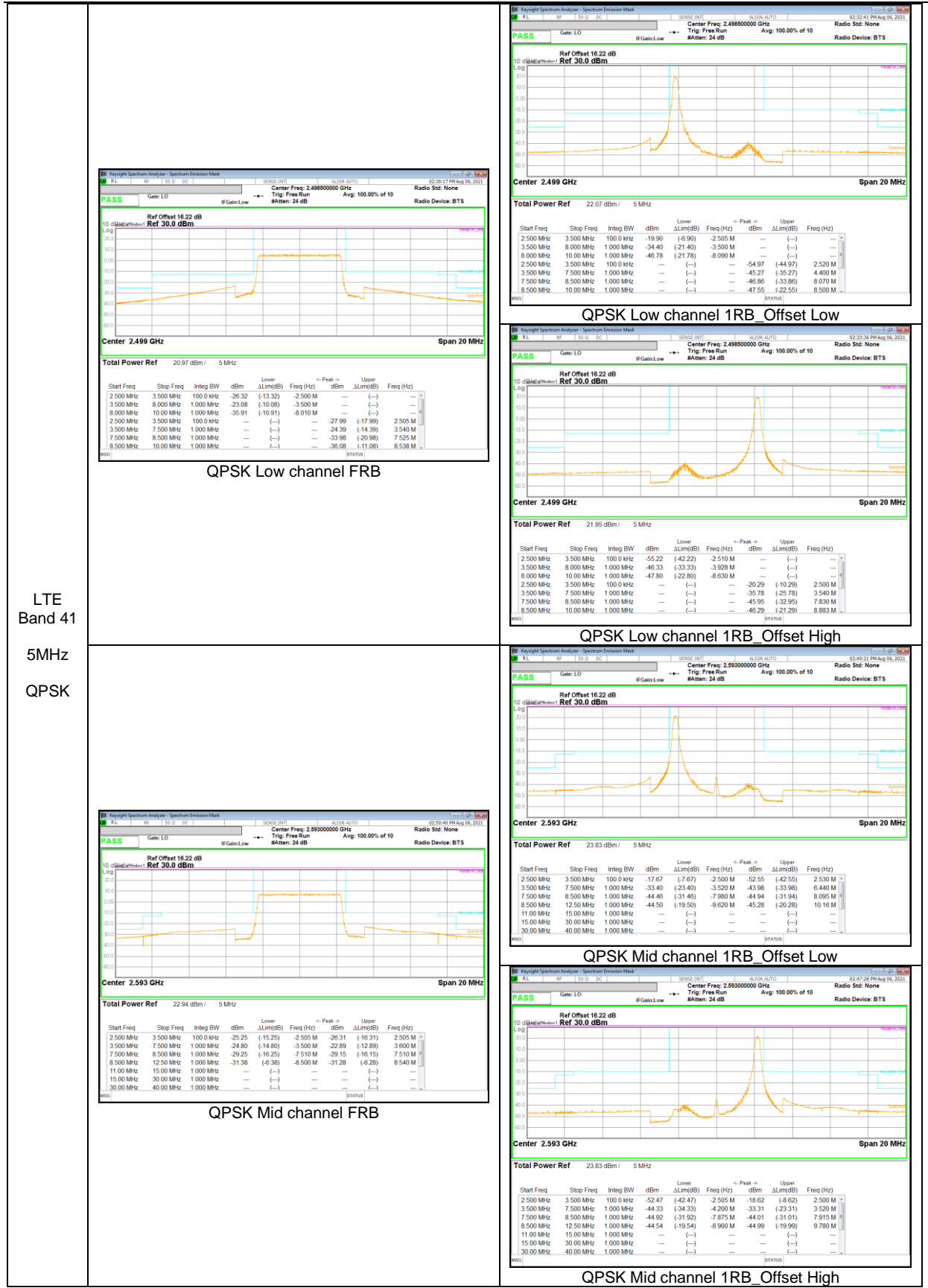
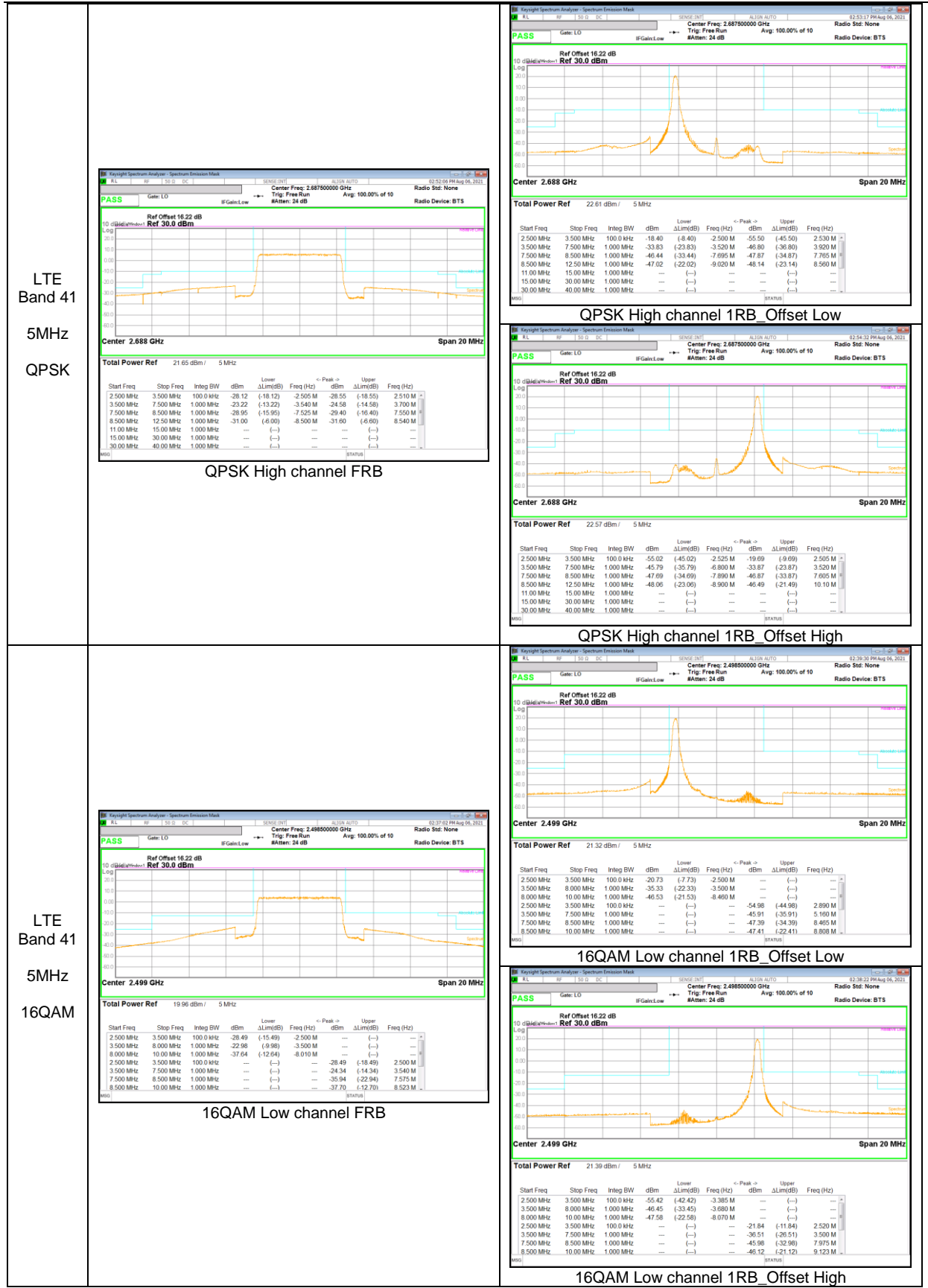
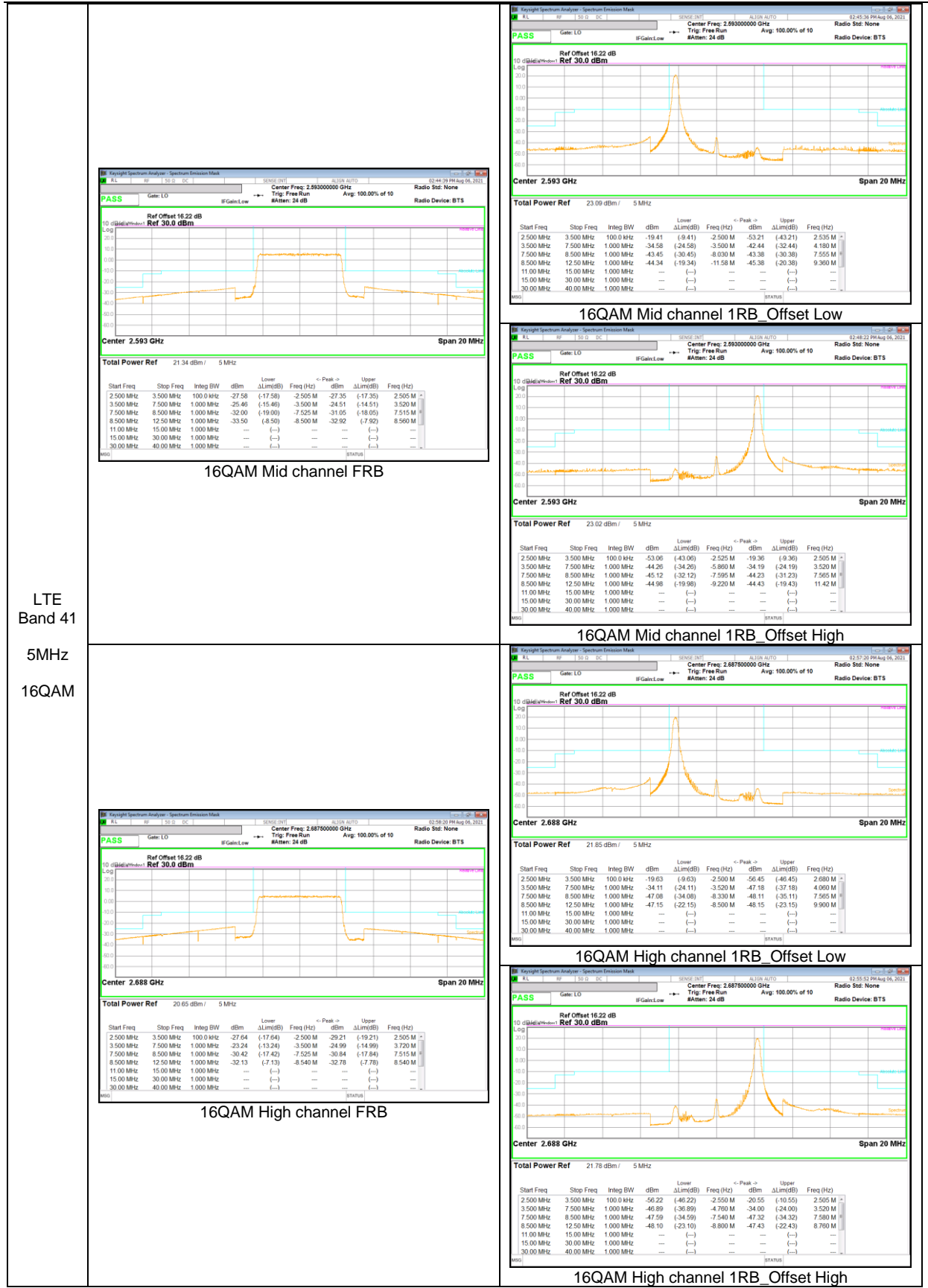


LTE
 Band 41
 10MHz
 16QAM



LTE
 Band 41
 5MHz
 QPSK





LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §27.53 and 90.691

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.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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), Max hold(GSM, LTE Band41);

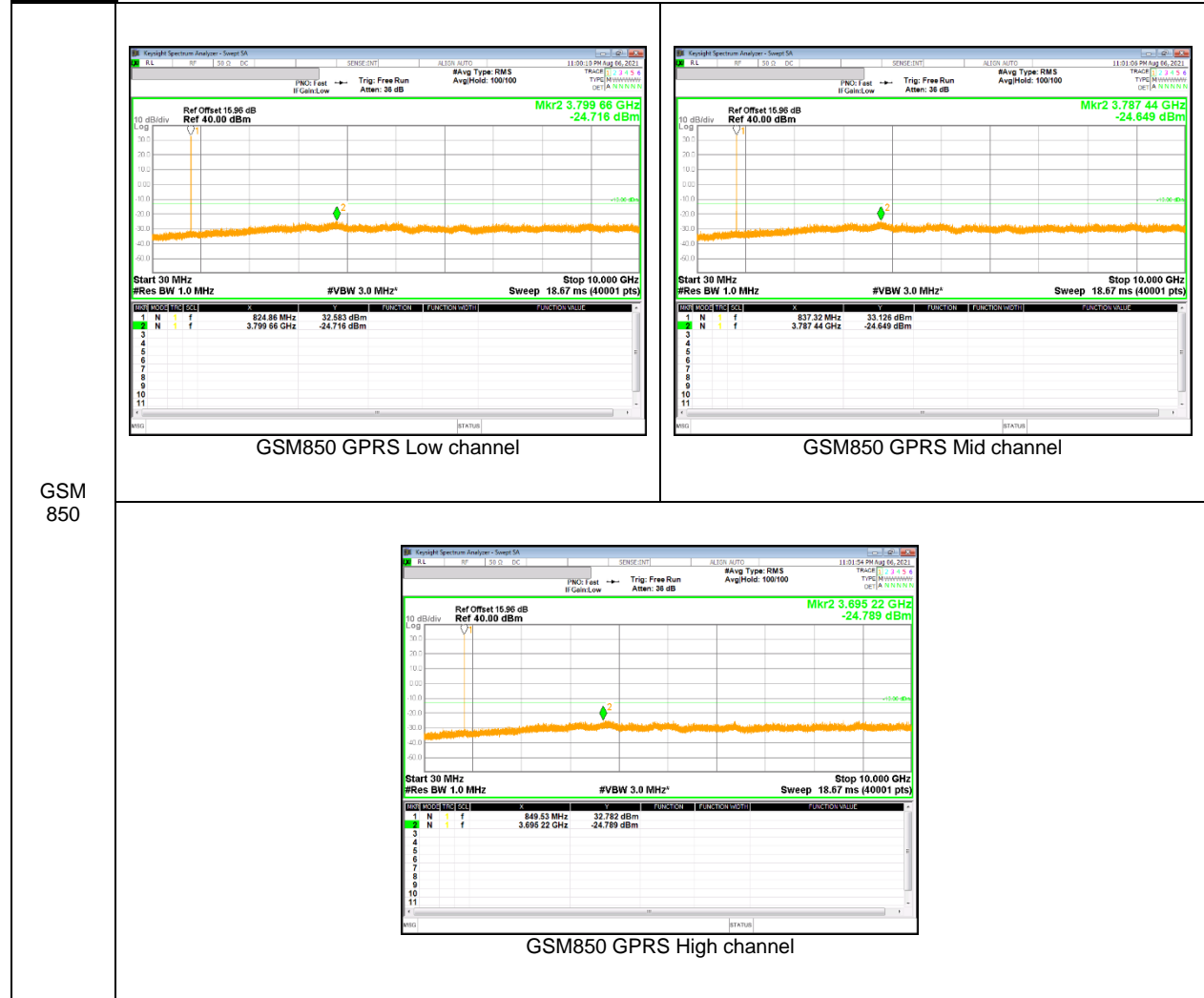
RESULTS

See the following pages.

