

Annex 1: Measurement diagrams to
TEST REPORT
No.: 17-1-0231001T14a-C1

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

ISED-Regulations
RSS-132 Issue 3, RSS-133 Issue 6,
RSS-139, Issue 3, RSS-Gen Issue 5

for

IPETRONIK GmbH & Co KG

µCROS SL
Data Logger

FCC-ID: 2ARF8UCROS-SL

Laboratory Accreditation and Listings
 Deutsche Akkreditierungsstelle D-PL-12047-01-01 D-PL-12047-01-03 D-PL-12047-01-04
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 conducted and PAPR.....	3
1.2. Magnetic field emissions radiated (FDD Band II transmitting mode).....	4
1.3. Magnetic field emissions radiated (FDD Band IV transmitting mode)	6
1.4. Magnetic field emissions radiated (FDD Band V transmitting mode).....	8
1.5. Spurious emissions radiated (FDD Band II transmitting mode).....	10
1.6. Spurious emissions radiated (FDD Band IV transmitting mode)	11
1.7. Spurious emissions radiated (FDD Band V transmitting mode).....	12
1.8. Radiated emissions on FDD Band II band-edge	13
1.9. Radiated emissions on FDD Band IV band-edge	15
1.10. Radiated emissions on FDD Band V band-edge.....	17

1. Measurement diagrams

1.1. Power conducted and PAPR

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

UMTS FDD Band	Channel	Frequency Center (MHz)	Peak Power (dBm)	RMS Power (dBm)	PAPR (dB)
II	9262	1852.4	26.73	23.66	3.07
	9400	1880.0	26.72	23.56	3.16
	9538	1907.6	26.65	23.54	3.11
IV	1312	1712.4	25.34	22.66	2.68
	1450	1732.5	25.33	22.54	2.79
	1513	1752.3	25.65	22.66	2.99
V	4132	826.4	25.56	22.67	2.89
	4183	837	25.62	22.52	3.1
	4233	846.6	25.64	22.71	2.93

1.2. Magnetic field emissions radiated (FDD Band II transmitting mode)

2.20a_RSE_R_Ch9262_RMC_UMTS_2

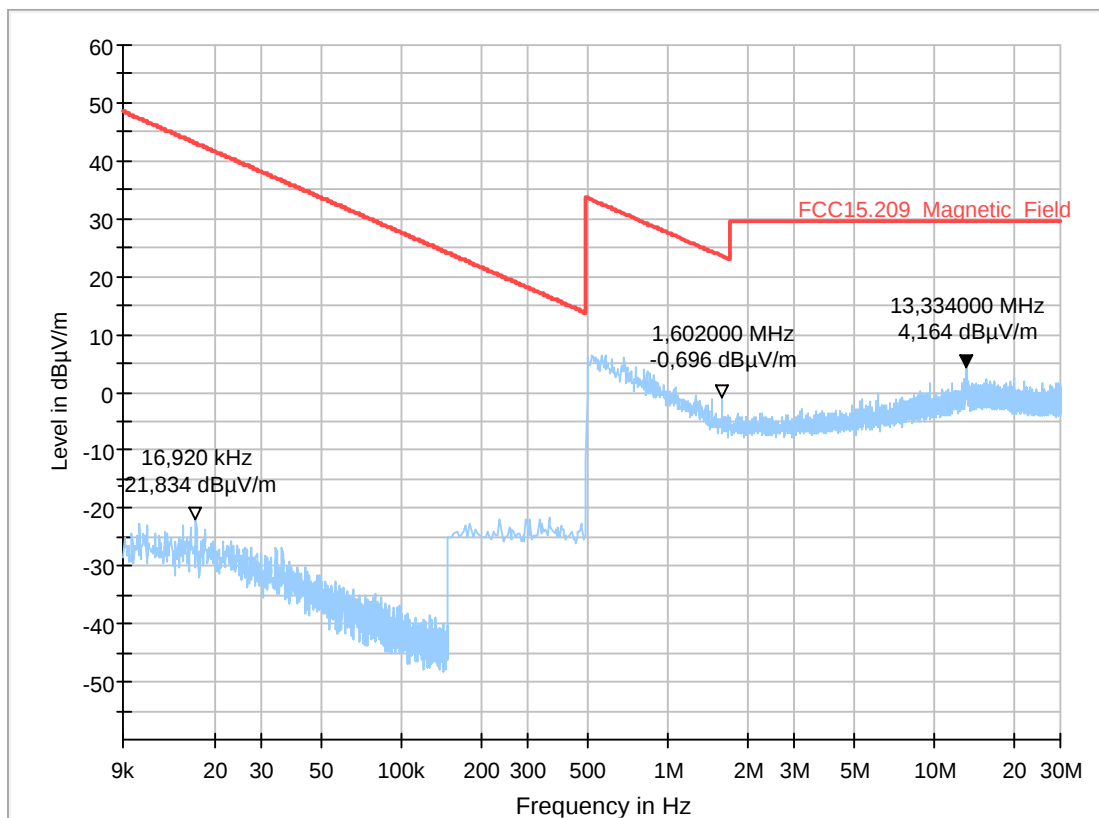
Common Information

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Klv
Power during tests:	24 V DC
Comment 1:	UMTS Channel: 9262
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



