

TEST REPORT
of the accredited test laboratory

TÜV Nr.:M/FG-06/129

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Notified Body 0408
IC 4413

Applicant: Adcon Telemetry GmbH
Inkustr. 24
A-3400 Klosterneuburg

Tested Product: Telemetry GSM transceiver

Type: A733GSM/GPRS

Manufacturer: Adcon Telemetry GmbH
A-3400 Klosterneuburg; Inkustr. 24

Output power / field strength: 2 W @ 850 and 1 W @ 1900
power supply: 6,2 VDC

Frequency range: 824 – 849 and 1850 - 1910 MHz
Channel separation: 200 kHz

Standard: FCC: 47 CFR 22 (RSS-128) and 47 CFR 24 (RSS-133)

TÜV Österreich
Test laboratory for EMC

Supervisor of EMC-
laboratory:


Ing. Wilhelm Seier



1. 12. 2006

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checked by:


Ing. Michael Emminger

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The results of this test report only refer to the provided equipment.

LIST OF MEASUREMENTS

The complete list of measurements called for in the standards is given below.

SUBCLAUSE	PARAMETER TO BE MEASURED	PAGE
	Intentional Radiators	
	Test object data	3
22.913 – 7.1 (RSS-128)	Power Output	4-7
24.232 – 6.2 (RSS-133)		
22.355 – 8. (RSS-128)	Frequency stability	8-9
24.235 – 7. (RSS-133)		
22.917 – 7.5 (RSS-128)	Emissions Limits	10-13
24.238 – 6.3 (RSS-133)		
15.209 – 9. (RSS-128/133)		
2.989 – 7.5 (RSS-128)	Occupied Bandwidth	14-25
– 6.3 (RSS-133)		

To make the documentation of the measurements easier, on the measurement related pages only the FCC requirements are referenced and are equal to the canadian requirements as referenced in the matrix above.

TEST OBJECT DATA

General EUT Description

This telemetry equipment will be used to collect data from various sensors and write it into memory. Occasionally it is connecting through the GSM network to send the collected data to other stations like observers. This telemetry equipment will be situated in environment where normally no persons are situated and will work without user interaction.

The GSM Modem used is capable of operation in the bands 850 MHz and 1900 MHz.

Power Output
850 MHz

§ 22.913

Conducted Measurement

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
824,2	0	32,5	32,4
836,6	0	32,4	32,3
848,8	0	32,5	32,3
Measurement uncertainty	$\pm 0,75$ dB		

LIMIT

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
5	+ 33	± 2

Test Equipment used: NT-208

Power Output
1900 MHz

§ 24.232

Conducted Measurement

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
1850,2	0	28,2	28,0
1880,0	0	28,2	28,1
1909,8	0	28,2	28,1
Measurement uncertainty	$\pm 0,75$ dB		

LIMIT

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	+ 30	± 2

Test Equipment used: NT-208

Power Output
850 MHz

§ 22.913

ERP Measurement

Frequency (MHz)	Power Step	Burst Average (dBm)	Modulation Average (dBm)
824,2	0	34,08	24,42
836,6	0	34,83	25,14
848,8	0	35,59	25,99
Measurement uncertainty	± 4 dB		

LIMIT

Power Step	Burst Average ERP (dBm)
5	$\leq 38,5$

Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-207; NT-208

Power Output
1900 MHz

§ 24.232

EIRP Measurement

Frequency (MHz)	Power Step	Burst Average (dBm)	Modulation Average (dBm)
1850,2	0	31,78	21,90
1880,0	0	32,44	22,62
1909,8	0	32,22	22,42
Measurement uncertainty	± 4 dB		

LIMIT

Power Step	Burst Average EIRP (dBm)
0	≤ 33

Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-207; NT-208

Frequency stability
850 MHz

§ 22.355

Frequency error vs. Supply voltage

The power supply voltage is nominal 6,2 VDC. The shut off voltage is 5,5 VDC. The GSM module power supply is regulated to 3,75 VDC. This voltage stays constant over the full supply voltage range from 5,5 VDC to 10 VDC. Because of this there were no change in frequency stability measureable over the full power supply range.

