

Annex 1: Measurement diagrams to
PARTIAL TEST REPORT
No.: 18-1-0097201T20a_C01

According to:
Title 47 CFR, Chapter I
FCC Regulations, Subchapter B
Part 27

ISED-Regulations
RSS-139 Issue 3, RSS-Gen Issue 5

for
Actia Nordic AB

103360002
Telematics Device

FCC-ID: 2AGKK103360002
ISED-ID: 20839-103360002

Laboratory Accreditation
  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. Conducted Power Verification.....	3
1.2. Magnetic field emissions radiated (UMTS_Band 4)	4
1.3. Spurious emissions radiated (UMTS_Band 4).....	8
1.4. Radiated emissions on UMTS_Band(4) band-edge, EUT Internal Antenna	12
1.5. Radiated emissions on UMTS_Band(4) band-edge, EUT External Antenna	14

1. Measurement diagrams

1.1. Conducted Power Verification

EUT Information

Manufacturer:	Actia Nordic AB
Product:	103360002
Product type:	Telematics Device
SW version:	1
HW version:	H1
Serial number:	AN103350102B163
Power Supply:	13,8 V DC

RMC99 - FDD4				CETECOM tested RF Power(Conducted)	Certified Module RF Power(Conducted)
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	PAR Faktor [dB]	RMS detektor [dBm]	RMS detektor [dBm]
Channel 1313	1712.6	26.02	3.26	22.76	24.47
Channel 1450	1740	25.84	3.17	22.67	24.35
Channel 1512	1752.4	26.34	3.55	22.79	24.30

Remarks:

- Worst case found channel 1512, please see module report(link given below)
- https://apps.fcc.gov/oetcf/eas/reports/ViewExhibitReport.cfm?mode=Exhibits&RequestTimeout=500&calledFromFrame=N&application_id=4cojh4pk6awpR5yXDNKOGg%3D%3D&fcc_id=QIPALAS5V-US

1.2. Magnetic field emissions radiated (UMTS_Band 4)

2.01_Magnetic_Emission_EUT_laying

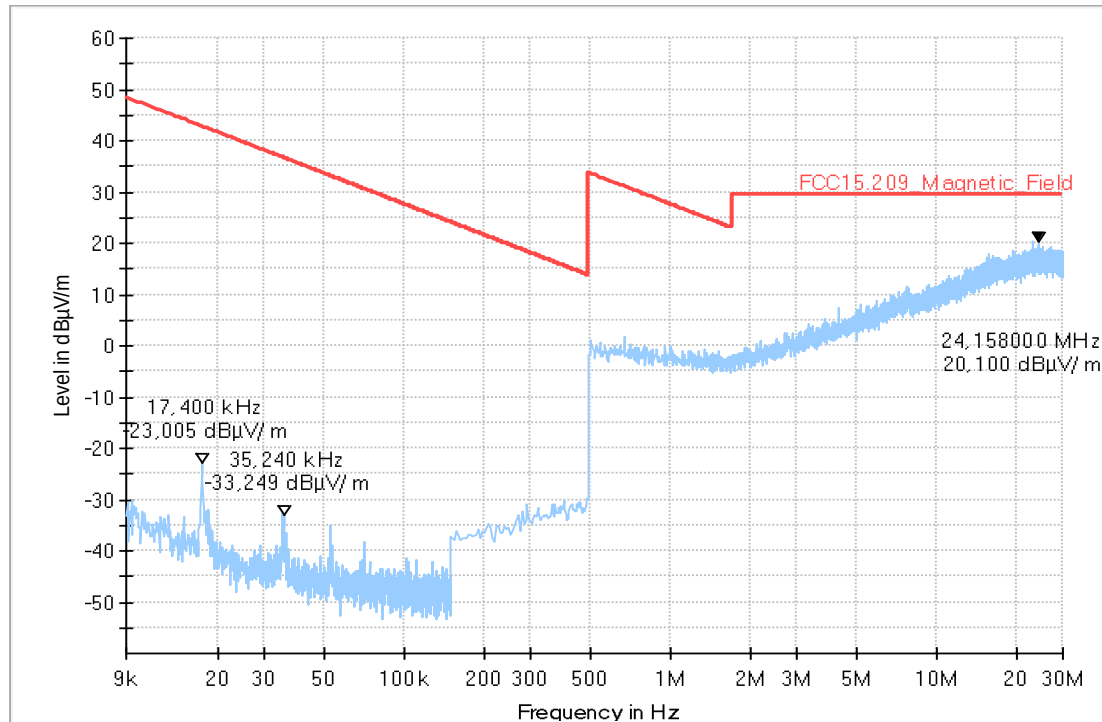
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Test software:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarization
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	LKu
Operating Mode:	UMTS Band 4
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Environmental Conditions::	Humidity : 41%rH; Temperature: 20°C
EUT Setup:	laying
Verdict:	Passed
Comment:	Internal Antenna

EUT Information

PMT number:	18-1-00972S20
Manufacturer:	ACTIA Nordic AB
Product:	103360002
Model:	Telematics Device
HW version:	H1
SW version:	1
Serial number:	AN103350102B160
Power Supply:	13,8V DC

