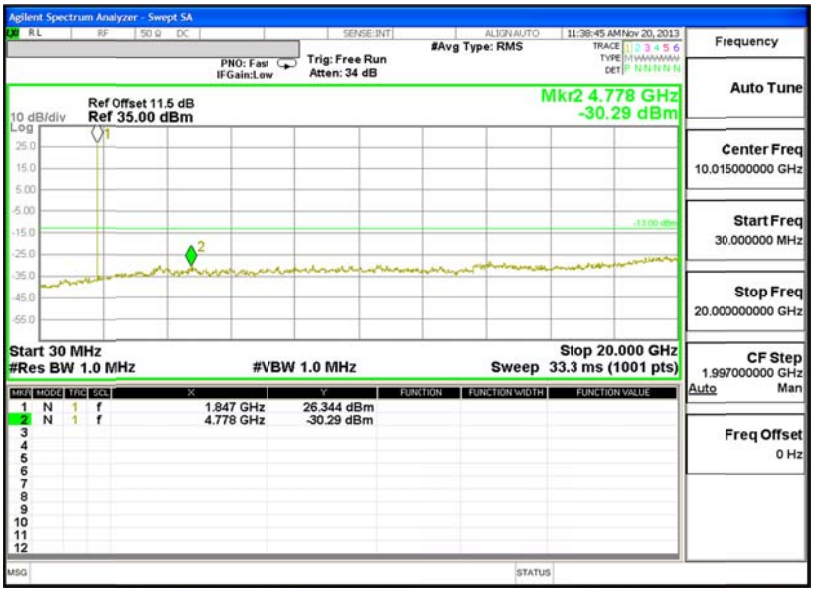
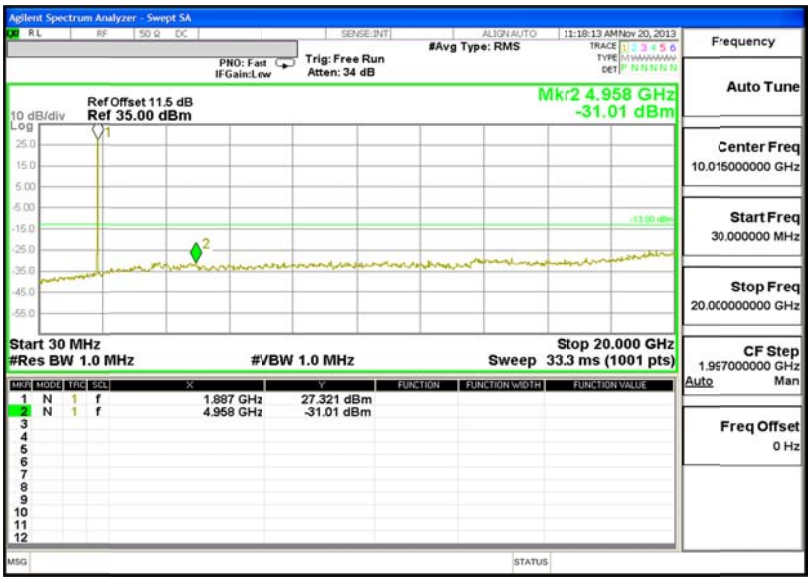
Band 2 (3MHz BANDWIDTH)

LTE QPSK

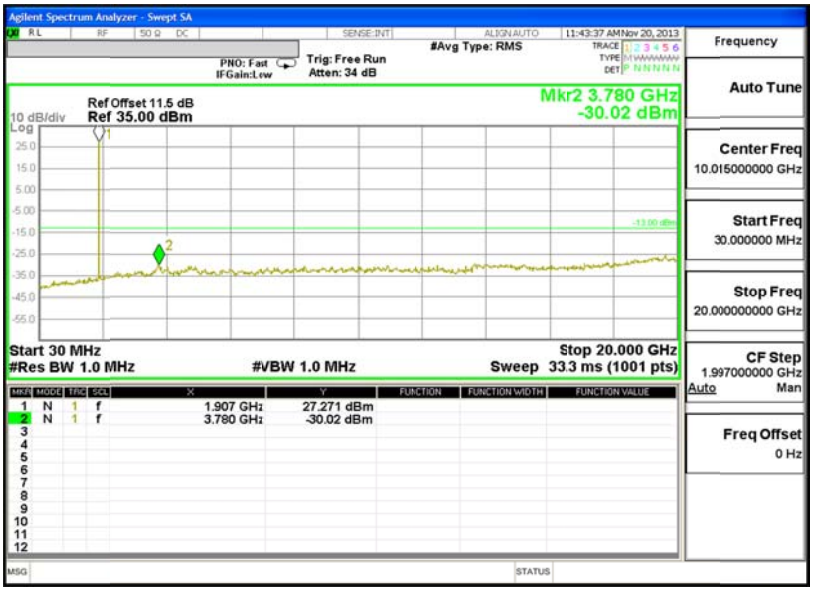
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



HIGH, RB1-0, 30 TO 20000 MHz



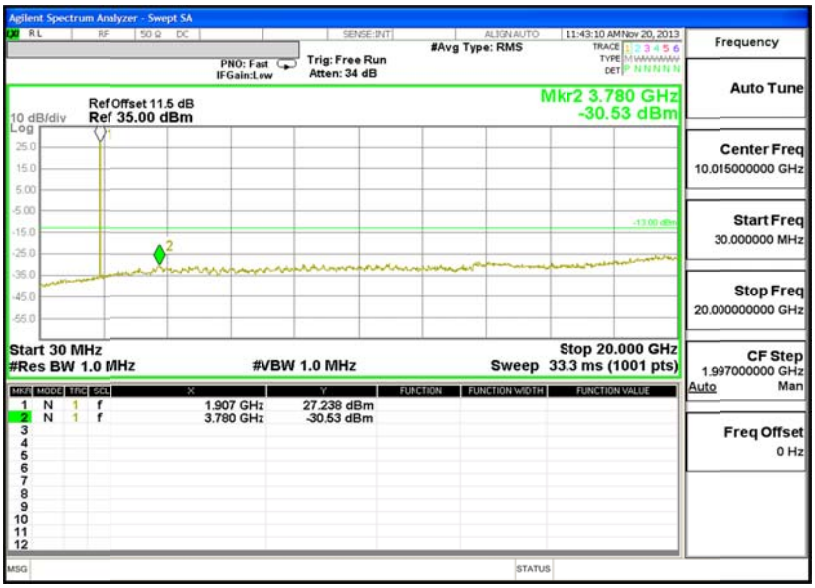
Band 2 (3MHz BANDWIDTH)

LTE 16QAM

LOW, RB1-0, 30 TO 20000 MHz

MID, RB1-0, 30 TO 20000 MHz

HIGH, RB1-0, 30 TO 20000 MHz



Band 2 (5MHz BANDWIDTH)

LTE QPSK

LOW, RB1-0, 30 TO 20000 MHz

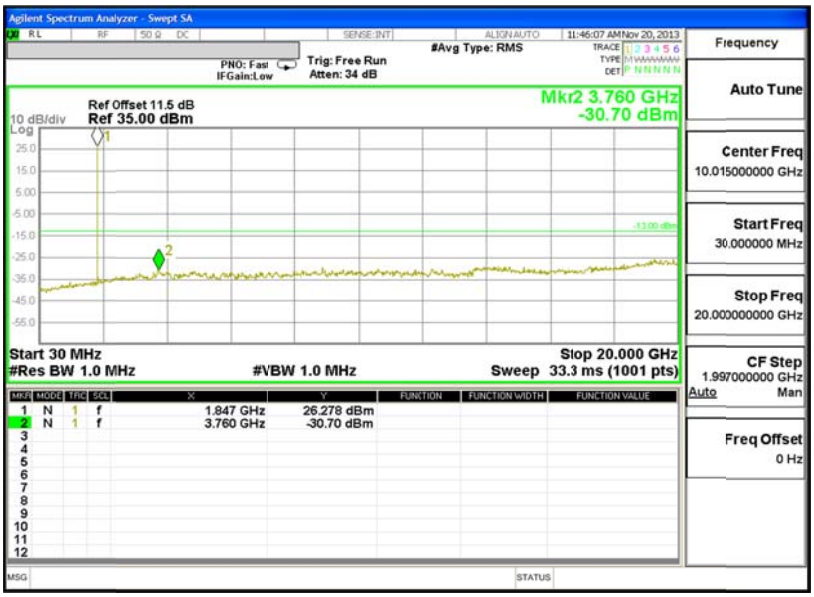
MID, RB1-0, 30 TO 20000 MHz

HIGH, RB1-0, 30 TO 20000 MHz

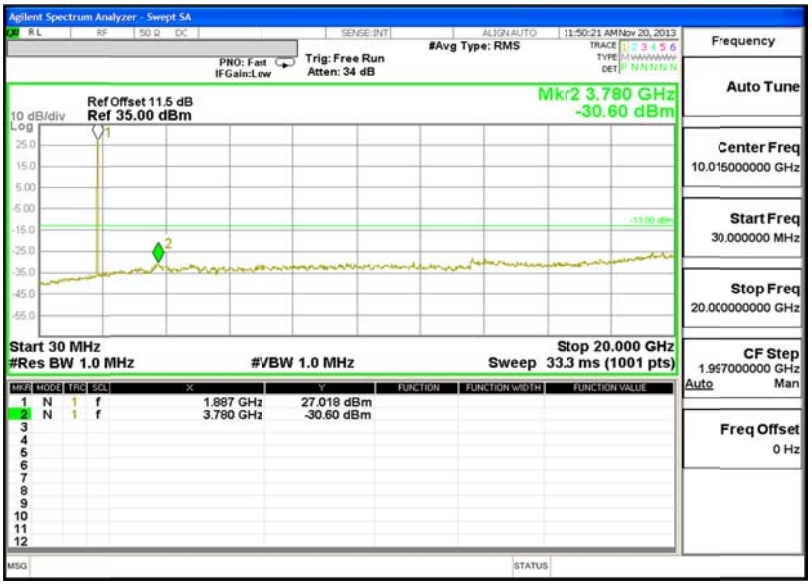
Band 2 (5MHz BANDWIDTH)

LTE 16QAM

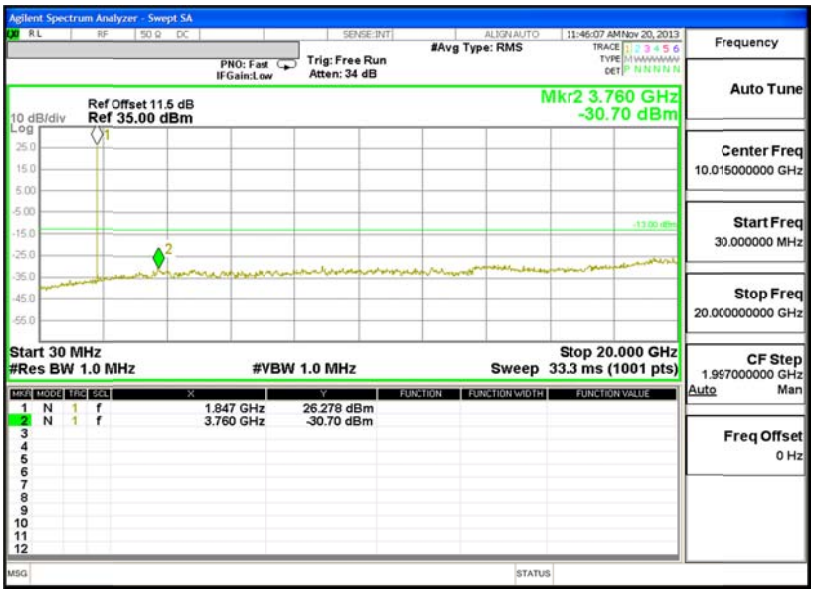
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



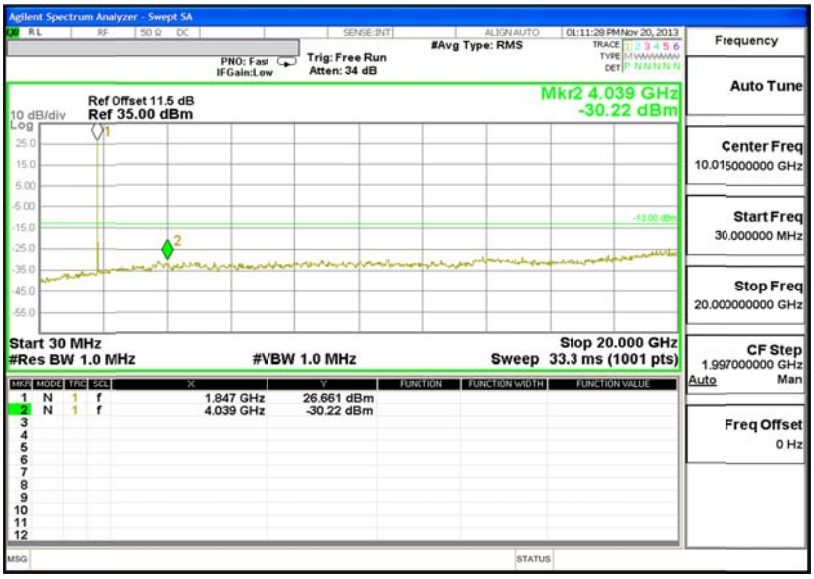
HIGH, RB1-0, 30 TO 20000 MHz



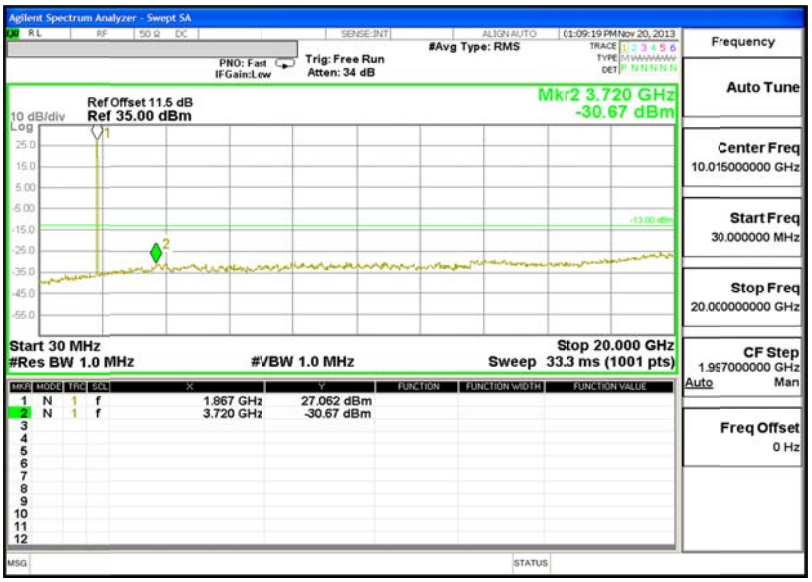
Band 2 (10MHz BANDWIDTH)