2.20b_RSE_R_Ch9262_RMC_UMTS_2

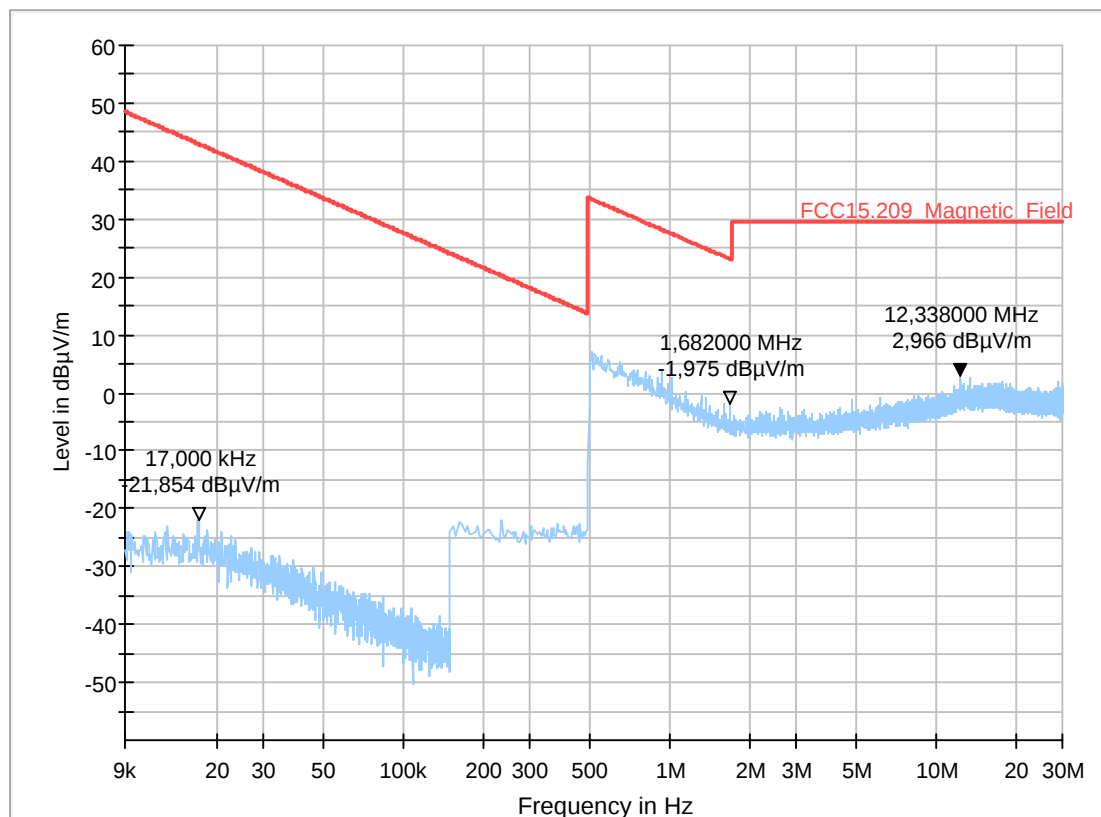
Common Information

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Klv
Power during tests:	24 V DC
Comment 1:	UMTS Channel: 9262
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.3. Magnetic field emissions radiated (FDD Band IV transmitting mode)

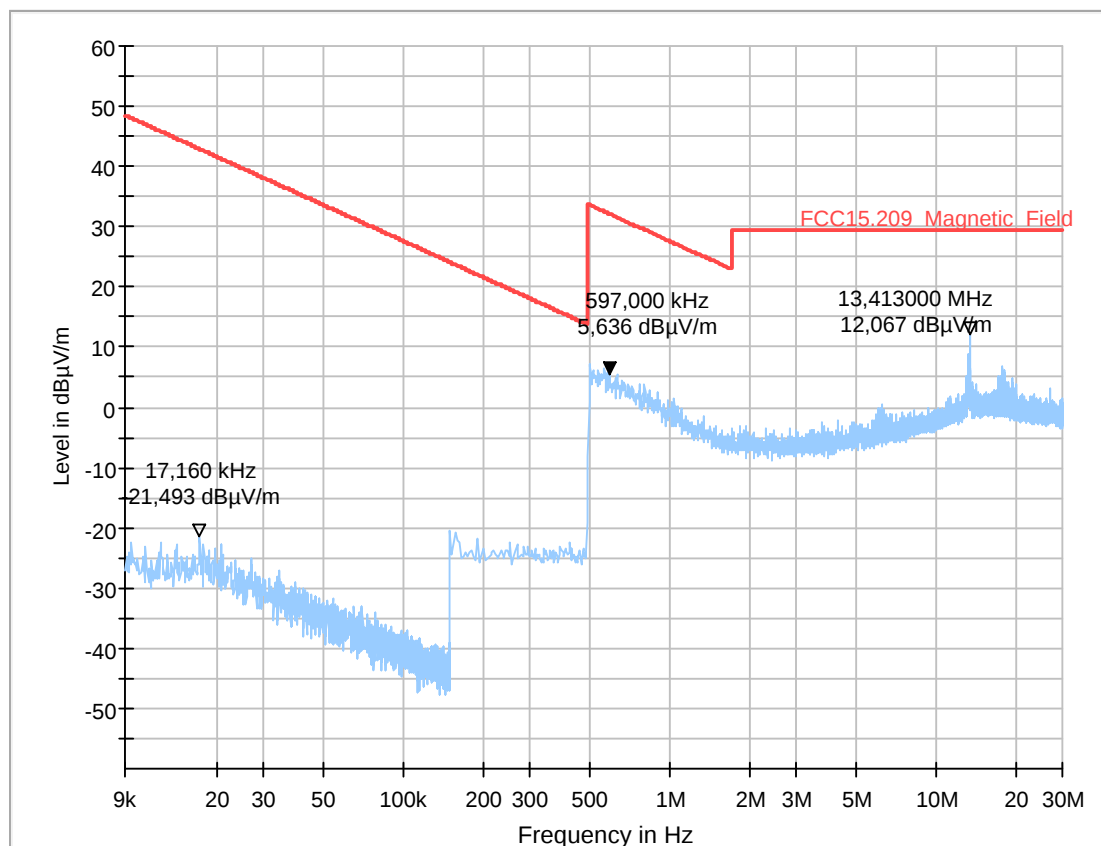
2.31a_RSE_R_Ch1312_RMC

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Klv
Power during tests:	24 V DC
Comment 1:	UMTS Channel: 1312
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC



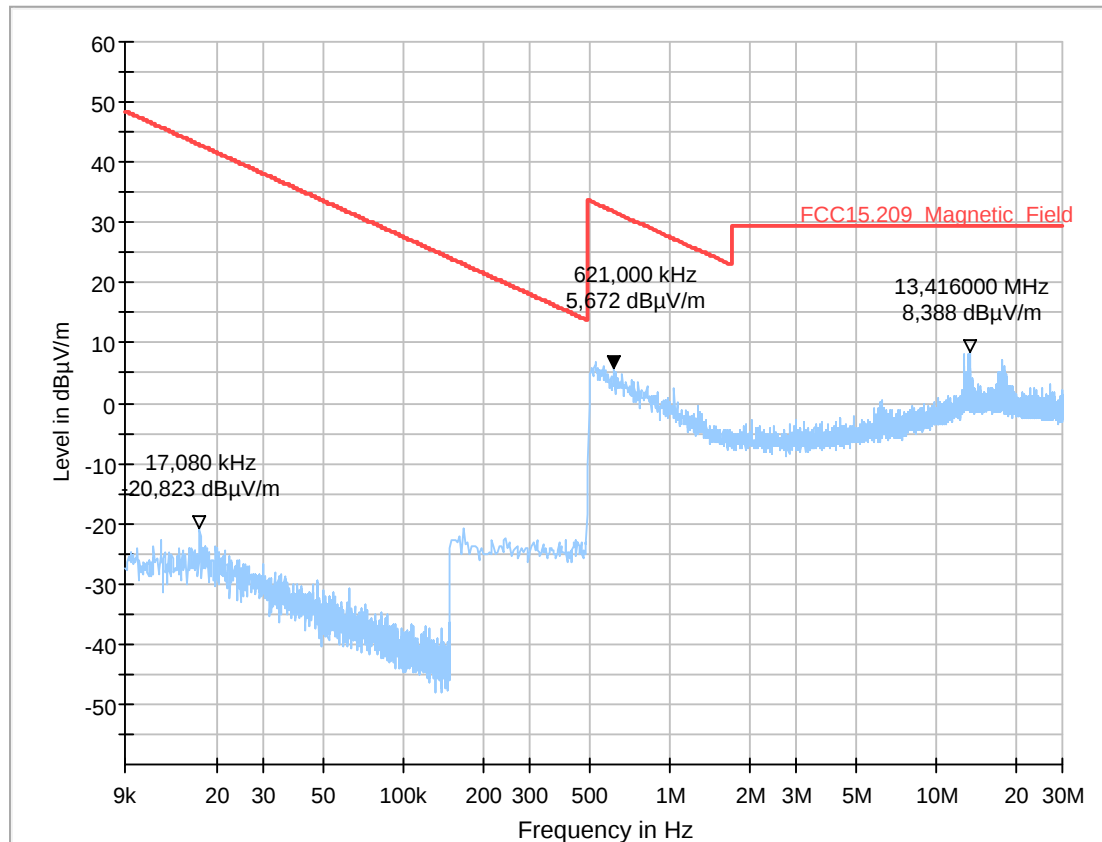
2.31b_RSE_R_Ch1312_RMC

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Klv
Power during tests:	24 V DC
Comment 1:	UMTS Channel: 1312
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC



1.4. Magnetic field emissions radiated (FDD Band V transmitting mode)

2.50a_RSE_R_ Ch4132_RMC

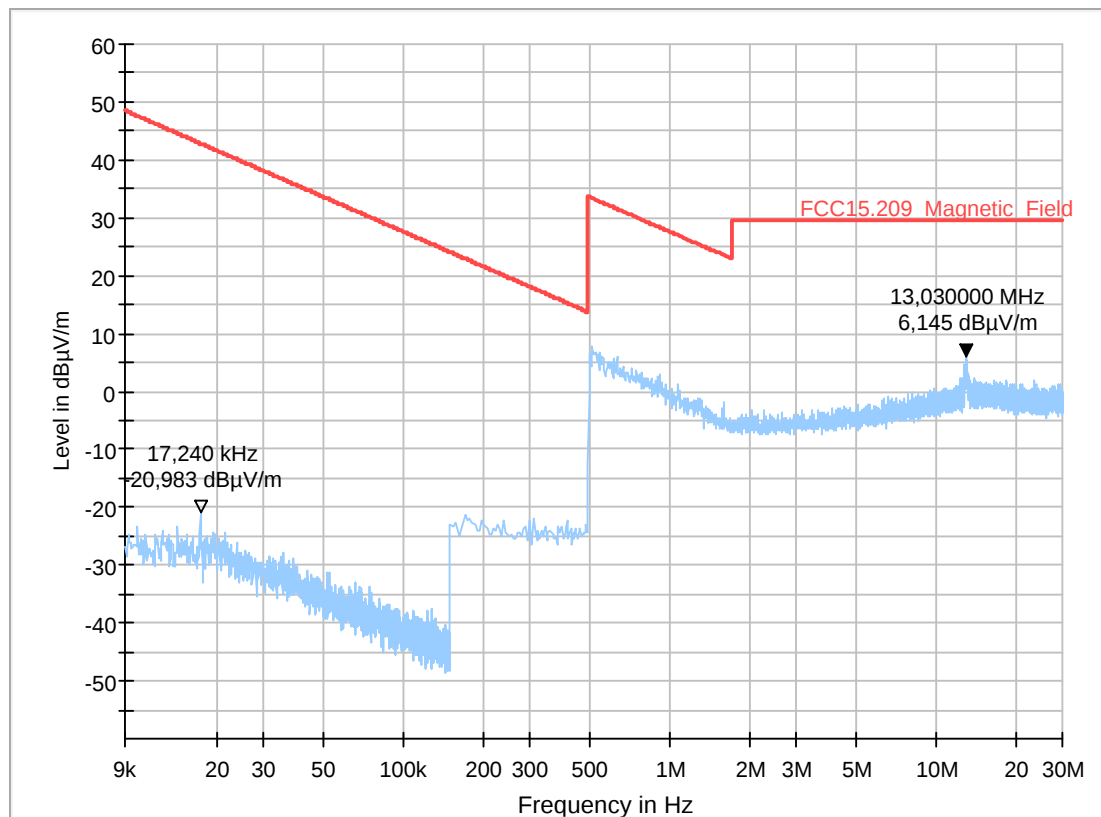
Common Information

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	TFra
Power during tests:	24 V DC
Comment 1:	UMTS Band 5
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



