

Annex 1: Measurement diagrams 20-1-0063601T08a-C01-A1

Number of pages:	15	Date of Report:	2022-Jan-19
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:	WITTE Velbert GmbH & Co KG
Product:	Automotive NFC Outer Door Handle		
Model:	DH421		
FCC ID:	V2T-DH421	IC:	7575A-DH421
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter A Part 15, Subpart C: §15.225 ANSI C63.10-2013 chapter 6.4/5/8/9 ISED Regulations RSS-Gen, Issue 5 + Amendment 2 RSS-210, Issue 10 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 Radiated field strength emissions and emission mask

2.01_H_Field_TX_standing

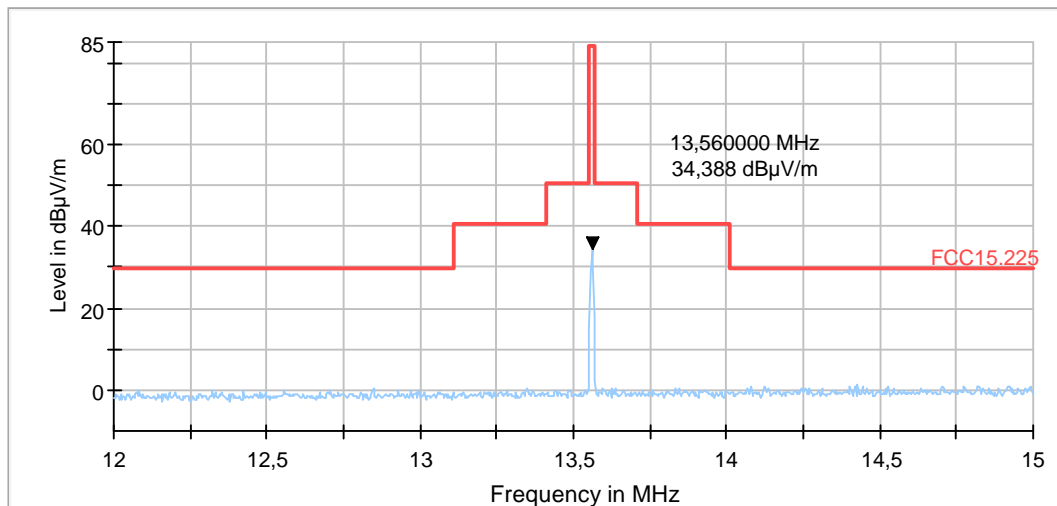
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



2.02_H_Field_TXRX_standing

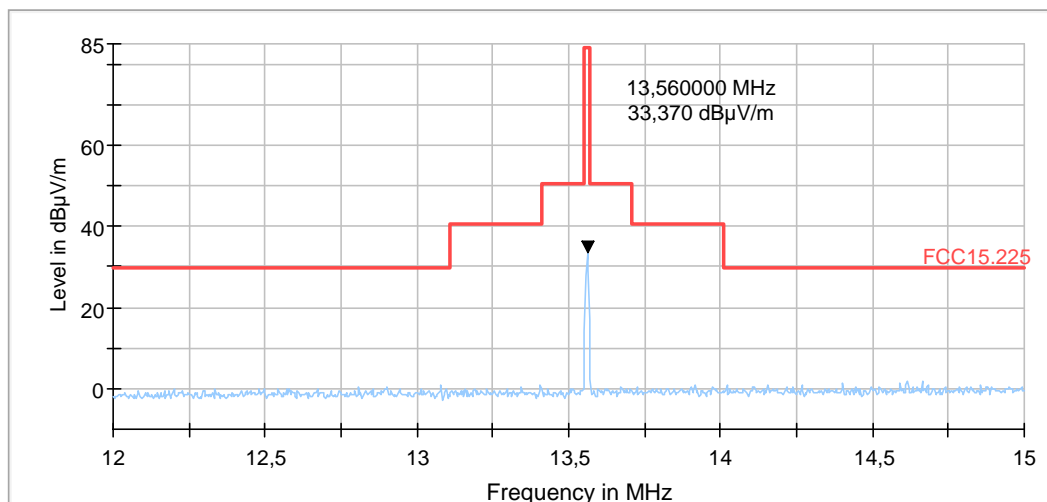
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TXRX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



2.03_H_Field_TX_laying

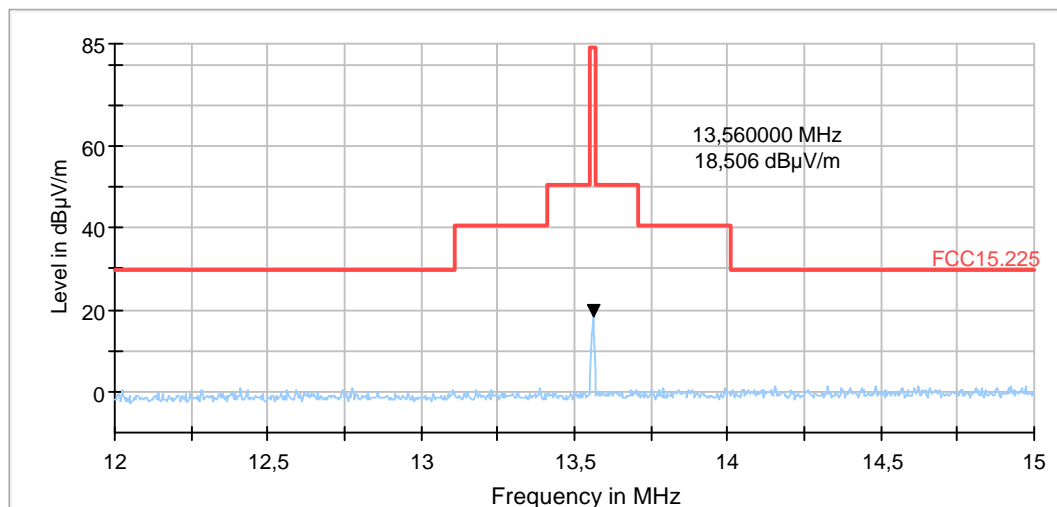
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



