

Annex 1: Measurement diagrams 18-1-0097202T01a-A1

Number of pages:	35	Date of Report:	2021-May-31
Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	Applicant:	ACTIA Nordic AB
Product: Model:	Telematics Device 103360002		
FCC ID:	2AGKK103360002	IC:	20839-103360002
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter B Part 22, Part 24, Part 27 RSS-132, Issue 3; RSS-133, Issue 6; RSS-130, Issue 2; RSS-139, Issue 3 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		



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1 Measurement diagrams

1.1 GSM+ Wifi 2.4GHz

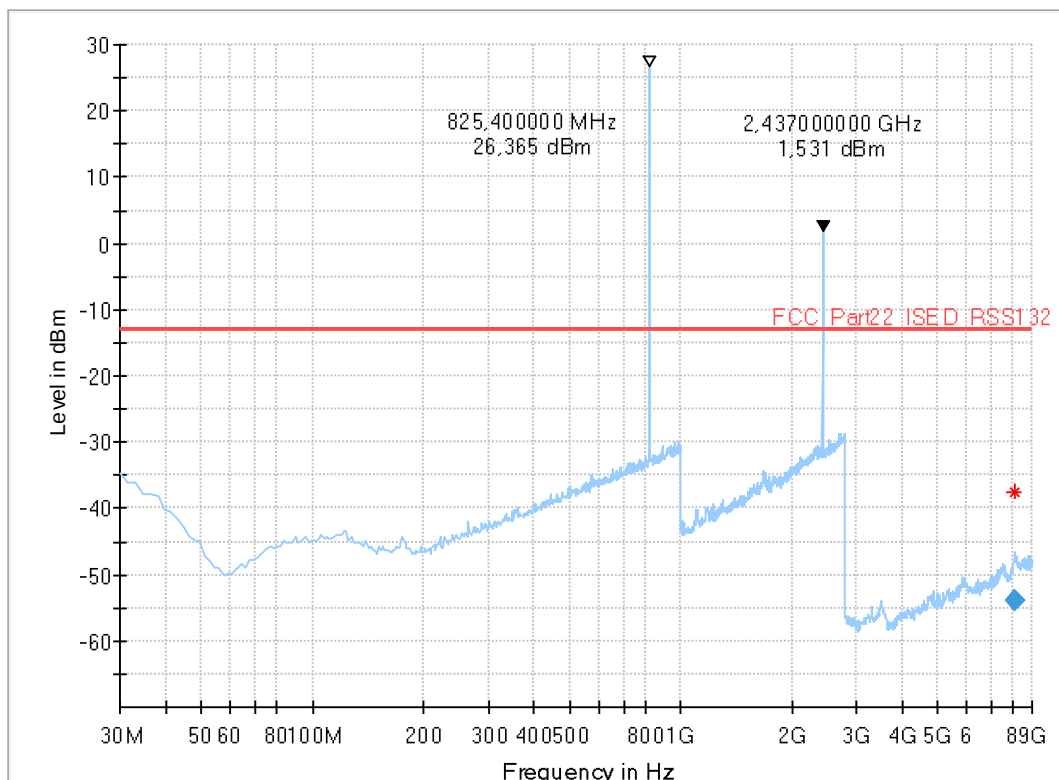
8.01a_simul_GSM850_WLAN2G4_standing

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operating Mode:	WLAN ch6_2437GHz 6MBps pwr_13 ext.Ant GSM850 ch128_824,2MHz
Operator:	TFra
Environmental Conditions::	Humidity : 44%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2437 MHz is the WLAN 2.4 GHz carrier and peak at 825 MHz is the GSM850 carrier

Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth (MHz)	Height	Pol	Azimuth	Elevation	Corr. (dB)
8092.291667	-53.90	-13.00	40.90	100.0	100.000	155.0	H	170.0	0.0	-80

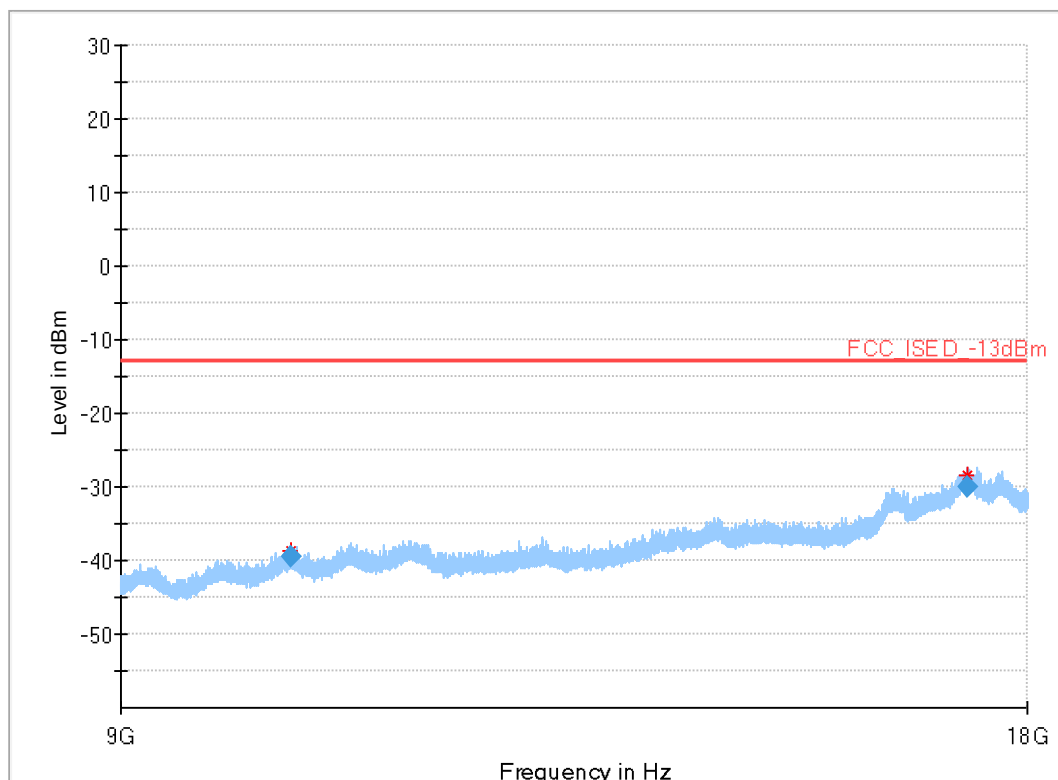
8.01b_simul_GSM850_WLAN2G4_standing

Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	WLAN ch6_2437GHz 6Mbps pwr_13 ext.Ant GSM850 ch128
Operator:	TFra
Comment:	
EUT Setup:	1
Verdict:	Passed

EUT Information

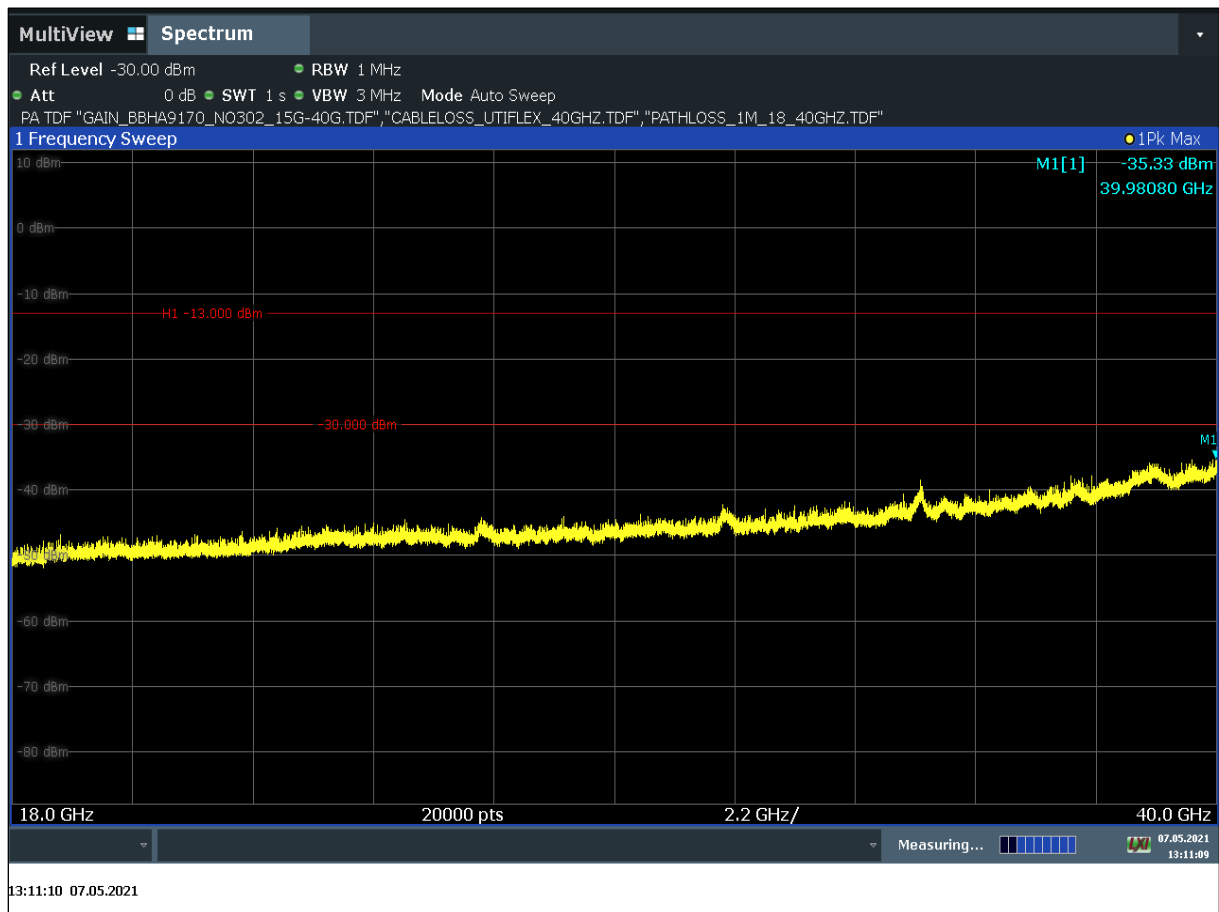
PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Elevation	Corr. (dB)
10257.601667	-39.54	-13.00	26.54	100.0	1000.000	155.0	V	255.0	0.0	-76
17191.261667	-30.09	-13.00	17.09	100.0	1000.000	155.0	V	345.0	0.0	-65

8.01c_simul_GSM850_WLAN2G4_standing



8.02a_simul_GSM850_WLAN2G4_laying

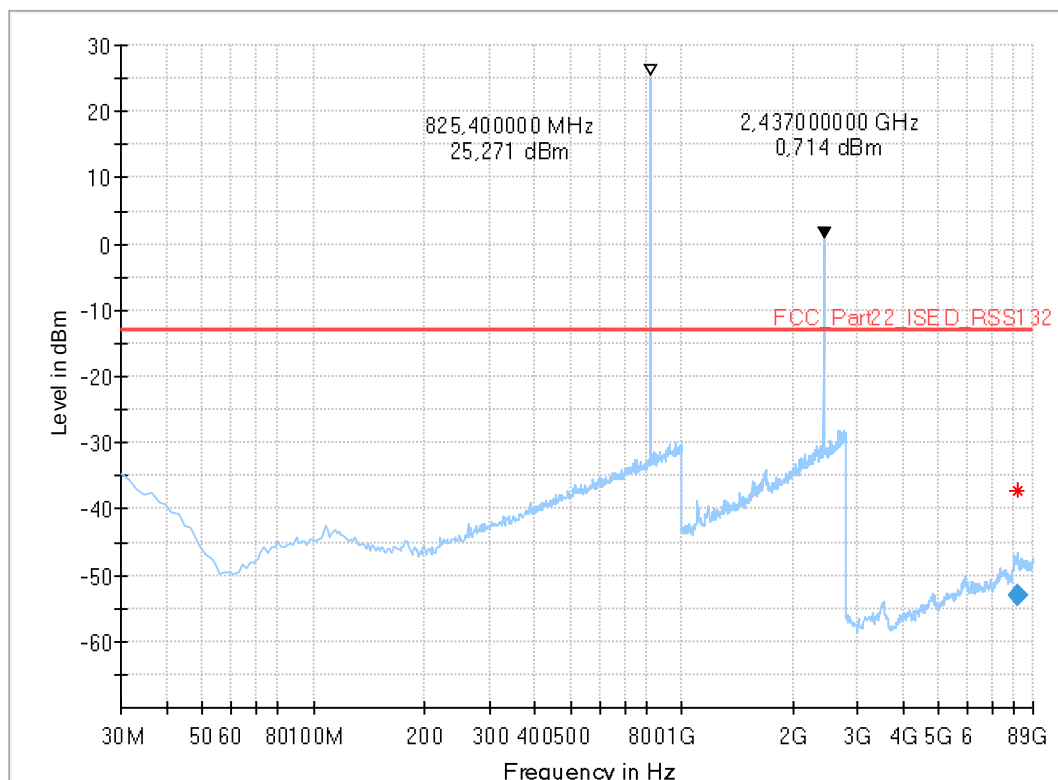
Common Information

Test Description: Radiated emission related to 1m
 Test Site: Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
 Test Standard: FCC FCC Part 24.238 Broadband PCS
 Antenna polarisation: vertical / horizontal

