EN 301 511 V9.0.2 (2003-03)

TEST REPORT

For

Shenzhen Anysecu Technology Co., Ltd.

Building 1, 4th floor, F1 financial services technology innovation base, kefa Road #8, Nanshan District, Shenzhen, China

Tested Model: GT-200
Multiple Model: GT-100, HD6500, HD6900

Report Type: Original Report	**Product Type:** Network Walkie Talkie
Report Number:	RXM171106070-11
Report Date:	2017-11-06
Reviewed By:	Dean Liu RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Anysecu Technology Co., Ltd.'s* product, model number: *GT-200* or (the "EUT") in this report was a *Network Walkie Talkie,* which was measured approximately: 15.7 cm (L) x 6.2 cm (W) x 5.3 cm (H), rated input voltage: DC7.4V from rechargeable Li-ion battery or DC 12V charging from adapter.

Adapter information:
Model: CGA-GT200
Input: 100-240V, 50/60Hz, 0.2A Max
Output: DC12V, 580mA

Note: The series product, model GT-200, GT-100, HD6500 & HD6900 are electrically identical, the difference between them just is the model name, we selected GT-200 for fully testing, the details were explained in the attached declaration letter.

All measurement and test data in this report was gathered from production sample serial number: 171106070 (Assigned by BACL Dongguan). The EUT was received on 2017-09-05.

Objective

This report of a radio equipment and system (RES) is prepared on behalf of *Shenzhen Anysecu Technology Co., Ltd.* in accordance with EN 301 511 V9.0.2 (2003-03), Global System for Mobile communications (GSM); Harmonized EN for mobile stations in the GSM 900 and DCS1800 bands.
The objective of the manufacturer is to determine the compliance of EUT with EN 301 511 V9.0.2 (2003-03), Global System for Mobile communications (GSM); Harmonized EN for mobile stations in the GSM 900 and DCS 1800 bands.
In order to determine compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards. Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

Related Submittal(s)/Grant(s)

No Related Submittal(s).

Test Methodology

All measurements contained in this report were conducted as specified in EN 301 511 V9.0.2 (2003-03).

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty

According to the requirements of ETSI TR 100 028, F_{lab}(the value of the measurement uncertainty) shall be, for each measurement, equal to or lower than the figure in the following table:

SN	Parameter	F_{lab}	Maximum allowable uncertainty
1	RF Frequency	$\pm 0.082\times10^{-6}$	$\pm 1\times10^{-7}$
2	Conducted RF Power	±0.61dB	±0.75dB
3	Radiated RF Power	±3.58dB	±6dB
4	Maximum frequency deviation(within 300Hz and 5kHz audio frequency)	4.57%	±5%
5	Maximum frequency deviation (within 6kHz and 25kHz audio frequency)	±0.53dB	±3dB
6	Spurious emissions, conducted	±2.47dB	±3dB
7	Spurious emissions, radiated	±3.62dB	±6dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The EUT and test equipment were configured for testing according to EN 301 511 V9.0.2 (2003-03).

The normal & extreme conditions as follow:
L.V.: Low Voltage 6.7VDC; L.T.: Low Temperature –10℃; N.V.: Normal Voltage 8.14VDC
N.T .: Normal Temperature +25℃; H.V.: High Voltage 8.2VDC; H.T.: High Temperature +55℃
Nominal Voltage: 7.4VDC
The extreme voltage is declared by applicant.

EUT Exercise Software

N/A

Special Accessories

No special accessory.

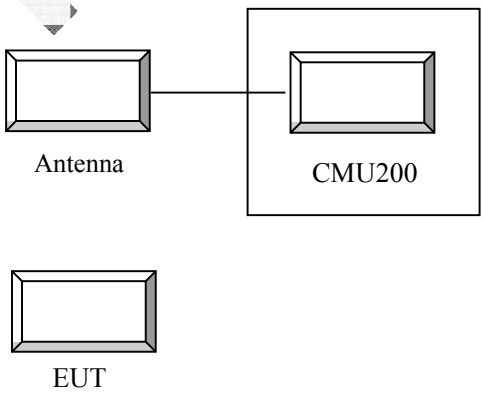
Equipment Modifications

No modification was made to the EUT.

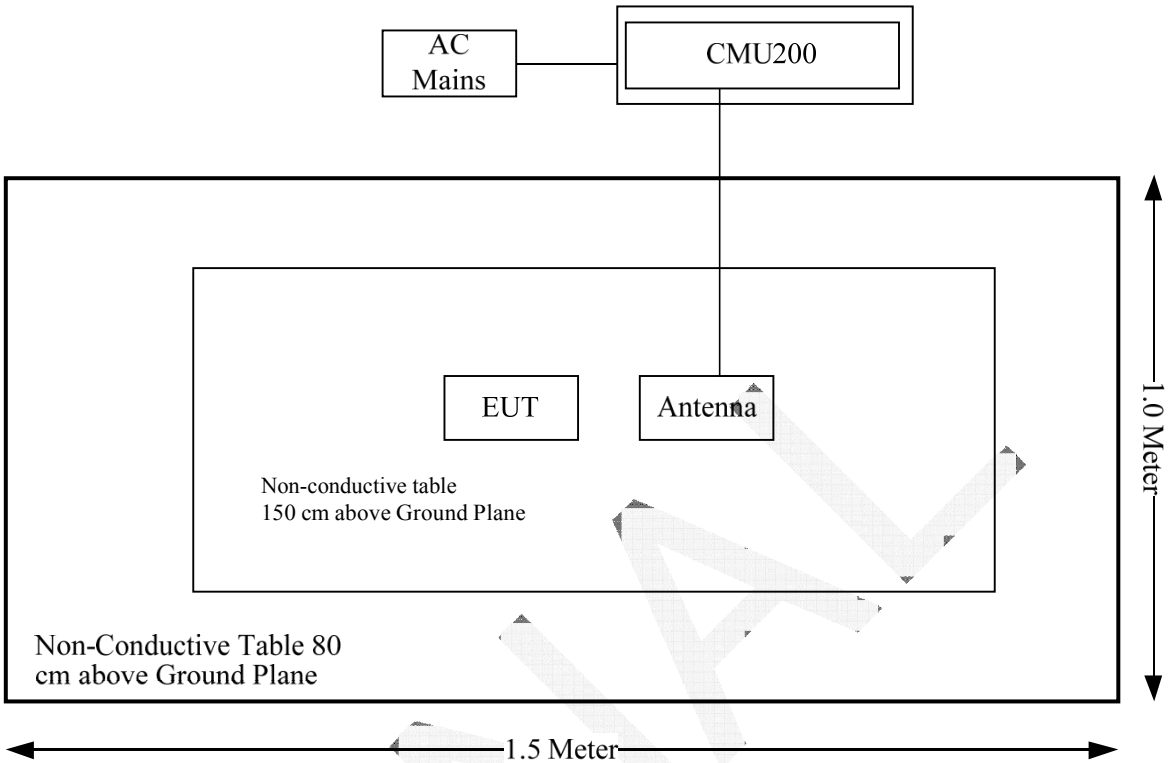
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	109038

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST REPORT

EN 301 511 V9.0.2 (2003-03)	Description of Test	Result
Section 4.2.1	Transmitter – Frequency error and phase error	Not Applicable
Section 4.2.2	Transmitter – Frequency error under multi path and interference conditions	Not Applicable
Section 4.2.3	Transmitter – Frequency error and Phase Error in HSCSD Multi slot Configuration	Not Applicable
Section 4.2.4	Frequency error and phase error in GPRS multi slot configuration	Compliance
Section 4.2.5	Transmitter output power and burst timing	Not Applicable
Section 4.2.6	Transmitter – Output RF spectrum	Not Applicable
Section 4.2.7	Transmitter output power and burst timing in HSCSD multi slot configuration	Not Applicable
Section 4.2.8	Transmitter – Output RF spectrum in HSCSD multi slot configuration	Not Applicable
Section 4.2.9	Transmitter – Output RF spectrum for MS supporting the R-GSM frequency band	Not Applicable
Section 4.2.10	Transmitter output power in GPRS multi slot configuration	Compliance
Section 4.2.11	Output RF spectrum in GPRS multi slot configuration	Compliance
Section 4.2.12	Conducted spurious emissions – MS allocated a channel	Compliance
Section 4.2.13	Conducted spurious emission – MS in idle mode	Compliance
Section 4.2.14	Conducted spurious emissions for MS supporting the R-GSM frequency band – MS allocated a channel	Not Applicable
Section 4.2.15	Conducted spurious emissions for MS supporting the R-GSM frequency band – MS in idle mode	Not Applicable
Section 4.2.16	Radiated spurious emissions – MS allocated a channel	Compliance
Section 4.2.17	Radiated spurious emissions – MS in idle mode	Compliance
Section 4.2.18	Radiated spurious emissions for MS supporting the R-GSM frequency band – MS allocated a channel	Not Applicable
Section 4.2.19	Radiated spurious emissions for MS supporting the R-GSM frequency band – MS in idle mode	Not Applicable
Section 4.2.20	Receiver blocking and spurious responses – speech channels	Compliance
Section 4.2.21	Receiver blocking and spurious response – speech channels for MS supporting the R-GSM frequency band	Not Applicable
Section 4.2.22	Frequency error and modulation accuracy in EGPRS configuration	Compliance
Section 4.2.23	Frequency error under multi path and interference conditions in EGPRS configuration	Compliance
Section 4.2.24	EGPRS Transmitter output power	Compliance
Section 4.2.25	Output RF spectrum in EGPRS configuration	Compliance
Section 4.2.26	Blocking and spurious response in EGPRS configuration	Compliance

Test Time:2017-09-10~2017-11-06.

§4.2.4 FREQUENCY ERROR AND PHASE ERROR IN GPRS MULTISLOT CONFIGURATION

Applicable Standard

According to EN 301 511 V9.0.2 (2003-03), section 4.2.4, The MS carrier frequency shall be accurate to within 0, 1 ppm compared to signals received from the BS. The RMS phase error (difference between the phase error trajectory and its linear regression on the active part of the time slot) for each burst shall not be greater than 5 degrees. The maximum peak deviation during the useful part of each burst shall not be greater than 20 degrees.

Test Procedure

a) For one transmitted burst on the last slot of the multislot configuration, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples.

b) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory.

c) From a) and b) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point.

d) Steps a) to c) are repeated for 20 bursts, not necessarily contiguous.

e) The SS instructs the MS to its maximum power control level by setting the power control parameter ALPHA (α) to 0 and GAMMA_TN (ΓCH) for each timeslot to the desired power level in the Packet Uplink Assignment message (Closed Loop Control, see 3GPP TS 05.08, clause B.2), all other conditions remaining constant. Steps a) to d) are repeated.

f) The SS instructs the MS to the minimum power control level, all other conditions remaining constant. Steps a) to d) are repeated.

g) The MS is hard mounted on a vibration table and vibrated at the frequency/amplitudes specified in annex 1, TC4. During the vibration steps a) to f) are repeated.
NOTE: If the call is terminated when mounting the MS to the vibration table, it will be necessary to establish the initial conditions again before repeating steps a) to f).

h) The MS is re-positioned on the vibration table in the two orthogonal planes to the plane used in step g). For each of the orthogonal planes step g) is repeated.

i) Steps a) to f) are repeated under extreme test conditions (see annex 1, TC2.2).

c.1) The sampled array of at least 294 phase measurements is represented by the vector:

$\varnothing_m = \varnothing_m(0)...\varnothing_m(n)$

where the number of samples in the array n+1 ≥ 294.

c.2) The calculated array, at the corresponding sampling instants, is represented by the vector:

$\varnothing_c = \varnothing_c(0)...\varnothing_c(n)$.

c.3) The error array is represented by the vector:

$\varnothing_e = \{\varnothing_m(0) - \varnothing_c(0)\}.....\{\varnothing_m(n) - \varnothing_c(n)\} = \varnothing_e(0)...\varnothing_e(n)$.

c.4) The corresponding sample numbers form a vector t = t(0)...t(n).

c.5) By regression theory the slope of the samples with respect to t is k where:

$$k = \frac{\sum_{j=0}^{j=n} t(j) * \varnothing_e(j)}{\sum_{j=0}^{j=n} t(j)^2}$$

c.6) The frequency error is given by k/(360 * g), where g is the sampling interval in s and all phase samples are measured in degrees.

c.7) The individual phase errors from the regression line are given by:

$\varnothing_e(j) - k*t(j)$.

c.8) The RMS value $\varnothing_e$ of the phase errors is given by:

$$\varnothing_e(RMS) = \left[\frac{\sum_{j=0}^{j=n} \{\varnothing_e(j) - k * t(j)\}^2}{n+1}\right]^{1/2}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Gaoxin	Simulated Transport Vibration Test Stand	GX-MZ-100	120 42315	2017-03-12	2017-03-12
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	52 %
ATM Pressure:	99.8 kPa

The testing was performed by Robin Zhengon 2017-09-10.

Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

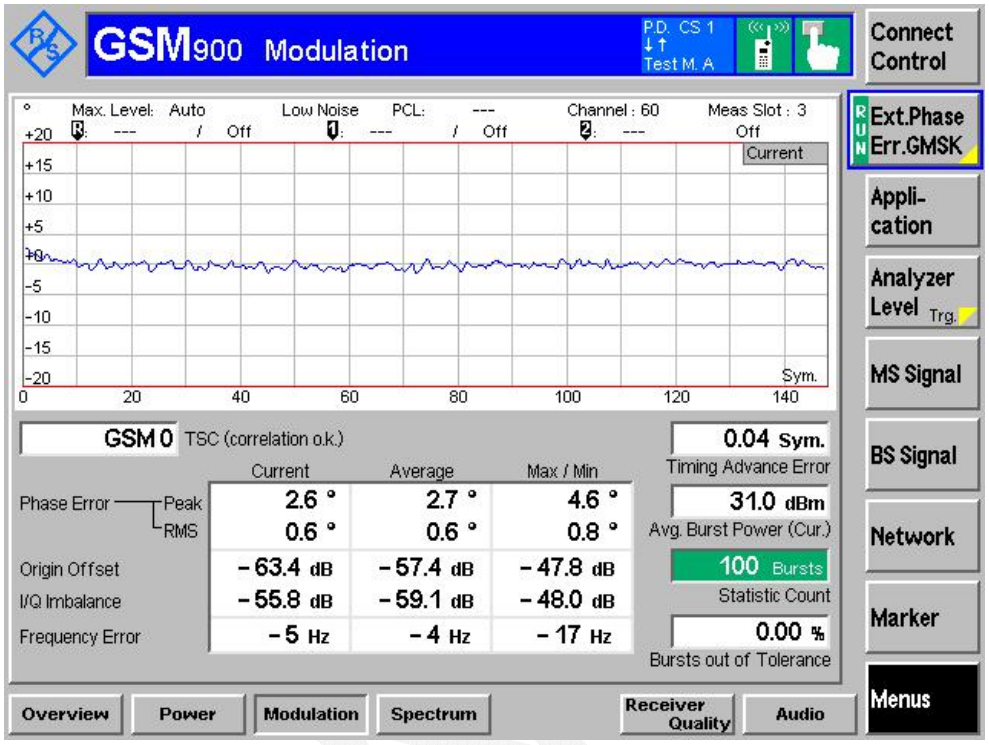
E-GSM 900 (Middle Channel)

MS under maximum power control level							
E-GSM 900	**Test Condition**	**Frequency Error**	**Limit**	**Phase Error**		**Limit**	**Result**
		Hz		**degree**			
Reference Frequency (902 MHz)	Normal	-4	90.2	RMS	0.6	5	Compliance
				Peak	2.7	20	

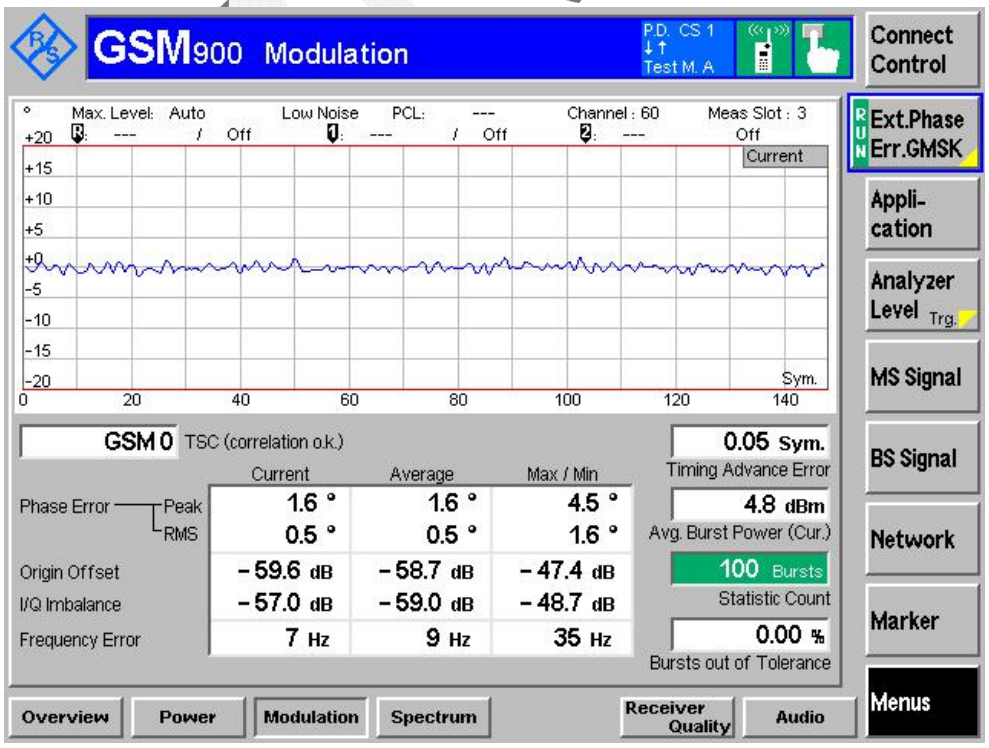
MS under minimum power control level							
E-GSM 900	**Test Condition**	**Frequency Error**	**Limit**	**Phase Error**		**Limit**	**Result**
		Hz		**degree**			
Reference Frequency (902 MHz)	Normal	9	90.2	RMS	0.5	5	Compliance
				Peak	1.6	20	

Normal Condition:

Maximum Power Control Level 3(Middle Channel)



Minimum Power Control Level 17 (Middle Channel)



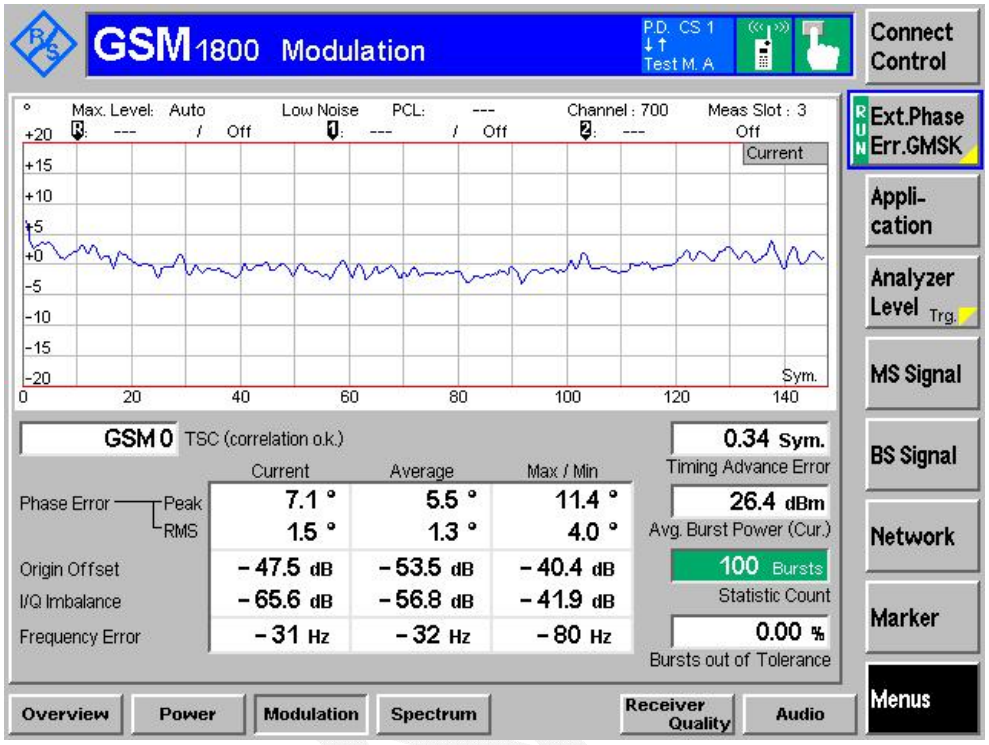
DCS1800 (Middle Channel)

MS under maximum power control level							
DCS 1800	**Test Condition**	**Frequency Error**	**Limit**	**Phase Error**		**Limit**	**Result**
		Hz		**degree**			
Reference Frequency (1747.8 MHz)	Normal	-32	174.78	RMS	1.3	5	Compliance
				Peak	5.5	20	

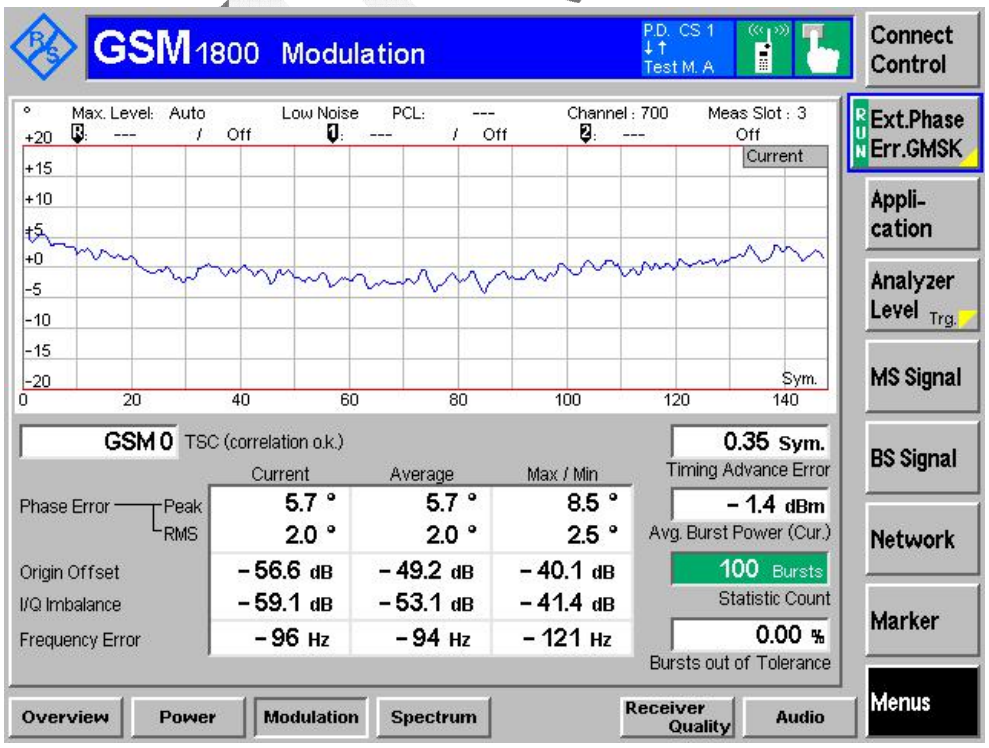
MS under minimum power control level							
DCS 1800	**Test Condition**	**Frequency Error**	**Limit**	**Phase Error**		**Limit**	**Result**
		Hz		**degree**			
Reference Frequency (1747.8 MHz)	Normal	-94	174.78	RMS	2	5	Compliance
				Peak	5.7	20	

Normal Condition:

Maximum Power Control Level 3(Middle Channel)



Minimum Power Control Level 18 (Middle Channel)



§4.2.10 TRANSMITTER OUTPUT POWER IN GPRS MULTISLOT CONFIGURATION

Applicable Standard

According to EN 301 511 V9.0.2 (2003-03), section 4.2.10,

1. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, first table, according to its power class, with a tolerance of ±2 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, first table.

2. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, first table, according to its power class, with a tolerance of ±2,5 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, first table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

3. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 1), with a tolerance of ±3 dB, ±4 dB or ±5 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table.

4. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, Subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 2), with a tolerance of ±4 dB, ±5 dB or ±6 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

5. The output power actually transmitted by the MS at consecutive power control levels shall form a monotonic sequence and the interval between power control levels shall be 2 ± 1,5 dB (1 ± 1dB between power control level 30 and 31 for PCS 1 900); 3GPP TS 05.05, subclause 4.1.1.

6. The transmitted power level relative to time for a normal burst shall be within the power/time template given in 3GPP TS 05.05, annex B figure B1. In multislot configurations where the bursts in two or more consecutive time slots are actually transmitted at the same frequency the template of annex B shall respected during the useful part of each burst and at the beginning and the end of the series of consecutive bursts. The output power during the guard period between every two consecutive active timeslots shall not exceed the level allowed for the useful part of the first timeslot or the level allowed for the useful part of the second timeslot plus 3 dB, whichever is the highest:

6.1 Under normal conditions; 3GPP TS 05.05, subclause 4.5.2.
Under extreme conditions; 3GPP TS 05.05, subclause 4.5.2, 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

7. When accessing a cell on the PRACH or RACH and before receiving the first power control parameters during packet transfer on PDCH, all GSM and class 1 and class 2 DCS 1 800 and PCS 1 900 MS shall use the power control level defined by the GPRS_MS_TXPWR_MAX_CCH parameter broadcast on the PBCCH or MS_TXPWR_MAX_CCH parameter broadcast on the BCCH of the cell. When MS_TXPWR_MAX_CCH is received on the BCCH, a class 3 DCS 1800

   MS shall add to it the value POWER_OFFSET broadcast on the BCCH. If MS_XPWR_MAX_CCH or the sum defined by: MS_TXPWR_MAX_CCH plus POWER_OFFSET corresponds to a power control level not supported by the MS as defined by its power class, the MS shall act as though the closest supported power control level had been broadcast.

8. The transmitted power level relative to time for a Random Access burst shall be within the power/time template given in 3GPP TS 05.05, annex B figure B.3:

   8.1 Under normal conditions; 3GPP TS 05.05, subclause 4.5.2.
   8.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.5.2, 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

Test Procedure

a) Measurement of normal burst transmitter output power.

   The SS takes power measurement samples evenly distributed over the duration of one burst with a Sampling rate of at least 2/T, where T is the bit duration. The samples are identified in time with respect to the modulation on the burst. The SS identifies the centre of the useful 147 transmitted bits, i.e. the transition from bit 13 to bit 14 of the midamble, as the timing reference.

   The transmitter output power is calculated as the average of the samples over the 147 useful bits. This is also used as the 0 dB reference for the power/time template.

b) Measurement of normal burst power/time relationship

   The array of power samples measured in a) are referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in a).

c) Steps a) to b) are repeated on each timeslot within the multislot configuration with the MS commanded to operate on each of the power control levels defined, even those not supported by the MS.

d) The SS commands the MS to the maximum power control level supported by the MS and steps a) to b) are repeated on each timeslot within the multislot configuration for ARFCN in the Low and High ranges.

e) The SS commands the MS to the maximum power control level in the first timeslot allocated within the multislot configuration and to the minimum power control level in the second timeslot allocated. Any further timeslots allocated are to be set to the maximum power control level. Steps a) to b) and corresponding measurements on each timeslot within the multislot configuration are repeated.

f) Measurement of access burst transmitter output power

The SS causes the MS to generate an Access Burst on an ARFCN in the Mid ARFCN range, this could be either by a cell re-selection or a new request for radio resource. In the case of a cell re-selection procedure the Power Level indicated in the PSI3 message is the maximum power control level supported by the MS. In the case of an Access Burst the MS shall use the Power Level indicated in the GPRS_MS_TXPWR_MAX_CCH parameter. If the power class of the MS is DCS 1 800 Class 3 and the Power Level is indicated by the MS_TXPWR_MAX_CCH parameter, the MS shall also use the POWER_OFFSET parameter.

The SS takes power measurement samples evenly distributed over the duration of the access burst as described in a). However, in this case the SS identifies the centre of the useful bits of the burst by identifying the transition from the last bit of the synch sequence. The centre of the burst is then five data bits prior to this point and is used as the timing reference.

The transmitter output power is calculated as the average of the samples over the 87 useful bits of the burst. This is also used as the 0 dB reference for the power/time template.

g) Measurement of access burst power/time relationship

The array of power samples measured in f) are referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in f).

h) Depending on the method used in step f) to cause the MS to send an Access Burst, the SS sends either a PACKET CELL CHANGE ORDER along with power control level set to 10 in PSI3 parameter GPRS_MS_TXPWR_MAX_CCH or it changes the (Packet) System Information elements (GPRS_)MS_TXPWR_MAX_CCH and for DCS 1 800 the POWER_OFFSET on the serving cell PBCCH/BCCH in order to limit the MS transmit power on the Access Burst to power control level 10 (+23 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps f) to g) are repeated.

i) Steps a) to h) are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step d) are only performed for power control level 10 and the minimum power control level of the MS.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	52 %
ATM Pressure:	99.8 kPa

The testing was performed by Robin Zhengon 2017-09-10.

Please refer to following tables.

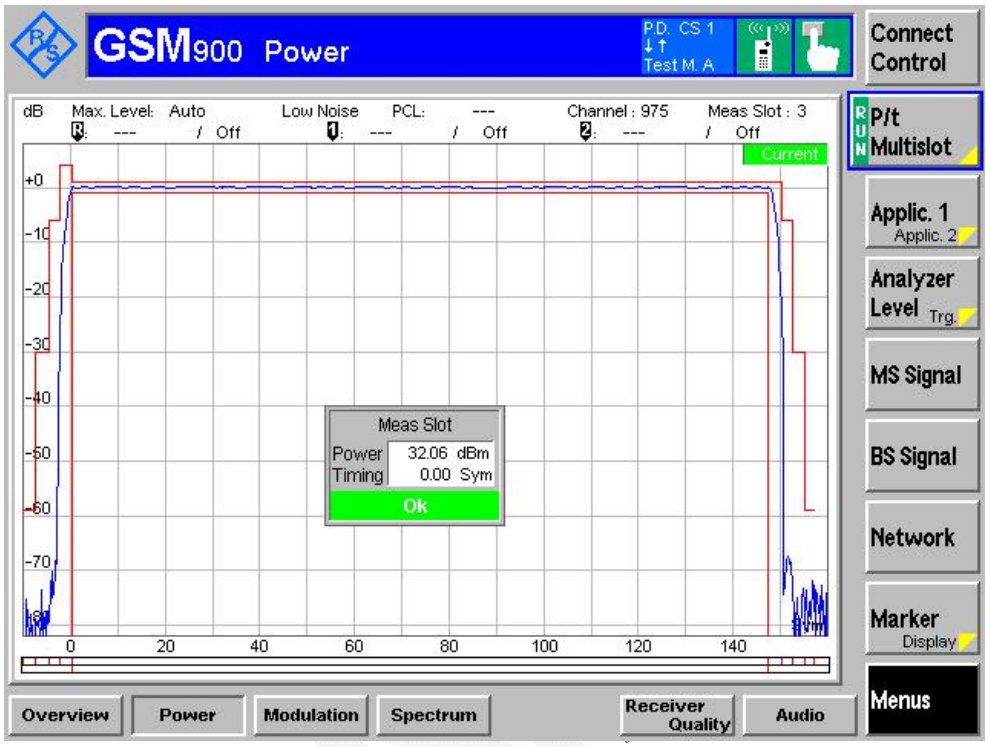
Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	880.2	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	914.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1710.4	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1784.6	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

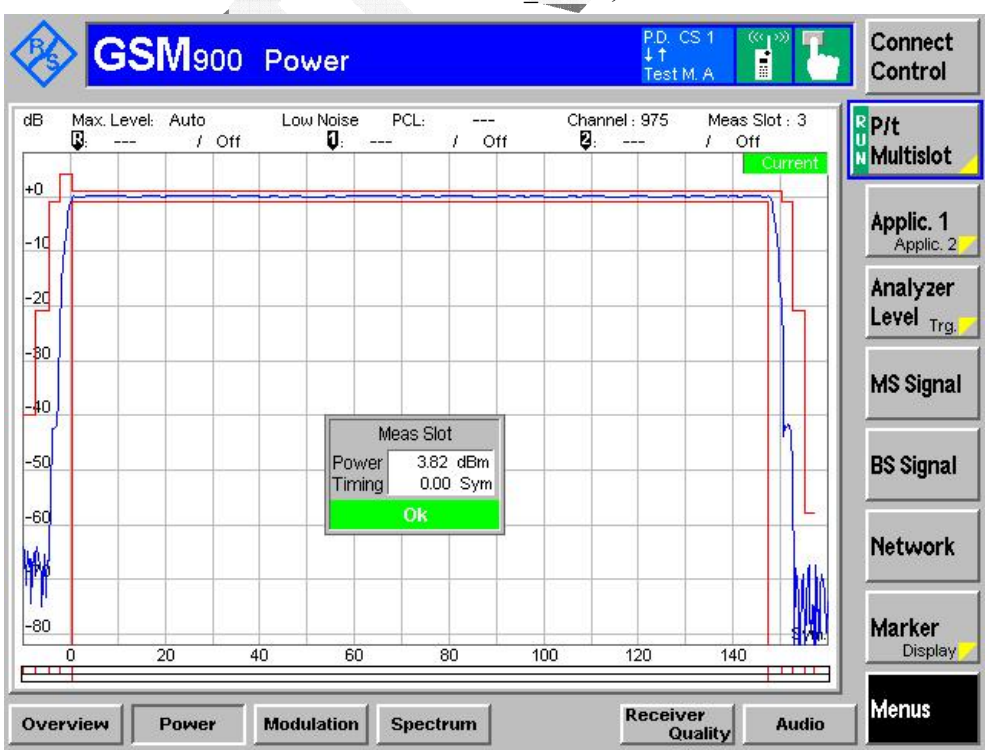
E-GSM900 output power in GPRS Mode				
Power Control Level	Output Power(dBm)			Result
	880.2 MHz	902.0 MHz	914.8 MHz	
1 uplinkslot				Compliance
3	32.06	32.50	32.63	
4	30.71	30.45	29.52	
5	29.12	27.14	28.01	
6	26.97	26.01	26.93	
7	25.01	25.26	25.12	
8	22.93	23.34	23.36	
9	21.57	21.38	21.21	
10	18.96	20.05	20.06	
11	16.64	17.53	17.47	
12	13.84	15.24	15.13	
13	12.1	13.76	13.74	
14	10.13	11.11	11.12	
15	8.21	8.12	8.46	
16	6.21	5.42	6.54	
17	3.82	3.86	4.01	
2 uplinkslot				
3	31.61	31.99	32.37	
17	3.78	3.74	3.79	

E-GSM900:
1 uplink slot:

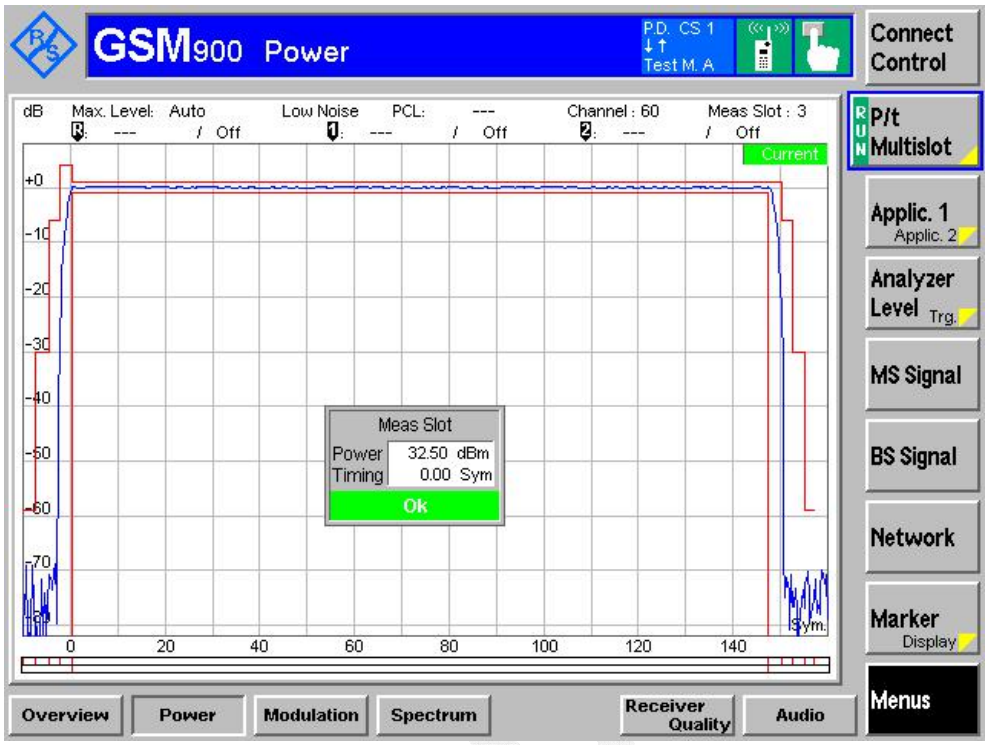
Normal Condition GAMMA_TN3, Low Channel



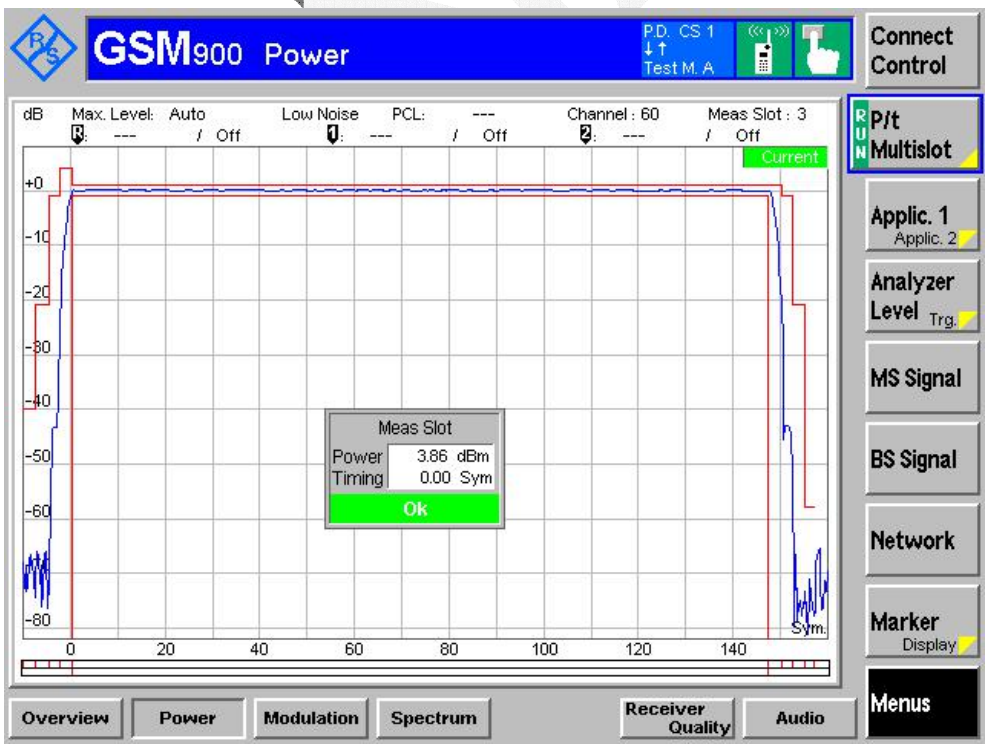
Normal Condition GAMMA_TN 17, Low Channel



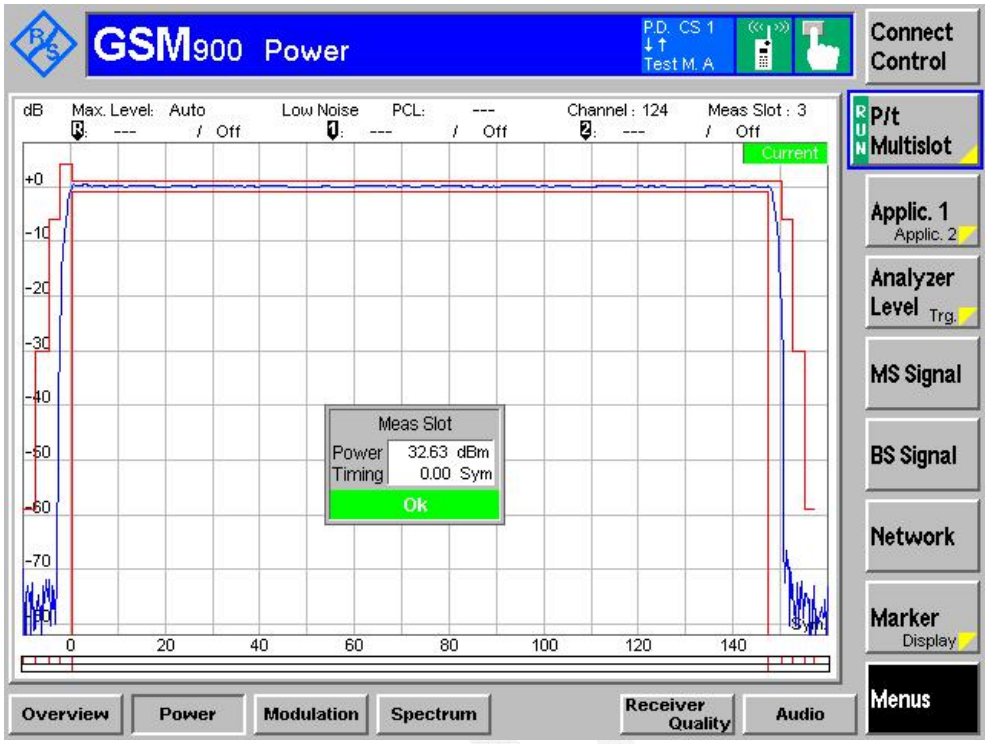
Normal Condition GAMMA_TN3, Middle Channel



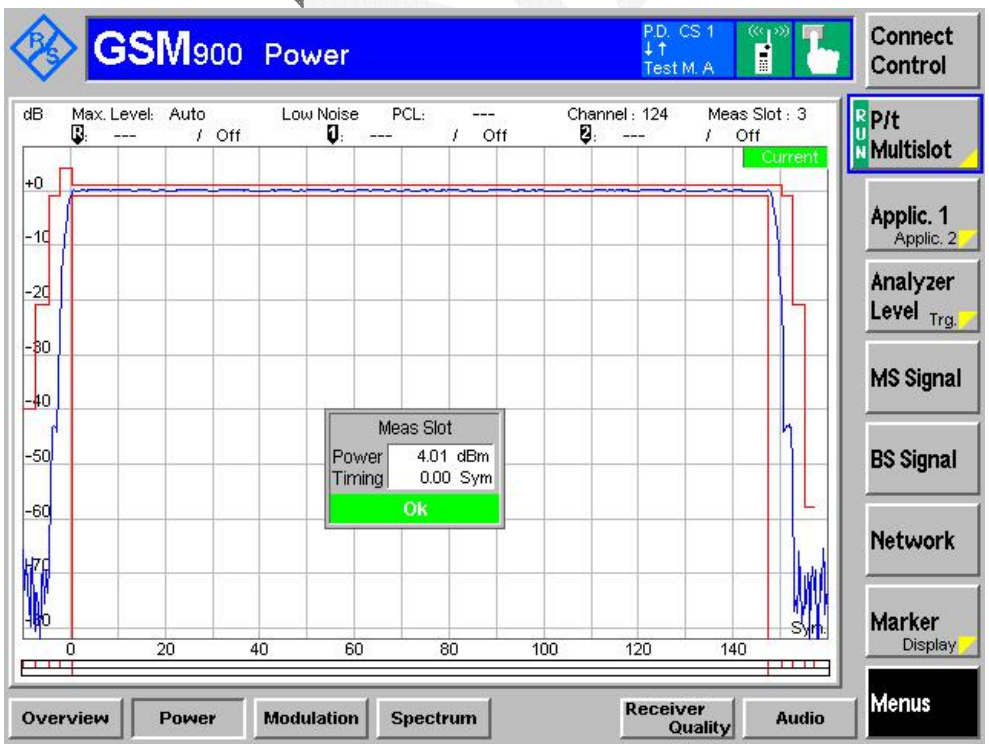
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN3, High Channel

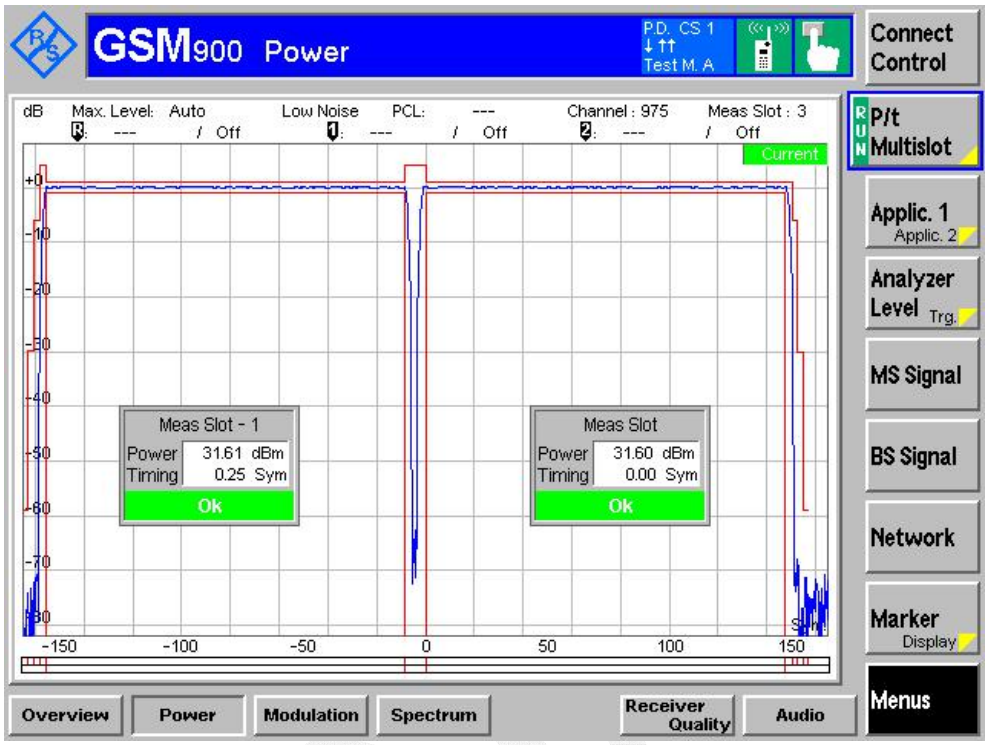


Normal Condition GAMMA_TN 17, High Channel

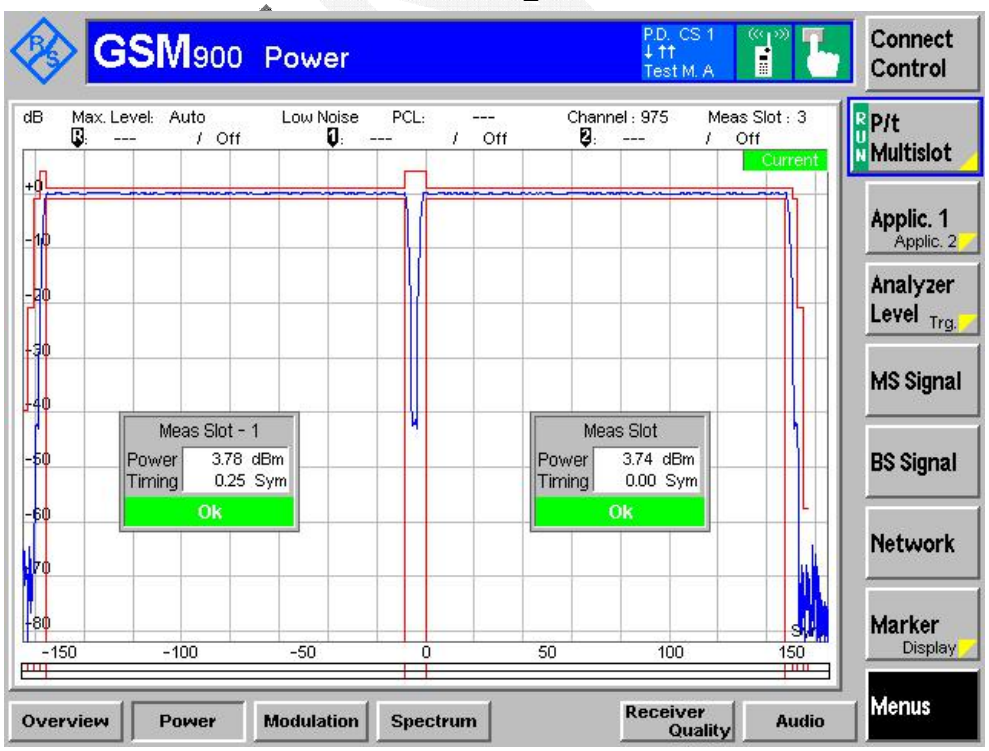


2 uplink slot:

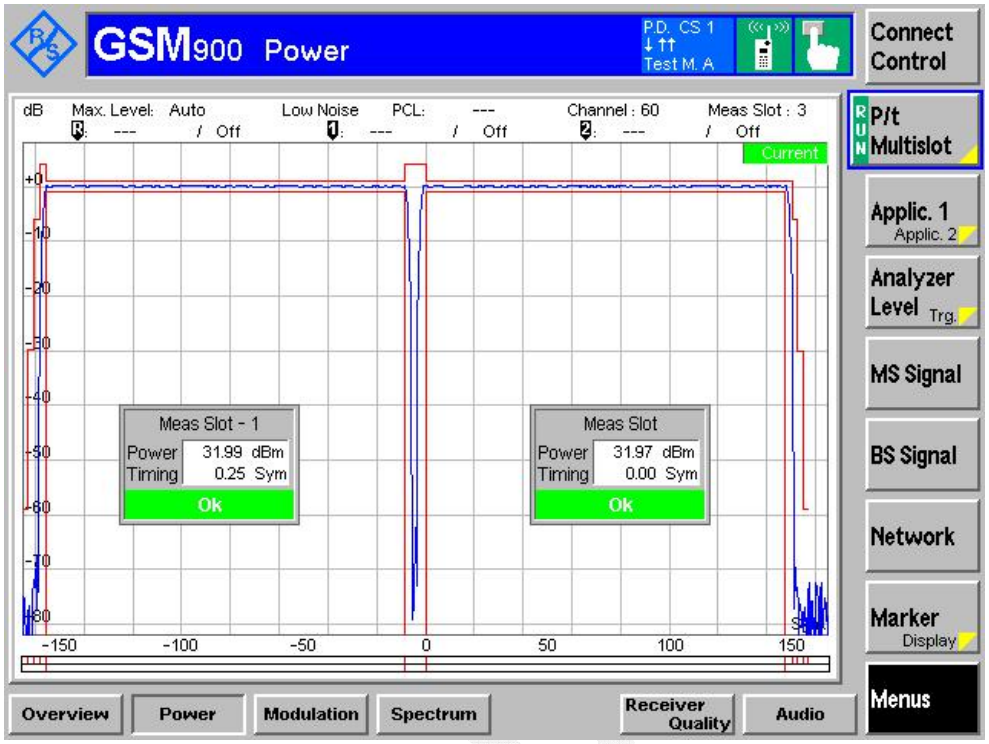
Normal Condition GAMMA_TN3, Low Channel



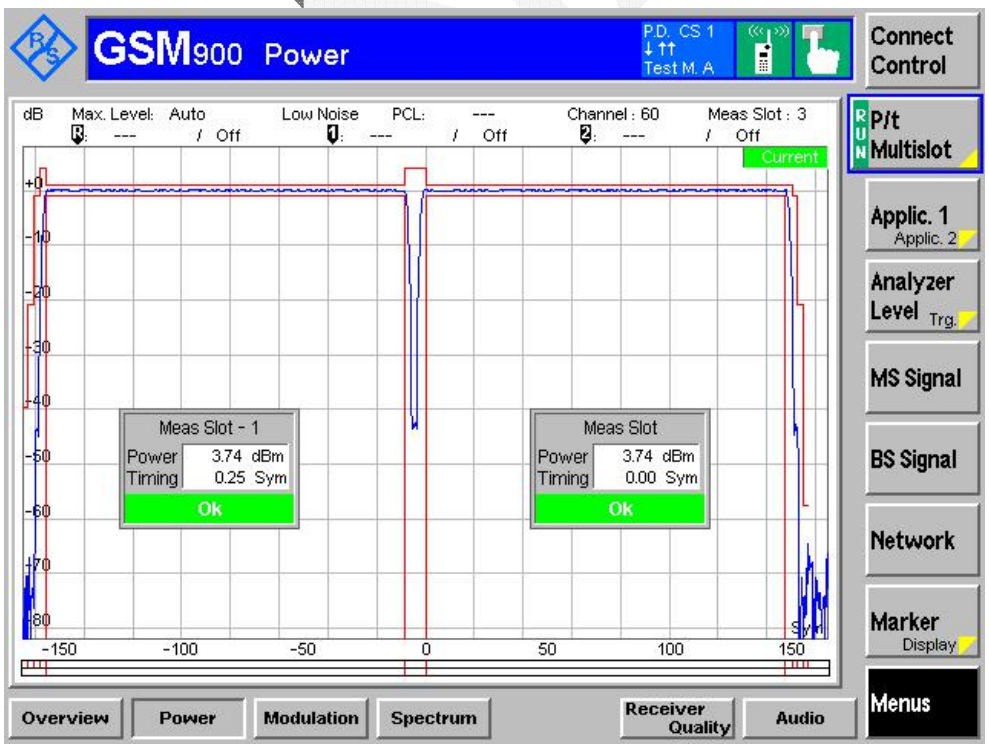
Normal Condition GAMMA_TN 17, Low Channel



