

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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.

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

GSM

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
GSM850	GPRS	824.2	-24.25	-13.00	11.25
		836.6	-24.23		11.23
		848.8	-24.53		11.53
	EGPRS	824.2	-24.96		11.96
		836.6	-23.75		10.75
		848.8	-23.43		10.43
GSM1900	GPRS	1850.2	-24.27		11.27
		1880.0	-24.35		11.35
		1909.8	-23.48		10.48
	EGPRS	1850.2	-23.95		10.95
		1880.0	-23.93		10.93
		1909.8	-23.53		10.53

WCDMA

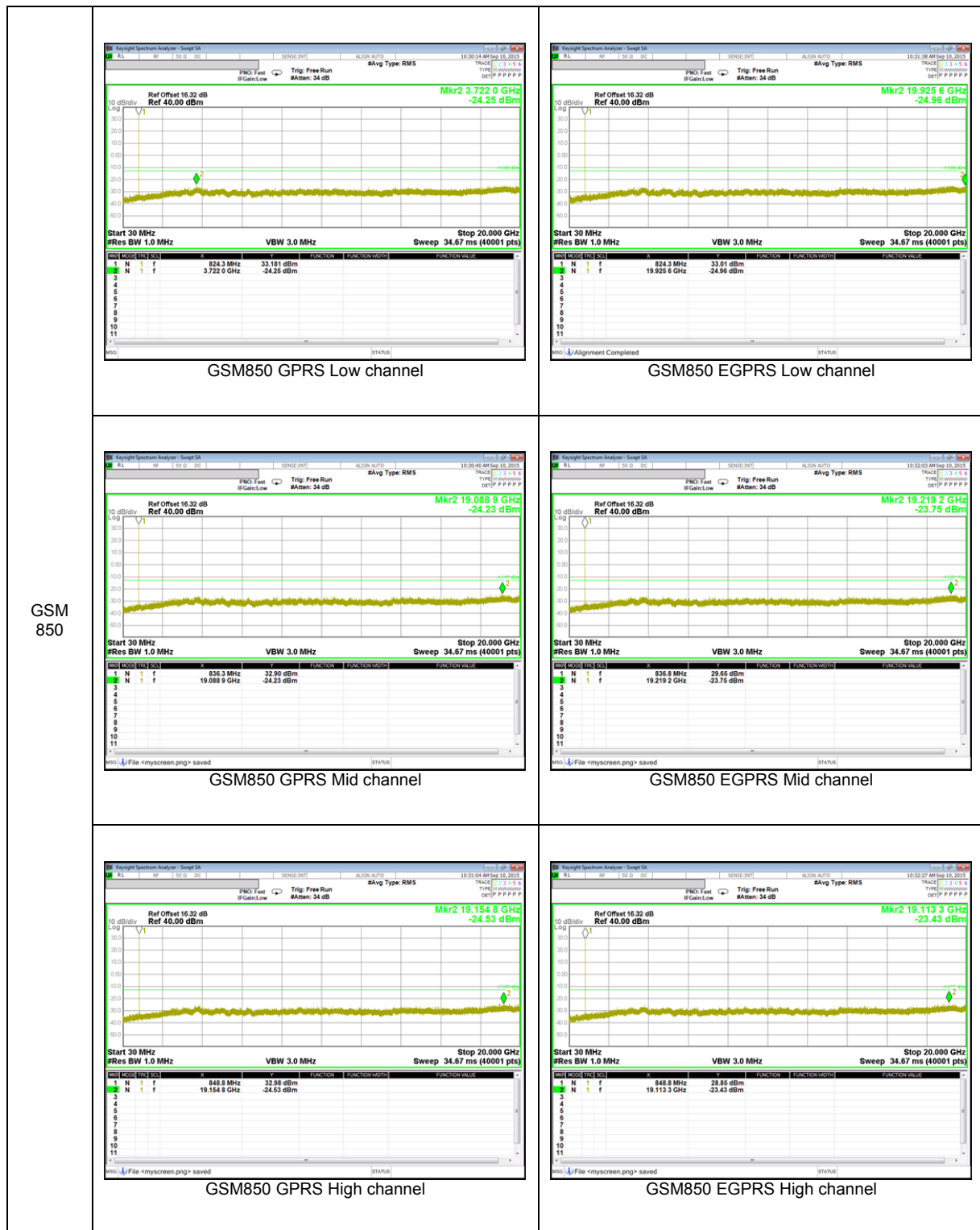
Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 5	REL99	826.4	-34.66	-13.00	21.66
		836.6	-34.65		21.65
		846.6	-33.98		20.98
	HSDPA	826.4	-34.79		21.79
		836.6	-35.15		22.15
		846.6	-34.79		21.79

LTE 5

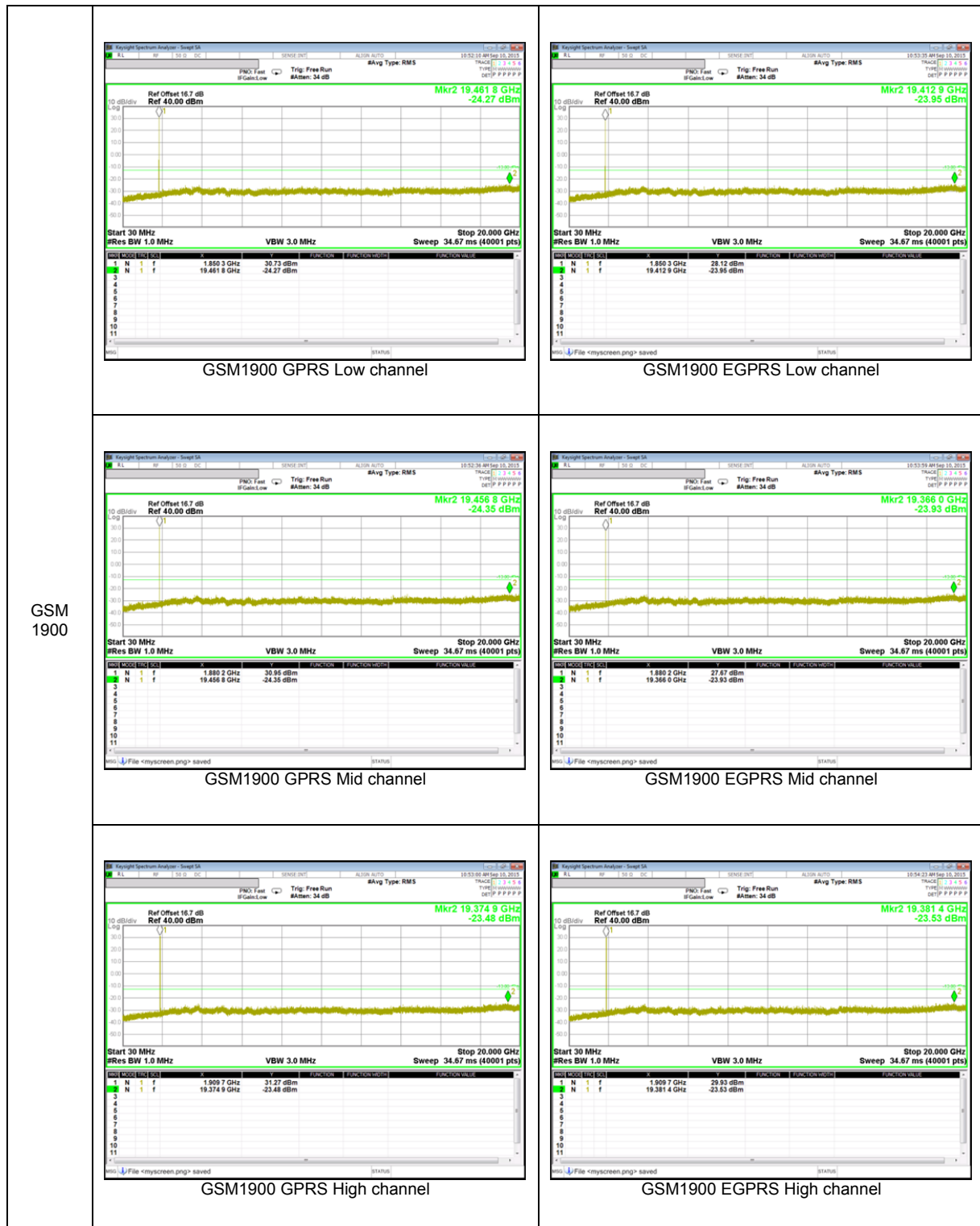
Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-29.04	-13.00	16.04
		836.5	-28.95		15.95
		844.0	-29.09		16.09
	16QAM	829.0	-29.27		16.27
		836.5	-28.55		15.55
		844.0	-29.47		16.47
5 MHz	QPSK	826.5	-29.19		16.19
		836.5	-28.42		15.42
		846.5	-29.16		16.16
	16QAM	826.5	-29.14		16.14
		836.5	-29.82		16.82
		846.5	-28.96		15.96
3 MHz	QPSK	825.5	-28.44		15.44
		836.5	-28.45		15.45
		847.5	-29.28		16.28
	16QAM	825.5	-28.97		15.97
		836.5	-28.32		15.32
		847.5	-27.57		14.57
1.4 MHz	QPSK	824.7	-28.94		15.94
		836.5	-26.96		13.96
		848.3	-27.59		14.59
	16QAM	824.7	-28.93		15.93
		836.5	-29.13		16.13
		848.3	-28.79		15.79

