

Annex 1: Measurement diagrams to
TEST REPORT
 No.: 15-1-0046901-01a

According to:
FCC Regulations
 Part 20.21

for

Kathrein Automotive GmbH & Co. KG

LTE Kompensator US

FCC-ID: ACC7LTECOMPB0







Laboratory Accreditation and Listings			
 DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01	 FEDERAL COMMUNICATIONS COMMISSION FC USA • NOISE MRA US-EU 0003	 Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	 Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301
 WiFi ALLIANCE AUTHORIZED RF LABORATORY	 CTIA Authorized Test Lab LAB CODE 20011130-00		
accredited according to DIN EN ISO/IEC 17025			
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 19-954 • Fax: + 49 (0) 20 54 / 95 19-964 E-mail: info@cetecom.com • Internet: www.cetecom.com			

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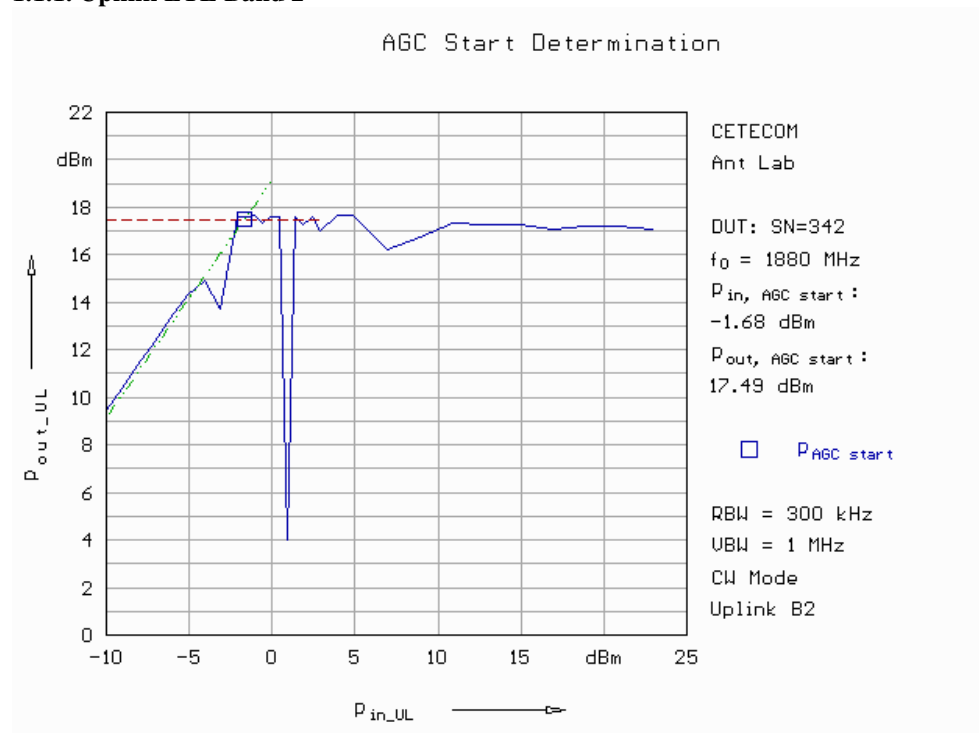
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1. Measurement diagrams LTE-mode

