Annex 1: Measurement diagrams to
T E S T R E P O R T
No.: 17-1-0227101T05a-C1

According to:
FCC Regulations
Part 15.209
Part 15.247

for

Daimler Trucks

A 000 446 5860
CTPMID

FCC: 2AMIOCTP4465860

Laboratory Accreditation and Listings			
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01 Accredited EMC-Test Laboratory	FCC MRA US-EU 0003	Industry Canada Reg N.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	VCCI Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301
Wi Fi ALLIANCE AUTHORIZED RF LABORATORY	ctia Authorized™ Test Lab Lab Code: 20011130-00		
accredited according to DIN EN ISO/IEC 17025			

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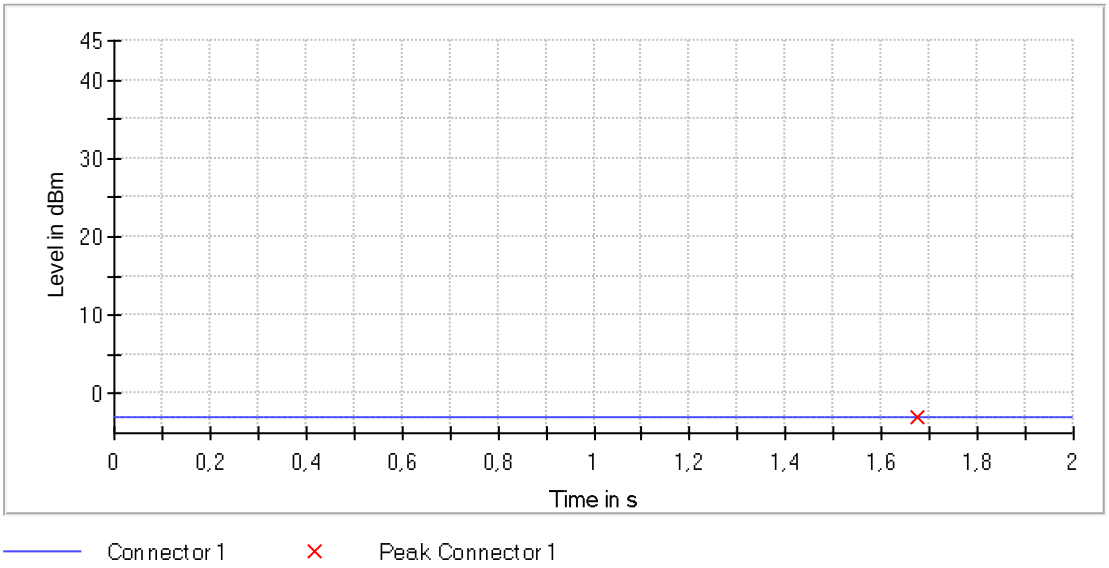
1. Conducted RF-measurements on antenna port

1.1. RF output Power

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402.000000	-2.9	30.0	PASS



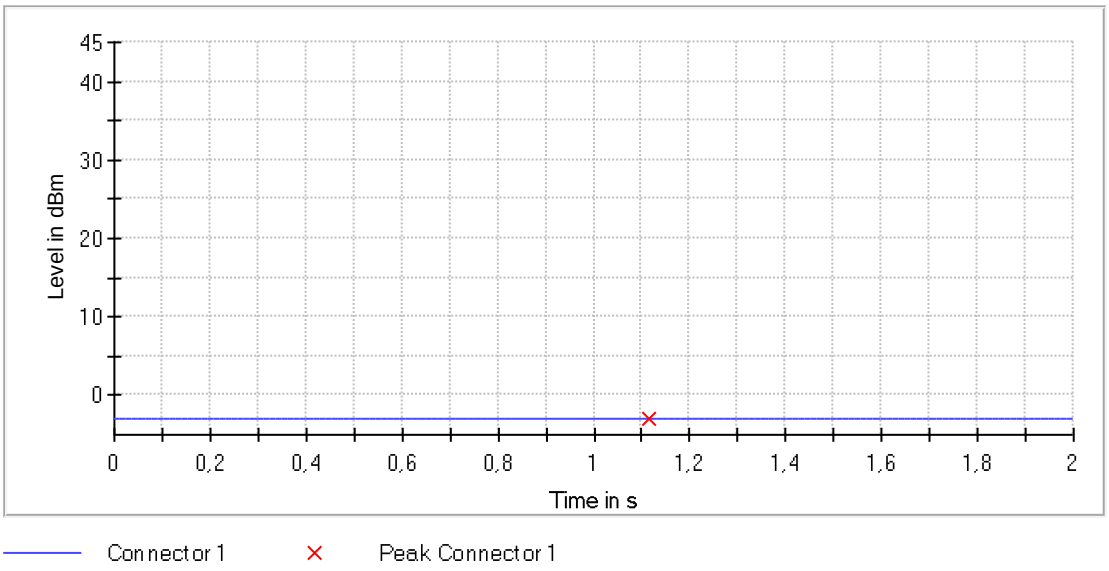
Peak Power 1

Peak Power_low_2402

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2442.000000	-2.9	30.0	PASS



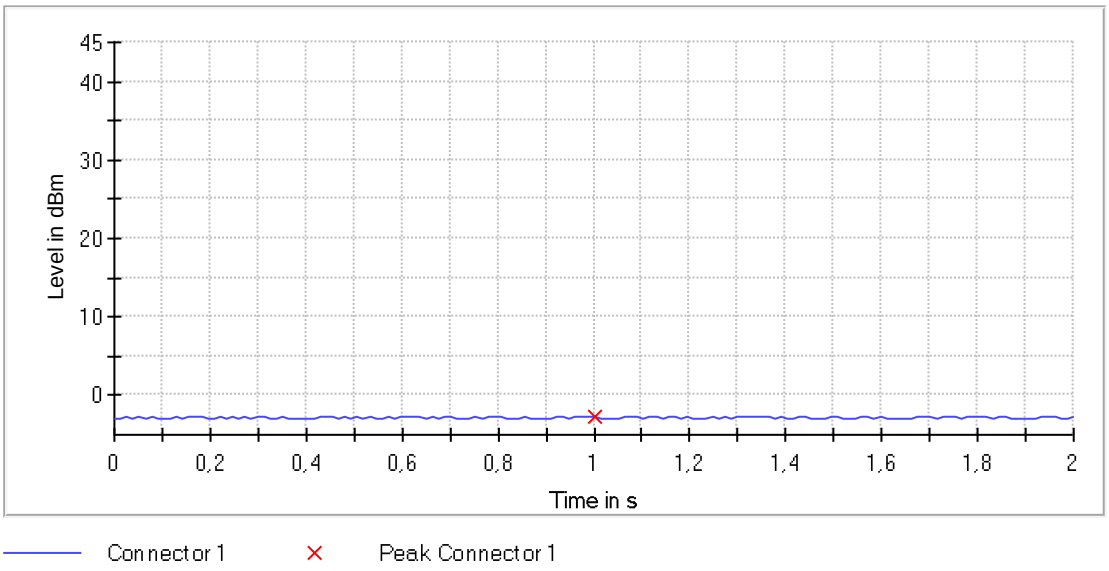
Peak Power 1

Peak Power_mid_2442

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

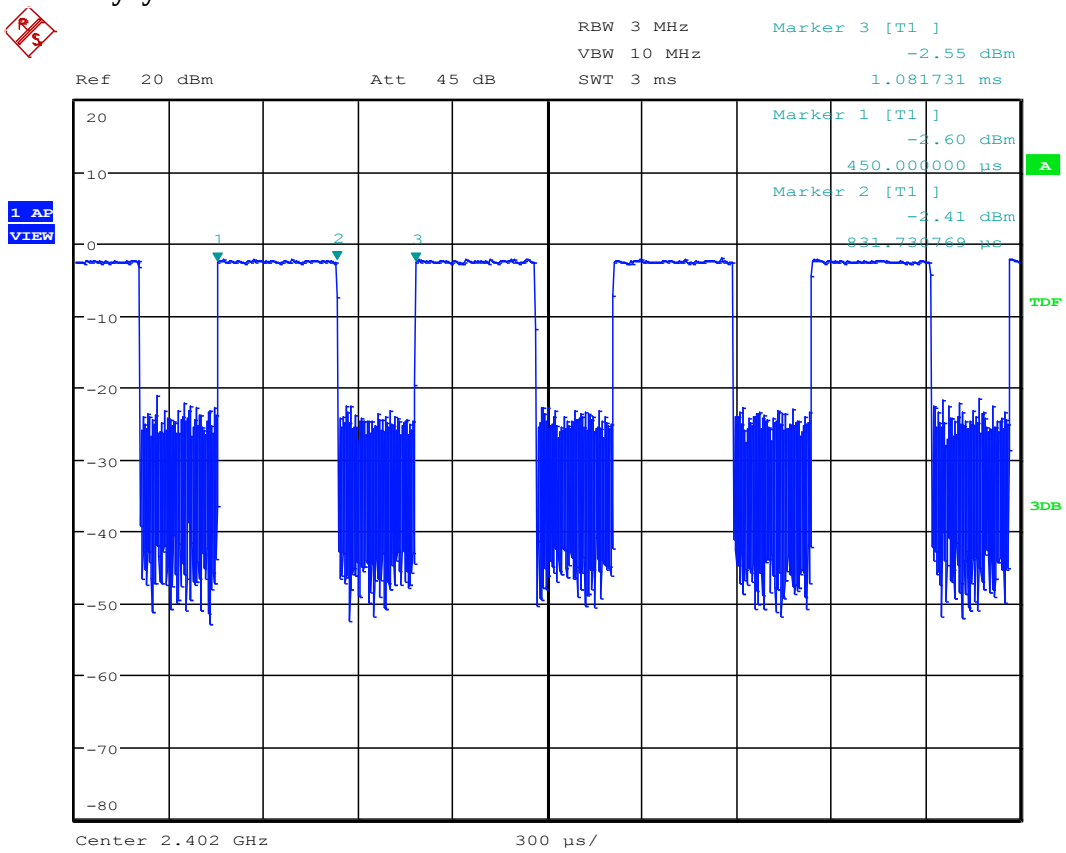
DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	-2.7	30.0	PASS