10.3.2. OUT OF BAND EMISSIONS PLOTS

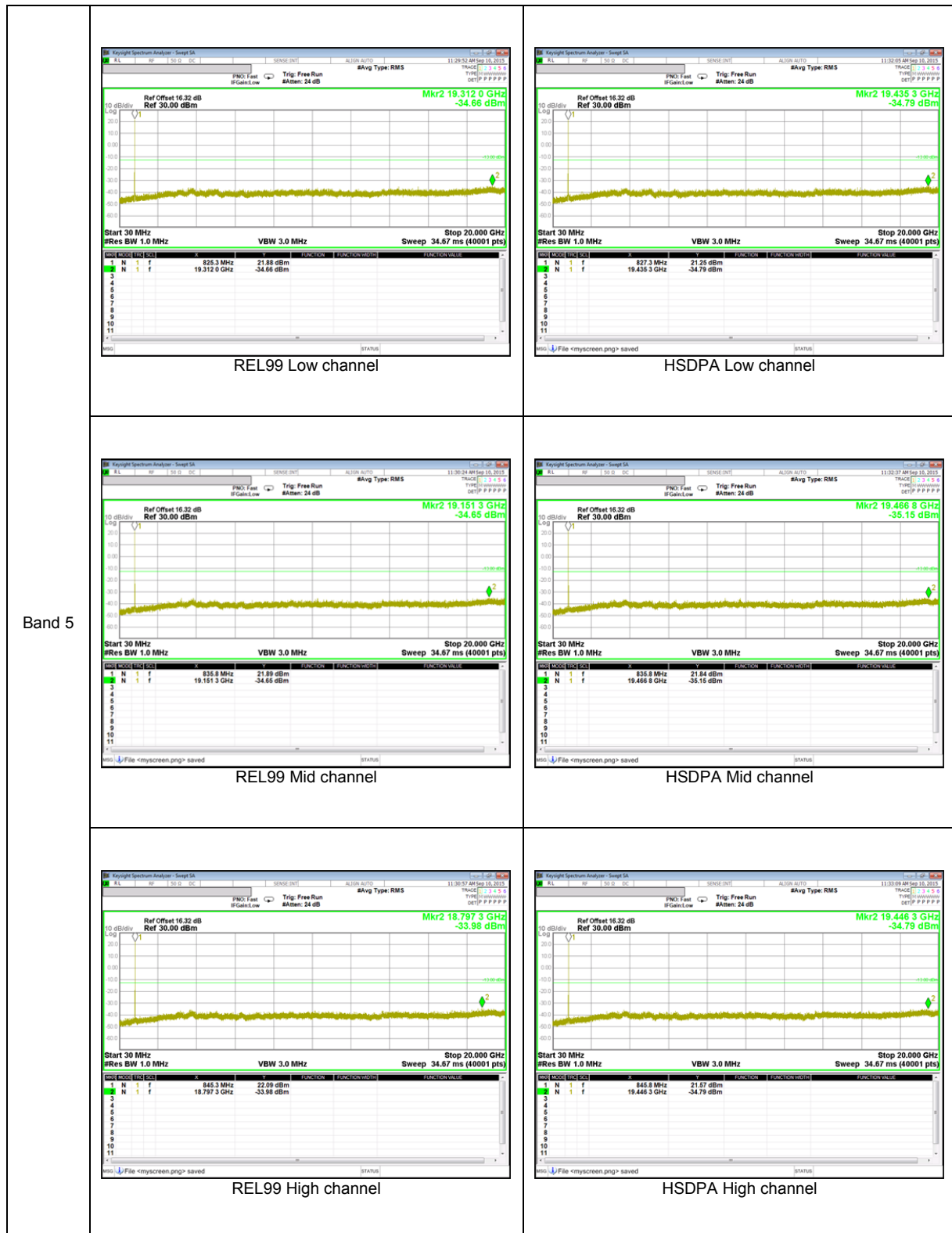
GSM 850



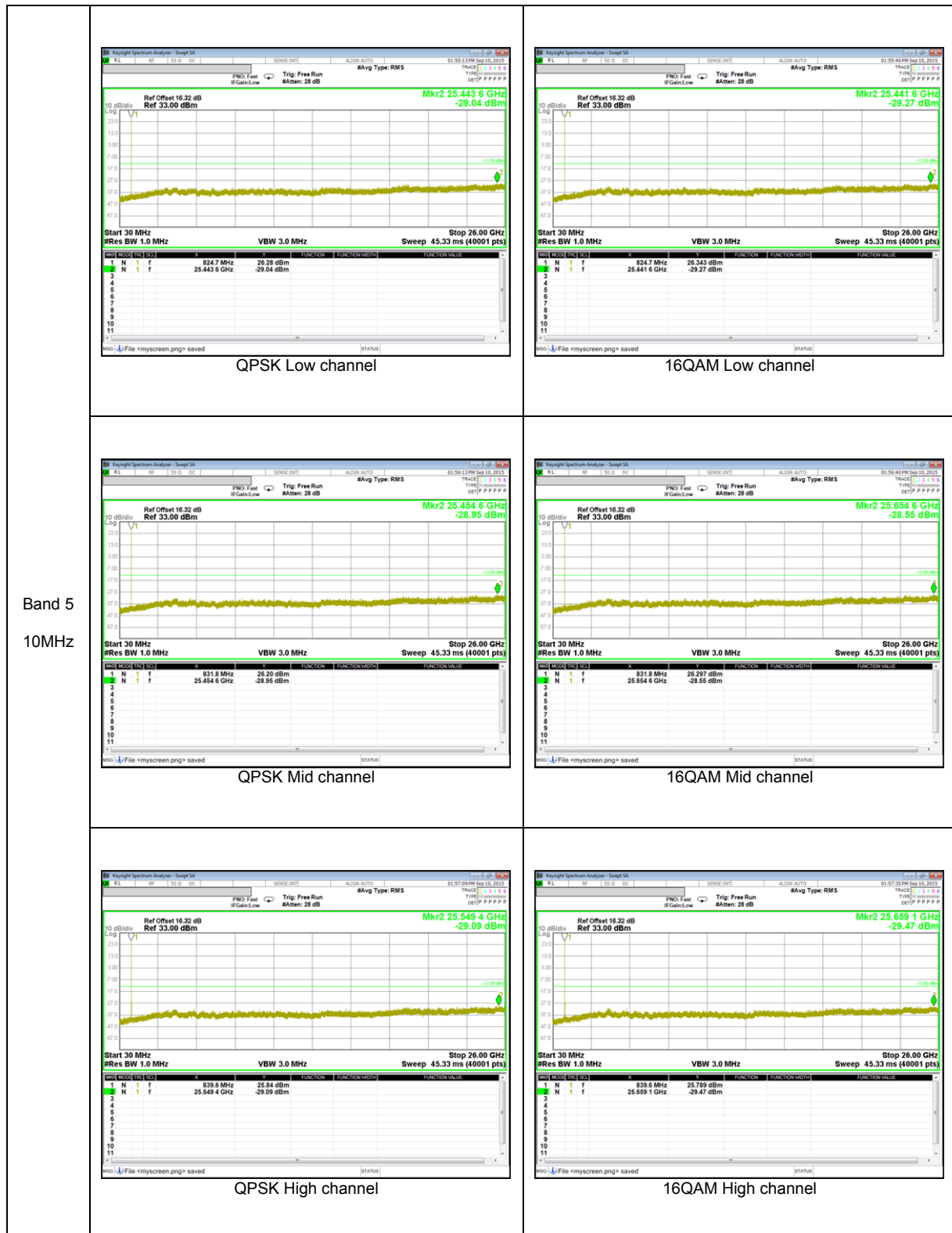
GSM 1900

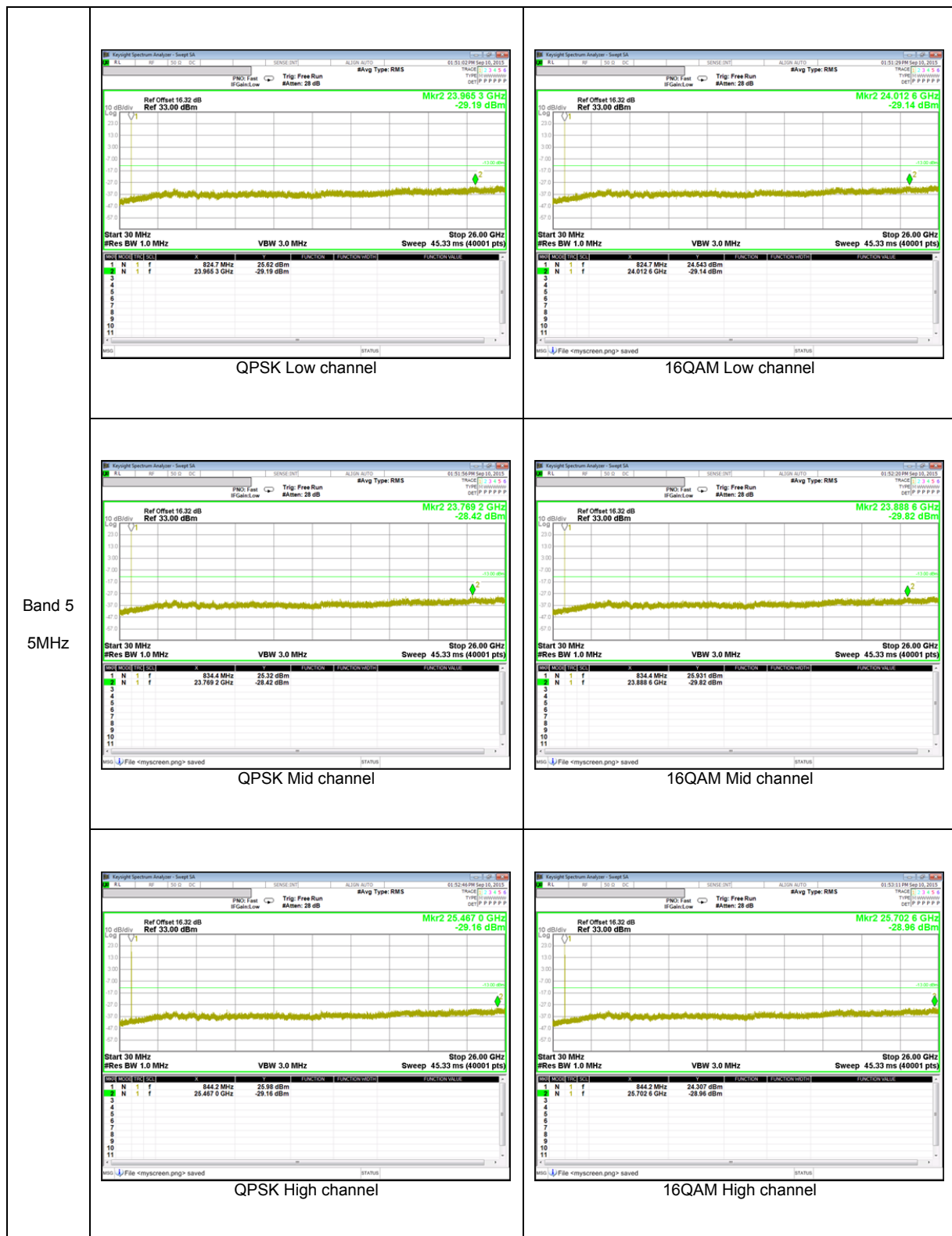


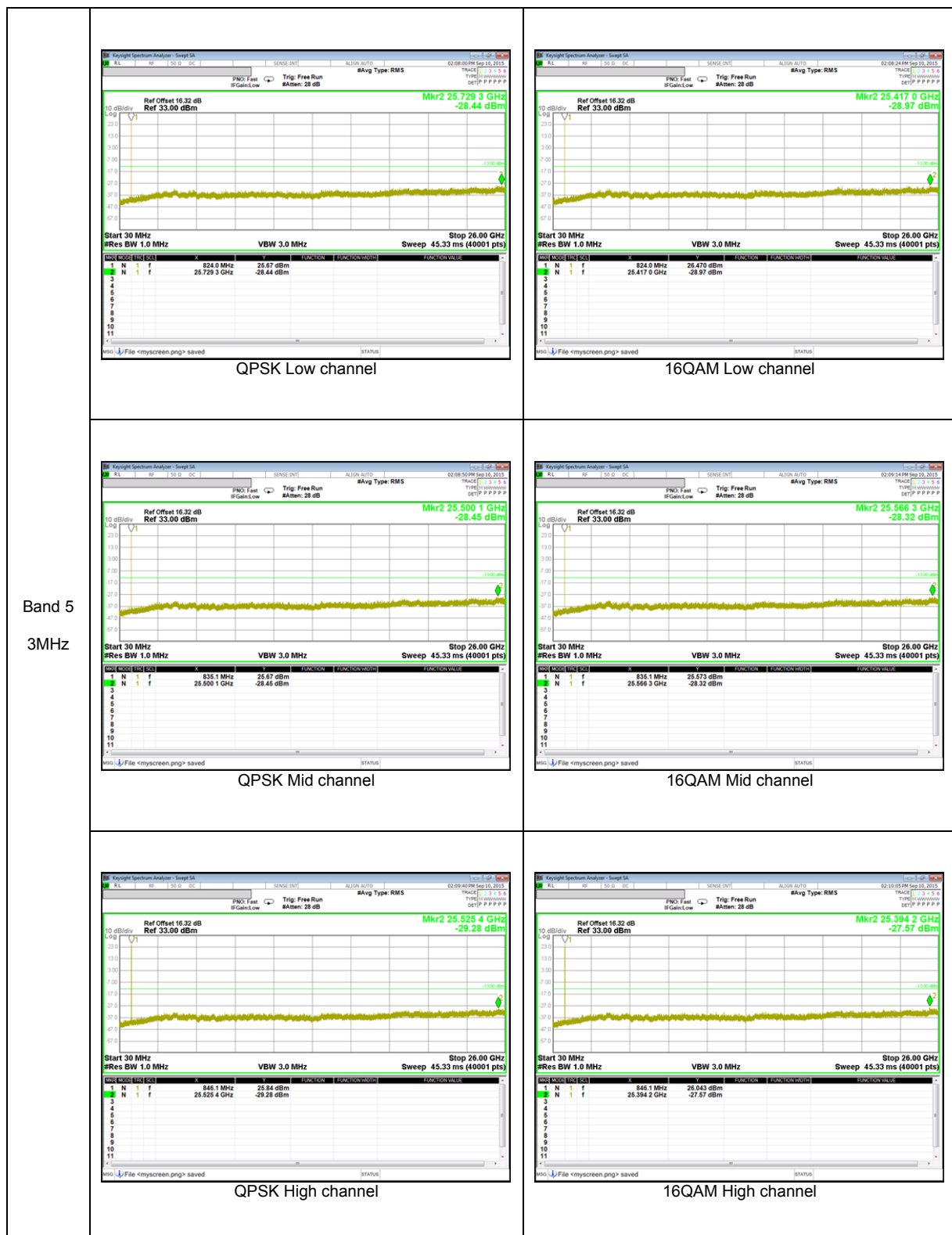
WCDMA Band 5

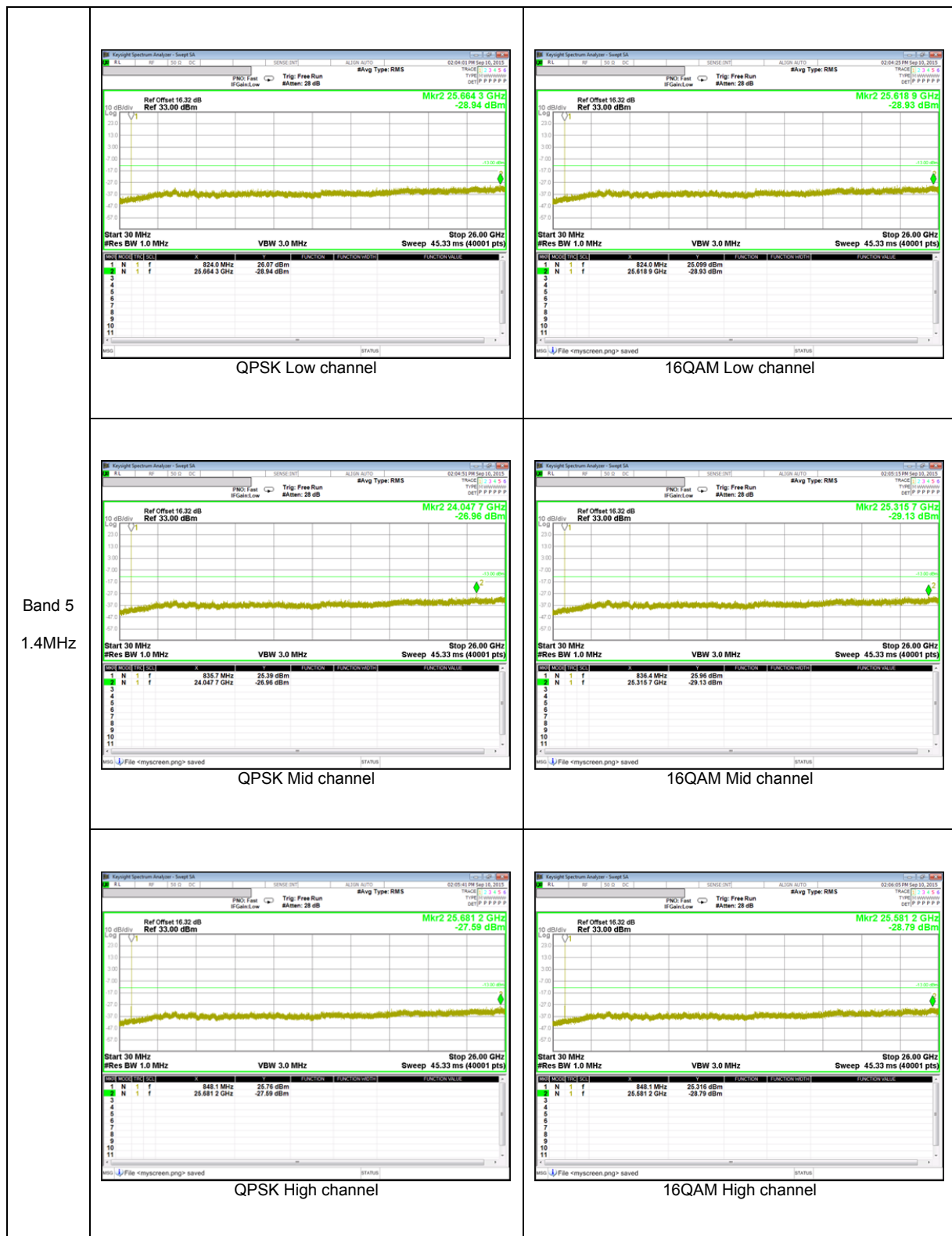


LTE Band 5









10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

LTE Band 5, Channel 20524, Frequency 836.5 MHz

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency: GSM850 Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.60003673	0.016	2.5
3.80	40	836.60004787	0.003	2.5
3.80	30	836.60004402	0.007	2.5
3.80	20	836.60004999	0	2.5
3.80	10	836.60005280	-0.003	2.5
3.80	0	836.60004577	0.005	2.5
3.80	-10	836.60004548	0.005	2.5
3.80	-20	836.60005862	-0.010	2.5
3.80	-30	836.60005171	-0.002	2.5

Reference Frequency: GSM850 Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.60004999	0	2.5
4.20	20	836.60004581	0.005	2.5
3.40	20	836.60003950	0.013	2.5

GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: GSM1900 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.00007699	0.005	2.5
3.80	40	1880.00007381	0.006	2.5
3.80	30	1880.00009142	-0.003	2.5
3.80	20	1880.00008577	0	2.5
3.80	10	1880.00008843	-0.001	2.5
3.80	0	1880.00007703	0.005	2.5
3.80	-10	1880.00008935	-0.002	2.5
3.80	-20	1880.00008515	0.000	2.5
3.80	-30	1880.00007849	0.004	2.5

Reference Frequency: GSM1900 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.00008577	0	2.5
4.20	20	1880.00008447	0.001	2.5
3.40	20	1880.00011093	-0.013	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

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.

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 603D Clause 2.2.17; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a MXA:

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

For average power measurement with a MXA:

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

TEST RESULTS

11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	25.05	319.89
		190	836.6	27.08	510.50
		251	848.8	28.81	760.33
	EGPRS	128	824.2	19.09	81.10
		190	836.6	21.27	133.97
		251	848.8	23.19	208.45
GSM1900	GPRS	512	1850.2	27.16	520.00
		661	1880.0	27.47	558.47
		810	1909.8	29.38	866.96
	EGPRS	512	1850.2	23.28	212.81
		661	1880.0	23.03	200.91
		810	1909.8	23.40	218.78

