

Annex 1: Measurement diagrams 21-1-0037301T008a-A1

Number of pages:	14	Date of Report:	2022-Dec-16
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: Model:	BTLE enabled secure vehicle access box flinkey BLE		
FCC ID:	FCC ID: V2TFB33 Contains FCC ID: SQGBL652	IC:	IC: 7575A-FB33 Contains IC: 3147A-BL652
Testing has been carried out in accordance with:	FCC Regulations Title 47 CFR, Chapter I, Subchapter A, Part 15 Subpart C, Intentional Radiators § 15.207 Conducted limits § 15.225 Radiated emission limits ISED-Regulations RSS-Gen, Issue 5 + Amendment 2 General Requirements for Compliance of Radio Apparatus RSS-210, Issue 10, Annex B.6		

Table of Contents

1	Measurement diagrams.....	3
1.1	Radiated measurements in anechoic chamber	3
1.2	Measurements in climatic chamber	8
1.3	Conducted emissions on AC-mains.....	11
1.4	Occupied bandwidth	13

1 Measurement diagrams

1.1 Radiated measurements in anechoic chamber

2.02a_H_Field_laying

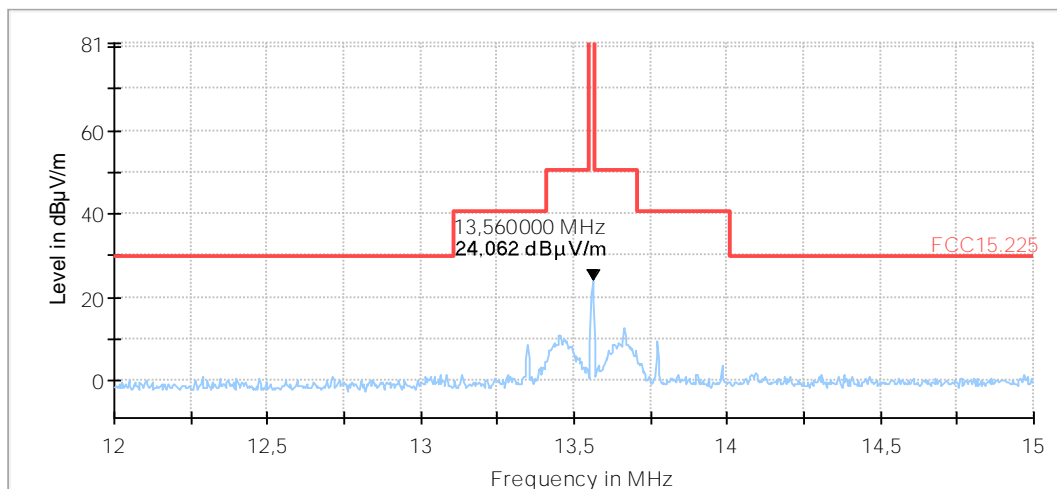
Common Information

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
Operating Mode:	NFC PRBS
Power during tests:	Internal battery
Comment 1:	nominal channel
Environmental Conditions::	Humidity : 46%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed
Comment:	

EUT Information

PMT number:	21-1-00373S20_C01
Manufacturer:	WITTE-Velbert GmbH & Co.KG
Product:	BTLE enabled secure vehicle access box
Model:	flinkey Box

