

Annex 1: Measurement diagrams to
TEST REPORT
No.: 18-1-0225601T17

According to:
FCC Regulations
Part 15.205 & Part 15.209
Part 15.247

for

Helmut Fischer GmbH

MMS Inspection DPM
Measurement equipment for corrosion market

FCC ID: 2ATFE-MMSINSPEC00

Laboratory Accreditation and Listings
 Deutsche Akkreditierungsstelle D-PL-12047-01-01 D-PL-12047-01-03 D-PL-12047-01-04
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Table of contents

1. MEASUREMENT DIAGRAMS.....	3
1.1. General Limit – Maximum power output conducted	3
1.2. General Limit - Radiated field strength emissions below 30 MHz	8
1.3. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz.....	10
1.4. General Limit - Radiated emissions, above 1 GHz.....	12
1.5. RF-Parameter - Band Edge compliance measurements	15

1. Measurement diagrams

1.1. General Limit – Maximum power output conducted

DFT Variant

BT classic					
Max Peak in dBm			DFT		
			2402MHz	2441 MHz	2480MHz
1M	PRBS9	DH1	2	0,7	0,2
	PRBS9	DH3	2,1	0,8	-0,1
	PRBS9	DH5	1,7	0,4	-0,3
2M	PRBS9	2DH1	3,9	2,7	2
	PRBS9	2DH3	3,8	2,5	1,9
	PRBS9	2DH5	3,7	2,4	1,7
3M	PRBS9	3DH1	4,3	3,1	2,3
	PRBS9	3DH3	4,4	3,1	2,5
	PRBS9	3DH5	4,1	2,9	2,1

DPM Variant

BT classic					
Max Peak in dBm			DPM		
			2402MHz	2441 MHz	2480MHz
1M	PRBS9	DH1	3,9	1,6	1,7
	PRBS9	DH3	3,6	1,3	1,4
	PRBS9	DH5	3,6	1,1	1,2
2M	PRBS9	2DH1	5,8	3,5	3,6
	PRBS9	2DH3	5,5	3,2	3,2
	PRBS9	2DH5	5,5	3,1	3,2
3M	PRBS9	3DH1	6,2	3,9	4
	PRBS9	3DH3	6	3,7	3,7
	PRBS9	3DH5	6	3,6	3,6

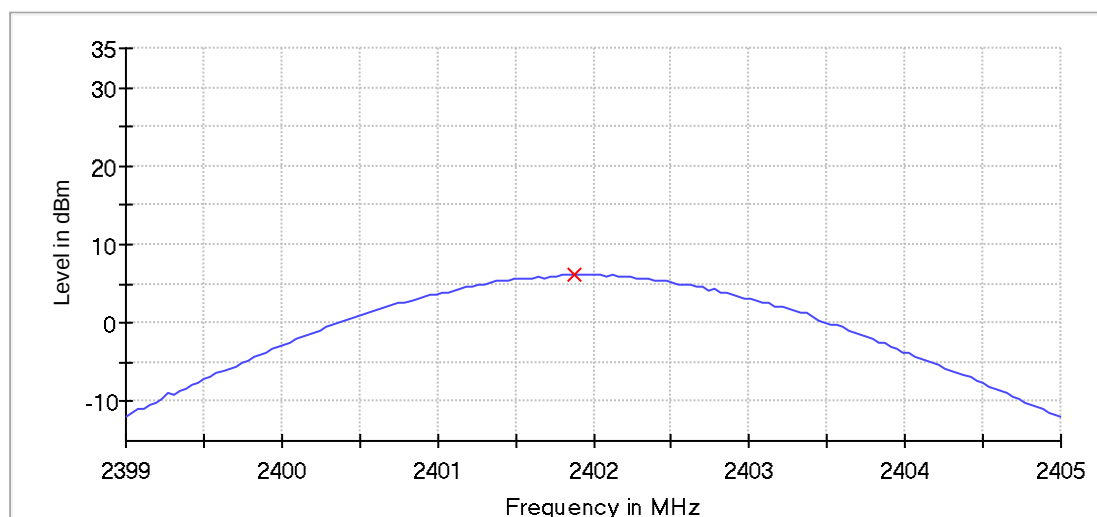
SPG Variant

BT classic					
Max Peak in dBm			SPG		
			2402MHz	2441 MHz	2480MHz
1M	PRBS9	DH1	2,6	1,7	0,5
	PRBS9	DH3	1,8	1,1	-0,1
	PRBS9	DH5	1,6	0,8	-0,5
2M	PRBS9	2DH1	3,7	3	1,9
	PRBS9	2DH3	3,7	3	1,7
	PRBS9	2DH5	3,6	2,9	1,6
3M	PRBS9	3DH1	4,2	3,4	2,4
	PRBS9	3DH3	4,1	3,3	2,1
	PRBS9	3DH5	3,9	3,1	1,9

Peak output power (Sweep) (2402 MHz; 10,000 dBm; 1 MHz; Test Mode)

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402.000000	6.2	21.0	PASS



— Connector 1 × Peak Connector 1

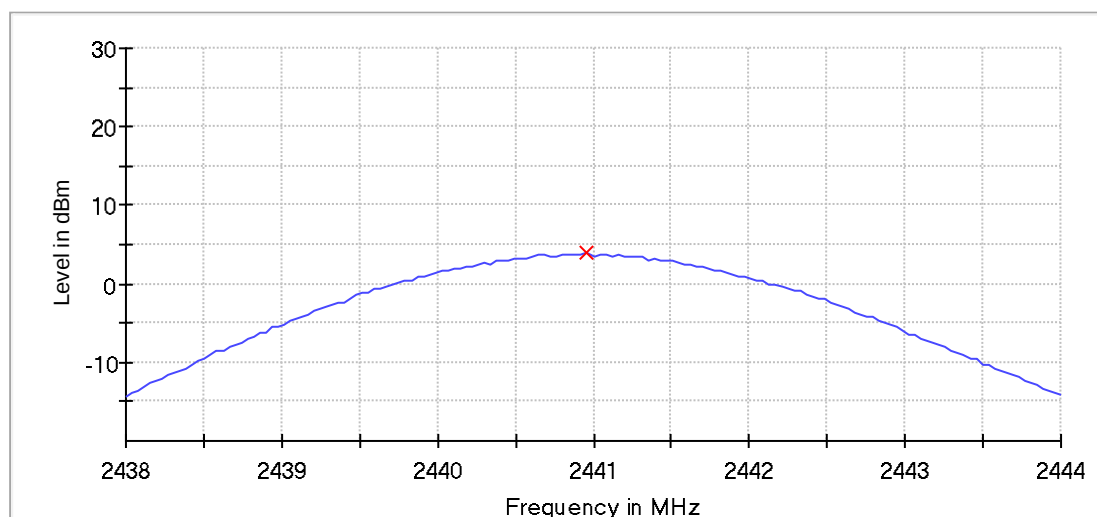
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.39900 GHz	2.39900 GHz
Stop Frequency	2.40500 GHz	2.40500 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	≥ 1.000 MHz
VBW	10.000 MHz	≥ 6.000 MHz
SweepPoints	155	~ 101
SweepTime	2.500 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.35 dB	0.50 dB