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	13.85	24.27
		4183	836.6	15.12	32.51
		4233	846.6	16.78	47.64
	HSDPA	4132	826.4	12.88	19.41
		4183	836.6	14.11	25.76
		4233	846.6	16.32	42.85

LTE Band 5

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 5	10	QPSK	50/0	1860.0	13.75	23.71
			50/0	1880.0	14.05	25.41
			50/0	1900.0	14.80	30.20
		16QAM	50/0	1860.0	12.71	18.66
			50/0	1880.0	13.02	20.04
			50/0	1900.0	13.70	23.44
	5	QPSK	25/0	1852.5	13.65	23.17
			25/0	1880.0	14.08	25.59
			25/0	1907.5	14.84	30.48
		16QAM	25/0	1852.5	13.22	20.99
			25/0	1880.0	12.99	19.91
			25/0	1907.5	14.31	26.98
	3	QPSK	15/0	1815.5	13.64	23.12
			15/0	1880.0	14.24	26.55
			15/0	1908.5	14.91	30.97
		16QAM	15/0	1815.5	12.64	18.37
			15/0	1880.0	13.21	20.94
			15/0	1908.5	14.38	27.42
	1.4	QPSK	6/0	1850.7	11.62	14.52
			6/0	1880.0	12.16	16.44
			6/0	1909.3	12.56	18.03
		16QAM	6/0	1850.7	10.59	11.46
			6/0	1880.0	11.10	12.88
			6/0	1909.3	12.08	16.14

11.1.2. ERP/EIRP DATA

GSM 850

GSM GSM850 GPRS	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: GPRS 850 MHz Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><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>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>824.20</td><td>20.51</td><td>V</td><td>1.1</td><td>-1.6</td><td>17.89</td><td>38.5</td><td>-20.6</td></tr><tr><td>824.20</td><td>27.67</td><td>H</td><td>1.1</td><td>-1.6</td><td>25.05</td><td>38.5</td><td>-13.4</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.60</td><td>19.81</td><td>V</td><td>1.1</td><td>-1.4</td><td>17.32</td><td>38.5</td><td>-21.1</td></tr><tr><td>836.60</td><td>29.57</td><td>H</td><td>1.1</td><td>-1.4</td><td>27.08</td><td>38.5</td><td>-11.4</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>848.80</td><td>20.93</td><td>V</td><td>1.1</td><td>-1.3</td><td>18.57</td><td>38.5</td><td>-19.9</td></tr><tr><td>848.80</td><td>31.17</td><td>H</td><td>1.1</td><td>-1.3</td><td>28.81</td><td>38.5</td><td>-9.6</td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								824.20	20.51	V	1.1	-1.6	17.89	38.5	-20.6	824.20	27.67	H	1.1	-1.6	25.05	38.5	-13.4	Mid Ch								836.60	19.81	V	1.1	-1.4	17.32	38.5	-21.1	836.60	29.57	H	1.1	-1.4	27.08	38.5	-11.4	High Ch								848.80	20.93	V	1.1	-1.3	18.57	38.5	-19.9	848.80	31.17	H	1.1	-1.3	28.81	38.5	-9.6
