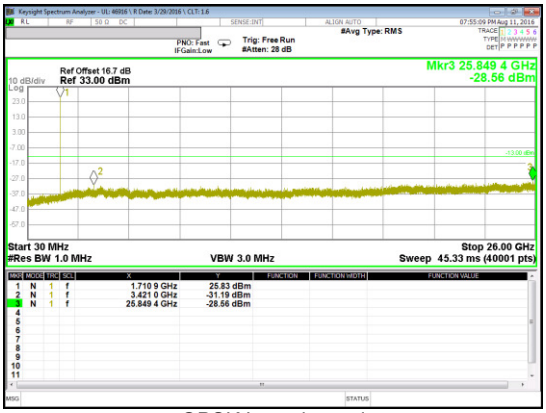
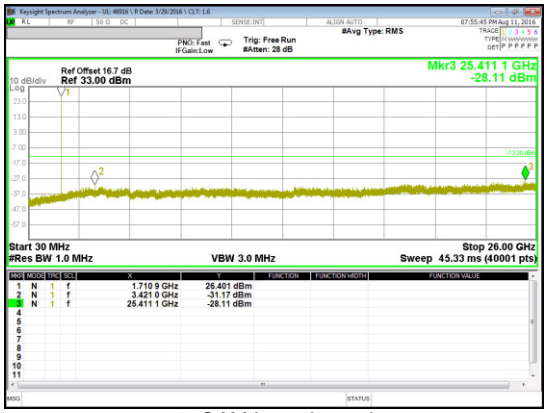
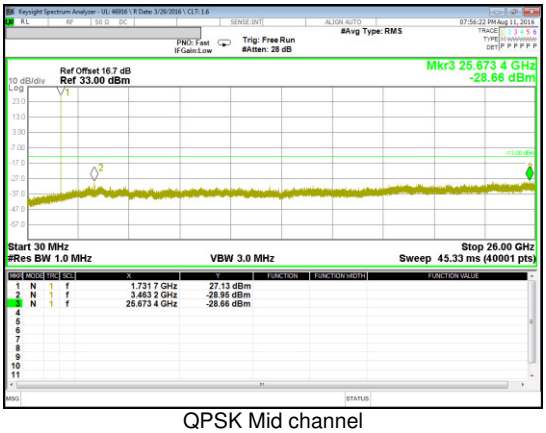
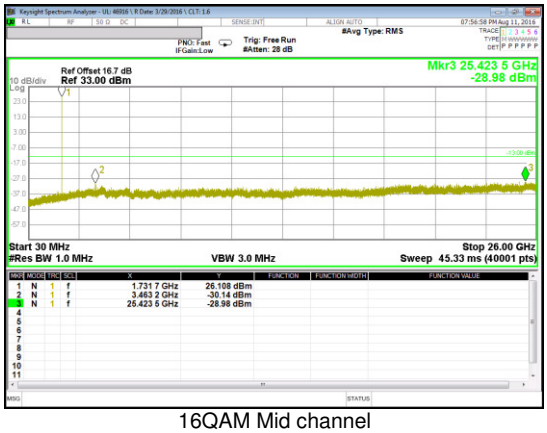
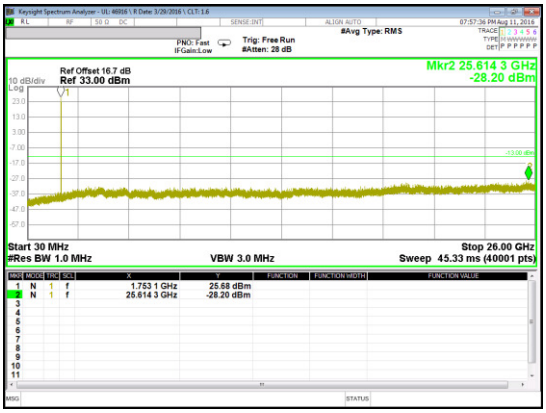
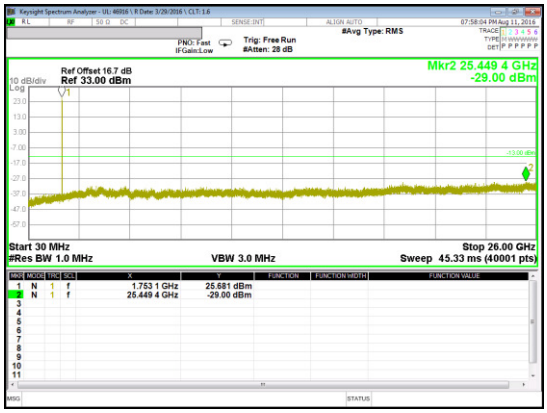
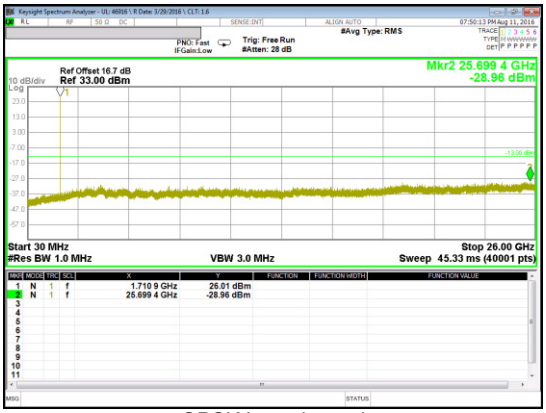
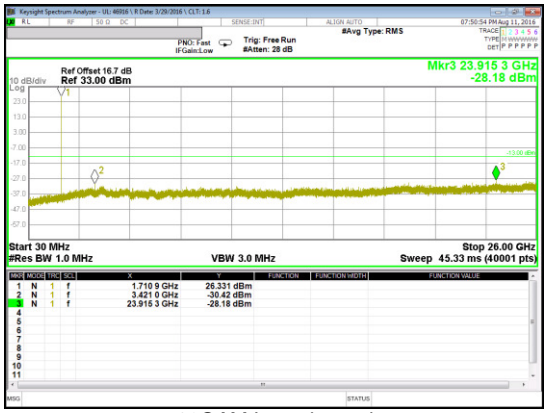
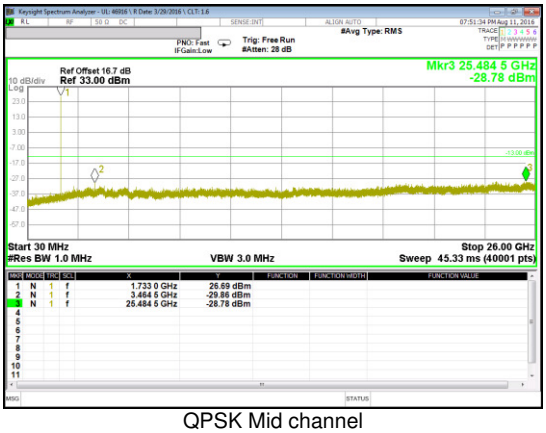
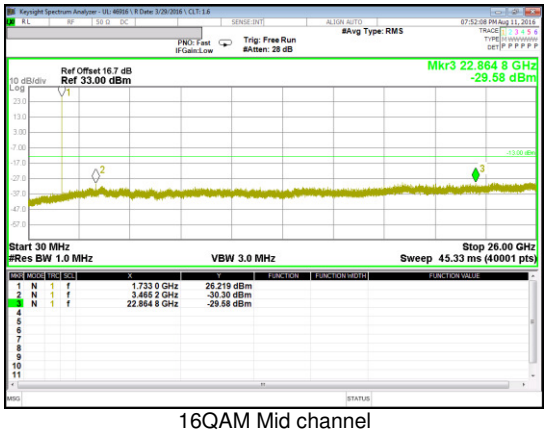
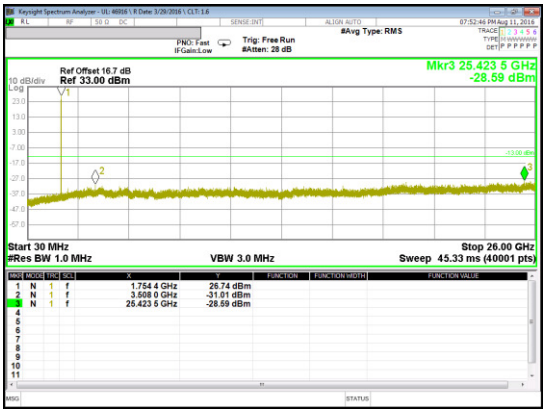
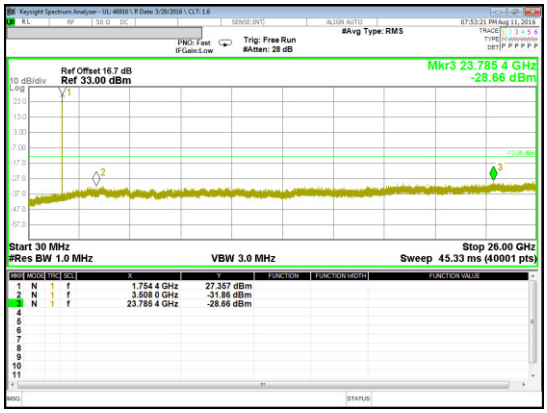
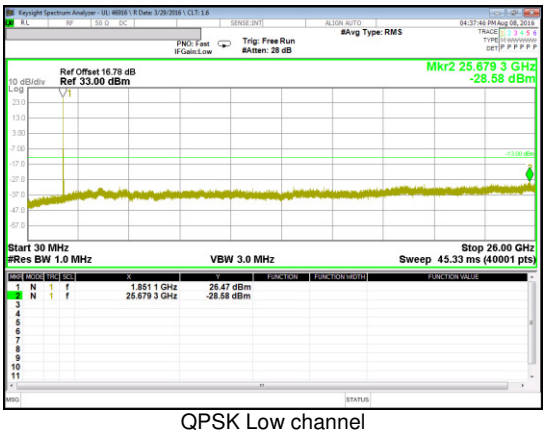
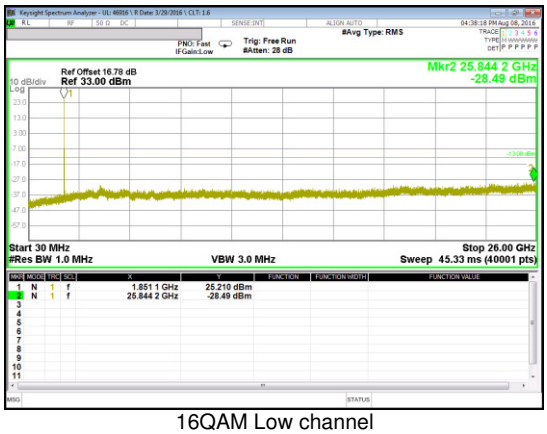
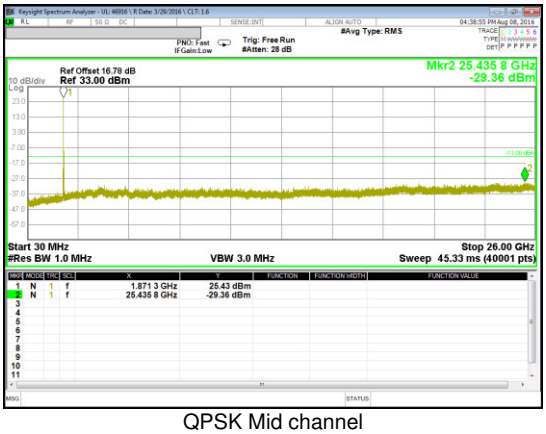
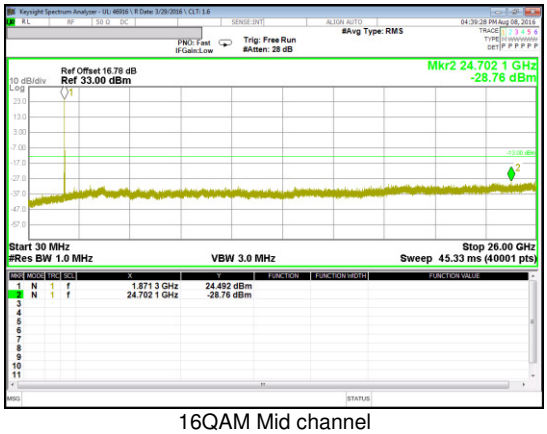
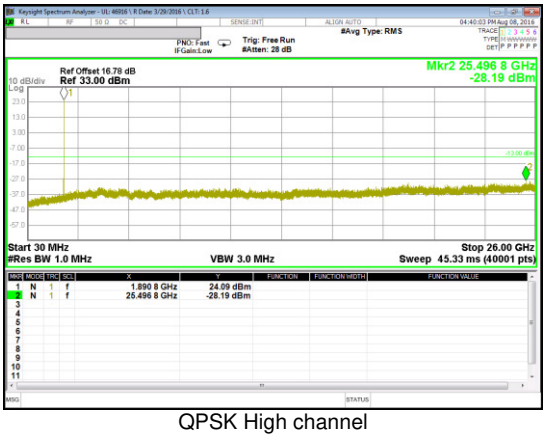
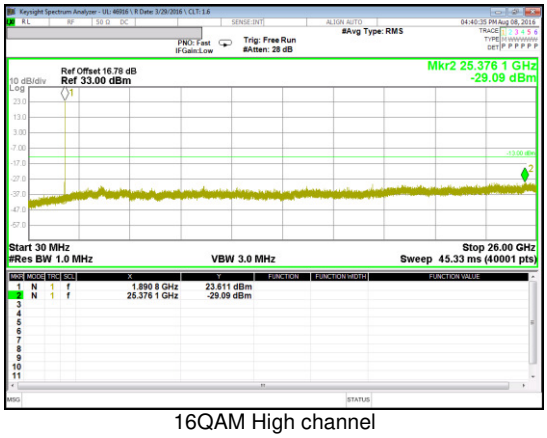
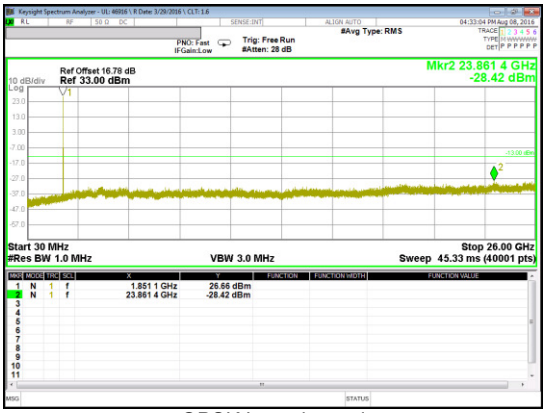
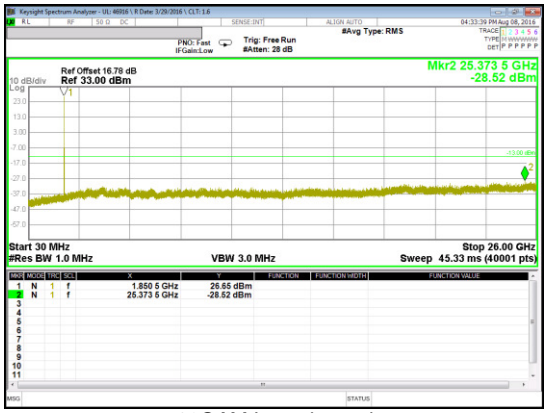
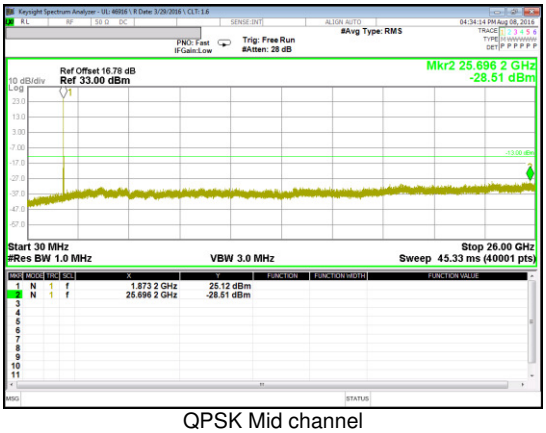
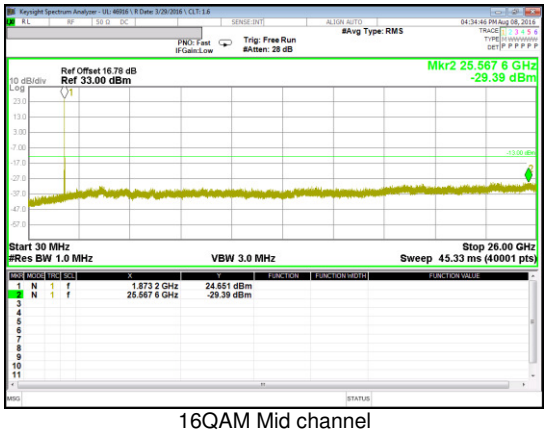
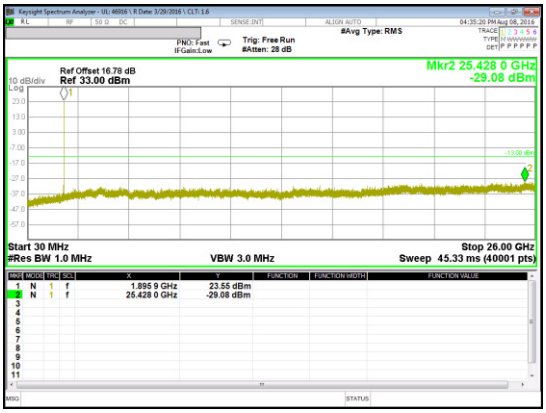
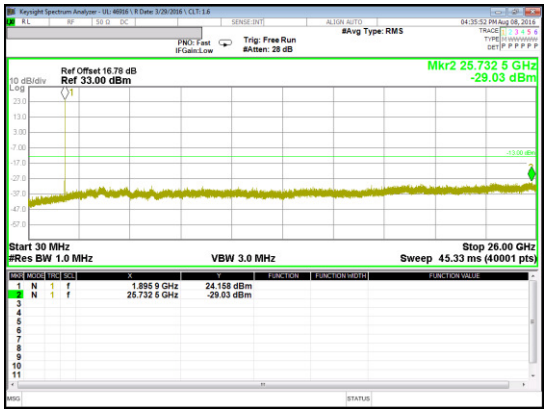
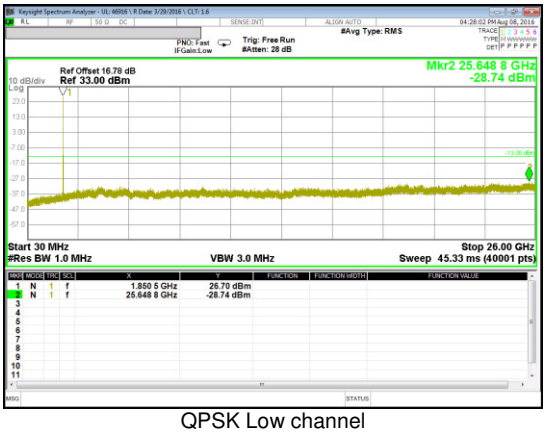
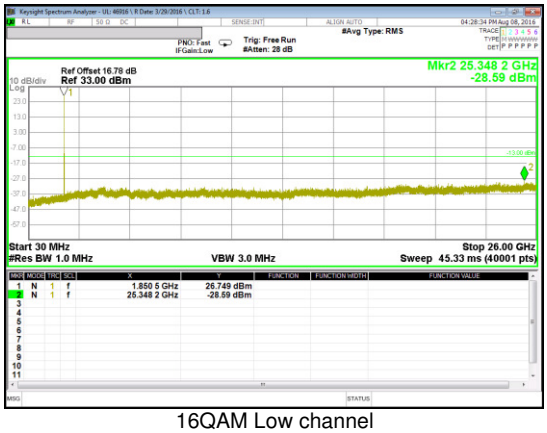
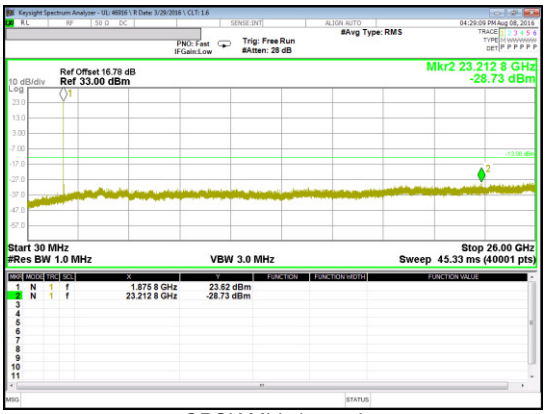
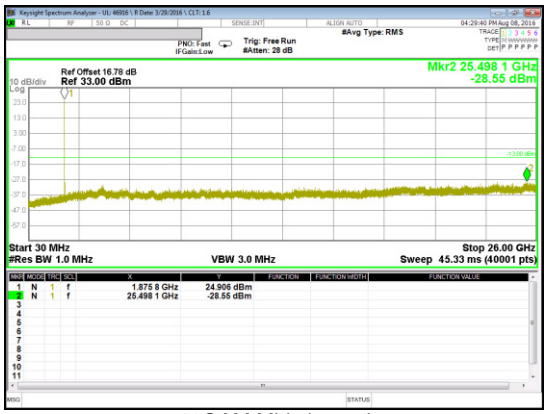
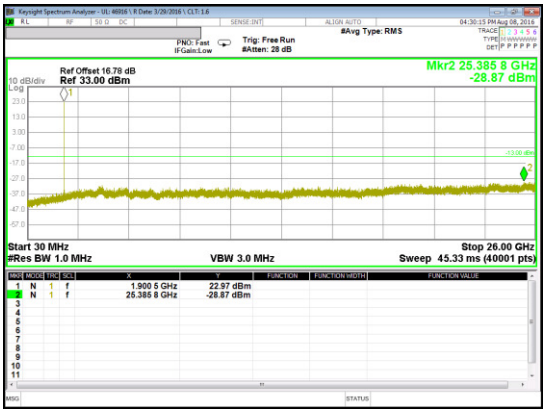
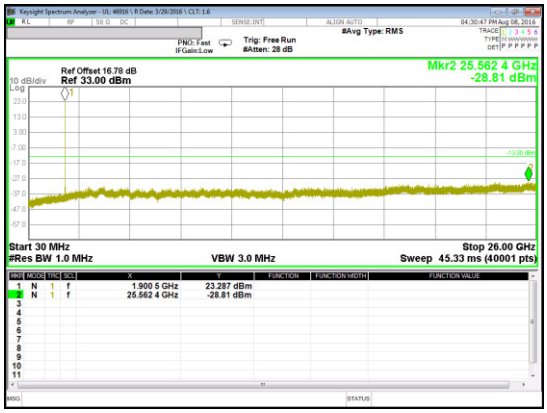
Band 4 3MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