Peak output power (Sweep) (2441 MHz; 10,000 dBm; 1 MHz; Test Mode)

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2441.000000	3.9	21.0	PASS



— Connector 1 × Peak Connector 1

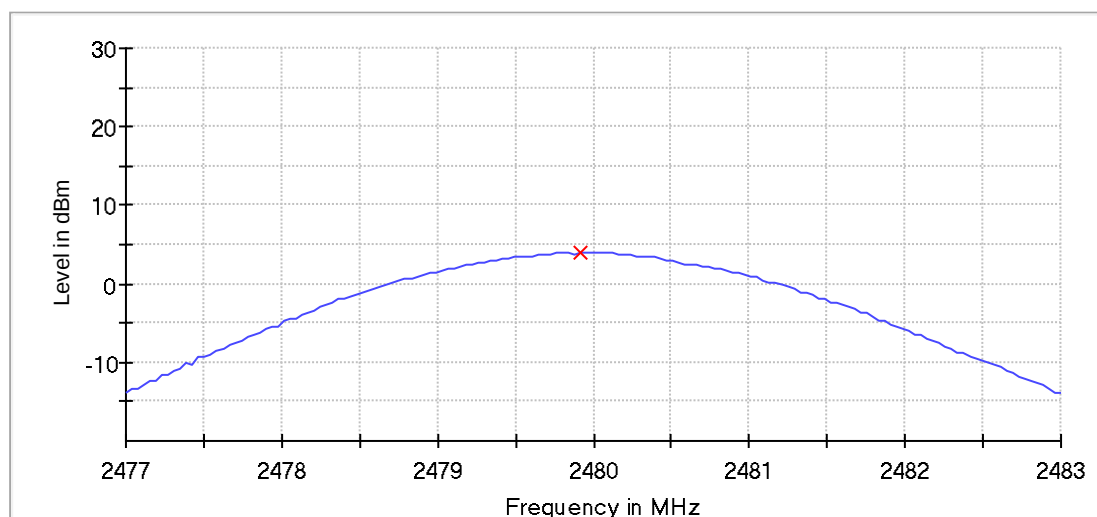
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43800 GHz	2.43800 GHz
Stop Frequency	2.44400 GHz	2.44400 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	≥ 1.000 MHz
VBW	10.000 MHz	≥ 6.000 MHz
SweepPoints	155	~ 101
SweepTime	2.500 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.24 dB	0.50 dB

Peak output power (Sweep) (2480 MHz; 10,000 dBm; 1 MHz; Test Mode)

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	4.0	21.0	PASS



— Connector 1 × Peak Connector 1

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47700 GHz	2.47700 GHz
Stop Frequency	2.48300 GHz	2.48300 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	≥ 1.000 MHz
VBW	10.000 MHz	≥ 6.000 MHz
SweepPoints	155	~ 101
SweepTime	2.500 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.20 dB	0.50 dB

1.2. General Limit - Radiated field strength emissions below 30 MHz

2.02a_BT_3-DH1_ch39_Laying

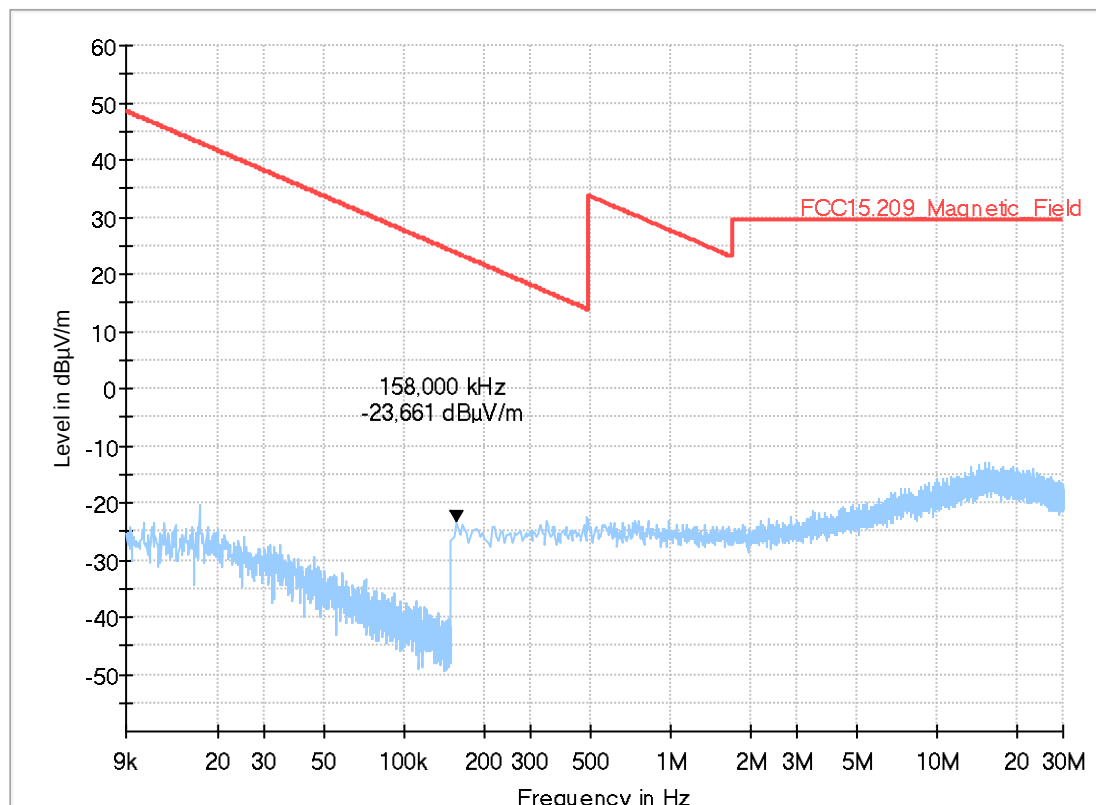
Common Information

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:	MKh
Operating Mode:	BT- DPM variant
Power during tests:	Batterie Betrieb
Comment 1:	BT BR 3-DH1 ch39
Environmental Conditions:	Humidity : 58,7%rH; Temperature: 20,7°C
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Model:	DPM
Type:	MMS Inspection Device
HW:	C1.3-10142823
SW:	tbd
Serial Nr.:	56
Power Supply:	Battery powered

