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Report No.: GTI20161071F-3

Page 1 of 45

TEST REPORT

Product Name: LTE/WCDMA/GSM(GPRS) Mutil-Mode Digital Mobile Phone

Trademark: /

Model/Type reference: ZTE BLADE V8 SE, ZTE BLADE V0820,
ZTE BLADE V8 LITE, BLADE V8 SE

FCC ID: SRQ-BLADEV8SE

Test Standards: FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
FCC CFR Title 47 Part 24 Subpart E

Applicant.....: ZTE CORPORATION

Address of Applicant.....: ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park,
Nanshan District, Shenzhen, Guangdong, 518057, P.R.
China Shenzhen

Date of Receipt: Dec. 26, 2016

Date of Test Date: Dec. 27, 2016 - Dec. 30, 2016

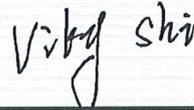
Data of Issue.: Jan. 02, 2017

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified above

GENERAL DESCRIPTION OF EUT	
Equipment:	LTE/WCDMA/GSM(GPRS) Mutil-Mode Digital Mobile Phone
Model Name:	ZTE BLADE V8 SE, ZTE BLADE V0820, ZTE BLADE V8 LITE, BLADE V8 SE
Model Difference	All models are the Circuit Design identical, only different on model number, the test is performed on model: ZTE BLADE V8 SE
Manufacturer:	ZTE CORPORATION
Manufacturer Address:	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China Shenzhen
Power Rating:	DC 3.85V form 2500mAh by Rechargeable Li-ion Battery
Adapter:	Model: STC-A515A-Z Input: AC 100-240V, 50Hz/60Hz, 300mA Output: DC 5V, 1500mA

Compiled By:



(Viky Shi)

Reviewed By:



(Winner Zhang)

Approved By:



(Walter Chen)

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Table of Contents

Page

1. SUMMARY.....	4
1.1. TEST STANDARDS.....	4
1.2. TEST DESCRIPTION.....	4
1.3. TEST FACILITY.....	5
1.4. MEASUREMENT UNCERTAINTY.....	5
2. GENERAL INFORMATION.....	6
2.1. ENVIRONMENTAL CONDITIONS.....	6
2.2. GENERAL DESCRIPTION OF EUT.....	6
2.3. DESCRIPTION OF TEST MODES AND TEST FREQUENCY.....	7
2.4. MEASUREMENT INSTRUMENTS LIST.....	7
3. TEST ITEM AND RESULTS.....	9
3.1. CONDUCTED OUTPUT POWER.....	9
3.2. OCCUPY BANDWIDTH.....	14
3.3. OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	22
3.4. BAND EDGE COMPLIANCE.....	27
3.5. RADIATED POWER MEASUREMENT.....	31
3.6. RADIATED SPURIOUS EMISSION.....	35
3.7. FREQUENCY STABILITY.....	39
4. EUT TEST PHOTOS.....	44
5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL.....	45

1. SUMMARY

1.1. Test Standards

[FCC Part 22 Subpart H](#): PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 24 Subpart E](#): PUBLIC MOBILE SERVICES

[TIA/EIA 603](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[ANSI C63.4:2013](#): Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2. Test Description

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

Note:

1. The measurement uncertainty is not included in the test result.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen General Testing & Inspection Technology Co., Ltd.

Add: 1F, 2 Block, Jiaquan Building, Guanlan High-tech Park Baoan District, Shenzhen, Guangdong, China

1.3.2 Laboratory accreditation

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

IC Registration No.: 9783A

The 3m alternate test site of Shenzhen GTI Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Aug, 2011.

FCC-Registration No.:214666

Shenzhen GTI Technology 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 our files. Registration 214666, Sep 19, 2011

1.4. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the Shenzhen General Testing & Inspection Technology Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for General Testing & Inspection laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)
Emission Mask	-----	(1)
Modulation Characteristic	-----	(1)
Transmitter Frequency Behavior	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	LTE/WCDMA/GSM(GPRS) Mutil-Mode Digital Mobile Phone
Model/Type reference:	LeBHP401
Power supply:	DC 3.85V form 2500mAh by Rechargeable Li-ion Battery
Adapter:	Model: STC-A515A-Z Input: AC 100-240V, 50Hz/60Hz, 300mA Output: DC 5V, 1500mA
GSM	
Operation Band:	GSM850: UL: 824MHz~849MHz, DL: 869MHz~894MHz PCS1900: UL: 1850MHz~1910, DL: 1930MHz~1990MHz
Supported Type:	GSM/GPRS/EGPRS
Modulation Type:	GMSK for GSM/GPRS, 8PSK for EGPRS
Antenna Type:	Internal Antenna
Antenna Gain:	GSM 850: -3.3dBi PCS 1900: -0.25dBi
WCDMA	
Operation Band:	Band II: UL: 824MHz~849MHz, DL: 869MHz~894MHz Band V: UL: 1850MHz~1910, DL: 1930MHz~1990MHz
Modulation Type:	QPSK for WCDMA/HSUPA/HSDPA
Antenna Type:	Internal Antenna
Antenna Gain:	WCDMA 850: -3.3dBi WCDAM 1900: -0.25dBi

2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing.

Test Frequency:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
190	836.60	661	1880.00
251	848.80	810	1909.80

FDD Band II		FDD Band V	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
9262	1852.4	4132	826.40
9400	1880.0	4182	836.60
9538	1907.6	4233	846.60

2.4. Measurement Instruments List

Output Power (Radiated) & Radiated Spurious Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100967	Jan. 07, 2017
2	High pass filter	Compliance Direction systems	BSU-6	34202	Jan. 07, 2017
3	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4180	Jan. 07, 2017
4	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4181	Jan. 07, 2017
5	Spectrum Analyzer	HP	8563E	02052	Jan. 07, 2017
6	Horn Antenna	Schwarzbeck	BBHA 9120D	648	Jan. 07, 2017
7	Horn Antenna	Schwarzbeck	BBHA 9120D	649	Jan. 07, 2017
8	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	Jan. 07, 2017
9	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25842	Jan. 07, 2017
10	Pre-Amplifier	HP	8447D	1937A03050	Jan. 07, 2017
11	Pre-Amplifier	EMCI	EMC051835	980075	Jan. 07, 2017
12	Splitter	Mini-Circuit	ZAPD-4	400059	Jan. 07, 2017
13	Signal Generator	Agilent	N5182A	1019356	Jan. 07, 2017
14	UNIVERSAL RADIO COMMUNICATION	Rohde & Schwarz	CMU200	114694	Jan. 07, 2017
15	Antenna Mast	UC	UC3000	N/A	N/A
16	Antenna mast	MATURO	TAM-4.0-P	N/A	N/A
17	Turn Table	UC	UC3000	N/A	N/A
18	Cable Below 1GHz	Schwarzbeck	AK9515E	33155	Jan. 07,2017
19	Cable Above 1GHz	Hubersuhner	SUCOFLEX102	DA1580	Jan. 07,2017



Output Power(Conducted) & Occupied Bandwidth & Emission Bandwidth & Band Edge Compliance & Conducted Spurious Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	UNIVERSAL RADIO COMMUNICATION	Rohde & Schwarz	CMU200	114694	Jan. 07, 2017
2	Spectrum Analyzer	Rohde & Schwarz	FSU	100105	Jan. 07, 2017
3	Splitter	Mini-Circuit	ZAPD-4	400059	Jan. 07, 2017

Frequency Stability					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	UNIVERSAL RADIO COMMUNICATION	Rohde & Schwarz	CMU200	114694	Jan. 07, 2017
2	Spectrum Analyzer	Rohde & Schwarz	FSU	100105	Jan. 07, 2017
3	Splitter	Mini-Circuit	ZAPD-4	400059	Jan. 07, 2017
4	Climate Chamber	ESPEC	EL-10KA	05107008	Oct 25,2017

Note: 1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.

3. TEST ITEM AND RESULTS

3.1. Conducted Output Power

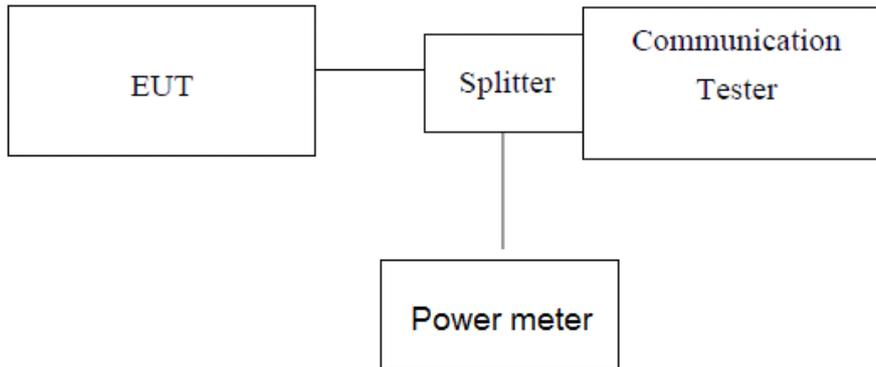
LIMIT:

GSM850/WCDMA Band V: 7W

PCS1900/WCDMA Band II: 2W

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



Note: Measurement setup for testing on Antenna connector

TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum PK burst power and maximum Avg. burst power.

TEST RESULTS

EUT Mode	Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio(dB)	Limit (dBm)	Result
GSM 850 (GMSK)	128	824.20	33.1	/	38.45	Pass
	190	836.60	33.1	/		
	251	848.80	33.2	/		
GPRS850 (GMSK, 1Slot)	128	824.20	33.1	/	38.45	Pass
	190	836.60	33.1	/		
	251	848.80	33.2	/		
GPRS850 (GMSK, 2Slot)	128	824.20	32.1	/	38.45	Pass
	190	836.60	32.1	/		
	251	848.80	32.2	/		
GPRS850 (GMSK, 3Slot)	128	824.20	30.2	/	38.45	Pass
	190	836.60	30.2	/		
	251	848.80	30.1	/		
GPRS850 (GMSK, 4Slot)	128	824.20	29.1	/	38.45	Pass
	190	836.60	29.0	/		
	251	848.80	29.0	/		
EGPRS850 (8PSK,1Slot)	128	824.20	26.7	/	38.45	Pass
	190	836.60	26.7	/		
	251	848.80	26.5	/		
EGPRS850 (8PSK, 2Slot)	128	824.20	25.6	/	38.45	Pass
	190	836.60	25.7	/		
	251	848.80	25.4	/		
EGPRS850 (8PSK, 3Slot)	128	824.20	23.5	/	38.45	Pass
	190	836.60	23.5	/		
	251	848.80	23.3	/		
EGPRS850 (8PSK, 4Slot)	128	824.20	22.3	/	38.45	Pass
	190	836.60	22.3	/		
	251	848.80	22.2	/		

Note: 1.Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.



