

Annex 1: Measurement diagrams to
TEST REPORT
No.: 17-1-0231001T13a-C1

According to:
FCC Regulations
Part 22, Part 24, Part 27

ISED-Regulations
RSS-132 Issue 3, RSS-133 Issue 6,
RSS-Gen Issue 5

for

IPETRONIK GmbH & Co KG

μCROS SL
Data Logger

FCC-ID: 2ARF8UCROS-SL

Laboratory Accreditation and Listings



accredited according to DIN EN ISO/IEC 17025:2018

CETECOM GmbH

Laboratory Radio Communications & Electromagnetic Compatibility
Im Teelbruch 116 • 45219 Essen • Germany
Registered in Essen, Germany, Reg. No.: HRB Essen 8984
Tel.: + 49 (0) 20 54 / 95 19-0 • Fax: + 49 (0) 20 54 / 95 19-150
E-mail: contact@cetecom.com • Internet: www.cetecom.com

Table of contents

1. MEASUREMENT DIAGRAMS.....	3
1.1. Power Measurements and PAPR-Value	3
1.2. Magnetic field emissions radiated (850 MHz transmitting mode).....	4
1.3. Magnetic field emissions radiated (1900 MHz transmitting mode).....	6
1.4. Spurious emissions radiated (850 MHz transmitting mode).....	8
1.5. Spurious emissions radiated (1900 MHz transmitting mode).....	9
1.6. Band-edge GPRS radiated low (850 MHz transmitting mode)	10
1.7. Band-edge GPRS radiated high (850 MHz transmitting mode)	11
1.8. Band-edge GPRS radiated low (1900 MHz transmitting mode)	12
1.9. Band-edge GPRS radiated high (1900 MHz transmitting mode)	13

1. Measurement diagrams

1.1. Conducted output power measurements and PAPR-Value

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	μCROS SL
Type:	Datalogger
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

GMSK-Mode 850MHz Band	Set-up No. 1			
Op mode No. 1	ARFCN- Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Faktor [dB]
Channel 128	824.2	32.00	31.80	0.20
Channel 192	837.0	32.00	31.80	0.20
Channel 251	848.8	32.00	31.80	0.20

EGPRS Mode 850MHz Band	Set-up No. 1			
Op mode No. 2	ARFCN- Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Faktor [dB]
Channel 128	824.2	29.20	26.50	2.70
Channel 192	837.0	29.20	26.60	2.60
Channel 251	848.8	29.20	26.60	2.60

GMSK Mode 1900MHz Band	Set-up No. 1			
Op mode No. 3	ARFCN- Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Faktor [dB]
Channel 512	1850.2	29.00	28.80	0.20
Channel 661	1880.0	29.00	28.80	0.20
Channel 810	1909.8	29.30	29.10	0.20

EGPRS Mode 1900MHz Band	Set-up No. 1			
Op mode No. 4	ARFCN- Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Faktor [dB]
Channel 512	1850.2	28.60	25.70	2.90
Channel 661	1880.0	28.60	25.00	3.60
Channel 810	1909.8	28.60	25.30	3.30