LTE QPSK

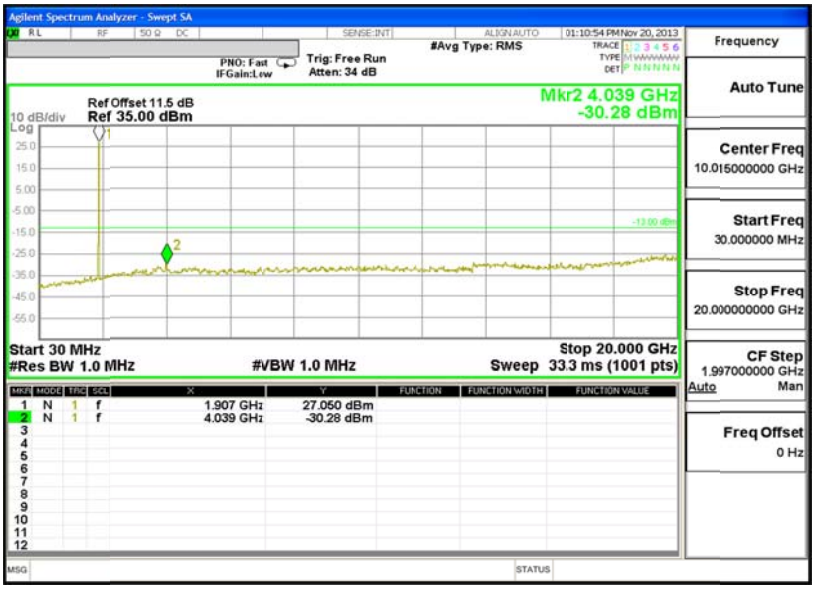
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



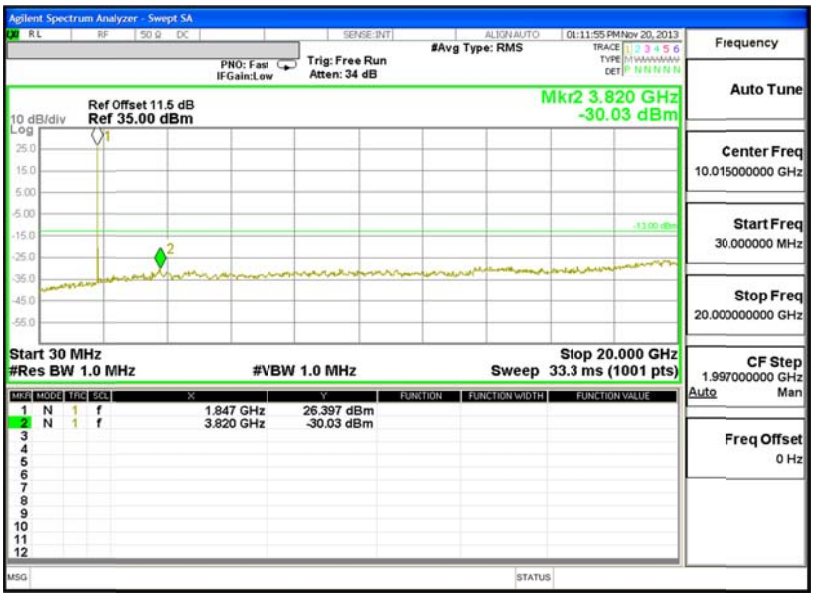
HIGH, RB1-0, 30 TO 20000 MHz



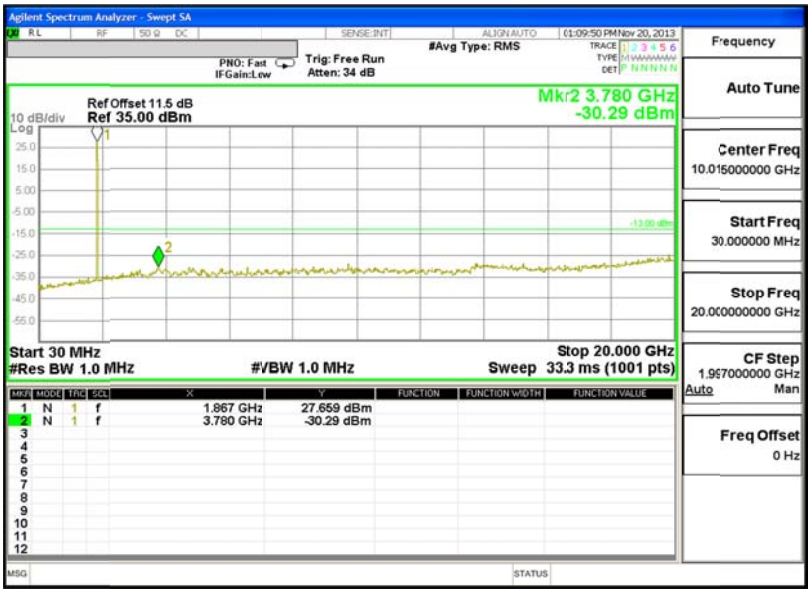
Band 2 (10MHz BANDWIDTH)

LTE 16QAM

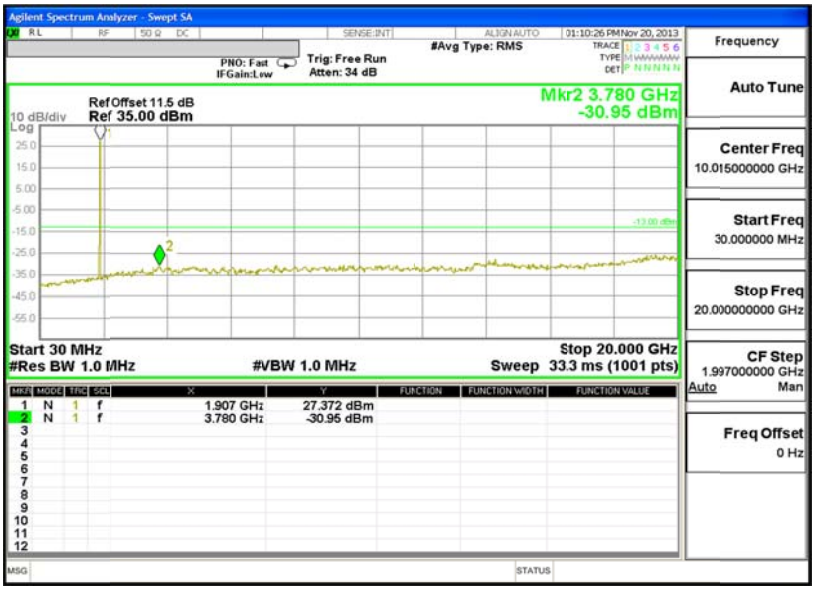
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



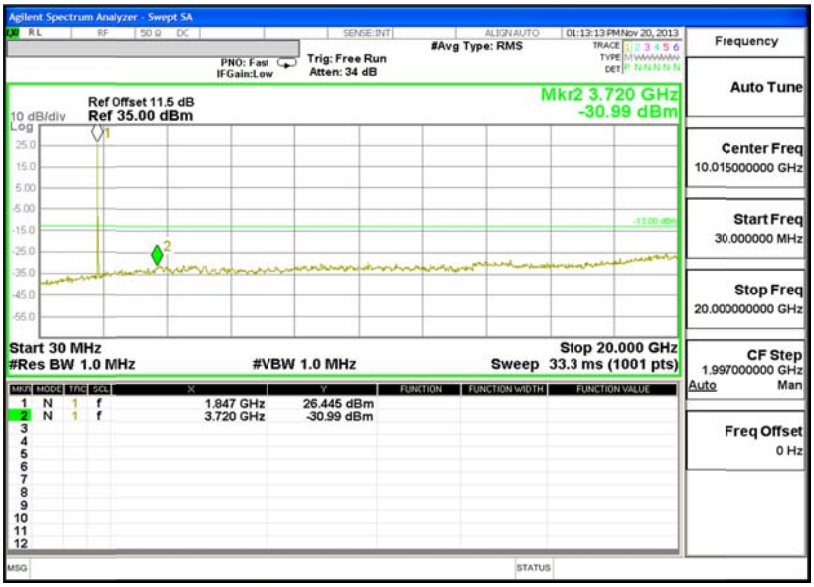
HIGH, RB1-0, 30 TO 20000 MHz



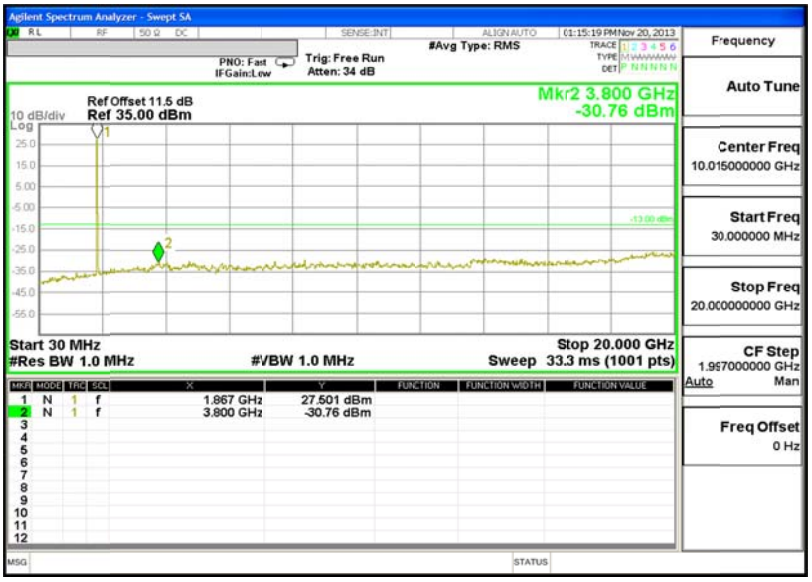
Band 2 (15MHz BANDWIDTH)

LTE QPSK

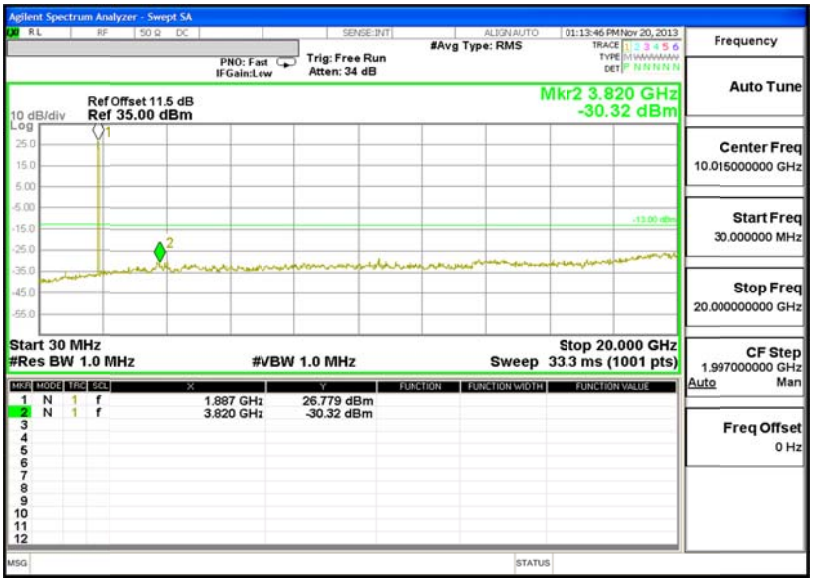
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



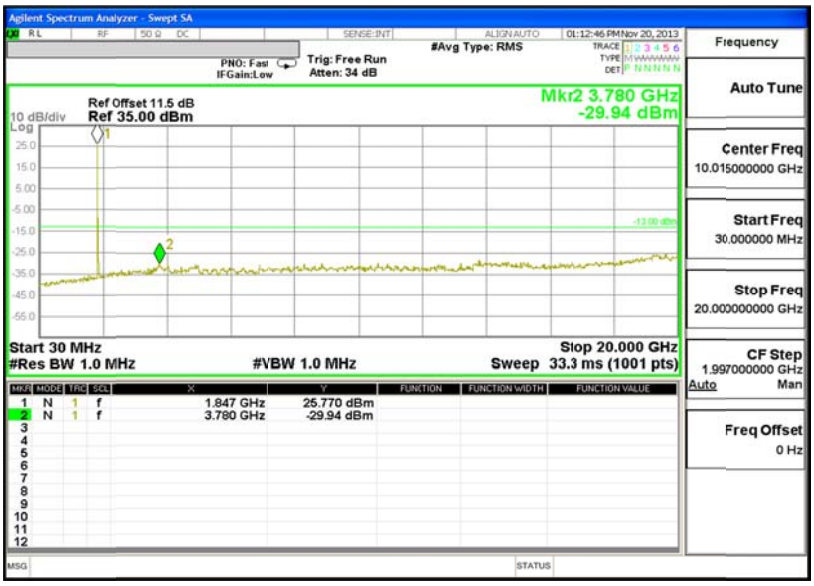
HIGH, RB1-0, 30 TO 20000 MHz



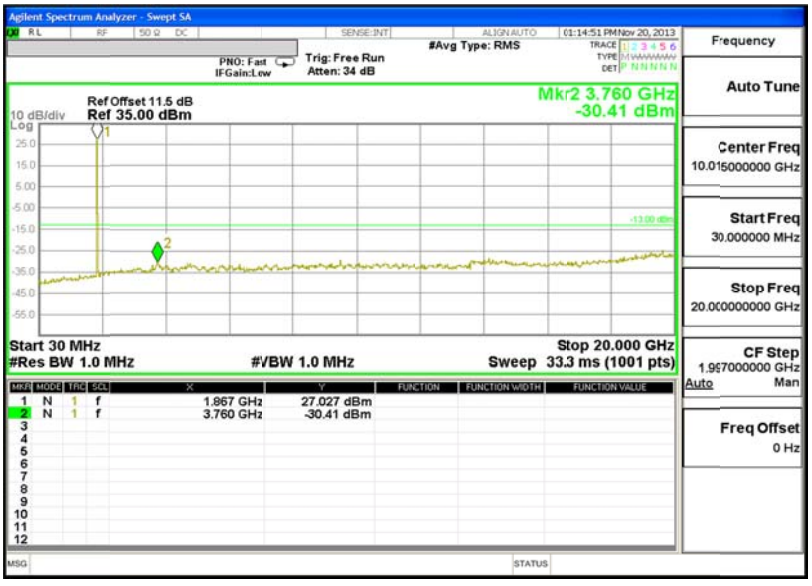
Band 2 (15MHz BANDWIDTH)