EUT Mode	Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio(dB)	Limit (dBm)	Result
PCS1900 (GMSK)	512	1850.20	30.3	0.11	33.00	Pass
	661	1880.00	30.3	0.12		
	810	1909.80	30.4	0.10		
GPRS1900 (GMSK, 1Slot)	512	1850.20	30.3	0.13	33.00	Pass
	661	1880.00	30.3	0.12		
	810	1909.80	30.4	0.12		
GPRS1900 (GMSK, 2Slot)	512	1850.20	29.4	0.11	33.00	Pass
	661	1880.00	29.4	0.10		
	810	1909.80	29.6	0.12		
GPRS1900 (GMSK, 3Slot)	512	1850.20	27.3	0.12	33.00	Pass
	661	1880.00	27.3	0.11		
	810	1909.80	27.5	0.13		
GPRS1900 (GMSK, 4Slot)	512	1850.20	26.1	0.10	33.00	Pass
	661	1880.00	26.1	0.11		
	810	1909.80	26.3	0.13		
EGPRS1900 (8PSK, 1Slot)	512	1850.20	26.0	0.12	33.00	Pass
	661	1880.00	26.0	0.12		
	810	1909.80	26.0	0.11		
EGPRS1900 (8PSK, 2Slot)	512	1850.20	24.8	0.14	33.00	Pass
	661	1880.00	24.9	0.12		
	810	1909.80	24.8	0.13		
EGPRS1900 (8PSK, 3Slot)	512	1850.20	22.6	0.14	33.00	Pass
	661	1880.00	22.5	0.12		
	810	1909.80	22.5	0.13		
EGPRS1900 (8PSK, 4Slot)	512	1850.20	21.3	0.13	33.00	Pass
	661	1880.00	21.4	0.12		
	810	1909.80	21.3	0.12		

Note: 1.Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.

EUT Mode		Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio(dB)	Limit (dBm)	Result
WCDMA Band II HSDPA	Subtest 1	9262	1852.40	22.70	2.84	33.00	Pass
		9400	1880.00	22.74	2.83		
		9538	1907.60	22.63	2.84		
	Subtest 2	9262	1852.40	22.68	2.83	33.00	Pass
		9400	1880.00	22.75	2.85		
		9538	1907.60	22.62	2.81		
	Subtest 3	9262	1852.40	22.68	2.86	33.00	Pass
		9400	1880.00	22.74	2.82		
		9538	1907.60	22.63	2.84		
	Subtest 4	9262	1852.40	22.71	2.85	33.00	Pass
		9400	1880.00	22.76	2.83		
		9538	1907.60	22.65	2.83		
WCDMA Band II HSUPA	Subtest 1	9262	1852.40	22.68	2.82	33.00	Pass
		9400	1880.00	22.73	2.84		
		9538	1907.60	22.62	2.83		
	Subtest 2	9262	1852.40	22.67	2.84	33.00	Pass
		9400	1880.00	22.74	2.83		
		9538	1907.60	22.66	2.81		
	Subtest 3	9262	1852.40	22.70	2.83	33.00	Pass
		9400	1880.00	22.73	2.81		
		9538	1907.60	22.62	2.83		
	Subtest 4	9262	1852.40	22.70	2.84	33.00	Pass
		9400	1880.00	22.76	2.83		
		9538	1907.60	22.64	2.81		
	Subtest 5	9262	1852.40	22.69	2.81	33.00	Pass
		9400	1880.00	22.72	2.83		
		9538	1907.60	22.65	2.84		
WCDMA Band II RMC	12.2kbps	9262	1852.40	23.72	2.83	33.00	Pass
		9400	1880.00	23.87	2.83		
		9538	1907.60	23.84	2.81		

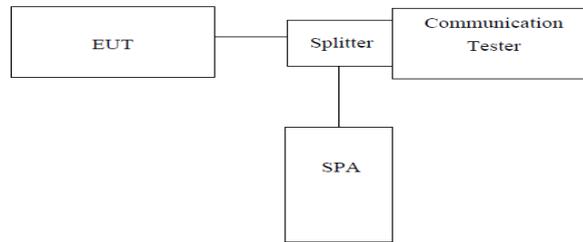
Note: 1.Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.

EUT Mode		Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio(dB)	Limit (dBm)	Result
WCDMA Band V HSDPA	Subtest 1	4132	826.40	22.97	/	38.45	Pass
		4183	836.60	22.86	/		
		4233	846.60	22.89	/		
	Subtest 2	4132	826.40	22.96	/	38.45	Pass
		4183	836.60	22.85	/		
		4233	846.60	22.87	/		
	Subtest 3	4132	826.40	22.97	/	38.45	Pass
		4183	836.60	22.87	/		
		4233	846.60	22.88	/		
	Subtest 4	4132	826.40	23.01	/	38.45	Pass
		4183	836.60	22.89	/		
		4233	846.60	22.87	/		
WCDMA Band V HSUPA	Subtest 1	4132	826.40	22.98	/	38.45	Pass
		4183	836.60	22.85	/		
		4233	846.60	22.86	/		
	Subtest 2	4132	826.40	22.96	/	38.45	Pass
		4183	836.60	22.84	/		
		4233	846.60	22.87	/		
	Subtest 3	4132	826.40	22.97	/	38.45	Pass
		4183	836.60	22.85	/		
		4233	846.60	22.86	/		
	Subtest 4	4132	826.40	22.95	/	38.45	Pass
		4183	836.60	22.86	/		
		4233	846.60	22.87	/		
	Subtest 5	4132	826.40	22.96	/	38.45	Pass
		4183	836.60	22.85	/		
		4233	846.60	22.87	/		
WCDMA Band V RMC	12.2kbps	4132	826.40	23.96	/	38.45	Pass
		4183	836.60	23.87	/		
		4233	846.60	23.98	/		

Note: 1.Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.

3.2. Occupy Bandwidth

TEST CONFIGURATION



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, $VBW \geq 3$ 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.

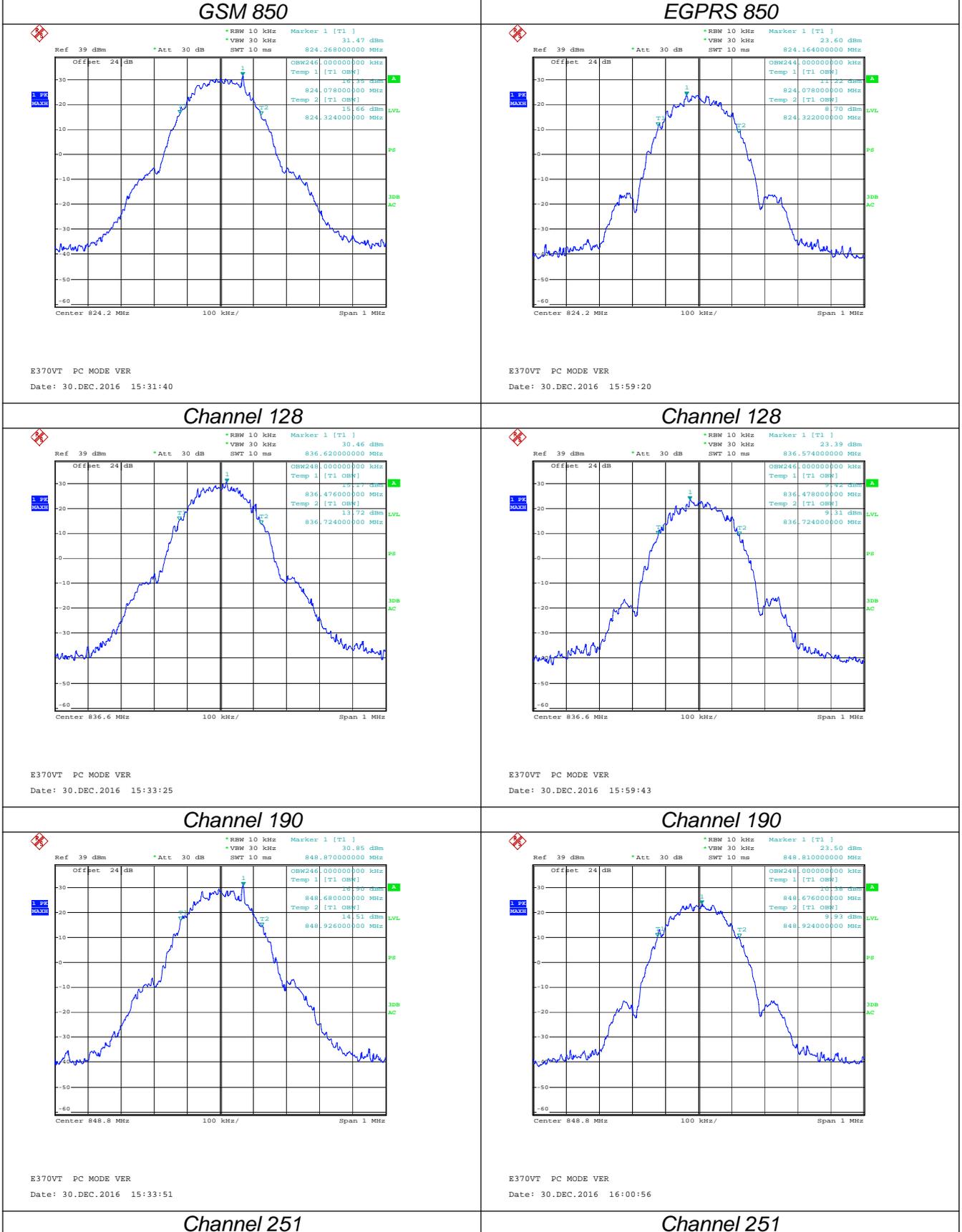
TEST RESULTS

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dBc bandwidth (KHz)
GSM 850 (GMSK)	128	824.20	246.00	318.00
	190	836.60	248.00	322.00
	251	848.80	246.00	316.00
EGPRS850 (8PSK,1Slot)	128	824.20	244.00	310.00
	190	836.60	246.00	310.00
	251	848.80	248.00	308.00
PCS1900 (GMSK)	512	1850.20	246.00	320.00
	661	1880.00	246.00	322.00
	810	1909.80	244.00	322.00
EGPRS1900 (GMSK,1Slot)	512	1850.20	244.00	312.00
	661	1880.00	250.00	320.00
	810	1909.80	248.00	314.00
WCDMA Band II (QPSK)	9262	1852.4	4180.00	4680.00
	9400	1880.0	4200.00	4720.00
	9538	1907.6	4180.00	4740.00
WCDMA Band V (QPSK)	4132	826.4	4160.00	4700.00
	4183	836.6	4180.00	4760.00
	4233	846.6	4180.00	4700.00

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.