Frequency error vs. Temperature

Temperature °C	Frequency Error Hz	Frequency Error ppm
-30	-5	-0,006
-20	-5	-0,006
-10	-5	-0,006
±0	0	0
+10	0	0
+20	0	0
+30	-5	-0,006
+40	0	0
+50	-5	-0,006

LIMIT

According to GSM standards the frequency stability of the carrier shall be accurate to within 0,1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 22.355, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Frequency stability
1900 MHz

§ 24.235

Frequency error vs. Supply voltage

The power supply voltage is nominal 6,2 VDC. The shut off voltage is 5,5 VDC. The GSM module power supply is regulated to 3,75 VDC. This voltage stays constant over the full supply voltage range from 5,5 VDC to 10 VDC. Because of this there were no change in frequency stability measureable over the full power supply range.

Frequency error vs. Temperature

Temperature °C	Frequency Error Hz	Frequency Error ppm
-30	0	0
-20	+10	+0,005
-10	+5	+0,003
±0	+10	+0,005
+10	+15	+0,008
+20	+10	+0,005
+30	+10	+0,005
+40	-5	-0,003
+50	-10	-0,005

LIMIT

According to GSM standards the frequency stability of the carrier shall be accurate to within 0,1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Ambient temperature: 25°C

Relative humidity: 46%

Emissions Limits
850 MHz

§ 22.917
§ 15.209

LIMIT

22.917:

The power of any emission outside the authorized operating frequency ranges must be attenuated below the transmitter power (P, in watts) by at least $43+10\log(P)$ dB. In the used power range this means a constant absolute limit of -13 dBm. Although the Limits of 15.209 are in field strength levels, the limits are far below that one of 22.917. So for all radiated measurements the 15.209 limit was taken to show compliance as digital device also.

Conducted Emissions

CHANNEL					
128 (824,2 MHz)		190 (836,6 MHz)		251 (848,8 MHz)	
Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)
2472,6	-50,7	2509,8	-50,0	2546,4	-47,6
3296,8	-44,3	3346,4	-46,7	3395,2	-53,2
All others	< -55	All others	< -55	All others	< -55

Test Equipment used: NT-207; NT-208

Ambient temperature: 25°C

Relative humidity: 46%

Emissions Limits
1900 MHz

§ 24.238
§ 15.209

LIMIT

24.238:

On any frequency outside a licensee's frequency block within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in watts) by at least $43+10\log(P)$ dB. In the used power range this means a constant absolute limit of -13 dBm. Although the Limits of 15.209 are in field strength levels, the limits are far below that one of 24.238. So for all radiated measurements the 15.209 limit was taken to show compliance as digital device also.

Conducted Emissions

CHANNEL					
512 (1850,2 MHz)		661 (1880 MHz)		810 (1909,8 MHz)	
Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)
1947,8	-52,4	1947,8	-51,8	1947,8	-52,6
3700,4	-49,1	3760	-48,8	3819,6	-49,5
5550,6	-52,5	5640	-54,2	5729,4	-51,0
9251,0	-42,7	9400	-38,9	9549,0	-43,9
11101,2	-52,4	All others	< -55	All others	< -55
All others	< -55				

Test Equipment used: NT-207; NT-208

Emissions Limits
850 MHz

§ 22.917
§ 15.209

Radiated Emissions

CHANNEL					
128 (824,2 MHz)		190 (836,6 MHz)		251 (848,8 MHz)	
Frequency (MHz)	Level (dBµV/m)	Frequency (MHz)	Level (dBµV/m)	Frequency (MHz)	Level (dBµV/m)
≤ 500	< 35 QP	≤ 500	< 35 QP	≤ 500	< 35 QP
≤ 1000	< 40 QP	≤ 1000	< 40 QP	≤ 1000	< 40 QP
> 1000	< 45 AV	> 1000	< 45 AV	> 1000	< 45 AV

LIMIT 15.209

Frequency (MHz)	Limit (dBµV/m)	Measurement distance (m)
30 - 88	40	3
88 - 216	43,5	3
216 - 960	46	3
Above 960	54	3

Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-207; NT-208

Measurement diagrams in Annex 2 are only for channel 190.