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

9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850

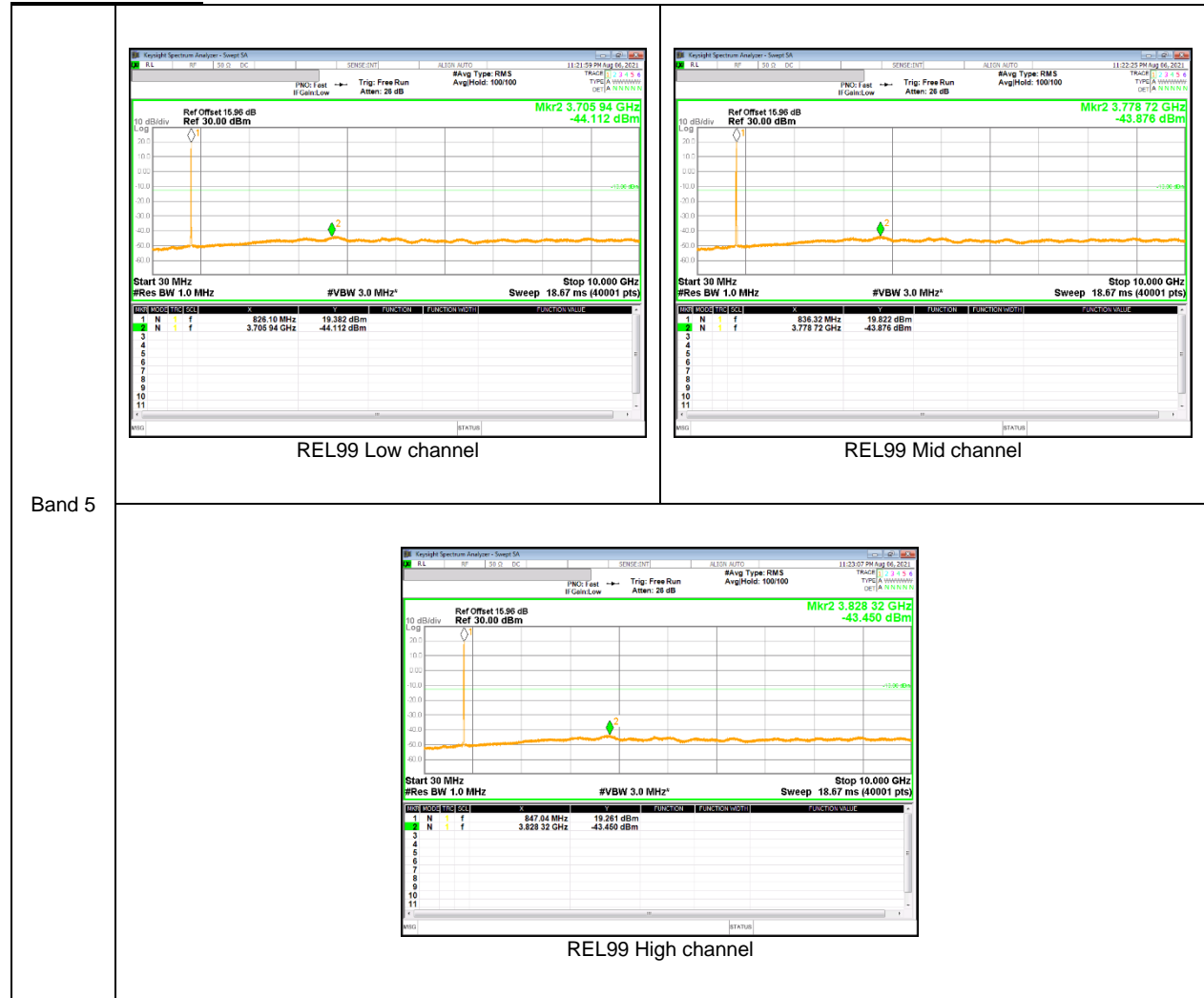


GSM 1900

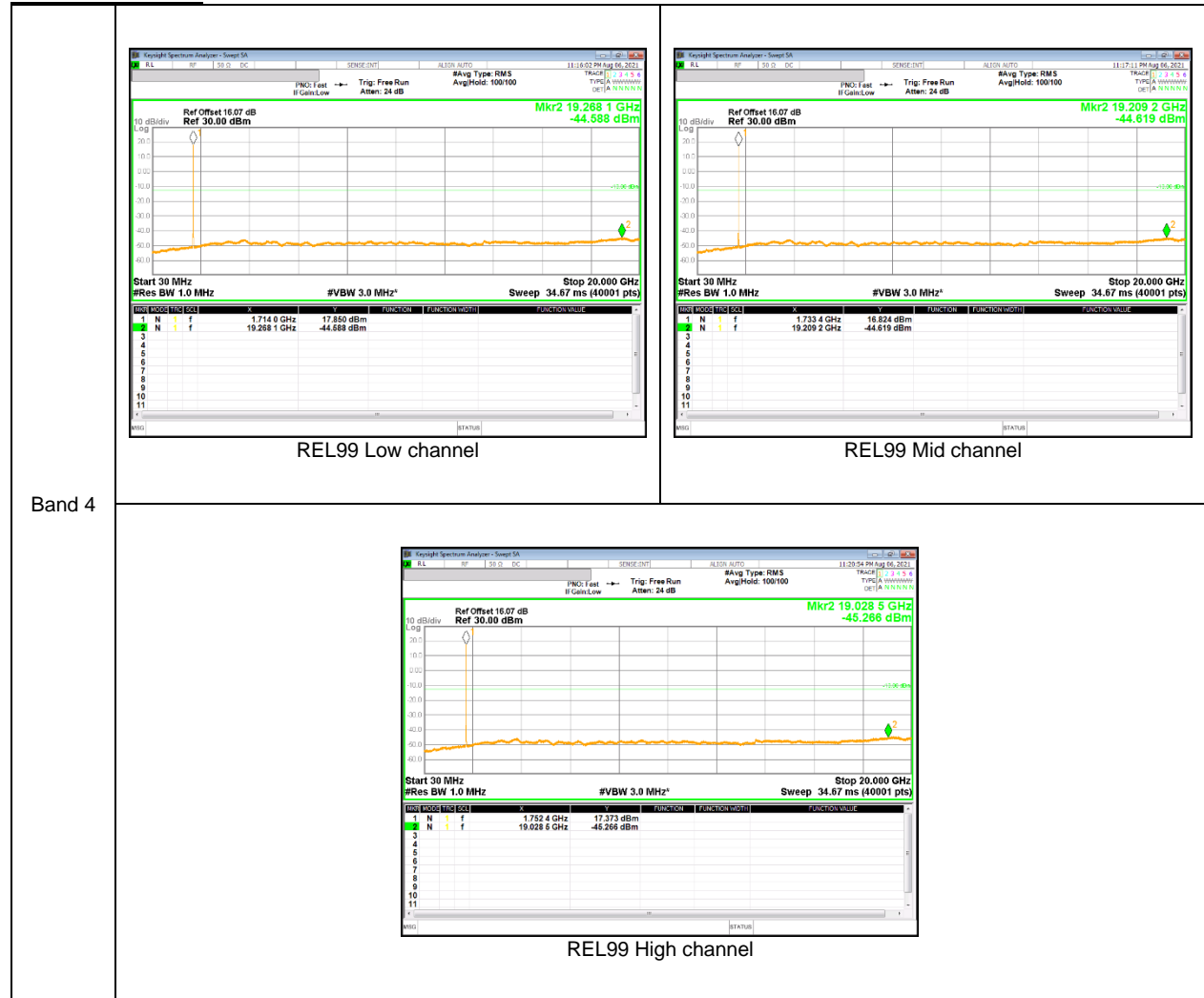


GSM
1900

WCDMA Band 5



WCDMA Band 4

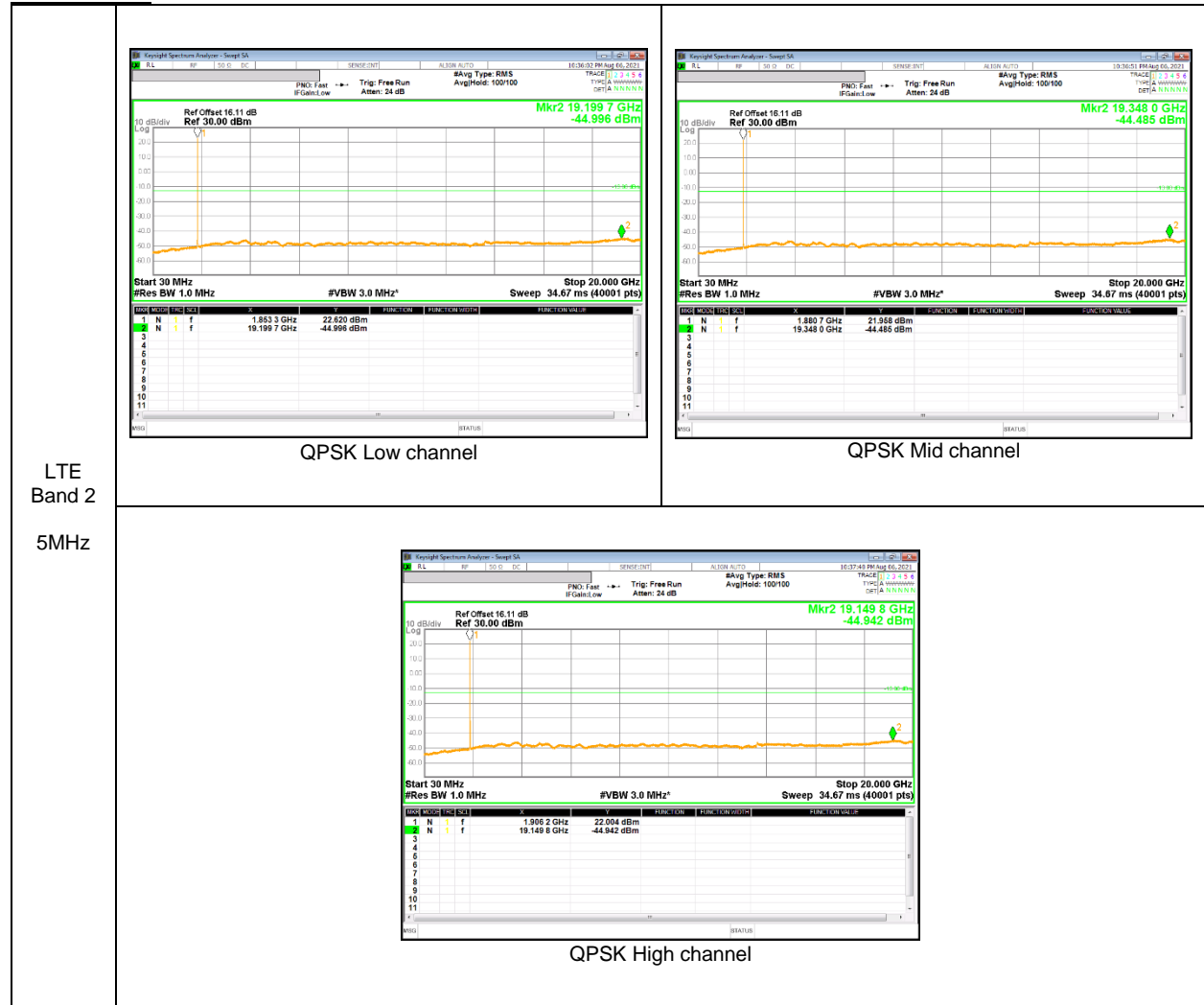


Band 4

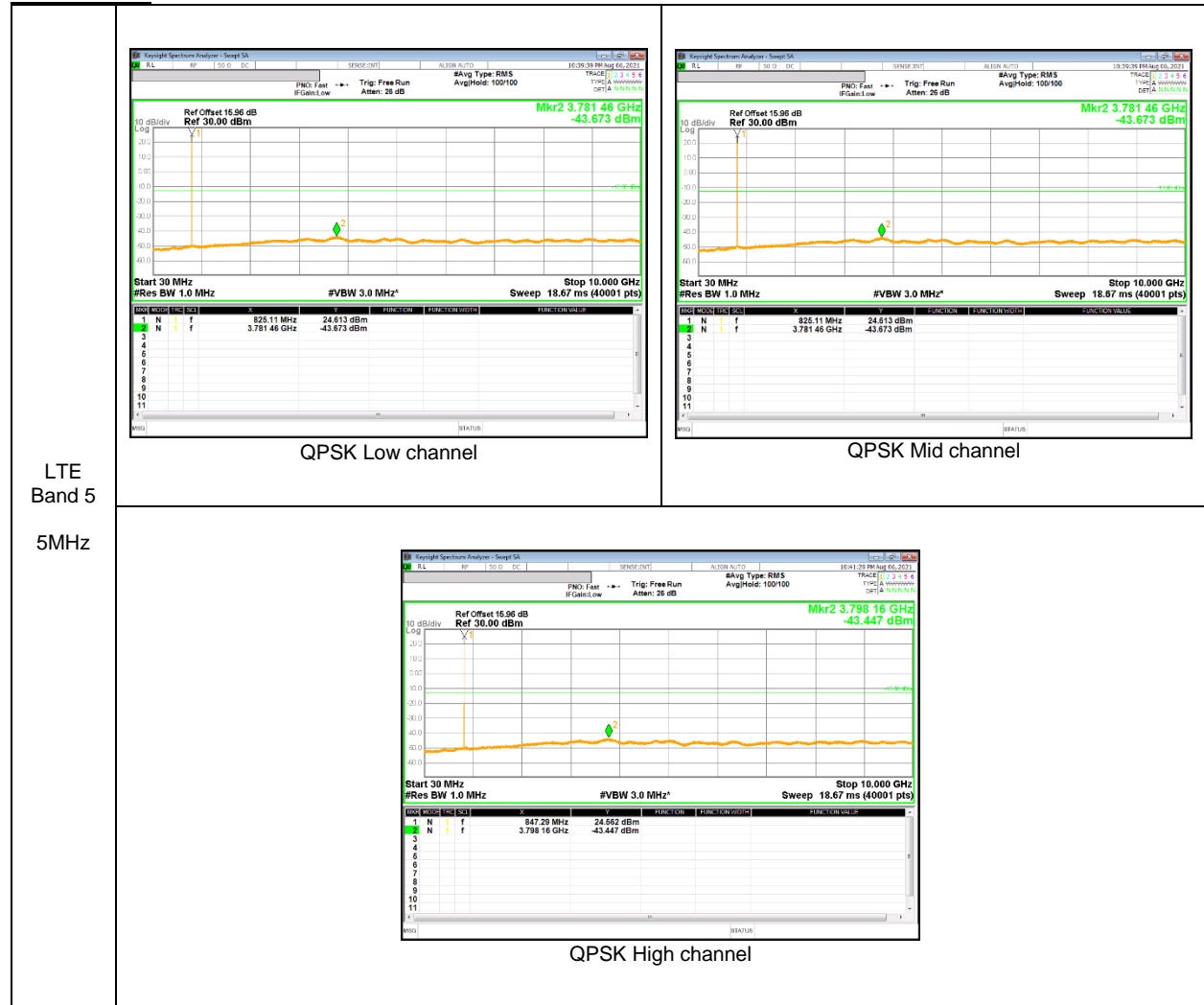
WCDMA Band 2



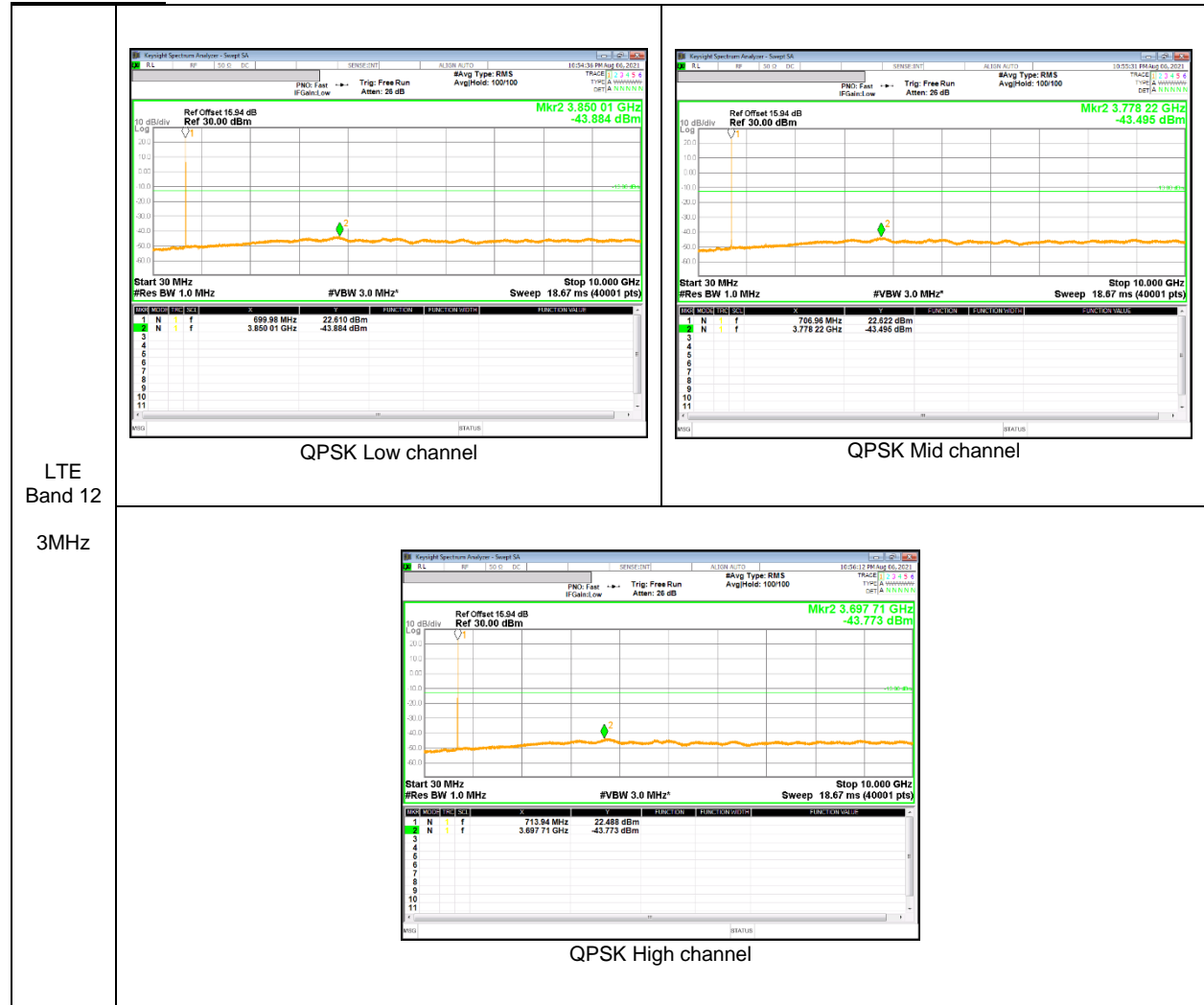
LTE Band 2



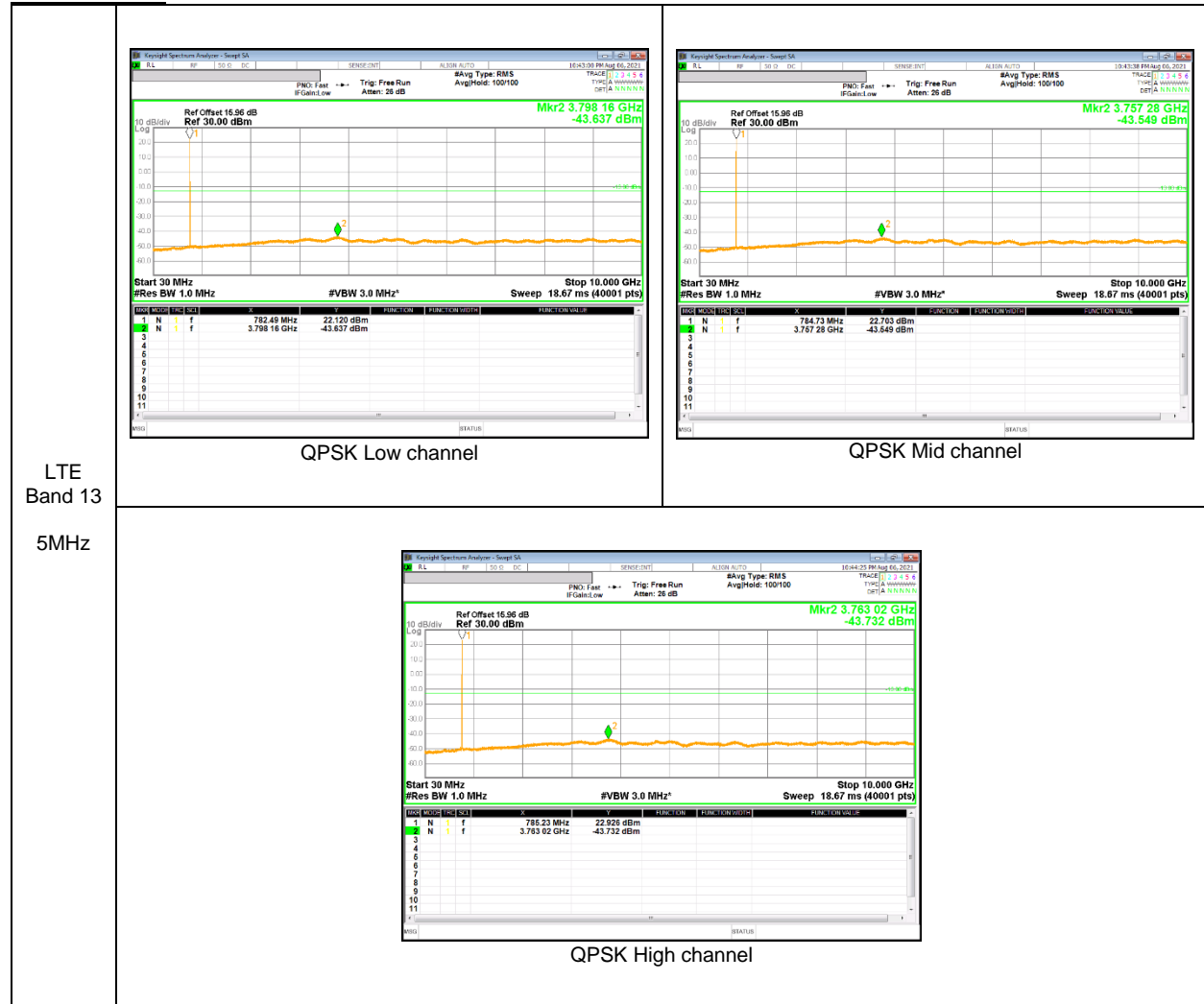