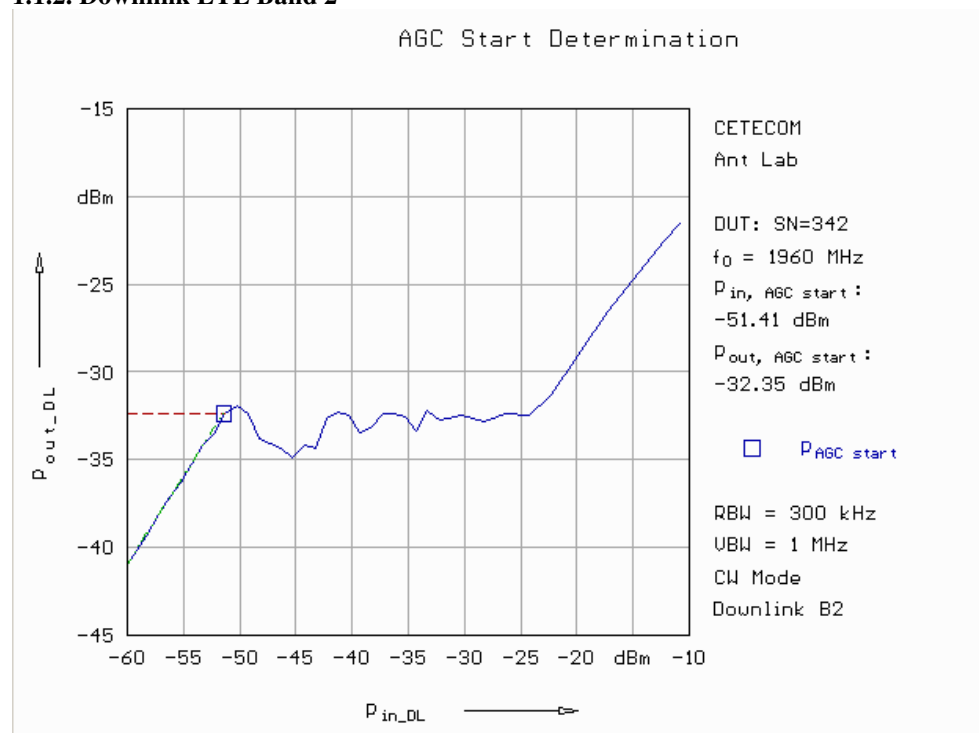
1.1. Maximum RF-power - LTE Band 2

Pls. find the test method description in test report 3-20835062

1.1.1. Uplink LTE Band 2



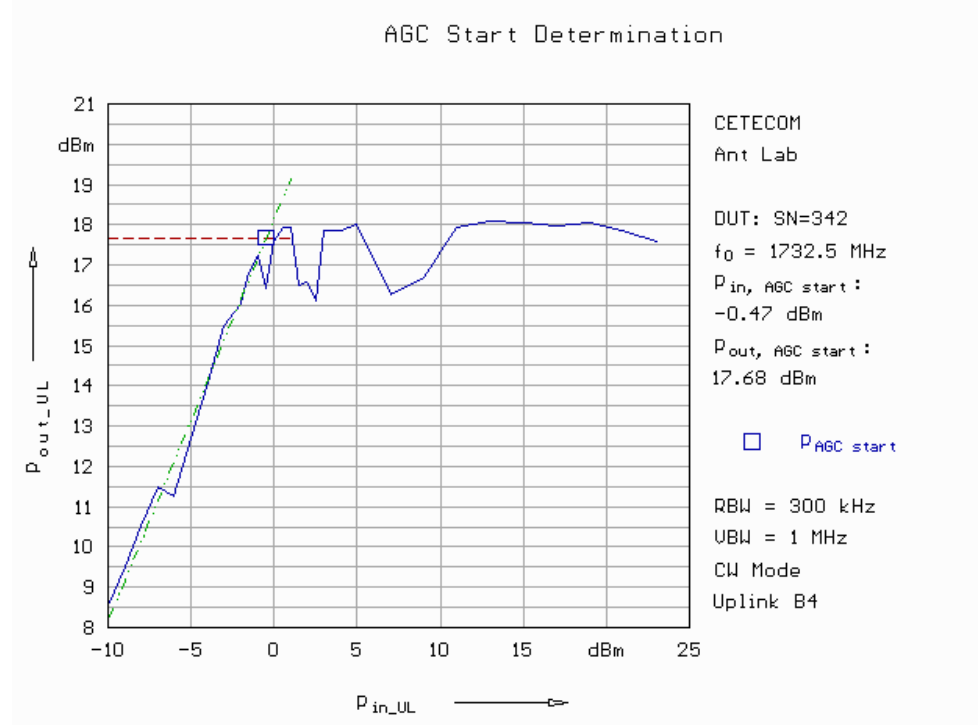
1.1.2. Downlink LTE Band 2



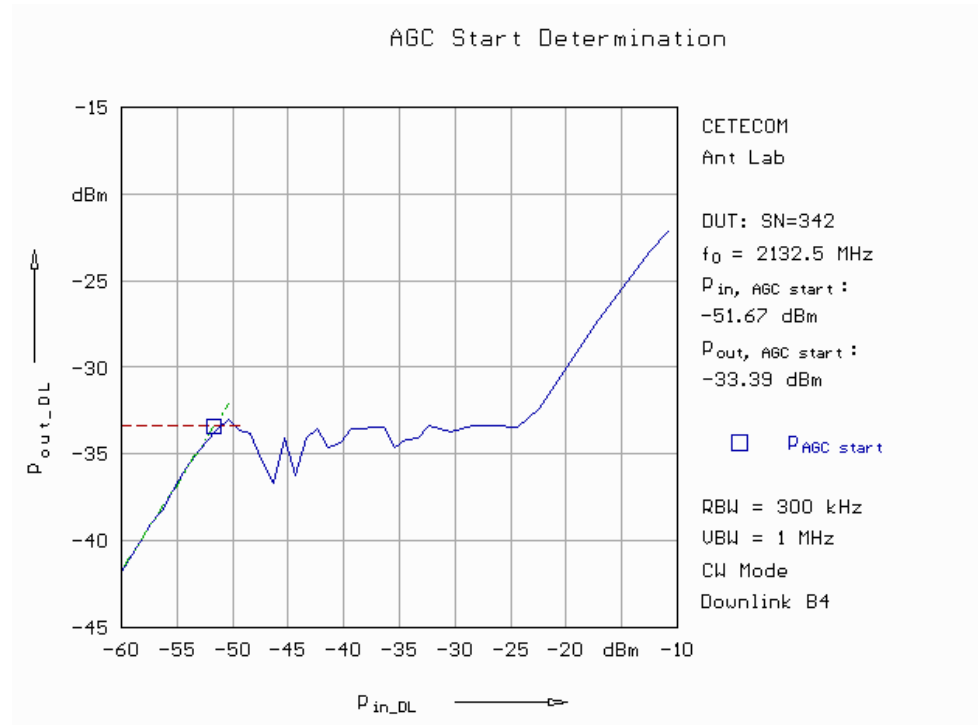
1.2. Maximum RF-power - LTE Band 4

Pls. find the test method description in test report 3-20835062

1.2.1. Uplink LTE Band 4



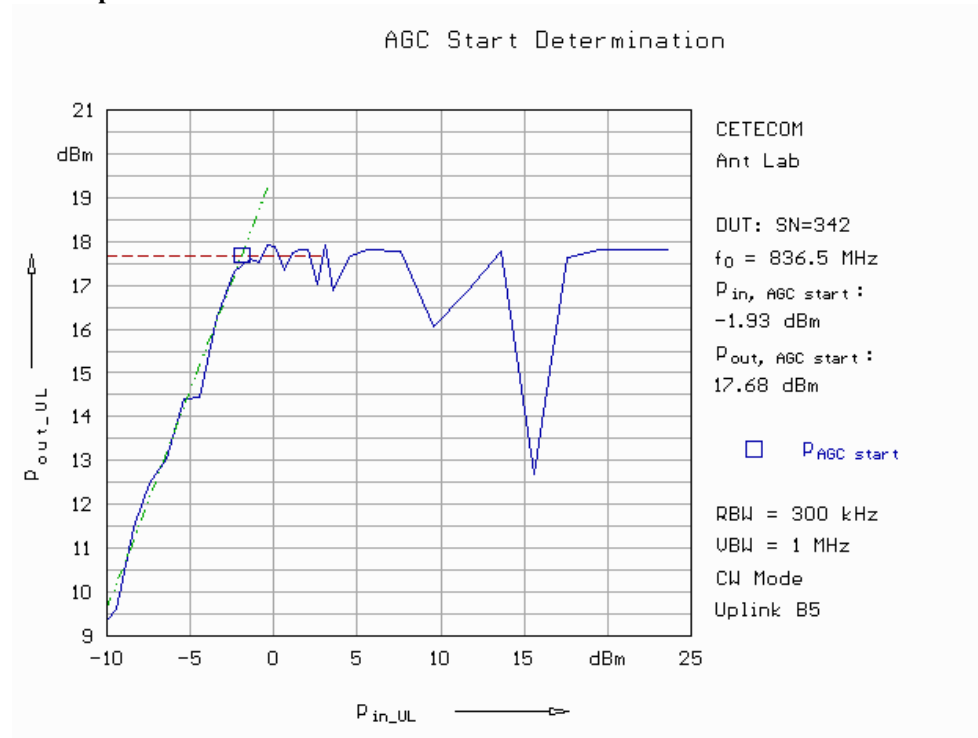