Operating Mode: WLAN ch6_2437GHz 6MBps pwr_13 ext.Ant | GSM850 ch128
 Operator: TFra
 Environmental Conditions: Humidity : 44%rH; Temperature: 20°C
 EUT Setup: 1
 Verdict: PassedComment:

EUT Information

PMT number: 18-1-00972S20_C02
 Manufacturer: ACTIA Nordic AB
 Full Spectrum



Remark: Peak at 2437 MHz is the WLAN 2.4 GHz carrier and peak at 825 MHz is the GSM850 carrier

Final Result

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation	Corr. (dB)
8138.275000	-53.08	-13.00	40.08	100.0	100.000	155.0	H	219.0	90.0	-80

8.02b_simul_GSM850_WLAN2G4_laying

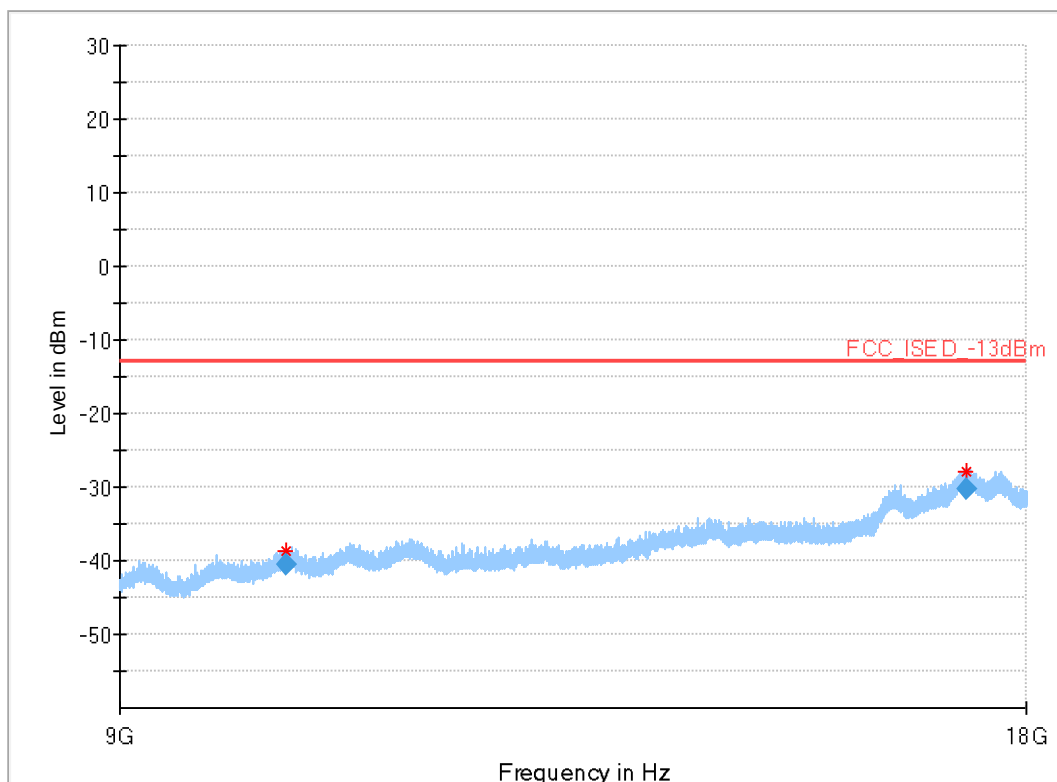
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	WLAN ch6_2437GHz 6Mbps pwr_13 ext.Ant GSM850 ch128
Operator:	TFra
Comment:	
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

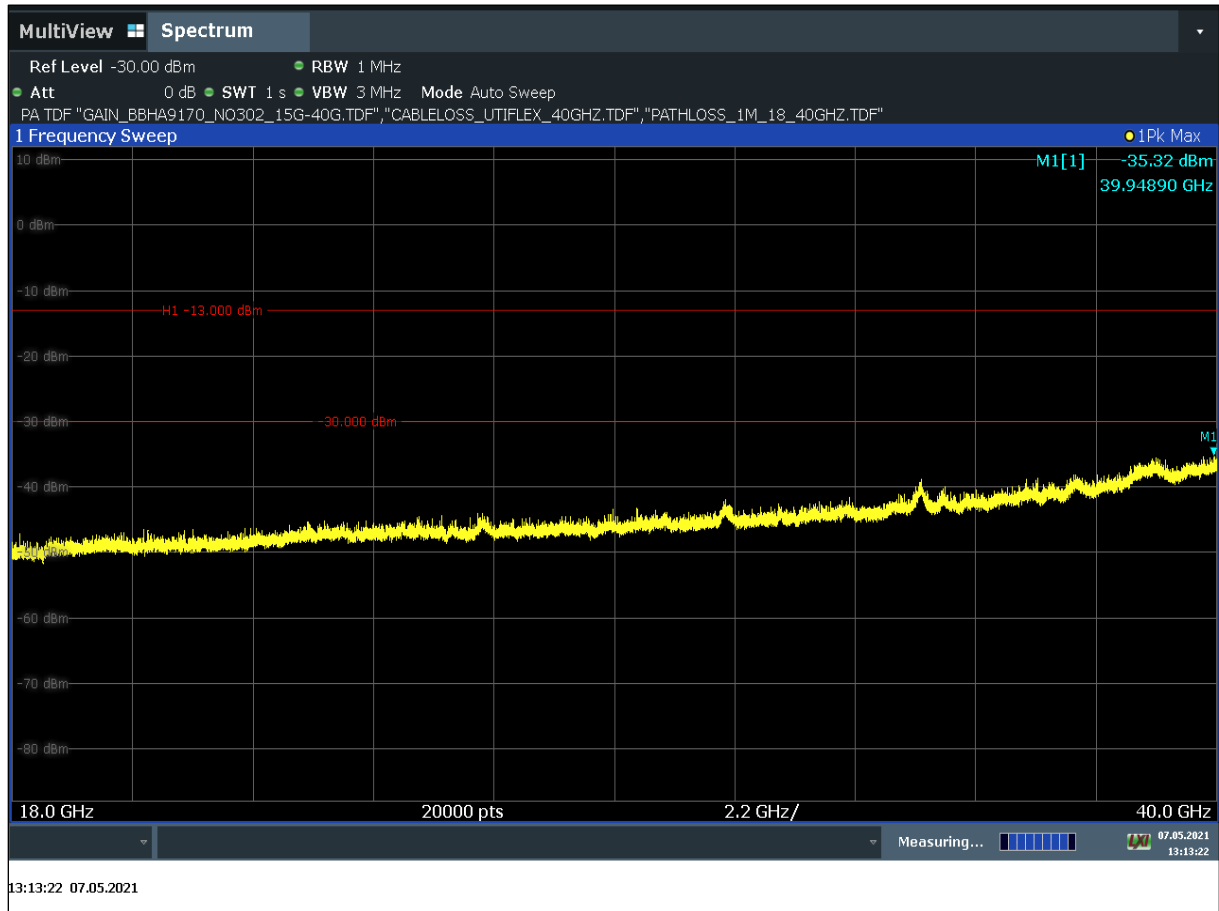
Full Spectrum



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation	Corr. (dB)
10217.836667	-40.41	-13.00	27.41	100.0	1000.000	155.0	H	149.0	0.0	-76.1
17197.233333	-30.16	-13.00	17.16	100.0	1000.000	155.0	H	202.0	90.0	-64.8

8.02c_simul_GSM850_WLAN2G4_laying



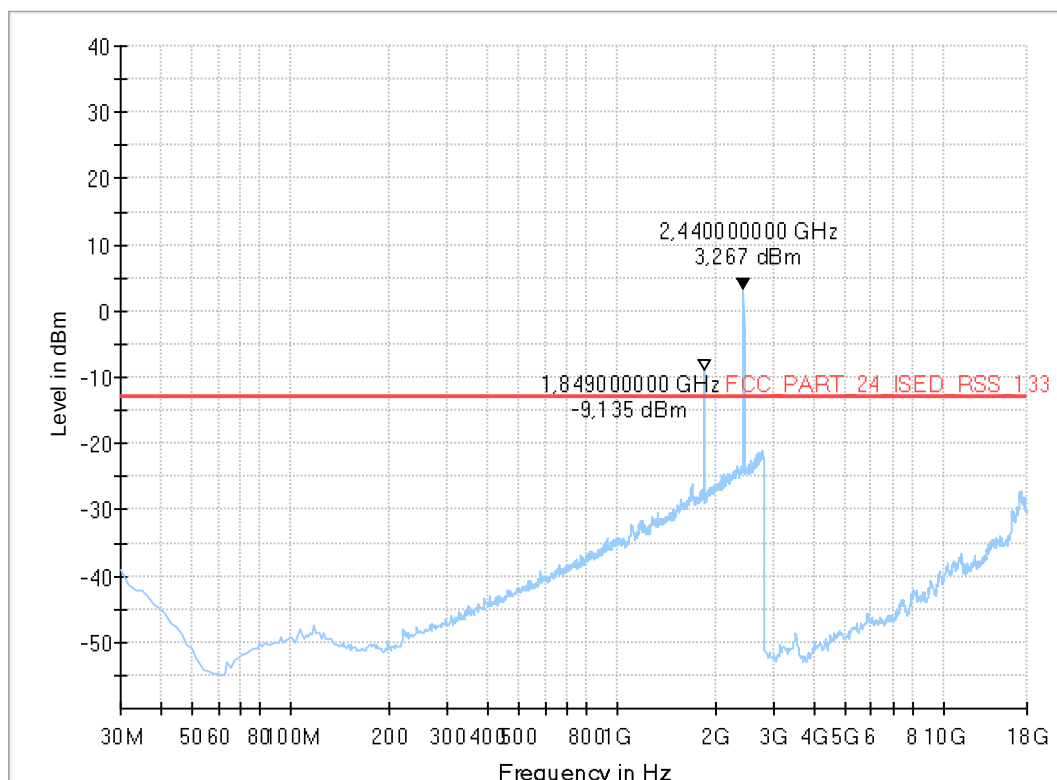
8.03a_Simultaneous_mode_GSM1900_WLAN 2G4_Operation mode_2

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
EUT:	
Manufacturer:	
Operating Mode:	GSM 1800_CH:810 Channel:(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13 ext Ant
Operator:	HEI
Comment:	
Environmental Conditions::	Humidity : 38%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

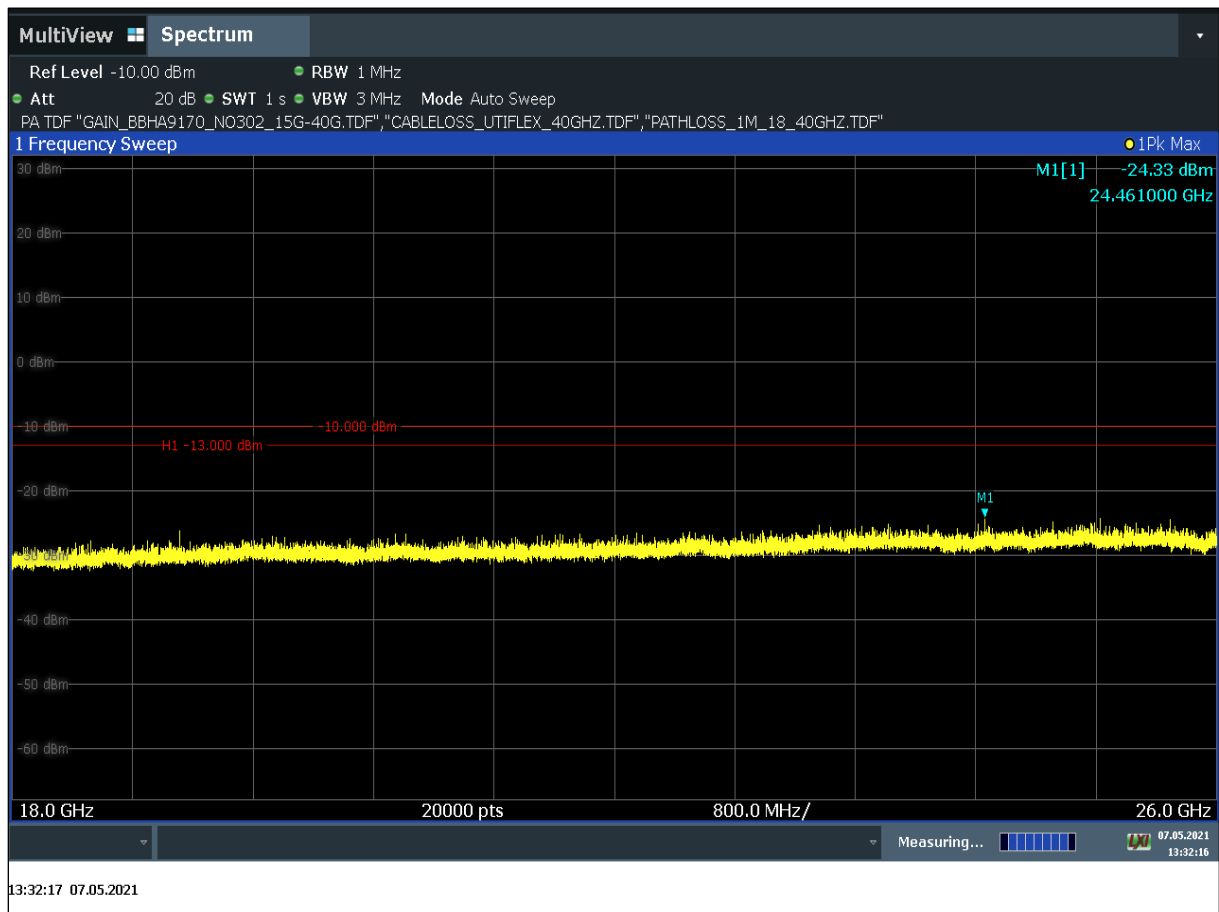
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2440 MHz is the WLAN 2.4 GHz carrier and peak at 1849 MHz is the GSM1900 carrier