LTE 16QAM

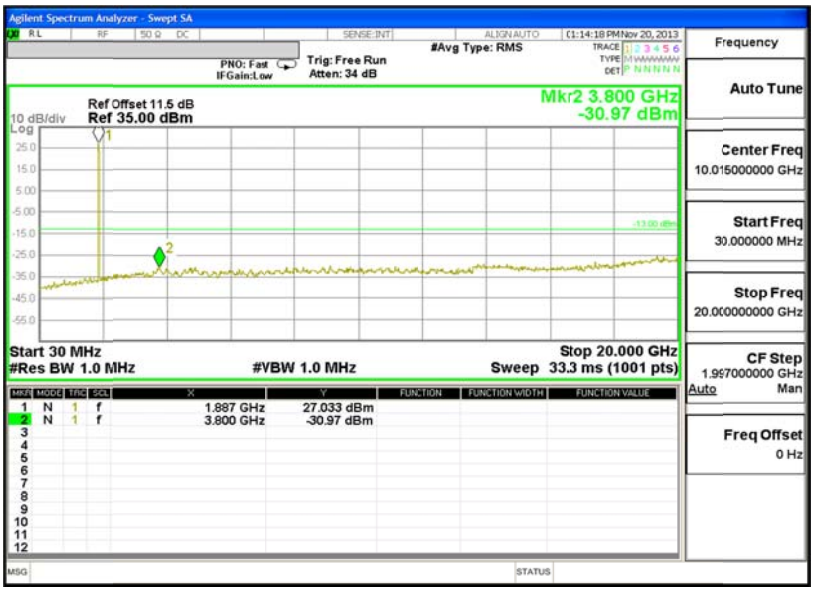
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



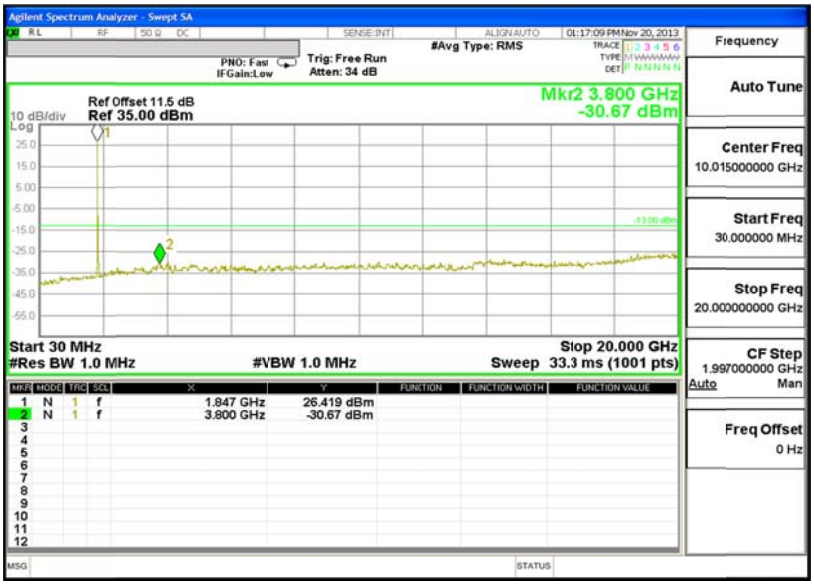
HIGH, RB1-0, 30 TO 20000 MHz



Band 2 (20MHz BANDWIDTH)

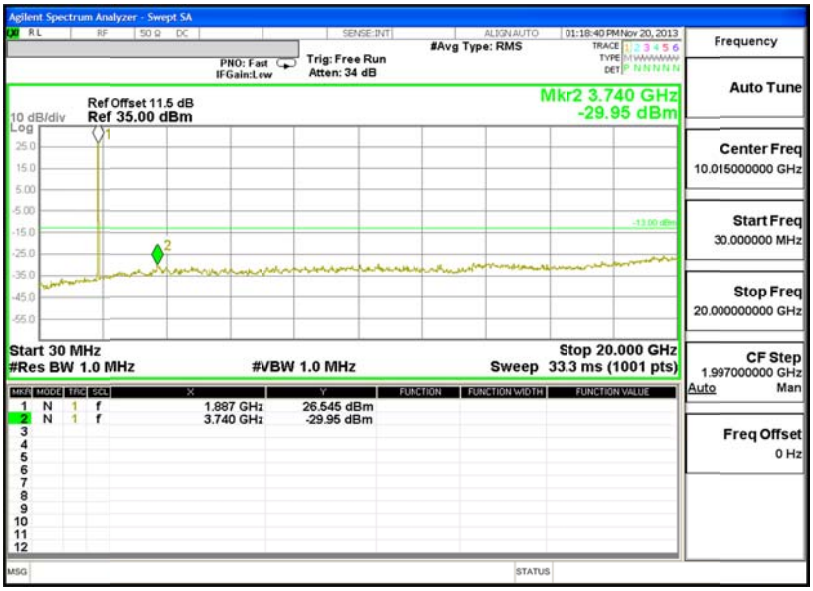
LTE QPSK

LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz

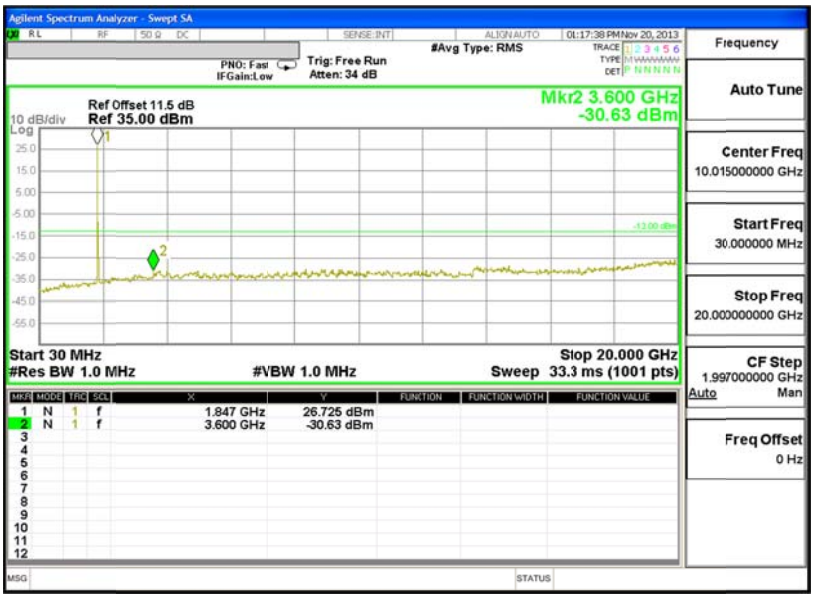
HIGH, RB1-0, 30 TO 20000 MHz



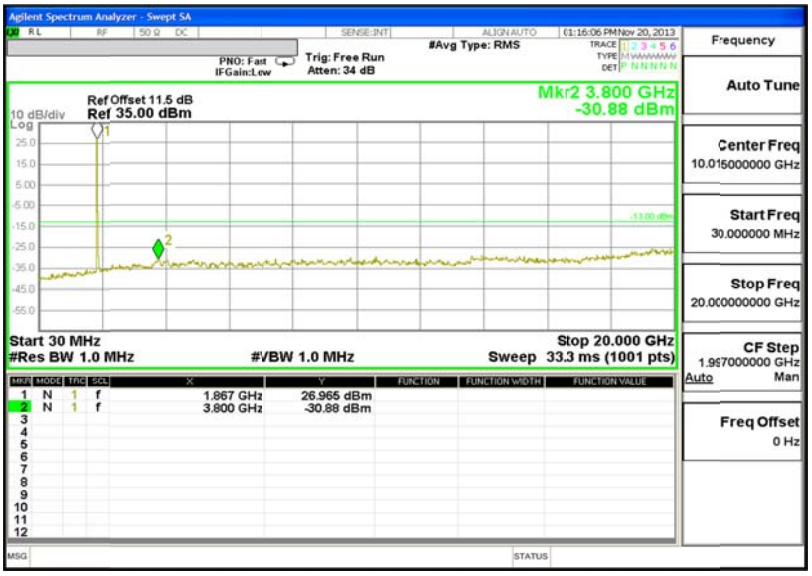
Band 2 (20MHz BANDWIDTH)

LTE 16QAM

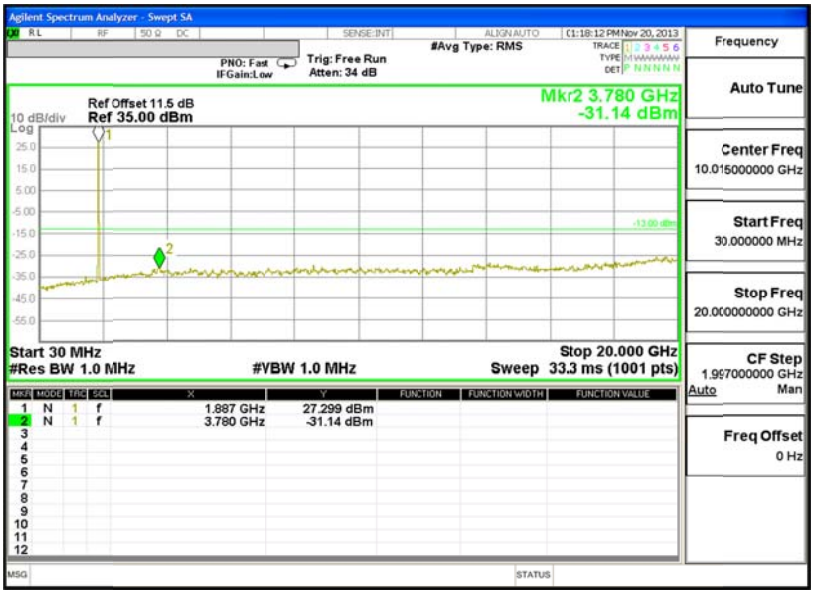
LOW, RB1-0, 30 TO 20000 MHz



MID, RB1-0, 30 TO 20000 MHz



HIGH, RB1-0, 30 TO 20000 MHz

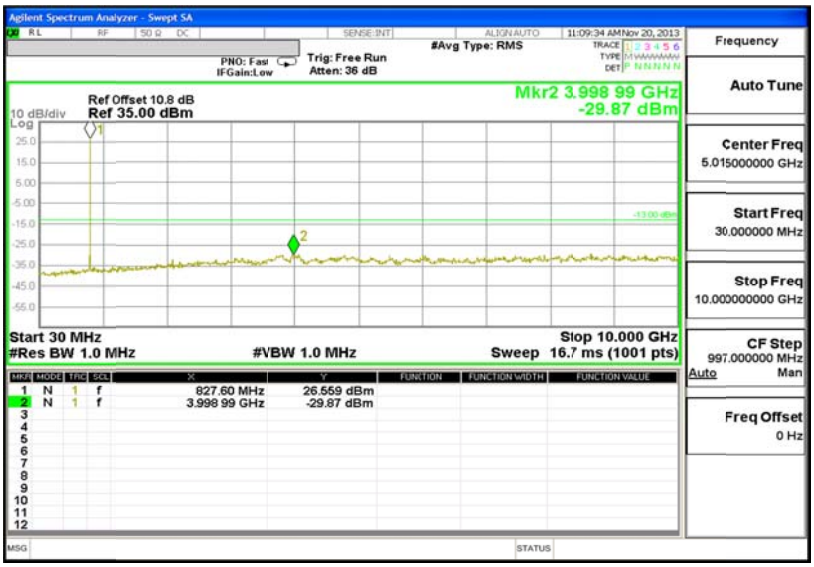


8.3.2. LTE BAND 5

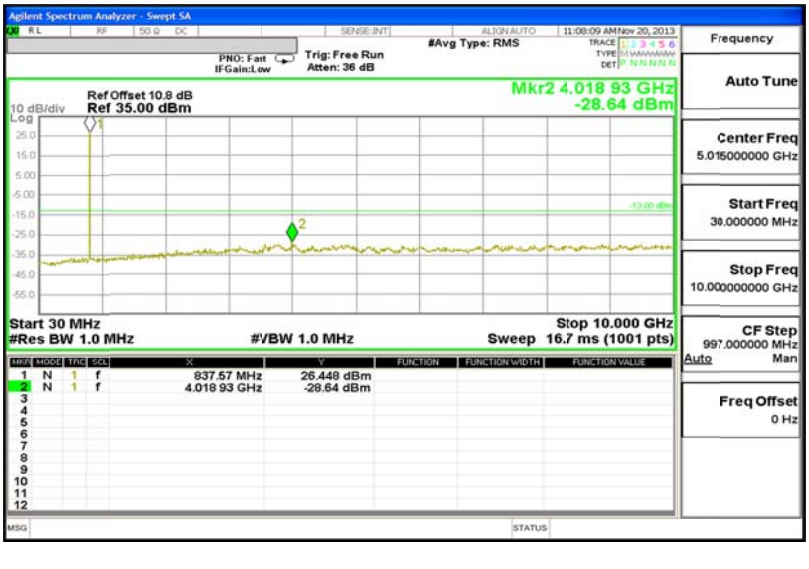
Band 5 (1.4 MHz BANDWIDTH)

