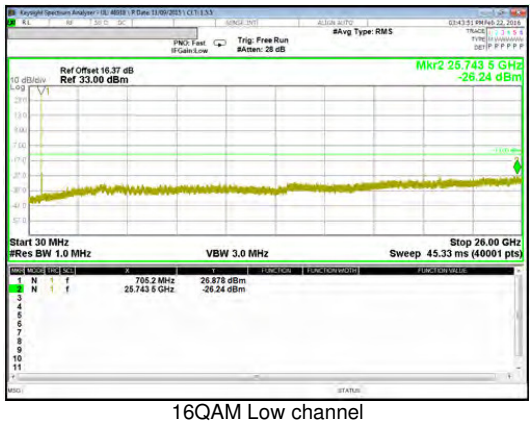
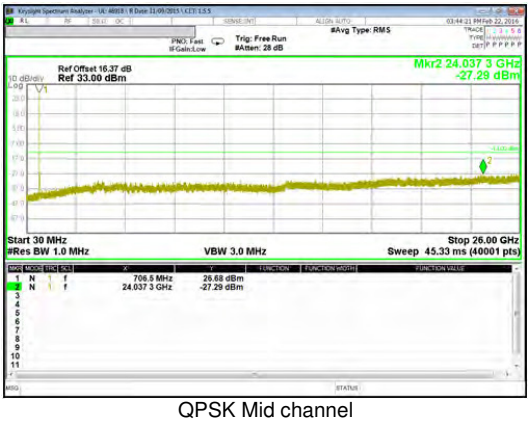
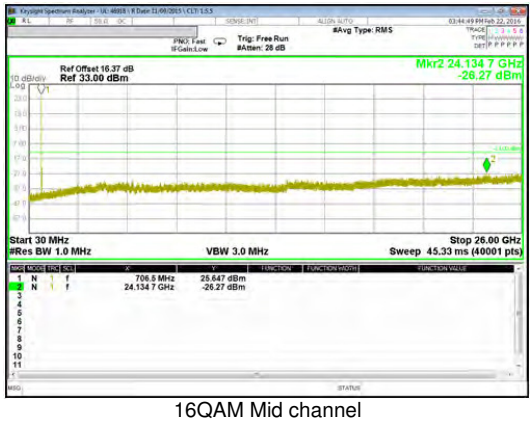
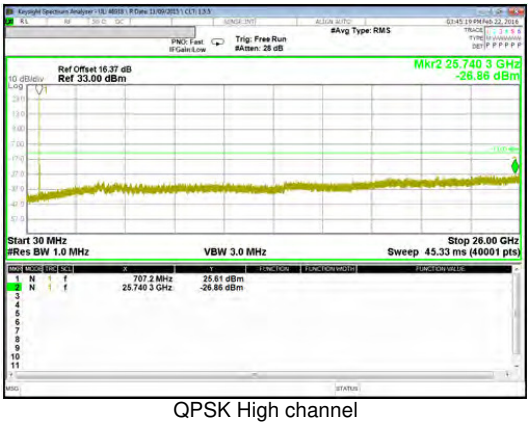
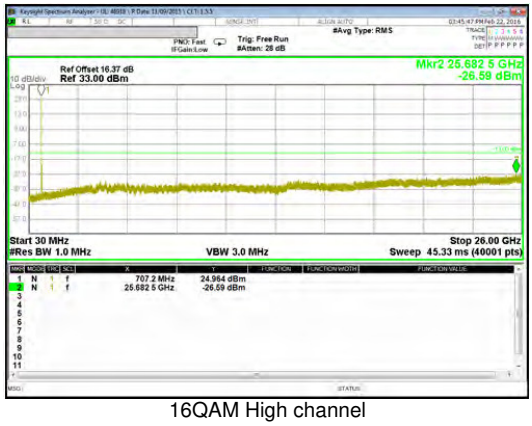
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

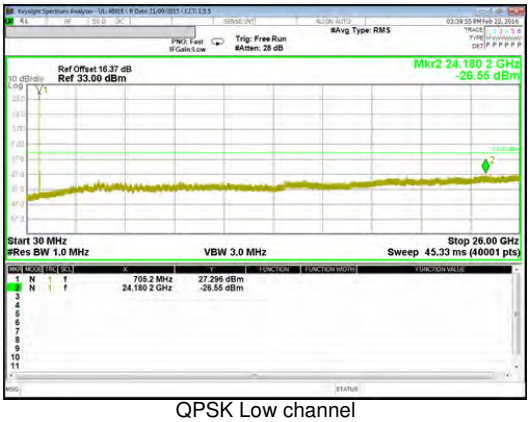
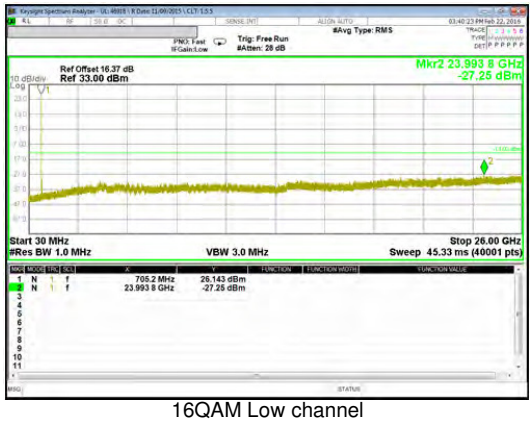
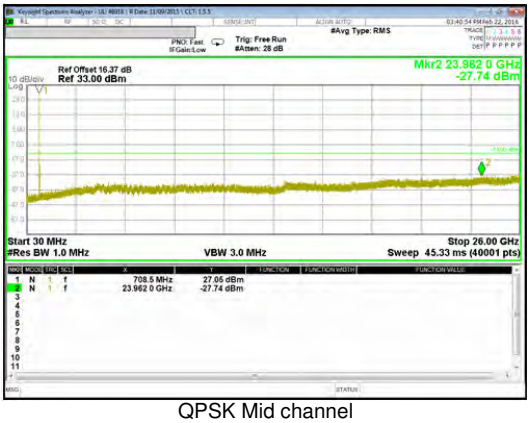
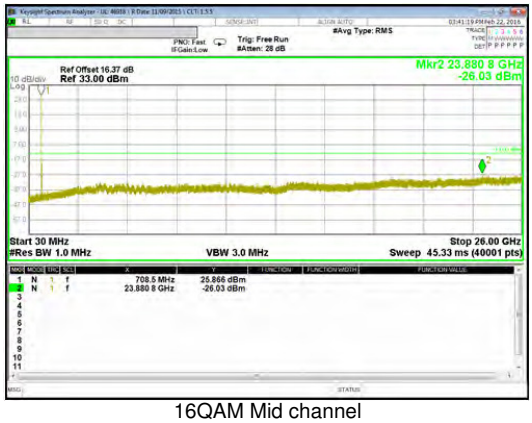
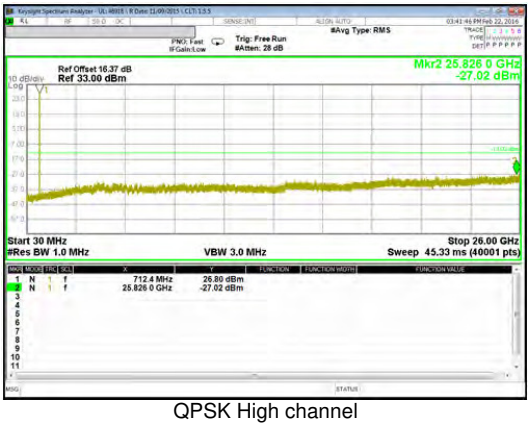
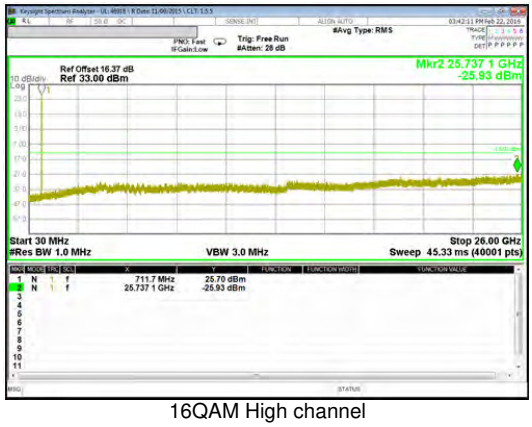
Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 17

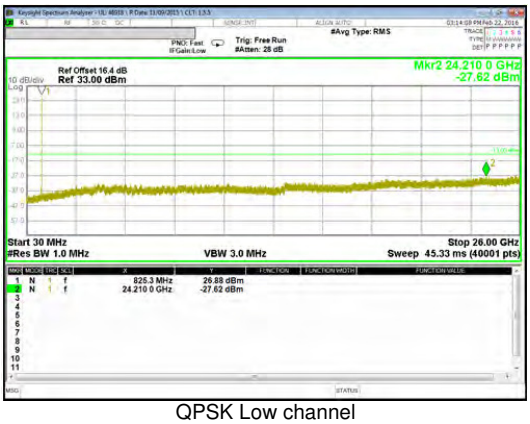
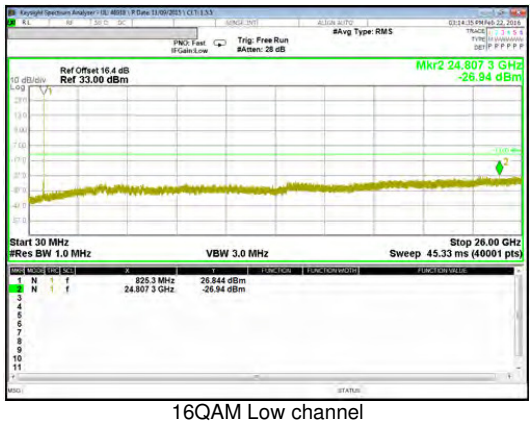
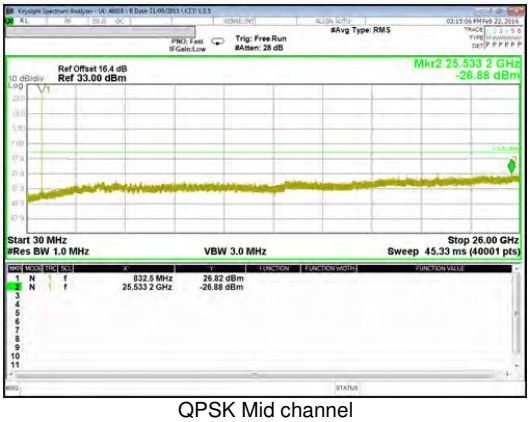
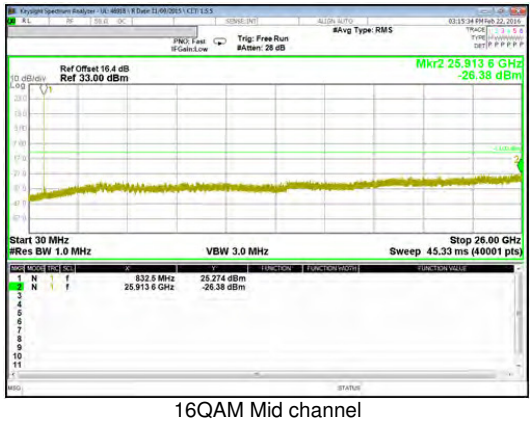
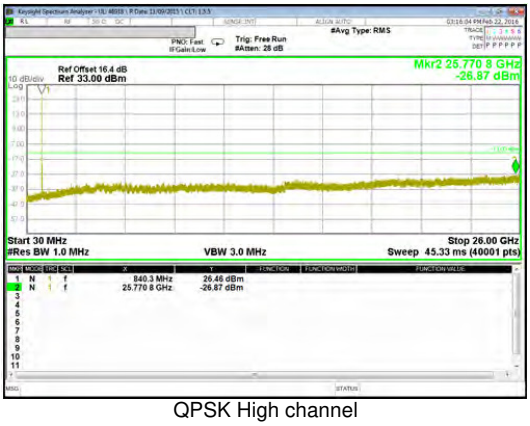
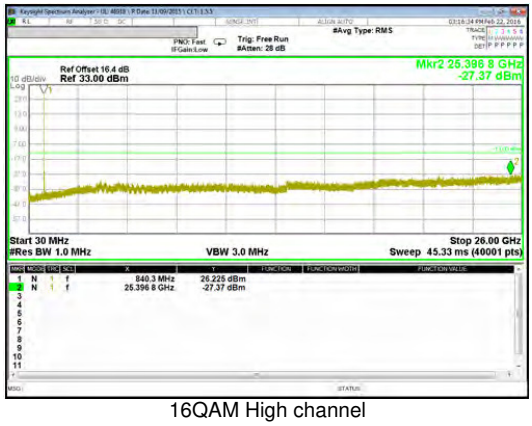
Band 17 10MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

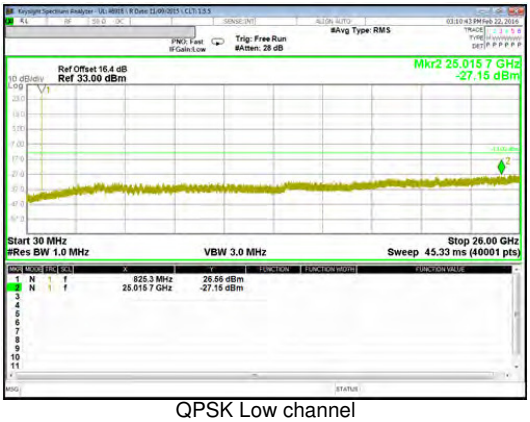
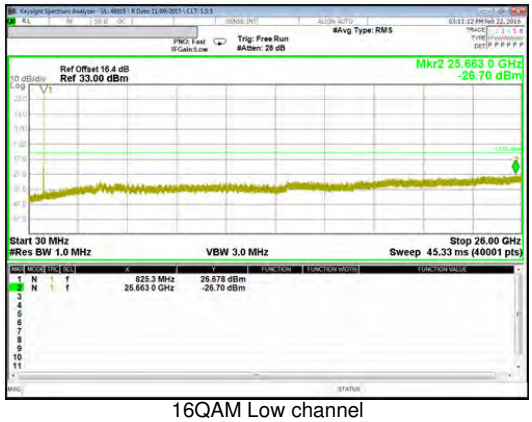
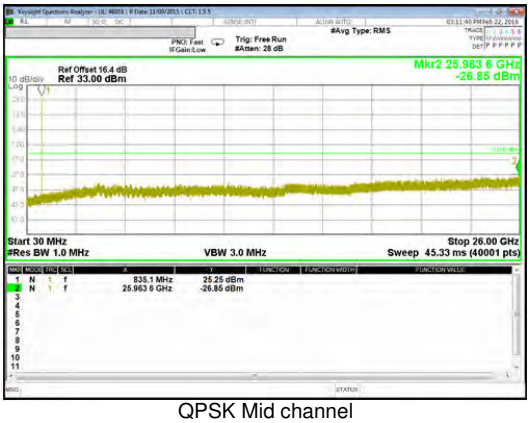
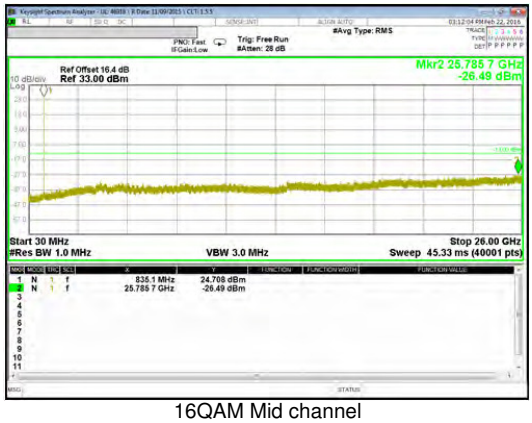
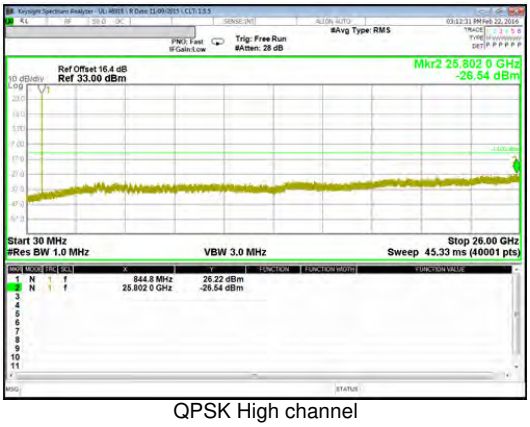
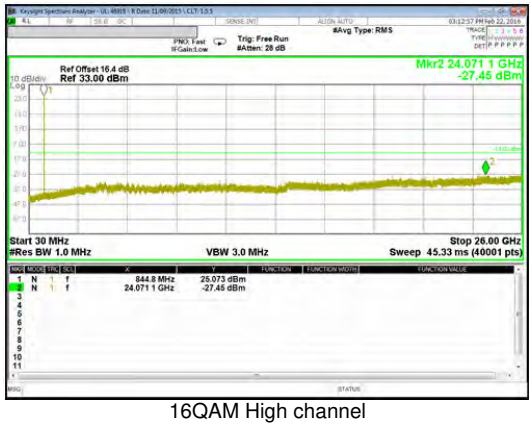
Band 17 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

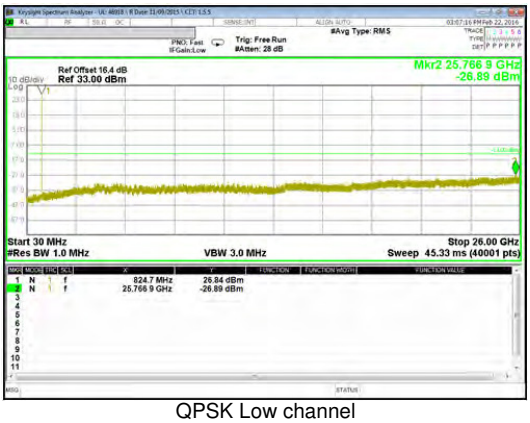
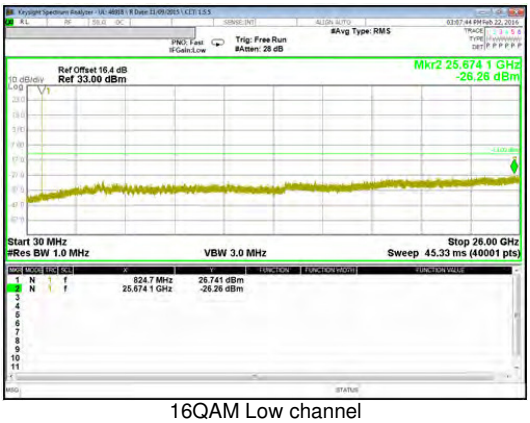
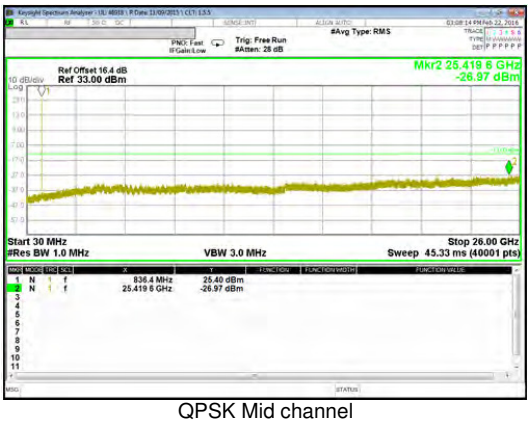
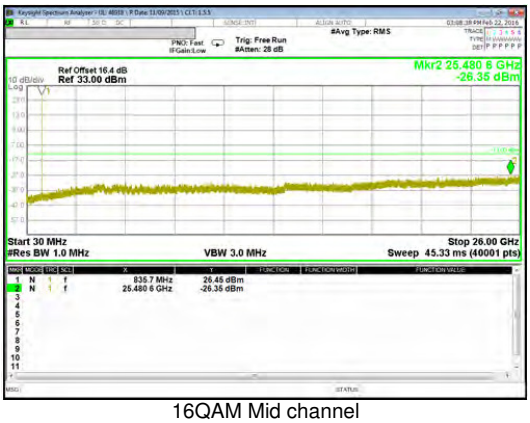
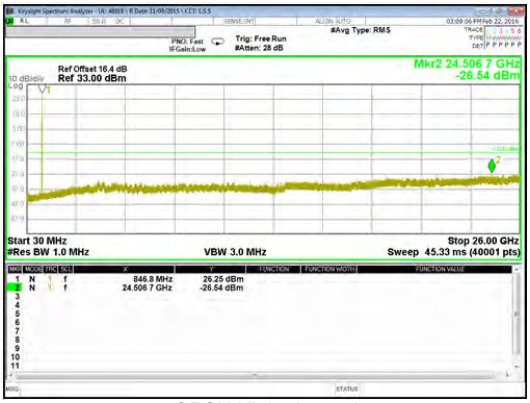
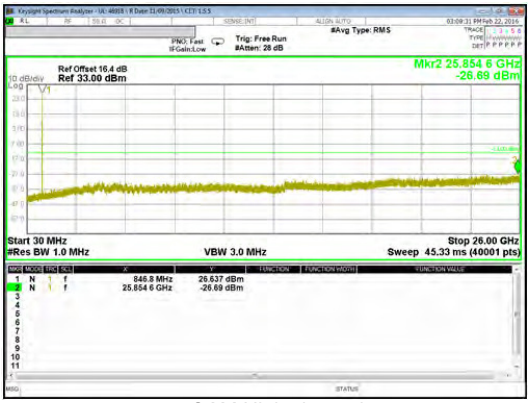
LTE Band 5

