



FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART F
FCC CFR47 PART 27 SUBPART L

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Tablet + Bluetooth/BLE and DTS/UNII a/b/g/n/ac and ANT+

MODEL NUMBER : SM-T815Y

FCC ID: A3LSMT815Y

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Tablet+Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+
MODEL NUMBER: SM-T815Y
SERIAL NUMBER: R32G300M6CW, 3300a9c824852285 (RADIATED);
R32G300N6DL, 3300a9704e88221f (CONDUCTED)
DATE TESTED: APRIL 06 - MAY 21, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E, 27	Pass

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
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Ji Ho Choi
Suwon Lab Manager
UL Korea, Ltd.

Tested By:



CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

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 and FCC CFR Part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro
☒ Chamber 1
☐ Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

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:

$$\text{EIRP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$$

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)}$$

(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	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 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/LTE Tablet + Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+.

5.2. MAXIMUM OUTPUT POWER (GSM)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24						
Band	Frequency Range [MHz]	Modulation Peak	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM850	824~849	GMSK	33.27	2123.2		
		GPRS	33.29	2133.0	33.80	2396.1
		EGPRS	26.91	490.9	28.77	752.8
GSM1900	1850~1910	GMSK	30.03	1006.9		
		GPRS	30.03	1006.9	31.01	1261.2
		EGPRS	25.94	392.6	26.39	435.3

5.3. MAXIMUM OUTPUT POWER (WCDMA)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24						
Band	Frequency Range [MHz]	Modulation Peak	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824~849	REL99	23.30	213.8	23.65	231.5
		HSDPA	23.64	231.2	21.76	149.8
		HSUPA	22.72	187.1		
Band 4	1710~1755	REL99	22.12	162.9	24.60	288.4
		HSDPA	22.71	186.5	25.79	379.3
		HSUPA	22.50	177.8		
Band 2	1850~1910	REL99	22.91	195.4	21.13	129.8
		HSDPA	22.97	198.2	23.63	230.6
		HSUPA	22.04	160.0		

5.4. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

LTE Band 17

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 17	704~716	10MHz	QPSK	23.65	231.7	17.13	51.6
			16QAM	22.71	186.6	16.36	43.3
		5MHz	QPSK	23.50	223.9	17.09	51.2
			16QAM	22.42	174.6	15.29	33.8

LTE Band 5

FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824~849	10MHz	QPSK	24.23	265.0	19.25	84.1
			16QAM	23.25	211.3	18.58	72.1
		5MHz	QPSK	23.94	247.7	18.67	73.5
			16QAM	23.25	211.2	18.56	71.7
		3MHz	QPSK	24.33	271.2	18.81	75.9
			16QAM	23.28	212.9	18.26	66.9
		1.4MHz	QPSK	24.32	270.5	17.26	53.1
			16QAM	23.42	220.0	16.64	46.1

LTE Band 4

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 4	1710~1755	20MHz	QPSK	22.81	191.1	24.51	282.5
			16QAM	21.76	150.1	23.34	215.8
		15MHz	QPSK	22.84	192.5	21.95	156.7
			16QAM	21.86	153.6	20.48	111.7
		10MHz	QPSK	23.04	201.4	23.34	215.8
			16QAM	22.30	170.0	23.24	210.9
		5MHz	QPSK	22.98	198.5	23.69	233.9
			16QAM	22.25	167.9	22.42	174.6
		3MHz	QPSK	23.42	219.7	19.78	95.1
			16QAM	22.91	195.5	19.11	81.5
		1.4MHz	QPSK	23.38	217.7	19.71	93.5
			16QAM	22.45	175.9	20.42	110.2

LTE Band 2

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1850~1910	20MHz	QPSK	22.96	197.6	22.74	187.8
			16QAM	21.68	147.3	21.60	144.5
		15MHz	QPSK	22.81	191.2	22.42	174.5
			16QAM	21.80	151.4	21.38	137.3
		10MHz	QPSK	22.89	194.6	22.44	175.3
			16QAM	21.84	152.6	21.54	142.5
		5MHz	QPSK	22.86	193.0	21.73	148.9
			16QAM	21.80	151.3	21.33	135.8
		3MHz	QPSK	23.09	203.6	17.26	53.2
			16QAM	21.95	156.6	16.90	49.0
		1.4MHz	QPSK	23.00	199.3	18.68	73.8
			16QAM	22.18	165.2	17.57	57.1

5.5. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
LTE Band 17 704 ~ 716 MHz	-7.60
GSM 850 / WCDMA Band 5 / LTE Band 5 824 ~ 849 MHz	1.51
WCDMA Band 4 / LTE Band 4 1710 ~ 1755 MHz	-1.40
GSM 1900 / WCDMA Band 2 / LTE Band 2 1850 ~ 1910 MHz	-1.41

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA12EWE	N/A	N/A
Data Cable	SAMSUNG	ECB-DG925UWE	N/A	N/A
Earphone	SAMSUNG	GH59-11129H	N/A	N/A

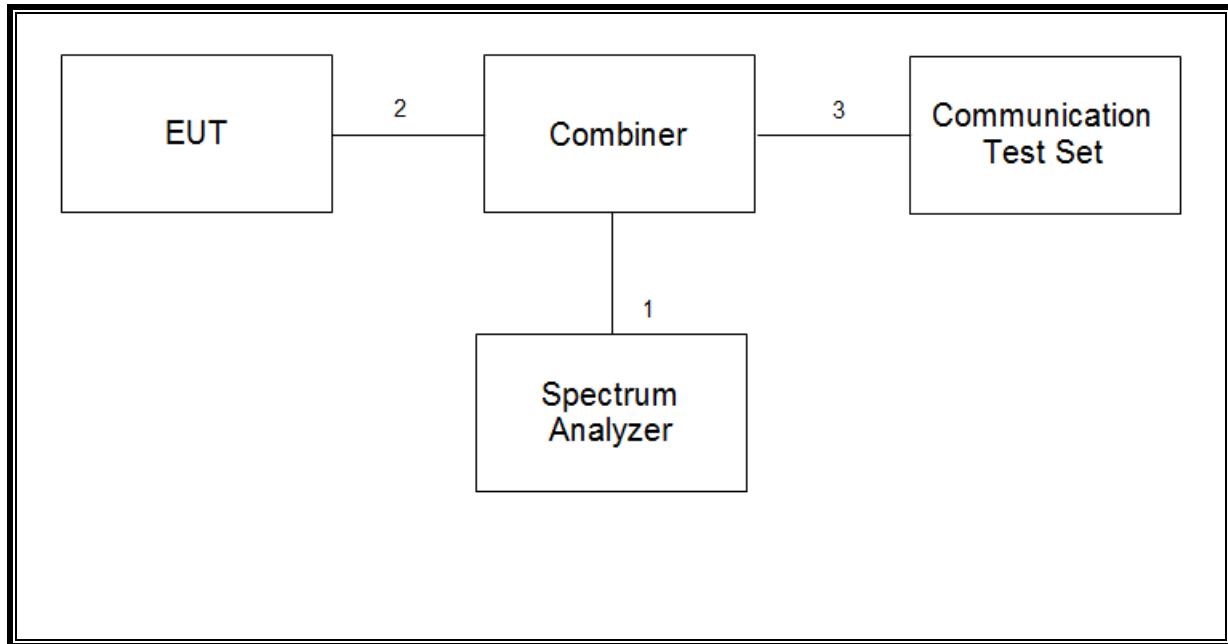
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

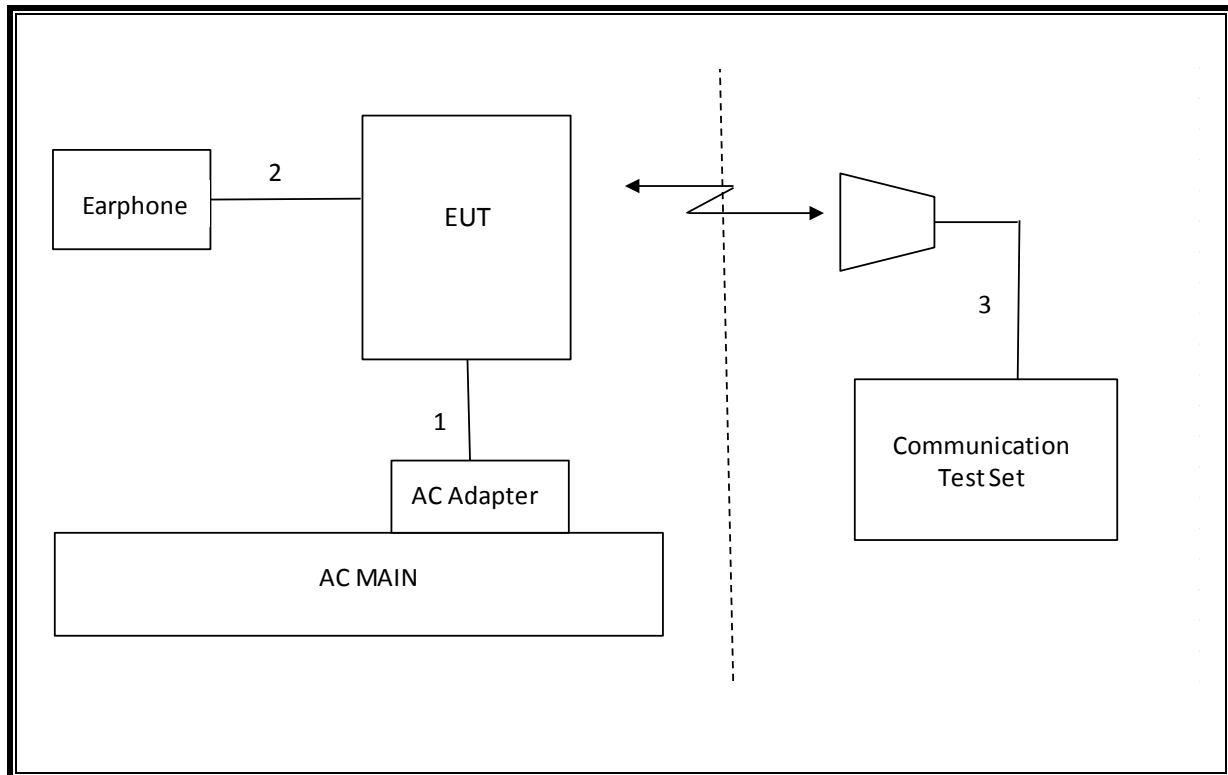
TEST SETUP

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	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	07-29-11
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Communications Test Set	R&S	CMW500	150312	08-13-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
Combiner	WEINSCHTEL	1575	2153	11-17-15
Temperature Chamber	ESPEC	SH-642	93001109	11-13-15
DC Power Supply	Agilent / HP	E3640A	MY54226395	09-23-15

7. Summary Table

The FCC ID: A3LSMT815Y and A3LSMT815 have the same PCB design, all the chipset, component including antennas are same.

A3LSMT815Y supports WCDMA Band 4 and changed switch for LTE Bnad17.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMT815C remains representative of FCC ID: A3LSMT815, test data for FCC ID: A3LSMT815 is being submitted for this application to cover GSM850, GSM1900, WCDMA Band 2, WCDMA Band5, LTE Band 2, LTE Band 4 and LTE Band 5 features.