LTE QPSK

LOW, RB1-0, 30 TO 10000 MHz



MID, RB1-0, 30 TO 10000 MHz



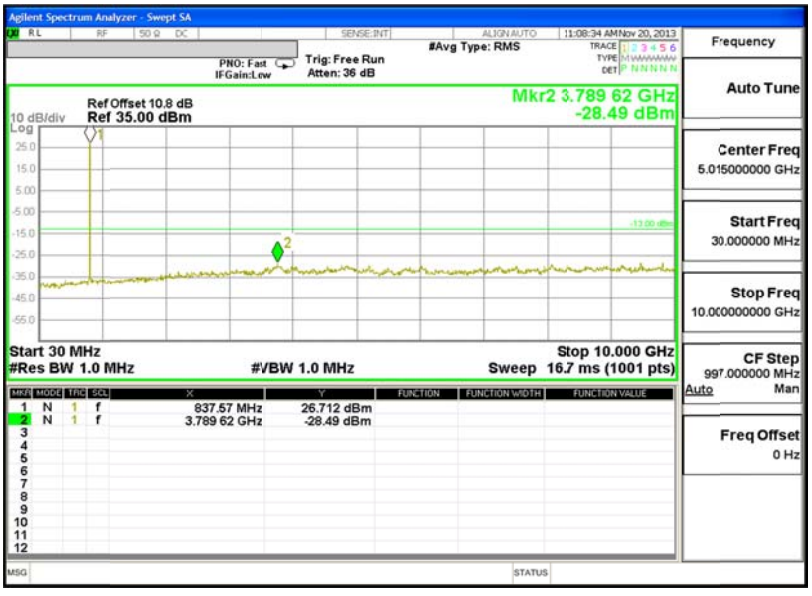
HIGH, RB1-0, 30 TO 10000 MHz

Band 5 (1.4 MHz BANDWIDTH)

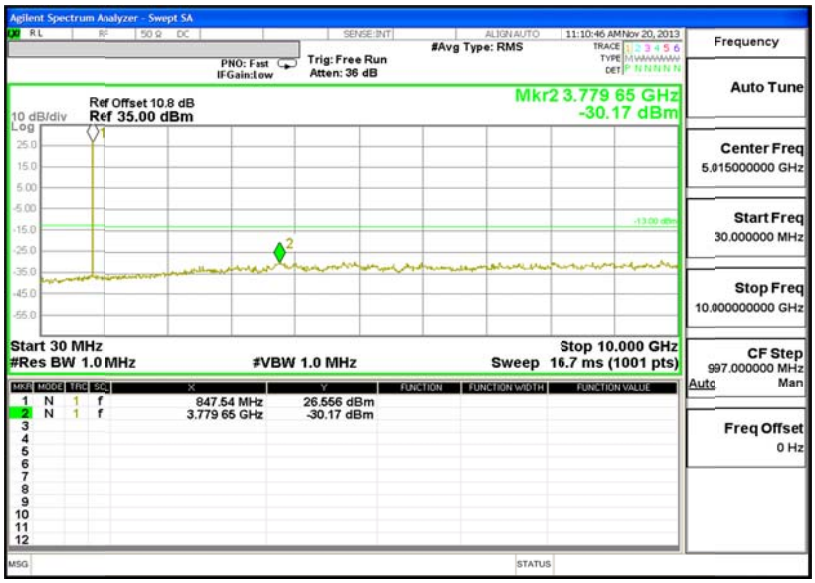
LTE 16QAM

LOW, RB1-0, 30 TO 10000 MHz

MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz

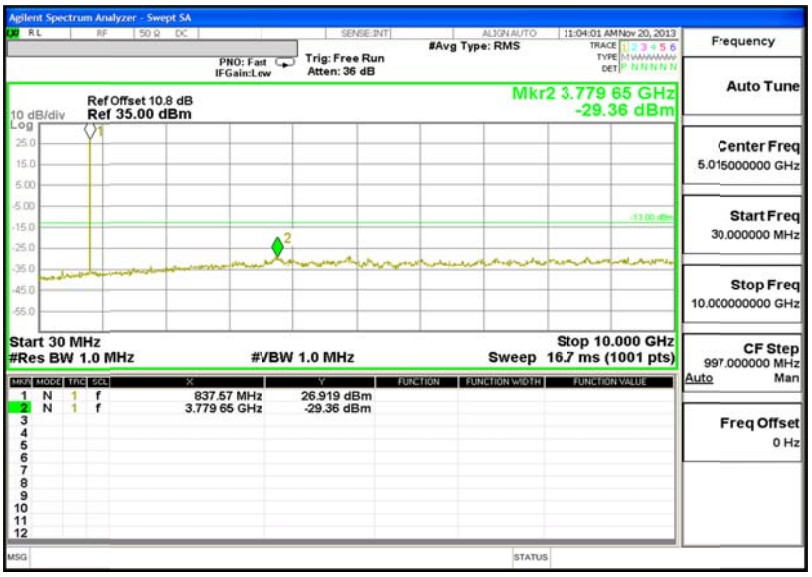


Band 5 (3MHz BANDWIDTH)

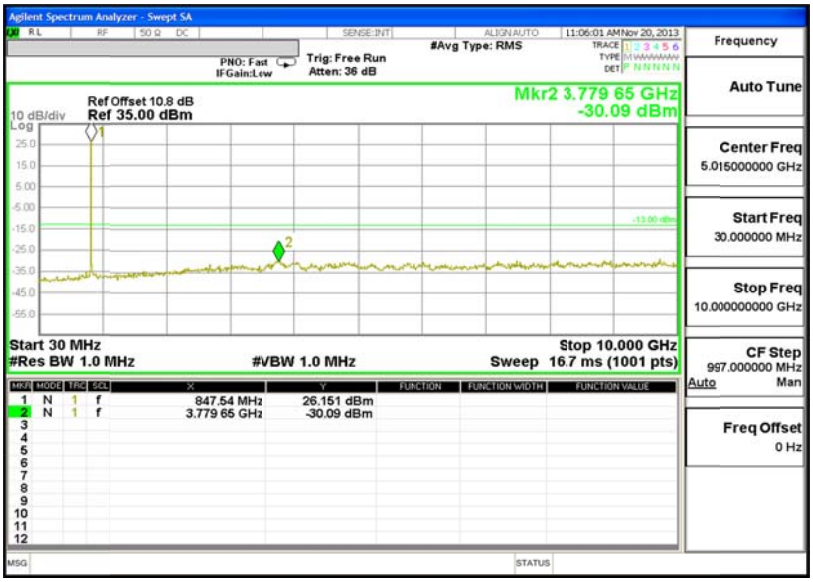
LTE QPSK

LOW, RB1-0, 30 TO 10000 MHz

MID, RB1-0, 30 TO 10000 MHz



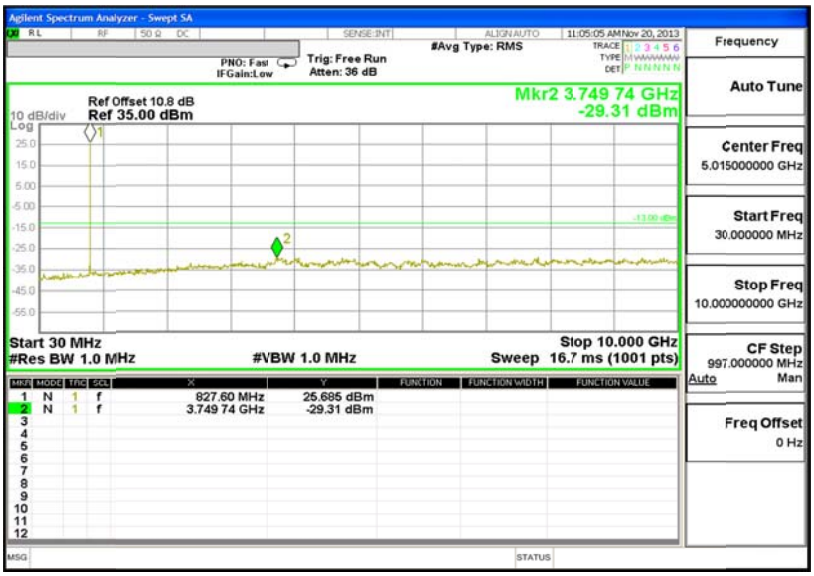
HIGH, RB1-0, 30 TO 10000 MHz



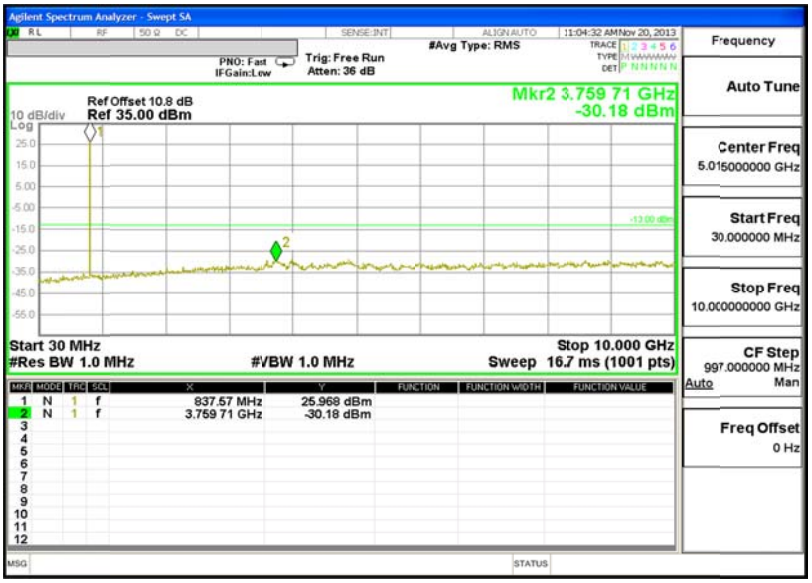
Band 5 (3MHz BANDWIDTH)

LTE 16QAM

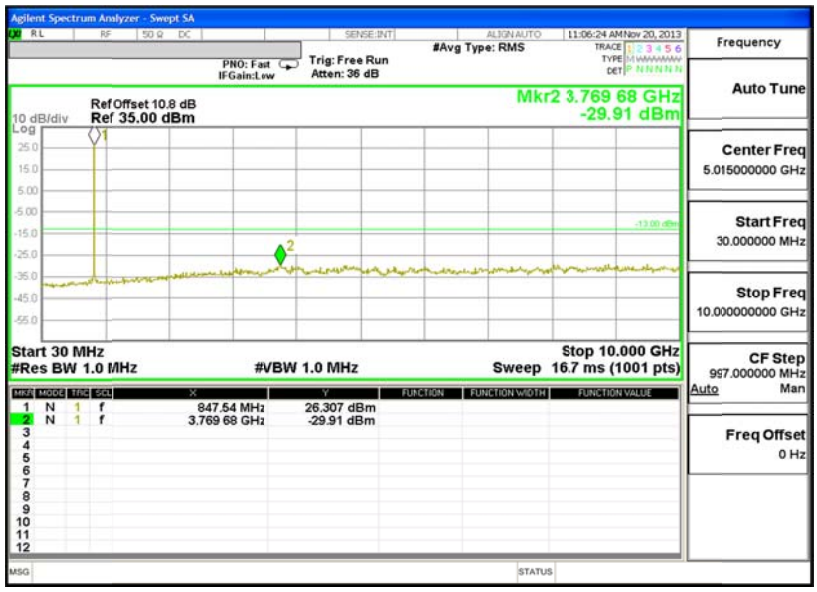
LOW, RB1-0, 30 TO 10000 MHz



MID, RB1-0, 30 TO 10000 MHz



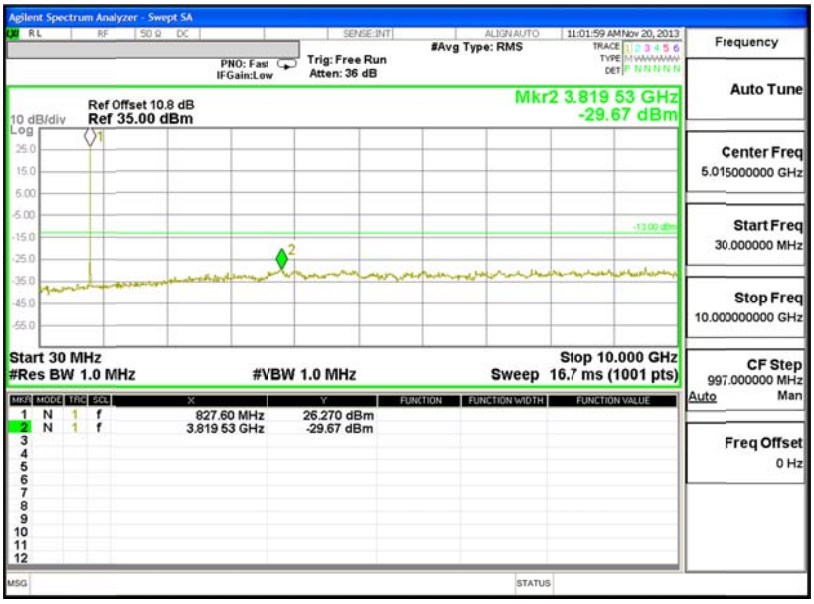
HIGH, RB1-0, 30 TO 10000 MHz



Band 5 (5MHz BANDWIDTH)

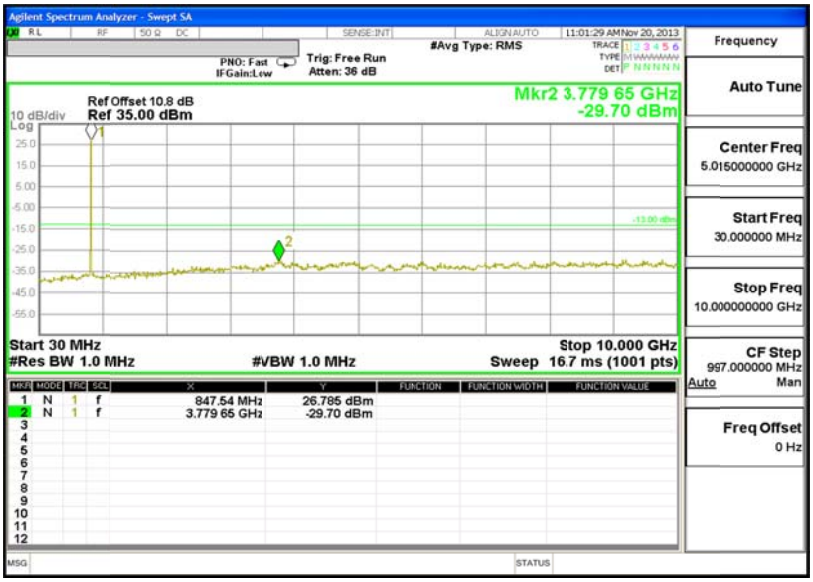
LTE QPSK

LOW, RB1-0, 30 TO 10000 MHz



MID, RB1-0, 30 TO 10000 MHz

HIGH, RB1-0, 30 TO 10000 MHz

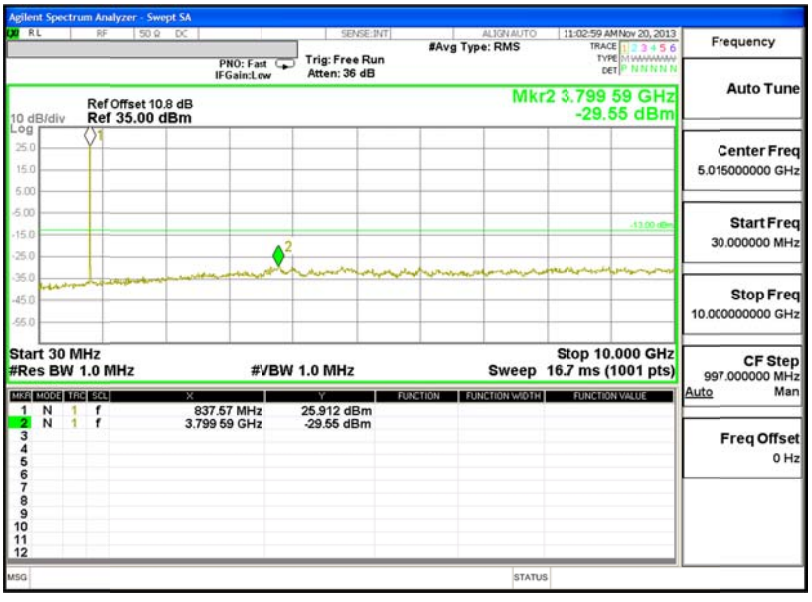


Band 5 (5MHz BANDWIDTH)

