

Annex 2: Measurement diagrams to  
**PARTIAL TEST REPORT**  
No.: 6-0461-14-6-1a

According to:







FCC Part 15.247  
RSS-247, Issue 1

for

Robert Bosch Car Multimedia GmbH

LCN2K58A10  
Radio Navigation System  
(Bluetooth 2.4GHz)

**FCC ID: YBN-LCN2K58A10**  
**IC: 9595A-LCN2K58A10**  
PMN: Nissan LCN2Kai  
HVIN: LCN2K58A10

Laboratory Accreditation and Listings			
 Deutsche Akkreditierungsstelle D-PL-12047-01-01	 MRA US-EU 0003	 Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	 Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301
 <b>AUTHORIZED RF LABORATORY</b>	 <b>LAB CODE 20011130-00</b>		
accredited according to DIN EN ISO/IEC 17025			
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## **1. Conducted EMI measurements on AC-mains port according 15.207, class B**

Not applicable since powered from 12V car equipment

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

### 2.1. Magnetic field measurements f<30MHz

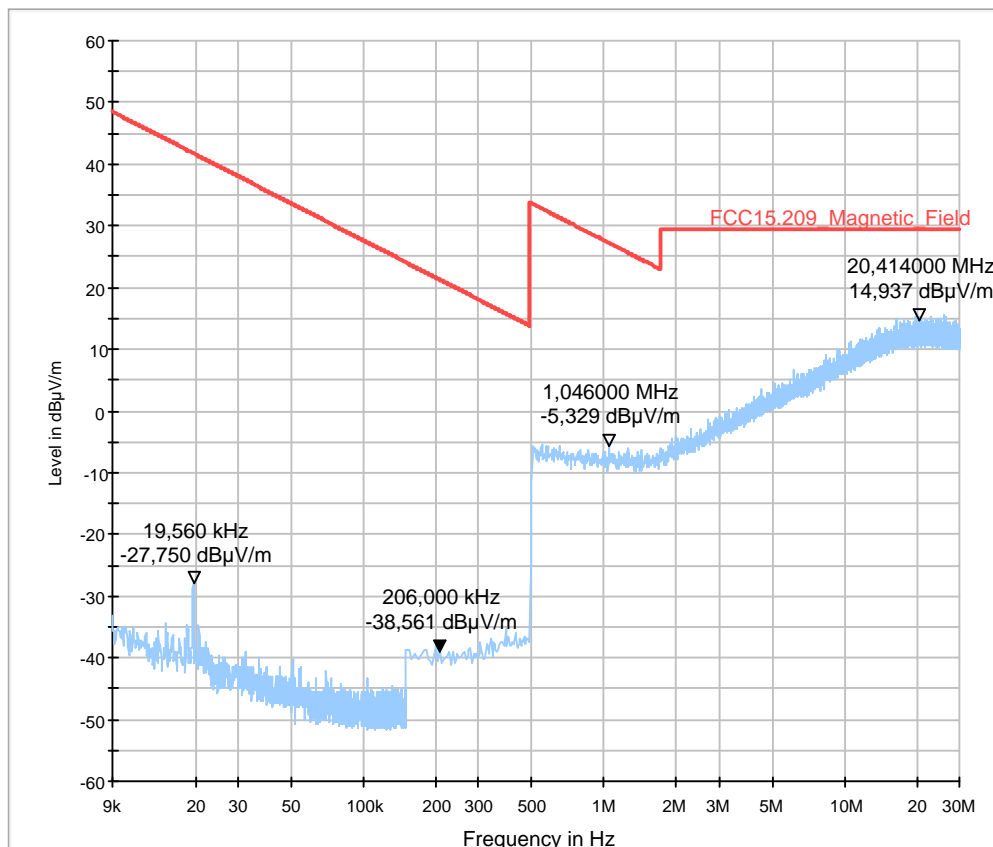
#### 2.1.1. GFSK modulation

### Diagram No. 2.01\_TX\_Ch0\_DH5

	21.05.2015	Page 1 of 2
Test description:	Electric Field Strength Measurement - Band-Edge	
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance	
Version of Testsoftware:	EMC32 V8.51.0	
Distance correction:	not used	
Used filter:	not used	
Technical Data:	please see page 2 for detailed data of measurement setup	
Test specification.:	15.209/15.205; RSS-Gen., Issue 4	
Operator:	HLa	
Operating conditions:	BT TX Ch:0 _DH5	
Power during tests:	13.5V DC	
Comment 1:	EUT standing (defined normal position)	

#### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC



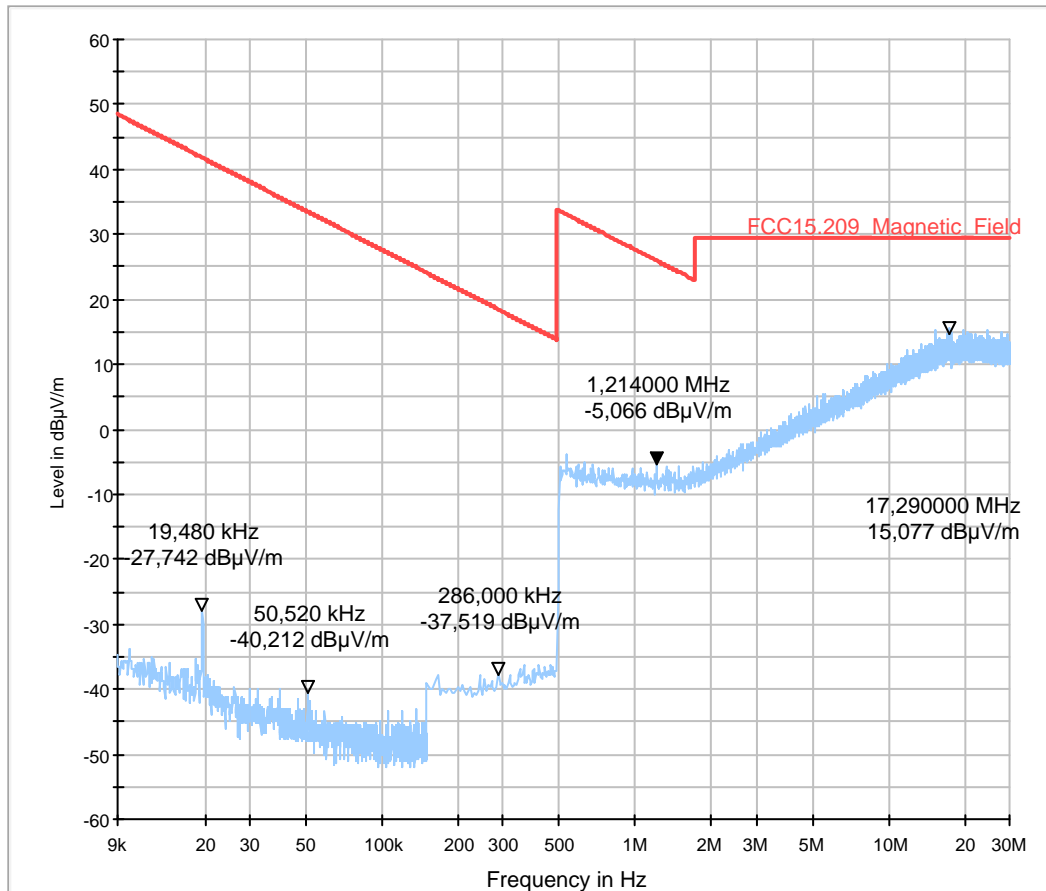
2.1.2.  $\pi/4$  DQPSK modulation

Diagram No. 2.02\_TX\_Ch39\_2-DH5

Test description:	21.05.2015 Page 1 of 2
Test site and distance:	Electric Field Strength Measurement - Band-Edge
Version of Testsoftware:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	EMC32 V8.51.0
Used filter:	not used
Technical Data:	not used
Test specification.:	please see page 2 for detailed data of measurement setup
	15.209/15.205; RSS-Gen., Issue 4
Operator:	HLa
Operating conditions:	BT TX Ch:39_2DH5
Power during tests:	13.5V DC
Comment 1:	EUT standing (defined normal position)

EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	-----
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC



2.1.3. 8DPSK modulation

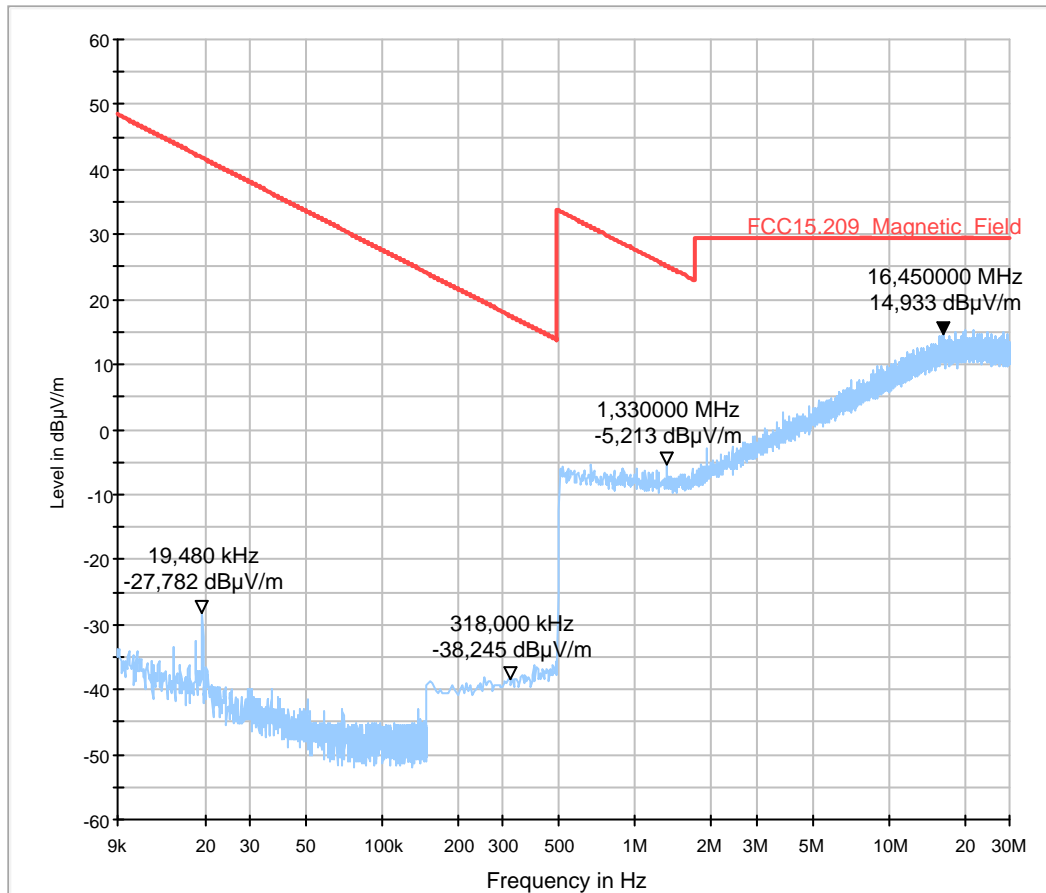
Diagram No. 2.03\_TX\_Ch78\_3-DH5

21.05.2015 Page 1 of 2  
 Test description: Electric Field Strength Measurement - Band-Edge  
 Test site and distance: Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance  
 Version of Testsoftware: EMC32 V8.51.0  
 Distance correction: not used  
 Used filter: not used  
 Technical Data: please see page 2 for detailed data of measurement setup  
 Test specification.: 15.209/15.205; RSS-Gen., Issue 4

Operator: HLa  
 Operating conditions: BT TX Ch:78\_3-DH5  
 Power during tests: 13.5V DC  
 Comment 1: EUT standing (defined normal position)

EUT Information

Manufacturer: Bosch  
 EuT: LCN2K58A10  
 -----  
 HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC



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

### 2.2.1. GFSK modulation

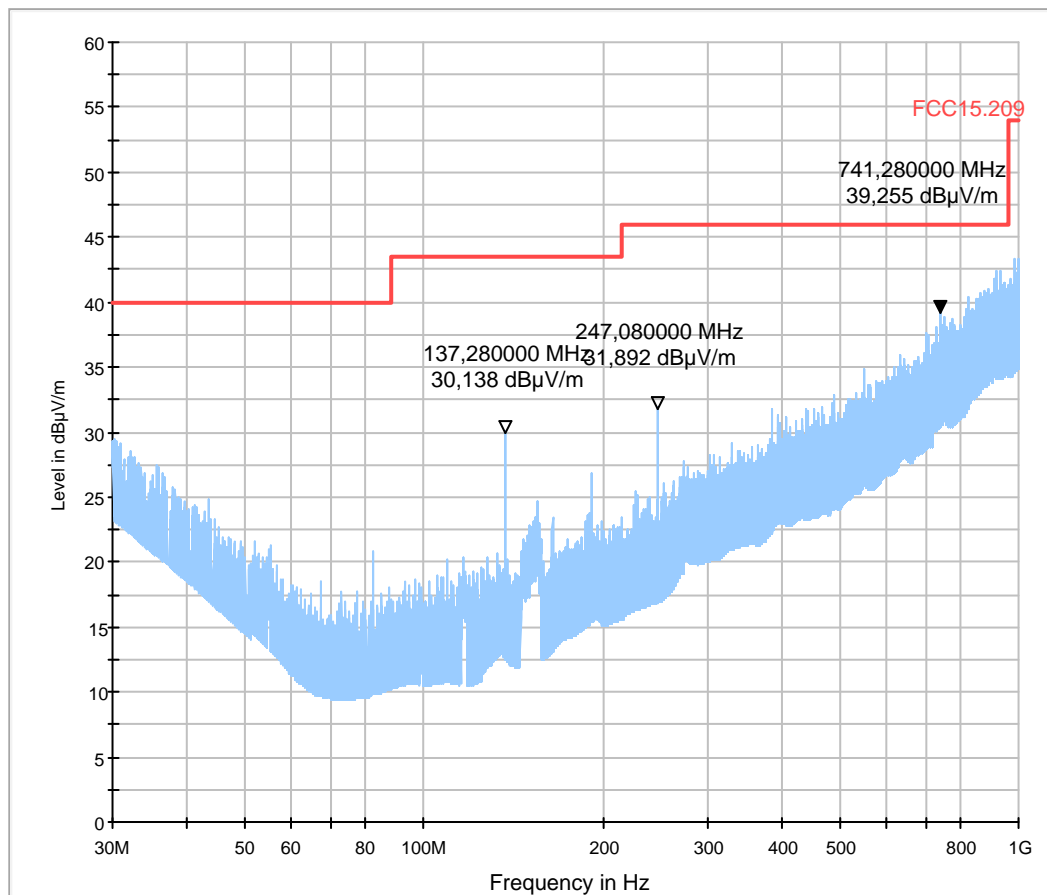
## Diagram No. 3.01\_TX\_Ch0\_DH5

Test description:	29.05.2015 Page 1 of 1
Test site and distance:	Electric Field Strength Measurement
Version of Testsoftware:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	EMC32 V8.51.0
Used filter:	not used
Technical Data:	not used
Test specification.:	please see page 2 for detailed data of measurement setup
	FCC 15.209; RSS-Gen: Issue 4
Operator:	HLa
Operating conditions:	BT TX Ch:00, DH5
Power during tests:	13.5V DC
Comment 1:	EUT standing (defined normal position)

### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC

01\_FCC15.209\_hor+vert\_KP0



2.2.2.  $\pi/4$  DQPSK modulation

Diagram No. 3.02\_TX\_Ch39\_2-DH5

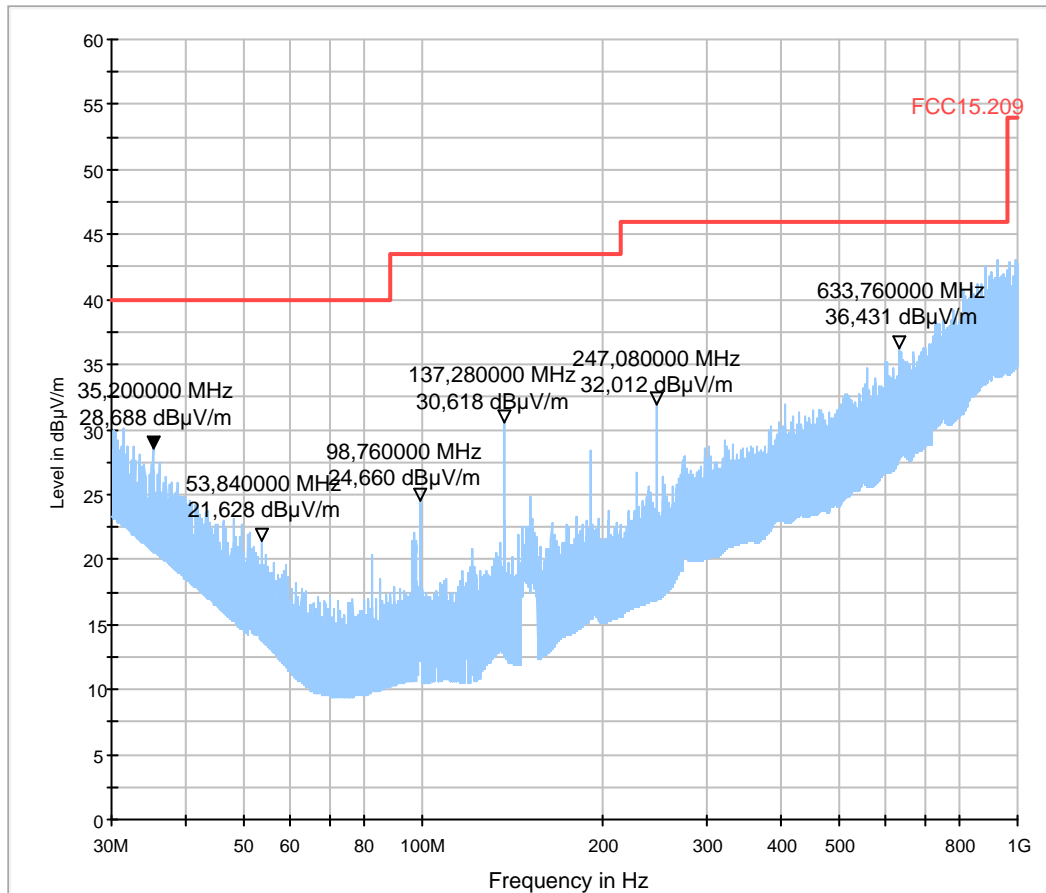
29.05.2015 Page 1 of 1  
 Test description: Electric Field Strength Measurement  
 Test site and distance: Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance  
 Version of Testsoftware: EMC32 V8.51.0  
 Distance correction: not used  
 Used filter: not used  
 Technical Data: please see page 2 for detailed data of measurement setup  
 Test specification.: FCC 15.209; RSS-Gen: Issue 4

Operator: HLa  
 Operating conditions: BT TX Ch:39, 2-DH5  
 Power during tests: 13.5V DC  
 Comment 1: EUT standing (defined normal position)

EUT Information

Manufacturer: Bosch  
 EuT: LCN2K58A10  
 -----  
 HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC

01\_FCC15.209\_hor+vert\_KP0





2.2.3. 8DPSK modulation

Diagram No. 3.03\_TX\_Ch78\_3-DH5

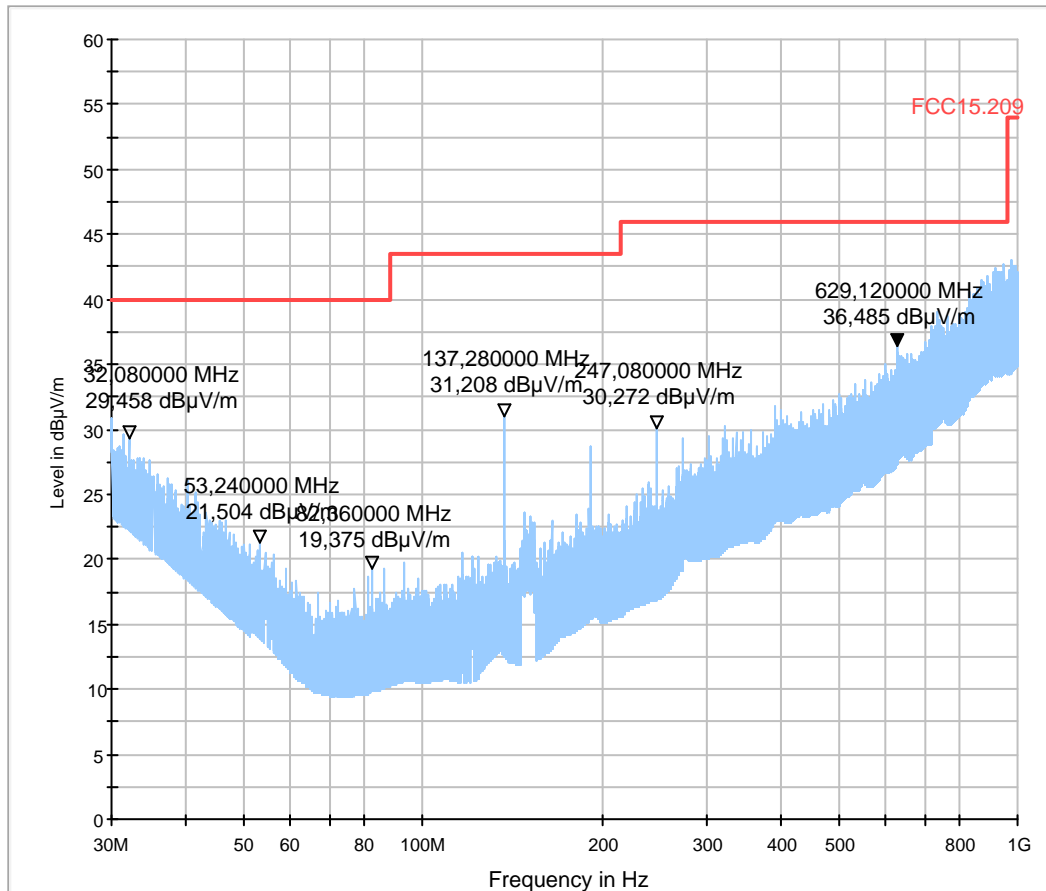
29.05.2015 Page 1 of 1  
 Test description: Electric Field Strength Measurement  
 Test site and distance: Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance  
 Version of Testsoftware: EMC32 V8.51.0  
 Distance correction: not used  
 Used filter: not used  
 Technical Data: please see page 2 for detailed data of measurement setup  
 Test specification.: FCC 15.209; RSS-Gen: Issue 4

