



CONFORMANCE TEST REPORT FOR FCC 47 CFR, Part 22 Subpart H / Part 24 Subpart E

Report No.: ET94S-12-054-01

Client: **LIGHTSPEED INTERNATIONAL CO.**
 Product: **EDGE PCMCIA CARD**
 Model: **EDGE-100M**
 FCC ID: **NGJEDGE100MPCMCIA**
 Manufacturer/supplier: **LIGHTSPEED INTERNATIONAL CO.**

Date test item received: 2005/12/06
 Date test campaign completed: 2006/02/06
 Date of issue: 2006/02/08

The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.

Total number of pages of this test report: 120 pages

Total number of pages of photos: External photos 1 pages

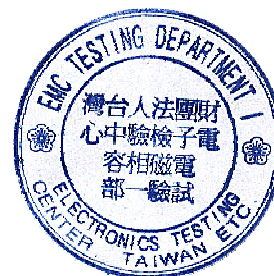
Internal photos 3 pages

Setup photos 2 pages

Test Engineer	Checked By	Approved By
 Mark	 Mark	 Joe Hsieh

ELECTRONICS TESTING CENTER, TAIWAN
 NO.8, LANE 29, WEN-MING RD.,
 LO-SHAN TSUN, KUI-SHAN HSIANG,
 TAOYUAN HSIEN 333
 TAIWAN, R.O.C.

TEL: (03) 3276170~4
 INT: +886-3-3276170~4
 FAX: (03) 3276188
 INT: +886-3-3276188



TEST REPORT CERTIFICATION

Client : LIGHTSPEED INTERNATIONAL CO.
Address : 5F-1, NO.9, SEC3, CHUNG HUA RD, HSINCHU, TAIWAN
Manufacturer : LIGHTSPEED INTERNATIONAL CO.
Address : 5F-1, NO.9, SEC3, CHUNG HUA RD, HSINCHU, TAIWAN
EUT : EDGE PCMCIA CARD
Trade name : LIGHTSPEED
Model No. : EDGE-100M
Power Source : 5V DC (From Notebook PCMCIA Interfac)
Regulations applied : FCC 47 CFR, Part 22 Subpart H and Part 24 Subpart E

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product. This report shall not be reproduced except in full, without the approval of ETC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Laboratory Introduction: Electronics Testing Center, Taiwan is recognized, filed and mutual recognition arrangement as following:

- ISO9001: TÜV Product Service
- ISO/IEC 17025: BSMI, CNLA, DGT, NVLAP, CCIBLAC, UL, Compliance
- Filing: FCC, Industry Canada, VCCI
- MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through CNLA
- FCC Registration Number: 90588, 91094, 91095



NVLAP Lab Code 200133-0

Table of Contents	Page
1. GENERAL INFORMATION	5
1.1 Product Description.....	5
1.2 Characteristics of Device	5
1.3 Test Methodology	5
1.4 Modification List of EUT	5
1.5 Test Facility.....	5
2. SYSTEM TEST CONFIGURATION	6
2.1 Justification	6
2.2 Devices for Tested System	6
3. PEAK POWER MEASUREMENT.....	7
3.1 Applicable Standard	7
3.2 Measurement Procedure	7
3.3 Measuring Instrument	7
3.4 Test Result.....	8
4. ERP & EIRP MEASUREMENT	27
4.1 Standard Applicable	27
4.2 Measurement Procedure	27
4.3 Measurement Equipment	27
4.4 Test Result.....	29
5. OCCUPIED BANDWIDTH MEASUREMENT	31
5.1 Standard Applicable	31
5.2 Measurement Procedure	31
5.3 Measuring Instrument	31
5.4 Test Result.....	32
6. OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	51
6.1 Standard Applicable	51
6.2 Measurement Procedure	51
6.3 Measurement Equipment	51
6.4 Test Result.....	52
7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT	83
7.1 Standard Applicable	83
7.2 Measurement Procedure	83
7.3 Measurement Equipment	83
7.4 Test Result.....	84

8. FREQUENCY STABILITY MEASUREMENT..... 90

8.1 Standard Applicable 90

8.2 Measurement Procedure 90

8.3 Measurement Equipment 91

8.4 Test Result..... 92

9. POWERLINE CONDUCTED EMISSIONS..... 95

9.1 Standard Applicable 95

9.2 Measurement Procedure 95

9.3 Measurement Equipment 96

9.4 Test Result..... 97

1. GENERAL INFORMATION

1.1 Product Description

- a) Type of EUT : EDGE PCMCIA CARD
- b) Trade Name : LIGHTSPEED
- c) Model No. : EDGE-100M
- d) Power Supply : 5V DC (From Notebook PCMCIA Interface)

1.2 Characteristics of Device

EDGE-100M is an EDGE NETWORK PCMCIA CARD that is compatible with 850/900/1800/1900MHZ EDGE/GPRS/GSM NETWORK. It can send/receive data, fax, voice, SMS & MMS.

Mode	GSM (Class8)		GPRS (Class10)		EGPRS (Class10)	
Band(MHz)	850	1900	850	1900	850	1900
Frequency Range(MHz)	824-849	1850-1910	824-849	1850-1910	824-849	1850-1910
Modulation Mode	GMSK		GMSK		8PSK	
Crast Factor	1:8.3		1:4		1:4	

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4 and FCC CFR 47, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

1.4 Modifiction List of EUT

N/A

1.5 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.

This site has been accreditation as a FCC filing site.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

For the purposes of this test report ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT during the test. The simulate equipment was used to control the RF channel under the highest, middle and lowest frequency and transmit the maximum RF power.

2.2 Devices for Tested System

Device	Manufacture	Model	Cable Description
* EDGE PCMCIA CARD	LIGHTSPEED INTERNATIONAL CO.	EDGE-100M	----
Notebook PC	ACER	N-30N3	3.3m, Unshielded Power Line (Adaptor)

Remark “*” means equipment under test.

Test Channel – Frequency comparison table for test:

850 Band		1900 Band	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.2	512	1850.2
190	836.6	661	1880.0
251	848.8	810	1909.8

3. PEAK POWER MEASUREMENT

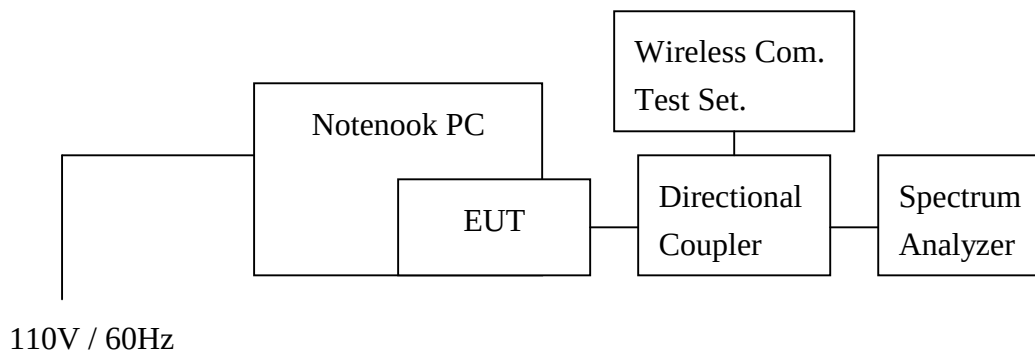
3.1 Applicable Standard

According to FCC § 2.1046.

3.2 Measurement Procedure

The setup of the EUT as shown in figure 1. The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a Spectrum Analyzer. Transmitter output was read off the Spectrum Analyzer in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the Spectrum Analyzer reading.

Figure 1: Peak power measurement configuration.



3.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Directional Coupler	AR	DC7420	12/05/2006
Wireless Com. Test Set	Agilent	E5515C	02/26/2006

3.4 Test Result

Test Date : 01/ 05/2006Temperature : 16°CHumidity : 66%

850 Band

Limits:

Power Control Level	Normal Peak Output Power	Tolerance (dB)
5	33dBm (2W)*	±2

*GSM Specification – ETSI EN 300 910 V8.5.1 (2000-11) Section 4.1

Power measurements:

Test Mode	Channel	Frequency (MHz)	Reading (dBm)	Attenuator & Cable Loss (dB)	Maximum Peak Output Power (dBm)
GSM850	128	824.2	21.12	10.8	31.92
	190	836.6	21.22	10.8	32.02
	251	848.8	21.37	10.8	32.17
GPRS850	128	824.2	21.11	10.8	31.91
	190	836.6	21.25	10.8	32.05
	251	848.8	21.43	10.8	32.23
EGPRS850	128	824.0	21.36	10.8	32.16
	190	836.6	21.48	10.8	32.28
	251	848.8	21.61	10.8	32.41

1900 Band

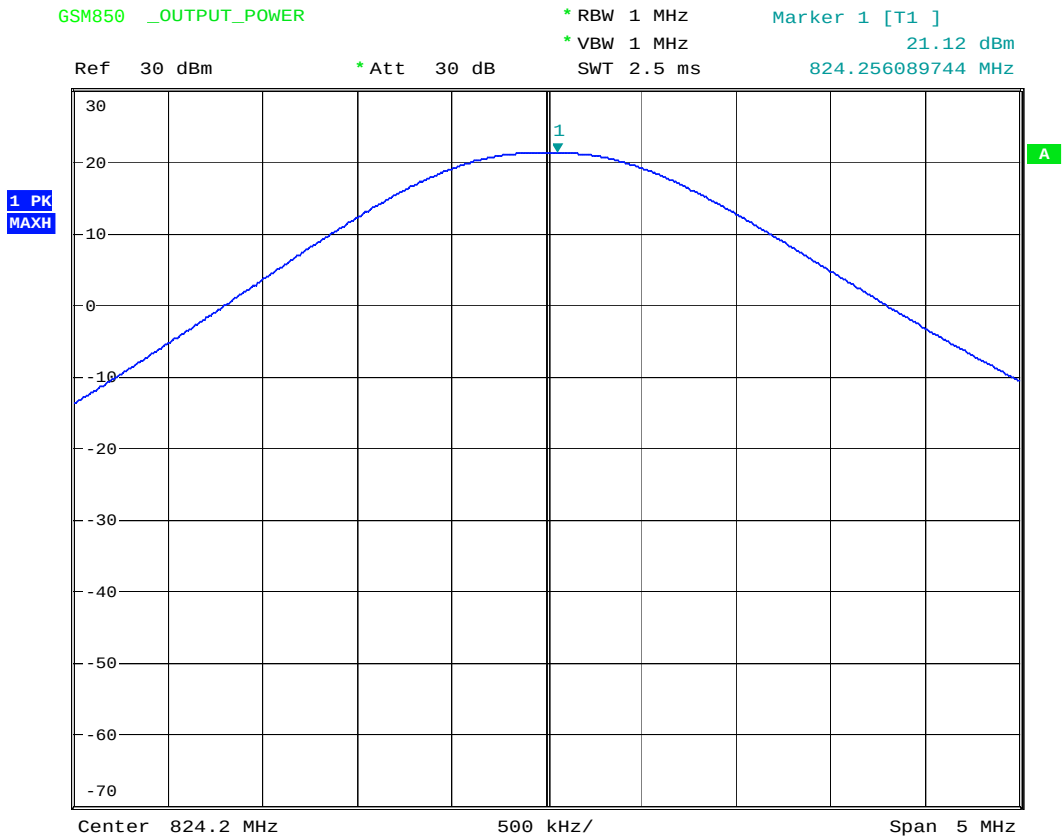
Limits:

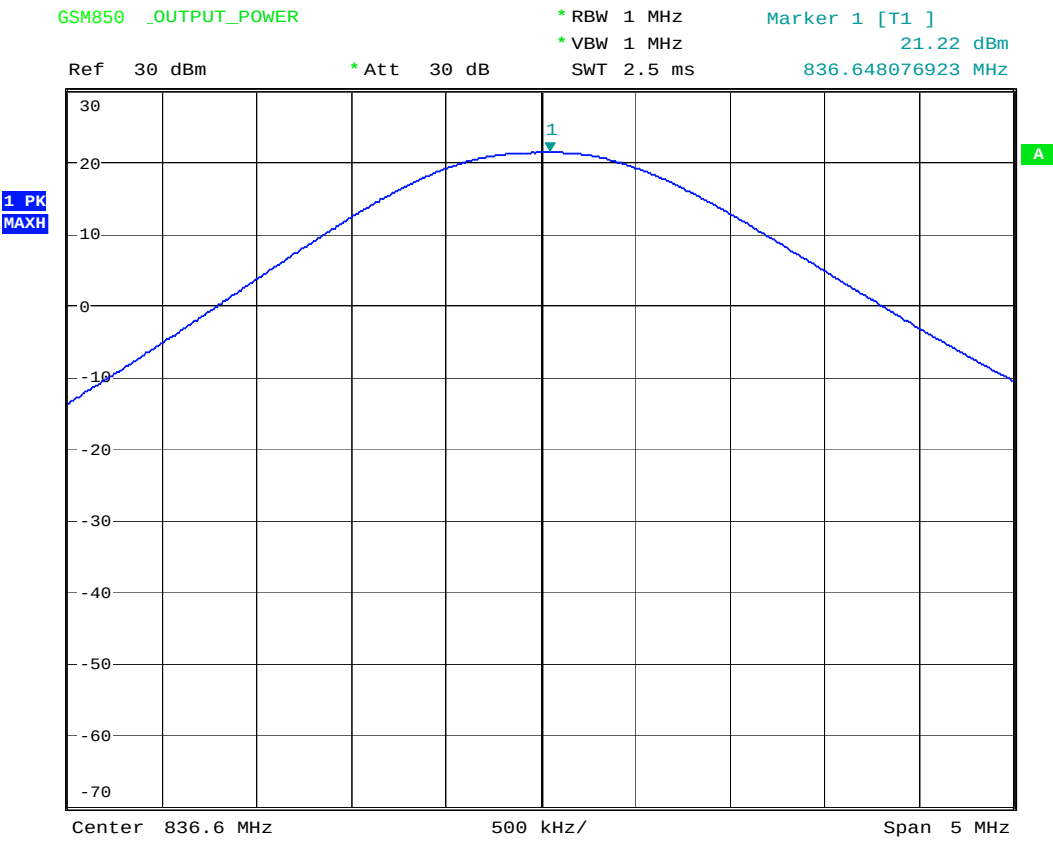
Power Control Level	Normal Peak Output Power	Tolerance (dB)
0	30dBm (1W)*	±2

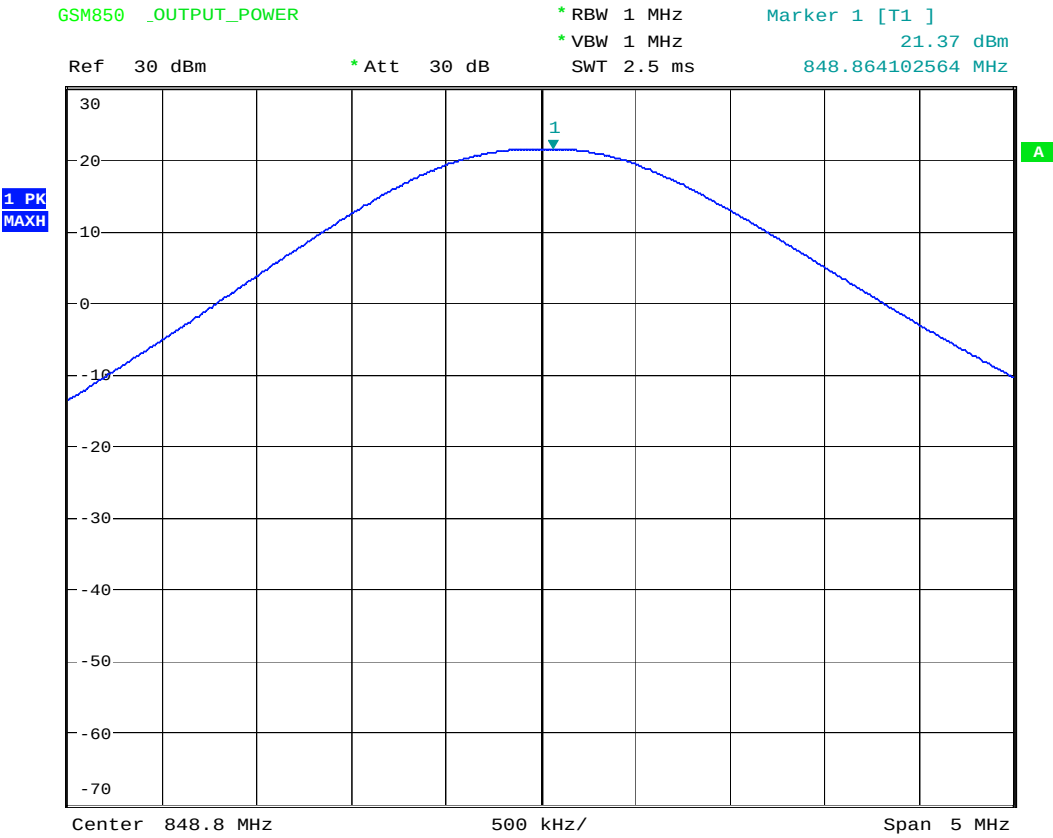
*GSM Specification – ETSI EN 300 910 V8.5.1 (2000-11) Section 4.1

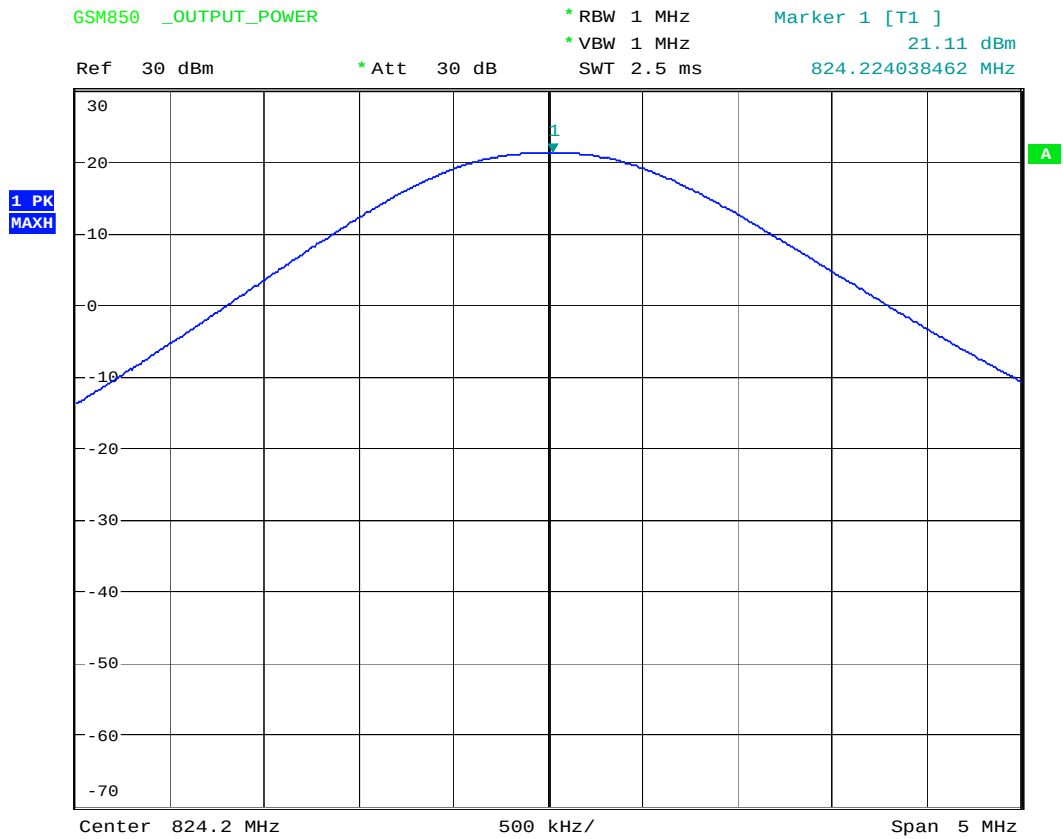
Power measurements:

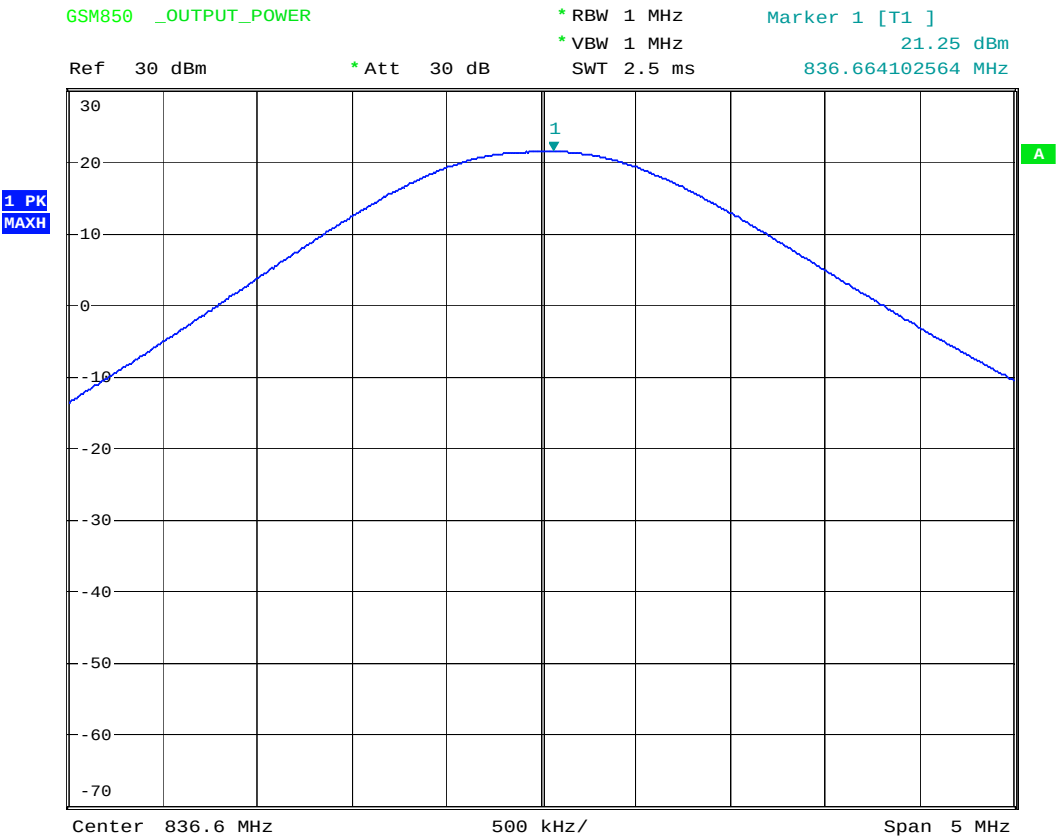
Test Mode	Channel	Frequency (MHz)	Reading (dBm)	Attenuator & Cable Loss (dB)	Maximum Peak Output Power (dBm)
PCS1900	512	1850.2	17.48	11.4	28.88
	661	1880.0	17.19	11.4	28.59
	810	1908.8	16.60	11.4	28.00
GPRS1900	512	1850.2	17.50	11.4	28.90
	661	1880.0	17.05	11.4	28.45
	810	1909.8	16.64	11.4	28.04
EGPRS1900	512	1850.2	17.55	11.4	28.95
	661	1880.0	17.11	11.4	28.51
	810	1909.8	16.95	11.4	28.35

