

FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.
EQUIPMENT : Mobile Phone
BRAND NAME : Motorola
MODEL NAME : XT615
MARKETING NAME : XT615
GPPD NUMBER : 3192
FCC ID : IHDP56MM6
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
Tx/Rx FREQUENCY RANGE : GSM850 : 824.2 ~ 848.8 MHz /
869.2 ~ 893.8 MHz
GSM1900 : 1850.2 ~ 1909.8 MHz /
1930.2 ~ 1989.8 MHz
WCDMA Band V : 826.4 ~ 846.6 MHz /
871.4 ~ 891.6 MHz
WCDMA Band II : 1852.4 ~ 1907.6 MHz /
1932.4 ~ 1987.6 MHz
MAX. ERP/EIRP POWER : GSM850 (GPRS 8) : 0.1253 W
GSM850 (EDGE 8) : 0.0378 W
GSM1900 (GPRS 8) : 0.0818 W
GSM1900 (EDGE 8) : 0.0380 W
WCDMA Band V (RMC 12.2Kbps) : 0.0601 W
WCDMA Band II (RMC 12.2Kbps) : 0.0673 W

The product was received on Jan. 18, 2012 and completely tested on Jan. 27, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG211846	Rev. 01	Initial issue of report	Jan. 31, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	N/A	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.2	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.3	§2.1049 §22.917(a) §24.238(a)	N/A	Occupied Bandwidth	N/A	PASS	-
3.4	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Band Edge Measurement	< 43+10log ₁₀ (P[Watts])	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Conducted Emission	< 43+10log ₁₀ (P[Watts])	PASS	-
3.6	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 26.02 dB at 7520.000 MHz
3.7	§2.1055 §22.355 §24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-



1 General Description

1.1 Applicant

Motorola Mobility, Inc.

8F., No. 9, Songgao Rd., Taipei 110, Taiwan, R.O.C.

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng District, New Taipei City, 23678, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	Motorola
Model Name	XT615
Marketing Name	XT615
FCC ID	IHDP56MM6
Tx Frequency	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz WCDMA Band II : 1850 MHz ~ 1910 MHz
Rx Frequency	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz WCDMA Band II : 1930 MHz ~ 1990 MHz
Maximum Output Power to Antenna	GSM850 : 33.01 dBm GSM1900 : 30.19 dBm WCDMA Band V : 23.68 dBm WCDMA Band II : 23.45 dBm
Antenna Type	Fixed Internal Antenna
HW Version	PR3
SW Version	V1_470
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Emission Designator and Maximum ERP/EIRP Power

FCC Rule	System	Type of Modulation	Emission Designator	Maximum ERP/EIRP
Part 22	GSM850 GPRS 8	GMSK	248KGXW	0.1253 W
Part 22	GSM850 EDGE 8	GMSK / 8PSK	244KG7W	0.0378 W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	4M18F9W	0.0601 W
Part 24	GSM1900 GPRS 8	GMSK	246KGXW	0.0818 W
Part 24	GSM1900 EDGE 8	GMSK / 8PSK	244KG7W	0.0380 W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	4M16F9W	0.0673 W

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH07-HY	722060/4086B-1

1.6 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ IC RSS-132 Issue 2
- ♦ IC RSS-133 Issue 5

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



1.7 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GPRS 8 Link ■ EDGE 8 Link	■ GPRS 8 Link ■ EDGE 8 Link
GSM 1900	■ GPRS 8 Link ■ EDGE 8 Link	■ GPRS 8 Link ■ EDGE 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

Note:

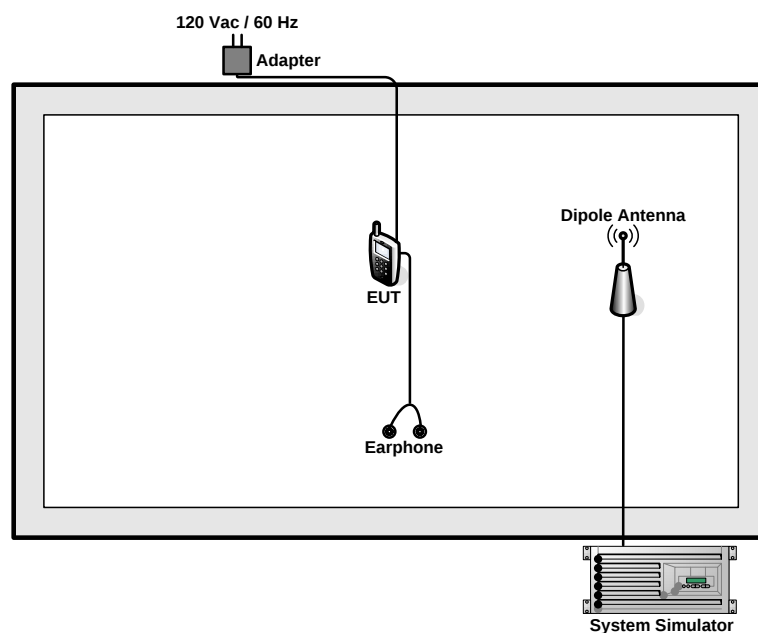
1. The maximum power levels are GPRS multi-slot class 8 mode for GMSK link, EDGE multi-slot class 8 mode for 8PSK link, RMC 12.2Kbps mode for WCDMA band V, and RMC 12.2Kbps mode for WCDMA band II, only these modes were used for all tests.
2. Because there are individual antennas for each WWAN, WLAN, and Bluetooth, the co-location test modes are not required.

The conducted power tables are as follows:

Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (1 Uplink)	32.99	32.95	32.85	30.18	30.05	29.96
GPRS 8 (1 Uplink)	33.01	32.96	32.86	30.19	30.06	30.10
GPRS 10 (2 Uplink)	29.59	29.56	29.47	27.26	27.16	26.91
GPRS 12 (4 Uplink)	27.03	26.98	26.91	24.73	24.61	24.39
EDGE 8 (MCS9) (1 Uplink)	27.09	27.05	26.95	26.17	26.07	26.02
EDGE 10 (MCS9) (2 Uplink)	24.82	24.78	24.70	23.82	23.71	23.48
EDGE 12 (MCS9) (4 Uplink)	21.34	21.30	21.20	20.67	20.55	20.34

Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
RMC 12.2K	23.63	23.68	23.56	23.39	23.45	23.44
HSDPA Subtest-1	23.49	23.42	23.38	23.30	23.35	23.29
HSDPA Subtest-2	23.45	23.37	23.38	23.24	23.29	23.31
HSDPA Subtest-3	23.10	23.07	23.04	22.97	23.00	23.05
HSDPA Subtest-4	23.01	22.98	22.92	23.00	23.08	23.02
HSUPA Subtest-1	23.30	23.26	23.35	23.10	23.13	23.04
HSUPA Subtest-2	21.81	21.73	21.79	22.10	22.15	22.03
HSUPA Subtest-3	22.21	22.13	22.30	22.43	22.55	22.34
HSUPA Subtest-4	21.76	21.89	21.92	22.07	22.21	22.12
HSUPA Subtest-5	23.40	23.38	23.42	23.30	23.42	23.36

2.2 Connection Diagram of Test System



3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

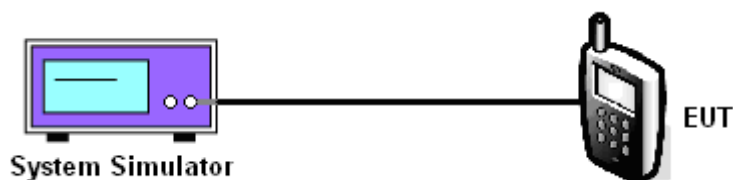
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band									
Modes	GSM850 (GPRS 8)			GSM850 (EDGE 8)			WCDMA Band V (RMC 12.2Kbps)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	826.4	836.4	846.6
Conducted Power (dBm)	33.01	32.96	32.86	27.09	27.05	26.95	23.63	23.68	23.56
Conducted Power (Watts)	2.00	1.98	1.93	0.51	0.51	0.50	0.23	0.23	0.23

PCS Band									
Modes	GSM1900 (GPRS 8)			GSM1900 (EDGE 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Conducted Power (dBm)	30.19	30.06	30.10	26.17	26.07	26.02	23.39	23.45	23.44
Conducted Power (Watts)	1.04	1.01	1.02	0.41	0.40	0.40	0.22	0.22	0.22

3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

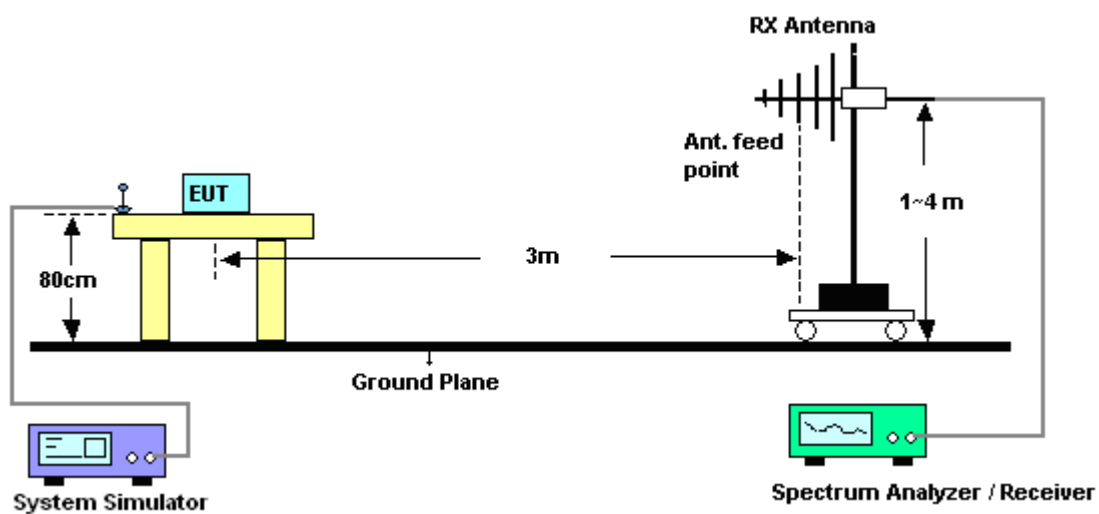
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 3MHz,VBW= 3MHz, and peak detector settings.
1. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
2. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$.

3.2.4 Test Setup



3.2.5 Test Result of ERP

GSM850 (GPRS 8) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.2	-8.39	30.89	20.35	0.1084
836.4	-8.97	31.13	20.01	0.1002
848.8	-8.49	31.62	20.98	0.1253
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.2	-17.65	35.93	16.13	0.0410
836.4	-16.74	34.95	16.06	0.0404
848.8	-15.81	34.71	16.75	0.0473

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

GSM850 (EDGE 8) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.2	-13.71	30.89	15.03	0.0318
836.4	-14.41	31.13	14.57	0.0286
848.8	-13.70	31.62	15.77	0.0378
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.2	-22.91	35.93	10.87	0.0122
836.4	-22.17	34.95	10.63	0.0116
848.8	-21.35	34.71	11.21	0.0132

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-11.50	30.89	17.24	0.0530
836.40	-11.19	31.13	17.79	0.0601
846.60	-11.94	31.62	17.53	0.0566
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-19.23	35.93	14.55	0.0285
836.40	-18.68	34.95	14.12	0.0258
846.60	-18.84	34.71	13.72	0.0236

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

3.2.6 Test Result of EIRP

GSM1900 (GPRS 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-22.11	41.24	19.13	0.0818
1880.0	-22.85	41.46	18.61	0.0726
1909.8	-22.23	41.21	18.98	0.0791
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-23.53	41.52	17.99	0.0630
1880.0	-25.51	43.10	17.59	0.0574
1909.8	-25.11	42.73	17.62	0.0578

* EIRP = LVL (dBm) + Correction Factor (dB)

GSM1900 (EDGE 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-25.44	41.24	15.80	0.0380
1880.0	-25.89	41.46	15.57	0.0361
1909.8	-25.57	41.21	15.64	0.0366
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-26.66	41.52	14.86	0.0306
1880.0	-28.89	43.10	14.21	0.0264
1909.8	-29.14	42.73	13.59	0.0229

* EIRP = LVL (dBm) + Correction Factor (dB)

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-22.96	41.24	18.28	0.0673
1880.00	-25.24	41.46	16.22	0.0419
1907.60	-23.74	41.21	17.47	0.0558
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-26.28	41.52	15.24	0.0334
1880.00	-26.82	43.10	16.28	0.0425
1907.60	-26.38	42.73	16.35	0.0432

* EIRP = LVL (dBm) + Correction Factor (dB)

3.3 Occupied Bandwidth Measurement

3.3.1 Description of Occupied Bandwidth Measurement

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

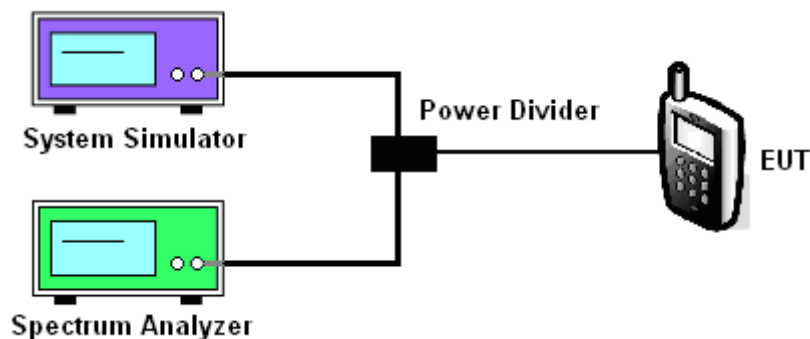
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.