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass	17.927 MHz
22.917(a) 24.238(a) 27.53(g)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-14.79 dBm
2.1046	Conducted output power	N/A		Pass	33.29 dBm
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass	0.031PPM
22.913(a)(2)	Effective Radiated Power	38 dBm	Radiated	Pass	33.80 dBm
27.50(c)(10)		34.77 dBm		Pass	17.13 dBm
24.232(c)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.01 dBm
27.50(d)(4)		30dBm		Pass	25.79 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-31.8 dBm

FCC Rule Part	Frequency Range	Output Power	Frequency Tolerance	Emission Designator
22H	824.2 - 848.8 MHz	2.396 W	2.5 ppm	243KGXW
22H	824.2 - 848.8 MHz	0.753 W	2.5 ppm	248KG7W
22H	826.4 - 846.6 MHz	0.232 W	2.5 ppm	4M16F9W
22H	829.0 - 844.0 MHz	0.084 W	2.5 ppm	8M98G7D
22H	829.0 - 844.0 MHz	0.072 W	2.5 ppm	8M97D7W
22H	824.7 - 848.3 MHz	0.053 W	2.5 ppm	1M10G7D
22H	824.7 - 848.3 MHz	0.046 W	2.5 ppm	1M09D7W
24E	1850.2 - 1909.8 MHz	1.261 W	2.5 ppm	243KGXW
24E	1850.2 - 1909.8 MHz	0.435 W	2.5 ppm	244KG7W
24E	1852.4 - 1907.6 MHz	0.231 W	2.5 ppm	4M16F9W
24E	1860.0 - 1900.0 MHz	0.188 W	2.5 ppm	17M9G7D
24E	1860.0 - 1900.0 MHz	0.145 W	2.5 ppm	17M9D7W
24E	1850.7 - 1909.3 MHz	0.074 W	2.5 ppm	1M10G7D
24E	1850.7 - 1909.3 MHz	0.057 W	2.5 ppm	1M10D7W
27F	709.0 - 711.0 MHz	0.052 W	2.5 ppm	8M95G7D
27F	709.0 - 711.0 MHz	0.043 W	2.5 ppm	8M96D7W
27L	1712.4 - 1752.6 MHz	0.379 W	2.5 ppm	4M16F9W
27L	1720.0 - 1745.0 MHz	0.283 W	2.5 ppm	17M9G7D
27L	1720.0 - 1745.0 MHz	0.216 W	2.5 ppm	17M9D7W

8. RF POWER OUTPUT VERIFICATION

8.1. 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

8.1.1. GSM OUTPUT POWER RESULT

GSM850 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM1900 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

8.2. UMTS REL 99

Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	11/15	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			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	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	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelisation Codes	2xSF2				SF4

DC-HSDPA Setup Procedures used to establish the test signals

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

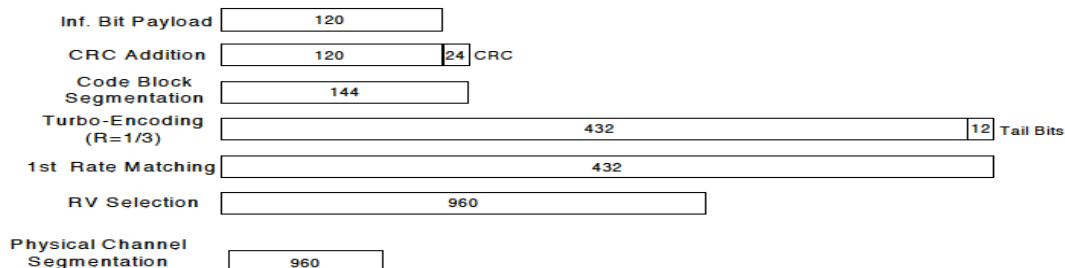


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	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
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

8.2.1. WCDMA OUTPUT POWER RESULT

WCDMA Band 5 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4 Measured Results

Band	Mode		UL Ch No.	Freq. [MHz]	MPR [dB]	Avg Pwr [dBm]
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	0	21.98
			1413	1732.6	0	21.96
			1513	1752.6	0	22.12
	HSDPA	Subtest 1	1312	1712.4	0	21.94
			1413	1732.6	0	22.31
			1513	1752.6	0	22.68
		Subtest 2	1312	1712.4	0	21.92
			1413	1732.6	0	22.34
			1513	1752.6	0	22.71
		Subtest 3	1312	1712.4	0.5	21.57
			1413	1732.6	0.5	22.36
			1513	1752.6	0.5	22.50
		Subtest 4	1312	1712.4	0.5	21.46
			1413	1732.6	0.5	21.82
			1513	1752.6	0.5	22.20
	HSUPA	Subtest 1	1312	1712.4	0	21.50
			1413	1732.6	0	21.28
			1513	1752.6	0	21.72
		Subtest 2	1312	1712.4	2	20.41
			1413	1732.6	2	20.74
			1513	1752.6	2	21.20
		Subtest 3	1312	1712.4	1	20.83
			1413	1732.6	1	21.23
			1513	1752.6	1	21.64
		Subtest 4	1312	1712.4	2	20.27
			1413	1732.6	2	20.66
			1513	1752.6	2	21.09
		Subtest 5	1312	1712.4	0	21.86
			1413	1732.6	0	22.20
			1513	1752.6	0	22.58

8.3. LTE OUTPUT VERIFICATION

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

8.3.1. LTE OUTPUT POWER RESULT

LTE Band 5 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2 Measured Results

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr [dBm]
						Max. Power
						710 MHz
LTE Band 17	10	QPSK	1	0	0	23.55
			1	25	0	23.58
			1	49	0	23.65
			25	0	1	22.22
			25	12	1	22.25
			25	25	1	22.18
			50	0	1	22.30
		16QAM	1	0	1	22.71
			1	25	1	22.63
			1	49	1	22.70
			25	0	2	21.24
			25	12	2	21.28
			25	25	2	21.14
			50	0	2	21.32
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						Max. Power
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.50
			1	12	0	23.48
			1	24	0	23.45
			12	0	1	22.22
			12	6	1	22.16
			12	11	1	22.15
			25	0	1	22.20
		16QAM	1	0	1	22.39
			1	12	1	22.36
			1	24	1	22.42
			12	0	2	21.05
			12	6	2	20.98
			12	11	2	20.99
			25	0	2	21.12

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r02;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

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.

9.1. CONDUCTED PEAK TO AVERAGE RESULT

GSM

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2 and 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2 and 4 and 5

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 4	1413	1732.6	REL99	2.95	-13.00
			HSDPA	3.05	

LTE Band 17

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 17	10	23790	710	QPSK	4.63	-13.00
				16QAM	5.47	
	5			QPSK	4.89	
				16QAM	5.33	

9.2. CONDUCTED PEAK TO AVERAGE PLOTS

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

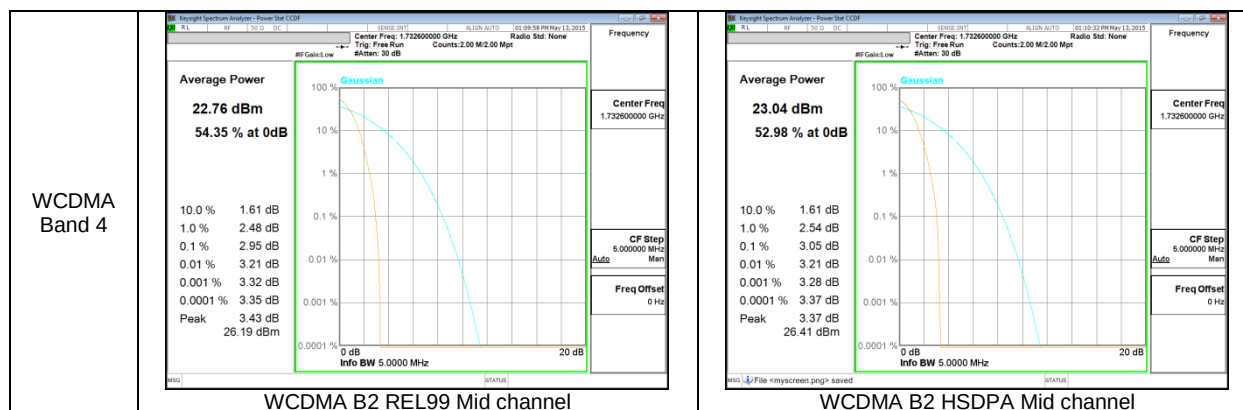
LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

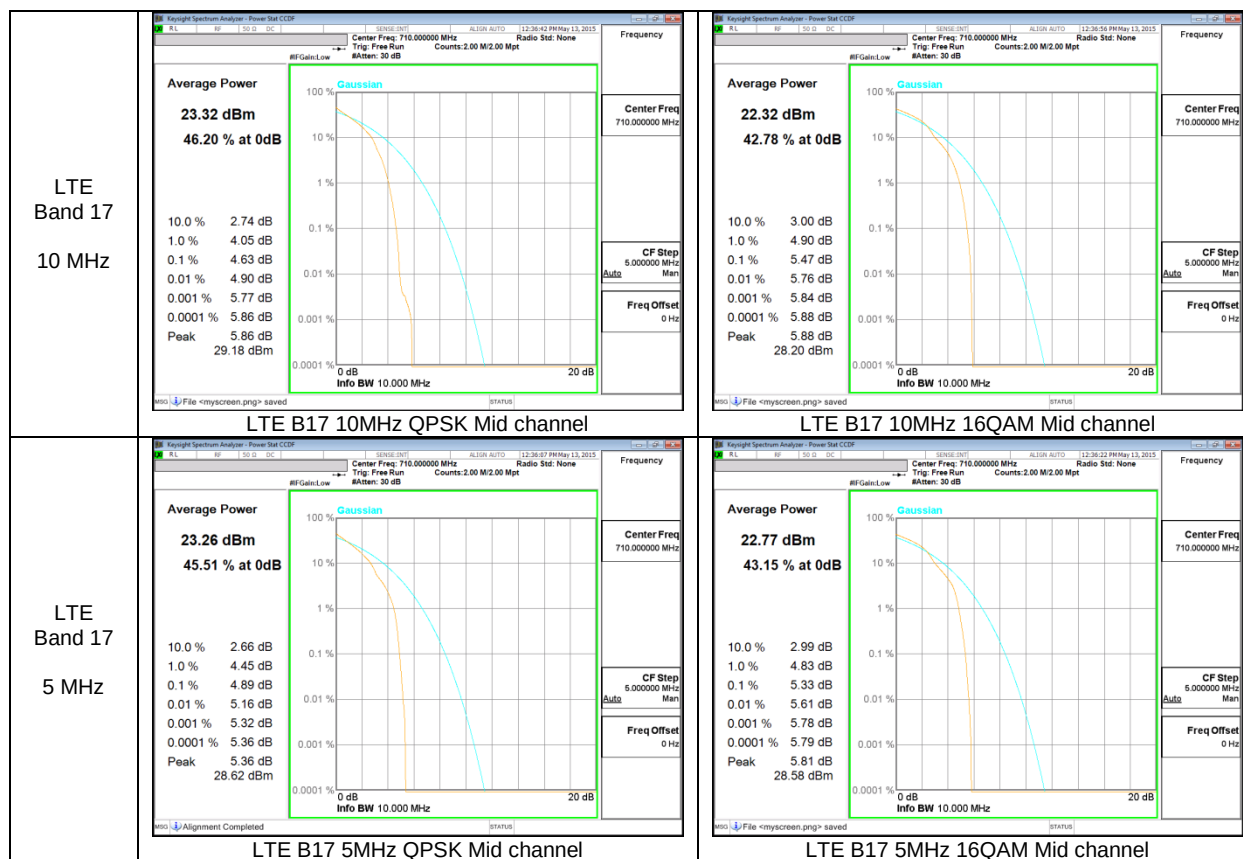
LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4