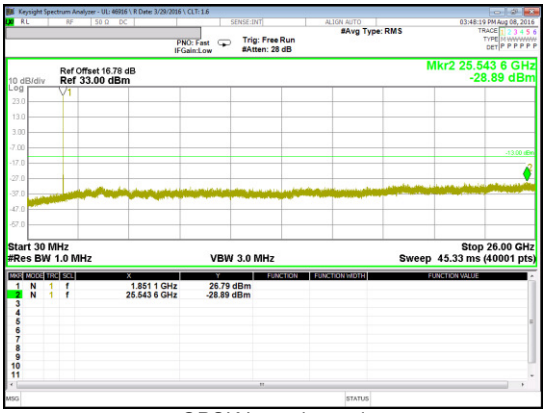
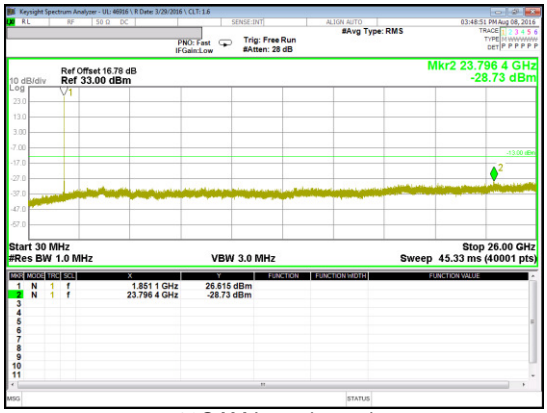
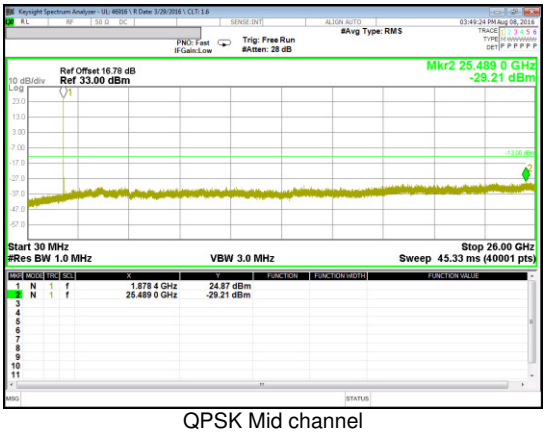
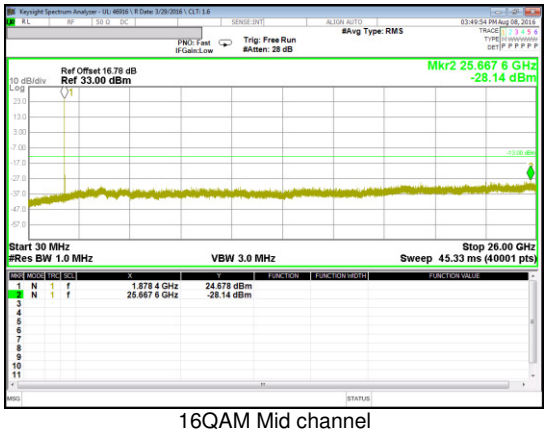
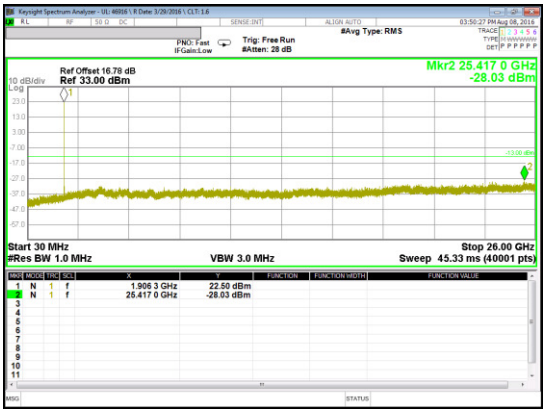
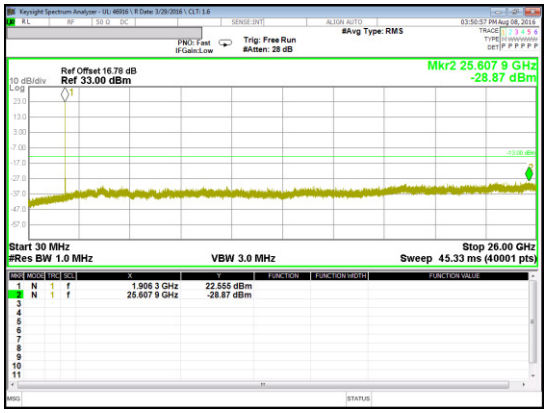
Band 4 1.4MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

