



LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

LTE Band41(PC3)

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

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 `;
- 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);

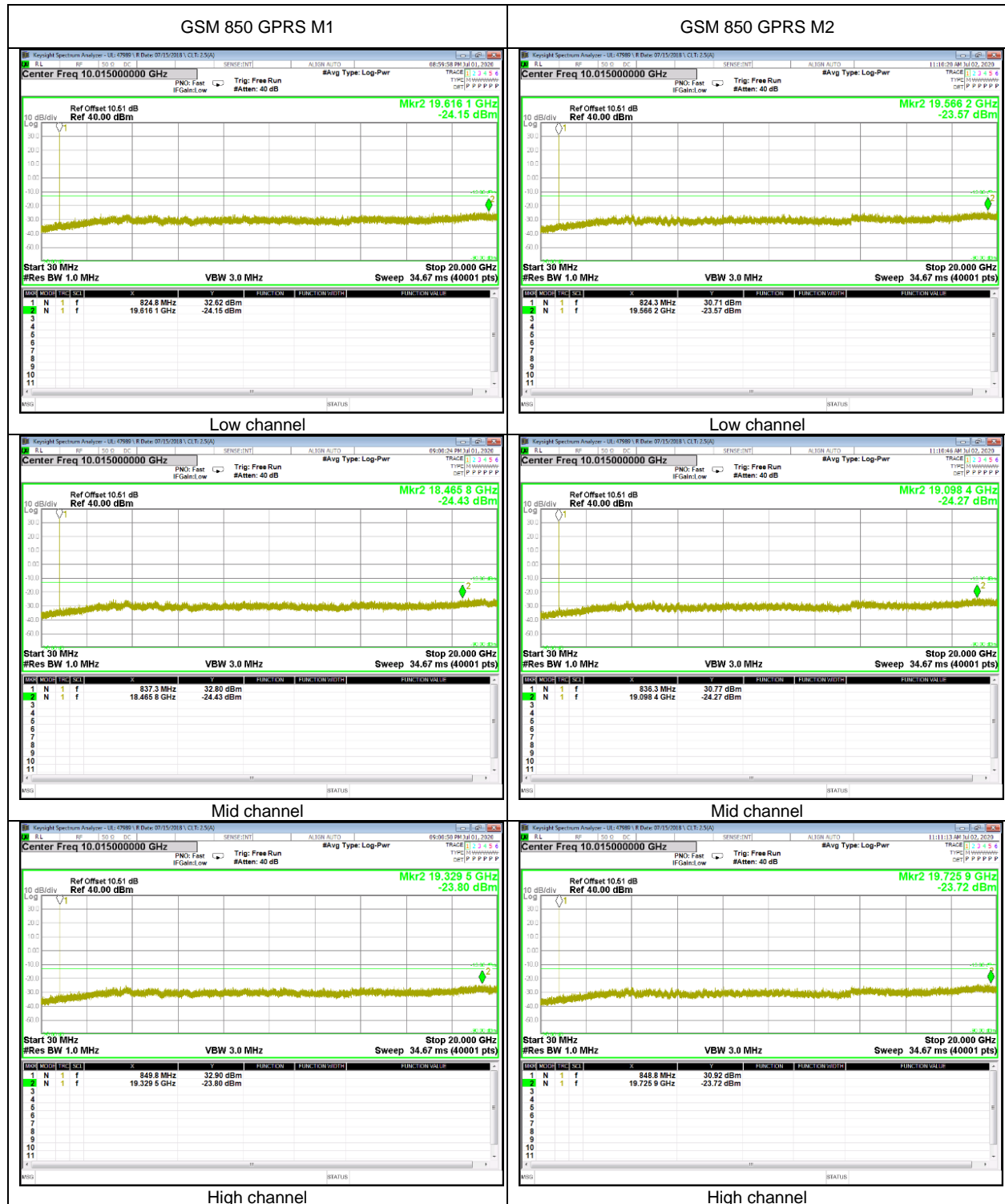
RESULTS