LTE Band 17



10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

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 v02r02)

10.1.1. OCCUPIED BANDWIDTH RESULTS

GSM

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 4	REL99	1312	1712.4	4.151	4.678
		1413	1732.6	4.154	4.685
		1513	1752.6	4.159	4.687
	HSDPA	1312	1712.4	4.139	4.703
		1413	1732.6	4.140	4.709
		1513	1752.6	4.134	4.715

LTE Band 17

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 17	10	23780	709.0	QPSK	8.947	10.150
				16QAM	8.940	10.130
		23790	710.0	QPSK	8.948	10.170
				16QAM	8.944	10.130
		23799	711.0	QPSK	8.942	10.100
				16QAM	8.963	10.210
	5	23755	706.5	QPSK	4.498	5.150
				16QAM	4.505	5.243
		23790	710.0	QPSK	4.503	5.273
				16QAM	4.500	5.255
		23824	713.5	QPSK	4.498	5.278
				16QAM	4.504	5.355

10.1.2. OCCUPIED BANDWIDTH PLOTS

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

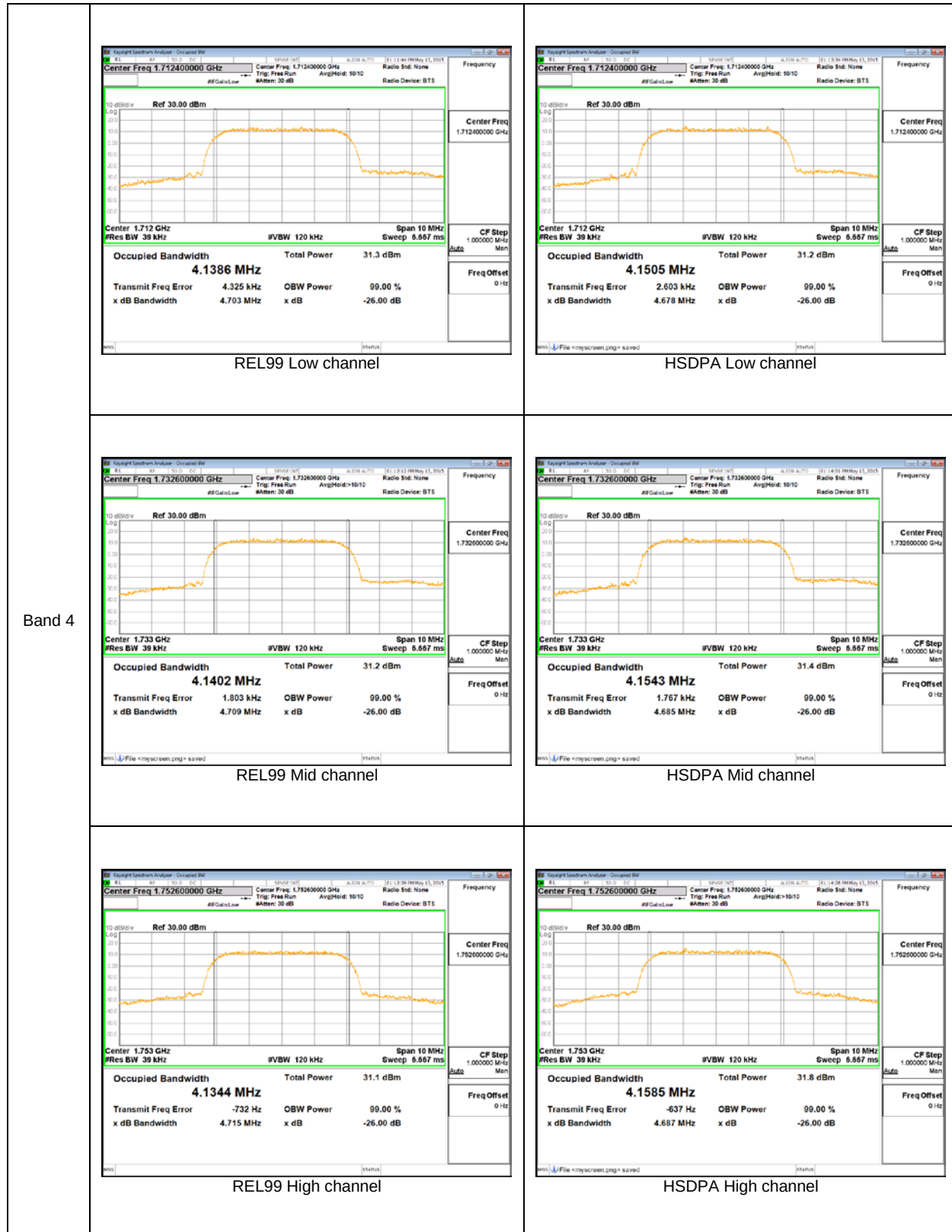
LTE Band 4

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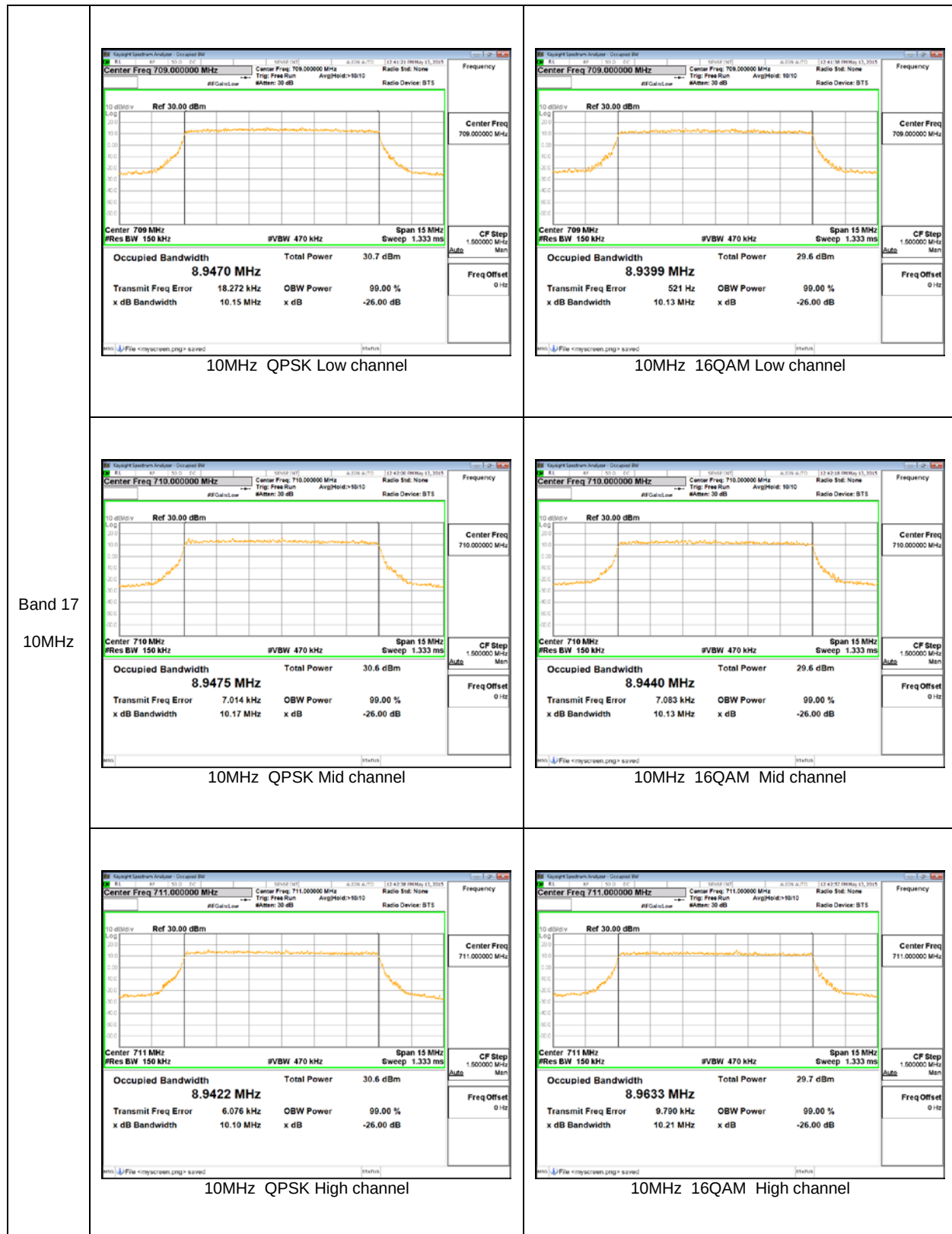
LTE Band 2

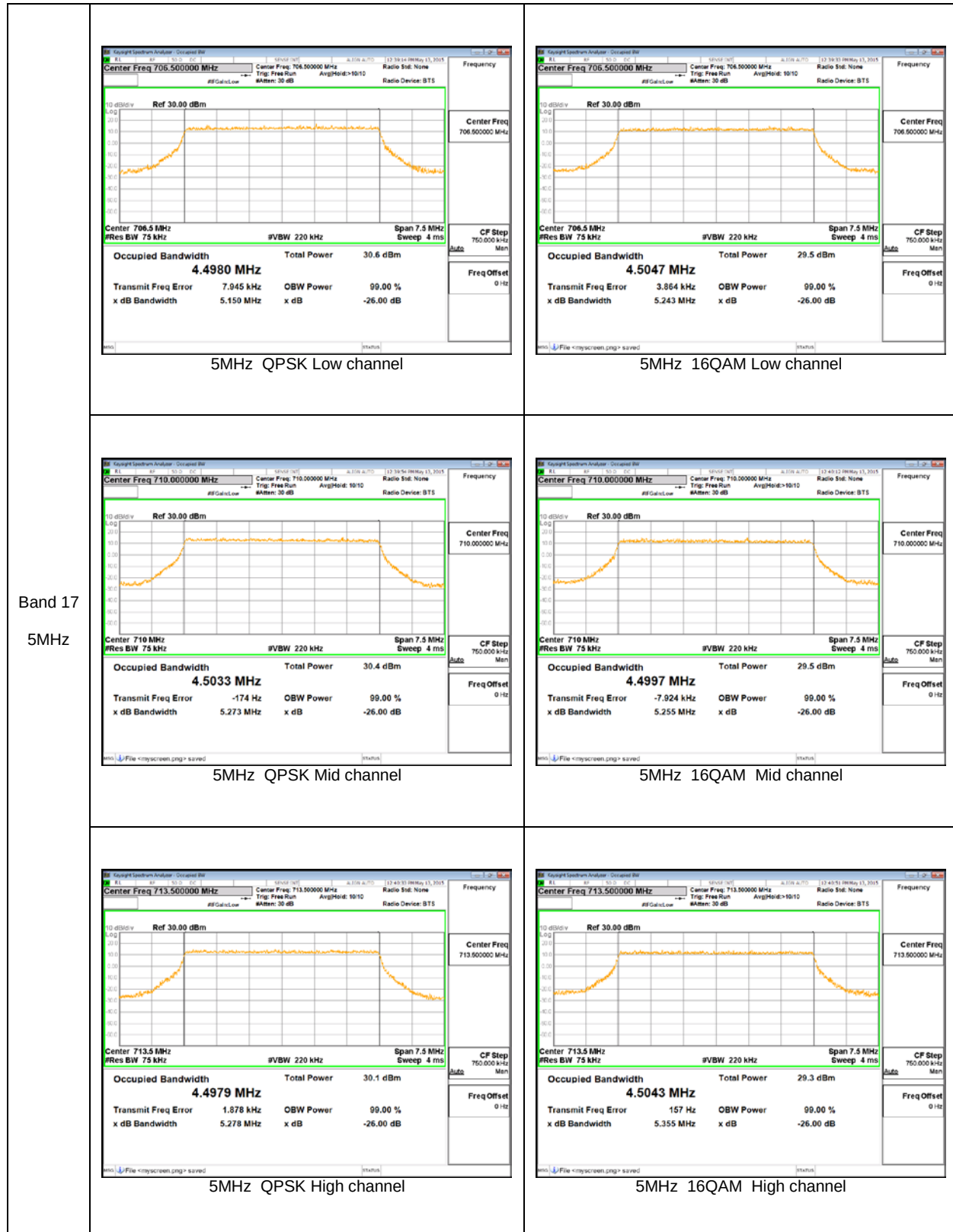
Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4



