

Annex 1: Measurement diagrams

24-1-0039801T021_TR1-A201-R01

Number of pages:	26	Date of Report:	2024-Nov-04
Testing company:	cetecom advanced GmbH Untertuerkheimer Str. 6-10 66117 Saarbruecken GERMANY	Applicant:	Lufthansa Technik AG
Product: Model:	Small Aircraft Cabin Management and Inflight Entertainment System (SAC) SAC0522		
FCC ID:	2BKRFSAC0522001001	IC:	32839-SAC0522001
		PMN:	SAC
		HVIN:	SAC0522-001-001
		FVIN:	SCDP1-01-B-RC01
Testing has been carried out in accordance with:	FCC Regulations Title 47 CFR, Chapter I, Subchapter A, Part 15 Subpart C Intentional Radiators § 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz ISED-Regulations Radio Standards Specification RSS-Gen, Issue 5 General Requirements for Compliance of Radio Apparatus RSS-247, Issue 3 Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Device		

Measurement diagrams

2.01_BLE_low_standing

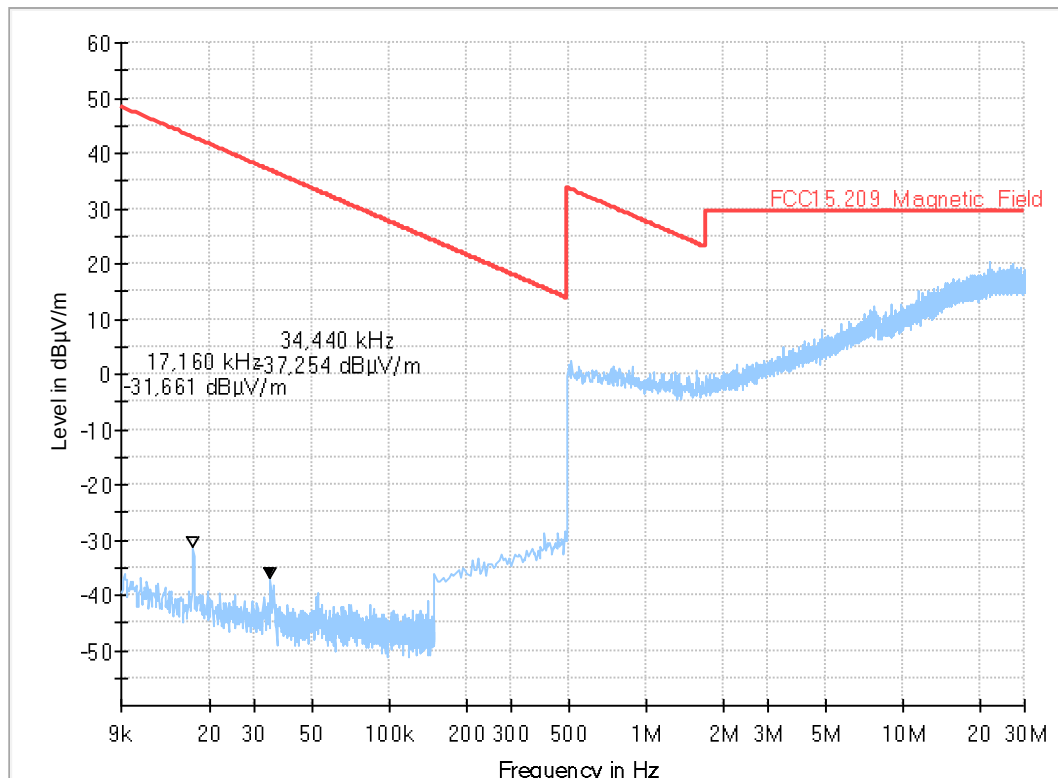
Common Information

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 V10.60.20
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:	KTe
Operating Mode:	BLE_low
Comment 1:	Channel low
Comment 2:	standing
Environmental Conditions:	Humidity: 50 % rH; Temperature: 22.8 °C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC

Full Spectrum



Remark: The results from magnetic field are applicable to BLE as well as Bluetooth Classic.

2.02_BLE_low_lying

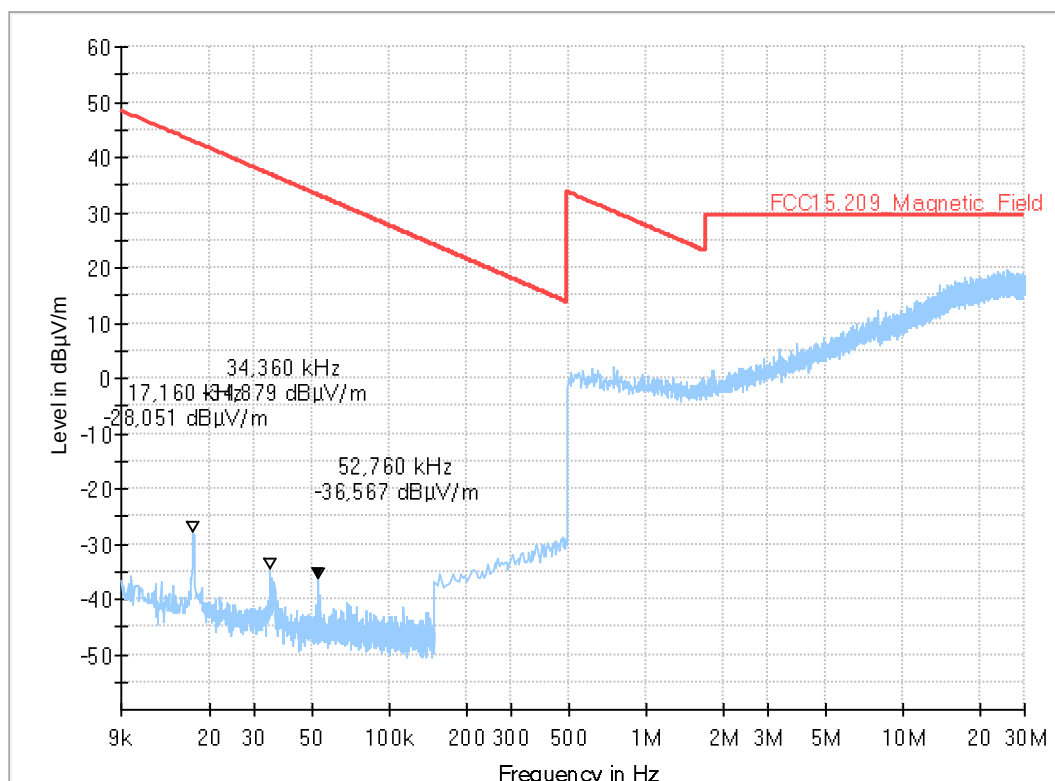
Common Information

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 V10.60.20
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:	KTe
Operating Mode:	BLE_low
Comment 1:	Channel low
Comment 2:	lying
Environmental Conditions:	Humidity: 50 % rH; Temperature: 22.8 °C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC

Full Spectrum



Remark: The results from magnetic field are applicable to BLE as well as Bluetooth Classic.