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
	Low Ch																																																																																									
	824.20	20.51	V	1.1	-1.6	17.89	38.5	-20.6																																																																																		
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GSM GSM850 EGPRS	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: EGPRS 850 MHz Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><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>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>824.20</td><td>14.44</td><td>V</td><td>1.1</td><td>-1.6</td><td>11.82</td><td>38.5</td><td>-26.6</td></tr><tr><td>824.20</td><td>21.71</td><td>H</td><td>1.1</td><td>-1.6</td><td>19.09</td><td>38.5</td><td>-19.4</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.60</td><td>14.42</td><td>V</td><td>1.1</td><td>-1.4</td><td>11.93</td><td>38.5</td><td>-26.5</td></tr><tr><td>836.60</td><td>23.76</td><td>H</td><td>1.1</td><td>-1.4</td><td>21.27</td><td>38.5</td><td>-17.2</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>848.80</td><td>14.96</td><td>V</td><td>1.1</td><td>-1.3</td><td>12.60</td><td>38.5</td><td>-25.9</td></tr><tr><td>848.80</td><td>25.55</td><td>H</td><td>1.1</td><td>-1.3</td><td>23.19</td><td>38.5</td><td>-15.3</td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								824.20	14.44	V	1.1	-1.6	11.82	38.5	-26.6	824.20	21.71	H	1.1	-1.6	19.09	38.5	-19.4	Mid Ch								836.60	14.42	V	1.1	-1.4	11.93	38.5	-26.5	836.60	23.76	H	1.1	-1.4	21.27	38.5	-17.2	High Ch								848.80	14.96	V	1.1	-1.3	12.60	38.5	-25.9	848.80	25.55	H	1.1	-1.3	23.19	38.5	-15.3
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
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	836.60	14.42	V	1.1	-1.4	11.93	38.5	-26.5																																																																																		
	836.60	23.76	H	1.1	-1.4	21.27	38.5	-17.2																																																																																		
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	848.80	14.96	V	1.1	-1.3	12.60	38.5	-25.9																																																																																		
848.80	25.55	H	1.1	-1.3	23.19	38.5	-15.3																																																																																			