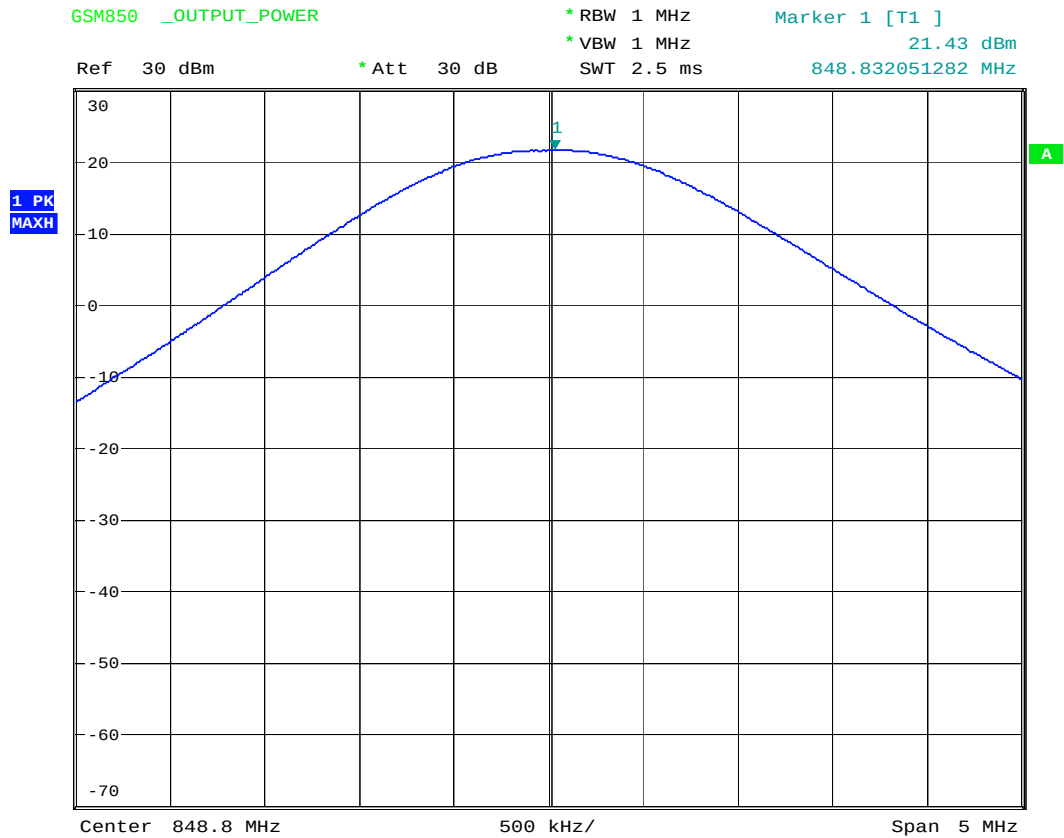


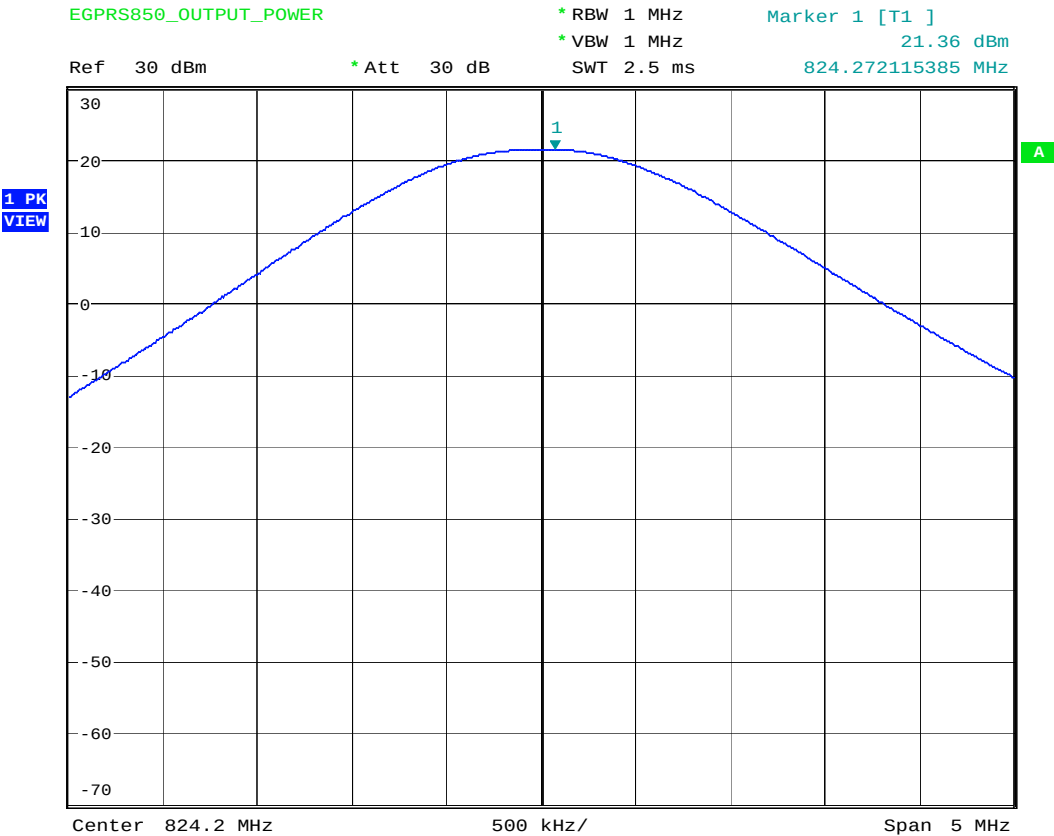


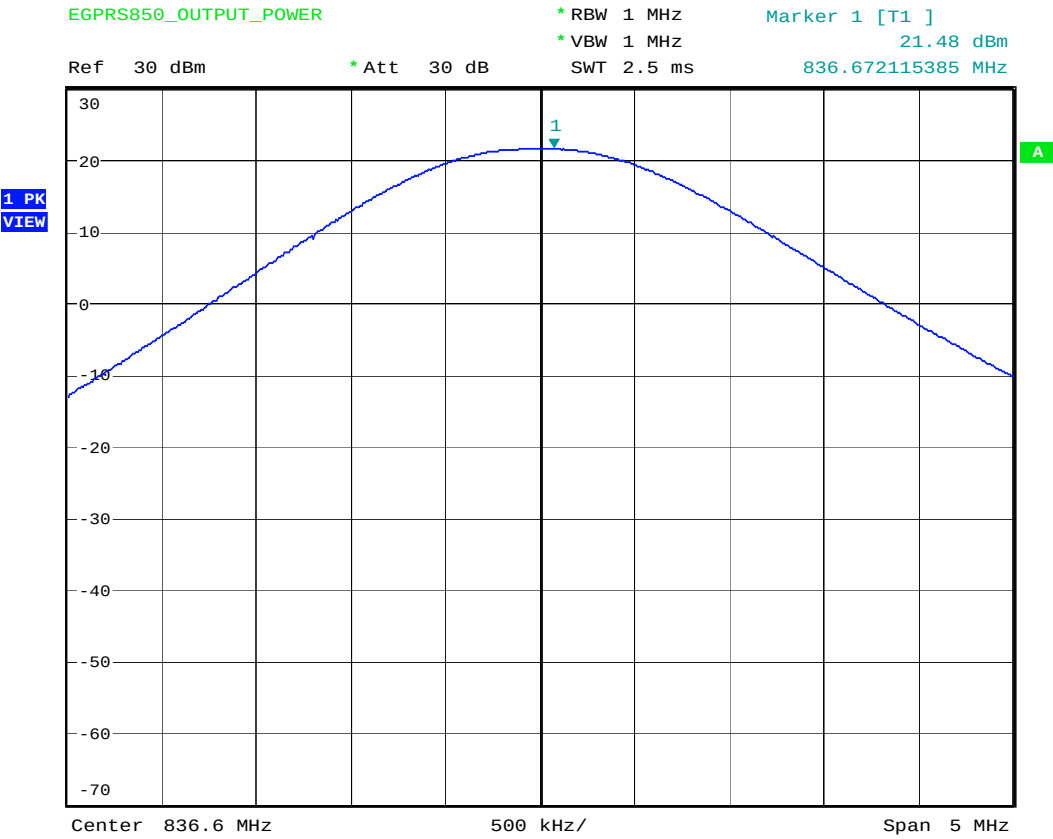


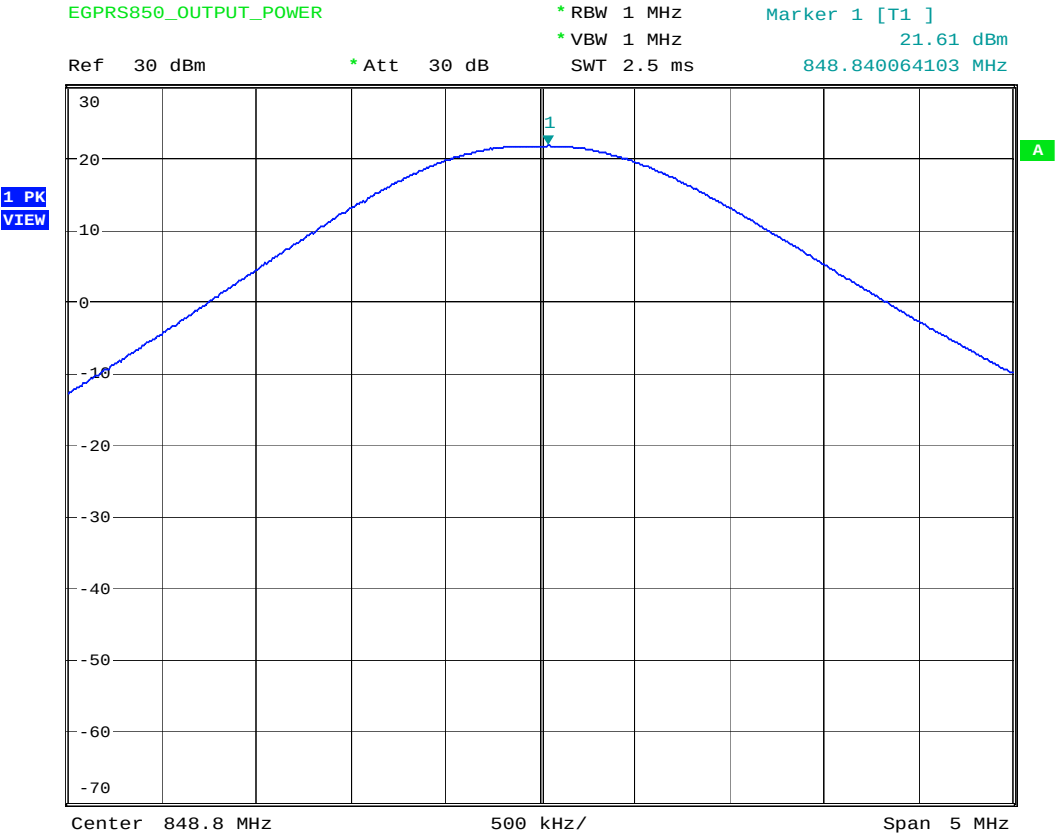


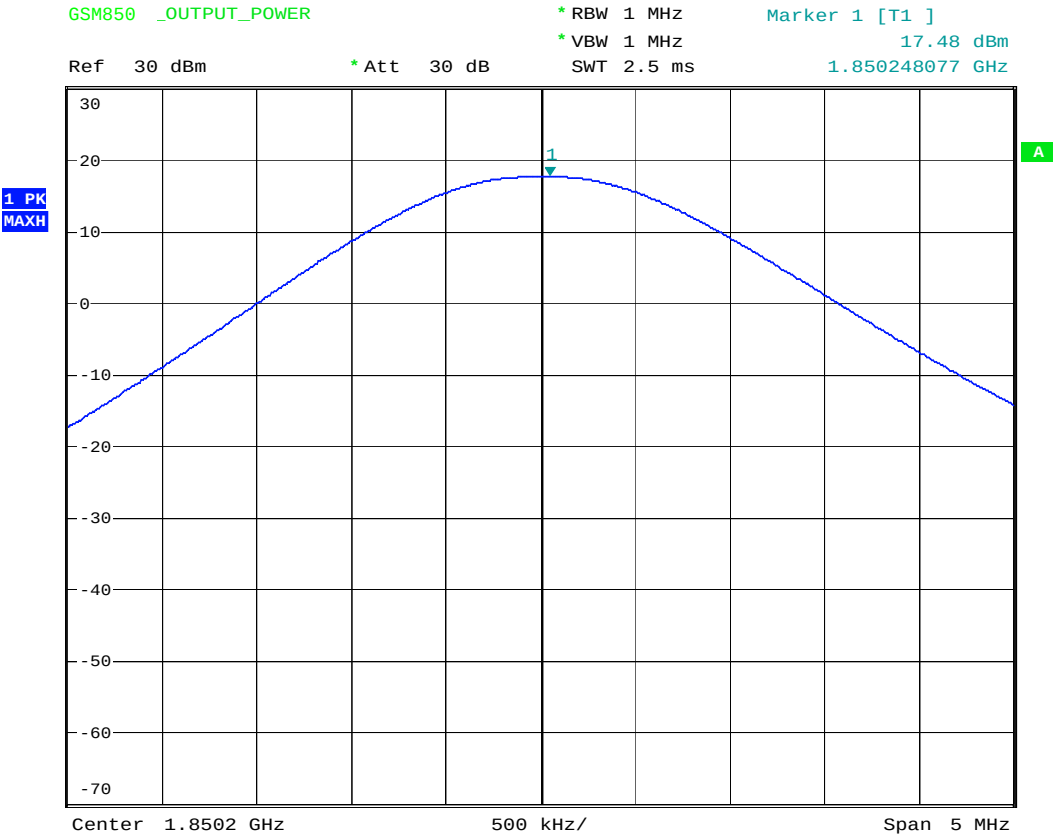


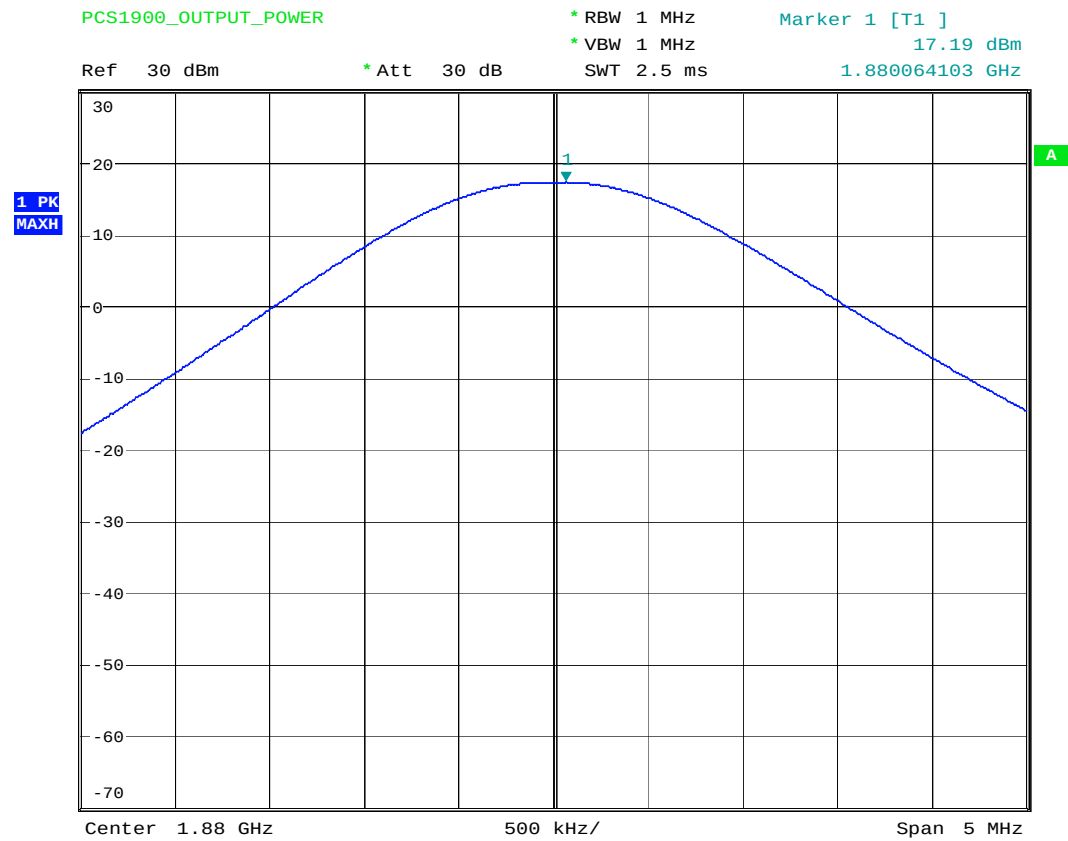


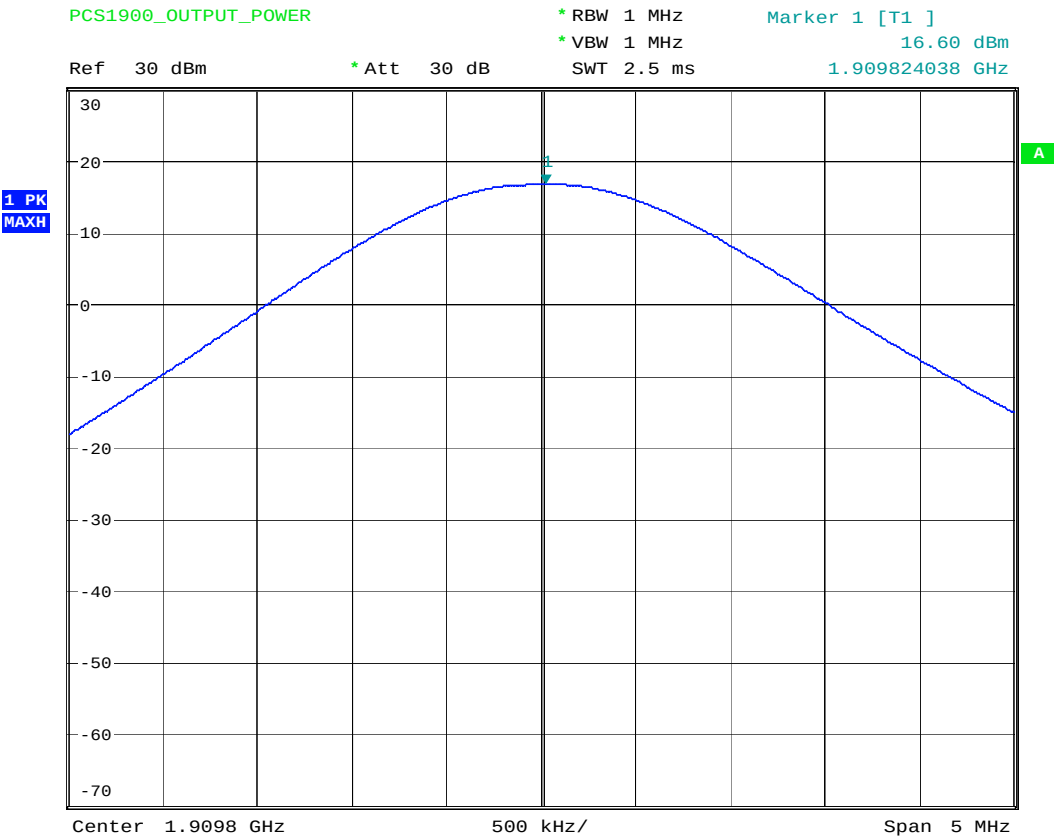


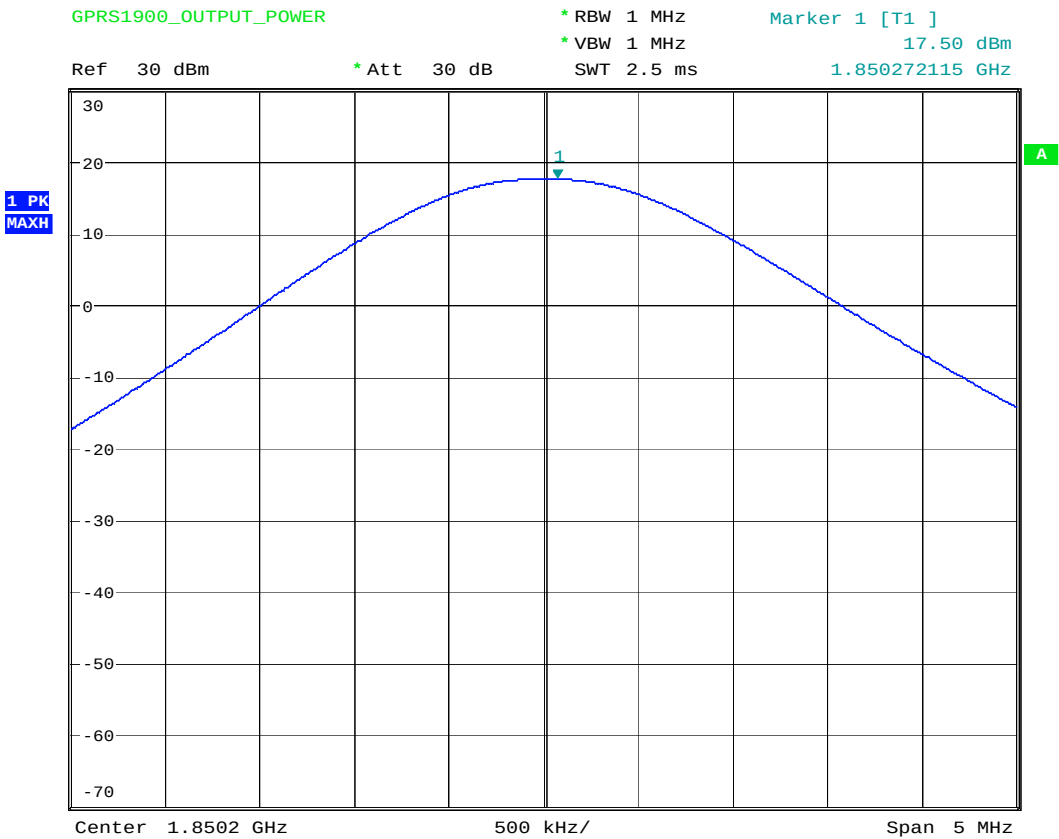


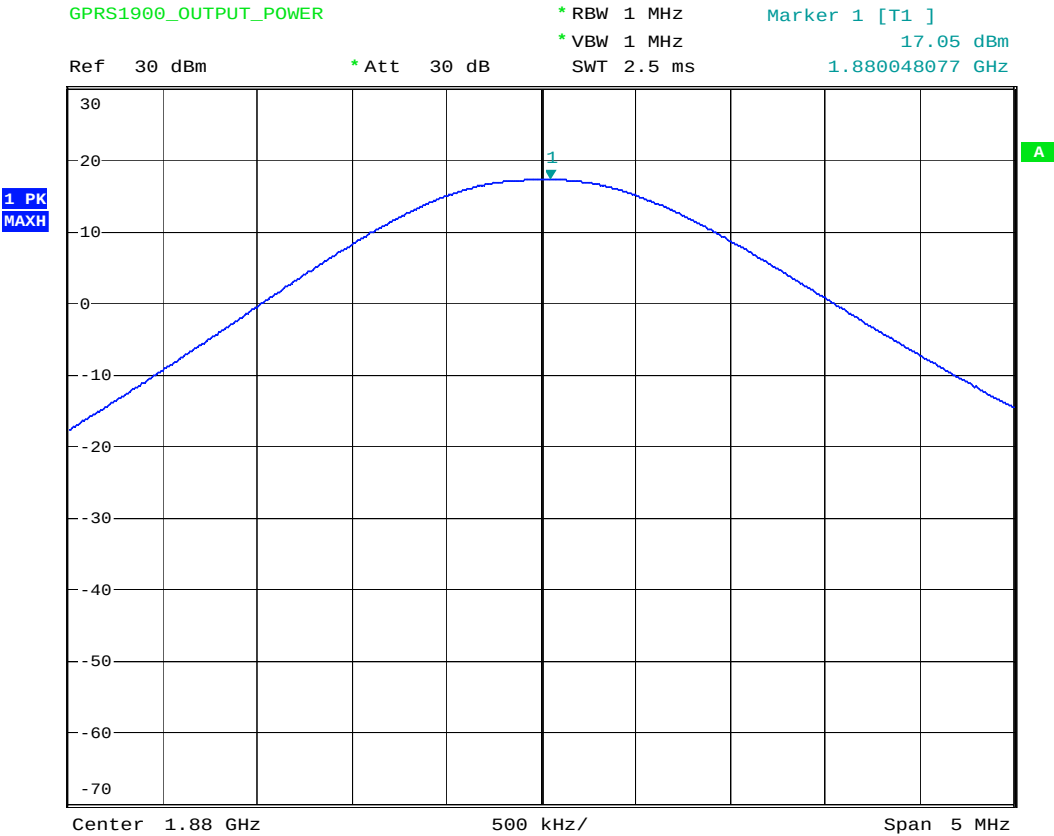


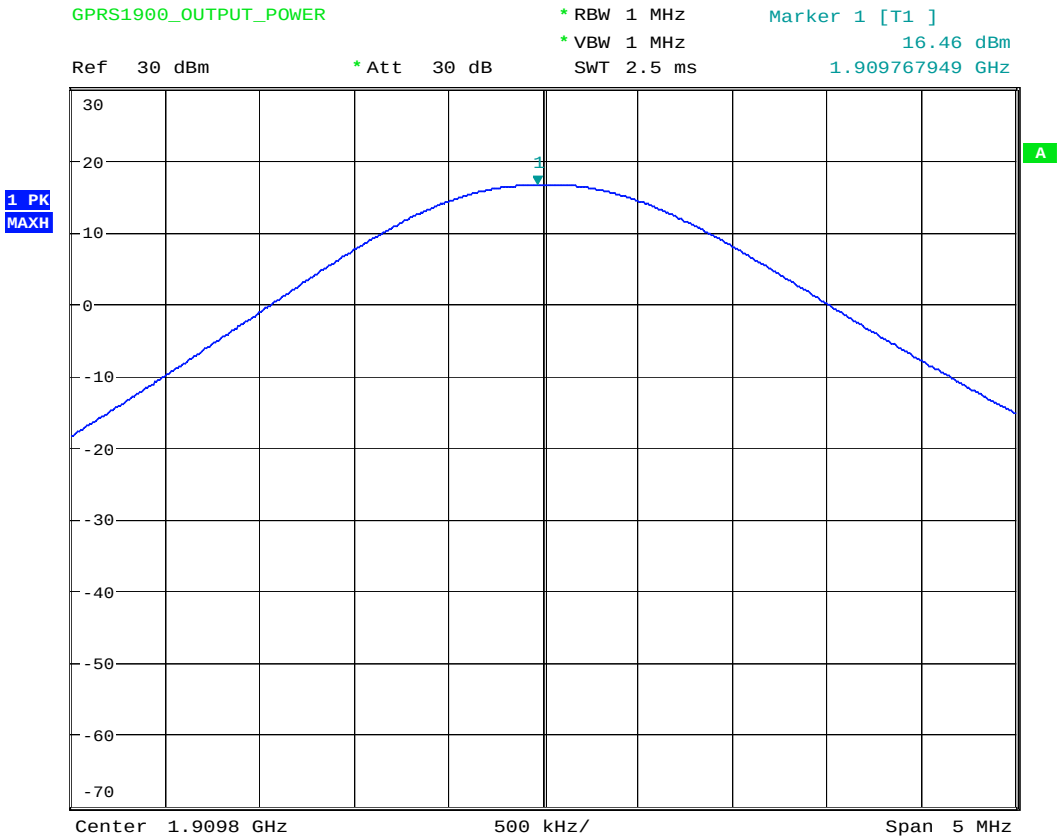


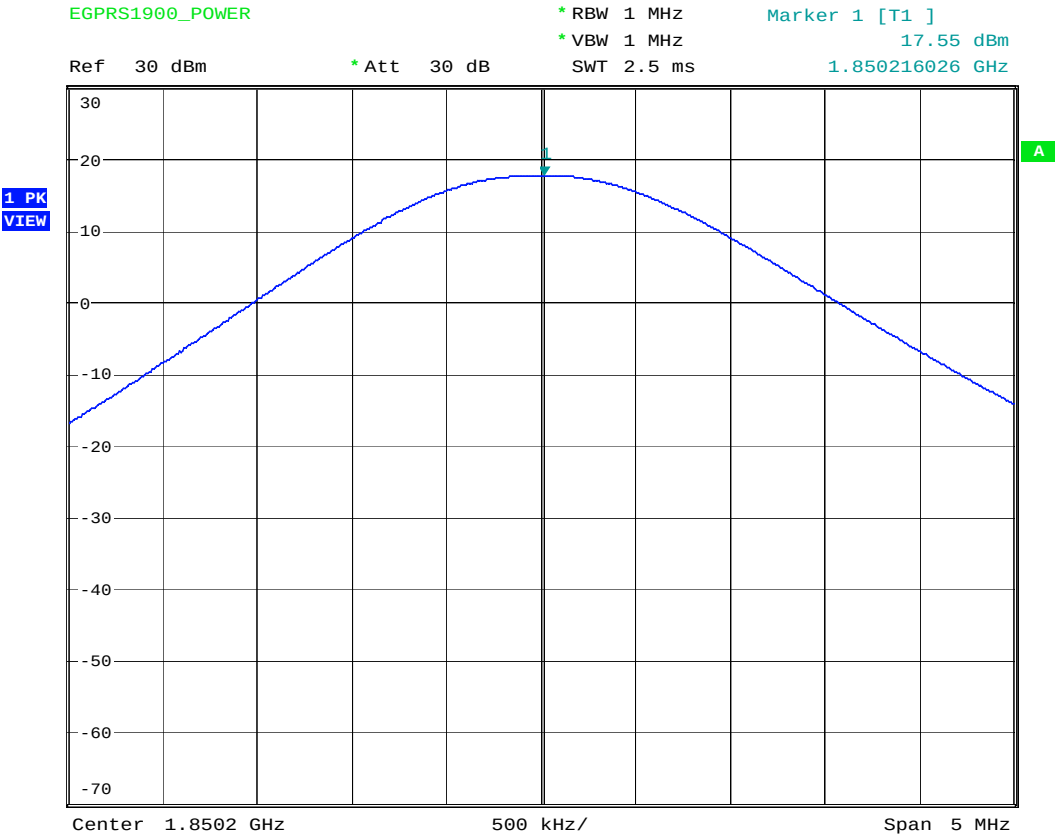


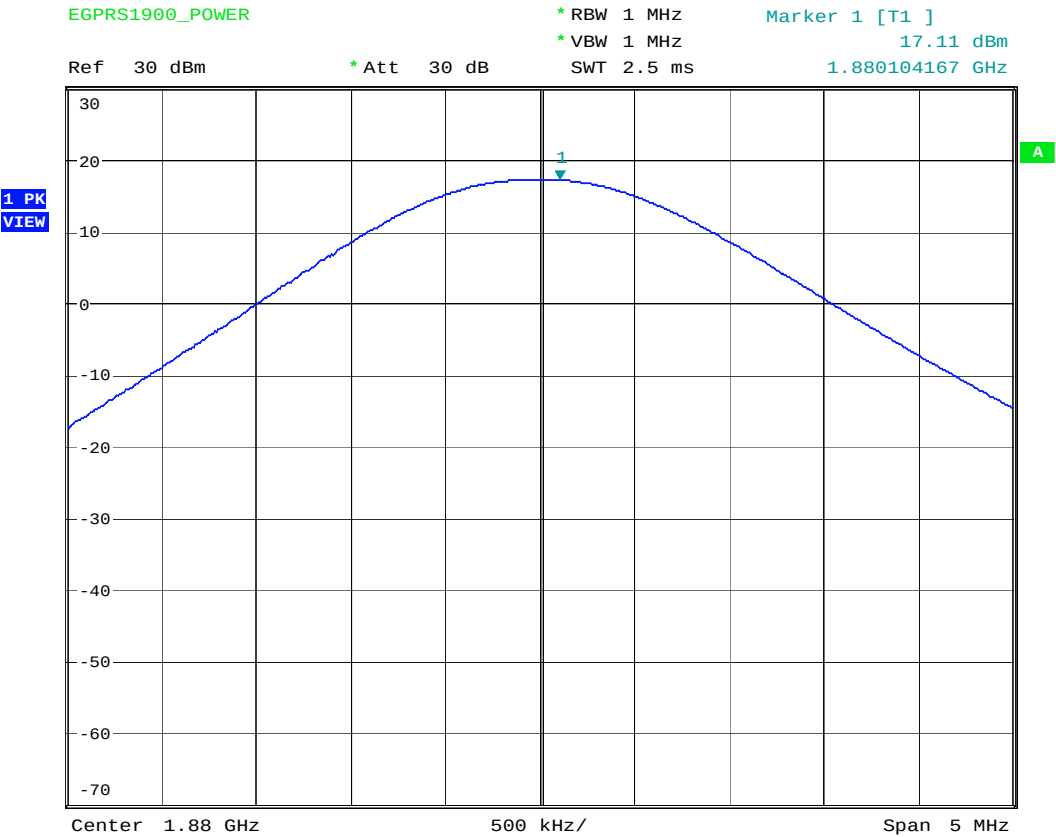


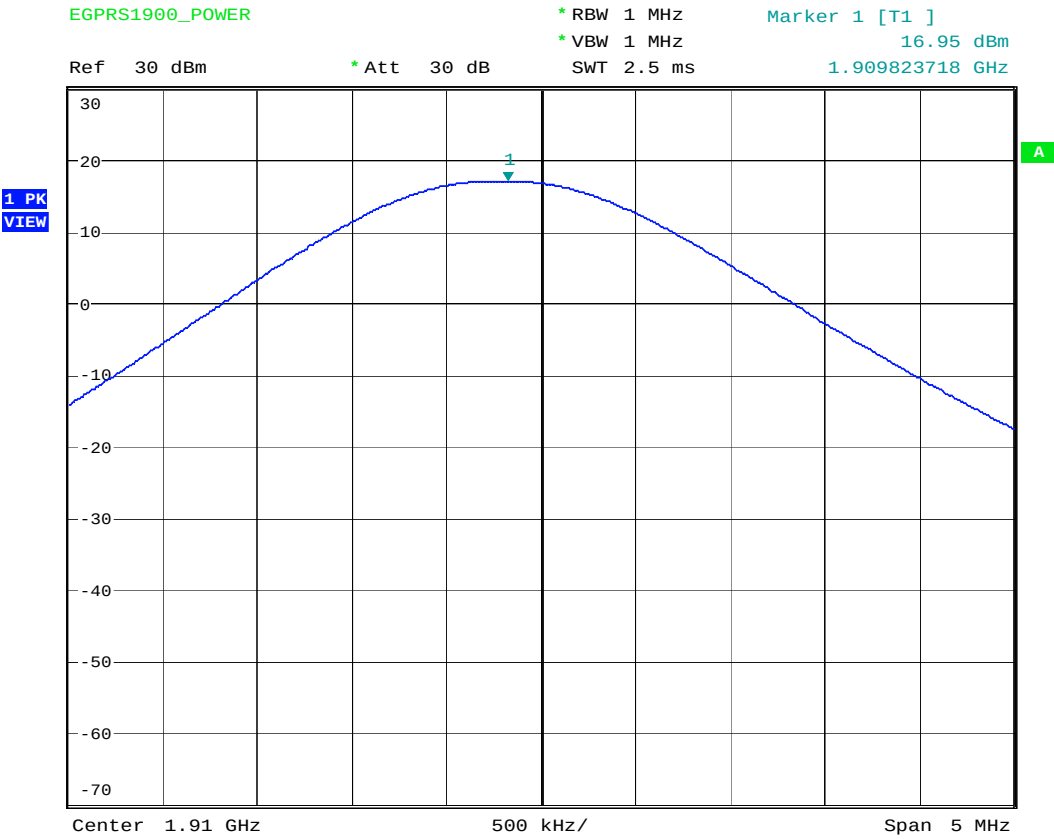












4. ERP & EIRP MEASUREMENT

4.1 Standard Applicable

According to FCC § 2.1046 and FCC § 22.913(b): 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.

4.2 Measurement Procedure

The setup of the EUT as shown in figure 2 and figure 3. The EUT was placed on a 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 3MHz and the average bandwidth was set to 3MHz. 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:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

4.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Hewlett-Packard	8546A	08/27/2006
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Horn Antenna	EMCO	3115	06/04/2006
LogBicone Antenna	Schwarzbeck	9160	10/28/2006
Horn Antenna	EMCO	3116	07/21/2006
Preamplifier	Hewlett-Packard	8449B	09/19/2006
SYNSESIZED SWEEPER	AGILENT	83640B	09/21/2006
DIPOLE ANTENNA	SCHWRZBECK	914;915	07/13/2007
DIPOLE ANTENNA	SCHWRZBECK	897;898	07/13/2007

Figure 2 : Frequencies measured below 1 GHz configuration

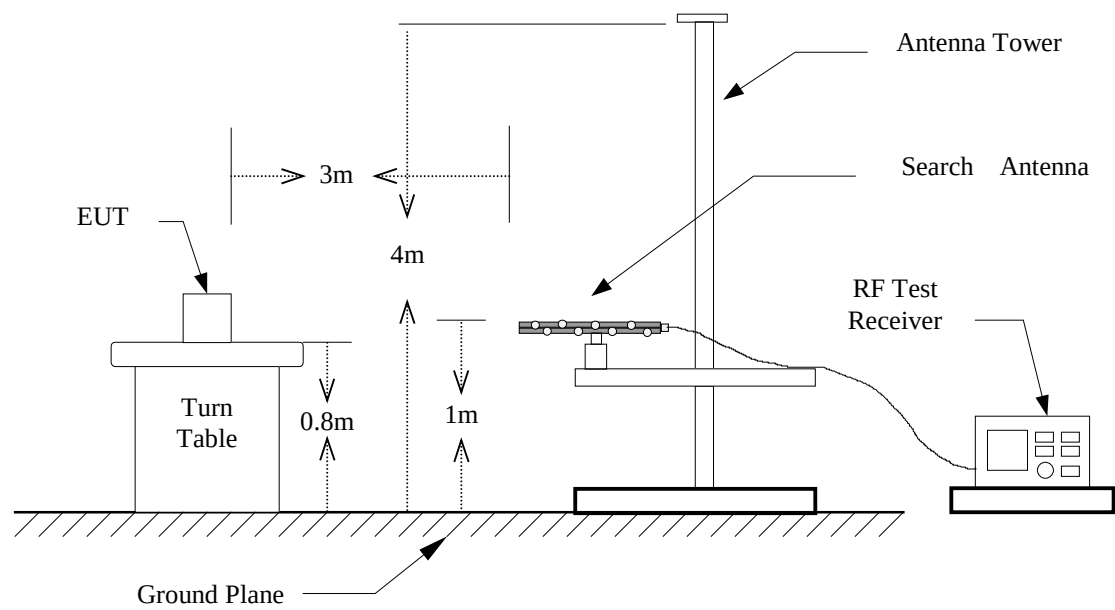
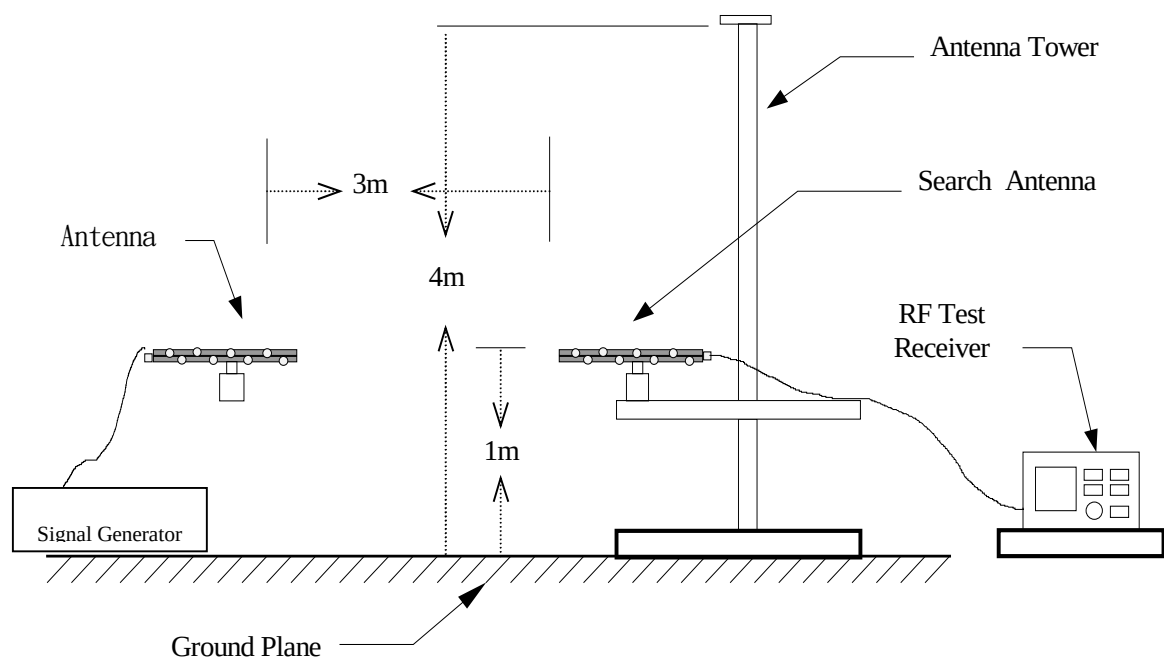


Figure 3 : Frequencies measured above 1 GHz configuration



4.4 Test ResultTest Date : 01/ 05/2006Temperature : 16°CHumidity : 66%

850 Band (ERP)

Test Mode	Channel	Frequency (MHz)	Reading (dBm)	Antenna Pol.	Factor (dB)	Result (dBm)	Limit (dBm)
GSM850	128	824.2	-0.3	H	32.5	32.2	38.45
	128	824.2	-5.6	V	32.5	26.9	38.45
	190	836.6	-0.1	H	32.5	32.4	38.45
	190	836.6	-5.4	V	32.5	27.1	38.45
	251	848.8	0	H	32.5	32.5	38.45
	251	848.8	-5.3	V	32.5	27.2	38.45
GPRS850	128	824.2	-0.4	H	32.5	32.1	38.45
	128	824.2	-5.7	V	32.5	26.8	38.45
	190	836.6	-0.2	H	32.5	32.3	38.45
	190	836.6	-5.5	V	32.5	27.0	38.45
	251	848.8	0	H	32.5	32.5	38.45
	251	848.8	-5.4	V	32.5	27.1	38.45
EGPRS850	128	824.2	-0.5	H	32.5	32.0	38.45
	128	824.2	-5.7	V	32.5	26.8	38.45
	190	836.6	-0.1	H	32.5	32.4	38.45
	190	836.6	-5.5	V	32.5	27.0	38.45
	251	848.8	0	H	32.5	32.5	38.45
	251	848.8	-5.5	V	32.5	27.0	38.45

1900 Band (EIRP)

Test Mode	Channel	Frequency (MHz)	Reading (dBm)	Antenna Pol.	Factor (dB)	Result (dBm)	Limit (dBm)
PCS1900	512	1850.2	38.8	H	-10.9	27.9	33.0
	512	1850.2	36.7	V	-10.9	25.8	33.0
	661	1880.0	38.3	H	-10.9	27.4	33.0
	661	1880.0	36.3	V	-10.9	25.4	33.0
	810	1909.8	38.2	H	-10.9	27.3	33.0
	810	1909.8	36.3	V	-10.9	25.4	33.0
GPRS1900	512	1850.2	38.7	H	-10.9	27.8	33.0
	512	1850.2	36.6	V	-10.9	25.7	33.0
	661	1880.0	38.2	H	-10.9	27.3	33.0
	661	1880.0	36.2	V	-10.9	25.3	33.0
	810	1909.8	38.3	H	-10.9	27.4	33.0
	810	1909.8	36.1	V	-10.9	25.2	33.0
EGPRS1900	512	1850.2	38.6	H	-10.9	27.7	33.0
	512	1850.2	36.6	V	-10.9	25.7	33.0
	661	1880.0	38.2	H	-10.9	27.3	33.0
	661	1880.0	36.1	V	-10.9	25.2	33.0
	810	1909.8	38.3	H	-10.9	27.4	33.0
	810	1909.8	36.1	V	-10.9	25.2	33.0

5. OCCUPIED BANDWIDTH MEASUREMENT

5.1 Standard Applicable

According to §FCC 2.1049.

5.2 Measurement Procedure

The setup of the EUT as shown in figure 1. 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.

5.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Directional Coupler	AR	DC7420	12/05/2006
Wireless Com. Test Set	Agilent	E5515C	02/26/2006

5.4 Test Result

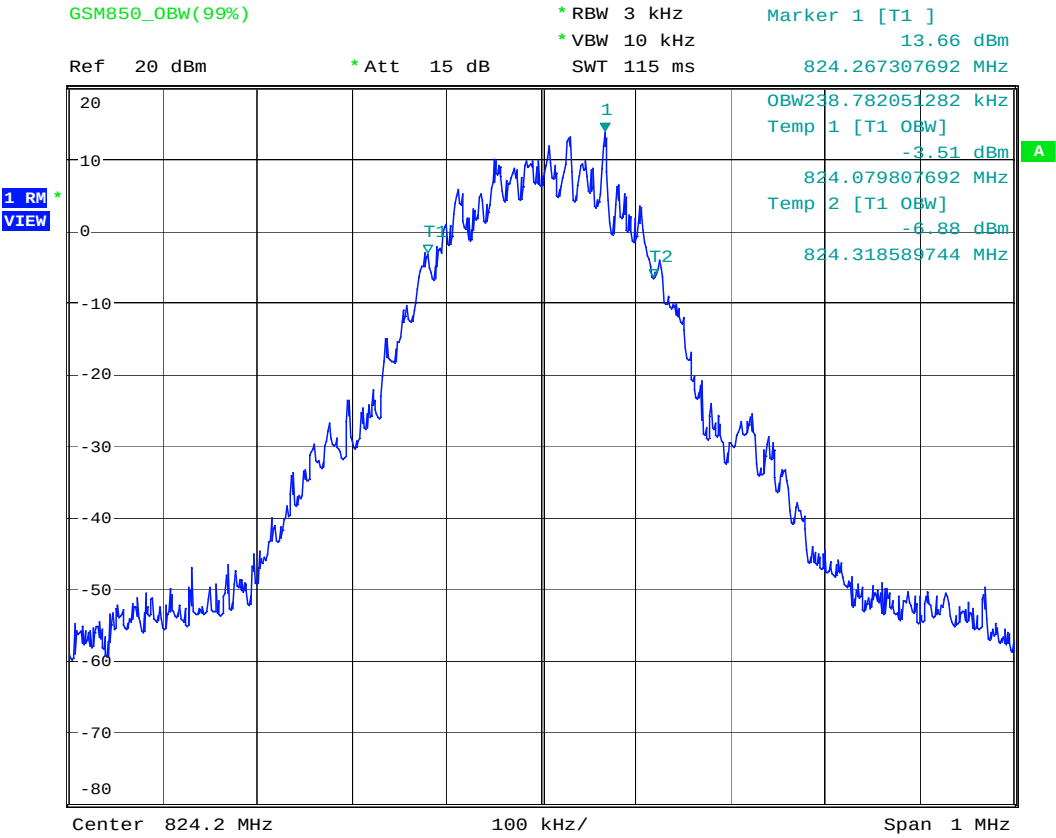
Test Date : 01/ 05/2006Temperature : 16°CHumidity : 66%

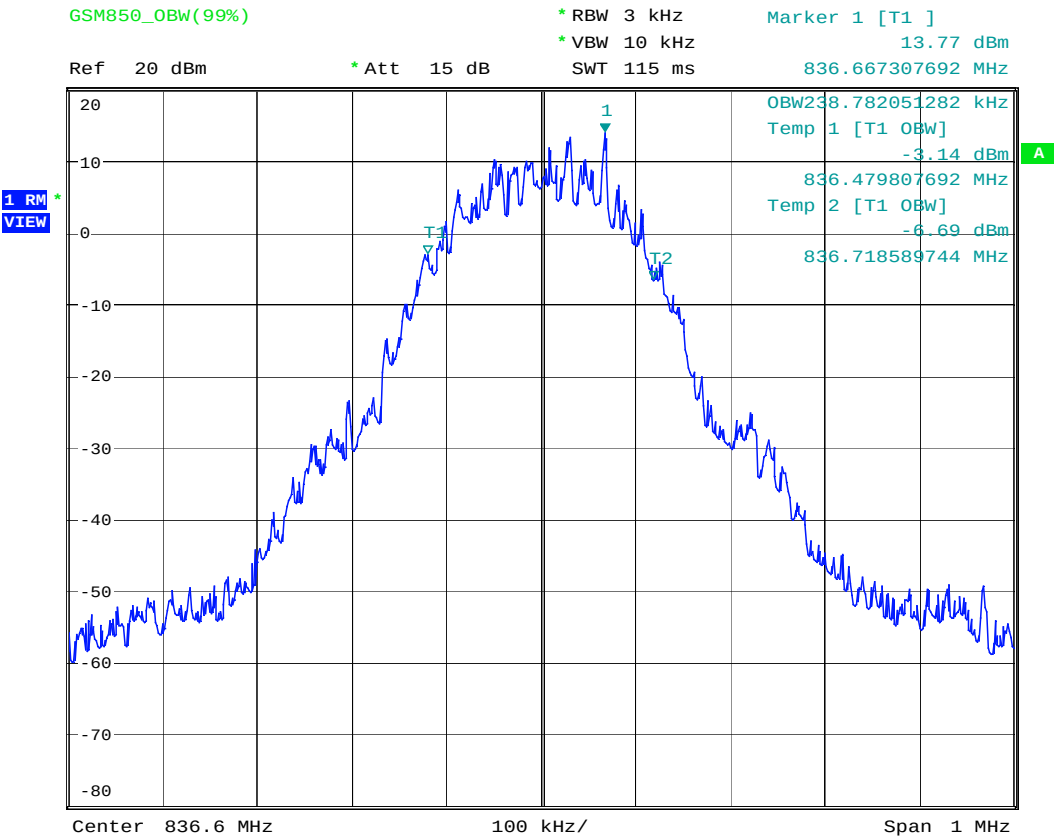
850MHz Band

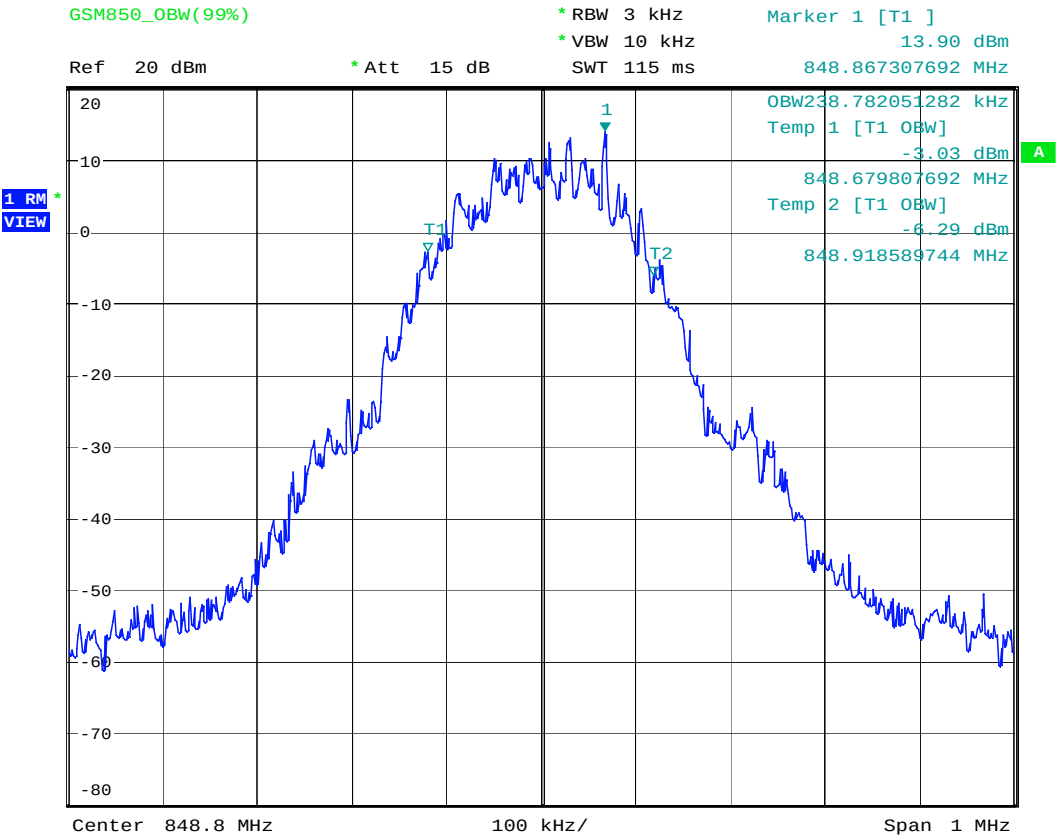
Test Mode	Channel	Frequency (MHz)	Bandwidth (kHz)
GSM850	128	824.2	238.782
	190	836.6	238.782
	251	848.8	238.782
GPRS850	128	824.2	238.782
	190	836.6	238.782
	251	848.8	238.782
EGPRS850	128	824.2	238.782
	190	836.6	238.782
	251	848.8	238.987