LTE Band 5



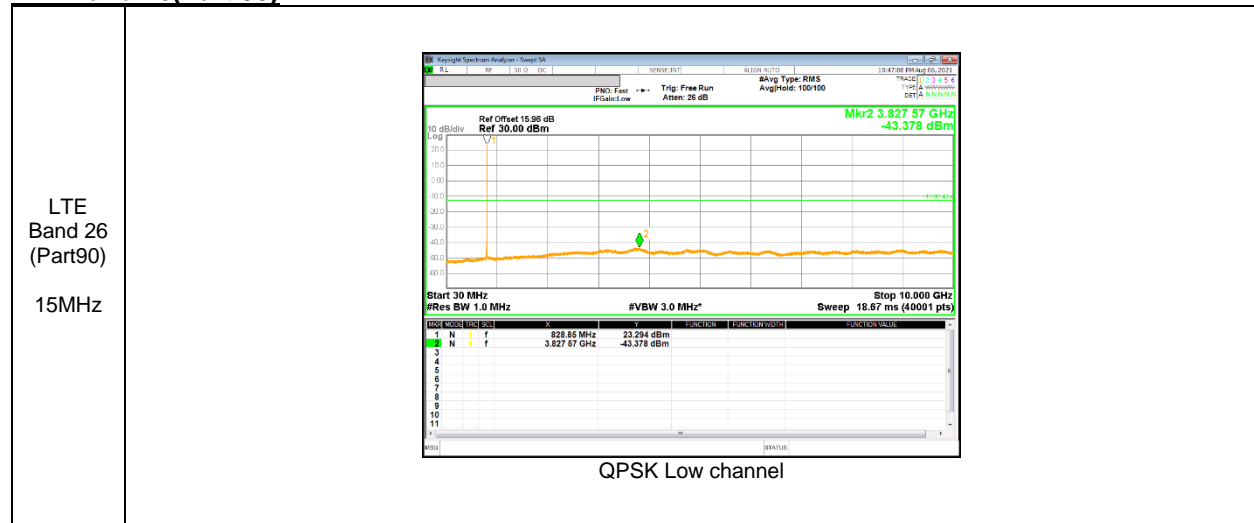
LTE Band 12



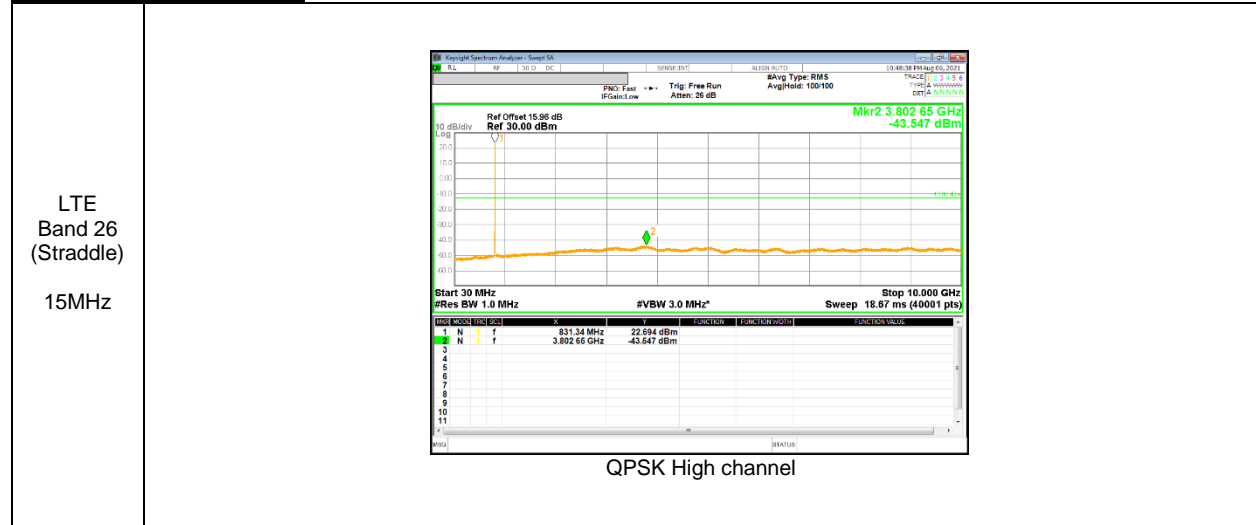
LTE Band 13



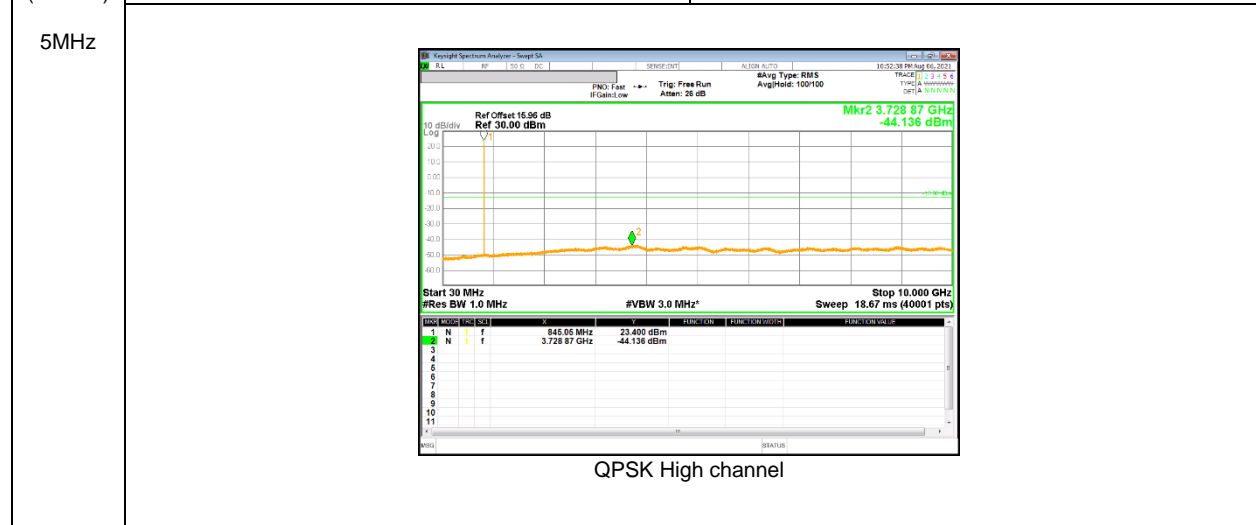
LTE Band 26(Part 90)



LTE Band 26 (Straddle)



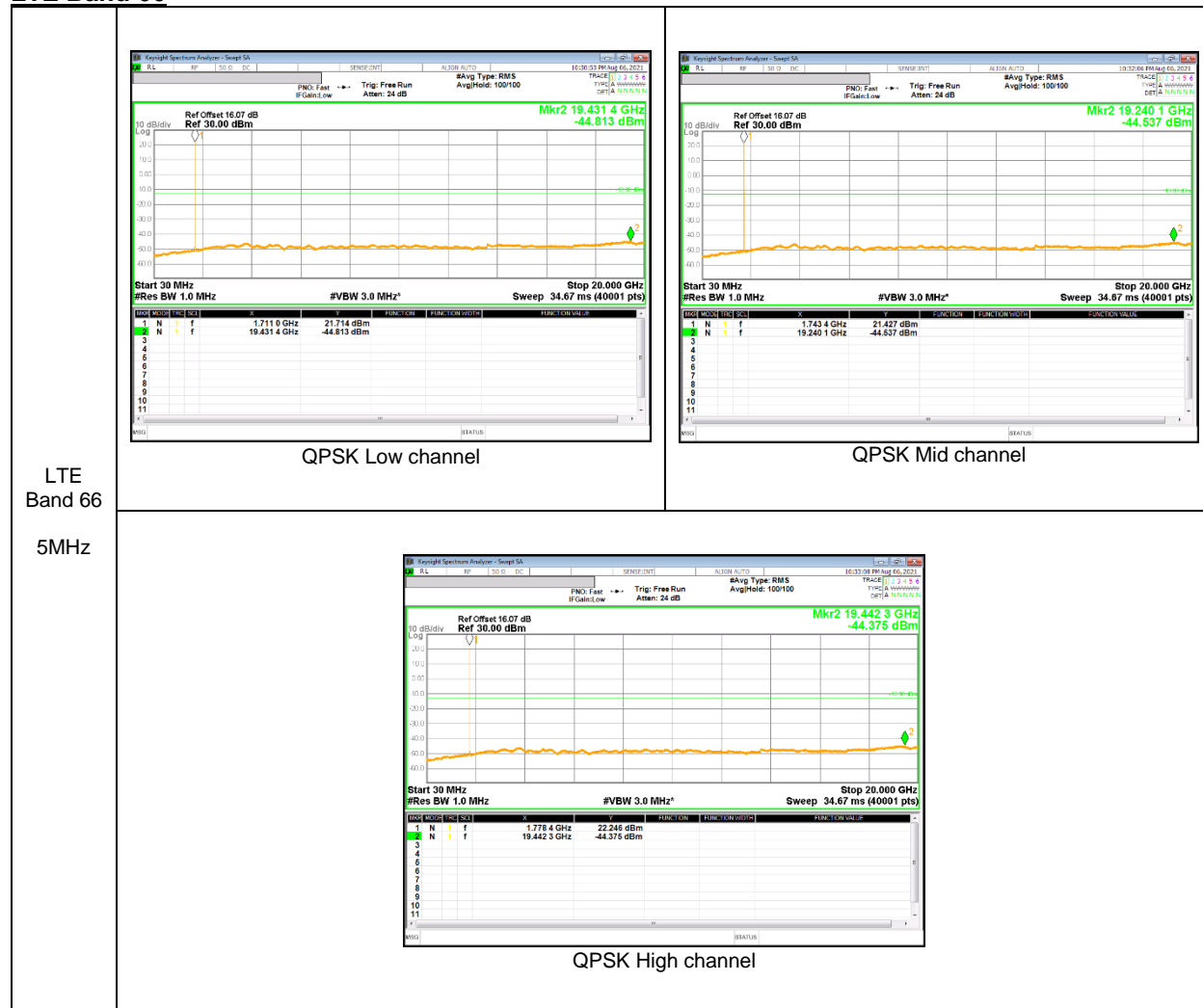
LTE Band 26 (Part 22)



LTE Band 41 (PC3)



LTE Band 66



LTE
 Band 66
 5MHz

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

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.