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



WCDMA Band 5



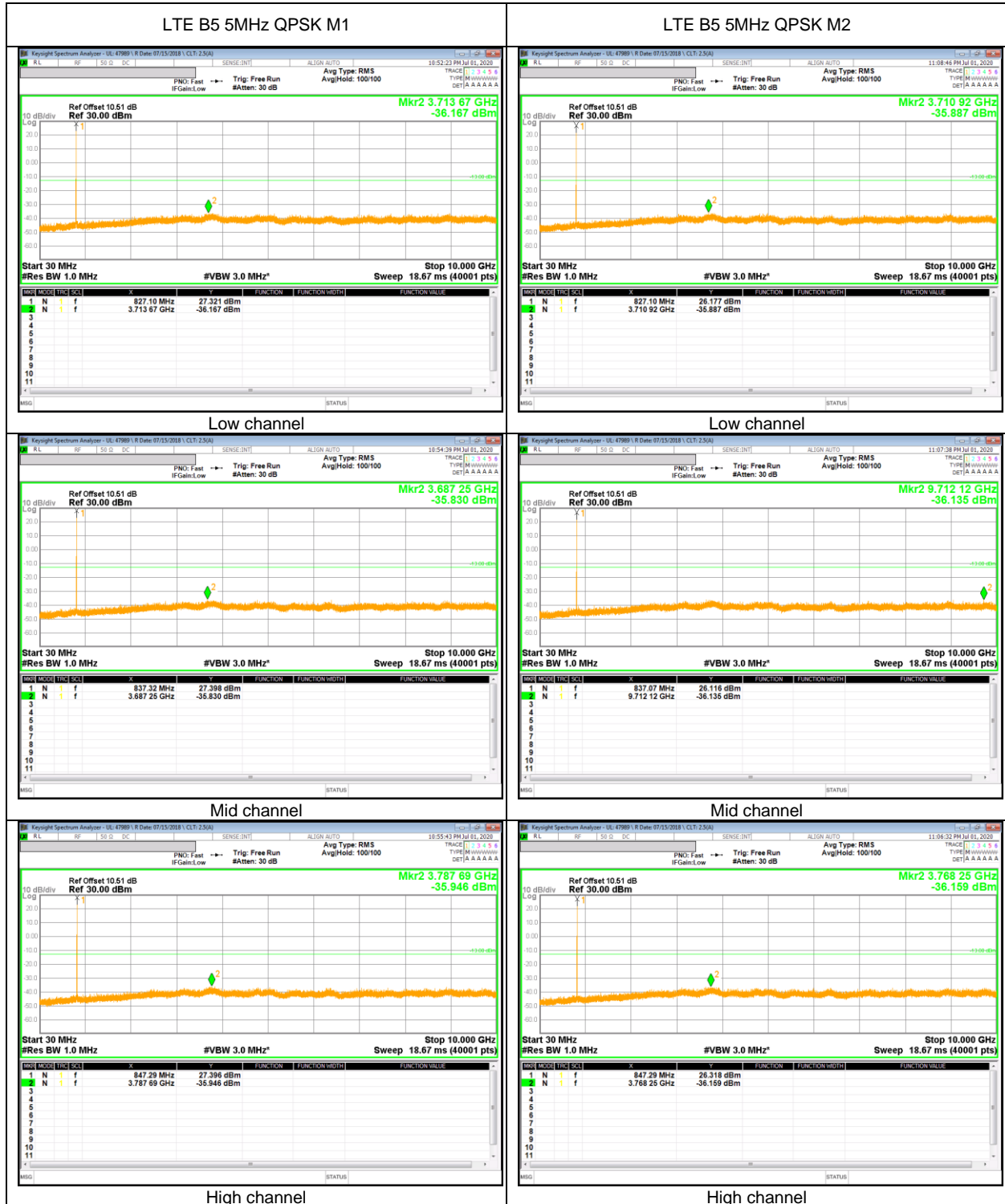
WCDMA Band 4



WCDMA Band 2



LTE Band 5



LTE Band 12



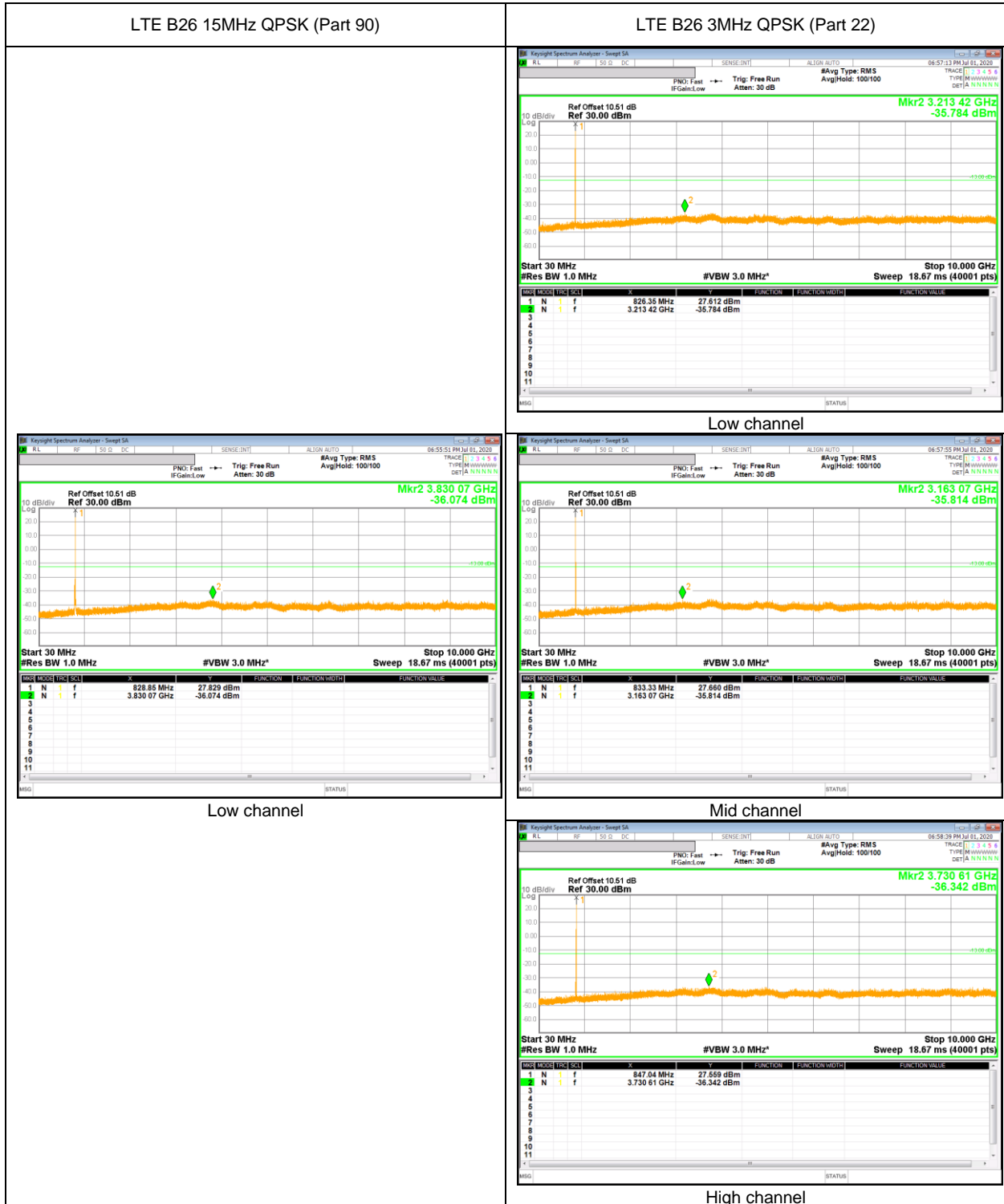
LTE Band 13



LTE Band 25



LTE Band 26(Part 90)
LTE Band 26(Part 22)