Full Spectrum



2.02b_H_Field_standing

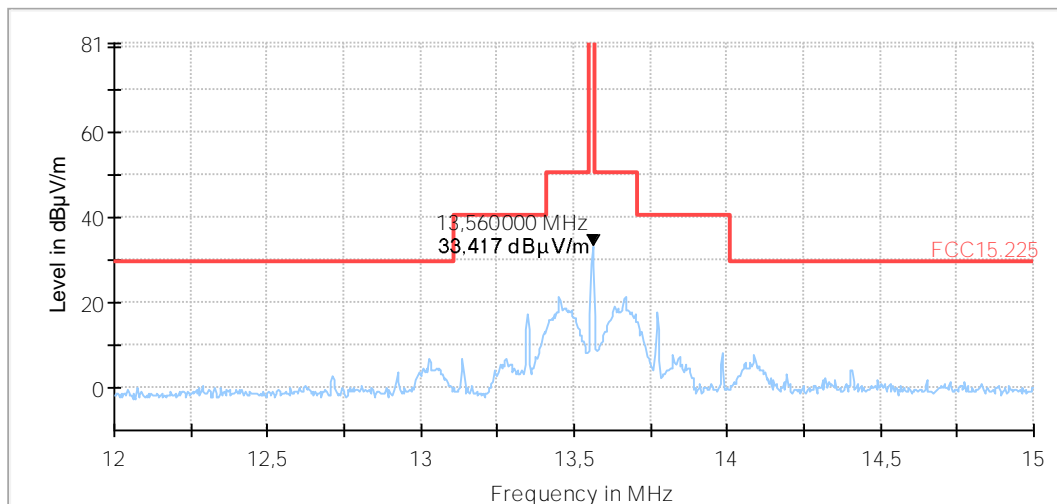
Common Information

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 3
Operator:	TFra/pst/RBe
Operating Mode:	NFC PRBS
Power during tests:	Internal battery
Comment 1:	nominal channel
Environmental Conditions::	Humidity : 45%rH; Temperature: 21°C
EUT Setup:	1
Verdict:	Passed
Comment:	

EUT Information

PMT number:	21-1-00373520_C01
Manufacturer:	WITTE-Velbert GmbH & Co.KG
Product:	BTLE enabled secure vehicle access box
Model:	flinkey Box

Full Spectrum



2.03 RSE Standing

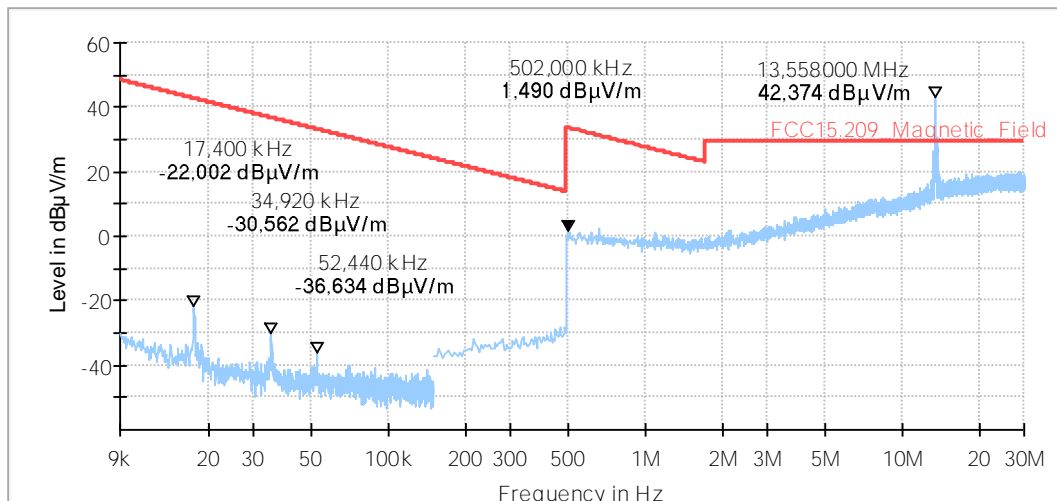
Common Information

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 5
Operator:	TFra/pst/RBe
Operating Mode:	NFC PRBS
Power during tests:	Internal battery
Comment 1:	Channel nominal
Comment 2:	
Environmental Conditions::	Humidity : 45%rH; Temperature: 21°C
EUT Setup:	1
Verdict:	Passed
Comment:	

EUT Information

PMT number:	21-1-00373S20_C01
Manufacturer:	WITTE-Velbert GmbH & Co.KG
Product:	BTLE enabled secure vehicle access box
Model:	flinkey Box

