



**FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E**

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n

**MODEL NUMBER: SM-G110M
FCC ID: A3LSMG110M**

REPORT NUMBER: 14I18253-1 REVISION A

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Prepared for

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n
MODEL: SM-G110M
SERIAL NUMBER: FL-261-B
DATE TESTED: JULY 9-14, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 22, FCC CFR Part 24.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss
(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss
(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n.

5.2. MAXIMUM OUTPUT POWER

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Peak (dBm)	Peak (mW)	Peak (dBm)	Peak (mW)
GSM850	824~849	GMSK	32.5	1778.28		
	824~849	GPRS	32.5	1778.28	30.631	1156.38
GSM1900	1850~1910	GMSK	29.7	933.25		
	1850~1910	GPRS	29.7	933.25	29.40	870.96

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
Band 5	824~849	REL99	22.5	177.83	19.34	85.90
	824~849	HSDPA	22.5	177.83	18.24	66.68
	824~849	HSUPA	22.5	177.83		
Band 2	1850~1910	REL99	22.8	190.55	21.564	143.35
	1850~1910	HSDPA	22.5	177.83	20.781	119.70
	1850~1910	HSUPA	22.5	177.83		

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
Band 5, 824~849MHz	-3.40
Band 2, 1850~1910MHz	0.94

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETA-U90CBC	N/A	N/A
Headset	Samsung	GH59	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

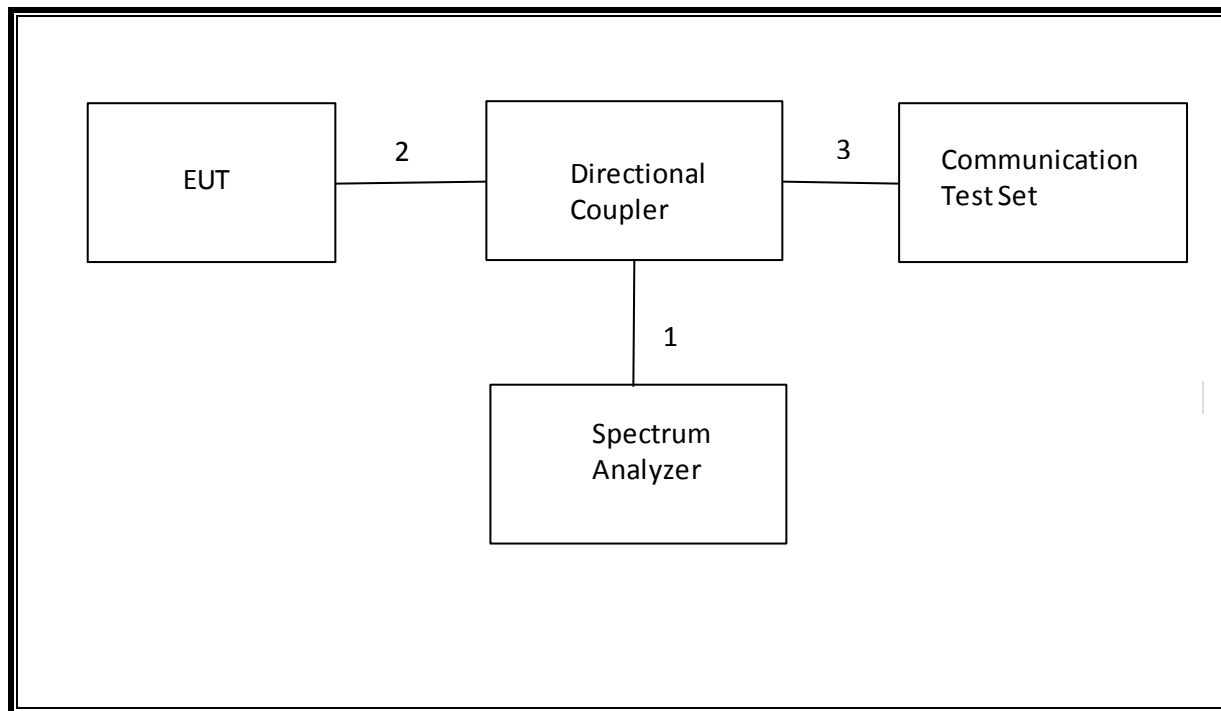
I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

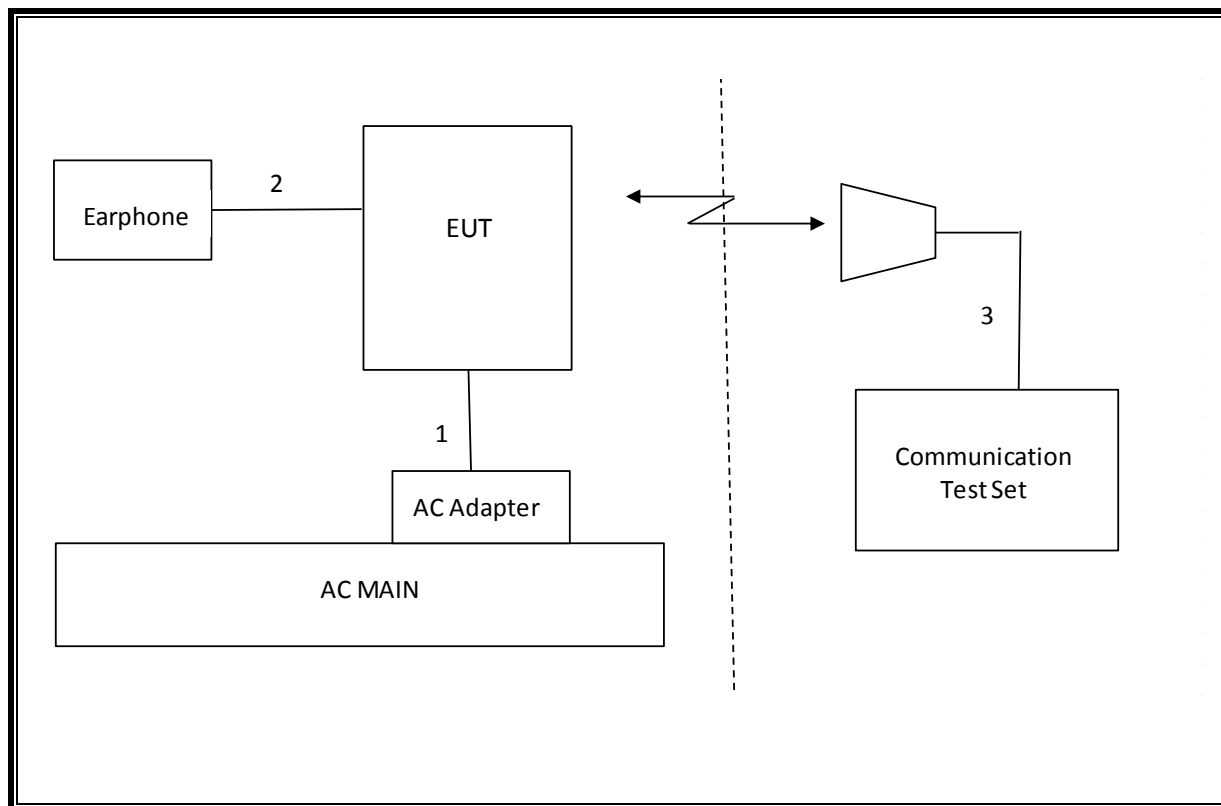
TEST SETUP

The EUT is continuously communicated to the call box during the tests.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/14
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/14

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	RSS Gen	Occupied Band width (99%)	N/A	Conducted	Pass	4191KHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-14.523dBm
2.1046	N/A	Conducted output power	N/A		Pass	32.5dBm
22.355 24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability	2.5PPM		Pass	0.038PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	30.63dBm
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	29.40dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-41.0dBm

RF POWER OUTPUT VERIFICATION

7.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press Connection control to choose the different menus

Press RESET > choose all to reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM+GPRS or GSM+EGPRS

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting

- > Slot configuration > Uplink/Gamma
- > 33 dBm for GPRS 850/900
- > 30 dBm for GPRS1800/1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stable)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off

P0> 4 dB

Slot Config > Unchanged (if already set under MS Signal)

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)

Bit Stream > 2E9-1PSR Bit Pattern

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal On to turn on the signal and change settings

