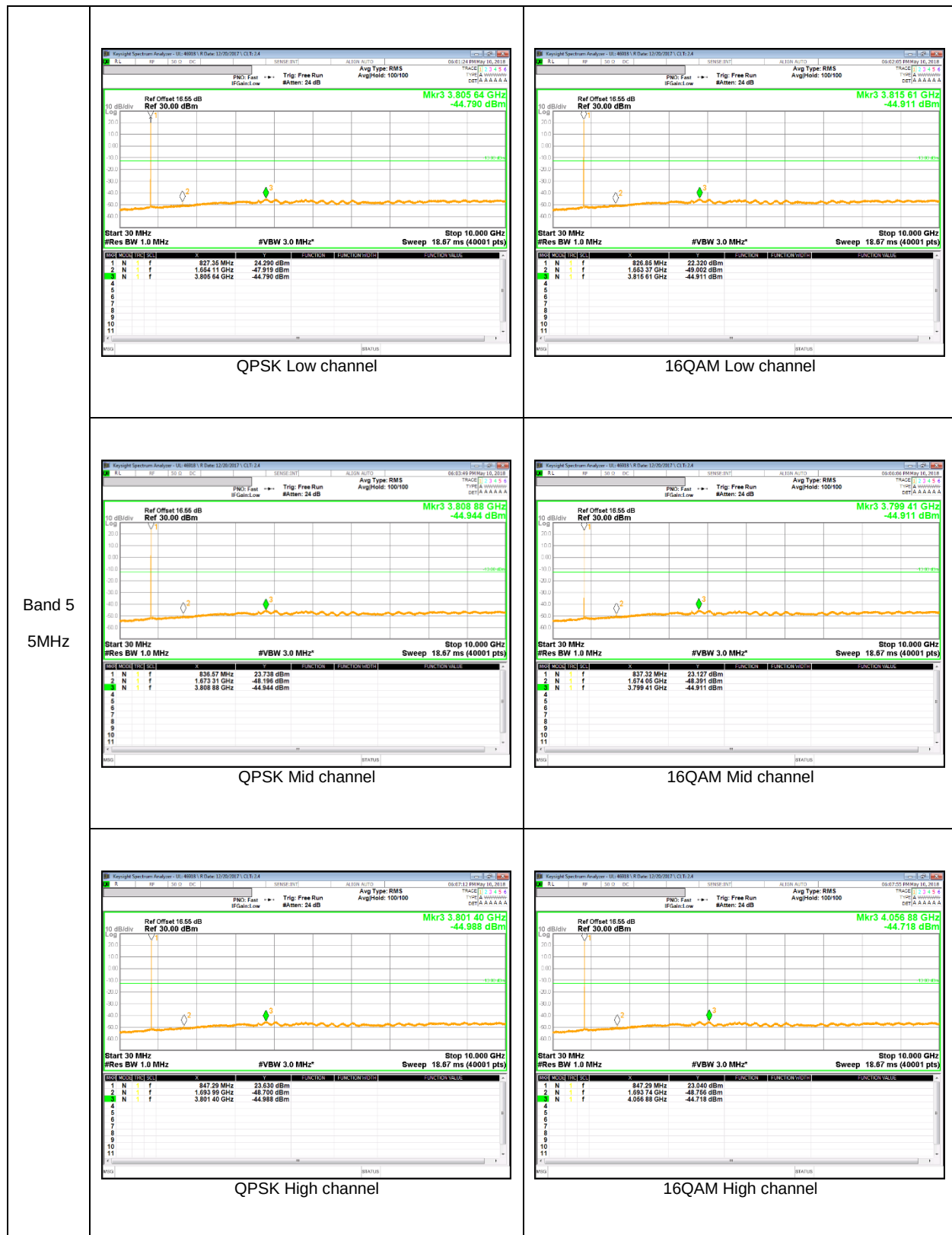
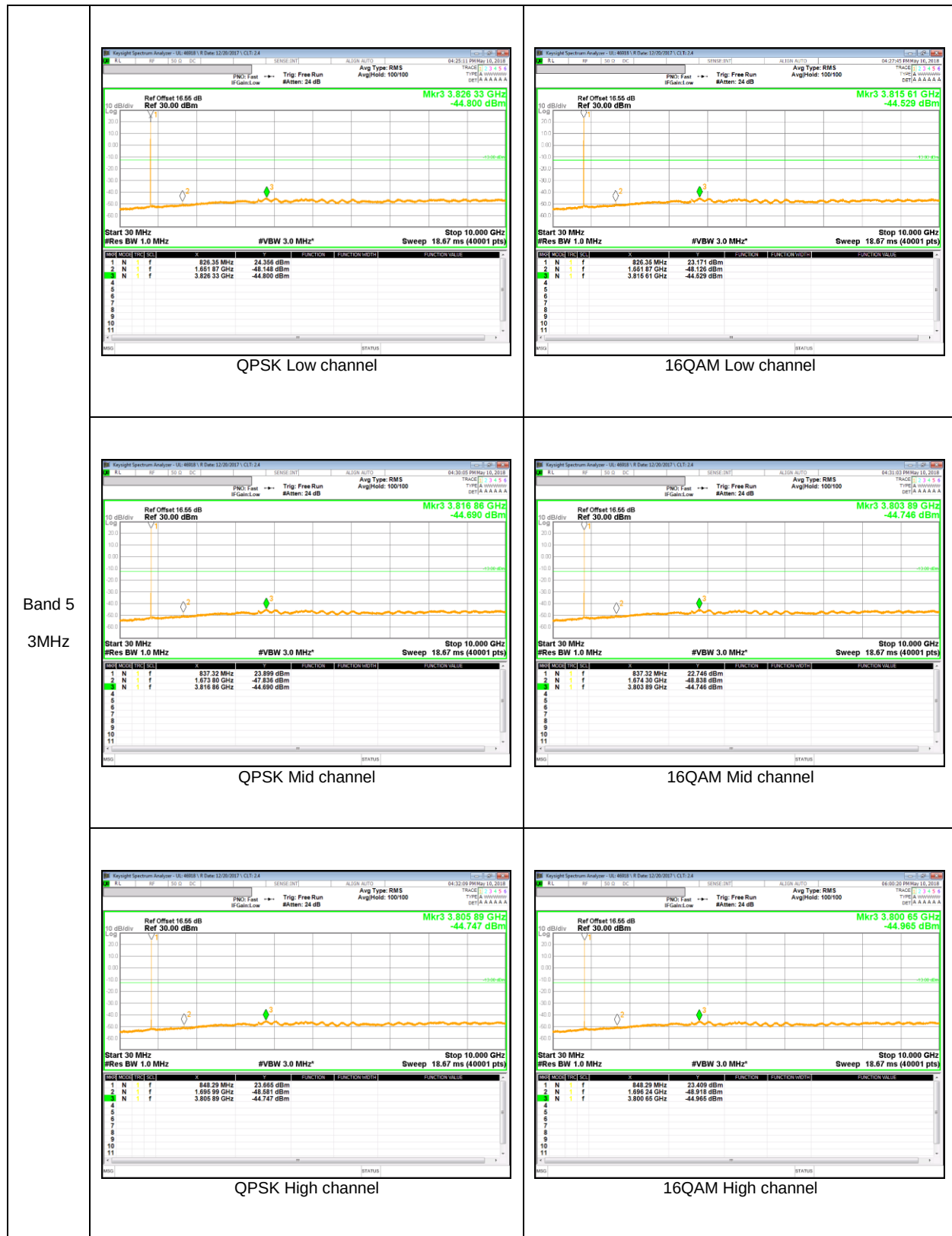
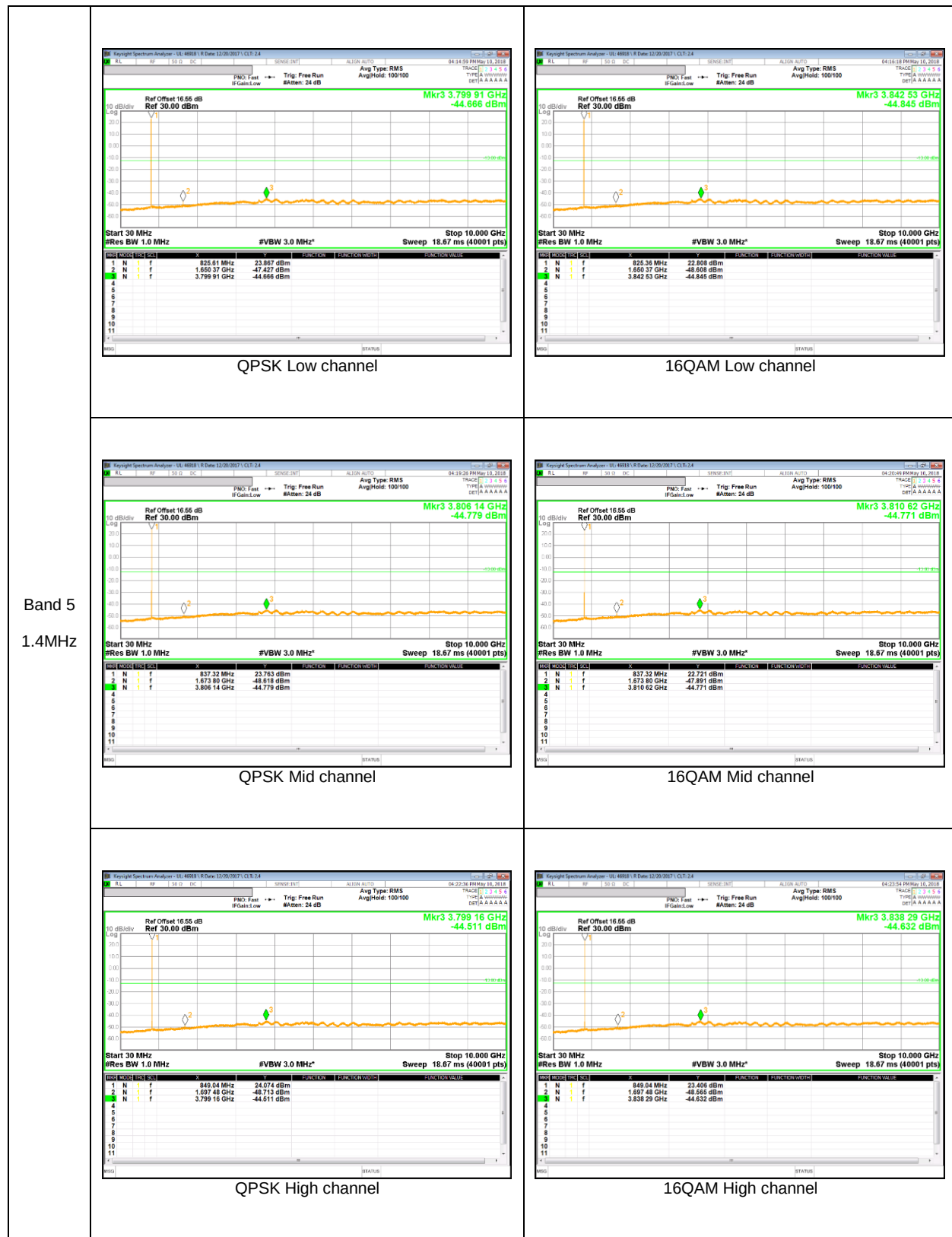
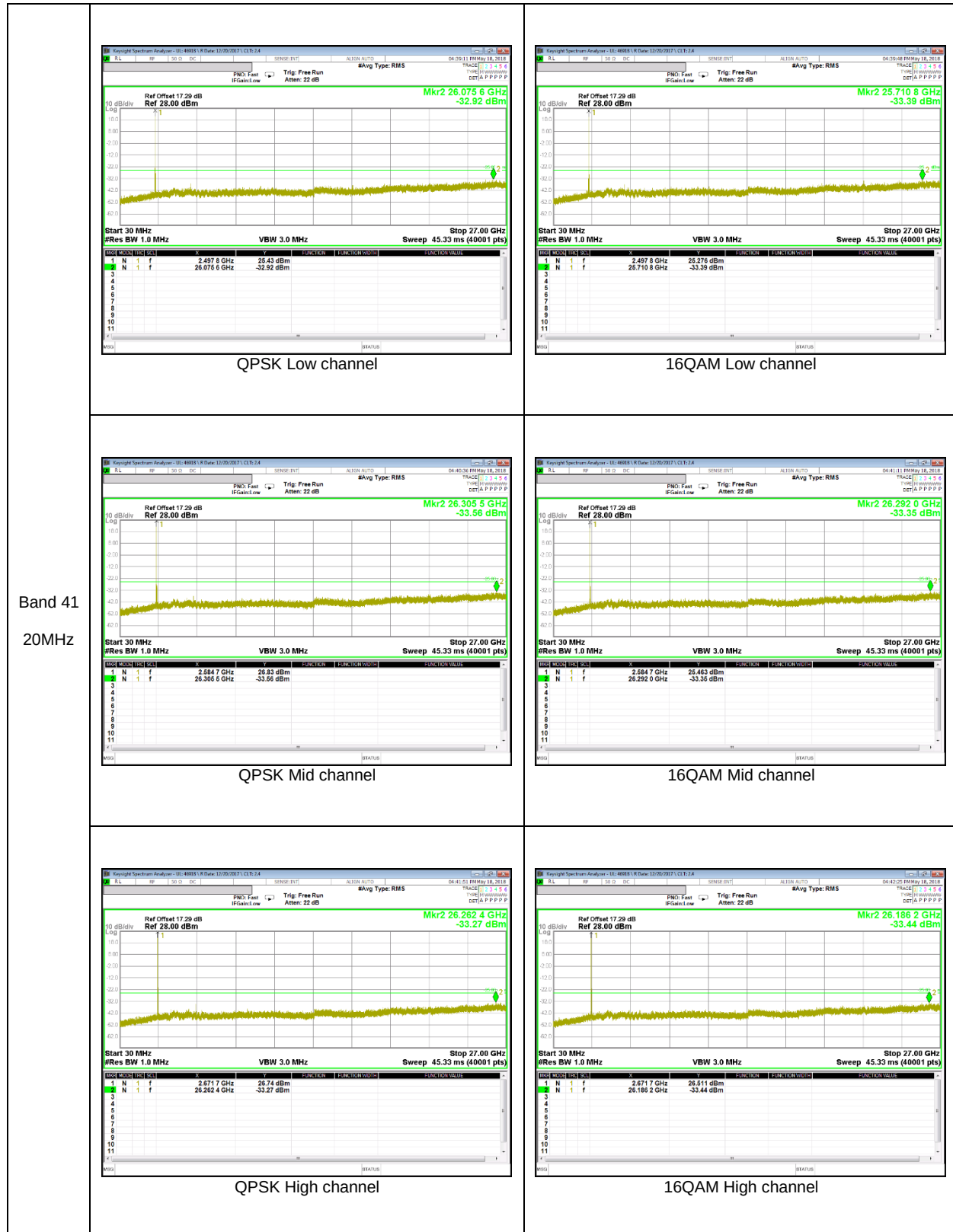