Full Spectrum



3.01a_RSE_standing

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

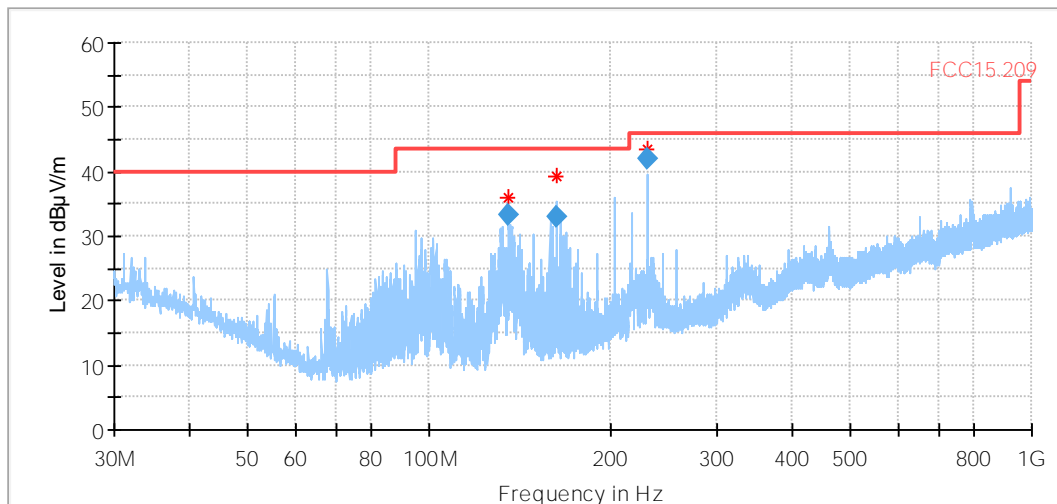
Environmental Conditions: Humidity : 45%rH; Temperature: 20°C
 Operator Name: TFra
 Operating Mode: NFC PRBS
 Power supply: Internal battery
 Comment:
 Verdict: Passed

EUT Information

PMT number: 21-1-00373S20_C01
 Manufacturer: WITTE-Velbert GmbH & Co.KG
 Product: BTLE enabled secure vehicle access box
 Model: flinkey BLE

Full Spectrum

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Sig Path (dB)	Trd Corr. (dB/m)
135.590000	33.33	43.50	10.17	120.000	105.0	V	277.0	0.0	7.7
162.730000	33.03	43.50	10.47	120.000	112.0	V	123.0	0.0	7.9
230.510000	42.06	46.00	3.94	120.000	127.0	H	113.0	0.0	11.1

3.01b_RSE_lying

Common Information

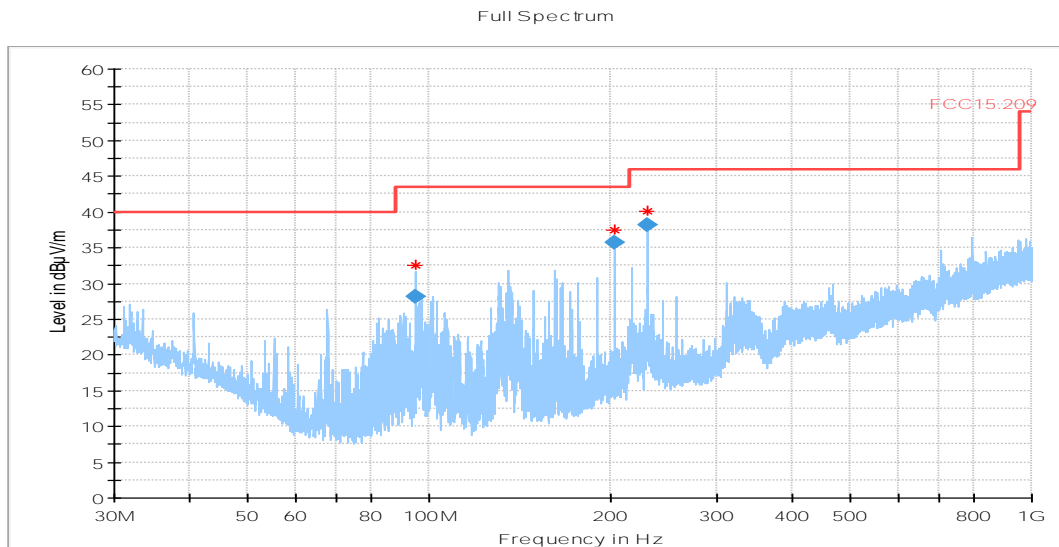
Test Description: Radiated field strength emission in 3m distance
 Test Site: CETECOM GmbH Essen
 Test Standard: FCC 15.205&15.209 & RSS Gen. Issue 5
 Antenna polarisation: horizontal/vertical

