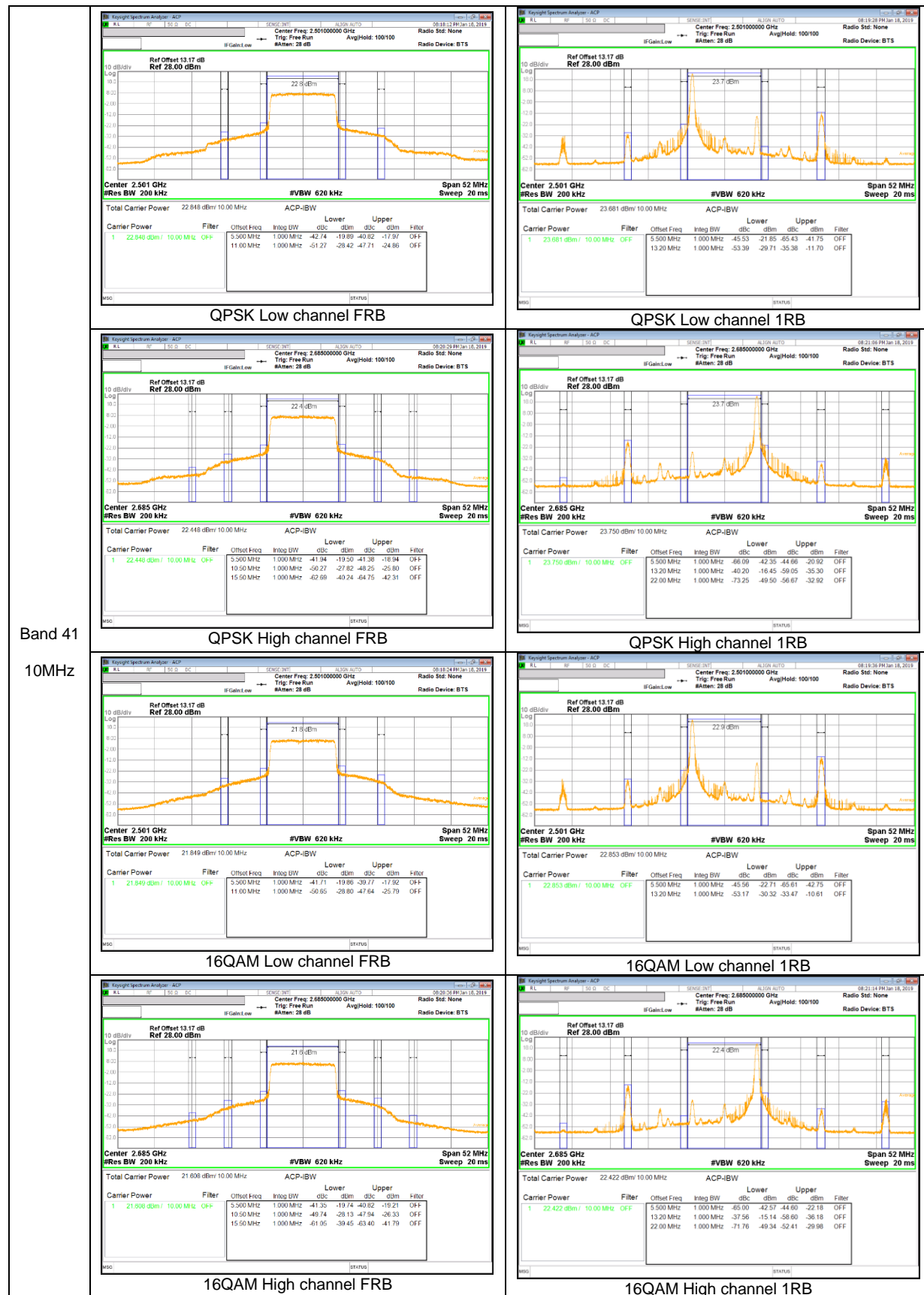
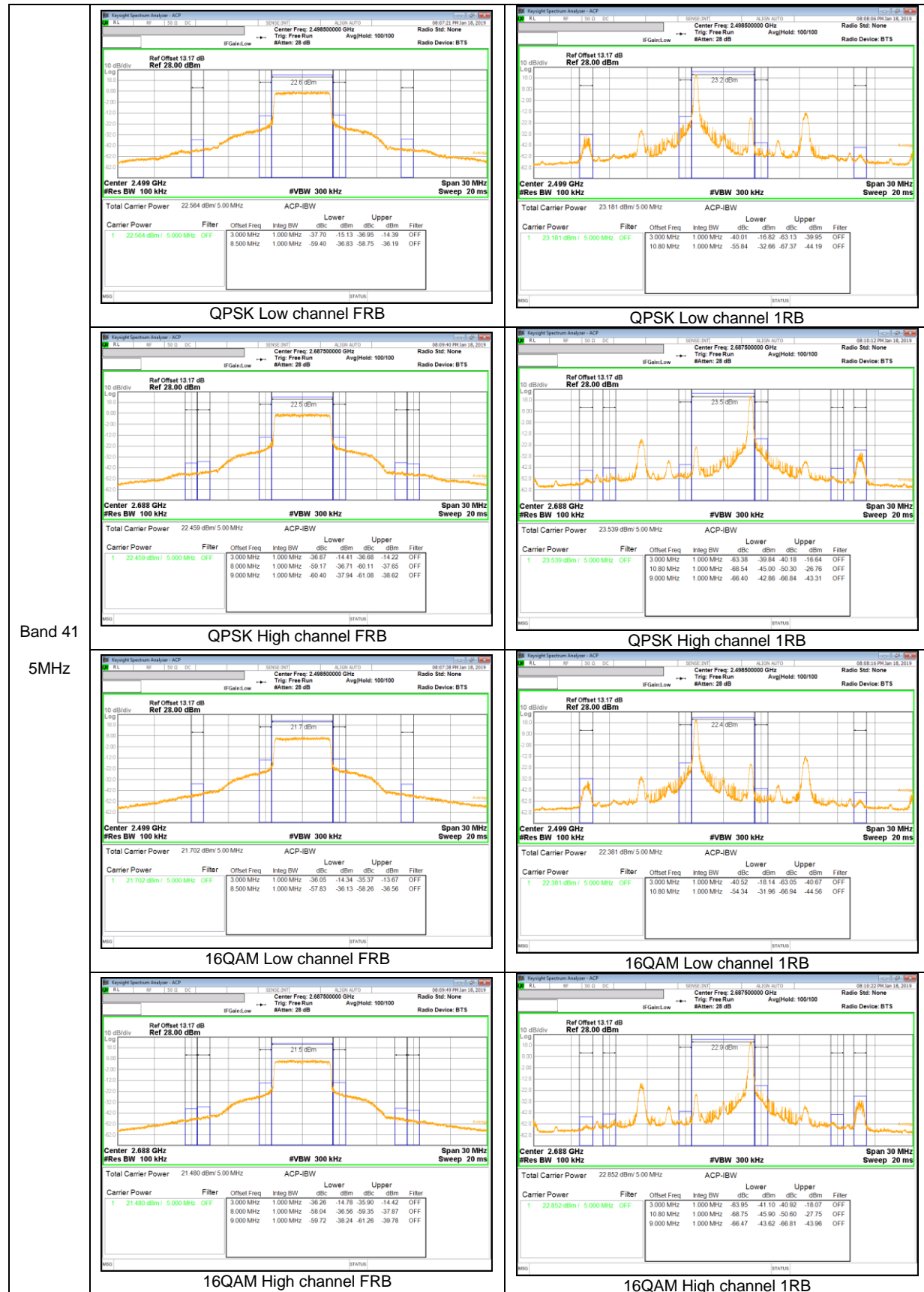


Band 41
 15MHz



Band 41
 10MHz



LTE Band 17

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

LTE Band 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.