LTE Band 41(PC2)



LTE Band 66



LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

LTE Band41(PC3)

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

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]		
3.88	50	824.20003861	0.002	848.80003729	0.006	2.5	
3.88	40	824.20003700	0.004	848.80003965	0.003	2.5	
3.88	30	824.20003716	0.004	848.80003690	0.007	2.5	
3.88	20	824.20004007	0.000	848.80004255	0.000	2.5	
3.88	10	824.20004107	-0.001	848.80004688	-0.005	2.5	
3.88	0	824.20004028	0.000	848.80004785	-0.006	2.5	
3.88	-10	824.20004297	-0.004	848.80004838	-0.007	2.5	
3.88	-20	824.20004588	-0.007	848.80004736	-0.006	2.5	
3.88	-30	824.20004314	-0.004	848.80004521	-0.003	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]		
3.88	20	824.20004007	0	848.80004255	0	2.5	
4.47	20	824.20003099	0.011	848.80002728	0.018	2.5	
3.60	20	824.20003161	0.010	848.80002806	0.017	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 (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.0779	1909.9244		
Extreme (50C)		1850.0779	1909.9245	43.9	0.023
Extreme (40C)		1850.0779	1909.9245	55.1	0.029
Extreme (30C)		1850.0779	1909.9245	56.1	0.030
Extreme (10C)		1850.0779	1909.9245	51.1	0.027
Extreme (0C)		1850.0779	1909.9245	50.9	0.027
Extreme (-10C)		1850.0779	1909.9245	57.0	0.030
Extreme (-20C)		1850.0779	1909.9245	54.5	0.029
Extreme (-30C)		1850.0779	1909.9245	53.3	0.028
20C		15%	1850.0779	1909.9244	35.5
	-15%	1850.0779	1909.9244	39.7	0.021
	End Point	1850.0779	1909.9245	42.2	0.022

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]		
3.88	50	826.40000885	-0.001	846.60000813	0.006	2.5	
3.88	40	826.40000952	-0.002	846.60000824	0.006	2.5	
3.88	30	826.40001011	-0.002	846.60001014	0.004	2.5	
3.88	20	826.40000825	0.000	846.60001311	0.000	2.5	
3.88	10	826.40001011	-0.002	846.60001132	0.002	2.5	
3.88	0	826.40000734	0.001	846.60001052	0.003	2.5	
3.88	-10	826.40000332	0.006	846.60000915	0.005	2.5	
3.88	-20	826.40001012	-0.002	846.60001134	0.002	2.5	
3.88	-30	826.40000880	-0.001	846.60000936	0.004	2.5	

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.88	20	826.40000825	0	846.60001311	0	2.5	
4.47	20	826.40000670	0.002	846.60000654	0.008	2.5	
3.60	20	826.40000544	0.003	846.60000618	0.008	2.5	

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

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	1710.3226	1754.6764		
Extreme (50C)		1710.3226	1754.6764	25.6	0.015
Extreme (40C)		1710.3226	1754.6764	25.6	0.015
Extreme (30C)		1710.3226	1754.6764	25.1	0.014
Extreme (10C)		1710.3226	1754.6764	39.1	0.023
Extreme (0C)		1710.3226	1754.6764	26.7	0.015
Extreme (-10C)		1710.3226	1754.6764	31.2	0.018
Extreme (-20C)		1710.3226	1754.6764	38.3	0.022
Extreme (-30C)		1710.3226	1754.6764	28.6	0.017
20C	15%	1710.3226	1754.6764	26.8	0.015
	-15%	1710.3226	1754.6764	26.2	0.015
	End Point	1710.3226	1754.6764	25.8	0.015

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	1850.3231	1909.6688	21.0	0.011
Extreme (50C)		1850.3231	1909.6688		
Extreme (40C)		1850.3231	1909.6688		
Extreme (30C)		1850.3231	1909.6688		
Extreme (10C)		1850.3231	1909.6688		
Extreme (0C)		1850.3231	1909.6688		
Extreme (-10C)		1850.3231	1909.6688		
Extreme (-20C)		1850.3231	1909.6688		
Extreme (-30C)		1850.3231	1909.6688		
20C		15%	1850.3231		
	-15%	1850.3231	1909.6688	22.6	0.012
	End Point	1850.3231	1909.6688	22.3	0.012

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	824.70001456	0.007	848.30002405	-0.002	2.5	
3.85	40	824.70002549	-0.006	848.30003417	-0.014	2.5	
3.85	30	824.70002438	-0.005	848.30002204	0.000	2.5	
3.85	20	824.70002026	0.000	848.30002217	0.000	2.5	
3.85	10	824.70002360	-0.004	848.30002636	-0.005	2.5	
3.85	0	824.70003081	-0.013	848.30002687	-0.006	2.5	
3.85	-10	824.70002709	-0.008	848.30002556	-0.004	2.5	
3.85	-20	824.70002928	-0.011	848.30002874	-0.008	2.5	
3.85	-30	824.70002681	-0.008	848.30002878	-0.008	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]		
3.88	20	824.70002026	0	848.30002217	0	2.5	
4.47	20	824.70002352	-0.004	848.30001523	0.008	2.5	
3.60	20	824.70002383	-0.004	848.30001509	0.008	2.5	