2.50b_RSE_R_Ch4132_RMC

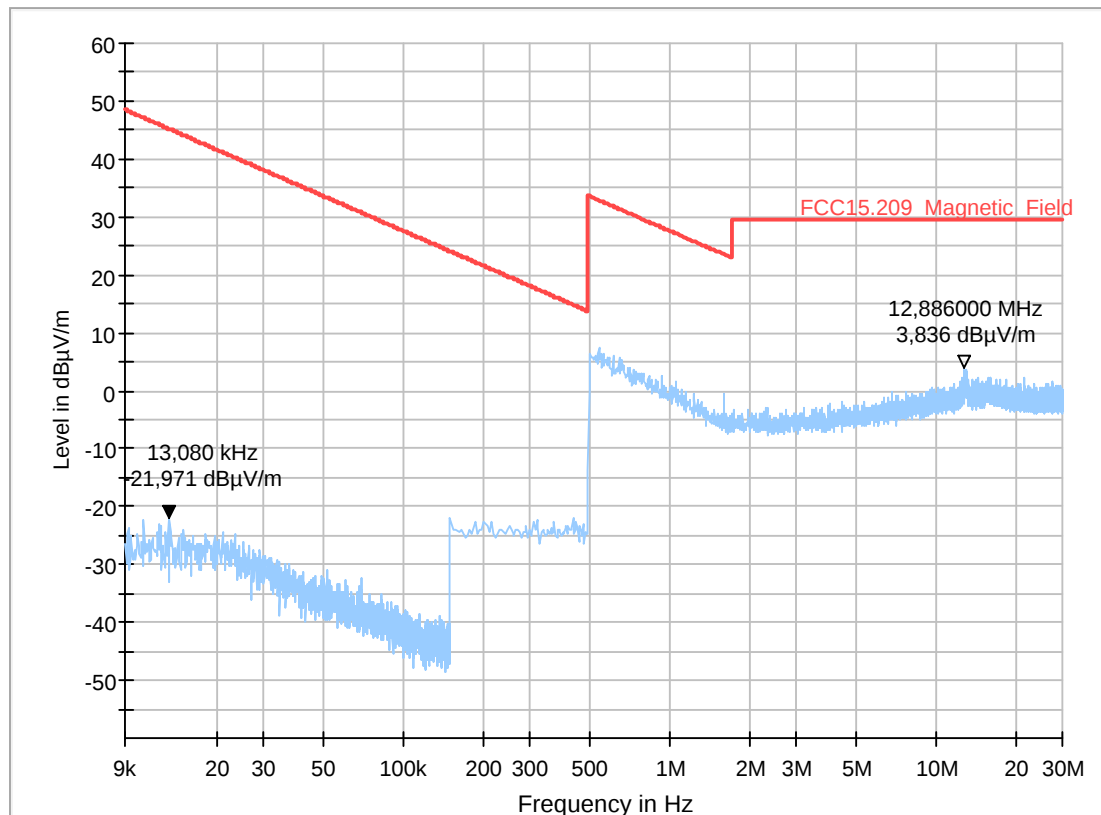
Common Information

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
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	TFra
Power during tests:	24 V DC
Comment 1:	UMTS Band 5
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 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.5. Spurious emissions radiated (FDD Band II transmitting mode)

8.20_RSE_R_Ch9262

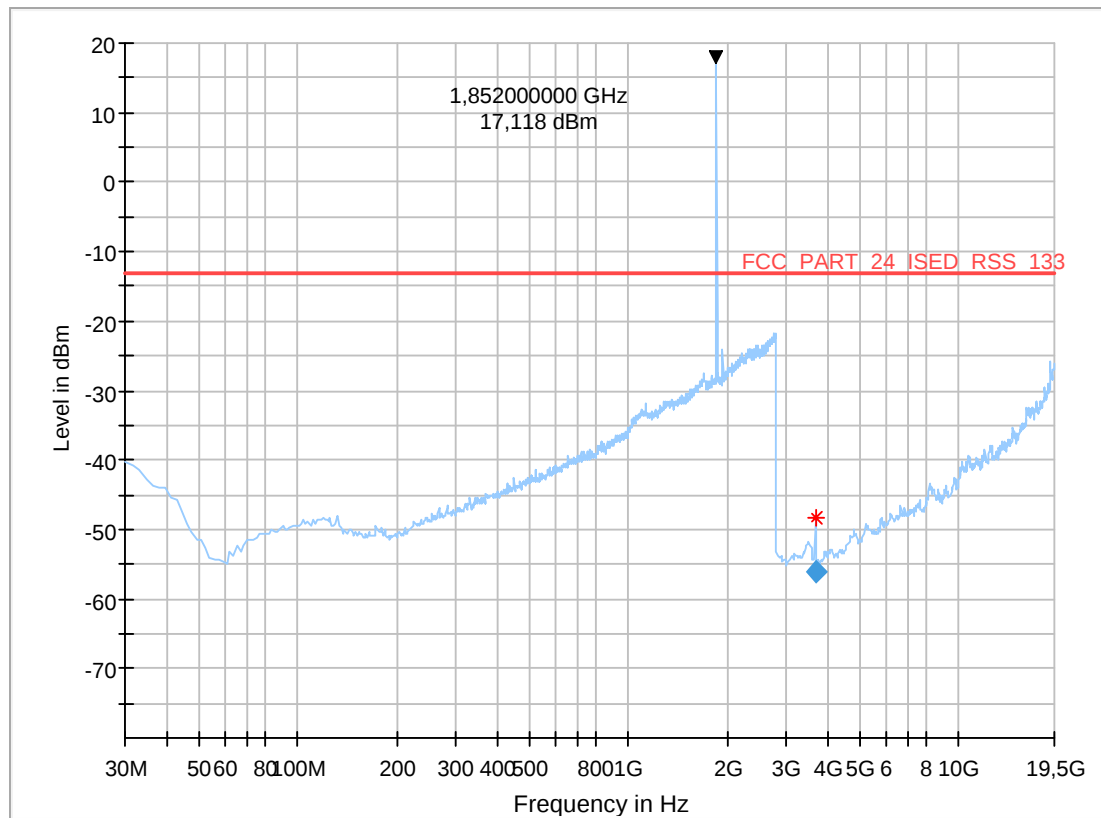
Common Information

Test Description:	Radiated emission related to 1m
Test Site:	FAR
Version of Testsoftware:	EMC32 V9.26.0
Test Standard:	FCC Part 24.238 Broadband PCS / RSS-132
Antenna polarisation:	vertical / horizontal
Operation mode:	UMTSFDDII CH. 9262
Operator Name:	HEL

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Measurement Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Correction (dB)
3700.633334	-56.03	-13.00	43.03	100.0	1000.000	154.0	V	343.0	0.0	-94.9