Peak Power 1

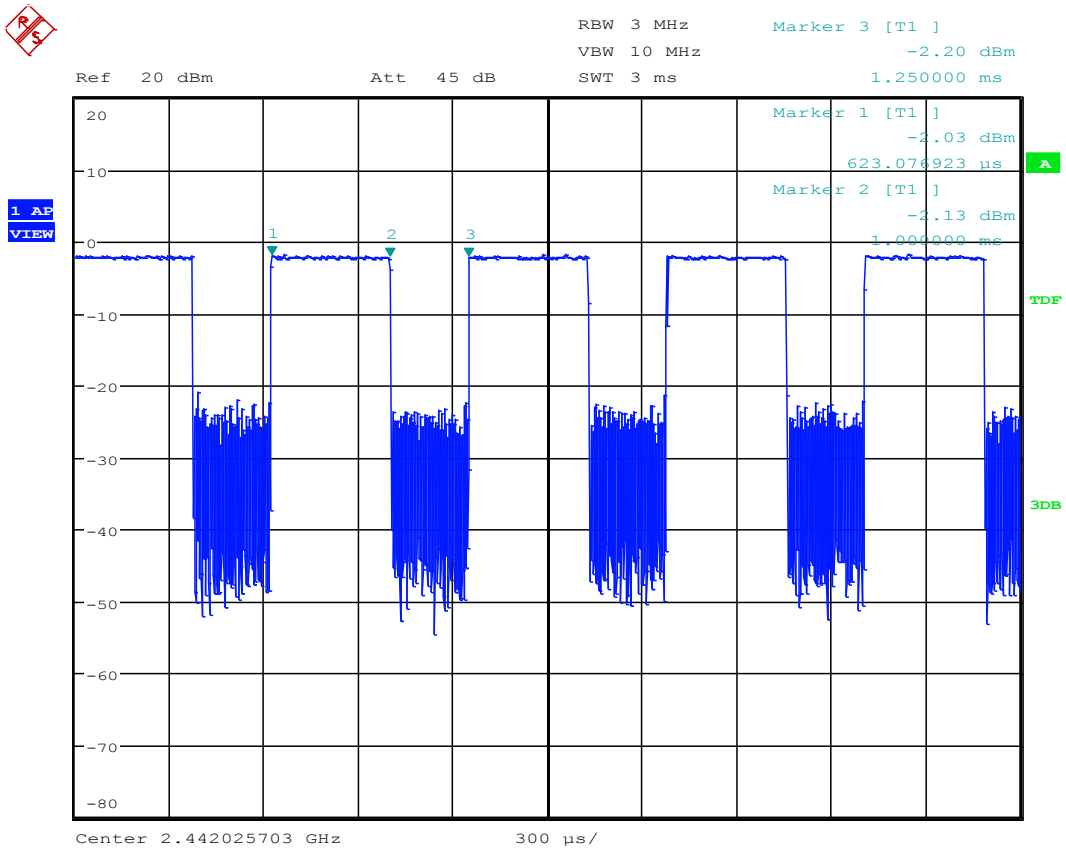
Peak Power_high_2480

1.2. Dutycyle



Date: 12.DEC.2017 11:38:54

DC_low_2402



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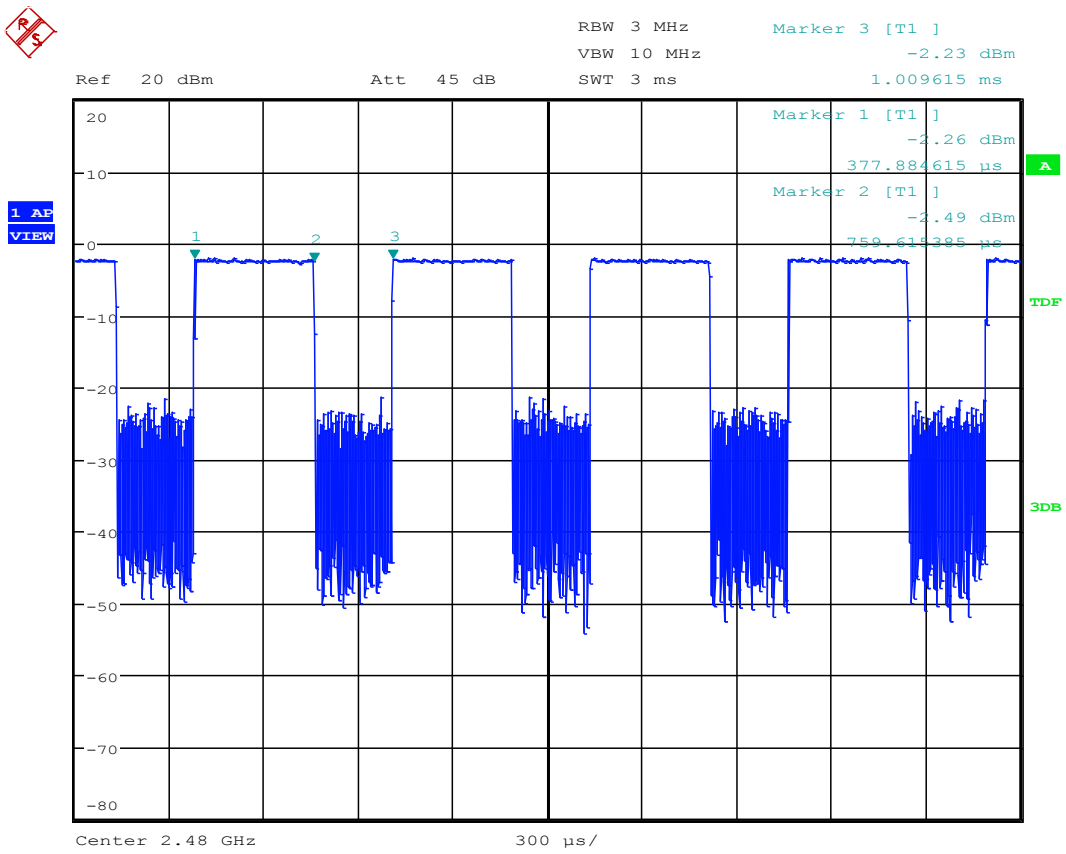
DC_mid_2442



Date: 12.DEC.2017 11:37:09

DC_high_2480

1.3. 6dB bandwidth

Minimum Emission Bandwidth 6 dB (2402 MHz)

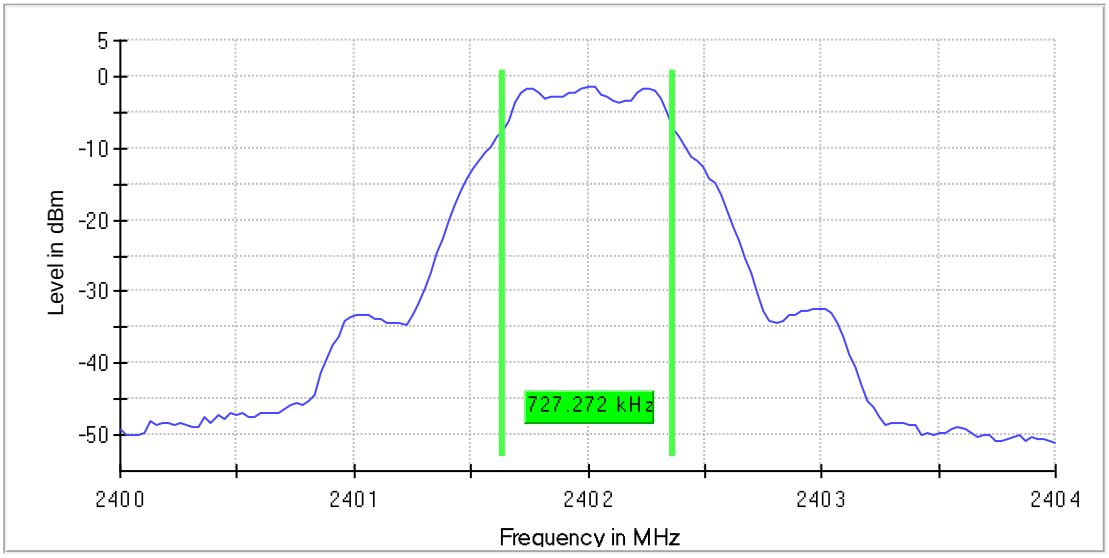
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
2402.000000	0.727272	0.500000	---	2401.636364	2402.363636	-1.3

(continuation of the "6 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
2402.000000	PASS



Bandwidth

Minimum Emission Bandwidth 6 dB (2442 MHz)

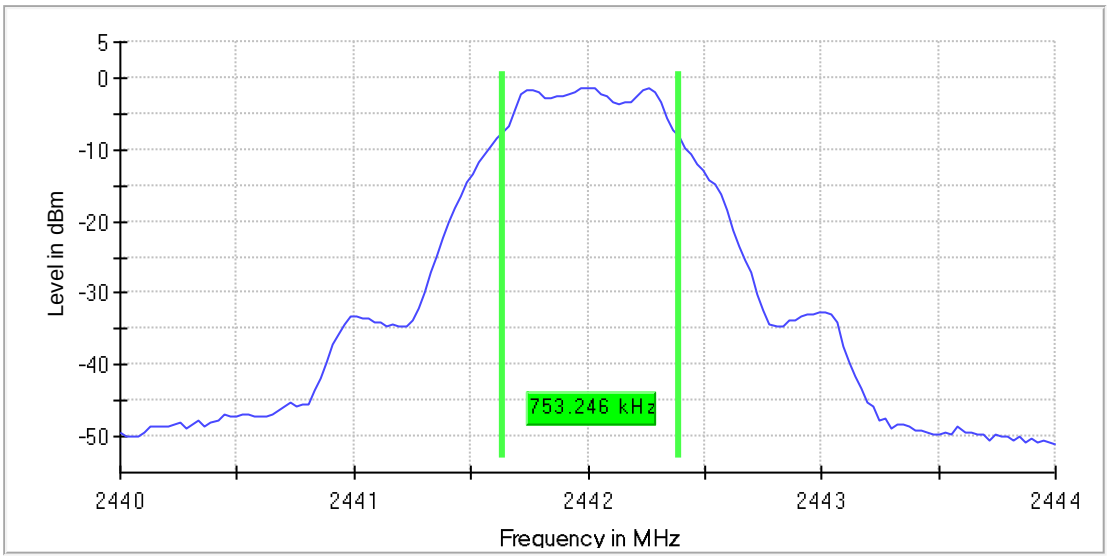
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
2442.000000	0.753246	0.500000	---	2441.636364	2442.389610	-1.3

(continuation of the "6 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
2442.000000	PASS



Bandwidth

Minimum Emission Bandwidth 6 dB (2480 MHz; 2 MHz)

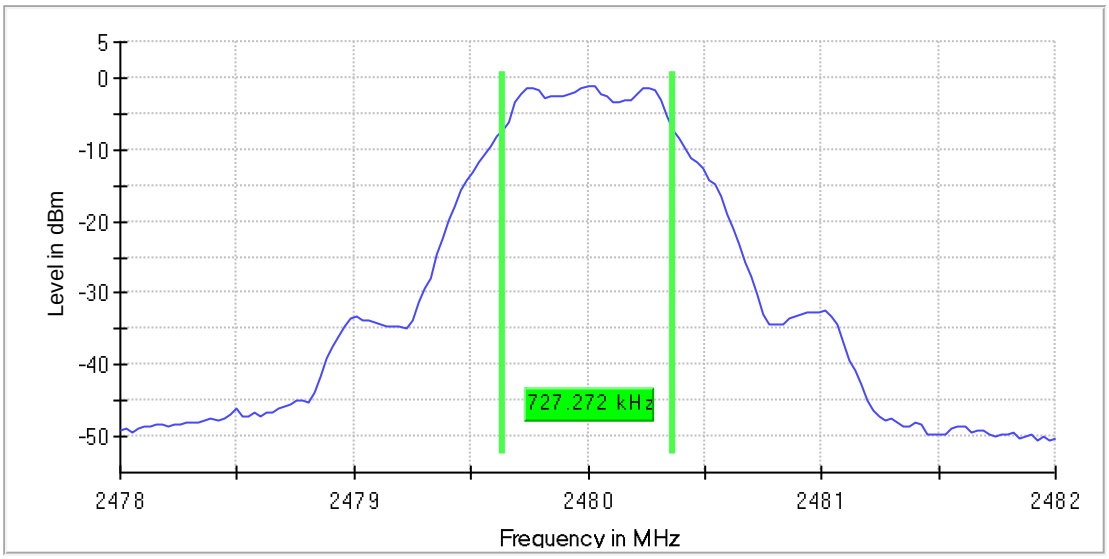
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
2480.000000	0.727272	0.500000	---	2479.636364	2480.363636	-1.1

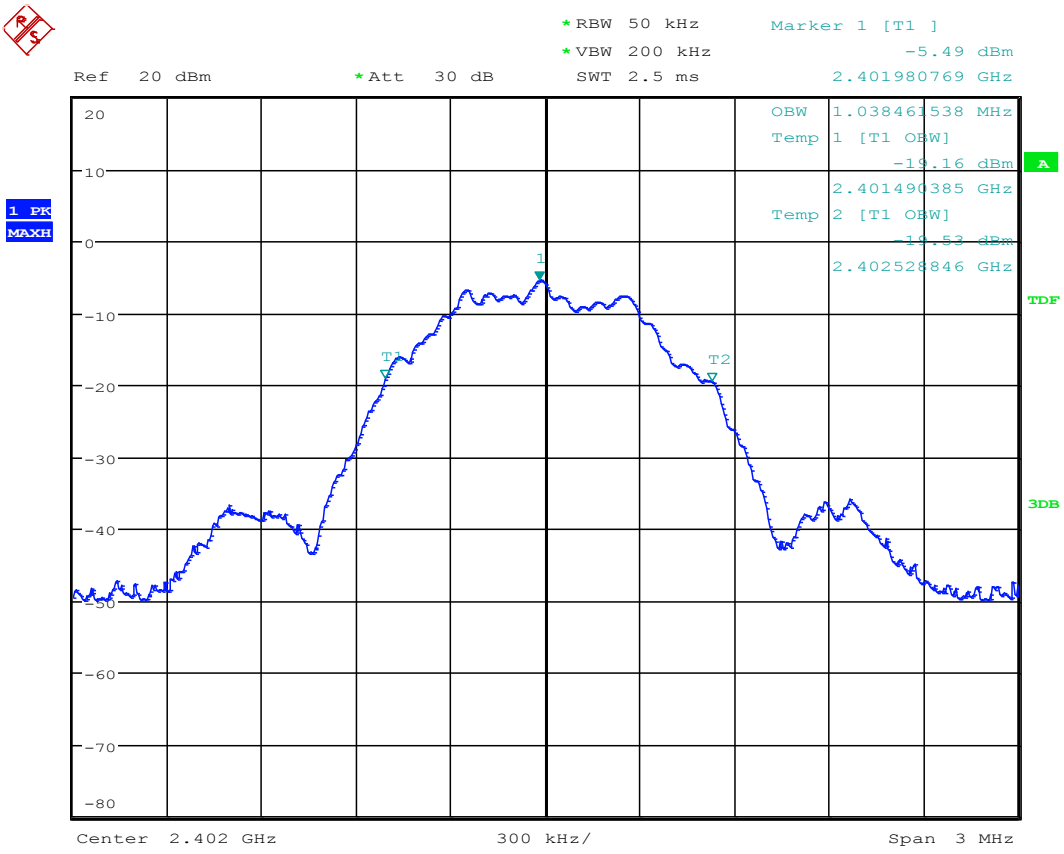
(continuation of the "6 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
2480.000000	PASS



