

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

Part 27.53:

(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

- a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);

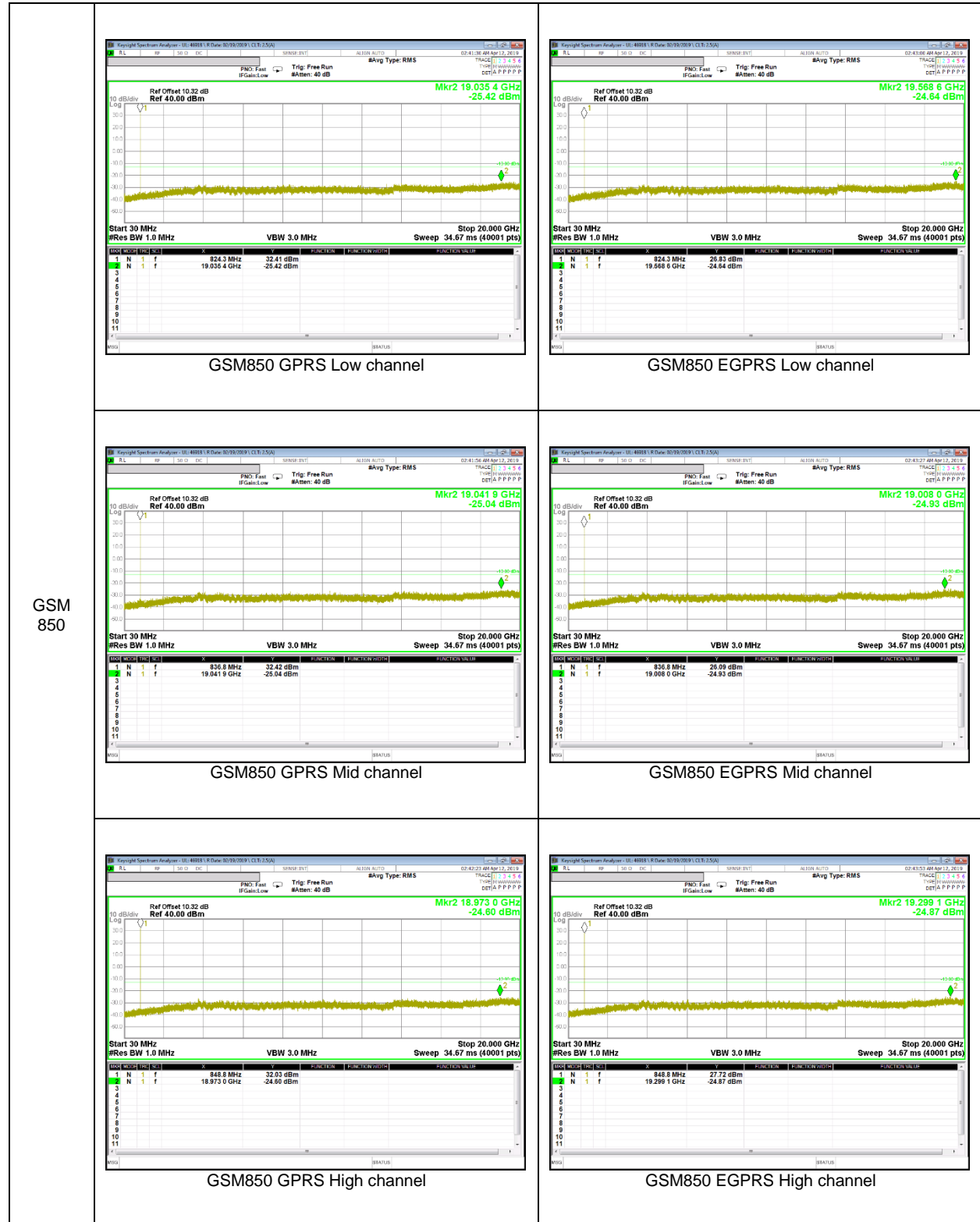
RESULTS

See the following pages.

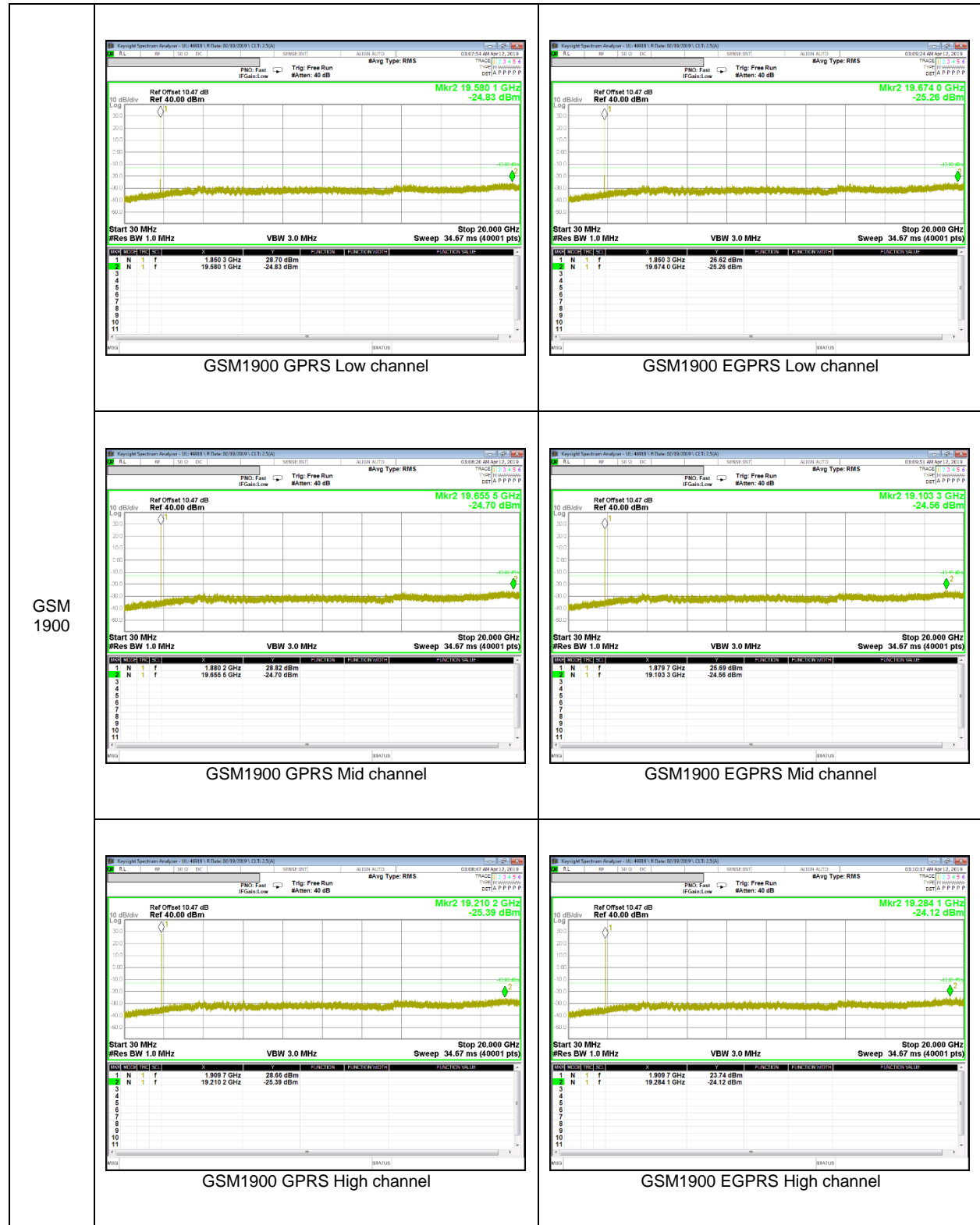
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