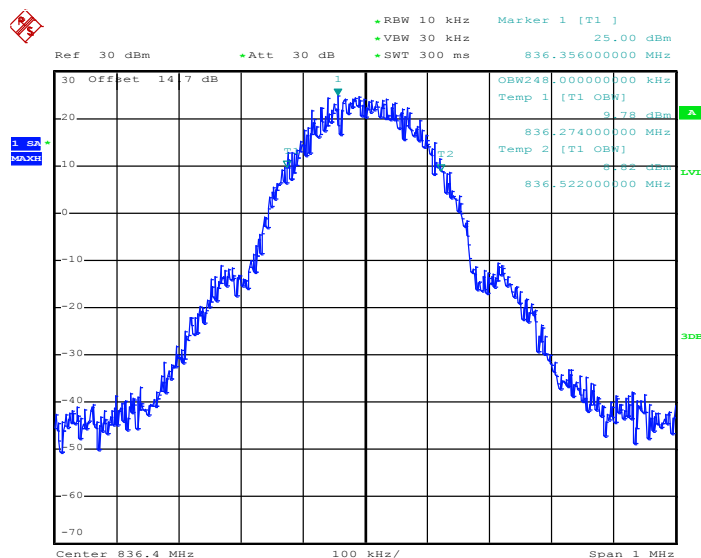
3.3.4 Test Setup



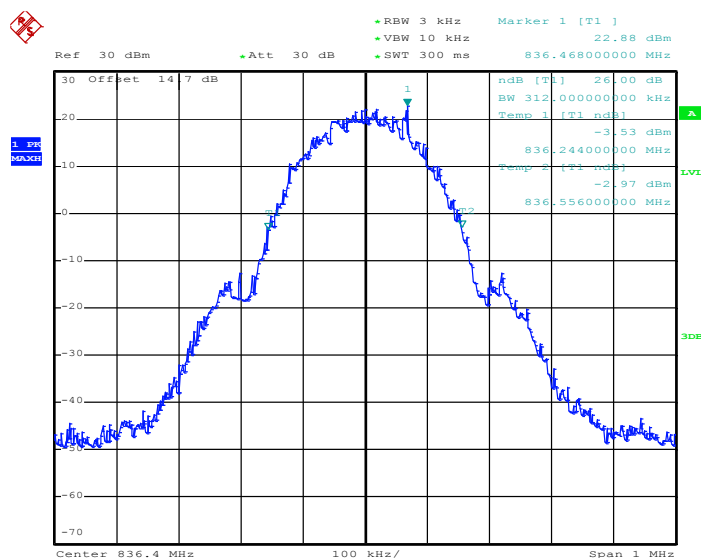
3.3.5 Test Result (Plots) of Occupied Bandwidth

Band :	GSM 850	Power Stage :	High
Test Mode :	GPRS 8 Link		

99% Occupied Bandwidth Plot on Channel 189



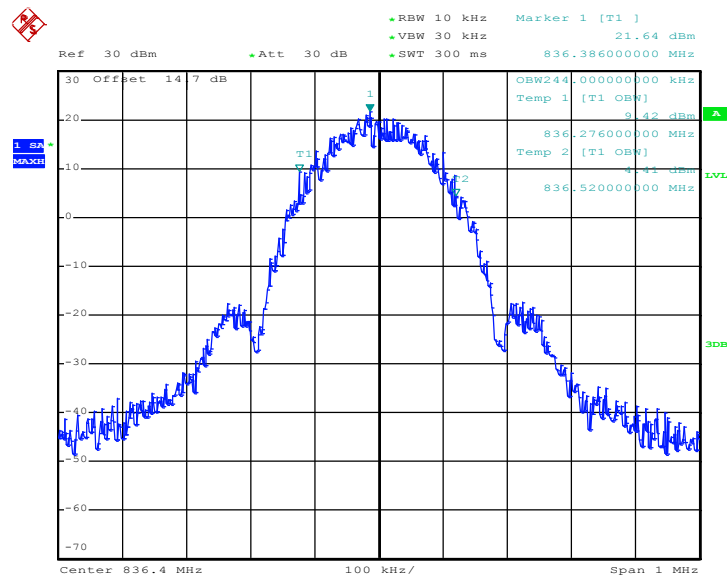
26dB Bandwidth Plot on Channel 189



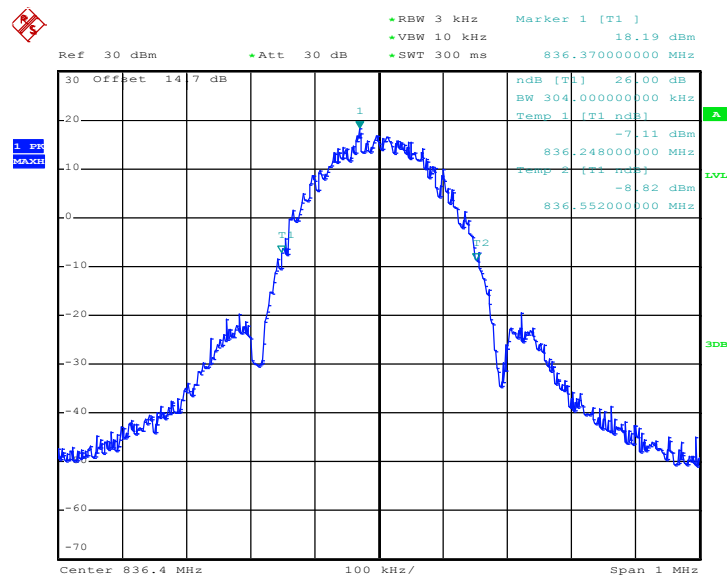


Band :	GSM 850	Power Stage :	High
Test Mode :	EDGE 8 Link		

99% Occupied Bandwidth Plot on Channel 189

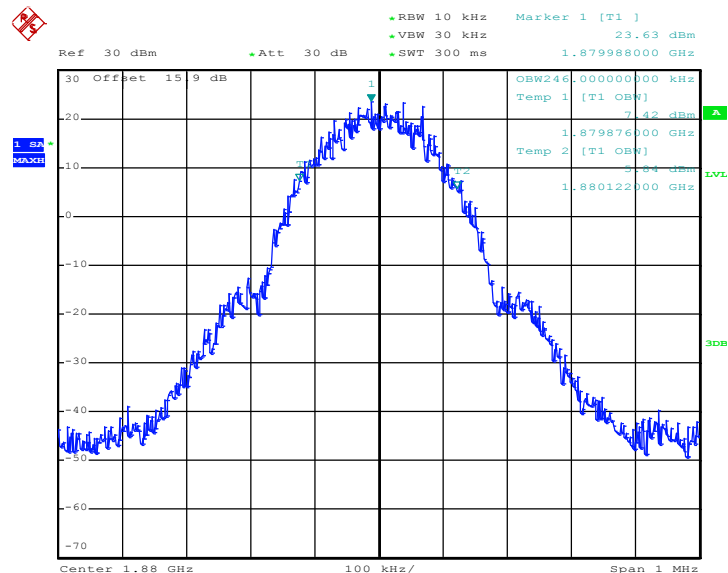


26dB Bandwidth Plot on Channel 189

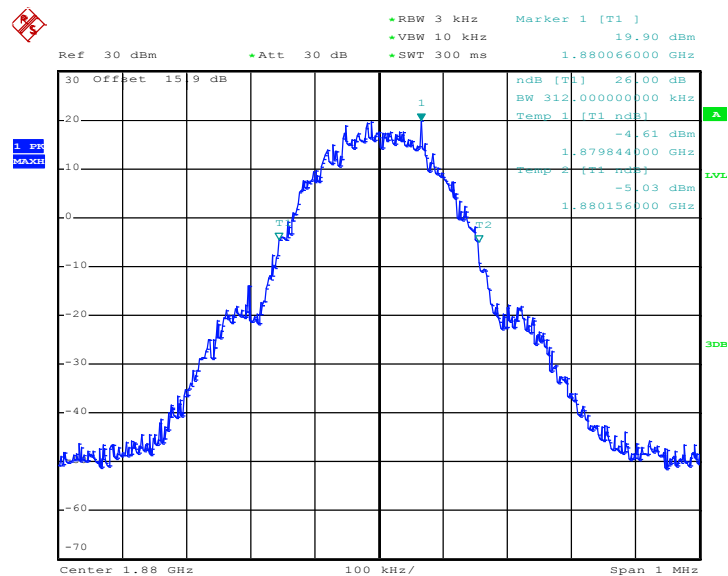


Band :	GSM 1900	Power Stage :	High
Test Mode :	GPRS 8 Link		

99% Occupied Bandwidth Plot on Channel 661



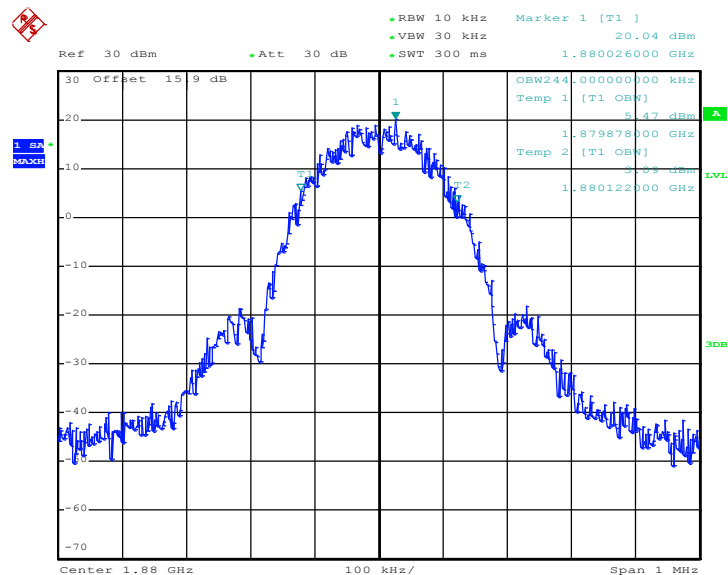
26dB Bandwidth Plot on Channel 661



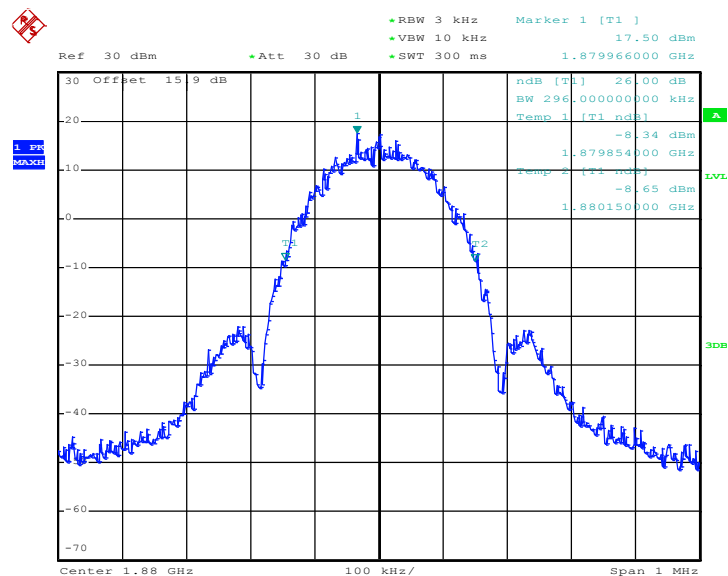


Band :	GSM 1900	Power Stage :	High
Test Mode :	EDGE 8 Link		

99% Occupied Bandwidth Plot on Channel 661



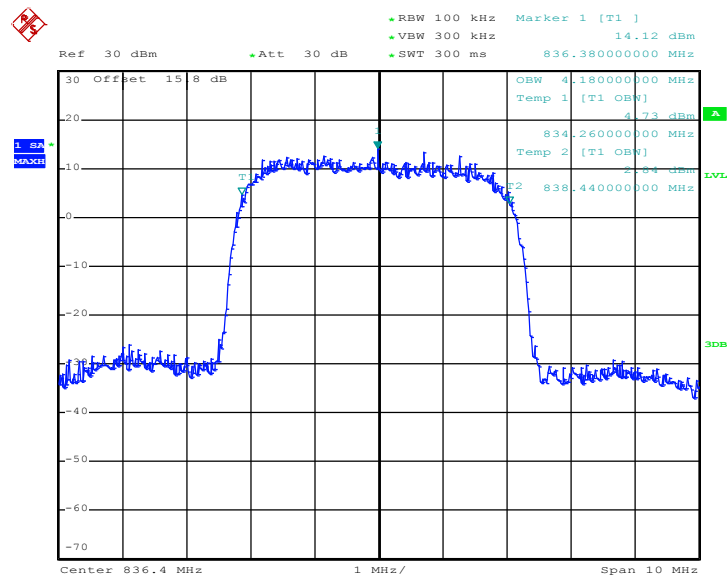
26dB Bandwidth Plot on Channel 661



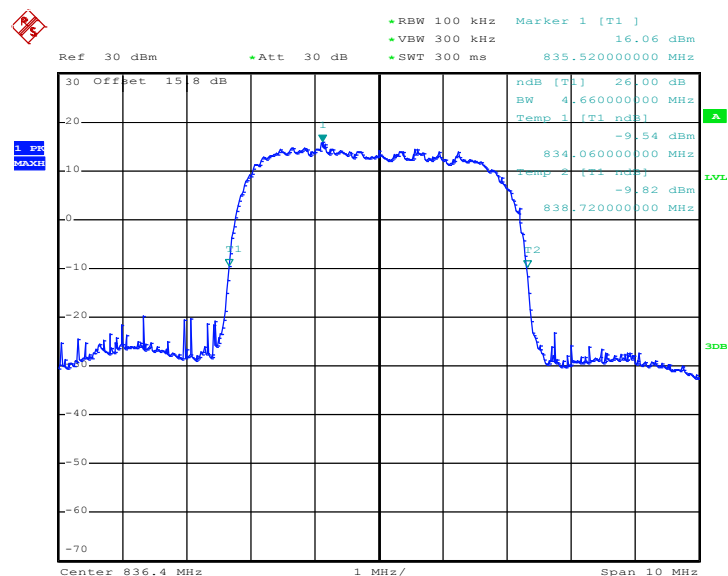


Band :	WCDMA Band V	Power Stage :	High
Test Mode :	RMC 12.2Kbps Link		

99% Occupied Bandwidth Plot on Channel 4182



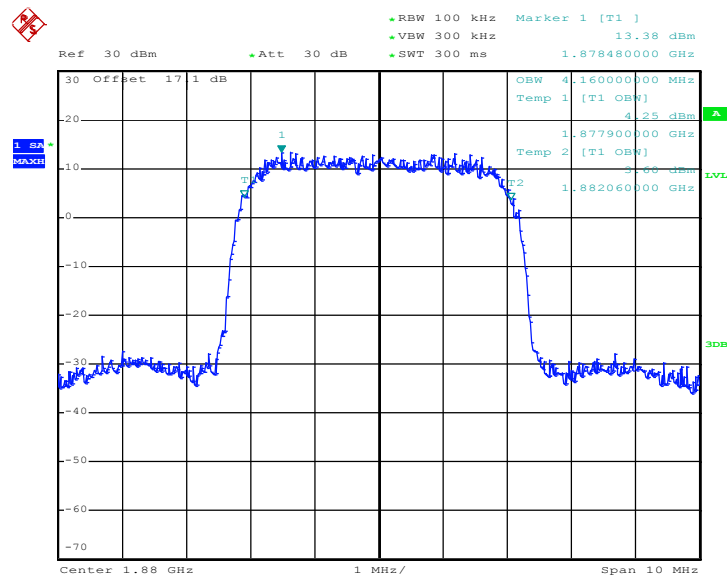
26dB Bandwidth Plot on Channel 4182



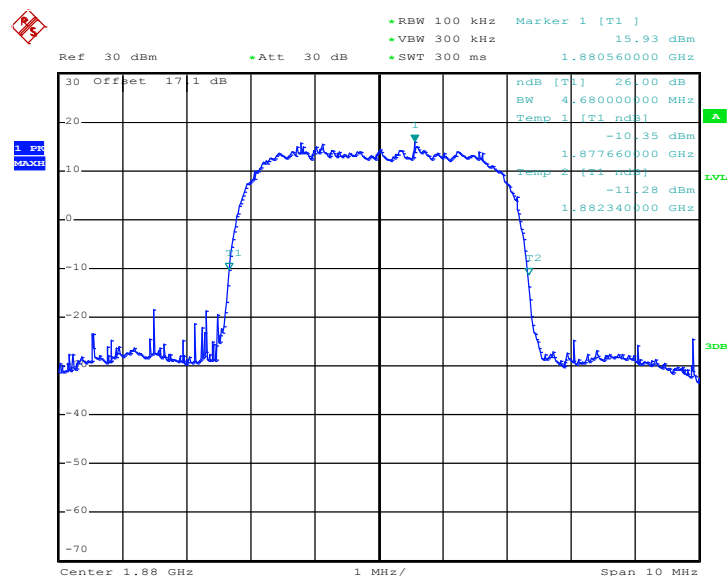


Band :	WCDMA Band II	Power Stage :	High
Test Mode :	RMC 12.2Kbps Link		

99% Occupied Bandwidth Plot on Channel 9400



26dB Bandwidth Plot on Channel 9400



3.4 Band Edge Measurement

3.4.1 Description of Band Edge Measurement

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

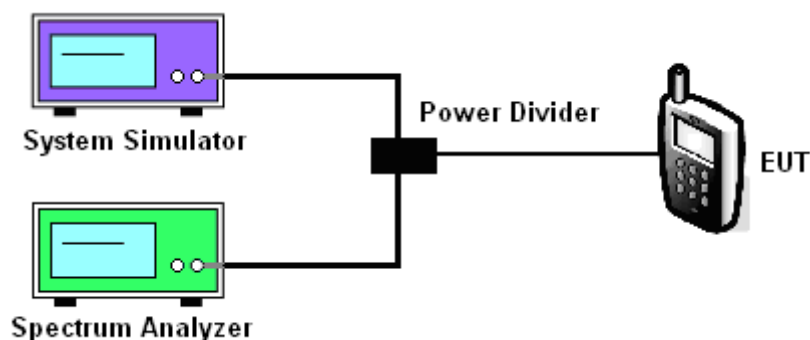
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.