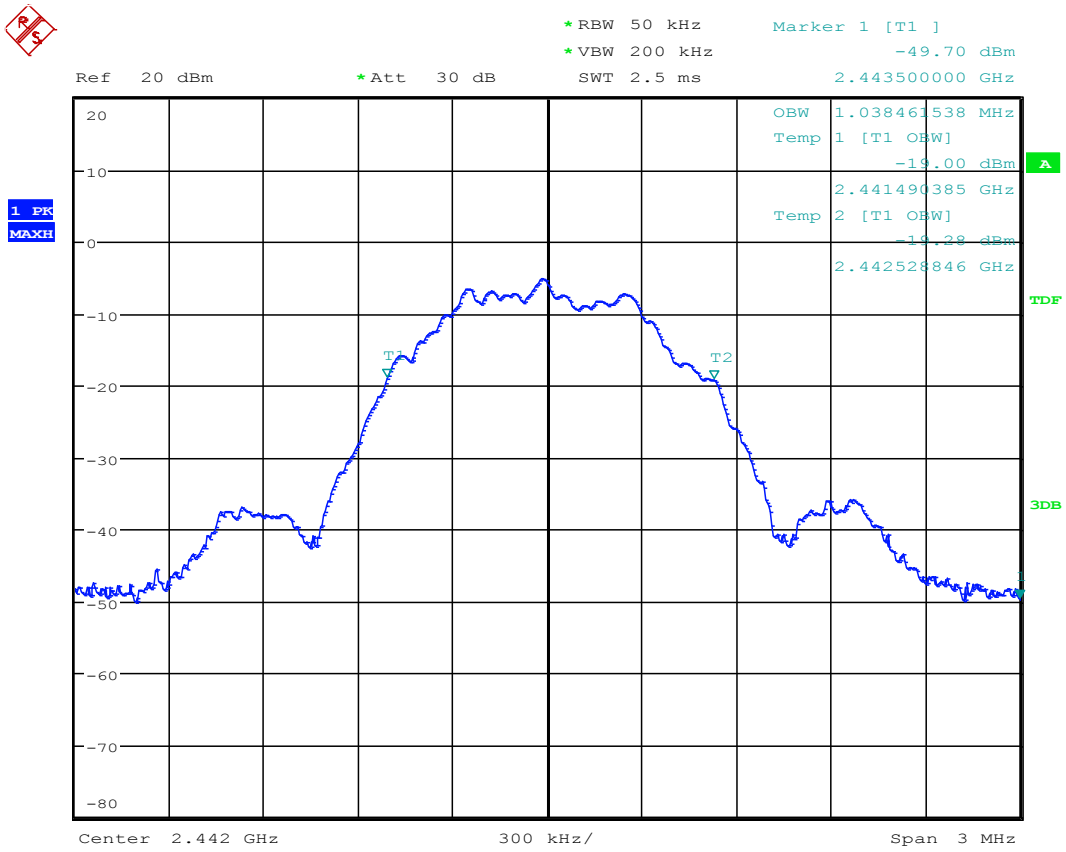
Bandwidth

1.4. 99% occupied channel bandwidth



Date: 12.DEC.2017 11:40:05

99%OBW_low_2402



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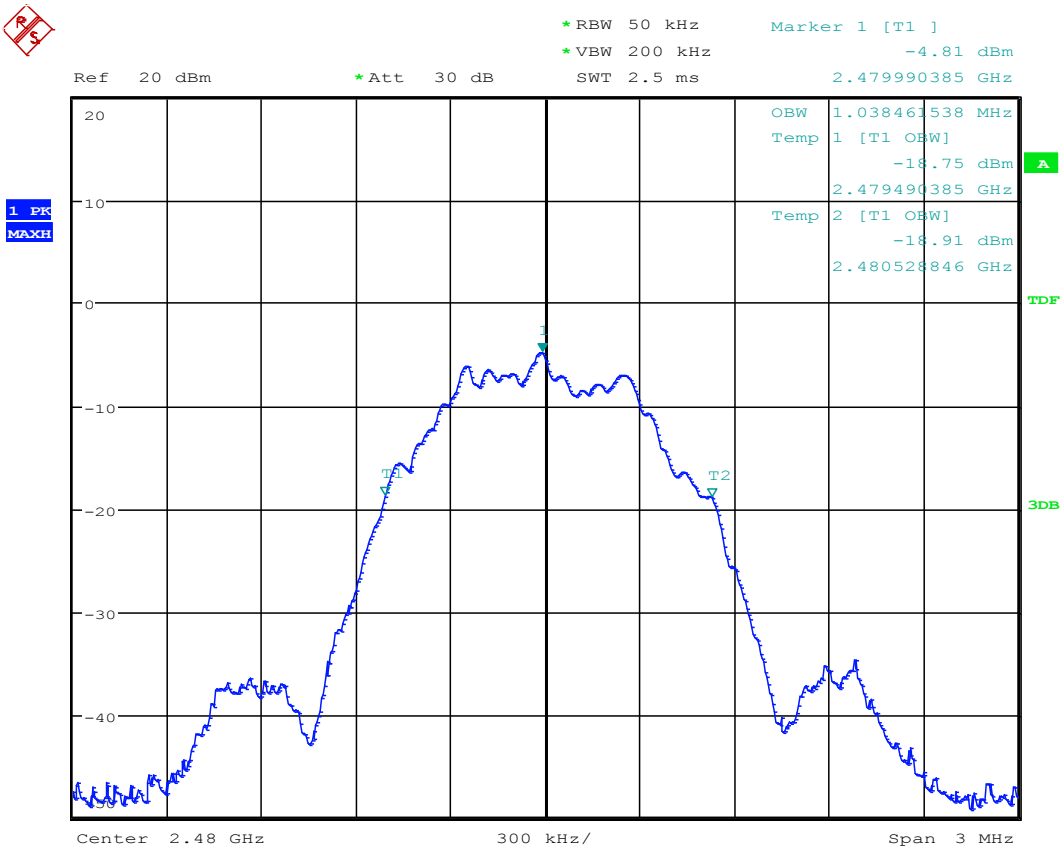
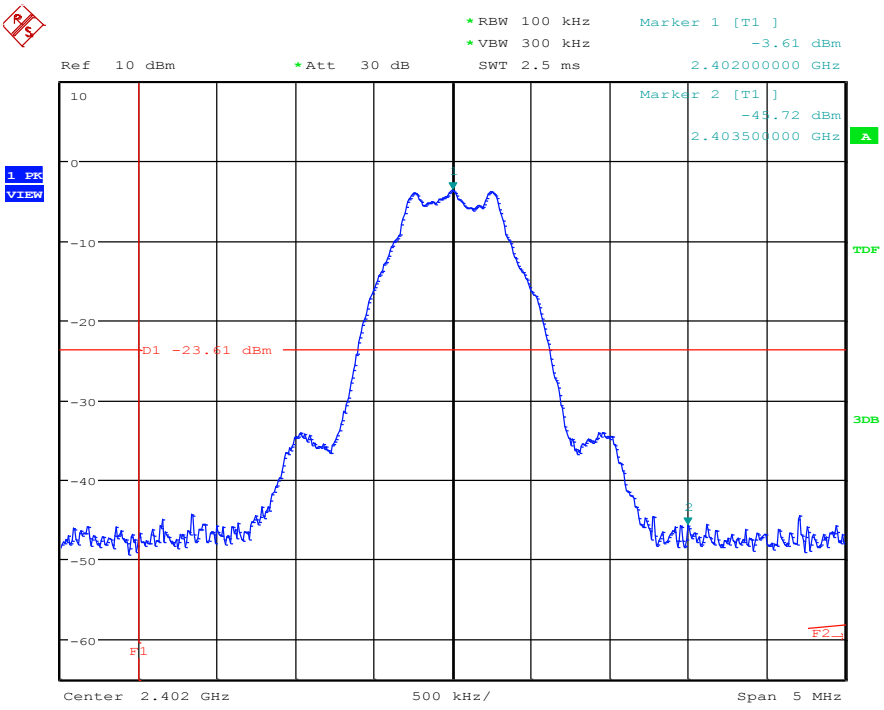
99%OBW_mid_2442



Date: 12.DEC.2017 11:44:04

99%OBW_high_2480

1.5. 20dBc



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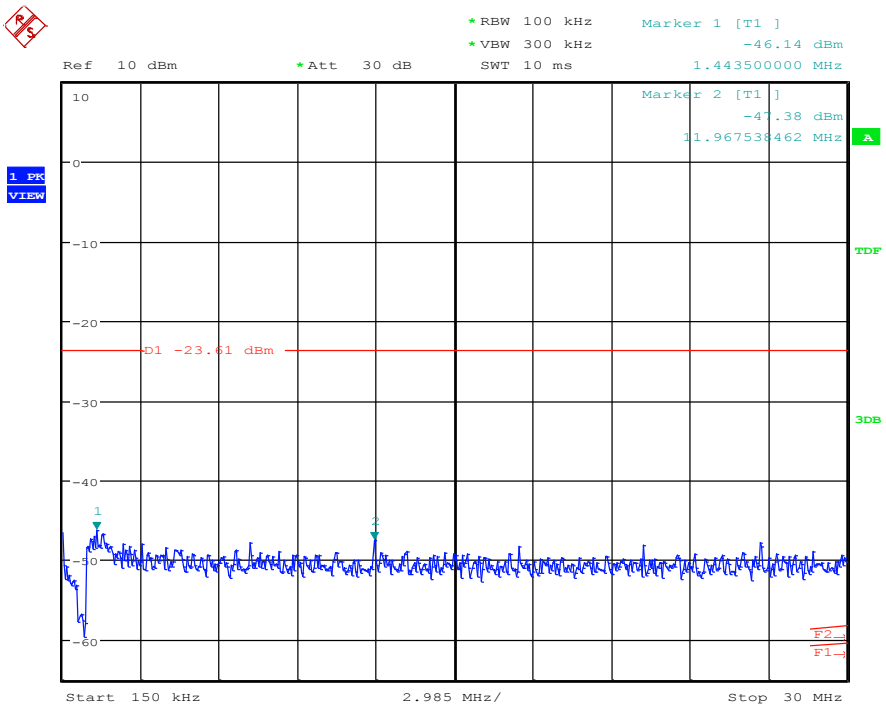
20dBc_ref_low_BT_LE



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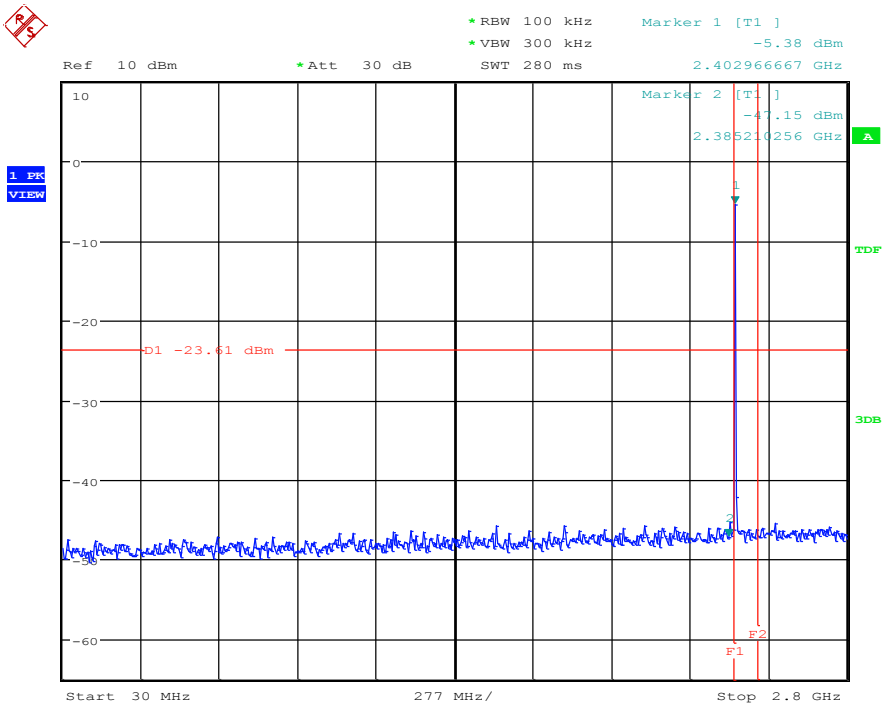
20dBc_150kHz-30MHz _low_BT_LE



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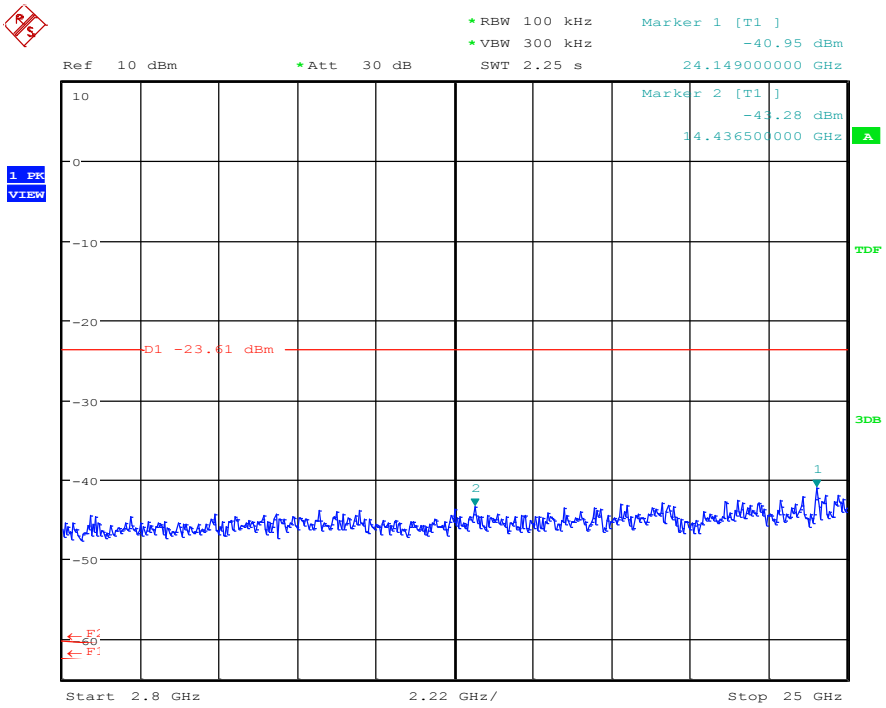
20dBc_30MHz-2.8GHz_low_BT_LE