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), Maxhold(GSM, LTE Band41);

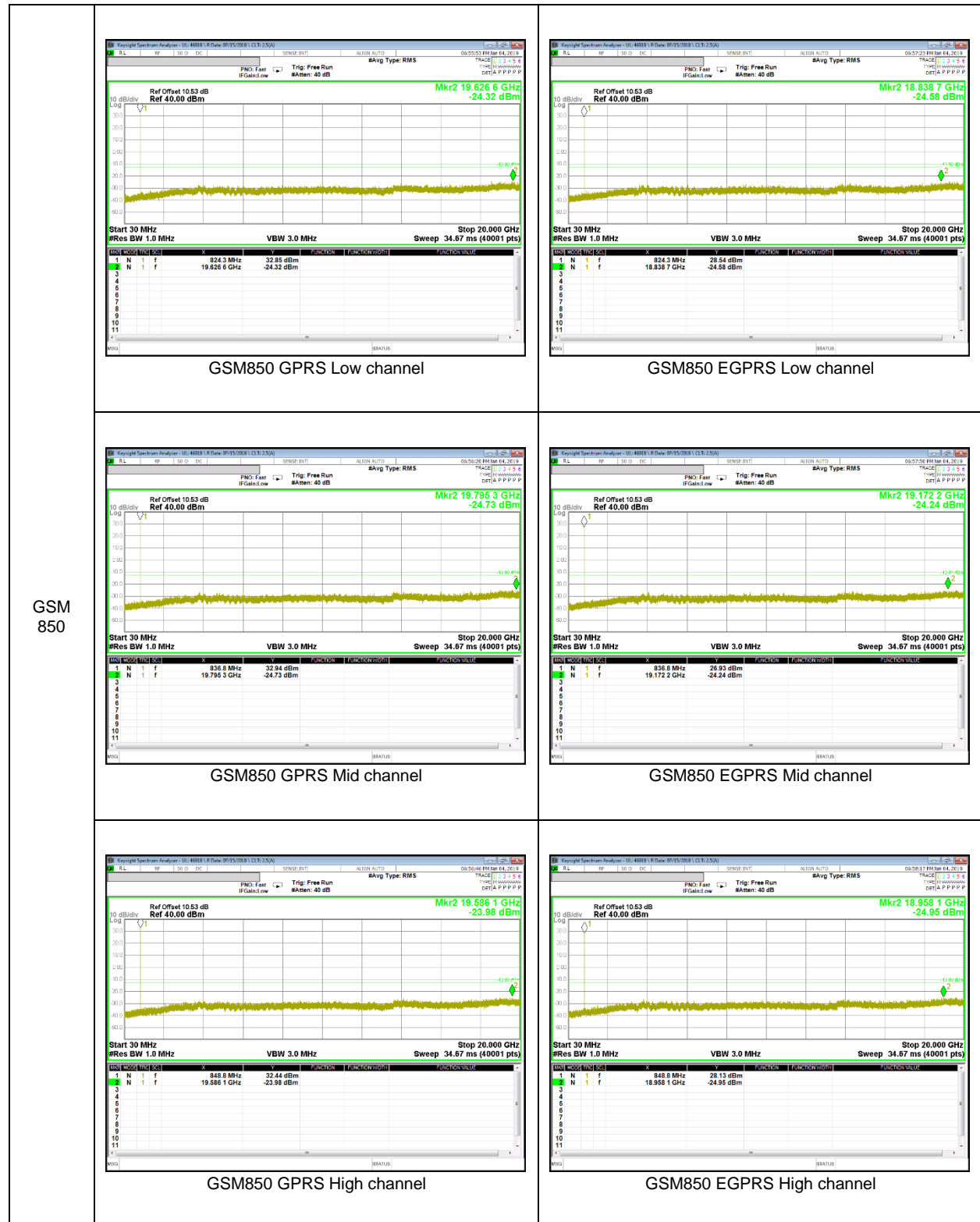
RESULTS

See the following pages.

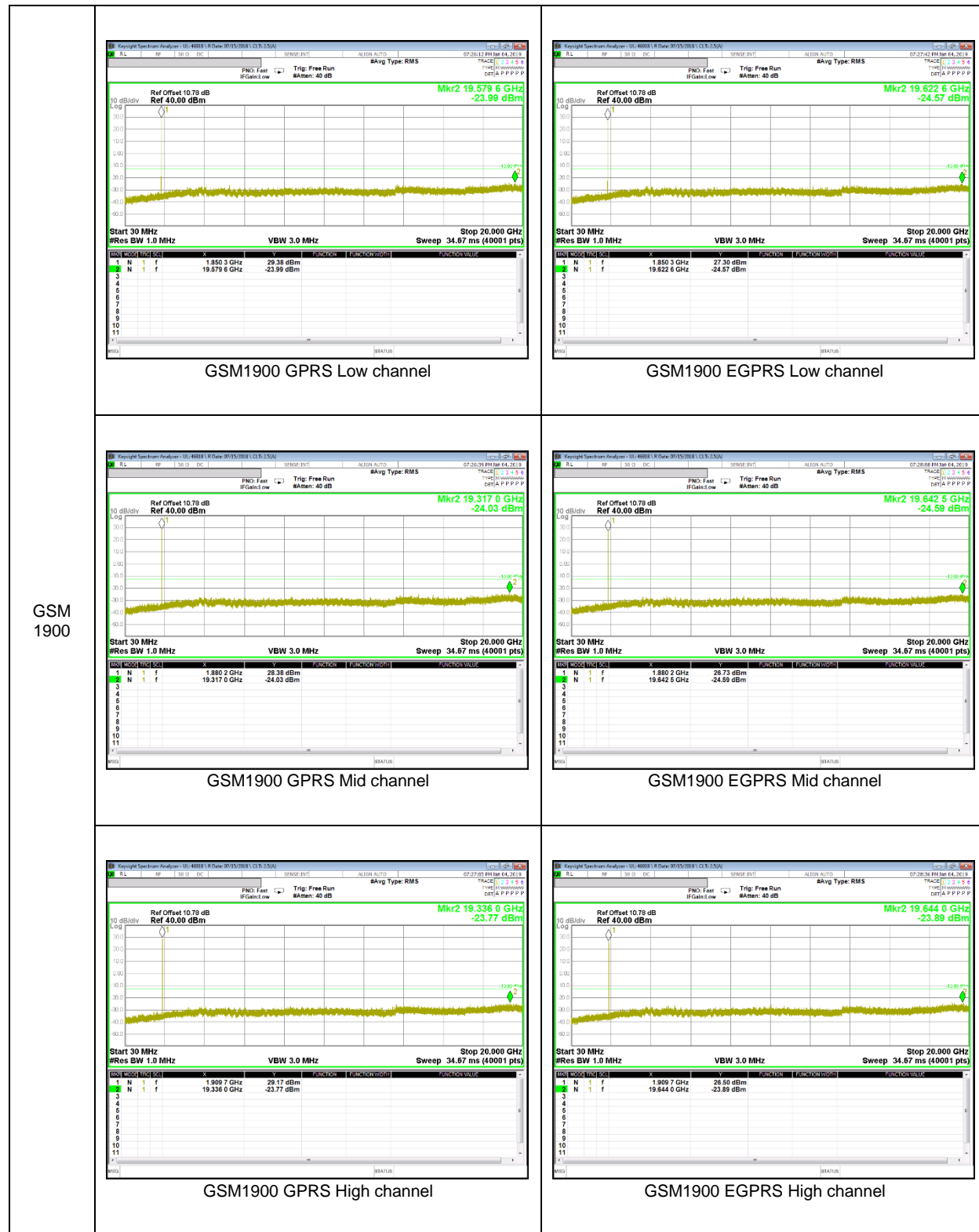
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850



