

FCC RF Test Report

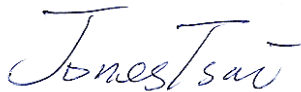
APPLICANT : Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT : Portable Tablet Computer
BRAND NAME : lenovo
MODEL NAME : 501LV, 502LV
MARKETING NAME : Lenovo TAB2
FCC ID : O57TAB2A8
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was completed on Jun. 06, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



TABLE OF CONTENTS

1	GENERAL DESCRIPTION	5
1.1	Applicant.....	5
1.2	Manufacturer	5
1.3	Product Feature of Equipment Under Test	5
1.4	Component List	5
1.5	Product Specification subjective to this standard.....	6
1.6	Modification of EUT	6
1.7	Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator	6
1.8	Testing Location	7
1.9	Applicable Standards	7
2	TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1	Test Mode.....	8
2.2	Connection Diagram of Test System	9
2.3	Support Unit used in test configuration	9
2.4	Measurement Results Explanation Example	10
3	TEST RESULT	11
3.1	Conducted Output Power Measurement.....	11
3.2	Peak-to-Average Ratio	13
3.3	Effective Radiated Power and Effective Isotropic Radiated Power Measurement	19
3.4	99% Occupied Bandwidth and 26dB Bandwidth Measurement.....	23
3.5	Band Edge Measurement.....	37
3.6	Conducted Spurious Emission Measurement.....	46
3.7	Field Strength of Spurious Radiation Measurement	57
3.8	Frequency Stability Measurement.....	63
4	LIST OF MEASURING EQUIPMENT	67
5	UNCERTAINTY OF EVALUATION	68
APPENDIX A. SETUP PHOTOGRAPHS		



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG550402A	Rev. 01	Initial issue of report	Jul. 23, 2015



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A	PASS	-
3.2	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.3	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.4	§2.1049	Occupied Bandwidth	N/A	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	-
3.6	§2.1051 §22.917(a) §24.238(a)	Conducted Spurious Emission	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	-
3.7	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 19.96 dB at 7520.000 MHz
3.8	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS	-
	§2.1055 §24.235				



1 General Description

1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.

No. 68 Building, 199 Fenju Road, Wai Gao Qiao FTZ, Shanghai, China

1.2 Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	lenovo
Model Name	501LV, 502LV
Marketing Name	Lenovo TAB2
FCC ID	O57TAB2A8
EUT supports Radios application	GPRS/EGPRS/ LTE/ WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	LenovoPad A8-50F
SW Version	A8-50F_150520
EUT Stage	Identical Prototype

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 Component List

Note: There are two types of EUT, the difference between sample 1 and sample 2 are for LCM/back camera. The details refer the following table. We only choose sample 1 to perform full tests.

Component	Sample 1	Sample 2
LCM	TFT_8"_1280X800_TTV080WXM-NL0 (BOE)	TFT_8"_1280X800_D0800CS00 (Dongshan)
Back_camera	Camera_500W_AF_L545A00 (O-Film)	Camera_500W-AF_BTBTB_30PIN_FH545AB (Q-tech)

1.5 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz
Maximum Output Power to Antenna	GSM850 : 31.95 dBm GSM1900 : 28.84 dBm
Antenna Type	PIFA Antenna
Type of Modulation	GPRS: GMSK EDGE: GMSK / 8PSK

1.6 Modification of EUT

No modifications are made to the EUT during all test items.

1.7 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22	GSM850 GPRS class 8	GMSK	0.7938	0.0514 ppm	246KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.2054	0.0550 ppm	252KG7W
Part 24	GSM1900 GPRS class 8	GMSK	0.7064	0.0229 ppm	244KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.3463	0.0255 ppm	248KG7W

1.8 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH02-SZ	566869

1.9 Applicable Standards

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

- FCC 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

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.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850.
2. 30 MHz to 10th harmonic for GSM1900.

All modes and data rates and positions were investigated.

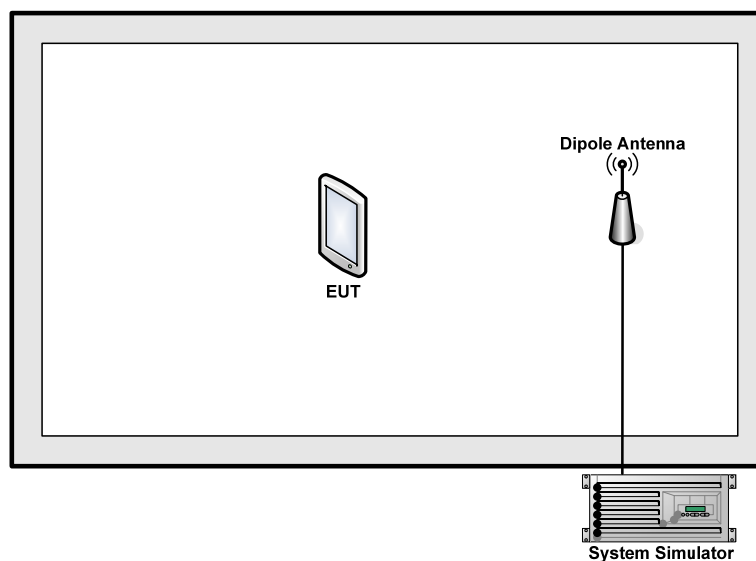
Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GPRS class 8 Link	■ GPRS class 8 Link
	■ EDGE class 8 Link	■ EDGE class 8 Link
GSM 1900	■ GPRS class 8 Link	■ GPRS class 8 Link
	■ EDGE class 8 Link	■ EDGE class 8 Link

Conducted Power Measurement Results:

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GPRS class 8	31.91	31.95	31.89	28.84	28.78	28.84
GPRS class 10	31.46	31.51	31.45	28.23	28.19	28.20
GPRS class 11	30.08	30.10	30.07	26.62	26.54	26.51
GPRS class 12	29.07	29.08	29.03	25.53	25.40	25.37
EGPRS class 8	27.07	27.08	27.11	25.69	25.74	25.78
EGPRS class 10	25.92	25.96	26.05	24.66	24.64	24.68
EGPRS class 11	24.06	24.08	24.18	22.63	22.65	22.70
EGPRS class 12	22.93	22.92	23.01	21.52	21.57	21.71

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPD-2303S	N/A	N/A	Unshielded, 1.8 m



2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 5.2 dB and a 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.2 + 10 = 15.2 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

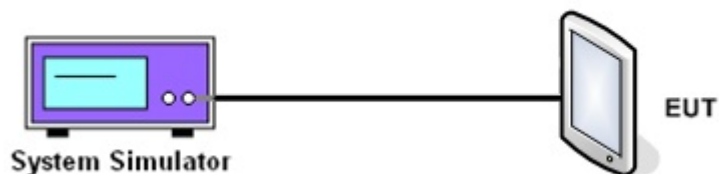
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band						
Modes	GSM850 (GPRS class 8)			GSM850 (EDGE class 8)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
Conducted Power (dBm)	31.91	31.95	31.89	27.07	27.08	27.11

PCS Band						
Modes	GSM1900 (GPRS class 8)			GSM1900 (EDGE class 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
Conducted Power (dBm)	28.84	28.78	28.84	25.69	25.74	25.78

Note: maximum burst average power for GSM.

3.2 Peak-to-Average Ratio

3.2.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

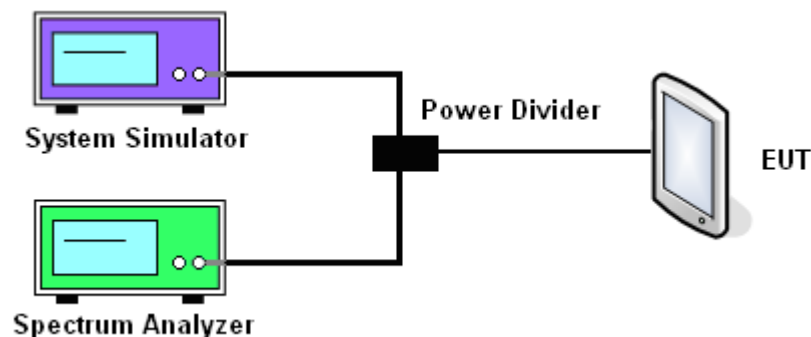
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. For GSM/EGPRS operating modes:
 - a. Set EUT in maximum power output.
 - b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.
 - c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second trace.
 - d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.
4. For UMTS operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



3.2.5 Test Result of Peak-to-Average Ratio

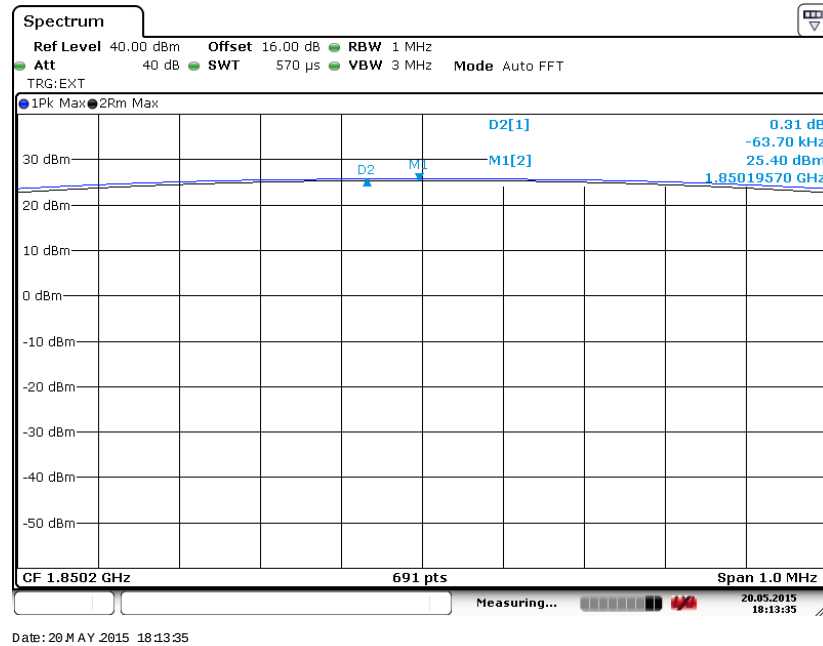
PCS Band						
Modes	GSM1900 (GPRS class 8)			GSM1900 (EDGE class 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	0.31	0.32	0.32	3.18	3.13	3.00



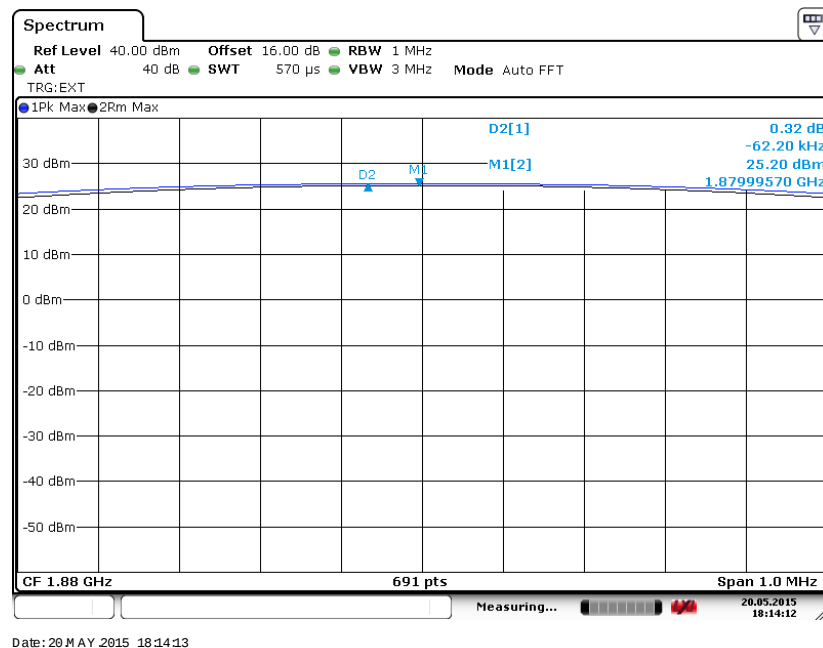
3.2.6 Test Result (Plots) of Peak-to-Average Ratio

Band :	GSM 1900	Test Mode :	GPRS class 8 Link (GMSK)
--------	----------	-------------	--------------------------

Peak-to-Average Ratio on Channel 512 (1850.2 MHz)

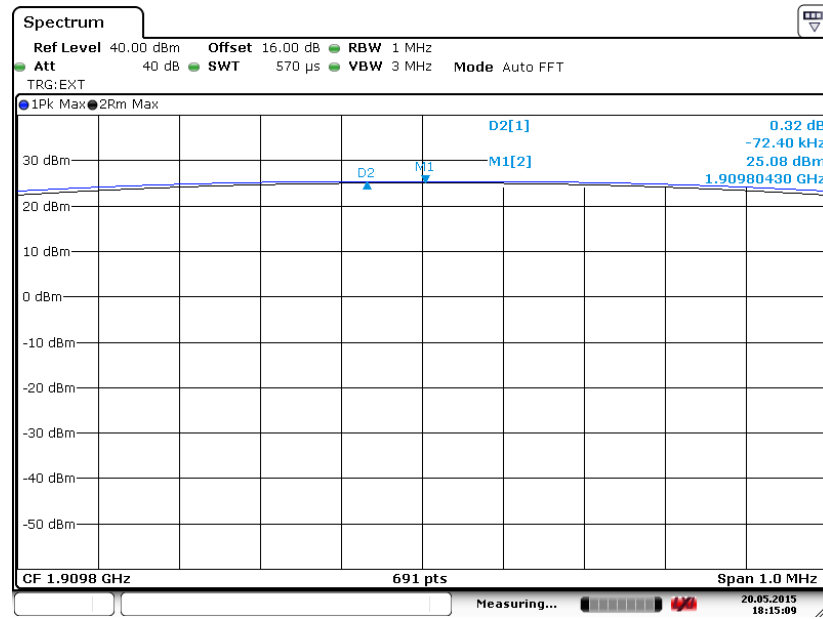


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)





Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

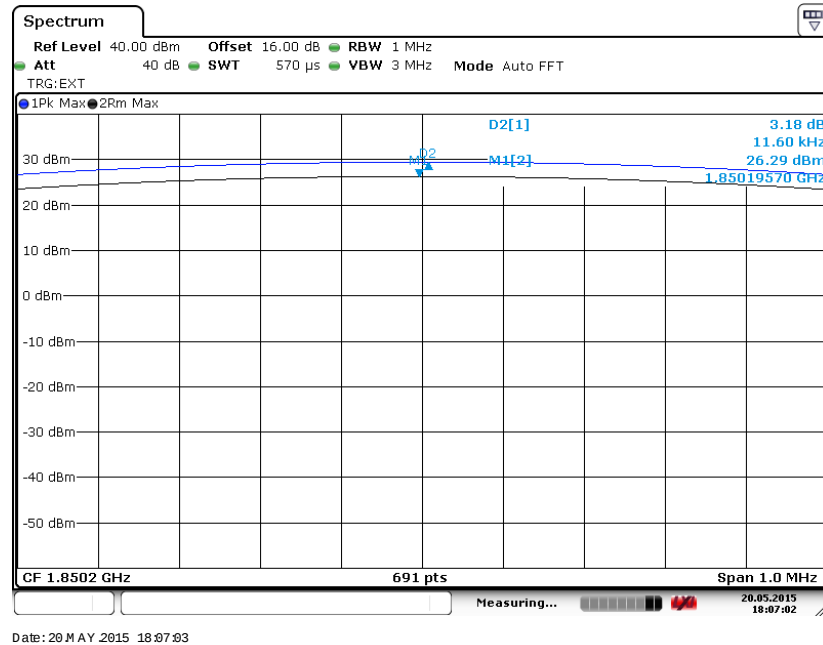


Date: 20 MAY 2015 18:15:10

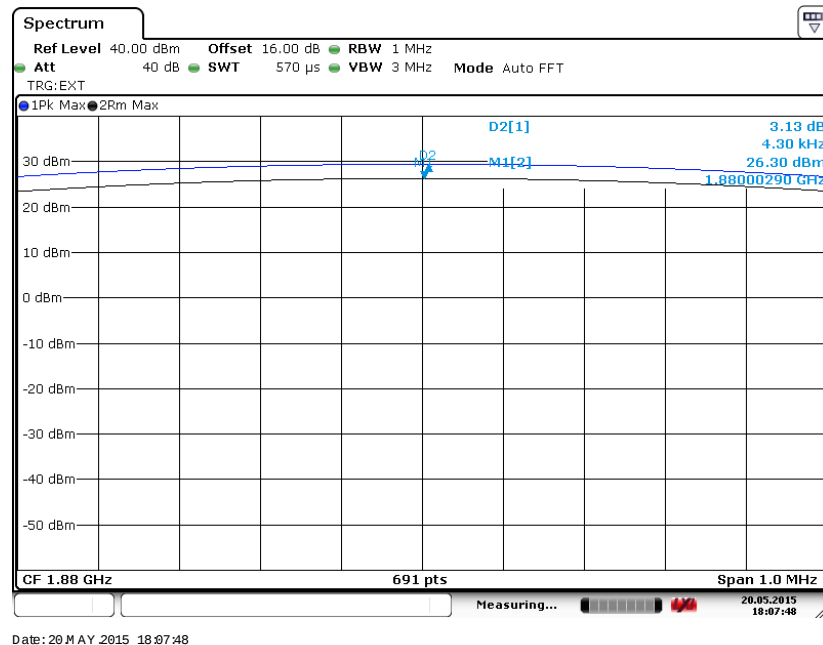


Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
--------	----------	-------------	--------------------------

Peak-to-Average Ratio on Channel 512 (1850.2 MHz)

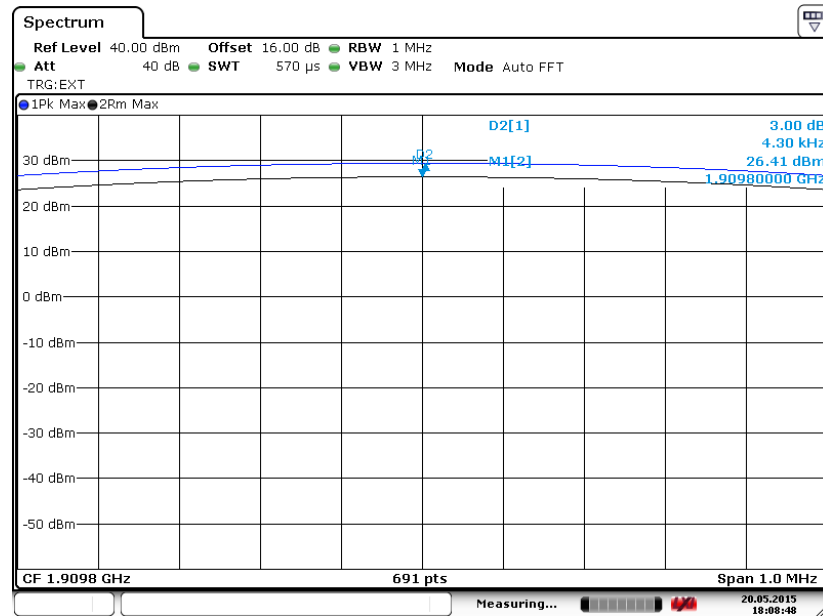


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)





Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



Date: 20 MAY 2015 18:08:48

3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.3.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high 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 RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum 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.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by the 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 $ERP = EIRP - 2.15$. Take the record of the output power at substitution antenna.



	GSM/GPRS/EDGE	WCDMA/HSPA
SPAN	500kHz	10MHz
RBW	10kHz	100kHz
VBW	30kHz	300kHz
Detector	RMS	RMS
Trace	Average	Average
Average Type	Power	Power
Sweep Count	100	100

3.3.4 Test Result of ERP

GSM850 (GPRS class 8) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	824.2	26.61	0.4585	27.18	0.5222
Middle	836.4	28.26	0.6699	28.24	0.6676
Highest	848.8	28.72	0.7447	29.00	0.7938
Limit	ERP < 7W	Result		PASS	

GSM850 (EDGE class 8) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	824.2	20.94	0.1243	21.42	0.1388
Middle	836.4	22.03	0.1597	22.51	0.1782
Highest	848.8	23.13	0.2054	22.79	0.1901
Limit	ERP < 7W	Result		PASS	

3.3.5 Test Result of EIRP

GSM1900 (GPRS class 8) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	1850.2	27.85	0.6098	28.34	0.6818
Middle	1880.0	28.39	0.6902	28.49	0.7064
Highest	1909.8	27.95	0.6237	28.46	0.7020
Limit	EIRP < 2W	Result		PASS	

GSM1900 (EDGE class 8) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	1850.2	25.13	0.3255	25.29	0.3382
Middle	1880.0	25.17	0.3290	25.39	0.3463
Highest	1909.8	24.70	0.2951	25.27	0.3362
Limit	EIRP < 2W	Result		PASS	

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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.

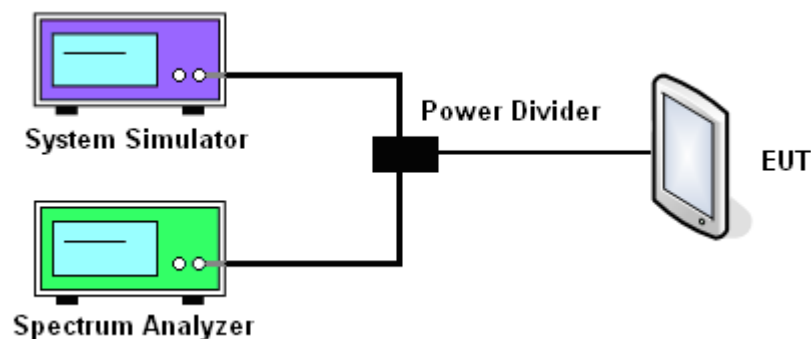
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, peak detector, trace maximum hold.
5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

3.4.4 Test Setup



3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

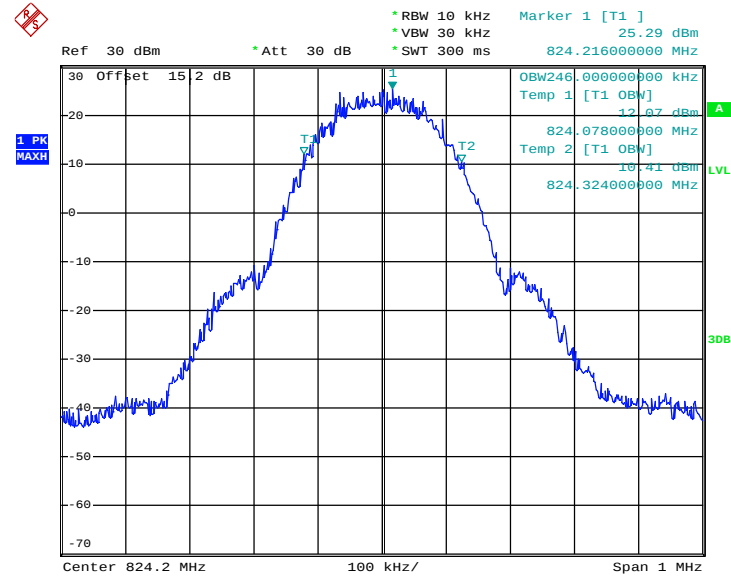
Cellular Band						
Modes	GSM850 (GPRS class 8)			GSM850 (EDGE class 8)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
99% OBW (kHz)	246.00	246.00	244.00	250.00	250.00	252.00
26dB BW (kHz)	312.00	314.00	318.00	318.00	312.00	314.00

PCS Band						
Modes	GSM1900 (GPRS class 8)			GSM1900 (EDGE class 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
99% OBW (kHz)	244.00	244.00	242.00	246.00	248.00	244.00
26dB BW (kHz)	316.00	316.00	316.00	310.00	314.00	312.00

3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

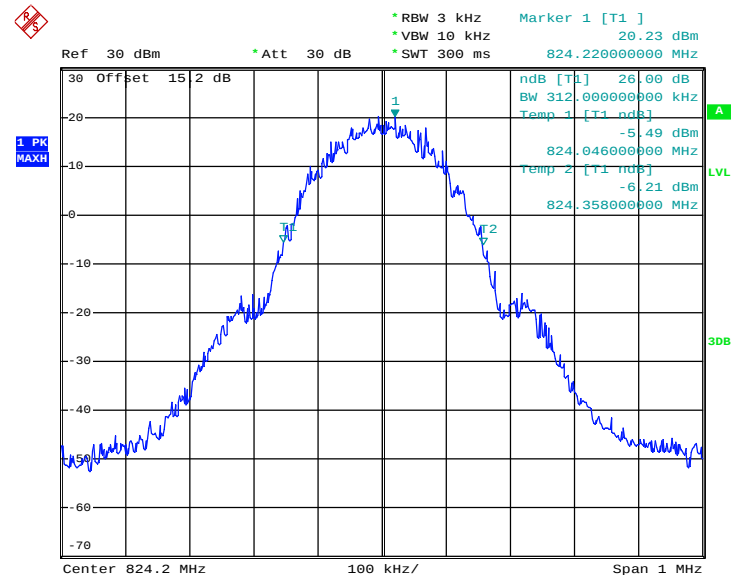
Band :	GSM 850	Test Mode :	GPRS class 8 Link (GMSK)
---------------	---------	--------------------	--------------------------

99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 21.MAY.2015 03:17:12

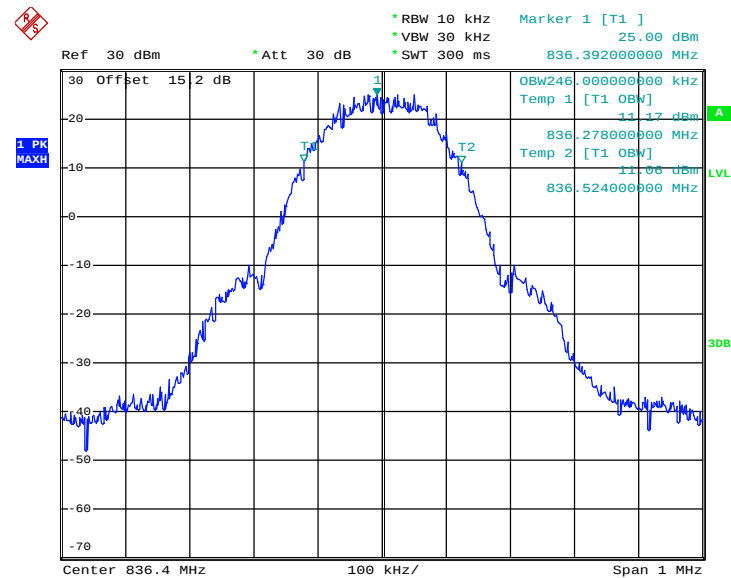
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 21.MAY.2015 03:10:47