1.2. Magnetic field emissions radiated (850 MHz transmitting mode)

2.03a_RSE_R_Ch251_GPRS

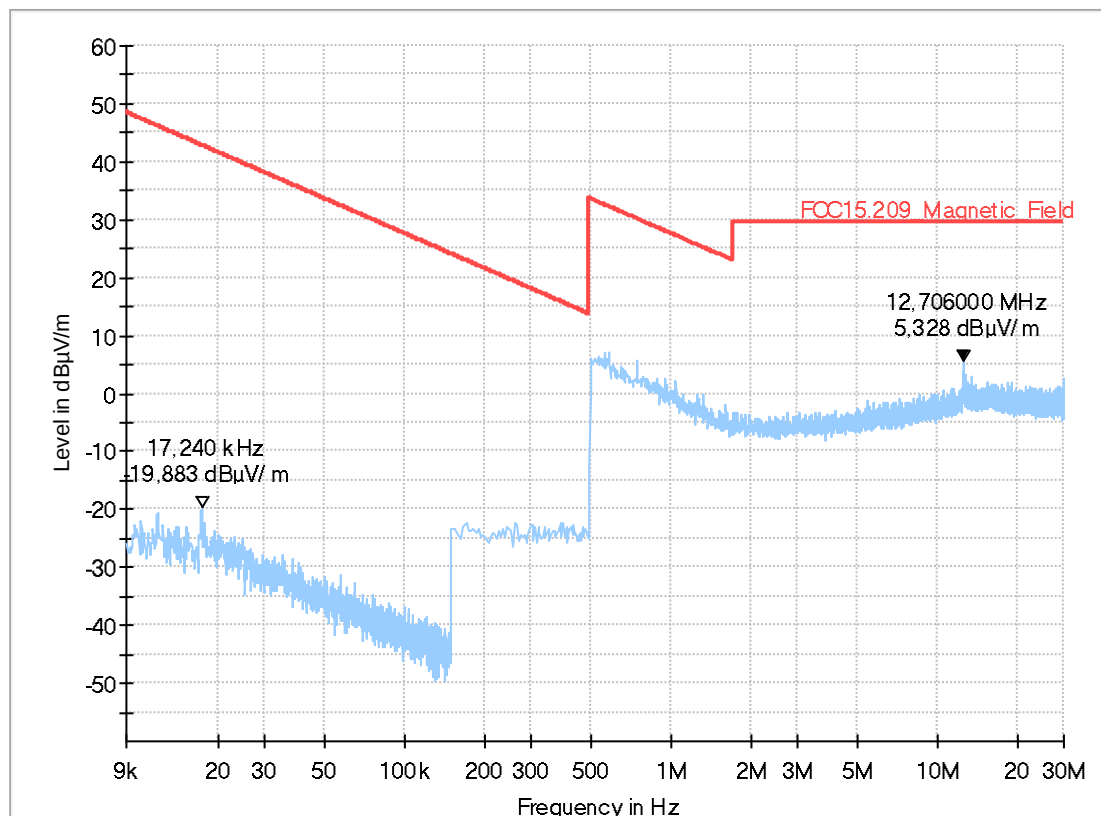
Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	TFra
Power during tests:	24 V DC
Comment 1:	GPRS850 Channel: 251
Comment 2:	DUT Laying

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



2.03b_RSE_R_Ch251_GPRS

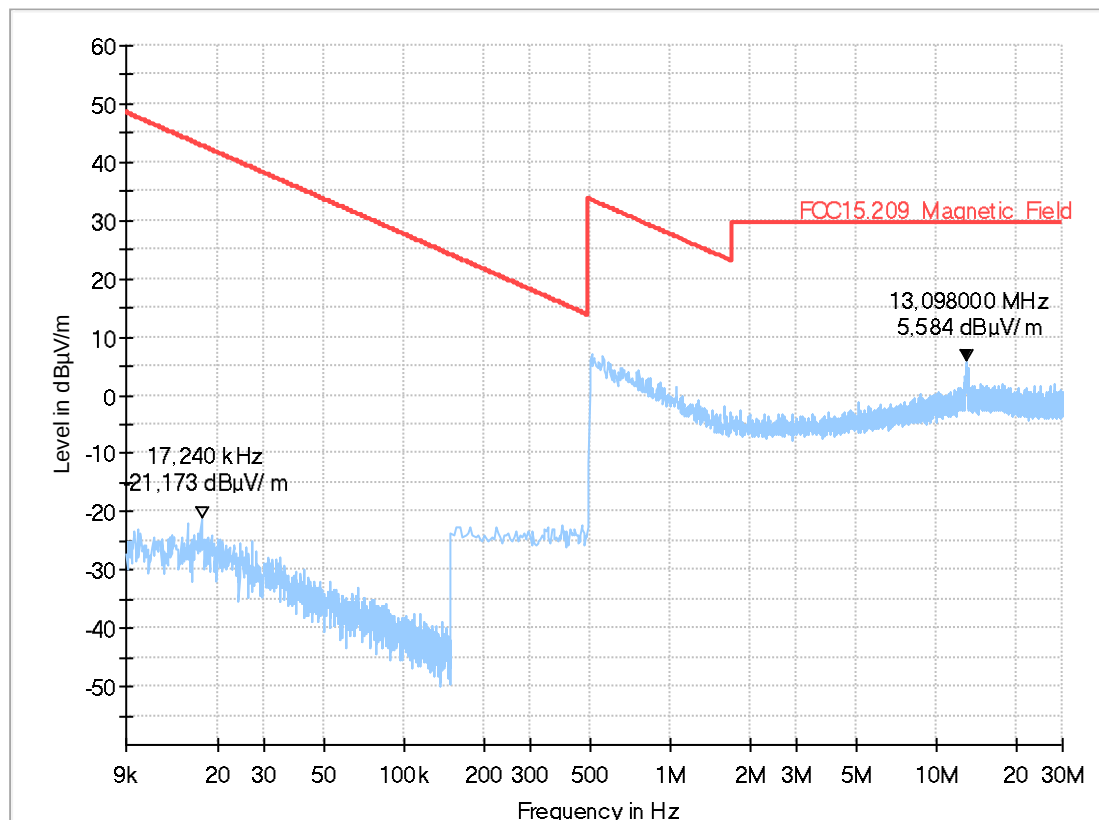
Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	TFra
Power during tests:	24 V DC
Comment 1:	GPRS850 Channel: 251
Comment 2:	DUT Standing