Full Spectrum



2.02_Magnetic_Emission_EUT_standing

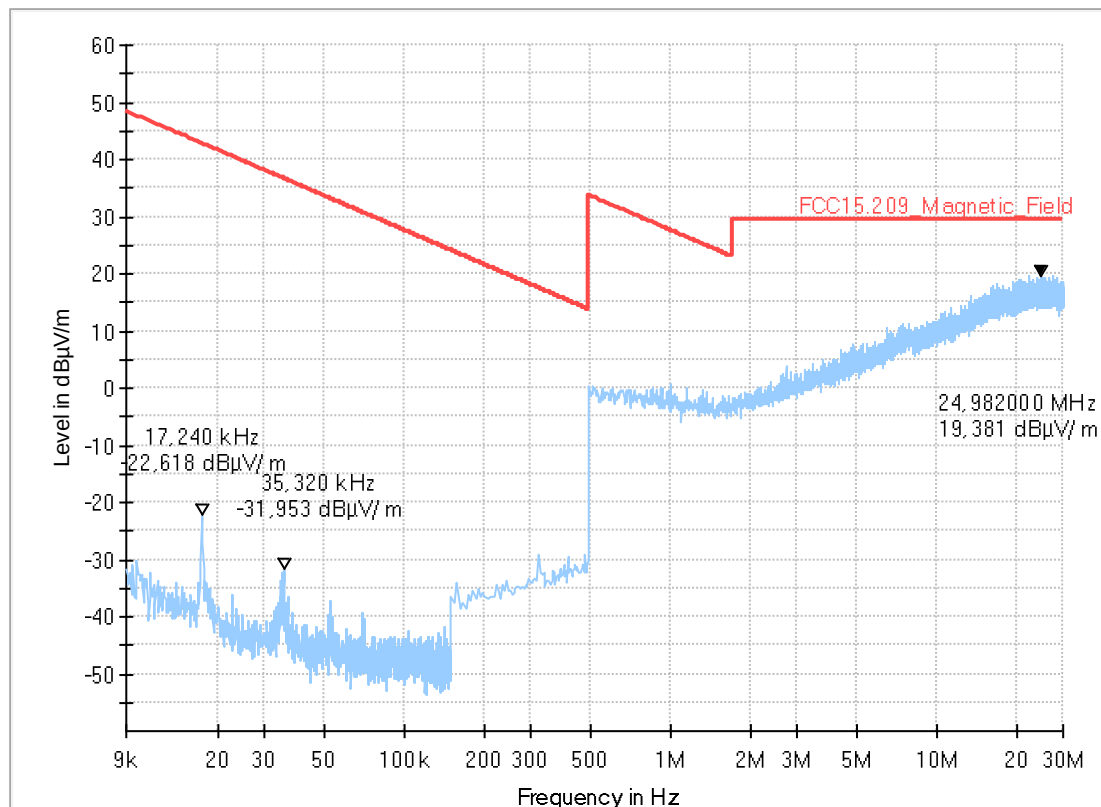
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Test software:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarization
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	LKu
Operating Mode:	UMTS Band 4
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Environmental Conditions::	Humidity : 39%rH; Temperature: 21°C
EUT Setup:	standing
Verdict:	Passed
Comment:	Internal Antenna

EUT Information

please see the Diagram 2.01

Full Spectrum



2.03_Magnetic_Emission_EUT_laying

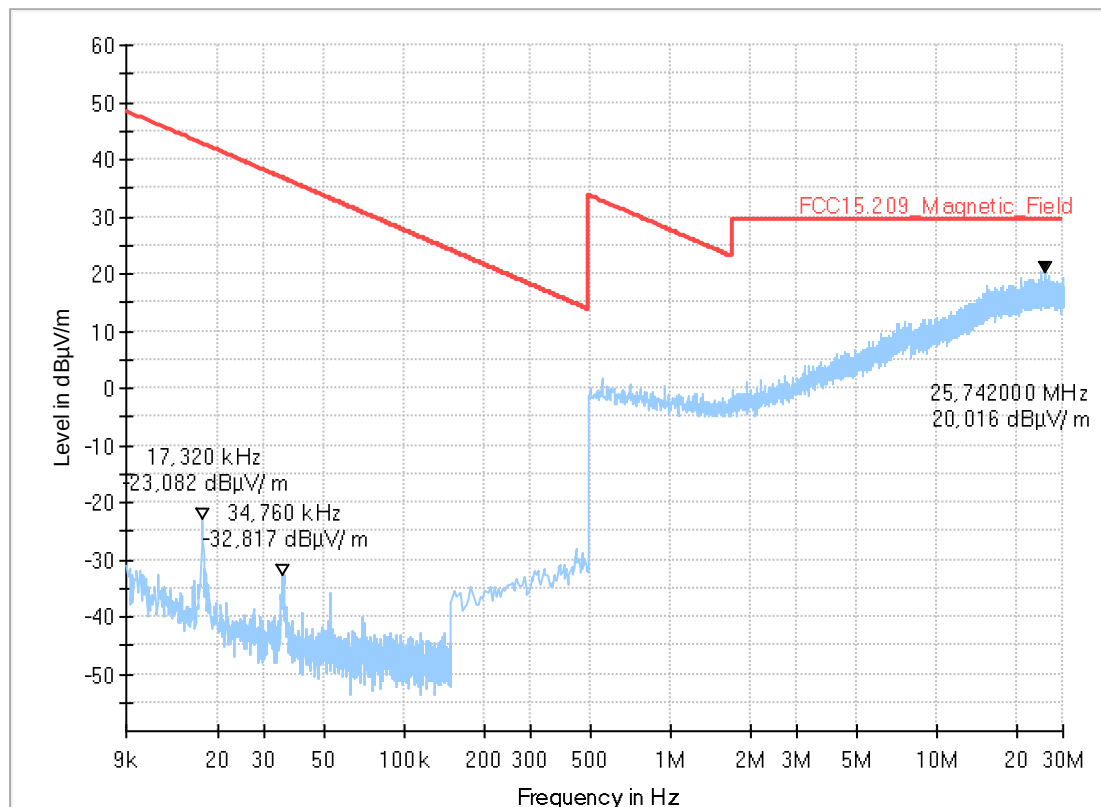
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Test software:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarization
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	LKu
Operating Mode:	UMTS Band 4
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Environmental Conditions::	Humidity : 39%rH; Temperature: 21°C
EUT Setup:	laying
Verdict:	Passed
Comment:	External Antenna