2.03_BLE_mid

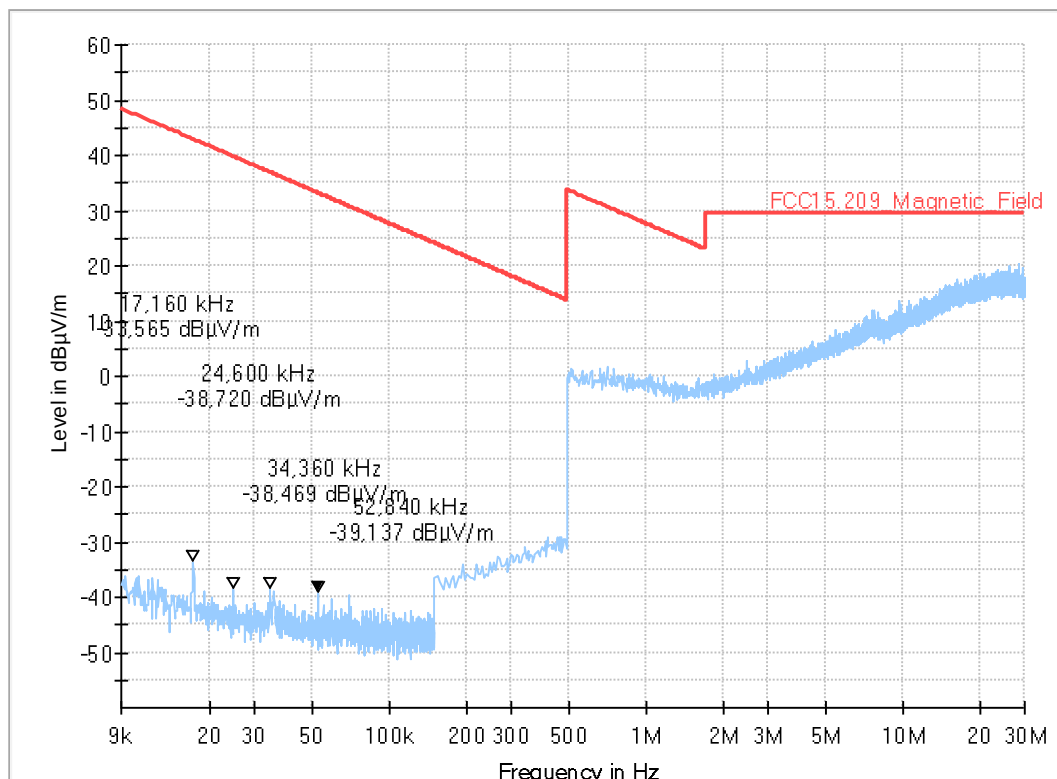
Common Information

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 V10.60.20
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:	KTe
Operating Mode:	BLE_mid
Comment 1:	Channel mid
Comment 2:	lying
Environmental Conditions:	Humidity: 50 % rH; Temperature: 22.8 °C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC

Full Spectrum



Remark: The results from magnetic field are applicable to BLE as well as Bluetooth Classic.

2.04_BLE_high

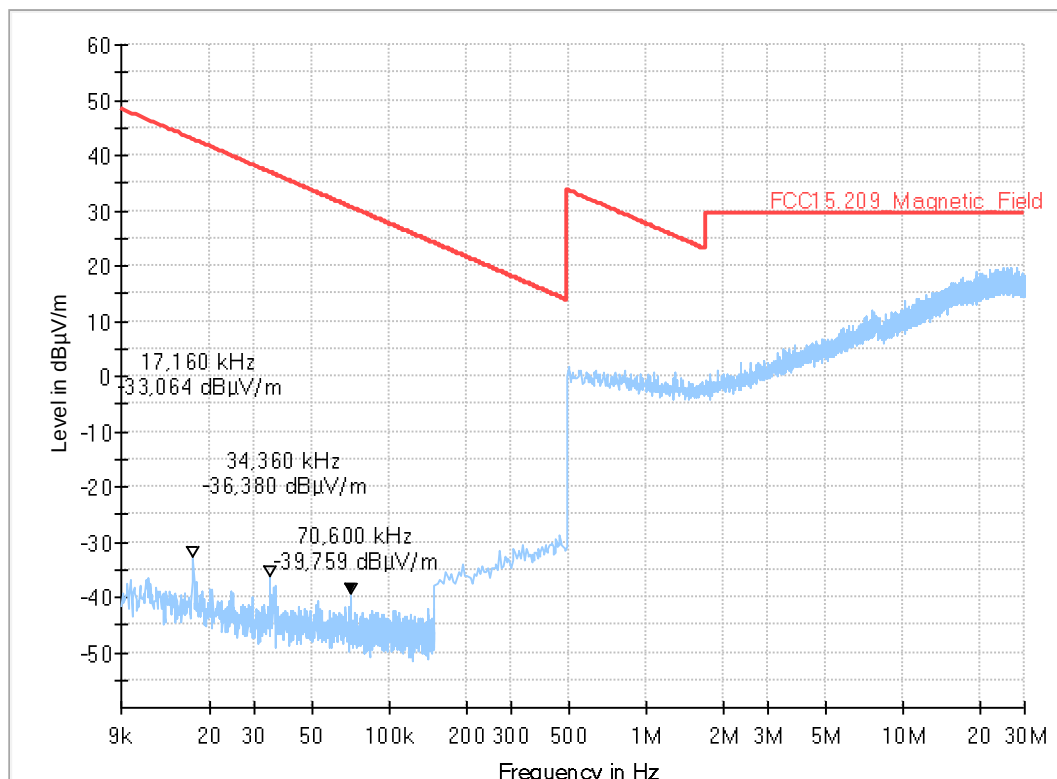
Common Information

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 V10.60.20
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:	KTe
Operating Mode:	BLE_high
Comment 1:	Channel high
Comment 2:	lying
Environmental Conditions:	Humidity: 50 % rH; Temperature: 22.8 °C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC

Full Spectrum



Remark: The results from magnetic field are applicable to BLE as well as Bluetooth Classic.

3.01a_BT_DH5_ch0_lying

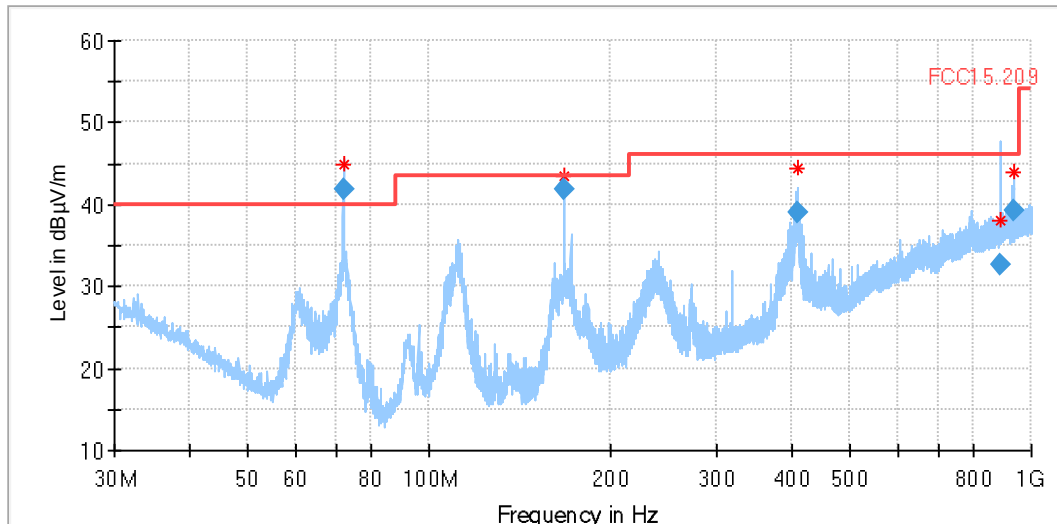
Common Information

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

 Environmental Conditions: Humidity: 42 % rH, Temperature: 22 °C
 Operator Name: PShin
 EUT: 1
 Operating Mode: BT BR | DH5 | ch0
 Verdict: Passed

EUT Information

PMT number: 24-1-00398S02_C01
 Power: 28 V DC



Remark: Peak at 71.99MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
167.990000	41.91	43.50	1.59	120.000	105.0	V	142.0	9.8	0.0
408.438000	38.93	46.00	7.07	120.000	104.0	H	0.0	19.2	0.0
890.298000	32.61	46.00	13.39	120.000	368.0	H	330.0	27.1	0.0
934.834000	39.32	46.00	6.68	120.000	246.0	H	49.0	27.1	0.0

