FCC REPORT

(GSM & WCDMA)

Applicant:	SUN CUPID TECHNOLOGY(HK)LIMITED
Address of Applicant:	16/F,CEO Tower,77 Wing Hong Street,Cheung Sha Wan,Hong Kong

Equipment Under Test (EUT)

Product Name:	LTE mobile phone
Model No.:	N5L
Trade mark:	NUU
FCC ID:	2ADINNUUN5L
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 Subpart H FCC CFR Title 47 Part24 Subpart E FCC CFR Title 47 Part 27 Subpart L
Date of sample receipt:	30 Nov., 2015
Date of Test:	30 Nov., to 15 Dec., 2015
Date of report issued:	16 Dec., 2015
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2. Version

Version No.	Date	Description
00	*16 Dec., 2015*	*Original*

Tested by: *Carey Chen*   ***Date:***   *16 Dec., 2015*
                              Test Engineer

Reviewed by: *Wimer Zhang*   ***Date:***   *16 Dec., 2015*
                                Project Engineer

3. Contents

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
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Project No.:CCIS151100916RF

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4. Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass (Please refer to SAR Report)
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c) Part 27.50 (d)(4)	Pass
Peak-to-Average Power Ratio	Part 24.232 (d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b) Part 27.53(h)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Pass: The EUT complies with the essential requirements in the standard.

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5. General Information

5.1 Client Information

Applicant:	SUN CUPID TECHNOLOGY(HK)LIMITED
Address of Applicant:	16/F,CEO Tower,77 Wing Hong Street,Cheung Sha Wan,Hong Kong
Manufacturer:	Sun cupid(Shen Zhen) Electronic Ltd.
Address of Manufacturer:	Baolong Industrial City, Longgang District, Shenzhen Hi-Tech Road, Building 1, A7

5.2 General Description of E.U.T.

Product Name:	LTE mobile phone
Model No.:	N5L
Operation Frequency range:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz WCDMA Band V:826.4MHz-846.6MHz WCDMA Band II:1852.4 MHz -1907.6 MHz WCDMA Band IV:1712.4 MHz -1752.6 MHz
Modulation type:	GSM/GPRS:GMSK, UMTS:QPSK, EGPRS: 8PSK
Antenna type:	Internal Antenna
Antenna gain:	GSM850:-0.72dBi PCS1900:0.62dBi WCDMA Band V:-0.72dBi WCDMA Band II:0.62dBi WCDMA Band IV: 0.85dBi
AC adapter:	Model:HNFL050100UU Input:100-240V AC,50/60Hz 0.2A Output:5V DC MAX1000mA
Power supply:	Rechargeable Li-ion Battery DC3.8V-3000mAh

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Operation Frequency List:

GSM 850		PCS1900	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
….	….	….	….
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
…	…	…	…
250	848.60	809	1909.60
251	848.80	810	1909.80
WCDMA Band V		WCDMA Band II	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
4132	826.40	9262	1852.40
4133	826.60	9263	1852.60
….	….	….	….
4182	836.40	9399	1879.80
4183	836.60	9400	1880.00
4184	836.80	9401	1880.20
…	…	…	…
4232	846.40	9537	1907.40
4233	846.60	9538	1907.60
WCDMA Band IV			
Channel:	Frequency (MHz)		
1312	1712.40		
1313	1712.60		
….	….		
1412	1732.40		
1413	1732.60		
1414	1732.80		
…	…		
1512	1752.40		
1513	1752.60		

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Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

GSM850			PCS1900		
Channel		Frequency(MHz)	Channel		Frequency(MHz)
Lowest channel	128	824.20	Lowest channel	512	1850.20
Middle channel	190	836.60	Middle channel	661	1880.00
Highest channel	251	848.80	Highest channel	810	1909.80
WCDMA Band V			WCDMA Band II		
Channel		Frequency(MHz)	Channel		Frequency(MHz)
Lowest channel	4132	826.40	Lowest channel	9262	1852.40
Middle channel	4183	836.60	Middle channel	9400	1880.00
Highest channel	4233	846.60	Highest channel	9538	1907.60
WCDMA Band IV					
Channel		Frequency(MHz)			
Lowest channel	1312	1712.40			
Middle channel	1413	1732.60			
Highest channel	1513	1752.60			

5.3 Test modes

Voice mode	Keep the EUT in voice mode on GSM850 and PCS 1900 respectively.
Data mode (GPRS)	Keep the EUT in GPRS mode on GSM850 and PCS 1900 respectively.
Data mode (EGPRS)	Keep the EUT in EGPRS mode on GSM850 and PCS 1900 respectively.
Voice mode (AMR 12.2 kbps)	Keep the EUT in voice mode on WCDMA Band II, IVand Vrespectively.
Data mode (RMC 12.2kbps)	Keep the EUT in RMC on WCDMA Band II, IVand Vrespectively.
Data mode (HSDPA Subtest 1~4)	Keep the EUT in HSDPA mode on WCDMA Band II, IVand Vrespectively.
Data mode (HSUPA Subtest 1~5)	Keep the EUT in HSUPA mode on WCDMA Band II, IVand Vrespectively.
Remark:	Just the worst case mode shown in report.

5.4 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E and Part 27 subpart L of the FCC CFR 47 Rules.

5.5 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Registration No.: 817957**
Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**
The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**
Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.7 Laboratory Location

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5.8 Test Instruments list

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-28-2015	03-28-2016
Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-28-2015	03-28-2016
Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2015	03-31-2016
Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2015	03-31-2016
Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2015	03-31-2016
Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2015	03-31-2016
Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2015	03-28-2016
EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2015	03-28-2016
Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2015	03-31-2016
Universal radio communication tester	Rhode&Schwarz	CMU200	CCIS0069	03-28-2015	03-28-2016

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6. System test configuration

6.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

6.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.
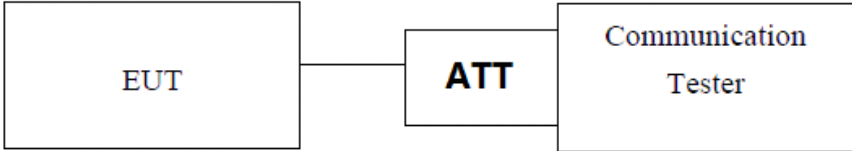
6.3 Configuration of Tested System
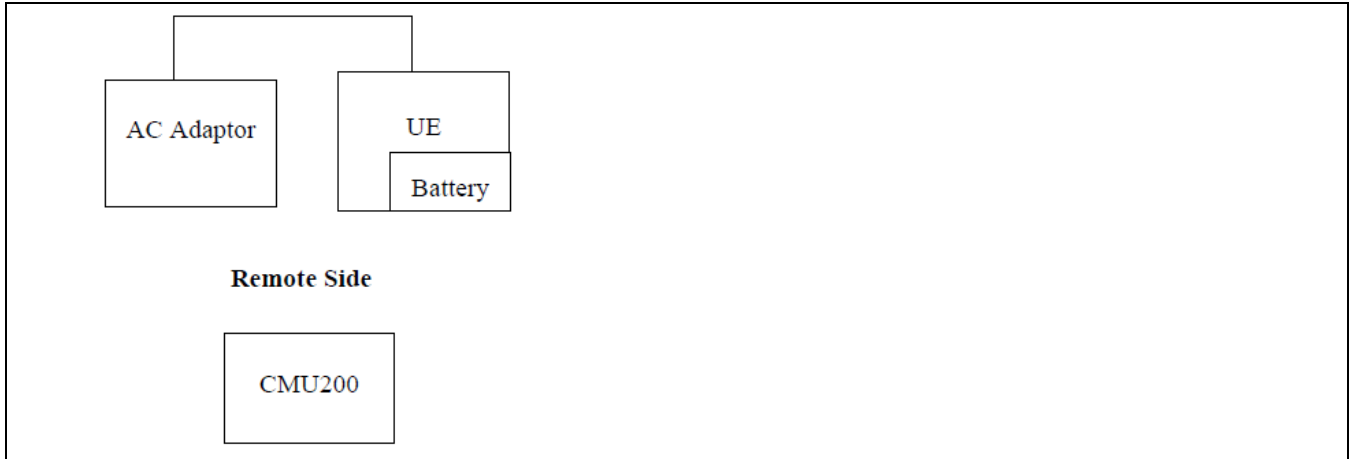
6.4 Description of Test Modes

The EUT has been tested under operating condition.
EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes (GSM850, PCS1900, WCDMA Band V, WCDMA Band IV and WCDMA Band II) with power adaptor, earphone and Data cable. The worst-case H mode for GSM850, PCS1900, WCDMA Band V, WCDMA Band IV and WCDMA Band II.
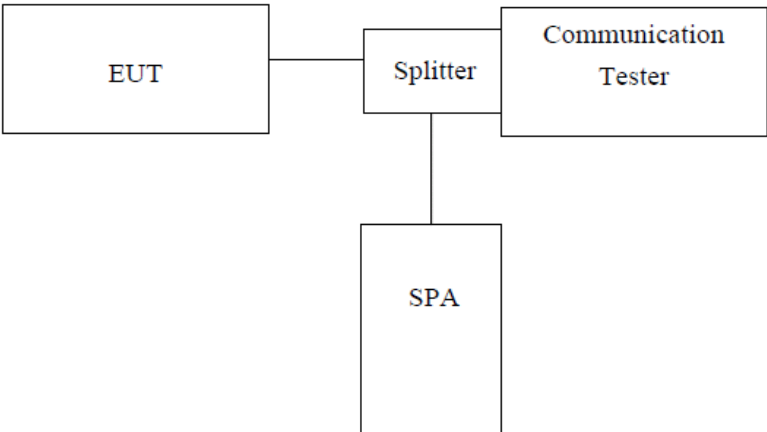
6.5 Conducted Output Power

Test Requirement:	FCC part22.913(a), FCC part24.232(b)and FCC part 27.50(d)
Test Method:	FCC part2.1046
Limit:	GSM850: 7W PCS1900: 2W WCDMA Band V: 7W WCDMA Band II: 2W WCDMA Band IV: 1W
Test setup:	 Note: Measurement setup for testing on Antenna connector
Test Procedure:	The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the simulated station. Transmitter output power was read off in dBm.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

EUT Mode	Burst Average power (dBm)			Limit(dBm)
	128	190	251	
	824.20MHz	836.60MHz	848.80MHz	
GSM 850	32.28	32.29	32.29	38.45
GPRS 850 (1 Uplink slot)	31.97	31.99	32.00	
GPRS 850 (2 Uplink slot)	31.35	31.39	31.39	
GPRS 850 (3 Uplink slot)	29.72	29.8	29.82	
GPRS 850 (4 Uplink slot)	28.64	28.63	28.64	
EGPRS 850 (1 Uplink slot)	27.7	27.6	27.57	
EGPRS 850 (2 Uplink slot)	26.62	26.46	26.47	
EGPRS 850 (3 Uplink slot)	24.85	24.68	24.73	
EGPRS 850 (4 Uplink slot)	23.82	23.68	23.79	
EUT Mode	Burst Average power (dBm)			Limit(dBm)
	512	661	810	
	1850.20MHz	1880.00MHz	1909.80MHz	
PCS 1900	29.23	29.3	29.32	33.00
GPRS 1900 (1 Uplink slot)	29.21	29.36	29.35	
GPRS 1900 (2 Uplink slot)	28.65	28.83	28.89	
GPRS 1900 (3 Uplink slot)	26.96	27.25	27.49	
GPRS 1900 (4 Uplink slot)	25.88	26.21	26.46	
EGPRS 1900 (1 Uplink slot)	26.86	27.21	27.58	
EGPRS 1900 (2 Uplink slot)	25.89	26.24	26.61	
EGPRS 1900 (3 Uplink slot)	24.02	24.44	25.14	
EGPRS 1900 (4 Uplink slot)	22.89	23.40	23.83	

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EUT Mode		Burst Average power (dBm)			Limit(dBm)
		4132	4183	4233	
		826.40MHz	836.60MHz	846.60MHz	
UMTS 850 HSDPA	Subtest 1	21.73	21.60	21.66	38.45
	Subtest 2	21.42	21.21	21.20	
	Subtest 3	19.90	19.70	19.44	
	Subtest 4	19.91	19.66	19.44	
UMTS 850 HSUPA	Subtest 1	21.70	21.58	21.54	
	Subtest 2	21.71	21.54	21.60	
	Subtest 3	19.97	19.81	19.35	
	Subtest 4	21.74	21.60	21.66	
	Subtest 5	20.82	20.64	20.70	
UMTS 850 RMC	12.2kbps	22.73	22.57	22.63	
UMTS 850 AMR	12.2kbps	22.42	22.25	22.27	

EUT Mode		Burst Average power (dBm)			Limit(dBm)
		9262	9400	9538	
		1852.40MHz	1880.00MHz	1907.60MHz	
UMTS 1900 HSDPA	Subtest 1	21.75	22.32	21.76	33.00
	Subtest 2	21.71	21.83	21.38	
	Subtest 3	20.42	20.64	20.08	
	Subtest 4	20.42	20.52	20.21	
UMTS 1900 HSUPA	Subtest 1	22.24	22.28	22.23	
	Subtest 2	21.79	22.10	22.18	
	Subtest 3	20.37	20.43	20.08	
	Subtest 4	22.32	21.90	22.24	
	Subtest 5	21.41	21.38	21.28	
UMTS 1900 RMC	12.2kbps	23.37	23.41	23.27	
UMTS 1900 AMR	12.2kbps	23.00	23.09	22.92	

EUT Mode		Burst Average power (dBm)			Limit(dBm)
		1312	1412	1513	
		1712.40MHz	1732.40MHz	1752.60MHz	
UMTS 1700 HSDPA	Subtest 1	22.23	22.26	22.24	38.45
	Subtest 2	21.91	21.93	21.82	
	Subtest 3	20.22	20.26	20.07	
	Subtest 4	20.18	20.52	20.25	
UMTS 1700 HSUPA	Subtest 1	22.15	22.2	22.17	
	Subtest 2	22.21	22.21	22.17	
	Subtest 3	20.15	20.26	20.32	
	Subtest 4	22.22	22.27	22.26	
	Subtest 5	21.38	21.33	21.36	
UMTS 1700 RMC	12.2kbps	23.21	23.24	23.22	
UMTS 1700 AMR	12.2kbps	22.86	22.95	22.90	

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6.6 Occupy Bandwidth

Test Requirement:	FCC part 22.913(a), FCC part 24.232(b) and FCC Part 27.53(h)
Test Method:	FCC part 2.1049
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

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EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
GSM 850	128	824.2	244	316
	190	836.6	250	316
	251	848.8	246	318
EGPRS850	128	824.2	248	330
	190	836.6	250	320
	251	848.8	250	316
PCS 1900	512	1850.2	246	320
	661	1880.0	252	318
	810	1909.8	246	322
EGPRS1900	512	1850.2	256	322
	661	1880.0	252	320
	810	1909.8	258	320
WCDMA BAND V 12.2k RMC	4132	826.4	4220	4860
	4183	836.6	4220	4880
	4233	846.6	4220	4880
WCDMA BAND II 12.2k RMC	9262	1852.4	4220	4900
	9400	1880.0	4220	4860
	9538	1907.6	4240	4860
WCDMA BAND IV 12.2k RMC	1312	1712.40	4220	4940
	1413	1732.60	4260	4940
	1513	1752.60	4260	4880

Note: GSM & GPRS use the same modulation technical (GMSK), and with the same channels, so the 99% OBW and the -26dB of GPRS not performed.