Emissions Limits
1900 MHz

§ 24.238
§ 15.209

Radiated Emissions

CHANNEL					
512 (1850,2 MHz)		661 (1880 MHz)		810 (1909,8 MHz)	
Frequency (MHz)	Level (dBµV/m)	Frequency (MHz)	Level (dBµV/m)	Frequency (MHz)	Level (dBµV/m)
≤ 500	< 35 QP	≤ 500	< 35 QP	≤ 500	< 35 QP
≤ 1000	< 40 QP	≤ 1000	< 40 QP	≤ 1000	< 40 QP
> 1000	< 45 AV	> 1000	< 45 AV	> 1000	< 45 AV

LIMIT 15.209

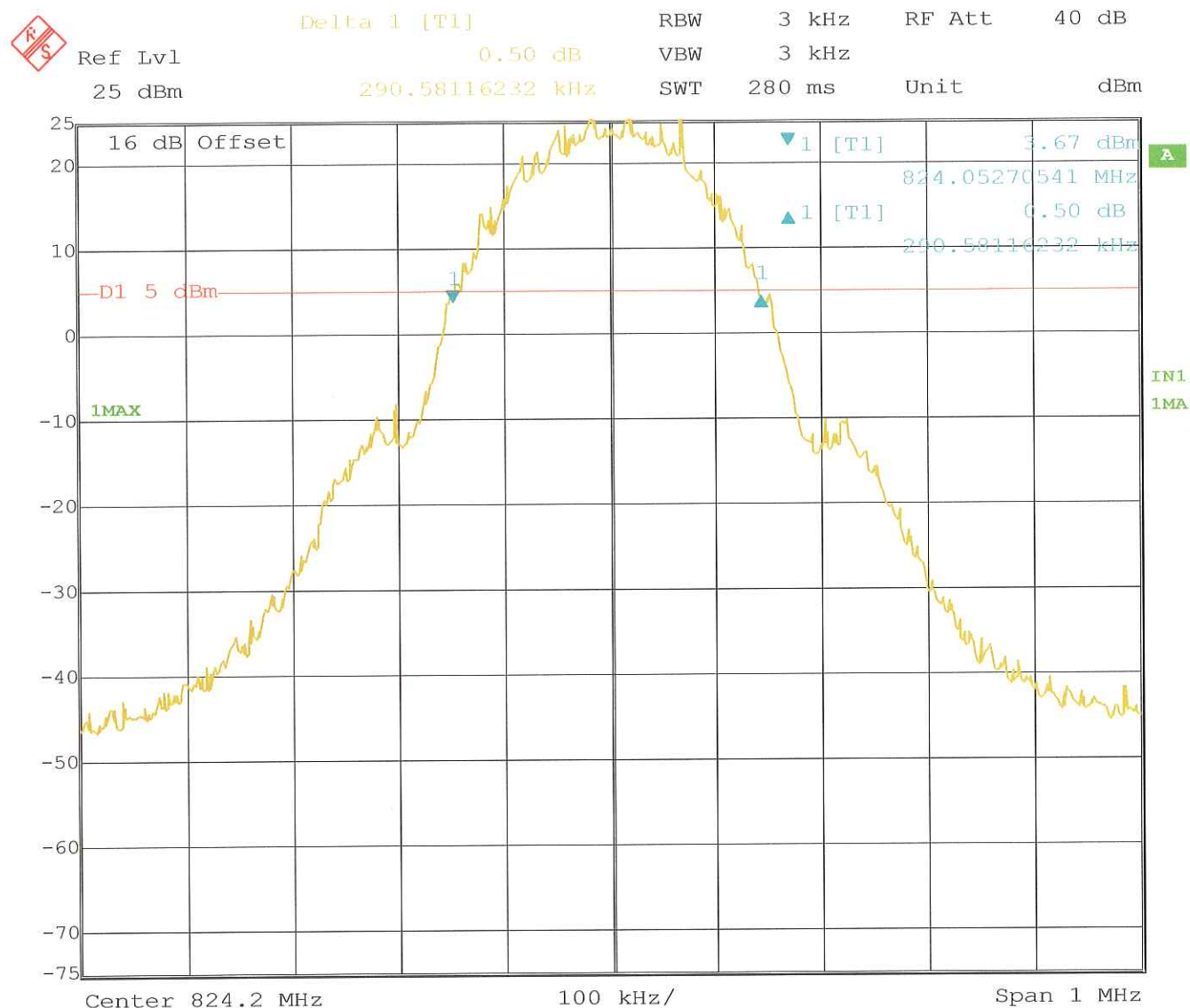
Frequency (MHz)	Limit (dBµV/m)	Measurement distance (m)
30 - 88	40	3
88 - 216	43,5	3
216 - 960	46	3
Above 960	54	3

Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-207; NT-208

Measurement diagrams in Annex 2 are only for channel 661. Although the measurements were made up to the 10th harmonic, the diagrams only show the frequency range up to 18 GHz. This is because the measurements above 18 GHz are not yet automatized and we were not able to plot the Spectrum analyzer display.