LTE Band 12 (Lowest Frequency: 16QAM / 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	699.1581	715.8456		
Extreme (50C)		699.1581	715.8456	18.6	0.026
Extreme (40C)		699.1581	715.8456	19.3	0.027
Extreme (30C)		699.1581	715.8456	25.9	0.037
Extreme (10C)		699.1581	715.8456	33.3	0.047
Extreme (0C)		699.1581	715.8456	18.3	0.026
Extreme (-10C)		699.1581	715.8456	19.2	0.027
Extreme (-20C)		699.1581	715.8456	28.9	0.041
Extreme (-30C)		699.1581	715.8456	28.3	0.040
20C		15%	699.1581	715.8456	30.3
	-15%	699.1581	715.8456	25.7	0.036
	End Point	699.1581	715.8456	18.7	0.026

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

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.2474	786.7430		
Extreme (50C)		777.2474	786.7430	10.2	0.013
Extreme (40C)		777.2474	786.7430	12.6	0.016
Extreme (30C)		777.2474	786.7430	13.2	0.017
Extreme (10C)		777.2474	786.7430	12.7	0.016
Extreme (0C)		777.2474	786.7430	9.9	0.013
Extreme (-10C)		777.2474	786.7430	12.6	0.016
Extreme (-20C)		777.2474	786.7430	9.8	0.013
Extreme (-30C)		777.2474	786.7430	13.1	0.017
20C		15%	777.2474	786.7430	8.7
	-15%	777.2474	786.7430	7.6	0.010
	End Point	777.2474	786.7430	8.5	0.011

LTE Band 25 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1556	1914.8432	22.6	0.012
Extreme (50C)		1850.1556	1914.8432		
Extreme (40C)		1850.1556	1914.8432		
Extreme (30C)		1850.1556	1914.8432		
Extreme (10C)		1850.1556	1914.8432		
Extreme (0C)		1850.1556	1914.8432		
Extreme (-10C)		1850.1556	1914.8432		
Extreme (-20C)		1850.1556	1914.8432		
Extreme (-30C)		1850.1556	1914.8432		
20C		15%	1850.1556		
	-15%	1850.1556	1914.8432	35.7	0.019
	End Point	1850.1556	1914.8432	26.9	0.014

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	814.70002877	0.001	848.30002904	0.005	2.5	
3.85	40	814.70003053	-0.001	848.30003040	0.003	2.5	
3.85	30	814.70003214	-0.003	848.30002804	0.006	2.5	
3.85	20	814.70002978	0.000	848.30003299	0.000	2.5	
3.85	10	814.70002714	0.003	848.30003184	0.001	2.5	
3.85	0	814.70002568	0.005	848.30002991	0.004	2.5	
3.85	-10	814.70002262	0.009	848.30003340	0.000	2.5	
3.85	-20	814.70002539	0.005	848.30002815	0.006	2.5	
3.85	-30	814.70002697	0.003	848.30002559	0.009	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]		
3.88	20	814.70002978	0	848.30003299	0	2.5	
4.47	20	814.70000864	0.026	848.30000924	0.028	2.5	
3.60	20	814.70001333	0.020	848.30001904	0.016	2.5	

LTE Band 41 (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	2494.0126	2691.9788		
Extreme (50C)		2494.0126	2691.9788	33.6	0.013
Extreme (40C)		2494.0126	2691.9788	34.1	0.013
Extreme (30C)		2494.0126	2691.9788	32.7	0.013
Extreme (10C)		2494.0126	2691.9788	32.3	0.012
Extreme (0C)		2494.0126	2691.9788	32.8	0.013
Extreme (-10C)		2494.0126	2691.9788	36.5	0.014
Extreme (-20C)		2494.0126	2691.9788	35.9	0.014
Extreme (-30C)		2494.0126	2691.9788	36.6	0.014
20C		15%	2494.0126	2691.9788	33.3
	-15%	2494.0126	2691.9788	36.9	0.014
	End Point	2494.0126	2691.9788	36.4	0.014

LTE Band 66 (Lowest Frequency: QPSK / 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	31.1	0.018
Extreme (40C)		1710.6995	1779.3006	28.7	0.016
Extreme (30C)		1710.6995	1779.3006	34.4	0.020
Extreme (10C)		1710.6995	1779.3006	27.0	0.015
Extreme (0C)		1710.6995	1779.3006	29.6	0.017
Extreme (-10C)		1710.6995	1779.3006	25.9	0.015
Extreme (-20C)		1710.6995	1779.3006	29.4	0.017
Extreme (-30C)		1710.6995	1779.3006	31.3	0.018
20C		15%	1710.6995	1779.3006	26.8
	-15%	1710.6995	1779.3006	30.5	0.017
	End Point	1710.6995	1779.3006	22.1	0.013

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

LTE Band41(PC3)

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

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 850

				M1		M2	
Band	Mode	Channel	f [MHz]	ERP / EIRP		ERP / EIRP	
				[dBm]	[mW]	[dBm]	[mW]
GSM850	GPRS	128	824.2	26.53	449.78	21.23	132.74
		190	836.6	27.19	523.60	23.48	222.84
		251	848.8	26.83	481.95	22.95	197.24
	EGPRS	128	824.2	20.75	118.85	17.01	50.23
		190	836.6	21.37	137.09	17.61	57.68
		251	848.8	21.44	139.32	17.42	55.21

GSM 1900

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM1900	GPRS	512	1850.2	29.16	824.14
		661	1880	28.76	751.62
		810	1909.8	30.23	1054.39
	EGPRS	512	1850.2	25.62	364.75
		661	1880	25.98	396.28
		810	1909.8	26.61	458.14