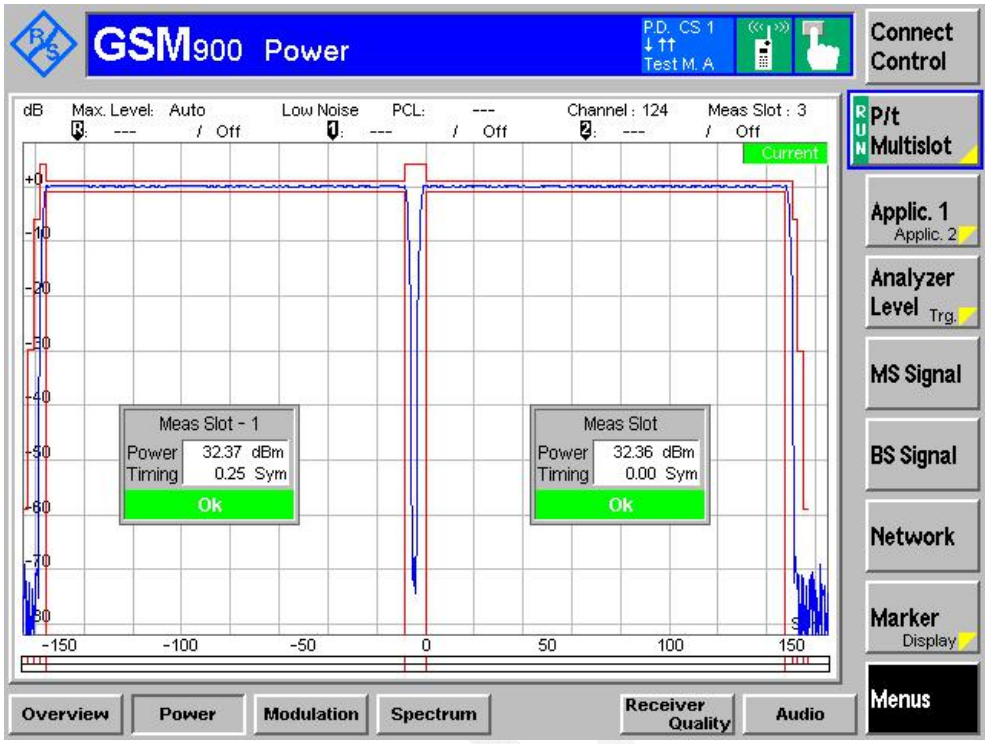
Normal Condition GAMMA_TN3, Middle Channel



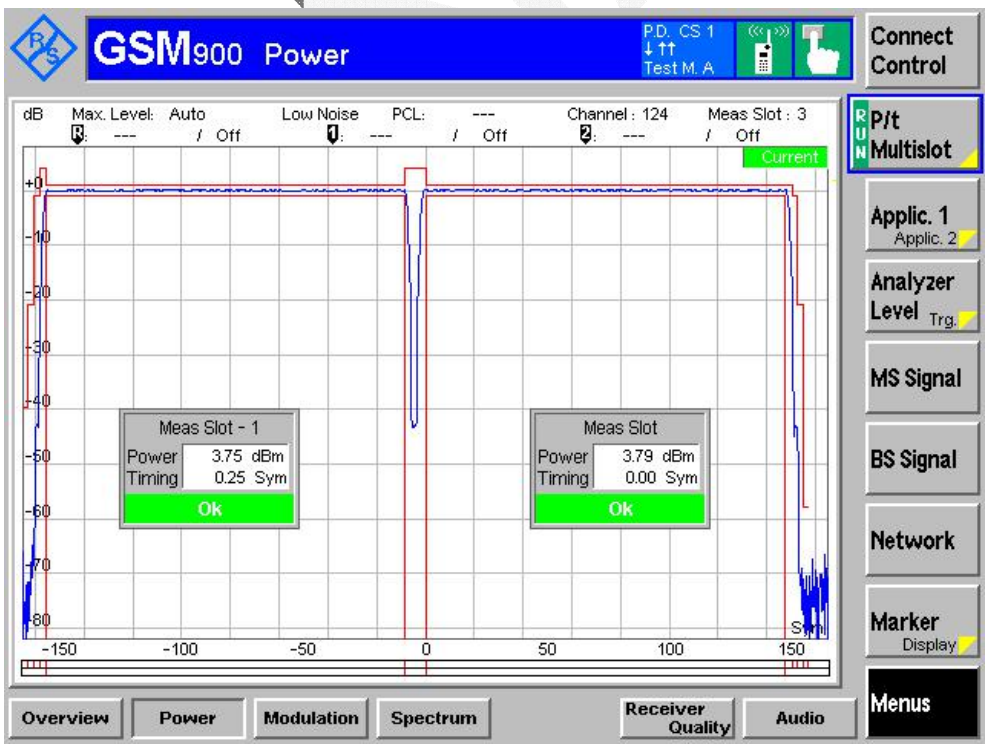
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN3, High Channel



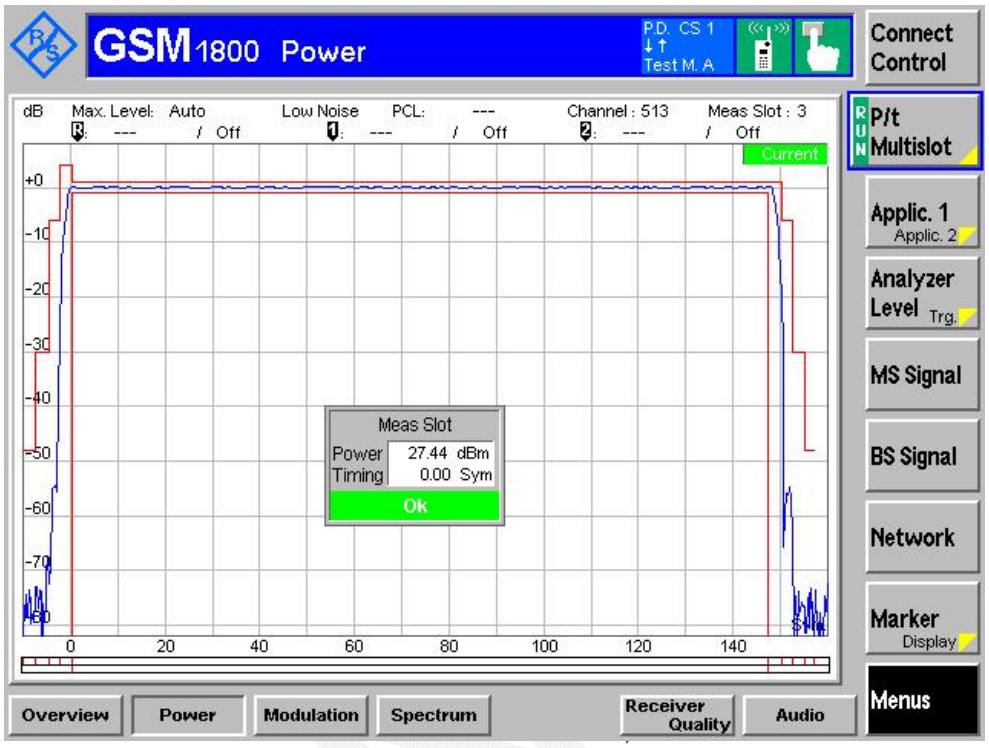
Normal Condition GAMMA_TN 17, High Channel



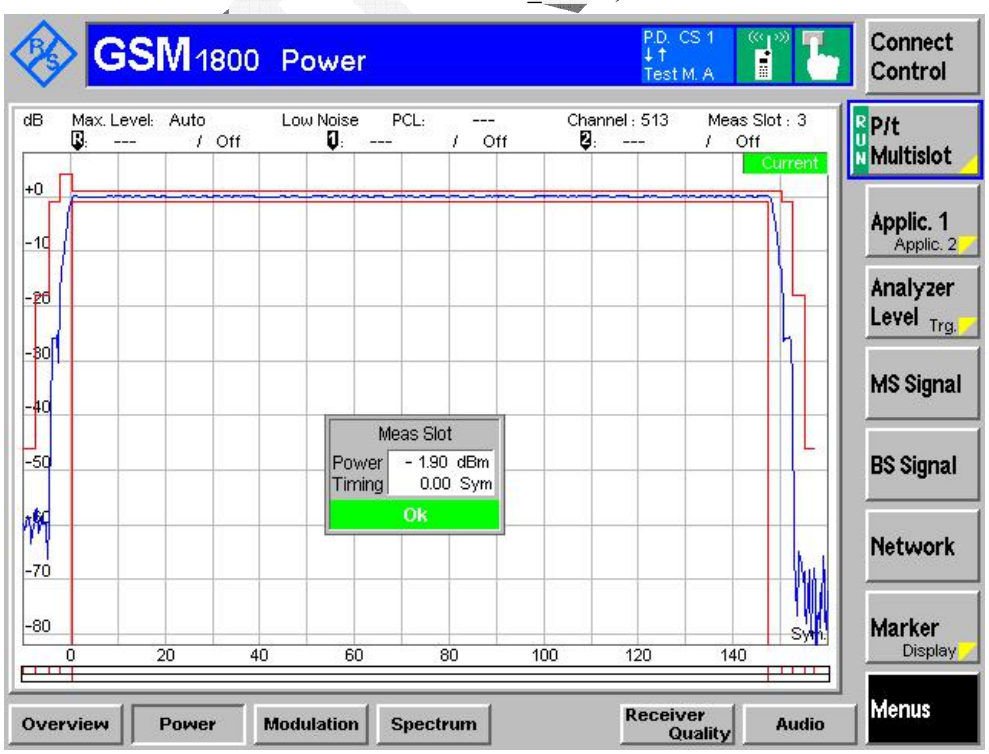
DCS1800 output power in GPRS Mode				
Power Control Level	Output Power(dBm)			Result
	1710.4 MHz	1747.8 MHz	1784.6 MHz	
1 uplinkslot				
3	27.44	27.48	27.94	
4	24.41	25.14	25.22	
5	23.23	24.12	24.32	
6	22.11	22.58	22.97	
7	21.21	20.35	20.91	
8	20.01	18.69	19.24	
9	17.87	16.52	16.76	
10	16.35	14.59	15.42	
11	14.08	12.56	12.86	
12	11.36	11.02	11.46	Compliance
13	10.58	9.48	9.62	
14	8.29	7.12	7.19	
15	6.92	5.24	5.31	
16	4.05	3.14	3.82	
17	2.14	1.22	1.89	
18	-1.90	-1.82	-1.56	
2 uplinkslot				
3	26.98	27.02	27.27	
18	-0.5	-0.42	-0.22	

DCS 1800:
1 uplink slot:

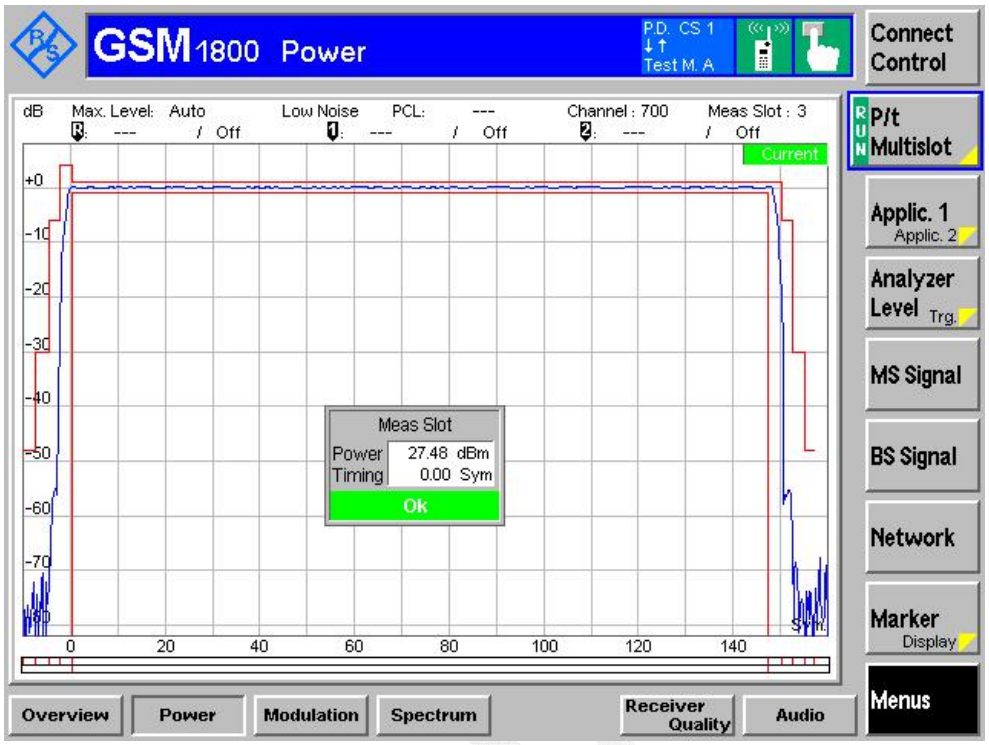
Normal Condition GAMMA_TN3, Low Channel



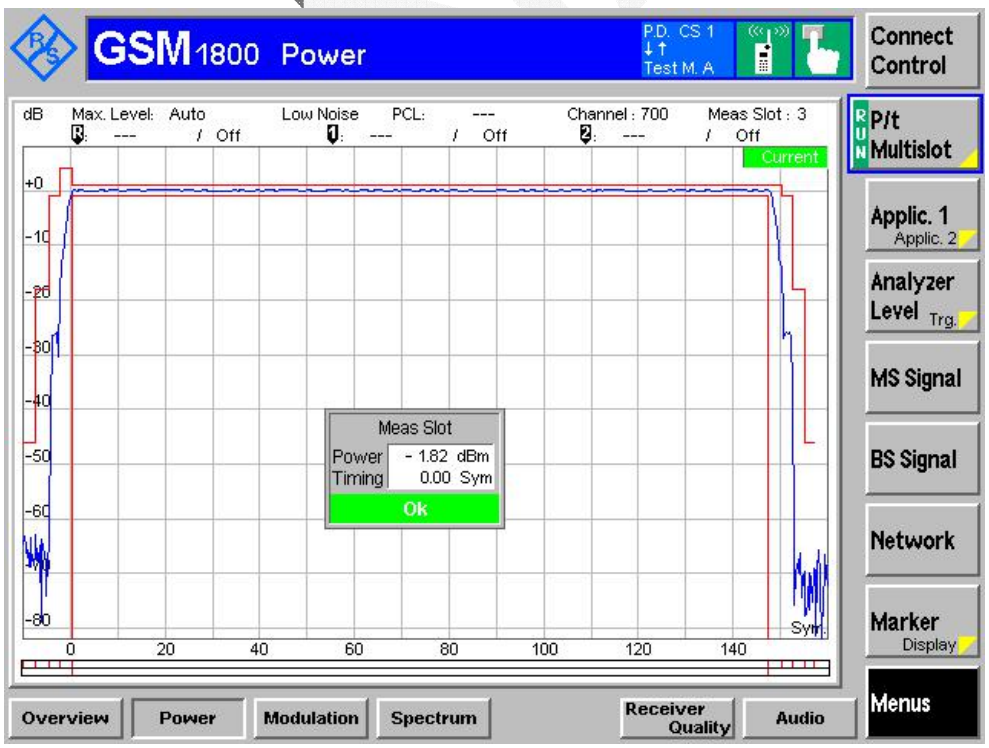
Normal Condition GAMMA_TN 18,Low Channel



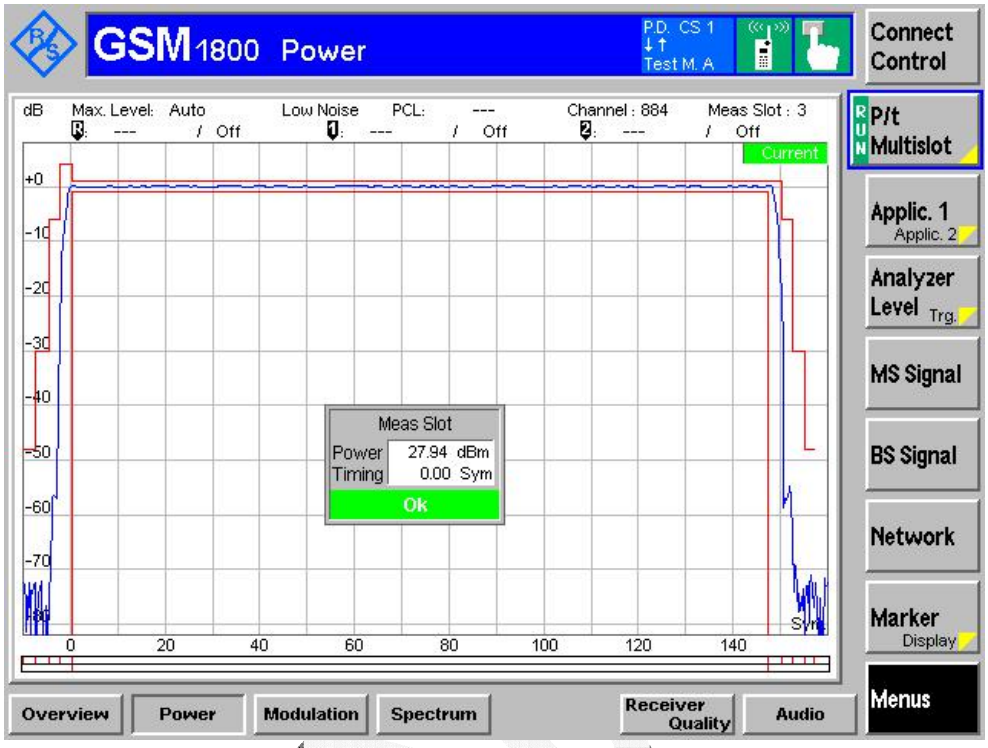
Normal Condition GAMMA_TN3, Middle Channel



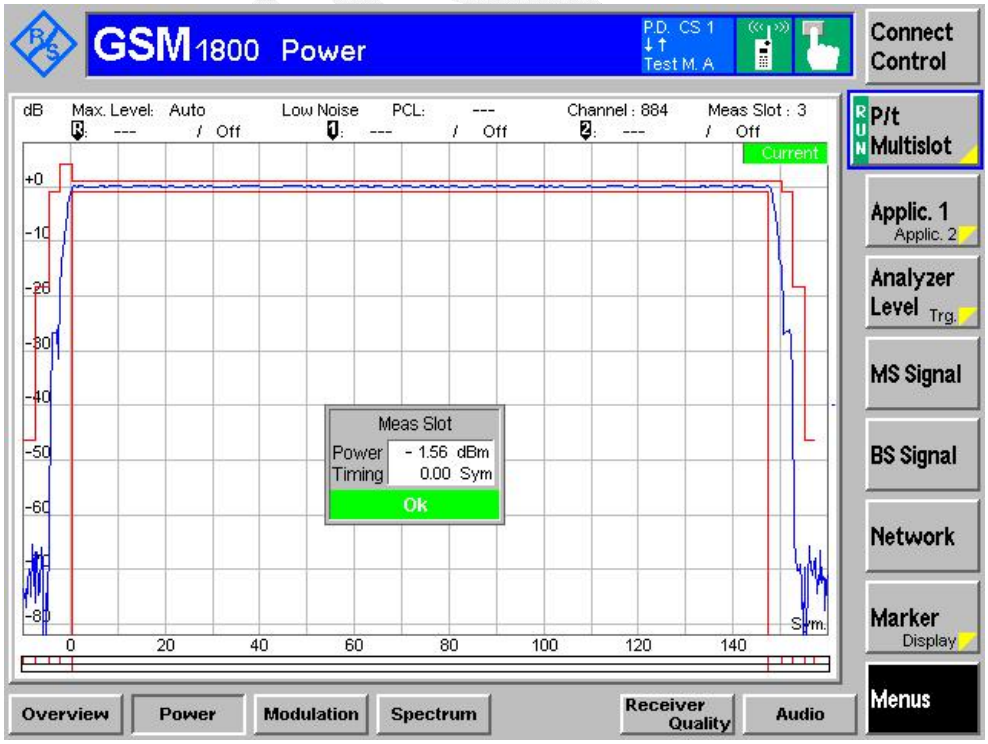
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN3, High Channel

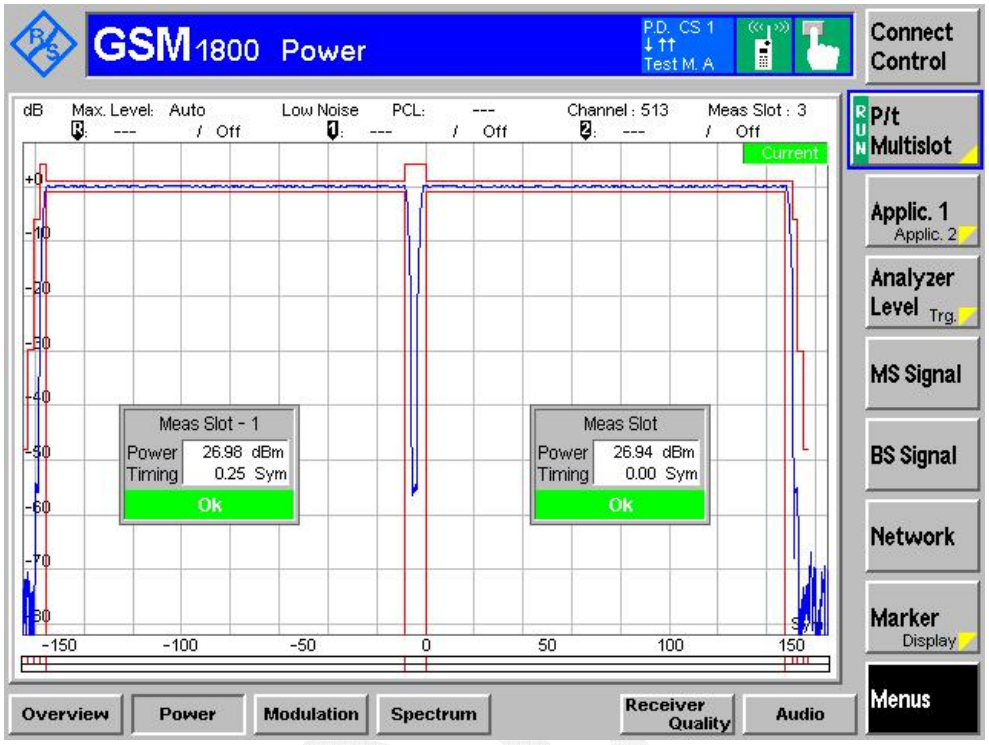


Normal Condition GAMMA_TN 18, High Channel

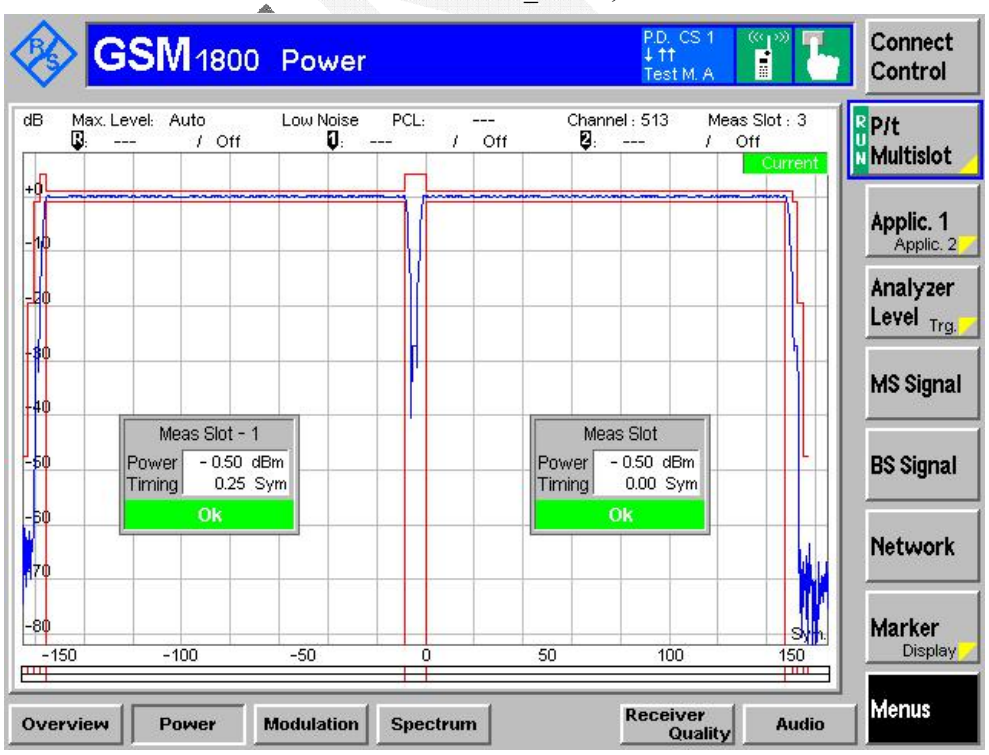


2 uplink slot:

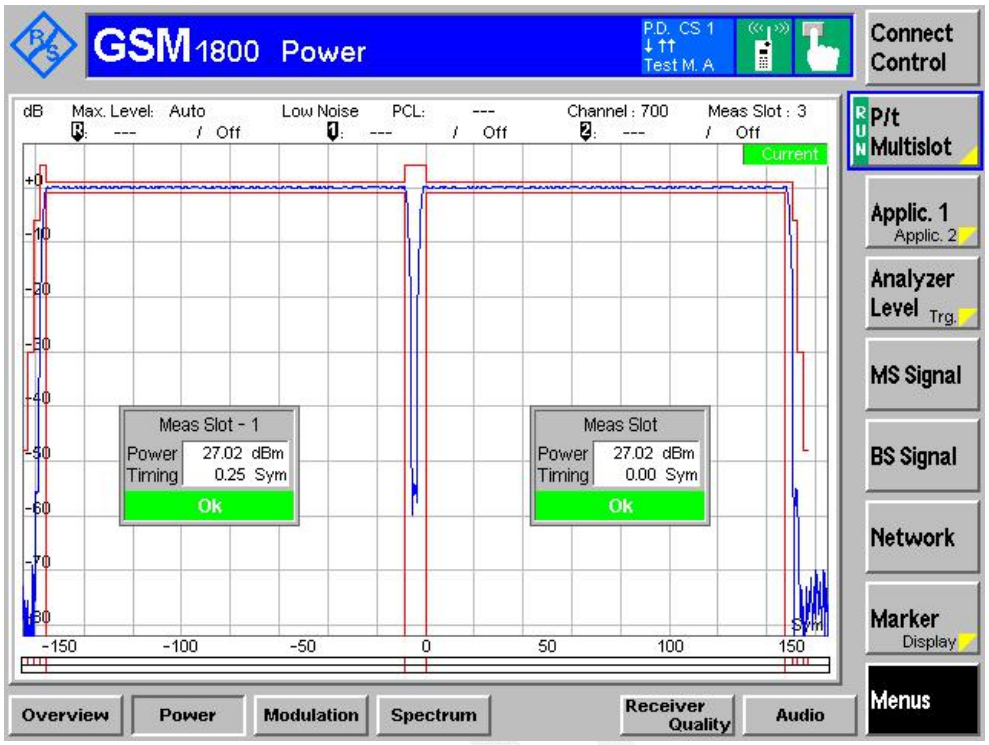
Normal Condition GAMMA_TN3, Low Channel



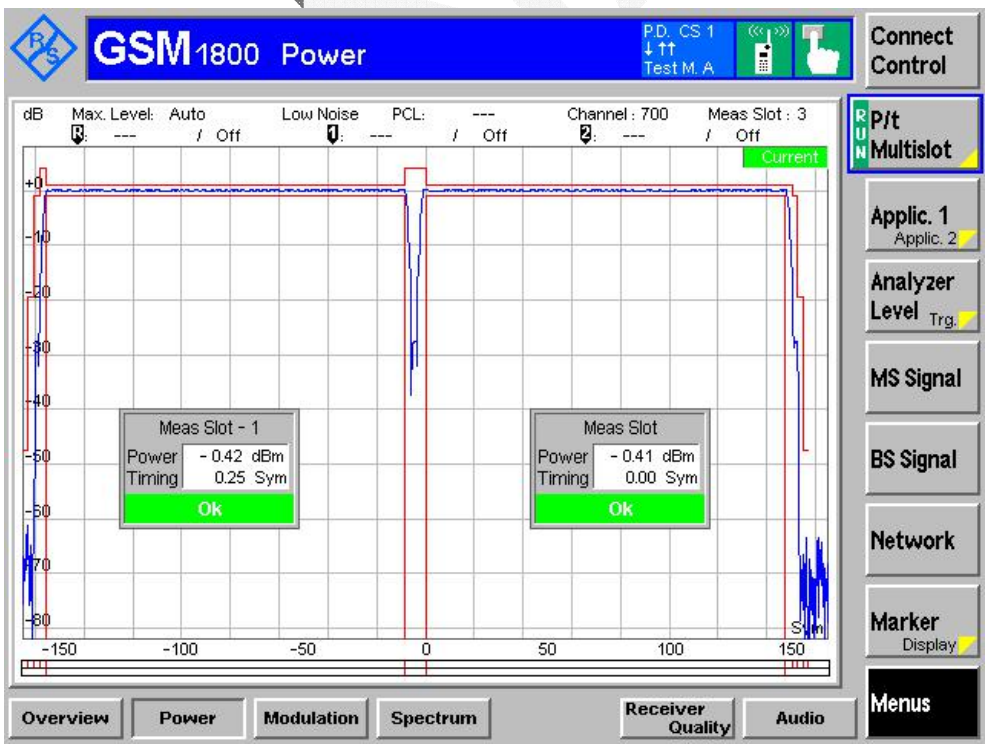
Normal Condition GAMMA_TN 18, Low Channel



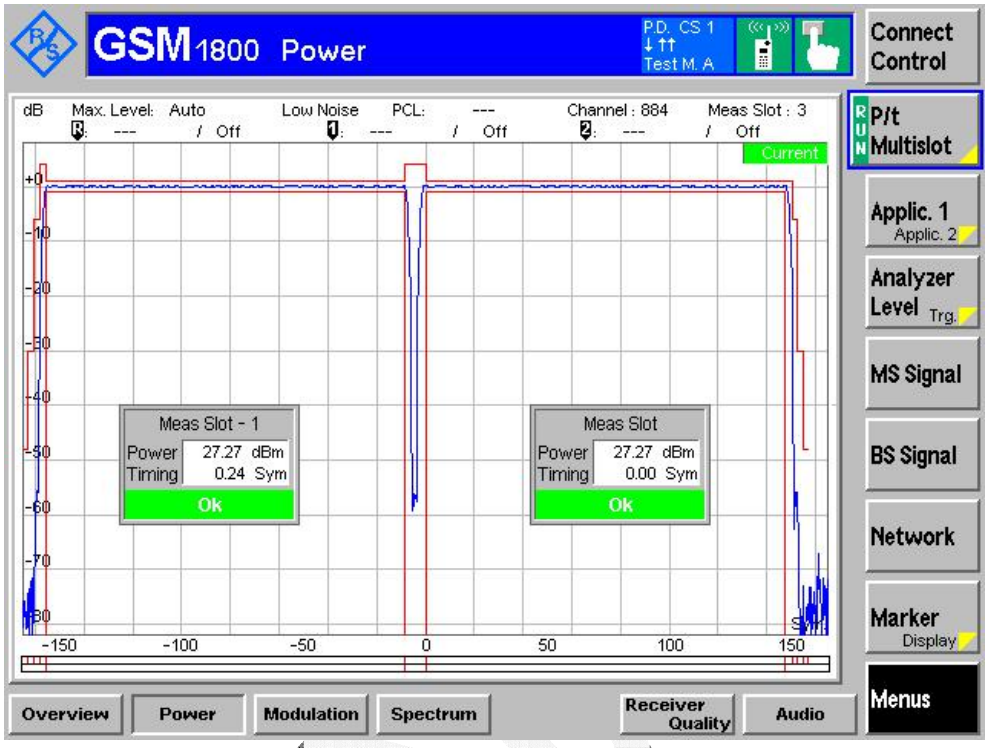
Normal Condition GAMMA_TN3, Middle Channel



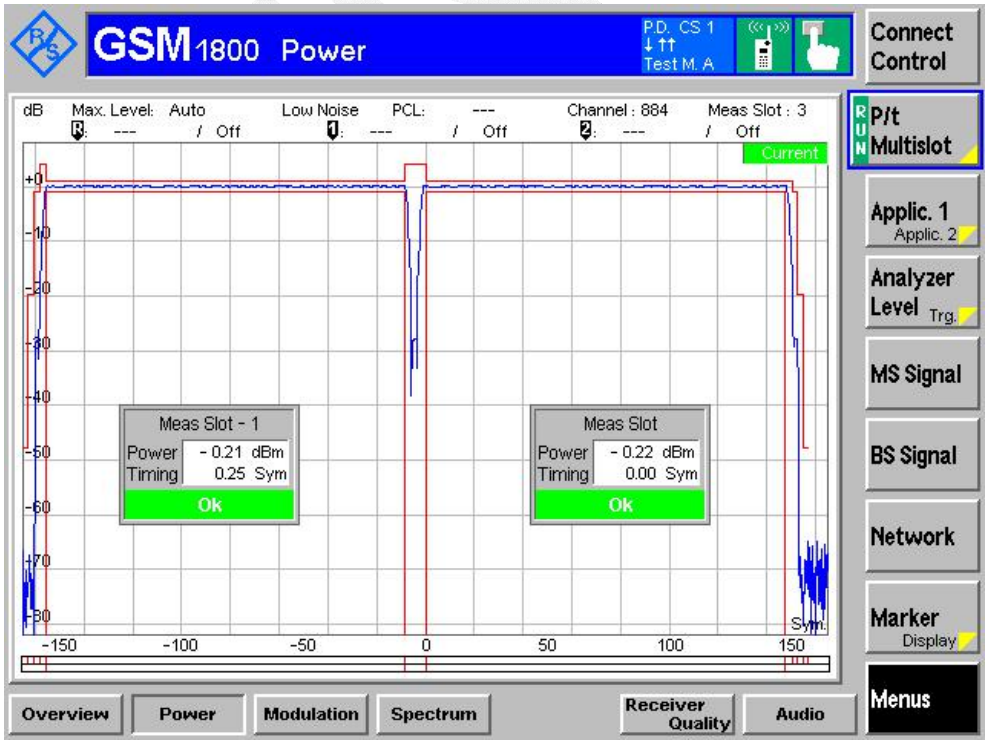
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN3, High Channel



Normal Condition GAMMA_TN 18, High Channel



§4.2.11 OUTPUT RF SPECTRUM IN GPRS MULTISLOT CONFIGURATION

Applicable Standard

According to EN 301 511 V9.0.2 (2003-03), section 4.2.11,

1. The level of the output RF spectrum due to modulation shall be no more than that given in 3GPP TS 05.05, subclause 4.2.1, table a) for GSM 400, GSM 700, GSM 850 and GSM 900, table b) for DCS 1800 or table c) for PCS 1900, with the following lowest measurement limits:

   - 36 dBm below 600 kHz offset from the carrier;
   - -51 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -56 dBm for DCS 1 800 and PCS 1 900 from 600 kHz out to less than 1 800 kHz offset from the carrier;
   - -46 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -51 dBm for DCS 1 800 and PCS 1 900 at and beyond 1 800 kHz offset from the carrier; b

   ut with the following exceptions at up to -36 dBm:

   - up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz in the combined range 600 kHz to 6 000 kHz above and below the carrier;
   - up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz at more than 6 000 kHz offset from the carrier.

   1.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.1.

   1.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.1; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

2. The level of the output RF spectrum due to switching transients shall be no more than given in 3GPP TS 05.05, subclause 4.2.2, table "a) Mobile Station".

   2.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.2.

   2.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.2; 3GPP TS 05.05 annex D subclause D.2.1 and D.2.2.

3. When allocated a channel, the power emitted by a GSM 400, GSM 900 and DCS 1 800 MS, in the band 935 MHz to 960 MHz shall be no more than -79 dBm, in the band 925 MHz to 935 MHz shall be no more than -67 dBm and in the band 1 805 MHz to 1 880 MHz shall be no more than -71 dBm except in five measurements in each of the bands 925 MHz to 960 MHz and 1 805 MHz to 1 880 MHz where exceptions at up to -36 dBm are permitted. For GSM 400 MS, in addition, the power emitted by MS, in the bands of 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz shall be no more than -67 dBm except in three measurements in each of the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz where exceptions at up to -36 dBm are permitted. For GSM 700 and GSM 850, the power emitted by MS, in the band of 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 762 MHz shall be no more than –73 dBm, in the band 869 MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than – 71 dBm except in five measurements in each of the bands 747 MHz to 762 MHz, 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted. For PCS 1 900 MS, the power emitted by MS, in the band 869 MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted. Under normal conditions; 3GPP TS 05.05, subclause 4.3.3.

Table 13.16.3-5: Spurious emissions in the MS receive bands

Band (MHz)	Spurious emissions level (dBm)	
	GSM 400, GSM 900 and DCS 1 800	GSM 700 GSM 850 PCS 1 900
925 to 935	-67	
935 to 960	-79	
1805 to 1880	-71	
728 to 736		-79
736 to 746		-73
747 to 757		-79
757 to763		-73
869 to 894		-79
1930 to 1990		-71

Test Procedure

NOTE: When averaging is in use during frequency hopping mode, the averaging only includes bursts transmitted when the hopping carrier corresponds to the nominal carrier of the measurement.

a) In steps b) to h) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range.

b) The other settings of the spectrum analyzer are set as follows:

- Zero frequency scan;
- Resolution bandwidth: 30 kHz;
- Video bandwidth: 30 kHz;
- Video averaging: may be used, depending on the implementation of the test.

The video signal of the spectrum analyzer is "gated" such that the spectrum generated by at least 40 of the bits 87 to 132 of the burst in one of the active time slots is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyzer. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyzer averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging.

The MS is commanded to its maximum power control level in every transmitted time slot.

c) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz.

d) The resolution and video bandwidth on the spectrum analyzer are adjusted to 100 kHz and the measurements are made at the following frequencies:

on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts.

at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts.

For GSM 400, GSM 900 and DCS 1800:

at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50bursts.

at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts.

e) The MS is commanded to its minimum power control level. The spectrum analyzer is set again as in b).

f) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies:
FT;
FT + 100 kHz FT - 100 kHz;
FT + 200 kHz FT - 200 kHz;
FT + 250 kHz FT - 250 kHz;
FT + 200 kHz * N FT - 200 kHz * N;
where N = 2, 3, 4, 5, 6, 7, and 8;
and FT = RF channel nominal centre frequency.

g) Steps a) to f) is repeated except that in step a) the spectrum analyzer is gated so that the burst of the next active time slot is measured.

h) The spectrum analyzer settings are adjusted to:

- Zero frequency scan;
- Resolution bandwidth: 30 kHz;
- Video bandwidth: 100 kHz;
- Peak hold.

The spectrum analyzer gating of the signal is switched off.

The MS is commanded to its maximum power control level in every transmitted time slot.

i) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured at the following frequencies:

FT + 400 kHz FT - 400 kHz;
FT + 600 kHz FT - 600 kHz;
FT + 1,2 MHz FT - 1,2 MHz;
FT + 1,8 MHz FT - 1,8 MHz;

where FT = RF channel nominal centre frequency.
The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT.

j) Step i) is repeated for power control levels 7 and 11.

k) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

l) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

m) Steps a) b) f) h), and i) are repeated under extreme test conditions (annex 1, TC2.2). except that at step h) the MS is commanded to power control level 11.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2017-11-22
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	52 %
ATM Pressure:	99.8 kPa

The testing was performed by Robin Zhengon 2017-09-10.

Test Results: Compliance.

Please see the following plots:

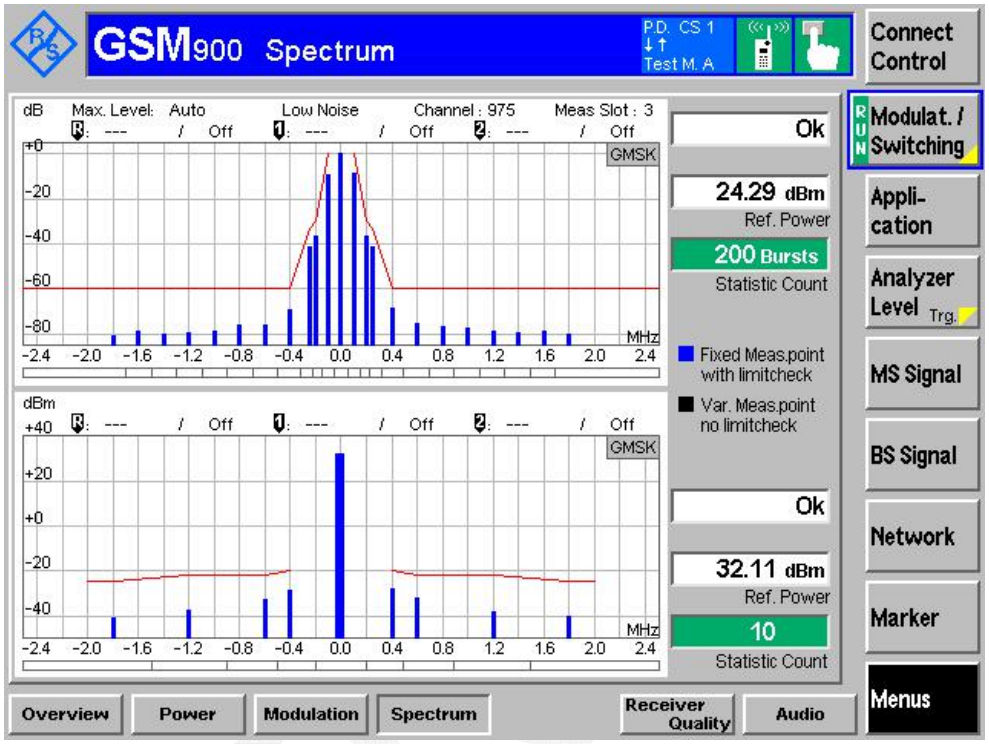
Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	880.2	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	914.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1710.4	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1784.6	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

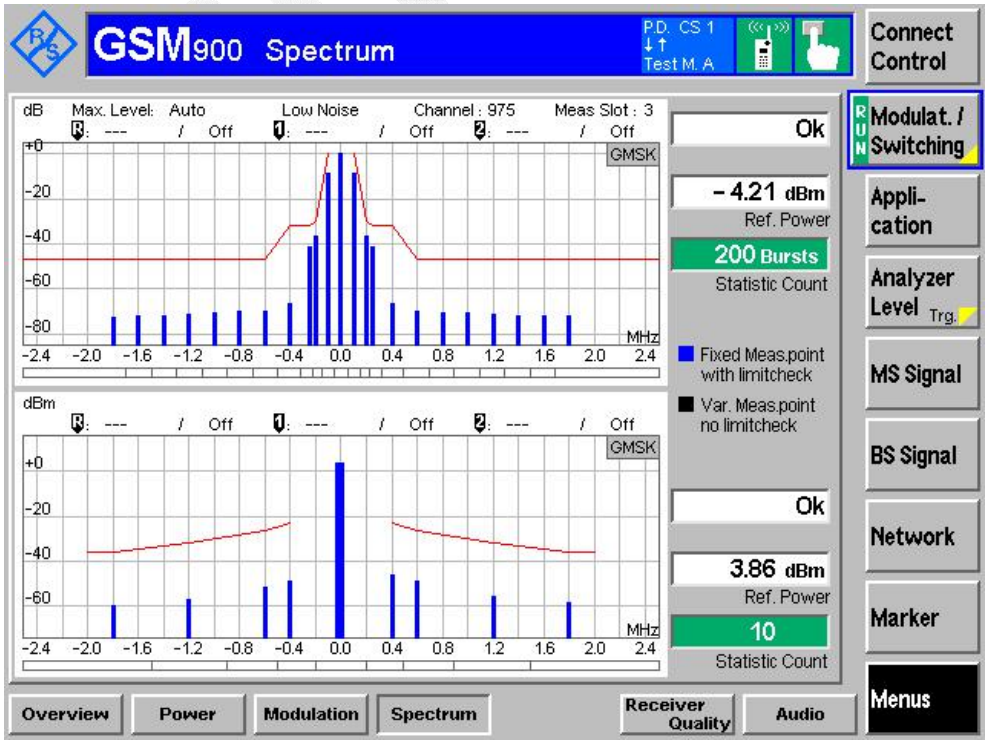
E-GSM900:

Normal Condition

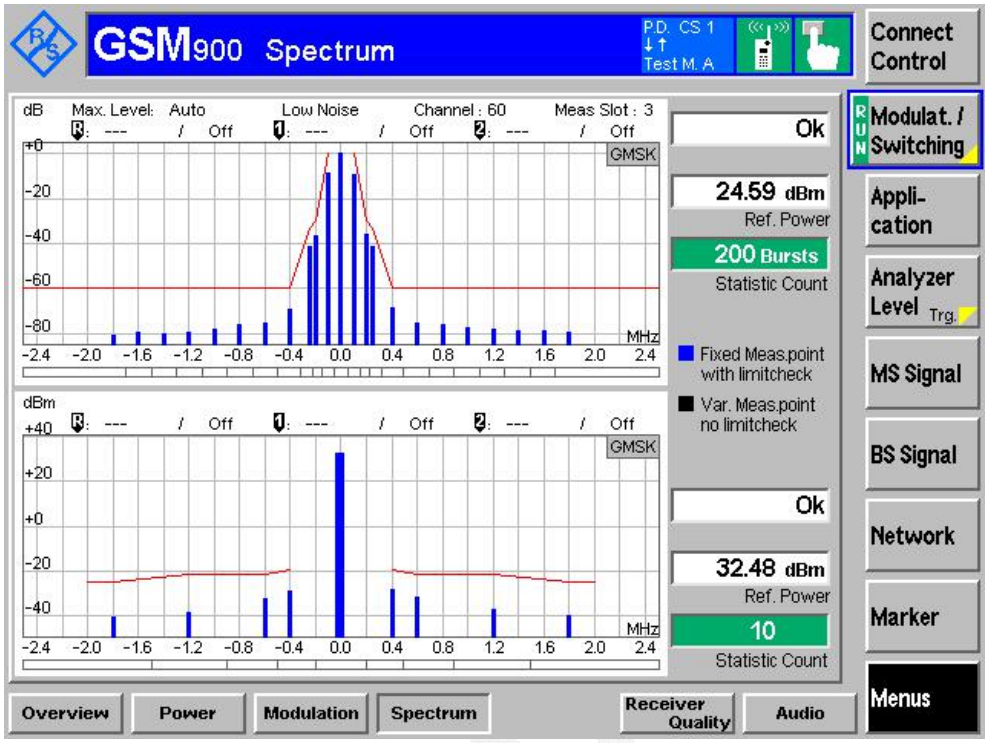
Normal Condition (γ =3), Low Channel



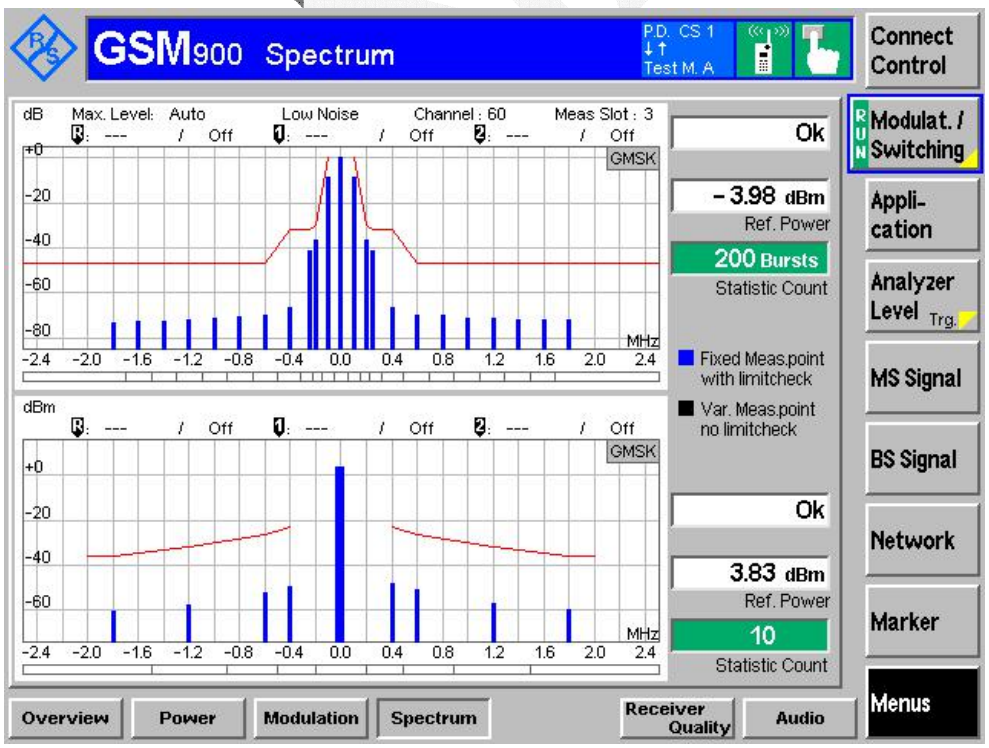
Normal Condition (γ =17), Low Channel



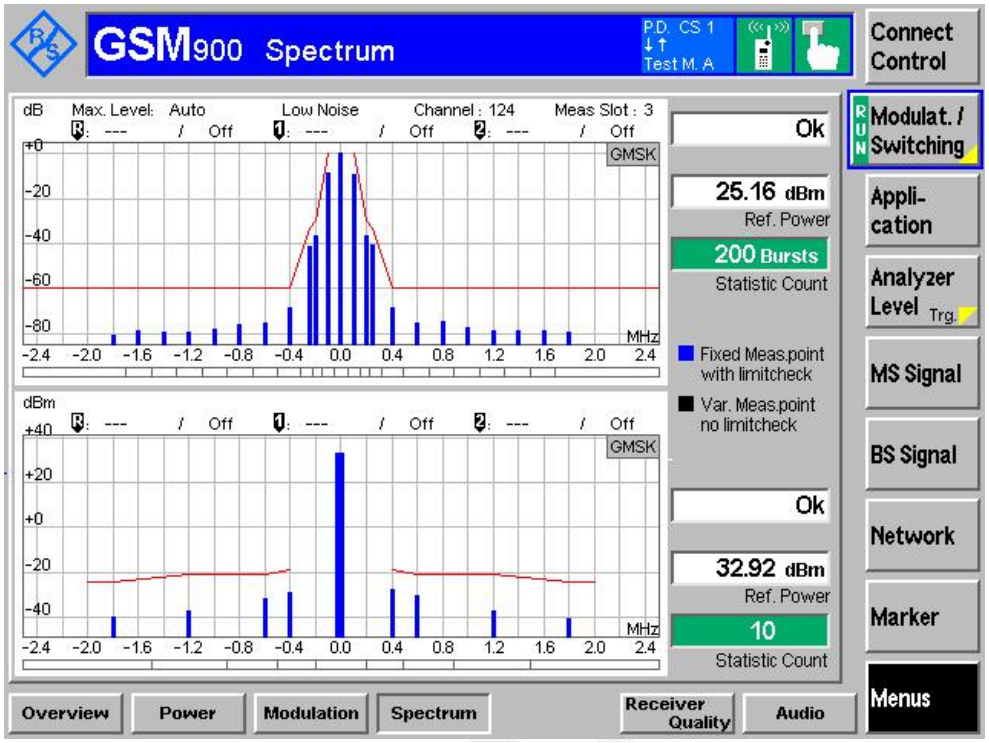
Normal Condition (γ =3), Middle Channel



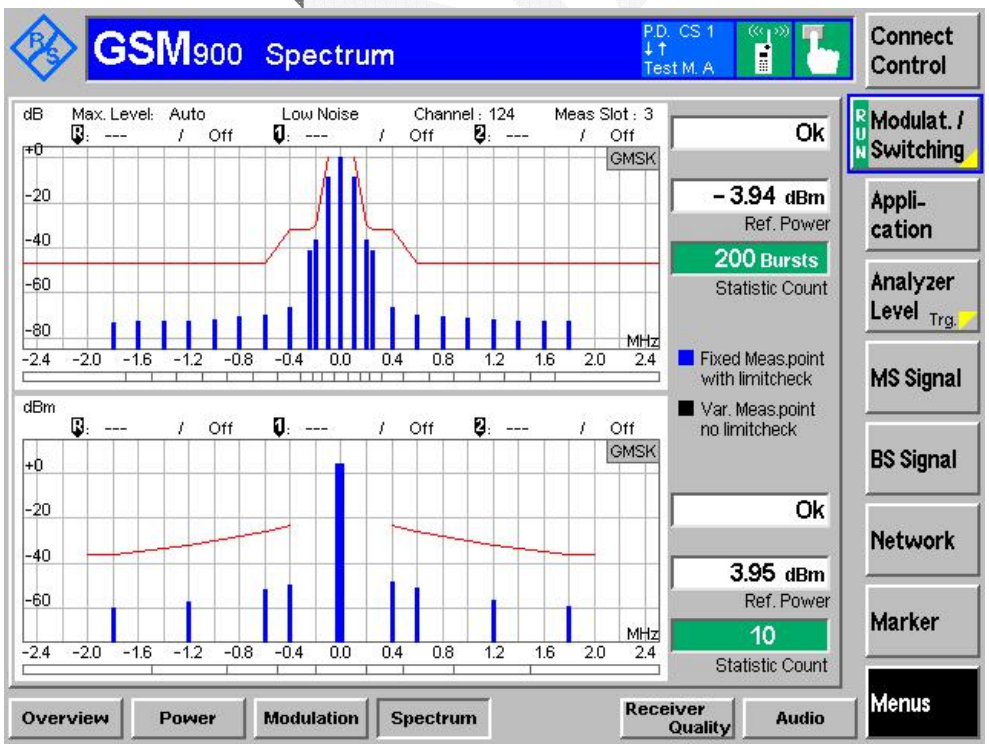
Normal Condition (γ =17), Middle Channel



