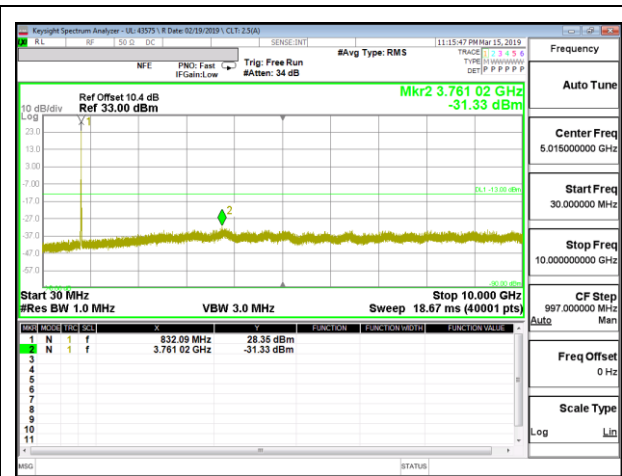
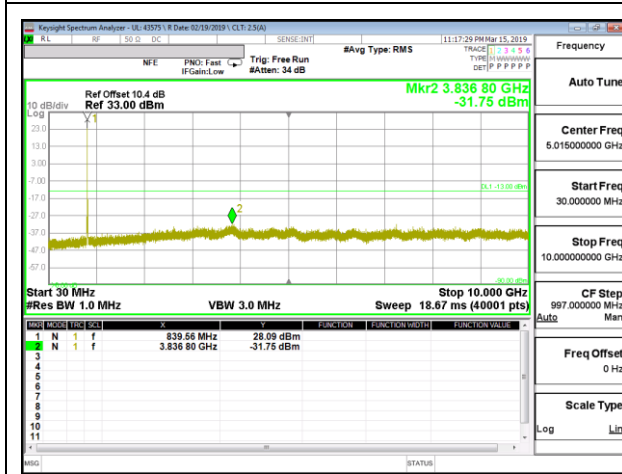