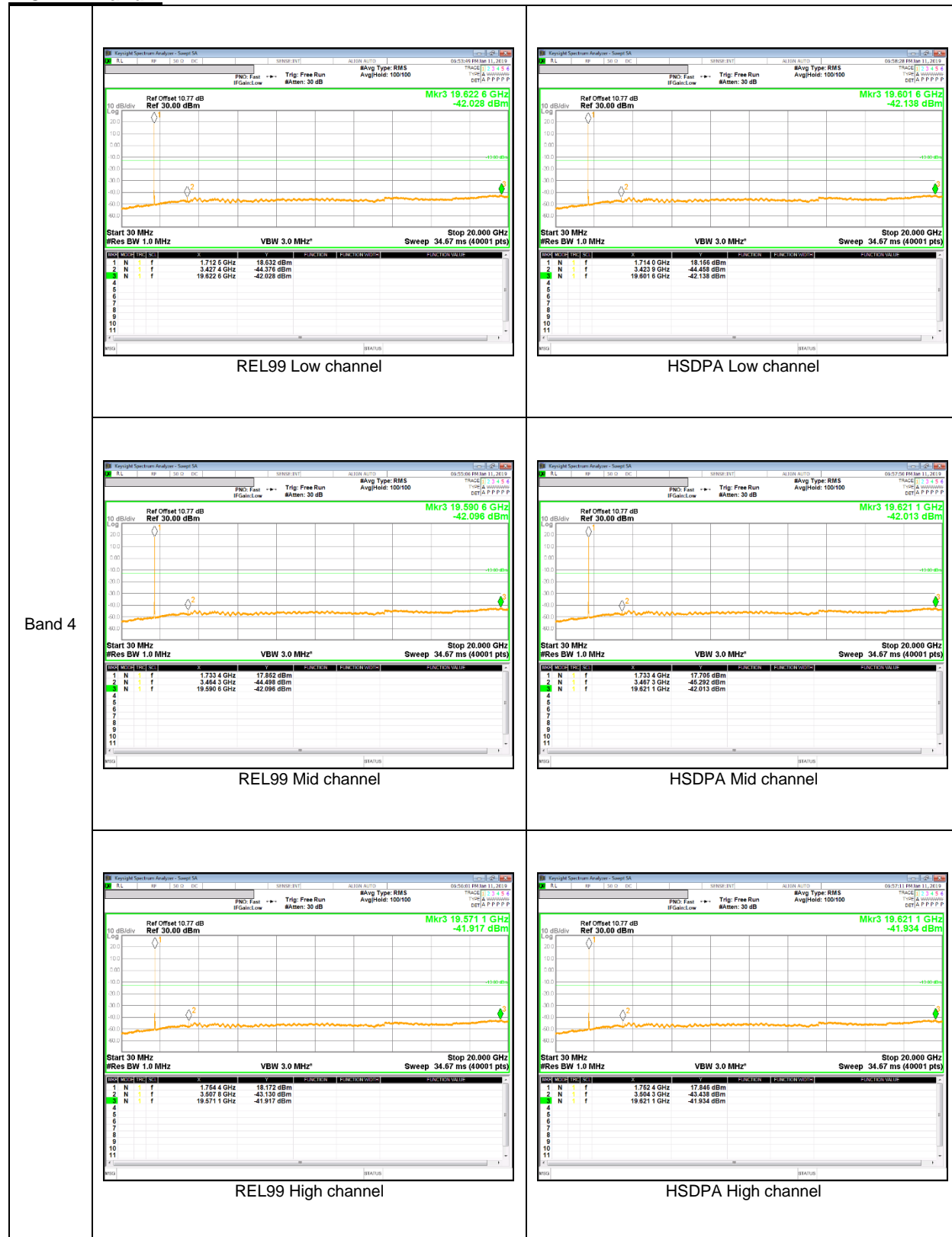
GSM 1900



WCDMA Band 5



WCDMA Band 4



Band 4

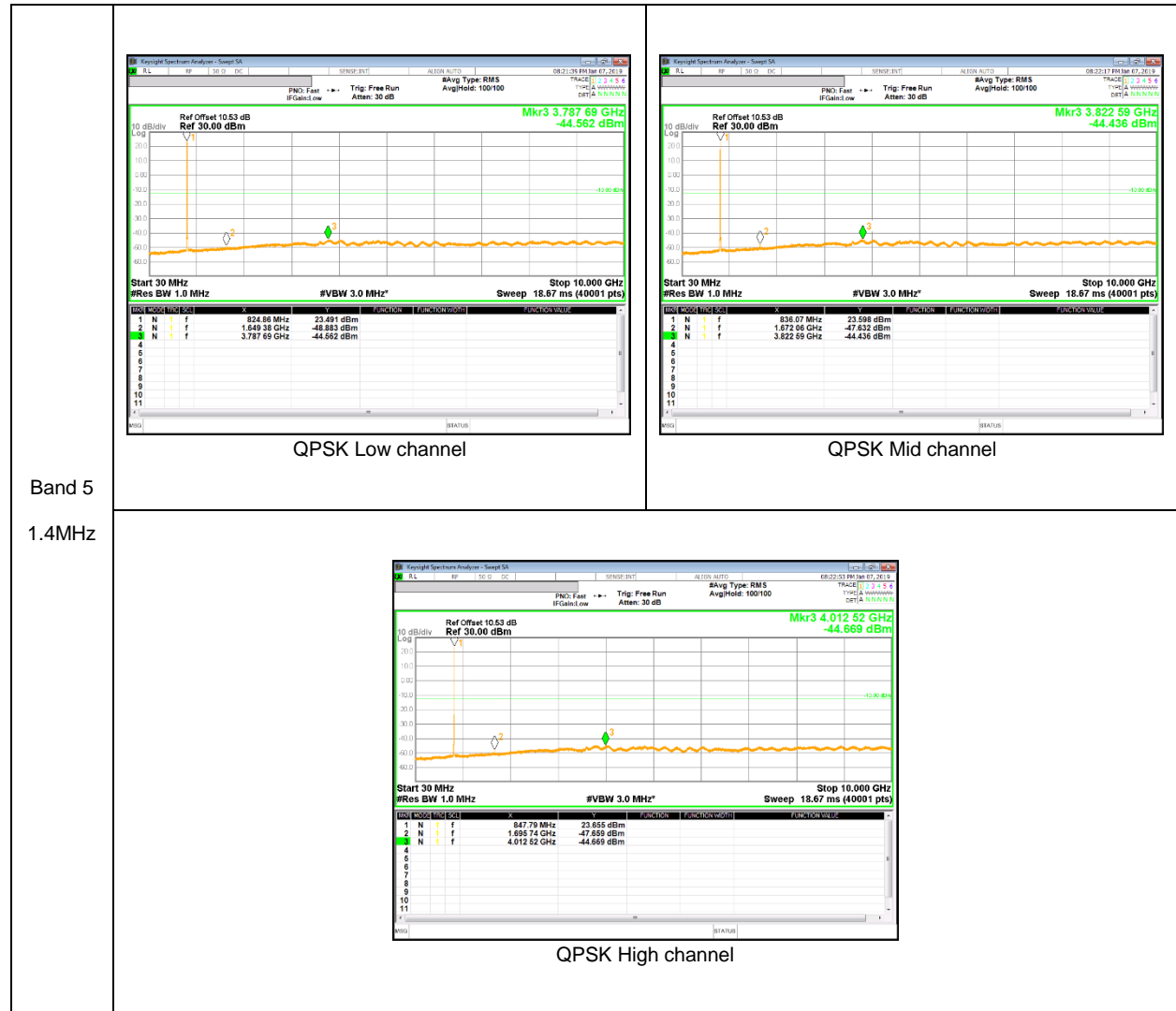
WCDMA Band 2



LTE Band 2



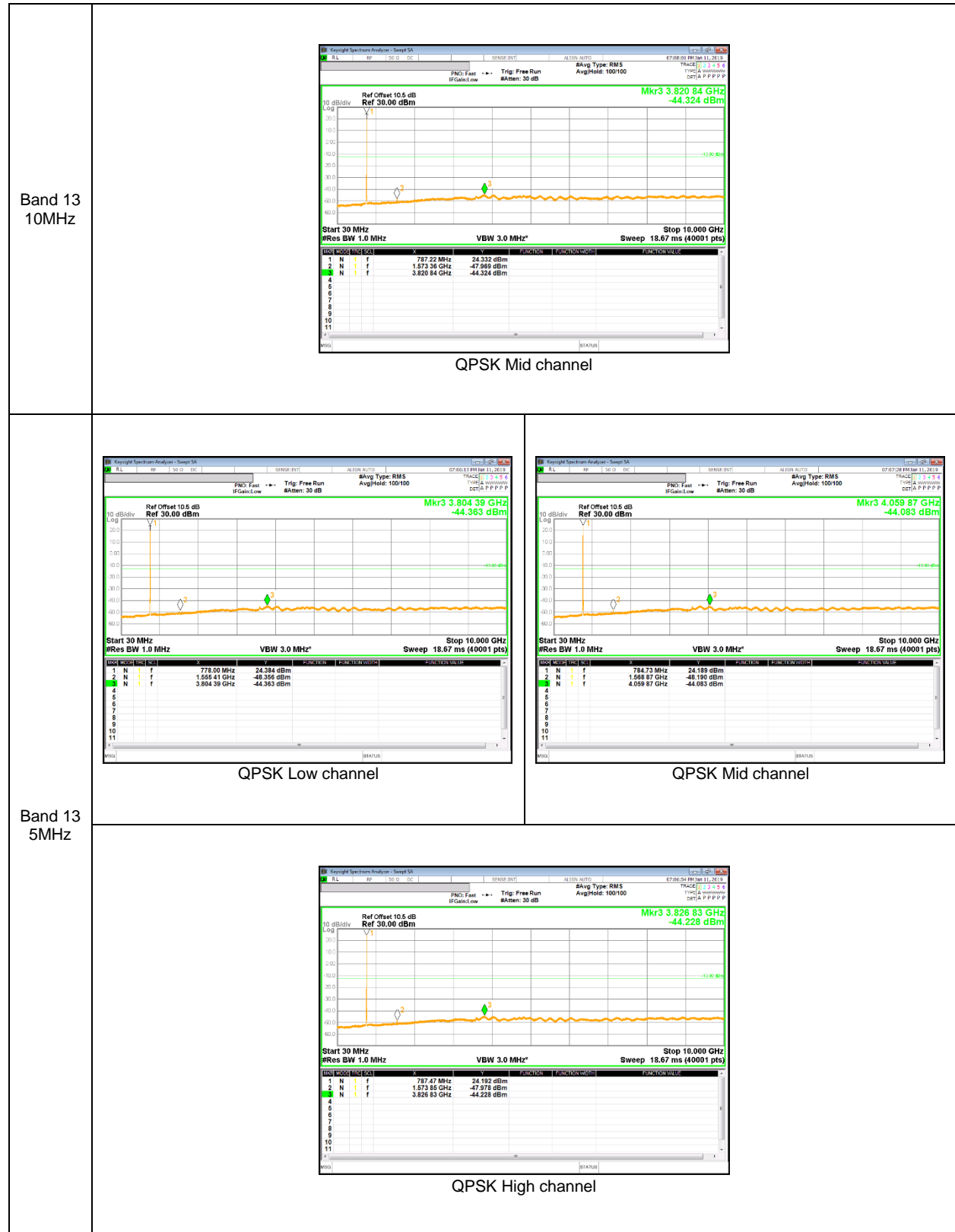
LTE Band 5



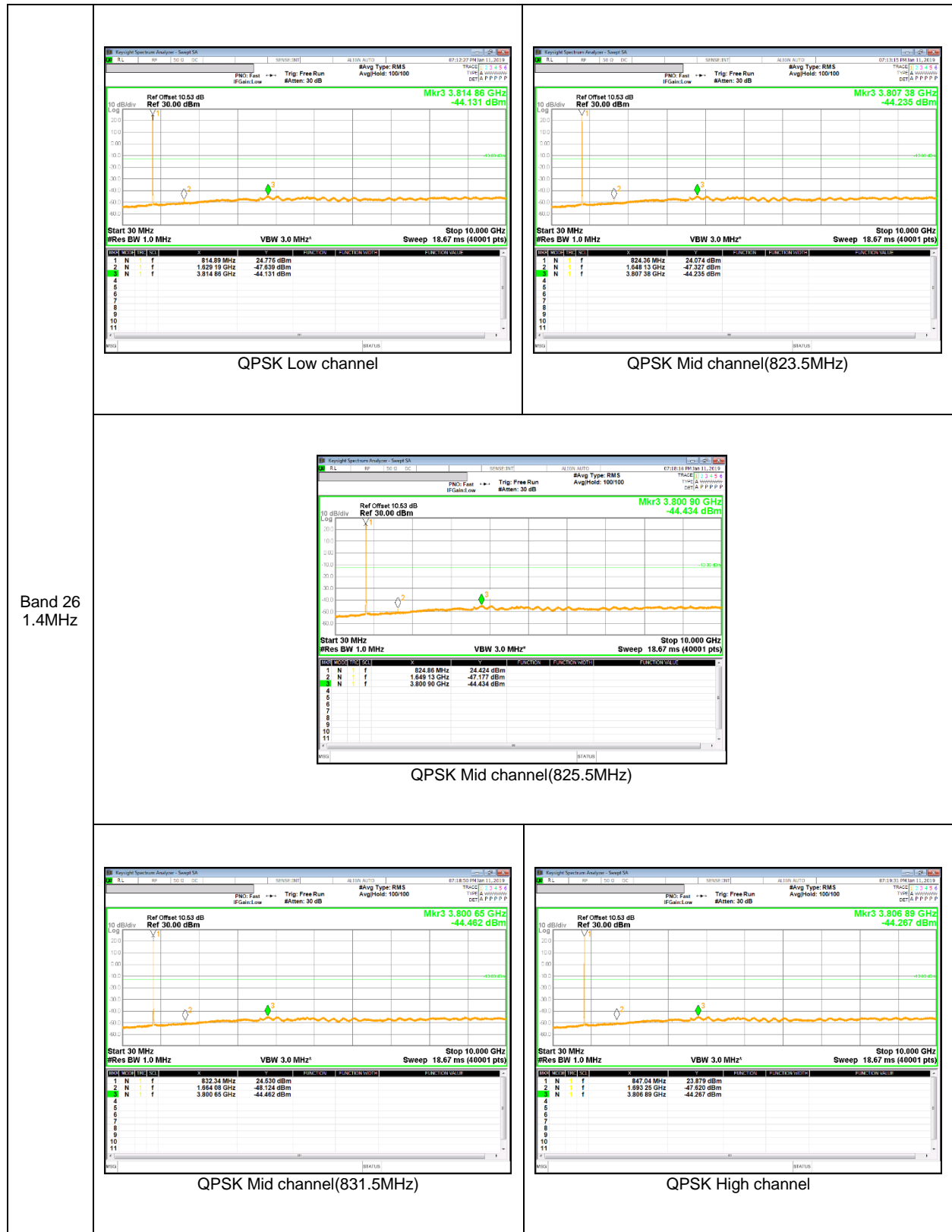
LTE Band 12



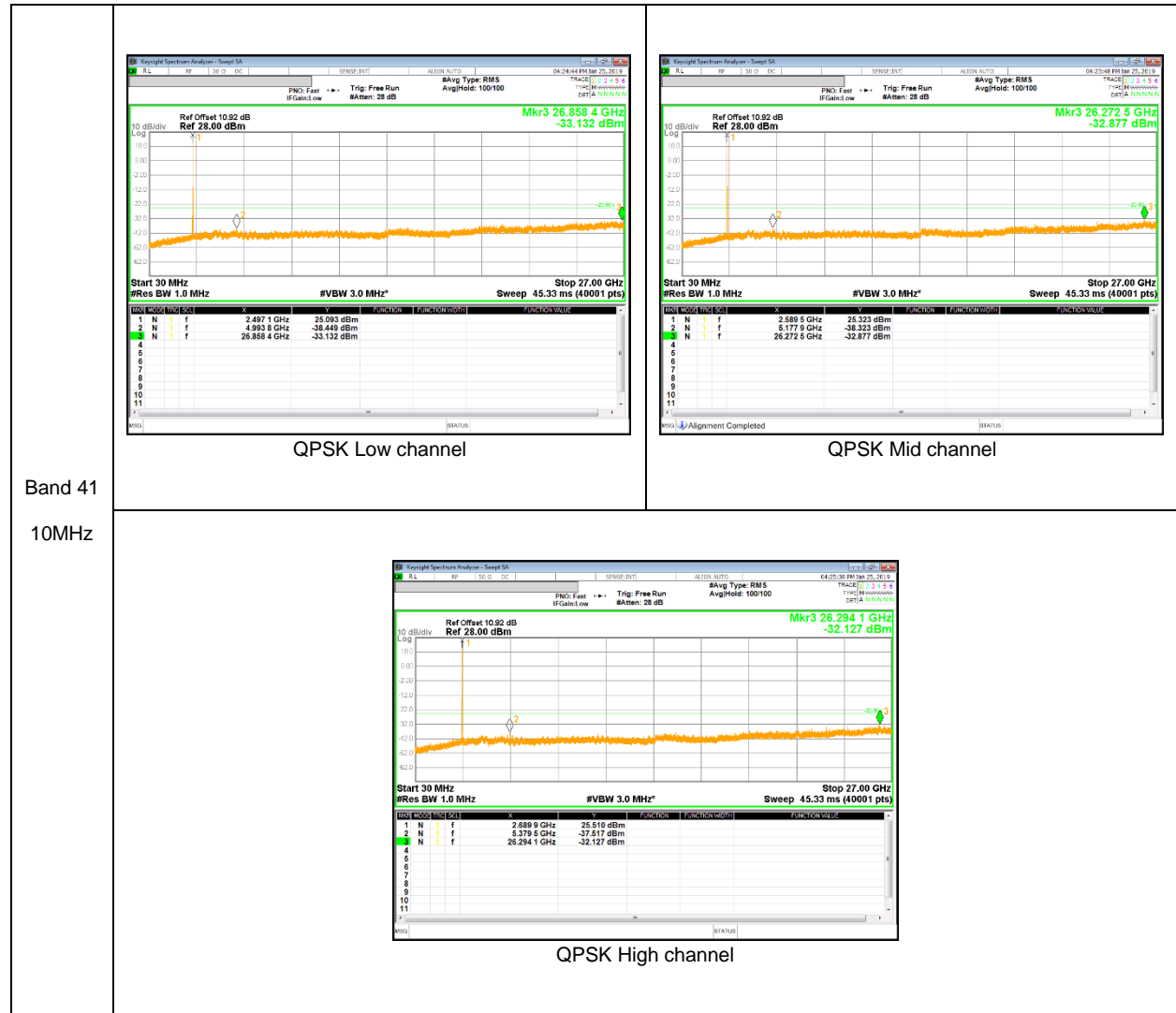
LTE Band 13



LTE Band 26



LTE Band 41



LTE Band 66



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]		
3.85	50	824.20001997	-0.004	848.80001735	0.006	2.5	
3.85	40	824.20001570	0.002	848.80001679	0.007	2.5	
3.85	30	824.20002497	-0.010	848.80001998	0.003	2.5	
3.85	20	824.20001705	0.000	848.80002268	0.000	2.5	
3.85	10	824.20002439	-0.009	848.80002461	-0.002	2.5	
3.85	0	824.20002297	-0.007	848.80002254	0.000	2.5	
3.85	-10	824.20002341	-0.008	848.80002163	0.001	2.5	
3.85	-20	824.20002188	-0.006	848.80002071	0.002	2.5	
3.85	-30	824.20001684	0.000	848.80001979	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]		
3.85	20	824.20001705	0	848.80002268	0	2.5	
4.35	20	824.20002066	-0.004	848.80001619	0.008	2.5	
3.60	20	824.20001843	-0.002	848.80002233	0.000	2.5	

