

Annex 1: Measurement diagrams to Test Report 19-1-0069003T29a-A1

Number of pages:	21	Date of Report:	2020-Nov-04
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:	WAGO Kontakttechnik GmbH & Co. KG
Test Object / Tested Device(s):	8DIO FLD PN DC 24V 2.0A, SlimLine 765-1105/0100-0000 WAGO I/O System Field		
FCC ID:	2AKUE-SLIMLINE	IC:	22322-SLIMLINE
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter A §15.247 (DTS) ISED-Regulations RSS-Gen, Issue 5 RSS 247, Issue 2 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".limit".		



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1 Measurement diagrams

1.1 Radiated measurements

2.01b _BT_LE_low_standing

Common Information

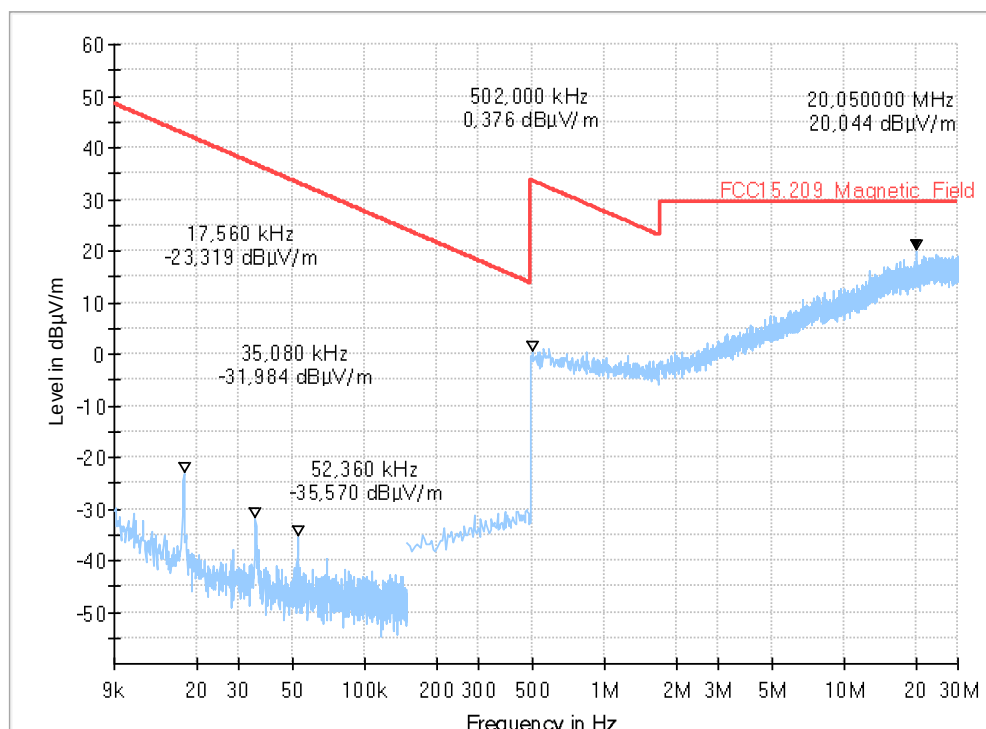
Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see 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
Operating Mode:	BT-LE Low channel
Power during tests:	24 V DC
Comment 1:	Channel low
Comment 2:	
Environmental Conditions::	Humidity : 55%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed
Comment:	

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



2.01b _BT_LE_low_standing

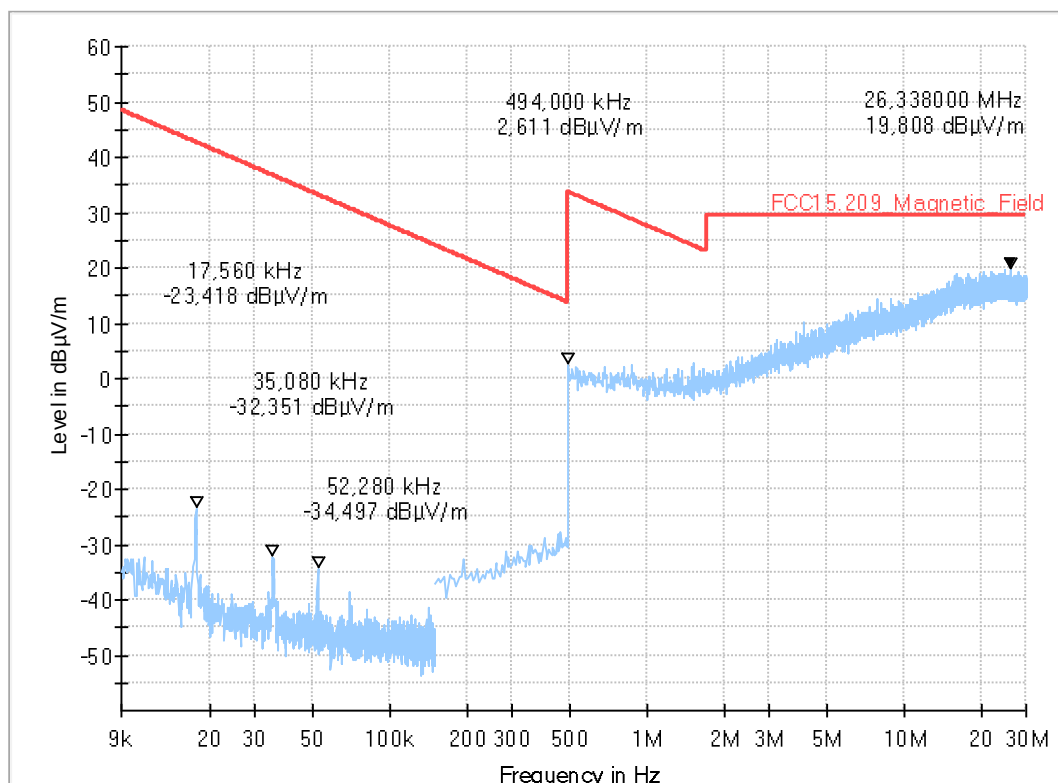
Common Information

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 V10.50.0
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
Operating Mode:	BT-LE Low channel
Environmental Conditions:	Humidity : 55%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