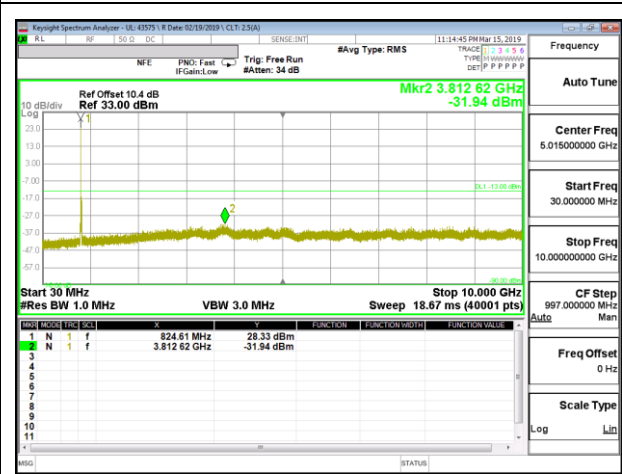
LTE B5 10MHz QPSK Low Channel RB1-0



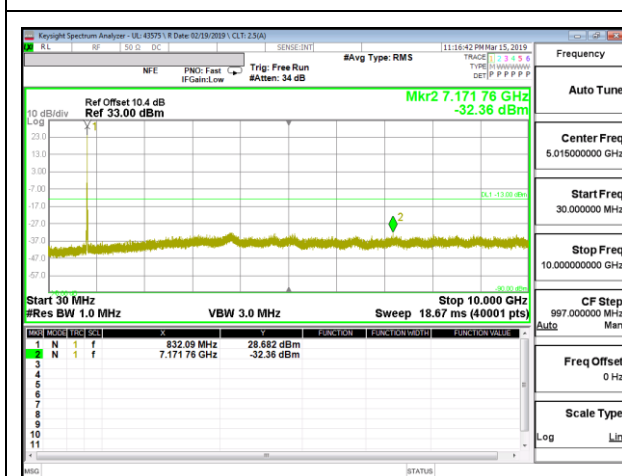
LTE B5 10MHz QPSK Mid Channel RB1-0



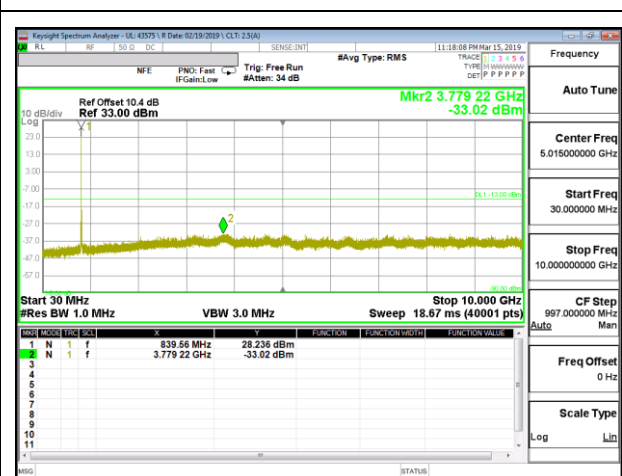
LTE B5 10MHz QPSK High Channel RB1-0



LTE B5 10MHz 16QAM Low Channel RB1-0

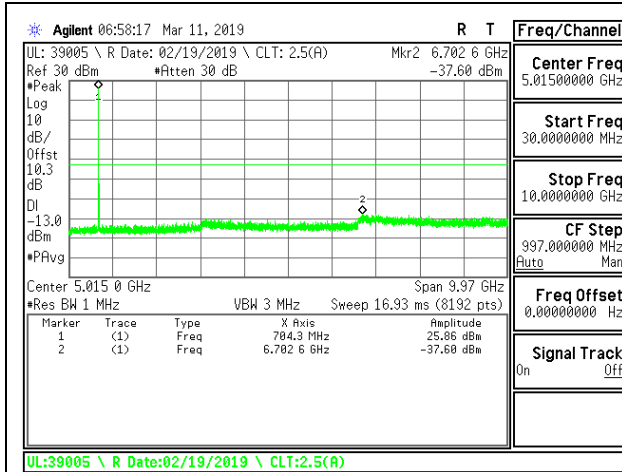


LTE B5 10MHz 16QAM Mid Channel RB1-0

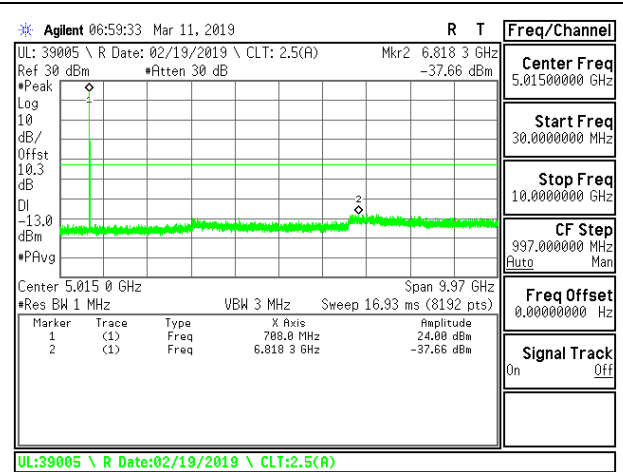


LTE B5 10MHz 16QAM High Channel RB1-0

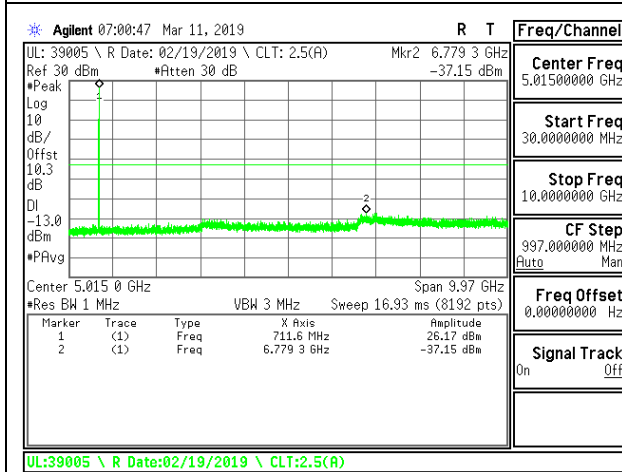
8.3.6. LTE BAND 17



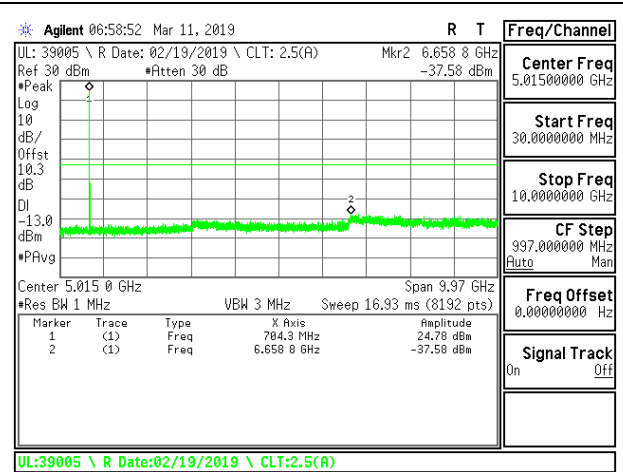
LTE B17 5MHz QPSK Low Channel RB1-0



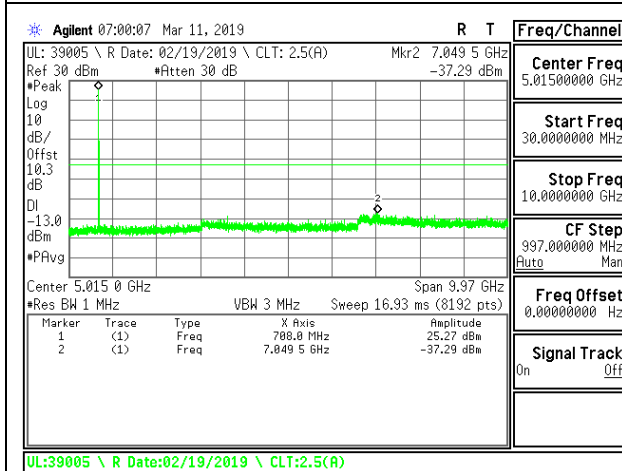
LTE B17 5MHz QPSK Mid Channel RB1-0



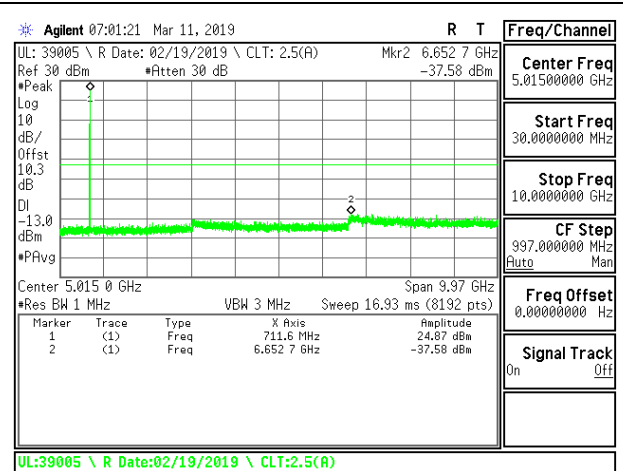
LTE B17 5MHz QPSK High Channel RB1-0



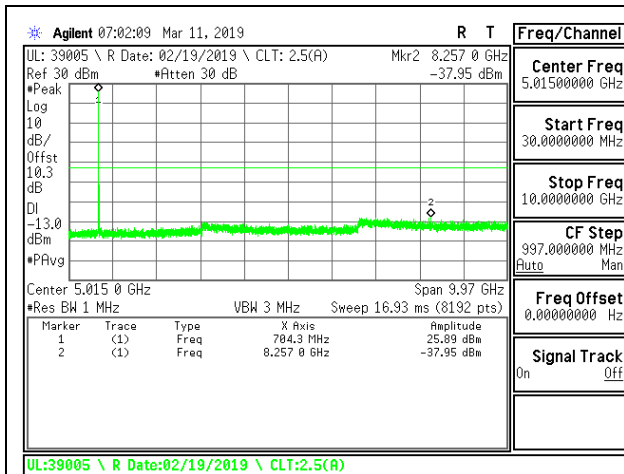
LTE B17 5MHz 16QAM Low Channel RB1-0



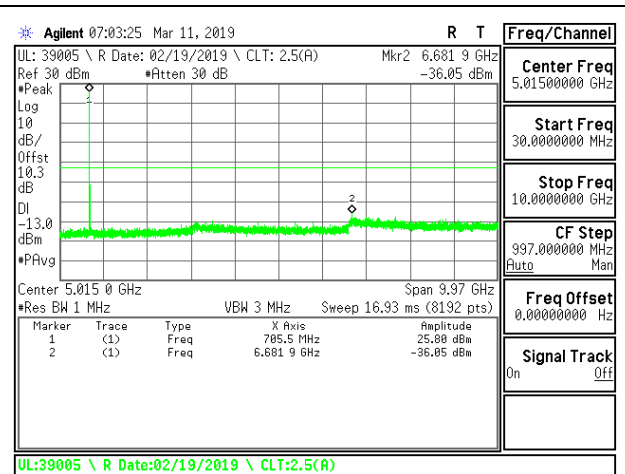
LTE B17 5MHz 16QAM Mid Channel RB1-0



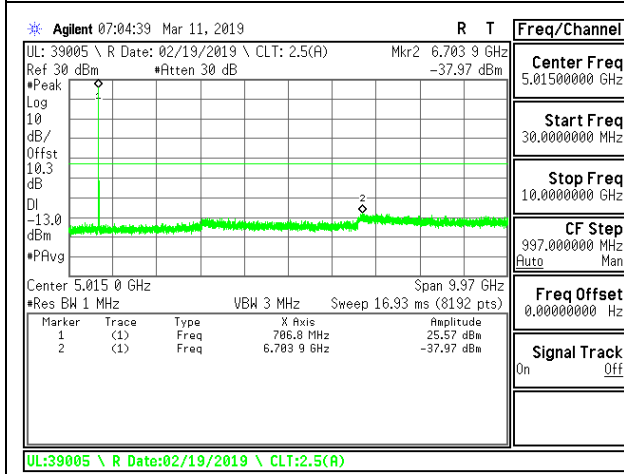
LTE B17 5MHz 16QAM High Channel RB1-0



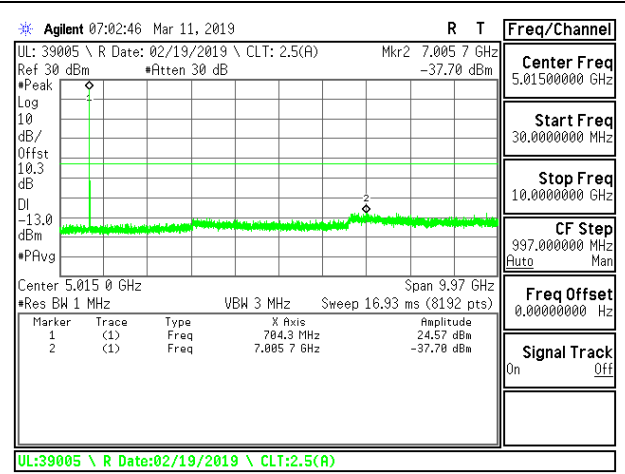
LTE B17 10MHz QPSK Low Channel RB1-0



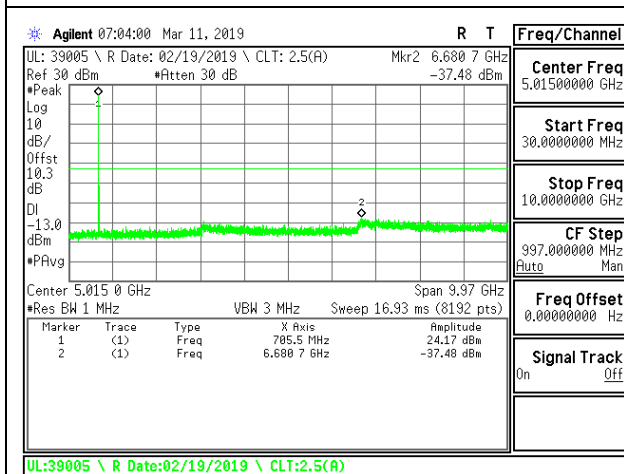
LTE B17 10MHz QPSK Mid Channel RB1-0



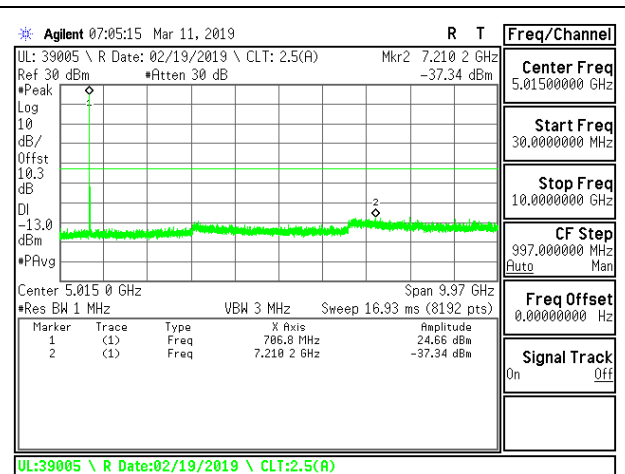
LTE B17 10MHz QPSK High Channel RB1-0



LTE B17 10MHz 16QAM Low Channel RB1-0

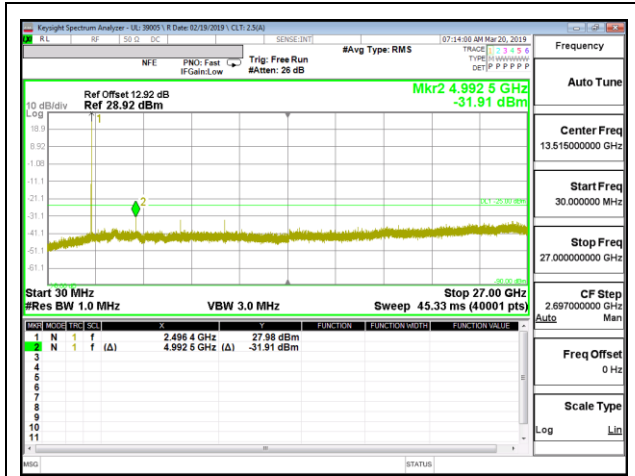


LTE B17 10MHz 16QAM Mid Channel RB1-0

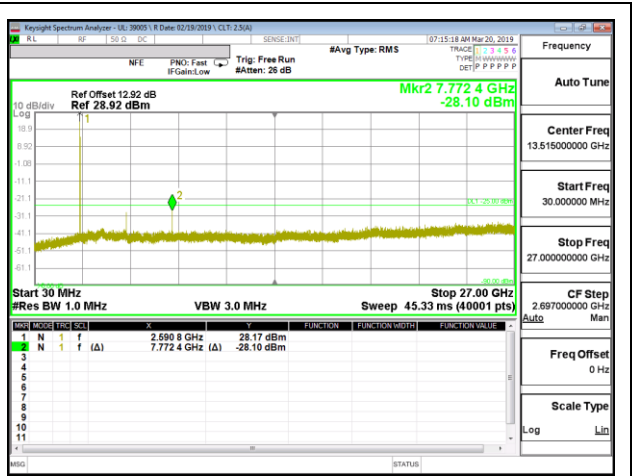


LTE B17 10MHz 16QAM High Channel RB1-0

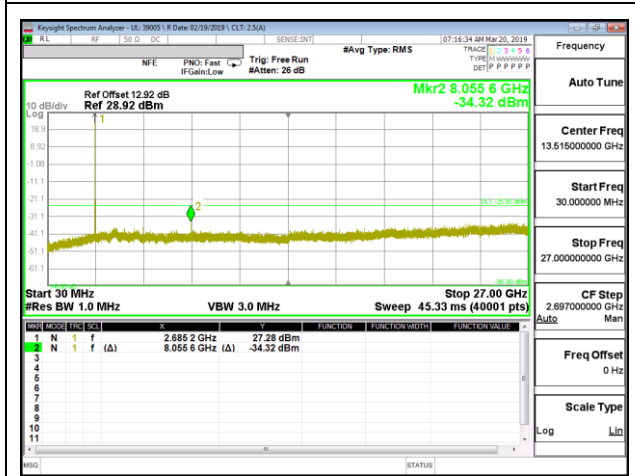
8.3.7. LTE BAND 41



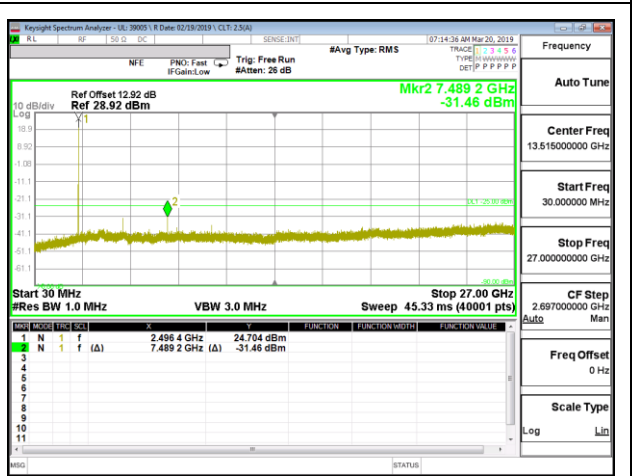
LTE B41 5MHz QPSK Low Channel RB1-0



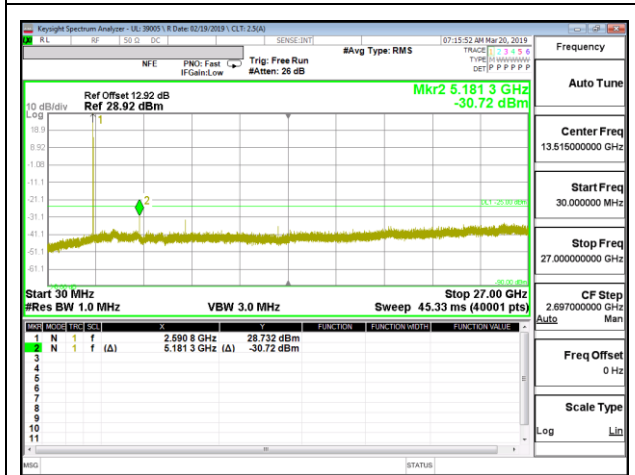
LTE B41 5MHz QPSK Mid Channel RB1-0



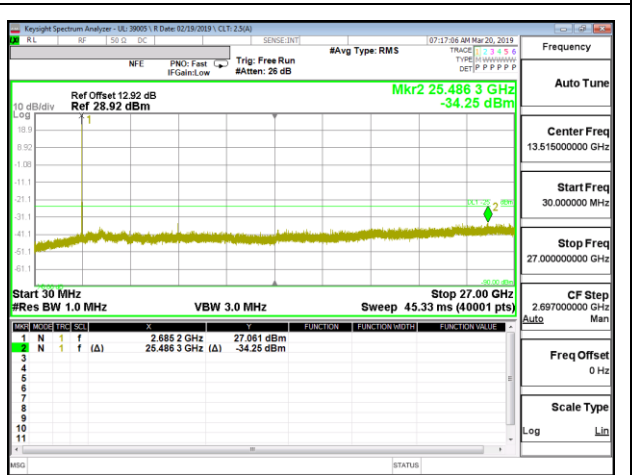
LTE B41 5MHz QPSK High Channel RB1-0



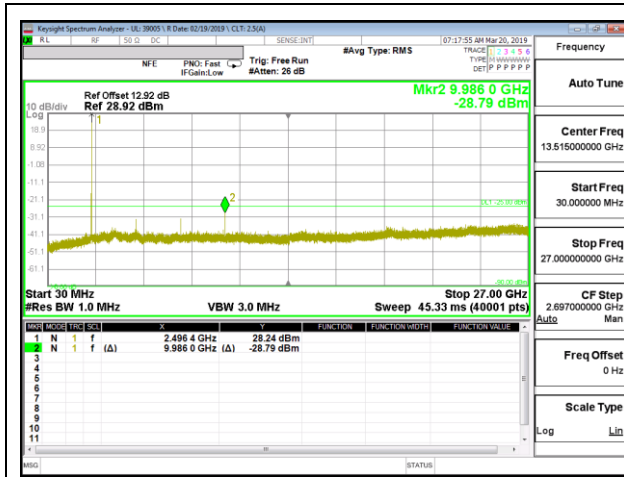
LTE B41 5MHz 16QAM Low Channel RB1-0



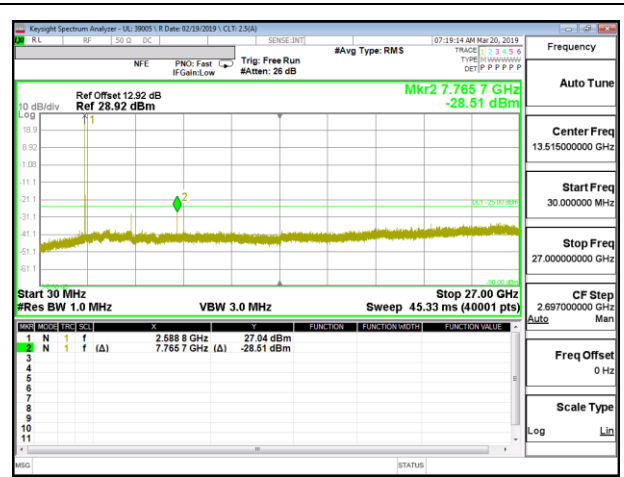
LTE B41 5MHz 16QAM Mid Channel RB1-0



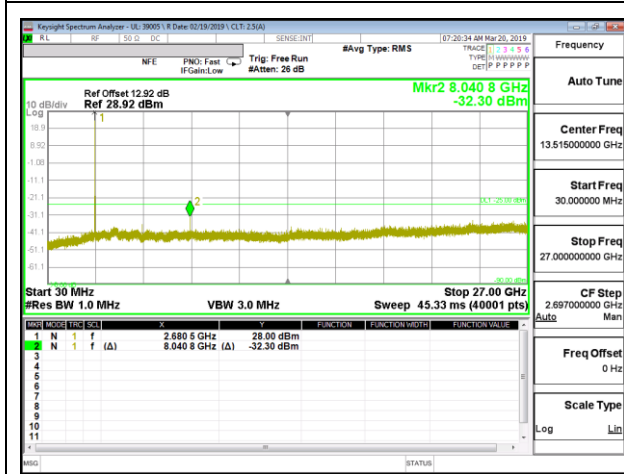
LTE B41 5MHz 16QAM High Channel RB1-0



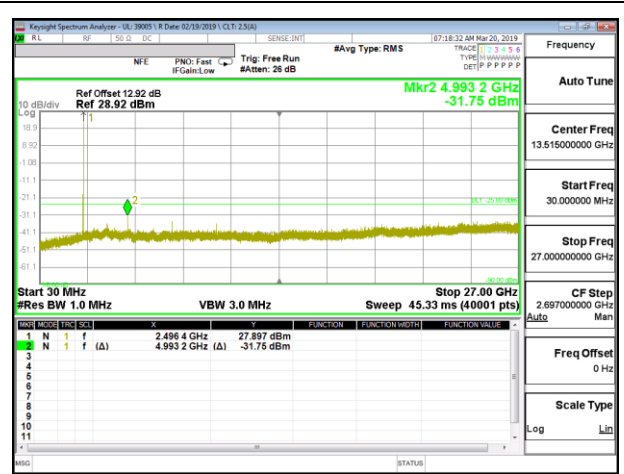
LTE B41 10MHz QPSK Low Channel RB1-0



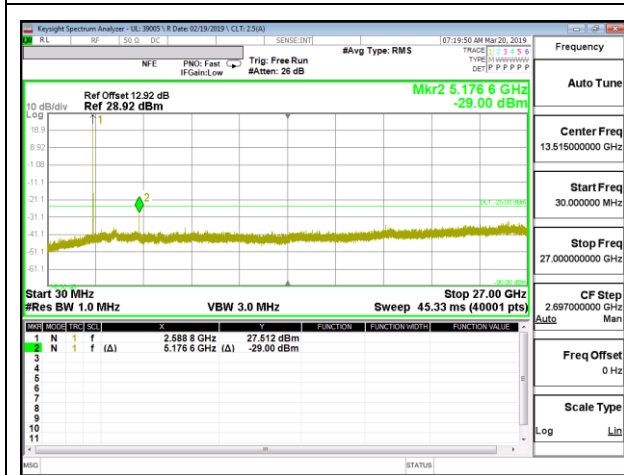
LTE B41 10MHz QPSK Mid Channel RB1-0



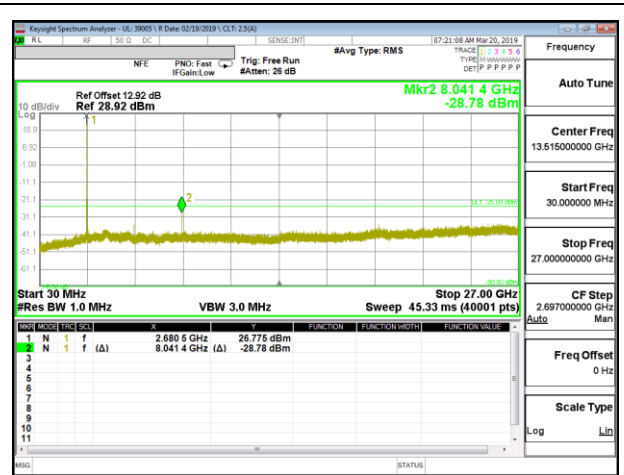
LTE B41 10MHz QPSK High Channel RB1-0



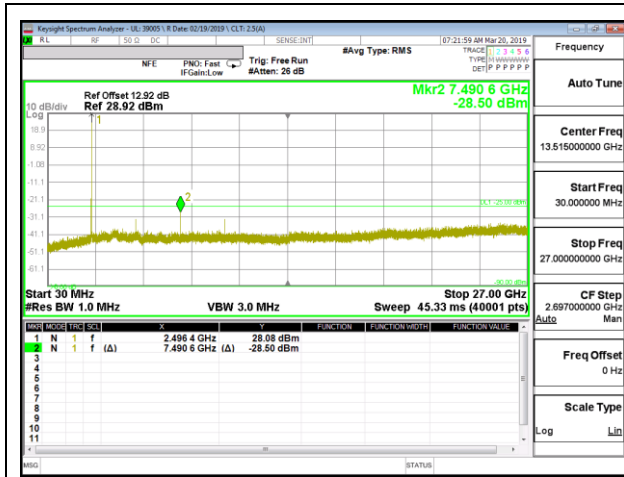
LTE B41 10MHz 16QAM Low Channel RB1-0



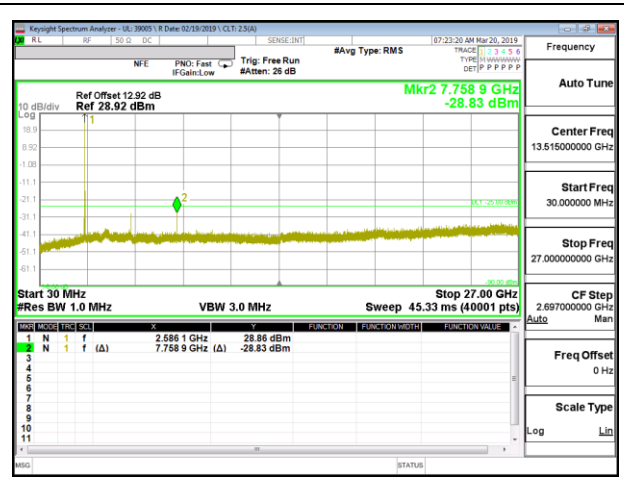
LTE B41 10MHz 16QAM Mid Channel RB1-0



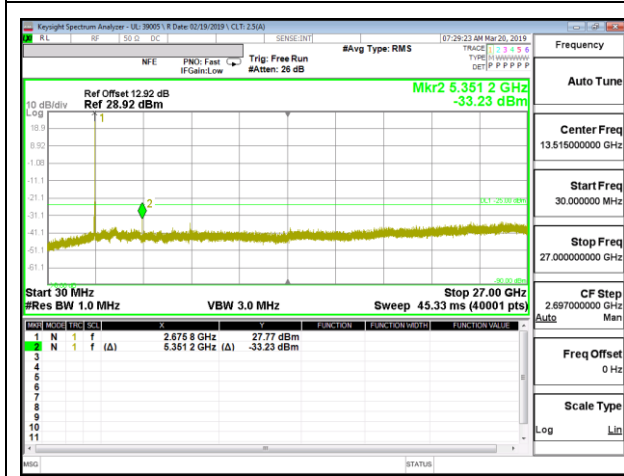
LTE B41 10MHz 16QAM High Channel RB1-0



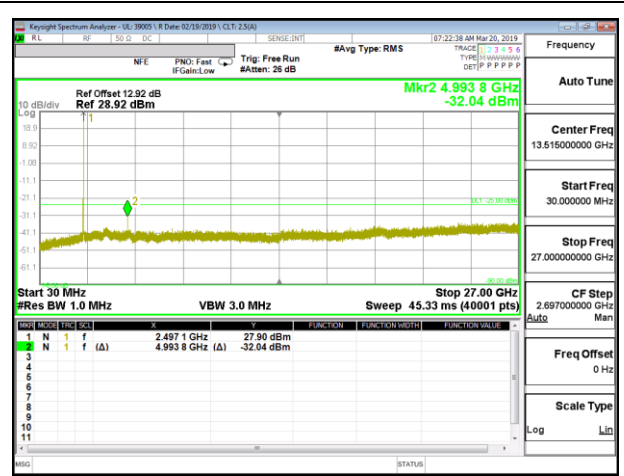
LTE B41 15MHz QPSK Low Channel RB1-0



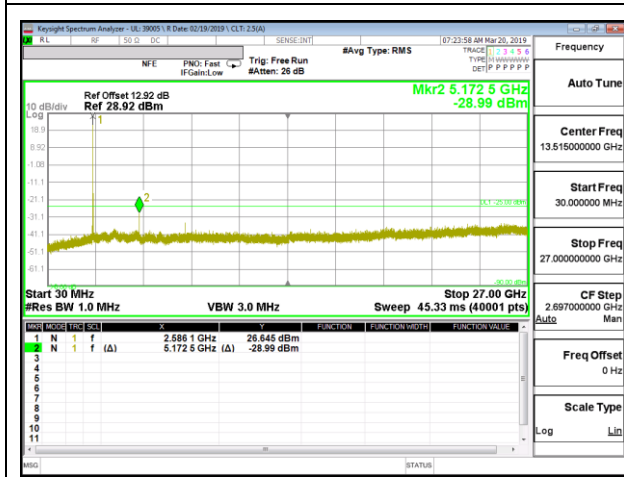
LTE B41 15MHz QPSK Mid Channel RB1-0



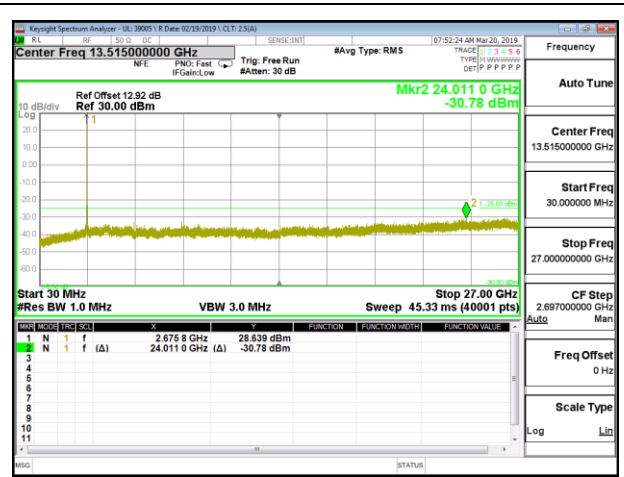
LTE B41 15MHz QPSK High Channel RB1-0



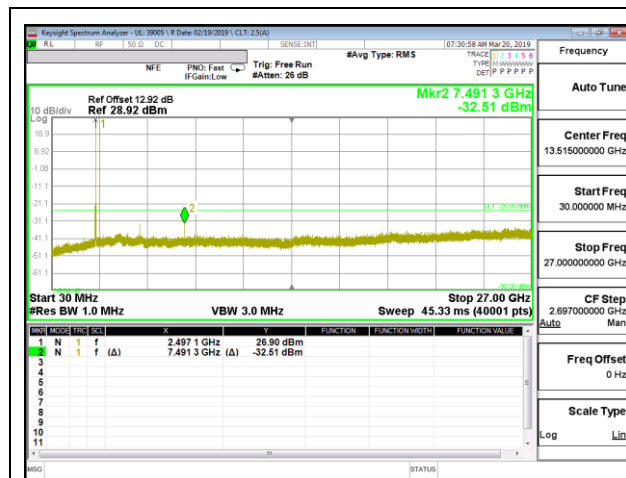
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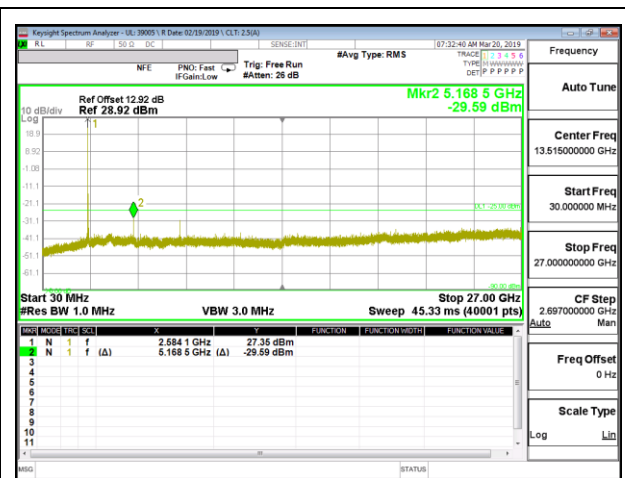
LTE B41 15MHz 16QAM Mid Channel RB1-0



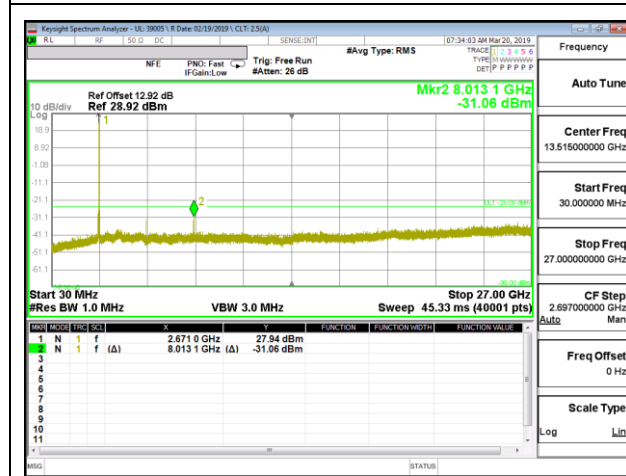
LTE B41 15MHz 16QAM High Channel RB1-0



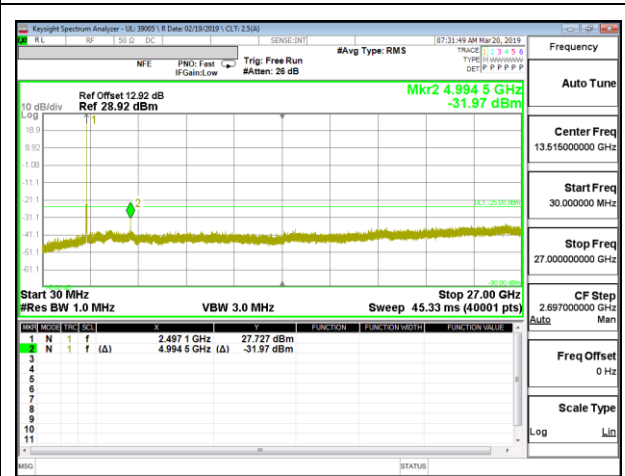
LTE B41 20MHz QPSK Low Channel RB1-0



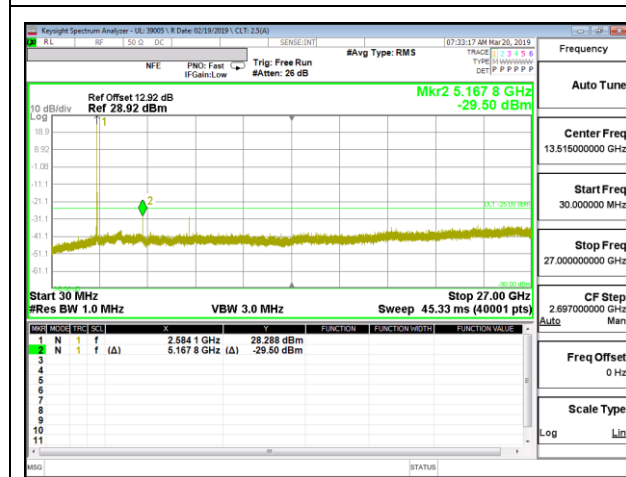
LTE B41 20MHz QPSK Mid Channel RB1-0



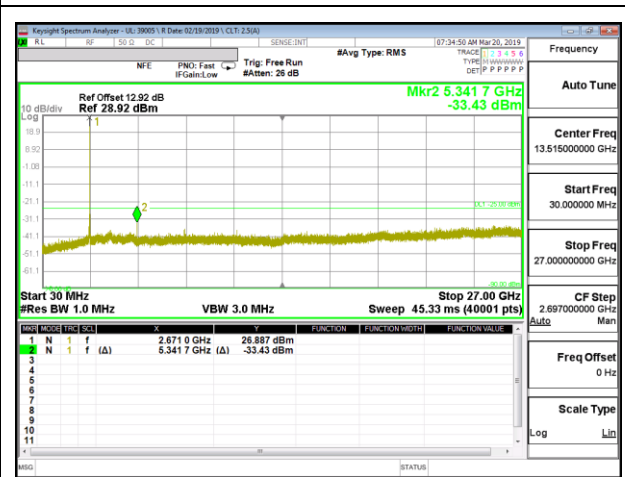
LTE B41 20MHz QPSK High Channel RB1-0



LTE B41 20MHz 16QAM Low Channel RB1-0