LTE Band 17





10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27.53 (g)

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

The transmitter output was connected to 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

GSM

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 4	REL99	Lower	1710.000	-25.38	-13.00
		Upper	1755.000	-25.09	
	HSDPA	Lower	1710.000	-25.91	
		Upper	1755.000	-24.12	

LTE 17

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	704.000	-29.53	-13.00
			FRB	704.000	-28.89	
		Upper	1RB	716.000	-23.73	
			FRB	716.000	-27.90	
	16QAM	Lower	1RB	704.000	-30.81	
			FRB	704.000	-29.71	
		Upper	1RB	716.000	-23.85	
			FRB	716.000	-26.81	
5 MHz	QPSK	Lower	1RB	704.000	-19.97	-13.00
			FRB	704.000	-27.03	
		Upper	1RB	716.000	-20.17	
			FRB	716.000	-25.16	
	16QAM	Lower	1RB	704.000	-18.27	
			FRB	704.000	-25.46	
		Upper	1RB	716.000	-19.10	
			FRB	716.000	-26.44	

10.2.1. BAND EDGE PLOTS

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

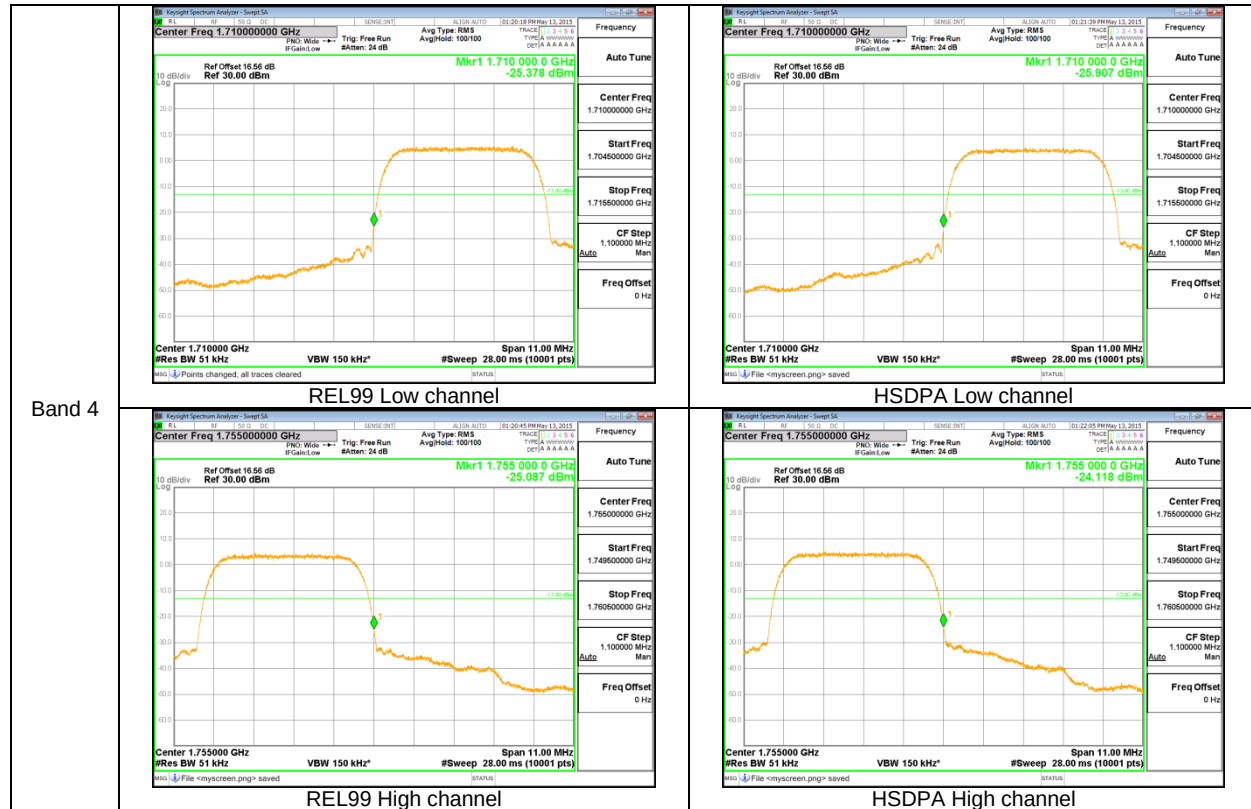
LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