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.3. Magnetic field emissions radiated (1900 MHz transmitting mode)

2.10a_RSE_R_Ch512_GPRS

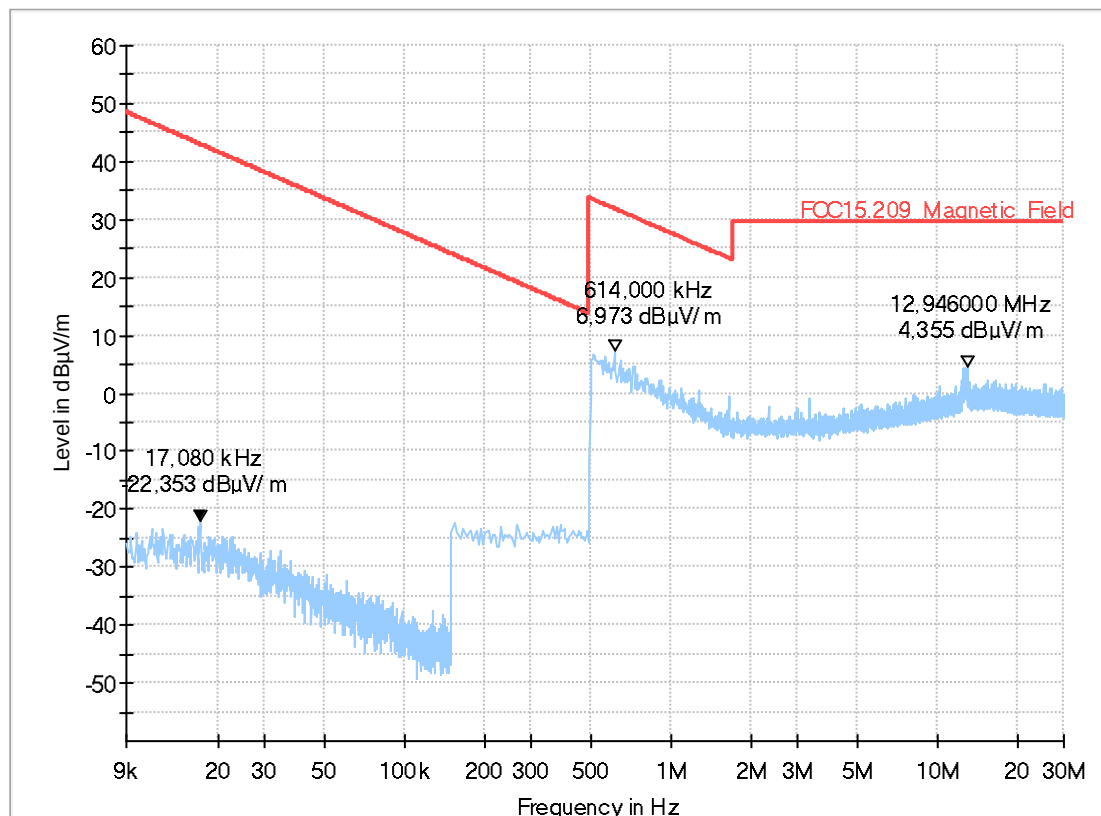
Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	MBe
Operating conditions:	Ch512_GPRS_Laying
Power during tests:	24 V DC

