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

TEST REPORT

For

Computer

Model: TREK-530

Trade Name: ADVANTECH

Issued to

Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Wugu Laboratoty
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
Issued Date: May 23, 2018

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		May 23, 2018		Initial Issue	ALL	Allison Chen
01		August 21, 2018		1. Revised antenna type. 2. Revised test summary. 3. Revised test methodology: KDB 971168 D01 Power Meas License Digital Systems 4. Revised date of test in section 1. 5. Removed power meter and power sensor in section 5.2. 6. Revised test data for reported values in section 8.4. 7. Revised test procedure of antenna gain values of (dBd) to (dBi) in section 8.6.	P.4-7, 9, 27-28, 44	Allison Chen
02		August 29, 2018		1. Revised test procedure in section 8.6.	P.44	Allison Chen

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Manufacturer:	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Equipment Under Test:	Computer
Trade Name:	ADVANTECH
Model Number:	TREK-530
Date of Test:	November 28, 2017 ~ May 29, 2018

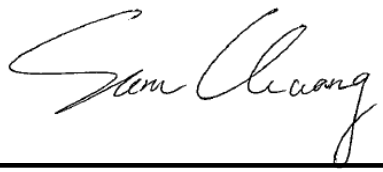
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 22 Subpart H & Part 24 Subpart E	No non-compliance noted

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-603-E 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.

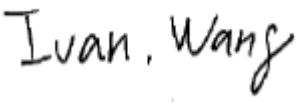
The test results of this report relate only to the tested sample identified in this report.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Ivan Wang
Assistant Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer
Trade Name	ADVANTECH
Model Number	TREK-530
Received Date	September 8, 2017
Power Supply	Powered from host device.(DC 12V)
Frequency Range	GPRS / EGPRS: 850: 824.2 ~ 848.8 MHz GPRS / EGPRS: 1900: 1850.2 ~ 1909.8 MHz
Transmit Power (ERP & EIRP Power)	GPRS 850: 24.31dBm GPRS 1900: 27.08dBm EGPRS 850: 22.73dBm EGPRS 1900: 27.12dBm
Cellular Phone Protocol	GPRS: GMSK EGPRS: 8PSK
Antenna Gain	Dipole Antenna GPRS 850: -1.8dBi GPRS 1900: 1.2dBi EGPRS 850: -1.8dBi EGPRS 1900: 1.2dBi

Remark:

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

3. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
2.1049	8.1	99% Bandwidth	Pass
2.1046	8.2	Peak Power	Pass
2.1046	8.3	Average Power	Pass
22.913(a), 24.232(c)	8.4	ERP and EIRP Measurement	Pass
2.1051, 22.917(a), 24.238(a)	8.5	Conducted Spurious Emission	Pass
22.917(a), 24.238(a)	8.6	Spurious Radiation Measurement	Pass
2.1055, 22.355, 24.235	8.7	Frequency Stability v.s. temperature measurement	Pass
2.1055, 22.355, 24.235	8.8	Frequency Stability v.s. voltage measurement	Pass

4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on TIA-603-E and FCC CFR 47, Part 2, PART 22 SUBPART H AND PART 24 SUBPART E, KDB 971168 D01 Power Meas License Digital Systems.

4.1 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.

4.2 EUT EXERCISE

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

4.3 DESCRIPTION OF TEST MODES

The EUT (model: TREK-530) had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed.

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

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

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

EGPRS 850 and GPRS 1900

Radiated Emission Measurement	
Test Condition	**Band edge, Emission for Unwanted and Fundamental**
DC Voltage	**DC 12V**
Test Mode	**Mode 1: EUT power by Power Supply.**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**
Position	☐ **P**laced in fixed position. ☐ **P**laced in fixed position at X-Plane (E2-Plane) ☐ **P**laced in fixed position at Y-Plane (E1-Plane) ☒ **P**laced in fixed position at Z-Plane (H-Plane)

Remark:
1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Z-Plane) were recorded in this report.

EGPRS 1900 and GPRS 850

Radiated Emission Measurement	
Test Condition	**Band edge, Emission for Unwanted and Fundamental**
DC Voltage	**DC 12V**
Test Mode	**Mode 1: EUT power by Power Supply.**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**
Position	☐ **P**laced in fixed position. ☒ **P**laced in fixed position at X-Plane (E2-Plane) ☐ **P**laced in fixed position at Y-Plane (E1-Plane) ☐ **P**laced in fixed position at Z-Plane (H-Plane)

Remark:
1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (X-Plane) were recorded in this report.

5. INSTRUMENT CALIBRATION

5.1 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.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Wugu fully Chamber					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Signal Analyzer	Agilent	E4407B	MY44212686	04/07/2017	04/06/2018
Pre-Amplifier	EMEC	EM01M62G	60570	08/01/2017	07/31/2018
Bilog Antenna	Sunol Sciences	JB1	A052609	03/17/2017	03/16/2018
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/08/2017	03/07/2018
Pre-Amplifier	Anritsu	MH648A	M89145	06/27/2017	6/26/2018
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
Filter	N/A	800-1G	N/A	07/20/2017	07/19/2018
Filter	N/A	1800-2000	N/A	07/20/2017	07/19/2018
WWAN signal cable	HUBER SUHNER	SUCOFLEX 104PEA	33960	07/31/2017	07/30/2018
Base Station	R&S	CMU 200	101245	07/29/2017	07/25/2018

Conducted Emissions Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Base Station	R&S	CMU 200	101245	07/29/2017	07/25/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Spectrum Analyzer	Keysight	N9010B	MY55460167	06/14/2017	06/13/2018
Thermostatic/Hrgrosatic Chamber	TAICHY	MHG-150LF	930619	10/11/2017	10/10/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018

5.3 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.*

6. FACILITIES AND ACCREDITATIONS

6.1 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

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

6.2 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.”

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

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

7.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	FCC ID	Series No.	Data Cable
1	DC Power Source	GWINSTEK	SPS-3610	N/A	N/A	DC Cable 1.5m shielding
2	NB	ASUS	M5200AE	N/A	PD9WM3B2100	RS232 to USB Cable 1.5m

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.*

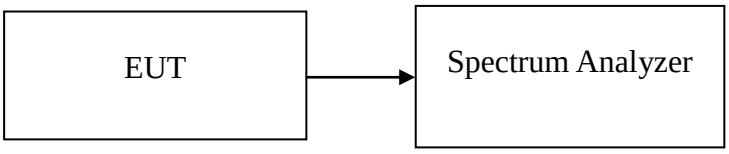
8. FCC PART 22 & 24 REQUIREMENTS

8.1 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

TEST RESULTS

No non-compliance noted.

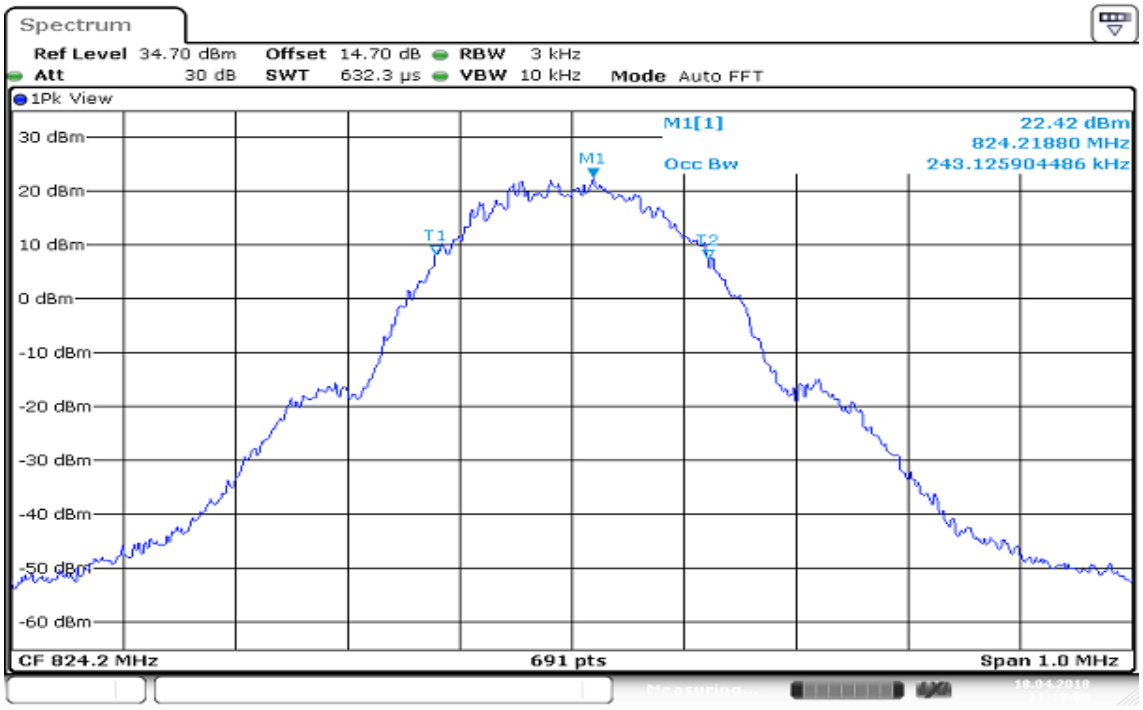
Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GPRS 850	128	824.20	243.125
	190	836.60	243.125
	251	848.80	***244.573**
EGPRS 850	128	824.20	244.573
	190	836.60	244.573
	251	848.80	***246.020**

Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GPRS 1900	512	1850.20	***247.467**
	661	1880.00	243.125
	810	1909.80	243.125
EGPRS 1900	512	1850.20	244.573
	661	1880.00	244.573
	810	1909.80	***247.467**

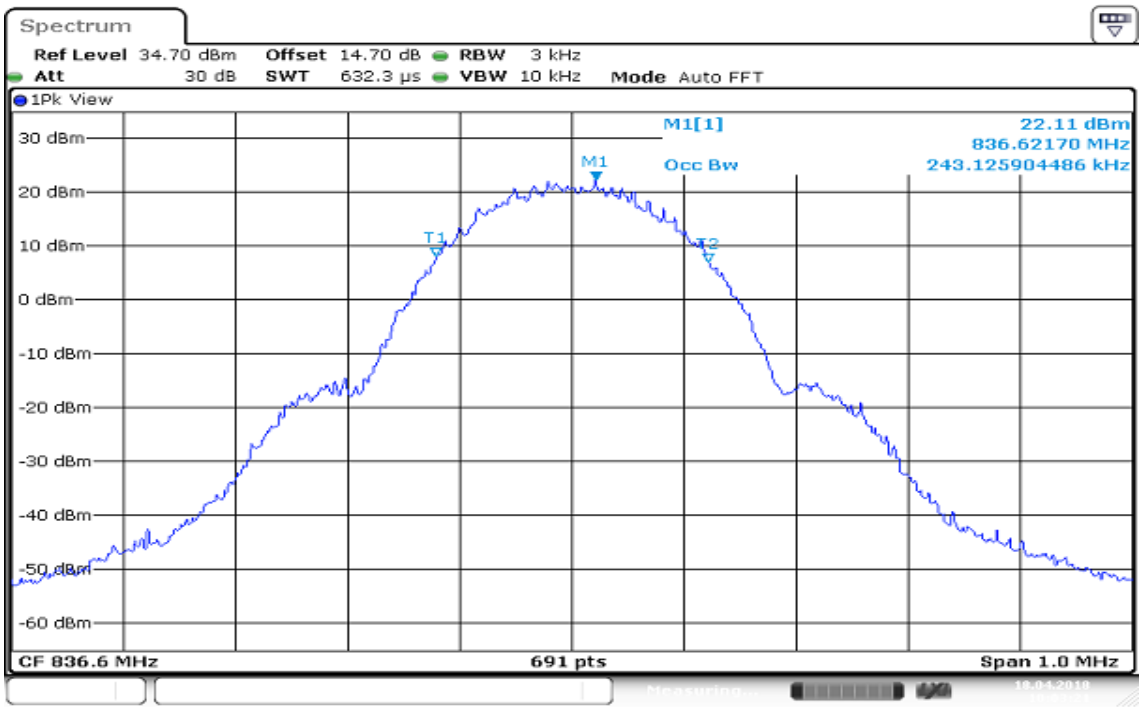
Test Plot

GPRS 850 (CH Low)



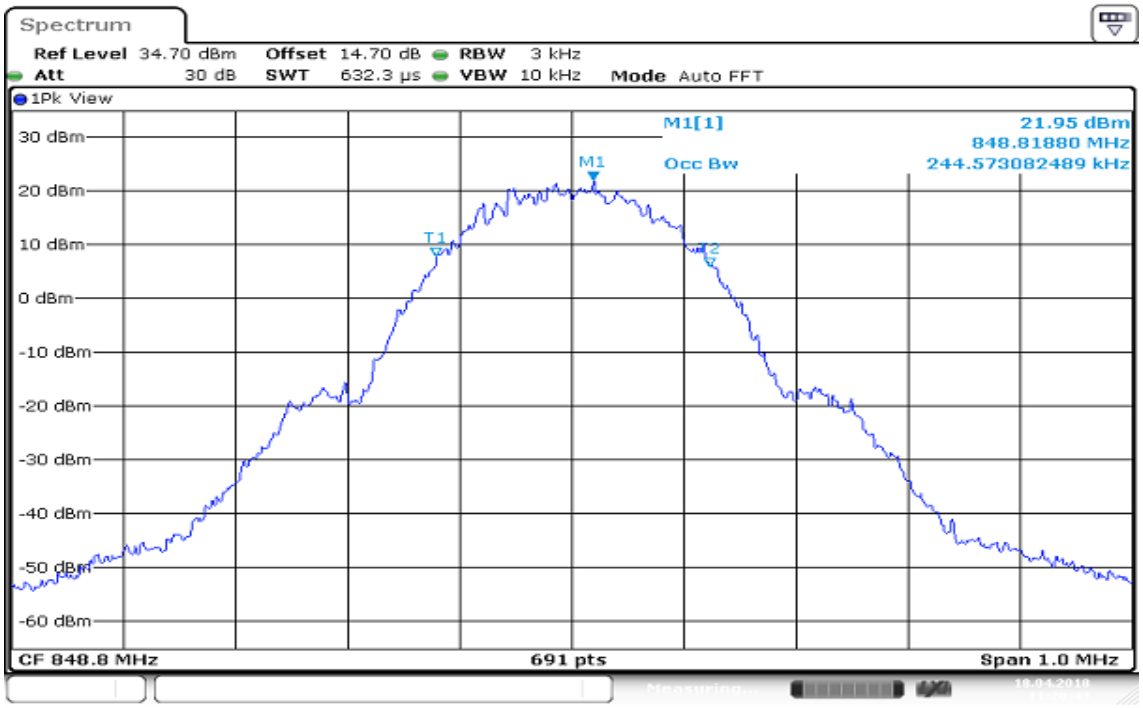
Date: 18.APR.2018 11:19:00

GPRS 850 (CH Mid)



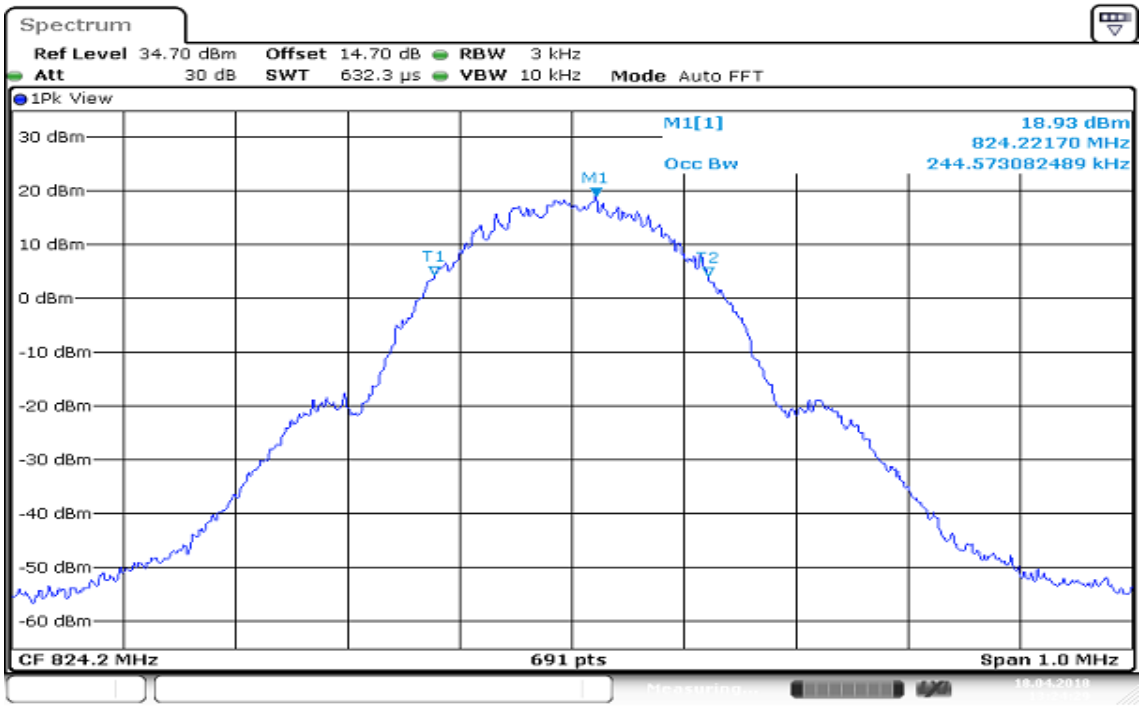
Date: 18.APR.2018 10:03:21

GPRS 850(CH High)



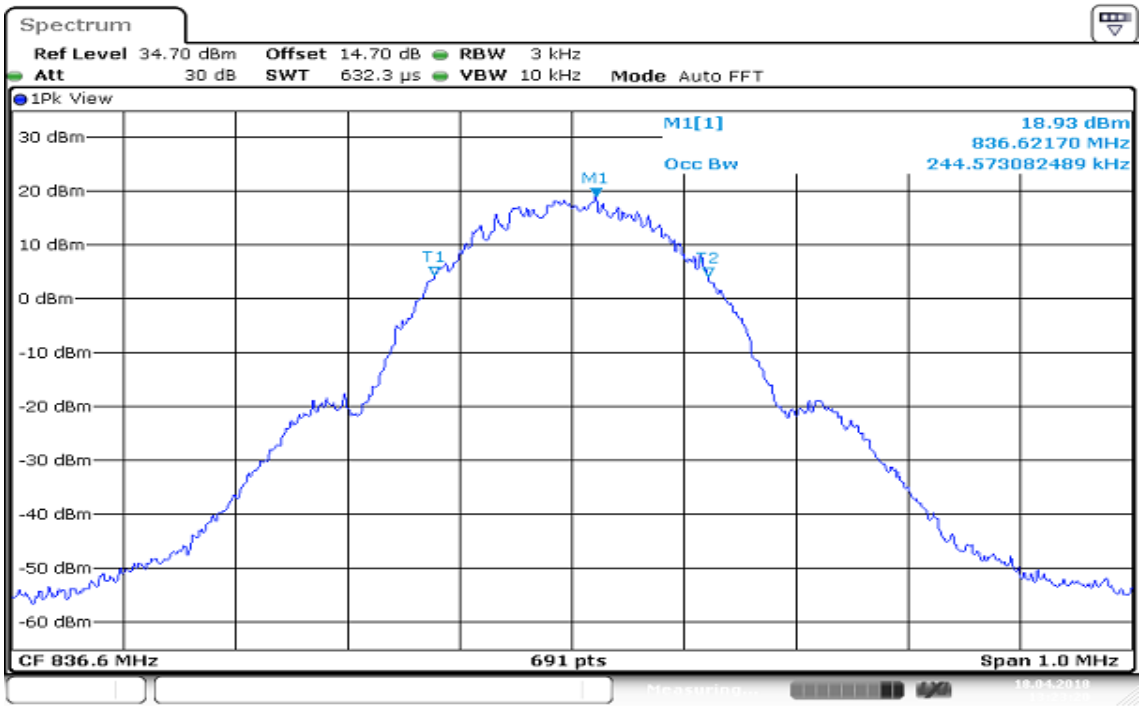
Date: 18.APR.2018 11:20:43

EGPRS 850 (CH Low)



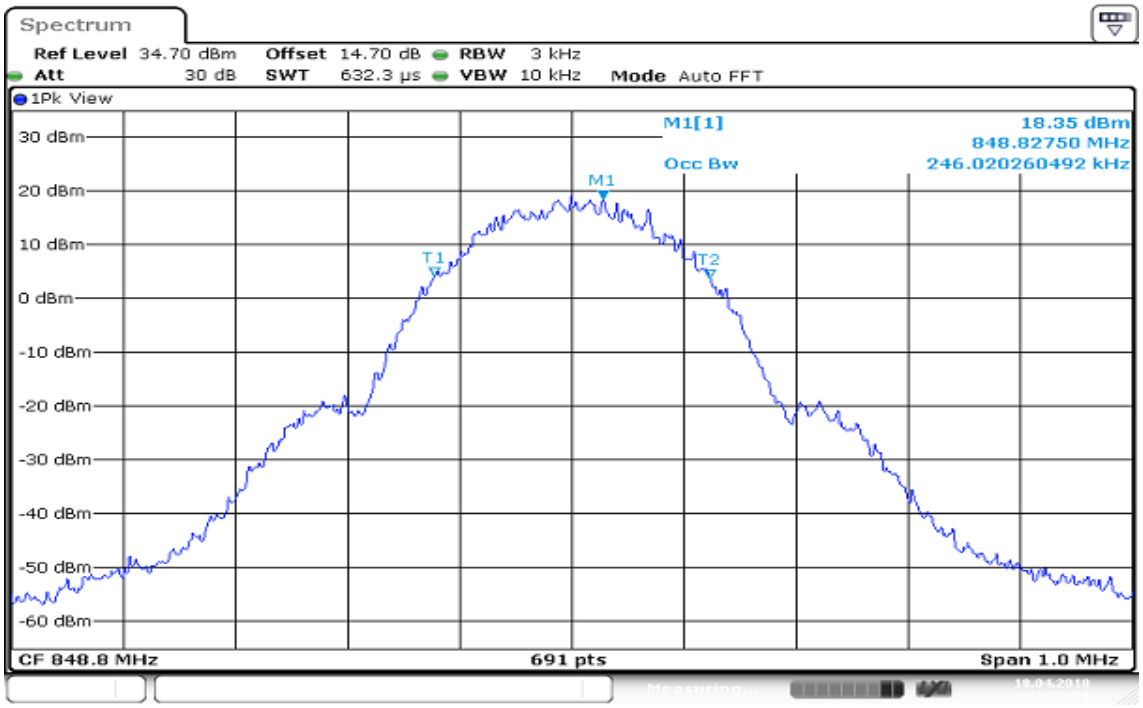
Date: 18.APR.2018 13:24:30

EGPRS 850 (CH Mid)

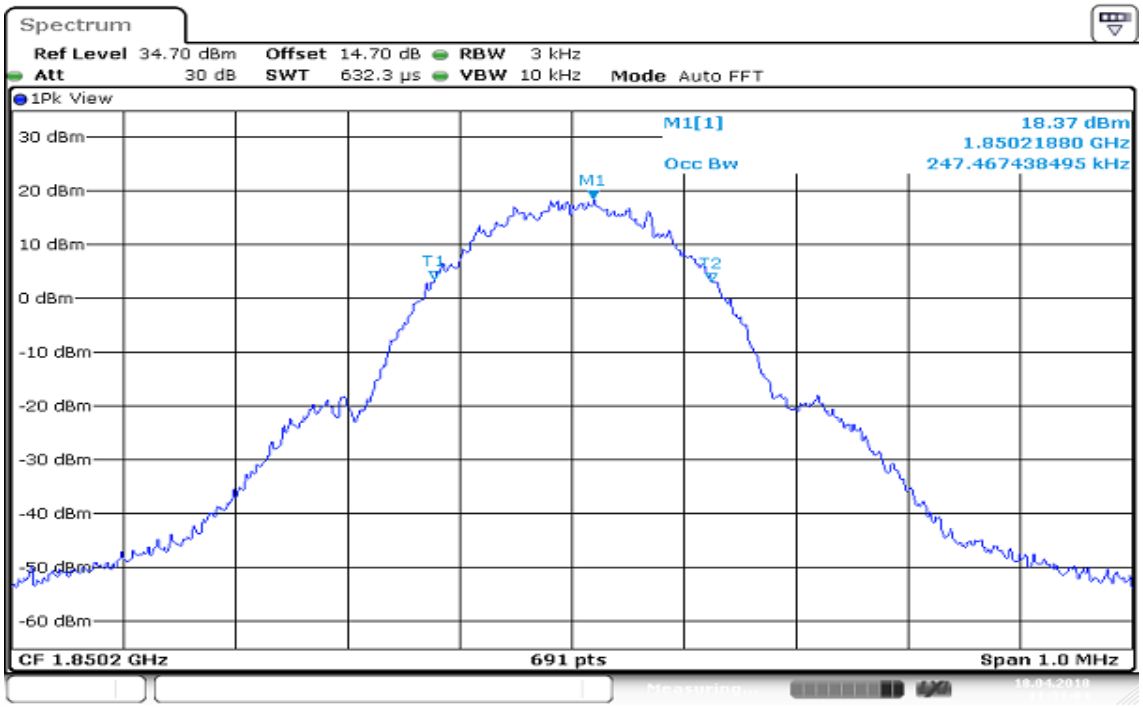


Date: 18.APR.2018 13:23:20

EGPRS 850(CH High)

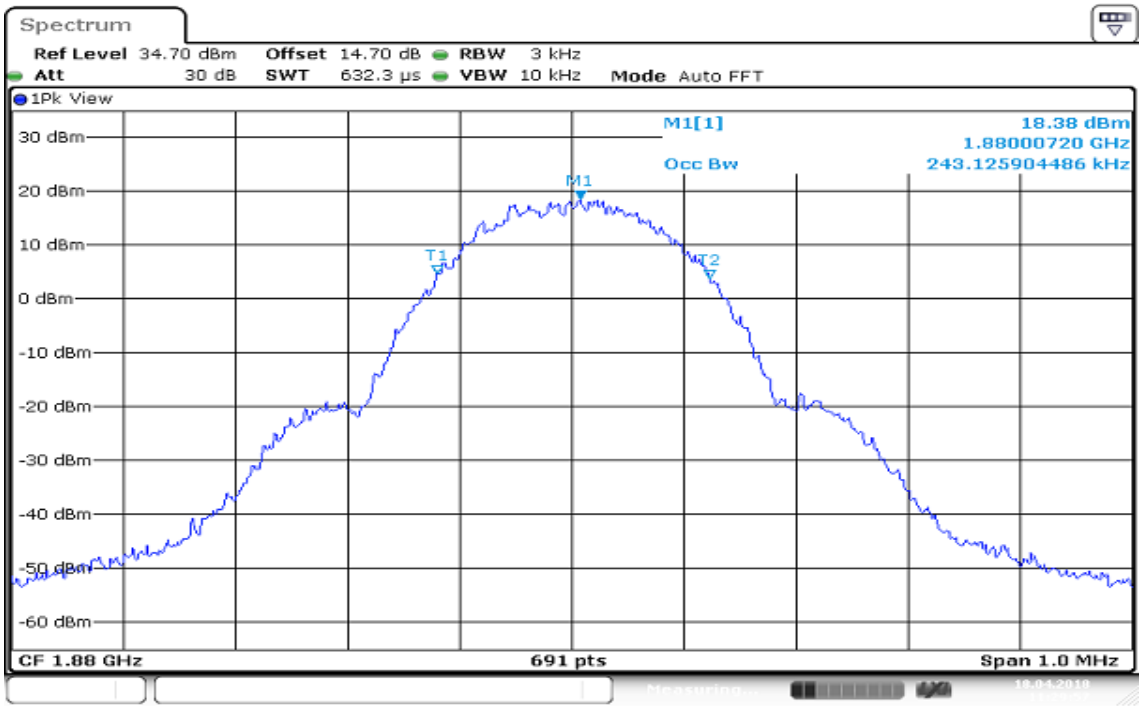


GPRS 1900 (CH Low)