Full Spectrum



2.02b_BT_3-DH1_ch39_Standing

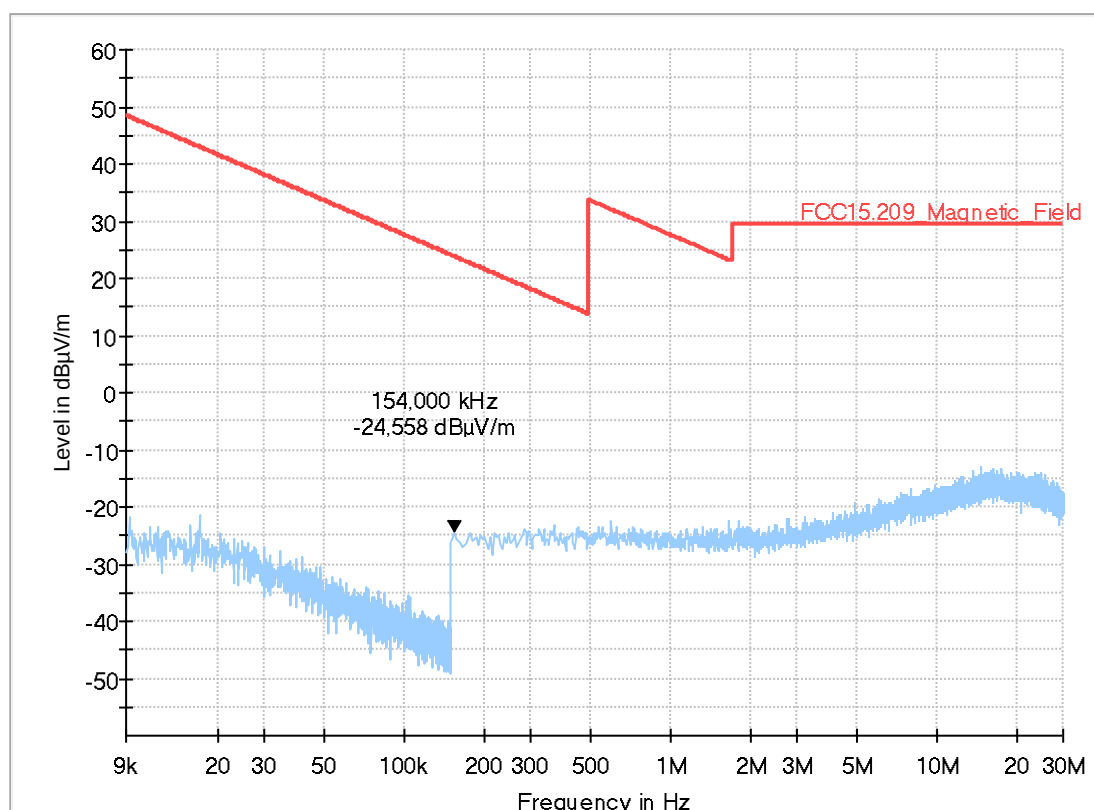
Common Information

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:	MKh
Operating Mode:	BT- DPM variant
Power during tests:	Batterie Betrieb
Comment 1:	BT BR 3-DH1 ch39
Environmental Conditions:	Humidity : 60,6%rH; Temperature: 20,4°C
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Model:	DPM
Type:	MMS Inspection Device
HW:	C1.3-10142823
SW:	tbd
Serial Nr.:	56
Power Supply:	Battery powered

Full Spectrum

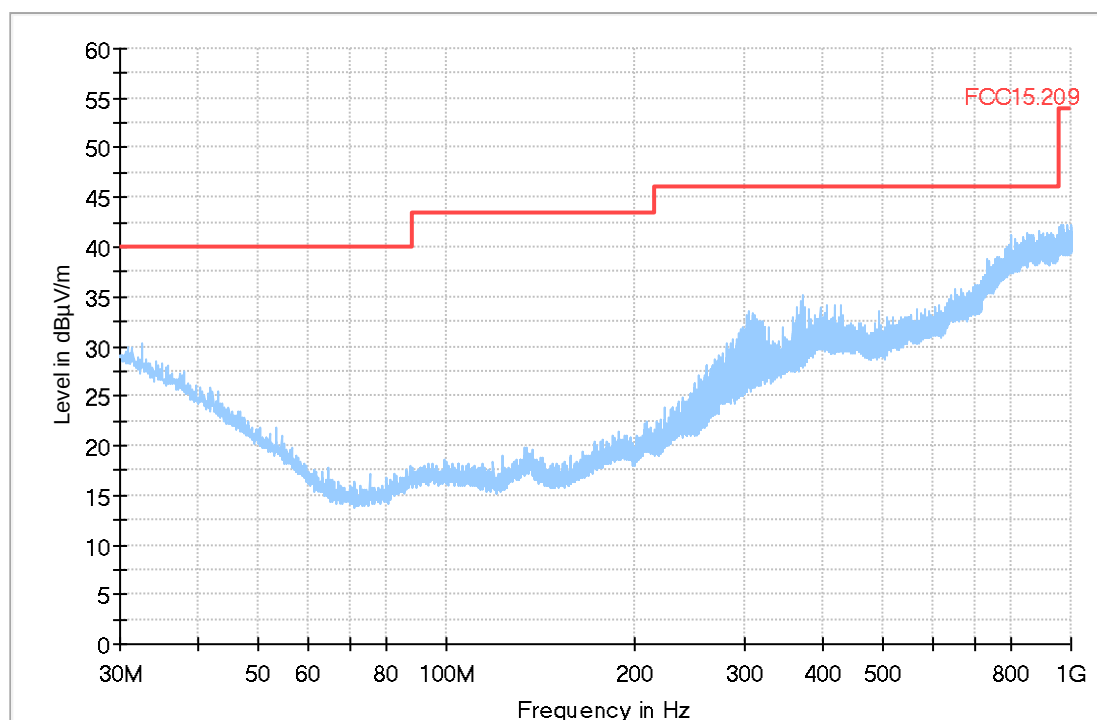


1.3. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz

3.01a_BT_3-DH1_ch39_laying

Test description:	11.06.2019 Page 1 of 4 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; RSS-Gen: Issue 3
Operator:	TFra
Operating conditions:	BT 3-DH1 ch39
Power during tests:	2x 1.5V Battery
Comment 1:	EUT standing (defined normal position)