EUT Information

please see the Diagram 2.01

Full Spectrum



2.04_Magnetic_Emission_EUT_standing

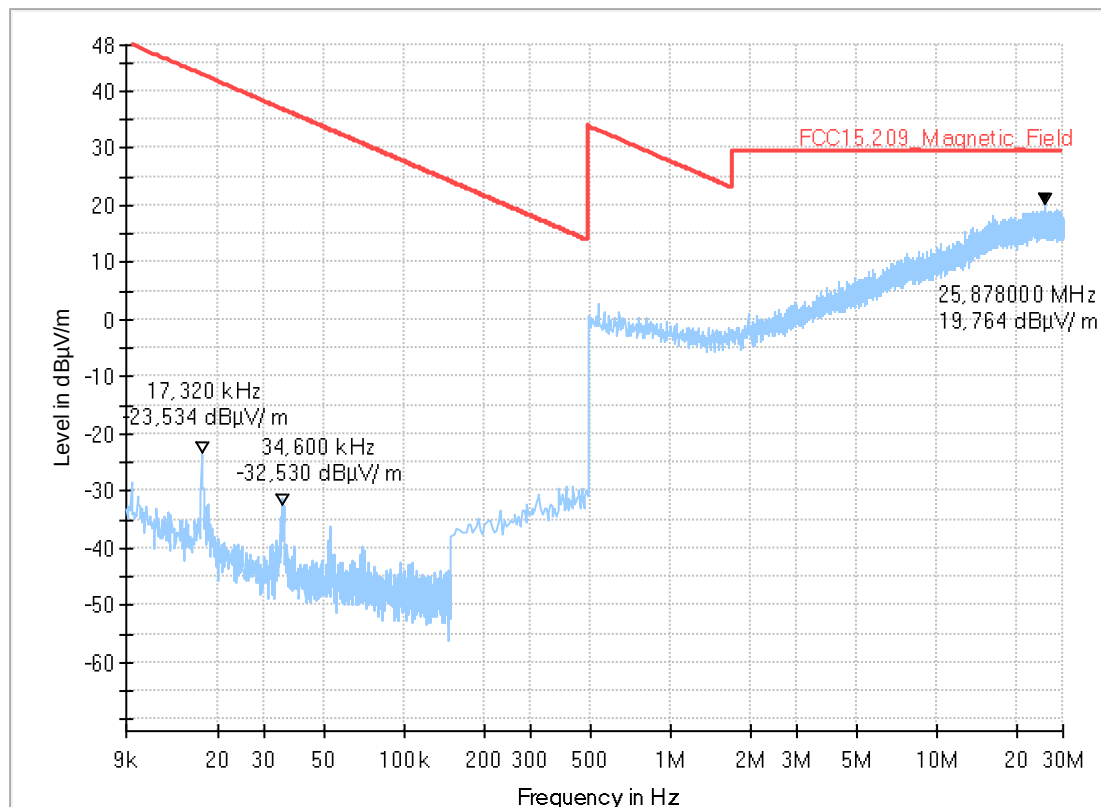
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Test software:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarization
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	LKu
Operating Mode:	UMTS Band 4
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Environmental Conditions::	Humidity : 40%rH; Temperature: 20°C
EUT Setup:	standing
Verdict:	Passed
Comment:	External Antenna

EUT Information

please see the Diagram 2.01

Full Spectrum



1.3. Spurious emissions radiated (UMTS_Band 4)

8.01_Traffic_mode_UMTS_Band_4_laying

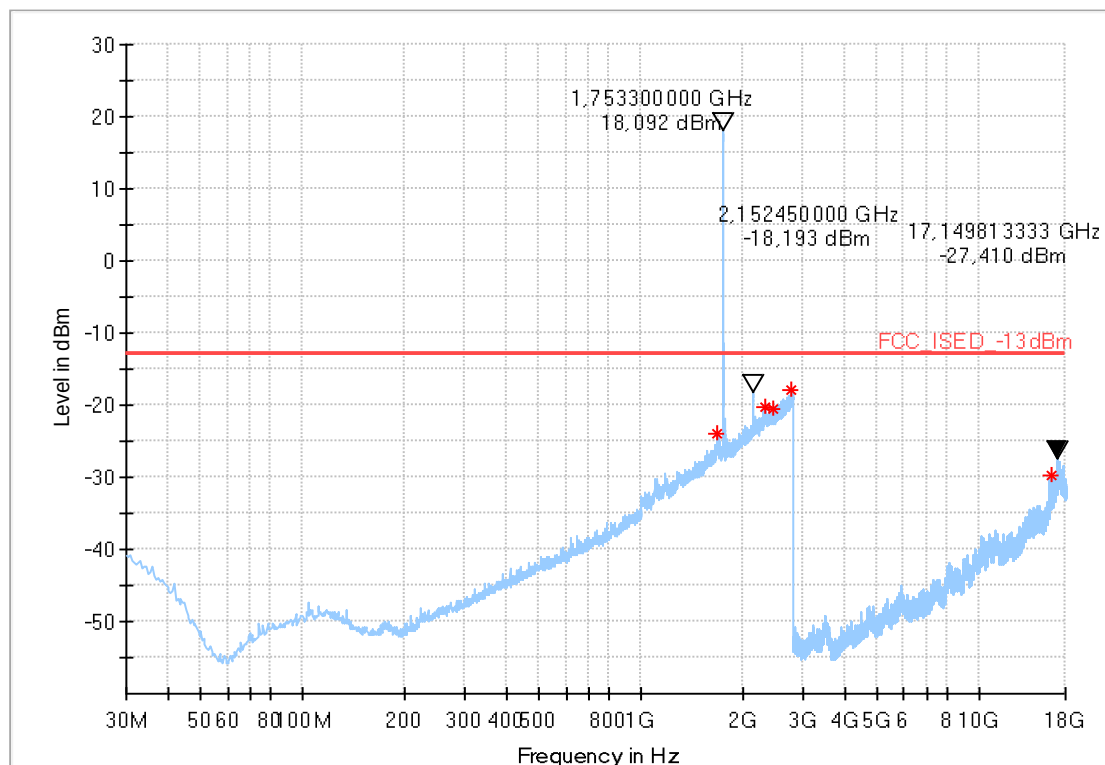
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Room
Test Standard:	FCC FCC Part 27.53 AWS emission limits / RSS-139, Issue 3
Antenna polarization:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	1
Operator:	LKu
EUT Setup:	2
Verdict:	Passed