LTE B41 20MHz 16QAM Mid Channel RB1-0



LTE B41 20MHz 16QAM High Channel RB1-0

8.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

FCC: §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC: §24.235 & §27.54

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°C to $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)
Low voltage, 3.3VDC, Normal, 3.85VDC and High voltage, 4.43VDC.
End Voltage, 3.2VDC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C 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 $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

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

MODES TESTED

- GSM 850
- GSM 1900
- WCDMA Band 5
- WCDMA Band 2
- LTE Band 5
- LTE Band 17
- LTE Band 41

RESULTS

See the following pages.

8.4.1. GSM

ID:	16069	Date:	3/18/19
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GPRS 850MHz

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0288	848.9718		
Extreme (50C)		824.0288	848.9718	4.1	0.005
Extreme (40C)		824.0288	848.9718	5.0	0.006
Extreme (30C)		824.0288	848.9718	4.4	0.005
Extreme (10C)		824.0288	848.9718	3.7	0.004
Extreme (0C)		824.0288	848.9718	6.0	0.007
Extreme (-10C)		824.0288	848.9718	5.0	0.006
Extreme (-20C)		824.0288	848.9718	5.3	0.006
Extreme (-30C)		824.0288	848.9718	6.3	0.007
20C	15%	824.0288	848.9718	8.0	0.010
	-15%	824.0288	848.9718	7.4	0.009
	End Point	824.0288	848.9718	6.3	0.008

GPRS 1900MHz

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.0367	1909.9623		
Extreme (50C)		1850.0367	1909.9623	-2.5	-0.001
Extreme (40C)		1850.0367	1909.9623	-3.4	-0.002
Extreme (30C)		1850.0367	1909.9623	-3.0	-0.002
Extreme (10C)		1850.0367	1909.9623	-4.7	-0.003
Extreme (0C)		1850.0367	1909.9623	-4.5	-0.002
Extreme (-10C)		1850.0367	1909.9623	-4.2	-0.002
Extreme (-20C)		1850.0367	1909.9623	-4.7	-0.002
Extreme (-30C)		1850.0367	1909.9623	-4.0	-0.002
20C	15%	1850.0367	1909.9623	-4.9	-0.003
	-15%	1850.0367	1909.9623	-5.2	-0.003
	End Point	1850.0367	1909.9623	-5.0	-0.003

8.4.2. WCDMA

ID:	16069	Date:	3/18/19
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UMTS REL99 BAND 5

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.1299	848.8581		
Extreme (50C)		824.1299	848.8581	-6.5	-0.0078
Extreme (40C)		824.1299	848.8581	-6.4	-0.0076
Extreme (30C)		824.1299	848.8581	-7.5	-0.0090
Extreme (10C)		824.1299	848.8581	-6.0	-0.0072
Extreme (0C)		824.1299	848.8581	-6.8	-0.0081
Extreme (-10C)		824.1299	848.8581	-5.3	-0.0064
Extreme (-20C)		824.1299	848.8581	-6.1	-0.0073
Extreme (-30C)		824.1299	848.8581	-5.5	-0.0065
20C	15%	824.1299	848.8581	-6.2	-0.0074
	-15%	824.1299	848.8581	-5.9	-0.0070
	End Point	824.1299	848.8581	-4.6	-0.0054

UMTS REL99 BAND 2

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.1660	1909.8584		
Extreme (50C)		1850.1660	1909.8584	-9.0	-0.0048
Extreme (40C)		1850.1660	1909.8584	-10.1	-0.0054
Extreme (30C)		1850.1660	1909.8584	-10.2	-0.0054
Extreme (10C)		1850.1660	1909.8584	-9.5	-0.0050
Extreme (0C)		1850.1660	1909.8584	-9.6	-0.0051
Extreme (-10C)		1850.1660	1909.8584	-9.8	-0.0052
Extreme (-20C)		1850.1660	1909.8584	-10.3	-0.0055
Extreme (-30C)		1850.1660	1909.8584	-11.0	-0.0059
20C	15%	1850.1660	1909.8584	-10.3	-0.0055
	-15%	1850.1660	1909.8584	-12.0	-0.0064
	End Point	1850.1660	1909.8584	-8.7	-0.0046