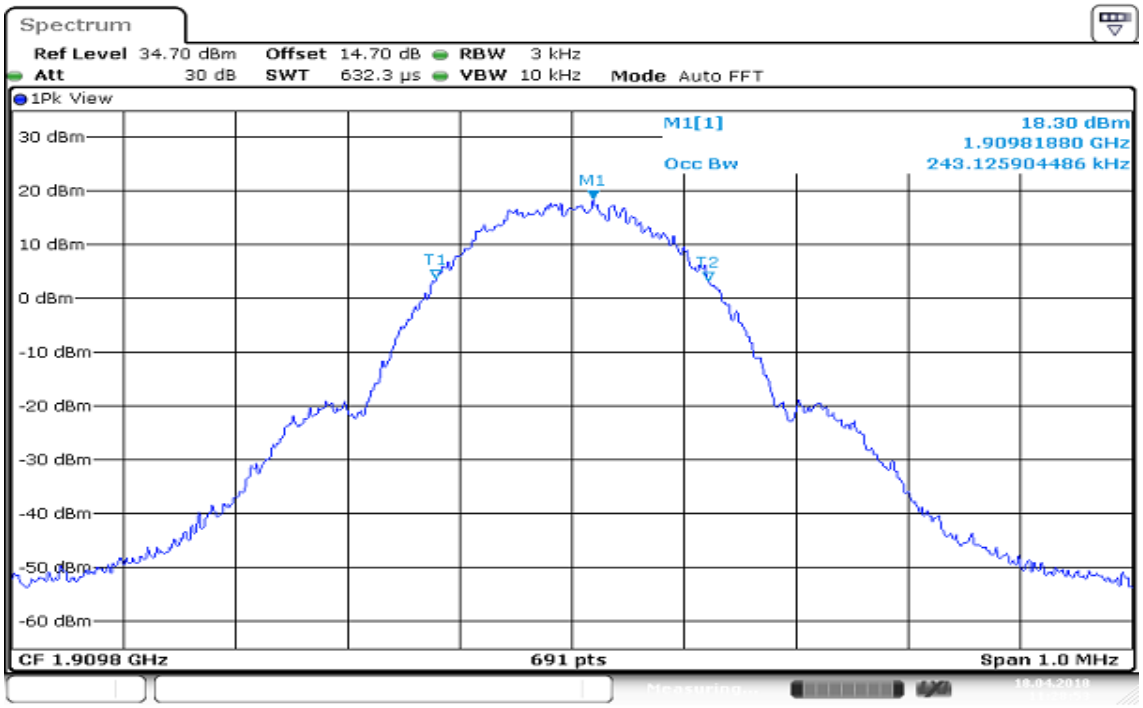
Date: 18.APR.2018 11:31:05

GPRS 1900 (CH Mid)

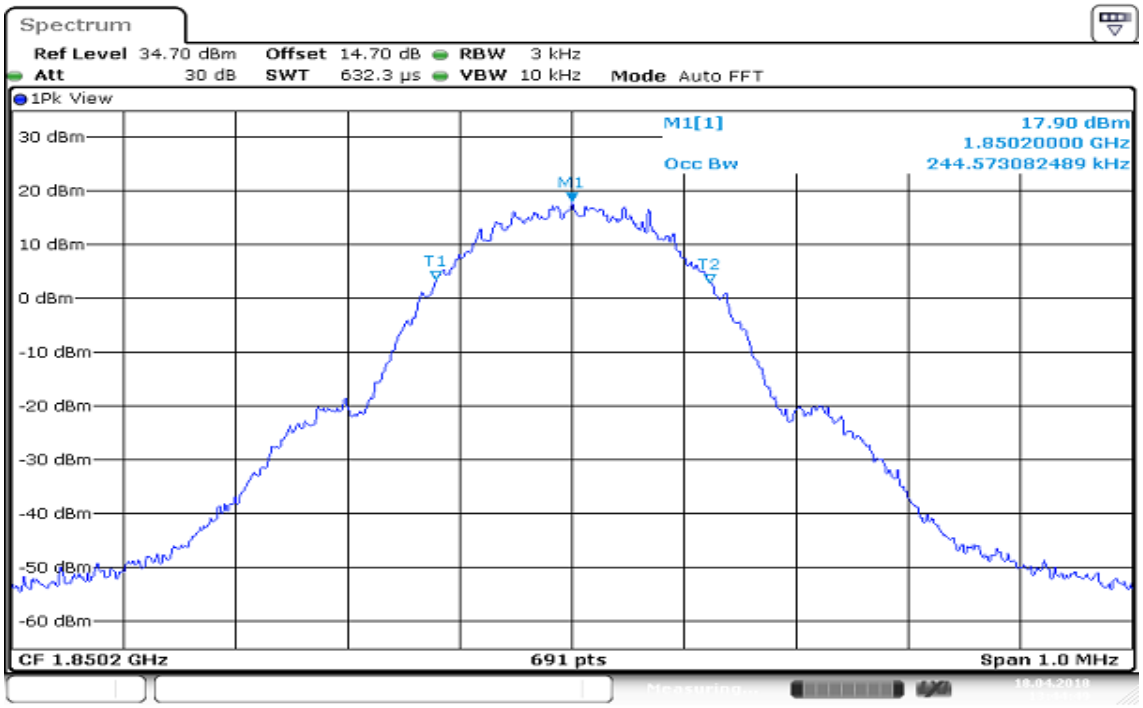


Date: 18.APR.2018 11:29:57

GPRS 1900 (CH High)

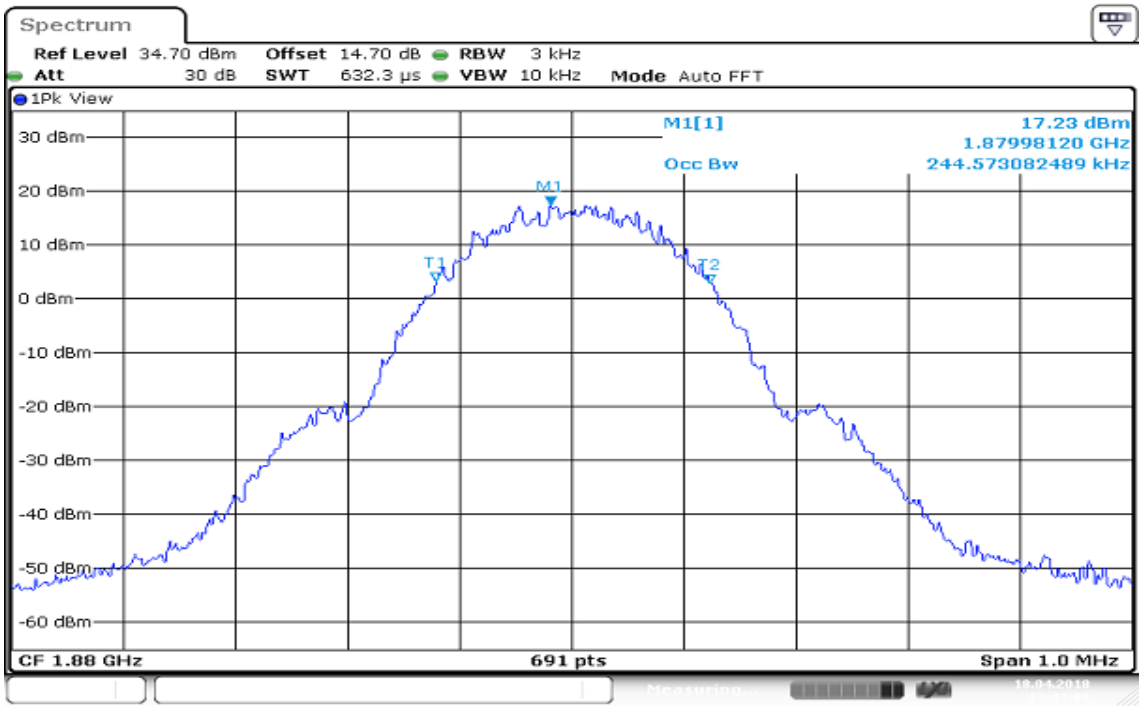


EGPRS 1900 (CH Low)



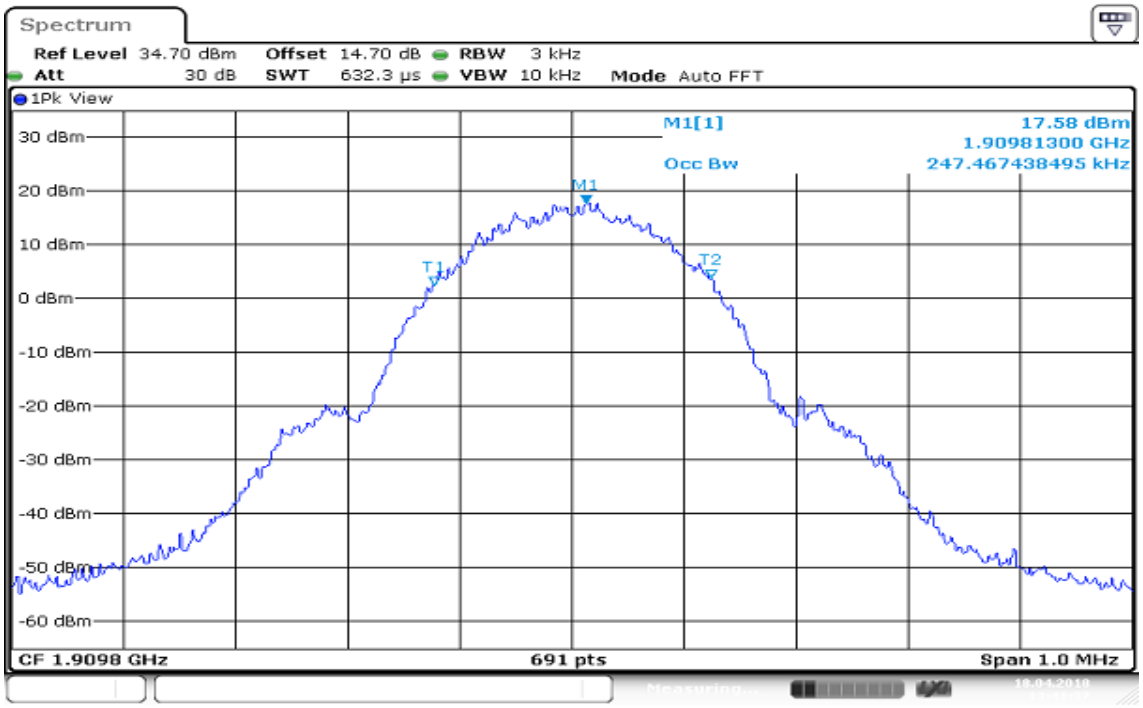
Date: 18.APR.2018 13:44:50

EGPRS 1900 (CH Mid)



Date: 18.APR.2018 13:43:09

EGPRS 1900 (CH High)

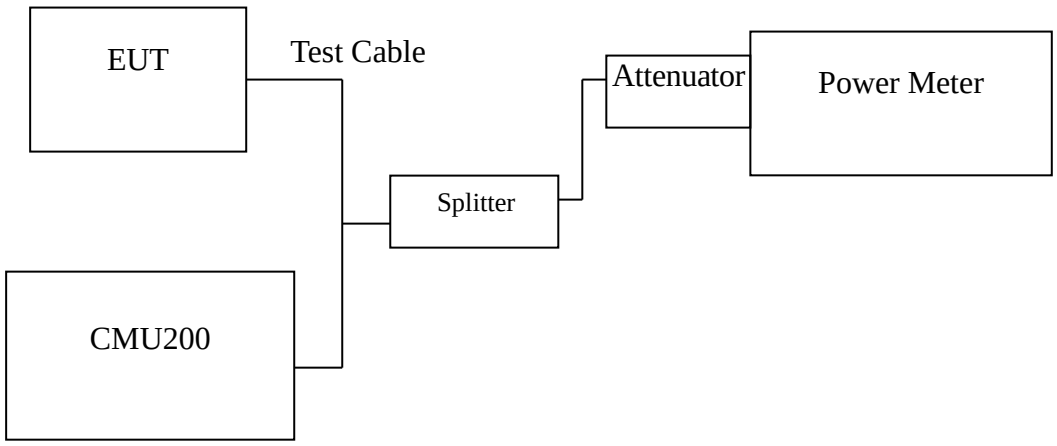


8.2 PEAK POWER

LIMIT

According to FCC §2.1046.

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

No non-compliance noted.

Test Data

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
GPRS 850	128	824.20	32.2	1.660
	190	836.60	32.1	1.622
	251	848.80	32.1	1.622

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
GPRS 1900	512	1850.20	29.8	0.955
	661	1880.00	29.7	0.933
	810	1909.80	29.7	0.933

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
EGPRS 850	128	824.20	26.7	0.468
	190	836.60	26.6	0.457
	251	848.80	26.6	0.457

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
EGPRS 1900	512	1850.20	25.8	0.380
	661	1880.00	25.7	0.372
	810	1909.80	25.7	0.372

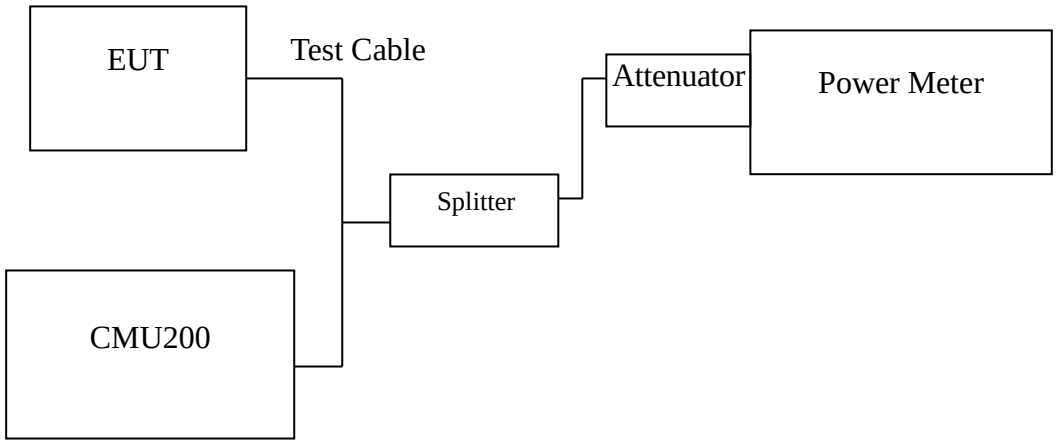
Remark: *The value of factor includes both the loss of cable and external attenuator*

8.3 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

No non-compliance noted.

Test Data

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
GPRS 850	128	824.20	32.1	1.622
	190	836.60	31.9	1.549
	251	848.80	31.9	1.549

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
GPRS 1900	512	1850.20	29.7	0.933
	661	1880.00	29.6	0.912
	810	1909.80	29.6	0.912

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
EGPRS 850	128	824.20	26.7	0.468
	190	836.60	26.5	0.447
	251	848.80	26.5	0.447

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
EGPRS 1900	512	1850.20	25.7	0.372
	661	1880.00	25.6	0.363
	810	1909.80	25.6	0.363

Remark: *The value of factor includes both the loss of cable and external attenuator*

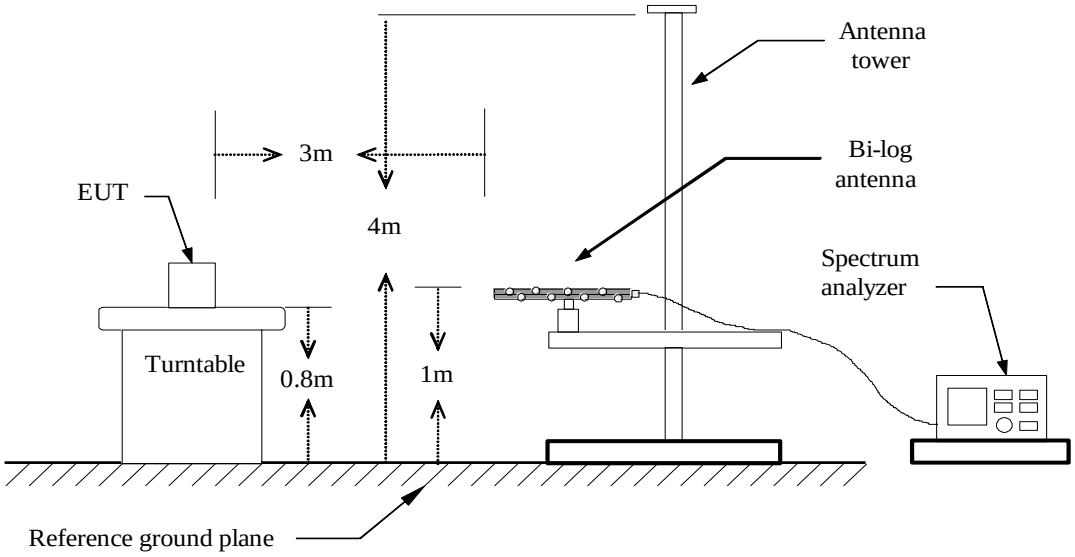
8.4 ERP & EIRP MEASUREMENT

LIMIT

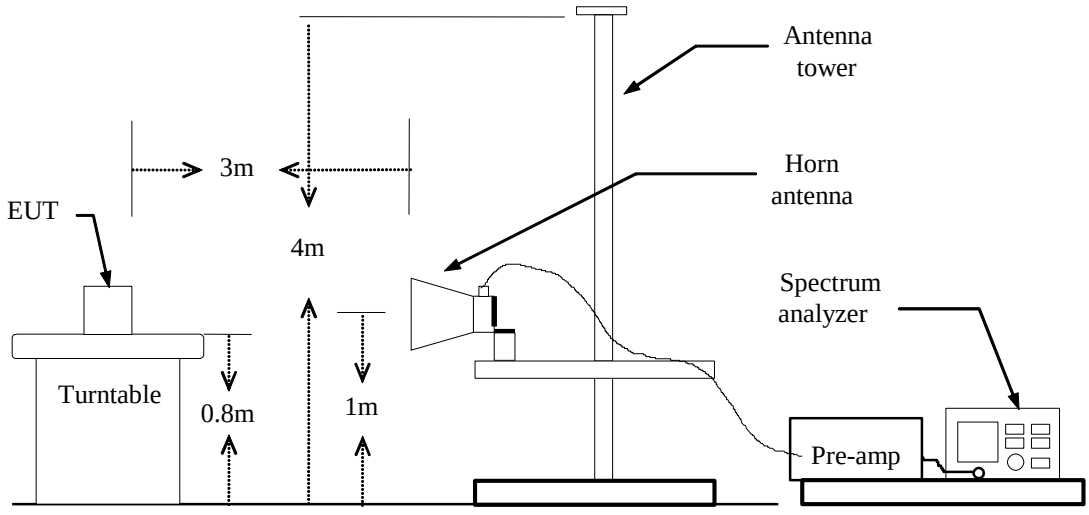
According to FCC §2.1049
According to FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.
According to FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Test Configuration

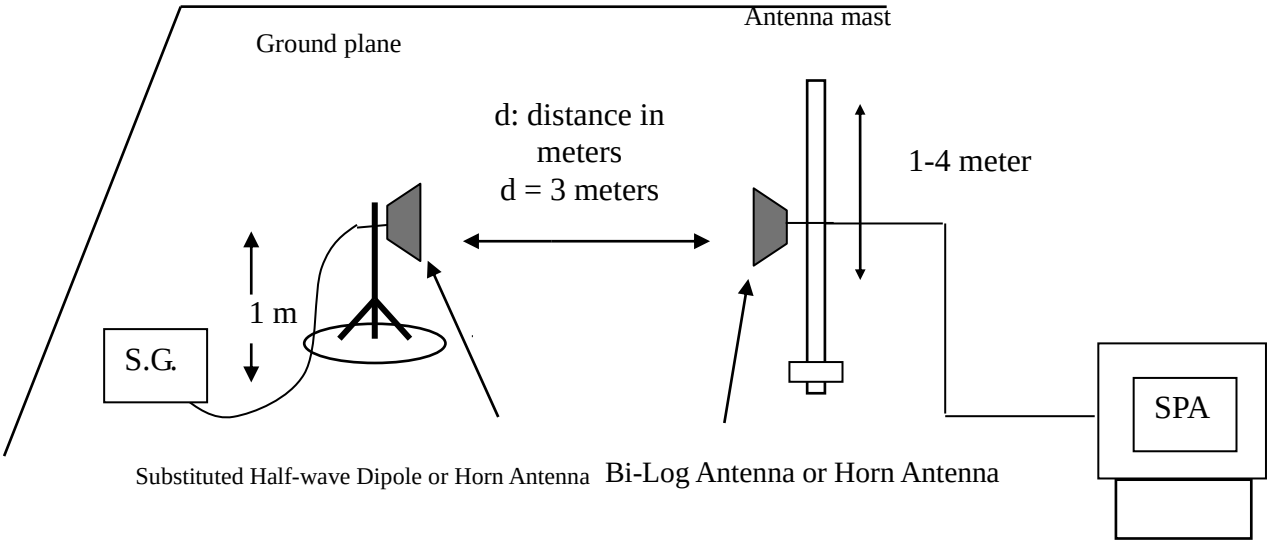
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per section 5, KDB 971168 D01 Power Meas License Digital Systems.
2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.
3. EIRP was measured method according to TIA/EIA-603-E. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

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

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

TEST RESULTS

No non-compliance noted.

GPRS 850 TEST DATA

Test Mode	Channel	Vertical		Horizontal	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
GPRS 850	Lowest	21.16	0.130	22.51	0.178
	Middle	22.41	0.174	24.31	0.269
	Highest	21.94	0.156	22.65	0.184

GPRS 1900 TEST DATA

Test Mode	Channel	Vertical		Horizontal	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
GPRS 1900	Lowest	25.79	0.379	26.11	0.408
	Middle	27.08	0.510	23.80	0.239
	Highest	23.95	0.248	22.62	0.182

EGPRS 850 TEST DATA

Test Mode	Channel	Vertical		Horizontal	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
EGPRS 850	Lowest	21.08	0.128	21.04	0.127
	Middle	21.14	0.130	21.35	0.136
	Highest	22.73	0.187	21.62	0.145

EGPRS 1900 TEST DATA

Test Mode	Channel	Vertical		Horizontal	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
EGPRS 1900	Lowest	26.70	0.467	26.66	0.463
	Middle	26.95	0.495	26.94	0.494
	Highest	27.12	0.515	27.05	0.506

8.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

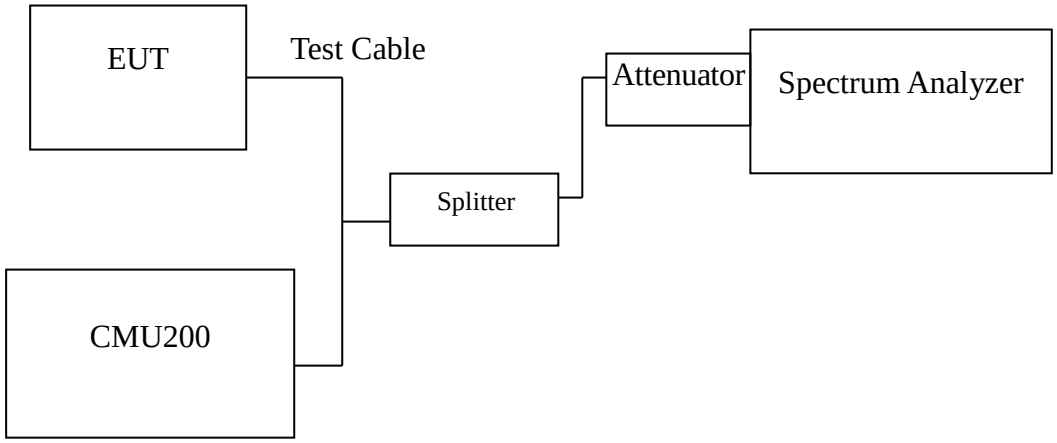
LIMIT

According to FCC §2.1051, FCC §22.917(a), 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, VBW = 1MHz, 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

No non-compliance noted.