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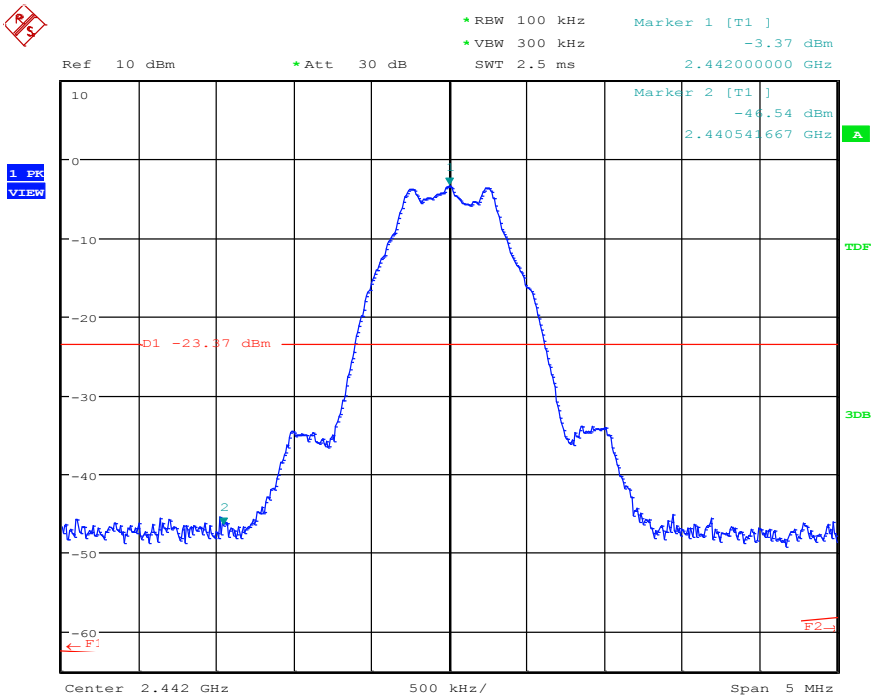
20dBc_2.8-25GHz_low_BT_LE



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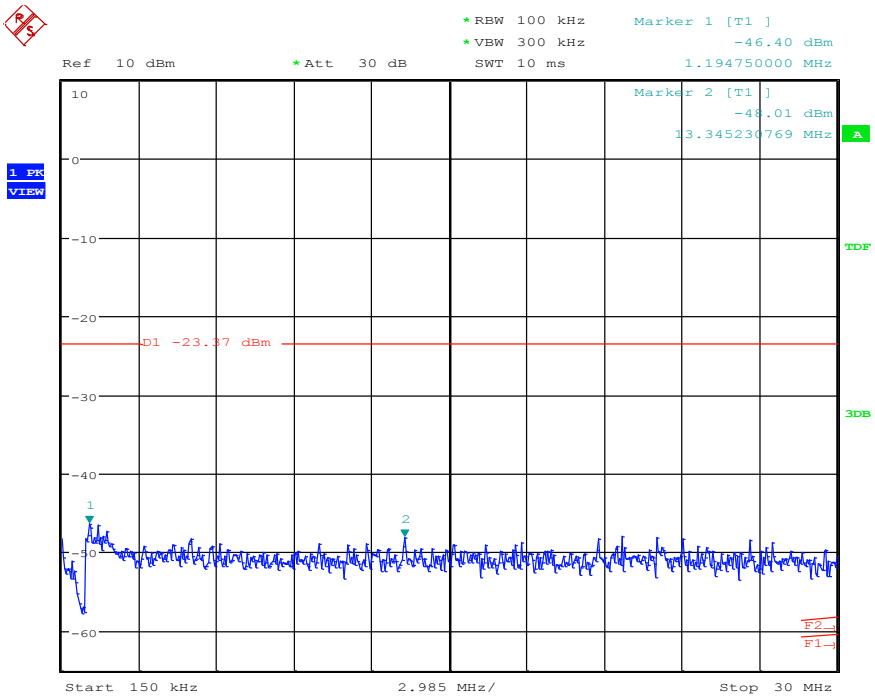
20dBc_ref_mid_BT_LE



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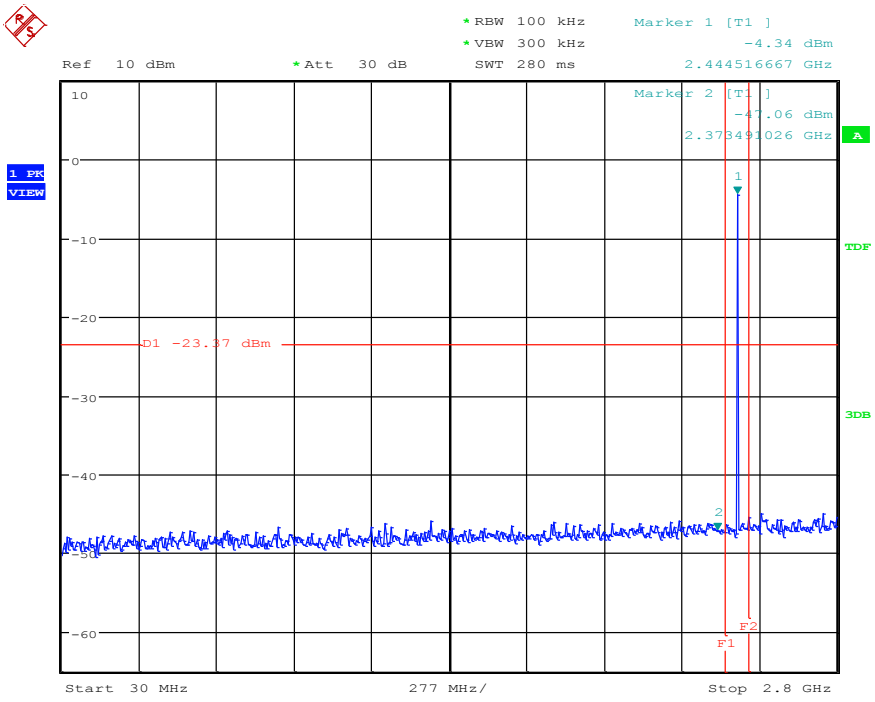
20dBc_150kHz-30MHz _mid_BT_LE



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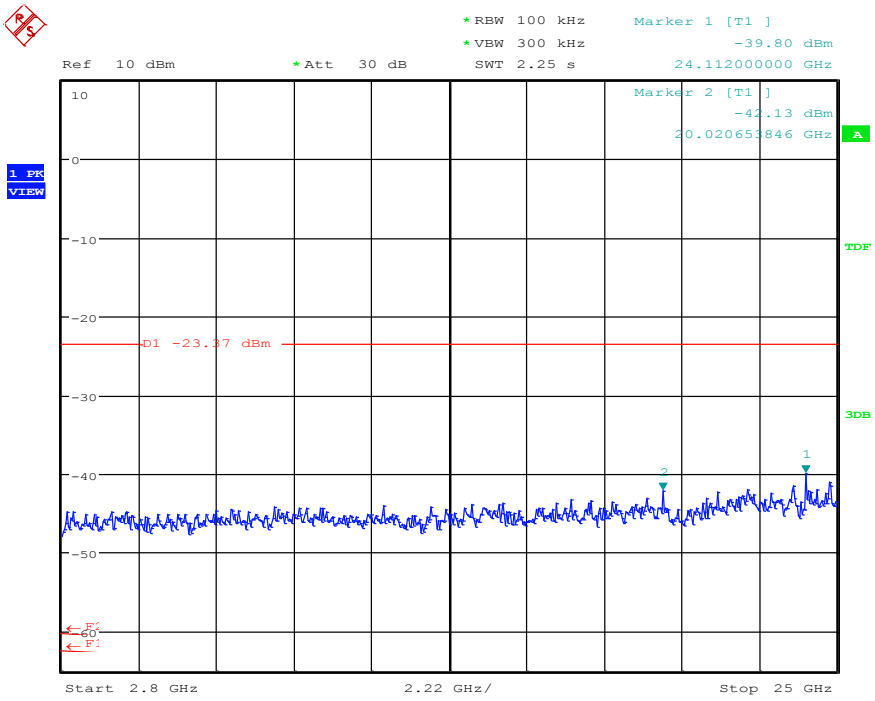
20dBc_30MHz-2.8GHz_mid_BT_LE



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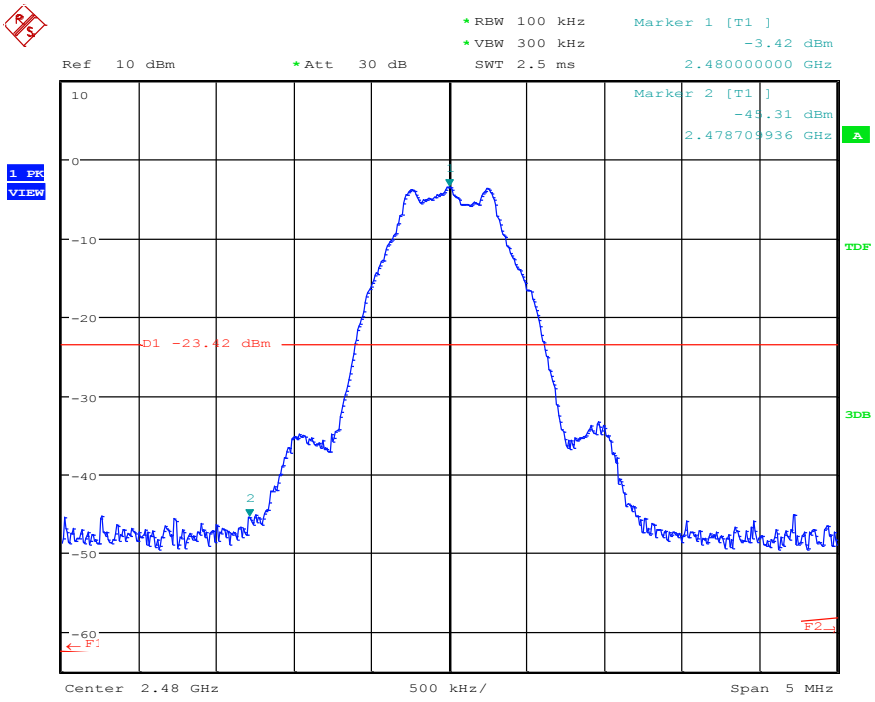
20dBc_2.8-25GHz_mid_BT_LE



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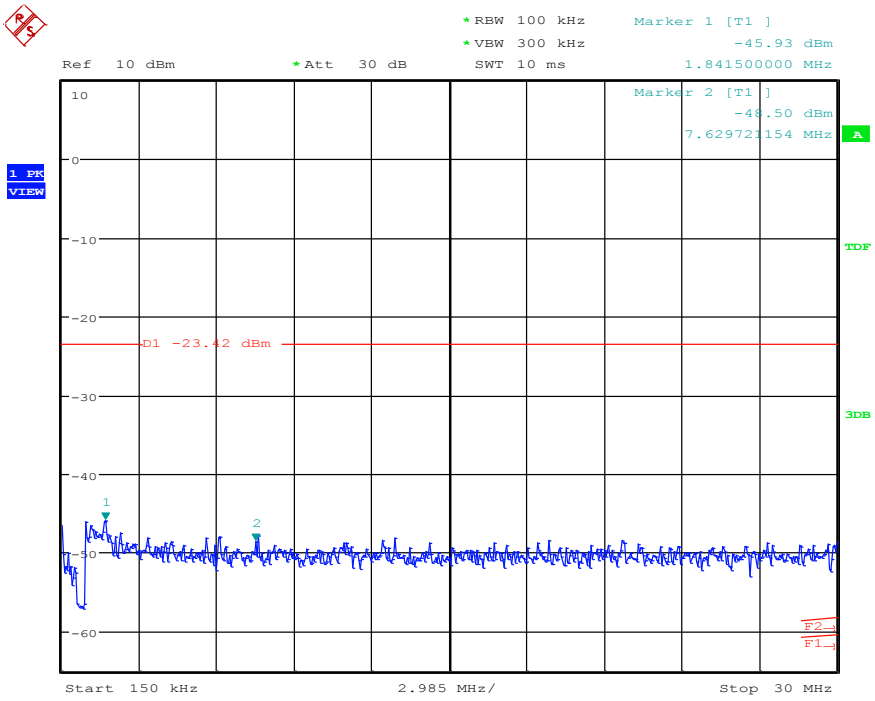
20dBc_ref_mid_BT_LE