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



2.10a_RSE_R_Ch512_GPRS

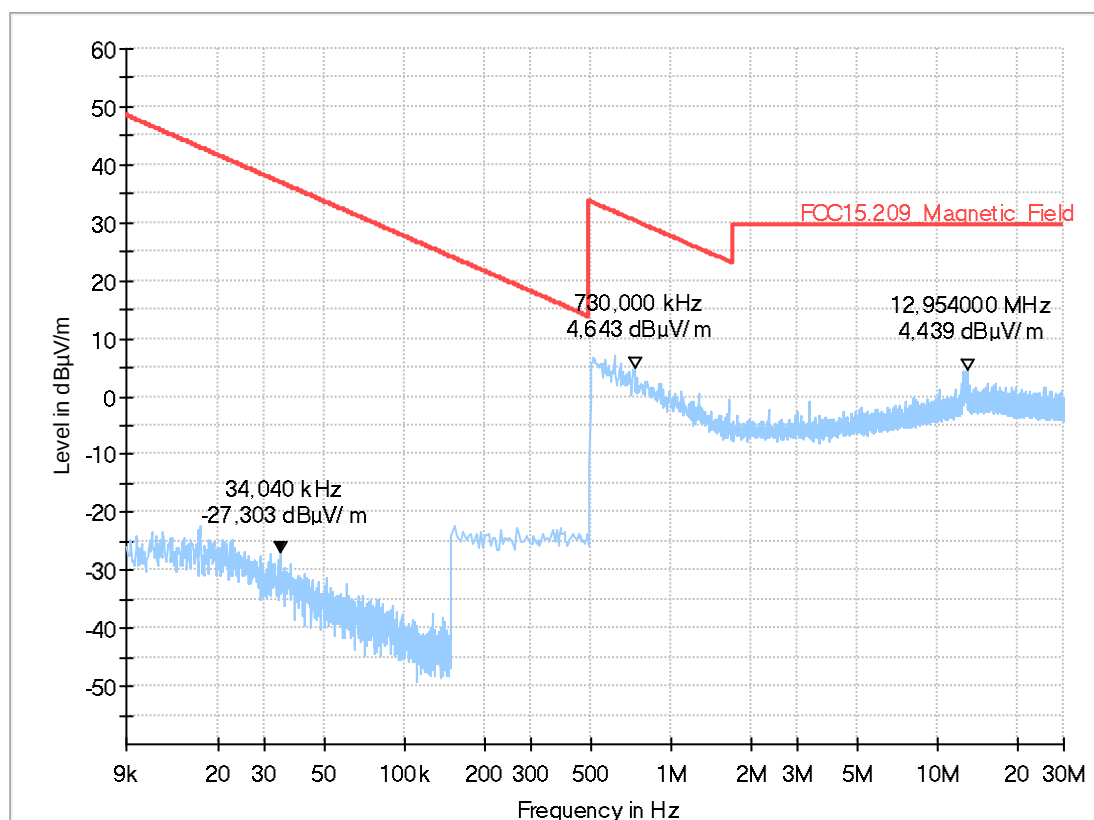
Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	MBe
Operating conditions:	Ch512_GPRS_Standing
Power during tests:	24 V DC

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.4. Spurious emissions radiated (850 MHz transmitting mode)

8.03_RSE_R_Ch251_GPRS

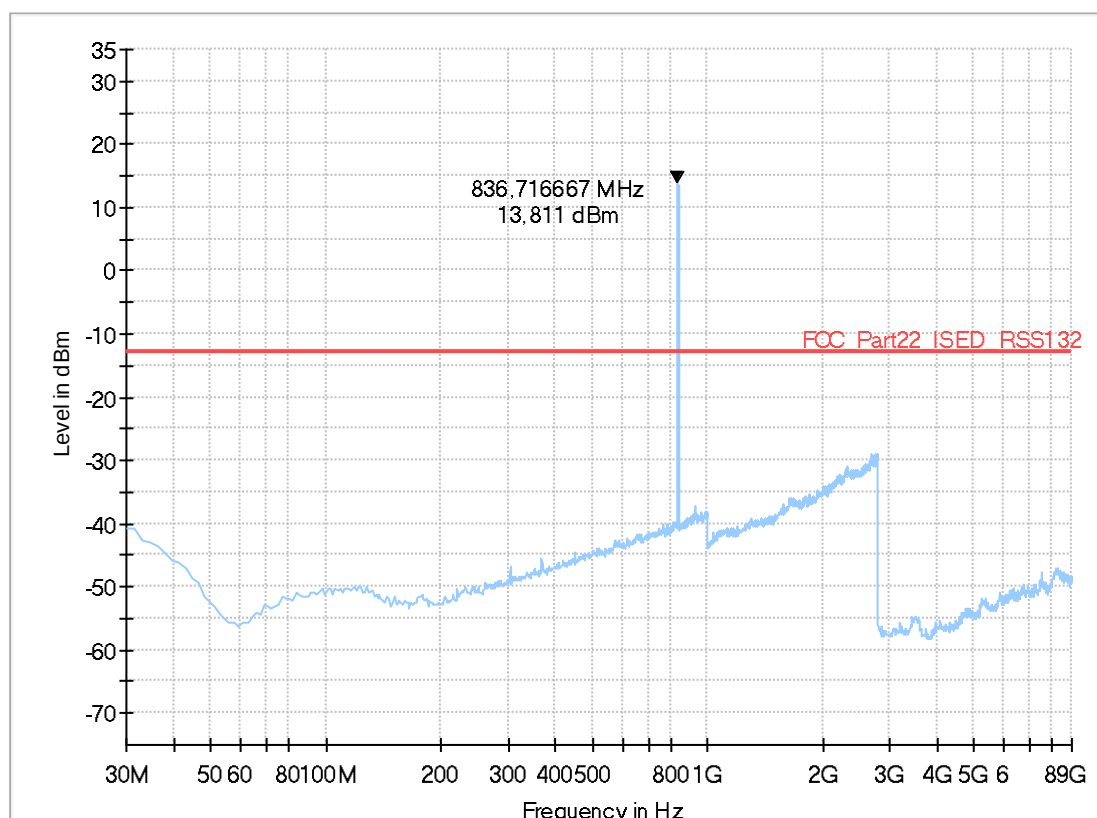
Common Information

Test Description:	Radiated emission related to 1m
Test Site:	FAR
Version of Testsoftware:	EMC32 V9.26.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operation mode:	GSM 850, Channel:251
operation Condition:	Humidity: 50%rH; Temperature: 20°C
Operator Name:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.5. Spurious emissions radiated (1900 MHz transmitting mode)