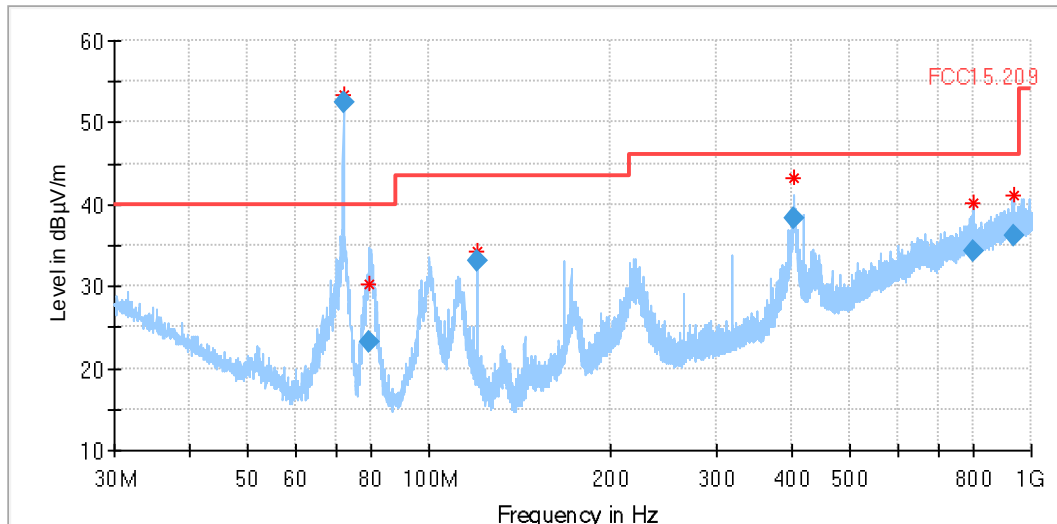
3.01b_BT_DH5_ch0_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	cetecom advanced GmbH (Essen)
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 42 % rH, Temperature: 22 °C
Operator Name:	PShin
EUT:	1
Operating Mode:	BT BR DH5 ch0
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC



Remark: Peak at 71.99MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
79.690000	23.16	40.00	16.84	120.000	141.0	V	90.0	6.9	0.0
119.994000	33.01	43.50	10.49	120.000	109.0	V	94.0	7.2	0.0
404.222000	38.19	46.00	7.81	120.000	147.0	V	44.0	19.3	0.0
799.322000	34.30	46.00	11.70	120.000	256.0	H	226.0	25.5	0.0
934.806000	36.25	46.00	9.75	120.000	341.0	H	24.0	27.1	0.0

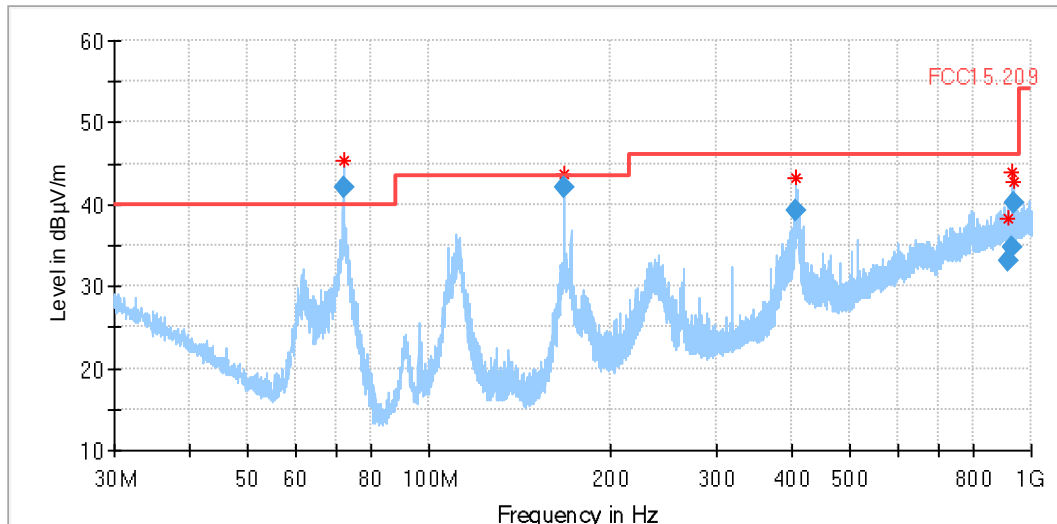
3.02a_BT_DH5_ch39_lying

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	cetecom advanced GmbH (Essen)
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 42 % rH, Temperature: 22 °C
Operator Name:	PShin
EUT:	1
Operating Mode:	BT BR DH5 ch39
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC



Remark: Peak at 71.99MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
167.994000	42.05	43.50	1.45	120.000	105.0	V	140.0	9.8	0.0
407.170000	39.16	46.00	6.84	120.000	100.0	H	0.0	19.2	0.0
917.026000	33.11	46.00	12.89	120.000	363.0	H	78.0	27.3	0.0
927.954000	34.77	46.00	11.23	120.000	149.0	V	1.0	27.0	0.0
934.834000	40.19	46.00	5.81	120.000	313.0	V	159.0	27.1	0.0

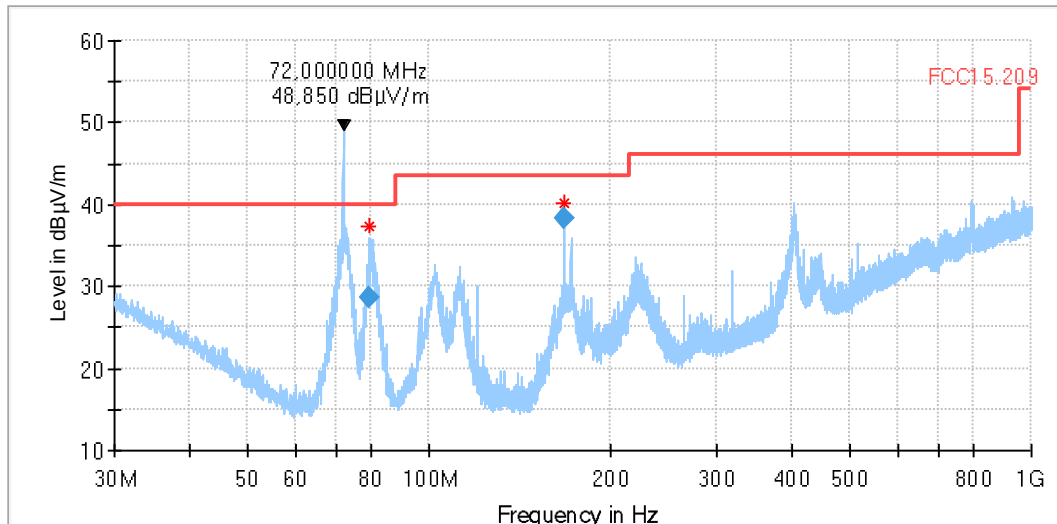
3.02b_BT_DH5_ch39_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	cetekom advanced GmbH (Essen)
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 42 % rH, Temperature: 22 °C
Operator Name:	PShin/PSt
EUT:	1
Operating Mode:	BT BR DH5 ch39
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC



Remark: Peak at 72.00MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
79.674000	28.54	40.00	11.46	120.000	167.0	V	138.0	6.9	0.0
167.990000	38.40	43.50	5.10	120.000	109.0	V	86.0	9.8	0.0

3.03a_BT_DH5_ch78_lying

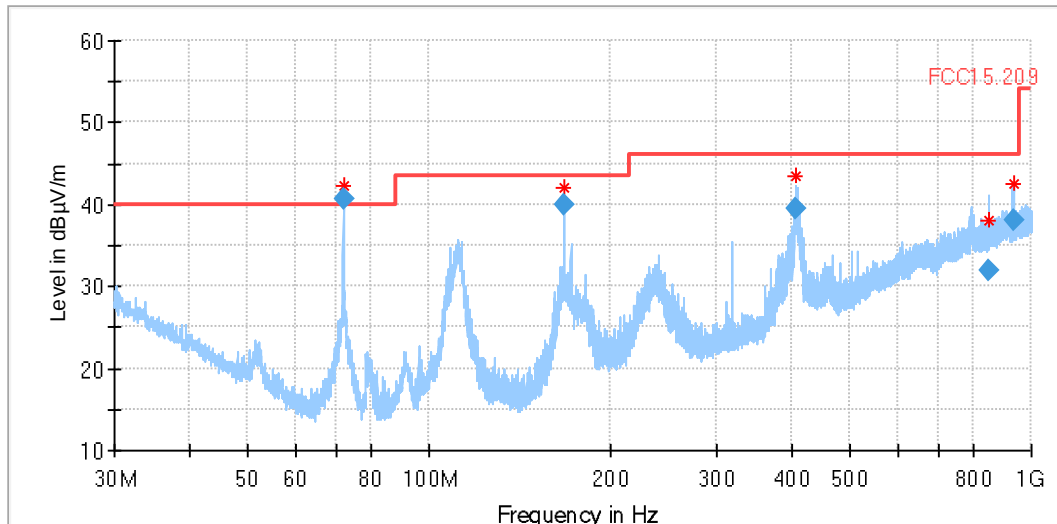
Common Information

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

 Environmental Conditions: Humidity: 42 % rH, Temperature: 22 °C
 Operator Name: PShin
 EUT: 1
 Operating Mode: BT BR | DH5 | ch78
 Verdict: Passed