8.03b_Simultaneous_mode_GSM1900_WLAN 2G4_Operation mode_2



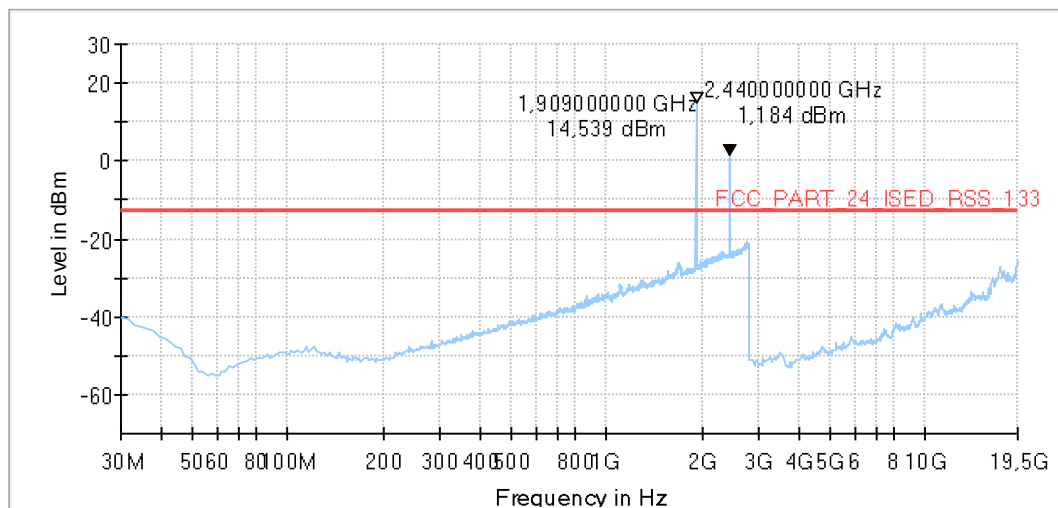
8.04a_Simultaneous_mode_GSM1900_WLAN 2G4_Operation mode_2

Common Information

Test Description:	Radiated emission related to 3m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
EUT:	
Manufacturer:	
Operating Mode:	GSM 1900_CH:810 Channel:Low(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13
Operator:	WAbdellatif
Comment:	--
Environmental Conditions:	Humidity : 35%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

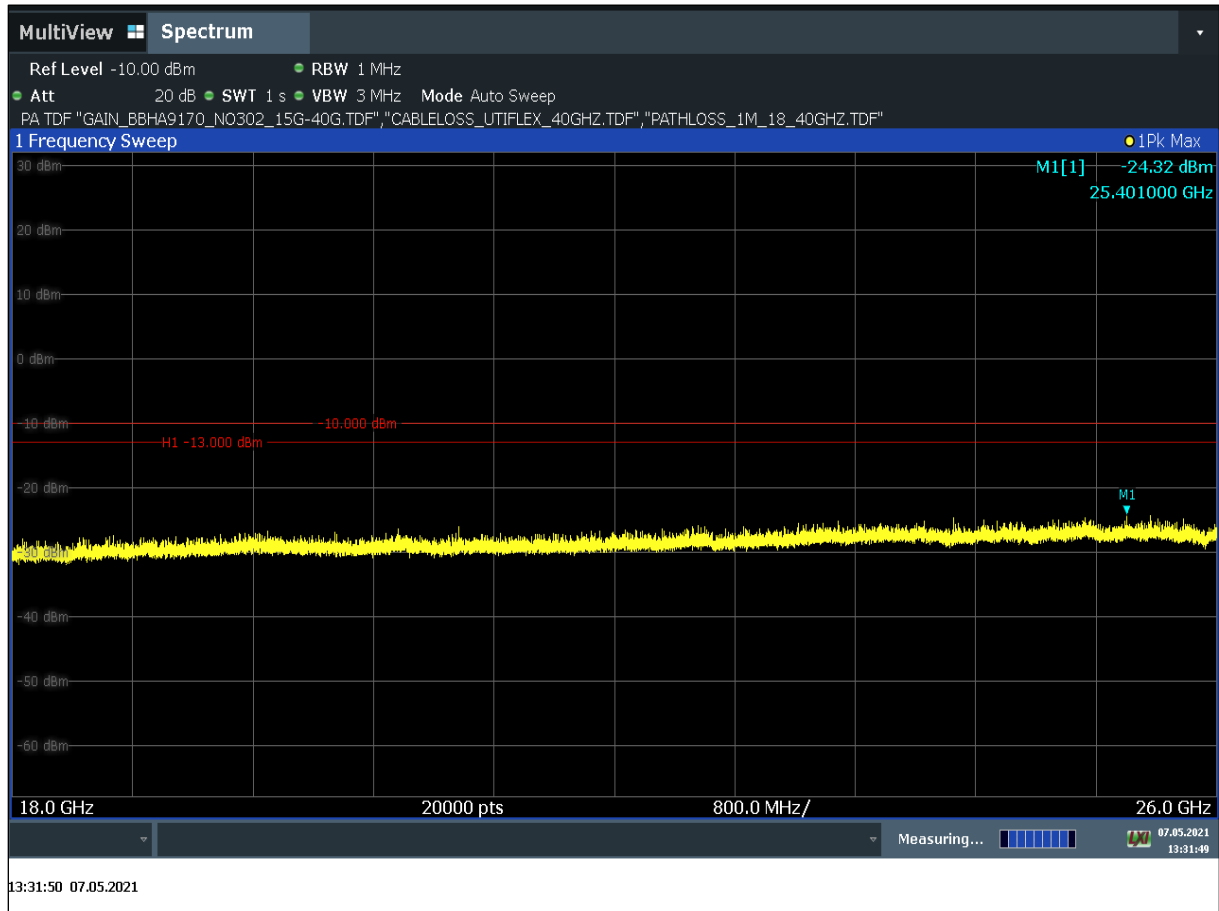
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2440 MHz is the WLAN 2.4 GHz carrier and peak at 1909 MHz is the GSM1900 carrier

8.04b_Simultaneous_mode_GSM1900_WLAN 2G4_Operation mode_2



1.2 WCDMA + Wifi 2.4GHz

8.05a_Simultaneous_mode_UMTS_FDDIV_WLAN 2G4_Operation mode_3

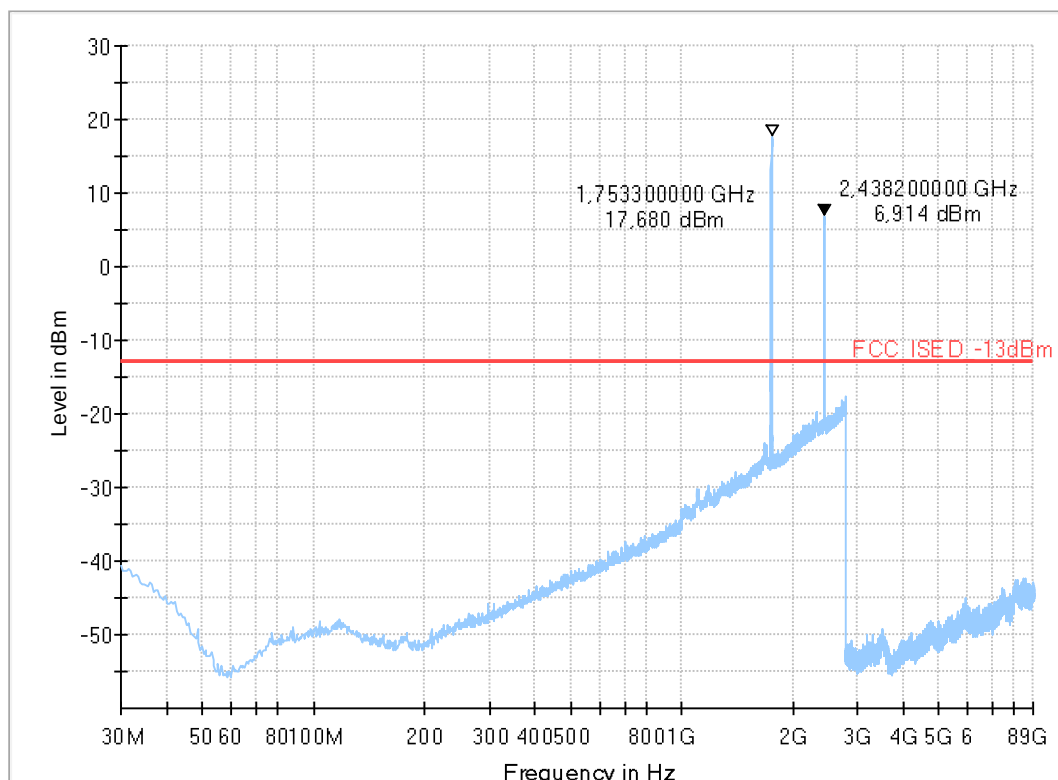
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	UMTS_ Band:4 \ Channel: low(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13 ext Ant
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

Full Spectrum



Remark: Peak at 2438 MHz is the WLAN 2.4 GHz carrier and peak at 1753 MHz is the UMTS FDD IV carrier

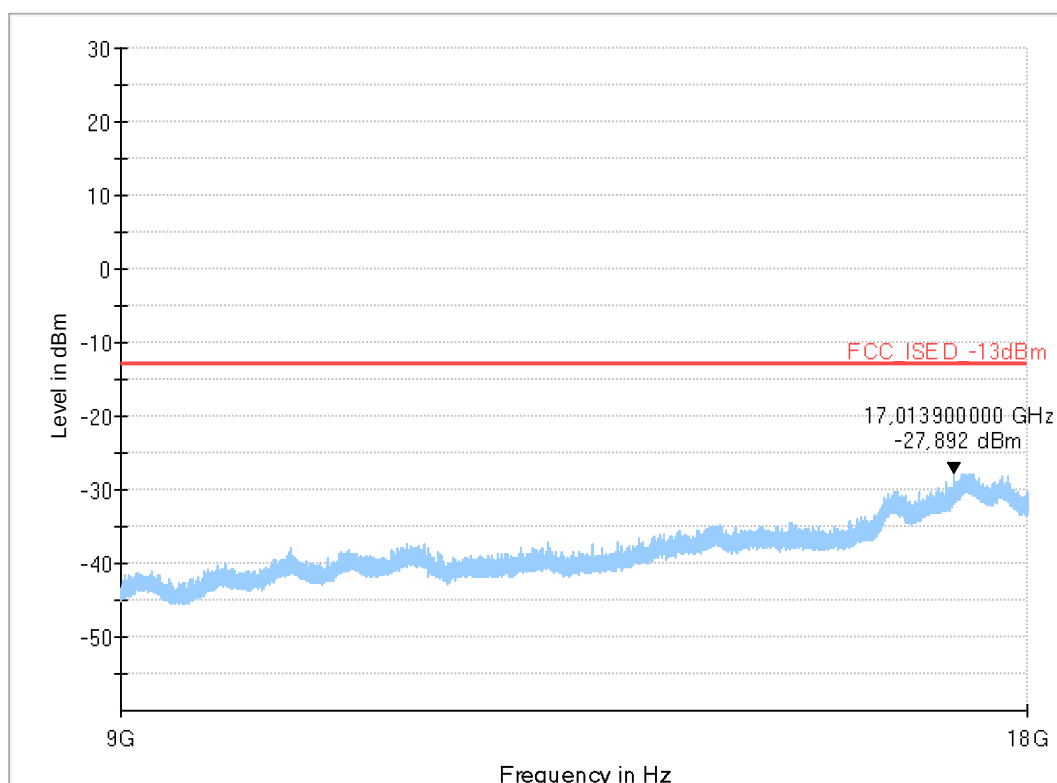
8.05b_Simultaneous_mode_UMTS_FDDIV_WLAN 2G4_Operation mode_3