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

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0802	1909.9187		
Extreme (50C)		1850.0803	1909.9187	27.6	0.015
Extreme (40C)		1850.0803	1909.9187	23.5	0.012
Extreme (30C)		1850.0803	1909.9187	29.3	0.016
Extreme (10C)		1850.0803	1909.9187	30.5	0.016
Extreme (0C)		1850.0803	1909.9187	21.7	0.012
Extreme (-10C)		1850.0803	1909.9187	23.0	0.012
Extreme (-20C)		1850.0803	1909.9187	27.1	0.014
Extreme (-30C)		1850.0803	1909.9187	29.9	0.016
20C	15%	1850.0803	1909.9187	20.9	0.011
	-15%	1850.0803	1909.9187	20.7	0.011
	End Point	1850.0803	1909.9187	21.7	0.012

WCDMA Band 5 (HSDPA)

Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C				
2066.000	Hz	High Channel	2116.500	Hz
Frequency Deviation Measured with Time Elapse				
Low Channel		High Channel		Limit [ppm]
[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
826.40002089	-0.001	846.60002151	0.004	2.5
826.40001581	0.005	846.60002506	-0.001	2.5
826.40002008	0.000	846.60001602	0.010	2.5
826.40001982	0.000	846.60002459	0.000	2.5
826.40001868	0.001	846.60001793	0.008	2.5
826.40002110	-0.002	846.60001560	0.011	2.5
826.40002374	-0.005	846.60001937	0.006	2.5
826.40002257	-0.003	846.60001565	0.011	2.5
826.40002289	-0.004	846.60002558	-0.001	2.5

Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C				
2066.000	Hz	High Channel	2116.500	Hz
Frequency Deviation Measured with Time Elapse				
Low Channel		High Channel		Limit [ppm]
[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
826.40001982	0	846.60002459	0	2.5
826.40001596	0.005	846.60001846	0.007	2.5
826.40001920	0.001	846.60001931	0.006	2.5

WCDMA Band 2 (HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6021	26.6	0.014
Extreme (40C)		1852.3980	1907.6021	30.8	0.016
Extreme (30C)		1852.3980	1907.6021	30.6	0.016
Extreme (10C)		1852.3979	1907.6021	25.9	0.014
Extreme (0C)		1852.3979	1907.6021	22.1	0.012
Extreme (-10C)		1852.3980	1907.6021	30.0	0.016
Extreme (-20C)		1852.3979	1907.6021	24.6	0.013
Extreme (-30C)		1852.3979	1907.6021	20.5	0.011
20C		15%	1852.3979	1907.6021	29.9
	-15%	1852.3980	1907.6021	25.3	0.013
	End Point	1852.3980	1907.6021	23.7	0.013

WCDMA Band 4 (Lowest Frequency: HSDPA / Highest Frequency: Rel. 99)

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	1712.3979	1752.6021		
Extreme (50C)		1712.3979	1752.6020	-25.8	-0.015
Extreme (40C)		1712.3979	1752.6021	-23.2	-0.013
Extreme (30C)		1712.3979	1752.6021	-20.5	-0.012
Extreme (10C)		1712.3979	1752.6020	-28.0	-0.016
Extreme (0C)		1712.3979	1752.6020	-24.7	-0.014
Extreme (-10C)		1712.3979	1752.6021	-23.7	-0.014
Extreme (-20C)		1712.3979	1752.6021	-20.0	-0.012
Extreme (-30C)		1712.3979	1752.6021	-20.7	-0.012
20C	15%	1712.3979	1752.6020	-27.7	-0.016
	-15%	1712.3979	1752.6020	-28.4	-0.016
	End Point	1712.3979	1752.6020	-25.5	-0.015

LTE Band 2 (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	1850.6995	1909.3005		
Extreme (50C)		1850.6994	1909.3005	-20.2	-0.011
Extreme (40C)		1850.6994	1909.3005	-25.0	-0.013
Extreme (30C)		1850.6994	1909.3005	-29.9	-0.016
Extreme (10C)		1850.6994	1909.3005	-21.0	-0.011
Extreme (0C)		1850.6994	1909.3005	-23.7	-0.013
Extreme (-10C)		1850.6994	1909.3005	-21.0	-0.011
Extreme (-20C)		1850.6994	1909.3005	-28.4	-0.015
Extreme (-30C)		1850.6994	1909.3005	-21.4	-0.011
20C		15%	1850.6994	1909.3005	-25.2
	-15%	1850.6994	1909.3005	-27.9	-0.015
	End Point	1850.6994	1909.3005	-23.4	-0.012

LTE Band 5 (16QAM)

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	824.69998238	-0.003	848.29997765	0.004	2.5	
3.85	40	824.69998024	0.000	848.29998203	-0.001	2.5	
3.85	30	824.69998318	-0.004	848.29997704	0.005	2.5	
3.85	20	824.69997989	0.000	848.29998138	0.000	2.5	
3.85	10	824.69998334	-0.004	848.29997992	0.002	2.5	
3.85	0	824.69998448	-0.006	848.29997508	0.007	2.5	
3.85	-10	824.69997752	0.003	848.29997755	0.005	2.5	
3.85	-20	824.69997752	0.003	848.29997926	0.002	2.5	
3.85	-30	824.69997784	0.002	848.29997743	0.005	2.5	

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	824.69997989	0	848.29998138	0	2.5	
4.35	20	824.69997903	0.001	848.29997865	0.003	2.5	
3.60	20	824.69998047	-0.001	848.29998217	-0.001	2.5	

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

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	699.6995	715.3005		
Extreme (50C)		699.6994	715.3005	-19.2	-0.027
Extreme (40C)		699.6994	715.3005	-15.3	-0.022
Extreme (30C)		699.6994	715.3005	-22.7	-0.032
Extreme (10C)		699.6994	715.3005	-16.6	-0.023
Extreme (0C)		699.6994	715.3005	-23.2	-0.033
Extreme (-10C)		699.6994	715.3005	-23.3	-0.033
Extreme (-20C)		699.6994	715.3005	-20.2	-0.029
Extreme (-30C)		699.6994	715.3005	-20.5	-0.029
20C		15%	699.6994	715.3005	-21.3
	-15%	699.6994	715.3005	-21.2	-0.030
	End Point	699.6994	715.3005	-20.9	-0.030

LTE Band 13 (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	779.4978	784.5022		
Extreme (50C)		779.4977	784.5022	-20.1	-0.026
Extreme (40C)		779.4977	784.5022	-23.8	-0.030
Extreme (30C)		779.4977	784.5022	-24.8	-0.032
Extreme (10C)		779.4977	784.5022	-15.5	-0.020
Extreme (0C)		779.4977	784.5022	-22.6	-0.029
Extreme (-10C)		779.4977	784.5022	-18.0	-0.023
Extreme (-20C)		779.4977	784.5022	-23.8	-0.030
Extreme (-30C)		779.4977	784.5022	-22.9	-0.029
20C		15%	779.4977	784.5022	-19.3
	-15%	779.4977	784.5022	-17.3	-0.022
	End Point	779.4977	784.5022	-20.1	-0.026

LTE Band 26 (QPSK)

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]		
3.80	50	814.69997767	0.001	848.29997665	0.002	2.5	
3.80	40	814.69997462	0.005	848.29997756	0.001	2.5	
3.80	30	814.69997358	0.006	848.29997107	0.008	2.5	
3.80	20	814.69997868	0.000	848.29997804	0.000	2.5	
3.80	10	814.69998029	-0.002	848.29997679	0.001	2.5	
3.80	0	814.69997999	-0.002	848.29997251	0.007	2.5	
3.80	-10	814.69997578	0.004	848.29997338	0.005	2.5	
3.80	-20	814.69997872	0.000	848.29997134	0.008	2.5	
3.80	-30	814.69997856	0.000	848.29997826	0.000	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]		
3.85	20	814.69997868	0	848.29997804	0	2.5	
4.35	20	814.69997722	0.002	848.29997417	0.005	2.5	
3.60	20	814.69997338	0.007	848.29997069	0.009	2.5	

LTE Band 41 (QPSK)

Limit		2496	2690	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	2498.4977	2687.5023		
Extreme (50C)		2498.4977	2687.5022	-45.2	-0.017
Extreme (40C)		2498.4977	2687.5022	-43.7	-0.017
Extreme (30C)		2498.4977	2687.5022	-36.7	-0.014
Extreme (10C)		2498.4977	2687.5022	-40.2	-0.016
Extreme (0C)		2498.4977	2687.5022	-43.0	-0.017
Extreme (-10C)		2498.4977	2687.5022	-37.6	-0.015
Extreme (-20C)		2498.4977	2687.5022	-43.4	-0.017
Extreme (-30C)		2498.4977	2687.5022	-39.2	-0.015
20C		15%	2498.4977	2687.5022	-35.9
	-15%	2498.4977	2687.5022	-40.6	-0.016
	End Point	2498.4977	2687.5022	-41.6	-0.016

LTE Band 66 (QPSK)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6994	1779.3005	-21.9	-0.013
Extreme (40C)		1710.6994	1779.3005	-20.6	-0.012
Extreme (30C)		1710.6994	1779.3005	-25.4	-0.015
Extreme (10C)		1710.6994	1779.3005	-26.1	-0.015
Extreme (0C)		1710.6994	1779.3005	-28.7	-0.016
Extreme (-10C)		1710.6994	1779.3005	-22.0	-0.013
Extreme (-20C)		1710.6994	1779.3005	-26.5	-0.015
Extreme (-30C)		1710.6994	1779.3005	-28.4	-0.016
20C		15%	1710.6994	1779.3005	-26.5
	-15%	1710.6994	1779.3005	-27.7	-0.016
	End Point	1710.6994	1779.3005	-24.1	-0.014

LTE Band 17

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

LTE Band 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.