8.4.3. LTE BAND 5

ID:	16069	Date:	3/18/19
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QPSK, (10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.5290	848.4623		
Extreme (50C)		824.5290	848.4623	-15.3	-0.018
Extreme (40C)		824.5290	848.4623	-16.3	-0.019
Extreme (30C)		824.5290	848.4623	-17.1	-0.020
Extreme (10C)		824.5290	848.4623	-15.5	-0.018
Extreme (0C)		824.5290	848.4623	-18.2	-0.022
Extreme (-10C)		824.5290	848.4623	-17.6	-0.021
Extreme (-20C)		824.5290	848.4623	-17.2	-0.021
Extreme (-30C)		824.5290	848.4623	-18.3	-0.022
20C	15%	824.5290	848.4623	-17.0	-0.020
	-15%	824.5290	848.4623	-17.5	-0.021
	End Point	824.5290	848.4623	-17.2	-0.021

8.4.4. LTE BAND 17

ID:	39005	Date:	3/12/19
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QPSK, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	704.5148	715.4859		
Extreme (50C)		704.5148	715.4859	3.0	0.004
Extreme (40C)		704.5148	715.4859	4.0	0.006
Extreme (30C)		704.5148	715.4859	2.6	0.004
Extreme (10C)		704.5148	715.4859	2.2	0.003
Extreme (0C)		704.5148	715.4859	4.0	0.006
Extreme (-10C)		704.5148	715.4859	3.0	0.004
Extreme (-20C)		704.5148	715.4859	2.5	0.003
Extreme (-30C)		704.5148	715.4859	3.2	0.005
20C	15%	704.5148	715.4859	2.5	0.004
	-15%	704.5148	715.4859	4.0	0.006
	End Point	704.5148	715.4859	3.0	0.004

8.4.5. LTE BAND 41

ID:	16069	Date:	3/18/19
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QPSK, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2496.8231	2688.8940		
Extreme (50C)		2496.8231	2688.8940	-18.1	-0.007
Extreme (40C)		2496.8231	2688.8940	-18.1	-0.007
Extreme (30C)		2496.8231	2688.8940	-17.7	-0.007
Extreme (10C)		2496.8231	2688.8940	-16.4	-0.006
Extreme (0C)		2496.8231	2688.8940	-17.1	-0.007
Extreme (-10C)		2496.8231	2688.8940	-18.6	-0.007
Extreme (-20C)		2496.8231	2688.8940	-17.5	-0.007
Extreme (-30C)		2496.8231	2688.8940	-16.9	-0.007
20C	15%	2496.8231	2688.8940	-18.4	-0.007
	-15%	2496.8231	2688.8940	-17.3	-0.007
	End Point	2496.8231	2688.8940	-19.3	-0.007

8.5. PEAK TO AVERAGE RATIO

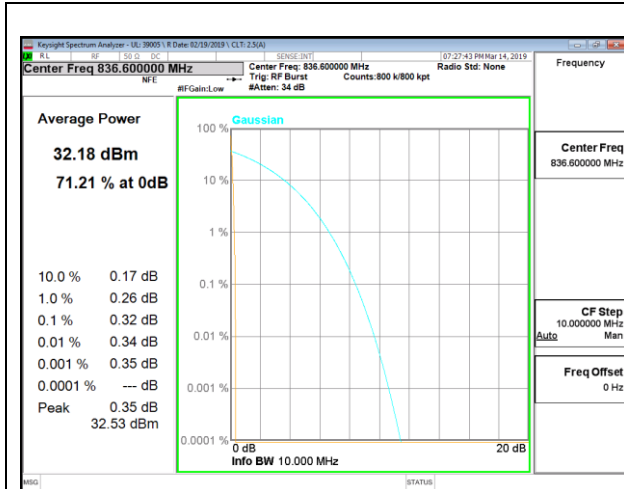
LIMITS

In addition, the peak to average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

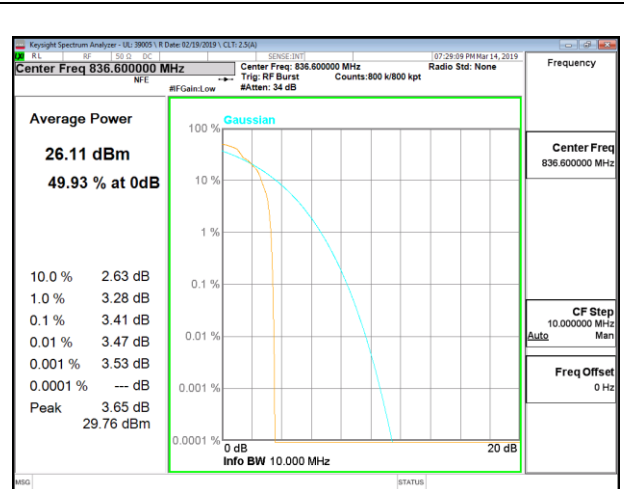
RESULT

LAT 1 Antenna was used to measure as the worst case. The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