7.1.1. GSM OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	1 time slot	2 time slot	3 time slot	4 time slot
				Peak (dBm)	Peak (dBm)	Peak (dBm)	Peak (dBm)
GSM850	GMSK	128	824.2	32.3			
		190	836.6	32.4			
		251	848.8	32.5			
	GPRS	128	824.2	32.3	29.3	27.5	25.6
		190	836.6	32.4	29.4	27.5	25.6
		251	848.8	32.5	29.4	27.5	25.6
GSM1900	GMSK	512	1850.2	29.7			
		661	1880	29.7			
		810	1909.8	29.7			
	GPRS	512	1850.2	29.7	27.9	25.7	23.8
		661	1880	29.7	28.0	25.8	24.0
		810	1909.8	29.7	28.1	26.0	24.1

7.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

WCDMA General Settings	Mode	Rel99
	Subtest	-
	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	β_c	Not Applicable
	β_d	Not Applicable
	β_{ec}	Not Applicable
	β_c/β_d	8/15
	β_{hs}	Not Applicable
	β_{ed}	Not Applicable

7.2.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	Conducted Power (dBm)
				Avg (dBm)
Band 5	REL99	4132	826.4	22.4
		4183	836.6	22.3
		4233	846.6	22.2
Band 2	REL99	9262	1852.4	22.8
		9400	1880	22.6
		9538	1907.6	22.5

7.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

7.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSDPA	1	4132	826.4	21.3
			4183	836.6	21.2
			4233	846.6	21.3
		2	4132	826.4	21.4
			4183	836.6	21.2
			4233	846.6	21.4
		3	4132	826.4	21.4
			4183	836.6	21.2
			4233	846.6	21.5
		4	4132	826.4	21.4
			4183	836.6	21.2
			4233	846.6	21.4

Band 2	HSDPA	1	9262	1852.4	21.6
			9400	1880	21.6
			9538	1907.6	21.5
		2	9262	1852.4	21.8
			9400	1880	21.7
			9538	1907.6	21.5
		3	9262	1852.4	21.8
			9400	1880	21.7
			9538	1907.6	21.6
		4	9262	1852.4	21.7
			9400	1880	21.7
			9538	1907.6	21.5

7.3.2. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
Subtest	1	2	3	4	5
WCDMA General Settings	Test Mode 1				
	Loopback Mode				
	P-CPICH (dB)				
	-10				
	P-CCPCH (dB)				
	-12				
	SCH (dB)				
	-12				
	PICH(dB)				
	-15				
	DPCH (dB)				
	-9				
	HS-SCCH_1 (dB)				
	-8				
	HS-PDSCH (dB)				
	-3				
	Rel99 RMC				
	12.2kbps RMC				
HSDPA Specific Settings	HSDPA FRC				
	H-Set1				
	HSUPA Test				
	HSUPA Loopback				
	Power Control Algorithm				
	Algorithm2				
	Bc				
HSUPA Specific Settings	11/15	6/15	15/15	2/15	15/15
	Bd				
	15/15	15/15	9/15	15/15	15/15
	Bec				
	209/225	12/15	30/15	2/15	5/15
	β_c/β_d				
	11/15	6/15	15/9	2/15	15/15
	Bhs				
	22/15	12/15	30/15	4/15	30/15
	β_{ed} (note1)				
	1309/225	94/75	47/15	56/75	134/15
	MPR				
	0	2	1	2	0
HSUPA Specific Settings	DACK				
	8				
	DNAK				
	8				
	DCQI				
	8				
	Ack-Nack repetition factor				
	3				
	CQI Feedback (Table 5.2B.4)				
	4ms				
	CQI Repetition Factor (Table 5.2B.4)				
	2				
	$A_{hs} = \beta_{hs}/\beta_c$				
	30/15				
HSUPA Specific Settings	D E-DPCCH				
	6	8	8	5	7
	DHARQ				
	0	0	0	0	0
	AG Index				
	20	12	15	17	21
	Reference E-TFCIs				
	5	5	2	5	5
	ETFCI (from 34.121 Table C.11.1.3)				
	75	67	92	71	81
	Associated Max UL Data Rate kbps				
	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs				
	E-TFCI 11		E-TFCI 11		E-TFCI 11
	E-TFCI PO 4		E-TFCI PO 4		E-TFCI PO 4
	E-TFCI 67		E-TFCI 67		E-TFCI 67
	E-TFCI PO 18		E-TFCI PO 18		E-TFCI PO 18
	E-TFCI 71		E-TFCI 71		E-TFCI 71
	E-TFCI PO 23		E-TFCI PO 23		E-TFCI PO 23
	E-TFCI 75		E-TFCI 75		E-TFCI 75
	E-TFCI PO 26		E-TFCI PO 26		E-TFCI PO 26
	E-TFCI 81		E-TFCI 81		E-TFCI 81
	E-TFCI PO 27		E-TFCI PO 27		E-TFCI PO 27

Note1: β_{ed} cannot be set directly, it is set by Absolute Grant Value.

7.3.3. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSUPA	1	4132	826.4	20.8
			4183	836.6	20.7
			4233	846.6	20.6
		2	4132	826.4	20.1
			4183	836.6	19.9
			4233	846.6	19.9
		3	4132	826.4	21.3
			4183	836.6	21.1
			4233	846.6	21.1
		4	4132	826.4	20.5
			4183	836.6	20.5
			4233	846.6	20.5
		5	4132	826.4	22.4
			4183	836.6	22.2
			4233	846.6	22.2
Band 2	HSUPA	1	9262	1852.4	20.5
			9400	1880	20.5
			9538	1907.6	20.5
		2	9262	1852.4	20.0
			9400	1880	19.8
			9538	1907.6	19.7
		3	9262	1852.4	21.3
			9400	1880	21.1
			9538	1907.6	21.0
		4	9262	1852.4	20.4
			9400	1880	20.5
			9538	1907.6	20.4
		5	9262	1852.4	22.5
			9400	1880	22.4
			9538	1907.6	22.2

