FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E

TEST REPORT

For

WHITE DRIVE BOX

Model: TB4001

Trade Name: N/A

Issued to

Hon Hai Precision Ind. Co., Ltd.
5F-1, 5, Hsin-An Road Hsinchu Science-Based Industrial Park,Hsinchu,Taiwan

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: October 17, 2016

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		October 17, 2016		Initial Issue	ALL	Doris Chu

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant: Hon Hai Precision Ind. Co., Ltd.
5F-1, 5, Hsin-An Road Hsinchu Science-Based Industrial Park,Hsinchu,Taiwan

Equipment Under Test: WHITE DRIVE BOX

Trade Name: N/A

Model Number: TB4001

Date of Test: September 2 ~ October 13, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 22 Subpart H & Part 24 Subpart E	Pass

We hereby certify that:

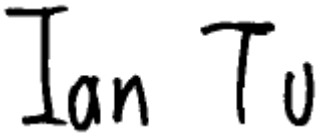
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-D: 2010 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 Subpart H and PART 24 Subpart E.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Ian Tu
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	WHITE DRIVE BOX
Trade Name	N/A
Model Number	TB4001
Received Date	August 1, 2016
Power Supply	DC 5V
Frequency Range	GSM / GPRS / EGPRS: 850: 824.2 ~ 848.8 MHz GSM / GPRS / EGPRS: 1900: 1850.2 ~ 1909.8 MHz
Transmit Power (ERP & EIRP Power)	GSM 850: 36.94 dBm GPRS 850: 36.04 dBm EGPRS 850: 30.40 dBm GSM 1900: 29.75 dBm GPRS 1900: 29.74 dBm EGPRS 1900: 25.87 dBm
Type of Emission	GSM 850: 244KGXW--- GPRS 850: 244KGXW--- EGPRS 850: 244KG7W--- GSM 1900: 244KGXW--- GPRS 1900: 243KGXW--- EGPRS 1900: 246KG7W---
Antenna Gain	1. P/N :WAG-F-LTE5-00-009 / PCB Antenna Gain: GSM / GPRS / EGPRS: 850: -0.98 dBi Gain: GSM / GPRS / EGPRS: 1900: 1.82 dBi 2. P/N :WAG-F-LTE5-00-010 / PCB Antenna Gain: GSM / GPRS / EGPRS: 850: 0.47 dBi Gain: GSM / GPRS / EGPRS: 1900: 1.25dBi

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.10: 2013, TIA/EIA-603-D: 2010 and FCC CFR 47, Part 2, PART 22 SUBPART H AND PART 24 SUBPART E

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

According to the requirements in ANSI C63.10: 2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in TIA-603-D: 2010 and ANSI 63.4: 2014.

3.4 DESCRIPTION OF TEST MODES

The EUT (model: TB4001) had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed.

GSM / GPRS / EGPRS 850:
Channel Low (CH128), Channel Mid (CH190) and Channel High (CH251) were chosen for full testing.

GSM / GPRS / EGPRS 1900:
Channel Low (CH512), Channel Mid (CH661) and Channel High (CH810) were chosen for full testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the worst case was recorded.

Worst Case mode

The worst mode be defined of maximum power among different multi-slots.

Test Mode		Worst mode	Test Mode		Worst mode
GSM 850		V	**PCS 1900**		V
GPRS 850	4Down1Up	V	**GPRS 1900**	4Down1Up	V
	3Down2Up			3Down2Up	
	2Down3Up			2Down3Up	
	1Down4Up			1Down4Up	
EGPRS 850	4Down1Up	V	**EGPRS 1900**	4Down1Up	V
	3Down2Up			3Down2Up	
	2Down3Up			2Down3Up	
	1Down4Up			1Down4Up	

Remark : Multislot class 33

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Conducted Emissions Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	R&S	FSV 40	101073	2016/8/1	2017/7/31
Communication Test Set	Agilent	8960	MY48363204	2016/7/26	2017/7/25

Wugu 966 Chamber A					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Signal Analyzer	Agilent	E4407B	MY44212686	2016/4/9	2017/4/8
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1042473	2017/7/6	2017/7/5
Bilog Antenna	Sunol Sciences	JB1	A052609	2016/3/20	2017/3/21
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	2016/3/9	2017/3/8
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

***Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	TAF Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
1	Notebook PC	ASUS	M5200AE	5BN0AG019631	PD9WM3B2100	N/A	AC I/P: Unshielded, 1.8m with a core DC O/P: Unshielded, 1.8m

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

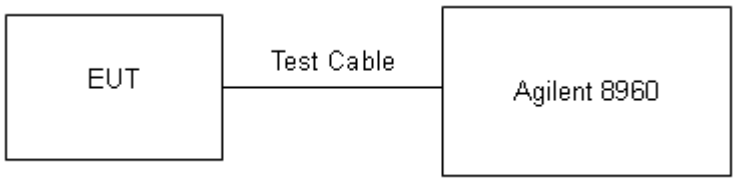
7. FCC PART 22 & 24 REQUIREMENTS

7.1 AVERAGE POWER

LIMIT

For reporting purposes only.

Test Configuration



Remark: *Measurement setup for testing on Antenna connector*

TEST PROCEDURE

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

TEST RESULTS

Pass.

Test Data

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GSM 850		128	824.2	22.6	31.62
		190	836.6	22.5	31.55
		251	848.8	22.5	31.50

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS850	4Down1Up	128	824.2	22.5	31.58
		190	836.6	22.6	31.64
		251	848.8	22.5	31.52

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS850	3Down2Up	128	824.2	24.8	30.85
		190	836.6	24.8	30.81
		251	848.8	24.7	30.71

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS850	2Down3Up	128	824.2	26.2	30.41
		190	836.6	26.1	30.32
		251	848.8	26.0	30.23

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS850	1Down4Up	128	824.2	25.8	28.83
		190	836.6	25.8	28.85
		251	848.8	26.0	29.03

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS850	4Down1Up	128	824.2	18.4	27.46
		190	836.6	18.5	27.57
		251	848.8	18.5	27.51

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS850	3Down2Up	128	824.2	21.3	27.32
		190	836.6	21.4	27.46
		251	848.8	21.4	27.44

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS850	2Down3Up	128	824.2	22.8	27.07
		190	836.6	22.8	27.01
		251	848.8	23.0	27.21

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS850	1Down4Up	128	824.2	23.7	26.67
		190	836.6	23.9	26.92
		251	848.8	23.5	26.51

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GSM1900		512	1850.2	21.8	30.85
		661	1880.0	21.9	30.89
		810	1909.8	21.7	30.71

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS1900	4Down1Up	512	1850.2	21.8	30.86
		661	1909.8	21.9	30.90
		810	1909.8	21.7	30.70

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS1900	3Down2Up	512	1850.2	22.2	28.20
		661	1909.8	22.3	28.32
		810	1909.8	22.3	28.33

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS1900	2Down3Up	512	1850.2	22.8	27.08
		661	1909.8	23.1	27.31
		810	1909.8	22.9	27.13

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
GPRS1900	1Down4Up	512	1850.2	22.9	25.94
		661	1909.8	23.1	26.12
		810	1909.8	22.8	25.83

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS1900	4Down1Up	512	1850.2	18.0	27.01
		661	1880.0	17.9	26.96
		810	1909.8	18.0	27.04

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS1900	3Down2Up	512	1850.2	20.8	26.84
		661	1909.8	20.9	26.92
		810	1909.8	20.9	26.95

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS1900	2Down3Up	512	1850.2	22.6	26.90
		661	1909.8	23.0	27.23
		810	1909.8	22.3	26.55

EUT Mode	Test Mode	CH	Frequency (MHz)	Frame Avg Pwr (dBm)	Avg. burst power (dBm)
EGPRS1900	1Down4Up	512	1850.2	23.8	26.84
		661	1909.8	23.9	26.89
		810	1909.8	23.6	26.66

7.2 ERP & EIRP MEASUREMENT

LIMIT

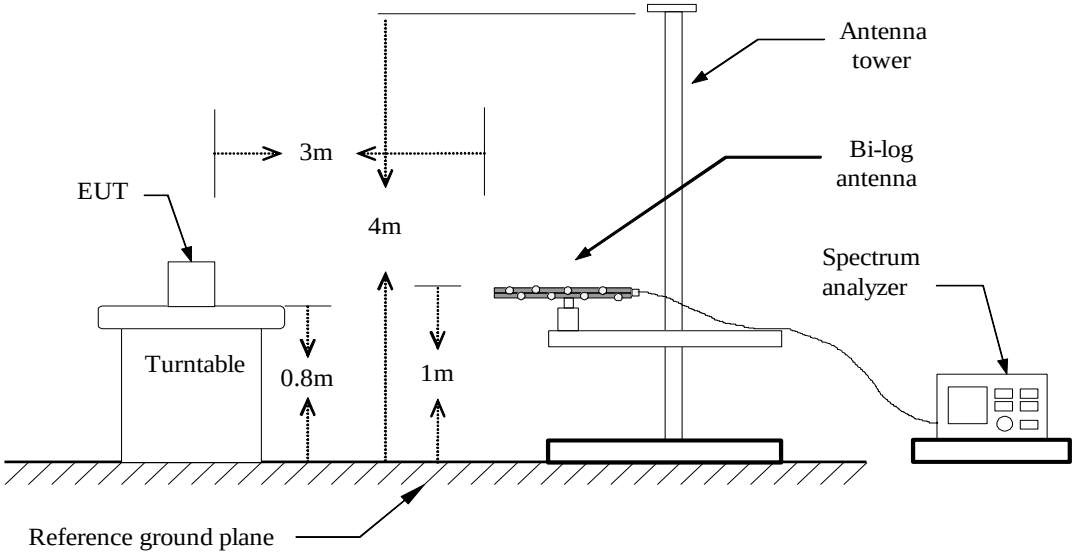
According to FCC §2.1046

FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

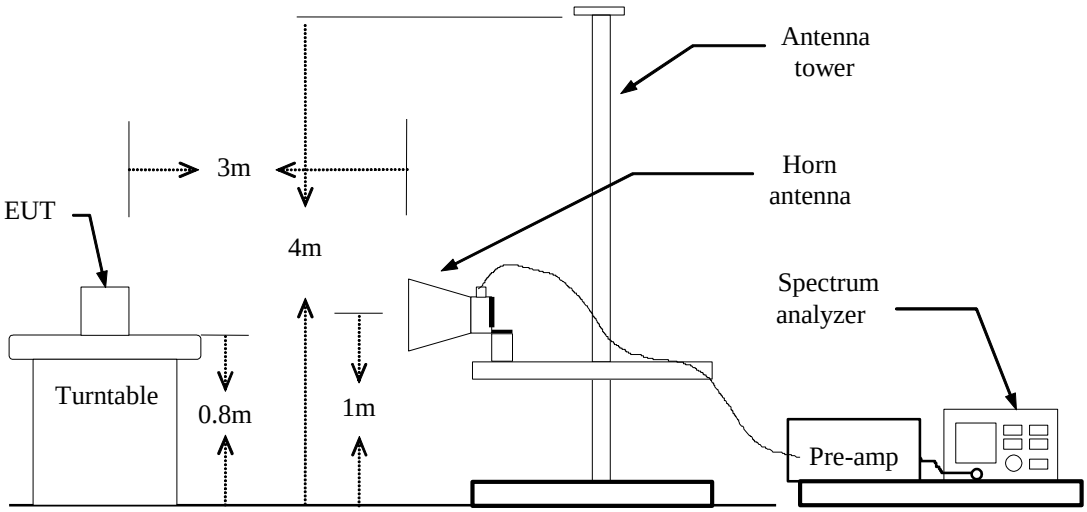
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

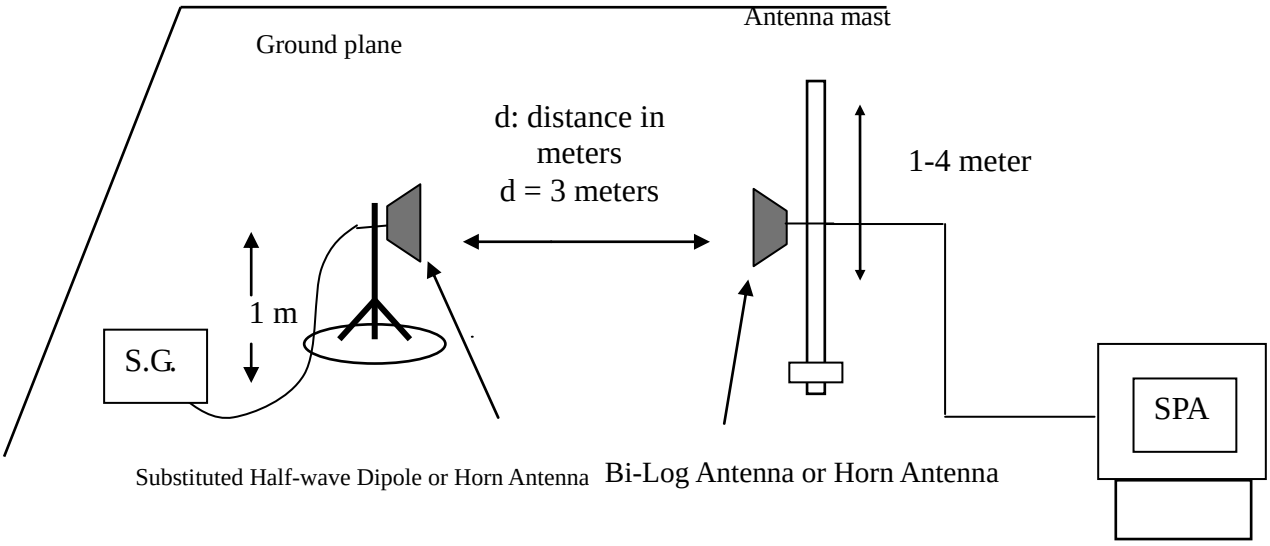
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 5MHz and the average bandwidth was set to 50MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

ERP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)-2.15
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

Pass.

GSM 850 TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
128	824.20	V	38.12	3.03	-1.37	33.72	38.45	-4.73
	824.20	H	28.68	3.03	-1.35	24.30	38.45	-14.15
190	836.60	V	40.09	3.06	-1.18	35.85	38.45	-2.60
	836.60	H	25.95	3.06	-1.18	21.71	38.45	-16.74
251	848.80	V	41.03	3.08	-1.01	***36.94**	38.45	-1.51
	848.80	H	25.80	3.08	-1.01	21.71	38.45	-16.74

GPRS 850(4Down1Up) TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
128	824.20	V	38.37	3.03	-1.37	33.97	38.45	-4.48
	824.20	H	28.68	3.03	-1.35	24.30	38.45	-14.15
190	836.60	V	40.28	3.06	-1.18	***36.04**	38.45	-2.41
	836.60	H	25.95	3.06	-1.18	21.71	38.45	-16.74
251	848.80	V	41.22	3.08	-1.01	37.13	38.45	-1.32
	848.80	H	25.80	3.08	-1.01	21.71	38.45	-16.74

EGPRS 850(4Down1Up) TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
128	824.20	V	34.61	3.03	-1.37	30.21	38.45	-8.24
	824.20	H	28.68	3.03	-1.35	24.30	38.45	-14.15
190	836.60	V	34.54	3.06	-1.18	30.30	38.45	-8.15
	836.60	H	25.95	3.06	-1.18	21.71	38.45	-16.74
251	848.80	V	34.49	3.08	-1.01	***30.40**	38.45	-8.05
	848.80	H	25.80	3.08	-1.01	21.71	38.45	-16.74

REMARK: " * " MEANS WORST VALUES.

GSM 1900 TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
512	1850.20	V	24.70	4.76	9.31	29.25	33.00	-3.75
	1850.20	H	17.39	4.76	9.31	21.94	33.00	-11.06
661	1880.00	V	24.97	4.80	9.31	29.48	33.00	-3.52
	1880.00	H	17.52	4.80	9.31	22.03	33.00	-10.97
810	1909.80	V	25.25	4.84	9.34	***29.75**	33.00	-3.25
	1909.80	H	17.28	4.84	9.34	21.78	33.00	-11.22

GPRS 1900(4Down1Up) TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
512	1850.20	V	24.72	4.76	9.31	29.27	33.00	-3.73
	1850.20	H	17.39	4.76	9.31	21.94	33.00	-11.06
661	1880.00	V	25.01	4.80	9.31	29.52	33.00	-3.48
	1880.00	H	17.52	4.80	9.31	22.03	33.00	-10.97
810	1909.80	V	25.24	4.84	9.34	***29.74**	33.00	-3.26
	1909.80	H	17.28	4.84	9.34	21.78	33.00	-11.22

EGPRS 1900(4Down1Up) TEST DATA

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
512	1850.20	V	20.90	4.76	9.31	25.45	33.00	-7.55
	1850.20	H	17.39	4.76	9.31	21.94	33.00	-11.06
661	1880.00	V	21.20	4.80	9.31	25.71	33.00	-7.29
	1880.00	H	17.52	4.80	9.31	22.03	33.00	-10.97
810	1909.80	V	21.37	4.84	9.34	***25.87**	33.00	-7.13
	1909.80	H	17.28	4.84	9.34	21.78	33.00	-11.22

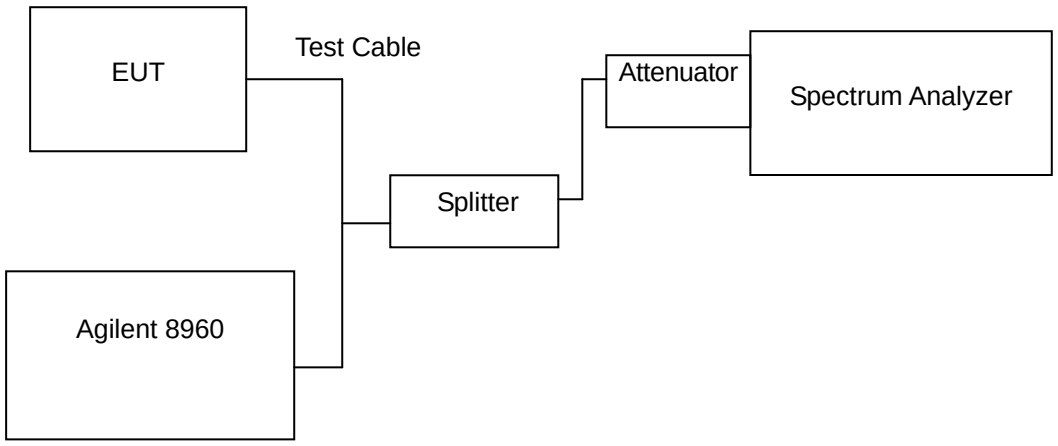
REMARK: " * " MEANS WORST VALUES.

7.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

According to §FCC 2.1049.

Test Configuration



Remark: *Measurement setup for testing on Antenna connector*

TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

Pass.

Test Data

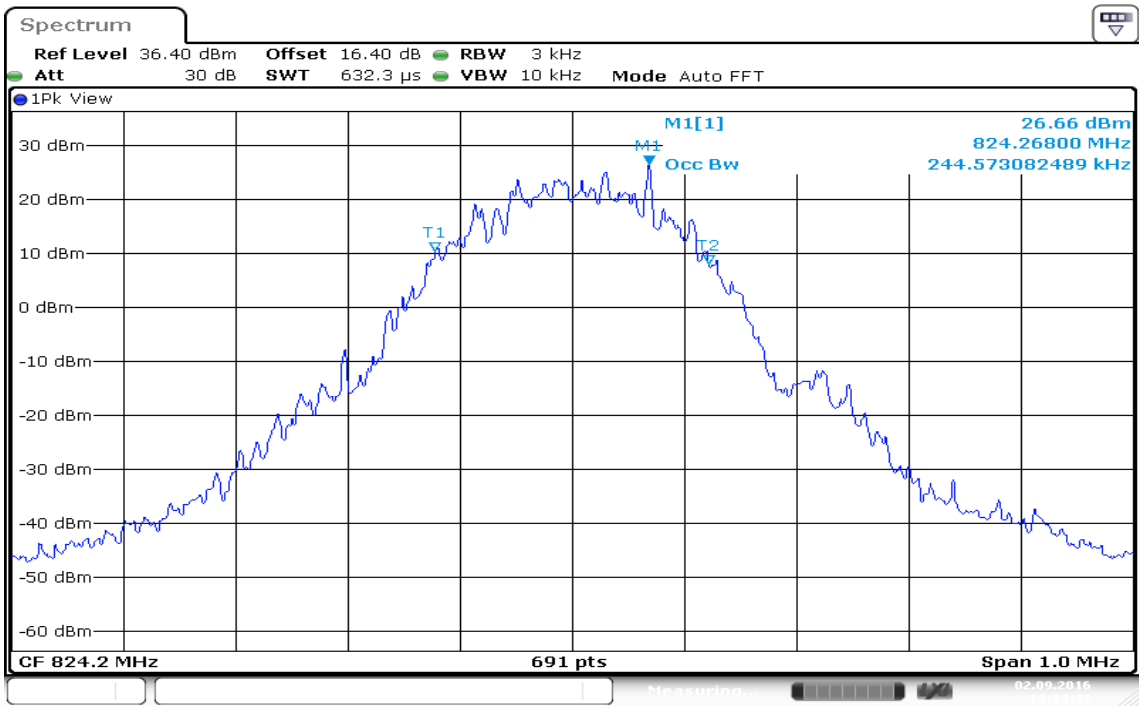
Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GSM 850	128	824.20	***244.5730**
	190	836.60	240.2315
	251	848.80	243.1259
GPRS 850 (4Down1Up)	128	824.20	***244.5730**
	190	836.60	240.2315
	251	848.80	243.1259
EGPRS 850 (4Down1Up)	128	824.20	***244.5730**
	190	836.60	241.6787
	251	848.80	243.1259

Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GSM 1900	512	1850.20	243.1259
	661	1880.00	243.1259
	810	1909.80	***244.5730**
GPRS 1900 (4Down1Up)	512	1850.20	***243.1259**
	661	1880.00	243.1259
	810	1909.80	243.1259
EGPRS 1900 (4Down1Up)	512	1850.20	***246.0202**
	661	1880.00	244.5730
	810	1909.80	243.1259

REMARK: " * " MEANS WORST VALUES.

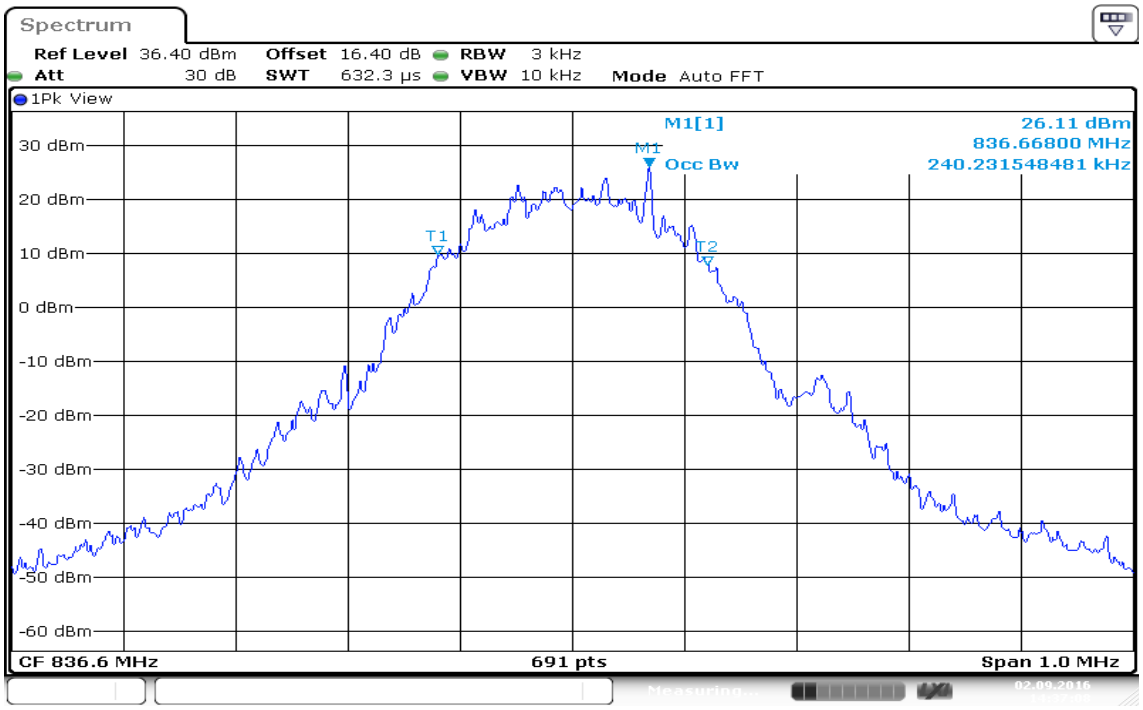
Test Plot

GSM 850 (CH Low)



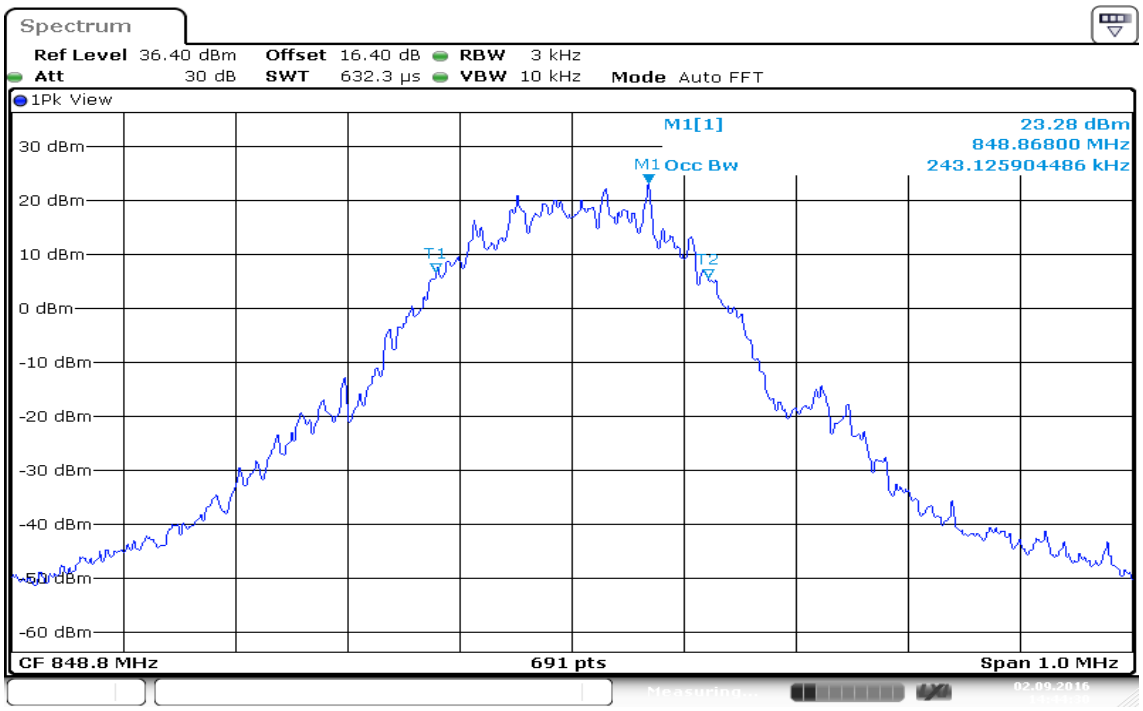
Date: 2.SEP.2016 14:34:41

GSM 850 (CH Mid)



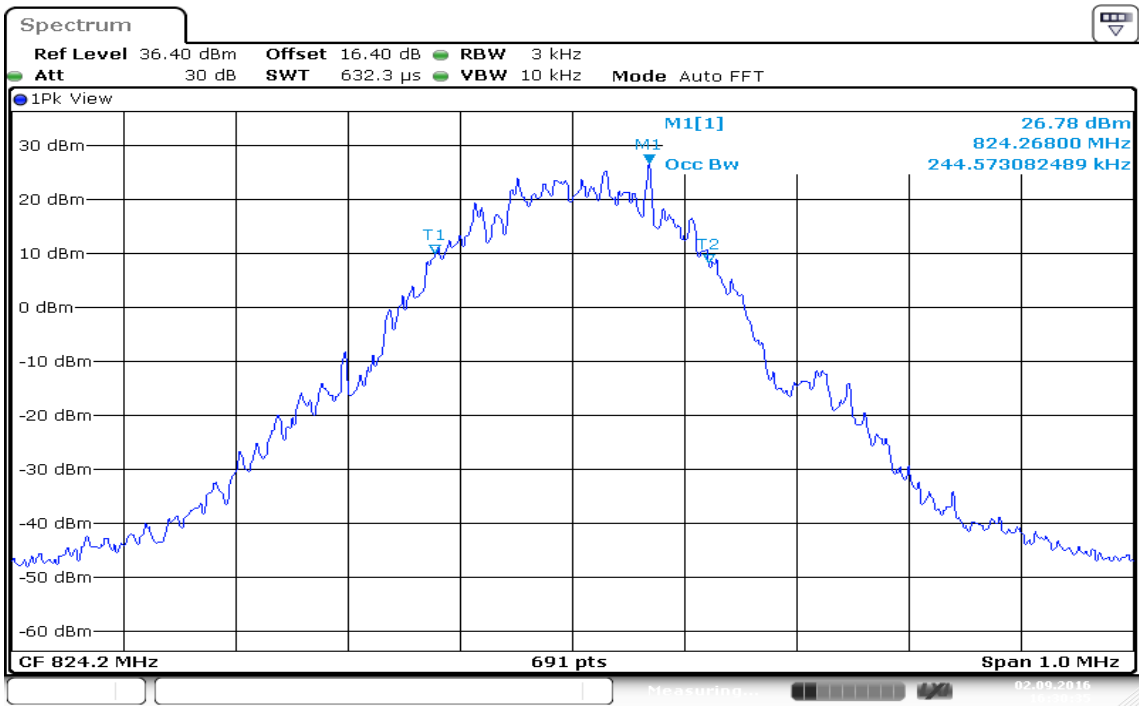
Date: 2.SEP.2016 14:37:09

GSM 850 (CH High)



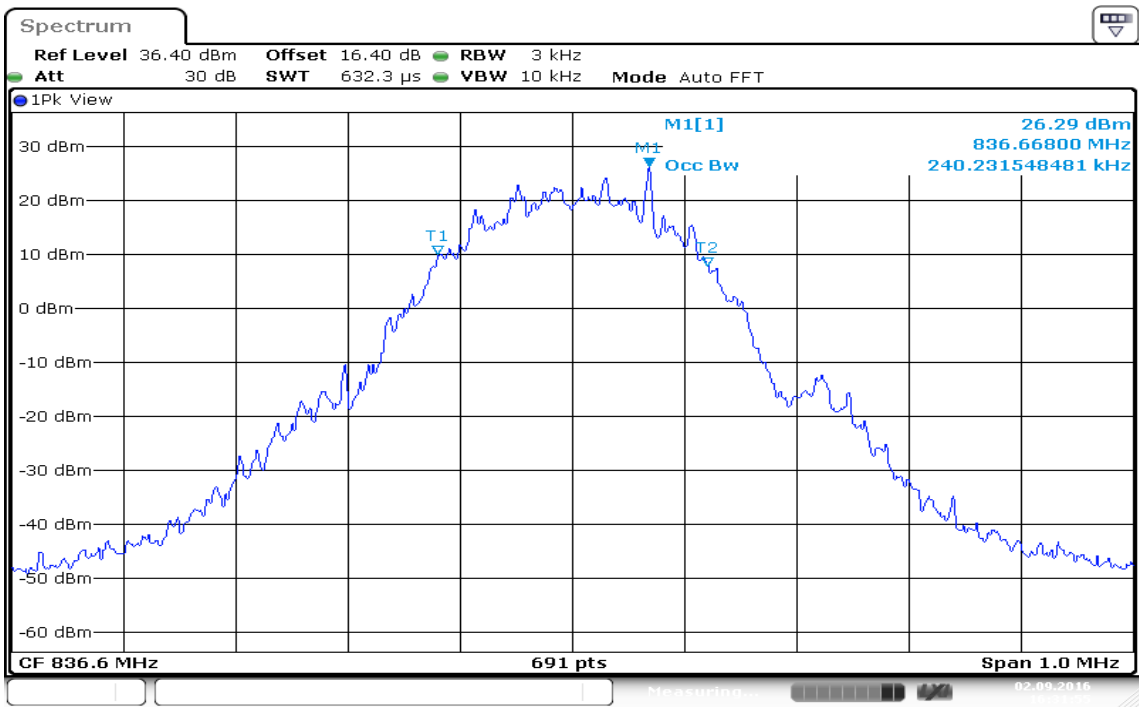
Date: 2.SEP.2016 14:44:31

GPRS 850 (CH Low)



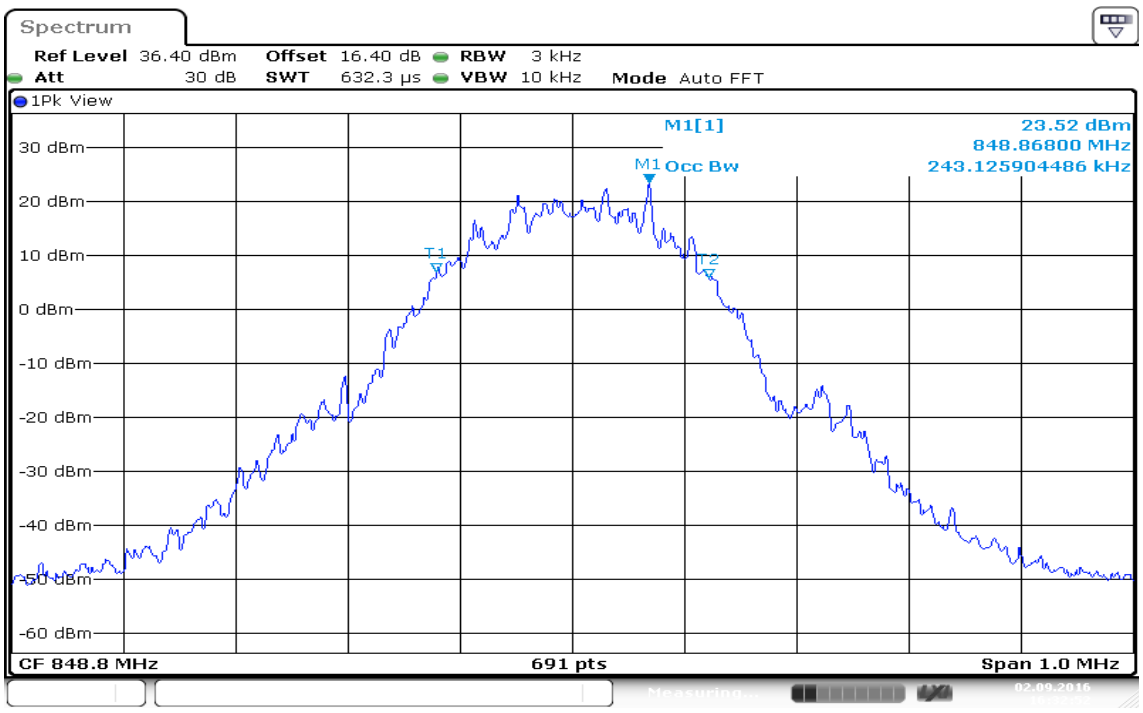
Date: 2.SEP.2016 16:30:36

GPRS 850 (CH Mid)



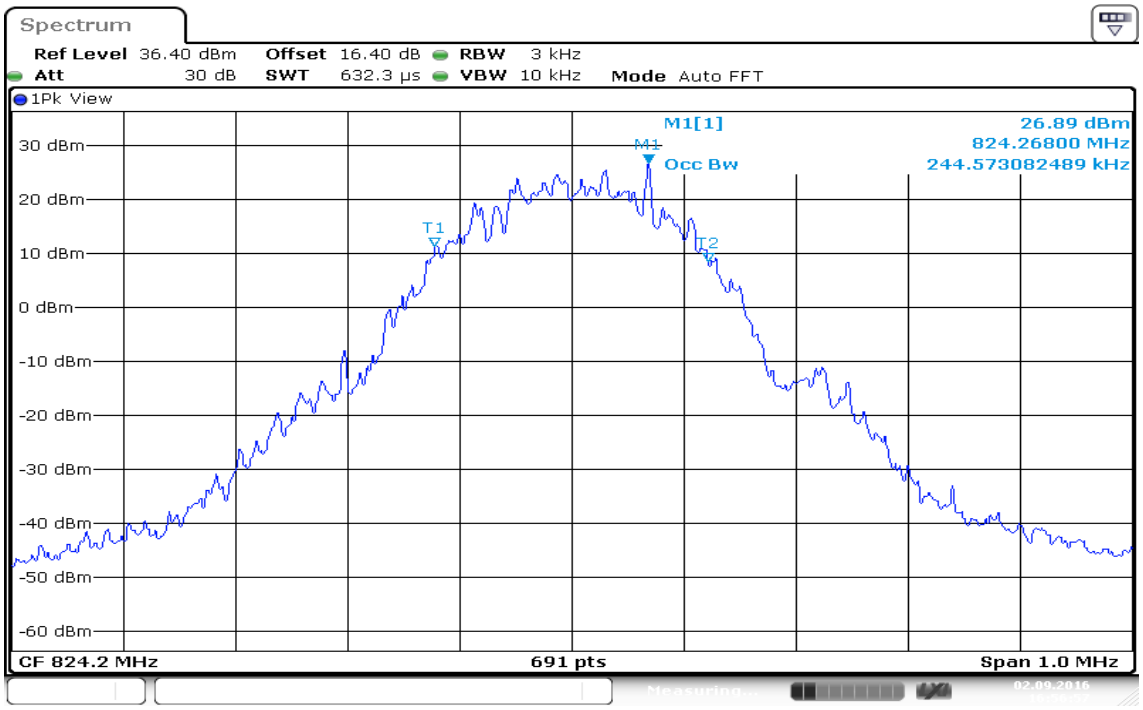
Date: 2.SEP.2016 16:31:56

GPRS 850(CH High)