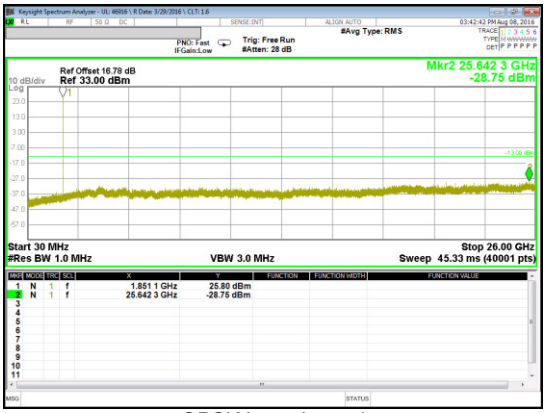
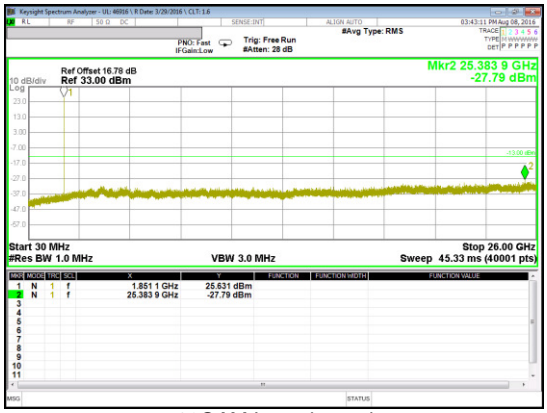
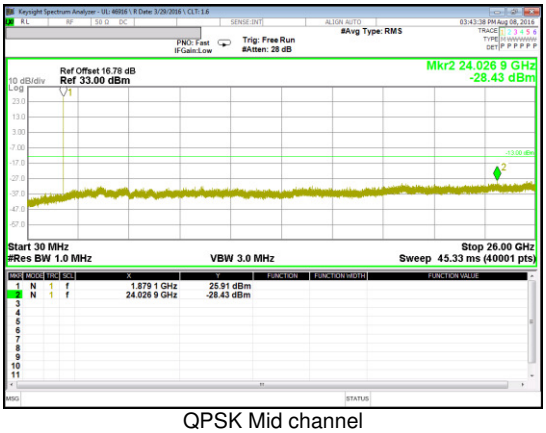
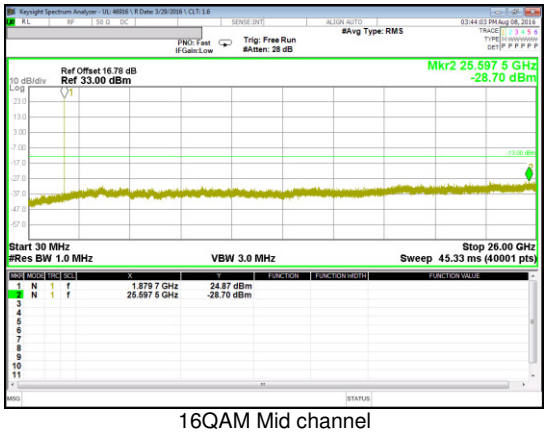
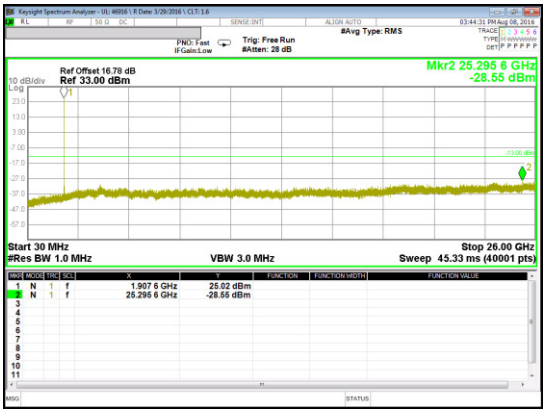
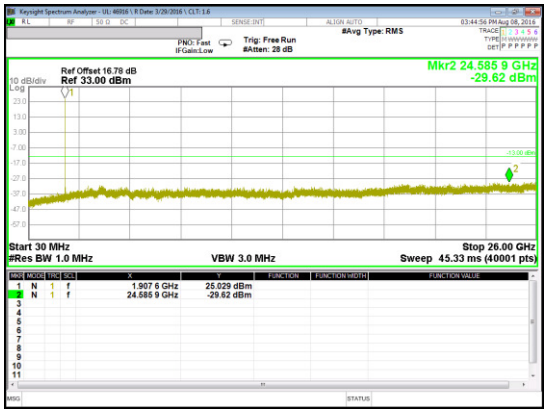
LTE Band 2