8. PEAK TO AVERAGE RATIO

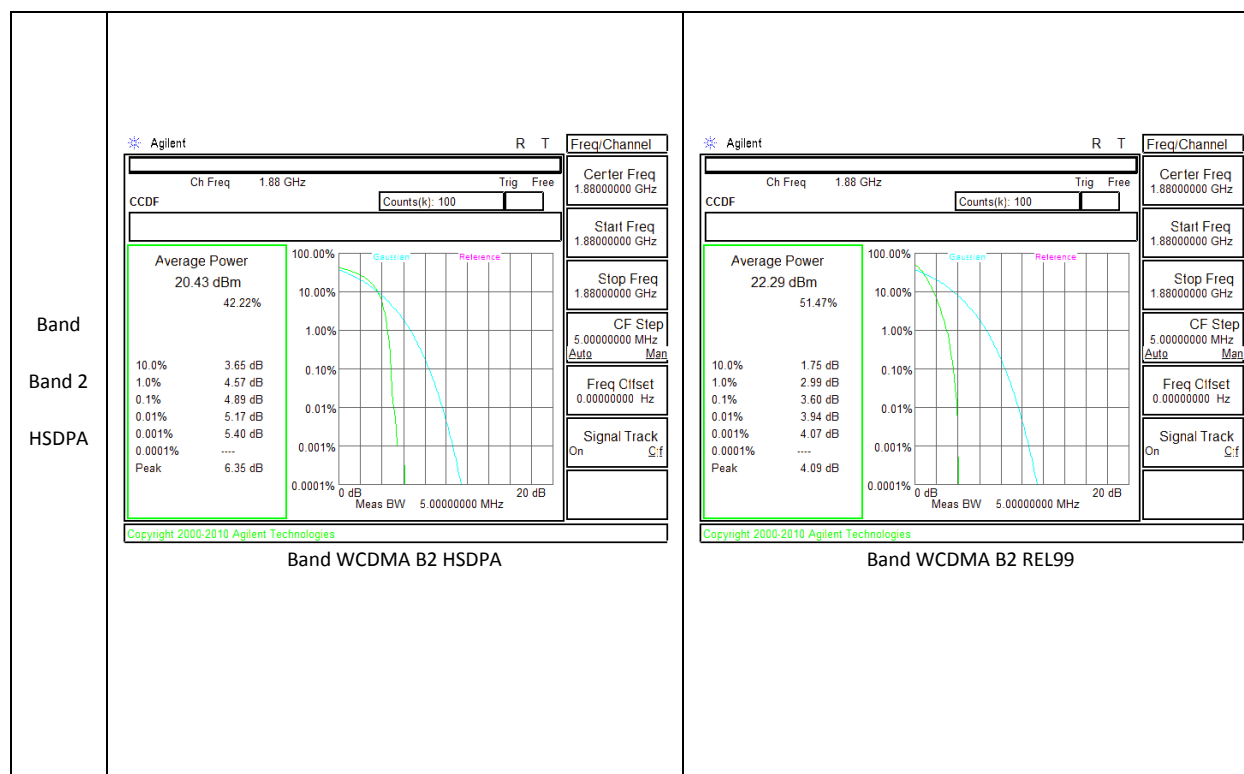
Test Procedure

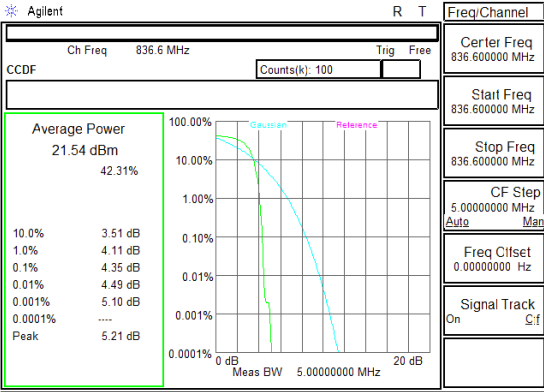
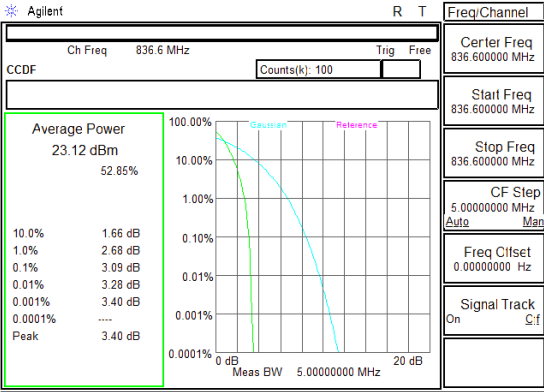
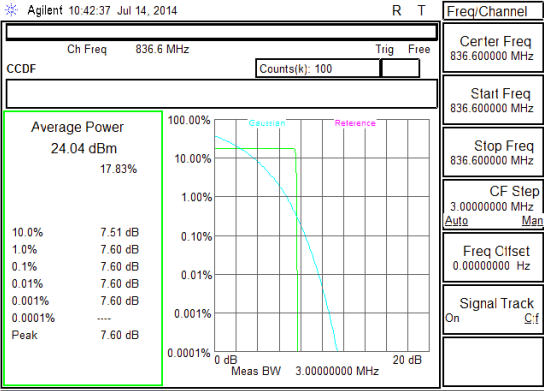
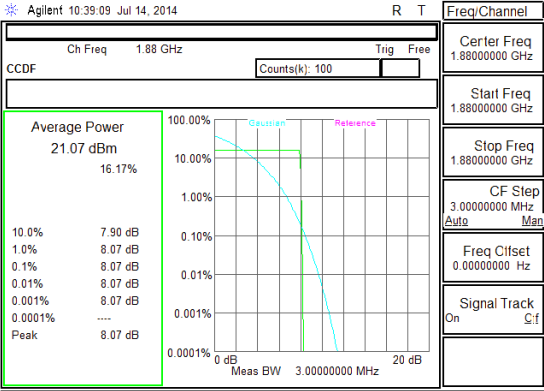
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

Test Spec

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

8.1. CONDUCTED PEAK TO AVERAGE RESULT



Band Band 5 HSDPA	 Copyright 2000-2010 Agilent Technologies Band WCDMA B5 HSDPA	 Copyright 2000-2010 Agilent Technologies Band WCDMA B5 REL99
GPRS	 Copyright 2000-2011 Agilent Technologies GPRS850	 Copyright 2000-2011 Agilent Technologies GPRS1900

9. LIMITS AND CONDUCTED RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

For reporting purposes only

TEST PROCEDURE

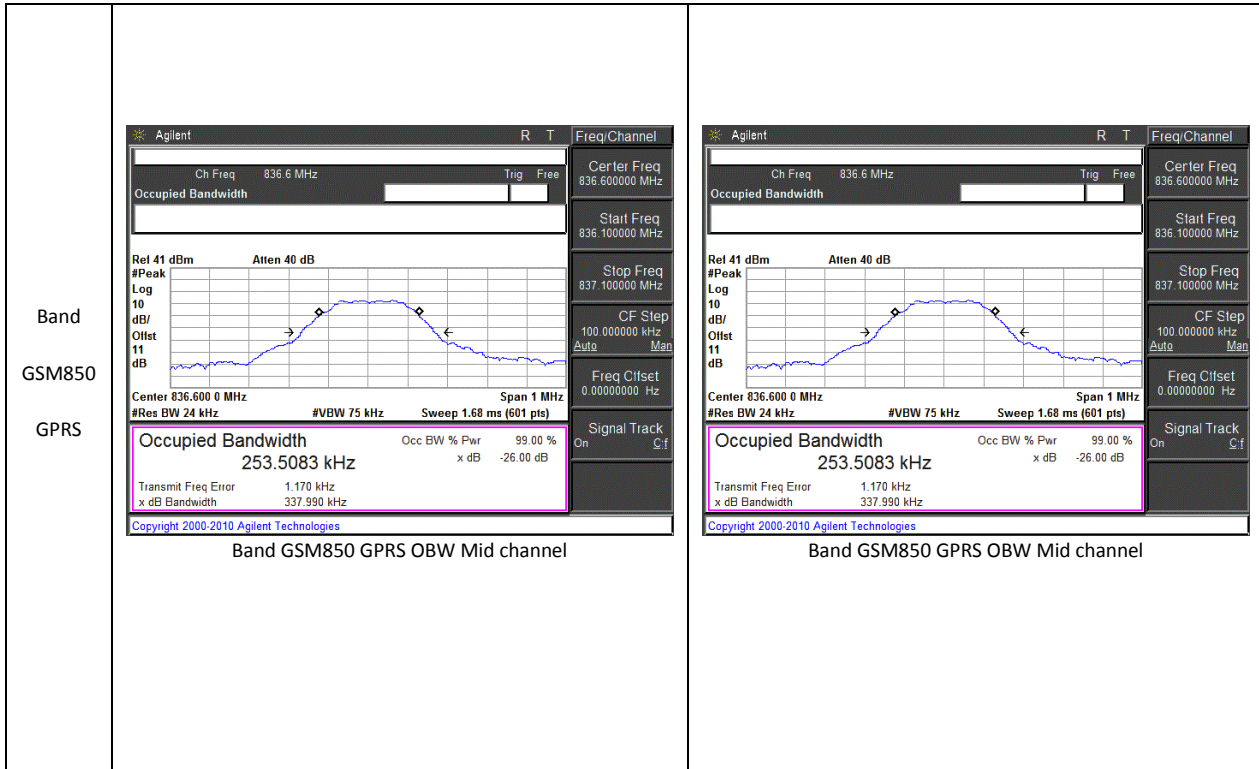
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r01 - 06/07/2013)

9.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	128	824.2	252	331
		190	836.6	254	338
		251	848.8	250	334
GSM1900	GPRS	512	1850.2	254	327
		661	1880	249	325
		810	1909.8	249	328
Band 5	REL99	4132	826.4	4191	4807
		4183	836.6	4103	4662
		4233	846.6	4101	4644
	HSDPA	4132	826.4	4112	4661
		4183	836.6	4104	4650
		4233	846.6	4110	4667
Band 2	REL99	9262	1852.4	4112	4625
		9400	1880	4097	4620
		9538	1907.6	4104	4625
	HSDPA	9262	1852.4	4092	4639
		9400	1880	4107	4665
		9538	1907.6	4108	4640

Band Band 5 HSDPA	Agilent R T Freq/Channel Ch Freq 836.6 MHz Trig Free Center Freq 836.600000 MHz Occupied Bandwidth Start Freq 831.600000 MHz Stop Freq 841.600000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Rel 39 dBm Atten 40 dB #Peak Log 10 dB/ 11 dB Center 836.600 MHz #VBW 120 kHz Sweep 6.28 ms (601 pts) Span 10 MHz Res BW 39 kHz Occupied Bandwidth 4.1036 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -4.595 kHz x dB Bandwidth 4.650 MHz Copyright 2000-2010 Agilent Technologies Band WCDMA B5 HSDPA OBW
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9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238