8.10_RSE_R_Ch512_GPRS

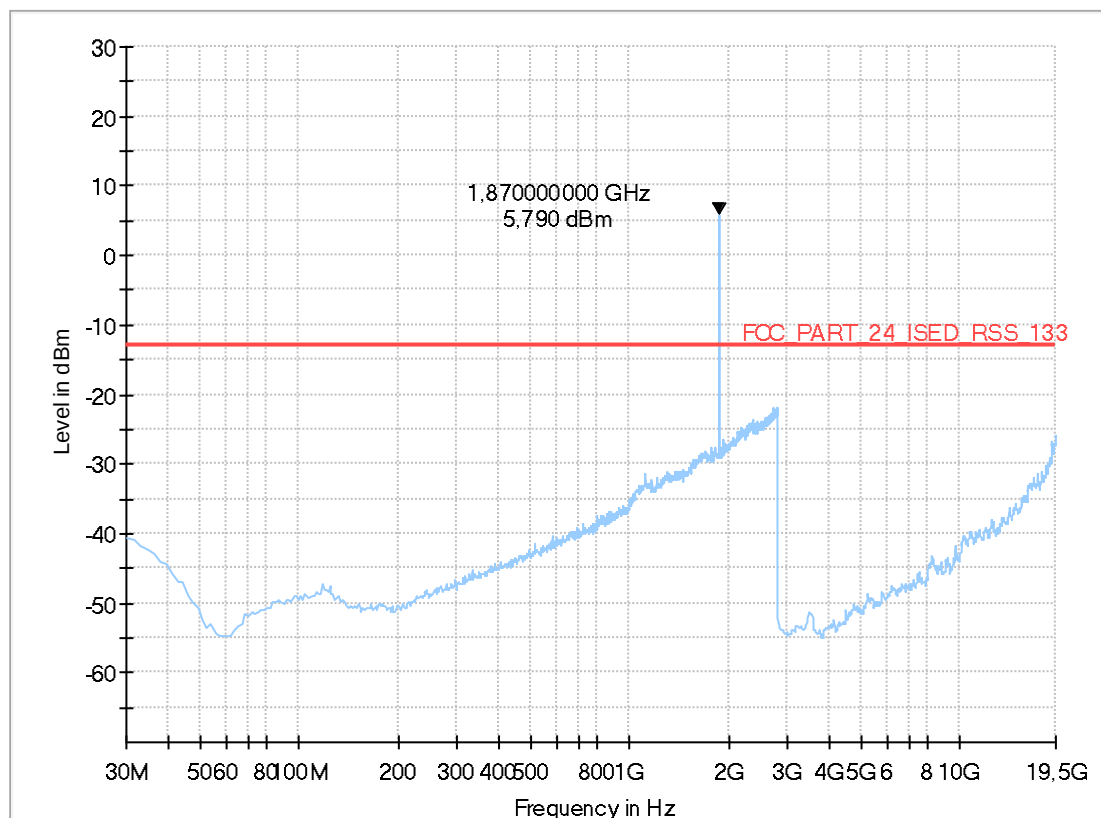
Common Information

Test Description:	Radiated emission related to 1m
Test Site:	FAR
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Version of Testsoftware:	EMC32 V9.26.0
Antenna polarisation:	vertical / horizontal
Operation mode:	TCH 1900, CHANNEL 512
operation Condition:	Humidity: 50%rH; Temperature: 20°C
Operator Name:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.6. Band-edge GPRS radiated low (850 MHz transmitting mode)