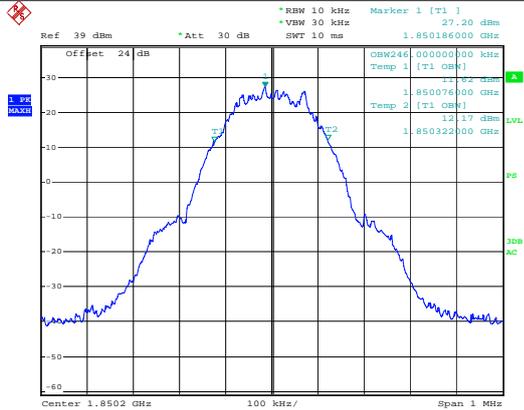
Test plots as follow:

99% Occupy bandwidth



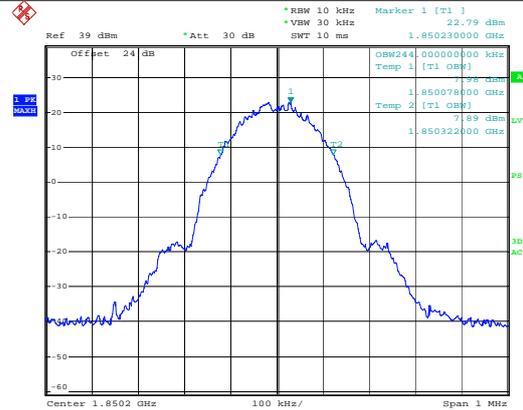
99% Occupy bandwidth

PCS 1900



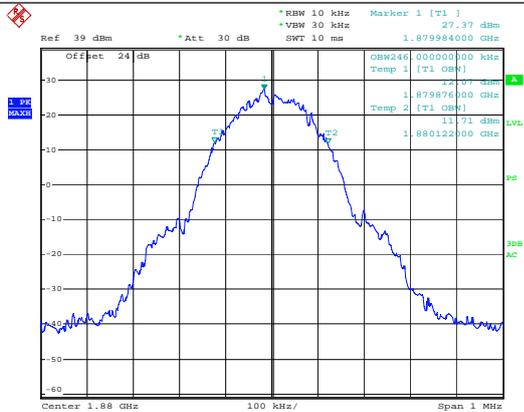
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EGPRS 1900



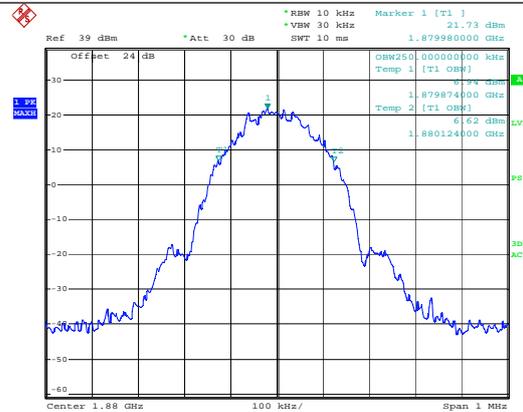
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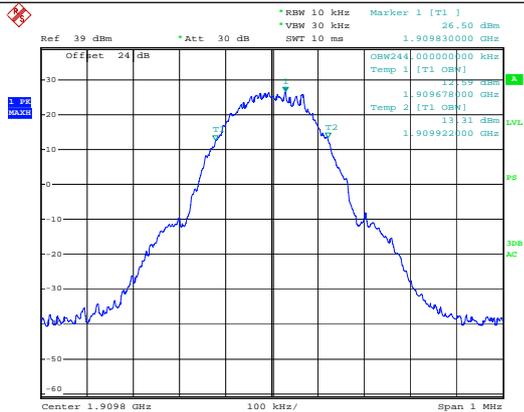
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Channel 512



E370VT PC MODE VER
Date: 30.DEC.2016 15:55:17

Channel 661



E370VT PC MODE VER
Date: 30.DEC.2016 15:41:55

Channel 661



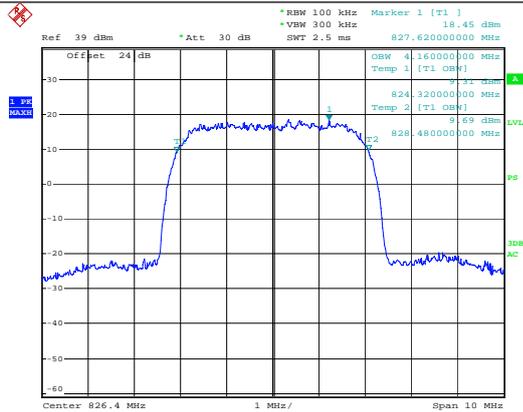
E370VT PC MODE VER
Date: 30.DEC.2016 16:03:09

Channel 810

Channel 810

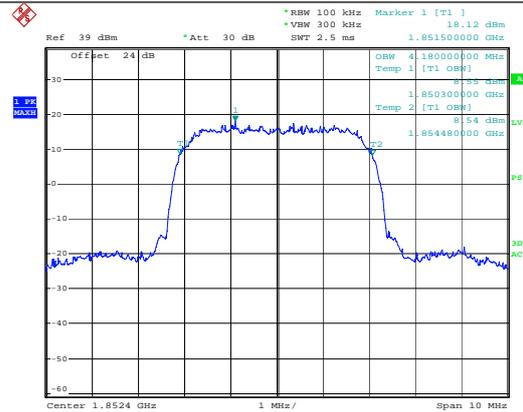
99% Occupy bandwidth

WCDMA 850



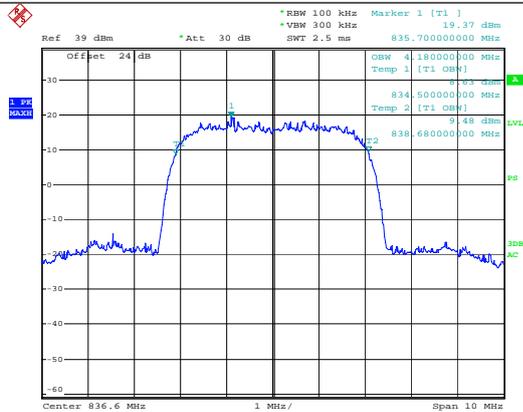
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Date: 30.DEC.2016 16:04:35

WCDMA 1900



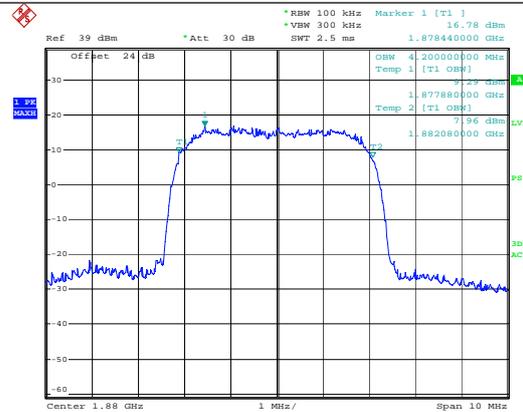
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Date: 30.DEC.2016 16:09:50

Channel 4132



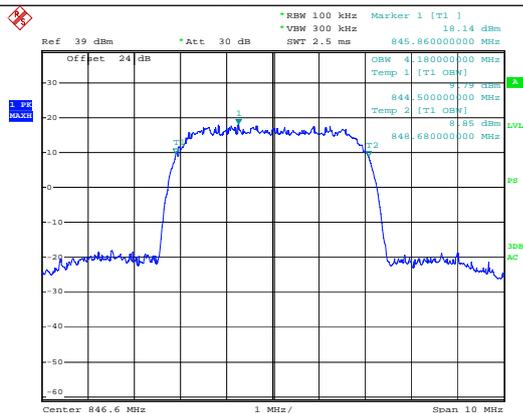
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Date: 30.DEC.2016 16:05:06

Channel 9262



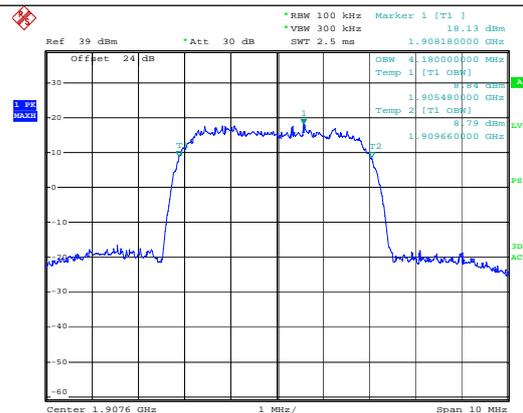
E370VT PC MODE VER
Date: 30.DEC.2016 16:10:32

Channel 4183



E370VT PC MODE VER
Date: 30.DEC.2016 16:06:18

Channel 9400



E370VT PC MODE VER
Date: 30.DEC.2016 16:11:02

Channel 4233

Channel 9538

-26dBc bandwidth

GSM 850



E370VT PC MODE VER
Date: 30.DEC.2016 15:32:09

EGPRS 850



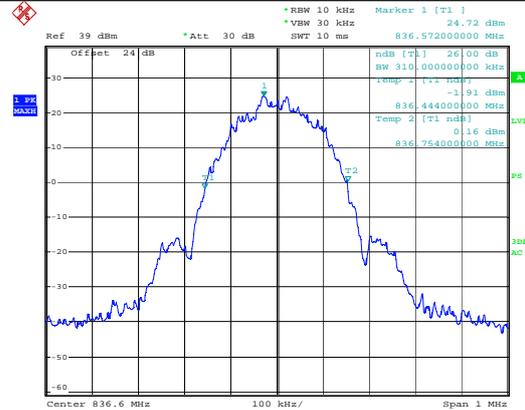
E370VT PC MODE VER
Date: 30.DEC.2016 15:58:59

Channel 128



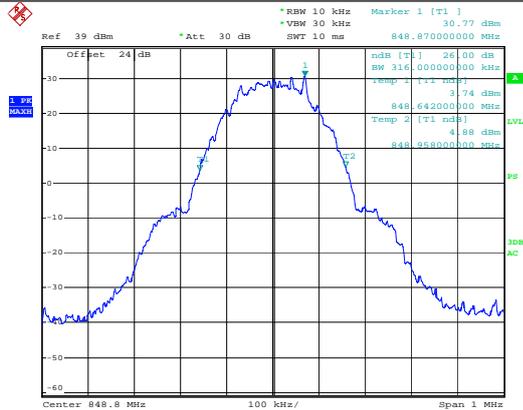
E370VT PC MODE VER
Date: 30.DEC.2016 15:33:11

Channel 128



E370VT PC MODE VER
Date: 30.DEC.2016 15:59:59

Channel 190



E370VT PC MODE VER
Date: 30.DEC.2016 15:34:17

Channel 190



E370VT PC MODE VER
Date: 30.DEC.2016 16:00:24

Channel 251

Channel 251

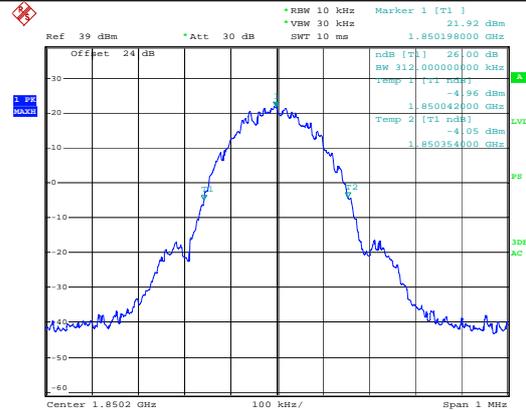
-26dBc bandwidth

PCS 1900



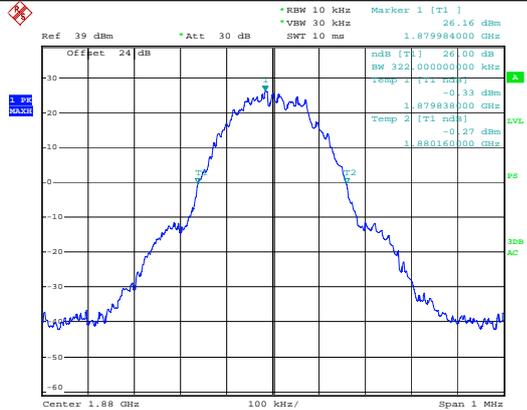
E370VT PC MODE VER
Date: 30.DEC.2016 15:36:48