3.01a _BT_LE_low_laying

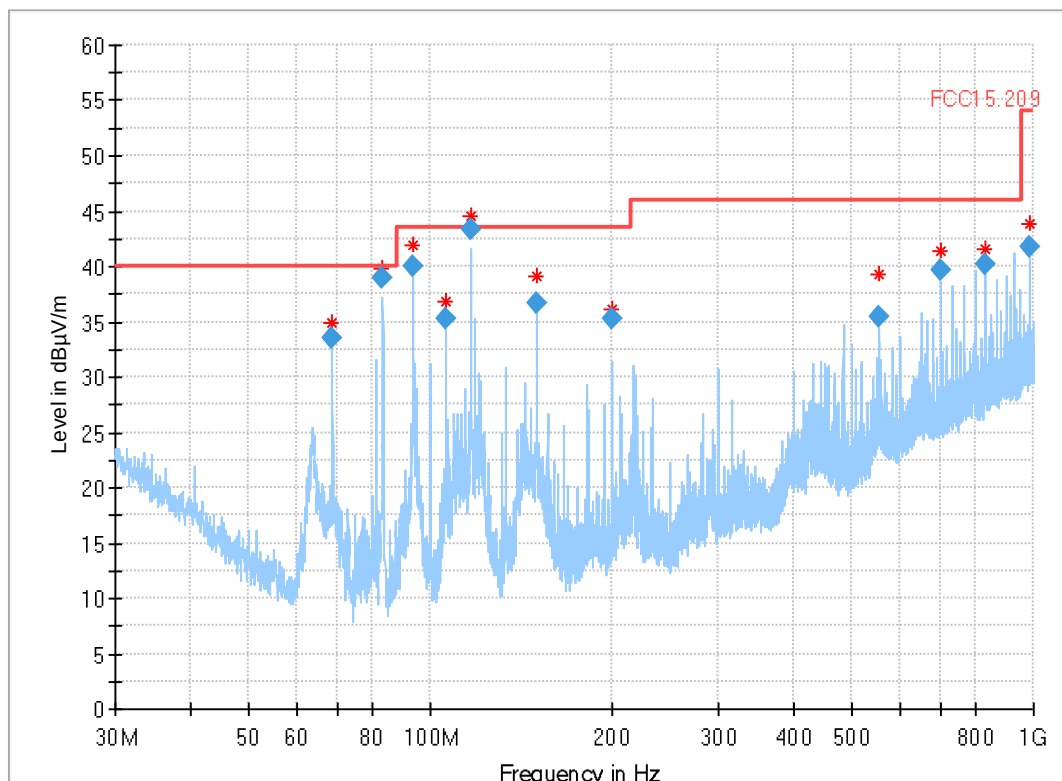
Common Information

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 Intentional Radiato
Antenna polarisation:	horizontal/vertical
Operation mode:	TCH mode
Operator Name:	
Comment:	Channel no. low
Operating Mode:	BT-LE Low channel
Environmental Conditions:	Humidity : 57%rH; Temperature: 20°C
Operator:	Mah
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)
68.752000	33.52	40.00	6.48	1000.0	120.000	186.0	V	9.0	6.7
83.356000	39.00	40.00	1.00	1000.0	120.000	368.0	H	215.0	7.6
93.746000	40.07	43.50	3.43	1000.0	120.000	134.0	V	6.0	8.3
106.244000	35.21	43.50	8.29	1000.0	120.000	113.0	V	7.0	8.1
116.660000	43.31	43.50	0.19	1000.0	120.000	105.0	V	35.0	8.0
149.996000	36.69	43.50	6.81	1000.0	120.000	196.0	H	352.0	8.6
200.006000	35.25	43.50	8.25	1000.0	120.000	153.0	H	134.0	11.3
553.302000	35.47	46.00	10.53	1000.0	120.000	117.0	V	349.0	21.5
700.006000	39.72	46.00	6.28	1000.0	120.000	109.0	H	258.0	23.7
833.310000	40.10	46.00	5.90	1000.0	120.000	105.0	H	355.0	25.8
983.344000	41.75	54.00	12.25	1000.0	120.000	109.0	V	175.0	27.7

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Comment
68.752000	10:56:53 - 12.10.2020
83.356000	10:22:00 - 12.10.2020
93.746000	10:32:41 - 12.10.2020
106.244000	10:37:19 - 12.10.2020
116.660000	10:51:39 - 12.10.2020
149.996000	10:17:11 - 12.10.2020
200.006000	10:12:48 - 12.10.2020
553.302000	10:41:17 - 12.10.2020
700.006000	10:27:25 - 12.10.2020
833.310000	10:07:46 - 12.10.2020
983.344000	10:46:23 - 12.10.2020