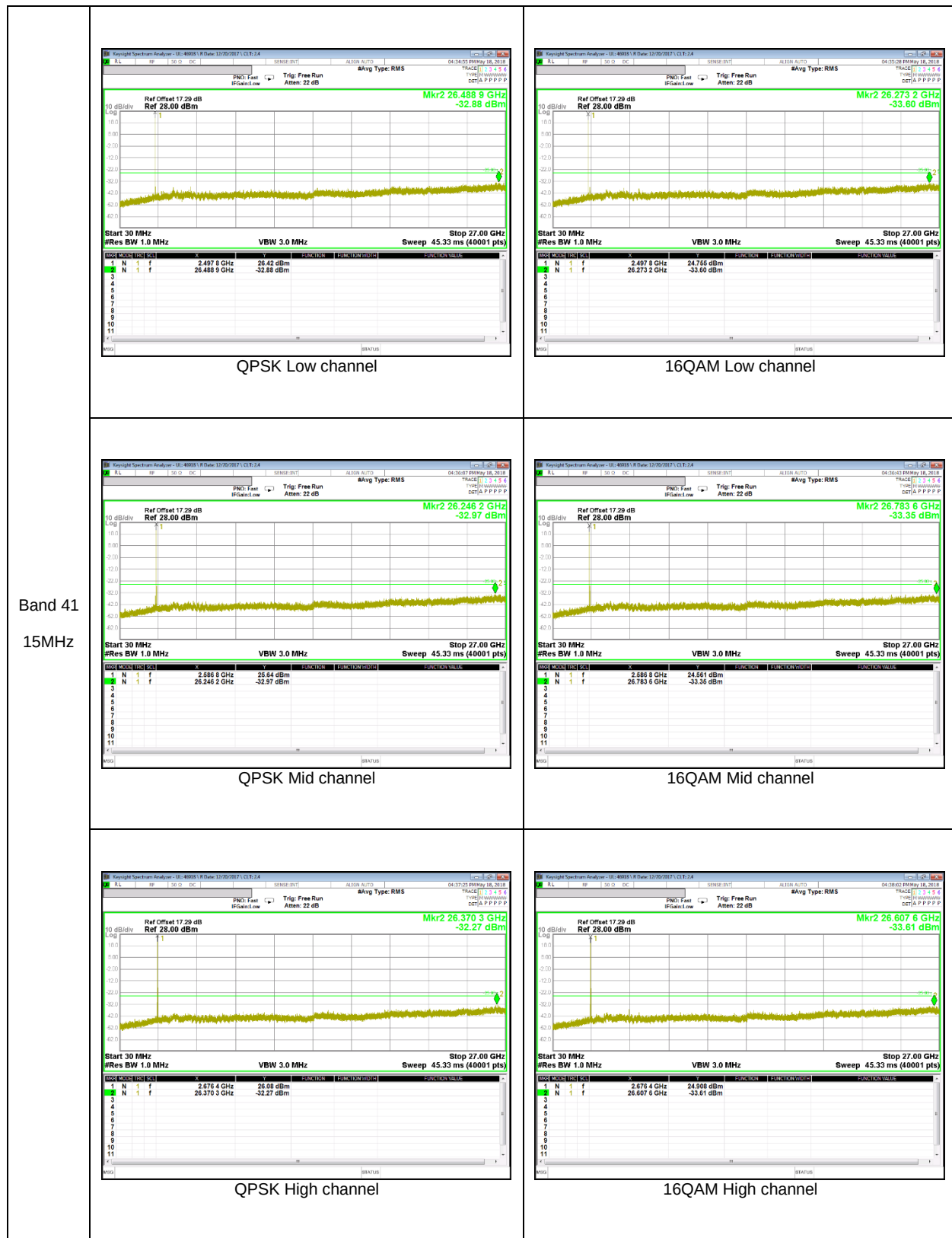


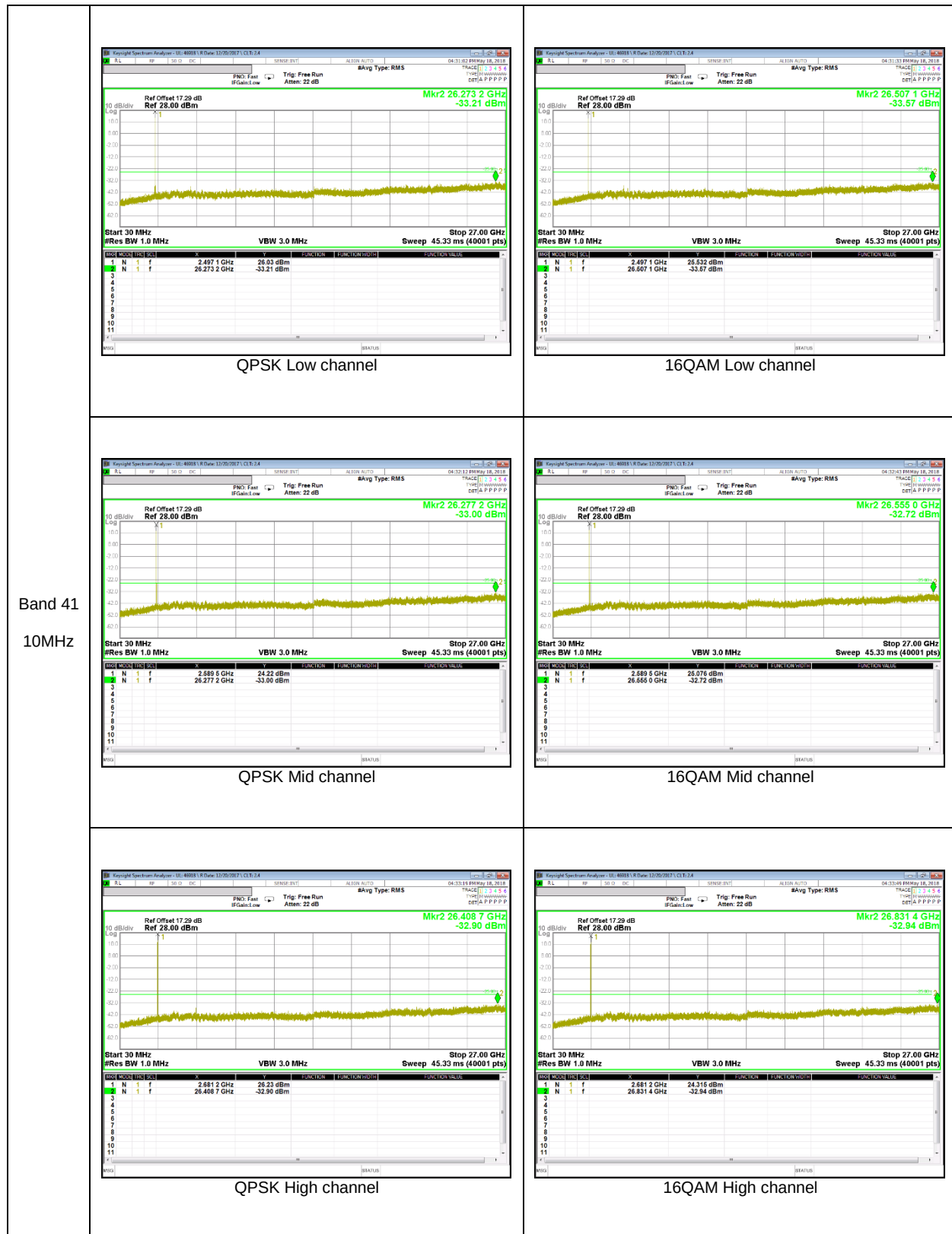


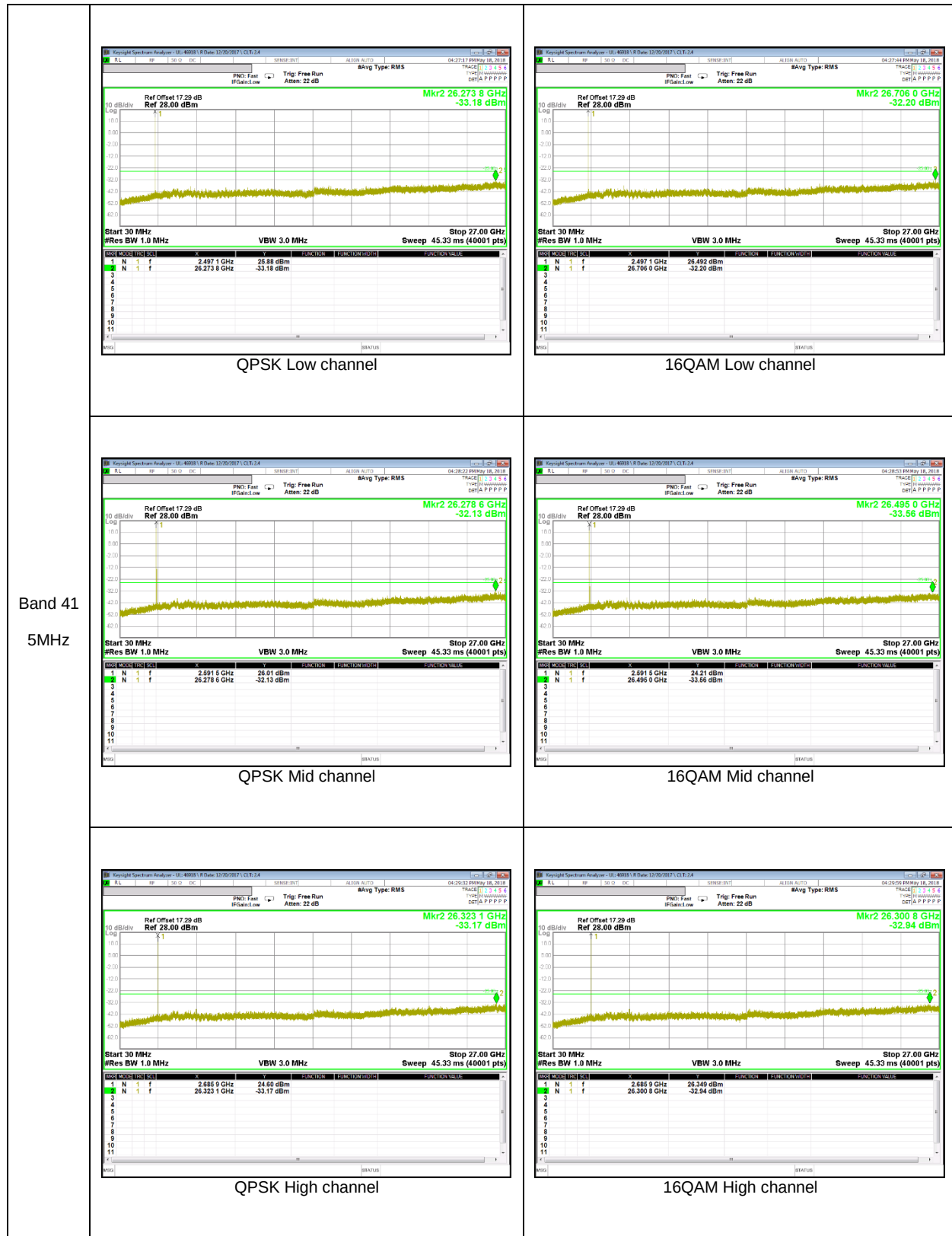


LTE Band 41









9.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

9.4.1. FREQUENCY STABILITY RESULTS

GSM 850 (GPRS)

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	824.19998388	0.004	848.79998065	0.009	2.5
3.85	40	824.19999089	-0.005	848.79998595	0.003	2.5
3.85	30	824.19998478	0.003	848.79998414	0.005	2.5
3.85	20	824.19998696	0.000	848.79998811	0.000	2.5
3.85	10	824.19998542	0.002	848.79998201	0.007	2.5
3.85	0	824.19998038	0.008	848.79998595	0.003	2.5
3.85	-10	824.19998936	-0.003	848.79998634	0.002	2.5
3.85	-20	824.19998389	0.004	848.79998769	0.000	2.5
3.85	-30	824.19998072	0.008	848.79998474	0.004	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	824.19998696	0	848.79998811	0	2.5
4.40	20	824.19998514	0.002	848.79998091	0.008	2.5
3.60	20	824.19998137	0.007	848.79998884	-0.001	2.5

GSM 1900 (Lowest Frequency : EGPRS / Highest Frequency : GPRS)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0808	1909.9223		
Extreme (50C)		1850.0808	1909.9223	-17.2	-0.009
Extreme (40C)		1850.0808	1909.9223	-17.8	-0.009
Extreme (30C)		1850.0808	1909.9223	-18.9	-0.010
Extreme (10C)		1850.0808	1909.9223	-15.5	-0.008
Extreme (0C)		1850.0808	1909.9223	-22.2	-0.012
Extreme (-10C)		1850.0808	1909.9223	-16.2	-0.009
Extreme (-20C)		1850.0808	1909.9223	-16.6	-0.009
Extreme (-30C)		1850.0808	1909.9223	-16.6	-0.009
20C	15%	1850.0808	1909.9223	-23.3	-0.012
	-15%	1850.0808	1909.9223	-15.0	-0.008
	End Point	1850.0808	1909.9223	-18.9	-0.010

WCDMA Band 5 (Rel 99)

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39998038	0.010	846.59998794	0.003	2.5
3.85	40	826.39998210	0.008	846.59998787	0.003	2.5
3.85	30	826.39999088	-0.002	846.59998470	0.007	2.5
3.85	20	826.39998890	0.000	846.59999055	0.000	2.5
3.85	10	826.39999068	-0.002	846.59998543	0.006	2.5
3.85	0	826.39998648	0.003	846.59998835	0.003	2.5
3.85	-10	826.39998686	0.002	846.59998591	0.005	2.5
3.85	-20	826.39998842	0.001	846.59998860	0.002	2.5
3.85	-30	826.39998651	0.003	846.59998170	0.010	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	826.39998890	0	846.59999055	0	2.5
4.40	20	826.39998079	0.010	846.59998365	0.008	2.5
3.60	20	826.39998365	0.006	846.59998526	0.006	2.5

WCDMA Band 2 (Rel 99)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-20.1	-0.011
Extreme (40C)		1852.3979	1907.6020	-24.4	-0.013
Extreme (30C)		1852.3979	1907.6020	-22.2	-0.012
Extreme (10C)		1852.3979	1907.6021	-18.0	-0.010
Extreme (0C)		1852.3979	1907.6020	-23.5	-0.013
Extreme (-10C)		1852.3979	1907.6021	-16.7	-0.009
Extreme (-20C)		1852.3979	1907.6020	-24.4	-0.013
Extreme (-30C)		1852.3979	1907.6020	-22.8	-0.012
20C	15%	1852.3979	1907.6020	-20.5	-0.011
	-15%	1852.3979	1907.6020	-23.0	-0.012
	End Point	1852.3979	1907.6021	-18.7	-0.010

LTE Band 5 (QPSK)

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	824.69998571	0.003	848.29998736	-0.001	2.5
3.85	40	824.69998088	0.009	848.29998034	0.007	2.5
3.85	30	824.69998600	0.003	848.29998235	0.005	2.5
3.85	20	824.69998849	0.000	848.29998628	0.000	2.5
3.85	10	824.69998864	0.000	848.29998217	0.005	2.5
3.85	0	824.69998337	0.006	848.29998098	0.006	2.5
3.85	-10	824.69998835	0.000	848.29998404	0.003	2.5
3.85	-20	824.69998517	0.004	848.29998349	0.003	2.5
3.85	-30	824.69998471	0.005	848.29998319	0.004	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					
		Low Channel		High Channel		Limit [ppm]	
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	824.69998849	0	848.29998628	0	2.5	
4.40	20	824.69998905	-0.001	848.29998025	0.007	2.5	
3.60	20	824.69998212	0.008	848.29999099	-0.006	2.5	

LTE Band 41 (Lowest Frequency: QPSK & 5MHz / Highest Frequency: QPSK & 5MHz)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2498.4978	2687.5022		
Extreme (50C)		2498.4977	2687.5022	-32.2	-0.012
Extreme (40C)		2498.4977	2687.5022	-33.0	-0.013
Extreme (30C)		2498.4977	2687.5022	-28.3	-0.011
Extreme (10C)		2498.4977	2687.5022	-33.8	-0.013
Extreme (0C)		2498.4977	2687.5022	-25.1	-0.010
Extreme (-10C)		2498.4977	2687.5022	-26.2	-0.010
Extreme (-20C)		2498.4977	2687.5022	-29.7	-0.011
Extreme (-30C)		2498.4977	2687.5022	-25.1	-0.010
20C	15%	2498.4977	2687.5022	-30.4	-0.012
	-15%	2498.4977	2687.5022	-26.3	-0.010
	End Point	2498.4977	2687.5022	-30.2	-0.012