EGPRS 1900



E370VT PC MODE VER
Date: 30.DEC.2016 15:56:00

Channel 512



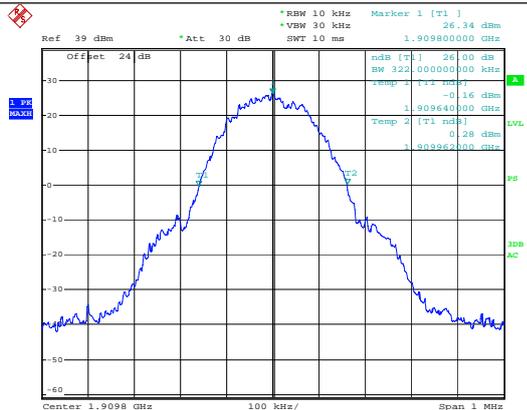
E370VT PC MODE VER
Date: 30.DEC.2016 15:38:10

Channel 512



E370VT PC MODE VER
Date: 30.DEC.2016 15:55:33

Channel 661



E370VT PC MODE VER
Date: 30.DEC.2016 15:38:42

Channel 661



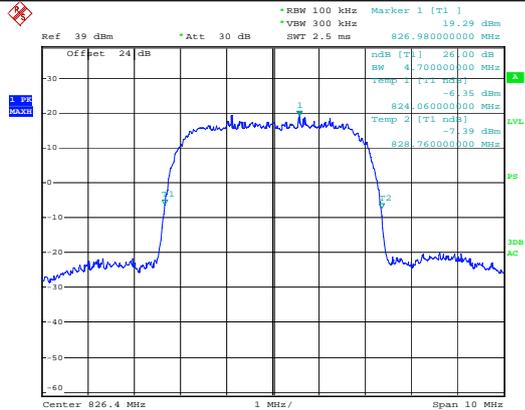
E370VT PC MODE VER
Date: 30.DEC.2016 15:56:29

Channel 810

Channel 810

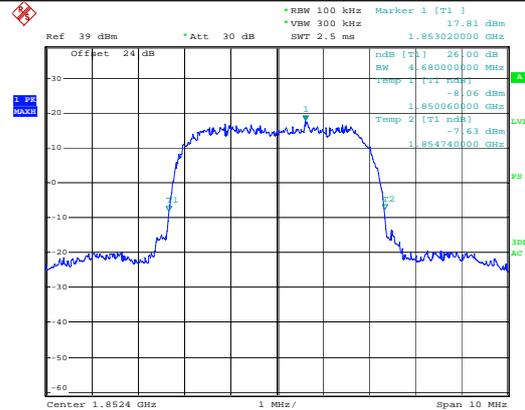
-26dBc bandwidth

WCDMA 850



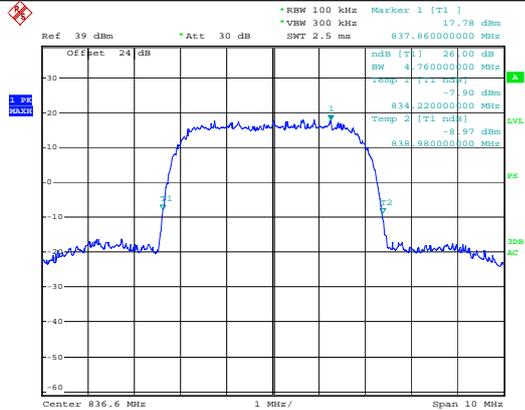
E370VT PC MODE VER
Date: 30.DEC.2016 16:05:44

WCDMA 1900



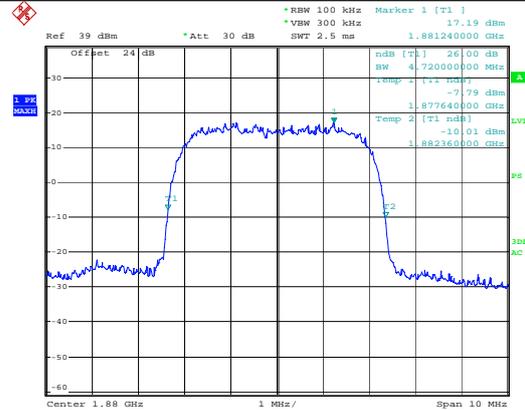
E370VT PC MODE VER
Date: 30.DEC.2016 16:09:59

Channel 4132



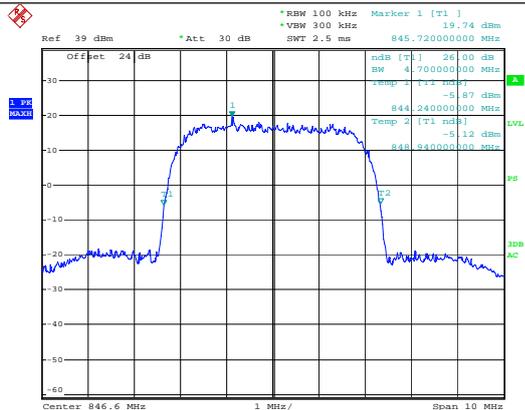
E370VT PC MODE VER
Date: 30.DEC.2016 16:05:17

Channel 9262



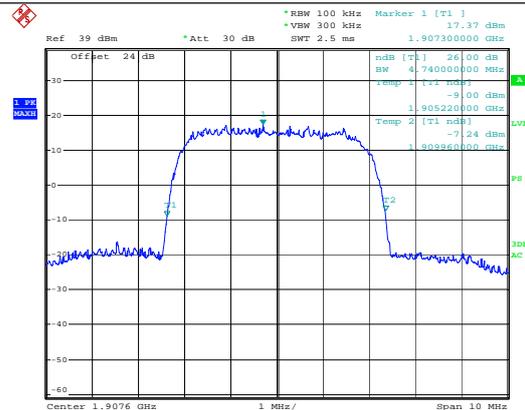
E370VT PC MODE VER
Date: 30.DEC.2016 16:10:20

Channel 4183



E370VT PC MODE VER
Date: 30.DEC.2016 16:06:06

Channel 9400



E370VT PC MODE VER
Date: 30.DEC.2016 16:11:16

Channel 4233

Channel 9538

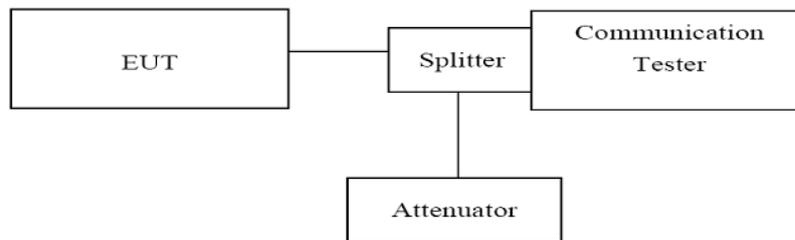
3.3. Out of band emission at antenna terminals

LIMIT

Part 24.238 and Part 22.917 specify that 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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION



TEST PROCEDURE

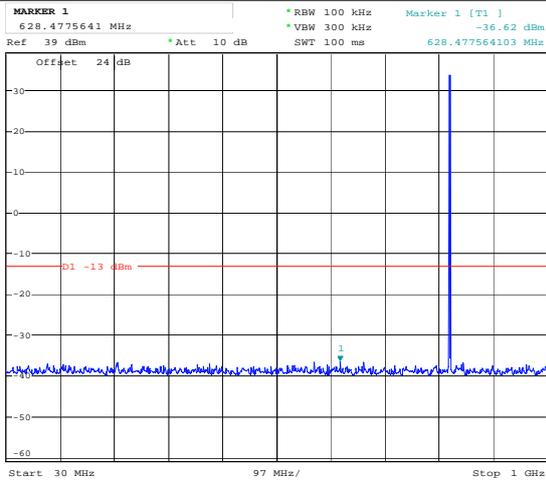
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW = 1MHz VBW \geq 3 times RBW, Start=30MHz, Stop= 10th harmonic.

TEST RESULTS

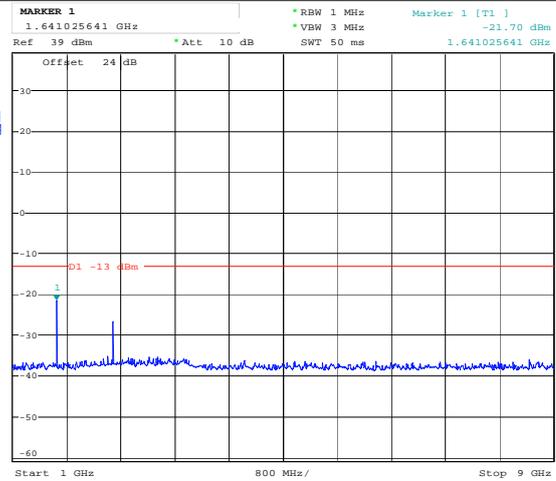
Remark: we test all modulation type and record worst case at Voice mode.