Test plot as follows:

99% Occupy bandwidth

GSM850
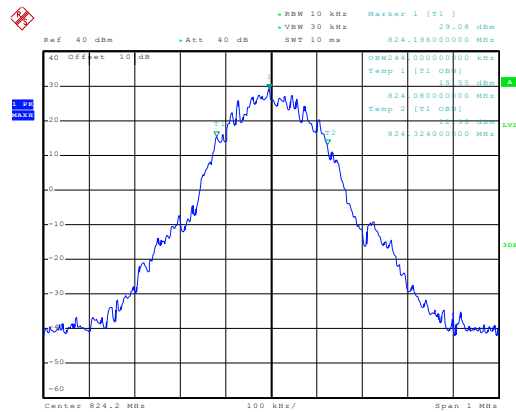
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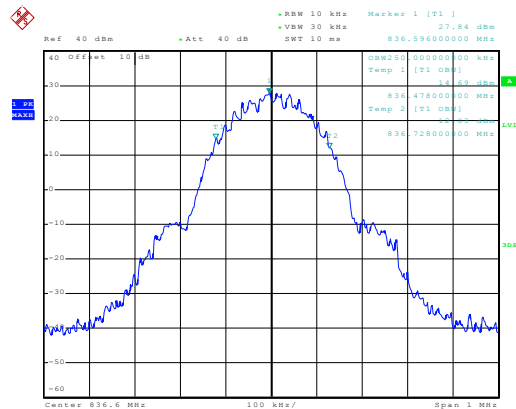
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Middle channel

Date: 28.NOV.2015 00:48:58

Highest channel

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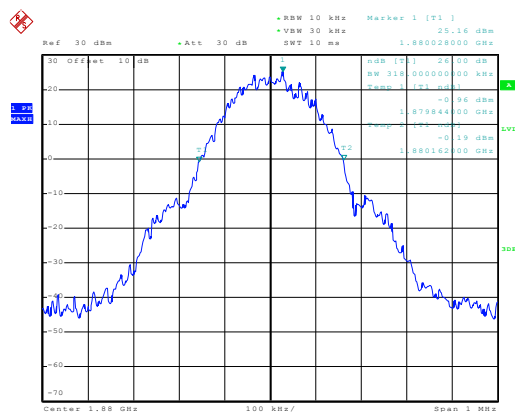Page 16 of 75
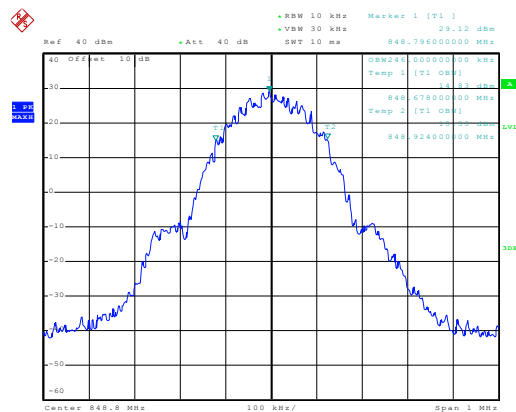
26dB Emission Bandwidth

GSM850
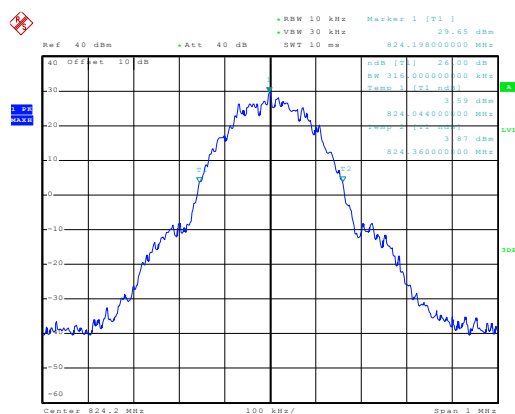
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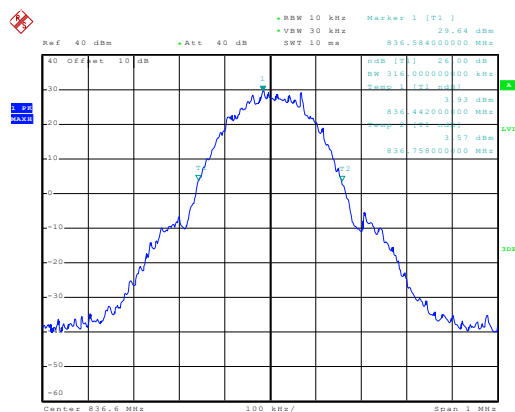
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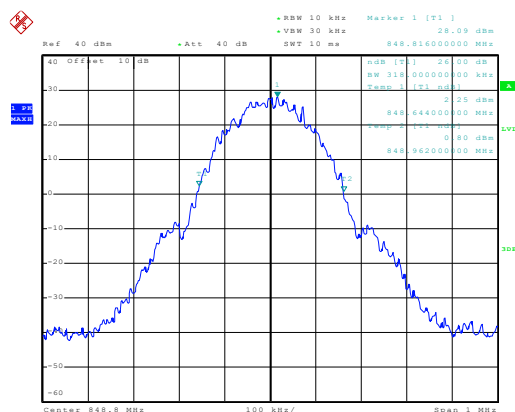
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Highest channel

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99% Occupy bandwidth
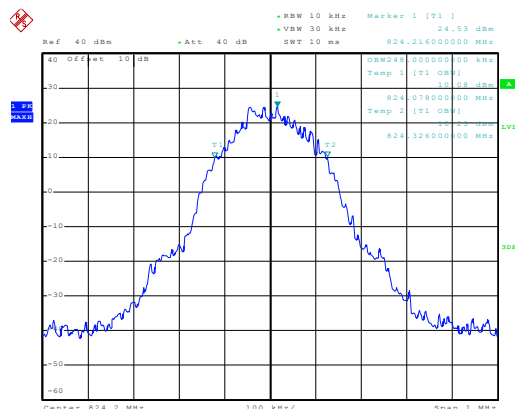
EGPRS850

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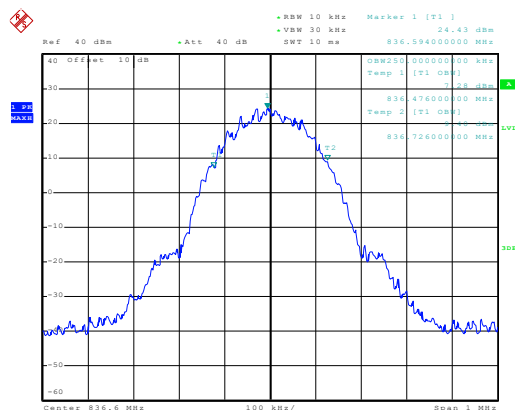
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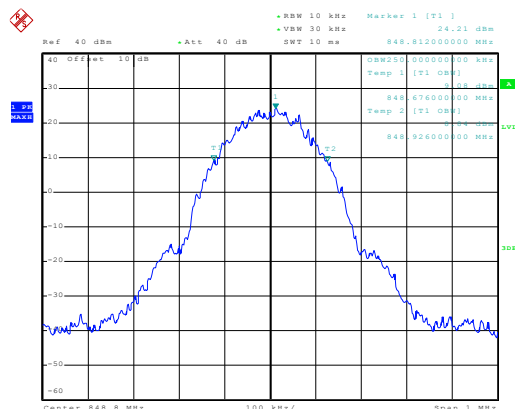
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Highest channel

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26dB Emission Bandwidth

EGPRS850
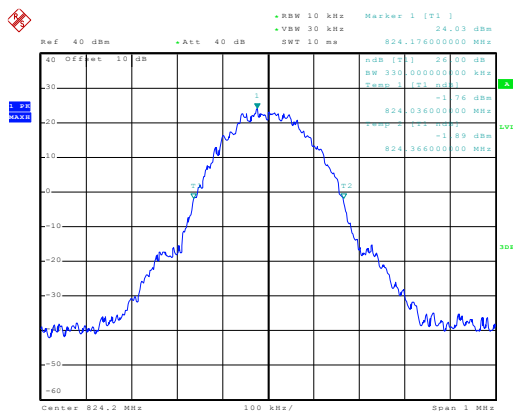
Date: 28.NOV.2015 00:57:06

Lowest channel
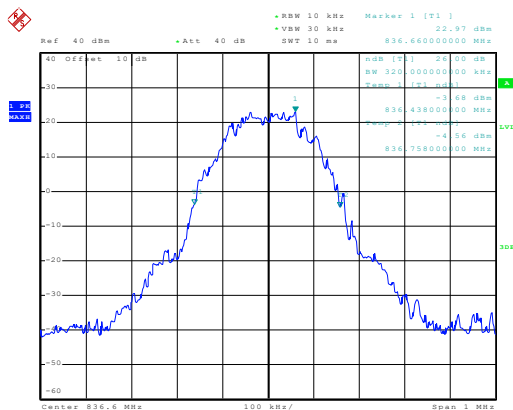
Date: 28.NOV.2015 00:56:30

Middle channel
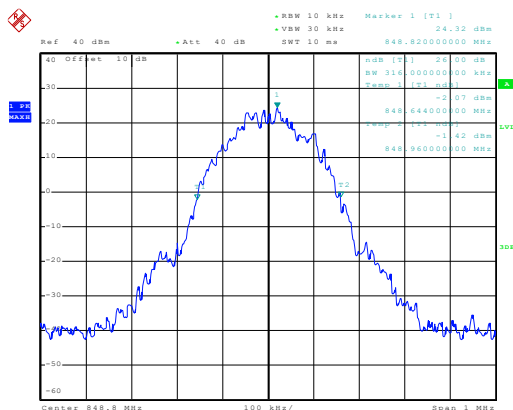
Date: 28.NOV.2015 00:56:20

Highest channel

99% Occupy bandwidth

PCS 1900
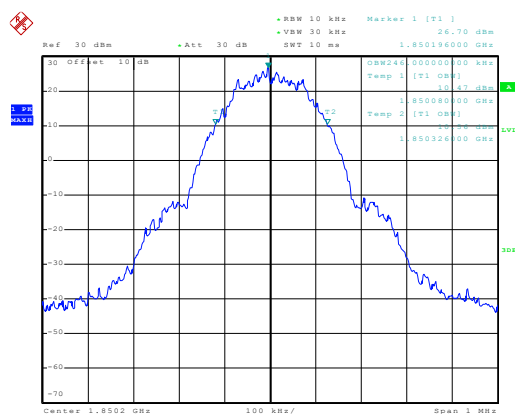
Date: 28.NOV.2015 01:05:43

Lowest channel
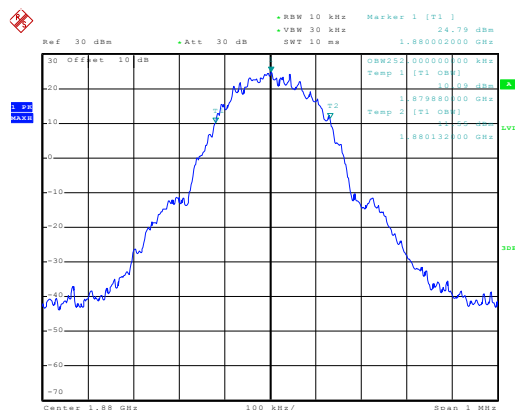
Date: 28.NOV.2015 01:06:14

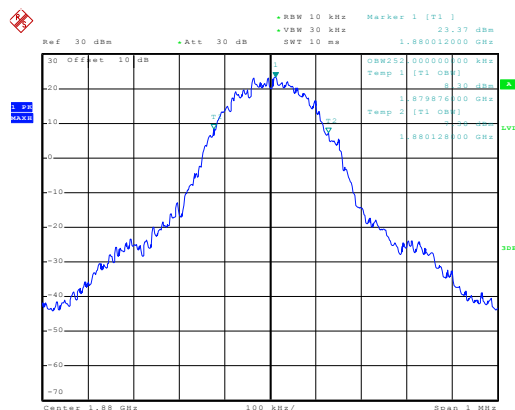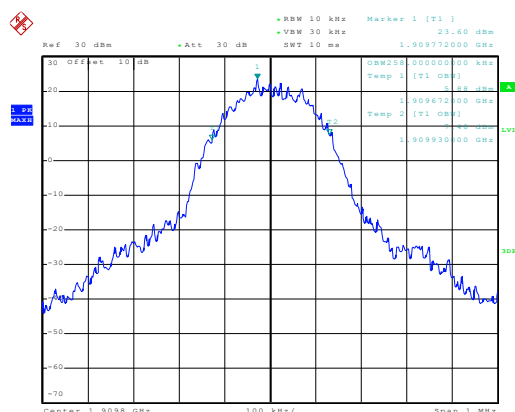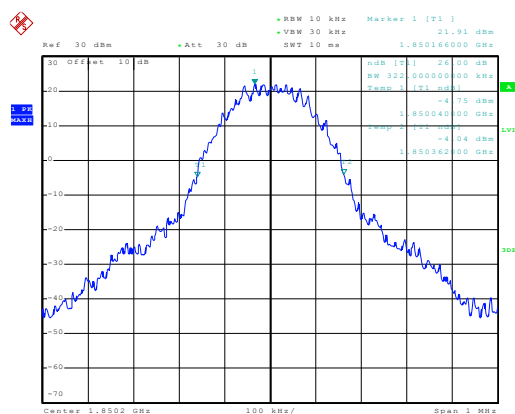Middle channel
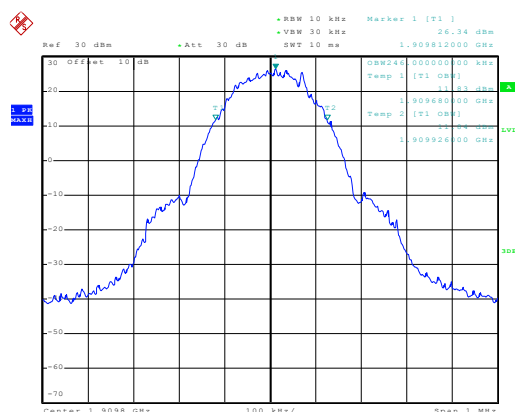
Date: 28.NOV.2015 01:07:26