 Environmental Conditions:: Humidity : 45%rH; Temperature: 19°C
 Operator Name: TFra
 EUT:
 Operating Mode: NFC PRBS
 Power supply: Internal battery
 Comment: --
 Verdict: Passed

EUT Information

PMT number: 21-1-00373S20_C01
 Manufacturer: WITTE-Velbert GmbH & Co.KG
 Product: BTLE enabled secure vehicle access box
 Model: flinkey BLE

Full Spectrum



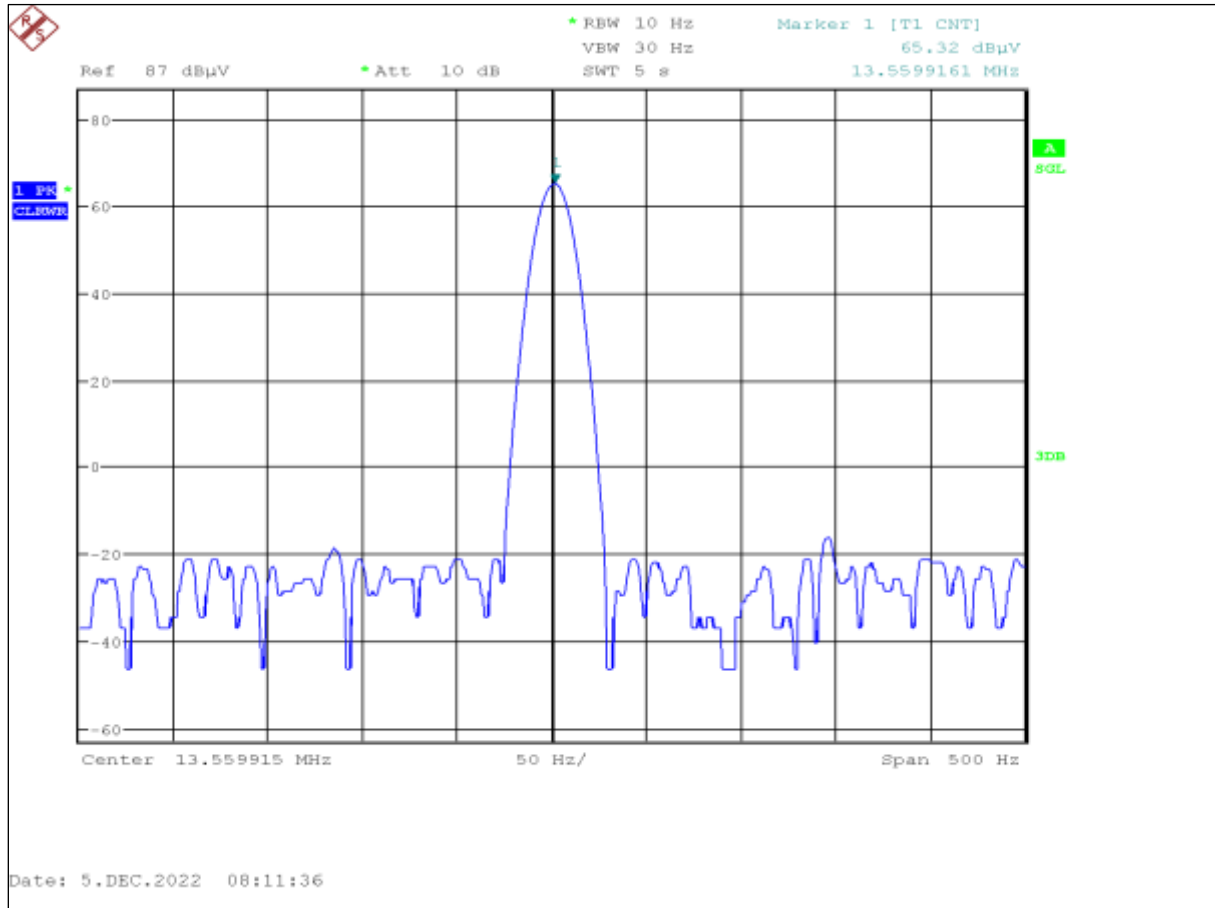
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Sig Path (dB)	Trd Corr. (dB/m)
94.910000	28.19	43.50	15.31	120.000	133.0	V	170.0	0.0	6.9
203.390000	35.79	43.50	7.71	120.000	106.0	V	180.0	0.0	9.7
230.510000	38.23	46.00	7.77	120.000	106.0	H	0.0	0.0	11.1