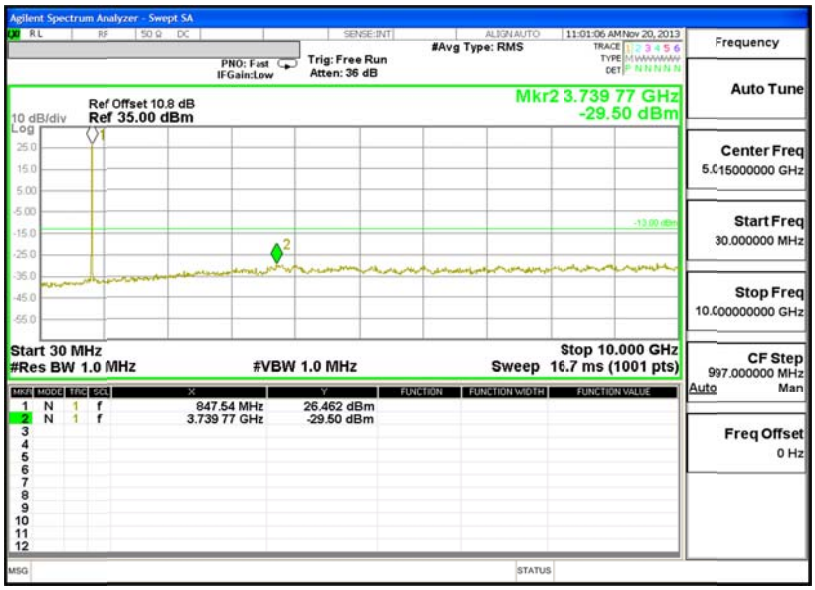
LTE 16QAM

LOW, RB1-0, 30 TO 10000 MH

MID, RB1-0, 30 TO 10000 MHz



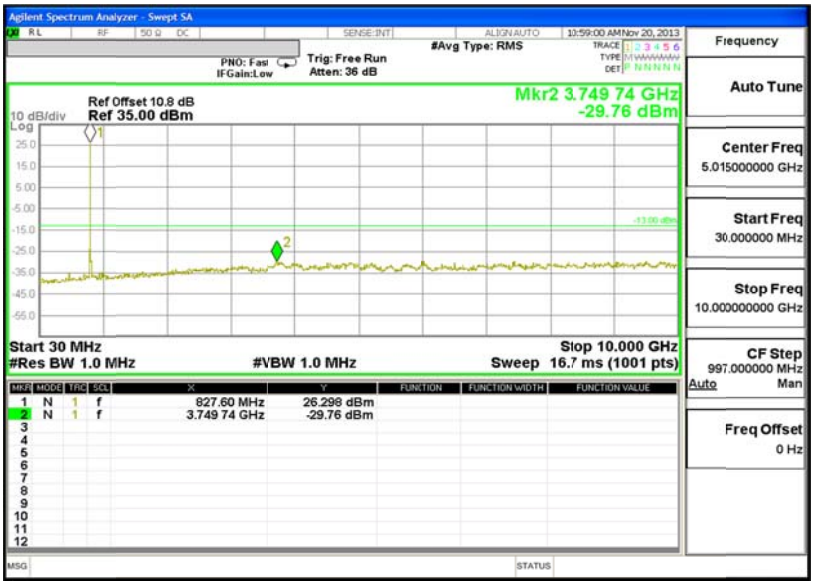
HIGH, RB1-0, 30 TO 10000 MHz



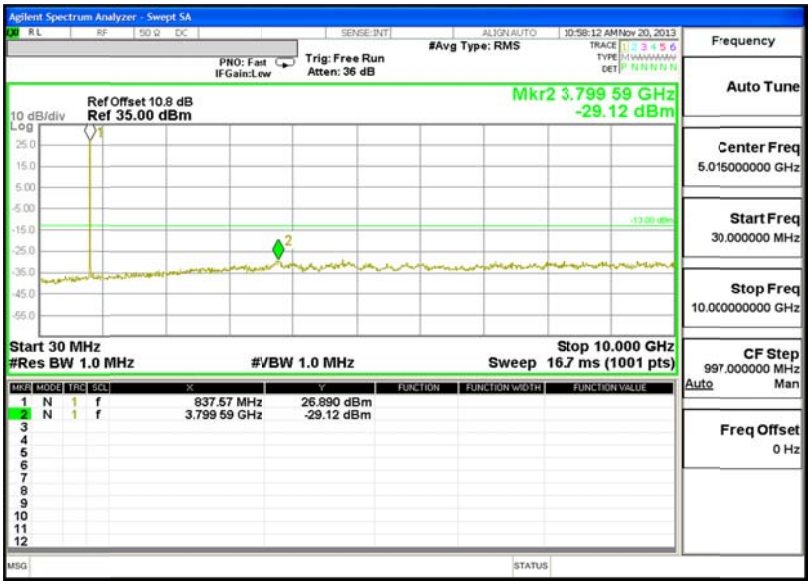
Band 5 (10MHz BANDWIDTH)

LTE QPSK

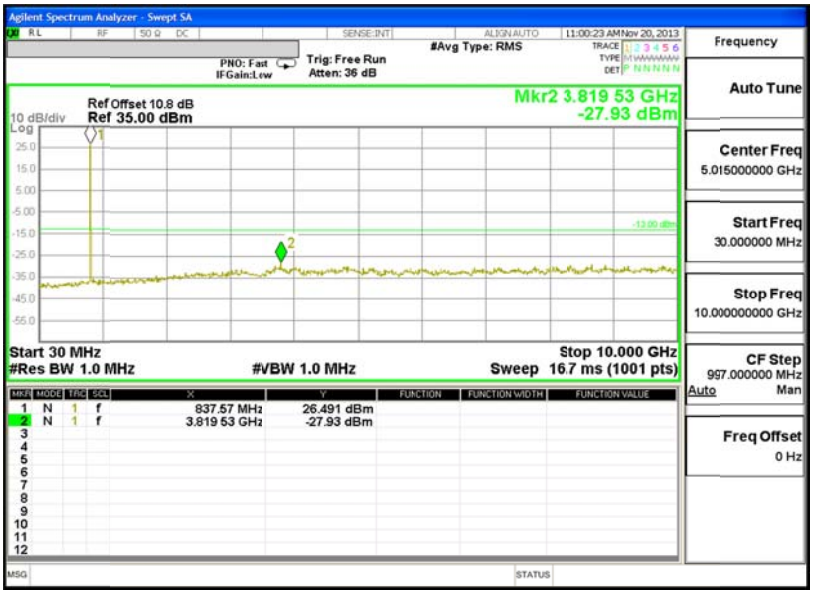
LOW, RB1-0, 30 TO 10000 MHz



MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz

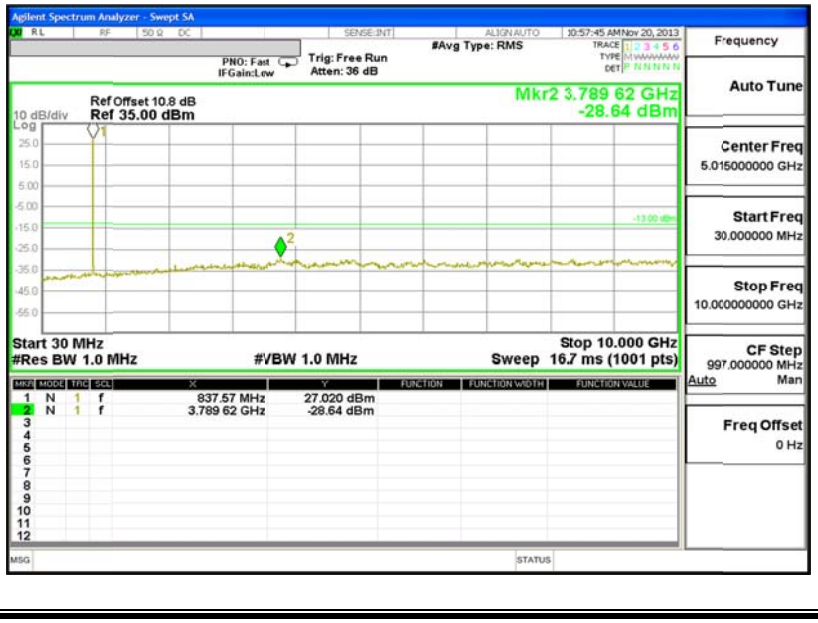


Band 5 (10MHz BANDWIDTH)

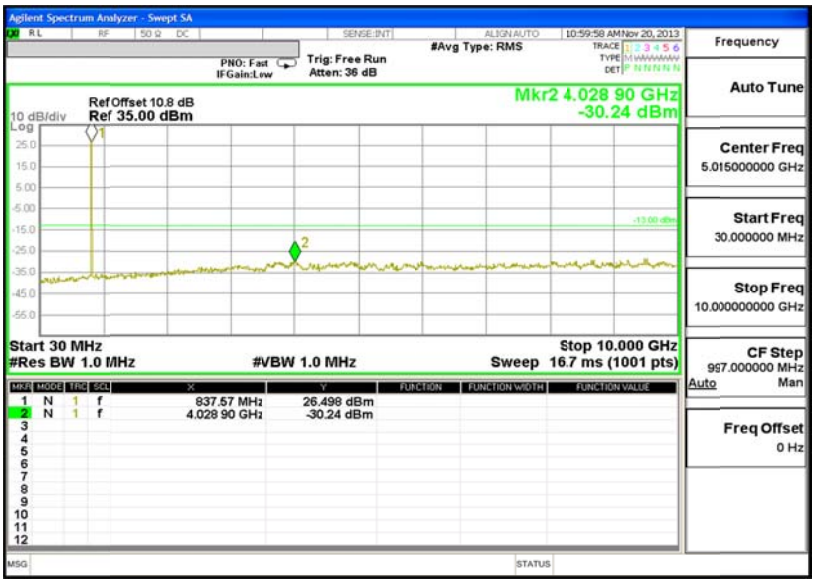
LTE 16QAM

LOW, RB1-0, 30 TO 10000 MHz

MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz



8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355 and §24.235

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.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage = Normal and ± 15%.

Frequency Stability Vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability Vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

- LTE Band 2
- LTE Band 5

RESULTS

See the following pages.

LTE BAND 2, QPSK – 1880.0 MHz

Reference Frequency: Mid Channel 1879.999977MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999975	0.001	2.5
3.80	40	1879.999976	0.000	2.5
3.80	30	1879.999982	-0.002	2.5
3.80	***20***	***1879.999977***	***0***	***2.5***
3.80	10	1879.999977	0.000	2.5
3.80	0	1879.999978	0.000	2.5
3.80	-10	1879.999978	-0.001	2.5
3.80	-20	1879.999980	-0.001	2.5
3.80	-30	1879.999979	-0.001	2.5

Reference Frequency: Mid Channel 1879.999977MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**1879.999977**	***0***	***2.5***
4.37	20	1879.999976	*0.001*	2.5
3.23	20	1879.999979	*-0.001*	2.5
End Voltage(3.05V)	20	1879.999979	*-0.001*	2.5

LTE BAND 2, 16QAM – 1880.0 MHz

Reference Frequency: Mid Channel 1879.999971MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999972	0.000	2.5
3.80	40	1879.999972	-0.001	2.5
3.80	30	1879.999973	-0.001	2.5
3.80	***20***	***1879.999971***	***0***	***2.5***
3.80	10	1879.999974	-0.002	2.5
3.80	0	1879.999976	-0.003	2.5
3.80	-10	1879.999973	-0.001	2.5
3.80	-20	1879.999980	-0.005	2.5
3.80	-30	1879.999974	-0.002	2.5

Reference Frequency: Mid Channel 1879.999971MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999971***	***0***	***2.5***
4.37	20	1879.999974	*-0.001*	2.5
3.23	20	1879.999973	*-0.001*	2.5
End Voltage(3.05V)	20	1879.999973	*-0.001*	2.5

LTE BAND 5 – 836.5 MHz QPSK

Reference Frequency: Mid Channel 836.500006 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.500006	0.000	2.5
3.80	40	836.500005	0.000	2.5
3.80	30	836.500006	0.000	2.5
3.80	***20***	**836.500006**	***0***	***2.5***
3.80	10	836.500005	0.000	2.5
3.80	0	836.500005	0.000	2.5
3.80	-10	836.500005	0.000	2.5
3.80	-20	836.500005	0.000	2.5
3.80	-30	836.500006	0.000	2.5

Reference Frequency: Mid Channel 836.500006 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.500006***	***0***	***2.5***
4.37	20	836.500006	*-0.001*	2.5
3.23	20	836.500005	*0.000*	2.5
End Voltage(3.05V)	20	836.500005	*0.000*	2.5