GSM 850

Lowest channel

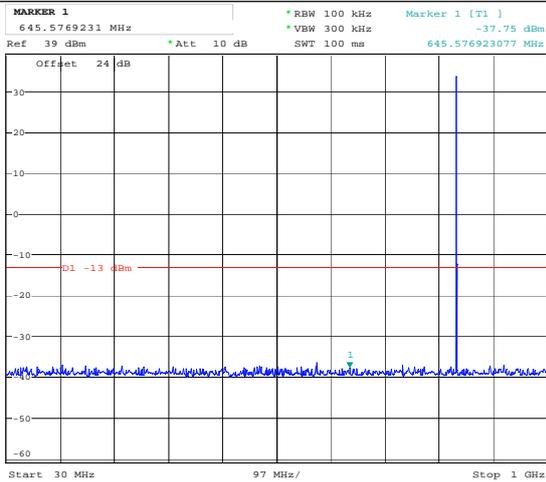


30MHz~1GHz

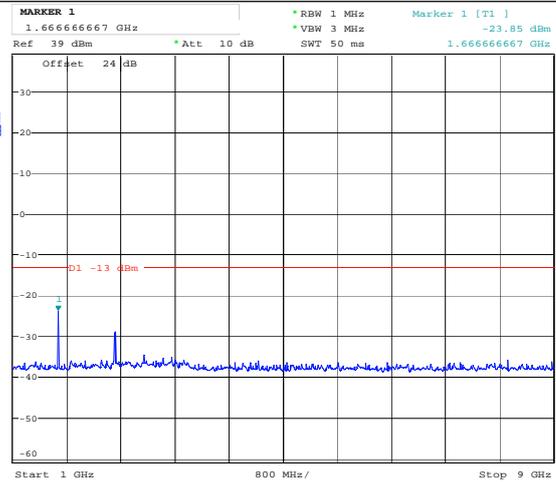


1GHz~9GHz

Middle channel

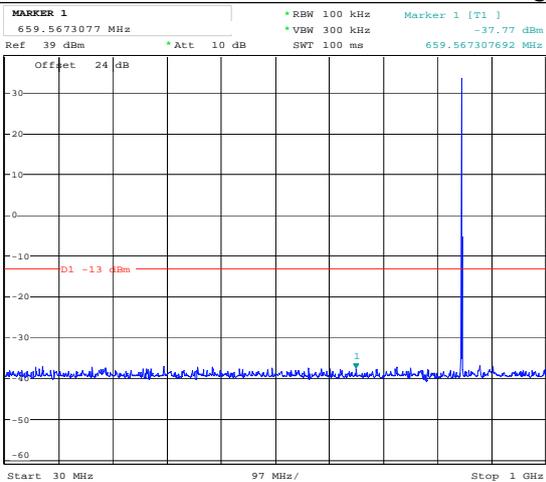


30MHz~1GHz

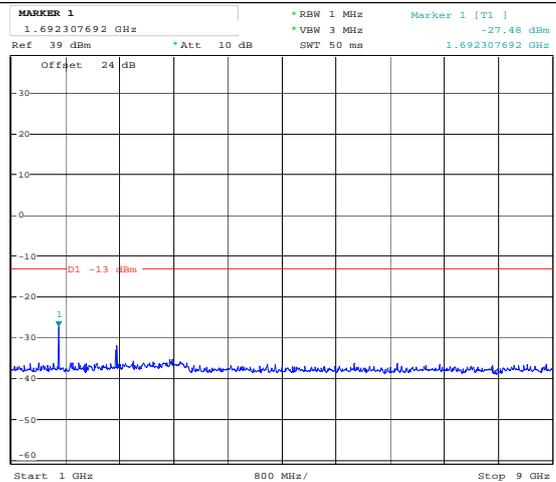


1GHz~9GHz

Highest channel



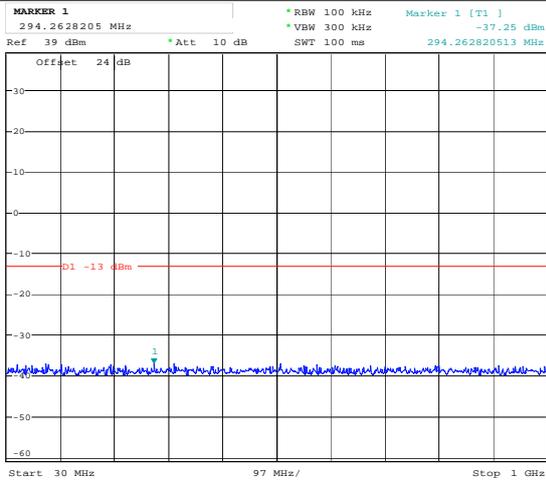
30MHz~1GHz



1GHz~9GHz

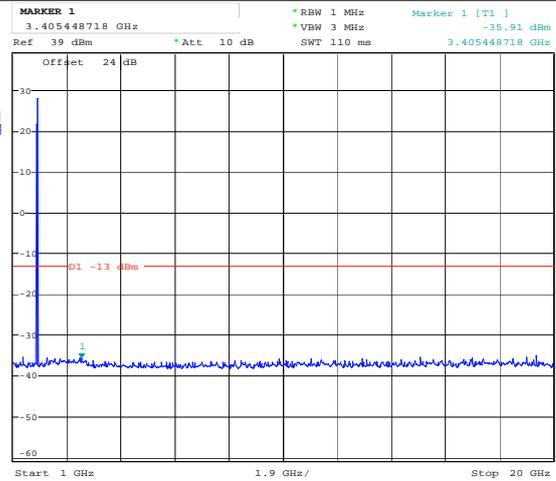
PCS 1900

Lowest channel



Date: 28.DEC.2016 11:39:49

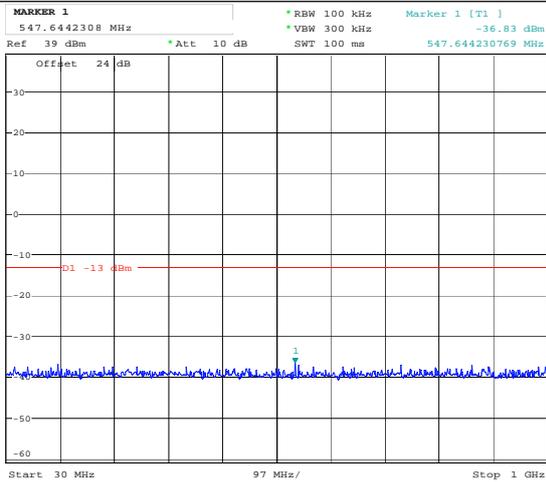
30MHz~1GHz



Date: 28.DEC.2016 11:42:57

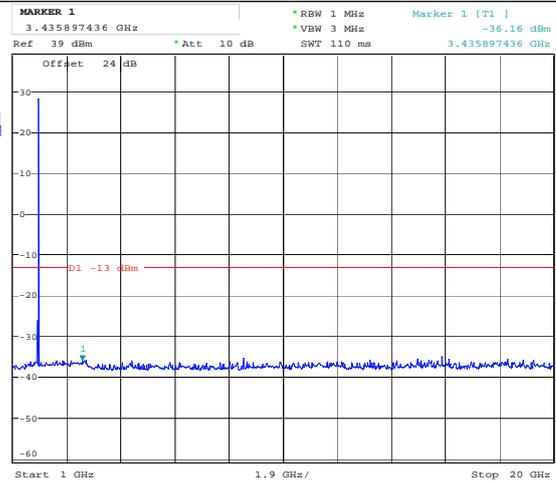
1GHz~20GHz

Middle channel



Date: 28.DEC.2016 11:40:24

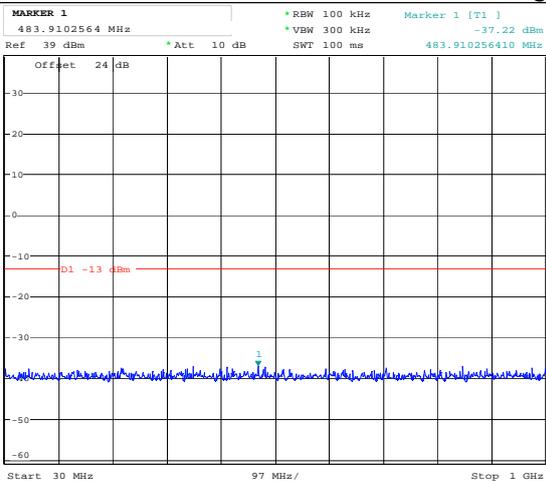
30MHz~1GHz



Date: 28.DEC.2016 11:42:15

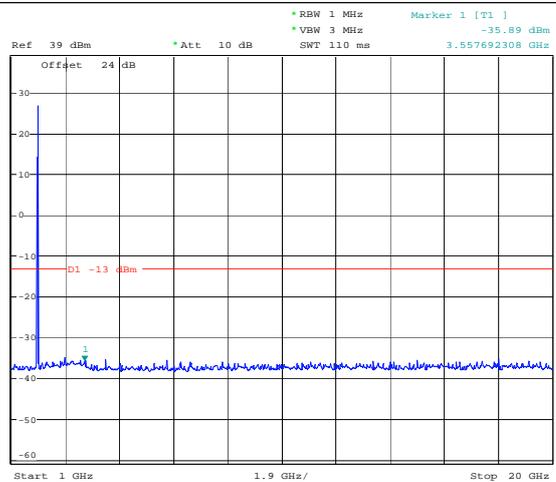
1GHz~20GHz

Highest channel



Date: 28.DEC.2016 11:40:51

30MHz~1GHz

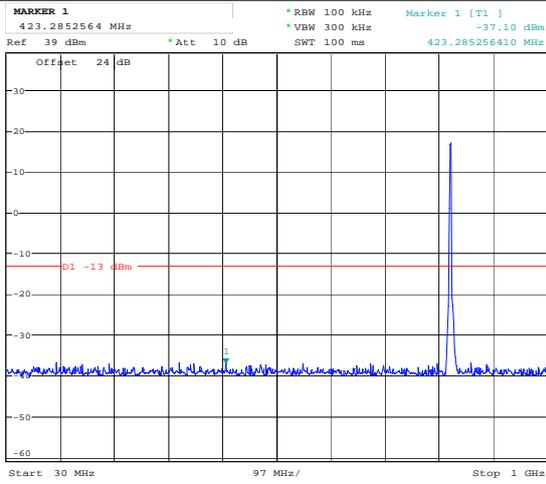


Date: 28.DEC.2016 11:41:41

1GHz~20GHz

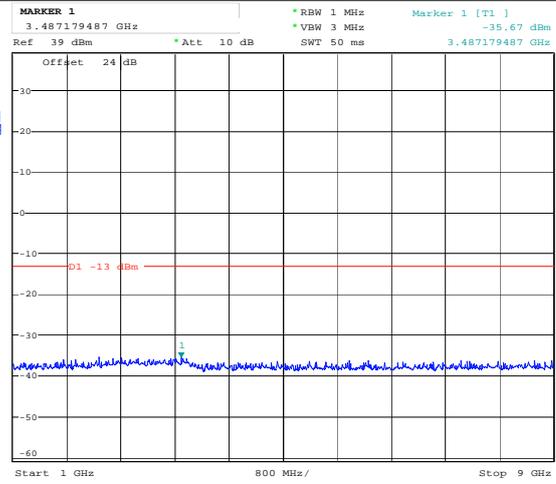
WCDMA 850

Lowest channel



Date: 28.DEC.2016 11:53:01

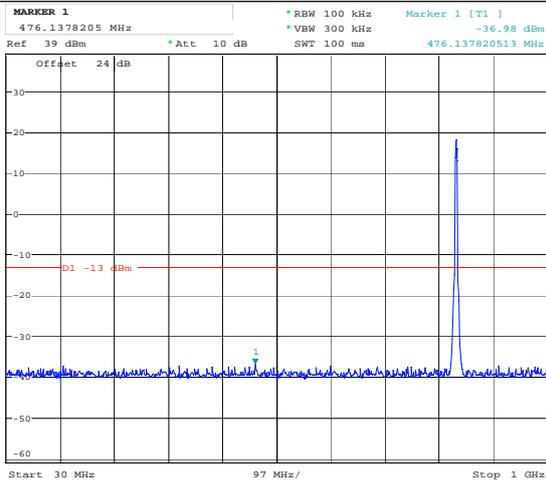
30MHz~1GHz



Date: 28.DEC.2016 11:56:18

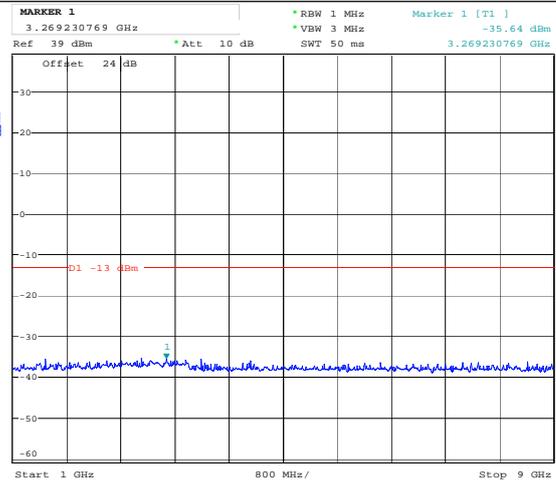
1GHz~9GHz

Middle channel



Date: 28.DEC.2016 11:53:41

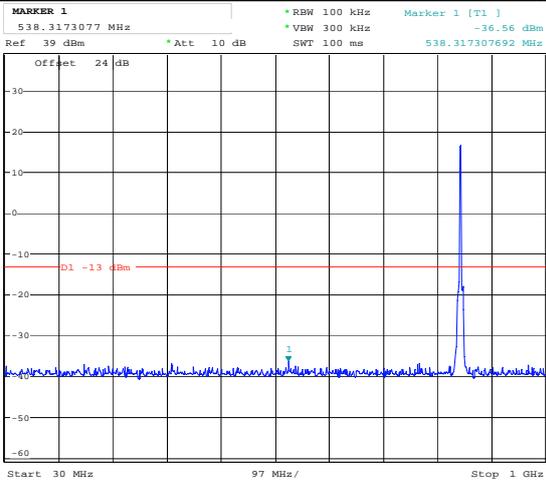
30MHz~1GHz



Date: 28.DEC.2016 11:55:41

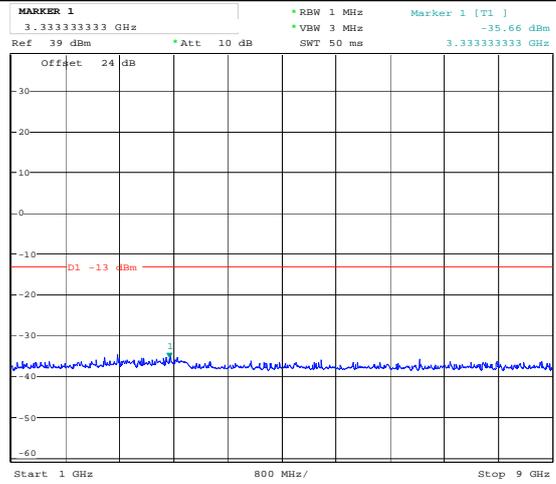
1GHz~9GHz

Highest channel



Date: 28.DEC.2016 11:54:19

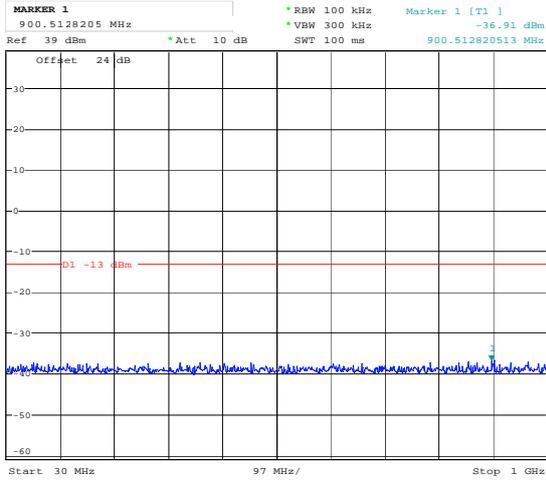
30MHz~1GHz



Date: 28.DEC.2016 11:55:00

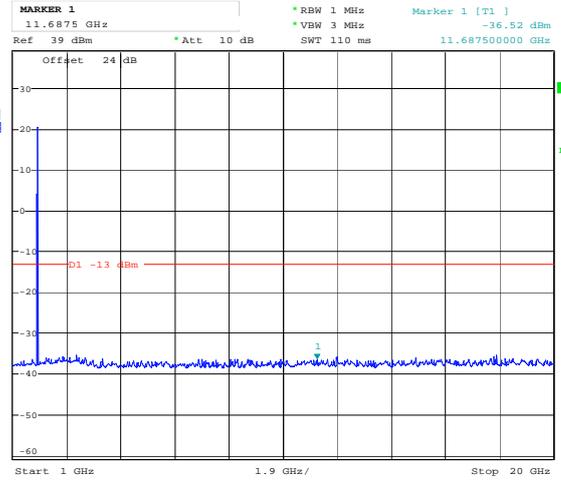
1GHz~9GHz

WCDMA 1900 Lowest channel



Date: 28.DEC.2016 11:59:19

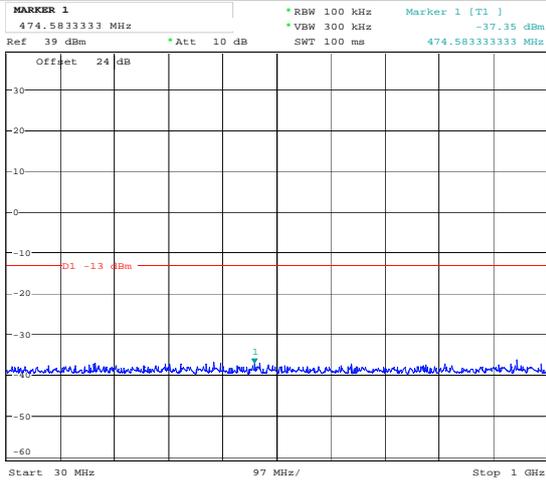
30MHz~1GHz



Date: 28.DEC.2016 12:02:31

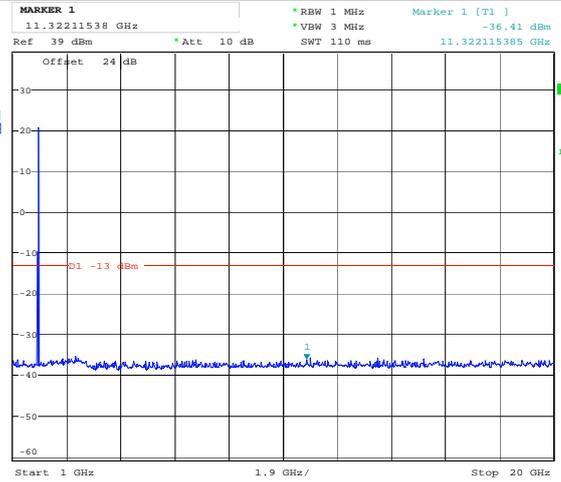
1GHz~20GHz

Middle channel



Date: 28.DEC.2016 12:00:10

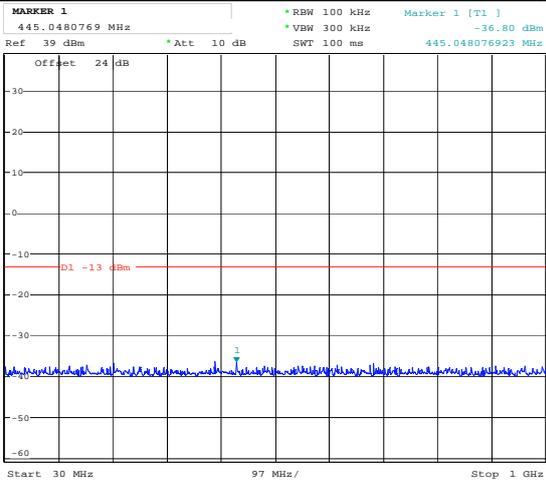
30MHz~1GHz



Date: 28.DEC.2016 12:02:05

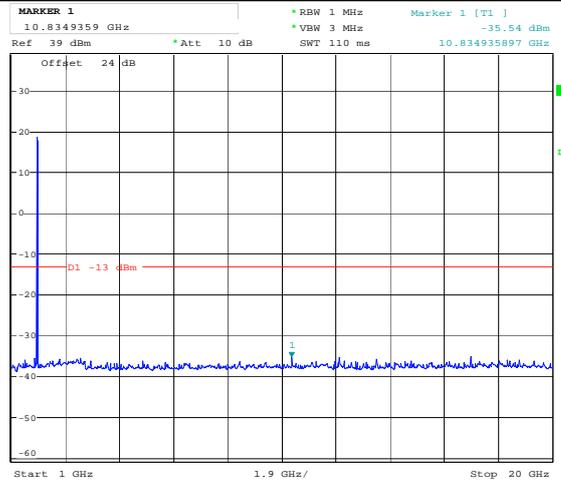
1GHz~20GHz

Highest channel



Date: 28.DEC.2016 12:00:50

30MHz~1GHz



Date: 28.DEC.2016 12:01:26

1GHz~20GHz

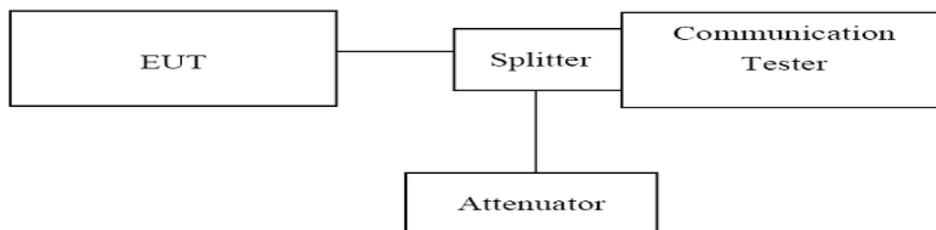