EUT Information

PMT number: 24-1-00398S02_C01
 Power: 28 V DC



Remark: Peak at 71.99MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
167.990000	40.05	43.50	3.45	120.000	109.0	V	136.0	9.8	0.0
406.754000	39.36	46.00	6.64	120.000	100.0	H	1.0	19.2	0.0
848.934000	31.94	46.00	14.06	120.000	348.0	H	269.0	26.4	0.0
934.806000	38.16	46.00	7.84	120.000	222.0	H	334.0	27.1	0.0

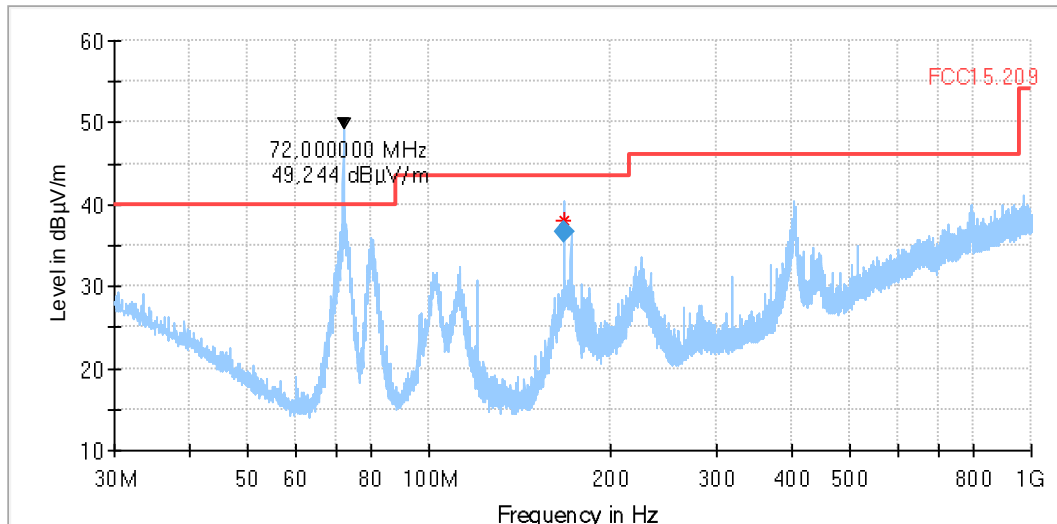
3.03b_BT_DH5_ch78_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	cetekom advanced GmbH (Essen)
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 42 % rH, Temperature: 22 °C
Operator Name:	PShin/PSt
EUT:	1
Operating Mode:	BT BR DH5 ch78
Verdict:	Passed

EUT Information

PMT number:	24-1-00398S02_C01
Power:	28 V DC



Remark: Peak at 72:00 MHz is in non-restricted band.

Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
167.990000	36.53	43.50	6.97	120.000	105.0	V	259.0	9.8	0.0

4.01_BT_DH5_ch0

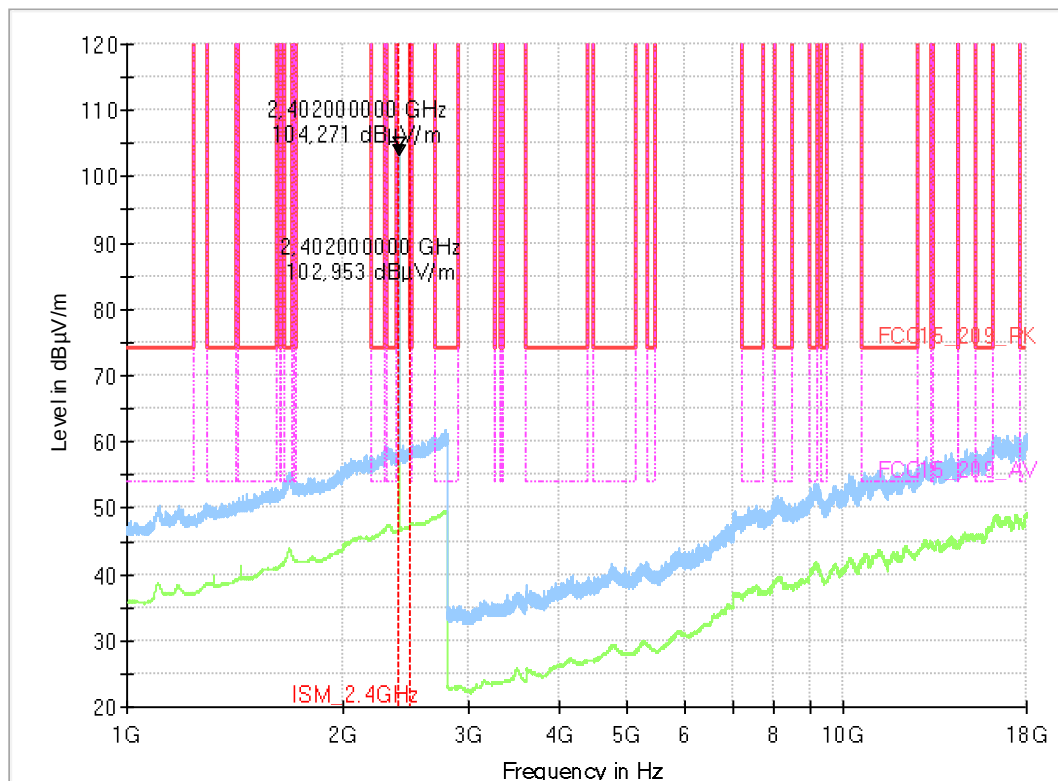
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT BR DH5 ch0
Operator:	ASa
Comment:	Channel low
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



4.02_BT_DH5_ch39

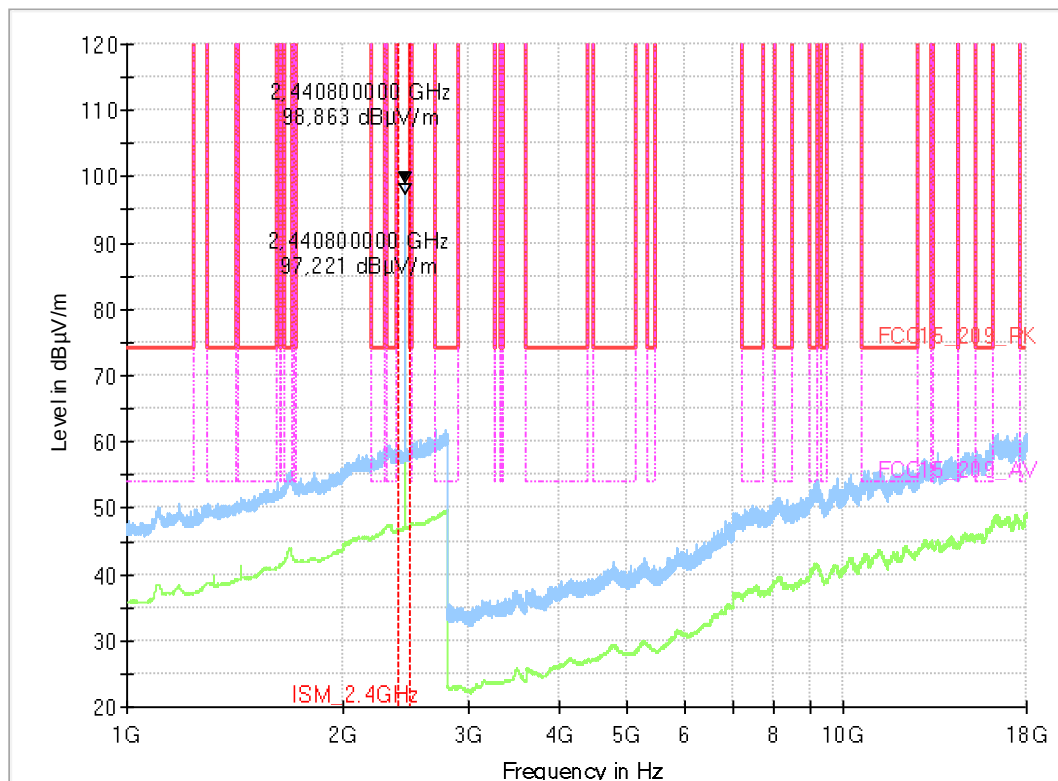
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT BR DH5 ch39
Operator:	ASa
Comment:	Channel mid
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