Common Information

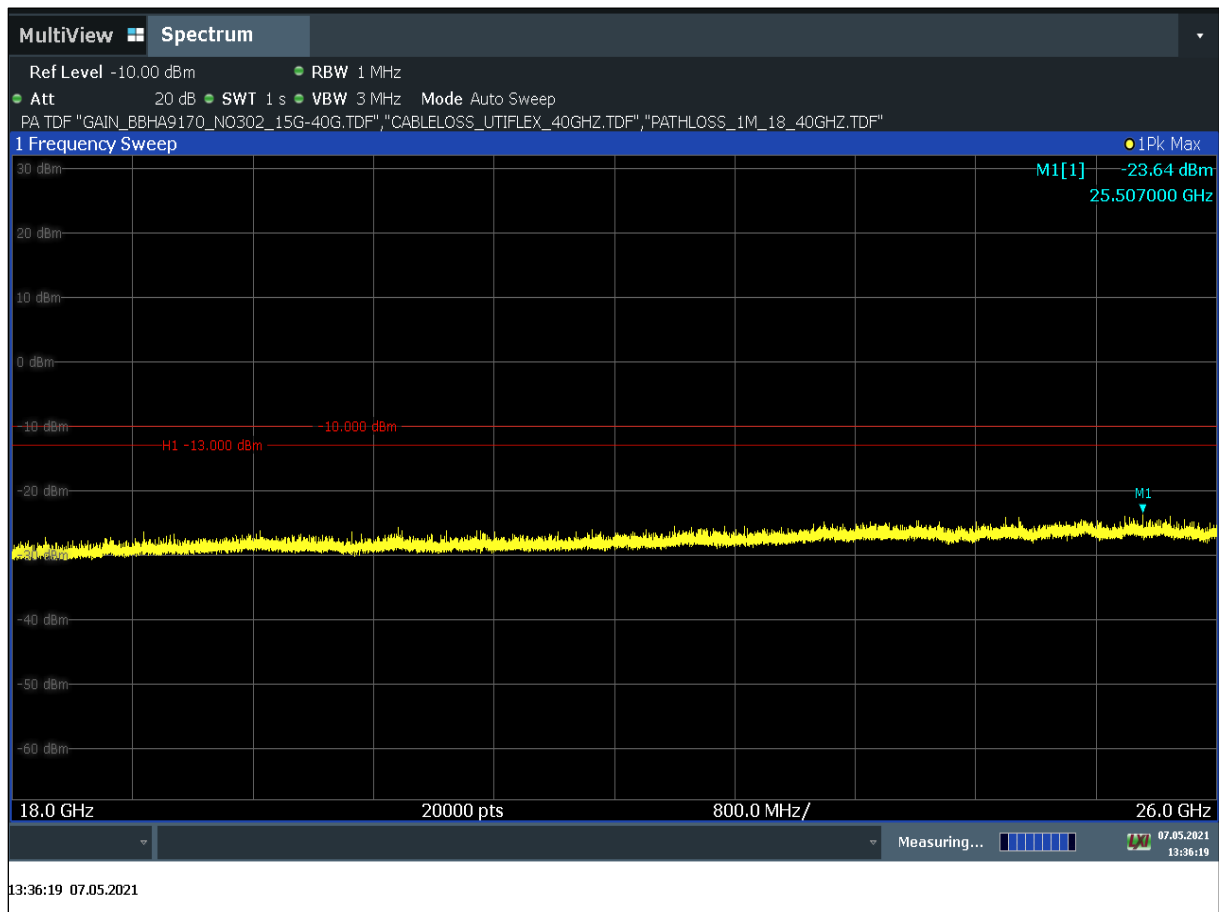
Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	UMTS FDD4 ch 1512 Channel:(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13 ext Ant
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



8.05c_Simultaneous_mode_UMTS_FDDIV_WLAN 2G4_Operation mode_3



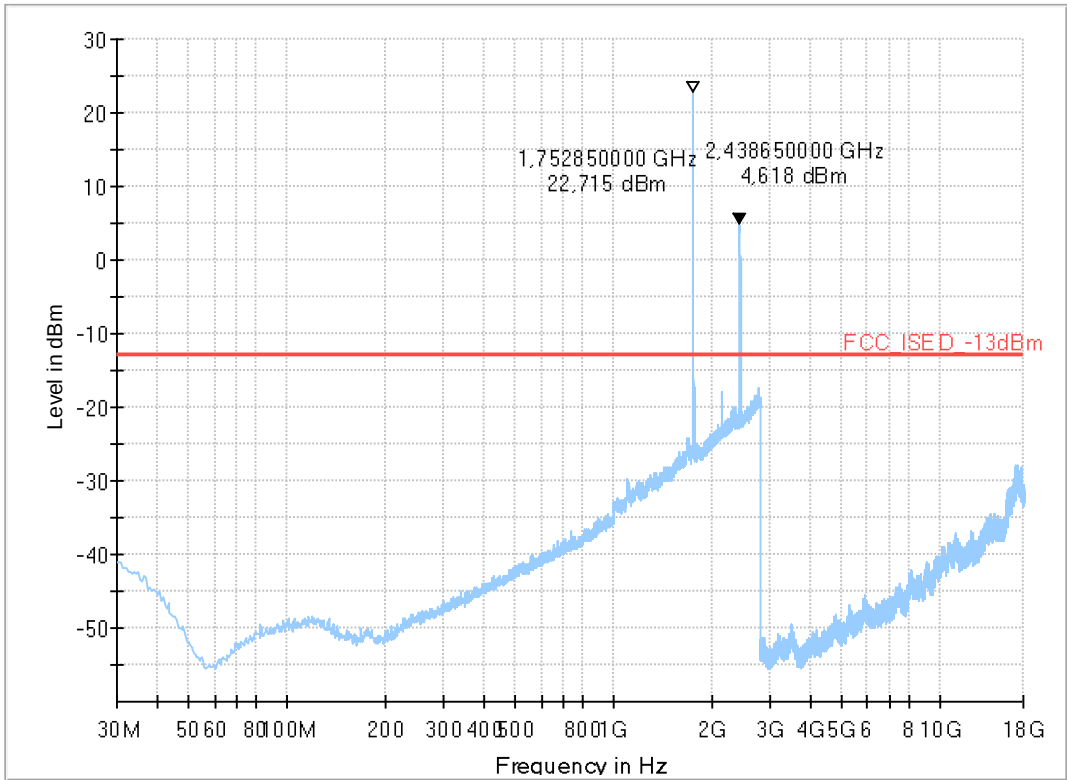
8.06a_Simultaneous_mode_UMTS_FDDIV_WLAN 2G4_Operation mode_3

Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	UMTS_FDDIV_CH:1512 Channel:Low(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13
Operator:	WAbdellatif
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

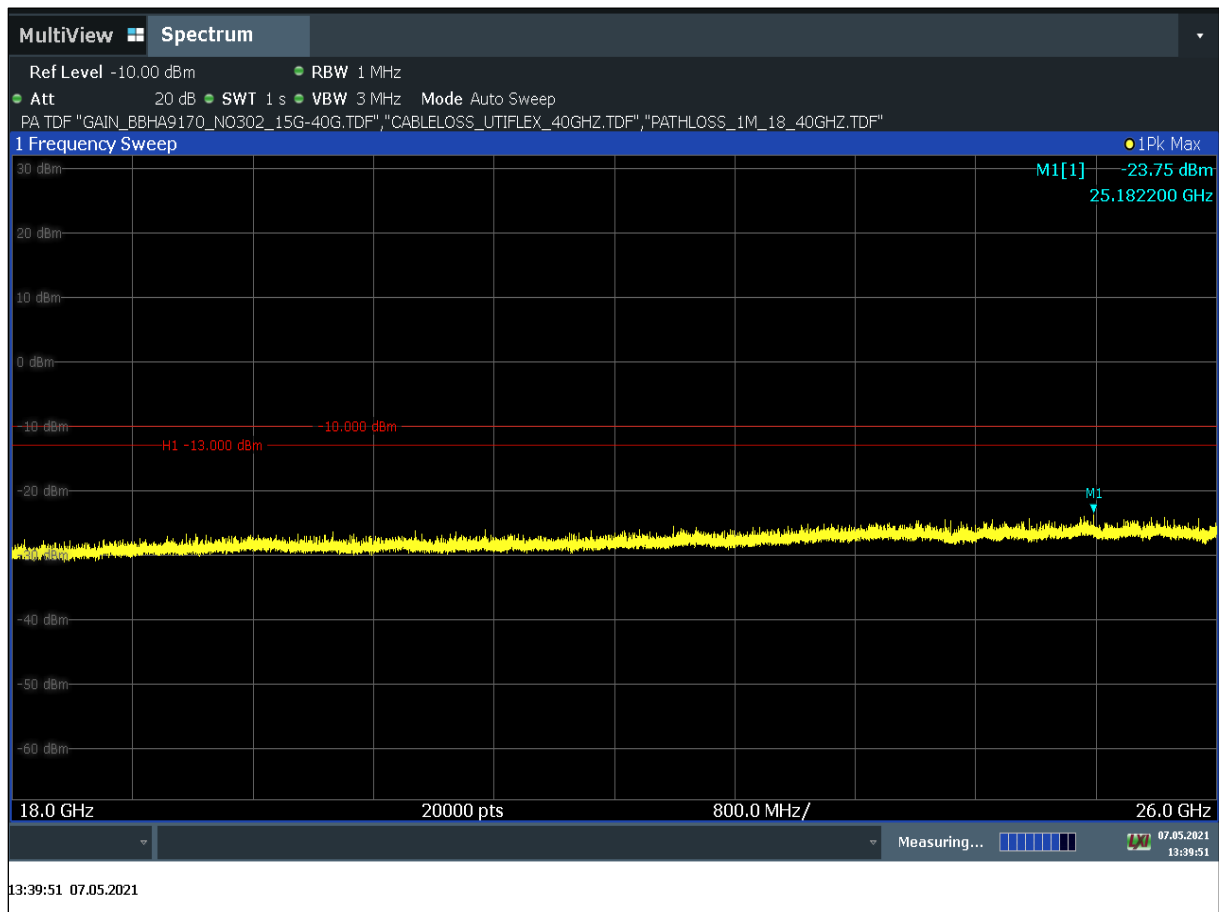
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2439 MHz is the WLAN 2.4 GHz carrier and peak at 1753 MHz is the UMTS FDD IV carrier

8.06b_Simultaneous_mode_UMTS_FDDIV_WLAN 2G4_Operation mode_3



1.3 LTE Wifi 2.4GHz

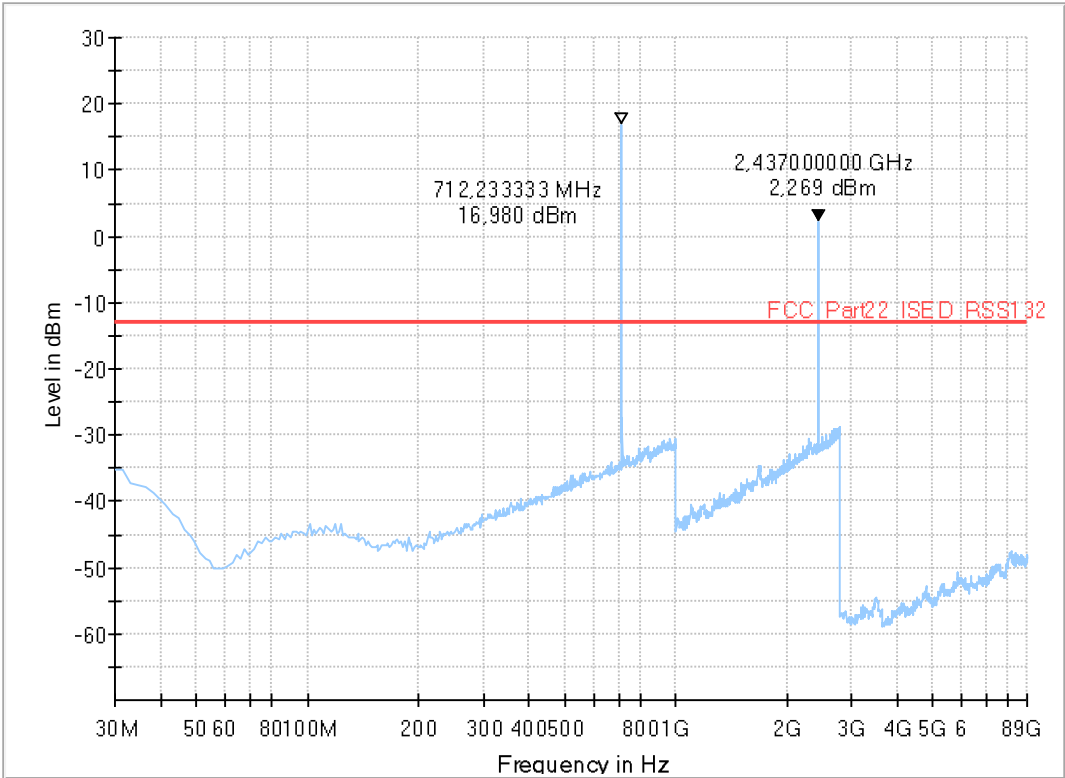
8.07a_Simultaneous_mode_LTE_FDD_Band 12_WLAN
2G4_Operation mode_4

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
EUT:	
Manufacturer:	
Operating Mode:	LTE FDD12 ch23155 Channel:(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13 ext Ant
Operator:	HEI
Comment:	
Environmental Conditions::	Humidity : 38%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2437 MHz is the WLAN 2.4 GHz carrier and peak at 712 MHz is the LTE FDD 12 carrier