LTE BAND 5 – 836.5 MHZ, 16QAM

Reference Frequency: Mid Channel 836.5000105MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.5000109	0.000	2.5
3.80	40	836.5000109	0.000	2.5
3.80	30	836.5000108	0.000	2.5
3.80	***20***	***836.5000105***	***0***	***2.5***
3.80	10	836.5000124	-0.002	2.5
3.80	0	836.5000118	-0.002	2.5
3.80	-10	836.5000128	-0.003	2.5
3.80	-20	836.5000098	0.001	2.5
3.80	-30	836.5000062	0.005	2.5

Reference Frequency: Mid Channel 836.5000105MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.5000105***	***0***	***2.5***
4.37	20	836.5000109	*0.000*	2.5
3.23	20	836.5000105	*0.000*	2.5
End Voltage(3.05V)	20	836.5000105	*0.000*	2.5

9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913 and §24.232

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.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

MODES TESTED

- LTE Band 2
- LTE Band 5

RESULTS

BAND 2

EIRP LTE Band 2 (1.4 MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
1.4MHz Band QPSK	6/0	1850.7	**29.37**	864.97
		1880.0	28.82	762.08
		1909.3	28.61	726.11
1.4MHz Band 16QAM	6/0	1850.7	**28.57**	719.45
		1880.0	27.92	619.44
		1909.3	27.71	590.20

EIRP LTE Band 2 (3MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
3.0MHz Band QPSK	15/0	1851.5	**29.15**	822.24
		1880.0	29.02	797.99
		1908.5	28.51	709.58
3.0MHz Band 16QAM	15/0	1851.5	**28.07**	641.21
		1880.0	28.02	633.87
		1908.5	27.51	563.64

EIRP LTE Band 2 (5MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
5.0MHz Band QPSK	25/0	1852.5	**29.17**	826.04
		1880.0	28.72	744.73
		1907.5	27.31	538.27
5.0MHz Band 16QAM	25/0	1852.5	**28.27**	671.43
		1880.0	27.72	591.56
		1907.5	26.31	427.56

EIRP LTE Band 2 (10MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
10.0MHz Band QPSK	50/0	1855.0	**29.07**	807.24
		1880.0	28.42	695.02
		1905.0	28.31	677.64
10.0MHz Band 16QAM	50/0	1855.0	**28.07**	641.21
		1880.0	27.62	578.10
		1905.0	27.31	538.27

EIRP LTE Band 2 (15MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
15MHz Band QPSK	75/0	1857.5	29.07	807.24
		1880.0	**29.32**	855.07
		1902.5	28.31	677.64
15MHz Band 16QAM	75/0	1857.5	28.27	671.43
		1880.0	**28.42**	695.02
		1902.5	27.31	538.27

EIRP LTE Band 2 (20MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	EIRP (Peak)	
			dBm	mW
20.0MHz Band QPSK	100/0	1860.0	**29.19**	829.85
		1880.0	29.12	816.58
		1900.0	28.61	726.11
20MHz Band 16QAM	100/0	1860.0	**28.27**	671.43
		1880.0	28.12	648.63
		1900.0	27.71	590.20

BAND 5

ERP LTE Band 5 (1.4 MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	ERP (Average)	
			dBm	mW
1.4MHz Band QPSK	1/0	824.7	**20.98**	125.31
		836.5	20.91	123.31
		848.3	20.93	123.88
1.4MHz Band 16QAM	1/0	824.7	**20.08**	101.86
		836.5	19.88	97.27
		848.3	19.98	99.54

ERP LTE Band 5 (3MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	ERP (Average)	
			dBm	mW
3.0 MHZ BAND QPSK	1/0	825.5	20.95	124.45
		836.5	20.88	122.46
		847.5	**20.98**	125.31
3.0 MHZ BAND 16QAM	1/0	825.5	19.88	97.27
		836.5	19.93	98.40
		847.5	**19.98**	99.54

ERP LTE Band 5 (5MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	ERP (Average)	
			dBm	mW
5MHz Band QPSK	1/0	826.5	**20.90**	123.03
		836.5	20.84	121.34
		846.5	20.68	116.95
5MHz Band 16QAM	1/0	826.5	**19.98**	99.54
		836.5	19.88	97.27
		846.5	19.78	95.06

ERP LTE Band 5 (10MHz BANDWIDTH)

Mode	RB Offset/ RB Size	f (MHz)	ERP (Average)	
			dBm	mW
10.0 MHZ BAND QPSK	1/0	829.0	**20.88**	122.46
		836.5	20.78	119.67
		844.0	20.68	116.95
10.0 MHZ BAND 16QAM	1/0	829.0	**19.88**	97.27
		836.5	19.83	96.16
		844.0	19.68	92.90

9.1.1. LTE BAND 2

PEAK

EIRP LTE QPSK Band 2 (1.4 MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 QPSK 1.4MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	23.0	V	1.53	7.88	29.37	33.0	-3.6	
1.851	13.1	H	1.53	7.88	19.42	33.0	-13.6	
Mid Ch								
1.880	22.5	V	1.53	7.86	28.82	33.0	-4.2	
1.880	13.0	H	1.53	7.86	19.29	33.0	-13.7	
High Ch								
1.909	22.3	V	1.53	7.84	28.61	33.0	-4.4	
1.909	10.9	H	1.53	7.84	17.17	33.0	-15.8	

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EIRP LTE 16QAM Band 2 (1.4 MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	1/7/2014
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 2 16QAM 1.4MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	22.2	V	1.53	7.88	28.57	33.0	-4.4	
1.851	12.2	H	1.53	7.88	18.51	33.0	-14.5	
Mid Ch								
1.880	21.6	V	1.53	7.86	27.92	33.0	-5.1	
1.880	11.9	H	1.53	7.86	18.18	33.0	-14.8	
High Ch								
1.909	21.4	V	1.53	7.84	27.71	33.0	-5.3	
1.909	9.9	H	1.53	7.84	16.24	33.0	-16.8	

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EIRP LTE QPSK Band 2 (3MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 QPSK 3MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	22.8	V	1.53	7.88	29.15	33.0	-3.9	
1.852	13.3	H	1.53	7.88	19.63	33.0	-13.4	
Mid Ch								
1.880	22.7	V	1.53	7.86	29.02	33.0	-4.0	
1.880	13.4	H	1.53	7.86	19.74	33.0	-13.3	
High Ch								
1.909	22.2	V	1.53	7.84	28.51	33.0	-4.5	
1.909	10.7	H	1.53	7.84	17.04	33.0	-16.0	

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EIRP LTE 16QAM Band 2 (3MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 16QAM 3MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	21.7	V	1.53	7.88	28.07	33.0	-4.9	
1.852	12.2	H	1.53	7.88	18.58	33.0	-14.4	
Mid Ch								
1.880	21.7	V	1.53	7.86	28.02	33.0	-5.0	
1.880	12.5	H	1.53	7.86	18.86	33.0	-14.1	
High Ch								
1.909	21.2	V	1.53	7.84	27.51	33.0	-5.5	
1.909	9.7	H	1.53	7.84	16.05	33.0	-17.0	

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EIRP LTE QPSK Band 2 (5MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 QPSK 5MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.853	22.8	V	1.53	7.88	29.17	33.0	-3.8	
1.853	14.1	H	1.53	7.88	20.44	33.0	-12.6	
Mid Ch								
1.880	22.4	V	1.53	7.86	28.72	33.0	-4.3	
1.880	14.1	H	1.53	7.86	20.44	33.0	-12.6	
High Ch								
1.908	21.0	V	1.53	7.84	27.31	33.0	-5.7	
1.908	11.9	H	1.53	7.84	18.24	33.0	-14.8	

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EIRP LTE 16QAM Band 2 (5MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 16QAM 5MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.853	21.9	V	1.53	7.88	28.27	33.0	-4.7	
1.853	13.2	H	1.53	7.88	19.51	33.0	-13.5	
Mid Ch								
1.880	21.4	V	1.53	7.86	27.72	33.0	-5.3	
1.880	13.2	H	1.53	7.86	19.48	33.0	-13.5	
High Ch								
1.908	20.0	V	1.53	7.84	26.31	33.0	-6.7	
1.908	11.0	H	1.53	7.84	17.27	33.0	-15.7	

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EIRP LTE QPSK Band 2 (10MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	1/7/2014
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 2 QPSK 10MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.855	22.7	V	1.53	7.88	29.07	33.0	-3.9	
1.855	14.3	H	1.53	7.88	20.60	33.0	-12.4	
Mid Ch								
1.880	22.1	V	1.53	7.86	28.42	33.0	-4.6	
1.880	14.0	H	1.53	7.86	20.30	33.0	-12.7	
High Ch								
1.905	22.0	V	1.53	7.84	28.31	33.0	-4.7	
1.905	11.7	H	1.53	7.84	18.05	33.0	-15.0	

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EIRP LTE 16QAM Band 2 (10MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 16QAM 10MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.855	21.7	V	1.53	7.88	28.07	33.0	-4.9	
1.855	13.3	H	1.53	7.88	19.62	33.0	-13.4	
Mid Ch								
1.880	21.3	V	1.53	7.86	27.62	33.0	-5.4	
1.880	13.5	H	1.53	7.86	19.79	33.0	-13.2	
High Ch								
1.905	21.0	V	1.53	7.84	27.31	33.0	-5.7	
1.905	10.7	H	1.53	7.84	17.03	33.0	-16.0	

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EIRP LTE QPSK Band 2 (15MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 QPSK 15MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.858	22.7	V	1.53	7.88	29.07	33.0	-3.9	
1.858	13.6	H	1.53	7.88	19.99	33.0	-13.0	
Mid Ch								
1.880	23.0	V	1.53	7.86	29.32	33.0	-3.7	
1.880	14.3	H	1.53	7.86	20.67	33.0	-12.3	
High Ch								
1.903	22.0	V	1.53	7.84	28.31	33.0	-4.7	
1.903	11.5	H	1.53	7.84	17.76	33.0	-15.2	

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EIRP LTE 16QAM Band 2 (15MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 16QAM 15MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.858	21.9	V	1.53	7.88	28.27	33.0	-4.7	
1.858	12.7	H	1.53	7.88	19.04	33.0	-14.0	
Mid Ch								
1.880	22.1	V	1.53	7.86	28.42	33.0	-4.6	
1.880	13.4	H	1.53	7.86	19.70	33.0	-13.3	
High Ch								
1.903	21.0	V	1.53	7.84	27.31	33.0	-5.7	
1.903	10.5	H	1.53	7.84	16.81	33.0	-16.2	

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EIRP LTE QPSK Band 2 (20MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 QPSK 20MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.860	22.8	V	1.53	7.88	29.19	33.0	-3.8	
1.860	13.9	H	1.53	7.88	20.21	33.0	-12.8	
Mid Ch								
1.880	22.8	V	1.53	7.86	29.12	33.0	-3.9	
1.880	14.4	H	1.53	7.86	20.72	33.0	-12.3	
High Ch								
1.900	22.3	V	1.53	7.84	28.61	33.0	-4.4	
1.900	12.7	H	1.53	7.84	19.05	33.0	-14.0	

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EIRP LTE 16QAM Band 2 (20MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 1/7/2014
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 2 16QAM 20MHz BW

Test Equipment:
Receiving: Horn T344 and Chamber D SMA Cables
Substitution: Horn T59 Substitution, and 12ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.860	21.9	V	1.53	7.88	28.27	33.0	-4.7	
1.860	12.9	H	1.53	7.88	19.26	33.0	-13.7	
Mid Ch								
1.880	21.8	V	1.53	7.86	28.12	33.0	-4.9	
1.880	13.4	H	1.53	7.86	19.70	33.0	-13.3	
High Ch								
1.900	21.4	V	1.53	7.84	27.71	33.0	-5.3	
1.900	11.8	H	1.53	7.84	18.09	33.0	-14.9	

Rev. 10.24.13

9.1.2. LTE BAND 5

AVERAGE

ERP LTE QPSK Band 5 (1.4 MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 12/19/13
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 5 QPSK 1.4MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	21.60	V	0.6	0.0	20.98	38.5	-17.5	
824.70	12.74	H	0.6	0.0	12.12	38.5	-26.3	
Mid Ch								
836.50	21.53	V	0.6	0.0	20.91	38.5	-17.5	
836.50	11.34	H	0.6	0.0	10.72	38.5	-27.7	
High Ch								
848.30	21.55	V	0.6	0.0	20.93	38.5	-17.5	
848.30	12.41	H	0.6	0.0	11.79	38.5	-26.7	

Rev. 10.24.13

ERP LTE 16QAM Band 5 (1.4 MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	12/19/13
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 5 16QAM 1.4MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	20.70	V	0.6	0.0	20.08	38.5	-18.4	
824.70	11.77	H	0.6	0.0	11.15	38.5	-27.3	
Mid Ch								
836.50	20.50	V	0.6	0.0	19.88	38.5	-18.6	
836.50	10.29	H	0.6	0.0	9.67	38.5	-28.8	
High Ch								
848.30	20.60	V	0.6	0.0	19.98	38.5	-18.5	
848.30	11.16	H	0.6	0.0	10.54	38.5	-27.9	

Rev. 10.24.13

ERP LTE QPSK Band 5 (3MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	12/19/13
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 5 QPSK 3MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	21.57	V	0.6	0.0	20.95	38.5	-17.5	
825.50	12.60	H	0.6	0.0	11.98	38.5	-26.5	
Mid Ch								
836.50	21.50	V	0.6	0.0	20.88	38.5	-17.6	
836.50	11.02	H	0.6	0.0	10.40	38.5	-28.0	
High Ch								
847.50	21.60	V	0.6	0.0	20.98	38.5	-17.5	
847.50	12.36	H	0.6	0.0	11.74	38.5	-26.7	

Rev. 10.24.13

ERP LTE 16QAM Band 5 (3MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	12/19/13
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 5 16QAM 3MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	20.50	V	0.6	0.0	19.88	38.5	-18.6	
825.50	11.89	H	0.6	0.0	11.27	38.5	-27.2	
Mid Ch								
836.50	20.55	V	0.6	0.0	19.93	38.5	-18.5	
836.50	9.85	H	0.6	0.0	9.23	38.5	-29.2	
High Ch								
847.50	20.60	V	0.6	0.0	19.98	38.5	-18.5	
847.50	11.40	H	0.6	0.0	10.78	38.5	-27.7	

Rev. 10.24.13

ERP LTE QPSK Band 5 (5MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	12/19/13
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 5 QPSK 5MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	21.52	V	0.6	0.0	20.90	38.5	-17.5	
826.50	12.86	H	0.6	0.0	12.24	38.5	-26.2	
Mid Ch								
836.50	21.46	V	0.6	0.0	20.84	38.5	-17.6	
836.50	10.84	H	0.6	0.0	10.22	38.5	-28.2	
High Ch								
846.50	21.30	V	0.6	0.0	20.68	38.5	-17.8	
846.50	12.92	H	0.6	0.0	12.30	38.5	-26.1	