EUT Information

please see the Diagram 2.01

Full Spectrum



Maximum Emission Frequency Table

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1684.900000	-24.04	-13.00	11.04	155.0	H	255.0
2316.700000	-20.16	-13.00	7.16	155.0	H	30.0
2469.700000	-20.44	-13.00	7.44	155.0	H	345.0
2783.350000	-17.90	-13.00	4.90	155.0	V	165.0
16305.200000	-29.82	-13.00	16.82	155.0	V	345.0

8.02_Traffic_mode_UMTS_Band_4_standing

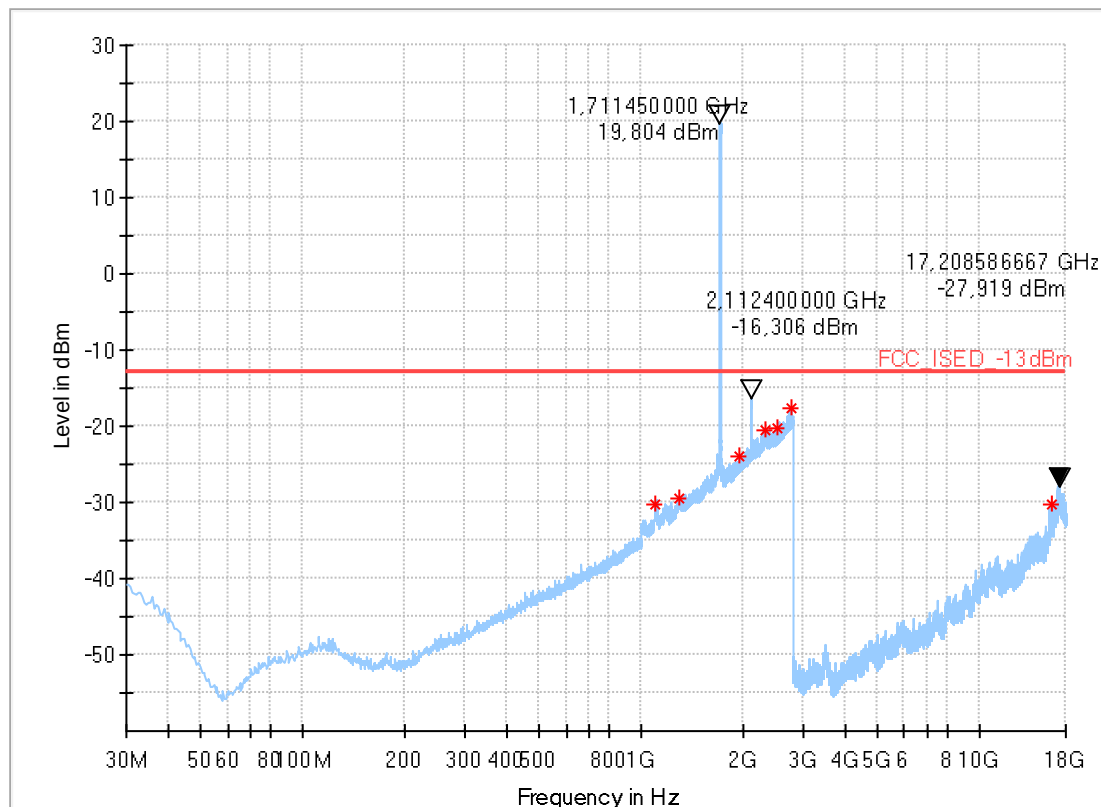
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Room
Test Standard:	FCC FCC Part 27.53 AWS emission limits / RSS-139, Issue 3
Antenna polarization:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	UMTS Band 4
Operator:	LKu
EUT Setup:	2
Verdict:	Passed

EUT Information

please see the Diagram 2.01

Full Spectrum



Maximum Emission Frequency Table

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1097.650000	-30.29	-13.00	17.29	---	---	155.0	V	165.0
1292.050000	-29.37	-13.00	16.37	---	---	155.0	H	165.0
1960.300000	-24.04	-13.00	11.04	---	---	155.0	H	75.0
2318.500000	-20.48	-13.00	7.48	---	---	155.0	V	255.0
2523.250000	-20.37	-13.00	7.37	---	---	155.0	H	165.0
2760.400000	-17.60	-13.00	4.60	---	---	155.0	H	345.0
16339.653333	-30.19	-13.00	17.19	---	---	155.0	V	345.0

8.03_Traffic_mode_UMTS_Band_4_laying

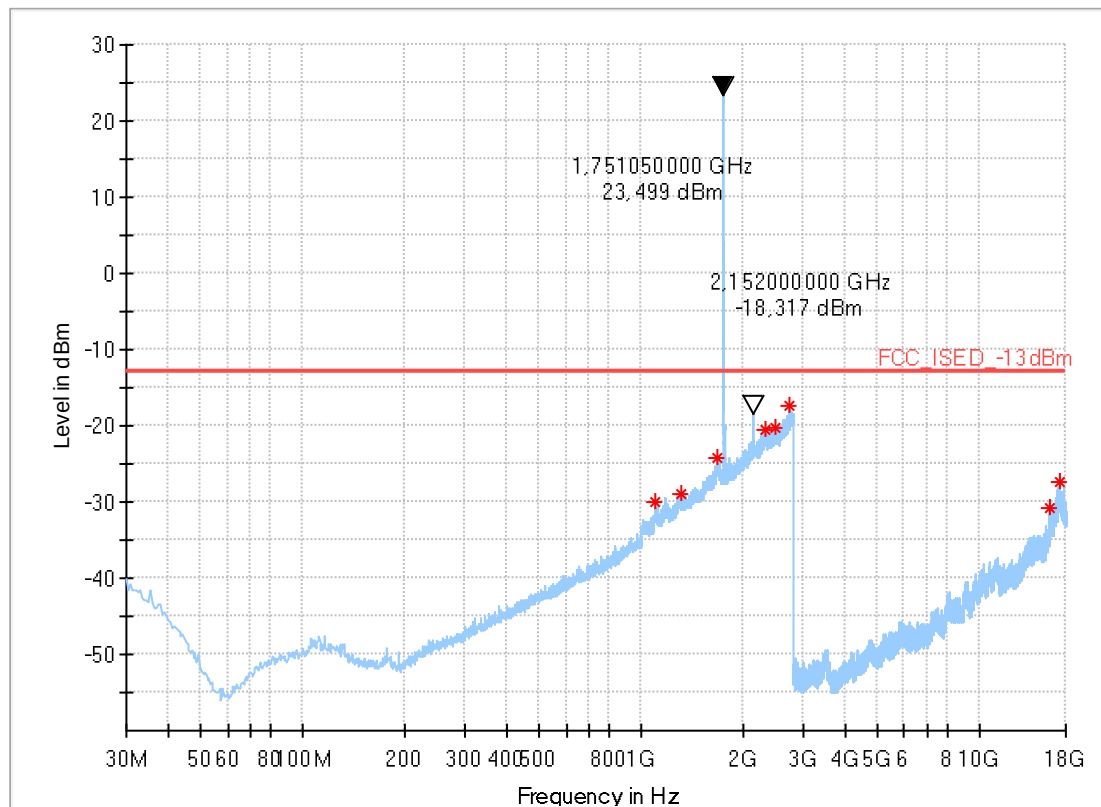
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Room
Test Standard:	FCC FCC Part 27.53 AWS emission limits / RSS-139, Issue 3
Antenna polarization:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	1
Operator:	LKu
EUT Setup:	1
Verdict:	Passed