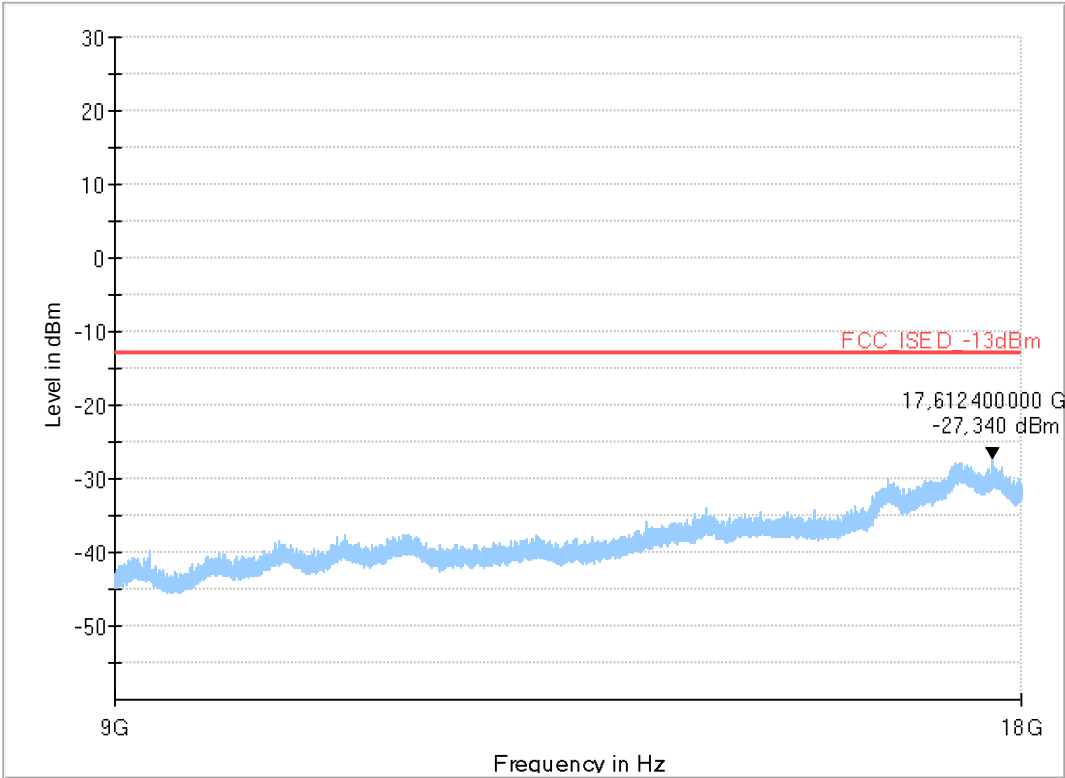
8.07b_Simultaneous_mode_LTE_FDD_Band 12_WLAN 2G4_Operation mode_4

Common Information

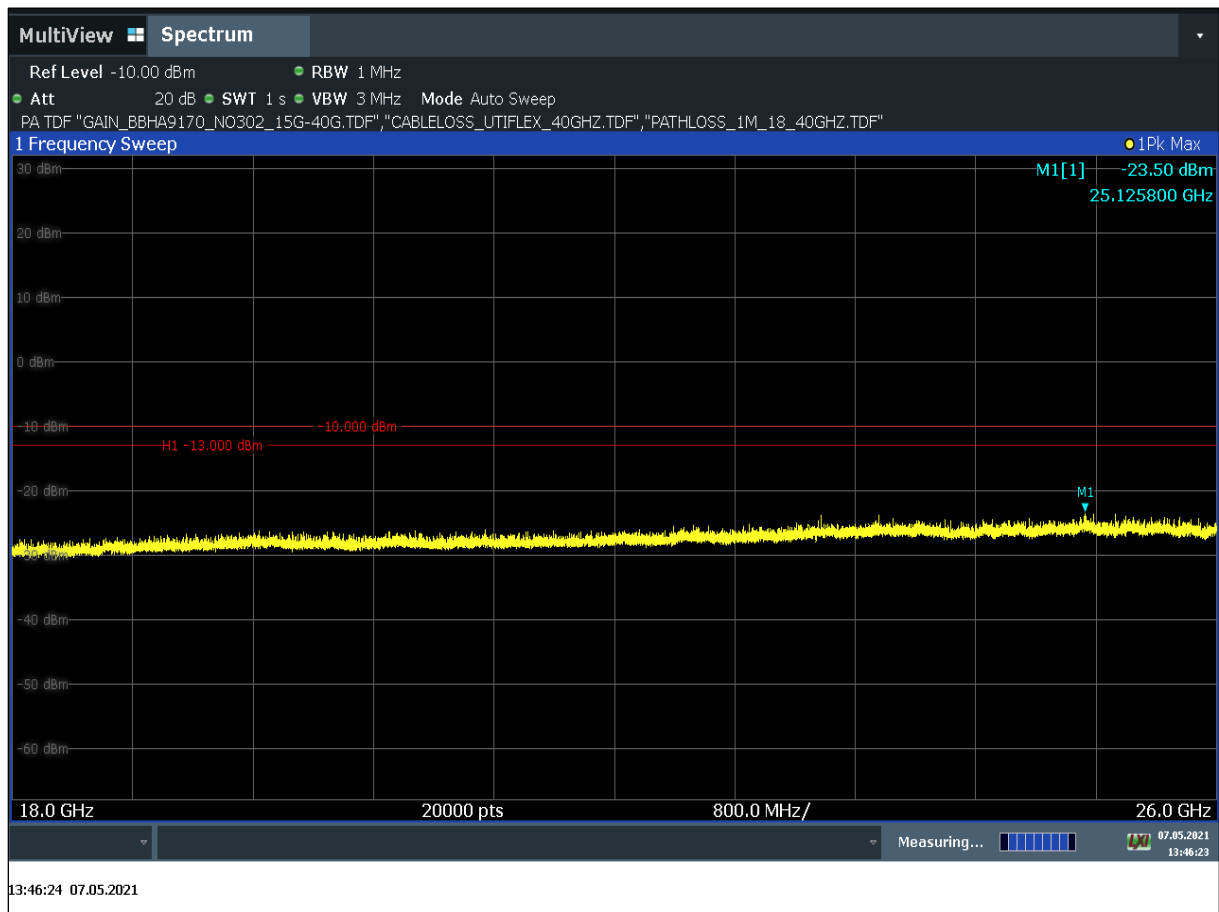
Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	LTE FDD12 ch23155 Channel:(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13 ext Ant
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



8.07c_Simultaneous_mode_LTE_FDD_Band 12_WLAN 2G4_Operation mode_4



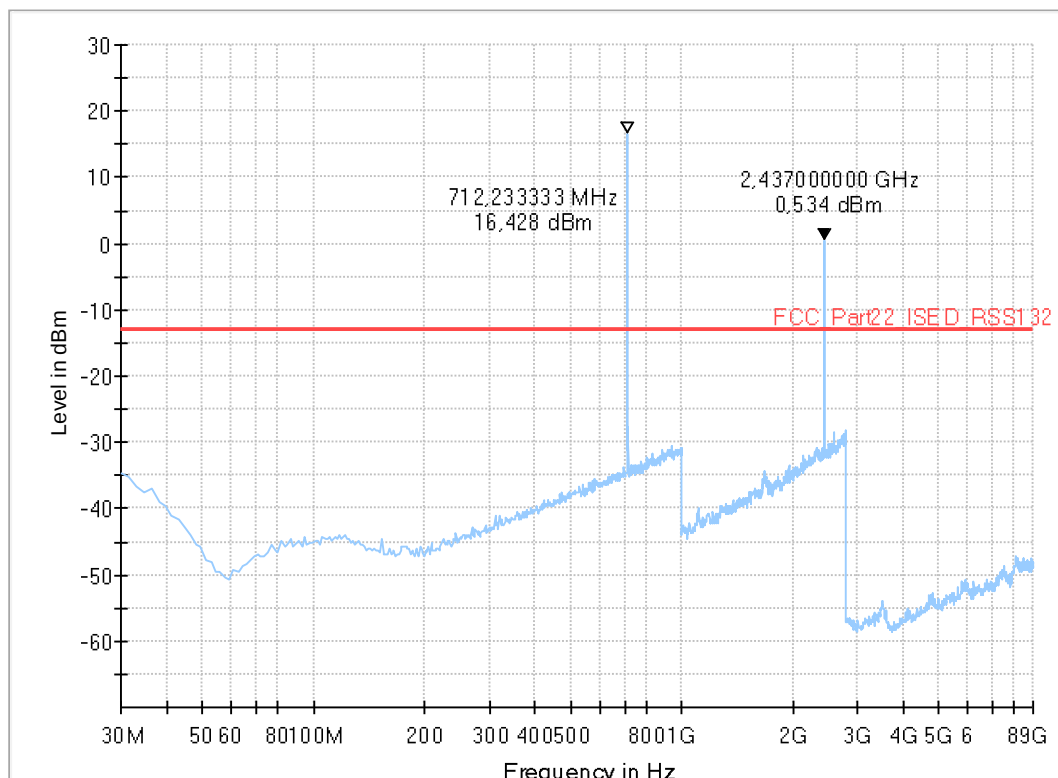
8.08a_Simultaneous_mode_LTE_FDD_Band 12_WLAN 2G4_Operation mode_4

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Manufacturer:	
Operating Mode:	LTE FDD12_Ch:23155_BW.5MHz Channel:Low(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13
Operator:	HEI
Comment:	
Environmental Conditions:	Humidity : 40%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2437 MHz is the WLAN 2.4 GHz carrier and peak at 712 MHz is the LTE FDD 12 carrier

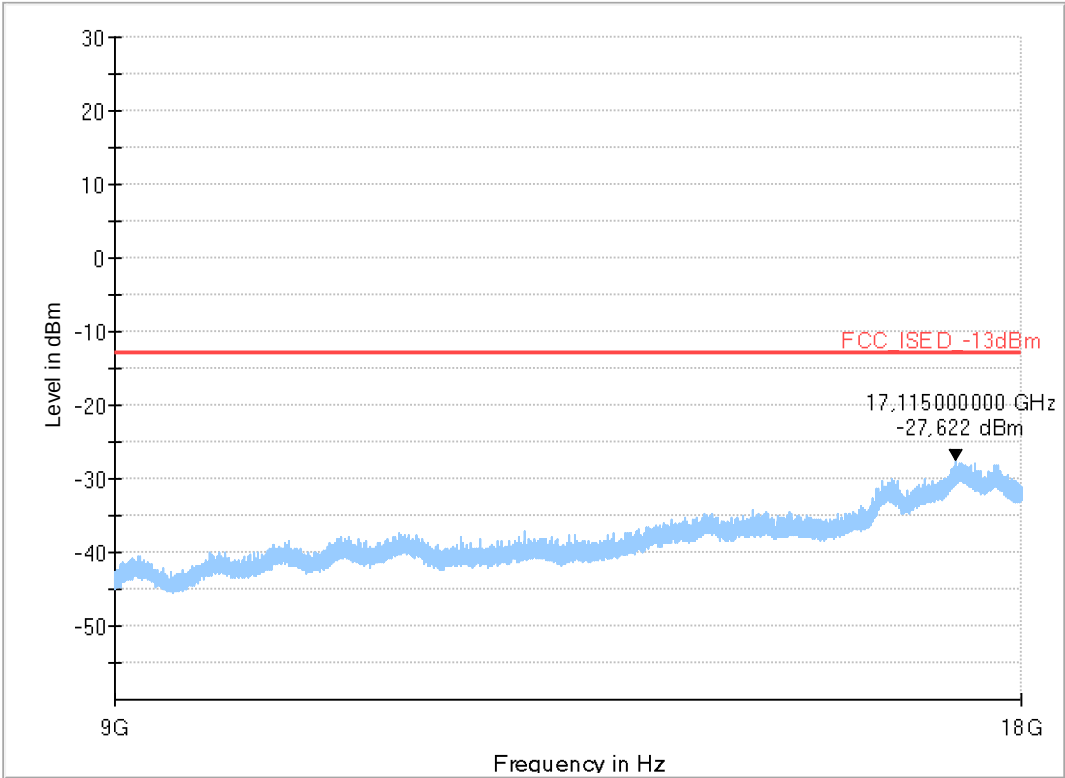
8.08b_Simultaneous_mode_LTE_FDD_Band 12_WLAN 2G4_Operation mode_4

Common Information

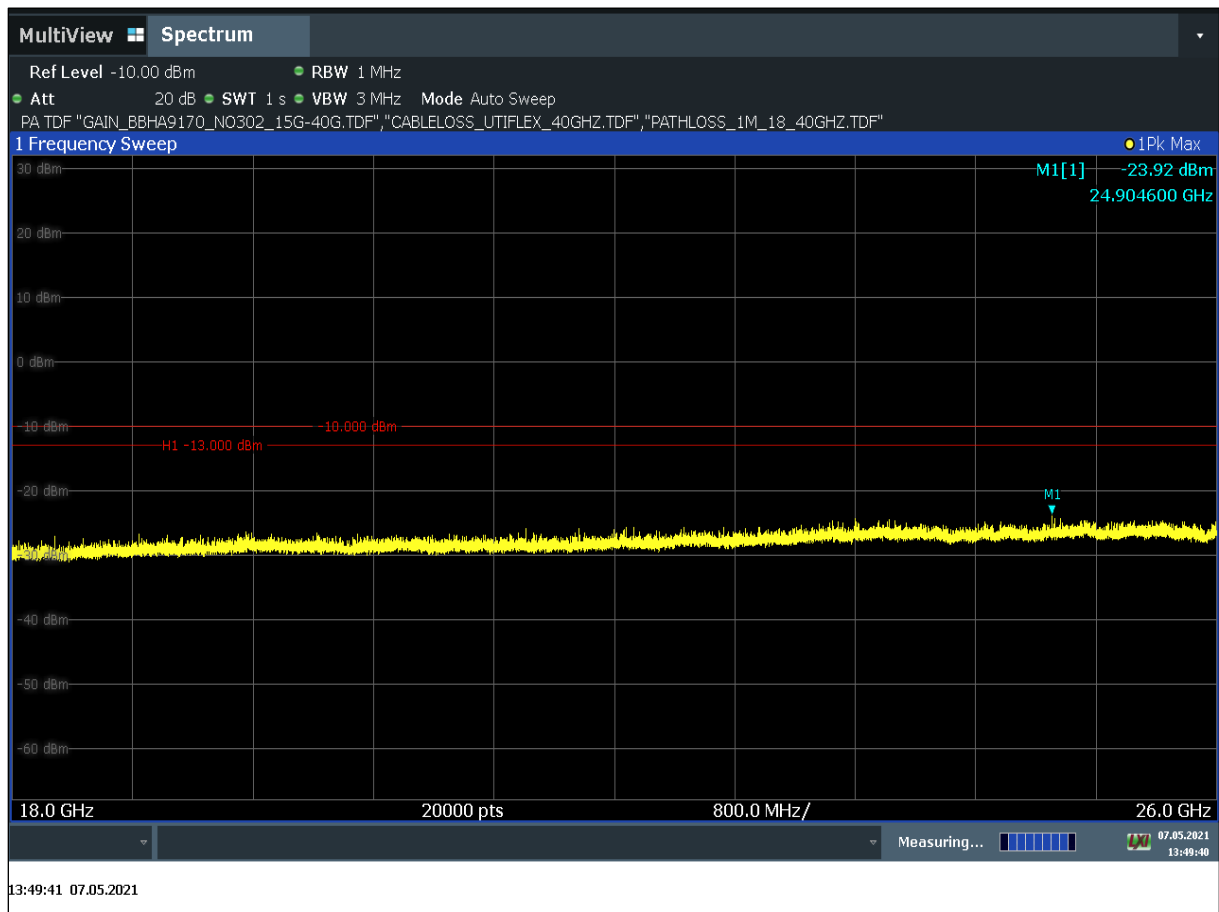
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Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	LTE FDD12_Ch:23155_BW.5MHz Channel:Low(6), 2437 MHz, 1 Mbps, 20 MHz, b-mode, pwr=13
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