4.03_BT_DH5_ch78

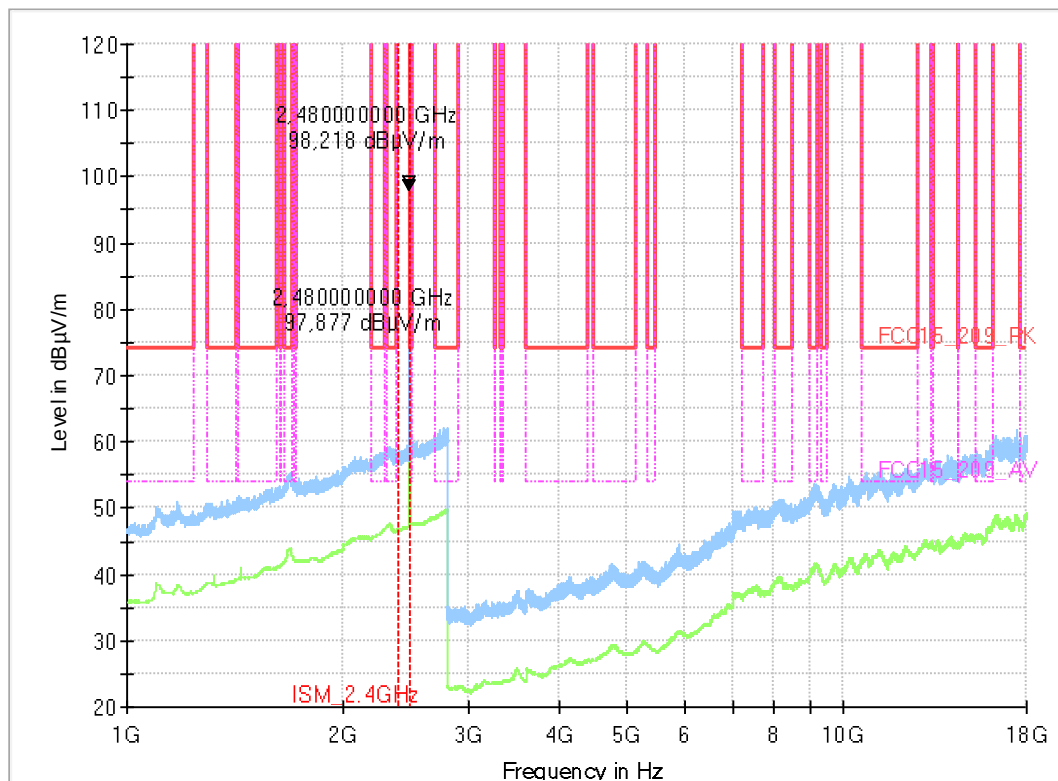
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT BR DH5 ch78
Operator:	ASa
Comment:	Channel high
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



4.04_BT_DH5_ch0_lying

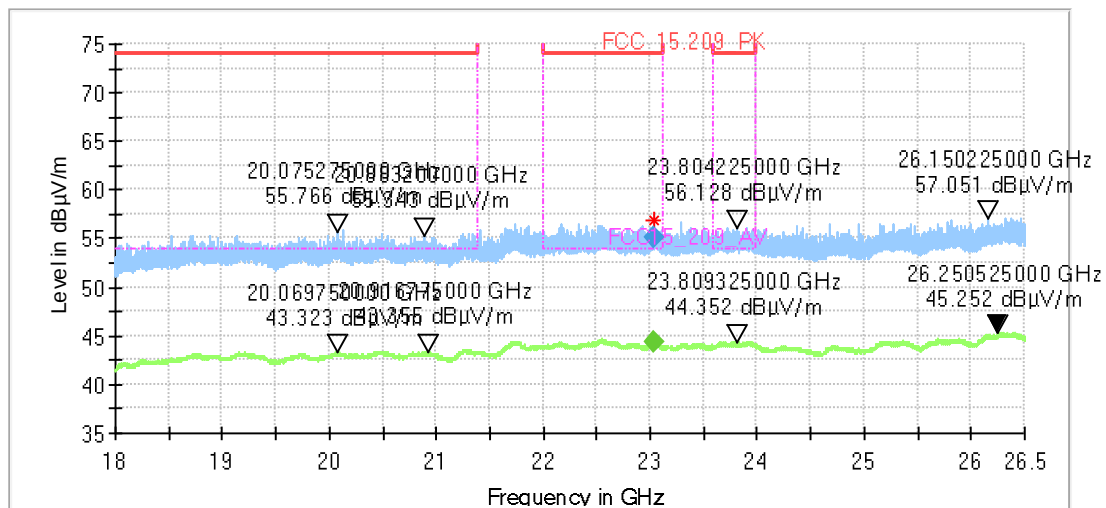
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetecom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section:	-
Operating Mode:	BT BR DH5 ch0
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr.	24-1-00398S02_C01
power:	28 V DC

Full Spectrum



Final_Result_PK+

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
23040.061600	55.18	74.00	18.82	1000.000	H	245.0	34.3	2.6

Final_Result_RMS

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
23034.651400	44.33	54.00	9.67	1000.000	H	219.0	34.4	2.6

4.05_BT_DH5_ch0_standing

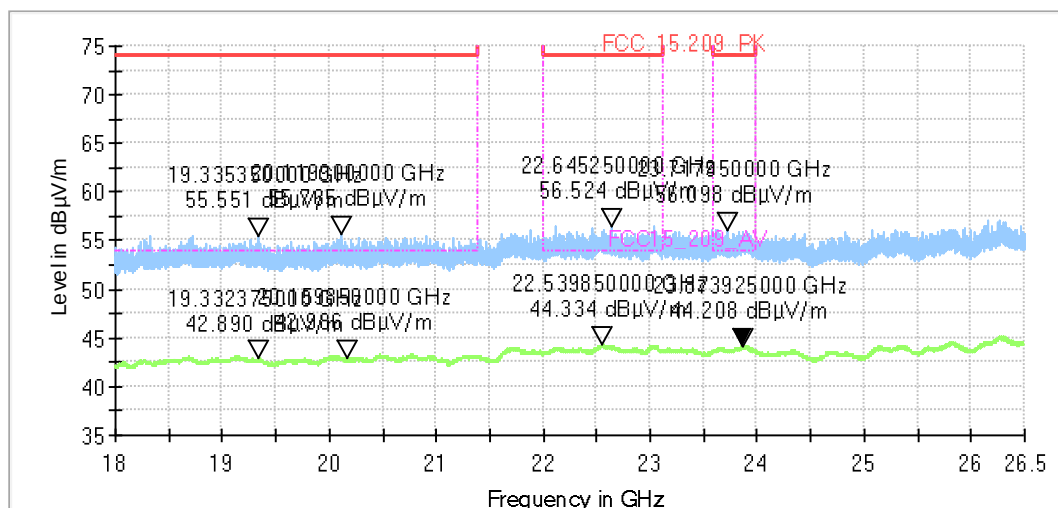
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetecom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section:	-
Operating Mode:	BT BR DH5 ch0
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr.	24-1-00398S02_C01
power:	28 V DC