2.04_H_Field_TXRX_laying

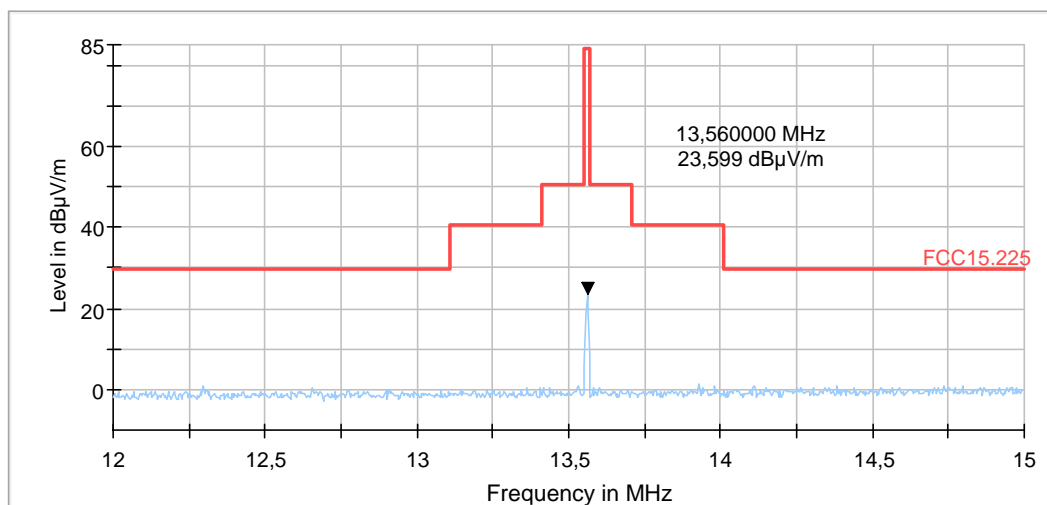
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TXRX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



1.2 Radiated field strength emissions below 30 MHz

2.05_RSE_TX_standing

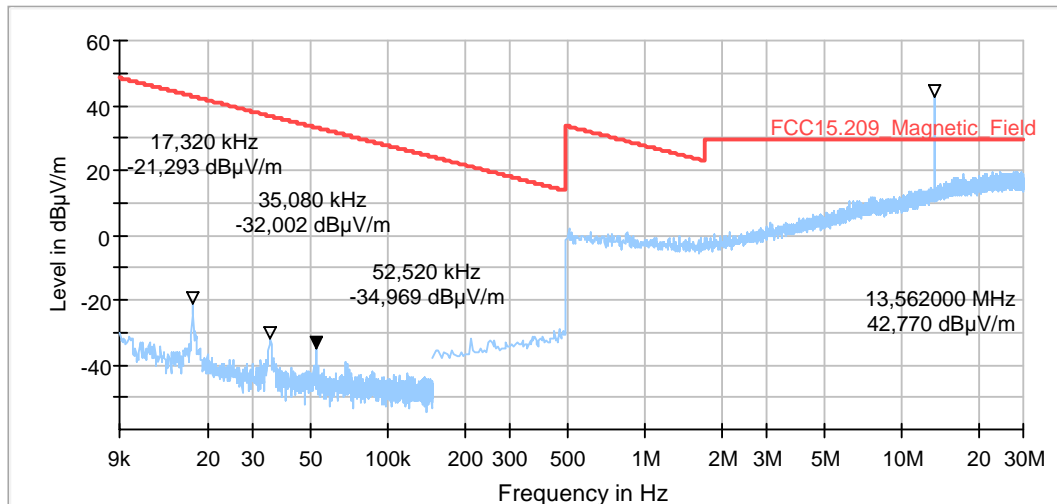
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
Environmental Conditions:	Humidity : 50%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



Remark: peaks in the frequency range up to ~100 kHz are caused by the electric motor of an antenna mast inside the chamber.

2.06_RSE_TXRX_standing

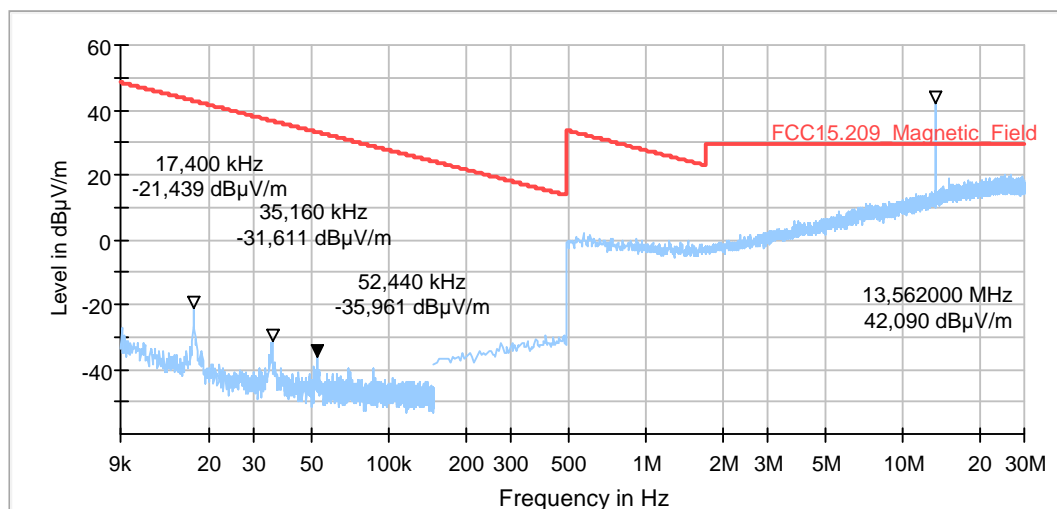
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
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 polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
Environmental Conditions:	Humidity : 50%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



Remark: peaks in the frequency range up to ~100 kHz are caused by the electric motor of an antenna mast inside the chamber.