Band 5 10MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

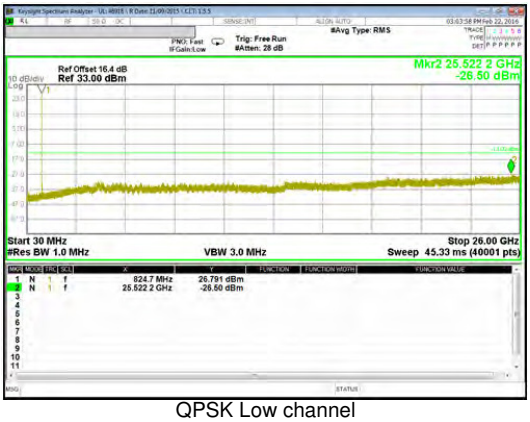
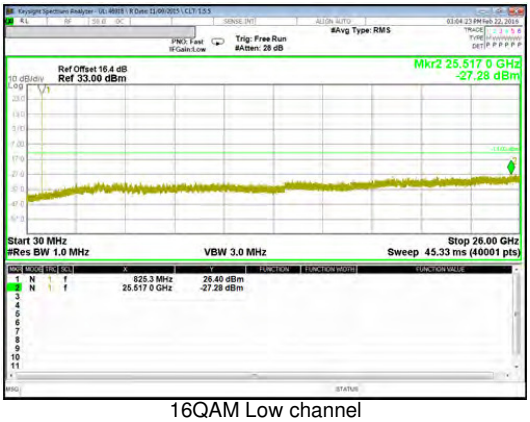
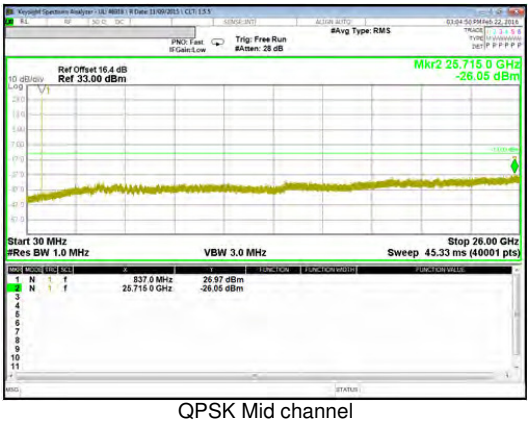
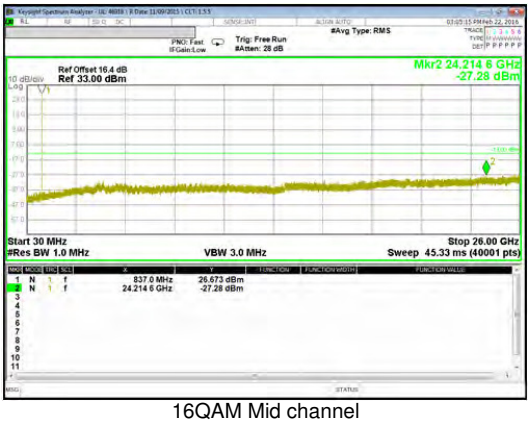
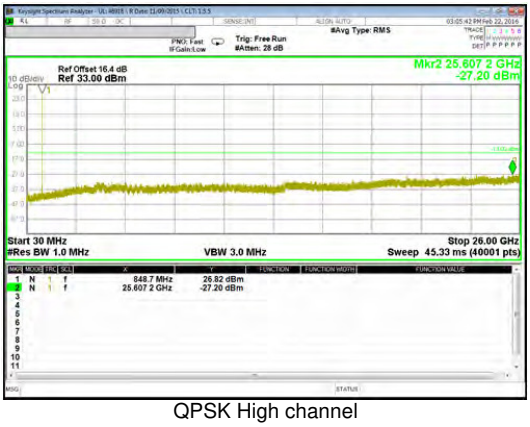
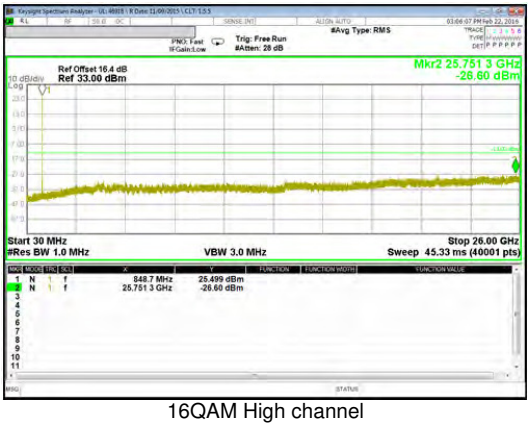
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 5 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

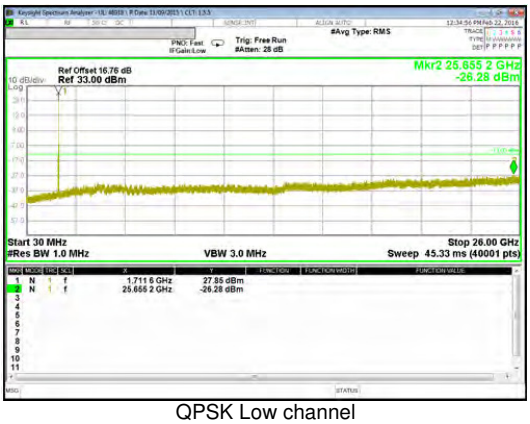
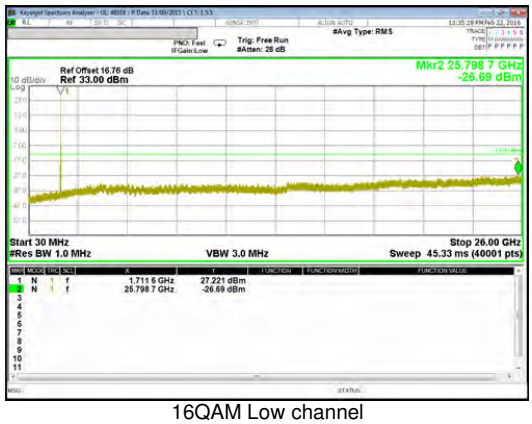
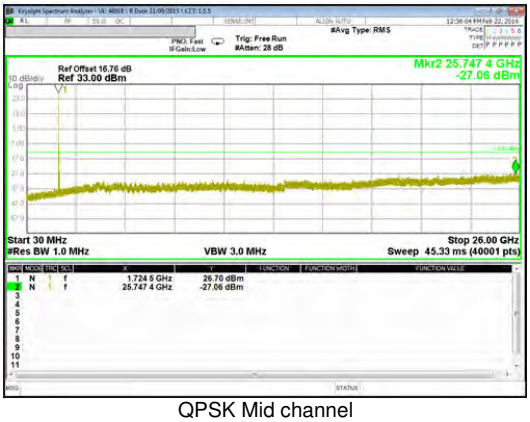
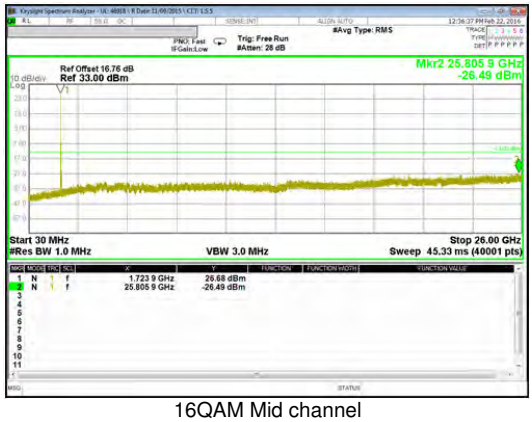
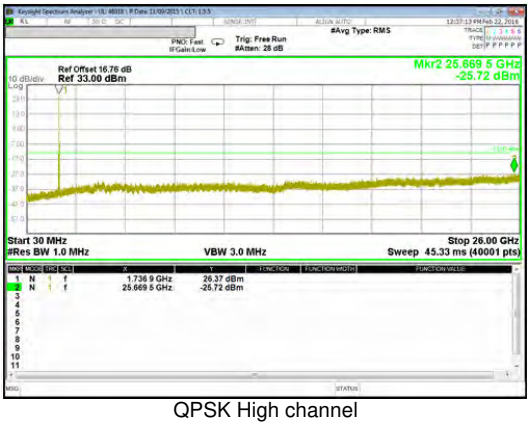
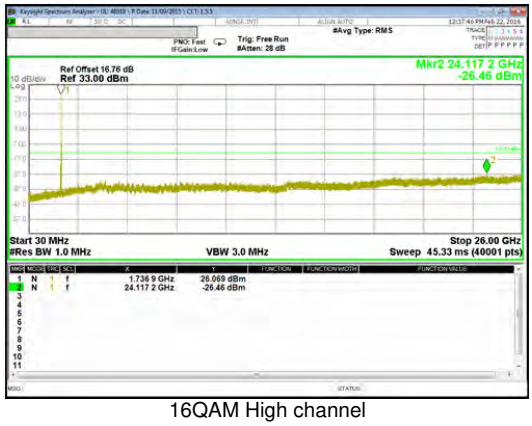
Band 5 3MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

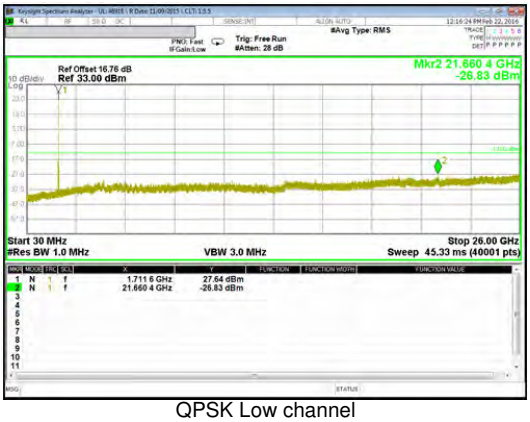
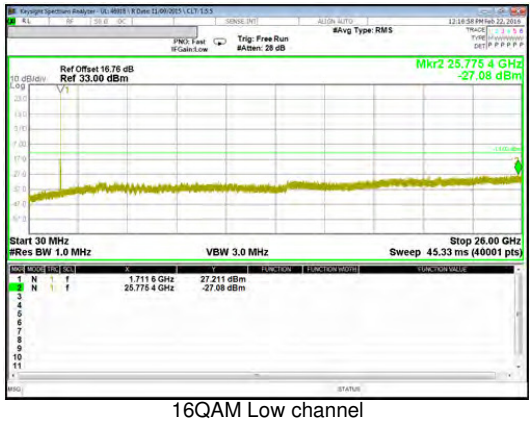
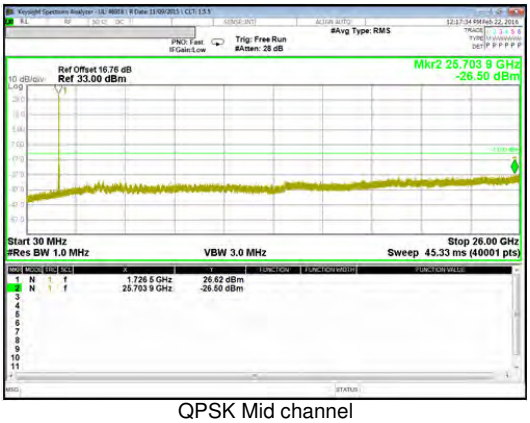
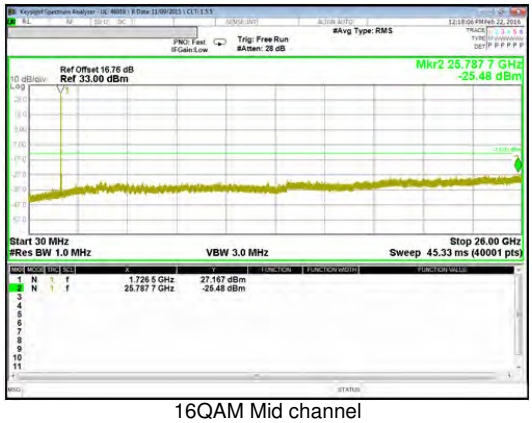
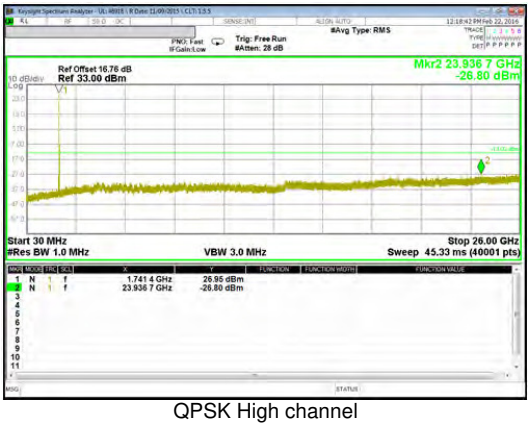
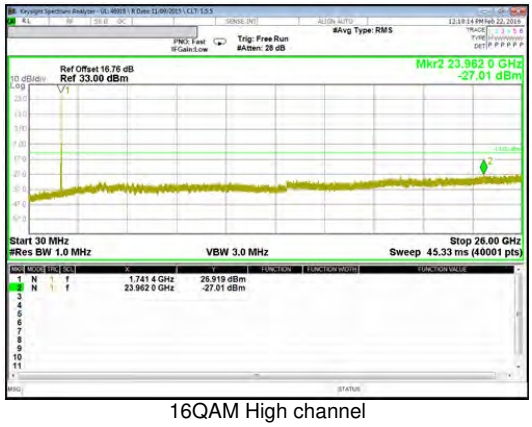
Band 5 1.4MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

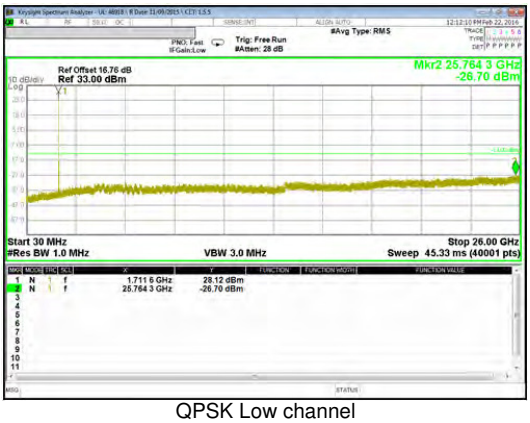
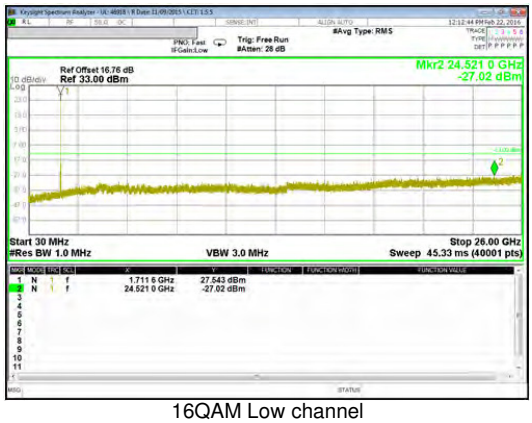
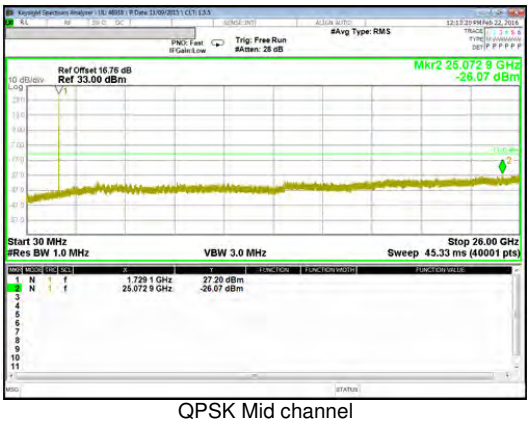
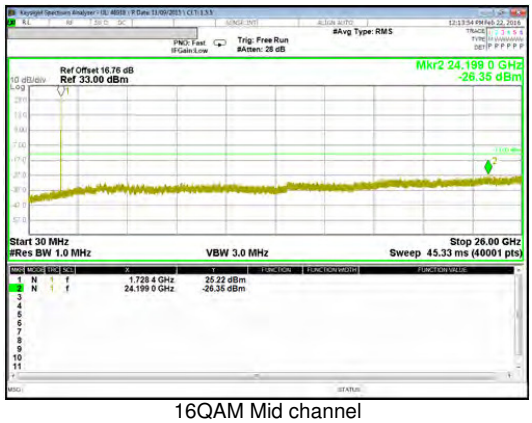
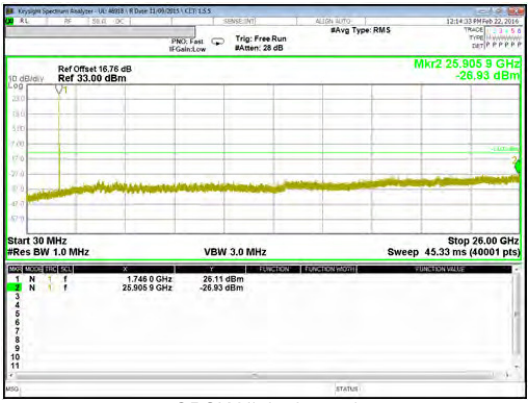
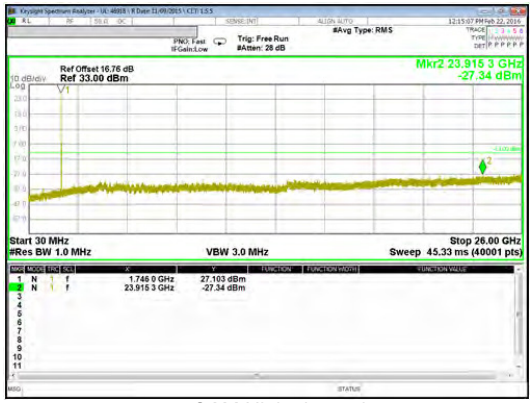
LTE Band 4

Band 4 20MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

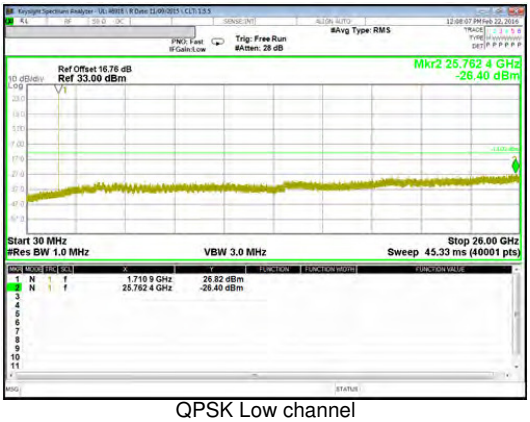
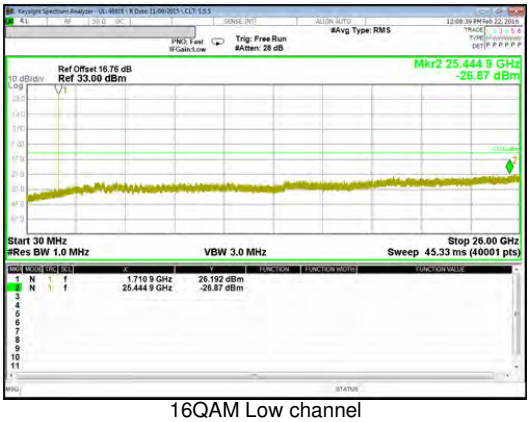
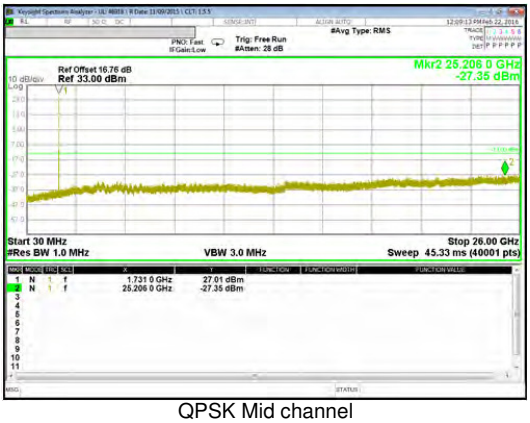
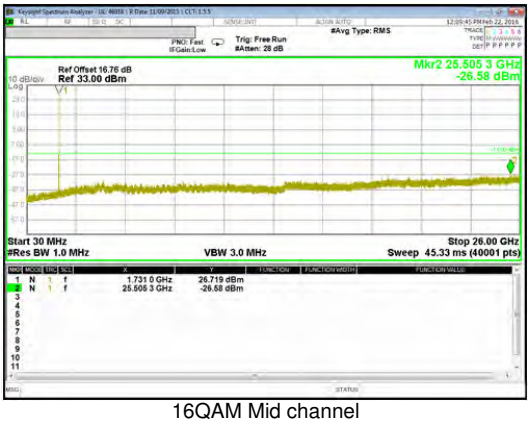
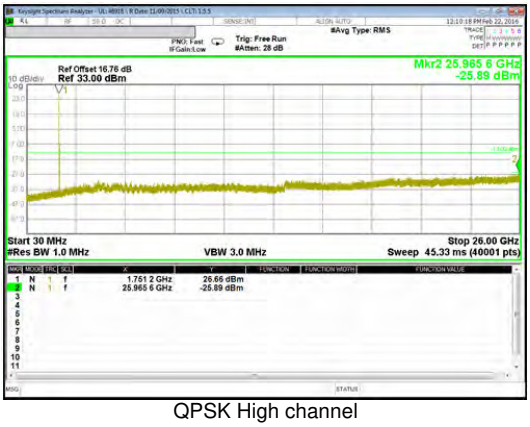
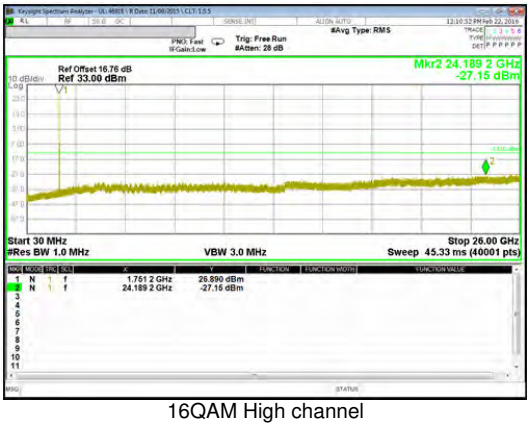
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 15MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