9.01_BE_R_Ch128_GPRS

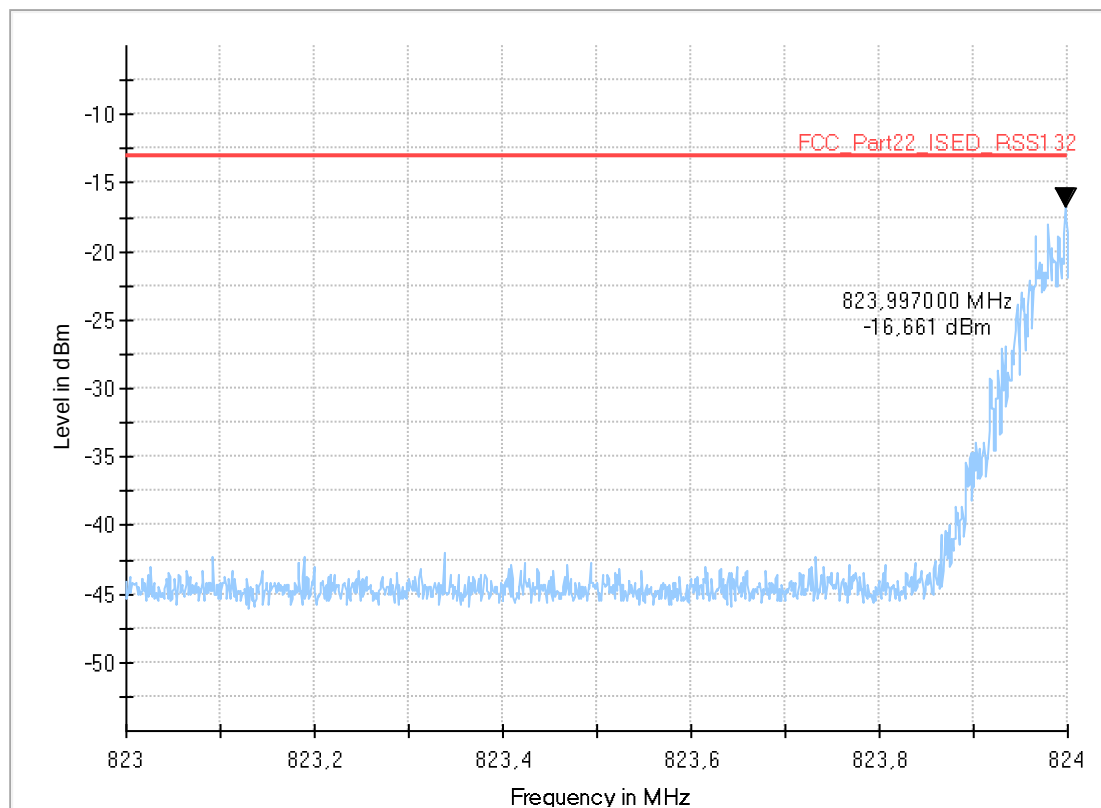
Common Information

Test Description:	Radiated Band Edge Compliance GSM850
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 22.917
Version of Testsoftware:	EMC32 V9.26.0
Operating Mode:	MS allocated channel 128 (fc = 824.2MHz), Voice, PCL5 (+33dBm)
Exclusionband:	824 - 849MHz
Environmental Conditions:	Humidity: 40%rH; Temperature: 20°C
Operator:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



GPRS mode	CH	Set-up No	OP-mode No	Peak detector value (dBm)	Limit (dBm)	Margin (dB)	Result
850	128	1	1	-16.66	-13	3.66	passed