Highest channel

26dB Emission Bandwidth

PCS 1900
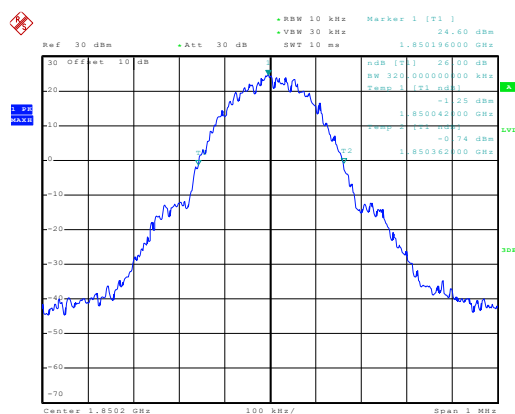
Date: 28.NOV.2015 01:05:53

Lowest channel

Date: 28.NOV.2015 01:06:03

Middle channel
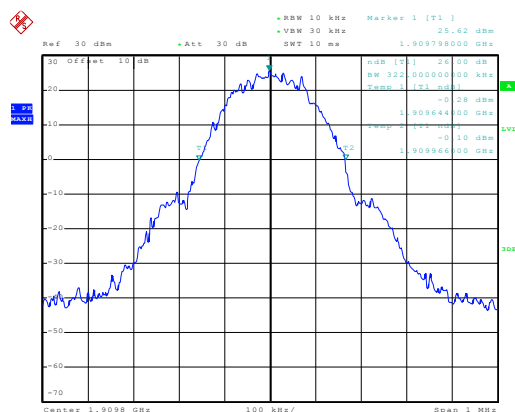
Date: 28.NOV.2015 01:07:40

Highest channel

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Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366   Page 21 of 75

99% Occupy bandwidth
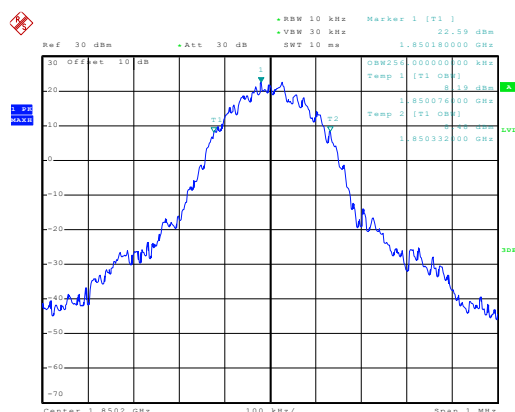
EGPRS 1900

Date: 28.NOV.2015 01:11:41

Lowest channel

Date: 28.NOV.2015 01:11:29

Middle channel

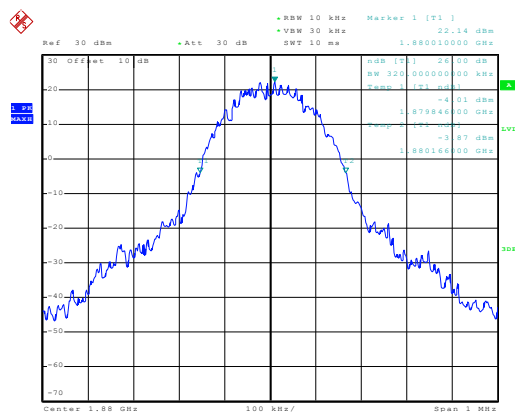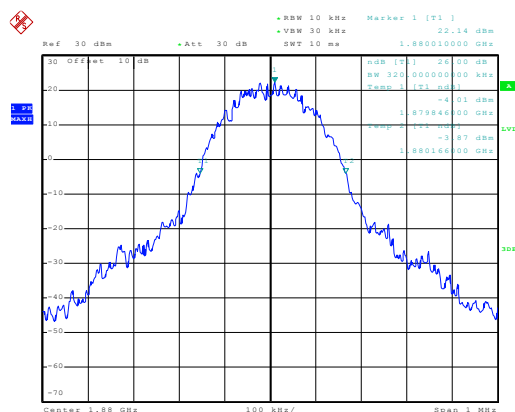Date: 28.NOV.2015 01:10:59

Highest channel

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26dB Emission Bandwidth

EGPRS 1900

Date: 28.NOV.2015 01:11:51

Lowest channel

Date: 28.NOV.2015 01:11:15
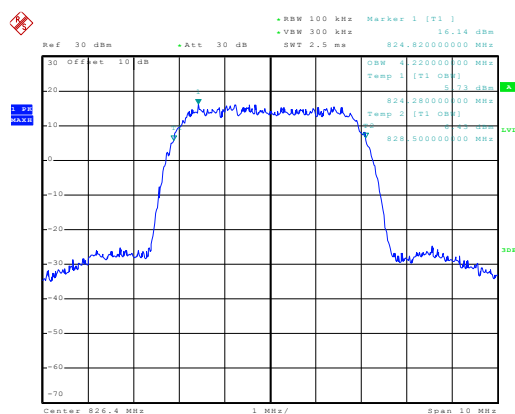
Middle channel

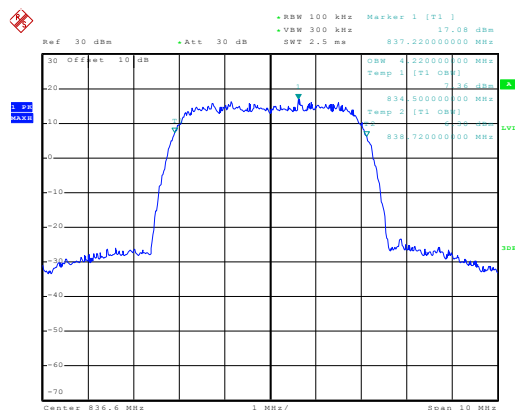Date: 28.NOV.2015 01:11:15

Highest channel
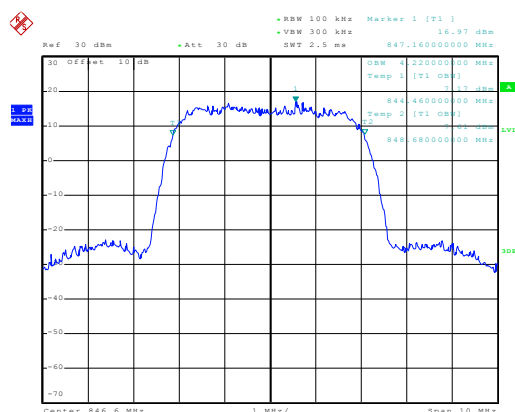
99% Occupy bandwidth

UMTS 850 12.2k RMC

Date: 28.NOV.2015 02:42:42

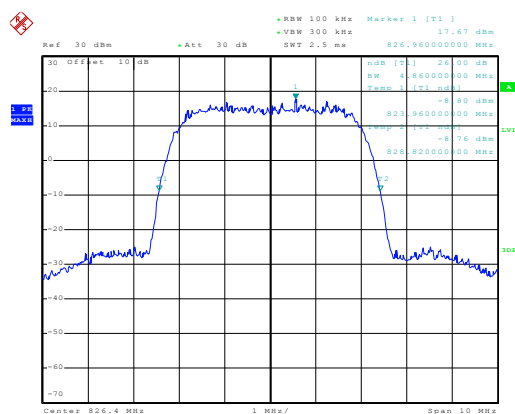Lowest channel

Date: 28.NOV.2015 02:43:19

Middle channel

Date: 28.NOV.2015 02:43:31

Highest channel

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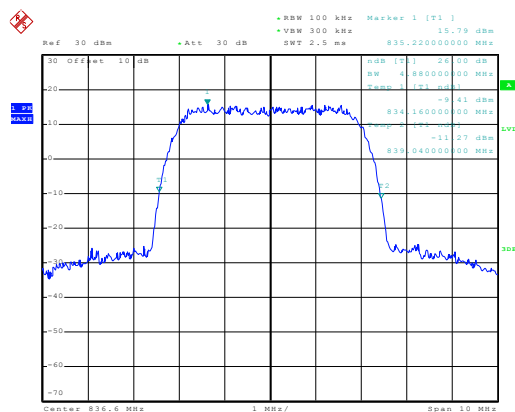Project No.:CCIS151100916RF

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26dB Emission Bandwidth

UMTS 850 12.2k RMC

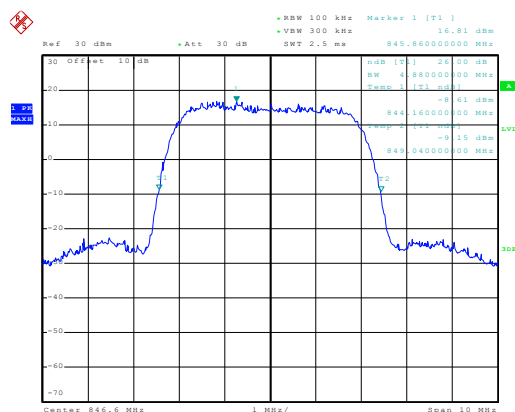Date: 28.NOV.2015 02:42:53

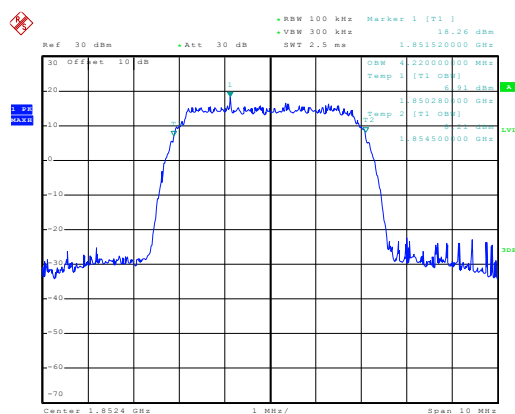Lowest channel

Date: 28.NOV.2015 02:43:09

Middle channel

Date: 28.NOV.2015 02:43:45

Highest channel

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Bao'an District, Shenzhen, Guangdong, China
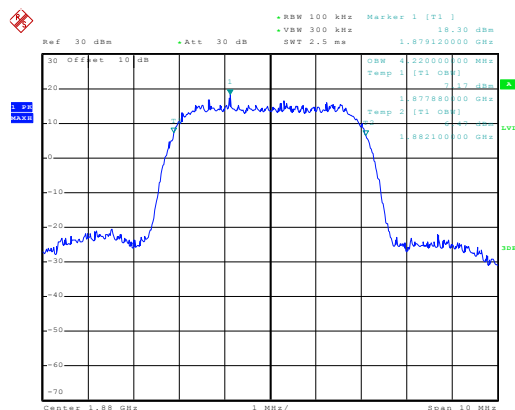Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366   Page 25 of 75
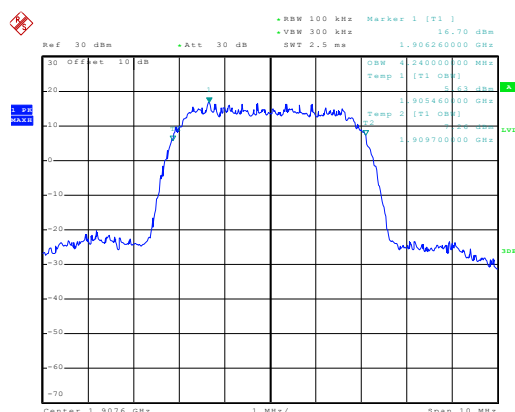
99% Occupy bandwidth

UMTS 1900 12.2k RMC

Date: 28.NOV.2015 02:49:06

Lowest channel

Date: 28.NOV.2015 02:48:50

Middle channel

Date: 28.NOV.2015 02:48:25

Highest channel

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Project No.:CCIS151100916RF

26dB Emission Bandwidth

UMTS 1900 12.2k RMC

Date: 28.NOV.2015 02:49:17

Lowest channel

Date: 28.NOV.2015 02:48:43

Middle channel

Date: 28.NOV.2015 02:48:31

Highest channel

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99% Occupy bandwidth

UMTS 1700 12.2k RMC

Date: 28.NOV.2015 02:50:08

Lowest channel

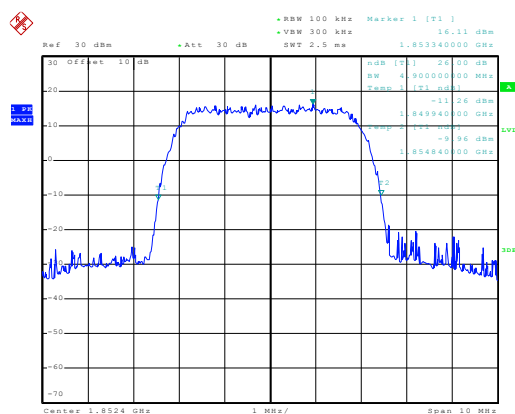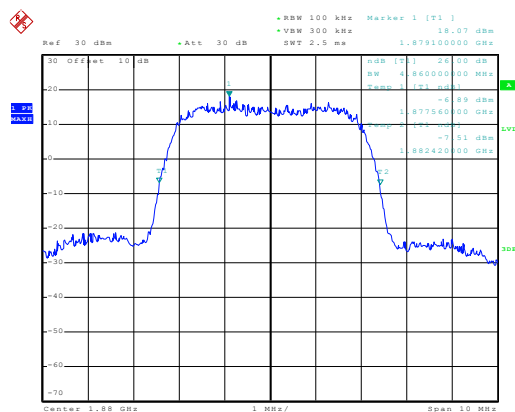Date: 28.NOV.2015 02:50:20