Normal Condition (γ =3), High Channel



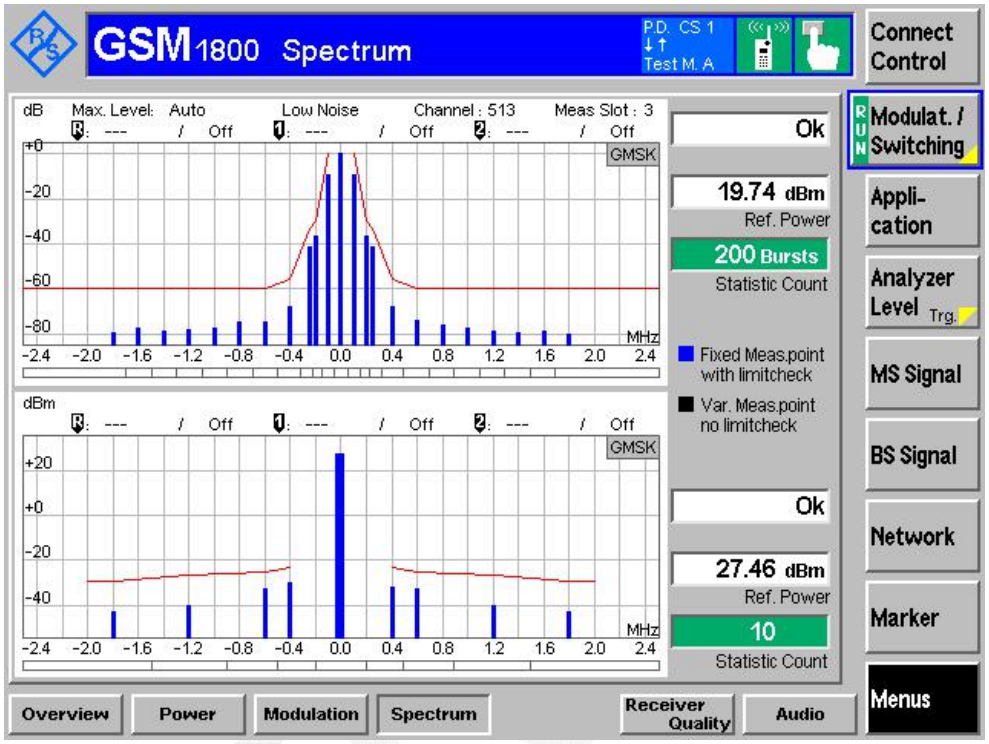
Normal Condition (γ =17), High Channel



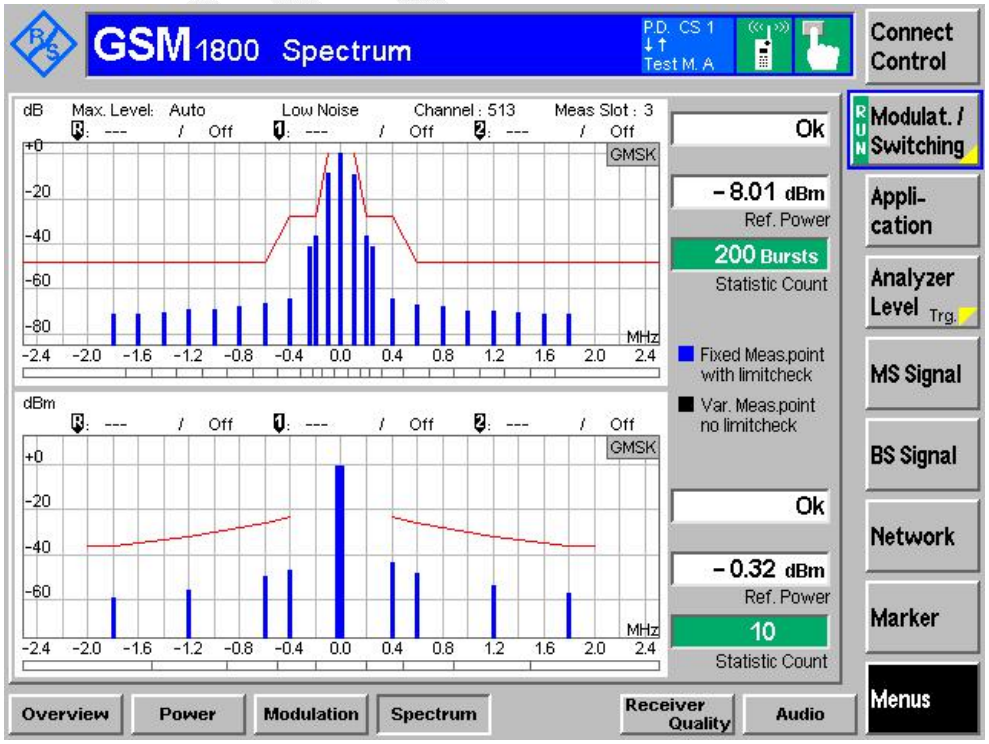
DCS1800:

Normal Condition

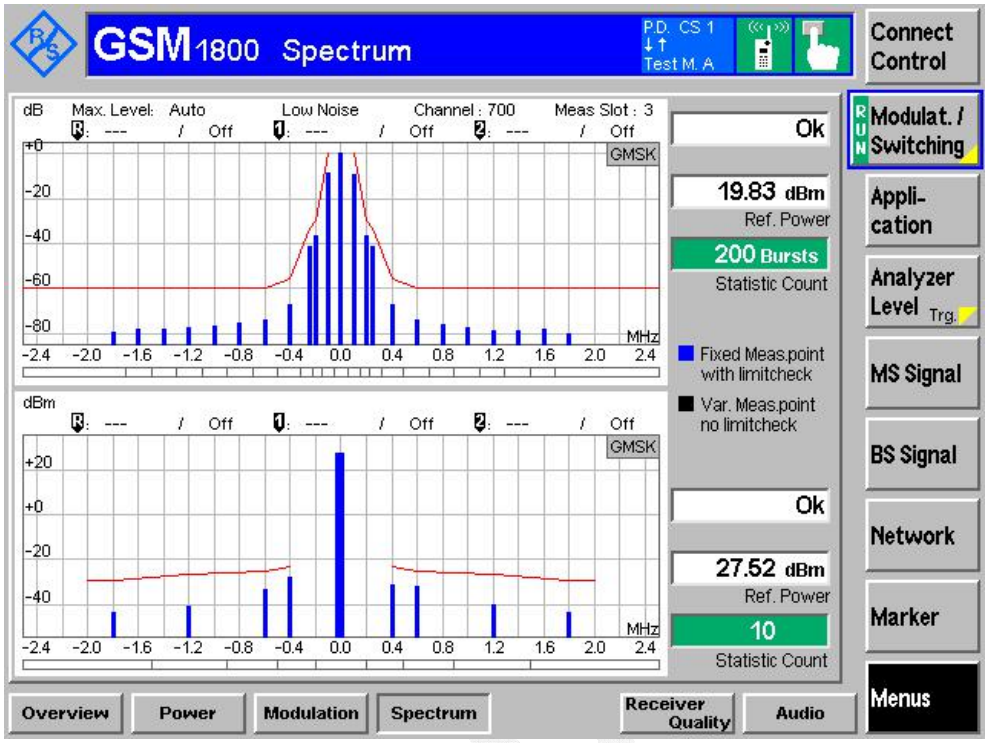
Normal Condition (γ =3), Low Channel



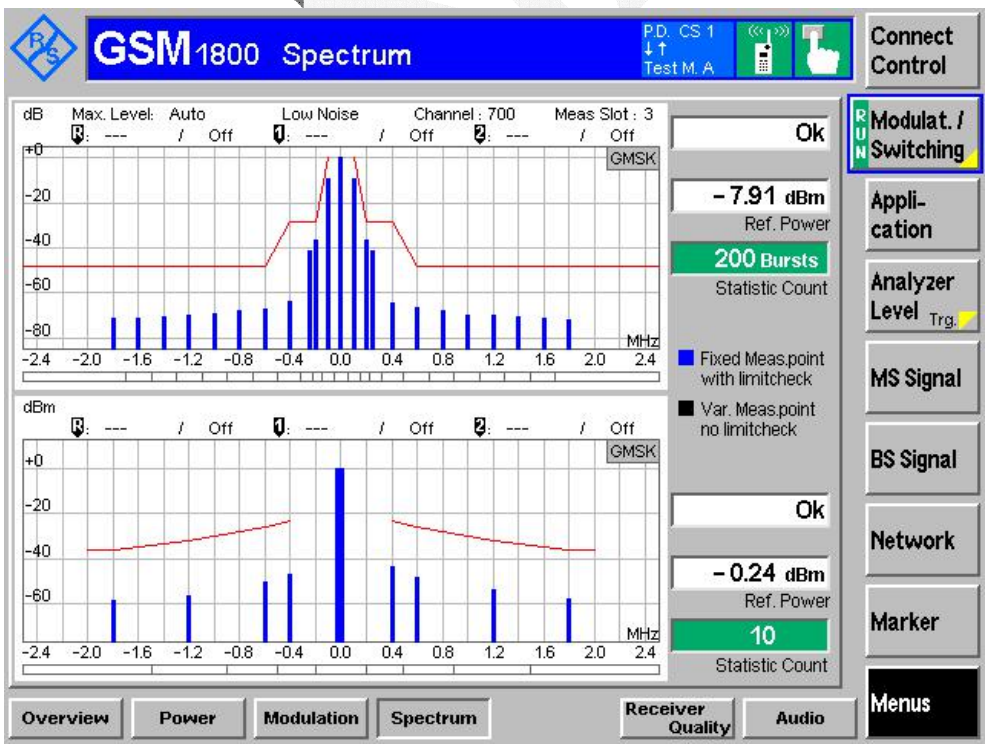
Normal Condition (γ =18), Low Channel



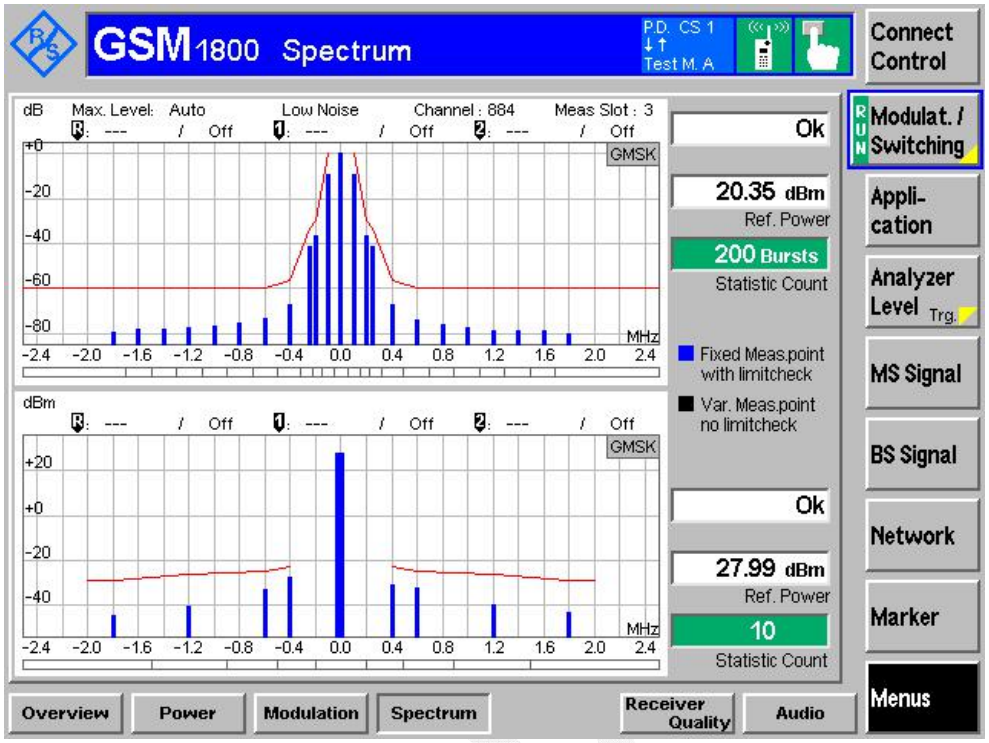
Normal Condition (γ =3), Middle Channel



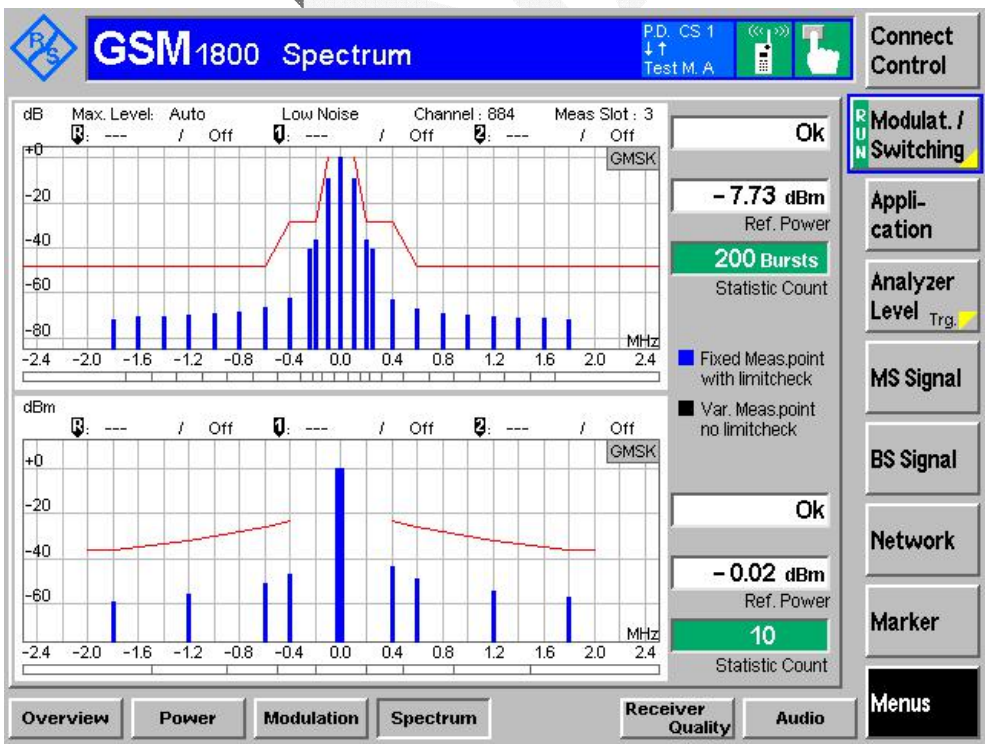
Normal Condition (γ =18), Middle Channel



Normal Condition (γ =3), High Channel



Normal Condition (γ =18), High Channel



Spurious Emissions in the MS receive bands:

For E-GSM900 Band (Middle Channel, 902.0 MHz)

Frequency range (MHz)	Frequency (MHz)	Spurious Emissions		
		Level (dBm)	Limit (dBm)	Results
925-935	930.45	-68.47	-67	Compliance
935-960	945.87	-81.12	-79	Compliance
	956.12	-80.89	-79	Compliance

For DCS1800 Band (Middle channel, 1747.8 MHz)

Frequency range (MHz)	Frequency (MHz)	Spurious Emissions		
		Level (dBm)	Limit (dBm)	Results
1805-1880	1810.4	-71.97	-71	Compliance
	1829.1	-72.45	-71	Compliance
	1850.7	-72.94	-71	Compliance
	1862.3	-72.89	-71	Compliance

Note: The MS is commanded to its maximum power level.

§4.2.12 – CONDUCTED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL

Applicable Standard

Requirements: According to EN 301 511 V9.0.2 (2003-03), section 4.2.12, the conducted spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table 1:

Table 1

Frequency range	Power level in dBm		
	GSM 400, GSM 700, GSM 850, GSM 900	DCS 1 800	PCS 1 900
9 kHz to 1 GHz	-36	-36	-36
1 GHz to 12,75 GHz	-30		-30
1 GHz to 1 710 MHz		-30	
1 710 MHz to 1 785 MHz		-36	
1 785 MHz to 12,75 GHz		-30	

Test Procedure

a) Measurements are made in the frequency range 100 kHz to 12,75 GHz. Spurious emissions are measured at the connector of the transceiver, as the power level of any discrete signal, higher than the requirement in table 1 minus 6 dB, delivered into a 50 Ω load.

The measurement bandwidth based on a 5 pole synchronously tuned filter is according to table 2. The power indication is the peak power detected by the measuring system.

The measurement on any frequency shall be performed for at least one TDMA frame period with the exception of the idle frame.

NOTE: This ensures that both the active times (MS transmitting) and the quiet times are measured.

b) The test is repeated under extreme voltage test conditions ([annex 1, TC2.2 and TC3]).

Table 2

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
100 kHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz excl. relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz; GSM 480: 478,8 MHz to 486 MHz, and the RX bands: For GSM 400 MS: 460,4 MHz to 467,6 MHz; 488,8 MHz to 496 MHz.	-	100 kHz	300 kHz

Table 2 (continued)

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
500 MHz to 12,75 GHz, excl. relevant TX band: GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz; P-GSM: 890 MHz to 915 MHz; E-GSM: 880 MHz to 915 MHz; DCS: 1 710 MHz to 1 785 MHz, PCS 1 900: 1 850 MHz to 1 910 MHz; and the RX bands: For GSM 400 MS, GSM 900 MS and DCS 1 800 MS: 925 MHz to 960 MHz; 1 805 MHz to 1 880 MHz. For GSM 700 MS, GSM 850 MS and PCS 1 900 MS: 747 MHz to 762 MHz; 869 MHz to 894 MHz; 1 930 MHz to 1 990 MHz	0 to 10 MHz >= 10 MHz >= 20 MHz >= 30 MHz (offset from edge of relevant TX band)	100 kHz 300 kHz 1 MHz 3 MHz	300 kHz 1 MHz 3 MHz 3 MHz
relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz GSM 480: 478,8 MHz to 486 MHz GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz E-GSM: 880 MHz to 915 MHz DCS: 1 710 MHz to 1 785 MHz PCS 1 900: 1 850 MHz to 1 910 MHz	1,8 to 6,0 MHz > 6,0 MHz (offset from carrier)	30 kHz 100 kHz	100 kHz 300 kHz
NOTE 1: The excluded RX bands are tested in subclause 13.4. NOTE 2: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in the Mid ARFCN range. NOTE 3: Due to practical implementation, the video bandwidth is restricted to a maximum of 3 MHz.			

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2017-11-22
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	49 %
ATM Pressure:	100.1 kPa

The testing was performed by Robin Zhengon 2017-09-14.

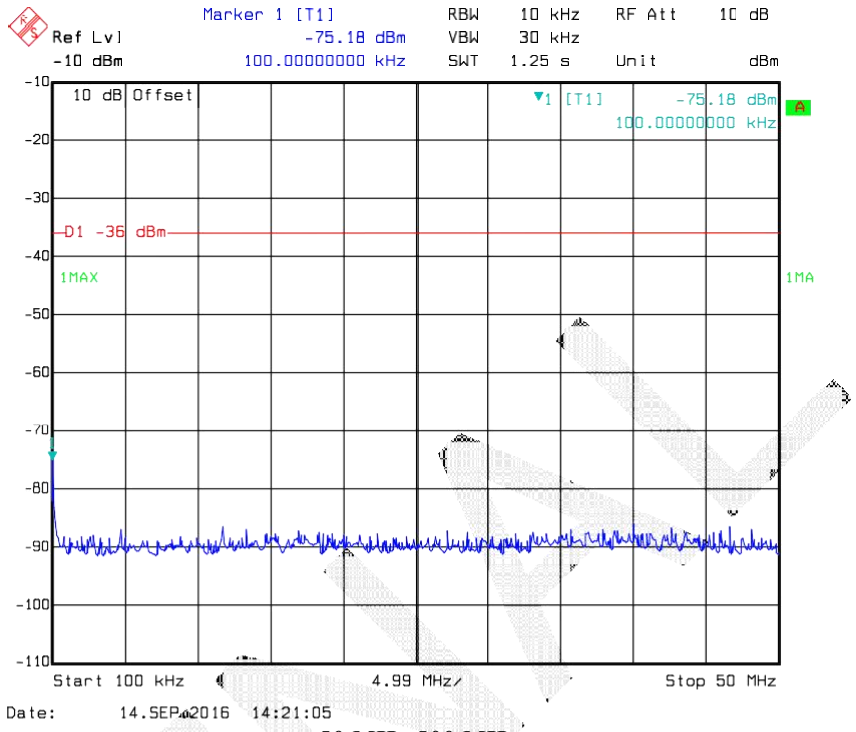
Test Result

Please see the following plots:

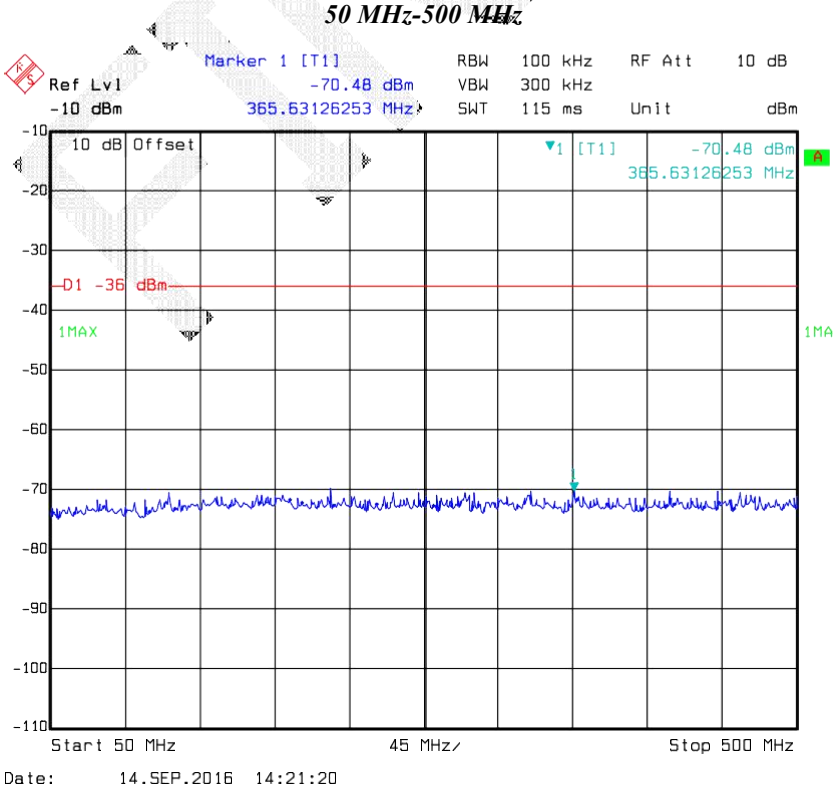
Mode	Test Frequency (MHz)	Test Condition		Result
E-GSM 900	902.0	Normal & H.V.	L.V.	Compliance
DCS 1800	1747.8	Normal & H.V.	L.V.	Compliance

Normal & H.V. Condition Test Data as below:
E-GSM 900 （Middle Channel）

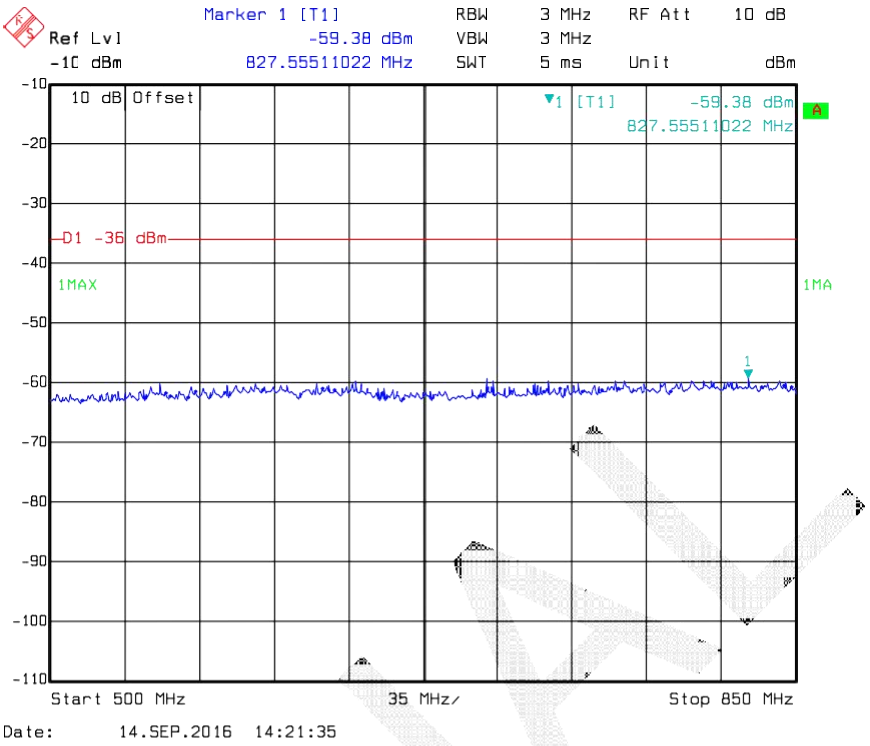
100 kHz-50 MHz



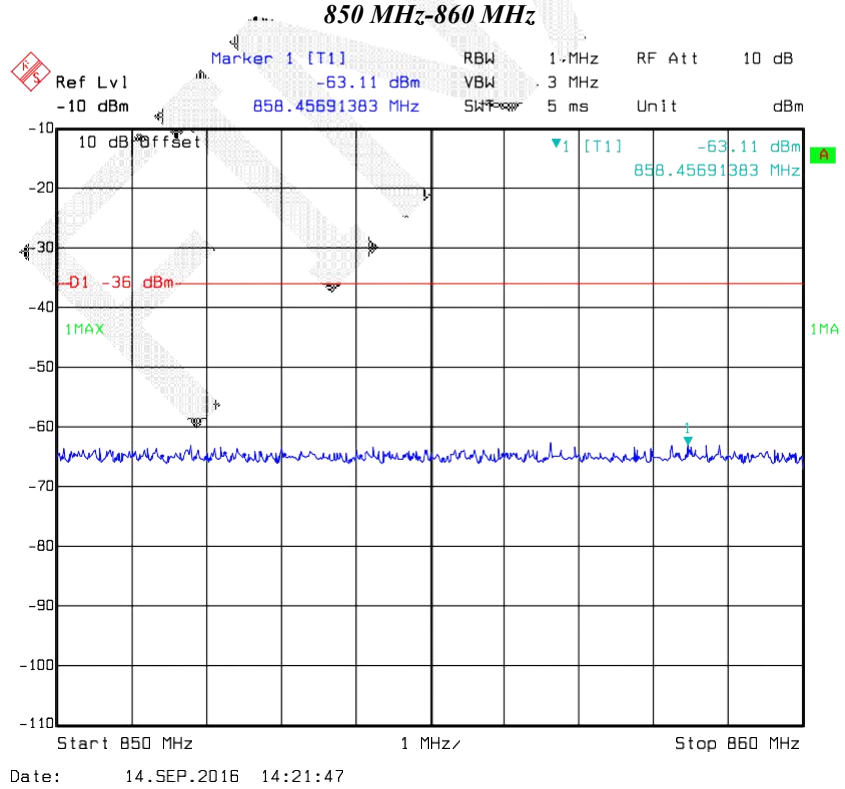
50 MHz-500 MHz



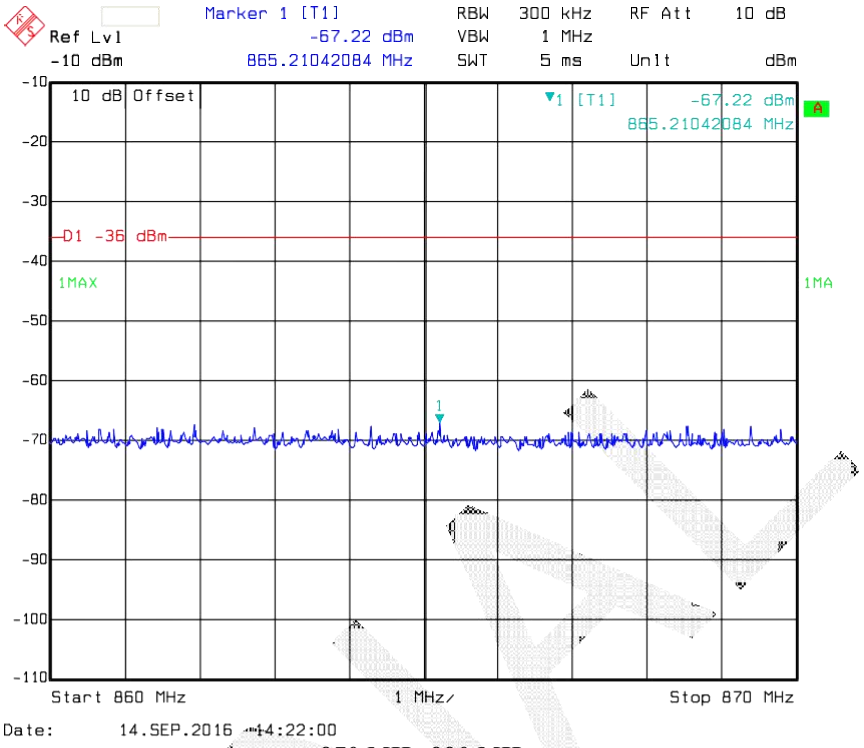
500 MHz-850 MHz



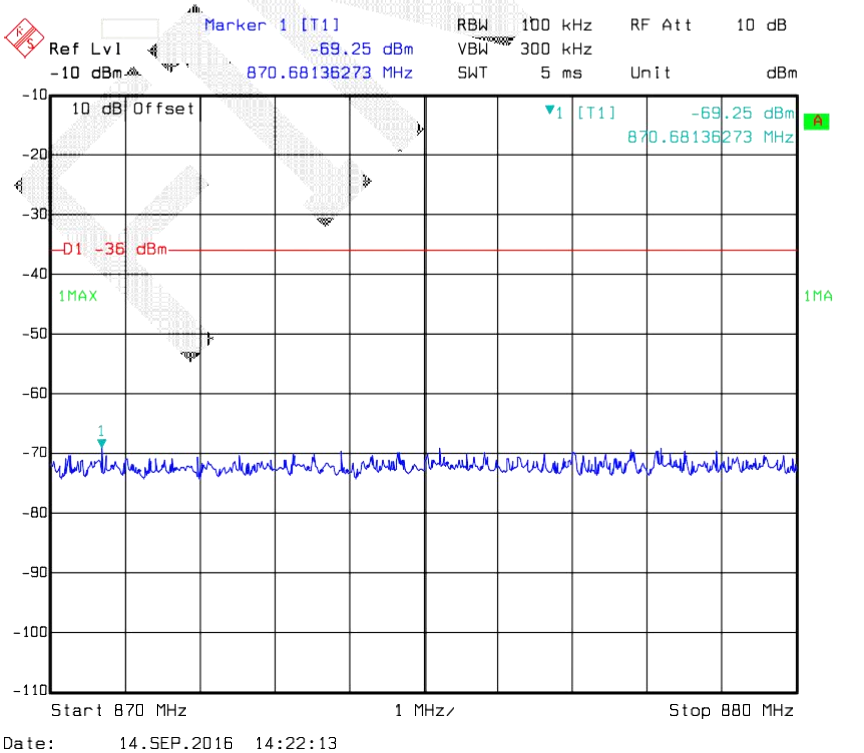
850 MHz-860 MHz



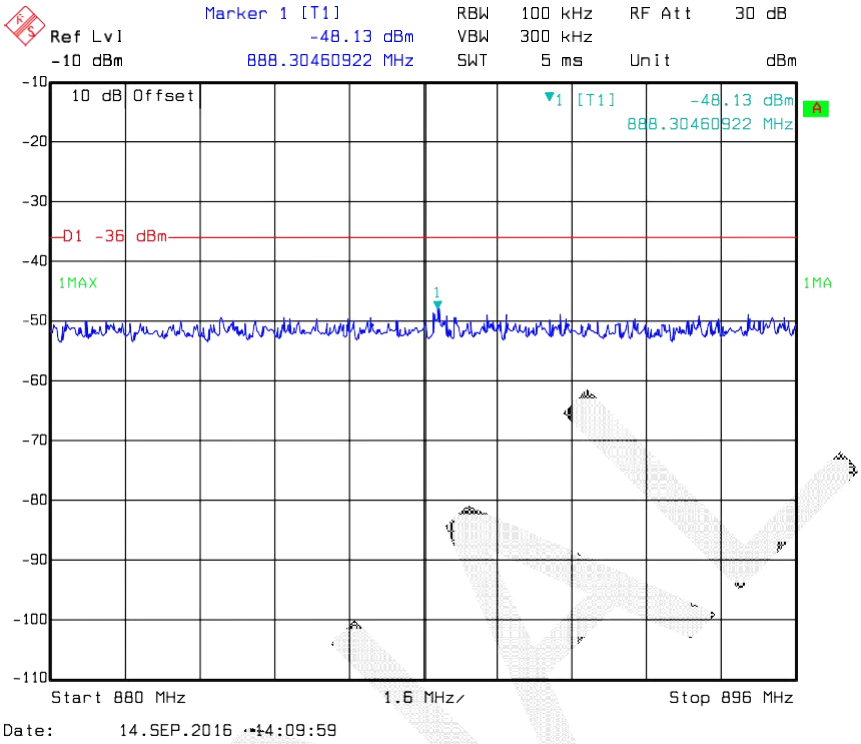
860 MHz-870 MHz



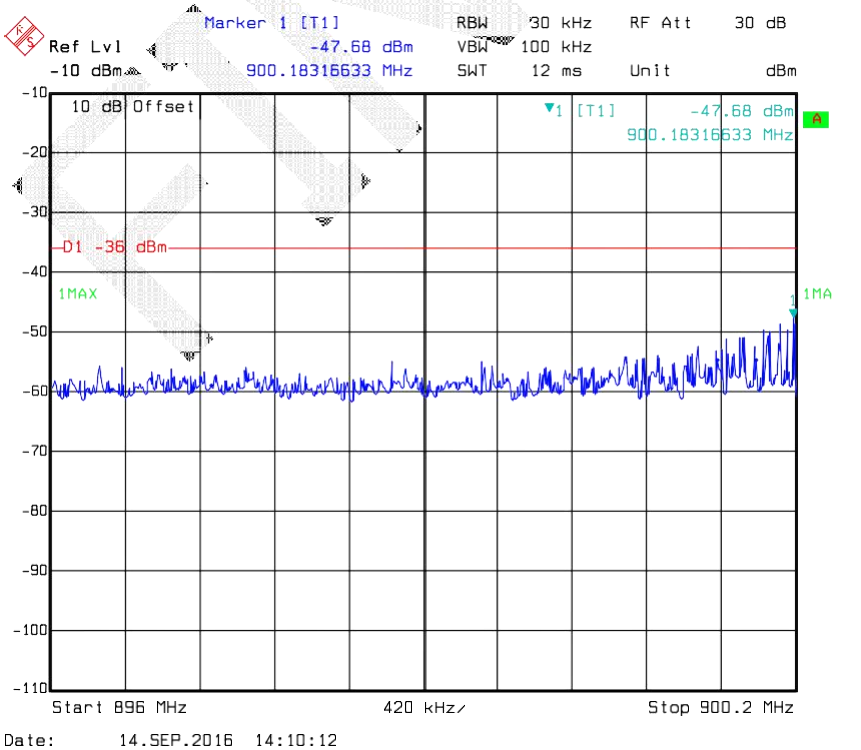
870 MHz-880 MHz



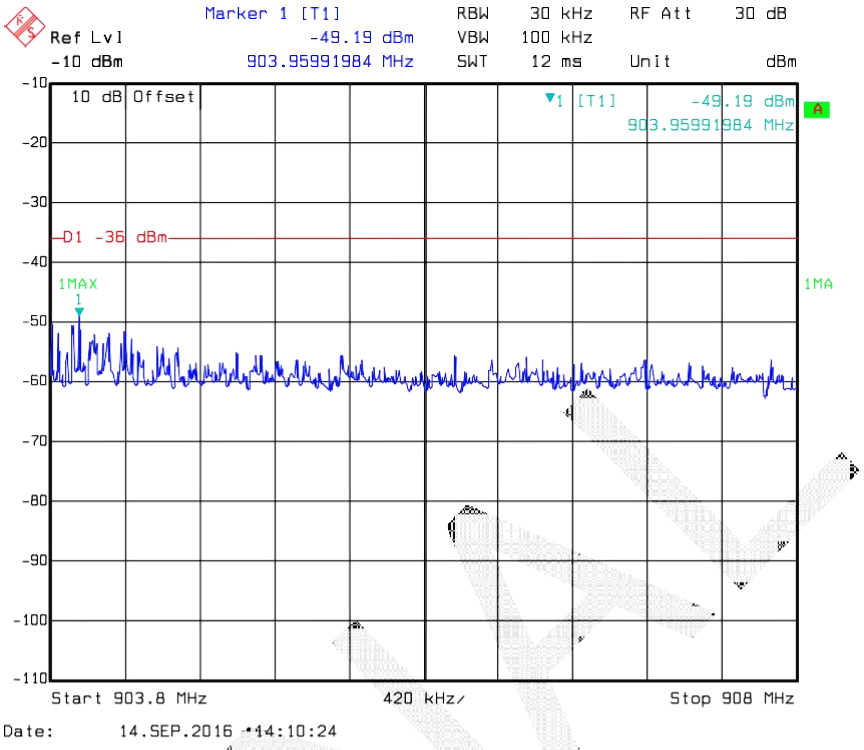
880 MHz-896 MHz



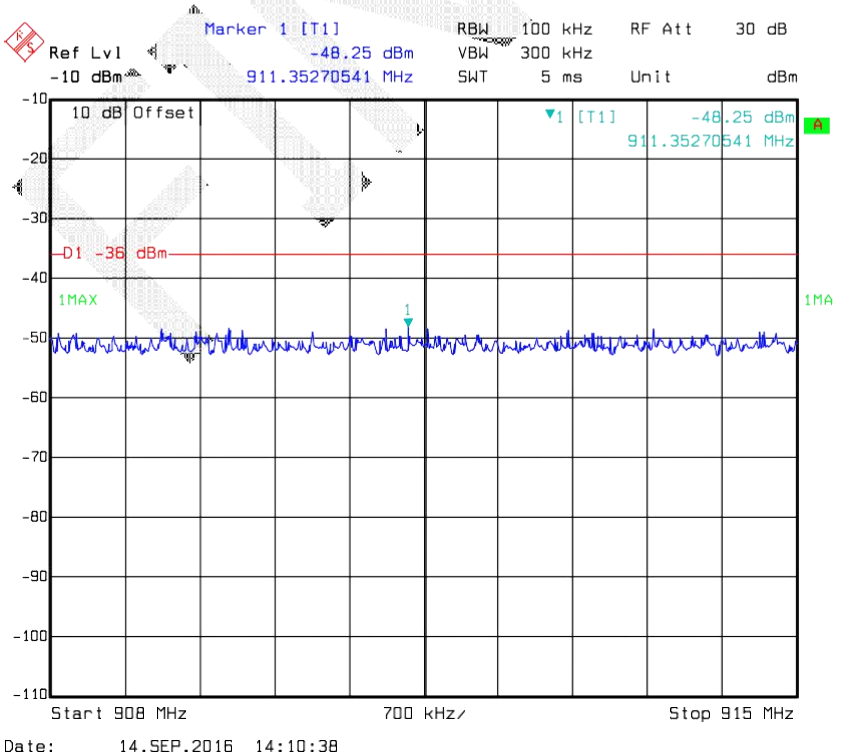
896 MHz-900.2 MHz



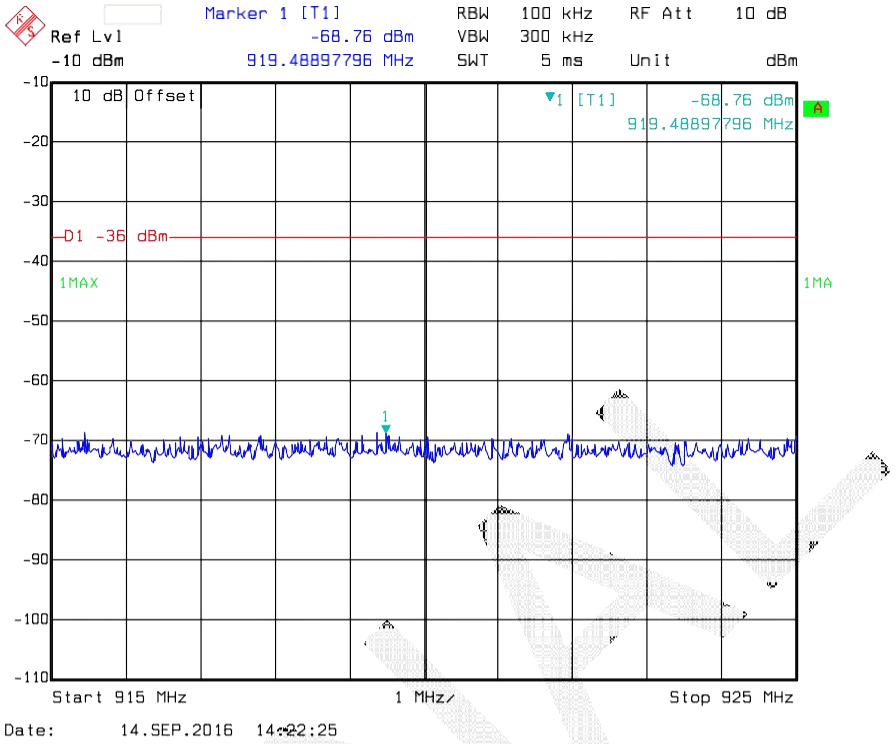
903.8 MHz-908 MHz



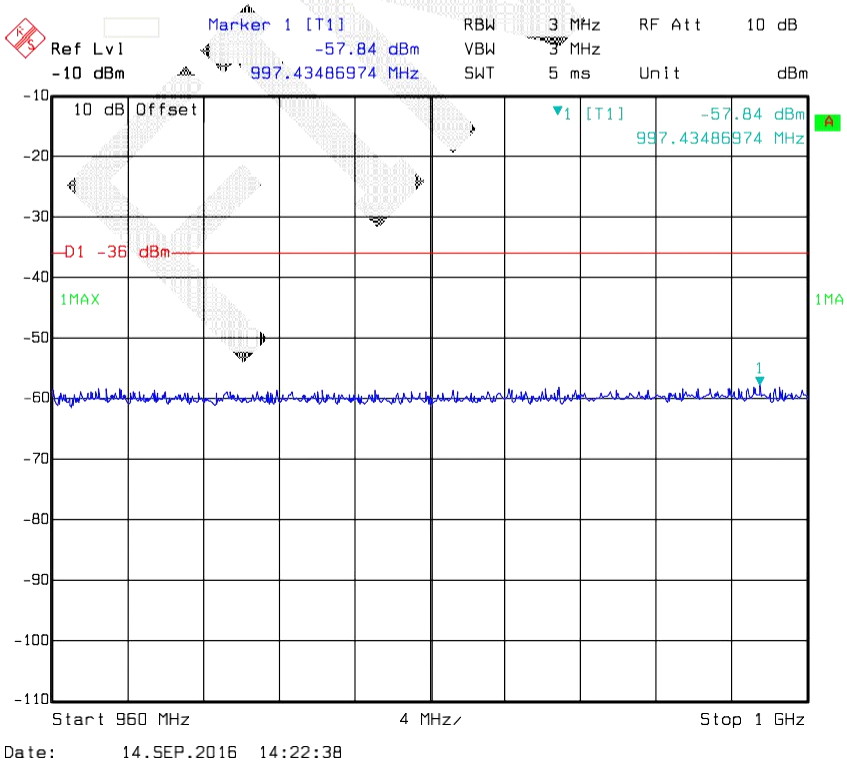
908 MHz-915 MHz



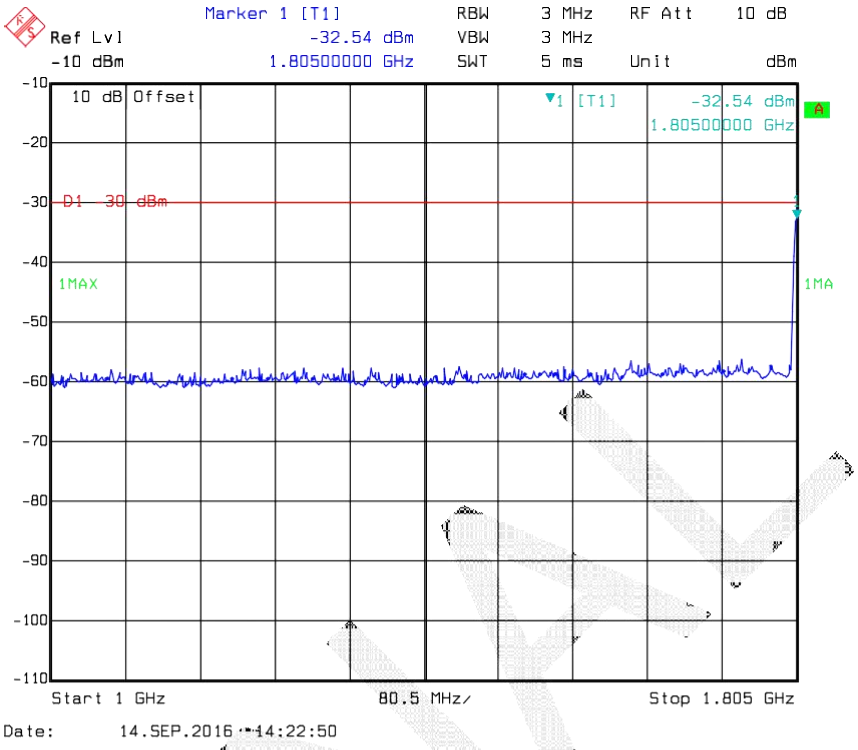
915 MHz-925 MHz



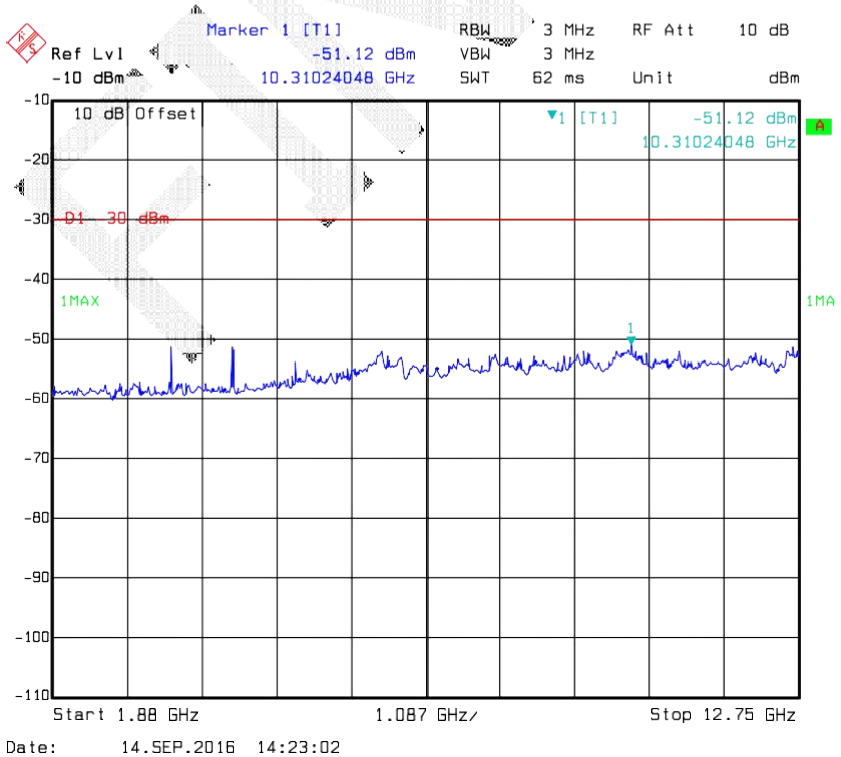
960 MHz-1 GHz



1 GHz-1.805 GHz



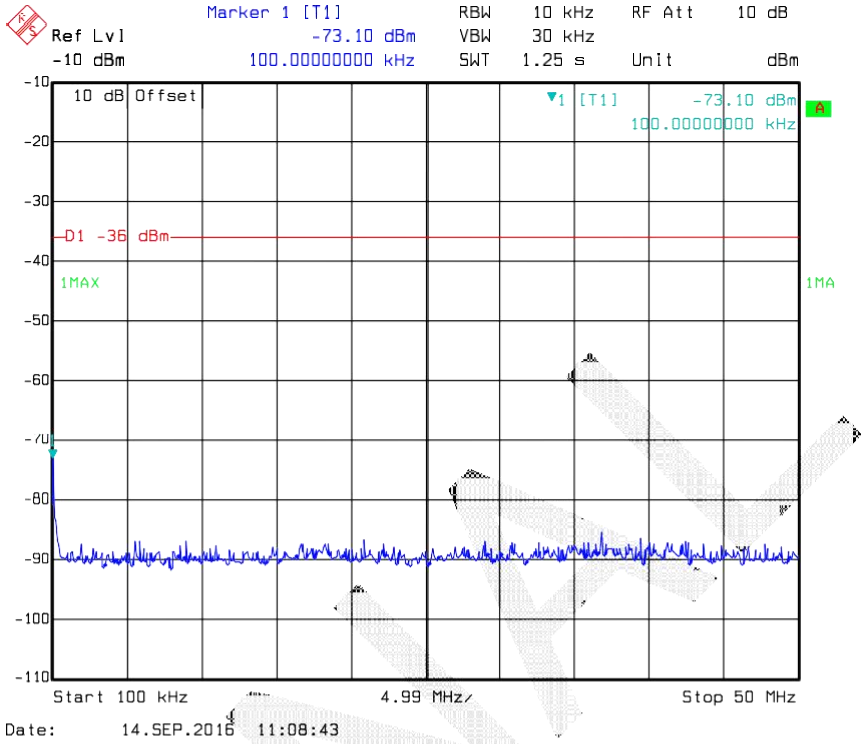
1.88 GHz-12.75 GHz



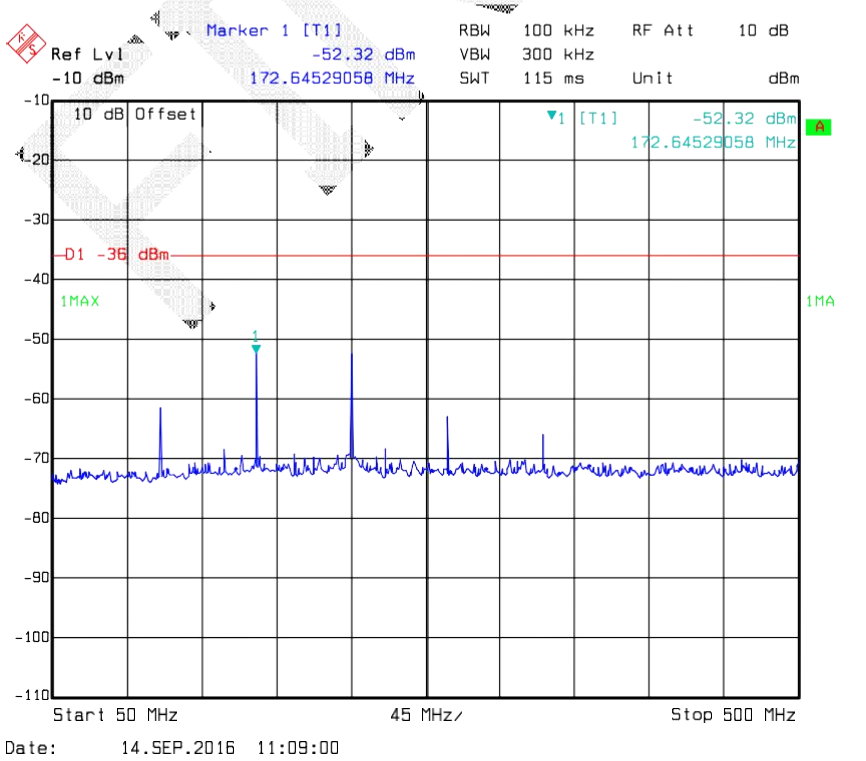
Note: 925-960MHz is RX bands, please refer to sub clause §4.2.6.