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

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

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

TEST PROCEDURE

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

For radiated output power measurement with a ESU40:

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

TEST RESULTS

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	26.15	412.10
		661	836.6	26.52	448.75
		810	848.8	27.48	559.76
	EGPRS	512	824.2	19.59	90.99
		661	836.6	19.71	93.54
		810	848.8	20.80	120.23
GSM1900	GPRS	512	1850.2	24.46	279.25
		661	1880.0	26.16	413.05
		810	1909.8	25.58	361.41
	EGPRS	512	1850.2	20.05	101.16
		661	1880.0	19.16	82.41
		810	1909.8	21.19	131.52

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.72	59.16
		4183	836.6	17.53	56.62
		4233	846.6	17.90	61.66
	HSDPA	4132	826.4	16.52	44.87
		4183	836.6	16.25	42.17
		4233	846.6	16.54	45.08
Band 2	REL99	9262	1852.4	19.36	86.30
		9400	1880.0	18.16	65.46
		9538	1907.6	17.85	60.95
	HSDPA	9262	1852.4	18.47	70.31
		9400	1880.0	17.35	54.33
		9538	1907.6	16.84	48.31

LTE Band 5

Band	BW [MHz]	Mode	RB/RB Offset	f [MHz]	ERP / EIRP	
			1 RB		[dBm]	[mW]
Band 5	10	QPSK	1 / 49	829.0	18.02	63.39
			1 / 49	836.5	18.69	73.96
			1 / 49	844.0	19.12	81.66
		16QAM	1 / 0	829.0	17.30	53.70
			1 / 49	836.5	18.01	63.24
			1 / 49	844.0	17.99	62.95
	5	QPSK	1 / 0	826.5	18.19	65.92
			1 / 24	836.5	18.35	68.39
			1 / 24	846.5	18.07	64.12
		16QAM	1 / 24	826.5	17.91	61.80
			1 / 24	836.5	17.52	56.49
			1 / 24	846.5	17.50	56.23
	3	QPSK	1 / 0	825.5	18.33	68.08
			1 / 14	836.5	18.24	66.68
			1 / 8	847.5	18.40	69.18
		16QAM	1 / 8	825.5	17.71	59.02
			1 / 14	836.5	17.49	56.10
			1 / 8	847.5	17.53	56.62
	1.4	QPSK	1 / 0	824.7	18.43	69.66
			1 / 0	836.5	18.17	65.61
			1 / 0	848.3	18.19	65.92
		16QAM	1 / 0	824.7	17.56	57.02
			1 / 0	836.5	17.29	53.58
			1 / 0	848.3	17.38	54.70

LTE Band 41

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 41	20	QPSK	1/99	2506.0	21.43	139.00
			1/99	2593.0	20.74	118.58
			1/0	2680.0	19.75	94.41
		16QAM	1/99	2506.0	19.99	99.77
			1/49	2593.0	21.90	154.88
			1/49	2680.0	18.04	63.68
	15	QPSK	1/74	2503.5	20.98	125.31
			1/74	2593.0	22.54	179.47
			1/0	2682.5	19.90	97.72
		16QAM	1/0	2503.5	20.69	117.22
			1/74	2593.0	21.78	150.66
			1/0	2682.5	19.65	92.26
	10	QPSK	1/49	2501.0	21.90	154.88
			1/49	2593.0	20.97	125.03
			1/0	2685.0	19.16	82.41
		16QAM	1/0	2501.0	21.44	139.32
			1/0	2593.0	22.83	191.87
			1/0	2685.0	19.40	87.10
	5	QPSK	1/24	2498.5	20.86	121.90
			1/0	2593.0	21.44	139.32
			1/0	2687.5	20.43	110.41
		16QAM	1/24	2498.5	20.97	125.03
			1/12	2593.0	20.31	107.40
			1/12	2687.5	18.72	74.47

10.1.2. ERP/EIRP DATA

GSM 850

GSM GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: GPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>28.58</td><td>V</td><td>1.0</td><td>-1.5</td><td>26.15</td><td>38.5</td><td>-12.3</td></tr><tr><td>824.20</td><td>16.52</td><td>H</td><td>1.0</td><td>-1.5</td><td>14.09</td><td>38.5</td><td>-24.4</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>28.90</td><td>V</td><td>1.0</td><td>-1.4</td><td>26.52</td><td>38.5</td><td>-12.0</td></tr><tr><td>836.60</td><td>16.99</td><td>H</td><td>1.0</td><td>-1.4</td><td>14.61</td><td>38.5</td><td>-23.9</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>29.83</td><td>V</td><td>1.0</td><td>-1.4</td><td>27.48</td><td>38.5</td><td>-11.0</td></tr><tr><td>848.80</td><td>18.64</td><td>H</td><td>1.0</td><td>-1.4</td><td>16.29</td><td>38.5</td><td>-22.2</td></tr></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	28.58	V	1.0	-1.5	26.15	38.5	-12.3	824.20	16.52	H	1.0	-1.5	14.09	38.5	-24.4	Mid Ch								836.60	28.90	V	1.0	-1.4	26.52	38.5	-12.0	836.60	16.99	H	1.0	-1.4	14.61	38.5	-23.9	High Ch								848.80	29.83	V	1.0	-1.4	27.48	38.5	-11.0	848.80	18.64	H	1.0	-1.4	16.29	38.5	-22.2
	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	28.58	V	1.0	-1.5	26.15	38.5	-12.3																																																																																		
	824.20	16.52	H	1.0	-1.5	14.09	38.5	-24.4																																																																																		
	Mid Ch																																																																																									
	836.60	28.90	V	1.0	-1.4	26.52	38.5	-12.0																																																																																		
	836.60	16.99	H	1.0	-1.4	14.61	38.5	-23.9																																																																																		
	High Ch																																																																																									
	848.80	29.83	V	1.0	-1.4	27.48	38.5	-11.0																																																																																		
848.80	18.64	H	1.0	-1.4	16.29	38.5	-22.2																																																																																			
GSM GSM850 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: EGPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>22.02</td><td>V</td><td>1.0</td><td>-1.5</td><td>19.59</td><td>38.5</td><td>-18.9</td></tr><tr><td>824.20</td><td>8.87</td><td>H</td><td>1.0</td><td>-1.5</td><td>6.44</td><td>38.5</td><td>-32.1</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>22.09</td><td>V</td><td>1.0</td><td>-1.4</td><td>19.71</td><td>38.5</td><td>-18.8</td></tr><tr><td>836.60</td><td>9.90</td><td>H</td><td>1.0</td><td>-1.4</td><td>7.52</td><td>38.5</td><td>-31.0</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>23.15</td><td>V</td><td>1.0</td><td>-1.4</td><td>20.80</td><td>38.5</td><td>-17.7</td></tr><tr><td>848.80</td><td>11.80</td><td>H</td><td>1.0</td><td>-1.4</td><td>9.45</td><td>38.5</td><td>-29.0</td></tr></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	22.02	V	1.0	-1.5	19.59	38.5	-18.9	824.20	8.87	H	1.0	-1.5	6.44	38.5	-32.1	Mid Ch								836.60	22.09	V	1.0	-1.4	19.71	38.5	-18.8	836.60	9.90	H	1.0	-1.4	7.52	38.5	-31.0	High Ch								848.80	23.15	V	1.0	-1.4	20.80	38.5	-17.7	848.80	11.80	H	1.0	-1.4	9.45	38.5	-29.0
	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	22.02	V	1.0	-1.5	19.59	38.5	-18.9																																																																																		
	824.20	8.87	H	1.0	-1.5	6.44	38.5	-32.1																																																																																		
	Mid Ch																																																																																									
	836.60	22.09	V	1.0	-1.4	19.71	38.5	-18.8																																																																																		
	836.60	9.90	H	1.0	-1.4	7.52	38.5	-31.0																																																																																		
	High Ch																																																																																									
	848.80	23.15	V	1.0	-1.4	20.80	38.5	-17.7																																																																																		
848.80	11.80	H	1.0	-1.4	9.45	38.5	-29.0																																																																																			

GSM 1900

GSM

GSM1900

GPRS

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsugn

Project #: 4788458975

Date: 2018-05-01

Test Engineer: 51072

Configuration: EUT / X-Position

Location: Chamber 1

Mode: GPRS 1900 MHz Fundamentals

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-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								
1850.20	18.56	V	4.5	9.5	23.57	33.0	-9.4	
1850.20	19.45	H	4.5	9.5	24.46	33.0	-8.5	
Mid Ch								
1880.00	18.17	V	4.5	9.2	22.85	33.0	-10.2	
1880.00	21.48	H	4.5	9.2	26.16	33.0	-6.8	
High Ch								
1909.80	19.07	V	4.6	8.9	23.37	33.0	-9.6	
1909.80	21.28	H	4.6	8.9	25.58	33.0	-7.4	

GSM

GSM1900

EGPRS

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsugn

Project #: 4788458975

Date: 2018-05-01

Test Engineer: 51072

Configuration: EUT / X-Position

Location: Chamber 1

Mode: EGPRS 1900 MHz Fundamentals

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-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								
1850.20	14.12	V	4.5	9.5	19.13	33.0	-13.9	
1850.20	15.04	H	4.5	9.5	20.05	33.0	-12.9	
Mid Ch								
1880.00	13.66	V	4.5	9.2	18.34	33.0	-14.7	
1880.00	14.48	H	4.5	9.2	19.16	33.0	-13.8	
High Ch								
1909.80	14.70	V	4.6	8.9	19.00	33.0	-14.0	
1909.80	16.89	H	4.6	8.9	21.19	33.0	-11.8	

WCDMA

Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>826.40</td><td>20.14</td><td>V</td><td>1.0</td><td>-1.5</td><td>17.72</td><td>38.5</td><td>-20.8</td><td></td></tr><tr><td>826.40</td><td>7.96</td><td>H</td><td>1.0</td><td>-1.5</td><td>5.54</td><td>38.5</td><td>-33.0</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.60</td><td>19.91</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.53</td><td>38.5</td><td>-21.0</td><td></td></tr><tr><td>836.60</td><td>8.31</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.93</td><td>38.5</td><td>-32.6</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>846.60</td><td>20.25</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.90</td><td>38.5</td><td>-20.6</td><td></td></tr><tr><td>846.60</td><td>8.76</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.41</td><td>38.5</td><td>-32.1</td><td></td></tr></table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									826.40	20.14	V	1.0	-1.5	17.72	38.5	-20.8		826.40	7.96	H	1.0	-1.5	5.54	38.5	-33.0		Mid Ch									836.60	19.91	V	1.0	-1.4	17.53	38.5	-21.0		836.60	8.31	H	1.0	-1.4	5.93	38.5	-32.6		High Ch									846.60	20.25	V	1.0	-1.4	17.90	38.5	-20.6		846.60	8.76	H	1.0	-1.4	6.41	38.5	-32.1	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																		
	Low Ch																																																																																										
	826.40	20.14	V	1.0	-1.5	17.72	38.5	-20.8																																																																																			
	826.40	7.96	H	1.0	-1.5	5.54	38.5	-33.0																																																																																			
	Mid Ch																																																																																										
	836.60	19.91	V	1.0	-1.4	17.53	38.5	-21.0																																																																																			
	836.60	8.31	H	1.0	-1.4	5.93	38.5	-32.6																																																																																			
	High Ch																																																																																										
	846.60	20.25	V	1.0	-1.4	17.90	38.5	-20.6																																																																																			
846.60	8.76	H	1.0	-1.4	6.41	38.5	-32.1																																																																																				
WCDMA Band 5 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: HSDPA Band 5 Fundamentals Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>826.40</td><td>18.94</td><td>V</td><td>1.0</td><td>-1.5</td><td>16.52</td><td>38.5</td><td>-22.0</td><td></td></tr><tr><td>826.40</td><td>6.75</td><td>H</td><td>1.0</td><td>-1.5</td><td>4.33</td><td>38.5</td><td>-34.2</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.60</td><td>18.63</td><td>V</td><td>1.0</td><td>-1.4</td><td>16.25</td><td>38.5</td><td>-22.2</td><td></td></tr><tr><td>836.60</td><td>7.02</td><td>H</td><td>1.0</td><td>-1.4</td><td>4.64</td><td>38.5</td><td>-33.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>846.60</td><td>18.89</td><td>V</td><td>1.0</td><td>-1.4</td><td>16.54</td><td>38.5</td><td>-22.0</td><td></td></tr><tr><td>846.60</td><td>7.46</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.11</td><td>38.5</td><td>-33.4</td><td></td></tr></table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									826.40	18.94	V	1.0	-1.5	16.52	38.5	-22.0		826.40	6.75	H	1.0	-1.5	4.33	38.5	-34.2		Mid Ch									836.60	18.63	V	1.0	-1.4	16.25	38.5	-22.2		836.60	7.02	H	1.0	-1.4	4.64	38.5	-33.9		High Ch									846.60	18.89	V	1.0	-1.4	16.54	38.5	-22.0		846.60	7.46	H	1.0	-1.4	5.11	38.5	-33.4	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																		
	Low Ch																																																																																										
	826.40	18.94	V	1.0	-1.5	16.52	38.5	-22.0																																																																																			
	826.40	6.75	H	1.0	-1.5	4.33	38.5	-34.2																																																																																			
	Mid Ch																																																																																										
	836.60	18.63	V	1.0	-1.4	16.25	38.5	-22.2																																																																																			
	836.60	7.02	H	1.0	-1.4	4.64	38.5	-33.9																																																																																			
	High Ch																																																																																										
	846.60	18.89	V	1.0	-1.4	16.54	38.5	-22.0																																																																																			
846.60	7.46	H	1.0	-1.4	5.11	38.5	-33.4																																																																																				

Band 2

WCDMA
Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788458975
Date: 2018-05-01
Test Engineer: 51072
Configuration: EUT / X-Position
Location: Chamber 1
Mode: Rel99 Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00161451], 3m N-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								
1852.40	11.72	V	4.5	9.5	16.71	33.0	-16.3	
1852.40	14.37	H	4.5	9.5	19.36	33.0	-13.6	
Mid Ch								
1880.00	10.67	V	4.5	9.2	15.35	33.0	-17.7	
1880.00	13.48	H	4.5	9.2	18.16	33.0	-14.8	
High Ch								
1907.60	11.21	V	4.6	8.9	15.55	33.0	-17.5	
1907.60	13.51	H	4.6	8.9	17.85	33.0	-15.1	

WCDMA
Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788458975
Date: 2018-05-01
Test Engineer: 51072
Configuration: EUT / X-Position
Location: Chamber 1
Mode: HSDPA Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00161451], 3m N-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								
1852.40	10.75	V	4.5	9.5	15.74	33.0	-17.3	
1852.40	13.48	H	4.5	9.5	18.47	33.0	-14.5	
Mid Ch								
1880.00	9.84	V	4.5	9.2	14.52	33.0	-18.5	
1880.00	12.67	H	4.5	9.2	17.35	33.0	-15.7	
High Ch								
1907.60	10.13	V	4.6	8.9	14.47	33.0	-18.5	
1907.60	12.50	H	4.6	8.9	16.84	33.0	-16.2	

LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-03 Test Engineer: 47989 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, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>829.00</td><td>20.43</td><td>V</td><td>1.0</td><td>-1.5</td><td>18.02</td><td>38.5</td><td>-20.5</td><td></td></tr><tr><td>829.00</td><td>9.76</td><td>H</td><td>1.0</td><td>-1.5</td><td>7.35</td><td>38.5</td><td>-31.2</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>21.07</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.69</td><td>38.5</td><td>-19.8</td><td></td></tr><tr><td>836.50</td><td>9.02</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.64</td><td>38.5</td><td>-31.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>844.00</td><td>21.47</td><td>V</td><td>1.0</td><td>-1.4</td><td>19.12</td><td>38.5</td><td>-19.4</td><td></td></tr><tr><td>844.00</td><td>9.96</td><td>H</td><td>1.0</td><td>-1.4</td><td>7.60</td><td>38.5</td><td>-30.9</td><td></td></tr></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									829.00	20.43	V	1.0	-1.5	18.02	38.5	-20.5		829.00	9.76	H	1.0	-1.5	7.35	38.5	-31.2		Mid Ch									836.50	21.07	V	1.0	-1.4	18.69	38.5	-19.8		836.50	9.02	H	1.0	-1.4	6.64	38.5	-31.9		High Ch									844.00	21.47	V	1.0	-1.4	19.12	38.5	-19.4		844.00	9.96	H	1.0	-1.4	7.60	38.5	-30.9	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	829.00	20.43	V	1.0	-1.5	18.02	38.5	-20.5																																																																																											
	829.00	9.76	H	1.0	-1.5	7.35	38.5	-31.2																																																																																											
	Mid Ch																																																																																																		
	836.50	21.07	V	1.0	-1.4	18.69	38.5	-19.8																																																																																											
	836.50	9.02	H	1.0	-1.4	6.64	38.5	-31.9																																																																																											
	High Ch																																																																																																		
	844.00	21.47	V	1.0	-1.4	19.12	38.5	-19.4																																																																																											
844.00	9.96	H	1.0	-1.4	7.60	38.5	-30.9																																																																																												
LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-03 Test Engineer: 47989 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, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>829.00</td><td>19.71</td><td>V</td><td>1.0</td><td>-1.5</td><td>17.30</td><td>38.5</td><td>-21.2</td><td></td></tr><tr><td>829.00</td><td>8.69</td><td>H</td><td>1.0</td><td>-1.5</td><td>6.28</td><td>38.5</td><td>-32.2</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>20.39</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.01</td><td>38.5</td><td>-20.5</td><td></td></tr><tr><td>836.50</td><td>8.12</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.74</td><td>38.5</td><td>-32.8</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>844.00</td><td>20.34</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.99</td><td>38.5</td><td>-20.5</td><td></td></tr><tr><td>844.00</td><td>8.72</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.36</td><td>38.5</td><td>-32.1</td><td></td></tr></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									829.00	19.71	V	1.0	-1.5	17.30	38.5	-21.2		829.00	8.69	H	1.0	-1.5	6.28	38.5	-32.2		Mid Ch									836.50	20.39	V	1.0	-1.4	18.01	38.5	-20.5		836.50	8.12	H	1.0	-1.4	5.74	38.5	-32.8		High Ch									844.00	20.34	V	1.0	-1.4	17.99	38.5	-20.5		844.00	8.72	H	1.0	-1.4	6.36	38.5	-32.1	
	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	19.71	V	1.0	-1.5	17.30	38.5	-21.2																																																																																											
	829.00	8.69	H	1.0	-1.5	6.28	38.5	-32.2																																																																																											
	Mid Ch																																																																																																		
	836.50	20.39	V	1.0	-1.4	18.01	38.5	-20.5																																																																																											
	836.50	8.12	H	1.0	-1.4	5.74	38.5	-32.8																																																																																											
	High Ch																																																																																																		
	844.00	20.34	V	1.0	-1.4	17.99	38.5	-20.5																																																																																											
844.00	8.72	H	1.0	-1.4	6.36	38.5	-32.1																																																																																												

LTE

Band 5

5MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788458975

Date: 2018-05-01

Test Engineer: 47989

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, 3m N-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	20.61	V	1.0	-1.5	18.19	38.5	-20.3	
826.50	8.81	H	1.0	-1.5	6.39	38.5	-32.1	
Mid Ch								
836.50	20.73	V	1.0	-1.4	18.35	38.5	-20.2	
836.50	8.83	H	1.0	-1.4	6.45	38.5	-32.1	
High Ch								
846.50	20.42	V	1.0	-1.4	18.07	38.5	-20.4	
846.50	8.85	H	1.0	-1.4	6.50	38.5	-32.0	

LTE

Band 5

5MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788458975

Date: 2018-05-01

Test Engineer: 47989

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, 3m N-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	20.33	V	1.0	-1.5	17.91	38.5	-20.6	
826.50	8.67	H	1.0	-1.5	6.25	38.5	-32.2	
Mid Ch								
836.50	19.90	V	1.0	-1.4	17.52	38.5	-21.0	
836.50	8.00	H	1.0	-1.4	5.62	38.5	-32.9	
High Ch								
846.50	19.85	V	1.0	-1.4	17.50	38.5	-21.0	
846.50	8.56	H	1.0	-1.4	6.21	38.5	-32.3	

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>825.50</td><td>20.75</td><td>V</td><td>1.0</td><td>-1.5</td><td>18.33</td><td>38.5</td><td>-20.2</td><td></td></tr><tr><td>825.50</td><td>8.93</td><td>H</td><td>1.0</td><td>-1.5</td><td>6.51</td><td>38.5</td><td>-32.0</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>20.62</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.24</td><td>38.5</td><td>-20.3</td><td></td></tr><tr><td>836.50</td><td>8.77</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.39</td><td>38.5</td><td>-32.1</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>847.50</td><td>20.74</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.40</td><td>38.5</td><td>-20.1</td><td></td></tr><tr><td>847.50</td><td>9.17</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.82</td><td>38.5</td><td>-31.7</td><td></td></tr></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									825.50	20.75	V	1.0	-1.5	18.33	38.5	-20.2		825.50	8.93	H	1.0	-1.5	6.51	38.5	-32.0		Mid Ch									836.50	20.62	V	1.0	-1.4	18.24	38.5	-20.3		836.50	8.77	H	1.0	-1.4	6.39	38.5	-32.1		High Ch									847.50	20.74	V	1.0	-1.4	18.40	38.5	-20.1		847.50	9.17	H	1.0	-1.4	6.82	38.5	-31.7	
	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	20.75	V	1.0	-1.5	18.33	38.5	-20.2																																																																																											
	825.50	8.93	H	1.0	-1.5	6.51	38.5	-32.0																																																																																											
	Mid Ch																																																																																																		
	836.50	20.62	V	1.0	-1.4	18.24	38.5	-20.3																																																																																											
	836.50	8.77	H	1.0	-1.4	6.39	38.5	-32.1																																																																																											
	High Ch																																																																																																		
	847.50	20.74	V	1.0	-1.4	18.40	38.5	-20.1																																																																																											
847.50	9.17	H	1.0	-1.4	6.82	38.5	-31.7																																																																																												
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>825.50</td><td>20.13</td><td>V</td><td>1.0</td><td>-1.5</td><td>17.71</td><td>38.5</td><td>-20.8</td><td></td></tr><tr><td>825.50</td><td>8.36</td><td>H</td><td>1.0</td><td>-1.5</td><td>5.94</td><td>38.5</td><td>-32.6</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>19.87</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.49</td><td>38.5</td><td>-21.0</td><td></td></tr><tr><td>836.50</td><td>8.11</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.73</td><td>38.5</td><td>-32.8</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>847.50</td><td>19.87</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.53</td><td>38.5</td><td>-21.0</td><td></td></tr><tr><td>847.50</td><td>8.39</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.04</td><td>38.5</td><td>-32.5</td><td></td></tr></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									825.50	20.13	V	1.0	-1.5	17.71	38.5	-20.8		825.50	8.36	H	1.0	-1.5	5.94	38.5	-32.6		Mid Ch									836.50	19.87	V	1.0	-1.4	17.49	38.5	-21.0		836.50	8.11	H	1.0	-1.4	5.73	38.5	-32.8		High Ch									847.50	19.87	V	1.0	-1.4	17.53	38.5	-21.0		847.50	8.39	H	1.0	-1.4	6.04	38.5	-32.5	
	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	20.13	V	1.0	-1.5	17.71	38.5	-20.8																																																																																											
	825.50	8.36	H	1.0	-1.5	5.94	38.5	-32.6																																																																																											
	Mid Ch																																																																																																		
	836.50	19.87	V	1.0	-1.4	17.49	38.5	-21.0																																																																																											
	836.50	8.11	H	1.0	-1.4	5.73	38.5	-32.8																																																																																											
	High Ch																																																																																																		
	847.50	19.87	V	1.0	-1.4	17.53	38.5	-21.0																																																																																											
847.50	8.39	H	1.0	-1.4	6.04	38.5	-32.5																																																																																												

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>824.70</td><td>20.86</td><td>V</td><td>1.0</td><td>-1.5</td><td>18.43</td><td>38.5</td><td>-20.1</td><td></td></tr><tr><td>824.70</td><td>8.95</td><td>H</td><td>1.0</td><td>-1.5</td><td>6.52</td><td>38.5</td><td>-32.0</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>20.55</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.17</td><td>38.5</td><td>-20.3</td><td></td></tr><tr><td>836.50</td><td>9.01</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.63</td><td>38.5</td><td>-31.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>848.30</td><td>20.54</td><td>V</td><td>1.0</td><td>-1.4</td><td>18.19</td><td>38.5</td><td>-20.3</td><td></td></tr><tr><td>848.30</td><td>8.46</td><td>H</td><td>1.0</td><td>-1.4</td><td>6.11</td><td>38.5</td><td>-32.4</td><td></td></tr></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									824.70	20.86	V	1.0	-1.5	18.43	38.5	-20.1		824.70	8.95	H	1.0	-1.5	6.52	38.5	-32.0		Mid Ch									836.50	20.55	V	1.0	-1.4	18.17	38.5	-20.3		836.50	9.01	H	1.0	-1.4	6.63	38.5	-31.9		High Ch									848.30	20.54	V	1.0	-1.4	18.19	38.5	-20.3		848.30	8.46	H	1.0	-1.4	6.11	38.5	-32.4	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	824.70	20.86	V	1.0	-1.5	18.43	38.5	-20.1																																																																																											
	824.70	8.95	H	1.0	-1.5	6.52	38.5	-32.0																																																																																											
	Mid Ch																																																																																																		
	836.50	20.55	V	1.0	-1.4	18.17	38.5	-20.3																																																																																											
	836.50	9.01	H	1.0	-1.4	6.63	38.5	-31.9																																																																																											
	High Ch																																																																																																		
	848.30	20.54	V	1.0	-1.4	18.19	38.5	-20.3																																																																																											
848.30	8.46	H	1.0	-1.4	6.11	38.5	-32.4																																																																																												
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-01 Test Engineer: 47989 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>824.70</td><td>19.99</td><td>V</td><td>1.0</td><td>-1.5</td><td>17.56</td><td>38.5</td><td>-20.9</td><td></td></tr><tr><td>824.70</td><td>8.23</td><td>H</td><td>1.0</td><td>-1.5</td><td>5.80</td><td>38.5</td><td>-32.7</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.50</td><td>19.67</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.29</td><td>38.5</td><td>-21.2</td><td></td></tr><tr><td>836.50</td><td>8.18</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.80</td><td>38.5</td><td>-32.7</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>848.30</td><td>19.73</td><td>V</td><td>1.0</td><td>-1.4</td><td>17.38</td><td>38.5</td><td>-21.1</td><td></td></tr><tr><td>848.30</td><td>7.68</td><td>H</td><td>1.0</td><td>-1.4</td><td>5.33</td><td>38.5</td><td>-33.2</td><td></td></tr></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									824.70	19.99	V	1.0	-1.5	17.56	38.5	-20.9		824.70	8.23	H	1.0	-1.5	5.80	38.5	-32.7		Mid Ch									836.50	19.67	V	1.0	-1.4	17.29	38.5	-21.2		836.50	8.18	H	1.0	-1.4	5.80	38.5	-32.7		High Ch									848.30	19.73	V	1.0	-1.4	17.38	38.5	-21.1		848.30	7.68	H	1.0	-1.4	5.33	38.5	-33.2	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	824.70	19.99	V	1.0	-1.5	17.56	38.5	-20.9																																																																																											
	824.70	8.23	H	1.0	-1.5	5.80	38.5	-32.7																																																																																											
	Mid Ch																																																																																																		
	836.50	19.67	V	1.0	-1.4	17.29	38.5	-21.2																																																																																											
	836.50	8.18	H	1.0	-1.4	5.80	38.5	-32.7																																																																																											
	High Ch																																																																																																		
	848.30	19.73	V	1.0	-1.4	17.38	38.5	-21.1																																																																																											
848.30	7.68	H	1.0	-1.4	5.33	38.5	-33.2																																																																																												

LTE Band 41

LTE Band 41 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2506.00</td><td>13.85</td><td>V</td><td>5.3</td><td>10.3</td><td>18.79</td><td>33.0</td><td>-14.2</td></tr><tr><td>2506.00</td><td>16.49</td><td>H</td><td>5.3</td><td>10.3</td><td>21.43</td><td>33.0</td><td>-11.6</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>12.38</td><td>V</td><td>5.4</td><td>10.1</td><td>17.05</td><td>33.0</td><td>-16.0</td></tr><tr><td>2593.00</td><td>16.07</td><td>H</td><td>5.4</td><td>10.1</td><td>20.74</td><td>33.0</td><td>-12.3</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2680.00</td><td>12.86</td><td>V</td><td>5.5</td><td>10.2</td><td>17.50</td><td>33.0</td><td>-15.5</td></tr><tr><td>2680.00</td><td>15.12</td><td>H</td><td>5.5</td><td>10.2</td><td>19.75</td><td>33.0</td><td>-13.2</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2506.00	13.85	V	5.3	10.3	18.79	33.0	-14.2	2506.00	16.49	H	5.3	10.3	21.43	33.0	-11.6	Mid Ch								2593.00	12.38	V	5.4	10.1	17.05	33.0	-16.0	2593.00	16.07	H	5.4	10.1	20.74	33.0	-12.3	High Ch								2680.00	12.86	V	5.5	10.2	17.50	33.0	-15.5	2680.00	15.12	H	5.5	10.2	19.75	33.0	-13.2
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2506.00	13.85	V	5.3	10.3	18.79	33.0	-14.2																																																																																		
	2506.00	16.49	H	5.3	10.3	21.43	33.0	-11.6																																																																																		
	Mid Ch																																																																																									
	2593.00	12.38	V	5.4	10.1	17.05	33.0	-16.0																																																																																		
	2593.00	16.07	H	5.4	10.1	20.74	33.0	-12.3																																																																																		
	High Ch																																																																																									
	2680.00	12.86	V	5.5	10.2	17.50	33.0	-15.5																																																																																		
2680.00	15.12	H	5.5	10.2	19.75	33.0	-13.2																																																																																			
LTE Band 41 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2506.00</td><td>12.08</td><td>V</td><td>5.3</td><td>10.3</td><td>17.02</td><td>33.0</td><td>-16.0</td></tr><tr><td>2506.00</td><td>15.05</td><td>H</td><td>5.3</td><td>10.3</td><td>19.99</td><td>33.0</td><td>-13.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>11.70</td><td>V</td><td>5.4</td><td>10.1</td><td>16.37</td><td>33.0</td><td>-16.6</td></tr><tr><td>2593.00</td><td>17.23</td><td>H</td><td>5.4</td><td>10.1</td><td>21.90</td><td>33.0</td><td>-11.1</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2680.00</td><td>9.95</td><td>V</td><td>5.5</td><td>10.2</td><td>14.59</td><td>33.0</td><td>-18.4</td></tr><tr><td>2680.00</td><td>13.41</td><td>H</td><td>5.5</td><td>10.2</td><td>18.04</td><td>33.0</td><td>-15.0</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2506.00	12.08	V	5.3	10.3	17.02	33.0	-16.0	2506.00	15.05	H	5.3	10.3	19.99	33.0	-13.0	Mid Ch								2593.00	11.70	V	5.4	10.1	16.37	33.0	-16.6	2593.00	17.23	H	5.4	10.1	21.90	33.0	-11.1	High Ch								2680.00	9.95	V	5.5	10.2	14.59	33.0	-18.4	2680.00	13.41	H	5.5	10.2	18.04	33.0	-15.0
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2506.00	12.08	V	5.3	10.3	17.02	33.0	-16.0																																																																																		
	2506.00	15.05	H	5.3	10.3	19.99	33.0	-13.0																																																																																		
	Mid Ch																																																																																									
	2593.00	11.70	V	5.4	10.1	16.37	33.0	-16.6																																																																																		
	2593.00	17.23	H	5.4	10.1	21.90	33.0	-11.1																																																																																		
	High Ch																																																																																									
	2680.00	9.95	V	5.5	10.2	14.59	33.0	-18.4																																																																																		
2680.00	13.41	H	5.5	10.2	18.04	33.0	-15.0																																																																																			