10.3.1.OUT OF BAND EMISSIONS RESULT

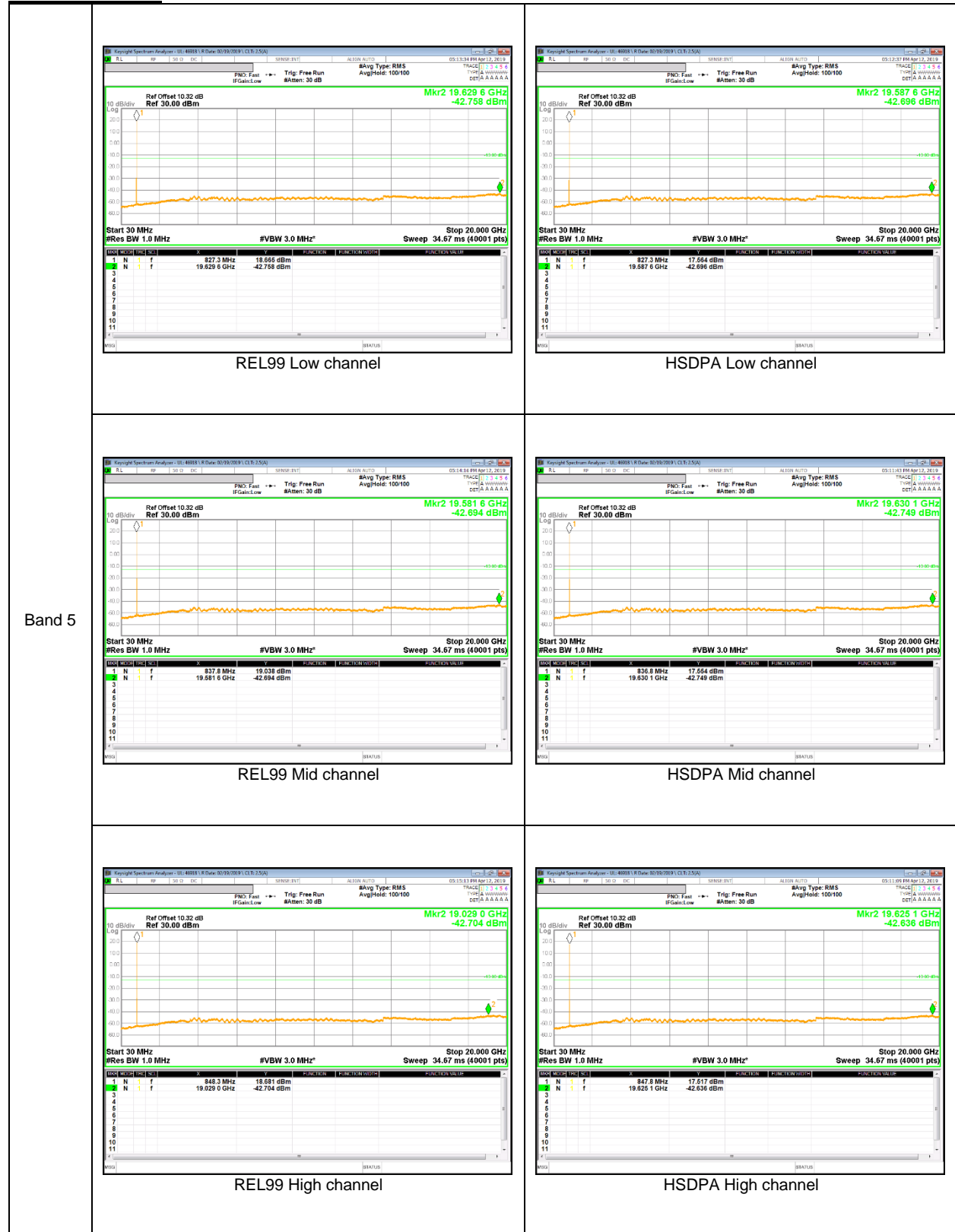
GSM 850



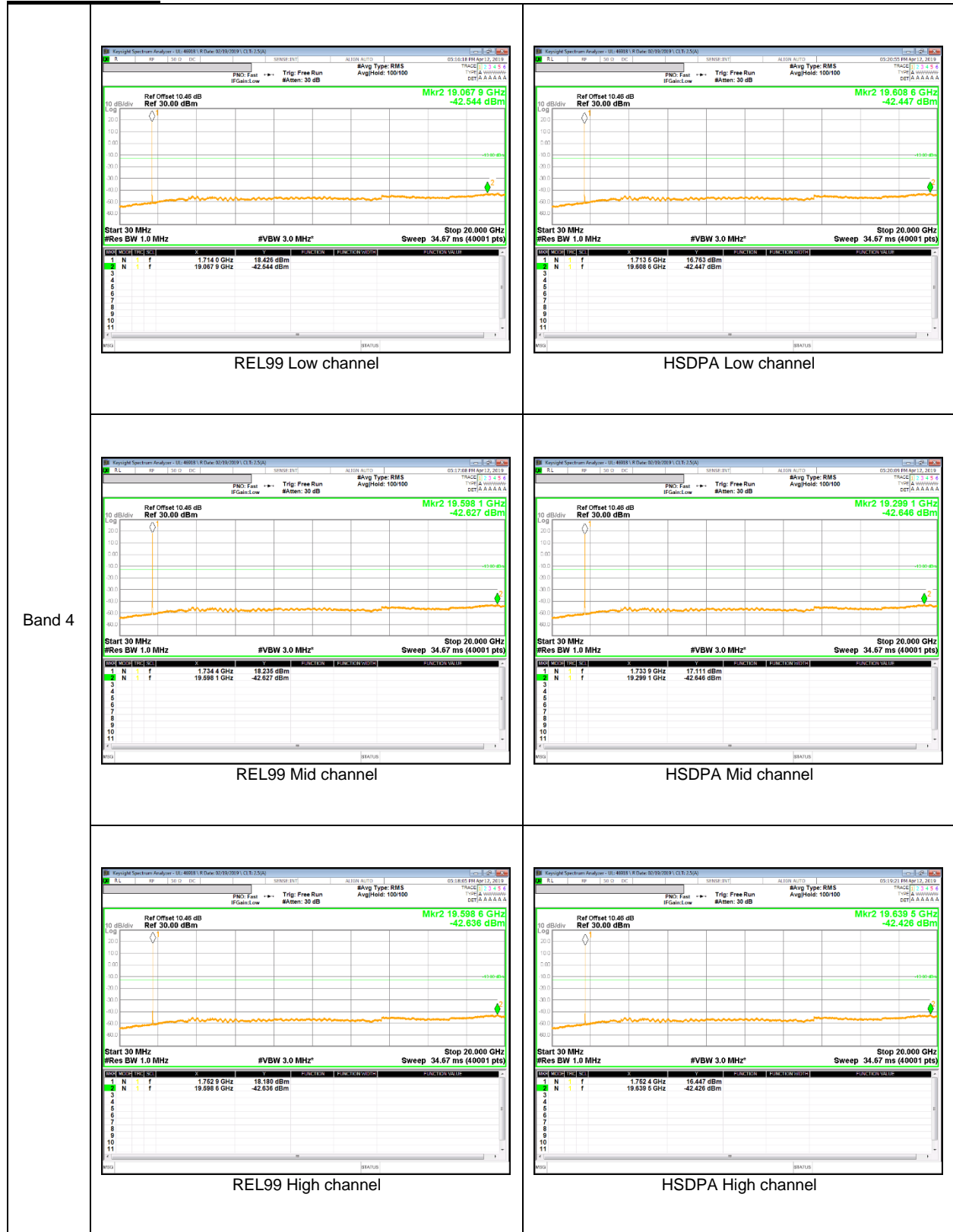
GSM 1900



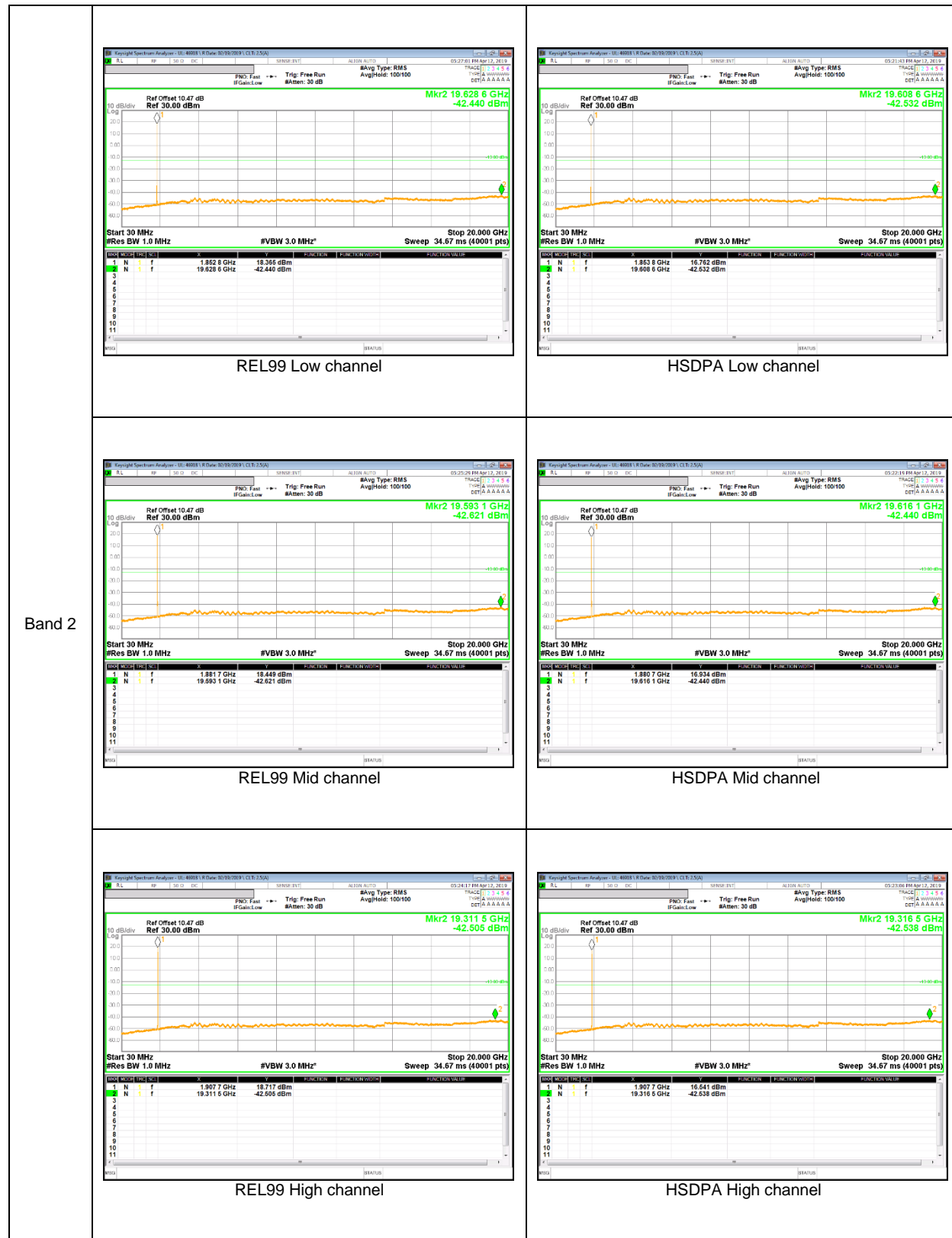
WCDMA Band 5



WCDMA Band 4



WCDMA Band 2



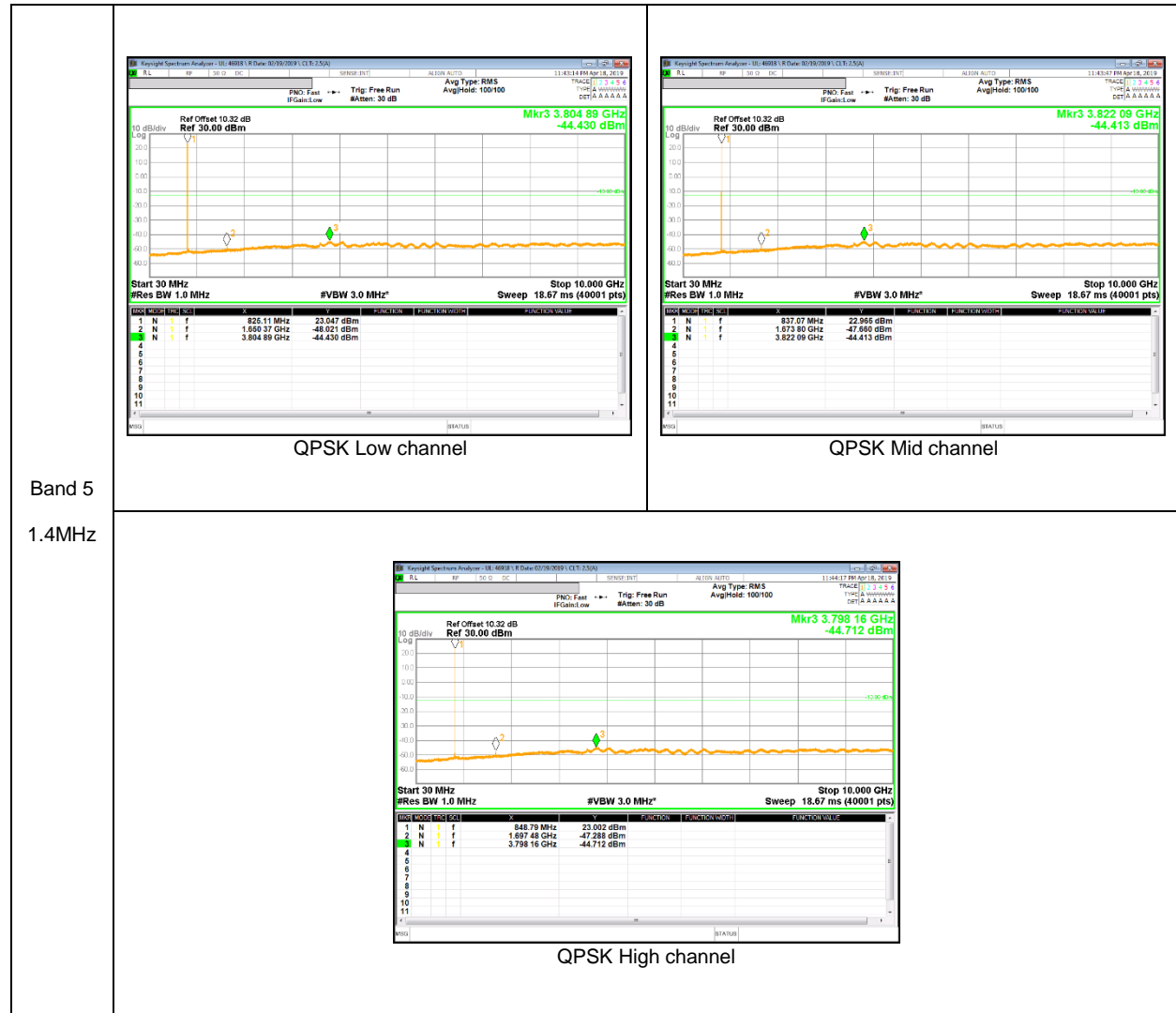
LTE Band 2



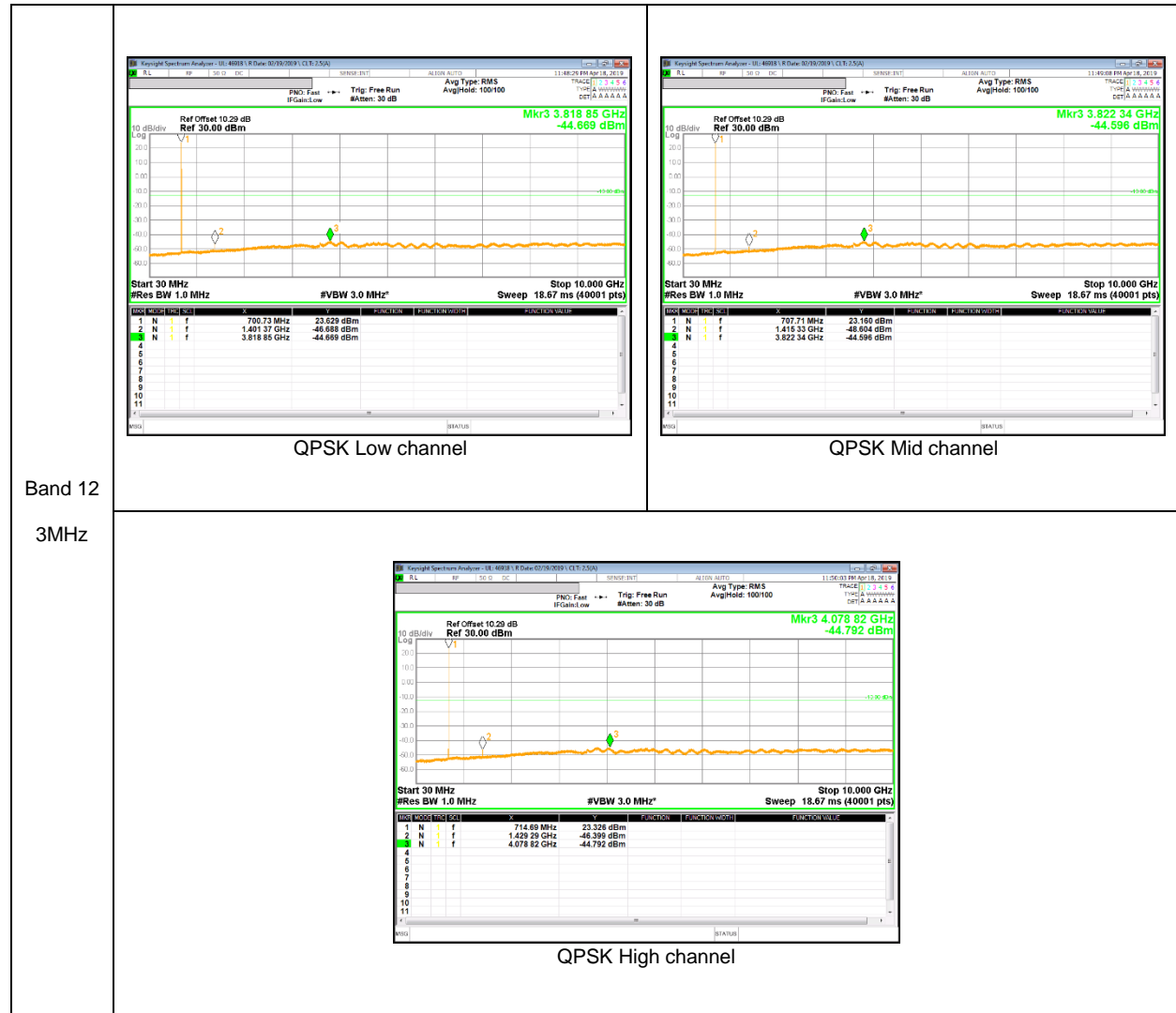
LTE Band 4



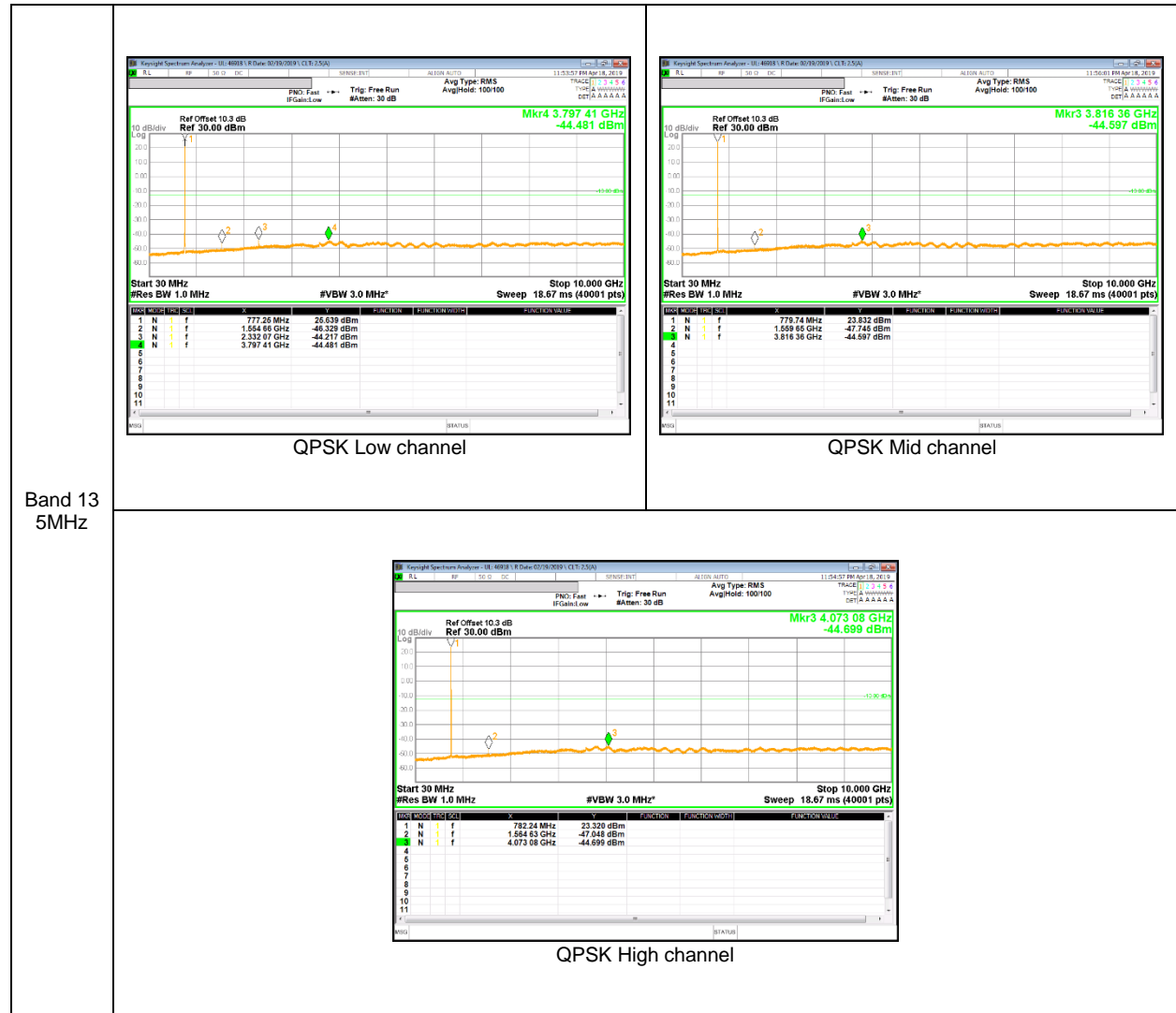
LTE Band 5



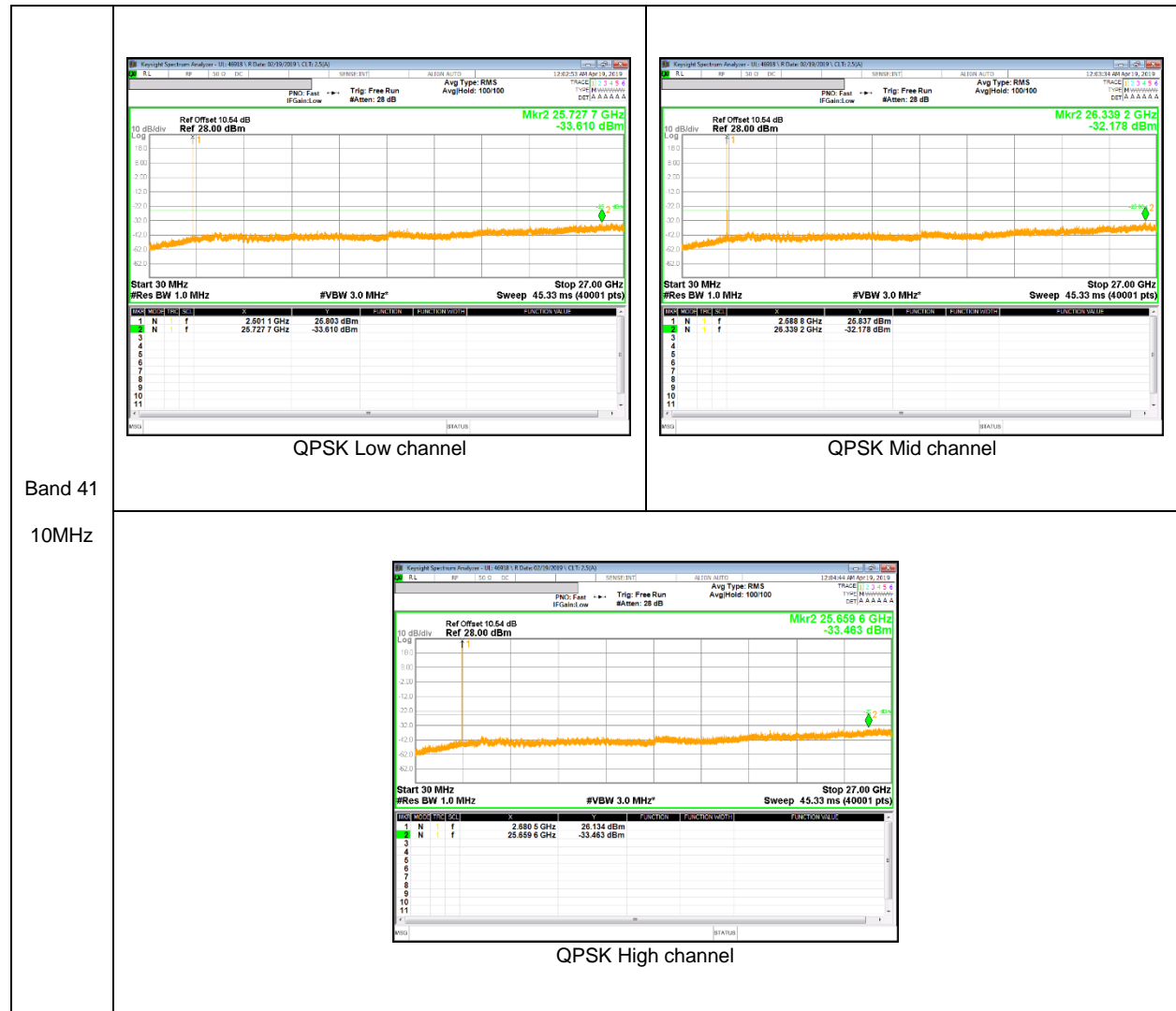
LTE Band 12



LTE Band 13



LTE Band 41



LTE Band 66



10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

NOTE : Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

10.4.1. FREQUENCY STABILITY RESULTS

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

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	50	824.19998041	0.010	848.79998930	-0.006	2.5	
3.85	40	824.19998603	0.004	848.79998519	-0.002	2.5	
3.85	30	824.19998656	0.003	848.79998267	0.001	2.5	
3.85	20	824.19998895	0.000	848.79998385	0.000	2.5	
3.85	10	824.19999095	-0.002	848.79999073	-0.008	2.5	
3.85	0	824.19998714	0.002	848.79998865	-0.006	2.5	
3.85	-10	824.19998837	0.001	848.79999100	-0.008	2.5	
3.85	-20	824.19998708	0.002	848.79998733	-0.004	2.5	
3.85	-30	824.19999068	-0.002	848.79998900	-0.006	2.5	

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	824.19998895	0	848.79998385	0	2.5	
4.40	20	824.19998169	0.009	848.79999006	-0.007	2.5	
3.60	20	824.19998676	0.003	848.79998397	0.000	2.5	

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0781	1909.9244		
Extreme (50C)		1850.0780	1909.9244	-27.5	-0.015
Extreme (40C)		1850.0780	1909.9244	-19.7	-0.011
Extreme (30C)		1850.0780	1909.9244	-27.2	-0.014
Extreme (10C)		1850.0780	1909.9244	-23.8	-0.013
Extreme (0C)		1850.0780	1909.9244	-28.7	-0.015
Extreme (-10C)		1850.0780	1909.9244	-23.2	-0.012
Extreme (-20C)		1850.0780	1909.9244	-29.8	-0.016
Extreme (-30C)		1850.0780	1909.9244	-19.4	-0.010
20C	15%	1850.0780	1909.9244	-20.9	-0.011
	-15%	1850.0780	1909.9244	-21.8	-0.012
	End Point	1850.0780	1909.9244	-25.8	-0.014

WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	50	826.39998516	0.002	846.59998877	-0.009	2.5	
3.85	40	826.39998588	0.001	846.59998918	-0.009	2.5	
3.85	30	826.39998897	-0.003	846.59998807	-0.008	2.5	
3.85	20	826.39998660	0.000	846.59998156	0.000	2.5	
3.85	10	826.39998982	-0.004	846.59998432	-0.003	2.5	
3.85	0	826.39998774	-0.001	846.59998012	0.002	2.5	
3.85	-10	826.39998201	0.006	846.59998586	-0.005	2.5	
3.85	-20	826.39998989	-0.004	846.59998073	0.001	2.5	
3.85	-30	826.39998539	0.001	846.59998471	-0.004	2.5	

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	826.39998660	0	846.59998156	0	2.5	
4.40	20	826.39998568	0.001	846.59998361	-0.002	2.5	
3.60	20	826.39998092	0.007	846.59999079	-0.011	2.5	

WCDMA Band 4 (Rel. 99)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1712.3979	1752.6021		
Extreme (50C)		1712.3979	1752.6020	-24.2	-0.014
Extreme (40C)		1712.3979	1752.6020	-22.8	-0.013
Extreme (30C)		1712.3979	1752.6020	-21.9	-0.013
Extreme (10C)		1712.3979	1752.6020	-21.3	-0.012
Extreme (0C)		1712.3979	1752.6020	-24.9	-0.014
Extreme (-10C)		1712.3979	1752.6020	-25.9	-0.015
Extreme (-20C)		1712.3979	1752.6020	-21.2	-0.012
Extreme (-30C)		1712.3979	1752.6020	-28.9	-0.017
20C		15%	1712.3979	1752.6020	-22.6
	-15%	1712.3979	1752.6020	-28.6	-0.016
	End Point	1712.3979	1752.6020	-21.5	-0.012

WCDMA Band 2 (Rel. 99)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-28.3	-0.015
Extreme (40C)		1852.3979	1907.6020	-21.9	-0.012
Extreme (30C)		1852.3979	1907.6020	-25.6	-0.014
Extreme (10C)		1852.3979	1907.6020	-26.6	-0.014
Extreme (0C)		1852.3979	1907.6020	-26.2	-0.014
Extreme (-10C)		1852.3979	1907.6020	-26.9	-0.014
Extreme (-20C)		1852.3979	1907.6020	-20.0	-0.011
Extreme (-30C)		1852.3979	1907.6020	-21.4	-0.011
20C		15%	1852.3979	1907.6020	-19.6
	-15%	1852.3979	1907.6020	-22.7	-0.012
	End Point	1852.3979	1907.6020	-23.6	-0.013

LTE Band 2 (16QAM)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.6995	1909.3005		
Extreme (50C)		1850.6994	1909.3005	-19.9	-0.011
Extreme (40C)		1850.6994	1909.3005	-21.8	-0.012
Extreme (30C)		1850.6994	1909.3005	-19.5	-0.010
Extreme (10C)		1850.6994	1909.3005	-27.0	-0.014
Extreme (0C)		1850.6994	1909.3005	-22.8	-0.012
Extreme (-10C)		1850.6994	1909.3005	-28.9	-0.015
Extreme (-20C)		1850.6994	1909.3005	-21.4	-0.011
Extreme (-30C)		1850.6994	1909.3005	-19.1	-0.010
20C		15%	1850.6994	1909.3005	-24.0
	-15%	1850.6994	1909.3005	-21.5	-0.011
	End Point	1850.6994	1909.3005	-27.4	-0.015

LTE Band 4 (Lowest Frequency: QPSK / Highest Frequency: 16QAM)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3995	1907.6005		
Extreme (50C)		1852.3994	1907.6005	-22.9	-0.013
Extreme (40C)		1852.3994	1907.6005	-22.1	-0.013
Extreme (30C)		1852.3994	1907.6005	-28.1	-0.016
Extreme (10C)		1852.3994	1907.6005	-27.2	-0.016
Extreme (0C)		1852.3994	1907.6005	-27.5	-0.016
Extreme (-10C)		1852.3994	1907.6005	-27.8	-0.016
Extreme (-20C)		1852.3994	1907.6005	-21.4	-0.012
Extreme (-30C)		1852.3994	1907.6005	-19.0	-0.011
20C		15%	1852.3994	1907.6005	-22.2
	-15%	1852.3994	1907.6005	-22.2	-0.013
	End Point	1852.3994	1907.6005	-25.9	-0.015

LTE Band 5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse					Limit [ppm]
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	50	824.69998171	0.006	848.29998796	0.000	2.5	
3.85	40	824.69998159	0.006	848.29998231	0.006	2.5	
3.85	30	824.69998954	-0.003	848.29998760	0.000	2.5	
3.85	20	824.69998692	0.000	848.29998782	0.000	2.5	
3.85	10	824.69998579	0.001	848.29998561	0.003	2.5	
3.85	0	824.69998033	0.008	848.29998657	0.001	2.5	
3.85	-10	824.69998787	-0.001	848.29998105	0.008	2.5	
3.85	-20	824.69998982	-0.004	848.29998599	0.002	2.5	
3.85	-30	824.69998483	0.003	848.29998175	0.007	2.5	

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse					Limit [ppm]
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	824.69998692	0	848.29998782	0	2.5	
4.40	20	824.69998022	0.008	848.29998568	0.003	2.5	
3.60	20	824.69998051	0.008	848.29998459	0.004	2.5	

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

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.6995	715.3005		
Extreme (50C)		699.6994	715.3005	-9.2	-0.013
Extreme (40C)		699.6994	715.3005	-13.0	-0.018
Extreme (30C)		699.6994	715.3005	-12.7	-0.018
Extreme (10C)		699.6994	715.3005	-8.8	-0.012
Extreme (0C)		699.6994	715.3005	-13.9	-0.020
Extreme (-10C)		699.6994	715.3005	-11.1	-0.016
Extreme (-20C)		699.6994	715.3005	-14.0	-0.020
Extreme (-30C)		699.6994	715.3005	-10.9	-0.015
20C		15%	699.6994	715.3005	-12.1
	-15%	699.6994	715.3005	-10.7	-0.015
	End Point	699.6994	715.3005	-7.3	-0.010

LTE Band 13 (Lowest Frequency: QPSK / Highest Frequency: 16QAM)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	779.4977	784.5022		
Extreme (50C)		779.4977	784.5022	-11.9	-0.015
Extreme (40C)		779.4977	784.5022	-4.7	-0.006
Extreme (30C)		779.4977	784.5022	-14.2	-0.018
Extreme (10C)		779.4977	784.5022	-11.8	-0.015
Extreme (0C)		779.4977	784.5022	-14.7	-0.019
Extreme (-10C)		779.4977	784.5022	-10.0	-0.013
Extreme (-20C)		779.4977	784.5022	-10.1	-0.013
Extreme (-30C)		779.4977	784.5022	-12.0	-0.015
20C		15%	779.4977	784.5022	-8.6
	-15%	779.4977	784.5022	-10.9	-0.014
	End Point	779.4977	784.5022	-11.6	-0.015

LTE Band 41 (QPSK)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2498.4978	2687.5022		
Extreme (50C)		2498.4977	2687.5022	-30.9	-0.012
Extreme (40C)		2498.4977	2687.5022	-34.6	-0.013
Extreme (30C)		2498.4977	2687.5022	-27.6	-0.011
Extreme (10C)		2498.4977	2687.5022	-33.2	-0.013
Extreme (0C)		2498.4977	2687.5022	-32.3	-0.012
Extreme (-10C)		2498.4977	2687.5022	-27.1	-0.010
Extreme (-20C)		2498.4977	2687.5022	-27.9	-0.011
Extreme (-30C)		2498.4977	2687.5022	-31.4	-0.012
20C		15%	2498.4977	2687.5022	-32.9
	-15%	2498.4977	2687.5022	-27.9	-0.011
	End Point	2498.4977	2687.5022	-32.1	-0.012

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

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6994	1779.3005	-27.4	-0.016
Extreme (40C)		1710.6994	1779.3005	-25.0	-0.014
Extreme (30C)		1710.6994	1779.3005	-22.4	-0.013
Extreme (10C)		1710.6994	1779.3005	-20.4	-0.012
Extreme (0C)		1710.6994	1779.3005	-19.0	-0.011
Extreme (-10C)		1710.6994	1779.3005	-26.0	-0.015
Extreme (-20C)		1710.6994	1779.3005	-27.6	-0.016
Extreme (-30C)		1710.6994	1779.3005	-24.1	-0.014
20C		15%	1710.6994	1779.3005	-26.8
	-15%	1710.6994	1779.3005	-29.8	-0.017
	End Point	1710.6994	1779.3005	-21.6	-0.012

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and §27.53

LIMITS

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

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

27.50:

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

(c) (10) - Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

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

TEST RESULTS

11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	20.28	106.66
		661	836.6	26.30	426.58
		810	848.8	19.36	86.30
	EGPRS	512	824.2	20.16	103.75
		661	836.6	19.96	99.08
		810	848.8	19.40	87.10
GSM1900	GPRS	512	1850.2	28.94	783.43
		661	1880	29.71	935.41
		810	1909.8	27.82	605.34
	EGPRS	512	1850.2	26.14	411.15
		661	1880	26.97	497.74
		810	1909.8	24.44	277.97

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.97	62.66
		4183	836.6	17.44	55.46
		4233	846.6	17.12	51.52
	HSDPA	4132	826.4	16.77	47.53
		4183	836.6	16.51	44.77
		4233	846.6	15.93	39.17
Band 4	REL99	1312	1712.4	20.78	119.67
		1413	1732.6	20.66	116.41
		1513	1752.6	20.50	112.20
	HSDPA	1312	1712.4	19.01	79.62
		1413	1732.6	19.10	81.28
		1513	1752.6	18.88	77.27
Band 2	REL99	9262	1852.4	21.18	131.22
		9400	1880.0	22.88	194.09
		9538	1907.6	22.36	172.19
	HSDPA	9262	1852.4	19.53	89.74
		9400	1880.0	21.06	127.64
		9538	1907.6	20.60	114.82

LTE Band 2

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 2	20	QPSK	1 / 99	1860.0	19.51	89.33
			1 / 49	1880.0	21.09	128.53
			1 / 0	1900.0	20.63	115.61
		16QAM	1 / 99	1860.0	18.53	71.29
			1 / 49	1880.0	19.87	97.05
			1 / 0	1900.0	19.47	88.51
	15	QPSK	1 / 74	1857.5	19.40	87.10
			1 / 37	1880.0	20.96	124.74
			1 / 37	1902.5	20.78	119.67
		16QAM	1 / 74	1857.5	18.43	69.66
			1 / 37	1880.0	19.92	98.17
			1 / 0	1902.5	19.46	88.31
	10	QPSK	1 / 0	1855.0	19.09	81.10
			1 / 49	1880.0	21.07	127.94
			1 / 0	1905.0	20.68	116.95
		16QAM	1 / 0	1855.0	17.97	62.66
			1 / 0	1880.0	20.22	105.20
			1 / 0	1905.0	19.59	90.99
	5	QPSK	1 / 12	1852.5	18.73	74.64
			1 / 12	1880.0	21.39	137.72
			1 / 0	1907.5	20.57	114.02
		16QAM	1 / 12	1852.5	17.94	62.23
			1 / 12	1880.0	20.31	107.40
			1 / 12	1907.5	19.68	92.90
	3	QPSK	1 / 8	1851.5	18.73	74.64
			1 / 8	1880.0	21.27	133.97
			1 / 8	1908.5	20.38	109.14
		16QAM	1 / 8	1851.5	17.61	57.68
			1 / 8	1880.0	20.34	108.14
			1 / 8	1908.5	19.32	85.51
	1.4	QPSK	1 / 3	1850.7	18.80	75.86
			1 / 3	1880.0	20.99	125.60
			1 / 0	1909.3	20.46	111.17
		16QAM	1 / 3	1850.7	17.52	56.49
			1 / 3	1880.0	19.75	94.41
			1 / 3	1909.3	19.37	86.50

LTE Band 4

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 4	20	QPSK	1 / 0	1720.0	20.92	123.59
			1 / 0	1732.5	21.15	130.32
			1 / 0	1745.0	20.90	123.03
		16QAM	1 / 0	1720.0	20.00	100.00
			1 / 0	1732.5	19.98	99.54
			1 / 0	1745.0	19.78	95.06
	15	QPSK	1 / 0	1717.5	21.13	129.72
			1 / 0	1732.5	20.98	125.31
			1 / 0	1747.5	21.05	127.35
		16QAM	1 / 74	1717.5	19.81	95.72
			1 / 0	1732.5	19.74	94.19
			1 / 0	1747.5	20.17	103.99
	10	QPSK	1 / 0	1715.0	20.82	120.78
			1 / 0	1732.5	20.74	118.58
			1 / 49	1750.0	20.45	110.92
		16QAM	1 / 0	1715.0	19.96	99.08
			1 / 0	1732.5	19.78	95.06
			1 / 0	1750.0	19.90	97.72
	5	QPSK	1 / 24	1712.5	20.76	119.12
			1 / 0	1732.5	20.73	118.30
			1 / 24	1752.5	20.87	122.18
		16QAM	1 / 0	1712.5	19.75	94.41
			1 / 0	1732.5	19.63	91.83
			1 / 24	1752.5	19.73	93.97
	3	QPSK	1 / 8	1711.5	20.97	125.03
			1 / 8	1732.5	20.70	117.49
			1 / 8	1753.5	21.14	130.02
		16QAM	1 / 8	1711.5	19.95	98.86
			1 / 8	1732.5	19.59	90.99
			1 / 8	1753.5	20.06	101.39
1.4	QPSK	1 / 3	1710.7	21.85	153.11	
		1 / 3	1732.5	21.73	148.94	
		1 / 3	1754.3	21.95	156.68	
	16QAM	1 / 3	1710.7	20.82	120.78	
		1 / 3	1732.5	20.35	108.39	
		1 / 3	1754.3	21.09	128.53	

LTE Band 5

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 5	10	QPSK	1 / 49	829.0	16.03	40.09
			1 / 0	836.5	16.55	45.19
			1 / 0	844.0	16.57	45.39
		16QAM	1 / 49	829.0	15.57	36.06
			1 / 25	836.5	15.41	34.75
			1 / 0	844.0	15.75	37.58
	5	QPSK	1 / 24	826.5	16.68	46.56
			1 / 0	836.5	16.31	42.76
			1 / 0	846.5	16.59	45.60
		16QAM	1 / 24	826.5	15.46	35.16
			1 / 12	836.5	15.60	36.31
			1 / 0	846.5	15.70	37.15
	3	QPSK	1 / 8	825.5	17.08	51.05
			1 / 8	836.5	16.53	44.98
			1 / 8	847.5	16.48	44.46
		16QAM	1 / 8	825.5	15.81	38.11
			1 / 8	836.5	15.51	35.56
			1 / 0	847.5	15.52	35.65
	1.4	QPSK	1 / 5	824.7	16.65	46.24
			1 / 5	836.5	16.56	45.29
			1 / 5	848.3	16.48	44.46
		16QAM	1 / 5	824.7	15.52	35.65
			1 / 5	836.5	15.45	35.08
			1 / 5	848.3	15.38	34.51

LTE Band 12

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 12	10	QPSK	1 / 0	704.0	16.94	49.43
			1 / 0	707.5	17.19	52.36
			1 / 0	711.0	17.39	54.83
		16QAM	1 / 0	704.0	16.22	41.88
			1 / 0	707.5	16.16	41.30
			1 / 0	711.0	16.03	40.09
	5	QPSK	1 / 0	701.5	16.73	47.10
			1 / 12	707.5	17.24	52.97
			1 / 12	713.5	17.15	51.88
		16QAM	1 / 0	701.5	15.92	39.08
			1 / 0	707.5	16.18	41.50
			1 / 0	713.5	16.10	40.74
	3	QPSK	1 / 8	700.5	16.83	48.19
			1 / 8	707.5	17.21	52.60
			1 / 8	714.5	17.09	51.17
		16QAM	1 / 8	700.5	15.68	36.98
			1 / 8	707.5	15.93	39.17
			1 / 8	714.5	15.95	39.36
	1.4	QPSK	1 / 3	699.7	16.22	41.88
			1 / 3	707.5	16.99	50.00
			1 / 0	715.3	16.78	47.64
		16QAM	1 / 3	699.7	15.09	32.28
			1 / 3	707.5	15.82	38.19
			1 / 3	715.3	15.72	37.33

LTE Band 13

Band	BW	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
	[MHz]				[dBm]	[mW]
Band 13	10	QPSK	1 / 0	782.0	12.43	17.50
		16QAM	1 / 49	782.0	11.41	13.84
	5	QPSK	1 / 0	779.5	12.09	16.18
			1 / 0	782.0	12.16	16.44
			1 / 0	784.5	12.55	17.99
	16QAM	1 / 24	779.5	11.25	13.34	
		1 / 0	782.0	11.27	13.40	
		1 / 24	784.5	11.50	14.13	

LTE Band 41

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1 / 0	2506.0	22.19	165.58
			1 / 0	2593.0	22.98	198.61
			1 / 49	2680.0	21.94	156.31
		16QAM	1 / 0	2506.0	22.45	175.79
			1 / 0	2593.0	23.00	199.53
			1 / 49	2680.0	22.06	160.69
	15	QPSK	1 / 0	2503.5	22.89	194.54
			1 / 0	2593.0	22.69	185.78
			1 / 37	2682.5	21.71	148.25
		16QAM	1 / 0	2503.5	22.33	171.00
			1 / 0	2593.0	23.58	228.03
			1 / 37	2682.5	21.98	157.76
	10	QPSK	1 / 25	2501.0	22.01	158.85
			1 / 0	2593.0	22.65	184.08
			1 / 0	2685.0	22.67	184.93
		16QAM	1 / 0	2501.0	21.73	148.94
			1 / 0	2593.0	23.88	244.34
			1 / 0	2685.0	22.35	171.79
	5	QPSK	1 / 0	2498.5	22.32	170.61
			1 / 0	2593.0	22.44	175.39
			1 / 12	2687.5	22.05	160.32
		16QAM	1 / 12	2498.5	21.93	155.96
			1 / 0	2593.0	23.75	237.14
			1 / 12	2687.5	21.07	127.94