1.3 Radiated field strength emissions 30 MHz – 1 GHz

3.01_RSE_TX_RADIO_S10_standing_testbox-with-filter

Common Information

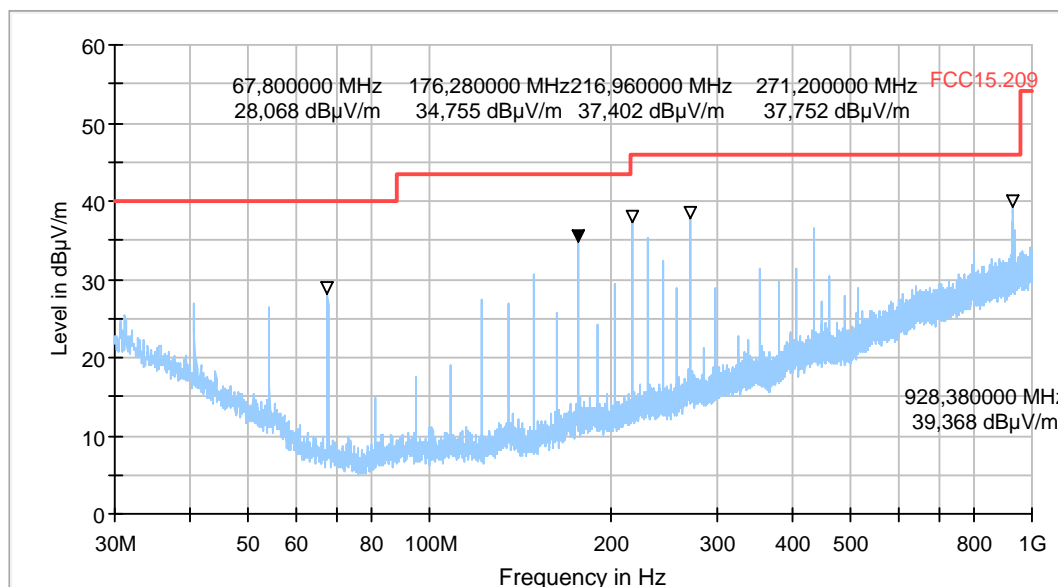
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions::	Humidity : 50%rH; Temperature: 20°C
Operator Name:	TFra
Operating Mode:	TX 13.56 MHz
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum

Full Spectrum



3.03_RSE_TXRX_EMCS18_standing_testbox-with-filter

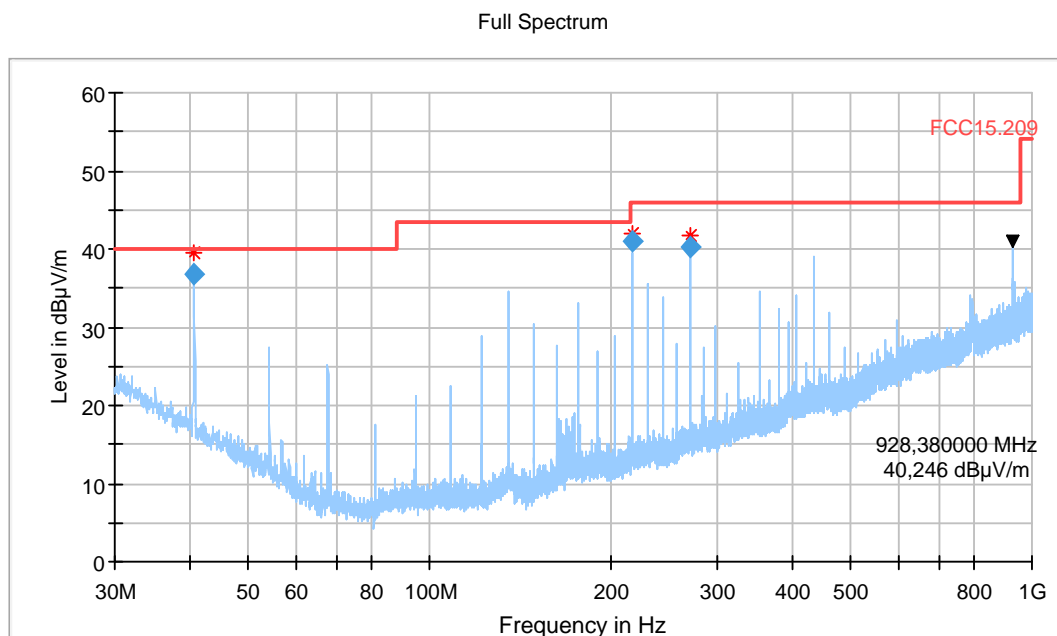
Common Information

Test Description: Radiated field strength emission in 3m distance
 Test Site: CETECOM GmbH Essen
 Test Standard: FCC 15.205&15.209 & RSS Gen. Issue 5
 Antenna polarisation: horizontal/vertical
 Environmental Conditions: Humidity : 50%rH; Temperature: 20°C
 Operator Name: TFra
 Operating Mode: TXRX 13.56 MHz
 Verdict: Passed