1.7. Band-edge GPRS radiated high (850 MHz transmitting mode)

9.02_BE_R_Ch251_GPRS

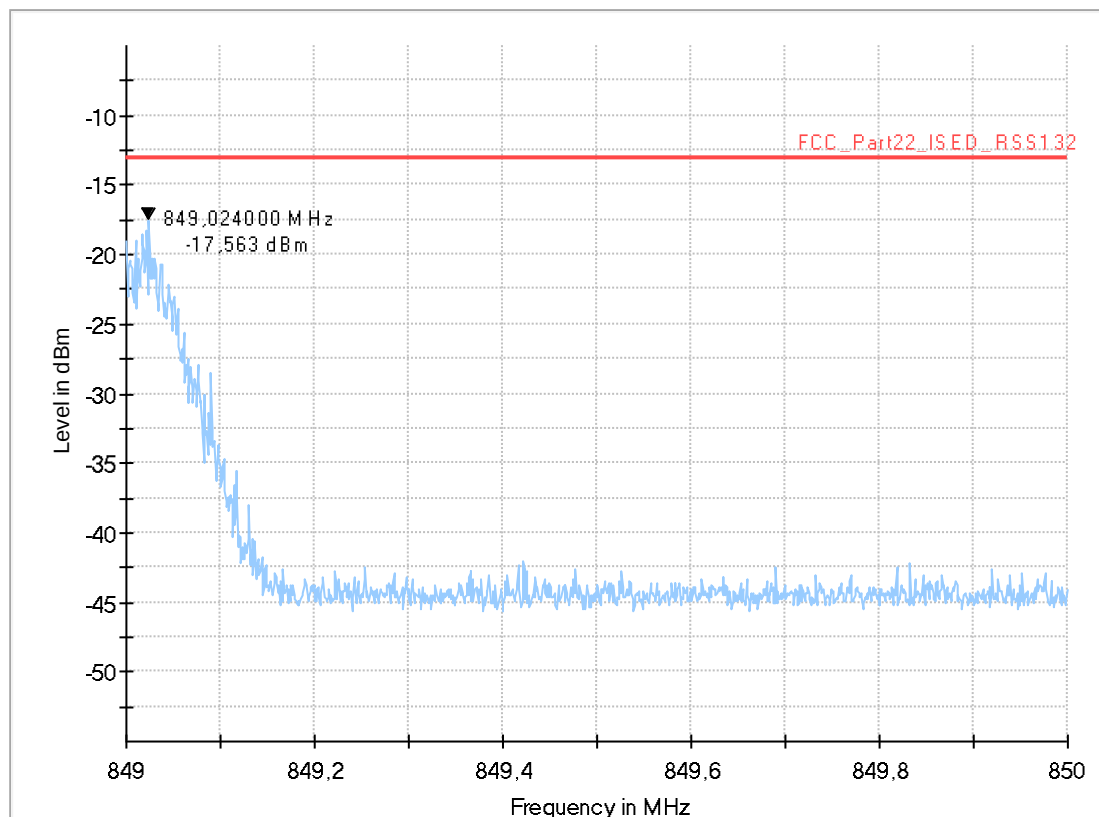
Common Information

Test Description:	Radiated Band Edge Compliance GSM850
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 22.917
Version of Testsoftware:	EMC32 V9.26.0
Operating Mode:	MS allocated channel 251 (fc = 848.8MHz), Voice, PCL0 (+33dBm)
Exclusionband:	824 - 849MHz
Environmental Conditions:	Humidity: 50%rH; Temperature: 20°C
Operator:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



GPRS mode	CH	Set-up No	OP-mode No	Peak detector value (dBm)	Limit (dBm)	Margin (dB)	Result
850	251	1	1	-17.56	-13	4.56	passed