EUT Information

please see the Diagram 2.01

Full Spectrum



Maximum Emission Frequency Table

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1103.950000	-29.88	-13.00	16.88	---	---	155.0	V	345.0
1305.550000	-28.86	-13.00	15.86	---	---	155.0	V	210.0
1687.600000	-24.29	-13.00	11.29	---	---	155.0	V	300.0
2315.800000	-20.52	-13.00	7.52	---	---	155.0	H	120.0
2486.350000	-20.21	-13.00	7.21	---	---	155.0	V	165.0
2736.550000	-17.33	-13.00	4.33	---	---	155.0	H	210.0
16195.253333	-30.84	-13.00	17.84	---	---	155.0	V	75.0
17243.040000	-27.24	-13.00	14.24	---	---	155.0	H	345.0

8.04_Traffic_mode_UMTS_Band_4_standing

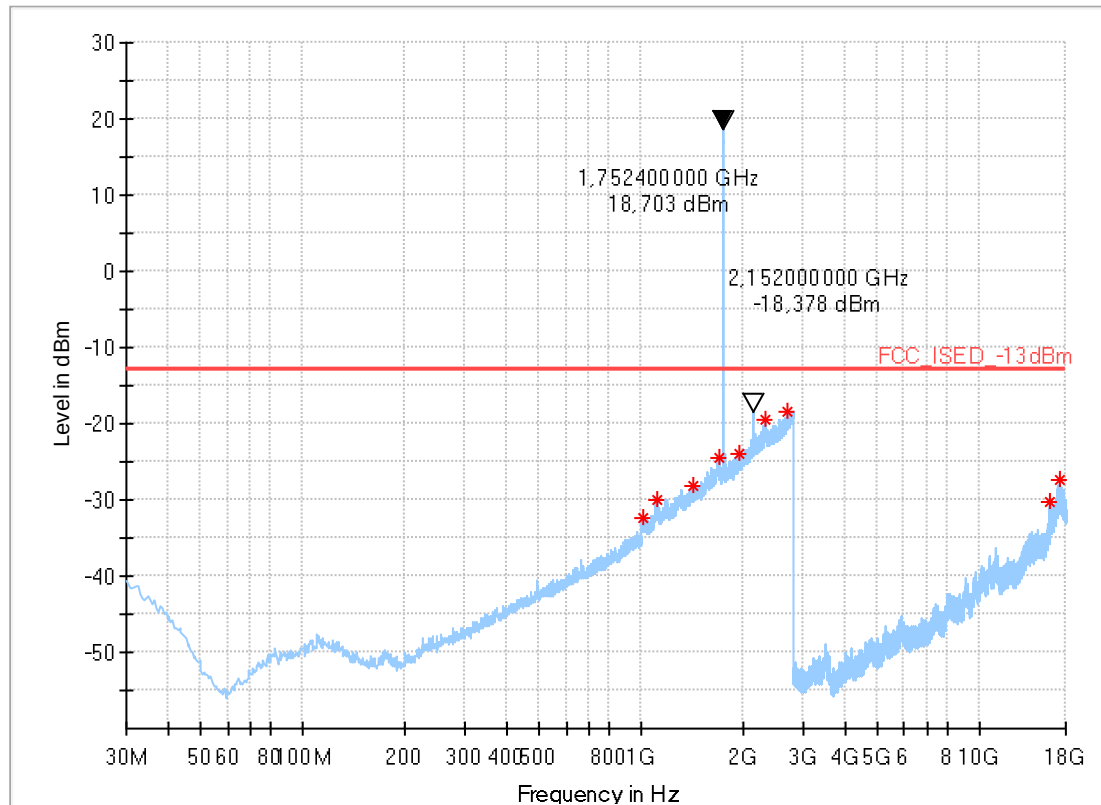
Common Information

Test Description:	Radiated emission
Test Site:	Fully-Anechoic Room
Test Standard:	FCC FCC Part 27.53 AWS emission limits / RSS-139, Issue 3
Antenna polarization:	vertical / horizontal
Measurement software version	EMC32 V10.50.0
Operating Mode:	1
Operator:	LKu
EUT Setup:	1
Verdict:	Passed