GSM 1900

GSM

GSM1900

GPRS

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K21761

Date:

09-16-15

Test Engineer:

Steven Kim

Configuration:

EUT ONLY, X Position

Mode:

GPRS 1900MHz

Test Equipment:

Receiving: 3117[00168724] and Chamber 1 SMA Cables

Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	15.8	V	1.60	8.80	23.04	33.0	-10.0	
1850.20	20.0	H	1.60	8.80	27.16	33.0	-5.8	
Mid Ch								
1880.00	19.6	V	1.62	8.62	26.57	33.0	-6.4	
1880.00	20.5	H	1.62	8.62	27.47	33.0	-5.5	
High Ch								
1909.80	22.6	V	1.63	8.44	29.38	33.0	-3.6	
1909.80	21.0	H	1.63	8.44	27.80	33.0	-5.2	

Rev. 3.17.11

GSM

GSM1900

EGPRS

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K21761

Date:

09-16-15

Test Engineer:

Steven Kim

Configuration:

EUT ONLY, X Position

Mode:

EGPRS 1900MHz

Test Equipment:

Receiving: 3117[00168724] and Chamber 1 SMA Cables

Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	11.4	V	1.60	8.80	18.61	33.0	-14.4	
1850.20	16.1	H	1.60	8.80	23.28	33.0	-9.7	
Mid Ch								
1880.00	15.8	V	1.62	8.62	22.82	33.0	-10.2	
1880.00	16.0	H	1.62	8.62	23.03	33.0	-10.0	
High Ch								
1909.80	16.6	V	1.63	8.44	23.40	33.0	-9.6	
1909.80	15.5	H	1.63	8.44	22.26	33.0	-10.7	

Rev. 3.17.11

WCDMA Band 5

WCDMA Band 5 REL99	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: Rel 99_850 MHz Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <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>Margin (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>826.40</td><td>8.87</td><td>V</td><td>1.1</td><td>-1.5</td><td>6.26</td><td>38.5</td><td>-32.2</td><td></td></tr> <tr><td>826.40</td><td>16.46</td><td>H</td><td>1.1</td><td>-1.5</td><td>13.85</td><td>38.5</td><td>-24.6</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>8.20</td><td>V</td><td>1.1</td><td>-1.4</td><td>5.71</td><td>38.5</td><td>-32.7</td><td></td></tr> <tr><td>836.60</td><td>17.61</td><td>H</td><td>1.1</td><td>-1.4</td><td>15.12</td><td>38.5</td><td>-23.3</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>846.60</td><td>9.32</td><td>V</td><td>1.1</td><td>-1.3</td><td>6.94</td><td>38.5</td><td>-31.5</td><td></td></tr> <tr><td>846.60</td><td>19.16</td><td>H</td><td>1.1</td><td>-1.3</td><td>16.78</td><td>38.5</td><td>-21.7</td><td></td></tr> </tbody> </table> Rev. 3.17.11								f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									826.40	8.87	V	1.1	-1.5	6.26	38.5	-32.2		826.40	16.46	H	1.1	-1.5	13.85	38.5	-24.6		Mid Ch									836.60	8.20	V	1.1	-1.4	5.71	38.5	-32.7		836.60	17.61	H	1.1	-1.4	15.12	38.5	-23.3		High Ch									846.60	9.32	V	1.1	-1.3	6.94	38.5	-31.5		846.60	19.16	H	1.1	-1.3	16.78	38.5	-21.7	
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WCDMA Band 5 HSDPA	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: HSDPA_850 MHz Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <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>Margin (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>826.40</td><td>7.82</td><td>V</td><td>1.1</td><td>-1.5</td><td>5.21</td><td>38.5</td><td>-33.2</td><td></td></tr> <tr><td>826.40</td><td>15.49</td><td>H</td><td>1.1</td><td>-1.5</td><td>12.88</td><td>38.5</td><td>-25.6</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>7.20</td><td>V</td><td>1.1</td><td>-1.4</td><td>4.71</td><td>38.5</td><td>-33.7</td><td></td></tr> <tr><td>836.60</td><td>16.60</td><td>H</td><td>1.1</td><td>-1.4</td><td>14.11</td><td>38.5</td><td>-24.3</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>846.60</td><td>7.99</td><td>V</td><td>1.1</td><td>-1.3</td><td>5.61</td><td>38.5</td><td>-32.8</td><td></td></tr> <tr><td>846.60</td><td>18.70</td><td>H</td><td>1.1</td><td>-1.3</td><td>16.32</td><td>38.5</td><td>-22.1</td><td></td></tr> </tbody> </table> Rev. 3.17.11								f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									826.40	7.82	V	1.1	-1.5	5.21	38.5	-33.2		826.40	15.49	H	1.1	-1.5	12.88	38.5	-25.6		Mid Ch									836.60	7.20	V	1.1	-1.4	4.71	38.5	-33.7		836.60	16.60	H	1.1	-1.4	14.11	38.5	-24.3		High Ch									846.60	7.99	V	1.1	-1.3	5.61	38.5	-32.8		846.60	18.70	H	1.1	-1.3	16.32	38.5	-22.1	
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LTE Band 5

LTE
Band 5
10MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K21761
Date: 09-10-15
Test Engineer: Stven.Kim
Configuration: EUT ONLY, Y Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

Test Equipment:

Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	7.34	V	1.1	-1.5	4.76	38.5	-33.7	
829.00	16.33	H	1.1	-1.5	13.75	38.5	-24.7	
Mid Ch								
836.50	7.20	V	1.1	-1.4	4.71	38.5	-33.7	
836.50	16.54	H	1.1	-1.4	14.05	38.5	-24.4	
High Ch								
844.00	7.95	V	1.1	-1.3	5.56	38.5	-32.9	
844.00	17.22	H	1.1	-1.3	14.80	38.5	-23.6	

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE
Band 5
10MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K21761
Date: 09-10-15
Test Engineer: Stven.Kim
Configuration: EUT ONLY, Y Position
Mode: LTE5 10MHz FUND 16QAM

Test Equipment:

Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	6.33	V	1.1	-1.5	3.75	38.5	-34.7	
829.00	15.29	H	1.1	-1.5	12.71	38.5	-25.7	
Mid Ch								
836.50	6.16	V	1.1	-1.4	3.65	38.5	-34.8	
836.50	15.53	H	1.1	-1.4	13.02	38.5	-25.4	
High Ch								
844.00	7.06	V	1.1	-1.3	4.64	38.5	-33.8	
844.00	16.12	H	1.1	-1.3	13.70	38.5	-24.7	

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE

Band 5

5MHz

QPSK

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K21761

Date:

09-10-15

Test Engineer:

Stven.Kim

Configuration:

EUT ONLY, Y Position

Mode:

LTE5 5MHz FUND QPSK

Test Equipment:

Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	7.24	V	1.1	-1.5	4.64	38.5	-33.8	
826.50	16.25	H	1.1	-1.5	13.65	38.5	-24.8	
Mid Ch								
836.50	7.19	V	1.1	-1.4	4.70	38.5	-33.8	
836.50	16.57	H	1.1	-1.4	14.08	38.5	-24.4	
High Ch								
846.50	8.28	V	1.6	-1.3	5.40	38.5	-33.0	
846.50	17.72	H	1.6	-1.3	14.84	38.5	-23.6	