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2503.50</td><td>13.61</td><td>V</td><td>5.3</td><td>10.3</td><td>18.56</td><td>33.0</td><td>-14.4</td></tr><tr><td>2503.50</td><td>16.03</td><td>H</td><td>5.3</td><td>10.3</td><td>20.98</td><td>33.0</td><td>-12.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>11.90</td><td>V</td><td>5.4</td><td>10.1</td><td>16.57</td><td>33.0</td><td>-16.4</td></tr><tr><td>2593.00</td><td>17.87</td><td>H</td><td>5.4</td><td>10.1</td><td>22.54</td><td>33.0</td><td>-10.5</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2682.50</td><td>12.47</td><td>V</td><td>5.5</td><td>10.2</td><td>17.10</td><td>33.0</td><td>-15.9</td></tr><tr><td>2682.50</td><td>15.26</td><td>H</td><td>5.5</td><td>10.2</td><td>19.90</td><td>33.0</td><td>-13.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2503.50	13.61	V	5.3	10.3	18.56	33.0	-14.4	2503.50	16.03	H	5.3	10.3	20.98	33.0	-12.0	Mid Ch								2593.00	11.90	V	5.4	10.1	16.57	33.0	-16.4	2593.00	17.87	H	5.4	10.1	22.54	33.0	-10.5	High Ch								2682.50	12.47	V	5.5	10.2	17.10	33.0	-15.9	2682.50	15.26	H	5.5	10.2	19.90	33.0	-13.1
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2503.50	13.61	V	5.3	10.3	18.56	33.0	-14.4																																																																																		
	2503.50	16.03	H	5.3	10.3	20.98	33.0	-12.0																																																																																		
	Mid Ch																																																																																									
	2593.00	11.90	V	5.4	10.1	16.57	33.0	-16.4																																																																																		
	2593.00	17.87	H	5.4	10.1	22.54	33.0	-10.5																																																																																		
	High Ch																																																																																									
	2682.50	12.47	V	5.5	10.2	17.10	33.0	-15.9																																																																																		
2682.50	15.26	H	5.5	10.2	19.90	33.0	-13.1																																																																																			
LTE Band 41 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2503.50</td><td>13.20</td><td>V</td><td>5.3</td><td>10.3</td><td>18.15</td><td>33.0</td><td>-14.8</td></tr><tr><td>2503.50</td><td>15.74</td><td>H</td><td>5.3</td><td>10.3</td><td>20.69</td><td>33.0</td><td>-12.3</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>12.91</td><td>V</td><td>5.4</td><td>10.1</td><td>17.58</td><td>33.0</td><td>-15.4</td></tr><tr><td>2593.00</td><td>17.11</td><td>H</td><td>5.4</td><td>10.1</td><td>21.78</td><td>33.0</td><td>-11.2</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2682.50</td><td>10.54</td><td>V</td><td>5.5</td><td>10.2</td><td>15.17</td><td>33.0</td><td>-17.8</td></tr><tr><td>2682.50</td><td>15.01</td><td>H</td><td>5.5</td><td>10.2</td><td>19.65</td><td>33.0</td><td>-13.4</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2503.50	13.20	V	5.3	10.3	18.15	33.0	-14.8	2503.50	15.74	H	5.3	10.3	20.69	33.0	-12.3	Mid Ch								2593.00	12.91	V	5.4	10.1	17.58	33.0	-15.4	2593.00	17.11	H	5.4	10.1	21.78	33.0	-11.2	High Ch								2682.50	10.54	V	5.5	10.2	15.17	33.0	-17.8	2682.50	15.01	H	5.5	10.2	19.65	33.0	-13.4
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2503.50	13.20	V	5.3	10.3	18.15	33.0	-14.8																																																																																		
	2503.50	15.74	H	5.3	10.3	20.69	33.0	-12.3																																																																																		
	Mid Ch																																																																																									
	2593.00	12.91	V	5.4	10.1	17.58	33.0	-15.4																																																																																		
	2593.00	17.11	H	5.4	10.1	21.78	33.0	-11.2																																																																																		
	High Ch																																																																																									
	2682.50	10.54	V	5.5	10.2	15.17	33.0	-17.8																																																																																		
2682.50	15.01	H	5.5	10.2	19.65	33.0	-13.4																																																																																			

LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788468750

Date: 2018-05-10

Test Engineer: 45585

Configuration: EUT / Z-Position

Location: Chamber 1

Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	14.15	V	5.3	10.3	19.11	33.0	-13.9	
2501.00	16.93	H	5.3	10.3	21.90	33.0	-11.1	
Mid Ch								
2593.00	12.83	V	5.4	10.1	17.50	33.0	-15.5	
2593.00	16.30	H	5.4	10.1	20.97	33.0	-12.0	
High Ch								
2685.00	10.52	V	5.5	10.2	15.15	33.0	-17.8	
2685.00	14.53	H	5.5	10.2	19.16	33.0	-13.8	

LTE

Band 41

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788468750

Date: 2018-05-10

Test Engineer: 45585

Configuration: EUT / Z-Position

Location: Chamber 1

Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	13.93	V	5.3	10.3	18.89	33.0	-14.1	
2501.00	16.47	H	5.3	10.3	21.44	33.0	-11.6	
Mid Ch								
2593.00	13.78	V	5.4	10.1	18.45	33.0	-14.6	
2593.00	18.16	H	5.4	10.1	22.83	33.0	-10.2	
High Ch								
2685.00	11.52	V	5.5	10.2	16.15	33.0	-16.8	
2685.00	14.77	H	5.5	10.2	19.40	33.0	-13.6	

LTE

Band 41

5MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788468750

Date: 2018-05-10

Test Engineer: 45585

Configuration: EUT / Z-Position

Location: Chamber 1

Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	13.68	V	5.3	10.3	18.68	33.0	-14.3	
2498.50	15.86	H	5.3	10.3	20.86	33.0	-12.1	
Mid Ch								
2593.00	12.66	V	5.4	10.1	17.33	33.0	-15.7	
2593.00	16.77	H	5.4	10.1	21.44	33.0	-11.6	
High Ch								
2687.50	11.79	V	5.5	10.2	16.42	33.0	-16.6	
2687.50	15.80	H	5.5	10.2	20.43	33.0	-12.6	

LTE

Band 41

5MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788468750

Date: 2018-05-10

Test Engineer: 45585

Configuration: EUT / Z-Position

Location: Chamber 1

Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	14.20	V	5.3	10.3	19.20	33.0	-13.8	
2498.50	15.97	H	5.3	10.3	20.97	33.0	-12.0	
Mid Ch								
2593.00	12.66	V	5.4	10.1	17.33	33.0	-15.7	
2593.00	15.64	H	5.4	10.1	20.31	33.0	-12.7	
High Ch								
2687.50	11.25	V	5.5	10.2	15.88	33.0	-17.1	
2687.50	14.09	H	5.5	10.2	18.72	33.0	-14.3	

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(h)

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

Part 27.

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge and $(55 + 10 \log (P))$ dB at the 5.5 MHz from the channel edges.

TEST PROCEDURE

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

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq$ span/RBW;
- g) Trace mode = max hold(GSM, LTE B41), average(WCDMA, LTE);

NOTE : Radiated spurious emissions were investigated below 30MHz, 30MHz – 1GHz and above 1GHz. There were no emissions found on below 30MHz and 30MHz – 1GHz.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

RESULTS

10.2.1. SPURIOUS RADIATION PLOTS

GSM 850

GSM GSM850 GPRS		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: GPRS 850 MHz Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 824.2MHz									
		1648.40	-14.1	V	3.0	38.2	1.0	-51.4	-13.0	-38.4	
		2472.60	-13.1	V	3.0	38.8	1.0	-50.9	-13.0	-37.9	
		3296.80	-25.2	V	3.0	39.4	1.0	-63.6	-13.0	-50.6	
		4121.00	-11.0	V	3.0	39.8	1.0	-49.8	-13.0	-36.8	
		1648.40	-20.0	H	3.0	38.2	1.0	-57.3	-13.0	-44.3	
		2472.60	-10.2	H	3.0	38.8	1.0	-48.0	-13.0	-35.0	
		3296.80	-25.8	H	3.0	39.4	1.0	-64.2	-13.0	-51.2	
		4121.00	-13.0	H	3.0	39.8	1.0	-51.8	-13.0	-38.8	
		Mid Ch, 836.6MHz									
		1673.20	-13.4	V	3.0	38.2	1.0	-50.7	-13.0	-37.7	
		2509.80	-9.1	V	3.0	38.8	1.0	-46.9	-13.0	-33.9	
		3346.40	-25.7	V	3.0	39.5	1.0	-64.2	-13.0	-51.2	
		4183.00	-9.9	V	3.0	39.8	1.0	-48.7	-13.0	-35.7	
		1673.20	-19.0	H	3.0	38.2	1.0	-56.2	-13.0	-43.2	
		2509.80	-4.6	H	3.0	38.8	1.0	-42.5	-13.0	-29.5	
		3346.40	-26.1	H	3.0	39.5	1.0	-64.6	-13.0	-51.6	
		4183.00	-4.5	H	3.0	39.8	1.0	-43.3	-13.0	-30.3	
		High Ch, 848.8MHz									
		1697.60	-14.3	V	3.0	38.2	1.0	-51.5	-13.0	-38.5	
		2546.40	-8.8	V	3.0	38.9	1.0	-46.7	-13.0	-33.7	
		3395.20	-25.5	V	3.0	39.5	1.0	-64.0	-13.0	-51.0	
		4244.00	-6.8	V	3.0	39.8	1.0	-45.6	-13.0	-32.6	
		1697.60	-20.8	H	3.0	38.2	1.0	-58.1	-13.0	-45.1	
		2546.40	-2.8	H	3.0	38.9	1.0	-40.7	-13.0	-27.7	
		3395.20	-25.0	H	3.0	39.5	1.0	-63.4	-13.0	-50.4	
		4244.00	-3.6	H	3.0	39.8	1.0	-42.4	-13.0	-29.4	
GSM GSM850 EGPRS		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: EGPRS 850 MHz Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 824.2MHz									
		1648.40	-20.2	V	3.0	38.2	1.0	-57.4	-13.0	-44.4	
		2472.60	-20.7	V	3.0	38.8	1.0	-58.5	-13.0	-45.5	
		3296.80	-26.5	V	3.0	39.4	1.0	-65.0	-13.0	-52.0	
		4121.00	-21.3	V	3.0	39.8	1.0	-60.2	-13.0	-47.2	
		1648.40	-23.7	H	3.0	38.2	1.0	-60.9	-13.0	-47.9	
		2472.60	-18.2	H	3.0	38.8	1.0	-56.0	-13.0	-43.0	
		3296.80	-26.5	H	3.0	39.4	1.0	-65.0	-13.0	-52.0	
		4121.00	-16.5	H	3.0	39.8	1.0	-55.3	-13.0	-42.3	
		Mid Ch, 836.6MHz									
		1673.20	-20.0	V	3.0	38.2	1.0	-57.3	-13.0	-44.3	
		2509.80	-21.9	V	3.0	38.8	1.0	-59.8	-13.0	-46.8	
		3346.40	-25.2	V	3.0	39.5	1.0	-63.7	-13.0	-50.7	
		4183.00	-22.1	V	3.0	39.8	1.0	-60.9	-13.0	-47.9	
		1673.20	-23.7	H	3.0	38.2	1.0	-60.9	-13.0	-47.9	
		2509.80	-18.5	H	3.0	38.8	1.0	-56.4	-13.0	-43.4	
		3346.40	-26.3	H	3.0	39.5	1.0	-64.7	-13.0	-51.7	
		4183.00	-17.2	H	3.0	39.8	1.0	-56.0	-13.0	-43.0	
		High Ch, 848.8MHz									
		1697.60	-16.5	V	3.0	38.2	1.0	-53.7	-13.0	-40.7	
		2546.40	-18.5	V	3.0	38.9	1.0	-56.4	-13.0	-43.4	
		3395.20	-25.9	V	3.0	39.5	1.0	-64.4	-13.0	-51.4	
		4244.00	-17.2	V	3.0	39.8	1.0	-56.0	-13.0	-43.0	
		1697.60	-24.2	H	3.0	38.2	1.0	-61.4	-13.0	-48.4	
		2546.40	-14.0	H	3.0	38.9	1.0	-51.8	-13.0	-38.8	
		3395.20	-25.7	H	3.0	39.5	1.0	-64.1	-13.0	-51.1	
		4244.00	-13.5	H	3.0	39.8	1.0	-52.3	-13.0	-39.3	

GSM 1900

GSM

GSM1900

GPRS

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788458975

2018-05-03

51072

EUT / Adapter / Earphone . X-Position

Chamber 1

GPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-9.3	V	3.0	43.8	1.0	-52.1	-13.0	-39.1	
5550.60	-0.3	V	3.0	43.7	1.0	-43.0	-13.0	-30.0	
7400.80	-8.9	V	3.0	42.5	1.0	-50.4	-13.0	-37.4	
9251.00	-18.4	V	3.0	41.3	1.0	-58.7	-13.0	-45.7	
11101.20	-13.2	V	3.0	40.9	1.0	-53.1	-13.0	-40.1	
12951.40	-12.5	V	3.0	42.0	1.0	-53.5	-13.0	-40.5	
14801.60	-10.0	V	3.0	43.5	1.0	-52.6	-13.0	-39.6	
3700.40	-7.7	H	3.0	43.8	1.0	-50.5	-13.0	-37.5	
5550.60	-3.3	H	3.0	43.7	1.0	-46.0	-13.0	-33.0	
7400.80	-12.4	H	3.0	42.5	1.0	-53.9	-13.0	-40.9	
9251.00	-17.9	H	3.0	41.3	1.0	-58.2	-13.0	-45.2	
11101.20	-16.2	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
12951.40	-12.4	H	3.0	42.0	1.0	-53.4	-13.0	-40.4	
14801.60	-9.0	H	3.0	43.5	1.0	-51.5	-13.0	-38.5	
Mid Ch, 1880MHz									
3760.00	-7.8	V	3.0	43.8	1.0	-50.6	-13.0	-37.6	
5640.00	-1.8	V	3.0	43.7	1.0	-44.5	-13.0	-31.5	
7520.00	-8.5	V	3.0	42.5	1.0	-49.9	-13.0	-36.9	
9400.00	-17.3	V	3.0	41.1	1.0	-57.4	-13.0	-44.4	
11280.00	-10.9	V	3.0	41.0	1.0	-50.8	-13.0	-37.8	
15040.00	-8.5	V	3.0	43.7	1.0	-51.2	-13.0	-38.2	
3760.00	-6.1	H	3.0	43.8	1.0	-48.9	-13.0	-35.9	
5640.00	-4.9	H	3.0	43.7	1.0	-47.6	-13.0	-34.6	
7520.00	-12.6	H	3.0	42.5	1.0	-54.0	-13.0	-41.0	
9400.00	-16.5	H	3.0	41.1	1.0	-56.7	-13.0	-43.7	
11280.00	-12.7	H	3.0	41.0	1.0	-52.7	-13.0	-39.7	
15040.00	-8.5	H	3.0	43.7	1.0	-51.1	-13.0	-38.1	
High Ch, 1909.8MHz									
3819.60	-7.9	V	3.0	43.8	1.0	-50.7	-13.0	-37.7	
5729.40	-2.7	V	3.0	43.7	1.0	-45.4	-13.0	-32.4	
7639.20	-8.5	V	3.0	42.4	1.0	-49.9	-13.0	-36.9	
9549.00	-17.1	V	3.0	41.0	1.0	-57.0	-13.0	-44.0	
11458.80	-6.2	V	3.0	41.0	1.0	-46.2	-13.0	-33.2	
13368.60	-12.0	V	3.0	42.3	1.0	-53.4	-13.0	-40.4	
15278.40	-8.5	V	3.0	43.4	1.0	-50.9	-13.0	-37.9	
3819.60	-6.1	H	3.0	43.8	1.0	-48.9	-13.0	-35.9	
5729.40	-7.8	H	3.0	43.7	1.0	-50.5	-13.0	-37.5	
7639.20	-14.0	H	3.0	42.4	1.0	-55.4	-13.0	-42.4	
9549.00	-17.1	H	3.0	41.0	1.0	-57.0	-13.0	-44.0	
11458.80	-12.1	H	3.0	41.0	1.0	-52.1	-13.0	-39.1	
13368.60	-11.4	H	3.0	42.3	1.0	-52.7	-13.0	-39.7	
15278.40	-9.5	H	3.0	43.4	1.0	-51.8	-13.0	-38.8	