Operator: HLa  
 Operating conditions: BT TX Ch:78, 3-DH5  
 Power during tests: 13.5V DC  
 Comment 1: EUT standing (defined normal position)

EUT Information

Manufacturer: Bosch  
 EuT: LCN2K58A10  
 -----  
 HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC

01\_FCC15.209\_hor+vert\_KP0



### 2.3. Field strength measurements f < 18GHz

#### 2.3.1. GFSK modulation

## Diagram No.: 4.01\_TX\_Ch0\_DH5

#### 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  
 Antenna polarisation: horizontal/vertical

Operation mode: UE transmits on channel 0 (UL = 2402.0MHz); Packet Type DH5  
 Operator Name: HLa  
 Comment:

#### EUT Information

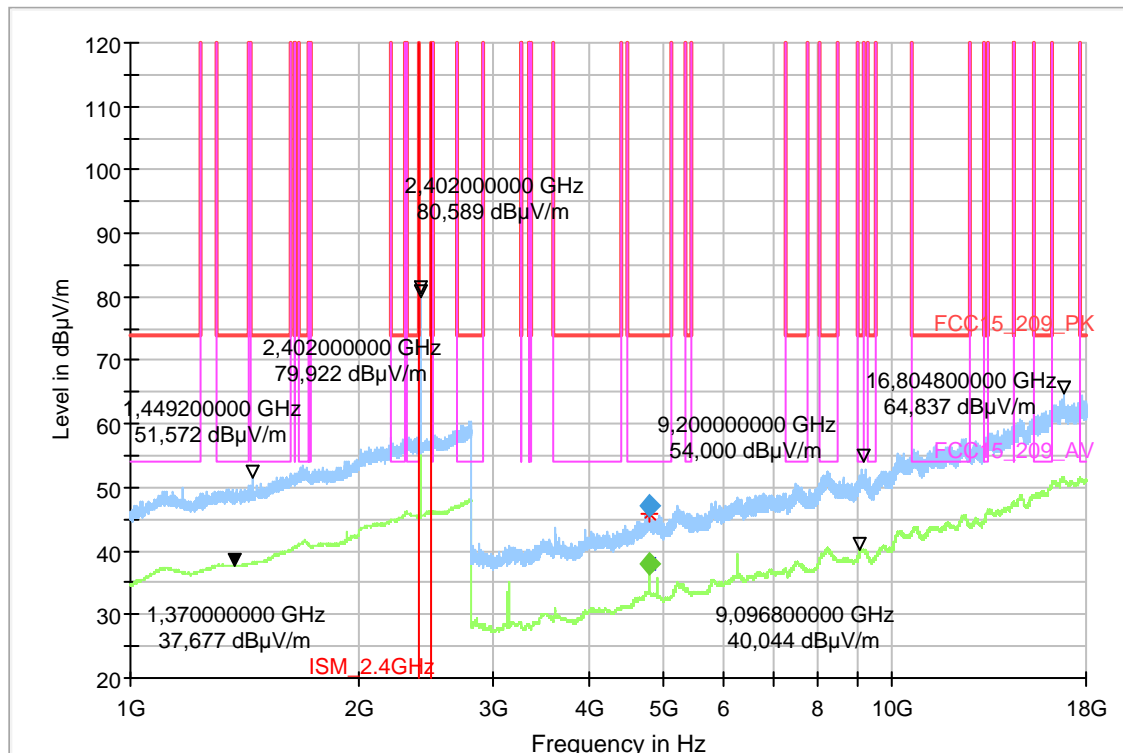
Manufacturer: Bosch  
 EuT: LCN2K58A10

-----

HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC  
 Comments:

#### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
4803.660000	46.99	---	74.00	27.01	100.0	1000.000	155.0	V	310.0	90.0
4804.020000	---	37.98	54.00	16.02	100.0	1000.000	155.0	V	284.0	90.0



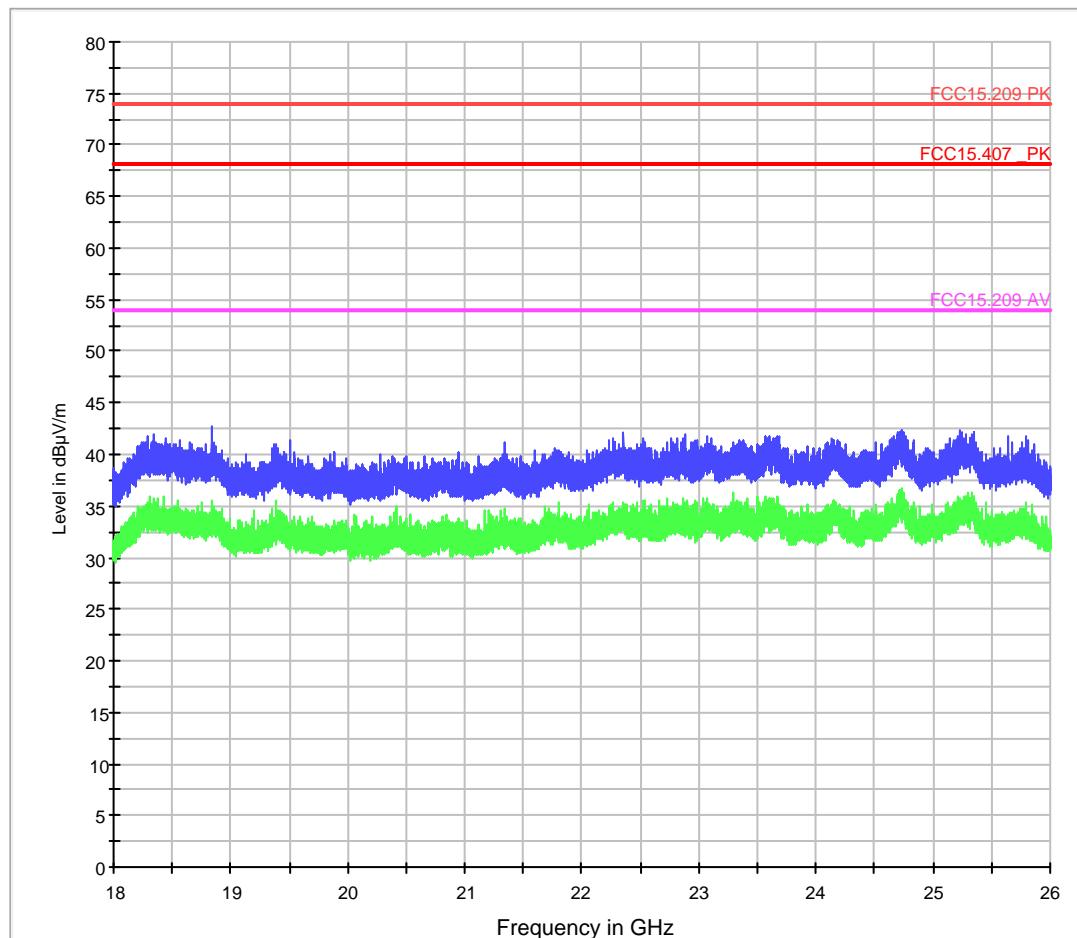
**Diagram No.: 4.07\_TX\_Ch0\_DH5****Common Information**