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 66

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 66	20	QPSK	1 / 0	1720.0	22.19	165.58
			1 / 0	1745.0	21.84	152.76
			1 / 0	1770.0	21.31	135.21
		16QAM	1 / 0	1720.0	20.98	125.31
			1 / 0	1745.0	20.67	116.68
			1 / 0	1770.0	20.50	112.20
	15	QPSK	1 / 0	1717.5	21.85	153.11
			1 / 0	1747.5	21.85	153.11
			1 / 0	1772.5	21.69	147.57
		16QAM	1 / 0	1717.5	20.59	114.55
			1 / 0	1747.5	20.91	123.31
			1 / 0	1772.5	20.69	117.22
	10	QPSK	1 / 49	1715.0	20.90	123.03
			1 / 0	1745.0	21.54	142.56
			1 / 0	1775.0	21.21	132.13
		16QAM	1 / 0	1715.0	20.61	115.08
			1 / 0	1745.0	20.70	117.49
			1 / 49	1775.0	19.44	87.90
	5	QPSK	1 / 0	1712.5	21.21	132.13
			1 / 0	1745.0	22.15	164.06
			1 / 0	1777.5	19.71	93.54
		16QAM	1 / 0	1712.5	20.57	114.02
			1 / 0	1745.0	21.28	134.28
			1 / 24	1777.5	19.62	91.62
	3	QPSK	1 / 8	1711.5	21.05	127.35
			1 / 8	1745.0	21.86	153.46
			1 / 8	1778.5	20.54	113.24
		16QAM	1 / 8	1711.5	19.87	97.05
			1 / 8	1745.0	20.65	116.14
			1 / 8	1778.5	19.44	87.90
1.4	QPSK	1 / 3	1710.7	21.13	129.72	
		1 / 3	1745.0	21.93	155.96	
		1 / 3	1779.3	20.49	111.94	
	16QAM	1 / 3	1710.7	20.14	103.28	
		1 / 3	1745.0	20.99	125.60	
		1 / 3	1779.3	19.35	86.10	

11.1.2. ERP/EIRP DATA

GSM850

GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	<p> Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: GPRS 850 MHz Fundamentals </p> <p> Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable </p>																																																																																										
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824.20	24.65	V	3.0	-1.5	20.16	38.5	-18.3																																																																																				
824.20	8.73	H	3.0	-1.5	4.24	38.5	-34.3																																																																																				
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836.60	24.42	V	3.0	-1.4	19.96	38.5	-18.5																																																																																				
836.60	9.35	H	3.0	-1.4	4.89	38.5	-33.6																																																																																				
High Ch																																																																																											
848.80	23.84	V	3.1	-1.4	19.40	38.5	-19.1																																																																																				
848.80	9.59	H	3.1	-1.4	5.15	38.5	-33.4																																																																																				

GSM1900

GSM1900 GPRS	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / X-Position ConfigurationTextBox Location: Chamber 1 Mode: GPRS 1900 MHz Fundamentals</p> <p>Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1850.20</td> <td>20.00</td> <td>V</td> <td>4.5</td> <td>9.5</td> <td>25.02</td> <td>33.0</td> <td>-8.0</td> <td></td> </tr> <tr> <td>1850.20</td> <td>23.92</td> <td>H</td> <td>4.5</td> <td>9.5</td> <td>28.94</td> <td>33.0</td> <td>-4.1</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>16.14</td> <td>V</td> <td>4.5</td> <td>9.3</td> <td>20.92</td> <td>33.0</td> <td>-12.1</td> <td></td> </tr> <tr> <td>1880.00</td> <td>24.94</td> <td>H</td> <td>4.5</td> <td>9.3</td> <td>29.71</td> <td>33.0</td> <td>-3.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1909.80</td> <td>18.98</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>23.47</td> <td>33.0</td> <td>-9.5</td> <td></td> </tr> <tr> <td>1909.80</td> <td>23.33</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>27.82</td> <td>33.0</td> <td>-5.2</td> <td></td> </tr> </tbody> </table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1850.20	20.00	V	4.5	9.5	25.02	33.0	-8.0		1850.20	23.92	H	4.5	9.5	28.94	33.0	-4.1		Mid Ch									1880.00	16.14	V	4.5	9.3	20.92	33.0	-12.1		1880.00	24.94	H	4.5	9.3	29.71	33.0	-3.3		High Ch									1909.80	18.98	V	4.6	9.1	23.47	33.0	-9.5		1909.80	23.33	H	4.6	9.1	27.82	33.0	-5.2	
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GSM1900 EGPRS	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: EGPRS 1900 MHz Fundamentals</p> <p>Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1850.20</td> <td>17.81</td> <td>V</td> <td>4.5</td> <td>9.5</td> <td>22.83</td> <td>33.0</td> <td>-10.2</td> <td></td> </tr> <tr> <td>1850.20</td> <td>21.12</td> <td>H</td> <td>4.5</td> <td>9.5</td> <td>26.14</td> <td>33.0</td> <td>-6.9</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>13.42</td> <td>V</td> <td>4.5</td> <td>9.3</td> <td>18.20</td> <td>33.0</td> <td>-14.8</td> <td></td> </tr> <tr> <td>1880.00</td> <td>22.20</td> <td>H</td> <td>4.5</td> <td>9.3</td> <td>26.97</td> <td>33.0</td> <td>-6.0</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1909.80</td> <td>15.47</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>19.96</td> <td>33.0</td> <td>-13.0</td> <td></td> </tr> <tr> <td>1909.80</td> <td>19.95</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>24.44</td> <td>33.0</td> <td>-8.6</td> <td></td> </tr> </tbody> </table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1850.20	17.81	V	4.5	9.5	22.83	33.0	-10.2		1850.20	21.12	H	4.5	9.5	26.14	33.0	-6.9		Mid Ch									1880.00	13.42	V	4.5	9.3	18.20	33.0	-14.8		1880.00	22.20	H	4.5	9.3	26.97	33.0	-6.0		High Ch									1909.80	15.47	V	4.6	9.1	19.96	33.0	-13.0		1909.80	19.95	H	4.6	9.1	24.44	33.0	-8.6	
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WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Fundamentals </p> <p> Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>826.40</td> <td>22.45</td> <td>V</td> <td>3.0</td> <td>-1.5</td> <td>17.97</td> <td>38.5</td> <td>-20.5</td> <td></td> </tr> <tr> <td>826.40</td> <td>5.56</td> <td>H</td> <td>3.0</td> <td>-1.5</td> <td>1.08</td> <td>38.5</td> <td>-37.4</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>21.90</td> <td>V</td> <td>3.0</td> <td>-1.4</td> <td>17.44</td> <td>38.5</td> <td>-21.1</td> <td></td> </tr> <tr> <td>836.60</td> <td>4.91</td> <td>H</td> <td>3.0</td> <td>-1.4</td> <td>0.45</td> <td>38.5</td> <td>-38.1</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>846.60</td> <td>21.56</td> <td>V</td> <td>3.1</td> <td>-1.4</td> <td>17.12</td> <td>38.5</td> <td>-21.4</td> <td></td> </tr> <tr> <td>846.60</td> <td>6.05</td> <td>H</td> <td>3.1</td> <td>-1.4</td> <td>1.61</td> <td>38.5</td> <td>-36.9</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									826.40	22.45	V	3.0	-1.5	17.97	38.5	-20.5		826.40	5.56	H	3.0	-1.5	1.08	38.5	-37.4		Mid Ch									836.60	21.90	V	3.0	-1.4	17.44	38.5	-21.1		836.60	4.91	H	3.0	-1.4	0.45	38.5	-38.1		High Ch									846.60	21.56	V	3.1	-1.4	17.12	38.5	-21.4		846.60	6.05	H	3.1	-1.4	1.61	38.5	-36.9
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WCDMA Band 5 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: HSDPA Band 5 Fundamentals </p> <p> Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>826.40</td> <td>21.25</td> <td>V</td> <td>3.0</td> <td>-1.5</td> <td>16.77</td> <td>38.5</td> <td>-21.7</td> <td></td> </tr> <tr> <td>826.40</td> <td>4.79</td> <td>H</td> <td>3.0</td> <td>-1.5</td> <td>0.31</td> <td>38.5</td> <td>-38.2</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>20.97</td> <td>V</td> <td>3.0</td> <td>-1.4</td> <td>16.51</td> <td>38.5</td> <td>-22.0</td> <td></td> </tr> <tr> <td>836.60</td> <td>4.42</td> <td>H</td> <td>3.0</td> <td>-1.4</td> <td>-0.04</td> <td>38.5</td> <td>-38.5</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>846.60</td> <td>20.37</td> <td>V</td> <td>3.1</td> <td>-1.4</td> <td>15.93</td> <td>38.5</td> <td>-22.6</td> <td></td> </tr> <tr> <td>846.60</td> <td>5.28</td> <td>H</td> <td>3.1</td> <td>-1.4</td> <td>0.84</td> <td>38.5</td> <td>-37.7</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									826.40	21.25	V	3.0	-1.5	16.77	38.5	-21.7		826.40	4.79	H	3.0	-1.5	0.31	38.5	-38.2		Mid Ch									836.60	20.97	V	3.0	-1.4	16.51	38.5	-22.0		836.60	4.42	H	3.0	-1.4	-0.04	38.5	-38.5		High Ch									846.60	20.37	V	3.1	-1.4	15.93	38.5	-22.6		846.60	5.28	H	3.1	-1.4	0.84	38.5	-37.7
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WCDMA Band 4

WCDMA Band 4 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		12810836						
	Date:		2019-04-11						
	Test Engineer:		45585						
	Configuration:		EUT / X-Position						
	Location:		Chamber 1						
	Mode:		Rel99 Band 4 Fundamentals						
	Test Equipment:								
	Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.40	10.89	V	4.3	9.4	15.98	30.0	-14.0	
	1712.40	15.70	H	4.3	9.4	20.78	30.0	-9.2	
	Mid Ch								
	1732.60	10.15	V	4.3	9.5	15.29	30.0	-14.7	
	1732.60	15.53	H	4.3	9.5	20.66	30.0	-9.3	
	High Ch								
	1752.60	2.84	V	4.4	9.5	8.01	30.0	-22.0	
	1752.60	15.33	H	4.4	9.5	20.50	30.0	-9.5	

WCDMA Band 4 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		12810836						
	Date:		2019-04-11						
	Test Engineer:		45585						
	Configuration:		EUT / X-Position						
	Location:		Chamber 1						
	Mode:		HSDPA Band 4 Fundamentals						
	Test Equipment:								
	Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.40	9.30	V	4.3	9.4	14.39	30.0	-15.6	
	1712.40	13.93	H	4.3	9.4	19.01	30.0	-11.0	
	Mid Ch								
	1732.60	8.81	V	4.3	9.5	13.95	30.0	-16.1	
	1732.60	13.97	H	4.3	9.5	19.10	30.0	-10.9	
	High Ch								
	1752.60	1.36	V	4.4	9.5	6.53	30.0	-23.5	
	1752.60	13.71	H	4.4	9.5	18.88	30.0	-11.1	

WCDMA Band 2

WCDMA Band 2 REL99	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: Rel99 Band 2 Fundamentals</p> <p>Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1852.40</td> <td>13.33</td> <td>V</td> <td>4.5</td> <td>9.5</td> <td>18.33</td> <td>33.0</td> <td>-14.7</td> <td></td> </tr> <tr> <td>1852.40</td> <td>16.18</td> <td>H</td> <td>4.5</td> <td>9.5</td> <td>21.18</td> <td>33.0</td> <td>-11.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>7.84</td> <td>V</td> <td>4.5</td> <td>9.3</td> <td>12.62</td> <td>33.0</td> <td>-20.4</td> <td></td> </tr> <tr> <td>1880.00</td> <td>18.11</td> <td>H</td> <td>4.5</td> <td>9.3</td> <td>22.88</td> <td>33.0</td> <td>-10.1</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1907.60</td> <td>7.82</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>12.33</td> <td>33.0</td> <td>-20.7</td> <td></td> </tr> <tr> <td>1907.60</td> <td>17.84</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>22.36</td> <td>33.0</td> <td>-10.6</td> <td></td> </tr> </tbody> </table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1852.40	13.33	V	4.5	9.5	18.33	33.0	-14.7		1852.40	16.18	H	4.5	9.5	21.18	33.0	-11.8		Mid Ch									1880.00	7.84	V	4.5	9.3	12.62	33.0	-20.4		1880.00	18.11	H	4.5	9.3	22.88	33.0	-10.1		High Ch									1907.60	7.82	V	4.6	9.1	12.33	33.0	-20.7		1907.60	17.84	H	4.6	9.1	22.36	33.0	-10.6	
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WCDMA Band 2 HSDPA	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: HSDPA Band 2 Fundamentals</p> <p>Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1852.40</td> <td>11.93</td> <td>V</td> <td>4.5</td> <td>9.5</td> <td>16.93</td> <td>33.0</td> <td>-16.1</td> <td></td> </tr> <tr> <td>1852.40</td> <td>14.53</td> <td>H</td> <td>4.5</td> <td>9.5</td> <td>19.53</td> <td>33.0</td> <td>-13.5</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>5.85</td> <td>V</td> <td>4.5</td> <td>9.3</td> <td>10.63</td> <td>33.0</td> <td>-22.4</td> <td></td> </tr> <tr> <td>1880.00</td> <td>16.29</td> <td>H</td> <td>4.5</td> <td>9.3</td> <td>21.06</td> <td>33.0</td> <td>-11.9</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1907.60</td> <td>6.37</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>10.88</td> <td>33.0</td> <td>-22.1</td> <td></td> </tr> <tr> <td>1907.60</td> <td>16.08</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>20.60</td> <td>33.0</td> <td>-12.4</td> <td></td> </tr> </tbody> </table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1852.40	11.93	V	4.5	9.5	16.93	33.0	-16.1		1852.40	14.53	H	4.5	9.5	19.53	33.0	-13.5		Mid Ch									1880.00	5.85	V	4.5	9.3	10.63	33.0	-22.4		1880.00	16.29	H	4.5	9.3	21.06	33.0	-11.9		High Ch									1907.60	6.37	V	4.6	9.1	10.88	33.0	-22.1		1907.60	16.08	H	4.6	9.1	20.60	33.0	-12.4	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																											
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LTE Band 2

LTE Band 2 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1860.00	14.67	V	4.5	9.3	19.51	33.0	-13.5	
	1860.00	11.46	H	4.5	9.3	16.30	33.0	-16.7	
	Mid Ch								
	1880.00	16.43	V	4.5	9.2	21.09	33.0	-11.9	
	1880.00	11.80	H	4.5	9.2	16.47	33.0	-16.5	
High Ch									
1900.00	16.13	V	4.6	9.0	20.63	33.0	-12.4		
1900.00	11.56	H	4.6	9.0	16.06	33.0	-16.9		
LTE Band 2 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1860.00	13.69	V	4.5	9.3	18.53	33.0	-14.5	
	1860.00	10.51	H	4.5	9.3	15.35	33.0	-17.6	
	Mid Ch								
	1880.00	15.21	V	4.5	9.2	19.87	33.0	-13.1	
	1880.00	10.83	H	4.5	9.2	15.50	33.0	-17.5	
High Ch									
1900.00	14.97	V	4.6	9.0	19.47	33.0	-13.5		
1900.00	10.48	H	4.6	9.0	14.98	33.0	-18.0		

LTE Band 2 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	14.54	V	4.5	9.4	19.40	33.0	-13.6	
	1857.50	11.15	H	4.5	9.4	16.01	33.0	-17.0	
	Mid Ch								
	1880.00	16.30	V	4.5	9.2	20.96	33.0	-12.0	
	1880.00	11.91	H	4.5	9.2	16.58	33.0	-16.4	
High Ch									
1902.50	16.32	V	4.6	9.0	20.78	33.0	-12.2		
1902.50	12.29	H	4.6	9.0	16.74	33.0	-16.3		
LTE Band 2 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	13.57	V	4.5	9.4	18.43	33.0	-14.6	
	1857.50	10.06	H	4.5	9.4	14.92	33.0	-18.1	
	Mid Ch								
	1880.00	15.26	V	4.5	9.2	19.92	33.0	-13.1	
	1880.00	10.75	H	4.5	9.2	15.42	33.0	-17.6	
High Ch									
1902.50	15.00	V	4.6	9.0	19.46	33.0	-13.5		
1902.50	10.56	H	4.6	9.0	15.01	33.0	-18.0		

LTE Band 2 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	14.21	V	4.5	9.4	19.09	33.0	-13.9	
	1855.00	10.27	H	4.5	9.4	15.15	33.0	-17.8	
	Mid Ch								
	1880.00	16.41	V	4.5	9.2	21.07	33.0	-11.9	
	1880.00	11.47	H	4.5	9.2	16.14	33.0	-16.9	
High Ch									
1905.00	16.26	V	4.6	9.0	20.68	33.0	-12.3		
1905.00	12.37	H	4.6	9.0	16.80	33.0	-16.2		
LTE Band 2 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	13.09	V	4.5	9.4	17.97	33.0	-15.0	
	1855.00	9.13	H	4.5	9.4	14.01	33.0	-19.0	
	Mid Ch								
	1880.00	15.56	V	4.5	9.2	20.22	33.0	-12.8	
	1880.00	11.02	H	4.5	9.2	15.69	33.0	-17.3	
High Ch									
1905.00	15.17	V	4.6	9.0	19.59	33.0	-13.4		
1905.00	11.24	H	4.6	9.0	15.67	33.0	-17.3		

LTE Band 2 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth									
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1852.50	13.83	V	4.5	9.4	18.73	33.0	-14.3		
	1852.50	10.07	H	4.5	9.4	14.97	33.0	-18.0		
	Mid Ch									
	1880.00	16.73	V	4.5	9.2	21.39	33.0	-11.6		
	1880.00	12.04	H	4.5	9.2	16.71	33.0	-16.3		
High Ch										
1907.50	16.18	V	4.6	9.0	20.57	33.0	-12.4			
1907.50	12.69	H	4.6	9.0	17.08	33.0	-15.9			
LTE Band 2 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth									
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1852.50	13.04	V	4.5	9.4	17.94	33.0	-15.1		
	1852.50	9.23	H	4.5	9.4	14.13	33.0	-18.9		
	Mid Ch									
	1880.00	15.65	V	4.5	9.2	20.31	33.0	-12.7		
	1880.00	10.91	H	4.5	9.2	15.58	33.0	-17.4		
High Ch										
1907.50	15.29	V	4.6	9.0	19.68	33.0	-13.3			
1907.50	11.56	H	4.6	9.0	15.95	33.0	-17.0			