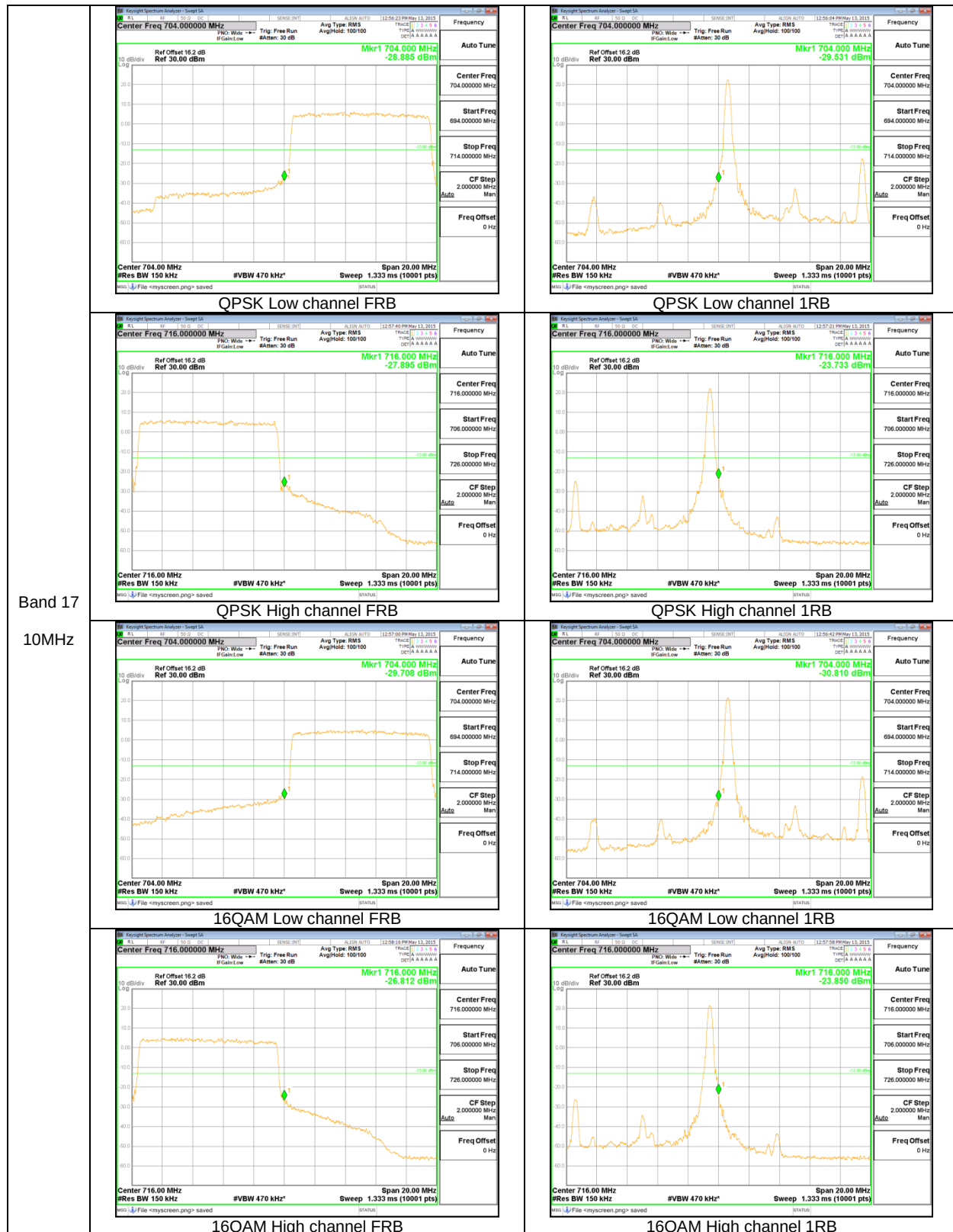
LTE Band 2

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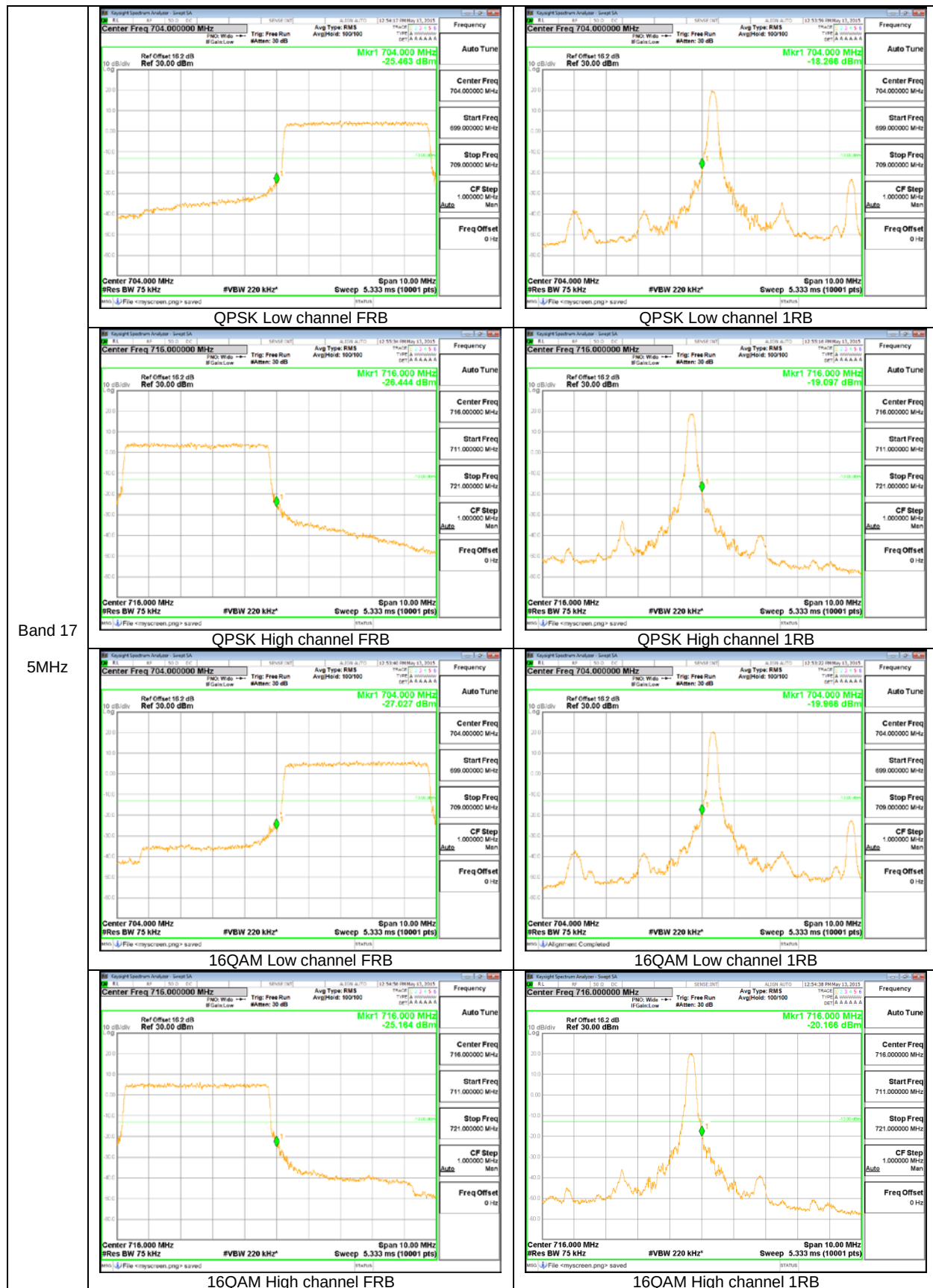
WCDMA Band 4



LTE Band 17



Band 17
10MHz



10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53 (g)

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

GSM

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 4	REL99	1712.4	-25.97	-13.00	12.97
		1732.6	-25.15		12.15
		1752.6	-25.35		12.35
	HSDPA	1712.4	-25.89		12.89
		1732.6	-26.15		13.15
		1752.6	-25.39		12.39

LTE 17

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
10 MHz	QPSK	709.0	-26.57	-13.00	13.57
		710.0	-26.84		13.84
		711.0	-26.94		13.94
	16QAM	709.0	-26.71		13.71
		710.0	-26.83		13.83
		711.0	-27.19		14.19
5 MHz	QPSK	706.5	-26.94		13.94
		710.0	-26.81		13.81
		713.5	-26.59		13.59
	16QAM	706.5	-27.03		14.03
		710.0	-27.06		14.06
		713.5	-27.25		14.25

10.3.2. OUT OF BAND EMISSIONS PLOTS

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

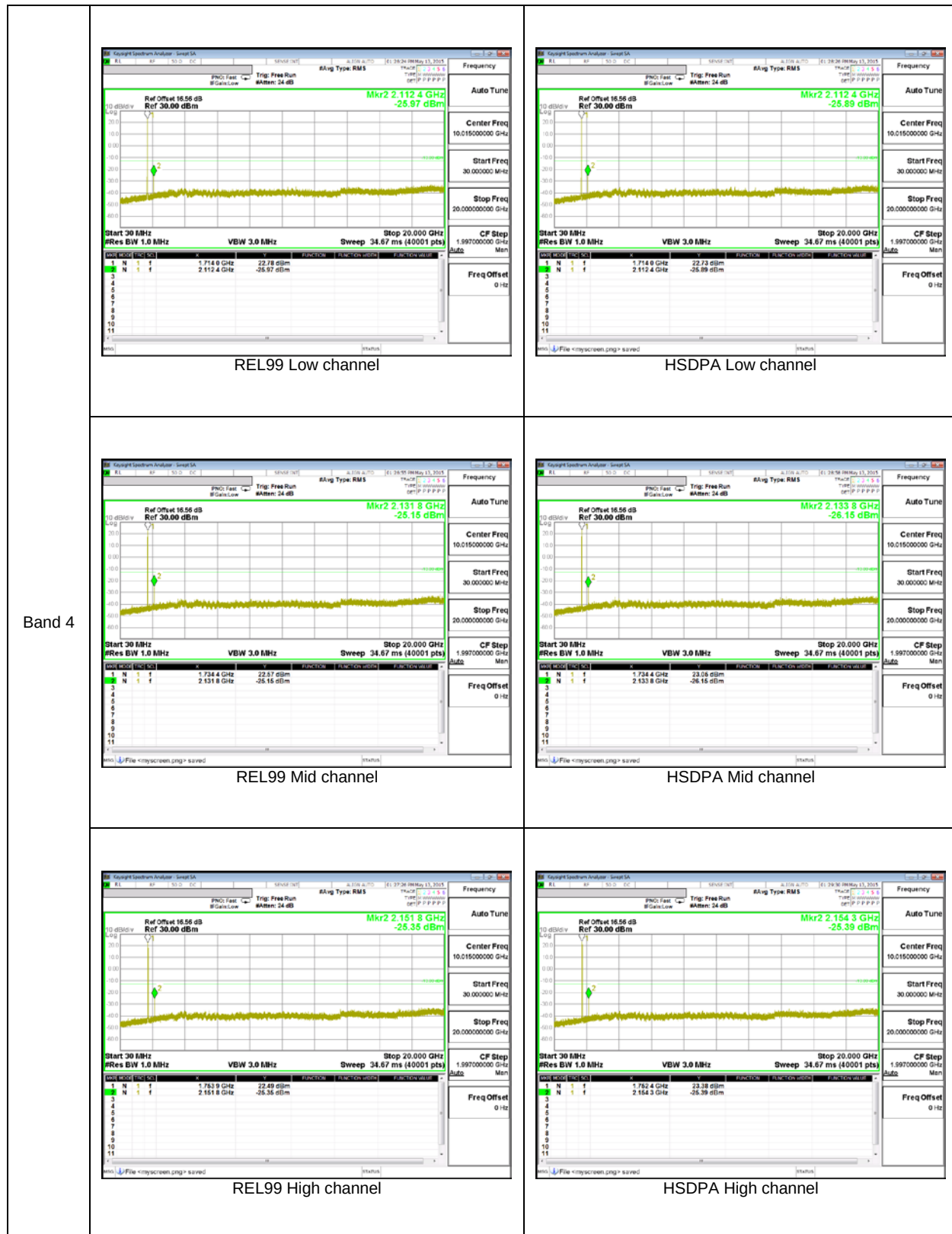
LTE Band 4

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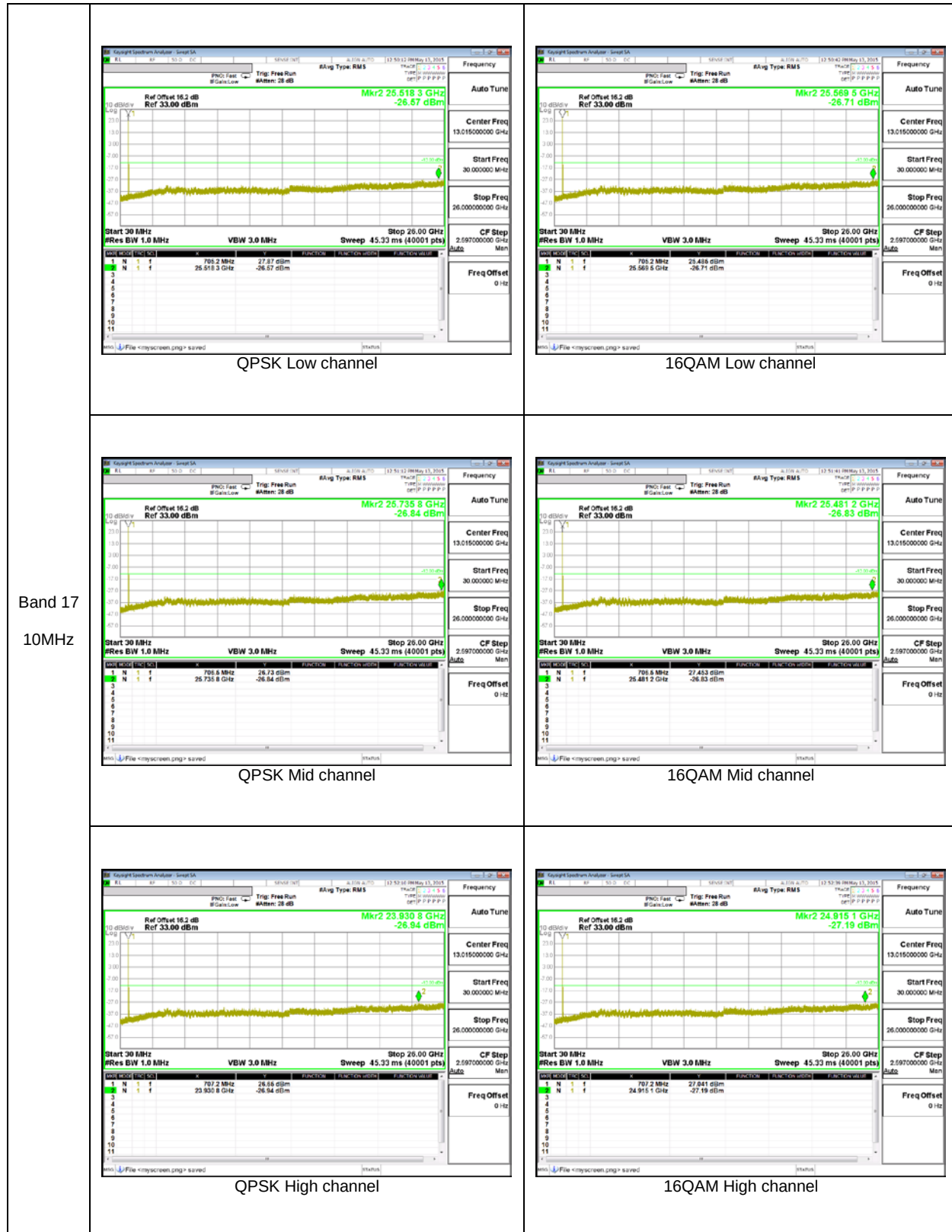
LTE Band 2