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

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)

9.4.1. 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]		
3.86	50	824.20002815	0.006	848.80002756	0.003	2.5	
3.86	40	824.20002906	0.005	848.80002682	0.004	2.5	
3.86	30	824.20003128	0.003	848.80003183	-0.002	2.5	
3.86	20	824.20003347	0.000	848.80003026	0.000	2.5	
3.86	10	824.20003228	0.001	848.80003139	-0.001	2.5	
3.86	0	824.20002956	0.005	848.80002958	0.001	2.5	
3.86	-10	824.20003047	0.004	848.80002748	0.003	2.5	
3.86	-20	824.20003135	0.003	848.80003022	0.000	2.5	
3.86	-30	824.20002919	0.005	848.80002967	0.001	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]		
3.86	20	824.20003347	0	848.80003026	0	2.5	
4.40	20	824.20004446	-0.013	848.80004350	-0.016	2.5	
3.65	20	824.20003667	-0.004	848.80004423	-0.016	2.5	

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz (Lowest Frequency:GPRS / Highest Frequency: GPRS)

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	1850.0788	1909.9208		
Extreme (50C)		1850.0789	1909.9208	40.3	0.021
Extreme (40C)		1850.0789	1909.9208	38.2	0.020
Extreme (30C)		1850.0789	1909.9208	39.6	0.021
Extreme (10C)		1850.0789	1909.9208	40.3	0.021
Extreme (0C)		1850.0789	1909.9208	41.3	0.022
Extreme (-10C)		1850.0789	1909.9208	52.6	0.028
Extreme (-20C)		1850.0789	1909.9208	52.6	0.028
Extreme (-30C)		1850.0789	1909.9208	58.1	0.031
20C	15%	1850.0789	1909.9208	39.7	0.021
	-15%	1850.0789	1909.9208	39.2	0.021
	End Point	1850.0789	1909.9208	40.3	0.021

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]		
3.86	50	826.40001012	0.001	846.60000895	0.002	2.5	
3.86	40	826.40001058	0.000	846.60000961	0.001	2.5	
3.86	30	826.40001318	-0.003	846.60001508	-0.006	2.5	
3.86	20	826.40001062	0.000	846.60001024	0.000	2.5	
3.86	10	826.40001153	-0.001	846.60001308	-0.003	2.5	
3.86	0	826.40001051	0.000	846.60001113	-0.001	2.5	
3.86	-10	826.40001307	-0.003	846.60001042	0.000	2.5	
3.86	-20	826.40001036	0.000	846.60001562	-0.006	2.5	
3.86	-30	826.40001046	0.000	846.60001428	-0.005	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]		
3.86	20	826.40001062	0	846.60001024	0	2.5	
4.40	20	826.40000573	0.006	846.60000733	0.003	2.5	
3.65	20	826.40000628	0.005	846.60000791	0.003	2.5	

WCDMA Band 4 (Lowest Frequency: Rel99 / Highest Frequency: Rel99)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.3263	1754.6767		
Extreme (50C)		1710.3263	1754.6767	19.1	0.011
Extreme (40C)		1710.3263	1754.6767	21.3	0.012
Extreme (30C)		1710.3263	1754.6767	20.1	0.012
Extreme (10C)		1710.3263	1754.6767	27.8	0.016
Extreme (0C)		1710.3263	1754.6767	24.3	0.014
Extreme (-10C)		1710.3263	1754.6767	22.7	0.013
Extreme (-20C)		1710.3263	1754.6767	19.2	0.011
Extreme (-30C)		1710.3263	1754.6767	20.6	0.012
20C		15%	1710.3263	1754.6767	20.7
	-15%	1710.3263	1754.6767	20.6	0.012
	End Point	1710.3263	1754.6767	19.7	0.011

WCDMA Band 2 (Lowest Frequency: HSDPA / Highest Frequency: Rel99)

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	1850.3260	1909.6779		
Extreme (50C)		1850.3260	1909.6779	17.6	0.009
Extreme (40C)		1850.3260	1909.6779	19.1	0.010
Extreme (30C)		1850.3260	1909.6779	13.2	0.007
Extreme (10C)		1850.3260	1909.6779	11.1	0.006
Extreme (0C)		1850.3260	1909.6779	12.8	0.007
Extreme (-10C)		1850.3260	1909.6779	13.4	0.007
Extreme (-20C)		1850.3260	1909.6779	11.0	0.006
Extreme (-30C)		1850.3260	1909.6779	11.7	0.006
20C		15%	1850.3260	1909.6779	19.7
	-15%	1850.3260	1909.6779	21.0	0.011
	End Point	1850.3260	1909.6779	18.2	0.010

LTE Band 2 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

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	1850.1534	1909.8464		
Extreme (50C)		1850.1534	1909.8464	27.0	0.014
Extreme (40C)		1850.1534	1909.8464	36.0	0.019
Extreme (30C)		1850.1534	1909.8464	20.6	0.011
Extreme (10C)		1850.1534	1909.8464	14.1	0.007
Extreme (0C)		1850.1534	1909.8464	20.5	0.011
Extreme (-10C)		1850.1534	1909.8464	13.8	0.007
Extreme (-20C)		1850.1534	1909.8464	31.4	0.017
Extreme (-30C)		1850.1534	1909.8464	13.0	0.007
20C		15%	1850.1534	1909.8464	25.5
	-15%	1850.1534	1909.8464	25.8	0.014
	End Point	1850.1534	1909.8464	26.7	0.014

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	824.70004018	-0.015	848.30004085	-0.022	2.5	
3.85	40	824.70003724	-0.011	848.30003687	-0.017	2.5	
3.85	30	824.70003615	-0.010	848.30002408	-0.002	2.5	
3.85	20	824.70002815	0.000	848.30002209	0.000	2.5	
3.85	10	824.70002248	0.007	848.30002568	-0.004	2.5	
3.85	0	824.70003167	-0.004	848.30002581	-0.004	2.5	
3.85	-10	824.70003285	-0.006	848.30003065	-0.010	2.5	
3.85	-20	824.70003158	-0.004	848.30003828	-0.019	2.5	
3.85	-30	824.70004318	-0.018	848.30004210	-0.024	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]		
3.86	20	824.70002815	0	848.30002209	0	2.5	
4.40	20	824.70001568	0.015	848.30002064	0.002	2.5	
3.65	20	824.70001199	0.020	848.30001773	0.005	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	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.1539	715.8453		
Extreme (50C)		699.1539	715.8453	10.1	0.014
Extreme (40C)		699.1539	715.8453	10.5	0.015
Extreme (30C)		699.1539	715.8453	10.4	0.015
Extreme (10C)		699.1539	715.8453	10.1	0.014
Extreme (0C)		699.1539	715.8453	13.1	0.019
Extreme (-10C)		699.1539	715.8453	19.2	0.027
Extreme (-20C)		699.1539	715.8453	24.2	0.034
Extreme (-30C)		699.1539	715.8453	17.9	0.025
20C	15%	699.1539	715.8453	11.2	0.016
	-15%	699.1539	715.8453	11.7	0.017
	End Point	699.1539	715.8453	11.1	0.016

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

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	777.2576	786.7391		
Extreme (50C)		777.2576	786.7391	14.6	0.019
Extreme (40C)		777.2576	786.7391	15.0	0.019
Extreme (30C)		777.2576	786.7391	10.2	0.013
Extreme (10C)		777.2576	786.7391	9.6	0.012
Extreme (0C)		777.2576	786.7391	10.7	0.014
Extreme (-10C)		777.2576	786.7391	13.0	0.017
Extreme (-20C)		777.2576	786.7391	15.2	0.019
Extreme (-30C)		777.2576	786.7391	16.3	0.021
20C	15%	777.2576	786.7391	12.7	0.016
	-15%	777.2576	786.7391	13.6	0.017
	End Point	777.2576	786.7391	16.7	0.021

LTE Band 26

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2036.750	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	814.70002713	-0.007	848.30003175	-0.017	2.5	
3.85	40	814.70003508	-0.017	848.30003026	-0.015	2.5	
3.85	30	814.70002452	-0.004	848.30002179	-0.005	2.5	
3.85	20	814.70002154	0.000	848.30001719	0.000	2.5	
3.85	10	814.70002714	-0.007	848.30002308	-0.007	2.5	
3.85	0	814.70002757	-0.007	848.30002082	-0.004	2.5	
3.85	-10	814.70004018	-0.023	848.30003855	-0.025	2.5	
3.85	-20	814.70004024	-0.023	848.30004228	-0.030	2.5	
3.85	-30	814.70003058	-0.011	848.30004335	-0.031	2.5	

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2036.750	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]		
3.86	20	814.70002154	0	848.30001719	0	2.5	
4.40	20	814.70000000	0.026	848.30000000	0.020	2.5	
3.65	20	814.70000000	0.026	848.30000000	0.020	2.5	

LTE Band 41 PC3 (Lowest Frequency:QPSK / Highest Frequency: 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	2496.2486	2689.7450		
Extreme (50C)		2496.2487	2689.7450	50.7	0.020
Extreme (40C)		2496.2486	2689.7450	48.1	0.019
Extreme (30C)		2496.2486	2689.7450	40.7	0.016
Extreme (10C)		2496.2486	2689.7450	48.3	0.019
Extreme (0C)		2496.2486	2689.7450	42.6	0.016
Extreme (-10C)		2496.2487	2689.7450	58.1	0.022
Extreme (-20C)		2496.2487	2689.7450	52.0	0.020
Extreme (-30C)		2496.2487	2689.7450	50.3	0.019
20C	15%	2496.2487	2689.7450	25.3	0.010
	-15%	2496.2486	2689.7450	26.2	0.010
	End Point	2496.2486	2689.7450	25.7	0.010

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

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)		1710.6995	1779.3006	12.3	0.007
Extreme (40C)		1710.6995	1779.3006	25.8	0.015
Extreme (30C)		1710.6995	1779.3006	22.1	0.013
Extreme (10C)		1710.6995	1779.3006	19.7	0.011
Extreme (0C)		1710.6995	1779.3006	12.3	0.007
Extreme (-10C)		1710.6995	1779.3006	11.9	0.007
Extreme (-20C)		1710.6995	1779.3006	14.1	0.008
Extreme (-30C)		1710.6995	1779.3006	32.3	0.019
20C	15%	1710.6995	1779.3006	14.5	0.008
	-15%	1710.6995	1779.3006	16.3	0.009
	End Point	1710.6995	1779.3006	14.3	0.008

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

9.5. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50, §27.53 and §90.635

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.

90.635(b) – The maximum output power of the transmitter for mobile stations is 100 watts (20dBw).

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

9.5.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	30.22	1051.96
		190	836.6	29.77	948.42
		251	848.8	28.07	641.21
	EGPRS	128	824.2	25.28	337.29
		190	836.6	24.93	311.17
		251	848.8	20.40	109.65
GSM1900	GPRS	512	1850.2	29.32	855.07
		661	1880	28.66	734.51
		810	1909.8	27.97	626.61
	EGPRS	512	1850.2	22.35	171.79
		661	1880	25.85	384.59
		810	1909.8	24.17	261.22

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	20.85	121.62
		4183	836.6	20.77	119.40
		4233	846.6	19.99	99.77
	HSDPA	4132	826.4	19.66	92.47
		4183	836.6	19.70	93.33
		4233	846.6	19.95	98.86
Band 4	REL99	1312	1712.4	21.96	157.04
		1413	1732.6	22.57	180.72
		1513	1752.6	21.99	158.12
	HSDPA	1312	1712.4	20.91	123.31
		1413	1732.6	21.51	141.58
		1513	1752.6	21.21	132.13
Band 2	REL99	9262	1852.4	22.44	175.39
		9400	1880.0	21.88	154.17
		9538	1907.6	21.75	149.62
	HSDPA	9262	1852.4	21.05	127.35
		9400	1880.0	20.96	124.74
		9538	1907.6	20.83	121.06

LTE Band 2

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 2	20	QPSK	1/99	1860.0	22.72	187.07
			1/49	1880.0	22.45	175.79
			1/0	1900.0	22.59	181.55
		16QAM	1/99	1860.0	21.55	142.89
			1/49	1880.0	21.47	140.28
			1/0	1900.0	21.74	149.28
	15	QPSK	1/74	1857.5	22.43	174.98
			1/0	1880.0	22.48	177.01
			1/0	1902.5	22.38	172.98
		16QAM	1/37	1857.5	21.44	139.32
			1/74	1880.0	20.71	117.76
			1/0	1902.5	21.44	139.32
	10	QPSK	1/25	1855.0	22.84	192.31
			1/25	1880.0	22.07	161.06
			1/0	1905.0	21.91	155.24
		16QAM	1/25	1855.0	21.81	151.71
			1/25	1880.0	21.25	133.35
			1/0	1905.0	21.07	127.94
	5	QPSK	1/12	1852.5	23.21	209.41
			1/12	1880.0	22.44	175.39
			1/0	1907.5	20.99	125.60
		16QAM	1/12	1852.5	22.41	174.18
			1/12	1880.0	21.47	140.28
			1/12	1907.5	20.08	101.86
	3	QPSK	1/0	1851.5	22.93	196.34
			1/0	1880.0	22.30	169.82
			1/8	1908.5	21.50	141.25
		16QAM	1/0	1851.5	22.09	161.81
			1/0	1880.0	21.23	132.74
			1/0	1908.5	20.39	109.40
1.4	QPSK	1/3	1850.7	22.99	199.07	
		1/3	1880.0	22.37	172.58	
		1/3	1909.3	21.27	133.97	
	16QAM	1/3	1850.7	21.91	155.24	
		1/3	1880.0	21.16	130.62	
		1/3	1909.3	20.06	101.39	

LTE Band 5

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 5	10	QPSK	1/49	829.0	21.09	128.53
			1/25	836.5	20.81	120.50
			1/0	844.0	20.48	111.69
		16QAM	1/0	829.0	20.17	103.99
			1/25	836.5	19.61	91.41
			1/0	844.0	19.84	96.38
	5	QPSK	1/0	826.5	20.92	123.59
			1/12	836.5	20.91	123.31
			1/12	846.5	21.38	137.40
		16QAM	1/0	826.5	20.37	108.89
			1/12	836.5	19.84	96.38
			1/12	846.5	20.39	109.40
	3	QPSK	1/0	825.5	20.88	122.46
			1/14	836.5	20.87	122.18
			1/0	847.5	21.52	141.91
		16QAM	1/0	825.5	19.76	94.62
			1/14	836.5	19.81	95.72
			1/14	847.5	20.60	114.82
	1.4	QPSK	1/3	824.7	21.15	130.32
			1/3	836.5	21.06	127.64
			1/3	848.3	21.62	145.21
		16QAM	1/3	824.7	19.80	95.50
			1/3	836.5	20.17	103.99
			1/3	848.3	20.61	115.08

LTE Band 12

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 12	10	QPSK	1/0	704.0	18.11	64.71
			1/0	707.5	18.16	65.46
			1/0	711.0	18.20	66.07
		16QAM	1/0	704.0	17.18	52.24
			1/0	707.5	17.10	51.29
			1/0	711.0	17.23	52.84
	5	QPSK	1/12	701.5	18.10	64.57
			1/0	707.5	17.83	60.67
			1/0	713.5	17.82	60.53
		16QAM	1/0	701.5	17.03	50.47
			1/0	707.5	16.87	48.64
			1/0	713.5	17.00	50.12
	3	QPSK	1/0	700.5	17.94	62.23
			1/0	707.5	17.86	61.09
			1/0	714.5	17.83	60.67
		16QAM	1/0	700.5	17.17	52.12
			1/0	707.5	17.73	59.29
			1/0	714.5	16.70	46.77
	1.4	QPSK	1/3	699.7	18.00	63.10
			1/3	707.5	17.86	61.09
			1/3	715.3	17.80	60.26
		16QAM	1/3	699.7	16.72	46.99
			1/3	707.5	16.96	49.66
			1/3	715.3	16.64	46.13

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 13	10	QPSK	1/49	782.0	18.41	69.34
		16QAM	1/49	782.0	17.41	55.08
	5	QPSK	1/24	779.5	18.50	70.79
			1/24	782.0	18.56	71.78
			1/12	784.5	18.37	68.71
		16QAM	1/24	779.5	17.29	53.58
			1/24	782.0	17.75	59.57
			1/24	784.5	17.73	59.29

LTE Band 26

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP/EIRP	
			RB Offset		[dBm]	[mW]
Band 26	15	QPSK	1/74	821.5	19.35	86.10
			1/37	831.5	19.82	95.94
			1/0	841.5	19.42	87.50
		16QAM	1/37	821.5	18.06	63.97
			1/37	831.5	18.78	75.51
			1/74	841.5	19.11	81.47
	10	QPSK	1/49	819.0	18.67	73.62
			1/0	829.0	19.84	96.38
			1/49	831.5	20.31	107.40
			1/0	844.0	19.38	86.70
		16QAM	1/0	819.0	17.74	59.43
			1/25	829.0	19.03	79.98
			1/25	831.5	19.52	89.54
			1/0	844.0	18.26	66.99
	5	QPSK	1/12	816.5	18.56	71.78
			1/24	821.5	19.32	85.51
			1/12	826.5	20.04	100.93
			1/24	831.5	20.25	105.93
			1/0	846.5	19.49	88.92
		16QAM	1/12	816.5	17.43	55.34
			1/12	821.5	18.32	67.92
			1/24	826.5	19.48	88.72
			1/24	831.5	19.22	83.56
			1/0	846.5	18.39	69.02
	3	QPSK	1/0	815.5	18.31	67.76
			1/8	822.5	19.20	83.18
			1/8	825.5	19.79	95.28
			1/14	831.5	20.20	104.71
			1/0	847.5	19.64	92.04
		16QAM	1/14	815.5	17.44	55.46
			1/8	822.5	18.30	67.61
			1/8	825.5	18.93	78.16
			1/14	831.5	19.30	85.11
			1/0	847.5	18.67	73.62
	1.4	QPSK	1/5	814.7	18.32	67.92
			1/3	823.3	19.81	95.72
			1/3	824.7	19.84	96.38
			1/5	831.5	20.19	104.47
			1/5	848.3	19.64	92.04
		16QAM	1/5	814.7	16.93	49.32
1/3			823.3	18.63	72.95	
1/3			824.7	18.64	73.11	
1/5			831.5	19.14	82.04	
1/5			848.3	18.55	71.61	

LTE Band 26(Straddle)

Band	BW	Mode	RB Size/	f [MHz]	ERP/EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 26 Straddle	15	QPSK	1/74	824	19.98	99.54
		16QAM	1/74		19.08	80.91
	10	QPSK	1/49	824	20.08	101.86
		16QAM	1/49		19.39	86.90
	5	QPSK	1/12	824	19.96	99.08
		16QAM	1/24		19.05	80.35
	3	QPSK	1/8	824	20.19	104.47
		16QAM	1/8		19.17	82.60
	1.4	QPSK	1/3	824	19.80	95.50
		16QAM	1/3		18.80	75.86

LTE Band 41 (PC3)