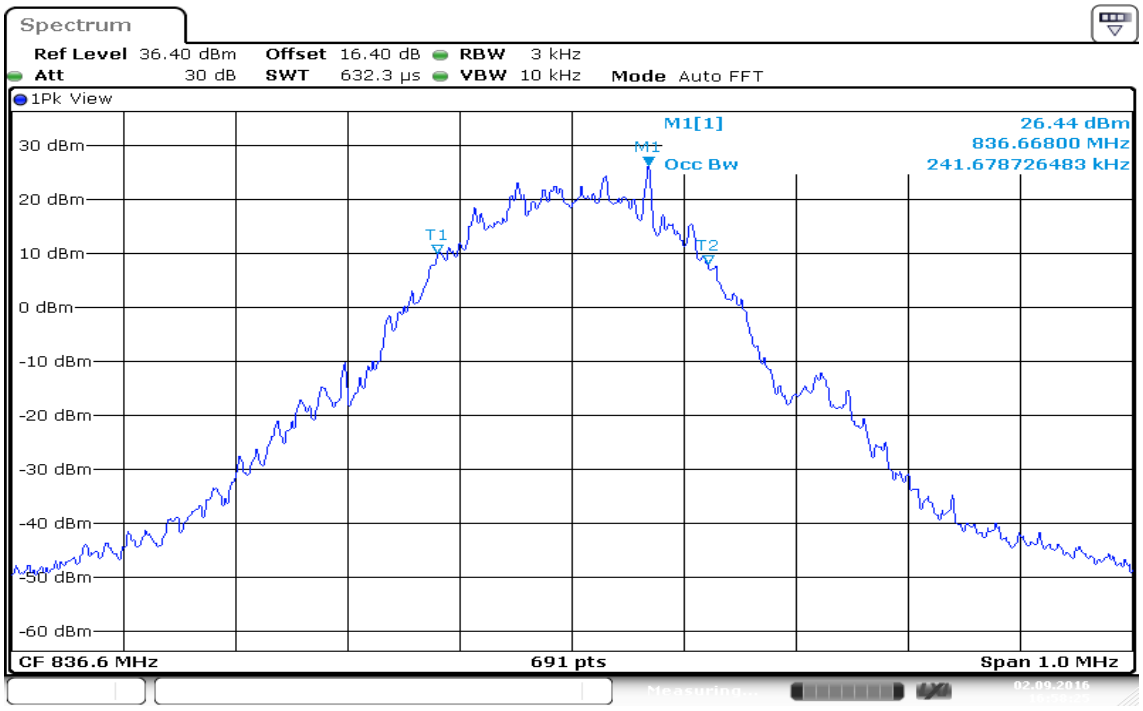
Date: 2.SEP.2016 16:32:53

EGPRS 850 (CH Low)



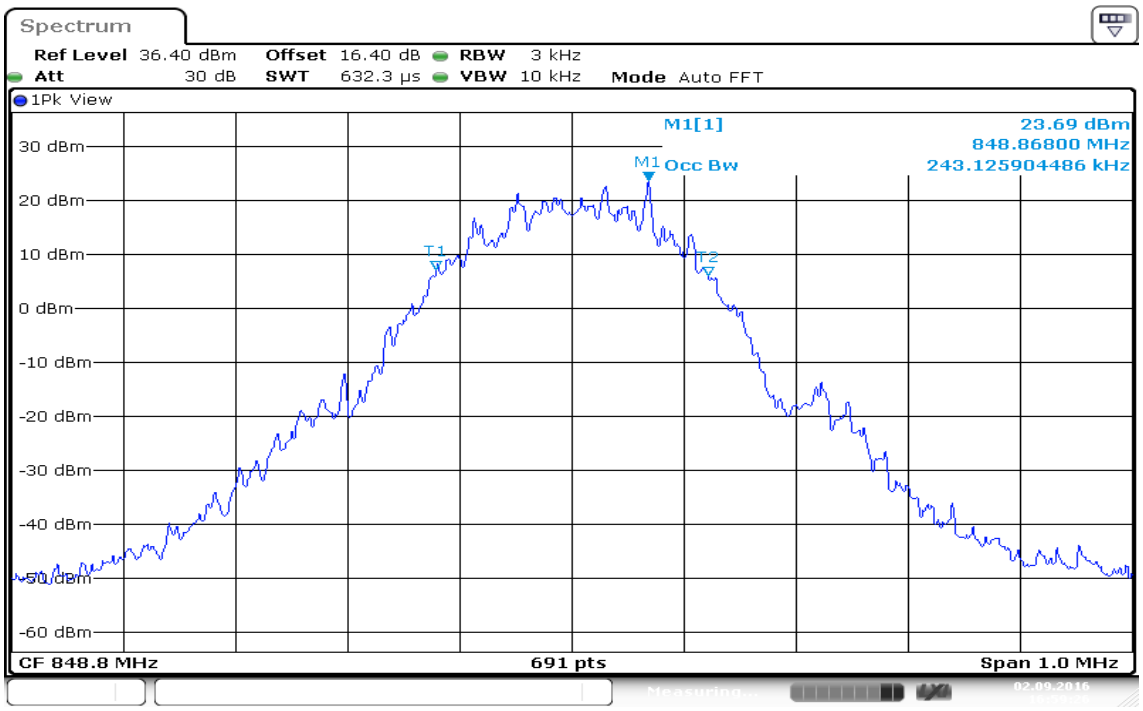
Date: 2.SEP.2016 16:56:57

EGPRS 850 (CH Mid)



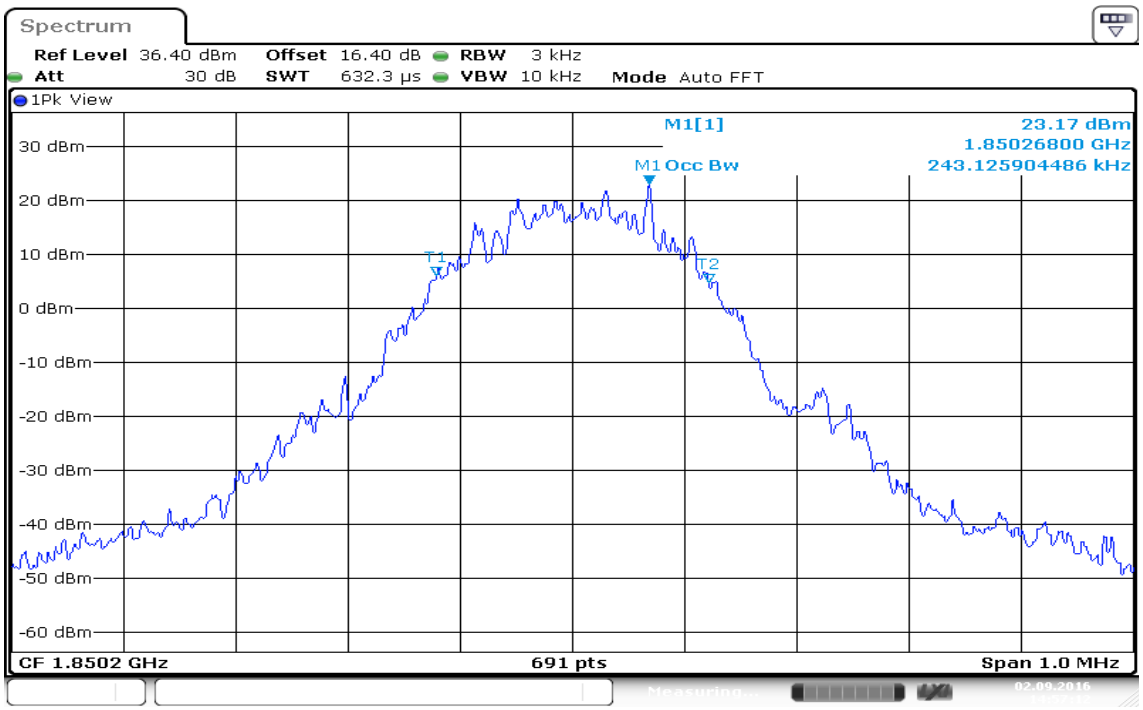
Date: 2.SEP.2016 16:58:26

EGPRS 850 (CH High)



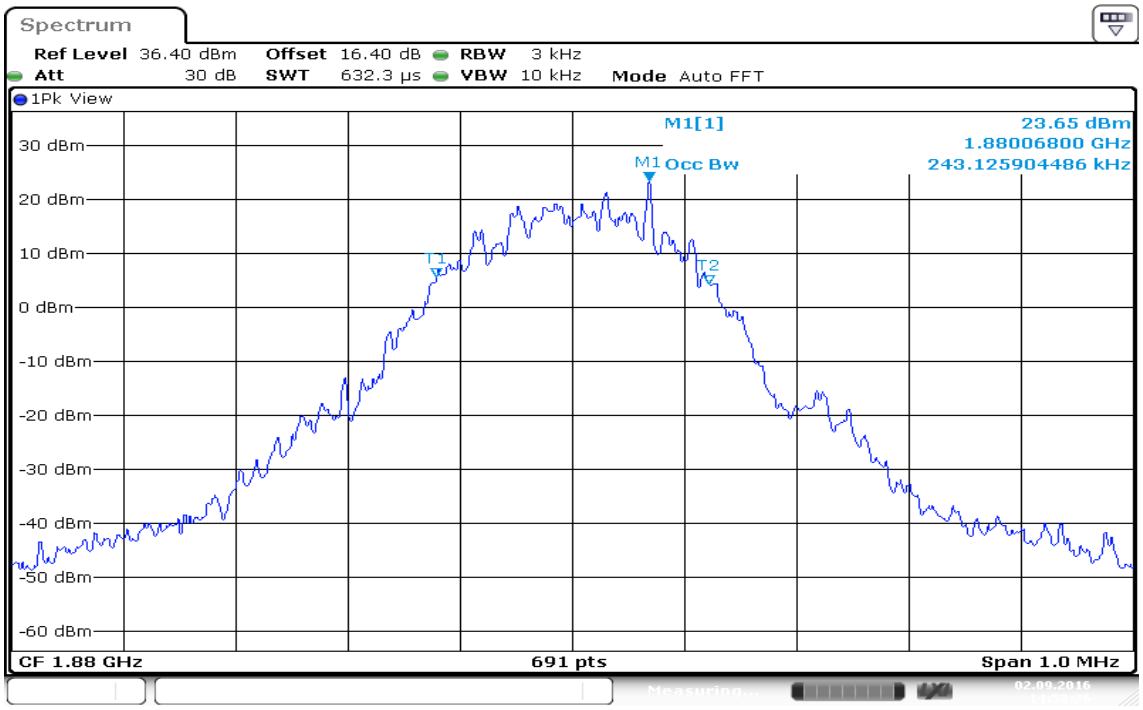
Date: 2.SEP.2016 16:59:26

GSM 1900 (CH Low)



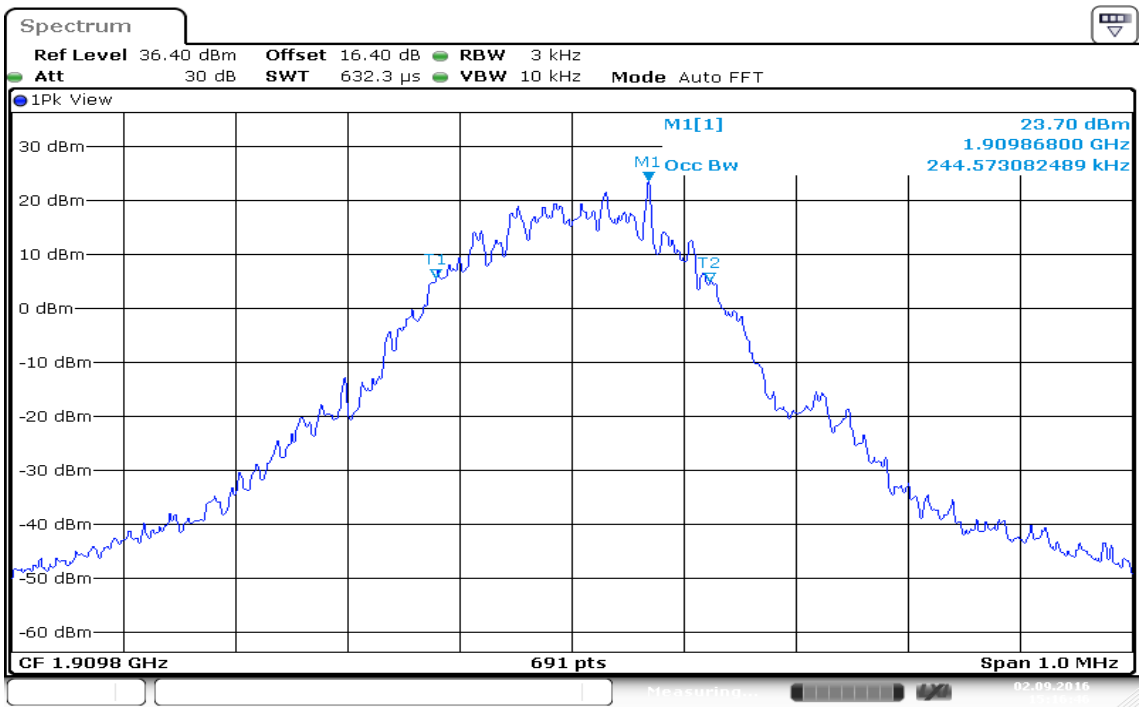
Date: 2.SEP.2016 14:57:13

GSM 1900 (CH Mid)



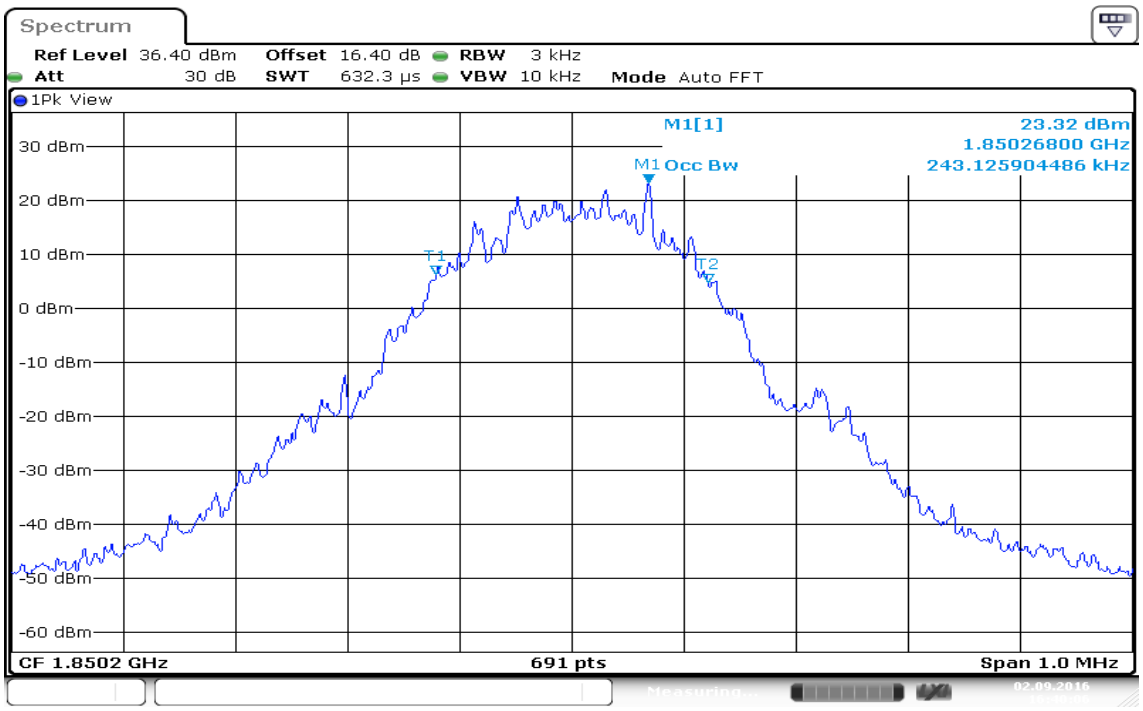
Date: 2.SEP.2016 14:58:27

GSM 1900 (CH High)



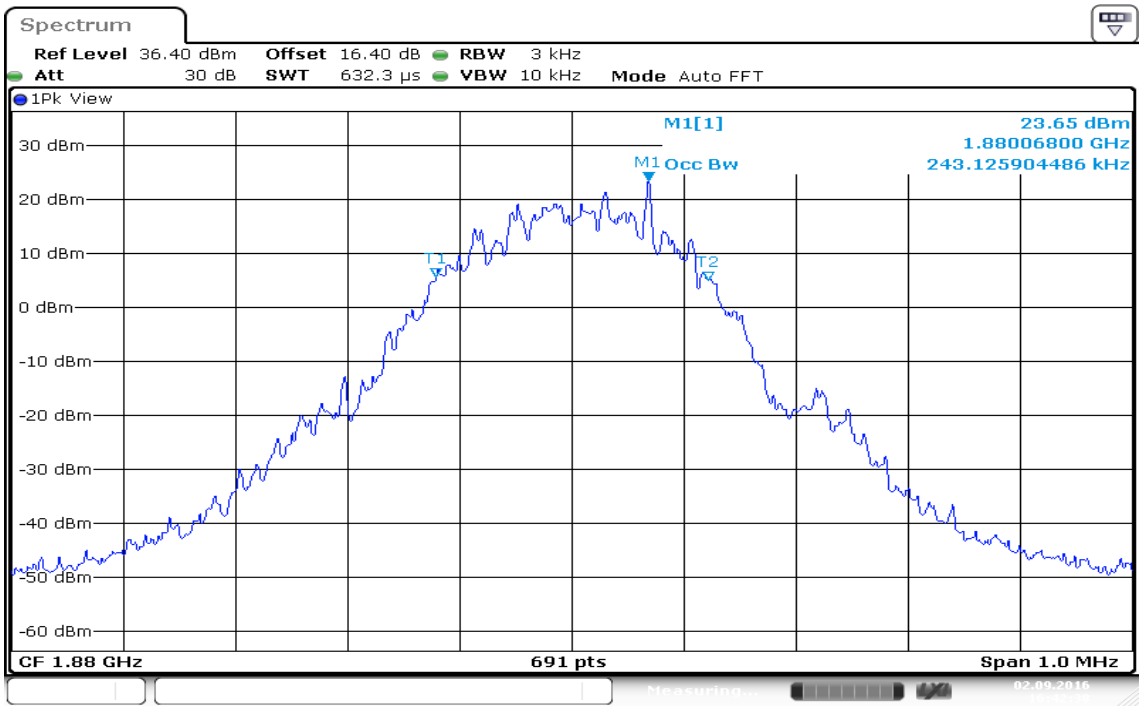
Date: 2.SEP.2016 15:16:47

GPRS 1900 (CH Low)



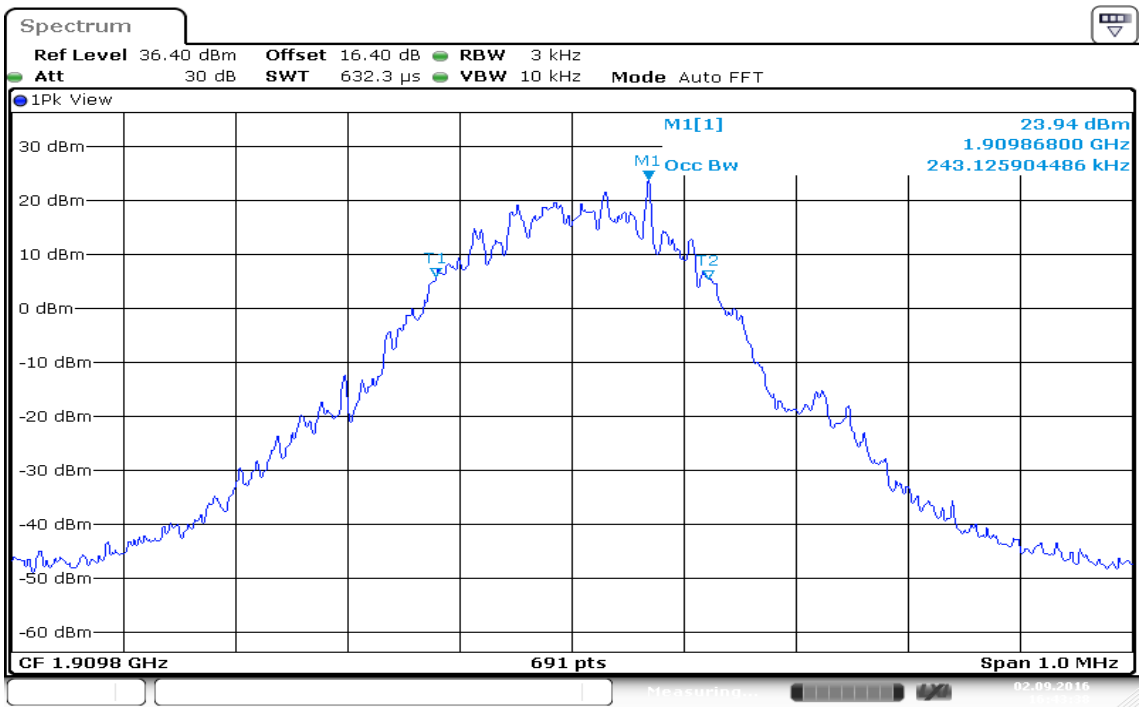
Date: 2.SEP.2016 16:40:07

GPRS 1900 (CH Mid)



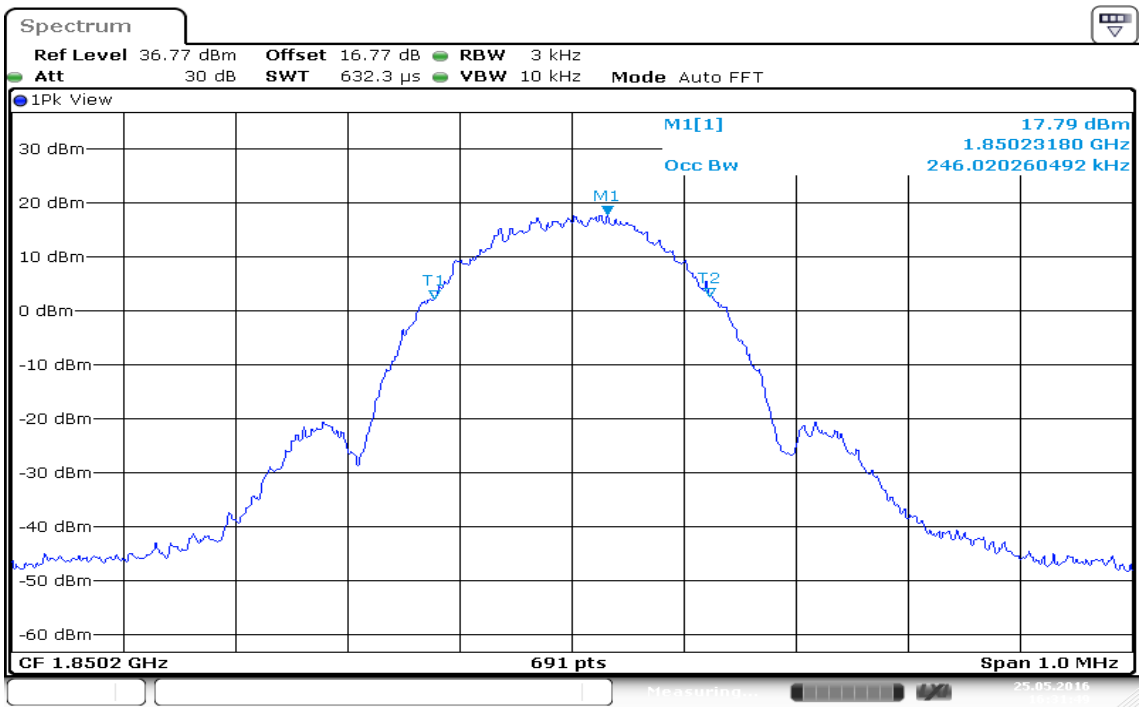
Date: 2.SEP.2016 16:42:38

GPRS 1900 (CH High)



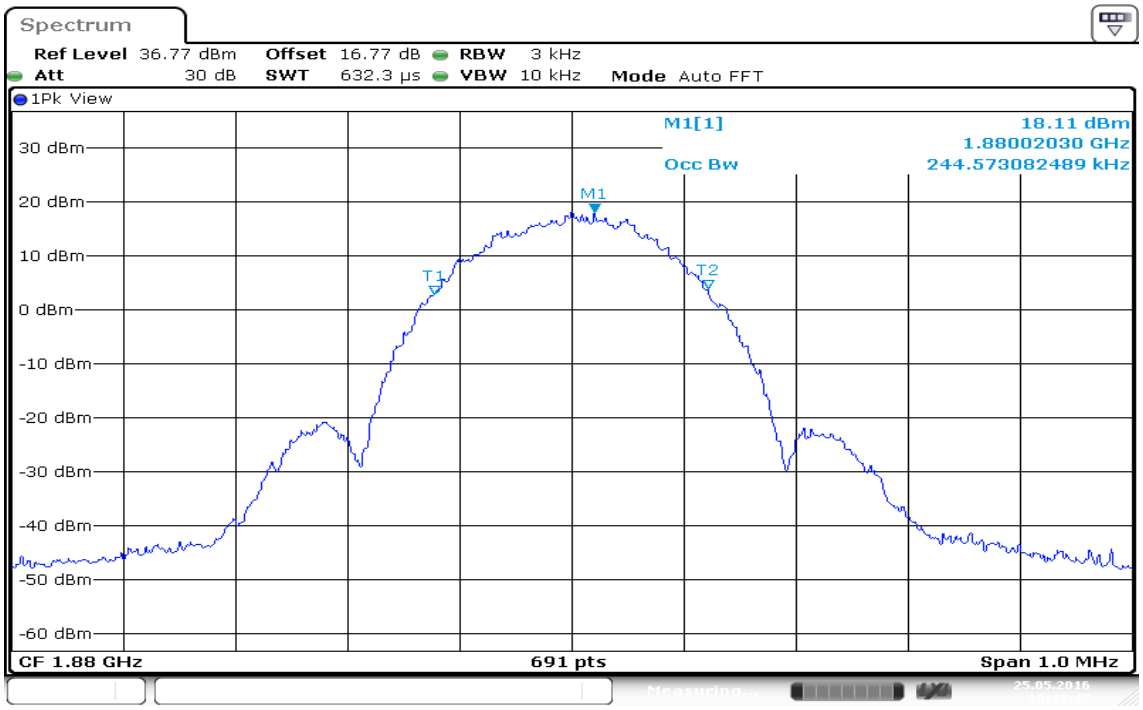
Date: 2.SEP.2016 16:43:39

EGPRS 1900 (CH Low)



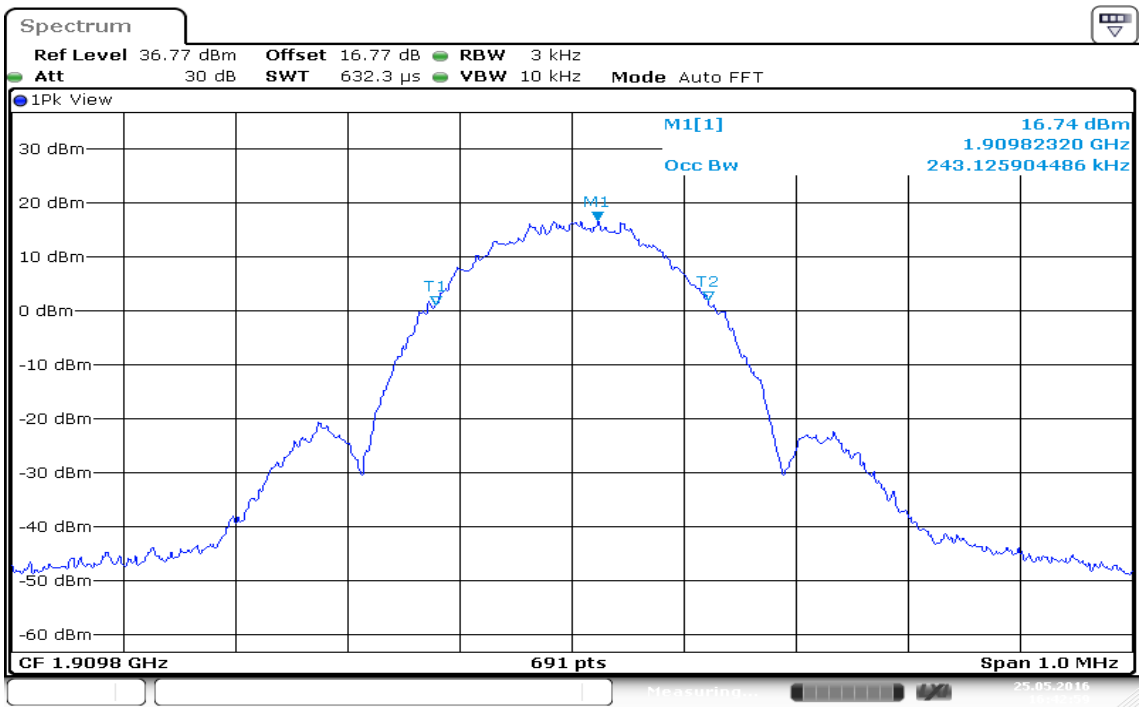
Date: 25.MAY.2016 16:31:50

EGPRS 1900 (CH Mid)



Date: 25.MAY.2016 16:41:46

EGPRS 1900 (CH High)



Date: 25.MAY.2016 16:42:58

7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

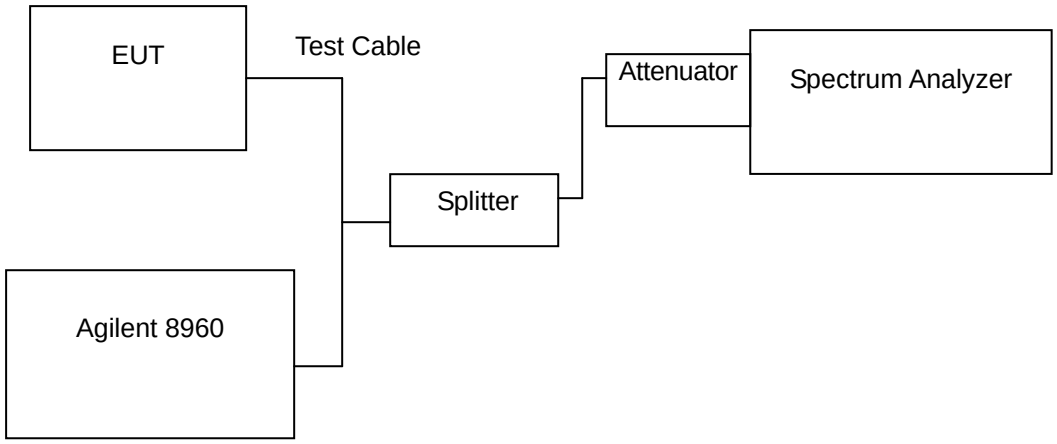
According to FCC §2.1051, FCC §22.917, FCC §24.238(a)

Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at lease 43 + 10 log P dB.

Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed –80 dBm at the transmit antenna connector.
Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at lease 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

Test Configuration

Out of band emission at antenna terminals:



TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW=1MHz, VBW=3MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

Band Edge Requirements (824 MHz and 849 MHz /1850MHz and 1910MHz): In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

TEST RESULTS

Pass.

Test Data

Mode	CH	Location	Description
GSM 850	128	Figure 7-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 7-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 7-3	Conducted spurious emissions, 30MHz - 20GHz
GPRS 850 (4Down1Up)	128	Figure 8-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 8-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 8-3	Conducted spurious emissions, 30MHz - 20GHz
EGPRS 850 (4Down1Up)	128	Figure 9-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 9-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 9-3	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
GSM 1900	512	Figure 10-1	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 10-2	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 10-3	Conducted spurious emissions, 30MHz - 20GHz
GPRS 1900 (4Down1Up)	512	Figure 11-1	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 11-2	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 11-3	Conducted spurious emissions, 30MHz - 20GHz
EGPRS 1900 (4Down1Up)	512	Figure 12-1	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 12-2	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 12-3	Conducted spurious emissions, 30MHz - 20GHz

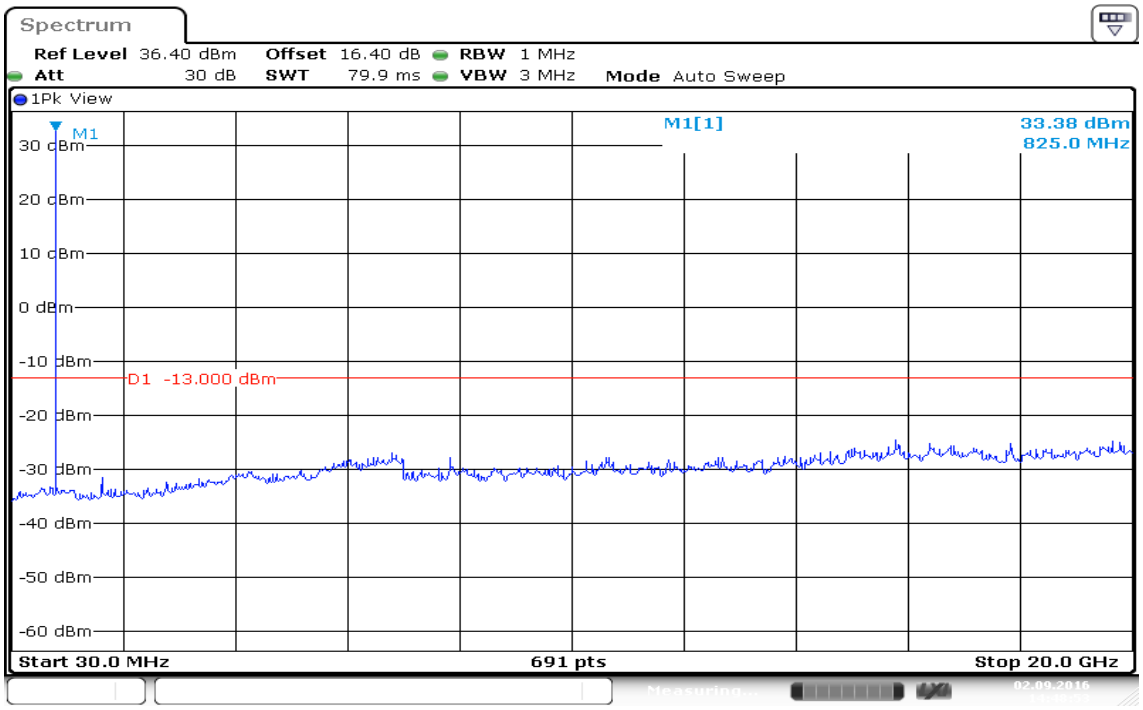
Mode	CH	Location	Description
GSM 850	128	Figure 13-1	Band Edge emissions
	251	Figure 13-2	Band Edge emissions
GPRS 850 (4Down1Up)	128	Figure 14-1	Band Edge emissions
	251	Figure 14-2	Band Edge emissions
EGPRS 850 (4Down1Up)	128	Figure 15-1	Band Edge emissions
	251	Figure 15-2	Band Edge emissions

Mode	CH	Location	Description
GSM 1900	512	Figure 16-1	Band Edge emissions
	810	Figure 16-2	Band Edge emissions
GPRS 1900 (4Down1Up)	512	Figure 17-1	Band Edge emissions
	810	Figure 17-2	Band Edge emissions
EGPRS 1900 (4Down1Up)	512	Figure 18-1	Band Edge emissions
	810	Figure 18-2	Band Edge emissions