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:	BT TX mode on Ch0, DH5
Operator Name:	HLa
Comment:	Channel no. low

**EUT Information**

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC

FCC\_Sweep\_15.407\_18\_40GHz\_Pre



2.3.2.  $\pi/4$  DQPSK modulation

Diagram No.: 4.02\_TX\_Ch39\_2-DH5

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  
 Antenna polarisation: horizontal/vertical  
 Operation mode: UE transmits on channel 39 (UL = 2441.0MHz); Packet Type 2-DH5  
 Operator Name: HLa

EUT Information

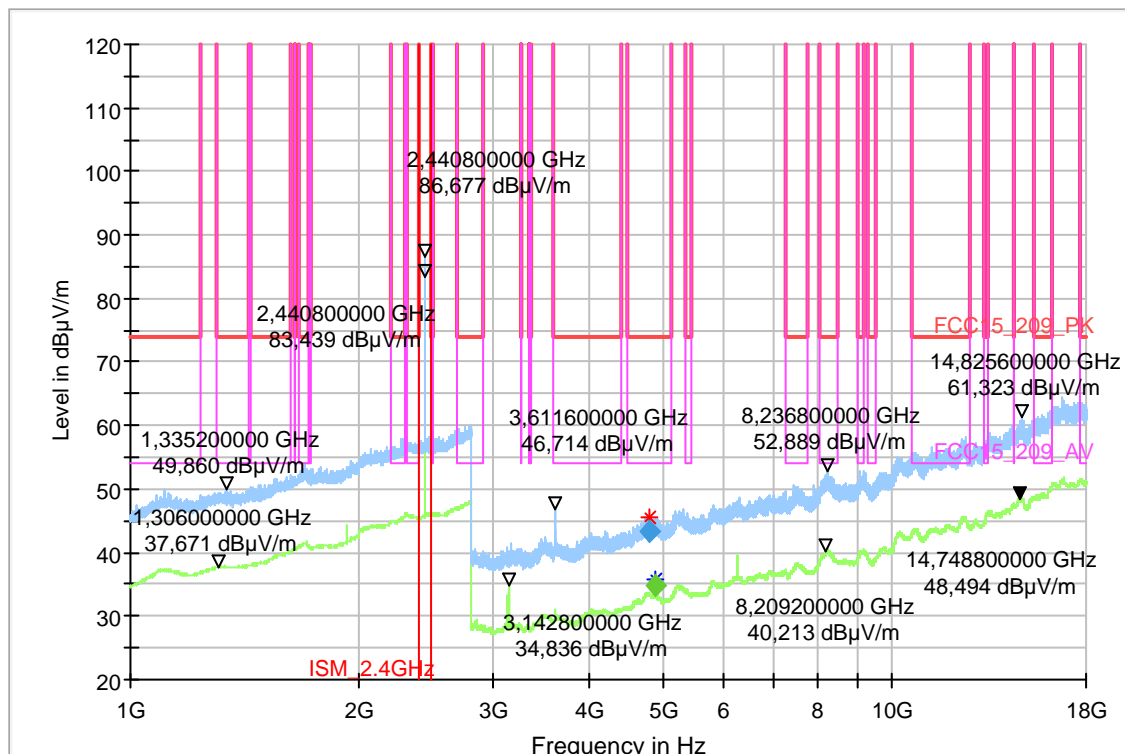
Manufacturer: Bosch  
 EuT: LCN2K58A10  
 HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC  
 Comments:

Final Result

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Po l	Azimuth (deg)	Elevation (deg)
4816.860000	43.49	---	74.00	30.51	100.0	1000.000	155.0	V	234.0	90.0
4881.980000	---	34.83	54.00	19.17	100.0	1000.000	155.0	H	310.0	0.0

(continuation of the "Final\_Result" table from column 16 ...)

Frequency (MHz)	Corr.	Comment
4816.860000	4.9	12:10:13 - 20.05.2015
4881.980000	4.6	12:11:51 - 20.05.2015