1.6. Spurious emissions radiated (FDD Band IV transmitting mode)

8.30_RSE_R_Ch1312

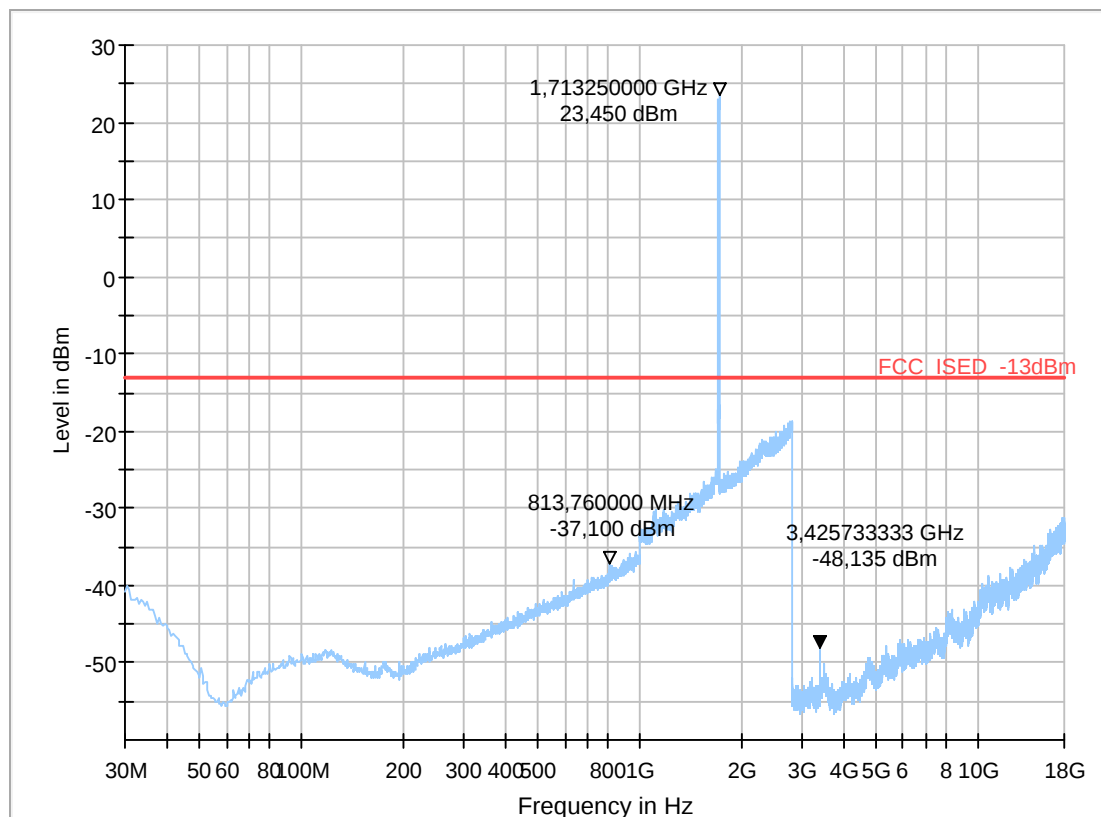
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Room
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V9.26.0
Operation mode:	UMTS Band 4 Ch 1312 Freq 1712.4MHz
Operator Name:	JVo
Comment:	Humidity: 56%rH; Temperature: 19,7°C

EUT Information

Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC 61
Connected Devices:	24 V DC

Full Spectrum



1.7. Spurious emissions radiated (FDD Band V transmitting mode)

8.50_RSE_R_Ch4132_RMC

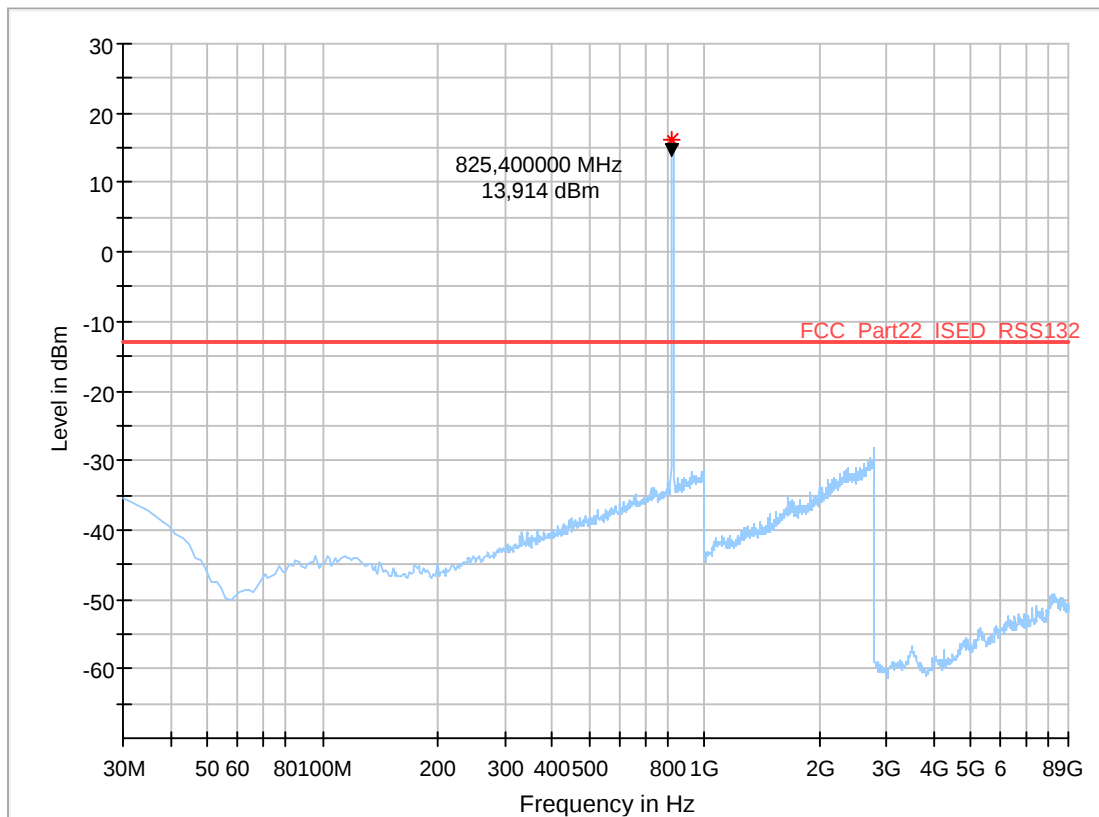
Common Information

Test Description:	Radiated emission related to 1m
Test Site:	FAR
Test Standard:	FCC Part 24.238 Broadband PCS / RSS-133
Version of Testsoftware:	EMC32 V9.26.0
Antenna polarisation:	vertical / horizontal
EUT:	US-R1
Operating conditions:	Humidity: 50%rH; Temperature: 20°C
Operation mode:	UMTS_Bnd:5_Channel:4132
Operator Name:	LKu/FKa