1.2.2. Downlink LTE Band 4



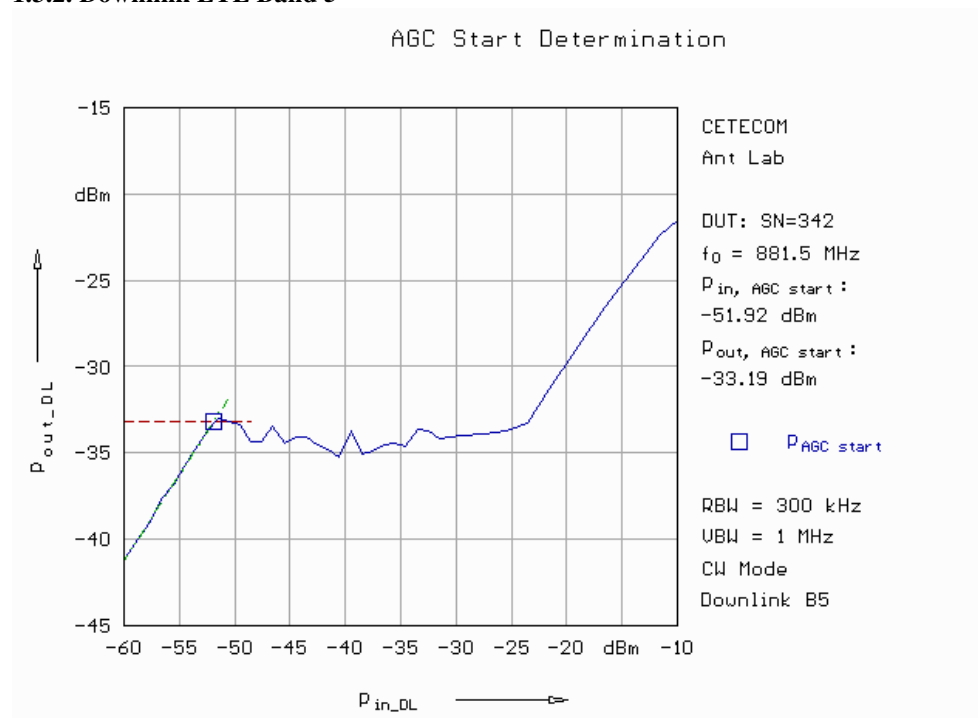
1.3. Maximum RF-power - LTE Band 5

Pls. find the test method description in test report 3-20835062.

1.3.1. Uplink LTE Band 5



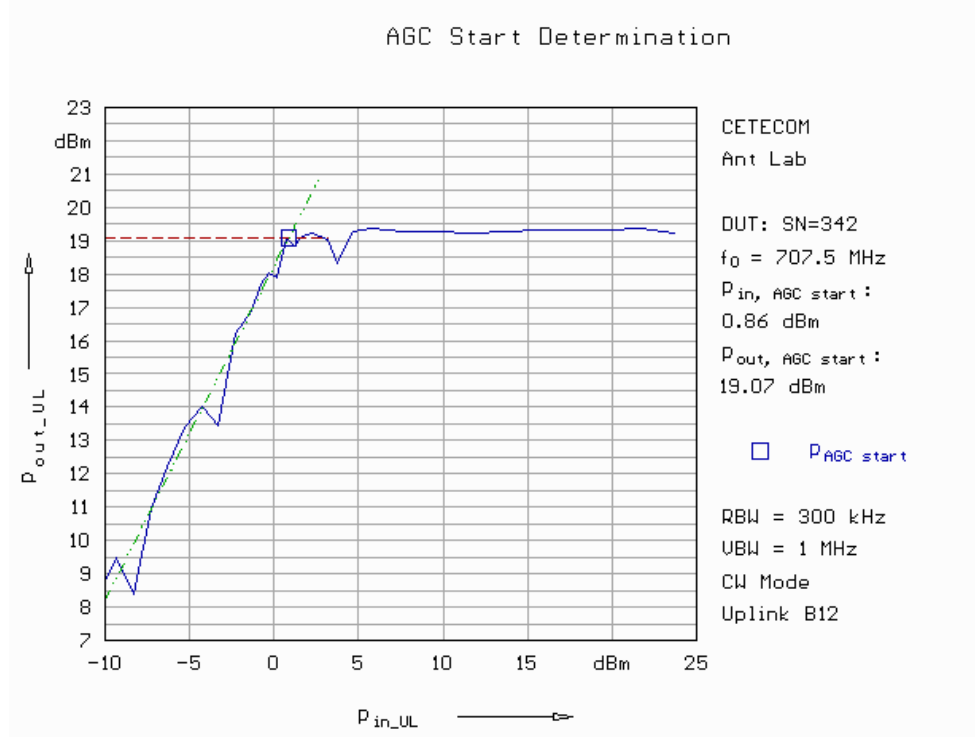
1.3.2. Downlink LTE Band 5



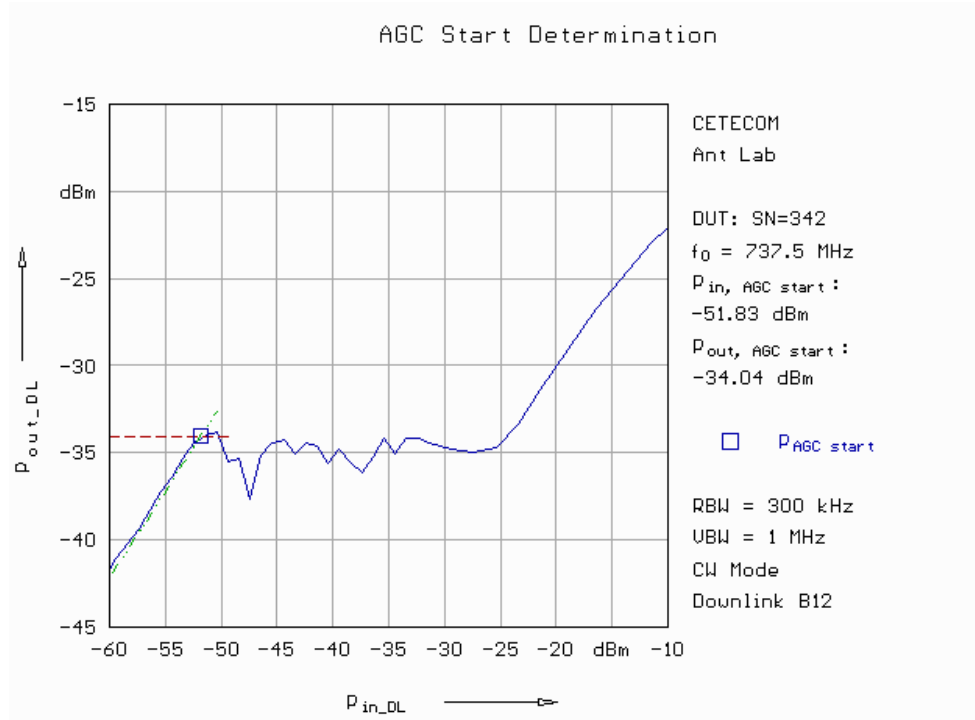
1.4. Maximum RF-power - LTE Band 12

Pls. find the test method description in test report 3-20835062.