DCS 1800 （Middle Channel）

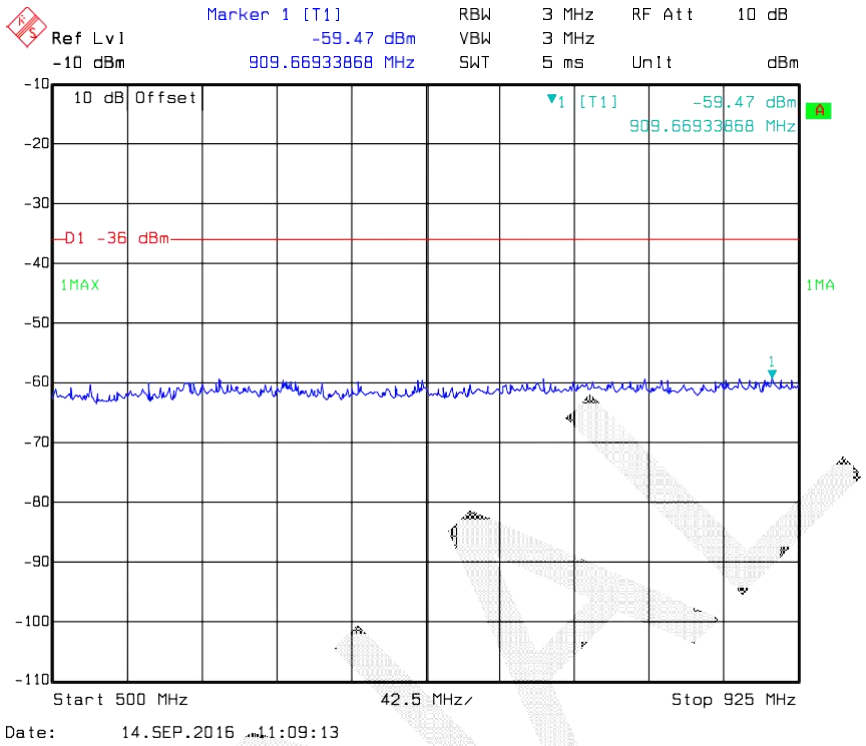
100 kHz-50 MHz



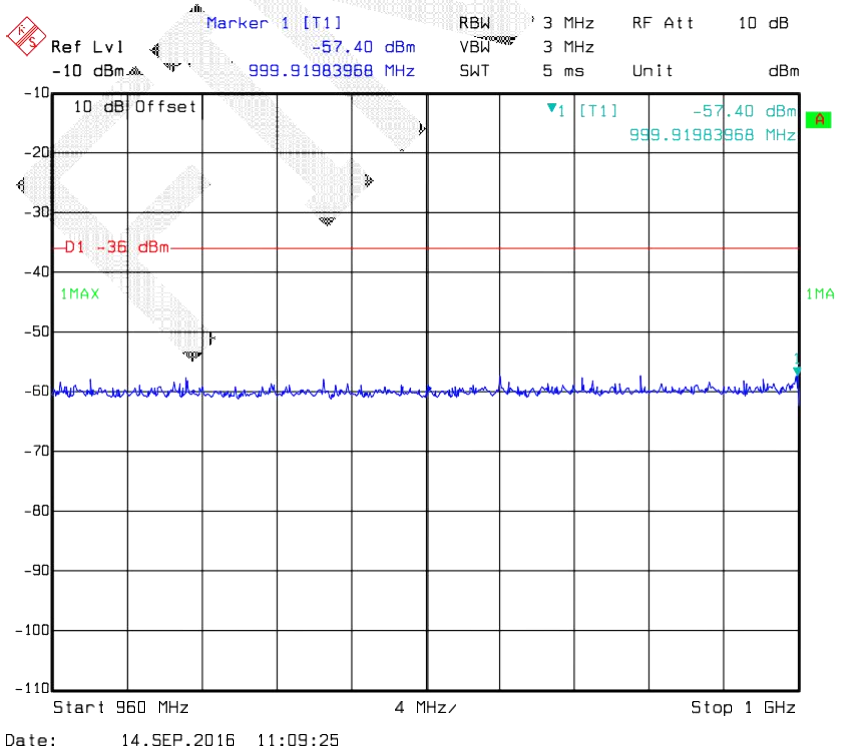
50 MHz-500 MHz



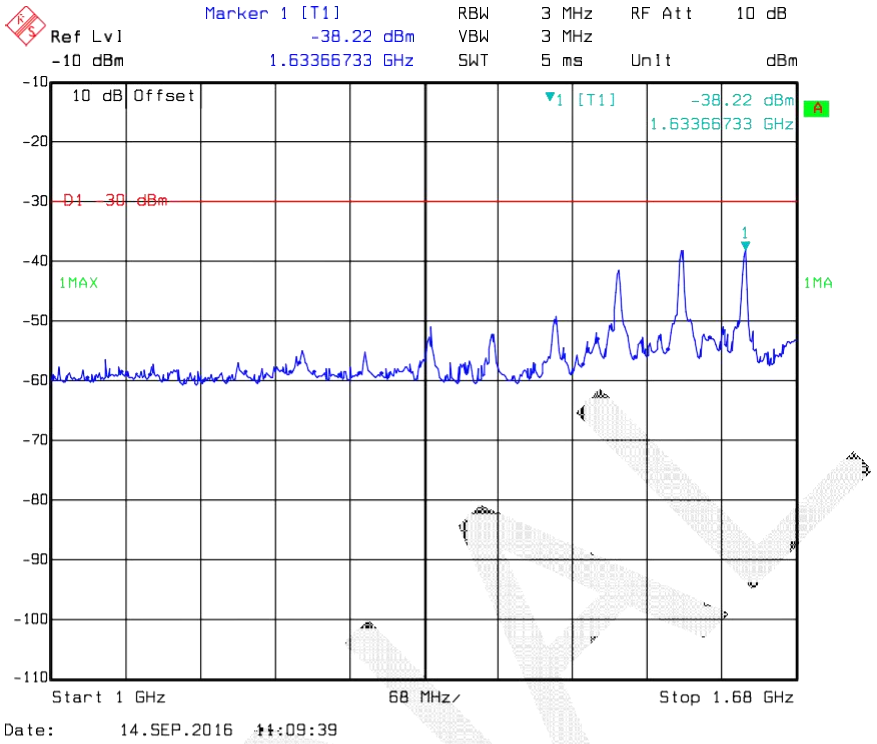
500 MHz-925 MHz



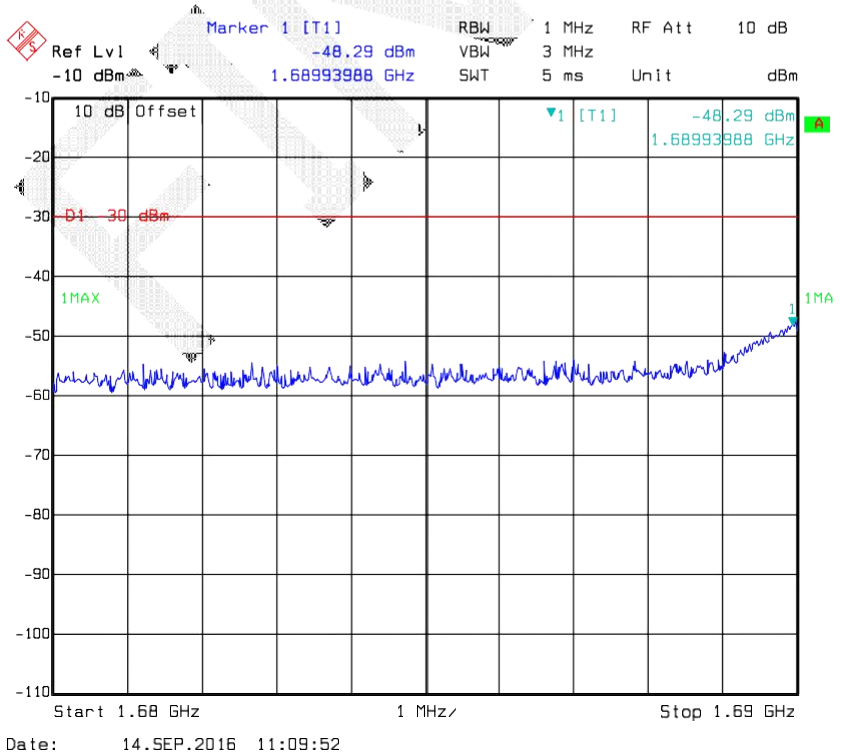
960 MHz-1 GHz



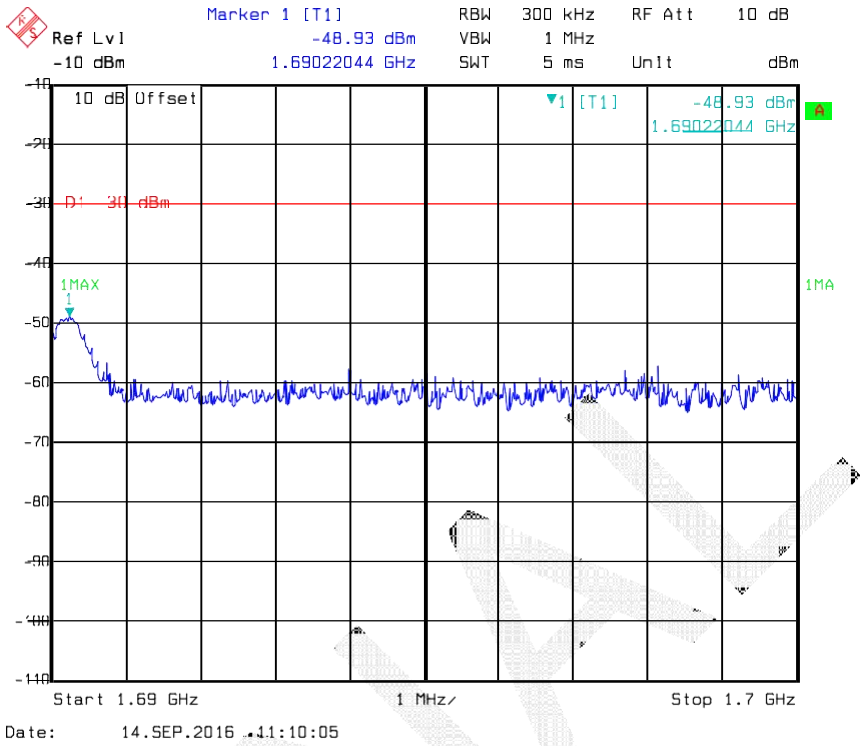
1.0 GHz-1.68 GHz



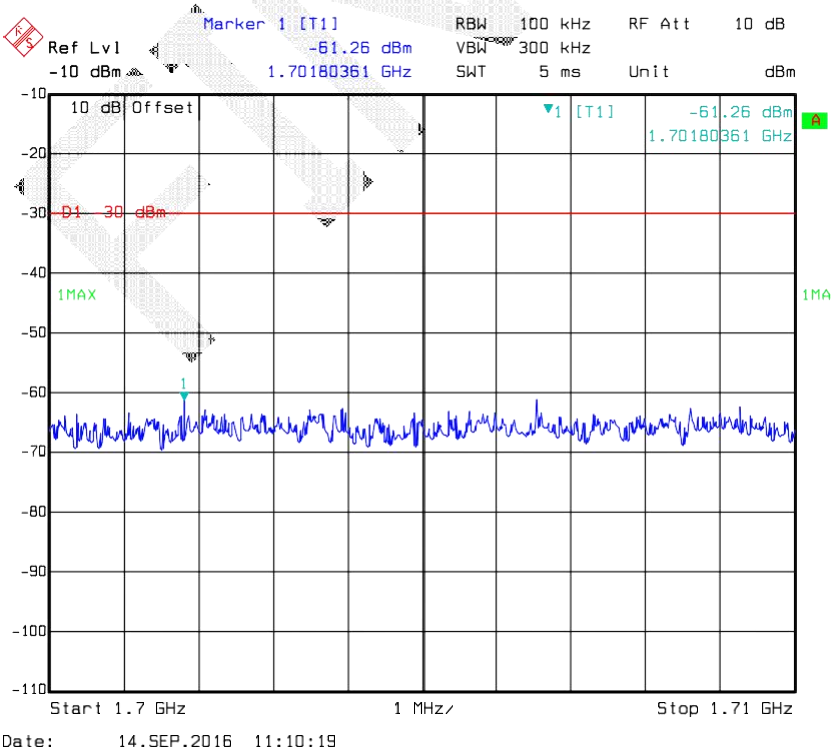
1.68 GHz-1.69 GHz



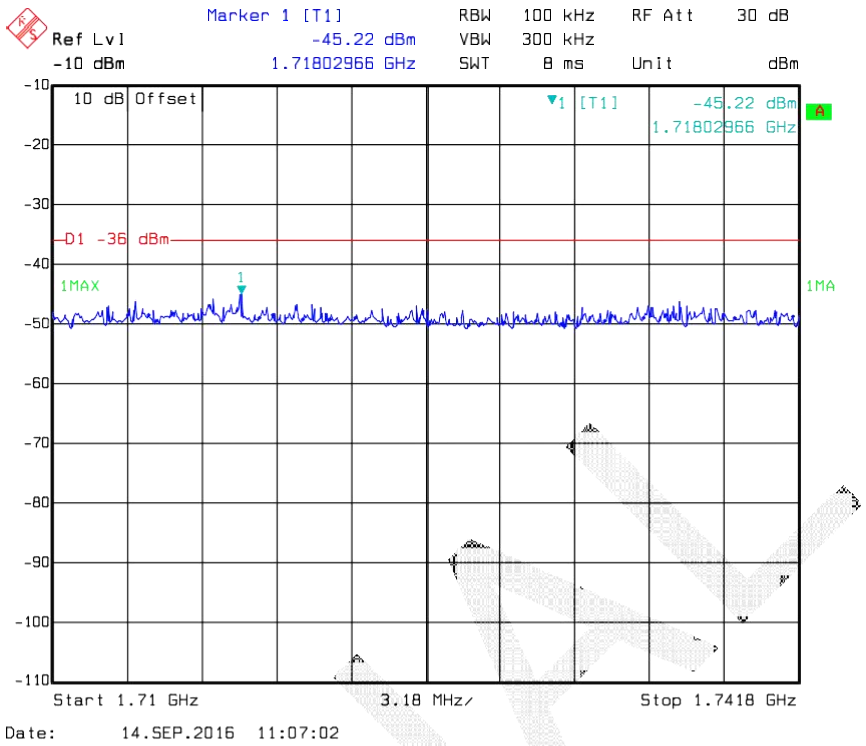
1.69 GHz-1.7 GHz



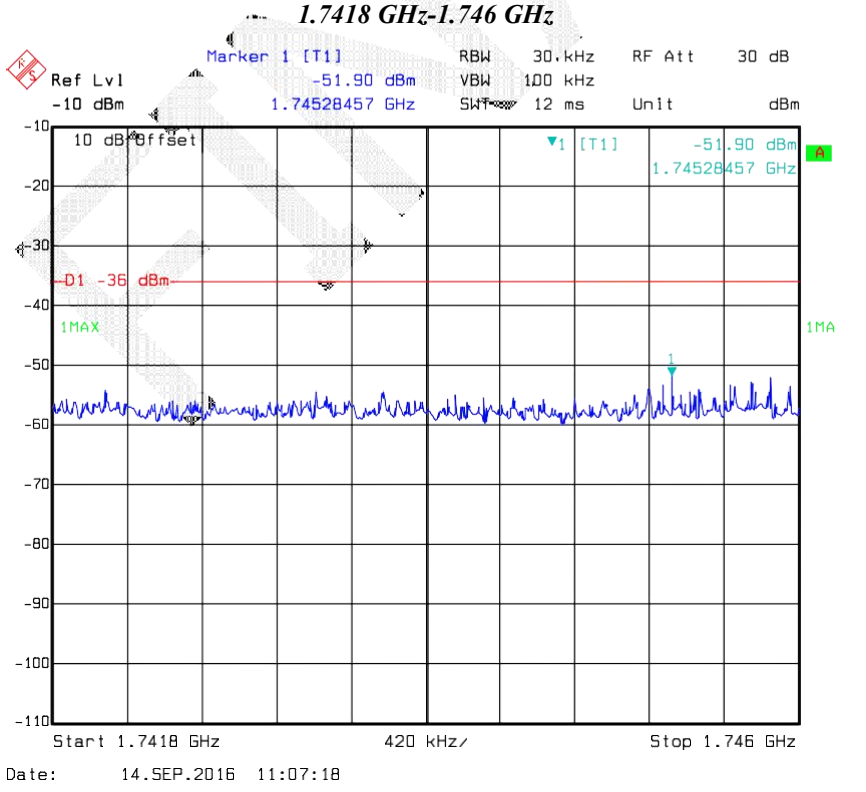
1.7 GHz-1.71 GHz



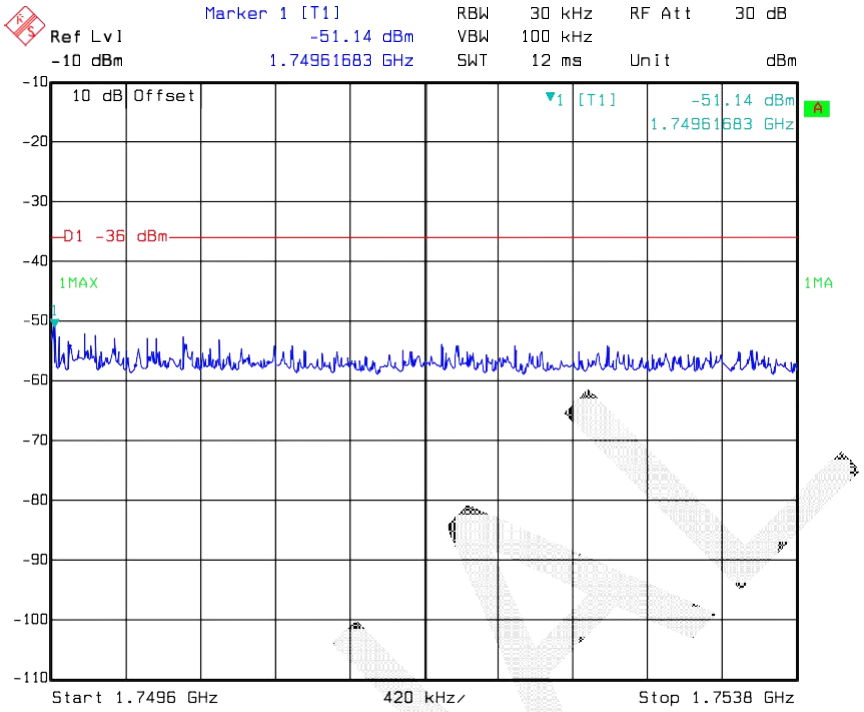
1.71 GHz-1.7418 GHz



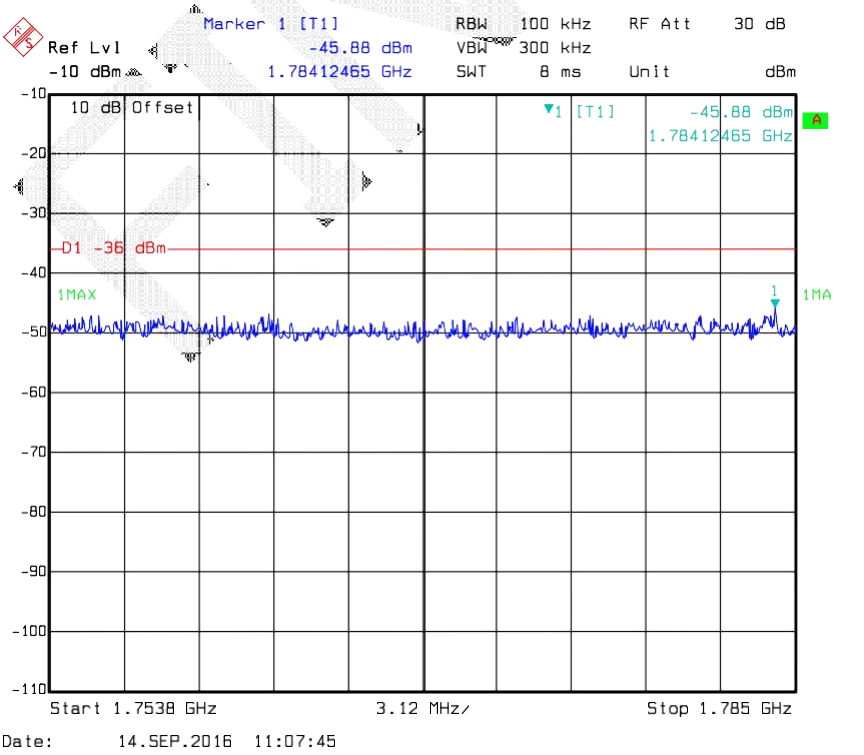
1.7418 GHz-1.746 GHz



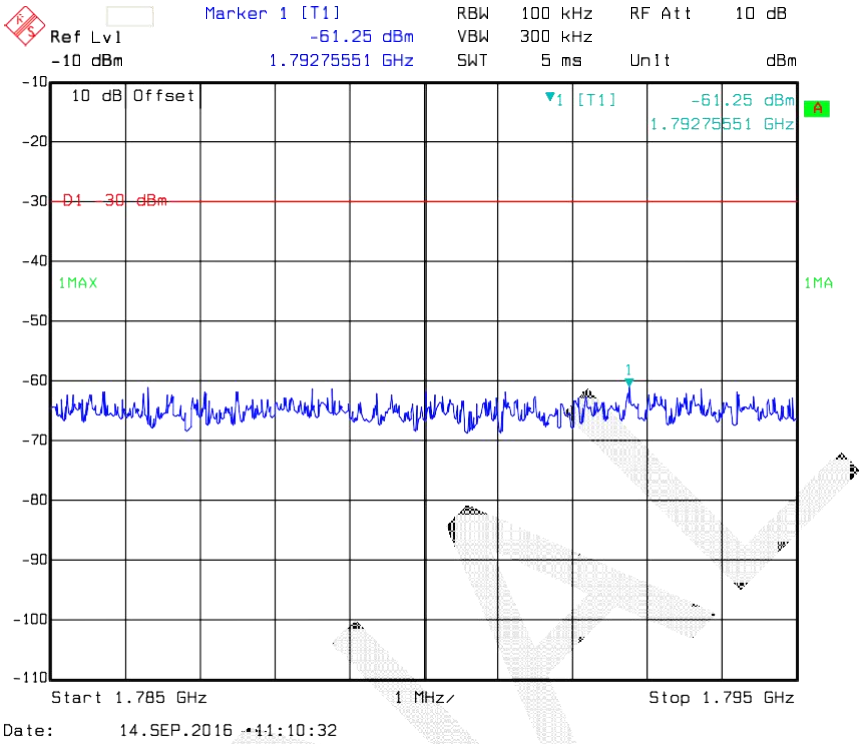
1.7496 GHz-1.7538 GHz



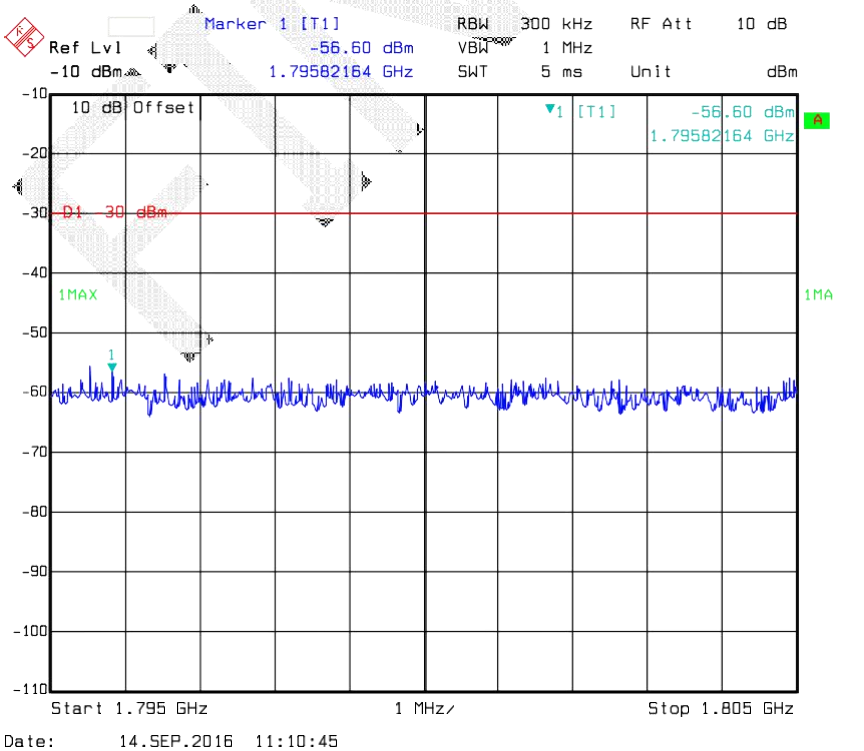
1.7538 GHz-1.785 GHz



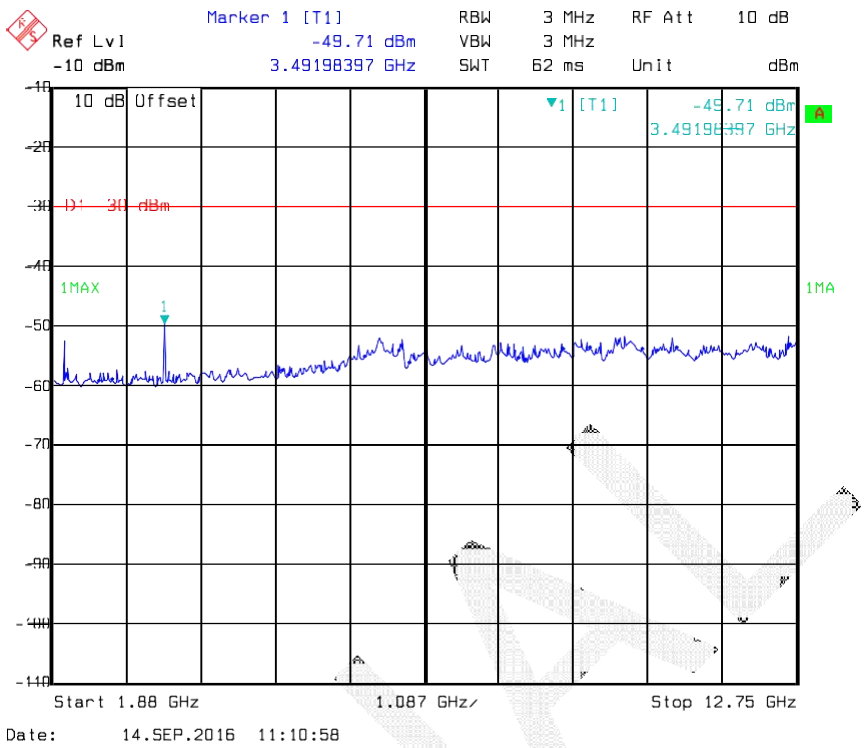
1.785 GHz-1.795 GHz



1.795 GHz-1.805 GHz



1.88 GHz-12.75 GHz



Note: 1805-1880MHz is RX bands, please refer to sub clause §4.2.6.

§4.2.13 – CONDUCTED SPURIOUS EMISSIONS – MS IN IDLE MODE

Applicable Standard

Requirements: According to EN 301 511 V9.0.2 (2003-03), section 4.2.13, the conducted spurious power emitted by the MS, when in idle mode, shall be no more than the levels in table 12.4:

Frequency range		Power level in dBm	
		GSM 400, T-GSM 810 GSM 900, DCS 1 800	GSM 700, GSM 850, PCS 1 900
9 kHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	12,75 GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	12,75 GHz		-47

Table 12.4

Test Procedure

a) Measurements are made in the frequency range 100 kHz to 12,75 GHz. Spurious emissions are measured as the power level of any discrete signal, higher than the requirement in table 12.4 minus 6 dB, delivered into a 50 Ω load.

The measurement bandwidth based on a 5 pole synchronously tuned filter is set according to table 4. The power indication is the peak power detected by the measuring system.

The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel.

Frequency range	Filter bandwidth	Video bandwidth
100 kHz to 50 MHz	10 kHz	30 kHz
50 MHz to 12,75 GHz	100 kHz	300 kHz

Table 4

b) The test is repeated under extreme voltage test conditions ([annex 1, TC2.2 and TC3])

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2017-11-22
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Temperature:	28.8~28.9 °C
Relative Humidity:	47~49 %
ATM Pressure:	100.1~100.2 kPa

The testing was performed by Robin Zhengon 2017-09-14 and 2017-11-06.

Test Result

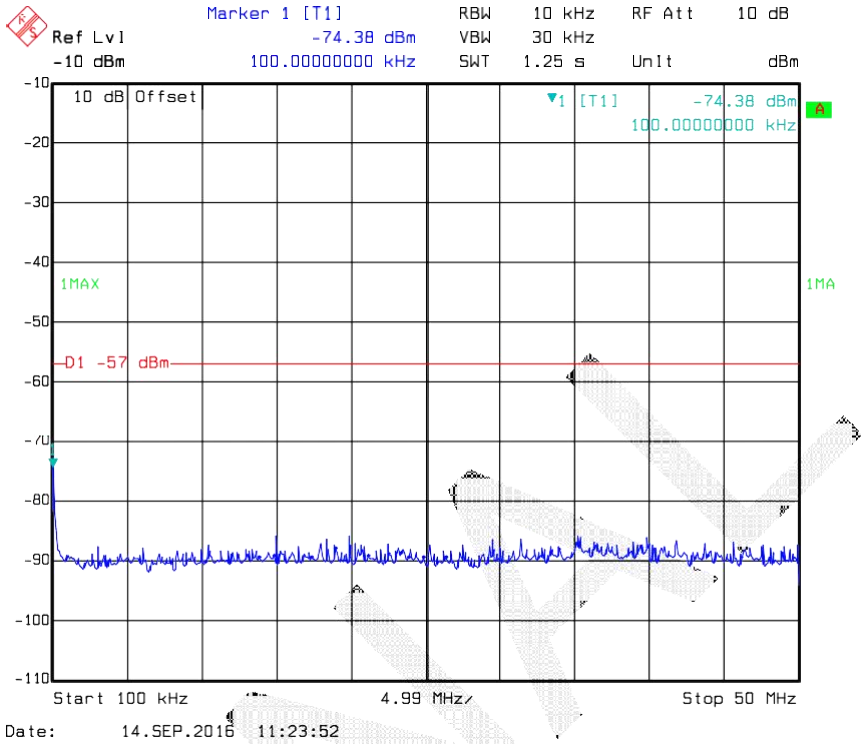
Please refer to the following plots.

Mode	Test Frequency (MHz)	Test Condition		Result
E-GSM 900	902.0	Normal & H.V.	L.V.	Compliance
DCS 1800	1747.8	Normal & H.V.	L.V.	Compliance

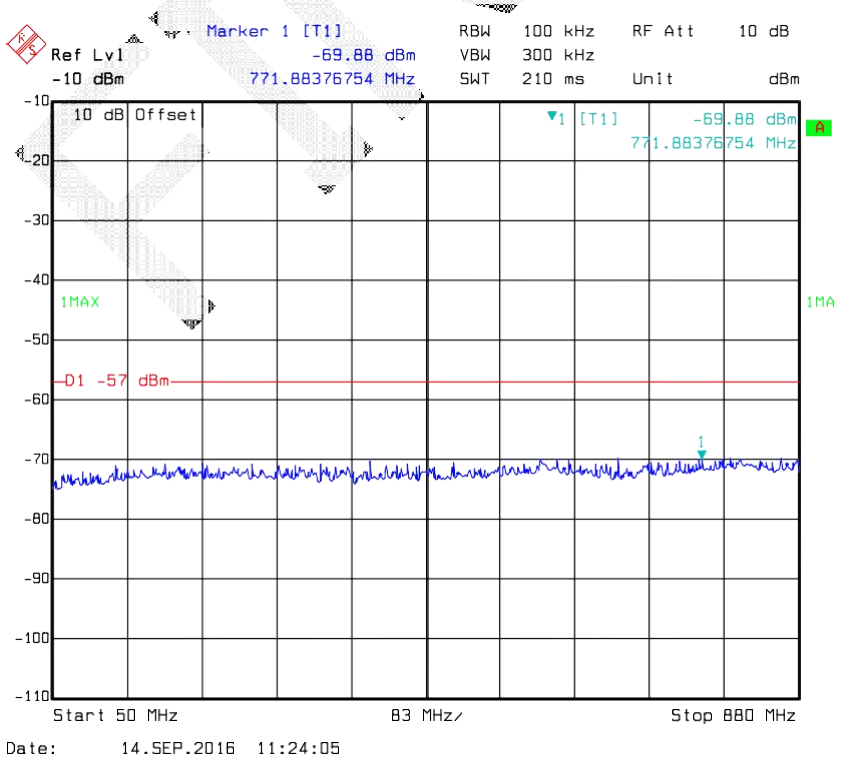
Normal & H.V. Condition Test Data as below:

E-GSM900

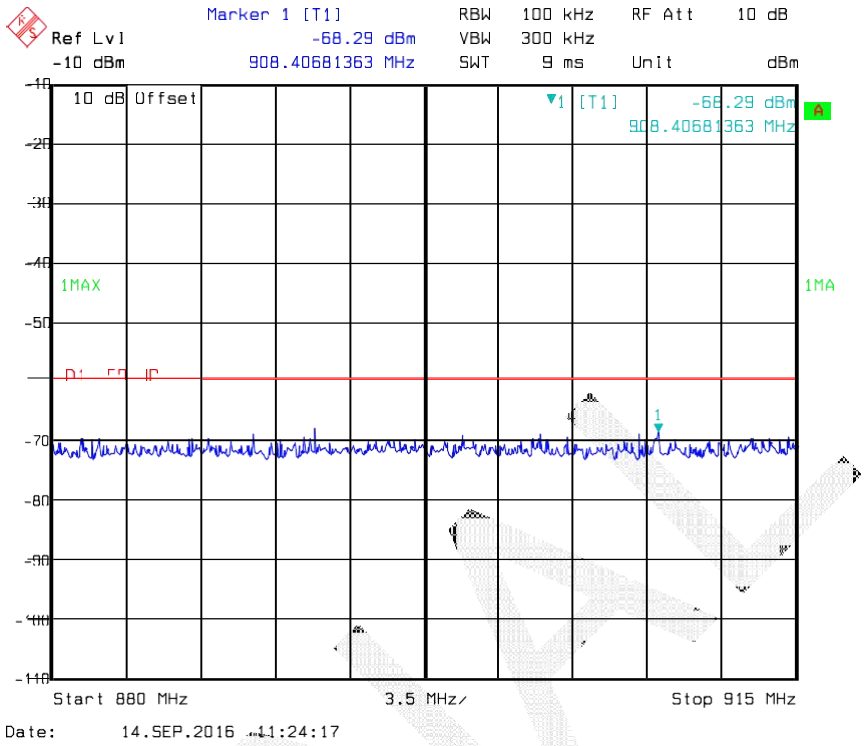
100 kHz-50 MHz



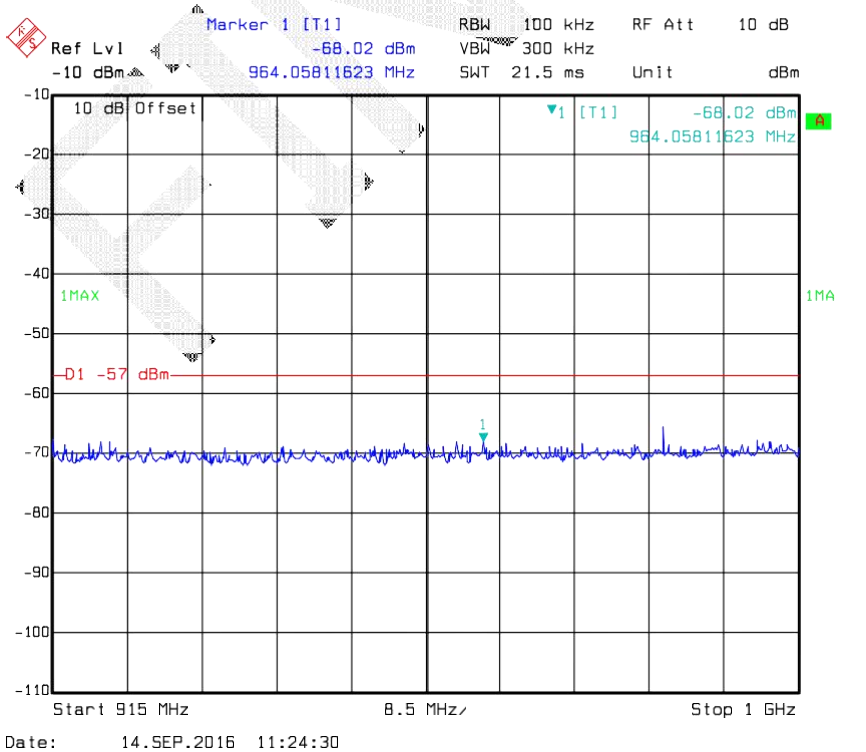
50 MHz-880 MHz



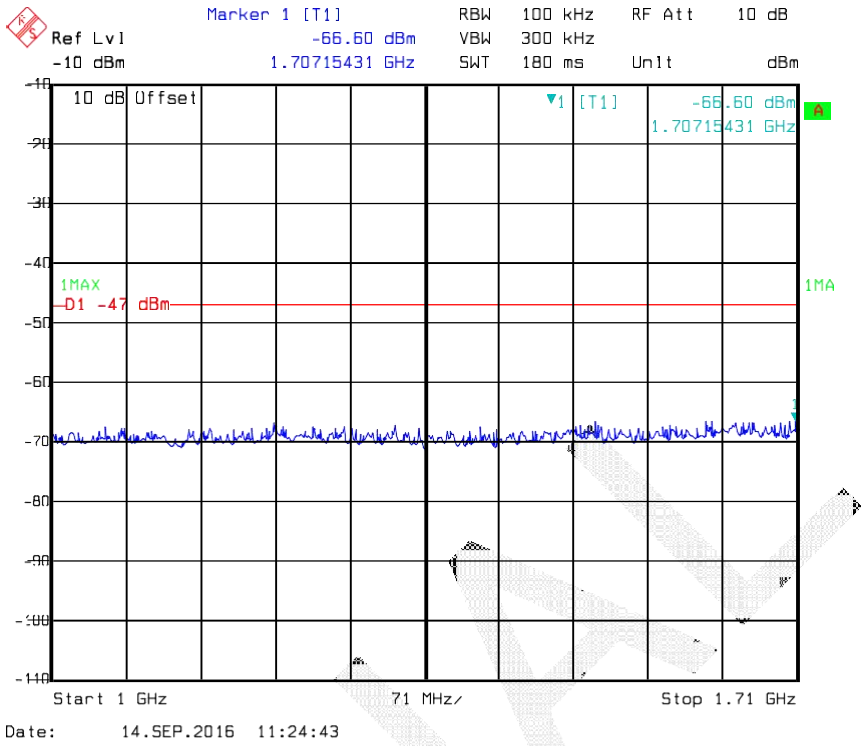
880 MHz-915 MHz



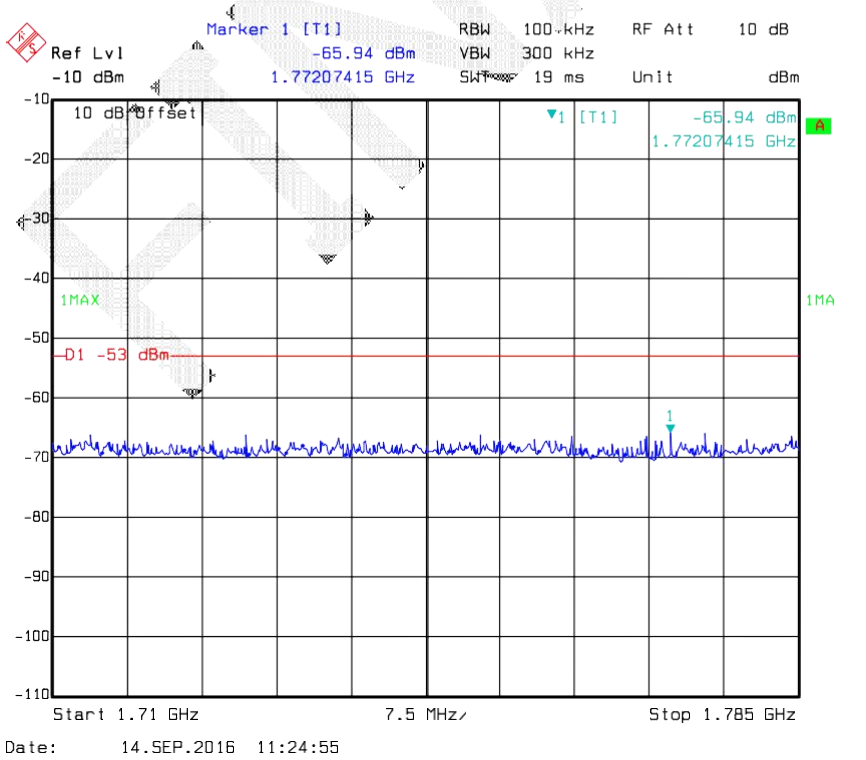
915 MHz-1 GHz



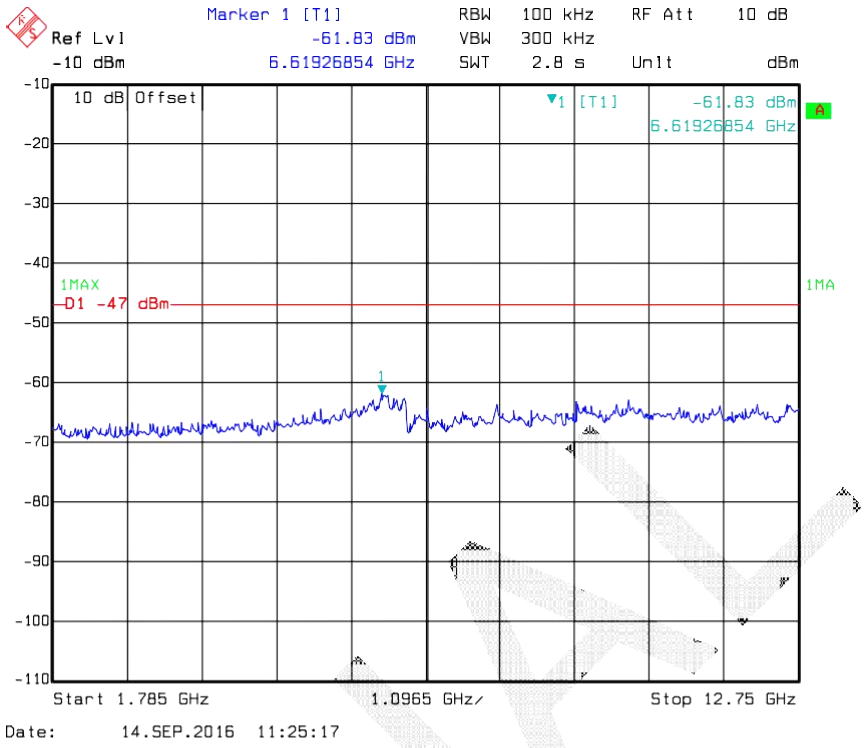
1 GHz-1.71 GHz



1.71 GHz-1.785 GHz

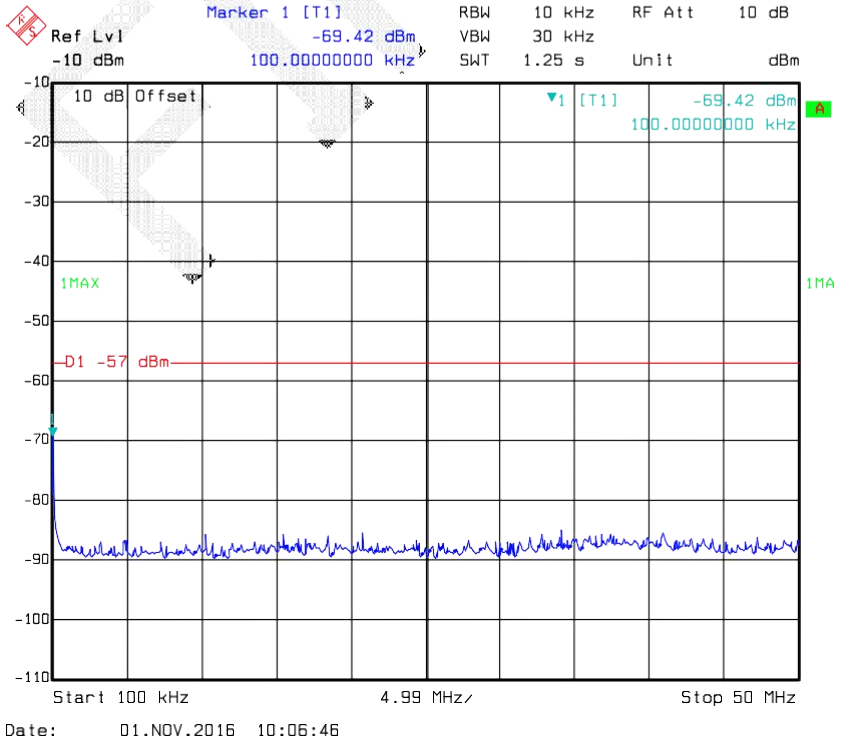


1.785 GHz-12.75 GHz

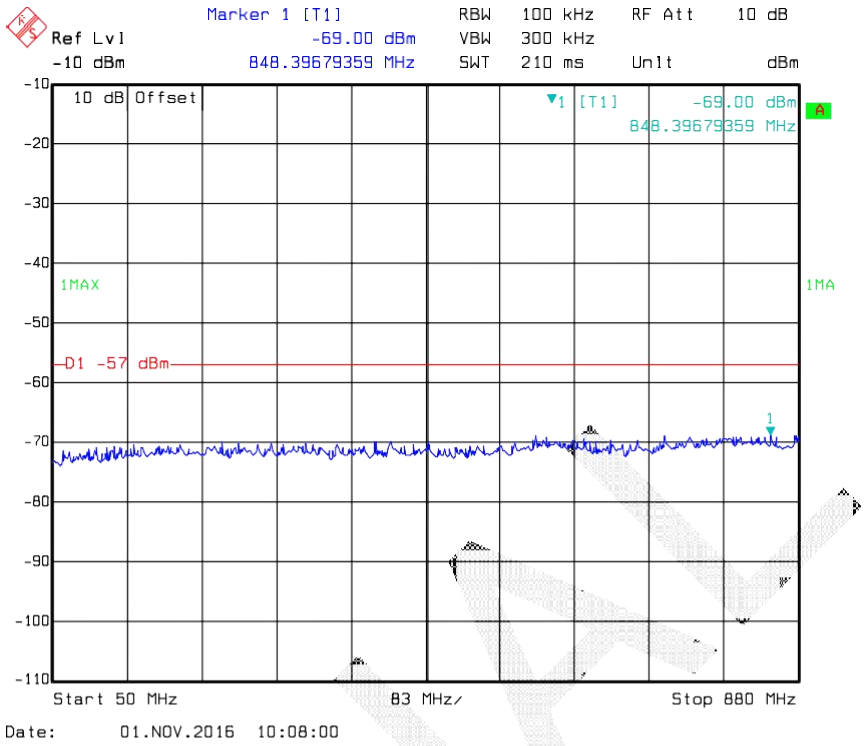


DCS 1800

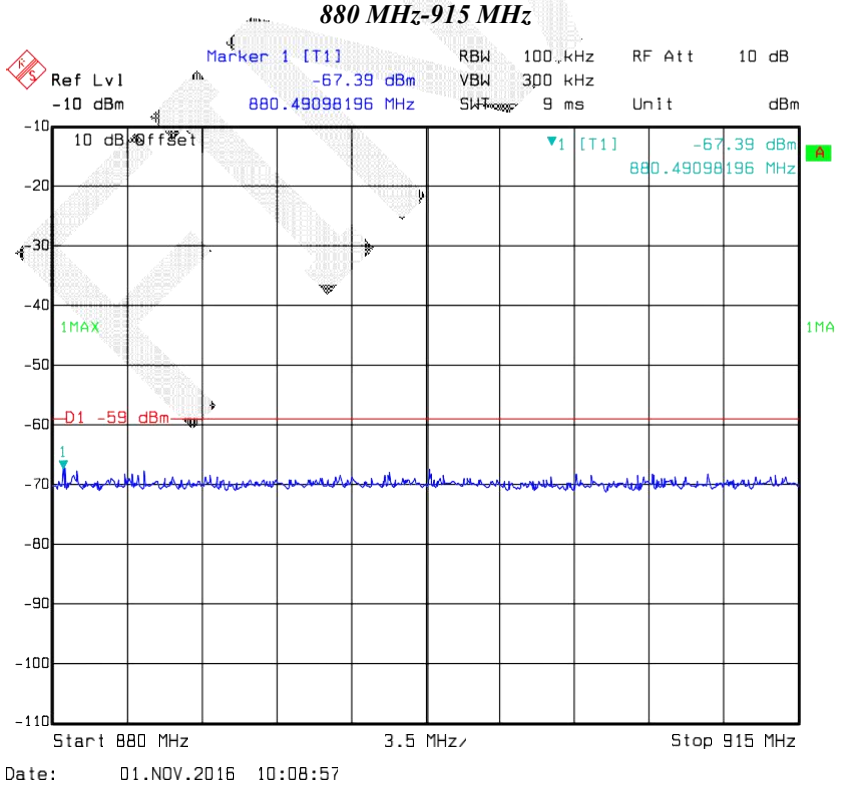
100 kHz-50 MHz



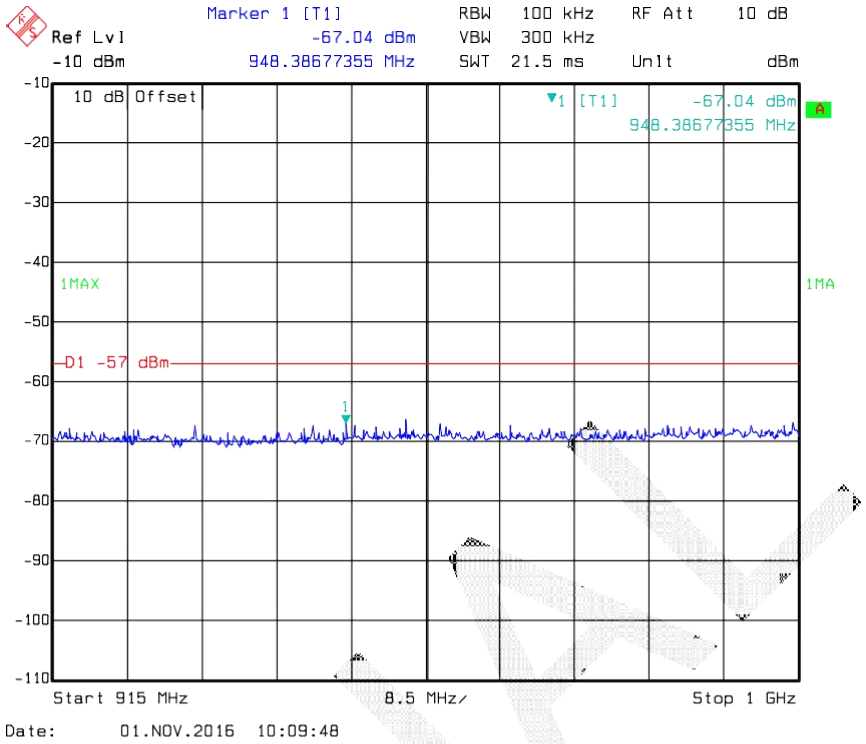
50 MHz-880 MHz



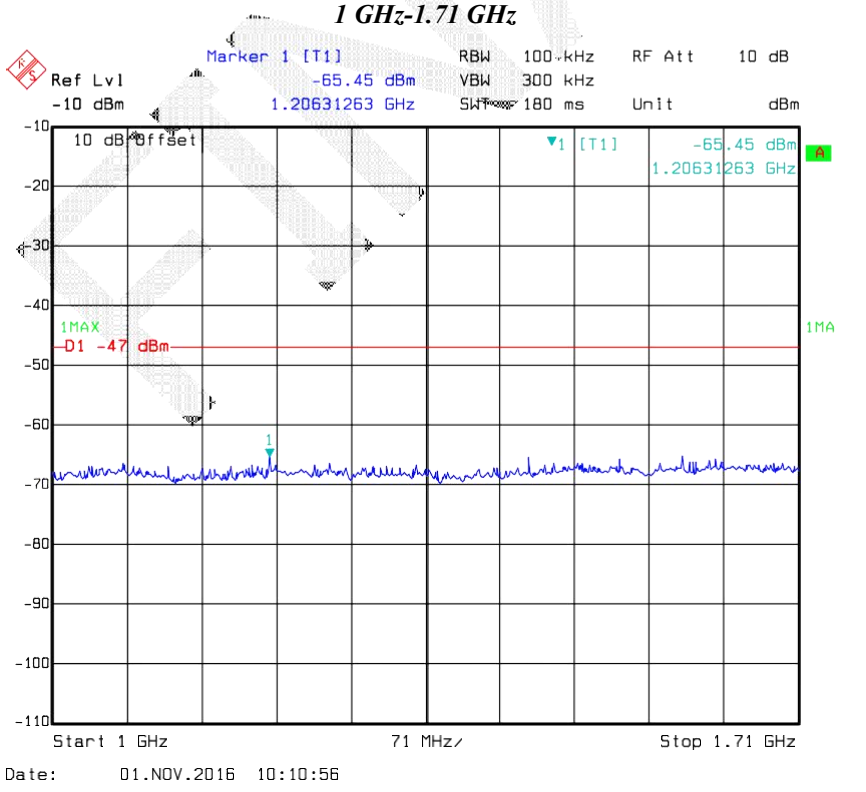
880 MHz-915 MHz



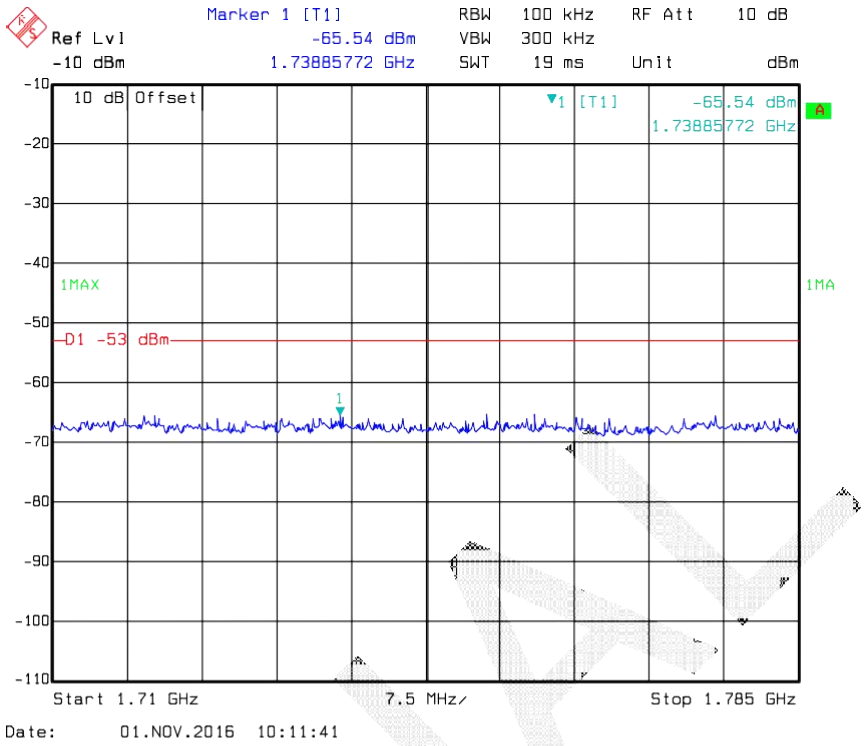
915MHz -1 GHz



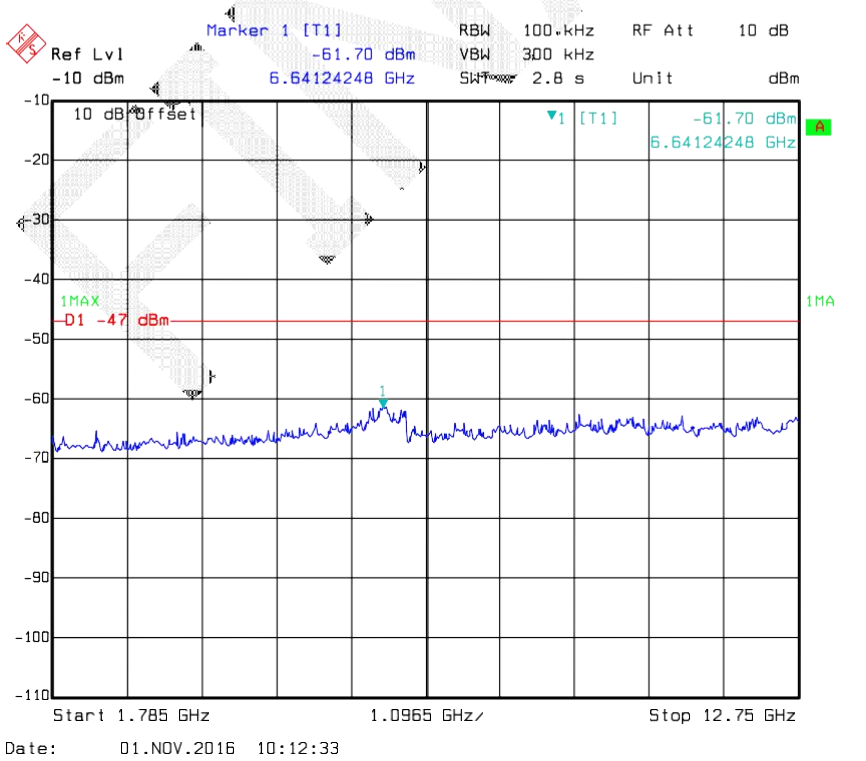
1 GHz-1.71 GHz



1.71 GHz-1.785 GHz



1.785 GHz-12.75 GHz



§4.2.16 – RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL

Applicable Standard

Requirements: According to EN 301 511 V9.0.2 (2003-03), section 4.2.16, the radiated spurious power emitted by the MS, when allocated channel, shall be no more than the levels in table 5 under normal and extreme voltage conditions.