GSM
GSM1900
GPRS

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4788458975							
Date:		2018-05-03							
Test Engineer:		51072							
Configuration:		EUT / Adapter / Earphone - X-Position							
Location:		Chamber 1							
Mode:		EGPRS 1900 MHz Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-15.1	V	3.0	43.8	1.0	-57.9	-13.0	-44.9	
5550.60	-11.6	V	3.0	43.7	1.0	-54.3	-13.0	-41.3	
7400.80	-15.8	V	3.0	42.5	1.0	-57.4	-13.0	-44.4	
9251.00	-18.6	V	3.0	41.3	1.0	-58.9	-13.0	-45.9	
11101.20	-17.0	V	3.0	40.9	1.0	-56.9	-13.0	-43.9	
12951.40	-12.6	V	3.0	42.0	1.0	-53.6	-13.0	-40.6	
14801.60	-10.3	V	3.0	43.5	1.0	-52.8	-13.0	-39.8	
3700.40	-14.1	H	3.0	43.8	1.0	-56.9	-13.0	-43.9	
5550.60	-14.5	H	3.0	43.7	1.0	-57.2	-13.0	-44.2	
7400.80	-16.4	H	3.0	42.5	1.0	-57.9	-13.0	-44.9	
9251.00	-18.2	H	3.0	41.3	1.0	-58.4	-13.0	-45.4	
11101.20	-16.6	H	3.0	40.9	1.0	-56.5	-13.0	-43.5	
12951.40	-12.2	H	3.0	42.0	1.0	-53.2	-13.0	-40.2	
14801.60	-9.1	H	3.0	43.5	1.0	-51.7	-13.0	-38.7	
Mid Ch, 1880MHz									
3760.00	-14.9	V	3.0	43.8	1.0	-57.7	-13.0	-44.7	
5640.00	-11.1	V	3.0	43.7	1.0	-53.8	-13.0	-40.8	
7520.00	-14.5	V	3.0	42.5	1.0	-56.0	-13.0	-43.0	
9400.00	-17.5	V	3.0	41.1	1.0	-57.6	-13.0	-44.6	
11280.00	-15.2	V	3.0	41.0	1.0	-55.2	-13.0	-42.2	
15040.00	-10.4	V	3.0	43.7	1.0	-53.0	-13.0	-40.0	
3760.00	-13.0	H	3.0	43.8	1.0	-55.8	-13.0	-42.8	
5640.00	-13.8	H	3.0	43.7	1.0	-56.5	-13.0	-43.5	
7520.00	-16.0	H	3.0	42.5	1.0	-57.5	-13.0	-44.5	
9400.00	-16.8	H	3.0	41.1	1.0	-57.0	-13.0	-44.0	
11280.00	-13.2	H	3.0	41.0	1.0	-53.1	-13.0	-40.1	
15040.00	-7.8	H	3.0	43.7	1.0	-50.4	-13.0	-37.4	
High Ch, 1909.8MHz									
3819.60	-15.3	V	3.0	43.8	1.0	-58.1	-13.0	-45.1	
5729.40	-11.7	V	3.0	43.7	1.0	-54.4	-13.0	-41.4	
7639.20	-15.1	V	3.0	42.4	1.0	-56.5	-13.0	-43.5	
9549.00	-17.5	V	3.0	41.0	1.0	-57.5	-13.0	-44.5	
11458.80	-14.2	V	3.0	41.0	1.0	-54.2	-13.0	-41.2	
13368.60	-12.4	V	3.0	42.3	1.0	-53.7	-13.0	-40.7	
15278.40	-11.5	V	3.0	43.4	1.0	-53.9	-13.0	-40.9	
3819.60	-13.8	H	3.0	43.8	1.0	-56.6	-13.0	-43.6	
5729.40	-14.9	H	3.0	43.7	1.0	-57.5	-13.0	-44.5	
7639.20	-16.5	H	3.0	42.4	1.0	-57.8	-13.0	-44.8	
9549.00	-17.5	H	3.0	41.0	1.0	-57.5	-13.0	-44.5	
11458.80	-14.2	H	3.0	41.0	1.0	-54.2	-13.0	-41.2	
13368.60	-11.5	H	3.0	42.3	1.0	-52.9	-13.0	-39.9	
15278.40	-9.6	H	3.0	43.4	1.0	-52.0	-13.0	-39.0	

GSM

GSM1900
EGPRS

WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 5 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: HSDPA Band 5 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes

WCDMA Band 2

WCDMA Band 2 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 51072 Configuration: EUT / Adapter / Earphone , X-Position Location: Chamber 1 Mode: Rel99 Band 2 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 2 HSDPA	Low Ch, 1852.4MHz									
	3704.80	-13.2	V	3.0	43.8	1.0	-56.0	-13.0	-43.0	
	5557.20	-11.8	V	3.0	43.7	1.0	-54.5	-13.0	-41.5	
	7409.60	-17.0	V	3.0	42.5	1.0	-58.5	-13.0	-45.5	
	3704.80	-8.3	H	3.0	43.8	1.0	-51.0	-13.0	-38.0	
	5557.20	-14.7	H	3.0	43.7	1.0	-57.4	-13.0	-44.4	
	7409.60	-15.1	H	3.0	42.5	1.0	-56.6	-13.0	-43.6	
	Mid Ch, 1880MHz									
	3760.00	-17.6	V	3.0	43.8	1.0	-60.4	-13.0	-47.4	
	5640.00	-12.3	V	3.0	43.7	1.0	-55.0	-13.0	-42.0	
	7520.00	-17.3	V	3.0	42.5	1.0	-58.8	-13.0	-45.8	
	3760.00	-12.9	H	3.0	43.8	1.0	-55.7	-13.0	-42.7	
	5640.00	-14.4	H	3.0	43.7	1.0	-57.1	-13.0	-44.1	
	7520.00	-17.0	H	3.0	42.5	1.0	-58.4	-13.0	-45.4	
	High Ch, 1907.6MHz									
	3815.20	-17.0	V	3.0	43.8	1.0	-59.8	-13.0	-46.8	
	5722.80	-13.7	V	3.0	43.7	1.0	-56.3	-13.0	-43.3	
	7630.40	-17.5	V	3.0	42.4	1.0	-58.9	-13.0	-45.9	
	3815.20	-10.6	H	3.0	43.8	1.0	-53.4	-13.0	-40.4	
	5722.80	-11.9	H	3.0	43.7	1.0	-54.6	-13.0	-41.6	
	7630.40	-17.6	H	3.0	42.4	1.0	-59.0	-13.0	-46.0	
WCDMA Band 2 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 51072 Configuration: EUT / Adapter / Earphone , X-Position Location: Chamber 1 Mode: HSDPA Band 2 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1852.4MHz									
	3704.80	-14.2	V	3.0	43.8	1.0	-57.0	-13.0	-44.0	
	5557.20	-13.1	V	3.0	43.7	1.0	-55.8	-13.0	-42.8	
	7409.60	-17.1	V	3.0	42.5	1.0	-58.6	-13.0	-45.6	
	3704.80	-9.4	H	3.0	43.8	1.0	-52.2	-13.0	-39.2	
	5557.20	-15.5	H	3.0	43.7	1.0	-58.2	-13.0	-45.2	
	7409.60	-16.2	H	3.0	42.5	1.0	-57.7	-13.0	-44.7	
	Mid Ch, 1880MHz									
	3760.00	-18.2	V	3.0	43.8	1.0	-61.0	-13.0	-48.0	
	5640.00	-13.2	V	3.0	43.7	1.0	-55.9	-13.0	-42.9	
	7520.00	-17.4	V	3.0	42.5	1.0	-58.8	-13.0	-45.8	
	3760.00	-13.0	H	3.0	43.8	1.0	-55.8	-13.0	-42.8	
	5640.00	-14.9	H	3.0	43.7	1.0	-57.6	-13.0	-44.6	
	7520.00	-17.0	H	3.0	42.5	1.0	-58.4	-13.0	-45.4	
	High Ch, 1907.6MHz									
	3815.20	-17.1	V	3.0	43.8	1.0	-59.9	-13.0	-46.9	
	5722.80	-14.6	V	3.0	43.7	1.0	-57.3	-13.0	-44.3	
	7630.40	-18.1	V	3.0	42.4	1.0	-59.5	-13.0	-46.5	
	3815.20	-10.8	H	3.0	43.8	1.0	-53.6	-13.0	-40.6	
	5722.80	-13.0	H	3.0	43.7	1.0	-55.7	-13.0	-42.7	
	7630.40	-17.7	H	3.0	42.4	1.0	-59.1	-13.0	-46.1	

LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788458975									
	Date: 2018-05-03									
	Test Engineer: 47989									
	Configuration: EUT / AC Adapter / Earphone, Z-Position									
	Location: Chamber 2									
	Mode: LTE_QPSK Band 5 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 829MHz									
	1658.00	-28.2	V	3.0	38.2	1.0	-65.4	-13.0	-52.4	
	2487.00	-28.2	V	3.0	38.8	1.0	-66.0	-13.0	-53.0	
	3316.00	-26.6	V	3.0	39.4	1.0	-65.0	-13.0	-52.0	
	1658.00	-29.4	H	3.0	38.2	1.0	-66.6	-13.0	-53.6	
	2487.00	-28.1	H	3.0	38.8	1.0	-65.9	-13.0	-52.9	
	3316.00	-26.6	H	3.0	39.4	1.0	-65.0	-13.0	-52.0	
	Mid Ch, 836.5MHz									
	1673.00	-28.8	V	3.0	38.2	1.0	-66.0	-13.0	-53.0	
	2509.50	-27.8	V	3.0	38.8	1.0	-65.7	-13.0	-52.7	
3346.00	-27.3	V	3.0	39.5	1.0	-65.7	-13.0	-52.7		
1673.00	-30.1	H	3.0	38.2	1.0	-67.3	-13.0	-54.3		
2509.50	-28.5	H	3.0	38.8	1.0	-66.3	-13.0	-53.3		
3346.00	-27.1	H	3.0	39.5	1.0	-65.6	-13.0	-52.6		
High Ch, 844MHz										
1688.00	-27.6	V	3.0	38.2	1.0	-64.8	-13.0	-51.8		
2532.00	-28.0	V	3.0	38.9	1.0	-65.8	-13.0	-52.8		
3376.00	-27.5	V	3.0	39.5	1.0	-66.0	-13.0	-53.0		
1688.00	-30.4	H	3.0	38.2	1.0	-67.6	-13.0	-54.6		
2532.00	-29.1	H	3.0	38.9	1.0	-66.9	-13.0	-53.9		
3376.00	-27.6	H	3.0	39.5	1.0	-66.1	-13.0	-53.1		
LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788458975									
	Date: 2018-05-03									
	Test Engineer: 47989									
	Configuration: EUT / AC Adapter / Earphone, Z-Position									
	Location: Chamber 2									
	Mode: LTE_16QAM Band 5 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 829MHz									
	1658.00	-28.5	V	3.0	38.2	1.0	-65.8	-13.0	-52.8	
	2487.00	-27.5	V	3.0	38.8	1.0	-65.3	-13.0	-52.3	
	3316.00	-26.8	V	3.0	39.4	1.0	-65.2	-13.0	-52.2	
	1658.00	-29.9	H	3.0	38.2	1.0	-67.1	-13.0	-54.1	
	2487.00	-28.2	H	3.0	38.8	1.0	-66.0	-13.0	-53.0	
	3316.00	-27.3	H	3.0	39.4	1.0	-65.7	-13.0	-52.7	
	Mid Ch, 836.5MHz									
	1673.00	-29.7	V	3.0	38.2	1.0	-66.9	-13.0	-53.9	
	2509.50	-28.0	V	3.0	38.8	1.0	-65.8	-13.0	-52.8	
3346.00	-27.4	V	3.0	39.5	1.0	-65.8	-13.0	-52.8		
1673.00	-30.3	H	3.0	38.2	1.0	-67.6	-13.0	-54.6		
2509.50	-28.8	H	3.0	38.8	1.0	-66.7	-13.0	-53.7		
3346.00	-27.3	H	3.0	39.5	1.0	-65.8	-13.0	-52.8		
High Ch, 844MHz										
1688.00	-28.4	V	3.0	38.2	1.0	-65.6	-13.0	-52.6		
2532.00	-28.1	V	3.0	38.9	1.0	-66.0	-13.0	-53.0		
3376.00	-27.4	V	3.0	39.5	1.0	-65.9	-13.0	-52.9		
1688.00	-30.6	H	3.0	38.2	1.0	-67.9	-13.0	-54.9		
2532.00	-29.0	H	3.0	38.9	1.0	-66.8	-13.0	-53.8		
3376.00	-27.5	H	3.0	39.5	1.0	-66.0	-13.0	-53.0		