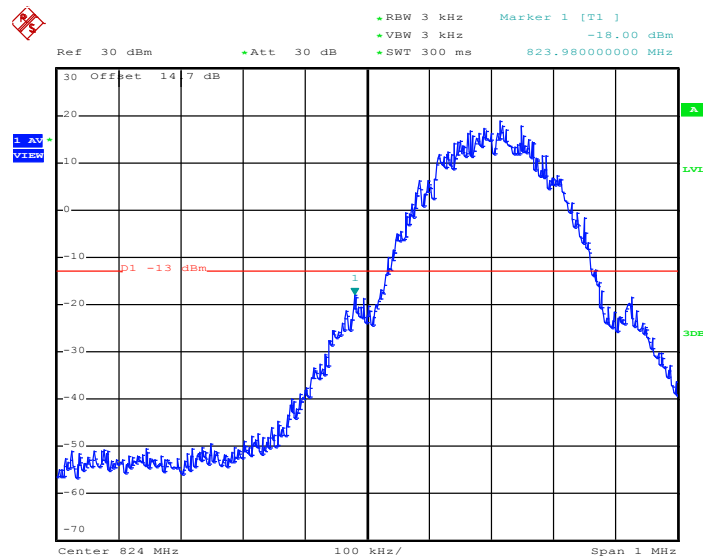
3.4.4 Test Setup



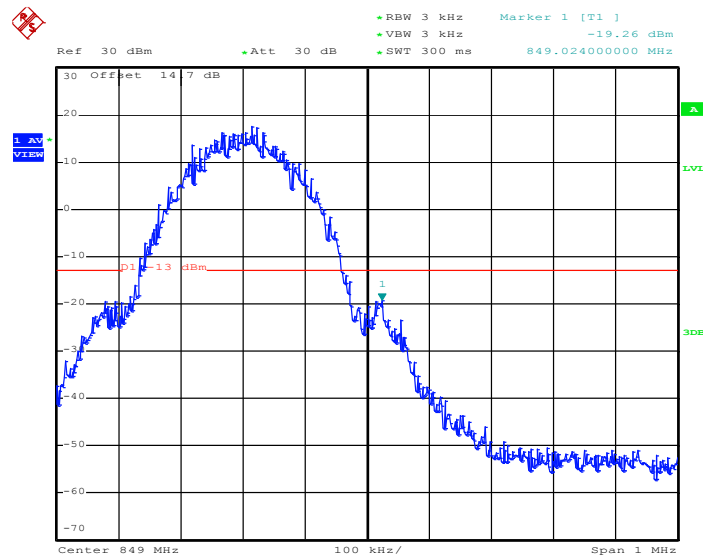
3.4.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM850	Power Stage :	High
Test Mode :	GPRS 8 Link		

