

Annex 1: Measurement diagrams to
TEST REPORT
No.: 18-1-0130902T06a-C1

According to:

FCC Regulations

Part 15.205

Part 15.209

Part 15.247

ISED-Regulations

RSS-Gen, Issue 5

RSS-247, Issue 2

for

Vorwerk Elektrowerke GmbH & Co. KG

Thermomix TM6-5
Household equipment with WLAN

FCC ID: 2AGELTM65

ISED: 20889-TM65

Laboratory Accreditation



accredited according to DIN EN ISO/IEC 17025

CETECOM GmbH

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Laboratory Accreditation

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1. Conducted EMI measurements on AC-mains port

1.01_BTLE_TX_EMI_AC

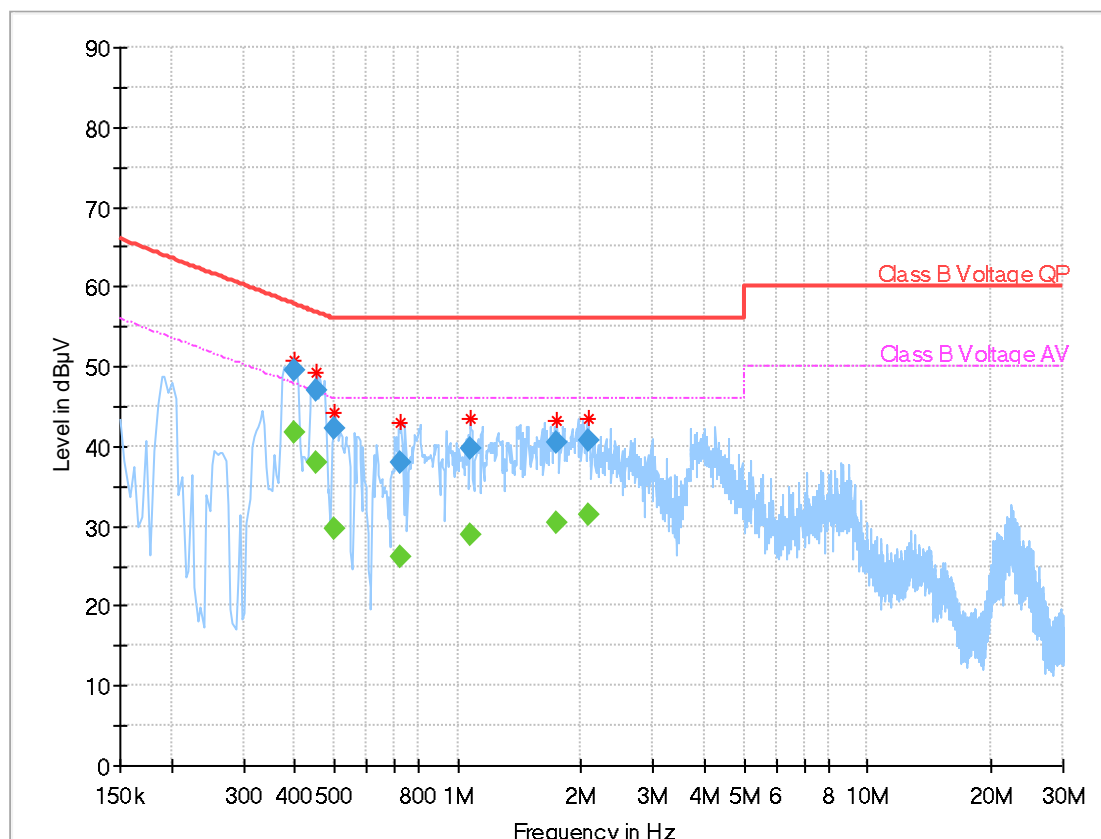
Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site & Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Specification:	EN 55022
Operating Mode:	BTLE TX Ch0
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Humidity: 45%rH; Temperature: 20°C
Operator:	JVo
Comments:	120V AC