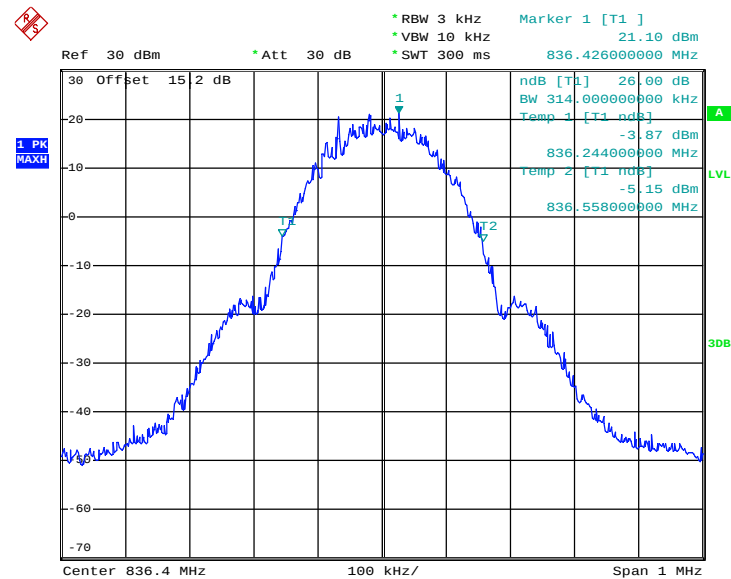


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 21.MAY.2015 03:16:34

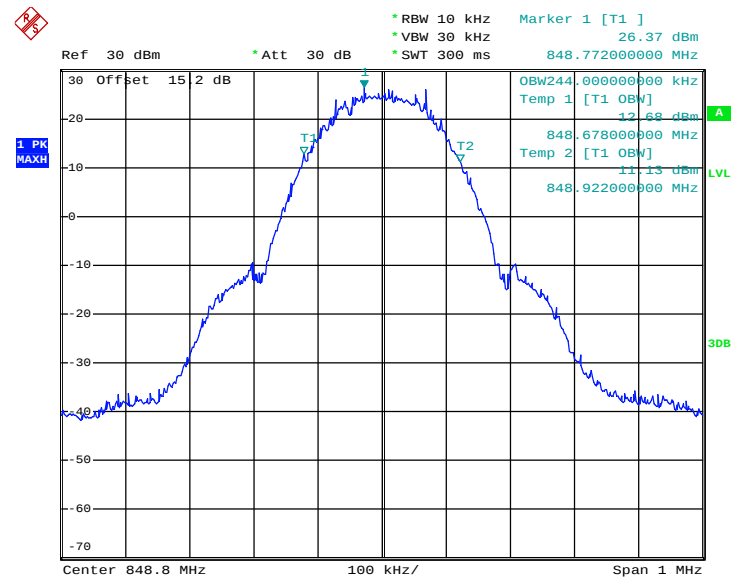
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 21.MAY.2015 03:10:14

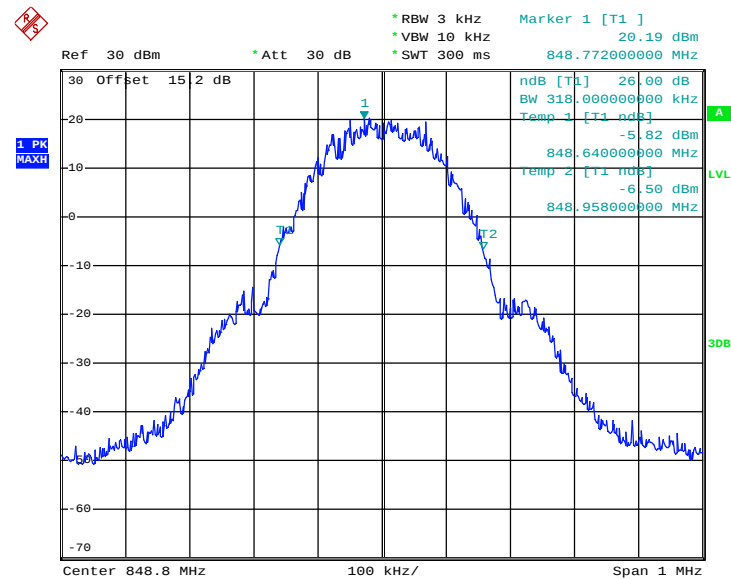


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



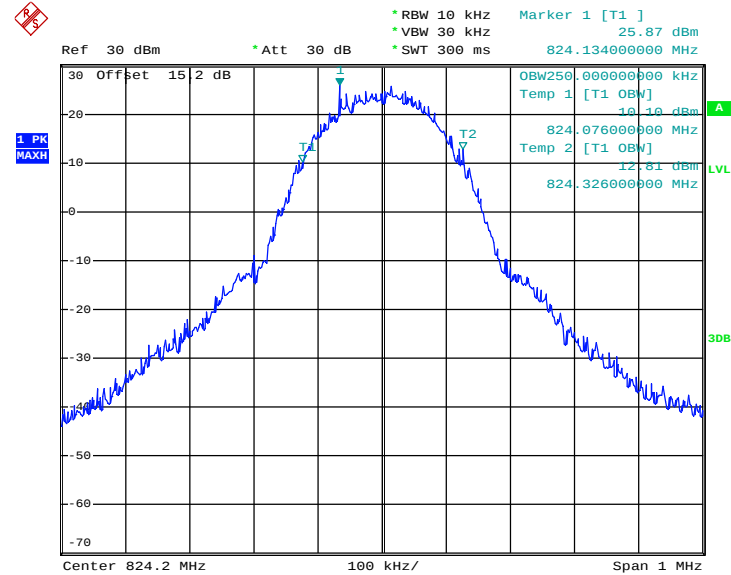
Date: 21.MAY.2015 03:13:59

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

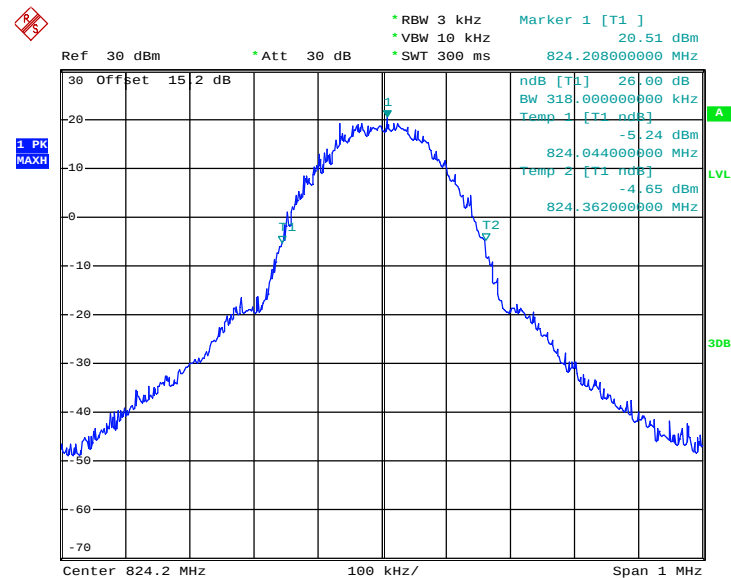


Date: 21.MAY.2015 03:12:30

Band :	GSM 850	Test Mode :	EDGE class 8 Link (8PSK)
---------------	---------	--------------------	--------------------------

99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)


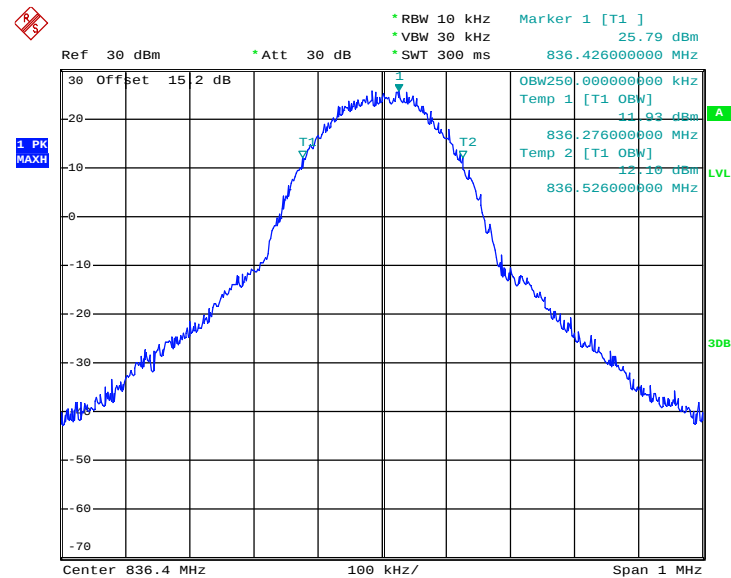
Date: 21.MAY.2015 02:34:20

26dB Bandwidth Plot on Channel 128 (824.2 MHz)


Date: 21.MAY.2015 02:24:34

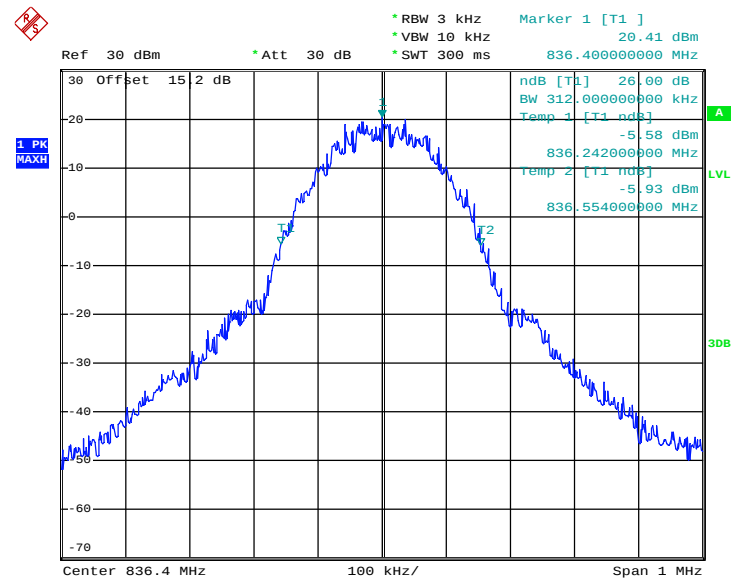


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 21.MAY.2015 02:33:33

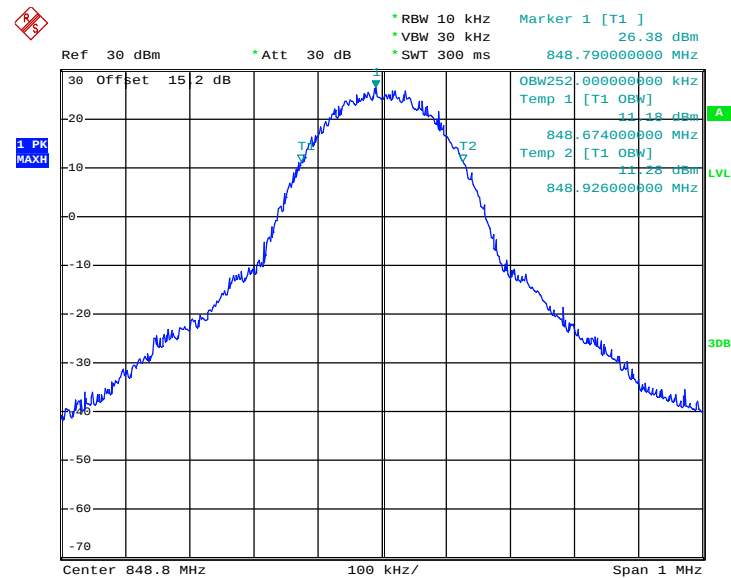
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 21.MAY.2015 02:26:32