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS

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

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

27.50:

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

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

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

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

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

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

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

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	26.59	456.04
		661	836.6	27.51	563.64
		810	848.8	27.98	628.06
	EGPRS	512	824.2	20.76	119.12
		661	836.6	22.09	161.81
		810	848.8	22.85	192.75
GSM1900	GPRS	512	1850.2	26.88	487.53
		661	1880	30.11	1025.65
		810	1909.8	30.36	1086.43
	EGPRS	512	1850.2	25.11	324.34
		661	1880	28.45	699.84
		810	1909.8	28.86	769.13

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.83	60.67
		4183	836.6	17.38	54.70
		4233	846.6	18.33	68.08
	HSDPA	4132	826.4	17.34	54.20
		4183	836.6	17.36	54.45
		4233	846.6	18.16	65.46
Band 4	REL99	1312	1712.4	22.30	169.82
		1413	1732.6	22.09	161.81
		1513	1752.6	19.75	94.41
	HSDPA	1312	1712.4	22.30	169.82
		1413	1732.6	22.17	164.82
		1513	1752.6	19.75	94.41
Band 2	REL99	9262	1852.4	21.75	149.62
		9400	1880.0	23.62	230.14
		9538	1907.6	23.85	242.66
	HSDPA	9262	1852.4	21.30	134.90
		9400	1880.0	23.27	212.32
		9538	1907.6	23.50	223.87

LTE Band 2

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 2	20	QPSK	1 / 99	1860.0	22.74	187.93
			1 / 0	1880.0	23.67	232.81
			1 / 49	1900.0	21.95	156.68
		16QAM	1 / 49	1860.0	21.56	143.22
			1 / 0	1880.0	22.74	187.93
			1 / 49	1900.0	20.28	106.66
	15	QPSK	1 / 74	1857.5	23.73	236.05
			1 / 0	1880.0	23.47	222.33
			1 / 0	1902.5	22.05	160.32
		16QAM	1 / 37	1857.5	22.73	187.50
			1 / 0	1880.0	22.52	178.65
			1 / 0	1902.5	20.60	114.82
	10	QPSK	1 / 49	1855.0	23.88	244.34
			1 / 0	1880.0	22.92	195.88
			1 / 0	1905.0	21.94	156.31
		16QAM	1 / 0	1855.0	22.88	194.09
			1 / 0	1880.0	21.61	144.88
			1 / 0	1905.0	20.40	109.65
	5	QPSK	1 / 24	1852.5	24.47	279.90
			1 / 0	1880.0	22.53	179.06
			1 / 0	1907.5	19.18	82.79
		16QAM	1 / 24	1852.5	22.79	190.11
			1 / 0	1880.0	21.44	139.32
			1 / 24	1907.5	17.97	62.66
	3	QPSK	1 / 8	1851.5	23.80	239.88
			1 / 8	1880.0	21.84	152.76
			1 / 0	1908.5	19.35	86.10
		16QAM	1 / 0	1851.5	22.66	184.50
			1 / 14	1880.0	21.50	141.25
			1 / 0	1908.5	18.24	66.68
1.4	QPSK	1 / 5	1850.7	23.89	244.91	
		1 / 5	1880.0	22.41	174.18	
		1 / 5	1909.3	19.43	87.70	
	16QAM	1 / 5	1850.7	22.77	189.23	
		1 / 3	1880.0	21.48	140.60	
		1 / 3	1909.3	17.80	60.26	

LTE Band 5

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 5	10	QPSK	1 / 0	829.0	17.99	62.95
			1 / 49	836.5	17.85	60.95
			1 / 0	844.0	17.88	61.38
		16QAM	1 / 0	829.0	16.66	46.34
			1 / 25	836.5	17.04	50.58
			1 / 0	844.0	16.42	43.85
	5	QPSK	1 / 0	826.5	17.65	58.21
			1 / 0	836.5	17.64	58.08
			1 / 12	846.5	18.43	69.66
		16QAM	1 / 24	826.5	15.64	36.64
			1 / 0	836.5	16.20	41.69
			1 / 0	846.5	16.98	49.89
	3	QPSK	1 / 0	825.5	17.38	54.70
			1 / 8	836.5	17.49	56.10
			1 / 14	847.5	18.10	64.57
		16QAM	1 / 8	825.5	16.16	41.30
			1 / 0	836.5	16.80	47.86
			1 / 8	847.5	17.20	52.48
	1.4	QPSK	1 / 3	824.7	17.12	51.52
			1 / 0	836.5	17.51	56.36
			1 / 0	848.3	18.08	64.27
		16QAM	1 / 3	824.7	15.79	37.93
			1 / 3	836.5	15.65	36.73
			1 / 0	848.3	16.99	50.00

LTE Band 12

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 12	10	QPSK	1 / 0	704.0	16.11	40.83
			1 / 49	707.5	17.76	59.70
			1 / 0	711.0	16.76	47.42
		16QAM	1 / 0	704.0	14.94	31.19
			1 / 49	707.5	17.02	50.35
			1 / 25	711.0	16.06	40.36
	5	QPSK	1 / 0	701.5	15.74	37.50
			1 / 24	707.5	17.22	52.72
			1 / 12	713.5	18.00	63.10
		16QAM	1 / 0	701.5	14.62	28.97
			1 / 24	707.5	16.87	48.64
			1 / 24	713.5	17.08	51.05
	3	QPSK	1 / 8	700.5	15.71	37.24
			1 / 8	707.5	16.95	49.55
			1 / 8	714.5	18.26	66.99
		16QAM	1 / 8	700.5	14.81	30.27
			1 / 0	707.5	16.13	41.02
			1 / 0	714.5	16.55	45.19
	1.4	QPSK	1 / 3	699.7	15.73	37.41
			1 / 5	707.5	17.15	51.88
			1 / 5	715.3	18.03	63.53
		16QAM	1 / 3	699.7	14.70	29.51
			1 / 5	707.5	16.15	41.21
			1 / 5	715.3	17.23	52.84

LTE Band 13

Band	BW	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
	[MHz]				[dBm]	[mW]
Band 13	10	QPSK	1 / 49	782.0	16.64	46.13
		16QAM	1 / 0	782.0	15.62	36.48
	5	QPSK	1 / 0	779.5	17.06	50.82
			1 / 24	782.0	16.70	46.77
			1 / 24	784.5	16.46	44.26
	16QAM	1 / 0	779.5	16.04	40.18	
		1 / 0	782.0	16.29	42.56	
		1 / 24	784.5	15.47	35.24	

LTE Band 26

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP	
					[dBm]	[mW]
Band 26	15	QPSK	1 / 0	821.5	16.10	40.74
			1 / 0	831.5	16.70	46.77
			1 / 37	841.5	17.27	53.33
		16QAM	1 / 0	821.5	15.34	34.20
			1 / 0	831.5	15.86	38.55
			1 / 37	841.5	16.51	44.77
	10	QPSK	1 / 0	819.0	15.87	38.64
			1 / 0	829.0	17.74	59.43
			1 / 0	831.5	16.76	47.42
			1 / 0	844.0	16.94	49.43
		16QAM	1 / 0	819.0	15.08	32.21
			1 / 0	829.0	16.38	43.45
			1 / 0	831.5	15.79	37.93
			1 / 0	844.0	16.18	41.50
			1 / 0	844.0	16.18	41.50
	5	QPSK	1 / 0	816.5	16.03	40.09
			1 / 0	821.5	17.45	55.59
			1 / 0	826.5	17.59	57.41
			1 / 0	831.5	16.77	47.53
			1 / 0	846.5	16.76	47.42
		16QAM	1 / 0	816.5	14.93	31.12
			1 / 0	821.5	16.37	43.35
			1 / 0	826.5	16.16	41.30
			1 / 12	831.5	15.44	34.99
			1 / 0	846.5	16.26	42.27
	3	QPSK	1 / 0	815.5	15.96	39.45
			1 / 0	822.5	17.22	52.72
			1 / 0	825.5	17.65	58.21
			1 / 8	831.5	16.38	43.45
			1 / 0	847.5	16.94	49.43
		16QAM	1 / 14	815.5	14.93	31.12
			1 / 0	822.5	15.67	36.90
			1 / 0	825.5	16.63	46.03
			1 / 0	831.5	15.28	33.73
			1 / 0	847.5	16.27	42.36
	1.4	QPSK	1 / 0	814.7	16.08	40.55
			1 / 5	823.3	17.35	54.33
			1 / 5	824.7	17.15	51.88
			1 / 5	831.5	16.30	42.66
			1 / 0	848.3	16.82	48.08
16QAM		1 / 0	814.7	14.90	30.90	
		1 / 0	823.3	16.29	42.56	
		1 / 0	824.7	16.18	41.50	
		1 / 3	831.5	15.26	33.57	
		1 / 3	848.3	16.14	41.11	