Test Plot

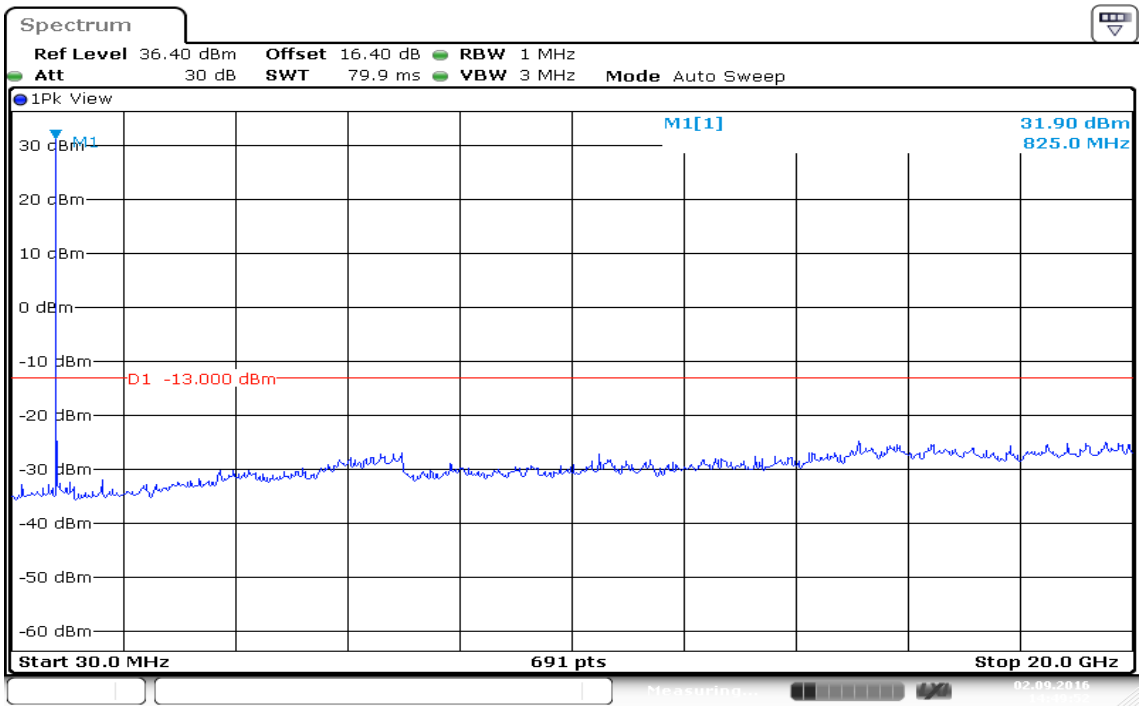
GSM 850

Figure 7-1: Out of Band emission at antenna terminals – GSM CH Low



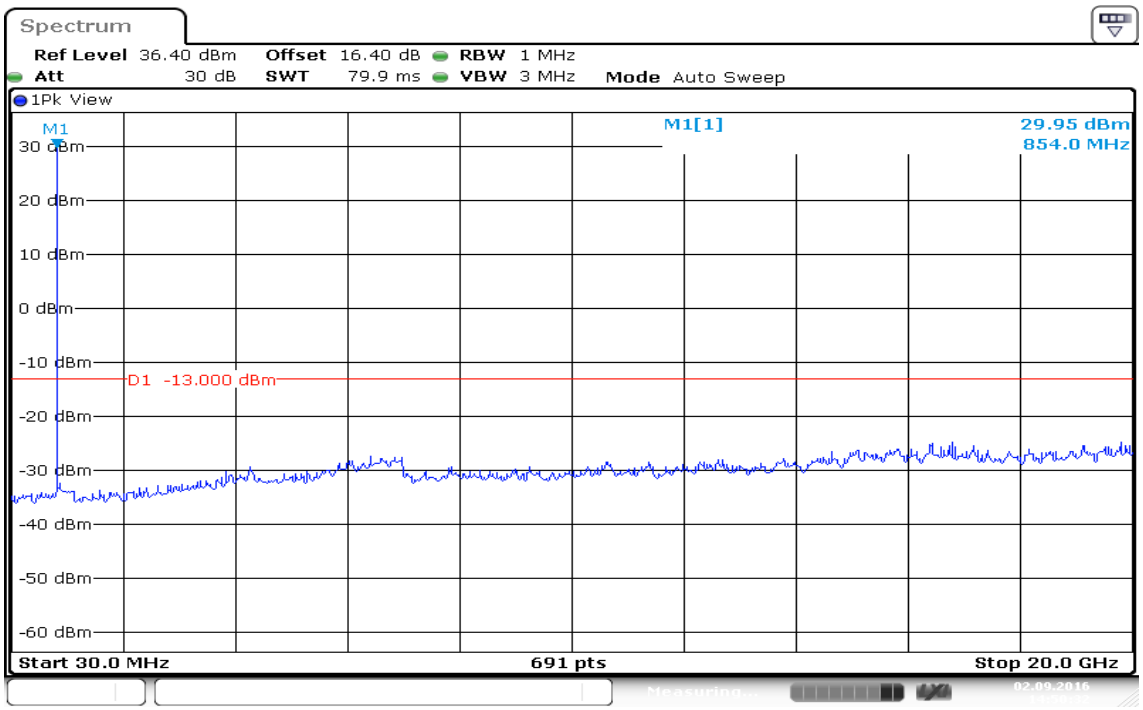
Date: 2.SEP.2016 14:48:53

Figure 7-2: Out of Band emission at antenna terminals – GSM CH Mid



Date: 2.SEP.2016 14:49:52

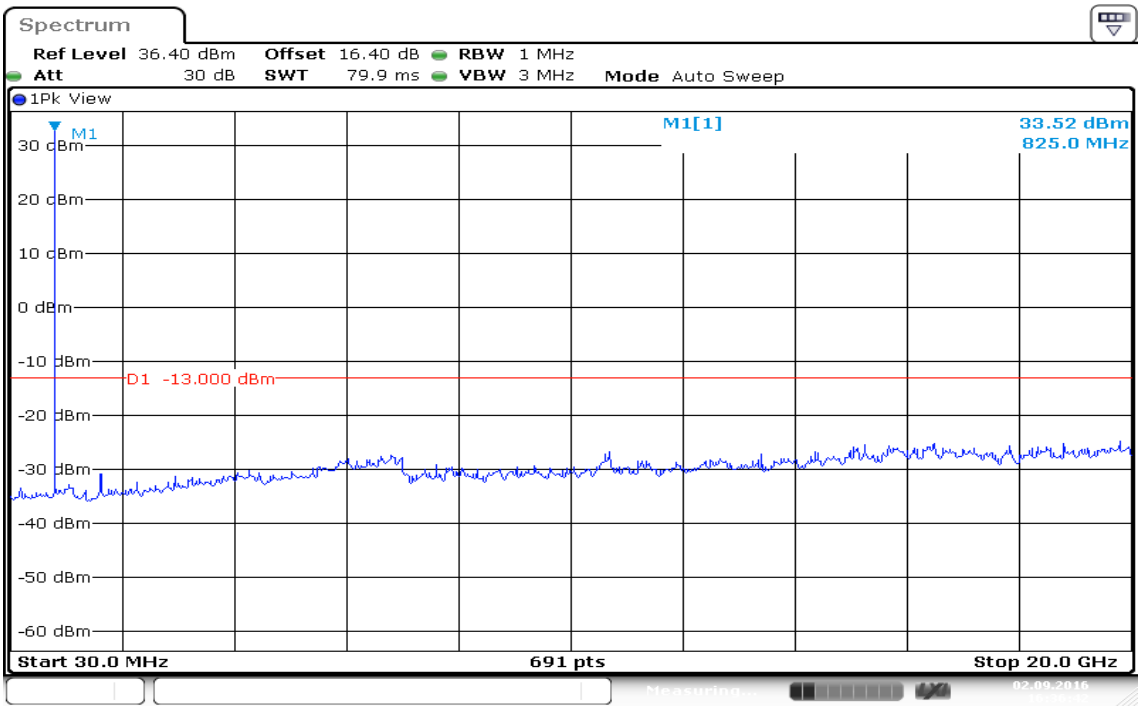
Figure 7-3: Out of Band emission at antenna terminals – GSM CH High



Date: 2.SEP.2016 14:50:33

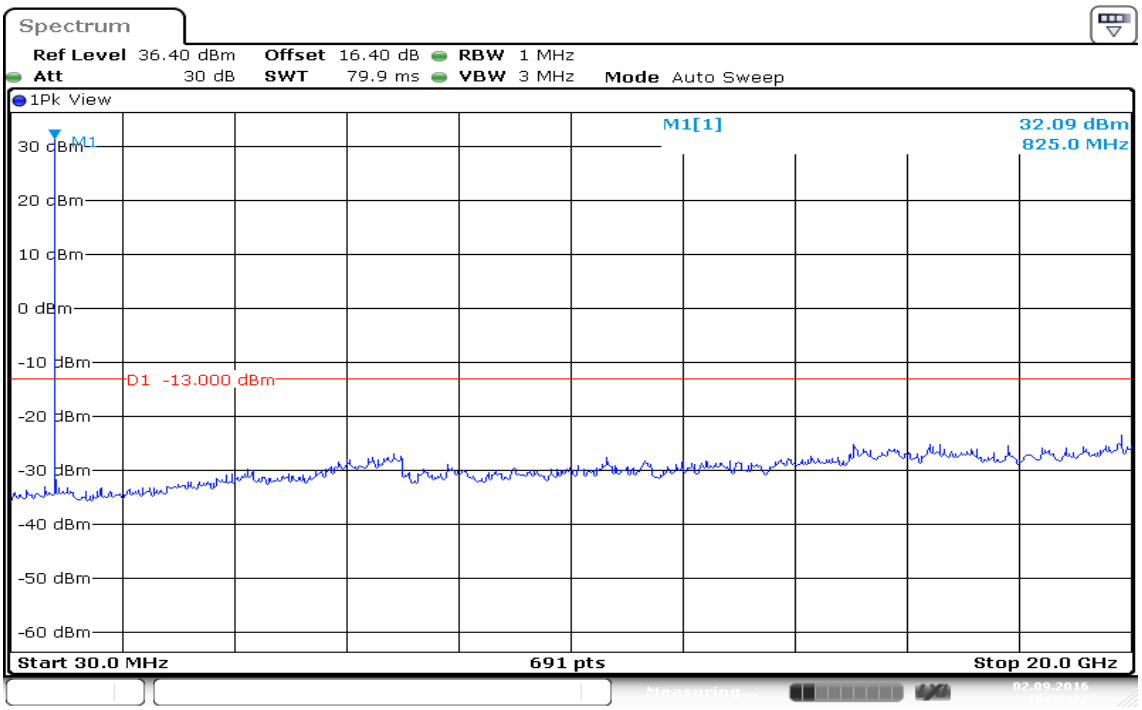
GPRS 850

Figure 8-1: Out of Band emission at antenna terminals – GPRS CH Low



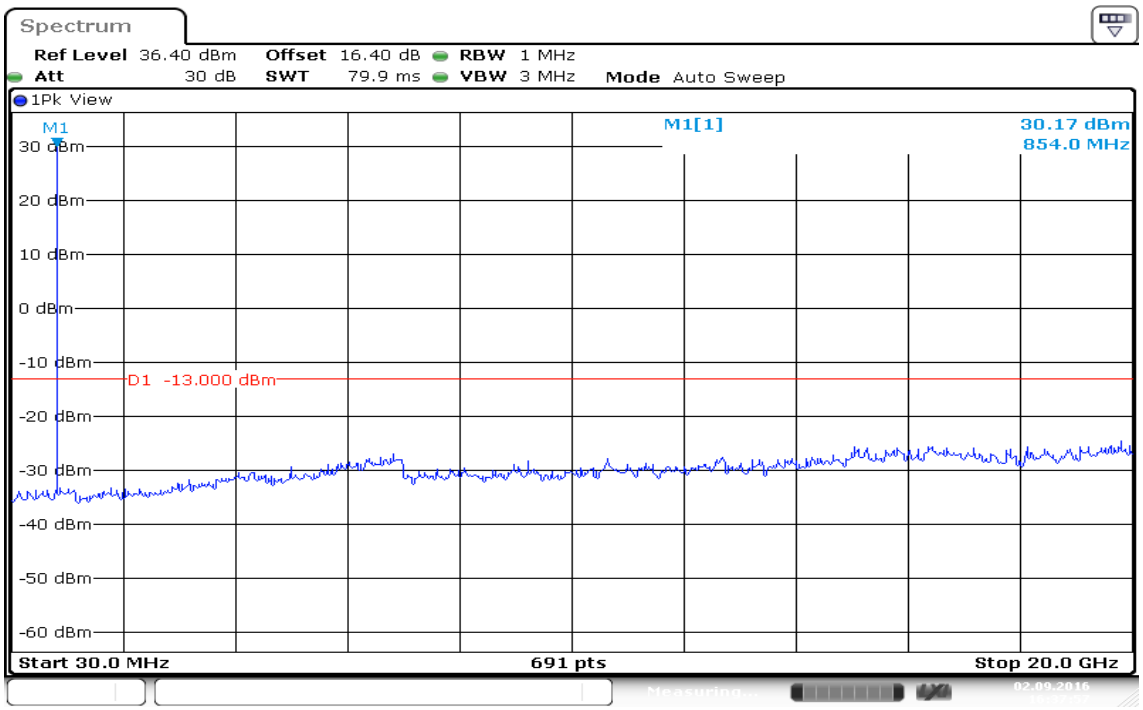
Date: 2.SEP.2016 16:36:43

Figure 8-2: Out of Band emission at antenna terminals – GPRS CH Mid



Date: 2.SEP.2016 16:37:22

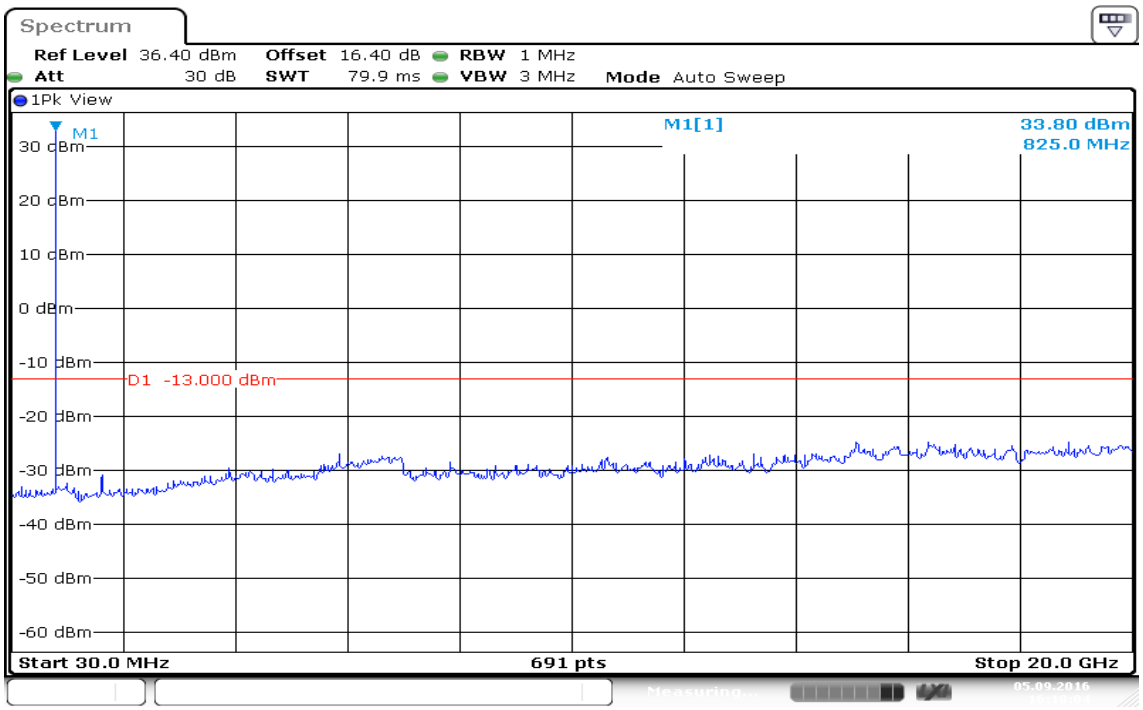
Figure 8-3: Out of Band emission at antenna terminals –GPRS CH High



Date: 2.SEP.2016 16:37:58

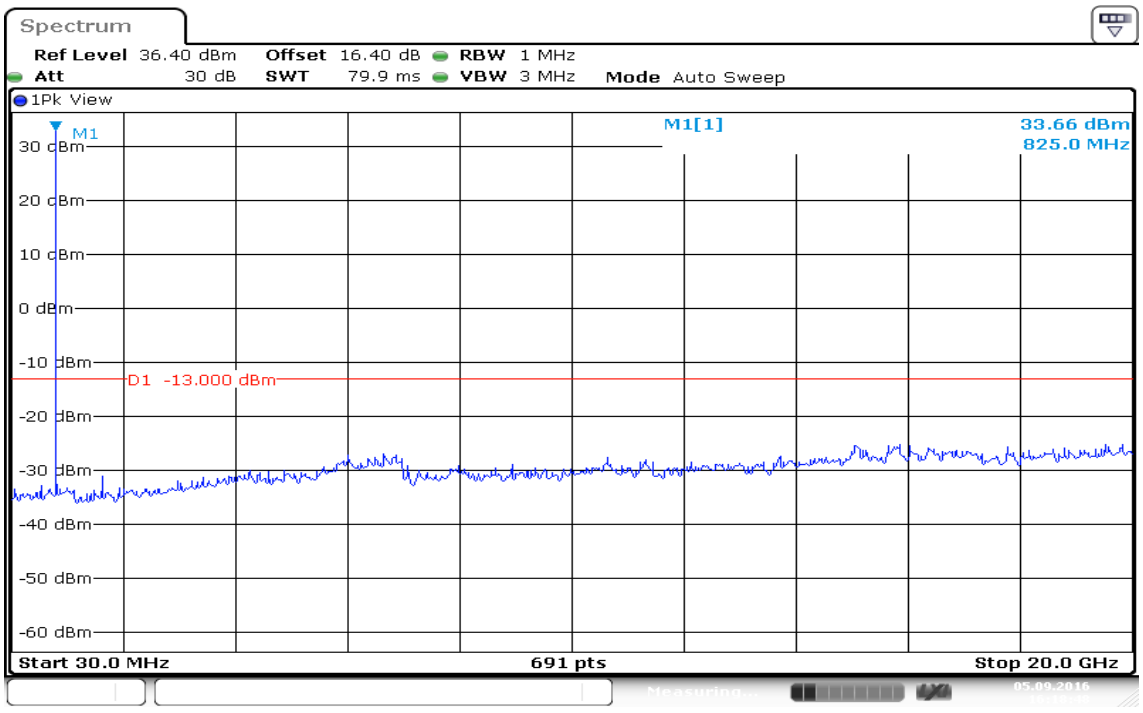
EGPRS 850

Figure 9-1: Out of Band emission at antenna terminals –EGPRS CH Low



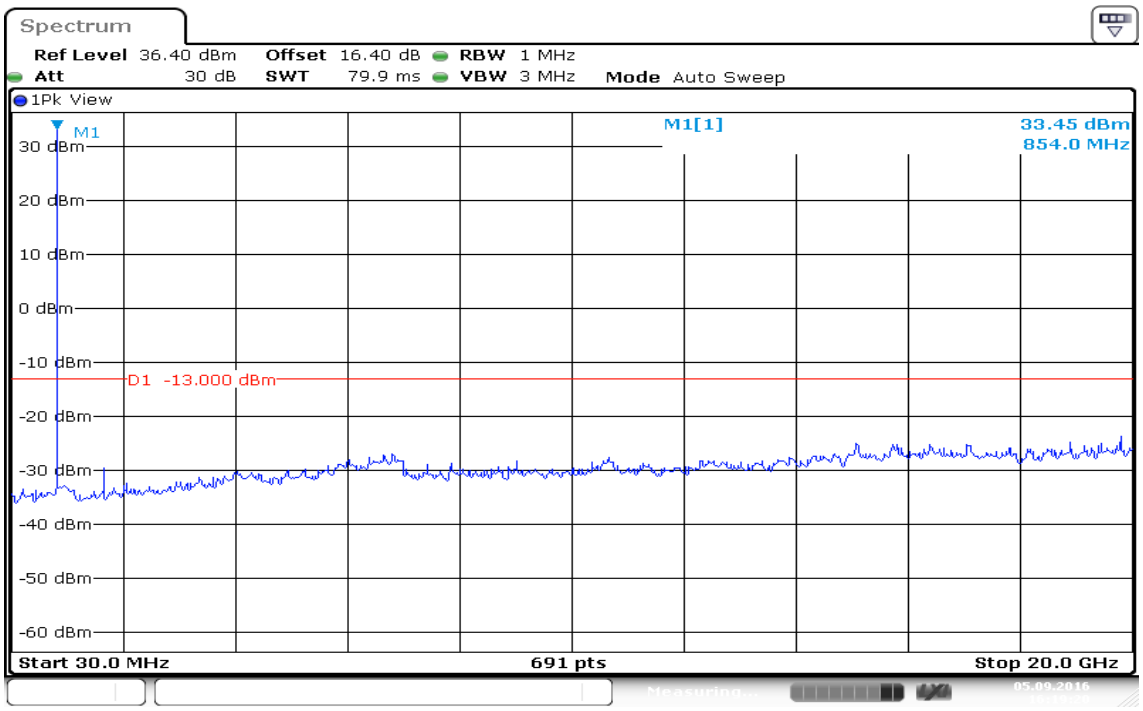
Date: 5.SEP.2016 16:18:04

Figure 9-2: Out of Band emission at antenna terminals –EGPRS CH Mid



Date: 5.SEP.2016 16:18:49

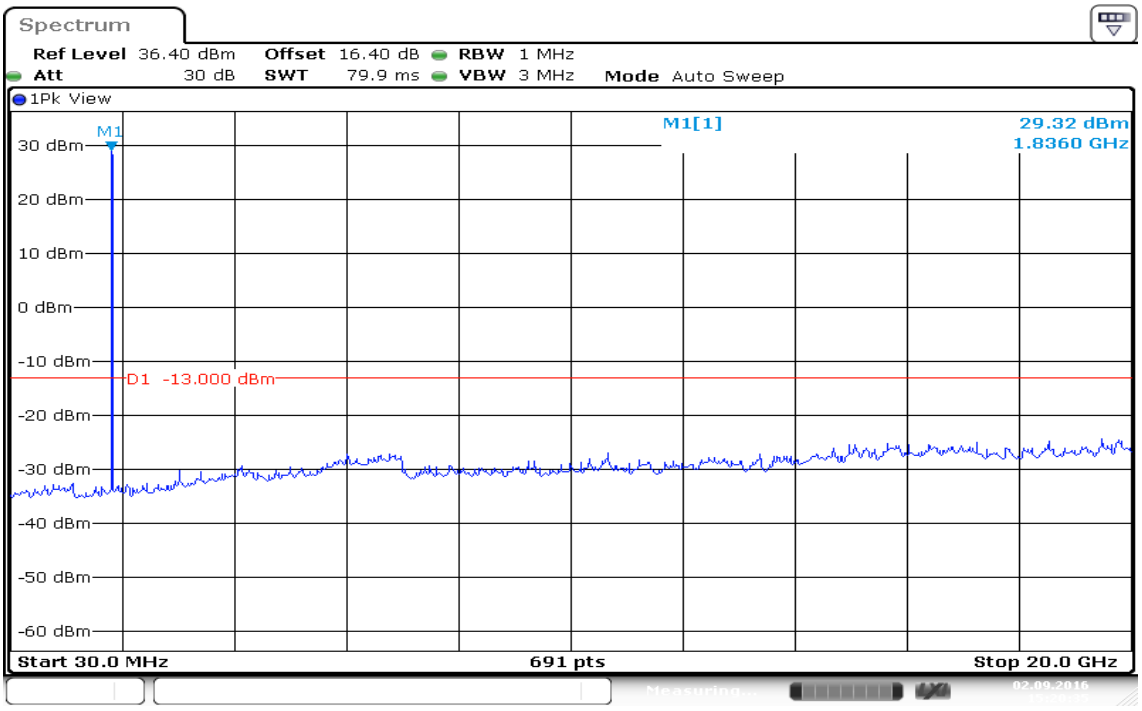
Figure 9-3: Out of Band emission at antenna terminals –EGPRS CH High