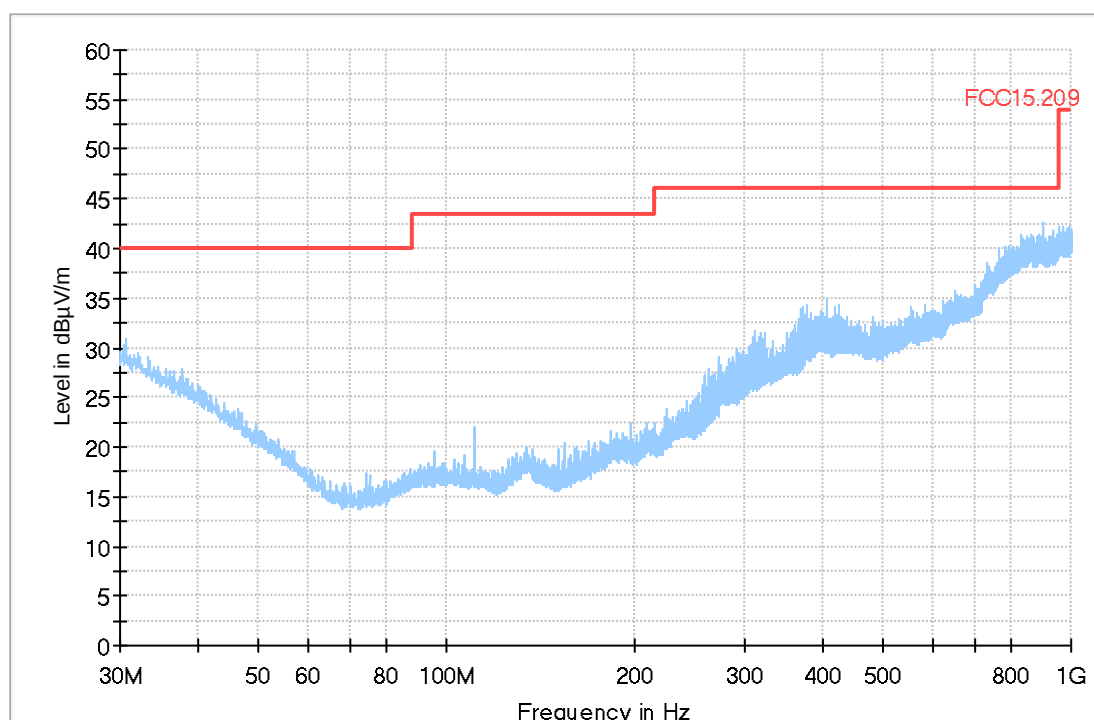
Full Spectrum



3.01b_BT_3-DH1_ch39_standing

Test description:	11.06.2019 Page 1 of 4
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 V9.25.0
Used filter:	not used
Technical Data:	not used
Test specification.:	please see page 2 for detailed data of measurement setup
Operator:	FCC 15.209; RSS-Gen: Issue 3
Operating conditions:	TFra
Power during tests:	BT 3-DH1 ch39
Comment 1:	2x 1.5V Battery
	EUT standing (defined normal position)

Full Spectrum



1.4. General Limit - Radiated emissions, above 1 GHz

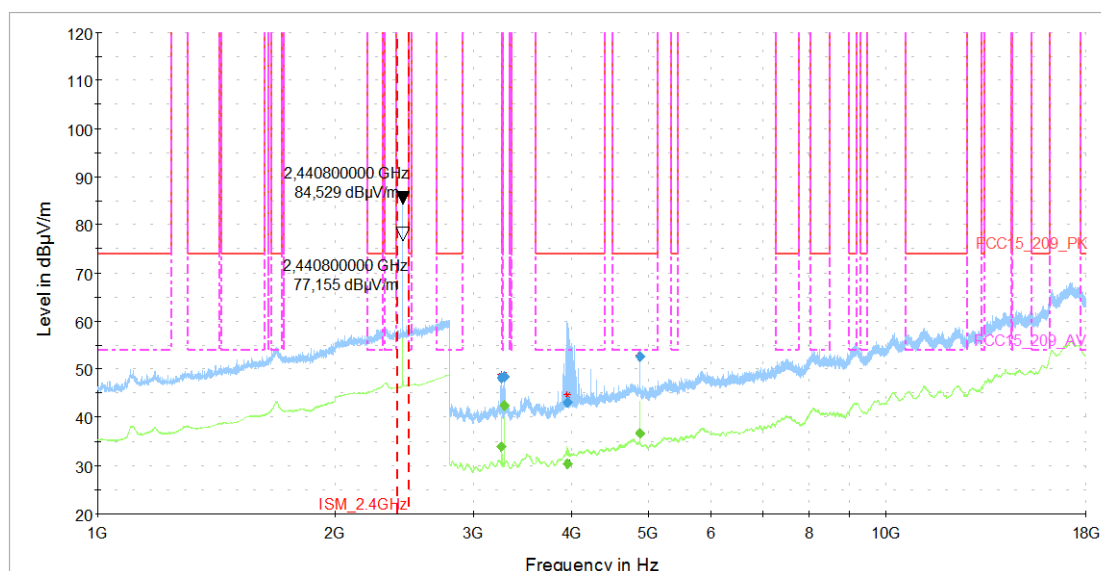
4.01a_BT_3-DH1_ch39

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
Operating Mode:	BT BDR 3-DH1
Operator:	npe
Comment:	Channel no. low/middle/high
Comment2:	Modulation Type: 3-DH1 Data Rate: 1Mbit
EUT Setup:	S0x
Verdict:	Passed