EUT Information

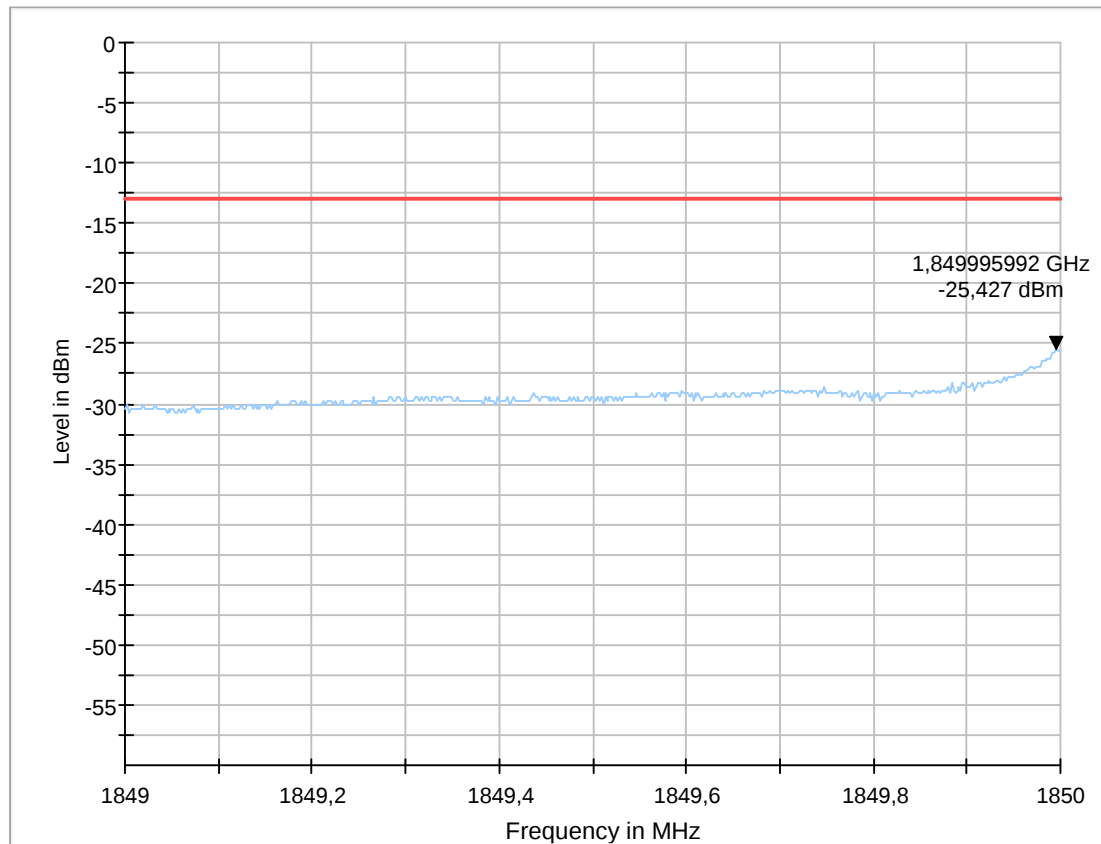
Manufacturer:	IPETRONIK GmbH & Co KG
Model:	µCROS SL
Type:	Datalogger
HW version:	HW1.03
SW version:	SW1.30
Serial number:	CAETEC 61
Connected Interfaces:	Antennas (WLAN/ BT/ GNSS/ CELL)
Power Supply:	24 V DC

Full Spectrum



1.8. Radiated emissions on FDD Band II band-edge

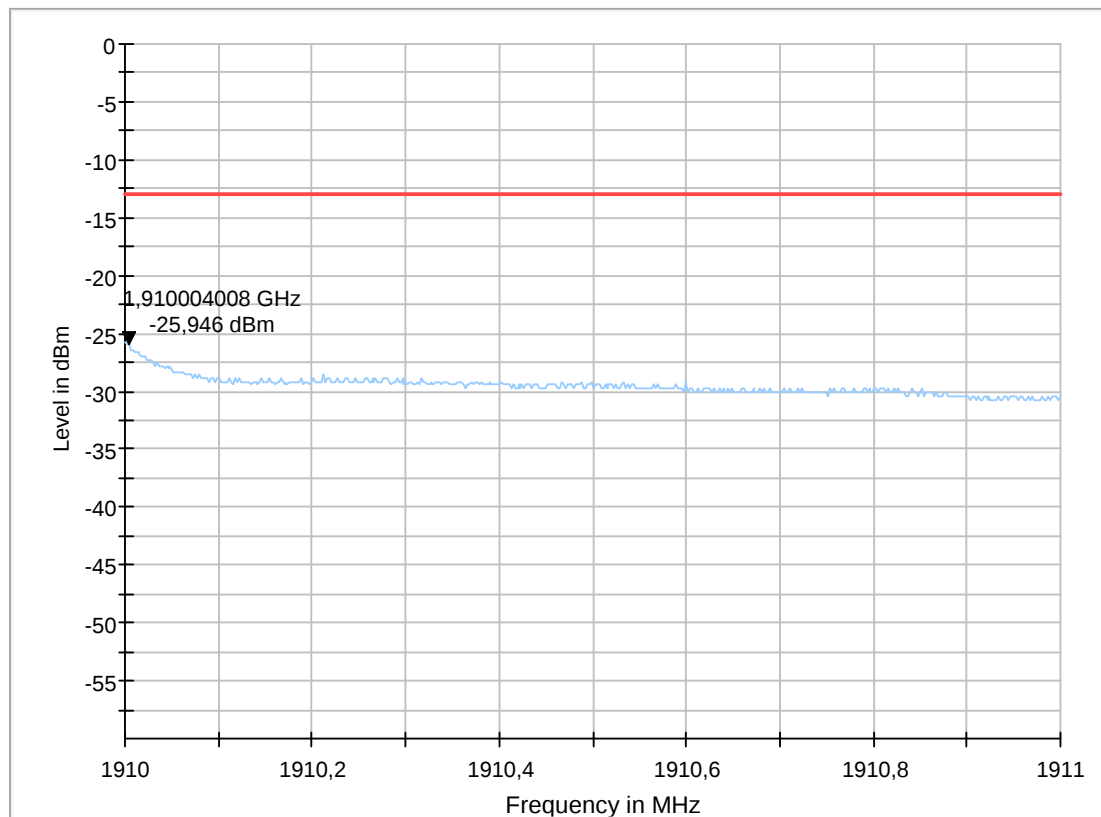
UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
II	9262	1	1	-25.43	-13	12.43	passed



9.20_BE_R_Ch9262_RMC

UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
II	9538	1	1	-25.95	-13	12.95	passed