Full Spectrum



4.06_BT_DH5_ch39_lying

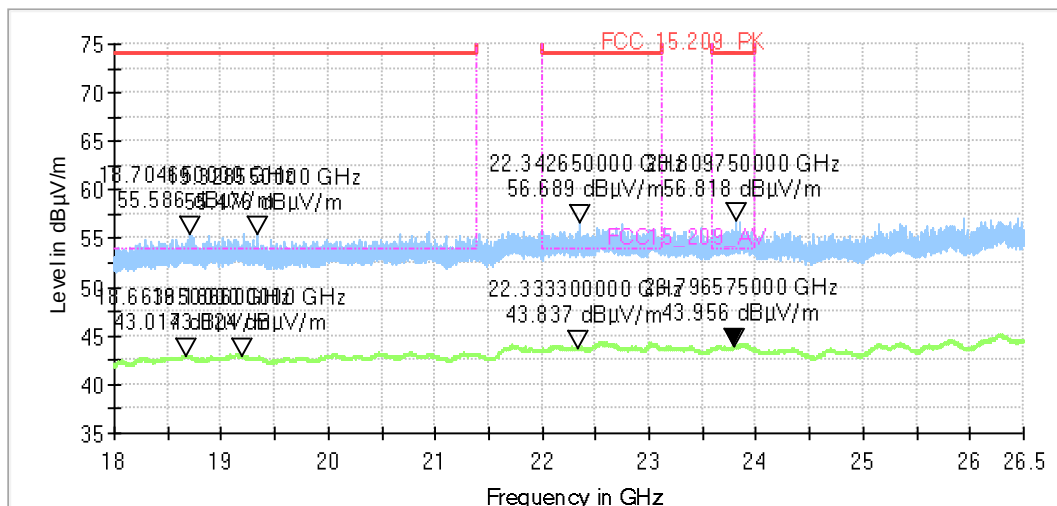
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetecom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section	-
Operating Mode:	BT BR DH5 ch39
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr. 24-1-00398S02_C01
power: 28 V DC

Full Spectrum



4.07_BT_DH5_ch39_standing

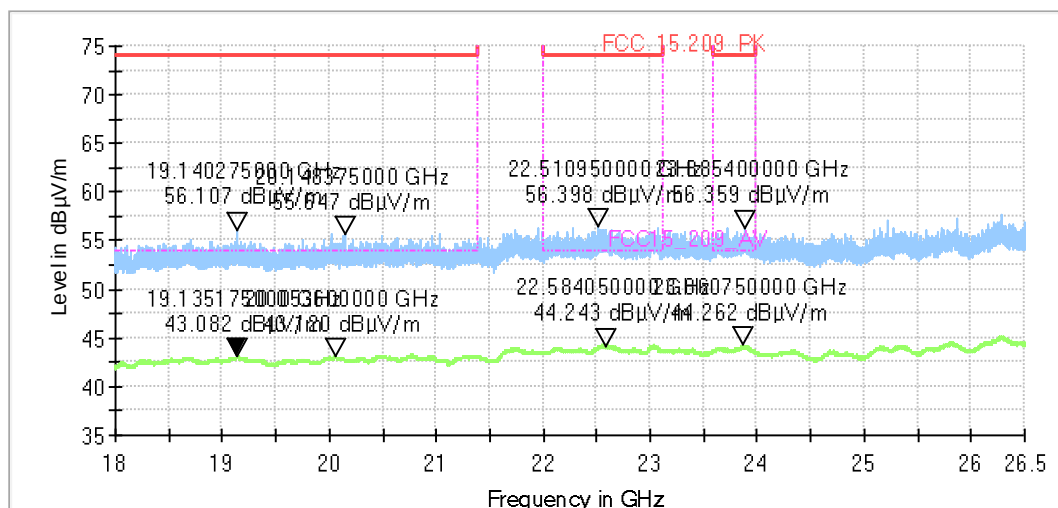
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetekom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section:	-
Operating Mode:	BT BR DH5 ch39
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr.	24-1-00398S02_C01
power:	28 V DC

Full Spectrum



4.08_BT_DH5_ch78_lying

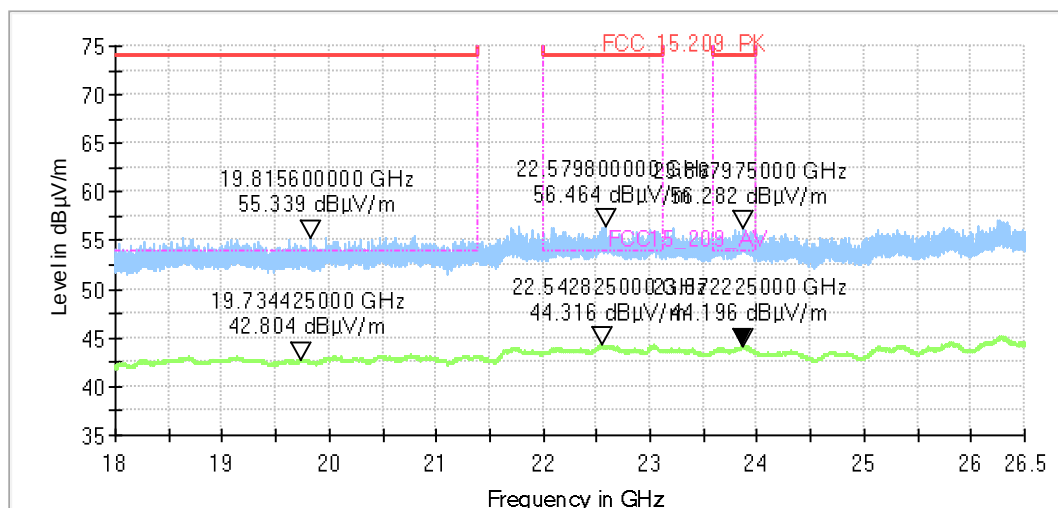
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetekom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section:	-
Operating Mode:	BT BR DH5 ch78
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr.	24-1-00398S02_C01
power:	28 V DC

Full Spectrum



4.09_BT_DH5_ch78_standing

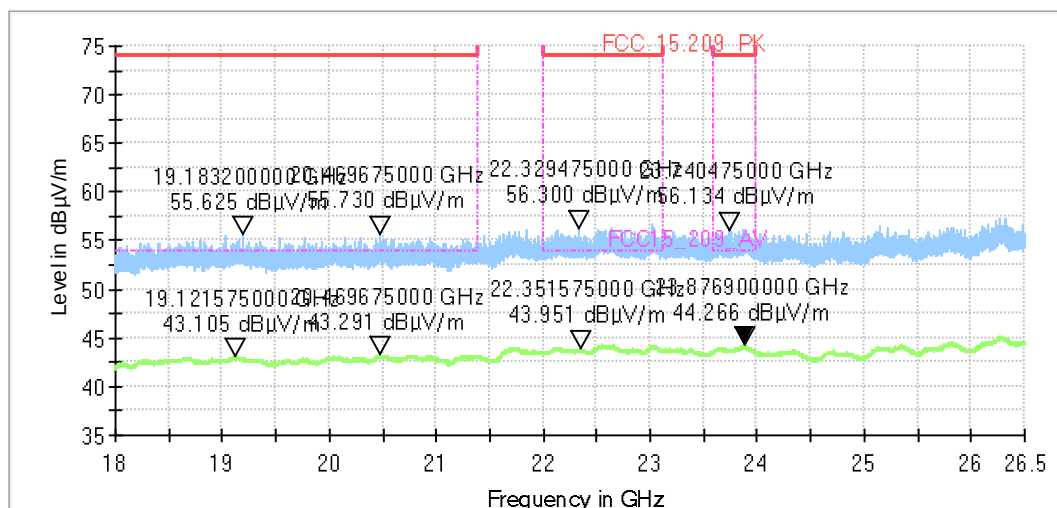
Common Information

Test Description:	Radiated field strength emission accord. §15.247/15.407 in 3m distance
Test Site Location:	cetekom advanced GmbH Essen
Test Site:	Fully Anechoic Room (FAR2)
Test Standard:	FCC Part 15.247 / 15.407
Section:	-
Operating Mode:	BT BR DH5 ch78
Environmental Conditions:	Humidity: 41 % rH; Temperature: 22.8 °C
Operator:	MNu
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT Sample Nr.	24-1-00398S02_C01
power:	28 V DC