EUT Information

please see the Diagram 2.01

Full Spectrum



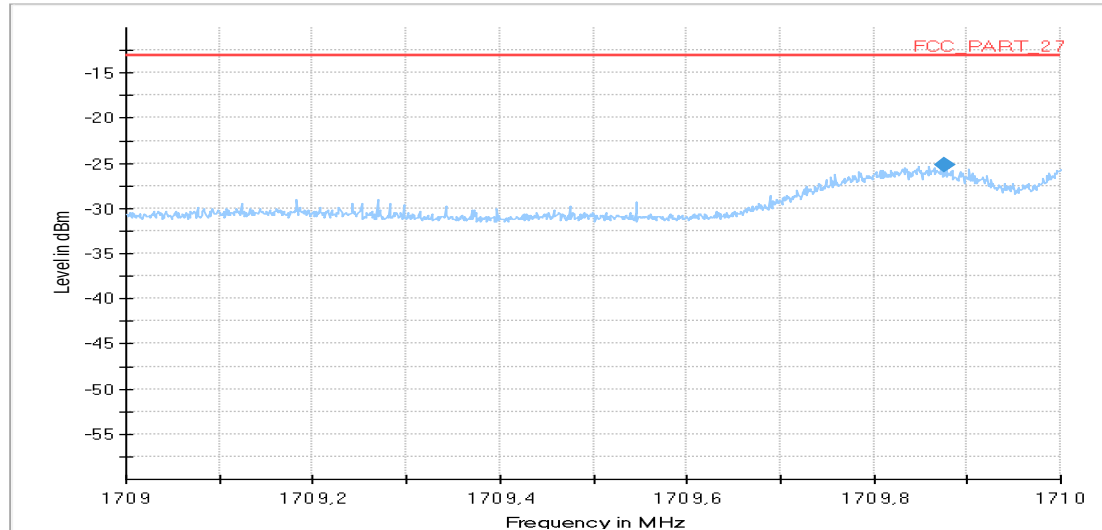
Maximum Emission Frequency Table

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1006.300000	-32.34	-13.00	19.34	---	---	155.0	V	345.0
1108.000000	-30.07	-13.00	17.07	---	---	155.0	H	255.0
1430.200000	-28.05	-13.00	15.05	---	---	155.0	H	165.0
1689.400000	-24.51	-13.00	11.51	---	---	155.0	V	75.0
1950.850000	-24.04	-13.00	11.04	---	---	155.0	V	300.0
2326.600000	-19.47	-13.00	6.47	---	---	155.0	H	75.0
2720.350000	-18.52	-13.00	5.52	---	---	155.0	H	300.0
16248.453333	-30.23	-13.00	17.23	---	---	155.0	H	165.0
17182.240000	-27.32	-13.00	14.32	---	---	155.0	V	255.0

1.4. Radiated emissions on UMTS_Band(4) band-edge, EUT Internal Antenna

9.1201a_Band-Edge_Channel_1312_UL_1712.6MHz__EUT_position_laying

Full Spectrum

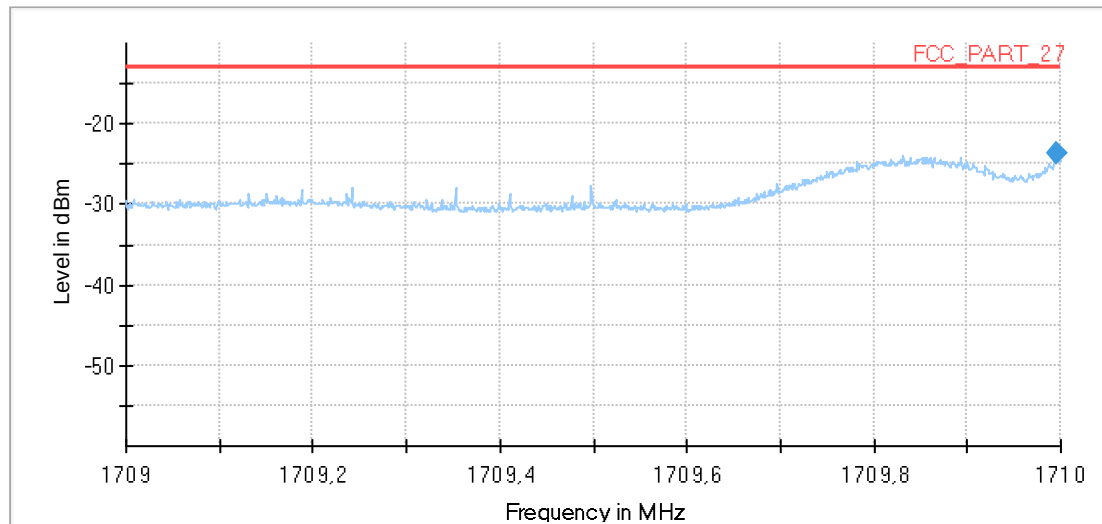


Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.876000	-25.27	-13.00	12.27	700.0	100.000	V	353.0	0.0	-63

9.1201b_Band-Edge_Channel_1312_UL_1712.6MHz__EUT_position_standing

Full Spectrum

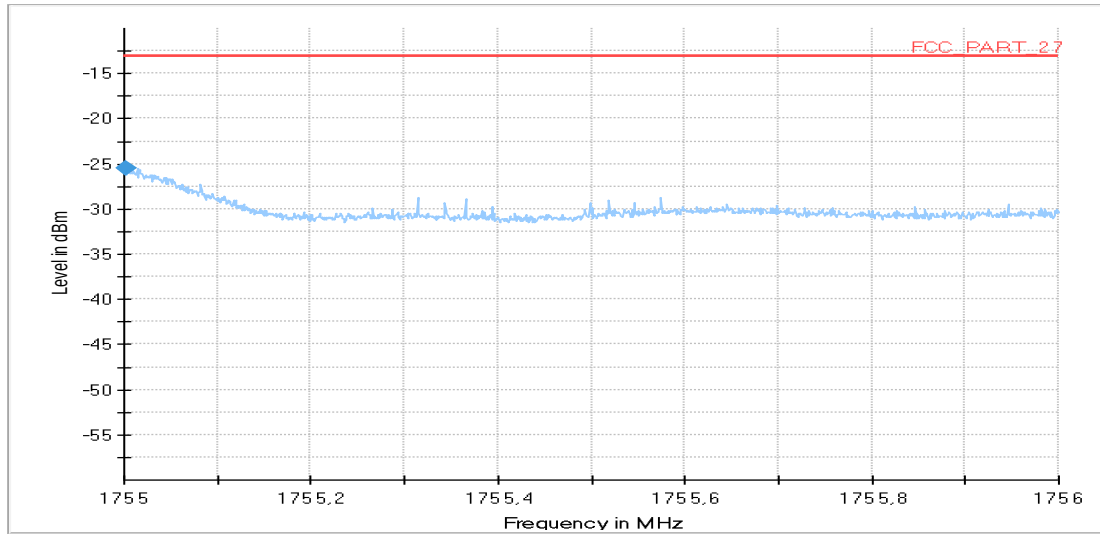


Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.996000	-23.57	-13.00	10.57	700.0	100.000	V	46.0	0.0	-63