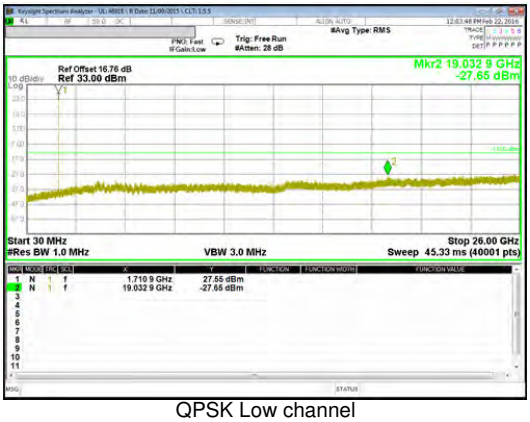
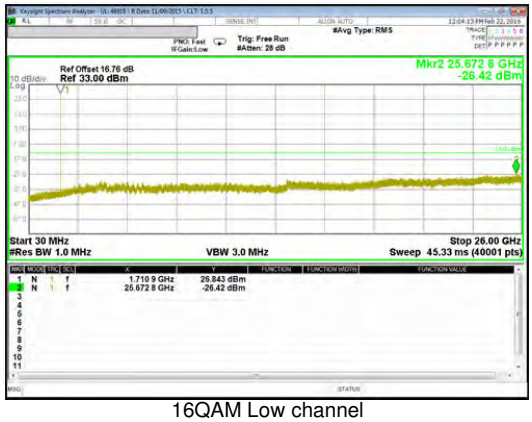
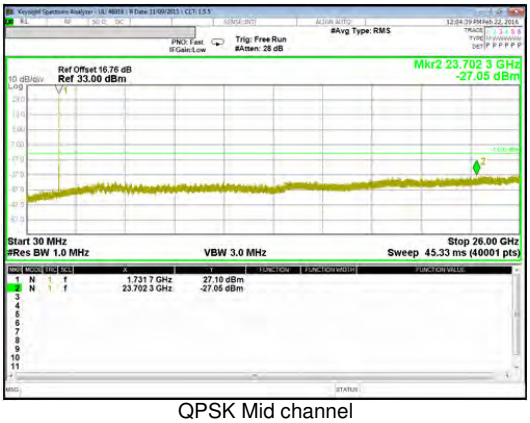
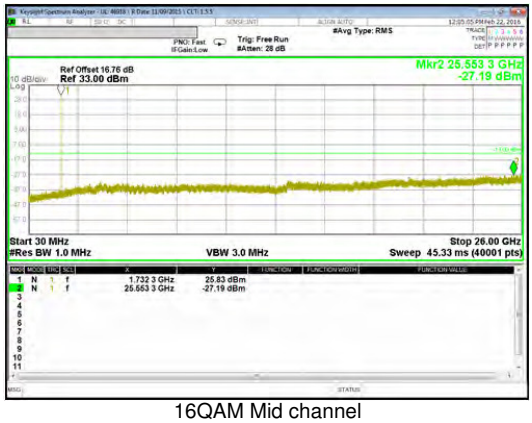
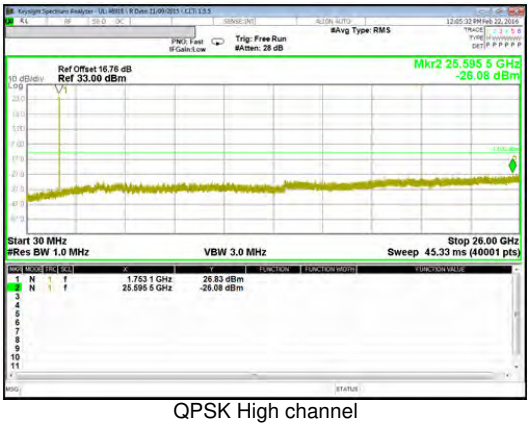
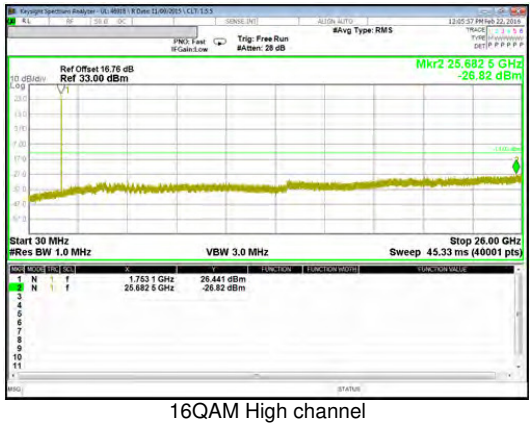
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

	 QPSK Low channel	 16QAM Low channel
Band 4 10MHz	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

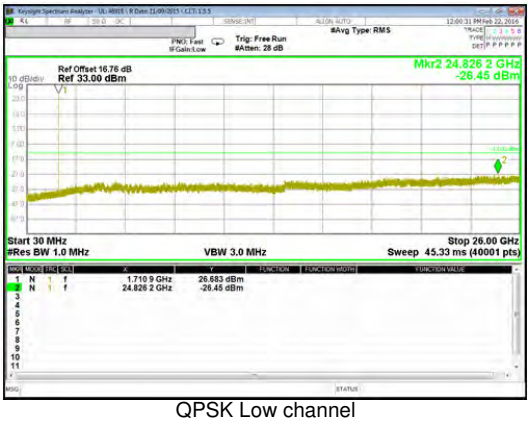
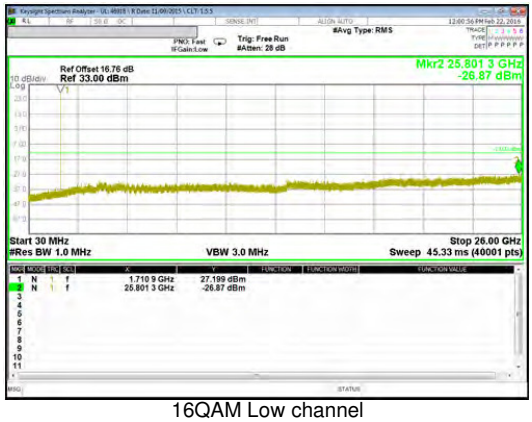
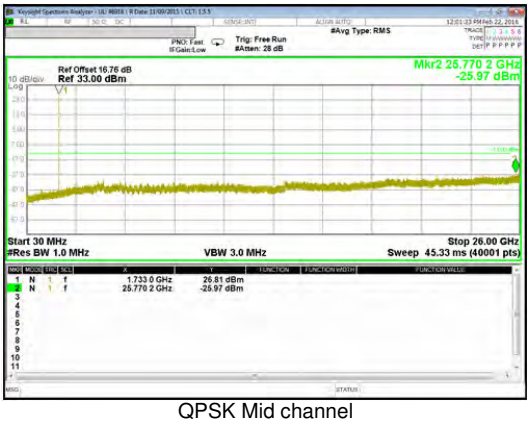
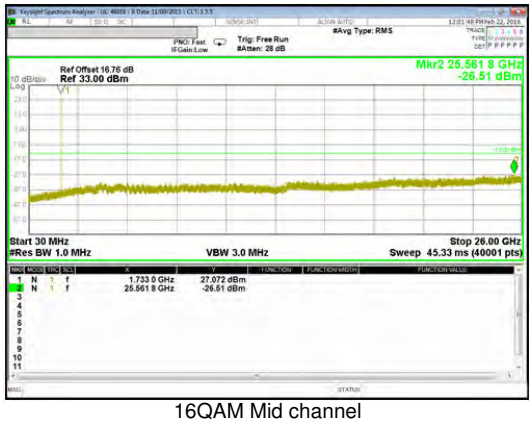
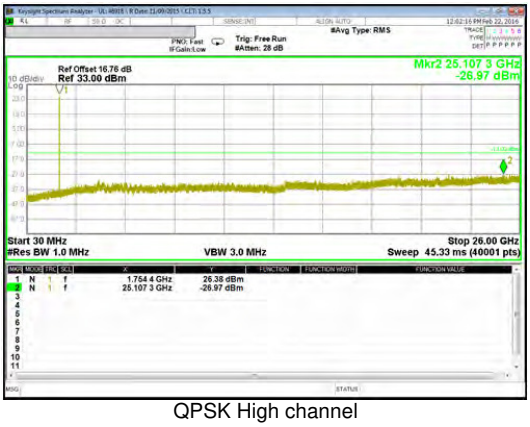
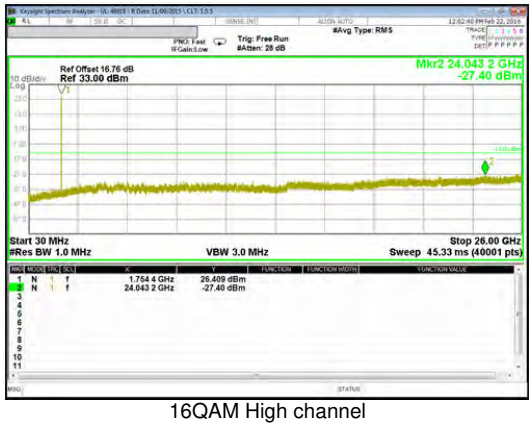
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

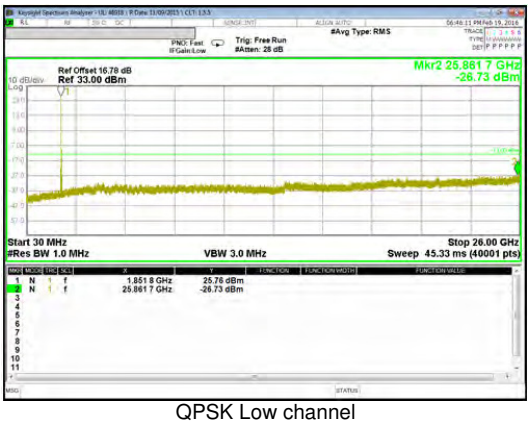
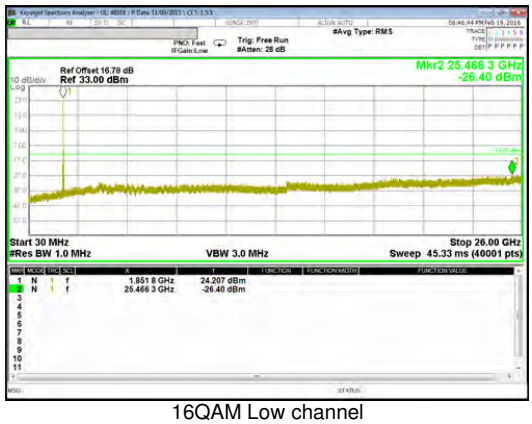
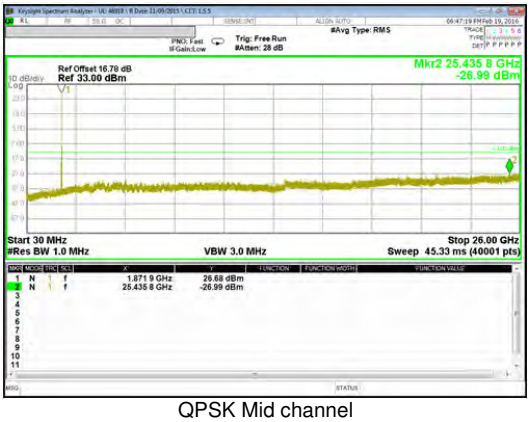
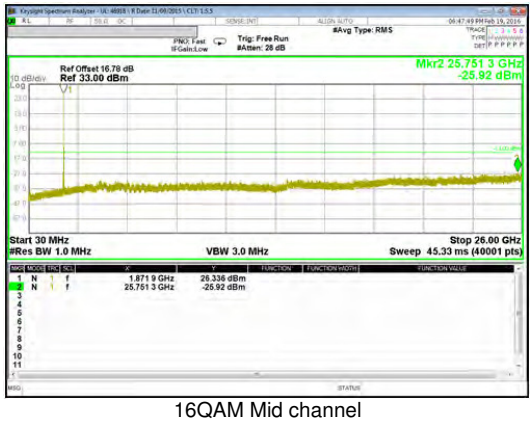
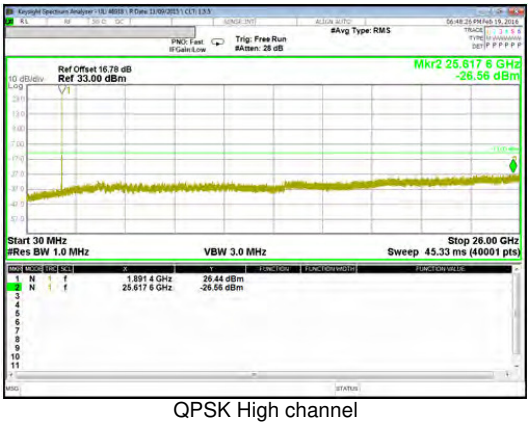
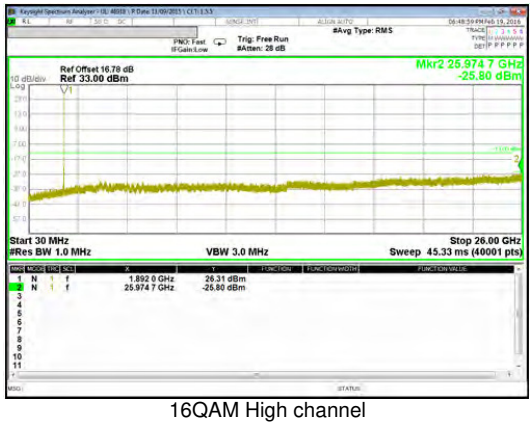
Band 4 3MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

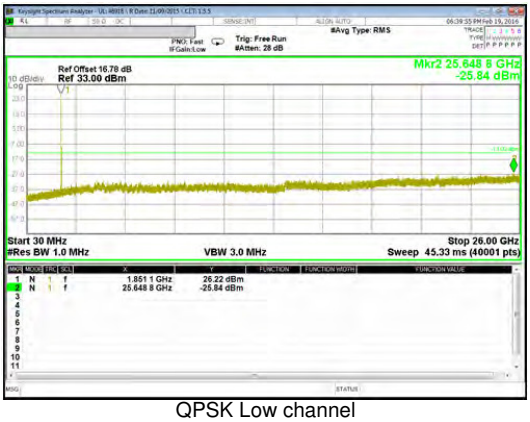
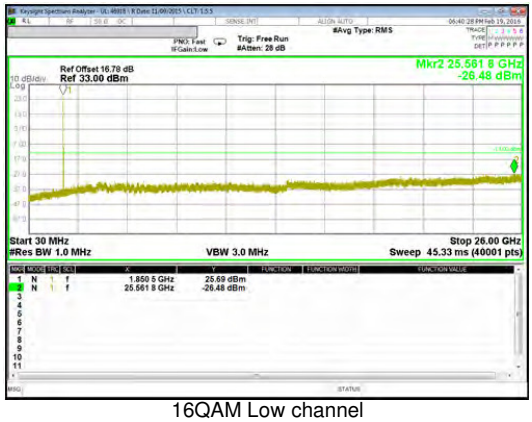
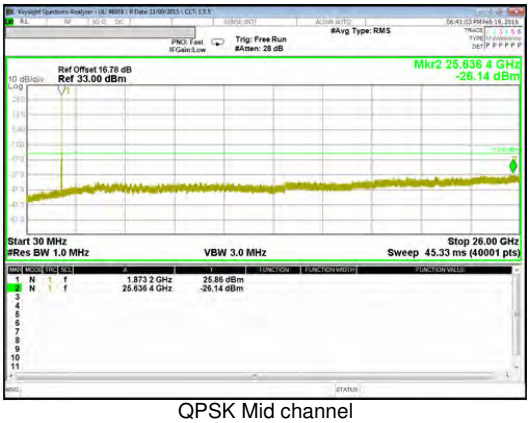
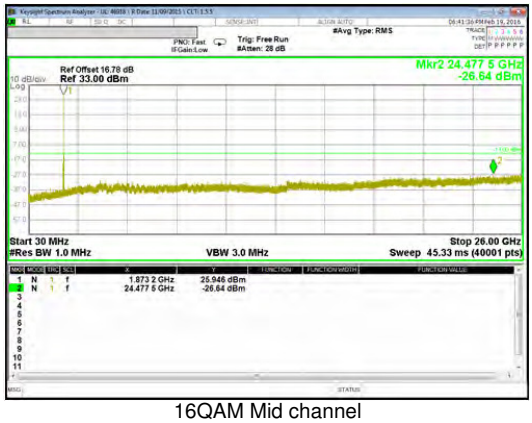
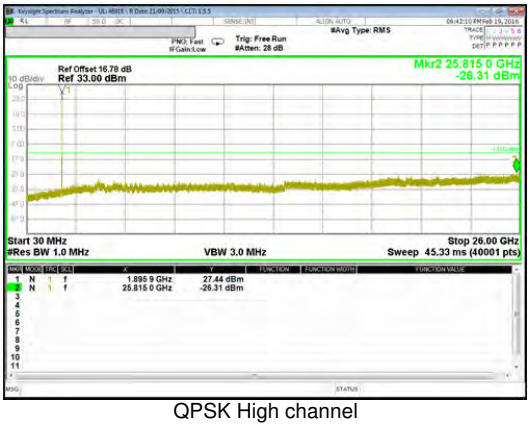
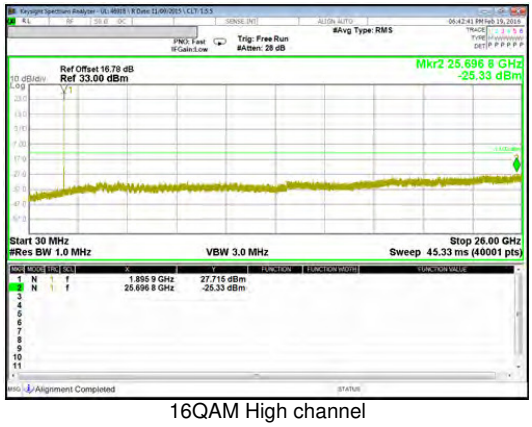
Band 4 1.4MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