EUT Information

PMT number: 20-1-00636S18_C01
 Power Supply: 12 V DC

Full Spectrum

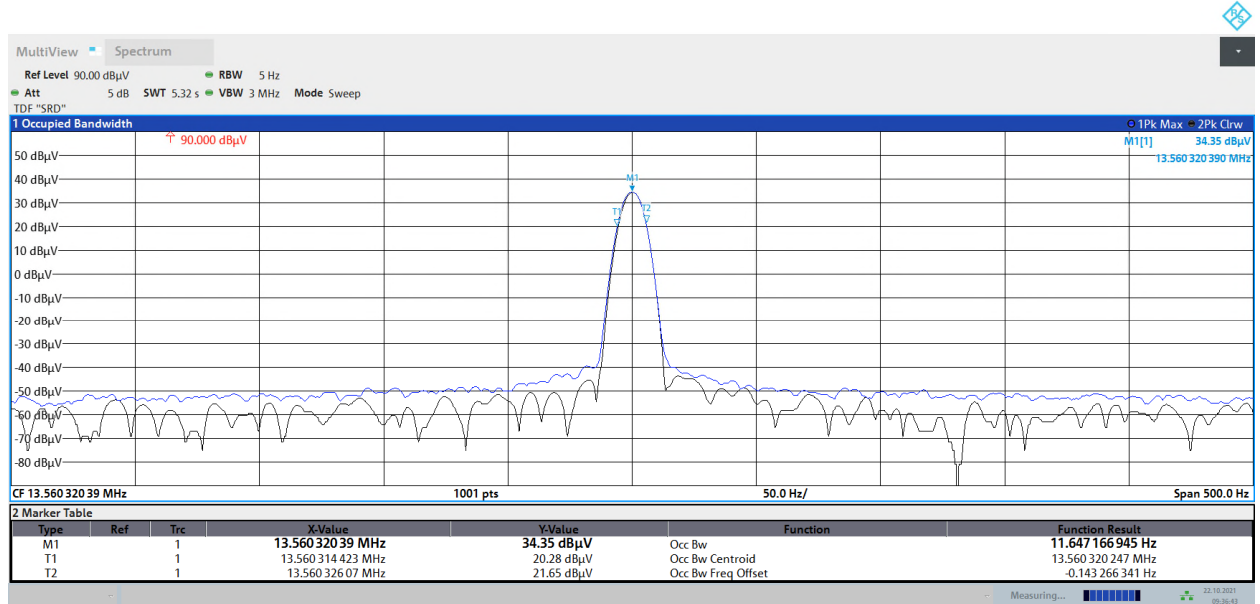


Final Result

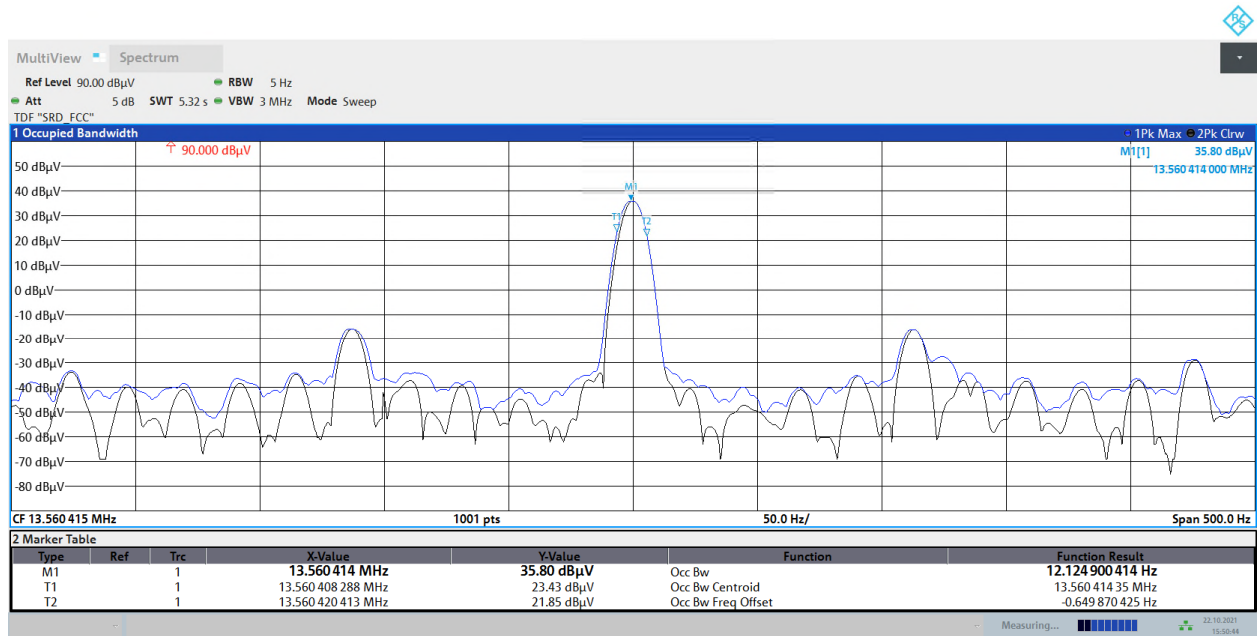
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
40.683000	36.84	40.00	3.16	120.000	105.0	V	268.0	16.8	0.0	0.6	16.2
216.965000	40.93	46.00	5.07	120.000	105.0	V	198.0	12.0	0.0	1.4	10.6
271.205000	40.20	46.00	5.80	120.000	105.0	V	28.0	14.6	0.0	1.6	13.0