Date: 5.SEP.2016 16:19:20

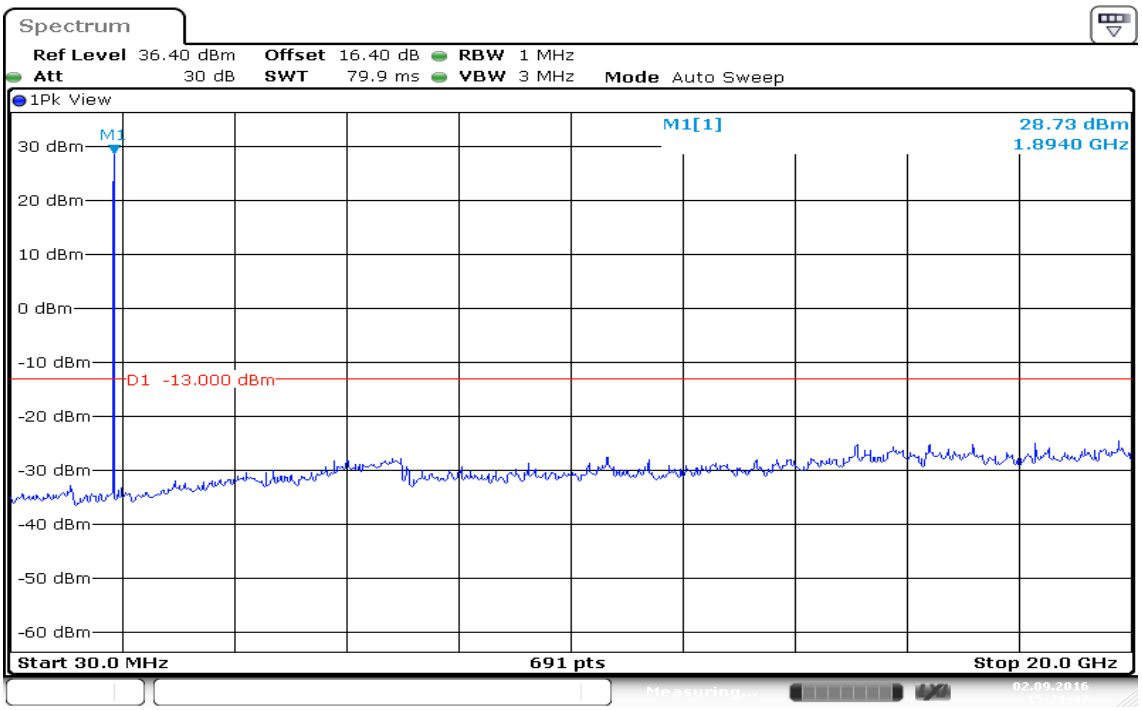
GSM 1900

Figure 10-1: Out of Band emission at antenna terminals – GSM CH Low



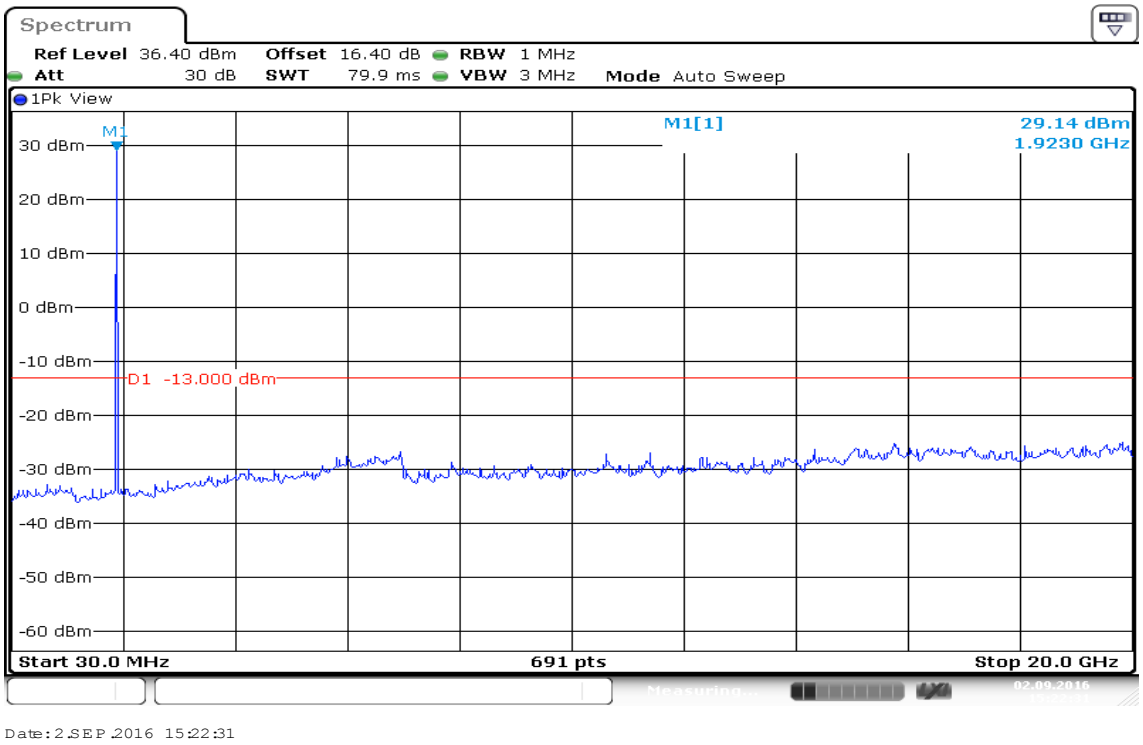
Date: 2.SEP.2016 15:20:36

Figure 10-2: Out of Band emission at antenna terminals – GSM CH Mid



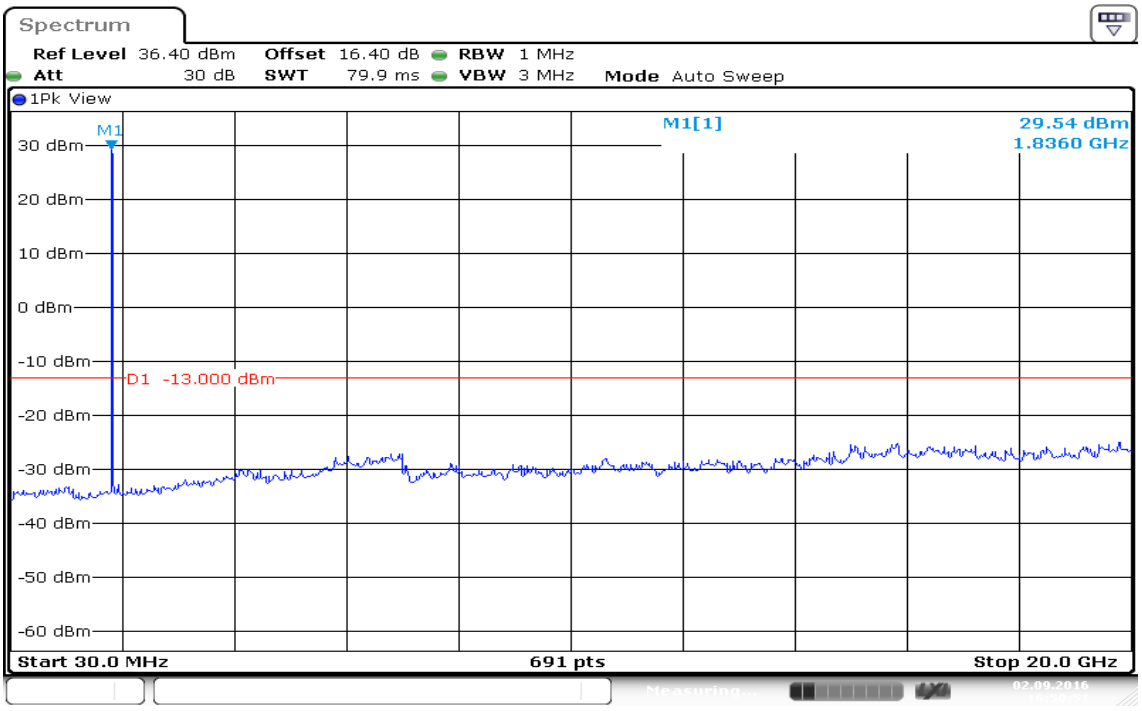
Date: 2.SEP.2016 15:21:47

Figure 10-3: Out of Band emission at antenna terminals – GSM CH High



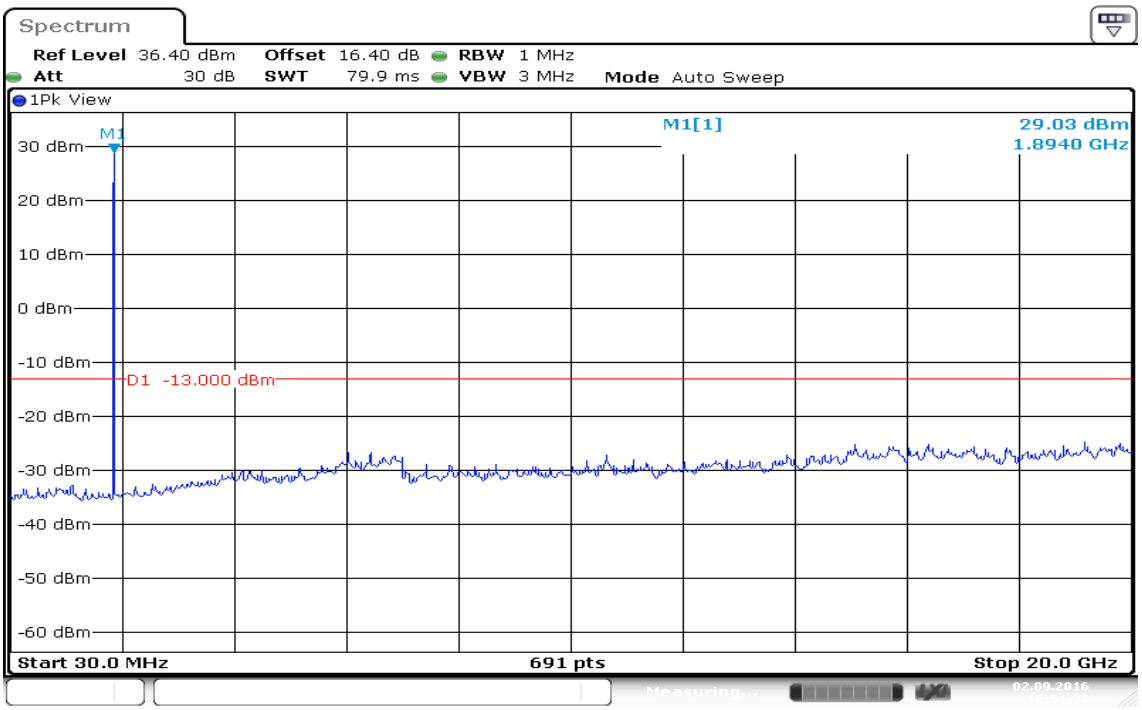
GPRS 1900

Figure 11-1: Out of Band emission at antenna terminals – GSM CH Low



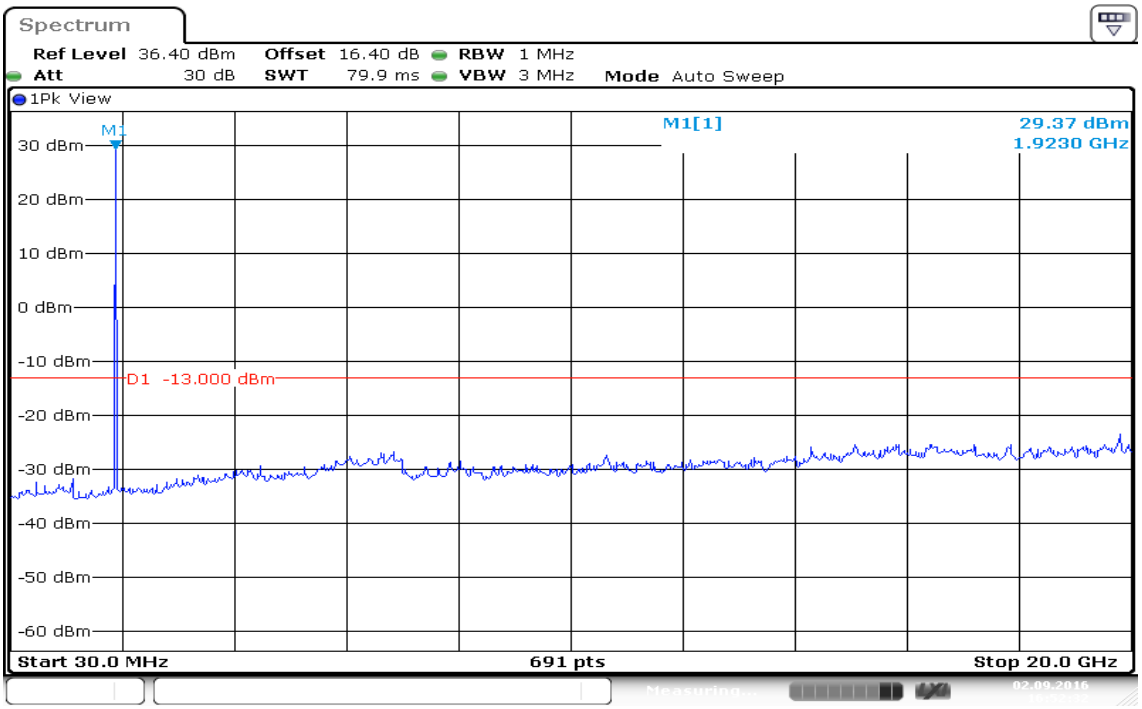
Date: 2.SEP.2016 16:50:52

Figure 11-2: Out of Band emission at antenna terminals – GSM CH Mid



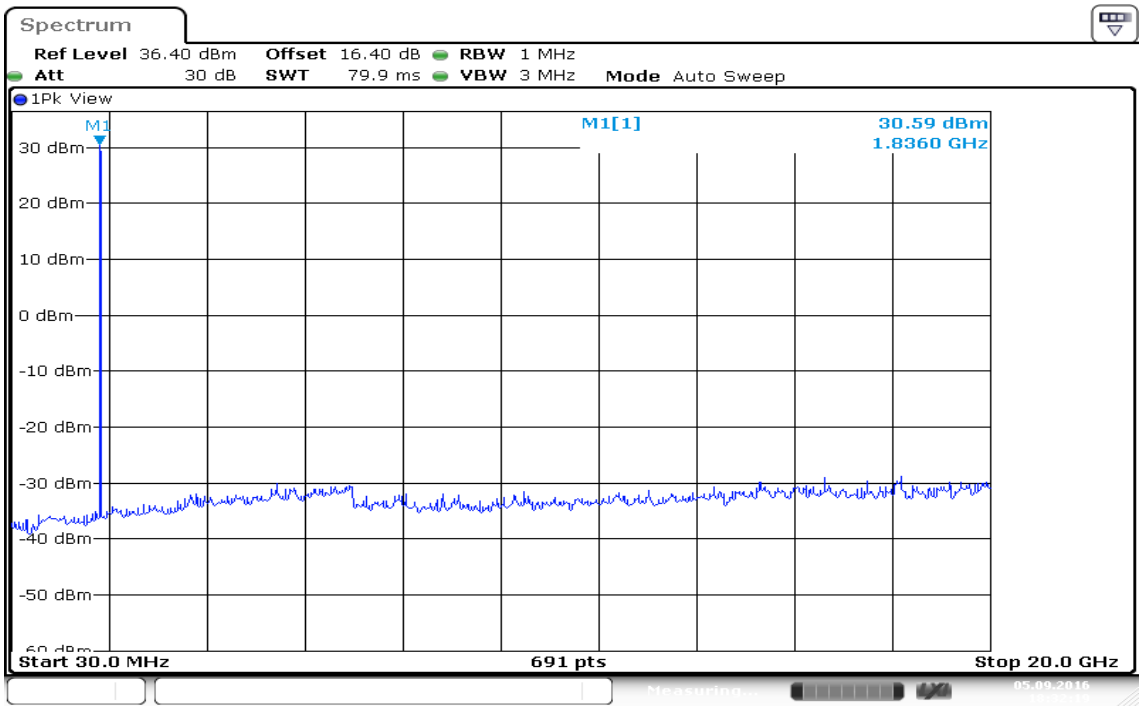
Date: 2.SEP.2016 16:51:38

Figure 11-3: Out of Band emission at antenna terminals – GSM CH High



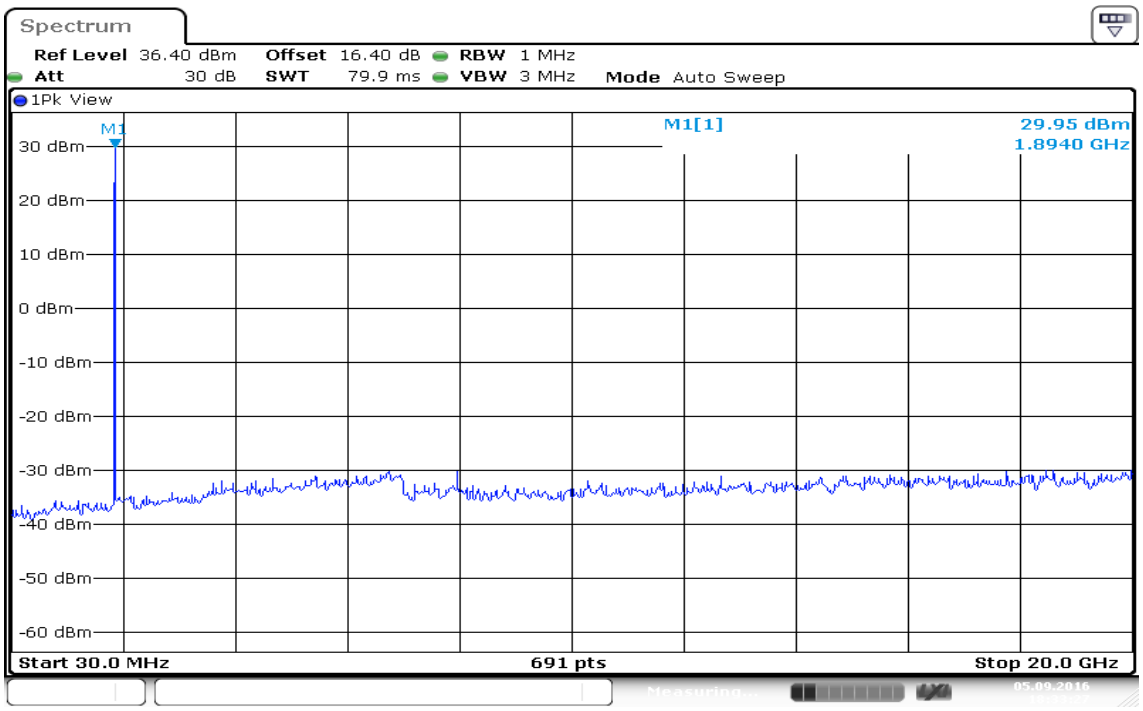
EGPRS 1900

Figure 12-1: Out of Band emission at antenna terminals –EGPRS CH Low



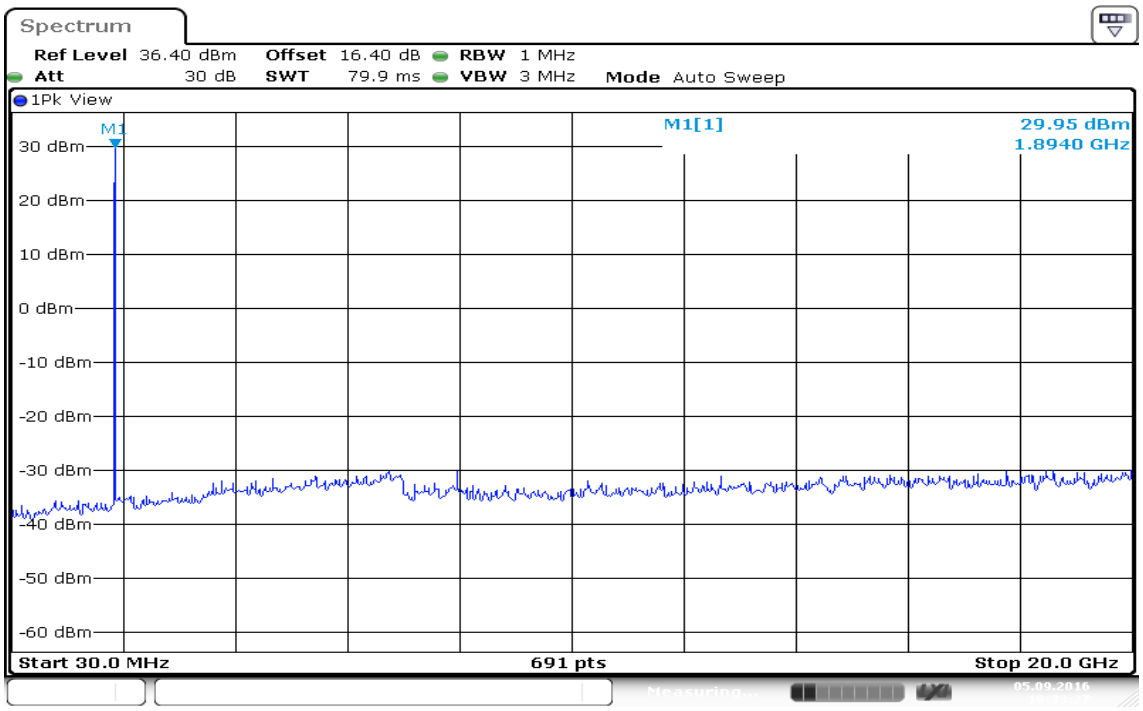
Date: 5.SEP.2016 18:32:19

Figure 12-2: Out of Band emission at antenna terminals –EGPRS CH Mid



Date: 5.SEP.2016 18:33:27

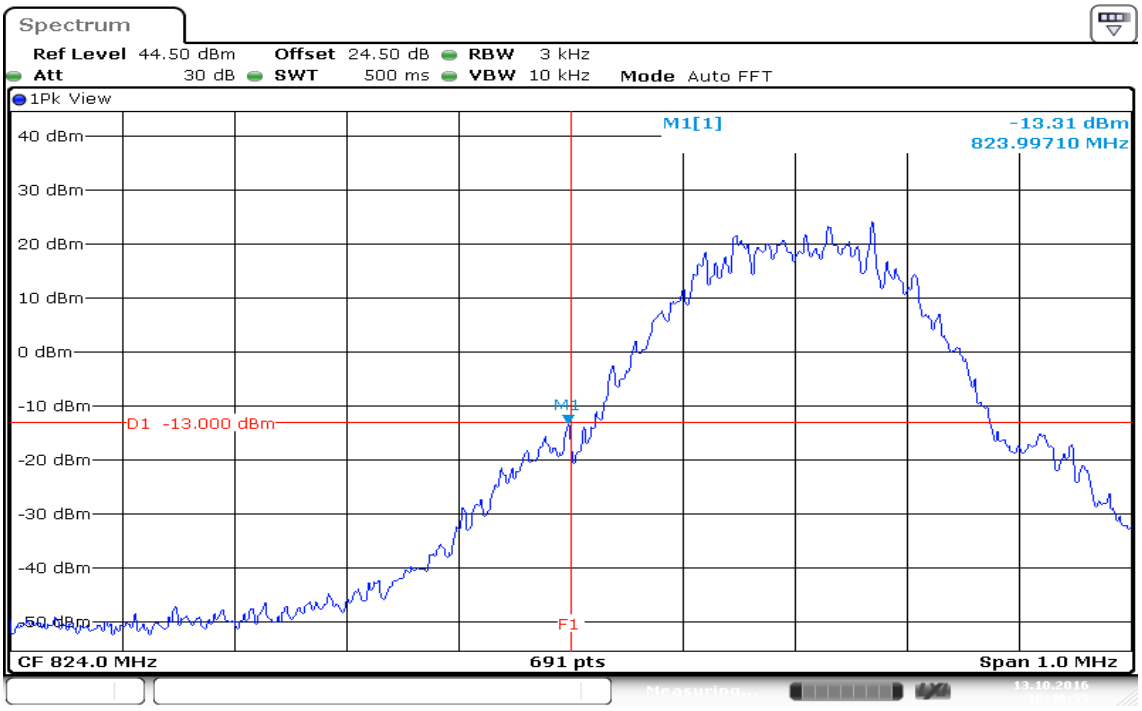
Figure 12-3: Out of Band emission at antenna terminals –EGPRS CH High



Date: 5.SEP.2016 18:33:27

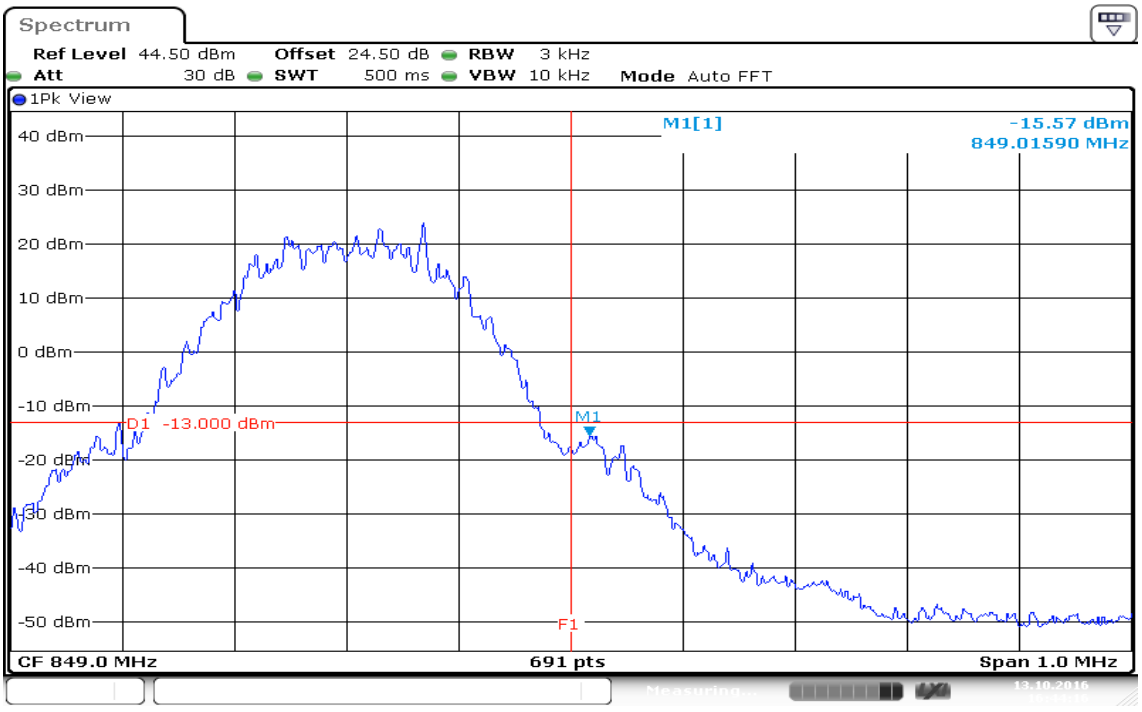
GSM 850

Figure 13-1: Band Edge emissions – GSM CH Low



Date: 13.OCT.2016 16:40:54

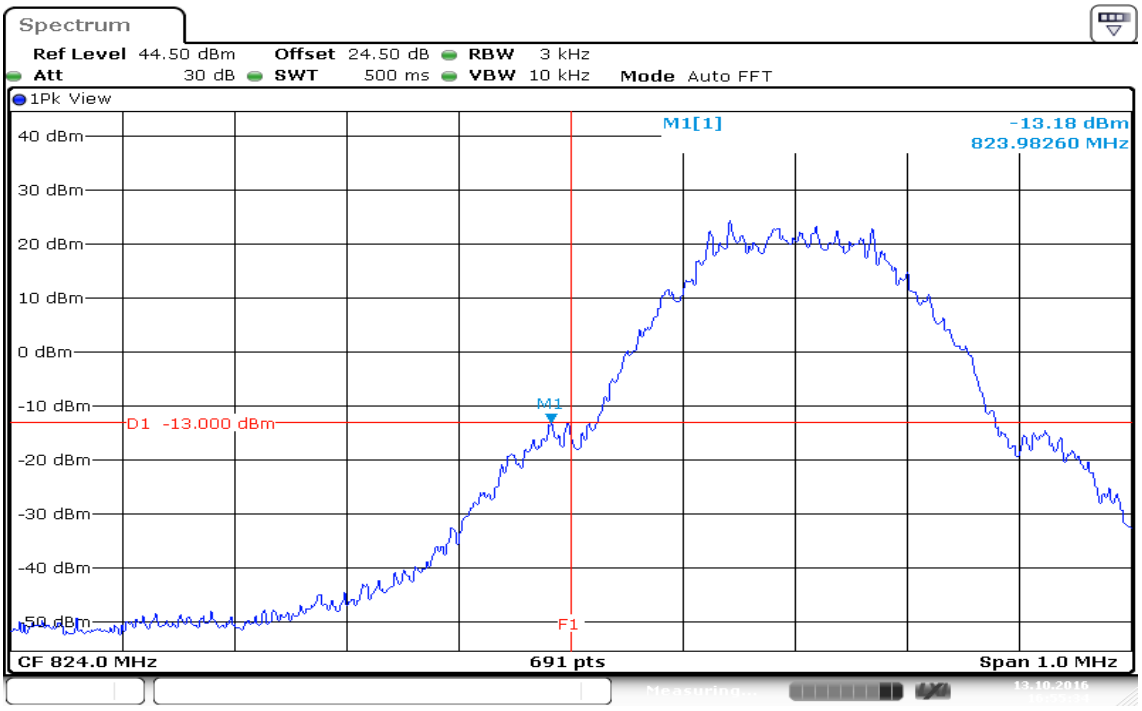
Figure 13-2: Band Edge emissions – GSM CH High



Date: 13.OCT.2016 16:44:16

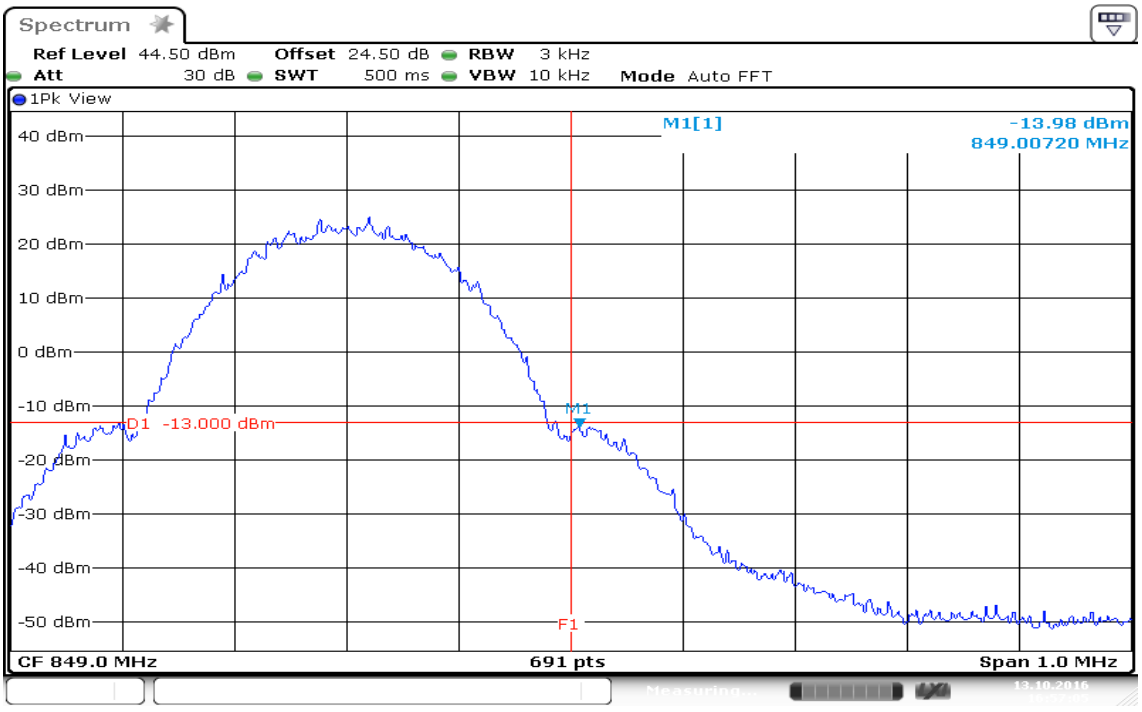
GPRS 850

Figure 14-1: Band Edge emissions – GPRS CH Low



Date: 13.OCT.2016 16:55:34

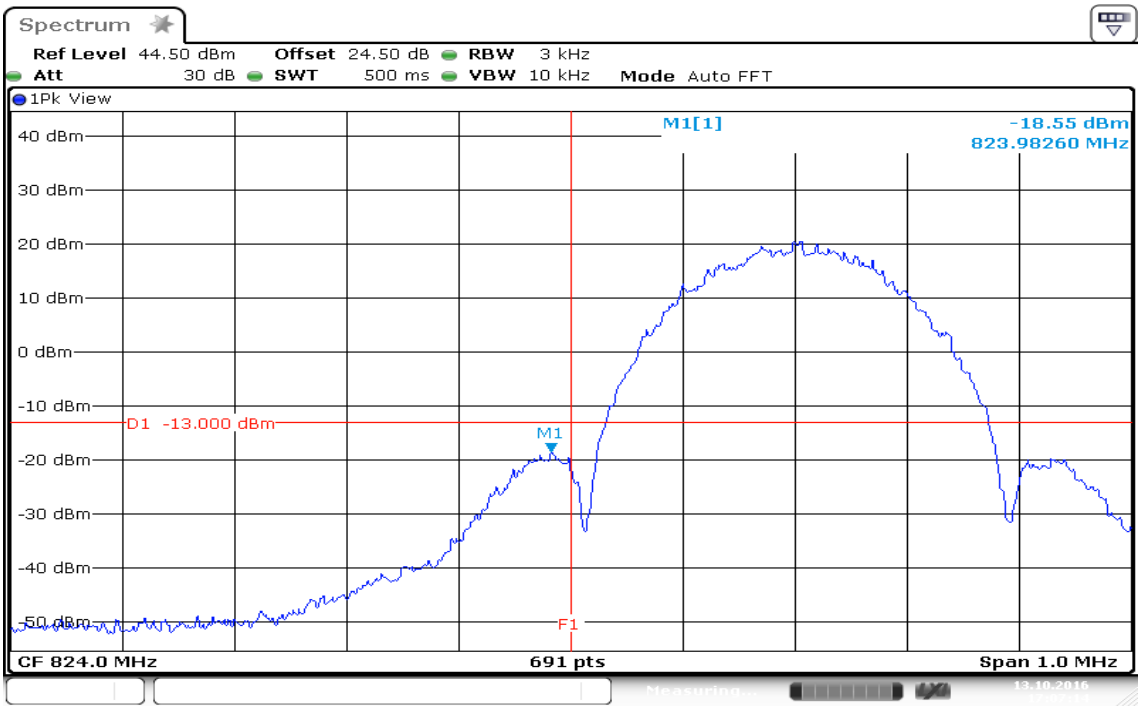
Figure 14-2: Band Edge emissions –GPRS CH High



Date: 13.OCT.2016 16:57:05

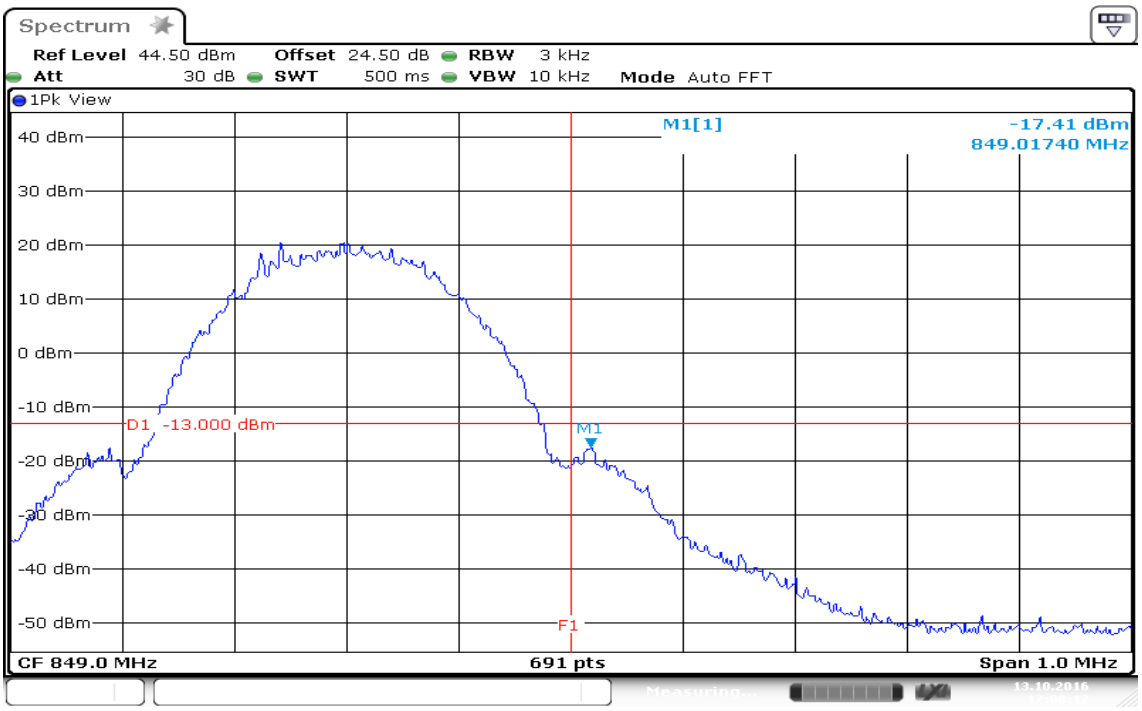
EGPRS 850

Figure 15-1: Band Edge emissions –EGPRS CH Low



Date: 13.OCT.2016 17:07:14

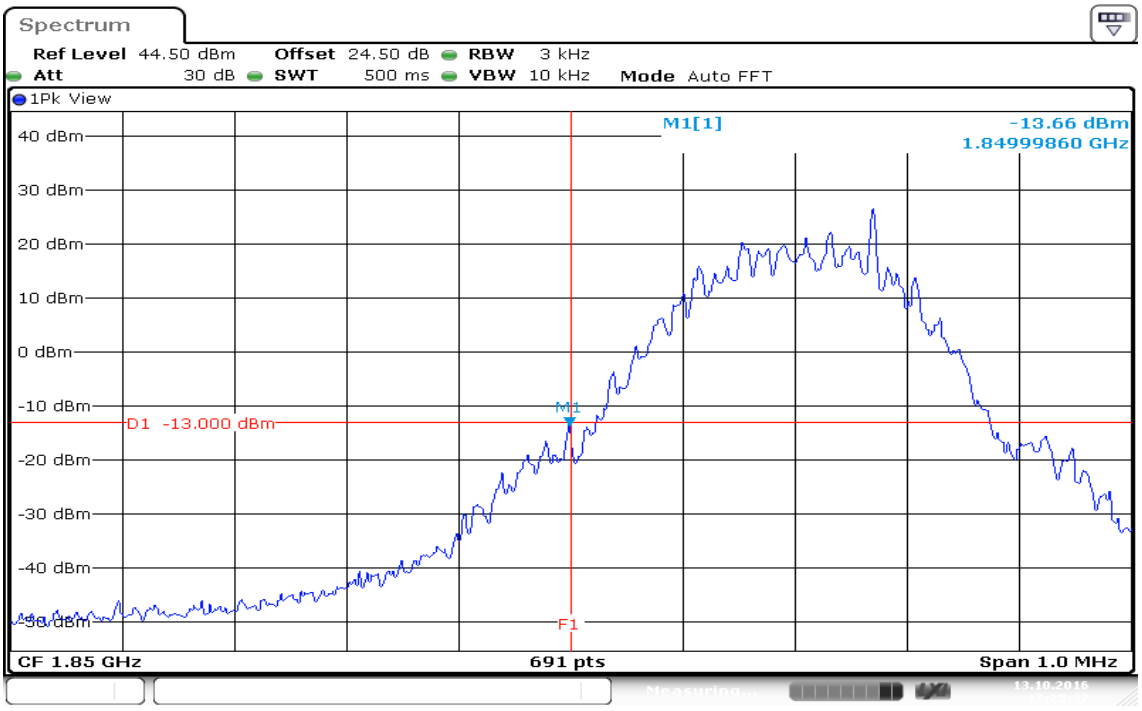
Figure 15-2: Band Edge emissions –EGPRS CH High



Date: 13.OCT.2016 17:08:12

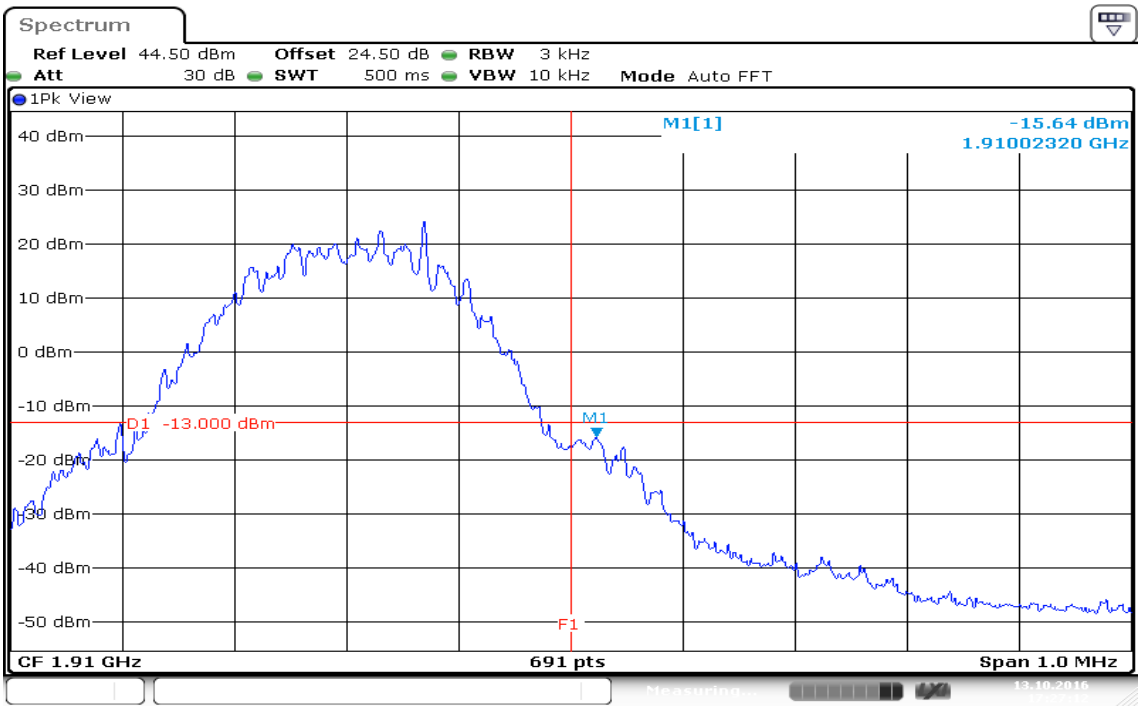
GSM 1900

Figure 16-1: Band Edge emissions – GSM CH Low



Date: 13.OCT.2016 17:25:37

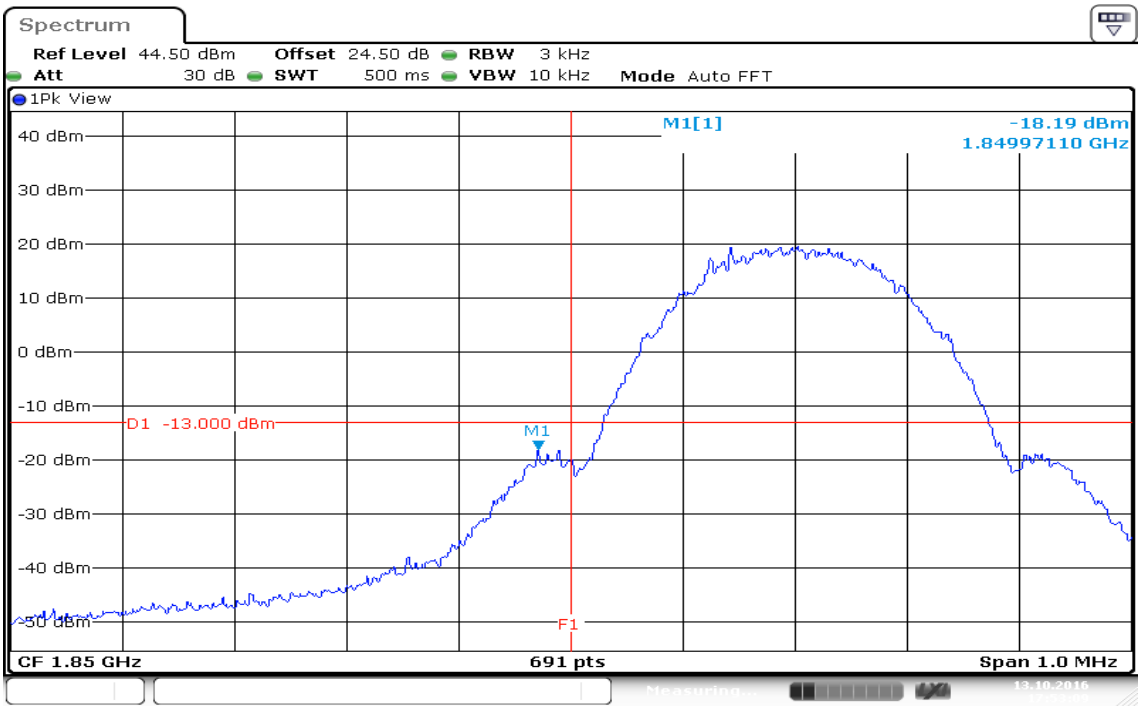
Figure 16-2: Band Edge emissions – GSM CH High



Date: 13.OCT.2016 17:27:12

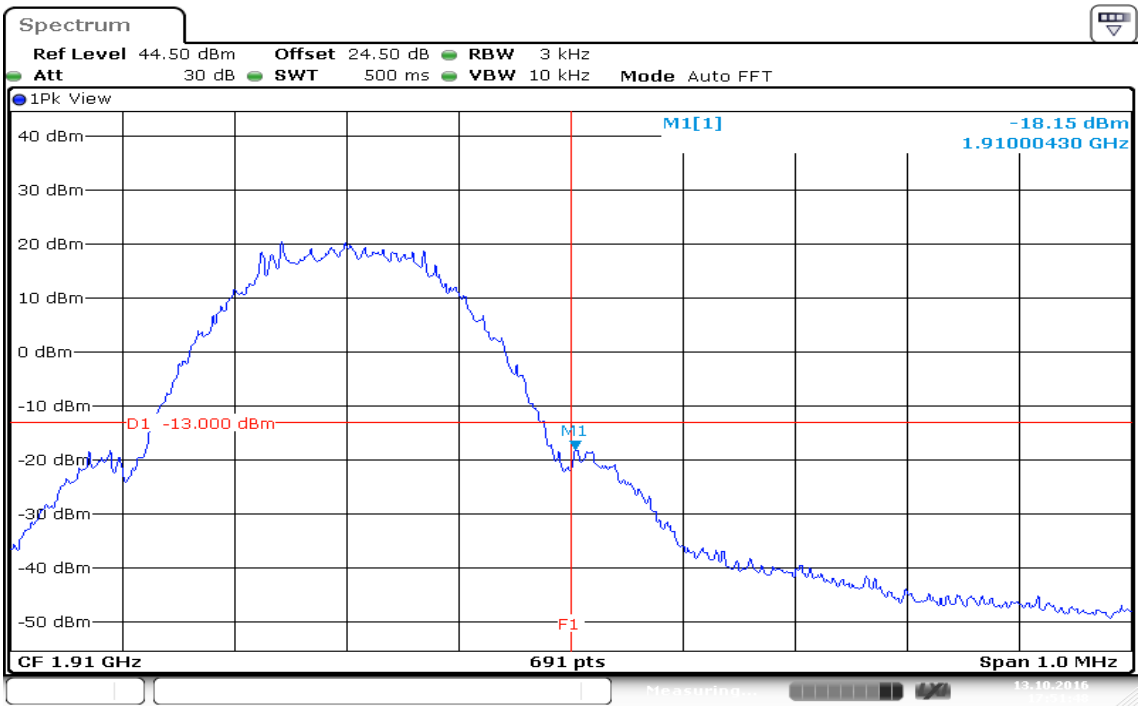
GPRS 1900

Figure 17-1: Band Edge emissions – GPRS CH Low



Date: 13.OCT.2016 17:53:09

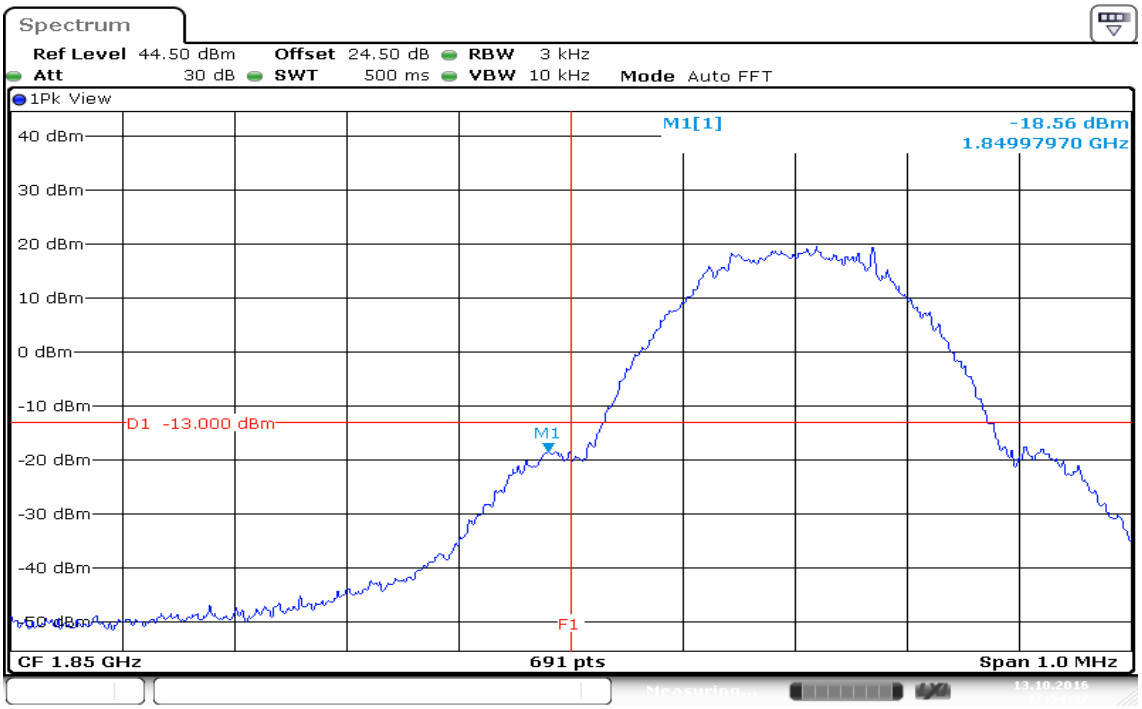
Figure 17-2: Band Edge emissions – GPRS CH High



Date: 13.OCT.2016 17:51:48

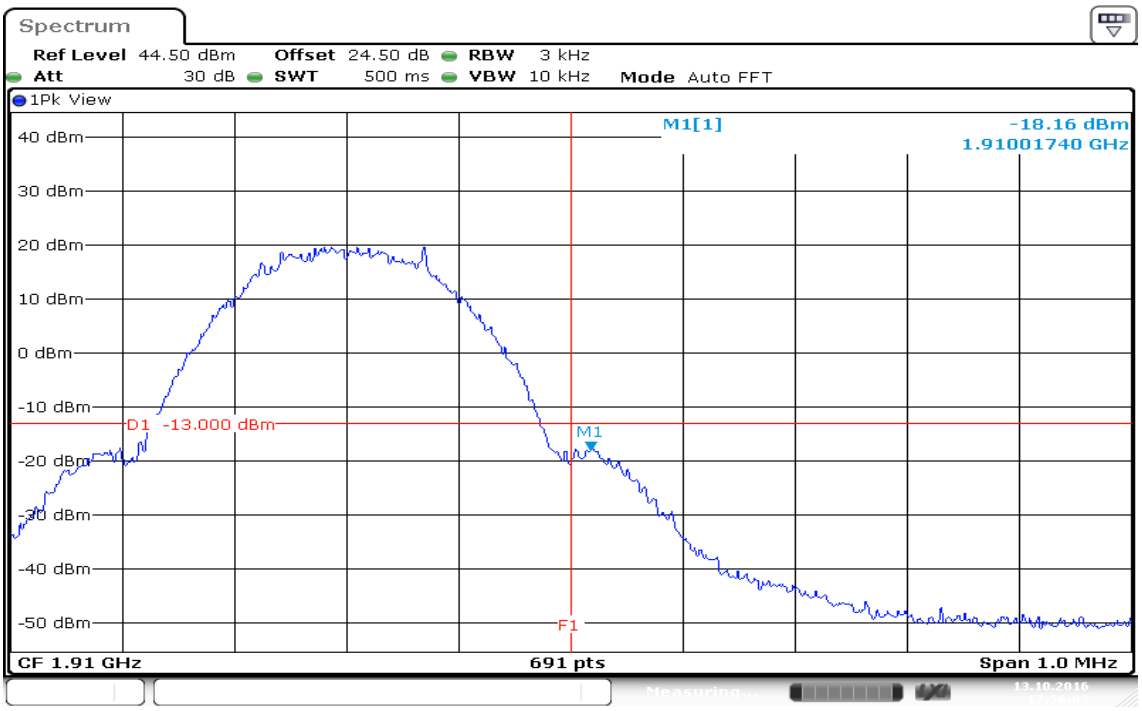
EGPRS 1900

Figure 18-1: Band Edge emissions –EGPRS CH Low



Date: 13.OCT.2016 17:54:37

Figure 18-2: Band Edge emissions –EGPRS CH High



Date: 13.OCT.2016 17:56:02

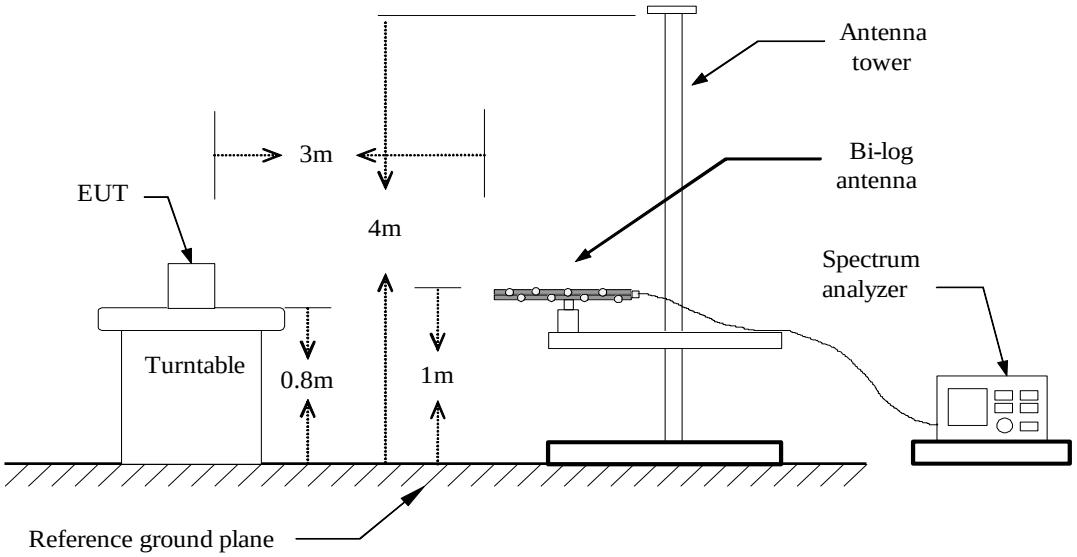
7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

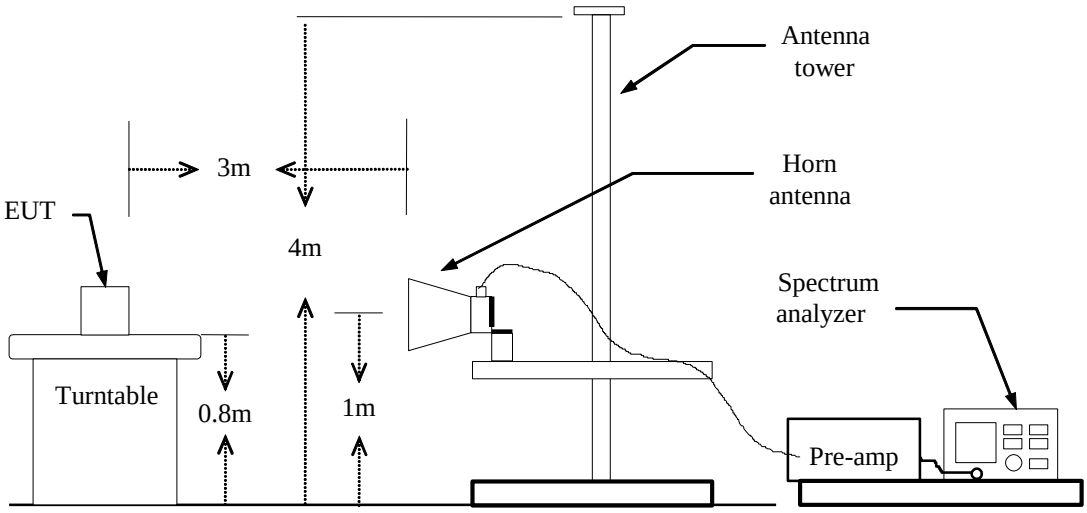
According to FCC §2.1053.