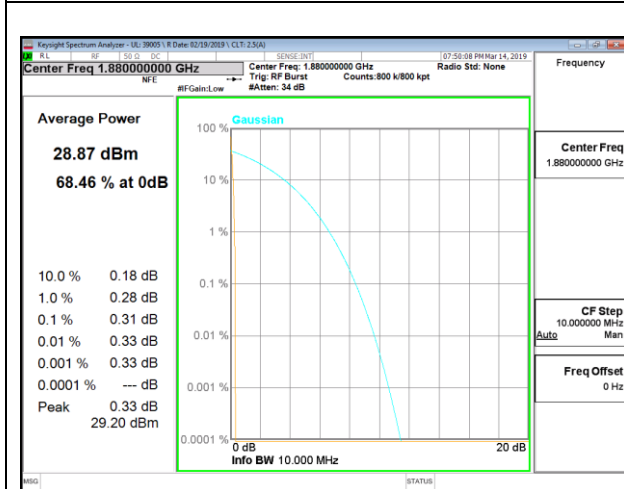
8.5.1. GSM



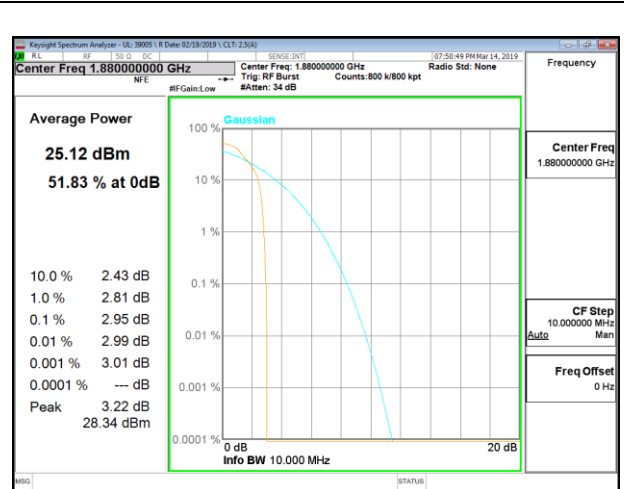
GSM 850MHz GPRS MID Channel



GSM 850MHz EGPRS MID Channel

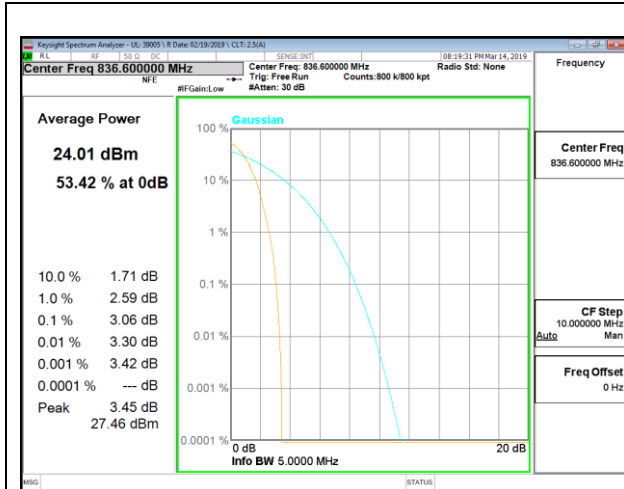


GSM 1900MHz GPRS MID Channel

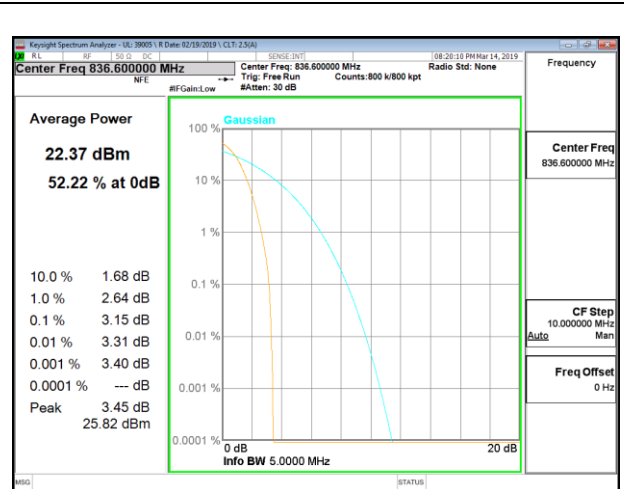


GSM 1900MHz EGPRS MID Channel

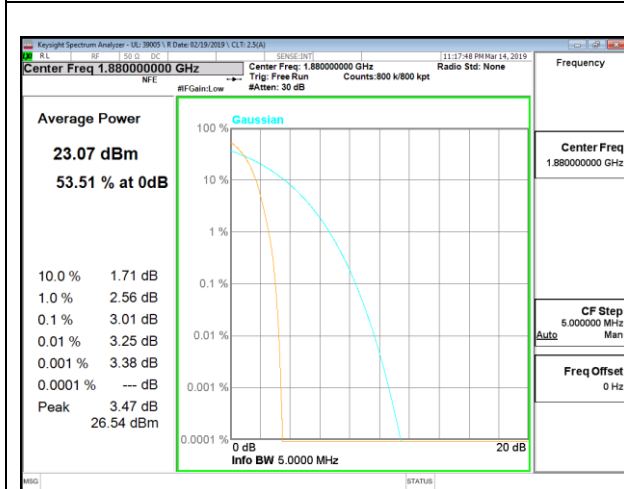
8.5.2. WCDMA



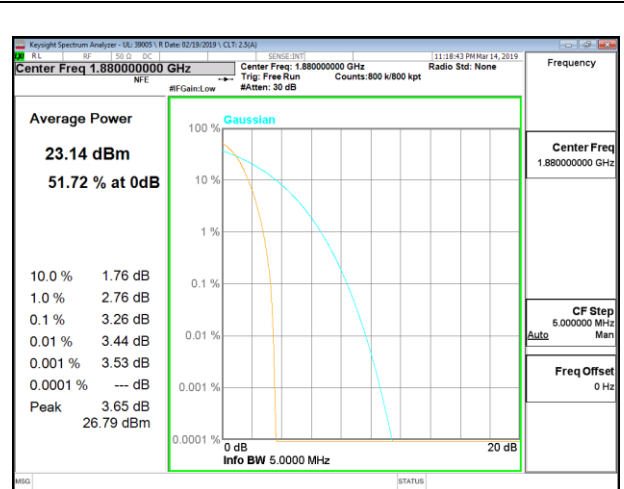
WCDMA BAND5 Rel99 MID Channel



WCDMA BAND5 HSDPA MID Channel

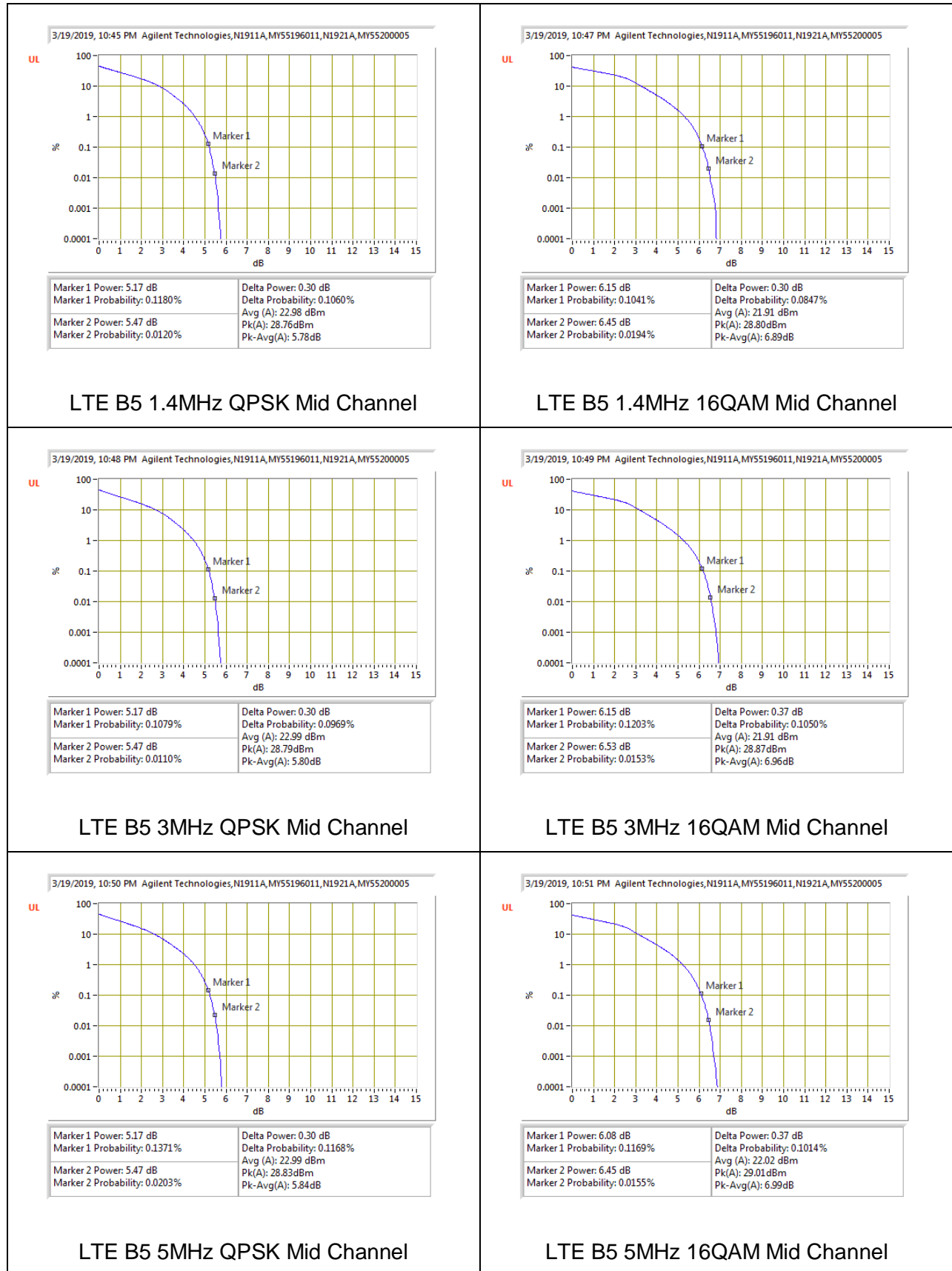


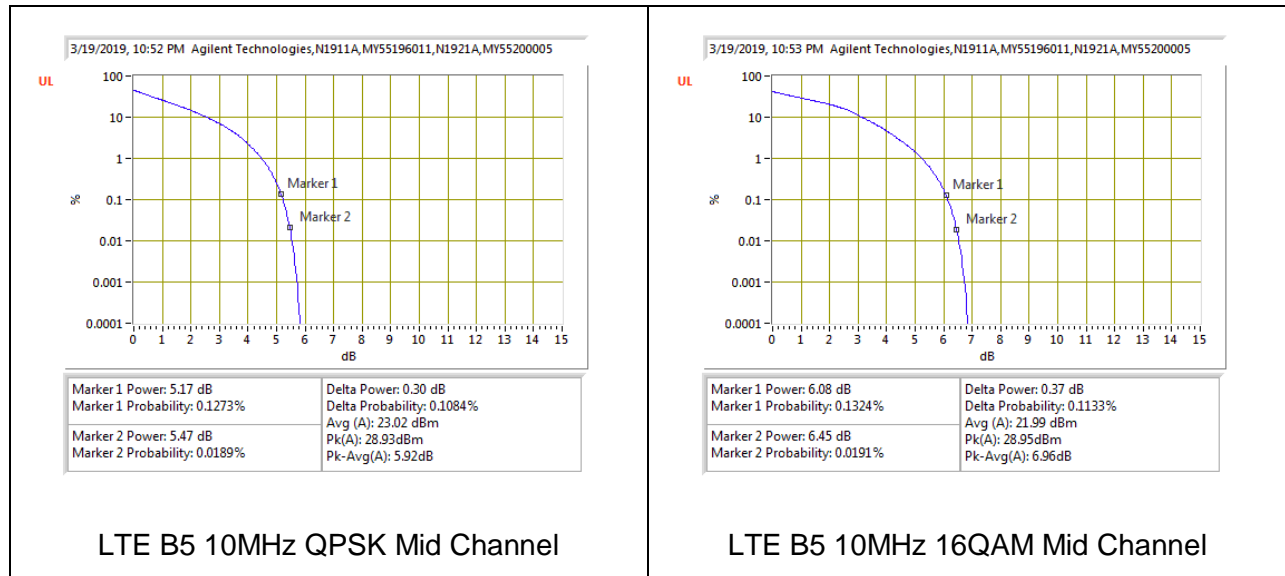
WCDMA BAND2 Rel99 MID Channel



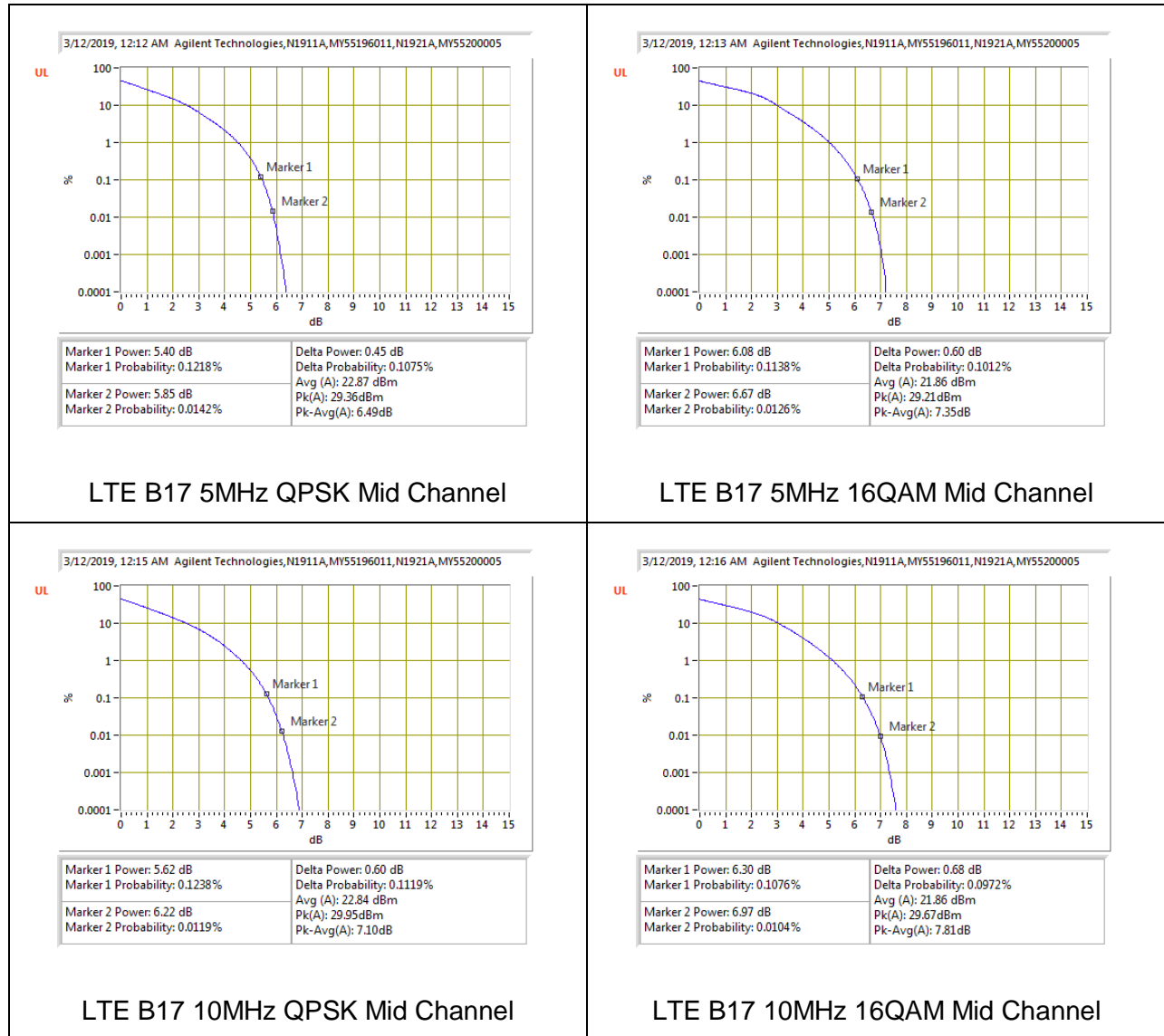
WCDMA BAND2 HSDPA MID Channel

8.5.3. LTE BAND 5



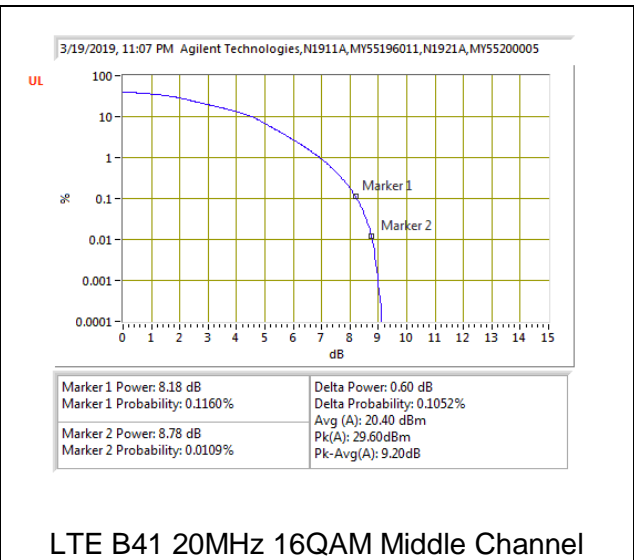
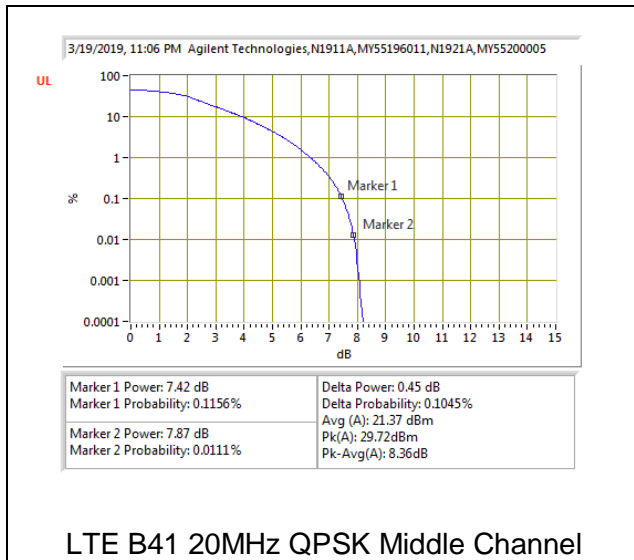


8.5.4. LTE BAND 17



8.5.5. LTE BAND 41





9. RADIATED TEST RESULTS

9.1. EFFECTIVE RADIATED POWER ERP/EIRP

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.50

LIMITS

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

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603-E (2016), Clause 2.2.17; PSA setting reference to 971168 D01 v03r01

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

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

MODES TESTED

- GSM 850
- GSM 1900
- WCDMA Band 5
- WCDMA Band 2
- LTE Band 5
- LTE Band 17
- LTE Band 41

Note: This testing was performed to confirm that the measured radiated powers were consistent with the calculated ERP/EIRP test data given device-to-device variations in output power and the measurement uncertainties associated with the radiated tests. Measured ERP/EIRP test results are for reference only. Please refer to Section 5.2 for the final ERP/EIRP results.

TEST RESULTS

GSM

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	mW
GSM 850	GPRS	128	824.2	29.88	972.75
		190	836.6	28.67	736.21
		251	848.8	29.92	981.75
	EGPRS	128	824.2	25.14	326.59
		190	836.6	23.84	242.10
		251	848.8	25.05	319.89
GSM 1900	GPRS	512	1850.2	30.38	1091.44
		661	1880.0	30.74	1185.77
		810	1909.8	30.68	1169.50
	EGPRS	512	1850.2	30.35	1083.93
		661	1880.0	30.69	1172.20
		810	1909.8	30.71	1177.61

WCDMA

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	24.11	257.63
		9400	1880	24.11	257.63
		9538	1907.6	24.94	311.89
	HSDPA	9262	1852.4	24.41	276.06
		9400	1880.0	24.35	272.27
		9538	1907.6	24.88	307.61
Band 5	REL99	4132	826.4	21.28	134.28
		4183	836.6	19.76	94.62
		4233	846.6	21.27	133.97
	HSDPA	4132	826.4	19.82	95.94
		4183	836.6	18.23	66.53
		4233	846.6	19.99	99.77

LTE Band 5

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
10	QPSK	1/0	829	21.66	146.55
		1/0	836.5	20.74	118.58
		1/0	844	20.98	125.31
	16QAM	1/0	829	20.51	112.46
		1/0	836.5	19.65	92.26
		1/0	844	19.94	98.63
5	QPSK	1/0	826.5	20.64	115.88
		1/0	836.5	19.71	93.54
		1/0	846.5	20.20	104.71
	16QAM	1/0	826.5	19.43	87.70
		1/0	836.5	18.45	69.98
		1/0	846.5	18.85	76.74
3	QPSK	1/0	825.5	21.62	145.21
		1/0	836.5	20.07	101.62
		1/0	847.5	21.67	146.89
	16QAM	1/0	825.5	20.31	107.40
		1/0	836.5	19.04	80.17
		1/0	847.5	20.86	121.90
1.4	QPSK	1/0	824.7	21.28	134.28
		1/0	836.5	19.69	93.11
		1/0	848.3	21.21	132.13
	16QAM	1/0	824.7	20.07	101.62
		1/0	836.5	18.47	70.31
		1/0	848.3	20.18	104.23

LTE Band 17

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
10	QPSK	1/0	709	18.87	77.09
		1/0	710	19.10	81.28
		1/0	711	19.23	83.75
	16QAM	1/0	709	17.68	58.61
		1/0	710	17.87	61.24
		1/0	711	17.98	62.81
5	QPSK	1/0	706.5	18.41	69.34
		1/0	710	19.00	79.43
		1/0	713.5	19.27	84.53
	16QAM	1/0	706.5	17.26	53.21
		1/0	710	17.71	59.02
		1/0	713.5	17.94	62.23

LTE Band 41

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	mW
20	QPSK	1/0	2506	17.22	52.72
		1/0	2593	15.68	36.98
		1/0	2680	13.59	22.86
	16QAM	1/0	2506	15.91	38.99
		1/0	2593	14.05	25.41
		1/0	2680	12.16	16.44
15	QPSK	1/0	2503.5	17.02	50.35
		1/0	2593	15.47	35.24
		1/0	2682.5	14.17	26.12
	16QAM	1/0	2503.5	16.08	40.55
		1/0	2593	14.11	25.76
		1/0	2682.5	12.68	18.54
10	QPSK	1/0	2501	16.99	50.00
		1/0	2593	15.14	32.66
		1/0	2685	14.20	26.30
	16QAM	1/0	2501	16.05	40.27
		1/0	2593	14.01	25.18
		1/0	2685	12.81	19.10
5	QPSK	1/0	2498.5	16.82	48.08
		1/0	2593	14.81	30.27
		1/0	2687.5	13.93	24.72
	16QAM	1/0	2498.5	15.44	34.99
		1/0	2593	13.66	23.23
		1/0	2687.5	12.46	17.62

9.1.1. GSM

GPRS 850										EGPRS 850																													
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement																													
Company: Samsung					Project #: 12756699					Date: 3/15/2019					Company: Samsung					Project #: 12756699					Date: 3/15/2019														
Test Engineer: 19480 BS					Configuration: EUT Only					Location: Chamber I					Mode: GPRS 850 MHz Fundamentals					Test Engineer: 19480 BS					Configuration: EUT Only					Location: Chamber I					Mode: EGPRS 850 MHz Fundamentals				
Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables										Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables																													
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																					
Low Ch										Low Ch																													
824.20	25.28	V	3.1	0.1	22.29	38.5	-16.2			824.20	20.28	V	3.1	0.1	17.29	38.5	-21.2																						
824.20	32.78	H	3.1	0.2	29.88	38.5	-8.6			824.20	28.04	H	3.1	0.2	25.14	38.5	-13.4																						
Mid Ch										Mid Ch																													
836.60	23.87	V	3.1	0.1	20.80	38.5	-17.7			836.60	19.08	V	3.1	0.1	16.01	38.5	-22.5																						
836.60	31.64	H	3.1	0.2	28.67	38.5	-9.8			836.60	26.81	H	3.1	0.2	23.84	38.5	-14.7																						
High Ch										High Ch																													
848.80	25.19	V	3.2	0.0	22.04	38.5	-16.5			848.80	20.16	V	3.2	0.0	17.01	38.5	-21.5																						
848.80	32.97	H	3.2	0.1	29.92	38.5	-8.6			848.80	28.10	H	3.2	0.1	25.05	38.5	-13.4																						

GPRS 1900										EGPRS 1900																													
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement																													
Company: Samsung					Project #: 12756699					Date: 3/19/2019					Company: Samsung					Project #: 12756699					Date: 3/19/2019														
Test Engineer: 43575 OS					Configuration: EUT Only					Location: Chamber I					Mode: GPRS 1900 MHz Fundamentals					Test Engineer: 43575 OS					Configuration: EUT Only					Location: Chamber I					Mode: EGPRS 1900 MHz Fundamentals				
Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables										Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables																													
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																					
Low Ch										Low Ch																													
1850.20	12.76	V	5.0	9.8	17.53	33.0	-15.5			1850.20	11.94	V	5.0	9.8	16.71	33.0	-16.3																						
1850.20	25.61	H	5.0	9.8	30.38	33.0	-2.6			1850.20	25.58	H	5.0	9.8	30.35	33.0	-2.6																						
Mid Ch										Mid Ch																													
1880.00	12.43	V	5.1	10.0	17.31	33.0	-15.7			1880.00	12.24	V	5.1	10.0	17.12	33.0	-15.9																						
1880.00	25.86	H	5.1	10.0	30.74	33.0	-2.3			1880.00	25.81	H	5.1	10.0	30.69	33.0	-2.3																						
High Ch										High Ch																													
1909.80	12.56	V	5.2	10.1	17.51	33.0	-15.5			1909.80	11.99	V	5.2	10.1	16.84	33.0	-16.1																						
1909.80	25.73	H	5.2	10.1	30.68	33.0	-2.3			1909.80	25.76	H	5.2	10.1	30.71	33.0	-2.3																						