Test Data

Mode	CH	Location	Description
GPRS 850	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

Mode	CH	Location	Description
GPRS 1900	512	Figure 9-1	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 9-2	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 9-3	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
GPRS 850	128	Figure 10-1	Band Edge emissions
	251	Figure 10-2	Band Edge emissions

Mode	CH	Location	Description
GPRS 1900	512	Figure 11-1	Band Edge emissions
	810	Figure 11-2	Band Edge emissions

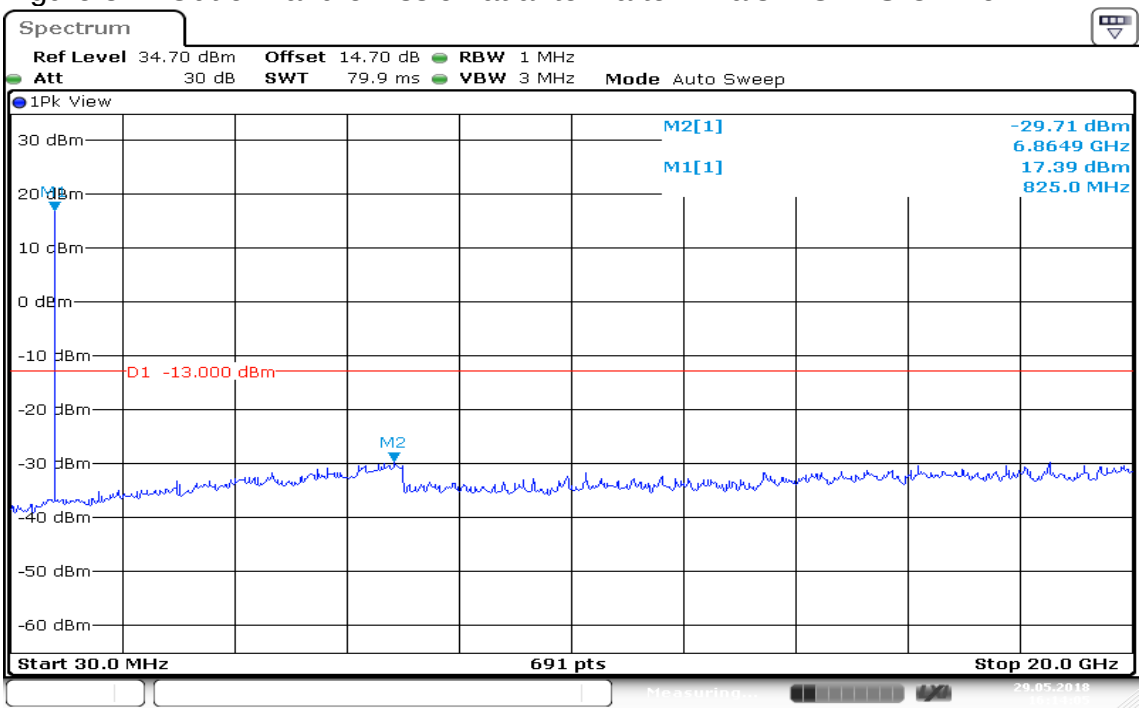
Mode	CH	Location	Description
EGPRS 850	128	Figure 12-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 12-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 12-3	Conducted spurious emissions, 30MHz - 20GHz
EGPRS 1900	512	Figure 13-1	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 13-2	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 13-3	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
EGPRS 850	128	Figure 14-1	Band Edge emissions
	251	Figure 14-2	Band Edge emissions
EGPRS 1900	512	Figure 15-1	Band Edge emissions
	810	Figure 15-2	Band Edge emissions

Test Plot

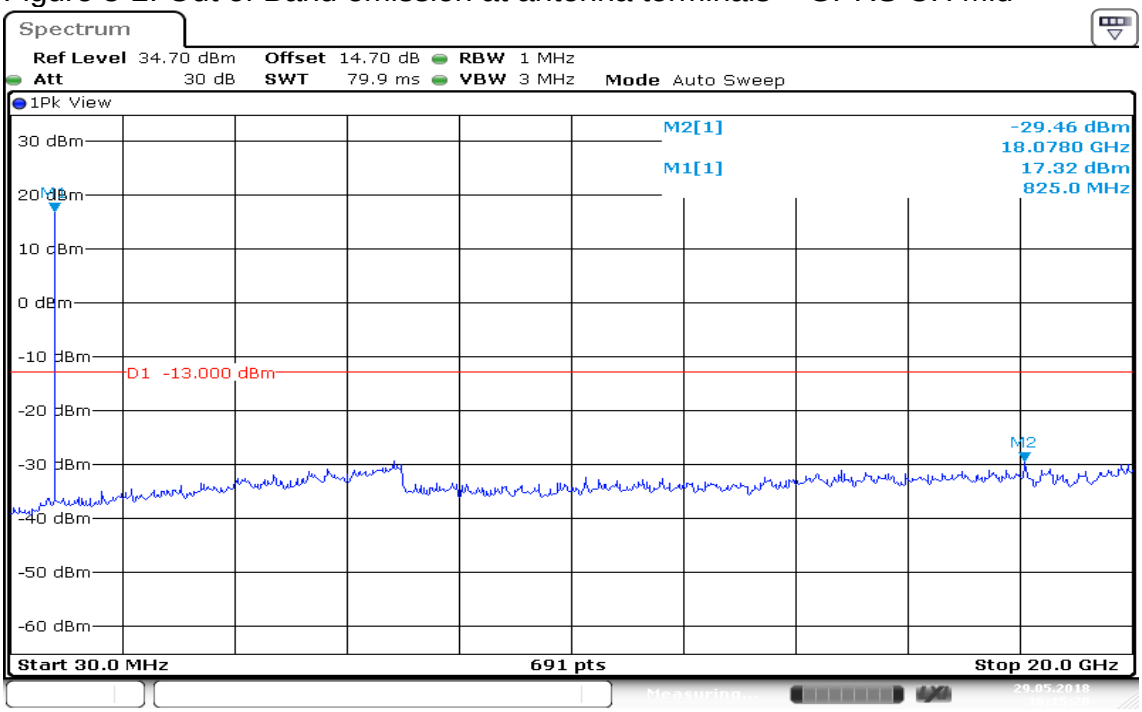
GPRS 850

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



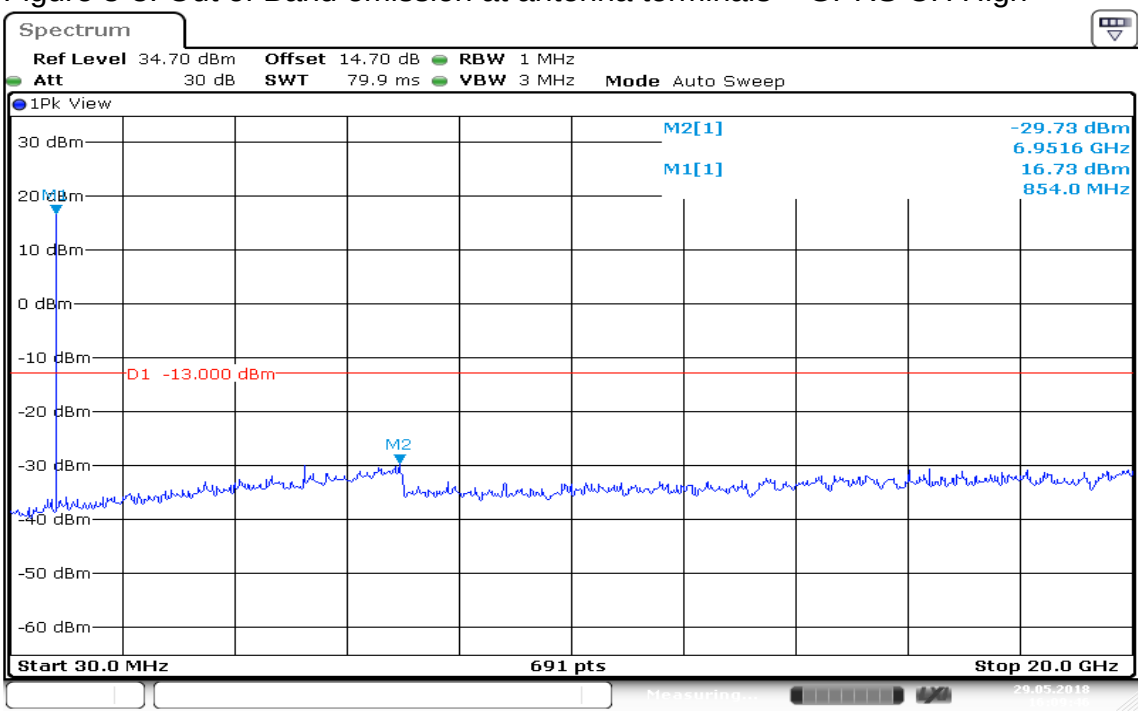
Date: 29.MAY.2018 16:14:06

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



Date: 29.MAY.2018 16:15:20

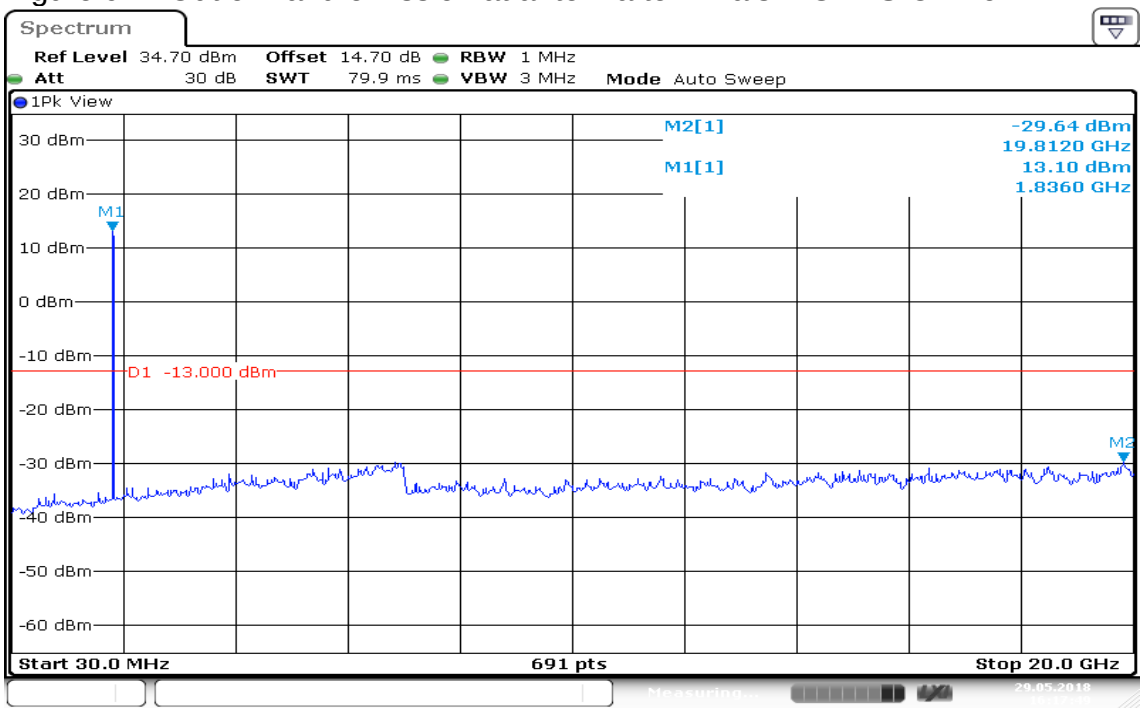
Figure 8-3: Out of Band emission at antenna terminals – GPRS CH High



Date: 29.MAY.2018 16:09:47

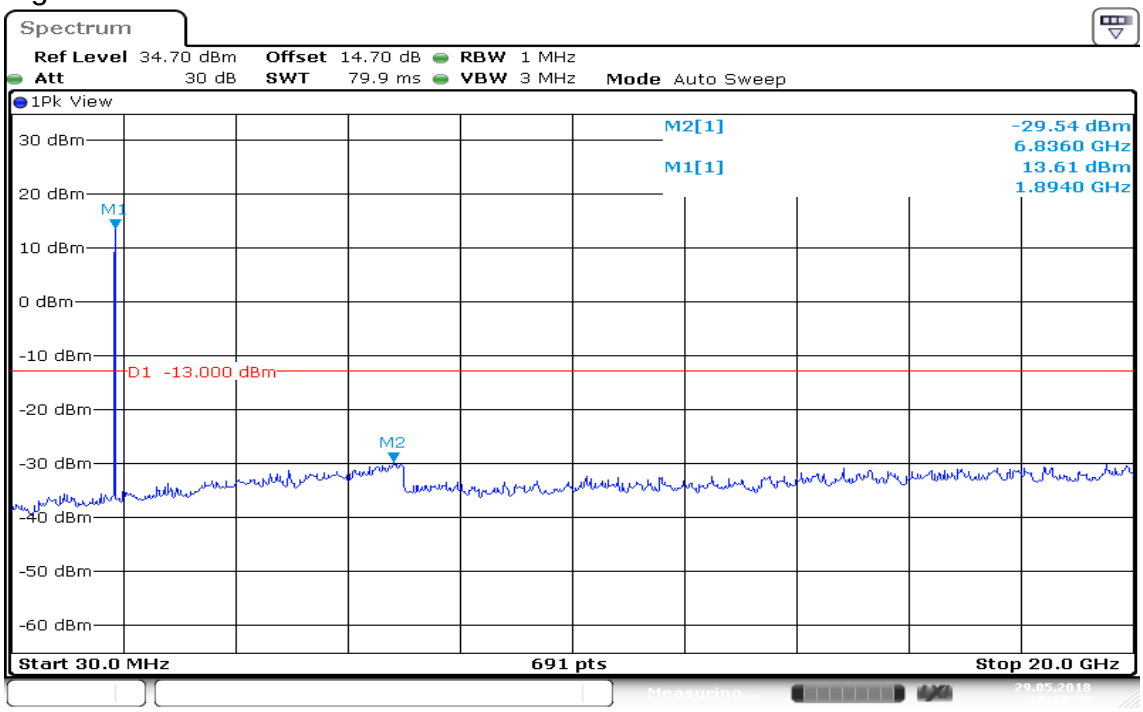
GPRS 1900

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



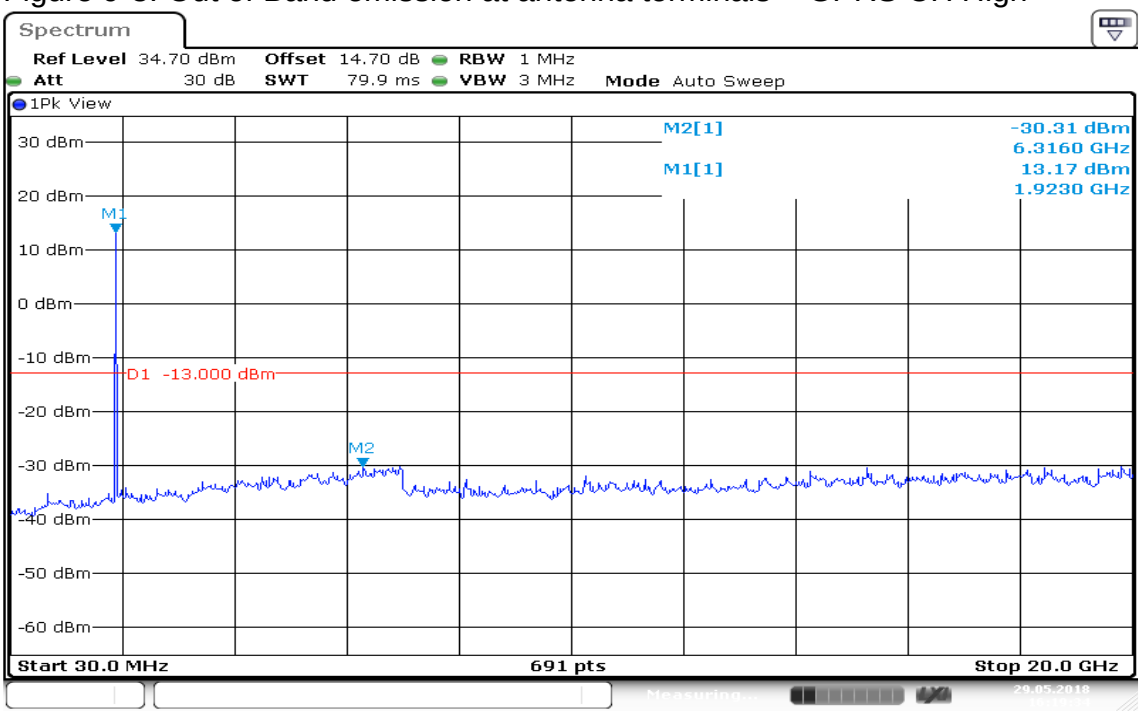
Date: 29.MAY.2018 16:17:50

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



Date: 29.MAY.2018 16:18:49

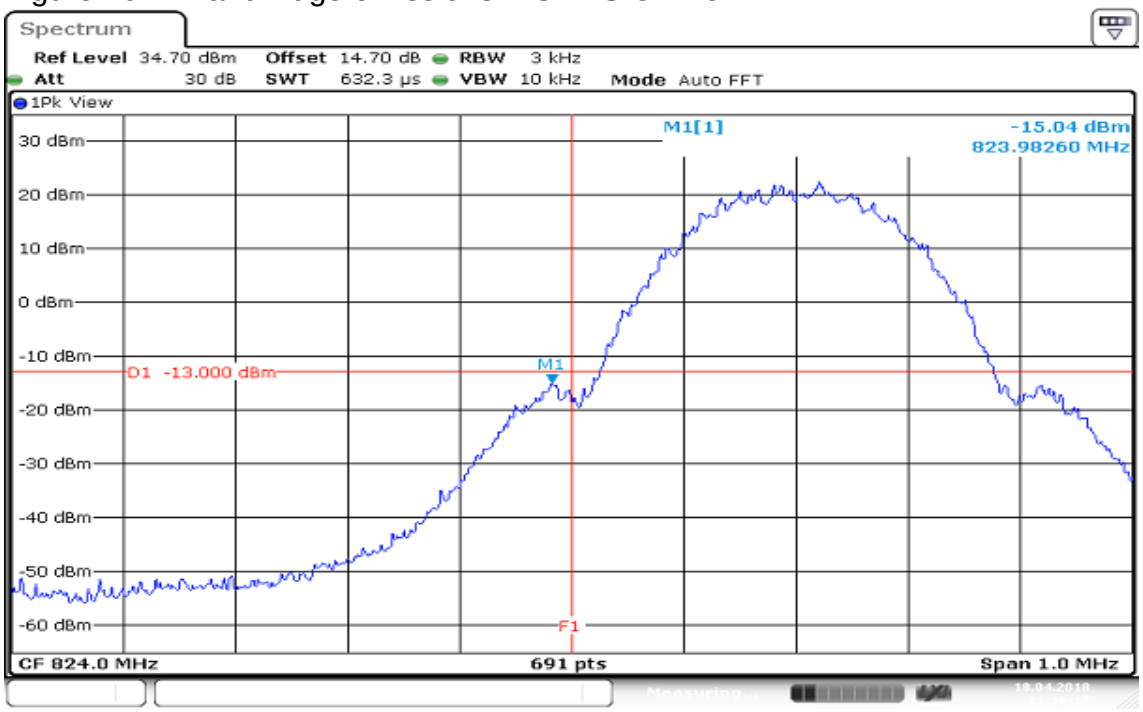
Figure 9-3: Out of Band emission at antenna terminals – GPRS CH High



Date: 29.MAY.2018 16:19:35

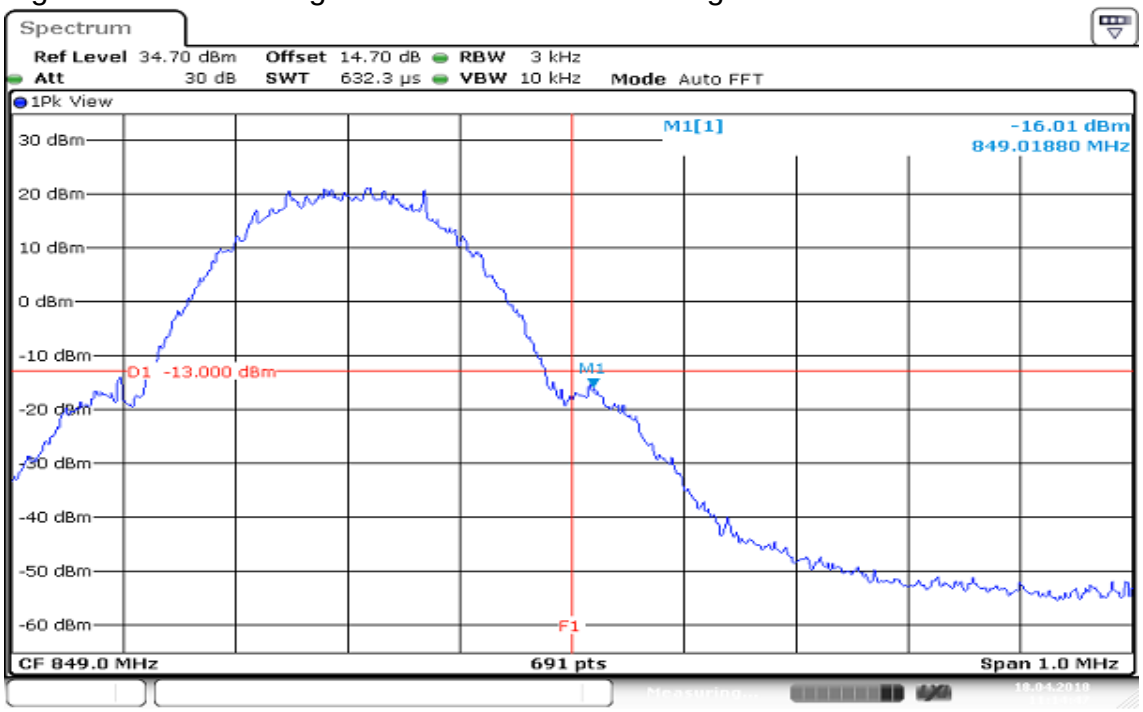
GPRS 850

Figure 10-1: Band Edge emissions – GPRS CH Low



Date: 18.APR.2018 11:16:17

Figure 10-2: Band Edge emissions –GPRS CH High



Date: 18.APR.2018 11:14:47

GPRS 1900

Figure 11-1: Band Edge emissions – GPRS CH Low

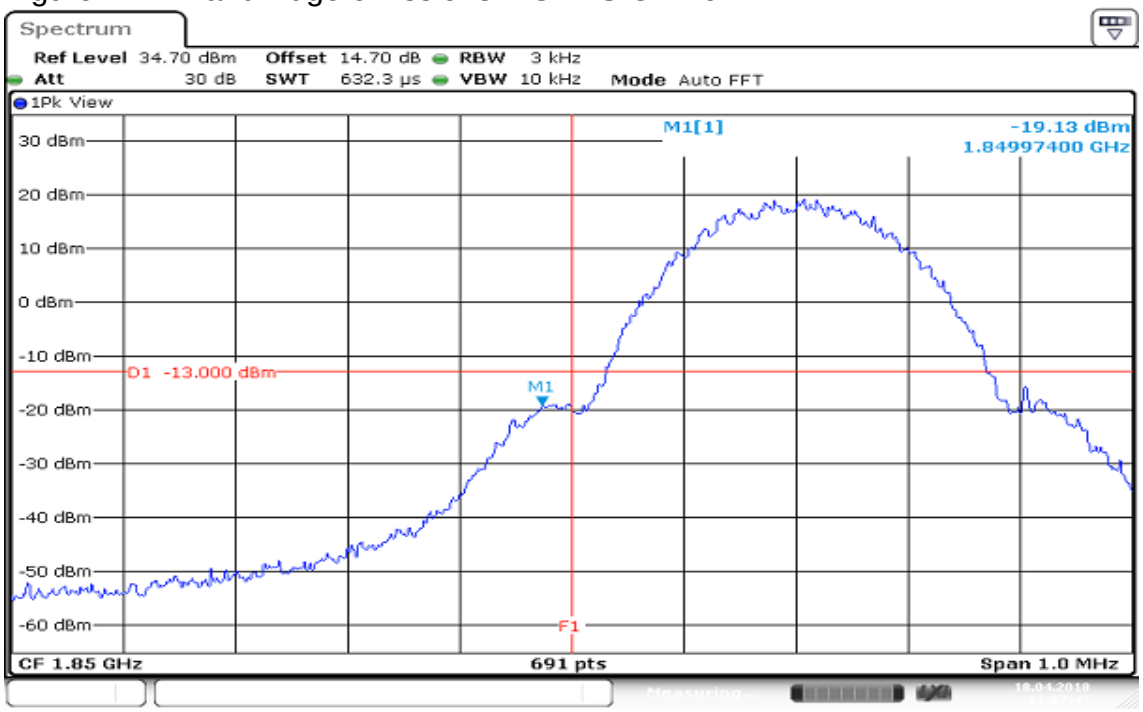
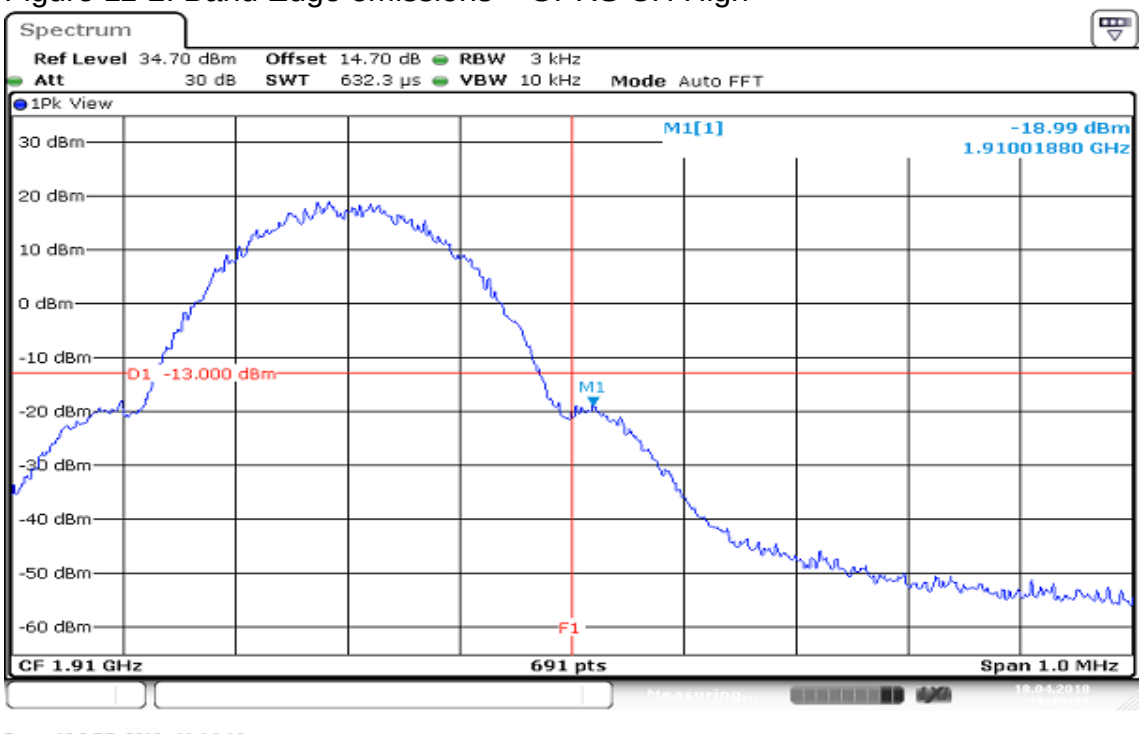
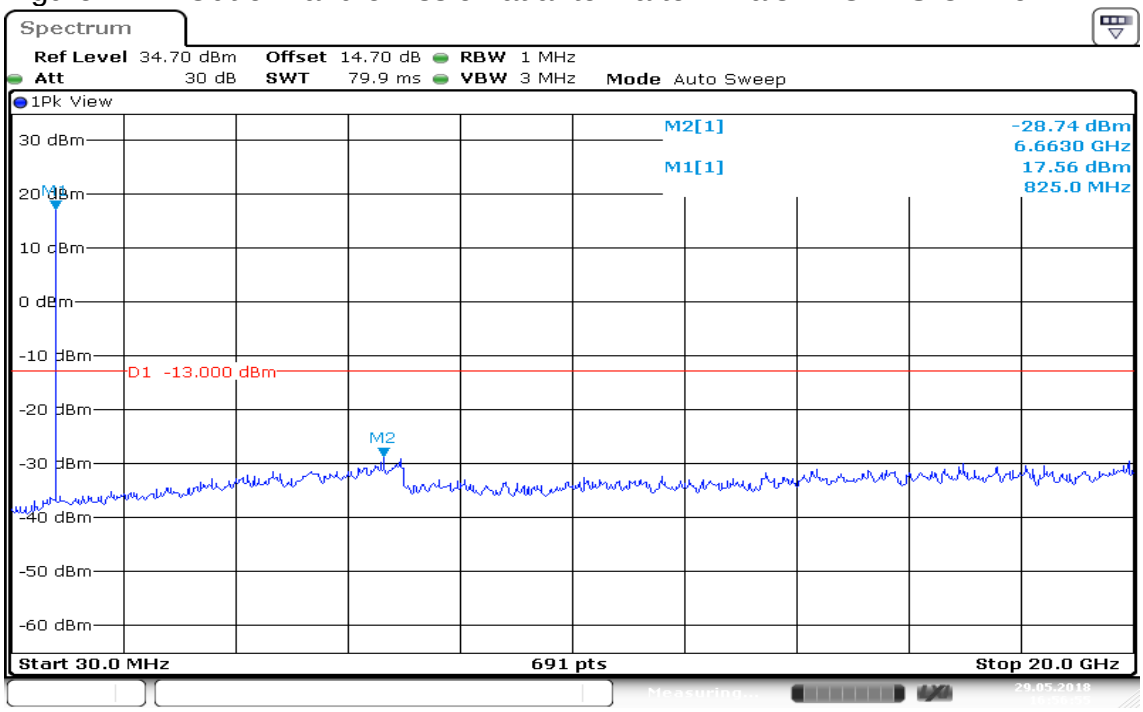