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE

Band 5

5MHz

16QAM

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K21761

Date:

09-10-15

Test Engineer:

Stven.Kim

Configuration:

EUT ONLY, Y Position

Mode:

LTE5 5MHz FUND 16QAM

Test Equipment:

Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	6.43	V	1.1	-1.5	3.83	38.5	-34.6	
826.50	15.82	H	1.1	-1.5	13.22	38.5	-25.2	
Mid Ch								
836.50	6.21	V	1.1	-1.4	3.72	38.5	-34.7	
836.50	15.48	H	1.1	-1.4	12.99	38.5	-25.5	
High Ch								
846.50	7.06	V	1.1	-1.3	4.68	38.5	-33.8	
846.50	16.69	H	1.1	-1.3	14.31	38.5	-24.1	

Rev. 3.17.11

Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 5 3MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: LTE5 3MHz FUND QPSK Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	825.50	7.12	V	1.1	-1.5	4.52	38.5	-33.9	
	825.50	16.24	H	1.1	-1.5	13.64	38.5	-24.8	
	Mid Ch								
	836.50	7.17	V	1.1	-1.4	4.68	38.5	-33.8	
	836.50	16.73	H	1.1	-1.4	14.24	38.5	-24.2	
	High Ch								
	847.50	8.32	V	1.6	-1.3	5.44	38.5	-33.0	
	847.50	17.79	H	1.6	-1.3	14.91	38.5	-23.5	
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									
LTE Band 5 3MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: LTE5 3MHz FUND 16QAM Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	825.50	6.06	V	1.1	-1.5	3.46	38.5	-35.0	
	825.50	15.24	H	1.1	-1.5	12.64	38.5	-25.8	
	Mid Ch								
	836.50	6.12	V	1.1	-1.4	3.63	38.5	-34.8	
	836.50	15.70	H	1.1	-1.4	13.21	38.5	-25.2	
	High Ch								
	847.50	7.31	V	1.1	-1.3	4.93	38.5	-33.5	
	847.50	16.76	H	1.1	-1.3	14.38	38.5	-24.1	
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE Band 5 1.4MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: LTE5 1.4MHz FUND QPSK								
	Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	824.70	5.03	V	1.1	-1.5	2.43	38.5	-36.0	
	824.70	14.22	H	1.1	-1.5	11.62	38.5	-26.8	
	Mid Ch								
	836.50	5.10	V	1.1	-1.4	2.61	38.5	-35.8	
	836.50	14.65	H	1.1	-1.4	12.16	38.5	-26.3	
	High Ch								
	844.30	5.57	V	1.6	-1.3	2.69	38.5	-35.8	
	844.30	15.44	H	1.6	-1.3	12.56	38.5	-25.9	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								
LTE Band 5 1.4MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K21761 Date: 09-10-15 Test Engineer: Stven.Kim Configuration: EUT ONLY, Y Position Mode: LTE5 1.4MHz FUND 16QAM								
	Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	824.70	4.43	V	1.1	-1.5	1.83	38.5	-36.6	
	824.70	13.19	H	1.1	-1.5	10.59	38.5	-27.9	
	Mid Ch								
	836.50	4.75	V	1.1	-1.4	2.26	38.5	-36.2	
	836.50	13.59	H	1.1	-1.4	11.10	38.5	-27.4	
	High Ch								
	844.30	4.54	V	1.1	-1.3	2.16	38.5	-36.3	
	844.30	14.46	H	1.1	-1.3	12.08	38.5	-26.4	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

Part 22.917(a) & Part 24.238(a) 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.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RESULTS

11.2.1. SPURIOUS RADIATION PLOTS

GSM 850

GSM GSM850 GPRS	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement																																																																																																																																																																																																																																				
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	Test Engineer: Steven Kim																																																																																																																																																																																																																																				
	Configuration: EUT / AC Adapter / Earphone, Y Position																																																																																																																																																																																																																																				
	Mode: GPRS 850 MHz																																																																																																																																																																																																																																				
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GSM1900

GPRS

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-16-15

Test Engineer: Steven Kim

Configuration: EUT / AC Adapter / Earphone, XPosition

Mode: GPRS 1900

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-15.7	V	3.0	40.5	1.0	-55.2	-13.0	-42.2	
5.5506	-21.9	V	3.0	40.8	1.0	-61.7	-13.0	-48.7	
7.4008	-21.2	V	3.0	40.8	1.0	-61.0	-13.0	-48.0	
3.7000	-14.7	H	3.0	40.5	1.0	-54.1	-13.0	-41.1	
5.5506	-20.8	H	3.0	40.8	1.0	-60.6	-13.0	-47.6	
7.4008	-22.4	H	3.0	40.8	1.0	-62.2	-13.0	-49.2	
Mid Ch, 1880.0MHz									
3.7600	-14.5	V	3.0	40.5	1.0	-54.1	-13.0	-41.1	
5.6400	-18.6	V	3.0	40.8	1.0	-58.4	-13.0	-45.4	
7.5200	-18.5	V	3.0	40.7	1.0	-58.2	-13.0	-45.2	
3.7600	-13.0	H	3.0	40.5	1.0	-52.5	-13.0	-39.5	
5.6400	-19.0	H	3.0	40.8	1.0	-58.8	-13.0	-45.8	
7.5200	-21.2	H	3.0	40.7	1.0	-61.0	-13.0	-48.0	
High Ch, 1909.8 MHz									
3.8196	-13.9	V	3.0	40.6	1.0	-53.5	-13.0	-40.5	
5.7294	-19.0	V	3.0	40.8	1.0	-58.8	-13.0	-45.8	
7.6392	-19.8	V	3.0	40.7	1.0	-59.5	-13.0	-46.5	
3.8196	-12.9	H	3.0	40.6	1.0	-52.4	-13.0	-39.4	
5.7294	-18.3	H	3.0	40.8	1.0	-58.1	-13.0	-45.1	
7.6392	-20.9	H	3.0	40.7	1.0	-60.6	-13.0	-47.6	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

GSM

GSM1900

EGPRS

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-16-15

Test Engineer: Steven Kim

Configuration: EUT / AC Adapter / Earphone, XPosition

Mode: EGPRS 1900 MHz

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-19.6	V	3.0	40.5	1.0	-59.1	-13.0	-46.1	
5.5506	-25.5	V	3.0	40.8	1.0	-65.3	-13.0	-52.3	
7.4008	-22.6	V	3.0	40.8	1.0	-62.4	-13.0	-49.4	
3.7000	-18.1	H	3.0	40.5	1.0	-57.6	-13.0	-44.6	
5.5500	-25.4	H	3.0	40.8	1.0	-65.2	-13.0	-52.2	
7.4000	-22.9	H	3.0	40.8	1.0	-62.7	-13.0	-49.7	
Mid Ch, 1880.0MHz									
3.7600	-19.3	V	3.0	40.5	1.0	-58.8	-13.0	-45.8	
5.6400	-24.5	V	3.0	40.8	1.0	-64.3	-13.0	-51.3	
7.5200	-21.7	V	3.0	40.7	1.0	-61.4	-13.0	-48.4	
3.7600	-16.7	H	3.0	40.5	1.0	-56.2	-13.0	-43.2	
5.6400	-24.6	H	3.0	40.8	1.0	-64.4	-13.0	-51.4	
7.5200	-22.9	H	3.0	40.7	1.0	-62.7	-13.0	-49.7	
High Ch, 1909.8 MHz									
3.8196	-18.3	V	3.0	40.6	1.0	-57.9	-13.0	-44.9	
5.7294	-23.4	V	3.0	40.8	1.0	-63.2	-13.0	-50.2	
7.6392	-22.2	V	3.0	40.7	1.0	-61.8	-13.0	-48.8	
3.8196	-17.6	H	3.0	40.6	1.0	-57.2	-13.0	-44.2	
5.7294	-23.5	H	3.0	40.8	1.0	-63.3	-13.0	-50.3	
7.6392	-23.7	H	3.0	40.7	1.0	-63.3	-13.0	-50.3	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA Band 5