Test Configuration

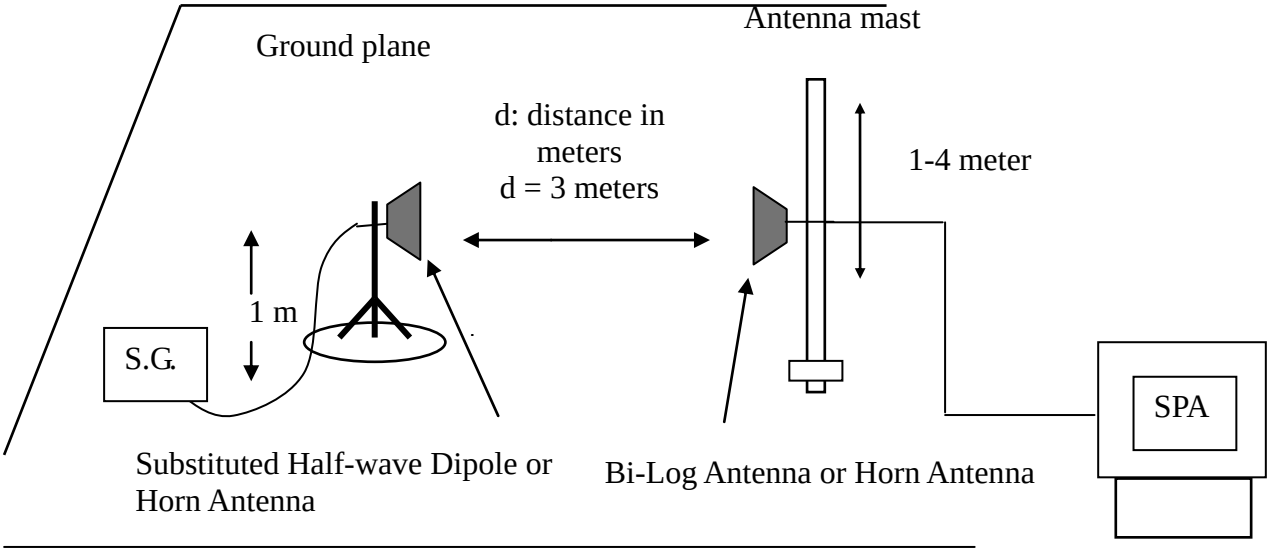
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)

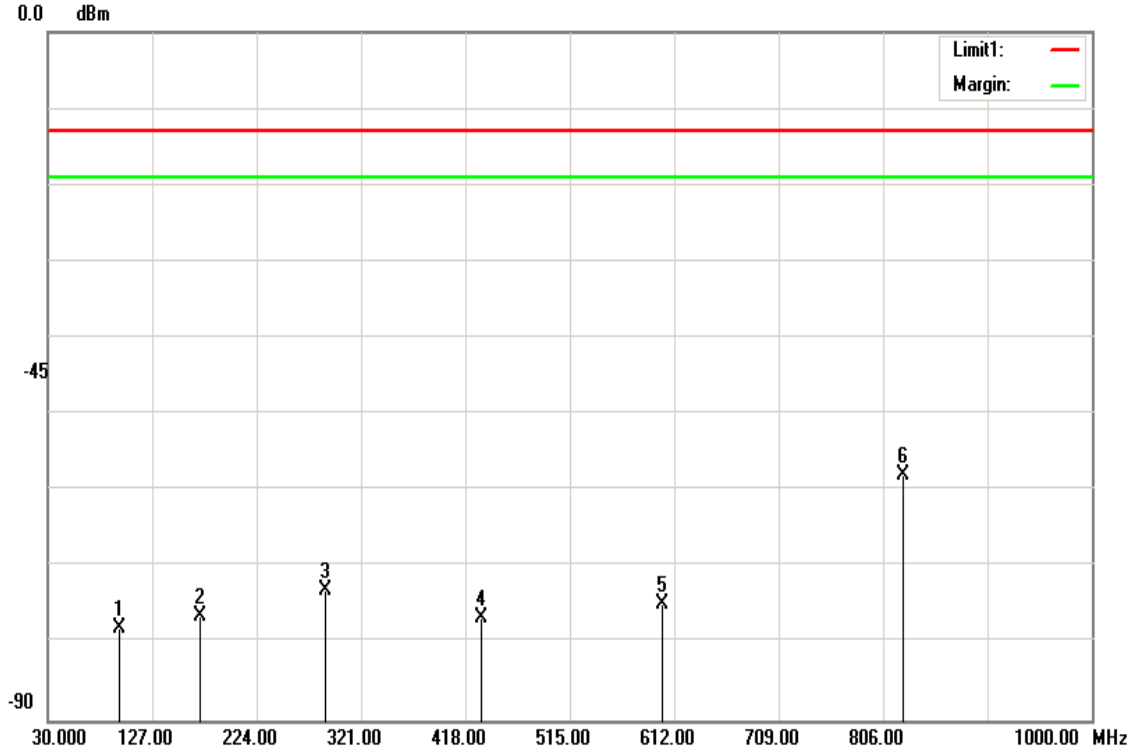
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

Refer to the attached tabular data sheets.

Radiated Spurious Emission Measurement Result / Below 1GHz

Operation Mode:	GSM 850 / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

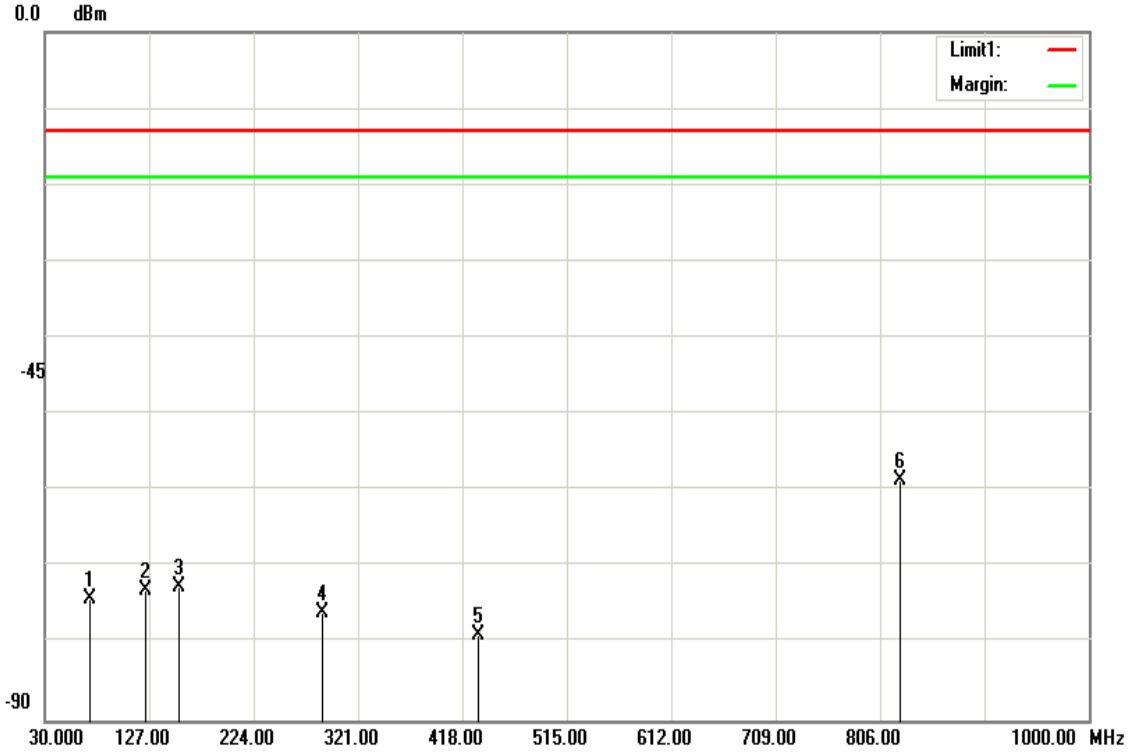


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
96.9300	-91.58	1.06	14.73	-77.91	-13.00	-64.91	V
171.6200	-92.1	1.4	17.14	-76.36	-13.00	-63.36	V
288.0200	-90.24	1.79	18.92	-73.11	-13.00	-60.11	V
432.5500	-96.54	2.19	22.02	-76.71	-13.00	-63.71	V
600.3600	-96.58	2.59	24.41	-74.76	-13.00	-61.76	V
824.4300	-82.44	3.03	27.44	-58.03	-13.00	-45.03	V

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

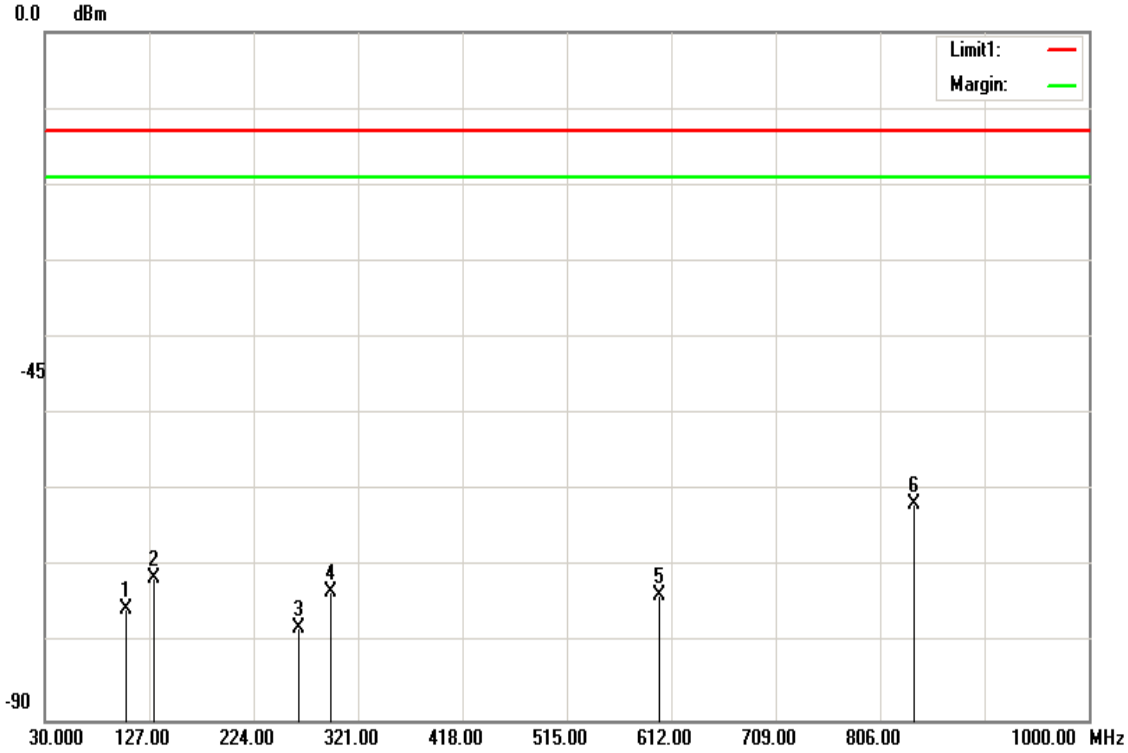


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
71.7100	-86.55	0.92	13.3	-74.17	-13.00	-61.17	H
123.1200	-90.9	1.24	19.13	-73.01	-13.00	-60.01	H
155.1300	-89.15	1.34	17.95	-72.54	-13.00	-59.54	H
288.0200	-93.13	1.79	18.92	-76.00	-13.00	-63.00	H
432.5500	-98.61	2.19	22.02	-78.78	-13.00	-65.78	H
824.4300	-82.98	3.03	27.44	-58.57	-13.00	-45.57	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

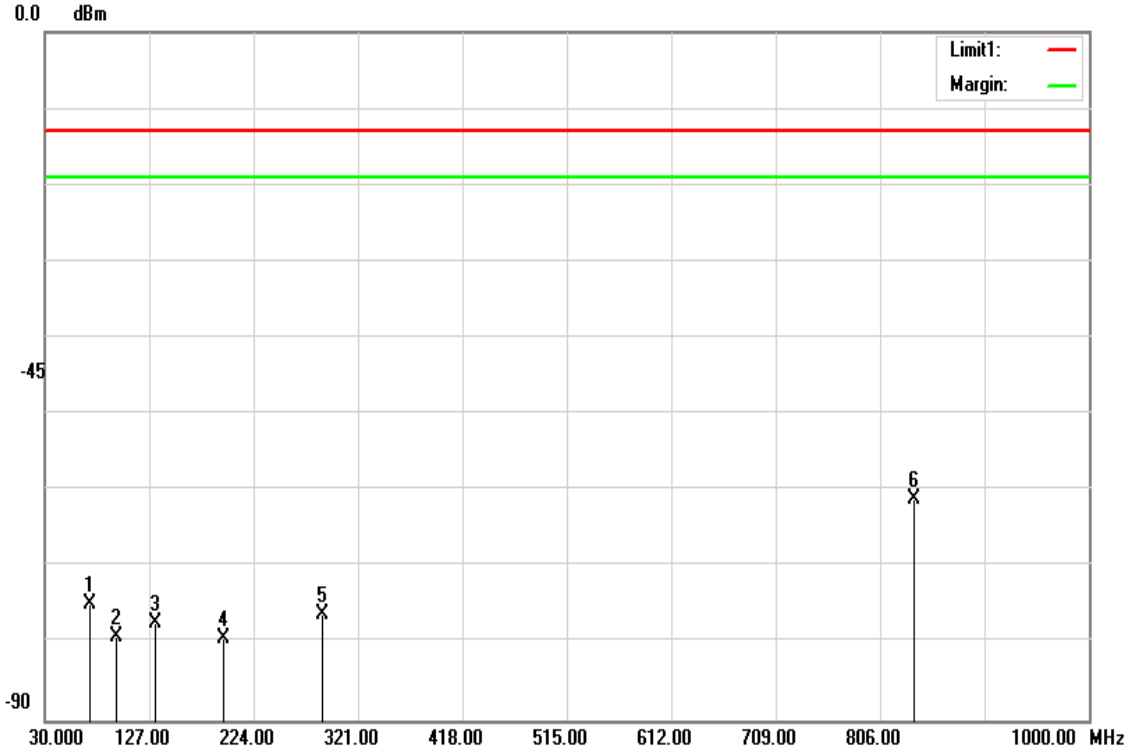


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
105.6600	-91.25	1.13	16.8	-75.58	-13.00	-62.58	V
131.8500	-89.25	1.25	19.07	-71.43	-13.00	-58.43	V
265.7100	-94.6	1.73	18.37	-77.96	-13.00	-64.96	V
295.7800	-90.34	1.82	19.02	-73.14	-13.00	-60.14	V
600.3600	-95.47	2.59	24.41	-73.65	-13.00	-60.65	V
837.0400	-86.25	3.06	27.57	-61.74	-13.00	-48.74	V

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

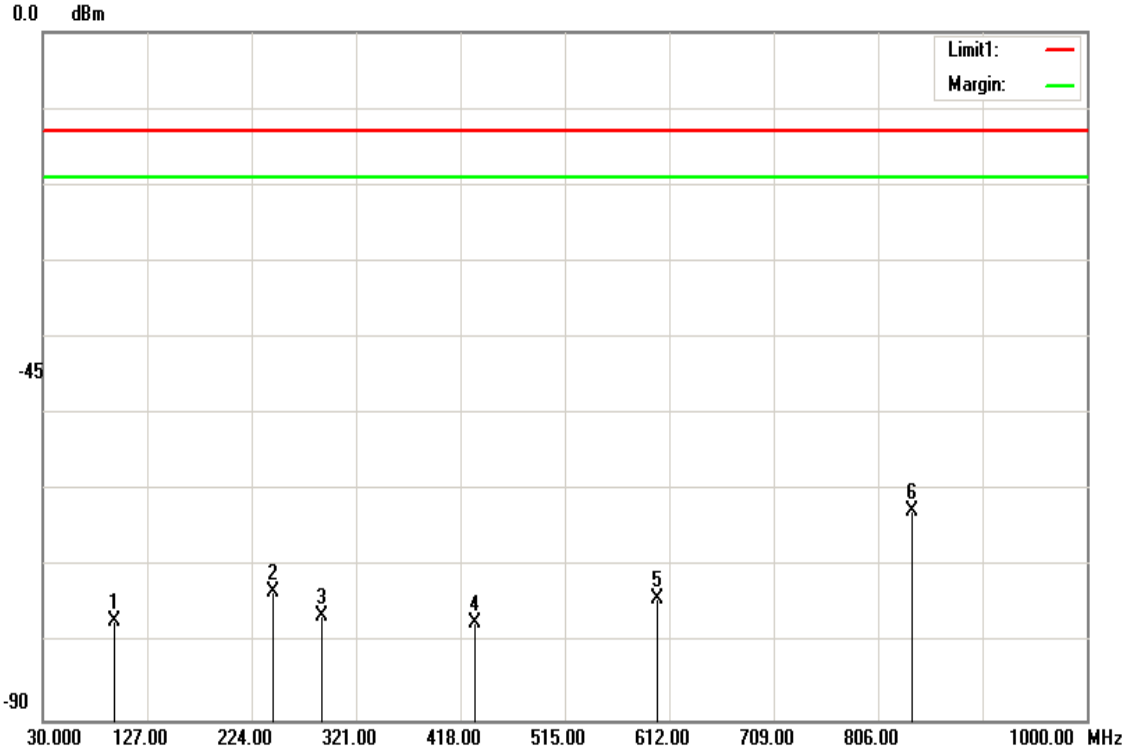


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
71.7100	-87.16	0.92	13.3	-74.78	-13.00	-61.78	H
96.9300	-92.86	1.06	14.73	-79.19	-13.00	-66.19	H
132.8200	-95.07	1.25	19	-77.32	-13.00	-64.32	H
195.8700	-95.97	1.49	18.06	-79.40	-13.00	-66.40	H
288.0200	-93.4	1.79	18.92	-76.27	-13.00	-63.27	H
837.0400	-85.59	3.06	27.57	-61.08	-13.00	-48.08	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

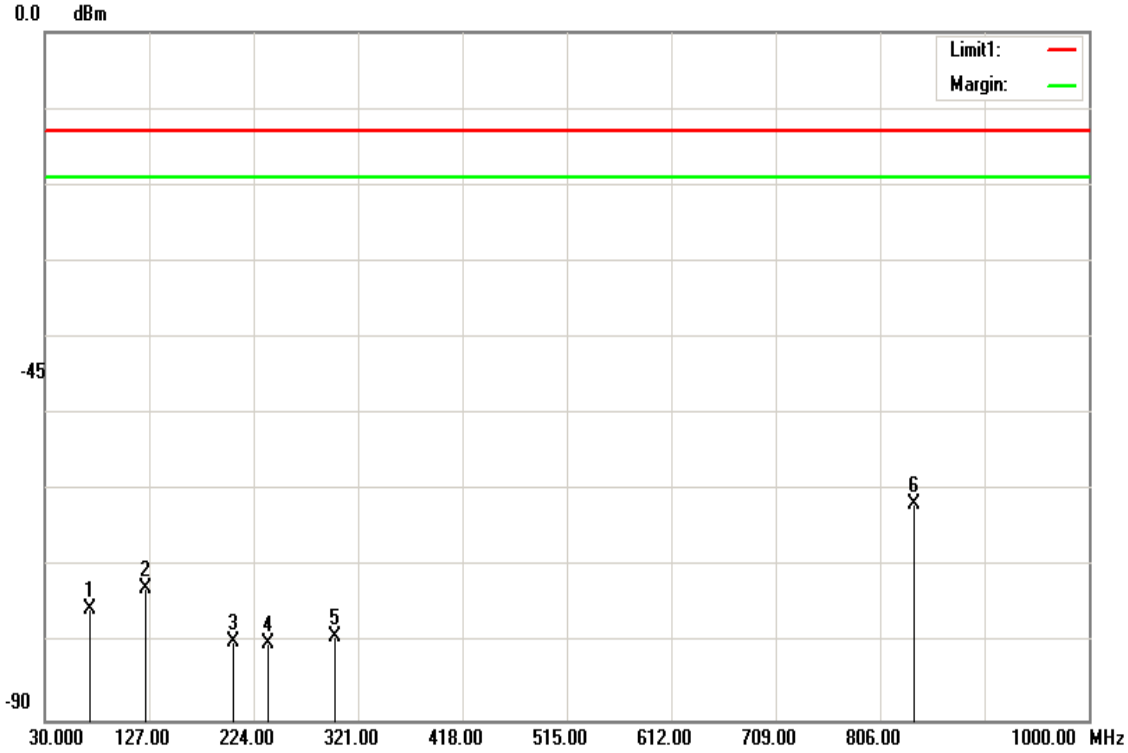


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
95.9600	-90.41	1.06	14.49	-76.98	-13.00	-63.98	V
243.4000	-88.91	1.66	17.37	-73.20	-13.00	-60.20	V
288.9900	-93.52	1.8	18.91	-76.41	-13.00	-63.41	V
431.5800	-97.19	2.19	21.99	-77.39	-13.00	-64.39	V
600.3600	-96	2.59	24.41	-74.18	-13.00	-61.18	V
837.0400	-87.07	3.06	27.57	-62.56	-13.00	-49.56	V

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

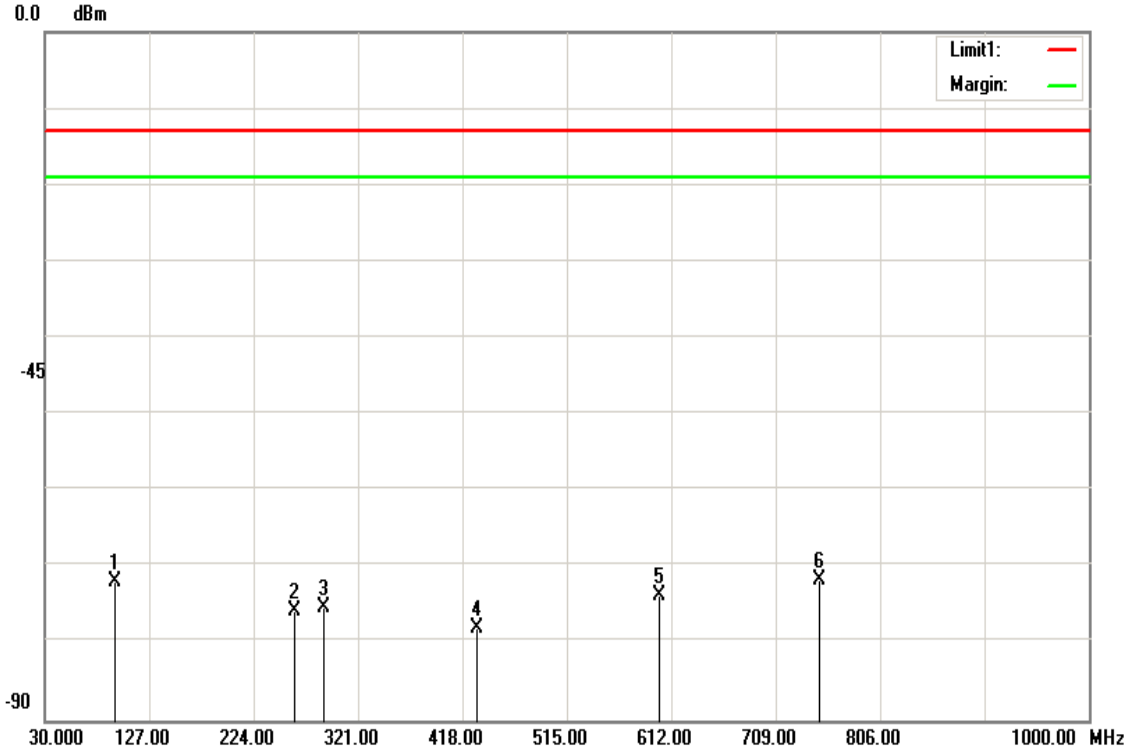


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
71.7100	-87.98	0.92	13.3	-75.60	-13.00	-62.60	H
124.0900	-90.6	1.24	19.14	-72.70	-13.00	-59.70	H
204.6000	-95.87	1.52	17.54	-79.85	-13.00	-66.85	H
237.5800	-95.72	1.64	17.3	-80.06	-13.00	-67.06	H
299.6600	-96.38	1.83	19.09	-79.12	-13.00	-66.12	H
837.0400	-86.24	3.06	27.57	-61.73	-13.00	-48.73	H

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

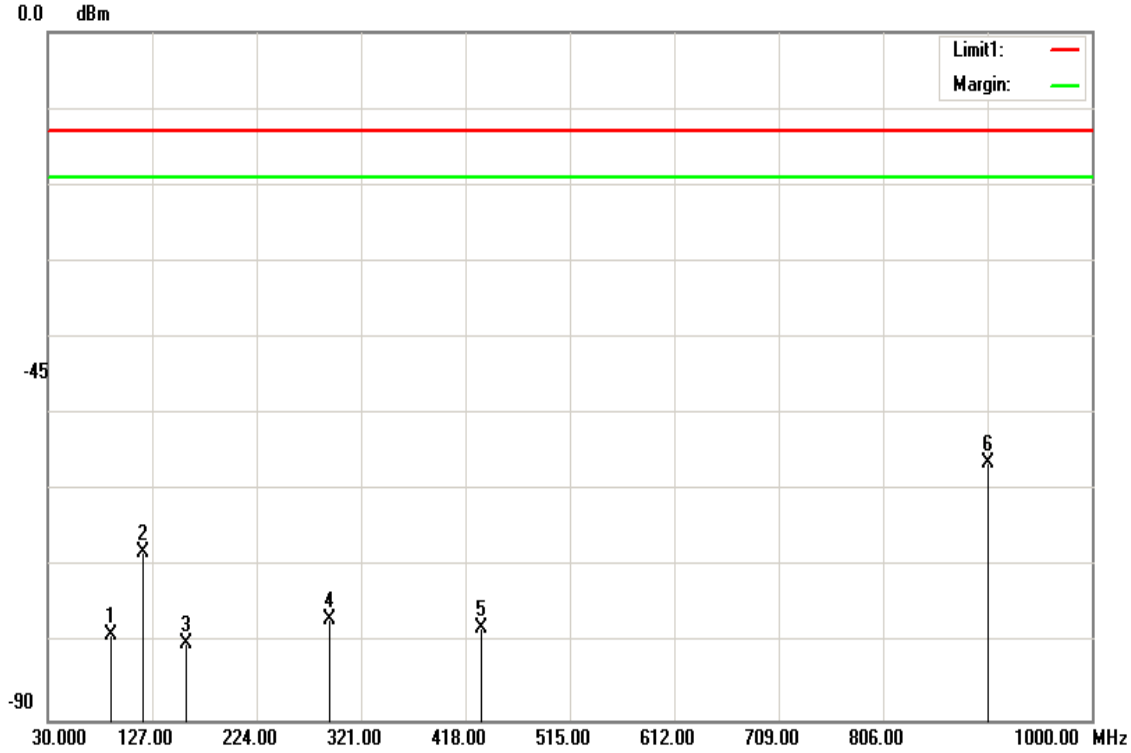


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
94.9900	-85.16	1.05	14.25	-71.96	-13.00	-58.96	V
261.8300	-91.89	1.72	17.98	-75.63	-13.00	-62.63	V
288.9900	-92.27	1.8	18.91	-75.16	-13.00	-62.16	V
431.5800	-97.69	2.19	21.99	-77.89	-13.00	-64.89	V
600.3600	-95.44	2.59	24.41	-73.62	-13.00	-60.62	V
749.7400	-95.56	2.89	26.7	-71.75	-13.00	-58.75	V

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

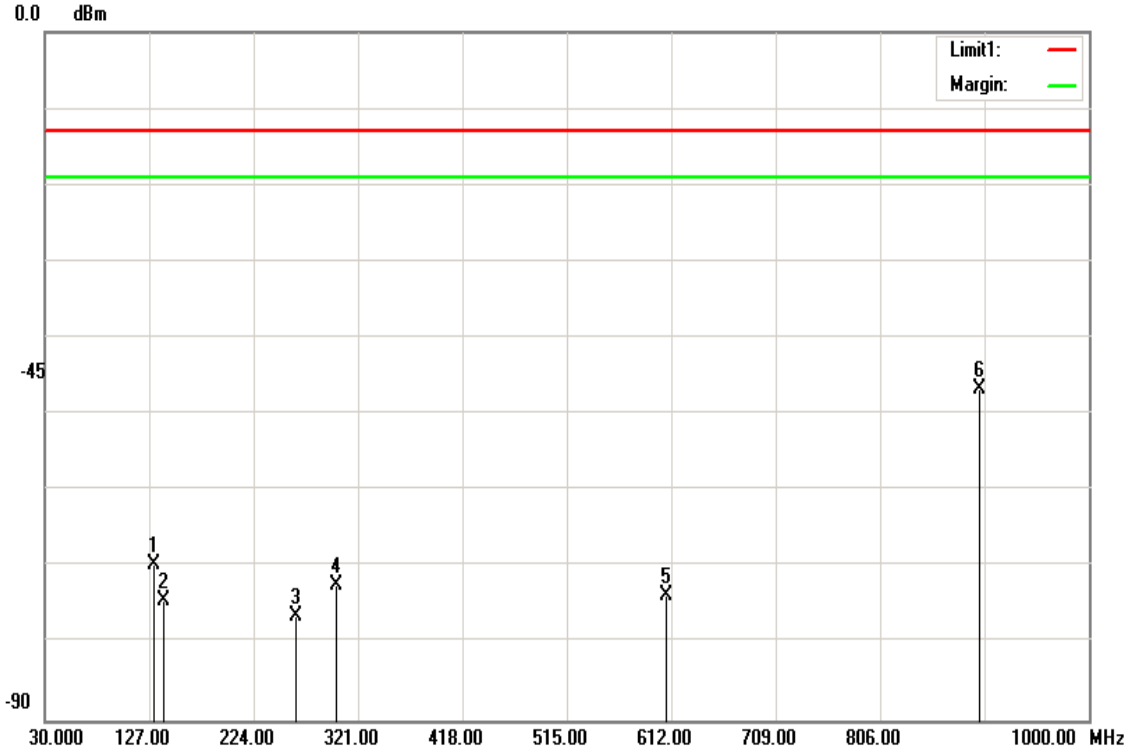


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
88.2000	-90.74	1.02	12.96	-78.80	-13.00	-65.80	H
118.2700	-85.76	1.23	18.88	-68.11	-13.00	-55.11	H
158.0400	-96.63	1.35	17.92	-80.06	-13.00	-67.06	H
291.9000	-93.94	1.81	18.94	-76.81	-13.00	-63.81	H
432.5500	-97.75	2.19	22.02	-77.92	-13.00	-64.92	H
903.0000	-81.34	3.18	28.13	-56.39	-13.00	-43.39	H

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

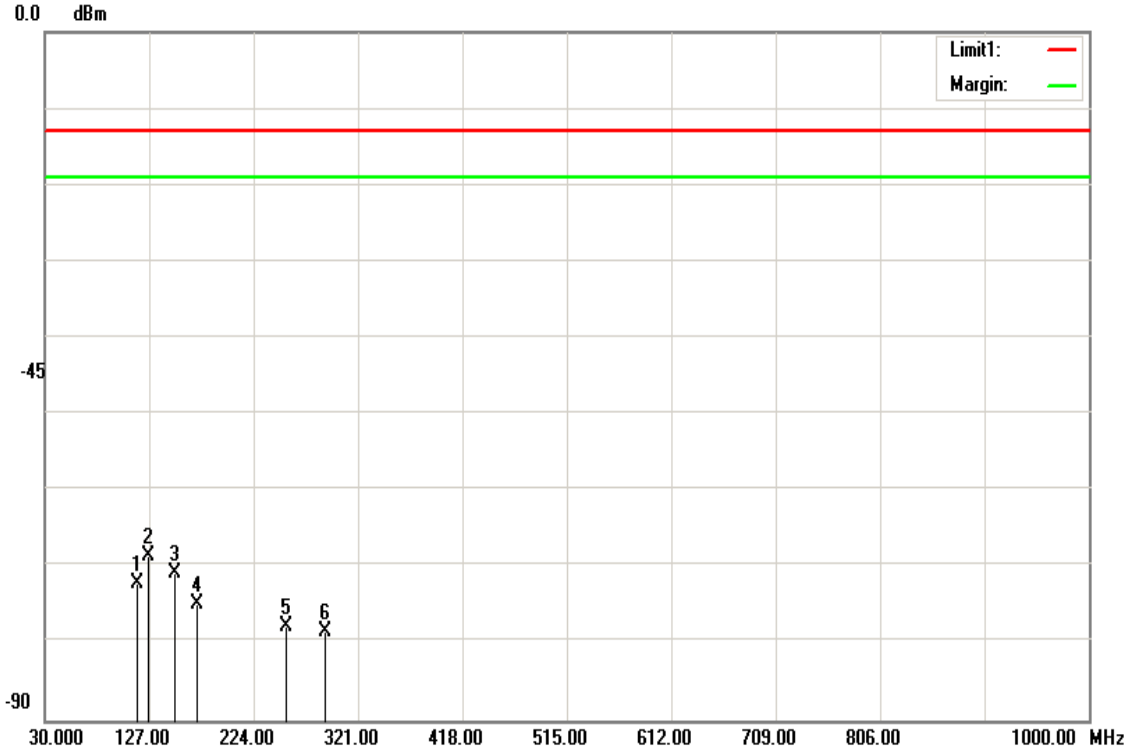


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.8500	-87.46	1.25	19.07	-69.64	-13.00	-56.64	V
140.5800	-91.58	1.26	18.47	-74.37	-13.00	-61.37	V
263.7700	-92.92	1.72	18.18	-76.46	-13.00	-63.46	V
300.6300	-89.58	1.83	19.12	-72.29	-13.00	-59.29	V
607.1500	-95.7	2.61	24.57	-73.74	-13.00	-60.74	V
898.1500	-71.67	3.17	28.09	-46.75	-13.00	-33.75	V

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

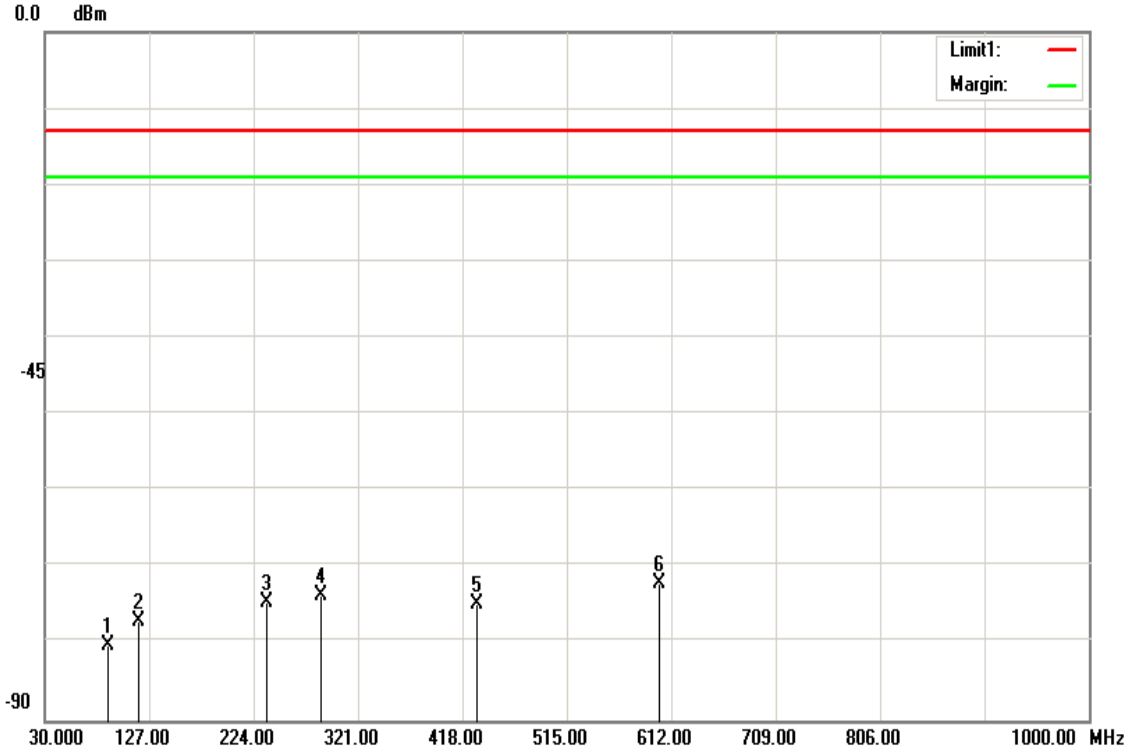


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
115.3600	-89.37	1.2	18.5	-72.07	-13.00	-59.07	H
126.0300	-86.31	1.25	19.16	-68.40	-13.00	-55.40	H
151.2500	-87.38	1.32	17.99	-70.71	-13.00	-57.71	H
171.6200	-90.64	1.4	17.14	-74.90	-13.00	-61.90	H
254.0700	-93.54	1.69	17.5	-77.73	-13.00	-64.73	H
290.9300	-95.5	1.8	18.92	-78.38	-13.00	-65.38	H

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

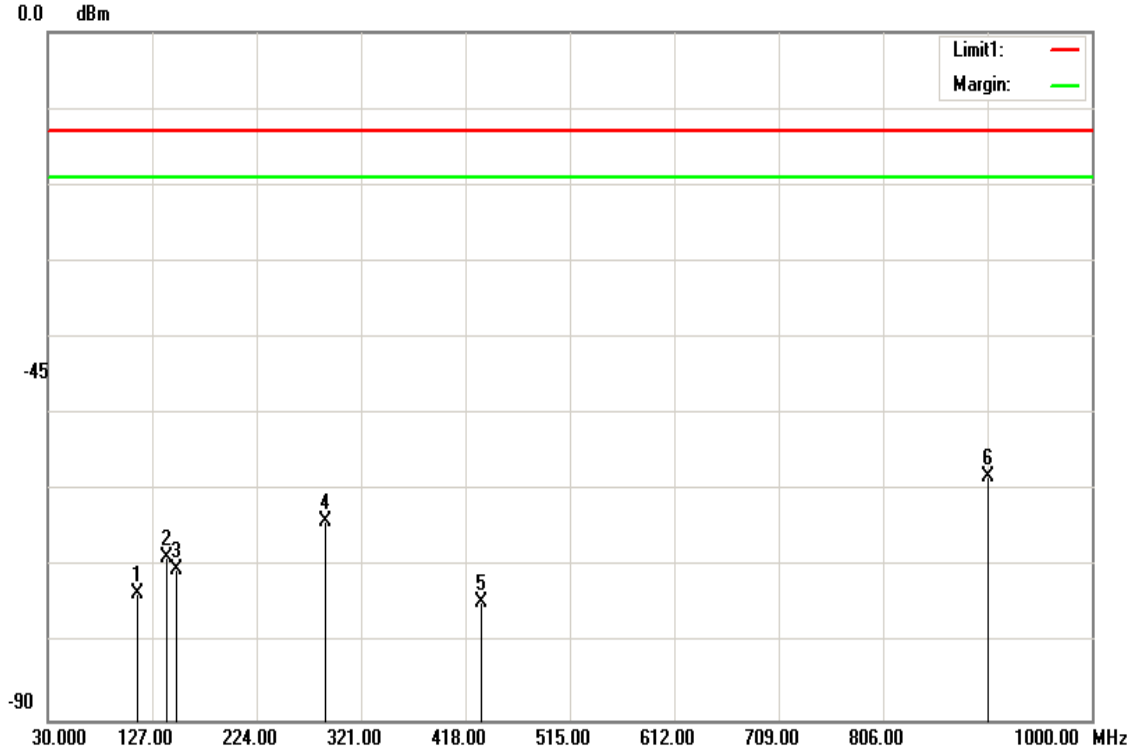


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
88.2000	-92.13	1.02	12.96	-80.19	-13.00	-67.19	V
117.3000	-94.54	1.22	18.75	-77.01	-13.00	-64.01	V
236.6100	-90.24	1.64	17.26	-74.62	-13.00	-61.62	V
287.0500	-90.73	1.79	18.93	-73.59	-13.00	-60.59	V
431.5800	-94.56	2.19	21.99	-74.76	-13.00	-61.76	V
600.3600	-94.01	2.59	24.41	-72.19	-13.00	-59.19	V

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX	**Test Date:**	September 7, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.