3.01b _BT_LE_low_standing

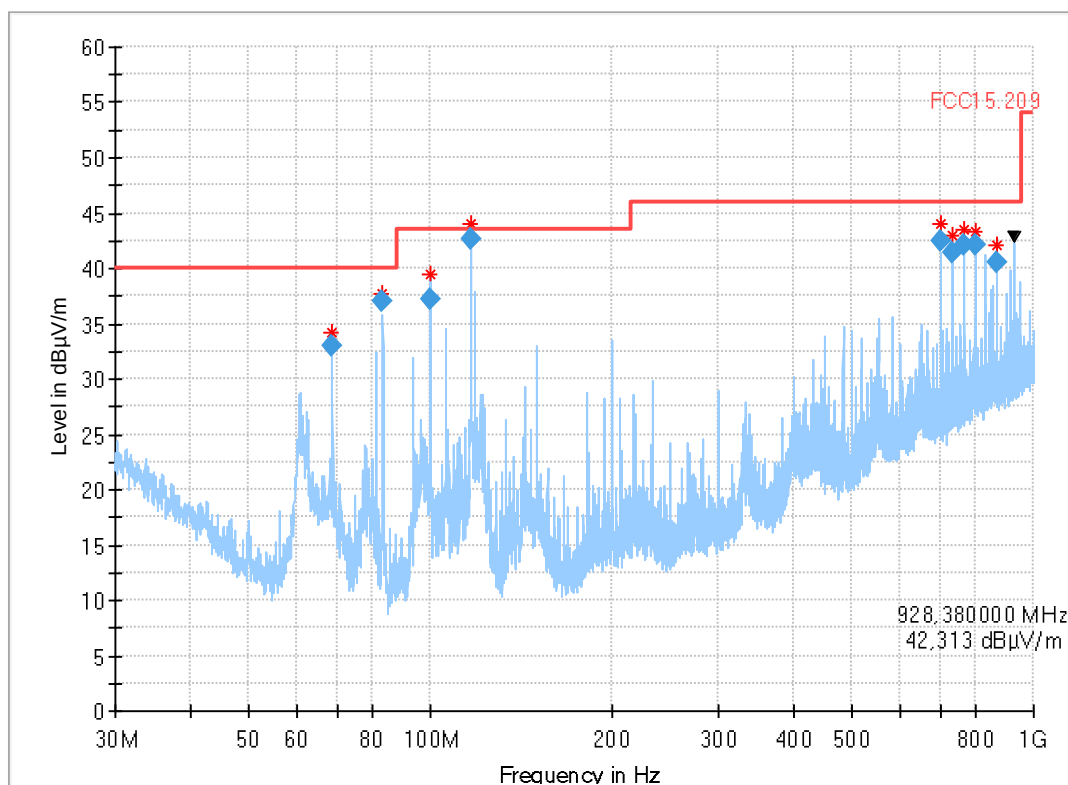
Common Information

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 Intentional Radiato
Antenna polarisation:	horizontal/vertical
Operation mode:	TCH mode
Operator Name:	
Comment:	Channel no. low
Operating Mode:	BT-LE Low channel
Environmental Conditions:	Humidity : 54%rH; Temperature: 21°C
Operator:	Mah
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)
68.754000	33.05	40.00	6.95	1000.0	120.000	151.0	V	284.0	6.7
83.352000	36.98	40.00	3.02	1000.0	120.000	220.0	H	209.0	7.6
100.006000	37.26	43.50	6.24	1000.0	120.000	120.0	V	4.0	8.1
116.646000	42.70	43.50	0.80	1000.0	120.000	118.0	V	19.0	8.0
699.986000	42.46	46.00	3.54	1000.0	120.000	119.0	H	0.0	23.7
733.298000	41.33	46.00	4.67	1000.0	120.000	118.0	H	176.0	24.3
766.692000	42.17	46.00	3.83	1000.0	120.000	111.0	H	180.0	24.7
799.992000	42.11	46.00	3.89	1000.0	120.000	105.0	H	21.0	25.3
866.682000	40.46	46.00	5.54	1000.0	120.000	105.0	H	334.0	26.7

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Comment
68.754000	12:34:02 - 12.10.2020
83.352000	12:17:29 - 12.10.2020
100.006000	12:28:33 - 12.10.2020
116.646000	12:22:51 - 12.10.2020
699.986000	11:57:58 - 12.10.2020
733.298000	12:03:08 - 12.10.2020
766.692000	12:07:54 - 12.10.2020
799.992000	12:12:56 - 12.10.2020
866.682000	11:52:40 - 12.10.2020