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1/99	2506.0	21.25	133.35
			1/49	2593.0	22.87	193.64
			1/0	2680.0	20.26	106.17
		16QAM	1/0	2506.0	19.69	93.11
			1/49	2593.0	22.17	164.82
			1/49	2680.0	19.56	90.36
	15	QPSK	1/37	2503.5	21.44	139.32
			1/37	2593.0	22.80	190.55
			1/37	2682.5	20.32	107.65
		16QAM	1/0	2503.5	19.79	95.28
			1/37	2593.0	22.43	174.98
			1/37	2682.5	20.13	103.04
	10	QPSK	1/25	2501.0	21.07	127.94
			1/25	2593.0	22.90	194.98
			1/25	2685.0	20.34	108.14
		16QAM	1/25	2501.0	21.02	126.47
			1/25	2593.0	22.71	186.64
			1/25	2685.0	19.69	93.11
	5	QPSK	1/24	2498.5	21.46	139.96
			1/24	2593.0	22.79	190.11
			1/12	2687.5	20.18	104.23
		16QAM	1/0	2498.5	19.96	99.08
			1/0	2593.0	22.65	184.08
			1/12	2687.5	19.94	98.63

LTE Band 66

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 66	20	QPSK	1/49	1720.0	22.11	162.55
			1/49	1745.0	22.33	171.00
			1/0	1770.0	23.00	199.53
		16QAM	1/49	1720.0	21.11	129.12
			1/49	1745.0	21.61	144.88
			1/0	1770.0	21.77	150.31
	15	QPSK	1/37	1717.5	22.39	173.38
			1/37	1747.5	22.65	184.08
			1/0	1772.5	22.95	197.24
		16QAM	1/0	1717.5	20.53	112.98
			1/37	1747.5	21.80	151.36
			1/0	1772.5	21.88	154.17
	10	QPSK	1/25	1715.0	21.88	154.17
			1/25	1745.0	22.32	170.61
			1/25	1775.0	22.65	184.08
		16QAM	1/25	1715.0	20.72	118.03
			1/25	1745.0	21.16	130.62
			1/25	1775.0	21.41	138.36
	5	QPSK	1/0	1712.5	21.75	149.62
			1/0	1745.0	22.60	181.97
			1/12	1777.5	22.58	181.13
		16QAM	1/0	1712.5	20.47	111.43
			1/24	1745.0	21.71	148.25
			1/12	1777.5	21.69	147.57
	3	QPSK	1/0	1711.5	21.63	145.55
			1/0	1745.0	22.47	176.60
			1/0	1778.5	22.75	188.36
		16QAM	1/0	1711.5	20.47	111.43
			1/0	1745.0	21.35	136.46
			1/0	1778.5	21.48	140.60
1.4	QPSK	1/3	1710.7	21.52	141.91	
		1/3	1745.0	22.68	185.35	
		1/3	1779.3	22.35	171.79	
	16QAM	1/3	1710.7	20.69	117.22	
		1/3	1745.0	21.53	142.23	
		1/3	1779.3	21.22	132.43	

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

9.5.2. ERP/EIRP DATA

GSM850

GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 4790047196 Date: 8/3/2021 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 1 Mode: GPRS 850 MHz Fundamentals </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 colspan="9">Low Ch</td> </tr> <tr> <td>824.20</td> <td>34.22</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>30.22</td> <td>38.5</td> <td>-8.3</td> <td></td> </tr> <tr> <td>824.20</td> <td>22.77</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>18.77</td> <td>38.5</td> <td>-19.7</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>33.73</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>29.77</td> <td>38.5</td> <td>-8.7</td> <td></td> </tr> <tr> <td>836.60</td> <td>24.23</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>20.26</td> <td>38.5</td> <td>-18.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>848.80</td> <td>32.01</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>28.07</td> <td>38.5</td> <td>-10.4</td> <td></td> </tr> <tr> <td>848.80</td> <td>23.82</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>19.88</td> <td>38.5</td> <td>-18.6</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									824.20	34.22	V	3.0	-1.0	30.22	38.5	-8.3		824.20	22.77	H	3.0	-1.0	18.77	38.5	-19.7		Mid Ch									836.60	33.73	V	3.1	-0.9	29.77	38.5	-8.7		836.60	24.23	H	3.1	-0.9	20.26	38.5	-18.2		High Ch									848.80	32.01	V	3.1	-0.9	28.07	38.5	-10.4		848.80	23.82	H	3.1	-0.9	19.88	38.5	-18.6
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																		
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f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																		
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Mid Ch																																																																																										
836.60	28.89	V	3.1	-0.9	24.93	38.5	-13.6																																																																																			
836.60	19.03	H	3.1	-0.9	15.06	38.5	-23.4																																																																																			
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848.80	24.34	V	3.1	-0.9	20.40	38.5	-18.1																																																																																			
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GSM1900

GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/3/2021 Test Engineer: 20882 Configuration: EUT, Y-Position Location: Chamber 1 Mode: GPRS 1900 MHz Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1850.20	24.25	V	4.5	9.6	29.32	33.0	-3.7	
	1850.20	17.90	H	4.5	9.6	22.97	33.0	-10.0	
	Mid Ch								
	1880.00	23.85	V	4.6	9.4	28.66	33.0	-4.3	
	1880.00	17.03	H	4.6	9.4	21.84	33.0	-11.2	
	High Ch								
	1909.80	23.45	V	4.6	9.1	27.97	33.0	-5.0	
	1909.80	17.43	H	4.6	9.1	21.95	33.0	-11.0	

GSM1900 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/3/2021 Test Engineer: 20882 Configuration: EUT, Y-Position Location: Chamber 1 Mode: EGPRS 1900 MHz Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1850.20	17.28	V	4.5	9.6	22.35	33.0	-10.7	
	1850.20	14.49	H	4.5	9.6	19.56	33.0	-13.4	
	Mid Ch								
	1880.00	21.04	V	4.6	9.4	25.85	33.0	-7.2	
	1880.00	14.58	H	4.6	9.4	19.39	33.0	-13.6	
	High Ch								
	1909.80	19.65	V	4.6	9.1	24.17	33.0	-8.8	
	1909.80	13.98	H	4.6	9.1	18.50	33.0	-14.5	

WCDMA Band 5

Band 5 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4790047196						
	Date:		8/3/2021						
	Test Engineer:		19568						
	Configuration:		EUT, Z-Position						
	Location:		Chamber 1						
	Mode:		Rel99 Band 5 Fundamentals						
	Test Equipment:								
	Receiving: VULB9163-750, and Chamber 1 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								
	826.40	24.85	V	3.0	-0.9	20.85	38.5	-17.6	
	826.40	13.44	H	3.0	-0.9	9.44	38.5	-29.1	
Mid Ch									
836.60	24.73	V	3.1	-0.9	20.77	38.5	-17.7		
836.60	14.23	H	3.1	-0.9	10.26	38.5	-28.2		
High Ch									
846.60	23.94	V	3.1	-0.9	19.99	38.5	-18.5		
846.60	14.18	H	3.1	-0.9	10.24	38.5	-28.3		

Band 5 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4790047196						
	Date:		8/3/2021						
	Test Engineer:		19568						
	Configuration:		EUT, Z-Position						
	Location:		Chamber 1						
	Mode:		HSDPA Band 5 Fundamentals						
	Test Equipment:								
	Receiving: VULB9163-750, and Chamber 1 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								
	826.40	23.66	V	3.0	-0.9	19.66	38.5	-18.8	
	826.40	12.82	H	3.0	-0.9	8.82	38.5	-29.7	
Mid Ch									
836.60	23.66	V	3.1	-0.9	19.70	38.5	-18.8		
836.60	12.59	H	3.1	-0.9	8.62	38.5	-29.9		
High Ch									
846.60	23.90	V	3.1	-0.9	19.95	38.5	-18.6		
846.60	12.52	H	3.1	-0.9	8.58	38.5	-29.9		

WCDMA Band 4

Band 4 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4790047196						
	Date:		8/3/2021						
	Test Engineer:		19568						
	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	9.82	V	4.4	9.6	15.03	30.0	-15.0	
	1712.40	16.75	H	4.4	9.6	21.96	30.0	-8.0	
	Mid Ch								
	1732.60	11.36	V	4.4	9.6	16.61	30.0	-13.4	
	1732.60	17.32	H	4.4	9.6	22.57	30.0	-7.4	
	High Ch								
	1752.60	12.18	V	4.4	9.7	17.46	30.0	-12.5	
	1752.60	16.70	H	4.4	9.7	21.99	30.0	-8.0	

Band 4 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4790047196						
	Date:		8/3/2021						
	Test Engineer:		19568						
	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	8.74	V	4.4	9.6	13.95	30.0	-16.1	
	1712.40	15.70	H	4.4	9.6	20.91	30.0	-9.1	
	Mid Ch								
	1732.60	10.26	V	4.4	9.6	15.51	30.0	-14.5	
	1732.60	16.26	H	4.4	9.6	21.51	30.0	-8.5	
	High Ch								
	1752.60	11.35	V	4.4	9.7	16.63	30.0	-13.4	
	1752.60	15.92	H	4.4	9.7	21.21	30.0	-8.8	

WCDMA Band 2

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1852.40	12.73	V	4.5	9.6	17.77	33.0	-15.2	
1852.40	17.39	H	4.5	9.6	22.44	33.0	-10.6	
1880.00	12.52	V	4.6	9.4	17.33	33.0	-15.7	
1880.00	17.07	H	4.6	9.4	21.88	33.0	-11.1	
1907.60	11.94	V	4.6	9.2	16.49	33.0	-16.5	
1907.60	17.20	H	4.6	9.2	21.75	33.0	-11.3	

Band 2
REL99

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1852.40	11.79	V	4.5	9.6	16.83	33.0	-16.2	
1852.40	16.00	H	4.5	9.6	21.05	33.0	-12.0	
1880.00	12.47	V	4.6	9.4	17.28	33.0	-15.7	
1880.00	16.15	H	4.6	9.4	20.96	33.0	-12.0	
1907.60	11.73	V	4.6	9.2	16.28	33.0	-16.7	
1907.60	16.28	H	4.6	9.2	20.83	33.0	-12.2	

Band 2
HSDPA

LTE Band 2

LTE Band 2 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/4/2021 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 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								
	1860.00	14.11	V	4.6	9.5	19.09	33.0	-13.9	
	1860.00	17.75	H	4.6	9.5	22.72	33.0	-10.3	
	Mid Ch								
	1880.00	13.73	V	4.6	9.4	18.54	33.0	-14.5	
	1880.00	17.64	H	4.6	9.4	22.45	33.0	-10.6	
High Ch									
1900.00	14.09	V	4.6	9.2	18.73	33.0	-14.3		
1900.00	17.94	H	4.6	9.2	22.59	33.0	-10.4		

LTE Band 2 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/4/2021 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 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								
	1860.00	13.13	V	4.6	9.5	18.11	33.0	-14.9	
	1860.00	16.58	H	4.6	9.5	21.55	33.0	-11.4	
	Mid Ch								
	1880.00	12.79	V	4.6	9.4	17.60	33.0	-15.4	
	1880.00	16.66	H	4.6	9.4	21.47	33.0	-11.5	
High Ch									
1900.00	13.07	V	4.6	9.2	17.71	33.0	-15.3		
1900.00	17.09	H	4.6	9.2	21.74	33.0	-11.3		

LTE Band 2 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 4790047196 Date: 8/4/2021 Test Engineer: 19568 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 15MHz 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>1857.50</td> <td>12.13</td> <td>V</td> <td>4.5</td> <td>9.5</td> <td>17.13</td> <td>33.0</td> <td>-15.9</td> <td></td> </tr> <tr> <td>1857.50</td> <td>17.43</td> <td>H</td> <td>4.5</td> <td>9.5</td> <td>22.43</td> <td>33.0</td> <td>-10.6</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>14.65</td> <td>V</td> <td>4.6</td> <td>9.4</td> <td>19.46</td> <td>33.0</td> <td>-13.5</td> <td></td> </tr> <tr> <td>1880.00</td> <td>17.67</td> <td>H</td> <td>4.6</td> <td>9.4</td> <td>22.48</td> <td>33.0</td> <td>-10.5</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1902.50</td> <td>14.53</td> <td>V</td> <td>4.6</td> <td>9.2</td> <td>19.14</td> <td>33.0</td> <td>-13.9</td> <td></td> </tr> <tr> <td>1902.50</td> <td>17.76</td> <td>H</td> <td>4.6</td> <td>9.2</td> <td>22.38</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									1857.50	12.13	V	4.5	9.5	17.13	33.0	-15.9		1857.50	17.43	H	4.5	9.5	22.43	33.0	-10.6		Mid Ch									1880.00	14.65	V	4.6	9.4	19.46	33.0	-13.5		1880.00	17.67	H	4.6	9.4	22.48	33.0	-10.5		High Ch									1902.50	14.53	V	4.6	9.2	19.14	33.0	-13.9		1902.50	17.76	H	4.6	9.2	22.38	33.0	-10.6
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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1857.50	12.13	V	4.5	9.5	17.13	33.0	-15.9																																																																																			
1857.50	17.43	H	4.5	9.5	22.43	33.0	-10.6																																																																																			
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1880.00	14.65	V	4.6	9.4	19.46	33.0	-13.5																																																																																			
1880.00	17.67	H	4.6	9.4	22.48	33.0	-10.5																																																																																			
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1902.50	14.53	V	4.6	9.2	19.14	33.0	-13.9																																																																																			
1902.50	17.76	H	4.6	9.2	22.38	33.0	-10.6																																																																																			
LTE Band 2 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
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	Low Ch								
	1851.50	12.85	V	4.5	9.6	17.90	33.0	-15.1	
	1851.50	17.88	H	4.5	9.6	22.93	33.0	-10.1	
	Mid Ch								
	1880.00	13.60	V	4.6	9.4	18.41	33.0	-14.6	
	1880.00	17.49	H	4.6	9.4	22.30	33.0	-10.7	
High Ch									
1908.50	15.16	V	4.6	9.1	19.70	33.0	-13.3		
1908.50	16.96	H	4.6	9.1	21.50	33.0	-11.5		
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	Low Ch								
	1851.50	11.76	V	4.5	9.6	16.81	33.0	-16.2	
	1851.50	17.04	H	4.5	9.6	22.09	33.0	-10.9	
	Mid Ch								
	1880.00	12.58	V	4.6	9.4	17.39	33.0	-15.6	
	1880.00	16.42	H	4.6	9.4	21.23	33.0	-11.8	
High Ch									
1908.50	14.25	V	4.6	9.1	18.79	33.0	-14.2		
1908.50	15.85	H	4.6	9.1	20.39	33.0	-12.6		

LTE Band 2 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 4790047196 Date: 8/4/2021 Test Engineer: 19568 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz 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>1850.70</td> <td>12.84</td> <td>V</td> <td>4.5</td> <td>9.6</td> <td>17.90</td> <td>33.0</td> <td>-15.1</td> <td></td> </tr> <tr> <td>1850.70</td> <td>17.94</td> <td>H</td> <td>4.5</td> <td>9.6</td> <td>22.99</td> <td>33.0</td> <td>-10.0</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>13.36</td> <td>V</td> <td>4.6</td> <td>9.4</td> <td>18.17</td> <td>33.0</td> <td>-14.8</td> <td></td> </tr> <tr> <td>1880.00</td> <td>17.56</td> <td>H</td> <td>4.6</td> <td>9.4</td> <td>22.37</td> <td>33.0</td> <td>-10.6</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1909.30</td> <td>15.50</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>20.02</td> <td>33.0</td> <td>-13.0</td> <td></td> </tr> <tr> <td>1909.30</td> <td>16.74</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>21.27</td> <td>33.0</td> <td>-11.7</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									1850.70	12.84	V	4.5	9.6	17.90	33.0	-15.1		1850.70	17.94	H	4.5	9.6	22.99	33.0	-10.0		Mid Ch									1880.00	13.36	V	4.6	9.4	18.17	33.0	-14.8		1880.00	17.56	H	4.6	9.4	22.37	33.0	-10.6		High Ch									1909.30	15.50	V	4.6	9.1	20.02	33.0	-13.0		1909.30	16.74	H	4.6	9.1	21.27	33.0	-11.7
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LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement										
	Company:		Samsung								
	Project #:		4790047196								
	Date:		8/5/2021								
	Test Engineer:		19568								
	Configuration:		EUT, Z-Position								
	Location:		Chamber 1								
	Mode:		LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment:		Receiving: VULB9163-750, and Chamber 1 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	25.07	V	3.1	-0.9	21.09	38.5	-17.4				
829.00	14.84	H	3.1	-0.9	10.86	38.5	-27.6				
Mid Ch											
836.50	24.78	V	3.1	-0.9	20.81	38.5	-17.7				
836.50	14.91	H	3.1	-0.9	10.94	38.5	-27.6				
High Ch											
844.00	24.43	V	3.1	-0.9	20.48	38.5	-18.0				
844.00	14.55	H	3.1	-0.9	10.60	38.5	-27.9				

LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement										
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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	24.15	V	3.1	-0.9	20.17	38.5	-18.3				
829.00	13.62	H	3.1	-0.9	9.64	38.5	-28.9				
Mid Ch											
836.50	23.58	V	3.1	-0.9	19.61	38.5	-18.9				
836.50	14.07	H	3.1	-0.9	10.10	38.5	-28.4				
High Ch											
844.00	23.79	V	3.1	-0.9	19.84	38.5	-18.7				
844.00	13.61	H	3.1	-0.9	9.66	38.5	-28.8				

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
	<p> Company: Samsung Project #: 4790047196 Date: 8/5/2021 Test Engineer: 19568 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz 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 colspan="9">Low Ch</td> </tr> <tr> <td>826.50</td> <td>24.91</td> <td>V</td> <td>3.0</td> <td>-0.9</td> <td>20.92</td> <td>38.5</td> <td>-17.6</td> <td></td> </tr> <tr> <td>826.50</td> <td>14.56</td> <td>H</td> <td>3.0</td> <td>-0.9</td> <td>10.57</td> <td>38.5</td> <td>-27.9</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.50</td> <td>24.88</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>20.91</td> <td>38.5</td> <td>-17.6</td> <td></td> </tr> <tr> <td>836.50</td> <td>14.81</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>10.84</td> <td>38.5</td> <td>-27.7</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>846.50</td> <td>25.32</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>21.38</td> <td>38.5</td> <td>-17.1</td> <td></td> </tr> <tr> <td>846.50</td> <td>14.65</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>10.71</td> <td>38.5</td> <td>-27.8</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									826.50	24.91	V	3.0	-0.9	20.92	38.5	-17.6		826.50	14.56	H	3.0	-0.9	10.57	38.5	-27.9		Mid Ch									836.50	24.88	V	3.1	-0.9	20.91	38.5	-17.6		836.50	14.81	H	3.1	-0.9	10.84	38.5	-27.7		High Ch									846.50	25.32	V	3.1	-0.9	21.38	38.5	-17.1		846.50	14.65	H	3.1	-0.9	10.71	38.5	-27.8
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LTE Band 12

LTE Band 12 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement										
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	Project #:		4790047196								
	Date:		8/5/2021								
	Test Engineer:		20882								
	Configuration:		EUT, X-Position								
	Location:		Chamber 1								
	Mode:		LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth								
	Test Equipment:		Receiving: VULB9163-750, and Chamber 1 SMA Cables								
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Low Ch											
704.00	14.86	V	2.8	-1.1	10.99	34.8	-23.8				
704.00	21.97	H	2.8	-1.1	18.11	34.8	-16.7				
Mid Ch											
707.50	14.85	V	2.8	-1.1	10.98	34.8	-23.8				
707.50	22.03	H	2.8	-1.1	18.16	34.8	-16.6				
High Ch											
711.00	14.72	V	2.8	-1.1	10.84	34.8	-23.9				
711.00	22.08	H	2.8	-1.1	18.20	34.8	-16.6				

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Low Ch											
704.00	13.65	V	2.8	-1.1	9.78	34.8	-25.0				
704.00	21.04	H	2.8	-1.1	17.18	34.8	-17.6				
Mid Ch											
707.50	13.73	V	2.8	-1.1	9.86	34.8	-24.9				
707.50	20.97	H	2.8	-1.1	17.10	34.8	-17.7				
High Ch											
711.00	13.74	V	2.8	-1.1	9.86	34.8	-24.9				
711.00	21.11	H	2.8	-1.1	17.23	34.8	-17.5				

LTE Band 12 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
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LTE Band 13

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LTE Band 26 (Part 22)

LTE Band 26 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
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LTE Band 26 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung								
	Project #: 4790047196								
	Date: 8/5/2021								
	Test Engineer: 20882								
	Configuration: EUT, Z-Position								
	Location: Chamber 1								
	Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Straddle Ch								
	824.00	23.95	V	3.0	-1.0	19.96	38.5	-18.5	
	824.00	13.24	H	3.0	-1.0	9.25	38.5	-29.3	
	Low Ch								
826.50	24.03	V	3.0	-0.9	20.04	38.5	-18.5		
826.50	14.33	H	3.0	-0.9	10.34	38.5	-28.2		
Mid Ch									
831.50	24.23	V	3.1	-0.9	20.25	38.5	-18.3		
831.50	14.38	H	3.1	-0.9	10.40	38.5	-28.1		
High Ch									
846.50	23.43	V	3.1	-0.9	19.49	38.5	-19.0		
846.50	14.03	H	3.1	-0.9	10.09	38.5	-28.4		
LTE Band 26 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
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	Project #: 4790047196								
	Date: 8/5/2021								
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	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Straddle Ch								
	824.00	23.04	V	3.0	-1.0	19.05	38.5	-19.5	
	824.00	12.45	H	3.0	-1.0	8.46	38.5	-30.0	
	Low Ch								
826.50	23.47	V	3.0	-0.9	19.48	38.5	-19.0		
826.50	13.16	H	3.0	-0.9	9.17	38.5	-29.3		
Mid Ch									
831.50	23.20	V	3.1	-0.9	19.22	38.5	-19.3		
831.50	13.50	H	3.1	-0.9	9.52	38.5	-29.0		
High Ch									
846.50	22.33	V	3.1	-0.9	18.39	38.5	-20.1		
846.50	13.05	H	3.1	-0.9	9.11	38.5	-29.4		

LTE Band 26 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																																																											
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LTE Band 26 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																																																											
	<p> Company: Samsung Project #: 4790047196 Date: 8/5/2021 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 26 Fundamentals, 3MHz 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 colspan="9">Straddle Ch</td> </tr> <tr> <td>824.00</td> <td>23.16</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>19.17</td> <td>38.5</td> <td>-19.3</td> <td></td> </tr> <tr> <td>824.00</td> <td>12.55</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>8.56</td> <td>38.5</td> <td>-29.9</td> <td></td> </tr> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>825.50</td> <td>22.92</td> <td>V</td> <td>3.0</td> <td>-0.9</td> <td>18.93</td> <td>38.5</td> <td>-19.6</td> <td></td> </tr> <tr> <td>825.50</td> <td>13.00</td> <td>H</td> <td>3.0</td> <td>-0.9</td> <td>9.01</td> <td>38.5</td> <td>-29.5</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>831.50</td> <td>23.28</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>19.30</td> <td>38.5</td> <td>-19.2</td> <td></td> </tr> <tr> <td>831.50</td> <td>13.52</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>9.54</td> <td>38.5</td> <td>-29.0</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>847.50</td> <td>22.62</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>18.67</td> <td>38.5</td> <td>-19.8</td> <td></td> </tr> <tr> <td>847.50</td> <td>12.92</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>8.98</td> <td>38.5</td> <td>-29.5</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	Straddle Ch									824.00	23.16	V	3.0	-1.0	19.17	38.5	-19.3		824.00	12.55	H	3.0	-1.0	8.56	38.5	-29.9		Low Ch									825.50	22.92	V	3.0	-0.9	18.93	38.5	-19.6		825.50	13.00	H	3.0	-0.9	9.01	38.5	-29.5		Mid Ch									831.50	23.28	V	3.1	-0.9	19.30	38.5	-19.2		831.50	13.52	H	3.1	-0.9	9.54	38.5	-29.0		High Ch									847.50	22.62	V	3.1	-0.9	18.67	38.5	-19.8		847.50	12.92	H	3.1	-0.9	8.98	38.5	-29.5
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LTE Band 26 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung								
	Project #: 4790047196								
	Date: 8/5/2021								
	Test Engineer: 20882								
	Configuration: EUT, Z-Position								
	Location: Chamber 1								
	Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 1 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
	Straddle Ch								
	824.00	23.79	V	3.0	-1.0	19.80	38.5	-18.7	
	824.00	13.38	H	3.0	-1.0	9.39	38.5	-29.1	
Low Ch									
824.70	23.83	V	3.0	-1.0	19.84	38.5	-18.7		
824.70	14.09	H	3.0	-1.0	10.09	38.5	-28.4		
Mid Ch									
831.50	24.17	V	3.1	-0.9	20.19	38.5	-18.3		
831.50	14.37	H	3.1	-0.9	10.39	38.5	-28.1		
High Ch									
848.30	23.58	V	3.1	-0.9	19.64	38.5	-18.9		
848.30	14.06	H	3.1	-0.9	10.12	38.5	-28.4		
LTE Band 26 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung								
	Project #: 4790047196								
	Date: 8/5/2021								
	Test Engineer: 20882								
	Configuration: EUT, Z-Position								
	Location: Chamber 1								
	Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 1 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
	Straddle Ch								
	824.00	22.79	V	3.0	-1.0	18.80	38.5	-19.7	
	824.00	12.35	H	3.0	-1.0	8.36	38.5	-30.1	
Low Ch									
824.70	22.63	V	3.0	-1.0	18.64	38.5	-19.9		
824.70	13.27	H	3.0	-1.0	9.27	38.5	-29.2		
Mid Ch									
831.50	23.12	V	3.1	-0.9	19.14	38.5	-19.4		
831.50	13.35	H	3.1	-0.9	9.37	38.5	-29.1		
High Ch									
848.30	22.49	V	3.1	-0.9	18.55	38.5	-19.9		
848.30	12.72	H	3.1	-0.9	8.78	38.5	-29.7		

LTE Band 41 (PC3)

LTE Band 41 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-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	14.15	V	5.3	10.2	19.02	33.0	-14.0	
	2506.00	16.37	H	5.3	10.2	21.25	33.0	-11.8	
	Mid Ch								
	2593.00	14.23	V	5.4	10.0	18.89	33.0	-14.1	
	2593.00	18.22	H	5.4	10.0	22.87	33.0	-10.1	
High Ch									
2680.00	12.99	V	5.5	10.1	17.56	33.0	-15.4		
2680.00	15.69	H	5.5	10.1	20.26	33.0	-12.7		

LTE Band 41 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-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	13.86	V	5.3	10.2	18.73	33.0	-14.3	
	2506.00	14.81	H	5.3	10.2	19.69	33.0	-13.3	
	Mid Ch								
	2593.00	13.35	V	5.4	10.0	18.01	33.0	-15.0	
	2593.00	17.52	H	5.4	10.0	22.17	33.0	-10.8	
High Ch									
2680.00	12.50	V	5.5	10.1	17.07	33.0	-15.9		
2680.00	14.99	H	5.5	10.1	19.56	33.0	-13.4		

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-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	14.19	V	5.3	10.2	19.08	33.0	-13.9	
	2503.50	16.56	H	5.3	10.2	21.44	33.0	-11.6	
	Mid Ch								
	2593.00	14.17	V	5.4	10.0	18.83	33.0	-14.2	
	2593.00	18.15	H	5.4	10.0	22.80	33.0	-10.2	
High Ch									
2682.50	13.72	V	5.5	10.1	18.28	33.0	-14.7		
2682.50	15.75	H	5.5	10.1	20.32	33.0	-12.7		
LTE Band 41 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-Position 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	14.15	V	5.3	10.2	19.04	33.0	-14.0	
	2503.50	14.91	H	5.3	10.2	19.79	33.0	-13.2	
	Mid Ch								
	2593.00	13.77	V	5.4	10.0	18.43	33.0	-14.6	
	2593.00	17.78	H	5.4	10.0	22.43	33.0	-10.6	
High Ch									
2682.50	13.52	V	5.5	10.1	18.08	33.0	-14.9		
2682.50	15.56	H	5.5	10.1	20.13	33.0	-12.9		

LTE Band 41 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-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	14.10	V	5.3	10.2	18.99	33.0	-14.0	
	2501.00	16.19	H	5.3	10.2	21.07	33.0	-11.9	
	Mid Ch								
	2593.00	13.66	V	5.4	10.0	18.32	33.0	-14.7	
	2593.00	18.25	H	5.4	10.0	22.90	33.0	-10.1	
High Ch									
2685.00	13.70	V	5.5	10.1	18.26	33.0	-14.7		
2685.00	15.78	H	5.5	10.1	20.34	33.0	-12.7		
LTE Band 41 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-Position 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	13.99	V	5.3	10.2	18.88	33.0	-14.1	
	2501.00	16.14	H	5.3	10.2	21.02	33.0	-12.0	
	Mid Ch								
	2593.00	13.51	V	5.4	10.0	18.17	33.0	-14.8	
	2593.00	18.06	H	5.4	10.0	22.71	33.0	-10.3	
High Ch									
2685.00	13.25	V	5.5	10.1	17.81	33.0	-15.2		
2685.00	15.13	H	5.5	10.1	19.69	33.0	-13.3		

LTE Band 41 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 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								
	2498.50	14.06	V	5.3	10.2	18.96	33.0	-14.0	
	2498.50	16.56	H	5.3	10.2	21.46	33.0	-11.5	
	Mid Ch								
	2593.00	13.70	V	5.4	10.0	18.36	33.0	-14.6	
	2593.00	18.14	H	5.4	10.0	22.79	33.0	-10.2	
High Ch									
2687.50	14.19	V	5.5	10.1	18.75	33.0	-14.2		
2687.50	15.62	H	5.5	10.1	20.18	33.0	-12.8		
LTE Band 41 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4790047196 Date: 8/9/2021 Test Engineer: 19568 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 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								
	2498.50	14.29	V	5.3	10.2	19.19	33.0	-13.8	
	2498.50	15.06	H	5.3	10.2	19.96	33.0	-13.0	
	Mid Ch								
	2593.00	17.46	V	5.4	10.0	22.12	33.0	-10.9	
	2593.00	18.00	H	5.4	10.0	22.65	33.0	-10.3	
High Ch									
2687.50	13.92	V	5.5	10.1	18.48	33.0	-14.5		
2687.50	15.38	H	5.5	10.1	19.94	33.0	-13.1		

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 #: 4790047196 Date: 8/4/2021 Test Engineer: 20882 Configuration: EUT, Y-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>16.88</td> <td>V</td> <td>4.4</td> <td>9.6</td> <td>22.11</td> <td>30.0</td> <td>-7.9</td> <td></td> </tr> <tr> <td>1720.00</td> <td>10.29</td> <td>H</td> <td>4.4</td> <td>9.6</td> <td>15.51</td> <td>30.0</td> <td>-14.5</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1745.00</td> <td>17.06</td> <td>V</td> <td>4.4</td> <td>9.7</td> <td>22.33</td> <td>30.0</td> <td>-7.7</td> <td></td> </tr> <tr> <td>1745.00</td> <td>10.18</td> <td>H</td> <td>4.4</td> <td>9.7</td> <td>15.45</td> <td>30.0</td> <td>-14.5</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1770.00</td> <td>17.73</td> <td>V</td> <td>4.4</td> <td>9.7</td> <td>23.00</td> <td>30.0</td> <td>-7.0</td> <td></td> </tr> <tr> <td>1770.00</td> <td>8.23</td> <td>H</td> <td>4.4</td> <td>9.7</td> <td>13.50</td> <td>30.0</td> <td>-16.5</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	16.88	V	4.4	9.6	22.11	30.0	-7.9		1720.00	10.29	H	4.4	9.6	15.51	30.0	-14.5		Mid Ch									1745.00	17.06	V	4.4	9.7	22.33	30.0	-7.7		1745.00	10.18	H	4.4	9.7	15.45	30.0	-14.5		High Ch									1770.00	17.73	V	4.4	9.7	23.00	30.0	-7.0		1770.00	8.23	H	4.4	9.7	13.50	30.0	-16.5	
	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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1745.00	17.06	V	4.4	9.7	22.33	30.0	-7.7																																																																																				
1745.00	10.18	H	4.4	9.7	15.45	30.0	-14.5																																																																																				
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1770.00	17.73	V	4.4	9.7	23.00	30.0	-7.0																																																																																				
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	Low Ch								
	1715.00	16.66	V	4.4	9.6	21.88	30.0	-8.1	
	1715.00	10.36	H	4.4	9.6	15.58	30.0	-14.4	
	Mid Ch								
	1745.00	17.05	V	4.4	9.7	22.32	30.0	-7.7	
	1745.00	10.10	H	4.4	9.7	15.37	30.0	-14.6	
High Ch									
1775.00	17.38	V	4.4	9.7	22.65	30.0	-7.4		
1775.00	10.63	H	4.4	9.7	15.89	30.0	-14.1		
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	Low Ch								
	1715.00	15.50	V	4.4	9.6	20.72	30.0	-9.3	
	1715.00	9.58	H	4.4	9.6	14.80	30.0	-15.2	
	Mid Ch								
	1745.00	15.89	V	4.4	9.7	21.16	30.0	-8.8	
	1745.00	9.42	H	4.4	9.7	14.69	30.0	-15.3	
High Ch									
1775.00	16.14	V	4.4	9.7	21.41	30.0	-8.6		
1775.00	9.52	H	4.4	9.7	14.78	30.0	-15.2		

LTE Band 66 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																									
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9.6. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691

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.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

(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.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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.