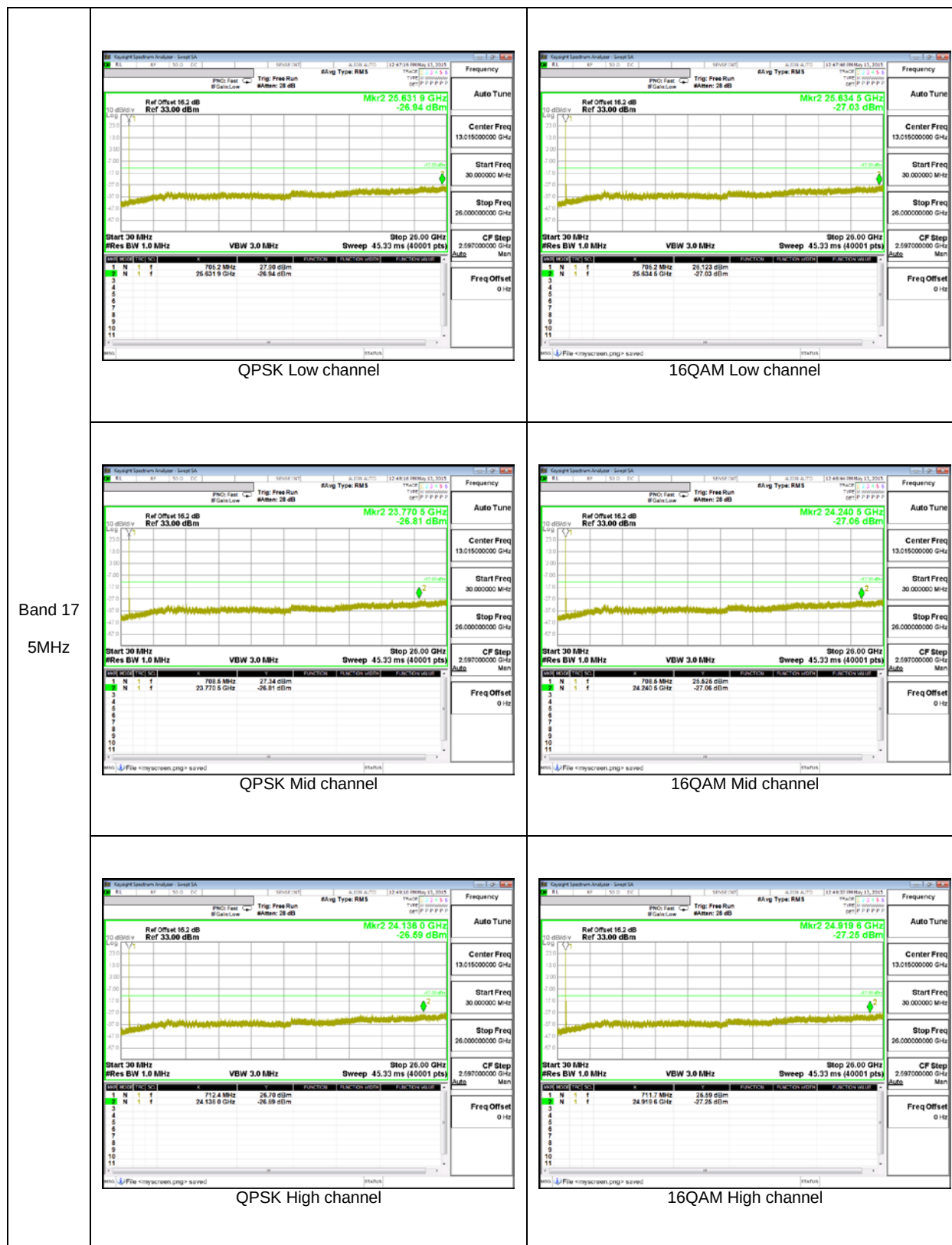
Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4



LTE Band 17





10.1. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §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 v02r02

RESULTS

See the following pages.

10.1.1. FREQUENCY STABILITY RESULTS

LTE Band 17, Channel 23790, Frequency 710.0 MHz

Reference Frequency: LTE Band17 Mid Channel 710 MHz @ 20°C Limit: +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	710.00001282	0.003	2.5
3.80	40	710.00001177	0.005	2.5
3.80	30	710.00000890	0.009	2.5
3.80	20	710.00001502	0	2.5
3.80	10	710.00001425	0.001	2.5
3.80	0	710.00002034	-0.007	2.5
3.80	-10	710.00001531	0.000	2.5
3.80	-20	710.00001481	0.000	2.5
3.80	-30	710.00001216	0.004	2.5

Reference Frequency: LTE Band17 Mid Channel 710 MHz @ 20°C Limit: +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	710.00001502	0	2.5
4.20	20	710.00002715	-0.017	2.5
3.40	20	710.00002361	-0.012	2.5

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

LTE Band 4, Channel 20174, Frequency 1732.5 MHz

Reference Frequency: WCDMA Band4 Mid Channel 1732.6 MHz @ 20°C Limit: +/- 2.5 ppm = 4331.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.59997590	0.001	2.5
3.80	40	1732.59997786	0.000	2.5
3.80	30	1732.59997514	0.001	2.5
3.80	20	1732.59997730	0	2.5
3.80	10	1732.59997682	0.000	2.5
3.80	0	1732.59997827	-0.001	2.5
3.80	-10	1732.59997916	-0.001	2.5
3.80	-20	1732.59997046	0.004	2.5
3.80	-30	1732.59997904	-0.001	2.5

Reference Frequency: WCDMA Band4 Mid Channel 1732.6 MHz @ 20°C Limit: +/- 2.5 ppm = 4331.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1732.59997730	0	2.5
4.20	20	1732.59997645	0.000	2.5
3.40	20	1732.59996838	0.005	2.5

LTE Band 5, Channel 20524, Frequency 836.5 MHz

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

GSM 850, Channel 190, Frequency 836.6 MHz

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2, Channel 18900, Frequency 1880.0 MHz

WCDMA Band 2, Channel 9400, Frequency 1880.0 MHz

GSM 1900, Channel 661, Frequency 1880.0 MHz

Please refer to WWAN test report of FCC ID: A3LSMT815

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §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(c) - (10) Portable stations (hand-held devices) are limited to 3 watts ERP; (LTE B17)

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

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; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a MXA:

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

For average power measurement with a MXA:

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

TEST RESULTS

11.1.1. ERP/EIRP Results

GSM

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WDM Band 4

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 4	REL99	1312	1712.4	23.92	246.6
		1413	1732.6	23.41	219.3
		1513	1752.6	24.60	288.4
	HSDPA	1312	1712.4	25.79	379.3
		1413	1732.6	24.77	299.9
		1513	1752.6	25.29	338.1

LTE Band 17

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 17	10	QPSK	50/0	709.0	16.73	47.1
			50/0	710.0	16.99	50.0
			50/0	711.0	17.13	51.6
		16QAM	50/0	709.0	13.77	23.8
			50/0	710.0	14.31	27.0
			50/0	711.0	16.36	43.3
	5	QPSK	25/0	706.5	16.54	45.1
			25/0	710.0	17.09	51.2
			25/0	713.5	15.72	37.3
		16QAM	25/0	706.5	13.23	21.0
			25/0	710.0	14.56	28.6
			25/0	713.5	15.29	33.8

11.1.2. ERP/EIRP DATA

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

WCDMA Band 4 REL99	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-11-15 Test Engineer: Steven Kim Configuration: EUT ONLY, X Position Mode: Rel 99_1700 MHz Test Equipment: Receiving: 3117, and Chamber 1 SMA Cables Substitution: 3115 Substitution, 3m SMA Cable Warehouse <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>1712.40</td><td>6.89</td><td>V</td><td>1.54</td><td>9.12</td><td>14.47</td><td>33.0</td><td>-18.5</td><td></td></tr><tr><td>1712.40</td><td>16.34</td><td>H</td><td>1.54</td><td>9.12</td><td>23.92</td><td>33.0</td><td>-9.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1732.60</td><td>3.87</td><td>V</td><td>1.55</td><td>9.42</td><td>11.74</td><td>33.0</td><td>-21.3</td><td></td></tr><tr><td>1732.60</td><td>15.54</td><td>H</td><td>1.55</td><td>9.42</td><td>23.41</td><td>33.0</td><td>-9.6</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1752.60</td><td>3.98</td><td>V</td><td>1.56</td><td>9.61</td><td>12.03</td><td>33.0</td><td>-21.0</td><td></td></tr><tr><td>1752.60</td><td>16.55</td><td>H</td><td>1.56</td><td>9.61</td><td>24.60</td><td>33.0</td><td>-8.4</td><td></td></tr></table> Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									1712.40	6.89	V	1.54	9.12	14.47	33.0	-18.5		1712.40	16.34	H	1.54	9.12	23.92	33.0	-9.1		Mid Ch									1732.60	3.87	V	1.55	9.42	11.74	33.0	-21.3		1732.60	15.54	H	1.55	9.42	23.41	33.0	-9.6		High Ch									1752.60	3.98	V	1.56	9.61	12.03	33.0	-21.0		1752.60	16.55	H	1.56	9.61	24.60	33.0	-8.4	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	1712.40	6.89	V	1.54	9.12	14.47	33.0	-18.5																																																																																											
	1712.40	16.34	H	1.54	9.12	23.92	33.0	-9.1																																																																																											
	Mid Ch																																																																																																		
	1732.60	3.87	V	1.55	9.42	11.74	33.0	-21.3																																																																																											
	1732.60	15.54	H	1.55	9.42	23.41	33.0	-9.6																																																																																											
	High Ch																																																																																																		
	1752.60	3.98	V	1.56	9.61	12.03	33.0	-21.0																																																																																											
1752.60	16.55	H	1.56	9.61	24.60	33.0	-8.4																																																																																												
WCDMA Band 4 HSDPA	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-11-15 Test Engineer: Steven Kim Configuration: EUT ONLY, X Position Mode: HSDPA_1700 MHz Test Equipment: Receiving: 3117, and Chamber 1 SMA Cables Substitution: 3115 Substitution, 3m SMA Cable Warehouse <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>1712.40</td><td>18.21</td><td>V</td><td>1.54</td><td>9.12</td><td>25.79</td><td>33.0</td><td>-7.2</td><td></td></tr><tr><td>1712.40</td><td>16.27</td><td>H</td><td>1.54</td><td>9.12</td><td>23.85</td><td>33.0</td><td>-9.2</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1732.60</td><td>16.90</td><td>V</td><td>1.55</td><td>9.42</td><td>24.77</td><td>33.0</td><td>-8.2</td><td></td></tr><tr><td>1732.60</td><td>15.00</td><td>H</td><td>1.55</td><td>9.42</td><td>22.87</td><td>33.0</td><td>-10.1</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1752.60</td><td>17.24</td><td>V</td><td>1.56</td><td>9.61</td><td>25.29</td><td>33.0</td><td>-7.7</td><td></td></tr><tr><td>1752.60</td><td>14.81</td><td>H</td><td>1.56</td><td>9.61</td><td>22.86</td><td>33.0</td><td>-10.1</td><td></td></tr></table> Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									1712.40	18.21	V	1.54	9.12	25.79	33.0	-7.2		1712.40	16.27	H	1.54	9.12	23.85	33.0	-9.2		Mid Ch									1732.60	16.90	V	1.55	9.42	24.77	33.0	-8.2		1732.60	15.00	H	1.55	9.42	22.87	33.0	-10.1		High Ch									1752.60	17.24	V	1.56	9.61	25.29	33.0	-7.7		1752.60	14.81	H	1.56	9.61	22.86	33.0	-10.1	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	1712.40	18.21	V	1.54	9.12	25.79	33.0	-7.2																																																																																											
	1712.40	16.27	H	1.54	9.12	23.85	33.0	-9.2																																																																																											
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	1732.60	16.90	V	1.55	9.42	24.77	33.0	-8.2																																																																																											
	1732.60	15.00	H	1.55	9.42	22.87	33.0	-10.1																																																																																											
	High Ch																																																																																																		
	1752.60	17.24	V	1.56	9.61	25.29	33.0	-7.7																																																																																											
1752.60	14.81	H	1.56	9.61	22.86	33.0	-10.1																																																																																												