Lower Band Edge Plot on Channel 128

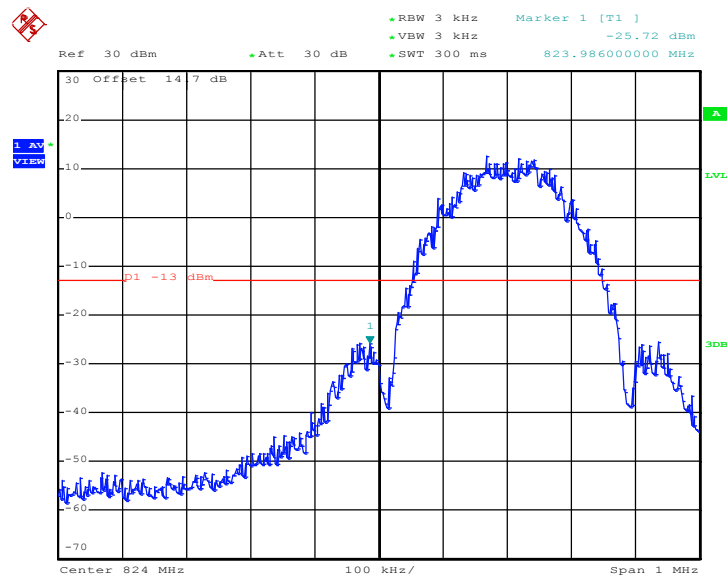


Higher Band Edge Plot on Channel 251

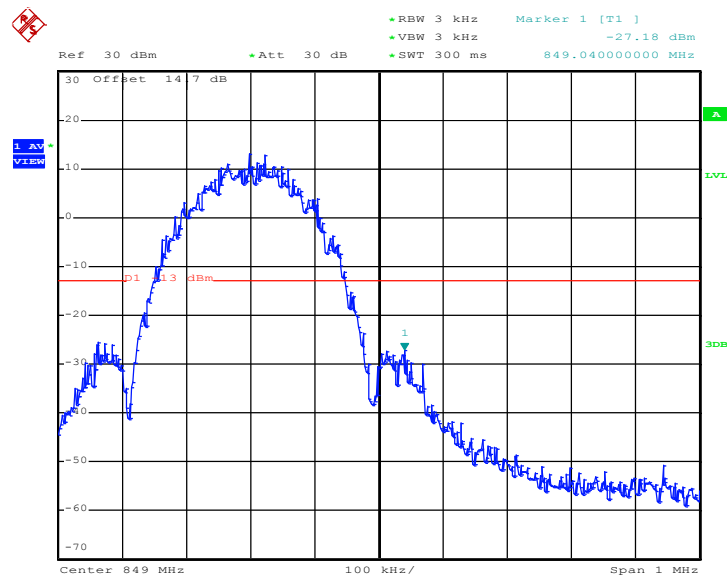


Band :	GSM850	Power Stage :	High
Test Mode :	EDGE 8 Link		

Lower Band Edge Plot on Channel 128



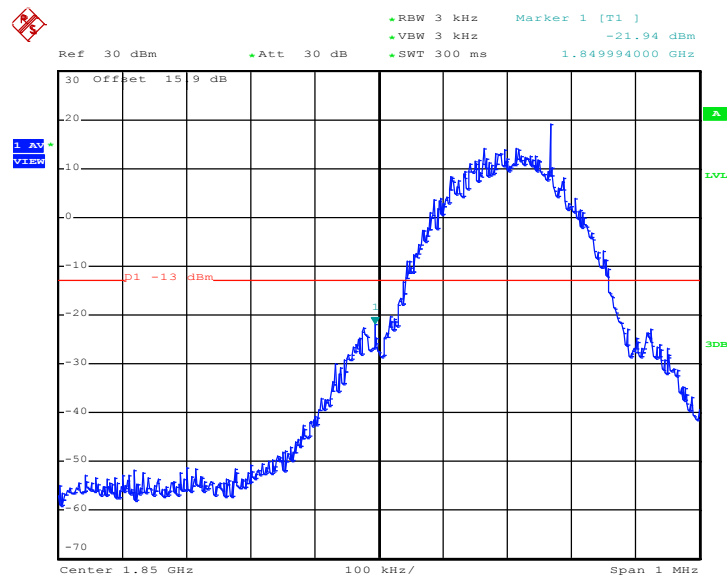
Higher Band Edge Plot on Channel 251



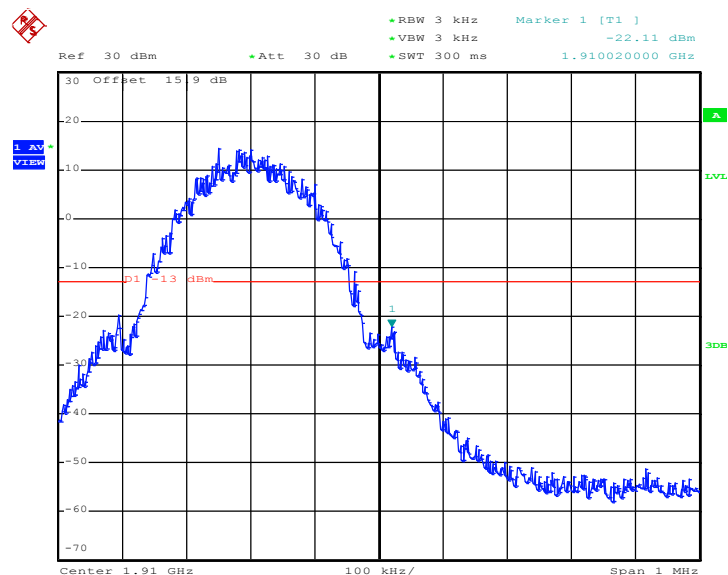


Band :	GSM1900	Power Stage :	High
Test Mode :	GPRS 8 Link		

Lower Band Edge Plot on Channel 512



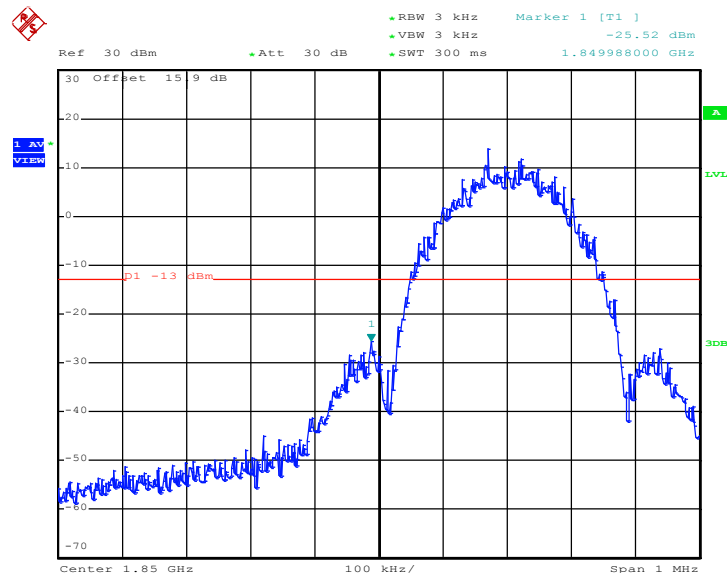
Higher Band Edge Plot on Channel 810



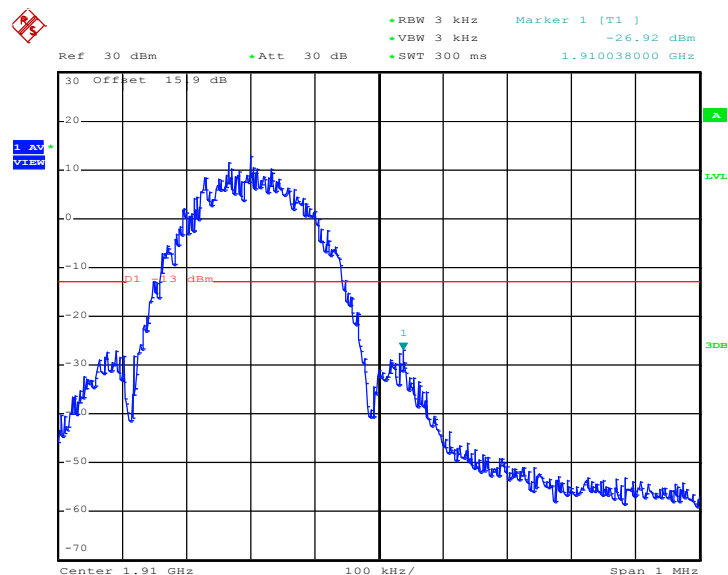


Band :	GSM1900	Power Stage :	High
Test Mode :	EDGE 8 Link		

Lower Band Edge Plot on Channel 512

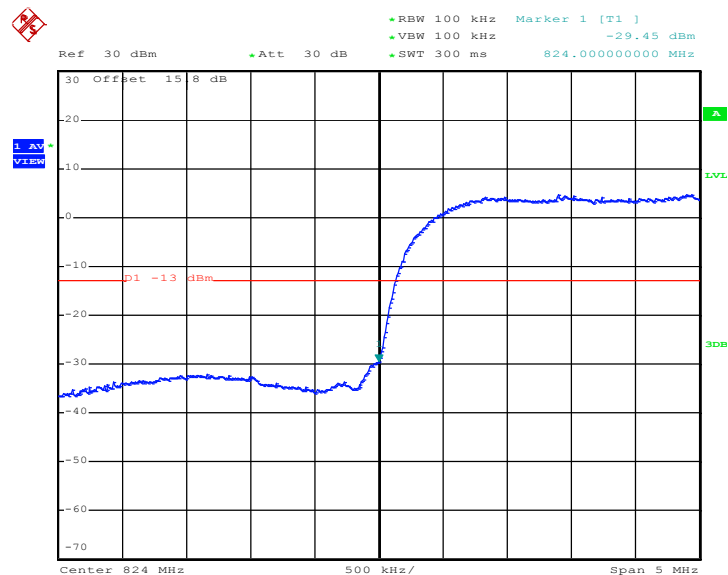


Higher Band Edge Plot on Channel 810

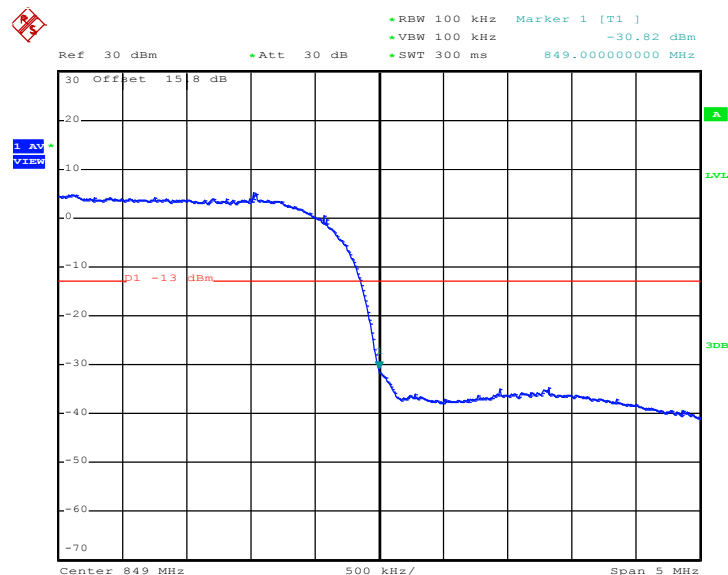


Band :	WCDMA Band V	Power Stage :	High
Test Mode :	RMC 12.2Kbps Link		

Lower Band Edge Plot on Channel 4132



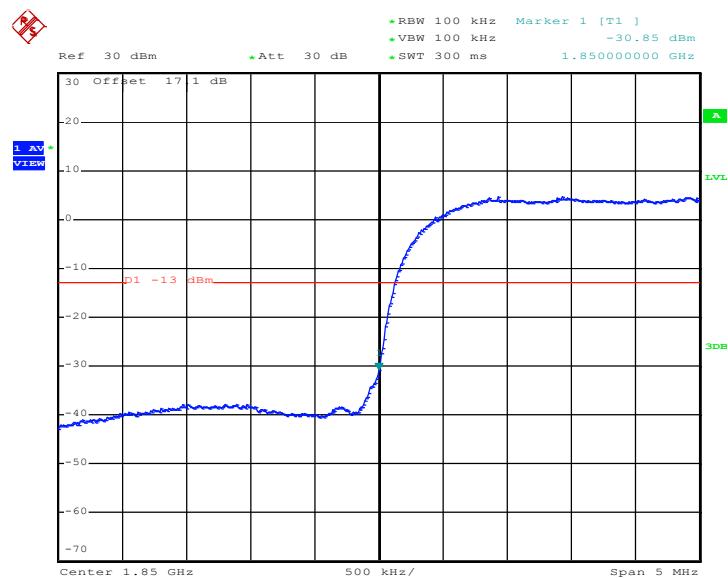
Higher Band Edge Plot on Channel 4233



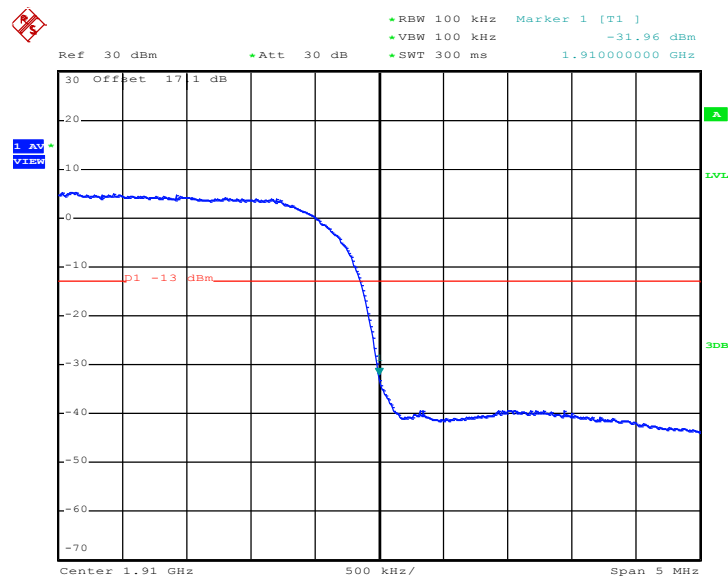


Band :	WCDMA Band II	Power Stage :	High
Test Mode :	RMC 12.2Kbps Link		

Lower Band Edge Plot on Channel 9262



Higher Band Edge Plot on Channel 9538



3.5 Conducted Emission Measurement

3.5.1 Description of Conducted Emission Measurement

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

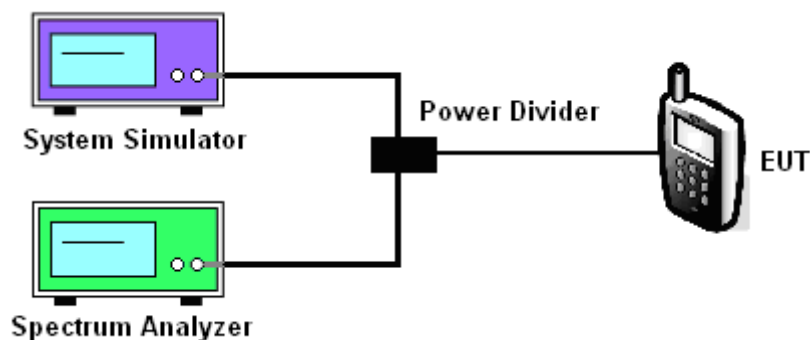
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

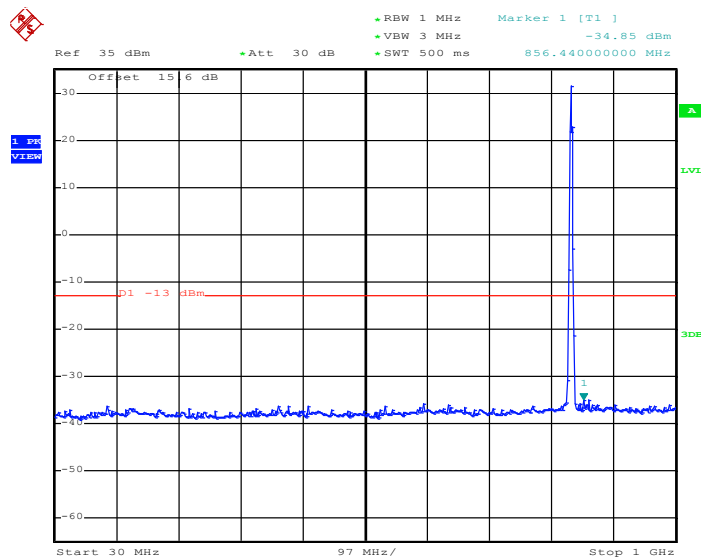
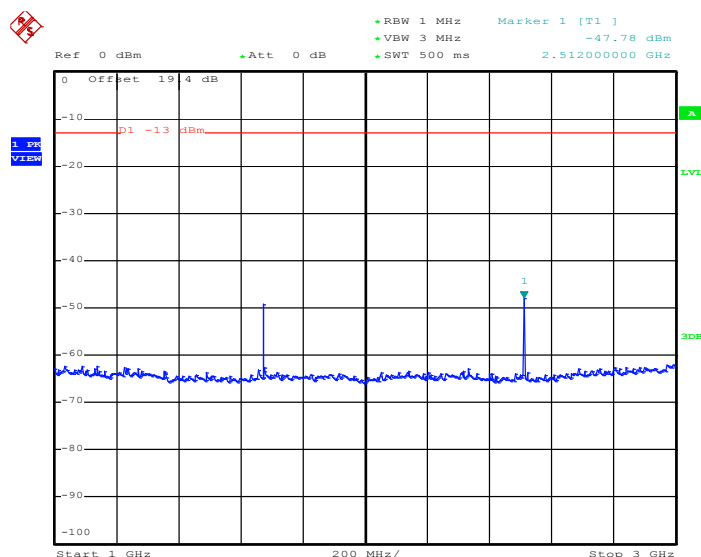
1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

3.5.4 Test Setup

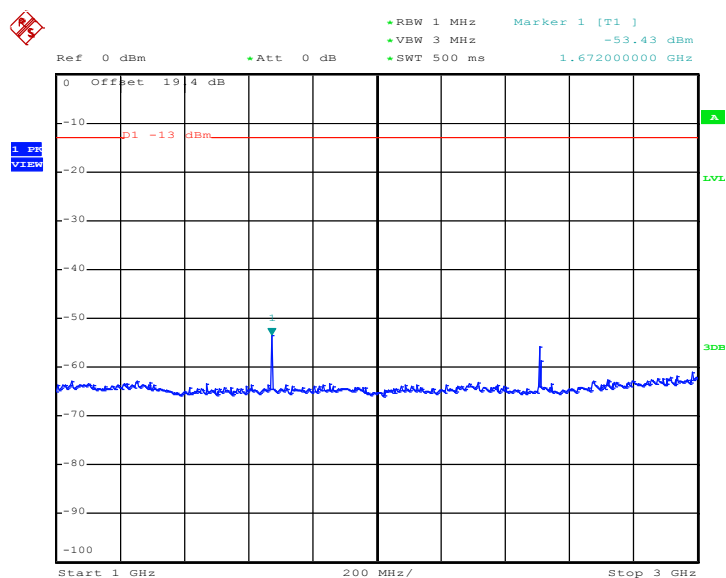


3.5.5 Test Result (Plots) of Conducted Emission

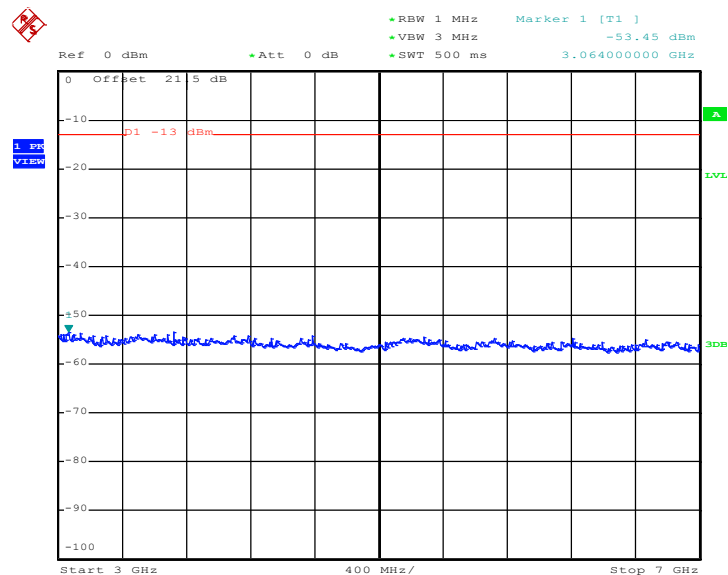
Band :	GSM850	Channel :	CH189
Test Mode :	GPRS 8 Link		

Conducted Emission Plot between 30MHz ~ 1GHz

Conducted Emission Plot between 1GHz ~ 3GHz


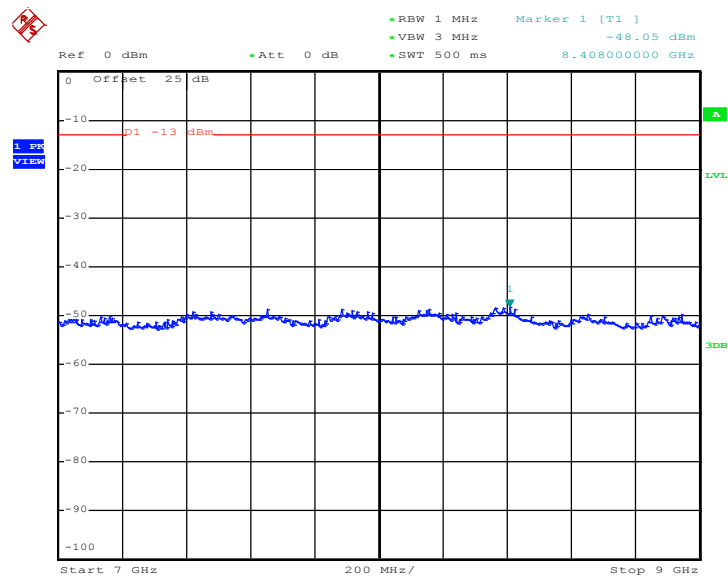




Conducted Emission Plot between 3GHz ~ 7GHz

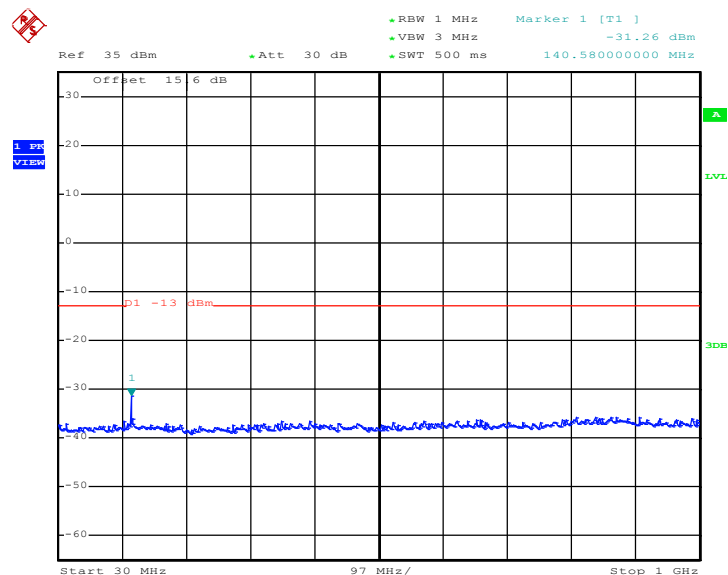


Conducted Emission Plot between 7GHz ~ 9GHz

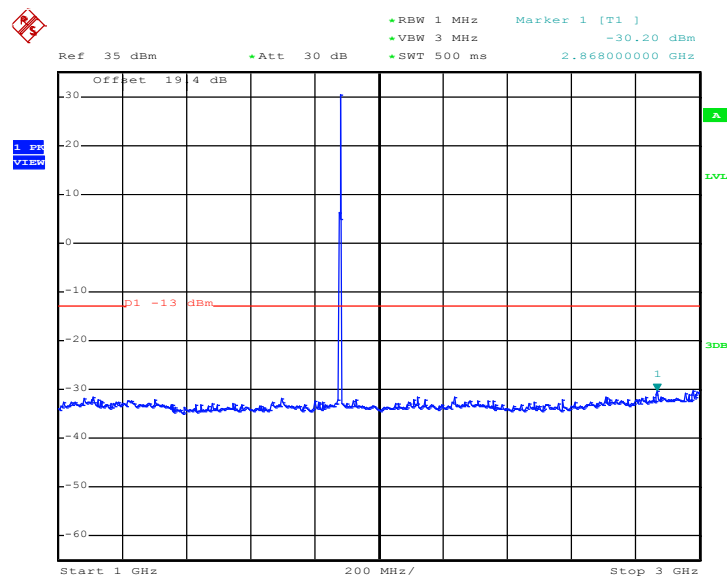


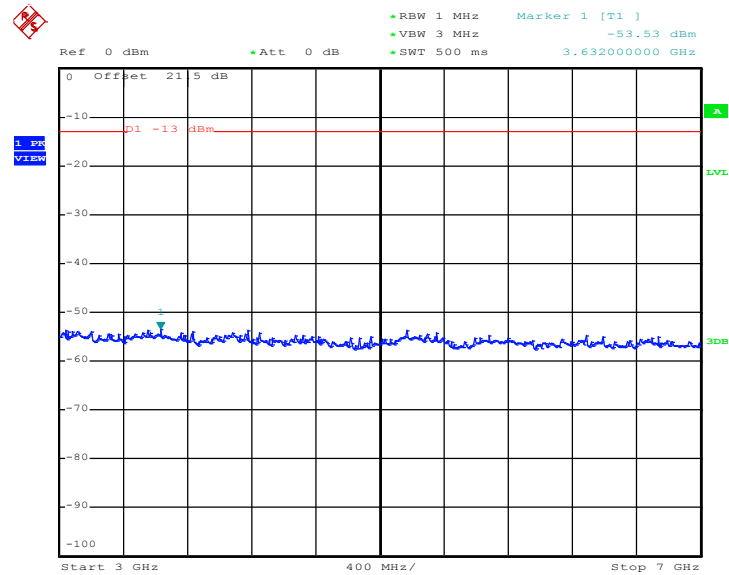
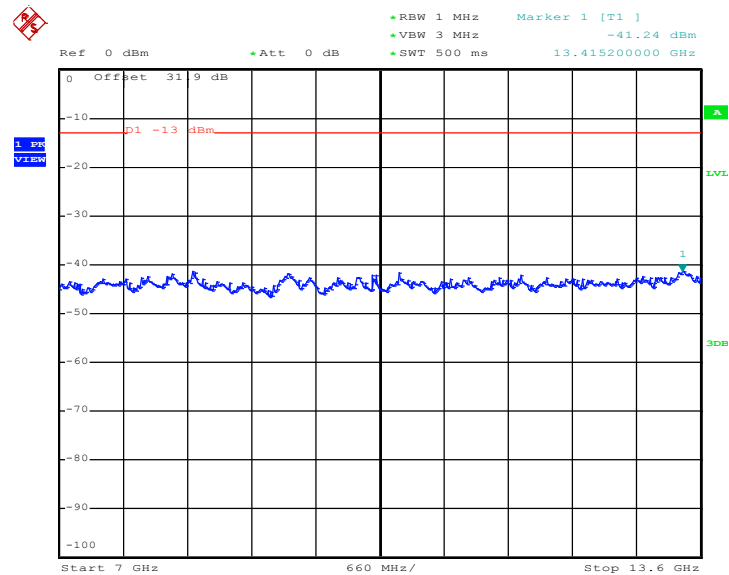
Band :	GSM1900	Channel :	CH661
Test Mode :	GPRS 8 Link		