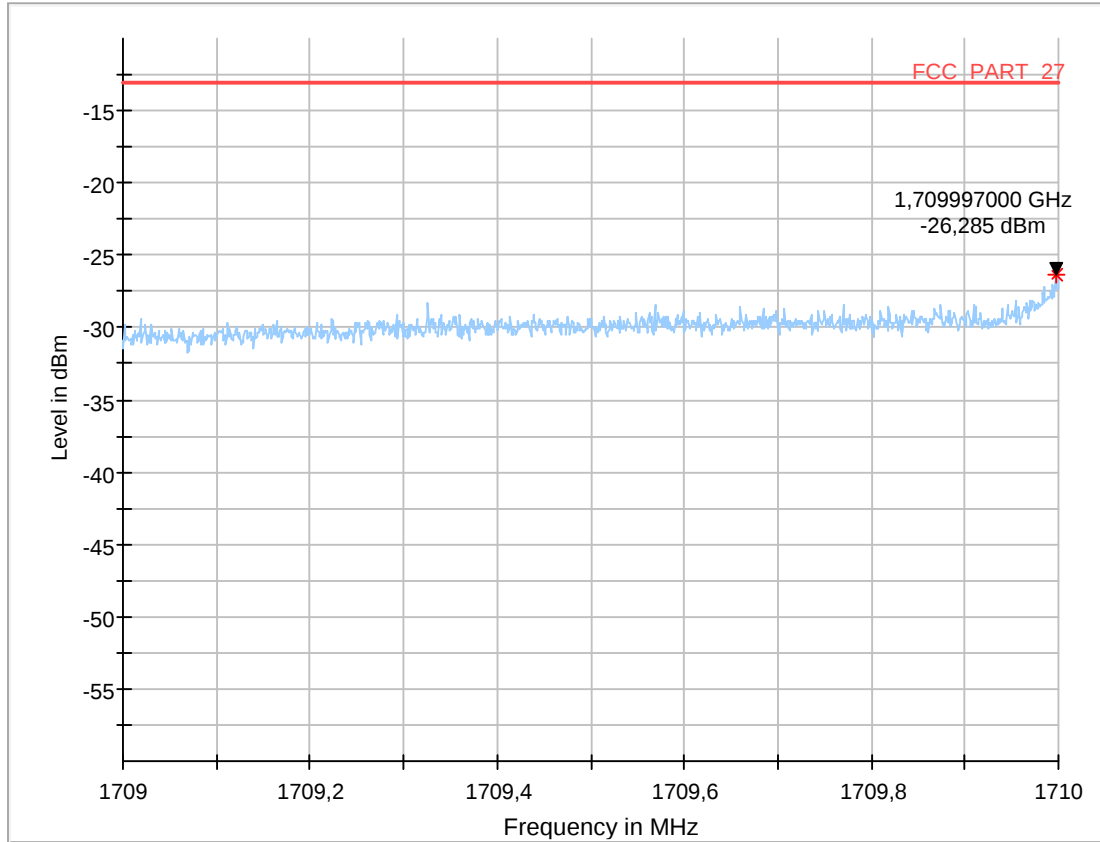
Full Spectrum



9.21_BE_R_Ch9528_RMC

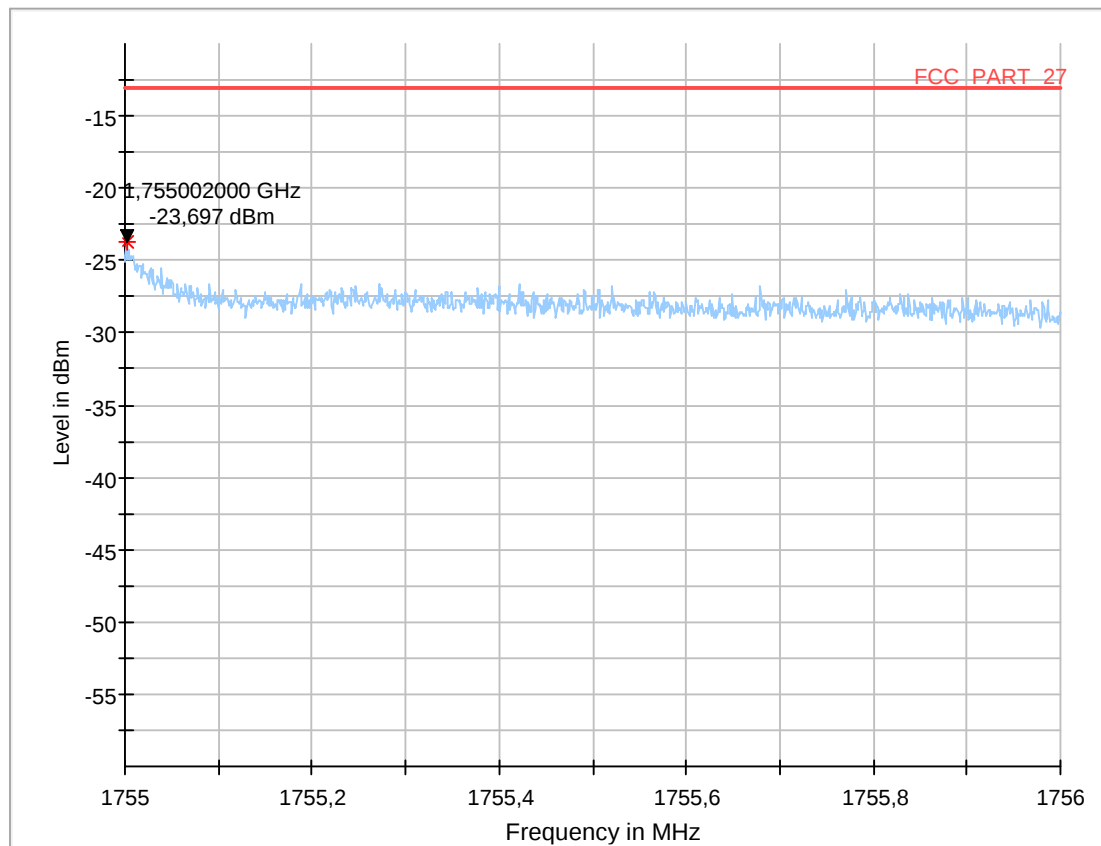
1.9. Radiated emissions on FDD Band IV band-edge

UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
IV	1312	1	2	-26.29	-13	13.29	passed



9.30_BE_R_Ch1312_RMC

UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
IV	1513	1	2	-23.69	-13	10.69	passed