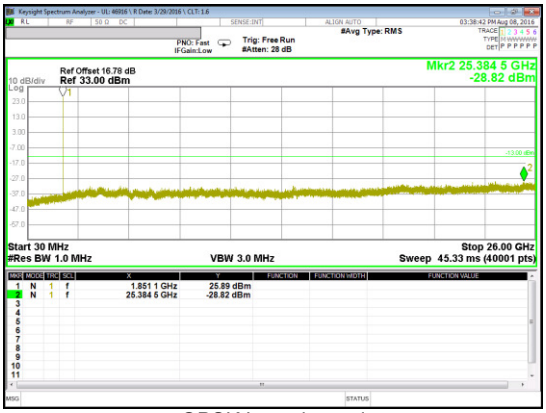
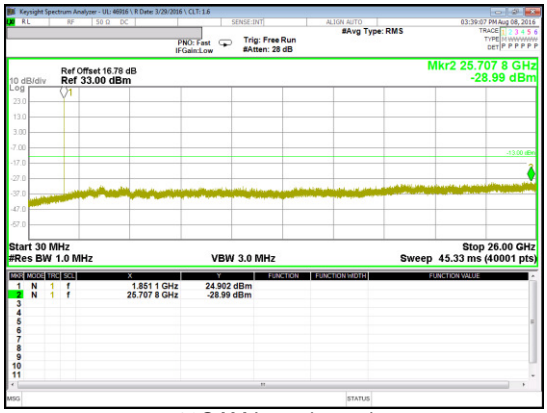
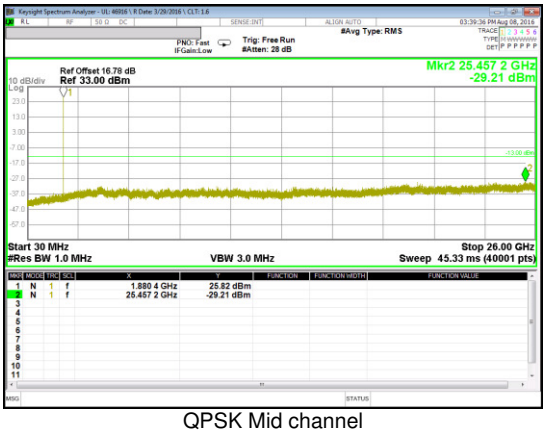
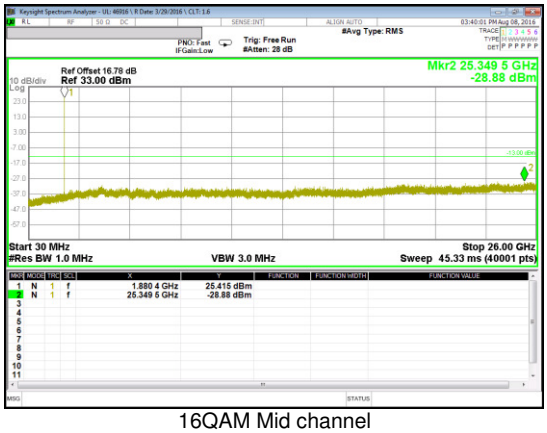
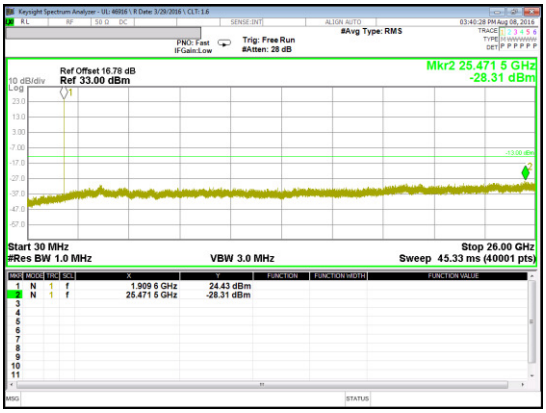
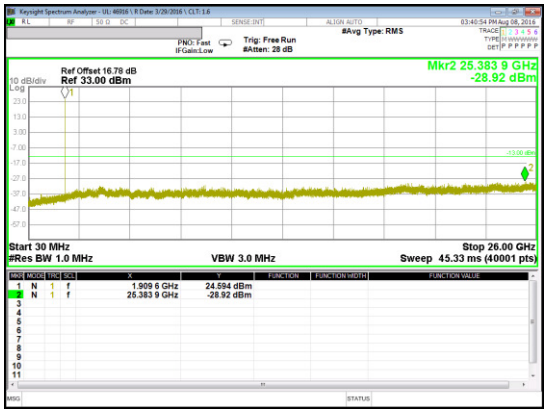
Band 2 20MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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

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

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

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

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

10.4. 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.

10.4.1. FREQUENCY STABILITY RESULTS

LTE Band 5, Channel 20524, Frequency 836.5 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	836.49999516	-0.001	2.5
3.80	40	836.49999631	-0.003	2.5
3.80	30	836.49999617	-0.002	2.5
3.80	***20***	836.49999413	***0***	***2.5***
3.80	10	836.49999602	-0.002	2.5
3.80	0	836.49999561	-0.002	2.5
3.80	-10	836.49999477	-0.001	2.5
3.80	-20	836.49999512	-0.001	2.5
3.80	-30	836.49999466	-0.001	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***	**836.49999413**	***0***	***2.5***
4.20	20	836.49999574	-0.002	2.5
3.40	20	836.49999481	-0.001	2.5

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	836.60000414	0.001	2.5
3.80	40	836.60000346	0.002	2.5
3.80	30	836.60000392	0.001	2.5
3.80	***20***	836.60000494	***0***	***2.5***
3.80	10	836.60000526	0.000	2.5
3.80	0	836.60000487	0.000	2.5
3.80	-10	836.60000468	0.000	2.5
3.80	-20	836.60000688	-0.002	2.5
3.80	-30	836.60000456	0.000	2.5

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	***20***	**836.60000494**	***0***	***2.5***
4.20	20	836.60000464	0.000	2.5
3.40	20	836.60000381	0.001	2.5

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency : GSM850 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	836.60001685	0.011	2.5
3.80	40	836.60001556	0.012	2.5
3.80	30	836.60001640	0.011	2.5
3.80	***20***	836.60002596	***0***	***2.5***
3.80	10	836.60002361	0.003	2.5
3.80	0	836.60002260	0.004	2.5
3.80	-10	836.60002412	0.002	2.5
3.80	-20	836.60002202	0.005	2.5
3.80	-30	836.60002315	0.003	2.5

Reference Frequency : GSM850 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	***20***	**836.60002596**	***0***	***2.5***
4.20	20	836.60002512	0.001	2.5
3.80	20	836.60002496	0.001	2.5

LTE Band 4, Channel 20174, Frequency 1732.5 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	1732.50000988	0.001	2.5
3.80	40	1732.50000953	0.001	2.5
3.80	30	1732.50000837	0.002	2.5
3.80	***20***	1732.50001100	***0***	***2.5***
3.80	10	1732.50001070	0.000	2.5
3.80	0	1732.50000866	0.001	2.5
3.80	-10	1732.50000824	0.002	2.5
3.80	-20	1732.50000945	0.001	2.5
3.80	-30	1732.50000710	0.002	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***	**1732.50001100**	***0***	***2.5***
4.20	20	1732.50001040	0.000	2.5
3.40	20	1732.50001123	0.000	2.5

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	1732.60000718	0.001	2.5
3.80	40	1732.60000850	0.000	2.5
3.80	30	1732.60000868	0.000	2.5
3.80	***20***	1732.60000877	***0***	***2.5***
3.80	10	1732.60000940	0.000	2.5
3.80	0	1732.60001076	-0.001	2.5
3.80	-10	1732.60001333	-0.003	2.5
3.80	-20	1732.60001491	-0.004	2.5
3.80	-30	1732.60001681	-0.005	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***	**1732.60000877**	***0***	***2.5***
4.20	20	1732.60000689	0.001	2.5
3.40	20	1732.60000748	0.001	2.5

LTE Band 2, Channel 18900, Frequency 1880.0 MHz

Reference Frequency: LTE Band 2 Mid Channel 1880 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	1879.99998765	0.000	2.5
3.80	40	1879.99998993	-0.001	2.5
3.80	30	1879.99998863	-0.001	2.5
3.80	***20***	1879.99998728	***0***	***2.5***
3.80	10	1879.99998732	0.000	2.5
3.80	0	1879.99998948	-0.001	2.5
3.80	-10	1879.99999019	-0.002	2.5
3.80	-20	1879.99999030	-0.002	2.5
3.80	-30	1879.99998798	0.000	2.5

Reference Frequency: LTE Band 2 Mid Channel 1880 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***	**1879.99998728**	***0***	***2.5***
4.20	20	1879.99998858	-0.001	2.5
3.40	20	1879.99998880	-0.001	2.5

WCDMA Band 2, Channel 9400, Frequency 1880.0 MHz

Reference Frequency: WCDMA 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	1880.00001135	-0.001	2.5
3.80	40	1880.00001171	-0.001	2.5
3.80	30	1880.00001129	-0.001	2.5
3.80	***20***	1880.00001019	***0***	***2.5***
3.80	10	1880.00001045	0.000	2.5
3.80	0	1880.00001011	0.000	2.5
3.80	-10	1880.00000986	0.000	2.5
3.80	-20	1880.00000846	0.001	2.5
3.80	-30	1880.00000717	0.002	2.5

Reference Frequency: WCDMA 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***	**1880.00001019**	***0***	***2.5***
4.20	20	1880.00000787	0.001	2.5
3.40	20	1880.00000916	0.001	2.5

GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: GSM1900 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	1880.00001198	0.002	2.5
3.80	40	1880.00001262	0.002	2.5
3.80	30	1880.00001452	0.001	2.5
3.80	***20***	1880.00001566	***0***	***2.5***
3.80	10	1880.00001635	0.000	2.5
3.80	0	1880.00001897	-0.002	2.5
3.80	-10	1880.00001866	-0.002	2.5
3.80	-20	1880.00002285	-0.004	2.5
3.80	-30	1880.00002444	-0.005	2.5

Reference Frequency: GSM1900 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***	**1880.00001566**	***0***	***2.5***
4.20	20	1880.00001508	0.000	2.5
3.80	20	1880.00001453	0.001	2.5

11. RADIATED TEST RESULTS

11.1. 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

ANSI / TIA / EIA 603D Clause 2.2.12; ESU40 setting reference to 971168 D01 v02r02

For peak power measurement with a ESU40:

a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = auto couple;

e) Detector = peak;

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

g) Trace mode = max hold;

RESULTS

11.1.1. SPURIOUS RADIATION PLOTS

GSM 850

GSM

GSM850
GPRS

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

Company: Wisol
Project #: 16K23790
Date: 09-07-16
Test Engineer: YH Lim
Configuration: EUT , X 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	-4.8	V	3.0	39.1	1.0	-42.9	-13.0	-29.9	
2.4726	-8.4	V	3.0	39.5	1.0	-46.9	-13.0	-33.9	
3.2968	-22.5	V	3.0	40.1	1.0	-61.6	-13.0	-48.6	
1.6484	-6.4	H	3.0	39.1	1.0	-44.5	-13.0	-31.5	
2.4726	-15.1	H	3.0	39.5	1.0	-53.6	-13.0	-40.6	
3.2968	-23.4	H	3.0	40.1	1.0	-62.5	-13.0	-49.5	
Mid Ch, 836.6MHz									
1.6730	-12.6	V	3.0	39.1	1.0	-50.8	-13.0	-37.8	
2.5098	-17.5	V	3.0	39.5	1.0	-56.0	-13.0	-43.0	
3.3464	-20.3	V	3.0	40.1	1.0	-59.4	-13.0	-46.4	
1.6730	-8.8	H	3.0	39.1	1.0	-46.9	-13.0	-33.9	
2.5098	-18.4	H	3.0	39.5	1.0	-57.0	-13.0	-44.0	
3.3464	-22.2	H	3.0	40.1	1.0	-61.3	-13.0	-48.3	
High Ch, 848.8MHz									
1.6976	-16.6	V	3.0	39.1	1.0	-54.7	-13.0	-41.7	
2.5466	-11.5	V	3.0	39.6	1.0	-50.1	-13.0	-37.1	
3.3952	-17.7	V	3.0	40.2	1.0	-56.9	-13.0	-43.9	
1.6976	-14.7	H	3.0	39.1	1.0	-52.8	-13.0	-39.8	
2.5466	-18.9	H	3.0	39.6	1.0	-57.5	-13.0	-44.5	
3.3952	-20.0	H	3.0	40.2	1.0	-59.2	-13.0	-46.2	

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

GSM 1900

GSM

GSM1900
GPR

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

Company: Wisol
Project #: 16K23790
Date: 09-07-16
Test Engineer: YH Lim
Configuration: EUT , X 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	-3.8	V	3.0	40.5	1.0	-43.2	-13.0	-30.2	
5.5506	4.4	V	3.0	40.8	1.0	-35.4	-13.0	-22.4	
7.4008	-2.2	V	3.0	40.8	1.0	-42.0	-13.0	-29.0	
3.7004	-6.6	H	3.0	40.5	1.0	-46.1	-13.0	-33.1	
5.5506	2.5	H	3.0	40.8	1.0	-37.3	-13.0	-24.3	
7.4008	-7.6	H	3.0	40.8	1.0	-47.4	-13.0	-34.4	
Mid Ch, 1880.0MHz									
3.7600	-4.8	V	3.0	40.5	1.0	-44.4	-13.0	-31.4	
5.6400	2.8	V	3.0	40.8	1.0	-37.0	-13.0	-24.0	
7.5200	0.3	V	3.0	40.7	1.0	-39.4	-13.0	-26.4	
3.7600	-10.0	H	3.0	40.5	1.0	-49.5	-13.0	-36.5	
5.6400	1.8	H	3.0	40.8	1.0	-38.0	-13.0	-25.0	
7.5200	-7.6	H	3.0	40.7	1.0	-47.3	-13.0	-34.3	
High Ch, 1909.8 MHz									
3.8196	0.4	V	3.0	40.6	1.0	-39.2	-13.0	-26.2	
5.7294	4.5	V	3.0	40.8	1.0	-35.3	-13.0	-22.3	
7.6392	1.8	V	3.0	40.7	1.0	-37.8	-13.0	-24.8	
3.8196	-6.5	H	3.0	40.6	1.0	-46.1	-13.0	-33.1	
5.7294	2.3	H	3.0	40.8	1.0	-37.5	-13.0	-24.5	
7.6392	-3.2	H	3.0	40.7	1.0	-42.9	-13.0	-29.9	

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

WCDMA B5

WCDMA

Band 5
REL99

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

Company: Wisol
Project #: 16K23790
Date: 09-07-16
Test Engineer: YH Lim
Configuration: EUT / X 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	-24.1	V	3.0	39.1	1.0	-62.2	-13.0	-49.2	
2.4790	-21.3	V	3.0	39.5	1.0	-59.8	-13.0	-46.8	
3.3056	-19.4	V	3.0	40.1	1.0	-58.5	-13.0	-45.5	
1.6520	-24.6	H	3.0	39.1	1.0	-62.7	-13.0	-49.7	
2.4790	-22.6	H	3.0	39.5	1.0	-61.1	-13.0	-48.1	
3.3056	-20.8	H	3.0	40.1	1.0	-59.9	-13.0	-46.9	
Mid Ch, 836.6MHz									
1.6732	-22.6	V	3.0	39.1	1.0	-60.8	-13.0	-47.8	
2.5098	-21.8	V	3.0	39.5	1.0	-60.3	-13.0	-47.3	
3.3464	-19.9	V	3.0	40.1	1.0	-59.0	-13.0	-46.0	
1.6732	-24.3	H	3.0	39.1	1.0	-62.4	-13.0	-49.4	
2.5098	-22.9	H	3.0	39.5	1.0	-61.4	-13.0	-48.4	
3.3464	-20.7	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
High Ch, 846.6MHz									
1.6932	-23.1	V	3.0	39.1	1.0	-61.2	-13.0	-48.2	
2.5390	-21.9	V	3.0	39.6	1.0	-60.5	-13.0	-47.5	
3.3860	-20.3	V	3.0	40.2	1.0	-59.5	-13.0	-46.5	
1.6932	-24.5	H	3.0	39.1	1.0	-62.6	-13.0	-49.6	
2.5390	-22.7	H	3.0	39.6	1.0	-61.3	-13.0	-48.3	
3.3860	-20.8	H	3.0	40.2	1.0	-60.0	-13.0	-47.0	

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: Wisol
Project #: 16K23790
Date: 09-07-16
Test Engineer: YH Lim
Configuration: EUT / X 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	-24.4	V	3.0	39.1	1.0	-62.5	-13.0	-49.5	
2.4790	-21.9	V	3.0	39.5	1.0	-60.4	-13.0	-47.4	
3.3056	-20.1	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
1.6520	-24.6	H	3.0	39.1	1.0	-62.7	-13.0	-49.7	
2.4790	-22.8	H	3.0	39.5	1.0	-61.3	-13.0	-48.3	
3.3056	-20.7	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
Mid Ch, 836.6MHz									
1.6732	-22.3	V	3.0	39.1	1.0	-60.4	-13.0	-47.4	
2.5098	-21.7	V	3.0	39.5	1.0	-60.2	-13.0	-47.2	
3.3464	-20.1	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
1.6732	-24.4	H	3.0	39.1	1.0	-62.5	-13.0	-49.5	
2.5098	-22.1	H	3.0	39.5	1.0	-60.6	-13.0	-47.6	
3.3464	-20.6	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
High Ch, 846.6MHz									
1.6932	-22.7	V	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.5390	-21.7	V	3.0	39.6	1.0	-60.2	-13.0	-47.2	
3.3860	-20.0	V	3.0	40.2	1.0	-59.2	-13.0	-46.2	
1.6932	-24.3	H	3.0	39.1	1.0	-62.5	-13.0	-49.5	
2.5390	-22.4	H	3.0	39.6	1.0	-60.9	-13.0	-47.9	
3.3860	-20.4	H	3.0	40.2	1.0	-59.6	-13.0	-46.6	

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

WCDMA B4

WCDMA

Band 4
REL99

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

Company: Wisol
Project #: 16K23790
Date: 08-31-16
Test Engineer: JH Park
Configuration: EUT / X Position
Mode: Tx, REL99,1700MHz

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: 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	-3.5	V	3.0	40.2	1.0	-42.7	-13.0	-29.7	
5.1372	-5.0	V	3.0	40.9	1.0	-44.9	-13.0	-31.9	
6.8496	1.2	V	3.0	41.0	1.0	-38.8	-13.0	-25.8	
3.4248	-3.3	H	3.0	40.2	1.0	-42.5	-13.0	-29.5	
5.1372	-8.0	H	3.0	40.9	1.0	-47.9	-13.0	-34.9	
6.8496	-3.5	H	3.0	41.0	1.0	-43.5	-13.0	-30.5	
Mid Ch, 1732.6MHz									
3.4652	-1.4	V	3.0	40.3	1.0	-40.7	-13.0	-27.7	
5.1978	-6.5	V	3.0	40.9	1.0	-46.4	-13.0	-33.4	
6.9304	1.3	V	3.0	41.0	1.0	-38.7	-13.0	-25.7	
3.4652	-3.8	H	3.0	40.3	1.0	-43.1	-13.0	-30.1	
5.1978	-9.5	H	3.0	40.9	1.0	-49.4	-13.0	-36.4	
6.9304	-4.0	H	3.0	41.0	1.0	-44.0	-13.0	-31.0	
High Ch, 1752.6MHz									
3.5052	-5.9	V	3.0	40.3	1.0	-45.2	-13.0	-32.2	
5.2578	-5.9	V	3.0	40.9	1.0	-45.8	-13.0	-32.8	
7.0104	-0.4	V	3.0	41.0	1.0	-40.4	-13.0	-27.4	
3.5052	-4.0	H	3.0	40.3	1.0	-43.2	-13.0	-30.2	
5.2578	-11.2	H	3.0	40.9	1.0	-51.1	-13.0	-38.1	
7.0104	-5.4	H	3.0	41.0	1.0	-45.4	-13.0	-32.4	