LIMITS

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

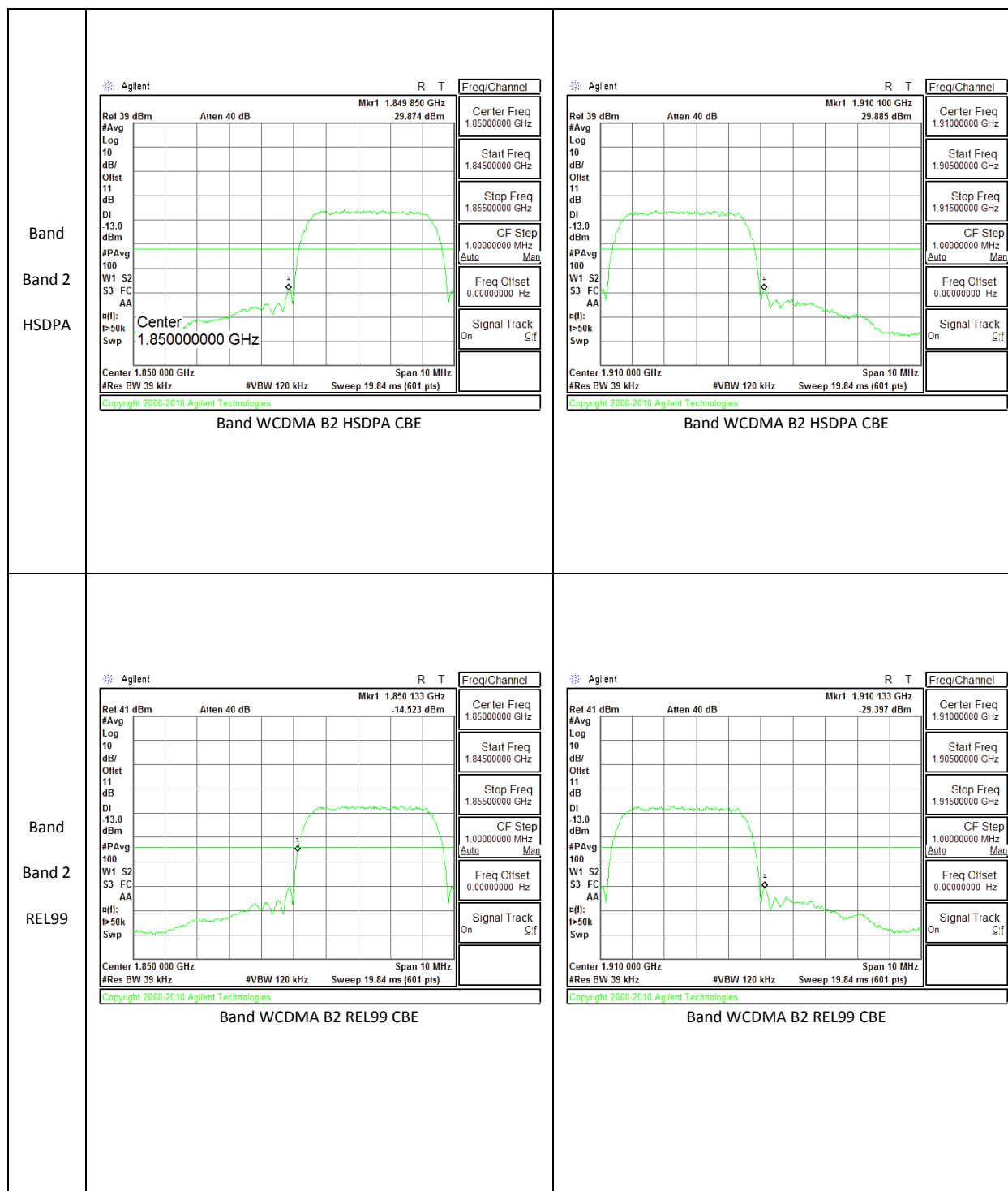
TEST PROCEDURE

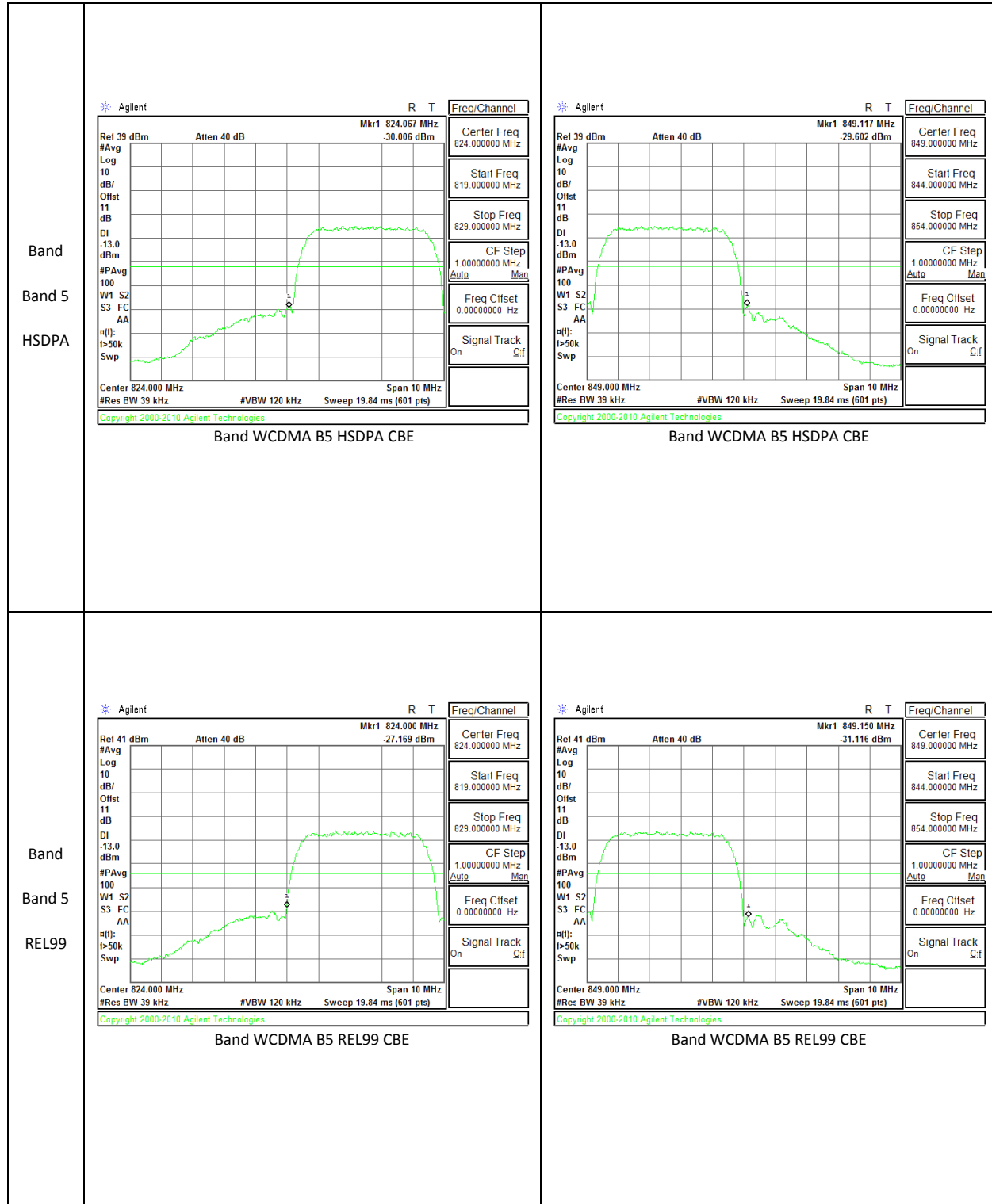
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