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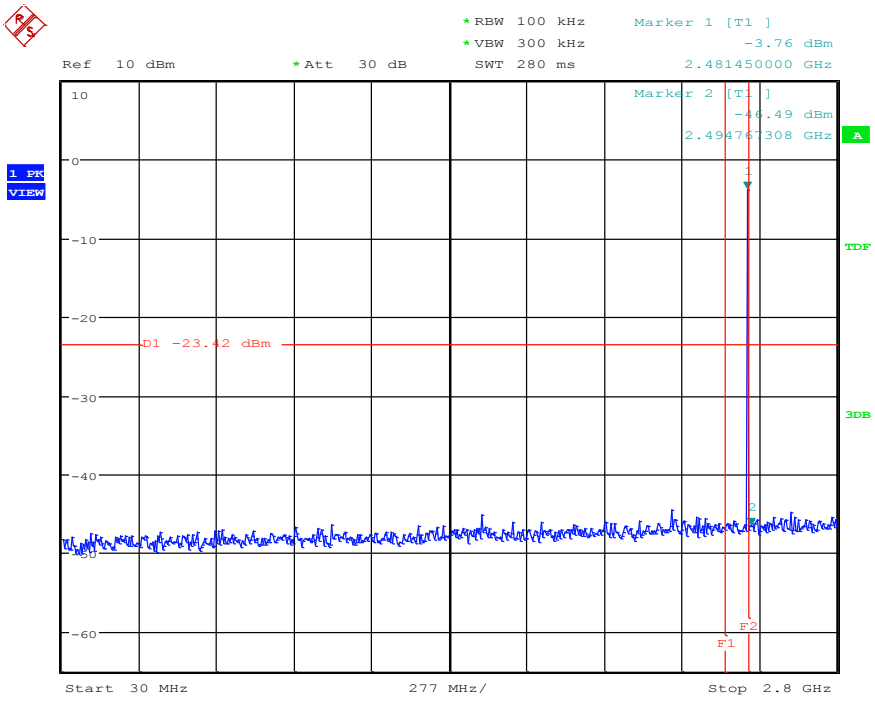
20dBc_150kHz-30MHz _mid_BT_LE



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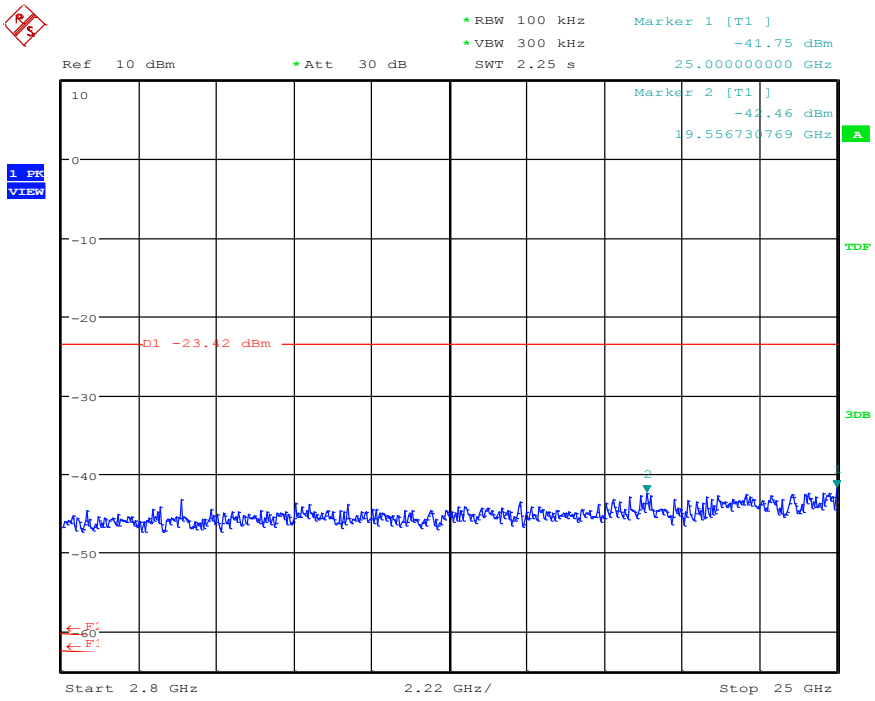
20dBc_30MHz-2.8GHz_high_BT_LE



Date: 12.DEC.2017 12:00:57

20dBc_2.8-25GHz_mid_BT_LE

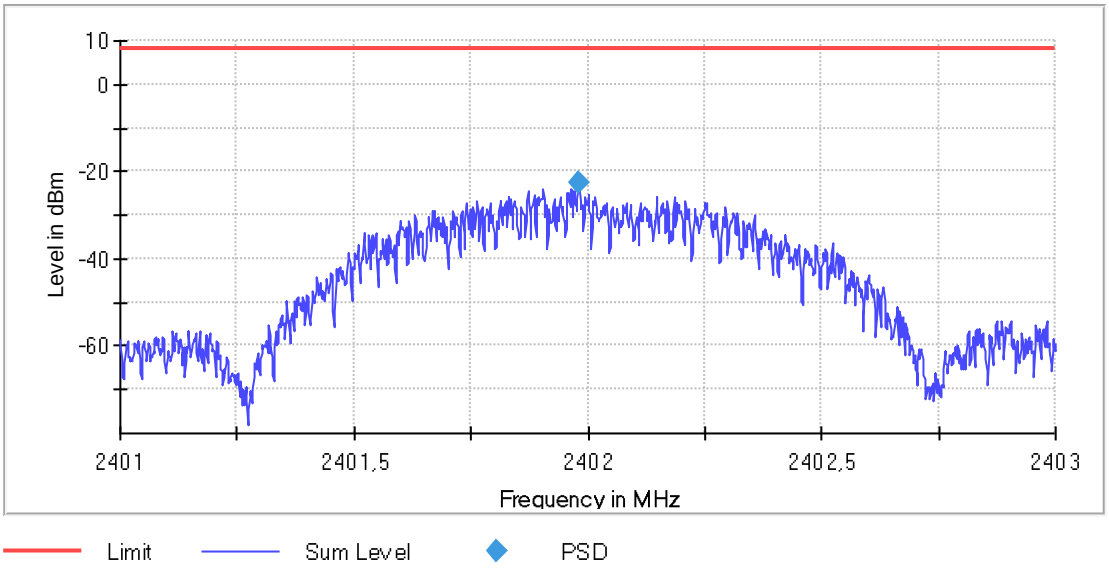
1.6.Power spectral density

Power Spectral Density (2402 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2401.981538	-22.548	8.0	PASS



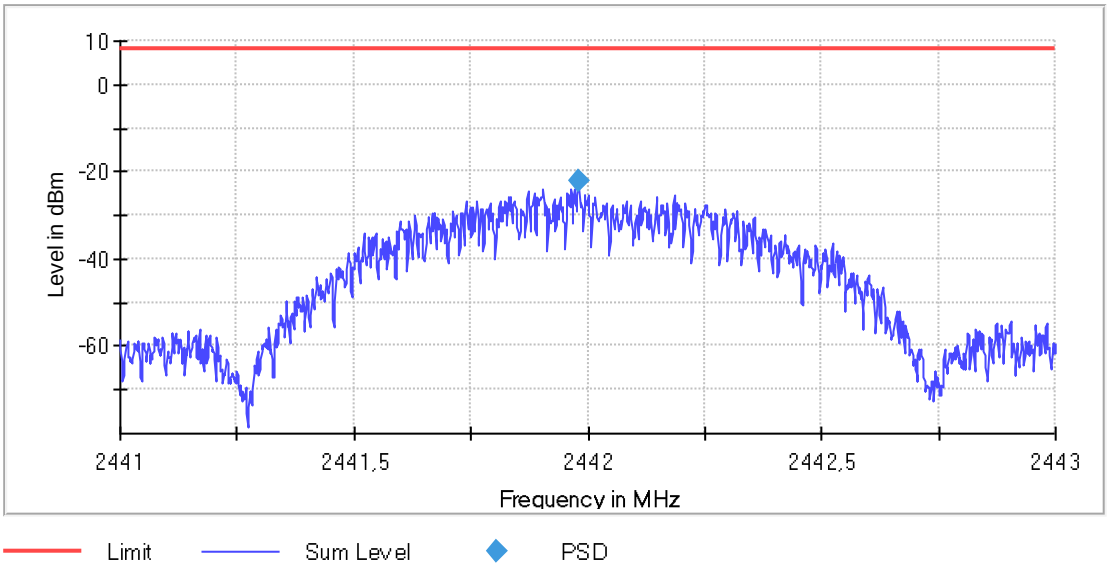
PSD Connector 1

Power Spectral Density (2442 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2442.000000	2441.980000	-22.290	8.0	PASS



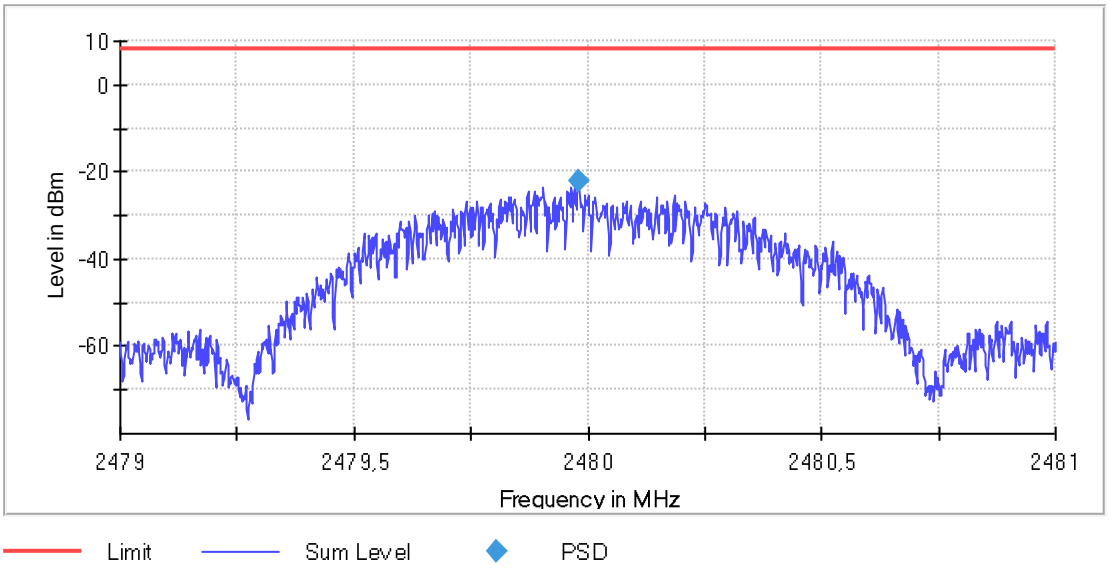
PSD Connector 1

Power Spectral Density (2480 MHz; 2 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.980000	-22.182	8.0	PASS



PSD Connector 1

2. Radiated field strength measurements accord. §15.209&15.205

2.1. Magnetic field measurements f<30MHz

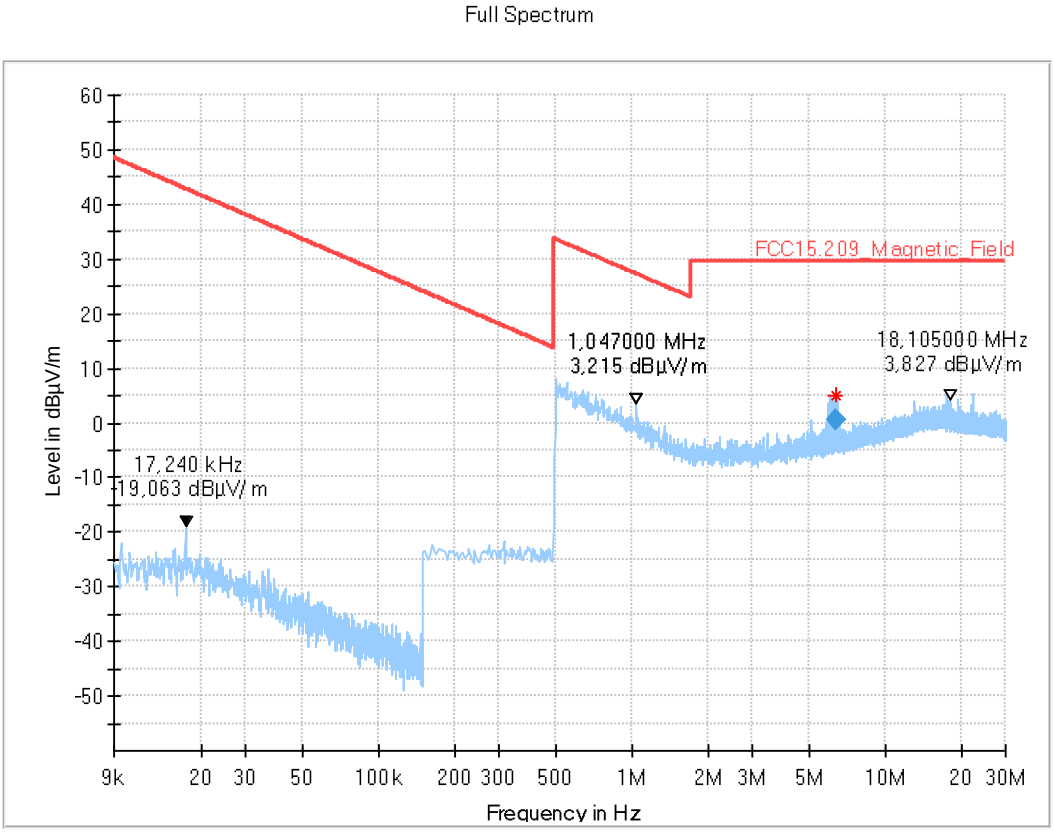
Diagram No. 2.10_BT_LE_low

Date: 05.12.2017 Page 1 of 1

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	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 polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	KIv
Operating conditions:	TX-on
Power during tests:	24 V DC
Comment 1:	BT_LE_low