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: Wisol
Project #: 16K23790
Date: 08-31-16
Test Engineer: JH Park
Configuration: EUT / X Position
Mode: Tx, HSDPA,1700MHz

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: 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	-2.3	V	3.0	40.2	1.0	-41.5	-13.0	-28.5	
5.1372	-6.4	V	3.0	40.9	1.0	-46.3	-13.0	-33.3	
6.8496	1.4	V	3.0	41.0	1.0	-38.6	-13.0	-25.6	
3.4248	-1.6	H	3.0	40.2	1.0	-40.8	-13.0	-27.8	
5.1372	-8.5	H	3.0	40.9	1.0	-48.4	-13.0	-35.4	
6.8496	-7.3	H	3.0	41.0	1.0	-47.3	-13.0	-34.3	
Mid Ch, 1732.6MHz									
3.4652	-4.4	V	3.0	40.3	1.0	-43.7	-13.0	-30.7	
5.1978	-8.2	V	3.0	40.9	1.0	-48.1	-13.0	-35.1	
6.9304	-1.3	V	3.0	41.0	1.0	-41.3	-13.0	-28.3	
3.4652	-2.6	H	3.0	40.3	1.0	-41.8	-13.0	-28.8	
5.1978	-10.4	H	3.0	40.9	1.0	-50.3	-13.0	-37.3	
6.9304	-6.4	H	3.0	41.0	1.0	-46.4	-13.0	-33.4	
High Ch, 1752.6MHz									
3.5052	1.3	V	3.0	40.3	1.0	-38.0	-13.0	-25.0	
5.2578	-8.2	V	3.0	40.9	1.0	-48.1	-13.0	-35.1	
7.0104	-2.8	V	3.0	41.0	1.0	-42.8	-13.0	-29.8	
3.5052	-1.4	H	3.0	40.3	1.0	-40.7	-13.0	-27.7	
5.2578	-10.6	H	3.0	40.9	1.0	-50.5	-13.0	-37.5	
7.0104	-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.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

WCDMA B2

WCDMA

Band 2
REL99

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

Company: Wisol
Project #: 16K23790
Date: 08-31-16
Test Engineer: JH Park
Configuration: EUT / X 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	-17.2	V	3.0	40.5	1.0	-56.7	-13.0	-43.7	
5.5572	-9.6	V	3.0	40.8	1.0	-49.4	-13.0	-36.4	
7.4096	-5.4	V	3.0	40.8	1.0	-45.2	-13.0	-32.2	
3.7048	-17.2	H	3.0	40.5	1.0	-56.7	-13.0	-43.7	
5.5572	-15.8	H	3.0	40.8	1.0	-55.6	-13.0	-42.6	
7.4096	-12.7	H	3.0	40.8	1.0	-52.5	-13.0	-39.5	
Mid Ch, 1880MHz									
3.7600	-15.5	V	3.0	40.5	1.0	-55.0	-13.0	-42.0	
5.6400	-9.2	V	3.0	40.8	1.0	-49.0	-13.0	-36.0	
7.5200	-2.9	V	3.0	40.7	1.0	-42.7	-13.0	-29.7	
3.7600	-15.7	H	3.0	40.5	1.0	-55.2	-13.0	-42.2	
5.6400	-13.9	H	3.0	40.8	1.0	-53.7	-13.0	-40.7	
7.5200	-11.1	H	3.0	40.7	1.0	-50.8	-13.0	-37.8	
High Ch, 1907.6MHz									
3.8152	-18.8	V	3.0	40.6	1.0	-58.4	-13.0	-45.4	
5.7228	-8.4	V	3.0	40.8	1.0	-48.2	-13.0	-35.2	
7.6304	-5.4	V	3.0	40.7	1.0	-45.1	-13.0	-32.1	
3.8152	-17.8	H	3.0	40.6	1.0	-57.4	-13.0	-44.4	
5.7228	-12.4	H	3.0	40.8	1.0	-52.2	-13.0	-39.2	
7.6304	-13.0	H	3.0	40.7	1.0	-52.6	-13.0	-39.6	

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: Wisol
Project #: 16K23790
Date: 08-31-16
Test Engineer: JH Park
Configuration: EUT / X 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	-17.4	V	3.0	40.5	1.0	-56.9	-13.0	-43.9	
5.5572	-10.5	V	3.0	40.8	1.0	-50.3	-13.0	-37.3	
7.4096	-6.6	V	3.0	40.8	1.0	-46.4	-13.0	-33.4	
3.7048	-18.5	H	3.0	40.5	1.0	-58.0	-13.0	-45.0	
5.5572	-15.0	H	3.0	40.8	1.0	-54.8	-13.0	-41.8	
7.4096	-13.3	H	3.0	40.8	1.0	-53.1	-13.0	-40.1	
Mid Ch, 1880MHz									
3.7600	-16.6	V	3.0	40.5	1.0	-56.1	-13.0	-43.1	
5.6400	-9.7	V	3.0	40.8	1.0	-49.5	-13.0	-36.5	
7.5200	-4.8	V	3.0	40.7	1.0	-44.6	-13.0	-31.6	
3.7600	-16.5	H	3.0	40.5	1.0	-56.0	-13.0	-43.0	
5.6400	-15.5	H	3.0	40.8	1.0	-55.3	-13.0	-42.3	
7.5200	-11.5	H	3.0	40.7	1.0	-51.3	-13.0	-38.3	
High Ch, 1907.6MHz									
3.8152	-17.6	V	3.0	40.6	1.0	-57.2	-13.0	-44.2	
5.7228	-9.3	V	3.0	40.8	1.0	-49.1	-13.0	-36.1	
7.6304	-7.1	V	3.0	40.7	1.0	-46.8	-13.0	-33.8	
3.8152	-18.0	H	3.0	40.6	1.0	-57.5	-13.0	-44.5	
5.7228	-13.6	H	3.0	40.8	1.0	-53.4	-13.0	-40.4	
7.6304	-14.5	H	3.0	40.7	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 5

LTE Band 5 10MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-23.6	V	3.0	39.1	1.0	-61.7	-13.0	-48.7	
2.4870	-20.3	V	3.0	39.5	1.0	-58.8	-13.0	-45.8	
3.3160	-19.8	V	3.0	40.1	1.0	-58.9	-13.0	-45.9	
1.6580	-25.2	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.4870	-22.8	H	3.0	39.5	1.0	-61.3	-13.0	-48.3	
3.3160	-21.1	H	3.0	40.1	1.0	-60.2	-13.0	-47.2	
Mid Channel (836.5MHz)									
1.6730	-18.6	V	3.0	39.1	1.0	-56.7	-13.0	-43.7	
2.5090	-21.6	V	3.0	39.5	1.0	-60.1	-13.0	-47.1	
3.3460	-21.5	V	3.0	40.1	1.0	-60.7	-13.0	-47.7	
1.6730	-23.7	H	3.0	39.1	1.0	-61.8	-13.0	-48.8	
2.5090	-23.5	H	3.0	39.5	1.0	-62.1	-13.0	-49.1	
3.3460	-20.9	H	3.0	40.1	1.0	-60.0	-13.0	-47.0	
High Channel (844MHz)									
1.6880	-23.3	V	3.0	39.1	1.0	-61.5	-13.0	-48.5	
2.5320	-22.3	V	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3760	-20.6	V	3.0	40.2	1.0	-59.7	-13.0	-46.7	
1.6880	-24.9	H	3.0	39.1	1.0	-63.0	-13.0	-50.0	
2.5320	-22.4	H	3.0	39.5	1.0	-61.0	-13.0	-48.0	
3.3760	-21.1	H	3.0	40.2	1.0	-60.2	-13.0	-47.2	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-24.0	V	3.0	39.1	1.0	-62.1	-13.0	-49.1	
2.4870	-19.7	V	3.0	39.5	1.0	-58.2	-13.0	-45.2	
3.3160	-20.1	V	3.0	40.1	1.0	-59.3	-13.0	-46.3	
1.6580	-24.9	H	3.0	39.1	1.0	-63.0	-13.0	-50.0	
2.4870	-23.7	H	3.0	39.5	1.0	-62.2	-13.0	-49.2	
3.3160	-20.3	H	3.0	40.1	1.0	-59.4	-13.0	-46.4	
Mid Channel (836.5MHz)									
1.6730	-18.4	V	3.0	39.1	1.0	-56.5	-13.0	-43.5	
2.5090	-22.5	V	3.0	39.5	1.0	-61.0	-13.0	-48.0	
3.3460	-19.8	V	3.0	40.1	1.0	-58.9	-13.0	-45.9	
1.6730	-24.2	H	3.0	39.1	1.0	-62.3	-13.0	-49.3	
2.5090	-22.2	H	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3460	-21.3	H	3.0	40.1	1.0	-60.4	-13.0	-47.4	
High Channel (844MHz)									
1.6880	-25.0	V	3.0	39.1	1.0	-63.2	-13.0	-50.2	
2.5320	-21.3	V	3.0	39.5	1.0	-59.9	-13.0	-46.9	
3.3760	-19.9	V	3.0	40.2	1.0	-59.1	-13.0	-46.1	
1.6880	-25.2	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.5320	-21.9	H	3.0	39.5	1.0	-60.5	-13.0	-47.5	
3.3760	-21.8	H	3.0	40.2	1.0	-61.0	-13.0	-48.0	