Conducted Emission Plot between 30MHz ~ 1GHz



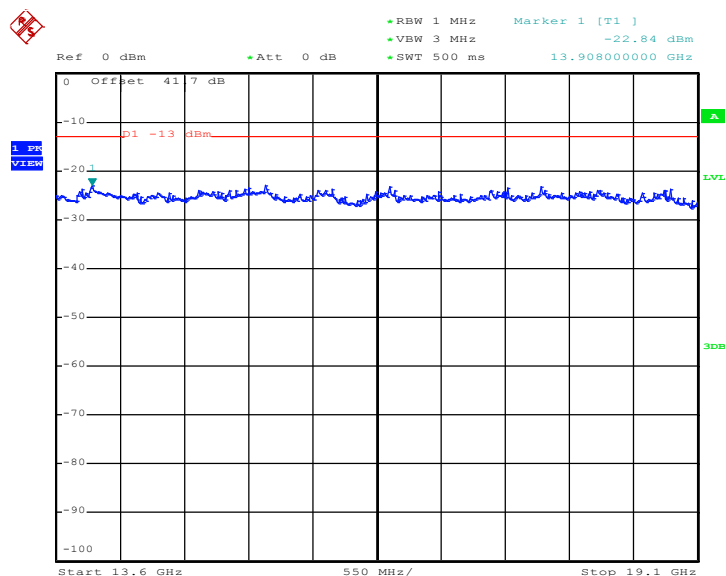
Conducted Emission Plot between 1GHz ~ 3GHz



Conducted Emission Plot between 3GHz ~ 7GHz

Conducted Emission Plot between 7GHz ~ 13.6GHz


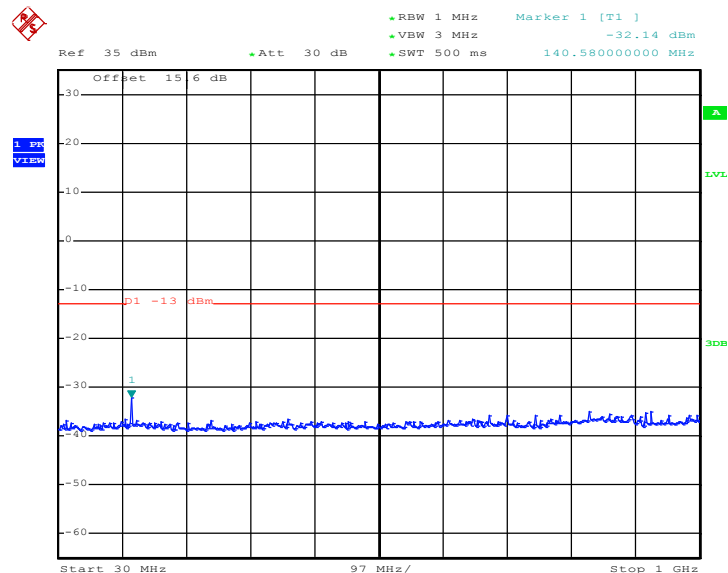


Conducted Emission Plot between 13.6GHz ~ 19.1GHz

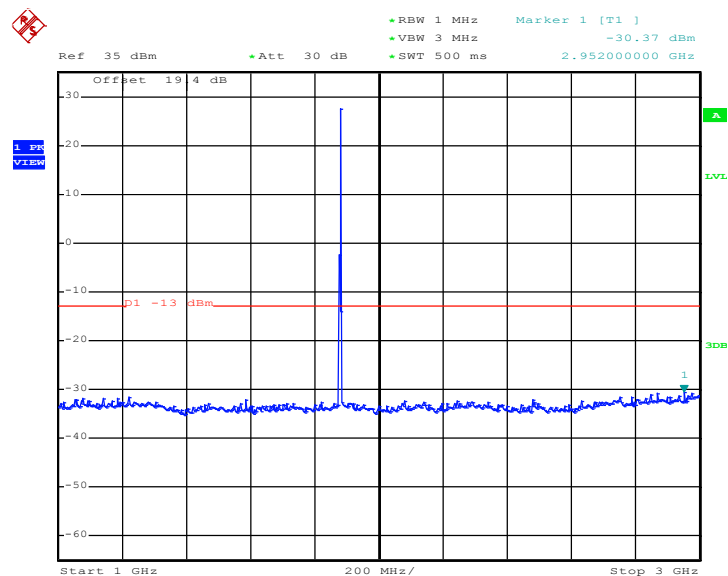


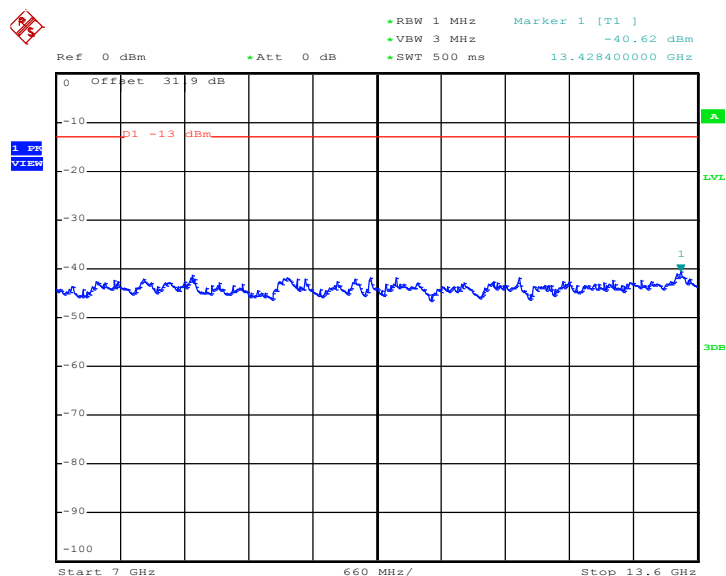
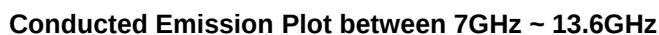
Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE 8 Link		

Conducted Emission Plot between 30MHz ~ 1GHz



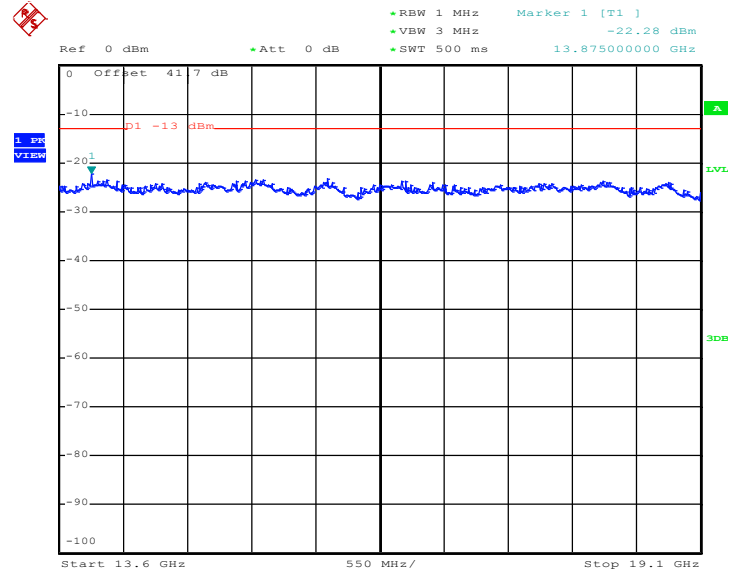
Conducted Emission Plot between 1GHz ~ 3GHz







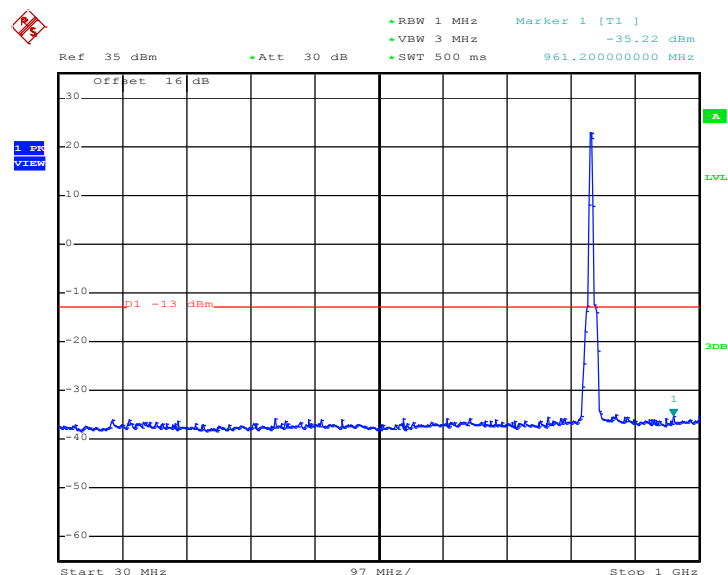
Conducted Emission Plot between 13.6GHz ~ 19.1GHz



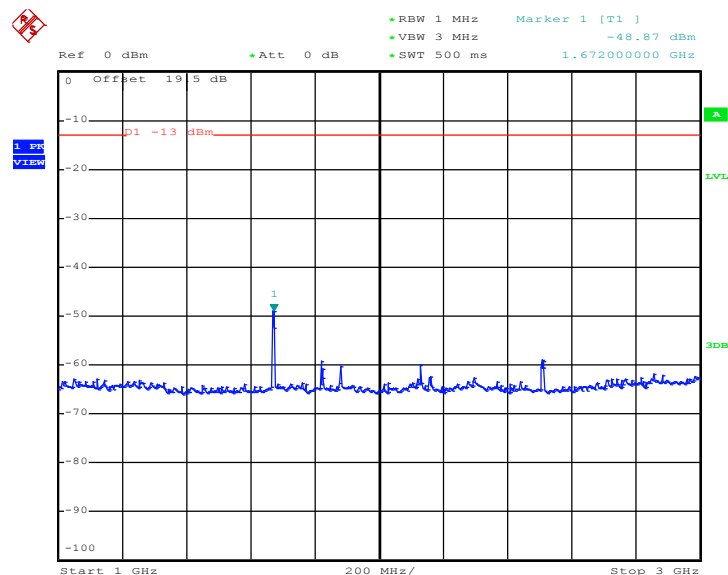


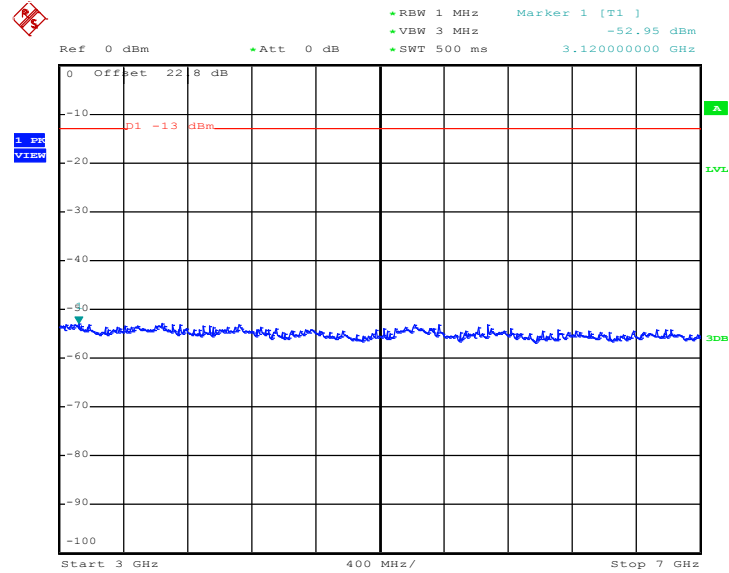
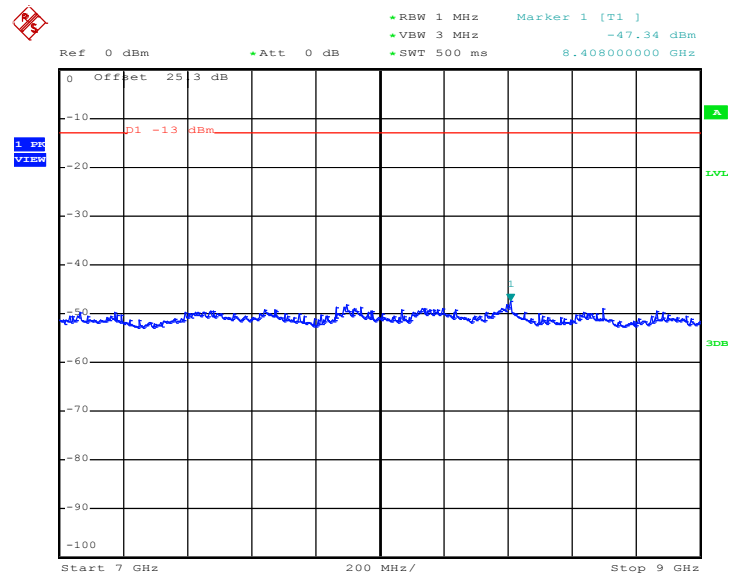
Band :	WCDMA Band V	Channel :	CH4182
Test Mode :	RMC 12.2Kbps Link		

Conducted Emission Plot between 30MHz ~ 1GHz



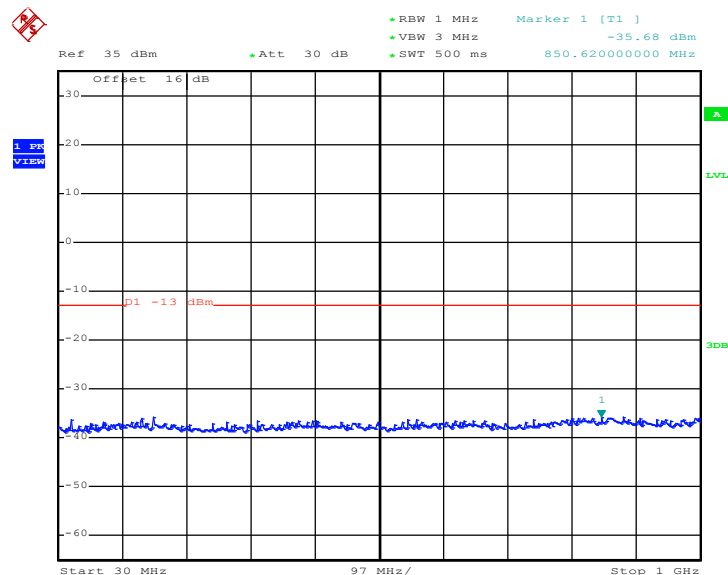
Conducted Emission Plot between 1GHz ~ 3GHz



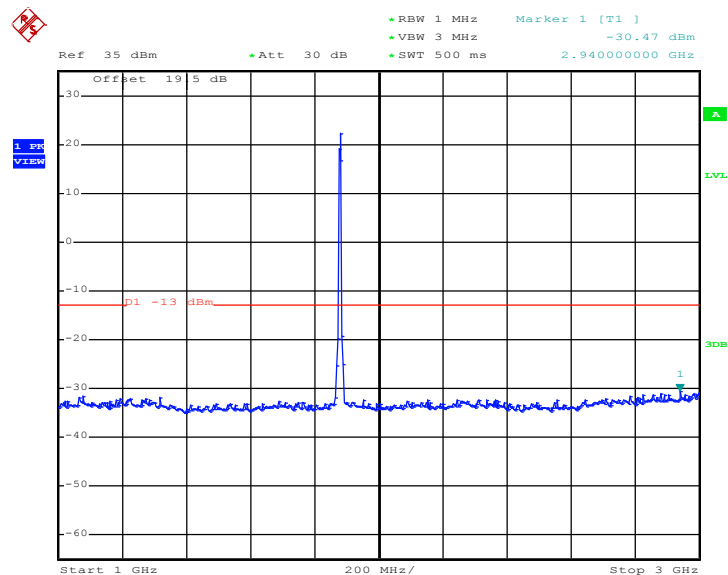
Conducted Emission Plot between 3GHz ~ 7GHz