WCDMA B5

Band	Mode	Channel	f [MHz]	M1		M2	
				ERP / EIRP		ERP / EIRP	
				[dBm]	[mW]	[dBm]	[mW]
Band 5	REL99	4132	826.4	20.34	108.14	13.38	21.78
		4183	836.6	20.23	105.44	13.80	23.99
		4233	846.6	19.69	93.11	14.18	26.18
	HSDPA	4132	826.4	19.33	85.70	11.91	15.52
		4183	836.6	19.12	81.66	12.78	18.97
		4233	846.6	18.60	72.44	13.68	23.33

WCDMA B4

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 4	REL99	1312	1712.4	24.35	272.27
		1413	1732.6	25.06	320.63
		1513	1752.6	22.71	186.64
	HSDPA	1312	1712.4	23.70	234.42
		1413	1732.6	23.73	236.05
		1513	1752.6	21.84	152.76

WCDMA B2

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 2	REL99	9262	1852.4	23.40	218.78
		9400	1880.0	22.90	194.98
		9538	1907.6	24.89	308.32
	HSDPA	9262	1852.4	22.46	176.20
		9400	1880.0	21.85	153.11
		9538	1907.6	23.93	247.17

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	19.34	85.90
			1/25	836.5	18.73	74.64
			1/25	844.0	18.52	71.12
		16QAM	1/49	829.0	18.18	65.77
			1/25	836.5	17.45	55.59
			1/0	844.0	16.98	49.89
	5	QPSK	1/12	826.5	18.66	73.45
			1/12	836.5	18.96	78.70
			1/12	846.5	18.94	78.34
		16QAM	1/12	826.5	17.75	59.57
			1/12	836.5	17.56	57.02
			1/24	846.5	18.10	64.57
	3	QPSK	1/14	825.5	18.14	65.16
			1/8	836.5	18.33	68.08
			1/14	847.5	18.51	70.96
		16QAM	1/14	825.5	16.80	47.86
			1/14	836.5	16.42	43.85
			1/14	847.5	17.65	58.21
	1.4	QPSK	1/3	824.7	18.69	73.96
			1/3	836.5	16.97	49.77
			1/3	848.3	17.43	55.34
		16QAM	1/5	824.7	17.59	57.41
			1/3	836.5	15.86	38.55
			1/3	848.3	16.20	41.69

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	16.34	43.05
			1/0	707.5	16.12	40.93
			1/0	711.0	15.70	37.15
		16QAM	1/0	704.0	14.85	30.55
			1/0	707.5	14.91	30.97
			1/0	711.0	14.69	29.44
	5	QPSK	1/0	701.5	16.18	41.50
			1/0	707.5	15.55	35.89
			1/12	713.5	15.60	36.31
		16QAM	1/12	701.5	14.29	26.85
			1/0	707.5	14.80	30.20
			1/12	713.5	14.65	29.17
	3	QPSK	1/0	700.5	16.06	40.36
			1/14	707.5	15.74	37.50
			1/14	714.5	15.78	37.84
		16QAM	1/0	700.5	15.31	33.96
			1/0	707.5	14.84	30.48
			1/14	714.5	14.76	29.92
	1.4	QPSK	1/3	699.7	15.97	39.54
			1/3	707.5	15.92	39.08
			1/3	715.3	15.87	38.64
		16QAM	1/3	699.7	14.80	30.20
			1/3	707.5	14.53	28.38
			1/3	715.3	14.92	31.05

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 13	10	QPSK	1/0	782.0	19.24	83.95
		16QAM	1/0	782.0	18.43	69.66
	5	QPSK	1/24	779.5	19.49	88.92
			1/12	782.0	19.57	90.57
			1/0	784.5	19.54	89.95
		16QAM	1/0	779.5	18.14	65.16
	1/24		782.0	18.65	73.28	
	1/24		784.5	19.40	87.10	

LTE Band 25

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 25	20	QPSK	1/99	1860.0	21.18	131.22
			1/49	1882.5	21.80	151.36
			1/0	1905.0	22.82	191.43
		16QAM	1/99	1860.0	20.22	105.20
			1/49	1882.5	20.84	121.34
			1/0	1905.0	21.63	145.55
	15	QPSK	1/37	1857.5	21.54	142.56
			1/0	1882.5	21.52	141.91
			1/0	1907.5	23.41	219.28
		16QAM	1/37	1857.5	20.48	111.69
			1/0	1882.5	20.46	111.17
			1/0	1907.5	22.25	167.88
	10	QPSK	1/25	1855.0	20.50	112.20
			1/25	1882.5	21.22	132.43
			1/0	1910.0	22.91	195.43
		16QAM	1/25	1855.0	19.39	86.90
			1/25	1882.5	20.31	107.40
			1/0	1910.0	22.16	164.44
	5	QPSK	1/24	1852.5	21.60	144.54
			1/0	1882.5	21.45	139.64
			1/0	1912.5	22.73	187.50
		16QAM	1/24	1852.5	20.74	118.58
			1/0	1882.5	20.81	120.50
			1/0	1912.5	21.57	143.55
	3	QPSK	1/14	1851.5	21.34	136.14
			1/14	1882.5	21.99	158.12
			1/8	1913.5	22.03	159.59
		16QAM	1/0	1851.5	20.33	107.89
			1/0	1882.5	20.59	114.55
			1/0	1913.5	21.31	135.21
1.4	QPSK	1/3	1850.7	21.27	133.97	
		1/3	1882.5	21.60	144.54	
		1/0	1914.3	21.85	153.11	
	16QAM	1/3	1850.7	20.14	103.28	
		1/3	1882.5	20.40	109.65	
		1/0	1914.3	20.97	125.03	