8.08c_Simultaneous_mode_LTE_FDD_Band 12_WLAN 2G4_Operation mode_4



1.4 GSM+ Wifi 5GHz

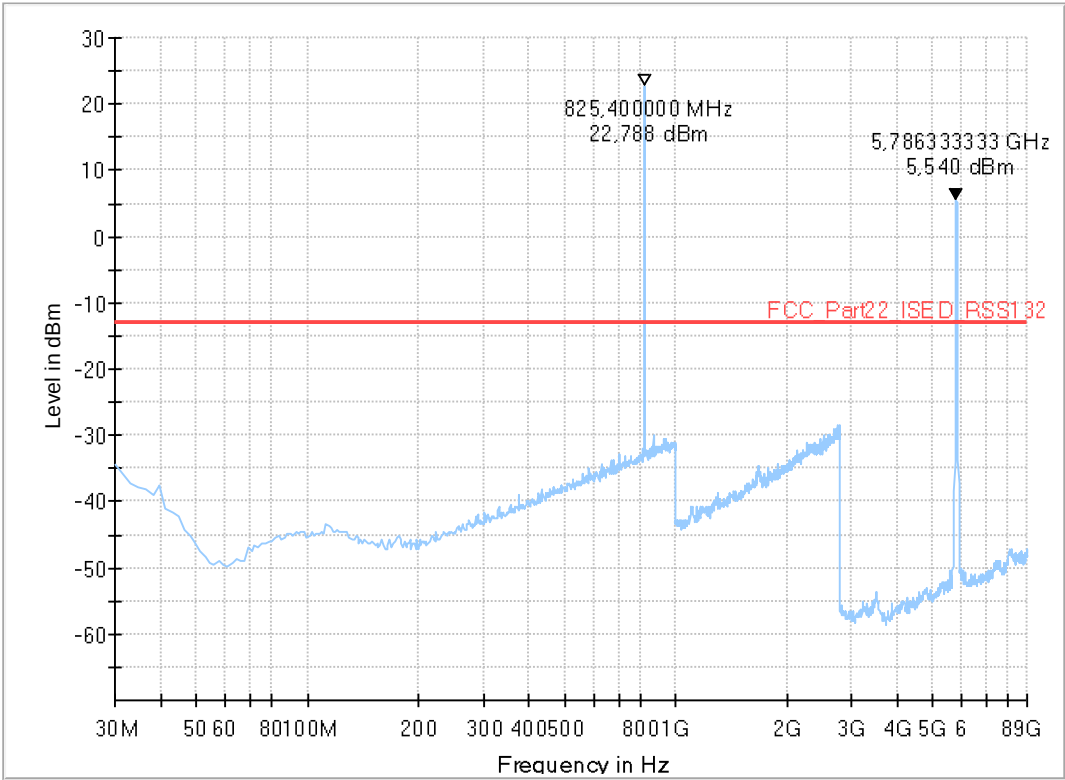
8.09a_simul_GSM850_WLAN5G_standing

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operating Mode:	GSM 850_CH:128\ WLAN 5GHz_CH:159_BW:40_MCS0_PWR:17
Operator:	HEI
Comment:	
Environmental Conditions::	Humidity : 38%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 5786 MHz is the WLAN 5 GHz carrier and peak at 825 MHz is the GSM850 carrier

8.09b_simul_GSM850_WLAN5G_standing

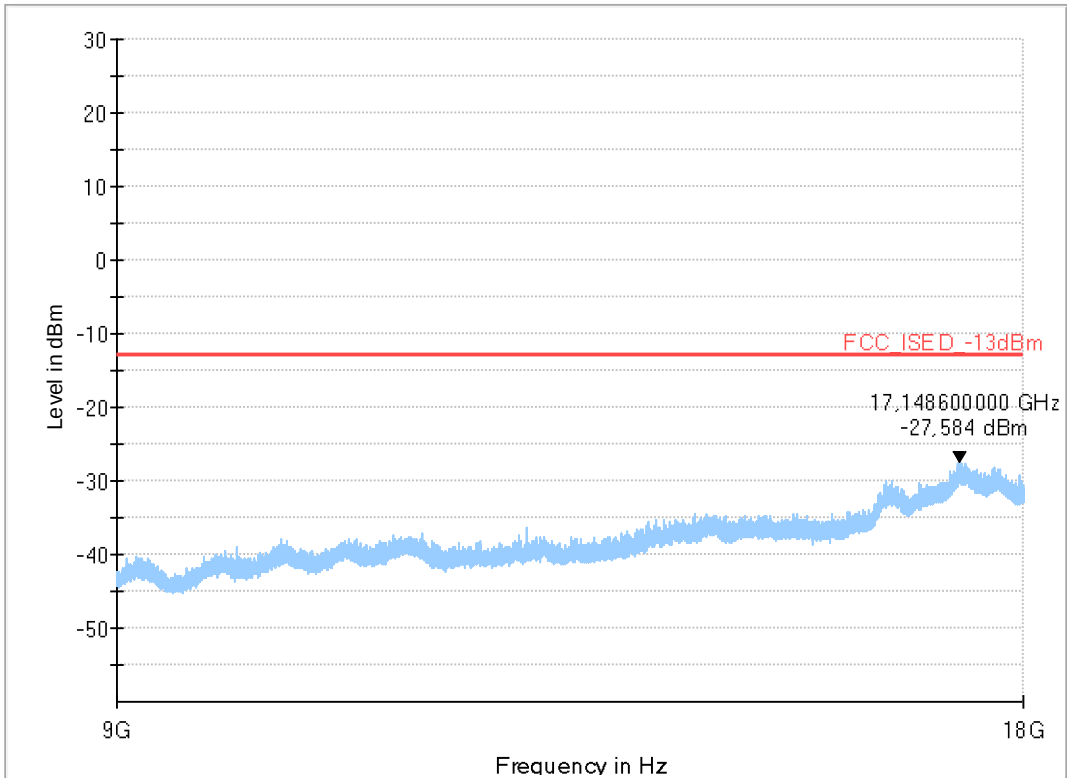
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	GSM 850_CH:128_BT classic_CH:39
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Inconclusive

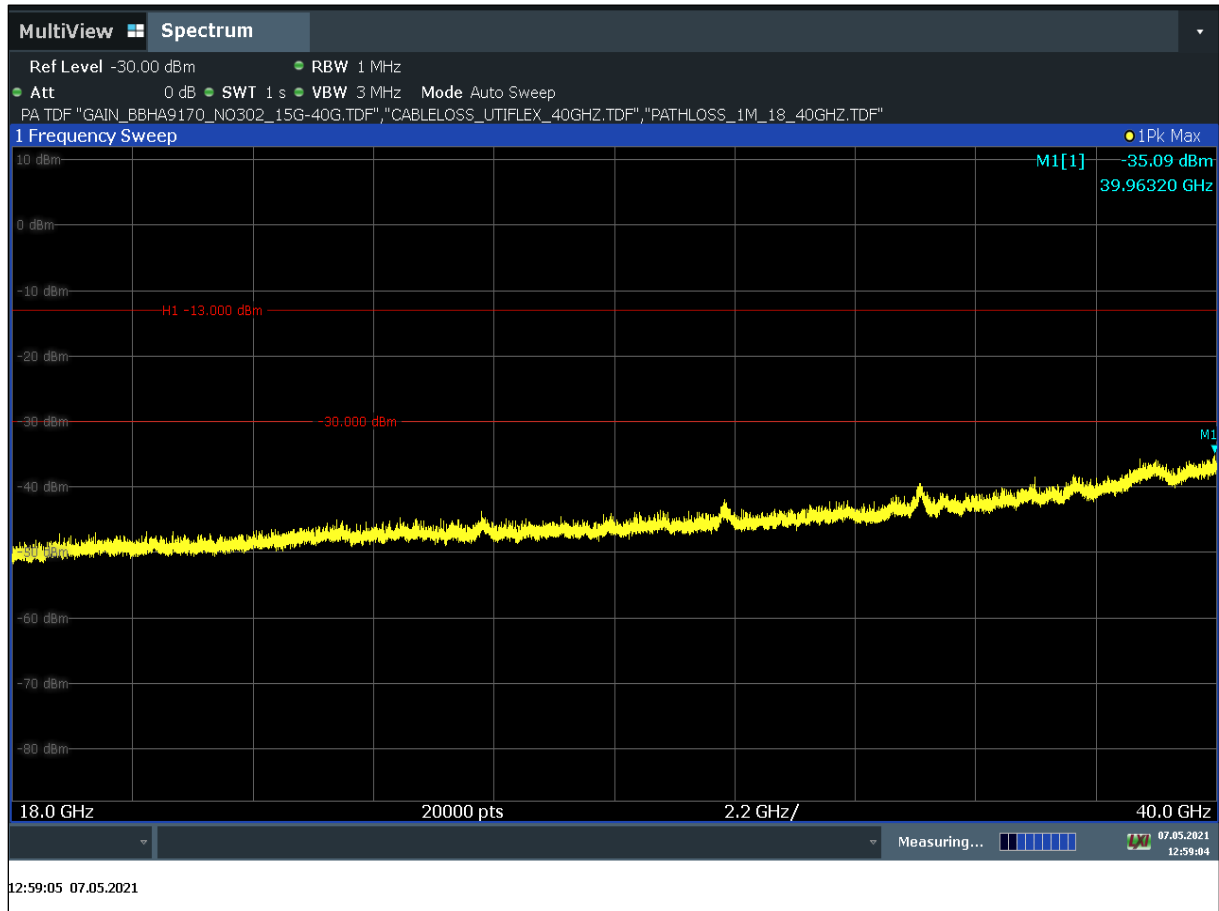
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

Full Spectrum



8.09c_simul_GSM850_WLAN5G_standing



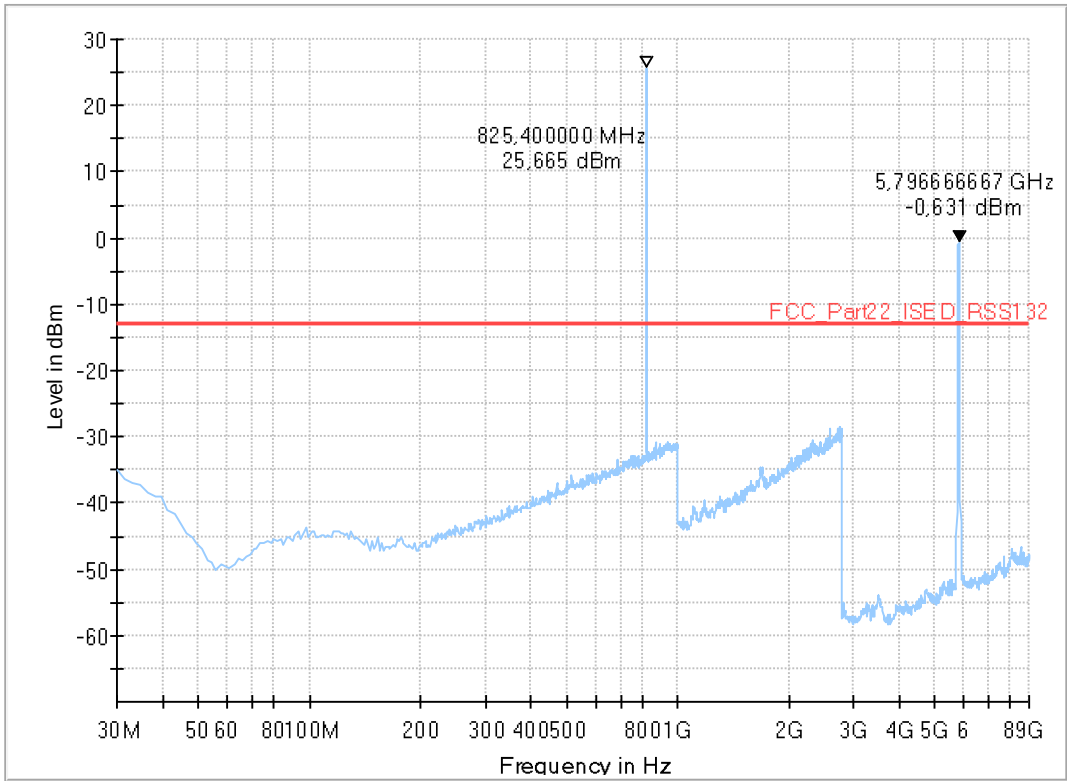
8.10a_simul_GSM850_WLAN5G_laying

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operating Mode:	GSM 850_CH:128\ WLAN 5GHz_CH:159_BW:40_MCS0_PWR:17
Operator:	HEI
Comment:	
Environmental Conditions::	Humidity : 38%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 5797 MHz is the WLAN 5 GHz carrier and peak at 825 MHz is the GSM850 carrier