Rev. 10.24.13

ERP LTE 16QAM Band 5 (5MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 12/19/13
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 5 16QAM 5MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	20.60	V	0.6	0.0	19.98	38.5	-18.5	
826.50	11.81	H	0.6	0.0	11.19	38.5	-27.3	
Mid Ch								
836.50	20.50	V	0.6	0.0	19.88	38.5	-18.6	
836.50	9.75	H	0.6	0.0	9.13	38.5	-29.3	
High Ch								
846.50	20.40	V	0.6	0.0	19.78	38.5	-18.7	
846.50	11.65	H	0.6	0.0	11.03	38.5	-27.4	

Rev. 10.24.13

ERP LTE QPSK Band 5 (10MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company: Apple
Project #: 13U16583
Date: 12/19/13
Test Engineer: M. Hua
Configuration: EUT Only
Mode: LTE Band 5 QPSK 10MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	21.50	V	0.6	0.0	20.88	38.5	-17.6	
829.00	12.99	H	0.6	0.0	12.37	38.5	-26.1	
Mid Ch								
836.50	21.40	V	0.6	0.0	20.78	38.5	-17.7	
836.50	11.18	H	0.6	0.0	10.56	38.5	-27.9	
High Ch								
844.00	21.30	V	0.6	0.0	20.68	38.5	-17.8	
844.00	12.46	H	0.6	0.0	11.84	38.5	-26.6	

Rev. 10.24.13

ERP LTE 16QAM Band 5 (10MHz BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber D

Company:	Apple
Project #:	13U16583
Date:	12/19/13
Test Engineer:	M. Hua
Configuration:	EUT Only
Mode:	LTE Band 5 16QAM 10MHz BW

Test Equipment:
Receiving: Sunol T407, and Chamber D Cable
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	20.50	V	0.6	0.0	19.88	38.5	-18.6	
829.00	11.77	H	0.6	0.0	11.15	38.5	-27.3	
Mid Ch								
836.50	20.45	V	0.6	0.0	19.83	38.5	-18.6	
836.50	10.11	H	0.6	0.0	9.49	38.5	-29.0	
High Ch								
844.00	20.30	V	0.6	0.0	19.68	38.5	-18.8	
844.00	11.44	H	0.6	0.0	10.82	38.5	-27.6	

Rev. 10.24.13

9.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917 and §24.238.

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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.

MODES TESTED

- LTE Band 2
- LTE Band 5

RESULTS

9.2.1. LTE BAND 2

QPSK Band 2 (1.4 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 1.4MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1851 MHz)									
3.702	-19.2	V	3.0	30.2	1.0	-48.4	-13.0	-35.4	
5.553	-22.8	V	3.0	28.4	1.0	-50.2	-13.0	-37.2	
3.702	-19.7	H	3.0	30.2	1.0	-48.9	-13.0	-35.9	
5.553	-21.4	H	3.0	28.4	1.0	-48.8	-13.0	-35.8	
Mid Ch, (1880 MHz)									
3.760	-19.1	V	3.0	30.1	1.0	-48.3	-13.0	-35.3	
5.640	-23.3	V	3.0	28.3	1.0	-50.6	-13.0	-37.6	
3.760	-19.6	H	3.0	30.1	1.0	-48.7	-13.0	-35.7	
5.640	-21.3	H	3.0	28.3	1.0	-48.6	-13.0	-35.6	
High Ch, (1909.3 MHz)									
3.819	-19.4	V	3.0	30.1	1.0	-48.5	-13.0	-35.5	
5.728	-22.3	V	3.0	28.2	1.0	-49.5	-13.0	-36.5	
3.819	-19.6	H	3.0	30.1	1.0	-48.7	-13.0	-35.7	
5.728	-21.3	H	3.0	28.2	1.0	-48.5	-13.0	-35.5	

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

16QAM Band 2 (1.4 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 1.4MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1851 MHz)									
3.702	-20.2	V	3.0	30.2	1.0	-49.4	-13.0	-36.4	
5.553	-23.8	V	3.0	28.4	1.0	-51.2	-13.0	-38.2	
3.702	-20.7	H	3.0	30.2	1.0	-49.9	-13.0	-36.9	
5.553	-22.4	H	3.0	28.4	1.0	-49.8	-13.0	-36.8	
Mid Ch, (1880 MHz)									
3.760	-20.1	V	3.0	30.1	1.0	-49.3	-13.0	-36.3	
5.640	-24.3	V	3.0	28.3	1.0	-51.6	-13.0	-38.6	
3.760	-20.6	H	3.0	30.1	1.0	-49.7	-13.0	-36.7	
5.640	-22.3	H	3.0	28.3	1.0	-49.6	-13.0	-36.6	
High Ch, (1909.3 MHz)									
3.819	-20.4	V	3.0	30.1	1.0	-49.5	-13.0	-36.5	
5.728	-23.3	V	3.0	28.2	1.0	-50.5	-13.0	-37.5	
3.819	-20.6	H	3.0	30.1	1.0	-49.7	-13.0	-36.7	
5.728	-22.1	H	3.0	28.2	1.0	-49.3	-13.0	-36.3	

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

QPSK Band 2 (3MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 3MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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 MHz)									
3.704	-19.3	V	3.0	30.2	1.0	-48.5	-13.0	-35.5	
5.556	-22.5	V	3.0	28.4	1.0	-49.8	-13.0	-36.8	
3.704	-20.0	H	3.0	30.2	1.0	-49.2	-13.0	-36.2	
5.556	-21.1	H	3.0	28.4	1.0	-48.5	-13.0	-35.5	
Mid Ch, (1880 MHz)									
3.760	-19.0	V	3.0	30.1	1.0	-48.2	-13.0	-35.2	
5.640	-22.7	V	3.0	28.3	1.0	-50.0	-13.0	-37.0	
3.760	-19.3	H	3.0	30.1	1.0	-48.4	-13.0	-35.4	
5.640	-21.1	H	3.0	28.3	1.0	-48.4	-13.0	-35.4	
High Ch, (1909 MHz)									
3.818	-19.1	V	3.0	30.1	1.0	-48.2	-13.0	-35.2	
5.727	-22.7	V	3.0	28.2	1.0	-49.9	-13.0	-36.9	
3.818	-19.7	H	3.0	30.1	1.0	-48.8	-13.0	-35.8	
5.727	-20.9	H	3.0	28.2	1.0	-48.1	-13.0	-35.1	

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

16QAM Band 2 (3MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 3MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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 MHz)									
3.704	-20.3	V	3.0	30.2	1.0	-49.5	-13.0	-36.5	
5.556	-23.5	V	3.0	28.4	1.0	-50.8	-13.0	-37.8	
3.704	-21.0	H	3.0	30.2	1.0	-50.2	-13.0	-37.2	
5.556	-22.1	H	3.0	28.4	1.0	-49.5	-13.0	-36.5	
Mid Ch, (1880 MHz)									
3.760	-20.0	V	3.0	30.1	1.0	-49.2	-13.0	-36.2	
5.640	-23.7	V	3.0	28.3	1.0	-51.0	-13.0	-38.0	
3.760	-20.2	H	3.0	30.1	1.0	-49.3	-13.0	-36.3	
5.640	-22.1	H	3.0	28.3	1.0	-49.4	-13.0	-36.4	
High Ch, (1909 MHz)									
3.818	-20.1	V	3.0	30.1	1.0	-49.2	-13.0	-36.2	
5.727	-23.5	V	3.0	28.2	1.0	-50.7	-13.0	-37.7	
3.818	-20.7	H	3.0	30.1	1.0	-49.8	-13.0	-36.8	
5.727	-21.9	H	3.0	28.2	1.0	-49.1	-13.0	-36.1	

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

QPSK Band 2 (5MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 5MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1853 MHz)									
3.706	-19.2	V	3.0	30.2	1.0	-48.4	-13.0	-35.4	
5.559	-22.6	V	3.0	28.4	1.0	-49.9	-13.0	-36.9	
3.706	-19.5	H	3.0	30.2	1.0	-48.7	-13.0	-35.7	
5.559	-21.7	H	3.0	28.4	1.0	-49.1	-13.0	-36.1	
Mid Ch, (1880 MHz)									
3.760	-19.7	V	3.0	30.1	1.0	-48.9	-13.0	-35.9	
5.640	-22.3	V	3.0	28.3	1.0	-49.6	-13.0	-36.6	
3.760	-20.3	H	3.0	30.1	1.0	-49.4	-13.0	-36.4	
5.640	-21.6	H	3.0	28.3	1.0	-48.9	-13.0	-35.9	
High Ch, (1908 MHz)									
3.816	-18.8	V	3.0	30.1	1.0	-47.9	-13.0	-34.9	
5.724	-22.2	V	3.0	28.2	1.0	-49.4	-13.0	-36.4	
3.816	-20.1	H	3.0	30.1	1.0	-49.2	-13.0	-36.2	
5.724	-21.2	H	3.0	28.2	1.0	-48.4	-13.0	-35.4	

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

16QAM Band 2 (5MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 5MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1853 MHz)									
3.706	-20.2	V	3.0	30.2	1.0	-49.4	-13.0	-36.4	
5.559	-23.6	V	3.0	28.4	1.0	-50.9	-13.0	-37.9	
3.706	-20.5	H	3.0	30.2	1.0	-49.7	-13.0	-36.7	
5.559	-22.5	H	3.0	28.4	1.0	-49.9	-13.0	-36.9	
Mid Ch, (1880 MHz)									
3.760	-20.6	V	3.0	30.1	1.0	-49.8	-13.0	-36.8	
5.640	-23.3	V	3.0	28.3	1.0	-50.6	-13.0	-37.6	
3.760	-21.2	H	3.0	30.1	1.0	-50.3	-13.0	-37.3	
5.640	-22.5	H	3.0	28.3	1.0	-49.8	-13.0	-36.8	
High Ch, (1908 MHz)									
3.816	-19.8	V	3.0	30.1	1.0	-48.9	-13.0	-35.9	
5.724	-23.2	V	3.0	28.2	1.0	-50.4	-13.0	-37.4	
3.816	-21.1	H	3.0	30.1	1.0	-50.2	-13.0	-37.2	
5.724	-22.2	H	3.0	28.2	1.0	-49.4	-13.0	-36.4	

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

QPSK Band 2 (10MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 10MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1855 MHz)									
3.701	-18.3	V	3.0	30.2	1.0	-47.5	-13.0	-34.5	
5.551	-22.6	V	3.0	28.4	1.0	-50.0	-13.0	-37.0	
3.701	-18.9	H	3.0	30.2	1.0	-48.1	-13.0	-35.1	
5.551	-21.0	H	3.0	28.4	1.0	-48.4	-13.0	-35.4	
Mid Ch, (1880 MHz)									
3.750	-19.1	V	3.0	30.2	1.0	-48.3	-13.0	-35.3	
5.625	-23.0	V	3.0	28.3	1.0	-50.3	-13.0	-37.3	
3.750	-19.2	H	3.0	30.2	1.0	-48.3	-13.0	-35.3	
5.625	-20.4	H	3.0	28.3	1.0	-47.7	-13.0	-34.7	
High Ch, (1905 MHz)									
3.801	-18.7	V	3.0	30.1	1.0	-47.8	-13.0	-34.8	
5.702	-22.0	V	3.0	28.2	1.0	-49.3	-13.0	-36.3	
3.801	-19.5	H	3.0	30.1	1.0	-48.6	-13.0	-35.6	
5.702	-21.1	H	3.0	28.2	1.0	-48.4	-13.0	-35.4	

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

16QAM Band 2 (10MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 10MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1855 MHz)									
3.701	-19.3	V	3.0	30.2	1.0	-48.5	-13.0	-35.5	
5.551	-23.6	V	3.0	28.4	1.0	-51.0	-13.0	-38.0	
3.701	-19.9	H	3.0	30.2	1.0	-49.1	-13.0	-36.1	
5.551	-22.0	H	3.0	28.4	1.0	-49.4	-13.0	-36.4	
Mid Ch, (1880 MHz)									
3.750	-20.1	V	3.0	30.2	1.0	-49.3	-13.0	-36.3	
5.625	-23.9	V	3.0	28.3	1.0	-51.2	-13.0	-38.2	
3.750	-20.1	H	3.0	30.2	1.0	-49.2	-13.0	-36.2	
5.625	-21.2	H	3.0	28.3	1.0	-48.5	-13.0	-35.5	
High Ch, (1905 MHz)									
3.801	-19.7	V	3.0	30.1	1.0	-48.8	-13.0	-35.8	
5.702	-23.0	V	3.0	28.2	1.0	-50.3	-13.0	-37.3	
3.801	-20.4	H	3.0	30.1	1.0	-49.5	-13.0	-36.5	
5.702	-21.9	H	3.0	28.2	1.0	-49.2	-13.0	-36.2	

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

QPSK Band 2 (15MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 15MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1858 MHz)									
3.703	-18.0	V	3.0	30.2	1.0	-47.2	-13.0	-34.2	
5.554	-23.4	V	3.0	28.4	1.0	-50.8	-13.0	-37.8	
3.703	-19.8	H	3.0	30.2	1.0	-49.0	-13.0	-36.0	
5.554	-21.0	H	3.0	28.4	1.0	-48.4	-13.0	-35.4	
Mid Ch, (1880 MHz)									
3.760	-19.2	V	3.0	30.1	1.0	-48.4	-13.0	-35.4	
5.621	-23.7	V	3.0	28.3	1.0	-51.0	-13.0	-38.0	
3.760	-19.7	H	3.0	30.1	1.0	-48.8	-13.0	-35.8	
5.621	-20.7	H	3.0	28.3	1.0	-48.0	-13.0	-35.0	
High Ch, (1903 MHz)									
3.806	-19.2	V	3.0	30.1	1.0	-48.3	-13.0	-35.3	
5.709	-23.4	V	3.0	28.2	1.0	-50.6	-13.0	-37.6	
3.806	-20.0	H	3.0	30.1	1.0	-49.1	-13.0	-36.1	
5.709	-21.3	H	3.0	28.2	1.0	-48.5	-13.0	-35.5	