Figure 11-2: Band Edge emissions – GPRS CH High



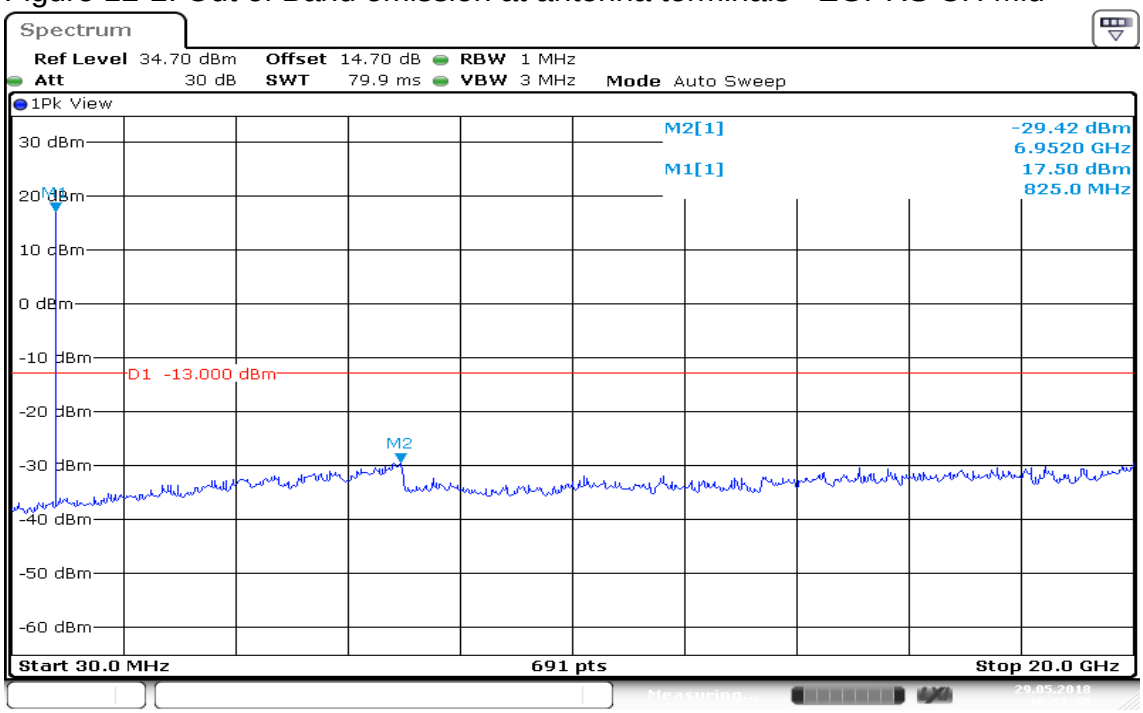
EGPRS 850

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



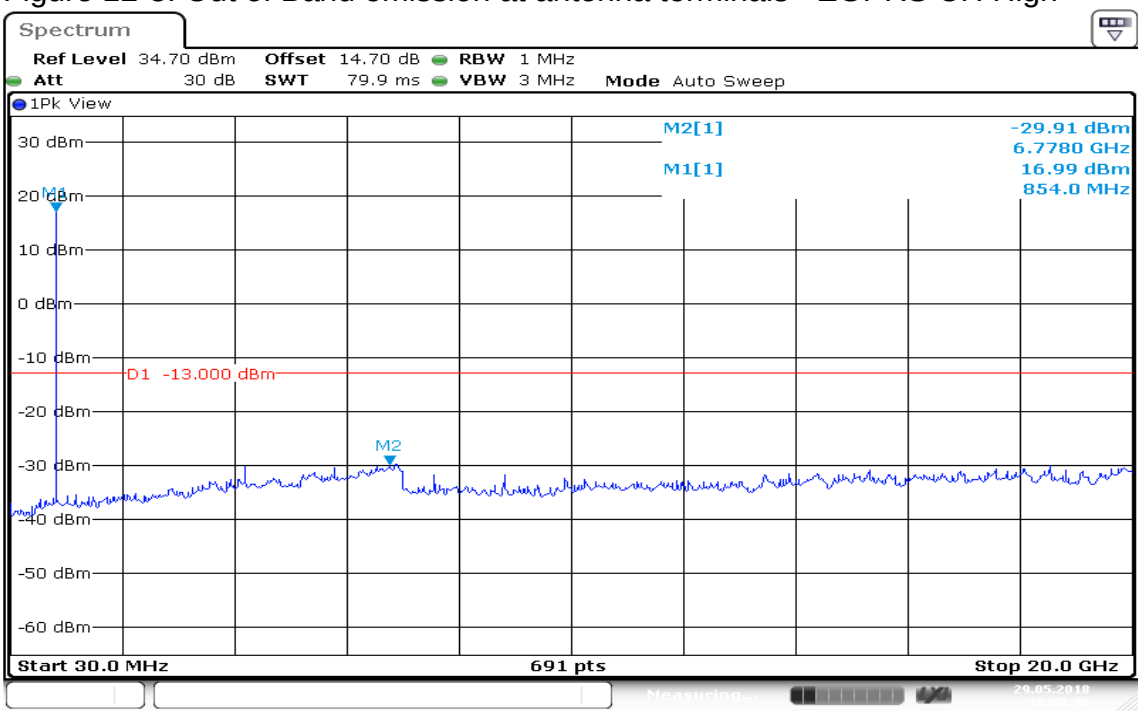
Date: 29.MAY.2018 16:56:56

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



Date: 29.MAY.2018 16:57:56

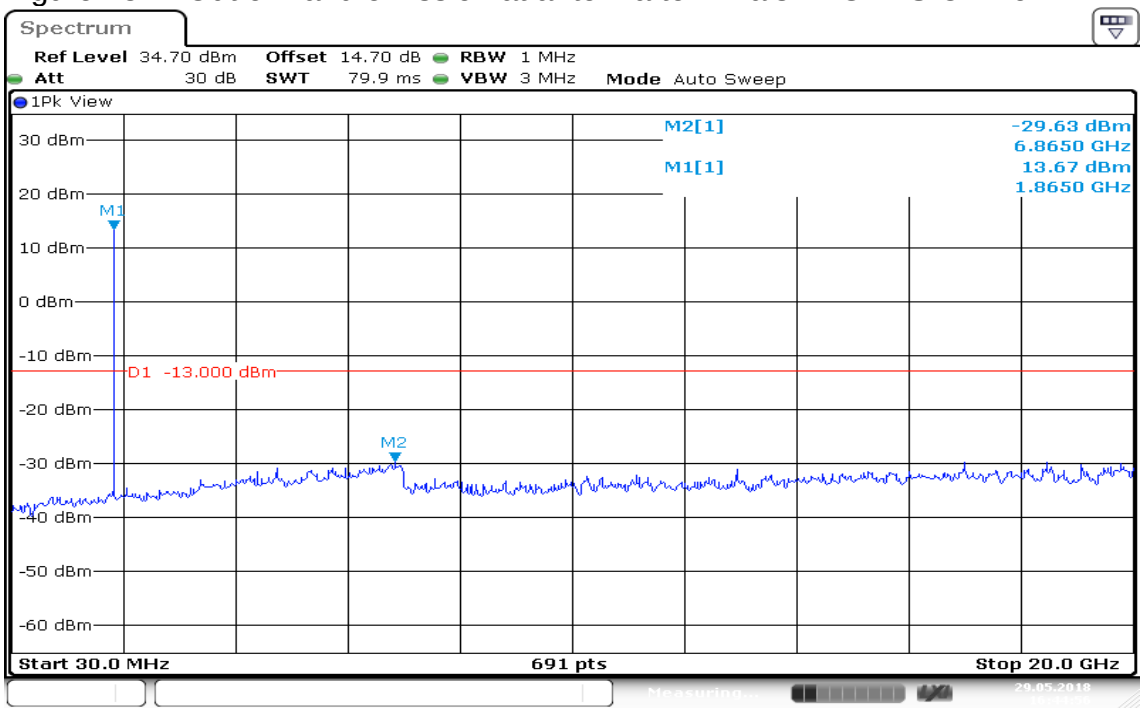
Figure 12-3: Out of Band emission at antenna terminals –EGPRS CH High



Date: 29.MAY.2018 16:58:46

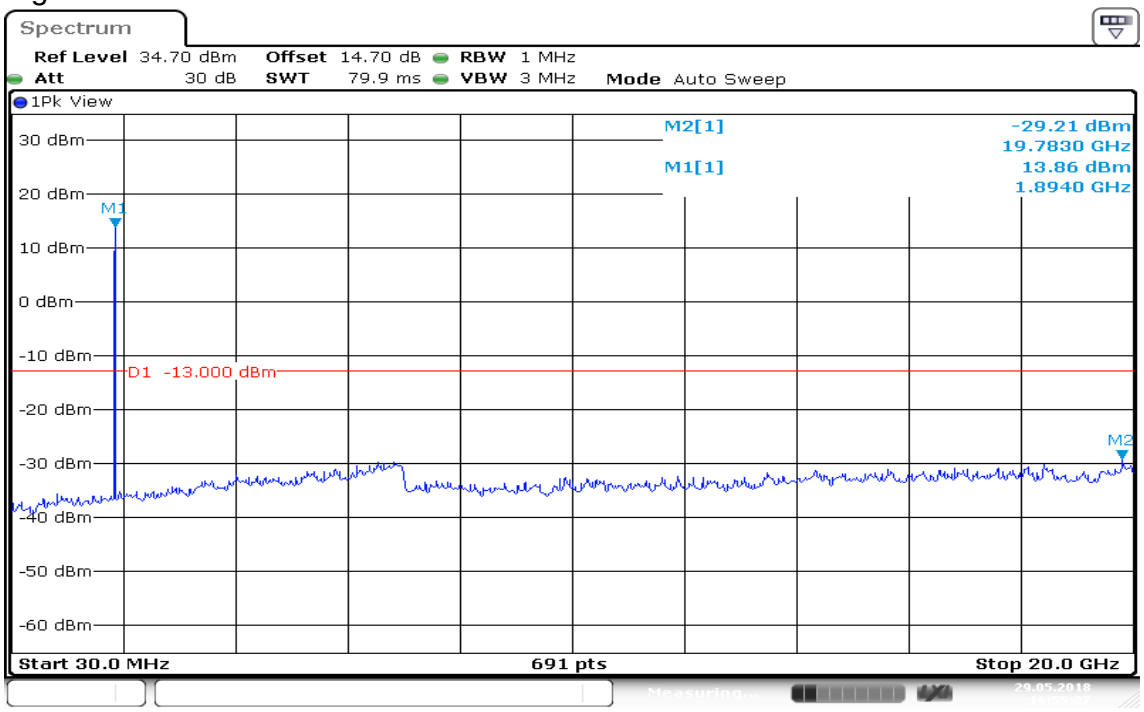
EGPRS 1900

Figure 13-1: Out of Band emission at antenna terminals –EGPRS CH Low



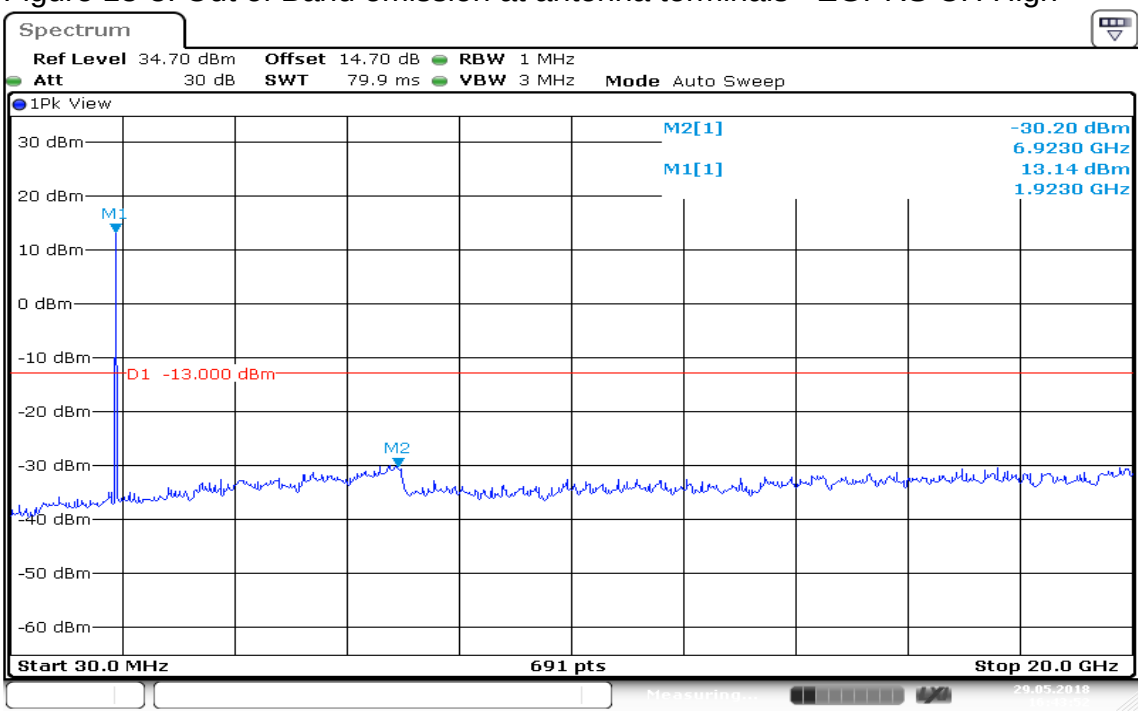
Date: 29.MAY.2018 16:44:56

Figure 13-2: Out of Band emission at antenna terminals –EGPRS CH Mid



Date: 29.MAY.2018 16:55:28

Figure 13-3: Out of Band emission at antenna terminals –EGPRS CH High



Date: 29.MAY.2018 16:43:53

EGPRS 850

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

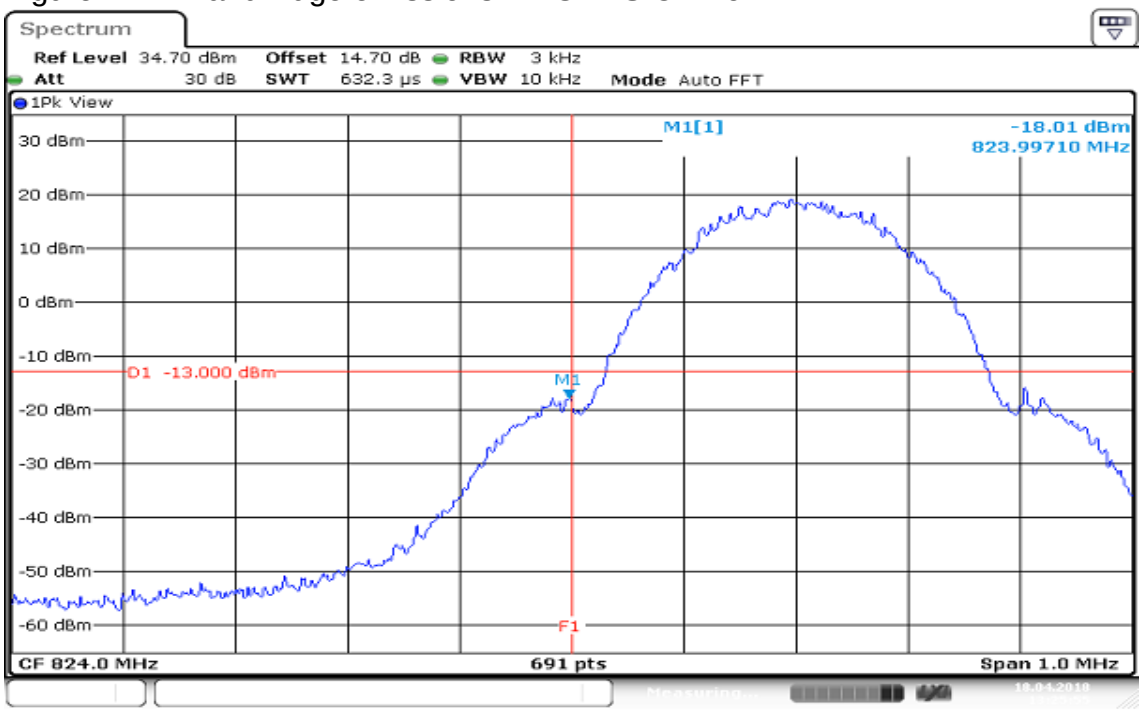
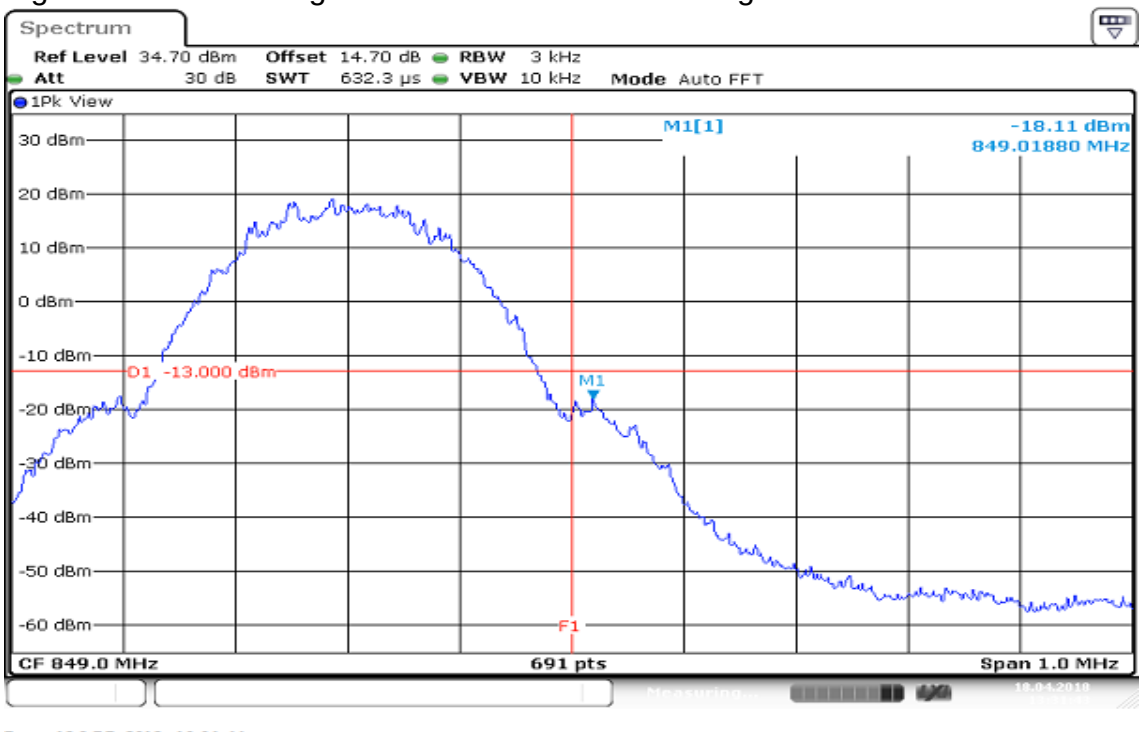


Figure 14-2: Band Edge emissions – EGPRS CH High



EGPRS 1900

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

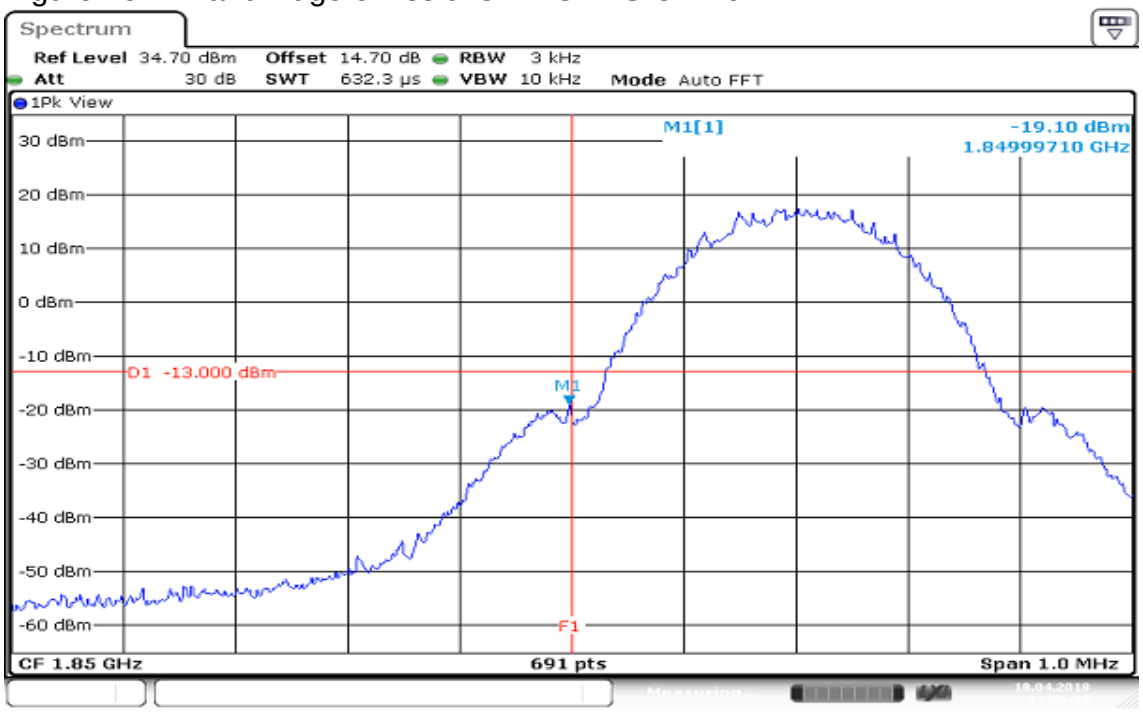
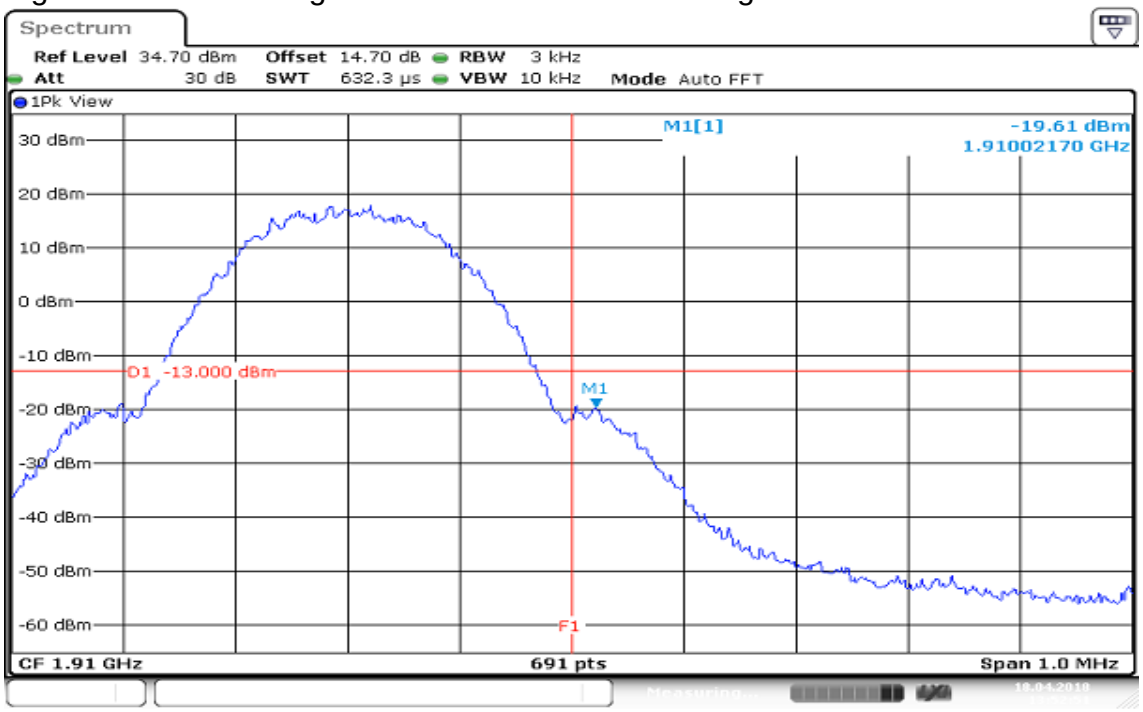


Figure 15-2: Band Edge emissions – EGPRS CH High



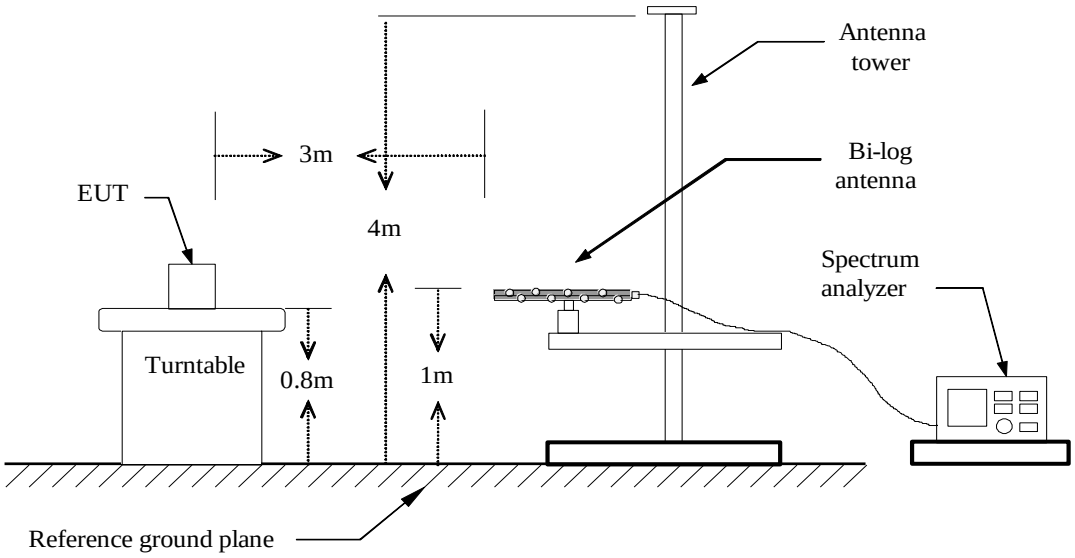
8.6 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