Middle channel

Date: 28.NOV.2015 02:50:46

Highest channel

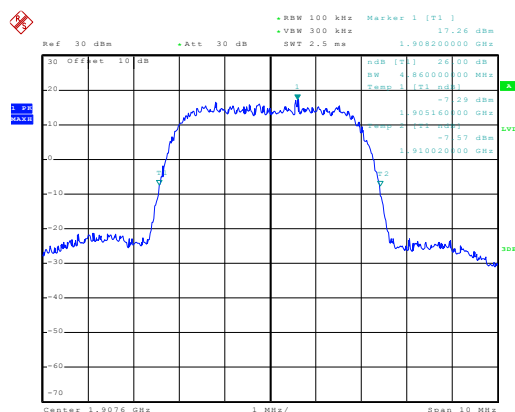## 26dB Emission Bandwidth

UMTS 1700 12.2k RMC

Date: 28.NOV.2015 02:50:00

Lowest channel

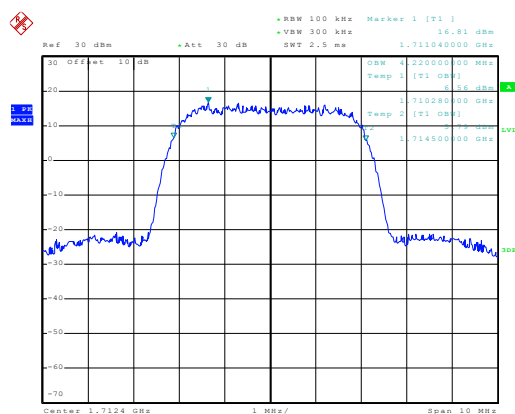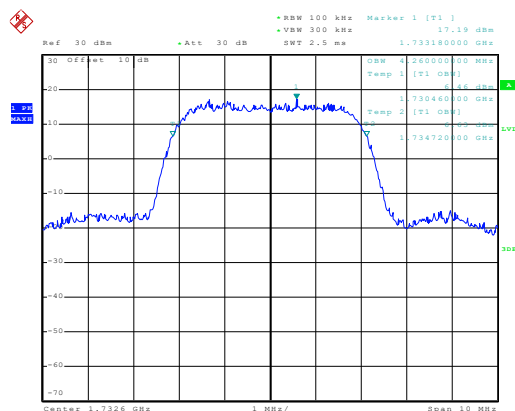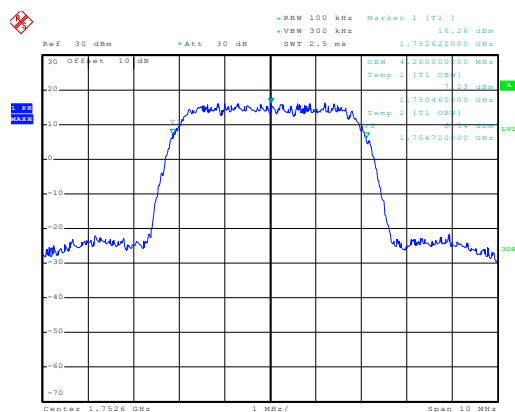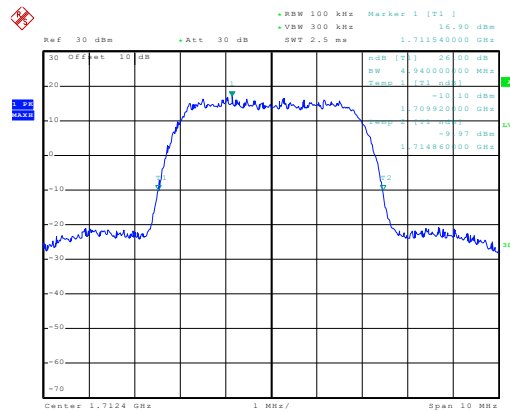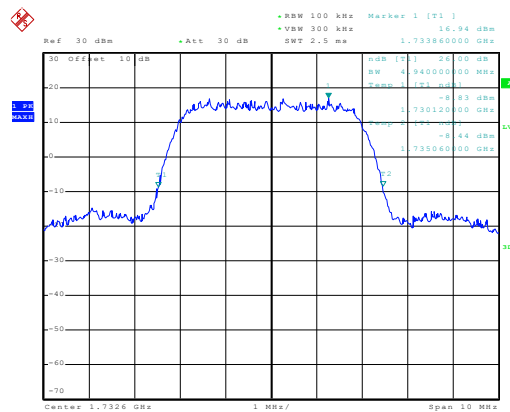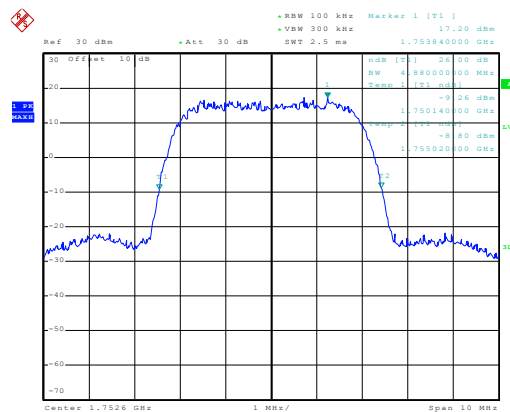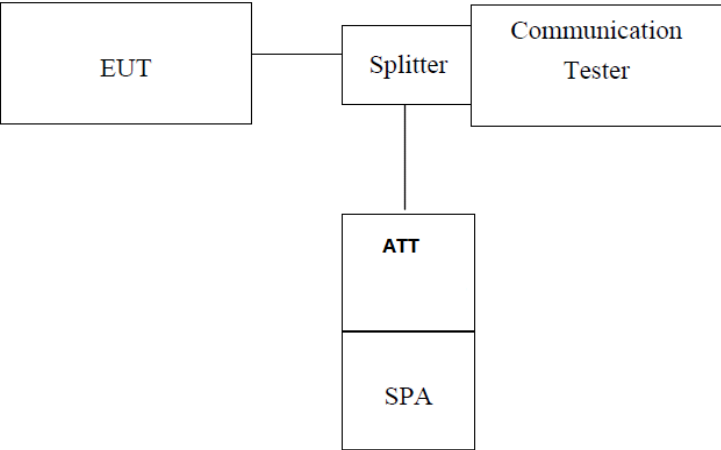Date: 28.NOV.2015 02:50:27

Middle channel

Date: 28.NOV.2015 02:50:39

Highest channel

6.7 Peak-to-Average Power Ratio

Test Requirement:	FCC part 24.232(d)
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test setup:	*Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 Set the CCDF option in spectrum analyzer, RBW ≥ OBW, 3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level. 4 Repeat step 1~3 at other frequency and modulations.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case)

Modulation	Test channel	PAPR
GSM 850	190	0.07
EGPRS 850	190	0.10
PCS 1900	661	0.12
EGPRS 1900	661	0.07
UMTS 850 RMC	4183	3.04
WCDMA BAND IV	1413	2.20
WCDMA BAND II	9400	2.48

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Report No: CCIS15110091601

CCIS

Test plots as below:

Middle channel

Modulation: GSM 850
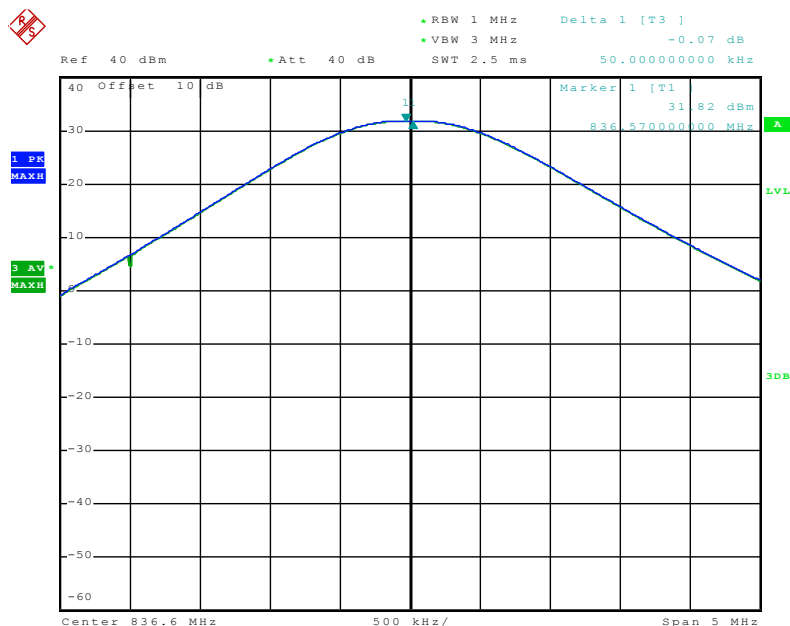
Date: 28.NOV.2015 00:51:06

Middle channel

Modulation: EGPRS 850
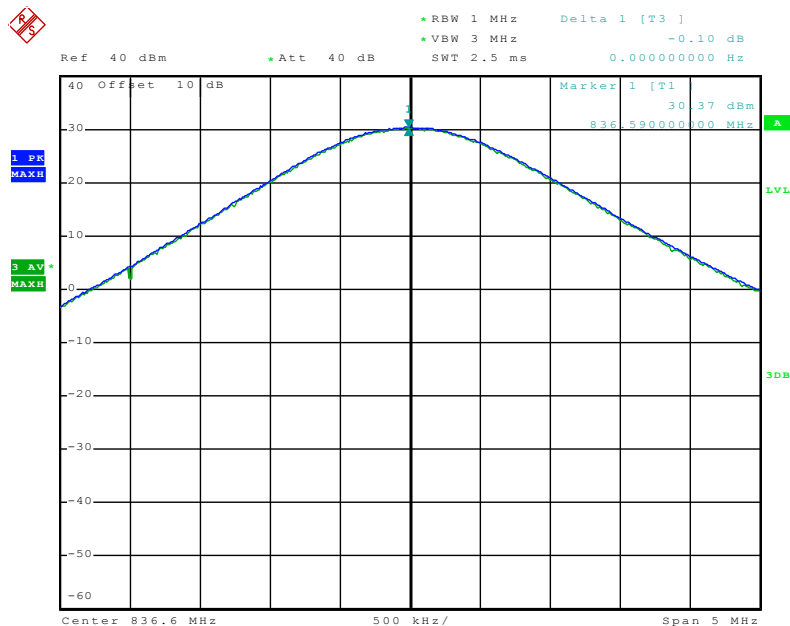
Date: 28.NOV.2015 00:52:06

Middle channel

Modulation:PCS 1900

```
          * RBW 1 MHz      Delta 1 [T3 ]
          * VBW 3 MHz              -0.12 dB
Ref  40 dBm      * Att  40 dB    SWT 2.5 ms    -60.000000000 kHz
40  Offset  10 dB                    Marker 1 [T1
                                            28.59 dBm
30                                       1.879980000 GHz
20
10
0
-10
-20
-30
-40
-50
-60
Center 1.88 GHz        500 kHz/              Span 5 MHz
```
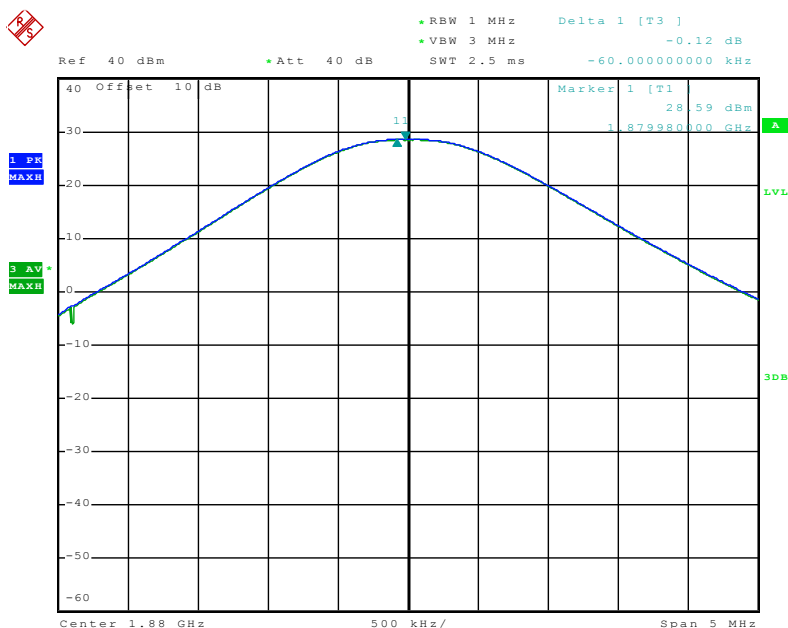
Date: 28.NOV.2015 01:08:23

Middle channel

Modulation:EGPRS 1900

```
          * RBW 1 MHz      Delta 1 [T3 ]
          * VBW 3 MHz              -0.07 dB
Ref  40 dBm      * Att  40 dB    SWT 2.5 ms    -50.000000000 kHz
40  Offset  10 dB                    Marker 1 [T1
30                                          28.73 dBm
                                         1.879990000 GHz
20
10
0
-10
-20
-30
-40
-50
-60
Center 1.88 GHz        500 kHz/              Span 5 MHz
```
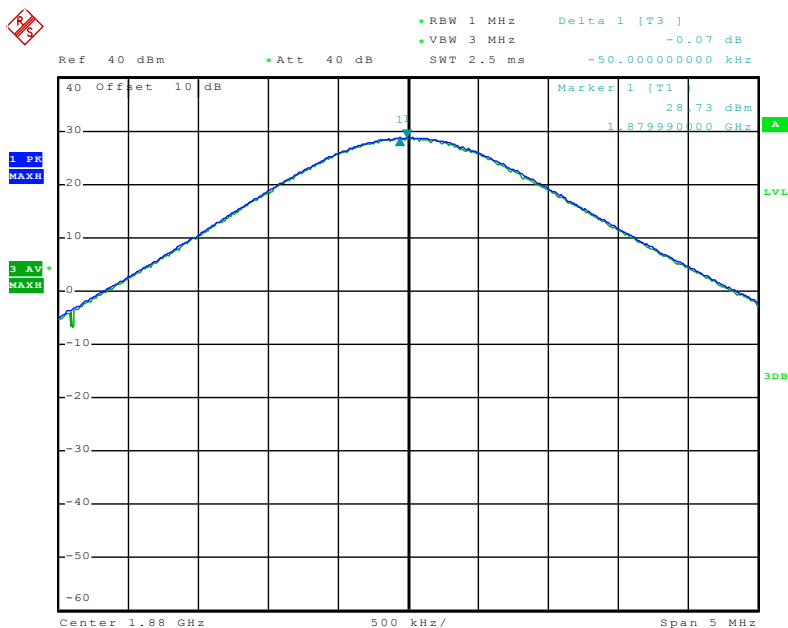
Date: 28.NOV.2015 01:09:25

Middle channel

Modulation:WCDMA Band VRMC

```
                                    RBW 10 MHz
   Ref  30 dBm          * Att  30 dB      AQT 3.125 ms
        Offset  10 dB
      0.1

      0.01

 1 SA
 CLRWR 1E-3

      1E-4

      1E-5

   Center 836.6 MHz              2 dB/           Mean Pwr + 20 dB
```