1.4.1. Uplink LTE Band 12



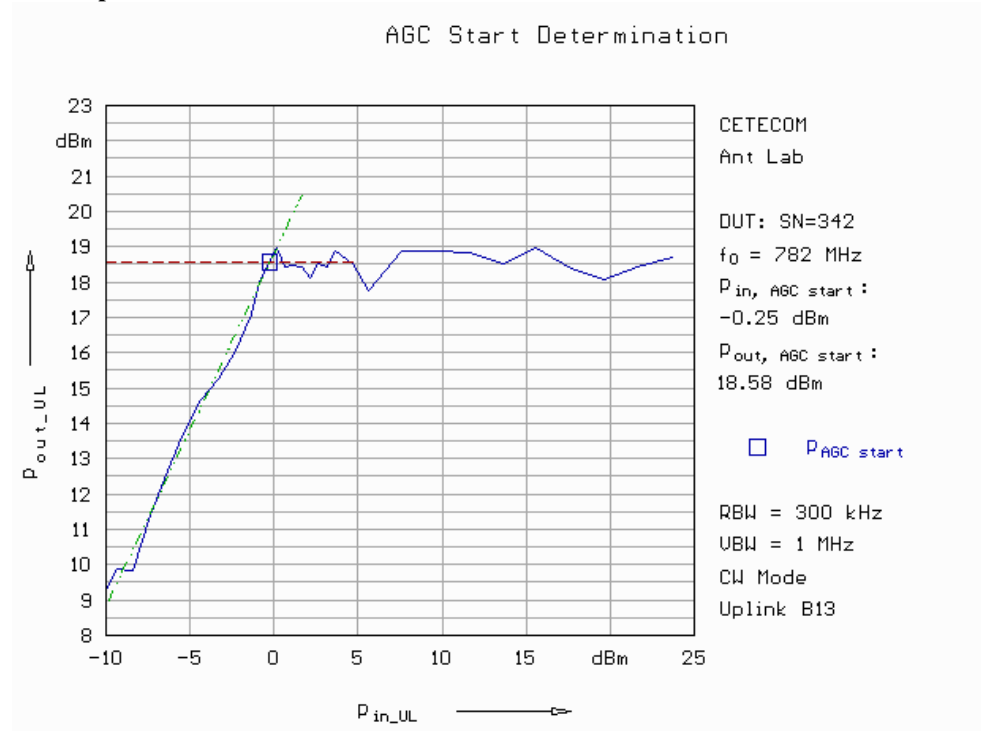
1.4.2. Downlink LTE Band 12



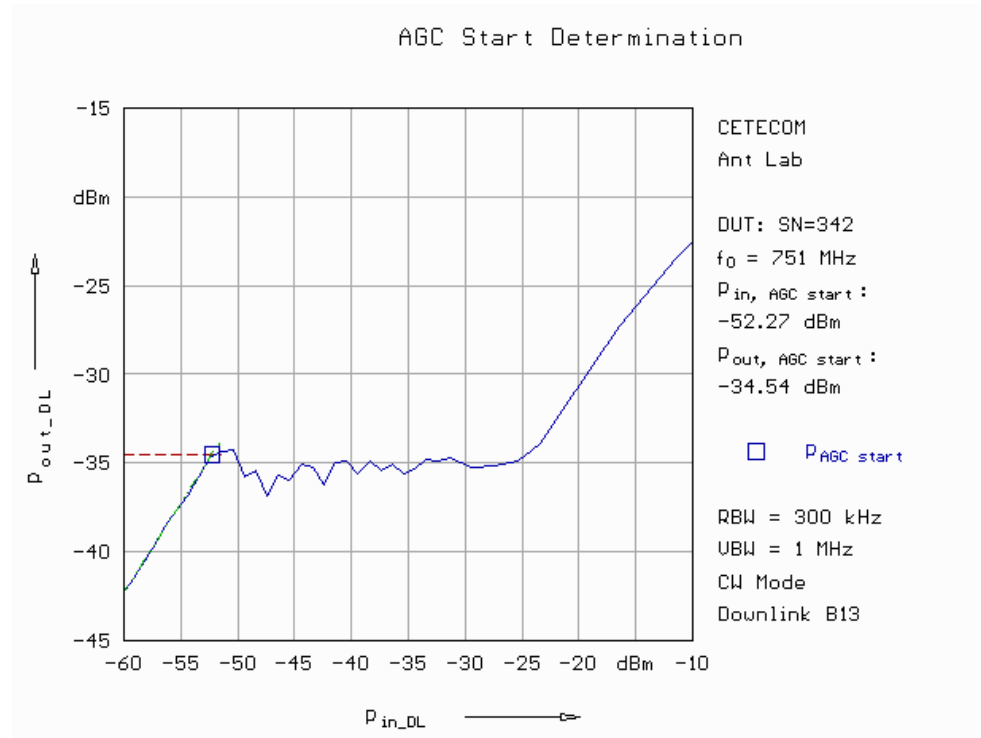
1.5. Maximum RF-power - LTE Band 13

Pls. find the test method description in test report 3-20835062/16-02-10.