9.1.2. WCDMA

B2 REL99										B2 HSDPA									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung					Project #: 12756699					Company: Samsung					Project #: 12756699				
Date: 3/19/2019					Test Engineer: 43575 OS					Date: 3/19/2019					Test Engineer: 43575 OS				
Configuration: EUT Only					Location: Chamber I					Configuration: EUT Only					Location: Chamber I				
Mode: Rel99 Band 2 Fundamentals					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables					Mode: HSDPA Band 2 Fundamentals					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
1852.40	14.53	V	5.0	9.8	19.31	33.0	-13.7			1852.40	15.14	V	5.0	9.8	19.92	33.0	-13.1		
1852.40	19.33	H	5.0	9.8	24.11	33.0	-8.9			1852.40	19.63	H	5.0	9.8	24.41	33.0	-8.6		
Mid Ch										Mid Ch									
1880.00	15.08	V	5.1	10.0	19.96	33.0	-13.0			1880.00	15.42	V	5.1	10.0	20.30	33.0	-12.7		
1880.00	19.23	H	5.1	10.0	24.11	33.0	-8.9			1880.00	19.47	H	5.1	10.0	24.35	33.0	-8.7		
High Ch										High Ch									
1907.60	15.82	V	5.2	10.1	20.77	33.0	-12.2			1907.60	15.77	V	5.2	10.1	20.72	33.0	-12.3		
1907.60	19.99	H	5.2	10.1	24.94	33.0	-8.1			1907.60	19.93	H	5.2	10.1	24.88	33.0	-8.1		
B5 REL99										B5 HSDPA									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung					Project #: 12756699					Company: Samsung					Project #: 12756699				
Date: 3/15/2019					Test Engineer: 19480 BS					Date: 3/15/2019					Test Engineer: 19480 BS				
Configuration: EUT Only					Location: Chamber I					Configuration: EUT Only					Location: Chamber I				
Mode: Rel99 Band 5 Fundamentals					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables					Mode: HSDPA Band 5 Fundamentals					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
826.40	17.10	V	3.1	0.1	14.09	38.5	-24.4			826.40	15.73	V	3.1	0.1	12.72	38.5	-25.8		
826.40	24.19	H	3.1	0.2	21.28	38.5	-17.2			826.40	22.73	H	3.1	0.2	19.62	38.5	-18.7		
Mid Ch										Mid Ch									
836.60	15.61	V	3.1	0.1	12.54	38.5	-26.0			836.60	13.99	V	3.1	0.1	10.92	38.5	-27.6		
836.60	22.73	H	3.1	0.2	19.76	38.5	-18.7			836.60	21.20	H	3.1	0.2	18.23	38.5	-20.3		
High Ch										High Ch									
846.60	16.84	V	3.1	0.0	13.71	38.5	-24.8			846.60	15.54	V	3.1	0.0	12.41	38.5	-26.1		
846.60	24.30	H	3.1	0.1	21.27	38.5	-17.2			846.60	23.02	H	3.1	0.1	19.99	38.5	-18.5		

9.1.3. LTE Band 5

10MHz QPSK										10MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_10QAM Band 5 Fundamentals, 10MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
829.00	17.30	V	3.1	0.1	14.28	38.5	-24.2			829.00	16.16	V	3.1	0.1	13.14	38.5	-25.4		
829.00	24.58	H	3.1	0.2	21.66	38.5	-16.8			829.00	23.43	H	3.1	0.2	20.51	38.5	-18.0		
Mid Ch										Mid Ch									
836.50	15.89	V	3.1	0.1	12.82	38.5	-25.7			836.50	14.80	V	3.1	0.1	11.73	38.5	-26.8		
836.50	23.71	H	3.1	0.2	20.74	38.5	-17.8			836.50	22.62	H	3.1	0.2	19.65	38.5	-18.8		
High Ch										High Ch									
844.00	16.32	V	3.1	0.0	13.20	38.5	-25.3			844.00	15.27	V	3.1	0.0	12.15	38.5	-26.3		
844.00	24.00	H	3.1	0.1	20.98	38.5	-17.5			844.00	22.96	H	3.1	0.1	19.94	38.5	-18.6		
5MHz QPSK										5MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
826.50	16.02	V	3.1	0.1	13.01	38.5	-25.5			826.50	14.80	V	3.1	0.1	11.79	38.5	-26.7		
826.50	23.55	H	3.1	0.2	20.64	38.5	-17.9			826.50	22.34	H	3.1	0.2	19.43	38.5	-19.1		
Mid Ch										Mid Ch									
836.50	14.44	V	3.1	0.1	11.37	38.5	-27.1			836.50	13.26	V	3.1	0.1	10.19	38.5	-28.3		
836.50	22.68	H	3.1	0.2	19.71	38.5	-18.8			836.50	21.42	H	3.1	0.2	18.45	38.5	-20.0		
High Ch										High Ch									
846.50	19.53	V	3.1	0.0	16.40	38.5	-22.1			846.50	18.66	V	3.1	0.0	15.53	38.5	-23.0		
846.50	23.23	H	3.1	0.1	20.20	38.5	-18.3			846.50	21.88	H	3.1	0.1	18.85	38.5	-19.7		
3MHz QPSK										3MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
825.50	17.35	V	3.1	0.1	14.35	38.5	-24.2			825.50	16.05	V	3.1	0.1	13.05	38.5	-25.5		
825.50	24.52	H	3.1	0.2	21.62	38.5	-16.9			825.50	23.21	H	3.1	0.2	20.31	38.5	-18.2		
Mid Ch										Mid Ch									
836.50	15.43	V	3.1	0.1	12.36	38.5	-26.1			836.50	14.41	V	3.1	0.1	11.34	38.5	-27.2		
836.50	23.04	H	3.1	0.2	20.07	38.5	-18.4			836.50	22.01	H	3.1	0.2	19.04	38.5	-19.5		
High Ch										High Ch									
847.50	16.70	V	3.1	0.0	13.56	38.5	-24.9			847.50	15.90	V	3.1	0.0	12.76	38.5	-25.7		
847.50	24.71	H	3.1	0.1	21.67	38.5	-16.8			847.50	23.90	H	3.1	0.1	20.86	38.5	-17.6		
1.4MHz QPSK										1.4MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/15/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth					Test Equipment: Receiving: Hybrid PRE0184971, and Chamber I SMA Cables Substitution: Dipole T416, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
824.70	16.87	V	3.1	0.1	13.87	38.5	-24.6			824.70	15.59	V	3.1	0.1	12.59	38.5	-25.9		
824.70	24.18	H	3.1	0.2	21.28	38.5	-17.2			824.70	22.97	H	3.1	0.2	20.07	38.5	-18.4		
Mid Ch										Mid Ch									
836.50	14.93	V	3.1	0.1	11.86	38.5	-26.8			836.50	13.69	V	3.1	0.1	10.62	38.5	-27.9		
836.50	22.66	H	3.1	0.2	19.69	38.5	-18.8			836.50	21.44	H	3.1	0.2	18.47	38.5	-20.0		
High Ch										High Ch									
848.30	16.44	V	3.2	0.0	13.30	38.5	-25.2			848.30	15.39	V	3.2	0.0	12.25	38.5	-26.3		
848.30	24.25	H	3.2	0.1	21.21	38.5	-17.3			848.30	23.22	H	3.2	0.1	20.18	38.5	-18.3		

9.1.4. LTE Band 17

10MHz QPSK										10MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 12756699 Date: 3/11/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 17 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: Hybrid PRE0181575, and Chamber J SMA Cables Substitution: Dipole T416, Chamber J Passthrough Cables										UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 12756699 Date: 3/11/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 17 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: Hybrid PRE0181575, and Chamber J SMA Cables Substitution: Dipole T416, Chamber J Passthrough Cables									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
709.00	12.81	V	2.9	1.1	11.08	34.8	-23.7			709.00	11.57	V	2.9	1.1	9.84	34.8	-24.9		
709.00	20.24	H	2.9	1.5	18.87	34.8	-15.9			709.00	19.05	H	2.9	1.5	17.68	34.8	-17.1		
Mid Ch										Mid Ch									
710.00	12.91	V	2.9	1.1	11.17	34.8	-23.6			710.00	11.69	V	2.9	1.1	9.95	34.8	-24.8		
710.00	20.48	H	2.9	1.5	19.10	34.8	-15.7			710.00	19.25	H	2.9	1.5	17.87	34.8	-16.9		
High Ch										High Ch									
711.00	12.90	V	2.9	1.1	11.15	34.8	-23.6			711.00	11.64	V	2.9	1.1	9.89	34.8	-24.9		
711.00	20.62	H	2.9	1.5	19.23	34.8	-15.5			711.00	19.37	H	2.9	1.5	17.88	34.8	-16.8		
5MHz QPSK										5MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 12756699 Date: 3/11/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: Hybrid PRE0181575, and Chamber J SMA Cables Substitution: Dipole T416, Chamber J Passthrough Cables										UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 12756699 Date: 3/11/2019 Test Engineer: 19480 BS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: Hybrid PRE0181575, and Chamber J SMA Cables Substitution: Dipole T416, Chamber J Passthrough Cables									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
706.50	11.93	V	2.9	1.1	10.23	34.8	-24.5			706.50	10.77	V	2.9	1.1	9.07	34.8	-25.7		
706.50	19.74	H	2.9	1.5	18.41	34.8	-16.4			706.50	18.59	H	2.9	1.5	17.26	34.8	-17.5		
Mid Ch										Mid Ch									
710.00	11.98	V	2.9	1.1	10.24	34.8	-24.5			710.00	10.67	V	2.9	1.1	8.93	34.8	-25.8		
710.00	20.38	H	2.9	1.5	19.00	34.8	-15.8			710.00	19.09	H	2.9	1.5	17.71	34.8	-17.1		
High Ch										High Ch									
713.50	13.15	V	2.9	1.1	11.38	34.8	-23.4			713.50	11.81	V	2.9	1.1	10.04	34.8	-24.7		
713.50	20.70	H	2.9	1.4	19.27	34.8	-15.5			713.50	19.37	H	2.9	1.4	17.94	34.8	-16.8		

9.1.5. LTE Band 41

20MHz QPSK										20MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 41(FCC) Fundamentals, 20MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 41(FCC) Fundamentals, 20MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
2506.00	13.43	V	5.8	9.6	17.22	33.0	-15.8			2506.00	12.12	V	5.8	9.6	15.91	33.0	-17.1		
2506.00	12.43	H	5.8	9.6	16.22	33.0	-16.8			2506.00	11.09	H	5.8	9.6	14.88	33.0	-18.1		
Mid Ch										Mid Ch									
2593.00	11.74	V	6.0	9.9	15.68	33.0	-17.3			2593.00	10.11	V	6.0	9.9	14.05	33.0	-18.9		
2593.00	9.07	H	6.0	9.9	13.01	33.0	-20.0			2593.00	7.52	H	6.0	9.9	11.46	33.0	-21.5		
High Ch										High Ch									
2680.00	9.84	V	6.1	9.9	13.59	33.0	-19.4			2680.00	8.41	V	6.1	9.9	12.16	33.0	-20.8		
2680.00	8.82	H	6.1	9.9	12.57	33.0	-20.4			2680.00	7.39	H	6.1	9.9	11.14	33.0	-21.9		
15MHz QPSK										15MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 41(FCC) Fundamentals, 15MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 41(FCC) Fundamentals, 15MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
2503.50	13.24	V	5.8	9.6	17.02	33.0	-16.0			2503.50	12.30	V	5.8	9.6	16.08	33.0	-16.9		
2503.50	12.34	H	5.8	9.6	16.12	33.0	-16.9			2503.50	11.09	H	5.8	9.6	14.87	33.0	-18.1		
Mid Ch										Mid Ch									
2593.00	11.53	V	6.0	9.9	15.47	33.0	-17.5			2593.00	10.17	V	6.0	9.9	14.11	33.0	-18.9		
2593.00	9.19	H	6.0	9.9	13.13	33.0	-19.9			2593.00	7.98	H	6.0	9.9	11.92	33.0	-21.1		
High Ch										High Ch									
2682.50	10.43	V	6.1	9.9	14.17	33.0	-18.8			2682.50	8.84	V	6.1	9.9	12.68	33.0	-20.3		
2682.50	8.94	H	6.1	9.9	12.68	33.0	-20.3			2682.50	7.55	H	6.1	9.9	11.29	33.0	-21.7		
10MHz QPSK										10MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 41(FCC) Fundamentals, 10MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 41(FCC) Fundamentals, 10MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
2501.00	13.21	V	5.8	9.6	16.99	33.0	-16.0			2501.00	12.27	V	5.8	9.6	16.05	33.0	-17.0		
2501.00	12.37	H	5.8	9.6	16.15	33.0	-16.9			2501.00	11.13	H	5.8	9.6	14.91	33.0	-18.1		
Mid Ch										Mid Ch									
2593.00	11.20	V	6.0	9.9	15.14	33.0	-17.9			2593.00	10.07	V	6.0	9.9	14.01	33.0	-19.0		
2593.00	9.37	H	6.0	9.9	13.31	33.0	-19.7			2593.00	7.99	H	6.0	9.9	11.93	33.0	-21.1		
High Ch										High Ch									
2685.00	10.46	V	6.1	9.9	14.20	33.0	-18.8			2685.00	9.07	V	6.1	9.9	12.81	33.0	-20.2		
2685.00	9.50	H	6.1	9.9	13.24	33.0	-19.8			2685.00	8.16	H	6.1	9.9	11.90	33.0	-21.1		
5MHz QPSK										5MHz 16QAM									
UL Verification Services, Inc. High Frequency Substitution Measurement										UL Verification Services, Inc. High Frequency Substitution Measurement									
Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_QPSK Band 41(FCC) Fundamentals, 5MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables					Company: Samsung Project #: 12756699 Date: 3/20/2019 Test Engineer: 43575 OS Configuration: EUT Only Location: Chamber I Mode: LTE_16QAM Band 41(FCC) Fundamentals, 5MHz Bandwidth					Test Equipment: Receiving: Horn T862, and Chamber I SMA Cables Substitution: Horn PRE0181258, Chamber I Passthrough Cables				
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch										Low Ch									
2498.50	13.05	V	5.8	9.6	16.82	33.0	-16.2			2498.50	11.67	V	5.8	9.6	15.44	33.0	-17.6		
2498.50	12.05	H	5.8	9.6	15.82	33.0	-17.2			2498.50	10.65	H	5.8	9.6	14.42	33.0	-18.6		
Mid Ch										Mid Ch									
2593.00	10.87	V	6.0	9.9	14.81	33.0	-18.2			2593.00	9.72	V	6.0	9.9	13.66	33.0	-19.3		
2593.00	8.48	H	6.0	9.9	12.42	33.0	-20.6			2593.00	8.41	H	6.0	9.9	12.35	33.0	-20.6		
High Ch										High Ch									
2687.50	10.20	V	6.1	9.9	13.93	33.0	-19.1			2687.50	8.73	V	6.1	9.9	12.46	33.0	-20.5		
2687.50	9.64	H	6.1	9.9	13.37	33.0	-19.6			2687.50	8.43	H	6.1	9.9	12.16	33.0	-20.8		

9.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.53

LIMITS

FCC: §22.917(a), §24.238(a), §27.53(g)

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.

FCC: §27.53 (m) (41)

At least $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r01

TIA-603-E, Section 2.2.12.

MODES TESTED

- GSM 850
- GSM 1900
- WCDMA Band 5
- WCDMA Band 2
- LTE Band 5
- LTE Band 17
- LTE Band 41

RESULTS

No spurious emissions were detected above system noise floor from 18-26GHz.