9.6.1. SPURIOUS RADIATION PLOTS

GSM850

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4790047196 Date: 8/3/2021 Test Engineer: 20882 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 1 Mode: GPRS 850 MHz Harmonics Test Voltage: AC 120 V, 60 Hz								
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	-10.7	V	3.0	45.3	1.0	-55.0	-13.0	-42.0		
2472.60	-4.2	V	3.0	45.1	1.0	-48.3	-13.0	-35.3		
3296.80	-8.4	V	3.0	45.3	1.0	-52.7	-13.0	-39.7		
Mid Ch, 836.6MHz										
1673.20	-10.5	V	3.0	45.3	1.0	-54.8	-13.0	-41.8		
2509.80	1.9	V	3.0	45.1	1.0	-42.2	-13.0	-29.2		
3346.40	-8.5	V	3.0	45.3	1.0	-52.8	-13.0	-39.8		
1673.20	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
2509.80	0.7	H	3.0	45.1	1.0	-43.4	-13.0	-30.4		
3346.40	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5		
High Ch, 848.8MHz										
1697.60	-1.0	V	3.0	45.2	1.0	-45.3	-13.0	-32.3		
2546.40	-9.0	V	3.0	45.1	1.0	-53.1	-13.0	-40.1		
3395.20	-8.1	V	3.0	45.3	1.0	-52.5	-13.0	-39.5		
1697.60	-0.8	H	3.0	45.2	1.0	-45.0	-13.0	-32.0		
2546.40	-10.2	H	3.0	45.1	1.0	-54.4	-13.0	-41.4		
3395.20	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		

GSM850
GPRS

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		Company: Samsung Project #: 4790047196 Date: 8/3/2021 Test Engineer: 20882 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 1 Mode: EGPRS 850 MHz Harmonics Test Voltage: AC 120 V, 60 Hz								
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1648.40	-4.1	V	3.0	45.3	1.0	-48.3	-13.0	-35.3		
2472.60	-9.8	V	3.0	45.1	1.0	-53.9	-13.0	-40.9		
3296.80	-8.6	V	3.0	45.3	1.0	-52.9	-13.0	-39.9		
1648.40	-6.9	H	3.0	45.3	1.0	-51.2	-13.0	-38.2		
2472.60	-6.8	H	3.0	45.1	1.0	-50.9	-13.0	-37.9		
3296.80	-8.3	H	3.0	45.3	1.0	-52.6	-13.0	-39.6		
Mid Ch, 836.6MHz										
1673.20	-9.9	V	3.0	45.3	1.0	-54.1	-13.0	-41.1		
2509.80	-9.0	V	3.0	45.1	1.0	-53.1	-13.0	-40.1		
3346.40	-8.4	V	3.0	45.3	1.0	-52.8	-13.0	-39.8		
1673.20	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
2509.80	-10.2	H	3.0	45.1	1.0	-54.3	-13.0	-41.3		
3346.40	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5		
High Ch, 848.8MHz										
1697.60	-5.1	V	3.0	45.2	1.0	-49.3	-13.0	-36.3		
2546.40	-9.8	V	3.0	45.1	1.0	-53.9	-13.0	-40.9		
3395.20	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6		
1697.60	-4.7	H	3.0	45.2	1.0	-48.9	-13.0	-35.9		
2546.40	-10.6	H	3.0	45.1	1.0	-54.7	-13.0	-41.7		
3395.20	-8.0	H	3.0	45.3	1.0	-52.3	-13.0	-39.3		

GSM850
EGPRS

GSM1900

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		20882							
Configuration:		EUT/ AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		GPRS 1900 MHz Harmonics							
Test Voltage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-10.5	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
5550.60	5.4	V	3.0	45.4	1.0	-39.0	-13.0	-26.0	
7400.80	-5.3	V	3.0	44.2	1.0	-48.5	-13.0	-35.5	
9251.00	-0.9	V	3.0	43.0	1.0	-42.8	-13.0	-29.8	
11101.20	0.7	V	3.0	42.6	1.0	-40.9	-13.0	-27.9	
3700.40	-10.3	H	3.0	45.5	1.0	-54.7	-13.0	-41.7	
5550.60	4.0	H	3.0	45.4	1.0	-40.4	-13.0	-27.4	
7400.80	-5.2	H	3.0	44.2	1.0	-48.4	-13.0	-35.4	
9251.00	-1.5	H	3.0	43.0	1.0	-43.5	-13.0	-30.5	
11101.20	0.8	H	3.0	42.6	1.0	-40.8	-13.0	-27.8	
Mid Ch, 1880MHz									
3760.00	-10.3	V	3.0	45.5	1.0	-54.8	-13.0	-41.8	
5640.00	7.1	V	3.0	45.4	1.0	-37.3	-13.0	-24.3	
7520.00	-5.5	V	3.0	44.1	1.0	-48.6	-13.0	-35.6	
9400.00	0.6	V	3.0	42.8	1.0	-41.2	-13.0	-28.2	
11280.00	0.7	V	3.0	42.6	1.0	-41.0	-13.0	-28.0	
3760.00	-10.3	H	3.0	45.5	1.0	-54.8	-13.0	-41.8	
5640.00	9.8	H	3.0	45.4	1.0	-34.6	-13.0	-21.6	
7520.00	-5.4	H	3.0	44.1	1.0	-48.6	-13.0	-35.6	
9400.00	0.2	H	3.0	42.8	1.0	-41.6	-13.0	-28.6	
11280.00	0.6	H	3.0	42.6	1.0	-41.1	-13.0	-28.1	
High Ch, 1909.8MHz									
3819.60	-10.5	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
5729.40	3.9	V	3.0	45.4	1.0	-40.4	-13.0	-27.4	
7639.20	-4.9	V	3.0	44.1	1.0	-48.0	-13.0	-35.0	
9549.00	-2.0	V	3.0	42.7	1.0	-43.7	-13.0	-30.7	
11458.80	0.6	V	3.0	42.7	1.0	-41.1	-13.0	-28.1	
3819.60	-10.1	H	3.0	45.5	1.0	-54.6	-13.0	-41.6	
5729.40	5.4	H	3.0	45.4	1.0	-38.9	-13.0	-25.9	
7639.20	-4.7	H	3.0	44.1	1.0	-47.8	-13.0	-34.8	
9549.00	-1.3	H	3.0	42.7	1.0	-43.0	-13.0	-30.0	
11458.80	0.7	H	3.0	42.7	1.0	-41.0	-13.0	-28.0	

GSM1900
GPRS

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		EGPRS 1900 MHz Harmonics							
Test Voltage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-10.6	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
5550.60	-2.7	V	3.0	45.4	1.0	-47.1	-13.0	-34.1	
7400.80	-5.2	V	3.0	44.2	1.0	-48.4	-13.0	-35.4	
9251.00	-3.0	V	3.0	43.0	1.0	-44.9	-13.0	-31.9	
11101.20	0.8	V	3.0	42.6	1.0	-40.8	-13.0	-27.8	
3700.40	-10.2	H	3.0	45.5	1.0	-54.7	-13.0	-41.7	
5550.60	-4.9	H	3.0	45.4	1.0	-49.3	-13.0	-36.3	
7400.80	-5.0	H	3.0	44.2	1.0	-48.2	-13.0	-35.2	
9251.00	-3.3	H	3.0	43.0	1.0	-45.3	-13.0	-32.3	
11101.20	0.8	H	3.0	42.6	1.0	-40.8	-13.0	-27.8	
Mid Ch, 1880MHz									
3760.00	-10.4	V	3.0	45.5	1.0	-54.8	-13.0	-41.8	
5640.00	0.9	V	3.0	45.4	1.0	-43.5	-13.0	-30.5	
7520.00	-5.3	V	3.0	44.1	1.0	-48.4	-13.0	-35.4	
9400.00	-1.9	V	3.0	42.8	1.0	-43.7	-13.0	-30.7	
11280.00	0.4	V	3.0	42.6	1.0	-41.2	-13.0	-28.2	
3760.00	-10.2	H	3.0	45.5	1.0	-54.7	-13.0	-41.7	
5640.00	-0.2	H	3.0	45.4	1.0	-44.6	-13.0	-31.6	
7520.00	-5.3	H	3.0	44.1	1.0	-48.4	-13.0	-35.4	
9400.00	-2.2	H	3.0	42.8	1.0	-44.0	-13.0	-31.0	
11280.00	0.5	H	3.0	42.6	1.0	-41.2	-13.0	-28.2	
High Ch, 1909.8MHz									
3819.60	-10.3	V	3.0	45.5	1.0	-54.8	-13.0	-41.8	
5729.40	-7.2	V	3.0	45.4	1.0	-51.6	-13.0	-38.6	
7639.20	-5.2	V	3.0	44.1	1.0	-48.3	-13.0	-35.3	
9549.00	-2.6	V	3.0	42.7	1.0	-44.3	-13.0	-31.3	
11458.80	0.6	V	3.0	42.7	1.0	-41.1	-13.0	-28.1	
3819.60	-10.3	H	3.0	45.5	1.0	-54.8	-13.0	-41.8	
5729.40	-5.5	H	3.0	45.4	1.0	-49.9	-13.0	-36.9	
7639.20	-5.0	H	3.0	44.1	1.0	-48.1	-13.0	-35.1	
9549.00	-2.7	H	3.0	42.7	1.0	-44.4	-13.0	-31.4	
11458.80	0.5	H	3.0	42.7	1.0	-41.2	-13.0	-28.2	

GSM1900
EGPRS

WCDMA Band 5

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Band 5 REL99		Company:		Samsung							
		Project #:		4790047196							
		Date:		8/3/2021							
		Test Engineer:		19568							
		Configuration:		EUT / AC Adapter, Z-Position							
		Location:		Chamber 1							
		Mode:		Rel99 Band 5 Harmonics							
		Test Voltage:		AC 120 V, 60 Hz							
		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	-13.6	V	3.0	45.3	1.0	-57.8	-13.0	-44.8			
2479.20	-9.7	V	3.0	45.1	1.0	-53.8	-13.0	-40.8			
3305.60	-9.4	V	3.0	45.3	1.0	-53.7	-13.0	-40.7			
1652.80	-15.4	H	3.0	45.3	1.0	-59.6	-13.0	-46.6			
2479.20	-9.9	H	3.0	45.1	1.0	-54.0	-13.0	-41.0			
3305.60	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3			
Mid Ch, 836.6MHz											
1673.20	-13.2	V	3.0	45.3	1.0	-57.5	-13.0	-44.5			
2509.80	-9.3	V	3.0	45.1	1.0	-53.4	-13.0	-40.4			
3346.40	-9.0	V	3.0	45.3	1.0	-53.3	-13.0	-40.3			
1673.20	-15.2	H	3.0	45.3	1.0	-59.4	-13.0	-46.4			
2509.80	-10.3	H	3.0	45.1	1.0	-54.4	-13.0	-41.4			
3346.40	-8.9	H	3.0	45.3	1.0	-53.2	-13.0	-40.2			
High Ch, 846.6MHz											
1693.20	-13.5	V	3.0	45.2	1.0	-57.7	-13.0	-44.7			
2539.80	-7.0	V	3.0	45.1	1.0	-51.1	-13.0	-38.1			
3386.40	-8.7	V	3.0	45.3	1.0	-53.1	-13.0	-40.1			
1693.20	-14.9	H	3.0	45.2	1.0	-59.1	-13.0	-46.1			
2539.80	-6.6	H	3.0	45.1	1.0	-50.8	-13.0	-37.8			
3386.40	-8.9	H	3.0	45.3	1.0	-53.2	-13.0	-40.2			
Band 5 HSDPA		Company:		Samsung							
		Project #:		4790047196							
		Date:		8/3/2021							
		Test Engineer:		19568							
		Configuration:		EUT / AC Adapter, Z-Position							
		Location:		Chamber 1							
		Mode:		HSDPA Band 5 Harmonics							
		Test Voltage:		AC 120 V, 60 Hz							
		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	-13.7	V	3.0	45.3	1.0	-57.9	-13.0	-44.9			
2479.20	-10.9	V	3.0	45.1	1.0	-55.0	-13.0	-42.0			
3305.60	-9.4	V	3.0	45.3	1.0	-53.8	-13.0	-40.8			
1652.80	-15.3	H	3.0	45.3	1.0	-59.6	-13.0	-46.6			
2479.20	-11.6	H	3.0	45.1	1.0	-55.7	-13.0	-42.7			
3305.60	-9.3	H	3.0	45.3	1.0	-53.6	-13.0	-40.6			
Mid Ch, 836.6MHz											
1673.20	-13.5	V	3.0	45.3	1.0	-57.7	-13.0	-44.7			
2509.80	-10.8	V	3.0	45.1	1.0	-54.9	-13.0	-41.9			
3346.40	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5			
1673.20	-15.1	H	3.0	45.3	1.0	-59.3	-13.0	-46.3			
2509.80	-11.6	H	3.0	45.1	1.0	-55.7	-13.0	-42.7			
3346.40	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3			
High Ch, 846.6MHz											
1693.20	-13.4	V	3.0	45.2	1.0	-57.6	-13.0	-44.6			
2539.80	-10.9	V	3.0	45.1	1.0	-55.0	-13.0	-42.0			
3386.40	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4			
1693.20	-14.9	H	3.0	45.2	1.0	-59.2	-13.0	-46.2			
2539.80	-11.5	H	3.0	45.1	1.0	-55.6	-13.0	-42.6			
3386.40	-8.7	H	3.0	45.3	1.0	-53.0	-13.0	-40.0			

WCDMA Band 4

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		19568							
Configuration:		EUT / AC Adpater, X-Position							
Location:		Chamber 1							
Mode:		Rel99 Band 4 Harmonics							
Test Votage:		AC 120 V, 60 Hz							
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	-8.6	V	3.0	45.4	1.0	-53.0	-13.0	-40.0	
5137.20	-9.8	V	3.0	45.5	1.0	-54.2	-13.0	-41.2	
6849.60	-6.8	V	3.0	44.5	1.0	-50.3	-13.0	-37.3	
3424.80	-8.4	H	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5137.20	-9.4	H	3.0	45.5	1.0	-53.9	-13.0	-40.9	
6849.60	-6.6	H	3.0	44.5	1.0	-50.1	-13.0	-37.1	
Mid Ch, 1732.6MHz									
3465.20	-8.4	V	3.0	45.4	1.0	-52.8	-13.0	-39.8	
5197.80	-9.4	V	3.0	45.4	1.0	-53.8	-13.0	-40.8	
6930.40	-6.7	V	3.0	44.5	1.0	-50.1	-13.0	-37.1	
3465.20	-8.2	H	3.0	45.4	1.0	-52.6	-13.0	-39.6	
5197.80	-9.0	H	3.0	45.4	1.0	-53.5	-13.0	-40.5	
6930.40	-6.4	H	3.0	44.5	1.0	-49.8	-13.0	-36.8	
High Ch, 1752.6MHz									
3505.20	-8.3	V	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5257.80	-9.4	V	3.0	45.4	1.0	-53.9	-13.0	-40.9	
7010.40	-6.2	V	3.0	44.4	1.0	-49.6	-13.0	-36.6	
3505.20	-8.1	H	3.0	45.4	1.0	-52.5	-13.0	-39.5	
5257.80	-9.1	H	3.0	45.4	1.0	-53.5	-13.0	-40.5	
7010.40	-6.0	H	3.0	44.4	1.0	-49.4	-13.0	-36.4	

Band 4
REL99

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		19568							
Configuration:		EUT / AC Adpater, X-Position							
Location:		Chamber 1							
Mode:		HSDPA Band 4 Harmonics							
Test Votage:		AC 120 V, 60 Hz							
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	-8.6	V	3.0	45.4	1.0	-53.0	-13.0	-40.0	
5137.20	-9.7	V	3.0	45.5	1.0	-54.2	-13.0	-41.2	
6849.60	-6.8	V	3.0	44.5	1.0	-50.3	-13.0	-37.3	
3424.80	-8.4	H	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5137.20	-9.4	H	3.0	45.5	1.0	-53.9	-13.0	-40.9	
6849.60	-6.6	H	3.0	44.5	1.0	-50.2	-13.0	-37.2	
Mid Ch, 1732.6MHz									
3465.20	-8.4	V	3.0	45.4	1.0	-52.8	-13.0	-39.8	
5197.80	-9.5	V	3.0	45.4	1.0	-53.9	-13.0	-40.9	
6930.40	-6.8	V	3.0	44.5	1.0	-50.3	-13.0	-37.3	
3465.20	-8.3	H	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5197.80	-9.1	H	3.0	45.4	1.0	-53.5	-13.0	-40.5	
6930.40	-6.5	H	3.0	44.5	1.0	-49.9	-13.0	-36.9	
High Ch, 1752.6MHz									
3505.20	-8.4	V	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5257.80	-9.5	V	3.0	45.4	1.0	-53.9	-13.0	-40.9	
7010.40	-6.3	V	3.0	44.4	1.0	-49.7	-13.0	-36.7	
3505.20	-8.1	H	3.0	45.4	1.0	-52.5	-13.0	-39.5	
5257.80	-9.1	H	3.0	45.4	1.0	-53.5	-13.0	-40.5	
7010.40	-5.9	H	3.0	44.4	1.0	-49.3	-13.0	-36.3	