Complementary Cumulative Distribution Function (100000 samples)

```
           Trace 1
Mean     21.87 dBm
Peak     25.20 dBm
Crest     3.33 dB

  10 %    1.72 dB
   1 %    2.52 dB
  .1 %    3.04 dB
 .01 %    3.24 dB
```
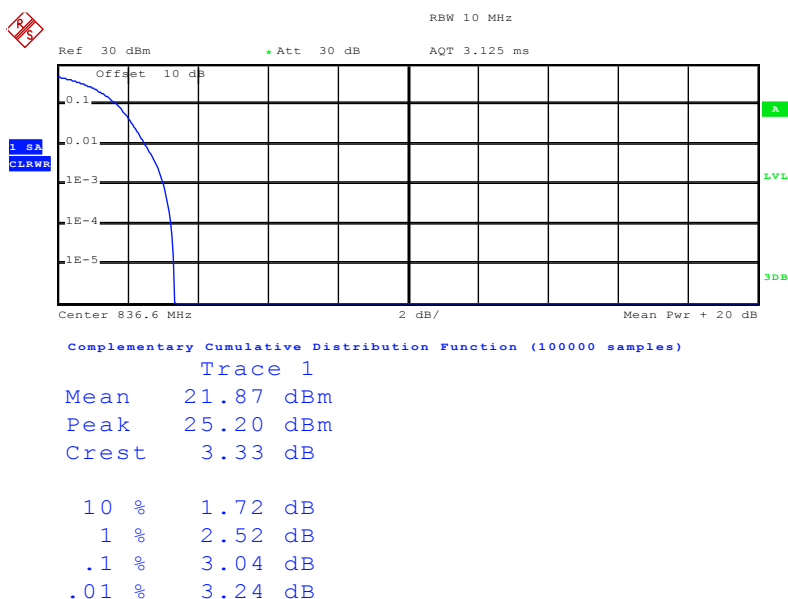
Date: 28.NOV.2015 02:44:06

Middle channel

Modulation:WCDMA BAND IVRMC

```
                                    RBW 10 MHz
   Ref  30 dBm          * Att  30 dB      AQT 3.125 ms
        Offset  10 dB
      0.1

      0.01

 1 SA
 CLRWR 1E-3

      1E-4

      1E-5

   Center 1.7326 GHz             2 dB/           Mean Pwr + 20 dB
```

Complementary Cumulative Distribution Function (100000 samples)

```
           Trace 1
Mean     22.27 dBm
Peak     24.64 dBm
Crest     2.36 dB

  10 %    1.44 dB
   1 %    1.96 dB
  .1 %    2.20 dB
 .01 %    2.32 dB
```
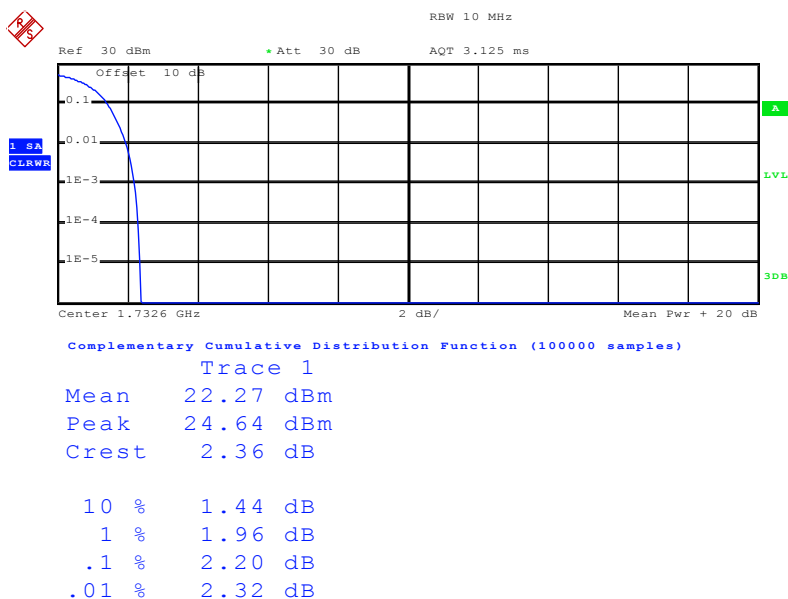
Date: 28.NOV.2015 02:44:33

Middle channel

Modulation:WCDMA BAND IIRMC

RBW 10 MHz

Ref 30 dBm   *Att 30 dB   AQT 3.125 ms

Offset 10 dB

0.1

0.01

1E-3

1E-4

1E-5

1 SA
CLRWR

A

LVL

3DB

Center 1.88 GHz   2 dB/   Mean Pwr + 20 dB

Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	22.56	dBm
Peak	25.27	dBm
Crest	2.72	dB
10 %	1.56	dB
1 %	2.16	dB
.1 %	2.48	dB
.01 %	2.64	dB

Date: 28.NOV.2015 02:44:52

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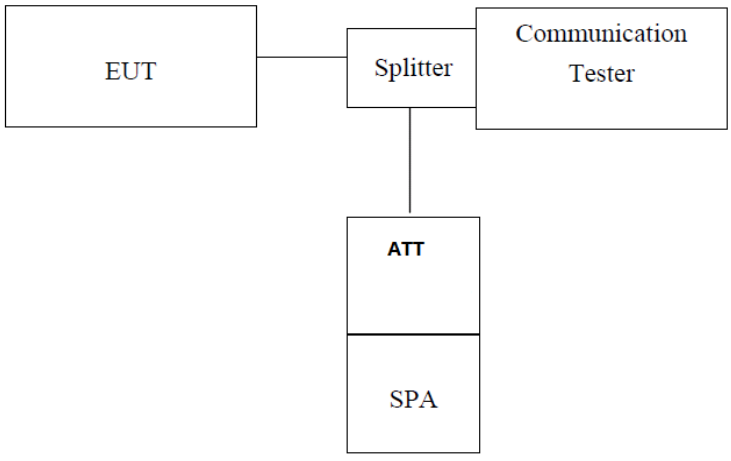Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366   Page 34 of 75

6.8 Modulation Characteristic

According to FCC § 2.1047(d), Part 22H & 24E& 27L there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.
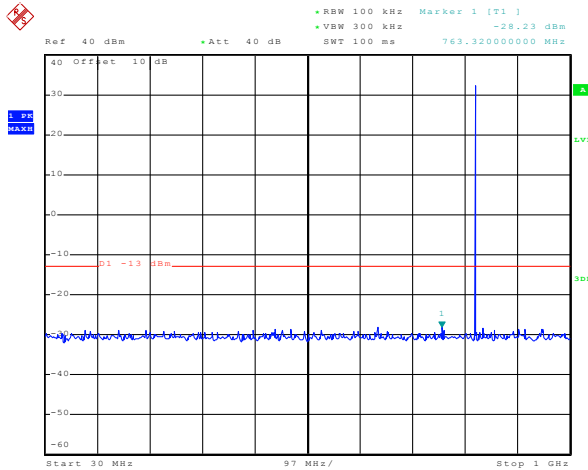
6.9 Out of band emission at antenna terminals

Test Requirement:	FCC part22.917(a), FCC part24.238(a) and FCC Part 27.53 (h)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	Note: *Measurement setup for testing on Antenna connector*
Test Procedure:	5 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 6 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 7 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic. 8 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

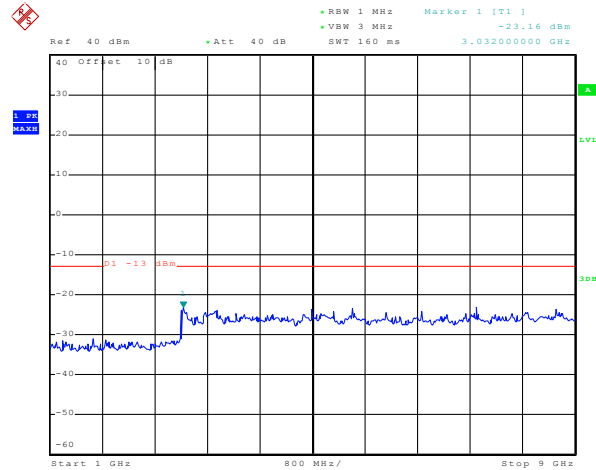Test plots as follows:

Spurious emission

GSM 850

Lowest Channel

30MHz~1GHz
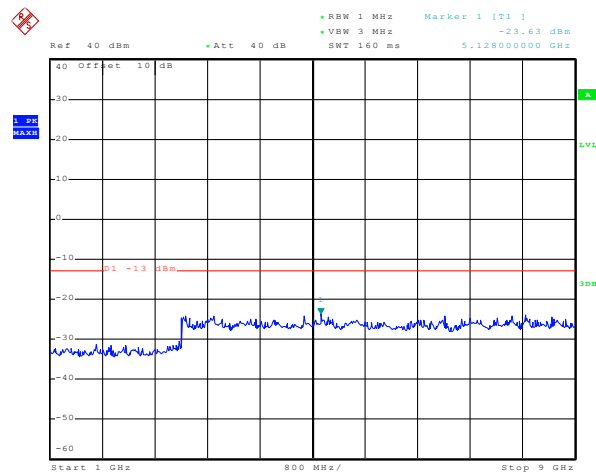
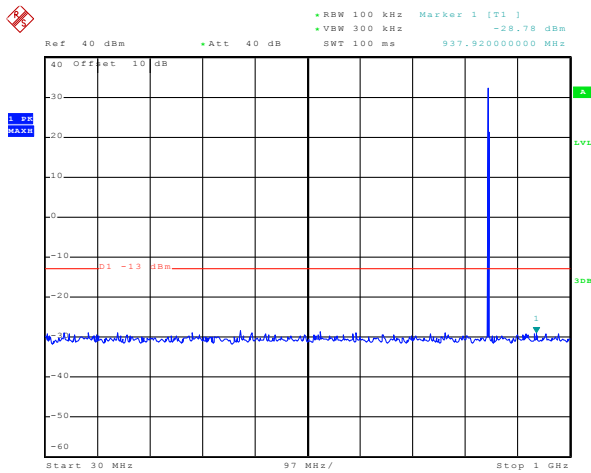1GHz~9GHz

Middle channel

30MHz~1GHz

1GHz~9GHz

Highest Channel

Date: 28.NOV.2015 00:46:51

30MHz~1GHz

Date: 28.NOV.2015 00:48:31

1GHz~9GHz

PCS 1900

Lowest Channel

Date: 28.NOV.2015 01:03:10

30MHz~1GHz

Date: 28.NOV.2015 01:03:39

1GHz~20GHz
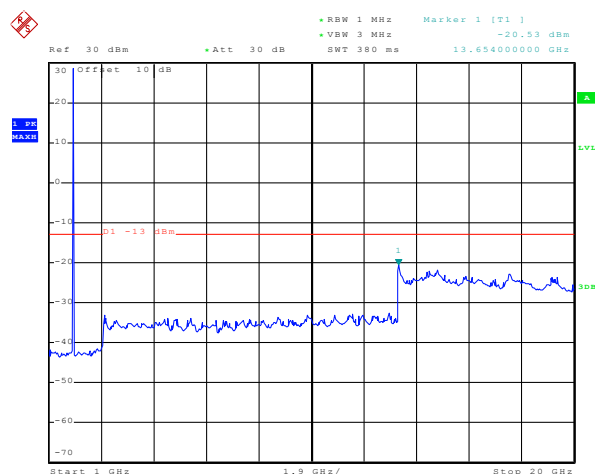
Shenzhen Zhongjian Nanfang Testing Co., Ltd.
No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
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Middle Channel

30MHz~1GHz

1GHz~20GHz

Highest Channel

30MHz~1GHz

1GHz~20GHz

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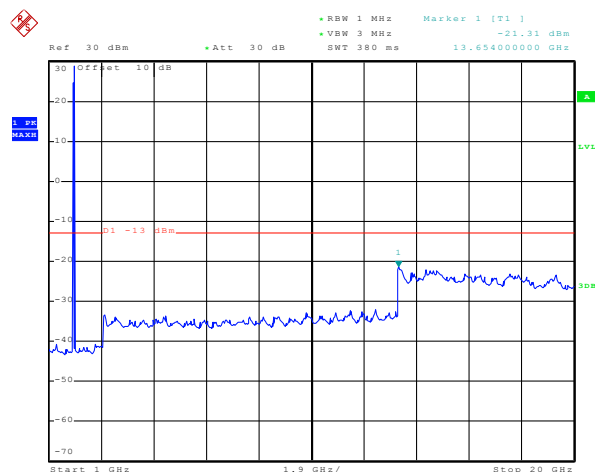
WCDMA Band V 12.2k RMC

Lowest Channel
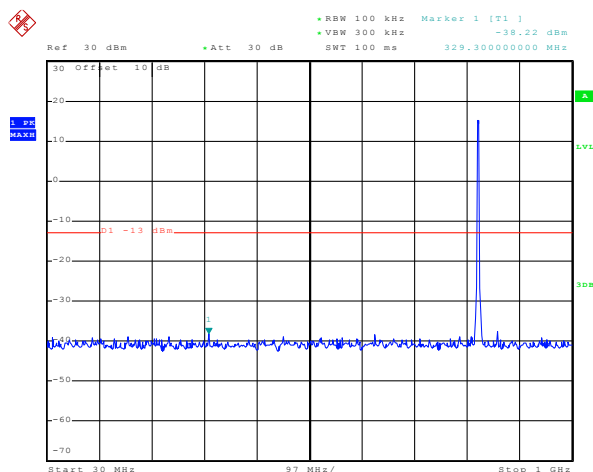
Date: 28.NOV.2015 02:41:02

30MHz~1GHz

Date: 28.NOV.2015 02:42:21

1GHz~9GHz

Middle Channel
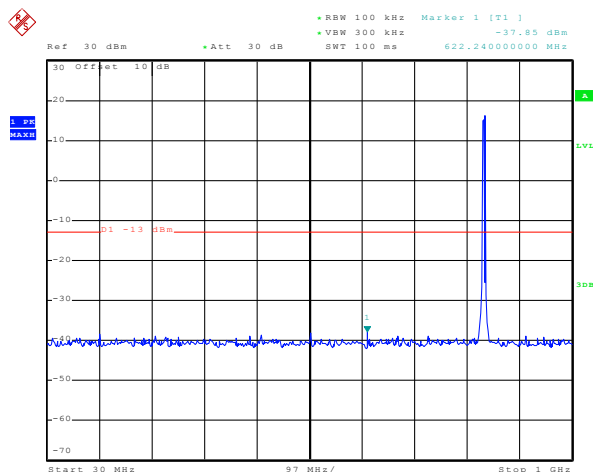
Date: 28.NOV.2015 02:41:25