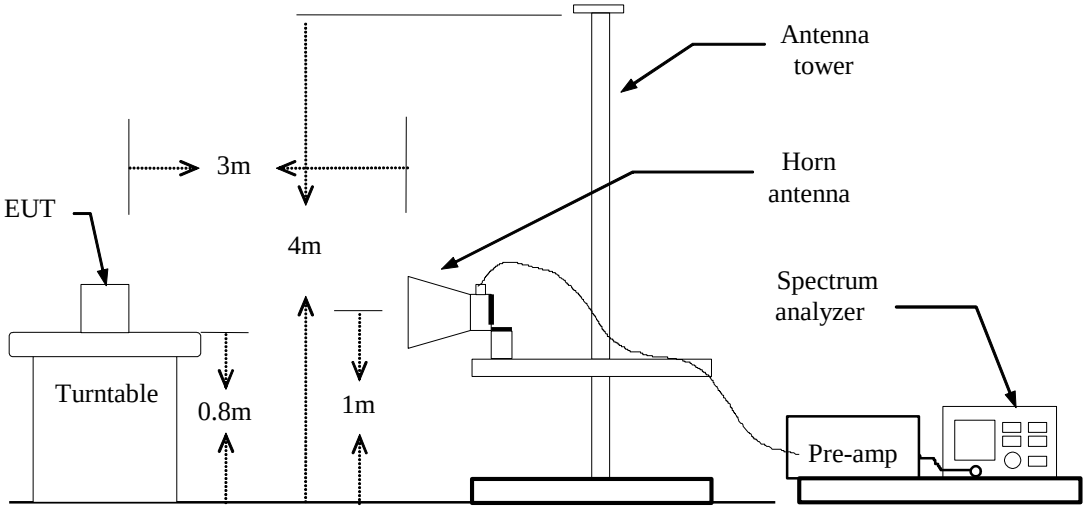
According to FCC §2.1053

Test Configuration

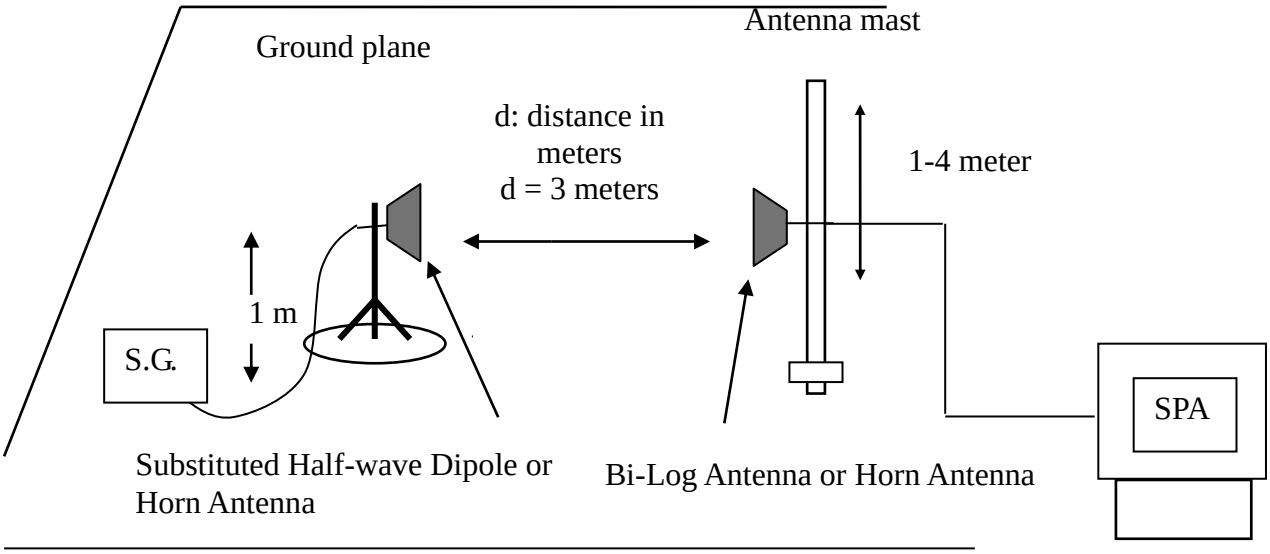
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

1. According to KDB 971168 D01 Power Meas License Digital Systems. section 5.8 and TIA-603-E section 2.2.12.
2. The EUT was placed on a turntable
   (1) Below 1G : 0.8m
   (2) Above 1G : 0.8m
   (3) EUT set 3m from the receiving antenna
   (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

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

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

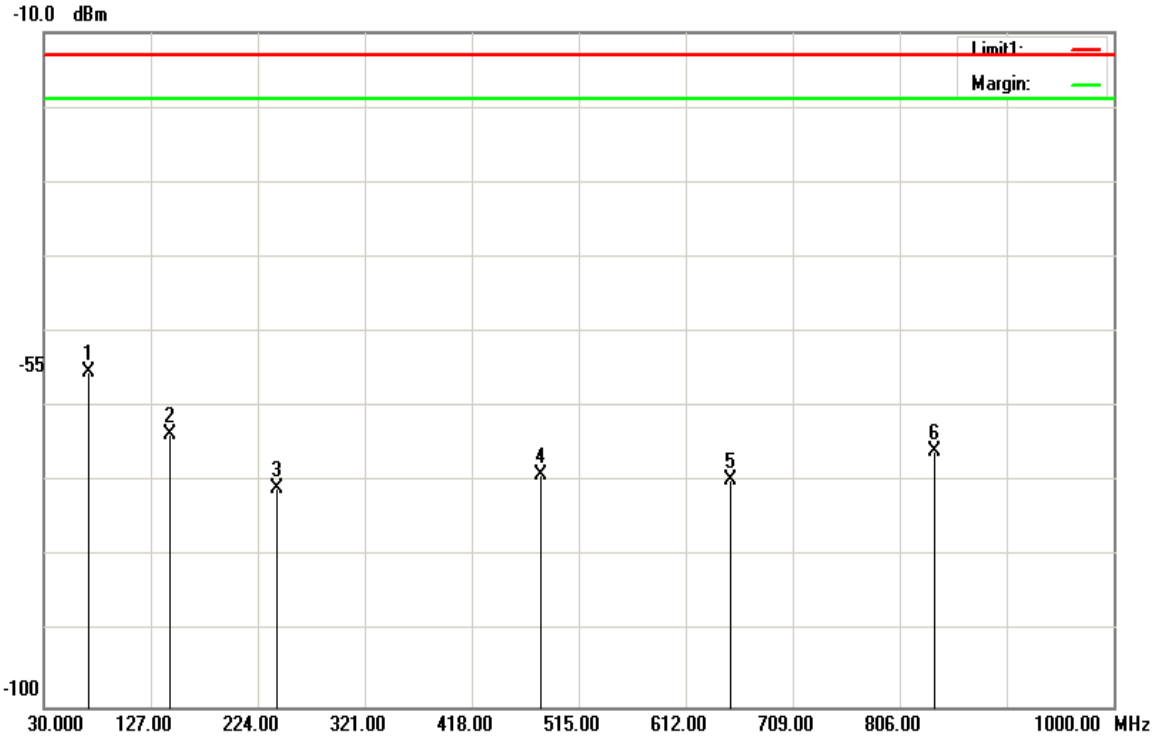
For test result, the S.G. value is including antenna gain and cable loss.

TEST RESULTS

Refer to the attached tabular data sheets.

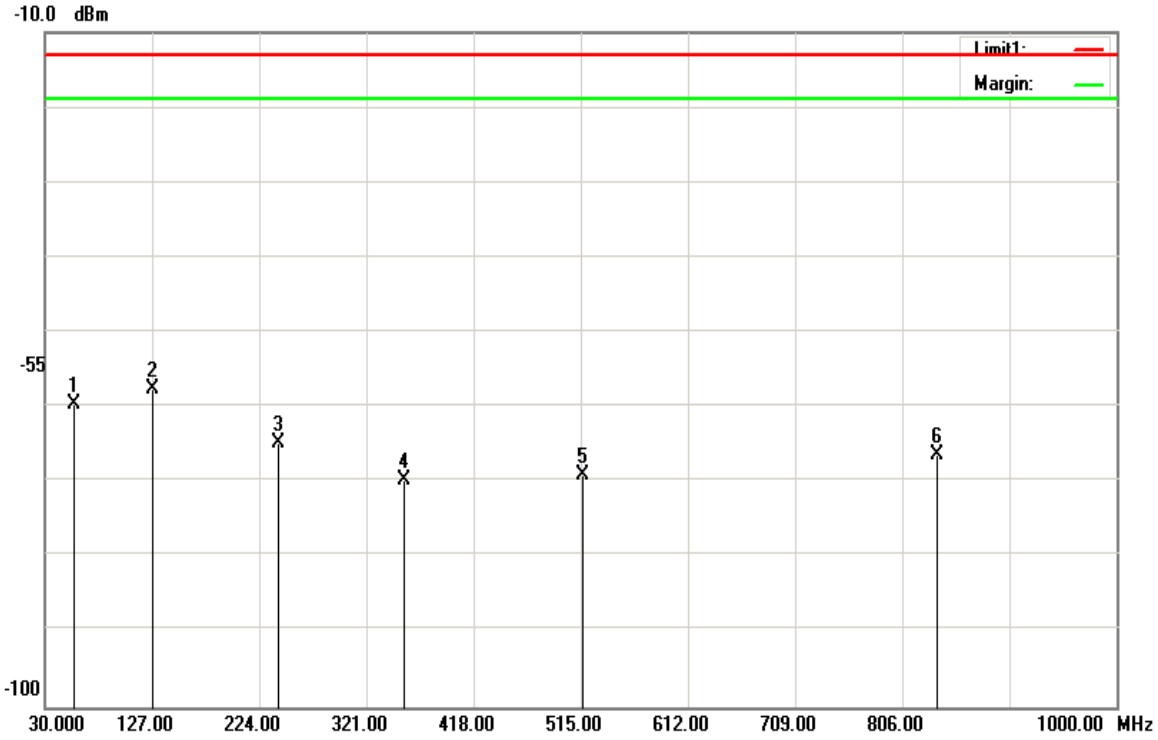
Radiated Spurious Emission Measurement Result / Below 1GHz

Operation Mode:	GPRS 850 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.



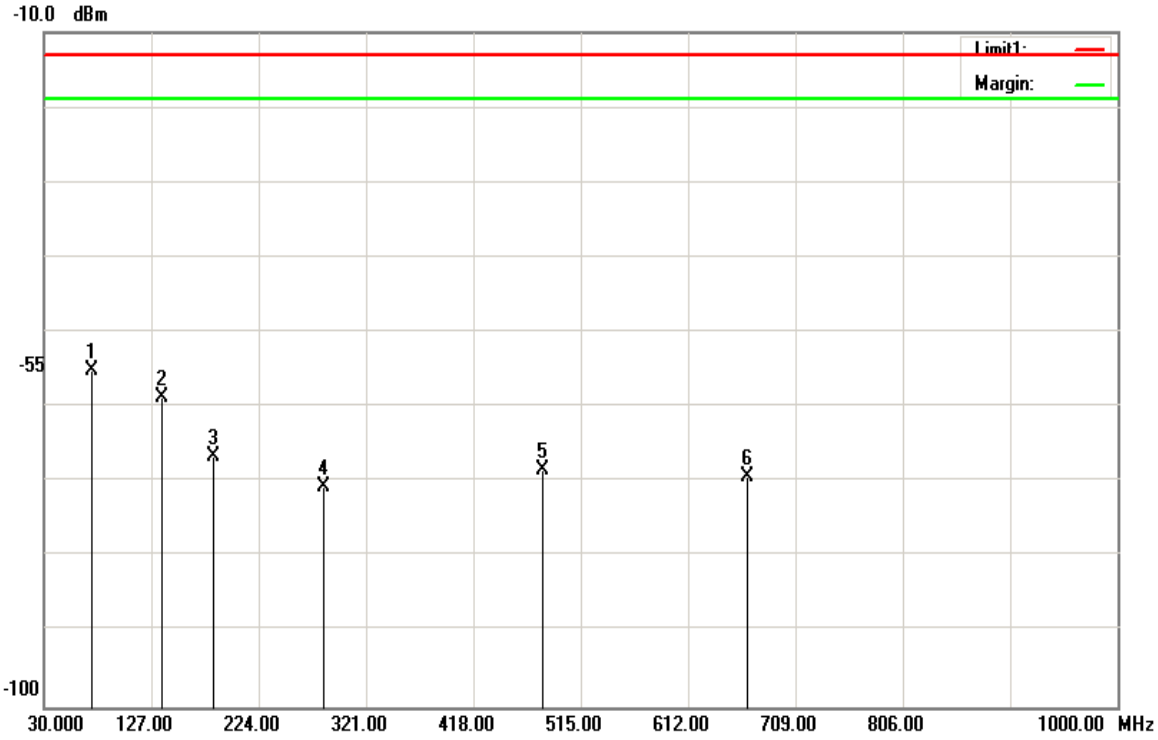
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
71.2250	-55.91	0.68	-55.23	-13.00	-42.23	V
143.9750	-64.41	0.84	-63.57	-13.00	-50.57	V
240.9750	-77.65	6.8	-70.85	-13.00	-57.85	V
481.0500	-75.84	6.89	-68.95	-13.00	-55.95	V
653.2250	-71.15	1.34	-69.81	-13.00	-56.81	V
837.5250	-67.11	1.2	-65.91	-13.00	-52.91	V

Operation Mode:	GPRS 850 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



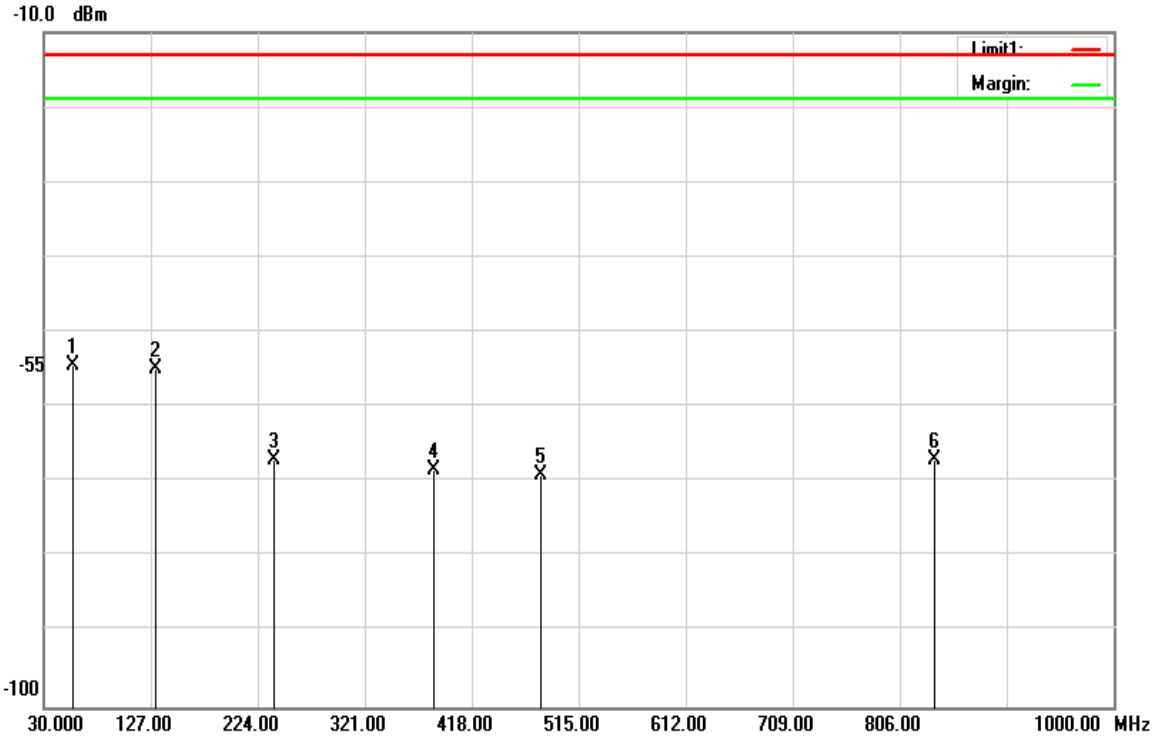
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
56.6750	-57.92	-1.63	-59.55	-13.00	-46.55	H
127.0000	-58.7	1.01	-57.69	-13.00	-44.69	H
240.9750	-71.66	6.8	-64.86	-13.00	-51.86	H
354.9500	-76.92	7.12	-69.80	-13.00	-56.80	H
517.4250	-75.8	6.82	-68.98	-13.00	-55.98	H
837.5250	-67.62	1.2	-66.42	-13.00	-53.42	H

Operation Mode:	EGPRS 850 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
73.6500	-55.74	0.63	-55.11	-13.00	-42.11	V
136.7000	-59.82	1.15	-58.67	-13.00	-45.67	V
182.7750	-70.69	4.1	-66.59	-13.00	-53.59	V
282.2000	-77.65	7.08	-70.57	-13.00	-57.57	V
481.0500	-75.29	6.89	-68.40	-13.00	-55.40	V
665.3500	-70.77	1.52	-69.25	-13.00	-56.25	V

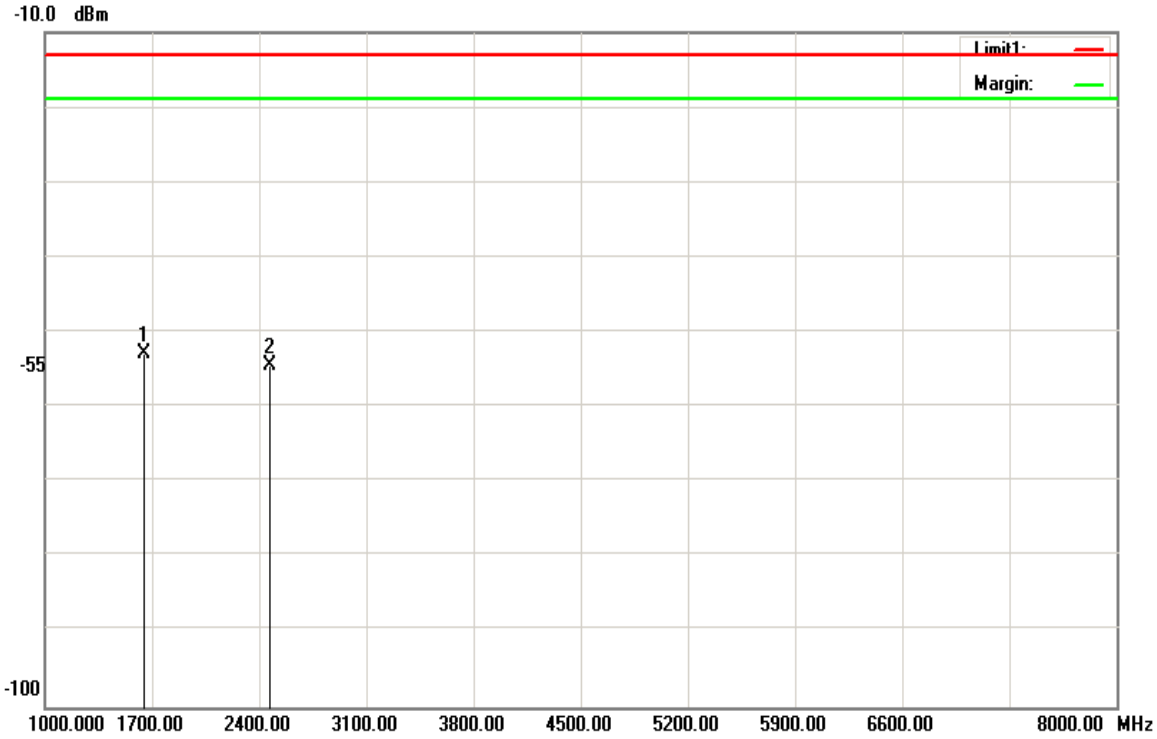
Operation Mode:	EGPRS 850 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
56.6750	-52.86	-1.63	-54.49	-13.00	-41.49	H
131.8500	-56.02	1.08	-54.94	-13.00	-41.94	H
238.5500	-73.68	6.64	-67.04	-13.00	-54.04	H
384.0500	-75.71	7.24	-68.47	-13.00	-55.47	H
481.0500	-75.84	6.89	-68.95	-13.00	-55.95	H
837.5250	-68.13	1.2	-66.93	-13.00	-53.93	H

Above 1GHz

Operation Mode:	GPRS 850 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

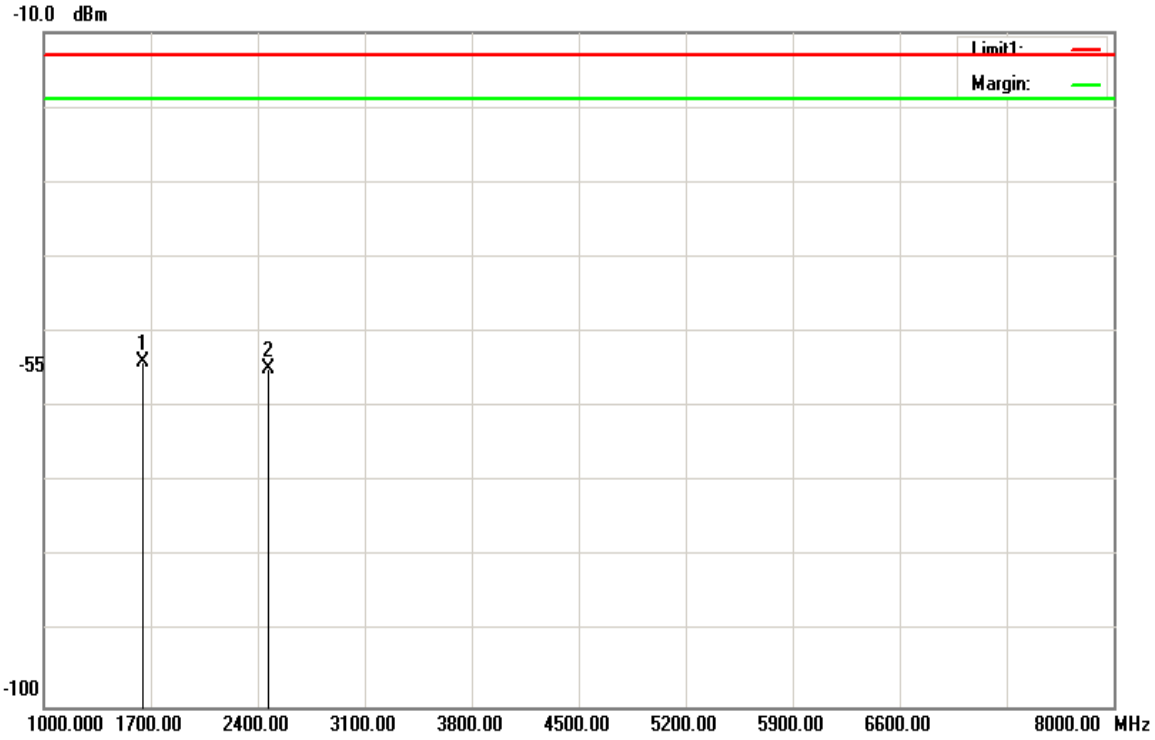


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.000	-54.43	1.52	-52.91	-13.00	-39.91	V
2472.000	-56.33	1.83	-54.50	-13.00	-41.50	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 850 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

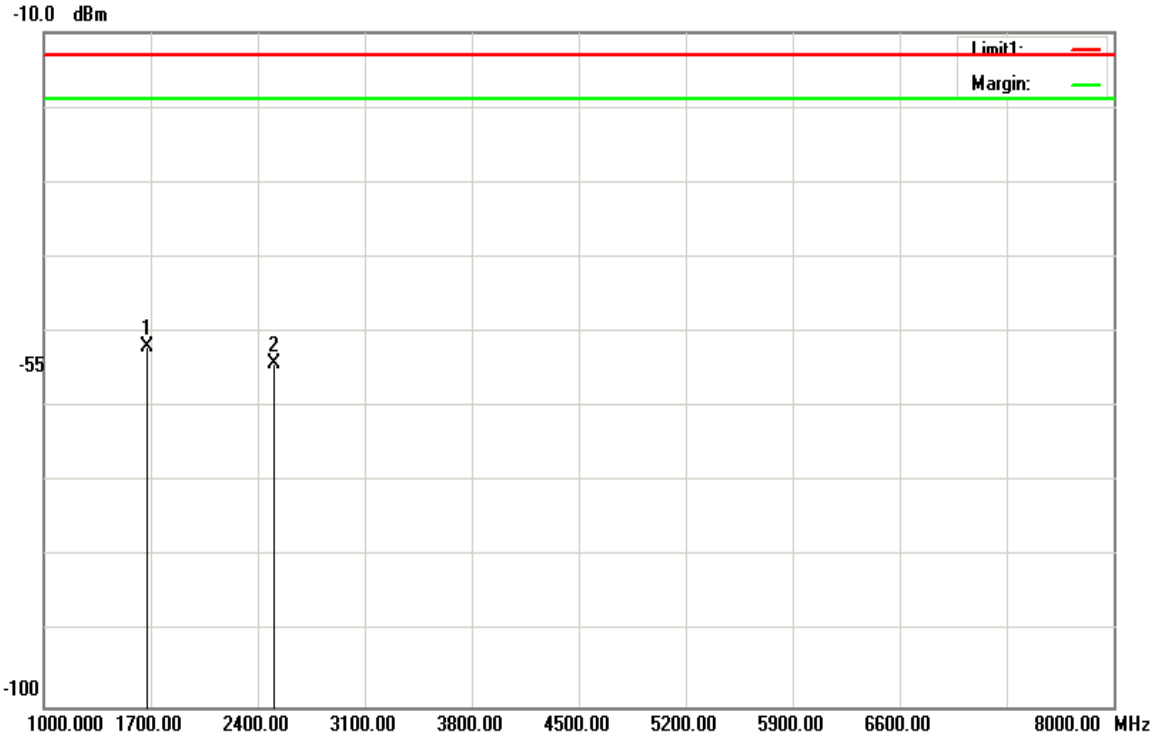


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.000	-55.44	1.52	-53.92	-13.00	-40.92	H
2472.000	-56.68	1.83	-54.85	-13.00	-41.85	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 850 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