LTE Band 41

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1 / 49	2506.0	23.97	249.46
			1 / 0	2593.0	24.33	271.02
			1 / 99	2680.0	22.52	178.65
		16QAM	1 / 0	2506.0	23.29	213.30
			1 / 49	2593.0	23.19	208.45
			1 / 99	2680.0	21.83	152.41
	15	QPSK	1 / 0	2503.5	23.67	232.81
			1 / 0	2593.0	24.11	257.63
			1 / 74	2682.5	21.04	127.06
		16QAM	1 / 0	2503.5	22.71	186.64
			1 / 0	2593.0	22.96	197.70
			1 / 0	2682.5	22.01	158.85
	10	QPSK	1 / 0	2501.0	23.64	231.21
			1 / 0	2593.0	24.08	255.86
			1 / 49	2685.0	21.71	148.25
		16QAM	1 / 0	2501.0	23.43	220.29
			1 / 0	2593.0	24.08	255.86
			1 / 49	2685.0	21.53	142.23
	5	QPSK	1 / 0	2498.5	23.77	238.23
			1 / 24	2593.0	23.76	237.68
			1 / 24	2687.5	22.07	161.06
		16QAM	1 / 0	2498.5	23.15	206.54
			1 / 0	2593.0	22.54	179.47
			1 / 24	2687.5	22.42	174.58

LTE Band 17

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

LTE Band 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 66

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 66	20	QPSK	1 / 0	1720.0	21.40	138.04
			1 / 0	1745.0	22.53	179.06
			1 / 0	1770.0	23.26	211.84
		16QAM	1 / 0	1720.0	19.71	93.54
			1 / 0	1745.0	21.26	133.66
			1 / 0	1770.0	22.02	159.22
	15	QPSK	1 / 0	1717.5	20.19	104.47
			1 / 0	1747.5	22.02	159.22
			1 / 0	1772.5	23.54	225.94
		16QAM	1 / 0	1717.5	21.75	149.62
			1 / 0	1747.5	20.96	124.74
			1 / 37	1772.5	22.21	166.34
	10	QPSK	1 / 0	1715.0	22.39	173.38
			1 / 0	1745.0	22.62	182.81
			1 / 0	1775.0	23.90	245.47
		16QAM	1 / 0	1715.0	20.35	108.39
			1 / 0	1745.0	20.85	121.62
			1 / 0	1775.0	22.77	189.23
	5	QPSK	1 / 0	1712.5	21.31	135.21
			1 / 0	1745.0	22.68	185.35
			1 / 12	1777.5	23.68	233.35
		16QAM	1 / 0	1712.5	20.29	106.91
			1 / 0	1745.0	21.32	135.52
			1 / 12	1777.5	22.53	179.06
	3	QPSK	1 / 14	1711.5	20.28	106.66
			1 / 0	1745.0	22.66	184.50
			1 / 8	1778.5	23.58	228.03
		16QAM	1 / 14	1711.5	19.31	85.31
			1 / 8	1745.0	19.02	79.80
			1 / 8	1778.5	22.54	179.47
1.4	QPSK	1 / 0	1710.7	21.12	129.42	
		1 / 5	1745.0	22.70	186.21	
		1 / 0	1779.3	23.24	210.86	
	16QAM	1 / 5	1710.7	19.53	89.74	
		1 / 3	1745.0	21.77	150.31	
		1 / 0	1779.3	22.34	171.40	

10.1.2. ERP/EIRP DATA

GSM850

GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 4788805451 Date: 2019-01-15 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 1 Mode: GPRS 850 MHz Fundamentals <u>Test Equipment:</u> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable																																																																																										
	<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>Low Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>824.20</td> <td>31.08</td> <td>V</td> <td>3.0</td> <td>-1.5</td> <td>26.59</td> <td>38.5</td> <td>-11.9</td> <td></td> </tr> <tr> <td>824.20</td> <td>18.14</td> <td>H</td> <td>3.0</td> <td>-1.5</td> <td>13.65</td> <td>38.5</td> <td>-24.8</td> <td></td> </tr> <tr> <td>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>836.60</td> <td>31.97</td> <td>V</td> <td>3.0</td> <td>-1.4</td> <td>27.51</td> <td>38.5</td> <td>-11.0</td> <td></td> </tr> <tr> <td>836.60</td> <td>19.89</td> <td>H</td> <td>3.0</td> <td>-1.4</td> <td>15.42</td> <td>38.5</td> <td>-23.1</td> <td></td> </tr> <tr> <td>High Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>848.80</td> <td>32.42</td> <td>V</td> <td>3.1</td> <td>-1.4</td> <td>27.98</td> <td>38.5</td> <td>-10.5</td> <td></td> </tr> <tr> <td>848.80</td> <td>19.83</td> <td>H</td> <td>3.1</td> <td>-1.4</td> <td>15.39</td> <td>38.5</td> <td>-23.1</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	31.08	V	3.0	-1.5	26.59	38.5	-11.9		824.20	18.14	H	3.0	-1.5	13.65	38.5	-24.8		Mid Ch									836.60	31.97	V	3.0	-1.4	27.51	38.5	-11.0		836.60	19.89	H	3.0	-1.4	15.42	38.5	-23.1		High Ch									848.80	32.42	V	3.1	-1.4	27.98	38.5	-10.5		848.80	19.83	H	3.1	-1.4	15.39	38.5	-23.1	
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848.80	32.42	V	3.1	-1.4	27.98	38.5	-10.5																																																																																				
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GSM1900

GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 4788805451 Date: 2019-01-15 Test Engineer: 478989 Configuration: EUT / X-Position Location: Chamber 1 Mode: GPRS 1900 MHz Fundamentals <u>Test Equipment:</u> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable																																																																																										
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WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 4788805451 Date: 2019-01-15 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 1 Mode: Rel99 Band 5 Fundamentals <u>Test Equipment:</u> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable																																																																																										
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WCDMA Band 4

WCDMA Band 4 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 4788805413 Date: 2019-01-11 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: Rel99 Band 4 Fundamentals <u>Test Equipment:</u> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable																																																																																										
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WCDMA Band 4 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement																																																																																										
	Company: Samsung Project #: 4788805413 Date: 2019-01-11 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: HSDPA Band 4 Fundamentals <u>Test Equipment:</u> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable																																																																																										
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WCDMA Band 2

WCDMA Band 2 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2019-01-15 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: Rel99 Band 2 Fundamentals <u>Test Equipment:</u> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m 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								
	1852.40	2.32	V	4.5	9.5	7.32	33.0	-25.7	
	1852.40	16.75	H	4.5	9.5	21.75	33.0	-11.3	
	Mid Ch								
	1880.00	4.67	V	4.5	9.3	9.45	33.0	-23.6	
	1880.00	18.85	H	4.5	9.3	23.62	33.0	-9.4	
	High Ch								
	1907.60	15.91	V	4.6	9.1	20.42	33.0	-12.6	
	1907.60	19.33	H	4.6	9.1	23.85	33.0	-9.2	
WCDMA Band 2 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2019-01-15 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: HSDPA Band 2 Fundamentals <u>Test Equipment:</u> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m 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								
	1852.40	2.23	V	4.5	9.5	7.23	33.0	-25.8	
	1852.40	16.30	H	4.5	9.5	21.30	33.0	-11.7	
	Mid Ch								
	1880.00	3.63	V	4.5	9.3	8.41	33.0	-24.6	
	1880.00	18.50	H	4.5	9.3	23.27	33.0	-9.7	
	High Ch								
	1907.60	16.21	V	4.6	9.1	20.72	33.0	-12.3	
	1907.60	18.98	H	4.6	9.1	23.50	33.0	-9.5	

LTE Band 2

LTE Band 2 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-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], 2.5m 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	11.63	V	4.5	9.4	16.57	33.0	-16.4	
	1860.00	17.81	H	4.5	9.4	22.74	33.0	-10.3	
	Mid Ch								
	1880.00	8.30	V	4.5	9.3	13.08	33.0	-19.9	
	1880.00	18.90	H	4.5	9.3	23.67	33.0	-9.3	
High Ch									
1900.00	8.91	V	4.6	9.2	13.52	33.0	-19.5		
1900.00	17.33	H	4.6	9.2	21.95	33.0	-11.0		
LTE Band 2 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-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], 2.5m 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	10.46	V	4.5	9.4	15.40	33.0	-17.6	
	1860.00	16.63	H	4.5	9.4	21.56	33.0	-11.4	
	Mid Ch								
	1880.00	7.51	V	4.5	9.3	12.29	33.0	-20.7	
	1880.00	17.97	H	4.5	9.3	22.74	33.0	-10.3	
High Ch									
1900.00	7.55	V	4.6	9.2	12.16	33.0	-20.8		
1900.00	15.66	H	4.6	9.2	20.28	33.0	-12.7		