Table 5

Frequency range		Power level in dBm		
		GSM 400, GSM 700, GSM 850, GSM 900	DCS 1 800	PCS 1 900
30 MHz to	1 GHz	-36	-36	-36
1 GHz to	4 GHz	-30		-30
1 GHz to	1 710 MHz		-30	
1 710 MHz to	1 785 MHz		-36	
1 785 MHz to	4 GHz		-30	

Test Procedure

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.

NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 6.
The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 2: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 3: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

e) The test is repeated under extreme voltage test conditions (see [annex 1, TC2.2]).

Table 6

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
30 MHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz excl. relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz; GSM 480: 478,8 MHz to 486 MHz	-	100 kHz	300 kHz
500 MHz to 4 GHz, Excl. relevant TX band: GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz; E-GSM: 880 MHz to 915 MHz; DCS: 1 710 MHz to 1 785 MHz. PCS 1 900: 1 850 MHz to 1 910 MHz Relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz GSM 480: 478,8 MHz to 486 MHz GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz E-GSM: 880 MHz to 915 MHz DCS: 1 710 MHz to 1 785 MHz PCS 1 900: 1 850 MHz to 1 910 MHz	0 to 10 MHz >= 10 MHz >= 20 MHz >= 30 MHz (offset from edge of relevant TX band) 1,8 MHz to 6,0 MHz > 6,0 MHz (offset from carrier)	100 kHz 300 kHz 1 MHz 3 MHz 30 kHz 100 kHz	300 kHz 1 MHz 3 MHz 3 MHz 100 kHz 300 kHz
NOTE 1: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in the Mid ARFCN range. NOTE 2: Due to practical implementation of a SS, the video bandwidth is restricted to a maximum of 3 MHz.			

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-2	2014-08-27	2017-08-26
HP	Amplifier	8447E	2434A02181	N/A	N/A
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2017-08-31
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22
Mini-Circuit	Amplifier	ZVA-213-S+	SN054201245	2017-02-19	2017-02-19
TDK RF	Horn Antenna	HRN-0118	130 084	2017-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2017-01-05	2019-01-04
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2017-12-22

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Temperature:	25.9 °C
Relative Humidity:	65 %
ATM Pressure:	100.1 kPa

The testing was performed by Liu Wentao on 2017-10-20.

Test Results: Please refer to the following tables.

Mode	Test Frequency (MHz)	Test Condition		Result
E-GSM 900	902.0	Normal & H.V.	L.V.	Compliance
DCS 1800	1747.8	Normal & H.V.	L.V.	Compliance

E-GSM 900 Band

Scan 30MHz -4GHz, Middle Channel, and Normal & High Voltage Condition and Low Voltage Condition, and worst case as below:

Frequency (MHz)	Indicated		Substituted				Limit (dBm)	Margin (dB)
	Polar (H/V)	Measured Level (dBµV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm）		
1804.00	H	50.45	-49.7	11.1	1.3	-39.9	-30.0	9.9
1804.00	V	46.87	-53.7	11.1	1.3	-43.9	-30.0	13.9
2706.00	H	38.73	-57.8	13.1	2.4	-47.1	-30.0	17.1
2706.00	V	36.52	-61.8	13.1	2.4	-51.1	-30.0	21.1
3608.00	H	35.26	-60.4	14.1	2.2	-48.5	-30.0	18.5
3608.00	V	33.49	-61.7	14.1	2.2	-49.8	-30.0	19.8
479.50	H	37.45	-62.1	0.0	0.7	-62.8	-36.0	26.8
501.90	V	36.51	-65.9	0.0	0.7	-66.6	-36.0	30.6

DCS1800 Band

Scan 30MHz -4GHz, Middle Channel, and Normal & High Voltage Condition and Low Voltage Condition, and worst case as below:

Frequency (MHz)	Indicated		Substituted				Limit (dBm)	Margin (dB)
	Polar (H/V)	Measured Level (dBµV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm）		
3495.60	H	45.45	-51.2	13.8	2.1	-39.5	-30.0	9.5
3495.60	V	40.17	-55.4	13.8	2.1	-43.7	-30.0	13.7
327.60	H	35.76	-67.6	0.0	0.5	-68.1	-36.0	32.1
315.20	V	36.92	-68.6	0.0	0.5	-69.1	-36.0	33.1

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

§4.2.17 – RADIATED SPURIOUS EMISSIONS – MS IN IDLE MODE

Applicable Standard

Requirements: According to EN 301 511 V9.0.2 (2003-03), section 4.2.17, the radiated spurious power emitted by the MS, when in idle mode, shall be no more than the levels in table 7 under normal and extreme voltage conditions.

Table 7

Frequency range		Power level in dBm	
		GSM 400, GSM 900, DCS 1 800	GSM 700, GSM 850, PCS 1 900
30 MHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1 000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	4 GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	4GHz		-47

Test Procedure

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.

NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to table 8. The power indication is the peak power detected by the measuring system.

The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

Table 8

Frequency range	Filter bandwidth	Video bandwidth
30 MHz to 50 MHz	10 kHz	30 kHz
50 MHz to 4 GHz	100 kHz	300 kHz

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.
e) The test is repeated under extreme voltage test conditions (see [Annex 1, TC2.2]).

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-2	2014-08-27	2017-08-26
HP	Amplifier	8447E	2434A02181	N/A	N/A
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2017-08-31
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22
Mini-Circuit	Amplifier	ZVA-213-S+	SN054201245	2017-02-19	2017-02-19
TDK RF	Horn Antenna	HRN-0118	130 084	2017-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2017-01-05	2019-01-04
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2017-12-22

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Results：Compliance

Environmental Conditions

Temperature:	25.9 °C
Relative Humidity:	65 %
ATM Pressure:	100.1 kPa

The testing was performed by Liu Wentao on 2017-10-20.

E-GSM 900 Band

Scan 30MHz -4GHz, Normal & High Voltage Condition and Low Voltage Condition, and worst case as below:

Frequency (MHz)	Indicated		Substituted				Limit (dBm)	Margin (dB)
	Polar (H/V)	Measured Level (dBμV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm）		
Idle mode								
1640.00	H	30.58	-70.6	10.4	1.3	-61.5	-47.0	14.5
1640.00	V	29.84	-71.8	10.4	1.3	-62.7	-47.0	15.7
278.50	H	36.45	-68.2	0.0	0.5	-68.7	-57.0	11.7
311.92	V	35.98	-69.6	0.0	0.5	-70.1	-57.0	13.1

DCS1800 Band

Scan 30MHz -4GHz, Normal & High Voltage Condition and Low Voltage Condition, and worst case as below:

Frequency (MHz)	Indicated		Substituted				Limit (dBm)	Margin (dB)
	Polar (H/V)	Measured Level (dBμV)	S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (dBm）		
Idle mode								
3152.00	H	31.75	-66	13.4	2.3	-54.9	-47.0	7.9
3152.00	V	30.18	-66.9	13.4	2.3	-55.8	-47.0	8.8
319.70	H	37.12	-66.5	0.0	0.5	-67.0	-57.0	10.0
309.70	V	36.48	-69.1	0.0	0.5	-69.6	-57.0	12.6

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

§4.2.20 – RECEIVER BLOCKING AND SPURIOUS RESPONSE – SPEECH CHANNELS

Applicable Standard

The blocking characteristics of the receiver are specified separately for in-band and out-of-band performance as Identified in 3GPP TS 05.05 sub clause 5.1.

The reference sensitivity performance as specified in table 1 of 3GPP TS 05.05 shall be met when the following Signals are simultaneously input to the receiver:

- a useful signal at frequency f0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 sub clause 6.2;

- a continuous, static sine wave signal at a level as in the table of 3GPP TS 05.05 sub clause 5.1 and at a frequency(f) which is an integer multiple of 200 kHz;

  - with the following exceptions, called spurious response frequencies:

a) GSM 700, GSM 850 and GSM 900: in band, for a maximum of six occurrences (which if grouped shall not exceed three contiguous occurrences per group);

b) out of band, for a maximum of 24 occurrences (which if below f0 and grouped shall not exceed three contiguous occurrences per group).

where the above performance shall be met when the continuous sine wave signal (f) is set to a level of 70 dBµV(emf) (i.e. -43 dBm). 3GPP TS 05.05, sub clause 5.1.

Test Procedure

a) The SS produces a static wanted signal and a static interfering signal at the same time. The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level.

b) The unwanted signal is a C.W. signal (Standard test signal IO) of frequency FB. It is applied in turn on the subset of frequencies calculated in step c) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz.

However, frequencies in the range FR ±600 kHz are excluded.

NOTE: Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.

c) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closely approximating the absolute frequency of the calculated blocking signal frequency) are the combined frequencies from i), ii) and iii) below:

i) The total frequency range formed by:

E-GSM 900 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 17,5 MHz).

And the frequencies +100 MHz and -100 MHz from the edge of the relevant receive band.

Measurements are made at 200 kHz intervals.

ii) The three frequencies IF1, IF1 + 200 kHz, IF1 - 200 kHz.

iii) The frequencies:

mFlo + IF1;

mFlo - IF1;

mFR;

where m is all positive integers greater than or equal to 2 such that either sum lies in the range 100 kHz to 12,75 GHz.

The frequencies in step ii) and iii) lying in the range of frequencies defined by step i) above need not be repeated.

Where:

Flo - local oscillator applied to first receiver mixer

IF1 ... IFn - are the n intermediate frequencies

Flo, IF1, IF2 ... IFn - shall be declared by the manufacturer in the PIXIT statement 3GPP TS 51.010-1 annex 3.

d) The level of the unwanted signal is set according to table 14-28.

Table 14-28a: Level of unwanted signals

	GSM 900		DCS 1 800
	Small MS	Other MS	
FREQUENCY	LEVEL IN dBµVemf( )		
FR ±600 kHz to FR ±800 kHz	70	75	70
FR ±800 kHz to FR ±1,6 MHz	70	80	70
FR ±1,6 MHz to FR ±3 MHz	80	90	80
915 MHz to FR - 3 MHz	90	90	-
FR + 3 MHz to 980 MHz	90	90	-
1 785 MHz to FR - 3 MHz	-	-	87
FR + 3 MHz to 1 920 MHz	-	-	87
835 MHz to < 915 MHz	113	113	
> 980 MHz to 1 000 MHz	113	113	
100 kHz to < 835 MHz	90	90	
> 1 000 MHz to 12,75 GHz	90	90	
100 kHz to 1 705 MHz	-	-	113
> 1 705 MHz to < 1 785 MHz	-	-	101
> 1 920 MHz to 1 980 MHz	-	-	101
> 1 980 MHz to 12,75 GHz	-	-	90

Table 14-28b: Level of unwanted signals

	GSM 450		GSM 480	
	Small MS	Other MS	Small MS	Other MS
FREQUENCY	LEVEL IN dBµVemf( )			
FR ±600 kHz to FR ±800 kHz	70	75	70	75
FR ±800 kHz to FR ±1,6 MHz	70	80	70	80
FR ±1,6 MHz to FR ±3 MHz	80	90	80	90
457,6 MHz to FR - 3 MHz	90	90	-	-
FR + 3 MHz to 473,6 MHz	90	90	-	-
486 MHz to FR - 3 MHz	-	-	90	90
FR + 3 MHz to 502 MHz	-	-	90	90
100 kHz to < 457,6 MHz	113	113	-	-
> 473,6 MHz to 12,75 GHz	113	113	-	-
100 kHz to < 486 MHz	-	-	113	113
> 502 MHz to 12,75 GHz	-	-	113	113

Table 14-28c: Level of unwanted signals

FREQUENCY	PCS 1 900 LEVEL IN dBµVemf( )
FR ±600 kHz to FR ±800 kHz	70
FR ±800 kHz to FR ±1,6 MHz	70
FR ±1,6 MHz to FR ±3 MHz	80
1 910 MHz to FR - 3 MHz	87
FR + 3 MHz to 2 010 MHz	87
100 kHz to 1 830 MHz	113
> 1 830 MHz to < 1 910 MHz	101
> 2 010 MHz to 2 070 MHz	101
> 2 070 MHz to 12,75 GHz	90

Table 14-28d: Level of unwanted signals

	GSM 750	GSM 850
FREQUENCY	LEVEL IN dBµVemf( )	
FR ±600 kHz to FR ±800 kHz	70	70
FR ±800 kHz to FR ±1,6 MHz	70	70
FR ±1,6 MHz to FR ±3 MHz	80	80
727 MHz to FR - 3 MHz	90	-
FR + 3 MHz to 782 MHz	90	-
849 MHz to FR - 3 MHz	-	90
FR + 3 MHz to 914 MHz	-	90
100 kHz to < 727 MHz	113	-
> 782 MHz to 12,75 GHz	113	-
100 kHz to < 849 MHz	-	113
> 914 MHz to 12,75 GHz	-	113

NOTE 1: These values differ from 3GPP TS 05.05 because of practical generator limits in the SS.

NOTE 2: For an E-GSM 900 MS the level of the unwanted signal in the band 905 MHz to < 915 MHz is relaxed to 108 dBuVemf( ).

NOTE 3: For a GSM 450 small MS the level of the unwanted signal in the band 450,4 MHz to < 457,6 MHz is relaxed to 108 dBuVemf( ). For a GSM 480 small MS the level of the unwanted signal in the band

478,8 MHz to < 486 MHz is relaxed to 108 dBuVemf( ).

e) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.

The SS tests the RBER compliance for the bits of class II, by examining sequences of at least the minimum
number of samples of consecutive bits of class II, where bits are taken only from those frames for which no bad frame indication was given. The number of error events is recorded.

If a failure is indicated it is noted and counted towards the allowed exemption totals.
In the case of failures discovered at the predicted frequencies at steps f ii), iii) or iv) the test is repeated on

the adjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz

beyond is also tested. This process is repeated until all channels constituting the group of failures is known.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
SUN MOON ELECTRONICS	Matching Network	N/A	MP0835-2	2017-10-16	2017-10-16
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	49 %
ATM Pressure:	100.1 kPa

The testing was performed by Robin Zheng on 2017-09-14.

Test Results: Compliance

E-GSM 900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.028	10000	2.439	Compliance
902.0	0.037	10000	2.439	Compliance
914.8	0.045	10000	2.439	Compliance

DCS 1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.4	0.043	10000	2.439	Compliance
1747.8	0.056	10000	2.439	Compliance
1784.6	0.075	10000	2.439	Compliance

§4.2.22FREQUENCY ERROR AND MODULATION ACCURACY IN EGPRS CONFIGURATION

Applicable Standard

According to EN 301 511 V9.0.2 (2003-03), section 4.2.22, the frequency error is the difference in frequency, after adjustment for the effect of the modulation accuracy between the RF transmission from the MS and either:

- the RF transmission from the BS;
- or - the nominal frequency for the ARFCN used.

Test Procedure

a) For one transmitted burst on the last slot of the multislot configuration, the SS captures the transmitted signal by taking at least four samples per symbol. The transmitted signal is modeled by:

$$Y(t) = C1\{R(t) + D(t) + C0\}Wt$$

R(t) is defined to be an ideal transmitter signal.

D(t) is the residual complex error on signal R(t).

C0 is a constant origin offset representing carrier feedthrough.

C1 is a complex constant representing the arbitrary phase and output power of the transmitter.

$W = e^{\alpha + j\,2\pi f}$ accounts for both a frequency offset of "2πf" radians per second phase rotation and an amplitude change of "α" nepers per second.

The symbol timing phase of Y(t) is aligned with R(t).

b) The SS shall generate the ideal transmitter signal as a reference. The ideal transmitter signal can be constructed from a priori knowledge of the transmitted symbols or from the demodulated symbols of the transmitted burst. In the latter case, unknown symbols shall be detected with an error rate sufficiently small to ensure the accuracy of the measurement equipment (see annex 5).

c)

c.1) The transmitted signal Y(t) is compensated in amplitude, frequency and phase by multiplying with the factor: W-t/C1. The values for W and C1 are determined using an iterative procedure. W(α,f), C1 and C0 are chosen to minimise the RMS value of EVM on a burst-by-burst basis.

c.2) After compensation, Y (t) is Complianceed through the specified measurement filter (3GPP TS 05.05, subclause 4.6.2) to produce the signal:

$$Z(k) = S(k) + E(k) + C0$$

where:

S(k) is the ideal transmitter signal observed through the measurement filter;

k = floor(t/Ts), where Ts =1/270.833 kHz corresponding to the symbol times.

c.3) The error vector is defined to be:

$$E(k) = Z(k) - C0 - S(k)$$

It is measured and calculated for each instant k over the useful part of the burst excluding tail bits. The RMS vector error is defined as:

$$\text{RMS EVM} = \sqrt{\sum_{k \in K} |E(k)|^2 / \sum_{k \in K} |S(k)|^2}$$

c.4) Steps c.1) to c.3) are repeated with successive approximations of W(α ,f), C1 and C0 until the minimum value of RMS EVM is found. The minimised value of RMS EVM and the final values for C1, C0 and f are noted. (f represents the frequency error of the burst).

d) For each symbol in the useful part of the burst excluding tail bits, the SS shall calculate the error vector magnitude as:

$$EVM(k) = \sqrt{\frac{|E(k)|^2}{\frac{\sum_{k \in K}|S(k)|^2}{N}}}$$

The peak value of symbol EVM in the useful part of the burst, excluding tail bits, is noted.

e) The SS shall calculate the value for Origin Offset Suppression for the burst as:

$$OOS = \left(\frac{|C_o|^2}{\frac{1}{N}\sum_{k \in K}|S(k)|^2} \right)$$

f) Steps a) to e) are repeated for a total of 200 bursts.

g) The peak values of symbol EVM noted in step d) are averaged for the 200 measured bursts.

h) The origin offset suppression values derived in step e) are averaged for the 200 measured bursts. The resulting average is converted to log format.)log(10)(OOSdBOOS−=

i) From the distribution of symbol EVM values calculated in step d) for the 200 measured bursts, the SS shall determine the 95: th percentile value.

j) The SS instructs the MS to its maximum power control level by setting the power control parameter ALPHA (α) to 0 and GAMMA_TN (ΓCH) for each timeslot to the desired power level in the Packet Uplink Assignment or Packet Timeslot Reconfigure message (Closed Loop Control, see 3GPP TS 05.08, clause B.2), all other conditions remaining constant. Steps a) to i) are repeated.

k) The SS instructs the MS to the minimum power control level, all other conditions remaining constant. Steps a) to i) are repeated.

l) Steps a) to i) are repeated under extreme test conditions (see annex 1, TC2.2).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	62 %
ATM Pressure:	100.1kPa

The testing was performed by Robin Zheng on 2017-09-14.

Frequency error and phase error

Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

E-GSM 900 (Middle Channel)

MS under maximum power control level										
EGSM 900	**Test Condition**	**Frequency Error**	**Limit**	**The 95:th-percentile**	**Limit**	**EVM**		**Limit**	**Origin Offset**	**Limit**
		Hz		**%**		**%**			**dB**	
Reference Frequency (902.0MHz)	Normal	-17	90.2	3.7	15	RMS	2.7	9	51.9	30
						Peak	6.7	30		

MS under minimum power control level										
EGSM 900	**Test Condition**	**Frequency Error**	**Limit**	**The 95:th-percentile**	**Limit**	**EVM**		**Limit**	**Origin Offset**	**Limit**
		Hz		**%**		**%**			**dB**	
Reference Frequency (902.0MHz)	Normal	24	90.2	1.2	15	RMS	1.1	9	59	30
						Peak	3	30		

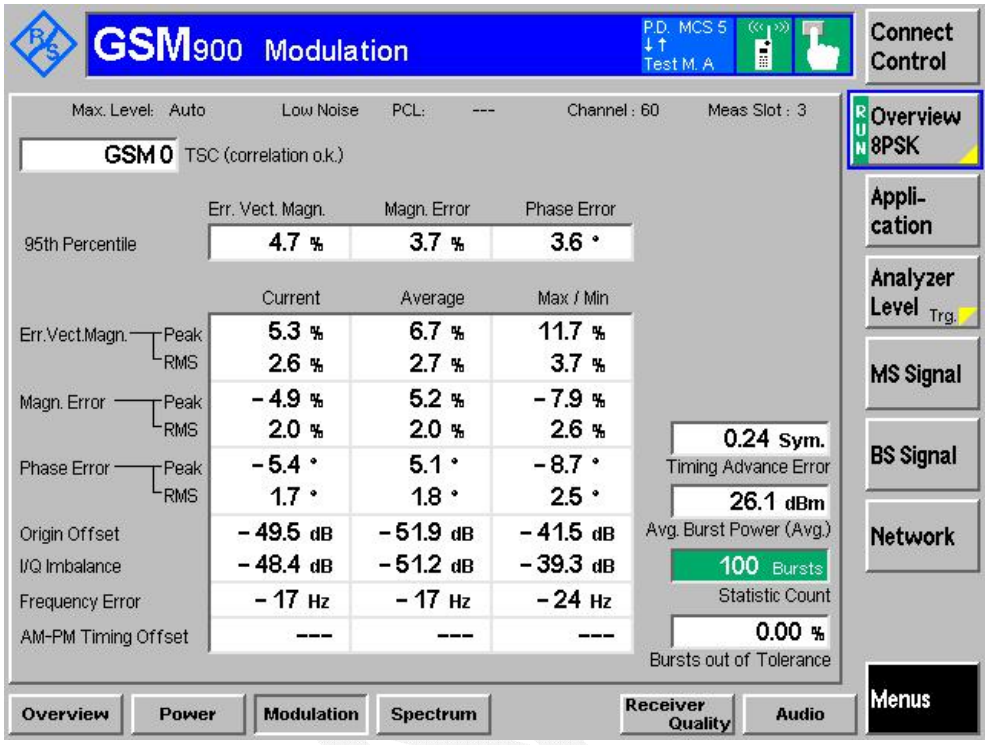
DCS 1800 (Middle Channel)

MS under maximum power control level										
DCS 1800	**Test Condition**	**Frequency Error**	**Limit**	**The 95:th-percentile**	**Limit**	**EVM**		**Limit**	**Origin Offset**	**Limit**
		Hz		**%**		**%**			**dB**	
Reference Frequency (1747.8 MHz)	Normal	-85	174.78	3.9	15	RMS	3.8	9	48.3	30
						Peak	10.2	30		

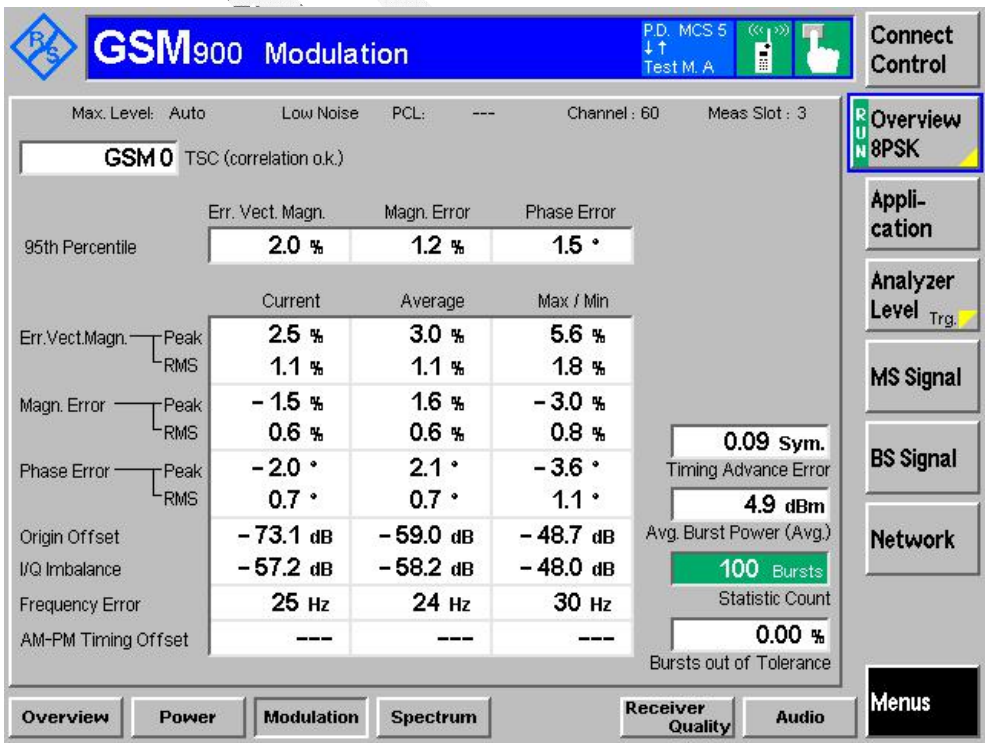
MS under minimum power control level										
DCS 1800	**Test Condition**	**Frequency Error**	**Limit**	**The 95:th-percentile**	**Limit**	**EVM**		**Limit**	**Origin Offset**	**Limit**
		Hz		**%**		**%**			**dB**	
Reference Frequency (1747.8 MHz)	Normal	-113	174.78	1.3	15	RMS	3.2	9	49.1	30
						Peak	10.7	30		

Normal Condition (E-GSM 900):

Maximum Power Control Level 6 (Middle Channel)

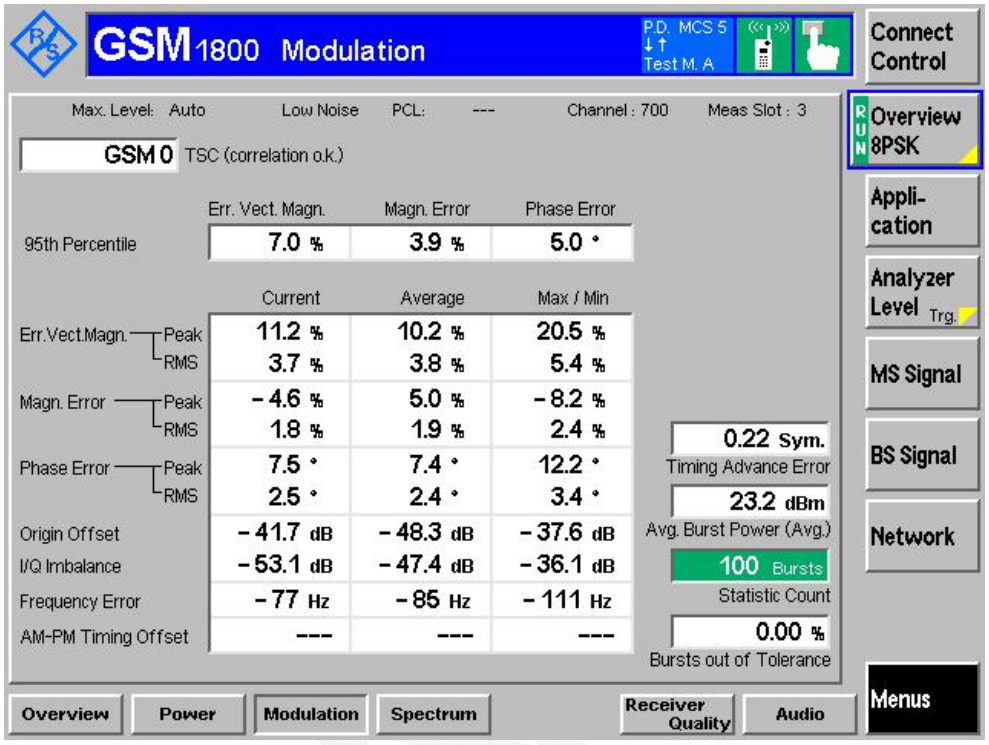


Minimum Power Control Level 17 (Middle Channel)

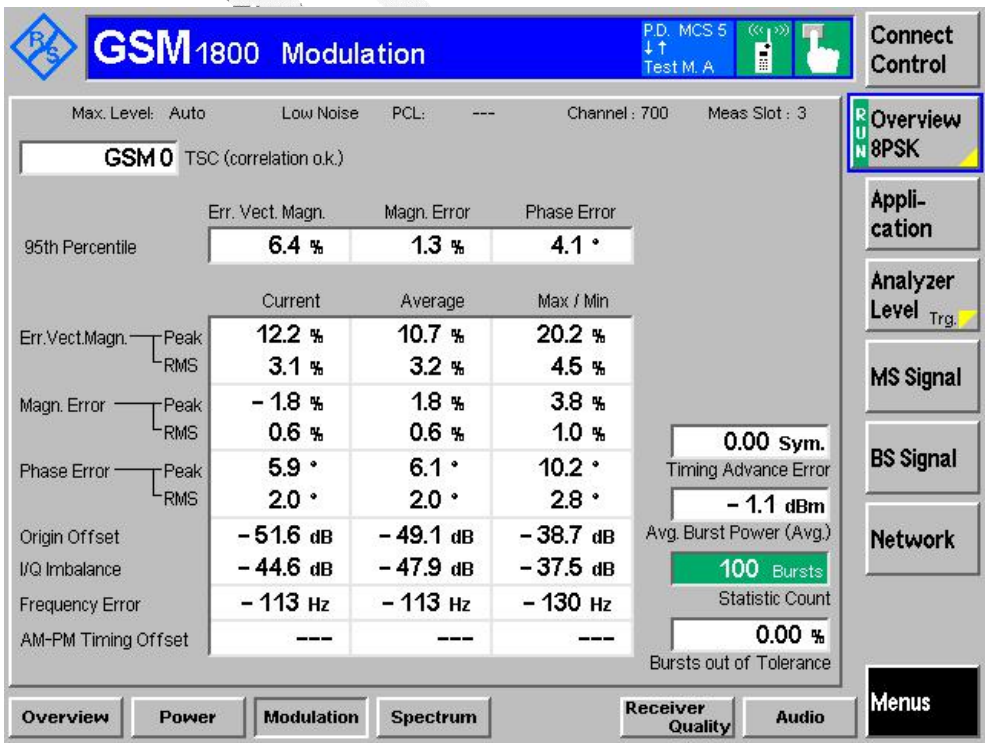


Normal Condition (DCS 1800):

Maximum Power Control Level 5 (Middle Channel)



Minimum Power Control Level 18 (Middle Channel)



§4.2.23 –FREQUENCY ERROR UNDER MULTI PATH AND INTERFERENCE CONDITIONS IN EGPRS CONFIGURATION

Standard Applicable

Requirement: Per EN 301 511 V9.0.2 (2003-03), section 4.2.23, the frequency error under multipath and interference conditions is a measure of the ability of the MS to maintainfrequency synchronization with the received signal under conditions of Doppler shift, multipath reception andinterference.

Test Procedure

a) The SS transmits packets under static conditions, using MCS-5 coding. The SS is set up to capture the first bursttransmitted by the MS during the uplink TBF. EGPRS Switched Radio Block Loop Back Mode is initiated bythe SS according to the procedure defined in 3GPP TS 04.14; 5.5.1 on a PDTCH/MCS-5 channel in the midARFCN range. The PDTCH level is set to 10 dB above the input signal level at reference sensitivityperformance for PDTCH/MCS-5 applicable to the type of MS and the fading function is set to RA. 8PSKmodulated downlink transmission shall be utilised.

b) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 for MS capable ofonly GMSK modulated transmission in the uplink. For MS capable of both GMSK and 8PSK modulatedtransmission in the uplink the frequency accuracy of the captured burst shall be calculated as described in thetest 13.17.1.

c) The SS sets the serving cell BCCH and PDTCH to the PDTCH input signal level at reference sensitivity performance for PDTCH/MCS-5 applicable to the type of MS, still with the fading function set to RA and thenwaits 30 s for the MS to stabilize to these conditions.

d) The SS shall capture subsequent bursts from the traffic channel in the manner described in test 13.16.1 ortest 13.17.1.

NOTE: Due to the very low signal level at the MS receiver input the MS receiver is liable to error. The "loopedback" bits are therefore also liable to error, and hence the SS does not know the expected bit sequence.The SS will have to demodulate the received signal to derive (error free) the transmitter burst bit pattern.Using this bit pattern the SS can calculate the expected phase trajectory according to the definition within3GPP TS 05.04.

e) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 or test 13.17.1.

f) Steps d) and e) are repeated for 5 traffic channel bursts spaced over a period of not less than 20 s.

g) Both downlink and uplink TBFs are terminated. The initial conditions are established again and steps a) to f) arerepeated but with the fading function set to HT200 for GSM 400, HT120 for GSM700 and HT100 for all otherbands.

h) The initial conditions are established again and steps a) to f) are repeated but with the fading function set toTU100 for GSM 400, TU60 for GSM700 and TU50 for all other bands.

i) The initial conditions are established again and steps a) and b) are repeated but with the following

differences:

- the levels of the BCCH and PDTCH are set to – 72,5 dBm + Corr. Corr = the correction factor for

referenceperformance according to Spec 45.005 subclause 6.2.
- two further independent 8-PSK modulated interfering signals are sent on the same nominal carrier frequency as the BCCH and PDTCH and at a level 20,5 dB below the level of the PDTCH and modulated
with random data, including the midamble.
- the fading function for all channels including the interfering signals is set to TUlow.

j) The SS waits 100 s for the MS to stabilize to these conditions.

k) Repeat steps d) to f), except that at step f) the measurement period must be extended to 200 s and the number ofmeasurements increased to 20.

l) The initial conditions are established again and steps a) to k) are repeated for ARFCN in the Low ARFCN range.

m) The initial conditions are established again and steps a) to k) are repeated for ARFCN in the High ARFCNrange.

n) Repeat step h) under extreme test conditions (see annex 1, TC2.2).

Test Requirements:

The frequency error, with reference to the SS carrier frequency as measured in repeats of step e), for each measured burst shall be less than the values shown in the table hereinafter:

Table: Requirements for frequency error under multi path, Doppler shift and interferenceconditions

GSM 850 and GSM 900		DCS 1800	
Propagation Condition	**Permitted frequency error**	**Propagation Condition**	**Permitted frequency error**
RA250 HT100 TU50 TU3	±300 Hz ±180 Hz ±160 Hz ±230 Hz	RA130 HT100 TU50 TU1.5	±400 Hz ±350 Hz ±260 Hz ±320 Hz

Test Equipment

Manufacturer	Equipment Description	Model No.	Serial No.	Calibration Due	CalibrationDue Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
Rohde & Schwarz	Fading Simulator	ABFS	100172	2017-01-30	2017-01-30

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	62 %
ATM Pressure:	100.1kPa

The testing was performed by Robin Zheng on 2017-09-14.

Test Results

Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

E-GSM 900 (Middle Channel, 902 MHz)

1) MS under maximum power control level: 6

E-GSM 900	Test Condition		Frequency error	Limit	Result
Reference Frequency (902 MHz)	Normal	RA250	-125	±300	Compliance
		HT100	-114	±180	
		TU50	-105	±160	
		TU3	-113	±230	

2) MS under minimum power control level: 17

E-GSM 900	Test Condition		Frequency error	Limit	Result
Reference Frequency (902 MHz)	Normal	RA250	-117	±300	Compliance
		HT100	-109	±180	
		TU50	-99	±160	
		TU3	-105	±230	

DCS 1800 (Middle Channel, 1747.8 MHz)

1) MS under maximum power control level: 5

DCS 1800	Test Condition		Frequency error	Limit	Result
Reference Frequency (1747.8 MHz)	Normal	RA130	-118	±400	Compliance
		HT100	-105	±350	
		TU50	-93	±260	
		TU1.5	-103	±320	

2) MS under minimum power control level: 18

DCS 1800	Test Condition		Frequency error	Limit	Result
Reference Frequency (1747.8 MHz)	Normal	RA130	-115	±400	Compliance
		HT100	-108	±350	
		TU50	-98	±260	
		TU1.5	-110	±320	

§4.2.24-EGPRS TRANSMITTER OUTPUT POWER

Applicable Standard

The transmitter output power is the average value of the power delivered to an artificial antenna or radiated by the MS and its integral antenna, over the time that the useful information bits of one burst are transmitted.
Since the conformance requirement, test procedure and test requirement of GSMK modulated signal's output power are defined in subclause 13.16.2 for GPRS MS, being thereby defined also for all EGPRS MS in that section, only 8PSK modulated signal's output power conformance requirement, test procedure and test requirements are defined in this subclause.

1. The MS maximum output power for 8-PSK modulated signal shall be as defined in 3GPP TS 05.05, subclause 4.1.1, second table, according to its power class, with a tolerances of ±2 dB, ±3 dB, +3/-4 dB defined under normal conditions in the 3GPP TS 05.05, subclause 4.1.1, second table. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±3 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, second and sixth table. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2 dB.

2. The MS maximum output power for 8-PSK modulated signal shall be as defined in 3GPP TS 05.05, subclause 4.1.1, second table, according to its power class, with a tolerances of ±2,5 dB, ±4 dB, +4/-4,5 dB defined under extreme conditions in the 3GPP TS 05.05, subclause 4.1.1, second table. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±4 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, second and sixth table; 3GPP TS 05.05 annex D in subclauses D.2.1 and D.2.2. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2,5 dB.

3. The power control levels for 8-PSK shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirement 1), with a tolerance of ±2 dB,±3 dB, 4 dB or 5 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table.

4. The power control levels for 8-PSK shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 2), with a tolerance of ±2,5 dB, ±4 dB, 5 dB or 6 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

4a. From R99 onwards, the supported maximum output power for each number of uplink timeslots shall form a monotonic sequence. The maximum reduction of maximum output power from an allocation of n uplink timeslots to an allocation of n+1 uplink timeslots shall be equal to the difference of maximum permissible nominal reduction of maximum output power for the corresponding number of timeslots, as defined in 3GPP TS 05.05, subclause 4.1.1, sixth table.

5. For 8-PSK, the output power actually transmitted by the MS at consecutive power control levels shall form a monotonic sequence and the interval between power control levels shall be 2 ± 1,5 dB; 3GPP TS 05.05, subclause 4.1.1, from R99 onwards, in a multislot configuration, the first power control step down from the maximum output power is allowed to be in the range 0…2 dB

6. The transmitted power level relative to time for a normal burst shall be within the power/time template given in 3GPP TS 05.05, annex B bottom figure for 8PSK modulated signal. In the case of Multislot Configurations where the bursts in two or more consecutive time slots are actually transmitted at the same frequency, the template of annex B shall be respected during the useful part of each burst and at the beginning and the end of the series of consecutive bursts. The output power during the guard period between every two consecutive active timeslots shall not exceed the level allowed for the useful part of the first timeslot, or the level allowed for the useful part of the second timeslot plus 3 dB, whichever is the highest.

Test Procedure

a) With the initial conditions set according to subclause 13.17.3.4.2.1
the test procedure in subclause 13.17.3.4.1.2is followed up to and including step e), except that in step a), when measurements are done at maximum powerfor ARFCN in the Low, Mid and High range, the measurement is made eight times with the MS rotated by n*45degrees for all values of n in the range 0 to 7.
The measurements taken are received transmitter output power measurements rather than transmitter output power measurements, the output power measurement values can be derived as follows.

b) Assessment of test site loss for scaling of received output power measurements.
The MS is replaced by a half-wave dipole, resonating at the centre frequency of the transmit band, connected to an RF generator.
The frequency of the RF signal generator is set to the frequency of the ARFCN used for the 24 measurements in step a), the output power is adjusted to reproduce the received transmitter output power averages recorded in step a).
For each indication the power, delivered by the generator (in Watts) to the half-wave dipole, is recorded. These values are recorded in the form Pnc, where n = MS rotation and c = channel number.
For each channel number used compute:

$$\text{Pac(Watts into dipole)} = \frac{1}{8} * \sum_{n=0}^{n=7} \text{Pnc}$$

from which: Pac (Tx dBm) = 10log10(Pac) + 30 + 2,15
The difference, for each of the three channels, between the actual transmitter output power averaged over the 8 measurement orientations and the received transmitter output power at orientation n = 0 is used to scale the received measurement results to actual transmitter output powers for all measured power control levels and ARFCN, which can then be checked against the requirements.

c) Temporary antenna connector calibration factors (transmit)
A modified test sample equipped with a temporary antenna connector is placed in a climatic test chamber and is linked to the SS by means of the temporary antenna connector.
Under normal test conditions, the power measurement and calculation parts of steps a) to e) of subclause 13.17.3.4.1.2 are repeated except that the repeats at step d) are only performed for power control level 10 and the minimum nominal output power level supported by the MS.
NOTE 1: The values noted here are related to the output transmitter carrier power levels under normal test conditions, which are known after step b). Therefore frequency dependent calibration factors that account for the effects of the temporary antenna connector can be determined.
d) Measurements at extreme test conditions.
NOTE 2: Basically the procedure for extreme conditions is:

- the power/time template is tested in the "normal" way;
- the radiated power is measured by measuring the difference with respect to the radiated power under normal

test conditions.
Under extreme test conditions steps a) to e) of subclause 13.17.3.4.1.2 are repeated except that the repeats at step d) are only performed for power control level 10 and the minimum nominal output power level supported by the MS.
The transmitter output power under extreme test conditions is calculated for each burst type, power control level and for every frequency used by adding the frequency dependent calibration factor, determined in c), to the values obtained at extreme conditions in this step.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	CalibrationDue Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	62 %
ATM Pressure:	100.1kPa

The testing was performed by Robin Zheng on 2017-09-14.

Test Results:

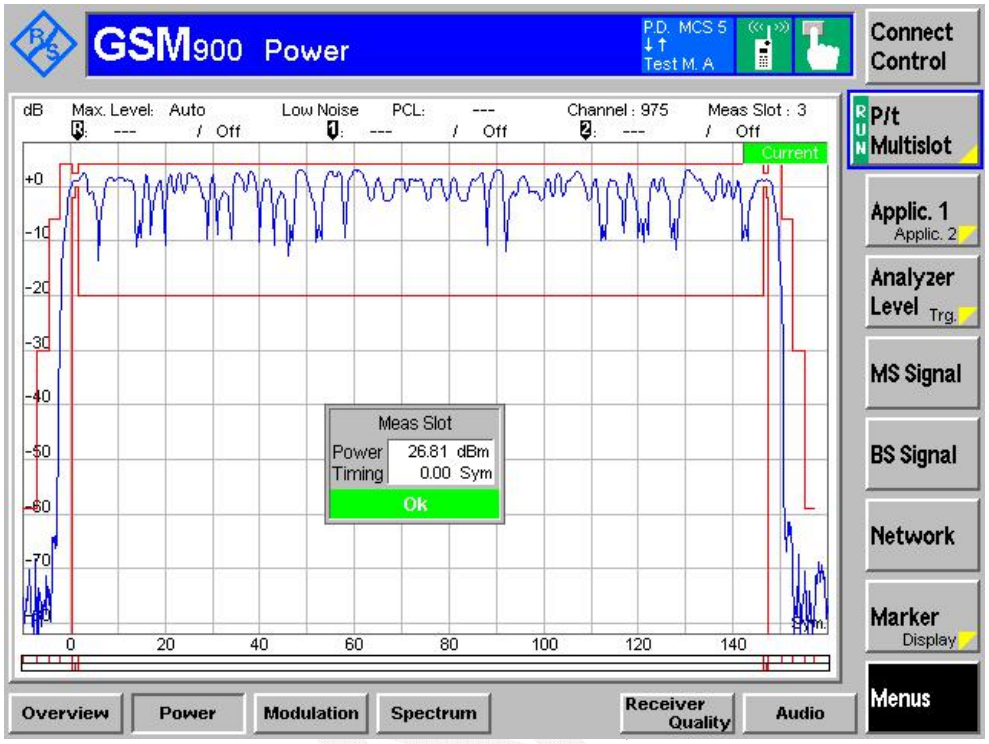
Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	880.2	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	914.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1710.4	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1784.6	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

Normal Condition Test Data as below:

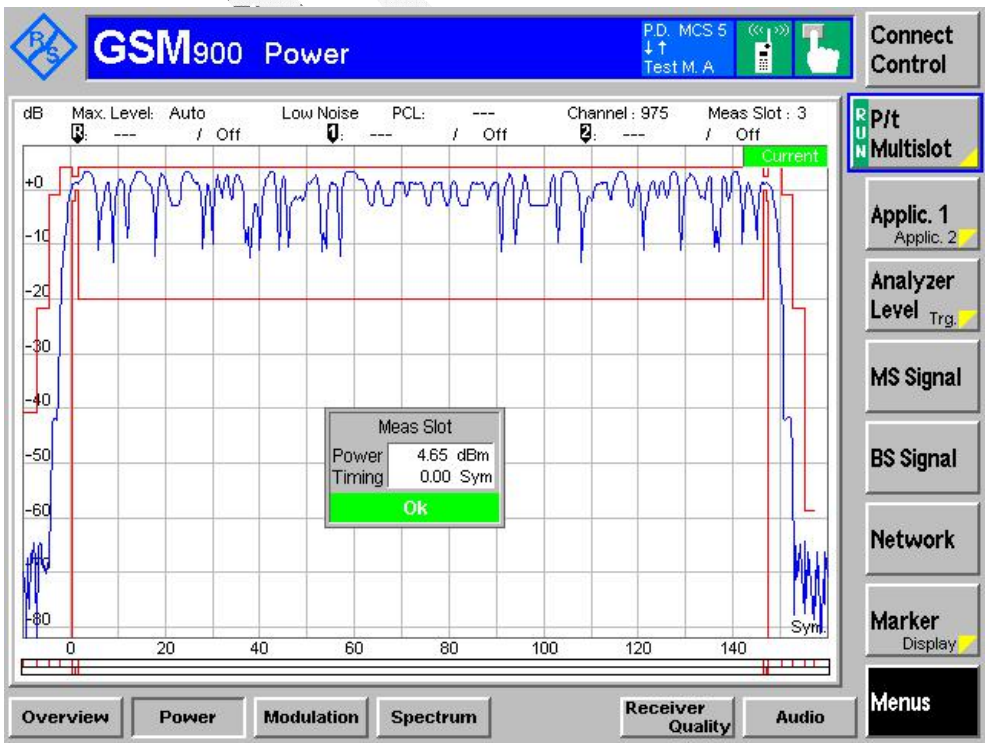
E-GSM900 output power in EGPRS Mode				
Power Control Level	Output Power(dBm)			Result
	880.2 MHz	902.0 MHz	914.8 MHz	
1 uplinkslot				
6	26.81	26.91	27.26	
7	24.43	24.95	25.46	
8	22.18	22.54	23.54	
9	19.98	20.12	20.15	
10	18.14	18.45	18.86	
11	16.12	16.54	16.52	
12	14.32	14.23	14.45	
13	12.05	12.54	12.56	
14	10.51	10.26	10.23	
15	8.32	8.15	8.45	
16	6.56	6.45	6.85	Compliance
17	4.65	4.68	4.84	
2 uplinkslot				
6	26.59	26.67	27.19	
17	4.71	4.75	4.79	
3 uplink slot				
6	26.52	26.43	26.53	
17	4.66	4.67	4.66	
4 uplinkslot				
6	26.13	26.03	26.00	
17	5.07	4.66	4.69	

E-GSM900:
1 uplink slot data:

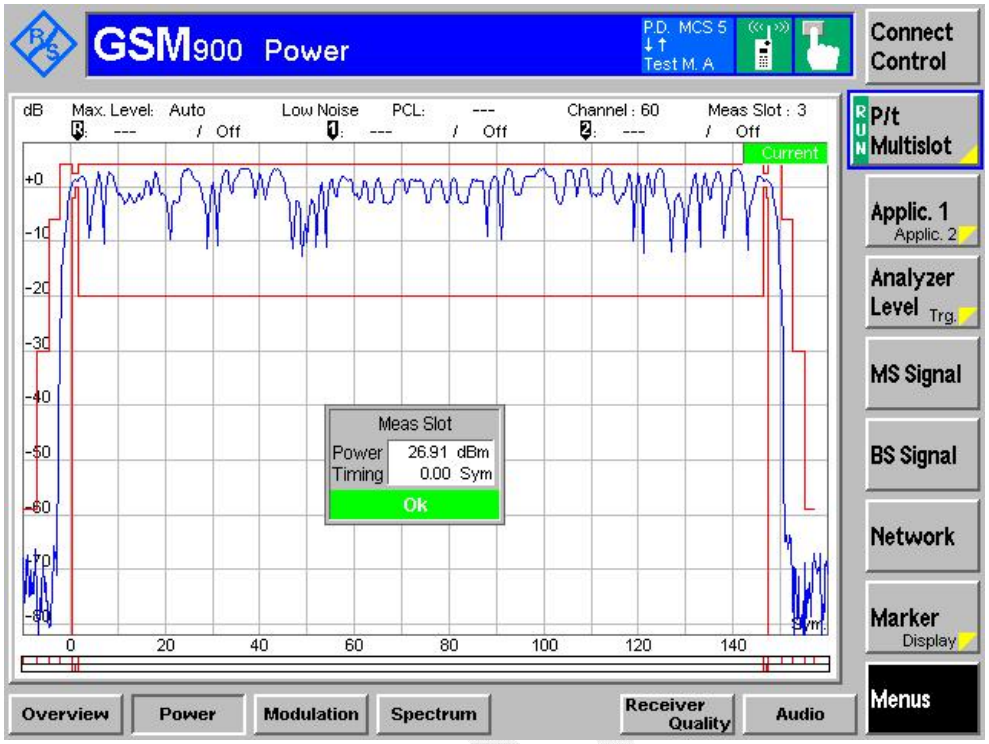
Normal Condition GAMMA_TN 6, Low Channel