Full Spectrum



9.01_BT_DH5_ch0

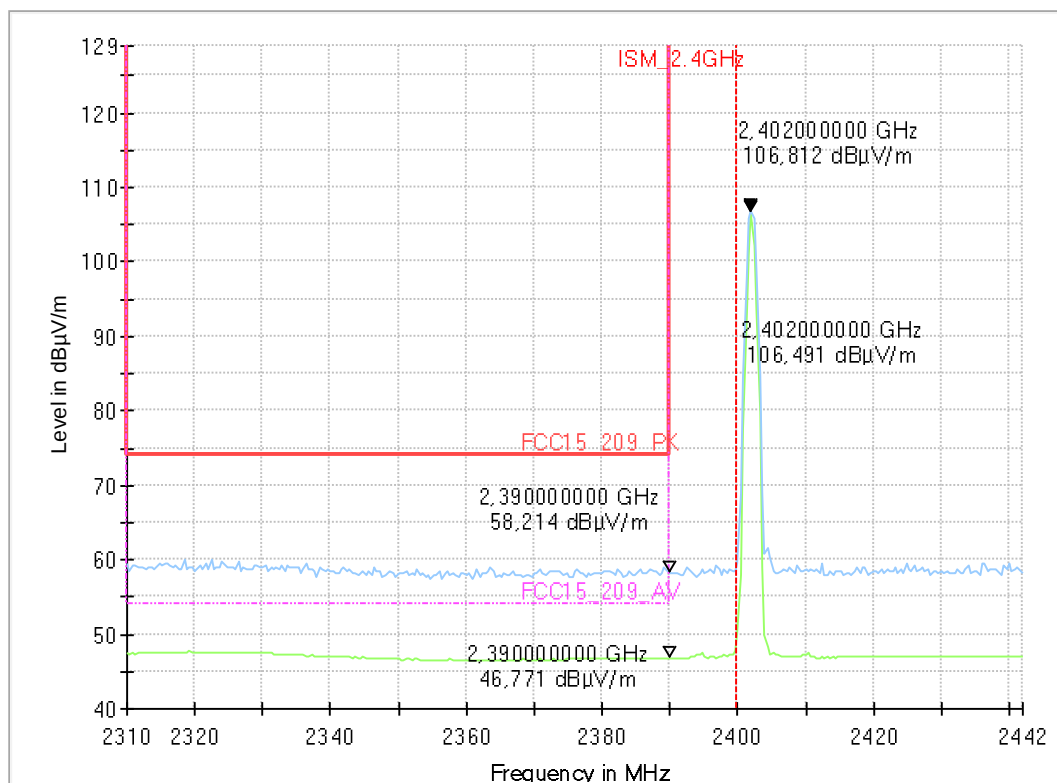
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT BR DH5 ch0
Operator:	ASa
Comment:	Channel low
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



9.02_BT_DH5_ch78

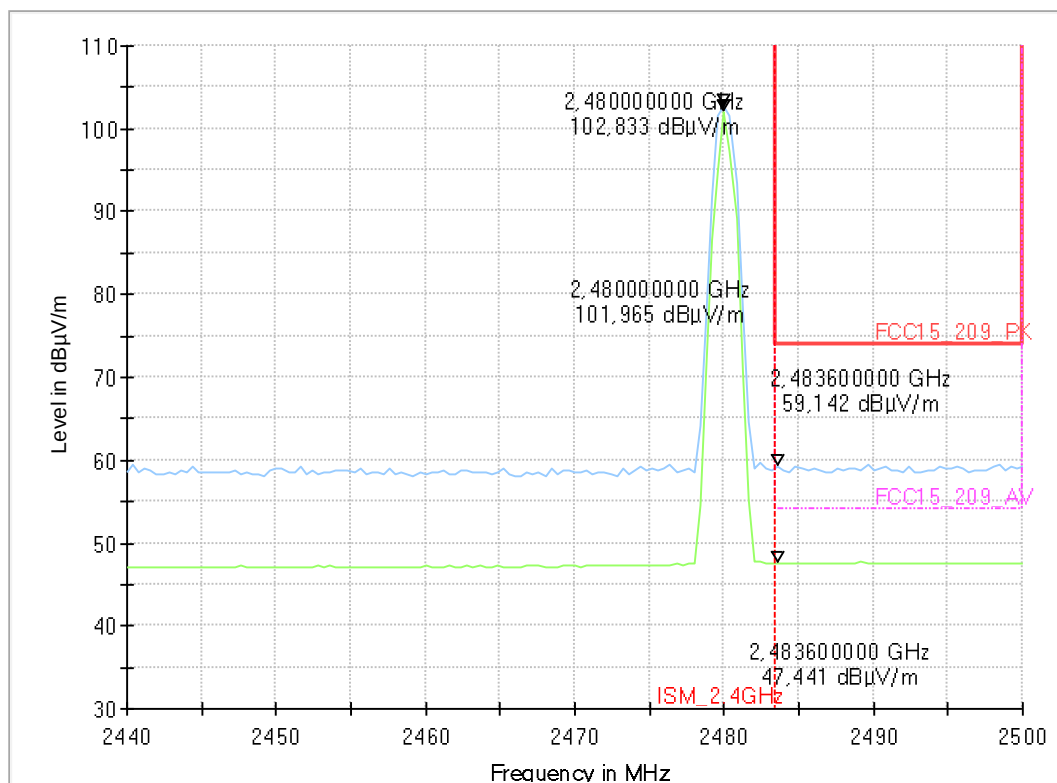
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT BR DH5 ch78
Operator:	ASa
Comment:	Channel high
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



9.03_BT_2_DH5_ch0

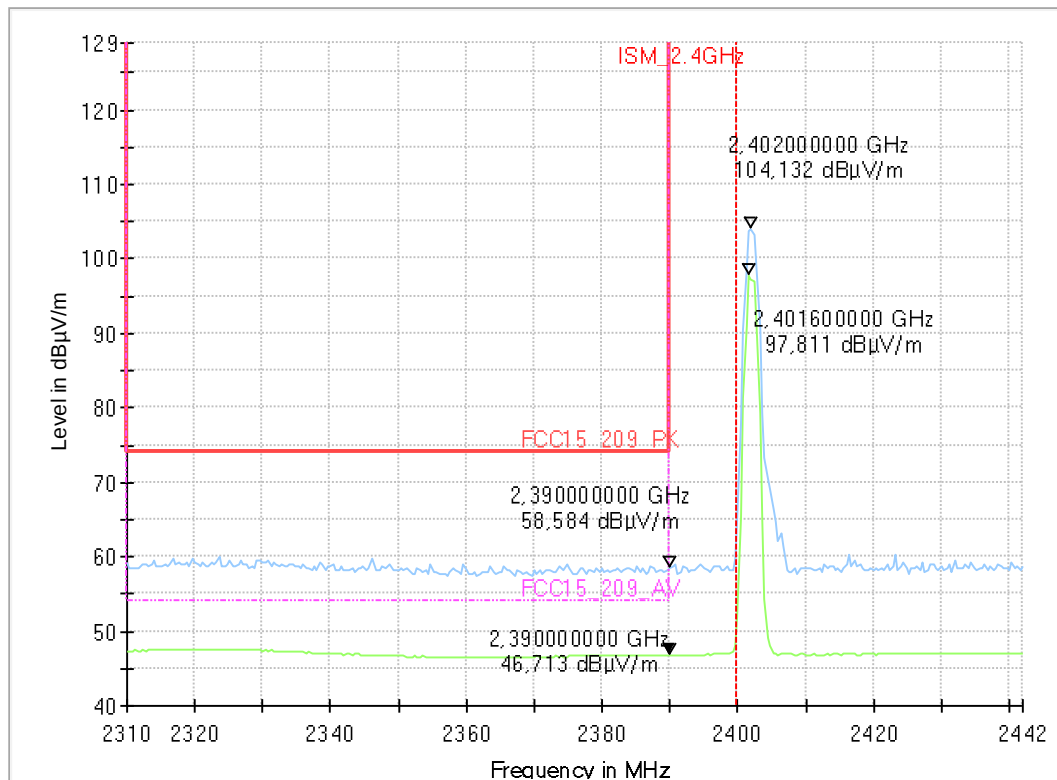
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT EDR 2-DH5 ch0
Operator:	ASa
Comment:	Channel low
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