1.2 Measurements in climatic chamber

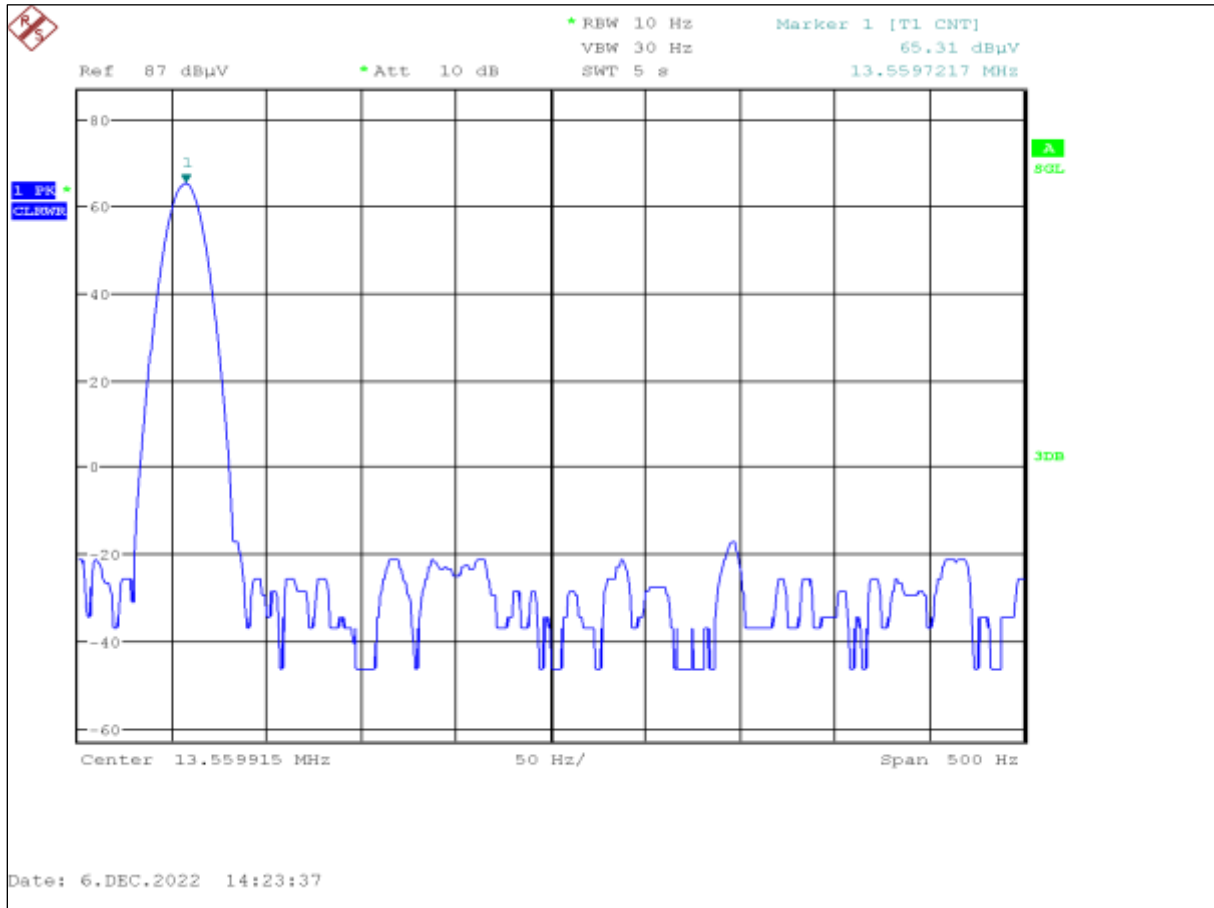
1.2.1 Reference at nominal conditions

01_Tnom_Vnom_Ref



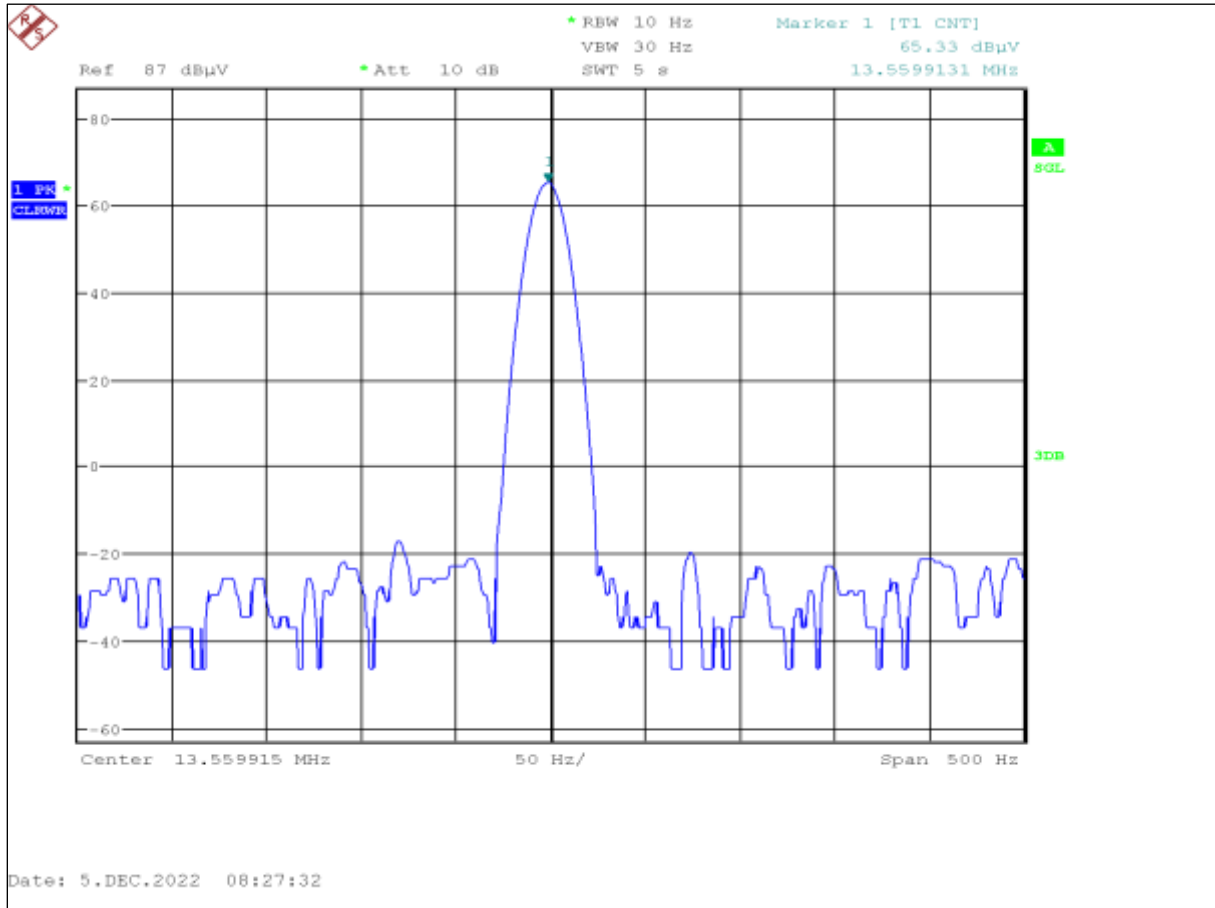
1.2.2 Maximum deviation at -40°deg

31_1_Tm40_Vnom



1.2.3 Maximum deviation for variable voltage

13_Tnom_4_3V



1.3 Conducted emissions on AC-mains

Diagram 1.01

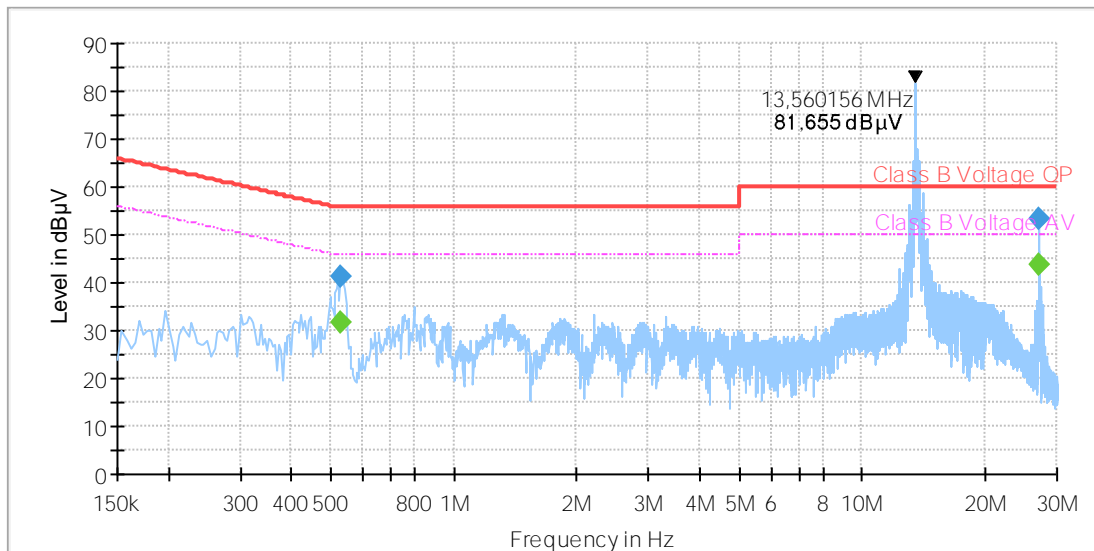
Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Standard:	FCC 15.107, FCC 15.207
Operating Mode:	TX
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Tnom, Vnom
Comments:	With AC/DC adapter
EUT Setup:	2
Verdict:	Further investigations necessary, see diagram 1.02

EUT Information

PMT number:	21-1-00373S16_C01
Date received:	--

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.528594	---	31.69	46.00	14.31	1000.0	9.000	N	GND	0.1
0.528594	41.25	---	56.00	14.75	1000.0	9.000	N	GND	0.1
27.117344	---	43.84	50.00	6.16	1000.0	9.000	N	GND	0.9
27.117344	53.13	---	60.00	6.87	1000.0	9.000	N	GND	0.9

1.02_antenna_terminated

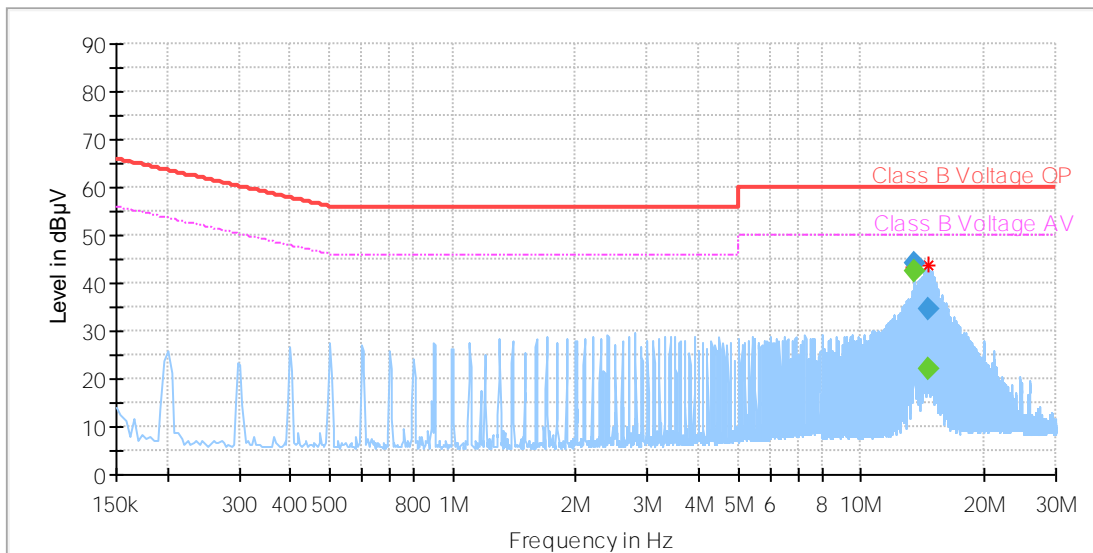
Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Standard:	FCC 15.107, FCC 15.207
Operating Mode:	TX
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Tnom, Vnom
Comments:	With AC/DC adapter
EUT Setup:	3
Verdict:	Passed