EUT Information

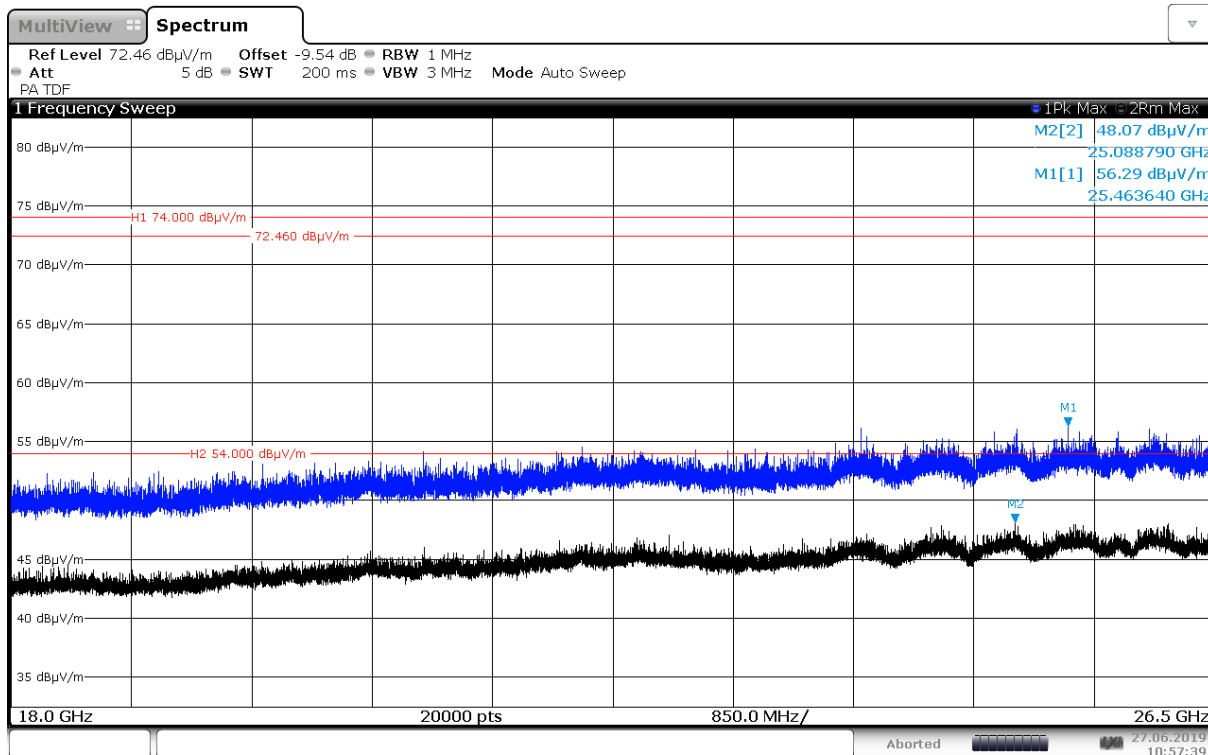
Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)



Final Result

Frequency (MHz)	MaxPeak (dB μ V/m)	RMS (dB μ V/m)	Limit (dB μ V/ m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
3254.400000	48.31	---	150.00	101.69	100.0	1000.000	H	324.0	90.0	2
3254.800000	---	33.88	150.00	116.12	100.0	1000.000	H	55.0	90.0	2
3282.800000	---	42.43	150.00	107.57	100.0	1000.000	H	312.0	90.0	2
3282.800000	48.43	---	150.00	101.57	100.0	1000.000	H	312.0	90.0	2
3943.600000	43.16	---	74.00	30.84	100.0	1000.000	H	252.0	0.0	3
3943.600000	---	30.38	54.00	23.62	100.0	1000.000	H	229.0	0.0	3
4882.000000	---	30.75	54.00	17.25	100.0	1000.000	H	215.0	90.0	6
4882.000000	52.60	---	74.00	21.40	100.0	1000.000	H	228.0	90.0	6

4.01b_BT_3-DH1_ch39



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1.5. RF-Parameter - Band Edge compliance measurements

9.01a_BT_DH1_ch00

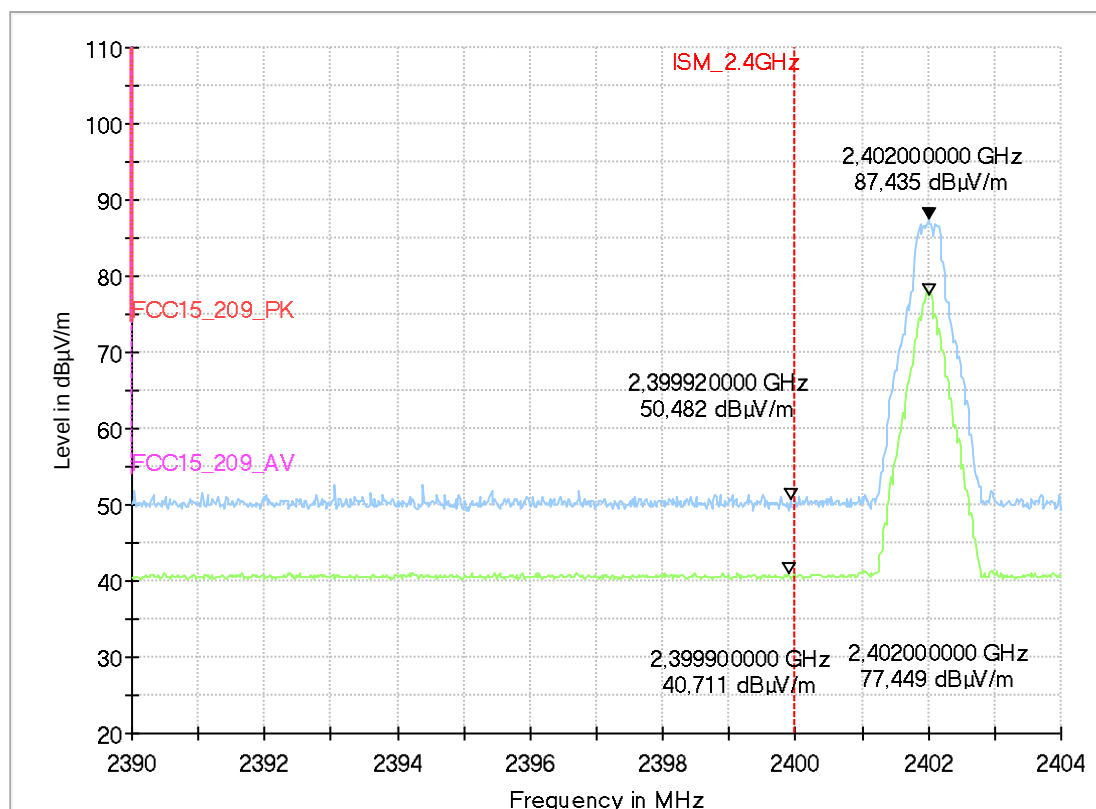
Common Information

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
Operating Mode:	BT BDR DH1
Operator:	npe
Comment:	Channel no. low
Comment2:	DH1
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.02b_BT_DH1_ch78