9.2.1. GSM

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	GPRS 850
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
824.2MHz												
1	1.648	-61.74	Pk	28.3	-33.3	12.5	-54.24	-13	-41.24	0-360	148	H
2	2.472	-59.1	Pk	32.3	-32	11.3	-47.5	-13	-34.5	0-360	148	H
3	3.296	-71.97	Pk	32.8	-30.8	12	-57.97	-13	-44.97	0-360	148	H
4	1.648	-56.94	Pk	28.3	-33.3	11.4	-50.54	-13	-37.54	0-360	149	V
5	2.472	-63.83	Pk	32.3	-32	11.6	-51.93	-13	-38.93	0-360	149	V
6	3.297	-70.53	Pk	32.8	-30.9	12.1	-56.53	-13	-43.53	0-360	149	V
836.6MHz												
1	1.673	-60.67	Pk	29	-33	11.6	-53.07	-13	-40.07	0-360	148	H
2	2.509	-67.74	Pk	32.4	-31.8	11.4	-55.74	-13	-42.74	0-360	148	H
3	3.347	-72.86	Pk	32.8	-30.7	11.4	-59.36	-13	-46.36	0-360	148	H
4	1.673	-57.74	Pk	29.1	-33	10.9	-50.74	-13	-37.74	0-360	148	V
5	2.51	-64.01	Pk	32.4	-31.7	11.4	-51.91	-13	-38.91	0-360	148	V
6	3.347	-73.28	Pk	32.8	-30.7	12	-59.18	-13	-46.18	0-360	148	V
848.8MHz												
1	1.697	-57.01	Pk	29.1	-33.1	11.2	-49.81	-13	-36.81	0-360	148	H
2	2.546	-67.95	Pk	32.3	-31.6	12	-55.25	-13	-42.25	0-360	148	H
3	3.395	-72.09	Pk	32.7	-30.9	11.8	-58.49	-13	-45.49	0-360	148	H
4	1.698	-50.86	Pk	29.1	-33.1	12.2	-42.66	-13	-29.66	0-360	149	V
5	2.546	-69.36	Pk	32.3	-31.6	11.8	-56.86	-13	-43.86	0-360	149	V
6	3.396	-72.1	Pk	32.7	-30.8	11.8	-58.4	-13	-45.4	0-360	149	V

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	EGPRS 850
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
824.2MHz												
1	1.648	-68.65	Pk	28.3	-33.3	12.5	-61.15	-13	-48.15	0-360	148	H
2	2.472	-68.86	Pk	32.3	-32	11.3	-57.26	-13	-44.26	0-360	148	H
3	3.297	-72.26	Pk	32.8	-30.9	12	-58.36	-13	-45.36	0-360	148	H
4	1.648	-60.02	Pk	28.3	-33.3	11.4	-53.62	-13	-40.62	0-360	149	V
5	2.472	-63.94	Pk	32.3	-32	11.6	-52.04	-13	-39.04	0-360	149	V
6	3.296	-71.94	Pk	32.8	-30.9	12	-58.04	-13	-45.04	0-360	149	V
836.6MHz												
1	1.673	-64.61	Pk	29.1	-33	11.6	-56.91	-13	-43.91	0-360	148	H
2	2.51	-69.96	Pk	32.4	-31.7	11.4	-57.86	-13	-44.86	0-360	148	H
3	3.347	-71.86	Pk	32.8	-30.7	11.4	-58.36	-13	-45.36	0-360	148	H
4	1.673	-63.04	Pk	29	-33	10.9	-56.14	-13	-43.14	0-360	148	V
5	2.51	-70.49	Pk	32.4	-31.7	11.4	-58.39	-13	-45.39	0-360	148	V
6	3.346	-70.79	Pk	32.8	-30.7	12	-56.69	-13	-43.69	0-360	148	V
848.8MHz												
1	1.698	-65.84	Pk	29.1	-33.1	11.2	-58.64	-13	-45.64	0-360	148	H
2	2.546	-71.66	Pk	32.3	-31.6	12	-58.96	-13	-45.96	0-360	148	H
3	3.396	-72.64	Pk	32.7	-30.8	11.8	-58.94	-13	-45.94	0-360	148	H
4	1.698	-58.56	Pk	29.1	-33.1	12.2	-50.36	-13	-37.36	0-360	149	V
5	2.546	-71.05	Pk	32.3	-31.6	11.8	-58.55	-13	-45.55	0-360	149	V
6	3.395	-72.39	Pk	32.7	-30.9	11.8	-58.79	-13	-45.79	0-360	149	V

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	16069 OG
Configuration:	EUT+ Support Equipment
Mode:	GPRS 1900MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF PRE0189055 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1850.2MHz												
1	3.705	-67.13	Pk	30.5	-33.8	12	-58.43	-13	-45.43	0-360	148	H
2	5.542	-69.82	Pk	34.1	-30.9	12.3	-54.32	-13	-41.32	0-360	148	H
3	7.394	-71.84	Pk	37.8	-28.3	12.3	-50.04	-13	-37.04	0-360	148	H
4	3.695	-67.47	Pk	30.5	-33.9	11.9	-58.97	-13	-45.97	0-360	148	V
5	5.547	-70.02	Pk	34.1	-30.9	11.9	-54.92	-13	-41.92	0-360	148	V
6	7.389	-71.72	Pk	37.8	-28.3	12.2	-50.02	-13	-37.02	0-360	148	V
1880MHz												
1	3.768	-66.78	Pk	30.8	-33.6	11.5	-58.08	-13	-45.08	0-360	148	H
2	5.63	-69.82	Pk	34	-31.1	12.4	-54.52	-13	-41.52	0-360	148	H
3	7.537	-71.39	Pk	37.5	-28.3	11.9	-50.29	-13	-37.29	0-360	148	H
4	3.756	-67.32	Pk	30.7	-33.7	11.7	-58.62	-13	-45.62	0-360	148	V
5	5.648	-70.01	Pk	34	-30.8	12.2	-54.61	-13	-41.61	0-360	148	V
6	7.511	-71.64	Pk	37.5	-28.3	12	-50.44	-13	-37.44	0-360	148	V
1909.8MHz												
1	3.82	-67.11	Pk	31.2	-33.4	11.2	-58.11	-13	-45.11	0-360	148	H
2	5.739	-68.47	Pk	34.1	-31	12.2	-53.17	-13	-40.17	0-360	148	H
3	7.63	-72.03	Pk	37.3	-28	12.2	-50.53	-13	-37.53	0-360	148	H
4	3.814	-67.99	Pk	31.1	-33.4	11.5	-58.79	-13	-45.79	0-360	148	V
5	5.732	-68.92	Pk	34.1	-30.9	12.1	-53.62	-13	-40.62	0-360	148	V
6	7.634	-72.12	Pk	37.3	-28	12	-50.82	-13	-37.82	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	16069 OG
Configuration:	EUT+ Support Equipment
Mode:	EGPRS 1900MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF PRE0189055 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1850.2MHz												
1	3.695	-66.94	Pk	30.5	-33.9	11.8	-58.54	-13	-45.54	0-360	148	H
2	5.537	-69.74	Pk	34.1	-30.8	12.5	-53.94	-13	-40.94	0-360	148	H
3	7.4	-71.73	Pk	37.8	-28.3	12.3	-49.93	-13	-36.93	0-360	148	H
4	3.705	-67.26	Pk	30.5	-33.8	11.8	-58.76	-13	-45.76	0-360	148	V
5	5.552	-68.09	Pk	34.1	-31	11.7	-53.29	-13	-40.29	0-360	148	V
6	7.394	-72.08	Pk	37.8	-28.3	12.2	-50.38	-13	-37.38	0-360	148	V
1880MHz												
1	3.753	-66.84	Pk	30.7	-33.7	11.8	-58.04	-13	-45.04	0-360	148	H
2	5.646	-69.69	Pk	34	-30.9	12.1	-54.49	-13	-41.49	0-360	148	H
3	7.512	-70.83	Pk	37.5	-28.3	12	-49.63	-13	-36.63	0-360	148	H
4	3.756	-66.75	Pk	30.7	-33.7	11.7	-58.05	-13	-45.05	0-360	148	V
5	5.635	-70.33	Pk	34	-31	12.3	-55.03	-13	-42.03	0-360	148	V
6	7.519	-71.96	Pk	37.5	-28.3	11.9	-50.86	-13	-37.86	0-360	148	V
1909.8MHz												
1	3.812	-67.32	Pk	31.1	-33.4	11.2	-58.42	-13	-45.42	0-360	148	H
2	5.73	-69.25	Pk	34.1	-30.8	12.1	-53.85	-13	-40.85	0-360	148	H
3	7.637	-72.26	Pk	37.3	-28	12.1	-50.86	-13	-37.86	0-360	148	H
4	3.818	-67.72	Pk	31.1	-33.4	11.5	-58.52	-13	-45.52	0-360	148	V
5	5.723	-69.99	Pk	34.1	-30.8	11.9	-54.79	-13	-41.79	0-360	148	V
6	7.636	-72.44	Pk	37.3	-28	12	-51.14	-13	-38.14	0-360	148	V

9.2.2. WCDMA

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	REL99 B5
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
829MHz												
1	1.655	-64.68	Pk	28.6	-33.2	12.1	-57.18	-13	-44.18	0-360	148	H
2	2.475	-65.39	Pk	32.3	-32	11.3	-53.79	-13	-40.79	0-360	148	H
3	3.306	-71.37	Pk	32.7	-30.9	11.6	-57.97	-13	-44.97	0-360	148	H
4	1.654	-62.61	Pk	28.5	-33.2	11.3	-56.01	-13	-43.01	0-360	148	V
5	2.482	-67.17	Pk	32.4	-32	11.3	-55.47	-13	-42.47	0-360	148	V
6	3.306	-71.48	Pk	32.7	-30.9	11.9	-57.78	-13	-44.78	0-360	148	V
836.5MHz												
1	1.674	-64.9	Pk	29.1	-33	11.6	-57.2	-13	-44.2	0-360	148	H
2	2.508	-68.34	Pk	32.4	-31.8	11.4	-56.34	-13	-43.34	0-360	148	H
3	3.346	-70.34	Pk	32.8	-30.7	11.4	-56.84	-13	-43.84	0-360	148	H
4	1.676	-67.42	Pk	29.1	-33	10.9	-60.42	-13	-47.42	0-360	149	V
5	2.507	-69.65	Pk	32.4	-31.8	11.5	-57.55	-13	-44.55	0-360	149	V
6	3.345	-70.06	Pk	32.8	-30.7	12	-55.96	-13	-42.96	0-360	149	V
844MHz												
1	1.691	-62.14	Pk	29.1	-33.1	11.4	-54.74	-13	-41.74	0-360	148	H
2	2.542	-66.8	Pk	32.4	-31.7	12.3	-53.8	-13	-40.8	0-360	148	H
3	3.385	-72	Pk	32.7	-30.8	11.4	-58.7	-13	-45.7	0-360	148	H
4	1.694	-63.69	Pk	29.1	-33.2	12.4	-55.39	-13	-42.39	0-360	148	V
5	2.54	-71.41	Pk	32.3	-31.6	11.6	-59.11	-13	-46.11	0-360	148	V
6	3.386	-70.82	Pk	32.7	-30.8	12	-56.92	-13	-43.92	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	HSDPA B5
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
829MHz												
1	1.651	-66.23	Pk	28.4	-33.3	12.4	-58.73	-13	-45.73	0-360	148	H
2	2.476	-67.94	Pk	32.3	-32	11.3	-56.34	-13	-43.34	0-360	148	H
3	3.305	-71.36	Pk	32.7	-30.9	11.6	-57.96	-13	-44.96	0-360	148	H
4	1.655	-65.94	Pk	28.6	-33.2	11.3	-59.24	-13	-46.24	0-360	149	V
5	2.478	-69.88	Pk	32.4	-32	11.3	-58.18	-13	-45.18	0-360	149	V
6	3.306	-71.52	Pk	32.7	-30.9	11.9	-57.82	-13	-44.82	0-360	149	V
836.5MHz												
1	1.672	-66.32	Pk	29	-33	11.6	-58.72	-13	-45.72	0-360	148	H
2	2.506	-69.01	Pk	32.5	-31.8	11.4	-56.91	-13	-43.91	0-360	148	H
3	3.343	-70.57	Pk	32.8	-30.7	11.5	-56.97	-13	-43.97	0-360	148	H
4	1.671	-68.64	Pk	29	-33.1	11.1	-61.64	-13	-48.64	0-360	148	V
5	2.506	-70.43	Pk	32.5	-31.8	11.6	-58.13	-13	-45.13	0-360	148	V
6	3.343	-70.87	Pk	32.8	-30.7	12	-56.77	-13	-43.77	0-360	148	V
844MHz												
1	1.691	-65.79	Pk	29.1	-33.1	11.4	-58.39	-13	-45.39	0-360	148	H
2	2.542	-68.54	Pk	32.4	-31.7	12.3	-55.54	-13	-42.54	0-360	148	H
3	3.387	-71.86	Pk	32.7	-30.8	11.5	-58.46	-13	-45.46	0-360	148	H
4	1.694	-65.78	Pk	29.1	-33.2	12.4	-57.48	-13	-44.48	0-360	148	V
5	2.542	-70.31	Pk	32.4	-31.7	11.7	-57.91	-13	-44.91	0-360	148	V
6	3.386	-72.87	Pk	32.7	-30.8	12	-58.97	-13	-45.97	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	43575
Configuration:	EUT+ Support Equipment
Mode:	REL99 B2
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1852.4MHz												
1	3.706	-71.63	Pk	32.9	-30.3	11.8	-57.23	-13	-44.23	0-360	148	H
2	5.509	-75.51	Pk	34.8	-28.5	11.8	-57.41	-13	-44.41	0-360	148	H
3	7.486	-76.59	Pk	35.6	-25.5	11.8	-54.69	-13	-41.69	0-360	148	H
4	3.703	-71.51	Pk	32.8	-30.3	12	-57.01	-13	-44.01	0-360	148	V
5	5.587	-75.26	Pk	35	-28.6	12	-56.86	-13	-43.86	0-360	148	V
6	7.432	-75.96	Pk	35.6	-25.9	11.8	-54.46	-13	-41.46	0-360	148	V
1880MHz												
1	3.718	-73.76	Pk	32.9	-30.1	11.7	-59.26	-13	-46.26	0-360	148	H
2	5.68	-74.01	Pk	35	-28.7	11.7	-56.01	-13	-43.01	0-360	148	H
3	7.495	-76.23	Pk	35.6	-25.5	11.9	-54.23	-13	-41.23	0-360	148	H
4	3.753	-72.7	Pk	33	-30	11.8	-57.9	-13	-44.9	0-360	148	V
5	5.659	-75.33	Pk	35.1	-28.7	12.2	-56.73	-13	-43.73	0-360	148	V
6	7.502	-76.78	Pk	35.6	-25.6	12.3	-54.48	-13	-41.48	0-360	148	V
1907.6MHz												
1	3.814	-73.32	Pk	33.1	-30	11.7	-58.52	-13	-45.52	0-360	148	H
2	5.677	-74.7	Pk	35	-28.7	11.9	-56.5	-13	-43.5	0-360	148	H
3	7.548	-76.54	Pk	35.7	-25.4	11.9	-54.34	-13	-41.34	0-360	148	H
4	3.817	-74.05	Pk	33.1	-30	11.4	-59.55	-13	-46.55	0-360	148	V
5	5.699	-74.95	Pk	35.1	-28.5	11.7	-56.65	-13	-43.65	0-360	148	V
6	7.649	-75.85	Pk	35.7	-25.7	11.6	-54.25	-13	-41.25	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	43575
Configuration:	EUT+ Support Equipment
Mode:	HSDPA B2
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1852.4MHz												
1	3.707	-68.98	Pk	32.9	-30.3	11.8	-54.58	-13	-41.58	0-360	148	H
2	5.605	-74.83	Pk	34.9	-28.7	12.2	-56.43	-13	-43.43	0-360	148	H
3	7.491	-75.76	Pk	35.6	-25.6	11.9	-53.86	-13	-40.86	0-360	148	H
4	3.706	-71.6	Pk	32.9	-30.3	12	-57	-13	-44	0-360	148	V
5	5.53	-75.82	Pk	34.8	-28.6	12	-57.62	-13	-44.62	0-360	148	V
6	7.39	-76	Pk	35.6	-25.9	12	-54.3	-13	-41.3	0-360	148	V
1880MHz												
1	3.761	-72.71	Pk	33	-30	11.7	-58.01	-13	-45.01	0-360	148	H
2	5.675	-75.01	Pk	35	-28.7	11.9	-56.81	-13	-43.81	0-360	148	H
3	7.473	-75.99	Pk	35.6	-25.8	11.5	-54.69	-13	-41.69	0-360	148	H
4	3.761	-72.46	Pk	33	-30	11.8	-57.66	-13	-44.66	0-360	149	V
5	5.659	-74.61	Pk	35.1	-28.7	12.2	-56.01	-13	-43.01	0-360	149	V
6	7.499	-76.62	Pk	35.6	-25.6	12.2	-54.42	-13	-41.42	0-360	149	V
1907.6MHz												
1	3.817	-73.6	Pk	33.1	-30	11.7	-58.8	-13	-45.8	0-360	148	H
2	5.754	-74.82	Pk	35.1	-28	11.5	-56.22	-13	-43.22	0-360	148	H
3	7.542	-76.89	Pk	35.7	-25.6	11.8	-54.99	-13	-41.99	0-360	148	H
4	3.816	-73.28	Pk	33.1	-30	11.5	-58.68	-13	-45.68	0-360	148	V
5	5.698	-74.79	Pk	35	-28.5	11.7	-56.59	-13	-43.59	0-360	148	V
6	7.634	-75.32	Pk	35.6	-25.8	12	-53.52	-13	-40.52	0-360	148	V