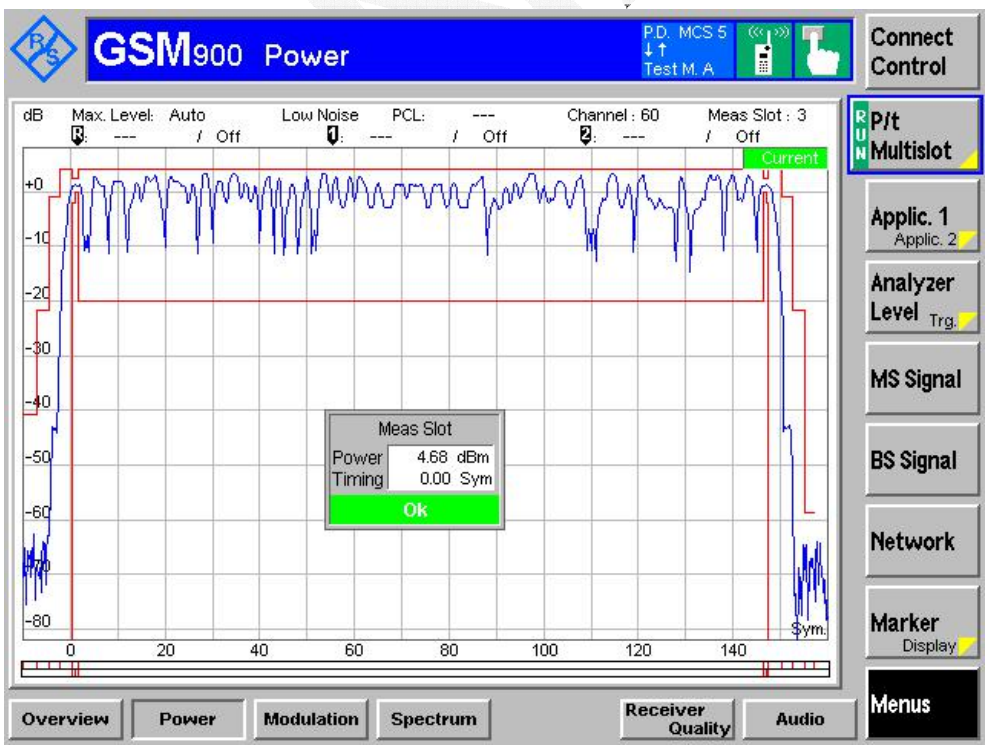
Normal Condition GAMMA_TN 17, Low Channel



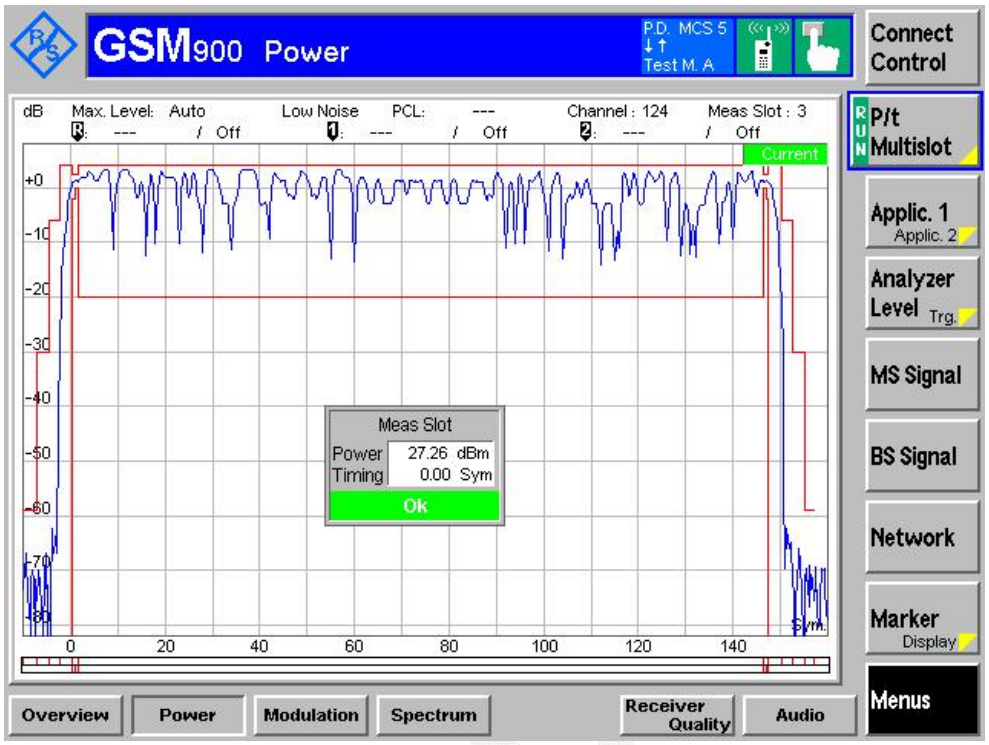
Normal Condition GAMMA_TN6, Middle Channel



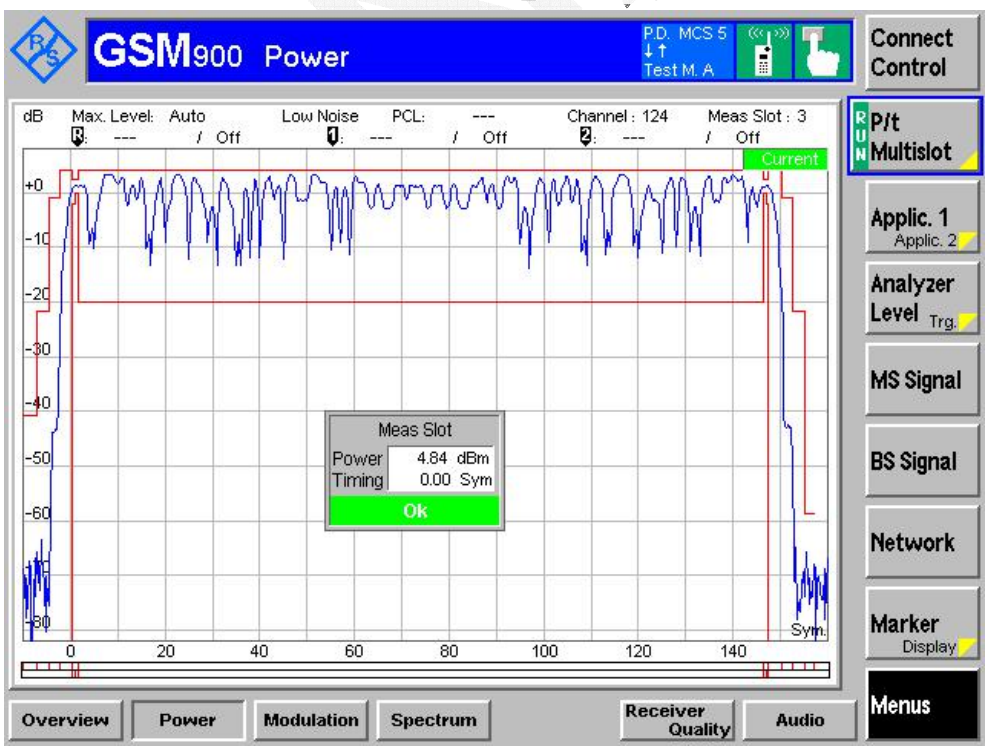
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN6, High Channel

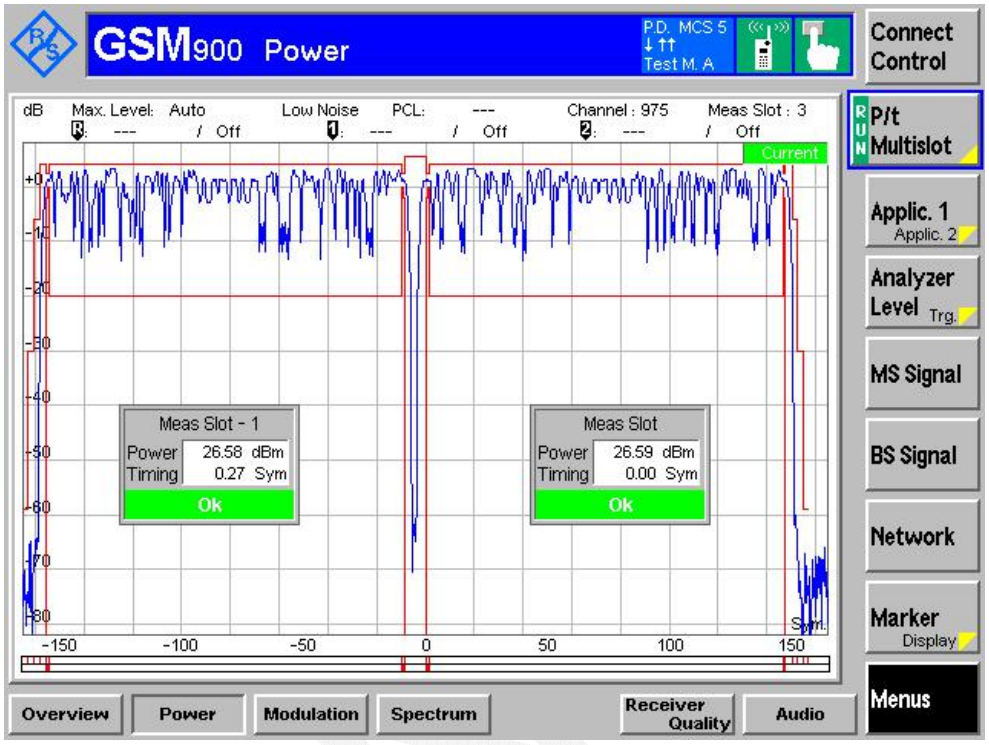


Normal Condition GAMMA_TN 17, High Channel

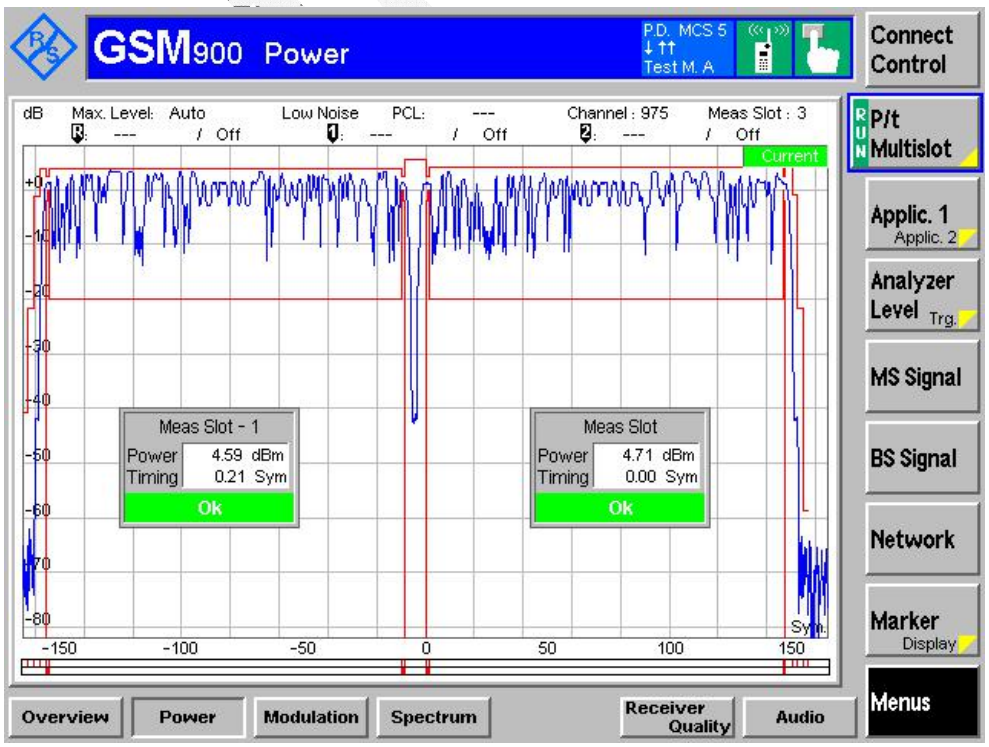


2uplink slots data:

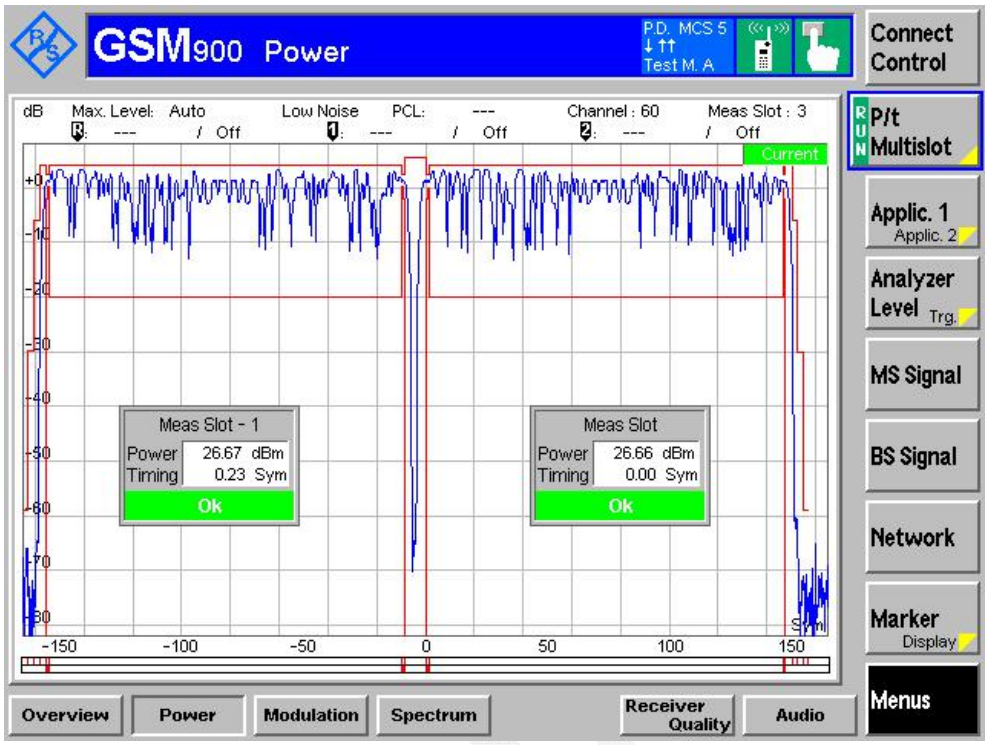
Normal Condition GAMMA_TN6, Low Channel



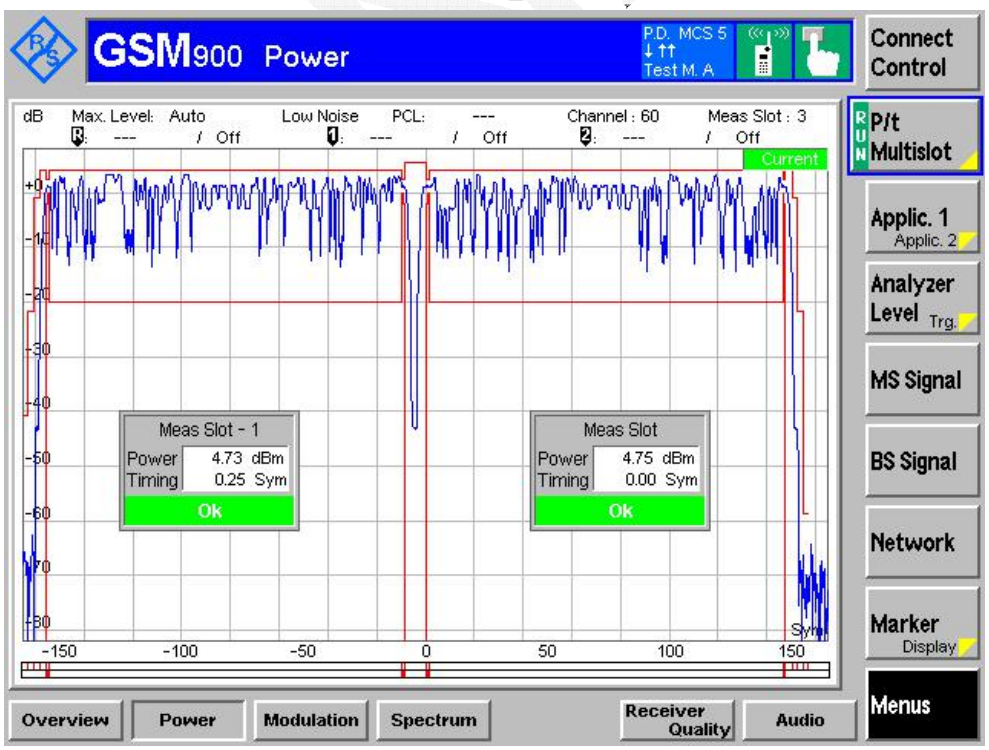
Normal Condition GAMMA_TN17, Low Channel



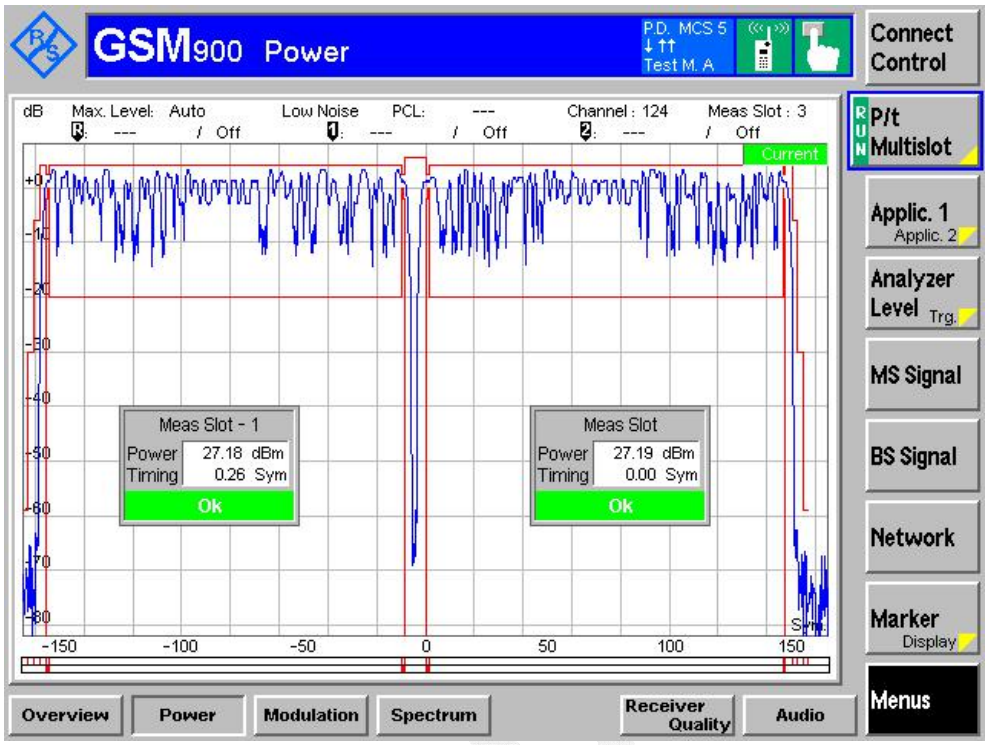
Normal Condition GAMMA_TN6, Middle Channel



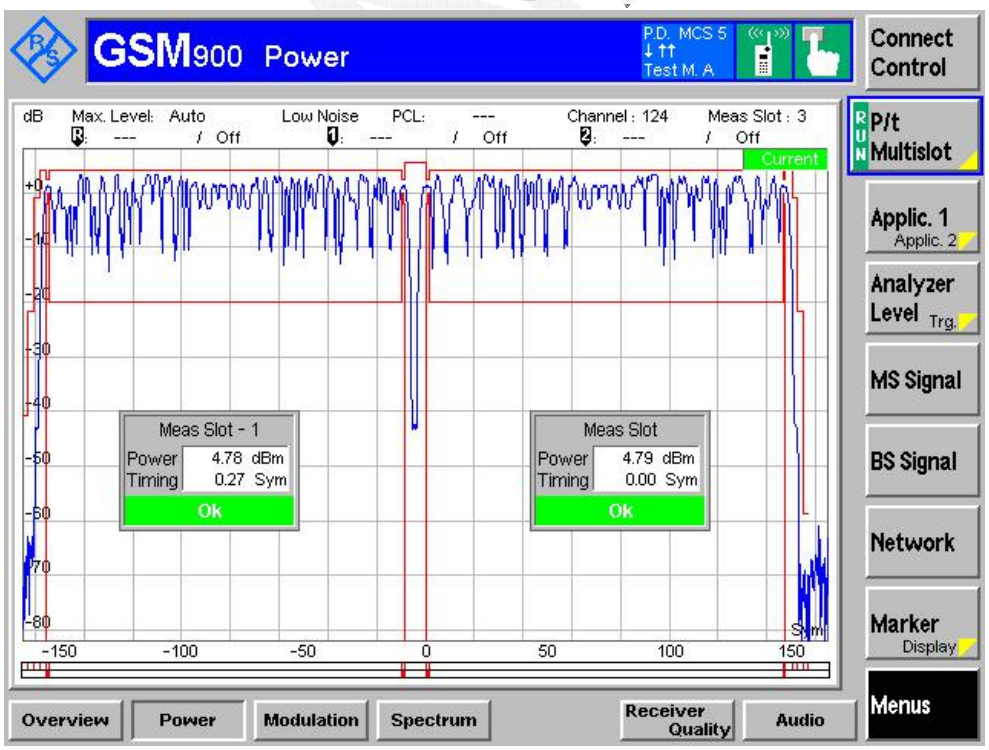
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN6, High Channel

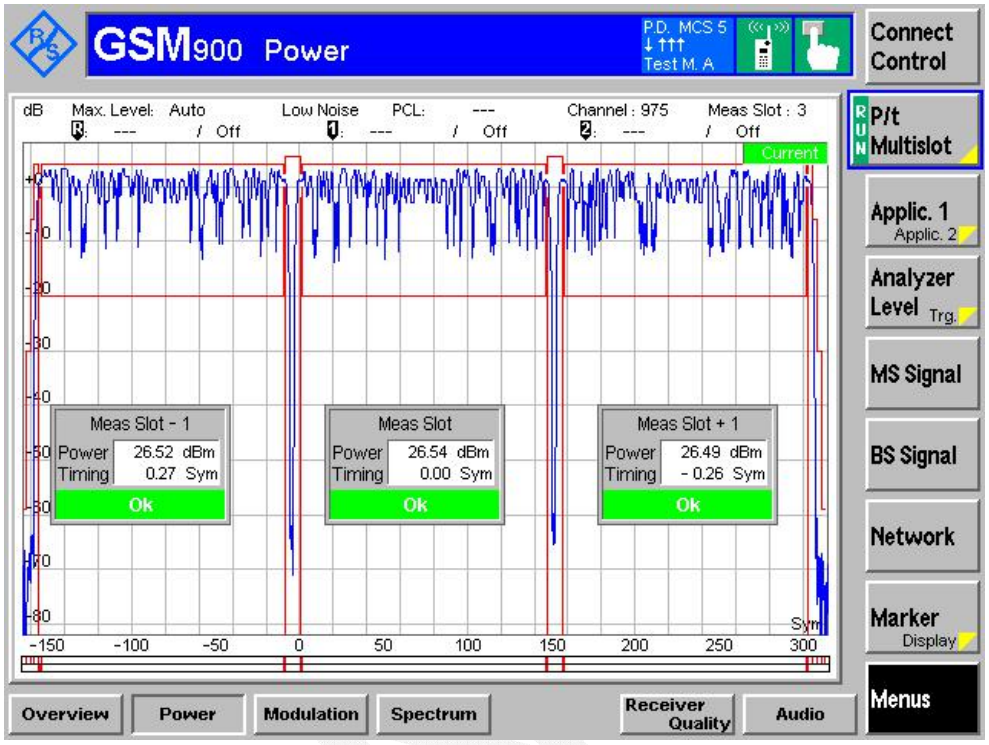


Normal Condition GAMMA_TN 17, High Channel

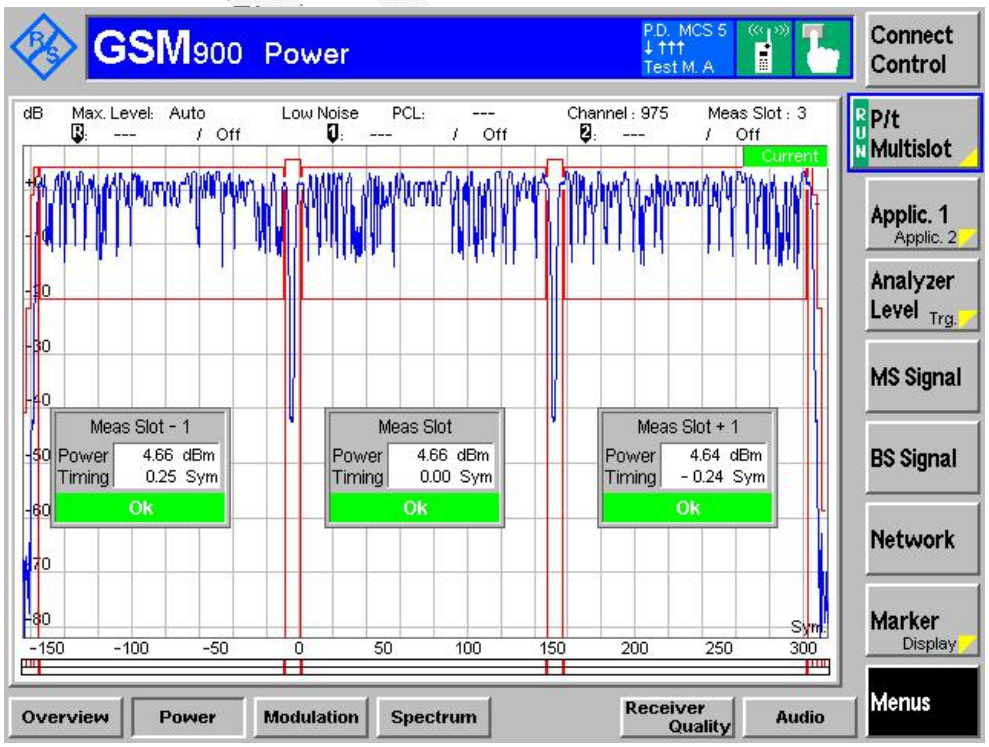


3uplink slots data:

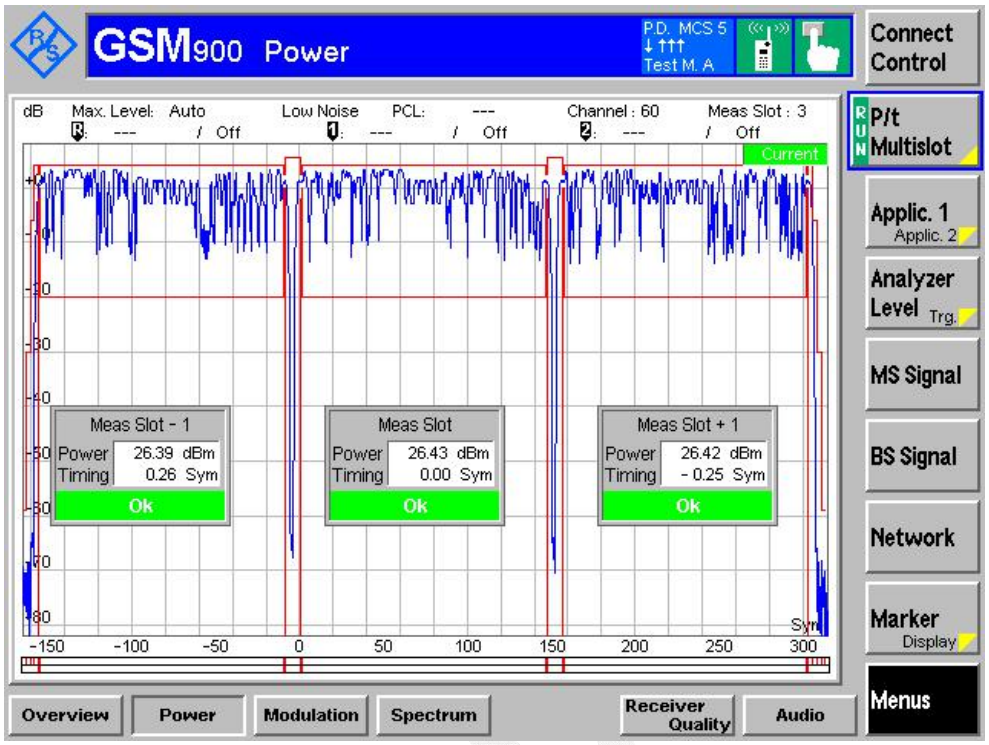
Normal Condition GAMMA_TN6, Low Channel



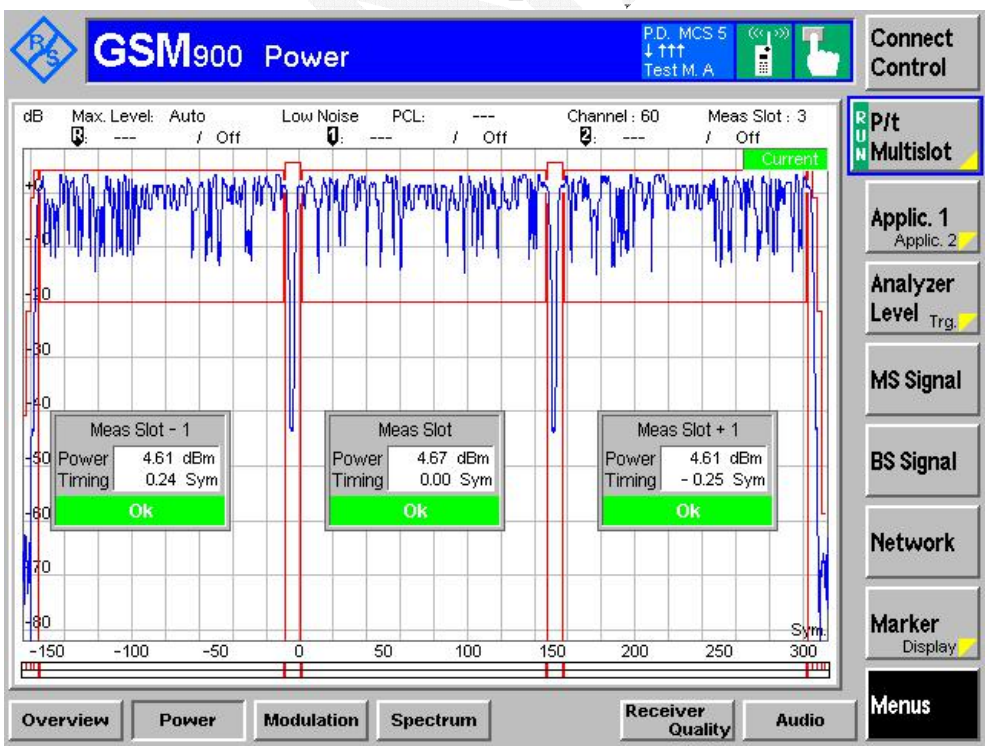
Normal Condition GAMMA_TN17, Low Channel



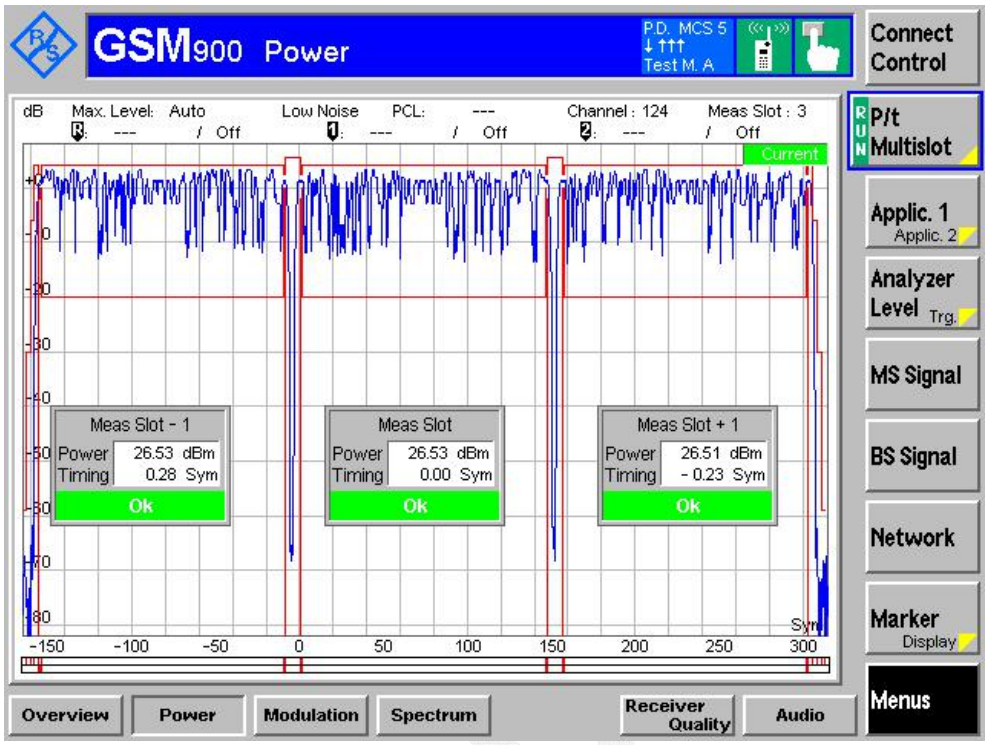
Normal Condition GAMMA_TN6, Middle Channel



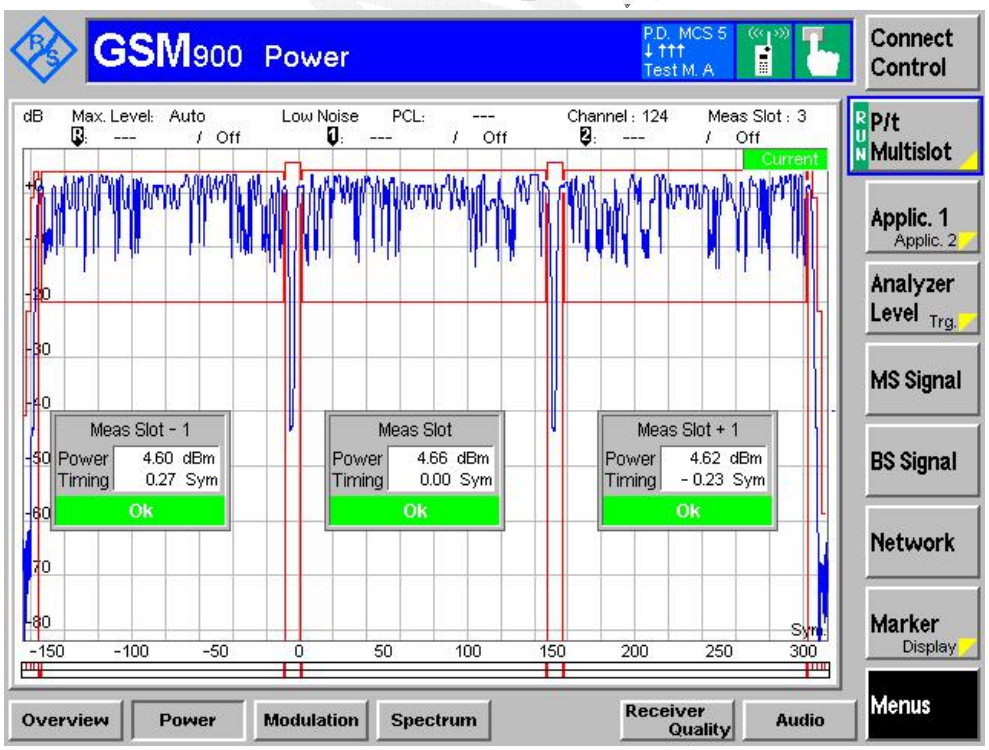
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN6, High Channel

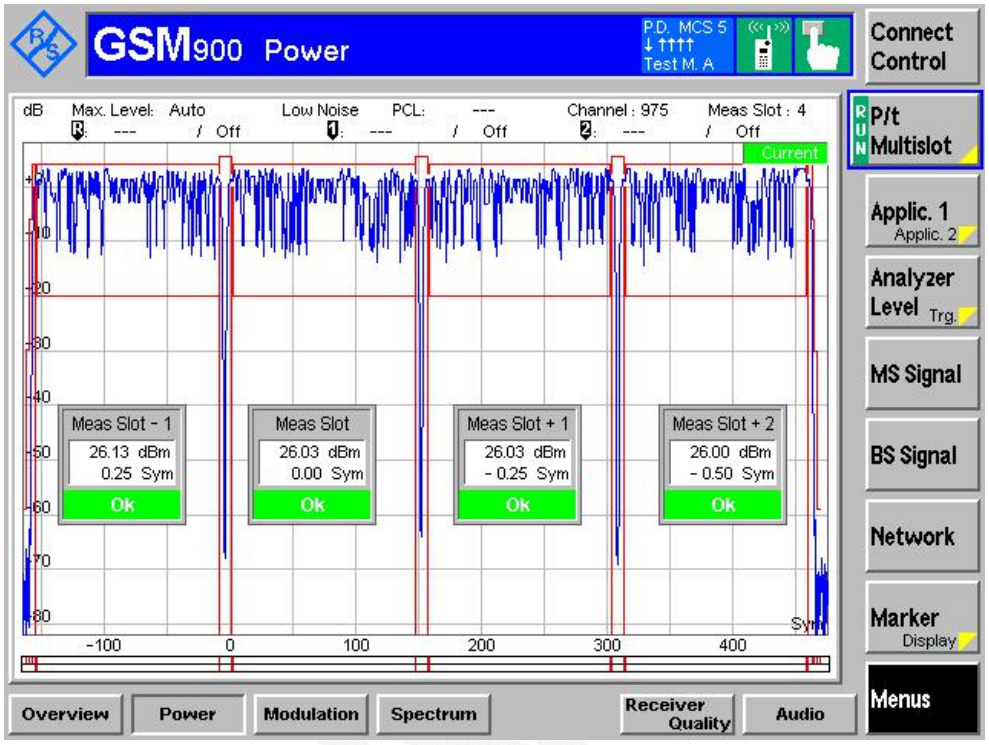


Normal Condition GAMMA_TN 17, High Channel

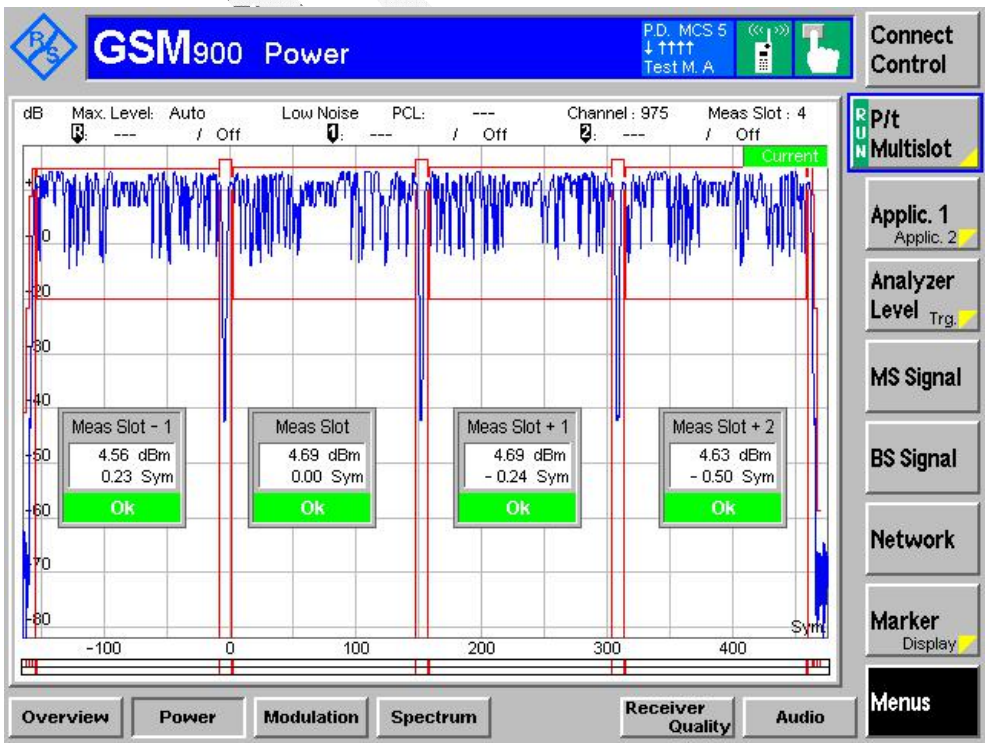


4 uplink slots data:

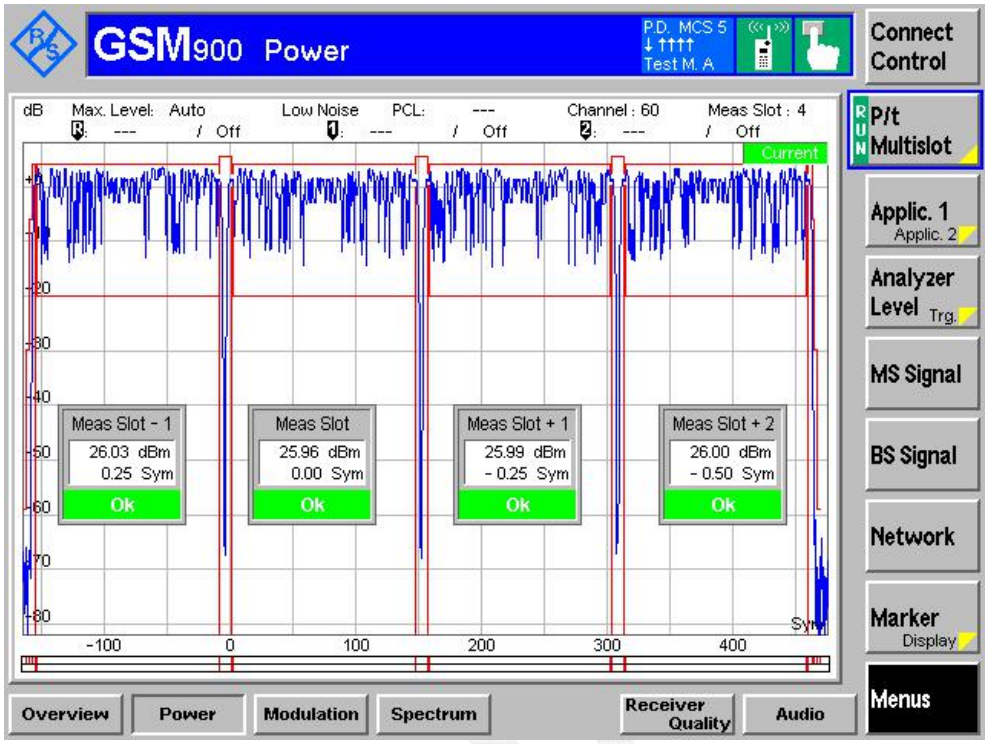
Normal Condition GAMMA_TN6, Low Channel



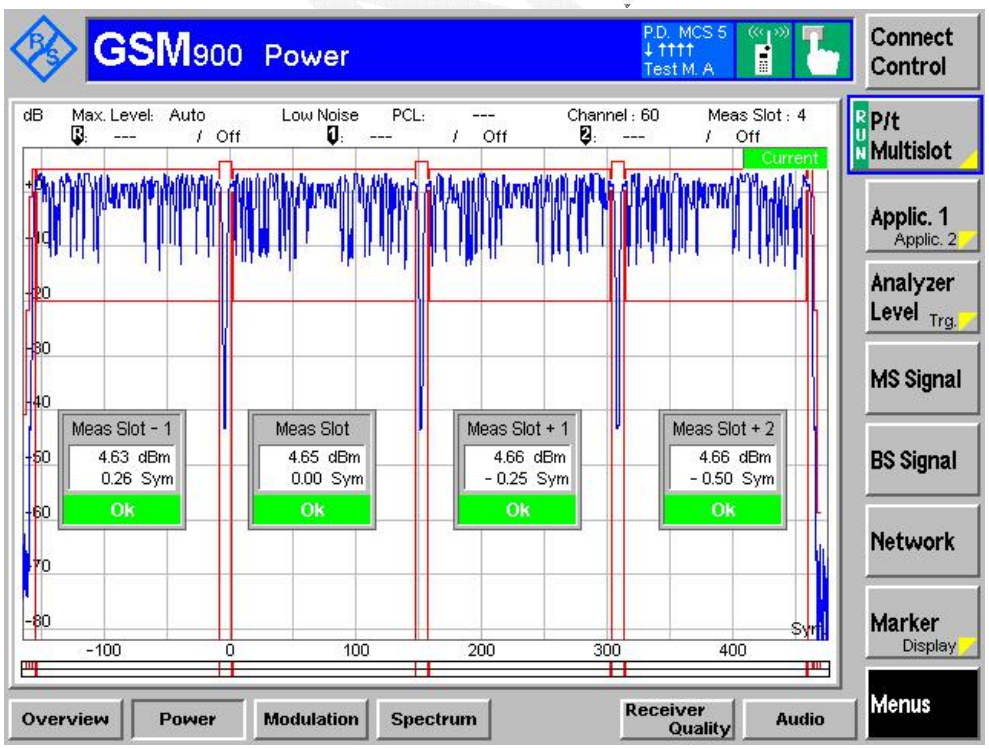
Normal Condition GAMMA_TN17, Low Channel



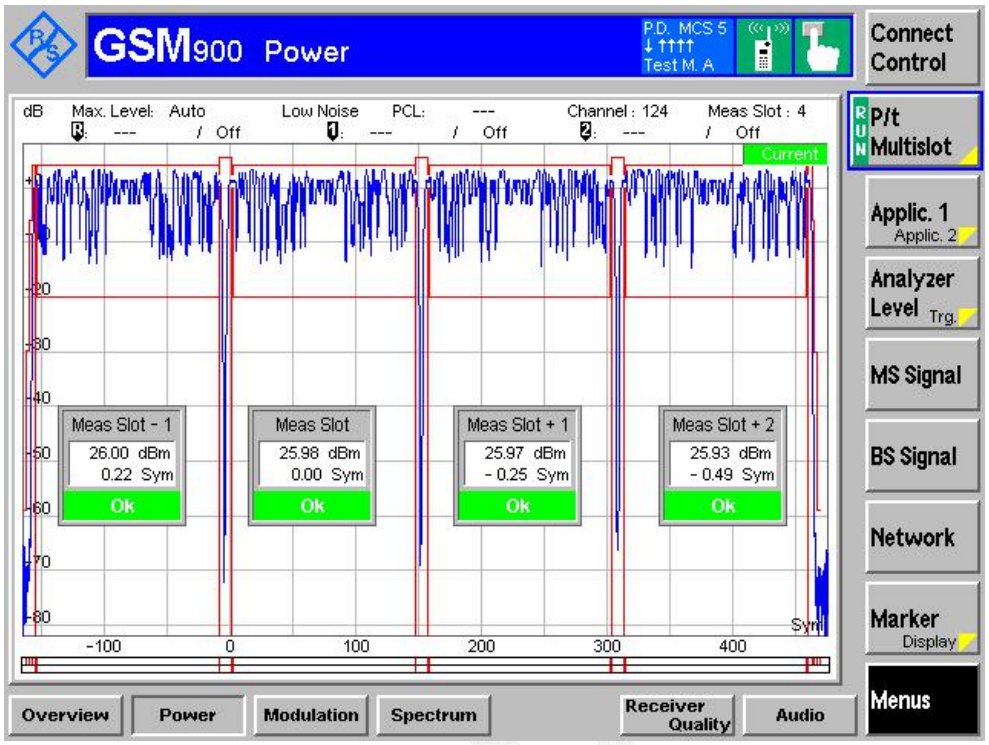
Normal Condition GAMMA_TN6, Middle Channel



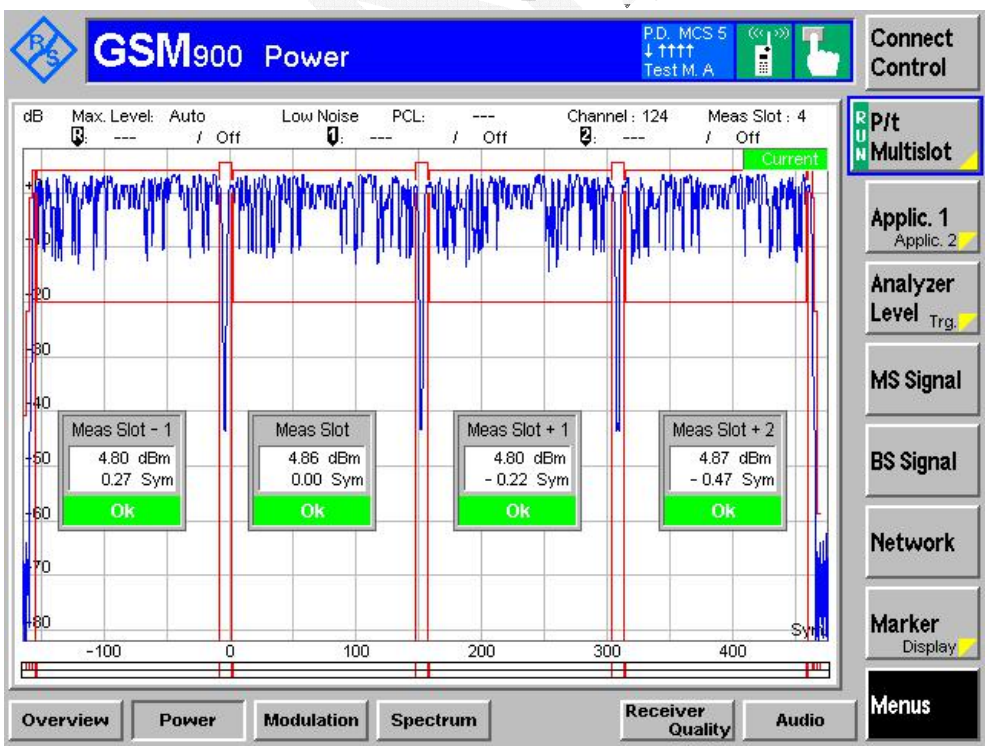
Normal Condition GAMMA_TN 17, Middle Channel



Normal Condition GAMMA_TN6, High Channel



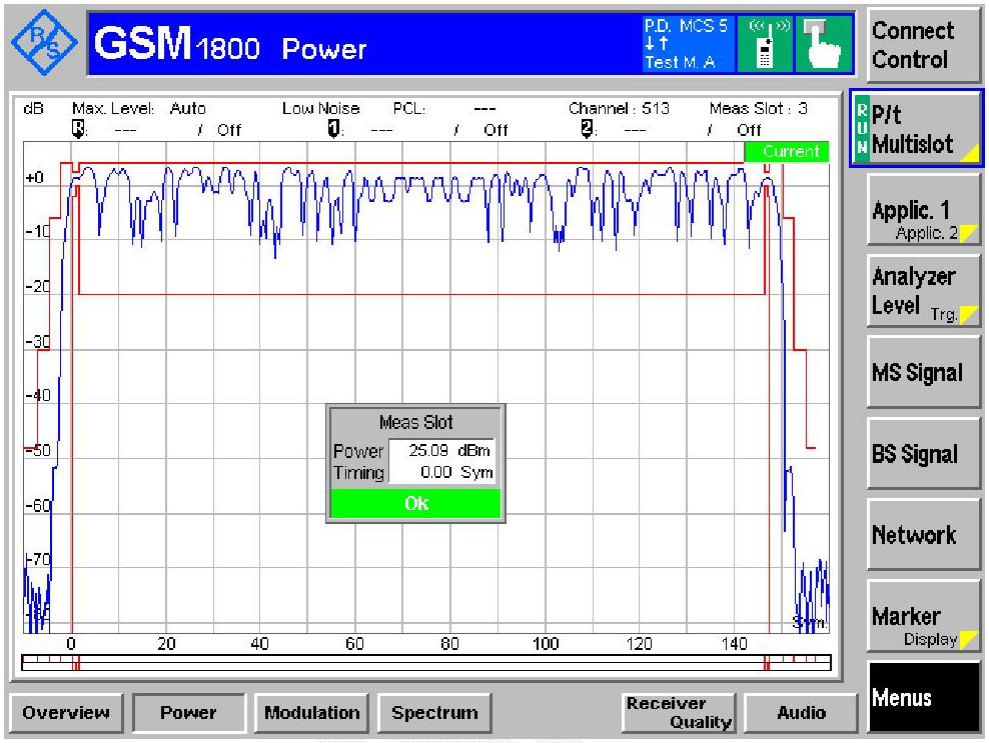
Normal Condition GAMMA_TN 17, High Channel



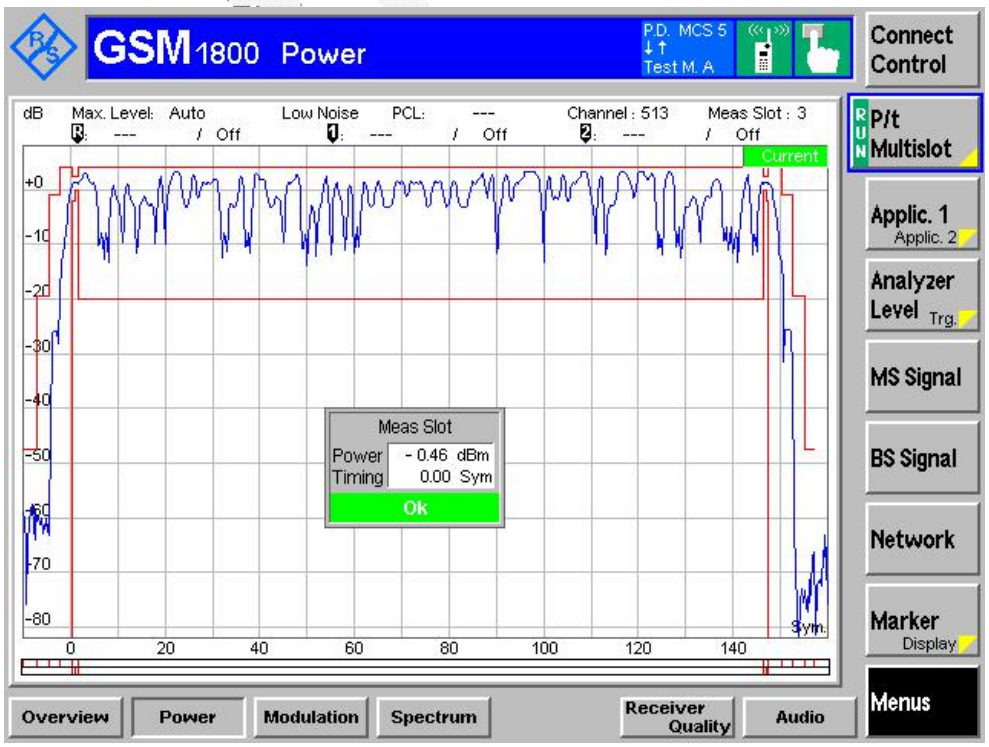
DCS1800 output power in EGPRS Mode				
Power Control Level	Output Power(dBm)			Result
	1710.4 MHz	1747.8 MHz	1784.6 MHz	
1 uplinkslot				
5	25.09	25.14	25.57	
6	23.1	23.01	23.14	
7	20.01	20.93	20.87	
8	18.99	19.24	19.21	
9	17.86	17.18	17.12	
10	16.47	15.53	15.48	
11	14.16	13.02	12.98	
12	11.42	11.54	11.47	
13	10.68	9.78	9.82	
14	8.32	7.46	7.43	
15	7.02	5.68	5.64	
16	4.03	4.05	4.02	Compliance
17	2.24	2.07	2.01	
18	-0.46	-0.41	-0.17	
2 uplinkslot				
5	24.56	24.62	25.08	
18	-0.46	-0.22	-1.04	
3 uplinkslot				
5	24.35	24.26	26.65	
18	-0.14	-0.26	-1.06	
4 uplinkslot				
5	23.86	23.80	23.10	
18	-0.46	-0.53	-1.35	