Conducted Emission Plot between 7GHz ~ 9GHz


Band :	WCDMA Band II	Channel :	CH9400
Test Mode :	RMC 12.2Kbps Link		

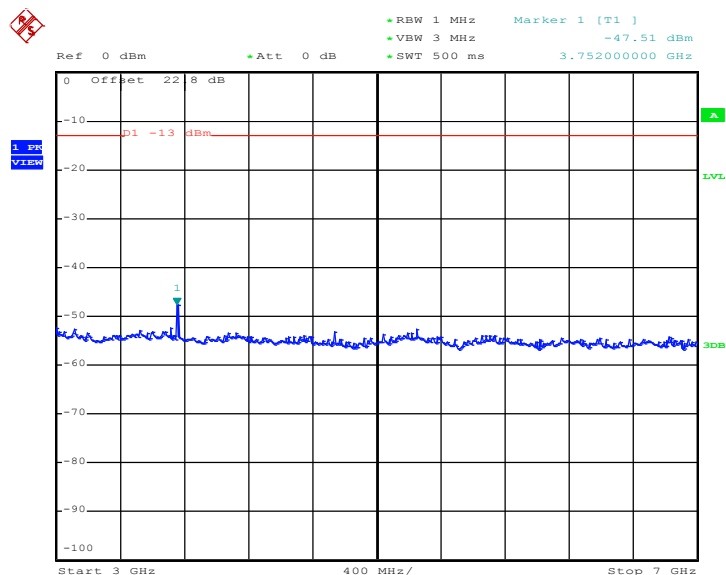
Conducted Emission Plot between 30MHz ~ 1GHz



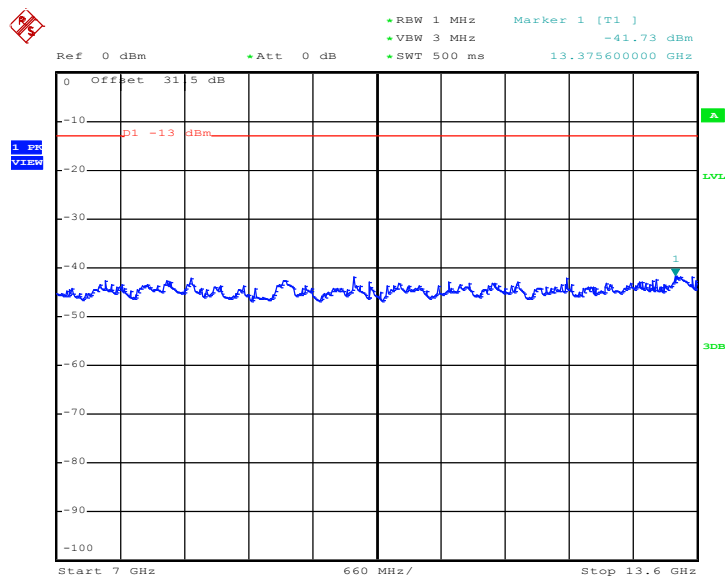
Conducted Emission Plot between 1GHz ~ 3GHz



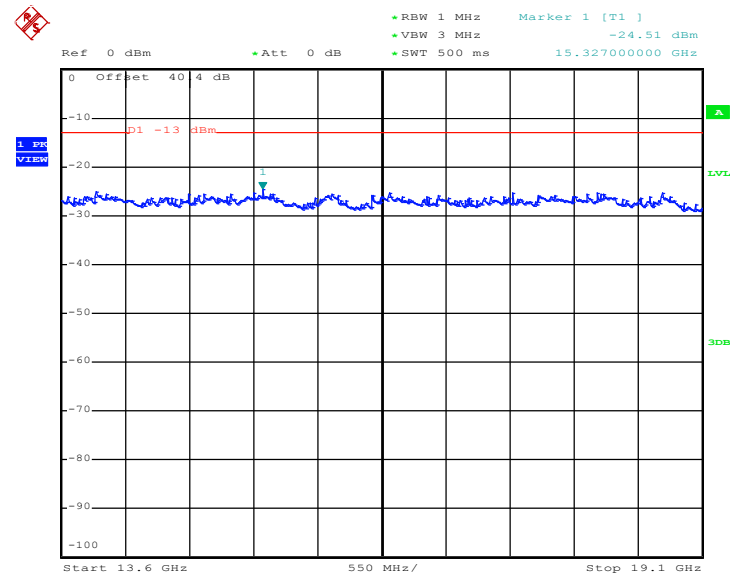
Conducted Emission Plot between 3GHz ~ 7GHz



Conducted Emission Plot between 7GHz ~ 13.6GHz



Conducted Emission Plot between 13.6GHz ~ 19.1GHz



3.6 Field Strength of Spurious Radiation Measurement

3.6.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

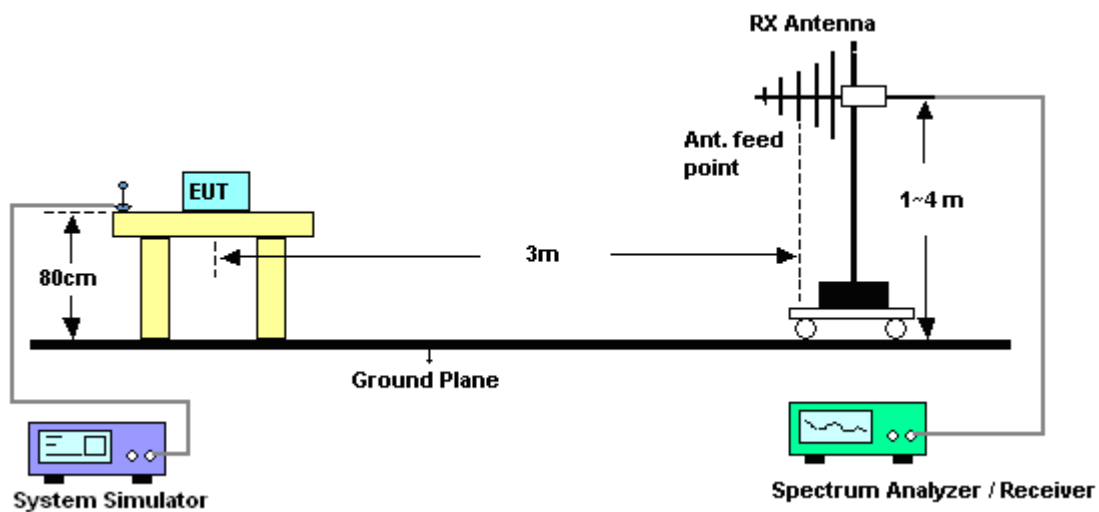
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

4. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
5. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
6. The table was rotated 360 degrees to determine the position of the highest spurious emission.
7. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
8. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
9. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
10. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
11. Taking the record of output power at antenna port.
12. Repeat step 7 to step 8 for another polarization.
13. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
14. $ERP \text{ (dBm)} = EIRP - 2.15$

3.6.4 Test Setup



3.6.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

Test Engineer :	David Yang	Temperature :	22~23°C
		Relative Humidity :	50~51%

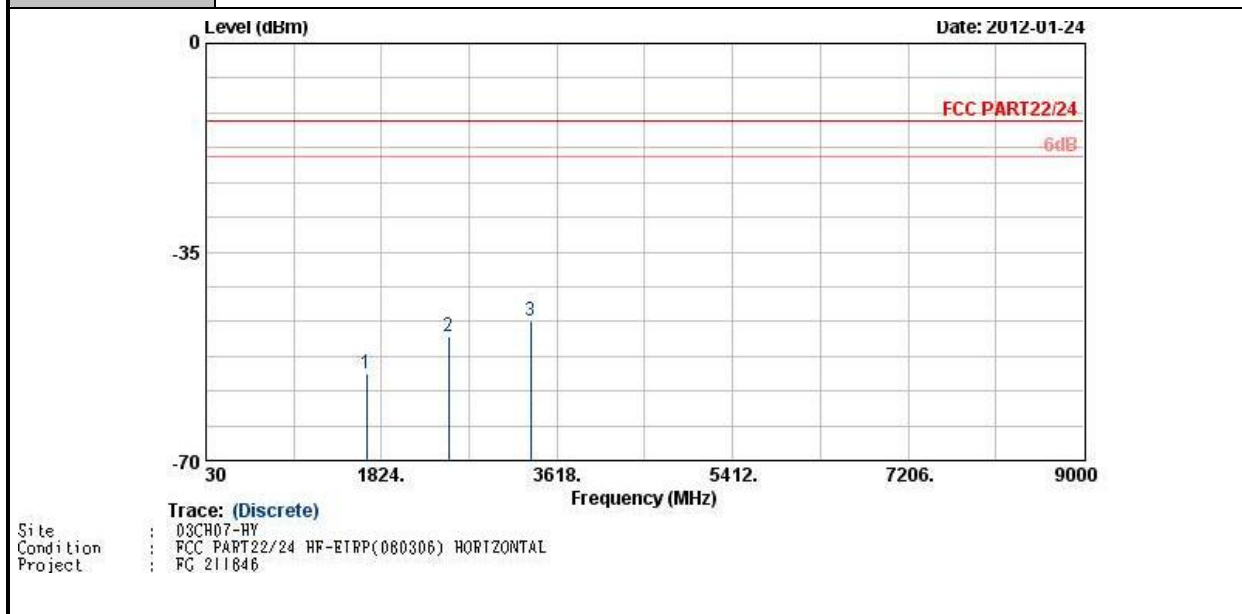
Frequency	Measurement Distance	Field Strength	Antenna Factor	Distance Factor	Limit Distance	Field Strength at Limit Distance (30m)	Limit (30m)
(MHz)	(m)	(dBuV/m)	(dB/m)	(dB/decade)	(m)	(dBuV/m)	(dBuV/m)
0.03277	3	-4.05	20.1	40	30	-44.05	29.54
19.20	3	12.06	19.7	40	30	-27.94	29.54
26.00	3	11.40	20.5	40	30	-28.60	29.54

Note:

- In accordance with 15.33 (a): For each frequency at which a measurement is made at only one distance, the square of an inverse linear distance extrapolation factor (40 dB/decade) is applied.
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.
- The field strength measured is direct conversion of all parameters (antenna factor and distance extrapolation factor) and loaded into the spectrum.
- For example 1:
Field Strength at 3m=10 (dBuV/m)
Field Strength at 30m=10- $40 \cdot \log(30\text{m}/3\text{m})$ =-30 (dBuV/m)
For example 2:
Field Strength at 10m=10 (dBuV/m)
Field Strength at 30m=10- $40 \cdot \log(30\text{m}/10\text{m})$ =-9.08 (dBuV/m)

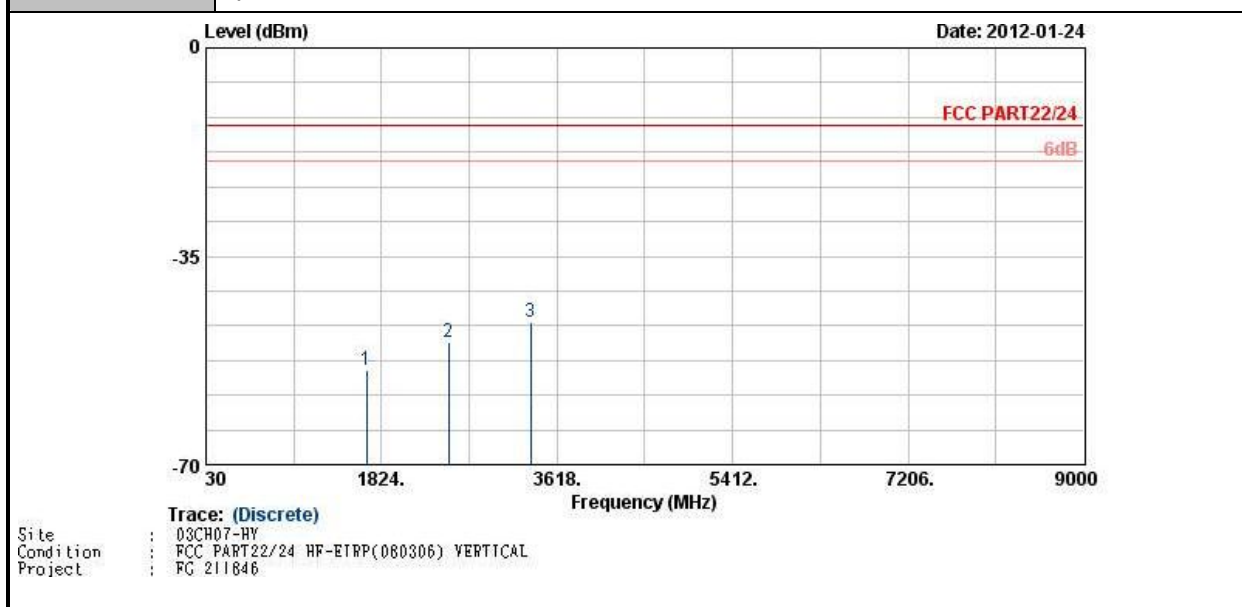
3.6.6 Test Result of Field Strength of Spurious Radiated

Band :	GSM850	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



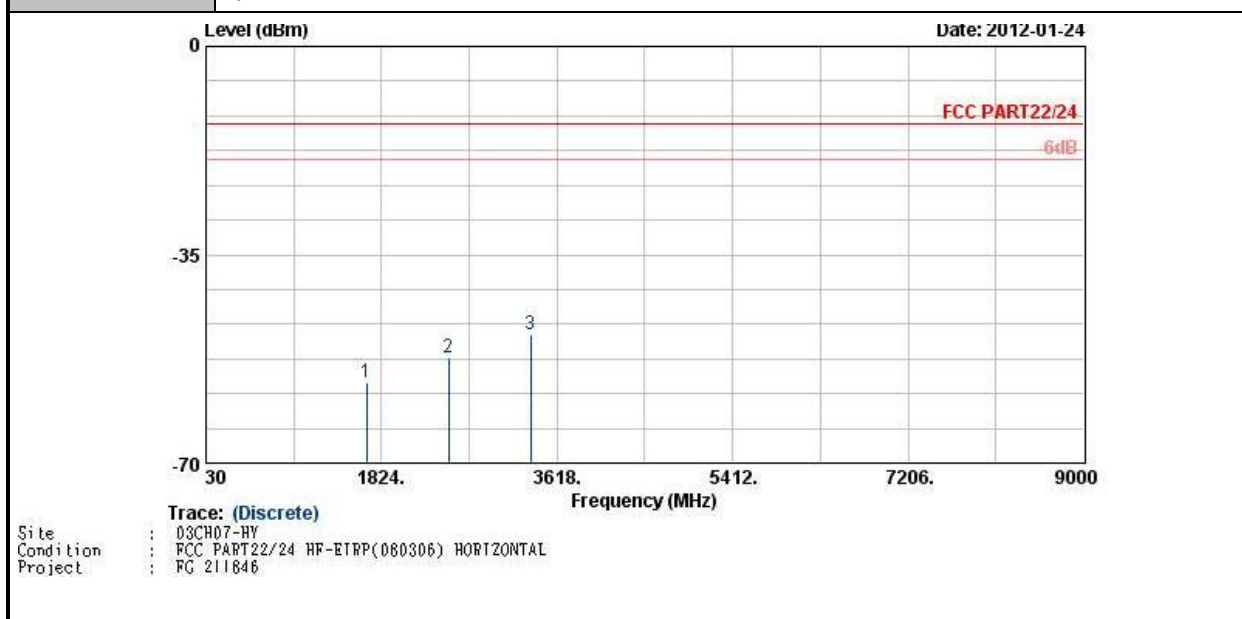
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-55.43	-13	-42.43	-64.82	-57.15	1.62	5.49	H	Pass
2509	-49.15	-13	-36.15	-61.63	-51.12	2.1	6.22	H	Pass
3345	-46.58	-13	-33.58	-60.75	-49.47	3.03	8.07	H	Pass