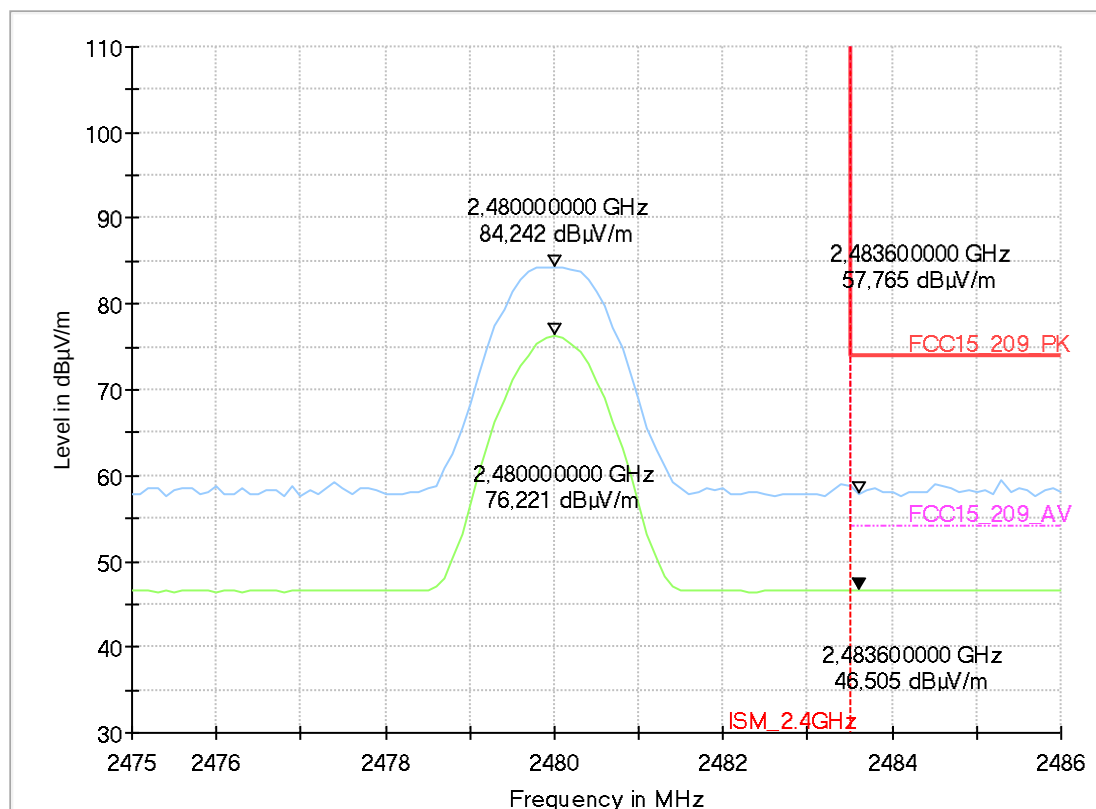
Common Information

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
Operating Mode:	BT BDR DH1
Operator:	npe
Comment:	Channel high
Comment2:	DH1
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.02a_BT_2-DH1_ch00

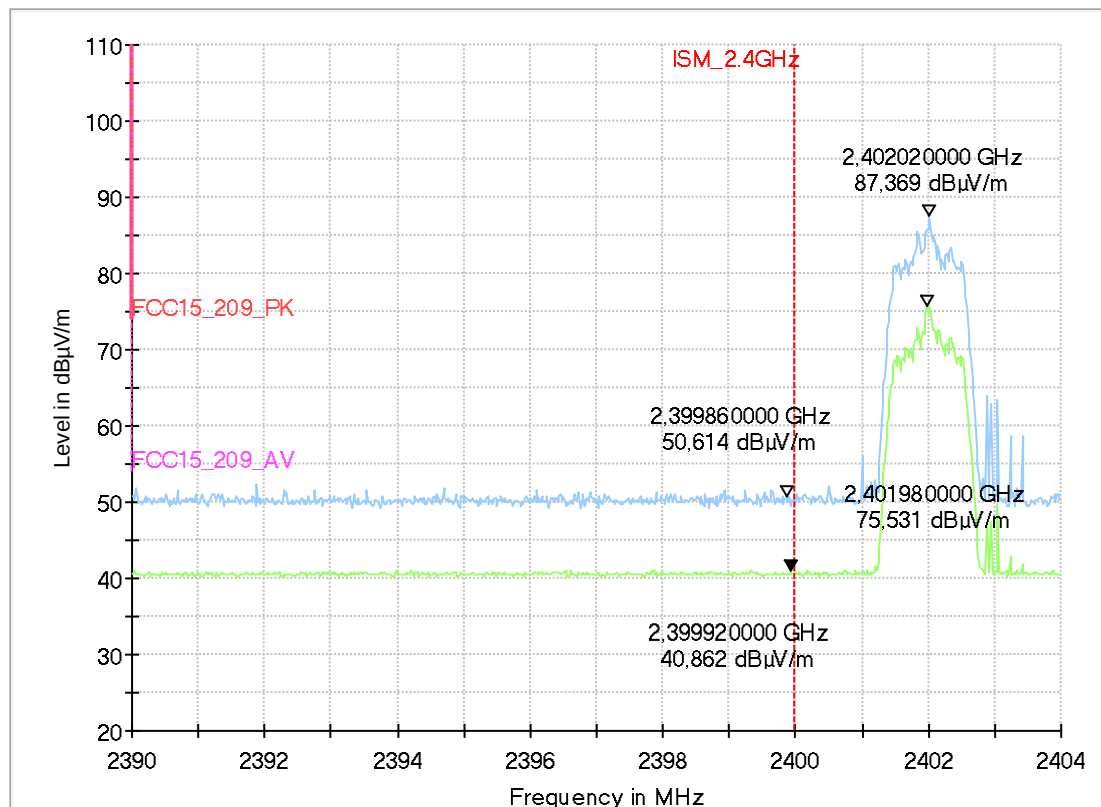
Common Information

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
Operating Mode:	BT EDR 2-DH1
Operator:	npe
Comment:	Channel low
Comment2:	BT EDR 2-DH1 ch00
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.02b_BT_2-DH1_ch78