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

LTE Band 5 5MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-24.2	V	3.0	39.1	1.0	-62.3	-13.0	-49.3	
2.4790	-21.5	V	3.0	39.5	1.0	-60.0	-13.0	-47.0	
3.3060	-21.5	V	3.0	40.1	1.0	-60.6	-13.0	-47.6	
1.6530	-24.7	H	3.0	39.1	1.0	-62.8	-13.0	-49.8	
2.4790	-22.9	H	3.0	39.5	1.0	-61.5	-13.0	-48.5	
3.3060	-21.0	H	3.0	40.1	1.0	-60.1	-13.0	-47.1	
Mid Channel (836.5MHz)									
1.6730	-18.6	V	3.0	39.1	1.0	-56.7	-13.0	-43.7	
2.5090	-22.8	V	3.0	39.5	1.0	-61.3	-13.0	-48.3	
3.3460	-20.4	V	3.0	40.1	1.0	-59.6	-13.0	-46.6	
1.6730	-25.2	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.5090	-23.2	H	3.0	39.5	1.0	-61.8	-13.0	-48.8	
3.3460	-21.9	H	3.0	40.1	1.0	-61.0	-13.0	-48.0	
High Channel (846.5MHz)									
1.6930	-21.8	V	3.0	39.1	1.0	-59.9	-13.0	-46.9	
2.5390	-20.3	V	3.0	39.6	1.0	-58.8	-13.0	-45.8	
3.3860	-20.4	V	3.0	40.2	1.0	-59.6	-13.0	-46.6	
1.6930	-25.7	H	3.0	39.1	1.0	-63.8	-13.0	-50.8	
2.5390	-21.8	H	3.0	39.6	1.0	-60.4	-13.0	-47.4	
3.3860	-21.5	H	3.0	40.2	1.0	-60.7	-13.0	-47.7	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-24.4	V	3.0	39.1	1.0	-62.5	-13.0	-49.5	
2.4790	-21.9	V	3.0	39.5	1.0	-60.4	-13.0	-47.4	
3.3060	-19.6	V	3.0	40.1	1.0	-58.7	-13.0	-45.7	
1.6530	-25.7	H	3.0	39.1	1.0	-63.8	-13.0	-50.8	
2.4790	-23.2	H	3.0	39.5	1.0	-61.8	-13.0	-48.8	
3.3060	-21.5	H	3.0	40.1	1.0	-60.6	-13.0	-47.6	
Mid Channel (836.5MHz)									
1.6730	-18.1	V	3.0	39.1	1.0	-56.2	-13.0	-43.2	
2.5090	-22.1	V	3.0	39.5	1.0	-60.6	-13.0	-47.6	
3.3460	-20.7	V	3.0	40.1	1.0	-59.8	-13.0	-46.8	
1.6730	-23.8	H	3.0	39.1	1.0	-61.9	-13.0	-48.9	
2.5090	-23.3	H	3.0	39.5	1.0	-61.9	-13.0	-48.9	
3.3460	-21.2	H	3.0	40.1	1.0	-60.4	-13.0	-47.4	
High Channel (846.5MHz)									
1.6930	-21.8	V	3.0	39.1	1.0	-59.9	-13.0	-46.9	
2.5390	-19.9	V	3.0	39.6	1.0	-58.5	-13.0	-45.5	
3.3860	-20.4	V	3.0	40.2	1.0	-59.5	-13.0	-46.5	
1.6930	-25.1	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.5390	-23.3	H	3.0	39.6	1.0	-61.8	-13.0	-48.8	
3.3860	-20.8	H	3.0	40.2	1.0	-60.0	-13.0	-47.0	

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

LTE Band 5 3MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-25.0	V	3.0	39.1	1.0	-63.1	-13.0	-50.1	
2.4765	-22.3	V	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3020	-20.3	V	3.0	40.1	1.0	-59.4	-13.0	-46.4	
1.6510	-25.4	H	3.0	39.1	1.0	-63.6	-13.0	-50.6	
2.4765	-23.2	H	3.0	39.5	1.0	-61.8	-13.0	-48.8	
3.3020	-21.1	H	3.0	40.1	1.0	-60.2	-13.0	-47.2	
Mid Channel (836.5MHz)									
1.6730	-19.7	V	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5090	-22.3	V	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3460	-21.0	V	3.0	40.1	1.0	-60.1	-13.0	-47.1	
1.6730	-23.7	H	3.0	39.1	1.0	-61.8	-13.0	-48.8	
2.5090	-23.8	H	3.0	39.5	1.0	-62.3	-13.0	-49.3	
3.3460	-21.5	H	3.0	40.1	1.0	-60.6	-13.0	-47.6	
High Channel (847.5MHz)									
1.6950	-18.1	V	3.0	39.1	1.0	-56.2	-13.0	-43.2	
2.5425	-21.1	V	3.0	39.6	1.0	-59.6	-13.0	-46.6	
3.3900	-20.0	V	3.0	40.2	1.0	-59.2	-13.0	-46.2	
1.6950	-25.5	H	3.0	39.1	1.0	-63.6	-13.0	-50.6	
2.5425	-22.4	H	3.0	39.6	1.0	-60.9	-13.0	-47.9	
3.3900	-21.2	H	3.0	40.2	1.0	-60.3	-13.0	-47.3	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-25.0	V	3.0	39.1	1.0	-63.1	-13.0	-50.1	
2.4765	-21.0	V	3.0	39.5	1.0	-59.6	-13.0	-46.6	
3.3020	-20.7	V	3.0	40.1	1.0	-59.8	-13.0	-46.8	
1.6510	-25.4	H	3.0	39.1	1.0	-63.5	-13.0	-50.5	
2.4765	-23.9	H	3.0	39.5	1.0	-62.4	-13.0	-49.4	
3.3020	-21.2	H	3.0	40.1	1.0	-60.3	-13.0	-47.3	
Mid Channel (836.5MHz)									
1.6730	-19.7	V	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5090	-22.6	V	3.0	39.5	1.0	-61.1	-13.0	-48.1	
3.3460	-20.2	V	3.0	40.1	1.0	-59.4	-13.0	-46.4	
1.6730	-24.5	H	3.0	39.1	1.0	-62.6	-13.0	-49.6	
2.5090	-22.9	H	3.0	39.5	1.0	-61.4	-13.0	-48.4	
3.3460	-21.5	H	3.0	40.1	1.0	-60.6	-13.0	-47.6	
High Channel (847.5MHz)									
1.6950	-19.0	V	3.0	39.1	1.0	-57.1	-13.0	-44.1	
2.5425	-21.6	V	3.0	39.6	1.0	-60.1	-13.0	-47.1	
3.3900	-20.2	V	3.0	40.2	1.0	-59.4	-13.0	-46.4	
1.6950	-24.8	H	3.0	39.1	1.0	-63.0	-13.0	-50.0	
2.5425	-21.7	H	3.0	39.6	1.0	-60.3	-13.0	-47.3	
3.3900	-21.1	H	3.0	40.2	1.0	-60.3	-13.0	-47.3	

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

LTE Band 5 1.4MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-25.0	V	3.0	39.1	1.0	-63.1	-13.0	-50.1	
2.4741	-21.2	V	3.0	39.5	1.0	-59.7	-13.0	-46.7	
3.2988	-20.7	V	3.0	40.1	1.0	-59.8	-13.0	-46.8	
1.6494	-25.3	H	3.0	39.1	1.0	-63.5	-13.0	-50.5	
2.4741	-23.7	H	3.0	39.5	1.0	-62.2	-13.0	-49.2	
3.2988	-21.8	H	3.0	40.1	1.0	-60.9	-13.0	-47.9	
Mid Channel (836.5MHz)									
1.6730	-17.8	V	3.0	39.1	1.0	-56.0	-13.0	-43.0	
2.5090	-22.6	V	3.0	39.5	1.0	-61.2	-13.0	-48.2	
3.3460	-20.2	V	3.0	40.1	1.0	-59.3	-13.0	-46.3	
1.6730	-24.2	H	3.0	39.1	1.0	-62.4	-13.0	-49.4	
2.5090	-23.7	H	3.0	39.5	1.0	-62.3	-13.0	-49.3	
3.3460	-21.0	H	3.0	40.1	1.0	-60.2	-13.0	-47.2	
High Channel (848.3MHz)									
1.6966	-19.0	V	3.0	39.1	1.0	-57.1	-13.0	-44.1	
2.5449	-21.1	V	3.0	39.6	1.0	-59.6	-13.0	-46.6	
3.3932	-21.0	V	3.0	40.2	1.0	-60.1	-13.0	-47.1	
1.6966	-22.1	H	3.0	39.1	1.0	-60.2	-13.0	-47.2	
2.5449	-23.2	H	3.0	39.6	1.0	-61.7	-13.0	-48.7	
3.3932	-20.7	H	3.0	40.2	1.0	-59.9	-13.0	-46.9	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X 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	-25.6	V	3.0	39.1	1.0	-63.7	-13.0	-50.7	
2.4741	-20.7	V	3.0	39.5	1.0	-59.2	-13.0	-46.2	
3.2988	-21.3	V	3.0	40.1	1.0	-60.4	-13.0	-47.4	
1.6494	-25.1	H	3.0	39.1	1.0	-63.3	-13.0	-50.3	
2.4741	-23.5	H	3.0	39.5	1.0	-62.0	-13.0	-49.0	
3.2988	-21.3	H	3.0	40.1	1.0	-60.4	-13.0	-47.4	
Mid Channel (836.5MHz)									
1.6730	-18.9	V	3.0	39.1	1.0	-57.0	-13.0	-44.0	
2.5090	-22.7	V	3.0	39.5	1.0	-61.2	-13.0	-48.2	
3.3460	-21.4	V	3.0	40.1	1.0	-60.5	-13.0	-47.5	
1.6730	-22.8	H	3.0	39.1	1.0	-60.9	-13.0	-47.9	
2.5090	-23.6	H	3.0	39.5	1.0	-62.1	-13.0	-49.1	
3.3460	-21.3	H	3.0	40.1	1.0	-60.5	-13.0	-47.5	
High Channel (848.3MHz)									
1.6966	-15.8	V	3.0	39.1	1.0	-53.9	-13.0	-40.9	
2.5449	-22.3	V	3.0	39.6	1.0	-60.8	-13.0	-47.8	
3.3932	-20.4	V	3.0	40.2	1.0	-59.6	-13.0	-46.6	
1.6966	-20.0	H	3.0	39.1	1.0	-58.1	-13.0	-45.1	
2.5449	-22.5	H	3.0	39.6	1.0	-61.0	-13.0	-48.0	
3.3932	-21.1	H	3.0	40.2	1.0	-60.3	-13.0	-47.3	