30MHz~1GHz
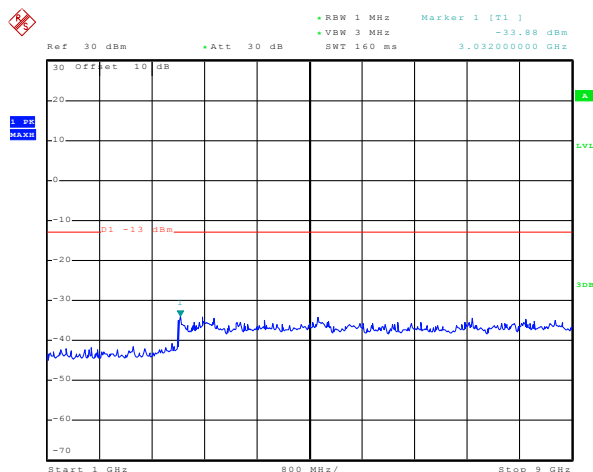
Date: 28.NOV.2015 02:42:08

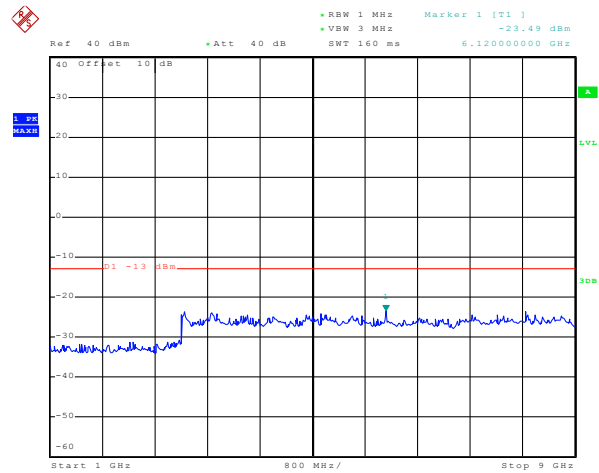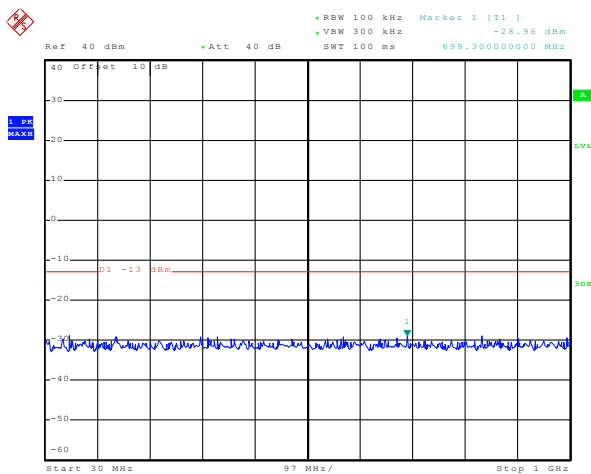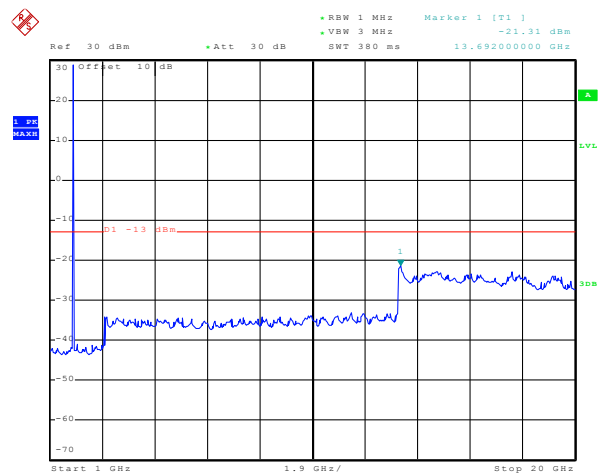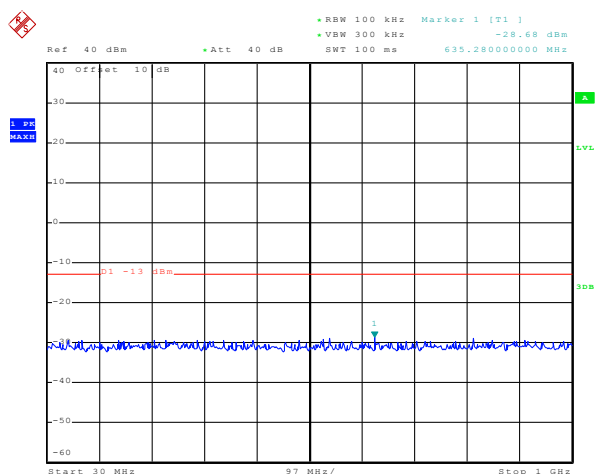1GHz~9GHz

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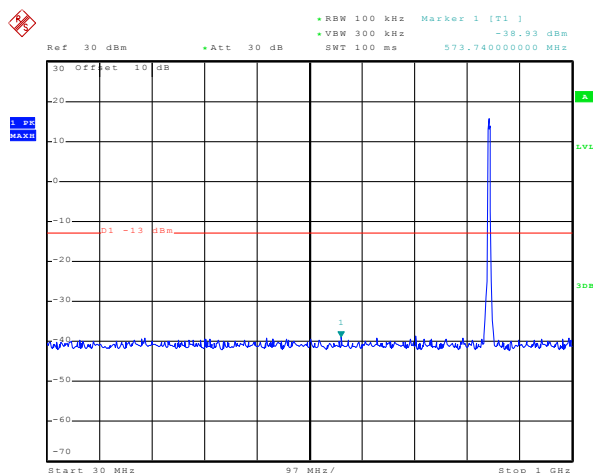
Highest Channel

| 30MHz~1GHz | 1GHz~9GHz |

WCDMA Band II 12.2k RMC

Lowest Channel
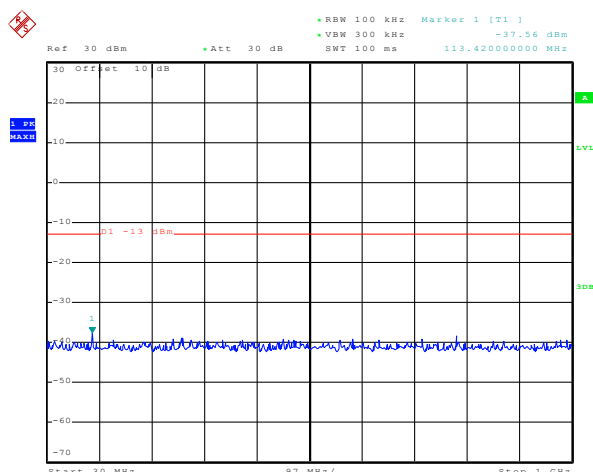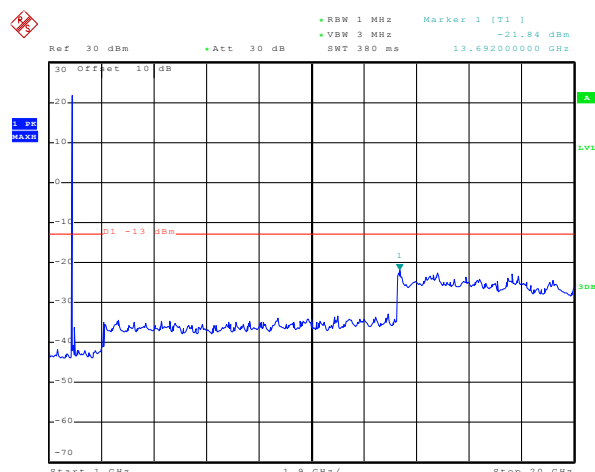
| 30MHz~1GHz | 1GHz~20GHz |

Middle Channel

30MHz~1GHz

1GHz~20GHz

Highest Channel

30MHz~1GHz

1GHz~20GHz

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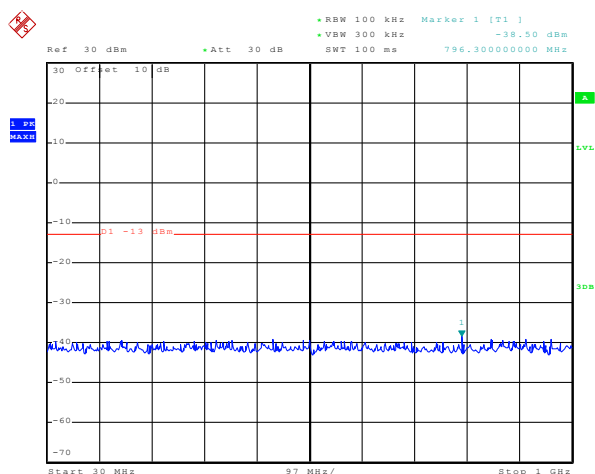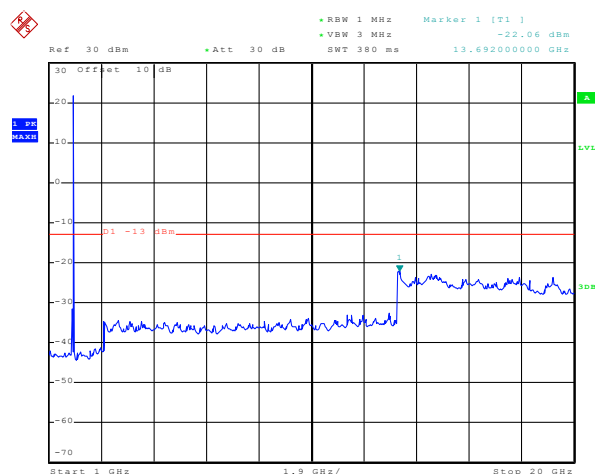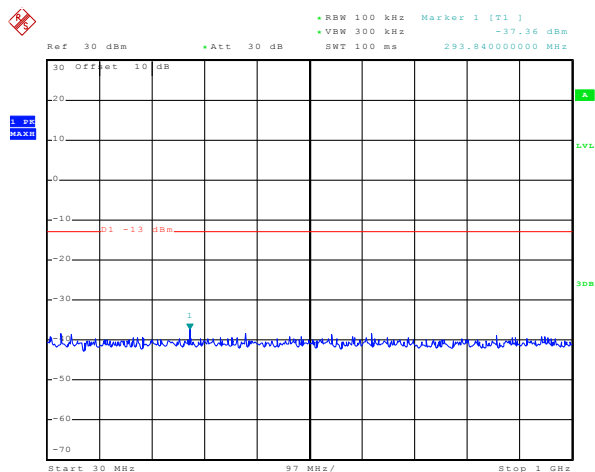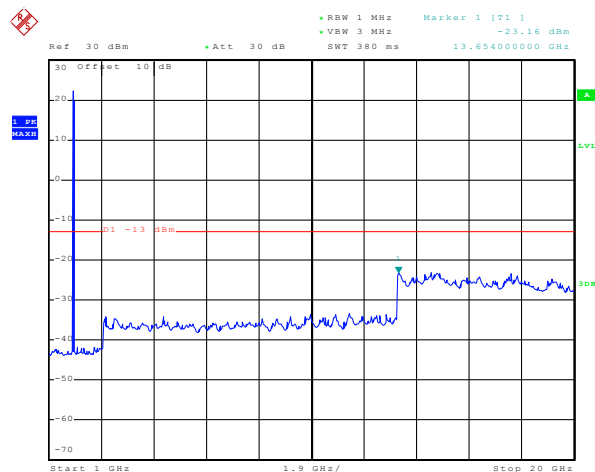
WCDMA Band IV 12.2k RMC

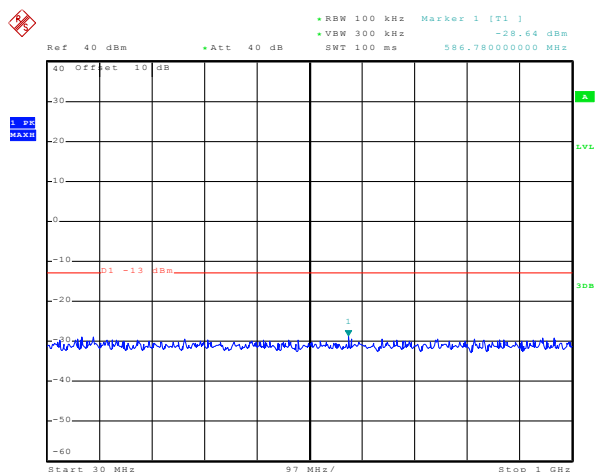Lowest Channel
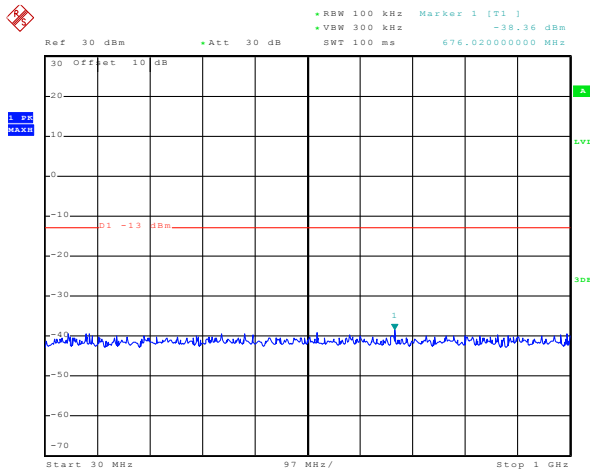
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30MHz~1GHz
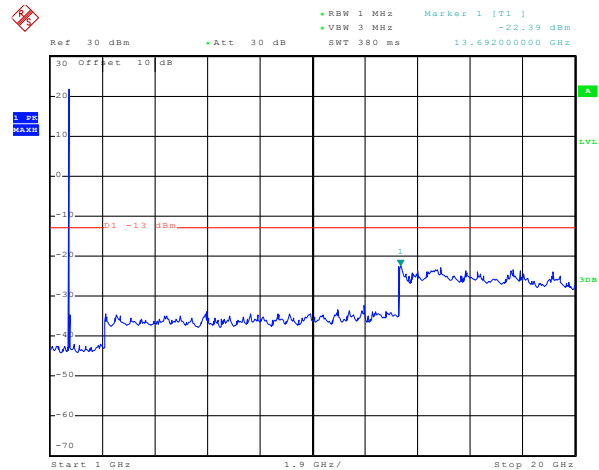
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1GHz~20GHz