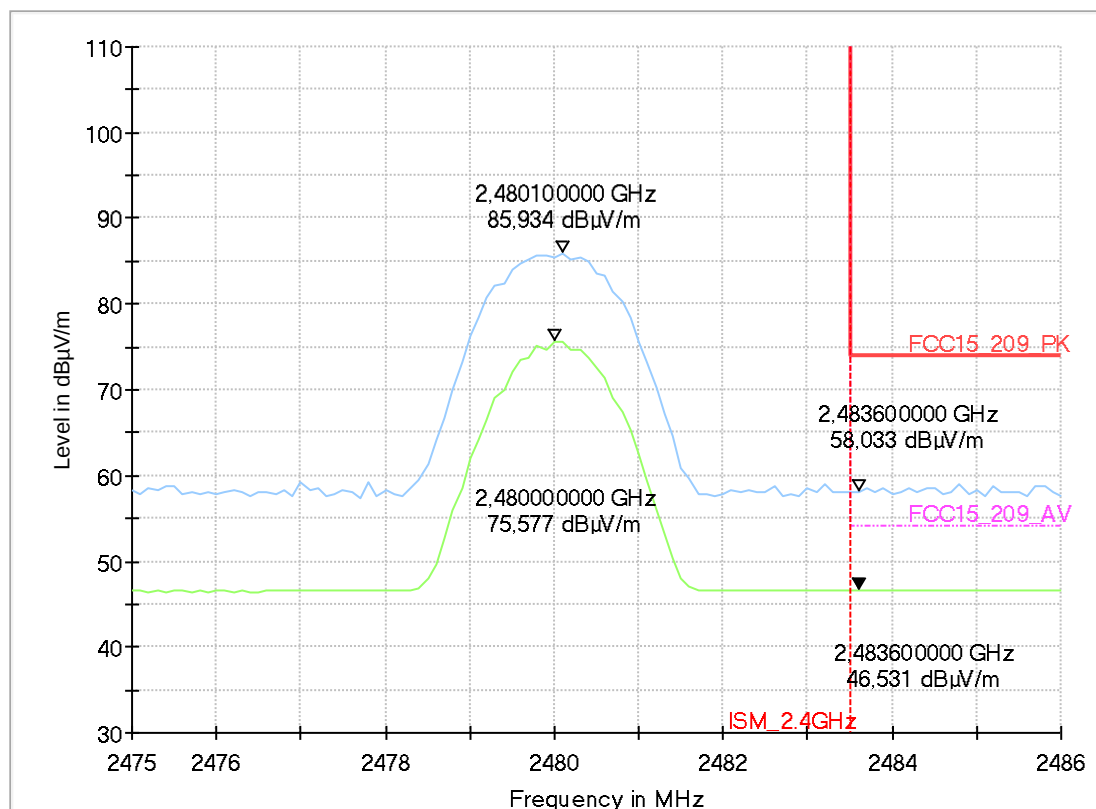
Common Information

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
Operating Mode:	BT EDR 2-DH1
Operator:	npe
Comment:	Channel high
Comment2:	BT EDR 2-DH1 ch78
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.03a_BT_3-DH1_ch00

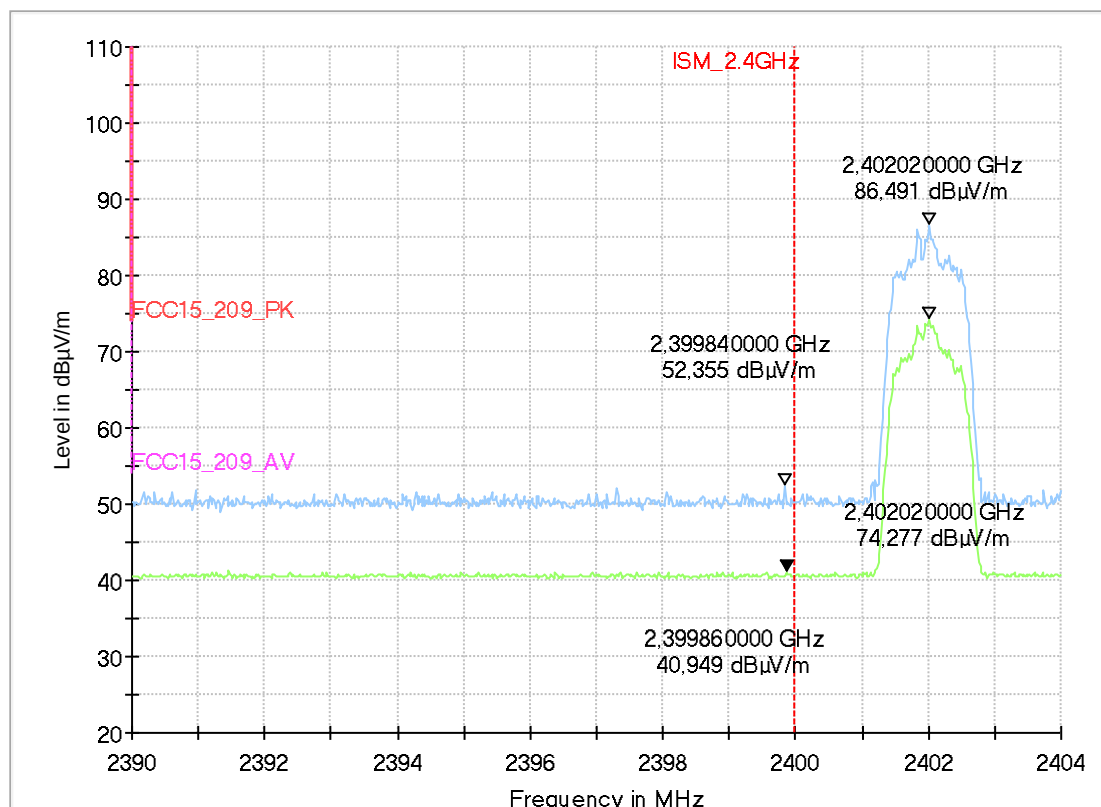
Common Information

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
Operating Mode:	BT EDR 3-DH1
Operator:	npe
Comment:	Channel low
Comment2:	BT EDR 3-DH1 ch00
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.03b_BT_3-DH1_ch78