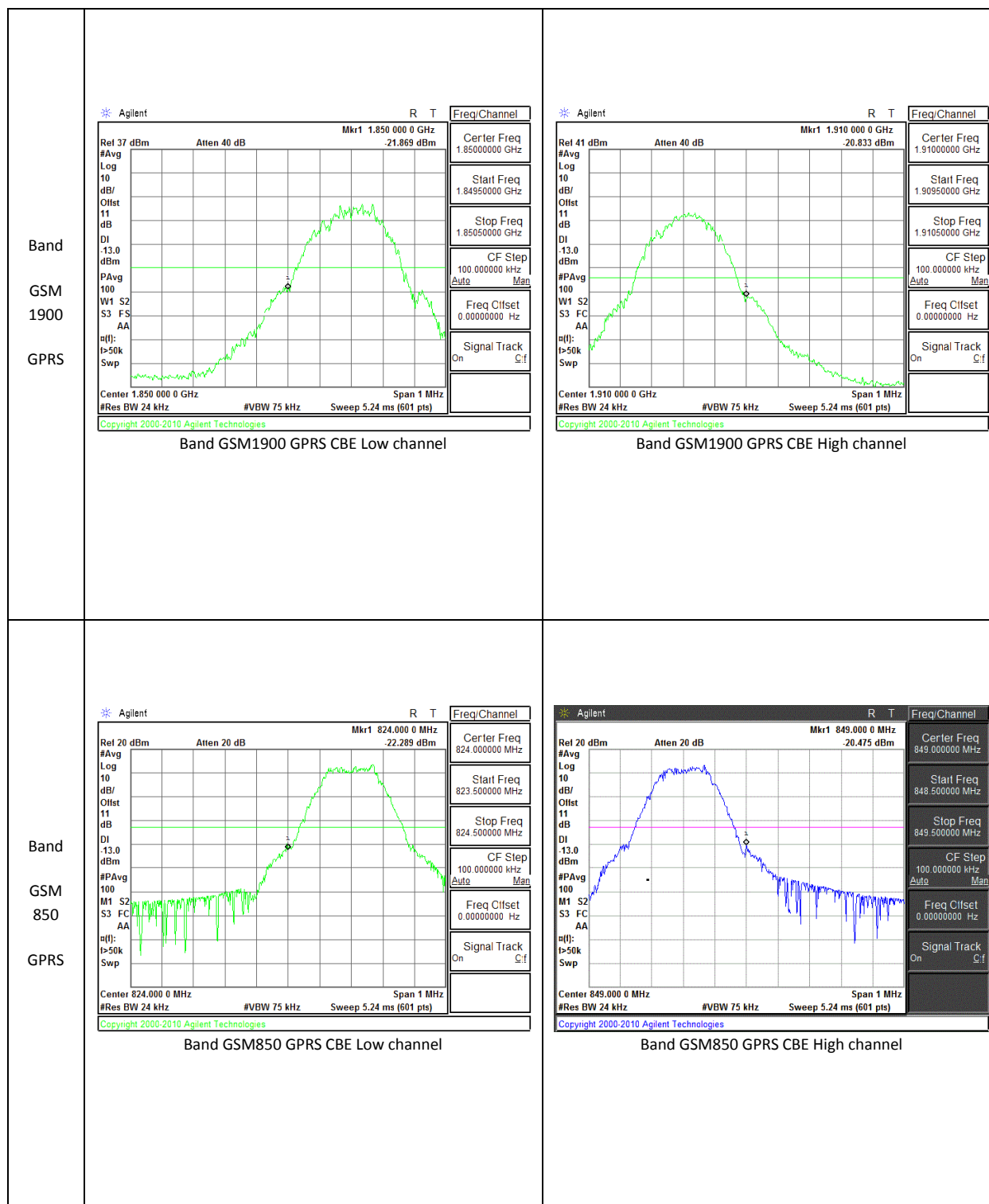
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

RESULTS

9.2.1.BAND EDGE PLOTS







9.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

RESULTS

9.3.1. OUT OF BAND EMISSIONS RESULT

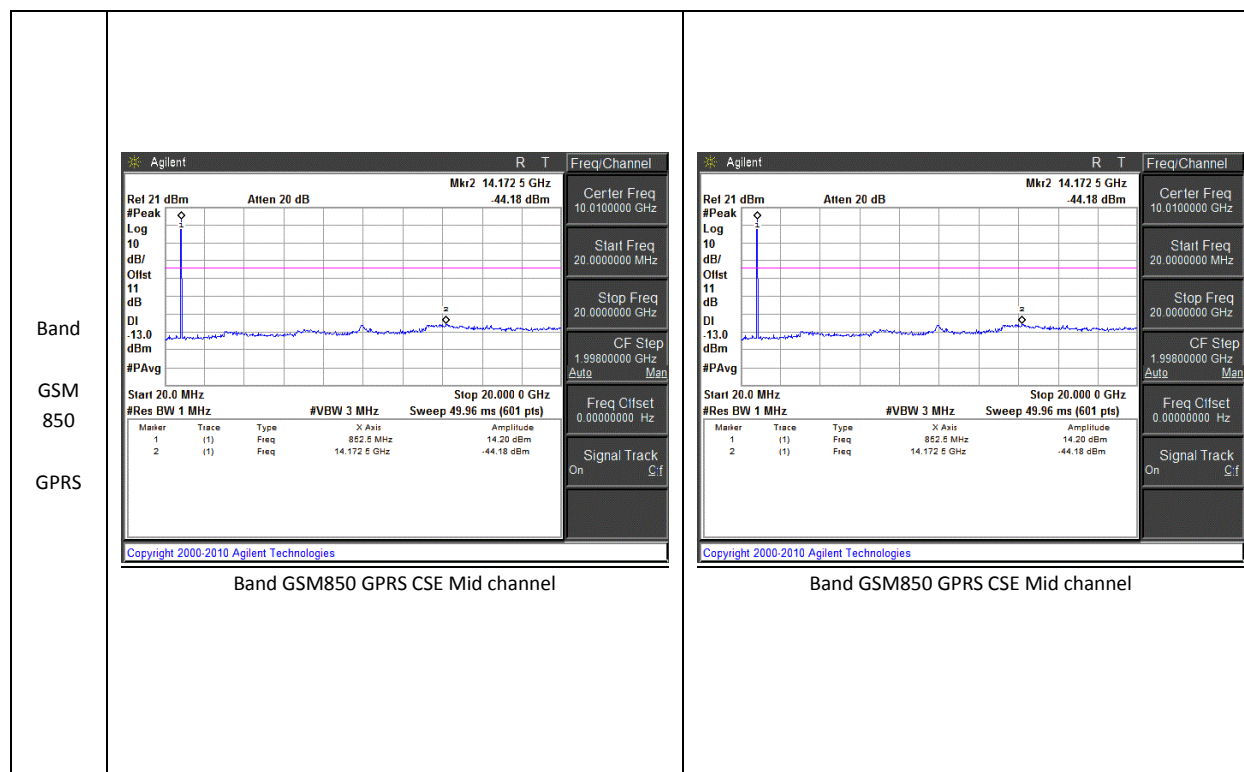
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-45.23	-13	-32.23
		836.6	-44.18	-13	-31.18
		848.8	-44.81	-13	-31.81
GSM1900	GPRS	1850.2	-25.50	-13	-12.50
		1880	-25.55	-13	-12.55
		1909.8	-24.97	-13	-11.97
Band 5	REL99	826.4	-35.81	-13	-22.81
		836.6	-35.76	-13	-22.76
		846.6	-35.02	-13	-22.02
	HSDPA	826.4	-24.63	-13	-11.63
		836.6	-24.83	-13	-11.83
		846.6	-24.45	-13	-11.45
Band 2	REL99	1852.4	-28.07	-13	-15.07
		1880	-26.92	-13	-13.92
		1907.6	-26.00	-13	-13.00
	HSDPA	1852.4	-24.05	-13	-11.05
		1880	-24.62	-13	-11.62
		1907.6	-25.42	-13	-12.42

9.3.2. OUT OF BAND EMISSIONS PLOTS



Band Band 5 HSDPA	Agilent Rel 39 dBm Atten 40 dB Mkr2 13.273 4 GHz -24.83 dBm Center Freq 10.01000000 GHz Start Freq 20.00000000 MHz Stop Freq 20.00000000 GHz CF Step 1.998000000 GHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Start 20.0 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 49.96 ms (601 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>819.2 MHz</td><td>22.52 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>13.273 4 GHz</td><td>-24.83 dBm</td></tr></table> Copyright 2000-2010 Agilent Technologies Band WCDMA B5 HSDPA CSE	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	819.2 MHz	22.52 dBm	2	(1)	Freq	13.273 4 GHz	-24.83 dBm
	Marker	Trace	Type	X Axis	Amplitude											
1	(1)	Freq	819.2 MHz	22.52 dBm												
2	(1)	Freq	13.273 4 GHz	-24.83 dBm												
Agilent Rel 41 dBm Atten 40 dB Mkr2 13.206 8 GHz -35.758 dBm Center Freq 10.01000000 GHz Start Freq 20.00000000 MHz Stop Freq 20.00000000 GHz CF Step 1.998000000 GHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Start 20.0 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 60.4 ms (601 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>819.2 MHz</td><td>6.91 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>13.206 8 GHz</td><td>-35.76 dBm</td></tr></table> Copyright 2000-2010 Agilent Technologies Band WCDMA B5 REL99 CSE	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	819.2 MHz	6.91 dBm	2	(1)	Freq	13.206 8 GHz	-35.76 dBm	
Marker	Trace	Type	X Axis	Amplitude												
1	(1)	Freq	819.2 MHz	6.91 dBm												
2	(1)	Freq	13.206 8 GHz	-35.76 dBm												