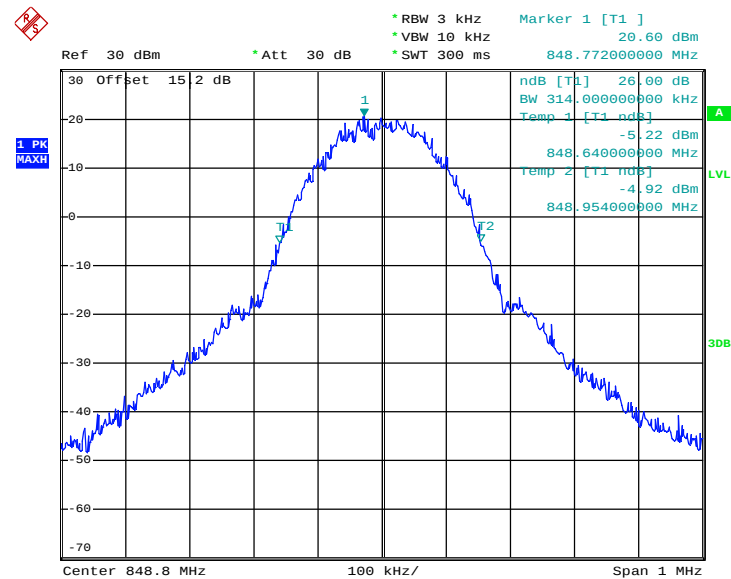


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



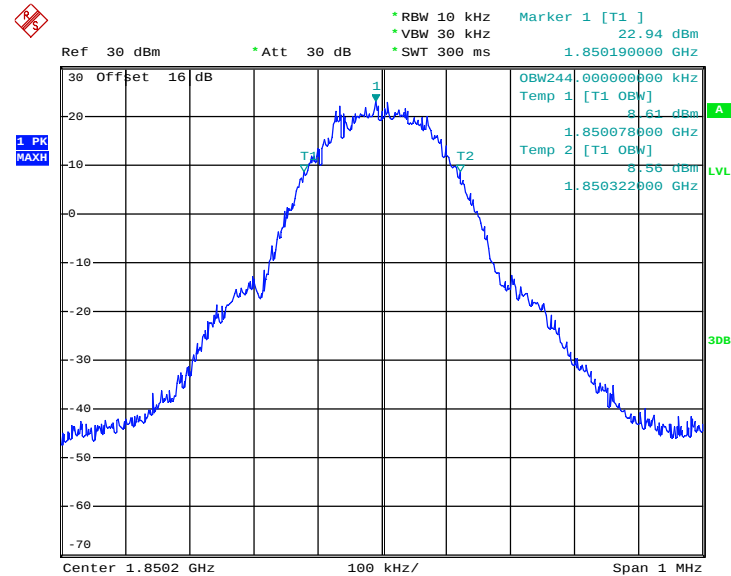
Date: 21.MAY.2015 02:29:50

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

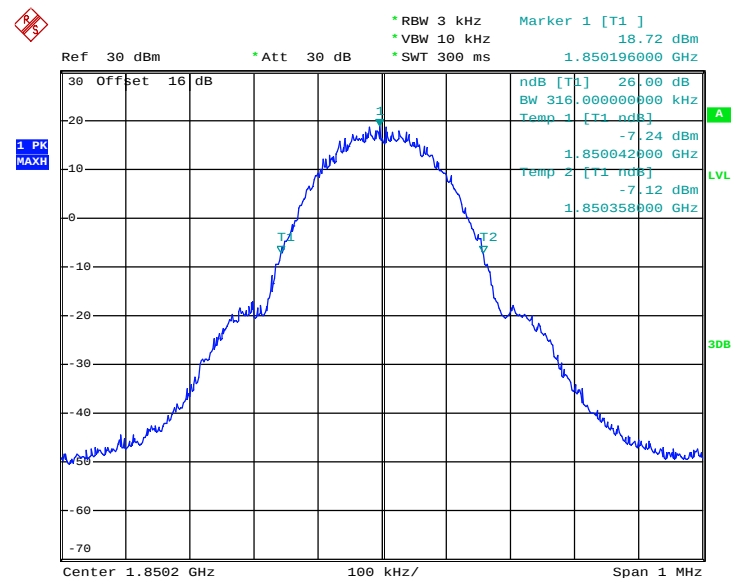


Date: 21.MAY.2015 02:27:47

Band :	GSM 1900	Test Mode :	GPRS class 8 Link (GMSK)
---------------	----------	--------------------	--------------------------

99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)


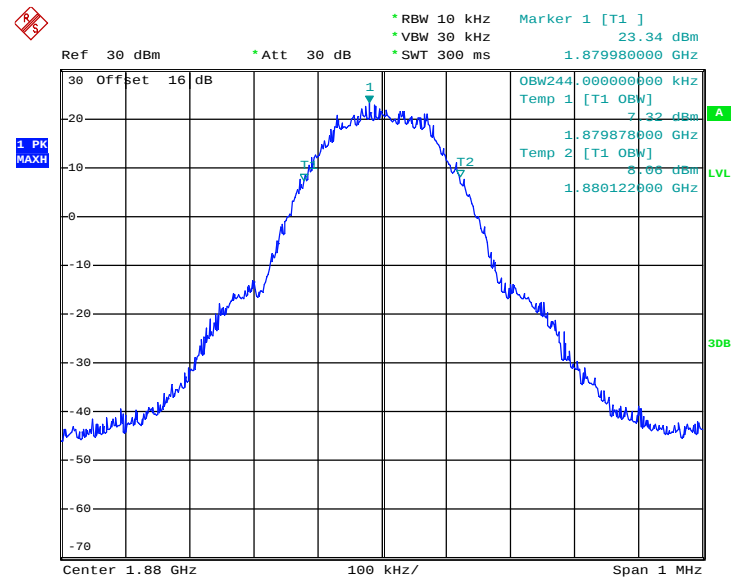
Date: 21.MAY.2015 04:25:15

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)


Date: 21.MAY.2015 04:01:38

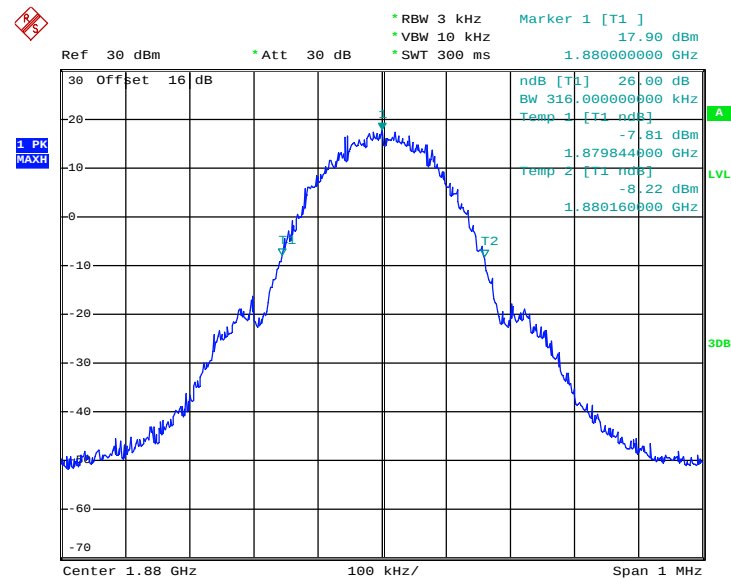


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 21.MAY.2015 04:22:36

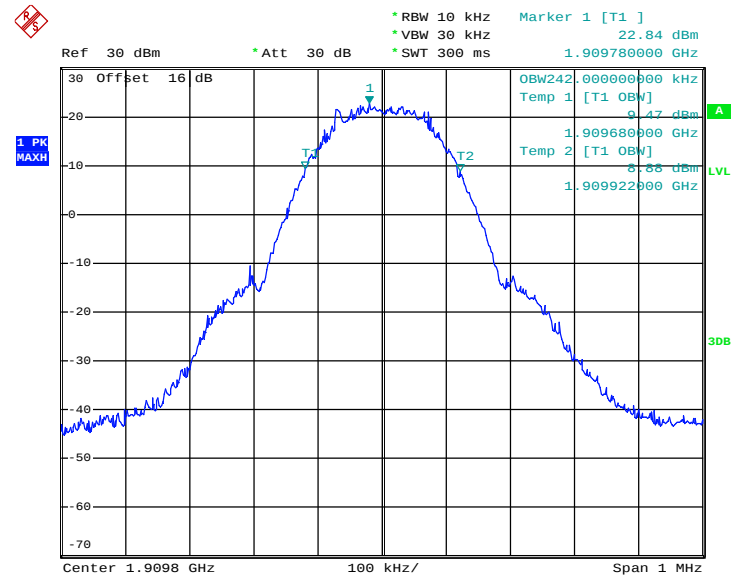
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 21.MAY.2015 04:03:10

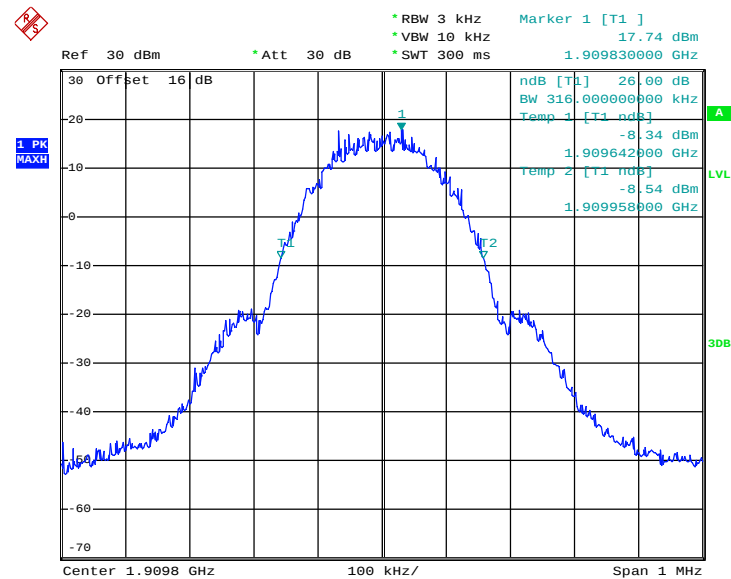


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



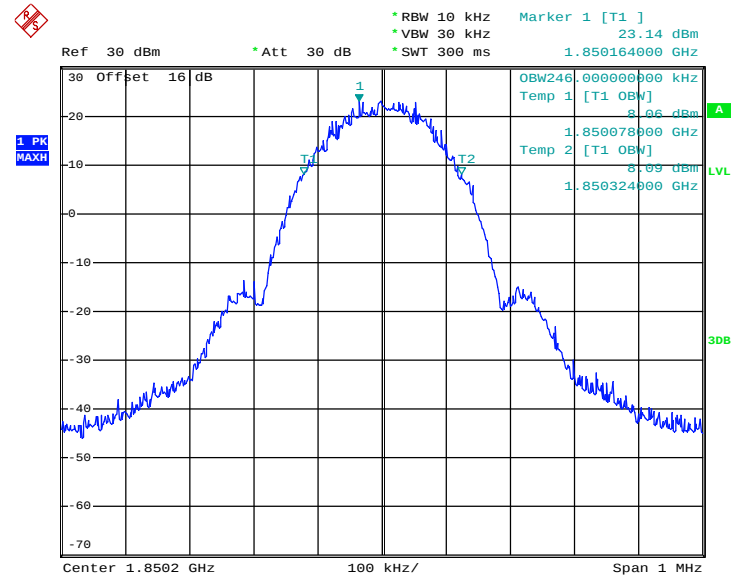
Date: 21.MAY.2015 04:21:58

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

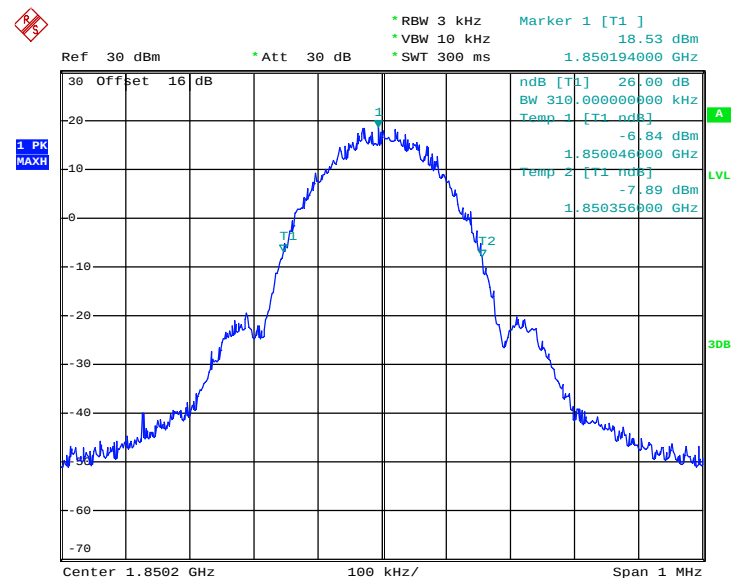


Date: 21.MAY.2015 04:06:09

Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
---------------	----------	--------------------	--------------------------

99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)


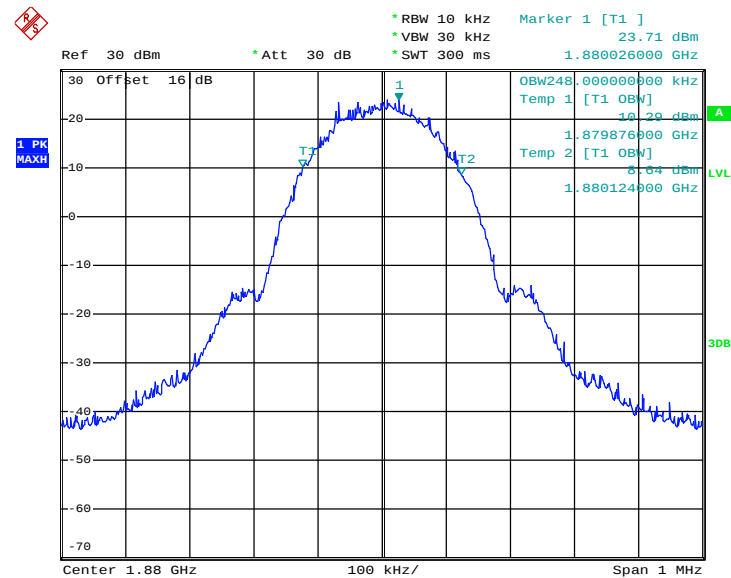
Date: 21.MAY.2015 05:00:33

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)