## Diagram No.: 4.08\_TX\_ch39\_3-DH5

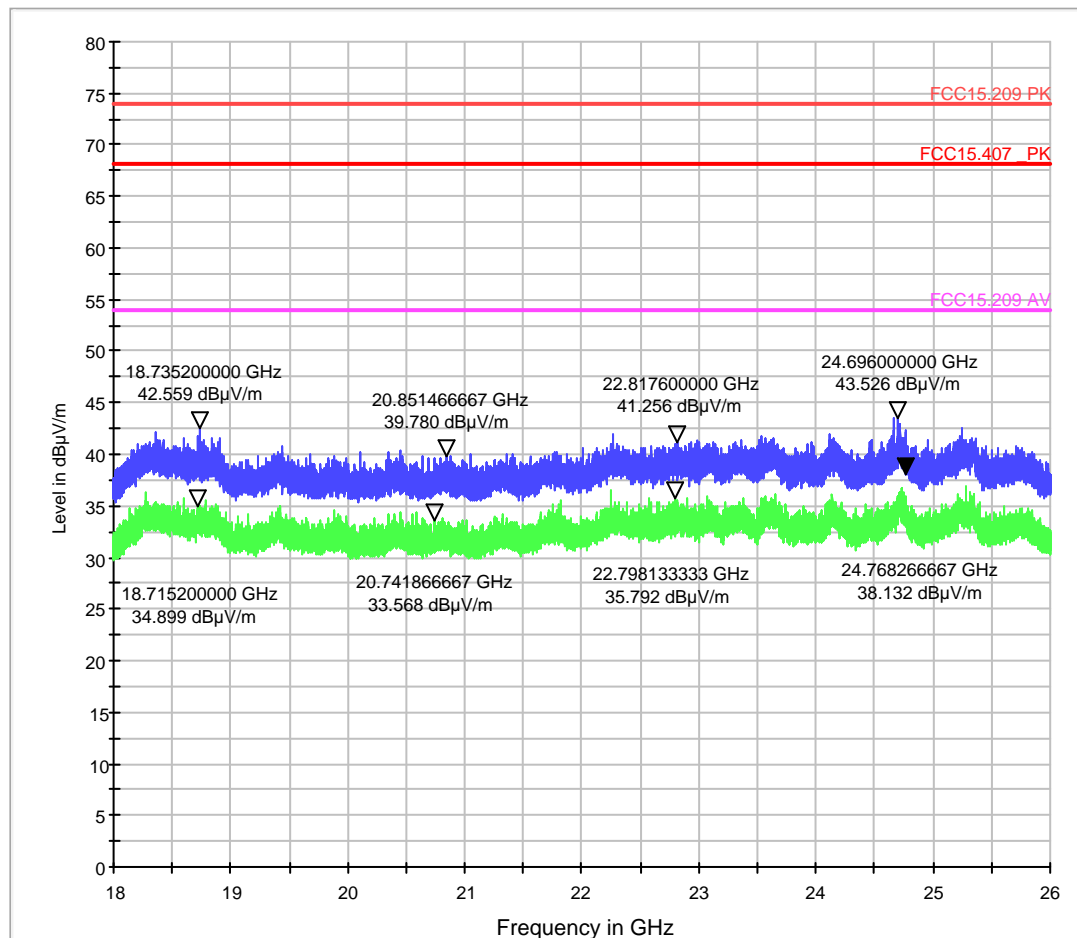
### Common Information

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:	BT TX mode on Ch39, 2-DH5
Operator Name:	HLa
Comment:	Channel no. middle

### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC

FCC\_Sweep\_15.407\_18\_40GHz\_Pre



### 2.3.3. 8DPSK modulation

## Diagram No.: 4.03\_TX\_Ch78\_3-DH5

#### 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  
 Antenna polarisation: horizontal/vertical

Operation mode: UE transmits on channel 78 (UL = 2480.0MHz); Packet Type 3-DH5  
 Operator Name: HLa  
 Comment:

#### EUT Information

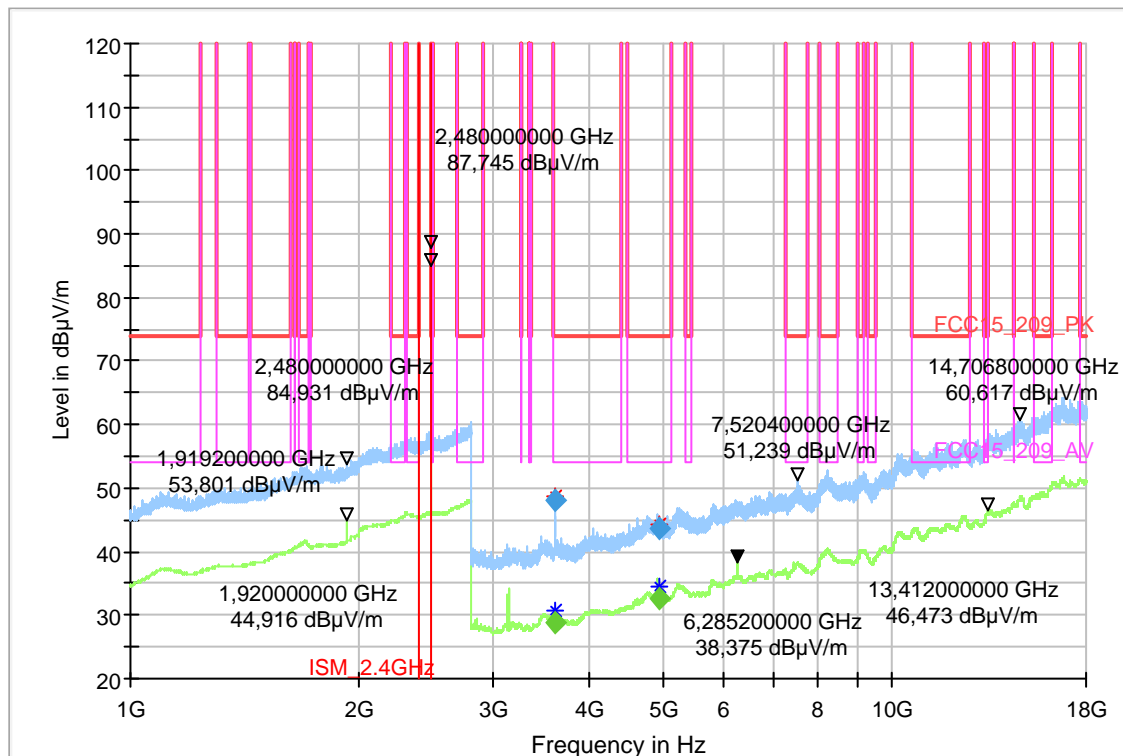
Manufacturer: Bosch  
 EuT: LCN2K58A10

-----

HW Version: 051  
 SW Version: 21  
 Serial Number: 002535  
 Connected Interfaces: -  
 Power Supply: via external power supply, nomVolt: 13.50 VDC  
 Comments:

#### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Po l	Azimuth (deg)	Elevation (deg)
3612.340000	---	28.85	54.00	25.15	100.0	1000.000	155.0	H	135.0	90.0
3612.340000	47.96	---	74.00	26.04	100.0	1000.000	155.0	H	127.0	0.0
4959.660000	43.56	---	74.00	30.44	100.0	1000.000	155.0	V	139.0	0.0
4960.020000	---	32.63	54.00	21.37	100.0	1000.000	155.0	H	318.0	0.0