LTE Band 17

LTE Band 17 10MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / Y-Position Mode: LTE Band 17, QPSK, 10MHz Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>709.00</td><td>19.33</td><td>V</td><td>1.0</td><td>-1.6</td><td>16.73</td><td>34.8</td><td>-18.0</td><td></td></tr><tr><td>709.00</td><td>12.32</td><td>H</td><td>1.0</td><td>-1.6</td><td>9.72</td><td>34.8</td><td>-25.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>710.00</td><td>19.59</td><td>V</td><td>1.0</td><td>-1.6</td><td>16.99</td><td>34.8</td><td>-17.8</td><td></td></tr><tr><td>710.00</td><td>11.32</td><td>H</td><td>1.0</td><td>-1.6</td><td>8.72</td><td>34.8</td><td>-26.1</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>711.00</td><td>19.73</td><td>V</td><td>1.0</td><td>-1.6</td><td>17.13</td><td>34.8</td><td>-17.6</td><td></td></tr><tr><td>711.00</td><td>12.50</td><td>H</td><td>1.0</td><td>-1.6</td><td>9.90</td><td>34.8</td><td>-24.9</td><td></td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									709.00	19.33	V	1.0	-1.6	16.73	34.8	-18.0		709.00	12.32	H	1.0	-1.6	9.72	34.8	-25.1		Mid Ch									710.00	19.59	V	1.0	-1.6	16.99	34.8	-17.8		710.00	11.32	H	1.0	-1.6	8.72	34.8	-26.1		High Ch									711.00	19.73	V	1.0	-1.6	17.13	34.8	-17.6		711.00	12.50	H	1.0	-1.6	9.90	34.8	-24.9	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	709.00	19.33	V	1.0	-1.6	16.73	34.8	-18.0																																																																																											
	709.00	12.32	H	1.0	-1.6	9.72	34.8	-25.1																																																																																											
	Mid Ch																																																																																																		
	710.00	19.59	V	1.0	-1.6	16.99	34.8	-17.8																																																																																											
	710.00	11.32	H	1.0	-1.6	8.72	34.8	-26.1																																																																																											
	High Ch																																																																																																		
	711.00	19.73	V	1.0	-1.6	17.13	34.8	-17.6																																																																																											
711.00	12.50	H	1.0	-1.6	9.90	34.8	-24.9																																																																																												
LTE Band 17 10MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / Y-Position Mode: LTE Band 17 16QAM, 10MHz Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>709.00</td><td>16.37</td><td>V</td><td>1.0</td><td>-1.6</td><td>13.77</td><td>34.8</td><td>-21.0</td><td></td></tr><tr><td>709.00</td><td>10.32</td><td>H</td><td>1.0</td><td>-1.6</td><td>7.72</td><td>34.8</td><td>-27.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>710.00</td><td>16.91</td><td>V</td><td>1.0</td><td>-1.6</td><td>14.31</td><td>34.8</td><td>-20.5</td><td></td></tr><tr><td>710.00</td><td>11.43</td><td>H</td><td>1.0</td><td>-1.6</td><td>8.83</td><td>34.8</td><td>-25.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>711.00</td><td>18.96</td><td>V</td><td>1.0</td><td>-1.6</td><td>16.36</td><td>34.8</td><td>-18.4</td><td></td></tr><tr><td>711.00</td><td>10.63</td><td>H</td><td>1.0</td><td>-1.6</td><td>8.03</td><td>34.8</td><td>-26.7</td><td></td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									709.00	16.37	V	1.0	-1.6	13.77	34.8	-21.0		709.00	10.32	H	1.0	-1.6	7.72	34.8	-27.1		Mid Ch									710.00	16.91	V	1.0	-1.6	14.31	34.8	-20.5		710.00	11.43	H	1.0	-1.6	8.83	34.8	-25.9		High Ch									711.00	18.96	V	1.0	-1.6	16.36	34.8	-18.4		711.00	10.63	H	1.0	-1.6	8.03	34.8	-26.7	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
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	709.00	16.37	V	1.0	-1.6	13.77	34.8	-21.0																																																																																											
	709.00	10.32	H	1.0	-1.6	7.72	34.8	-27.1																																																																																											
	Mid Ch																																																																																																		
	710.00	16.91	V	1.0	-1.6	14.31	34.8	-20.5																																																																																											
	710.00	11.43	H	1.0	-1.6	8.83	34.8	-25.9																																																																																											
	High Ch																																																																																																		
	711.00	18.96	V	1.0	-1.6	16.36	34.8	-18.4																																																																																											
711.00	10.63	H	1.0	-1.6	8.03	34.8	-26.7																																																																																												

LTE Band 17 5MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / Y-Position Mode: LTE Band 17, QPSK , 5MHz Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>706.50</td><td>19.14</td><td>V</td><td>1.0</td><td>-1.6</td><td>16.54</td><td>34.8</td><td>-18.2</td></tr><tr><td>706.50</td><td>11.23</td><td>H</td><td>1.0</td><td>-1.6</td><td>8.63</td><td>34.8</td><td>-26.1</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>710.00</td><td>19.69</td><td>V</td><td>1.0</td><td>-1.6</td><td>17.09</td><td>34.8</td><td>-17.7</td></tr><tr><td>710.00</td><td>12.34</td><td>H</td><td>1.0</td><td>-1.6</td><td>9.74</td><td>34.8</td><td>-25.0</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>713.50</td><td>18.32</td><td>V</td><td>1.0</td><td>-1.6</td><td>15.72</td><td>34.8</td><td>-19.1</td></tr><tr><td>713.50</td><td>11.74</td><td>H</td><td>1.0</td><td>-1.6</td><td>9.14</td><td>34.8</td><td>-25.6</td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								706.50	19.14	V	1.0	-1.6	16.54	34.8	-18.2	706.50	11.23	H	1.0	-1.6	8.63	34.8	-26.1	Mid Ch								710.00	19.69	V	1.0	-1.6	17.09	34.8	-17.7	710.00	12.34	H	1.0	-1.6	9.74	34.8	-25.0	High Ch								713.50	18.32	V	1.0	-1.6	15.72	34.8	-19.1	713.50	11.74	H	1.0	-1.6	9.14	34.8	-25.6
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
	Low Ch																																																																																									
	706.50	19.14	V	1.0	-1.6	16.54	34.8	-18.2																																																																																		
	706.50	11.23	H	1.0	-1.6	8.63	34.8	-26.1																																																																																		
	Mid Ch																																																																																									
	710.00	19.69	V	1.0	-1.6	17.09	34.8	-17.7																																																																																		
	710.00	12.34	H	1.0	-1.6	9.74	34.8	-25.0																																																																																		
	High Ch																																																																																									
	713.50	18.32	V	1.0	-1.6	15.72	34.8	-19.1																																																																																		
713.50	11.74	H	1.0	-1.6	9.14	34.8	-25.6																																																																																			
LTE Band 17 5MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 1 Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / Y-Position Mode: LTE Band 17 16QAM, 5MHz Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>706.50</td><td>15.83</td><td>V</td><td>1.0</td><td>-1.6</td><td>13.23</td><td>34.8</td><td>-21.5</td></tr><tr><td>706.50</td><td>10.13</td><td>H</td><td>1.0</td><td>-1.6</td><td>7.53</td><td>34.8</td><td>-27.2</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>710.00</td><td>17.16</td><td>V</td><td>1.0</td><td>-1.6</td><td>14.56</td><td>34.8</td><td>-20.2</td></tr><tr><td>710.00</td><td>10.42</td><td>H</td><td>1.0</td><td>-1.6</td><td>7.82</td><td>34.8</td><td>-27.0</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>713.50</td><td>17.89</td><td>V</td><td>1.0</td><td>-1.6</td><td>15.29</td><td>34.8</td><td>-19.5</td></tr><tr><td>713.50</td><td>11.45</td><td>H</td><td>1.0</td><td>-1.6</td><td>8.85</td><td>34.8</td><td>-25.9</td></tr></table> Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								706.50	15.83	V	1.0	-1.6	13.23	34.8	-21.5	706.50	10.13	H	1.0	-1.6	7.53	34.8	-27.2	Mid Ch								710.00	17.16	V	1.0	-1.6	14.56	34.8	-20.2	710.00	10.42	H	1.0	-1.6	7.82	34.8	-27.0	High Ch								713.50	17.89	V	1.0	-1.6	15.29	34.8	-19.5	713.50	11.45	H	1.0	-1.6	8.85	34.8	-25.9
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
	Low Ch																																																																																									
	706.50	15.83	V	1.0	-1.6	13.23	34.8	-21.5																																																																																		
	706.50	10.13	H	1.0	-1.6	7.53	34.8	-27.2																																																																																		
	Mid Ch																																																																																									
	710.00	17.16	V	1.0	-1.6	14.56	34.8	-20.2																																																																																		
	710.00	10.42	H	1.0	-1.6	7.82	34.8	-27.0																																																																																		
	High Ch																																																																																									
	713.50	17.89	V	1.0	-1.6	15.29	34.8	-19.5																																																																																		
713.50	11.45	H	1.0	-1.6	8.85	34.8	-25.9																																																																																			

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

LIMIT

Part 22.917(a) & Part 24.238(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Part 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