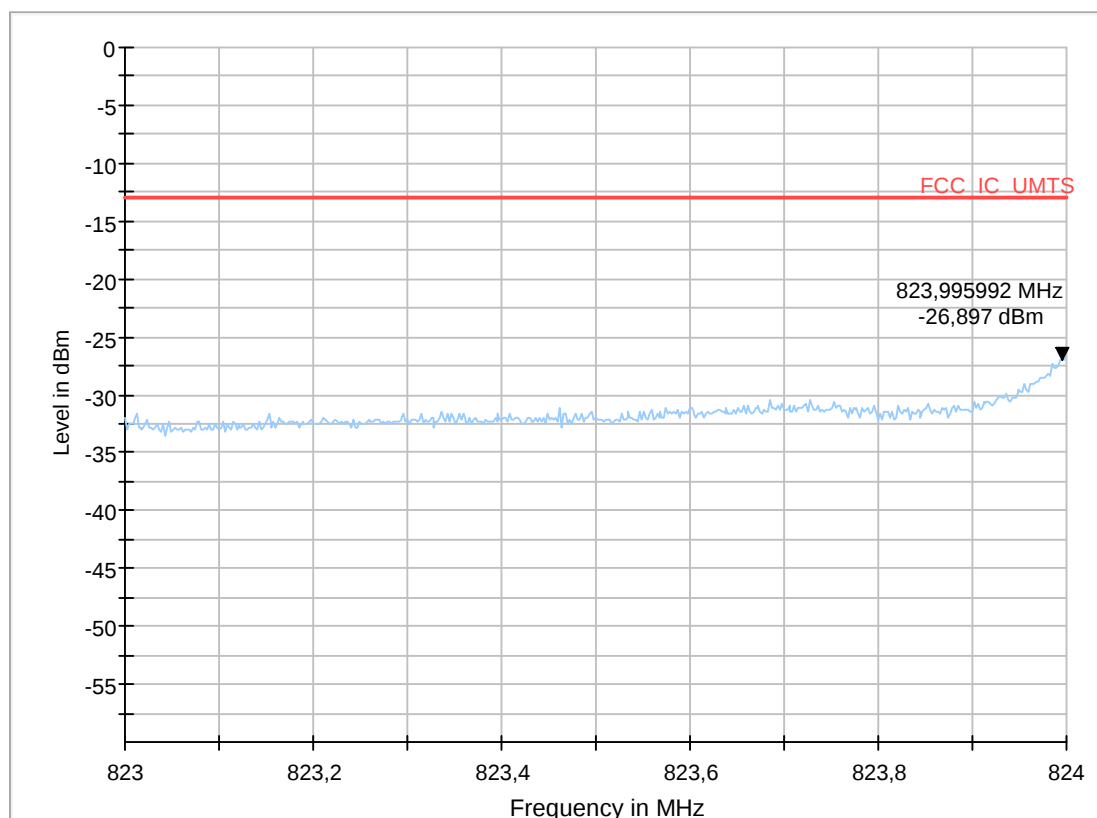


9.31_BE_R_Ch1513_RMC

1.10. Radiated emissions on FDD Band V band-edge

UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
V	4132	1	3	-26.89	-13	13.89	passed

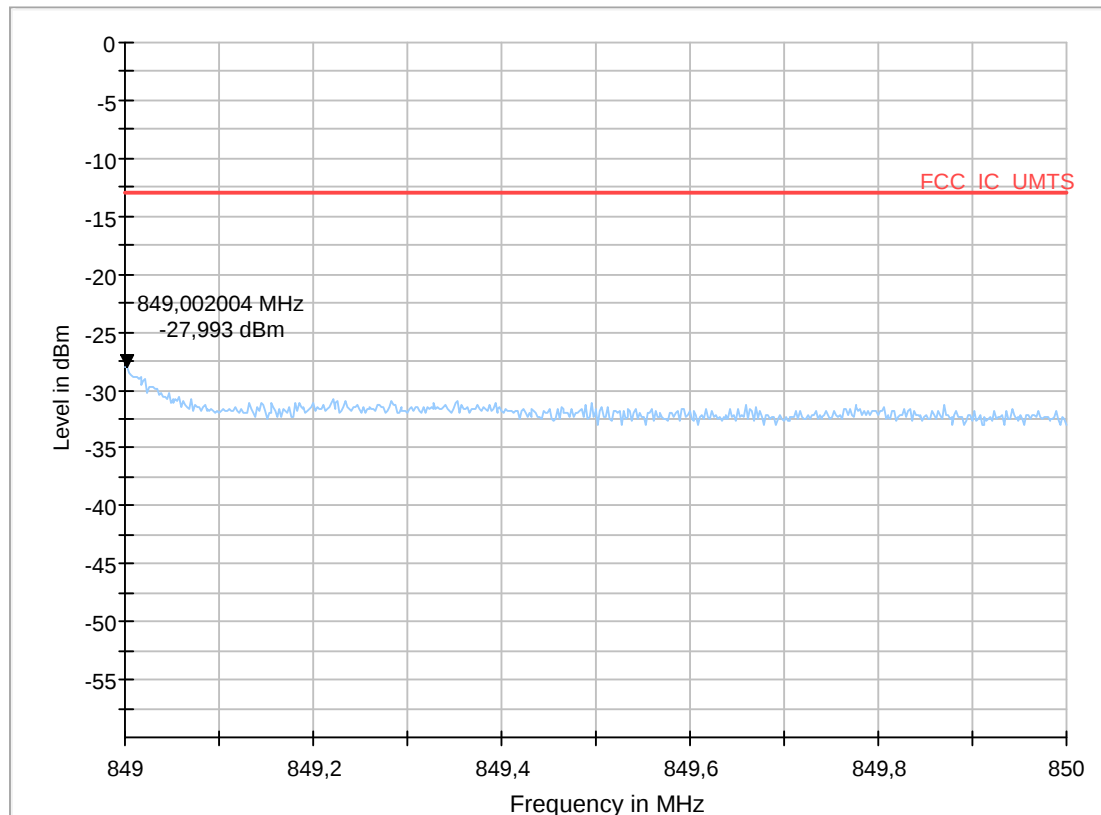
Full Spectrum



9.50_BE_R_Ch4132_RMC

UMTS Band	CH	Set-up No	OP-mode No	Power RMS (dBm)	Limit (dBm)	Margin (dB)	Result
V	4233	1	3	-27.99	-13	14.99	passed

Full Spectrum



9.51_BE_R_Ch4233_RMC