Band :	GSM850	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



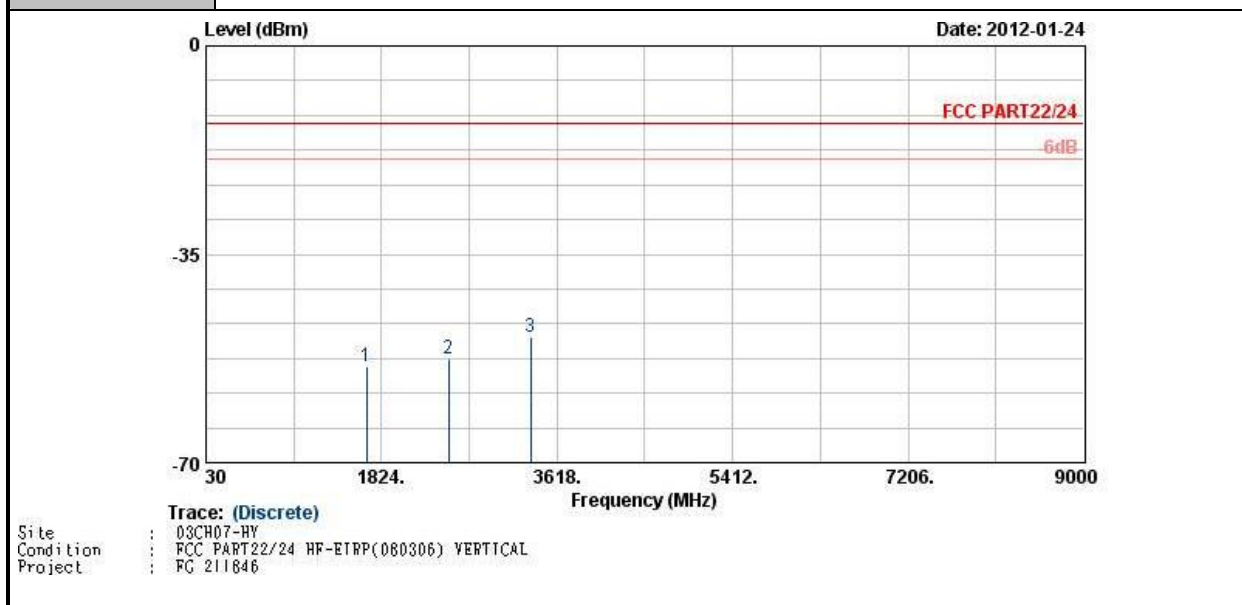
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-54.15	-13	-41.15	-65.68	-55.87	1.62	5.49	V	Pass
2509	-49.44	-13	-36.44	-63.54	-51.41	2.1	6.22	V	Pass
3345	-46.10	-13	-33.10	-61.46	-48.99	3.03	8.07	V	Pass

Band :	GSM850	Temperature :	22~23°C
Test Mode :	EDGE 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



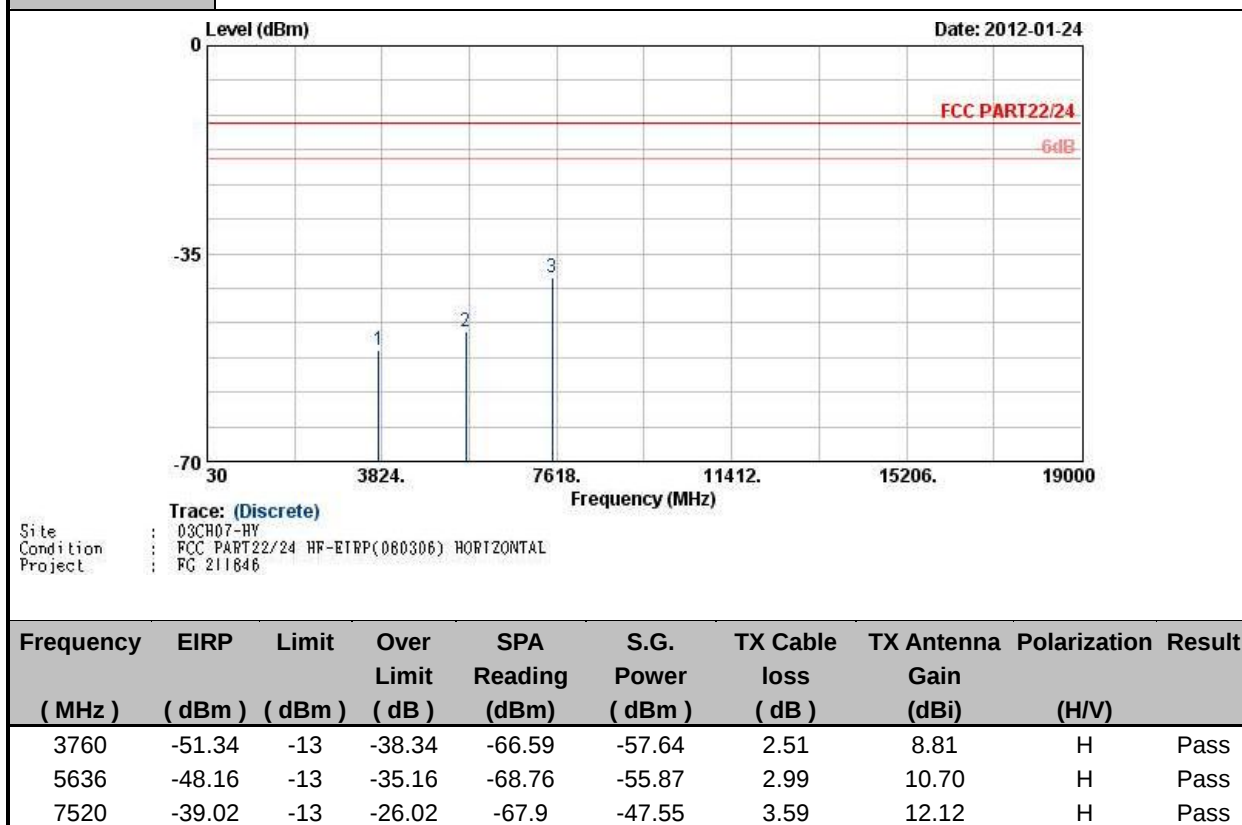
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-56.53	-13	-43.53	-66.18	-58.25	1.62	5.49	H	Pass
2509	-52.18	-13	-39.18	-66.02	-54.15	2.1	6.22	H	Pass
3345	-48.36	-13	-35.36	-62.3	-51.25	3.03	8.07	H	Pass

Band :	GSM850	Temperature :	22~23°C
Test Mode :	EDGE 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

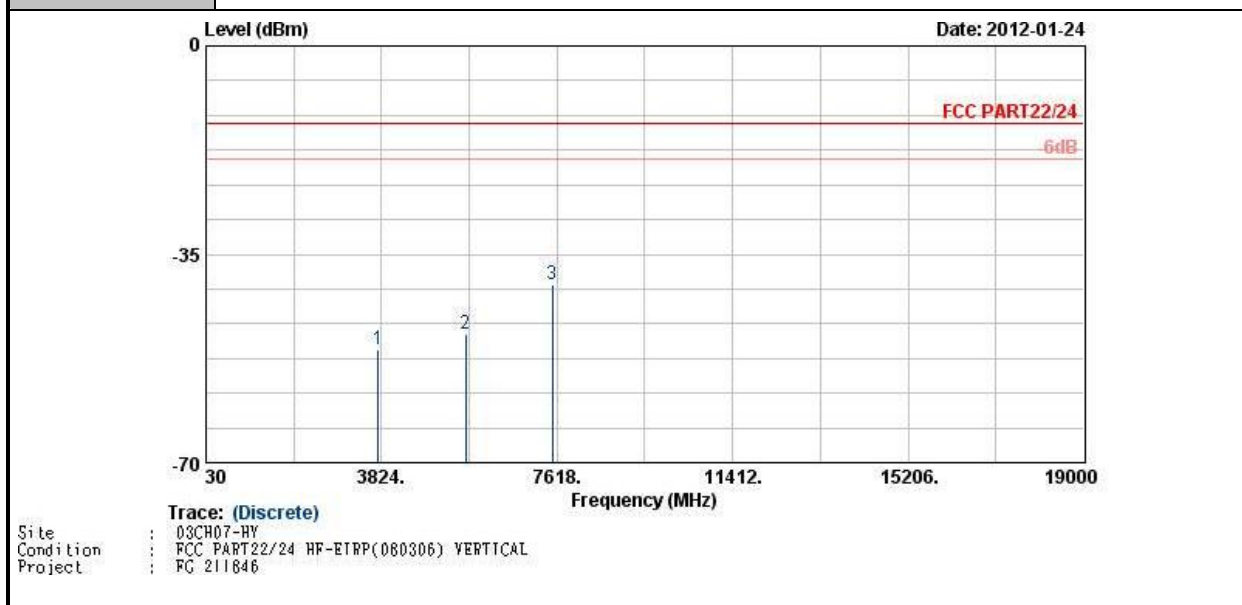


Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-53.82	-13	-40.82	-64.88	-55.54	1.62	5.49	V	Pass
2509	-52.61	-13	-39.61	-66.84	-54.58	2.1	6.22	V	Pass
3345	-48.98	-13	-35.98	-64.78	-51.87	3.03	8.07	V	Pass

Band :	GSM1900	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



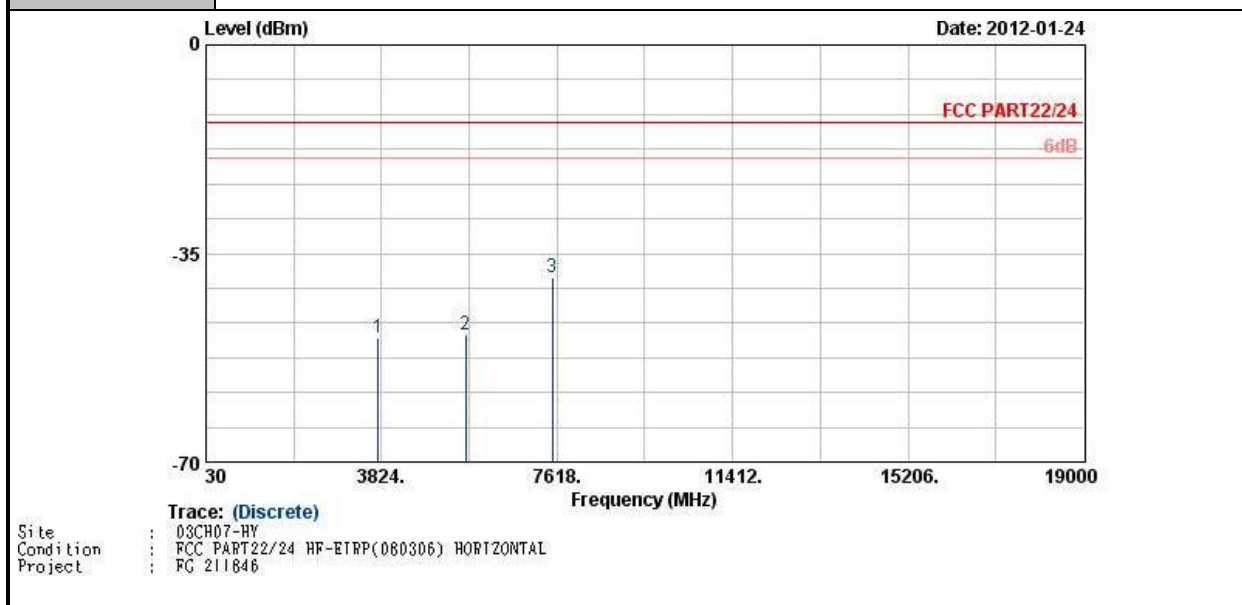
Band :	GSM1900	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-50.95	-13	-37.95	-67.15	-57.25	2.51	8.81	V	Pass
5636	-48.47	-13	-35.47	-68.75	-56.18	2.99	10.70	V	Pass
7520	-40.04	-13	-27.04	-67.81	-48.57	3.59	12.12	V	Pass

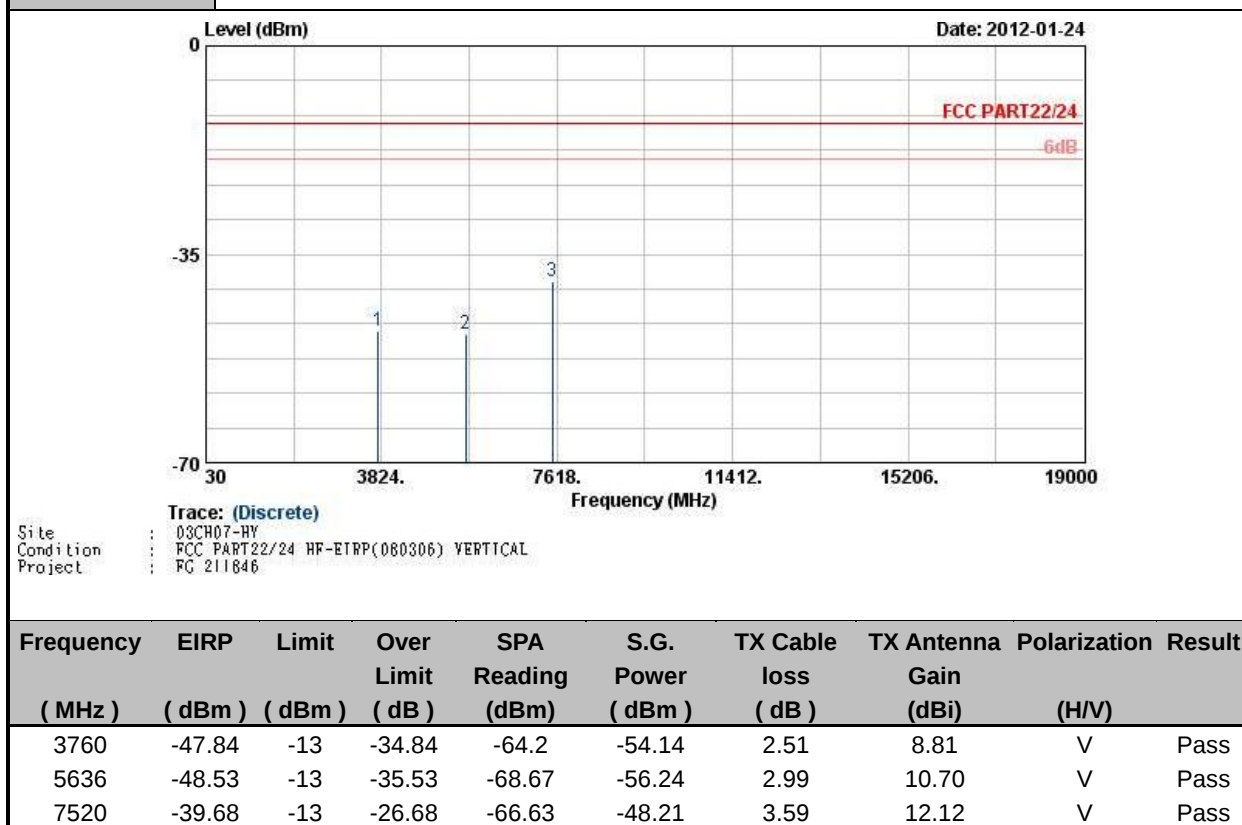


Band :	GSM1900	Temperature :	22~23°C
Test Mode :	EDGE 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