WCDMA

Band 5

REL99

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Samsung

15K21761

09-17-15

Steven Kim

EUT / AC Adapter / Earphone / Y Position

Tx, REL99,850MHz

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-8.7	V	3.0	39.1	1.0	-46.8	-13.0	-33.8	
2.4790	-20.0	V	3.0	39.5	1.0	-58.5	-13.0	-45.5	
3.3056	-28.3	V	3.0	40.1	1.0	-67.4	-13.0	-54.4	
1.6520	-25.0	H	3.0	39.1	1.0	-63.1	-13.0	-50.1	
2.4790	-27.8	H	3.0	39.5	1.0	-66.3	-13.0	-53.3	
3.3056	-28.6	H	3.0	40.1	1.0	-67.7	-13.0	-54.7	
Mid Ch, 836.6MHz									
1.6732	-11.4	V	3.0	39.1	1.0	-49.5	-13.0	-36.5	
2.5098	-21.8	V	3.0	39.5	1.0	-60.3	-13.0	-47.3	
3.3464	-29.0	V	3.0	40.1	1.0	-68.2	-13.0	-55.2	
1.6732	-21.9	H	3.0	39.1	1.0	-60.1	-13.0	-47.1	
2.5098	-26.8	H	3.0	39.5	1.0	-65.3	-13.0	-52.3	
3.3464	-28.6	H	3.0	40.1	1.0	-67.7	-13.0	-54.7	
High Ch, 846.6MHz									
1.6932	-9.7	V	3.0	39.1	1.0	-47.8	-13.0	-34.8	
2.5390	-25.6	V	3.0	39.6	1.0	-64.1	-13.0	-51.1	
3.3860	-28.4	V	3.0	40.2	1.0	-67.6	-13.0	-54.6	
1.6932	-22.9	H	3.0	39.1	1.0	-61.0	-13.0	-48.0	
2.5390	-27.4	H	3.0	39.6	1.0	-65.9	-13.0	-52.9	
3.3860	-28.8	H	3.0	40.2	1.0	-68.0	-13.0	-55.0	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA

Band 5

HSDPA

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Samsung

15K21761

09-17-15

Steven Kim

EUT / AC Adapter / Earphone / Y Position

Tx, HSDPA,850MHz

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-10.0	V	3.0	39.1	1.0	-48.1	-13.0	-35.1	
2.4790	-20.3	V	3.0	39.5	1.0	-58.9	-13.0	-45.9	
3.3056	-28.6	V	3.0	40.1	1.0	-67.7	-13.0	-54.7	
1.6520	-25.3	H	3.0	39.1	1.0	-63.4	-13.0	-50.4	
2.4790	-28.1	H	3.0	39.5	1.0	-66.6	-13.0	-53.6	
3.3056	-28.5	H	3.0	40.1	1.0	-67.7	-13.0	-54.7	
Mid Ch, 836.6MHz									
1.6732	-12.6	V	3.0	39.1	1.0	-50.7	-13.0	-37.7	
2.5098	-22.3	V	3.0	39.5	1.0	-60.8	-13.0	-47.8	
3.3464	-28.7	V	3.0	40.1	1.0	-67.9	-13.0	-54.9	
1.6732	-22.7	H	3.0	39.1	1.0	-60.8	-13.0	-47.8	
2.5098	-26.8	H	3.0	39.5	1.0	-65.4	-13.0	-52.4	
3.3464	-28.7	H	3.0	40.1	1.0	-67.9	-13.0	-54.9	
High Ch, 846.6MHz									
1.6932	-11.3	V	3.0	39.1	1.0	-49.4	-13.0	-36.4	
2.5390	-26.5	V	3.0	39.6	1.0	-65.1	-13.0	-52.1	
3.3860	-28.6	V	3.0	40.2	1.0	-67.8	-13.0	-54.8	
1.6932	-23.5	H	3.0	39.1	1.0	-61.6	-13.0	-48.6	
2.5390	-27.9	H	3.0	39.6	1.0	-66.4	-13.0	-53.4	
3.3860	-28.7	H	3.0	40.2	1.0	-67.8	-13.0	-54.8	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE Band 5

LTE Band 5 10MHz QPSK	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 15K21761									
	Date: 09-19-15									
	Test Engineer: Steven.Kim									
	Configuration: EUT / AC Adapter / Earphone, Y Position									
	Mode: TX, LTE BAND 5, 10MHz BW,QPSK									
	Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit Part 22			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (829MHz)									
1.6580	-6.1	V	3.0	39.1	1.0	-44.2	-13.0	-31.2		
2.4870	-24.4	V	3.0	39.5	1.0	-62.9	-13.0	-49.9		
3.3160	-30.7	V	3.0	40.1	1.0	-69.9	-13.0	-56.9		
1.6580	-12.5	H	3.0	39.1	1.0	-50.6	-13.0	-37.6		
2.4870	-25.4	H	3.0	39.5	1.0	-64.0	-13.0	-51.0		
3.3160	-30.8	H	3.0	40.1	1.0	-69.9	-13.0	-56.9		
Mid Channel (836.5MHz)										
1.6730	-6.0	V	3.0	39.1	1.0	-44.1	-13.0	-31.1		
2.5090	-24.5	V	3.0	39.5	1.0	-63.0	-13.0	-50.0		
3.3460	-34.4	V	3.0	40.1	1.0	-73.5	-13.0	-60.5		
1.6730	-14.8	H	3.0	39.1	1.0	-52.9	-13.0	-39.9		
2.5090	-32.2	H	3.0	39.5	1.0	-70.8	-13.0	-57.8		
3.3460	-34.6	H	3.0	40.1	1.0	-73.7	-13.0	-60.7		
High Channel (844MHz)										
1.6880	-9.0	V	3.0	39.1	1.0	-47.1	-13.0	-34.1		
2.5320	-25.4	V	3.0	39.5	1.0	-64.0	-13.0	-51.0		
3.3760	-32.3	V	3.0	40.2	1.0	-71.4	-13.0	-58.4		
1.6880	-17.4	H	3.0	39.1	1.0	-55.5	-13.0	-42.5		
2.5320	-26.9	H	3.0	39.5	1.0	-65.5	-13.0	-52.5		
3.3760	-33.2	H	3.0	40.2	1.0	-72.4	-13.0	-59.4		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

LTE Band 5 10MHz 16QAM	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 15K21761									
	Date: 09-19-15									
	Test Engineer: Steven.Kim									
	Configuration: EUT / AC Adapter / Earphone, Y Position									
	Mode: TX, LTE BAND 5, 10MHz BW,16QAM									
	Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit Part 22			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (829MHz)									
1.6580	-7.1	V	3.0	39.1	1.0	-45.2	-13.0	-32.2		
2.4870	-24.4	V	3.0	39.5	1.0	-62.9	-13.0	-49.9		
3.3160	-30.8	V	3.0	40.1	1.0	-69.9	-13.0	-56.9		
1.6580	-13.7	H	3.0	39.1	1.0	-51.8	-13.0	-38.8		
2.4870	-25.8	H	3.0	39.5	1.0	-64.4	-13.0	-51.4		
3.3160	-30.7	H	3.0	40.1	1.0	-69.8	-13.0	-56.8		
Mid Channel (836.5MHz)										
1.6730	-7.3	V	3.0	39.1	1.0	-45.4	-13.0	-32.4		
2.5090	-25.4	V	3.0	39.5	1.0	-63.9	-13.0	-50.9		
3.3460	-34.3	V	3.0	40.1	1.0	-73.4	-13.0	-60.4		
1.6730	-15.8	H	3.0	39.1	1.0	-53.9	-13.0	-40.9		
2.5090	-32.0	H	3.0	39.5	1.0	-70.5	-13.0	-57.5		
3.3460	-34.4	H	3.0	40.1	1.0	-73.6	-13.0	-60.6		
High Channel (844MHz)										
1.6880	-10.0	V	3.0	39.1	1.0	-48.2	-13.0	-35.2		
2.5320	-26.3	V	3.0	39.5	1.0	-64.9	-13.0	-51.9		
3.3760	-33.2	V	3.0	40.2	1.0	-72.4	-13.0	-59.4		
1.6880	-18.6	H	3.0	39.1	1.0	-56.8	-13.0	-43.8		
2.5320	-27.9	H	3.0	39.5	1.0	-66.5	-13.0	-53.5		
3.3760	-34.3	H	3.0	40.2	1.0	-73.5	-13.0	-60.5		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