8.10b_simul_GSM850_WLAN5G_laying

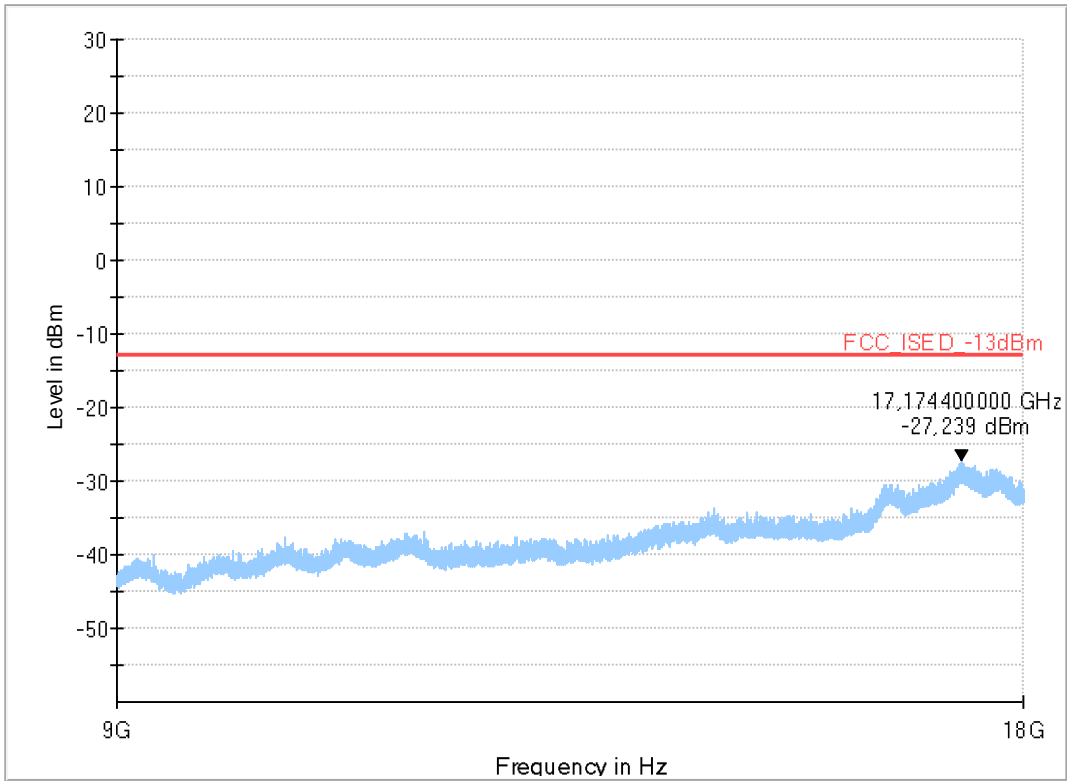
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	GSM 850_CH:128\ WLAN 5GHz_CH:159_BW:40_MCS0_PWR:17
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

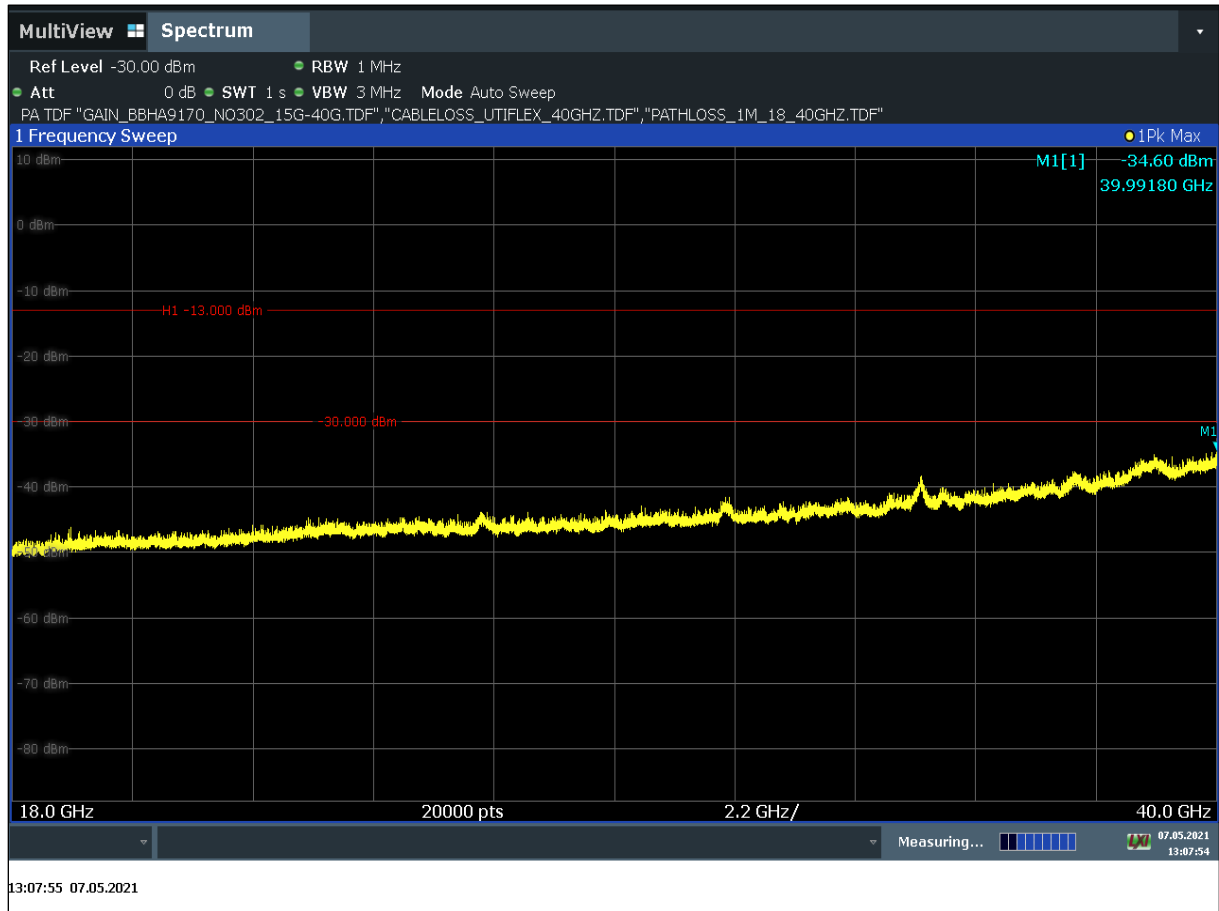
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

Full Spectrum



8.10c_simul_GSM850_WLAN5G_laying



1.5 GSM + BT

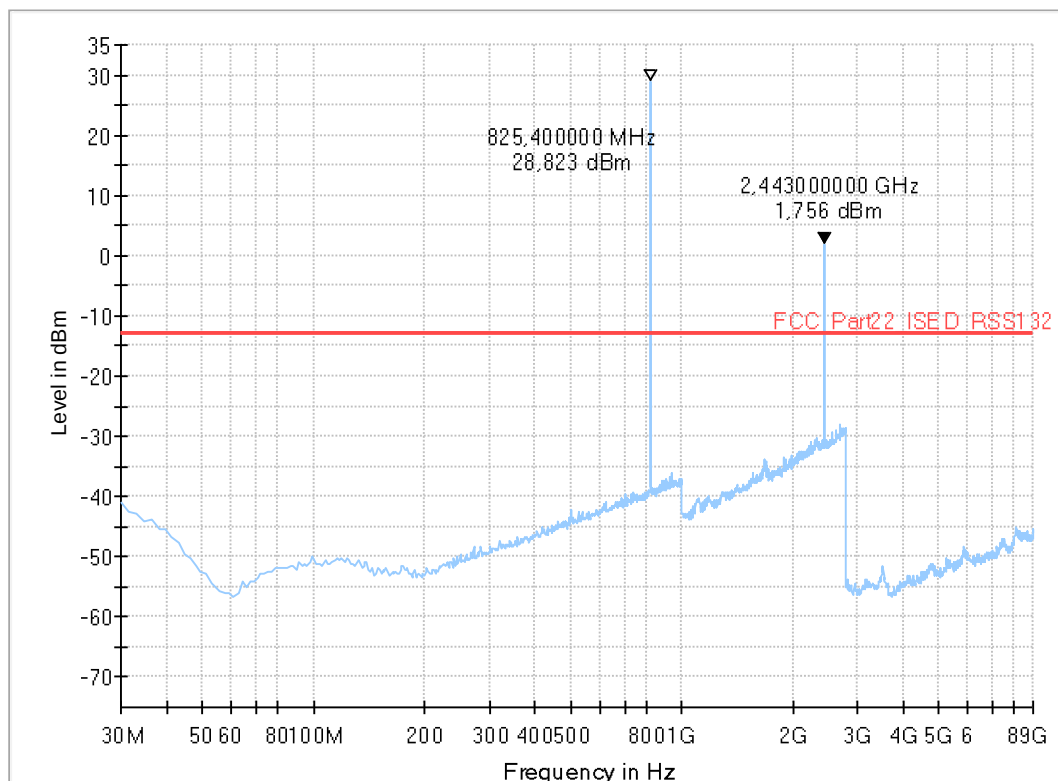
8.11a_simul_GSM850_BT_standing

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operating Mode:	GSM 850_BT_classic
Operator:	HEI
Comment:	
Environmental Conditions:	Humidity : 28%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2443 MHz is the BT carrier and peak at 825 MHz is the GSM850 carrier

8.11b_simul_GSM850_BT_standing

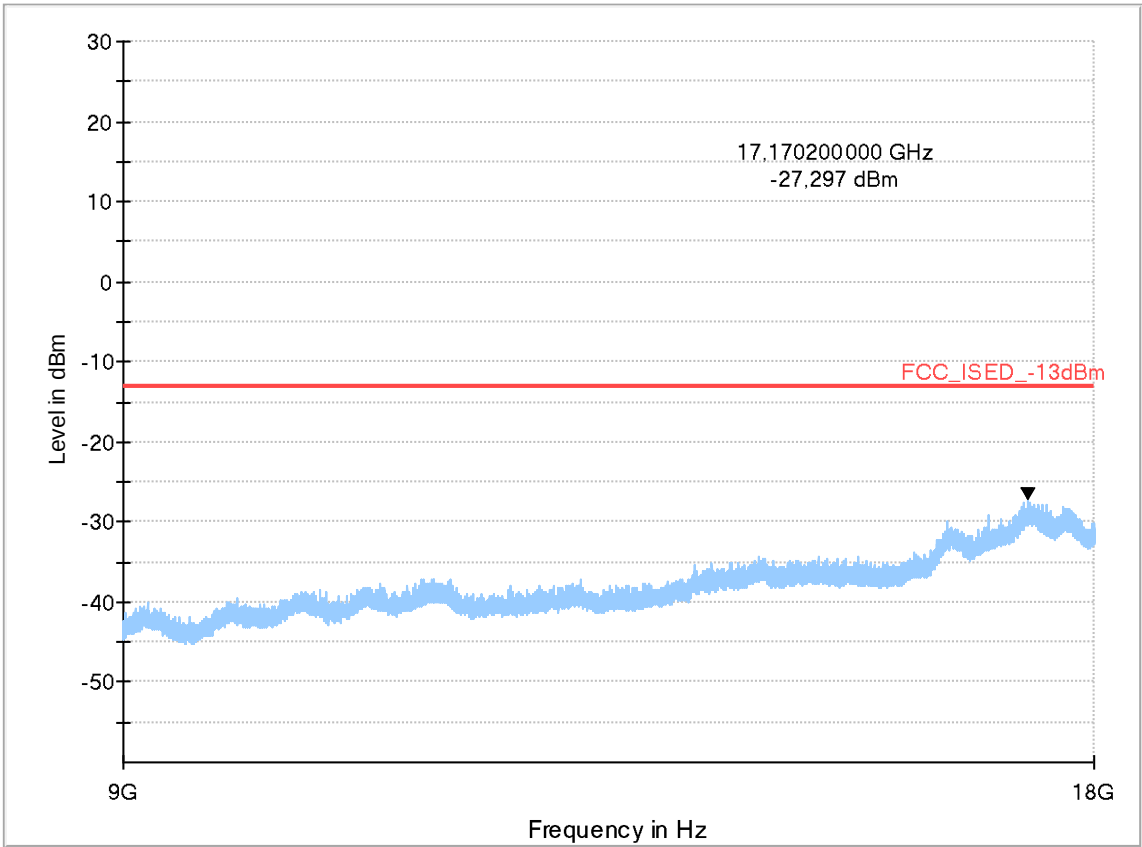
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	GSM 850_CH:128_BT classic_CH:39
Operator:	HEI
Environmental Conditions::	Humidity : 28%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