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	19.64	92.04
			1/74	831.5	18.43	69.66
			1/0	841.5	17.26	53.21
		16QAM	1/74	821.5	18.72	74.47
			1/74	831.5	17.41	55.08
			1/74	841.5	16.96	49.66
	10	QPSK	1/49	819.0	19.37	86.50
			1/0	829.0	18.05	63.83
			1/49	831.5	18.53	71.29
			1/25	844.0	17.82	60.53
		16QAM	1/49	819.0	18.44	69.82
			1/0	829.0	17.05	50.70
			1/49	831.5	17.24	52.97
			1/0	844.0	16.34	43.05
	5	QPSK	1/24	816.5	19.14	82.04
			1/12	821.5	19.43	87.70
			1/12	826.5	18.79	75.68
			1/12	831.5	18.65	73.28
			1/0	846.5	17.81	60.39
		16QAM	1/24	816.5	17.58	57.28
			1/12	821.5	18.43	69.66
			1/24	826.5	17.57	57.15
			1/24	831.5	17.82	60.53
			1/12	846.5	17.29	53.58
	3	QPSK	1/14	815.5	18.70	74.13
			1/8	822.5	19.55	90.16
			1/8	825.5	20.25	105.93
			1/14	831.5	18.83	76.38
			1/0	847.5	18.43	69.66
		16QAM	1/14	815.5	17.60	57.54
			1/8	822.5	18.49	70.63
			1/8	825.5	19.30	85.11
			1/14	831.5	17.82	60.53
			1/0	847.5	17.32	53.95

	1.4	QPSK	1/3	814.7	18.40	69.18
			1/0	823.3	19.39	86.90
			1/3	824.7	19.90	97.72
			1/3	831.5	18.59	72.28
			1/3	848.3	18.10	64.57
		16QAM	1/5	814.7	17.34	54.20
			1/3	823.3	18.49	70.63
			1/3	824.7	18.59	72.28
			1/3	831.5	17.61	57.68
			1/5	848.3	16.85	48.42

LTE Band 41(PC2)

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1/99	2506.0	29.17	826.04
			1/0	2593.0	28.76	751.62
			1/0	2680.0	25.56	359.75
		16QAM	1/99	2506.0	28.36	685.49
			1/49	2593.0	28.01	632.41
			1/0	2680.0	26.35	431.52
	15	QPSK	1/74	2503.5	27.90	616.60
			1/0	2593.0	28.89	774.46
			1/0	2682.5	26.01	399.02
		16QAM	1/74	2503.5	27.02	503.50
			1/74	2593.0	27.69	587.49
			1/0	2682.5	26.46	442.59
	10	QPSK	1/49	2501.0	27.39	548.28
			1/0	2593.0	28.61	726.11
			1/0	2685.0	25.64	366.44
		16QAM	1/49	2501.0	26.55	451.86
			1/49	2593.0	27.85	609.54
			1/0	2685.0	25.23	333.43
	5	QPSK	1/24	2498.5	27.95	623.73
			1/0	2593.0	28.26	669.88
			1/0	2687.5	25.74	374.97
		16QAM	1/24	2498.5	26.74	472.06
			1/0	2593.0	27.37	545.76
			1/0	2687.5	25.42	348.34

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	24.56	285.76
			1/49	1745.0	24.48	280.54
			1/49	1770.0	23.47	222.33
		16QAM	1/49	1720.0	23.61	229.61
			1/49	1745.0	23.60	229.09
			1/49	1770.0	22.21	166.34
	15	QPSK	1/0	1717.5	24.79	301.30
			1/37	1747.5	24.24	265.46
			1/37	1772.5	23.63	230.67
		16QAM	1/74	1717.5	24.02	252.35
			1/37	1747.5	23.26	211.84
			1/37	1772.5	22.71	186.64
	10	QPSK	1/25	1715.0	24.77	299.92
			1/25	1745.0	24.82	303.39
			1/0	1775.0	22.72	187.07
		16QAM	1/49	1715.0	23.55	226.46
			1/25	1745.0	23.47	222.33
			1/25	1775.0	22.50	177.83
	5	QPSK	1/24	1712.5	24.05	254.10
			1/0	1745.0	24.39	274.79
			1/0	1777.5	23.14	206.06
		16QAM	1/24	1712.5	23.52	224.91
			1/24	1745.0	23.65	231.74
			1/0	1777.5	22.50	177.83
	3	QPSK	1/14	1711.5	23.80	239.88
			1/0	1745.0	26.65	462.38
			1/0	1778.5	23.19	208.45
		16QAM	1/14	1711.5	23.11	204.64
			1/14	1745.0	23.25	211.35
			1/0	1778.5	22.14	163.68
	1.4	QPSK	1/0	1710.7	23.42	219.79
			1/0	1745.0	24.05	254.10
			1/0	1779.3	23.44	220.80
		16QAM	1/3	1710.7	22.99	199.07
			1/3	1745.0	23.30	213.80
			1/0	1779.3	22.14	163.68

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

LTE Band41(PC3)