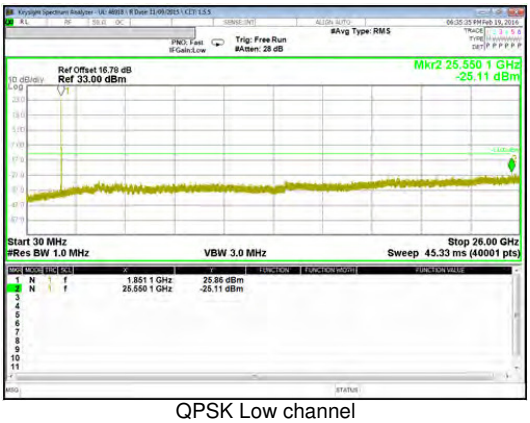
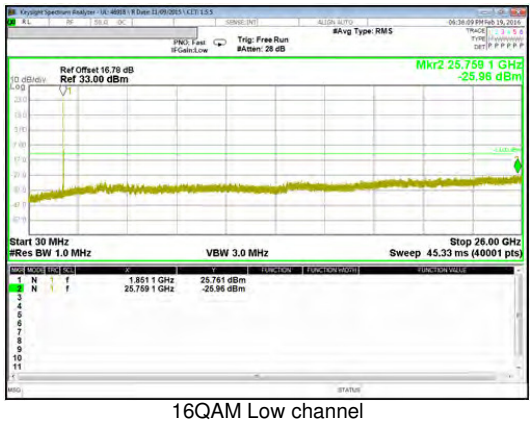
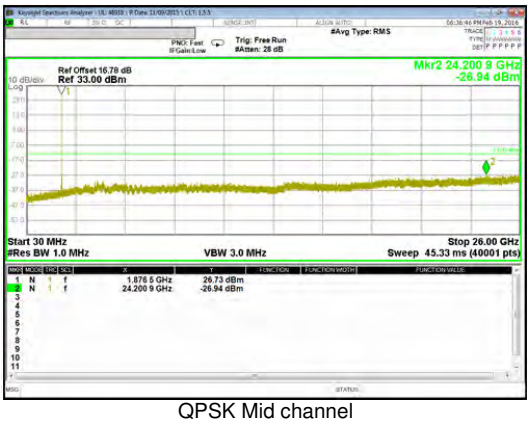
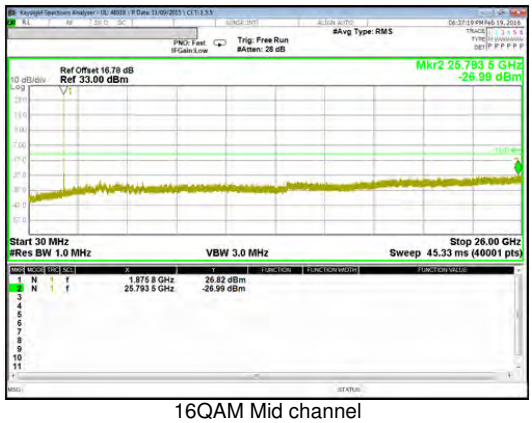
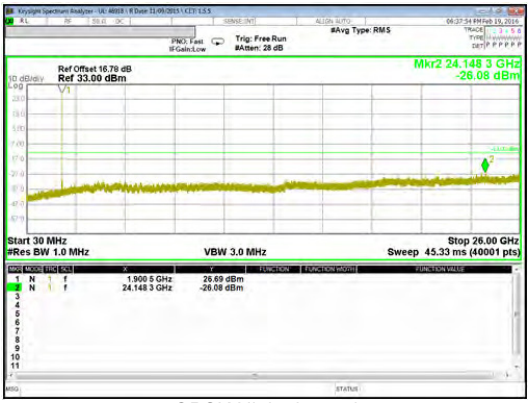
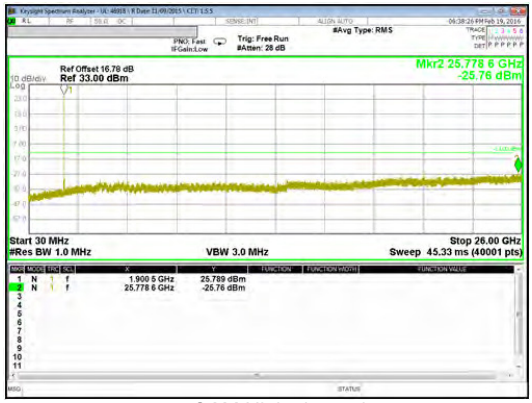
LTE Band 2

Band 2 20MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

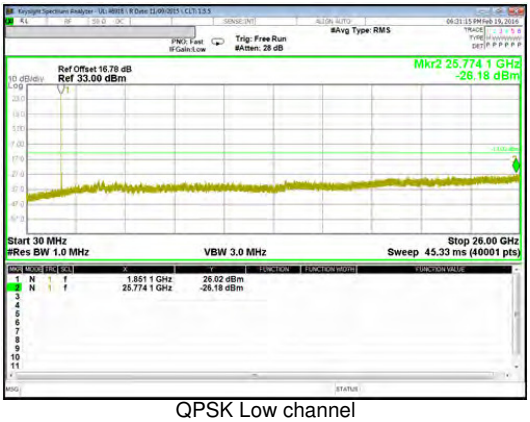
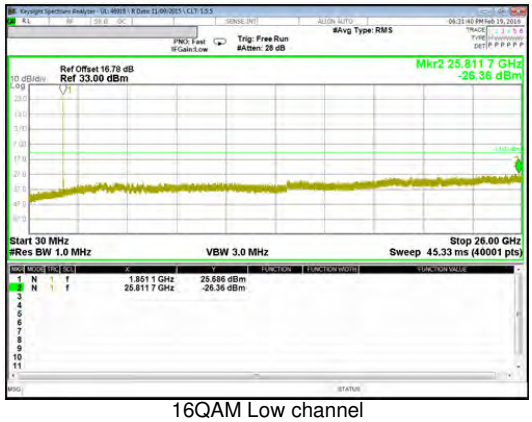
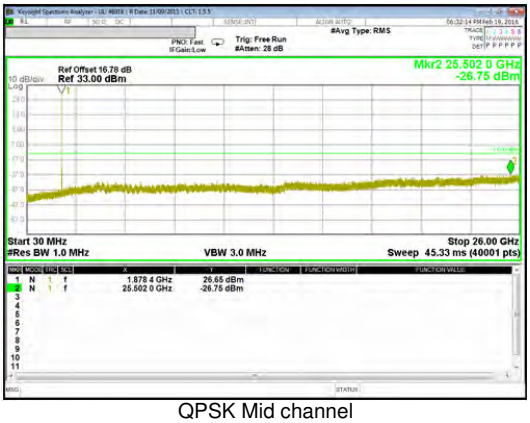
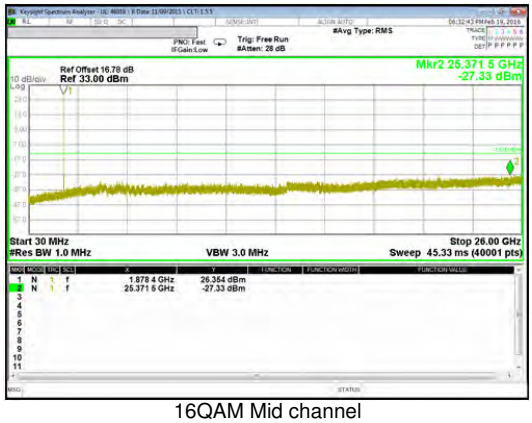
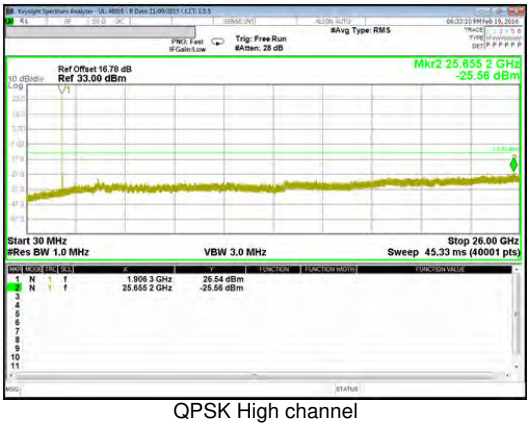
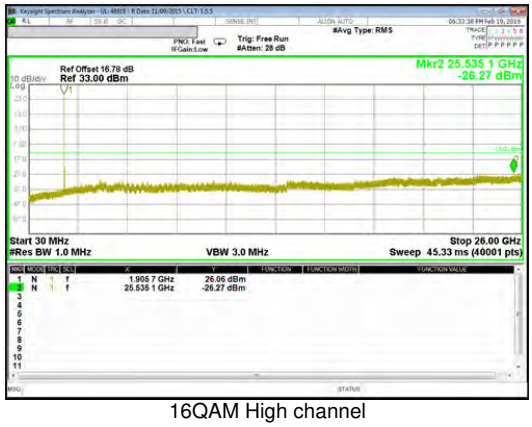
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

	 QPSK Low channel	 16QAM Low channel
Band 2 15MHz	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

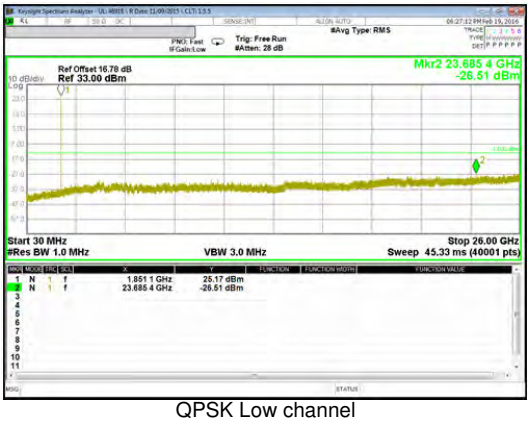
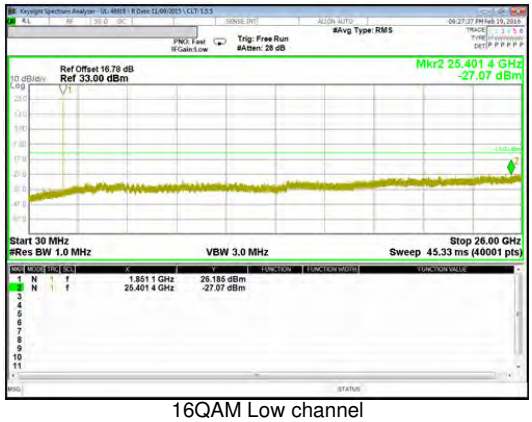
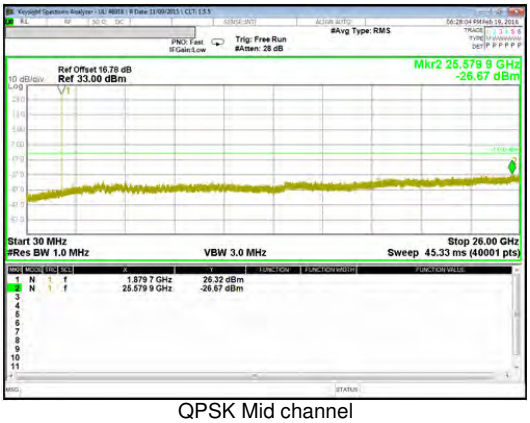
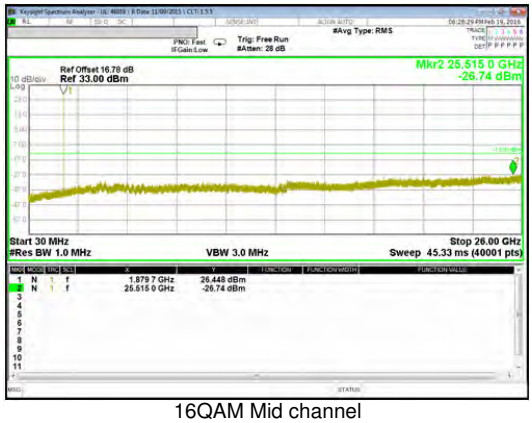
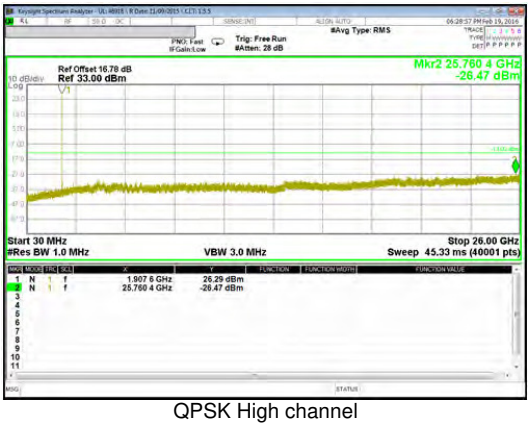
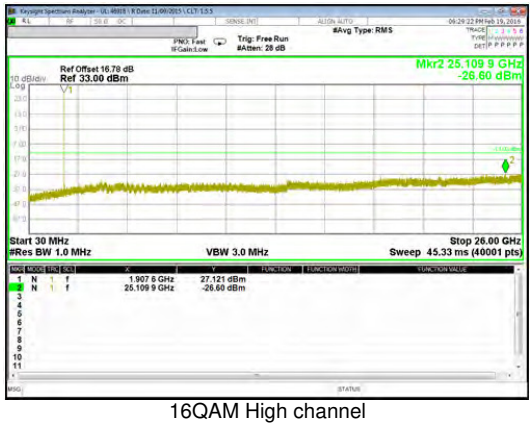
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

	 QPSK Low channel	 16QAM Low channel
Band 2 10MHz	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

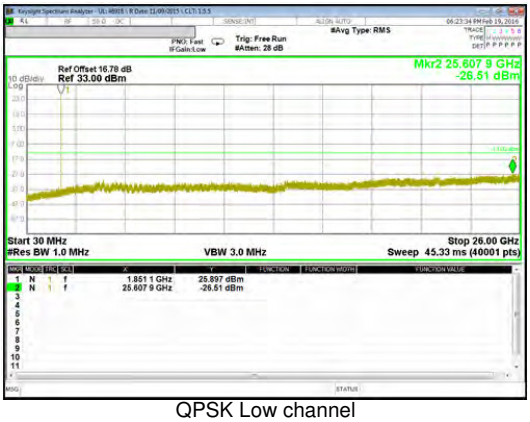
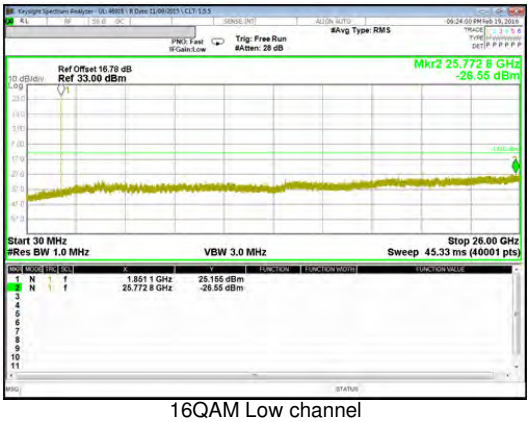
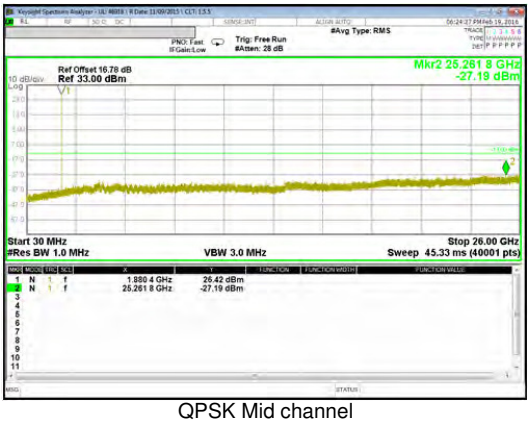
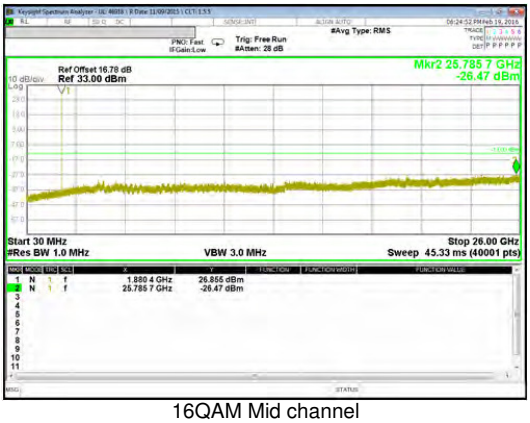
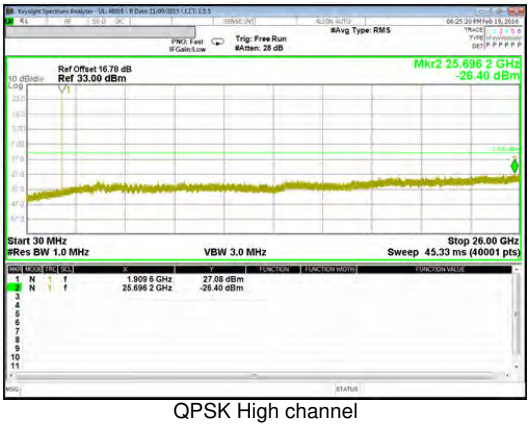
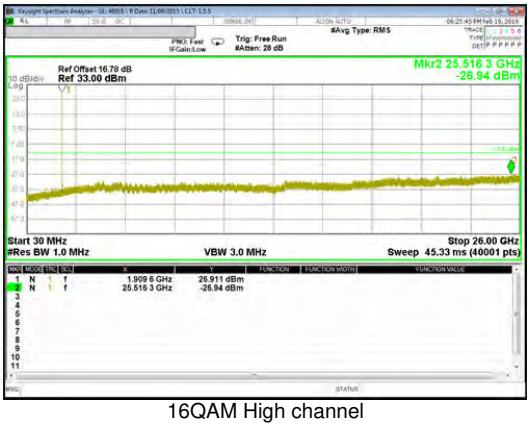
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 3MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 1.4MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.3. FREQUENCY STABILITY

RULE PART(S)

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

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.3.1. FREQUENCY STABILITY RESULTS

LTE Band 17, Channel 23790, Frequency 710.0 MHz

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20ºC Limit: +- 2.5 ppm = 1775.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	710.00000386	-0.001	2.5
3.80	40	709.99999595	0.010	2.5
3.80	30	710.00000316	0.000	2.5
3.80	***20***	710.00000312	***0***	***2.5***
3.80	10	710.00000458	-0.002	2.5
3.80	0	709.99999731	0.008	2.5
3.80	-10	710.00000411	-0.001	2.5
3.80	-20	709.99999697	0.009	2.5
3.80	-30	709.99999777	0.008	2.5

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20ºC Limit: +- 2.5 ppm = 1775.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	***20***	**710.00000312**	***0***	***2.5***
4.30	20	710.00000358	-0.001	2.5
3.60	20	710.00000349	-0.001	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 5, Channel 20524, Frequency 836.5 MHz

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	836.49999517	0.009	2.5
3.80	40	836.49999532	0.009	2.5
3.80	30	836.49999698	0.007	2.5
3.80	***20***	836.50000272	***0***	***2.5***
3.80	10	836.50000425	-0.002	2.5
3.80	0	836.49999673	0.007	2.5
3.80	-10	836.49999655	0.007	2.5
3.80	-20	836.49999662	0.007	2.5
3.80	-30	836.49999712	0.007	2.5

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	***20***	**836.50000272**	***0***	***2.5***
4.30	20	836.50000292	0.000	2.5
3.60	20	836.50000249	0.000	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4, Channel 20174, Frequency 1732.5 MHz

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	1732.50000515	0.000	2.5
3.80	40	1732.50000428	0.001	2.5
3.80	30	1732.50000403	0.001	2.5
3.80	***20***	1732.50000548	***0***	***2.5***
3.80	10	1732.50000525	0.000	2.5
3.80	0	1732.50000457	0.001	2.5
3.80	-10	1732.50000389	0.001	2.5
3.80	-20	1732.50000492	0.000	2.5
3.80	-30	1732.50000401	0.001	2.5

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	***20***	**1732.50000548**	***0***	***2.5***
4.30	20	1732.50000624	0.000	2.5
3.60	20	1732.50000458	0.001	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 2, Channel 18900, Frequency 1880.0 MHz

WCDMA Band 2, Channel 9400, Frequency 1880.0 MHz

GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: LTE Band 2 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	1879.99999182	-0.001	2.5
3.80	40	1879.99999378	-0.002	2.5
3.80	30	1879.99999299	-0.002	2.5
3.80	***20***	1879.99999009	***0***	***2.5***
3.80	10	1879.99999153	-0.001	2.5
3.80	0	1879.99999237	-0.001	2.5
3.80	-10	1879.99999326	-0.002	2.5
3.80	-20	1879.99999401	-0.002	2.5
3.80	-30	1879.99999342	-0.002	2.5

Reference Frequency: LTE Band 2 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	***20***	**1879.99999009**	***0***	***2.5***
4.30	20	1879.99999459	-0.002	2.5
3.60	20	1879.99999219	-0.001	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4, Channel 20174, Frequency 1732.5 MHz

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	1732.59999616	0.000	2.5
3.80	40	1732.59999464	0.001	2.5
3.80	30	1732.60000480	-0.005	2.5
3.80	***20***	1732.59999582	***0***	***2.5***
3.80	10	1732.60000492	-0.005	2.5
3.80	0	1732.60000602	-0.006	2.5
3.80	-10	1732.60000466	-0.005	2.5
3.80	-20	1732.60000625	-0.006	2.5
3.80	-30	1732.59999276	0.002	2.5

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	***20***	**1732.59999582**	***0***	***2.5***
4.30	20	1732.59999587	0.000	2.5
3.60	20	1732.60000459	-0.005	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

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(c) - (10) Portable stations (hand-held devices) are limited to 3 watts ERP; (LTE B17)

27.50(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.(Band 4)

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 603D Clause 2.2.17; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a MXA:

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

For average power measurement with a MXA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98; h) Use trigger to capture bursts If burst duty cycle < 98; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

TEST RESULTS

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	26.75	473.15
		190	836.6	26.07	404.58
		251	848.8	26.31	427.56
	EGPRS	128	824.2	21.84	152.76
		190	836.6	20.28	106.66
		251	848.8	20.68	116.95
GSM1900	GPRS	512	1850.2	31.17	1309.18
		661	1880.0	31.65	1462.18
		810	1909.8	31.56	1432.19
	EGPRS	512	1850.2	29.26	843.33
		661	1880.0	29.84	963.83
		810	1909.8	30.01	1002.31

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	16.10	40.74
		4183	836.6	15.39	34.59
		4233	846.6	15.22	33.27
	HSDPA	4132	826.4	16.92	49.20
		4183	836.6	16.27	42.36
		4233	846.6	15.97	39.54
Band 2	REL99	9262	1852.4	24.22	264.24
		9400	1880.0	23.59	228.56
		9538	1907.6	22.91	195.43
	HSDPA	9262	1852.4	23.72	235.50
		9400	1880.0	23.25	211.35
		9538	1907.6	22.79	190.11
Band 4	REL99	1312	1712.4	26.49	445.66
		1413	1732.6	27.25	530.88
		1513	1752.6	27.37	545.76
	HSDPA	1312	1712.4	26.25	421.70
		1413	1732.6	26.93	493.17
		1513	1752.6	27.09	511.68