LTE Band 2 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	13.82	V	4.5	9.4	18.73	33.0	-14.3	
	1851.50	10.01	H	4.5	9.4	14.92	33.0	-18.1	
	Mid Ch								
	1880.00	16.61	V	4.5	9.2	21.27	33.0	-11.7	
	1880.00	11.58	H	4.5	9.2	16.25	33.0	-16.8	
High Ch									
1908.50	16.01	V	4.6	8.9	20.38	33.0	-12.6		
1908.50	12.43	H	4.6	8.9	16.81	33.0	-16.2		
LTE Band 2 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	12.70	V	4.5	9.4	17.61	33.0	-15.4	
	1851.50	8.84	H	4.5	9.4	13.75	33.0	-19.2	
	Mid Ch								
	1880.00	15.68	V	4.5	9.2	20.34	33.0	-12.7	
	1880.00	10.64	H	4.5	9.2	15.31	33.0	-17.7	
High Ch									
1908.50	14.95	V	4.6	8.9	19.32	33.0	-13.7		
1908.50	11.29	H	4.6	8.9	15.67	33.0	-17.3		

LTE Band 2 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	13.88	V	4.5	9.4	18.80	33.0	-14.2	
	1850.70	9.80	H	4.5	9.4	14.72	33.0	-18.3	
	Mid Ch								
	1880.00	16.33	V	4.5	9.2	20.99	33.0	-12.0	
	1880.00	12.19	H	4.5	9.2	16.86	33.0	-16.1	
High Ch									
1909.30	16.09	V	4.6	8.9	20.46	33.0	-12.5		
1909.30	12.25	H	4.6	8.9	16.62	33.0	-16.4		
LTE Band 2 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-11 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	12.60	V	4.5	9.4	17.52	33.0	-15.5	
	1850.70	8.88	H	4.5	9.4	13.80	33.0	-19.2	
	Mid Ch								
	1880.00	15.09	V	4.5	9.2	19.75	33.0	-13.3	
	1880.00	11.03	H	4.5	9.2	15.70	33.0	-17.3	
High Ch									
1909.30	15.00	V	4.6	8.9	19.37	33.0	-13.6		
1909.30	11.09	H	4.6	8.9	15.46	33.0	-17.5		

LTE Band 4

LTE Band 4 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	4.35	V	4.3	9.4	9.45	30.0	-20.5	
	1720.00	15.81	H	4.3	9.4	20.92	30.0	-9.1	
	Mid Ch								
	1732.50	9.92	V	4.3	9.5	15.06	30.0	-14.9	
	1732.50	16.02	H	4.3	9.5	21.15	30.0	-8.8	
High Ch									
1745.00	3.98	V	4.4	9.5	9.14	30.0	-20.9		
1745.00	15.73	H	4.4	9.5	20.90	30.0	-9.1		
LTE Band 4 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	3.49	V	4.3	9.4	8.59	30.0	-21.4	
	1720.00	14.89	H	4.3	9.4	20.00	30.0	-10.0	
	Mid Ch								
	1732.50	8.77	V	4.3	9.5	13.91	30.0	-16.1	
	1732.50	14.85	H	4.3	9.5	19.98	30.0	-10.0	
High Ch									
1745.00	3.05	V	4.4	9.5	8.21	30.0	-21.8		
1745.00	14.61	H	4.4	9.5	19.78	30.0	-10.2		

LTE Band 4 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	4.48	V	4.3	9.4	9.58	30.0	-20.4	
	1717.50	16.03	H	4.3	9.4	21.13	30.0	-8.9	
	Mid Ch								
	1732.50	10.20	V	4.3	9.5	15.34	30.0	-14.7	
	1732.50	15.85	H	4.3	9.5	20.98	30.0	-9.0	
High Ch									
1747.50	8.93	V	4.4	9.5	14.10	30.0	-15.9		
1747.50	15.88	H	4.4	9.5	21.05	30.0	-8.9		
LTE Band 4 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	-1.04	V	4.3	9.4	4.06	30.0	-25.9	
	1717.50	14.71	H	4.3	9.4	19.81	30.0	-10.2	
	Mid Ch								
	1732.50	9.13	V	4.3	9.5	14.27	30.0	-15.7	
	1732.50	14.61	H	4.3	9.5	19.74	30.0	-10.3	
High Ch									
1747.50	7.70	V	4.4	9.5	12.87	30.0	-17.1		
1747.50	15.00	H	4.4	9.5	20.17	30.0	-9.8		

LTE Band 4 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	8.68	V	4.3	9.4	13.77	30.0	-16.2	
	1715.00	15.72	H	4.3	9.4	20.82	30.0	-9.2	
	Mid Ch								
	1732.50	10.30	V	4.3	9.5	15.44	30.0	-14.6	
	1732.50	15.61	H	4.3	9.5	20.74	30.0	-9.3	
High Ch									
1750.00	11.08	V	4.4	9.5	16.26	30.0	-13.7		
1750.00	15.27	H	4.4	9.5	20.45	30.0	-9.6		
LTE Band 4 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	7.53	V	4.3	9.4	12.62	30.0	-17.4	
	1715.00	14.86	H	4.3	9.4	19.96	30.0	-10.0	
	Mid Ch								
	1732.50	9.71	V	4.3	9.5	14.85	30.0	-15.2	
	1732.50	14.65	H	4.3	9.5	19.78	30.0	-10.2	
High Ch									
1750.00	2.02	V	4.4	9.5	7.20	30.0	-22.8		
1750.00	14.72	H	4.4	9.5	19.90	30.0	-10.1		

LTE Band 4 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	7.02	V	4.3	9.4	12.11	30.0	-17.9	
	1712.50	15.67	H	4.3	9.4	20.76	30.0	-9.2	
	Mid Ch								
	1732.50	9.36	V	4.3	9.5	14.50	30.0	-15.5	
	1732.50	15.60	H	4.3	9.5	20.73	30.0	-9.3	
High Ch									
1752.50	2.58	V	4.4	9.5	7.75	30.0	-22.2		
1752.50	15.70	H	4.4	9.5	20.87	30.0	-9.1		
LTE Band 4 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	7.70	V	4.3	9.4	12.79	30.0	-17.2	
	1712.50	14.66	H	4.3	9.4	19.75	30.0	-10.3	
	Mid Ch								
	1732.50	8.57	V	4.3	9.5	13.71	30.0	-16.3	
	1732.50	14.50	H	4.3	9.5	19.63	30.0	-10.4	
High Ch									
1752.50	1.61	V	4.4	9.5	6.78	30.0	-23.2		
1752.50	14.56	H	4.4	9.5	19.73	30.0	-10.3		

LTE Band 4 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	3.91	V	4.3	9.4	9.00	30.0	-21.0	
	1711.50	15.88	H	4.3	9.4	20.97	30.0	-9.0	
	Mid Ch								
	1732.50	9.03	V	4.3	9.5	14.17	30.0	-15.8	
	1732.50	15.57	H	4.3	9.5	20.70	30.0	-9.3	
High Ch									
1753.50	10.90	V	4.4	9.5	16.08	30.0	-13.9		
1753.50	15.96	H	4.4	9.5	21.14	30.0	-8.9		
LTE Band 4 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	2.92	V	4.3	9.4	8.01	30.0	-22.0	
	1711.50	14.86	H	4.3	9.4	19.95	30.0	-10.1	
	Mid Ch								
	1732.50	7.84	V	4.3	9.5	12.98	30.0	-17.0	
	1732.50	14.46	H	4.3	9.5	19.59	30.0	-10.4	
High Ch									
1753.50	9.78	V	4.4	9.5	14.96	30.0	-15.0		
1753.50	14.88	H	4.4	9.5	20.06	30.0	-9.9		

LTE Band 4 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 4 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	3.29	V	4.3	9.4	8.37	30.0	-21.6	
	1710.70	16.77	H	4.3	9.4	21.85	30.0	-8.1	
	Mid Ch								
	1732.50	11.28	V	4.3	9.5	16.42	30.0	-13.6	
	1732.50	16.60	H	4.3	9.5	21.73	30.0	-8.3	
High Ch									
1754.30	13.63	V	4.4	9.5	18.81	30.0	-11.2		
1754.30	16.77	H	4.4	9.5	21.95	30.0	-8.1		
LTE Band 4 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 4 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	2.19	V	4.3	9.4	7.27	30.0	-22.7	
	1710.70	15.74	H	4.3	9.4	20.82	30.0	-9.2	
	Mid Ch								
	1732.50	10.28	V	4.3	9.5	15.42	30.0	-14.6	
	1732.50	15.22	H	4.3	9.5	20.35	30.0	-9.6	
High Ch									
1754.30	12.50	V	4.4	9.5	17.68	30.0	-12.3		
1754.30	15.91	H	4.4	9.5	21.09	30.0	-8.9		

LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	20.51	V	3.0	-1.5	16.03	38.5	-22.5	
	829.00	7.34	H	3.0	-1.5	2.86	38.5	-35.6	
	Mid Ch								
	836.50	21.01	V	3.0	-1.4	16.55	38.5	-22.0	
	836.50	7.32	H	3.0	-1.4	2.85	38.5	-35.6	
High Ch									
844.00	21.02	V	3.1	-1.4	16.57	38.5	-21.9		
844.00	6.63	H	3.1	-1.4	2.18	38.5	-36.3		
LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	20.05	V	3.0	-1.5	15.57	38.5	-22.9	
	829.00	4.97	H	3.0	-1.5	0.49	38.5	-38.0	
	Mid Ch								
	836.50	19.87	V	3.0	-1.4	15.41	38.5	-23.1	
	836.50	6.17	H	3.0	-1.4	1.70	38.5	-36.8	
High Ch									
844.00	20.20	V	3.1	-1.4	15.75	38.5	-22.8		
844.00	5.75	H	3.1	-1.4	1.30	38.5	-37.2		

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	21.17	V	3.0	-1.5	16.68	38.5	-21.8	
	826.50	5.20	H	3.0	-1.5	0.72	38.5	-37.8	
	Mid Ch								
	836.50	20.77	V	3.0	-1.4	16.31	38.5	-22.2	
	836.50	5.27	H	3.0	-1.4	0.80	38.5	-37.7	
High Ch									
846.50	21.04	V	3.1	-1.4	16.59	38.5	-21.9		
846.50	6.80	H	3.1	-1.4	2.35	38.5	-36.1		
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	19.95	V	3.0	-1.5	15.46	38.5	-23.0	
	826.50	4.13	H	3.0	-1.5	-0.35	38.5	-38.9	
	Mid Ch								
	836.50	20.06	V	3.0	-1.4	15.60	38.5	-22.9	
	836.50	4.34	H	3.0	-1.4	-0.13	38.5	-38.6	
High Ch									
846.50	20.15	V	3.1	-1.4	15.70	38.5	-22.8		
846.50	6.07	H	3.1	-1.4	1.62	38.5	-36.9		

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth									
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	825.50	21.56	V	3.0	-1.5	17.08	38.5	-21.4		
	825.50	5.13	H	3.0	-1.5	0.64	38.5	-37.9		
	Mid Ch									
	836.50	20.99	V	3.0	-1.4	16.53	38.5	-22.0		
	836.50	5.24	H	3.0	-1.4	0.77	38.5	-37.7		
High Ch										
847.50	20.92	V	3.1	-1.4	16.48	38.5	-22.0			
847.50	7.18	H	3.1	-1.4	2.74	38.5	-35.8			
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth									
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	825.50	20.29	V	3.0	-1.5	15.81	38.5	-22.7		
	825.50	3.90	H	3.0	-1.5	-0.59	38.5	-39.1		
	Mid Ch									
	836.50	19.97	V	3.0	-1.4	15.51	38.5	-23.0		
	836.50	4.34	H	3.0	-1.4	-0.13	38.5	-38.6		
High Ch										
847.50	19.96	V	3.1	-1.4	15.52	38.5	-23.0			
847.50	6.21	H	3.1	-1.4	1.77	38.5	-36.7			

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	21.13	V	3.0	-1.5	16.65	38.5	-21.9	
	824.70	5.08	H	3.0	-1.5	0.59	38.5	-37.9	
	Mid Ch								
	836.50	21.02	V	3.0	-1.4	16.56	38.5	-21.9	
	836.50	5.19	H	3.0	-1.4	0.72	38.5	-37.8	
High Ch									
848.30	20.92	V	3.1	-1.4	16.48	38.5	-22.0		
848.30	6.96	H	3.1	-1.4	2.52	38.5	-36.0		
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	20.00	V	3.0	-1.5	15.52	38.5	-23.0	
	824.70	4.01	H	3.0	-1.5	-0.48	38.5	-39.0	
	Mid Ch								
	836.50	19.91	V	3.0	-1.4	15.45	38.5	-23.1	
	836.50	3.95	H	3.0	-1.4	-0.52	38.5	-39.0	
High Ch									
848.30	19.82	V	3.1	-1.4	15.38	38.5	-23.1		
848.30	5.93	H	3.1	-1.4	1.49	38.5	-37.0		

LTE Band 12

LTE Band 12 10MHz QPSK	<p>UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 12810836 Date: 2019-04-23 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth</p> <p>Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>704.00</td> <td>11.22</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>6.84</td> <td>34.8</td> <td>-28.0</td> <td></td> </tr> <tr> <td>704.00</td> <td>21.33</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>16.94</td> <td>34.8</td> <td>-17.9</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>707.50</td> <td>13.45</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>9.07</td> <td>34.8</td> <td>-25.7</td> <td></td> </tr> <tr> <td>707.50</td> <td>21.57</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>17.19</td> <td>34.8</td> <td>-17.6</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>711.00</td> <td>14.22</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>9.82</td> <td>34.8</td> <td>-25.0</td> <td></td> </tr> <tr> <td>711.00</td> <td>21.79</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>17.39</td> <td>34.8</td> <td>-17.4</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									704.00	11.22	V	2.8	-1.6	6.84	34.8	-28.0		704.00	21.33	H	2.8	-1.6	16.94	34.8	-17.9		Mid Ch									707.50	13.45	V	2.8	-1.6	9.07	34.8	-25.7		707.50	21.57	H	2.8	-1.6	17.19	34.8	-17.6		High Ch									711.00	14.22	V	2.8	-1.6	9.82	34.8	-25.0		711.00	21.79	H	2.8	-1.6	17.39	34.8	-17.4	
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LTE Band 12 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-23 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	11.26	V	2.8	-1.6	6.88	34.8	-27.9	
	701.50	21.11	H	2.8	-1.6	16.73	34.8	-18.1	
	Mid Ch								
	707.50	13.94	V	2.8	-1.6	9.56	34.8	-25.2	
	707.50	21.62	H	2.8	-1.6	17.24	34.8	-17.6	
High Ch									
713.50	14.45	V	2.8	-1.6	10.05	34.8	-24.8		
713.50	21.54	H	2.8	-1.6	17.15	34.8	-17.7		
LTE Band 12 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-23 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	10.10	V	2.8	-1.6	5.72	34.8	-29.1	
	701.50	20.30	H	2.8	-1.6	15.92	34.8	-18.9	
	Mid Ch								
	707.50	12.69	V	2.8	-1.6	8.31	34.8	-26.5	
	707.50	20.56	H	2.8	-1.6	16.18	34.8	-18.6	
High Ch									
713.50	13.44	V	2.8	-1.6	9.04	34.8	-25.8		
713.50	20.49	H	2.8	-1.6	16.10	34.8	-18.7		

LTE Band 12 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-16 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	700.50	11.13	V	2.8	-1.6	6.75	34.8	-28.0	
	700.50	21.21	H	2.8	-1.6	16.83	34.8	-18.0	
	Mid Ch								
	707.50	13.19	V	2.8	-1.6	8.81	34.8	-26.0	
	707.50	21.59	H	2.8	-1.6	17.21	34.8	-17.6	
High Ch									
714.50	14.28	V	2.8	-1.6	9.88	34.8	-24.9		
714.50	21.49	H	2.8	-1.6	17.09	34.8	-17.7		
LTE Band 12 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-16 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	700.50	10.05	V	2.8	-1.6	5.67	34.8	-29.1	
	700.50	20.06	H	2.8	-1.6	15.68	34.8	-19.1	
	Mid Ch								
	707.50	12.37	V	2.8	-1.6	7.99	34.8	-26.8	
	707.50	20.31	H	2.8	-1.6	15.93	34.8	-18.9	
High Ch									
714.50	13.34	V	2.8	-1.6	8.94	34.8	-25.9		
714.50	20.35	H	2.8	-1.6	15.95	34.8	-18.8		

LTE Band 12 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-16 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	699.70	13.20	V	2.8	-1.6	8.82	34.8	-26.0	
	699.70	20.59	H	2.8	-1.6	16.22	34.8	-18.6	
	Mid Ch								
	707.50	13.47	V	2.8	-1.6	9.09	34.8	-25.7	
	707.50	21.37	H	2.8	-1.6	16.99	34.8	-17.8	
High Ch									
715.30	12.14	V	2.8	-1.6	7.74	34.8	-27.1		
715.30	21.18	H	2.8	-1.6	16.78	34.8	-18.0		
LTE Band 12 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-16 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	699.70	11.92	V	2.8	-1.6	7.54	34.8	-27.3	
	699.70	19.46	H	2.8	-1.6	15.09	34.8	-19.7	
	Mid Ch								
	707.50	12.15	V	2.8	-1.6	7.77	34.8	-27.0	
	707.50	20.20	H	2.8	-1.6	15.82	34.8	-19.0	
High Ch									
715.30	10.63	V	2.8	-1.6	6.23	34.8	-28.6		
715.30	20.12	H	2.8	-1.6	15.72	34.8	-19.1		