Middle Channel
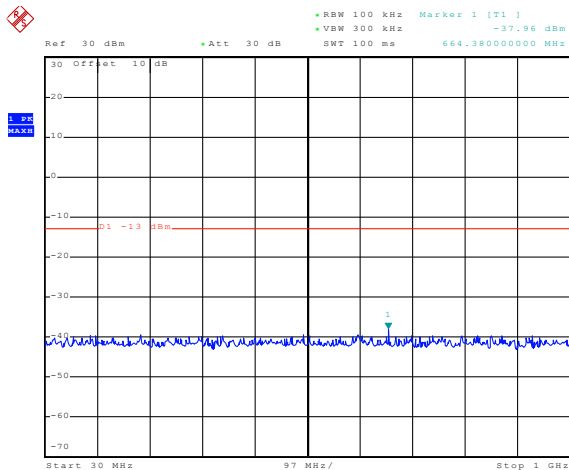
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30MHz~1GHz
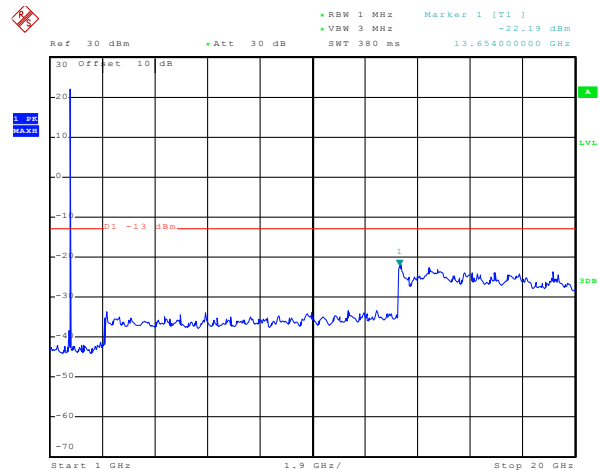
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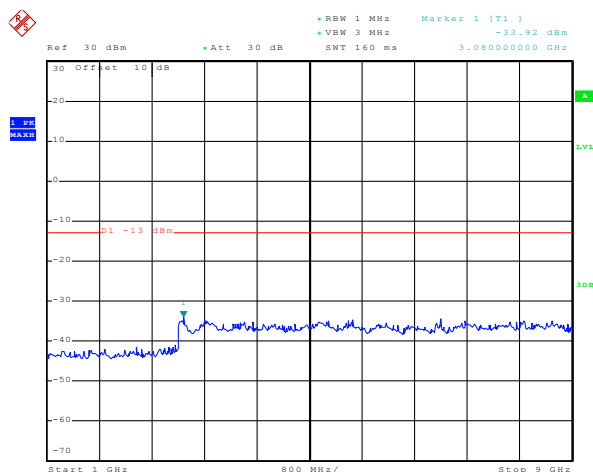1GHz~20GHz

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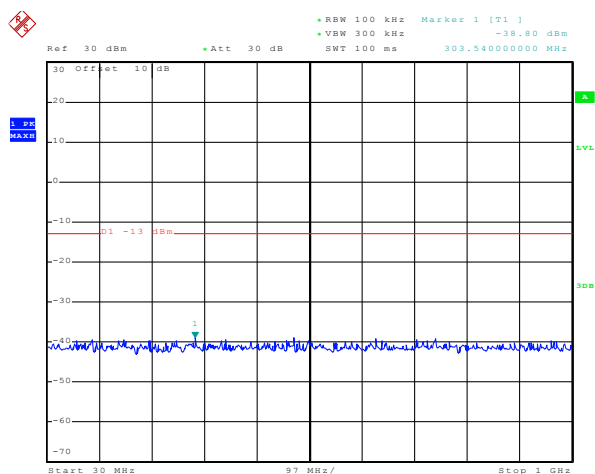
Highest Channel

Date: 28.NOV.2015 02:51:14

30MHz~1GHz
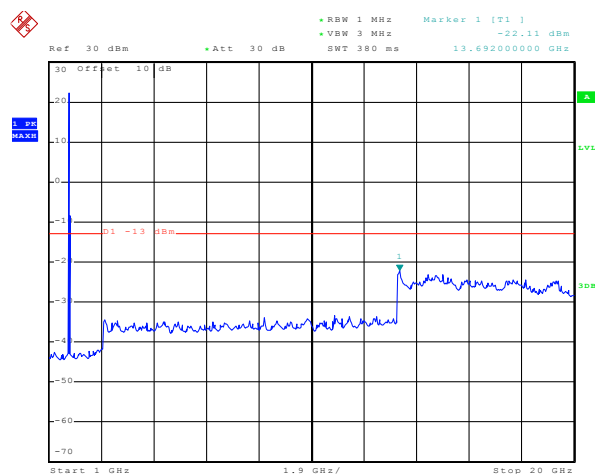
Date: 28.NOV.2015 02:52:08

1GHz~20GHz

Band edge emission

GSM850
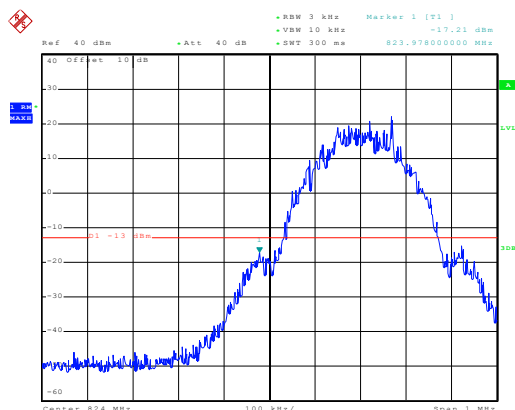
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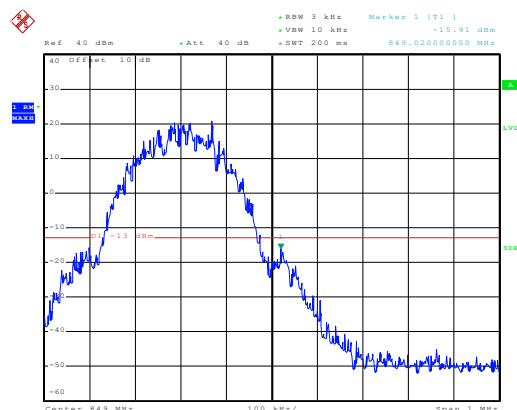
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Highest channel

PCS1900
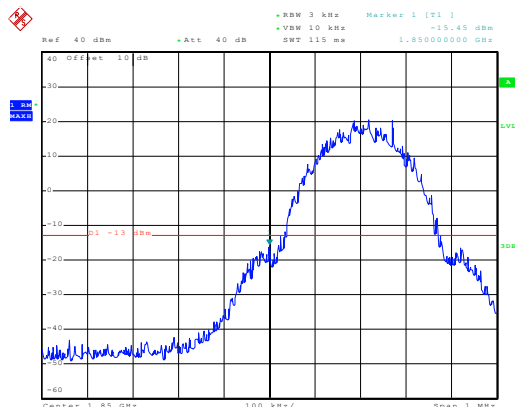
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Lowest channel
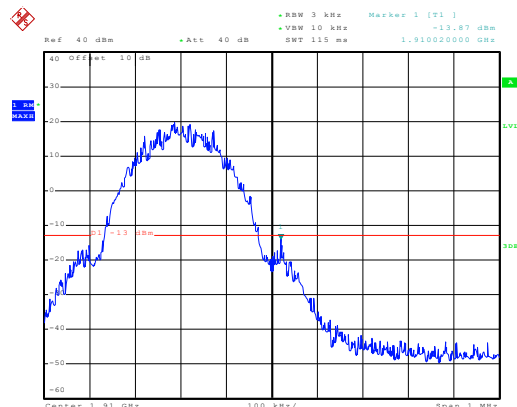
Date: 28.NOV.2015 01:02:19

Highest channel

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CCIS

EGPRS850
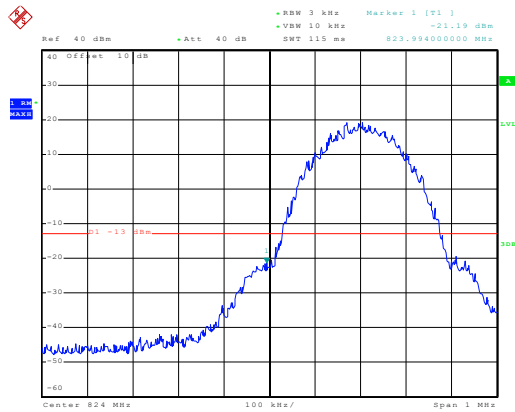
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Lowest channel
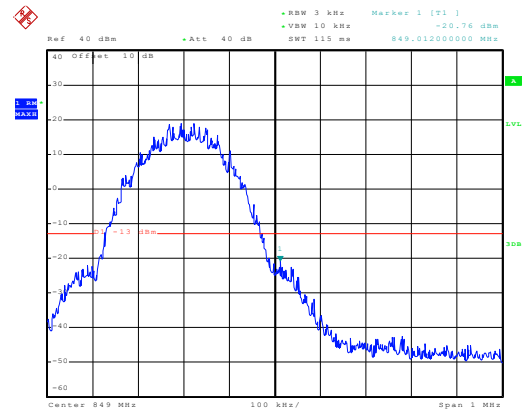
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Highest channel

EGPRS1900
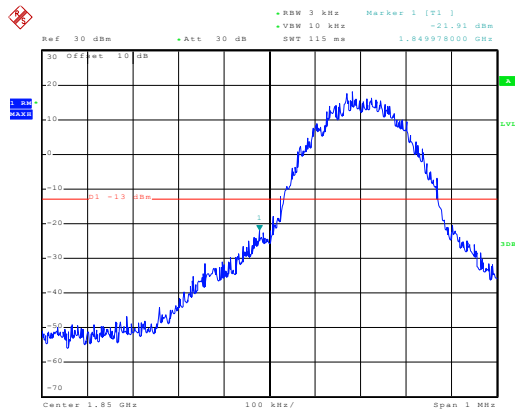
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Lowest channel
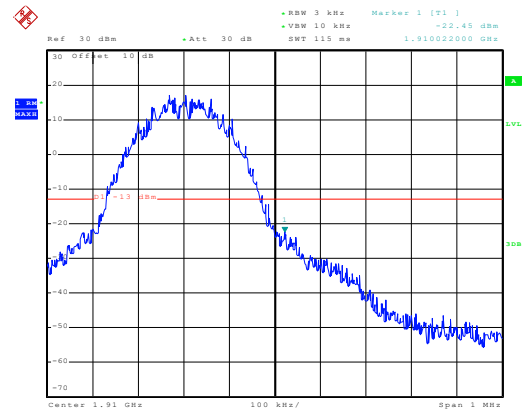
Date: 28.NOV.2015 01:10:38

Highest channel

WCDMA BAND V RMC 12.2kbps
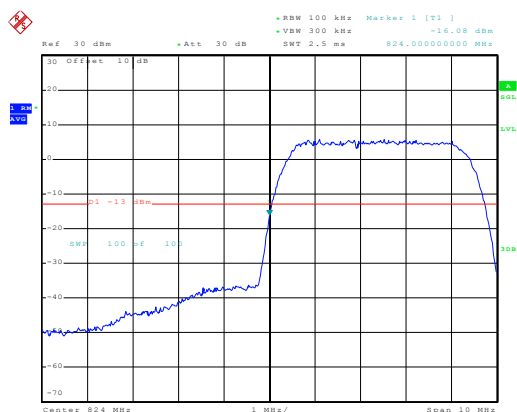
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Lowest channel
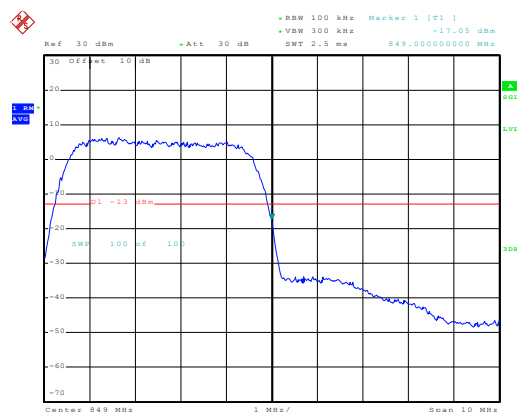
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Highest channel

WCDMA Band II RMC 12.2kbps
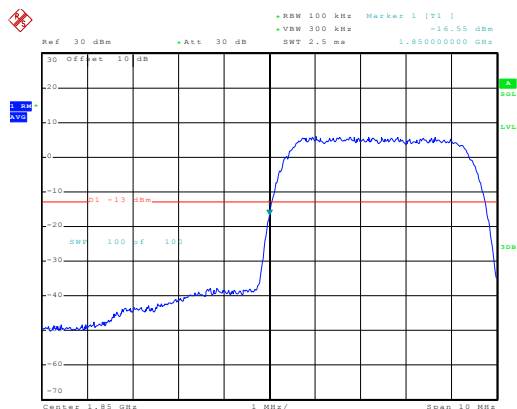
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Lowest channel
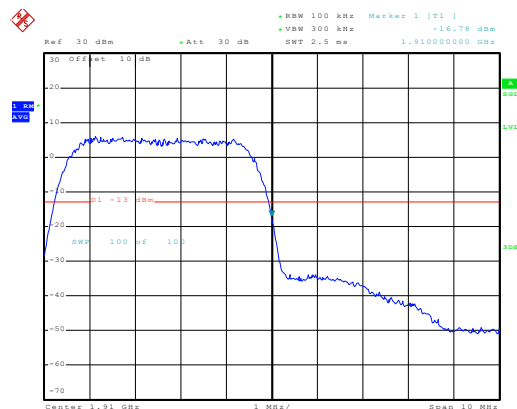
Date: 28.NOV.2015 02:46:17

Highest channel

WCDMA Band IV RMC 12.2kbps
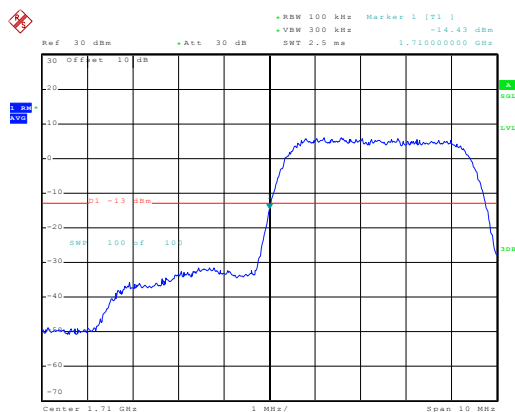
Lowest channel