Date: 21.MAY.2015 04:55:08

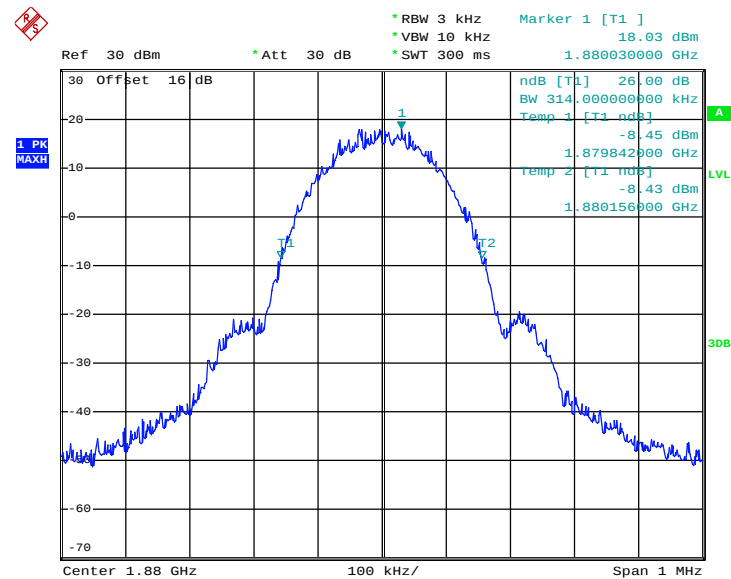


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)

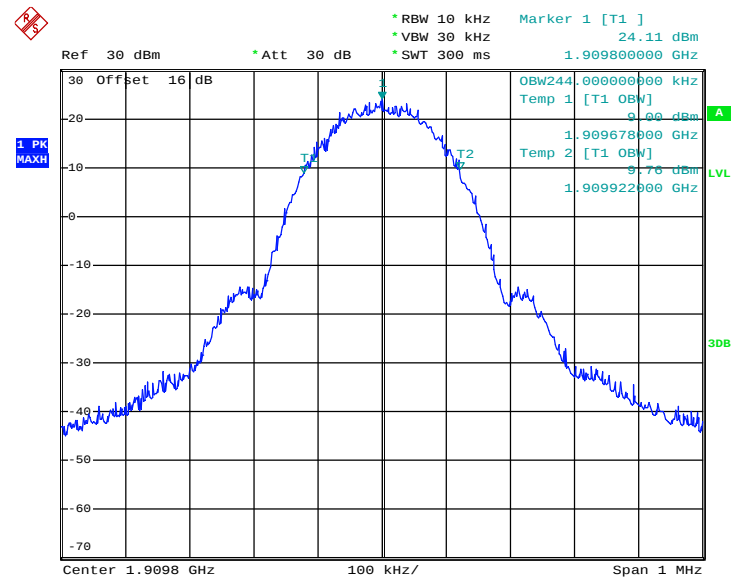


Date: 21.MAY.2015 05:20:16

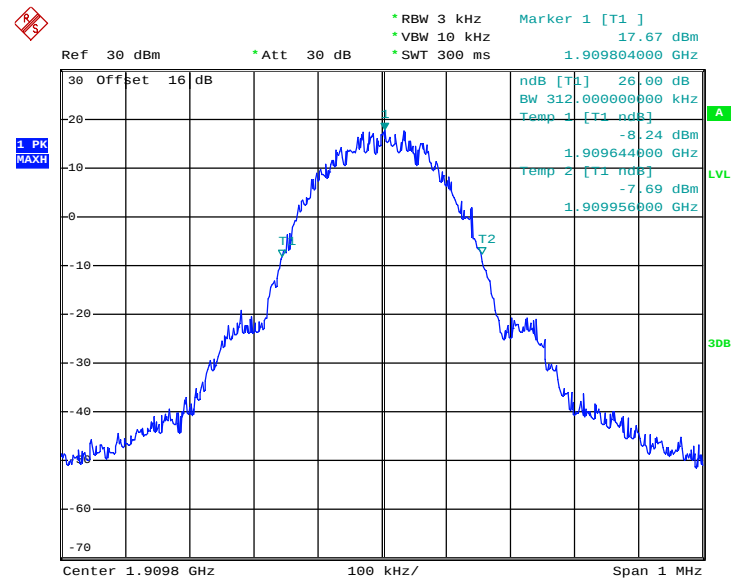
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 21.MAY.2015 04:56:17

99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)


Date: 21.MAY.2015 04:58:32

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)


Date: 21.MAY.2015 04:57:03

3.5 Band Edge Measurement

3.5.1 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.

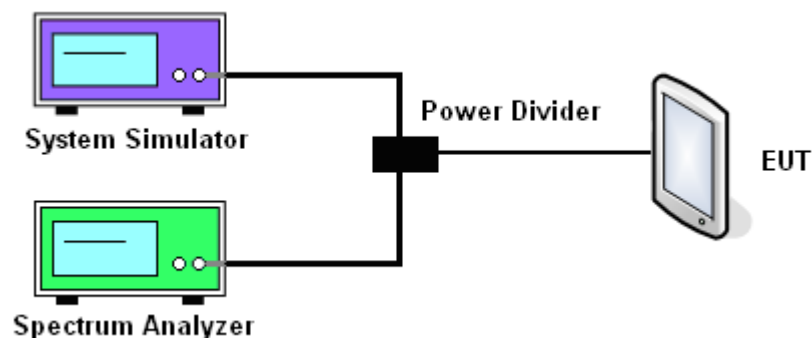
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.5.4 Test Setup

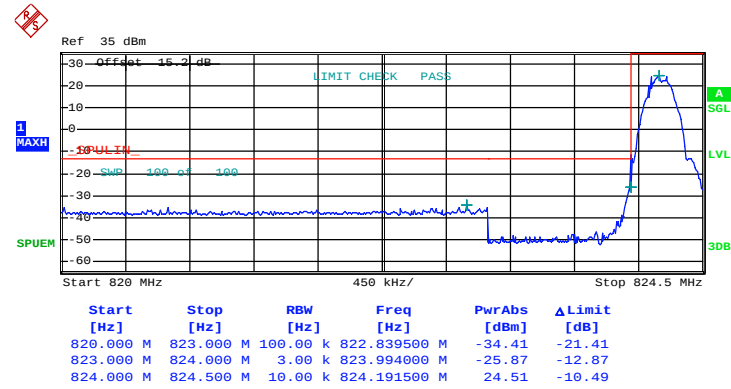




3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM850	Test Mode :	GPRS class 8 Link (GMSK)
--------	--------	-------------	--------------------------

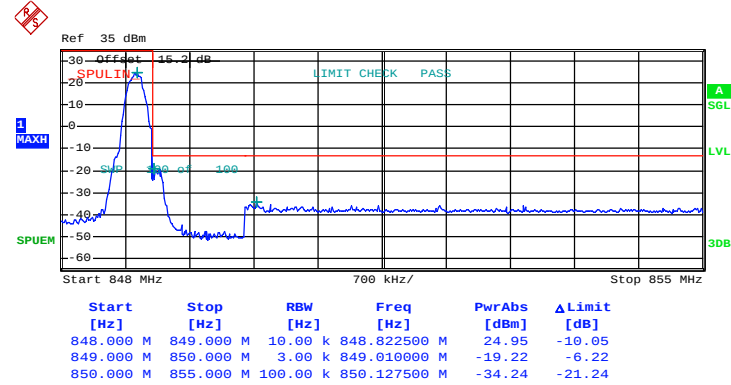
Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 21.MAY.2015 03:26:44

Band :	GSM850	Test Mode :	GPRS class 8 Link (GMSK)
---------------	--------	--------------------	--------------------------

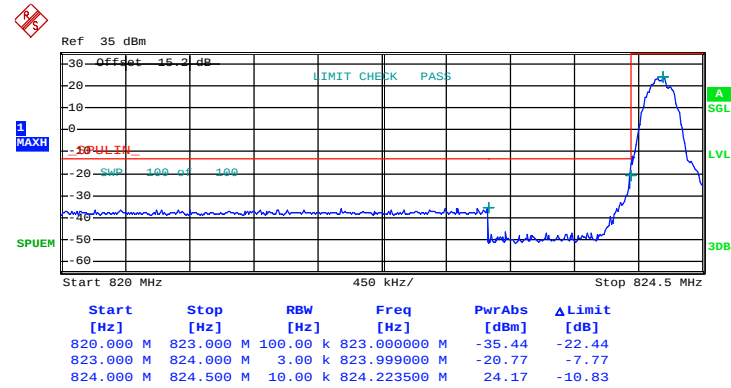
Higher Band Edge Plot on Channel 251 (848.8 MHz)



Date: 21.MAY.2015 03:29:41

Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)
---------------	--------	--------------------	--------------------------

Lower Band Edge Plot on Channel 128 (824.2 MHz)

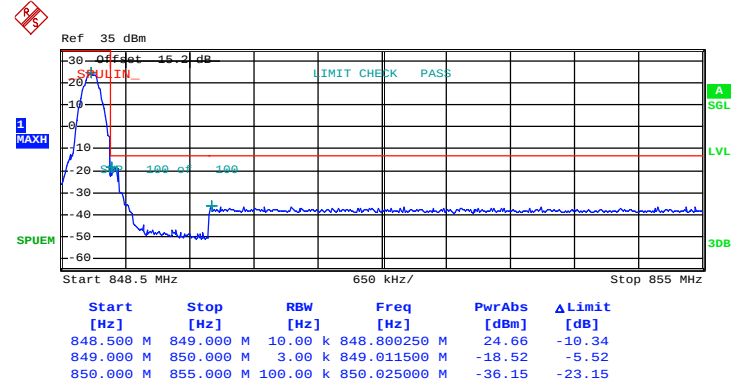


Date: 21.MAY.2015 02:46:14



Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)
--------	--------	-------------	--------------------------

Higher Band Edge Plot on Channel 251 (848.8 MHz)

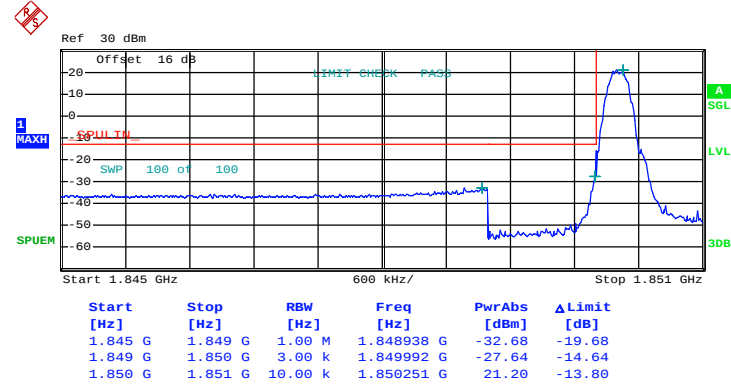


Date: 21.MAY.2015 02:48:27



Band :	GSM1900	Test Mode :	GPRS class 8 Link (GMSK)
--------	---------	-------------	--------------------------

Lower Band Edge Plot on Channel 512 (1850.2 MHz)

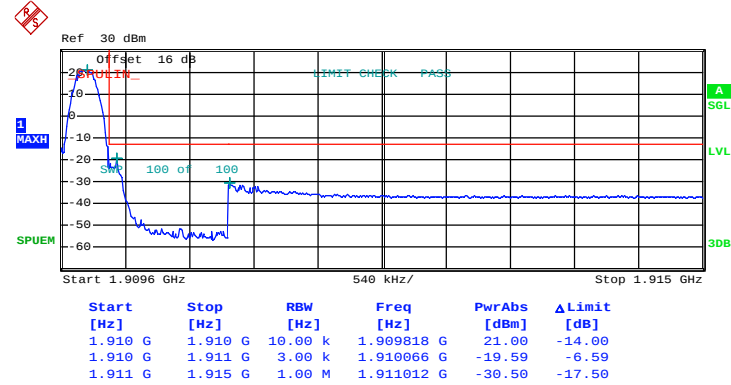


Date: 21.MAY.2015 04:32:41



Band :	GSM1900	Test Mode :	GPRS class 8 Link (GMSK)
--------	---------	-------------	--------------------------