9.1202a_Band-Edge_Channel_1512_UL_1712.6MHz__EUT_position_laying

Full Spectrum

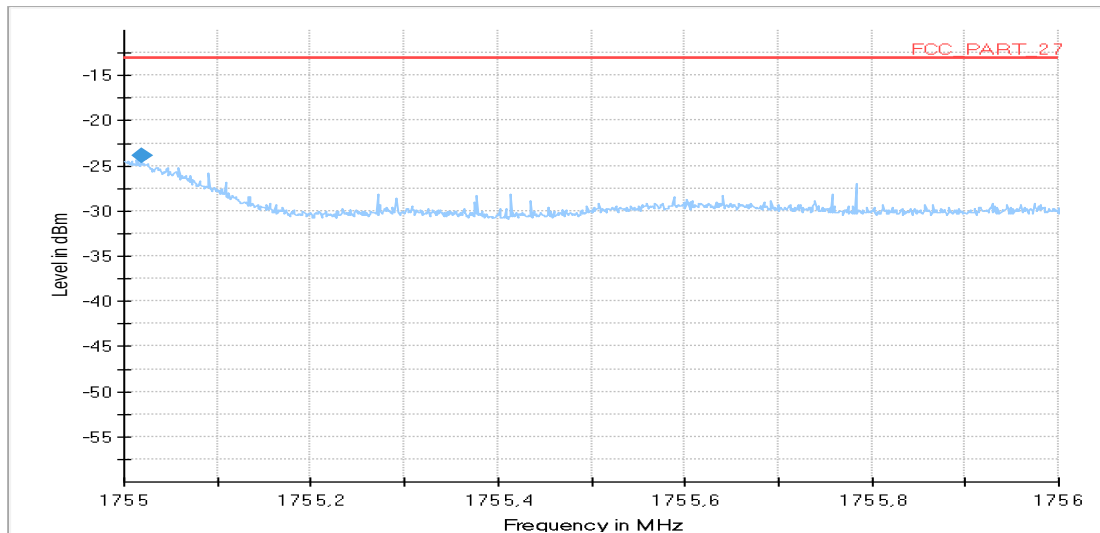


Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.002000	-25.51	-13.00	12.51	700.0	100.000	V	281.0	0.0	-63

9.1202b_Band-Edge_Channel_1512_UL_1712.6MHz__EUT_position_standing

Full Spectrum



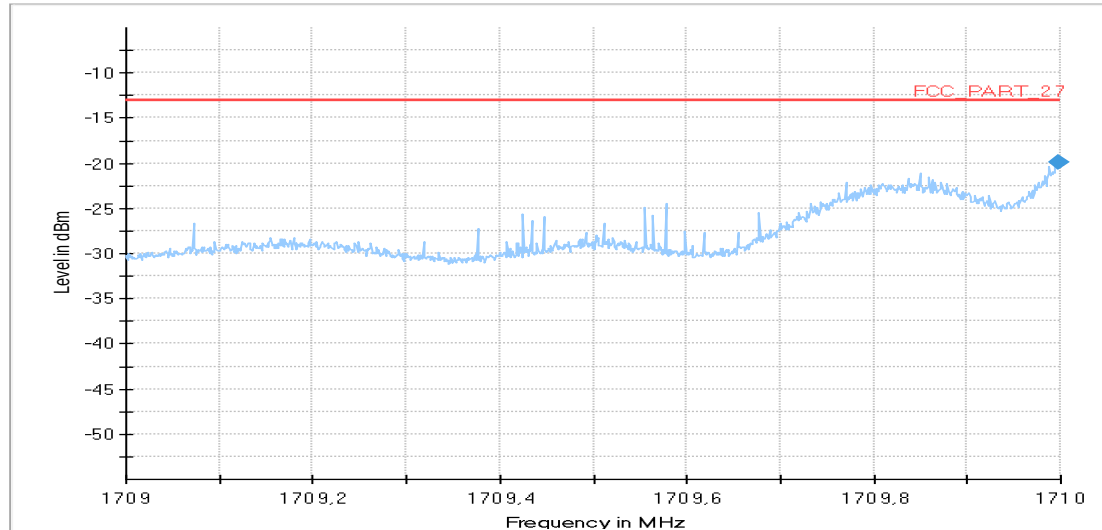
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.019000	-23.83	-13.00	10.83	700.0	100.000	H	349.0	0.0	-63