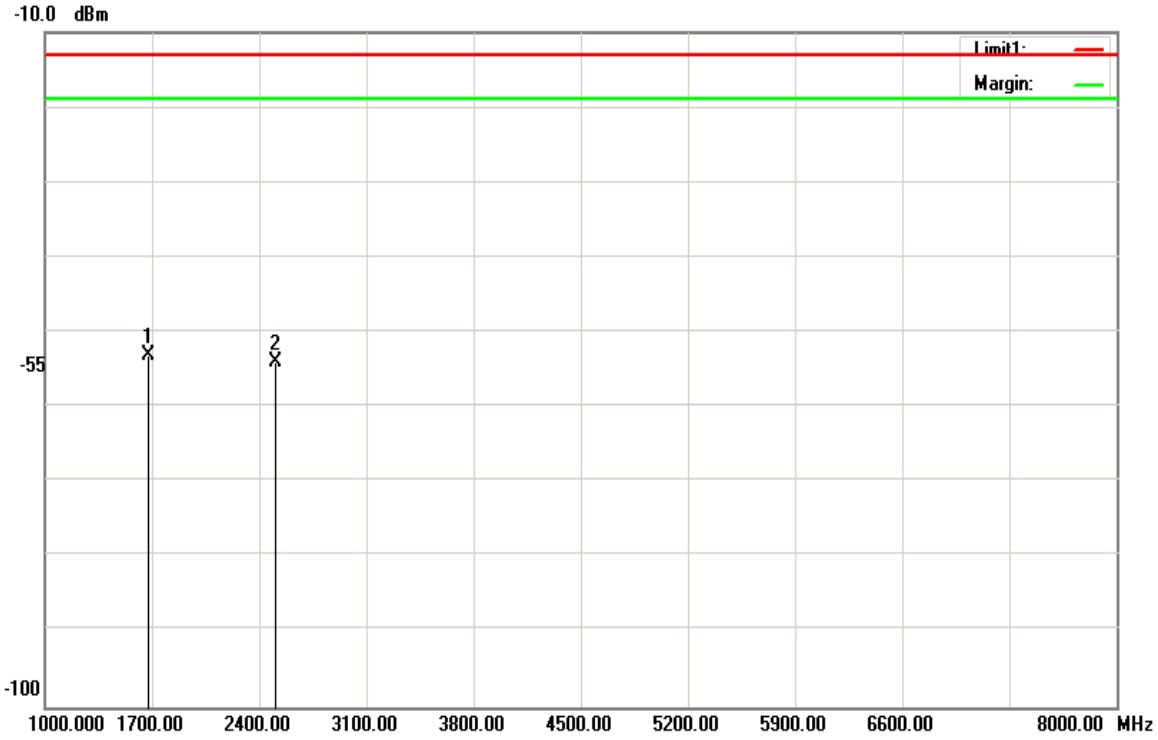


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-53.52	1.52	-52.00	-13.00	-39.00	V
2509.000	-56.31	2.02	-54.29	-13.00	-41.29	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 850 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

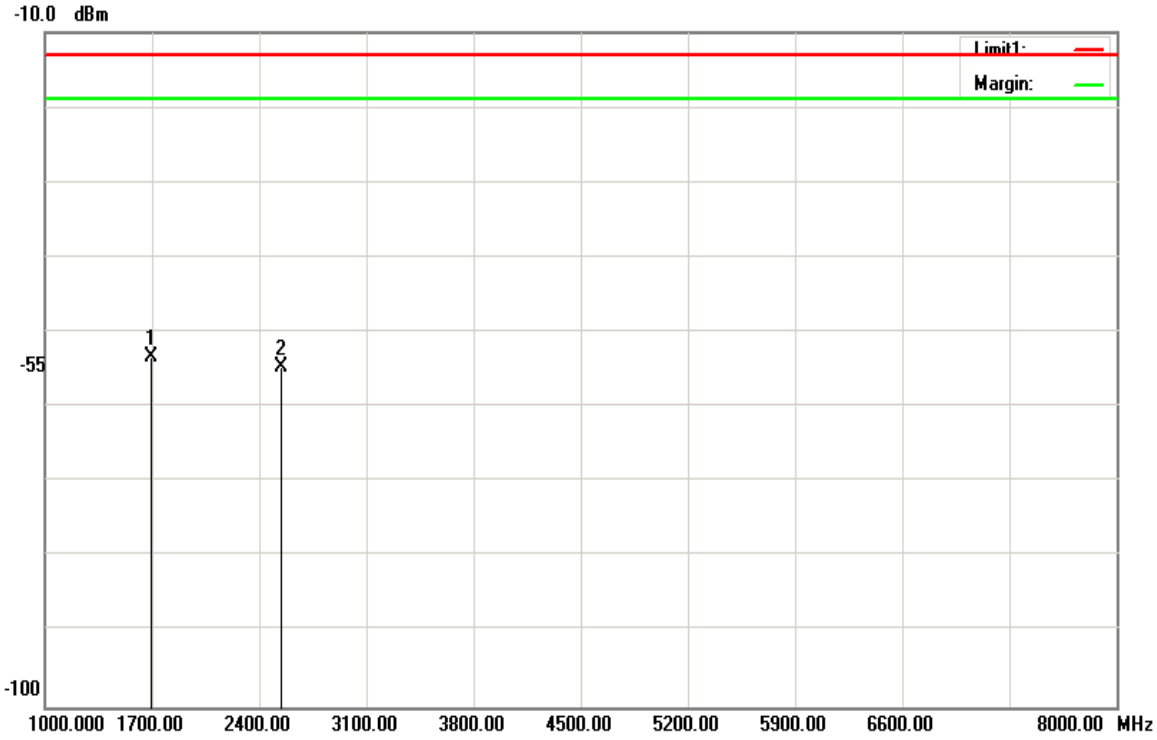


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-54.7	1.52	-53.18	-13.00	-40.18	H
2509.000	-56.03	2.02	-54.01	-13.00	-41.01	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 850 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

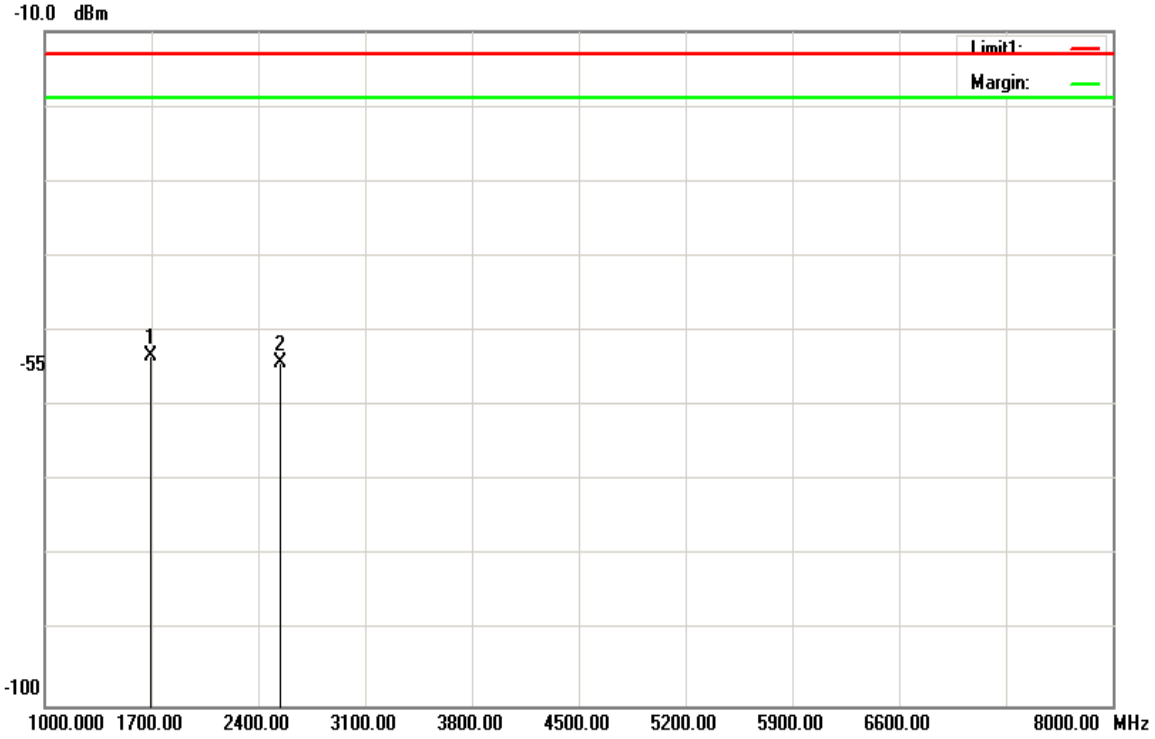


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.000	-54.75	1.51	-53.24	-13.00	-40.24	V
2546.000	-57.35	2.71	-54.64	-13.00	-41.64	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 850 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

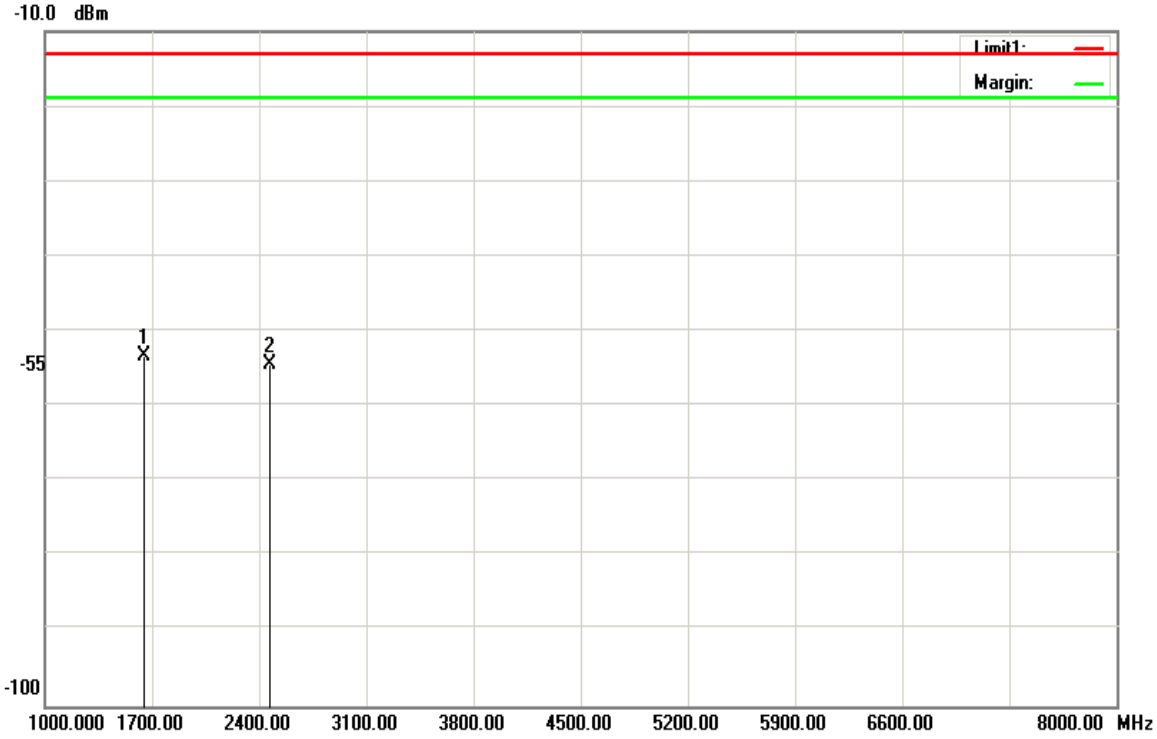


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.000	-54.71	1.51	-53.20	-13.00	-40.20	H
2546.000	-56.92	2.71	-54.21	-13.00	-41.21	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

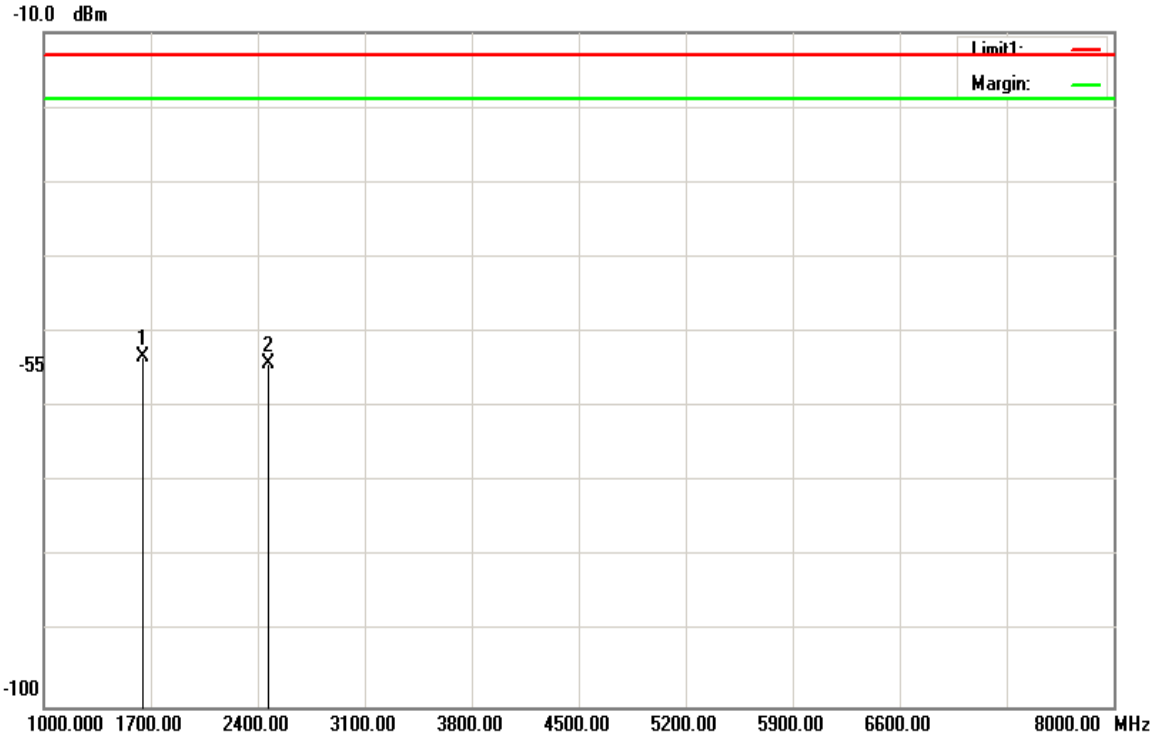


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.000	-54.8	1.52	-53.28	-13.00	-40.28	V
2472.000	-56.16	1.83	-54.33	-13.00	-41.33	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

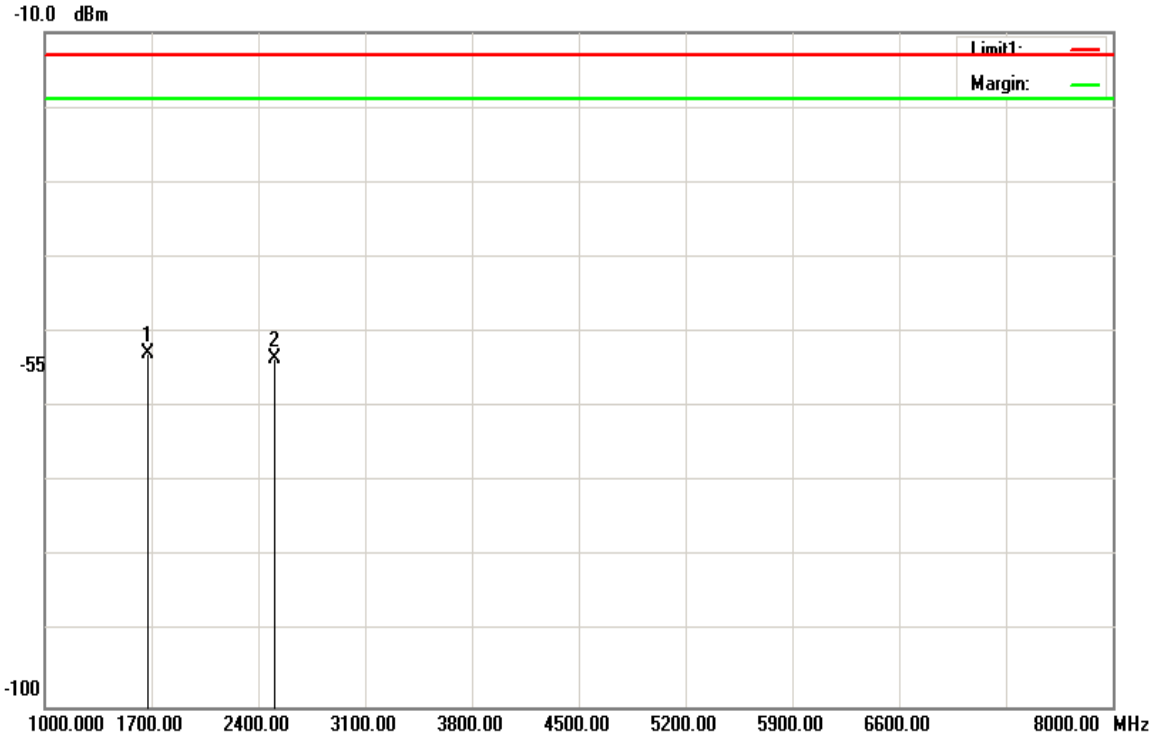


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1648.000	-54.93	1.52	-53.41	-13.00	-40.41	H
2472.000	-56.03	1.83	-54.20	-13.00	-41.20	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

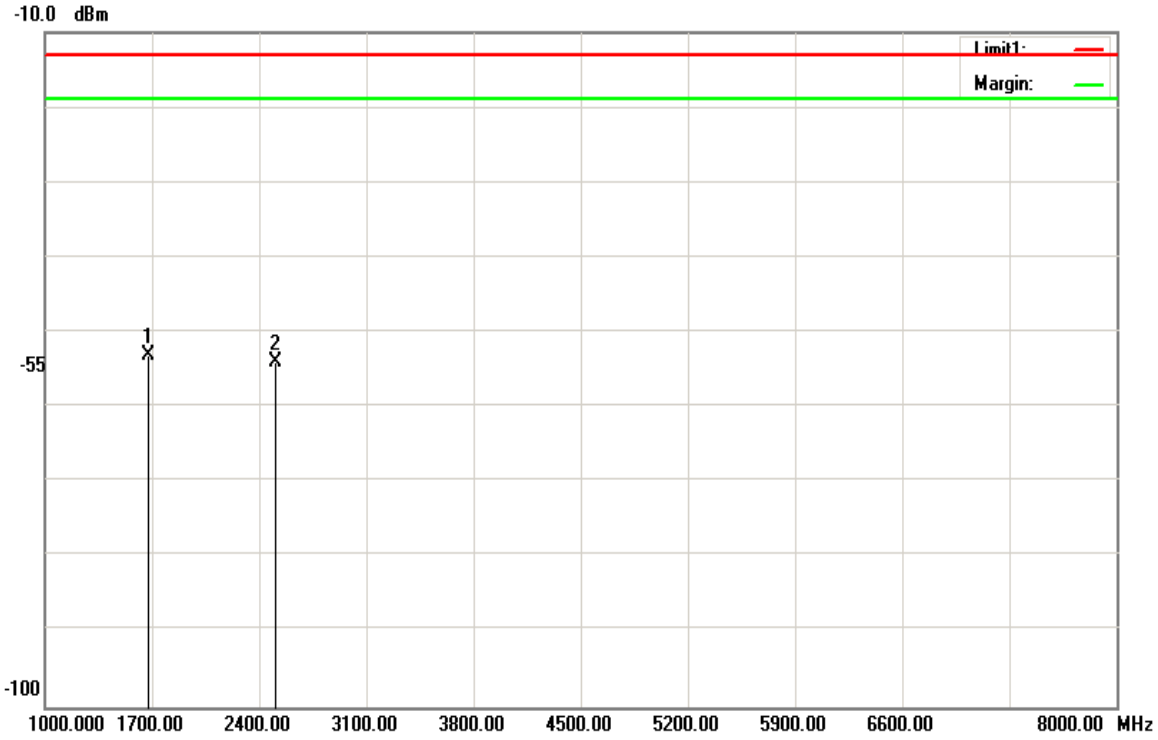


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-54.37	1.52	-52.85	-13.00	-39.85	V
2509.000	-55.49	2.02	-53.47	-13.00	-40.47	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

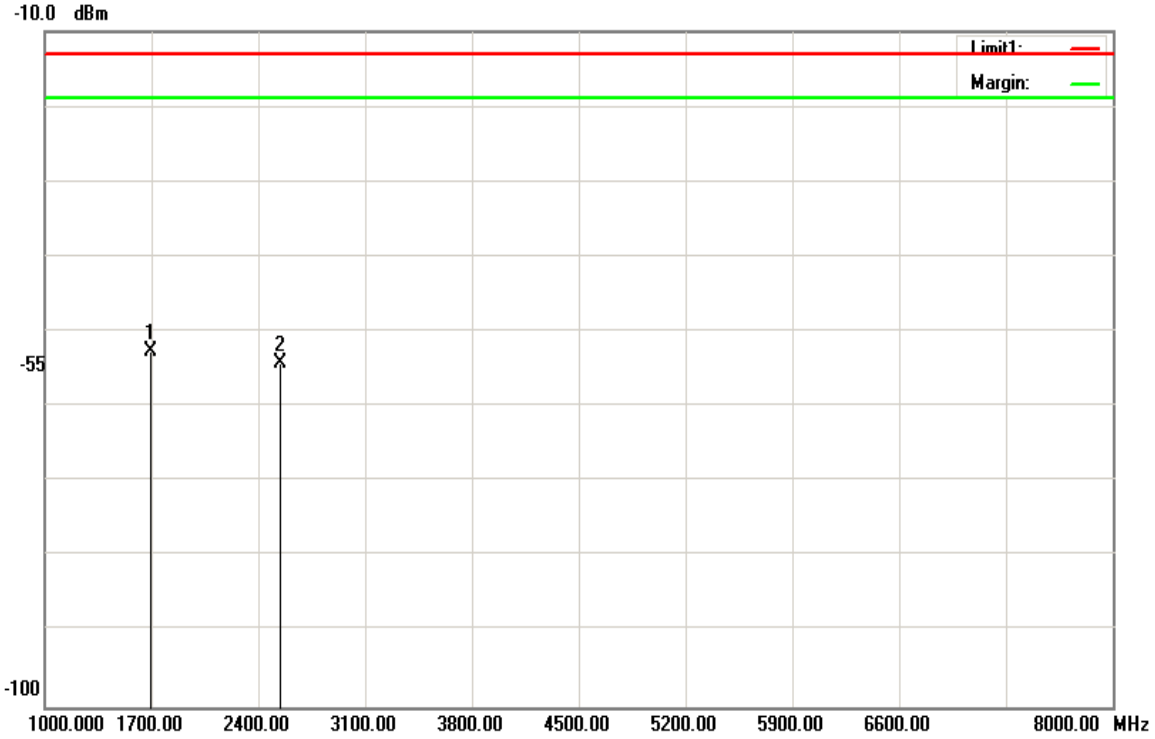


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1673.000	-54.5	1.52	-52.98	-13.00	-39.98	H
2509.000	-56.08	2.02	-54.06	-13.00	-41.06	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

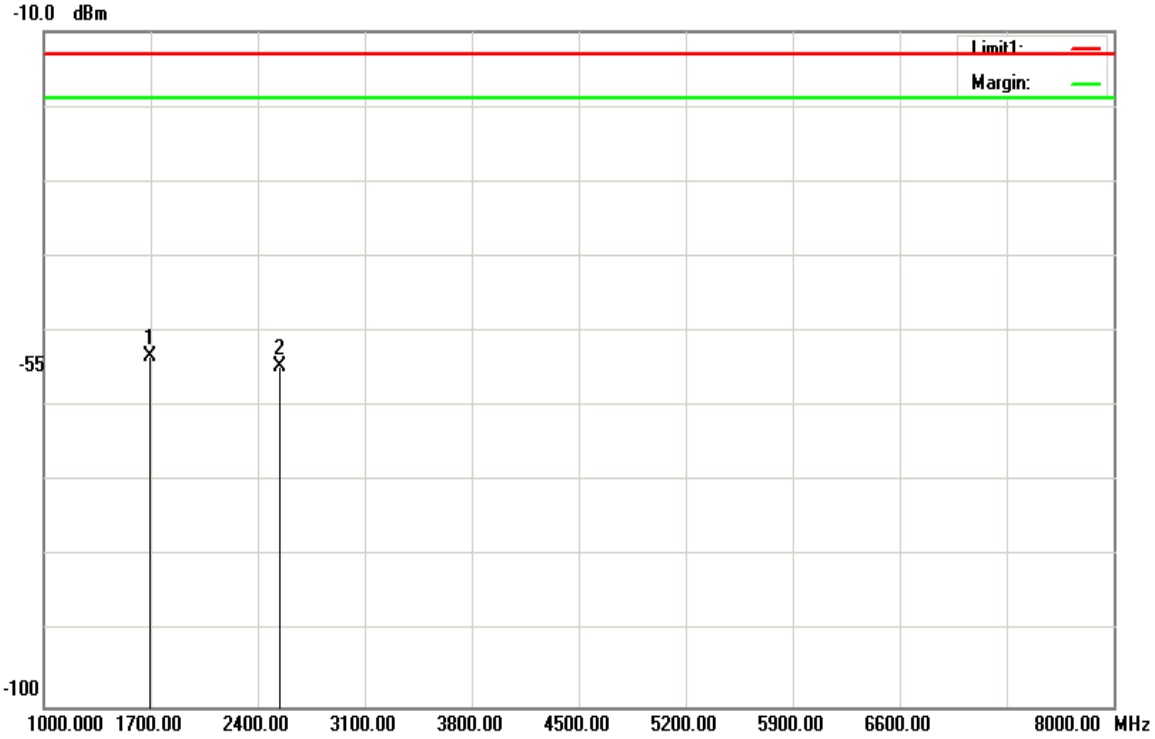


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.000	-54.23	1.51	-52.72	-13.00	-39.72	V
2546.000	-56.82	2.71	-54.11	-13.00	-41.11	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 850 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