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788458975									
	Date: 2018-05-03									
	Test Engineer: 47989									
	Configuration: EUT / AC Adapter / Earphone, Z-Position									
	Location: Chamber 2									
	Mode: LTE_QPSK Band 5 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.5MHz									
	1653.00	-30.1	V	3.0	38.2	1.0	-67.3	-13.0	-54.3	
	2479.50	-27.5	V	3.0	38.8	1.0	-65.3	-13.0	-52.3	
	3306.00	-27.4	V	3.0	39.4	1.0	-65.8	-13.0	-52.8	
	1653.00	-29.6	H	3.0	38.2	1.0	-66.8	-13.0	-53.8	
	2479.50	-28.5	H	3.0	38.8	1.0	-66.3	-13.0	-53.3	
	3306.00	-27.4	H	3.0	39.4	1.0	-65.9	-13.0	-52.9	
	Mid Ch, 836.5MHz									
	1673.00	-29.4	V	3.0	38.2	1.0	-66.6	-13.0	-53.6	
	2509.50	-27.9	V	3.0	38.8	1.0	-65.8	-13.0	-52.8	
	3346.00	-27.2	V	3.0	39.5	1.0	-65.7	-13.0	-52.7	
	1673.00	-30.5	H	3.0	38.2	1.0	-67.7	-13.0	-54.7	
	2509.50	-29.0	H	3.0	38.8	1.0	-66.8	-13.0	-53.8	
	3346.00	-27.3	H	3.0	39.5	1.0	-65.8	-13.0	-52.8	
	High Ch, 846.5MHz									
1693.00	-28.5	V	3.0	38.2	1.0	-65.7	-13.0	-52.7		
2539.50	-28.2	V	3.0	38.9	1.0	-66.0	-13.0	-53.0		
3386.00	-27.3	V	3.0	39.5	1.0	-65.7	-13.0	-52.7		
1693.00	-29.8	H	3.0	38.2	1.0	-67.1	-13.0	-54.1		
2539.50	-27.9	H	3.0	38.9	1.0	-65.8	-13.0	-52.8		
3386.00	-27.2	H	3.0	39.5	1.0	-65.7	-13.0	-52.7		
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788458975									
	Date: 2018-05-03									
	Test Engineer: 47989									
	Configuration: EUT / AC Adapter / Earphone, Z-Position									
	Location: Chamber 2									
	Mode: LTE_16QAM Band 5 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.5MHz									
	1653.00	-28.3	V	3.0	38.2	1.0	-65.5	-13.0	-52.5	
	2479.50	-27.4	V	3.0	38.8	1.0	-65.2	-13.0	-52.2	
	3306.00	-27.3	V	3.0	39.4	1.0	-65.7	-13.0	-52.7	
	1653.00	-30.0	H	3.0	38.2	1.0	-67.2	-13.0	-54.2	
	2479.50	-28.8	H	3.0	38.8	1.0	-66.6	-13.0	-53.6	
	3306.00	-27.5	H	3.0	39.4	1.0	-65.9	-13.0	-52.9	
	Mid Ch, 836.5MHz									
	1673.00	-29.7	V	3.0	38.2	1.0	-66.9	-13.0	-53.9	
	2509.50	-28.1	V	3.0	38.8	1.0	-66.0	-13.0	-53.0	
	3346.00	-27.3	V	3.0	39.5	1.0	-65.7	-13.0	-52.7	
	1673.00	-30.9	H	3.0	38.2	1.0	-68.2	-13.0	-55.2	
	2509.50	-28.9	H	3.0	38.8	1.0	-66.7	-13.0	-53.7	
	3346.00	-27.3	H	3.0	39.5	1.0	-65.7	-13.0	-52.7	
	High Ch, 846.5MHz									
1693.00	-28.8	V	3.0	38.2	1.0	-66.1	-13.0	-53.1		
2539.50	-28.4	V	3.0	38.9	1.0	-66.2	-13.0	-53.2		
3386.00	-27.1	V	3.0	39.5	1.0	-65.6	-13.0	-52.6		
1693.00	-30.2	H	3.0	38.2	1.0	-67.4	-13.0	-54.4		
2539.50	-28.7	H	3.0	38.9	1.0	-66.5	-13.0	-53.5		
3386.00	-27.4	H	3.0	39.5	1.0	-65.9	-13.0	-52.9		

	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788458975 Date: 2018-05-03 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Harmonics, 3MHz Bandwidth									
LTE Band 5 3MHz QPSK	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 825.5MHz									
	1651.00	-29.4	V	3.0	38.2	1.0	-66.7	-13.0	-53.7	
	2476.50	-26.7	V	3.0	38.8	1.0	-64.5	-13.0	-51.5	
	3302.00	-27.3	V	3.0	39.4	1.0	-65.8	-13.0	-52.8	
	1651.00	-30.2	H	3.0	38.2	1.0	-67.4	-13.0	-54.4	
	2476.50	-28.1	H	3.0	38.8	1.0	-65.9	-13.0	-52.9	
	3302.00	-27.4	H	3.0	39.4	1.0	-65.9	-13.0	-52.9	
	Mid Ch, 836.5MHz									
	1673.00	-28.4	V	3.0	38.2	1.0	-65.7	-13.0	-52.7	
	2509.50	-27.0	V	3.0	38.8	1.0	-64.8	-13.0	-51.8	
	3346.00	-26.7	V	3.0	39.5	1.0	-65.1	-13.0	-52.1	
	1673.00	-29.5	H	3.0	38.2	1.0	-66.7	-13.0	-53.7	
	2509.50	-28.3	H	3.0	38.8	1.0	-66.1	-13.0	-53.1	
	3346.00	-26.7	H	3.0	39.5	1.0	-65.1	-13.0	-52.1	
	High Ch, 847.5MHz									
	1695.00	-27.6	V	3.0	38.2	1.0	-64.9	-13.0	-51.9	
	2542.50	-26.5	V	3.0	38.9	1.0	-64.4	-13.0	-51.4	
	3390.00	-26.7	V	3.0	39.5	1.0	-65.2	-13.0	-52.2	
	1695.00	-29.4	H	3.0	38.2	1.0	-66.6	-13.0	-53.6	
	2542.50	-28.3	H	3.0	38.9	1.0	-66.1	-13.0	-53.1	
	3390.00	-27.0	H	3.0	39.5	1.0	-65.5	-13.0	-52.5	

	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788458975 Date: 2018-05-03 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Harmonics, 3MHz Bandwidth									
LTE Band 5 3MHz 16QAM	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 825.5MHz									
	1651.00	-29.4	V	3.0	38.2	1.0	-66.7	-13.0	-53.7	
	2476.50	-27.0	V	3.0	38.8	1.0	-64.8	-13.0	-51.8	
	3302.00	-27.0	V	3.0	39.4	1.0	-65.5	-13.0	-52.5	
	1651.00	-29.5	H	3.0	38.2	1.0	-66.7	-13.0	-53.7	
	2476.50	-28.7	H	3.0	38.8	1.0	-66.5	-13.0	-53.5	
	3302.00	-27.4	H	3.0	39.4	1.0	-65.9	-13.0	-52.9	
	Mid Ch, 836.5MHz									
	1673.00	-28.9	V	3.0	38.2	1.0	-66.1	-13.0	-53.1	
	2509.50	-27.4	V	3.0	38.8	1.0	-65.2	-13.0	-52.2	
	3346.00	-26.7	V	3.0	39.5	1.0	-65.1	-13.0	-52.1	
	1673.00	-29.7	H	3.0	38.2	1.0	-66.9	-13.0	-53.9	
	2509.50	-28.6	H	3.0	38.8	1.0	-66.5	-13.0	-53.5	
	3346.00	-26.6	H	3.0	39.5	1.0	-65.0	-13.0	-52.0	
	High Ch, 847.5MHz									
	1695.00	-28.3	V	3.0	38.2	1.0	-65.6	-13.0	-52.6	
	2542.50	-26.9	V	3.0	38.9	1.0	-64.7	-13.0	-51.7	
	3390.00	-27.0	V	3.0	39.5	1.0	-65.4	-13.0	-52.4	
	1695.00	-29.9	H	3.0	38.2	1.0	-67.1	-13.0	-54.1	
	2542.50	-28.5	H	3.0	38.9	1.0	-66.3	-13.0	-53.3	
	3390.00	-26.9	H	3.0	39.5	1.0	-65.3	-13.0	-52.3	

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
	1649.40	-27.8	V	3.0	38.2	1.0	-65.0	-13.0	-52.0	
	2474.10	-28.5	V	3.0	38.8	1.0	-66.3	-13.0	-53.3	
	3298.80	-27.8	V	3.0	39.4	1.0	-66.2	-13.0	-53.2	
	1649.40	-29.3	H	3.0	38.2	1.0	-66.5	-13.0	-53.5	
	2474.10	-29.1	H	3.0	38.8	1.0	-66.9	-13.0	-53.9	
	3298.80	-27.7	H	3.0	39.4	1.0	-66.1	-13.0	-53.1	
	Mid Ch, 836.5MHz									
	1673.00	-25.1	V	3.0	38.2	1.0	-62.3	-13.0	-49.3	
	2509.50	-28.3	V	3.0	38.8	1.0	-66.2	-13.0	-53.2	
	3346.00	-28.7	V	3.0	39.5	1.0	-67.2	-13.0	-54.2	
	1673.00	-29.2	H	3.0	38.2	1.0	-66.4	-13.0	-53.4	
	2509.50	-27.4	H	3.0	38.8	1.0	-65.2	-13.0	-52.2	
	3346.00	-27.3	H	3.0	39.5	1.0	-65.8	-13.0	-52.8	
	High Ch, 848.3MHz									
	1696.60	-26.6	V	3.0	38.2	1.0	-63.8	-13.0	-50.8	
	2544.90	-28.6	V	3.0	38.9	1.0	-66.4	-13.0	-53.4	
	3393.20	-27.2	V	3.0	39.5	1.0	-65.7	-13.0	-52.7	
	1696.60	-29.6	H	3.0	38.2	1.0	-66.8	-13.0	-53.8	
	2544.90	-29.1	H	3.0	38.9	1.0	-67.0	-13.0	-54.0	
3393.20	-27.2	H	3.0	39.5	1.0	-65.7	-13.0	-52.7		
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788458975 Date: 2018-05-02 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
	1649.40	-28.5	V	3.0	38.2	1.0	-65.7	-13.0	-52.7	
	2474.10	-28.7	V	3.0	38.8	1.0	-66.5	-13.0	-53.5	
	3298.80	-27.6	V	3.0	39.4	1.0	-66.0	-13.0	-53.0	
	1649.40	-29.6	H	3.0	38.2	1.0	-66.8	-13.0	-53.8	
	2474.10	-29.3	H	3.0	38.8	1.0	-67.1	-13.0	-54.1	
	3298.80	-27.7	H	3.0	39.4	1.0	-66.1	-13.0	-53.1	
	Mid Ch, 836.5MHz									
	1673.00	-25.9	V	3.0	38.2	1.0	-63.2	-13.0	-50.2	
	2509.50	-28.6	V	3.0	38.8	1.0	-66.4	-13.0	-53.4	
	3346.00	-28.4	V	3.0	39.5	1.0	-66.8	-13.0	-53.8	
	1673.00	-29.0	H	3.0	38.2	1.0	-66.3	-13.0	-53.3	
	2509.50	-28.1	H	3.0	38.8	1.0	-65.9	-13.0	-52.9	
	3346.00	-27.8	H	3.0	39.5	1.0	-66.2	-13.0	-53.2	
	High Ch, 848.3MHz									
	1696.60	-27.2	V	3.0	38.2	1.0	-64.4	-13.0	-51.4	
	2544.90	-28.6	V	3.0	38.9	1.0	-66.5	-13.0	-53.5	
	3393.20	-27.2	V	3.0	39.5	1.0	-65.7	-13.0	-52.7	
	1696.60	-29.3	H	3.0	38.2	1.0	-66.6	-13.0	-53.6	
	2544.90	-29.1	H	3.0	38.9	1.0	-67.0	-13.0	-54.0	
3393.20	-27.1	H	3.0	39.5	1.0	-65.5	-13.0	-52.5		

LTE Band 41

LTE Band 41 20MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Harmonics, 20MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2506MHz									
	5012.00	0.6	V	3.0	43.8	1.0	-42.2	-25.0	-17.2	
	7518.00	-2.5	V	3.0	42.5	1.0	-44.0	-25.0	-19.0	
	10024.00	-10.9	V	3.0	40.6	1.0	-50.4	-25.0	-25.4	
	12530.00	-8.2	V	3.0	41.6	1.0	-48.8	-25.0	-23.8	
	5012.00	-1.4	H	3.0	43.8	1.0	-44.2	-25.0	-19.2	
	7518.00	1.7	H	3.0	42.5	1.0	-39.8	-25.0	-14.8	
	10024.00	-6.1	H	3.0	40.6	1.0	-45.6	-25.0	-20.6	
	12530.00	-6.3	H	3.0	41.6	1.0	-47.0	-25.0	-22.0	
	Mid Ch, 2593MHz									
	5186.00	-2.3	V	3.0	43.8	1.0	-45.0	-25.0	-20.0	
	7779.00	-2.0	V	3.0	42.3	1.0	-43.3	-25.0	-18.3	
	10372.00	-10.0	V	3.0	40.7	1.0	-49.6	-25.0	-24.6	
	12965.00	-6.0	V	3.0	42.0	1.0	-47.0	-25.0	-22.0	
	5186.00	-3.2	H	3.0	43.8	1.0	-46.0	-25.0	-21.0	
	7779.00	-3.7	H	3.0	42.3	1.0	-45.0	-25.0	-20.0	
	10372.00	-7.1	H	3.0	40.7	1.0	-46.8	-25.0	-21.8	
	12965.00	-5.1	H	3.0	42.0	1.0	-46.1	-25.0	-21.1	
	High Ch, 2680MHz									
	5360.00	-0.4	V	3.0	43.7	1.0	-43.2	-25.0	-18.2	
	8040.00	-6.9	V	3.0	42.2	1.0	-48.1	-25.0	-23.1	
	10720.00	-6.3	V	3.0	40.8	1.0	-46.1	-25.0	-21.1	
	13400.00	-8.3	V	3.0	42.4	1.0	-49.7	-25.0	-24.7	
	5360.00	3.0	H	3.0	43.7	1.0	-39.7	-25.0	-14.7	
	8040.00	-2.5	H	3.0	42.2	1.0	-43.7	-25.0	-18.7	
	10720.00	-3.0	H	3.0	40.8	1.0	-42.8	-25.0	-17.8	
	13400.00	-4.3	H	3.0	42.4	1.0	-45.6	-25.0	-20.6	
LTE Band 41 20MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-10 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Harmonics, 20MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2506MHz									
	5012.00	-2.3	V	3.0	43.8	1.0	-45.1	-25.0	-20.1	
	7518.00	2.6	V	3.0	42.5	1.0	-38.9	-25.0	-13.9	
	10024.00	-11.2	V	3.0	40.6	1.0	-50.8	-25.0	-25.8	
	12530.00	-8.1	V	3.0	41.6	1.0	-48.7	-25.0	-23.7	
	5012.00	-2.9	H	3.0	43.8	1.0	-45.7	-25.0	-20.7	
	7518.00	-0.2	H	3.0	42.5	1.0	-41.6	-25.0	-16.6	
	10024.00	-6.8	H	3.0	40.6	1.0	-46.4	-25.0	-21.4	
	12530.00	-6.4	H	3.0	41.6	1.0	-47.1	-25.0	-22.1	
	Mid Ch, 2593MHz									
	5186.00	-1.5	V	3.0	43.8	1.0	-44.2	-25.0	-19.2	
	7779.00	-6.3	V	3.0	42.3	1.0	-47.7	-25.0	-22.7	
	10372.00	-10.6	V	3.0	40.7	1.0	-50.2	-25.0	-25.2	
	12965.00	-4.7	V	3.0	42.0	1.0	-45.7	-25.0	-20.7	
	5186.00	-0.6	H	3.0	43.8	1.0	-43.4	-25.0	-18.4	
	7779.00	-3.2	H	3.0	42.3	1.0	-44.5	-25.0	-19.5	
	10372.00	-7.5	H	3.0	40.7	1.0	-47.1	-25.0	-22.1	
	12965.00	-6.0	H	3.0	42.0	1.0	-47.0	-25.0	-22.0	
	High Ch, 2680MHz									
	5360.00	-0.5	V	3.0	43.7	1.0	-43.2	-25.0	-18.2	
	8040.00	-5.5	V	3.0	42.2	1.0	-46.6	-25.0	-21.6	
	10720.00	-6.1	V	3.0	40.8	1.0	-45.8	-25.0	-20.8	
	13400.00	-6.4	V	3.0	42.4	1.0	-47.8	-25.0	-22.8	
	5360.00	-0.6	H	3.0	43.7	1.0	-43.3	-25.0	-18.3	
	8040.00	-3.6	H	3.0	42.2	1.0	-44.8	-25.0	-19.8	
	10720.00	-4.8	H	3.0	40.8	1.0	-44.6	-25.0	-19.6	
	13400.00	-4.6	H	3.0	42.4	1.0	-46.0	-25.0	-21.0	