OCCUPIED BANDWIDTH – 20 dB BANDWIDTH
850 MHz

§ 2.989



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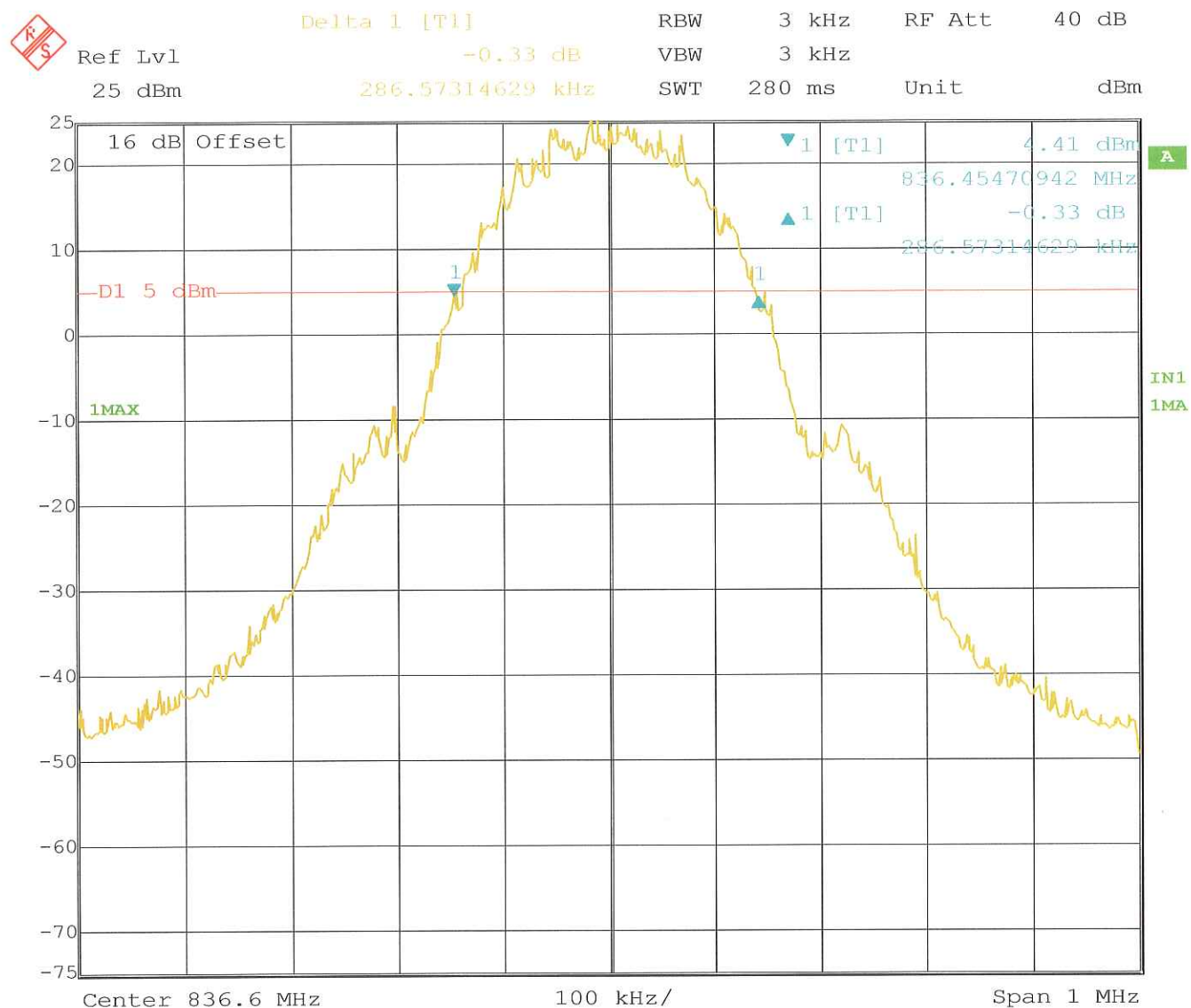
channel 128

Bandwidth: 290,58 kHz

TEST EQUIPMENT USED: NT-207; NT-208

OCCUPIED BANDWIDTH – 20 dB BANDWIDTH
850 MHz

§ 2.989



Date: 12.SEP.2006 08:22:51

channel 190

Bandwidth: 286,57 kHz

TEST EQUIPMENT USED: NT-207; NT-208