1.5.1. Uplink LTE Band 13



1.5.2. Downlink LTE Band 13



1.6. Radiated spurious emissions - LTE Band 2

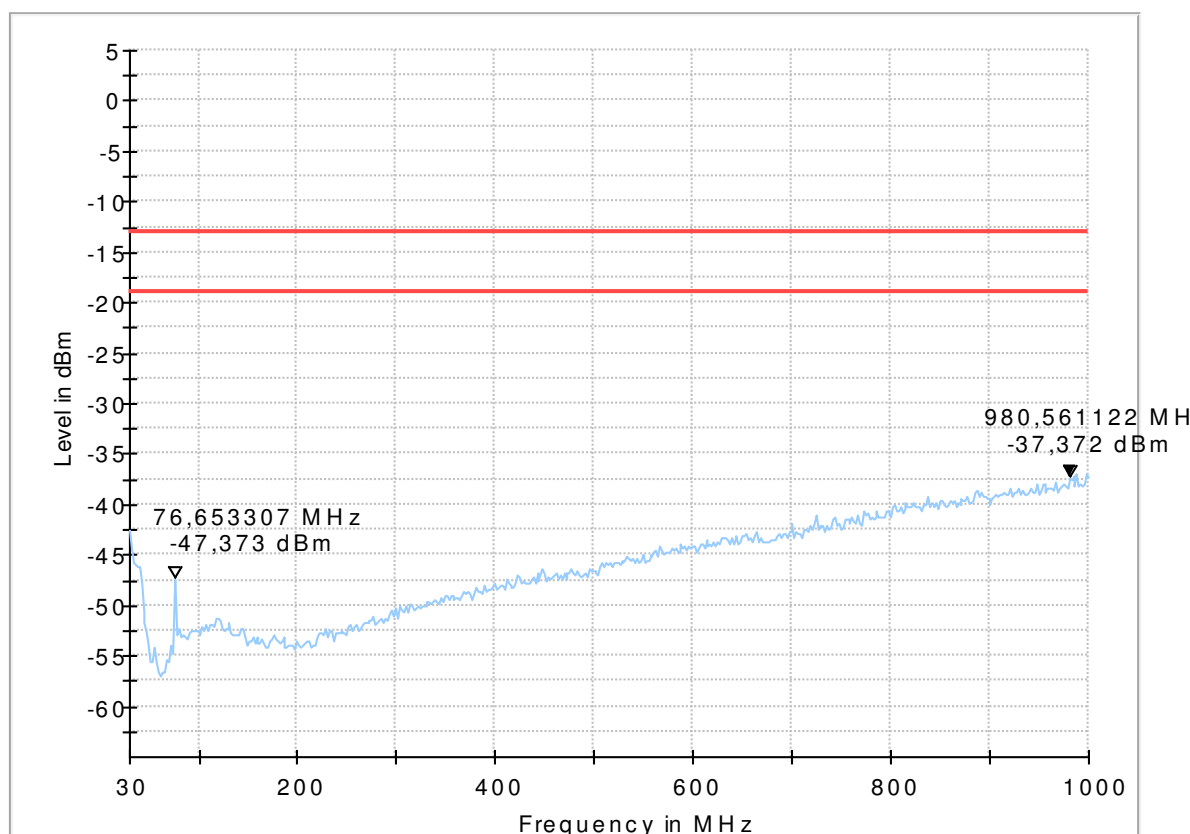
8.20_LTE_Band_2

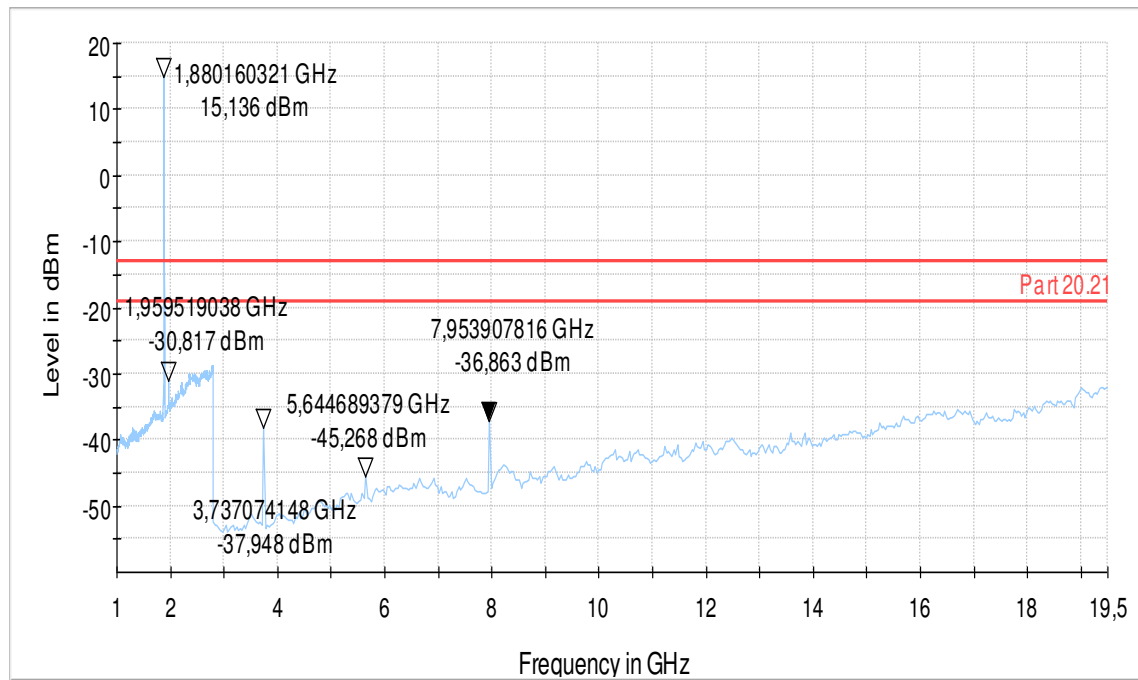
Common Information

Test Description:	Radiated Spurious Emissions UMTS FDDII
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 24 / FCC Part 20.21 / RSS-133, Issue 6
Operating Mode:	EUT at channel on uplink frequency = 1880.0MHz and 1960 MHz Downlink
Test SW:	EMC32 V9.21.0
Environmental Conditions:	Humidity: 28%rH; Temperature:21,9°C
Operator:	Lor/Ase
Remark:	Operated at Pin levels at Uplink/Downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--





1.7. Radiated spurious emissions - LTE Band 4

8.40_LTE_Band_4

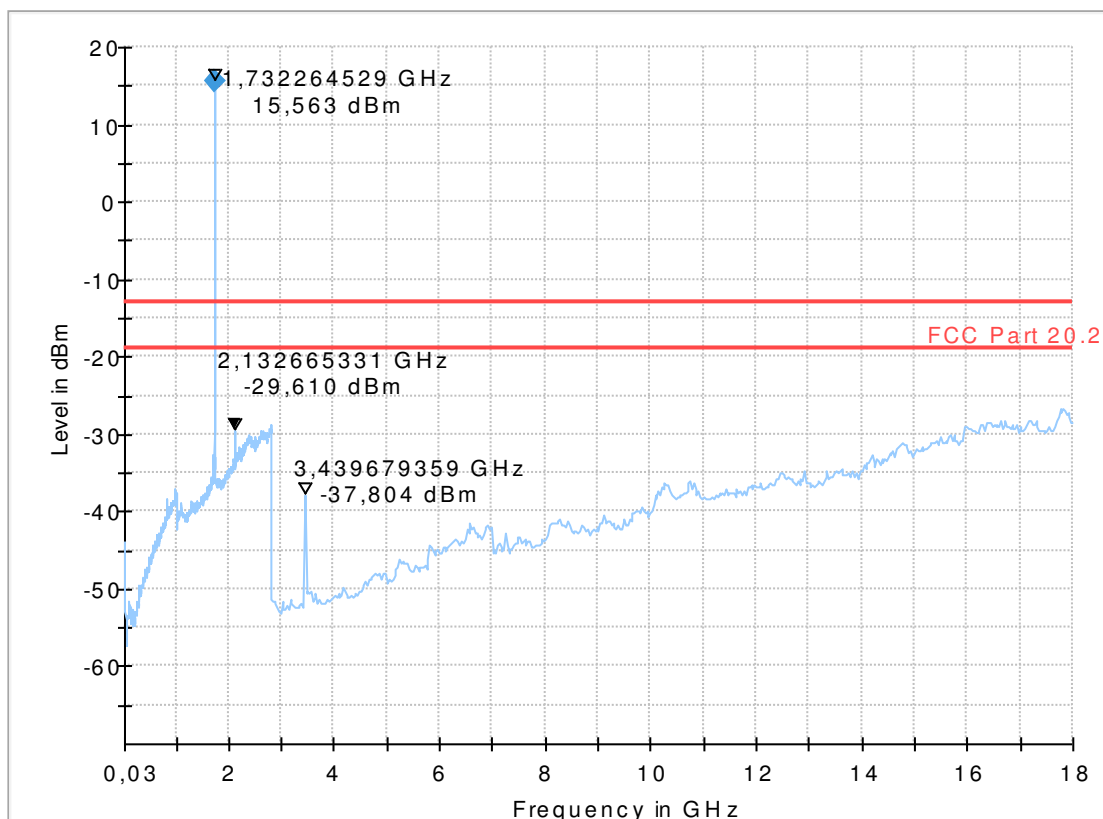
Common Information

Test Description:	Radiated Spurious Emissions LTE Band 4
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 27.53 /Part 20.21 / RSS-139, issue 3
Comm. Link:	LTE Band 4
Operating Mode:	MS allocated channel Uplink=1732.5MHz, Downlink=2132.5MHz
Exclusionband:	1710 to 1755 MHz
Environmental Conditions:	Humidity: 26%rH; Temperature: 22°C
Operator:	Lor/Ase
Remark:	Operated at Pin levels Uplink/Downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables
Power Supply:	12 V DC
Comments:	--