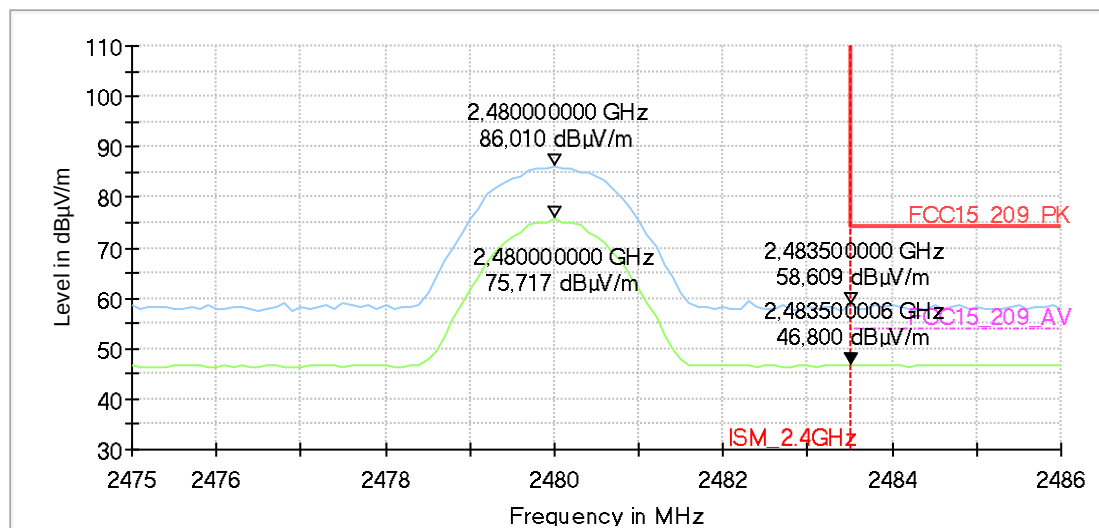
Common Information

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
Operating Mode:	BT EDR 3-DH1
Operator:	npe
Comment:	Channel high
Comment2:	BT EDR 3-DH1 ch78
EUT Setup:	S0x
Verdict:	Passed

EUT Information

Manufacturer:	Savari
Model:	MW2000
Type:	Telematic Device
HW version:	1
SW version:	100.1
Serial number:	004

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB/m)
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9.04a_BT_DH1_hopping

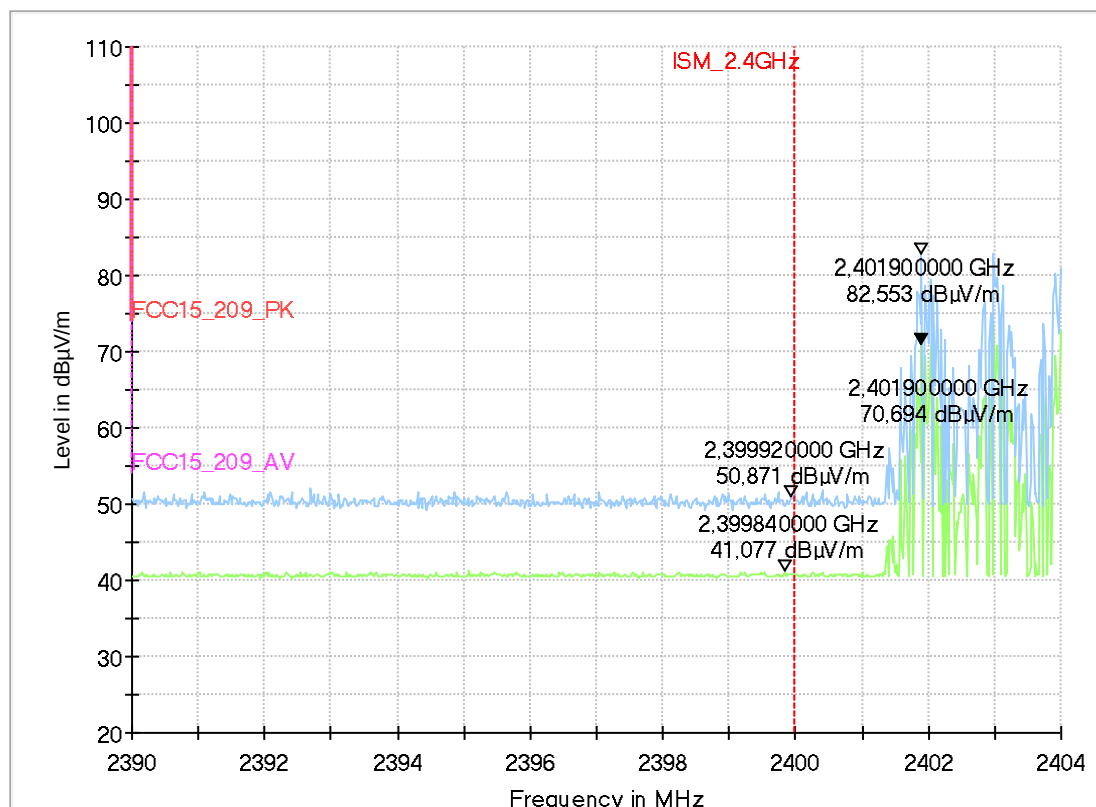
Common Information

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
Operating Mode:	BT_DH1_hopping
Operator:	npe
Comment:	
Comment2:	
EUT Setup:	1
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum



9.04b_BT_DH1_hopping

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
Operating Mode:	BT_DH1_hopping
Operator:	npe
Comment:	
Comment2:	
EUT Setup:	1
Verdict:	Passed

EUT Information

Manufacturer:	Helmut Fischer GmbH
Product:	Messgerät
Model:	MMS Inspection DPM
HW version:	tbd
SW version:	tbd
Serial number:	56
Power Supply:	2x AA Battery (1.5V)

Full Spectrum