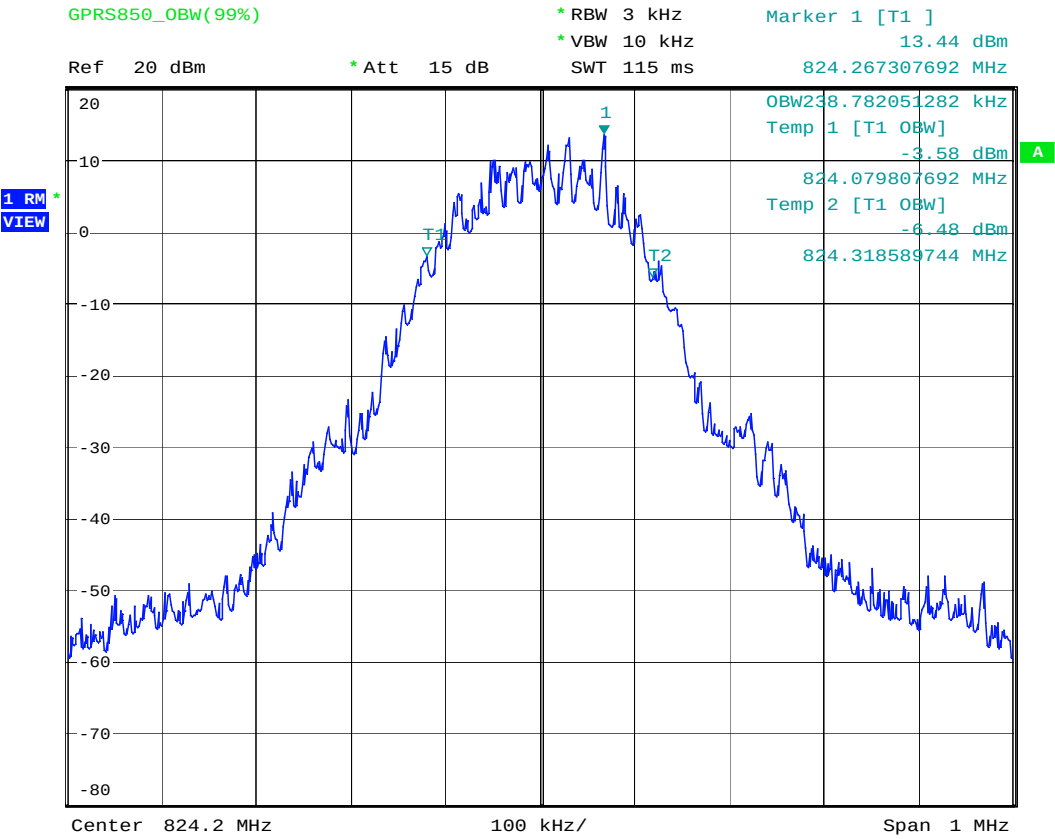
1900 Band

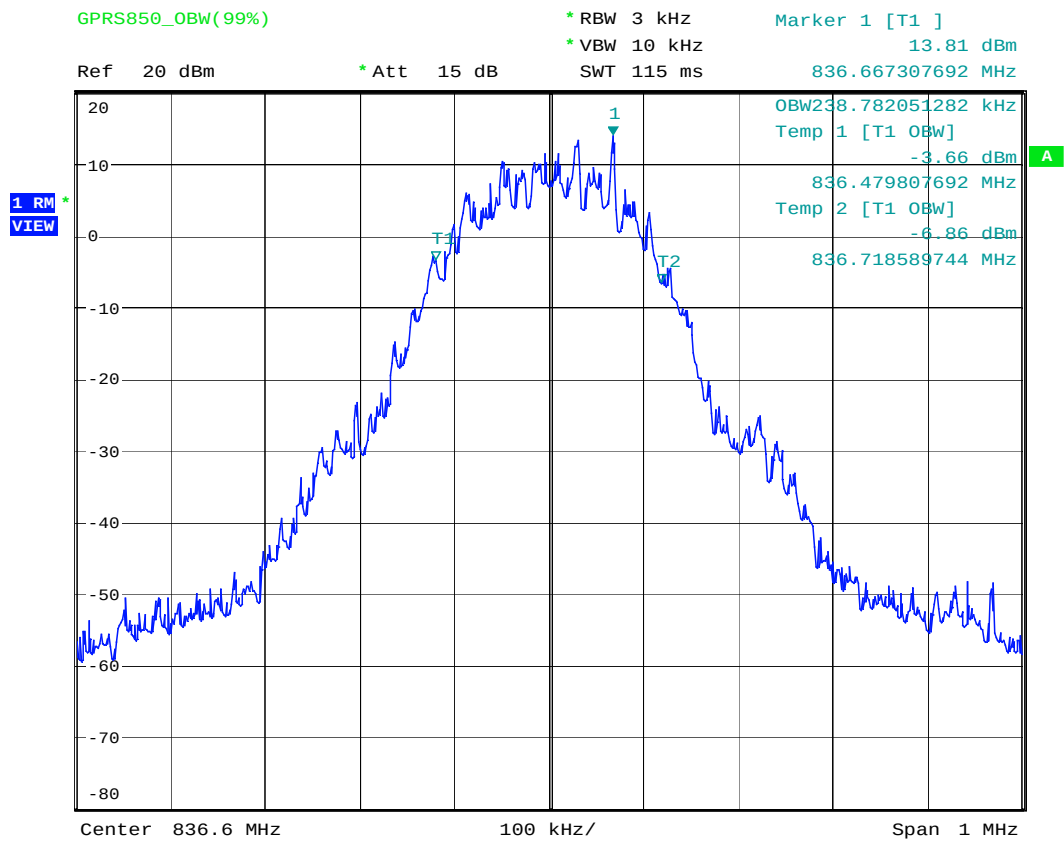
Test Mode	Channel	Frequency (MHz)	Bandwidth (kHz)
PCS1900	512	1850.2	238.782
	661	1880.0	238.782
	810	1909.8	238.782
GPRS1900	512	1850.2	238.782
	661	1880.0	238.385
	810	1909.8	238.782
EGPRS1900	512	1850.2	238.385
	661	1880.0	238.385
	810	1909.8	238.782