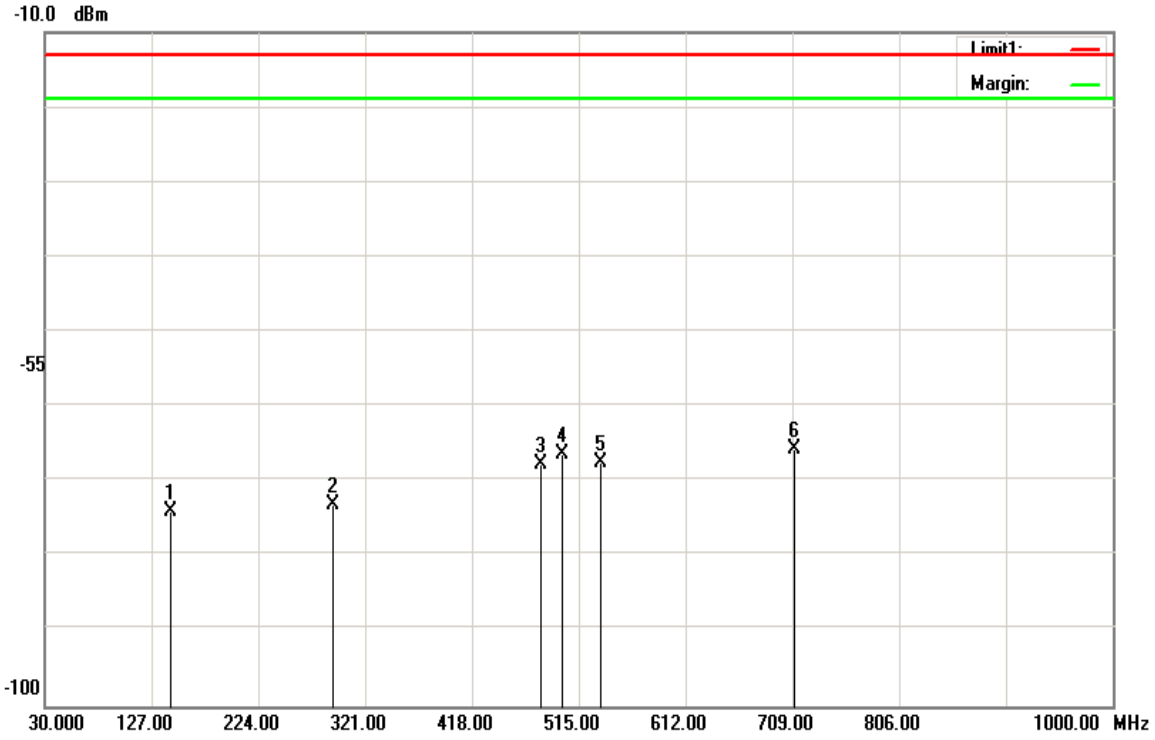
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1697.000	-54.8	1.51	-53.29	-13.00	-40.29	H
2546.000	-57.47	2.71	-54.76	-13.00	-41.76	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

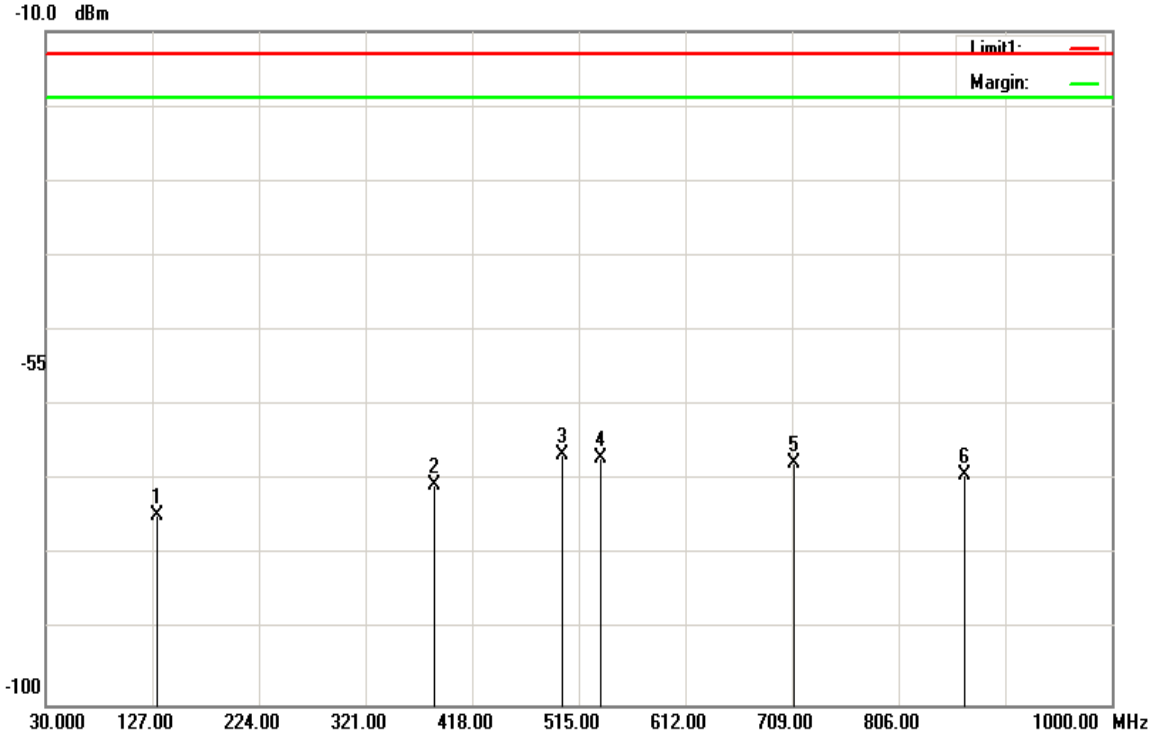
Radiated Spurious Emission Measurement Result / Below 1GHz

Operation Mode:	GPRS 1900 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.



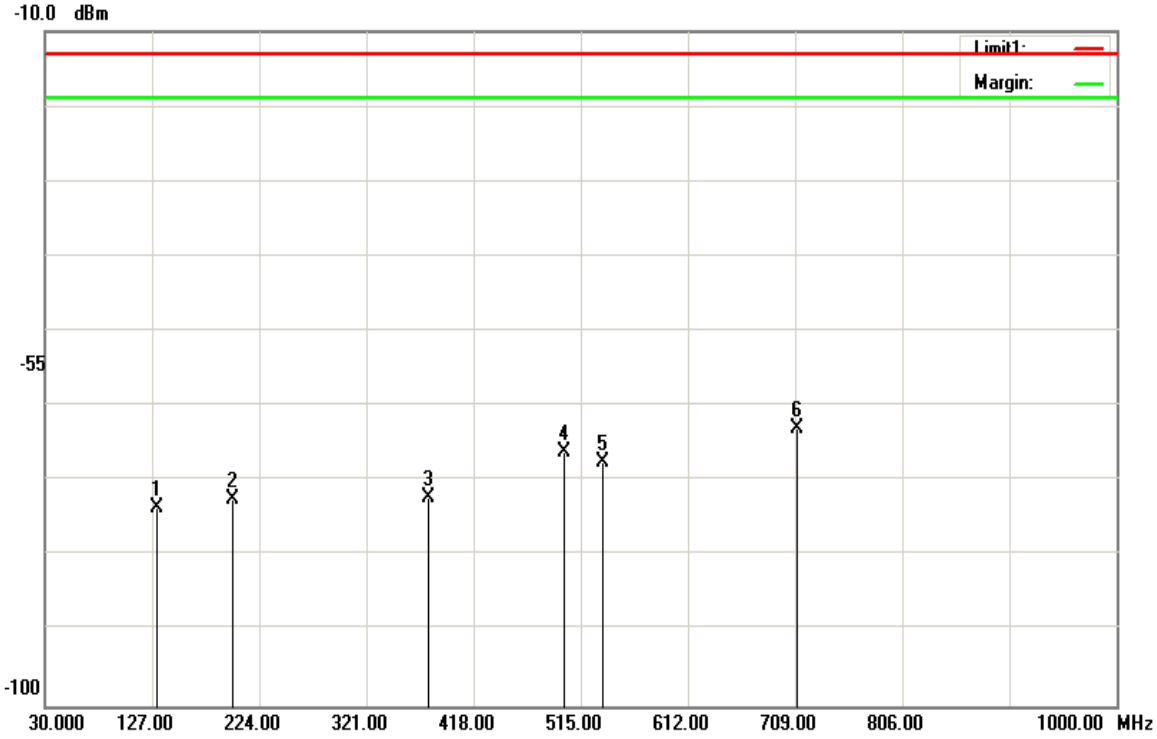
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
143.9750	-74.9	0.84	-74.06	-13.00	-61.06	V
291.9000	-80	6.98	-73.02	-13.00	-60.02	V
481.0500	-74.61	6.89	-67.72	-13.00	-54.72	V
500.4500	-73.19	6.8	-66.39	-13.00	-53.39	V
534.4000	-74.36	6.83	-67.53	-13.00	-54.53	V
711.4250	-67.67	1.96	-65.71	-13.00	-52.71	V

Operation Mode:	GPRS 1900 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	44 % RH	**Polarity:**	Hor.



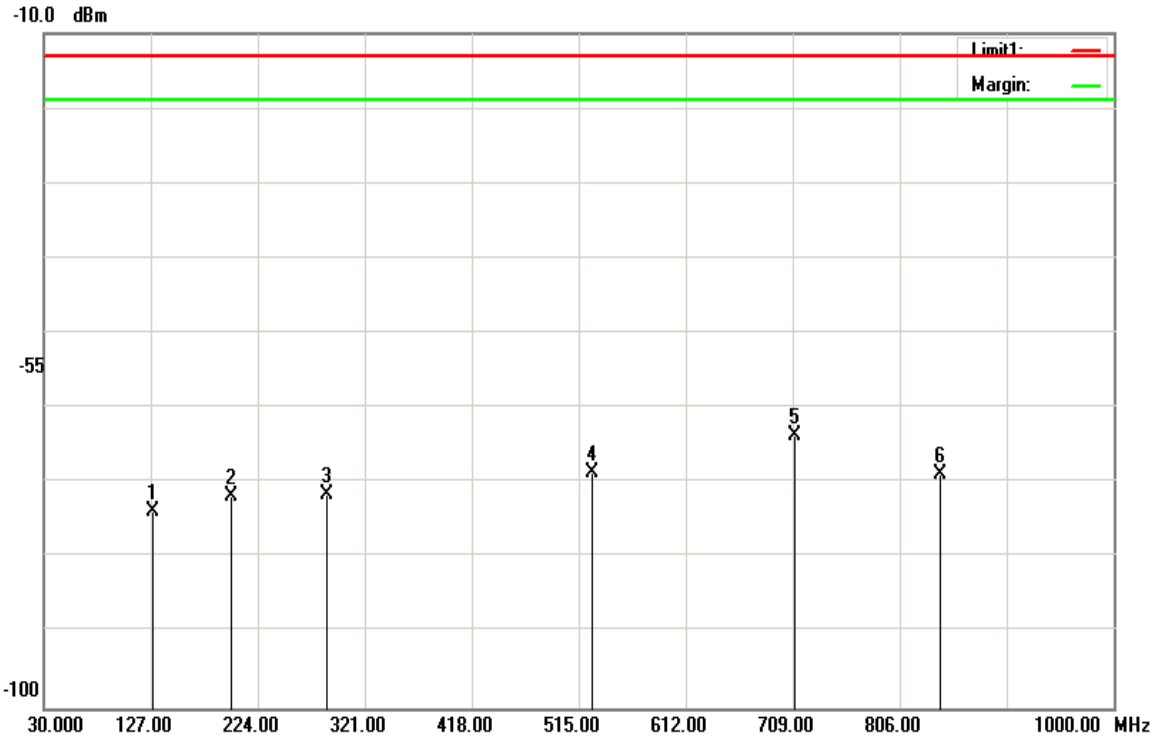
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.8500	-75.71	1.08	-74.63	-13.00	-61.63	H
384.0500	-77.97	7.24	-70.73	-13.00	-57.73	H
500.4500	-73.42	6.8	-66.62	-13.00	-53.62	H
534.4000	-73.86	6.83	-67.03	-13.00	-54.03	H
711.4250	-69.69	1.96	-67.73	-13.00	-54.73	H
866.6250	-70.53	1.26	-69.27	-13.00	-56.27	H

Operation Mode:	EGPRS 1900 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.8500	-74.66	1.08	-73.58	-13.00	-60.58	V
199.7500	-76.59	4.1	-72.49	-13.00	-59.49	V
376.7750	-79.41	7.21	-72.20	-13.00	-59.20	V
500.4500	-72.95	6.8	-66.15	-13.00	-53.15	V
534.4000	-74.22	6.83	-67.39	-13.00	-54.39	V
711.4250	-64.99	1.96	-63.03	-13.00	-50.03	V

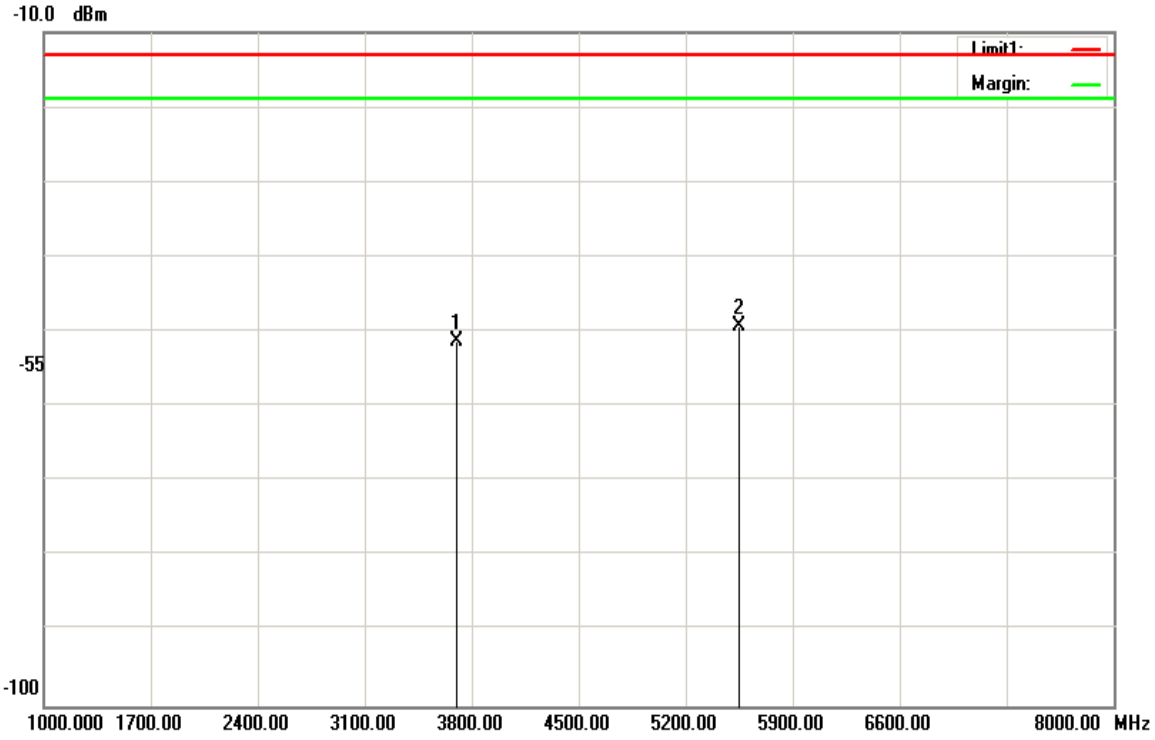
Operation Mode:	EGPRS 1900 /Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
129.4250	-74.92	1.04	-73.88	-13.00	-60.88	H
199.7500	-75.95	4.1	-71.85	-13.00	-58.85	H
287.0500	-78.52	7.03	-71.49	-13.00	-58.49	H
527.1250	-75.43	6.83	-68.60	-13.00	-55.60	H
711.4250	-65.61	1.96	-63.65	-13.00	-50.65	H
842.3750	-70.1	1.19	-68.91	-13.00	-55.91	H

Above 1GHz

Operation Mode:	GPRS 1900 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

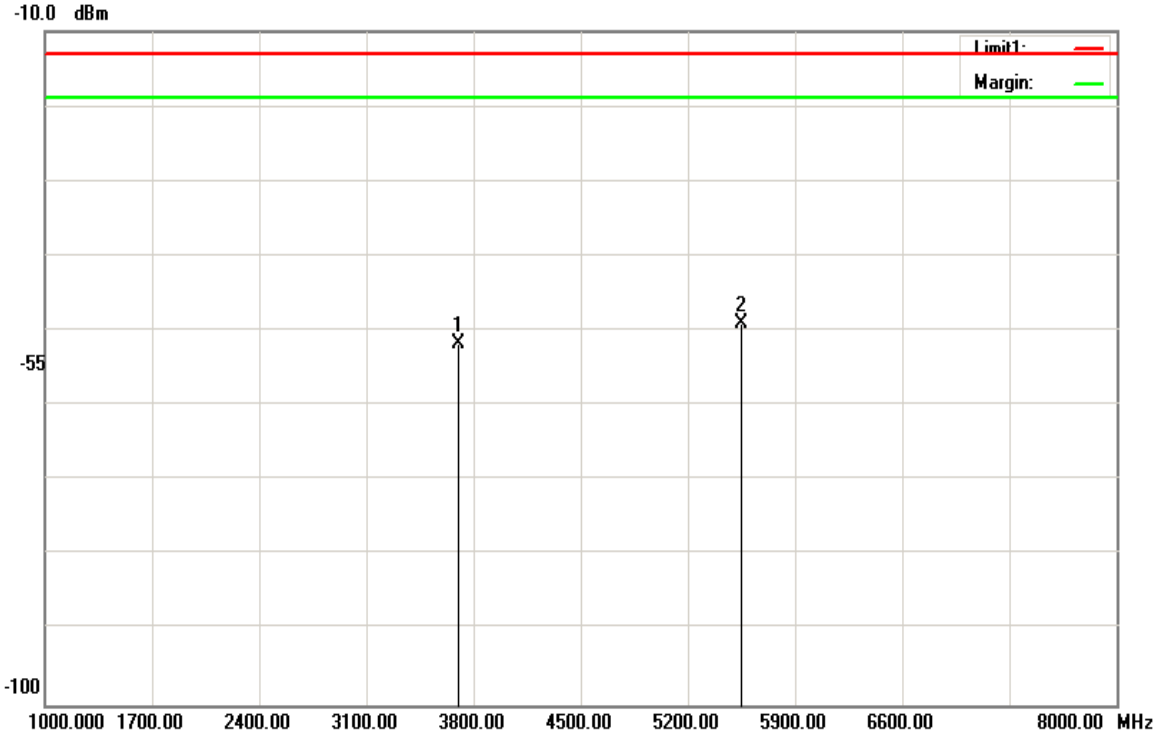


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.76	12.54	-51.22	-13.00	-38.22	V
5550.000	-62.2	12.88	-49.32	-13.00	-36.32	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 1900 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

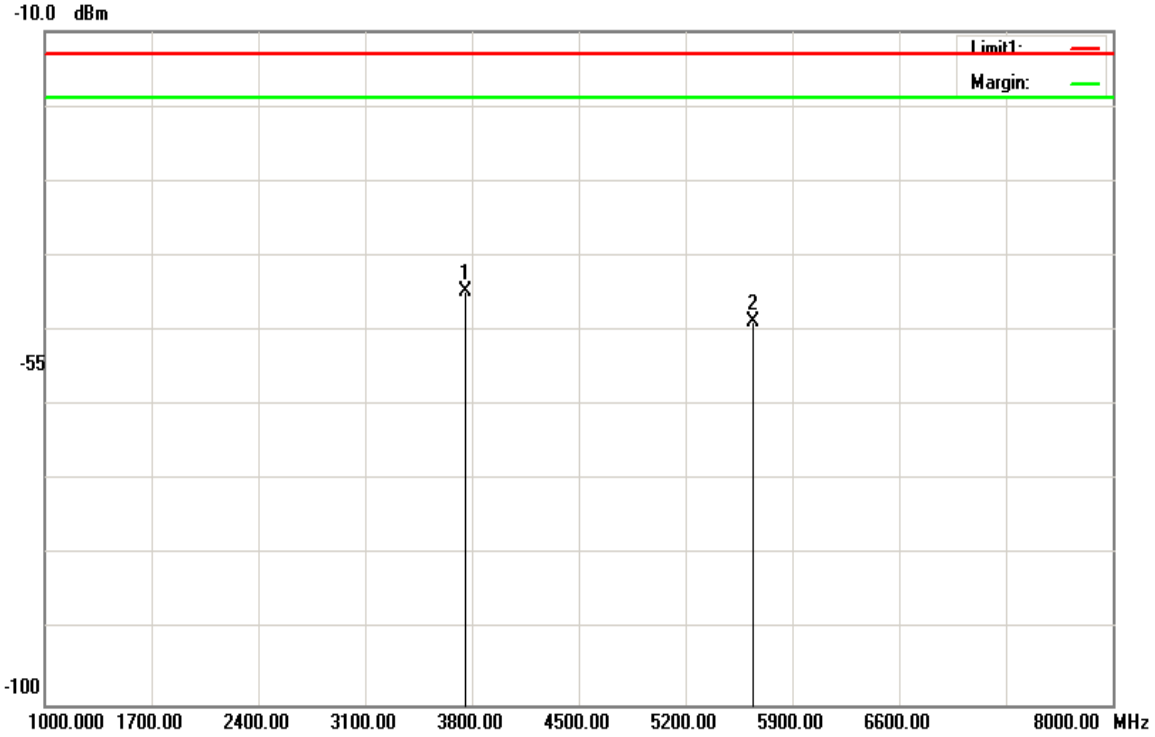


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-64.36	12.54	-51.82	-13.00	-38.82	H
5550.000	-61.89	12.88	-49.01	-13.00	-36.01	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 1900 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

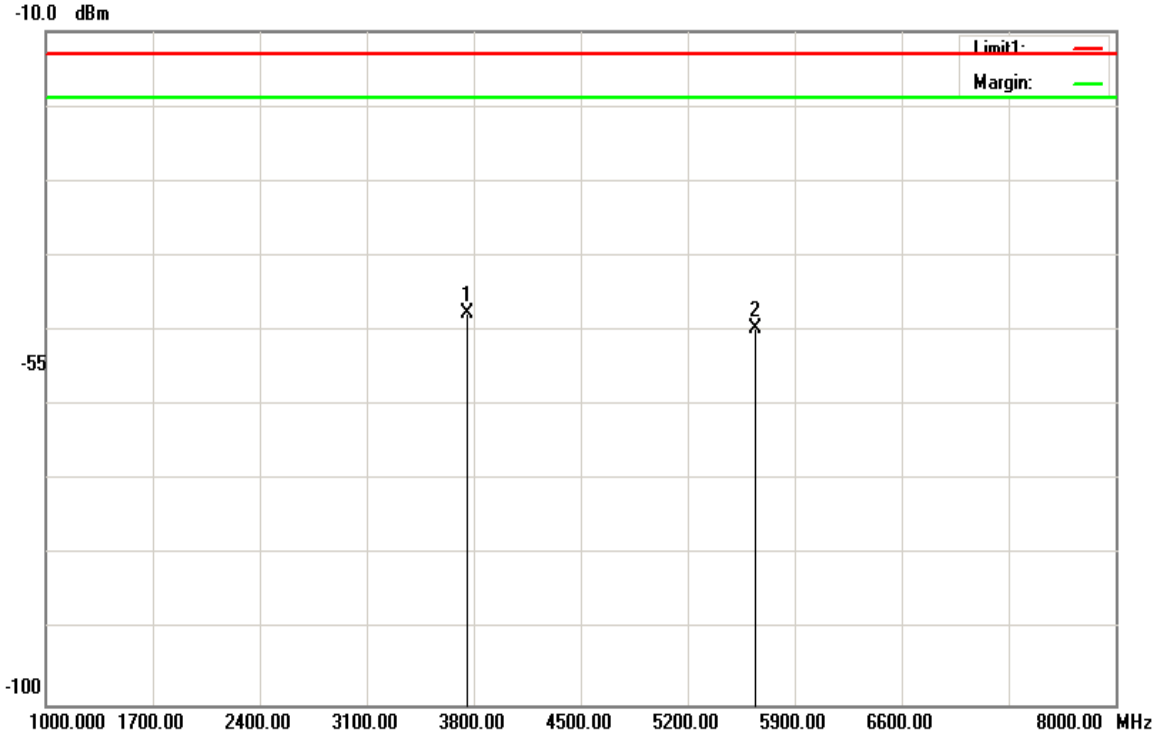


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-57.36	12.55	-44.81	-13.00	-31.81	V
5640.000	-61.76	12.84	-48.92	-13.00	-35.92	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 1900 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

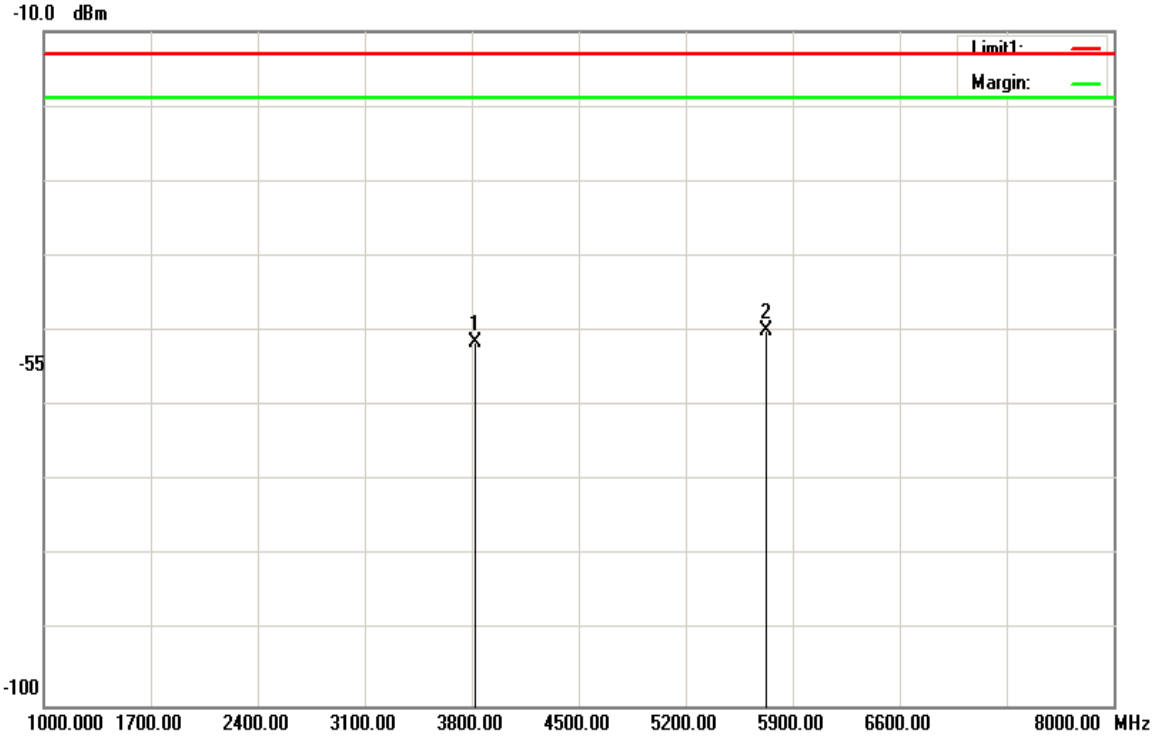


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-60.22	12.55	-47.67	-13.00	-34.67	H
5640.000	-62.49	12.84	-49.65	-13.00	-36.65	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 1900 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