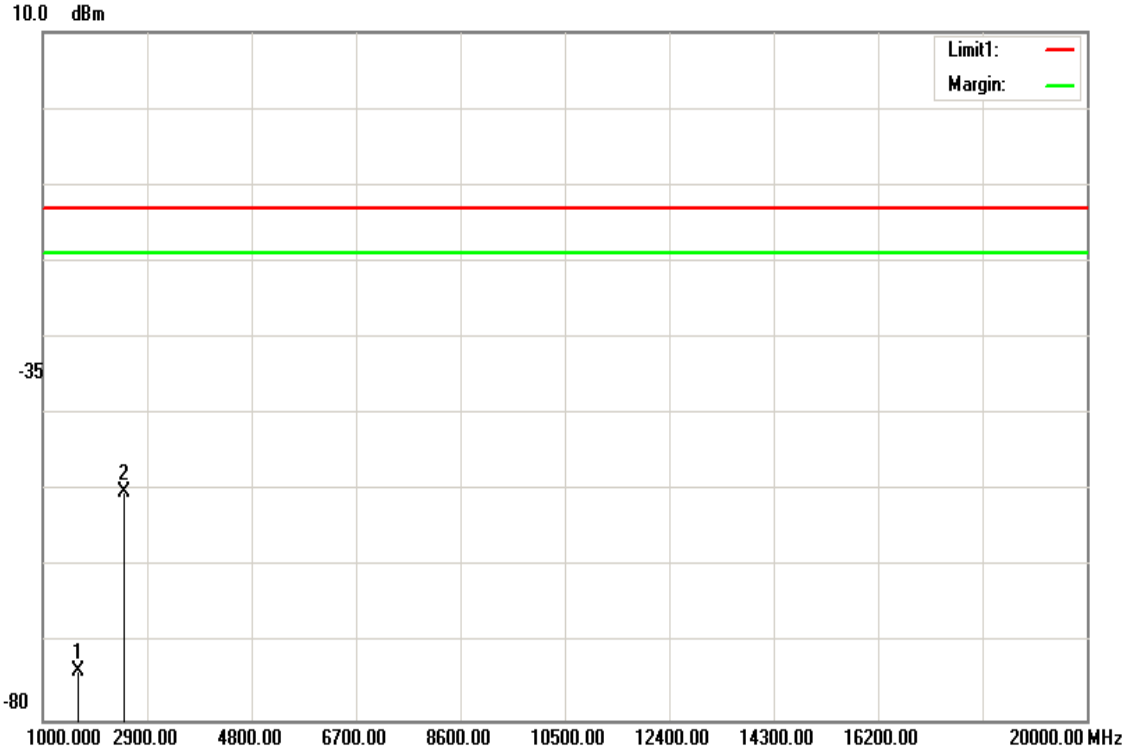
Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
113.4200	-90.41	1.19	18.24	-73.36	-13.00	-60.36	H
140.5800	-85.92	1.26	18.47	-68.71	-13.00	-55.71	H
149.3100	-87.14	1.31	18.03	-70.42	-13.00	-57.42	H
288.0200	-81.18	1.79	18.92	-64.05	-13.00	-51.05	H
432.5500	-94.35	2.19	22.02	-74.52	-13.00	-61.52	H
903.0000	-83.15	3.18	28.13	-58.20	-13.00	-45.20	H

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Above 1GHz

Operation Mode:	GSM 850 / TX / CH 128	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

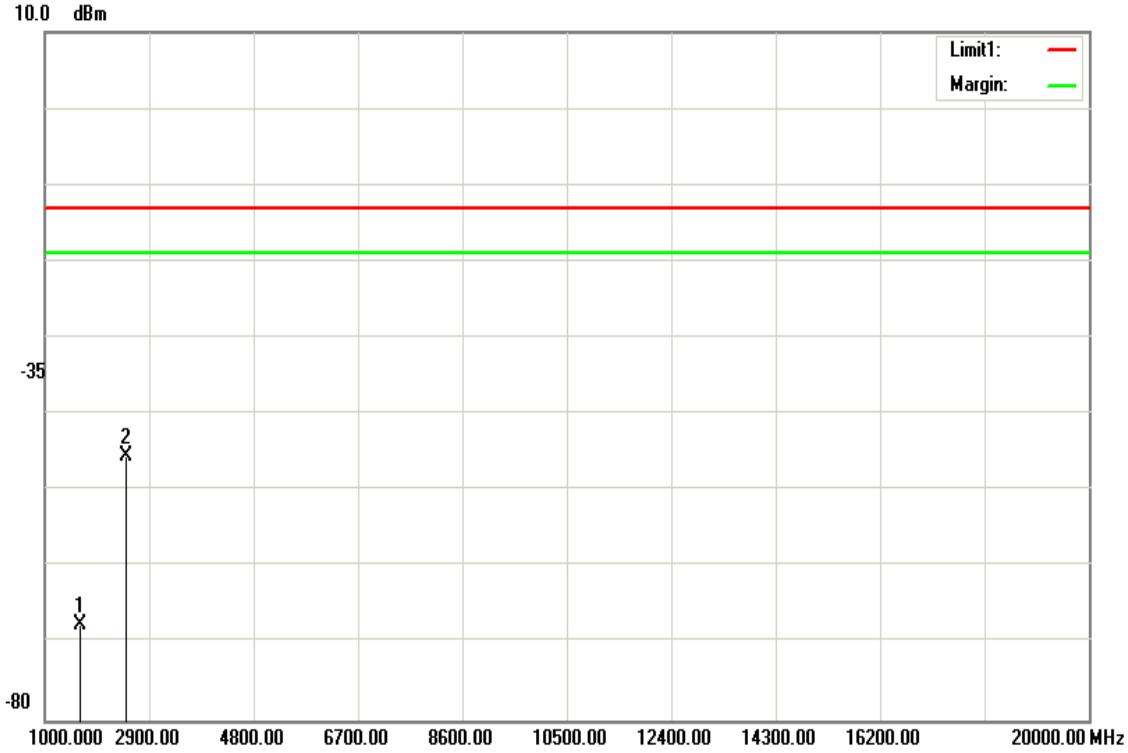


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-78.43	4.49	9.32	-73.60	-13.00	-60.60	V
2472.600	-55.3	5.56	10.68	-50.18	-13.00	-37.18	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX / CH 128	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

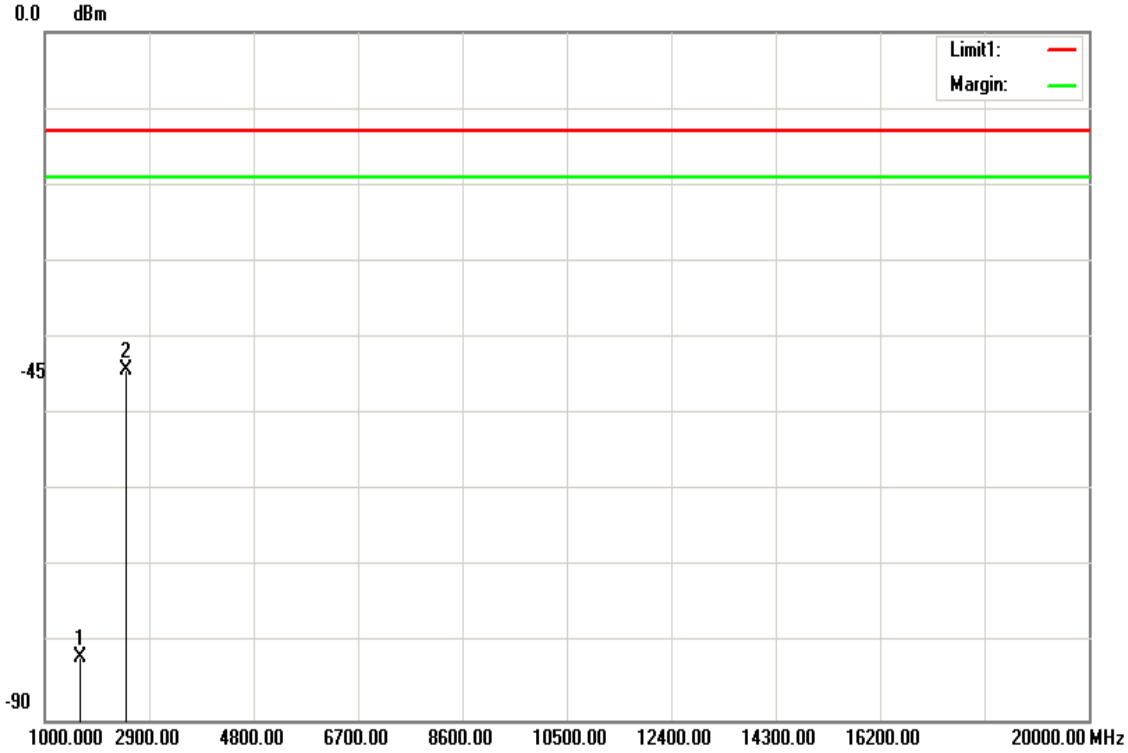


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-72.24	4.49	9.32	-67.41	-13.00	-54.41	H
2472.600	-50.61	5.56	10.68	-45.49	-13.00	-32.49	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX / CH 190	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

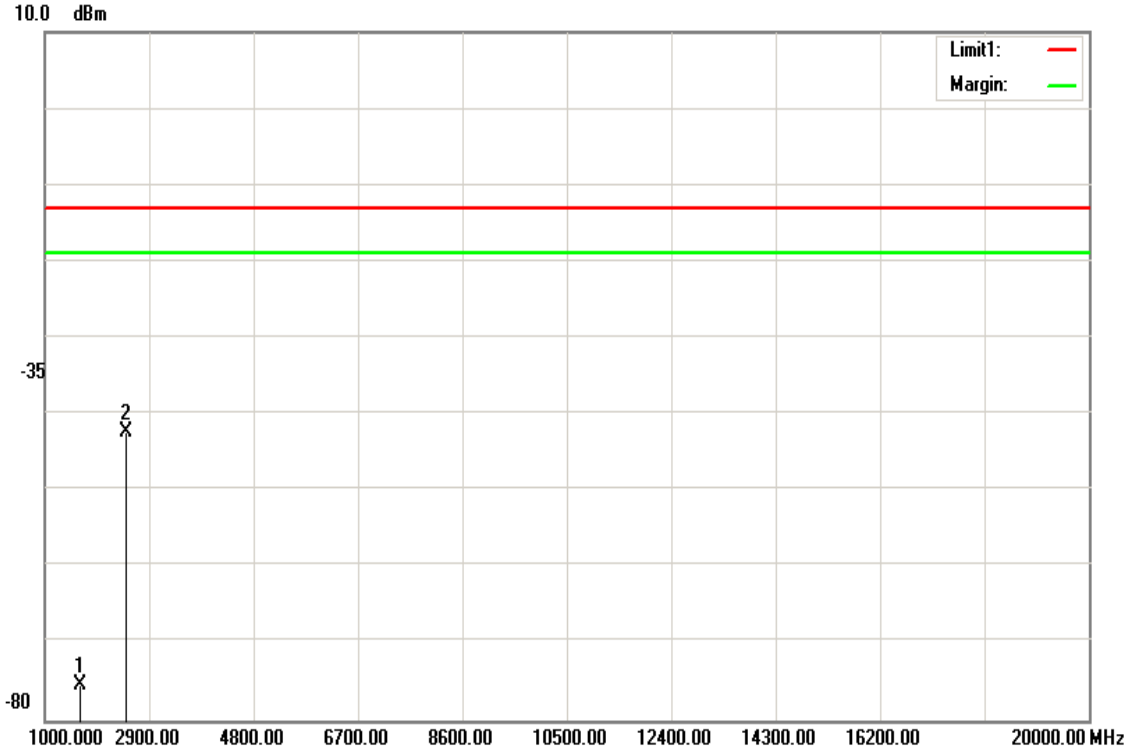


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-86.56	4.49	9.32	-81.73	-13.00	-68.73	V
2472.600	-49.37	5.56	10.68	-44.25	-13.00	-31.25	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX / CH 190	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

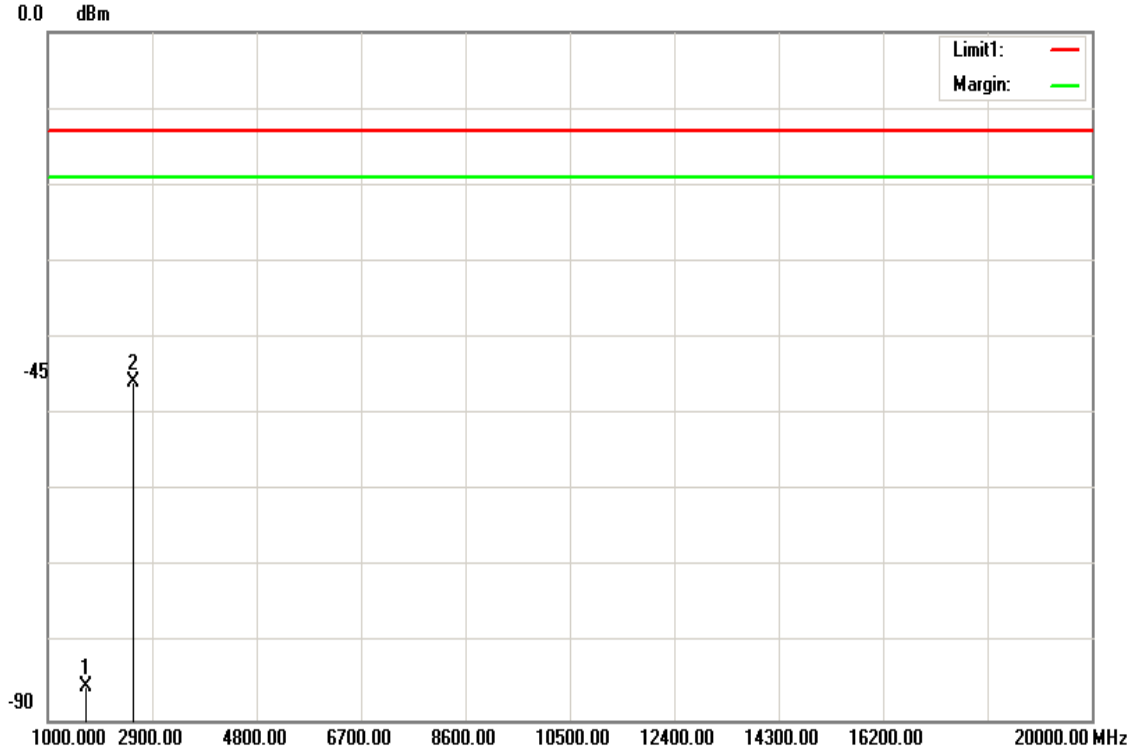


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-80.17	4.49	9.32	-75.34	-13.00	-62.34	H
2472.600	-47.5	5.56	10.68	-42.38	-13.00	-29.38	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX / CH 251	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

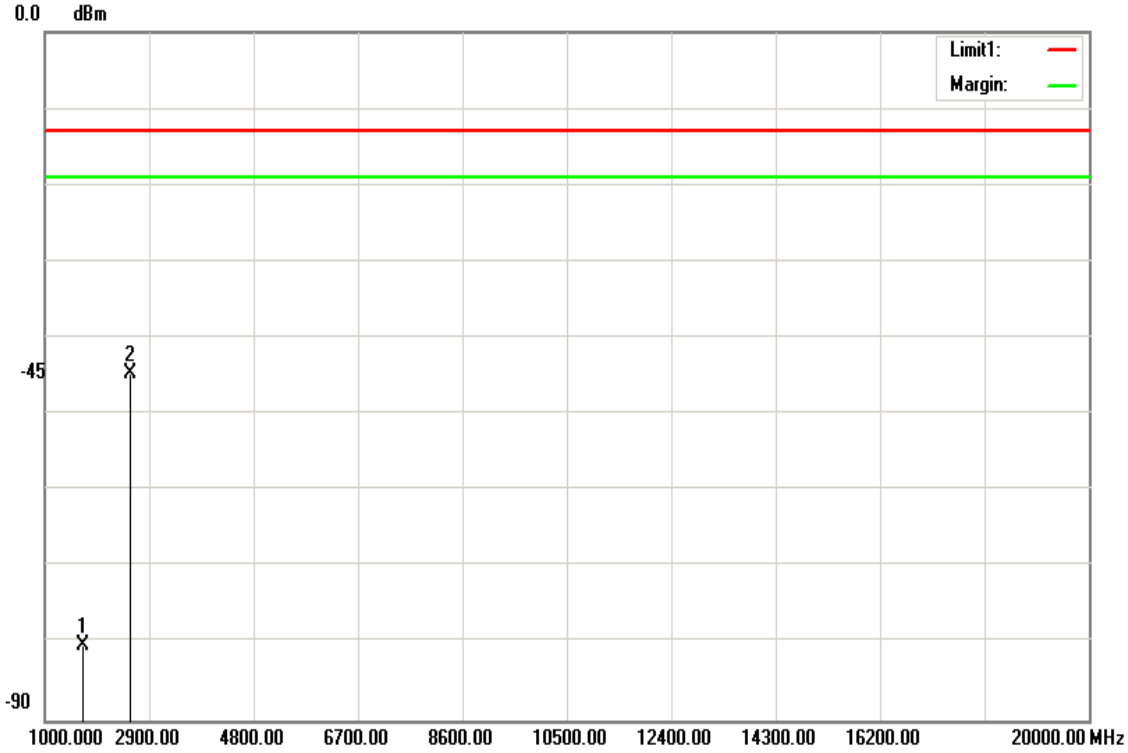


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-90.41	4.55	9.45	-85.51	-13.00	-72.51	V
2546.400	-50.86	5.64	10.75	-45.75	-13.00	-32.75	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 850 / TX / CH 251	**Test Date:**	September 5, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

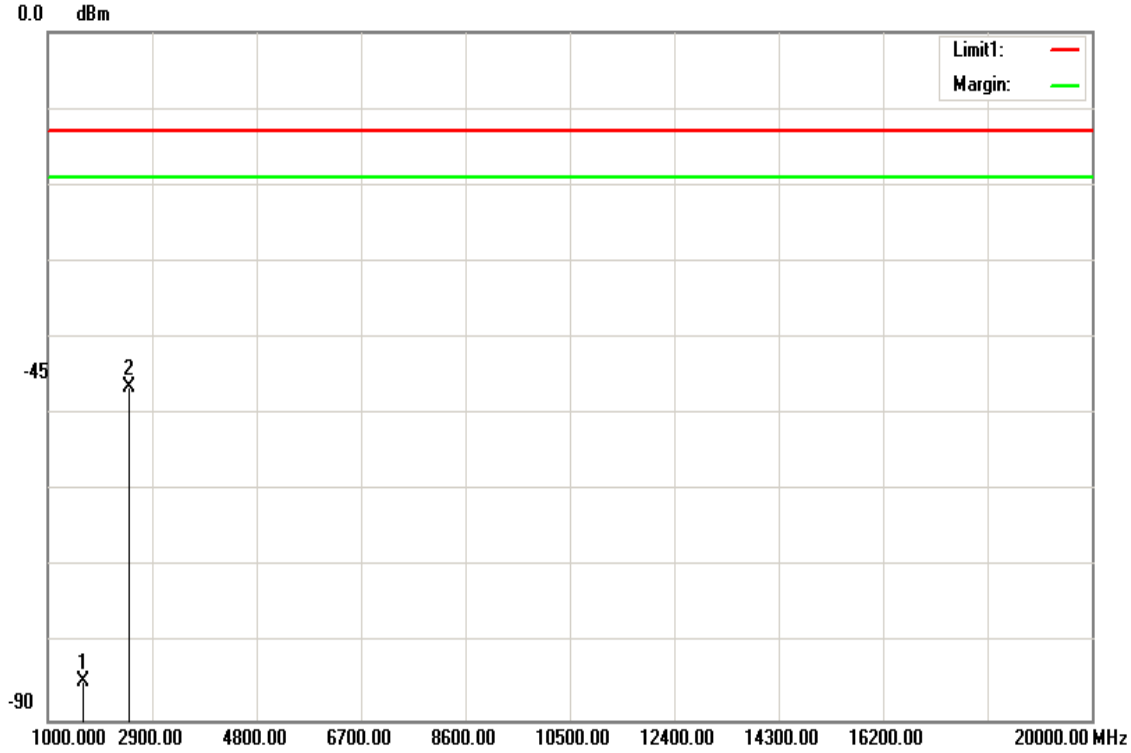


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-85.05	4.55	9.45	-80.15	-13.00	-67.15	H
2546.400	-49.81	5.64	10.75	-44.70	-13.00	-31.70	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 128	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

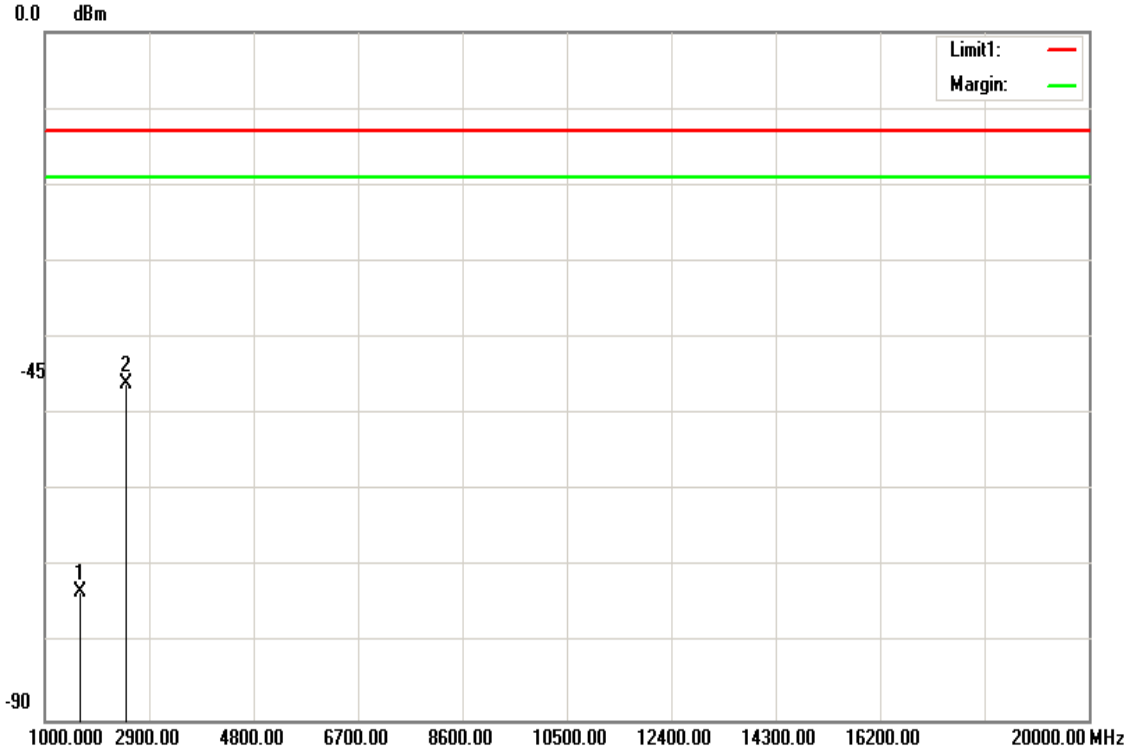


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-89.68	4.49	9.32	-84.85	-13.00	-71.85	V
2470.000	-51.61	5.55	10.68	-46.48	-13.00	-33.48	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 128	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

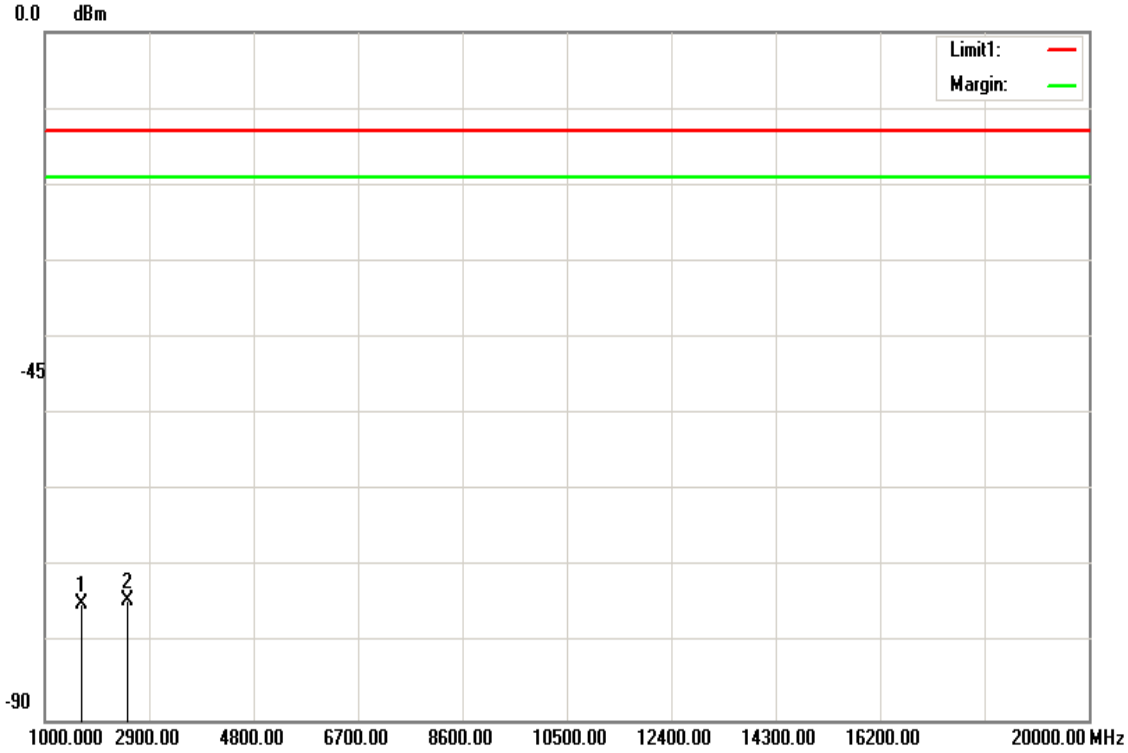


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1651.000	-78.08	4.49	9.32	-73.25	-13.00	-60.25	H
2470.000	-51.05	5.55	10.68	-45.92	-13.00	-32.92	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 190	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

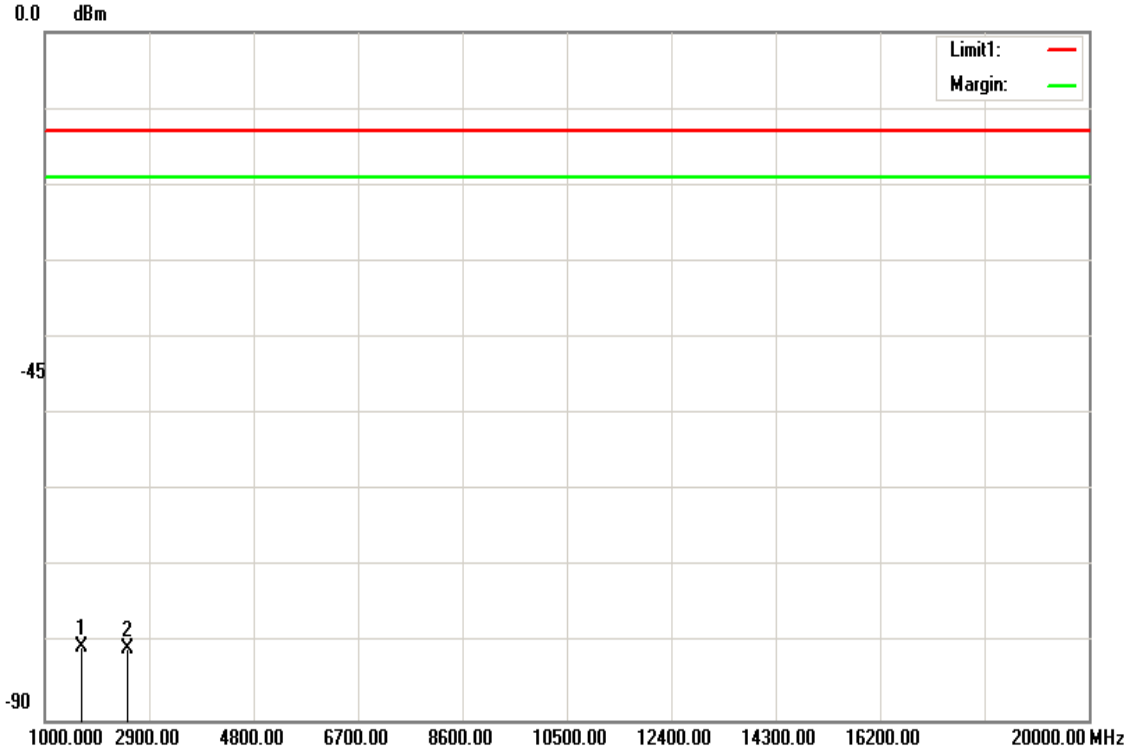


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-79.7	4.52	9.38	-74.84	-13.00	-61.84	V
2509.800	-79.38	5.6	10.71	-74.27	-13.00	-61.27	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 190	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

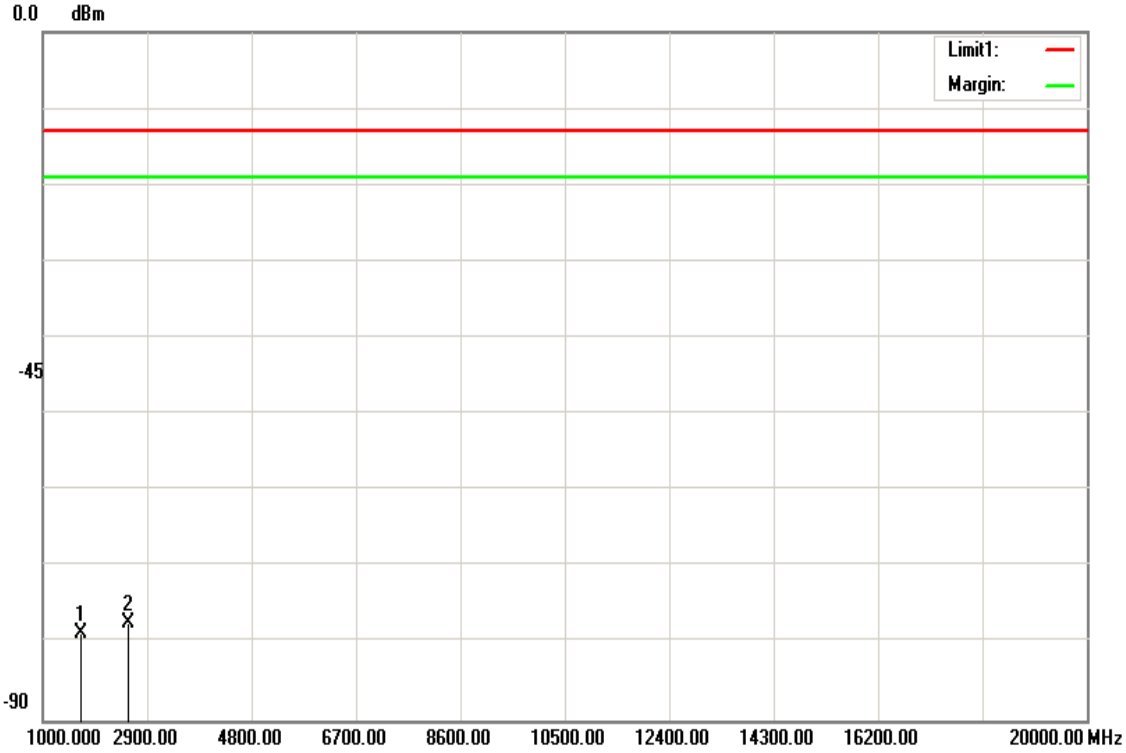


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1672.000	-85.35	4.52	9.38	-80.49	-13.00	-67.49	H
2509.800	-85.71	5.6	10.71	-80.60	-13.00	-67.60	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 251	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

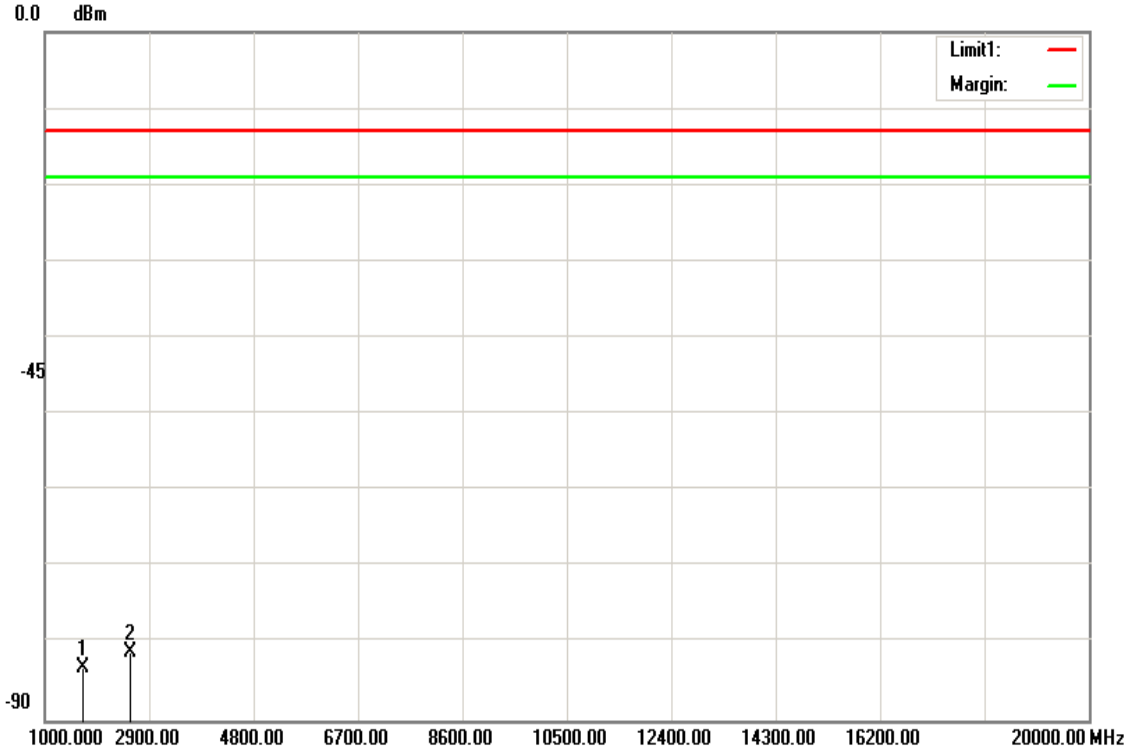


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-83.61	4.55	9.45	-78.71	-13.00	-65.71	V
2546.400	-82.33	5.64	10.75	-77.22	-13.00	-64.22	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 850(4Down1Up) / TX / CH 251	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