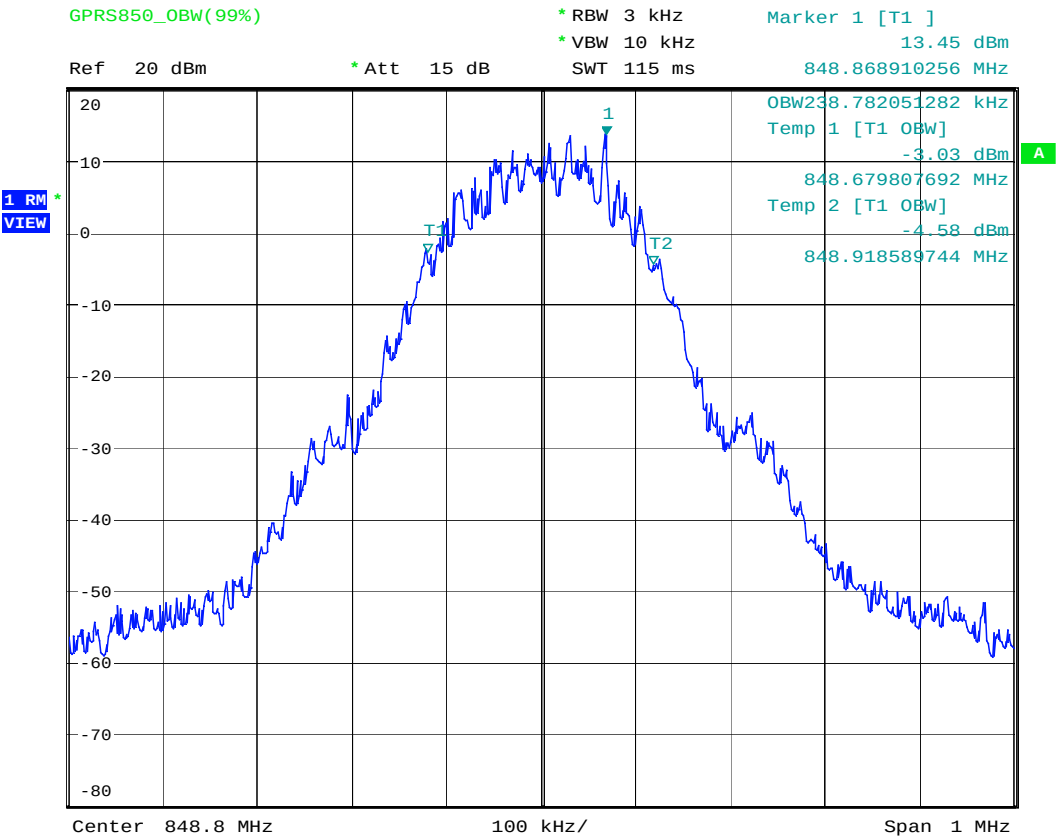


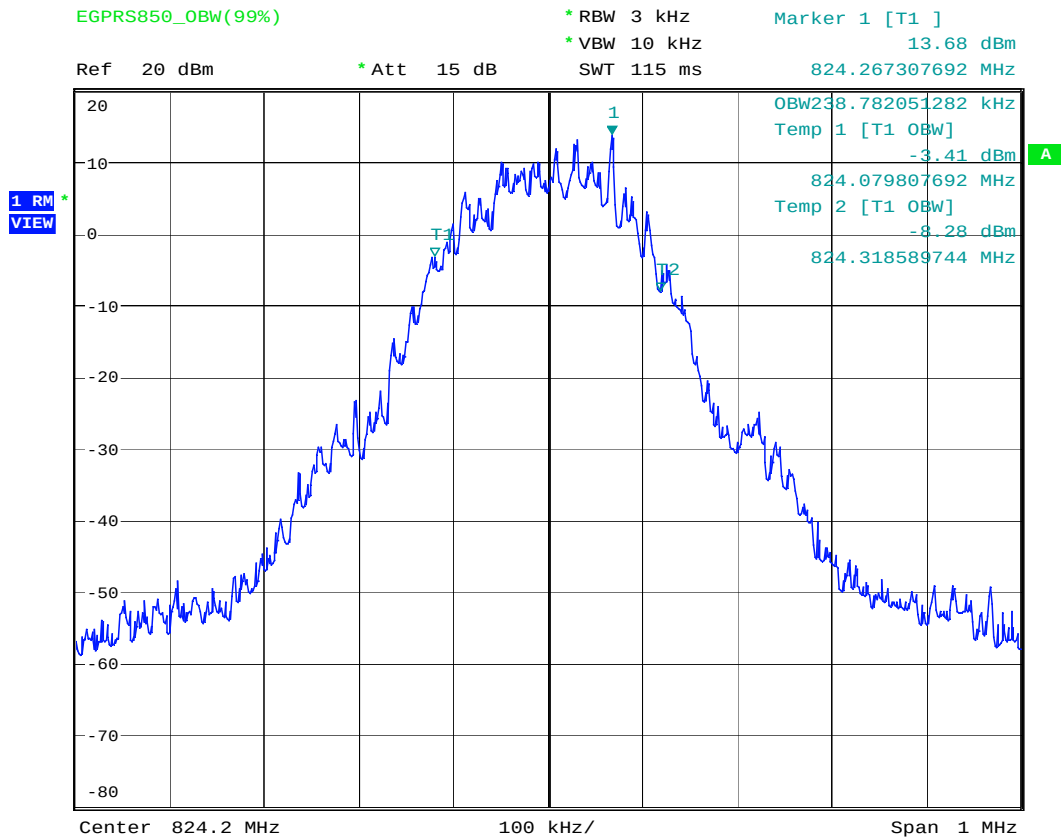


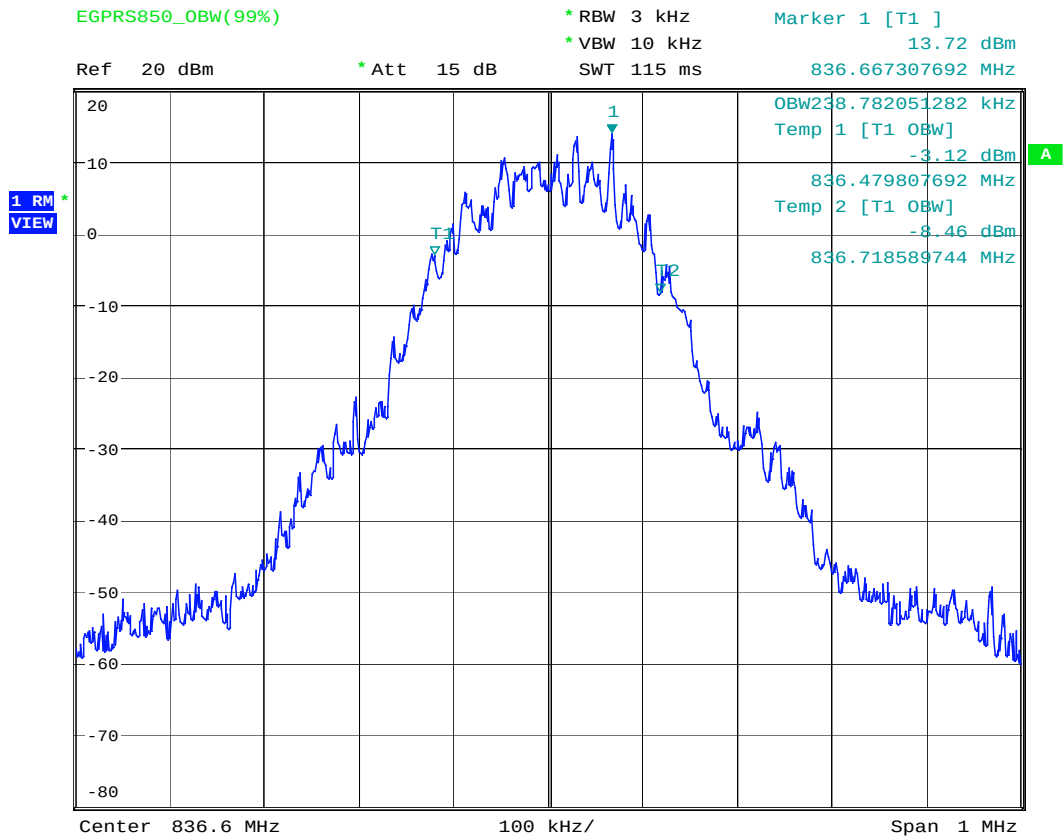




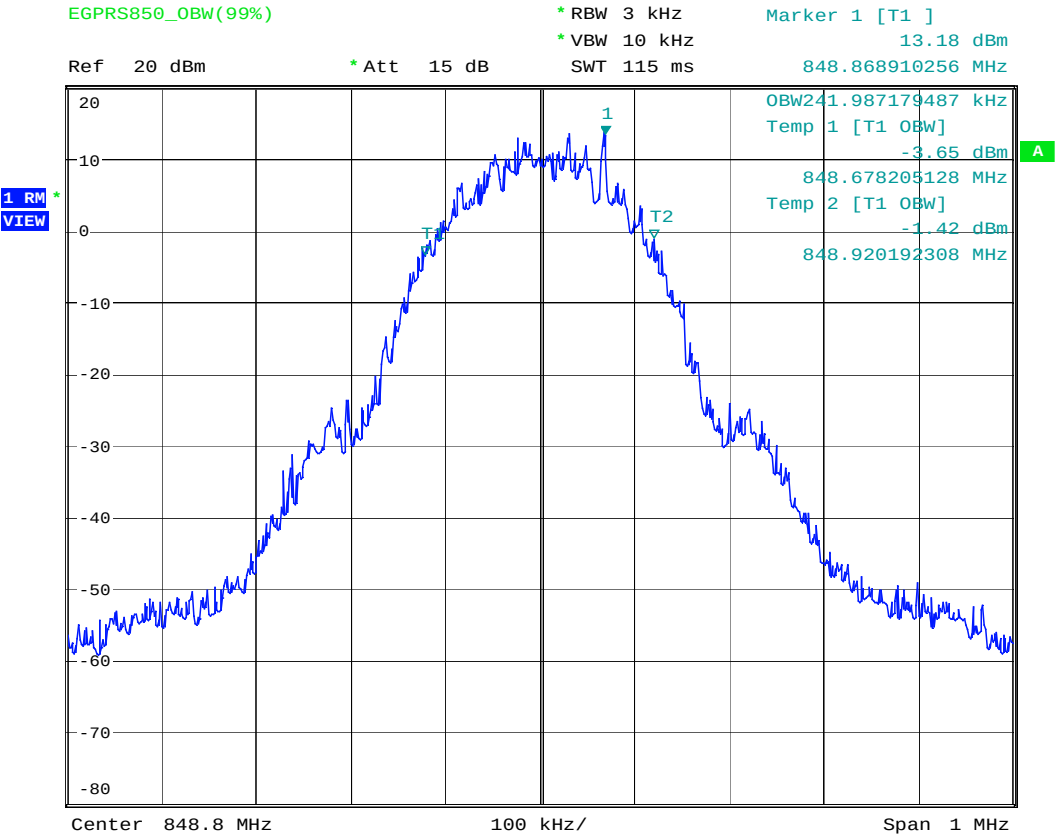


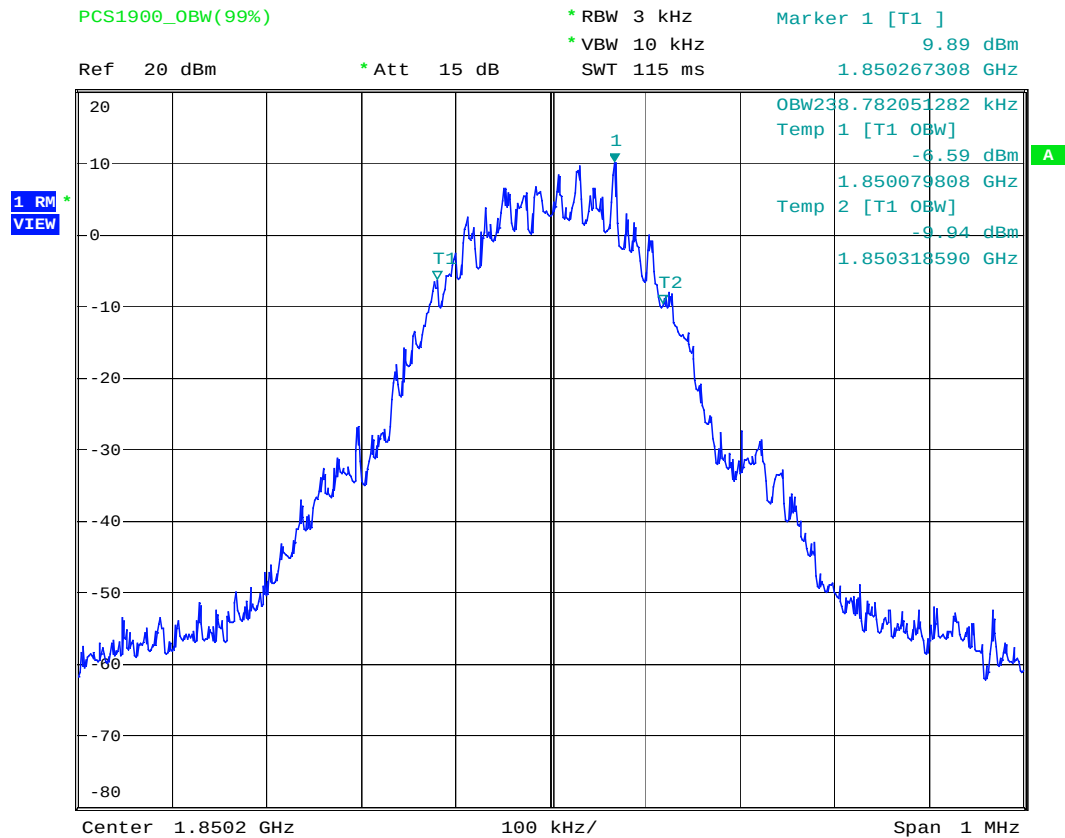


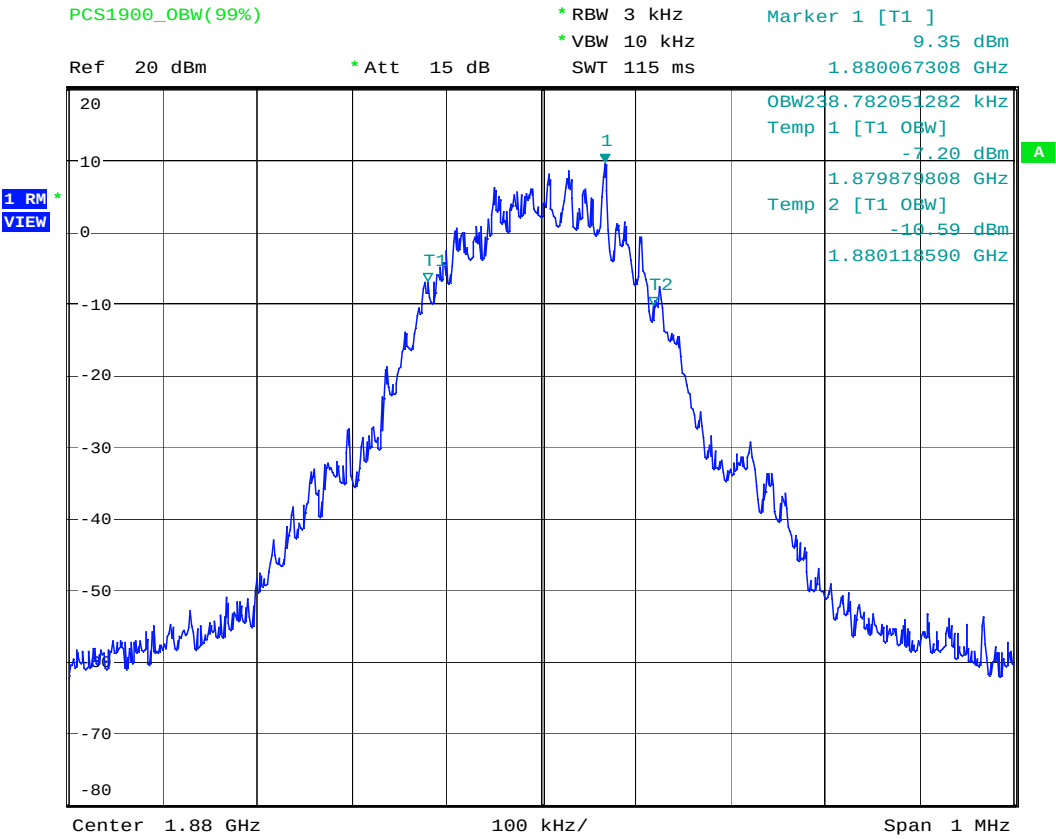


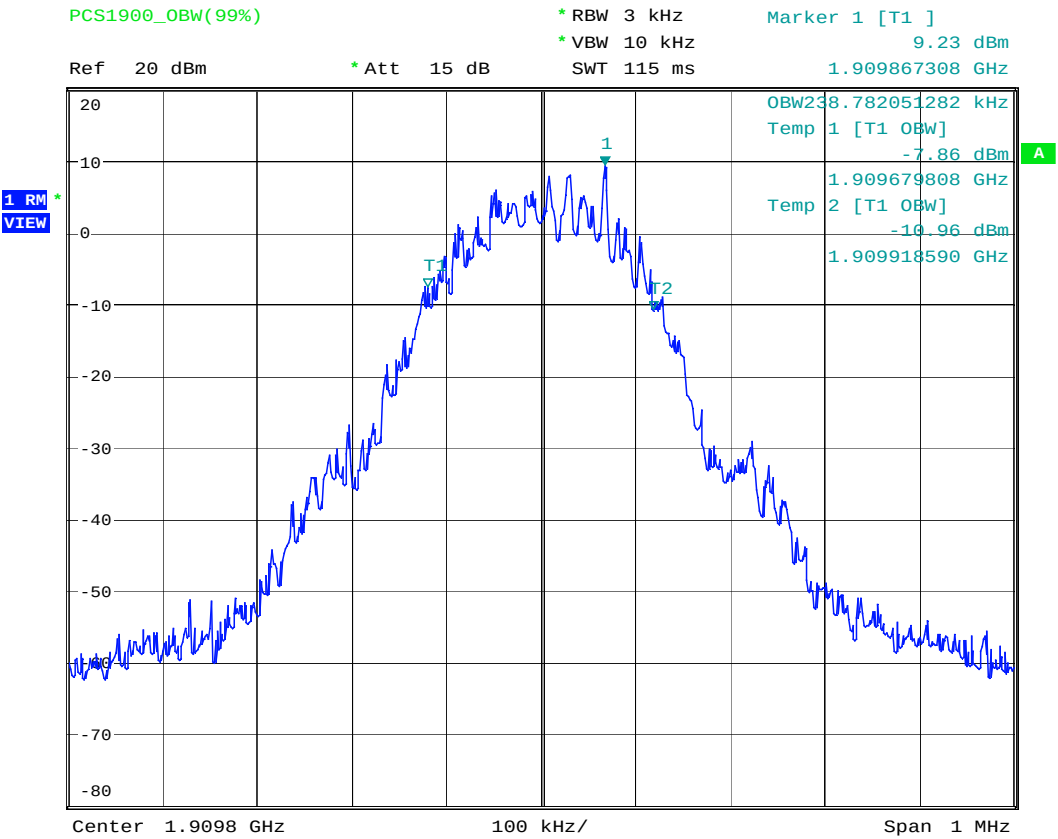


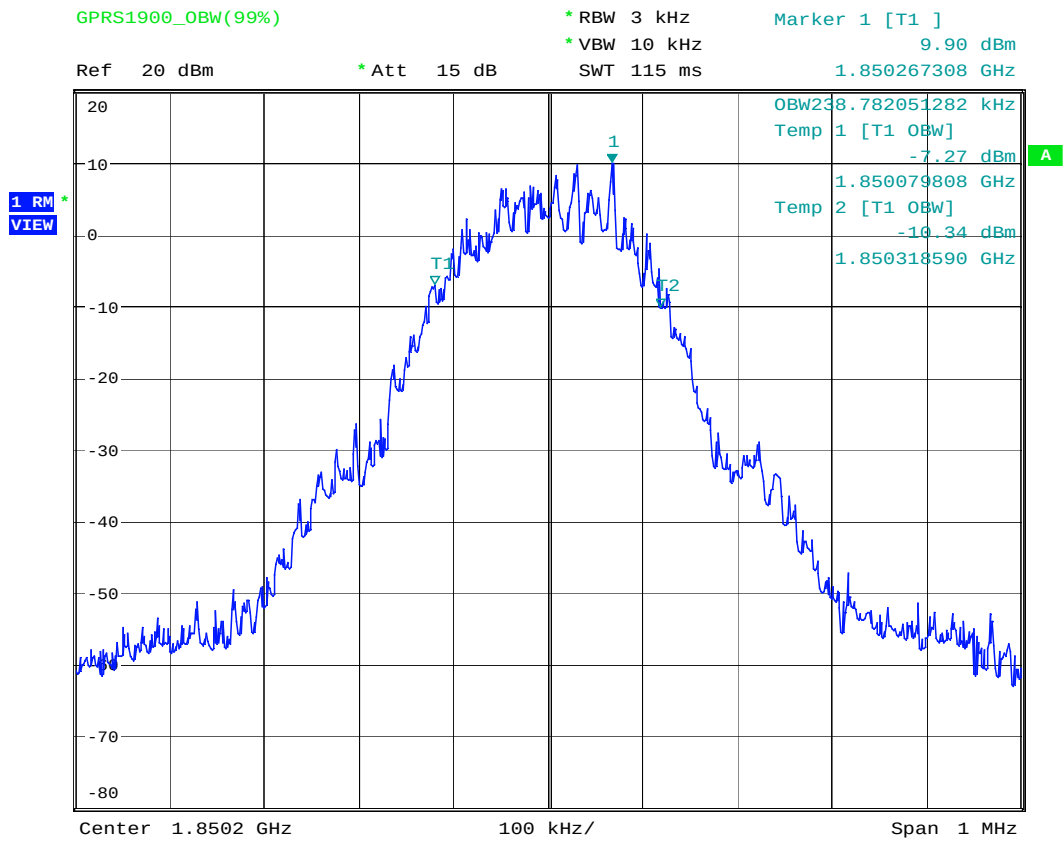
,

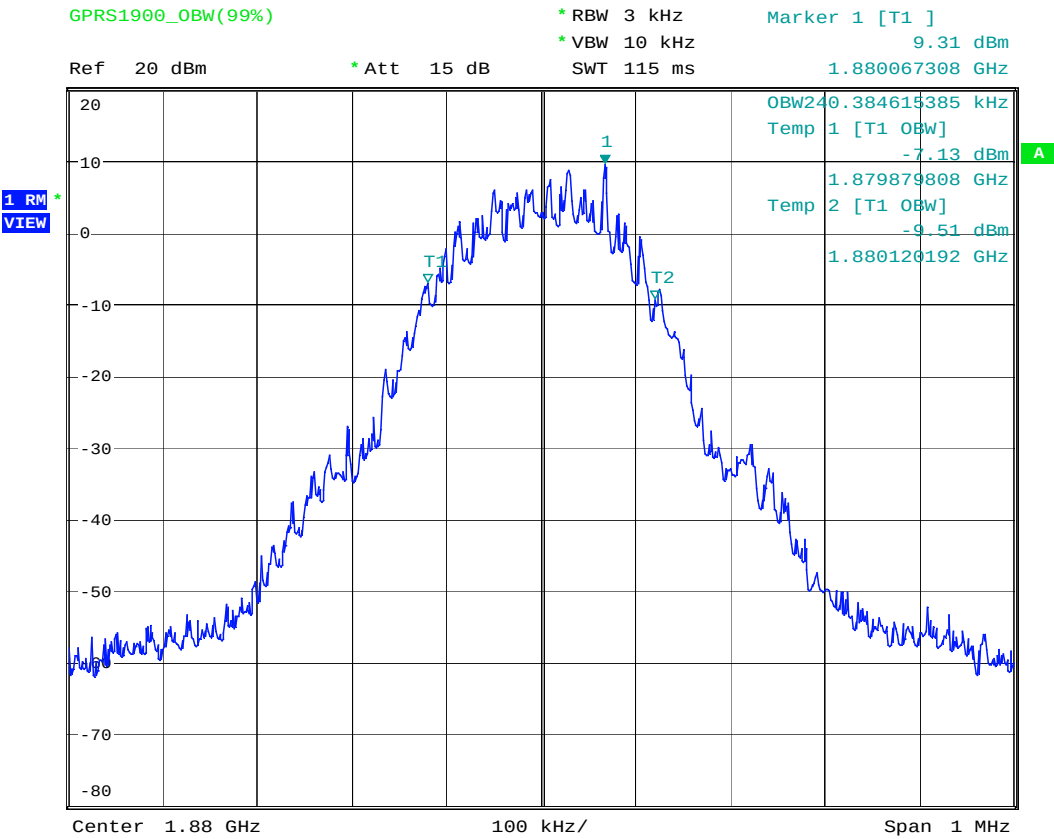


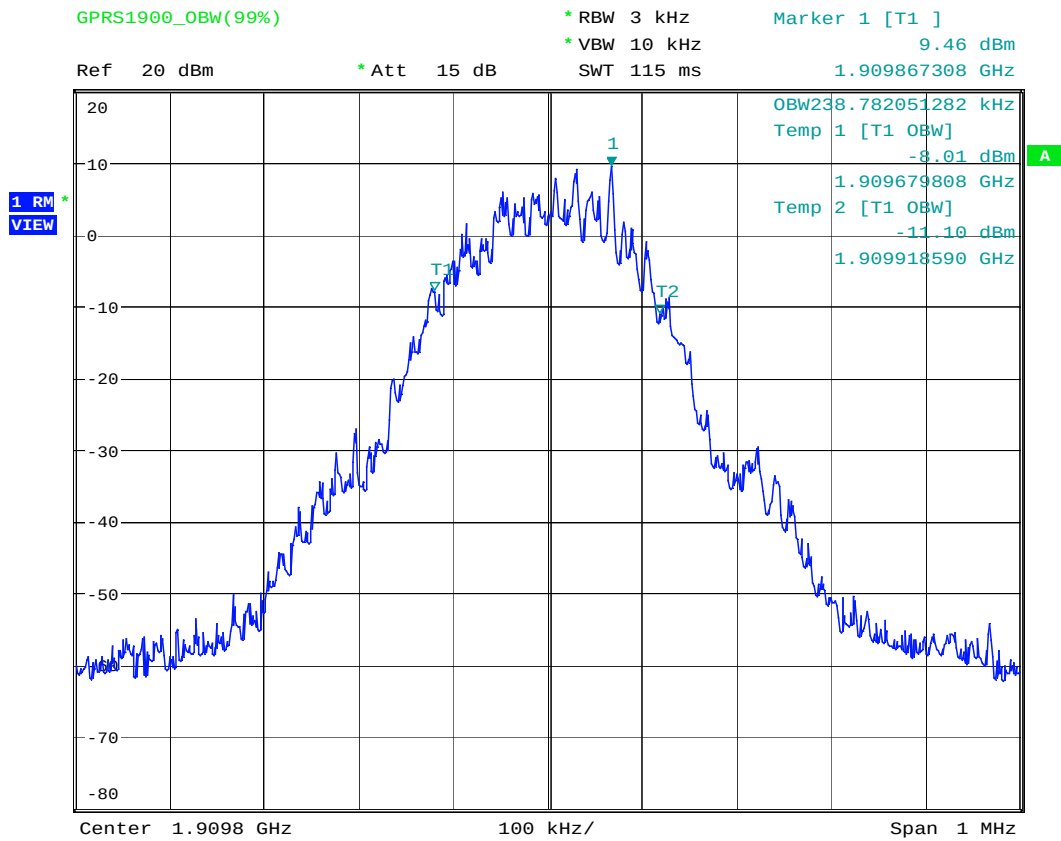


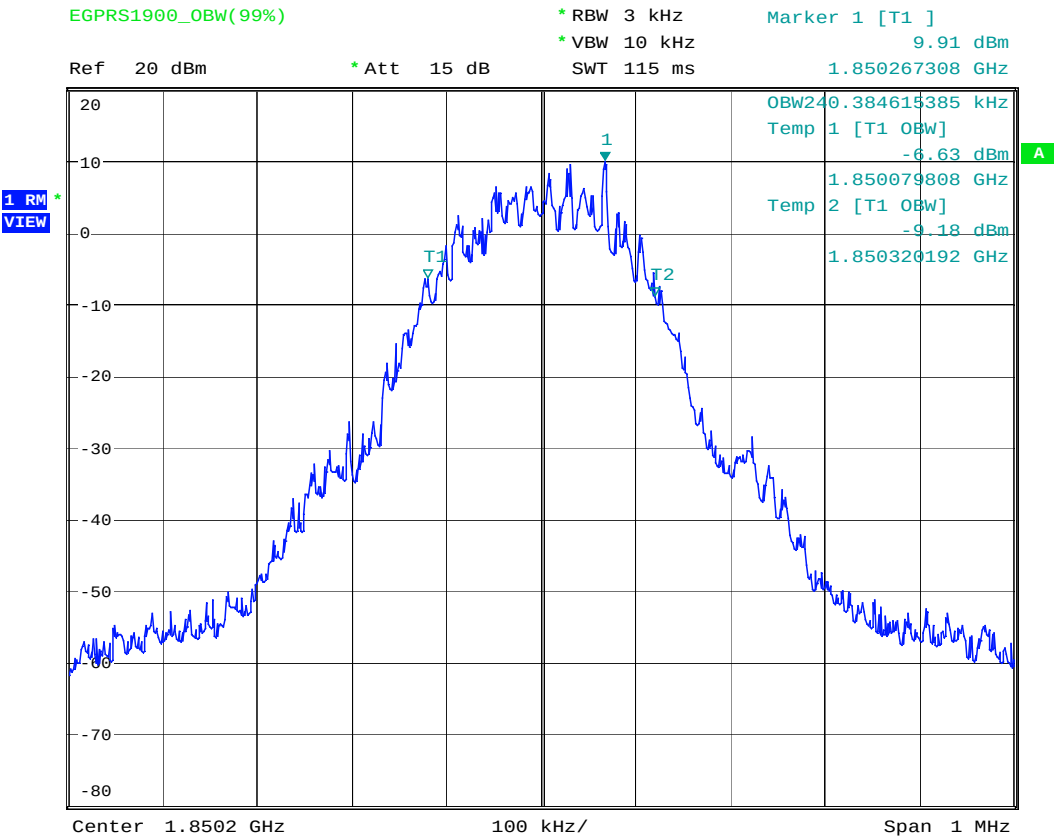


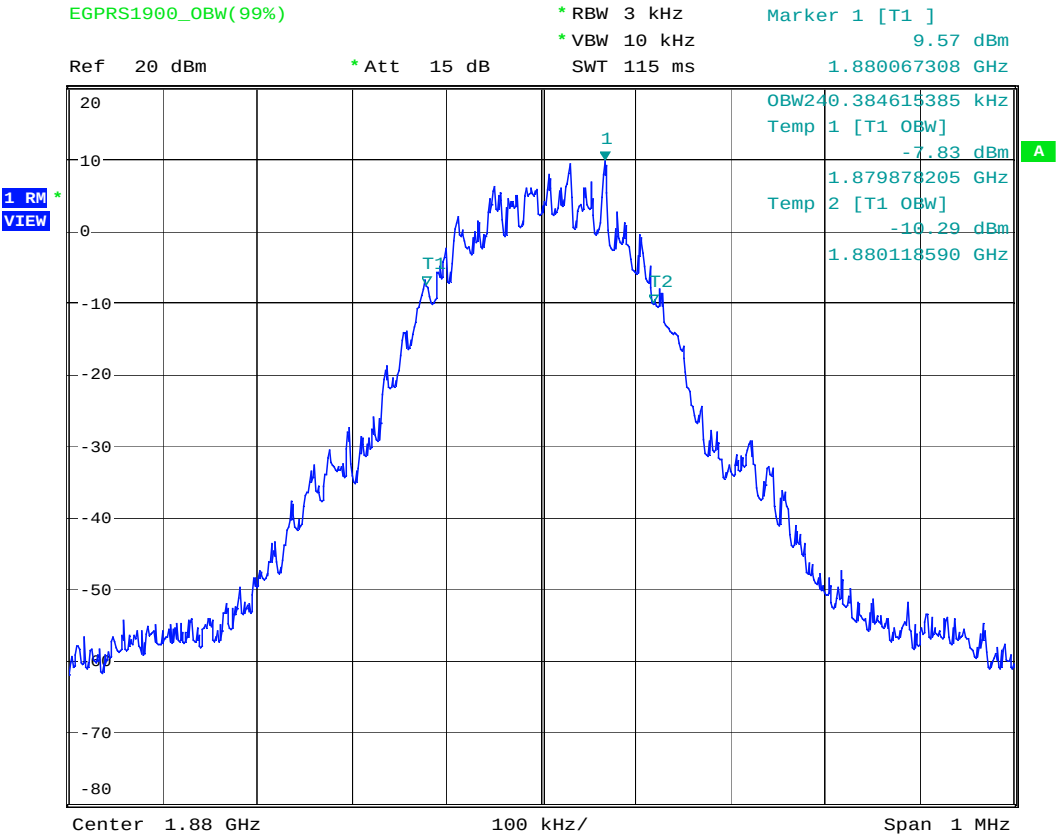


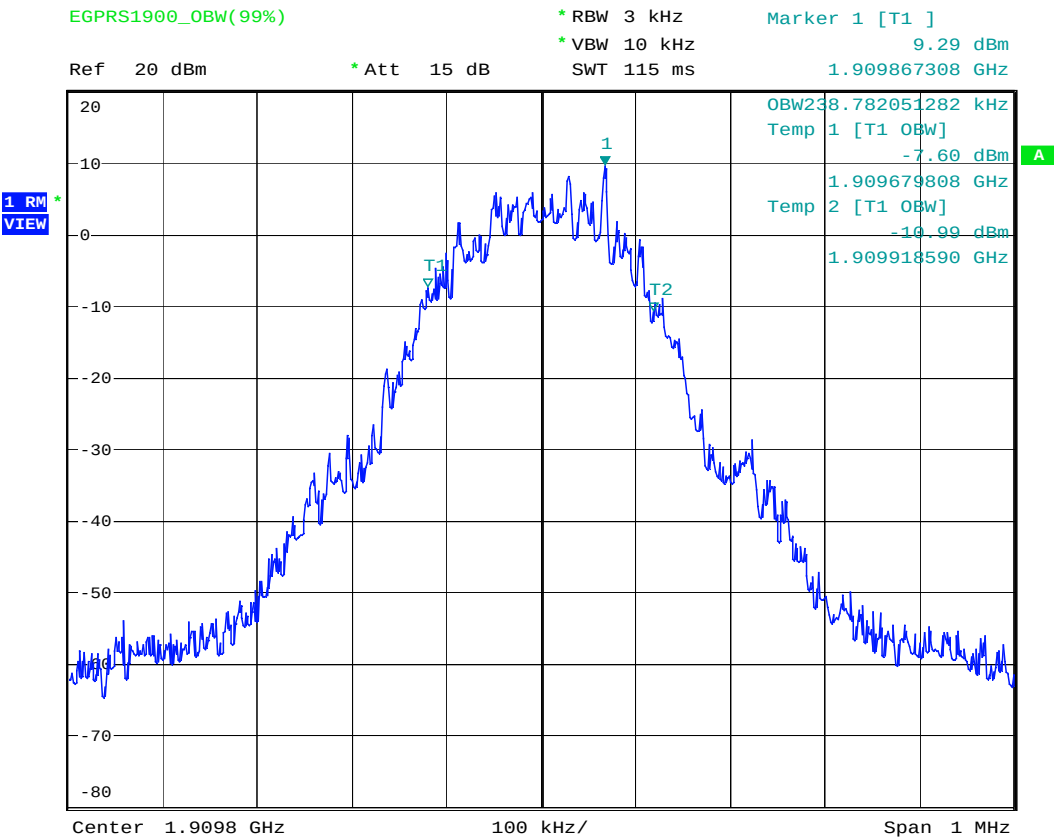












6. OUT OF BAND EMISSION AT ANTENNA TERMINALS

6.1 Standard Applicable

According to FCC § 2.1051, FCC § 22.917(f), 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 least $43 + 10 \log P$ 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 least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission.

6.2 Measurement Procedure

The setup of the EUT as shown in figure 1. 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= 10th harmonic. Limit = -13 dBm

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.

6.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Coupler	AR	DC7420	12/05/2006
Wireless Com. Tst. Set	Agilent	E5515C	02/26/2006

6.4 Test Result

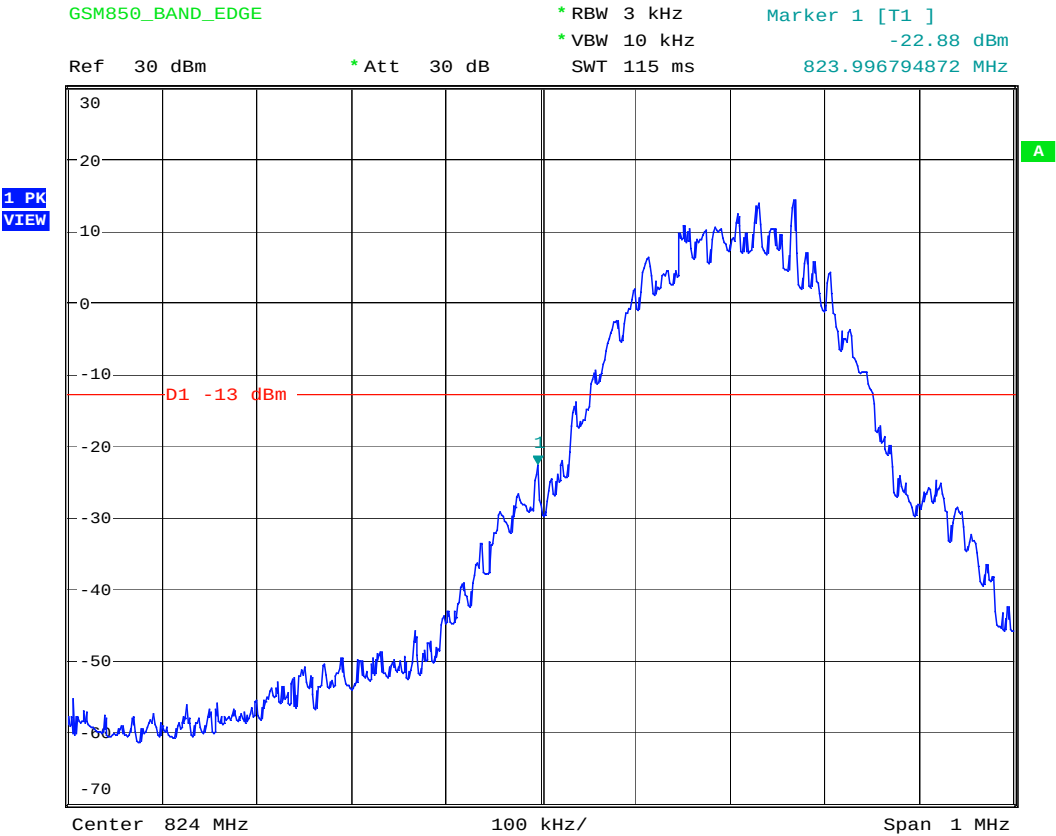
Test Date : 01/ 05/2006Temperature : 16°CHumidity : 66%

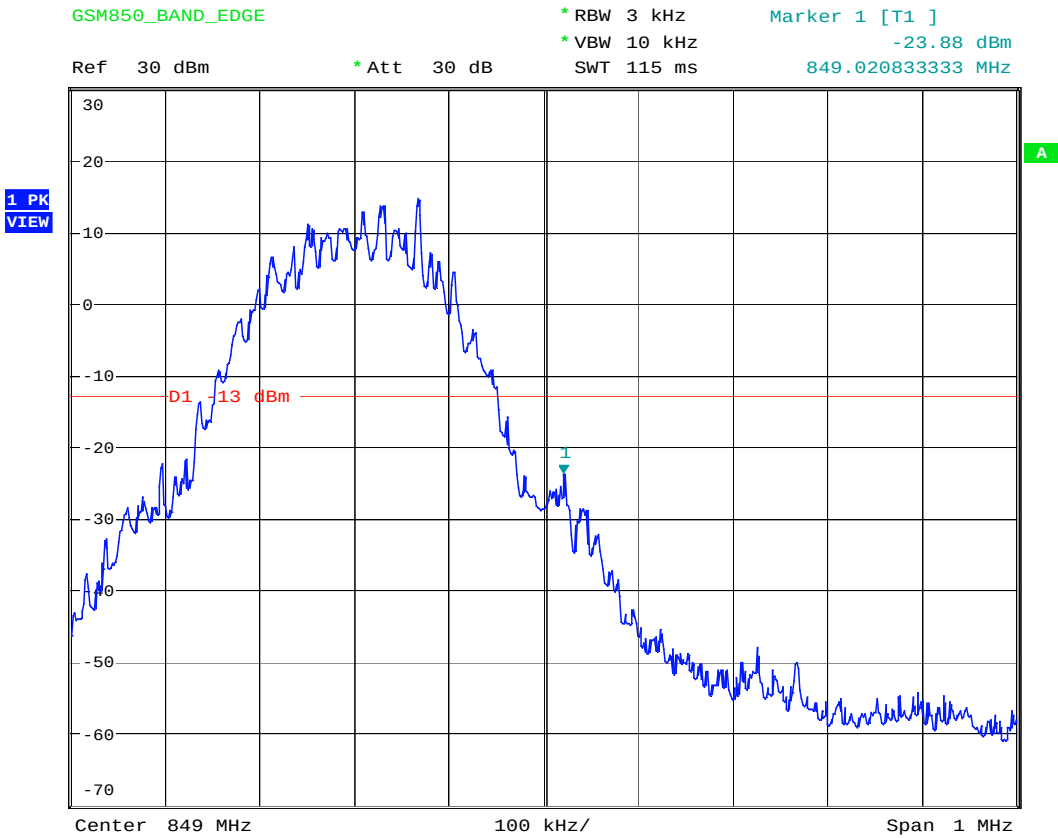
850 Band

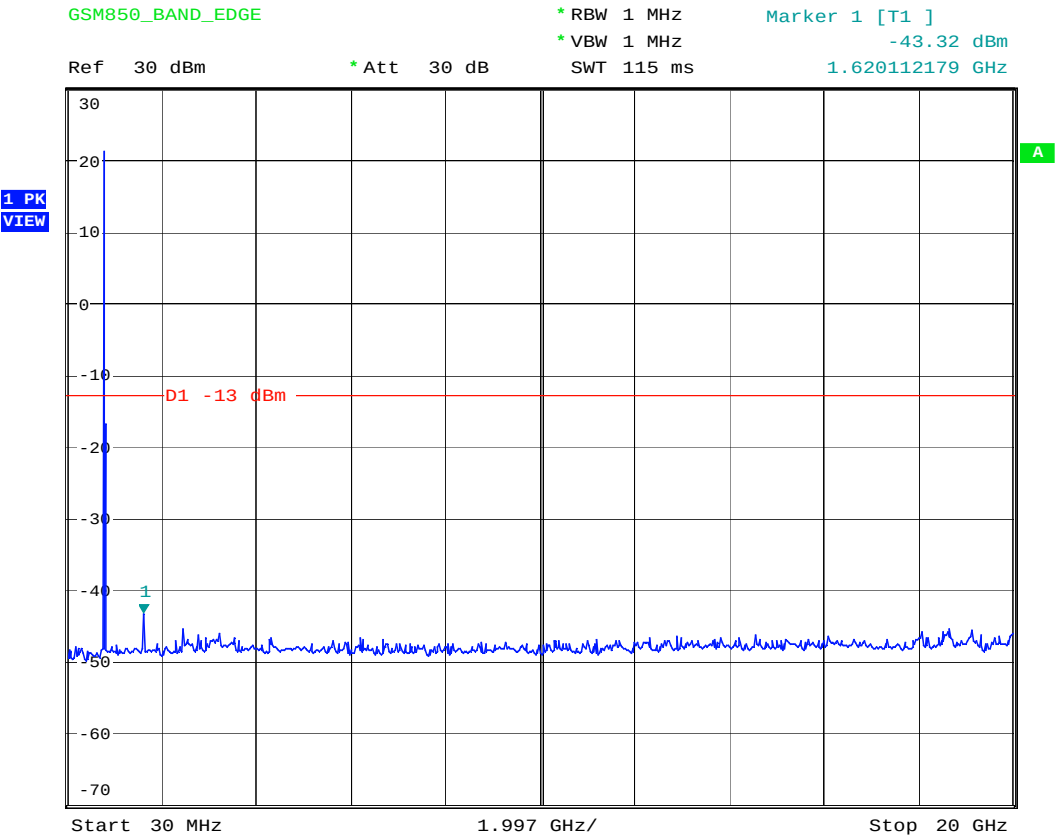
Test Mode	Channel	Frequency Range	Note	Chart
GSM850	128	823MHz-825MHz	Lower Band Edge	Page53
	251	823MHz-825MHz	Upper Band Edge	Page54
	128	30MHz-20GHz	All Band Edge	Page55
	190	30MHz-20GHz	All Band Edge	Page56
	251	30MHz-20GHz	All Band Edge	Page57
GPRS850	128	823MHz-825MHz	Lower Band Edge	Page58
	251	823MHz-825MHz	Upper Band Edge	Page59
	128	30MHz-20GHz	All Band Edge	Page60
	190	30MHz-20GHz	All Band Edge	Page61
	251	30MHz-20GHz	All Band Edge	Page62
EGPRS850	128	823MHz-825MHz	Lower Band Edge	Page63
	251	823MHz-825MHz	Upper Band Edge	Page64
	128	30MHz-20GHz	All Band Edge	Page65
	190	30MHz-20GHz	All Band Edge	Page66
	251	30MHz-20GHz	All Band Edge	Page67

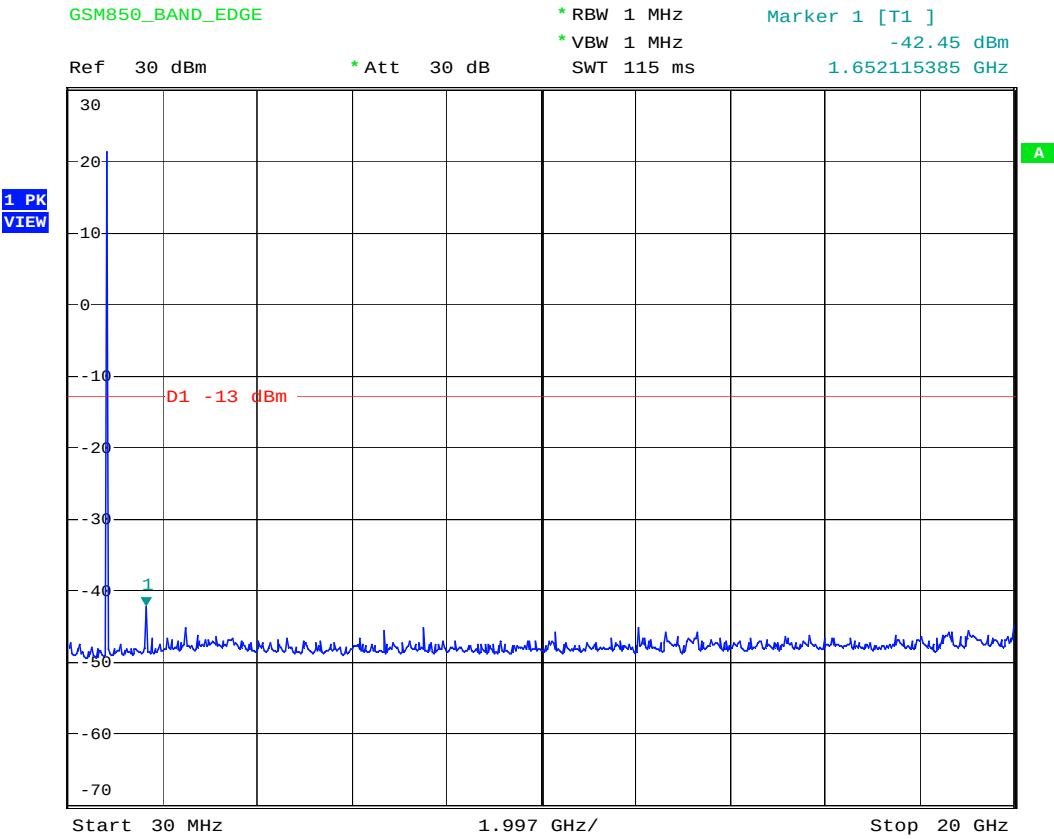
1900 Band

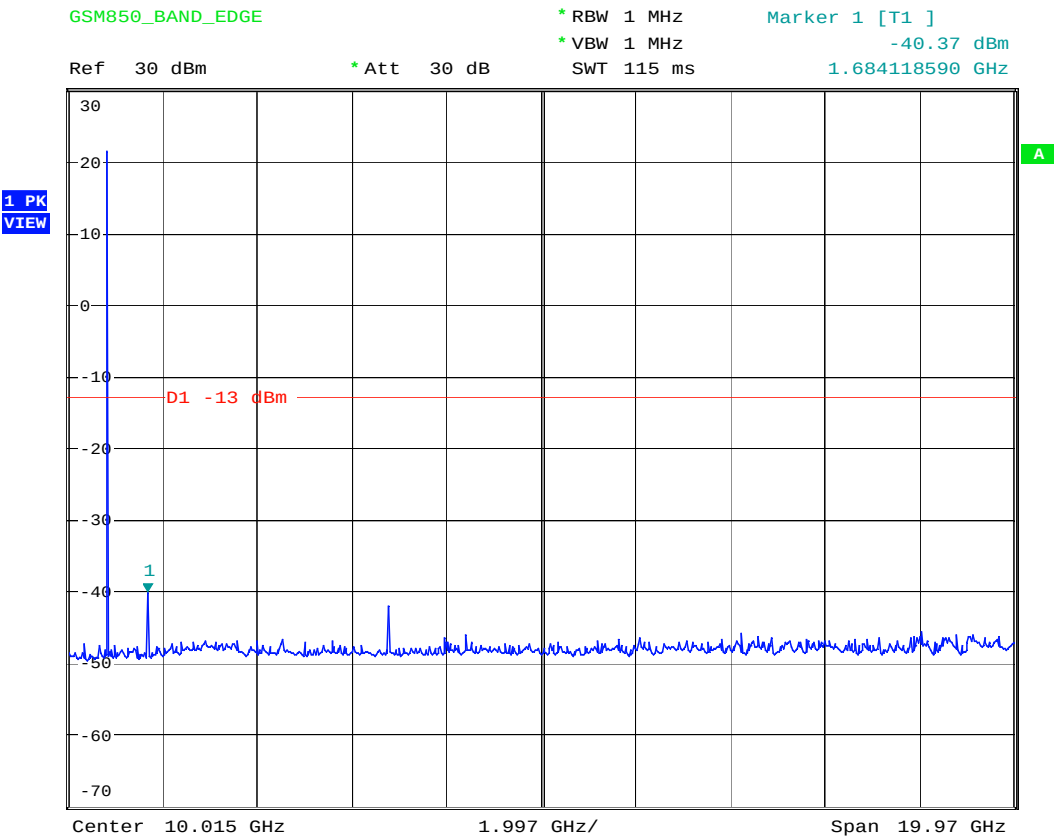
Test Mode	Channel	Frequency Range	Note	Chart
PCS1900	512	1849MHz-1851MHz	Lower Band Edge	Page68
	810	1909MHz-1901MHz	Upper Band Edge	Page69
	512	30MHz-20GHz	All Band Edge	Page70
	661	30MHz-20GHz	All Band Edge	Page71
	810	30MHz-20GHz	All Band Edge	Page72
GPRS1900	512	1849MHz-1851MHz	Lower Band Edge	Page73
	810	1909MHz-1901MHz	Upper Band Edge	Page74
	512	30MHz-20GHz	All Band Edge	Page75
	661	30MHz-20GHz	All Band Edge	Page76
	810	30MHz-20GHz	All Band Edge	Page77
EGPRS1900	512	1849MHz-1851MHz	Lower Band Edge	Page78
	810	1909MHz-1901MHz	Upper Band Edge	Page79
	512	30MHz-20GHz	All Band Edge	Page80
	661	30MHz-20GHz	All Band Edge	Page81
	810	30MHz-20GHz	All Band Edge	Page82