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

9.5.2. ERP/EIRP DATA

GSM850

GSM850 GPRS M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789497384 Date: 2020-06-22 Test Engineer: 20881 Configuration: EUT, Z-Position_Open Location: Chamber 2 Mode: GPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 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)	
	Low Ch								
	824.20	30.49	V	3.0	-1.0	26.53	38.5	-12.0	
	824.20	26.70	H	3.0	-1.0	22.74	38.5	-15.8	
	Mid Ch								
	836.60	31.13	V	3.0	-0.9	27.19	38.5	-11.3	
	836.60	26.30	H	3.0	-0.9	22.36	38.5	-16.1	
	High Ch								
	848.80	30.74	V	3.1	-0.9	26.83	38.5	-11.7	
	848.80	26.36	H	3.1	-0.9	22.45	38.5	-16.0	
GSM850 EGPRS M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789497384 Date: 2020-06-22 Test Engineer: 20881 Configuration: EUT, Z-Position_Open Location: Chamber 2 Mode: EGPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 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)	
	Low Ch								
	824.20	24.71	V	3.0	-1.0	20.75	38.5	-17.8	
	824.20	21.40	H	3.0	-1.0	17.44	38.5	-21.1	
	Mid Ch								
	836.60	25.31	V	3.0	-0.9	21.37	38.5	-17.1	
	836.60	20.23	H	3.0	-0.9	16.29	38.5	-22.2	
	High Ch								
	848.80	25.35	V	3.1	-0.9	21.44	38.5	-17.1	
	848.80	20.61	H	3.1	-0.9	16.70	38.5	-21.8	

GSM850

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
824.20	25.12	V	3.0	-1.0	21.16	38.5	-17.3	
824.20	19.72	H	3.0	-1.0	15.76	38.5	-22.7	
836.60	25.54	V	3.0	-0.9	21.60	38.5	-16.9	
836.60	20.20	H	3.0	-0.9	16.26	38.5	-22.2	
848.80	25.71	V	3.1	-0.9	21.80	38.5	-16.7	
848.80	21.34	H	3.1	-0.9	17.43	38.5	-21.1	

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
824.20	19.52	V	3.0	-1.0	15.56	38.5	-22.9	
824.20	14.14	H	3.0	-1.0	10.18	38.5	-28.3	
836.60	20.00	V	3.0	-0.9	16.06	38.5	-22.4	
836.60	15.10	H	3.0	-0.9	11.16	38.5	-27.3	
848.80	20.49	V	3.1	-0.9	16.58	38.5	-21.9	
848.80	15.48	H	3.1	-0.9	11.57	38.5	-26.9	

GSM1900

GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																																	
	Company:		Samsung																																																																																															
	Project #:		4789497384																																																																																															
	Date:		2020-06-29																																																																																															
	Test Engineer:		20881																																																																																															
	Configuration:		EUT, X-Position_Open																																																																																															
	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																																																																																															
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GSM1900 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																																	
	Company:		Samsung																																																																																															
	Project #:		4789497384																																																																																															
	Date:		2020-06-29																																																																																															
	Test Engineer:		20881																																																																																															
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WCDMA Band 5

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
UL Verification Services, Inc.								
High Frequency Substitution Measurement								
Company: Samsung								
Project #: 4789497384								
Date: 2020-06-24								
Test Engineer: 20881								
Configuration: EUT, X-Position_Open								
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								
Low Ch								
826.40	18.72	V	3.0	-0.9	14.76	38.5	-23.7	
826.40	24.30	H	3.0	-0.9	20.34	38.5	-18.2	
Mid Ch								
836.60	18.84	V	3.0	-0.9	14.90	38.5	-23.6	
836.60	24.17	H	3.0	-0.9	20.23	38.5	-18.3	
High Ch								
846.60	18.38	V	3.1	-0.9	14.46	38.5	-24.0	
846.60	23.60	H	3.1	-0.9	19.69	38.5	-18.8	

WCDMA
 Band 5
 REL99
 M1

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
UL Verification Services, Inc.								
High Frequency Substitution Measurement								
Company: Samsung								
Project #: 4789497384								
Date: 2020-06-24								
Test Engineer: 20881								
Configuration: EUT, X-Position_Open								
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								
Low Ch								
826.40	17.72	V	3.0	-0.9	13.76	38.5	-24.7	
826.40	23.29	H	3.0	-0.9	19.33	38.5	-19.2	
Mid Ch								
836.60	17.67	V	3.0	-0.9	13.73	38.5	-24.8	
836.60	23.06	H	3.0	-0.9	19.12	38.5	-19.4	
High Ch								
846.60	17.12	V	3.1	-0.9	13.20	38.5	-25.3	
846.60	22.51	H	3.1	-0.9	18.60	38.5	-19.9	

WCDMA
 Band 5
 HSDPA
 M1

WCDMA Band 5

WCDMA Band 5 REL99 M2	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4789497384						
	Date:		2020-07-03						
	Test Engineer:		20881						
	Configuration:		EUT, Z-Position_Full Folded						
	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	17.34	V	3.0	-0.9	13.38	38.5	-25.1	
	826.40	9.01	H	3.0	-0.9	5.05	38.5	-33.4	
	Mid Ch								
	836.60	17.74	V	3.0	-0.9	13.80	38.5	-24.7	
	836.60	11.39	H	3.0	-0.9	7.45	38.5	-31.0	
	High Ch								
	846.60	18.10	V	3.1	-0.9	14.18	38.5	-24.3	
	846.60	11.11	H	3.1	-0.9	7.20	38.5	-31.3	

WCDMA Band 5 HSDPA M2	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4789497384						
	Date:		2020-07-03						
	Test Engineer:		20881						
	Configuration:		EUT, Z-Position_Full Folded						
	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	15.87	V	3.0	-0.9	11.91	38.5	-26.6	
	826.40	9.34	H	3.0	-0.9	5.38	38.5	-33.1	
	Mid Ch								
	836.60	16.72	V	3.0	-0.9	12.78	38.5	-25.7	
	836.60	10.40	H	3.0	-0.9	6.46	38.5	-32.0	
	High Ch								
	846.60	17.60	V	3.1	-0.9	13.68	38.5	-24.8	
	846.60	10.03	H	3.1	-0.9	6.12	38.5	-32.4	