9.04_BT_2_DH5_ch78

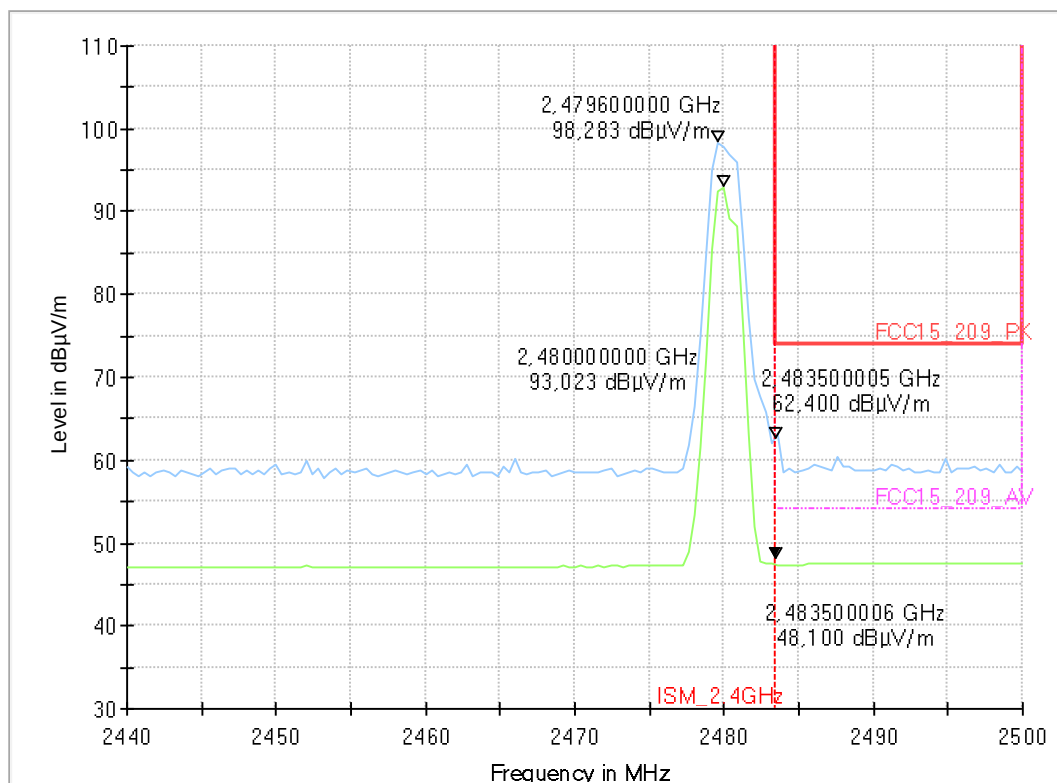
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT EDR 2-DH5 ch78
Operator:	ASa
Comment:	Channel high
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



9.05_BT_3_DH5_ch0

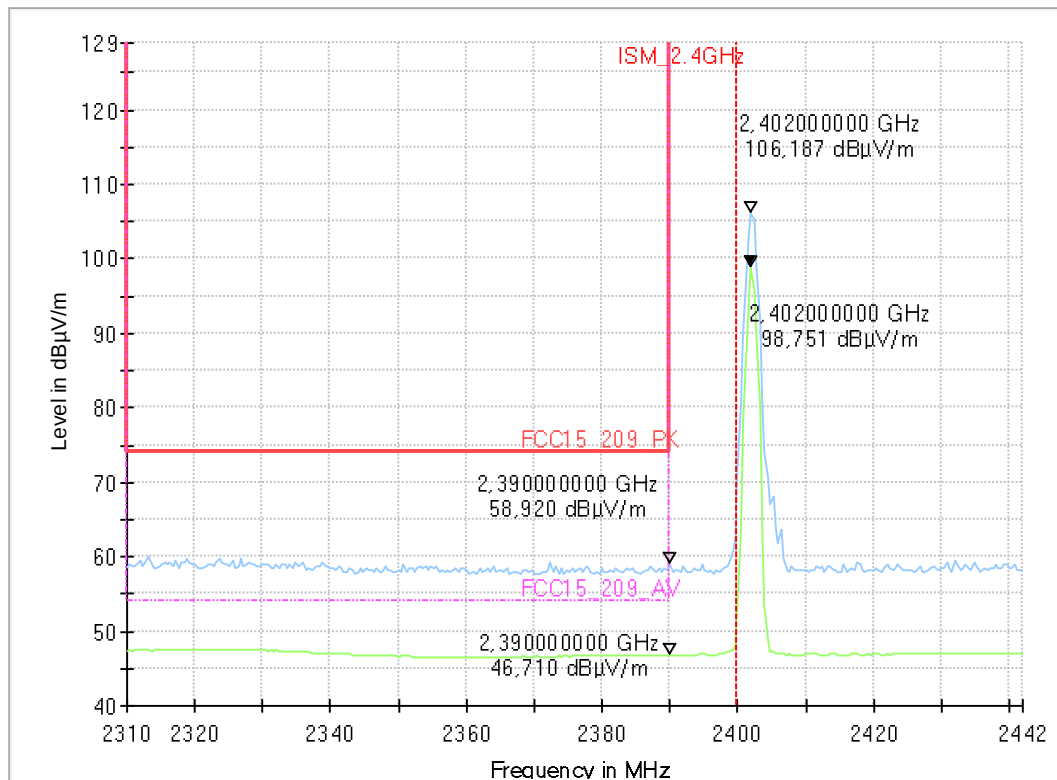
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT EDR 3-DH5 ch0
Operator:	ASa
Comment:	Channel low
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



9.06_BT_3_DH5_ch78

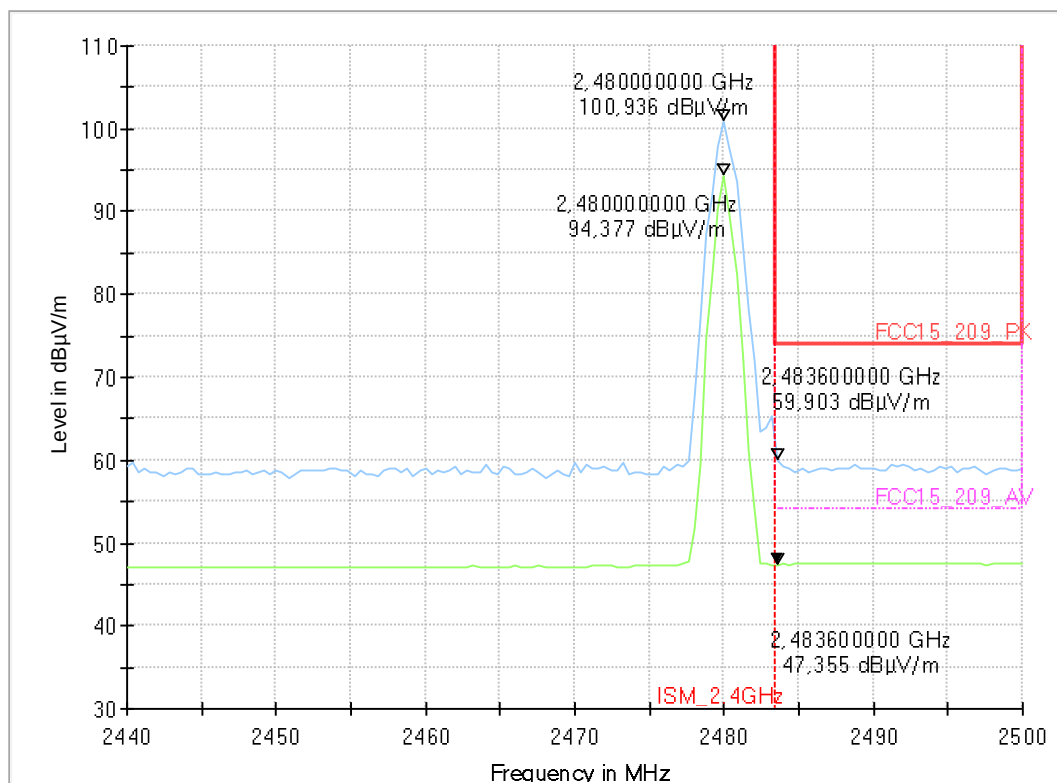
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operating Mode:	BT EDR 3-DH5 ch78
Operator:	ASa
Comment:	Channel high
EUT Setup:	1
Environmental Conditions:	Humidity: 50 % rH; Temperature: 20 °C
Verdict:	Passed

EUT Information

Sample:	24-1-00398S02_C01
Power Supply :	28 V DC

Full Spectrum



End Of Annex 1