LTE Band 13

LTE Band 13 10MHz QPSK	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p> Company: Samsung Project #: 12810836 Date: 2109-04-19 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth </p> <p> Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>782.00</td> <td>16.94</td> <td>V</td> <td>2.9</td> <td>-1.6</td> <td>12.43</td> <td>34.8</td> <td>-22.3</td> <td></td> </tr> <tr> <td>782.00</td> <td>-0.12</td> <td>H</td> <td>2.9</td> <td>-1.6</td> <td>-4.62</td> <td>34.8</td> <td>-39.4</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Mid Ch									782.00	16.94	V	2.9	-1.6	12.43	34.8	-22.3		782.00	-0.12	H	2.9	-1.6	-4.62	34.8	-39.4	
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LTE Band 13 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 12810836 Date: 2109-04-19 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth																																																																																										
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LTE Band 41

LTE Band 41 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung								
	Project #: 12810836								
	Date: 2019-04-12								
	Test Engineer: 45585								
	Configuration: EUT / Y-Position								
	Location: Chamber 1								
	Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2506.00	13.96	V	5.2	9.9	18.63	33.0	-14.4	
2506.00	17.52	H	5.2	9.9	22.19	33.0	-10.8		
Mid Ch									
2593.00	15.59	V	5.3	9.8	20.05	33.0	-12.9		
2593.00	18.51	H	5.3	9.8	22.98	33.0	-10.0		
High Ch									
2680.00	16.78	V	5.4	9.8	21.15	33.0	-11.8		
2680.00	17.57	H	5.4	9.8	21.94	33.0	-11.1		
LTE Band 41 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung								
	Project #: 12810836								
	Date: 2019-04-12								
	Test Engineer: 45585								
	Configuration: EUT / Y-Position								
	Location: Chamber 1								
	Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2506.00	14.17	V	5.2	9.9	18.84	33.0	-14.2	
2506.00	17.78	H	5.2	9.9	22.45	33.0	-10.5		
Mid Ch									
2593.00	15.63	V	5.3	9.8	20.09	33.0	-12.9		
2593.00	18.53	H	5.3	9.8	23.00	33.0	-10.0		
High Ch									
2680.00	16.90	V	5.4	9.8	21.27	33.0	-11.7		
2680.00	17.69	H	5.4	9.8	22.06	33.0	-10.9		

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	15.75	V	5.2	9.9	20.43	33.0	-12.6	
	2503.50	18.22	H	5.2	9.9	22.89	33.0	-10.1	
	Mid Ch								
	2593.00	16.05	V	5.3	9.8	20.51	33.0	-12.5	
	2593.00	18.22	H	5.3	9.8	22.69	33.0	-10.3	
High Ch									
2682.50	15.90	V	5.4	9.8	20.28	33.0	-12.7		
2682.50	17.34	H	5.4	9.8	21.71	33.0	-11.3		
LTE Band 41 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	15.18	V	5.2	9.9	19.86	33.0	-13.1	
	2503.50	17.66	H	5.2	9.9	22.33	33.0	-10.7	
	Mid Ch								
	2593.00	16.95	V	5.3	9.8	21.41	33.0	-11.6	
	2593.00	19.11	H	5.3	9.8	23.58	33.0	-9.4	
High Ch									
2682.50	17.36	V	5.4	9.8	21.74	33.0	-11.3		
2682.50	17.61	H	5.4	9.8	21.98	33.0	-11.0		

LTE Band 41 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	15.04	V	5.2	9.9	19.73	33.0	-13.3	
	2501.00	17.33	H	5.2	9.9	22.01	33.0	-11.0	
	Mid Ch								
	2593.00	16.39	V	5.3	9.8	20.85	33.0	-12.1	
	2593.00	18.18	H	5.3	9.8	22.65	33.0	-10.4	
High Ch									
2685.00	16.85	V	5.4	9.8	21.22	33.0	-11.8		
2685.00	18.31	H	5.4	9.8	22.67	33.0	-10.3		
LTE Band 41 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	13.75	V	5.2	9.9	18.44	33.0	-14.6	
	2501.00	17.05	H	5.2	9.9	21.73	33.0	-11.3	
	Mid Ch								
	2593.00	17.60	V	5.3	9.8	22.06	33.0	-10.9	
	2593.00	19.41	H	5.3	9.8	23.88	33.0	-9.1	
High Ch									
2685.00	16.54	V	5.4	9.8	20.91	33.0	-12.1		
2685.00	17.99	H	5.4	9.8	22.35	33.0	-10.6		

LTE Band 41 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth																																																																																										
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f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																			
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2498.50	14.97	V	5.2	9.9	19.66	33.0	-13.3																																																																																				
2498.50	17.24	H	5.2	9.9	21.93	33.0	-11.1																																																																																				
Mid Ch																																																																																											
2593.00	17.64	V	5.3	9.8	22.10	33.0	-10.9																																																																																				
2593.00	19.28	H	5.3	9.8	23.75	33.0	-9.3																																																																																				
High Ch																																																																																											
2687.50	16.17	V	5.4	9.8	20.54	33.0	-12.5																																																																																				
2687.50	16.70	H	5.4	9.8	21.07	33.0	-11.9																																																																																				

LTE Band 66

LTE Band 66 20MHz QPSK	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p> Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth </p> <p> Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1720.00</td> <td>12.93</td> <td>V</td> <td>4.3</td> <td>9.4</td> <td>18.03</td> <td>30.0</td> <td>-12.0</td> <td></td> </tr> <tr> <td>1720.00</td> <td>17.08</td> <td>H</td> <td>4.3</td> <td>9.4</td> <td>22.19</td> <td>30.0</td> <td>-7.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1745.00</td> <td>12.89</td> <td>V</td> <td>4.4</td> <td>9.5</td> <td>18.05</td> <td>30.0</td> <td>-11.9</td> <td></td> </tr> <tr> <td>1745.00</td> <td>16.67</td> <td>H</td> <td>4.4</td> <td>9.5</td> <td>21.84</td> <td>30.0</td> <td>-8.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1770.00</td> <td>13.04</td> <td>V</td> <td>4.4</td> <td>9.6</td> <td>18.21</td> <td>30.0</td> <td>-11.8</td> <td></td> </tr> <tr> <td>1770.00</td> <td>16.14</td> <td>H</td> <td>4.4</td> <td>9.6</td> <td>21.31</td> <td>30.0</td> <td>-8.7</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1720.00	12.93	V	4.3	9.4	18.03	30.0	-12.0		1720.00	17.08	H	4.3	9.4	22.19	30.0	-7.8		Mid Ch									1745.00	12.89	V	4.4	9.5	18.05	30.0	-11.9		1745.00	16.67	H	4.4	9.5	21.84	30.0	-8.2		High Ch									1770.00	13.04	V	4.4	9.6	18.21	30.0	-11.8		1770.00	16.14	H	4.4	9.6	21.31	30.0	-8.7	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																		
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1720.00	12.93	V	4.3	9.4	18.03	30.0	-12.0																																																																																				
1720.00	17.08	H	4.3	9.4	22.19	30.0	-7.8																																																																																				
Mid Ch																																																																																											
1745.00	12.89	V	4.4	9.5	18.05	30.0	-11.9																																																																																				
1745.00	16.67	H	4.4	9.5	21.84	30.0	-8.2																																																																																				
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1770.00	13.04	V	4.4	9.6	18.21	30.0	-11.8																																																																																				
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LTE Band 66 20MHz 16QAM	<p style="text-align: center;">UL Verification Services, Inc. High Frequency Substitution Measurement</p> <p> Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth </p> <p> Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1720.00</td> <td>11.71</td> <td>V</td> <td>4.3</td> <td>9.4</td> <td>16.81</td> <td>30.0</td> <td>-13.2</td> <td></td> </tr> <tr> <td>1720.00</td> <td>15.87</td> <td>H</td> <td>4.3</td> <td>9.4</td> <td>20.98</td> <td>30.0</td> <td>-9.0</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1745.00</td> <td>11.88</td> <td>V</td> <td>4.4</td> <td>9.5</td> <td>17.04</td> <td>30.0</td> <td>-13.0</td> <td></td> </tr> <tr> <td>1745.00</td> <td>15.50</td> <td>H</td> <td>4.4</td> <td>9.5</td> <td>20.67</td> <td>30.0</td> <td>-9.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1770.00</td> <td>12.03</td> <td>V</td> <td>4.4</td> <td>9.6</td> <td>17.20</td> <td>30.0</td> <td>-12.8</td> <td></td> </tr> <tr> <td>1770.00</td> <td>15.33</td> <td>H</td> <td>4.4</td> <td>9.6</td> <td>20.50</td> <td>30.0</td> <td>-9.5</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1720.00	11.71	V	4.3	9.4	16.81	30.0	-13.2		1720.00	15.87	H	4.3	9.4	20.98	30.0	-9.0		Mid Ch									1745.00	11.88	V	4.4	9.5	17.04	30.0	-13.0		1745.00	15.50	H	4.4	9.5	20.67	30.0	-9.3		High Ch									1770.00	12.03	V	4.4	9.6	17.20	30.0	-12.8		1770.00	15.33	H	4.4	9.6	20.50	30.0	-9.5	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																			
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1720.00	11.71	V	4.3	9.4	16.81	30.0	-13.2																																																																																				
1720.00	15.87	H	4.3	9.4	20.98	30.0	-9.0																																																																																				
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1745.00	11.88	V	4.4	9.5	17.04	30.0	-13.0																																																																																				
1745.00	15.50	H	4.4	9.5	20.67	30.0	-9.3																																																																																				
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1770.00	12.03	V	4.4	9.6	17.20	30.0	-12.8																																																																																				
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LTE Band 66 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	6.75	V	4.3	9.4	11.85	30.0	-18.1	
	1717.50	16.75	H	4.3	9.4	21.85	30.0	-8.2	
	Mid Ch								
	1745.00	14.29	V	4.4	9.5	19.45	30.0	-10.5	
	1745.00	16.68	H	4.4	9.5	21.85	30.0	-8.2	
High Ch									
1772.50	13.54	V	4.4	9.6	18.71	30.0	-11.3		
1772.50	16.52	H	4.4	9.6	21.69	30.0	-8.3		
LTE Band 66 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	5.63	V	4.3	9.4	10.73	30.0	-19.3	
	1717.50	15.49	H	4.3	9.4	20.59	30.0	-9.4	
	Mid Ch								
	1745.00	13.21	V	4.4	9.5	18.37	30.0	-11.6	
	1745.00	15.74	H	4.4	9.5	20.91	30.0	-9.1	
High Ch									
1772.50	12.49	V	4.4	9.6	17.66	30.0	-12.3		
1772.50	15.52	H	4.4	9.6	20.69	30.0	-9.3		

LTE Band 66 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-20 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	12.64	V	4.3	9.4	17.73	30.0	-12.3	
	1715.00	15.80	H	4.3	9.4	20.90	30.0	-9.1	
	Mid Ch								
	1745.00	12.68	V	4.4	9.5	17.84	30.0	-12.2	
	1745.00	16.37	H	4.4	9.5	21.54	30.0	-8.5	
High Ch									
1775.00	12.38	V	4.4	9.6	17.55	30.0	-12.5		
1775.00	16.04	H	4.4	9.6	21.21	30.0	-8.8		
LTE Band 66 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-20 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	10.08	V	4.3	9.4	15.17	30.0	-14.8	
	1715.00	15.51	H	4.3	9.4	20.61	30.0	-9.4	
	Mid Ch								
	1745.00	11.48	V	4.4	9.5	16.64	30.0	-13.4	
	1745.00	15.53	H	4.4	9.5	20.70	30.0	-9.3	
High Ch									
1775.00	11.42	V	4.4	9.6	16.59	30.0	-13.4		
1775.00	14.27	H	4.4	9.6	19.44	30.0	-10.6		

LTE Band 66 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-17 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	12.58	V	4.3	9.4	17.67	30.0	-12.3	
	1712.50	16.12	H	4.3	9.4	21.21	30.0	-8.8	
	Mid Ch								
	1745.00	6.29	V	4.4	9.5	11.45	30.0	-18.5	
	1745.00	16.98	H	4.4	9.5	22.15	30.0	-7.9	
High Ch									
1777.50	13.03	V	4.4	9.6	18.20	30.0	-11.8		
1777.50	14.54	H	4.4	9.6	19.71	30.0	-10.3		
LTE Band 66 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-17 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	11.69	V	4.3	9.4	16.78	30.0	-13.2	
	1712.50	15.48	H	4.3	9.4	20.57	30.0	-9.4	
	Mid Ch								
	1745.00	6.27	V	4.4	9.5	11.43	30.0	-18.6	
	1745.00	16.11	H	4.4	9.5	21.28	30.0	-8.7	
High Ch									
1777.50	11.36	V	4.4	9.6	16.53	30.0	-13.5		
1777.50	14.45	H	4.4	9.6	19.62	30.0	-10.4		

LTE Band 66 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-19 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	12.94	V	4.3	9.4	18.03	30.0	-12.0	
	1711.50	15.96	H	4.3	9.4	21.05	30.0	-9.0	
	Mid Ch								
	1745.00	6.63	V	4.4	9.5	11.79	30.0	-18.2	
	1745.00	16.69	H	4.4	9.5	21.86	30.0	-8.1	
High Ch									
1778.50	12.31	V	4.4	9.6	17.48	30.0	-12.5		
1778.50	15.37	H	4.4	9.6	20.54	30.0	-9.5		
LTE Band 66 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-19 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	12.29	V	4.3	9.4	17.38	30.0	-12.6	
	1711.50	14.78	H	4.3	9.4	19.87	30.0	-10.1	
	Mid Ch								
	1745.00	5.43	V	4.4	9.5	10.59	30.0	-19.4	
	1745.00	15.48	H	4.4	9.5	20.65	30.0	-9.4	
High Ch									
1778.50	11.22	V	4.4	9.6	16.39	30.0	-13.6		
1778.50	14.27	H	4.4	9.6	19.44	30.0	-10.6		

LTE Band 66 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-19 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	4.82	V	4.3	9.4	9.90	30.0	-20.1	
	1710.70	16.05	H	4.3	9.4	21.13	30.0	-8.9	
	Mid Ch								
	1745.00	6.65	V	4.4	9.5	11.81	30.0	-18.2	
	1745.00	16.76	H	4.4	9.5	21.93	30.0	-8.1	
High Ch									
1779.30	11.91	V	4.4	9.6	17.08	30.0	-12.9		
1779.30	15.32	H	4.4	9.6	20.49	30.0	-9.5		
LTE Band 66 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 12810836 Date: 2019-04-19 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	3.66	V	4.3	9.4	8.74	30.0	-21.3	
	1710.70	15.06	H	4.3	9.4	20.14	30.0	-9.9	
	Mid Ch								
	1745.00	5.34	V	4.4	9.5	10.50	30.0	-19.5	
	1745.00	15.82	H	4.4	9.5	20.99	30.0	-9.0	
High Ch									
1779.30	10.92	V	4.4	9.6	16.09	30.0	-13.9		
1779.30	14.18	H	4.4	9.6	19.35	30.0	-10.7		

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(h) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Part 27.53:

(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points \geq span/RBW;
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);;

RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

11.2.1. SPURIOUS RADIATION PLOTS

GSM850

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

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: GPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	11.4	V	3.0	38.2	1.0	-25.8	-13.0	-12.8	
2472.60	15.0	V	3.0	38.8	1.0	-22.8	-13.0	-9.8	
3296.80	4.5	V	3.0	39.4	1.0	-33.9	-13.0	-20.9	
4121.00	10.3	V	3.0	39.8	1.0	-28.5	-13.0	-15.5	
4945.20	10.3	V	3.0	39.8	1.0	-28.5	-13.0	-15.5	
5796.40	-6.7	V	3.0	40.0	1.0	-45.8	-13.0	-32.8	
1648.40	10.4	H	3.0	38.2	1.0	-26.8	-13.0	-13.8	
2472.60	13.9	H	3.0	38.8	1.0	-23.9	-13.0	-10.9	
3296.80	1.5	H	3.0	39.4	1.0	-37.0	-13.0	-24.0	
4121.00	11.4	H	3.0	39.8	1.0	-27.4	-13.0	-14.4	
4945.20	10.3	H	3.0	39.8	1.0	-28.5	-13.0	-15.5	
5796.40	-6.9	H	3.0	40.0	1.0	-45.9	-13.0	-32.9	
Mid Ch, 836.6MHz									
1673.20	14.7	V	3.0	38.2	1.0	-22.5	-13.0	-9.5	
2509.80	13.1	V	3.0	38.8	1.0	-24.7	-13.0	-11.7	
3346.40	6.0	V	3.0	39.5	1.0	-32.4	-13.0	-19.4	
4183.00	9.1	V	3.0	39.8	1.0	-29.7	-13.0	-16.7	
5019.60	5.5	V	3.0	39.8	1.0	-33.3	-13.0	-20.3	
5856.20	11.4	V	3.0	40.0	1.0	-27.6	-13.0	-14.6	
1673.20	12.1	H	3.0	38.2	1.0	-25.2	-13.0	-12.2	
2509.80	7.2	H	3.0	38.8	1.0	-30.6	-13.0	-17.6	
3346.40	1.5	H	3.0	39.5	1.0	-37.0	-13.0	-24.0	
4183.00	9.1	H	3.0	39.8	1.0	-29.7	-13.0	-16.7	
5019.60	5.7	H	3.0	39.8	1.0	-33.1	-13.0	-20.1	
5856.20	9.3	H	3.0	40.0	1.0	-29.7	-13.0	-16.7	
High Ch, 848.8MHz									
1697.60	18.8	V	3.0	38.2	1.0	-18.5	-13.0	-5.5	
2546.40	12.1	V	3.0	38.9	1.0	-25.8	-13.0	-12.8	
3395.20	2.9	V	3.0	39.5	1.0	-35.6	-13.0	-22.6	
4244.00	9.5	V	3.0	39.8	1.0	-29.3	-13.0	-16.3	
5092.80	3.4	V	3.0	39.8	1.0	-35.4	-13.0	-22.4	
5941.60	11.5	V	4.0	40.1	2.0	-24.0	-13.0	-11.0	
1697.60	14.5	H	3.0	38.2	1.0	-22.8	-13.0	-9.8	
2546.40	12.1	H	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	-1.2	H	3.0	39.5	1.0	-39.7	-13.0	-26.7	
4244.00	9.0	H	3.0	39.8	1.0	-29.8	-13.0	-16.8	
5092.80	1.5	H	3.0	39.8	1.0	-37.3	-13.0	-24.3	
5941.60	12.5	H	3.0	40.1	1.0	-26.6	-13.0	-13.6	