Band GSM 1900 GPRS	Agilent Rel 41 dBm Atten 40 dB Mkr2 13.44 GHz -25.55 dBm Center Freq 10.01000000 GHz Start Freq 20.00000000 MHz Stop Freq 20.00000000 GHz CF Step 1.998000000 GHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Start 20 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 49.96 ms (601 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>1.88 GHz</td><td>28.78 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>13.44 GHz</td><td>-25.55 dBm</td></tr></table> Copyright 2000-2010 Agilent Technologies Band GSM1900 GPRS CSE Mid channel	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	1.88 GHz	28.78 dBm	2	(1)	Freq	13.44 GHz	-25.55 dBm
	Marker	Trace	Type	X Axis	Amplitude											
1	(1)	Freq	1.88 GHz	28.78 dBm												
2	(1)	Freq	13.44 GHz	-25.55 dBm												
Agilent Rel 41 dBm Atten 40 dB Mkr2 13.44 GHz -25.55 dBm Center Freq 10.01000000 GHz Start Freq 20.00000000 MHz Stop Freq 20.00000000 GHz CF Step 1.998000000 GHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Start 20 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 49.96 ms (601 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>1.88 GHz</td><td>28.78 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>13.44 GHz</td><td>-25.55 dBm</td></tr></table> Copyright 2000-2010 Agilent Technologies Band GSM1900 GPRS CSE Mid channel	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	1.88 GHz	28.78 dBm	2	(1)	Freq	13.44 GHz	-25.55 dBm	
Marker	Trace	Type	X Axis	Amplitude												
1	(1)	Freq	1.88 GHz	28.78 dBm												
2	(1)	Freq	13.44 GHz	-25.55 dBm												



9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

LIMITS

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

RESULTS

See the following pages.

9.4.1. FREQUENCY STABILITY RESULTS

CELL, GPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.6000246MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.6000084	0.019	2.5
3.80	40	836.6000098	0.018	2.5
3.80	30	836.6000112	0.016	2.5
3.80	20	836.6000246	0	2.5
3.80	10	836.6000102	0.017	2.5
3.80	0	836.6000066	0.022	2.5
3.80	-10	836.5999932	0.038	2.5
3.80	-20	836.6000076	0.020	2.5
3.80	-30	836.6000091	0.019	2.5

Reference Frequency: Cellular Mid Channel 836.600025MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.600025	0.00000	2.5
4.30	20	836.600021	0.00478	2.5
3.40	20	836.600014	0.01315	2.5

PCS, GPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000022MHz @ 20°C Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000022	0.000	2.5
3.80	40	1880.000018	0.002	2.5
3.80	30	1880.000019	0.001	2.5
3.80	20	1880.000022	0	2.5
3.80	10	1880.000018	0.002	2.5
3.80	0	1880.000021	0.001	2.5
3.80	-10	1880.000002	0.001	2.5
3.80	-20	1880.000021	0.000	2.5
3.80	-30	1880.000002	0.001	2.5

Reference Frequency: PCS Mid Channel 1880.000022MHz @ 20°C Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.000022	0	2.5
4.30	20	1880.000025	-0.002	2.5
3.40	20	1880.000021	0.000	2.5

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

TEST RESULTS

10.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	21.564	143.35
		9400	1880	20.637	115.8
		9538	1907.6	21.255	133.51
	HSDPA	9262	1852.4	20.781	119.7
		9400	1880	19.996	99.91
		9538	1907.6	20.180	104.23

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	17.61	57.68
		4183	836.6	18.28	67.30
		4233	846.6	19.34	85.90
	HSDPA	4132	826.4	16.98	49.89
		4183	836.6	18.03	63.53
		4233	846.6	18.24	16.68

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	29.10	812.83
		661	1880	29.40	870.96
		810	1909.8	29.08	809.10

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	30.631	1156.38
		190	836.6	30.585	1144.19
		251	848.8	30.311	1074.24

10.1.2. ERP/EIRP DATA

Band Band 2 HSDPA	High Frequency Fundamental Measurement Compliance Certification Services Chamber A Company: Samsung Project #: 14I18253 Date: 07/09/14 Test Engineer: O. Stoelting, L. Lara Configuration: EUT ONLY, X Position Mode: WCDMA_1900 MHz_HSDPA Test Equipment: Receiving: T130, and Chamber A Cable (Setup this one for testing EUT) Substitution: Horn T119 Substitution, 4ft SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1852.40	11.76	V	0.85	7.9	18.81	33.0	-14.2	
	1852.40	13.73	H	0.85	7.9	20.78	33.0	-12.2	
	Mid Ch								
	1880.00	11.39	V	0.85	7.9	18.44	33.0	-14.6	
	1880.00	12.95	H	0.85	7.9	20.00	33.0	-13.0	
	High Ch								
	1907.60	10.71	V	0.85	7.8	17.66	33.0	-15.3	
	1907.60	13.23	H	0.85	7.8	20.18	33.0	-12.8	
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

Band 2 REL99	High Frequency Fundamental Measurement Compliance Certification Services Chamber A Company: Samsung Project #: 14I18253 Date: 07/09/14 Test Engineer: O. Stoelting, L. Lara Configuration: EUT ONLY, X Position Mode: WCDMA_1900 MHz_Rel 99 Test Equipment: Receiving: Horn T136, and Chamber A SMA Cables Substitution: Horn T119 Substitution, 4ft SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1852.40	12.63	V	0.85	7.9	19.68	33.0	-13.3	
	1852.40	14.51	H	0.85	7.9	21.56	33.0	-11.4	
	Mid Ch								
	1880.00	12.42	V	0.85	7.9	19.47	33.0	-13.5	
	1880.00	13.59	H	0.85	7.9	20.64	33.0	-12.4	
	High Ch								
	1907.60	13.52	V	0.85	7.8	20.47	33.0	-12.5	
	1907.60	14.31	H	0.85	7.8	21.26	33.0	-11.7	
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

Band Band 5 HSDPA	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B Company: Samsung Project #: 14I18253 Date: 07/10/14 Test Engineer: K. Kedida Configuration: EUT ONLY, X Position Mode: WCDMA_HSDPA_850 Test Equipment: Receiving: Sunoi T243, and 5m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole T416, 4ft SMA Cable Warehouse. <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Low Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>826.40</td> <td>7.90</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>7.40</td> <td>38.5</td> <td>-31.0</td> <td></td> </tr> <tr> <td>826.40</td> <td>17.48</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>16.98</td> <td>38.5</td> <td>-21.5</td> <td></td> </tr> <tr> <td>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>836.60</td> <td>8.31</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>7.81</td> <td>38.5</td> <td>-30.6</td> <td></td> </tr> <tr> <td>836.60</td> <td>18.53</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>18.03</td> <td>38.5</td> <td>-20.4</td> <td></td> </tr> <tr> <td>High Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>846.60</td> <td>8.07</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>7.57</td> <td>38.5</td> <td>-30.9</td> <td></td> </tr> <tr> <td>846.60</td> <td>18.74</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>18.24</td> <td>38.5</td> <td>-20.2</td> <td></td> </tr> </tbody> </table> Rev. 3.17.11									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									826.40	7.90	V	0.5	0.0	7.40	38.5	-31.0		826.40	17.48	H	0.5	0.0	16.98	38.5	-21.5		Mid Ch									836.60	8.31	V	0.5	0.0	7.81	38.5	-30.6		836.60	18.53	H	0.5	0.0	18.03	38.5	-20.4		High Ch									846.60	8.07	V	0.5	0.0	7.57	38.5	-30.9		846.60	18.74	H	0.5	0.0	18.24	38.5	-20.2	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	826.40	7.90	V	0.5	0.0	7.40	38.5	-31.0																																																																																											
	826.40	17.48	H	0.5	0.0	16.98	38.5	-21.5																																																																																											
	Mid Ch																																																																																																		
	836.60	8.31	V	0.5	0.0	7.81	38.5	-30.6																																																																																											
	836.60	18.53	H	0.5	0.0	18.03	38.5	-20.4																																																																																											
	High Ch																																																																																																		
	846.60	8.07	V	0.5	0.0	7.57	38.5	-30.9																																																																																											
846.60	18.74	H	0.5	0.0	18.24	38.5	-20.2																																																																																												