1.4 Occupied Channel Bandwidth 99%

1.4.1 OBW_TX_S10_TnomVnom



1.4.2 OBW_TXRX_S18_TnomVnom

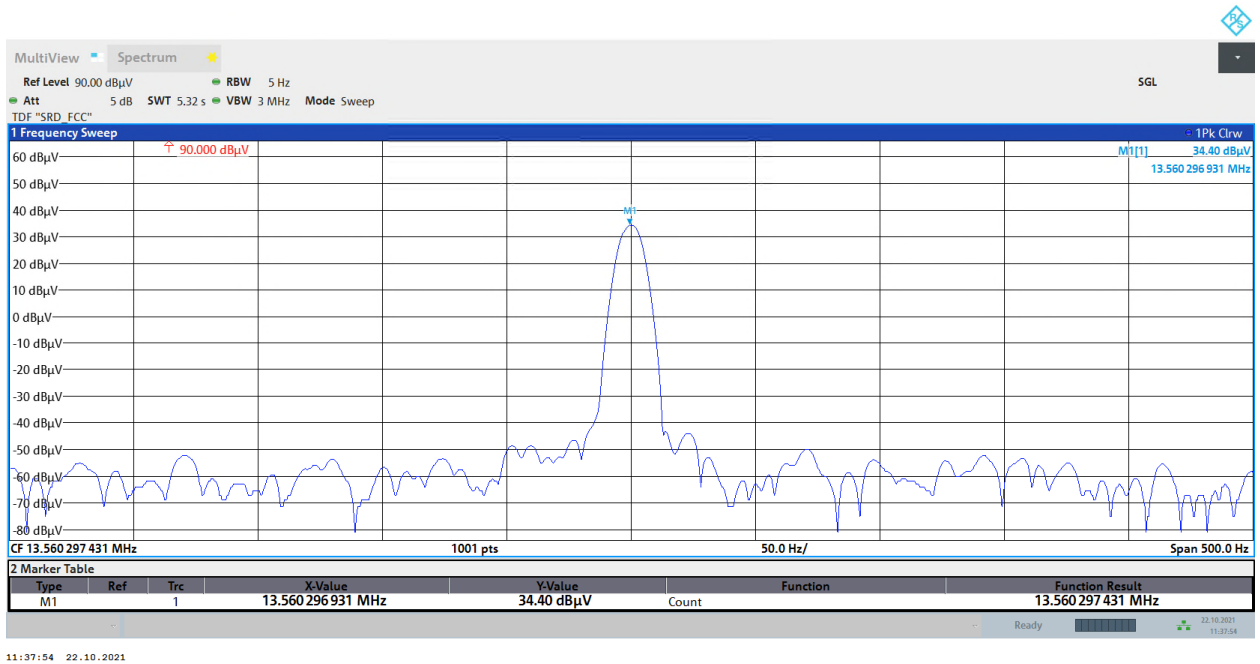


1.5 Frequency stability

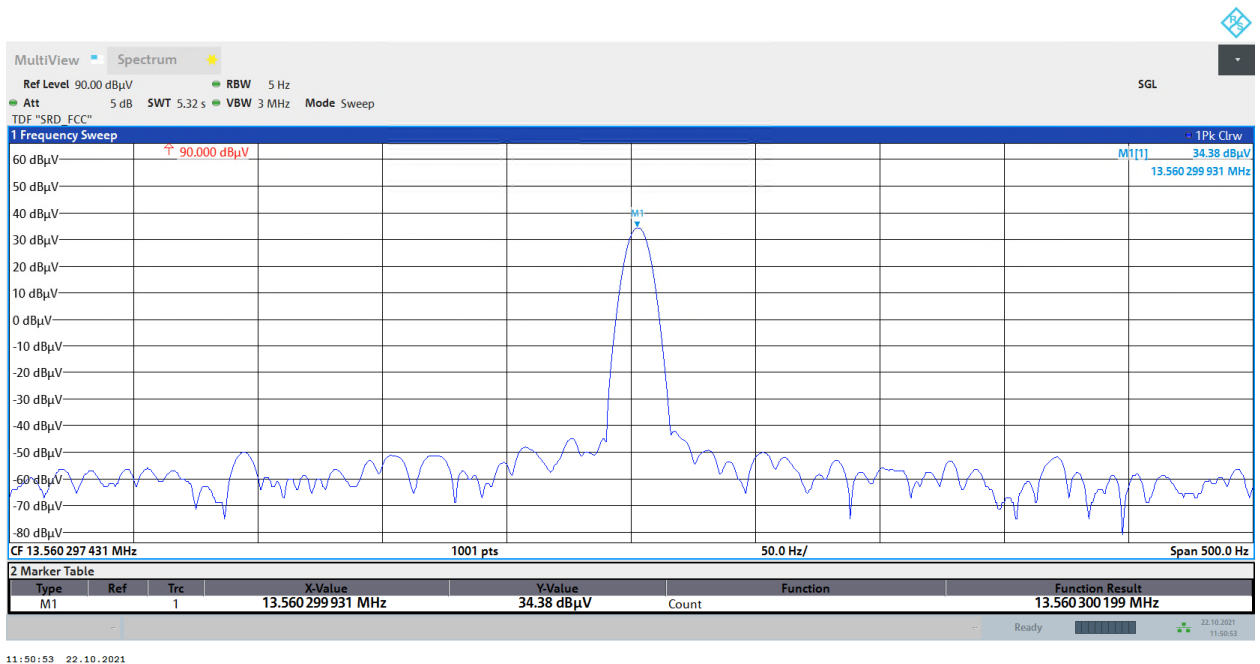
Only reference and worst-case measurement diagrams are shown