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

16QAM Band 2 (15MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 15MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1858 MHz)									
3.703	-19.0	V	3.0	30.2	1.0	-48.2	-13.0	-35.2	
5.554	-24.4	V	3.0	28.4	1.0	-51.8	-13.0	-38.8	
3.703	-20.8	H	3.0	30.2	1.0	-50.0	-13.0	-37.0	
5.554	-22.0	H	3.0	28.4	1.0	-49.4	-13.0	-36.4	
Mid Ch, (1880 MHz)									
3.760	-20.2	V	3.0	30.1	1.0	-49.4	-13.0	-36.4	
5.621	-24.7	V	3.0	28.3	1.0	-52.0	-13.0	-39.0	
3.760	-20.7	H	3.0	30.1	1.0	-49.8	-13.0	-36.8	
5.621	-21.7	H	3.0	28.3	1.0	-49.0	-13.0	-36.0	
High Ch, (1903 MHz)									
3.806	-20.2	V	3.0	30.1	1.0	-49.3	-13.0	-36.3	
5.709	-24.4	V	3.0	28.2	1.0	-51.6	-13.0	-38.6	
3.806	-21.0	H	3.0	30.1	1.0	-50.1	-13.0	-37.1	
5.709	-22.3	H	3.0	28.2	1.0	-49.5	-13.0	-36.5	

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

QPSK Band 2 (20MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 20MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1860 MHz)									
3.720	-18.1	V	3.0	30.2	1.0	-47.3	-13.0	-34.3	
5.580	-23.1	V	3.0	28.3	1.0	-50.5	-13.0	-37.5	
3.720	-19.7	H	3.0	30.2	1.0	-48.9	-13.0	-35.9	
5.580	-21.9	H	3.0	28.3	1.0	-49.2	-13.0	-36.2	
Mid Ch, (1880 MHz)									
3.760	-19.7	V	3.0	30.1	1.0	-48.9	-13.0	-35.9	
5.640	-22.1	V	3.0	28.3	1.0	-49.4	-13.0	-36.4	
3.760	-19.9	H	3.0	30.1	1.0	-49.0	-13.0	-36.0	
5.640	-21.7	H	3.0	28.3	1.0	-49.0	-13.0	-36.0	
High Ch, (1900 MHz)									
3.800	-18.6	V	3.0	30.1	1.0	-47.7	-13.0	-34.7	
5.700	-23.3	V	3.0	28.2	1.0	-50.6	-13.0	-37.6	
3.800	-18.4	H	3.0	30.1	1.0	-47.5	-13.0	-34.5	
5.700	-22.5	H	3.0	28.2	1.0	-49.8	-13.0	-36.8	

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

16QAM Band 2 (20MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/09/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE band 2, 20MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	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, (1860 MHz)									
3.720	-19.1	V	3.0	30.2	1.0	-48.3	-13.0	-35.3	
5.580	-24.1	V	3.0	28.3	1.0	-51.5	-13.0	-38.5	
3.720	-20.7	H	3.0	30.2	1.0	-49.9	-13.0	-36.9	
5.580	-22.9	H	3.0	28.3	1.0	-50.2	-13.0	-37.2	
Mid Ch, (1880 MHz)									
3.760	-20.7	V	3.0	30.1	1.0	-49.9	-13.0	-36.9	
5.640	-23.1	V	3.0	28.3	1.0	-50.4	-13.0	-37.4	
3.760	-20.9	H	3.0	30.1	1.0	-50.0	-13.0	-37.0	
5.640	-22.7	H	3.0	28.3	1.0	-50.0	-13.0	-37.0	
High Ch, (1900 MHz)									
3.800	-19.6	V	3.0	30.1	1.0	-48.7	-13.0	-35.7	
5.700	-24.3	V	3.0	28.2	1.0	-51.6	-13.0	-38.6	
3.800	-19.4	H	3.0	30.1	1.0	-48.5	-13.0	-35.5	
5.700	-23.5	H	3.0	28.2	1.0	-50.8	-13.0	-37.8	

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

9.2.1. LTE BAND 5

QPSK Band 5 (1.4 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/10/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE Band 5, 1.4MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-15.6	V	3.0	32.7	1.0	-47.3	-13.0	-34.3	
2.474	-20.2	V	3.0	31.4	1.0	-50.6	-13.0	-37.6	
1.649	-17.5	H	3.0	32.7	1.0	-49.2	-13.0	-36.2	
2.474	-21.5	H	3.0	31.4	1.0	-51.9	-13.0	-38.9	
Mid Ch, (836.5MHz)									
1.673	-15.5	V	3.0	32.6	1.0	-47.1	-13.0	-34.1	
2.510	-20.1	V	3.0	31.5	1.0	-50.6	-13.0	-37.6	
1.673	-16.5	H	3.0	32.6	1.0	-48.1	-13.0	-35.1	
2.510	-22.3	H	3.0	31.5	1.0	-52.8	-13.0	-39.8	
High Ch, (848.3MHz)									
1.697	-12.2	V	3.0	32.6	1.0	-43.7	-13.0	-30.7	
2.545	-20.0	V	3.0	31.4	1.0	-50.5	-13.0	-37.5	
1.697	-14.4	H	3.0	32.6	1.0	-45.9	-13.0	-32.9	
2.545	-21.9	H	3.0	31.4	1.0	-52.3	-13.0	-39.3	

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

16QAM Band 5 (1.4 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/10/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE Band 5, 1.4MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-16.6	V	3.0	32.7	1.0	-48.3	-13.0	-35.3	
2.474	-21.1	V	3.0	31.4	1.0	-51.5	-13.0	-38.5	
1.649	-18.5	H	3.0	32.7	1.0	-50.2	-13.0	-37.2	
2.474	-22.5	H	3.0	31.4	1.0	-52.9	-13.0	-39.9	
Mid Ch, (836.5MHz)									
1.673	-16.5	V	3.0	32.6	1.0	-48.1	-13.0	-35.1	
2.510	-21.1	V	3.0	31.5	1.0	-51.6	-13.0	-38.6	
1.673	-17.5	H	3.0	32.6	1.0	-49.1	-13.0	-36.1	
2.510	-23.3	H	3.0	31.5	1.0	-53.8	-13.0	-40.8	
High Ch, (848.3MHz)									
1.697	-13.2	V	3.0	32.6	1.0	-44.7	-13.0	-31.7	
2.545	-20.9	V	3.0	31.4	1.0	-51.4	-13.0	-38.4	
1.697	-15.4	H	3.0	32.6	1.0	-46.9	-13.0	-33.9	
2.545	-22.9	H	3.0	31.4	1.0	-53.3	-13.0	-40.3	

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

QPSK Band 5 (3MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project#: 13U16583
Date: 12/10/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE Band 5, 3MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.5MHz)									
1.651	-14.3	V	3.0	32.7	1.0	-46.0	-13.0	-33.0	
2.477	-20.2	V	3.0	31.4	1.0	-50.6	-13.0	-37.6	
1.651	-17.7	H	3.0	32.7	1.0	-49.4	-13.0	-36.4	
2.477	-22.5	H	3.0	31.4	1.0	-52.9	-13.0	-39.9	
Mid Ch, (836.5MHz)									
1.673	-16.7	V	3.0	32.6	1.0	-48.3	-13.0	-35.3	
2.510	-19.8	V	3.0	31.5	1.0	-50.3	-13.0	-37.3	
1.673	-16.7	H	3.0	32.6	1.0	-48.3	-13.0	-35.3	
2.510	-22.2	H	3.0	31.5	1.0	-52.7	-13.0	-39.7	
High Ch, (847.5MHz)									
1.694	-9.8	V	3.0	32.6	1.0	-41.3	-13.0	-28.3	
2.541	-20.6	V	3.0	31.4	1.0	-51.0	-13.0	-38.0	
1.694	-12.5	H	3.0	32.6	1.0	-44.0	-13.0	-31.0	
2.541	-21.9	H	3.0	31.4	1.0	-52.4	-13.0	-39.4	

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

16QAM Band 5 (3MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/10/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: TX, LTE Band 5, 3MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.5MHz)									
1.651	-15.3	V	3.0	32.7	1.0	-47.0	-13.0	-34.0	
2.477	-21.2	V	3.0	31.4	1.0	-51.6	-13.0	-38.6	
1.651	-18.7	H	3.0	32.7	1.0	-50.4	-13.0	-37.4	
2.477	-23.5	H	3.0	31.4	1.0	-53.9	-13.0	-40.9	
Mid Ch, (836.5MHz)									
1.673	-17.7	V	3.0	32.6	1.0	-49.3	-13.0	-36.3	
2.510	-20.7	V	3.0	31.5	1.0	-51.2	-13.0	-38.2	
1.673	-17.7	H	3.0	32.6	1.0	-49.3	-13.0	-36.3	
2.510	-23.1	H	3.0	31.5	1.0	-53.6	-13.0	-40.6	
High Ch, (847.5MHz)									
1.695	-10.8	V	3.0	32.6	1.0	-42.3	-13.0	-29.3	
2.543	-21.6	V	3.0	31.4	1.0	-52.0	-13.0	-39.0	
1.695	-13.5	H	3.0	32.6	1.0	-45.0	-13.0	-32.0	
2.543	-22.9	H	3.0	31.4	1.0	-53.3	-13.0	-40.3	

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

QPSK Band 5 (5MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: TX, LTE Band 5, 5MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.649	-16.2	V	3.0	32.7	1.0	-47.9	-13.0	-34.9	
2.473	-19.5	V	3.0	31.4	1.0	-49.8	-13.0	-36.8	
1.649	-20.9	H	3.0	32.7	1.0	-52.6	-13.0	-39.6	
2.473	-21.9	H	3.0	31.4	1.0	-52.3	-13.0	-39.3	
Mid Ch, (836.5MHz)									
1.668	-13.2	V	3.0	32.6	1.0	-44.8	-13.0	-31.8	
2.503	-17.5	V	3.0	31.5	1.0	-47.9	-13.0	-34.9	
1.668	-18.5	H	3.0	32.6	1.0	-50.1	-13.0	-37.1	
2.503	-22.0	H	3.0	31.5	1.0	-52.5	-13.0	-39.5	
High Ch, (846.5MHz)									
1.689	-10.9	V	3.0	32.6	1.0	-42.5	-13.0	-29.5	
2.533	-15.8	V	3.0	31.5	1.0	-46.3	-13.0	-33.3	
1.689	-18.3	H	3.0	32.6	1.0	-49.8	-13.0	-36.8	
2.533	-20.9	H	3.0	31.5	1.0	-51.4	-13.0	-38.4	

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

16QAM Band 5 (5MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: TX, LTE Band 5, 5MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.649	-16.7	V	3.0	32.7	1.0	-48.4	-13.0	-35.4	
2.473	-19.8	V	3.0	31.4	1.0	-50.2	-13.0	-37.2	
1.649	-21.7	H	3.0	32.7	1.0	-53.4	-13.0	-40.4	
2.473	-22.7	H	3.0	31.4	1.0	-53.1	-13.0	-40.1	
Mid Ch, (836.5MHz)									
1.668	-13.6	V	3.0	32.6	1.0	-45.2	-13.0	-32.2	
2.503	-19.1	V	3.0	31.5	1.0	-49.6	-13.0	-36.6	
1.668	-19.7	H	3.0	32.6	1.0	-51.3	-13.0	-38.3	
2.503	-21.7	H	3.0	31.5	1.0	-52.2	-13.0	-39.2	
High Ch, (846.5MHz)									
1.689	-12.0	V	3.0	32.6	1.0	-43.6	-13.0	-30.6	
2.533	-16.8	V	3.0	31.5	1.0	-47.3	-13.0	-34.3	
1.689	-19.0	H	3.0	32.6	1.0	-50.6	-13.0	-37.6	
2.533	-21.7	H	3.0	31.5	1.0	-52.2	-13.0	-39.2	

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

QPSK Band 5 (10MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: TX, LTE Band 5, 10MHz, QPSK

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.649	-14.5	V	3.0	32.7	1.0	-46.1	-13.0	-33.1	
2.474	-20.2	V	3.0	31.4	1.0	-50.6	-13.0	-37.6	
1.649	-20.9	H	3.0	32.7	1.0	-52.5	-13.0	-39.5	
2.474	-21.8	H	3.0	31.4	1.0	-52.2	-13.0	-39.2	
Mid Ch, (836.5MHz)									
1.664	-13.9	V	3.0	32.6	1.0	-45.5	-13.0	-32.5	
2.496	-18.3	V	3.0	31.5	1.0	-48.8	-13.0	-35.8	
1.664	-16.8	H	3.0	32.6	1.0	-48.4	-13.0	-35.4	
2.496	-21.3	H	3.0	31.5	1.0	-51.8	-13.0	-38.8	
High Ch, (844MHz)									
1.680	-20.7	V	3.0	32.6	1.0	-52.3	-13.0	-39.3	
2.519	-18.0	V	3.0	31.5	1.0	-48.4	-13.0	-35.4	
1.680	-24.6	H	3.0	32.6	1.0	-56.2	-13.0	-43.2	
2.519	-20.1	H	3.0	31.5	1.0	-50.6	-13.0	-37.6	

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

16QAM Band 5 (10MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #: 13U16583
Date: 12/09/13
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: TX, LTE Band 5, 10MHz, 16QAM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.649	-16.5	V	3.0	32.7	1.0	-48.2	-13.0	-35.2	
2.474	-21.5	V	3.0	31.4	1.0	-51.9	-13.0	-38.9	
1.649	-22.0	H	3.0	32.7	1.0	-53.6	-13.0	-40.6	
2.474	-22.0	H	3.0	31.4	1.0	-52.3	-13.0	-39.3	
Mid Ch, (836.5MHz)									
1.664	-15.8	V	3.0	32.6	1.0	-47.4	-13.0	-34.4	
2.496	-19.6	V	3.0	31.5	1.0	-50.1	-13.0	-37.1	
1.664	-18.1	H	3.0	32.6	1.0	-49.7	-13.0	-36.7	
2.496	-22.4	H	3.0	31.5	1.0	-52.9	-13.0	-39.9	
High Ch, (844MHz)									
1.680	-21.4	V	3.0	32.6	1.0	-53.0	-13.0	-40.0	
2.519	-19.2	V	3.0	31.5	1.0	-49.6	-13.0	-36.6	
1.680	-25.0	H	3.0	32.6	1.0	-56.6	-13.0	-43.6	
2.519	-20.5	H	3.0	31.5	1.0	-51.0	-13.0	-38.0	

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