EUT Information

PMT number:	21-1-01857S15_C01
Date received:	--

Full Spectrum

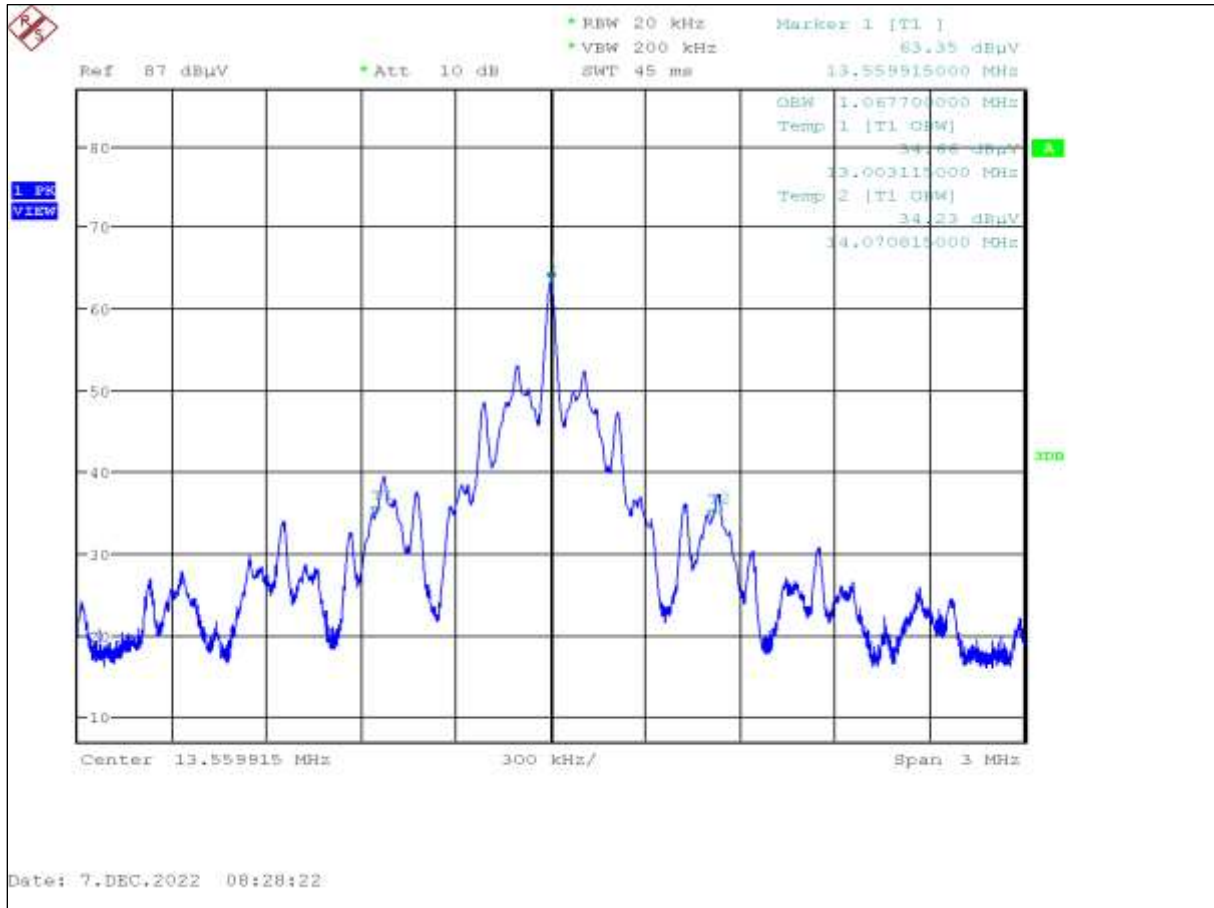


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
13.557656	---	42.36	50.00	7.64	1000.0	9.000	L1	GND	0.6
13.557656	44.01	---	60.00	15.99	1000.0	9.000	L1	GND	0.6
14.633438	---	21.95	50.00	28.05	1000.0	9.000	L1	GND	0.6
14.633438	34.50	---	60.00	25.50	1000.0	9.000	L1	GND	0.6

1.4 Occupied bandwidth

D100_OBW_Ch_nom_PRBS_Mode_TnomVnom



End Of Annex 1