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

LTE Band 4

LTE Band 4 20MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	0.0	V	3.0	40.2	1.0	-39.3	-13.0	-26.3	
5.1600	-5.0	V	3.0	40.9	1.0	-44.9	-13.0	-31.9	
6.8800	4.3	V	3.0	41.0	1.0	-35.7	-13.0	-22.7	
3.4400	-1.7	H	3.0	40.2	1.0	-40.9	-13.0	-27.9	
5.1600	-5.1	H	3.0	40.9	1.0	-45.0	-13.0	-32.0	
6.8800	-3.7	H	3.0	41.0	1.0	-43.7	-13.0	-30.7	
Mid Channel (1732.5MHz)									
3.4650	-1.3	V	3.0	40.3	1.0	-40.6	-13.0	-27.6	
5.1975	-2.5	V	3.0	40.9	1.0	-42.4	-13.0	-29.4	
6.9300	6.5	V	3.0	41.0	1.0	-33.5	-13.0	-20.5	
3.4650	0.5	H	3.0	40.3	1.0	-38.7	-13.0	-25.7	
5.1975	-5.4	H	3.0	40.9	1.0	-45.3	-13.0	-32.3	
6.9300	2.1	H	3.0	41.0	1.0	-37.9	-13.0	-24.9	
High Channel (1745MHz)									
3.4900	3.1	V	3.0	40.3	1.0	-36.2	-13.0	-23.2	
5.2350	-2.9	V	3.0	40.9	1.0	-42.8	-13.0	-29.8	
6.9800	6.2	V	3.0	41.0	1.0	-33.8	-13.0	-20.8	
3.4900	0.4	H	3.0	40.3	1.0	-38.8	-13.0	-25.8	
5.2350	-6.2	H	3.0	40.9	1.0	-46.1	-13.0	-33.1	
6.9800	0.4	H	3.0	41.0	1.0	-39.6	-13.0	-26.6	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	0.1	V	3.0	40.2	1.0	-39.1	-13.0	-26.1	
5.1600	-6.2	V	3.0	40.9	1.0	-46.1	-13.0	-33.1	
6.8800	4.4	V	3.0	41.0	1.0	-35.6	-13.0	-22.6	
3.4400	-1.7	H	3.0	40.2	1.0	-41.0	-13.0	-28.0	
5.1600	-5.9	H	3.0	40.9	1.0	-45.7	-13.0	-32.7	
6.8800	-4.5	H	3.0	41.0	1.0	-44.5	-13.0	-31.5	
Mid Channel (1732.5MHz)									
3.4650	-0.9	V	3.0	40.3	1.0	-40.2	-13.0	-27.2	
5.1975	-2.3	V	3.0	40.9	1.0	-42.2	-13.0	-29.2	
6.9300	7.8	V	3.0	41.0	1.0	-32.2	-13.0	-19.2	
3.4650	0.6	H	3.0	40.3	1.0	-38.6	-13.0	-25.6	
5.1975	-4.9	H	3.0	40.9	1.0	-44.8	-13.0	-31.8	
6.9300	3.4	H	3.0	41.0	1.0	-36.6	-13.0	-23.6	
High Channel (1745MHz)									
3.4900	3.9	V	3.0	40.3	1.0	-35.4	-13.0	-22.4	
5.2350	-2.5	V	3.0	40.9	1.0	-42.4	-13.0	-29.4	
6.9800	7.1	V	3.0	41.0	1.0	-32.9	-13.0	-19.9	
3.4900	0.9	H	3.0	40.3	1.0	-38.4	-13.0	-25.4	
5.2350	-6.2	H	3.0	40.9	1.0	-46.1	-13.0	-33.1	
6.9800	1.1	H	3.0	41.0	1.0	-38.9	-13.0	-25.9	

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

LTE Band 4 15MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	0.9	V	3.0	40.2	1.0	-38.3	-13.0	-25.3	
5.1525	-2.1	V	3.0	40.9	1.0	-41.9	-13.0	-28.9	
6.8700	5.8	V	3.0	41.0	1.0	-34.1	-13.0	-21.1	
3.4350	1.0	H	3.0	40.2	1.0	-38.2	-13.0	-25.2	
5.1525	-5.7	H	3.0	40.9	1.0	-45.5	-13.0	-32.5	
6.8700	2.0	H	3.0	41.0	1.0	-37.9	-13.0	-24.9	
Mid Channel (1732.5MHz)									
3.4650	-1.2	V	3.0	40.3	1.0	-40.5	-13.0	-27.5	
5.1975	-3.4	V	3.0	40.9	1.0	-43.3	-13.0	-30.3	
6.9300	7.5	V	3.0	41.0	1.0	-32.5	-13.0	-19.5	
3.4650	-0.3	H	3.0	40.3	1.0	-39.5	-13.0	-26.5	
5.1975	-5.1	H	3.0	40.9	1.0	-44.9	-13.0	-31.9	
6.9300	-2.5	H	3.0	41.0	1.0	-42.5	-13.0	-29.5	
High Channel (1747.5MHz)									
3.4950	1.7	V	3.0	40.3	1.0	-37.6	-13.0	-24.6	
5.2425	-2.8	V	3.0	40.9	1.0	-42.7	-13.0	-29.7	
6.9900	5.1	V	3.0	41.0	1.0	-34.9	-13.0	-21.9	
3.4950	0.6	H	3.0	40.3	1.0	-38.7	-13.0	-25.7	
5.2425	-7.0	H	3.0	40.9	1.0	-46.8	-13.0	-33.8	
6.9900	-5.3	H	3.0	41.0	1.0	-45.3	-13.0	-32.3	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	1.0	V	3.0	40.2	1.0	-38.3	-13.0	-25.3	
5.1525	-1.2	V	3.0	40.9	1.0	-41.0	-13.0	-28.0	
6.8700	6.6	V	3.0	41.0	1.0	-33.4	-13.0	-20.4	
3.4350	1.5	H	3.0	40.2	1.0	-37.7	-13.0	-24.7	
5.1525	-5.4	H	3.0	40.9	1.0	-45.3	-13.0	-32.3	
6.8700	3.5	H	3.0	41.0	1.0	-36.5	-13.0	-23.5	
Mid Channel (1732.5MHz)									
3.4650	-0.3	V	3.0	40.3	1.0	-39.6	-13.0	-26.6	
5.1975	-4.1	V	3.0	40.9	1.0	-44.0	-13.0	-31.0	
6.9300	8.4	V	3.0	41.0	1.0	-31.6	-13.0	-18.6	
3.4650	-0.3	H	3.0	40.3	1.0	-39.6	-13.0	-26.6	
5.1975	-5.4	H	3.0	40.9	1.0	-45.3	-13.0	-32.3	
6.9300	-2.2	H	3.0	41.0	1.0	-42.2	-13.0	-29.2	
High Channel (1747.5MHz)									
3.4950	1.7	V	3.0	40.3	1.0	-37.6	-13.0	-24.6	
5.2425	-2.1	V	3.0	40.9	1.0	-41.9	-13.0	-28.9	
6.9900	6.5	V	3.0	41.0	1.0	-33.5	-13.0	-20.5	
3.4950	1.5	H	3.0	40.3	1.0	-37.8	-13.0	-24.8	
5.2425	-5.9	H	3.0	40.9	1.0	-45.8	-13.0	-32.8	
6.9900	-3.3	H	3.0	41.0	1.0	-43.3	-13.0	-30.3	

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

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LTE Band 4 10MHz QPSK

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

Company: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	0.5	V	3.0	40.2	1.0	-38.8	-13.0	-25.8	
5.1450	-2.2	V	3.0	40.9	1.0	-42.1	-13.0	-29.1	
6.8600	6.7	V	3.0	41.0	1.0	-33.3	-13.0	-20.3	
3.4300	-1.6	H	3.0	40.2	1.0	-40.8	-13.0	-27.8	
5.1450	-4.0	H	3.0	40.9	1.0	-43.9	-13.0	-30.9	
6.8600	-1.7	H	3.0	41.0	1.0	-41.7	-13.0	-28.7	
Mid Channel (1732.5MHz)									
3.4650	-1.0	V	3.0	40.3	1.0	-40.2	-13.0	-27.2	
5.1975	-3.0	V	3.0	40.9	1.0	-42.8	-13.0	-29.8	
6.9300	7.6	V	3.0	41.0	1.0	-32.4	-13.0	-19.4	
3.4650	-0.7	H	3.0	40.3	1.0	-40.0	-13.0	-27.0	
5.1975	-5.3	H	3.0	40.9	1.0	-45.2	-13.0	-32.2	
6.9300	1.8	H	3.0	41.0	1.0	-38.2	-13.0	-25.2	
High Channel (1750MHz)									
3.5000	1.8	V	3.0	40.3	1.0	-37.5	-13.0	-24.5	
5.2500	-2.1	V	3.0	40.9	1.0	-41.9	-13.0	-28.9	
7.0000	5.7	V	3.0	41.0	1.0	-34.3	-13.0	-21.3	
3.5000	1.4	H	3.0	40.3	1.0	-37.9	-13.0	-24.9	
5.2500	-5.3	H	3.0	40.9	1.0	-45.2	-13.0	-32.2	
7.0000	-4.0	H	3.0	41.0	1.0	-44.0	-13.0	-31.0	

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: Wisol
Project #: 16K23790
Date: 09-06-16
Test Engineer: JH Park
Configuration: EUT / X-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	1.0	V	3.0	40.2	1.0	-38.3	-13.0	-25.3	
5.1450	-2.1	V	3.0	40.9	1.0	-42.0	-13.0	-29.0	
6.8600	8.1	V	3.0	41.0	1.0	-31.9	-13.0	-18.9	
3.4300	-1.5	H	3.0	40.2	1.0	-40.7	-13.0	-27.7	
5.1450	-3.4	H	3.0	40.9	1.0	-43.3	-13.0	-30.3	
6.8600	-2.2	H	3.0	41.0	1.0	-42.1	-13.0	-29.1	
Mid Channel (1732.5MHz)									
3.4650	-1.3	V	3.0	40.3	1.0	-40.5	-13.0	-27.5	
5.1975	-2.5	V	3.0	40.9	1.0	-42.3	-13.0	-29.3	
6.9300	8.5	V	3.0	41.0	1.0	-31.5	-13.0	-18.5	
3.4650	-0.1	H	3.0	40.3	1.0	-39.4	-13.0	-26.4	
5.1975	-5.4	H	3.0	40.9	1.0	-45.3	-13.0	-32.3	
6.9300	3.3	H	3.0	41.0	1.0	-36.7	-13.0	-23.7	
High Channel (1750MHz)									
3.5000	1.8	V	3.0	40.3	1.0	-37.5	-13.0	-24.5	
5.2500	-1.1	V	3.0	40.9	1.0	-41.0	-13.0	-28.0	
7.0000	5.5	V	3.0	41.0	1.0	-34.5	-13.0	-21.5	
3.5000	1.7	H	3.0	40.3	1.0	-37.6	-13.0	-24.6	
5.2500	-5.5	H	3.0	40.9	1.0	-45.4	-13.0	-32.4	
7.0000	-3.5	H	3.0	41.0	1.0	-43.6	-13.0	-30.6	

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