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788468750									
	Date: 2018-05-11									
	Test Engineer: 45585									
	Configuration: EUT / Adapter / Earphone, Z-Position									
	Location: Chamber 1									
	Mode: LTE_QPSK Band 41 Harmonics, 15MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2503.5MHz									
	5007.00	-2.9	V	3.0	43.8	1.0	-45.7	-25.0	-20.7	
	7510.50	-1.4	V	3.0	42.5	1.0	-42.9	-25.0	-17.9	
	10014.00	-11.7	V	3.0	40.6	1.0	-51.2	-25.0	-26.2	
	12517.50	-7.5	V	3.0	41.6	1.0	-48.2	-25.0	-23.2	
	5007.00	-3.3	H	3.0	43.8	1.0	-46.0	-25.0	-21.0	
	7510.50	0.9	H	3.0	42.5	1.0	-40.6	-25.0	-15.6	
	10014.00	-10.7	H	3.0	40.6	1.0	-50.2	-25.0	-25.2	
	12517.50	-6.4	H	3.0	41.6	1.0	-47.0	-25.0	-22.0	
	Mid Ch, 2593MHz									
	5186.00	-2.6	V	3.0	43.8	1.0	-45.4	-25.0	-20.4	
	7779.00	-4.1	V	3.0	42.3	1.0	-45.4	-25.0	-20.4	
	10372.00	-10.1	V	3.0	40.7	1.0	-49.7	-25.0	-24.7	
	12965.00	-5.8	V	3.0	42.0	1.0	-46.8	-25.0	-21.8	
	5186.00	-3.1	H	3.0	43.8	1.0	-45.9	-25.0	-20.9	
	7779.00	-4.7	H	3.0	42.3	1.0	-46.0	-25.0	-21.0	
	10372.00	-6.0	H	3.0	40.7	1.0	-45.7	-25.0	-20.7	
	12965.00	-5.6	H	3.0	42.0	1.0	-46.6	-25.0	-21.6	
	High Ch, 2682.5MHz									
	5365.00	-0.8	V	3.0	43.7	1.0	-43.5	-25.0	-18.5	
8047.50	-9.0	V	3.0	42.2	1.0	-50.1	-25.0	-25.1		
10730.00	-8.0	V	3.0	40.8	1.0	-47.8	-25.0	-22.8		
13412.50	-8.2	V	3.0	42.4	1.0	-49.6	-25.0	-24.6		
5365.00	3.1	H	3.0	43.7	1.0	-39.7	-25.0	-14.7		
8047.50	-5.5	H	3.0	42.2	1.0	-46.7	-25.0	-21.7		
10730.00	-4.8	H	3.0	40.8	1.0	-44.6	-25.0	-19.6		
13412.50	-5.5	H	3.0	42.4	1.0	-46.9	-25.0	-21.9		
LTE Band 41 15MHz 16QAM	Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788468750									
	Date: 2018-05-11									
	Test Engineer: 45585									
	Configuration: EUT / Adapter / Earphone, Z-Position									
	Location: Chamber 1									
	Mode: LTE_16QAM Band 41 Harmonics, 15MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2503.5MHz									
	5007.00	-3.6	V	3.0	43.8	1.0	-46.4	-25.0	-21.4	
	7510.50	-2.0	V	3.0	42.5	1.0	-43.5	-25.0	-18.5	
	10014.00	-8.2	V	3.0	40.6	1.0	-47.8	-25.0	-22.8	
	12517.50	-8.4	V	3.0	41.6	1.0	-49.0	-25.0	-24.0	
	5007.00	-1.7	H	3.0	43.8	1.0	-44.5	-25.0	-19.5	
	7510.50	-2.5	H	3.0	42.5	1.0	-43.9	-25.0	-18.9	
	10014.00	-5.9	H	3.0	40.6	1.0	-45.4	-25.0	-20.4	
	12517.50	-2.5	H	3.0	41.6	1.0	-43.1	-25.0	-18.1	
	Mid Ch, 2593MHz									
	5186.00	-2.3	V	3.0	43.8	1.0	-45.1	-25.0	-20.1	
	7779.00	-3.6	V	3.0	42.3	1.0	-44.9	-25.0	-19.9	
	10372.00	-10.2	V	3.0	40.7	1.0	-49.9	-25.0	-24.9	
	12965.00	-6.9	V	3.0	42.0	1.0	-47.9	-25.0	-22.9	
	5186.00	-3.6	H	3.0	43.8	1.0	-46.4	-25.0	-21.4	
	7779.00	-4.3	H	3.0	42.3	1.0	-45.7	-25.0	-20.7	
	10372.00	-6.2	H	3.0	40.7	1.0	-45.9	-25.0	-20.9	
	12965.00	-5.8	H	3.0	42.0	1.0	-46.8	-25.0	-21.8	
	High Ch, 2682.5MHz									
	5365.00	-1.1	V	3.0	43.7	1.0	-43.8	-25.0	-18.8	
8047.50	-9.3	V	3.0	42.2	1.0	-50.5	-25.0	-25.5		
10730.00	-8.1	V	3.0	40.8	1.0	-47.9	-25.0	-22.9		
13412.50	-8.9	V	3.0	42.4	1.0	-50.3	-25.0	-25.3		
5365.00	3.3	H	3.0	43.7	1.0	-39.4	-25.0	-14.4		
8047.50	-4.3	H	3.0	42.2	1.0	-45.4	-25.0	-20.4		
10730.00	-5.2	H	3.0	40.8	1.0	-45.0	-25.0	-20.0		
13412.50	-5.7	H	3.0	42.4	1.0	-47.0	-25.0	-22.0		

LTE Band 41 10MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-11 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2501MHz									
	5002.00	0.0	V	3.0	43.8	1.0	-42.8	-25.0	-17.8	
	7503.00	0.0	V	3.0	42.5	1.0	-41.5	-25.0	-16.5	
	10004.00	0.0	V	3.0	40.6	1.0	-39.6	-25.0	-14.6	
	12505.00	0.0	V	3.0	41.6	1.0	-40.6	-25.0	-15.6	
	5002.00	0.0	H	3.0	43.8	1.0	-42.8	-25.0	-17.8	
	7503.00	0.0	H	3.0	42.5	1.0	-41.5	-25.0	-16.5	
	10004.00	0.0	H	3.0	40.6	1.0	-39.6	-25.0	-14.6	
	12505.00	0.0	H	3.0	41.6	1.0	-40.6	-25.0	-15.6	
	Mid Ch, 2593MHz									
	5186.00	-2.4	V	3.0	43.8	1.0	-45.1	-25.0	-20.1	
	7779.00	-4.4	V	3.0	42.3	1.0	-45.7	-25.0	-20.7	
	10372.00	-11.8	V	3.0	40.7	1.0	-51.5	-25.0	-26.5	
	12965.00	-5.8	V	3.0	42.0	1.0	-46.8	-25.0	-21.8	
	5186.00	-3.0	H	3.0	43.8	1.0	-45.7	-25.0	-20.7	
	7779.00	-3.1	H	3.0	42.3	1.0	-44.4	-25.0	-19.4	
	10372.00	-8.6	H	3.0	40.7	1.0	-48.3	-25.0	-23.3	
	12965.00	-6.0	H	3.0	42.0	1.0	-47.0	-25.0	-22.0	
	High Ch, 2685MHz									
	5370.00	0.0	V	3.0	43.7	1.0	-42.7	-25.0	-17.7	
	8055.00	0.0	V	3.0	42.2	1.0	-41.2	-25.0	-16.2	
	10740.00	0.0	V	3.0	40.8	1.0	-39.8	-25.0	-14.8	
	16110.00	0.0	V	3.0	42.4	1.0	-41.4	-25.0	-16.4	
	5370.00	0.0	H	3.0	43.7	1.0	-42.7	-25.0	-17.7	
	8055.00	0.0	H	3.0	42.2	1.0	-41.2	-25.0	-16.2	
	10740.00	0.0	H	3.0	40.8	1.0	-39.8	-25.0	-14.8	
	13425.00	0.0	H	3.0	42.4	1.0	-41.4	-25.0	-16.4	
LTE Band 41 10MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788468750 Date: 2018-05-11 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2501MHz									
	5002.00	2.5	V	3.0	43.8	1.0	-40.3	-25.0	-15.3	
	7503.00	5.2	V	3.0	42.5	1.0	-36.3	-25.0	-11.3	
	10004.00	1.2	V	3.0	40.6	1.0	-38.4	-25.0	-13.4	
	12505.00	-0.8	V	3.0	41.6	1.0	-41.4	-25.0	-16.4	
	5002.00	2.9	H	3.0	43.8	1.0	-39.9	-25.0	-14.9	
	7503.00	5.3	H	3.0	42.5	1.0	-36.1	-25.0	-11.1	
	10004.00	0.8	H	3.0	40.6	1.0	-38.7	-25.0	-13.7	
	12505.00	0.0	H	3.0	41.6	1.0	-40.6	-25.0	-15.6	
	Mid Ch, 2593MHz									
	5186.00	-3.2	V	3.0	43.8	1.0	-45.9	-25.0	-20.9	
	7779.00	-4.3	V	3.0	42.3	1.0	-45.6	-25.0	-20.6	
	10372.00	-11.9	V	3.0	40.7	1.0	-51.5	-25.0	-26.5	
	12965.00	-5.0	V	3.0	42.0	1.0	-46.0	-25.0	-21.0	
	5186.00	-3.5	H	3.0	43.8	1.0	-46.2	-25.0	-21.2	
	7779.00	-2.7	H	3.0	42.3	1.0	-44.0	-25.0	-19.0	
	10372.00	-8.4	H	3.0	40.7	1.0	-48.1	-25.0	-23.1	
	12965.00	-6.0	H	3.0	42.0	1.0	-47.0	-25.0	-22.0	
	High Ch, 2685MHz									
	5370.00	-2.1	V	3.0	43.7	1.0	-44.8	-25.0	-19.8	
	8055.00	-4.7	V	3.0	42.2	1.0	-45.9	-25.0	-20.9	
	10740.00	-4.8	V	3.0	40.8	1.0	-44.6	-25.0	-19.6	
	13425.00	-7.0	V	3.0	42.4	1.0	-48.3	-25.0	-23.3	
	5370.00	-1.3	H	3.0	43.7	1.0	-44.0	-25.0	-19.0	
	8055.00	-1.5	H	3.0	42.2	1.0	-42.6	-25.0	-17.6	
	10740.00	-3.2	H	3.0	40.8	1.0	-43.0	-25.0	-18.0	
	13425.00	-2.0	H	3.0	42.4	1.0	-43.4	-25.0	-18.4	

LTE Band 41 5MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788468750 Date: 2018-05-18 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2498.5MHz									
	4997.00	2.0	V	3.0	43.8	1.0	-40.8	-25.0	-15.8	
	7495.50	4.3	V	3.0	42.5	1.0	-37.2	-25.0	-12.2	
	9994.00	-5.0	V	3.0	40.6	1.0	-44.6	-25.0	-19.6	
	12492.50	-3.8	V	3.0	41.6	1.0	-44.4	-25.0	-19.4	
	4997.00	3.3	H	3.0	43.8	1.0	-39.5	-25.0	-14.5	
	7495.50	3.9	H	3.0	42.5	1.0	-37.5	-25.0	-12.5	
	9994.00	1.3	H	3.0	40.6	1.0	-38.3	-25.0	-13.3	
	12492.50	-2.3	H	3.0	41.6	1.0	-42.9	-25.0	-17.9	
	Mid Ch, 2593MHz									
	5186.00	-1.4	V	3.0	43.8	1.0	-44.2	-25.0	-19.2	
	7779.00	-6.8	V	3.0	42.3	1.0	-48.2	-25.0	-23.2	
	10372.00	-7.6	V	3.0	40.7	1.0	-47.3	-25.0	-22.3	
	12965.00	-4.9	V	3.0	42.0	1.0	-45.9	-25.0	-20.9	
	5186.00	-6.0	H	3.0	43.8	1.0	-48.8	-25.0	-23.8	
	7779.00	-3.5	H	3.0	42.3	1.0	-44.8	-25.0	-19.8	
	10372.00	-5.8	H	3.0	40.7	1.0	-45.5	-25.0	-20.5	
	12965.00	-5.5	H	3.0	42.0	1.0	-46.5	-25.0	-21.5	
	High Ch, 2687.5MHz									
	5375.00	-2.3	V	3.0	43.7	1.0	-45.0	-25.0	-20.0	
	8062.50	-5.0	V	3.0	42.2	1.0	-46.1	-25.0	-21.1	
	10750.00	-3.1	V	3.0	40.8	1.0	-42.9	-25.0	-17.9	
	13437.50	-7.6	V	3.0	42.4	1.0	-49.0	-25.0	-24.0	
	5375.00	-1.0	H	3.0	43.7	1.0	-43.8	-25.0	-18.8	
	8062.50	-1.8	H	3.0	42.2	1.0	-42.9	-25.0	-17.9	
	10750.00	-2.4	H	3.0	40.8	1.0	-42.2	-25.0	-17.2	
	13437.50	-4.3	H	3.0	42.4	1.0	-45.7	-25.0	-20.7	
LTE Band 41 5MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4788468750 Date: 2018-05-18 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 2498.5MHz									
	4997.00	1.6	V	3.0	43.8	1.0	-41.2	-25.0	-16.2	
	7495.50	4.4	V	3.0	42.5	1.0	-37.1	-25.0	-12.1	
	9994.00	-5.3	V	3.0	40.6	1.0	-44.8	-25.0	-19.8	
	12492.50	-4.0	V	3.0	41.6	1.0	-44.6	-25.0	-19.6	
	4997.00	3.1	H	3.0	43.8	1.0	-39.7	-25.0	-14.7	
	7495.50	2.9	H	3.0	42.5	1.0	-38.6	-25.0	-13.6	
	9994.00	1.3	H	3.0	40.6	1.0	-38.2	-25.0	-13.2	
	12492.50	-3.7	H	3.0	41.6	1.0	-44.3	-25.0	-19.3	
	Mid Ch, 2593MHz									
	5186.00	-2.1	V	3.0	43.8	1.0	-44.8	-25.0	-19.8	
	7779.00	-6.1	V	3.0	42.3	1.0	-47.4	-25.0	-22.4	
	10372.00	-8.2	V	3.0	40.7	1.0	-47.9	-25.0	-22.9	
	12965.00	-6.0	V	3.0	42.0	1.0	-47.0	-25.0	-22.0	
	5186.00	-6.2	H	3.0	43.8	1.0	-49.0	-25.0	-24.0	
	7779.00	-2.0	H	3.0	42.3	1.0	-43.3	-25.0	-18.3	
	10372.00	-5.3	H	3.0	40.7	1.0	-45.0	-25.0	-20.0	
	12965.00	-5.9	H	3.0	42.0	1.0	-46.9	-25.0	-21.9	
	High Ch, 2687.5MHz									
	5375.00	-2.4	V	3.0	43.7	1.0	-45.2	-25.0	-20.2	
	8062.50	-6.6	V	3.0	42.2	1.0	-47.8	-25.0	-22.8	
	10750.00	-2.3	V	3.0	40.8	1.0	-42.1	-25.0	-17.1	
	13437.50	-7.7	V	3.0	42.4	1.0	-49.1	-25.0	-24.1	
	5375.00	-1.2	H	3.0	43.7	1.0	-43.9	-25.0	-18.9	
	8062.50	0.8	H	3.0	42.2	1.0	-40.3	-25.0	-15.3	
	10750.00	-2.0	H	3.0	40.8	1.0	-41.8	-25.0	-16.8	
	13437.50	-3.8	H	3.0	42.4	1.0	-45.2	-25.0	-20.2	