Full Spectrum



1.8. Radiated spurious emissions - LTE Band 5

8.03_LTE_Band_5

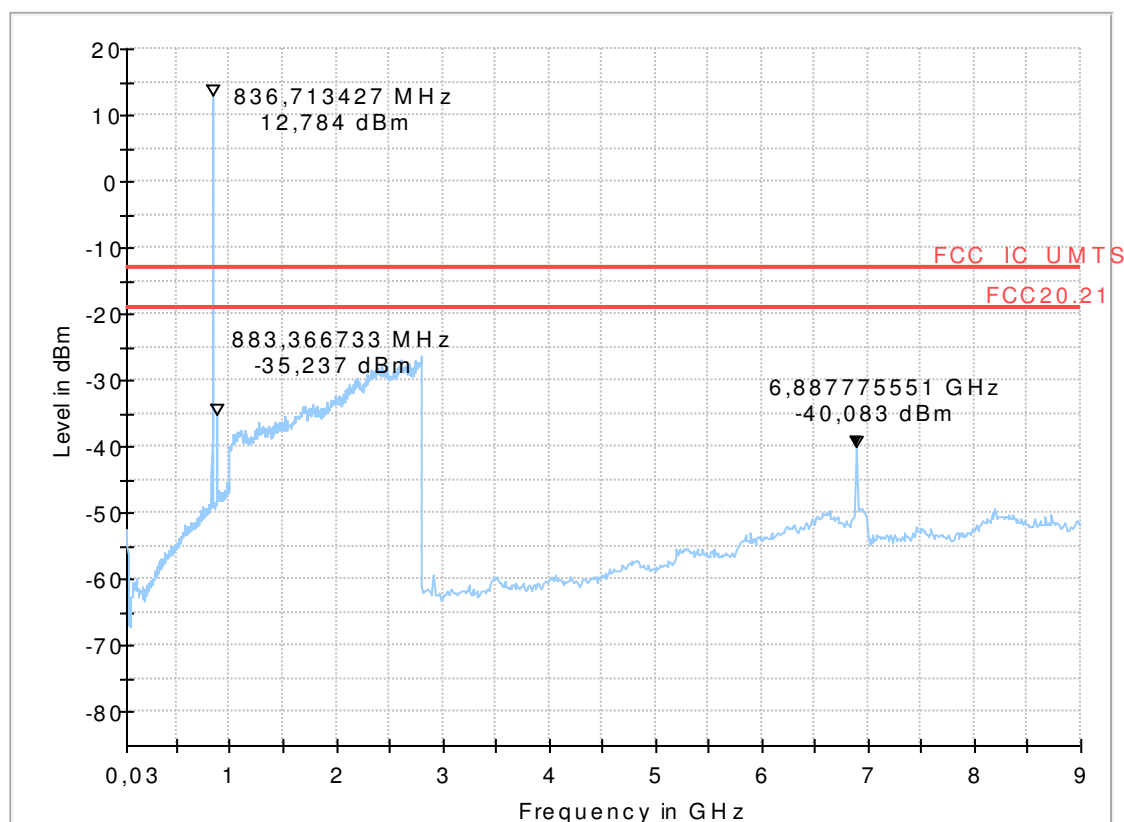
Common Information

Test Description:	Radiated Spurious Emissions UMTS FDDV
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 22.917(a) / RSS-132, Issue 3
Test SW:	EMC32 V9.21.0
Operating Mode:	LTE Band 5
Environmental Conditions:	Humidity: 23%rH; Temperature: 22.6°C
Operator:	Lor
Remark:	Operated at Pin-levels Uplink/downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
<hr/>	
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--

Full Spectrum



1.9. Radiated spurious emissions - LTE Band 12

8.05_LTE_Band_12

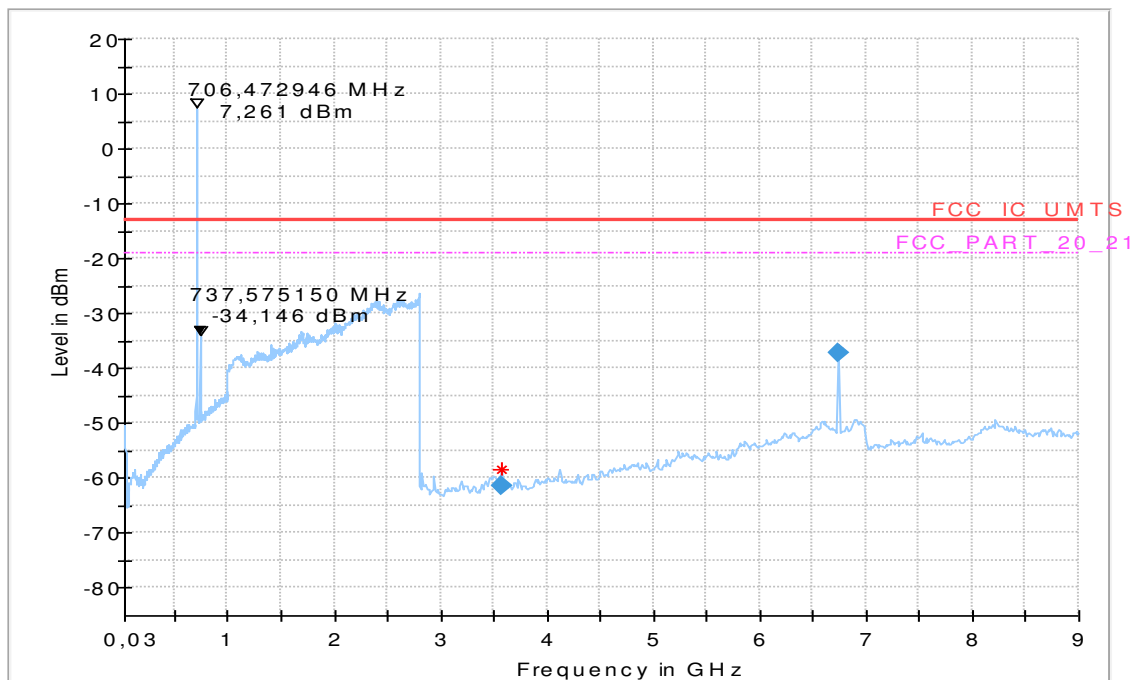
Common Information

Test Description:	Radiated Spurious Emissions LTE Band 12
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR) - EMC32 V9.21.0
Test Standard:	FCC Part 22.917(a) // RSS-130, Issue 1
Test SW:	EMC32 V9.21.0
Operating Mode:	LTE Band 12
Environmental Conditions:	Humidity: 24%rH; Temperature:21.8°C
Operator:	KMo
Remark:	Operated at Pin-levels Uplink/downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--

Full Spectrum



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
3571.432865	-61.27	-	48.27	1000.0	100.000	155.0	V	194.0	90.0	-94.3
6736.983968	-37.12	-	24.12	1000.0	100.000	155.0	H	246.0	90.0	-85.4