1.5.1 Voltage variation

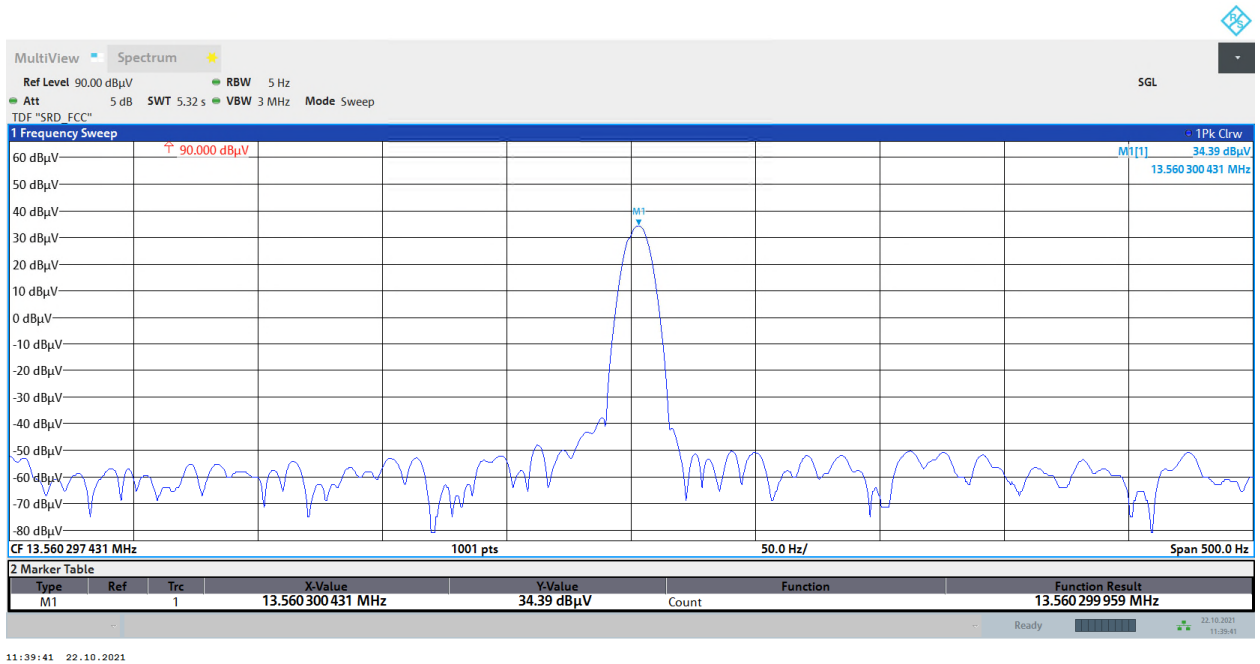
1.5.1.1 TnomVnom



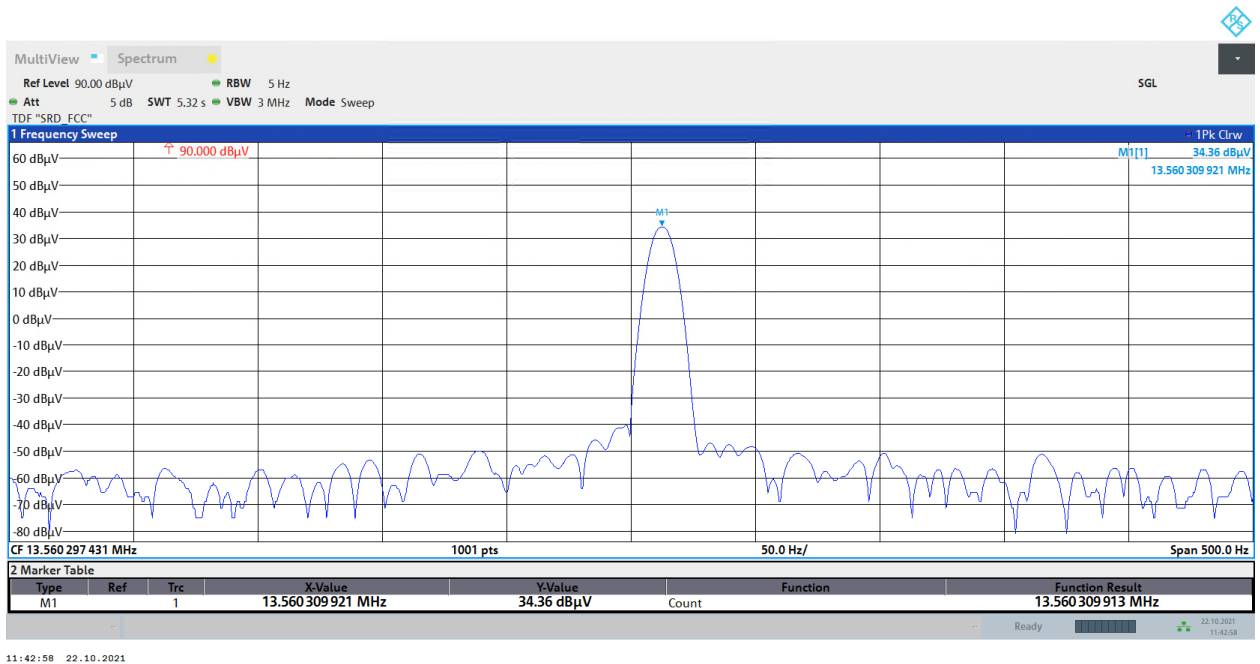
1.5.1.2 TnomVmin



1.5.1.3 TnomVmax