4.01a_BT_LE_low

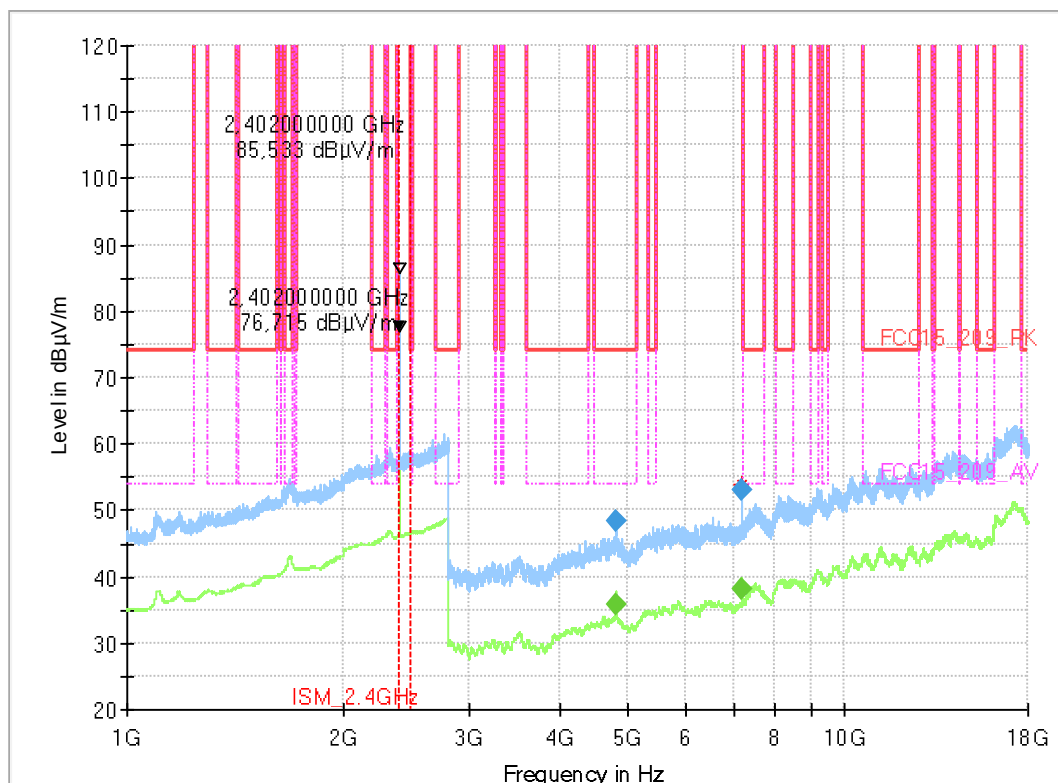
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operating Mode:	TX 2402MHz CH 0 GFSK PRBS9
Operator:	TFra
Comment:	
Environmental Conditions:	Humidity : 60%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation
4803.600000	---	35.92	54.00	18.08	100.0	1000.000	155.0	H	210.0	90.0
4804.000000	48.42	---	74.00	25.58	100.0	1000.000	155.0	V	21.0	0.0
7204.800000	53.05	---	150.00	96.95	100.0	1000.000	155.0	V	7.0	0.0
7205.200000	---	38.18	150.00	111.82	100.0	1000.000	155.0	V	6.0	0.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
4803.600000	6	15:19:42 - 12.10.2020
4804.000000	6	15:16:35 - 12.10.2020
7204.800000	12	15:15:17 - 12.10.2020
7205.200000	12	15:17:56 - 12.10.2020

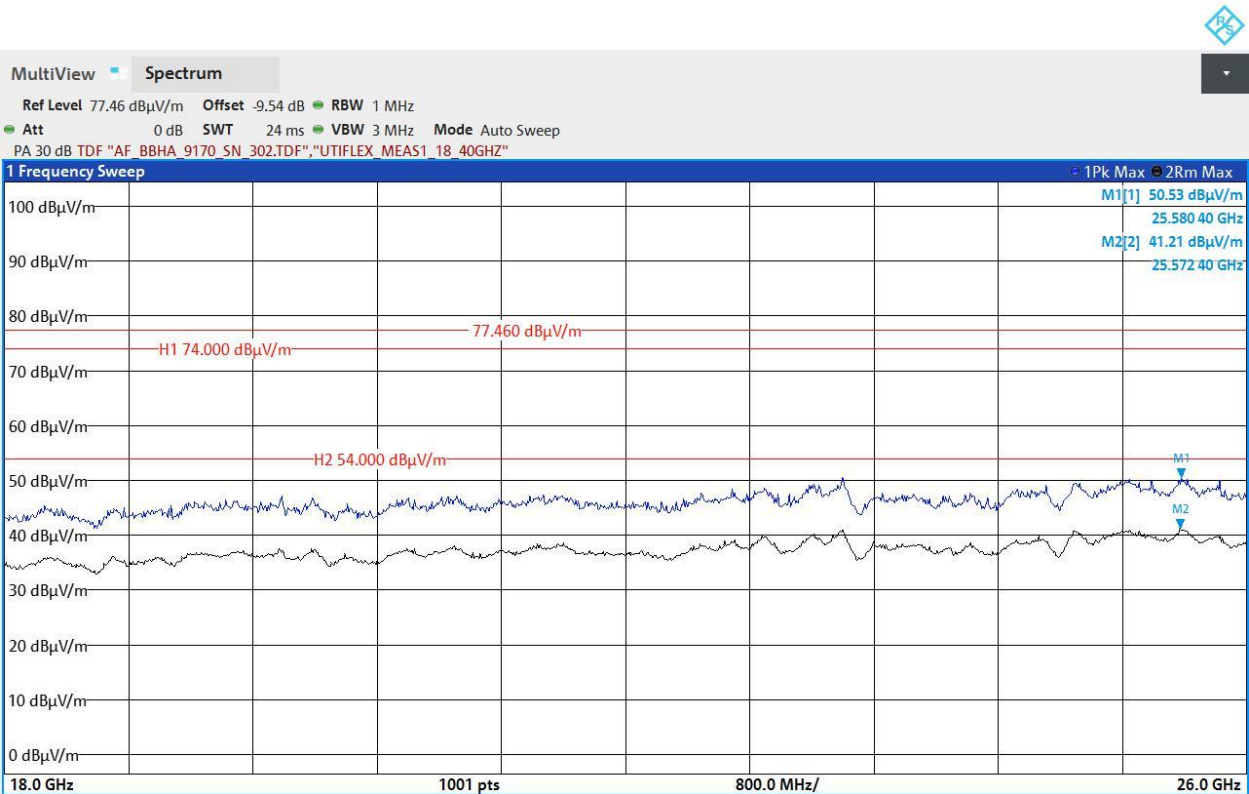
4.01b_BT_LE_low

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operating Mode:	TX 2402MHz CH 0 GFSK PRBS9
Operator:	TFra
Comment:	
Environmental Conditions:	Humidity : 60%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH



9.01_BE_BT_LE_low

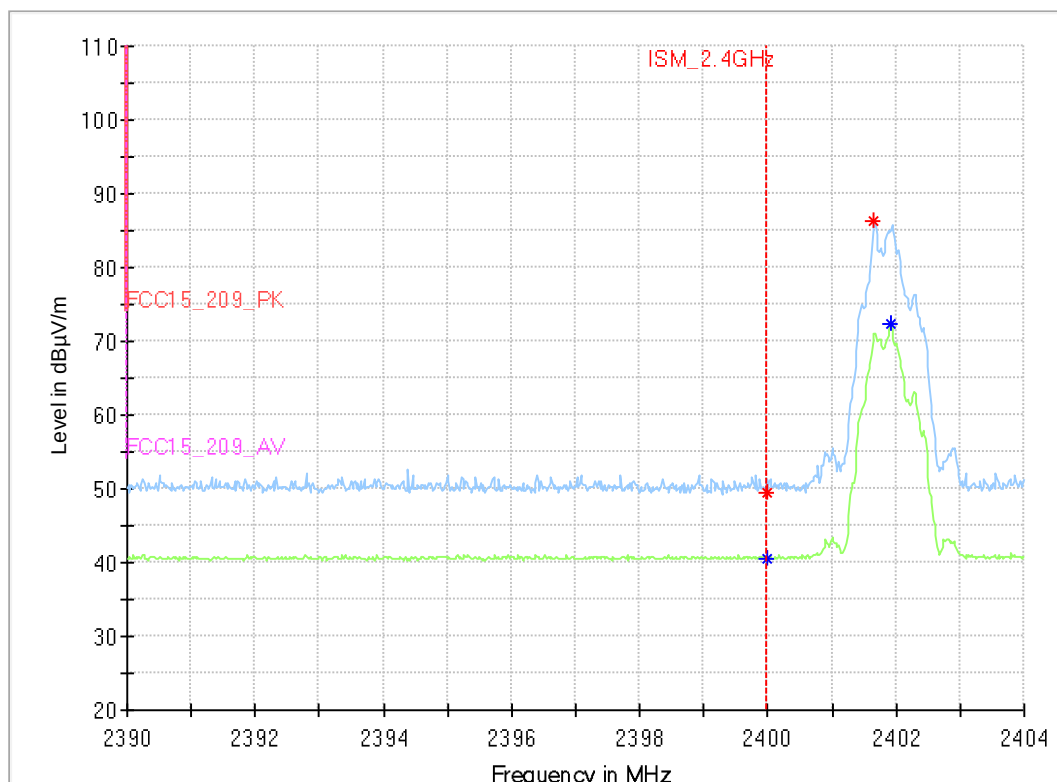
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operating Mode:	TX 2402MHz CH 0 GFSK PRBS9
Operator:	TFra
Environmental Conditions:	Humidity : 60%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	RMS (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation
2400.000000	49.53	---	150.00	100.47	---	---	155.0	H	54.0	0.0
2400.000000	---	40.49	150.00	109.51	---	---	155.0	V	289.0	0.0
2401.660000	86.38	---	150.00	63.62	---	---	155.0	H	101.0	90.0
2401.920000	---	72.25	150.00	77.75	---	---	155.0	H	101.0	90.0

(continuation of the "Critical_Freqs" table from column 16 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
2400.000000	36	15:48:28 - 12.10.2020
2400.000000	36	15:48:25 - 12.10.2020
2401.660000	36	15:48:58 - 12.10.2020
2401.920000	36	15:49:00 - 12.10.2020

9.02_BE_BT_LE_high

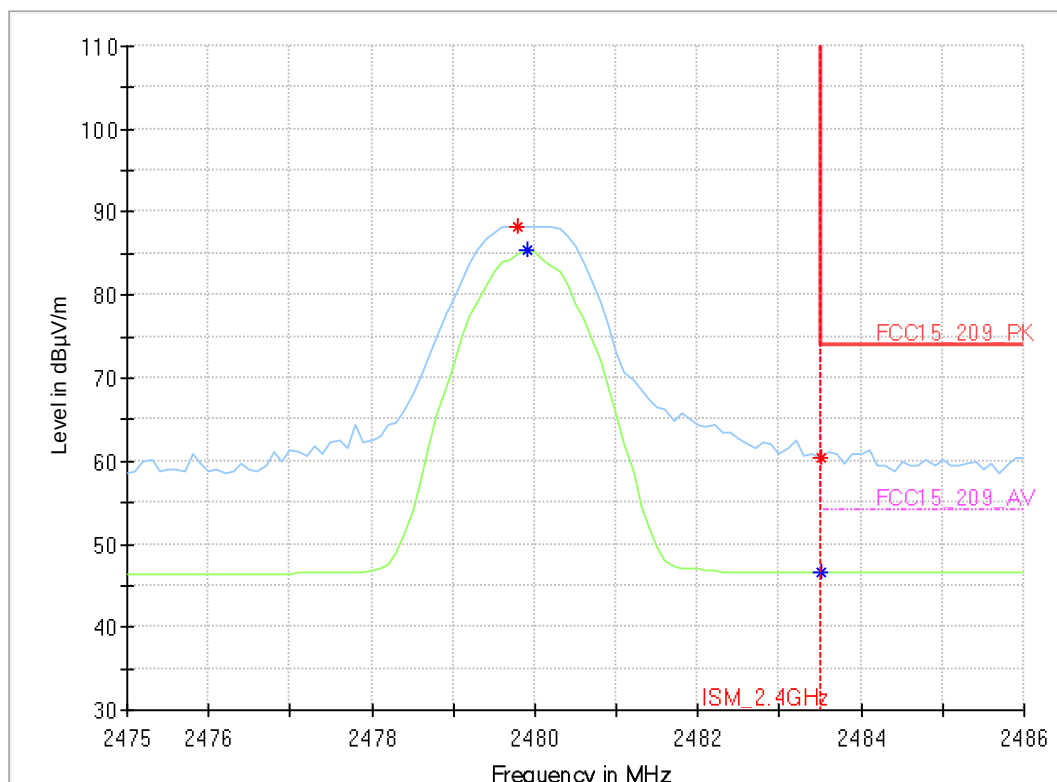
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.50.0
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operating Mode:	TX 2480MHz CH 39 GFSK PRBS9
Operator:	TFra
Environmental Conditions:	Humidity : 60%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	19-1-00690S155_C01
Manufacturer:	Hilscher Gesellschaft für Systemautomation mbH