1.10. Radiated spurious emissions - LTE Band 13

8.04a_LTE_Band_13_Sweep1

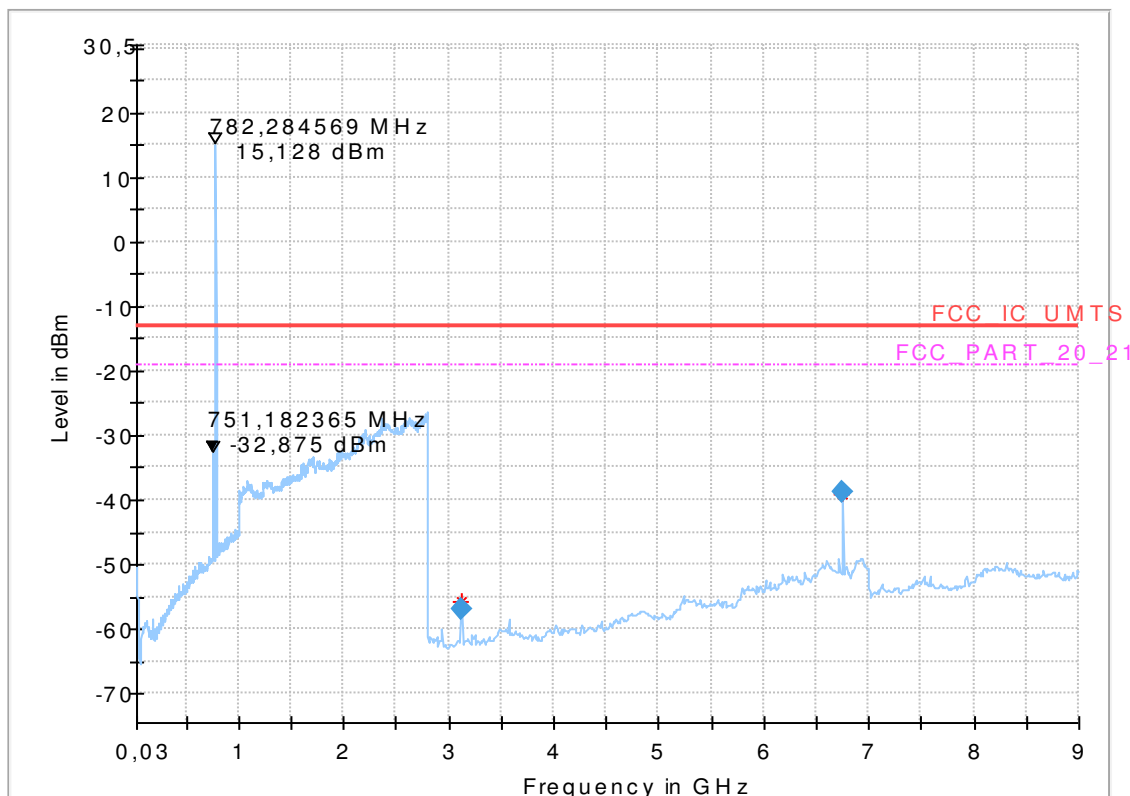
Common Information

Test Description:	Radiated Spurious Emissions LTE Band 13
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 27.53 (§20.21)/ RSS-130, Issue 1
Test SW:	EMC32 V9.21.0
Operating Mode:	LTE Band 13
Environmental Conditions:	Humidity: 24%rH; Temperature:21.8°C
Operator:	KMo
Remark:	Pin= 0.73dBm Uplink, Pin=-48.16dBm Downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--

Full Spectrum



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
3127.985972	-56.80	-	43.80	1000.0	100.000	155.0	H	1.0	0.0	-95.8
6750.991984	-38.87	-	25.87	1000.0	100.000	155.0	H	248.0	90.0	-85.4

8.04b_LTE_Band_13_Sweep2

Common Information

Test Description:	Radiated Spurious Emissions LTE Band 13
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 27.53 / RSS-130, Issue 1
Test SW:	EMC32 V9.21.0
Operating Mode:	LTE Band 13
Exclusionband:	Uplink: 776-787MHz Downlink: -31MHz Offset
Environmental Conditions:	Humidity: 40%rH; Temperature: 22°C
Operator:	KMo
Remark:	Operated at Pin-levels Uplink/downlink

EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--

Full Spectrum

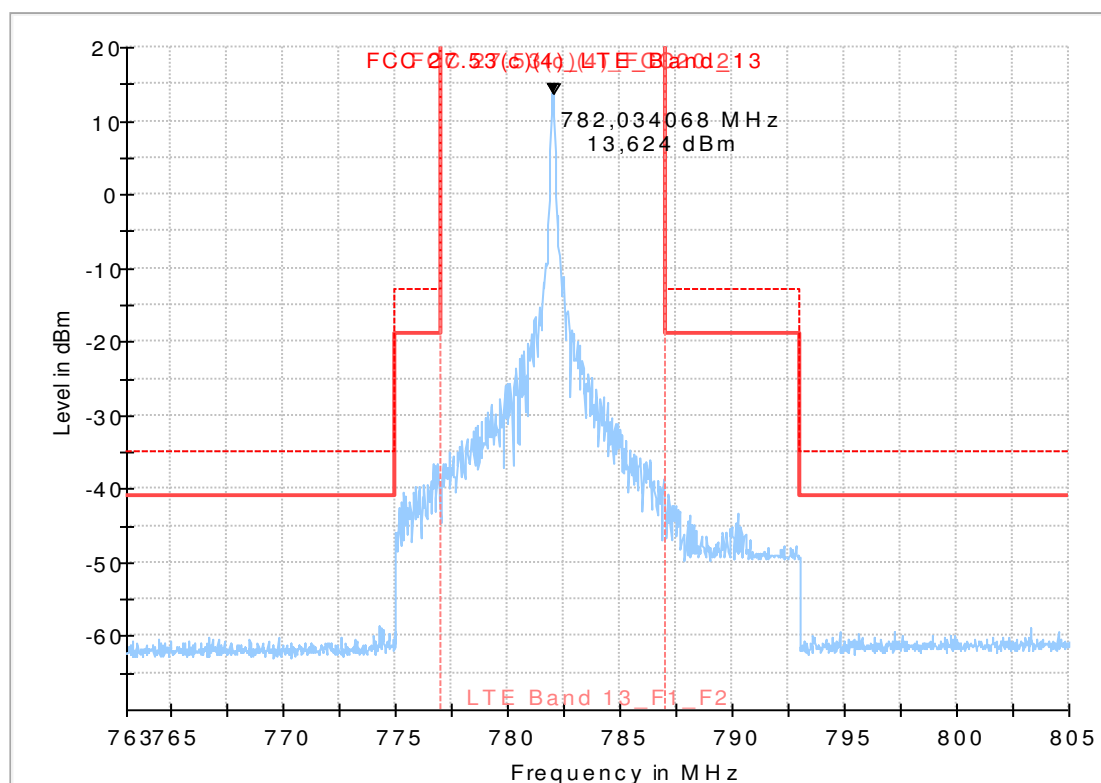


Diagram 8.04c_LTE_Band_13_Sweep3

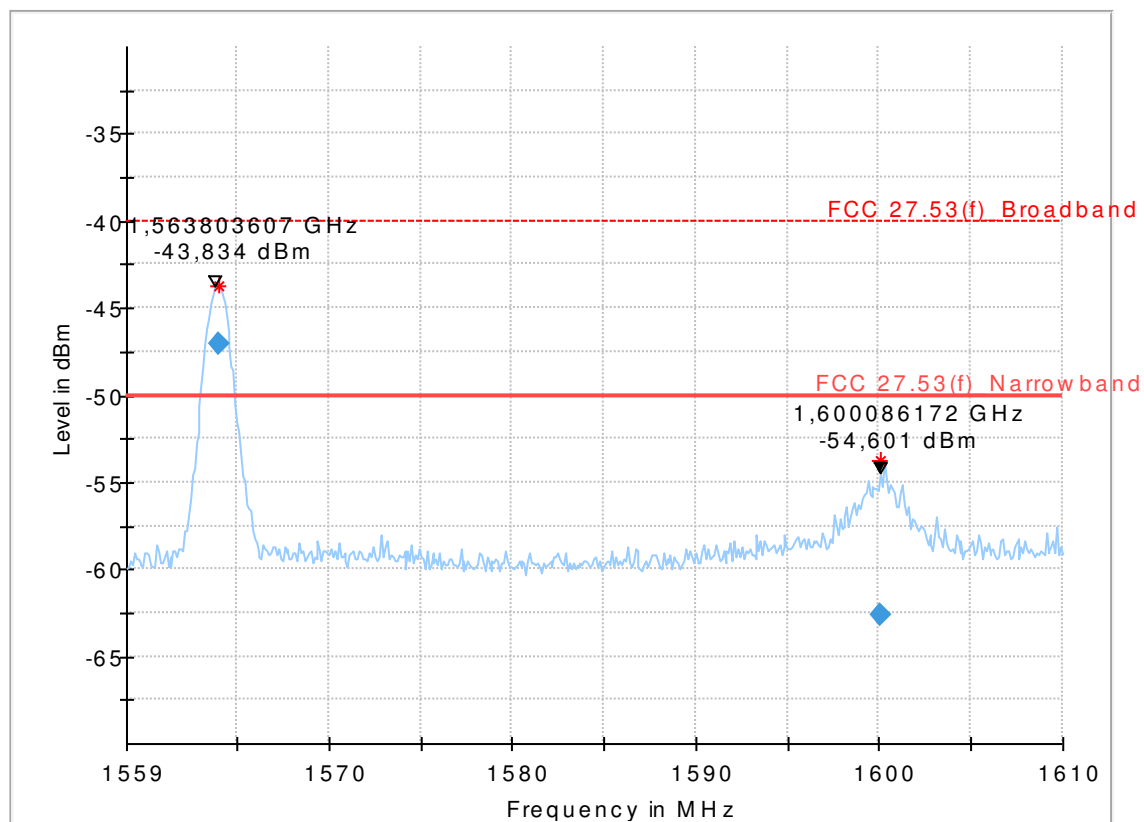
Common Information

Test Description:	Radiated Spurious Emissions LTE Band 13
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 27.53 / RSS-130, Issue 1
Operating Mode:	LTE Band 13
Test SW:	EMC32 V9.21.0
Environmental Conditions:	Humidity: 25%rH; Temperature: 19.9°C
Operator:	Lor
Remark:	Pin=0.73dBm Uplink / Pin=-48.16dBm Downlink
Remark2:	Harmonic of uplink channel at 1564MHz. LTE Bandwidth at least 1.4MHz, wideband limit of -70dBW/MHz (-40dBm/MHz) applicable

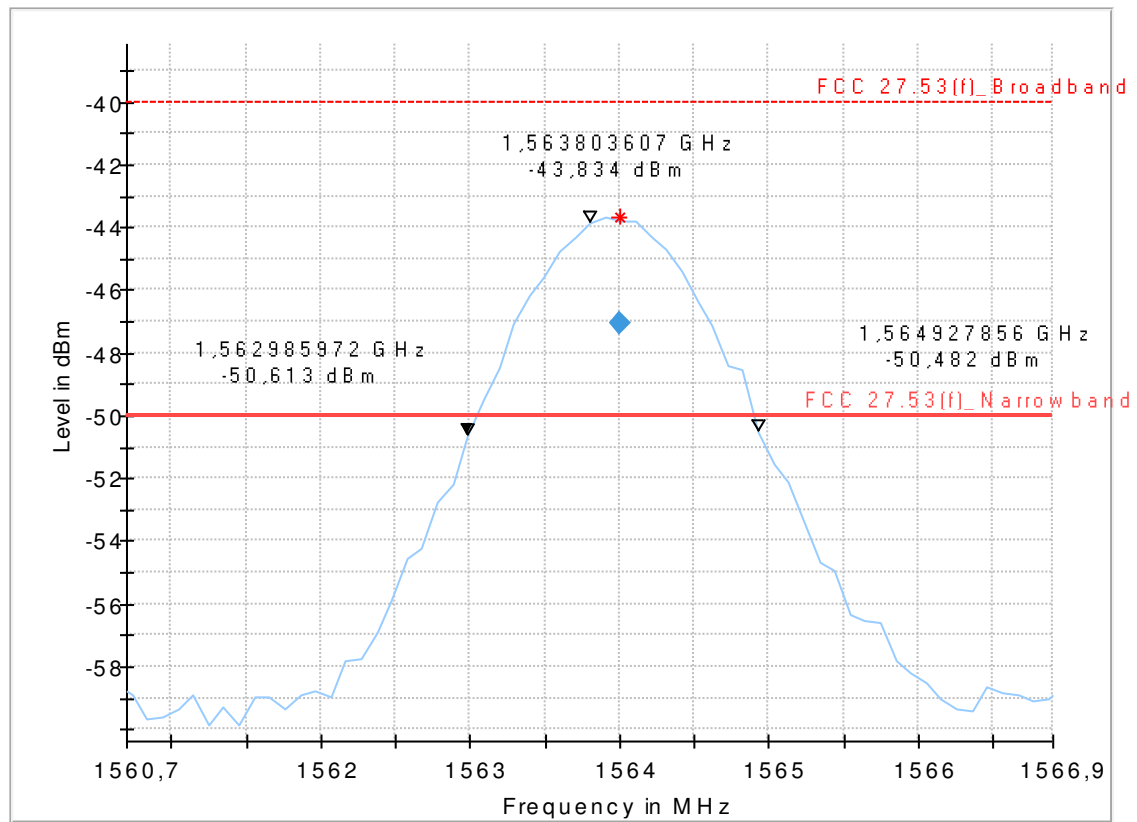
EUT Information

Manufacturer:	Kathrein
EuT:	LTE Kompensator US
HW Version:	13611416B01V04
SW Version:	9408675_S01_RC09
Serial Number:	342
Connected Interfaces:	antenne with ground plane, directional coupler, cables,
Power Supply:	12 V DC
Comments:	--

Full Spectrum



Full Spectrum



Bandwidth is 1.5614MHz wide (more then 700Hz) -> Broadband karakter (broadband limit of -40dBm/MHz applicable) -> pass