## Diagram No.: 4.09\_TX\_ch78\_3-DH5

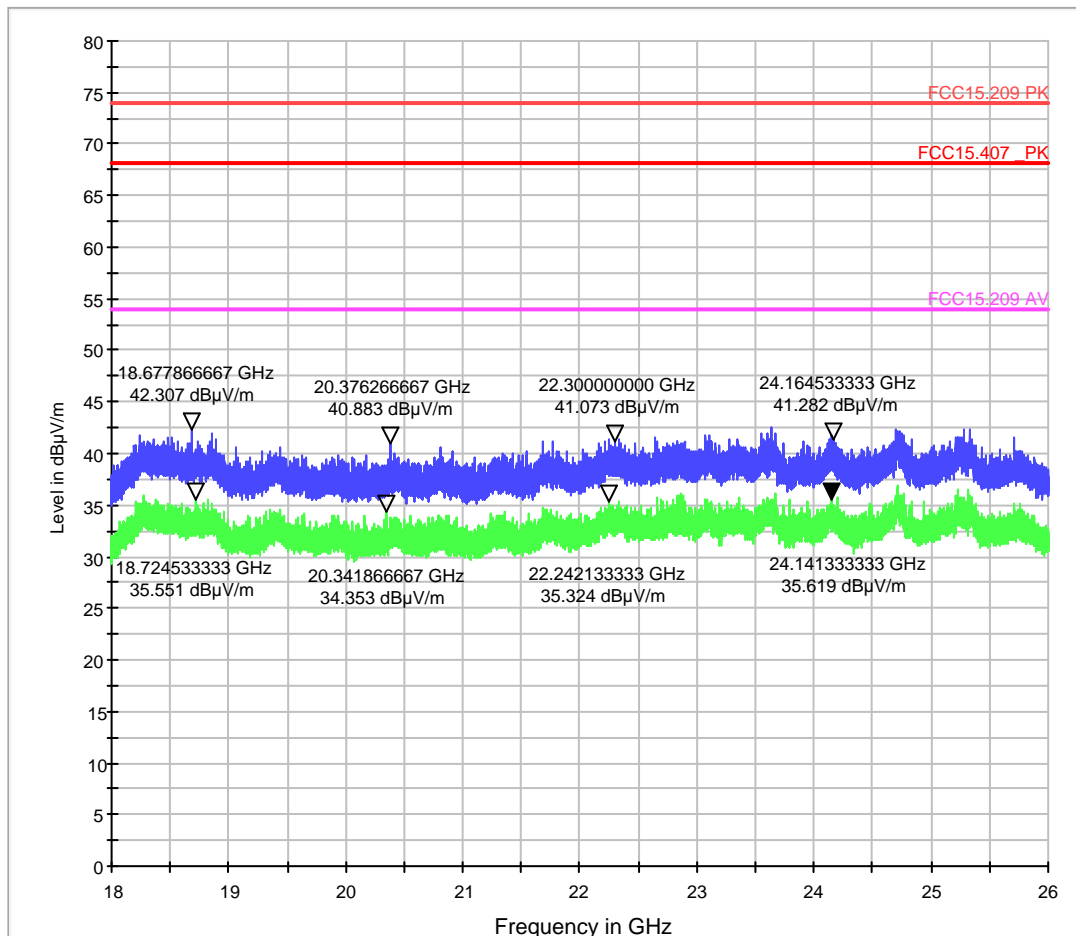
### Common Information

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:	BT TX mode on Ch78, 3-DH5
Operator Name:	HLa
Comment:	Channel no. high=78

### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC

FCC\_Sweep\_15.407\_18\_40GHz\_Pre



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

#### 3.1. Channel 0 (left band edge )

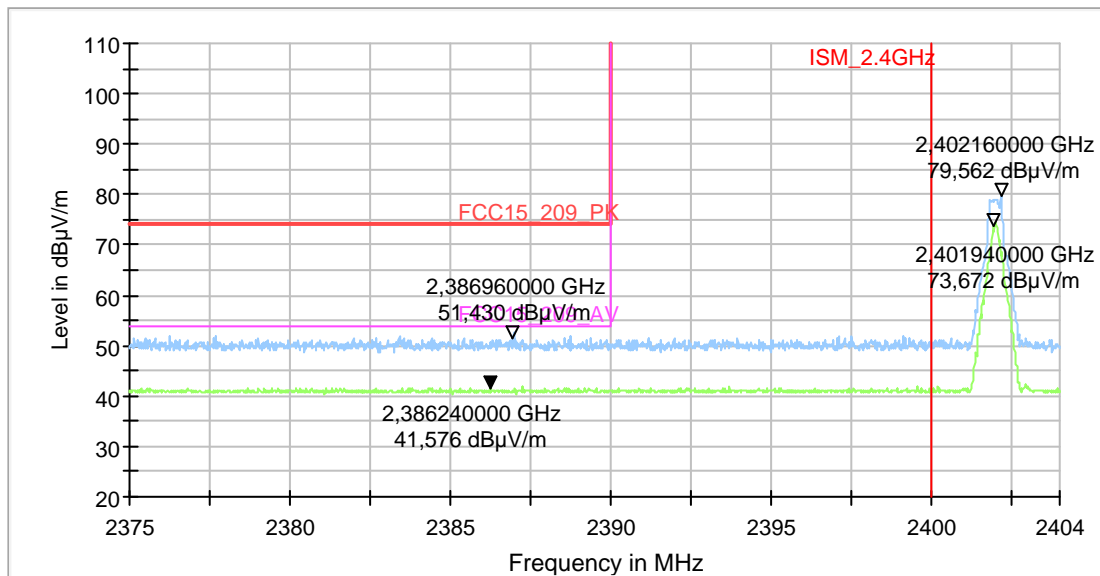
#### Diagram No.: 9.01\_BE\_high\_Ch0\_DH5

##### Common Information

Test Description:	Radiated Band-Edge Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	UE transmits on channel 0 (UL = 2402.0MHz); Packet Type DH5
Operator Name:	HLa
Comment:	EMC32 V9.15.0

##### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	-----
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC
Comments:	





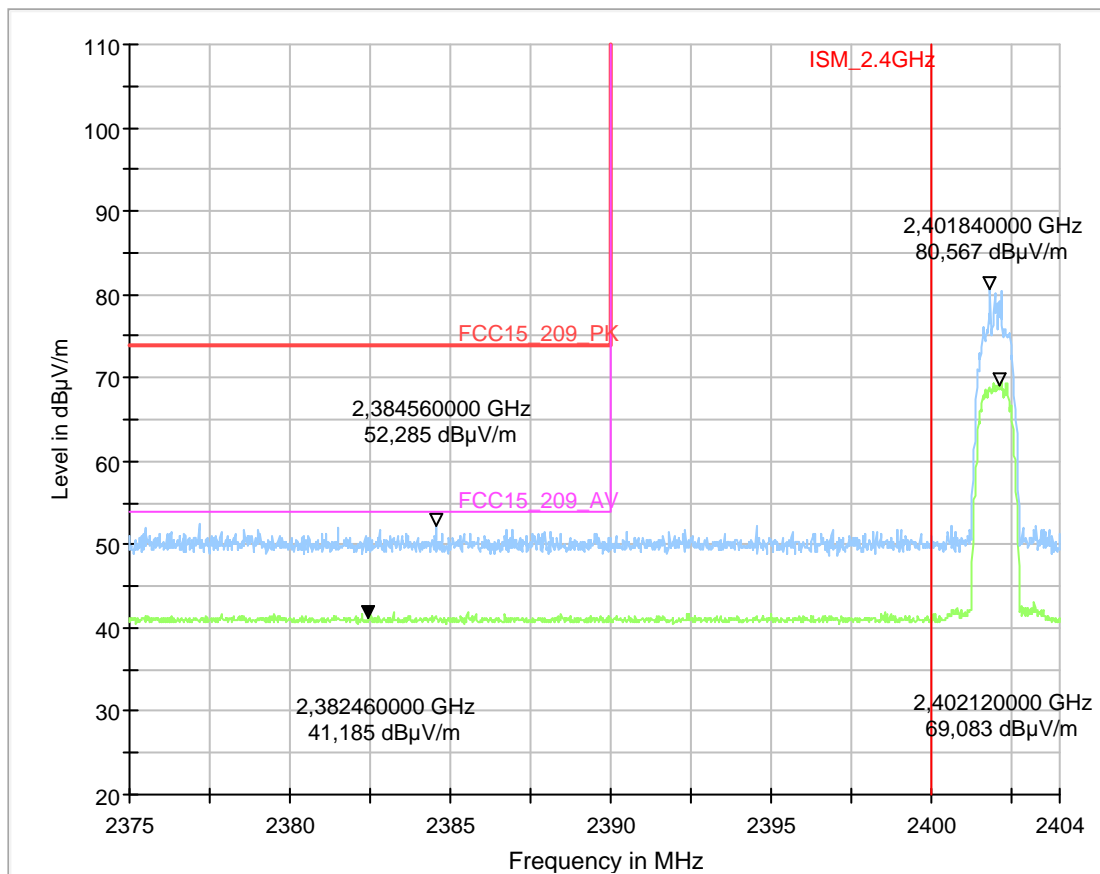
## Diagram No.: 9.03\_BE\_high\_Ch0\_3-DH5