GSM850
GPRS

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

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	10.2	V	3.0	38.2	1.0	-27.0	-13.0	-14.0	
2472.60	14.3	V	3.0	38.8	1.0	-23.5	-13.0	-10.5	
3296.80	3.9	V	3.0	39.4	1.0	-34.5	-13.0	-21.5	
4121.00	10.1	V	3.0	39.8	1.0	-28.7	-13.0	-15.7	
4945.20	9.3	V	3.0	39.8	1.0	-29.5	-13.0	-16.5	
5796.40	-6.6	V	3.0	40.0	1.0	-45.6	-13.0	-32.6	
1648.40	8.5	H	3.0	38.2	1.0	-28.7	-13.0	-15.7	
2472.60	13.7	H	3.0	38.8	1.0	-24.1	-13.0	-11.1	
3296.80	0.6	H	3.0	39.4	1.0	-37.8	-13.0	-24.8	
4121.00	7.6	H	3.0	39.8	1.0	-31.2	-13.0	-18.2	
4945.20	8.9	H	3.0	39.8	1.0	-29.9	-13.0	-16.9	
5796.40	-6.9	H	3.0	40.0	1.0	-45.9	-13.0	-32.9	
Mid Ch, 836.6MHz									
1673.20	16.8	V	3.0	38.2	1.0	-20.4	-13.0	-7.4	
2509.80	13.1	V	3.0	38.8	1.0	-24.8	-13.0	-11.8	
3346.40	5.4	V	3.0	39.5	1.0	-35.1	-13.0	-22.1	
4183.00	8.7	V	3.0	39.8	1.0	-30.1	-13.0	-17.1	
5019.60	5.9	V	3.0	39.8	1.0	-32.8	-13.0	-19.8	
5856.20	12.0	V	3.0	40.0	1.0	-27.0	-13.0	-14.0	
1673.20	2.4	H	3.0	38.2	1.0	-34.9	-13.0	-21.9	
2509.80	11.4	H	3.0	38.8	1.0	-26.4	-13.0	-13.4	
3346.40	0.7	H	3.0	39.5	1.0	-37.8	-13.0	-24.8	
4183.00	7.9	H	3.0	39.8	1.0	-30.9	-13.0	-17.9	
5019.60	4.1	H	3.0	39.8	1.0	-34.7	-13.0	-21.7	
5856.20	7.8	H	3.0	40.0	1.0	-31.3	-13.0	-18.3	
High Ch, 848.8MHz									
1697.60	18.8	V	3.0	38.2	1.0	-18.5	-13.0	-5.5	
2546.40	12.2	V	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	3.1	V	3.0	39.5	1.0	-35.4	-13.0	-22.4	
4244.00	9.6	V	3.0	39.8	1.0	-29.2	-13.0	-16.2	
5092.80	3.8	V	3.0	39.8	1.0	-35.0	-13.0	-22.0	
5941.60	11.6	V	3.0	40.1	1.0	-27.5	-13.0	-14.5	
1697.60	14.5	H	3.0	38.2	1.0	-22.7	-13.0	-9.7	
2546.40	12.2	H	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	-1.2	H	3.0	39.5	1.0	-39.7	-13.0	-26.7	
4244.00	9.0	H	3.0	39.8	1.0	-29.8	-13.0	-16.8	
5092.80	1.9	H	3.0	39.8	1.0	-36.9	-13.0	-23.9	
5941.60	12.5	H	3.0	40.1	1.0	-26.5	-13.0	-13.5	

GSM850
EGPRS

GSM1900

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
GSM1900 GPRS		Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 1 Mode: GPRS 1900 MHz Harmonics								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
		Low Ch, 1850.2MHz								
	3700.40	7.1	V	3.0	43.8	1.0	-35.7	-13.0	-22.7	
	5550.60	4.9	V	3.0	43.7	1.0	-37.8	-13.0	-24.8	
	7400.80	-0.4	V	3.0	42.5	1.0	-41.9	-13.0	-28.9	
	3700.40	10.5	H	3.0	43.8	1.0	-32.3	-13.0	-19.3	
	5550.60	11.8	H	3.0	43.7	1.0	-30.9	-13.0	-17.9	
	7400.80	2.6	H	3.0	42.5	1.0	-39.0	-13.0	-26.0	
		Mid Ch, 1880MHz								
	3760.00	-2.6	V	3.0	43.8	1.0	-45.4	-13.0	-32.4	
	5640.00	3.3	V	3.0	43.7	1.0	-39.4	-13.0	-26.4	
	7520.00	-2.7	V	3.0	42.5	1.0	-44.2	-13.0	-31.2	
	3760.00	-1.9	H	3.0	43.8	1.0	-44.7	-13.0	-31.7	
	5640.00	4.7	H	3.0	43.7	1.0	-38.0	-13.0	-25.0	
	7520.00	-2.8	H	3.0	42.5	1.0	-44.3	-13.0	-31.3	
		High Ch, 1909.8MHz								
	3819.60	-6.7	V	3.0	43.8	1.0	-49.5	-13.0	-36.5	
	5729.40	2.8	V	3.0	43.7	1.0	-39.9	-13.0	-26.9	
	7639.20	-2.7	V	3.0	42.4	1.0	-44.1	-13.0	-31.1	
	3819.60	-2.4	H	3.0	43.8	1.0	-45.3	-13.0	-32.3	
	5729.40	3.5	H	3.0	43.7	1.0	-39.2	-13.0	-26.2	
	7639.20	-2.8	H	3.0	42.4	1.0	-44.2	-13.0	-31.2	
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
GSM1900 EGPRS		Company: Samsung Project #: 12810836 Date: 2019-04-22 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 1 Mode: EGPRS 1900 MHz Harmonics								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
		Low Ch, 1850.2MHz								
	3700.40	0.7	V	3.0	43.8	1.0	-42.1	-13.0	-29.1	
	5550.60	-1.9	V	3.0	43.7	1.0	-44.6	-13.0	-31.6	
	7400.80	-2.6	V	3.0	42.5	1.0	-44.1	-13.0	-31.1	
	3700.40	4.0	H	3.0	43.8	1.0	-38.8	-13.0	-25.8	
	5550.60	4.2	H	3.0	43.7	1.0	-38.5	-13.0	-25.5	
	7400.80	-2.2	H	3.0	42.5	1.0	-43.8	-13.0	-30.8	
		Mid Ch, 1880MHz								
	3760.00	-5.6	V	3.0	43.8	1.0	-48.4	-13.0	-35.4	
	5640.00	-0.7	V	3.0	43.7	1.0	-43.4	-13.0	-30.4	
	7520.00	-3.2	V	3.0	42.5	1.0	-44.6	-13.0	-31.6	
	3760.00	-3.4	H	3.0	43.8	1.0	-46.2	-13.0	-33.2	
	5640.00	1.8	H	3.0	43.7	1.0	-40.9	-13.0	-27.9	
	7520.00	-3.2	H	3.0	42.5	1.0	-44.7	-13.0	-31.7	
		High Ch, 1909.8MHz								
	3819.60	-7.4	V	3.0	43.8	1.0	-50.2	-13.0	-37.2	
	5729.40	-3.5	V	3.0	43.7	1.0	-46.2	-13.0	-33.2	
	7639.20	-2.9	V	3.0	42.4	1.0	-44.3	-13.0	-31.3	
	3819.60	-3.6	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	
	5729.40	-1.0	H	3.0	43.7	1.0	-43.7	-13.0	-30.7	
	7639.20	-2.9	H	3.0	42.4	1.0	-44.3	-13.0	-31.3	

WCDMA Band 5

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
WCDMA Band 5 REL99		Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Harmonics										
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
		Low Ch, 826.4MHz										
		1652.80	-10.7	V	3.0	38.2	1.0	-47.9	-13.0	-34.9		
		2479.20	-11.9	V	3.0	38.8	1.0	-49.7	-13.0	-36.7		
		3305.60	-10.2	V	3.0	39.4	1.0	-48.7	-13.0	-35.7		
		1652.80	-15.7	H	3.0	38.2	1.0	-52.9	-13.0	-39.9		
		2479.20	-12.3	H	3.0	38.8	1.0	-50.1	-13.0	-37.1		
		3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9		
		Mid Ch, 836.6MHz										
1673.20	-12.4	V	3.0	38.2	1.0	-49.6	-13.0	-36.6				
2509.80	-12.0	V	3.0	38.8	1.0	-49.8	-13.0	-36.8				
3346.40	-9.4	V	3.0	39.5	1.0	-47.9	-13.0	-34.9				
1673.20	-13.7	H	3.0	38.2	1.0	-50.9	-13.0	-37.9				
2509.80	-12.7	H	3.0	38.8	1.0	-50.5	-13.0	-37.5				
3346.40	-10.0	H	3.0	39.5	1.0	-48.4	-13.0	-35.4				
High Ch, 846.6MHz												
1693.20	-1.4	V	3.0	38.2	1.0	-38.7	-13.0	-25.7				
2539.80	-12.2	V	3.0	38.9	1.0	-50.0	-13.0	-37.0				
3386.40	-9.4	V	3.0	39.5	1.0	-47.9	-13.0	-34.9				
1693.20	-0.1	H	3.0	38.2	1.0	-37.3	-13.0	-24.3				
2539.80	-12.4	H	3.0	38.9	1.0	-50.3	-13.0	-37.3				
3386.40	-9.8	H	3.0	39.5	1.0	-48.2	-13.0	-35.2				
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
WCDMA Band 5 HSDPA		Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: HSDPA Band 5 Harmonics										
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
		Low Ch, 826.4MHz										
		1652.80	-12.4	V	3.0	38.2	1.0	-49.6	-13.0	-36.6		
		2479.20	-12.1	V	3.0	38.8	1.0	-49.9	-13.0	-36.9		
		3305.60	-10.2	V	3.0	39.4	1.0	-48.7	-13.0	-35.7		
		1652.80	-15.7	H	3.0	38.2	1.0	-52.9	-13.0	-39.9		
		2479.20	-12.4	H	3.0	38.8	1.0	-50.2	-13.0	-37.2		
		3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9		
		Mid Ch, 836.6MHz										
1673.20	-12.8	V	3.0	38.2	1.0	-50.0	-13.0	-37.0				
2509.80	-12.0	V	3.0	38.8	1.0	-49.8	-13.0	-36.8				
3346.40	-9.5	V	3.0	39.5	1.0	-47.9	-13.0	-34.9				
1673.20	-15.2	H	3.0	38.2	1.0	-52.5	-13.0	-39.5				
2509.80	-12.7	H	3.0	38.8	1.0	-50.6	-13.0	-37.6				
3346.40	-10.0	H	3.0	39.5	1.0	-48.5	-13.0	-35.5				
High Ch, 846.6MHz												
1693.20	-3.7	V	3.0	38.2	1.0	-40.9	-13.0	-27.9				
2539.80	-11.6	V	3.0	38.9	1.0	-49.5	-13.0	-36.5				
3386.40	-9.3	V	3.0	39.5	1.0	-47.8	-13.0	-34.8				
1693.20	-3.2	H	3.0	38.2	1.0	-40.4	-13.0	-27.4				
2539.80	-12.5	H	3.0	38.9	1.0	-50.4	-13.0	-37.4				
3386.40	-9.3	H	3.0	39.5	1.0	-47.8	-13.0	-34.8				

WCDMA Band 4

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
WCDMA Band 4 REL99		Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: Rel99 Band 4 Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 1712.4MHz									
		3424.80	-8.8	V	3.0	43.7	1.0	-51.5	-13.0	-38.5	
		5137.20	9.5	V	3.0	43.8	1.0	-33.3	-13.0	-20.3	
		6849.60	-5.4	V	3.0	42.9	1.0	-47.3	-13.0	-34.3	
		3424.80	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
		5137.20	14.3	H	3.0	43.8	1.0	-28.5	-13.0	-15.5	
		6849.60	-5.0	H	3.0	42.9	1.0	-46.9	-13.0	-33.9	
		Mid Ch, 1732.6MHz									
		3465.20	-8.9	V	3.0	43.7	1.0	-51.5	-13.0	-38.5	
		5197.80	13.2	V	3.0	43.8	1.0	-29.6	-13.0	-16.6	
		6930.40	-5.5	V	3.0	42.8	1.0	-47.2	-13.0	-34.2	
		3465.20	-8.6	H	3.0	43.7	1.0	-51.3	-13.0	-38.3	
		5197.80	15.2	H	3.0	43.8	1.0	-27.5	-13.0	-14.5	
6930.40	-5.2	H	3.0	42.8	1.0	-47.0	-13.0	-34.0			
High Ch, 1752.6MHz											
3505.20	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1			
5257.80	12.5	V	3.0	43.8	1.0	-30.2	-13.0	-17.2			
7010.40	-5.2	V	3.0	42.7	1.0	-46.9	-13.0	-33.9			
3505.20	-8.4	H	3.0	43.7	1.0	-51.1	-13.0	-38.1			
5257.80	16.6	H	3.0	43.8	1.0	-26.2	-13.0	-13.2			
7010.40	-5.3	H	3.0	42.7	1.0	-47.0	-13.0	-34.0			
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
WCDMA Band 4 HSDPA		Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: HSDPA Band 4 Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 1712.4MHz									
		3424.80	-9.4	V	3.0	43.7	1.0	-52.1	-13.0	-39.1	
		5137.20	2.5	V	3.0	43.8	1.0	-40.3	-13.0	-27.3	
		6849.60	-5.0	V	3.0	42.9	1.0	-46.9	-13.0	-33.9	
		3424.80	-8.1	H	3.0	43.7	1.0	-50.8	-13.0	-37.8	
		5137.20	8.9	H	3.0	43.8	1.0	-33.9	-13.0	-20.9	
		6849.60	-5.4	H	3.0	42.9	1.0	-47.3	-13.0	-34.3	
		Mid Ch, 1732.6MHz									
		3465.20	-8.6	V	3.0	43.7	1.0	-51.3	-13.0	-38.3	
		5197.80	8.4	V	3.0	43.8	1.0	-34.3	-13.0	-21.3	
		6930.40	-5.3	V	3.0	42.8	1.0	-47.0	-13.0	-34.0	
		3465.20	-8.8	H	3.0	43.7	1.0	-51.5	-13.0	-38.5	
		5197.80	7.5	H	3.0	43.8	1.0	-35.2	-13.0	-22.2	
6930.40	-5.0	H	3.0	42.8	1.0	-46.8	-13.0	-33.8			
High Ch, 1752.6MHz											
3505.20	-8.3	V	3.0	43.7	1.0	-51.0	-13.0	-38.0			
5257.80	9.5	V	3.0	43.8	1.0	-33.2	-13.0	-20.2			
7010.40	-5.3	V	3.0	42.7	1.0	-47.0	-13.0	-34.0			
3505.20	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4			
5257.80	14.5	H	3.0	43.8	1.0	-28.3	-13.0	-15.3			
7010.40	-5.2	H	3.0	42.7	1.0	-46.9	-13.0	-33.9			

WCDMA Band 2

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
WCDMA Band 2 REL99		Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: Rel99 Band 2 Harmonics								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
		Low Ch, 1852.4MHz								
	3704.80	-8.2	V	3.0	43.8	1.0	-51.0	-13.0	-38.0	
	5557.20	12.0	V	3.0	43.7	1.0	-30.7	-13.0	-17.7	
	7409.60	-5.5	V	3.0	42.5	1.0	-47.0	-13.0	-34.0	
	3704.80	-9.0	H	3.0	43.8	1.0	-51.8	-13.0	-38.8	
	5557.20	15.5	H	3.0	43.7	1.0	-27.2	-13.0	-14.2	
	7409.60	-5.6	H	3.0	42.5	1.0	-47.2	-13.0	-34.2	
		Mid Ch, 1880MHz								
	3760.00	-5.6	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
	5640.00	13.2	V	3.0	43.7	1.0	-29.5	-13.0	-16.5	
	7520.00	-5.5	V	3.0	42.5	1.0	-47.0	-13.0	-34.0	
	3760.00	-7.1	H	3.0	43.8	1.0	-49.9	-13.0	-36.9	
	5640.00	18.4	H	3.0	43.7	1.0	-24.3	-13.0	-11.3	
	7520.00	-5.5	H	3.0	42.5	1.0	-47.0	-13.0	-34.0	
		High Ch, 1907.6MHz								
	3815.20	-2.1	V	3.0	43.8	1.0	-44.9	-13.0	-31.9	
	5722.80	14.0	V	3.0	43.7	1.0	-28.7	-13.0	-15.7	
	7630.40	-5.3	V	3.0	42.4	1.0	-46.7	-13.0	-33.7	
	3815.20	-4.1	H	3.0	43.8	1.0	-47.0	-13.0	-34.0	
	5722.80	16.8	H	3.0	43.7	1.0	-25.9	-13.0	-12.9	
	7630.40	-5.1	H	3.0	42.4	1.0	-46.5	-13.0	-33.5	
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
WCDMA Band 2 HSDPA		Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: HSDPA Band 2 Harmonics								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
		Low Ch, 1852.4MHz								
	3704.80	1.4	V	3.0	43.8	1.0	-41.4	-13.0	-28.4	
	5557.20	9.8	V	3.0	43.7	1.0	-32.9	-13.0	-19.9	
	7409.60	-5.6	V	3.0	42.5	1.0	-47.1	-13.0	-34.1	
	3704.80	-9.6	H	3.0	43.8	1.0	-52.4	-13.0	-39.4	
	5557.20	12.7	H	3.0	43.7	1.0	-30.1	-13.0	-17.1	
	7409.60	-5.2	H	3.0	42.5	1.0	-46.7	-13.0	-33.7	
		Mid Ch, 1880MHz								
	3760.00	-6.8	V	3.0	43.8	1.0	-49.6	-13.0	-36.6	
	5640.00	11.1	V	3.0	43.7	1.0	-31.6	-13.0	-18.6	
	7520.00	-5.3	V	3.0	42.5	1.0	-46.8	-13.0	-33.8	
	3760.00	-7.6	H	3.0	43.8	1.0	-50.4	-13.0	-37.4	
	5640.00	15.1	H	3.0	43.7	1.0	-27.6	-13.0	-14.6	
	7520.00	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
		High Ch, 1907.6MHz								
	3815.20	-3.5	V	3.0	43.8	1.0	-46.3	-13.0	-33.3	
	5722.80	11.3	V	3.0	43.7	1.0	-31.4	-13.0	-18.4	
	7630.40	-5.2	V	3.0	42.4	1.0	-46.6	-13.0	-33.6	
	3815.20	-5.2	H	3.0	43.8	1.0	-48.0	-13.0	-35.0	
	5722.80	14.2	H	3.0	43.7	1.0	-28.5	-13.0	-15.5	
	7630.40	-5.0	H	3.0	42.4	1.0	-46.4	-13.0	-33.4	