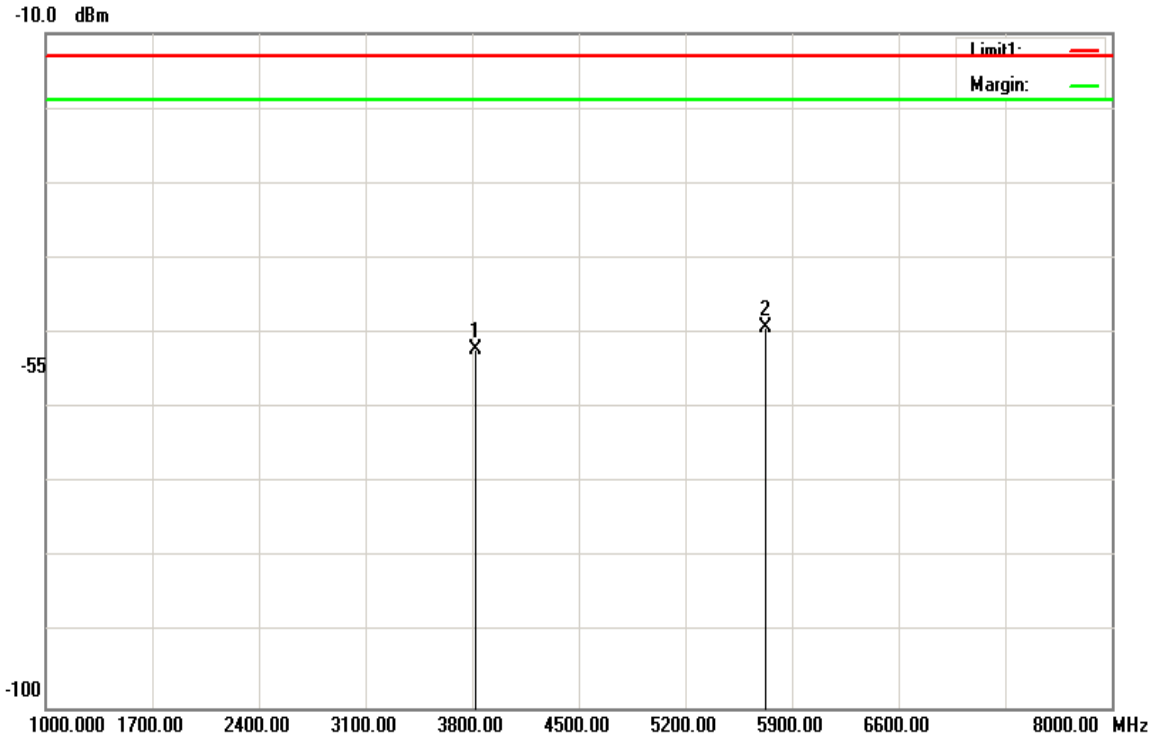


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3819.000	-64.01	12.56	-51.45	-13.00	-38.45	V
5729.000	-62.83	12.81	-50.02	-13.00	-37.02	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	GPRS 1900 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

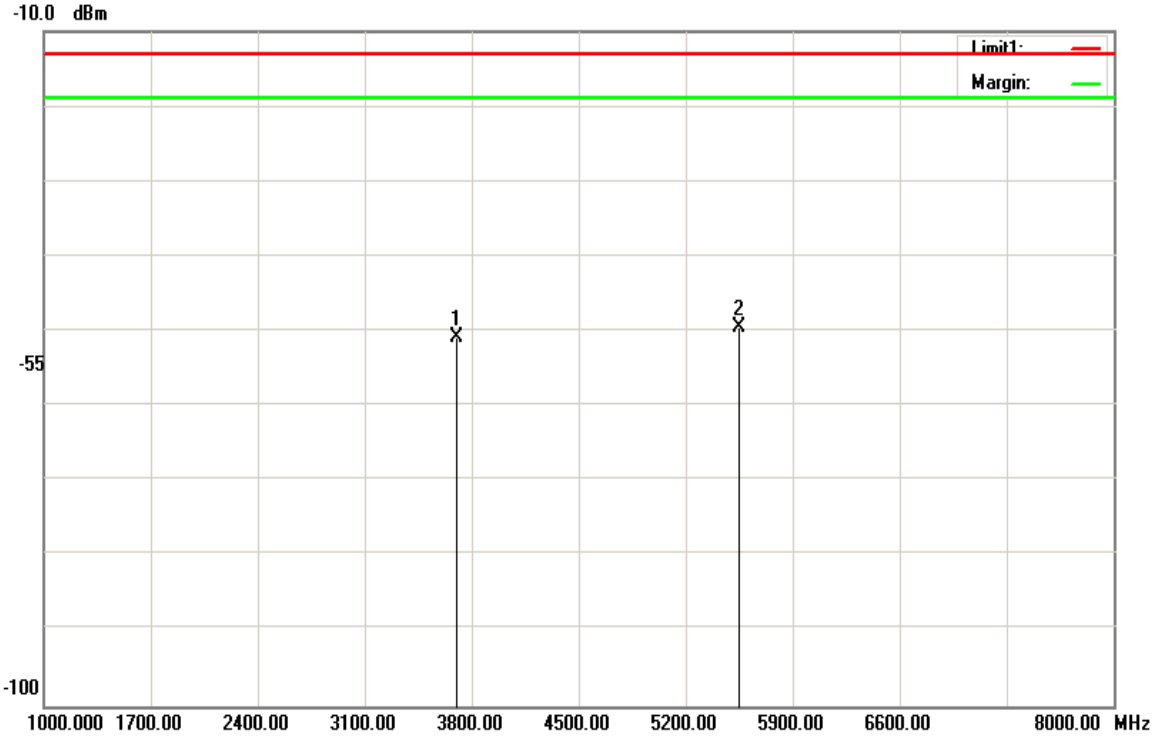


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3819.000	-64.73	12.56	-52.17	-13.00	-39.17	H
5729.000	-62.05	12.81	-49.24	-13.00	-36.24	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

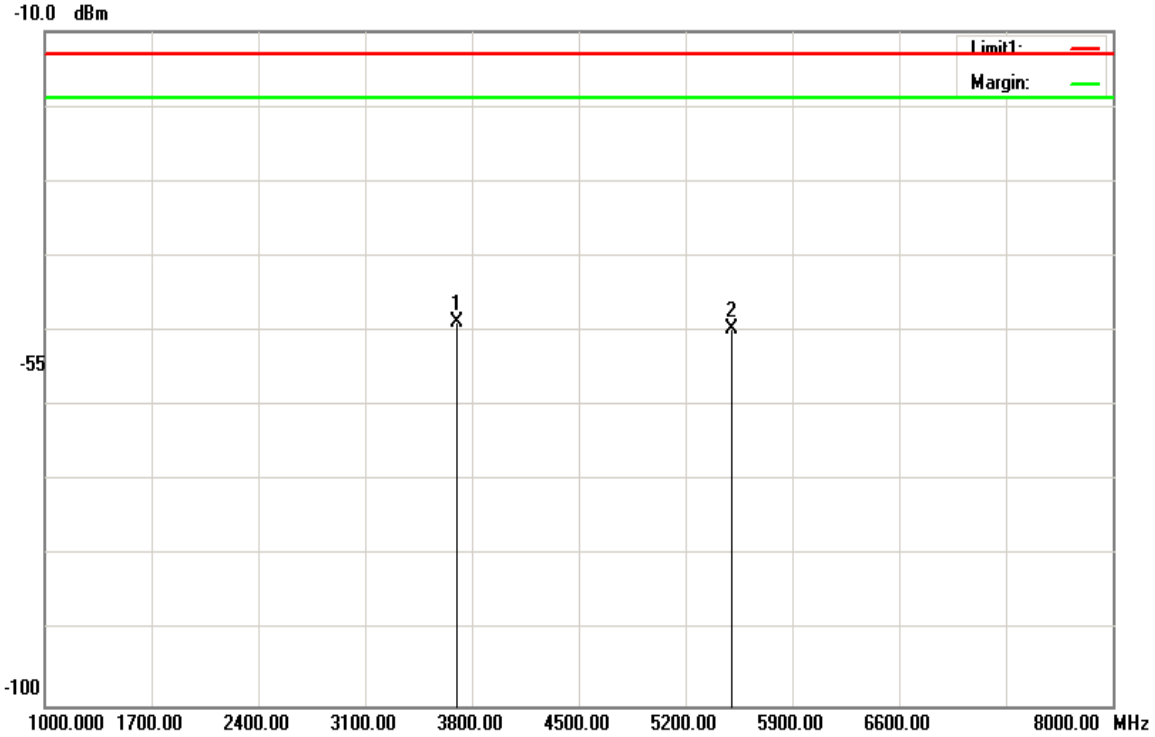


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-63.48	12.54	-50.94	-13.00	-37.94	V
5550.000	-62.44	12.88	-49.56	-13.00	-36.56	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / Low CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

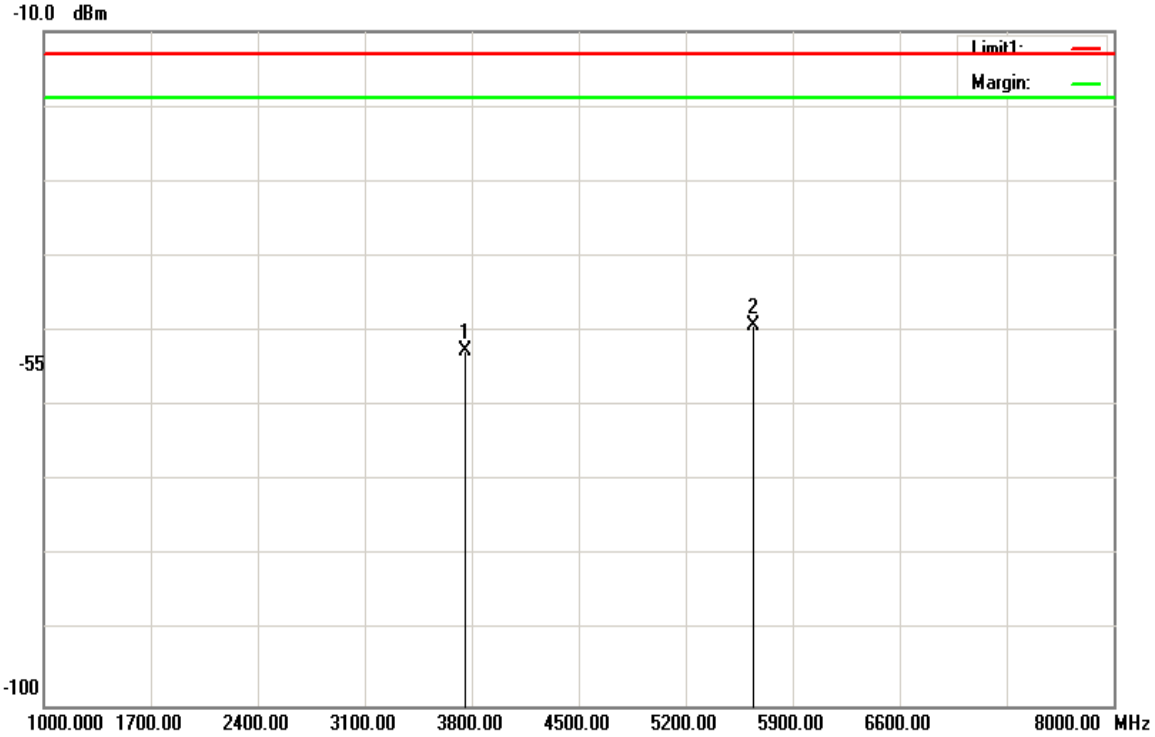


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3700.000	-61.35	12.54	-48.81	-13.00	-35.81	H
5500.000	-62.51	12.9	-49.61	-13.00	-36.61	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

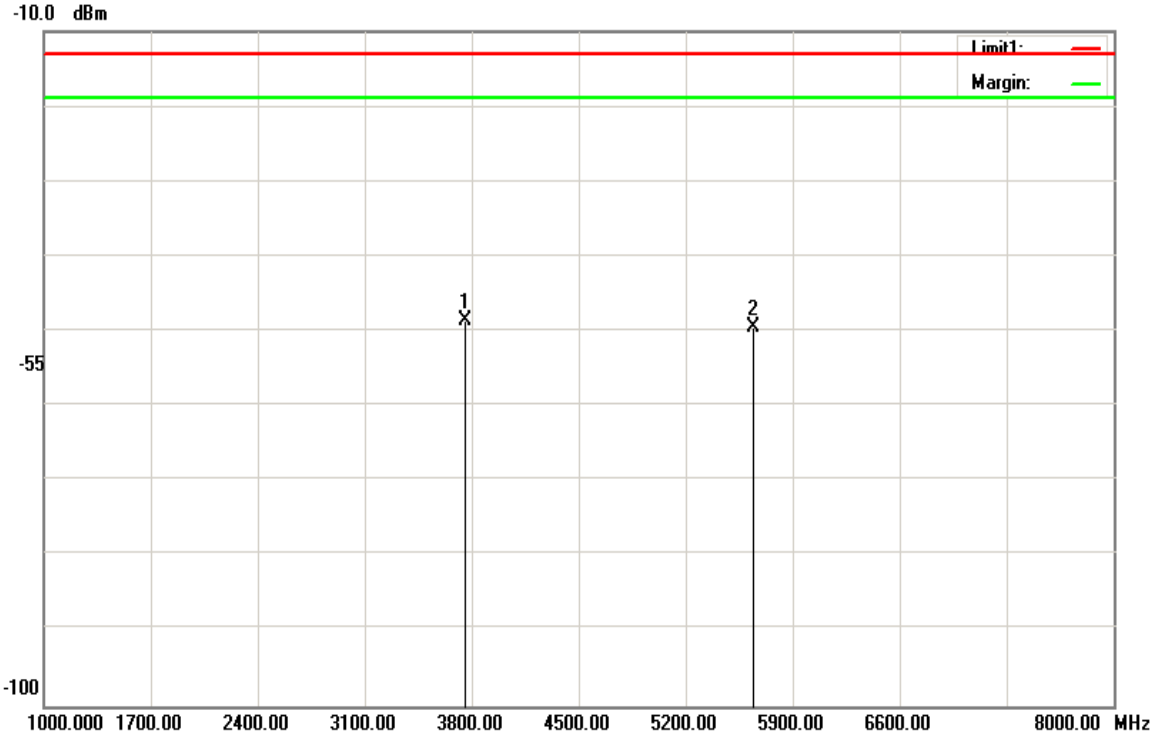


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-65.29	12.55	-52.74	-13.00	-39.74	V
5640.000	-62.11	12.84	-49.27	-13.00	-36.27	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / Mid CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.

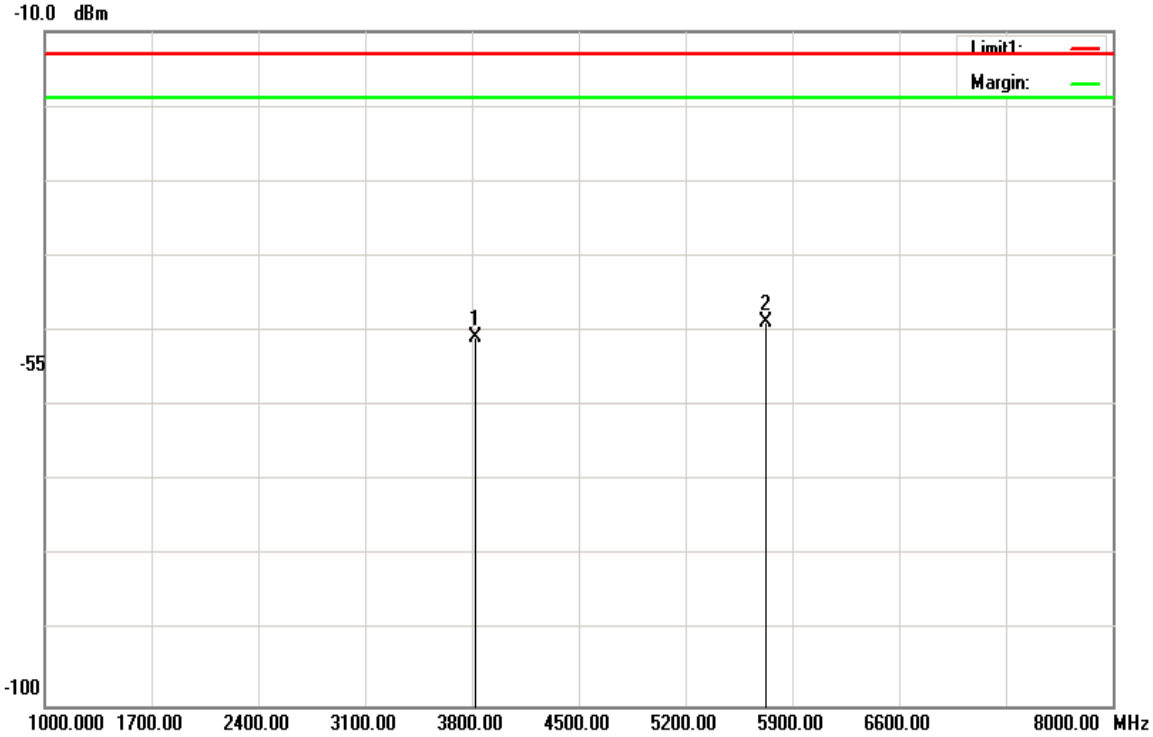


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3760.000	-61.23	12.55	-48.68	-13.00	-35.68	H
5640.000	-62.39	12.84	-49.55	-13.00	-36.55	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Ver.

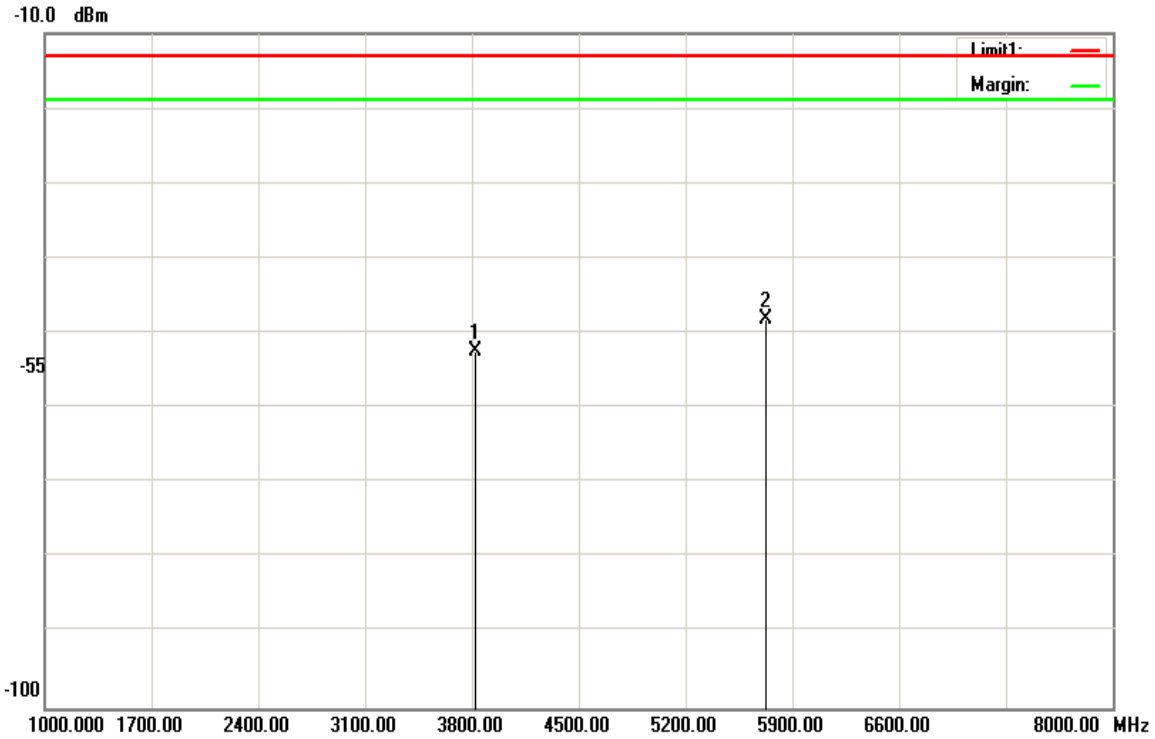


Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3819.000	-63.42	12.56	-50.86	-13.00	-37.86	V
5729.000	-61.52	12.81	-48.71	-13.00	-35.71	V
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

Operation Mode:	EGPRS 1900 / High CH	**Test Date:**	November 28, 2017
Temperature:	21℃	**Tested by:**	Ivan Wang
Humidity:	54 % RH	**Polarity:**	Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3819.000	-64.92	12.56	-52.36	-13.00	-39.36	H
5729.000	-60.94	12.81	-48.13	-13.00	-35.13	H
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

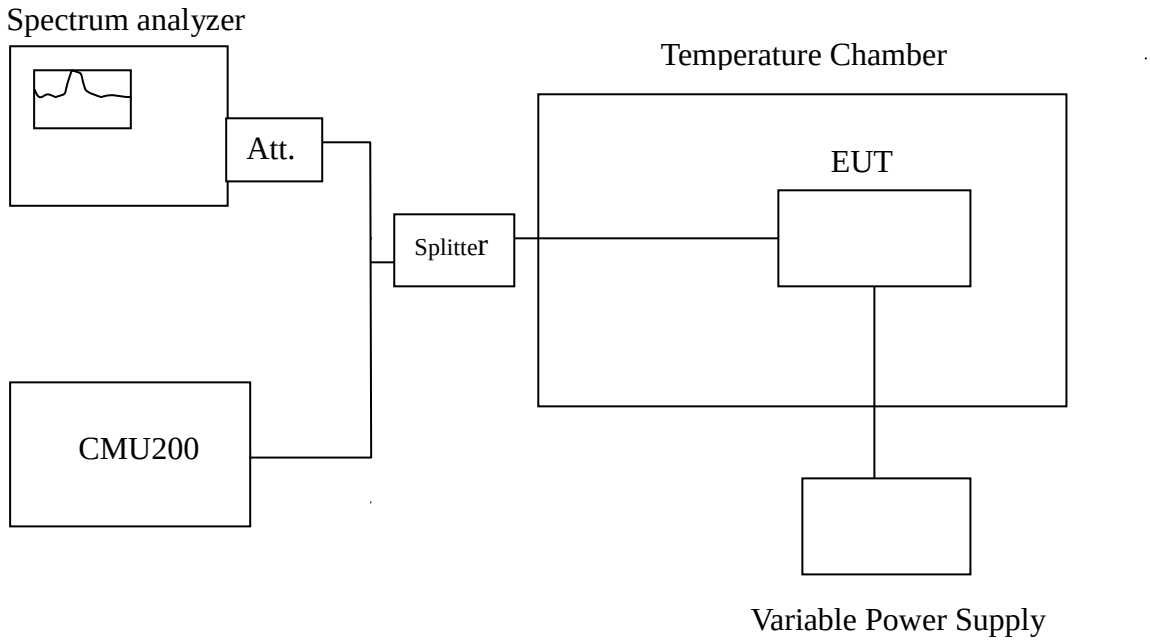
8.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

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

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 20ºC operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30ºC. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10ºC increased per stage until the highest temperature of +50ºC reached.

TEST RESULTS

No non-compliance noted.

Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C		
Limit: 824.2 ~ 848.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
12	50	8
	40	6
	30	2
	20	2
	10	-1
	0	3
	-10	2
	-20	-1
	-30	8

Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C		
Limit: 1850.2 ~ 1909.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
12	50	7
	40	5
	30	3
	20	4
	10	2
	0	8
	-10	7
	-20	2
	-30	7

Reference Frequency: EGPRS Mid Channel 836.6 MHz @ 20°C		
Limit: 824.2 ~ 848.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
12	50	-1
	40	6
	30	3
	20	7
	10	5
	0	2
	-10	-2
	-20	4
	-30	-1

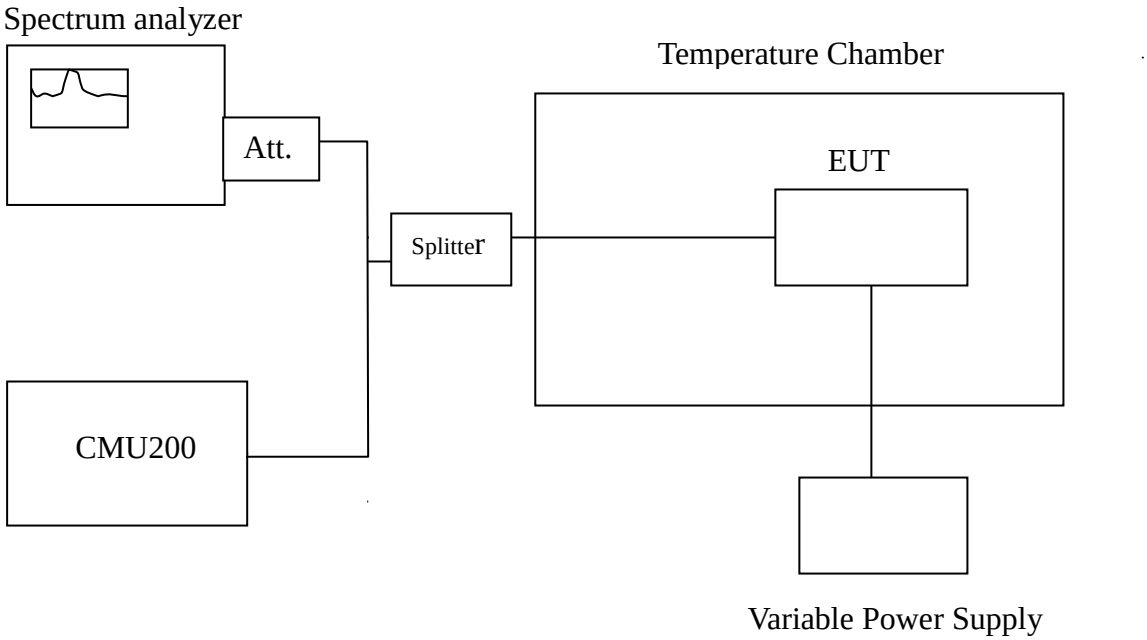
Reference Frequency: EGPRS Mid Channel 1880 MHz @ 20°C		
Limit: 1850.2 ~ 1909.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
12	50	-4
	40	1
	30	3
	20	-2
	10	1
	0	3
	-10	-2
	-20	3
	-30	-4

8.8 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

No non-compliance noted.

Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C		
Limit: 824.2 ~ 848.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
10.2	20	3
12		5
13.8		1

Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C		
Limit: 1850.2 ~ 1909.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
10.2	20	3
12		2
13.8		4

Reference Frequency: EGPRS Mid Channel 836.6 MHz @ 20°C		
Limit: 824.2 ~ 848.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
10.2	20	-2
12		2
13.8		7

Reference Frequency: EGPRS Mid Channel 1880 MHz @ 20°C		
Limit: 1850.2 ~ 1909.8 MHz		
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)
10.2	20	-2
12		4
13.8		4

-- End of Test Report --