LTE Band 2 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	13.28	V	4.5	9.5	18.23	33.0	-14.8	
	1857.50	18.78	H	4.5	9.5	23.73	33.0	-9.3	
	Mid Ch								
	1880.00	10.47	V	4.5	9.3	15.25	33.0	-17.8	
	1880.00	18.70	H	4.5	9.3	23.47	33.0	-9.5	
High Ch									
1902.50	12.72	V	4.6	9.1	17.31	33.0	-15.7		
1902.50	17.47	H	4.6	9.1	22.05	33.0	-10.9		
LTE Band 2 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	12.00	V	4.5	9.5	16.95	33.0	-16.0	
	1857.50	17.78	H	4.5	9.5	22.73	33.0	-10.3	
	Mid Ch								
	1880.00	8.73	V	4.5	9.3	13.51	33.0	-19.5	
	1880.00	17.75	H	4.5	9.3	22.52	33.0	-10.5	
High Ch									
1902.50	11.34	V	4.6	9.1	15.93	33.0	-17.1		
1902.50	16.02	H	4.6	9.1	20.60	33.0	-12.4		

LTE Band 2 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	8.14	V	4.5	9.5	13.11	33.0	-19.9	
	1855.00	18.91	H	4.5	9.5	23.88	33.0	-9.1	
	Mid Ch								
	1880.00	8.44	V	4.5	9.3	13.22	33.0	-19.8	
	1880.00	18.15	H	4.5	9.3	22.92	33.0	-10.1	
High Ch									
1905.00	10.47	V	4.6	9.1	15.02	33.0	-18.0		
1905.00	17.39	H	4.6	9.1	21.94	33.0	-11.1		
LTE Band 2 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	7.32	V	4.5	9.5	12.29	33.0	-20.7	
	1855.00	17.91	H	4.5	9.5	22.88	33.0	-10.1	
	Mid Ch								
	1880.00	7.60	V	4.5	9.3	12.38	33.0	-20.6	
	1880.00	16.84	H	4.5	9.3	21.61	33.0	-11.4	
High Ch									
1905.00	9.22	V	4.6	9.1	13.77	33.0	-19.2		
1905.00	15.85	H	4.6	9.1	20.40	33.0	-12.6		

LTE Band 2 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth									
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1852.50	13.09	V	4.5	9.5	18.09	33.0	-14.9		
	1852.50	19.47	H	4.5	9.5	24.47	33.0	-8.5		
	Mid Ch									
	1880.00	7.89	V	4.5	9.3	12.67	33.0	-20.3		
	1880.00	17.76	H	4.5	9.3	22.53	33.0	-10.5		
High Ch										
1907.50	7.26	V	4.6	9.1	11.78	33.0	-21.2			
1907.50	14.66	H	4.6	9.1	19.18	33.0	-13.8			
LTE Band 2 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth									
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1852.50	14.30	V	4.5	9.5	19.30	33.0	-13.7		
	1852.50	17.79	H	4.5	9.5	22.79	33.0	-10.2		
	Mid Ch									
	1880.00	6.80	V	4.5	9.3	11.58	33.0	-21.4		
	1880.00	16.67	H	4.5	9.3	21.44	33.0	-11.6		
High Ch										
1907.50	6.19	V	4.6	9.1	10.71	33.0	-22.3			
1907.50	13.45	H	4.6	9.1	17.97	33.0	-15.0			

LTE Band 2 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	15.48	V	4.5	9.5	20.49	33.0	-12.5	
	1851.50	18.80	H	4.5	9.5	23.80	33.0	-9.2	
	Mid Ch								
	1880.00	9.85	V	4.5	9.3	14.63	33.0	-18.4	
	1880.00	17.07	H	4.5	9.3	21.84	33.0	-11.2	
High Ch									
1908.50	8.32	V	4.6	9.1	12.83	33.0	-20.2		
1908.50	14.85	H	4.6	9.1	19.35	33.0	-13.6		
LTE Band 2 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	14.39	V	4.5	9.5	19.40	33.0	-13.6	
	1851.50	17.66	H	4.5	9.5	22.66	33.0	-10.3	
	Mid Ch								
	1880.00	7.82	V	4.5	9.3	12.60	33.0	-20.4	
	1880.00	16.73	H	4.5	9.3	21.50	33.0	-11.5	
High Ch									
1908.50	8.20	V	4.6	9.1	12.71	33.0	-20.3		
1908.50	13.74	H	4.6	9.1	18.24	33.0	-14.8		

LTE Band 2 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	12.63	V	4.5	9.5	17.64	33.0	-15.4	
	1850.70	18.88	H	4.5	9.5	23.89	33.0	-9.1	
	Mid Ch								
	1880.00	5.98	V	4.5	9.3	10.76	33.0	-22.2	
	1880.00	17.64	H	4.5	9.3	22.41	33.0	-10.6	
High Ch									
1909.30	8.01	V	4.6	9.1	12.50	33.0	-20.5		
1909.30	14.94	H	4.6	9.1	19.43	33.0	-13.6		
LTE Band 2 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805413 Date: 2019-01-14 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	11.69	V	4.5	9.5	16.70	33.0	-16.3	
	1850.70	17.76	H	4.5	9.5	22.77	33.0	-10.2	
	Mid Ch								
	1880.00	3.58	V	4.5	9.3	8.36	33.0	-24.6	
	1880.00	16.71	H	4.5	9.3	21.48	33.0	-11.5	
High Ch									
1909.30	7.12	V	4.6	9.1	11.61	33.0	-21.4		
1909.30	13.31	H	4.6	9.1	17.80	33.0	-15.2		

LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2018-12-20 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m 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	22.47	V	3.0	-1.5	17.99	38.5	-20.5	
	829.00	8.76	H	3.0	-1.5	4.28	38.5	-34.2	
	Mid Ch								
	836.50	22.31	V	3.0	-1.4	17.85	38.5	-20.7	
	836.50	7.94	H	3.0	-1.4	3.47	38.5	-35.0	
High Ch									
844.00	22.33	V	3.1	-1.4	17.88	38.5	-20.6		
844.00	8.51	H	3.1	-1.4	4.06	38.5	-34.4		
LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2018-12-20 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m 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	21.14	V	3.0	-1.5	16.66	38.5	-21.8	
	829.00	7.58	H	3.0	-1.5	3.10	38.5	-35.4	
	Mid Ch								
	836.50	21.50	V	3.0	-1.4	17.04	38.5	-21.5	
	836.50	6.93	H	3.0	-1.4	2.46	38.5	-36.0	
High Ch									
844.00	20.87	V	3.1	-1.4	16.42	38.5	-22.1		
844.00	7.08	H	3.1	-1.4	2.63	38.5	-35.9		

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2018-12-20 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	22.14	V	3.0	-1.5	17.65	38.5	-20.8	
	826.50	9.29	H	3.0	-1.5	4.81	38.5	-33.7	
	Mid Ch								
	836.50	22.10	V	3.0	-1.4	17.64	38.5	-20.9	
	836.50	8.43	H	3.0	-1.4	3.96	38.5	-34.5	
High Ch									
846.50	22.88	V	3.1	-1.4	18.43	38.5	-20.1		
846.50	9.70	H	3.1	-1.4	5.25	38.5	-33.2		
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2018-12-20 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	20.13	V	3.0	-1.5	15.64	38.5	-22.9	
	826.50	8.30	H	3.0	-1.5	3.82	38.5	-34.7	
	Mid Ch								
	836.50	20.66	V	3.0	-1.4	16.20	38.5	-22.3	
	836.50	6.99	H	3.0	-1.4	2.52	38.5	-36.0	
High Ch									
846.50	21.43	V	3.1	-1.4	16.98	38.5	-21.5		
846.50	8.01	H	3.1	-1.4	3.56	38.5	-34.9		

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2018-12-20 Test Engineer: 45585 Configuration: EUT, Z-Posigion Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	21.86	V	3.0	-1.5	17.38	38.5	-21.1	
	825.50	9.09	H	3.0	-1.5	4.60	38.5	-33.9	
	Mid Ch								
	836.50	21.95	V	3.0	-1.4	17.49	38.5	-21.0	
	836.50	8.08	H	3.0	-1.4	3.61	38.5	-34.9	
High Ch									
847.50	22.54	V	3.1	-1.4	18.10	38.5	-20.4		
847.50	9.46	H	3.1	-1.4	5.02	38.5	-33.5		
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788805451 Date: 2019-01-16 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	20.64	V	3.0	-1.5	16.16	38.5	-22.3	
	825.50	7.58	H	3.0	-1.5	3.10	38.5	-35.4	
	Mid Ch								
	836.50	21.26	V	3.0	-1.4	16.80	38.5	-21.7	
	836.50	8.03	H	3.0	-1.4	3.57	38.5	-34.9	
High Ch									
847.50	21.64	V	3.1	-1.4	17.20	38.5	-21.3		
847.50	9.03	H	3.1	-1.4	4.58	38.5	-33.9		