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

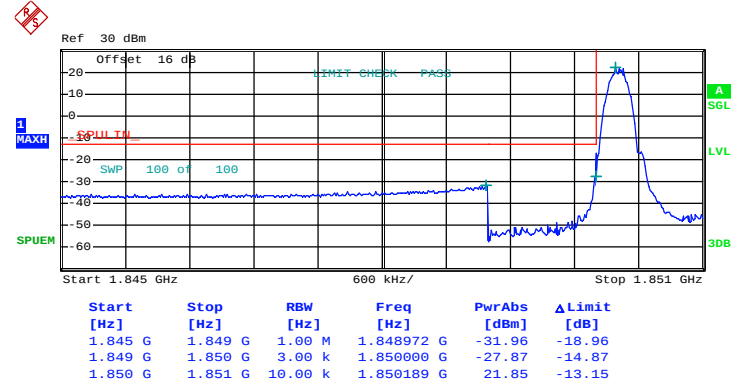


Date: 21.MAY.2015 04:35:04



Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
--------	---------	-------------	--------------------------

Lower Band Edge Plot on Channel 512 (1850.2 MHz)

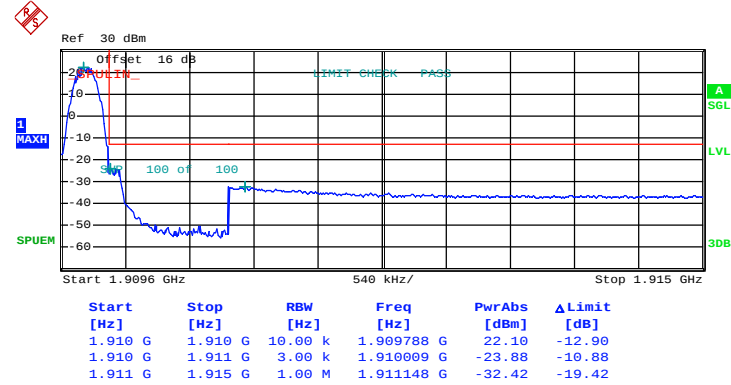


Date: 21.MAY.2015 05:07:48



Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
--------	---------	-------------	--------------------------

Higher Band Edge Plot on Channel 810 (1909.8 MHz)



Date: 21.MAY.2015 05:09:48

3.6 Conducted Spurious Emission Measurement

3.6.1 Description of Conducted Spurious 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.

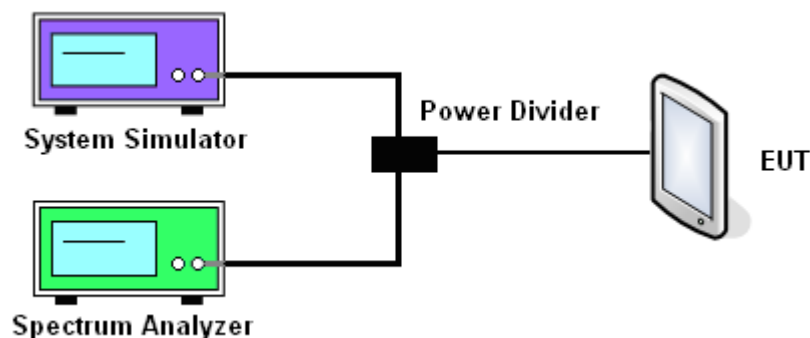
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

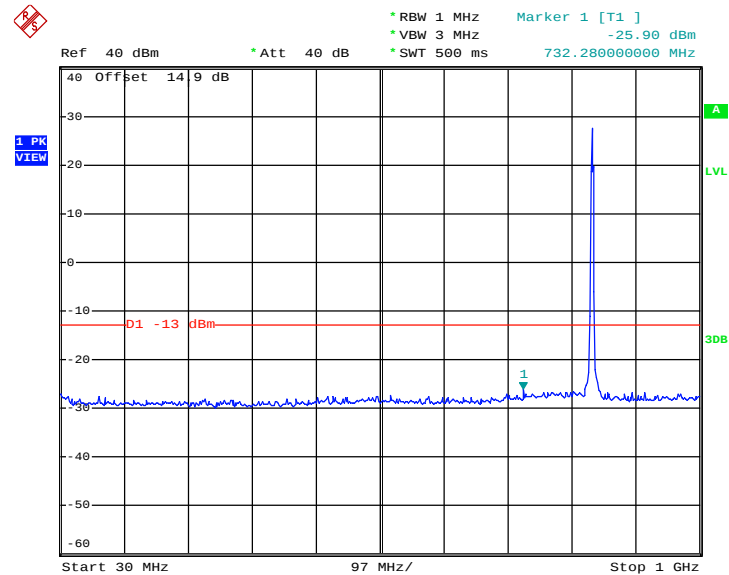
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

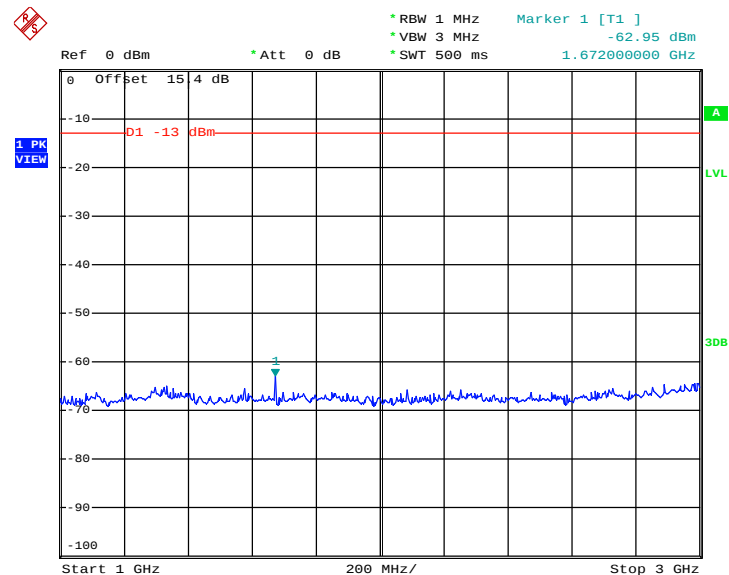
Band :	GSM850	Channel :	CH189
Test Mode :	GPRS class 8 Link (GMSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.MAY.2015 03:38:23

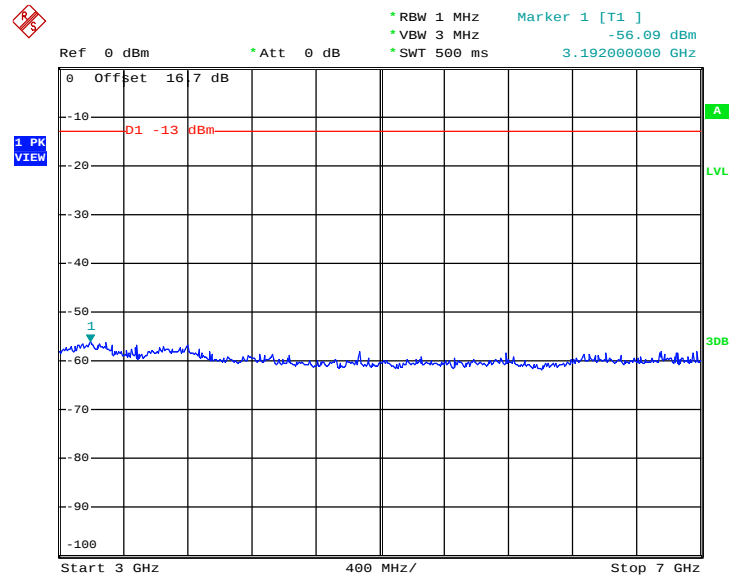
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 21.MAY.2015 03:40:09

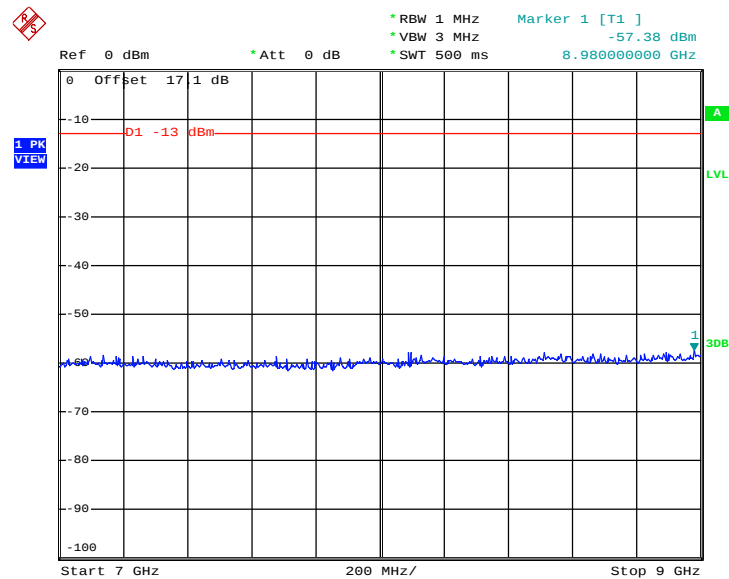


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 21.MAY.2015 03:41:14

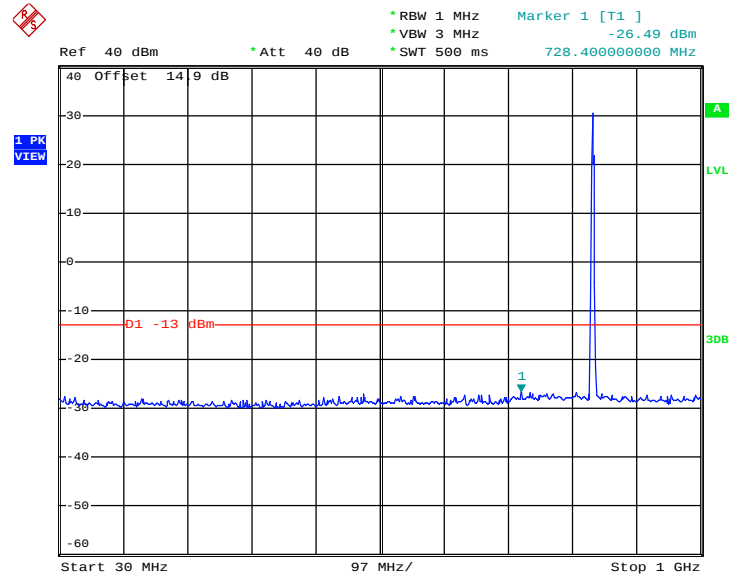
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



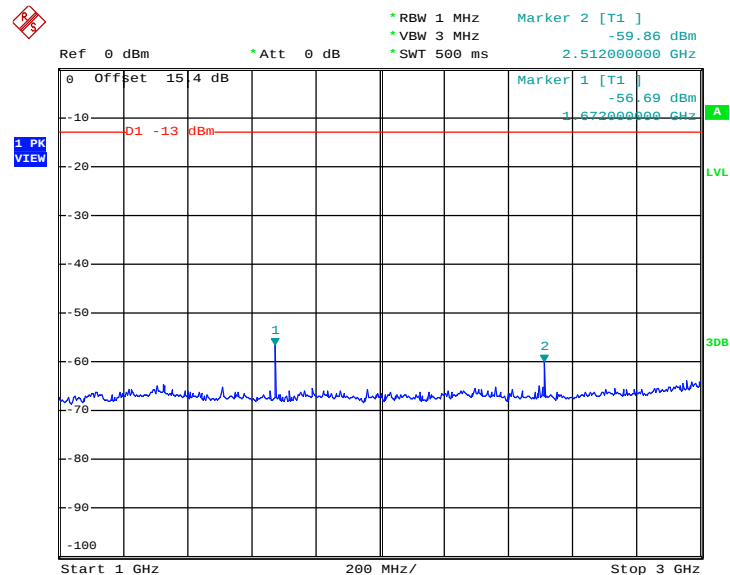
Date: 21.MAY.2015 03:43:19



Band :	GSM850	Channel :	CH189
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