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	RMS (dBμV/m)	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Elevation
2479.800000	88.30	---	150.00	61.70	---	---	155.0	V	34.0	0.0
2479.900000	---	85.38	150.00	64.62	---	---	155.0	V	34.0	0.0
2483.500000	60.41	---	74.00	13.59	---	---	155.0	H	319.0	0.0
2483.500000	---	46.52	54.00	7.48	---	---	155.0	V	123.0	90.0

(continuation of the "Critical_Freqs" table from column 16 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
2479.800000	36	16:17:26 - 12.10.2020
2479.900000	36	16:17:29 - 12.10.2020
2483.500000	36	16:16:41 - 12.10.2020
2483.500000	36	16:16:45 - 12.10.2020

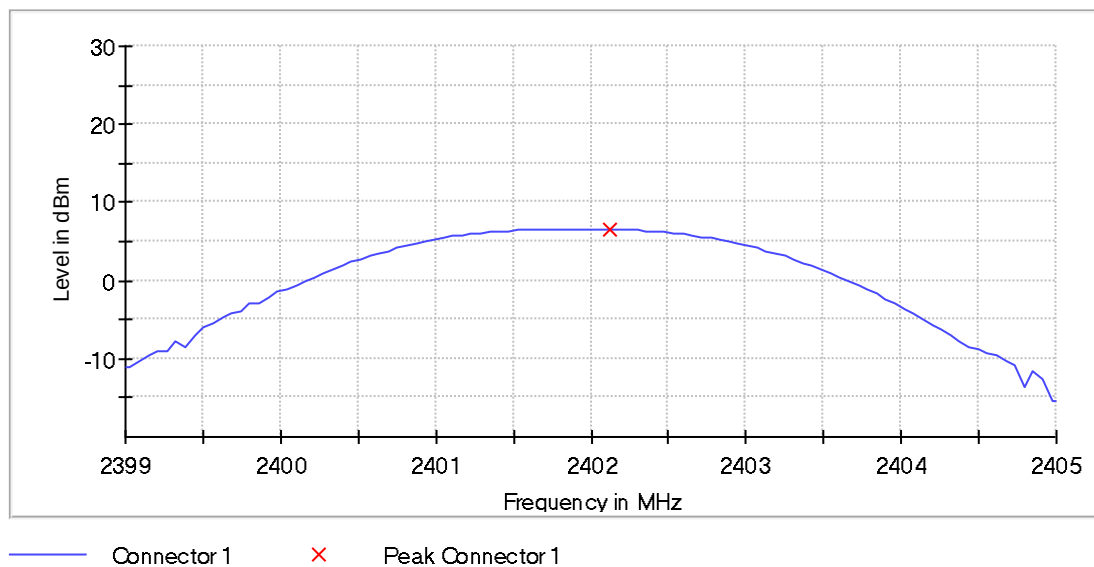
1.2 Conducted measurements

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

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402.000000	6.5	30.0	PASS



Measurement

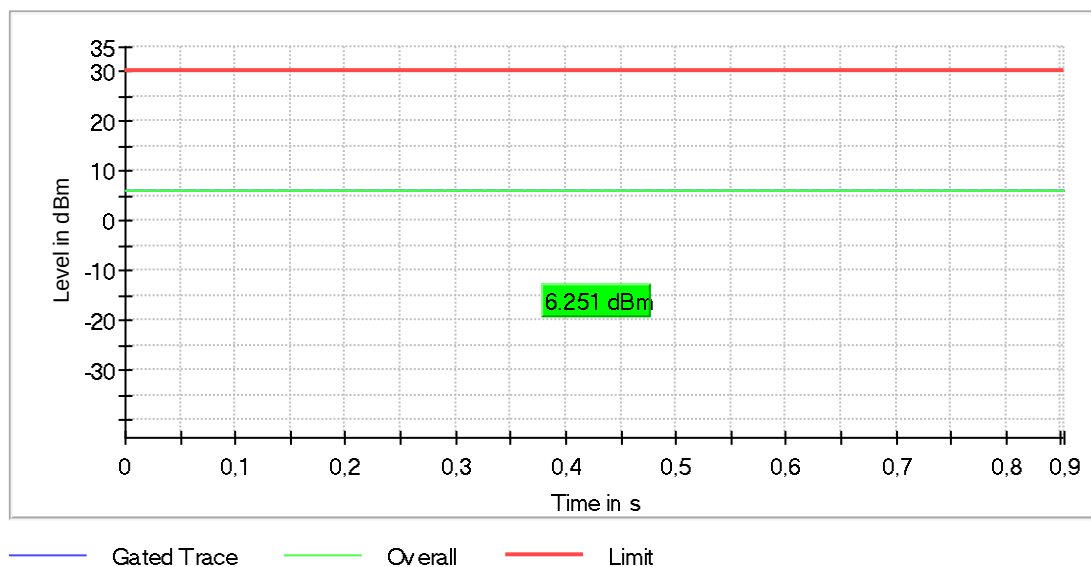
Setting	Instrument Value	Target Value
Start Frequency	2.39900 GHz	2.39900 GHz