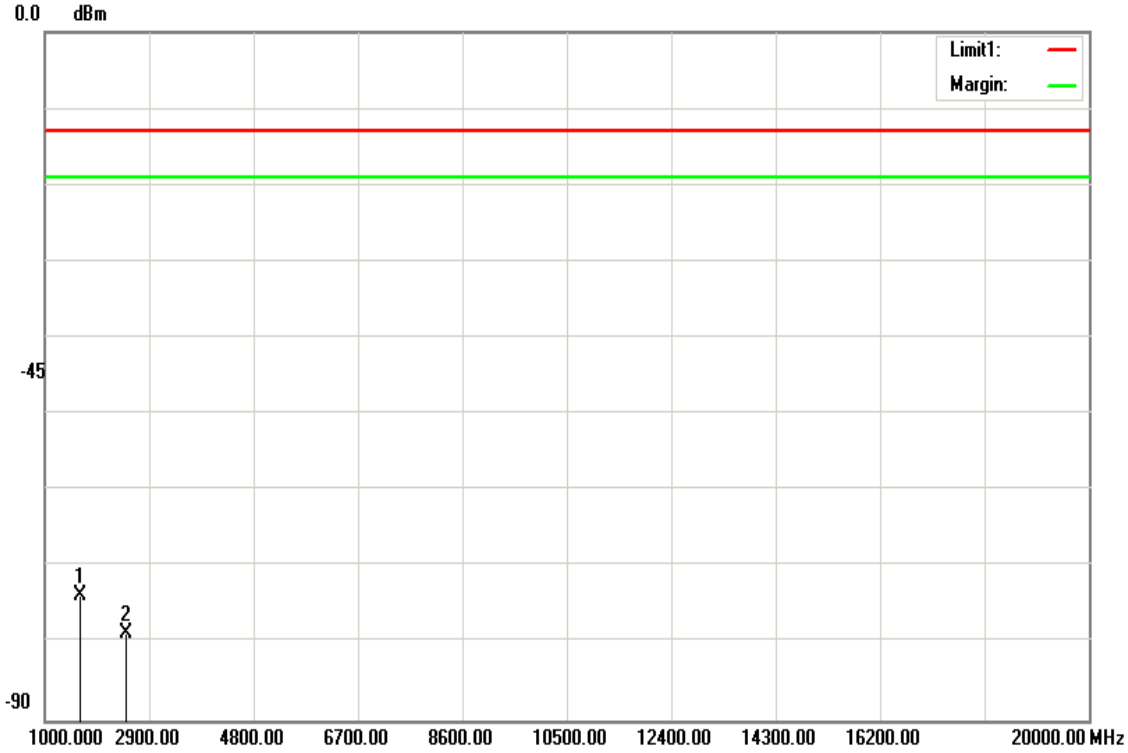


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-88.14	4.55	9.45	-83.24	-13.00	-70.24	H
2546.400	-86.27	5.64	10.75	-81.16	-13.00	-68.16	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 128	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

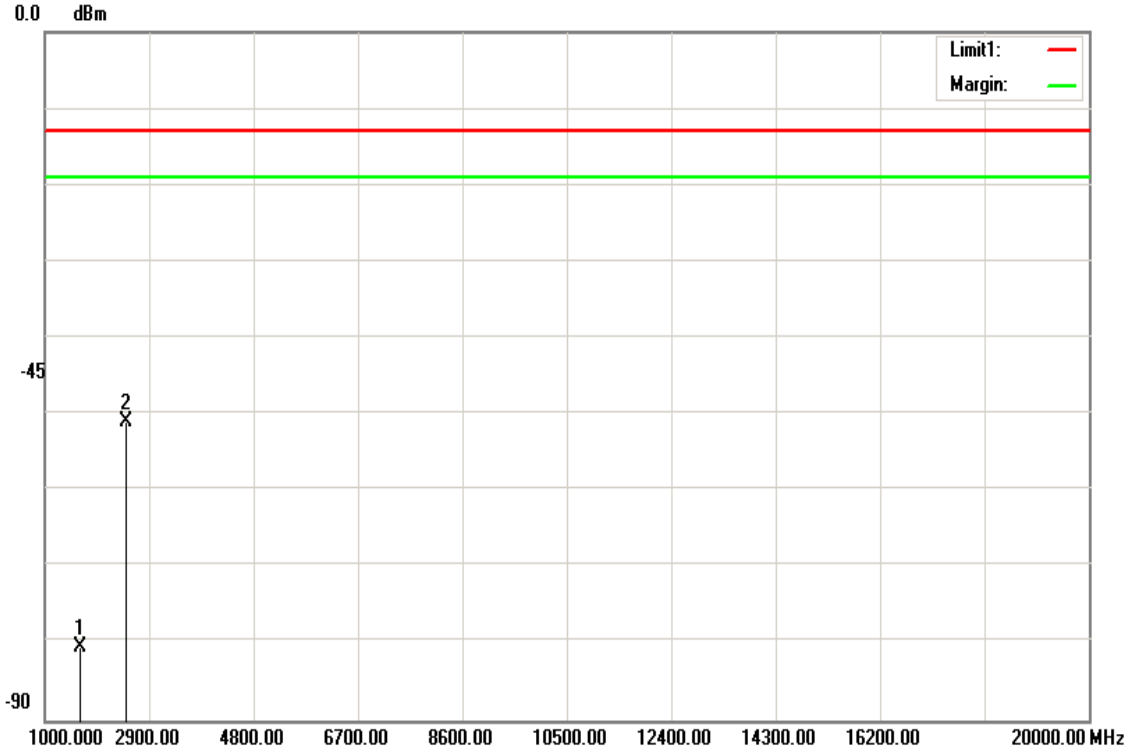


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.400	-78.48	4.49	9.32	-73.65	-13.00	-60.65	V
2470.000	-83.66	5.55	10.68	-78.53	-13.00	-65.53	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 128	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

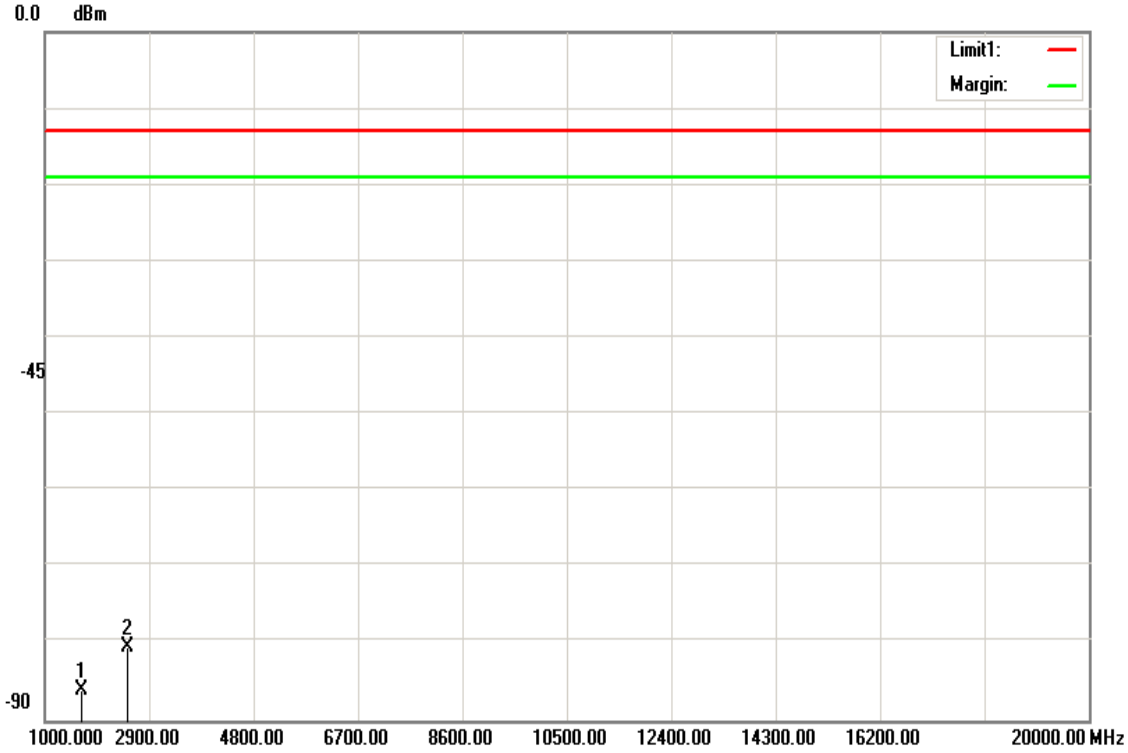


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1651.000	-85.28	4.49	9.32	-80.45	-13.00	-67.45	H
2470.000	-56.1	5.55	10.68	-50.97	-13.00	-37.97	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 190	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver..

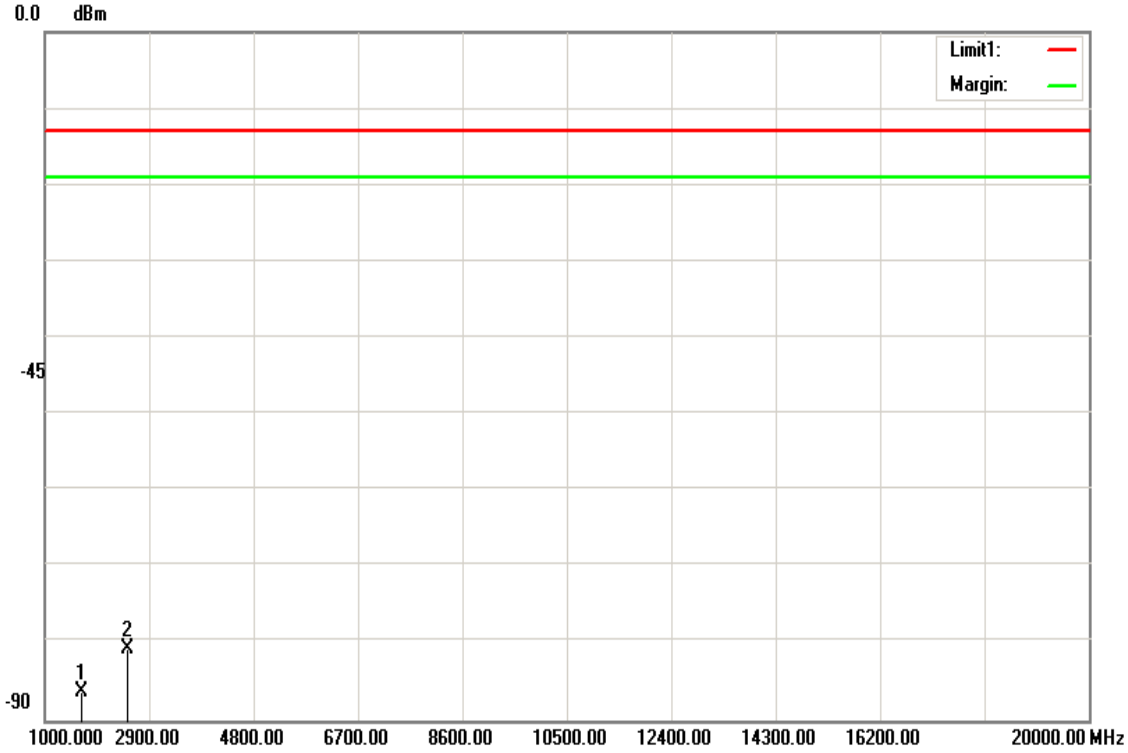


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.200	-90.88	4.52	9.38	-86.02	-13.00	-73.02	V
2512.000	-85.49	5.6	10.71	-80.38	-13.00	-67.38	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 190	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

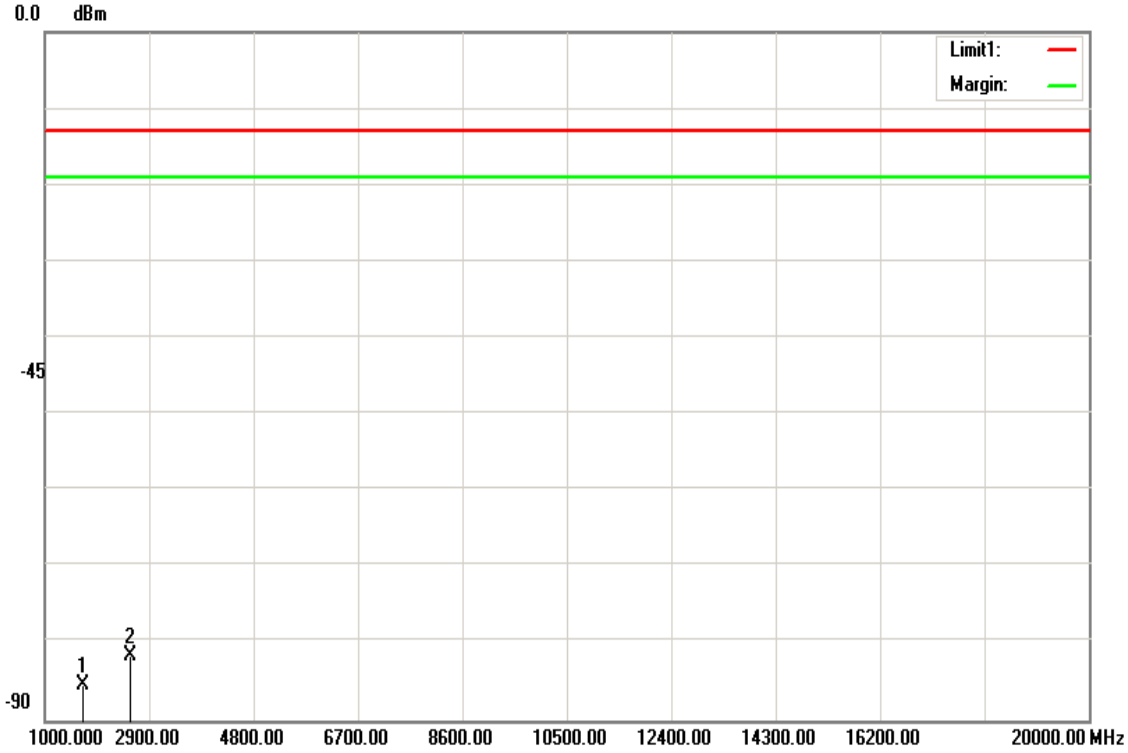


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.200	-91.07	4.52	9.38	-86.21	-13.00	-73.21	H
2509.800	-85.83	5.6	10.71	-80.72	-13.00	-67.72	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 251	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

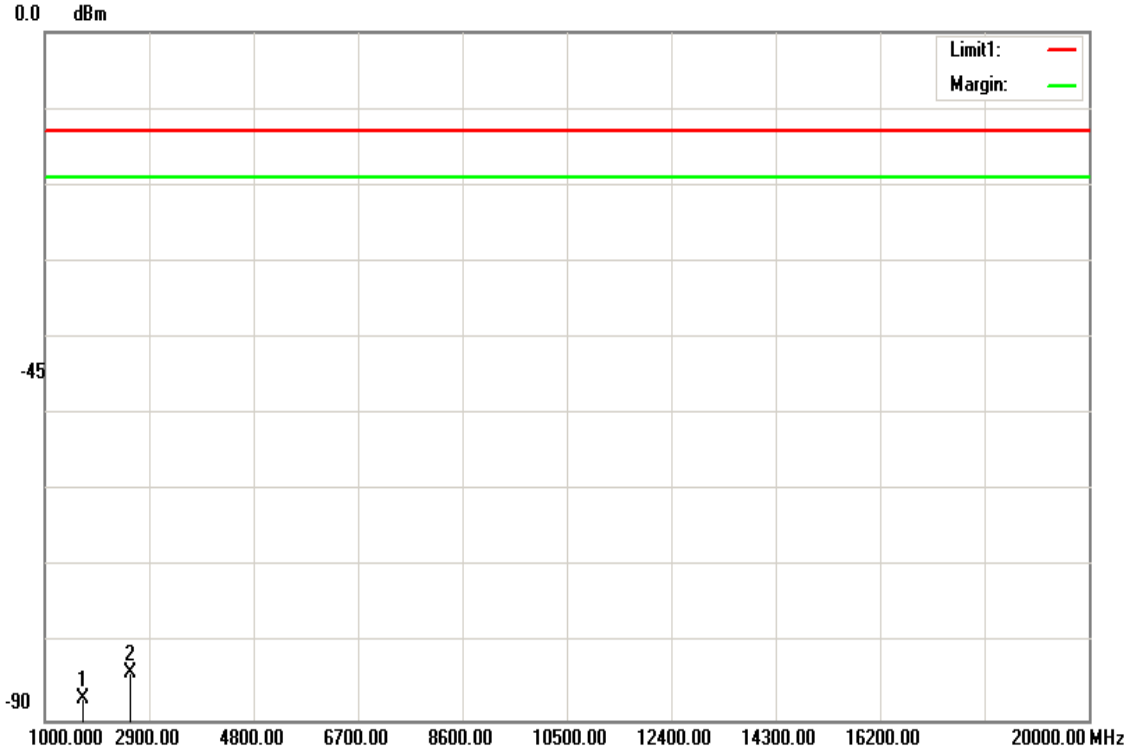


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-90.33	4.55	9.45	-85.43	-13.00	-72.43	V
2546.400	-86.64	5.64	10.75	-81.53	-13.00	-68.53	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 850(4Down1Up) / TX / CH 251	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

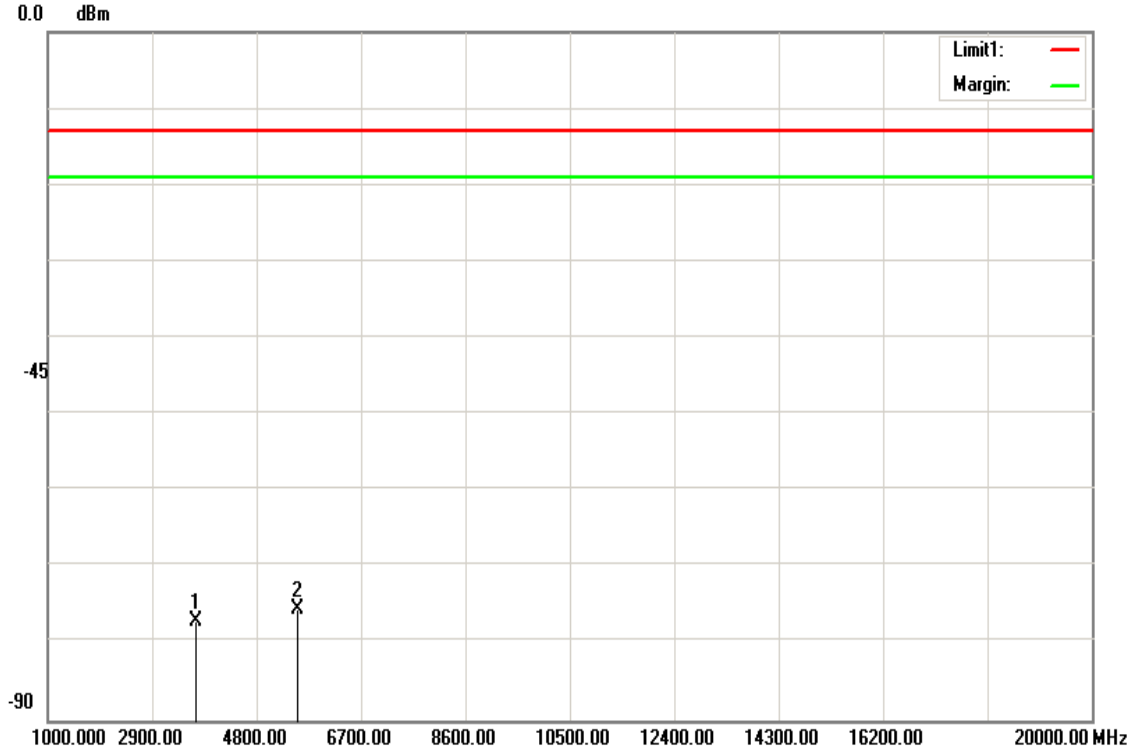


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.600	-92.15	4.55	9.45	-87.25	-13.00	-74.25	H
2546.400	-88.81	5.64	10.75	-83.70	-13.00	-70.70	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

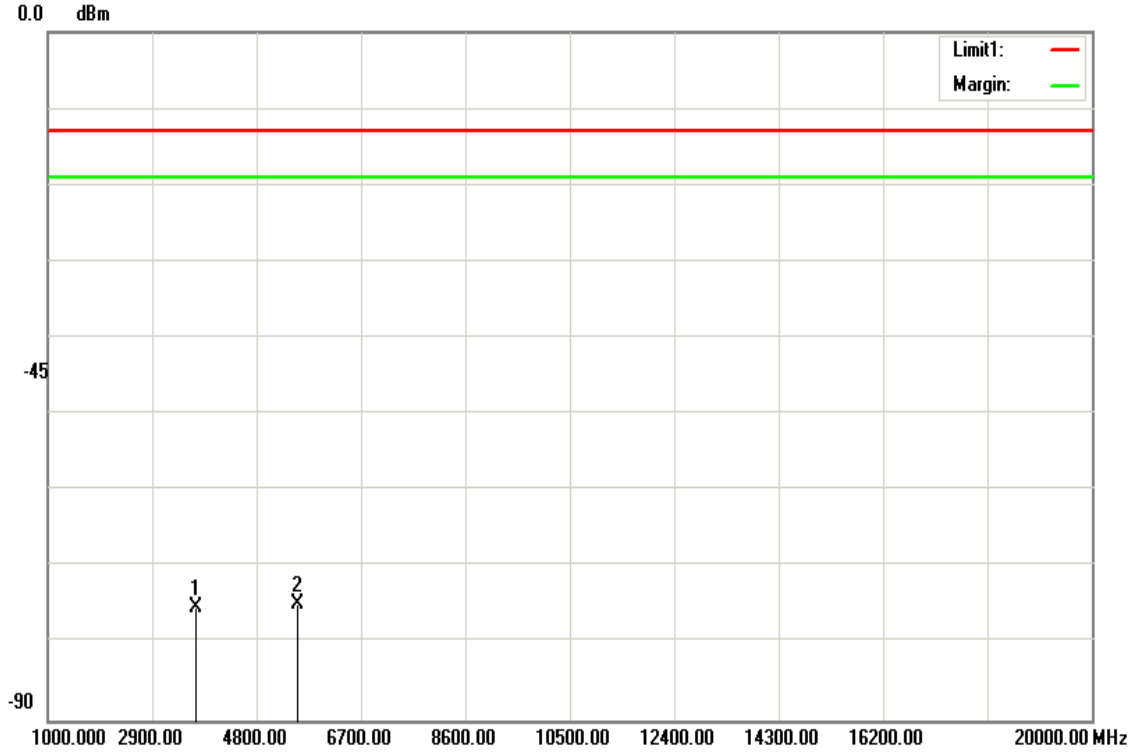


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3702.000	-82.68	6.9	12.54	-77.04	-13.00	-64.04	V
5550.000	-79.8	8.62	12.88	-75.54	-13.00	-62.54	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

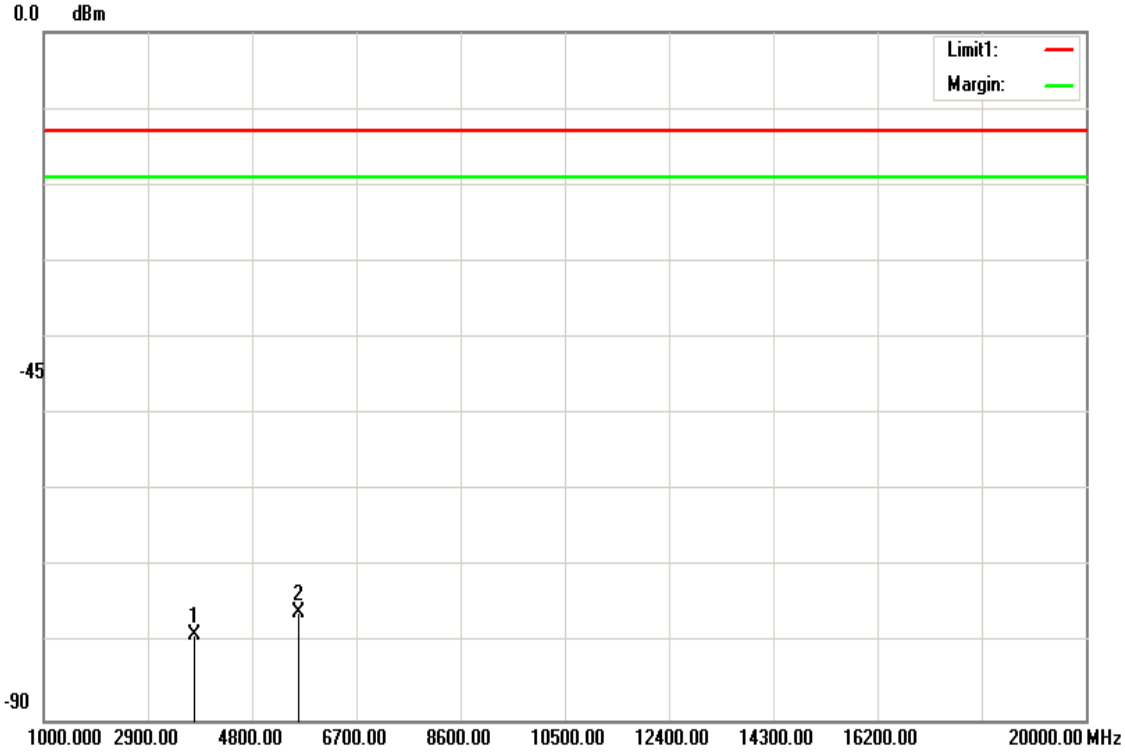


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3702.000	-80.96	6.9	12.54	-75.32	-13.00	-62.32	H
5550.000	-79.11	8.62	12.88	-74.85	-13.00	-61.85	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

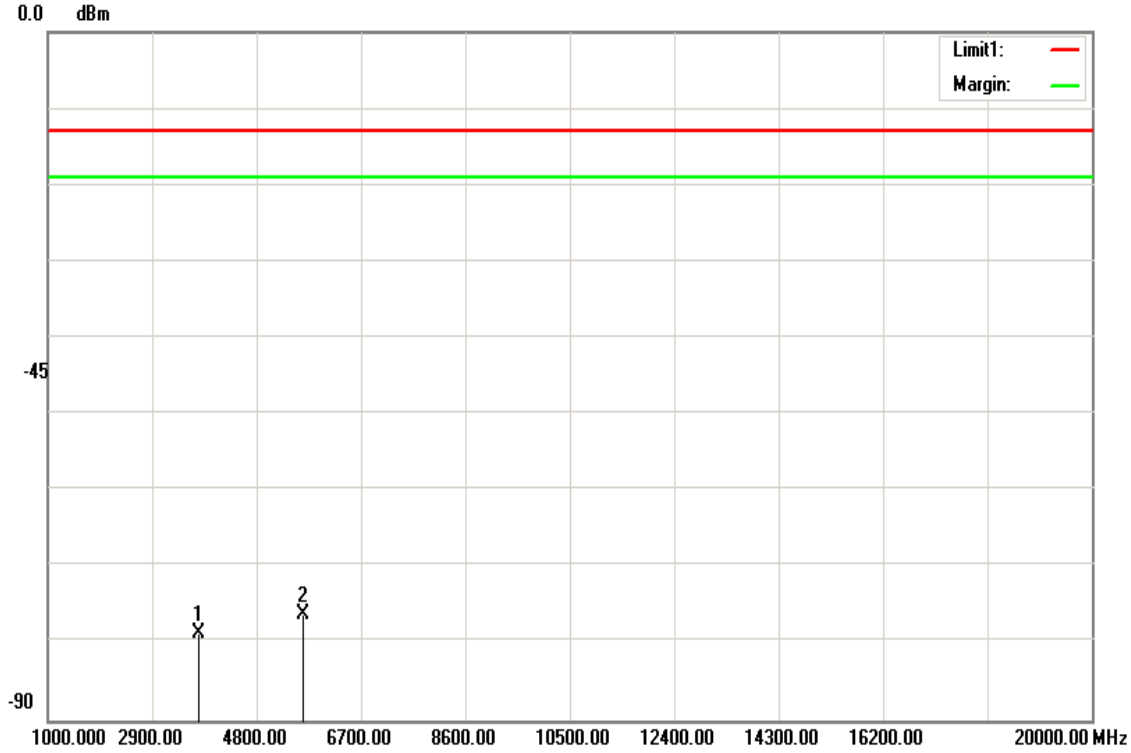


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3758.000	-84.35	6.95	12.55	-78.75	-13.00	-65.75	V
5640.000	-80.02	8.69	12.84	-75.87	-13.00	-62.87	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

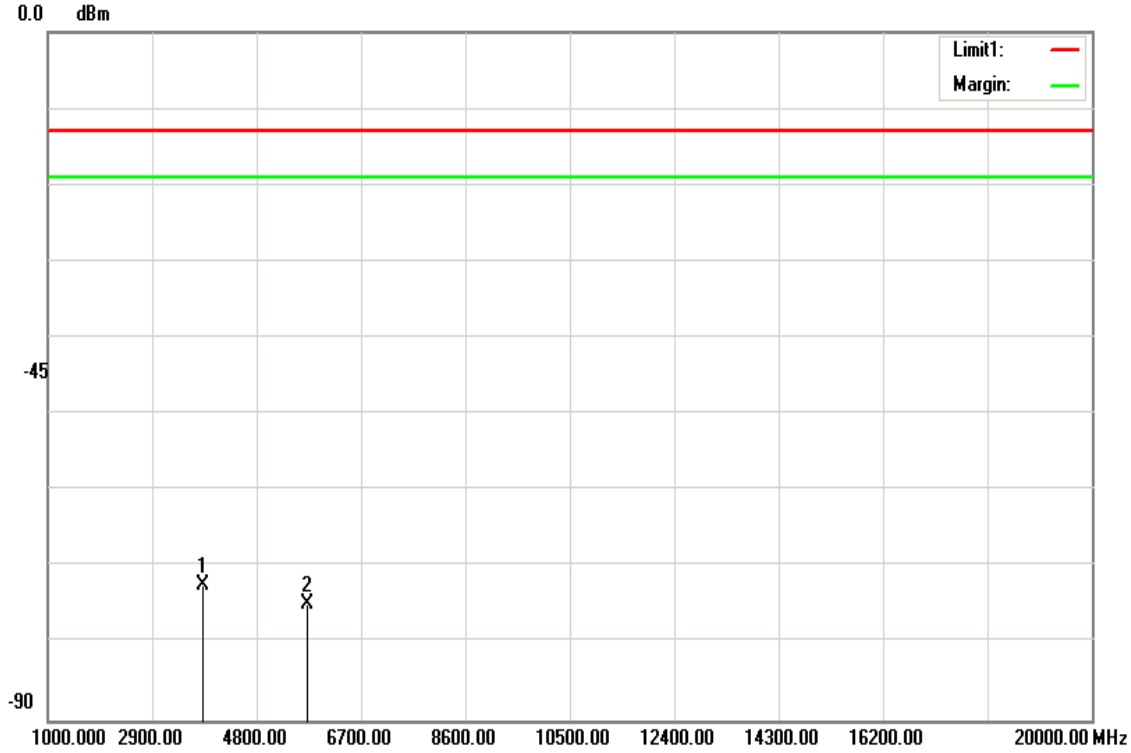


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3758.000	-84.24	6.95	12.55	-78.64	-13.00	-65.64	H
5640.000	-80.3	8.69	12.84	-76.15	-13.00	-63.15	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

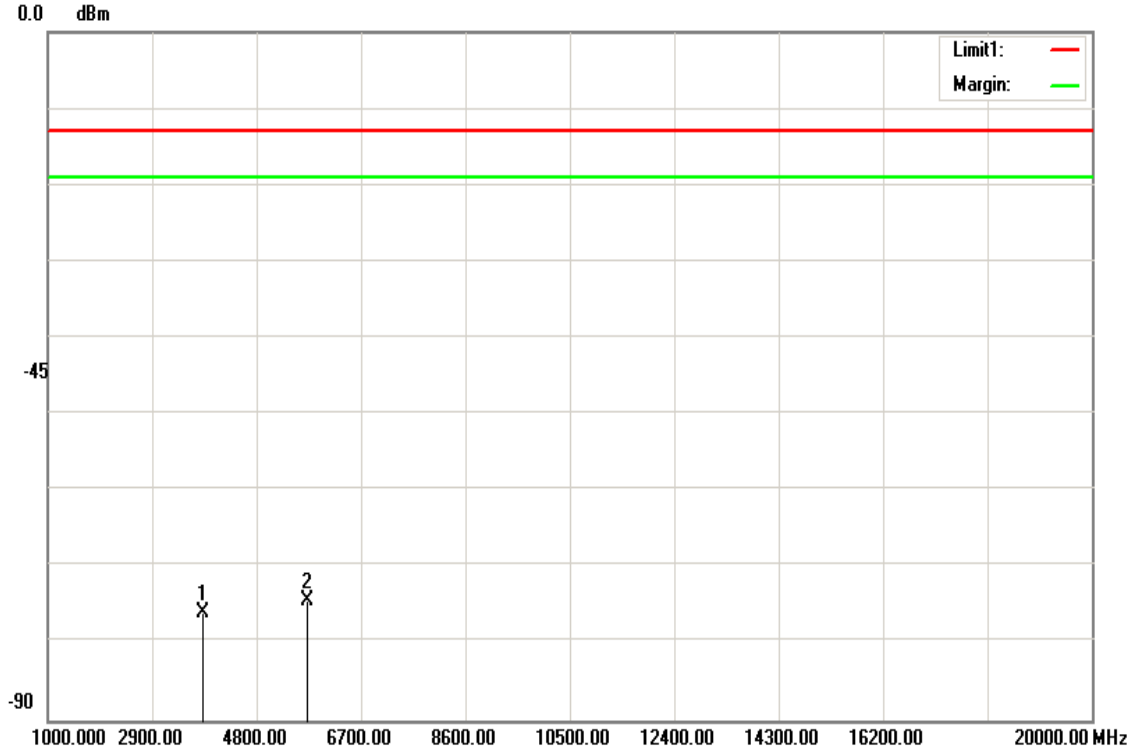


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-77.88	7.02	12.56	-72.34	-13.00	-59.34	V
5729.000	-78.93	8.76	12.81	-74.88	-13.00	-61.88	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GSM 1900 / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

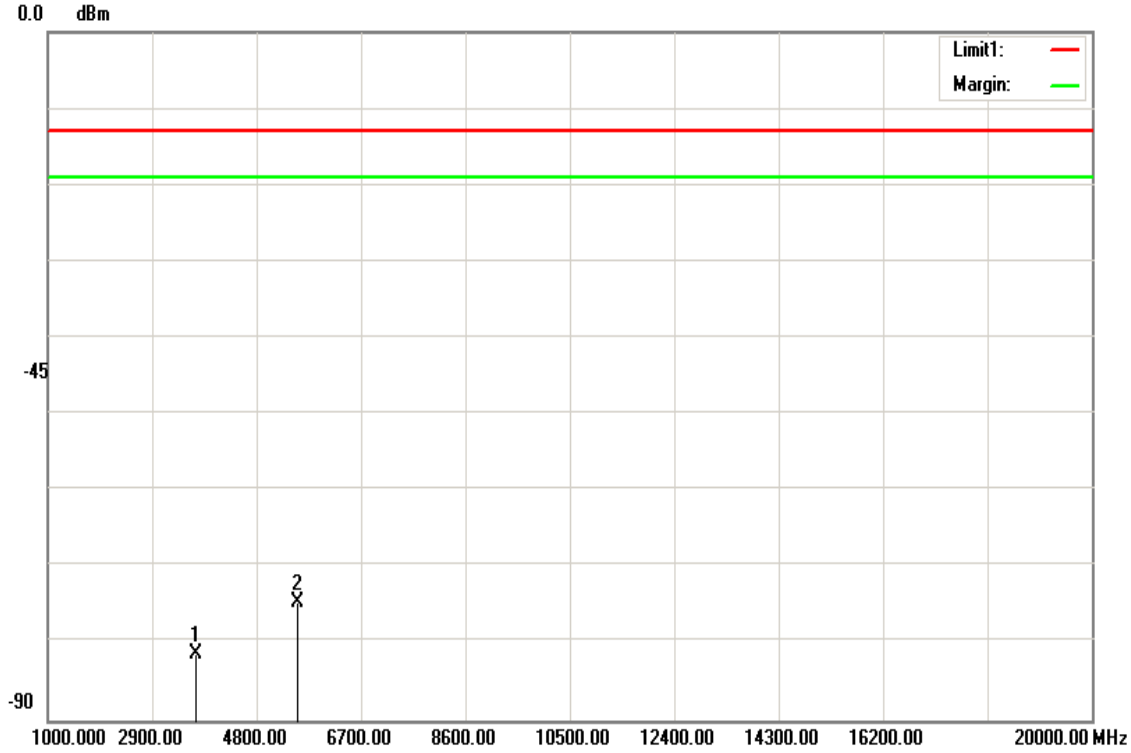


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-81.42	7.02	12.56	-75.88	-13.00	-62.88	H
5729.000	-78.32	8.76	12.81	-74.27	-13.00	-61.27	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