Highest channel

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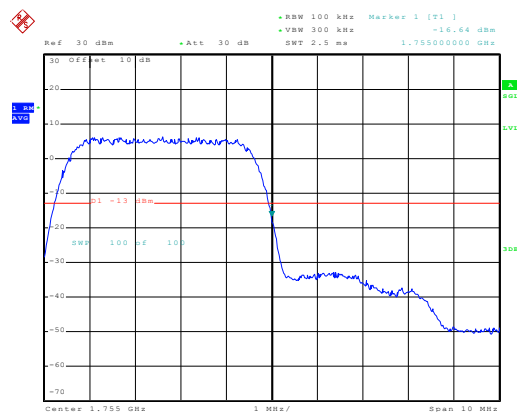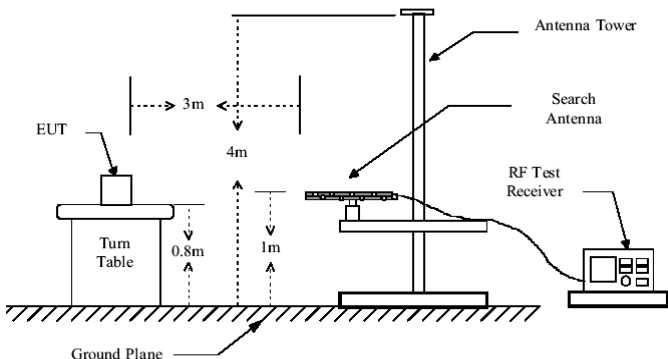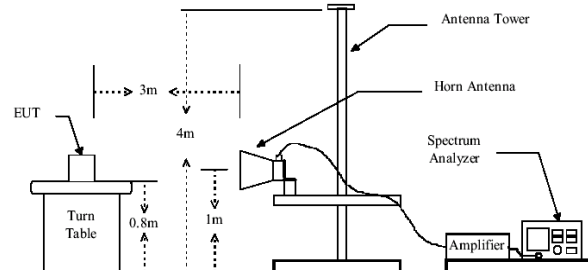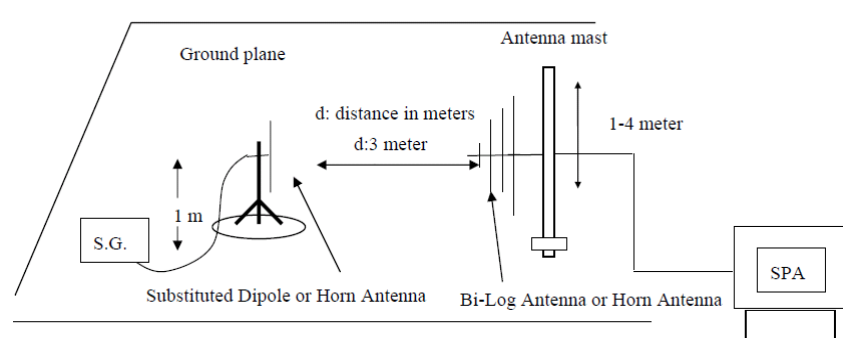
6.10   ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a), FCC part24.232(b) and FCC part 27.50(d)
Test Method:	FCC part2.1046
Limit:	GSM850 7W: ERP PCS1900 2W: EIRP WCDMA Band V: 7W ERP WCDMA Band II: 2W EIRP WCDMA Band IV: 1W EIRP
Test setup:	Below 1GHz Above 1GHz Substituted method:

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
	2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
	3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
	4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
	5. The worse case was relating to the conducted output power.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed (All three channels were tested, and just the worst case data were shown in the report.)

Measurement Data (worst case)

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EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850	190	H	V	29.04	38.45	Pass
			H	26.55		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
PCS1900	810	H	V	25.07	33.00	Pass
			H	23.45		

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
EGPRS850	190	H	V	27.12	38.45	Pass
			H	24.61		
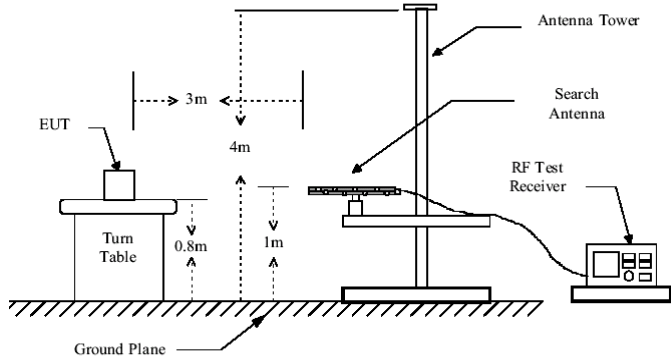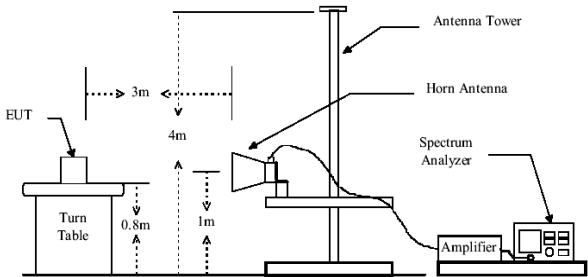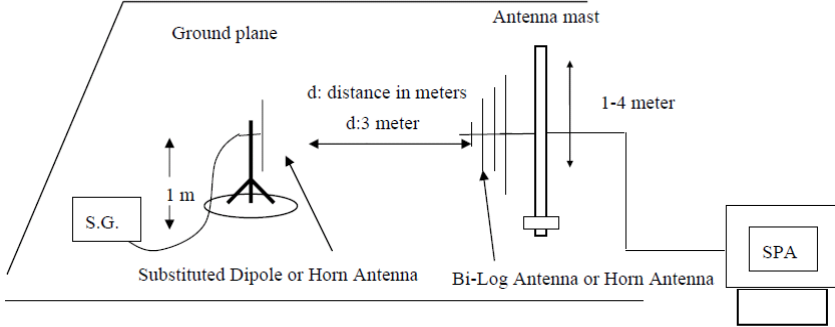
EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
EGPRS1900	810	H	V	25.00	33.00	Pass
			H	22.07		

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
UMTS 850 12.2k RMC	4132	H	V	22.46	38.45	Pass
			H	19.27		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
UMTS 1900 12.2k RMC	9400	H	V	20.42	33.00	Pass
			H	20.02		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
UMTS 1700 12.2k RMC	1413	H	V	19.40	30.00	Pass
			H	17.36		

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6.11 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917(a), FCC part24.238(a) and FCC part 27.53(h)
Test Method:	FCC part2.1053
Limit:	-13dBm
Test setup:	Below 1GHz Above 1GHz Substituted method:
Test Procedure:	1. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

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	4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Uncertainty:	± 4.88 dB
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

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Measurement Data (worst case)

Test mode:	GSM850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1648.40	Vertical	-45.32	-13.00	Pass
2472.60	V	-37.22		
1648.40	Horizontal	-52.55	-13.00	Pass
2472.60	H	-47.73		
3296.80	H	-48.69		
Test mode:	GSM850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-45.58	-13.00	Pass
2509.80	V	-44.15		
3346.40	V	-48.40		
1673.20	Horizontal	-54.57	-13.00	Pass
2509.80	H	-47.69		
3346.40	H	-47.74		
Test mode:	GSM850		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-47.82	-13.00	Pass
2546.40	V	-40.95		
3395.20	V	-47.68		
1697.60	Horizontal	-52.58	-13.00	Pass
2546.40	H	-45.06		
3395.20	H	-47.17		

Remark:
1.   The emission levels of below 1 GHz are very lower than the limit and not show in test report.

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Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-47.35	-13.00	Pass
5550.60	V	-40.34		
3700.40	Horizontal	-48.81	-13.00	Pass
5550.60	H	-38.37		
Test mode:	PCS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-48.45	-13.00	Pass
5640.00	V	-33.93		
3760.00	Horizontal	-48.38	-13.00	Pass
5640.00	H	-40.59		
Test mode:	PCS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-48.12	-13.00	Pass
5729.40	V	-36.73		
3819.60	Horizontal	-48.28	-13.00	Pass
5729.40	H	-39.85		

Remark:
1. *The emission levels of below 1 GHz are very lower than the limit and not show in test report.*

Test mode:	WCDMA BAND V 12.2k RMC		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1652.80	Vertical	-56.49	-13.00	Pass
2479.20	V	-38.94		
3305.60	V	-48.74		
1652.80	Horizontal	-57.83	-13.00	Pass
2479.20	H	-50.46		
3305.60	H	-49.01		
Test mode:	WCDMA BAND V 12.2k RMC		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-56.24	-13.00	Pass
2509.80	V	-52.32		
3346.40	V	-49.89		
1673.20	Horizontal	-57.67	-13.00	Pass
2509.80	H	-50.78		
3346.40	H	-47.95		
Test mode:	WCDMA BAND V 12.2k RMC		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1693.20	Vertical	-56.84	-13.00	Pass
2539.80	V	-43.24		
3386.40	V	-47.03		
1693.20	Horizontal	-56.38	-13.00	Pass
2539.80	H	-46.36		
3386.40	H	-47.23		

Remark:
1. *The emission levels of below 1 GHz are very lower than the limit and not show in test report.*

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Test mode:	WCDMA Band II 12.2k RMC		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3704.80	Vertical	-44.05	-13.00	Pass
5557.20	V	-32.93		
3704.80	Horizontal	-41.07	-13.00	Pass
5557.20	H	-27.42		
Test mode:	WCDMA Band II 12.2k RMC		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-46.46	-13.00	Pass
5640.00	V	-36.24		
3760.00	Horizontal	-40.65	-13.00	Pass
5640.00	H	-32.36		
Test mode:	WCDMA Band II 12.2k RMC		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3815.20	Vertical	-46.03	-13.00	Pass
5722.80	V	-35.68		
3815.20	Horizontal	-39.11	-13.00	Pass
5722.80	H	-33.14		

Remark:
1. *The emission levels of below 1 GHz are very lower than the limit and not show in test report.*
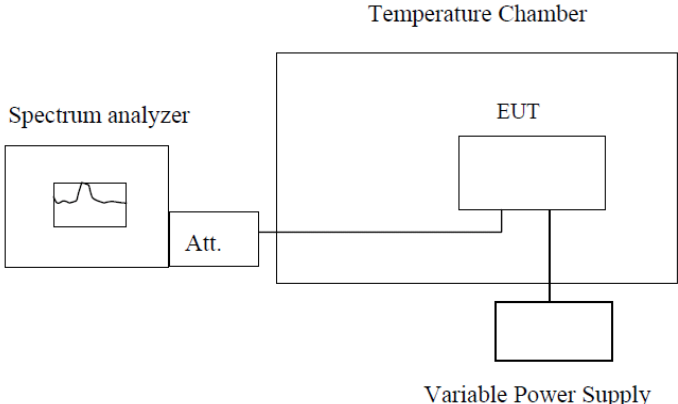
Test mode:	WCDMA Band IV 12.2k RMC		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3424.40	Vertical	-46.89	-13.00	Pass
5136.60	V	-35.05		
3424.40	Horizontal	-39.33		
5136.60	H	-32.71		
Test mode:	WCDMA Band IV 12.2k RMC		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3464.80	Vertical	-46.62	-13.00	Pass
5197.20	V	-38.41		
3464.80	Horizontal	-39.54		
5197.20	H	-37.44		
Test mode:	WCDMA Band IV 12.2k RMC		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3505.20	Vertical	-46.55	-13.00	Pass
5257.80	V	-32.30		
3505.20	Horizontal	-40.50		
5257.80	H	-29.06		

Remark:
1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

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6.12 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	±2.5ppm
Test setup:	\n\nNote : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage.\n2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.\n3. The EUT was placed inside the temperature chamber.\n4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.\n5. Turn EUT off and set the chamber temperature to −30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.\n6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.
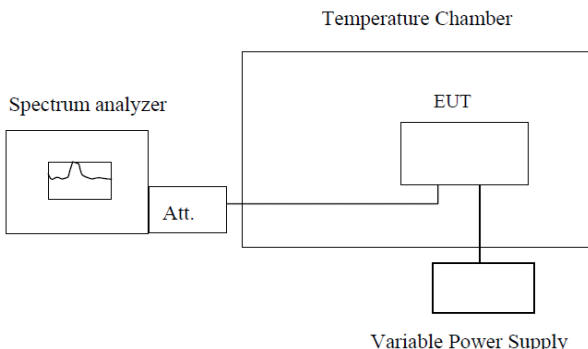
Measurement Data:

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	170	0.203203	±2.5	Pass
	-20	163	0.194836		
	-10	152	0.181688		
	0	147	0.175711		
	10	166	0.198422		
	20	128	0.153000		
	30	147	0.175711		
	40	133	0.158977		
	50	160	0.191250		

Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	174	0.092553	±2.5	Pass
	-20	159	0.084574		
	-10	148	0.078723		
	0	136	0.072340		
	10	124	0.065957		
	20	118	0.062766		
	30	139	0.073936		
	40	147	0.078191		
	50	125	0.066489		

Reference Frequency: EGPRS850 Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	179	0.213961	±2.5	Pass
	-20	152	0.181688		
	-10	147	0.175711		
	0	128	0.153000		
	10	136	0.162563		
	20	107	0.127899		
	30	140	0.167344		
	40	155	0.185274		
	50	122	0.145828		
Reference Frequency: EGPRS 1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	160	0.085106	±2.5	Pass
	-20	147	0.078191		
	-10	135	0.071809		
	0	128	0.068085		
	10	125	0.066489		
	20	109	0.057979		
	30	155	0.082447		
	40	102	0.054255		
	50	133	0.070745		

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Reference Frequency:WCDMA BAND V 12.2k RMC Middle channel=4183 channel=836.6MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	159	0.190055	±2.5	Pass
	-20	123	0.147024		
	-10	114	0.136266		
	0	126	0.150610		
	10	105	0.125508		
	20	125	0.149414		
	30	136	0.162563		
	40	137	0.163758		
	50	140	0.167344		

Reference Frequency: WCDMA BAND II 12.2k RMC Middle channel=9400 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	154	0.081915	±2.5	Pass
	-20	126	0.067021		
	-10	133	0.070745		
	0	104	0.055319		
	10	108	0.057447		
	20	125	0.066489		
	30	135	0.071809		
	40	144	0.076596		
	50	146	0.077660		

Reference Frequency: WCDMA BAND IV 12.2k RMC Middle channel=1413 channel=1732.6MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	144	0.083112	±2.5	Pass
	-20	126	0.072723		
	-10	130	0.075032		
	0	125	0.072146		
	10	108	0.062334		
	20	104	0.060025		
	30	127	0.073300		
	40	126	0.072723		
	50	136	0.078495		

6.13 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	±2.5ppm
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

Measurement Data (the worst channel):

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Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	66	0.078891	±2.5	Pass
	3.70	75	0.089649		
	3.40	89	0.106383		

Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	96	0.051064	±2.5	Pass
	3.70	74	0.039362		
	3.40	63	0.033511		

Reference Frequency: EGPRS 850 Middle channel=190 channel=836.6MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	74	0.088453	±2.5	Pass
	3.70	89	0.106383		
	3.40	82	0.098016		

Reference Frequency: EGPRS 1900 Middle channel=661 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	74	0.039362	±2.5	Pass
	3.70	69	0.036702		
	3.40	85	0.045213		

Reference Frequency: UMTS 850 12.2k RMC Middle channel=4183 channel=836.6MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	74	0.088453	±2.5	Pass
	3.70	96	0.114750		
	3.40	63	0.075305		

Reference Frequency: UMTS 1900 12.2k RMC Middle channel=9400 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	74	0.039362	±2.5	Pass
	3.70	85	0.045213		
	3.40	89	0.047340		

Reference Frequency: WCDMA BAND IV12.2k RMC Middle channel=1413 channel=1732.6MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	74	0.042710	±2.5	Pass
	3.70	66	0.038093		
	3.40	69	0.039825		