LTE

Band 5

5MHz

QPSK

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-17-15

Test Engineer: Steven.Kim

Configuration: EUT / AC Adapter / Earphone, Y Position

Mode: TX, LTE BAND 5, 5MHz BW,QPSK

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-5.6	V	3.0	39.1	1.0	-43.7	-13.0	-30.7	
2.4790	-24.8	V	3.0	39.5	1.0	-63.3	-13.0	-50.3	
3.3060	-31.1	V	3.0	40.1	1.0	-70.2	-13.0	-57.2	
1.6530	-14.0	H	3.0	39.1	1.0	-52.1	-13.0	-39.1	
2.4790	-24.8	H	3.0	39.5	1.0	-63.4	-13.0	-50.4	
3.3060	-32.0	H	3.0	40.1	1.0	-71.1	-13.0	-58.1	
Mid Channel (836.5MHz)									
1.6730	-10.3	V	3.0	39.1	1.0	-48.4	-13.0	-35.4	
2.5090	-24.5	V	3.0	39.5	1.0	-63.0	-13.0	-50.0	
3.3460	-34.4	V	3.0	40.1	1.0	-73.5	-13.0	-60.5	
1.6730	-20.2	H	3.0	39.1	1.0	-58.3	-13.0	-45.3	
2.5090	-32.5	H	3.0	39.5	1.0	-71.0	-13.0	-58.0	
3.3460	-34.5	H	3.0	40.1	1.0	-73.6	-13.0	-60.6	
High Channel (846.5MHz)									
1.6930	-8.8	V	3.0	39.1	1.0	-46.9	-13.0	-33.9	
2.5390	-26.5	V	3.0	39.6	1.0	-65.0	-13.0	-52.0	
3.3860	-32.1	V	3.0	40.2	1.0	-71.3	-13.0	-58.3	
1.6930	-16.9	H	3.0	39.1	1.0	-55.0	-13.0	-42.0	
2.5390	-27.5	H	3.0	39.6	1.0	-66.1	-13.0	-53.1	
3.3860	-32.1	H	3.0	40.2	1.0	-71.3	-13.0	-58.3	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE

Band 5

5MHz

16QAM

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-17-15

Test Engineer: Steven.Kim

Configuration: EUT / AC Adapter / Earphone, Y Position

Mode: TX, LTE BAND 5, 5MHz BW,16QAM

Chamber

Chamber 2

Pre-amplifier

AFS42

Filter

Filter 1

Limit

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-7.7	V	3.0	39.1	1.0	-45.8	-13.0	-32.8	
2.4790	-26.7	V	3.0	39.5	1.0	-65.2	-13.0	-52.2	
3.3060	-32.0	V	3.0	40.1	1.0	-71.1	-13.0	-58.1	
1.6530	-16.9	H	3.0	39.1	1.0	-55.0	-13.0	-42.0	
2.4790	-26.3	H	3.0	39.5	1.0	-64.8	-13.0	-51.8	
3.3060	-32.1	H	3.0	40.1	1.0	-71.2	-13.0	-58.2	
Mid Channel (836.5MHz)									
1.6730	-12.9	V	3.0	39.1	1.0	-51.0	-13.0	-38.0	
2.5090	-26.6	V	3.0	39.5	1.0	-65.1	-13.0	-52.1	
3.3460	-34.6	V	3.0	40.1	1.0	-73.7	-13.0	-60.7	
1.6730	-22.0	H	3.0	39.1	1.0	-60.1	-13.0	-47.1	
2.5090	-33.7	H	3.0	39.5	1.0	-72.3	-13.0	-59.3	
3.3460	-34.5	H	3.0	40.1	1.0	-73.6	-13.0	-60.6	
High Channel (846.5MHz)									
1.6930	-9.6	V	3.0	39.1	1.0	-47.7	-13.0	-34.7	
2.5390	-28.2	V	3.0	39.6	1.0	-66.7	-13.0	-53.7	
3.3860	-32.9	V	3.0	40.2	1.0	-72.1	-13.0	-59.1	
1.6930	-18.6	H	3.0	39.1	1.0	-56.7	-13.0	-43.7	
2.5390	-29.0	H	3.0	39.6	1.0	-67.6	-13.0	-54.6	
3.3860	-32.9	H	3.0	40.2	1.0	-72.0	-13.0	-59.0	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE Band 5 3MHz QPSK	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement																																																																																																																																																																																																																																				
	Company: Samsung																																																																																																																																																																																																																																				
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Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.																																																																																																																																																																																																																																					

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3.3900	-32.9	V	3.0	40.2	1.0	-72.1	-13.0	-59.1																																																																																																																																																																																																																													
1.6950	-21.8	H	3.0	39.1	1.0	-59.9	-13.0	-46.9																																																																																																																																																																																																																													
2.5425	-27.3	H	3.0	39.6	1.0	-65.9	-13.0	-52.9																																																																																																																																																																																																																													
3.3900	-32.6	H	3.0	40.2	1.0	-71.8	-13.0	-58.8																																																																																																																																																																																																																													
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.																																																																																																																																																																																																																																					

LTE
Band 5
1.4MHz
QPSK

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-17-15

Test Engineer: Steven.Kim

Configuration: EUT / AC Adapter / Earphone, Y Position

Mode: TX, LTE BAND 5, 1.4MHz BW,QPSK

Chamber

Pre-amplifier

Filter

Limit

Chamber 2

AFS42

Filter 1

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-3.0	V	3.0	39.1	1.0	-41.1	-13.0	-28.1	
2.4741	-15.6	V	3.0	39.5	1.0	-54.1	-13.0	-41.1	
3.2988	-34.3	V	3.0	40.1	1.0	-73.4	-13.0	-60.4	
1.6494	-15.7	H	3.0	39.1	1.0	-53.8	-13.0	-40.8	
2.4741	-26.7	H	3.0	39.5	1.0	-65.2	-13.0	-52.2	
3.2988	-34.2	H	3.0	40.1	1.0	-73.3	-13.0	-60.3	
Mid Channel (836.5MHz)									
1.6730	-7.5	V	3.0	39.1	1.0	-45.6	-13.0	-32.6	
2.5090	-23.3	V	3.0	39.5	1.0	-61.8	-13.0	-48.8	
3.3460	-34.7	V	3.0	40.1	1.0	-73.9	-13.0	-60.9	
1.6730	-19.7	H	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5090	-31.0	H	3.0	39.5	1.0	-69.5	-13.0	-56.5	
3.3460	-34.6	H	3.0	40.1	1.0	-73.7	-13.0	-60.7	
High Channel (844.3MHz)									
1.6886	-10.0	V	3.0	39.1	1.0	-48.2	-13.0	-35.2	
2.5329	-26.6	V	3.0	39.5	1.0	-65.2	-13.0	-52.2	
3.3772	-34.3	V	3.0	40.2	1.0	-73.5	-13.0	-60.5	
1.6886	-17.2	H	3.0	39.1	1.0	-55.3	-13.0	-42.3	
2.5329	-29.0	H	3.0	39.5	1.0	-67.5	-13.0	-54.5	
3.3772	-32.1	H	3.0	40.2	1.0	-71.3	-13.0	-58.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE
Band 5
1.4MHz
16QAM

UL Korea, Ltd Suwon Laboratory

Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 15K21761

Date: 09-17-15

Test Engineer: Steven.Kim

Configuration: EUT / AC Adapter / Earphone, Y Position

Mode: TX, LTE BAND 5, 1.4MHz BW,16QAM

Chamber

Pre-amplifier

Filter

Limit

Chamber 2

AFS42

Filter 1

Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-6.9	V	3.0	39.1	1.0	-45.0	-13.0	-32.0	
2.4741	-18.8	V	3.0	39.5	1.0	-57.3	-13.0	-44.3	
3.2988	-34.4	V	3.0	40.1	1.0	-73.5	-13.0	-60.5	
1.6494	-18.1	H	3.0	39.1	1.0	-56.2	-13.0	-43.2	
2.4741	-29.6	H	3.0	39.5	1.0	-68.1	-13.0	-55.1	
3.2988	-34.3	H	3.0	40.1	1.0	-73.4	-13.0	-60.4	
Mid Channel (836.5MHz)									
1.6730	-9.4	V	3.0	39.1	1.0	-47.5	-13.0	-34.5	
2.5090	-24.7	V	3.0	39.5	1.0	-63.3	-13.0	-50.3	
3.3460	-34.5	V	3.0	40.1	1.0	-73.7	-13.0	-60.7	
1.6730	-22.1	H	3.0	39.1	1.0	-60.2	-13.0	-47.2	
2.5090	-32.1	H	3.0	39.5	1.0	-70.7	-13.0	-57.7	
3.3460	-34.8	H	3.0	40.1	1.0	-73.9	-13.0	-60.9	
High Channel (844.3MHz)									
1.6886	-11.5	V	3.0	39.1	1.0	-49.7	-13.0	-36.7	
2.5329	-27.5	V	3.0	39.5	1.0	-66.1	-13.0	-53.1	
3.3772	-34.5	V	3.0	40.2	1.0	-73.6	-13.0	-60.6	
1.6886	-18.5	H	3.0	39.1	1.0	-56.6	-13.0	-43.6	
2.5329	-30.2	H	3.0	39.5	1.0	-68.8	-13.0	-55.8	
3.3772	-32.8	H	3.0	40.2	1.0	-72.0	-13.0	-59.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.