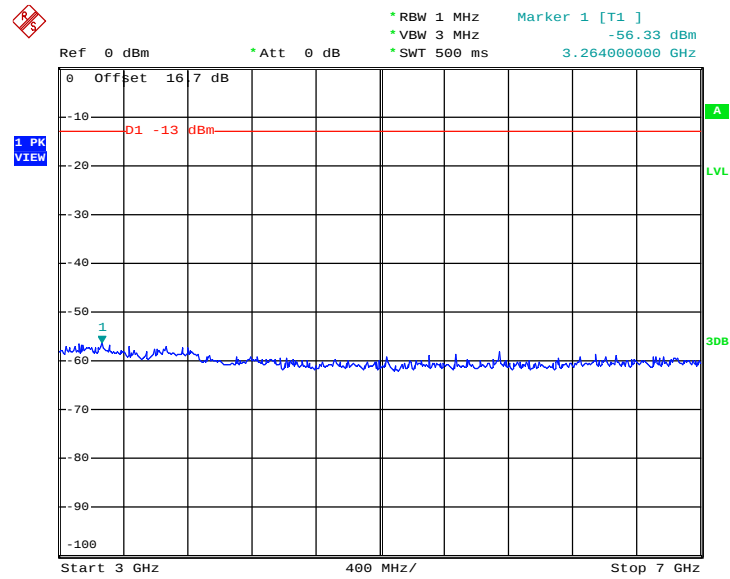
Date: 21.MAY.2015 02:51:22

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 21.MAY.2015 03:52:12

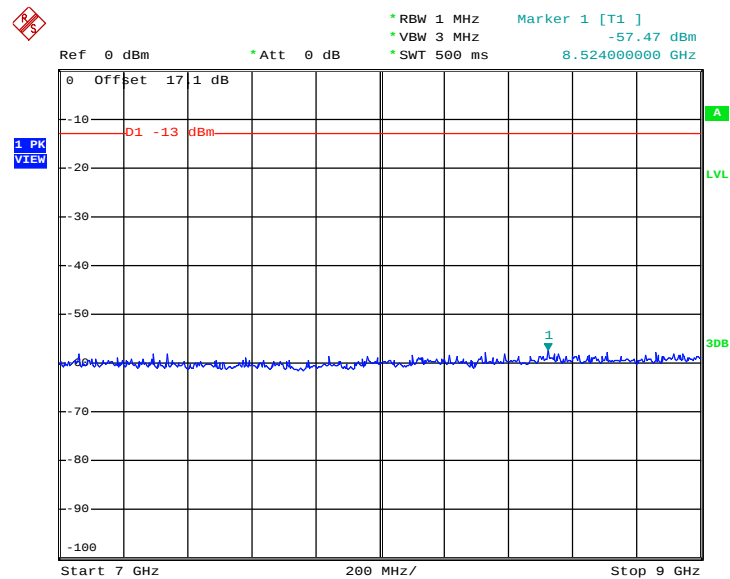


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



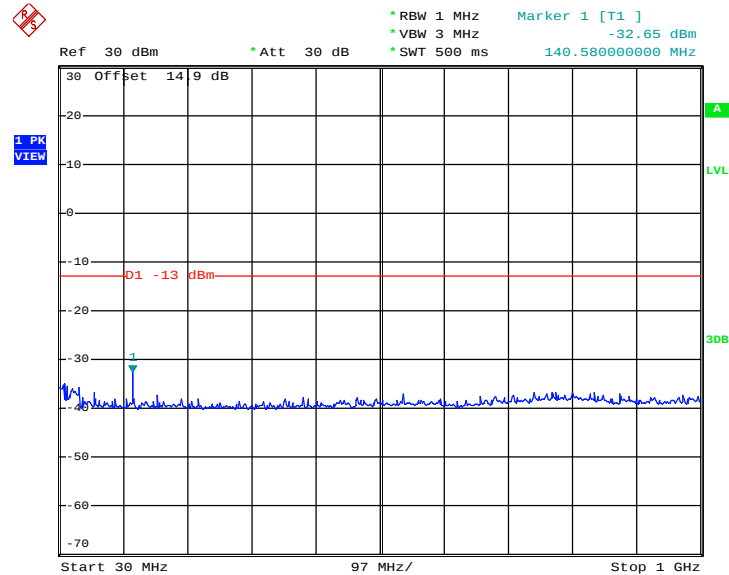
Date: 21.MAY.2015 03:49:39

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

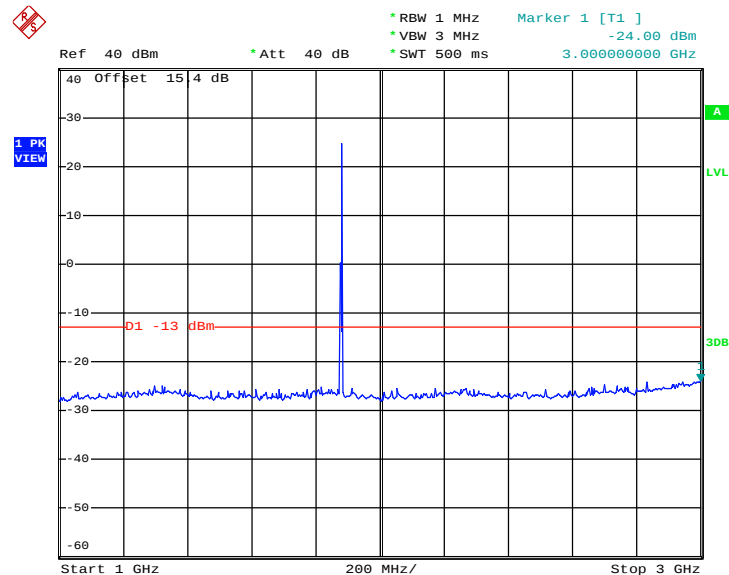


Date: 21.MAY.2015 03:47:54

Band :	GSM1900	Channel :	CH661
Test Mode :	GPRS class 8 Link (GMSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz


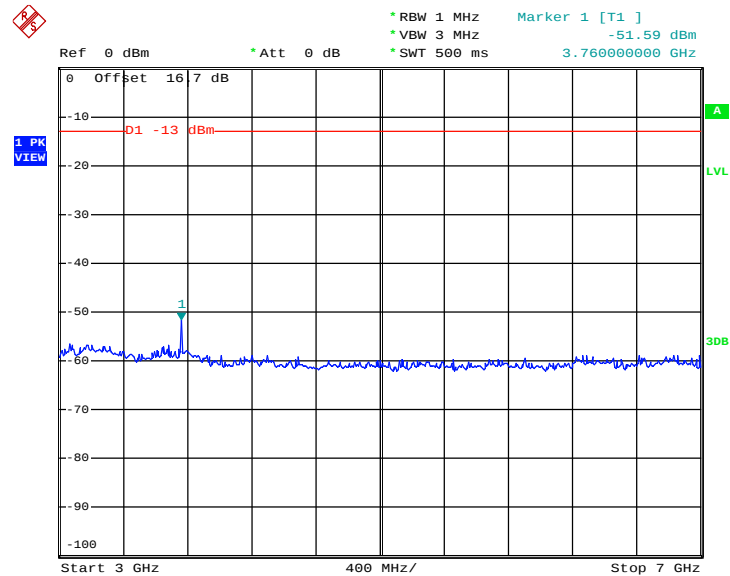
Date: 21.MAY.2015 04:37:19

Conducted Spurious Emission Plot between 1GHz ~ 3GHz


Date: 21.MAY.2015 04:39:07

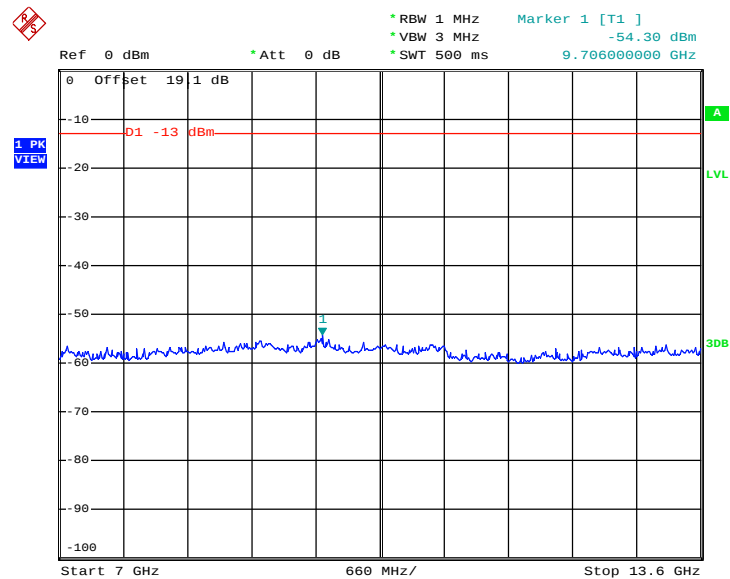


Conducted Spurious Emission Plot between 3GHz ~ 7GHz

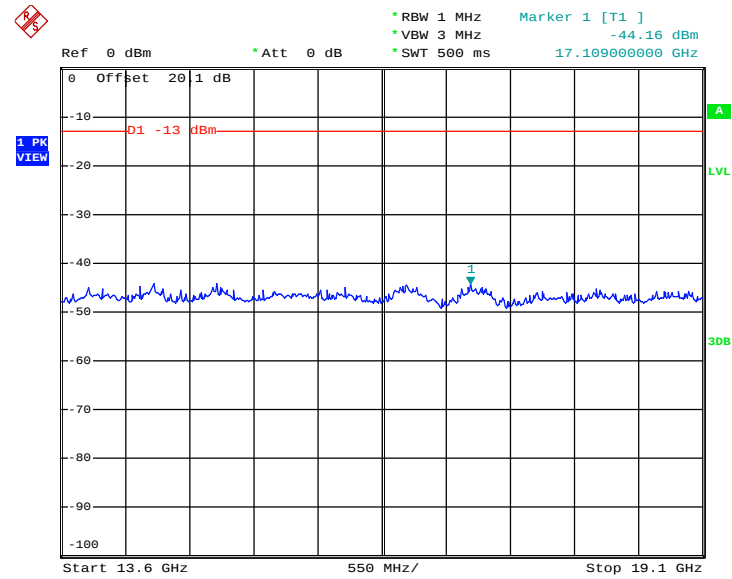


Date: 21.MAY.2015 04:40:24

Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



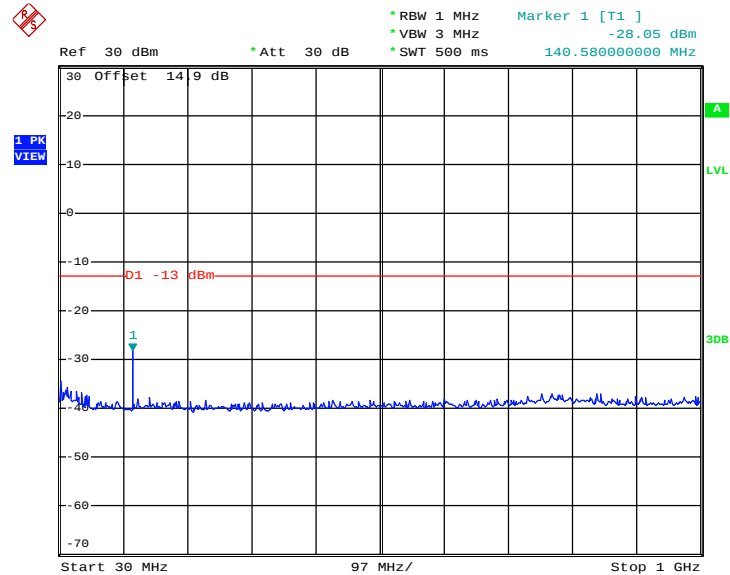
Date: 21.MAY.2015 04:41:21

Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz


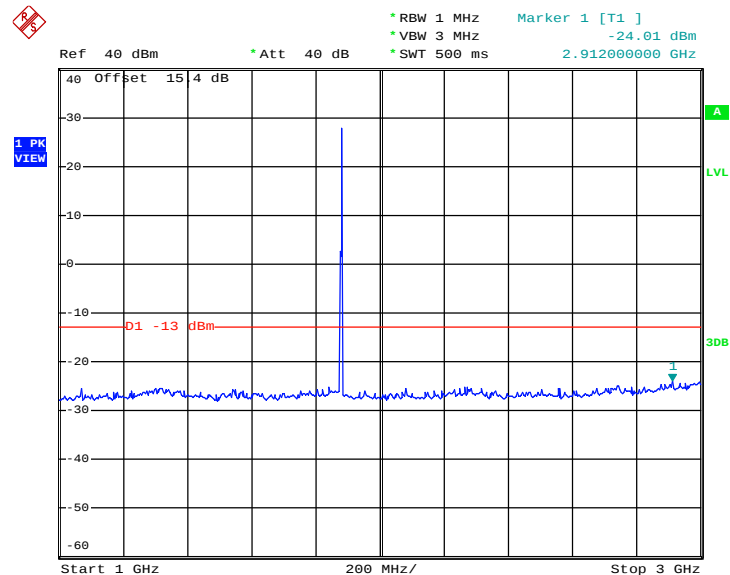
Date: 21.MAY.2015 04:42:41



Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

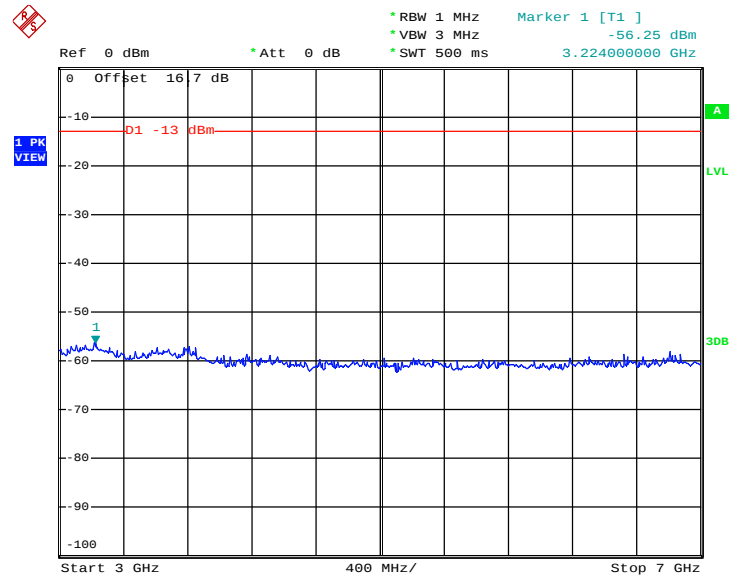
Date: 21.MAY.2015 04:47:30

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 21.MAY.2015 04:49:27

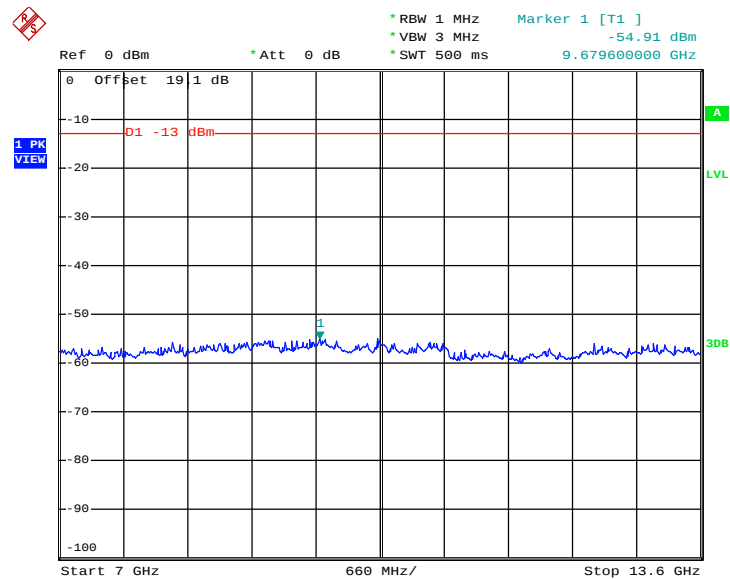


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 21.MAY.2015 04:50:32

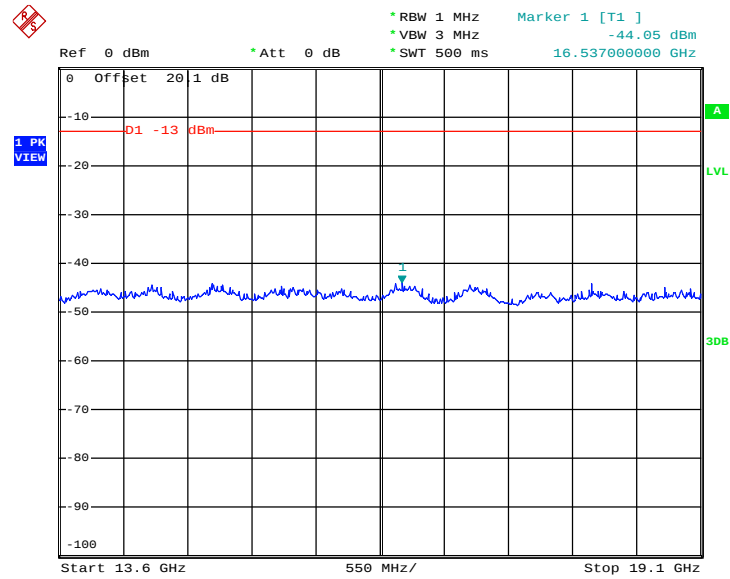
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 21.MAY.2015 04:51:33



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 21.MAY.2015 04:46:05

3.7 Field Strength of Spurious Radiation Measurement

3.7.1 Description of Field Strength of Spurious Radiated Measurement

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.

3.7.2 Measuring Instruments

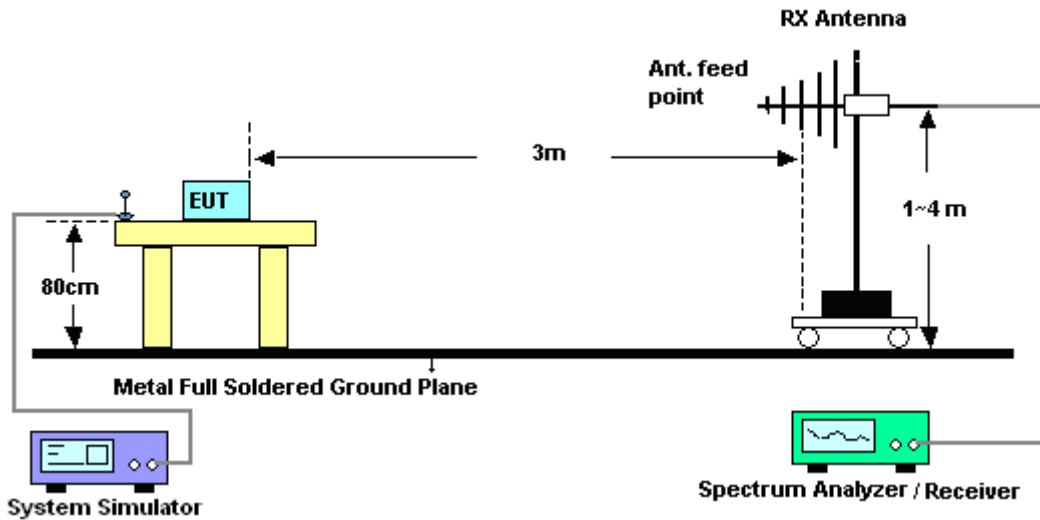
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

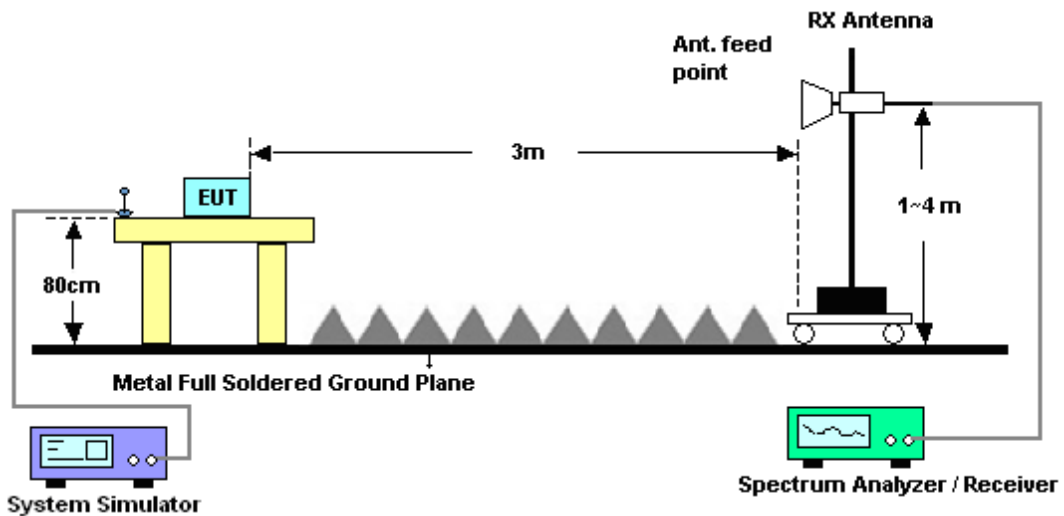
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.7.5 Test Result of Field Strength of Spurious Radiated**

Band :	GSM850					Temperature :	23~25℃		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-48.84	-13	-35.84	-52.55	-52.66	0.53	6.50	H	Pass
2510	-41.45	-13	-28.45	-48.20	-44.32	0.68	5.70	H	Pass
3346	-55.33	-13	-42.33	-65.35	-60.37	0.81	8.00	H	Pass

Band :	GSM850					Temperature :	23~25℃		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-53.92	-13	-40.92	-57.22	-57.74	0.53	6.50	V	Pass
2510	-42.57	-13	-29.57	-49.56	-45.44	0.68	5.70	V	Pass
3346	-56.41	-13	-43.41	-65.42	-61.45	0.81	8.00	V	Pass



Band :	GSM850					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-48.32	-13	-35.32	-52.04	-52.14	0.53	6.50	H	Pass
2510	-44.13	-13	-31.13	-50.94	-47.00	0.68	5.70	H	Pass
3346	-54.65	-13	-41.65	-64.67	-59.69	0.81	8.00	H	Pass

Band :	GSM850					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-53.05	-13	-40.05	-56.41	-56.87	0.53	6.50	V	Pass
2510	-41.82	-13	-28.82	-48.83	-44.69	0.68	5.70	V	Pass
3346	-56.22	-13	-43.22	-65.23	-61.26	0.81	8.00	V	Pass



Band :	GSM1900					Temperature :	23~25℃		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-35.21	-13	-22.21	-49.69	-42.40	0.81	8.00	H	Pass
5640	-38.59	-13	-25.59	-58.06	-48.58	1.01	11.00	H	Pass
7520	-34.44	-13	-21.44	-59.87	-46.68	1.46	13.70	H	Pass

Band :	GSM1900					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-39.10	-13	-26.10	-52.8	-46.29	0.81	8	V	Pass
5640	-39.21	-13	-26.21	-58.45	-49.20	1.01	11	V	Pass
7520	-32.96	-13	-19.96	-58.93	-45.20	1.46	13.7	V	Pass



Band :	GSM1900					Temperature :	23~25℃		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-35.93	-13	-22.93	-50.27	-43.12	0.81	8.00	H	Pass
5640	-39.35	-13	-26.35	-58.51	-49.34	1.01	11.00	H	Pass
7520	-33.95	-13	-20.95	-59.61	-46.19	1.46	13.70	H	Pass

Band :	GSM1900					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Sam Li					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-38.66	-13	-25.66	-52.42	-45.85	0.81	8	V	Pass
5640	-39.81	-13	-26.81	-58.91	-49.80	1.01	11	V	Pass
7520	-37.49	-13	-24.49	-61.03	-49.73	1.46	13.7	V	Pass

3.8 Frequency Stability Measurement

3.8.1 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.

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

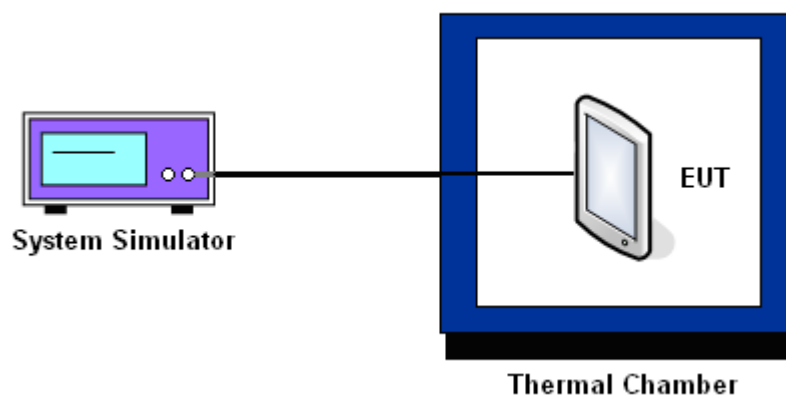
3.8.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps 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.

3.8.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation

Band :	GSM 850	Channel :	189
Limit (ppm) :	2.5	Frequency :	836.4 MHz

Temperature (°C)	GPRS class 8	EDGE class 8	Result
	Deviation (ppm)	Deviation (ppm)	
50	0.0084	0.0096	PASS
40	0.0048	0.0550	
30	0.0514	0.0454	
20(Ref.)	0.0000	0.0000	
10	0.0442	0.0048	
0	0.0072	0.0430	
-10	0.0036	0.0478	
-20	0.0490	0.0084	
-30	0.0096	0.0096	

Band :	GSM 1900	Channel :	661
Limit (ppm) :	within authorized band	Frequency :	1880.0 MHz

Temperature (°C)	GPRS class 8	EDGE class 8	Result
	Deviation (ppm)	Deviation (ppm)	
50	0.0059	0.0021	PASS
40	0.0043	0.0255	
30	0.0229	0.0027	
20(Ref.)	0.0000	0.0000	
10	0.0197	0.0213	
0	0.0016	0.0218	
-10	0.0176	0.0016	
-20	0.0154	0.0223	
-30	0.0011	0.0059	

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

3.8.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GPRS class 8	3.8	0.0430	2.5	PASS
		BEP	0.0407		
		4.35	0.0108		
	EDGE class 8	3.8	0.0383		
		BEP	0.0167		
		4.35	0.0060		
GSM 1900 CH661	GPRS class 8	3.8	0.0149	(Note 3.)	
		BEP	0.0069		
		4.35	0.0032		
	EDGE class 8	3.8	0.0207		
		BEP	0.0176		
		4.35	0.0037		

Note:

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.6 V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	May 20, 2015~ May 21, 2015	Oct. 27, 2015	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2015	May 20, 2015~ May 21, 2015	May 03, 2016	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	May 20, 2015~ May 21, 2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz; Max 30dBm	Oct. 14, 2014	Jun. 06, 2015	Oct. 13, 2015	Radiation (03CH02-SZ)
Spectrum Analyzer	R&S	FSV40	101041	10kHz~40GHz;Ma x 30dBm	Oct. 15, 2014	Jun. 06, 2015	Oct. 14, 2015	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	23188	30MHz~2GHz	Nov. 07, 2014	Jun. 06, 2015	Nov. 06, 2015	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 20, 2015	Jun. 06, 2015	Jan. 19, 2016	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Sep. 04, 2014	Jun. 06, 2015	Sep. 03, 2015	Radiation (03CH02-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz / 30 dB	Jan. 28, 2015	Jun. 06, 2015	Jan. 27, 2016	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct. 29, 2014	Jun. 06, 2015	Oct. 28, 2015	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Jun. 06, 2015	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Jun. 06, 2015	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Jun. 06, 2015	NCR	Radiation (03CH02-SZ)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.5dB
--	-------