1.5. Radiated emissions on UMTS_Band(4) band-edge, EUT External Antenna

9.1203a_Band-Edge_Channel_1312_UL_1712.6MHz__EUT_position_laying

Full Spectrum

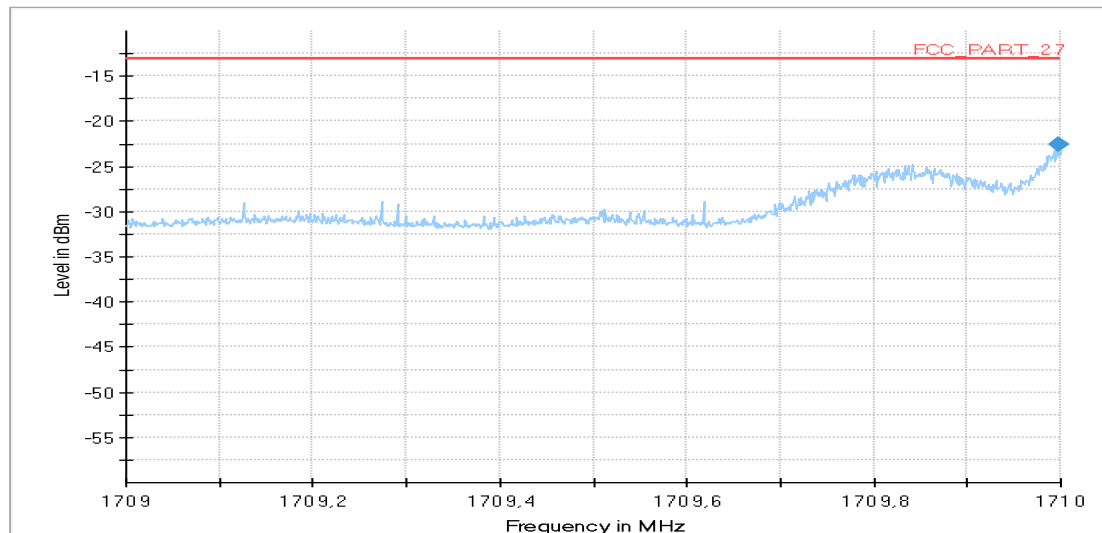


Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.998000	-19.88	-13.00	6.88	700.0	100.000	H	137.0	0.0	-63

9.1203b_Band-Edge_Channel_1312_UL_1712.6MHz__EUT_position_standing

Full Spectrum

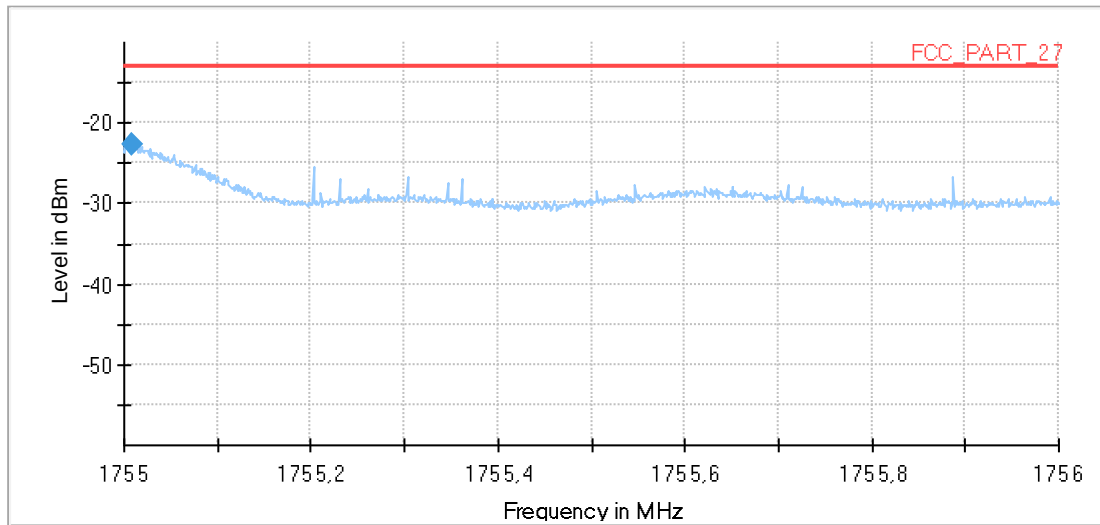


Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1709.998000	-22.63	-13.00	9.63	700.0	100.000	V	38.0	0.0	-63

9.1204a_Band-Edge_Channel_1512_UL_1712.6MHz__EUT_position_laying

Full Spectrum

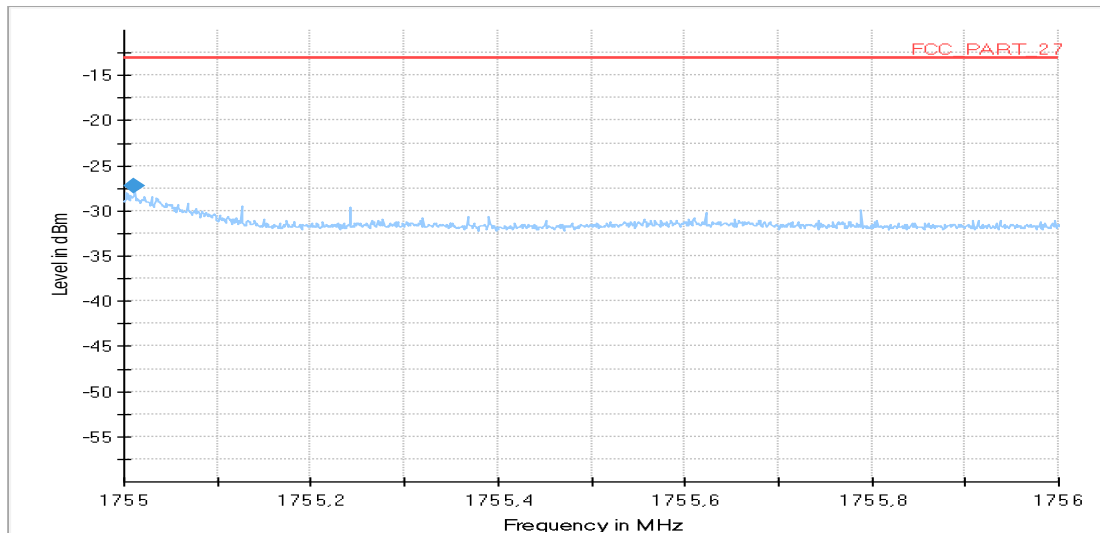


Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.008000	-22.58	-13.00	9.58	700.0	100.000	H	227.0	0.0	-63

9.1204b_Band-Edge_Channel_1512_UL_1712.6MHz__EUT_position_standing

Full Spectrum



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
1755.011000	-27.32	-13.00	14.32	700.0	100.000	V	151.0	0.0	-63

End of Annex