3.4. Band Edge compliance

LIMIT

Part 24.238 and Part 22.917 specify that 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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION



TEST PROCEDURE

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. Set the RBW=5 KHz, VBW = 50KHz, Span=1MHz Sweep time= Auto for 2G system measurement.
3. Set the RBW=50 KHz, VBW = 300KHz, Span=1MHz Sweep time= Auto for 3G system measurement.

TEST RESULTS

GSM 850					
Channel Number	Frequency (MHz)	Max Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
128	824.20	823.994	-13.60	-13.00	Pass
251	848.80	849.018	-14.24	-13.00	Pass

E370VT PC MODE VER
Date: 30.DEC.2016 16:56:51

E370VT PC MODE VER
Date: 30.DEC.2016 16:55:40

EGPRS 850					
Channel Number	Frequency (MHz)	Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
128	824.20	823.974	-21.32	-13.00	Pass
251	848.80	849.012	-20.51	-13.00	Pass

E370VT PC MODE VER
Date: 30.DEC.2016 16:46:35

E370VT PC MODE VER
Date: 30.DEC.2016 16:47:21

PCS 1900					
Channel Number	Frequency (MHz)	Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
512	1850.20	1849.996	-13.73	-13.00	Pass
810	1909.80	1910.018	-13.67	-13.00	Pass

E370VT PC MODE VER
Date: 30.DEC.2016 16:41:34

E370VT PC MODE VER
Date: 30.DEC.2016 16:42:30

EGPRS 1900					
Channel Number	Frequency (MHz)	Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
512	1850.20	1849.974	-23.48	-13.00	Pass
810	1909.80	1910.032	-22.94	-13.00	Pass

E370VT PC MODE VER
Date: 30.DEC.2016 16:44:59

E370VT PC MODE VER
Date: 30.DEC.2016 16:44:21

WCDMA Band II					
Channel Number	Frequency (MHz)	Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
9262	1852.4	823.994	-14.08	-13.00	Pass
9538	1907.6	849.00	-13.38	-13.00	Pass

Ref 30 dBm *Att 30 dB *RBW 100 kHz *VBM 300 kHz SWT 2.5 ms Marker 1 [T1] -14.08 dBm
1.849920000 GHz

Center 1.85 GHz 1 MHz/ Span 10 MHz

E370VT PC MODE VER
Date: 30.DEC.2016 17:05:08

Ref 30 dBm *Att 30 dB *RBW 100 kHz *VBM 300 kHz SWT 2.5 ms Marker 1 [T1] -13.19 dBm
1.910000000 GHz