Stop Frequency	2.40500 GHz	2.40500 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	≥ 1.000 MHz
VBW	10.000 MHz	≥ 6.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	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	0.04 dB	0.50 dB

RF output power (2402 MHz; 10,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2402.000000	6.3	30.0	6.3	85.426	PASS



OSP PowerMeter settings

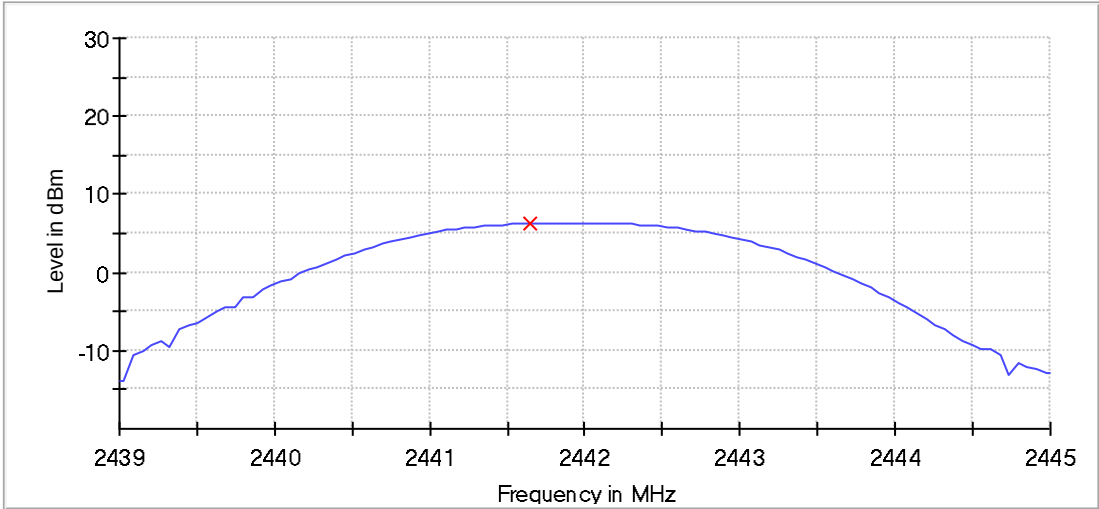
Setting	Instrument Value	Target Value
Measurement Time	1.000 s	1.000 s
Points	1000000	1000000
Time resolution	1.000 μ s	1.000 μ s

Peak output power (Sweep) (2442 MHz; 10,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2442.000000	6.2	30.0	PASS



Connector 1 X Peak Connector 1

Measurement

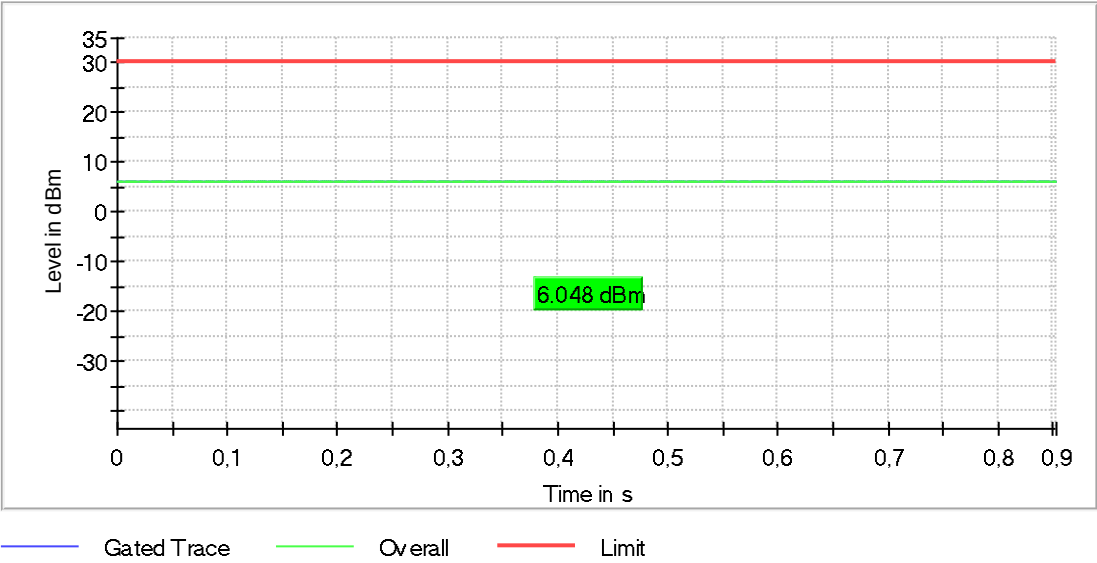
Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44500 GHz	2.44500 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	>= 1.000 MHz
VBW	10.000 MHz	>= 6.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamplifier	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	0.05 dB	0.50 dB