Band Band 5 REL99	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B Company: Samsung Project #: 14I18253 Date: 07/10/14 Test Engineer: K. Kedida Configuration: EUT ONLY, X Position Mode: WCDMA_Rel99_850 Test Equipment: Receiving: T243, and Chamber A Cable (Setup this one for testing EUT) Substitution: Dipole T416, 4ft SMA Cable Warehouse. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Low Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>826.40</td> <td>8.10</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>7.60</td> <td>38.5</td> <td>-30.8</td> <td></td> </tr> <tr> <td>826.40</td> <td>18.11</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>17.61</td> <td>38.5</td> <td>-20.8</td> <td></td> </tr> <tr> <td>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>836.60</td> <td>8.48</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>7.98</td> <td>38.5</td> <td>-30.5</td> <td></td> </tr> <tr> <td>836.60</td> <td>18.78</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>18.28</td> <td>38.5</td> <td>-20.2</td> <td></td> </tr> <tr> <td>High Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>846.60</td> <td>9.16</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>8.66</td> <td>38.5</td> <td>-29.8</td> <td></td> </tr> <tr> <td>846.60</td> <td>19.84</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>19.34</td> <td>38.5</td> <td>-19.1</td> <td></td> </tr> </tbody> </table> Rev. 3.17.11	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									826.40	8.10	V	0.5	0.0	7.60	38.5	-30.8		826.40	18.11	H	0.5	0.0	17.61	38.5	-20.8		Mid Ch									836.60	8.48	V	0.5	0.0	7.98	38.5	-30.5		836.60	18.78	H	0.5	0.0	18.28	38.5	-20.2		High Ch									846.60	9.16	V	0.5	0.0	8.66	38.5	-29.8		846.60	19.84	H	0.5	0.0	19.34	38.5	-19.1	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																			
Low Ch																																																																																											
826.40	8.10	V	0.5	0.0	7.60	38.5	-30.8																																																																																				
826.40	18.11	H	0.5	0.0	17.61	38.5	-20.8																																																																																				
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Band GSM19 00 GPRS	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber B								
	Company: Samsung Project #: 14I18253 Date: 07/14/14 Test Engineer: S. Her, K. Ros, B. Liu Configuration: EUT ONLY, X Position Mode: GSM1900_GPRS								
	Test Equipment: Receiving: Horn T345, and Chamber B SMA Cables Substitution: Horn T72 Substitution, 4ft SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1850.20	12.67	V	0.9	7.9	19.67	33.0	-13.3	
	1850.20	22.10	H	0.9	7.9	29.10	33.0	-3.9	
	Mid Ch								
	1880.00	11.70	V	0.9	7.9	18.70	33.0	-14.3	
	1880.00	22.40	H	0.9	7.9	29.40	33.0	-3.6	
High Ch									
1909.80	11.62	V	0.9	7.9	18.62	33.0	-14.4		
1909.80	22.08	H	0.9	7.9	29.08	33.0	-3.9		
Rev. 3.17.11									

Band GSM85 0 GPRS	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber A								
	Company:		Samsung						
	Project #:		14I18253						
	Date:								
	Test Engineer:		Edward/Jude						
	Configuration:		EUT ONLY, X Position						
	Mode:		GSM850_GPRS						
	Test Equipment:								
	Receiving: Sunol T243, and 3m Chamber N-type Cable (Setup this one for testing EUT)								
	Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	824.20	22.79	V	0.5	0.0	22.29	38.5	-16.2	
	824.20	31.13	H	0.5	0.0	30.63	38.5	-7.8	
	Mid Ch								
	836.60	23.01	V	0.5	0.0	22.51	38.5	-15.9	
	836.60	31.08	H	0.5	0.0	30.59	38.5	-7.9	
	High Ch								
	848.80	21.53	V	0.5	0.0	21.03	38.5	-17.4	
	848.80	30.81	H	0.5	0.0	30.31	38.5	-8.1	
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB

TEST PROCEDURE

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

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

RESULTS

10.2.1. SPURIOUS RADIATION PLOTS

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14I18253							
Date:		07/09/14							
Test Engineer:		O. Stoelting, L. Lara							
Configuration:		X-pos. EUT w/ ac charger & HS							
Mode:		HSDPA_HARM_1900MHz							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber A		T34 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-10.1	V	3.0	35.4	1.0	-44.5	-13.0	-31.5	
5.557	-13.5	V	3.0	34.7	1.0	-47.2	-13.0	-34.2	
7.409	-12.1	V	3.0	34.9	1.0	-46.0	-13.0	-33.0	
3.705	-13.1	H	3.0	35.4	1.0	-47.5	-13.0	-34.5	
5.557	-12.6	H	3.0	34.7	1.0	-46.3	-13.0	-33.3	
7.409	-10.9	H	3.0	34.9	1.0	-44.8	-13.0	-31.8	
Mid Ch, 1880MHz									
3.760	-10.8	V	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.640	-11.9	V	3.0	34.7	1.0	-45.7	-13.0	-32.7	
7.520	-9.4	V	3.0	34.9	1.0	-43.3	-13.0	-30.3	
3.760	-12.6	H	3.0	35.3	1.0	-47.0	-13.0	-34.0	
5.640	-11.2	H	3.0	34.7	1.0	-44.9	-13.0	-31.9	
7.520	-8.8	H	3.0	34.9	1.0	-42.8	-13.0	-29.8	
High Ch, 1907.6MHz									
3.815	-10.5	V	3.0	35.3	1.0	-44.8	-13.0	-31.8	
5.723	-13.1	V	3.0	34.7	1.0	-46.9	-13.0	-33.9	
7.630	-11.2	V	3.0	34.9	1.0	-45.1	-13.0	-32.1	
3.815	-14.0	H	3.0	35.3	1.0	-48.3	-13.0	-35.3	
5.723	-12.3	H	3.0	34.7	1.0	-46.0	-13.0	-33.0	
7.630	-9.9	H	3.0	34.9	1.0	-43.9	-13.0	-30.9	
Rev. 03.03.09									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14I18253							
Date:		07/09/14							
Test Engineer:		O. Stoelting, L. Lara							
Configuration:		X-pos. EUT with AC charger & HS							
Mode:		Rel 99_HARM_ 1900MHz							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber A		T34 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-6.8	V	3.0	35.4	1.0	-41.2	-13.0	-28.2	
5.557	-13.0	V	3.0	34.7	1.0	-46.7	-13.0	-33.7	
7.409	-12.0	V	3.0	34.9	1.0	-45.9	-13.0	-32.9	
3.705	-8.8	H	3.0	35.4	1.0	-43.2	-13.0	-30.2	
5.557	-12.5	H	3.0	34.7	1.0	-46.2	-13.0	-33.2	
7.409	-11.3	H	3.0	34.9	1.0	-45.2	-13.0	-32.2	
Mid Ch, 1880MHz									
3.760	-8.0	V	3.0	35.3	1.0	-42.3	-13.0	-29.3	
5.640	-11.1	V	3.0	34.7	1.0	-44.8	-13.0	-31.8	
7.520	-11.6	V	3.0	34.9	1.0	-45.5	-13.0	-32.5	
3.760	-9.3	H	3.0	35.3	1.0	-43.6	-13.0	-30.6	
5.640	-12.8	H	3.0	34.7	1.0	-46.6	-13.0	-33.6	
7.520	-9.8	H	3.0	34.9	1.0	-43.7	-13.0	-30.7	
High Ch, 1907.6MHz									
3.815	-9.9	V	3.0	35.3	1.0	-44.2	-13.0	-31.2	
5.723	-12.3	V	3.0	34.7	1.0	-46.1	-13.0	-33.1	
7.630	-11.5	V	3.0	34.9	1.0	-45.4	-13.0	-32.4	
3.815	-9.8	H	3.0	35.3	1.0	-44.1	-13.0	-31.1	
5.723	-12.1	H	3.0	34.7	1.0	-45.8	-13.0	-32.8	
7.630	-9.4	H	3.0	34.9	1.0	-43.4	-13.0	-30.4	
Rev. 03.03.09									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14I18253							
Date:		07/09/14							
Test Engineer:		O. Stoelting, L. Lara							
Configuration:		X-pos. EUT w/ ac charger & HS							
Mode:		WCDMA_HSDPA_850							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber A		T34 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
Band 5	1.652	-17.6	V	3.0	37.4	1.0	-54.0	-13.0	-41.0
	2.479	-20.4	V	3.0	36.4	1.0	-55.8	-13.0	-42.8
	3.306	-15.2	V	3.0	35.8	1.0	-50.0	-13.0	-37.0
	1.652	-17.4	H	3.0	37.4	1.0	-53.7	-13.0	-40.7
HSDPA	2.479	-18.4	H	3.0	36.4	1.0	-53.8	-13.0	-40.8
	3.306	-13.5	H	3.0	35.8	1.0	-48.3	-13.0	-35.3
	Mid Ch, 836.6MHz								
	1.673	-12.2	V	3.0	37.3	1.0	-48.6	-13.0	-35.6
	2.510	-18.7	V	3.0	36.4	1.0	-54.1	-13.0	-41.1
	3.346	-9.1	V	3.0	35.8	1.0	-43.8	-13.0	-30.8
	1.673	-16.4	H	3.0	37.3	1.0	-52.7	-13.0	-39.7
	2.510	-21.9	H	3.0	36.4	1.0	-57.2	-13.0	-44.2
	3.346	-6.3	H	3.0	35.8	1.0	-41.1	-13.0	-28.1
	High Ch, 846.6MHz								
	1.693	-10.6	V	3.0	37.3	1.0	-46.9	-13.0	-33.9
	2.539	-19.8	V	3.0	36.3	1.0	-55.2	-13.0	-42.2
	3.386	-7.4	V	3.0	35.7	1.0	-42.2	-13.0	-29.2
	1.693	-14.9	H	3.0	37.3	1.0	-51.2	-13.0	-38.2
	2.539	-18.6	H	3.0	36.3	1.0	-54.0	-13.0	-41.0
	3.386	-15.3	H	3.0	35.7	1.0	-50.0	-13.0	-37.0
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14I18253							
Date:		07/09/14							
Test Engineer:		O. Stoelting, L. Lara							
Configuration:		X-pos. EUT with AC charger & HS							
Mode:		WCDMA_Rel 99_ 850							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber A		T34 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-16.6	V	3.0	37.4	1.0	-53.0	-13.0	-40.0	
2.479	-19.3	V	3.0	36.4	1.0	-54.7	-13.0	-41.7	
3.306	-11.7	V	3.0	35.8	1.0	-46.5	-13.0	-33.5	
1.652	-16.3	H	3.0	37.4	1.0	-52.7	-13.0	-39.7	
2.479	-17.5	H	3.0	36.4	1.0	-52.9	-13.0	-39.9	
3.306	-12.0	H	3.0	35.8	1.0	-46.8	-13.0	-33.8	
Mid Ch, 836.6MHz									
1.673	-11.8	V	3.0	37.3	1.0	-48.2	-13.0	-35.2	
2.510	-19.4	V	3.0	36.4	1.0	-54.7	-13.0	-41.7	
3.346	-9.2	V	3.0	35.8	1.0	-43.9	-13.0	-30.9	
1.673	-14.2	H	3.0	37.3	1.0	-50.6	-13.0	-37.6	
2.510	-20.0	H	3.0	36.4	1.0	-55.4	-13.0	-42.4	
3.346	-12.0	H	3.0	35.8	1.0	-46.8	-13.0	-33.8	
High Ch, 846.6MHz									
1.693	-9.0	V	3.0	37.3	1.0	-45.3	-13.0	-32.3	
2.539	-20.0	V	3.0	36.3	1.0	-55.3	-13.0	-42.3	
3.386	-6.4	V	3.0	35.7	1.0	-41.1	-13.0	-28.1	
1.693	-9.6	H	3.0	37.3	1.0	-45.9	-13.0	-32.9	
2.539	-21.7	H	3.0	36.3	1.0	-57.1	-13.0	-44.1	
3.386	-7.1	H	3.0	35.7	1.0	-41.8	-13.0	-28.8	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	14I18253									
Date:	07/09/14									
Test Engineer:	O. Stoelting, L. Lara									
Configuration:	X-pos. EUT w/ ac charger & HS									
Mode:	GPRS 1900									
Chamber Pre-amplifier Filter Limit 5m Chamber A T343 8449B Filter 1 Part 24										
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM19 00 GPRS	Low Ch, 1850MHz									
	3.700	-11.6	V	3.0	35.4	1.0	-46.0	-13.0	-33.0	
	5.550	-12.2	V	3.0	34.7	1.0	-45.9	-13.0	-32.9	
	7.400	-14.8	V	3.0	34.9	1.0	-48.7	-13.0	-35.7	
	3.700	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
	5.550	-14.0	H	3.0	34.7	1.0	-47.8	-13.0	-34.8	
	7.400	-13.8	H	3.0	34.9	1.0	-47.7	-13.0	-34.7	
	Mid Ch, 1880.0MHz									
	3.760	-10.4	V	3.0	35.3	1.0	-44.8	-13.0	-31.8	
	5.640	-15.4	V	3.0	34.7	1.0	-49.1	-13.0	-36.1	
	7.520	-13.9	V	3.0	34.9	1.0	-47.8	-13.0	-34.8	
	3.760	-11.8	H	3.0	35.3	1.0	-46.2	-13.0	-33.2	
	5.640	-14.0	H	3.0	34.7	1.0	-47.8	-13.0	-34.8	
	7.520	-13.8	H	3.0	34.9	1.0	-47.7	-13.0	-34.7	
	High Ch, 1909.8 MHz									
3.820	-10.7	V	3.0	35.3	1.0	-45.0	-13.0	-32.0		
5.729	-12.5	V	3.0	34.7	1.0	-46.2	-13.0	-33.2		
7.639	-10.9	V	3.0	35.0	1.0	-44.9	-13.0	-31.9		
3.820	-8.4	H	3.0	35.3	1.0	-42.7	-13.0	-29.7		
5.729	-12.0	H	3.0	34.7	1.0	-45.8	-13.0	-32.8		
7.639	-9.2	H	3.0	35.0	1.0	-43.1	-13.0	-30.1		
Rev. 03.03.09										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14I18253							
Date:		07/09/14							
Test Engineer:		O. Stoelting, L. Lara							
Configuration:		X-pos EUT, Charger, HS							
Mode:		GPRS 850							
Chamber Pre-amplifier Filter Limit 5m Chamber A T34 8449B Filter 1 Part 22									
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-15.3	V	3.0	37.4	1.0	-51.7	-13.0	-38.7	
2.473	-23.2	V	3.0	36.4	1.0	-58.6	-13.0	-45.6	
3.297	-18.5	V	3.0	35.8	1.0	-53.3	-13.0	-40.3	
1.648	-13.8	H	3.0	37.4	1.0	-50.2	-13.0	-37.2	
2.473	-25.1	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
3.297	-19.8	H	3.0	35.8	1.0	-54.6	-13.0	-41.6	
Mid Ch, 836.6MHz									
1.673	-12.9	V	3.0	37.3	1.0	-49.3	-13.0	-36.3	
2.510	-22.5	V	3.0	36.4	1.0	-57.9	-13.0	-44.9	
3.346	-17.2	V	3.0	35.8	1.0	-51.9	-13.0	-38.9	
1.673	-14.0	H	3.0	37.3	1.0	-50.3	-13.0	-37.3	
2.510	-18.6	H	3.0	36.4	1.0	-53.9	-13.0	-40.9	
3.346	-21.2	H	3.0	35.8	1.0	-56.0	-13.0	-43.0	
High Ch, 848.8MHz									
1.698	-13.4	V	3.0	37.3	1.0	-49.7	-13.0	-36.7	
2.547	-23.1	V	3.0	36.3	1.0	-58.4	-13.0	-45.4	
3.395	-18.2	V	3.0	35.7	1.0	-52.9	-13.0	-39.9	
1.698	-13.8	H	3.0	37.3	1.0	-50.1	-13.0	-37.1	
2.547	-20.0	H	3.0	36.3	1.0	-55.4	-13.0	-42.4	
3.395	-16.3	H	3.0	35.7	1.0	-51.0	-13.0	-38.0	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									