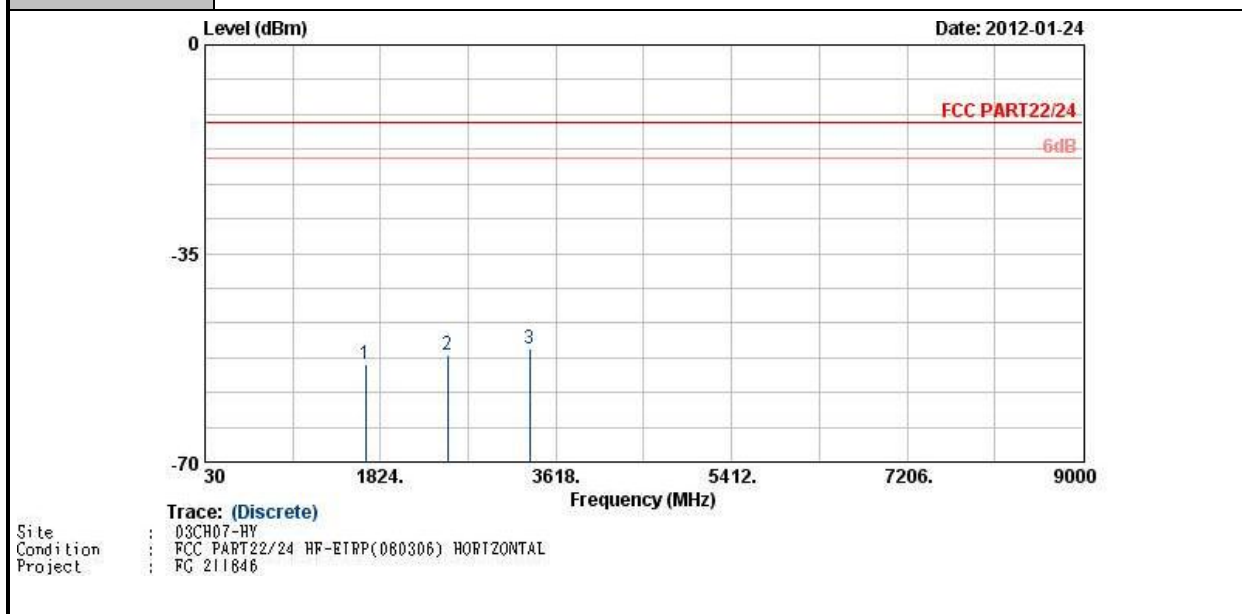


Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-49.27	-13	-36.27	-65.97	-55.57	2.51	8.81	H	Pass
5636	-48.74	-13	-35.74	-68.85	-56.45	2.99	10.70	H	Pass
7520	-39.04	-13	-26.04	-66.15	-47.57	3.59	12.12	H	Pass

Band :	GSM1900	Temperature :	22~23°C
Test Mode :	EDGE 8 Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

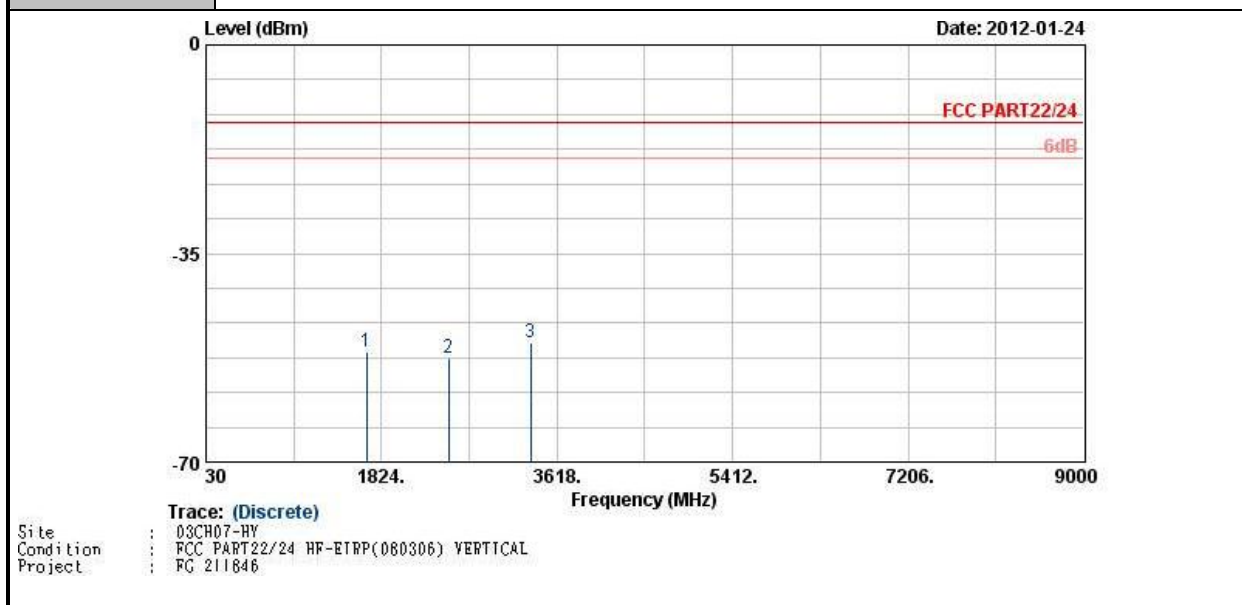


Band :	WCDMA Band V	Temperature :	22~23°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-53.73	-13	-40.73	-62.74	-55.45	1.62	5.49	H	Pass
2509	-52.17	-13	-39.17	-65.85	-54.14	2.1	6.22	H	Pass
3345	-50.88	-13	-37.88	-65.07	-53.77	3.03	8.07	H	Pass

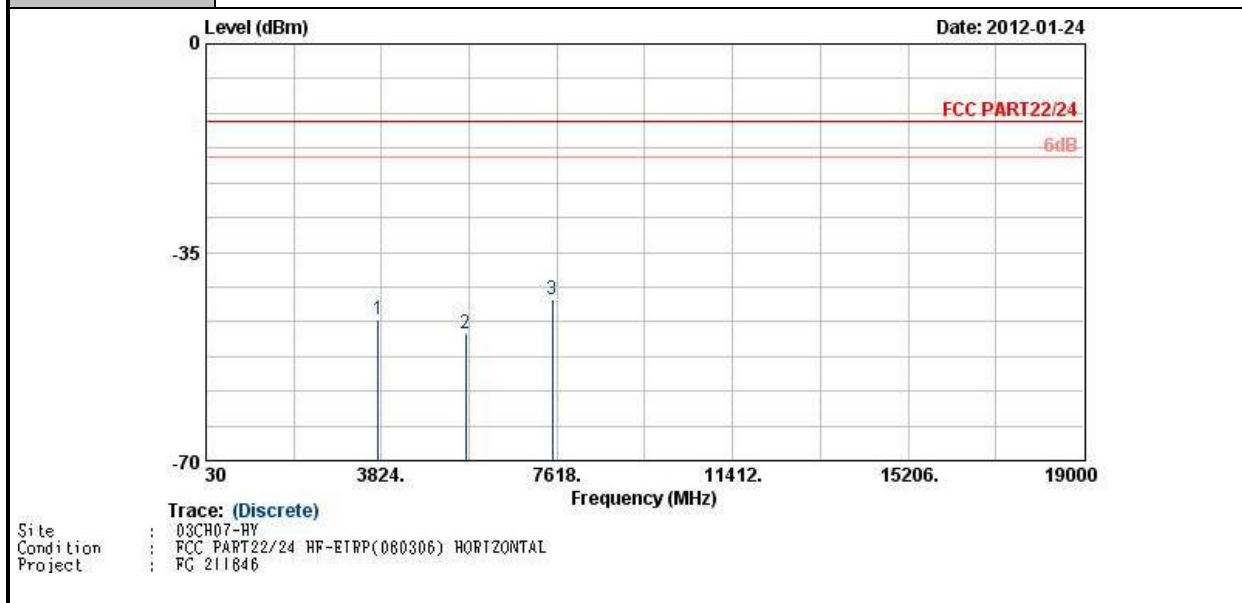
Band :	WCDMA Band V	Temperature :	22~23°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-51.43	-13	-38.43	-63.48	-53.15	1.62	5.49	V	Pass
2509	-52.69	-13	-39.69	-67.51	-54.66	2.1	6.22	V	Pass
3345	-49.99	-13	-36.99	-65.66	-52.88	3.03	8.07	V	Pass



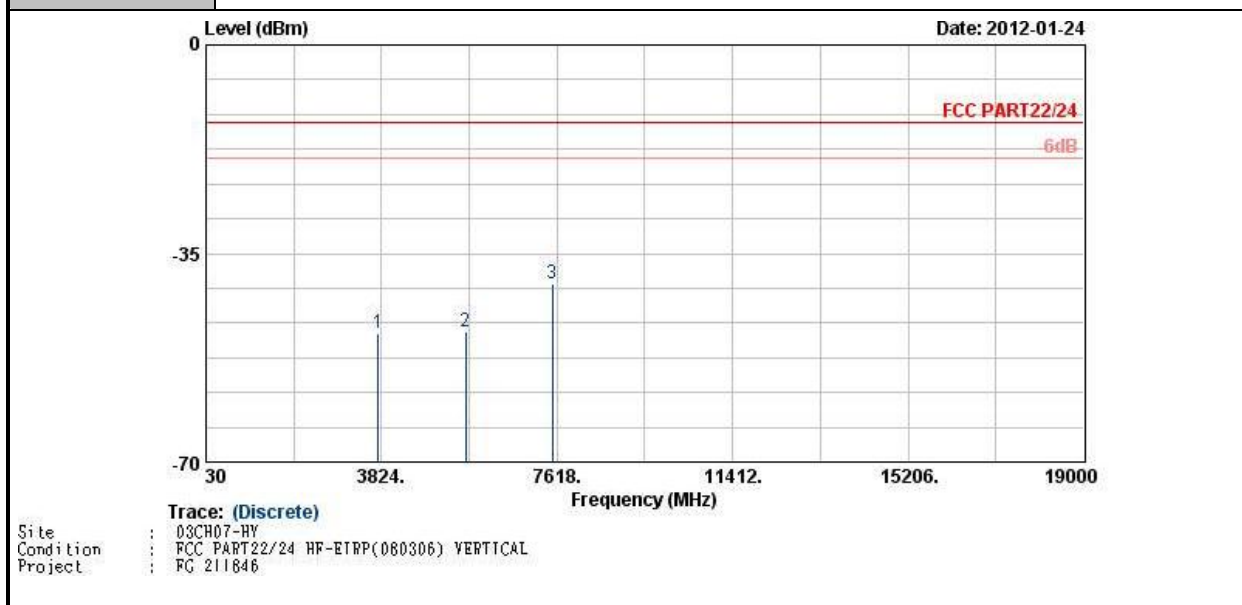
Band :	WCDMA Band II	Temperature :	22~23°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-46.38	-13	-33.38	-62.43	-52.68	2.51	8.81	H	Pass
5636	-48.76	-13	-35.76	-68.96	-56.47	2.99	10.70	H	Pass
7520	-43.04	-13	-30.04	-67.93	-51.57	3.59	12.12	H	Pass



Band :	WCDMA Band II	Temperature :	22~23°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	50~51%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-48.28	-13	-35.28	-64.56	-54.58	2.51	8.81	V	Pass
5636	-48.16	-13	-35.16	-68.69	-55.87	2.99	10.70	V	Pass
7520	-40.05	-13	-27.05	-67.33	-48.58	3.59	12.12	V	Pass

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

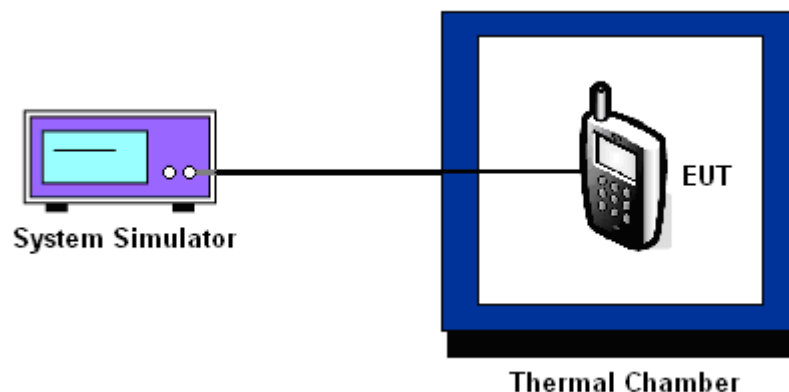
3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT cannot be turned on at -30°C , the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.7.5 Test Setup



3.7.6 Test Result of Temperature Variation

Band :	GSM 850	Channel :	189
Limit (ppm) :	2.5		

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	N/A	N/A	PASS
-20	N/A	N/A	N/A	N/A	
-10	-38	-0.04	-34	-0.04	
0	-30	-0.04	-39	-0.05	
10	-34	-0.04	-33	-0.04	
20	-31	-0.04	-28	-0.03	
30	-27	-0.03	-21	-0.02	
40	-26	-0.03	-24	-0.03	
50	-22	-0.03	-20	-0.02	
55	-19	-0.02	-18	-0.02	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~55°C.

Band :	GSM 1900	Channel :	661
Limit (ppm) :	2.5		

Temperature (°C)	GPRS 8		EDGE 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	N/A	N/A	PASS
-20	N/A	N/A	N/A	N/A	
-10	-99	-0.05	-49	-0.03	
0	-87	-0.05	-47	-0.02	
10	-89	-0.05	-42	-0.02	
20	-84	-0.04	-44	-0.02	
30	-88	-0.05	-38	-0.02	
40	-76	-0.04	-36	-0.02	
50	-74	-0.04	-33	-0.02	
55	-79	-0.04	-37	-0.02	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~55°C.

Band :	WCDMA Band V	Channel :	4182
Limit (ppm) :	2.5		

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	N/A	N/A	
-10	-21	-0.02	
0	-22	-0.03	
10	-20	-0.02	
20	-19	-0.02	
30	-23	-0.03	
40	-17	-0.02	
50	-21	-0.02	
55	-19	-0.02	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~55°C.

Band :	WCDMA Band II	Channel :	9400
Limit (ppm) :	2.5		

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	N/A	N/A	
-10	-32	-0.02	
0	-27	-0.01	
10	-30	-0.02	
20	-21	-0.01	
30	-27	-0.01	
40	-34	-0.02	
50	-25	-0.01	
55	-23	-0.01	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~55°C.

3.7.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GPRS 8	3.8	-32	-0.04	2.5	PASS
		BEP	-35	-0.04		
		4.2	-28	-0.03		
	EDGE 8	3.8	-16	-0.02		
		BEP	-21	-0.02		
		4.2	-14	-0.02		
GSM 1900 CH661	GPRS 8	3.8	-72	-0.04		
		BEP	-73	-0.04		
		4.2	-68	-0.04		
	EDGE 8	3.8	-36	-0.02		
		BEP	-44	-0.02		
		4.2	-39	-0.02		
WCDMA Band V CH4182	RMC 12.2Kbps	3.8	-24	-0.03		
		BEP	-20	-0.02		
		4.2	-19	-0.02		
WCDMA Band II CH9400	RMC 12.2Kbps	3.8	-30	-0.02		
		BEP	-24	-0.01		
		4.2	-32	-0.02		

Note:

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.5 V.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	Jan. 19, 2012	Jul. 27, 2012	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jan. 19, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 27, 2011	Jan. 19, 2012	Jul. 26, 2012	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 05, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB .GAIN	Mar. 29, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-00 101800-30-1	159088	1GHz ~ 18GHz	Feb. 21, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Feb. 20, 2012	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	114256	N/A	Feb. 15, 2011	Jan. 24, 2012 ~ Jan. 27, 2012	Feb. 14, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jan. 24, 2012 ~ Jan. 27, 2012	Jul. 28, 2012	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1-\Gamma_1\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				