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 17

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 17	10	QPSK	50/0	709.0	9.31	8.53
			50/0	710.0	10.56	11.38
			50/0	711.0	9.48	8.87
		16QAM	50/0	709.0	8.30	6.76
			50/0	710.0	9.44	8.79
			50/0	711.0	8.40	6.92
	5	QPSK	25/0	706.5	10.28	10.67
			25/0	710.0	10.92	12.36
			25/0	713.5	9.52	8.95
		16QAM	25/0	706.5	9.37	8.65
			25/0	710.0	9.90	9.77
			25/0	713.5	8.64	7.31

LTE Band 5

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 5	10	QPSK	50/0	829.0	17.10	51.29
			50/0	836.5	16.54	45.08
			50/0	844.0	16.19	41.59
		16QAM	50/0	829.0	16.11	40.83
			50/0	836.5	15.48	35.32
			50/0	844.0	15.12	32.51
	5	QPSK	25/0	826.5	17.02	50.35
			25/0	836.5	16.69	46.67
			25/0	846.5	15.68	36.98
		16QAM	25/0	826.5	16.09	40.64
			25/0	836.5	15.69	37.07
			25/0	846.5	15.20	33.11
	3	QPSK	15/0	825.5	16.37	43.35
			15/0	836.5	16.53	44.98
			15/0	847.5	15.93	39.17
		16QAM	15/0	825.5	15.48	35.32
			15/0	836.5	15.38	34.51
			15/0	847.5	15.39	34.59
	1.4	QPSK	6/0	824.7	14.29	26.85
			6/0	836.5	13.16	20.70
			6/0	848.3	12.12	16.29
		16QAM	6/0	824.7	13.35	21.63
			6/0	836.5	12.16	16.44
			6/0	848.3	11.82	15.21

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 4	20	QPSK	100/0	1720.0	21.64	145.88
			100/0	1732.5	22.98	198.61
			100/0	1745.0	24.64	291.07
		16QAM	100/0	1720.0	22.57	180.72
			100/0	1732.5	24.02	252.35
			100/0	1745.0	23.73	236.05
	15	QPSK	75/0	1717.5	23.77	238.23
			75/0	1732.5	24.07	255.27
			75/0	1747.5	23.71	234.96
		16QAM	75/0	1717.5	22.80	190.55
			75/0	1732.5	23.16	207.01
			75/0	1747.5	22.88	194.09
	10	QPSK	50/0	1715.0	24.20	263.03
			50/0	1732.5	23.63	230.67
			50/0	1750.0	24.61	289.07
		16QAM	50/0	1715.0	23.21	209.41
			50/0	1732.5	22.69	185.78
			50/0	1750.0	23.58	228.03
	5	QPSK	25/0	1712.5	24.24	265.46
			25/0	1732.5	24.45	278.61
			25/0	1752.5	22.65	184.08
		16QAM	25/0	1712.5	23.37	217.27
			25/0	1732.5	23.35	216.27
			25/0	1752.5	21.74	149.28
	3	QPSK	15/0	1711.5	23.00	199.53
			15/0	1732.5	23.42	219.79
			15/0	1753.5	21.97	157.40
		16QAM	15/0	1711.5	22.04	159.96
			15/0	1732.5	22.57	180.72
			15/0	1753.5	20.97	125.03
	1.4	QPSK	6/0	1710.7	21.16	130.62
			6/0	1732.5	21.75	149.62
			6/0	1754.3	21.06	127.64
		16QAM	6/0	1710.7	19.94	98.63
			6/0	1732.5	20.57	114.02
			6/0	1754.3	20.21	104.95

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 2

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 2	20	QPSK	100/0	1860.0	22.70	186.21
			100/0	1880.0	22.08	161.44
			100/0	1900.0	21.86	153.46
		16QAM	100/0	1860.0	21.86	153.46
			100/0	1880.0	21.12	129.42
			100/0	1900.0	20.72	118.03
	15	QPSK	75/0	1857.5	21.79	151.01
			75/0	1880.0	21.86	153.46
			75/0	1902.5	21.97	157.40
		16QAM	75/0	1857.5	20.76	119.12
			75/0	1880.0	20.94	124.17
			75/0	1902.5	21.06	127.64
	10	QPSK	50/0	1955.0	22.24	167.49
			50/0	1880.0	22.10	162.18
			50/0	1905.0	21.59	144.21
		16QAM	50/0	1955.0	21.08	128.23
			50/0	1880.0	21.00	125.89
			50/0	1905.0	20.31	107.40
	5	QPSK	25/0	1852.5	21.65	146.22
			25/0	1880.0	21.86	153.46
			25/0	1907.5	21.33	135.83
		16QAM	25/0	1852.5	20.68	116.95
			25/0	1880.0	20.94	124.17
			25/0	1907.5	20.37	108.89
	3	QPSK	15/0	1815.5	21.80	151.36
			15/0	1880.0	21.98	157.76
			15/0	1908.5	21.26	133.66
		16QAM	15/0	1815.5	21.65	146.22
			15/0	1880.0	20.99	125.60
			15/0	1908.5	20.22	105.20
	1.4	QPSK	6/0	1850.7	19.32	85.51
			6/0	1880.0	20.14	103.28
			6/0	1909.3	19.40	87.10
		16QAM	6/0	1850.7	18.28	67.30
			6/0	1880.0	19.12	81.66
			6/0	1909.3	18.37	68.71

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.1.2. ERP/EIRP DATA

GSM 850

GSM

GSM850
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT ONLY, Y Position
Mode: GPRS 850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	29.37	V	1.1	-1.6	26.75	38.5	-11.7	
824.20	21.51	H	1.1	-1.6	18.89	38.5	-19.6	
Mid Ch								
836.60	28.56	V	1.1	-1.4	26.07	38.5	-12.4	
836.60	23.04	H	1.1	-1.4	20.55	38.5	-17.9	
High Ch								
848.80	28.67	V	1.1	-1.3	26.31	38.5	-12.1	
848.80	24.13	H	1.1	-1.3	21.77	38.5	-16.7	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

GSM

GSM850
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT ONLY, Y Position
Mode: EGPRS 850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	24.46	V	1.1	-1.6	21.84	38.5	-16.6	
824.20	16.50	H	1.1	-1.6	13.88	38.5	-24.6	
Mid Ch								
836.60	22.77	V	1.1	-1.4	20.28	38.5	-18.2	
836.60	12.50	H	1.1	-1.4	10.01	38.5	-28.4	
High Ch								
848.80	23.04	V	1.1	-1.3	20.68	38.5	-17.8	
848.80	18.95	H	1.1	-1.3	16.59	38.5	-21.9	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

GSM

GSM1900
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 03-09-16
Test Engineer: Steven Kim
Configuration: EUT ONLY, Z Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	20.9	V	1.60	8.80	28.09	33.0	-4.9	
1850.20	24.0	H	1.60	8.80	31.17	33.0	-1.8	
Mid Ch								
1880.00	22.4	V	1.62	8.62	29.39	33.0	-3.6	
1880.00	24.7	H	1.62	8.62	31.65	33.0	-1.3	
High Ch								
1909.80	21.4	V	1.63	8.44	28.25	33.0	-4.7	
1909.80	24.8	H	1.63	8.44	31.56	33.0	-1.4	

Rev. 3.17.11

GSM

GSM1900
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 03-09-16
Test Engineer: Steven Kim
Configuration: EUT ONLY, Z Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	19.1	V	1.60	8.80	26.29	33.0	-6.7	
1850.20	22.1	H	1.60	8.80	29.26	33.0	-3.7	
Mid Ch								
1880.00	19.8	V	1.62	8.62	26.80	33.0	-6.2	
1880.00	22.8	H	1.62	8.62	29.84	33.0	-3.2	
High Ch								
1909.80	19.7	V	1.63	8.44	26.46	33.0	-6.5	
1909.80	23.2	H	1.63	8.44	30.01	33.0	-3.0	

Rev. 3.17.11

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

WCDMA

Band 5
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT ONLY, Y Position
Mode: Rel 99_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	18.71	V	1.1	-1.5	16.10	38.5	-22.4	
826.40	12.74	H	1.1	-1.5	10.13	38.5	-28.3	
Mid Ch								
836.60	17.88	V	1.1	-1.4	15.39	38.5	-23.1	
836.60	12.72	H	1.1	-1.4	10.23	38.5	-28.2	
High Ch								
846.60	17.60	V	1.1	-1.3	15.22	38.5	-23.2	
846.60	13.79	H	1.1	-1.3	11.41	38.5	-27.0	

Rev. 3.17.11

WCDMA

Band 5
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT ONLY, Y Position
Mode: HSDPA_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	19.53	V	1.1	-1.5	16.92	38.5	-21.5	
826.40	13.13	H	1.1	-1.5	10.52	38.5	-27.9	
Mid Ch								
836.60	18.76	V	1.1	-1.4	16.27	38.5	-22.2	
836.60	13.00	H	1.1	-1.4	10.51	38.5	-27.9	
High Ch								
846.60	18.35	V	1.1	-1.3	15.97	38.5	-22.5	
846.60	14.15	H	1.1	-1.3	11.77	38.5	-26.7	

Rev. 3.17.11

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

WCDMA

Band 2
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: REL99_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	10.24	V	1.60	8.79	17.43	33.0	-15.6	
1852.40	17.03	H	1.60	8.79	24.22	33.0	-8.8	
Mid Ch								
1880.00	12.57	V	1.62	8.62	19.57	33.0	-13.4	
1880.00	16.59	H	1.62	8.62	23.59	33.0	-9.4	
High Ch								
1907.60	12.83	V	1.63	8.45	19.65	33.0	-13.3	
1907.60	16.09	H	1.63	8.45	22.91	33.0	-10.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 2
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: HSDPA_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	10.06	V	1.60	8.79	17.25	33.0	-15.8	
1852.40	16.53	H	1.60	8.79	23.72	33.0	-9.3	
Mid Ch								
1880.00	12.29	V	1.62	8.62	19.29	33.0	-13.7	
1880.00	16.25	H	1.62	8.62	23.25	33.0	-9.7	
High Ch								
1907.60	12.68	V	1.63	8.45	19.50	33.0	-13.5	
1907.60	15.97	H	1.63	8.45	22.79	33.0	-10.2	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

WCDMA

Band 4
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23258
Date: 04-04-16
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: Rel 99_1700 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	13.22	V	1.54	9.20	20.88	30.0	-9.1	
1712.40	18.83	H	1.54	9.20	26.49	30.0	-3.5	
Mid Ch								
1732.60	14.56	V	1.55	9.31	22.32	30.0	-7.7	
1732.60	19.49	H	1.55	9.31	27.25	30.0	-2.8	
High Ch								
1752.60	15.08	V	1.56	9.38	22.90	30.0	-7.1	
1752.60	19.55	H	1.56	9.38	27.37	30.0	-2.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 4
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23258
Date: 04-04-16
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: HSDPA_1700 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	12.82	V	1.54	9.20	20.48	30.0	-9.5	
1712.40	18.59	H	1.54	9.20	26.25	30.0	-3.8	
Mid Ch								
1732.60	14.23	V	1.55	9.31	21.99	30.0	-8.0	
1732.60	19.17	H	1.55	9.31	26.93	30.0	-3.1	
High Ch								
1752.60	14.77	V	1.56	9.38	22.59	30.0	-7.4	
1752.60	19.27	H	1.56	9.38	27.09	30.0	-2.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RESULTS

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.2.1. SPURIOUS RADIATION PLOTS

GSM 850

GSM

GSM850
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-18-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: GPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.6484	-19.0	V	3.0	39.1	1.0	-57.1	-13.0	-44.1	
2.4726	-19.4	V	3.0	39.5	1.0	-57.9	-13.0	-44.9	
3.2968	-17.9	V	3.0	40.1	1.0	-57.0	-13.0	-44.0	
1.6484	-20.5	H	3.0	39.1	1.0	-58.6	-13.0	-45.6	
2.4726	-16.6	H	3.0	39.5	1.0	-55.1	-13.0	-42.1	
3.2968	-18.3	H	3.0	40.1	1.0	-57.4	-13.0	-44.4	
Mid Ch, 836.6MHz									
1.6730	-18.1	V	3.0	39.1	1.0	-56.2	-13.0	-43.2	
2.5098	-19.4	V	3.0	39.5	1.0	-58.0	-13.0	-45.0	
3.3464	-17.7	V	3.0	40.1	1.0	-56.8	-13.0	-43.8	
1.6730	-20.9	H	3.0	39.1	1.0	-59.0	-13.0	-46.0	
2.5098	-17.5	H	3.0	39.5	1.0	-56.0	-13.0	-43.0	
3.3464	-17.8	H	3.0	40.1	1.0	-56.9	-13.0	-43.9	
High Ch, 848.8MHz									
1.6976	-17.7	V	3.0	39.1	1.0	-55.8	-13.0	-42.8	
2.5466	-19.3	V	3.0	39.6	1.0	-57.9	-13.0	-44.9	
3.3952	-17.3	V	3.0	40.2	1.0	-56.5	-13.0	-43.5	
1.6976	-21.3	H	3.0	39.1	1.0	-59.5	-13.0	-46.5	
2.5466	-17.4	H	3.0	39.6	1.0	-56.0	-13.0	-43.0	
3.3952	-17.4	H	3.0	40.2	1.0	-56.6	-13.0	-43.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GSM

GSM850
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-18-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: EGPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.6484	-21.5	V	3.0	39.1	1.0	-59.6	-13.0	-46.6	
2.4726	-19.8	V	3.0	39.5	1.0	-58.3	-13.0	-45.3	
3.2968	-18.2	V	3.0	40.1	1.0	-57.3	-13.0	-44.3	
1.6484	-22.8	H	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.4726	-20.2	H	3.0	39.5	1.0	-58.7	-13.0	-45.7	
3.2968	-18.5	H	3.0	40.1	1.0	-57.6	-13.0	-44.6	
Mid Ch, 836.6MHz									
1.6730	-21.8	V	3.0	39.1	1.0	-59.9	-13.0	-46.9	
2.5098	-19.5	V	3.0	39.5	1.0	-58.1	-13.0	-45.1	
3.3464	-17.6	V	3.0	40.1	1.0	-56.8	-13.0	-43.8	
1.6730	-22.8	H	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.5098	-19.9	H	3.0	39.5	1.0	-58.5	-13.0	-45.5	
3.3464	-18.0	H	3.0	40.1	1.0	-57.2	-13.0	-44.2	
High Ch, 848.8MHz									
1.6976	-21.3	V	3.0	39.1	1.0	-59.4	-13.0	-46.4	
2.5466	-19.6	V	3.0	39.6	1.0	-58.2	-13.0	-45.2	
3.3952	-17.3	V	3.0	40.2	1.0	-56.5	-13.0	-43.5	
1.6976	-22.4	H	3.0	39.1	1.0	-60.6	-13.0	-47.6	
2.5466	-19.7	H	3.0	39.6	1.0	-58.3	-13.0	-45.3	
3.3952	-17.7	H	3.0	40.2	1.0	-56.9	-13.0	-43.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

GSM

GSM1900
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-09-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: GPRS 1900

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-8.3	V	3.0	40.5	1.0	-47.8	-13.0	-34.8	
5.5506	5.3	V	3.0	40.8	1.0	-34.5	-13.0	-21.5	
7.4008	-8.8	V	3.0	40.8	1.0	-48.6	-13.0	-35.6	
3.7000	-6.8	H	3.0	40.5	1.0	-46.3	-13.0	-33.3	
5.5506	2.8	H	3.0	40.8	1.0	-37.0	-13.0	-24.0	
7.4008	-7.8	H	3.0	40.8	1.0	-47.6	-13.0	-34.6	
Mid Ch, 1880.0MHz									
3.7600	-5.2	V	3.0	40.5	1.0	-44.8	-13.0	-31.8	
5.6400	5.7	V	3.0	40.8	1.0	-34.1	-13.0	-21.1	
7.5200	-8.5	V	3.0	40.7	1.0	-48.2	-13.0	-35.2	
3.7600	-5.0	H	3.0	40.5	1.0	-44.6	-13.0	-31.6	
5.6400	4.0	H	3.0	40.8	1.0	-35.8	-13.0	-22.8	
7.5200	-7.4	H	3.0	40.7	1.0	-47.1	-13.0	-34.1	
High Ch, 1909.8 MHz									
3.8196	-4.3	V	3.0	40.6	1.0	-43.9	-13.0	-30.9	
5.7294	6.6	V	3.0	40.8	1.0	-33.2	-13.0	-20.2	
7.6392	-8.3	V	3.0	40.7	1.0	-48.0	-13.0	-35.0	
3.8196	-4.6	H	3.0	40.6	1.0	-44.2	-13.0	-31.2	
5.7294	7.6	H	3.0	40.8	1.0	-32.2	-13.0	-19.2	
7.6392	-6.2	H	3.0	40.7	1.0	-45.8	-13.0	-32.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GSM

GSM1900
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-09-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: EGPRS 1900 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-9.6	V	3.0	40.5	1.0	-49.0	-13.0	-36.0	
5.5506	1.8	V	3.0	40.8	1.0	-38.0	-13.0	-25.0	
7.4008	-9.3	V	3.0	40.8	1.0	-49.1	-13.0	-36.1	
3.7000	-8.6	H	3.0	40.5	1.0	-48.0	-13.0	-35.0	
5.5500	-0.6	H	3.0	40.8	1.0	-40.5	-13.0	-27.5	
7.4000	-8.9	H	3.0	40.8	1.0	-48.7	-13.0	-35.7	
Mid Ch, 1880.0MHz									
3.7600	-7.1	V	3.0	40.5	1.0	-46.7	-13.0	-33.7	
5.6400	1.0	V	3.0	40.8	1.0	-38.8	-13.0	-25.8	
7.5200	-9.0	V	3.0	40.7	1.0	-48.7	-13.0	-35.7	
3.7600	-7.1	H	3.0	40.5	1.0	-46.6	-13.0	-33.6	
5.6400	0.4	H	3.0	40.8	1.0	-39.4	-13.0	-26.4	
7.5200	-8.5	H	3.0	40.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1909.8 MHz									
3.8196	-5.8	V	3.0	40.6	1.0	-45.4	-13.0	-32.4	
5.7294	2.2	V	3.0	40.8	1.0	-37.6	-13.0	-24.6	
7.6392	-8.9	V	3.0	40.7	1.0	-48.5	-13.0	-35.5	
3.8196	-8.8	H	3.0	40.6	1.0	-48.4	-13.0	-35.4	
5.7294	2.8	H	3.0	40.8	1.0	-37.0	-13.0	-24.0	
7.6392	-7.0	H	3.0	40.7	1.0	-46.7	-13.0	-33.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

WCDMA

Band 5
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone / Y Position
Mode: Tx, REL99,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-17.1	V	3.0	39.1	1.0	-55.2	-13.0	-42.2	
2.4790	-16.9	V	3.0	39.5	1.0	-55.4	-13.0	-42.4	
3.3056	-15.9	V	3.0	40.1	1.0	-55.0	-13.0	-42.0	
1.6520	-20.0	H	3.0	39.1	1.0	-58.1	-13.0	-45.1	
2.4790	-14.9	H	3.0	39.5	1.0	-53.4	-13.0	-40.4	
3.3056	-16.1	H	3.0	40.1	1.0	-55.2	-13.0	-42.2	
Mid Ch, 836.6MHz									
1.6732	-18.9	V	3.0	39.1	1.0	-57.0	-13.0	-44.0	
2.5098	-16.9	V	3.0	39.5	1.0	-55.4	-13.0	-42.4	
3.3464	-15.8	V	3.0	40.1	1.0	-55.0	-13.0	-42.0	
1.6732	-20.4	H	3.0	39.1	1.0	-58.5	-13.0	-45.5	
2.5098	-15.2	H	3.0	39.5	1.0	-53.7	-13.0	-40.7	
3.3464	-16.2	H	3.0	40.1	1.0	-55.3	-13.0	-42.3	
High Ch, 846.6MHz									
1.6932	-18.5	V	3.0	39.1	1.0	-56.7	-13.0	-43.7	
2.5398	-16.1	V	3.0	39.6	1.0	-54.7	-13.0	-41.7	
3.3864	-15.4	V	3.0	40.2	1.0	-54.6	-13.0	-41.6	
1.6932	-19.6	H	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5398	-13.6	H	3.0	39.6	1.0	-52.1	-13.0	-39.1	
3.3864	-15.8	H	3.0	40.2	1.0	-54.9	-13.0	-41.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 5
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-18-15
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone / Y Position
Mode: Tx, HSDPA,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-19.1	V	3.0	39.1	1.0	-57.2	-13.0	-44.2	
2.4790	-17.0	V	3.0	39.5	1.0	-55.6	-13.0	-42.6	
3.3056	-15.9	V	3.0	40.1	1.0	-55.0	-13.0	-42.0	
1.6520	-20.1	H	3.0	39.1	1.0	-58.2	-13.0	-45.2	
2.4790	-14.7	H	3.0	39.5	1.0	-53.2	-13.0	-40.2	
3.3056	-16.0	H	3.0	40.1	1.0	-55.1	-13.0	-42.1	
Mid Ch, 836.6MHz									
1.6732	-18.8	V	3.0	39.1	1.0	-56.9	-13.0	-43.9	
2.5098	-17.0	V	3.0	39.5	1.0	-55.6	-13.0	-42.6	
3.3464	-15.6	V	3.0	40.1	1.0	-54.7	-13.0	-41.7	
1.6732	-20.6	H	3.0	39.1	1.0	-58.7	-13.0	-45.7	
2.5098	-15.5	H	3.0	39.5	1.0	-54.0	-13.0	-41.0	
3.3464	-16.0	H	3.0	40.1	1.0	-55.1	-13.0	-42.1	
High Ch, 846.6MHz									
1.6932	-18.4	V	3.0	39.1	1.0	-56.5	-13.0	-43.5	
2.5398	-17.0	V	3.0	39.6	1.0	-55.6	-13.0	-42.6	
3.3864	-15.1	V	3.0	40.2	1.0	-54.3	-13.0	-41.3	
1.6932	-18.2	H	3.0	39.1	1.0	-56.3	-13.0	-43.3	
2.5398	-16.0	H	3.0	39.6	1.0	-54.6	-13.0	-41.6	
3.3864	-15.4	H	3.0	40.2	1.0	-54.6	-13.0	-41.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