LTE Band 2

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
LTE Band 2 5MHz QPSK		Company: Samsung Project #: 12810836 Date: 2019-04-12 Test Engineer: 45585 Configuration: EUT / AC Adapter/ Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 1852.5MHz									
		3705.00	-9.7	V	3.0	39.7	1.0	-48.3	-13.0	-35.3	
		5557.50	-8.2	V	3.0	39.9	1.0	-47.1	-13.0	-34.1	
7410.00	-6.0	V	3.0	39.4	1.0	-44.5	-13.0	-31.5			
3705.00	-8.8	H	3.0	39.7	1.0	-47.5	-13.0	-34.5			
5557.50	-8.4	H	3.0	39.9	1.0	-47.3	-13.0	-34.3			
7410.00	-6.9	H	3.0	39.4	1.0	-45.4	-13.0	-32.4			
Mid Ch, 1880MHz											
3760.00	-7.0	V	3.0	39.7	1.0	-45.7	-13.0	-32.7			
5640.00	-5.4	V	3.0	40.0	1.0	-44.4	-13.0	-31.4			
7520.00	-6.2	V	3.0	39.4	1.0	-44.6	-13.0	-31.6			
3760.00	-2.8	H	3.0	39.7	1.0	-41.5	-13.0	-28.5			
5640.00	-6.4	H	3.0	40.0	1.0	-45.3	-13.0	-32.3			
7520.00	-6.9	H	3.0	39.4	1.0	-45.2	-13.0	-32.2			
High Ch, 1907.5MHz											
3815.00	-3.7	V	3.0	39.7	1.0	-42.4	-13.0	-29.4			
5722.50	-3.5	V	3.0	40.0	1.0	-42.5	-13.0	-29.5			
7630.00	-6.1	V	3.0	39.3	1.0	-44.5	-13.0	-31.5			
3815.00	2.2	H	3.0	39.7	1.0	-36.6	-13.0	-23.6			
5722.50	-5.0	H	3.0	40.0	1.0	-44.0	-13.0	-31.0			
7630.00	-6.9	H	3.0	39.3	1.0	-45.2	-13.0	-32.2			

LTE Band 4

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		12810836							
Date:		2019-04-13							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter / Earphone, Y-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 4 Harmonics, 15MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1717.5MHz									
3435.00	-0.5	V	3.0	43.7	1.0	-43.1	-13.0	-30.1	
5152.50	-2.1	V	3.0	43.8	1.0	-44.9	-13.0	-31.9	
6870.00	-2.3	V	3.0	42.8	1.0	-44.1	-13.0	-31.1	
8587.50	-2.5	V	3.0	41.8	1.0	-43.3	-13.0	-30.3	
10305.00	0.6	V	3.0	40.6	1.0	-39.0	-13.0	-26.0	
3435.00	-0.2	H	3.0	43.7	1.0	-42.9	-13.0	-29.9	
5152.50	-3.1	H	3.0	43.8	1.0	-45.8	-13.0	-32.8	
6870.00	-2.7	H	3.0	42.8	1.0	-44.6	-13.0	-31.6	
8587.50	-2.5	H	3.0	41.8	1.0	-43.2	-13.0	-30.2	
10305.00	0.8	H	3.0	40.6	1.0	-38.9	-13.0	-25.9	
Mid Ch, 1732.5MHz									
3465.00	4.4	V	3.0	43.7	1.0	-38.3	-13.0	-25.3	
5197.50	-0.3	V	3.0	43.8	1.0	-43.0	-13.0	-30.0	
6930.00	0.4	V	3.0	42.8	1.0	-41.4	-13.0	-28.4	
8662.50	-2.5	V	3.0	41.7	1.0	-43.3	-13.0	-30.3	
10395.00	1.1	V	3.0	40.7	1.0	-38.6	-13.0	-25.6	
3465.00	3.0	H	3.0	43.7	1.0	-39.6	-13.0	-26.6	
5197.50	-0.9	H	3.0	43.8	1.0	-43.7	-13.0	-30.7	
6930.00	1.7	H	3.0	42.8	1.0	-40.1	-13.0	-27.1	
8662.50	-2.0	H	3.0	41.7	1.0	-42.8	-13.0	-29.8	
10395.00	0.8	H	3.0	40.7	1.0	-38.9	-13.0	-25.9	
High Ch, 1747.5MHz									
3495.00	1.5	V	3.0	43.7	1.0	-41.2	-13.0	-28.2	
5242.50	-1.4	V	3.0	43.8	1.0	-44.1	-13.0	-31.1	
6990.00	0.8	V	3.0	42.7	1.0	-41.0	-13.0	-28.0	
8737.50	-2.3	V	3.0	41.7	1.0	-43.0	-13.0	-30.0	
10485.00	1.3	V	3.0	40.7	1.0	-38.4	-13.0	-25.4	
3495.00	1.6	H	3.0	43.7	1.0	-41.1	-13.0	-28.1	
5242.50	-3.7	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	
6990.00	0.6	H	3.0	42.7	1.0	-41.1	-13.0	-28.1	
8737.50	-2.3	H	3.0	41.7	1.0	-43.0	-13.0	-30.0	
10485.00	1.2	H	3.0	40.7	1.0	-38.5	-13.0	-25.5	

LTE
Band 4
15MHz
QPSK

LTE Band 5

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
LTE Band 5 1.4MHz QPSK		Company: Samsung Project #: 12810836 Date: 2019-04-18 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 824.7MHz									
		1649.40	-13.8	V	3.0	38.2	1.0	-51.1	-13.0	-38.1	
		2474.10	-12.7	V	3.0	38.8	1.0	-50.5	-13.0	-37.5	
		3298.80	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
		1649.40	-14.1	H	3.0	38.2	1.0	-51.3	-13.0	-38.3	
		2474.10	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
		3298.80	-10.6	H	3.0	39.4	1.0	-49.0	-13.0	-36.0	
		Mid Ch, 836.5MHz									
1673.00	-14.0	V	3.0	38.2	1.0	-51.2	-13.0	-38.2			
2509.50	-12.5	V	3.0	38.8	1.0	-50.3	-13.0	-37.3			
3346.00	-10.3	V	3.0	39.5	1.0	-48.7	-13.0	-35.7			
1673.00	-15.0	H	3.0	38.2	1.0	-52.3	-13.0	-39.3			
2509.50	-13.0	H	3.0	38.8	1.0	-50.8	-13.0	-37.8			
3346.00	-10.4	H	3.0	39.5	1.0	-48.9	-13.0	-35.9			
High Ch, 848.3MHz											
1696.60	0.3	V	3.0	38.2	1.0	-36.9	-13.0	-23.9			
2544.90	-12.4	V	3.0	38.9	1.0	-50.2	-13.0	-37.2			
3393.20	-10.0	V	3.0	39.5	1.0	-48.4	-13.0	-35.4			
1696.60	-1.7	H	3.0	38.2	1.0	-38.9	-13.0	-25.9			
2544.90	-12.8	H	3.0	38.9	1.0	-50.7	-13.0	-37.7			
3393.20	-10.2	H	3.0	39.5	1.0	-48.7	-13.0	-35.7			

LTE Band 12

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		12810836							
Date:		2019-04-23							
Test Engineer:		45585							
Configuration:		ETU / AC Adapter /Earphone							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 700.5MHz									
1401.00	0.5	V	3.0	43.8	1.0	-42.3	-13.0	-29.3	
2101.50	7.1	V	3.0	43.3	1.0	-35.2	-13.0	-22.2	
2802.00	-1.2	V	3.0	43.5	1.0	-43.6	-13.0	-30.6	
3502.50	4.7	V	3.0	43.7	1.0	-38.0	-13.0	-25.0	
4203.00	3.0	V	3.0	43.9	1.0	-39.8	-13.0	-26.8	
4903.50	4.5	V	3.0	43.8	1.0	-38.3	-13.0	-25.3	
1401.00	2.0	H	3.0	43.8	1.0	-40.8	-13.0	-27.8	
2101.50	8.8	H	3.0	43.3	1.0	-33.5	-13.0	-20.5	
2802.00	-2.0	H	3.0	43.5	1.0	-44.5	-13.0	-31.5	
3502.50	5.3	H	3.0	43.7	1.0	-37.4	-13.0	-24.4	
4203.00	6.4	H	3.0	43.9	1.0	-36.5	-13.0	-23.5	
4903.50	6.7	H	3.0	43.8	1.0	-36.1	-13.0	-23.1	
Mid Ch, 707.5MHz									
1415.00	-1.6	V	3.0	43.8	1.0	-44.4	-13.0	-31.4	
2122.50	4.1	V	3.0	43.3	1.0	-38.3	-13.0	-25.3	
2830.00	-2.9	V	3.0	43.5	1.0	-45.4	-13.0	-32.4	
3537.50	4.0	V	3.0	43.7	1.0	-38.7	-13.0	-25.7	
4245.00	2.3	V	3.0	43.9	1.0	-40.6	-13.0	-27.6	
4952.50	1.3	V	3.0	43.8	1.0	-41.5	-13.0	-28.5	
1415.00	2.0	H	3.0	43.8	1.0	-40.8	-13.0	-27.8	
2122.50	4.8	H	3.0	43.3	1.0	-37.5	-13.0	-24.5	
2830.00	-1.6	H	3.0	43.5	1.0	-44.1	-13.0	-31.1	
3537.50	4.4	H	3.0	43.7	1.0	-38.4	-13.0	-25.4	
4245.00	3.8	H	3.0	43.9	1.0	-39.1	-13.0	-26.1	
4952.50	3.7	H	3.0	43.8	1.0	-39.1	-13.0	-26.1	
High Ch, 714.5MHz									
1429.00	-5.7	V	3.0	43.8	1.0	-48.5	-13.0	-35.5	
2143.50	-2.1	V	3.0	43.3	1.0	-44.4	-13.0	-31.4	
2858.00	-5.4	V	3.0	43.5	1.0	-47.9	-13.0	-34.9	
3572.50	0.8	V	3.0	43.7	1.0	-41.9	-13.0	-28.9	
4287.00	-1.1	V	3.0	43.8	1.0	-44.0	-13.0	-31.0	
5001.50	-5.5	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
1429.00	-3.1	H	3.0	43.8	1.0	-45.9	-13.0	-32.9	
2143.50	-1.1	H	3.0	43.3	1.0	-43.4	-13.0	-30.4	
2858.00	-5.2	H	3.0	43.5	1.0	-47.7	-13.0	-34.7	
3572.50	2.7	H	3.0	43.7	1.0	-40.0	-13.0	-27.0	
4287.00	0.1	H	3.0	43.8	1.0	-42.8	-13.0	-29.8	
5001.50	-3.6	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	

LTE
 Band 12
 3MHz
 QPSK

LTE Band 13

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		12810836							
Date:		2019-04-20							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter / Earphone, Y-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE									
Band 13									
5MHz									
QPSK									
Low Ch, 779.5MHz									
1559.00	-10.0	V	3.0	43.7	1.0	-52.7	-40.0	-12.7	
2338.50	-10.8	V	3.0	43.4	1.0	-53.2	-13.0	-40.2	
3118.00	-10.3	V	3.0	43.6	1.0	-52.9	-13.0	-39.9	
1559.00	-14.6	H	3.0	43.7	1.0	-57.2	-40.0	-17.2	
2338.50	-12.0	H	3.0	43.4	1.0	-54.4	-13.0	-41.4	
3118.00	-11.0	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
Mid Ch, 782MHz									
1564.00	-4.5	V	3.0	43.7	1.0	-47.1	-40.0	-7.1	
2346.00	-11.5	V	3.0	43.4	1.0	-53.9	-13.0	-40.9	
3128.00	-10.8	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
1564.00	-8.9	H	3.0	43.7	1.0	-51.5	-40.0	-11.5	
2346.00	-12.4	H	3.0	43.4	1.0	-54.8	-13.0	-41.8	
3128.00	-10.7	H	3.0	43.6	1.0	-53.3	-13.0	-40.3	
High Ch, 784.5MHz									
1569.00	-11.7	V	3.0	43.7	1.0	-54.4	-40.0	-14.4	
2353.50	-11.8	V	3.0	43.4	1.0	-54.2	-13.0	-41.2	
3138.00	-10.7	V	3.0	43.6	1.0	-53.2	-13.0	-40.2	
1569.00	-12.7	H	3.0	43.7	1.0	-55.4	-40.0	-15.4	
2353.50	-12.8	H	3.0	43.4	1.0	-55.2	-13.0	-42.2	
3138.00	-10.8	H	3.0	43.6	1.0	-53.3	-13.0	-40.3	

LTE Band 41

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		12810836							
Date:		2019-04-12							
Test Engineer:		45585							
Configuration:		EUT / AC Adpater / Earphone, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2501MHz									
5002.00	-8.7	V	3.0	43.8	1.0	-51.5	-25.0	-26.5	
7503.00	-6.5	V	3.0	42.5	1.0	-47.9	-25.0	-22.9	
10004.00	-0.6	V	3.0	40.6	1.0	-40.2	-25.0	-15.2	
12505.00	-2.6	V	3.0	41.6	1.0	-43.3	-25.0	-18.3	
15006.00	-6.3	V	3.0	43.7	1.0	-49.0	-25.0	-24.0	
5002.00	-8.2	H	3.0	43.8	1.0	-51.0	-25.0	-26.0	
7503.00	-8.6	H	3.0	42.5	1.0	-50.1	-25.0	-25.1	
10004.00	-3.9	H	3.0	40.6	1.0	-43.5	-25.0	-18.5	
12505.00	-7.1	H	3.0	41.6	1.0	-47.7	-25.0	-22.7	
15006.00	-7.8	H	3.0	43.7	1.0	-50.5	-25.0	-25.5	
Mid Ch, 2593MHz									
5186.00	-11.3	V	3.0	43.8	1.0	-54.0	-25.0	-29.0	
7779.00	-7.1	V	3.0	42.3	1.0	-48.4	-25.0	-23.4	
10372.00	-2.5	V	3.0	40.7	1.0	-42.2	-25.0	-17.2	
12965.00	-4.4	V	3.0	42.0	1.0	-45.4	-25.0	-20.4	
15558.00	-6.9	V	3.0	43.0	1.0	-49.0	-25.0	-24.0	
5186.00	-12.3	H	3.0	43.8	1.0	-55.1	-25.0	-30.1	
7779.00	-7.8	H	3.0	42.3	1.0	-49.1	-25.0	-24.1	
10372.00	-6.1	H	3.0	40.7	1.0	-45.8	-25.0	-20.8	
12965.00	-7.7	H	3.0	42.0	1.0	-48.7	-25.0	-23.7	
15558.00	-7.3	H	3.0	43.0	1.0	-49.3	-25.0	-24.3	
High Ch, 2685MHz									
5370.00	-2.5	V	3.0	43.7	1.0	-45.3	-25.0	-20.3	
8055.00	4.9	V	3.0	42.2	1.0	-36.3	-25.0	-11.3	
10740.00	3.3	V	3.0	40.8	1.0	-36.4	-25.0	-11.4	
13425.00	0.7	V	3.0	42.4	1.0	-40.7	-25.0	-15.7	
16110.00	-6.9	V	3.0	42.4	1.0	-48.3	-25.0	-23.3	
5370.00	-3.0	H	3.0	43.7	1.0	-45.8	-25.0	-20.8	
8055.00	1.9	H	3.0	42.2	1.0	-39.2	-25.0	-14.2	
10740.00	-1.1	H	3.0	40.8	1.0	-40.9	-25.0	-15.9	
13425.00	-4.4	H	3.0	42.4	1.0	-45.7	-25.0	-20.7	
16110.00	-7.0	H	3.0	42.4	1.0	-48.4	-25.0	-23.4	

LTE
 Band 41
 10MHz
 QPSK

LTE Band 66

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		12810836							
Date:		2019-04-22							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter / Earphone, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 66 Harmonics, 5MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5MHz									
3425.00	-7.3	V	3.0	43.7	1.0	-50.0	-13.0	-37.0	
5137.50	-6.4	V	3.0	43.8	1.0	-49.2	-13.0	-36.2	
6850.00	-6.1	V	3.0	42.9	1.0	-48.0	-13.0	-35.0	
3425.00	-4.4	H	3.0	43.7	1.0	-47.1	-13.0	-34.1	
5137.50	-5.8	H	3.0	43.8	1.0	-48.6	-13.0	-35.6	
6850.00	-6.1	H	3.0	42.9	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1745MHz									
3490.00	-8.9	V	3.0	43.7	1.0	-51.6	-13.0	-38.6	
5235.00	-8.0	V	3.0	43.8	1.0	-50.8	-13.0	-37.8	
6980.00	-5.9	V	3.0	42.7	1.0	-47.7	-13.0	-34.7	
3490.00	-8.3	H	3.0	43.7	1.0	-51.0	-13.0	-38.0	
5235.00	-8.0	H	3.0	43.8	1.0	-50.7	-13.0	-37.7	
6980.00	-5.9	H	3.0	42.7	1.0	-47.7	-13.0	-34.7	
High Ch, 1777.5MHz									
3555.00	-7.5	V	3.0	43.7	1.0	-50.2	-13.0	-37.2	
5332.50	-7.0	V	3.0	43.7	1.0	-49.7	-13.0	-36.7	
7110.00	-5.8	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
3555.00	-7.7	H	3.0	43.7	1.0	-50.4	-13.0	-37.4	
5332.50	-6.6	H	3.0	43.7	1.0	-49.3	-13.0	-36.3	
7110.00	-5.7	H	3.0	42.7	1.0	-47.4	-13.0	-34.4	

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.