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC



Final_Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
6.360000	0.51	29.54	29.03	1000.0	10.000	100.0	H	211.0	-17.2

Diagram No. 2.11_BT_LE_mid

Date: 05.12.2017 Page 1 of 1

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	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 polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	KIv
Operating conditions:	TX-on
Power during tests:	24 V DC
Comment 1:	BT_LE_mid

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

Full Spectrum

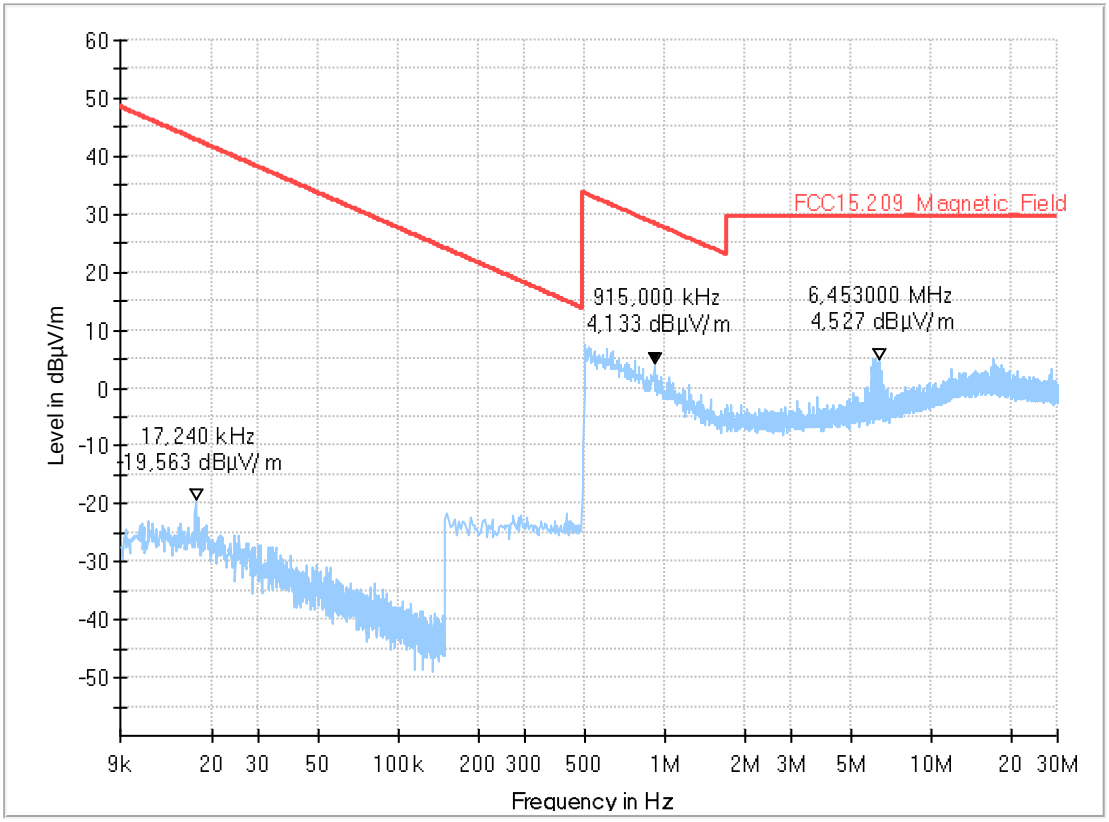


Diagram No. 2.12_BT_LE_high

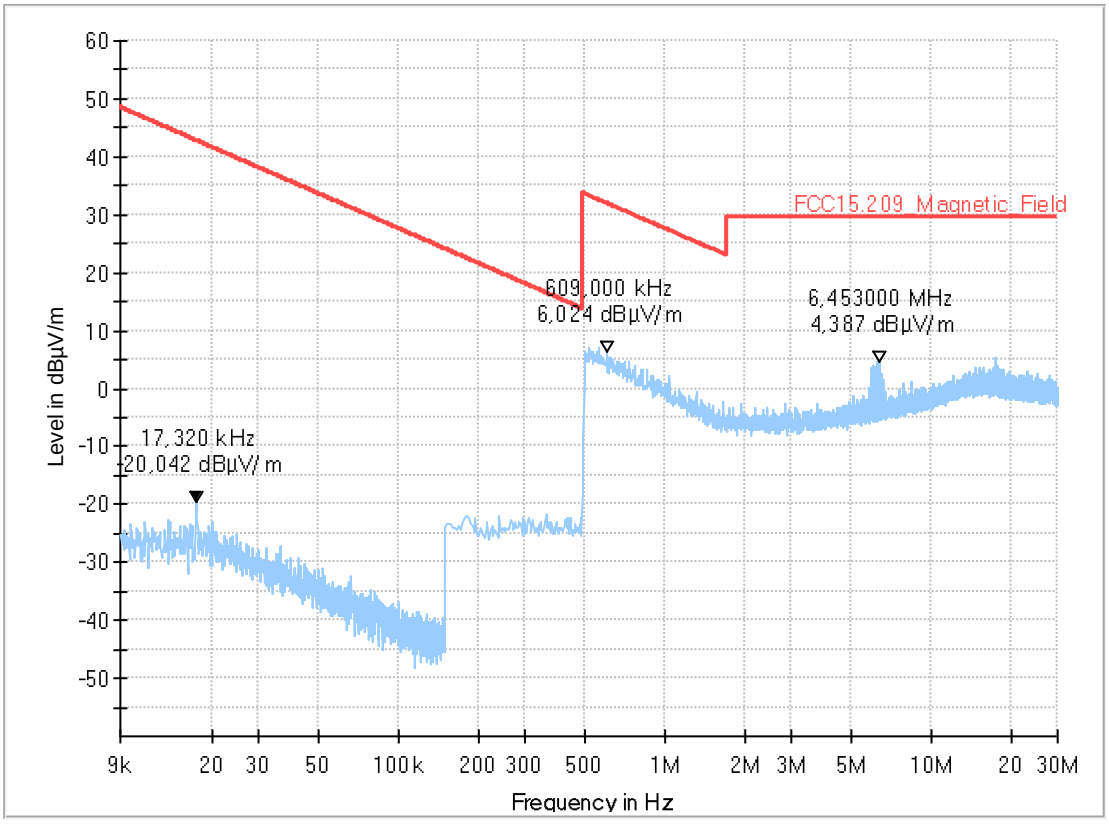
Date: 05.12.2017 Page 1 of 1

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	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 polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	KIv
Operating conditions:	TX-on
Power during tests:	24 V DC
Comment 1:	BT_LE_high

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

Full Spectrum



2.2. Field strength measurements 30MHz <f <1GHz

Diagram No. 3.10_BT_LE_low

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Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209/15.205; RSS-Gen., Issue 4
Operator:	KIv
Operating conditions:	BT_LE_low
Power during tests:	24V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

Full Spectrum

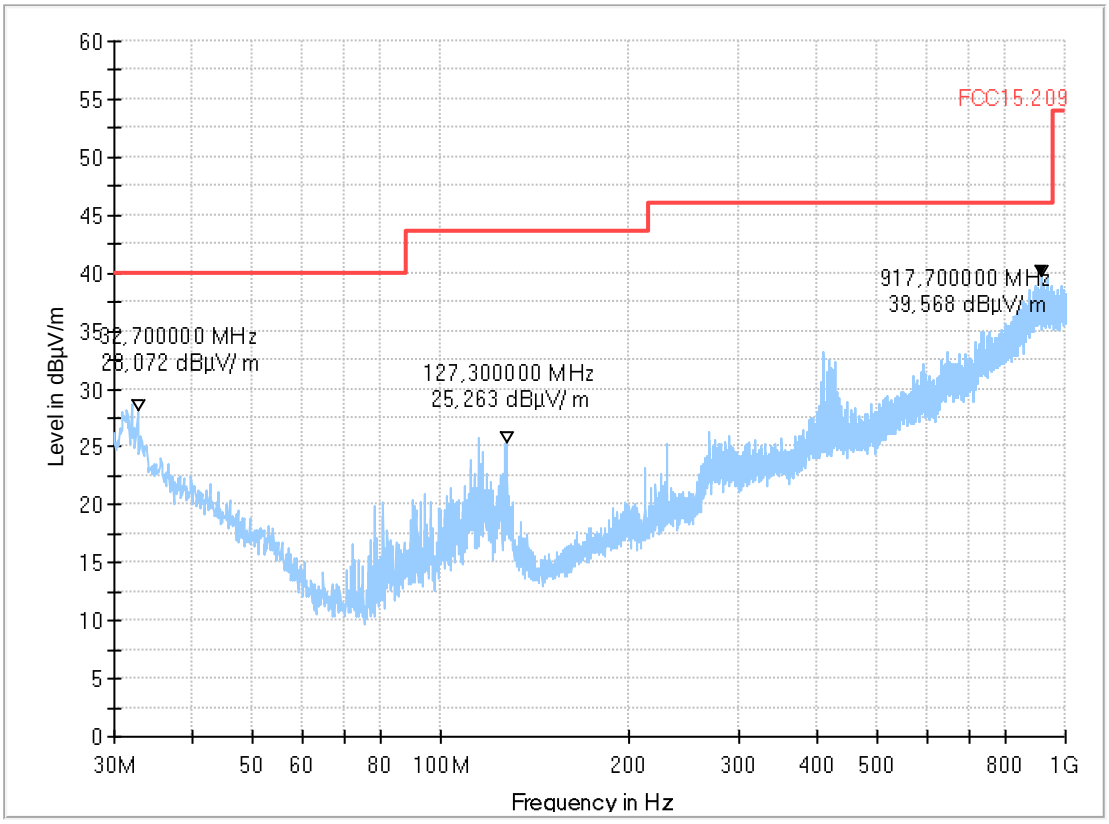


Diagram No. 3.11_BT_LE_mid

07.12.2017 Page 1 of 1

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209/15.205; RSS-Gen., Issue 4
Operator:	KIv
Operating conditions:	BT_LE_mid
Power during tests:	24V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