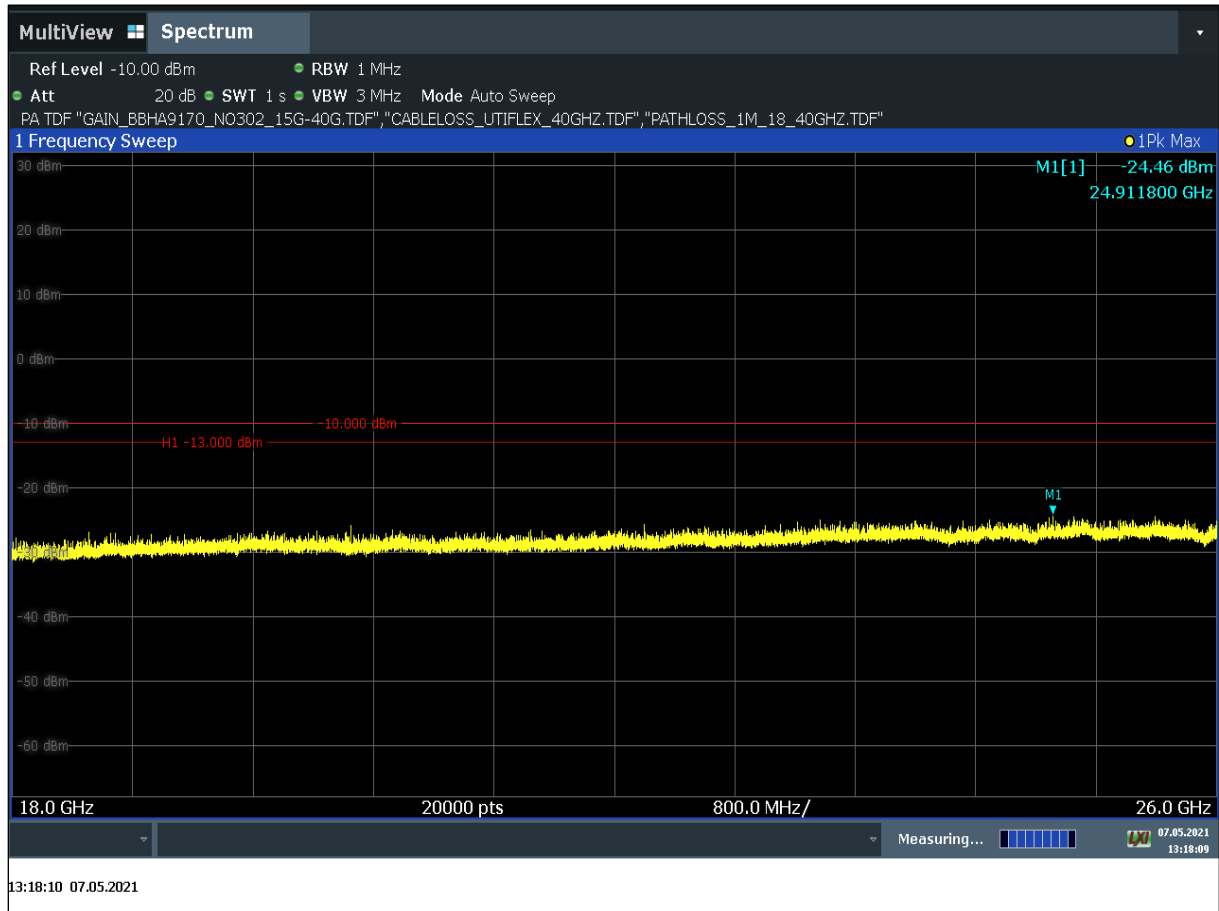
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

Full Spectrum



8.11c_simul_GSM850_BT_standing



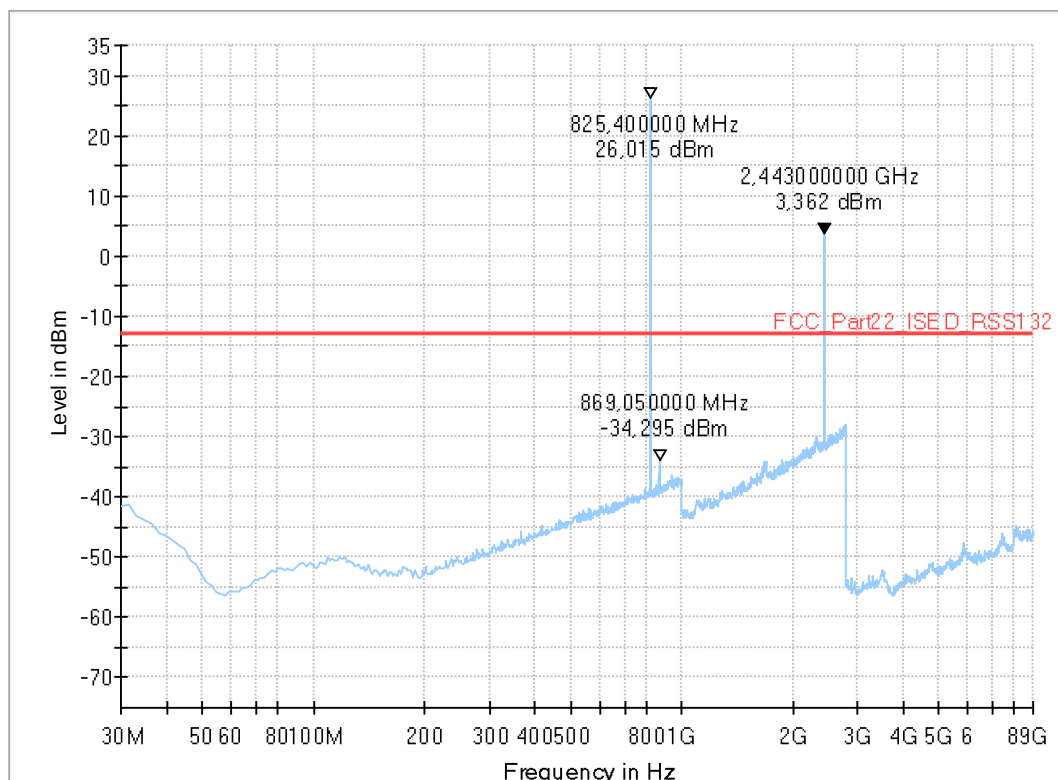
8.12a_simul_GSM850_BT_laying

Common Information

Test Description:	Radiated emission related to 1m
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC FCC Part 24.238 Broadband PCS
Antenna polarisation:	vertical / horizontal
Operating Mode:	GSM 850_BT_classic
Operator:	HEI
Comment:	
Environmental Conditions:	Humidity : 38%rH; Temperature: 18°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB
	Full Spectrum



Remark: Peak at 2443 MHz is the BT carrier and peak at 825 MHz is the GSM850 carrier

8.12b_simul_GSM850_BT_laying

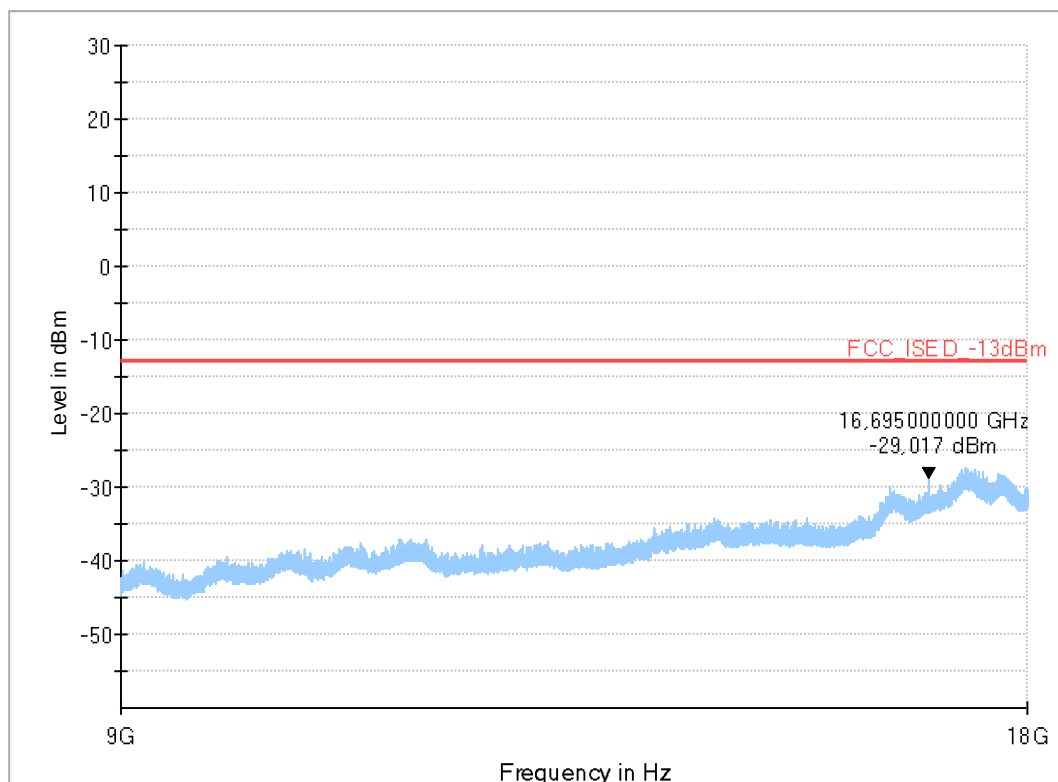
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Chamber
Test Standard:	FCC FCC Part 27.53(h) AWS emission limits / RSS-139, Issue 3
Antenna polarisation:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	GSM 850_CH:128_BT classic_CH:39
Operator:	HEI
Comment:	Environmental Conditions:
EUT Setup:	1
Verdict:	Passed

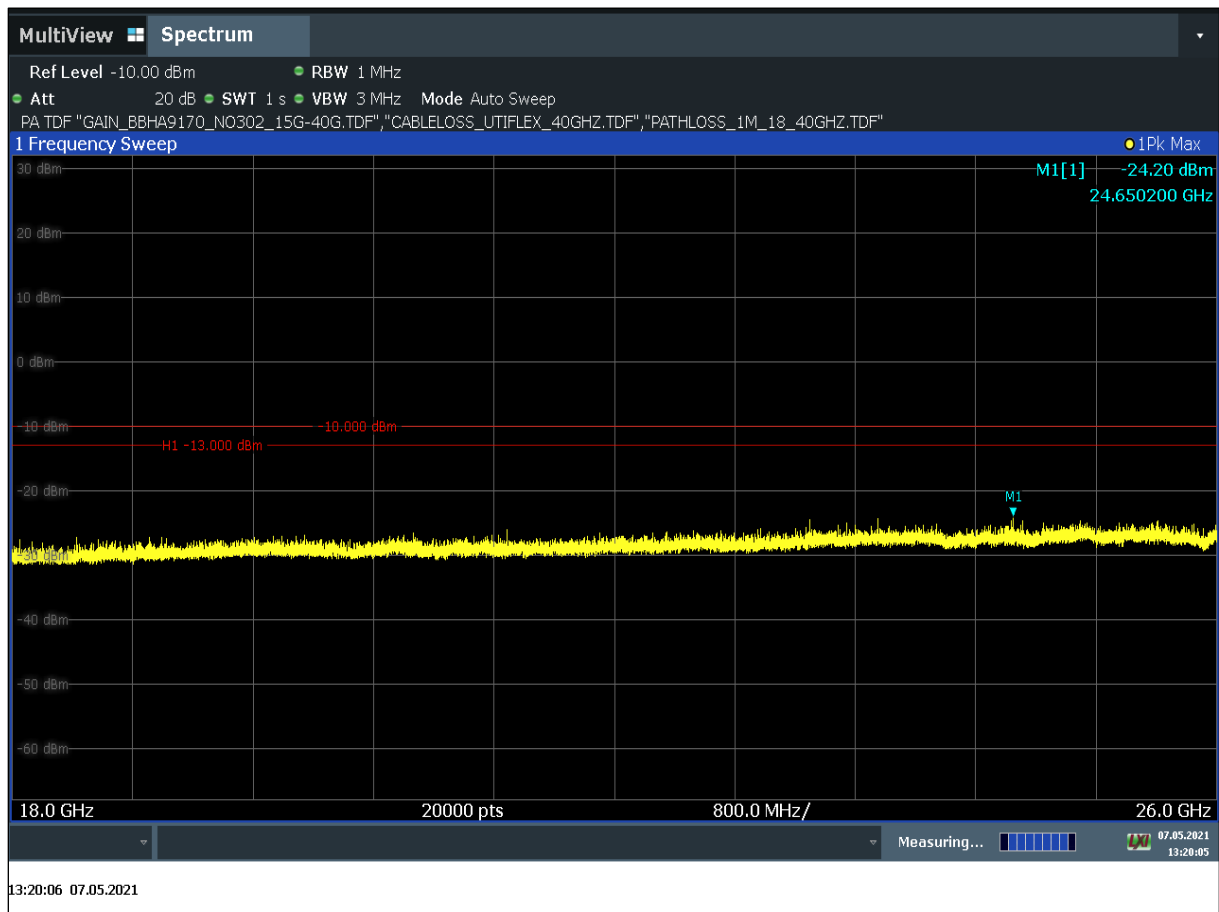
EUT Information

PMT number:	18-1-00972S20_C02
Manufacturer:	ACTIA Nordic AB

Full Spectrum



8.12c_simul_GSM850_BT_laying



End Of Annex 1