Band 4
HSDPA

WCDMA Band 2

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		19568							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		Rel99 Band 2 Harmonics							
Test Votage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5557.20	-9.2	V	3.0	45.4	1.0	-53.6	-13.0	-40.6	
7409.60	-6.4	V	3.0	44.2	1.0	-49.6	-13.0	-36.6	
3704.80	-11.2	H	3.0	45.5	1.0	-55.6	-13.0	-42.6	
5557.20	-8.9	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7409.60	-6.2	H	3.0	44.2	1.0	-49.4	-13.0	-36.4	
Mid Ch, 1880MHz									
3760.00	-11.2	V	3.0	45.5	1.0	-55.7	-13.0	-42.7	
5640.00	-8.9	V	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7520.00	-6.4	V	3.0	44.1	1.0	-49.6	-13.0	-36.6	
3760.00	-11.1	H	3.0	45.5	1.0	-55.6	-13.0	-42.6	
5640.00	-8.8	H	3.0	45.4	1.0	-53.1	-13.0	-40.1	
7520.00	-6.3	H	3.0	44.1	1.0	-49.4	-13.0	-36.4	
High Ch, 1907.6MHz									
3815.20	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5722.80	-9.0	V	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7630.40	-6.1	V	3.0	44.1	1.0	-49.2	-13.0	-36.2	
3815.20	-11.0	H	3.0	45.5	1.0	-55.5	-13.0	-42.5	
5722.80	-8.9	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7630.40	-5.8	H	3.0	44.1	1.0	-48.9	-13.0	-35.9	

Band 2
REL99

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/3/2021							
Test Engineer:		19568							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		HSDPA Band 2 Harmonics							
Test Votage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-11.6	V	3.0	45.5	1.0	-56.0	-13.0	-43.0	
5557.20	-9.3	V	3.0	45.4	1.0	-53.7	-13.0	-40.7	
7409.60	-6.4	V	3.0	44.2	1.0	-49.6	-13.0	-36.6	
3704.80	-11.3	H	3.0	45.5	1.0	-55.7	-13.0	-42.7	
5557.20	-8.9	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7409.60	-5.9	H	3.0	44.2	1.0	-49.1	-13.0	-36.1	
Mid Ch, 1880MHz									
3760.00	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5640.00	-9.1	V	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7520.00	-6.5	V	3.0	44.1	1.0	-49.7	-13.0	-36.7	
3760.00	-11.1	H	3.0	45.5	1.0	-55.6	-13.0	-42.6	
5640.00	-8.9	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7520.00	-6.4	H	3.0	44.1	1.0	-49.5	-13.0	-36.5	
High Ch, 1907.6MHz									
3815.20	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5722.80	-9.0	V	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7630.40	-6.2	V	3.0	44.1	1.0	-49.3	-13.0	-36.3	
3815.20	-11.1	H	3.0	45.5	1.0	-55.6	-13.0	-42.6	
5722.80	-9.0	H	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7630.40	-6.1	H	3.0	44.1	1.0	-49.2	-13.0	-36.2	

Band 2
HSDPA

LTE Band 2

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/4/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
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	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5557.50	-8.9	V	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7410.00	-6.2	V	3.0	44.2	1.0	-49.4	-13.0	-36.4	
5MHz									
3705.00	-11.2	H	3.0	45.5	1.0	-55.7	-13.0	-42.7	
5557.50	-8.9	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
7410.00	-6.1	H	3.0	44.2	1.0	-49.3	-13.0	-36.3	
QPSK									
Mid Ch, 1880MHz									
3760.00	-11.2	V	3.0	45.5	1.0	-55.7	-13.0	-42.7	
5640.00	-8.5	V	3.0	45.4	1.0	-52.9	-13.0	-39.9	
7520.00	-6.2	V	3.0	44.1	1.0	-49.3	-13.0	-36.3	
3760.00	-11.0	H	3.0	45.5	1.0	-55.5	-13.0	-42.5	
5640.00	-7.8	H	3.0	45.4	1.0	-52.1	-13.0	-39.1	
7520.00	-6.2	H	3.0	44.1	1.0	-49.3	-13.0	-36.3	
High Ch, 1907.5MHz									
3815.00	-11.4	V	3.0	45.5	1.0	-55.9	-13.0	-42.9	
5722.50	-9.0	V	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7630.00	-6.1	V	3.0	44.1	1.0	-49.2	-13.0	-36.2	
3815.00	-11.0	H	3.0	45.5	1.0	-55.5	-13.0	-42.5	
5722.50	-9.0	H	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7630.00	-6.0	H	3.0	44.1	1.0	-49.1	-13.0	-36.1	

LTE Band 5

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/6/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 5 Harmonics, 5MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5MHz									
1653.00	-13.5	V	3.0	45.3	1.0	-57.8	-13.0	-44.8	
2479.50	-10.5	V	3.0	45.1	1.0	-54.6	-13.0	-41.6	
3306.00	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
5MHz									
1653.00	-14.9	H	3.0	45.3	1.0	-59.1	-13.0	-46.1	
2479.50	-11.4	H	3.0	45.1	1.0	-55.5	-13.0	-42.5	
3306.00	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3	
QPSK									
Mid Ch, 836.5MHz									
1673.00	-13.3	V	3.0	45.3	1.0	-57.5	-13.0	-44.5	
2509.50	-10.5	V	3.0	45.1	1.0	-54.6	-13.0	-41.6	
3346.00	-8.7	V	3.0	45.3	1.0	-53.1	-13.0	-40.1	
1673.00	-14.8	H	3.0	45.3	1.0	-59.0	-13.0	-46.0	
2509.50	-11.0	H	3.0	45.1	1.0	-55.1	-13.0	-42.1	
3346.00	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3	
High Ch, 846.5MHz									
1693.00	-13.1	V	3.0	45.2	1.0	-57.4	-13.0	-44.4	
2539.50	-10.6	V	3.0	45.1	1.0	-54.7	-13.0	-41.7	
3386.00	-8.9	V	3.0	45.3	1.0	-53.2	-13.0	-40.2	
1693.00	-14.8	H	3.0	45.2	1.0	-59.1	-13.0	-46.1	
2539.50	-11.3	H	3.0	45.1	1.0	-55.4	-13.0	-42.4	
3386.00	-8.9	H	3.0	45.3	1.0	-53.2	-13.0	-40.2	

LTE Band 12

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/6/2021							
Test Engineer:		19568							
Configuration:		EUT, Y-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
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	-15.1	V	3.0	45.5	1.0	-59.6	-13.0	-46.6	
2101.50	-2.7	V	3.0	45.0	1.0	-46.7	-13.0	-33.7	
2802.00	-9.8	V	3.0	45.2	1.0	-54.0	-13.0	-41.0	
1401.00	-16.5	H	3.0	45.5	1.0	-60.9	-13.0	-47.9	
2101.50	-9.2	H	3.0	45.0	1.0	-53.3	-13.0	-40.3	
2802.00	-10.0	H	3.0	45.2	1.0	-54.2	-13.0	-41.2	
Mid Ch, 707.5MHz									
1415.00	-13.8	V	3.0	45.5	1.0	-58.2	-13.0	-45.2	
2122.50	-3.3	V	3.0	45.0	1.0	-47.3	-13.0	-34.3	
2830.00	-10.0	V	3.0	45.2	1.0	-54.1	-13.0	-41.1	
1415.00	-16.6	H	3.0	45.5	1.0	-61.0	-13.0	-48.0	
2122.50	-8.7	H	3.0	45.0	1.0	-52.7	-13.0	-39.7	
2830.00	-9.9	H	3.0	45.2	1.0	-54.1	-13.0	-41.1	
High Ch, 714.5MHz									
1429.00	-14.8	V	3.0	45.4	1.0	-59.2	-13.0	-46.2	
2143.50	-3.4	V	3.0	45.0	1.0	-47.5	-13.0	-34.5	
2858.00	-10.0	V	3.0	45.2	1.0	-54.1	-13.0	-41.1	
1429.00	-16.3	H	3.0	45.4	1.0	-60.7	-13.0	-47.7	
2143.50	-6.7	H	3.0	45.0	1.0	-50.7	-13.0	-37.7	
2858.00	-11.0	H	3.0	45.2	1.0	-55.2	-13.0	-42.2	

LTE
 Band 12
 3MHz
 QPSK

LTE Band 13

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/6/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 779.5MHz									
1559.00	-20.7	V	3.0	45.3	1.0	-65.1	-40.0	-25.1	
2338.50	-10.3	V	3.0	45.1	1.0	-54.3	-13.0	-41.3	
3118.00	-9.1	V	3.0	45.3	1.0	-53.3	-13.0	-40.3	
1559.00	-19.5	H	3.0	45.3	1.0	-63.9	-40.0	-23.9	
2338.50	-11.3	H	3.0	45.1	1.0	-55.4	-13.0	-42.4	
3118.00	-9.6	H	3.0	45.3	1.0	-53.8	-13.0	-40.8	
Mid Ch, 782MHz									
1564.00	-18.8	V	3.0	45.3	1.0	-63.1	-40.0	-23.1	
2346.00	-10.0	V	3.0	45.1	1.0	-54.0	-13.0	-41.0	
3128.00	-9.4	V	3.0	45.3	1.0	-53.7	-13.0	-40.7	
1564.00	-19.7	H	3.0	45.3	1.0	-64.1	-40.0	-24.1	
2346.00	-9.7	H	3.0	45.1	1.0	-53.7	-13.0	-40.7	
3128.00	-9.4	H	3.0	45.3	1.0	-53.6	-13.0	-40.6	
High Ch, 784.5MHz									
1569.00	-20.4	V	3.0	45.3	1.0	-64.7	-40.0	-24.7	
2353.50	-10.3	V	3.0	45.1	1.0	-54.4	-13.0	-41.4	
3138.00	-9.5	V	3.0	45.3	1.0	-53.7	-13.0	-40.7	
1569.00	-19.6	H	3.0	45.3	1.0	-63.9	-40.0	-23.9	
2353.50	-11.6	H	3.0	45.1	1.0	-55.7	-13.0	-42.7	
3138.00	-9.5	H	3.0	45.3	1.0	-53.7	-13.0	-40.7	

Note : No narrowband emissions so only applied the -70dBW/MHz (-40dBm/MHz) wideband emission limit for the 1559-1610 MHz band

LTE Band 26 (Part 90)

LTE Band 26 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4790047196 Date: 8/6/2021 Test Engineer: 20882 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Votage: AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 821.5MHz									
	1653.00	-13.5	V	3.0	45.3	1.0	-57.8	-13.0	-44.8	
	2479.50	-10.6	V	3.0	45.1	1.0	-54.7	-13.0	-41.7	
	3306.00	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
	1653.00	-15.2	H	3.0	45.3	1.0	-59.4	-13.0	-46.4	
	2479.50	-11.1	H	3.0	45.1	1.0	-55.2	-13.0	-42.2	
	3306.00	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4	

LTE Band 26 (Straddle)

LTE Band 26 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4790047196 Date: 8/6/2021 Test Engineer: 20882 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Votage: AC 120 V, 60 Hz									
	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 MHz									
	1648.00	-13.2	V	3.0	45.3	1.0	-57.5	-13.0	-44.5	
	2472.00	-10.4	V	3.0	45.1	1.0	-54.5	-13.0	-41.5	
	3296.00	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
	1648.00	-14.6	H	3.0	45.3	1.0	-58.9	-13.0	-45.9	
	2472.00	-10.8	H	3.0	45.1	1.0	-54.9	-13.0	-41.9	
	3296.00	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3	

LTE Band 26 (Part 22)

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/6/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 26 Harmonics, 5MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5									
1653.00	-13.2	V	3.0	45.3	1.0	-57.5	-13.0	-44.5	
2479.50	-10.6	V	3.0	45.1	1.0	-54.6	-13.0	-41.6	
3306.00	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
5MHz									
1653.00	-13.3	H	3.0	45.3	1.0	-57.6	-13.0	-44.6	
2479.50	-11.1	H	3.0	45.1	1.0	-55.2	-13.0	-42.2	
3306.00	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4	
QPSK									
Mid Ch, 831.5MHz									
1663.00	-11.7	V	3.0	45.3	1.0	-56.0	-13.0	-43.0	
2494.50	-7.3	V	3.0	45.1	1.0	-51.4	-13.0	-38.4	
3326.00	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
1663.00	-13.2	H	3.0	45.3	1.0	-57.5	-13.0	-44.5	
2494.50	-8.9	H	3.0	45.1	1.0	-53.0	-13.0	-40.0	
3326.00	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4	
High Ch, 846.5MHz									
1693.00	-12.9	V	3.0	45.2	1.0	-57.1	-13.0	-44.1	
2539.50	-10.3	V	3.0	45.1	1.0	-54.4	-13.0	-41.4	
3386.00	-9.0	V	3.0	45.3	1.0	-53.3	-13.0	-40.3	
1693.00	-13.5	H	3.0	45.2	1.0	-57.8	-13.0	-44.8	
2539.50	-11.3	H	3.0	45.1	1.0	-55.4	-13.0	-42.4	
3386.00	-8.9	H	3.0	45.3	1.0	-53.2	-13.0	-40.2	

LTE
 Band 26
 5MHz
 QPSK

LTE Band 41 (PC3)

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/9/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
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	-19.3	V	3.0	45.5	1.0	-63.8	-25.0	-38.8	
7503.00	-17.4	V	3.0	44.1	1.0	-60.6	-25.0	-35.6	
10004.00	-14.8	V	3.0	42.2	1.0	-56.0	-25.0	-31.0	
10MHz									
5002.00	-18.8	H	3.0	45.5	1.0	-63.2	-25.0	-38.2	
7503.00	-16.9	H	3.0	44.1	1.0	-60.0	-25.0	-35.0	
10004.00	-14.9	H	3.0	42.2	1.0	-56.1	-25.0	-31.1	
QPSK									
Mid Ch, 2593MHz									
5186.00	-19.2	V	3.0	45.4	1.0	-63.6	-25.0	-38.6	
7779.00	-15.7	V	3.0	44.0	1.0	-58.7	-25.0	-33.7	
10372.00	-14.5	V	3.0	42.4	1.0	-55.8	-25.0	-30.8	
5186.00	-18.9	H	3.0	45.4	1.0	-63.4	-25.0	-38.4	
7779.00	-11.6	H	3.0	44.0	1.0	-54.6	-25.0	-29.6	
10372.00	-14.6	H	3.0	42.4	1.0	-56.0	-25.0	-31.0	
High Ch, 2685MHz									
5370.00	-18.5	V	3.0	45.4	1.0	-62.9	-25.0	-37.9	
8055.00	-13.4	V	3.0	43.9	1.0	-56.2	-25.0	-31.2	
10740.00	-13.7	V	3.0	42.5	1.0	-55.1	-25.0	-30.1	
5370.00	-18.3	H	3.0	45.4	1.0	-62.7	-25.0	-37.7	
8055.00	-12.8	H	3.0	43.9	1.0	-55.6	-25.0	-30.6	
10740.00	-14.1	H	3.0	42.5	1.0	-55.6	-25.0	-30.6	

LTE Band 66

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4790047196							
Date:		8/4/2021							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, Y-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 66 Harmonics, 5MHz Bandwidth							
Test Voltage:		AC 120 V, 60 Hz							
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	-8.4	V	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5137.50	-9.5	V	3.0	45.5	1.0	-54.0	-13.0	-41.0	
6850.00	-6.3	V	3.0	44.5	1.0	-49.8	-13.0	-36.8	
5MHz									
3425.00	-8.0	H	3.0	45.4	1.0	-52.4	-13.0	-39.4	
5137.50	-9.1	H	3.0	45.5	1.0	-53.6	-13.0	-40.6	
6850.00	-6.1	H	3.0	44.5	1.0	-49.7	-13.0	-36.7	
QPSK									
Mid Ch, 1745MHz									
3490.00	-8.5	V	3.0	45.4	1.0	-52.9	-13.0	-39.9	
5235.00	-9.2	V	3.0	45.4	1.0	-53.7	-13.0	-40.7	
6980.00	-6.3	V	3.0	44.4	1.0	-49.7	-13.0	-36.7	
3490.00	-7.9	H	3.0	45.4	1.0	-52.2	-13.0	-39.2	
5235.00	-8.8	H	3.0	45.4	1.0	-53.3	-13.0	-40.3	
6980.00	-6.1	H	3.0	44.4	1.0	-49.5	-13.0	-36.5	
High Ch, 1777.5MHz									
3555.00	-7.8	V	3.0	45.4	1.0	-52.2	-13.0	-39.2	
5332.50	-9.0	V	3.0	45.4	1.0	-53.4	-13.0	-40.4	
7110.00	-6.0	V	3.0	44.4	1.0	-49.4	-13.0	-36.4	
3555.00	-7.4	H	3.0	45.4	1.0	-51.8	-13.0	-38.8	
5332.50	-8.7	H	3.0	45.4	1.0	-53.2	-13.0	-40.2	
7110.00	-5.8	H	3.0	44.4	1.0	-49.2	-13.0	-36.2	

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

END OF REPORT