TEST PROCEDURE

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

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

RESULTS

11.2.1. SPURIOUS RADIATION PLOTS

GSM 850

Please refer to WWAN test report of FCC ID: A3LSMT815

GSM 1900

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 5

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 4

Please refer to WWAN test report of FCC ID: A3LSMT815

LTE Band 2

Please refer to WWAN test report of FCC ID: A3LSMT815

WCDMA Band 4

WCDMA Band 4 REL99	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 15I20727 Date: 05-11-15 Test Engineer: Steven Kim Configuration: EUT / AC Adapter / Earphone / X Position Mode: Tx, REL99,1700MHz Chamber Pre-amplifier Filter Limit Chamber 1 AFS42 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, 1712.4MHz										
3.4248	-19.8	V	3.0	39.5	1.0	-58.3	-13.0	-45.3		
5.1372	-12.6	V	3.0	40.1	1.0	-51.6	-13.0	-38.6		
6.8496	-9.7	V	3.0	39.4	1.0	-48.1	-13.0	-35.1		
3.4248	-20.2	H	3.0	39.5	1.0	-58.7	-13.0	-45.7		
5.1372	-14.2	H	3.0	40.1	1.0	-53.2	-13.0	-40.2		
6.8496	-9.7	H	3.0	39.4	1.0	-48.1	-13.0	-35.1		
Mid Ch, 1732.6MHz										
3.4652	-20.5	V	3.0	39.4	1.0	-58.9	-13.0	-45.9		
5.1978	-12.6	V	3.0	40.1	1.0	-51.7	-13.0	-38.7		
6.9304	-8.6	V	3.0	39.4	1.0	-47.0	-13.0	-34.0		
3.4652	-20.7	H	3.0	39.4	1.0	-59.1	-13.0	-46.1		
5.1978	-12.8	H	3.0	40.1	1.0	-51.9	-13.0	-38.9		
6.9304	-9.1	H	3.0	39.4	1.0	-47.4	-13.0	-34.4		
High Ch, 1752.6MHz										
3.5052	-19.5	V	3.0	39.4	1.0	-57.9	-13.0	-44.9		
5.2578	-11.8	V	3.0	40.1	1.0	-50.9	-13.0	-37.9		
7.0104	-9.3	V	3.0	39.3	1.0	-47.6	-13.0	-34.6		
3.5052	-20.0	H	3.0	39.4	1.0	-58.4	-13.0	-45.4		
5.2578	-13.9	H	3.0	40.1	1.0	-53.0	-13.0	-40.0		
7.0104	-10.2	H	3.0	39.3	1.0	-48.5	-13.0	-35.5		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										
WCDMA Band 4 HSDPA	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 15I20727 Date: 05-11-15 Test Engineer: Steven Kim Configuration: EUT / AC Adapter / Earphone / X Position Mode: Tx, HSDPA,1700MHz Chamber Pre-amplifier Filter Limit Chamber 1 AFS42 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, 1712.4MHz										
3.4248	-19.9	V	3.0	39.5	1.0	-58.4	-13.0	-45.4		
5.1372	-13.8	V	3.0	40.1	1.0	-52.8	-13.0	-39.8		
6.8496	-11.1	V	3.0	39.4	1.0	-49.5	-13.0	-36.5		
3.4248	-20.1	H	3.0	39.5	1.0	-58.5	-13.0	-45.5		
5.1372	-14.2	H	3.0	40.1	1.0	-53.2	-13.0	-40.2		
6.8496	-10.9	H	3.0	39.4	1.0	-49.2	-13.0	-36.2		
Mid Ch, 1732.6MHz										
3.4652	-20.6	V	3.0	39.4	1.0	-59.0	-13.0	-46.0		
5.1978	-12.9	V	3.0	40.1	1.0	-52.0	-13.0	-39.0		
6.9304	-9.8	V	3.0	39.4	1.0	-48.2	-13.0	-35.2		
3.4652	-20.7	H	3.0	39.4	1.0	-59.1	-13.0	-46.1		
5.1978	-13.6	H	3.0	40.1	1.0	-52.7	-13.0	-39.7		
6.9304	-10.1	H	3.0	39.4	1.0	-48.5	-13.0	-35.5		
High Ch, 1752.6MHz										
3.5052	-20.0	V	3.0	39.4	1.0	-58.4	-13.0	-45.4		
5.2578	-12.6	V	3.0	40.1	1.0	-51.7	-13.0	-38.7		
7.0104	-10.6	V	3.0	39.3	1.0	-49.0	-13.0	-36.0		
3.5052	-19.8	H	3.0	39.4	1.0	-58.2	-13.0	-45.2		
5.2578	-14.0	H	3.0	40.1	1.0	-53.1	-13.0	-40.1		
7.0104	-10.8	H	3.0	39.3	1.0	-49.1	-13.0	-36.1		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

LTE Band 17

LTE Band 17 10MHz QPSK	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / AC Adapter / Ear Phone / Y-Position Mode: TX, LTE BAND 17, 10MHz BW, QPSK									
	Chamber Pre-amplifier Filter Limit Chamber 1 AFS42 Filter 1 FCC Part 27									
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (709MHz)									
	1.4180	-14.0	V	3.0	40.2	1.0	-53.2	-13.0	-40.2	
	2.1270	-25.2	V	3.0	40.1	1.0	-65.4	-13.0	-52.4	
	2.8360	-30.9	V	3.0	40.0	1.0	-69.9	-13.0	-56.9	
	1.4180	-23.9	H	3.0	40.2	1.0	-63.1	-13.0	-50.1	
	2.1270	-22.8	H	3.0	40.1	1.0	-62.0	-13.0	-49.0	
	2.8360	-31.4	H	3.0	40.0	1.0	-70.4	-13.0	-57.4	
	Mid Channel (710MHz)									
	1.4200	-13.1	V	3.0	40.2	1.0	-52.2	-13.0	-39.2	
	2.1300	-25.5	V	3.0	40.1	1.0	-64.7	-13.0	-51.7	
	2.8400	-31.1	V	3.0	40.0	1.0	-70.1	-13.0	-57.1	
	1.4200	-23.8	H	3.0	40.2	1.0	-63.0	-13.0	-50.0	
	2.1300	-21.5	H	3.0	40.1	1.0	-60.7	-13.0	-47.7	
	2.8400	-31.5	H	3.0	40.0	1.0	-70.5	-13.0	-57.5	
	High Channel (711MHz)									
	1.4220	-11.6	V	3.0	40.2	1.0	-50.8	-13.0	-37.8	
	2.1330	-25.2	V	3.0	40.1	1.0	-64.4	-13.0	-51.4	
	2.8440	-30.9	V	3.0	40.0	1.0	-69.9	-13.0	-56.9	
	1.4220	-19.7	H	3.0	40.2	1.0	-58.9	-13.0	-45.9	
	2.1330	-21.1	H	3.0	40.1	1.0	-60.3	-13.0	-47.3	
	2.8440	-31.5	H	3.0	40.0	1.0	-70.5	-13.0	-57.5	
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									
LTE Band 17 10MHz 16QAM	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 15I20727 Date: 05-13-15 Test Engineer: Steven Kim Configuration: EUT / AC Adapter / Ear Phone / Y-Position Mode: TX, LTE BAND 17, 10MHz BW, 16QAM									
	Chamber Pre-amplifier Filter Limit Chamber 1 AFS42 Filter 1 FCC Part 27									
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (709MHz)									
	1.4180	-18.4	V	3.0	40.2	1.0	-57.6	-13.0	-44.6	
	2.1270	-25.7	V	3.0	40.1	1.0	-64.8	-13.0	-51.8	
	2.8360	-31.1	V	3.0	40.0	1.0	-70.1	-13.0	-57.1	
	1.4180	-24.8	H	3.0	40.2	1.0	-64.0	-13.0	-51.0	
	2.1270	-23.9	H	3.0	40.1	1.0	-63.0	-13.0	-50.0	
	2.8360	-31.4	H	3.0	40.0	1.0	-70.4	-13.0	-57.4	
	Mid Channel (710MHz)									
	1.4200	-14.1	V	3.0	40.2	1.0	-53.3	-13.0	-40.3	
	2.1300	-26.4	V	3.0	40.1	1.0	-65.5	-13.0	-52.5	
	2.8400	-31.2	V	3.0	40.0	1.0	-70.2	-13.0	-57.2	
	1.4200	-22.9	H	3.0	40.2	1.0	-62.1	-13.0	-49.1	
	2.1300	-23.9	H	3.0	40.1	1.0	-63.0	-13.0	-50.0	
	2.8400	-31.6	H	3.0	40.0	1.0	-70.6	-13.0	-57.6	
	High Channel (711MHz)									
	1.4220	-15.6	V	3.0	40.2	1.0	-54.8	-13.0	-41.8	
	2.1330	-25.7	V	3.0	40.1	1.0	-64.9	-13.0	-51.9	
	2.8440	-31.0	V	3.0	40.0	1.0	-70.0	-13.0	-57.0	
	1.4220	-23.1	H	3.0	40.2	1.0	-62.3	-13.0	-49.3	
	2.1330	-22.5	H	3.0	40.1	1.0	-61.6	-13.0	-48.6	
	2.8440	-31.4	H	3.0	40.0	1.0	-70.4	-13.0	-57.4	
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

LTE Band 17 5MHz QPSK	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 15I20727									
	Date: 05-13-15									
	Test Engineer: Steven Kim									
	Configuration: EUT / AC Adapter / Ear Phone / Y-Position									
	Mode: TX, LTE BAND 17, 5MHz BW, QPSK									
	Chamber Chamber 1		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (706.5MHz)									
	1.4130	-17.2	V	3.0	40.2	1.0	-56.4	-13.0	-43.4	
	2.1195	-26.2	V	3.0	40.1	1.0	-65.4	-13.0	-52.4	
	2.8260	-30.4	V	3.0	40.0	1.0	-69.4	-13.0	-56.4	
	1.4130	-24.8	H	3.0	40.2	1.0	-64.0	-13.0	-51.0	
	2.1195	-25.1	H	3.0	40.1	1.0	-64.2	-13.0	-51.2	
	2.8260	-31.0	H	3.0	40.0	1.0	-69.9	-13.0	-56.9	
	Mid Channel (710MHz)									
	1.4200	-14.0	V	3.0	40.2	1.0	-53.2	-13.0	-40.2	
	2.1300	-25.1	V	3.0	40.1	1.0	-64.3	-13.0	-51.3	
	2.8400	-31.0	V	3.0	40.0	1.0	-70.0	-13.0	-57.0	
	1.4200	-22.1	H	3.0	40.2	1.0	-61.3	-13.0	-48.3	
	2.1300	-22.8	H	3.0	40.1	1.0	-61.9	-13.0	-48.9	
	2.8400	-31.3	H	3.0	40.0	1.0	-70.3	-13.0	-57.3	
	High Channel (713.5MHz)									
	1.4270	-15.0	V	3.0	40.2	1.0	-54.2	-13.0	-41.2	
	2.1405	-25.7	V	3.0	40.1	1.0	-64.8	-13.0	-51.8	
	2.8540	-30.8	V	3.0	40.0	1.0	-69.8	-13.0	-56.8	
	1.4270	-22.4	H	3.0	40.2	1.0	-61.5	-13.0	-48.5	
	2.1405	-23.6	H	3.0	40.1	1.0	-62.7	-13.0	-49.7	
	2.8540	-31.2	H	3.0	40.0	1.0	-70.2	-13.0	-57.2	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										
LTE Band 17 5MHz 16QAM	UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 15I20727									
	Date: 05-13-15									
	Test Engineer: Steven Kim									
	Configuration: EUT / AC Adapter / Ear Phone / Y-Position									
	Mode: TX, LTE BAND 17, 5MHz BW, 16QAM									
	Chamber Chamber 1		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Channel (706.5MHz)									
	1.4130	-19.0	V	3.0	40.2	1.0	-58.2	-13.0	-45.2	
	2.1195	-25.7	V	3.0	40.1	1.0	-64.8	-13.0	-51.8	
	2.8260	-30.3	V	3.0	40.0	1.0	-69.3	-13.0	-56.3	
	1.4130	-24.9	H	3.0	40.2	1.0	-64.1	-13.0	-51.1	
	2.1195	-23.0	H	3.0	40.1	1.0	-62.2	-13.0	-49.2	
	2.8260	-30.8	H	3.0	40.0	1.0	-69.8	-13.0	-56.8	
	Mid Channel (710MHz)									
	1.4200	-15.7	V	3.0	40.2	1.0	-54.9	-13.0	-41.9	
	2.1300	-26.1	V	3.0	40.1	1.0	-65.3	-13.0	-52.3	
	2.8400	-30.9	V	3.0	40.0	1.0	-69.9	-13.0	-56.9	
	1.4200	-25.3	H	3.0	40.2	1.0	-64.5	-13.0	-51.5	
	2.1300	-21.4	H	3.0	40.1	1.0	-60.6	-13.0	-47.6	
	2.8400	-31.5	H	3.0	40.0	1.0	-70.4	-13.0	-57.4	
	High Channel (713.5MHz)									
	1.4270	-14.9	V	3.0	40.2	1.0	-54.1	-13.0	-41.1	
	2.1405	-23.5	V	3.0	40.1	1.0	-62.7	-13.0	-49.7	
	2.8540	-30.7	V	3.0	40.0	1.0	-69.7	-13.0	-56.7	
	1.4270	-22.8	H	3.0	40.2	1.0	-62.0	-13.0	-49.0	
	2.1405	-16.7	H	3.0	40.1	1.0	-55.8	-13.0	-42.8	
	2.8540	-31.2	H	3.0	40.0	1.0	-70.1	-13.0	-57.1	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										