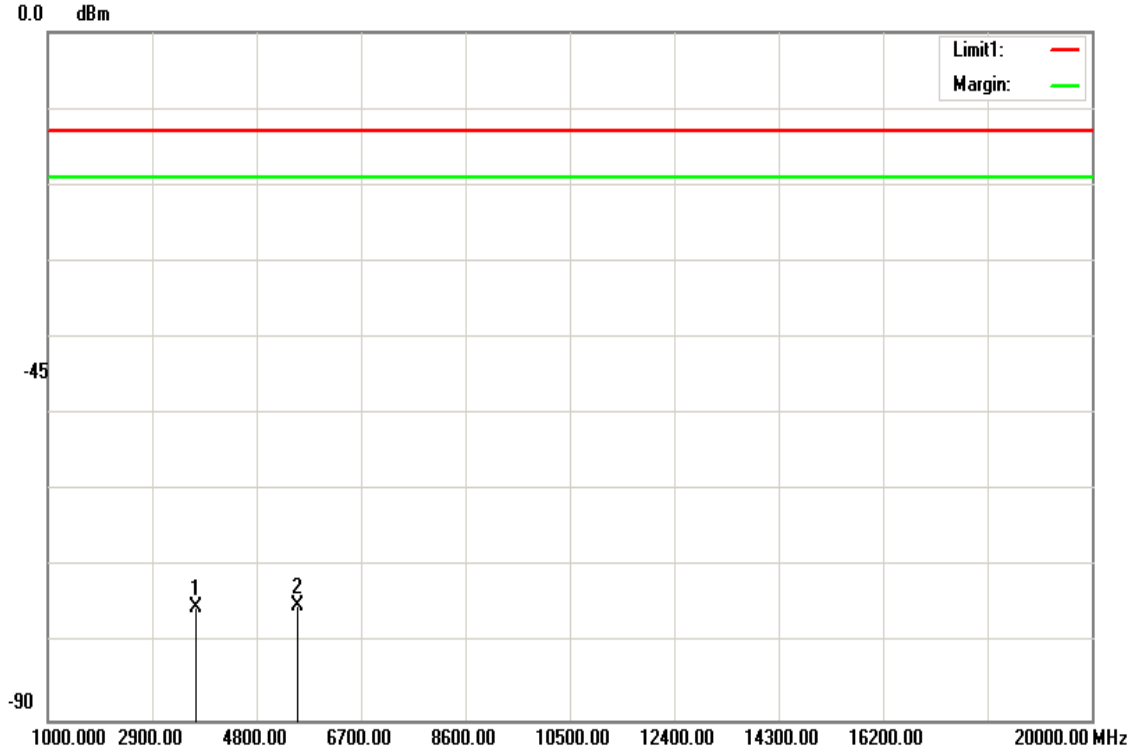


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.400	-86.88	6.89	12.54	-81.23	-13.00	-68.23	V
5550.600	-78.87	8.62	12.88	-74.61	-13.00	-61.61	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

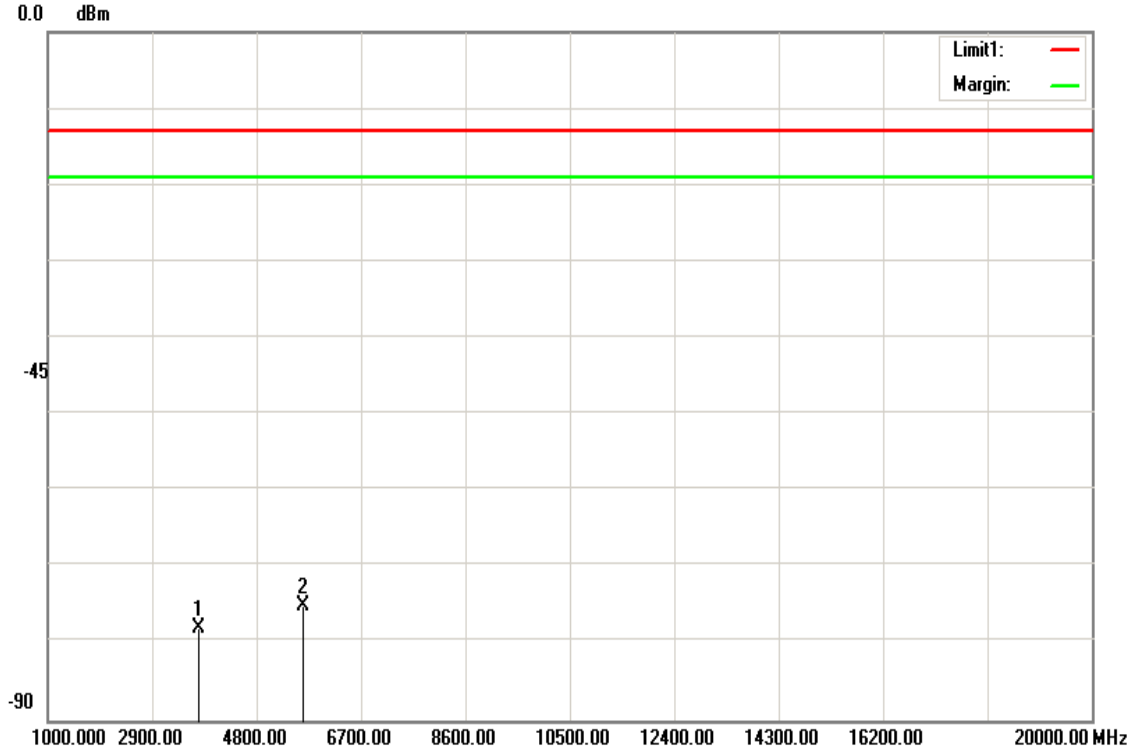


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.400	-80.96	6.89	12.54	-75.31	-13.00	-62.31	H
5550.600	-79.4	8.62	12.88	-75.14	-13.00	-62.14	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

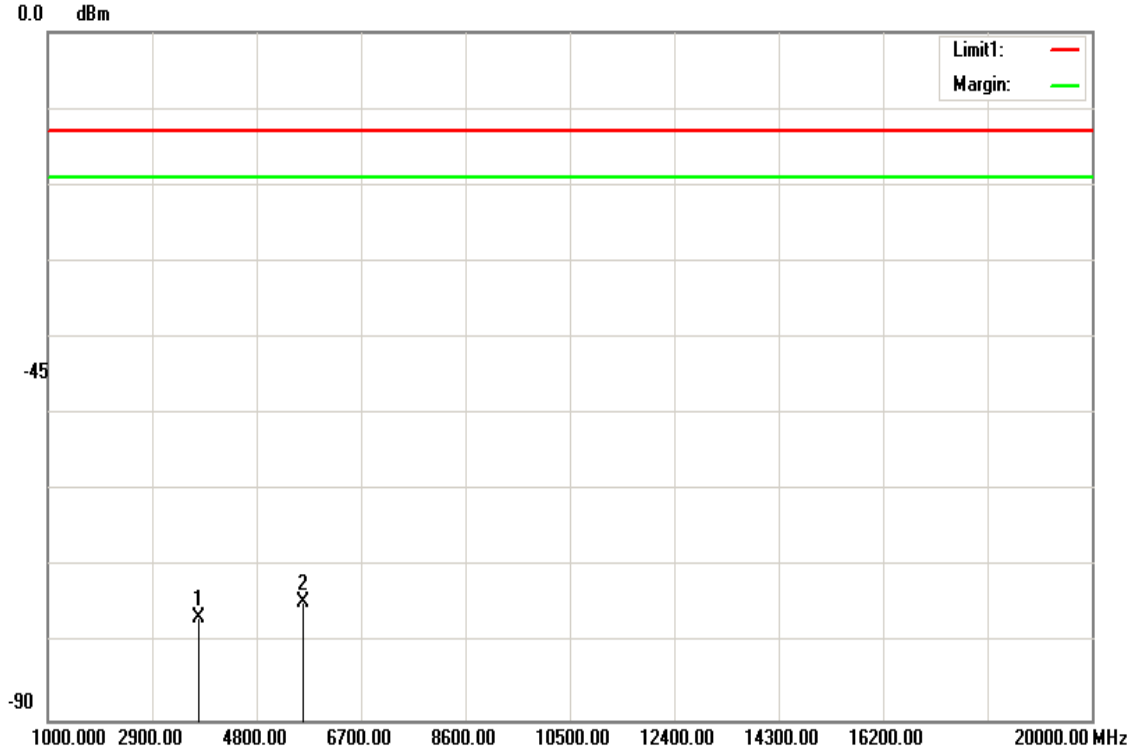


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3758.000	-83.67	6.95	12.55	-78.07	-13.00	-65.07	V
5640.000	-79.22	8.69	12.84	-75.07	-13.00	-62.07	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

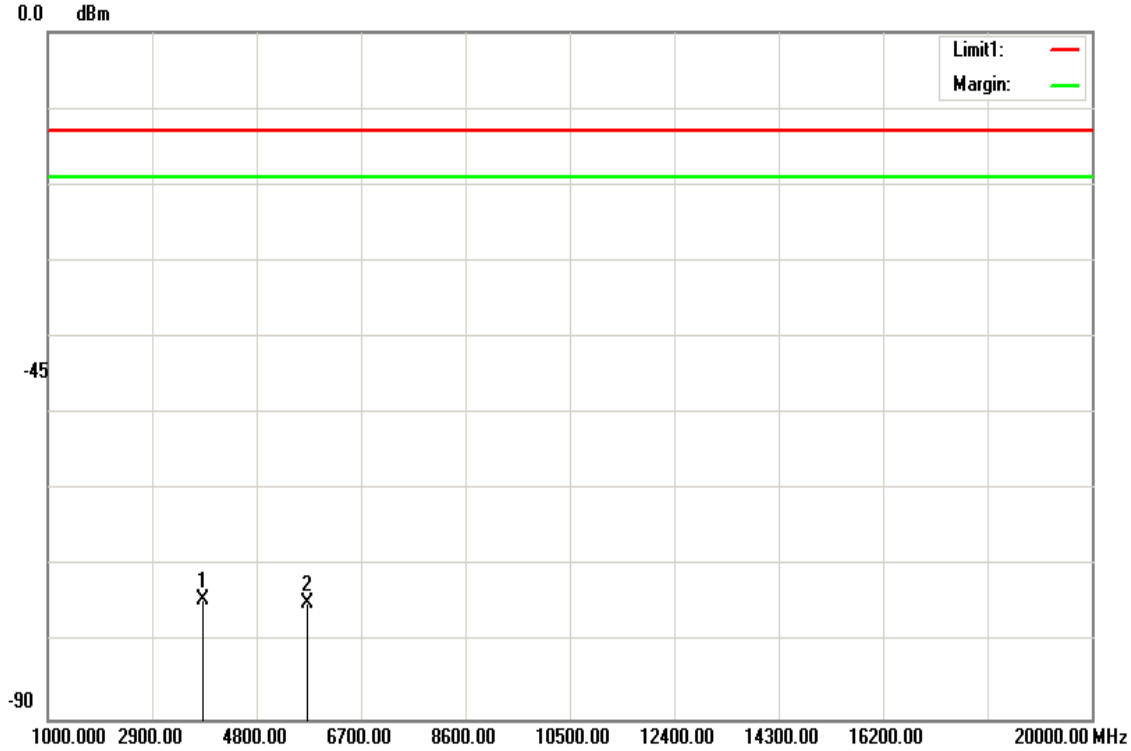


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3758.000	-82.13	6.95	12.55	-76.53	-13.00	-63.53	H
5640.000	-78.8	8.69	12.84	-74.65	-13.00	-61.65	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Ver.

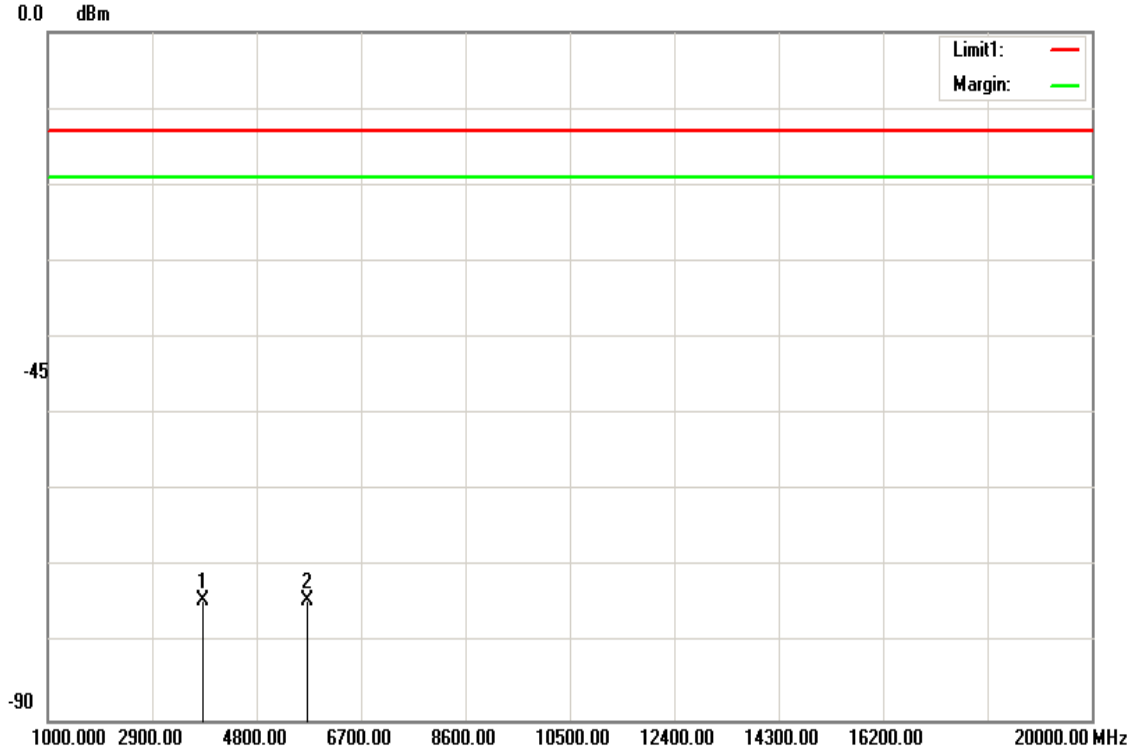


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-79.89	7.02	12.56	-74.35	-13.00	-61.35	V
5729.400	-78.97	8.76	12.81	-74.92	-13.00	-61.92	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	GPRS 1900(4Down1Up) / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	55 % RH	**Polarity:**	Hor.

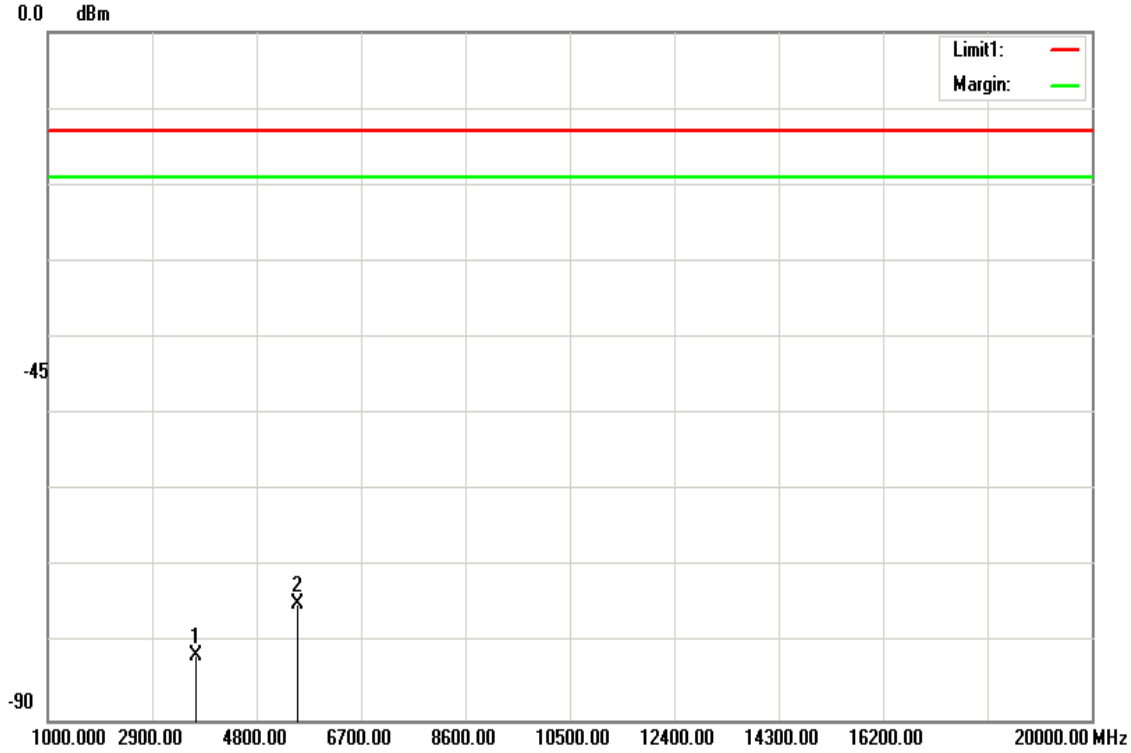


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-79.88	7.02	12.56	-74.34	-13.00	-61.34	H
5729.400	-78.46	8.76	12.81	-74.41	-13.00	-61.41	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

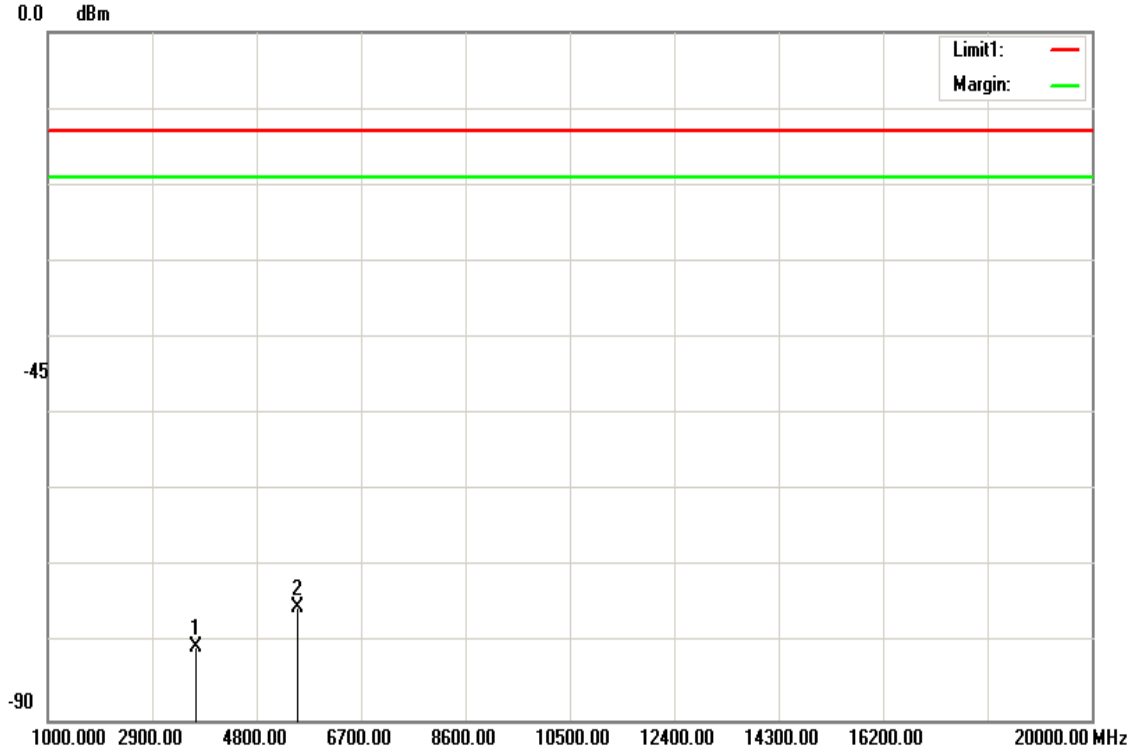


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.400	-87.11	6.89	12.54	-81.46	-13.00	-68.46	V
5550.600	-79.14	8.62	12.88	-74.88	-13.00	-61.88	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 512	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

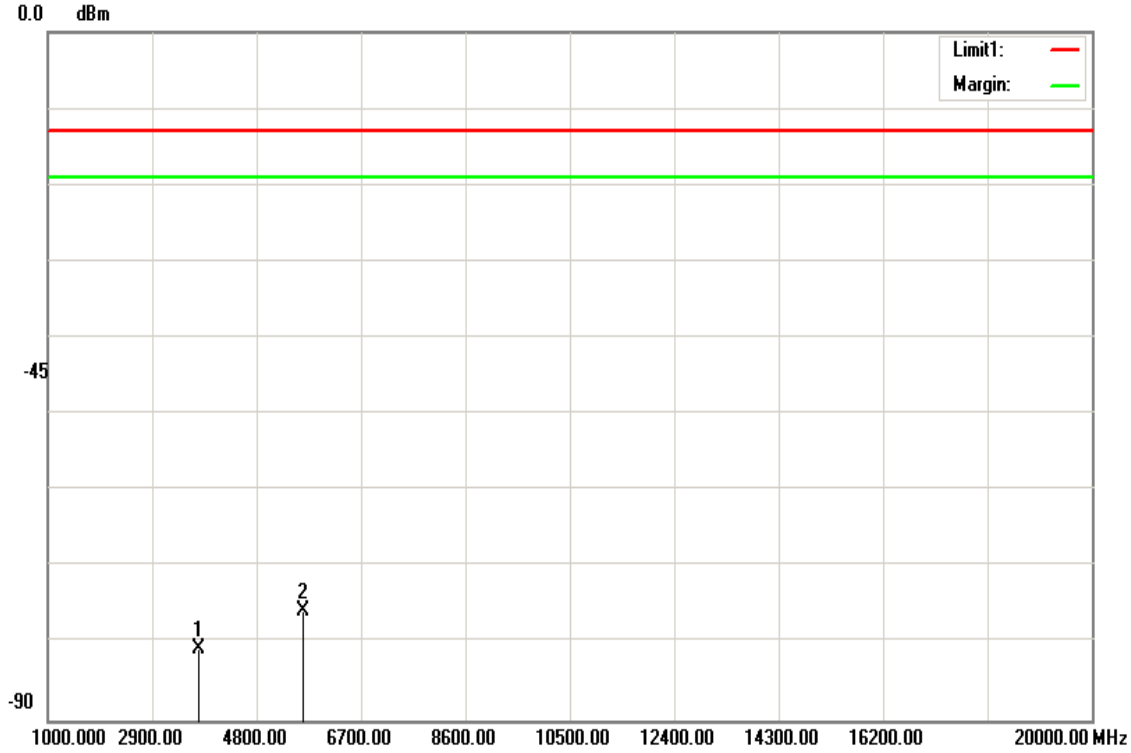


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.400	-86.11	6.89	12.54	-80.46	-13.00	-67.46	H
5550.600	-79.56	8.62	12.88	-75.30	-13.00	-62.30	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

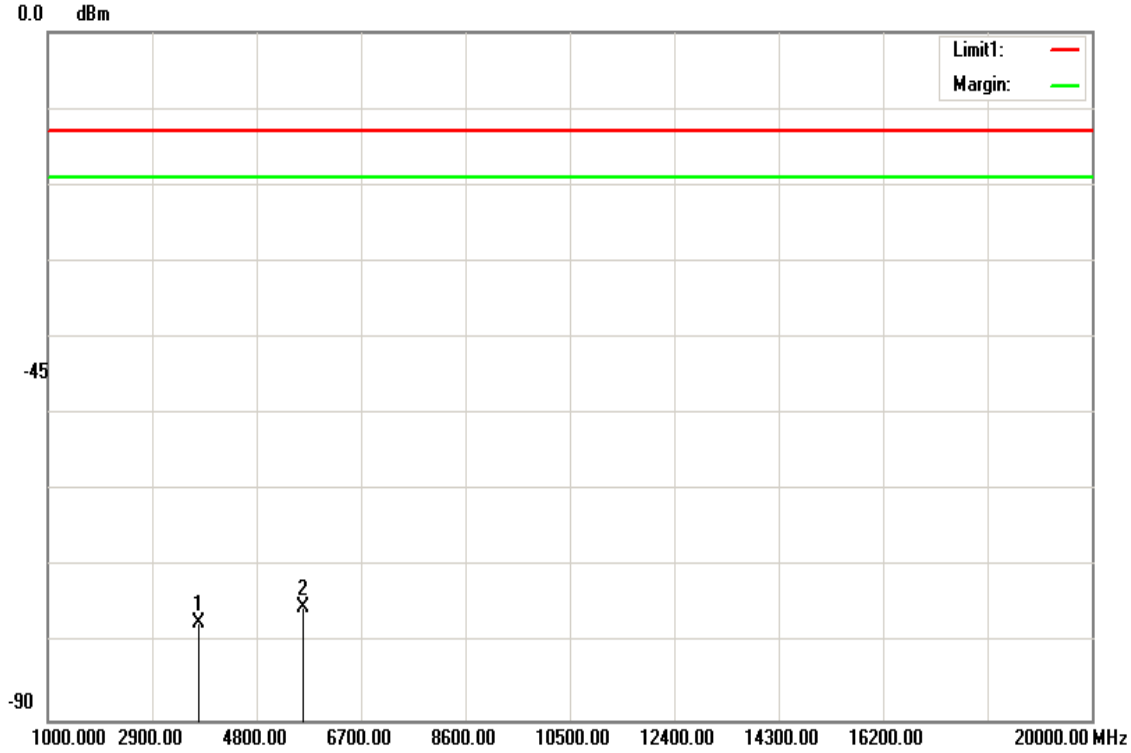


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-86.32	6.96	12.55	-80.73	-13.00	-67.73	V
5640.000	-79.8	8.69	12.84	-75.65	-13.00	-62.65	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 661	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.

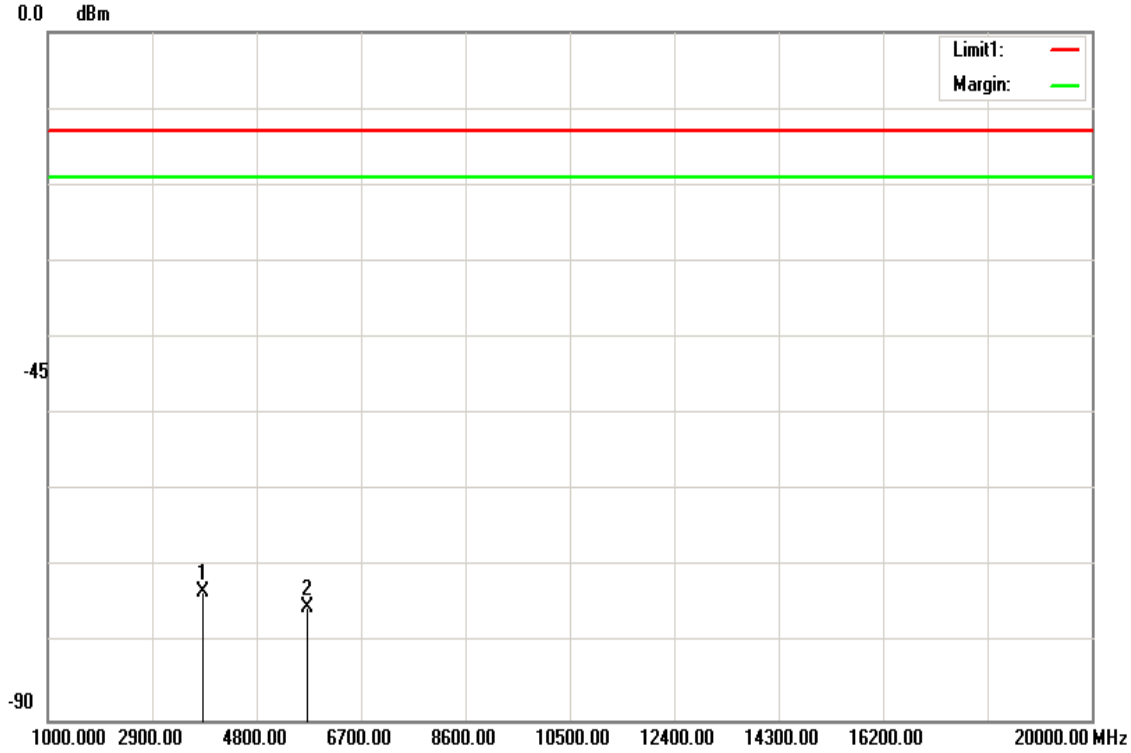


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3758.000	-82.92	6.95	12.55	-77.32	-13.00	-64.32	H
5640.000	-79.41	8.69	12.84	-75.26	-13.00	-62.26	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Ver.

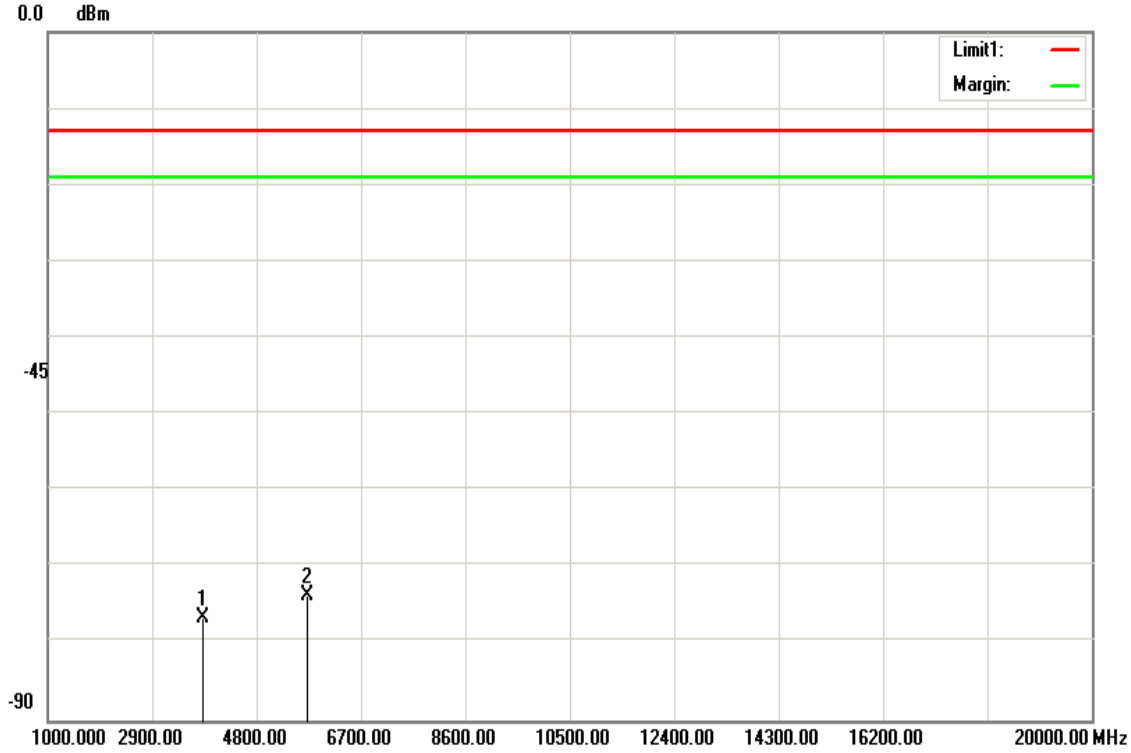


Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-78.75	7.02	12.56	-73.21	-13.00	-60.21	V
5729.400	-79.22	8.76	12.81	-75.17	-13.00	-62.17	V
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode:	EGPRS 1900(4Down1Up) / TX / CH 810	**Test Date:**	September 6, 2016
Temperature:	25°C	**Tested by:**	Weicheng Kuo
Humidity:	50 % RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3821.000	-82.2	7.02	12.56	-76.66	-13.00	-63.66	H
5729.400	-77.85	8.76	12.81	-73.80	-13.00	-60.80	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

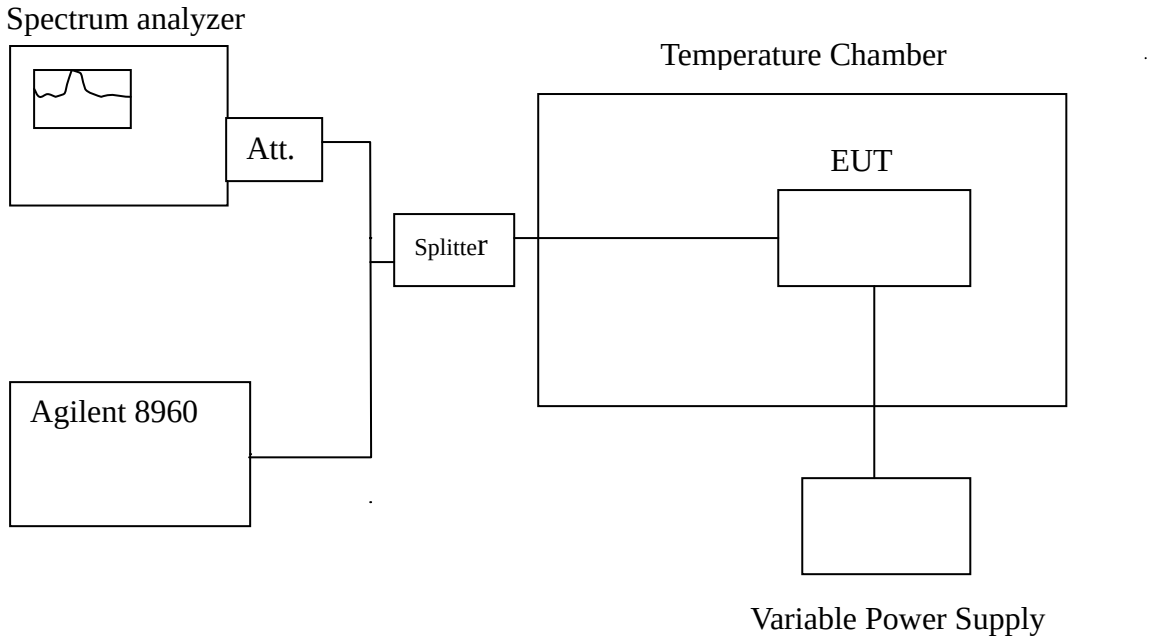
7.1 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235.

Frequency Tolerance: 2.5 ppm

Test Configuration



Remark: *Measurement setup for testing on Antenna connector.*

TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST RESULTS

Pass.

Reference Frequency: GSM Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-5	-0.0060	2.5
	40	-7	-0.0084	
	30	-6	-0.0072	
	20	-5	-0.0060	
	10	-6	-0.0072	
	0	-7	-0.0084	
	-10	-5	-0.0060	
	-20	-6	-0.0072	
	-30	-7	-0.0084	

Reference Frequency: GSM Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-15	-0.0080	2.5
	40	-17	-0.0090	
	30	-15	-0.0080	
	20	-16	-0.0085	
	10	-17	-0.0090	
	0	-16	-0.0085	
	-10	-15	-0.0080	
	-20	-15	-0.0080	
	-30	-17	-0.0090	

Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-16	-0.0191	2.5
	40	-14	-0.0167	
	30	-7	-0.0084	
	20	-3	-0.0036	
	10	-5	-0.0060	
	0	-17	-0.0203	
	-10	-18	-0.0215	
	-20	-17	-0.0203	
	-30	-19	-0.0227	

Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-8	-0.0043	2.5
	40	-6	-0.0032	
	30	-5	-0.0027	
	20	-7	-0.0037	
	10	-5	-0.0027	
	0	-3	-0.0016	
	-10	-8	-0.0043	
	-20	-14	-0.0074	
	-30	-12	-0.0064	

Reference Frequency: EGPRS Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-7	-0.0084	2.5
	40	-9	-0.0108	
	30	-6	-0.0072	
	20	-3	-0.0036	
	10	-8	-0.0096	
	0	-5	-0.0060	
	-10	-13	-0.0155	
	-20	-17	-0.0203	
	-30	-15	-0.0179	

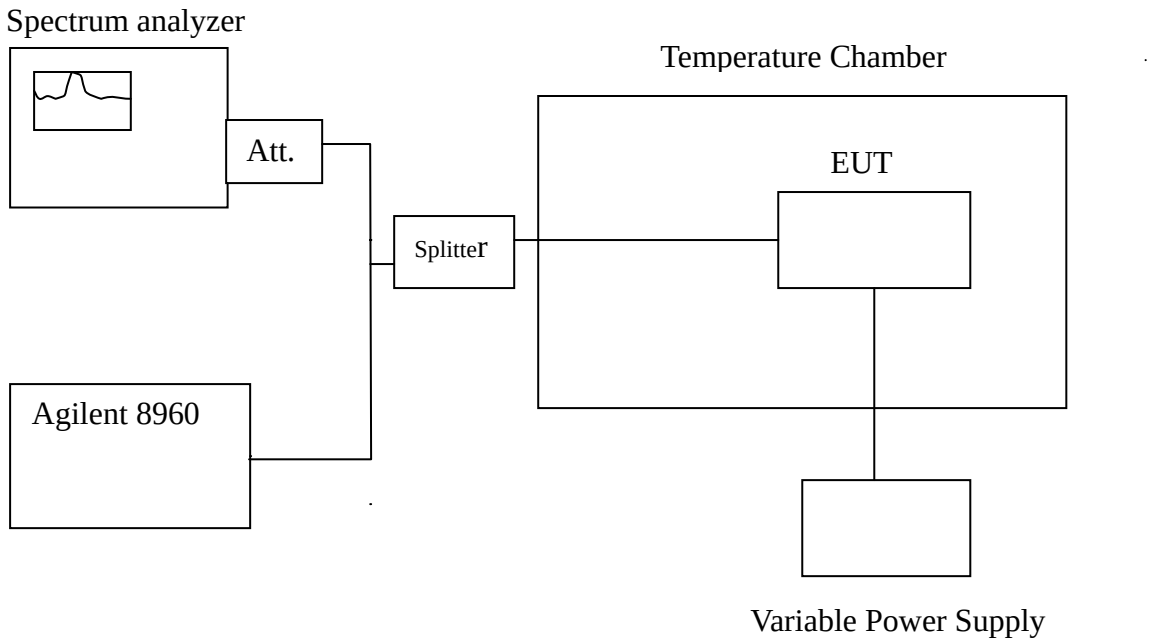
Reference Frequency: EGPRS Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5	50	-13.00	-0.0069	2.5
	40	-11.00	-0.0059	
	30	-9.00	-0.0048	
	20	-4.00	-0.0021	
	10	-7.00	-0.0037	
	0	-18.00	-0.0096	
	-10	-15.00	-0.0080	
	-20	-11.00	-0.0059	
	-30	-13.00	-0.0069	

7.2 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235,

Test Configuration



Remark: *Measurement setup for testing on Antenna connector.*

TEST PROCEDURE

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (± 15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Pass.

Reference Frequency: GSM Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-5	-0.0060	2.5
5		-5	-0.0060	
4.25		-6	-0.0072	

Reference Frequency: GSM Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-16.00	-0.0085	2.5
5		-16.00	-0.0085	
4.25		-17.00	-0.0090	

Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-5.00	-0.0060	2.5
5		-3.00	-0.0036	
4.25		-7.00	-0.0084	

Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-7.00	-0.0037	2.5
5		-7.00	-0.0037	
4.25		-8.00	-0.0043	

Reference Frequency: EGPRS Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-4.00	-0.0048	2.5
5		-3.00	-0.0036	
4.25		-5.00	-0.0060	

Reference Frequency: EGPRS Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
5.75	20	-5.00	-0.0027	2.5
5		-4.00	-0.0021	
4.25		-6.00	-0.0032	