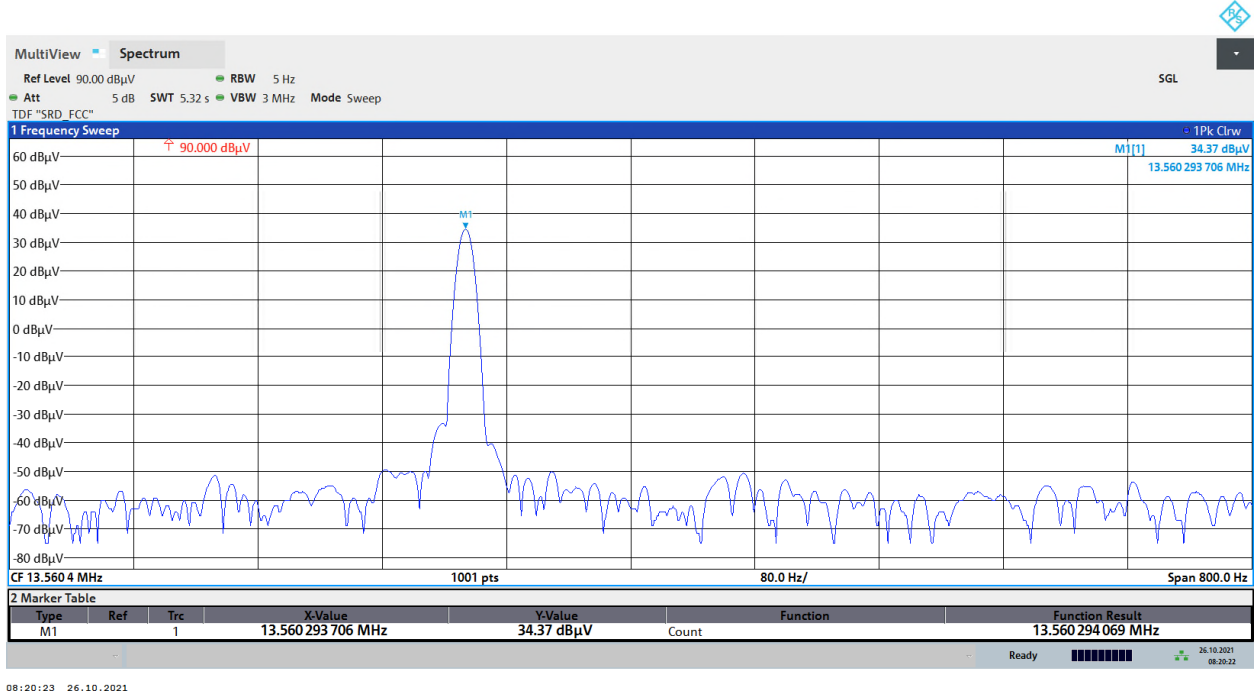


1.5.1.4 TnomV=13 V DC (worst case)

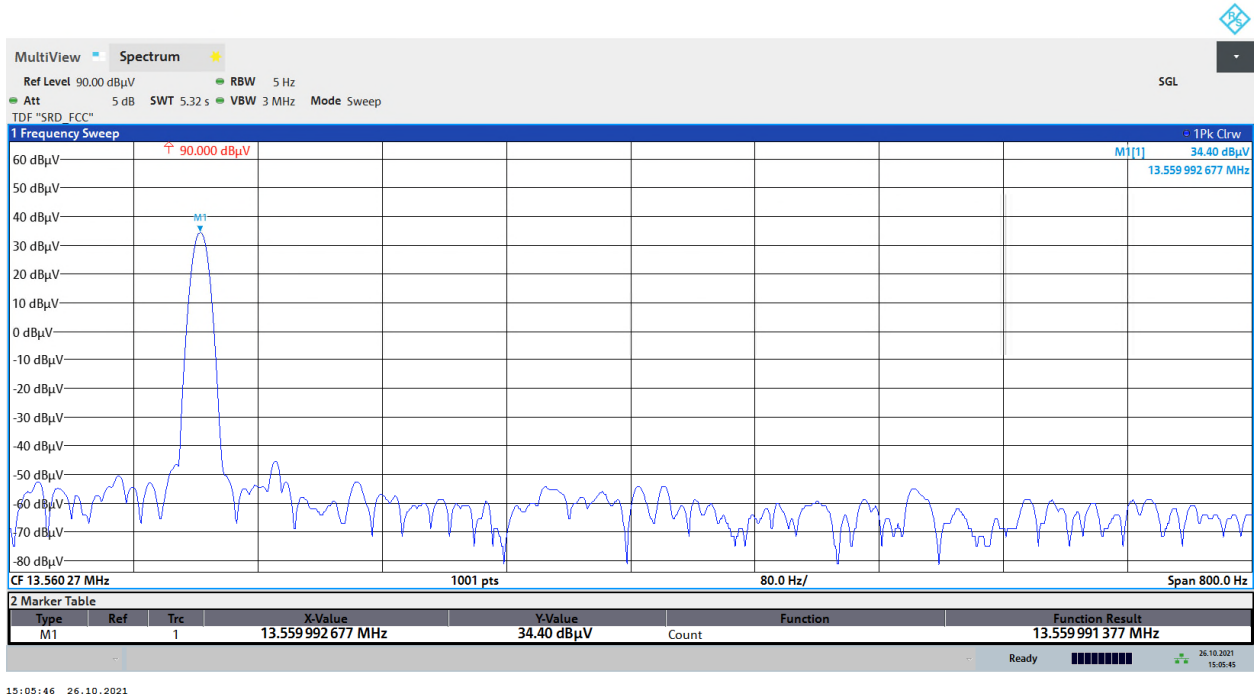


1.5.2 Temperatur variation

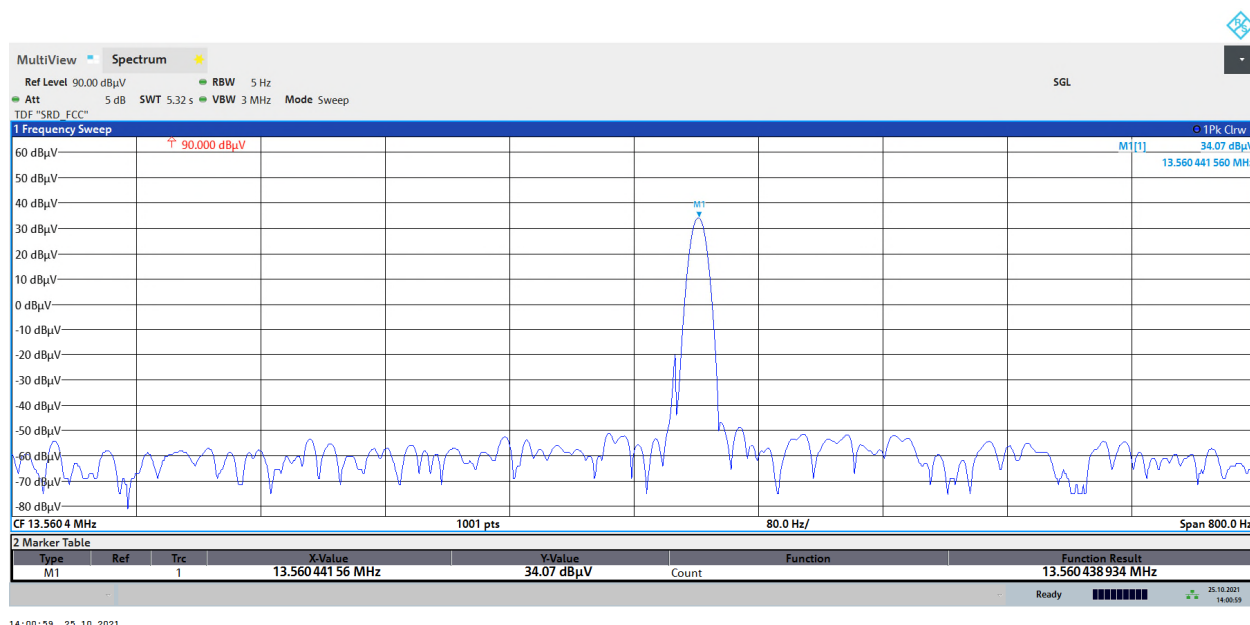