Full Spectrum

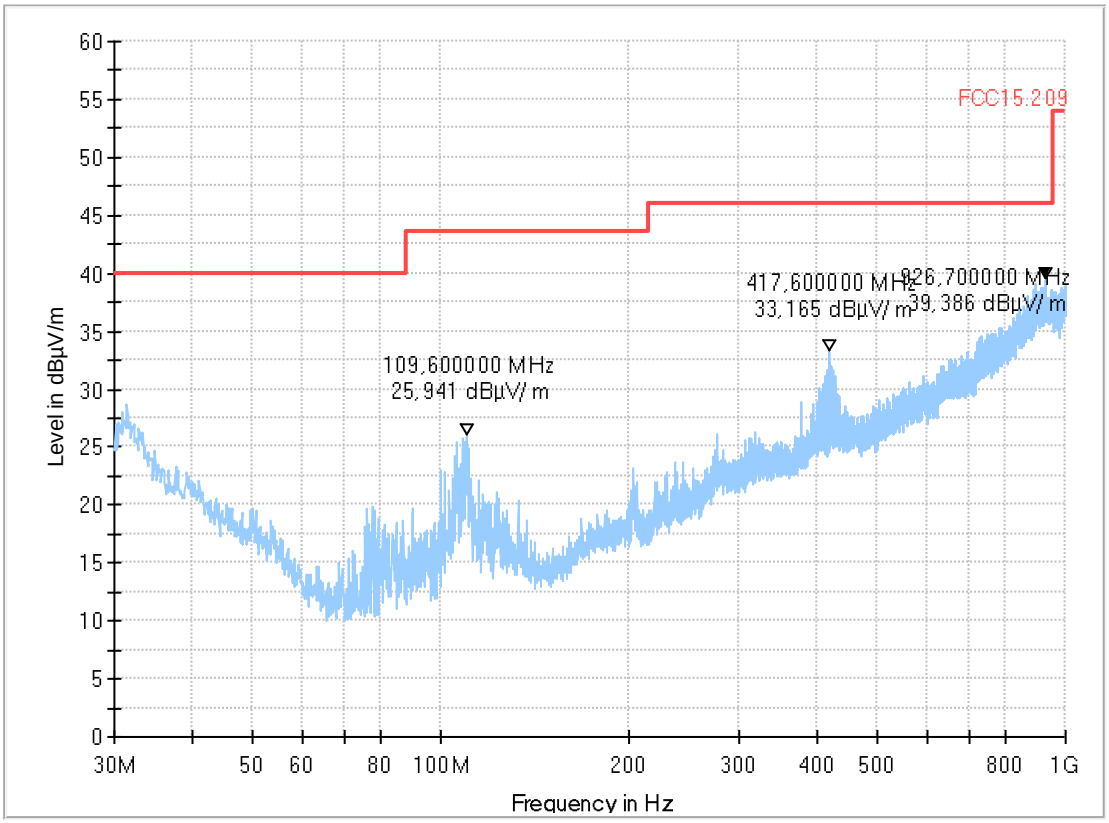


Diagram No. 3.12_BT_LE_high

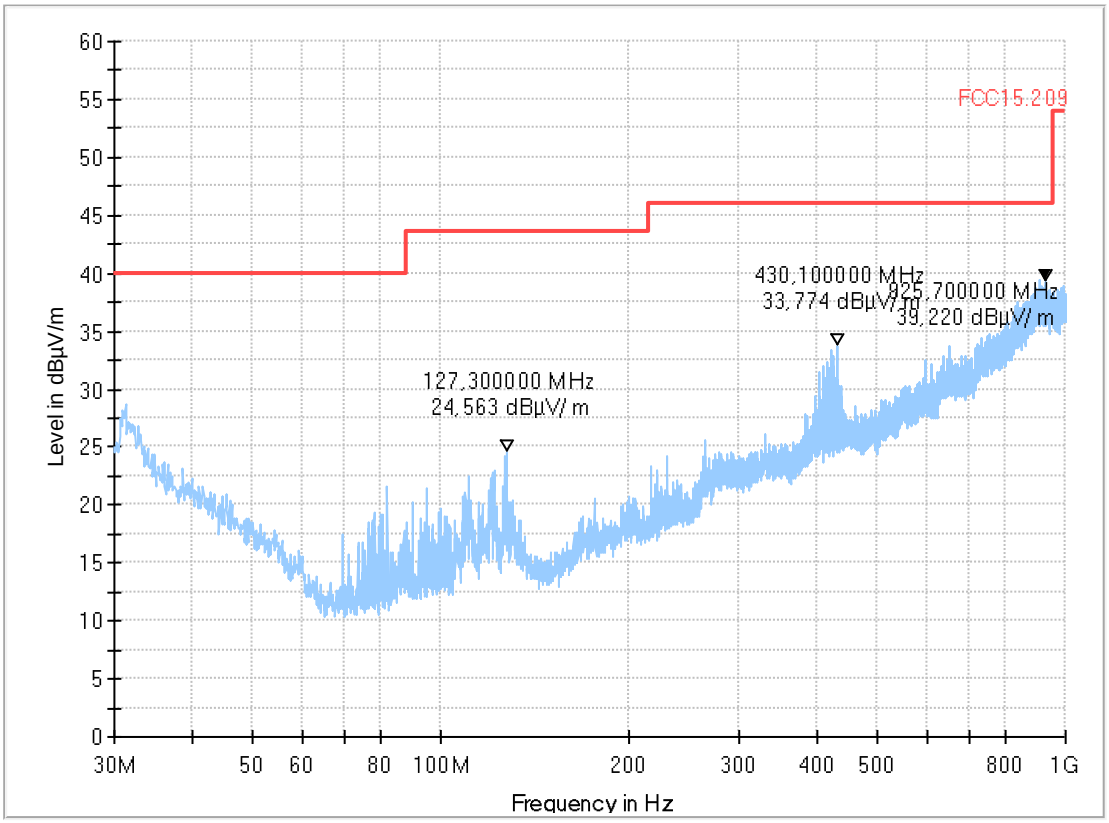
07.12.2017 Page 1 of 1

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209/15.205; RSS-Gen., Issue 4
Operator:	KIv
Operating conditions:	BT_LE_high
Power during tests:	24V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

Full Spectrum



2.3. Field strength measurements f < 18GHz

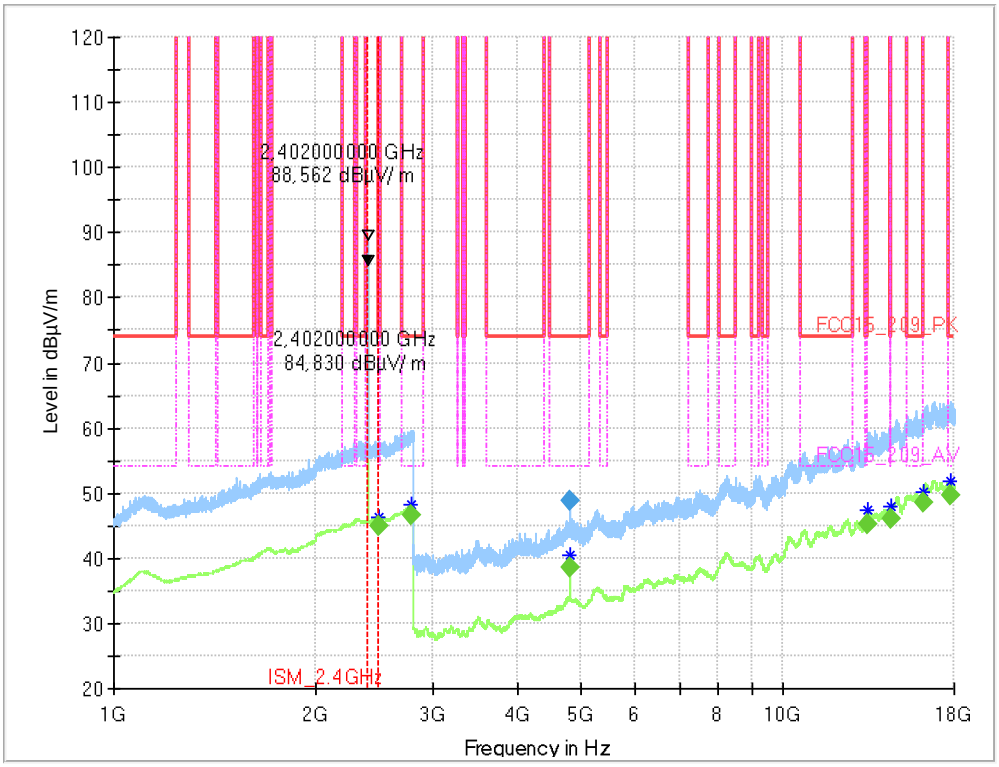
4.10a_BT_LE_low

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	BT_LE_low
Operator Name:	Klv
Power during tests:	24 V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2494.400000	---	44.86	54.00	9.14	100.0	1000.000	155.0	V	46.0
2782.800000	---	46.73	54.00	7.27	100.0	1000.000	155.0	V	180.0
4804.000000	---	38.63	54.00	15.37	100.0	1000.000	155.0	H	247.0
4804.000000	48.70	---	74.00	25.30	100.0	1000.000	155.0	H	264.0
13397.600000	---	45.25	54.00	8.75	100.0	1000.000	155.0	H	301.0
14496.800000	---	45.96	54.00	8.04	100.0	1000.000	155.0	H	172.0
16198.800000	---	48.46	54.00	5.54	100.0	1000.000	155.0	H	19.0
17774.800000	---	49.75	54.00	4.25	100.0	1000.000	155.0	H	228.0

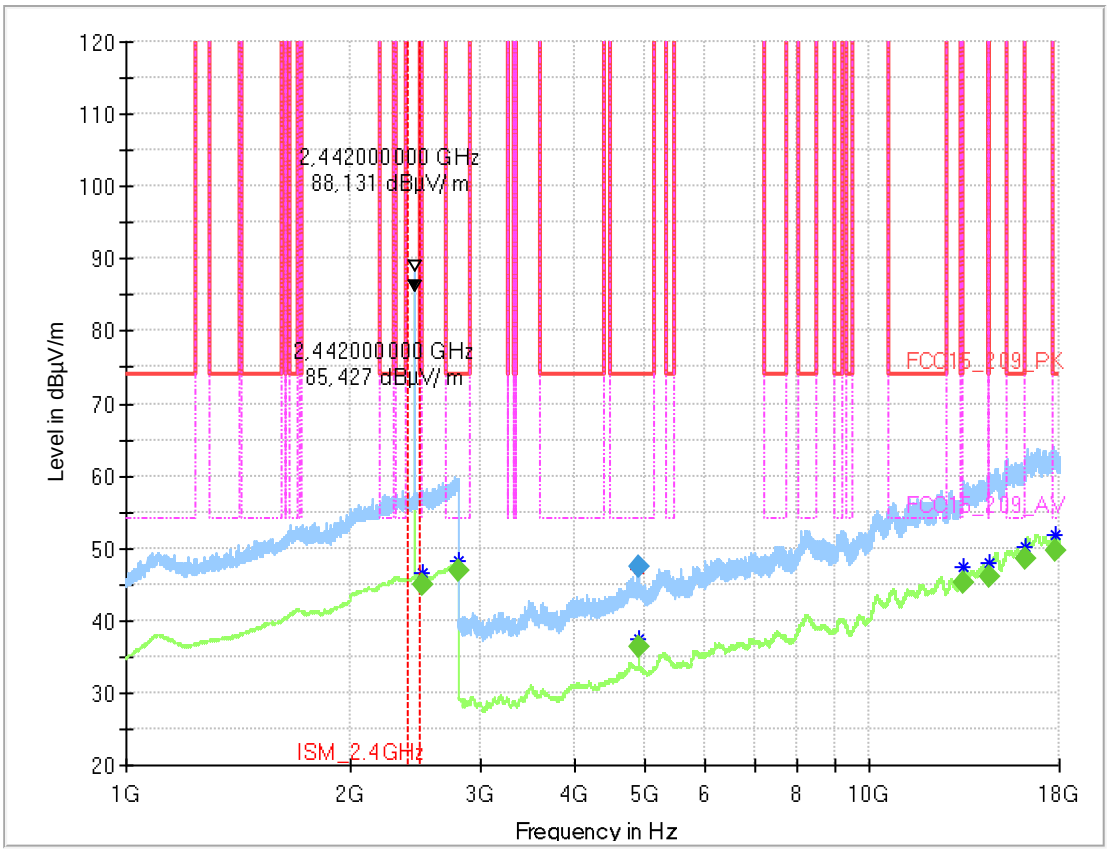
4.11a_BT_LE_mid

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	BT_LE_mid
Operator Name:	KIv
Power during tests:	24 V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2498.800000	---	44.91	54.00	9.09	100.0	1000.000	155.0	V	46.0
2800.000000	---	46.76	54.00	7.24	100.0	1000.000	155.0	V	253.0
4883.600000	47.31	---	74.00	26.69	100.0	1000.000	155.0	H	23.0
4884.000000	---	36.22	54.00	17.78	100.0	1000.000	155.0	H	86.0
13397.200000	---	45.33	54.00	8.67	100.0	1000.000	155.0	H	7.0
14488.000000	---	45.96	54.00	8.04	100.0	1000.000	155.0	H	199.0
16198.800000	---	48.46	54.00	5.54	100.0	1000.000	155.0	H	101.0
17791.200000	---	49.73	54.00	4.27	100.0	1000.000	155.0	H	351.0

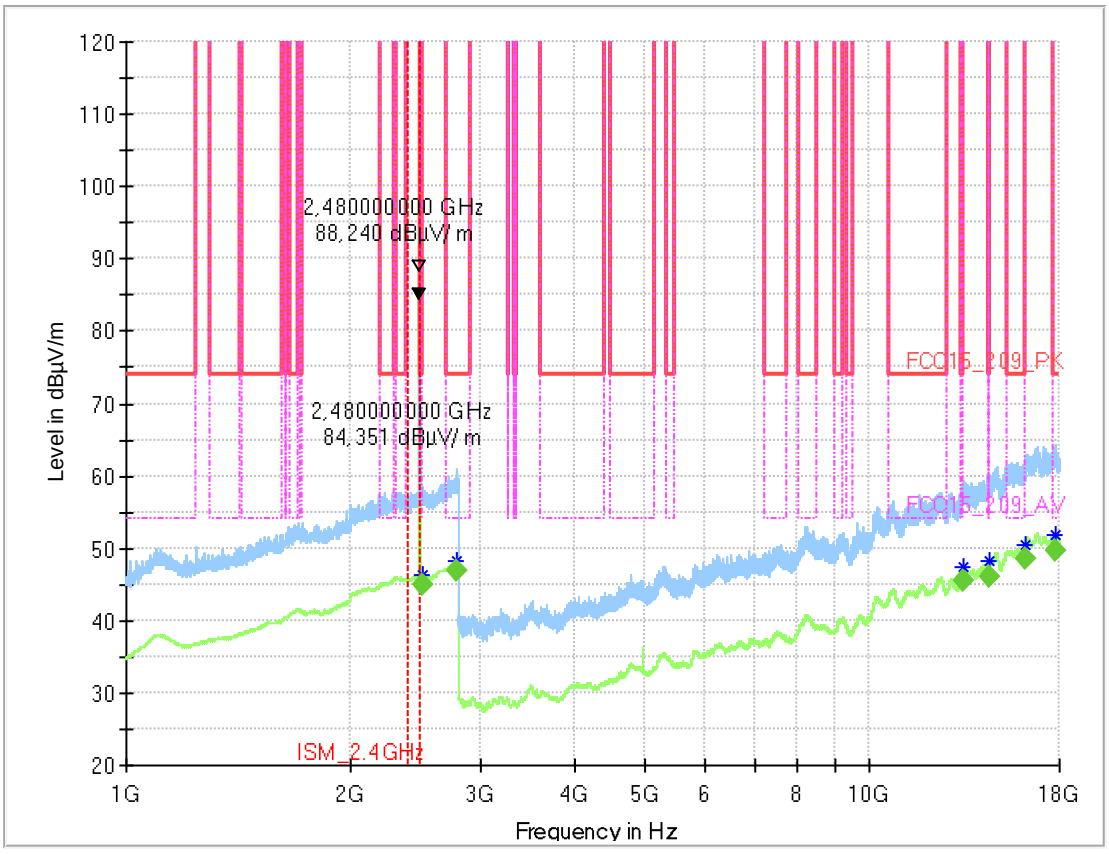
4.12a_BT_LE_high

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	BT_LE_high
Operator Name:	KIv
Power during tests:	24 V DC