9.2.3. LTE BAND 5

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	LTE 5 QPSK 10MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
829MHz												
1	1.658	-61.51	Pk	28.7	-33.2	12	-54.01	-13	-41.01	0-360	148	H
2	2.486	-61.6	Pk	32.4	-31.9	11.5	-49.6	-13	-36.6	0-360	148	H
3	3.317	-71.53	Pk	32.7	-30.9	11.3	-58.43	-13	-45.43	0-360	148	H
4	1.657	-63.02	Pk	28.7	-33.2	11.4	-56.12	-13	-43.12	0-360	149	V
5	2.486	-65.34	Pk	32.4	-31.9	11.6	-53.24	-13	-40.24	0-360	149	V
6	3.318	-71.32	Pk	32.8	-30.9	11.6	-57.82	-13	-44.82	0-360	149	V
836.5MHz												
1	1.673	-57.07	Pk	29	-33	11.6	-49.47	-13	-36.47	0-360	148	H
2	2.509	-61.28	Pk	32.4	-31.8	11.4	-49.28	-13	-36.28	0-360	148	H
3	3.345	-72.28	Pk	32.8	-30.7	11.4	-58.78	-13	-45.78	0-360	148	H
4	1.673	-63.82	Pk	29	-33	10.9	-56.92	-13	-43.92	0-360	148	V
5	2.509	-64.77	Pk	32.4	-31.8	11.4	-52.77	-13	-39.77	0-360	148	V
844MHz												
1	1.687	-60.13	Pk	29.1	-33	11.4	-52.63	-13	-39.63	0-360	148	H
2	2.532	-64.12	Pk	32.4	-31.7	12.7	-50.72	-13	-37.72	0-360	148	H
3	3.375	-71.9	Pk	32.7	-30.9	11.3	-58.8	-13	-45.8	0-360	148	H
4	1.687	-59.95	Pk	29.1	-33	11.8	-52.05	-13	-39.05	0-360	148	V
5	2.532	-66.01	Pk	32.4	-31.7	11.5	-53.81	-13	-40.81	0-360	148	V
6	3.375	-70.92	Pk	32.7	-30.9	11.9	-57.22	-13	-44.22	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/15/19
Test Engineer:	39339
Configuration:	EUT+ Support Equipment
Mode:	LTE 5 16QAM 10MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
829MHz												
1	1.658	-61.33	Pk	28.7	-33.2	12	-53.83	-13	-40.83	0-360	148	H
2	2.486	-60.94	Pk	32.4	-31.9	11.5	-48.94	-13	-35.94	0-360	148	H
3	3.317	-72.23	Pk	32.7	-30.8	11.3	-59.03	-13	-46.03	0-360	148	H
4	1.658	-64.41	Pk	28.7	-33.2	11.4	-57.51	-13	-44.51	0-360	148	V
5	2.486	-67.07	Pk	32.4	-31.9	11.6	-54.97	-13	-41.97	0-360	148	V
6	3.317	-72.27	Pk	32.7	-30.9	11.6	-58.87	-13	-45.87	0-360	148	V
836.5MHz												
1	1.673	-59.81	Pk	29	-33	11.6	-52.21	-13	-39.21	0-360	148	H
2	2.509	-62.05	Pk	32.4	-31.8	11.4	-50.05	-13	-37.05	0-360	148	H
3	3.345	-72.08	Pk	32.8	-30.7	11.4	-58.58	-13	-45.58	0-360	148	H
4	1.673	-66.6	Pk	29	-33	10.9	-59.7	-13	-46.7	0-360	149	V
5	2.509	-64.89	Pk	32.4	-31.8	11.4	-52.89	-13	-39.89	0-360	149	V
6	3.346	-70.9	Pk	32.8	-30.7	12	-56.8	-13	-43.8	0-360	149	V
844MHz												
1	1.688	-61.19	Pk	29.1	-33	11.4	-53.69	-13	-40.69	0-360	148	H
2	2.532	-66.14	Pk	32.4	-31.7	12.7	-52.74	-13	-39.74	0-360	148	H
3	3.375	-71.95	Pk	32.7	-30.9	11.3	-58.85	-13	-45.85	0-360	148	H
4	1.687	-60.42	Pk	29.1	-33	11.8	-52.52	-13	-39.52	0-360	148	V
5	2.532	-65.68	Pk	32.4	-31.7	11.5	-53.48	-13	-40.48	0-360	148	V
6	3.376	-71.76	Pk	32.7	-30.9	11.9	-58.06	-13	-45.06	0-360	148	V

9.2.4. LTE BAND 17

Company:	Samsung
Project #:	12756699
Date:	3/8/19
Test Engineer:	19498
Configuration:	EUT+ Support Equipment
Mode:	LTE 17 QPSK 10MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
709MHz												
1	1.429	-72.72	Pk	28.6	-33.5	12.3	-65.32	-13	-52.32	0-360	148	H
2	2.127	-64.64	Pk	31.3	-32.5	12.3	-53.54	-13	-40.54	0-360	148	H
3	2.819	-74.43	Pk	32.3	-31.4	12.2	-61.33	-13	-48.33	0-360	148	H
4	1.427	-72.08	Pk	28.6	-33.6	12.2	-64.88	-13	-51.88	0-360	148	V
5	2.126	-68.79	Pk	31.3	-32.5	11.8	-58.19	-13	-45.19	0-360	148	V
6	2.821	-75.28	Pk	32.3	-31.4	12	-62.38	-13	-49.38	0-360	148	V
710MHz												
1	1.42	-72.28	Pk	28.7	-33.6	12.4	-64.78	-13	-51.78	0-360	148	H
2	2.129	-64.13	Pk	31.3	-32.5	12.2	-53.13	-13	-40.13	0-360	148	H
3	2.84	-73.1	Pk	32.2	-31.6	11.6	-60.9	-13	-47.9	0-360	148	H
4	1.42	-71.06	Pk	28.7	-33.6	12.3	-63.66	-13	-50.66	0-360	149	V
5	2.13	-68.04	Pk	31.3	-32.5	11.9	-57.34	-13	-44.34	0-360	149	V
6	2.838	-74.74	Pk	32.2	-31.5	11.6	-62.44	-13	-49.44	0-360	149	V
711MHz												
1	1.422	-71.27	Pk	28.7	-33.5	12.4	-63.67	-13	-50.67	0-360	148	H
2	2.133	-62.99	Pk	31.3	-32.5	12	-52.19	-13	-39.19	0-360	148	H
3	2.843	-73.16	Pk	32.2	-31.6	11.4	-61.16	-13	-48.16	0-360	148	H
4	1.421	-72.62	Pk	28.7	-33.5	12.4	-65.02	-13	-52.02	0-360	148	V
5	2.133	-67.51	Pk	31.3	-32.5	12	-56.71	-13	-43.71	0-360	148	V
6	2.842	-74.73	Pk	32.2	-31.6	11.7	-62.43	-13	-49.43	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/8/19
Test Engineer:	19498
Configuration:	EUT+ Support Equipment
Mode:	LTE 17 16QAM 10MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
709MHz												
1	1.418	-71.9	Pk	28.7	-33.7	12.3	-64.6	-13	-51.6	0-360	148	H
2	2.127	-64.79	Pk	31.3	-32.5	12.3	-53.69	-13	-40.69	0-360	148	H
3	2.836	-73.19	Pk	32.2	-31.5	11.7	-60.79	-13	-47.79	0-360	148	H
4	1.42	-72.17	Pk	28.7	-33.6	12.3	-64.77	-13	-51.77	0-360	148	V
5	2.127	-68.72	Pk	31.3	-32.5	11.8	-58.12	-13	-45.12	0-360	148	V
6	2.839	-75.11	Pk	32.2	-31.6	11.6	-62.91	-13	-49.91	0-360	148	V
710MHz												
1	1.42	-69.13	Pk	28.7	-33.6	12.4	-61.63	-13	-48.63	0-360	148	H
2	2.129	-63.99	Pk	31.3	-32.5	12.2	-52.99	-13	-39.99	0-360	148	H
3	2.84	-70.99	Pk	32.2	-31.6	11.6	-58.79	-13	-45.79	0-360	148	H
5	1.42	-72.69	Pk	28.7	-33.6	12.3	-65.29	-13	-52.29	0-360	148	V
6	2.13	-67.9	Pk	31.3	-32.5	11.9	-57.2	-13	-44.2	0-360	148	V
7	2.835	-74.64	Pk	32.2	-31.5	11.6	-62.34	-13	-49.34	0-360	148	V
711MHz												
1	1.423	-72.84	Pk	28.7	-33.5	12.5	-65.14	-13	-52.14	0-360	148	H
2	2.133	-63.24	Pk	31.3	-32.5	12	-52.44	-13	-39.44	0-360	148	H
3	2.82	-74.14	Pk	32.3	-31.4	12.2	-61.04	-13	-48.04	0-360	148	H
4	1.418	-73.02	Pk	28.7	-33.6	12.2	-65.72	-13	-52.72	0-360	148	V
5	2.133	-68.15	Pk	31.3	-32.5	12	-57.35	-13	-44.35	0-360	148	V
6	2.82	-74.41	Pk	32.3	-31.4	11.9	-61.61	-13	-48.61	0-360	148	V

9.2.5. LTE BAND 41

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	19498 ER
Configuration:	EUT+ Support Equipment
Mode:	LTE 41 QPSK 20MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2506MHz												
1	5.011	-60.36	Pk	34.3	-29.2	11.9	-43.36	-25	-18.36	0-360	148	H
2	7.517	-64.87	Pk	35.6	-25.8	12	-43.07	-25	-18.07	0-360	148	H
3	10.024	-74.74	Pk	37	-22.4	12	-48.14	-25	-23.14	0-360	148	H
4	5.011	-63.66	Pk	34.3	-29.2	12.1	-46.46	-25	-21.46	0-360	148	V
5	7.517	-62.44	Pk	35.6	-25.8	12.1	-40.54	-25	-15.54	0-360	148	V
6	10.024	-77.21	Pk	37	-22.4	12.1	-50.51	-25	-25.51	0-360	148	V
2593MHz												
1	5.186	-61.61	Pk	34.3	-29.1	12	-44.41	-25	-19.41	0-360	148	H
2	7.778	-59.19	Pk	35.7	-25.4	12.1	-36.79	-25	-11.79	0-360	148	H
3	10.35	-75.63	Pk	37.3	-21.6	11.8	-48.13	-25	-23.13	0-360	148	H
4	5.186	-65.08	Pk	34.3	-29.1	12.2	-47.68	-25	-22.68	0-360	149	V
5	7.779	-64.49	Pk	35.7	-25.3	12.1	-41.99	-25	-16.99	0-360	149	V
6	10.371	-77.21	Pk	37.3	-21.6	12.2	-49.31	-25	-24.31	0-360	149	V
2680MHz												
1	5.359	-66.74	Pk	34.4	-28.8	12.2	-48.94	-25	-23.94	0-360	148	H
2	8.04	-69.51	Pk	35.7	-24.9	11.9	-46.81	-25	-21.81	0-360	148	H
3	10.706	-76.53	Pk	37.8	-21.6	11.8	-48.53	-25	-23.53	0-360	148	H
4	5.36	-68.05	Pk	34.4	-28.8	12.2	-50.25	-25	-25.25	0-360	148	V
5	8.04	-70.67	Pk	35.7	-24.9	12	-47.87	-25	-22.87	0-360	148	V
6	10.714	-77.11	Pk	37.9	-21.4	11.7	-48.91	-25	-23.91	0-360	148	V

Company:	Samsung
Project #:	12756699
Date:	3/20/19
Test Engineer:	19498 ER
Configuration:	EUT+ Support Equipment
Mode:	LTE 41 16QAM 20MHz
Chamber #:	Chamber I

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2506MHz												
1	5.011	-61.27	Pk	34.3	-29.2	11.9	-44.27	-25	-19.27	0-360	148	H
2	7.517	-62.36	Pk	35.6	-25.8	12	-40.56	-25	-15.56	0-360	148	H
3	10.039	-76.82	Pk	37.1	-22.3	11.9	-50.12	-25	-25.12	0-360	148	H
4	5.011	-64.76	Pk	34.3	-29.2	12.1	-47.56	-25	-22.56	0-360	148	V
5	7.517	-64.96	Pk	35.6	-25.8	12.1	-43.06	-25	-18.06	0-360	148	V
6	10.013	-76.8	Pk	37	-22.3	11.9	-50.2	-25	-25.2	0-360	148	V
2593MHz												
1	5.185	-65.95	Pk	34.3	-29.1	11.9	-48.85	-25	-23.85	0-360	148	H
2	7.779	-63.24	Pk	35.7	-25.3	12.1	-40.74	-25	-15.74	0-360	148	H
3	10.372	-76.25	Pk	37.3	-21.6	12.2	-48.35	-25	-23.35	0-360	148	H
4	5.186	-65.51	Pk	34.3	-29.1	12.2	-48.11	-25	-23.11	0-360	148	V
5	7.779	-69.1	Pk	35.7	-25.3	12.1	-46.6	-25	-21.6	0-360	148	V
6	10.365	-77.16	Pk	37.3	-21.7	12.1	-49.46	-25	-24.46	0-360	148	V
2680MHz												
1	5.359	-68.31	Pk	34.4	-28.8	12.2	-50.51	-25	-25.51	0-360	148	H
2	8.04	-67.43	Pk	35.7	-24.9	11.9	-44.73	-25	-19.73	0-360	148	H
3	10.72	-77.6	Pk	37.8	-21.2	11.9	-49.1	-25	-24.1	0-360	148	H
4	5.359	-70.19	Pk	34.4	-28.8	12.2	-52.39	-25	-27.39	0-360	148	V
5	8.04	-67.93	Pk	35.7	-24.9	12	-45.13	-25	-20.13	0-360	148	V
6	10.72	-77.16	Pk	37.8	-21.2	11.9	-48.66	-25	-23.66	0-360	148	V