Center 1.91 GHz 1 MHz/ Span 10 MHz

E370VT PC MODE VER
Date: 30.DEC.2016 17:06:44

WCDMA Band V					
Channel Number	Frequency (MHz)	Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
4132	826.4	1849.920	-14.20	-13.00	Pass
4233	846.6	1910.00	-13.19	-13.00	Pass

Ref 30 dBm *Att 30 dB *RBW 100 kHz *VBM 300 kHz SWT 2.5 ms Marker 1 [T1] -14.08 dBm
823.994000000 MHz

Center 824 MHz 1 MHz/ Span 10 MHz

E370VT PC MODE VER
Date: 30.DEC.2016 17:01:48

Ref 30 dBm *Att 30 dB *RBW 100 kHz *VBM 300 kHz SWT 2.5 ms Marker 1 [T1] -13.38 dBm
849.000000000 MHz

Center 849 MHz 1 MHz/ Span 10 MHz

E370VT PC MODE VER
Date: 30.DEC.2016 17:03:27

3.5. Radiated Power Measurement

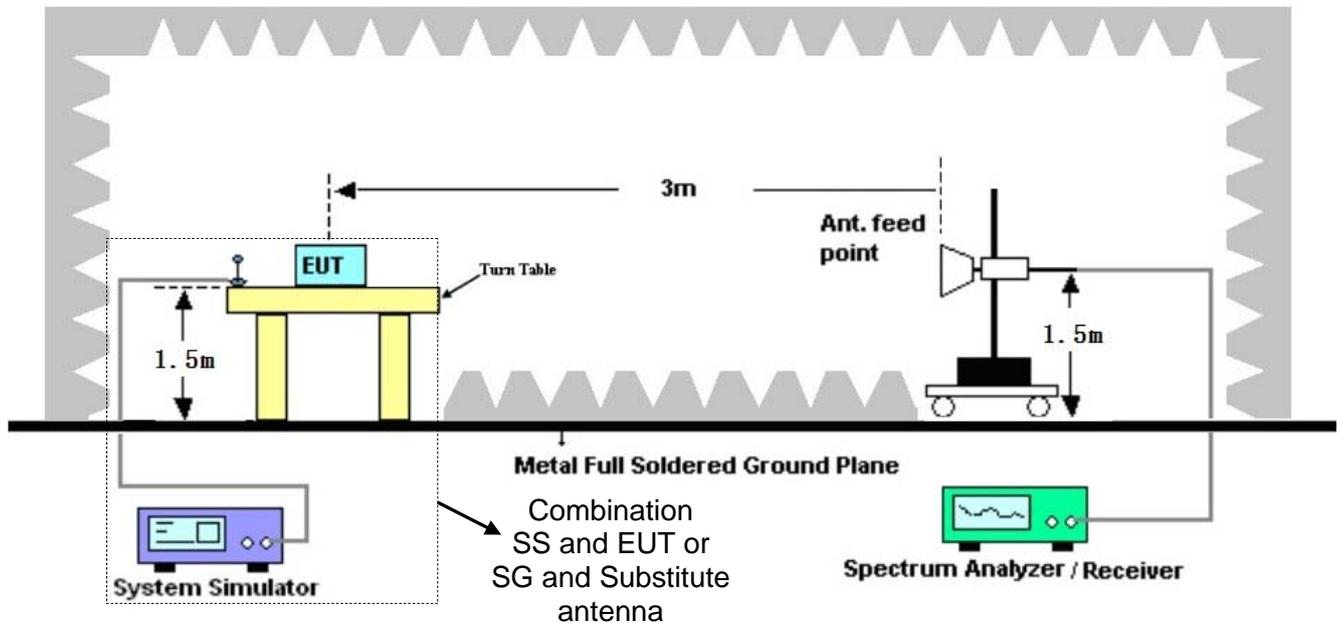
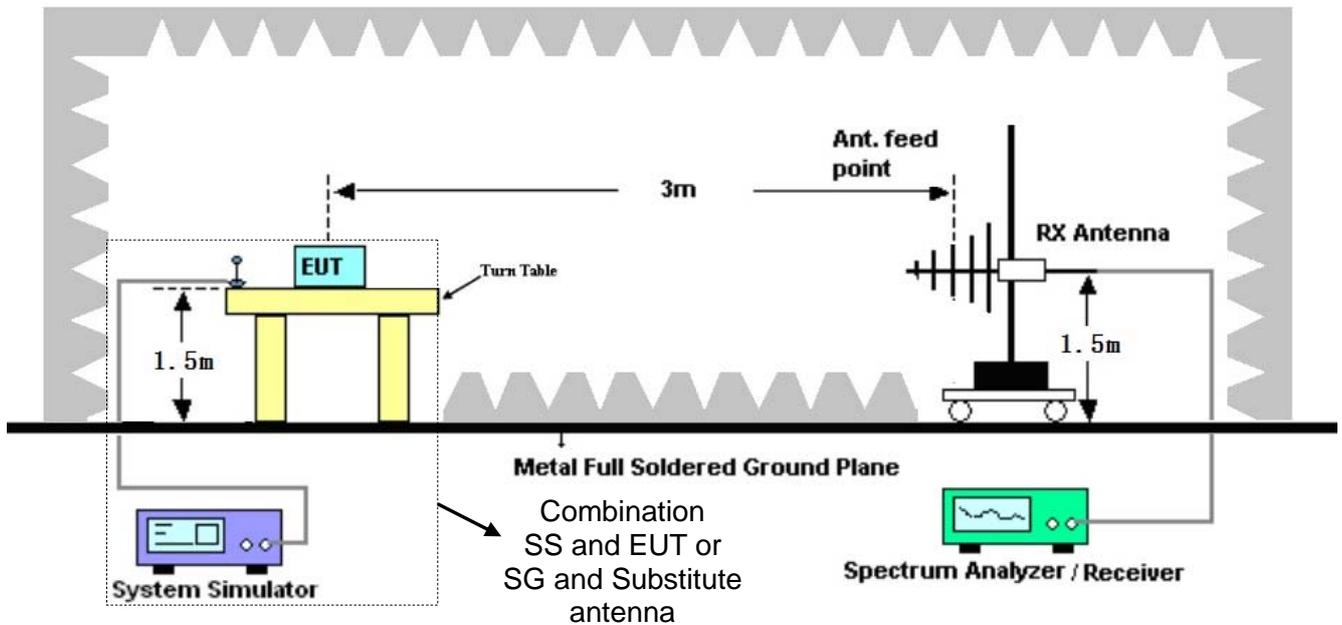
LIMIT

GSM850/WCDMA Band V: 7W ERP

PCS1900/WCDMA Band II: 2W EIRP

TEST CONFIGURATION

For the actual test configuration, please refer to the related Item –EUT Test Photos.



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
We used N5182A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.

Measurement Data(worst case):

Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
GSM850 (GMSK)	128	V	30.23	38.45	Pass
		H	28.67		
	190	V	30.31		
		H	28.70		
	251	V	30.47		
		H	28.78		
Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
PCS1900 (GMSK)	512	V	24.04	33.00	Pass
		H	25.64		
	661	V	24.14		
		H	25.71		
	810	V	24.20		
		H	25.77		
Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
EGPRS850 (8PSK)	128	V	30.10	38.45	Pass
		H	28.35		
	190	V	30.44		
		H	28.53		
	251	V	30.09		
		H	28.39		
Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
EGPRS1900 (8PSK)	512	V	24.13	33.00	Pass
		H	25.50		
	661	V	24.25		
		H	25.65		
	810	V	24.32		
		H	25.59		



Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
WCDMA Band II (QPSK)	9262	V	18.64	33.00	Pass
		H	18.67		
	9400	V	18.70		
		H	18.71		
	9538	V	18.76		
		H	18.78		
Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
WCDMA Band V (QPSK)	4132	V	21.27	38.45	Pass
		H	20.10		
	4182	V	21.32		
		H	20.14		
	4233	V	21.38		
		H	20.19		

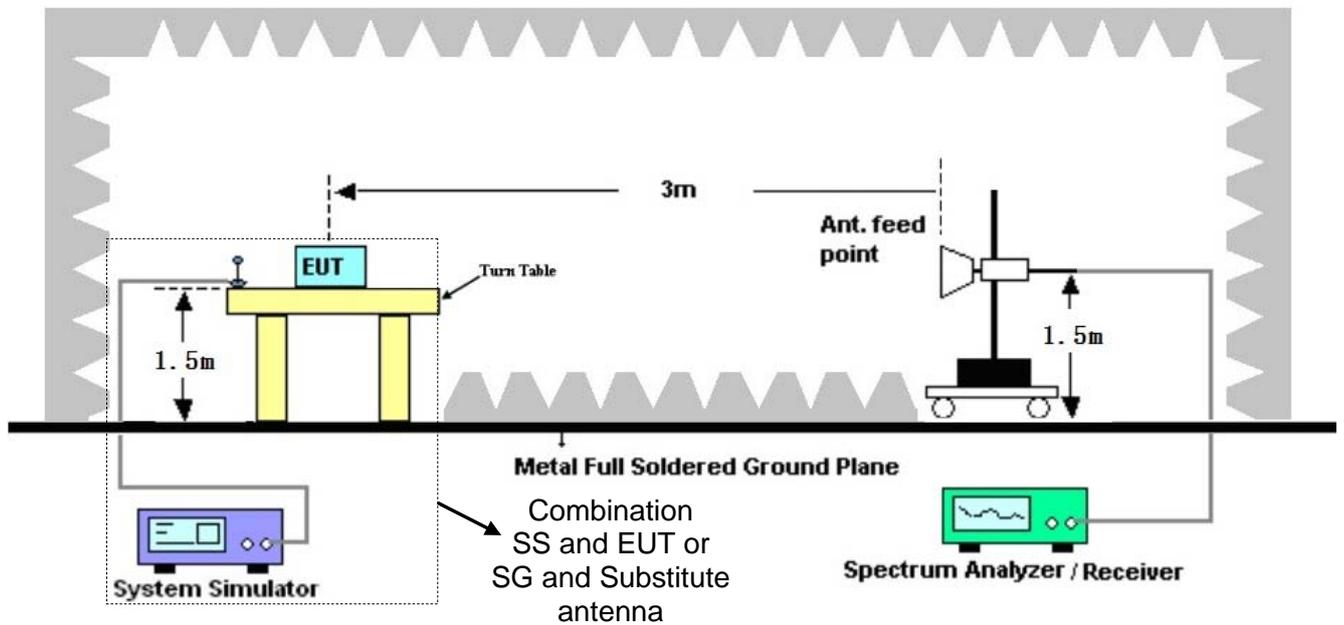
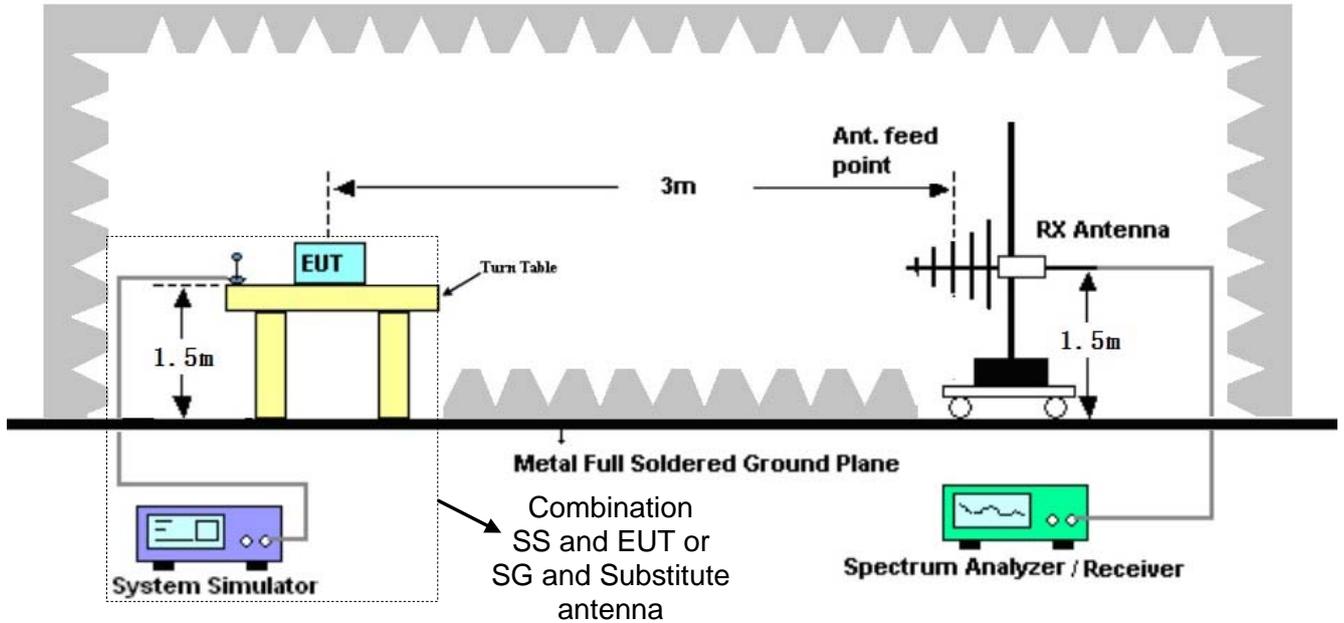
3.6. Radiated Spurious Emission