### Common Information

Test Description:	Radiated Band-Edge Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	UE transmits on channel 0 (UL = 2402.0MHz); Packet Type DH5
Operator Name:	HLa
Comment:	EMC32 V9.15.0

### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC
Comments:	



### 3.2. Channel 78 (right band edge)

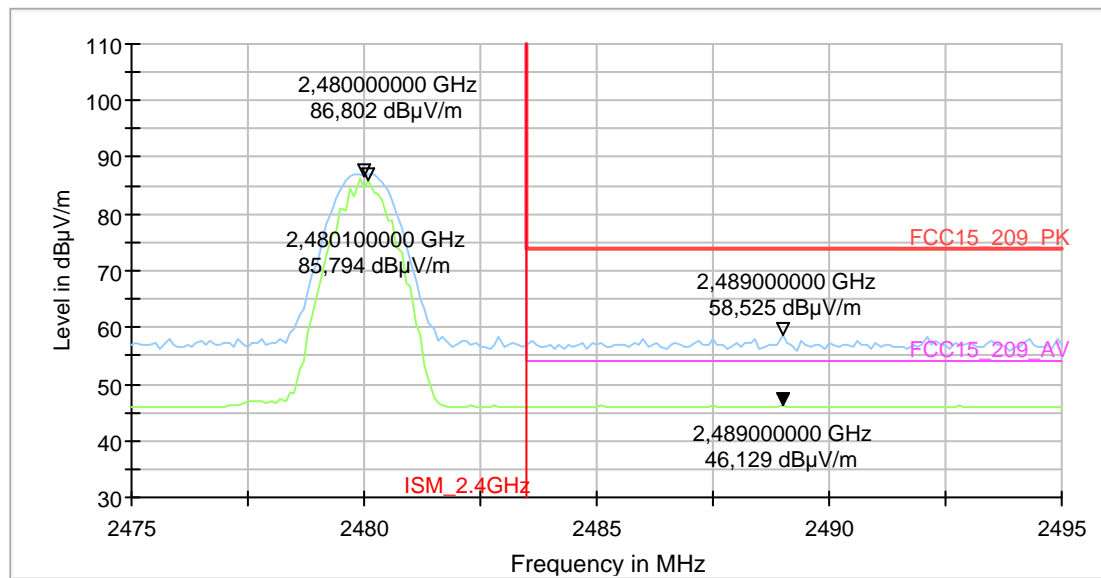
## Diagram No.: 9.04\_BE\_high\_Ch78\_DH5

#### Common Information

Test Description:	Radiated Band-Edge Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	UE transmits on channel 78 (UL = 2480.0MHz); Packet Type 3-DH5
Operator Name:	HLa
Comment:	EMC32 V9.15.0

#### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	-----
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC
Comments:	



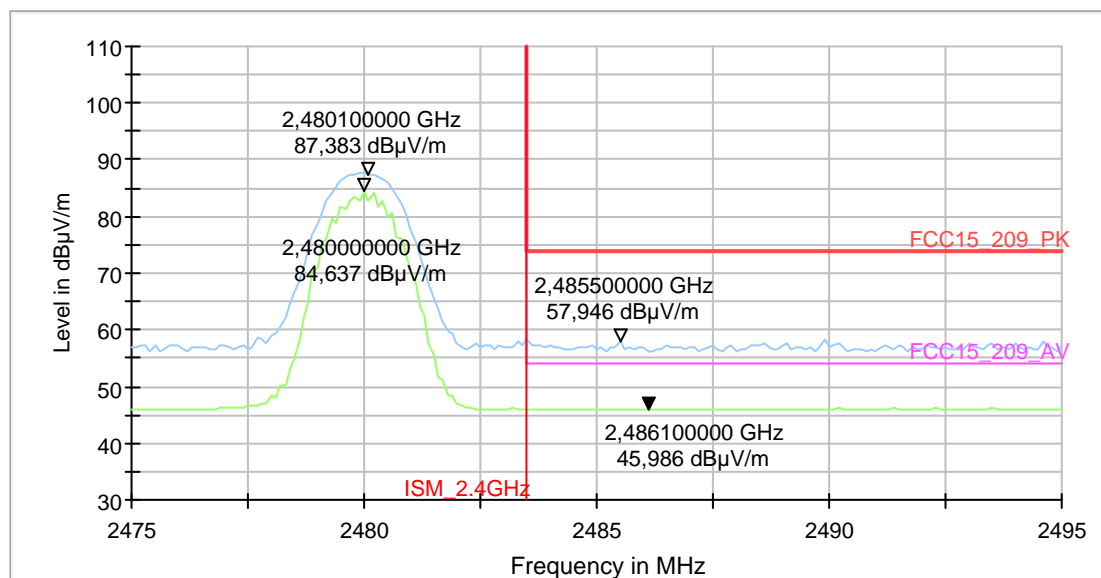
## Diagram No.: 9.02\_BE\_high\_Ch78\_3-DH5

### Common Information

Test Description:	Radiated Band-Edge Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	UE transmits on channel 78 (UL = 2480.0MHz); Packet Type 3-DH5
Operator Name:	HLa
Comment:	EMC32 V9.15.0

### EUT Information

Manufacturer:	Bosch
EuT:	LCN2K58A10
-----	-----
HW Version:	051
SW Version:	21
Serial Number:	002535
Connected Interfaces:	-
Power Supply:	via external power supply, nomVolt: 13.50 VDC
Comments:	



## 4. MPE calculation

A minimum distance to the user of 20cm is assumed.

Following calculations show assumption with the limits with a duty-cycle of 60%. (3 active slots maximum of a maximum of 5 slots)

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Antenna Gain Max. (dBi)	Max. positive tolerance according manufacturer (dB)	Declared maximum output power (Measured+ Tune-up) (dBm)	Duty cycle	Declared Maximum conducted output power (W)	Equivalent conducted output power (maximum conducted output power x duty cycle) (mW)
BT 2.4GHz	2402,0	1,83	0,00	0,00	1,83	60%	0,0015	0,914
	2441,0	1,33	0,00		1,33		0,0014	0,815
	2480,0	0,24	0,00		0,24		0,0011	0,634

Maximum calculated MPE value:		
MPE-Limit:	1	[mW/cm <sup>2</sup> ]
Highest MPE value:	0,0002	[mW/cm <sup>2</sup> ]
Margin to limit	0,9998	[mW/cm <sup>2</sup> ]

Note: the device is exempt from routine (RF exposure) evaluation because the eirp exemption limit for 2480MHz is 33.7dBm (see 2.5.2 of RSS-102 i5) which is way above the eirp of the BT transmitter under consideration