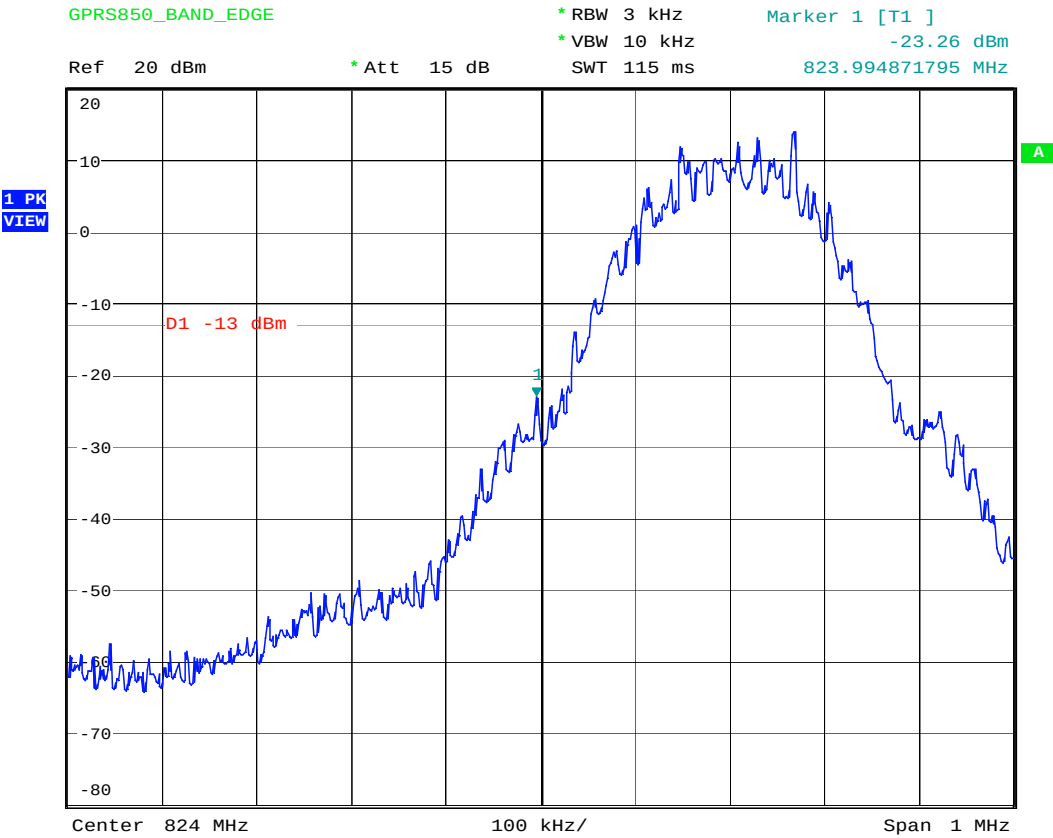




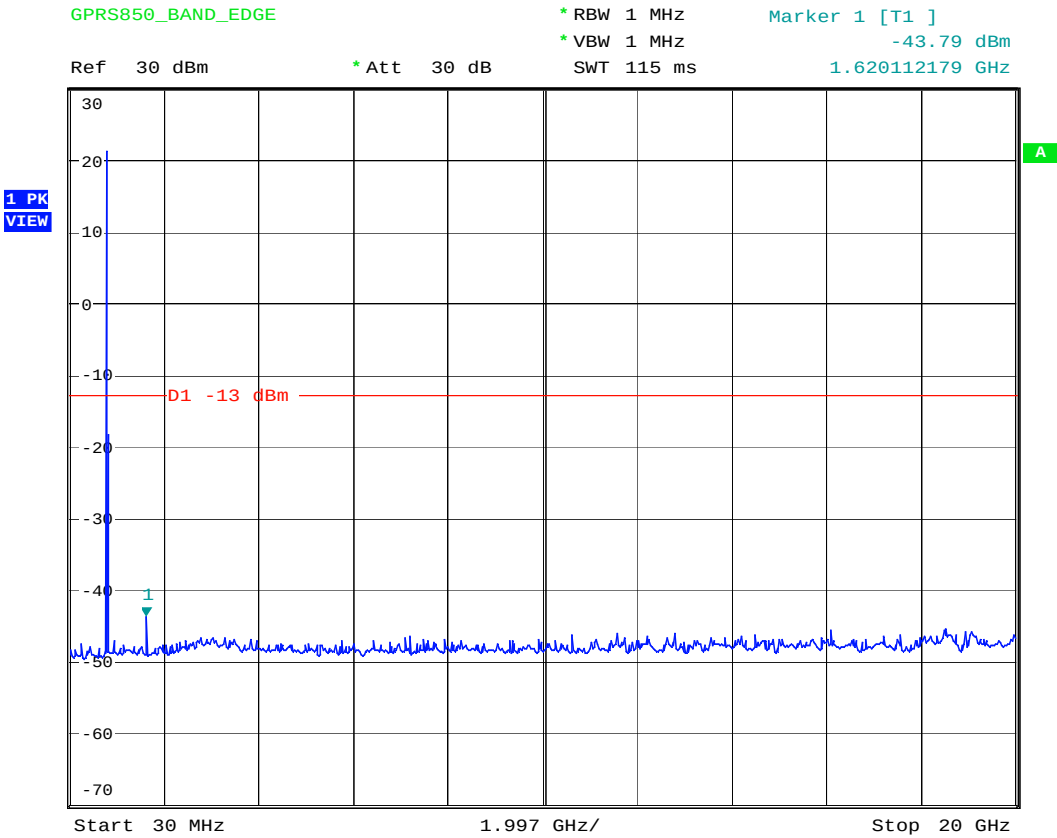


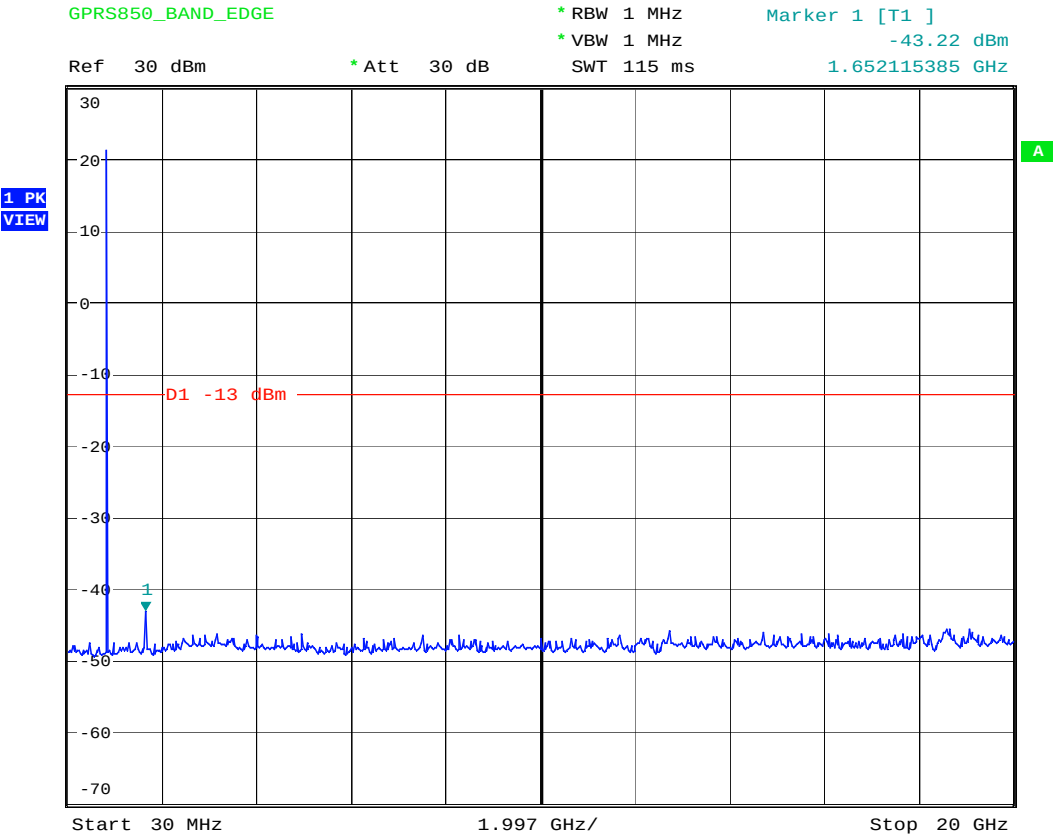


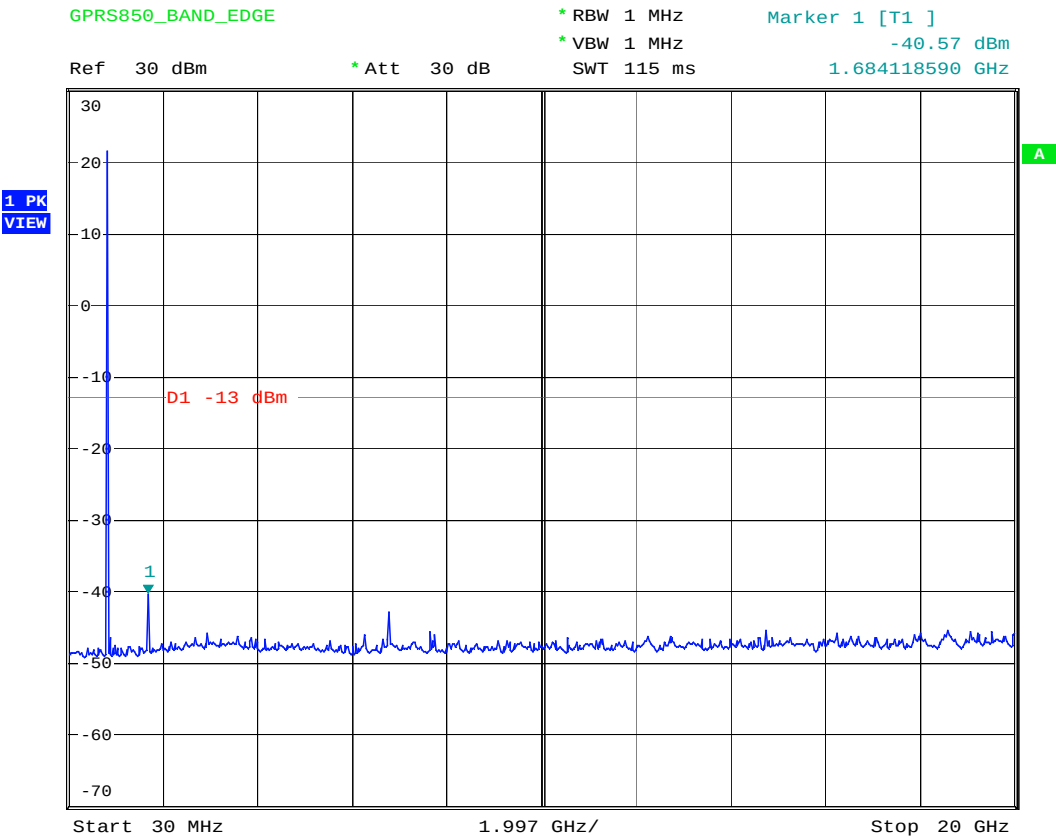


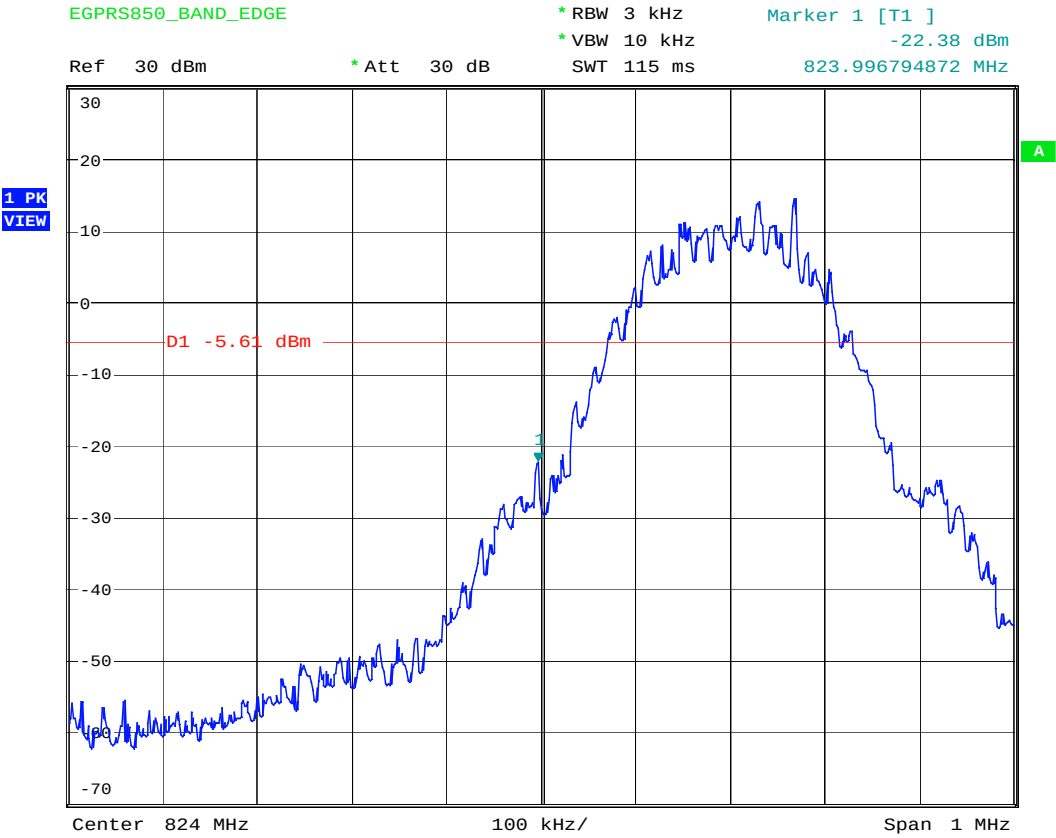


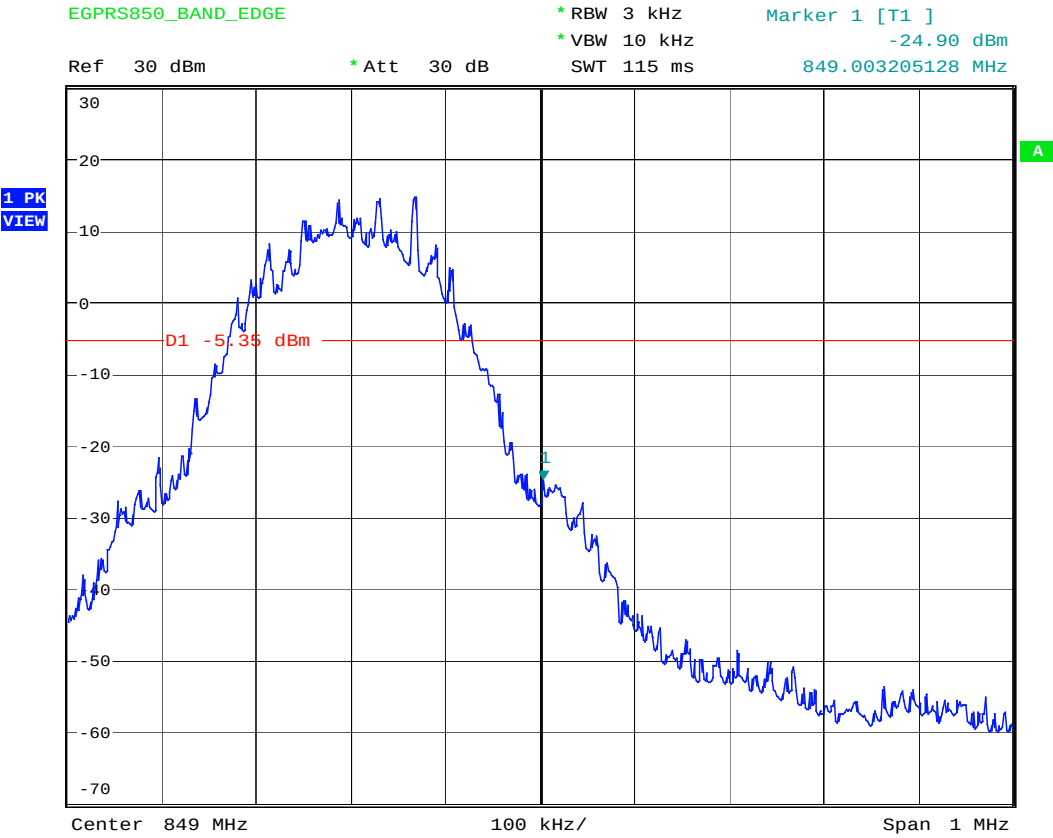


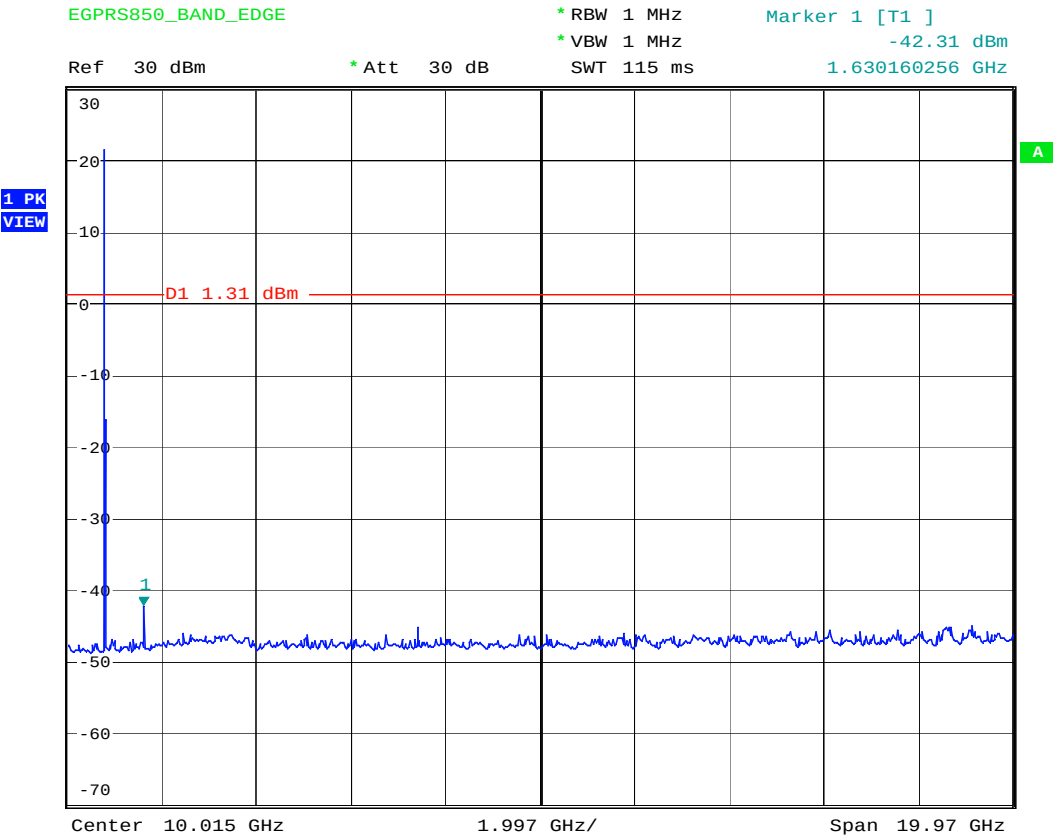


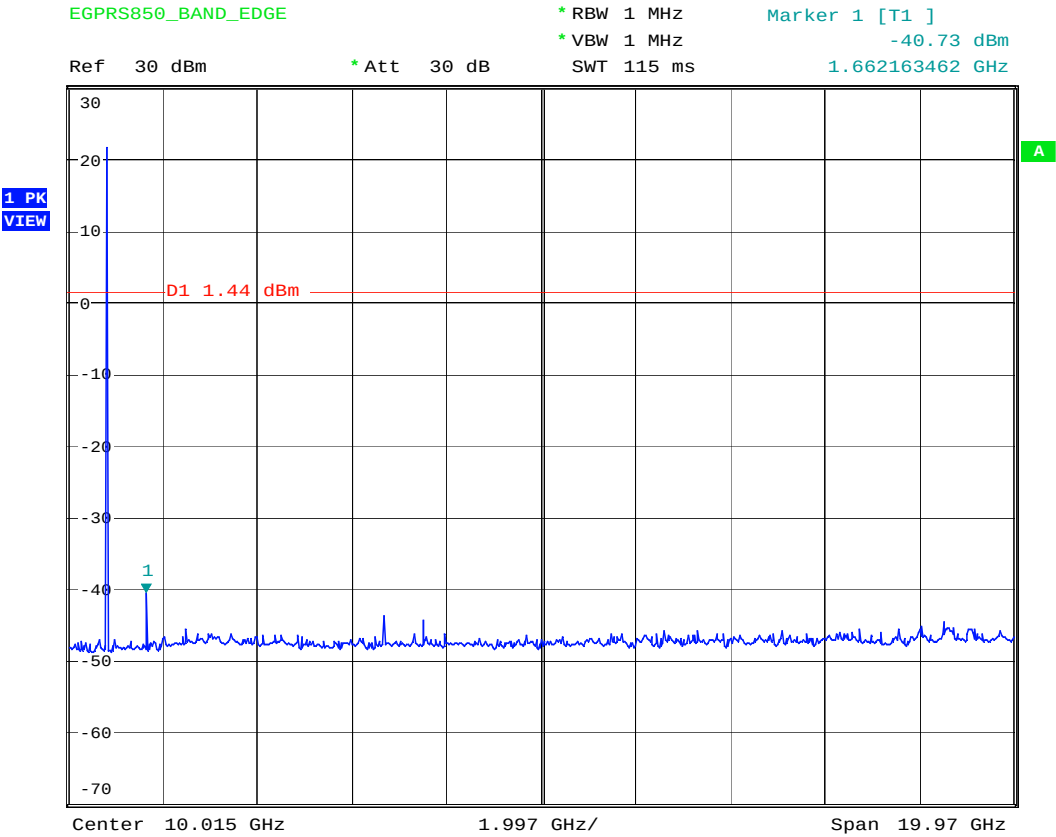


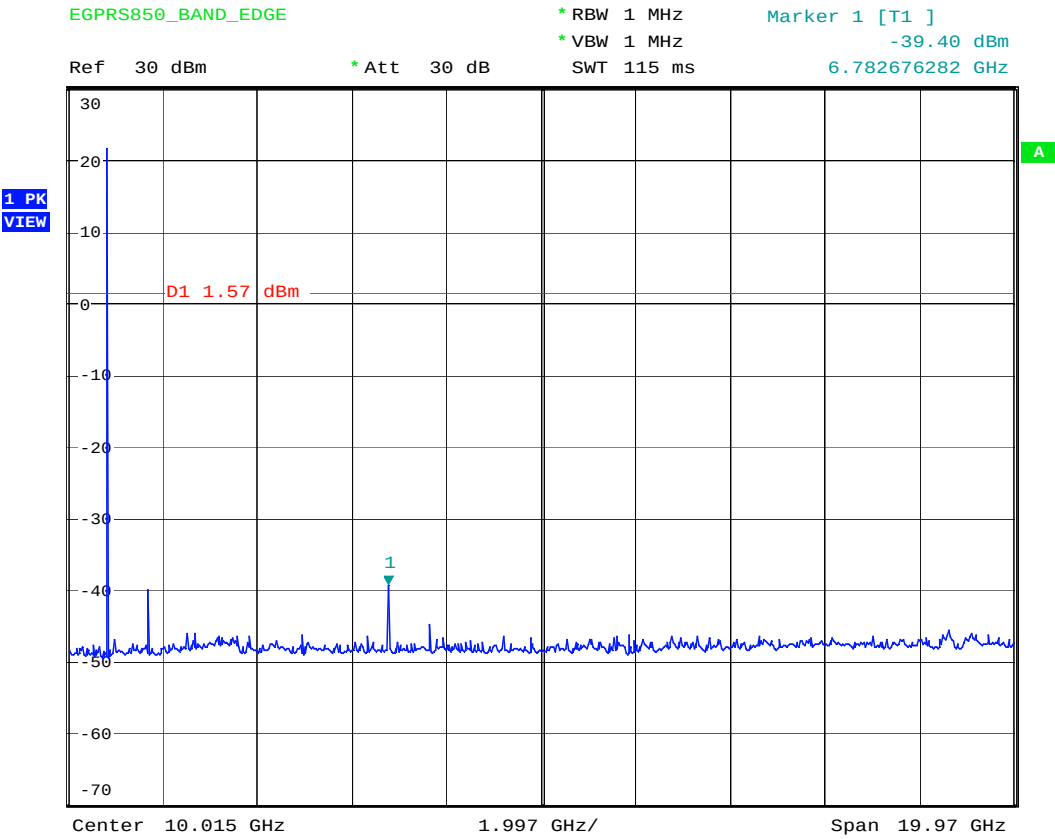


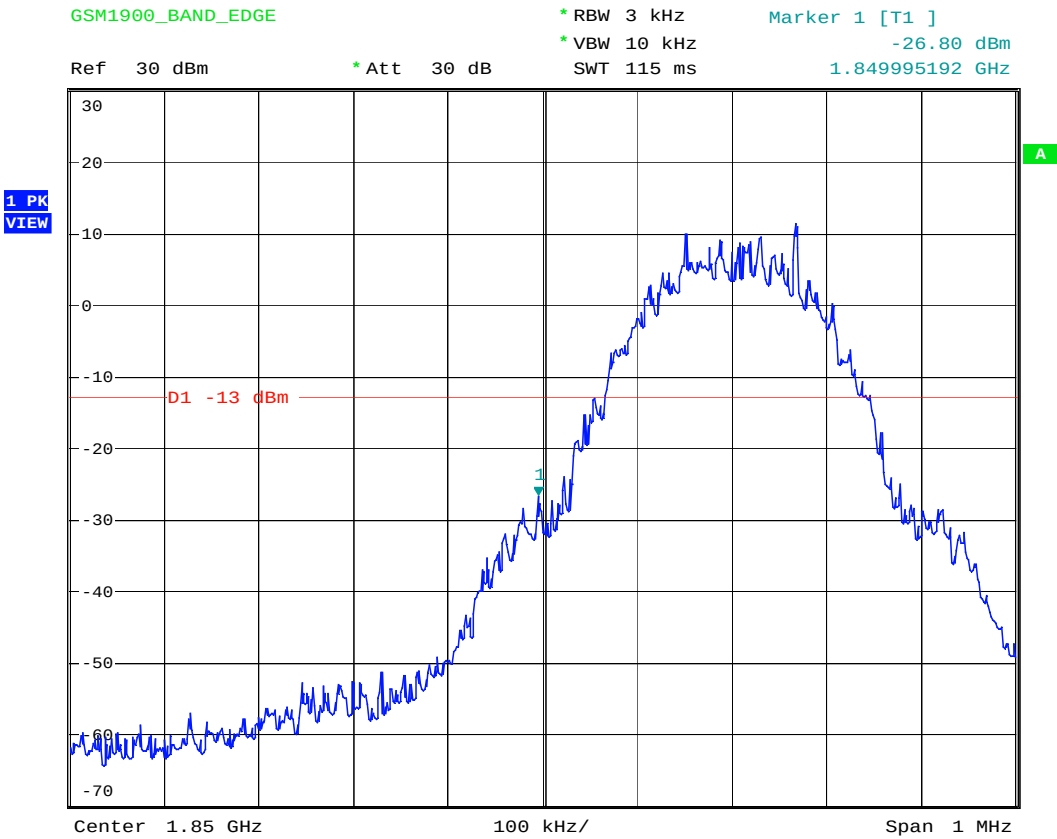




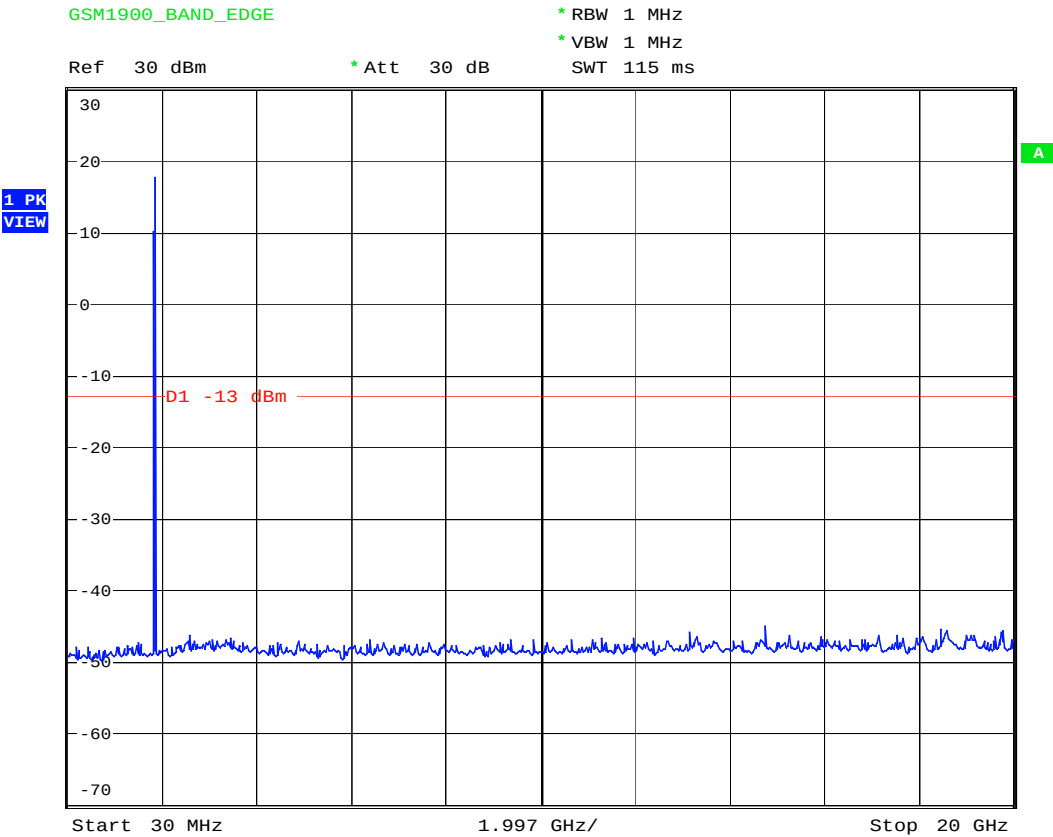


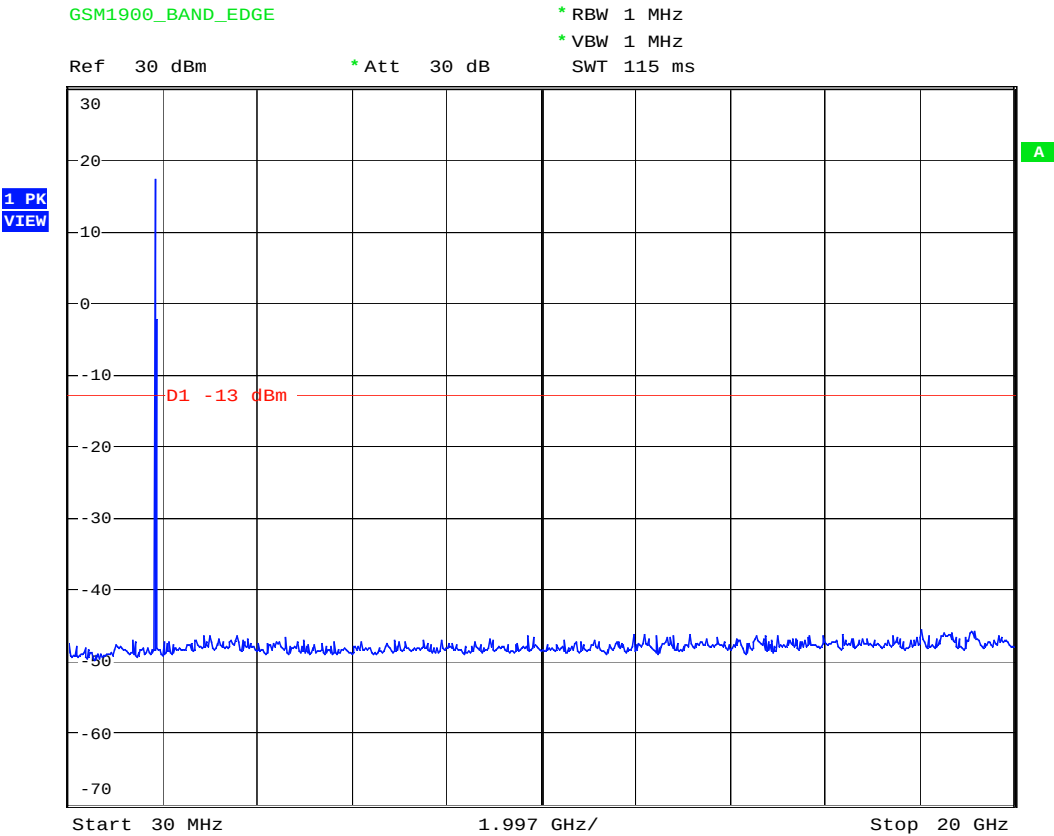


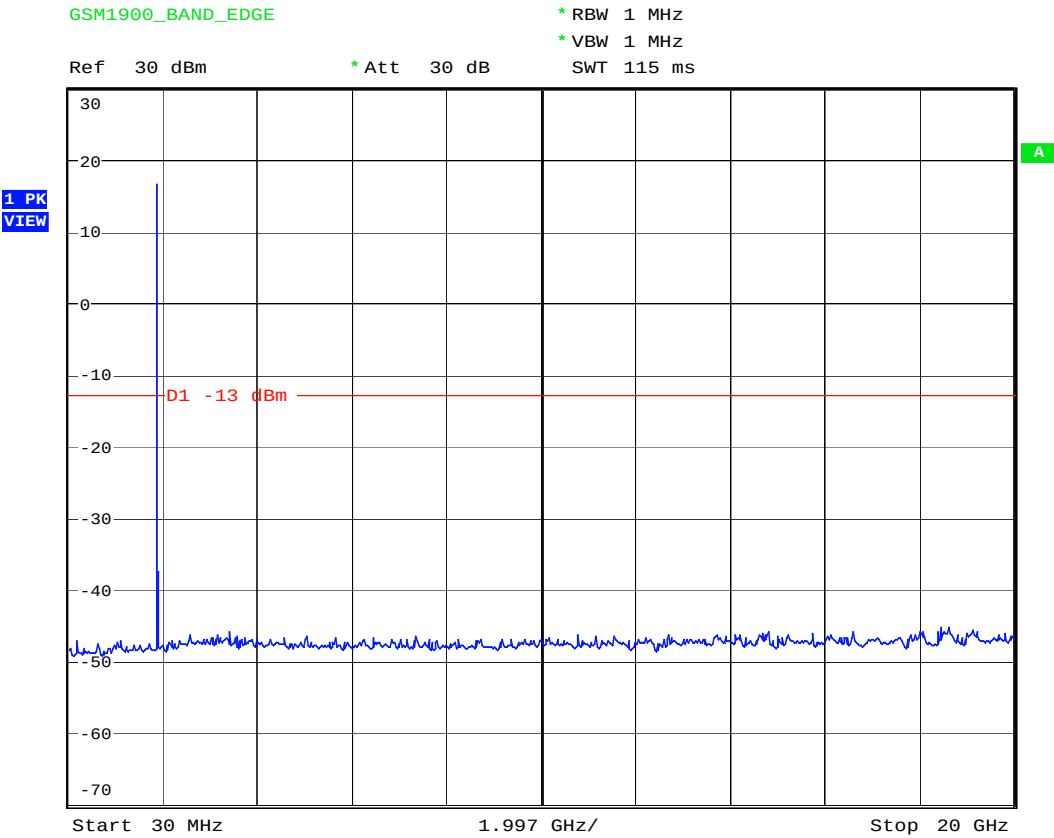


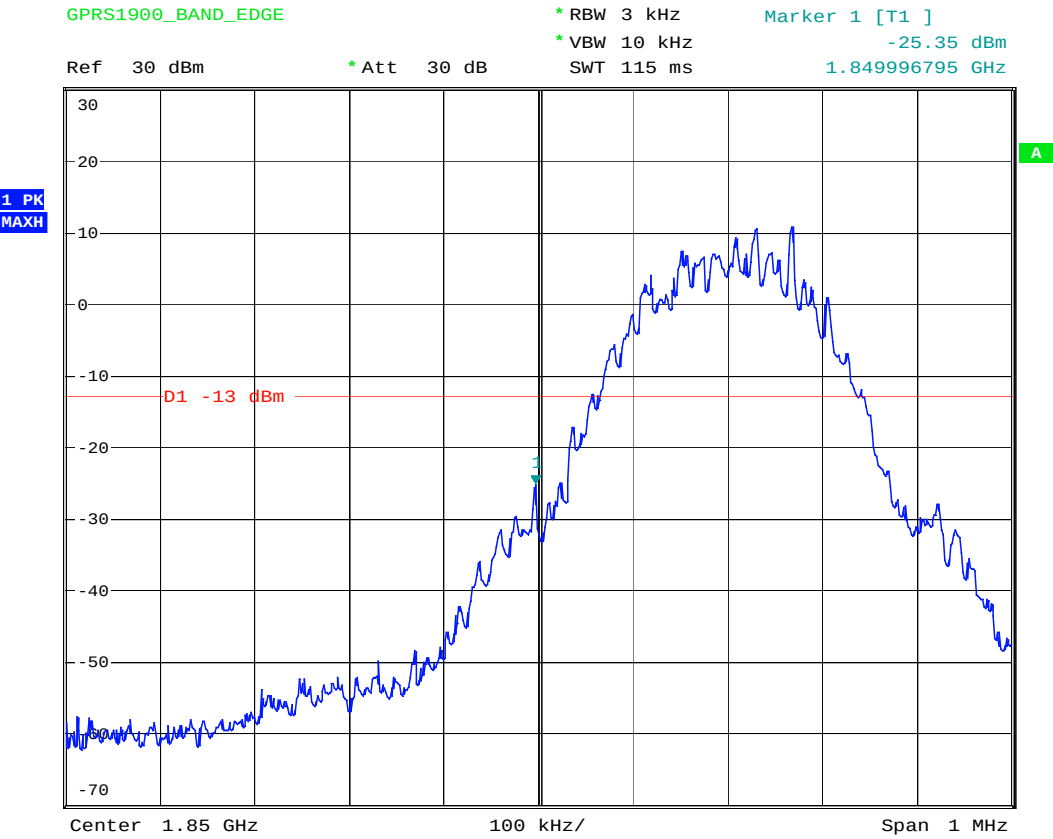




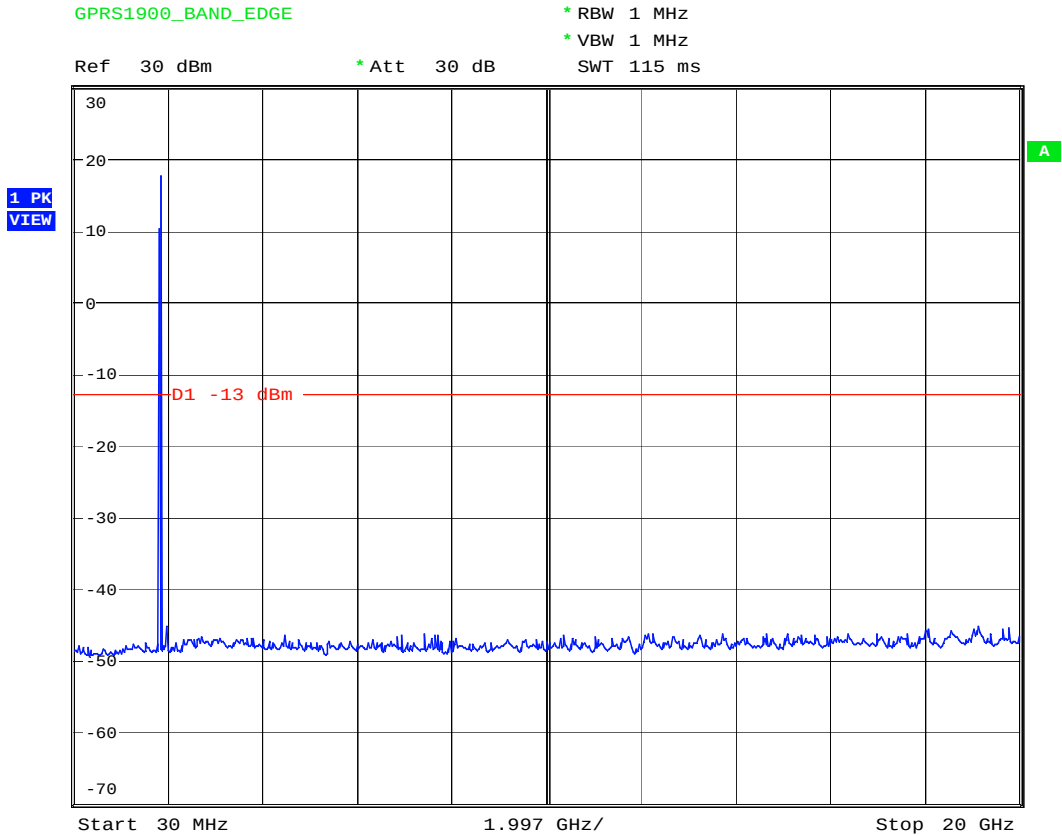


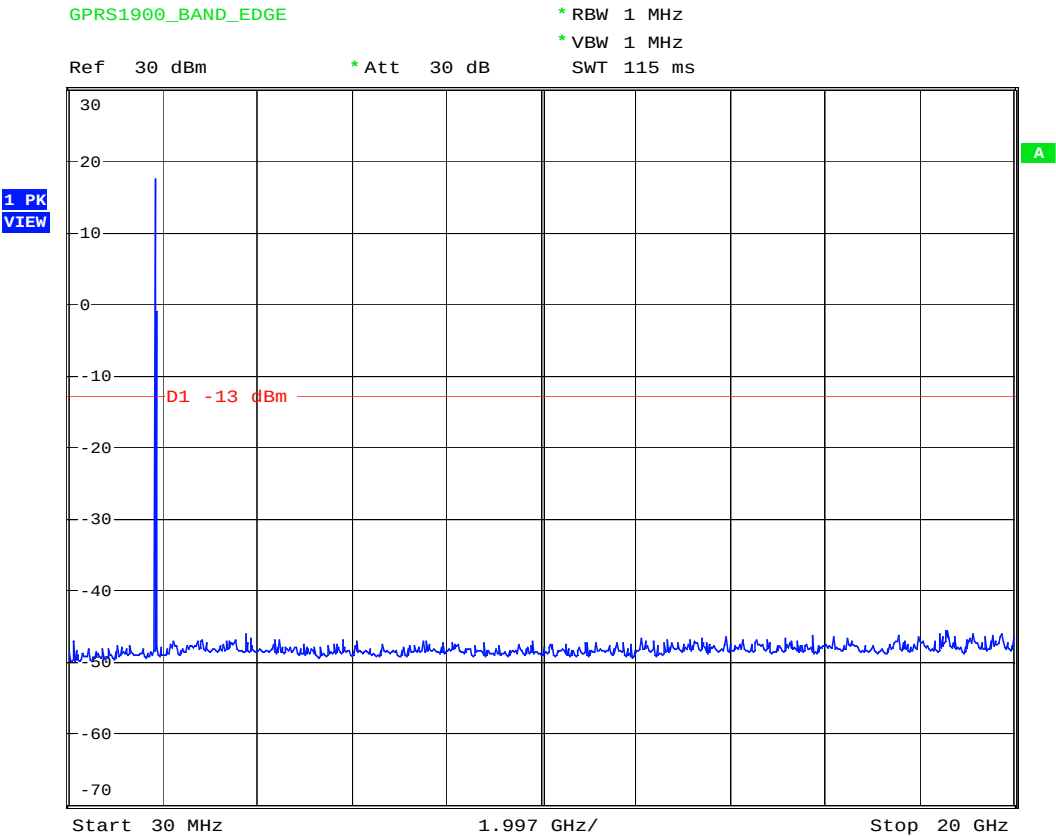


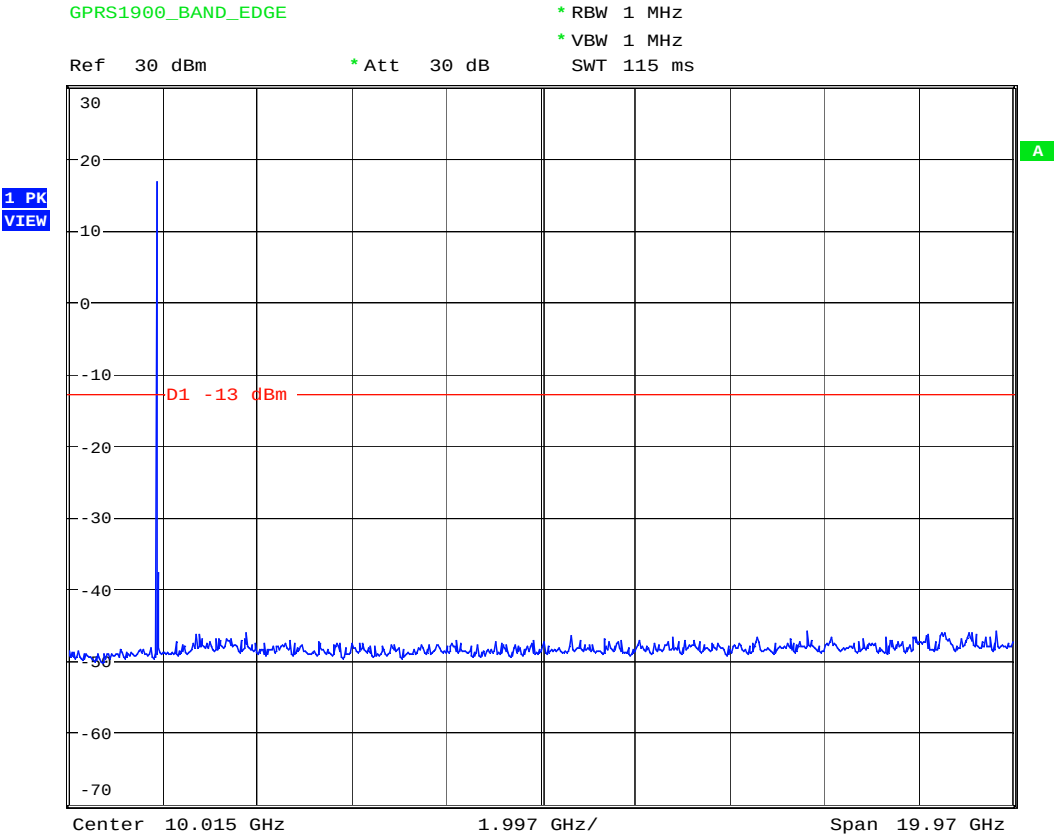


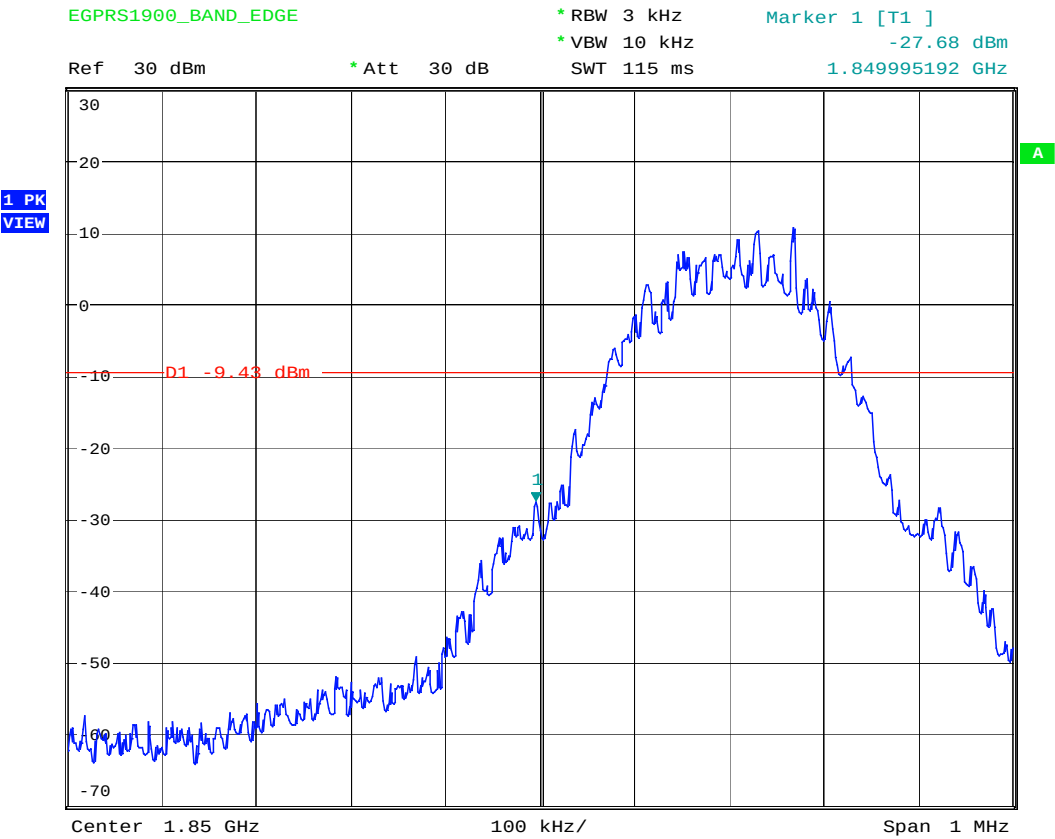


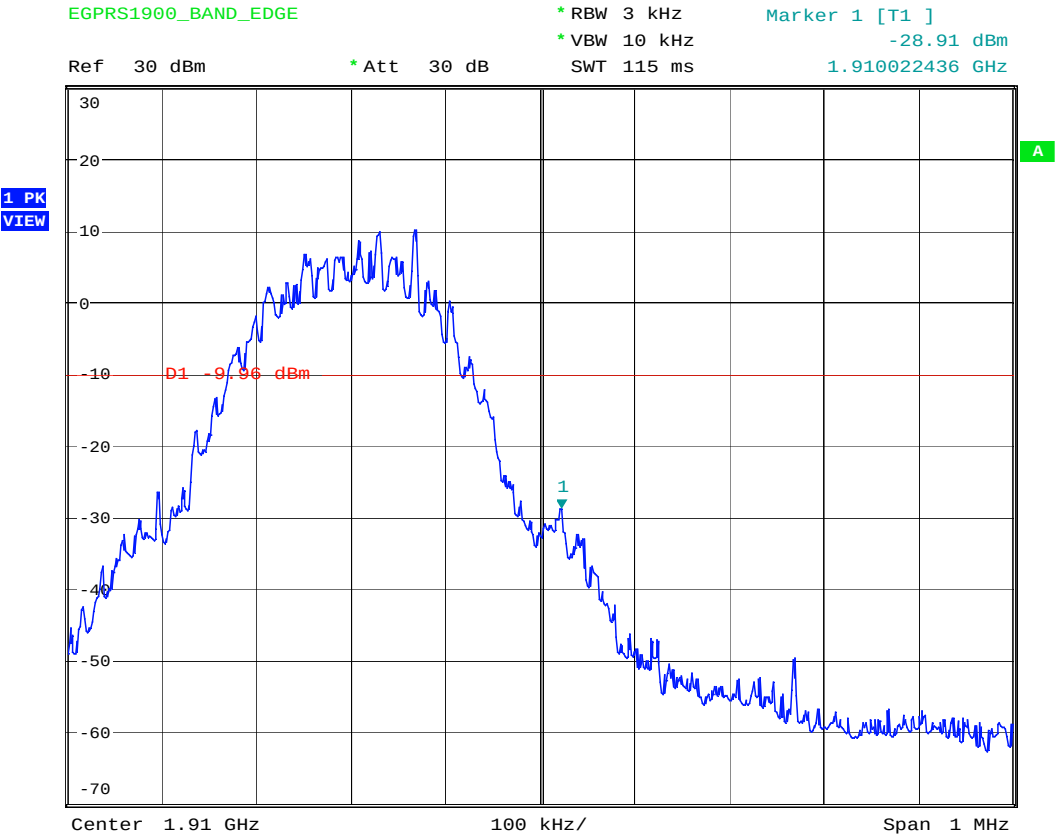


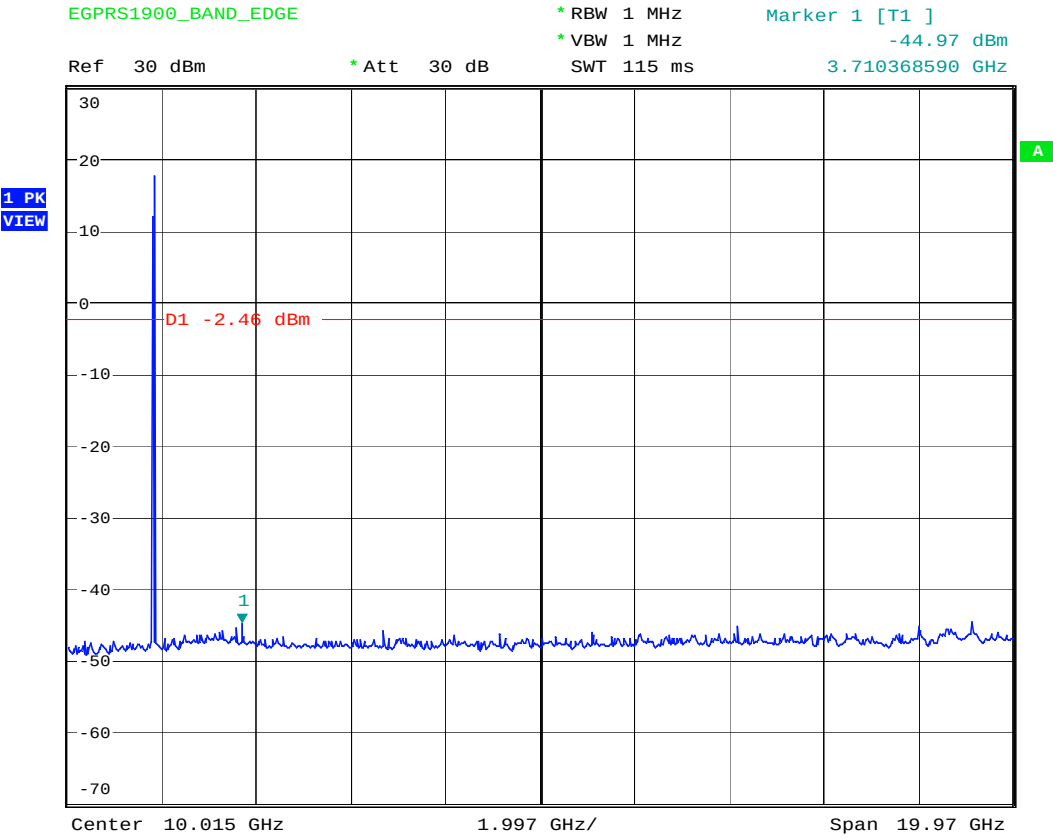


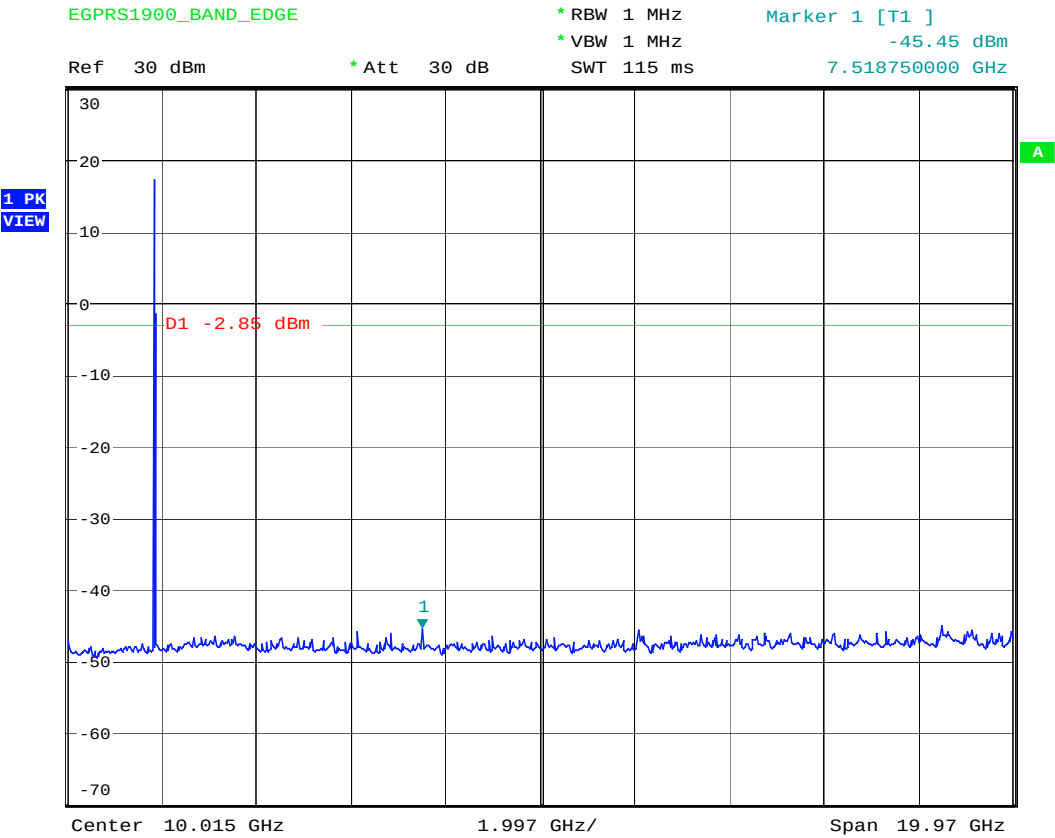


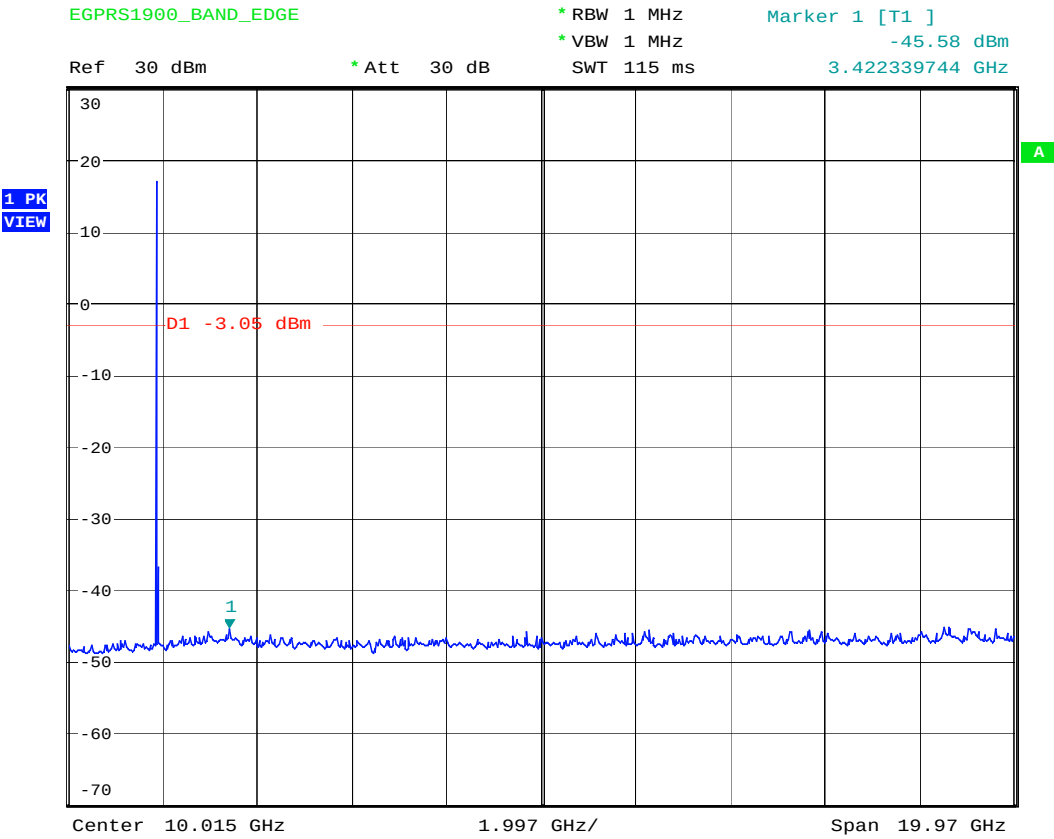












7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

7.1 Standard Applicable

According to FCC § 2.1053

7.2 Measurement Procedure

The setup of the EUT as shown in figure 2 and figure 3. 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)

7.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Hewlett-Packard	8546A	08/27/2006
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Horn Antenna	EMCO	3115	06/04/2006
LogBicone Antenna	Schwarzbeck	9160	10/28/2006
Horn Antenna	EMCO	3116	07/21/2006
Preamplifier	Hewlett-Packard	8449B	09/19/2006
SYNSESIZED SWEEPER	AGILENT	83640B	09/21/2006
DIPOLE ANTENNA	SCHWRZBECK	914; 915	07/13/2007
DIPOLE ANTENNA	SCHWRZBECK	897; 898	07/13/2007

7.4 Test Result

Test Date : 01/ 05/2006Temperature : 16°CHumidity : 66%Operated mode : GSM850/CH128

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.3	-13.0
271.48	V	-59.3	-13.0
271.53	H	-54.3	-13.0
381.14	V	-60.2	-13.0
402.48	H	-55.6	-13.0
460.68	V	-53.3	-13.0

Operated mode : GSM850/CH190

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.3	-13.0
271.48	V	-58.3	-13.0
271.53	H	-54.7	-13.0
381.14	V	-59.2	-13.0
402.48	H	-55.6	-13.0
460.68	V	-52.3	-13.0

Operated mode : GSM850/CH251

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.3	-13.0
271.48	V	-58.3	-13.0
271.53	H	-54.3	-13.0
381.14	V	-60.1	-13.0
402.48	H	-56.6	-13.0
460.68	V	-53.8	-13.0

Operated mode : GPRS850/CH128

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.3	-13.0
271.48	V	-60.1	-13.0
271.53	H	-54.3	-13.0
381.14	V	-59.2	-13.0
402.48	H	-57.6	-13.0
460.68	V	-53.8	-13.0

Operated mode : GPRS 850/CH190

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-60.6	-13.0
271.48	V	-59.3	-13.0
271.53	H	-58.3	-13.0
381.14	V	-60.9	-13.0
402.48	H	-56.8	-13.0
460.68	V	-53.1	-13.0

Operated mode : GPRS 850/CH251

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-59.5	-13.0
271.48	V	-58.3	-13.0
271.53	H	-54.7	-13.0
381.14	V	-61.0	-13.0
402.48	H	-56.8	-13.0
460.68	V	-54.1	-13.0

Operated mode : EGPRS850/CH128

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.1	-13.0
271.48	V	-60.1	-13.0
271.53	H	-54.5	-13.0
381.14	V	-59.2	-13.0
402.48	H	-57.8	-13.0
460.68	V	-53.8	-13.0

Operated mode : EGPRS 850/CH190

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-60.6	-13.0
271.48	V	-59.2	-13.0
271.53	H	-58.3	-13.0
381.14	V	-60.9	-13.0
402.48	H	-56.9	-13.0
460.68	V	-53.2	-13.0

Operated mode : EGPRS 850/CH251

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-59.5	-13.0
271.48	V	-58.3	-13.0
271.53	H	-54.7	-13.0
381.14	V	-61.3	-13.0
402.48	H	-56.8	-13.0
460.68	V	-54.7	-13.0

Operated mode : PCS1900/CH512

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.3	-13.0
271.48	V	-59.3	-13.0
271.53	H	-54.7	-13.0
381.14	V	-60.4	-13.0
402.48	H	-54.6	-13.0
460.68	V	-52.8	-13.0

Operated mode : PCS1900/CH661

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.9	-13.0
271.48	V	-58.2	-13.0
271.53	H	-54.3	-13.0
381.14	V	-61.1	-13.0
402.48	H	-56.6	-13.0
460.68	V	-53.7	-13.0

Operated mode : PCS1900/CH810

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.3	-13.0
271.48	V	-59.3	-13.0
271.53	H	-55.3	-13.0
381.14	V	-60.1	-13.0
402.48	H	-55.5	-13.0
460.68	V	-54.3	-13.0

Operated mode : GPRS1900/CH512

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.3	-13.0
271.48	V	-59.3	-13.0
271.53	H	-56.3	-13.0
381.14	V	-61.2	-13.0
402.48	H	-55.8	-13.0
460.68	V	-53.9	-13.0

Operated mode : GPRS1900/CH661

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.3	-13.0
271.48	V	-61.3	-13.0
271.53	H	-58.3	-13.0
381.14	V	-60.2	-13.0
402.48	H	-57.6	-13.0
460.68	V	-54.9	-13.0