WCDMA

Band 2
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, REL99,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-5.6	V	3.0	40.5	1.0	-45.1	-13.0	-32.1	
5.5572	-7.3	V	3.0	40.8	1.0	-47.2	-13.0	-34.2	
7.4096	-8.3	V	3.0	40.8	1.0	-48.1	-13.0	-35.1	
3.7048	-9.5	H	3.0	40.5	1.0	-49.0	-13.0	-36.0	
5.5572	-6.7	H	3.0	40.8	1.0	-46.5	-13.0	-33.5	
7.4096	-8.3	H	3.0	40.8	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3.7600	-3.7	V	3.0	40.5	1.0	-43.2	-13.0	-30.2	
5.6400	-4.1	V	3.0	40.8	1.0	-43.9	-13.0	-30.9	
7.5200	-7.6	V	3.0	40.7	1.0	-47.3	-13.0	-34.3	
3.7600	-7.0	H	3.0	40.5	1.0	-46.5	-13.0	-33.5	
5.6400	-4.5	H	3.0	40.8	1.0	-44.3	-13.0	-31.3	
7.5200	-7.5	H	3.0	40.7	1.0	-47.2	-13.0	-34.2	
High Ch, 1907.6MHz									
3.8152	0.9	V	3.0	40.6	1.0	-38.7	-13.0	-25.7	
5.7228	-2.4	V	3.0	40.8	1.0	-42.1	-13.0	-29.1	
7.6304	-8.2	V	3.0	40.7	1.0	-47.8	-13.0	-34.8	
3.8152	-2.7	H	3.0	40.6	1.0	-42.3	-13.0	-29.3	
5.7228	0.7	H	3.0	40.8	1.0	-39.1	-13.0	-26.1	
7.6304	-8.1	H	3.0	40.7	1.0	-47.8	-13.0	-34.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 2
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, HSDPA,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-5.9	V	3.0	40.5	1.0	-45.4	-13.0	-32.4	
5.5572	-7.5	V	3.0	40.8	1.0	-47.3	-13.0	-34.3	
7.4096	-8.3	V	3.0	40.8	1.0	-48.1	-13.0	-35.1	
3.7048	-10.2	H	3.0	40.5	1.0	-49.7	-13.0	-36.7	
5.5572	-6.8	H	3.0	40.8	1.0	-46.7	-13.0	-33.7	
7.4096	-8.2	H	3.0	40.8	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3.7600	-3.9	V	3.0	40.5	1.0	-43.4	-13.0	-30.4	
5.6400	-4.3	V	3.0	40.8	1.0	-44.1	-13.0	-31.1	
7.5200	-7.7	V	3.0	40.7	1.0	-47.4	-13.0	-34.4	
3.7600	-7.0	H	3.0	40.5	1.0	-46.6	-13.0	-33.6	
5.6400	-4.1	H	3.0	40.8	1.0	-43.9	-13.0	-30.9	
7.5200	-7.5	H	3.0	40.7	1.0	-47.2	-13.0	-34.2	
High Ch, 1907.6MHz									
3.8152	-0.3	V	3.0	40.6	1.0	-39.8	-13.0	-26.8	
5.7228	-2.9	V	3.0	40.8	1.0	-42.7	-13.0	-29.7	
7.6304	-8.2	V	3.0	40.7	1.0	-47.9	-13.0	-34.9	
3.8152	-2.8	H	3.0	40.6	1.0	-42.4	-13.0	-29.4	
5.7228	1.3	H	3.0	40.8	1.0	-38.5	-13.0	-25.5	
7.6304	-8.0	H	3.0	40.7	1.0	-47.7	-13.0	-34.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

WCDMA

Band 4
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23258
Date: 04-04-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, REL99,1700MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3.4248	-3.9	V	3.0	40.2	1.0	-43.2	-13.0	-30.2	
5.1372	-7.5	V	3.0	40.9	1.0	-47.4	-13.0	-34.4	
6.8496	-8.8	V	3.0	41.0	1.0	-48.8	-13.0	-35.8	
3.4248	-10.9	H	3.0	40.2	1.0	-50.1	-13.0	-37.1	
5.1372	-7.0	H	3.0	40.9	1.0	-46.9	-13.0	-33.9	
6.8496	-7.4	H	3.0	41.0	1.0	-47.4	-13.0	-34.4	
Mid Ch, 1732.6MHz									
3.4652	-3.2	V	3.0	40.3	1.0	-42.4	-13.0	-29.4	
5.1978	-6.1	V	3.0	40.9	1.0	-46.0	-13.0	-33.0	
6.9304	-6.9	V	3.0	41.0	1.0	-46.9	-13.0	-33.9	
3.4652	-10.5	H	3.0	40.3	1.0	-49.8	-13.0	-36.8	
5.1978	-6.2	H	3.0	40.9	1.0	-46.1	-13.0	-33.1	
6.9304	-6.9	H	3.0	41.0	1.0	-46.9	-13.0	-33.9	
High Ch, 1752.6MHz									
3.5052	-3.3	V	3.0	40.3	1.0	-42.6	-13.0	-29.6	
5.2578	-6.8	V	3.0	40.9	1.0	-46.7	-13.0	-33.7	
7.0104	-8.1	V	3.0	41.0	1.0	-48.1	-13.0	-35.1	
3.5052	-9.9	H	3.0	40.3	1.0	-49.2	-13.0	-36.2	
5.2578	-6.4	H	3.0	40.9	1.0	-46.2	-13.0	-33.2	
7.0104	-6.8	H	3.0	41.0	1.0	-46.8	-13.0	-33.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 4
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23258
Date: 04-04-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, HSDPA,1700MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3.4248	-5.3	V	3.0	40.2	1.0	-44.5	-13.0	-31.5	
5.1372	-7.5	V	3.0	40.9	1.0	-47.4	-13.0	-34.4	
6.8496	-8.9	V	3.0	41.0	1.0	-48.8	-13.0	-35.8	
3.4248	-11.0	H	3.0	40.2	1.0	-50.2	-13.0	-37.2	
5.1372	-7.2	H	3.0	40.9	1.0	-47.1	-13.0	-34.1	
6.8496	-7.5	H	3.0	41.0	1.0	-47.4	-13.0	-34.4	
Mid Ch, 1732.6MHz									
3.4652	-4.5	V	3.0	40.3	1.0	-43.7	-13.0	-30.7	
5.1978	-6.3	V	3.0	40.9	1.0	-46.1	-13.0	-33.1	
6.9304	-6.9	V	3.0	41.0	1.0	-46.9	-13.0	-33.9	
3.4652	-11.1	H	3.0	40.3	1.0	-50.4	-13.0	-37.4	
5.1978	-6.4	H	3.0	40.9	1.0	-46.3	-13.0	-33.3	
6.9304	-7.1	H	3.0	41.0	1.0	-47.1	-13.0	-34.1	
High Ch, 1752.6MHz									
3.5052	-4.1	V	3.0	40.3	1.0	-43.4	-13.0	-30.4	
5.2578	-6.9	V	3.0	40.9	1.0	-46.7	-13.0	-33.7	
7.0104	-8.3	V	3.0	41.0	1.0	-48.4	-13.0	-35.4	
3.5052	-10.3	H	3.0	40.3	1.0	-49.6	-13.0	-36.6	
5.2578	-6.4	H	3.0	40.9	1.0	-46.3	-13.0	-33.3	
7.0104	-7.0	H	3.0	41.0	1.0	-47.0	-13.0	-34.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 17

LTE Band 17 10MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Y-Position
Mode: TX, LTE BAND 17, 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (709MHz)									
1.4180	-25.0	V	3.0	39.0	1.0	-63.1	-13.0	-50.1	
2.1270	-11.0	V	3.0	39.3	1.0	-49.3	-13.0	-36.3	
2.8360	-22.4	V	3.0	39.7	1.0	-61.1	-13.0	-48.1	
1.4180	-27.3	H	3.0	39.0	1.0	-65.3	-13.0	-52.3	
2.1270	-14.3	H	3.0	39.3	1.0	-52.7	-13.0	-39.7	
2.8360	-22.4	H	3.0	39.7	1.0	-61.2	-13.0	-48.2	
Mid Channel (710MHz)									
1.4200	-22.2	V	3.0	39.0	1.0	-60.2	-13.0	-47.2	
2.1300	-11.6	V	3.0	39.3	1.0	-50.0	-13.0	-37.0	
2.8400	-23.5	V	3.0	39.7	1.0	-62.2	-13.0	-49.2	
1.4200	-26.6	H	3.0	39.0	1.0	-64.6	-13.0	-51.6	
2.1300	-13.8	H	3.0	39.3	1.0	-52.1	-13.0	-39.1	
2.8400	-23.5	H	3.0	39.7	1.0	-62.2	-13.0	-49.2	
High Channel (711MHz)									
1.4220	-24.6	V	3.0	39.0	1.0	-62.6	-13.0	-49.6	
2.1330	-9.0	V	3.0	39.3	1.0	-47.4	-13.0	-34.4	
2.8440	-23.2	V	3.0	39.7	1.0	-61.9	-13.0	-48.9	
1.4220	-27.6	H	3.0	39.0	1.0	-65.6	-13.0	-52.6	
2.1330	-14.0	H	3.0	39.3	1.0	-52.4	-13.0	-39.4	
2.8440	-23.4	H	3.0	39.7	1.0	-62.1	-13.0	-49.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 17 10MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Y-Position
Mode: TX, LTE BAND 17, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (709MHz)									
1.4180	-25.6	V	3.0	39.0	1.0	-63.6	-13.0	-50.6	
2.1270	-12.9	V	3.0	39.3	1.0	-51.2	-13.0	-38.2	
2.8360	-22.4	V	3.0	39.7	1.0	-61.1	-13.0	-48.1	
1.4180	-27.8	H	3.0	39.0	1.0	-65.8	-13.0	-52.8	
2.1270	-15.8	H	3.0	39.3	1.0	-54.1	-13.0	-41.1	
2.8360	-22.5	H	3.0	39.7	1.0	-61.3	-13.0	-48.3	
Mid Channel (710MHz)									
1.4200	-23.3	V	3.0	39.0	1.0	-61.3	-13.0	-48.3	
2.1300	-14.2	V	3.0	39.3	1.0	-52.5	-13.0	-39.5	
2.8400	-23.4	V	3.0	39.7	1.0	-62.1	-13.0	-49.1	
1.4200	-27.1	H	3.0	39.0	1.0	-65.1	-13.0	-52.1	
2.1300	-16.1	H	3.0	39.3	1.0	-54.4	-13.0	-41.4	
2.8400	-23.5	H	3.0	39.7	1.0	-62.2	-13.0	-49.2	
High Channel (711MHz)									
1.4220	-23.4	V	3.0	39.0	1.0	-61.4	-13.0	-48.4	
2.1330	-12.4	V	3.0	39.3	1.0	-50.7	-13.0	-37.7	
2.8440	-23.2	V	3.0	39.7	1.0	-62.0	-13.0	-49.0	
1.4220	-29.2	H	3.0	39.0	1.0	-67.2	-13.0	-54.2	
2.1330	-17.0	H	3.0	39.3	1.0	-55.4	-13.0	-42.4	
2.8440	-23.2	H	3.0	39.7	1.0	-61.9	-13.0	-48.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 17

5MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Y-Position
Mode: TX, LTE BAND 17, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.4130	-25.4	V	3.0	39.0	1.0	-63.4	-13.0	-50.4	
2.1195	-9.4	V	3.0	39.3	1.0	-47.7	-13.0	-34.7	
2.8260	-23.9	V	3.0	39.7	1.0	-62.6	-13.0	-49.6	
1.4130	-26.2	H	3.0	39.0	1.0	-64.2	-13.0	-51.2	
2.1195	-16.2	H	3.0	39.3	1.0	-54.5	-13.0	-41.5	
2.8260	-24.0	H	3.0	39.7	1.0	-62.8	-13.0	-49.8	
Mid Channel (710MHz)									
1.4200	-22.8	V	3.0	39.0	1.0	-60.8	-13.0	-47.8	
2.1300	-9.2	V	3.0	39.3	1.0	-47.6	-13.0	-34.6	
2.8400	-23.6	V	3.0	39.7	1.0	-62.3	-13.0	-49.3	
1.4200	-26.9	H	3.0	39.0	1.0	-64.9	-13.0	-51.9	
2.1300	-16.6	H	3.0	39.3	1.0	-54.9	-13.0	-41.9	
2.8400	-23.1	H	3.0	39.7	1.0	-61.8	-13.0	-48.8	
High Channel (713.5MHz)									
1.4270	-24.2	V	3.0	39.0	1.0	-62.2	-13.0	-49.2	
2.1405	-10.0	V	3.0	39.3	1.0	-48.4	-13.0	-35.4	
2.8540	-23.8	V	3.0	39.7	1.0	-62.5	-13.0	-49.5	
1.4270	-26.2	H	3.0	39.0	1.0	-64.2	-13.0	-51.2	
2.1405	-14.1	H	3.0	39.3	1.0	-52.5	-13.0	-39.5	
2.8540	-23.9	H	3.0	39.7	1.0	-62.6	-13.0	-49.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 17

5MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Y-Position
Mode: TX, LTE BAND 17, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.4130	-26.0	V	3.0	39.0	1.0	-64.1	-13.0	-51.1	
2.1195	-10.7	V	3.0	39.3	1.0	-49.0	-13.0	-36.0	
2.8260	-24.0	V	3.0	39.7	1.0	-62.7	-13.0	-49.7	
1.4130	-26.9	H	3.0	39.0	1.0	-64.9	-13.0	-51.9	
2.1195	-17.5	H	3.0	39.3	1.0	-55.8	-13.0	-42.8	
2.8260	-24.0	H	3.0	39.7	1.0	-62.7	-13.0	-49.7	
Mid Channel (710MHz)									
1.4200	-24.0	V	3.0	39.0	1.0	-62.0	-13.0	-49.0	
2.1300	-12.2	V	3.0	39.3	1.0	-50.5	-13.0	-37.5	
2.8400	-23.6	V	3.0	39.7	1.0	-62.3	-13.0	-49.3	
1.4200	-27.2	H	3.0	39.0	1.0	-65.2	-13.0	-52.2	
2.1300	-18.4	H	3.0	39.3	1.0	-56.7	-13.0	-43.7	
2.8400	-23.1	H	3.0	39.7	1.0	-61.8	-13.0	-48.8	
High Channel (713.5MHz)									
1.4270	-25.4	V	3.0	39.0	1.0	-63.4	-13.0	-50.4	
2.1405	-13.2	V	3.0	39.3	1.0	-51.6	-13.0	-38.6	
2.8540	-23.9	V	3.0	39.7	1.0	-62.6	-13.0	-49.6	
1.4270	-27.1	H	3.0	39.0	1.0	-65.1	-13.0	-52.1	
2.1405	-17.3	H	3.0	39.3	1.0	-55.6	-13.0	-42.6	
2.8540	-23.9	H	3.0	39.7	1.0	-62.6	-13.0	-49.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 5

LTE Band 5 10MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (829MHz)									
1.6580	-18.1	V	3.0	39.1	1.0	-56.2	-13.0	-43.2	
2.4870	-16.3	V	3.0	39.5	1.0	-54.8	-13.0	-41.8	
3.3160	-21.9	V	3.0	40.1	1.0	-61.0	-13.0	-48.0	
1.6580	-25.7	H	3.0	39.1	1.0	-63.8	-13.0	-50.8	
2.4870	-10.3	H	3.0	39.5	1.0	-48.9	-13.0	-35.9	
3.3160	-22.3	H	3.0	40.1	1.0	-61.4	-13.0	-48.4	
Mid Channel (836.5MHz)									
1.6730	-21.9	V	3.0	39.1	1.0	-60.0	-13.0	-47.0	
2.5090	-16.8	V	3.0	39.5	1.0	-55.3	-13.0	-42.3	
3.3460	-22.2	V	3.0	40.1	1.0	-61.3	-13.0	-48.3	
1.6730	-23.9	H	3.0	39.1	1.0	-62.1	-13.0	-49.1	
2.5090	-9.9	H	3.0	39.5	1.0	-48.4	-13.0	-35.4	
3.3460	-22.6	H	3.0	40.1	1.0	-61.8	-13.0	-48.8	
High Channel (844MHz)									
1.6880	-21.9	V	3.0	39.1	1.0	-60.0	-13.0	-47.0	
2.5320	-16.5	V	3.0	39.5	1.0	-55.1	-13.0	-42.1	
3.3760	-22.6	V	3.0	40.2	1.0	-61.8	-13.0	-48.8	
1.6880	-22.0	H	3.0	39.1	1.0	-60.1	-13.0	-47.1	
2.5320	-14.4	H	3.0	39.5	1.0	-53.0	-13.0	-40.0	
3.3760	-22.9	H	3.0	40.2	1.0	-62.1	-13.0	-49.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 5 10MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-23-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (829MHz)									
1.6580	-20.0	V	3.0	39.1	1.0	-58.1	-13.0	-45.1	
2.4870	-16.8	V	3.0	39.5	1.0	-55.3	-13.0	-42.3	
3.3160	-22.1	V	3.0	40.1	1.0	-61.2	-13.0	-48.2	
1.6580	-26.2	H	3.0	39.1	1.0	-64.3	-13.0	-51.3	
2.4870	-12.4	H	3.0	39.5	1.0	-50.9	-13.0	-37.9	
3.3160	-22.3	H	3.0	40.1	1.0	-61.4	-13.0	-48.4	
Mid Channel (836.5MHz)									
1.6730	-22.7	V	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.5090	-18.1	V	3.0	39.5	1.0	-56.6	-13.0	-43.6	
3.3460	-22.3	V	3.0	40.1	1.0	-61.5	-13.0	-48.5	
1.6730	-24.1	H	3.0	39.1	1.0	-62.2	-13.0	-49.2	
2.5090	-11.6	H	3.0	39.5	1.0	-50.1	-13.0	-37.1	
3.3460	-22.6	H	3.0	40.1	1.0	-61.7	-13.0	-48.7	
High Channel (844MHz)									
1.6880	-22.8	V	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.5320	-18.3	V	3.0	39.5	1.0	-56.9	-13.0	-43.9	
3.3760	-22.6	V	3.0	40.2	1.0	-61.7	-13.0	-48.7	
1.6880	-23.5	H	3.0	39.1	1.0	-61.7	-13.0	-48.7	
2.5320	-15.2	H	3.0	39.5	1.0	-53.8	-13.0	-40.8	
3.3760	-22.8	H	3.0	40.2	1.0	-62.0	-13.0	-49.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 5

5MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 5MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-21.3	V	3.0	39.1	1.0	-59.4	-13.0	-46.4	
2.4790	-20.5	V	3.0	39.5	1.0	-59.0	-13.0	-46.0	
3.3060	-22.9	V	3.0	40.1	1.0	-62.0	-13.0	-49.0	
1.6530	-26.5	H	3.0	39.1	1.0	-64.6	-13.0	-51.6	
2.4790	-22.0	H	3.0	39.5	1.0	-60.5	-13.0	-47.5	
3.3060	-22.9	H	3.0	40.1	1.0	-62.0	-13.0	-49.0	
Mid Channel (836.5MHz)									
1.6730	-20.3	V	3.0	39.1	1.0	-58.4	-13.0	-45.4	
2.5090	-22.8	V	3.0	39.5	1.0	-61.3	-13.0	-48.3	
3.3460	-22.8	V	3.0	40.1	1.0	-61.9	-13.0	-48.9	
1.6730	-25.6	H	3.0	39.1	1.0	-63.7	-13.0	-50.7	
2.5090	-21.5	H	3.0	39.5	1.0	-60.1	-13.0	-47.1	
3.3460	-22.8	H	3.0	40.1	1.0	-61.9	-13.0	-48.9	
High Channel (846.5MHz)									
1.6930	-23.9	V	3.0	39.1	1.0	-62.0	-13.0	-49.0	
2.5390	-23.8	V	3.0	39.6	1.0	-62.3	-13.0	-49.3	
3.3860	-22.5	V	3.0	40.2	1.0	-61.6	-13.0	-48.6	
1.6930	-25.8	H	3.0	39.1	1.0	-64.0	-13.0	-51.0	
2.5390	-22.4	H	3.0	39.6	1.0	-61.0	-13.0	-48.0	
3.3860	-22.8	H	3.0	40.2	1.0	-62.0	-13.0	-49.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 5

5MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-22.3	V	3.0	39.1	1.0	-60.4	-13.0	-47.4	
2.4790	-21.2	V	3.0	39.5	1.0	-59.7	-13.0	-46.7	
3.3060	-23.1	V	3.0	40.1	1.0	-62.2	-13.0	-49.2	
1.6530	-26.7	H	3.0	39.1	1.0	-64.8	-13.0	-51.8	
2.4790	-22.3	H	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3060	-23.1	H	3.0	40.1	1.0	-62.2	-13.0	-49.2	
Mid Channel (836.5MHz)									
1.6730	-22.6	V	3.0	39.1	1.0	-60.7	-13.0	-47.7	
2.5090	-23.6	V	3.0	39.5	1.0	-62.2	-13.0	-49.2	
3.3460	-23.0	V	3.0	40.1	1.0	-62.2	-13.0	-49.2	
1.6730	-26.5	H	3.0	39.1	1.0	-64.6	-13.0	-51.6	
2.5090	-23.1	H	3.0	39.5	1.0	-61.6	-13.0	-48.6	
3.3460	-23.2	H	3.0	40.1	1.0	-62.3	-13.0	-49.3	
High Channel (846.5MHz)									
1.6930	-24.4	V	3.0	39.1	1.0	-62.5	-13.0	-49.5	
2.5390	-24.2	V	3.0	39.6	1.0	-62.8	-13.0	-49.8	
3.3860	-22.9	V	3.0	40.2	1.0	-62.1	-13.0	-49.1	
1.6930	-26.7	H	3.0	39.1	1.0	-64.8	-13.0	-51.8	
2.5390	-23.5	H	3.0	39.6	1.0	-62.1	-13.0	-49.1	
3.3860	-23.2	H	3.0	40.2	1.0	-62.4	-13.0	-49.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 5

3MHz

QPSK

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (825.5MHz)									
1.6510	-20.4	V	3.0	39.1	1.0	-58.5	-13.0	-45.5	
2.4765	-20.2	V	3.0	39.5	1.0	-58.7	-13.0	-45.7	
3.3020	-22.8	V	3.0	40.1	1.0	-61.9	-13.0	-48.9	
1.6510	-26.6	H	3.0	39.1	1.0	-64.7	-13.0	-51.7	
2.4765	-19.5	H	3.0	39.5	1.0	-58.0	-13.0	-45.0	
3.3020	-22.7	H	3.0	40.1	1.0	-61.8	-13.0	-48.8	
Mid Channel (836.5MHz)									
1.6730	-20.0	V	3.0	39.1	1.0	-58.1	-13.0	-45.1	
2.5090	-20.7	V	3.0	39.5	1.0	-59.3	-13.0	-46.3	
3.3460	-22.7	V	3.0	40.1	1.0	-61.8	-13.0	-48.8	
1.6730	-25.2	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.5090	-20.6	H	3.0	39.5	1.0	-59.2	-13.0	-46.2	
3.3460	-23.0	H	3.0	40.1	1.0	-62.1	-13.0	-49.1	
High Channel (847.5MHz)									
1.6950	-20.7	V	3.0	39.1	1.0	-58.8	-13.0	-45.8	
2.5425	-23.0	V	3.0	39.6	1.0	-61.6	-13.0	-48.6	
3.3900	-22.7	V	3.0	40.2	1.0	-61.9	-13.0	-48.9	
1.6950	-26.5	H	3.0	39.1	1.0	-64.6	-13.0	-51.6	
2.5425	-22.3	H	3.0	39.6	1.0	-60.8	-13.0	-47.8	
3.3900	-22.6	H	3.0	40.2	1.0	-61.8	-13.0	-48.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 5

3MHz

16QAM

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (825.5MHz)									
1.6510	-21.9	V	3.0	39.1	1.0	-60.0	-13.0	-47.0	
2.4765	-21.6	V	3.0	39.5	1.0	-60.1	-13.0	-47.1	
3.3020	-23.1	V	3.0	40.1	1.0	-62.2	-13.0	-49.2	
1.6510	-26.9	H	3.0	39.1	1.0	-65.0	-13.0	-52.0	
2.4765	-21.5	H	3.0	39.5	1.0	-60.0	-13.0	-47.0	
3.3020	-23.1	H	3.0	40.1	1.0	-62.2	-13.0	-49.2	
Mid Channel (836.5MHz)									
1.6730	-21.8	V	3.0	39.1	1.0	-59.9	-13.0	-46.9	
2.5090	-20.2	V	3.0	39.5	1.0	-58.7	-13.0	-45.7	
3.3460	-22.9	V	3.0	40.1	1.0	-62.1	-13.0	-49.1	
1.6730	-26.0	H	3.0	39.1	1.0	-64.1	-13.0	-51.1	
2.5090	-21.7	H	3.0	39.5	1.0	-60.3	-13.0	-47.3	
3.3460	-22.8	H	3.0	40.1	1.0	-61.9	-13.0	-48.9	
High Channel (847.5MHz)									
1.6950	-22.3	V	3.0	39.1	1.0	-60.4	-13.0	-47.4	
2.5425	-23.5	V	3.0	39.6	1.0	-62.1	-13.0	-49.1	
3.3900	-22.8	V	3.0	40.2	1.0	-62.0	-13.0	-49.0	
1.6950	-26.9	H	3.0	39.1	1.0	-65.0	-13.0	-52.0	
2.5425	-23.6	H	3.0	39.6	1.0	-62.1	-13.0	-49.1	
3.3900	-22.8	H	3.0	40.2	1.0	-62.0	-13.0	-49.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 5

1.4MHz

QPSK

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 1.4MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-19.2	V	3.0	39.1	1.0	-57.3	-13.0	-44.3	
2.4741	-20.7	V	3.0	39.5	1.0	-59.3	-13.0	-46.3	
3.2988	-23.0	V	3.0	40.1	1.0	-62.1	-13.0	-49.1	
1.6494	-27.5	H	3.0	39.1	1.0	-65.6	-13.0	-52.6	
2.4741	-20.0	H	3.0	39.5	1.0	-58.5	-13.0	-45.5	
3.2988	-22.9	H	3.0	40.1	1.0	-62.0	-13.0	-49.0	
Mid Channel (836.5MHz)									
1.6730	-22.9	V	3.0	39.1	1.0	-61.0	-13.0	-48.0	
2.5090	-21.6	V	3.0	39.5	1.0	-60.2	-13.0	-47.2	
3.3460	-22.7	V	3.0	40.1	1.0	-61.8	-13.0	-48.8	
1.6730	-24.5	H	3.0	39.1	1.0	-62.6	-13.0	-49.6	
2.5090	-19.4	H	3.0	39.5	1.0	-57.9	-13.0	-44.9	
3.3460	-22.6	H	3.0	40.1	1.0	-61.7	-13.0	-48.7	
High Channel (848.3MHz)									
1.6966	-18.9	V	3.0	39.1	1.0	-57.0	-13.0	-44.0	
2.5449	-23.2	V	3.0	39.6	1.0	-61.8	-13.0	-48.8	
3.3932	-22.4	V	3.0	40.2	1.0	-61.6	-13.0	-48.6	
1.6966	-25.7	H	3.0	39.1	1.0	-63.9	-13.0	-50.9	
2.5449	-20.3	H	3.0	39.6	1.0	-58.8	-13.0	-45.8	
3.3932	-22.2	H	3.0	40.2	1.0	-61.4	-13.0	-48.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 5

1.4MHz

16QAM

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-07-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, Y Position
Mode: TX, LTE BAND 5, 1.4MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-20.9	V	3.0	39.1	1.0	-59.0	-13.0	-46.0	
2.4741	-22.3	V	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.2988	-23.1	V	3.0	40.1	1.0	-62.2	-13.0	-49.2	
1.6494	-27.2	H	3.0	39.1	1.0	-65.3	-13.0	-52.3	
2.4741	-21.7	H	3.0	39.5	1.0	-60.2	-13.0	-47.2	
3.2988	-23.0	H	3.0	40.1	1.0	-62.1	-13.0	-49.1	
Mid Channel (836.5MHz)									
1.6730	-23.4	V	3.0	39.1	1.0	-61.5	-13.0	-48.5	
2.5090	-22.2	V	3.0	39.5	1.0	-60.7	-13.0	-47.7	
3.3460	-22.8	V	3.0	40.1	1.0	-62.0	-13.0	-49.0	
1.6730	-25.6	H	3.0	39.1	1.0	-63.8	-13.0	-50.8	
2.5090	-20.7	H	3.0	39.5	1.0	-59.3	-13.0	-46.3	
3.3460	-22.9	H	3.0	40.1	1.0	-62.1	-13.0	-49.1	
High Channel (848.3MHz)									
1.6966	-21.0	V	3.0	39.1	1.0	-59.1	-13.0	-46.1	
2.5449	-23.9	V	3.0	39.6	1.0	-62.4	-13.0	-49.4	
3.3932	-22.6	V	3.0	40.2	1.0	-61.8	-13.0	-48.8	
1.6966	-26.1	H	3.0	39.1	1.0	-64.2	-13.0	-51.2	
2.5449	-21.4	H	3.0	39.6	1.0	-60.0	-13.0	-47.0	
3.3932	-22.6	H	3.0	40.2	1.0	-61.8	-13.0	-48.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4

LTE Band 4 20MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 20MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1720MHz)									
3.4400	-8.9	V	3.0	40.2	1.0	-48.1	-13.0	-35.1	
5.1600	-10.4	V	3.0	40.9	1.0	-50.3	-13.0	-37.3	
6.8800	-14.2	V	3.0	41.0	1.0	-54.2	-13.0	-41.2	
3.4400	-12.4	H	3.0	40.2	1.0	-51.6	-13.0	-38.6	
5.1600	-13.7	H	3.0	40.9	1.0	-53.6	-13.0	-40.6	
6.8800	-12.5	H	3.0	41.0	1.0	-52.5	-13.0	-39.5	
Mid Channel (1732.5MHz)									
3.4650	-8.5	V	3.0	40.3	1.0	-47.7	-13.0	-34.7	
5.1975	-7.5	V	3.0	40.9	1.0	-47.4	-13.0	-34.4	
6.9300	-14.9	V	3.0	41.0	1.0	-54.9	-13.0	-41.9	
3.4650	-11.6	H	3.0	40.3	1.0	-50.9	-13.0	-37.9	
5.1975	-12.2	H	3.0	40.9	1.0	-52.0	-13.0	-39.0	
6.9300	-11.4	H	3.0	41.0	1.0	-51.4	-13.0	-38.4	
High Channel (1745MHz)									
3.4900	-7.2	V	3.0	40.3	1.0	-46.5	-13.0	-33.5	
5.2350	-9.3	V	3.0	40.9	1.0	-49.2	-13.0	-36.2	
6.9800	-14.8	V	3.0	41.0	1.0	-54.8	-13.0	-41.8	
3.4900	-8.4	H	3.0	40.3	1.0	-47.7	-13.0	-34.7	
5.2350	-9.5	H	3.0	40.9	1.0	-49.4	-13.0	-36.4	
6.9800	-11.9	H	3.0	41.0	1.0	-51.9	-13.0	-38.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 4 20MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 20MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1720MHz)									
3.4400	-10.7	V	3.0	40.2	1.0	-49.9	-13.0	-36.9	
5.1600	-11.8	V	3.0	40.9	1.0	-51.7	-13.0	-38.7	
6.8800	-14.9	V	3.0	41.0	1.0	-54.9	-13.0	-41.9	
3.4400	-14.0	H	3.0	40.2	1.0	-53.2	-13.0	-40.2	
5.1600	-16.1	H	3.0	40.9	1.0	-56.0	-13.0	-43.0	
6.8800	-13.7	H	3.0	41.0	1.0	-53.7	-13.0	-40.7	
Mid Channel (1732.5MHz)									
3.4650	-9.2	V	3.0	40.3	1.0	-48.4	-13.0	-35.4	
5.1975	-9.6	V	3.0	40.9	1.0	-49.5	-13.0	-36.5	
6.9300	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.4650	-10.7	H	3.0	40.3	1.0	-49.9	-13.0	-36.9	
5.1975	-12.5	H	3.0	40.9	1.0	-52.4	-13.0	-39.4	
6.9300	-12.1	H	3.0	41.0	1.0	-52.1	-13.0	-39.1	
High Channel (1745MHz)									
3.4900	-8.9	V	3.0	40.3	1.0	-48.2	-13.0	-35.2	
5.2350	-8.1	V	3.0	40.9	1.0	-48.0	-13.0	-35.0	
6.9800	-15.0	V	3.0	41.0	1.0	-55.0	-13.0	-42.0	
3.4900	-10.3	H	3.0	40.3	1.0	-49.5	-13.0	-36.5	
5.2350	-11.1	H	3.0	40.9	1.0	-51.0	-13.0	-38.0	
6.9800	-13.1	H	3.0	41.0	1.0	-53.1	-13.0	-40.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4

15MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX LTE BAND 4, 15MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1717.5MHz)									
3.4350	-9.0	V	3.0	40.2	1.0	-48.2	-13.0	-35.2	
5.1525	-11.3	V	3.0	40.9	1.0	-51.2	-13.0	-38.2	
6.8700	-14.9	V	3.0	41.0	1.0	-54.8	-13.0	-41.8	
3.4350	-11.5	H	3.0	40.2	1.0	-50.8	-13.0	-37.8	
5.1525	-12.9	H	3.0	40.9	1.0	-52.8	-13.0	-39.8	
6.8700	-11.9	H	3.0	41.0	1.0	-51.9	-13.0	-38.9	
Mid Channel (1732.5MHz)									
3.4650	-8.5	V	3.0	40.3	1.0	-47.8	-13.0	-34.8	
5.1975	-11.0	V	3.0	40.9	1.0	-50.9	-13.0	-37.9	
6.9300	-16.2	V	3.0	41.0	1.0	-56.2	-13.0	-43.2	
3.4650	-12.7	H	3.0	40.3	1.0	-52.0	-13.0	-39.0	
5.1975	-14.1	H	3.0	40.9	1.0	-53.9	-13.0	-40.9	
6.9300	-15.3	H	3.0	41.0	1.0	-55.3	-13.0	-42.3	
High Channel (1747.5MHz)									
3.4950	-5.7	V	3.0	40.3	1.0	-45.0	-13.0	-32.0	
5.2425	-9.4	V	3.0	40.9	1.0	-49.3	-13.0	-36.3	
6.9900	-16.5	V	3.0	41.0	1.0	-56.5	-13.0	-43.5	
3.4950	-10.6	H	3.0	40.3	1.0	-49.9	-13.0	-36.9	
5.2425	-11.1	H	3.0	40.9	1.0	-50.9	-13.0	-37.9	
6.9900	-12.8	H	3.0	41.0	1.0	-52.8	-13.0	-39.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 4

15MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 15MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1717.5MHz)									
3.4350	-10.7	V	3.0	40.2	1.0	-50.0	-13.0	-37.0	
5.1525	-12.4	V	3.0	40.9	1.0	-52.3	-13.0	-39.3	
6.8700	-15.1	V	3.0	41.0	1.0	-55.1	-13.0	-42.1	
3.4350	-10.3	H	3.0	40.2	1.0	-49.5	-13.0	-36.5	
5.1525	-14.5	H	3.0	40.9	1.0	-54.4	-13.0	-41.4	
6.8700	-12.7	H	3.0	41.0	1.0	-52.6	-13.0	-39.6	
Mid Channel (1732.5MHz)									
3.4650	-10.1	V	3.0	40.3	1.0	-49.4	-13.0	-36.4	
5.1975	-13.1	V	3.0	40.9	1.0	-53.0	-13.0	-40.0	
6.9300	-16.2	V	3.0	41.0	1.0	-56.2	-13.0	-43.2	
3.4650	-10.9	H	3.0	40.3	1.0	-50.2	-13.0	-37.2	
5.1975	-15.5	H	3.0	40.9	1.0	-55.4	-13.0	-42.4	
6.9300	-14.7	H	3.0	41.0	1.0	-54.7	-13.0	-41.7	
High Channel (1747.5MHz)									
3.4950	-8.1	V	3.0	40.3	1.0	-47.4	-13.0	-34.4	
5.2425	-11.7	V	3.0	40.9	1.0	-51.5	-13.0	-38.5	
6.9900	-16.5	V	3.0	41.0	1.0	-56.5	-13.0	-43.5	
3.4950	-12.5	H	3.0	40.3	1.0	-51.8	-13.0	-38.8	
5.2425	-13.8	H	3.0	40.9	1.0	-53.7	-13.0	-40.7	
6.9900	-13.8	H	3.0	41.0	1.0	-53.8	-13.0	-40.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4

10MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX LTE BAND 4, 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1715MHz)									
3.4300	-9.5	V	3.0	40.2	1.0	-48.7	-13.0	-35.7	
5.1450	-12.1	V	3.0	40.9	1.0	-52.0	-13.0	-39.0	
6.8600	-13.6	V	3.0	41.0	1.0	-53.5	-13.0	-40.5	
3.4300	-11.3	H	3.0	40.2	1.0	-50.5	-13.0	-37.5	
5.1450	-12.5	H	3.0	40.9	1.0	-52.4	-13.0	-39.4	
6.8600	-11.4	H	3.0	41.0	1.0	-51.4	-13.0	-38.4	
Mid Channel (1732.5MHz)									
3.4650	-7.8	V	3.0	40.3	1.0	-47.1	-13.0	-34.1	
5.1975	-10.5	V	3.0	40.9	1.0	-50.4	-13.0	-37.4	
6.9300	-15.6	V	3.0	41.0	1.0	-55.6	-13.0	-42.6	
3.4650	-11.8	H	3.0	40.3	1.0	-51.0	-13.0	-38.0	
5.1975	-11.4	H	3.0	40.9	1.0	-51.3	-13.0	-38.3	
6.9300	-15.6	H	3.0	41.0	1.0	-55.6	-13.0	-42.6	
High Channel (1750MHz)									
3.5000	-6.6	V	3.0	40.3	1.0	-45.8	-13.0	-32.8	
5.2500	-9.2	V	3.0	40.9	1.0	-49.1	-13.0	-36.1	
7.0000	-15.1	V	3.0	41.0	1.0	-55.1	-13.0	-42.1	
3.5000	-10.8	H	3.0	40.3	1.0	-50.1	-13.0	-37.1	
5.2500	-12.0	H	3.0	40.9	1.0	-51.9	-13.0	-38.9	
7.0000	-12.5	H	3.0	41.0	1.0	-52.5	-13.0	-39.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 4

10MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX LTE BAND 4, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1715MHz)									
3.4300	-10.6	V	3.0	40.2	1.0	-49.9	-13.0	-36.9	
5.1450	-13.7	V	3.0	40.9	1.0	-53.6	-13.0	-40.6	
6.8600	-14.2	V	3.0	41.0	1.0	-54.2	-13.0	-41.2	
3.4300	-12.6	H	3.0	40.2	1.0	-51.9	-13.0	-38.9	
5.1450	-14.2	H	3.0	40.9	1.0	-54.1	-13.0	-41.1	
6.8600	-11.7	H	3.0	41.0	1.0	-51.7	-13.0	-38.7	
Mid Channel (1732.5MHz)									
3.4650	-9.7	V	3.0	40.3	1.0	-48.9	-13.0	-35.9	
5.1975	-12.1	V	3.0	40.9	1.0	-52.0	-13.0	-39.0	
6.9300	-15.8	V	3.0	41.0	1.0	-55.8	-13.0	-42.8	
3.4650	-13.3	H	3.0	40.3	1.0	-52.6	-13.0	-39.6	
5.1975	-13.0	H	3.0	40.9	1.0	-52.9	-13.0	-39.9	
6.9300	-15.6	H	3.0	41.0	1.0	-55.6	-13.0	-42.6	
High Channel (1750MHz)									
3.5000	-8.1	V	3.0	40.3	1.0	-47.4	-13.0	-34.4	
5.2500	-10.9	V	3.0	40.9	1.0	-50.8	-13.0	-37.8	
7.0000	-15.5	V	3.0	41.0	1.0	-55.6	-13.0	-42.6	
3.5000	-12.4	H	3.0	40.3	1.0	-51.7	-13.0	-38.7	
5.2500	-13.4	H	3.0	40.9	1.0	-53.2	-13.0	-40.2	
7.0000	-13.1	H	3.0	41.0	1.0	-53.1	-13.0	-40.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4 5MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1712.5MHz)									
3.4250	-8.9	V	3.0	40.2	1.0	-48.1	-13.0	-35.1	
5.1375	-11.6	V	3.0	40.9	1.0	-51.5	-13.0	-38.5	
6.8500	-14.6	V	3.0	41.0	1.0	-54.6	-13.0	-41.6	
3.4250	-11.8	H	3.0	40.2	1.0	-51.1	-13.0	-38.1	
5.1375	-15.1	H	3.0	40.9	1.0	-55.0	-13.0	-42.0	
6.8500	-10.4	H	3.0	41.0	1.0	-50.4	-13.0	-37.4	
Mid Channel (1732.5MHz)									
3.4650	-7.2	V	3.0	40.3	1.0	-46.5	-13.0	-33.5	
5.1975	-11.1	V	3.0	40.9	1.0	-51.0	-13.0	-38.0	
6.9300	-16.3	V	3.0	41.0	1.0	-56.3	-13.0	-43.3	
3.4650	-13.1	H	3.0	40.3	1.0	-52.3	-13.0	-39.3	
5.1975	-15.0	H	3.0	40.9	1.0	-54.8	-13.0	-41.8	
6.9300	-12.8	H	3.0	41.0	1.0	-52.8	-13.0	-39.8	
High Channel (1752.5MHz)									
3.5050	-7.0	V	3.0	40.3	1.0	-46.3	-13.0	-33.3	
5.2575	-9.5	V	3.0	40.9	1.0	-49.3	-13.0	-36.3	
7.0100	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.5050	-12.1	H	3.0	40.3	1.0	-51.4	-13.0	-38.4	
5.2575	-13.1	H	3.0	40.9	1.0	-53.0	-13.0	-40.0	
7.0100	-12.1	H	3.0	41.0	1.0	-52.1	-13.0	-39.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 4 5MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 02-29-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 7, 5MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1712.5MHz)									
3.4250	-10.5	V	3.0	40.2	1.0	-49.7	-13.0	-36.7	
5.1375	-13.7	V	3.0	40.9	1.0	-53.6	-13.0	-40.6	
6.8500	-15.0	V	3.0	41.0	1.0	-55.0	-13.0	-42.0	
3.4250	-13.7	H	3.0	40.2	1.0	-52.9	-13.0	-39.9	
5.1375	-16.2	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
6.8500	-11.7	H	3.0	41.0	1.0	-51.7	-13.0	-38.7	
Mid Channel (1732.5MHz)									
3.4650	-8.8	V	3.0	40.3	1.0	-48.0	-13.0	-35.0	
5.1975	-13.1	V	3.0	40.9	1.0	-53.0	-13.0	-40.0	
6.9300	-16.2	V	3.0	41.0	1.0	-56.2	-13.0	-43.2	
3.4650	-14.6	H	3.0	40.3	1.0	-53.8	-13.0	-40.8	
5.1975	-16.1	H	3.0	40.9	1.0	-56.0	-13.0	-43.0	
6.9300	-13.7	H	3.0	41.0	1.0	-53.7	-13.0	-40.7	
High Channel (1752.5MHz)									
3.5050	-9.1	V	3.0	40.3	1.0	-48.4	-13.0	-35.4	
5.2575	-12.1	V	3.0	40.9	1.0	-52.0	-13.0	-39.0	
7.0100	-15.7	V	3.0	41.0	1.0	-55.7	-13.0	-42.7	
3.5050	-13.2	H	3.0	40.3	1.0	-52.5	-13.0	-39.5	
5.2575	-14.8	H	3.0	40.9	1.0	-54.6	-13.0	-41.6	
7.0100	-12.8	H	3.0	41.0	1.0	-52.8	-13.0	-39.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4 3MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-02-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1711.5MHz)									
3.4230	-8.9	V	3.0	40.2	1.0	-48.1	-13.0	-35.1	
5.1345	-6.5	V	3.0	40.9	1.0	-46.4	-13.0	-33.4	
6.8460	-15.4	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.4230	-12.4	H	3.0	40.2	1.0	-51.6	-13.0	-38.6	
5.1345	-7.7	H	3.0	40.9	1.0	-47.6	-13.0	-34.6	
6.8460	-13.1	H	3.0	41.0	1.0	-53.1	-13.0	-40.1	
Mid Channel (1732.5MHz)									
3.4650	-7.2	V	3.0	40.3	1.0	-46.5	-13.0	-33.5	
5.1975	-7.4	V	3.0	40.9	1.0	-47.3	-13.0	-34.3	
6.9300	-15.1	V	3.0	41.0	1.0	-55.1	-13.0	-42.1	
3.4650	-11.1	H	3.0	40.3	1.0	-50.3	-13.0	-37.3	
5.1975	-6.4	H	3.0	40.9	1.0	-46.3	-13.0	-33.3	
6.9300	-13.0	H	3.0	41.0	1.0	-53.0	-13.0	-40.0	
High Channel (1753.5MHz)									
3.5070	-6.9	V	3.0	40.3	1.0	-46.2	-13.0	-33.2	
5.2605	-8.7	V	3.0	40.9	1.0	-48.5	-13.0	-35.5	
7.0140	-15.7	V	3.0	41.0	1.0	-55.7	-13.0	-42.7	
3.5070	-8.3	H	3.0	40.3	1.0	-47.5	-13.0	-34.5	
5.2605	-4.2	H	3.0	40.9	1.0	-44.1	-13.0	-31.1	
7.0140	-13.7	H	3.0	41.0	1.0	-53.7	-13.0	-40.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 4 3MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-02-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1711.5MHz)									
3.4230	-9.8	V	3.0	40.2	1.0	-49.0	-13.0	-36.0	
5.1345	-8.3	V	3.0	40.9	1.0	-48.2	-13.0	-35.2	
6.8460	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.4230	-13.4	H	3.0	40.2	1.0	-52.6	-13.0	-39.6	
5.1345	-9.6	H	3.0	40.9	1.0	-49.5	-13.0	-36.5	
6.8460	-13.5	H	3.0	41.0	1.0	-53.5	-13.0	-40.5	
Mid Channel (1732.5MHz)									
3.4650	-8.7	V	3.0	40.3	1.0	-47.9	-13.0	-34.9	
5.1975	-9.2	V	3.0	40.9	1.0	-49.1	-13.0	-36.1	
6.9300	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.4650	-12.9	H	3.0	40.3	1.0	-52.2	-13.0	-39.2	
5.1975	-9.9	H	3.0	40.9	1.0	-49.8	-13.0	-36.8	
6.9300	-13.3	H	3.0	41.0	1.0	-53.3	-13.0	-40.3	
High Channel (1752.5MHz)									
3.5070	-5.9	V	3.0	40.3	1.0	-45.2	-13.0	-32.2	
5.2605	-5.5	V	3.0	40.9	1.0	-45.4	-13.0	-32.4	
7.0140	-15.8	V	3.0	41.0	1.0	-55.8	-13.0	-42.8	
3.5070	-9.4	H	3.0	40.3	1.0	-48.7	-13.0	-35.7	
5.2605	-7.3	H	3.0	40.9	1.0	-47.2	-13.0	-34.2	
7.0140	-14.2	H	3.0	41.0	1.0	-54.2	-13.0	-41.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4

1.4MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-02-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 1.4MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1710.7MHz)									
3.4214	-8.9	V	3.0	40.2	1.0	-48.1	-13.0	-35.1	
5.1321	-6.8	V	3.0	40.9	1.0	-46.7	-13.0	-33.7	
6.8428	-14.5	V	3.0	41.0	1.0	-54.4	-13.0	-41.4	
3.4214	-12.7	H	3.0	40.2	1.0	-51.9	-13.0	-38.9	
5.1321	-6.7	H	3.0	40.9	1.0	-46.6	-13.0	-33.6	
6.8428	-13.8	H	3.0	41.0	1.0	-53.8	-13.0	-40.8	
Mid Channel (1732.5MHz)									
3.4650	-8.7	V	3.0	40.3	1.0	-48.0	-13.0	-35.0	
5.1975	-7.1	V	3.0	40.9	1.0	-46.9	-13.0	-33.9	
6.9300	-15.5	V	3.0	41.0	1.0	-55.5	-13.0	-42.5	
3.4650	-11.4	H	3.0	40.3	1.0	-50.7	-13.0	-37.7	
5.1975	-7.0	H	3.0	40.9	1.0	-46.8	-13.0	-33.8	
6.9300	-12.8	H	3.0	41.0	1.0	-52.8	-13.0	-39.8	
High Channel (1754.3MHz)									
3.5086	-5.6	V	3.0	40.3	1.0	-44.9	-13.0	-31.9	
5.2629	-6.5	V	3.0	40.9	1.0	-46.3	-13.0	-33.3	
7.0172	-14.9	V	3.0	41.0	1.0	-54.9	-13.0	-41.9	
3.5086	-11.2	H	3.0	40.3	1.0	-50.5	-13.0	-37.5	
5.2629	-4.4	H	3.0	40.9	1.0	-44.2	-13.0	-31.2	
7.0172	-14.2	H	3.0	41.0	1.0	-54.2	-13.0	-41.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 4

1.4MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-02-16
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 1.4MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1710.7MHz)									
3.4214	-10.6	V	3.0	40.2	1.0	-49.9	-13.0	-36.9	
5.1321	-9.4	V	3.0	40.9	1.0	-49.3	-13.0	-36.3	
6.8428	-14.9	V	3.0	41.0	1.0	-54.9	-13.0	-41.9	
3.4214	-13.5	H	3.0	40.2	1.0	-52.7	-13.0	-39.7	
5.1321	-8.9	H	3.0	40.9	1.0	-48.8	-13.0	-35.8	
6.8428	-14.3	H	3.0	41.0	1.0	-54.3	-13.0	-41.3	
Mid Channel (1732.5MHz)									
3.4650	-9.9	V	3.0	40.3	1.0	-49.2	-13.0	-36.2	
5.1975	-8.2	V	3.0	40.9	1.0	-48.1	-13.0	-35.1	
6.9300	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.4650	-12.6	H	3.0	40.3	1.0	-51.9	-13.0	-38.9	
5.1975	-5.9	H	3.0	40.9	1.0	-45.7	-13.0	-32.7	
6.9300	-13.4	H	3.0	41.0	1.0	-53.4	-13.0	-40.4	
High Channel (1754.3MHz)									
3.5086	-7.1	V	3.0	40.3	1.0	-46.4	-13.0	-33.4	
5.2629	-8.3	V	3.0	40.9	1.0	-48.2	-13.0	-35.2	
7.0172	-15.3	V	3.0	41.0	1.0	-55.3	-13.0	-42.3	
3.5086	-12.5	H	3.0	40.3	1.0	-51.8	-13.0	-38.8	
5.2629	-6.6	H	3.0	40.9	1.0	-46.4	-13.0	-33.4	
7.0172	-14.8	H	3.0	41.0	1.0	-54.8	-13.0	-41.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 2

LTE Band 2 20MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 2, 20MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1860MHz)									
3.7200	-3.8	V	3.0	40.5	1.0	-43.3	-13.0	-30.3	
5.5800	-4.9	V	3.0	40.8	1.0	-44.7	-13.0	-31.7	
7.4400	-14.6	V	3.0	40.8	1.0	-54.3	-13.0	-41.3	
3.7200	-9.9	H	3.0	40.5	1.0	-49.4	-13.0	-36.4	
5.5800	-2.3	H	3.0	40.8	1.0	-42.1	-13.0	-29.1	
7.4400	-13.3	H	3.0	40.8	1.0	-53.0	-13.0	-40.0	
Mid Channel (1880MHz)									
3.7600	-4.9	V	3.0	40.5	1.0	-44.5	-13.0	-31.5	
5.6400	-3.2	V	3.0	40.8	1.0	-43.0	-13.0	-30.0	
7.5200	-14.4	V	3.0	40.7	1.0	-54.1	-13.0	-41.1	
3.7600	-8.5	H	3.0	40.5	1.0	-48.1	-13.0	-35.1	
5.6400	-3.3	H	3.0	40.8	1.0	-43.1	-13.0	-30.1	
7.520	-12.3	H	3.0	40.7	1.0	-52.0	-13.0	-39.0	
High Channel (1900MHz)									
3.8000	-2.7	V	3.0	40.6	1.0	-42.3	-13.0	-29.3	
5.7000	-3.9	V	3.0	40.8	1.0	-43.7	-13.0	-30.7	
7.6000	-13.9	V	3.0	40.7	1.0	-53.6	-13.0	-40.6	
3.8000	-6.5	H	3.0	40.6	1.0	-46.1	-13.0	-33.1	
5.7000	3.5	H	3.0	40.8	1.0	-36.3	-13.0	-23.3	
7.6000	-12.5	H	3.0	40.7	1.0	-52.2	-13.0	-39.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 2 20MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 2, 20MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1860MHz)									
3.7200	-5.6	V	3.0	40.5	1.0	-45.1	-13.0	-32.1	
5.5800	-7.2	V	3.0	40.8	1.0	-47.0	-13.0	-34.0	
7.4400	-15.5	V	3.0	40.8	1.0	-55.3	-13.0	-42.3	
3.7200	-11.6	H	3.0	40.5	1.0	-51.1	-13.0	-38.1	
5.5800	-5.0	H	3.0	40.8	1.0	-44.8	-13.0	-31.8	
7.4400	-14.3	H	3.0	40.8	1.0	-54.0	-13.0	-41.0	
Mid Channel (1880MHz)									
3.7600	-6.0	V	3.0	40.5	1.0	-45.6	-13.0	-32.6	
5.6400	-4.5	V	3.0	40.8	1.0	-44.3	-13.0	-31.3	
7.5200	-14.8	V	3.0	40.7	1.0	-54.5	-13.0	-41.5	
3.7600	-9.6	H	3.0	40.5	1.0	-49.1	-13.0	-36.1	
5.6400	-4.3	H	3.0	40.8	1.0	-44.1	-13.0	-31.1	
7.5200	-12.2	H	3.0	40.7	1.0	-51.9	-13.0	-38.9	
High Channel (1900MHz)									
3.8000	-4.1	V	3.0	40.6	1.0	-43.7	-13.0	-30.7	
5.7000	-1.7	V	3.0	40.8	1.0	-41.5	-13.0	-28.5	
7.6000	-14.4	V	3.0	40.7	1.0	-54.0	-13.0	-41.0	
3.8000	-5.0	H	3.0	40.6	1.0	-44.5	-13.0	-31.5	
5.7000	1.4	H	3.0	40.8	1.0	-38.4	-13.0	-25.4	
7.6000	-13.4	H	3.0	40.7	1.0	-53.0	-13.0	-40.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2

15MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 2, 15MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1857.5MHz)									
3.7150	-4.1	V	3.0	40.5	1.0	-43.6	-13.0	-30.6	
5.5725	-7.8	V	3.0	40.8	1.0	-47.6	-13.0	-34.6	
7.4300	-15.7	V	3.0	40.8	1.0	-55.4	-13.0	-42.4	
3.7150	-10.3	H	3.0	40.5	1.0	-49.8	-13.0	-36.8	
5.5725	-4.4	H	3.0	40.8	1.0	-44.3	-13.0	-31.3	
7.4300	-12.9	H	3.0	40.8	1.0	-52.7	-13.0	-39.7	
Mid Channel (1880MHz)									
3.7600	-4.5	V	3.0	40.5	1.0	-44.1	-13.0	-31.1	
5.6400	-4.3	V	3.0	40.8	1.0	-44.1	-13.0	-31.1	
7.5200	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
3.7600	-8.8	H	3.0	40.5	1.0	-48.3	-13.0	-35.3	
5.6400	-1.2	H	3.0	40.8	1.0	-41.0	-13.0	-28.0	
7.5200	-12.3	H	3.0	40.7	1.0	-52.0	-13.0	-39.0	
High Channel (1902.5MHz)									
3.8050	-7.8	V	3.0	40.6	1.0	-47.4	-13.0	-34.4	
5.7075	-0.6	V	3.0	40.8	1.0	-40.4	-13.0	-27.4	
7.6100	-15.1	V	3.0	40.7	1.0	-54.8	-13.0	-41.8	
3.8050	-4.4	H	3.0	40.6	1.0	-44.0	-13.0	-31.0	
5.7075	3.2	H	3.0	40.8	1.0	-36.6	-13.0	-23.6	
7.6100	-13.3	H	3.0	40.7	1.0	-53.0	-13.0	-40.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 2

15MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 2, 15MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1857.5MHz)									
3.7150	-5.5	V	3.0	40.5	1.0	-45.0	-13.0	-32.0	
5.5725	-8.3	V	3.0	40.8	1.0	-48.1	-13.0	-35.1	
7.4300	-15.4	V	3.0	40.8	1.0	-55.2	-13.0	-42.2	
3.7150	-11.9	H	3.0	40.5	1.0	-51.4	-13.0	-38.4	
5.5725	-5.9	H	3.0	40.8	1.0	-45.7	-13.0	-32.7	
7.4300	-13.5	H	3.0	40.8	1.0	-53.2	-13.0	-40.2	
Mid Channel (1880MHz)									
3.7600	-6.6	V	3.0	40.5	1.0	-46.2	-13.0	-33.2	
5.6400	-6.4	V	3.0	40.8	1.0	-46.2	-13.0	-33.2	
7.5200	-15.1	V	3.0	40.7	1.0	-54.8	-13.0	-41.8	
3.7600	-10.2	H	3.0	40.5	1.0	-49.7	-13.0	-36.7	
5.6400	-4.7	H	3.0	40.8	1.0	-44.5	-13.0	-31.5	
7.5200	-13.4	H	3.0	40.7	1.0	-53.1	-13.0	-40.1	
High Channel (1902.5MHz)									
3.8050	-3.8	V	3.0	40.6	1.0	-43.4	-13.0	-30.4	
5.7075	-3.2	V	3.0	40.8	1.0	-43.0	-13.0	-30.0	
7.6100	-14.8	V	3.0	40.7	1.0	-54.5	-13.0	-41.5	
3.8050	-6.3	H	3.0	40.6	1.0	-45.9	-13.0	-32.9	
5.7075	1.5	H	3.0	40.8	1.0	-38.3	-13.0	-25.3	
7.6100	-14.2	H	3.0	40.7	1.0	-53.9	-13.0	-40.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2

10MHz

QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX LTE BAND 2, 10MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1855MHz)									
3.7100	-5.5	V	3.0	40.5	1.0	-45.0	-13.0	-32.0	
5.5650	-6.8	V	3.0	40.8	1.0	-46.6	-13.0	-33.6	
7.4200	-15.9	V	3.0	40.8	1.0	-55.7	-13.0	-42.7	
3.7100	-11.3	H	3.0	40.5	1.0	-50.8	-13.0	-37.8	
5.5650	-5.0	H	3.0	40.8	1.0	-44.8	-13.0	-31.8	
7.4200	-12.8	H	3.0	40.8	1.0	-52.6	-13.0	-39.6	
Mid Channel (1880MHz)									
3.7600	-4.1	V	3.0	40.5	1.0	-43.6	-13.0	-30.6	
5.6400	-3.5	V	3.0	40.8	1.0	-43.3	-13.0	-30.3	
7.5200	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
3.7600	-7.6	H	3.0	40.5	1.0	-47.1	-13.0	-34.1	
5.6400	-3.4	H	3.0	40.8	1.0	-43.2	-13.0	-30.2	
7.5200	-12.7	H	3.0	40.7	1.0	-52.4	-13.0	-39.4	
High Channel (1905MHz)									
3.8100	-1.7	V	3.0	40.6	1.0	-41.2	-13.0	-28.2	
5.7150	2.4	V	3.0	40.8	1.0	-37.4	-13.0	-24.4	
7.6200	-15.3	V	3.0	40.7	1.0	-55.0	-13.0	-42.0	
3.8100	-4.9	H	3.0	40.6	1.0	-44.5	-13.0	-31.5	
5.7150	6.0	H	3.0	40.8	1.0	-33.8	-13.0	-20.8	
7.620	-12.3	H	3.0	40.7	1.0	-52.0	-13.0	-39.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE

Band 2

10MHz

16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K22866
Date: 03-08-16
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX LTE BAND 2, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1855MHz)									
3.7100	-7.4	V	3.0	40.5	1.0	-46.9	-13.0	-33.9	
5.5650	-7.6	V	3.0	40.8	1.0	-47.4	-13.0	-34.4	
7.4200	-16.4	V	3.0	40.8	1.0	-56.2	-13.0	-43.2	
3.7100	-12.4	H	3.0	40.5	1.0	-51.9	-13.0	-38.9	
5.5650	-6.7	H	3.0	40.8	1.0	-46.5	-13.0	-33.5	
7.4200	-14.3	H	3.0	40.8	1.0	-54.1	-13.0	-41.1	
Mid Channel (1880MHz)									
3.7600	-5.5	V	3.0	40.5	1.0	-45.0	-13.0	-32.0	
5.6400	-5.3	V	3.0	40.8	1.0	-45.1	-13.0	-32.1	
7.5200	-15.1	V	3.0	40.7	1.0	-54.8	-13.0	-41.8	
3.7600	-9.2	H	3.0	40.5	1.0	-48.7	-13.0	-35.7	
5.6400	-1.1	H	3.0	40.8	1.0	-40.9	-13.0	-27.9	
7.5200	-13.3	H	3.0	40.7	1.0	-53.0	-13.0	-40.0	
High Channel (1905MHz)									
3.8100	-4.7	V	3.0	40.6	1.0	-44.3	-13.0	-31.3	
5.7150	-1.5	V	3.0	40.8	1.0	-41.3	-13.0	-28.3	
7.6200	-15.5	V	3.0	40.7	1.0	-55.1	-13.0	-42.1	
3.8100	-6.4	H	3.0	40.6	1.0	-46.0	-13.0	-33.0	
5.7150	3.8	H	3.0	40.8	1.0	-36.0	-13.0	-23.0	
7.6200	-12.9	H	3.0	40.7	1.0	-52.5	-13.0	-39.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.