WCDMA Band 4

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1712.40	14.01	V	4.3	9.4	19.09	30.0	-10.9	
1712.40	19.27	H	4.3	9.4	24.35	30.0	-5.6	
1732.60	17.00	V	4.3	9.5	22.13	30.0	-7.9	
1732.60	19.93	H	4.3	9.5	25.06	30.0	-4.9	
1752.60	14.40	V	4.4	9.5	19.58	30.0	-10.4	
1752.60	17.53	H	4.4	9.5	22.71	30.0	-7.3	

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1712.40	13.31	V	4.3	9.4	18.39	30.0	-11.6	
1712.40	18.62	H	4.3	9.4	23.70	30.0	-6.3	
1732.60	15.63	V	4.3	9.5	20.76	30.0	-9.2	
1732.60	18.60	H	4.3	9.5	23.73	30.0	-6.3	
1752.60	13.51	V	4.4	9.5	18.69	30.0	-11.3	
1752.60	16.66	H	4.4	9.5	21.84	30.0	-8.2	

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	15.44	V	4.5	9.5	20.43	33.0	-12.6	
1852.40	18.42	H	4.5	9.5	23.40	33.0	-9.6	
1880.00	12.98	V	4.5	9.3	17.75	33.0	-15.2	
1880.00	18.13	H	4.5	9.3	22.90	33.0	-10.1	
1907.60	16.99	V	4.6	9.1	21.51	33.0	-11.5	
1907.60	20.37	H	4.6	9.1	24.89	33.0	-8.1	

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1852.40	14.45	V	4.5	9.5	19.44	33.0	-13.6	
1852.40	17.48	H	4.5	9.5	22.46	33.0	-10.5	
1880.00	12.05	V	4.5	9.3	16.82	33.0	-16.2	
1880.00	17.08	H	4.5	9.3	21.85	33.0	-11.2	
1907.60	15.96	V	4.6	9.1	20.48	33.0	-12.5	
1907.60	19.41	H	4.6	9.1	23.93	33.0	-9.1	

LTE Band 5

LTE Band 5 10MHz QPSK M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789497384 Date: 2020-07-01 Test Engineer: 20882 Configuration: EUT, Z-Position_half folded Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	23.30	V	3.0	-0.9	19.34	38.5	-19.2	
	829.00	18.42	H	3.0	-0.9	14.47	38.5	-24.0	
	Mid Ch								
	836.50	22.66	V	3.0	-0.9	18.73	38.5	-19.8	
	836.50	17.33	H	3.0	-0.9	13.39	38.5	-25.1	
High Ch									
844.00	22.44	V	3.0	-0.9	18.52	38.5	-20.0		
844.00	16.86	H	3.0	-0.9	12.94	38.5	-25.6		
LTE Band 5 10MHz 16QAM M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789497384 Date: 2020-07-01 Test Engineer: 20882 Configuration: EUT, Z-Positon_half folded Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	22.14	V	3.0	-0.9	18.18	38.5	-20.3	
	829.00	17.31	H	3.0	-0.9	13.36	38.5	-25.1	
	Mid Ch								
	836.50	21.38	V	3.0	-0.9	17.45	38.5	-21.1	
	836.50	16.21	H	3.0	-0.9	12.27	38.5	-26.2	
High Ch									
844.00	20.90	V	3.0	-0.9	16.98	38.5	-21.5		
844.00	15.06	H	3.0	-0.9	11.14	38.5	-27.4		

LTE Band 5 5MHz QPSK M1	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																																
	Company:		Samsung																																																																																														
	Project #:		4789497384																																																																																														
	Date:		2020-07-01																																																																																														
	Test Engineer:		20882																																																																																														
	Configuration:		EUT, Z-Position_half folded																																																																																														
	Location:		Chamber 2																																																																																														
	Mode:		LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth																																																																																														
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836.50	17.49	H	3.0	-0.9	13.55	38.5	-24.9																																																																																										
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846.50	22.85	V	3.0	-0.9	18.94	38.5	-19.6																																																																																										
846.50	17.39	H	3.0	-0.9	13.47	38.5	-25.0																																																																																										
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LTE Band 5 1.4MHz QPSK M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4789497384						
	Date:		2020-07-01						
	Test Engineer:		20882						
	Configuration:		EUT, Z-Position_half folded						
	Location:		Chamber 2						
	Mode:		LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth						
	Test Equipment:		Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable						
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	824.70	22.65	V	3.0	-1.0	18.69	38.5	-19.8	
	824.70	17.31	H	3.0	-1.0	13.34	38.5	-25.2	
	Mid Ch								
	836.50	20.90	V	3.0	-0.9	16.97	38.5	-21.5	
	836.50	17.34	H	3.0	-0.9	13.40	38.5	-25.1	
	High Ch								
	848.30	21.34	V	3.0	-0.9	17.43	38.5	-21.1	
	848.30	17.51	H	3.0	-0.9	13.60	38.5	-24.9	
LTE Band 5 1.4MHz 16QAM M1	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4789497384						
	Date:		2020-07-01						
	Test Engineer:		20896						
	Configuration:		EUT, Z-Position_half folded						
	Location:		Chamber 2						
	Mode:		LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth						
	Test Equipment:		Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable						
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	824.70	21.55	V	3.0	-1.0	17.59	38.5	-20.9	
	824.70	16.68	H	3.0	-1.0	12.71	38.5	-25.8	
	Mid Ch								
	836.50	19.79	V	3.0	-0.9	15.86	38.5	-22.6	
	836.50	15.97	H	3.0	-0.9	12.03	38.5	-26.5	
	High Ch								
	848.30	20.11	V	3.0	-0.9	16.20	38.5	-22.3	
	848.30	16.05	H	3.0	-0.9	12.14	38.5	-26.4	