1.8. Band-edge GPRS radiated low (1900 MHz transmitting mode)

9.07_BE_R_Ch512_GPRS

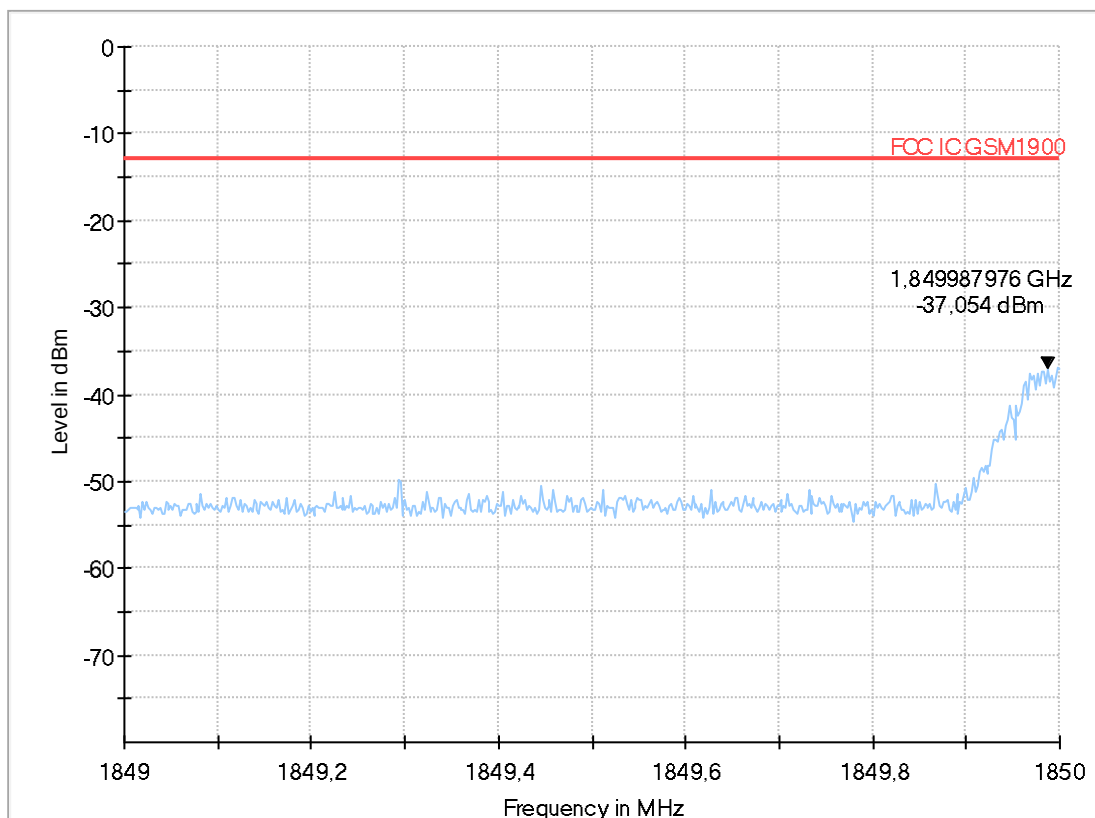
Common Information

Test Description:	Radiated Band Edge Compliance GSM1900
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 22.917
Version of Testsoftware:	EMC32 V9.26.0
Operating Mode:	MS allocated channel 512
Environmental Conditions:	Humidity: 50%rH; Temperature: 20°C
Operator:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



GPRS mode	CH	Set-up No	OP-mode No	Peak detector value (dBm)	Limit (dBm)	Margin (dB)	Result
1900	512	1	3	-37.05	-13	24.05	passed

1.9. Band-edge GPRS radiated high (1900 MHz transmitting mode)

9.08_BE_R_Ch810_GPRS

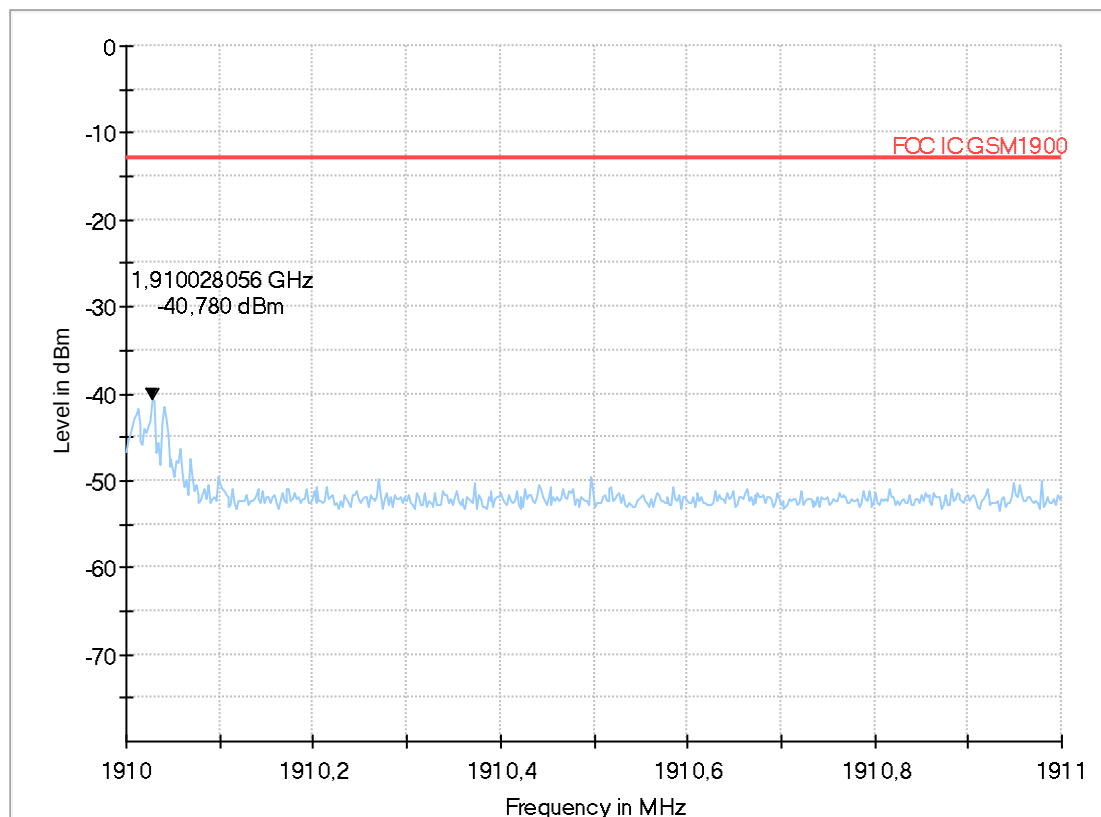
Common Information

Test Description:	Radiated Spurious Emissions GSM1900
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 24.238
Version of Testsoftware:	EMC32 V9.26.0
Comm. Link:	GSM1900, Voice/EDGE
Operating Mode:	GSM 1900, CH:810
Environmental Conditions:	Humidity: 40%rH; Temperature: 20°C
Operator:	HEI

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



GPRS mode	CH	Set-up No	OP-mode No	Peak detector value (dBm)	Limit (dBm)	Margin (dB)	Result
1900	810	1	3	-40.78	-13	27.78	passed