LIMIT

-13dBm

TEST CONFIGURATION

For the actual test configuration, please refer to the related Item –EUT Test Photos.



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
6. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAG - Pcl + Ga
We used SMF100A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
8. Test frequency range should extend to 10th harmonic of highest fundamental frequency.

TEST RESULTS

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
2. We test all modulation type and record worst case at Voice mode.

Measurement Data(worst case):

GSM850					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
128	1648.40	Vertical	-44.98	-13.00	Pass
	2472.60	Vertical	-40.57		
	1648.40	Horizontal	-43.92		
	2472.60	Horizontal	-40.76		
190	1673.20	Vertical	-44.25		
	2509.80	Vertical	-40.21		
	1673.20	Vertical	-43.65		
	2509.80	Horizontal	-40.69		
251	1697.60	Vertical	-42.87		
	2546.40	Vertical	-39.18		
	1697.60	Horizontal	-41.31		
	2546.40	Horizontal	-39.14		

Remark :

- The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

PCS1900					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
512	3700.40	Vertical	-51.98	-13.00	Pass
	5550.60	Vertical	-47.73		
	3700.40	Horizontal	-51.84		
	5550.60	Horizontal	-47.67		
661	3760.00	Vertical	-51.63		
	5640.00	Vertical	-47.49		
	3760.00	Horizontal	-51.63		
	5640.00	Horizontal	-47.49		
810	3819.60	Vertical	-48.96		
	5729.40	Vertical	-45.20		
	3819.60	Horizontal	-50.25		
	5729.40	Horizontal	-46.42		

Remark :

- The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

WCDMA Band II					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
9262	3704.80	Vertical	-56.74	-13.00	Pass
	5557.20	Vertical	-53.41		
	3704.80	Horizontal	-57.63		
	5557.20	Horizontal	-53.39		
9400	3760.00	Vertical	-56.46		
	5640.00	Vertical	-53.20		
	3760.00	Horizontal	-56.32		
	5640.00	Horizontal	-53.25		
9538	3815.20	Vertical	-56.30		
	5722.80	Vertical	-53.20		
	3815.20	Horizontal	-56.17		
	5722.80	Horizontal	-53.13		

Remark :

- The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

WCDMA Band V					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
4132	1652.80	Vertical	-53.74	-13.00	Pass
	2479.20	Vertical	-51.69		
	1652.80	Horizontal	-53.54		
	2479.20	Horizontal	-51.26		
4182	1673.20	Vertical	-53.12		
	2509.80	Vertical	-51.15		
	1673.20	Horizontal	-53.23		
	2509.80	Horizontal	-51.04		
4233	1693.20	Vertical	-52.98		
	2539.80	Vertical	-51.06		
	1693.20	Horizontal	-52.14		
	2539.80	Horizontal	-50.94		

Remark :

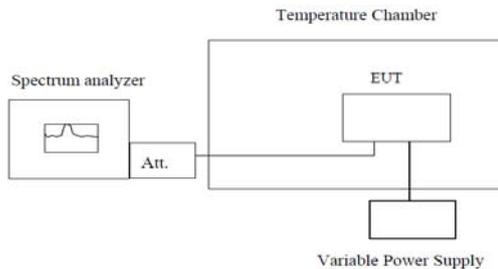
- The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

3.7. Frequency stability

LIMIT

Cellular Band: $\pm 2.5\text{ppm}$ PCS Band: Within the authorized frequency block

TEST CONFIGURATION



Note : 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.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -30°C . After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of $+50^{\circ}\text{C}$ reached.
7. Reduce the input voltage to specified extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark: we test all modulation type and record worst case at Voice mode

1. Temperature measurement:

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	182	0.217547	2.5	Pass
	-20	173	0.206789		
	-10	170	0.203203		
	0	169	0.202008		
	10	167	0.199617		
	20	172	0.205594		
	30	168	0.200813		
	40	163	0.194836		
	50	167	0.199617		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	176	0.093617	2.5	Pass
	-20	176	0.093617		
	-10	182	0.096809		
	0	169	0.089894		
	10	176	0.093617		
	20	184	0.097872		
	30	167	0.088830		
	40	171	0.090957		
	50	185	0.098404		

Reference Frequency: EGPRS850 Middle channel=190 channel=836.6MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	186	0.222328	2.5	Pass
	-20	177	0.211571		
	-10	172	0.205594		
	0	172	0.205594		
	10	168	0.200813		
	20	175	0.20918		
	30	180	0.215157		
	40	170	0.203203		
	50	165	0.197227		
Reference Frequency: EGPRS1900 Middle channel=661 channel=1880MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	180	0.095745	2.5	Pass
	-20	178	0.094681		
	-10	178	0.094681		
	0	182	0.096809		
	10	169	0.089894		
	20	166	0.088298		
	30	172	0.091489		
	40	173	0.092021		
	50	181	0.096277		

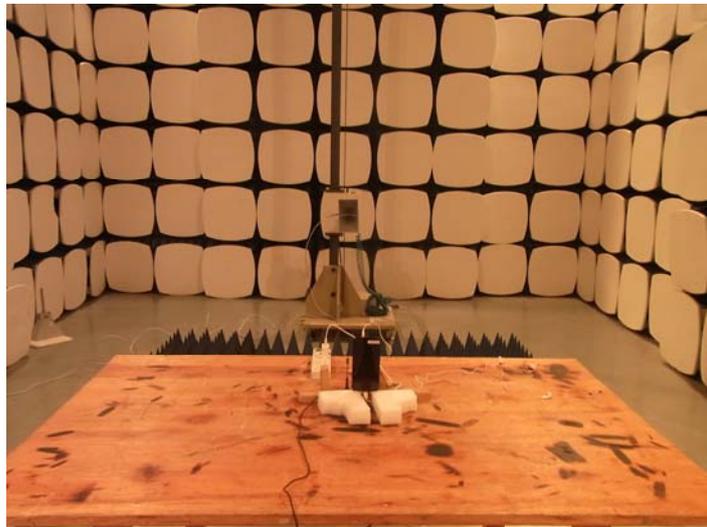
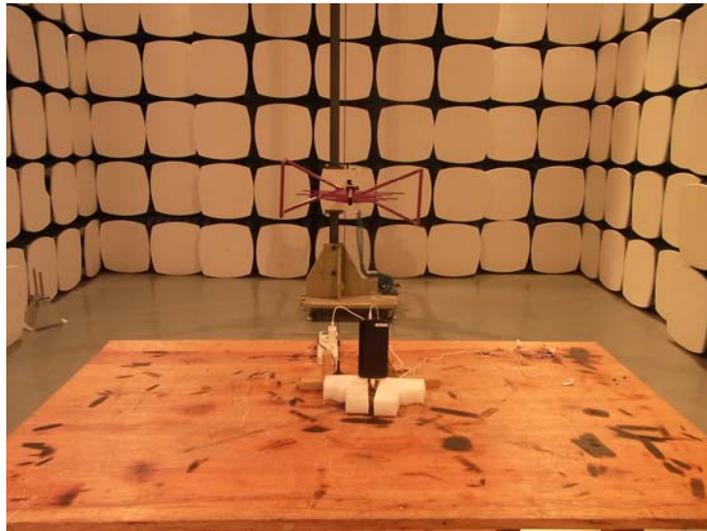
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	182	0.096809	2.5	Pass
	-20	176	0.093617		
	-10	175	0.093085		
	0	168	0.089362		
	10	180	0.095745		
	20	176	0.093617		
	30	174	0.092553		
	40	188	0.100000		
50	179	0.095213			
Reference Frequency: WCDMA Band V Middle channel=4182 channel=836.6MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.85	-30	172	0.205594	2.5	Pass
	-20	179	0.213961		
	-10	182	0.217547		
	0	169	0.202008		
	10	164	0.196032		
	20	174	0.207985		
	30	164	0.196032		
	40	189	0.225914		
	50	170	0.203203		

2. Voltage measurement:

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	186	0.222328	2.5	Pass
	3.85	164	0.196032		
	3.60	173	0.206789		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	172	0.091489	2.5	Pass
	3.85	164	0.087234		
	3.60	170	0.090426		
Reference Frequency: EGPRS850 Middle channel=190 channel=836.6MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	178	0.212766	2.5	Pass
	3.85	182	0.217547		
	3.60	169	0.202008		
Reference Frequency: EGPRS1900 Middle channel=661 channel=1880MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	172	0.091489	2.5	Pass
	3.85	173	0.092021		
	3.60	181	0.096277		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	160	0.085106	2.5	Pass
	3.85	176	0.093617		
	3.60	183	0.097340		
Reference Frequency: WCDMA Band V Middle channel=4182 channel=836.6MHz					
Temperature (°C)	Voltage (V)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.40	168	0.200813	2.5	Pass
	3.85	176	0.210375		
	3.60	171	0.204399		

4. EUT TEST PHOTOS

Radiated Emission





5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please reference to the test report No.: GTI20161071F-1

*****THE END*****