DCS 1800:
1 uplink slot data:

Normal Condition GAMMA_TN5, Low Channel

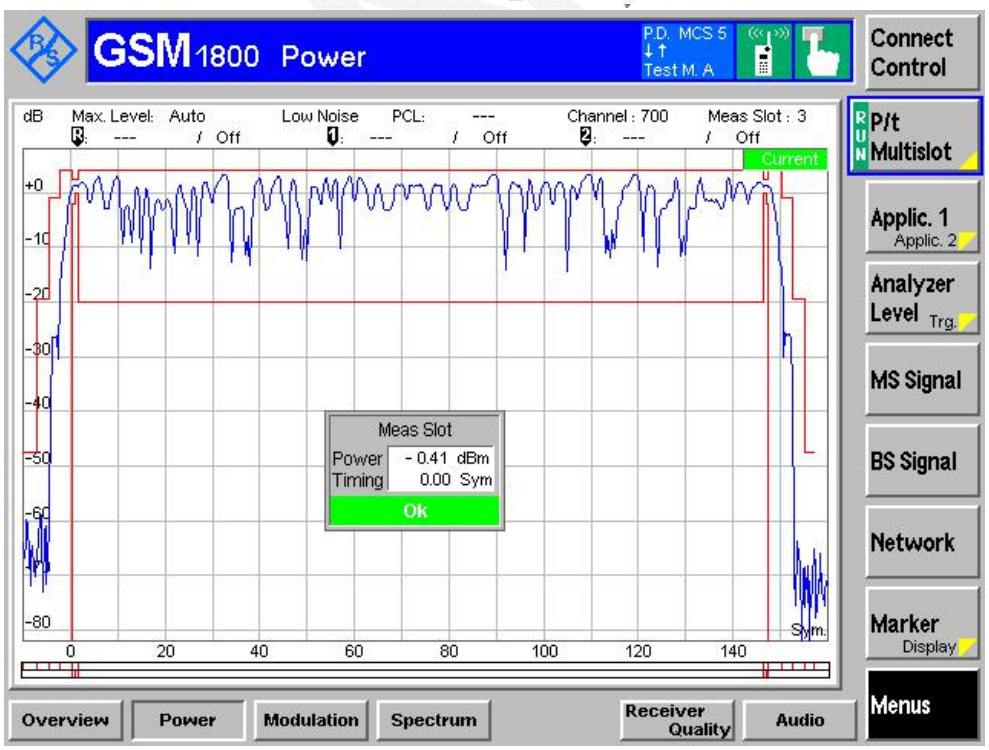


Normal Condition GAMMA_TN18, Low Channel

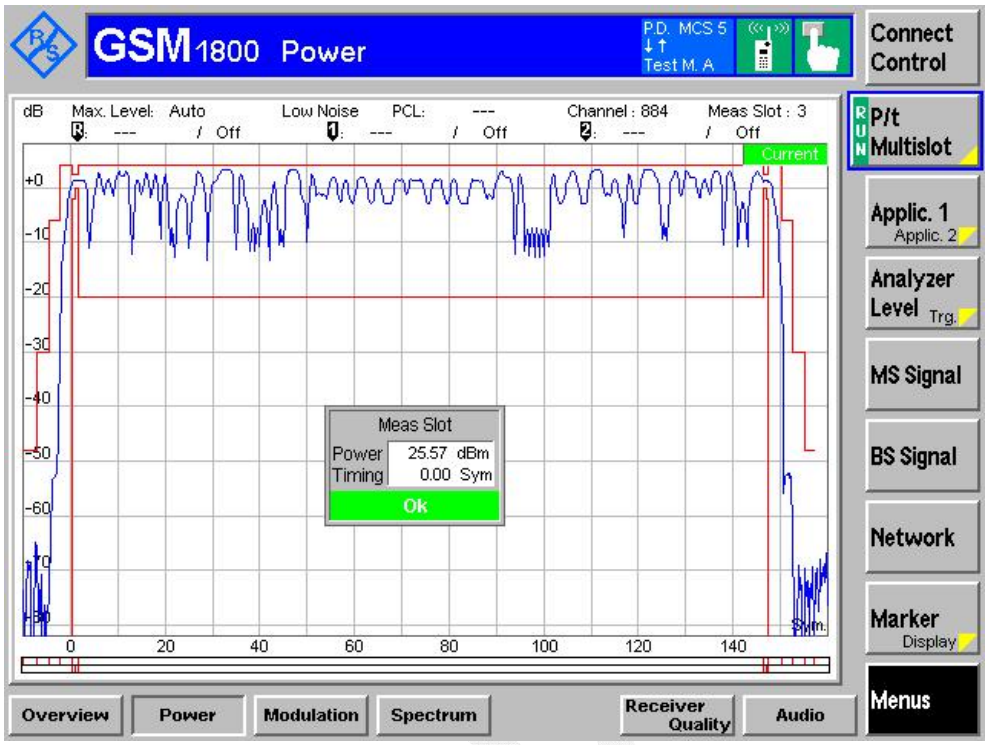


Normal Condition GAMMA_TN5, Middle Channel

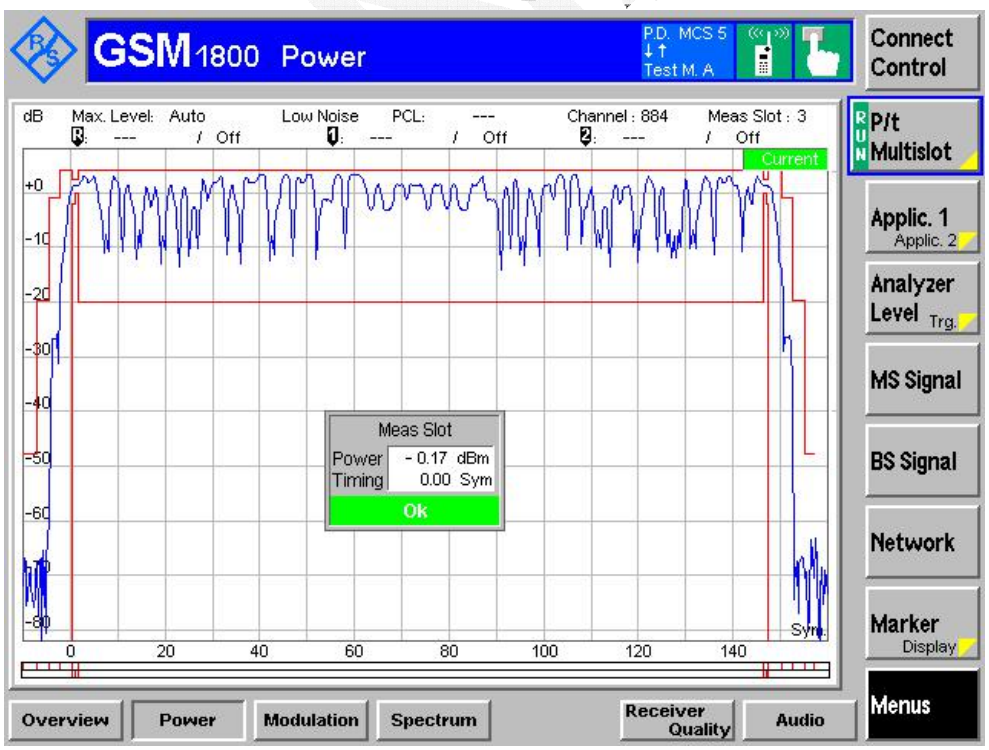
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN5, High Channel

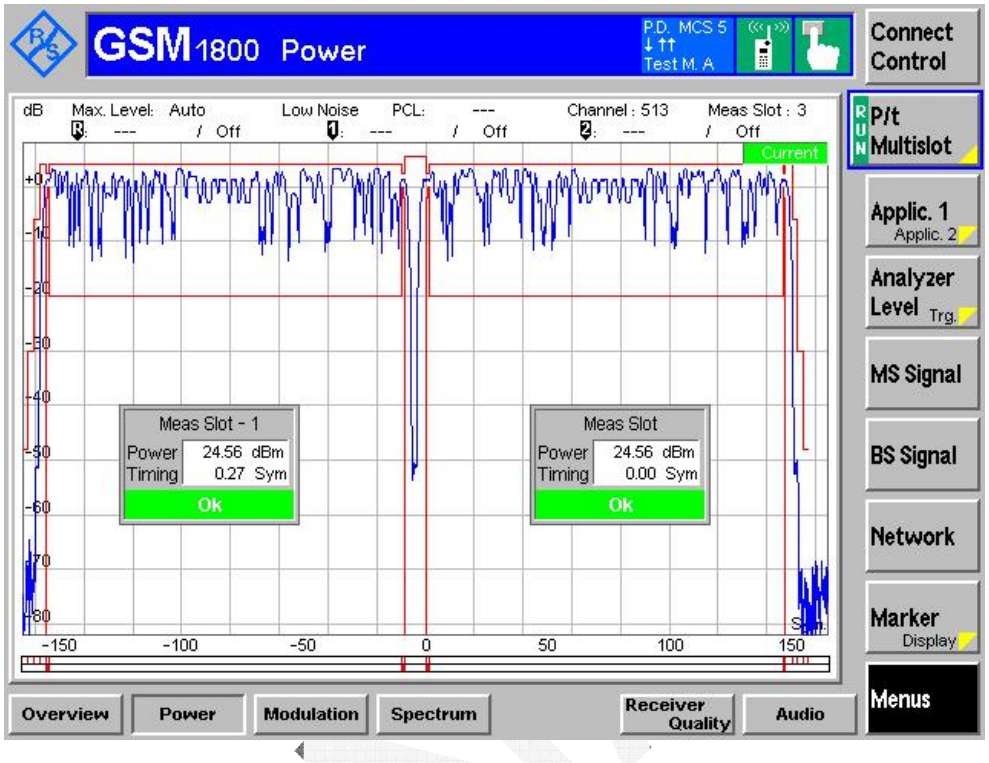


Normal Condition GAMMA_TN 18, High Channel

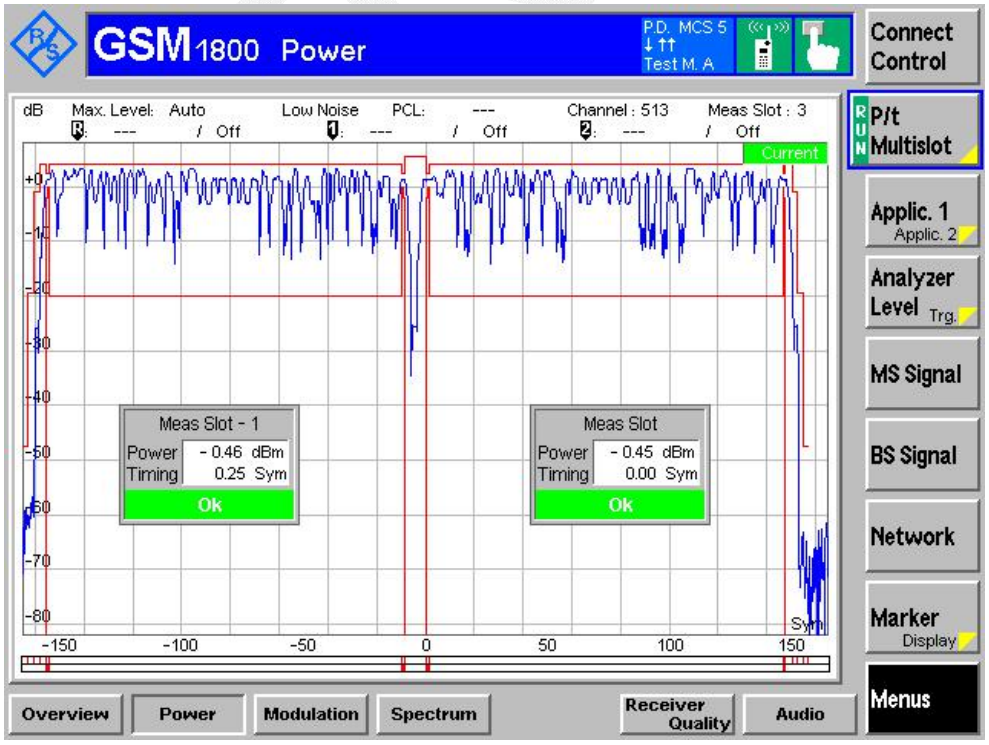


2uplink slots data:

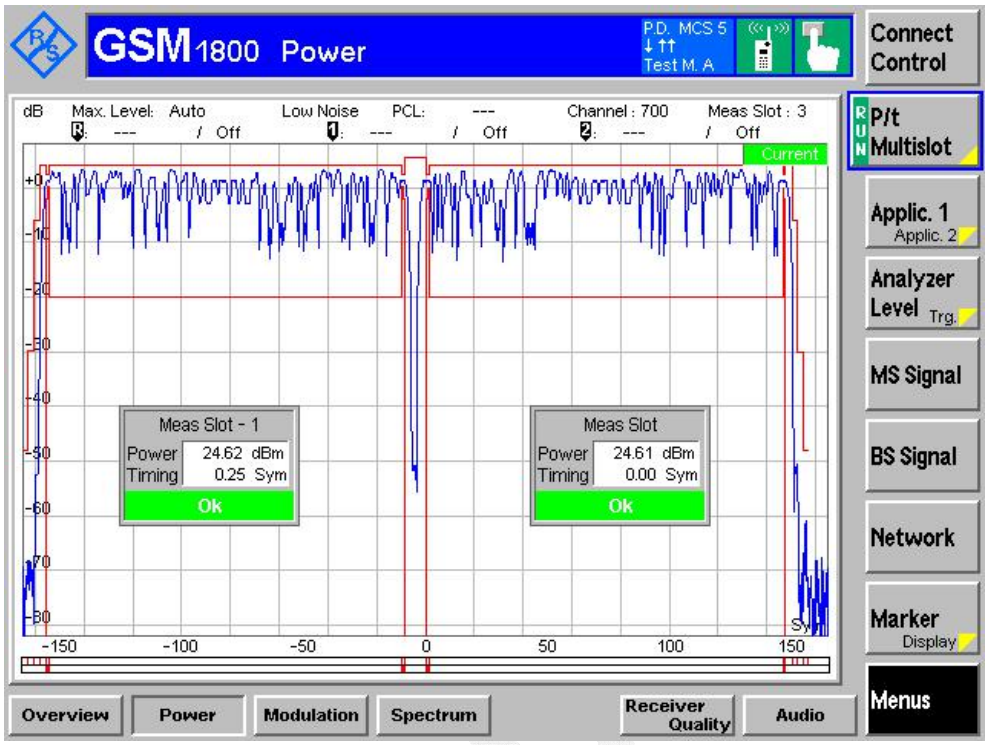
Normal Condition GAMMA_TN5, Low Channel



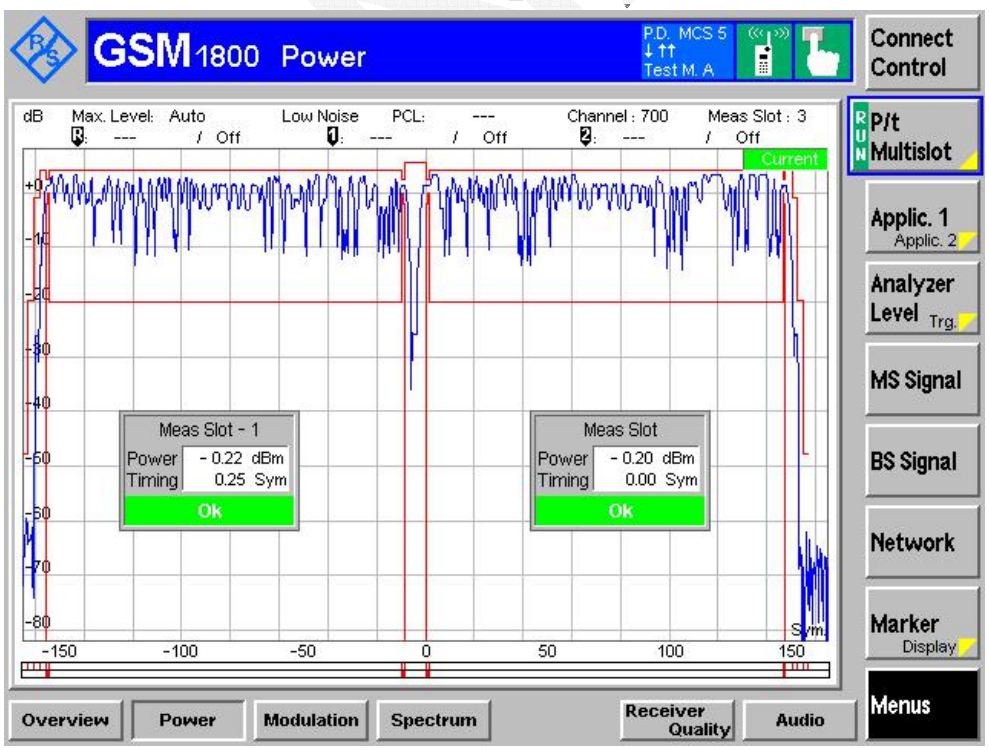
Normal Condition GAMMA_TN 18, Low Channel



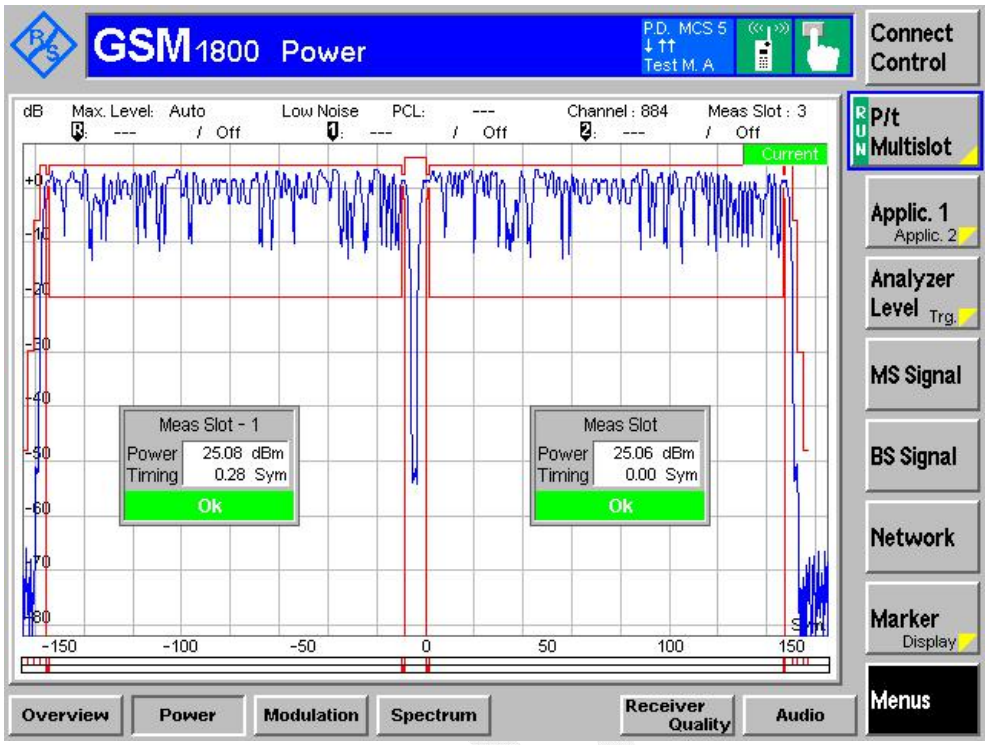
Normal Condition GAMMA_TN5, Middle Channel



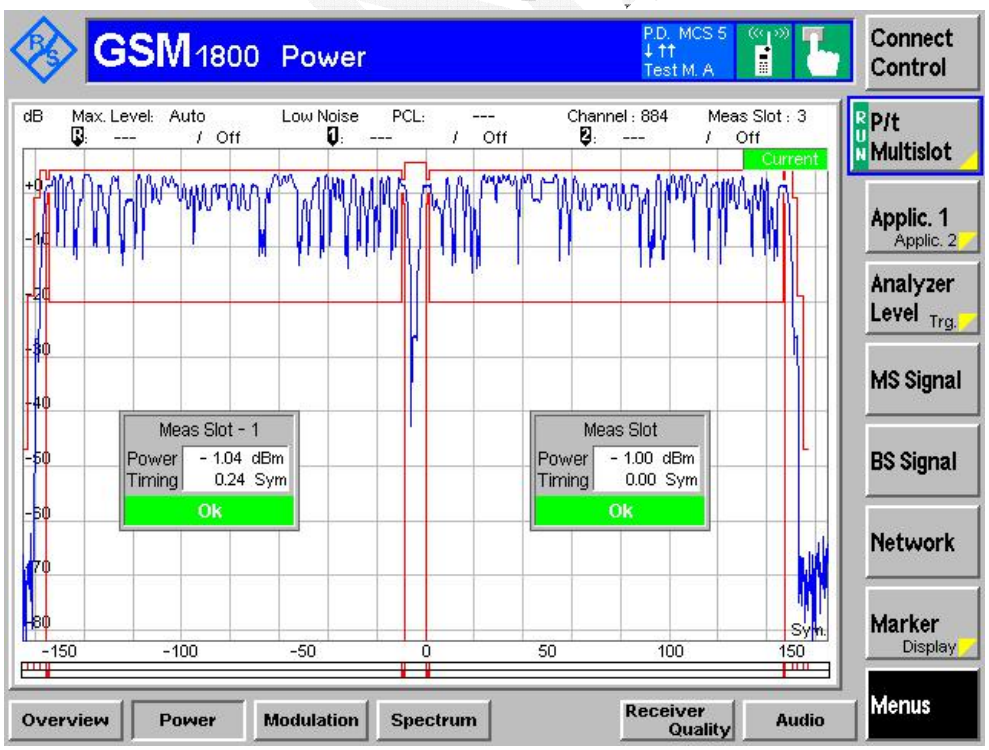
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN5, High Channel

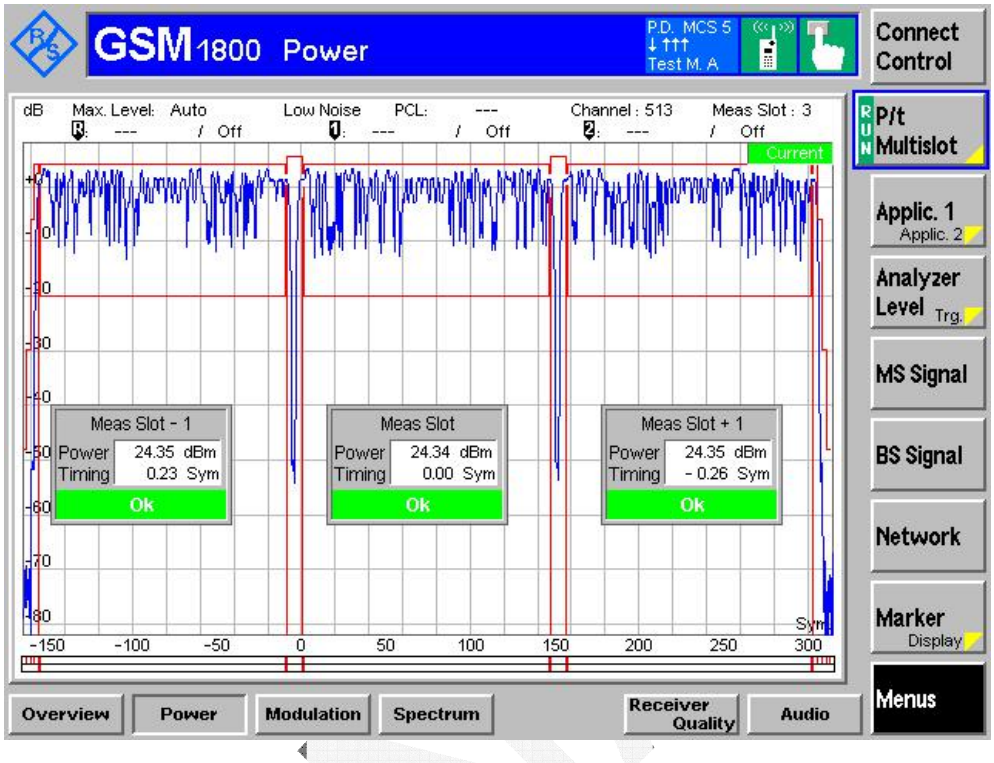


Normal Condition GAMMA_TN 18, High Channel

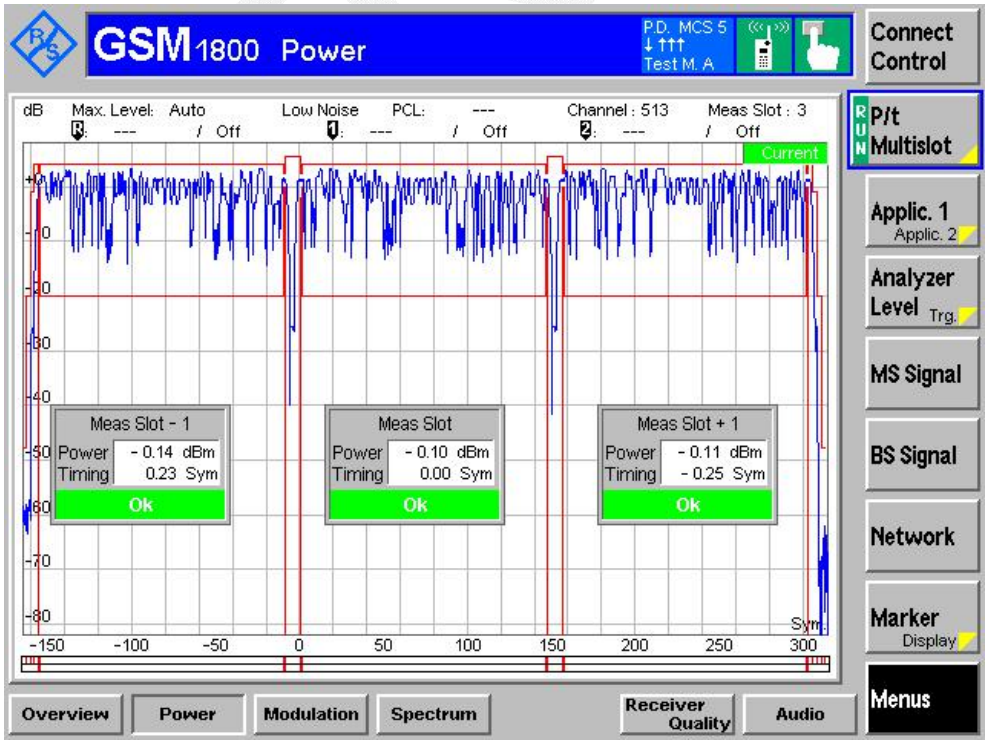


3uplink slots data:

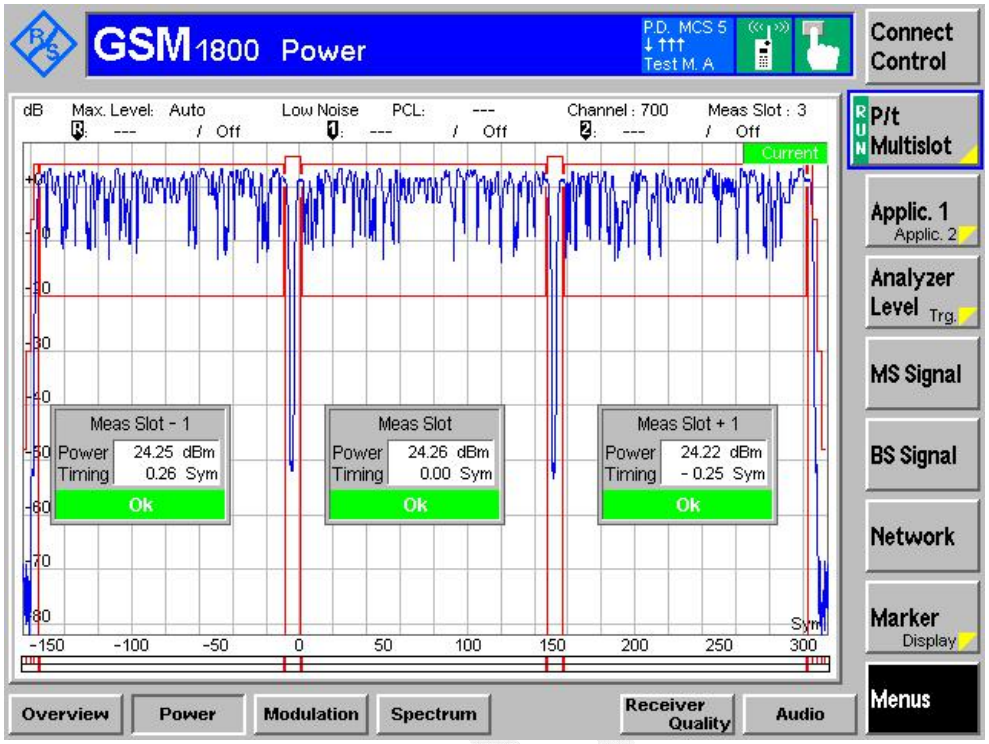
Normal Condition GAMMA_TN5, Low Channel



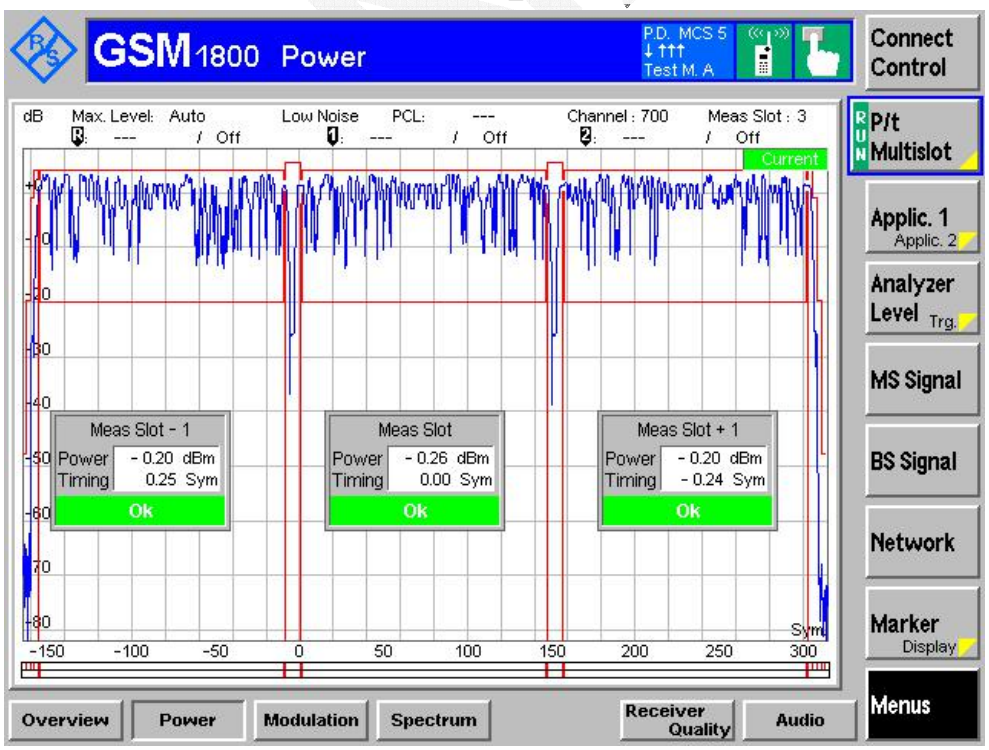
Normal Condition GAMMA_TN 18, Low Channel



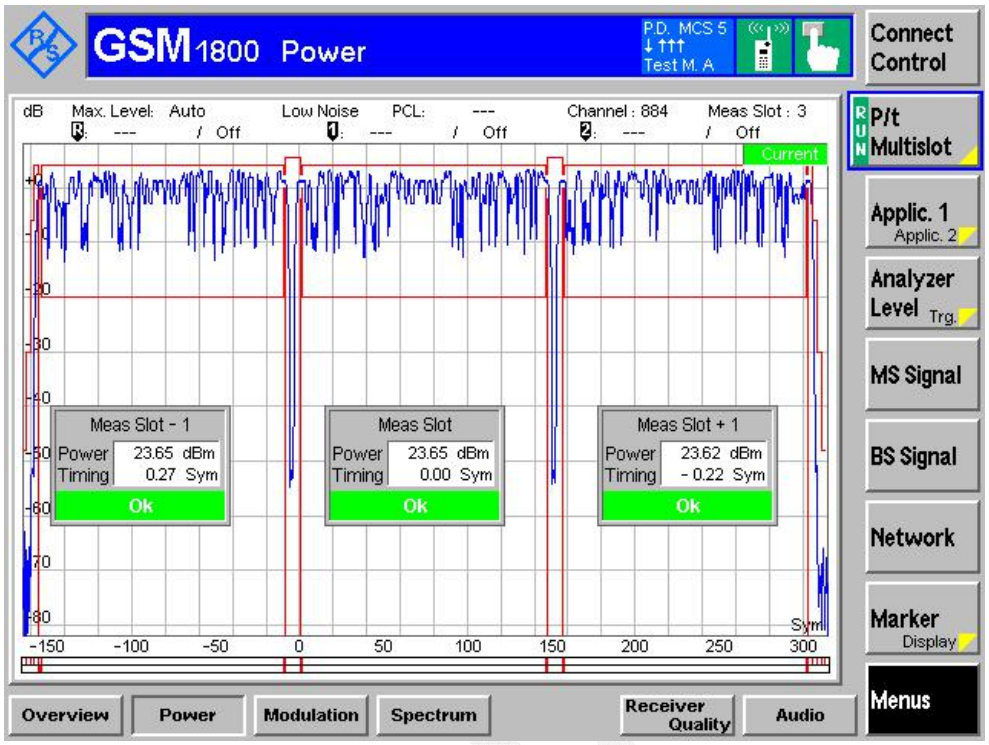
Normal Condition GAMMA_TN5, Middle Channel



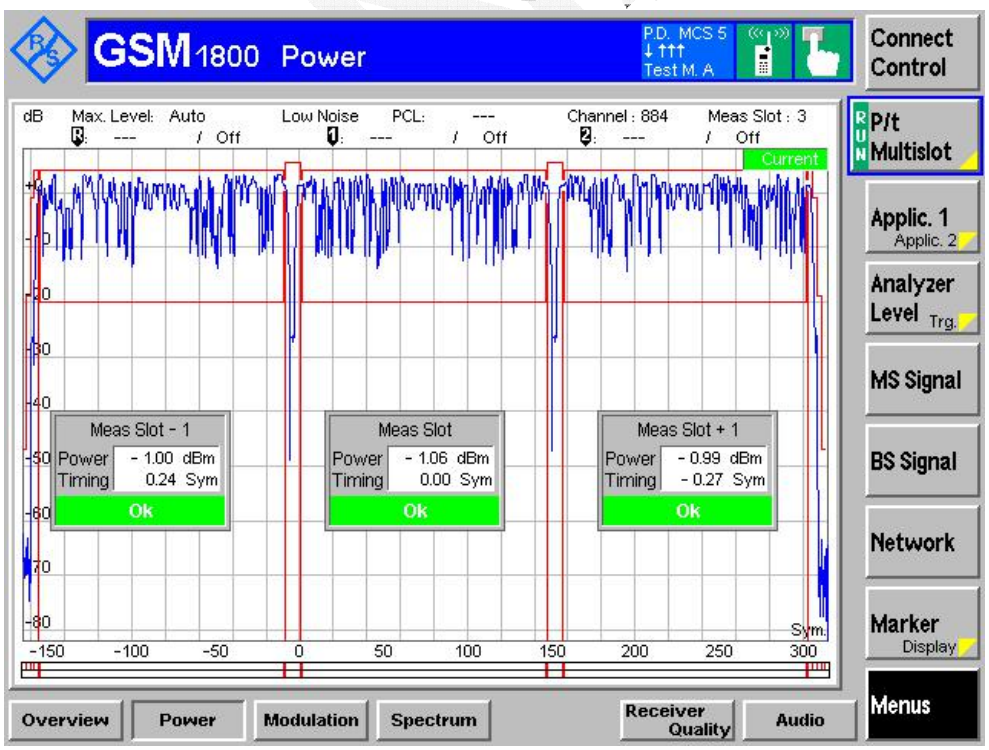
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN5, High Channel

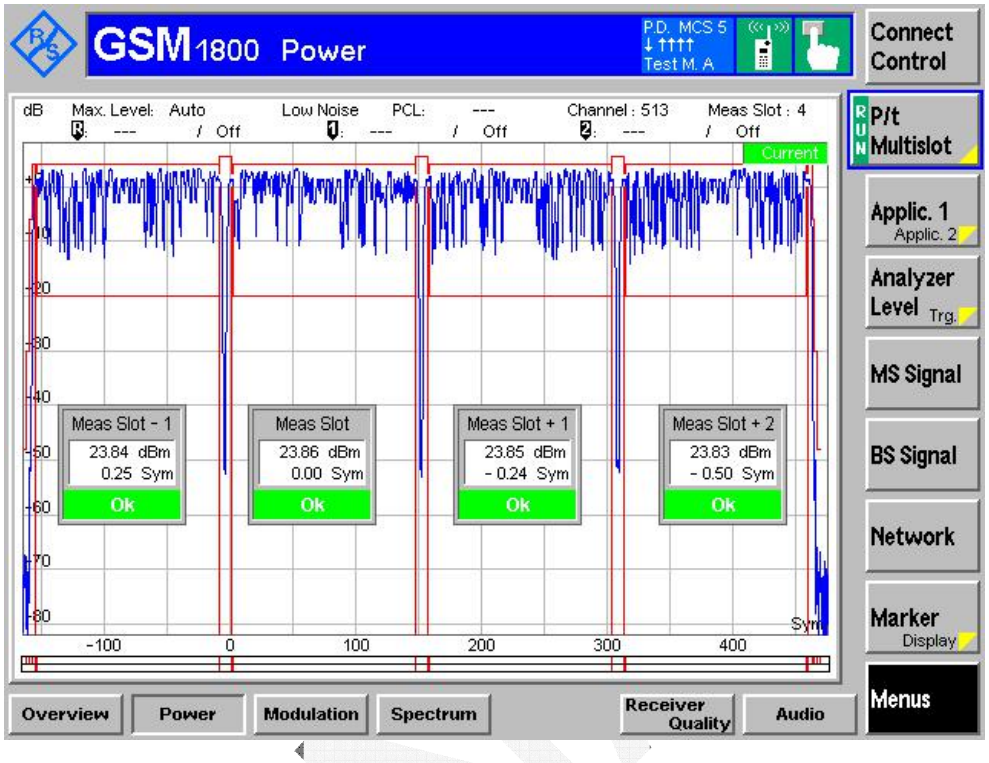


Normal Condition GAMMA_TN 18, High Channel

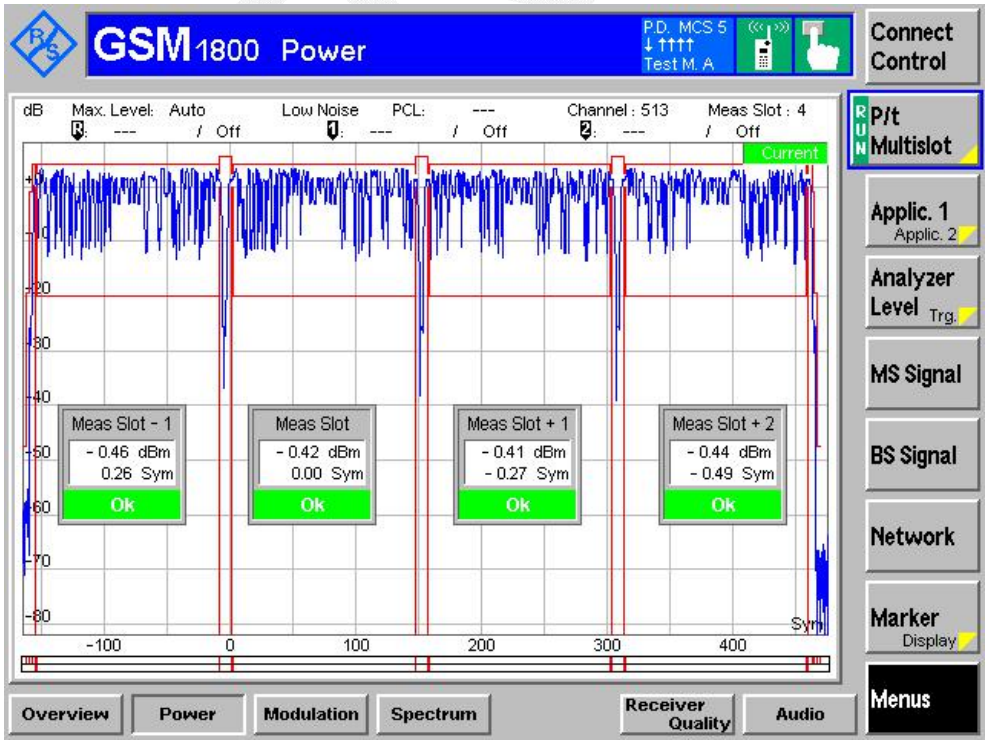


4uplink slots data:

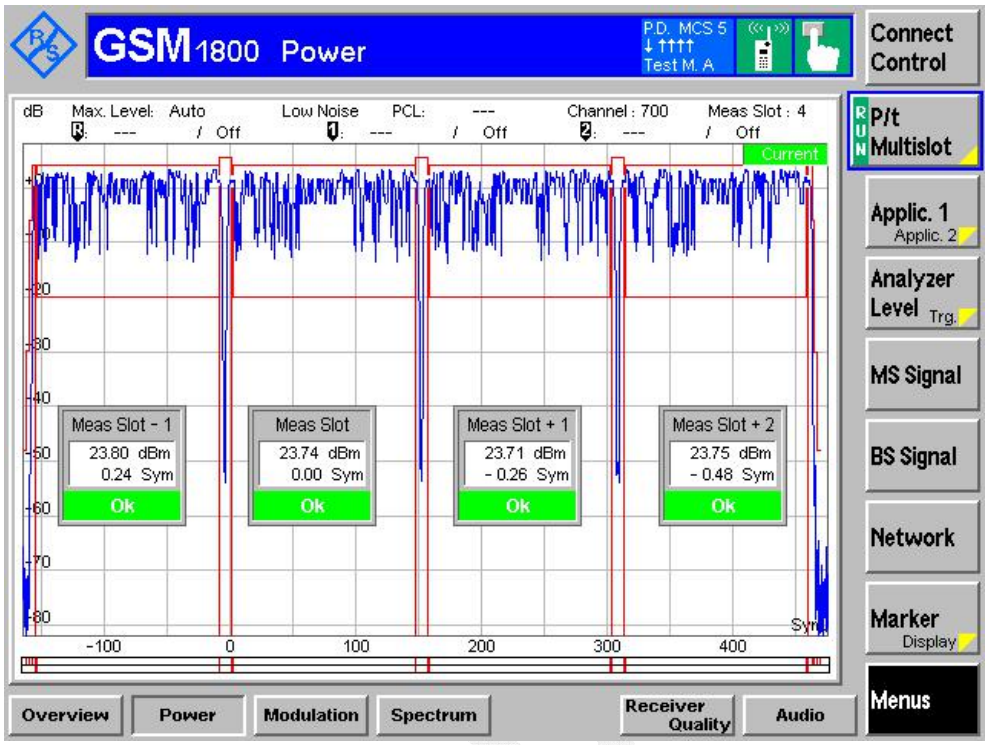
Normal Condition GAMMA_TN5, Low Channel



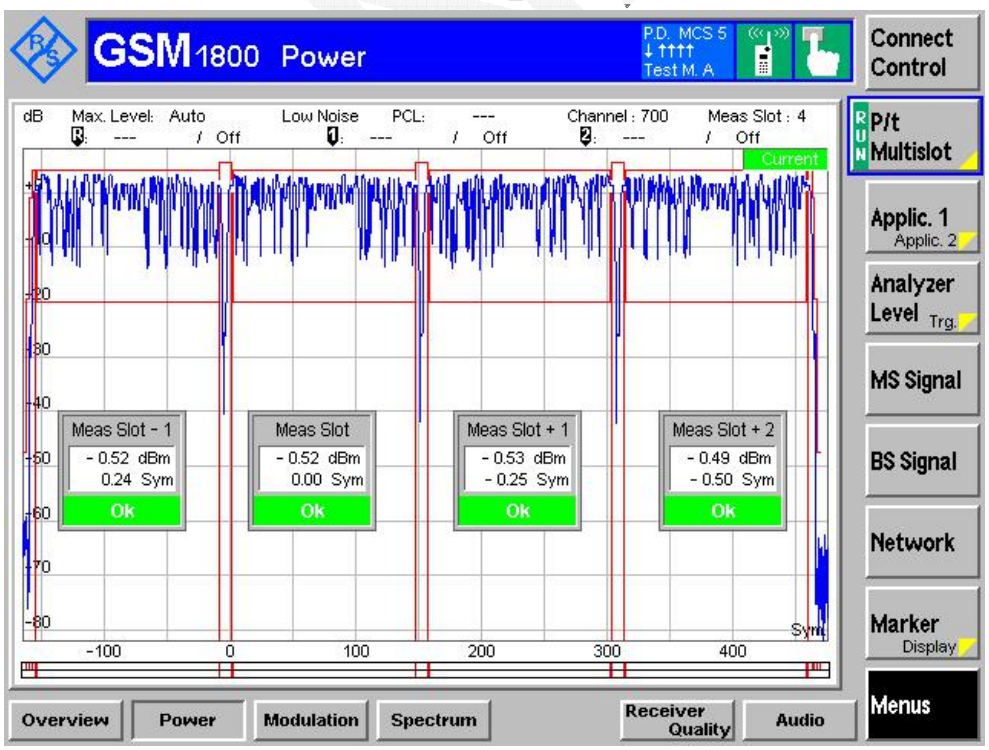
Normal Condition GAMMA_TN 18, Low Channel



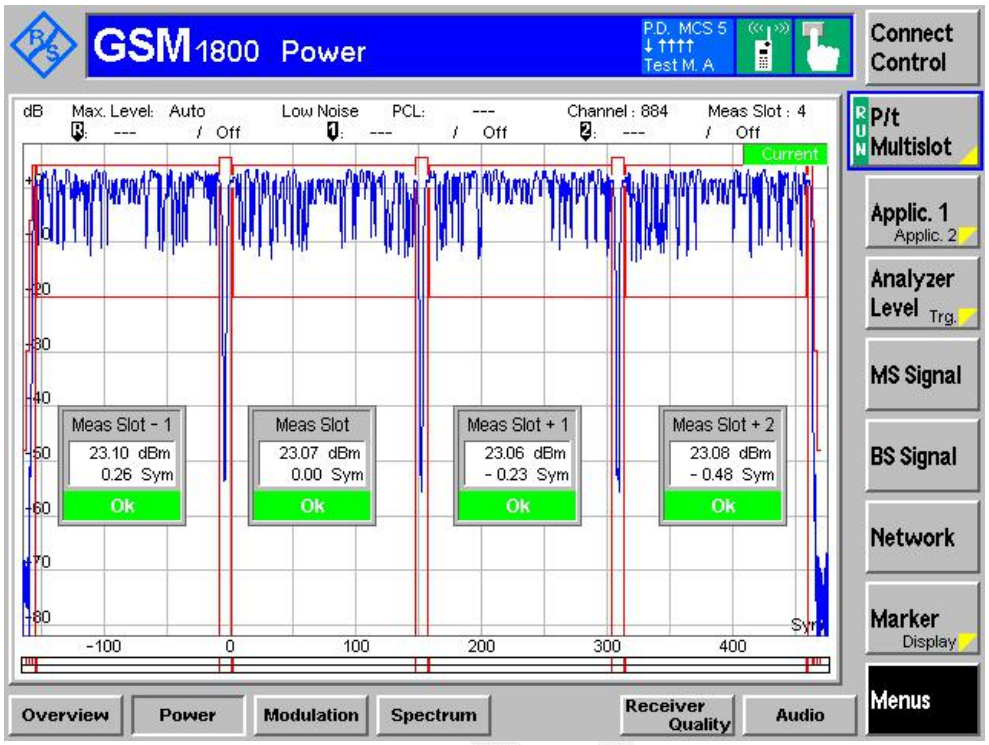
Normal Condition GAMMA_TN5, Middle Channel



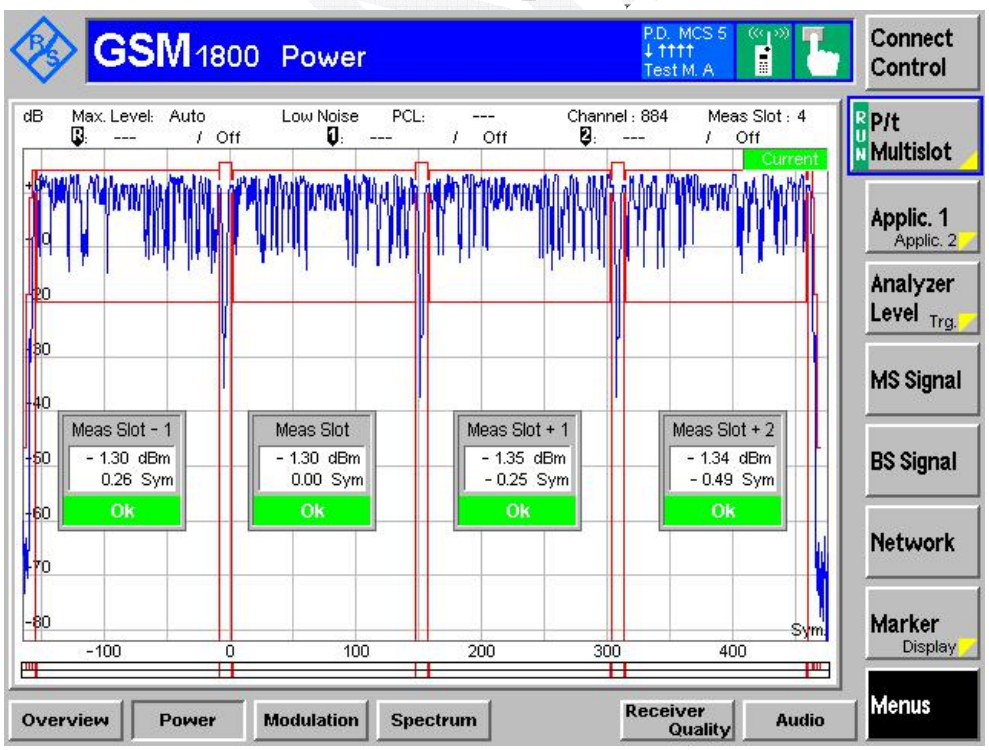
Normal Condition GAMMA_TN 18, Middle Channel



Normal Condition GAMMA_TN5, High Channel



Normal Condition GAMMA_TN 18, High Channel



§4.2.25 OUTPUT RF SPECTRUM IN EGPRS CONFIGURATION

Applicable Standard

According to EN 301 511 V9.0.2 (2003-03), section 4.2.25,

The output RF spectrum is the relationship between the frequency offset from the carrier and the power, measured in a specified bandwidth and time, produced by the MS due to the effects of modulation and power ramping.

Since the conformance requirement, test procedure and test requirement of GSMK modulated signal's output RF spectrum are defined in subclause 13.16.3 for GPRS MS, being thereby defined also for all EGPRS MS in that section, only 8PSK modulated signal's RF output spectrum conformance requirement, test procedure and test requirements are defined in this subclause.

1. The level of the output RF spectrum due to 8PSK modulation shall be no more than that given in 3GPP TS 05.05, subclause 4.2.1, with the following lowest measurement limits:

- -36 dBm below 600 kHz offset from the carrier;

- -51 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -56 dBm for DCS 1 800 and PCS 1 900 from 600 kHz out to less than 1 800 kHz offset from the carrier;

- -46 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -51 dBm for DCS 1 800 and PCS 1 900 at and beyond 1 800 kHz offset from the carrier; but with the following exceptions at up to -36 dBm:

- up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz in the combined range 600 kHz to 6 000 kHz above and below the carrier;

- up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz at more than 6 000 kHz offset from the carrier.

1.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.1.