1.5.2.1 VnomTnom



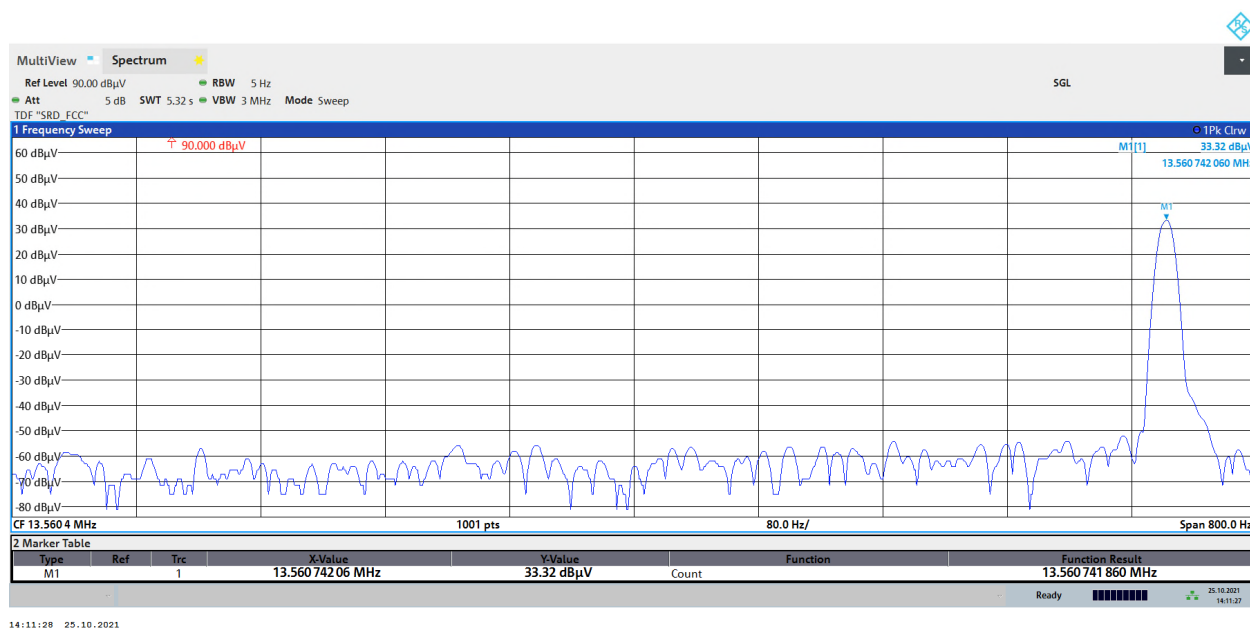
1.5.2.2 VnomTmin at startup



1.5.2.3 VnomTmax at startup



1.5.2.4 VnomT=80 °C at 10 min (worst case)



End Of Annex 1