RF output power (2442 MHz; 10,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2442.000000	6.0	30.0	6.0	85.444	PASS



OSP PowerMeter settings

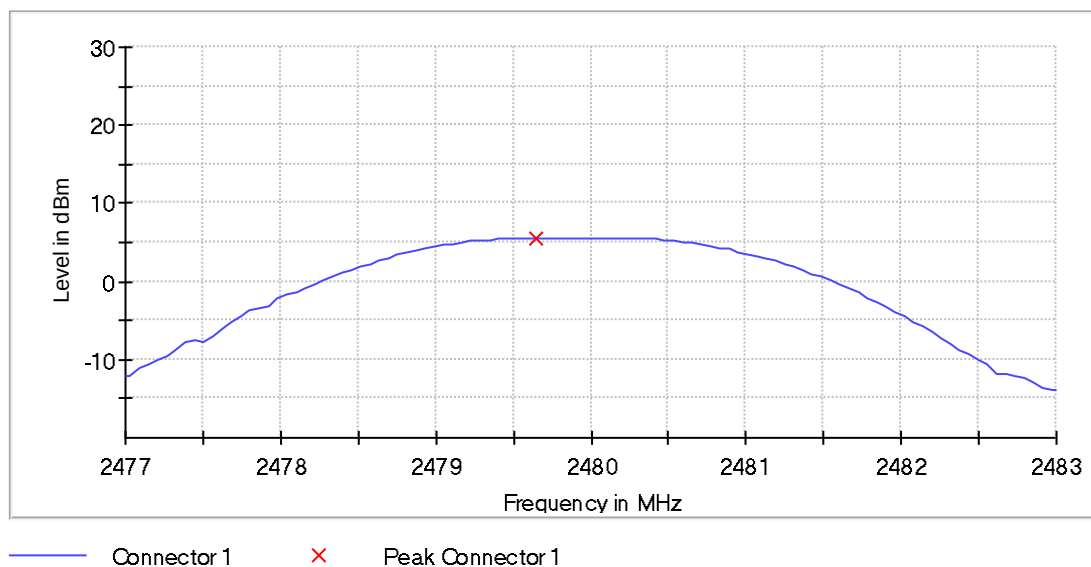
Setting	Instrument Value	Target Value
Measurement Time	1.000 s	1.000 s
Points	1000000	1000000
Time resolution	1.000 µs	1.000 µs

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

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	5.6	30.0	PASS



Measurement

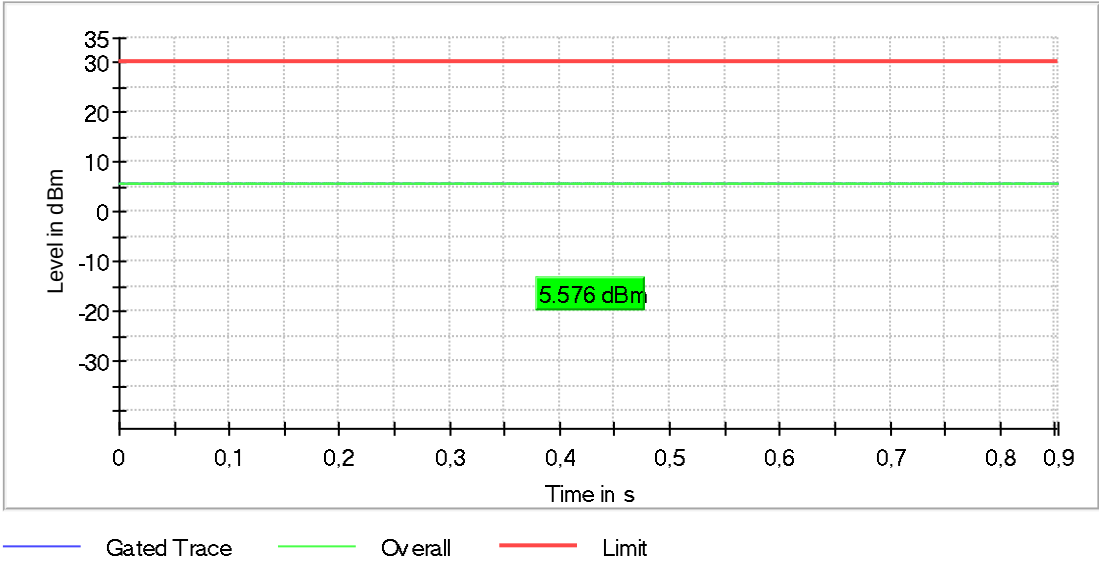
Setting	Instrument Value	Target Value
Start Frequency	2.47700 GHz	2.47700 GHz
Stop Frequency	2.48300 GHz	2.48300 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	>= 1.000 MHz
VBW	10.000 MHz	>= 6.000 MHz
SweepPoints	101	~ 101
SweepTime	1.000 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamplifier	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	0.03 dB	0.50 dB

RF output power (2480 MHz; 10,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10-2013

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2480.000000	5.6	30.0	5.6	85.432	PASS



OSP PowerMeter settings

Setting	Instrument Value	Target Value
Measurement Time	1.000 s	1.000 s
Points	1000000	1000000
Time resolution	1.000 μ s	1.000 μ s

End Of Annex 1