Operated mode : GPRS1900/CH810

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-59.1	-13.0
271.48	V	-59.2	-13.0
271.53	H	-56.1	-13.0
381.14	V	-61.2	-13.0
402.48	H	-55.9	-13.0
460.68	V	-52.3	-13.0

Operated mode : EGPRS1900/CH512

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-57.3	-13.0
271.48	V	-59.3	-13.0
271.53	H	-56.7	-13.0
381.14	V	-61.2	-13.0
402.48	H	-55.3	-13.0
460.68	V	-53.8	-13.0

Operated mode : EGPRS1900/CH661

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-58.3	-13.0
271.48	V	-61.9	-13.0
271.53	H	-58.3	-13.0
381.14	V	-60.1	-13.0
402.48	H	-57.6	-13.0
460.68	V	-54.8	-13.0

Operated mode : EGPRS1900/CH810

Frequency (MHz)	Antenna Pol.	Result (dBm)	Limit (dBm)
240.49	H	-59.5	-13.0
271.48	V	-59.2	-13.0
271.53	H	-56.1	-13.0
381.14	V	-61.2	-13.0
402.48	H	-55.3	-13.0
460.68	V	-52.1	-13.0

8. FREQUENCY STABILITY MEASUREMENT

8.1 Standard Applicable

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

Frequency Tolerance: 2.5 ppm

8.2 Measurement Procedure

Frequency Error V.S. Temperature:

The setup of the EUT as shown in figure 4. 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.

Frequency Error V.S. Voltage:

Set chamber temperature to 20°C. Use a variable DC (AC) power supply 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.

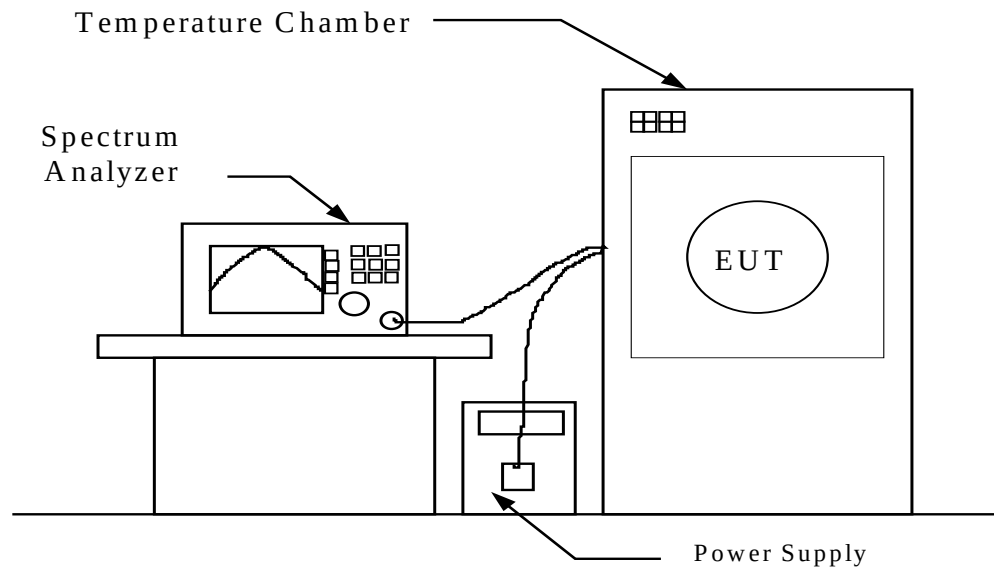


Figure 4: Frequency stability measurement configuration.

8.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/02/2006
Temperature Chamber	ESPEC	SH-240	02/14/2006
DC Power Supply	GW	GPC-3030D	N/A
Digital Multi Meter	YF-FONG	YF1069	04/12/2006

8.4 Test ResultTest Date : 01/ 05/2006Temperature : 16°CHumidity : 66%

Reference Frequency: GSM850 Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	836.600021	4.0	2091.5
	40	836.600021	4.0	
	30	836.600020	3.0	
	20	836.600017	0.0	
	10	836.600016	-1.0	
	0	836.600018	1.0	
	-10	836.600020	3.0	
	-20	836.600019	2.0	
	-30	836.600019	2.0	
4.25	20	836.600017	0.0	
5.75		836.600017	0.0	

Reference Frequency: GPRS850 Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	836.600021	4.0	2091.5
	40	836.600021	4.0	
	30	836.600021	4.0	
	20	836.600017	0.0	
	10	836.600017	0.0	
	0	836.600018	1.0	
	-10	836.600021	4.0	
	-20	836.600019	2.0	
	-30	836.600019	2.0	
4.25	20	836.600017	0.0	
5.75		836.600017	0.0	

Reference Frequency: EGPRS850 Mid Channel 836.6 MHz @ 20°C				
Limit: ± 2.5 ppm = 2091.5 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	836.600021	4.0	2091.5
	40	836.600021	4.0	
	30	836.600017	0.0	
	20	836.600017	0.0	
	10	836.600017	0.0	
	0	836.600018	1.0	
	-10	836.600018	1.0	
	-20	836.600019	2.0	
	-30	836.600019	2.0	
4.25	20	836.600017	0.0	
5.75		836.600017	0.0	

Reference Frequency: PCS1900 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	1880.000027	2.0	4700
	40	1880.000027	2.0	
	30	1880.000027	2.0	
	20	1880.000025	0.0	
	10	1880.000023	-2.0	
	0	1880.000025	0.0	
	-10	1880.000025	0.0	
	-20	1880.000023	-2.0	
	-30	1880.000023	-2.0	
4.25	20	1880.000025	0.0	
5.75		1880.000025	0.0	

Reference Frequency: GPRS1900 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	1880.000027	2.0	4700
	40	1880.000026	1.0	
	30	1880.000027	2.0	
	20	1880.000025	0.0	
	10	1880.000023	-2.0	
	0	1880.000025	0.0	
	-10	1880.000024	-1.0	
	-20	1880.000023	-2.0	
	-30	1880.000022	-3.0	
4.25	20	1880.000025	0.0	4700
5.75		1880.000025	0.0	

Reference Frequency: EGPRS1900 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (Hz)
5.0	50	1880.000027	2.0	4700
	40	1880.000026	1.0	
	30	1880.000026	1.0	
	20	1880.000025	0.0	
	10	1880.000023	-2.0	
	0	1880.000024	-1.0	
	-10	1880.000024	-1.0	
	-20	1880.000023	-2.0	
	-30	1880.000022	-3.0	
4.25	20	1880.000025	0.0	4700
5.75		1880.000025	0.0	

9. POWERLINE CONDUCTED EMISSIONS

9.1 Standard Applicable

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

9.2 Measurement Procedure

1. Setup the configuration per figure 5.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

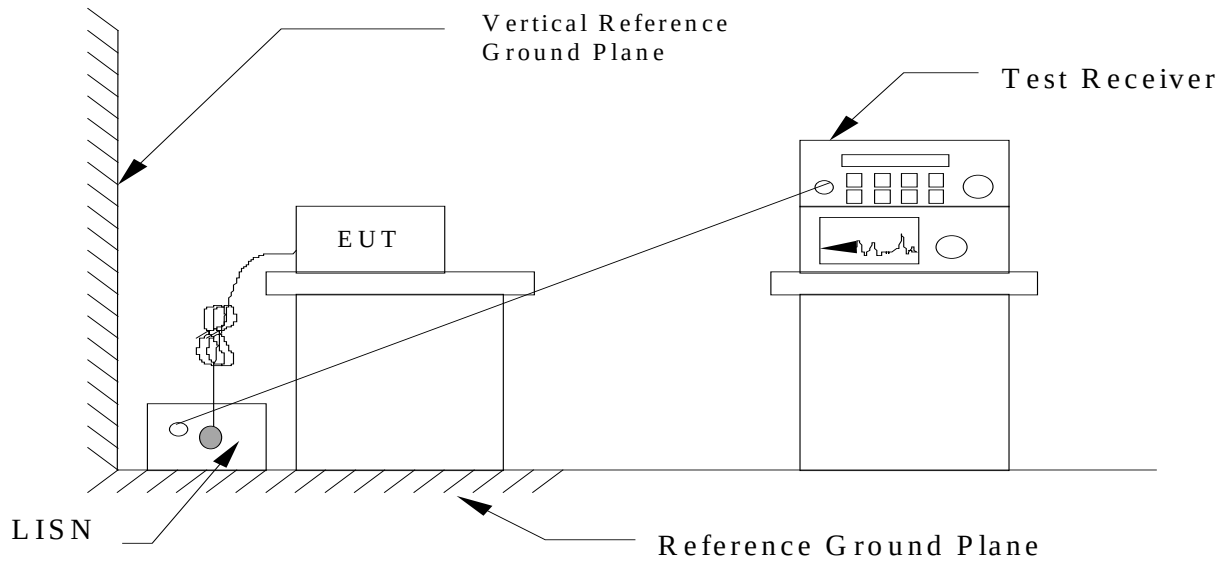


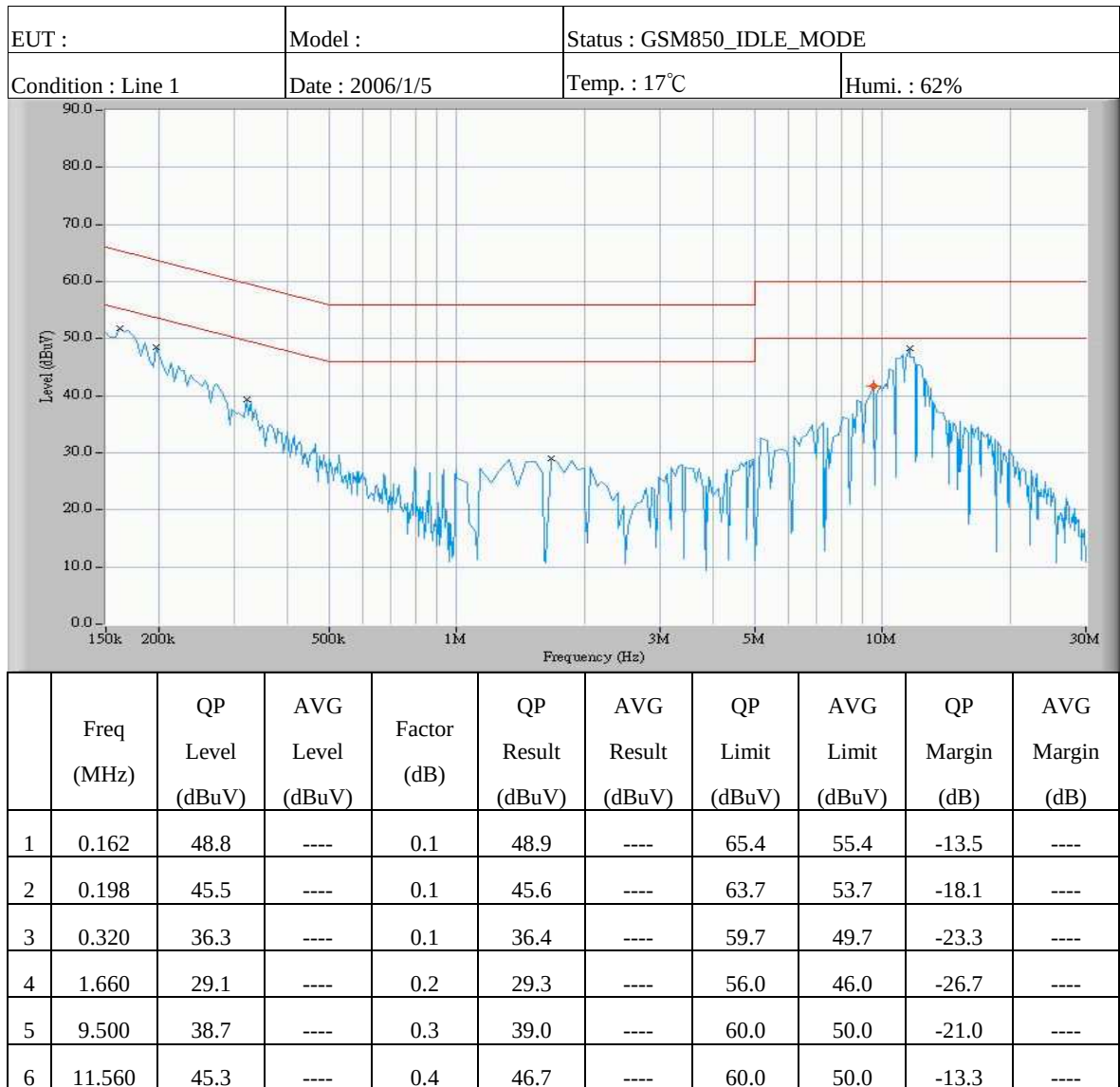
Figure 5 : Conducted emissions measurement configuration

9.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde and Schwarz	ESCS30	03/31/2006
Line Impedance Stabilization network	EMCO	3825	11/09/2006
Line Impedance Stabilization network	Rolf Heine	NNB-2/16Z	03/31/2006

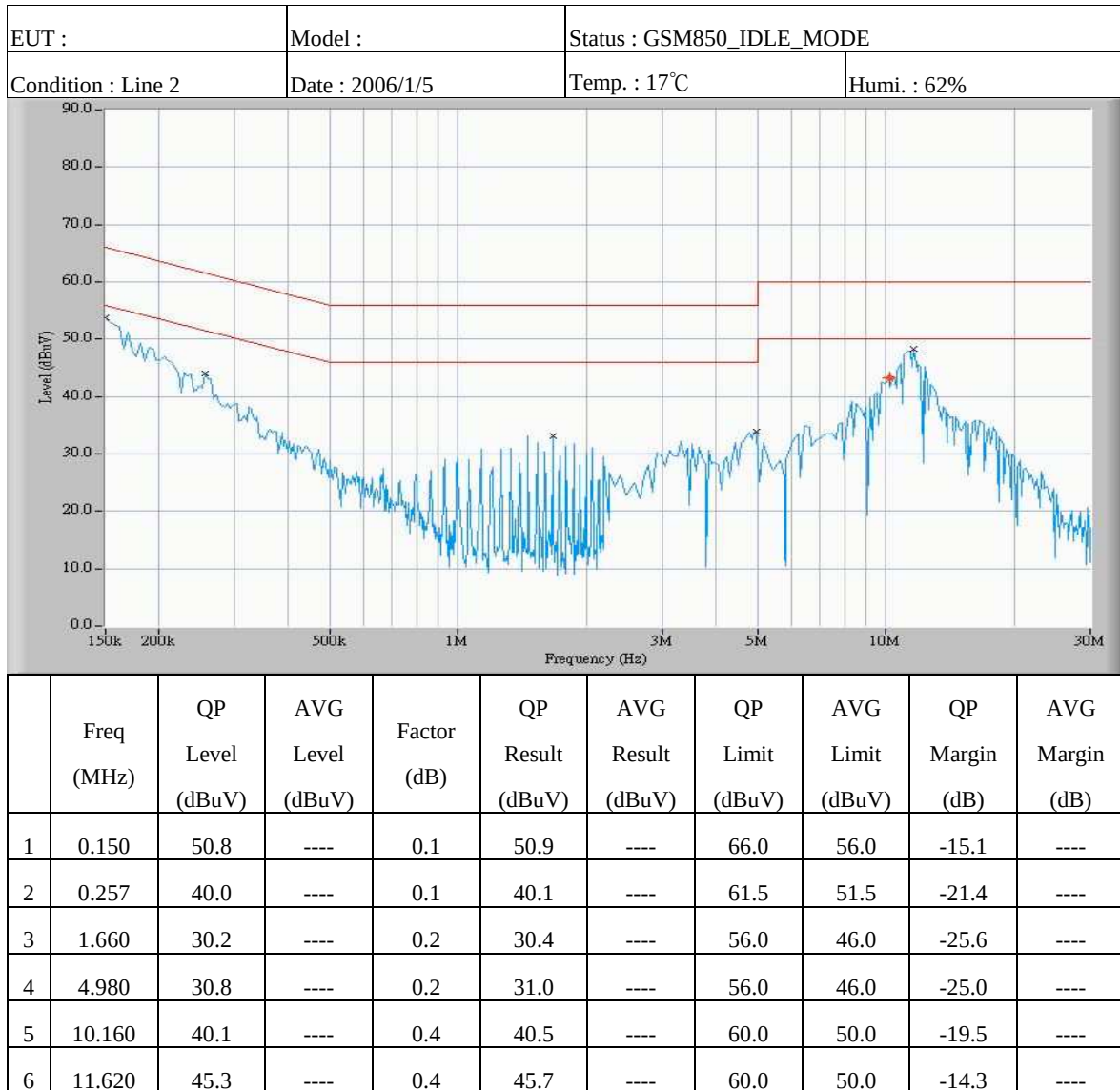
9.4 Test Result

9.4.1



Note:

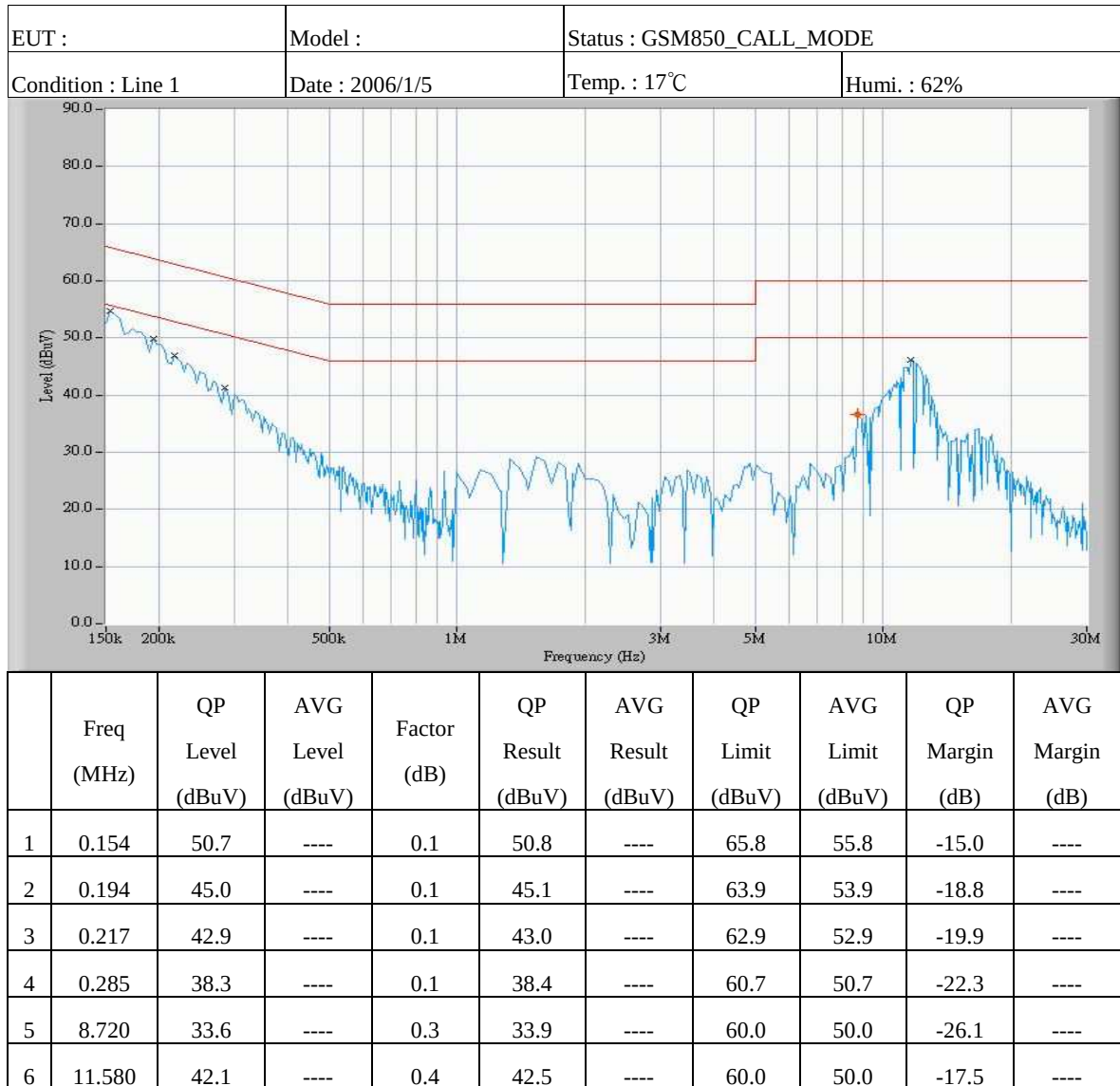
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

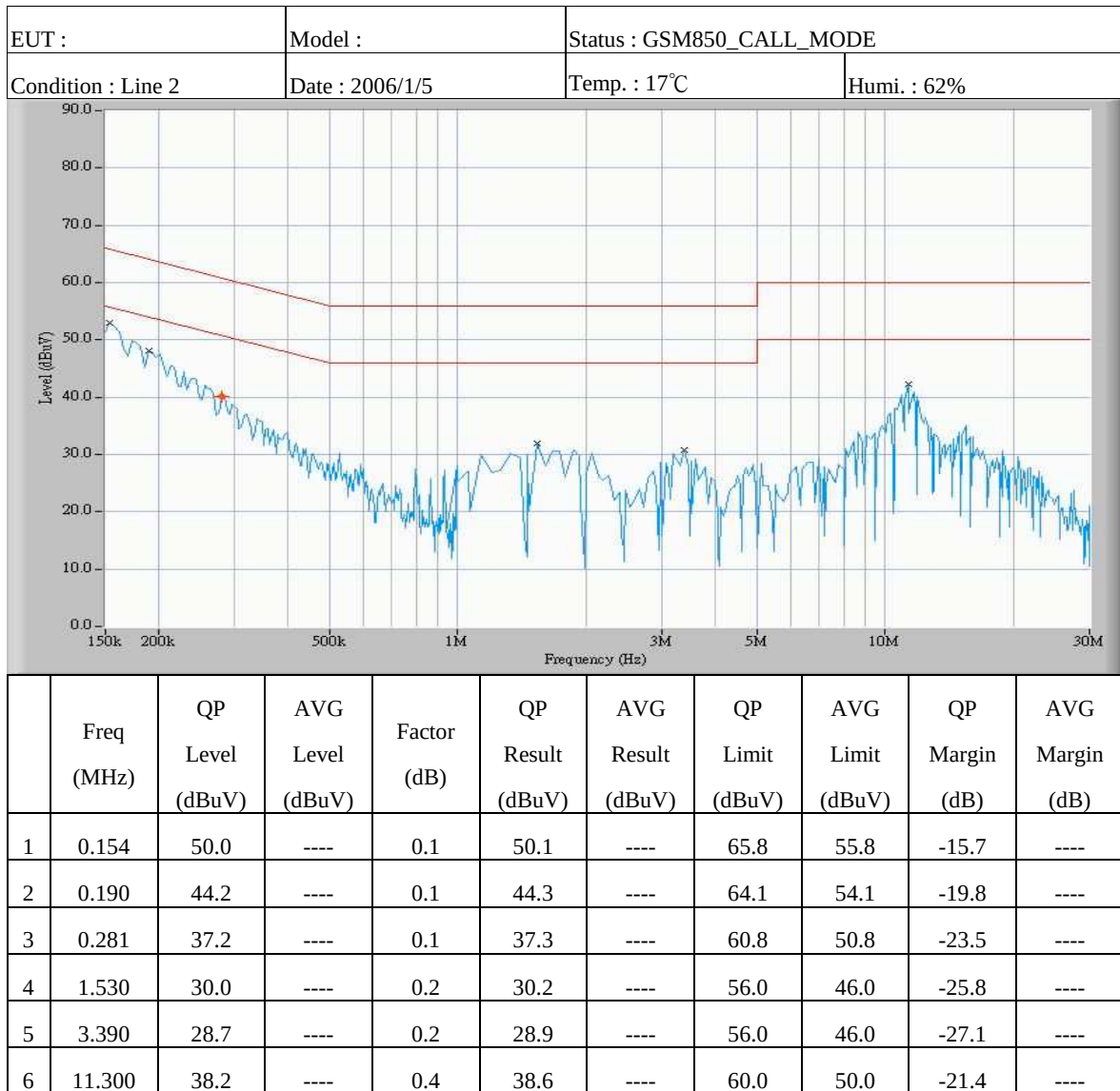
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.2



Note:

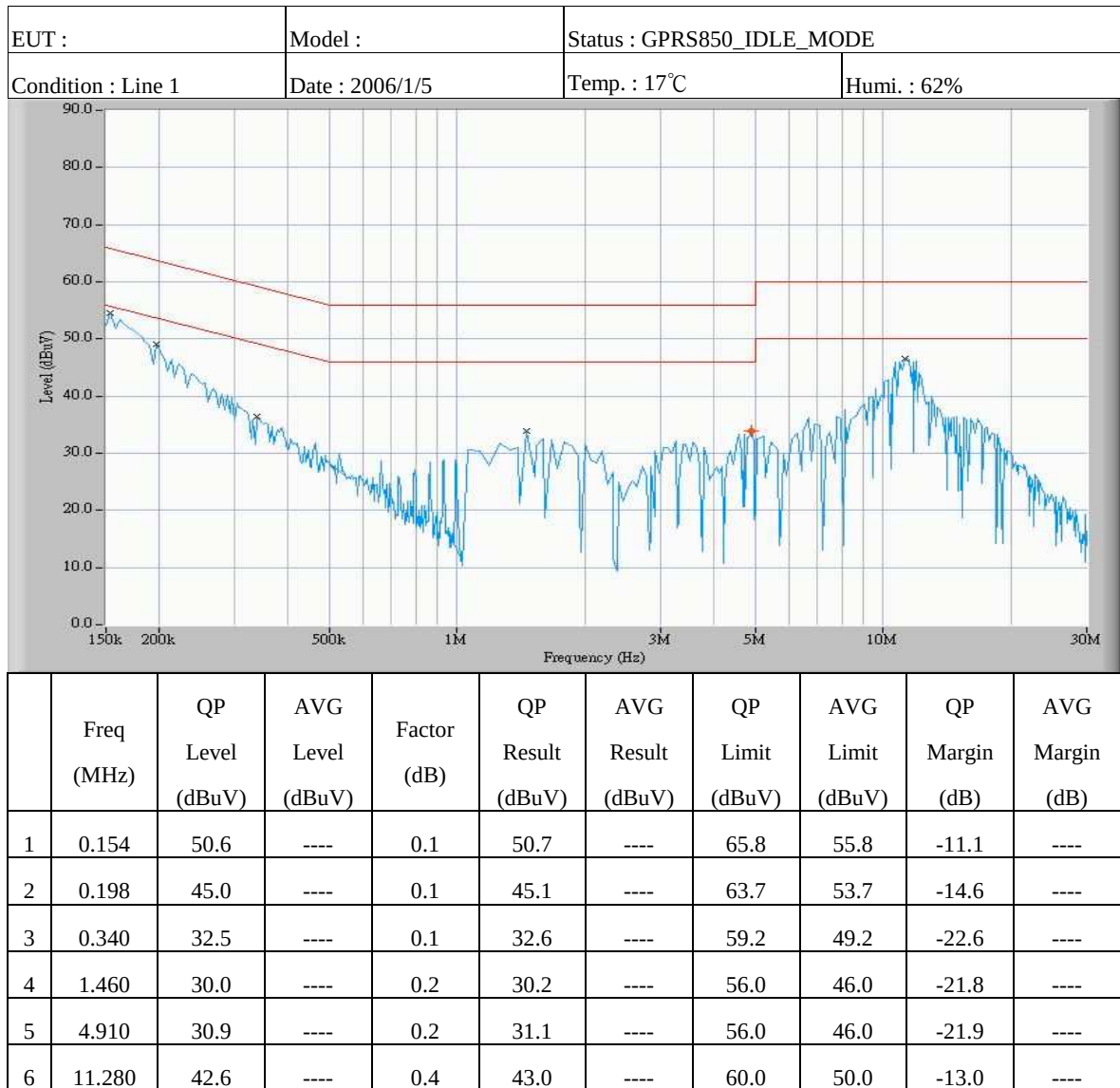
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

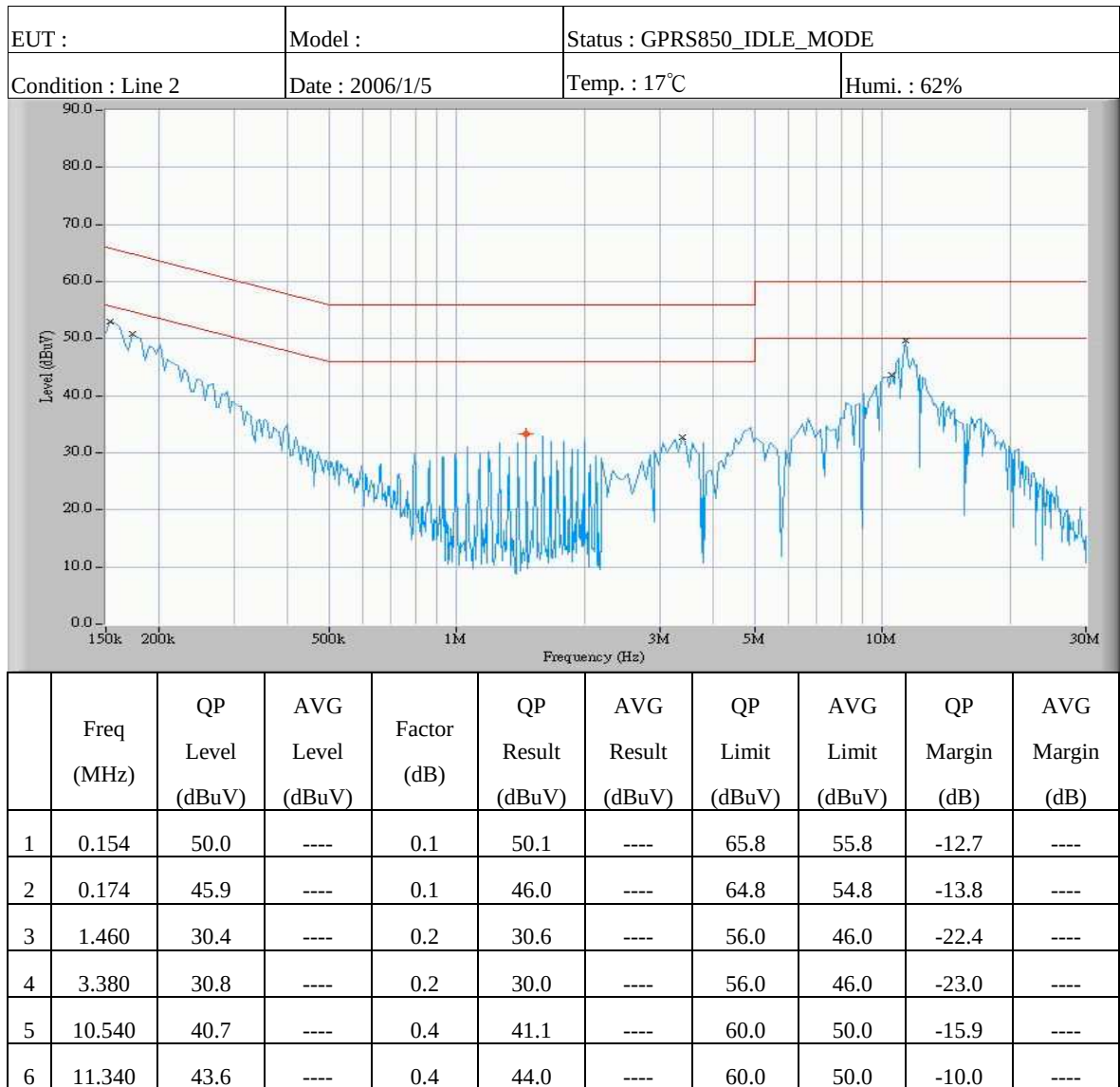
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.3



Note:

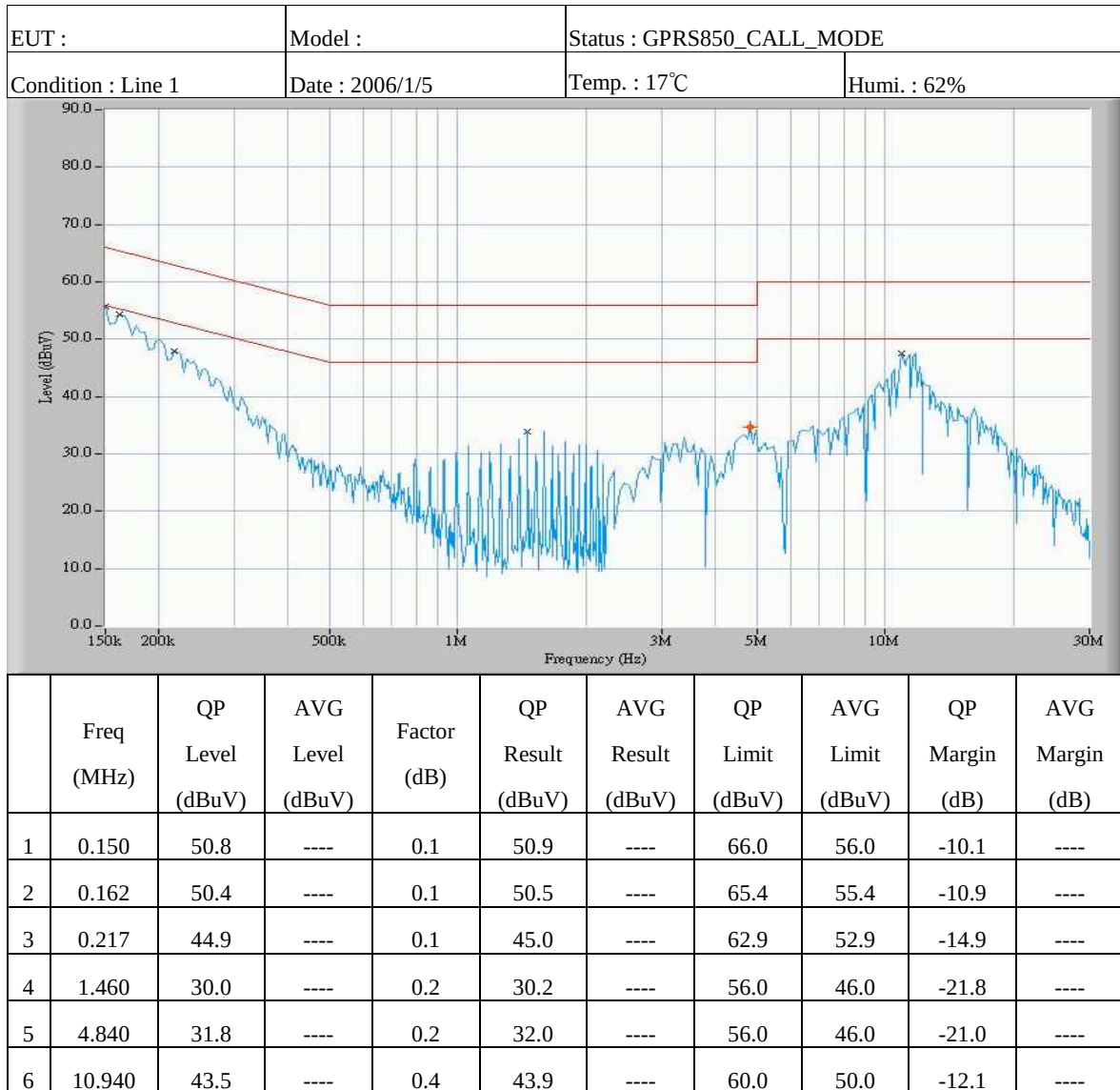
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

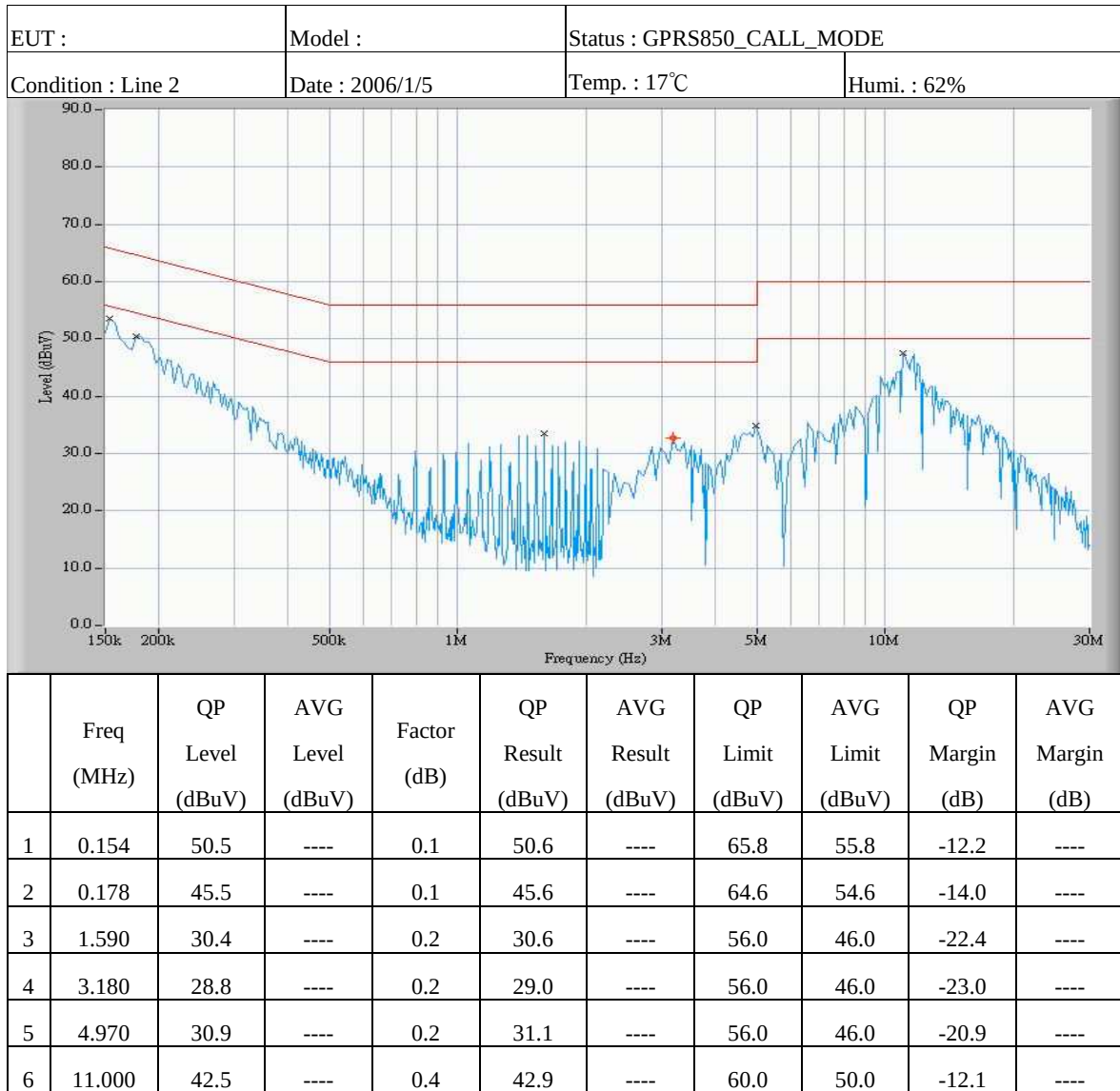
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.4



Note:

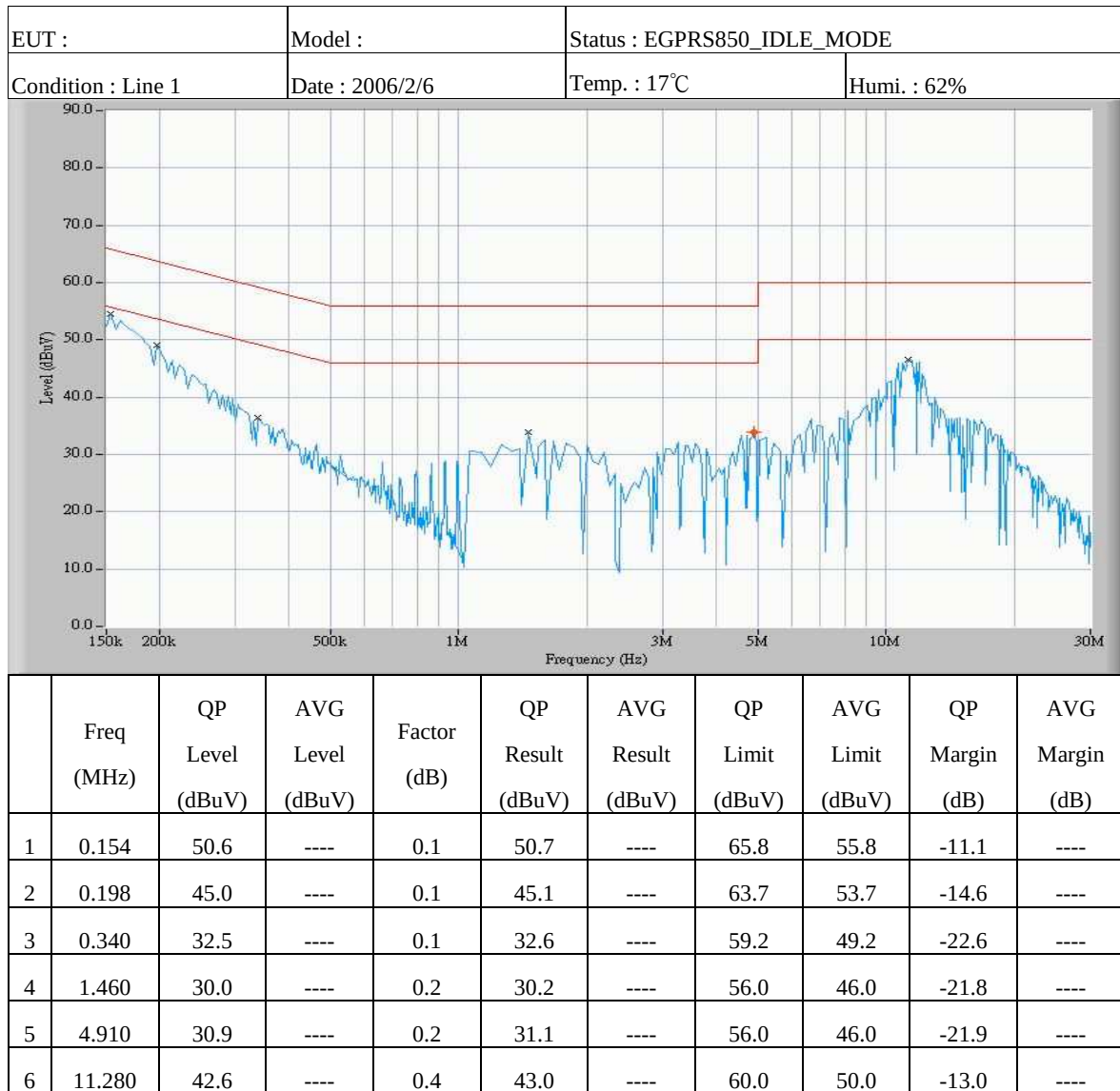
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



Note:

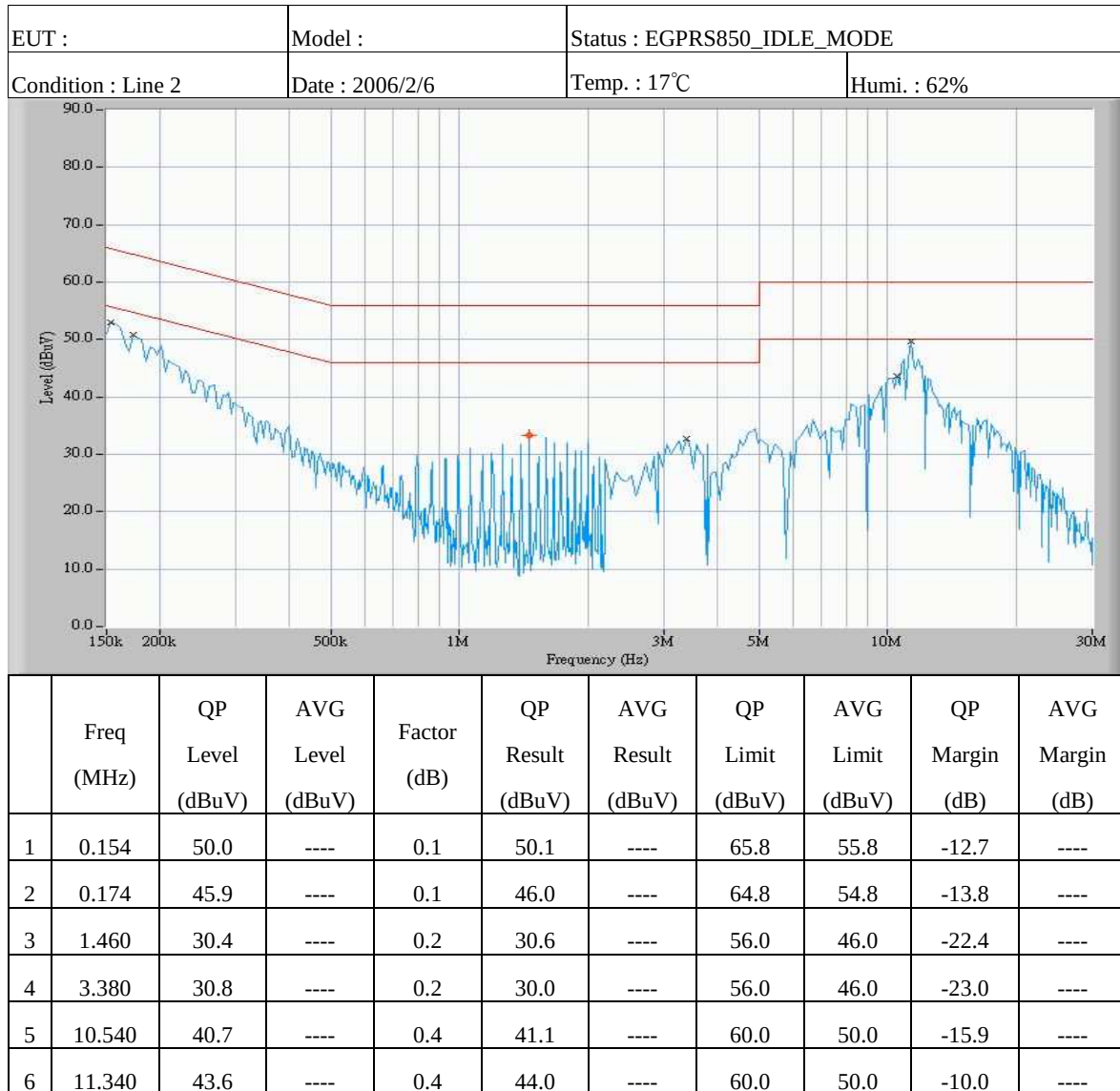
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.5



Note:

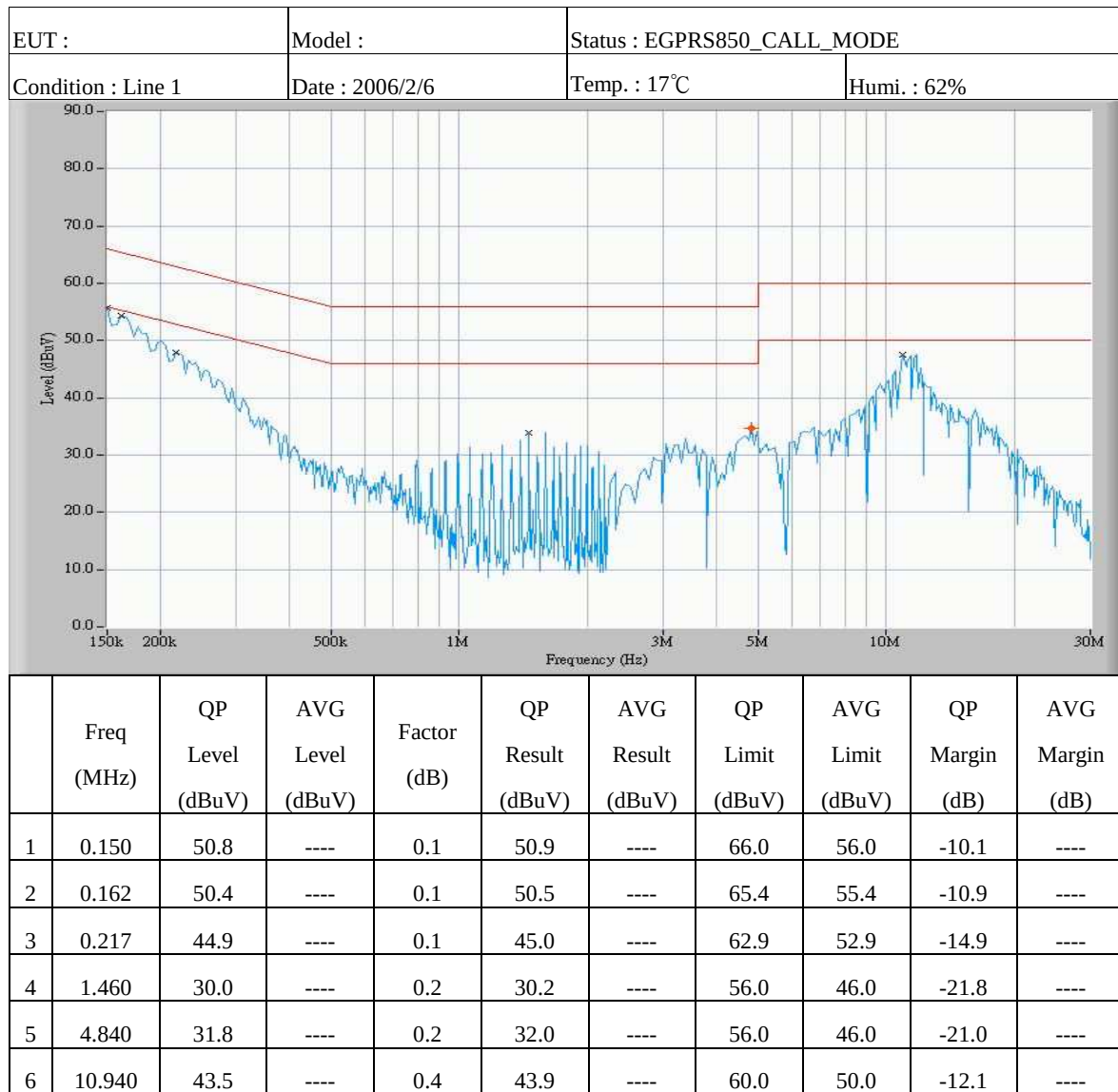
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

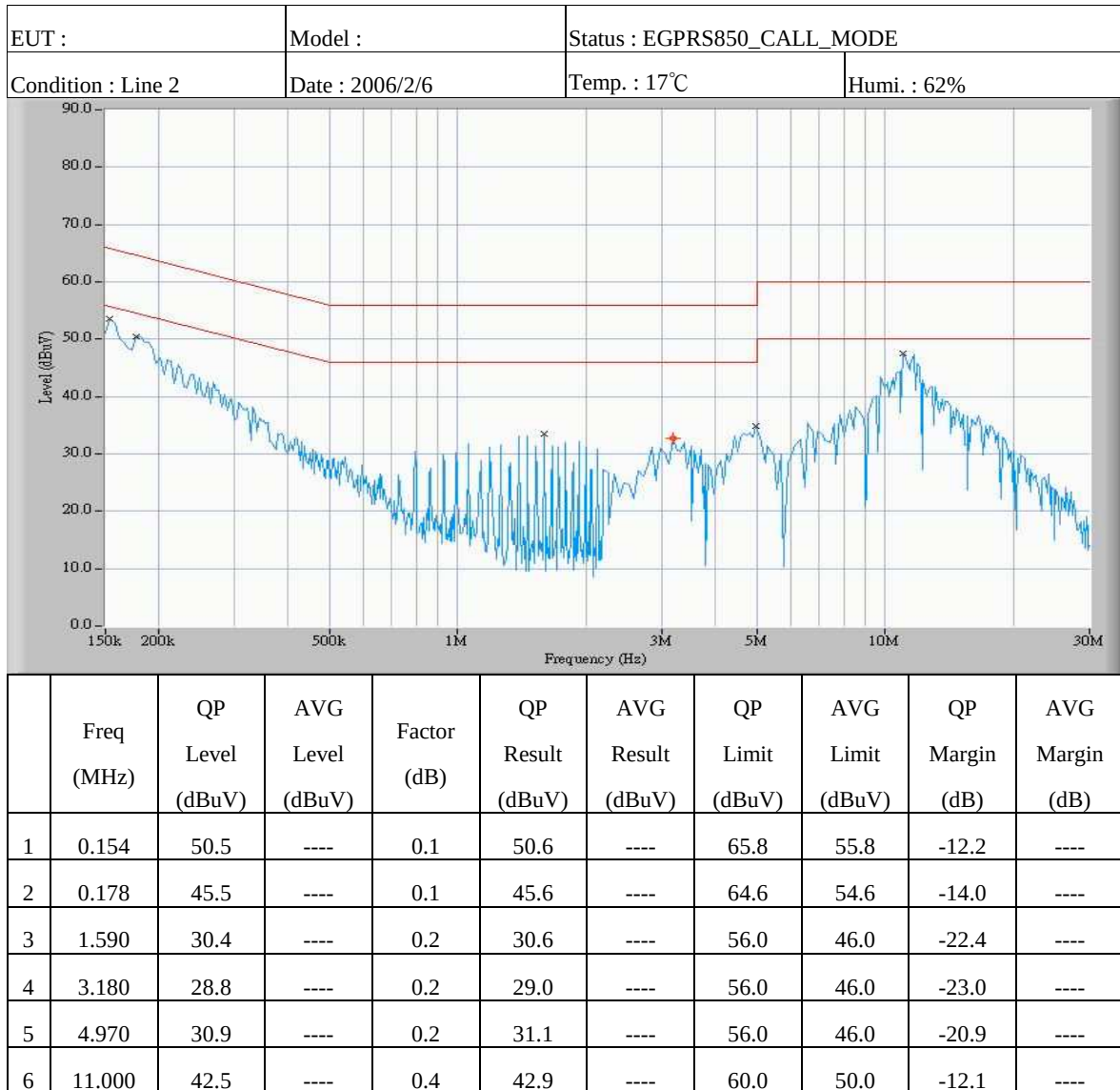
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.6



Note:

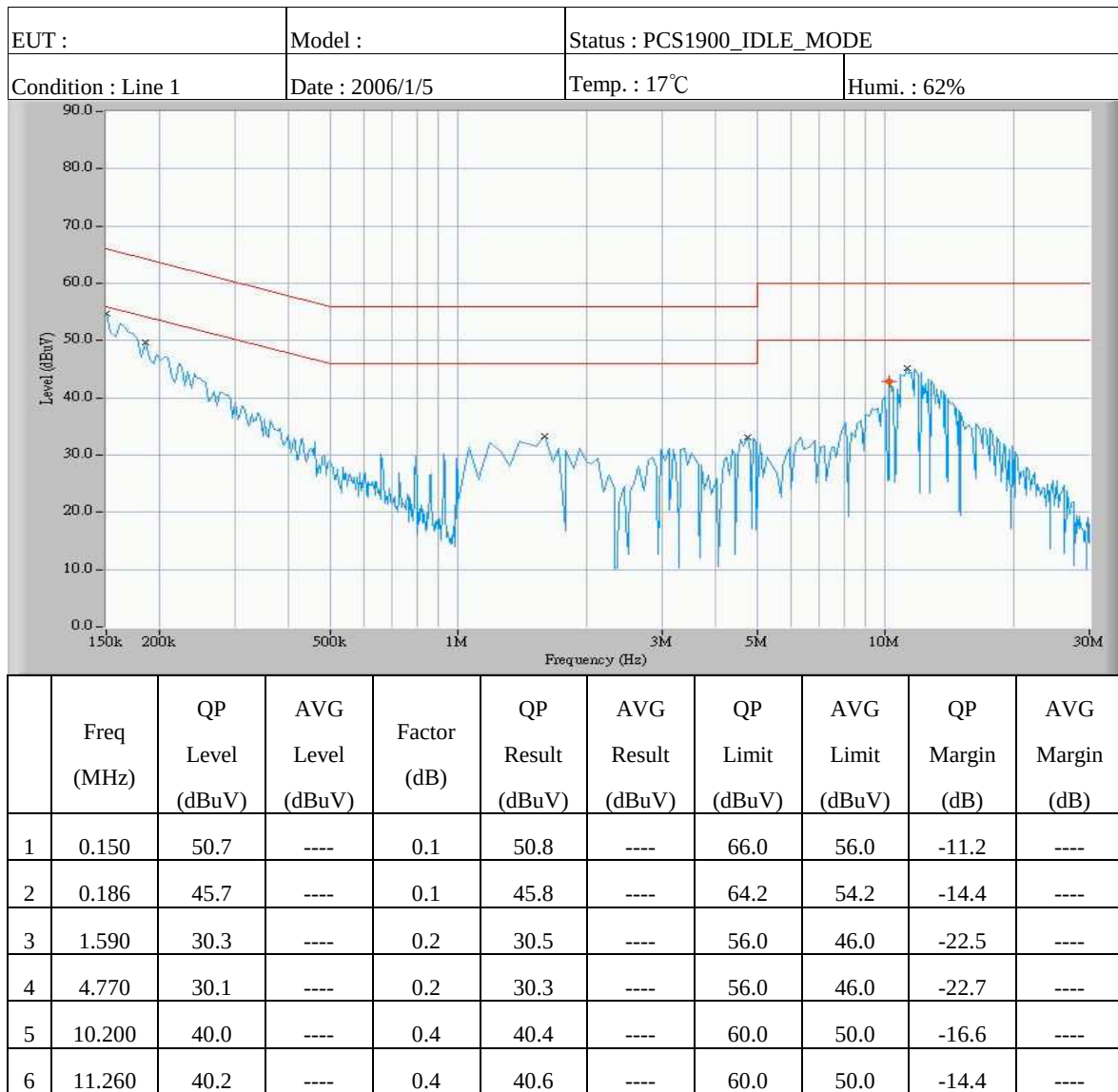
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of “----” means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

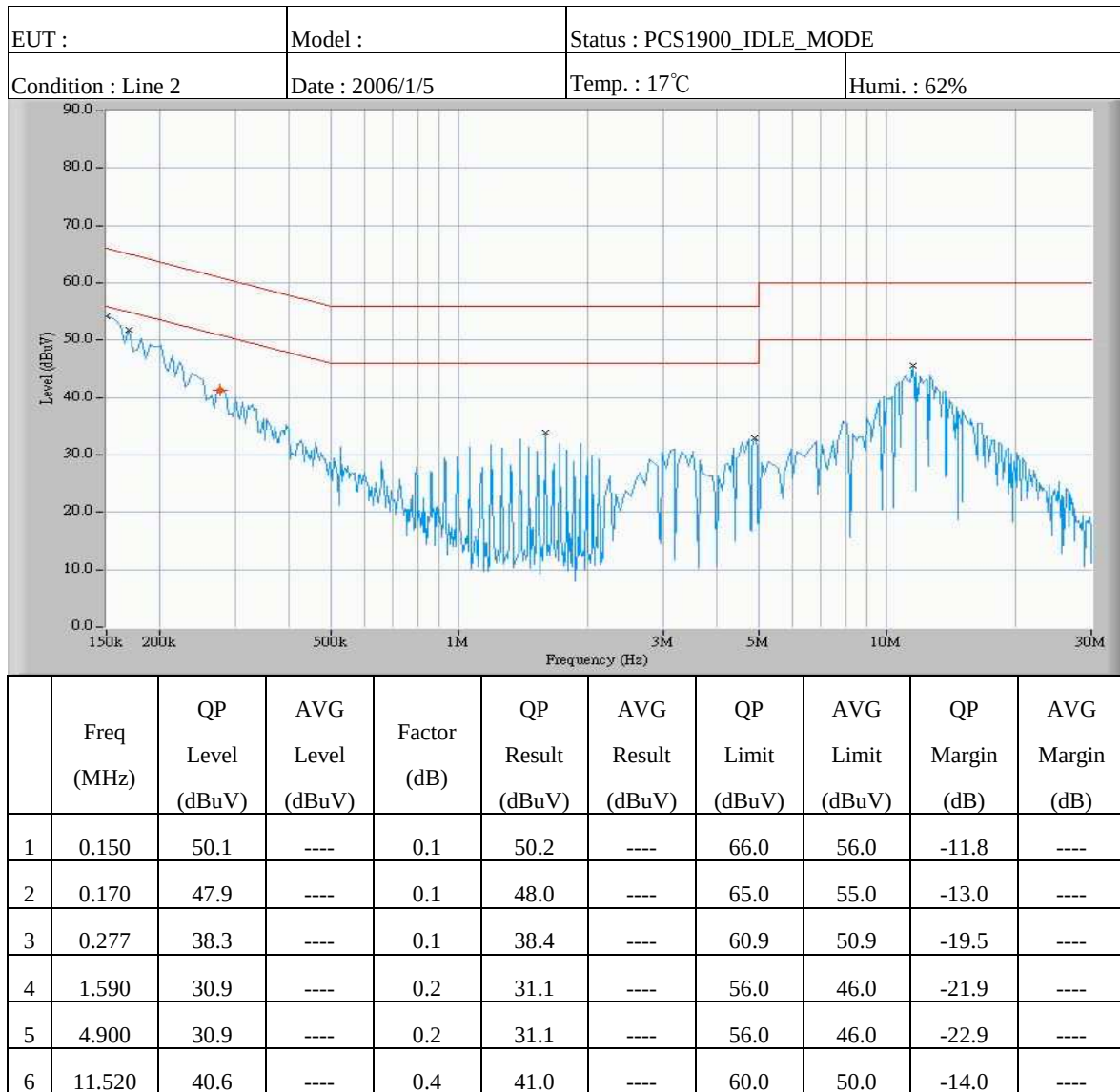
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.7



Note:

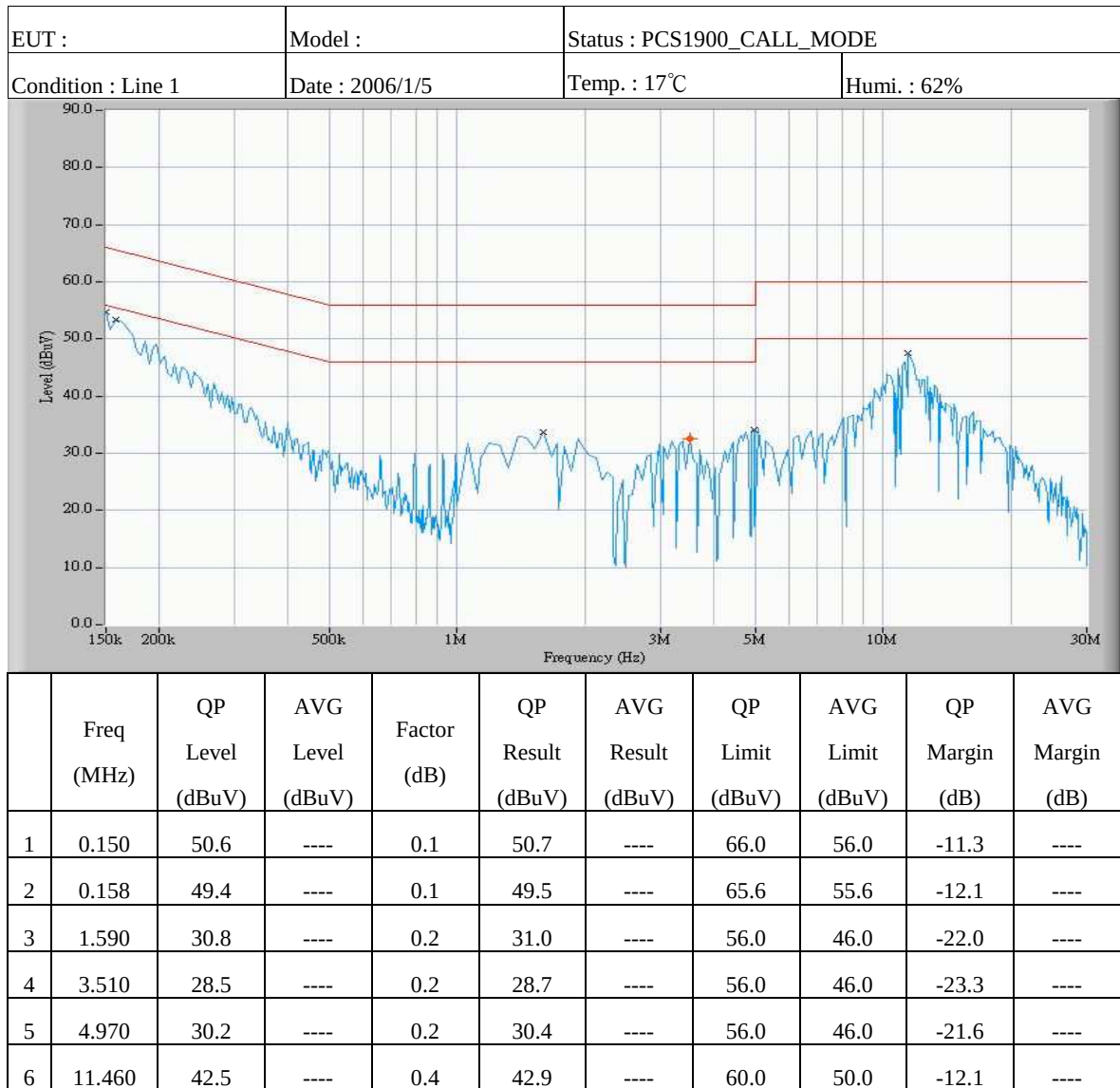
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

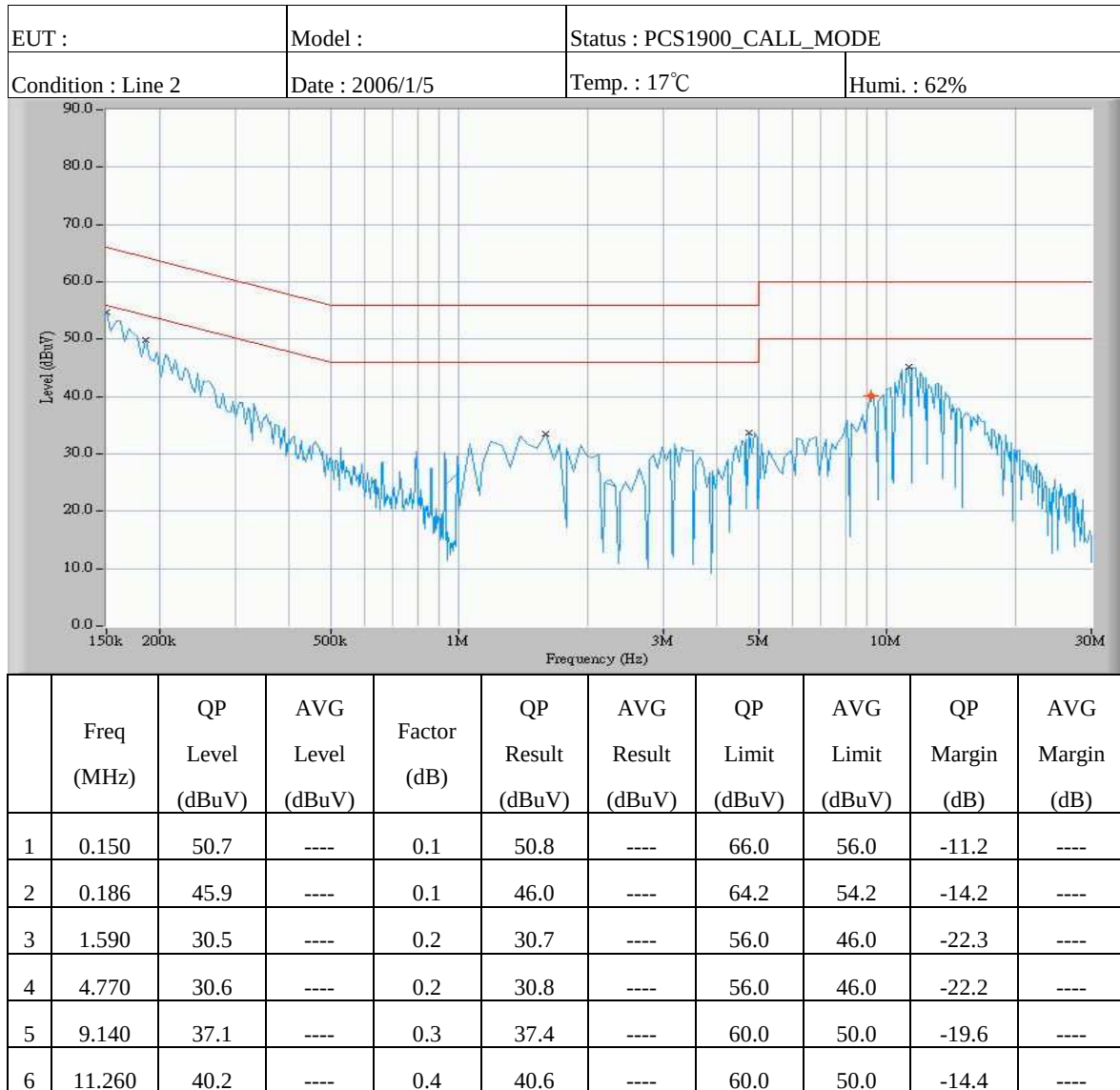
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.8



Note:

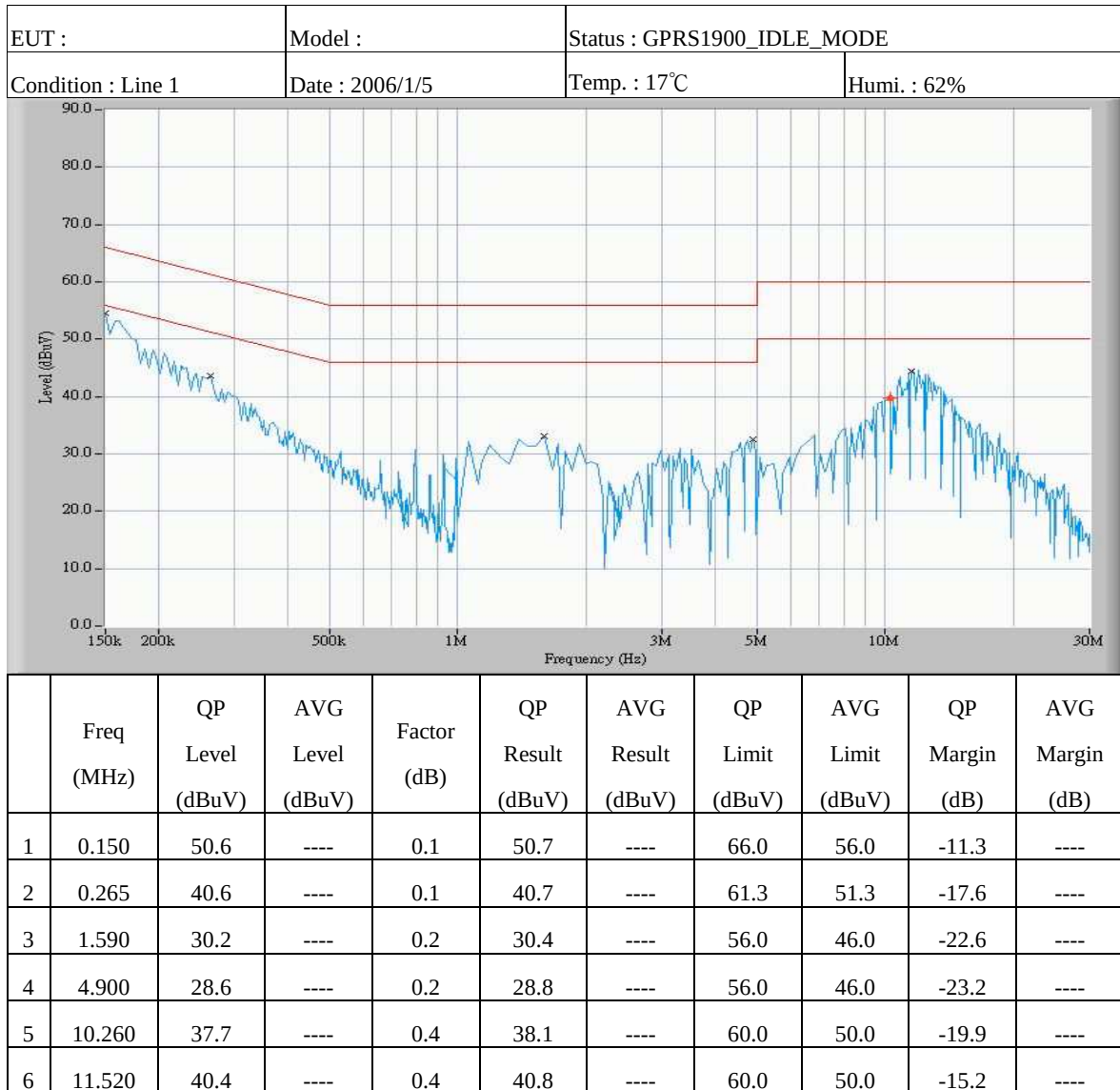
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of “----” means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

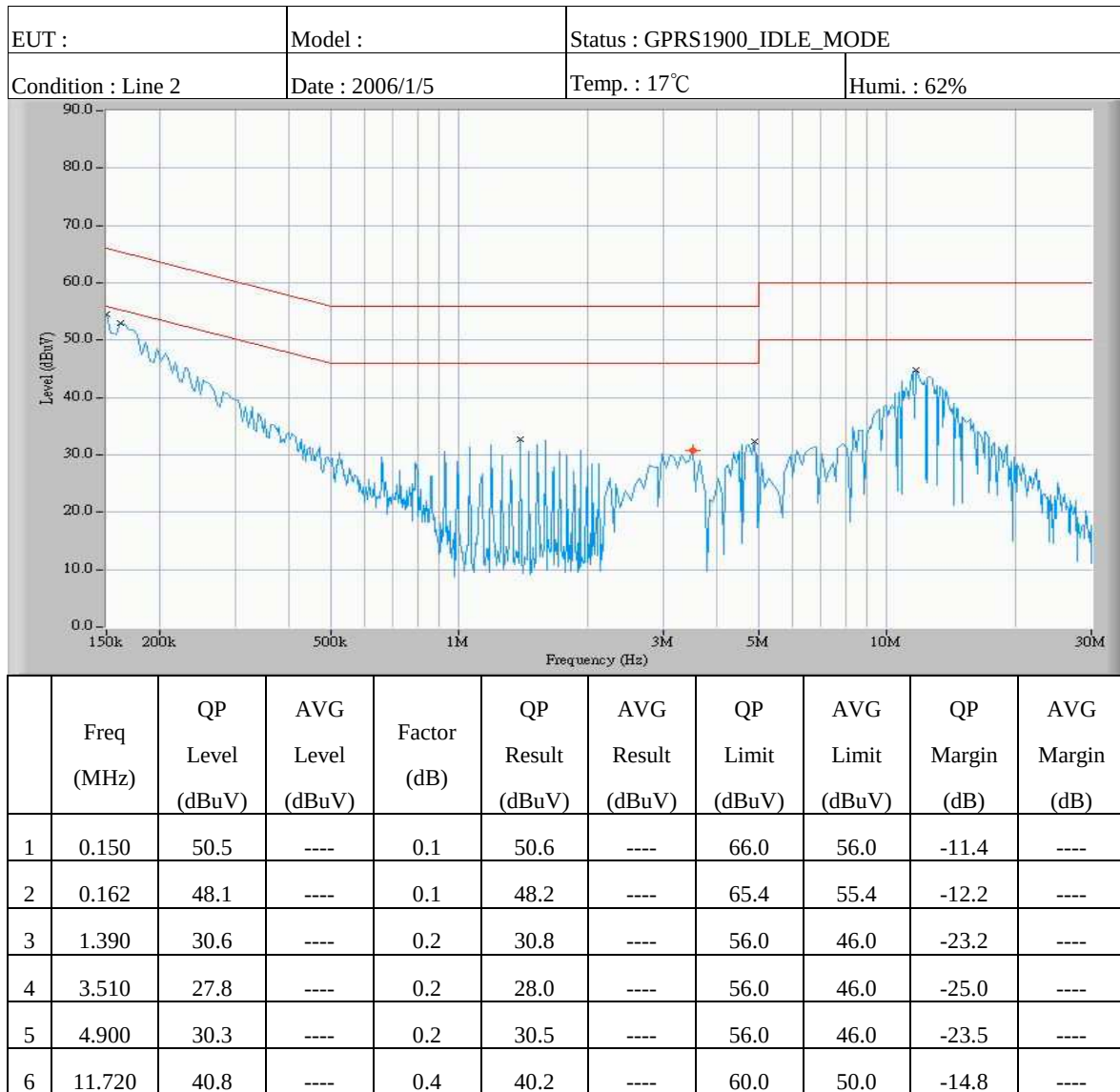
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.9



Note:

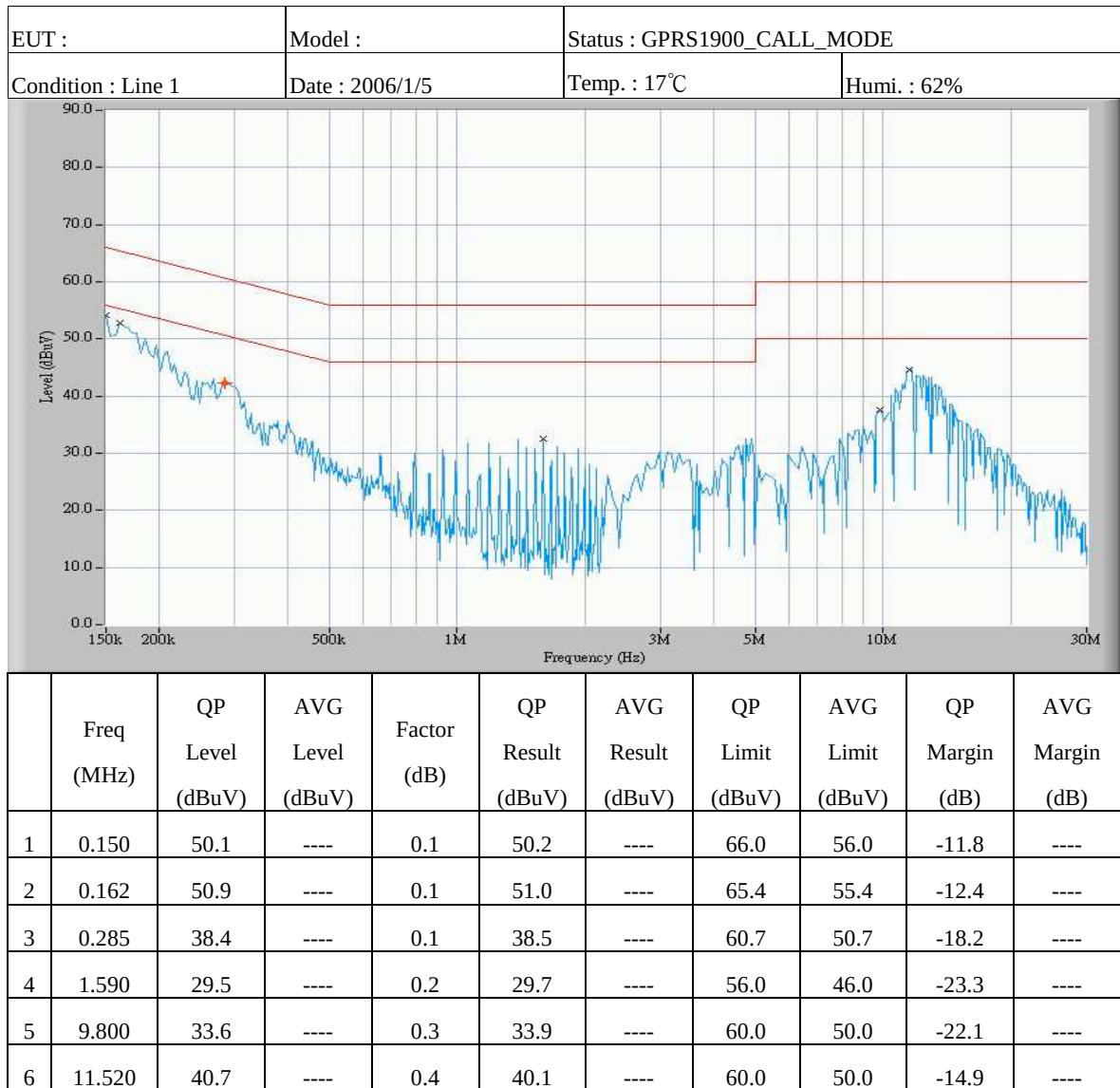
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

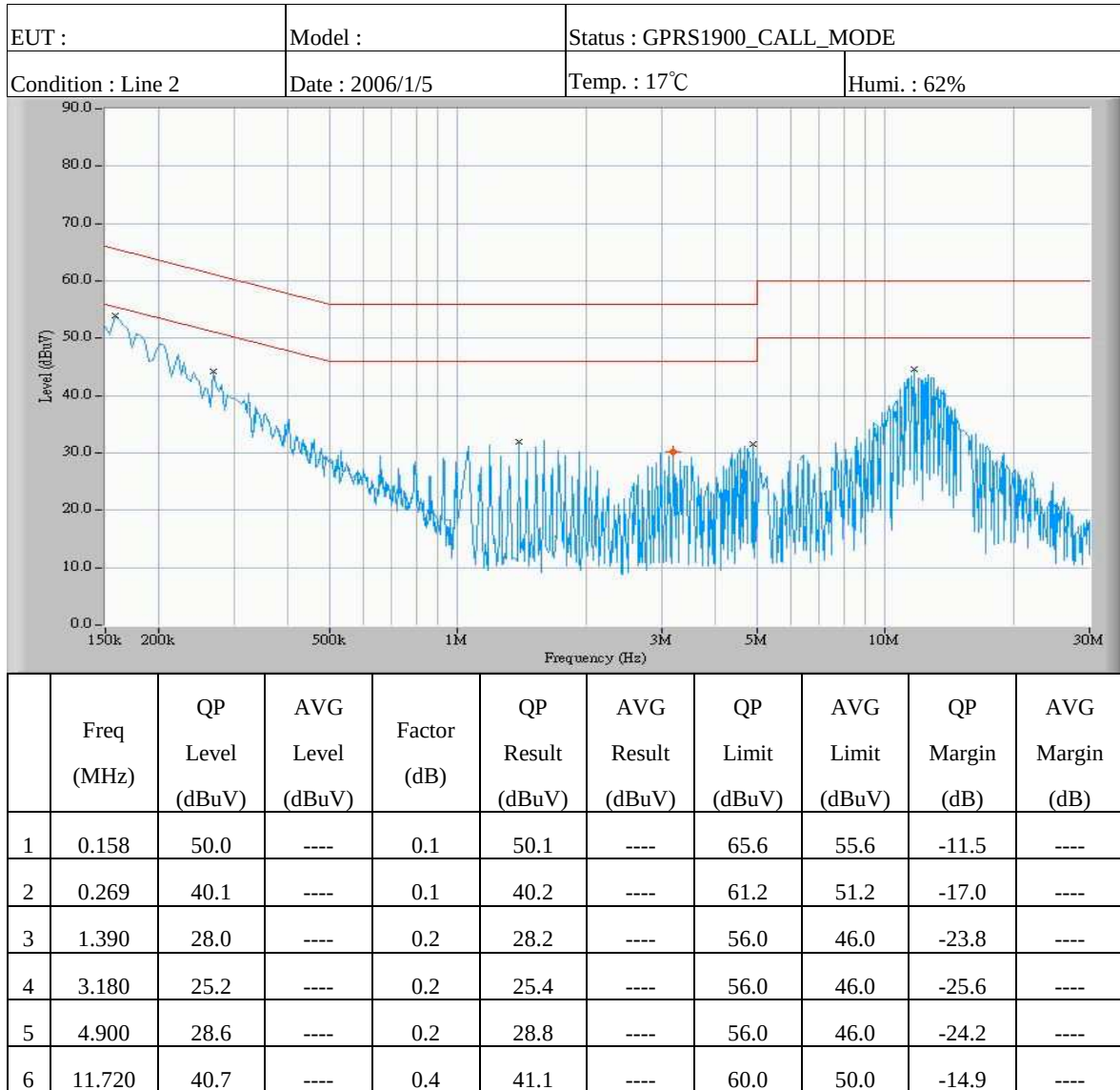
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "***" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.10



Note:

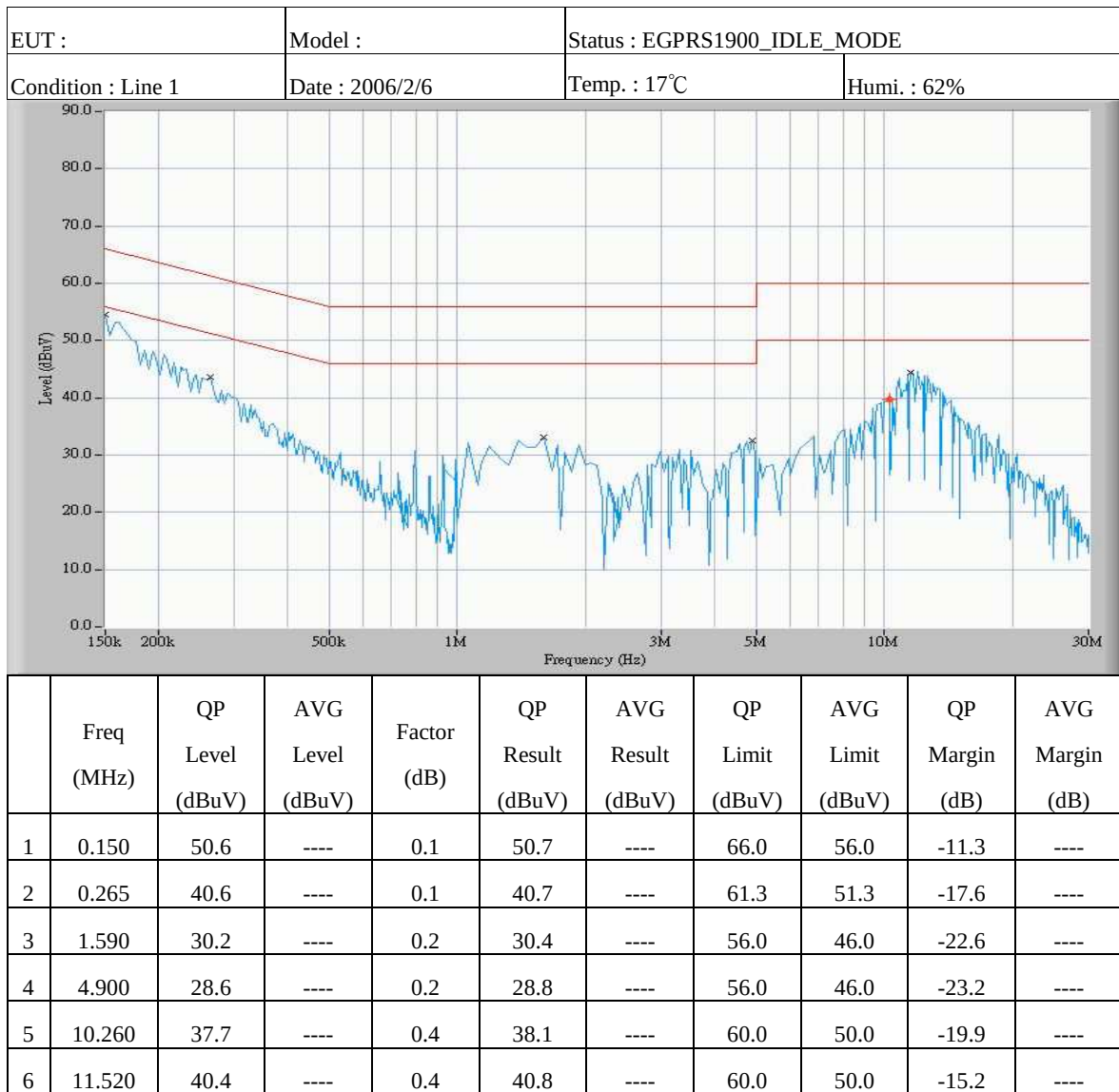
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

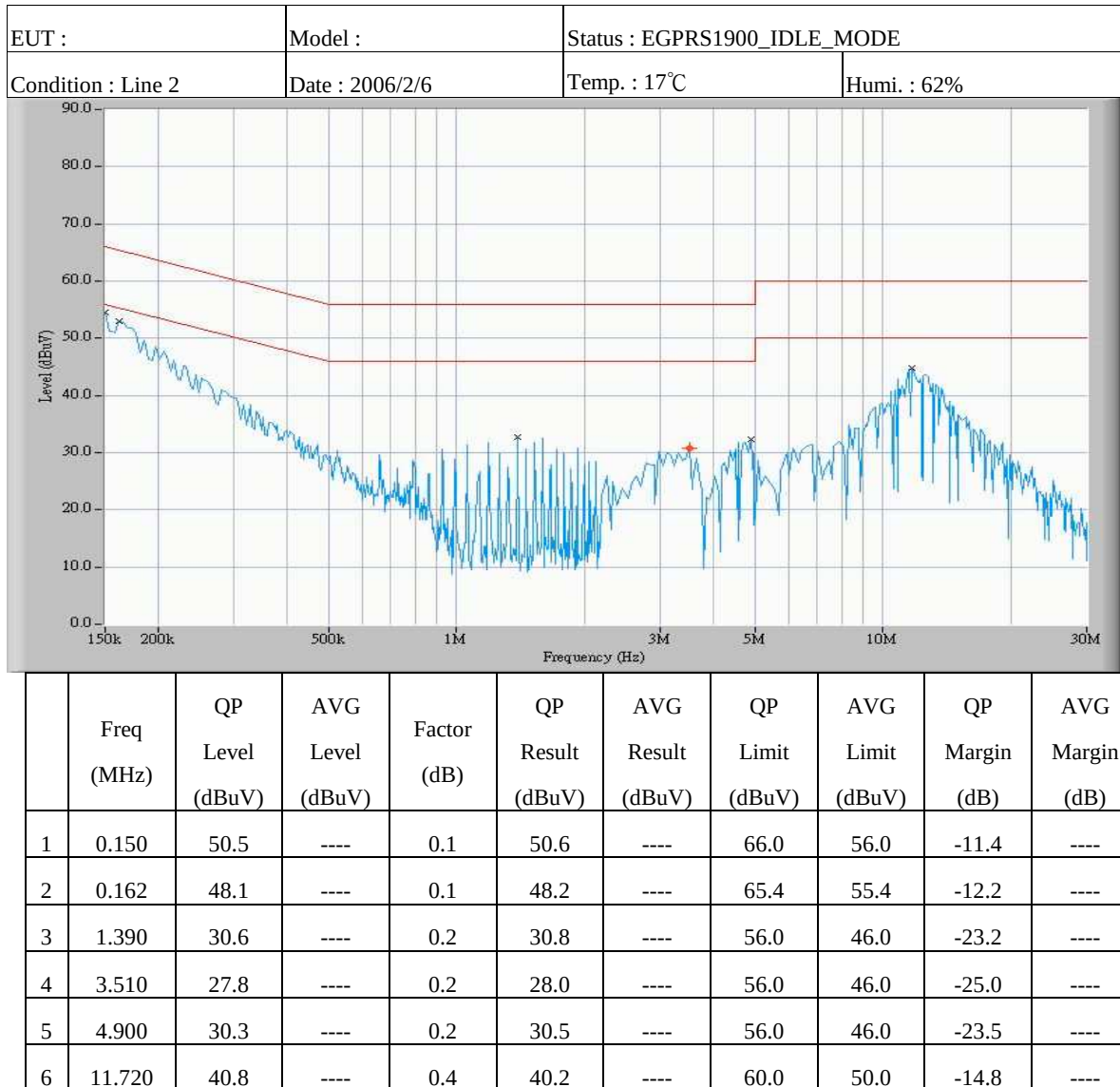
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.11



Note:

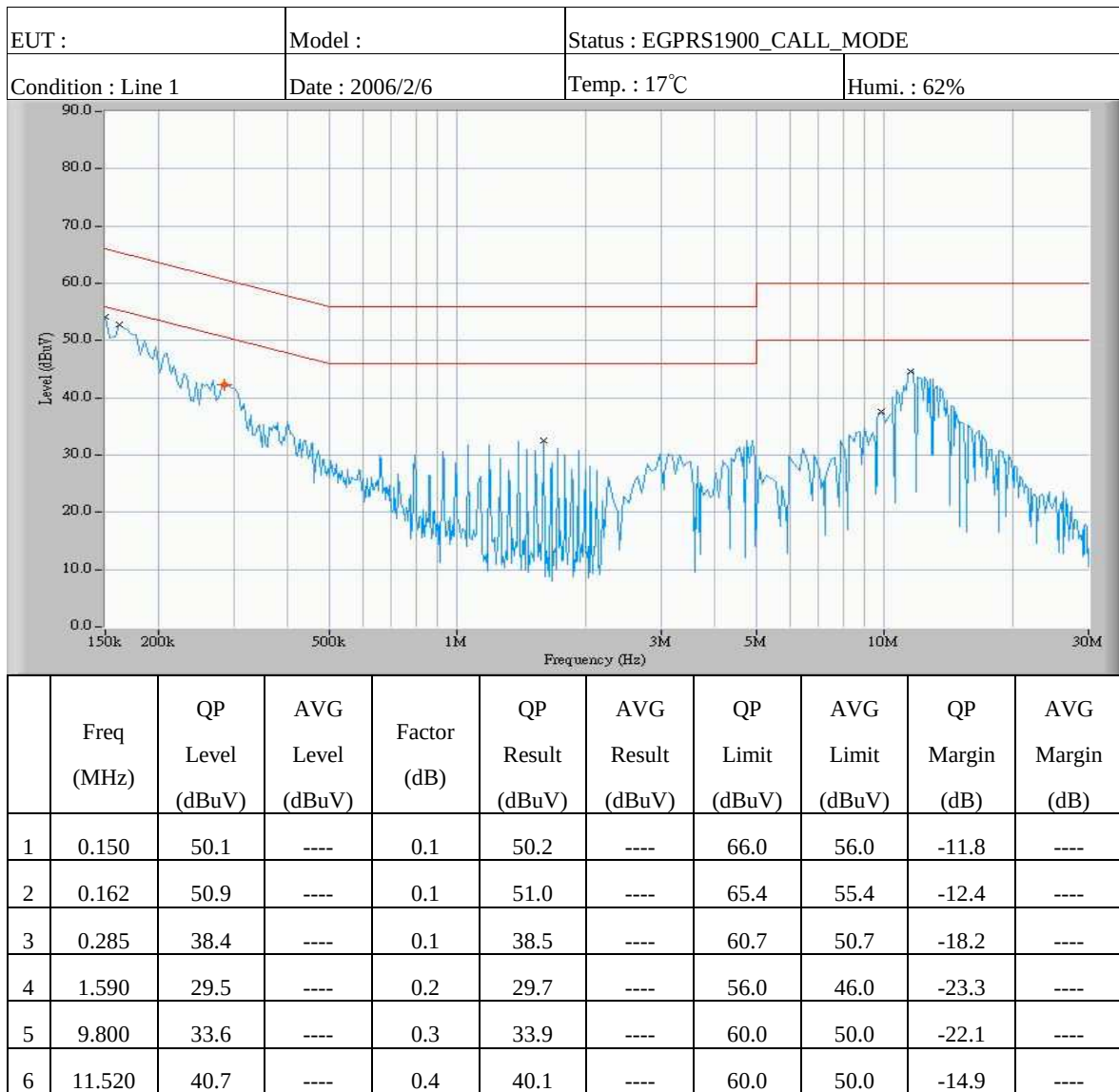
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. “***” means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

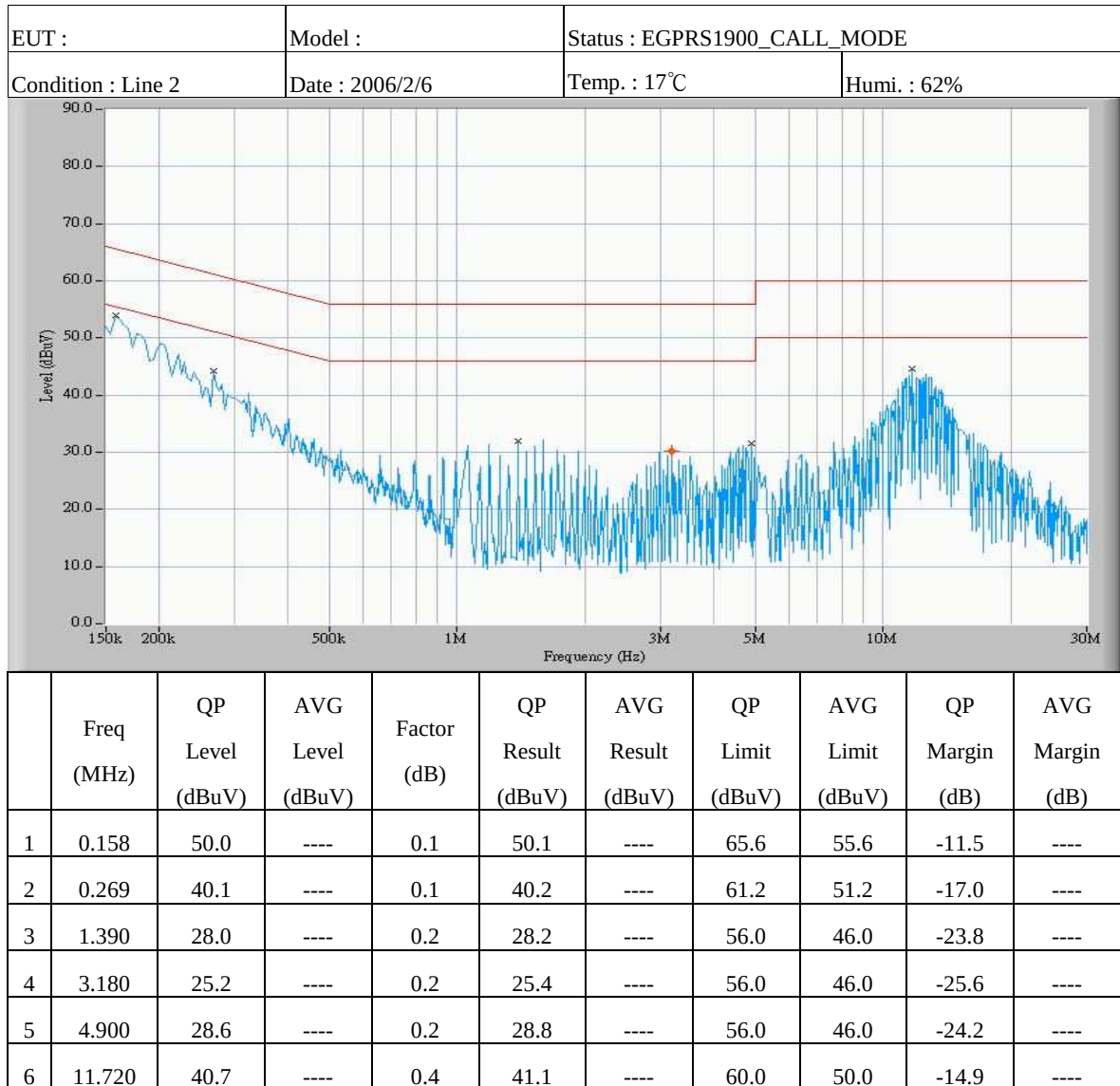
1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.

9.4.12



Note:

1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.



Note:

1. Place of measurement: EMC LAB. of the ETC.
2. The full frequency range scanning test data is shown in next two pages.
3. "****" means the value was too low to be measured.
4. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
5. The estimated measurement uncertainty of the result measurement is $\pm 2.5\text{dB}$.