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2498.800000	---	44.91	54.00	9.09	100.0	1000.000	155.0	V	268.0
2786.000000	---	46.76	54.00	7.24	100.0	1000.000	155.0	V	271.0
13397.200000	---	45.39	54.00	8.61	100.0	1000.000	155.0	V	-24.0
14494.000000	---	45.97	54.00	8.03	100.0	1000.000	155.0	V	5.0
16199.600000	---	48.44	54.00	5.56	100.0	1000.000	155.0	V	71.0
17794.400000	---	49.77	54.00	4.23	100.0	1000.000	155.0	V	129.0

2.4. Field strength measurements f > 18GHz

Diagram No.: 4.10b_BT_LE_low

Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	TX mode continuous
Operator Name:	TFr

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

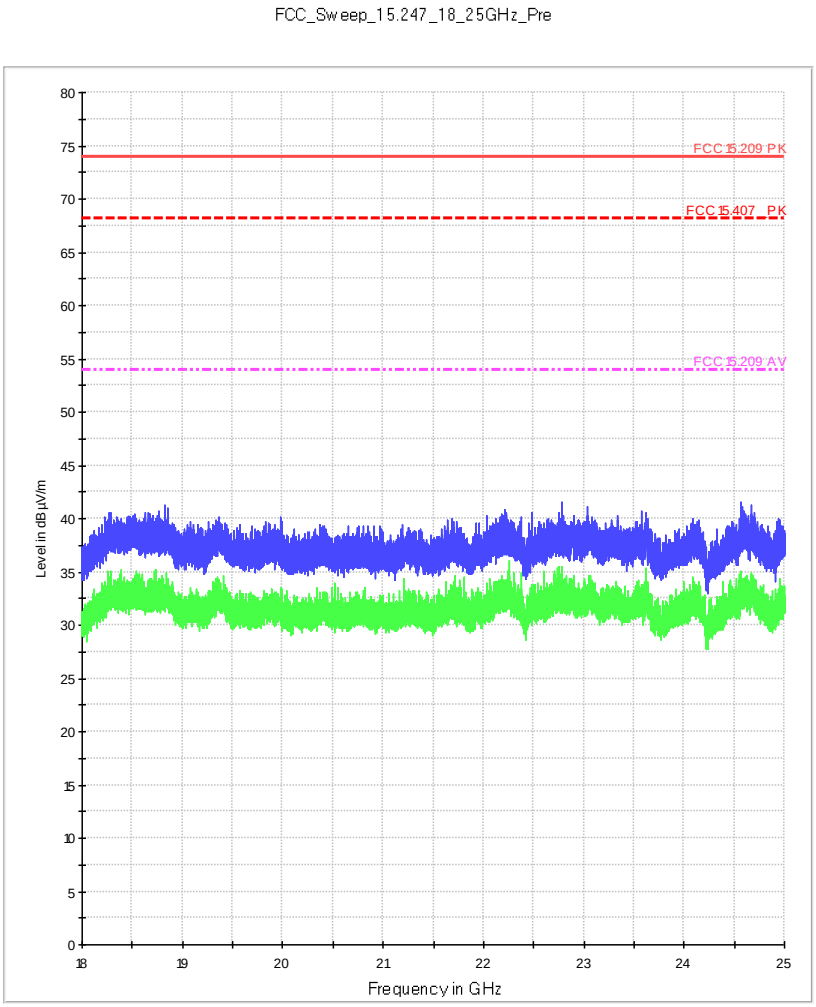


Diagram No.: 4.11b_BT_LE_mid

Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	TX mode continuous
Operator Name:	TFr

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

FCC_Sweep_15.247_18_25GHz_Pre

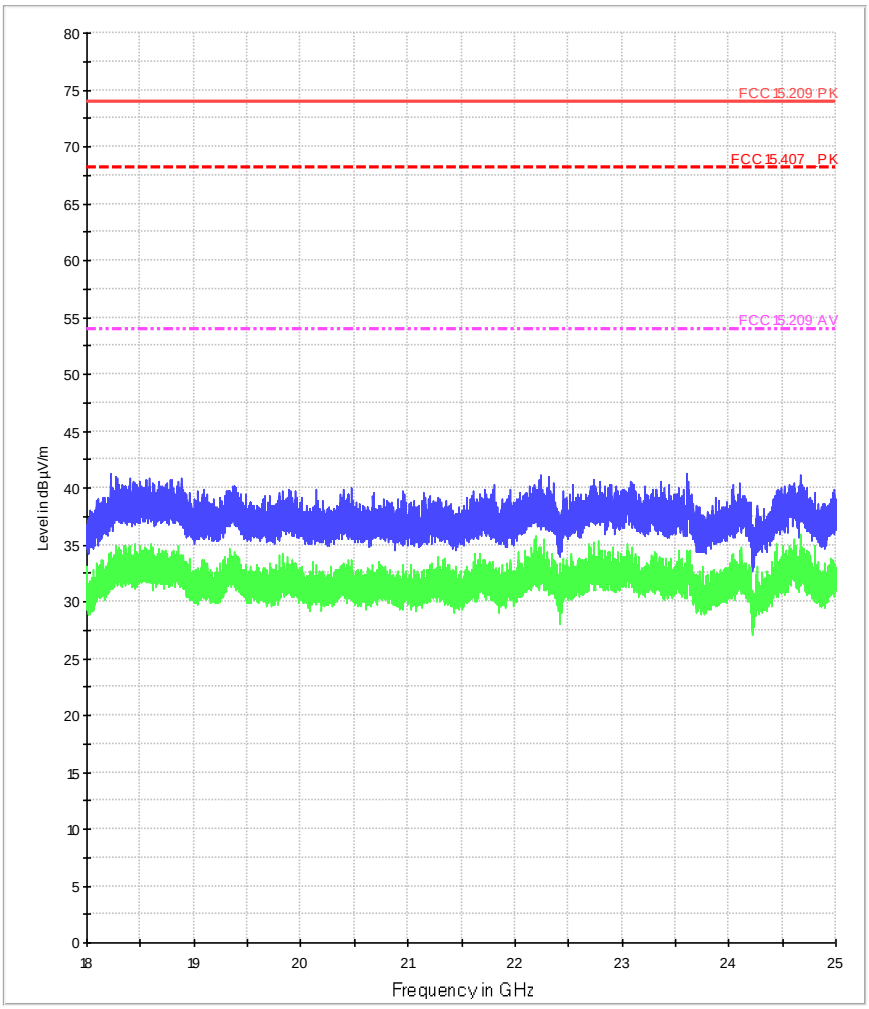


Diagram No.: 4.12c_BT_LE_high

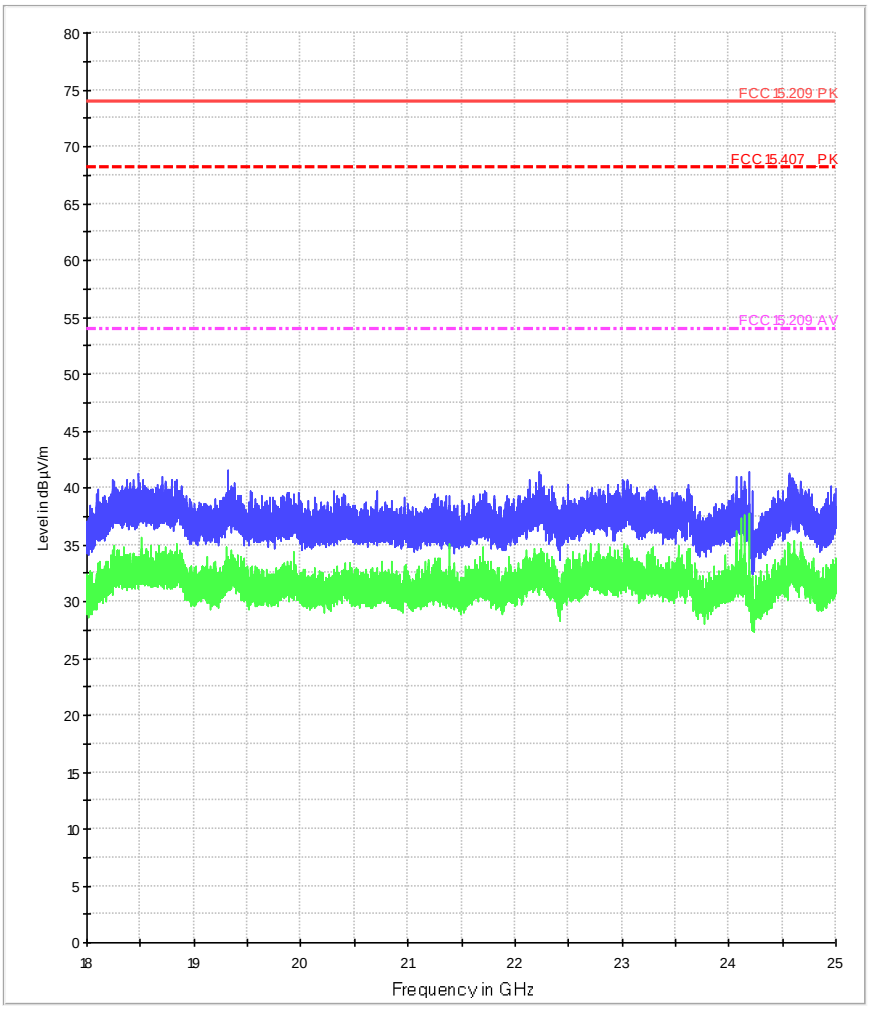
Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	TX mode continuous
Operator Name:	TFr

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC

FCC_Sweep_15.247_18_25GHz_Pre



3. Radiated band-edge measurements accord. §15.209 & §15.205 (§15.247)

3.1. Channel 37 (left band edge)

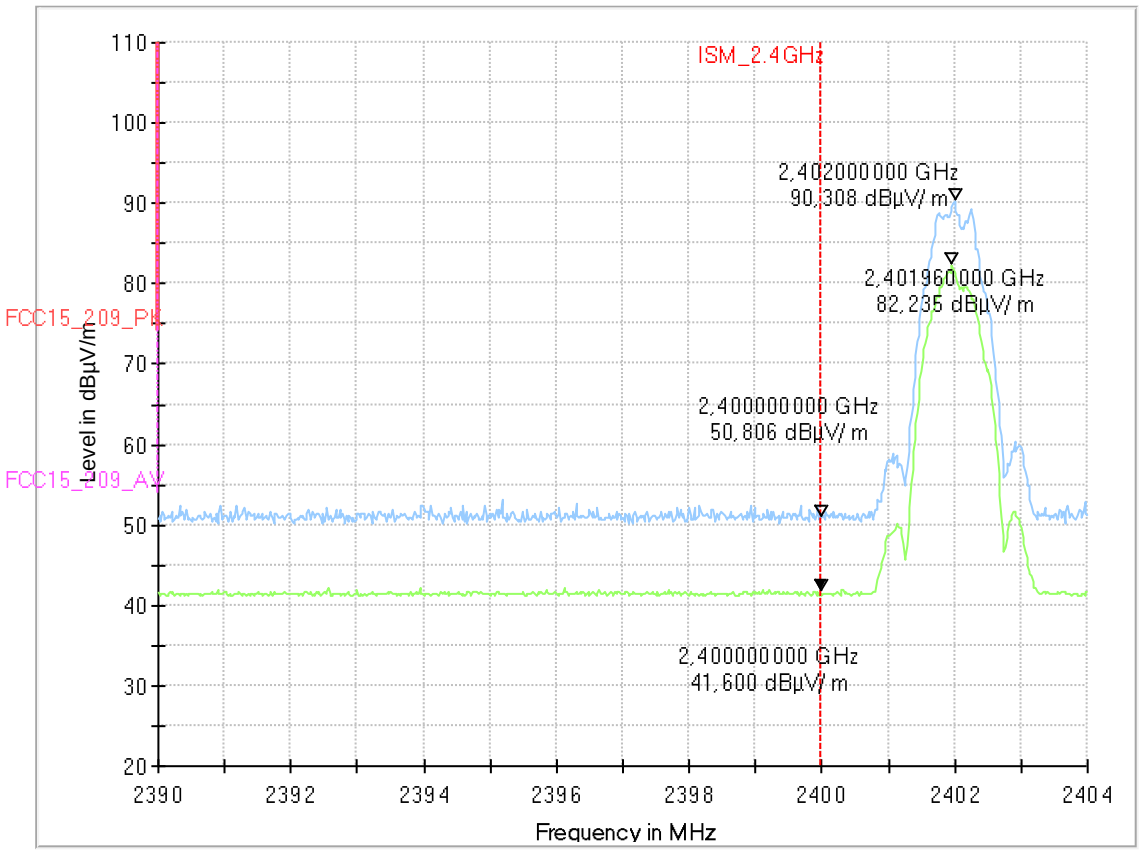
Diagram No.: 9.07_BE_BT_LE_low

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	BT_LE_low
Operator Name:	KIv

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC



3.2. Channel 39 (right band edge)

Diagram No.: 9.08_BE_BT_LE_high

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	BT_LE_high
Operator Name:	KIv

EUT Information

Manufacturer:	Daimler AG
EuT:	CTPMID/ A 000 446 58 60
---	---
HW Version:	0342G05
SW Version:	tbd
Serial Number:	3600003042
Connected Interfaces:	Main wiring + Antenna A005 820 30 75 + Splitter A005 820 43 75
Power Supply:	24 V DC