1.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.1; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

2. The level of the output RF spectrum due to switching transients shall be no more than given in 3GPP TS 05.05, subclause 4.2.2, table "a) Mobile Station". 2.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.2. 2.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.2; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

3. When allocated a channel, the power emitted by the GSM 400, GSM 900 and DCS 1800 MS, in the band 935 MHz to 960 MHz shall be no more than -79 dBm, in the band 925 MHz to 935 MHz shall be no more than -67 dBm and in the band 1 805 MHz to 1 880 MHz shall be no more than -71 dBm, except in five measurements in each of the bands 925 MHz to 960 MHz and 1 805 MHz to 1 880 MHz, where exceptions at up to -36 dBm are permitted. For GSM 400 mobiles, in addition, a limit of -67 dBm shall apply in the frequency bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz.

For GSM 700, GSM 850 and PCS 1 900, the power emitted by MS, in the band of 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 762 MHz shall be no more than -73 dBm, in the band 869 MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 747 MHz to 762 MHz, 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted; 3GPP TS 05.05, subclause 4.3.3.

Test Procedure

NOTE: When averaging is in use during frequency hopping mode, the averaging only includes bursts transmitted when the hopping carrier corresponds to the nominal carrier of the measurement.

a) In steps b) to h) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range.

b) The other settings of the spectrum analyser are set as follows:
- Zero frequency scan;
- Resolution bandwidth: 30 kHz;
- Video bandwidth: 30 kHz;
- Video averaging: may be used, depending on the implementation of the test.

The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the symbols 87 to 132 of the burst in one of the active time slots is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyser averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging.

The MS is commanded to its maximum power control level in every transmitted time slot.

c) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz.

d) The resolution and video bandwidth on the spectrum analyser are adjusted to 100 kHz and the measurements are made at the following frequencies:
on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts.
at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts. For GSM 400 and DCS 1 800:
at 200 kHz intervals over the band 450 MHz to 496 MHz for each measurement over 50 bursts.
at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50 bursts.
at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts.
For GSM 900
at 200 kHz intervals over the band 925 MHz to 960MHz for each measurement over 50 bursts;
at 200 kHz intervals over the band 1805 MHz to 1880 MHz for each measurement over 50 bursts.
For GSM 700, GSM 850 and DCS 1 900:
at 200 kHz intervals over the band 747 MHz to 762 MHz for each measurement over 50 bursts.
at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts.
at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts.

e) The MS is commanded to its minimum power control level. The spectrum analyser is set again as in b).

f) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies:
FT;
FT + 100 kHz FT - 100 kHz;
FT + 200 kHz FT - 200 kHz;
FT + 250 kHz FT - 250 kHz;
FT + 200 kHz * N FT - 200 kHz * N;

where N = 2, 3, 4, 5, 6, 7, and 8;

and FT = RF channel nominal centre frequency.

g) Steps a) to f) is repeated except that in step a) the spectrum analyzer is gated so that the burst of the next active time slot is measured.

h) The spectrum analyser settings are adjusted to:
- Zero frequency scan; - Resolution bandwidth: 30 kHz;
- Video bandwidth: 100 kHz;
- Peak hold.
The spectrum analyser gating of the signal is switched off.
The MS is commanded to its maximum power control level in every transmitted time slot.

i)By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured at the following frequencies:
FT + 400 kHz FT - 400 kHz;
FT + 600 kHz FT - 600 kHz;
FT + 1,2 MHz FT - 1,2 MHz;
FT + 1,8 MHz FT - 1,8 MHz;
where FT = RF channel nominal centre frequency.
The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT.

j) Step i) is repeated for power control levels 7 and 11.

k) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

l) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

m) Steps a) b) f) h), and i) are repeated under extreme test conditions (annex 1, TC2.2). except that at step h) the MS is commanded to power control level 11.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2017-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-101
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2017-11-22

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	62 %
ATM Pressure:	100.1kPa

The testing was performed by Robin Zheng on 2017-09-14.

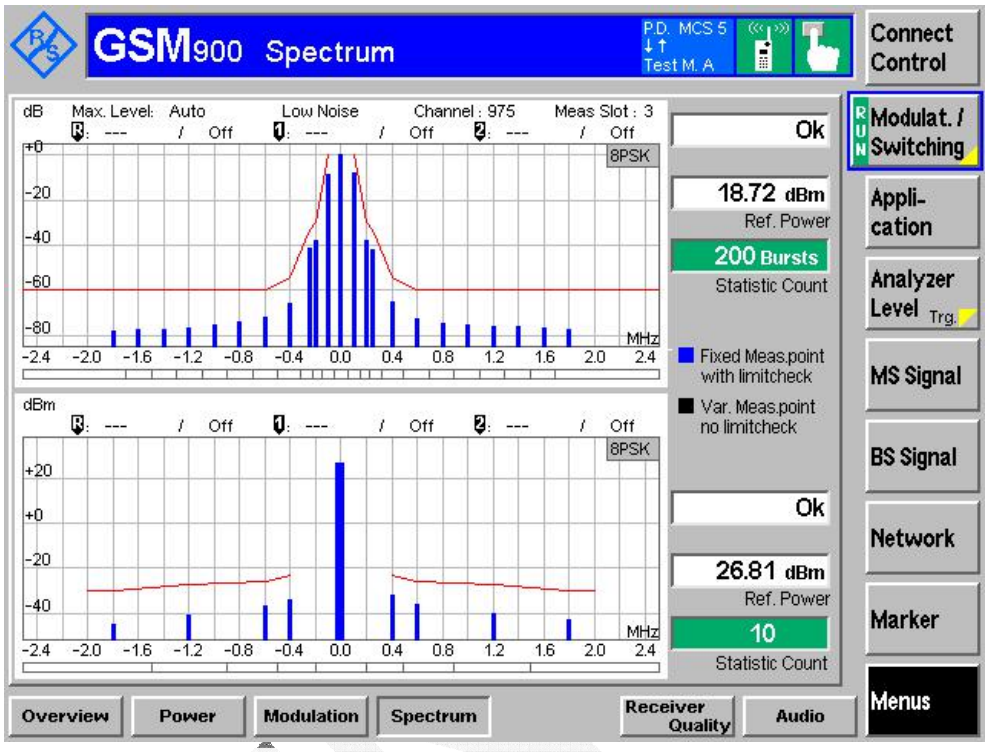
Test Results:

Mode	Test Frequency (MHz)	Test Condition					Result
E-GSM 900	880.2	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	902.0	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	914.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
DCS 1800	1710.4	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1747.8	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance
	1784.6	Normal	L.V. L.T.	L.V. H.T.	H.V L.T.	H.V. H.T.	Compliance

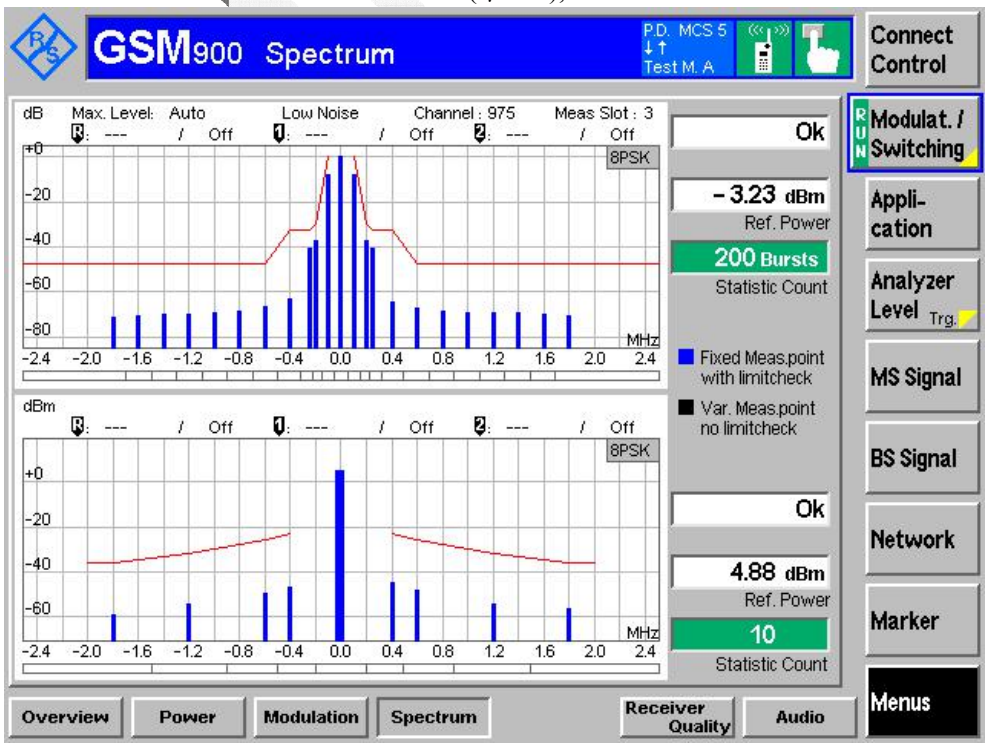
E-GSM900:

Normal Condition:

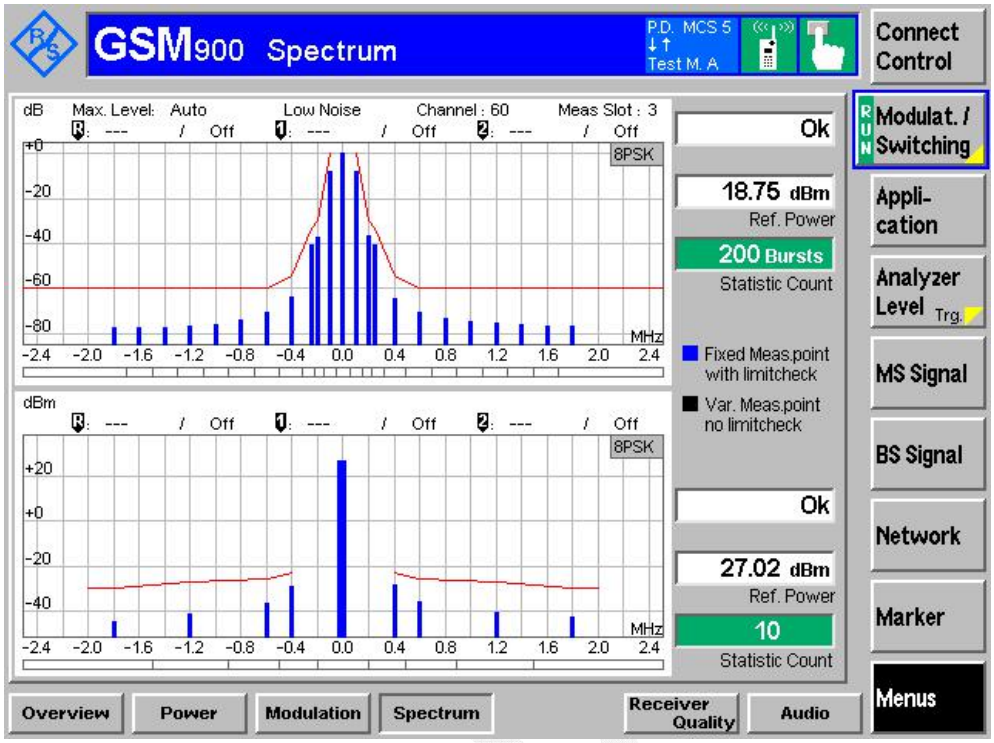
Normal Condition (γ =6), Low Channel



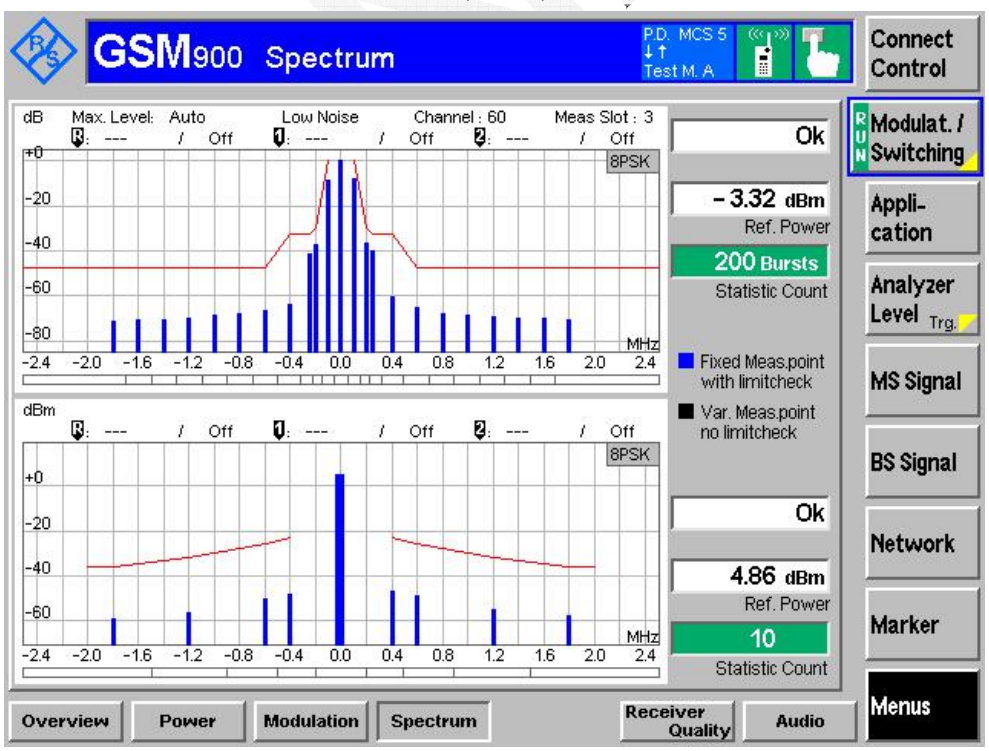
Normal Condition (γ =17), Low Channel



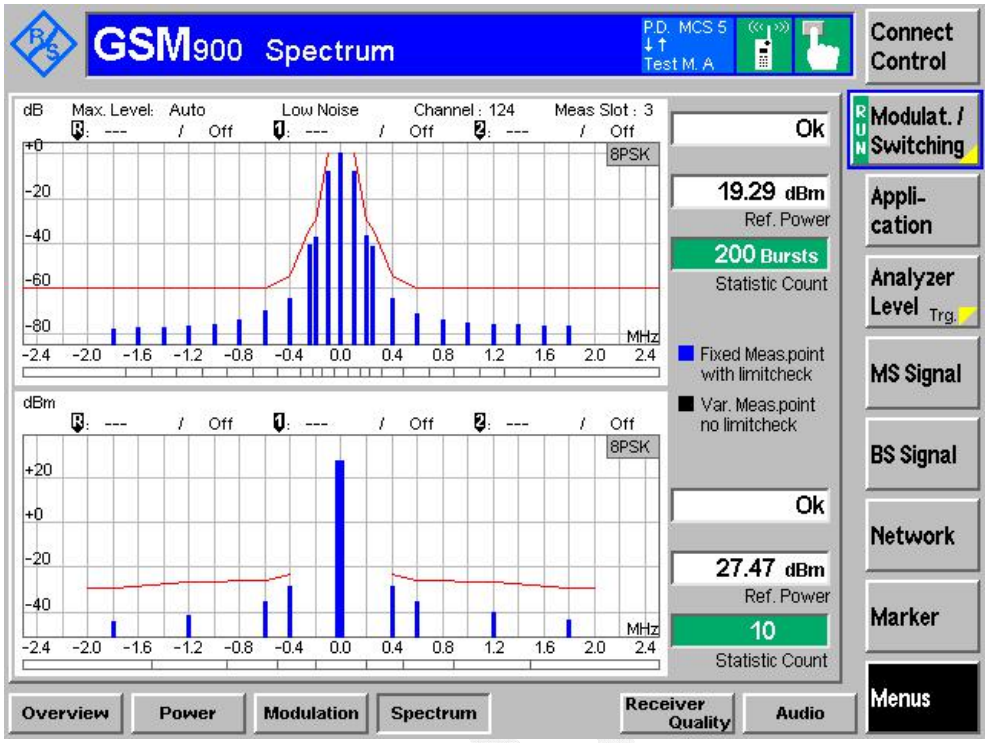
Normal Condition (γ =6), Middle Channel



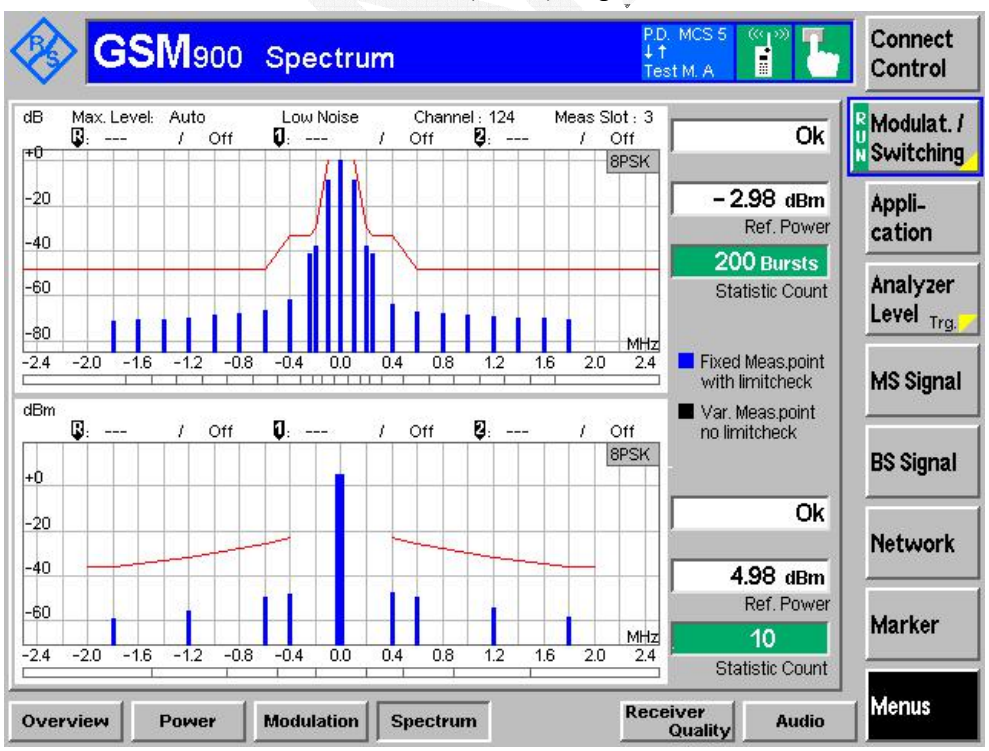
Normal Condition (γ =17), Middle Channel



Normal Condition (γ =6), High Channel



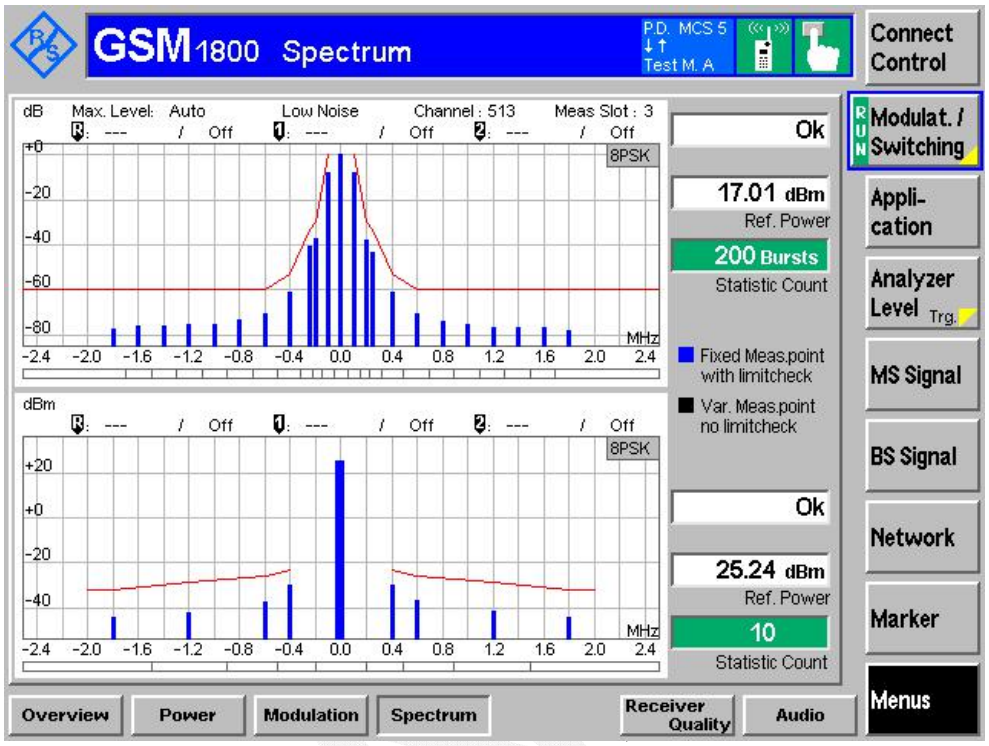
Normal Condition (γ =17), High Channel



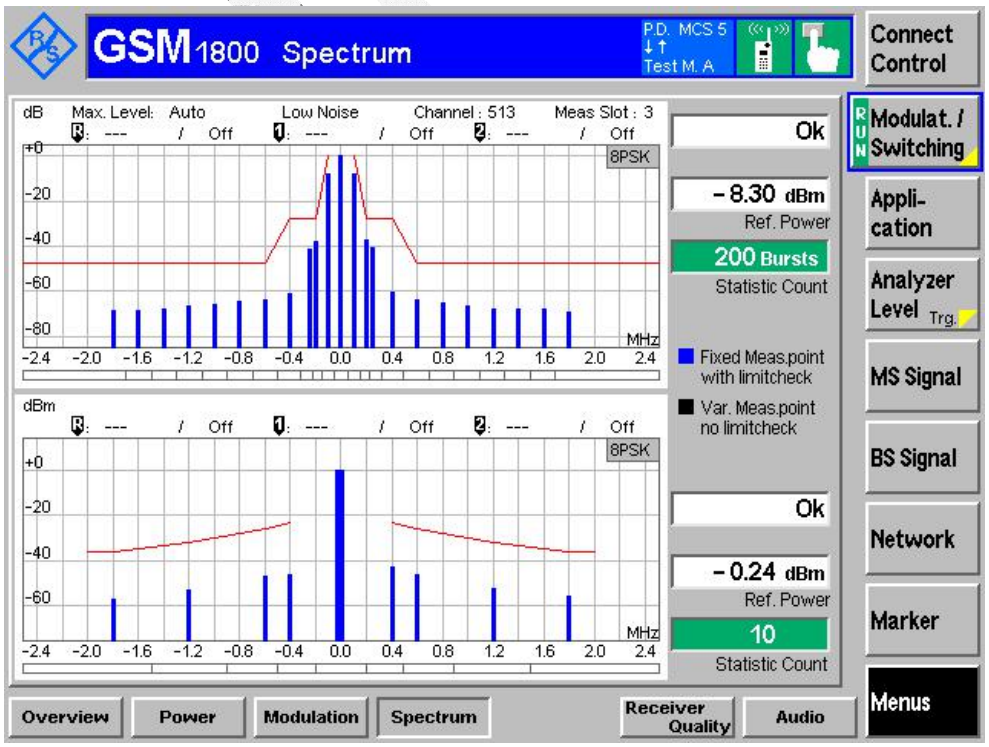
DCS1800:

Normal Condition

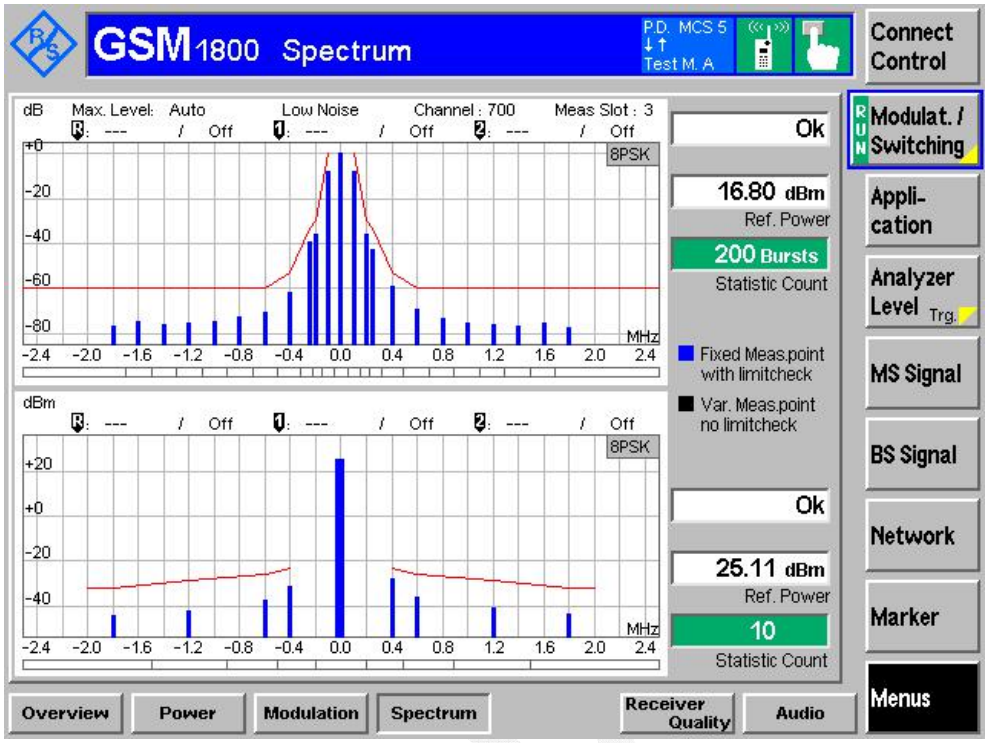
Normal Condition (γ =5), Low Channel



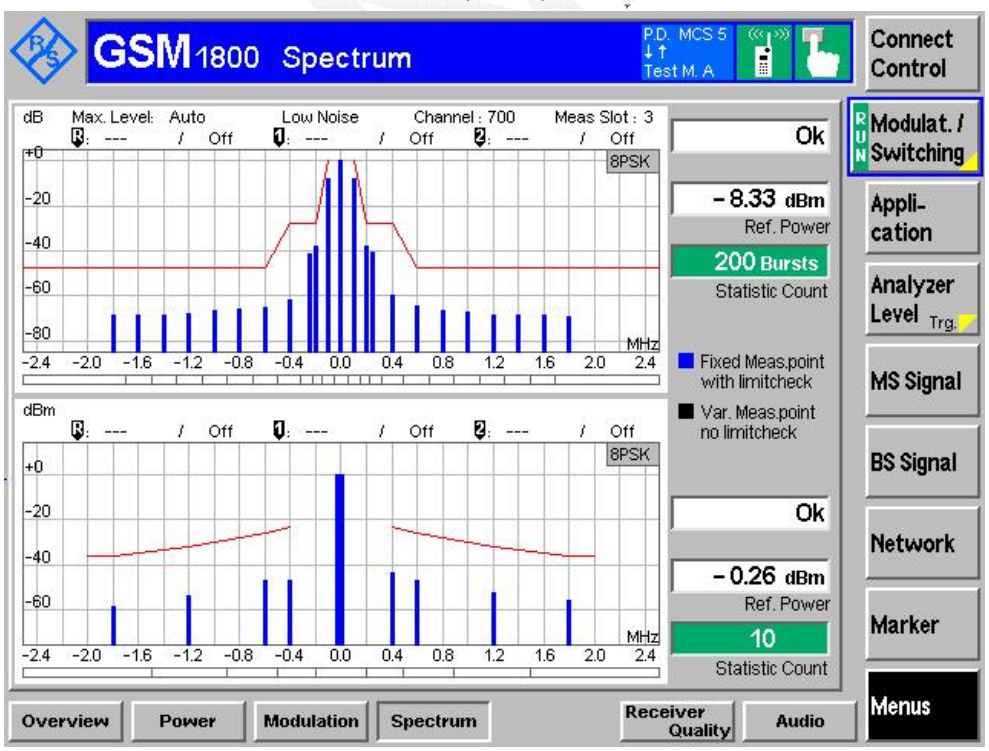
Normal Condition (γ =18), Low Channel



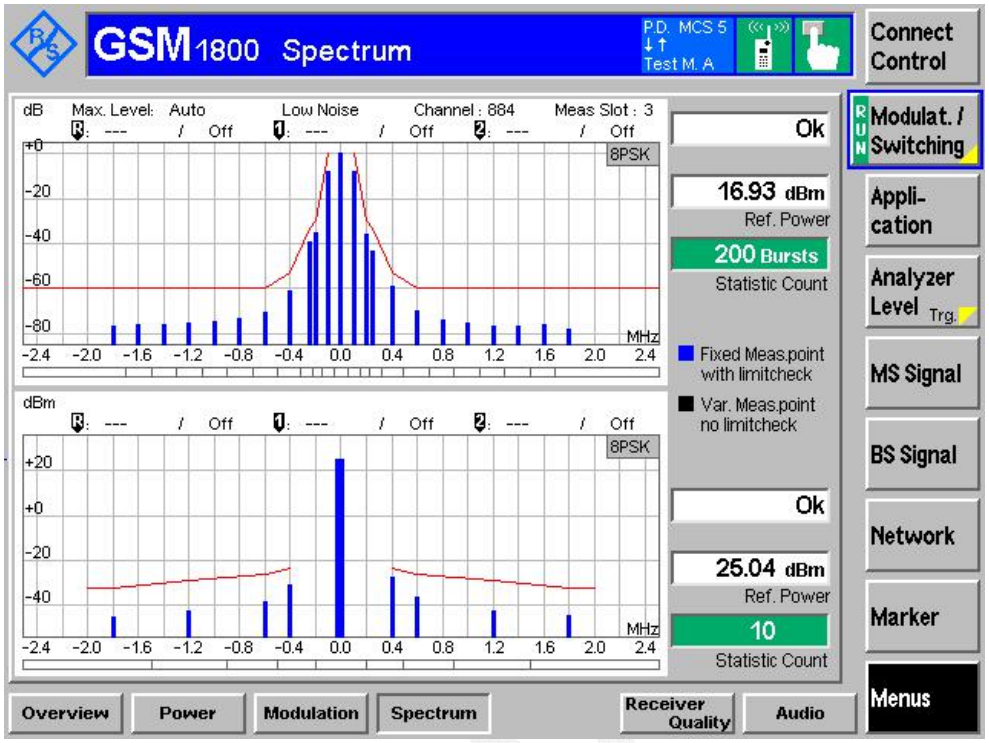
Normal Condition (γ =5), Middle Channel



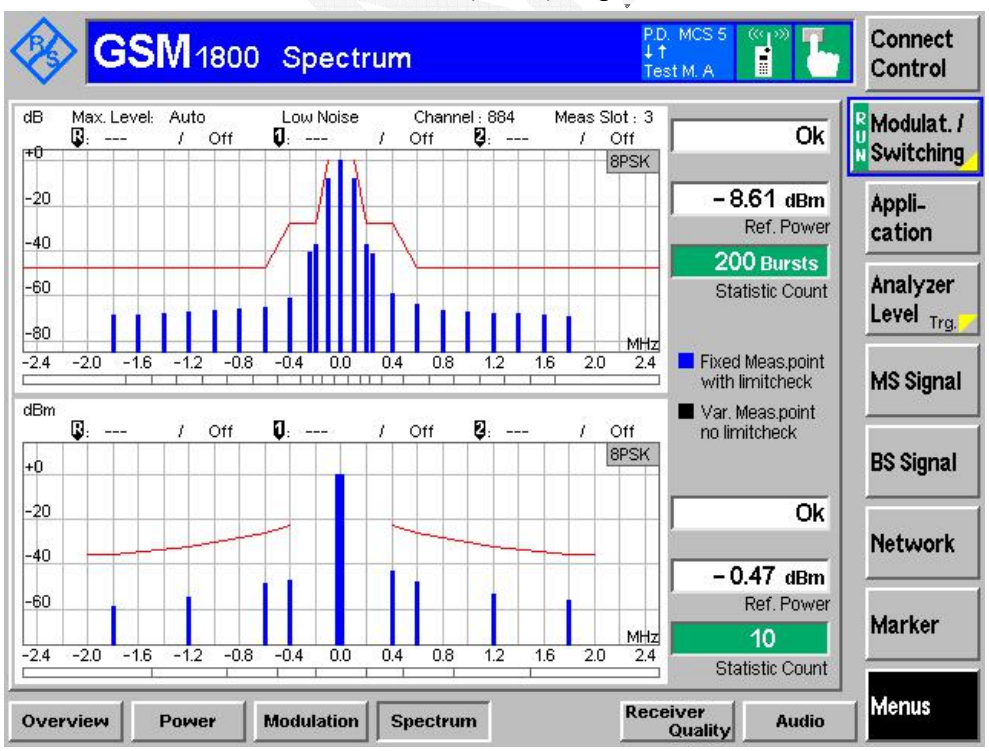
Normal Condition (γ =18), Middle Channel



Normal Condition (γ =5),High Channel



Normal Condition (γ =18), High Channel



Spurious Emissions in the MS receive bands-EDGE:

For E-GSM900 Band (Middle channel)

Frequency Range	Frequency	Level	Limit	Result
MHz	MHz	dBm	dBm	
925-935	928.96	-68.31	-67	Compliance
935-960	938.69	-80.12	-79	Compliance
	955.64	-82.01	-79	Compliance

For DCS1800 Band (Middle channel)

Frequency Range	Frequency	Level	Limit	Result
MHz	MHz	dBm	dBm	
1805-1880	1812.34	-71.85	-71	Compliance
	1841.68	-72.16	-71	Compliance
	1863.15	-72.37	-71	Compliance
	1873.24	-72.62	-71	Compliance

Result: PASS

Note: The MS is commanded to its maximum power level.

§4.2.26–BLOCKING AND SPURIOUS RESPONSE IN EGPRS CONFIGURATION

Applicable Standard

Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation. "Wanted signal" in this test is the signal generated by the transmitted RLC data blocks.

Test Procedure

a) The SS is set to produce a static 8-PSK wanted signal and a static interfering signal at the same time. The SS setsthe amplitude of the wanted signal to 4 dB above the reference sensitivity level specified in table 14.18-3b forPDTCH channel and in table 14.18-4b for USF channel with correction values as specified in 3GPP TS 05.05subclause 6.2;

b) The SS transmits packets on PDTCH using MCS-9 coding to MS on all allocated timeslots.

c) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) inthe overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded.
NOTE 3: Allowance must be made for possible spurious signals arising from the SS. These are particularly likely atsub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.

d) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closelyapproximating the absolute frequency of the calculated blocking signal frequency) are the combined frequenciesfrom i), ii) and iii) which follow:

i) The total frequency range formed by:
GSM 400 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 3,6 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 3,6 MHz).
GSM 700 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 7,5 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 7,5 MHz).
GSM 850 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz).
P-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz).
E-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 17,5 MHz).
DCS 1 800: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 37,5 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 37,5 MHz).
PCS 1 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 30 MHz)
and Flo - (IF1 + IF2 + ... + IFn + 30 MHz).
and
the frequencies +100 MHz and -100 MHz from the edge of the relevant receive band.
Measurement are made at 200 kHz intervals.
ii) The three frequencies IF1, IF1 + 200 kHz, IF1 - 200 kHz.
iii) The frequencies:

mFlo + IF1;
mFlo - IF1;

mFR;
where m is all positive integers greater than or equal to 2 such that either sum lies in the range 100 kHz to12,75 GHz.

The frequencies in step ii) and iii) lying in the range of frequencies defined by step i) above need not berepeated.

Where:

Flo - local oscillator applied to first receiver mixer
IF1 ... IFn - are the n intermediate frequencies
Flo, IF1, IF2 ... IFn - shall be declared by the manufacturer in the PIXIT statement 3GPP TS 51.010-1 annex 3.

e) The level of the unwanted signal is set according to table 14.18-9.

f) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks notacknowledged based on the content of the Ack/Nack Description information element (see 04.60, 12.3) in thePacket Downlink Ack/Nack as sent from the MS to the SS on the PACCH.
NOTE 4: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting thePacket Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then againassigns uplink resources so the MS can send this message.

g) Once the number of blocks transmitted with the current coding scheme as counted in step f) reaches or exceedsthe minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resetsboth counters. If a failure is indicated, it is noted and counted towards the allowed exemption total.In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on theadjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz beyondis also be tested. This process is repeated until all channels constituting the group of failures is known.

h) The SS sets the value of the USF/MCS-9 such as to allocate the uplink to the MS.

j) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) inthe overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded.
NOTE 5: Allowance must be made for possible spurious signals arising from the SS. These are particularly likely atsub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.

k) The level of the unwanted signal is set according to table 14.18-9.

l) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does nottransmit while being allocated the uplink.

m) Once the number of USF/MCS-9 allocating the uplink for the MS as counted in step l) reaches or exceeds theminimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets bothcounters. If a failure is indicated, it is noted and counted towards the allowed exemption total.In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on theadjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz beyondis also be tested. This process is repeated until all channels constituting the group of failures is known.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-01	2017-07-01
SUN MOON ELECTRONICS	Matching Network	N/A	MP0835-2	2017-10-16	2017-10-16
Pro-Instrument	DC Power Supply	pps3300	N/A	N/A	N/A
Agilent	Signal Generator	E8247C	MY43321350	2017-09-23	2017-09-22

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	62 %
ATM Pressure:	100.1kPa

The testing was performed by Robin Zheng on 2017-09-14.

Test Results: Compliance

E-GSM 900 Band:

Channel frequency (MHz)	BLER (%)	Limit (%)	Result
880.2	0.068	10	Compliance
902.0	0.075	10	Compliance
914.8	0.065	10	Compliance

DCS 1800 Band:

Channel frequency (MHz)	BLER (%)	Limit (%)	Result
1710.4	0.065	10	Compliance
1747.8	0.076	10	Compliance
1784.6	0.054	10	Compliance

EXHIBIT A - EUT PHOTOGRAPHS

EUT – All View

EUT – Top View

EUT – Bottom View

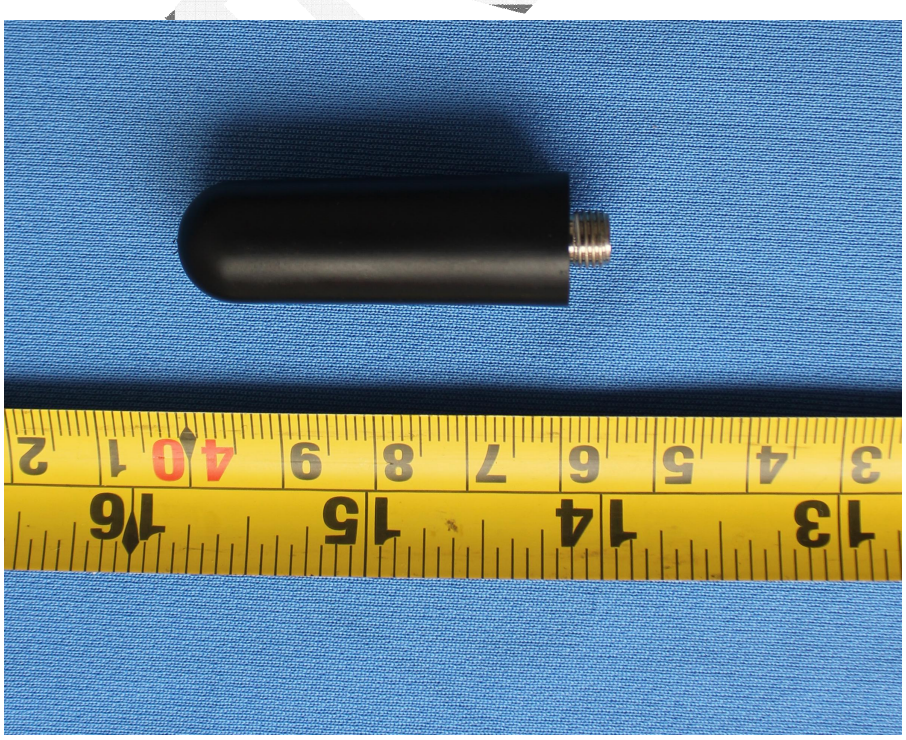
EUT – Side View

EUT – Side View

EUT – Side View

EUT – Side View

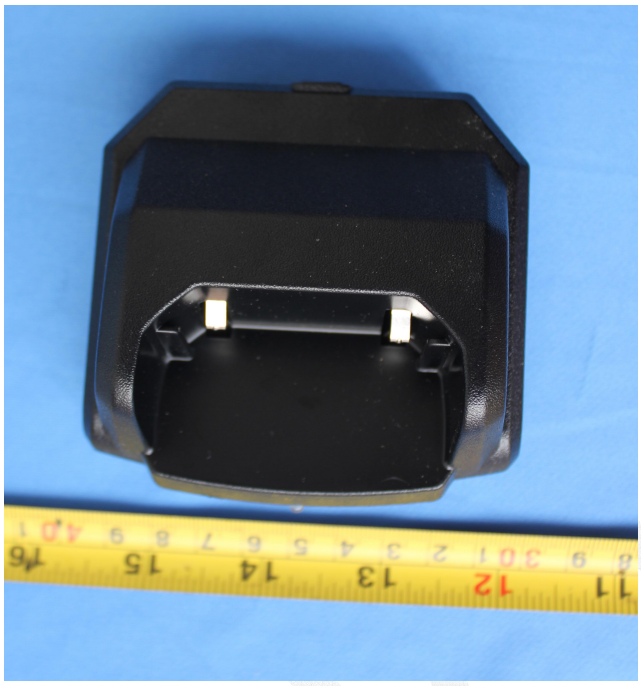
EUT – Antenna View



EUT – Adapter View

EUT – Adapter Label View

EUT – Charging Base View



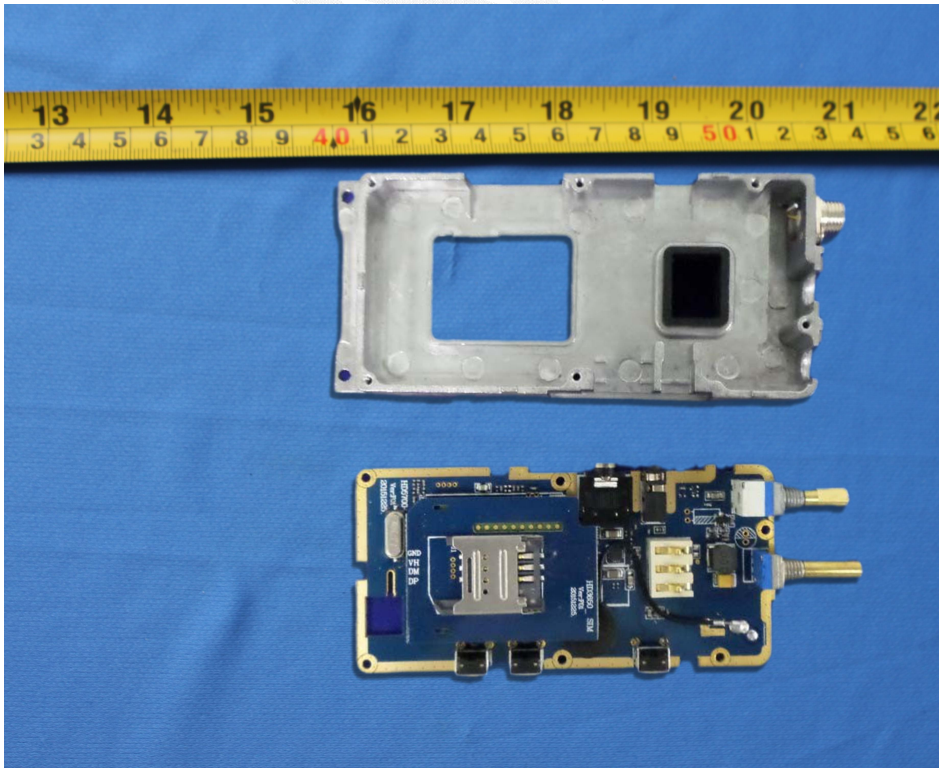
EUT – Charging Base Label View

EUT – Uncover View

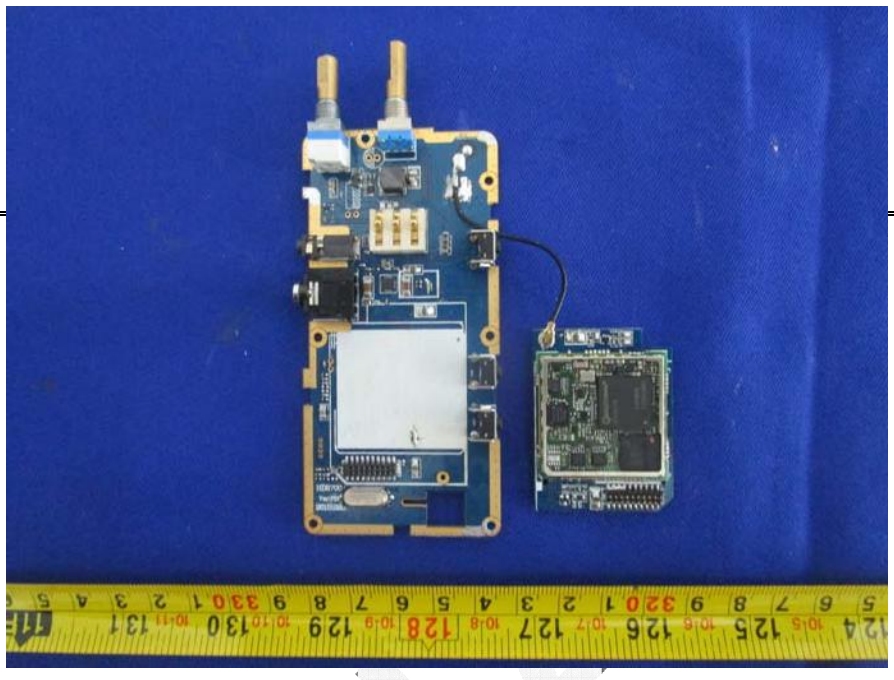
EUT – Uncover View

EUT – Uncover View

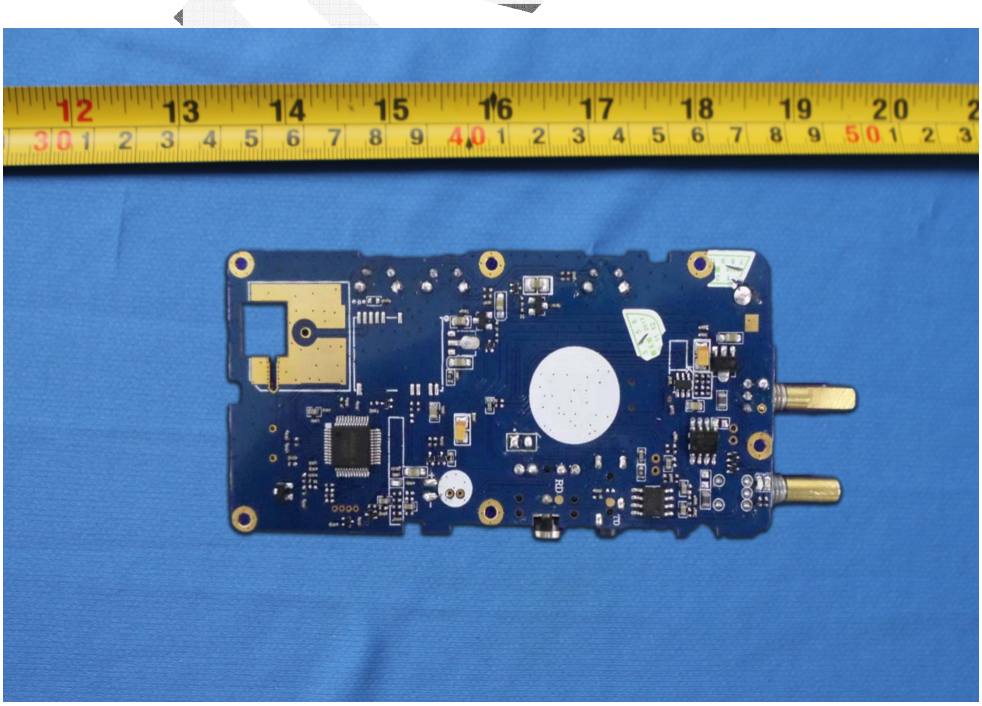
EUT – Uncover View



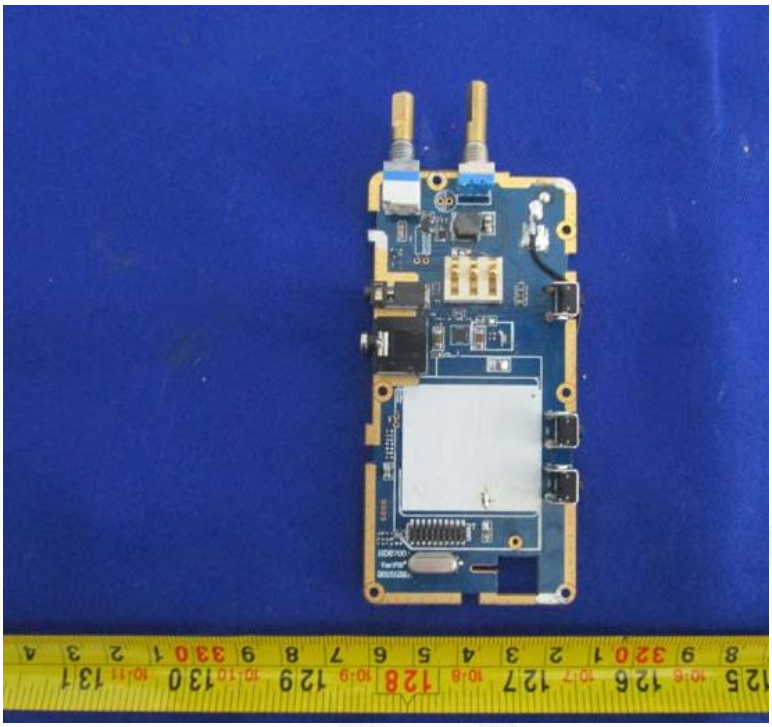
EUT – Uncover View



EUT – Main Board Top View

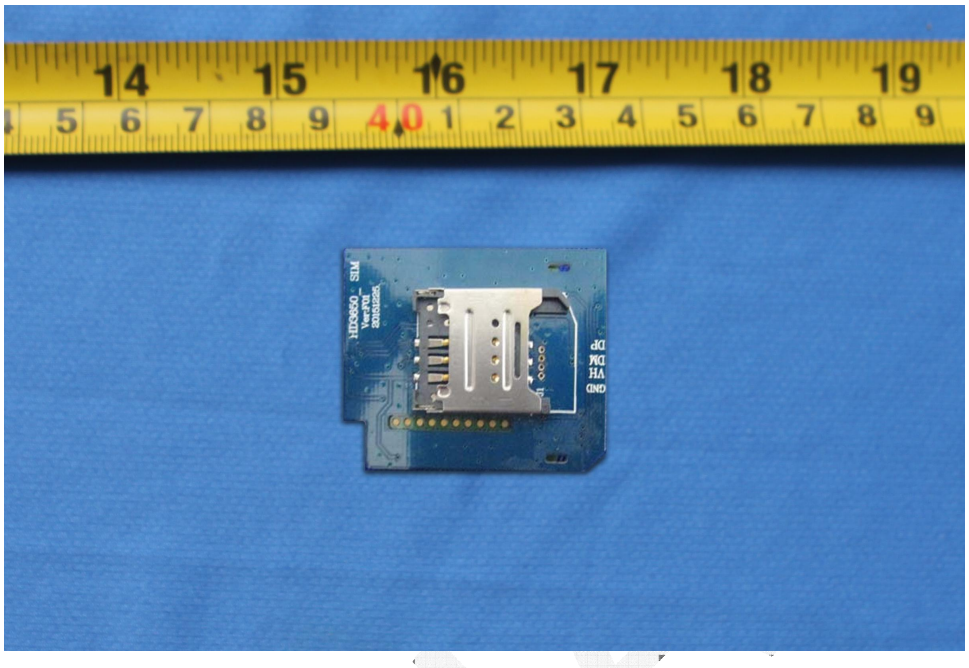


EUT –Main Board Bottom View



EUT – RF Module Top View

EUT –RF Module Bottom View



EUT – Main Chip View

EUT – Battery Top View

EUT – Battery Bottom View

EUT – Battery Label View

EXHIBITB– TEST SETUP PHOTOGRAPHS

Radiated Emissions Below 1GHz View

Radiated Emissions Above 1GHz View

DECLARATION LETTER

Shenzhen Anysecu Technology Co., Ltd.
EC Declaration of Conformity

We,Shenzhen Anysecu Technology Co., Ltd. (Building 1, 4th floor, F1 financial services technology innovation base, kefa Road #8, Nanshan District, Shenzhen, China)declare under our sole responsibility that the product:

Product name: Network Walkie Talkie
Model no (of supplier).:GT-200
Is fully in conformity with the essential requirements of the following EU Directive or other normative documents. This declaration is based on the full compliance of the products with the following European standards:

Directive	Standard detail and/or measurement reference
RF Frequency Directive	EN 301 511 V9.0.2 (2003-03)
Electromagnetic compatibility directive	ETSI TR 100 028
RoHS Directive (2011/65/EU)	Complied
WEEE Directive (2002/96/EC)	Complied
REACH Directive (EC 1907/2006)	Complied
Batteries Directive (2006/66/EC)	Complied
Packaging and Packaging Waste Directive (94/62/EC)	EN13427, EN13428, EN 13430

By Manufacturer: Shenzhen Anysecu Technology Co., Ltd.

AUTHORISED SIGNATURE: 刘晓波

Division and Position: C.E.O.
DATE 6th Nov. 2017

*******END OF REPORT*******