EUT Information

EUT Name:	Thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Correction (dB)
0.400000	---	41.62	47.85	6.23	9.000	0.1
0.400000	49.46	---	57.85	8.39	9.000	0.1
0.450781	47.05	---	56.86	9.81	9.000	0.1
0.450781	---	37.88	46.86	8.98	9.000	0.1
0.501563	42.31	---	56.00	13.69	9.000	0.1
0.501563	---	29.67	46.00	16.33	9.000	0.1
0.728125	37.97	---	56.00	18.03	9.000	0.2
0.728125	---	26.22	46.00	19.78	9.000	0.2
1.071875	39.69	---	56.00	16.31	9.000	0.3
1.071875	---	28.99	46.00	17.01	9.000	0.3
1.747656	---	30.35	46.00	15.65	9.000	0.3
1.747656	40.36	---	56.00	15.64	9.000	0.3
2.091406	---	31.40	46.00	14.60	9.000	0.3
2.091406	40.64	---	56.00	15.36	9.000	0.3

2. Radiated Field Strength Measurements

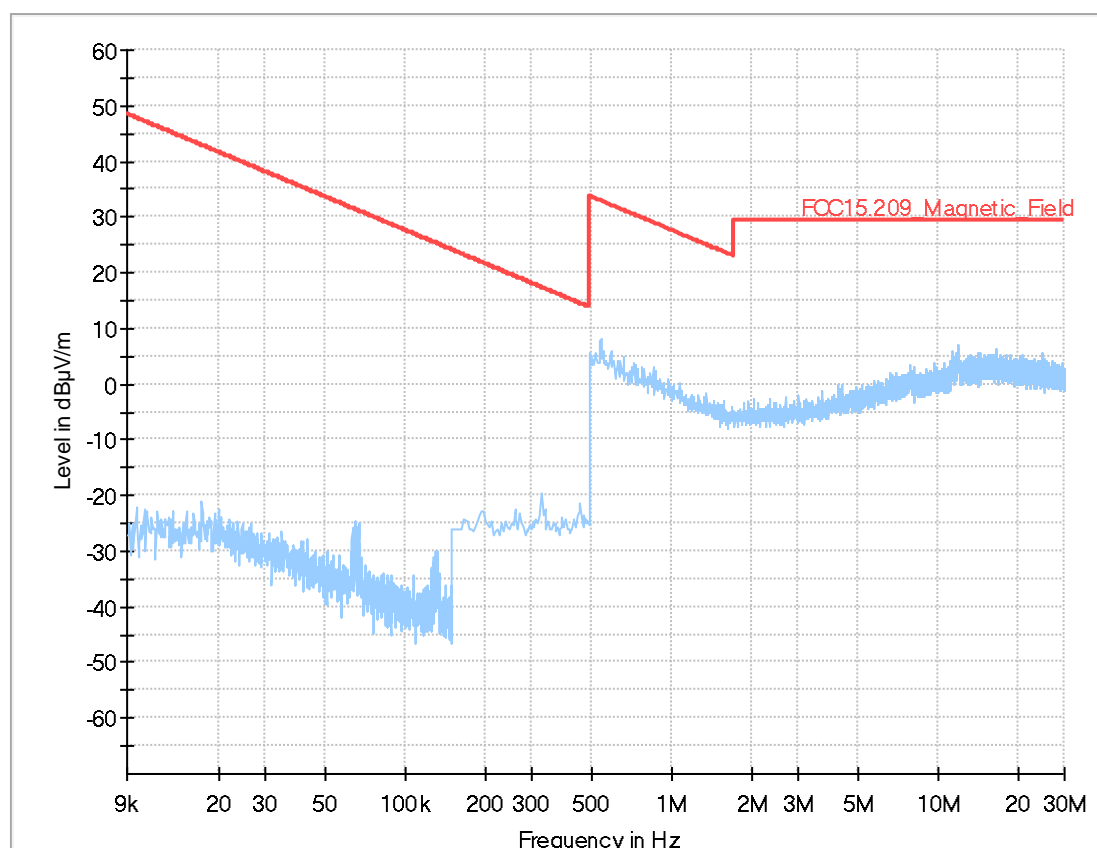
2.1. Radiated Field Strength Emissions – 9 kHz to 30 MHz

2.01b_BT_LE_low_standing

Test description:	Date: 01.02.2019 Page 1 of 1
Test site and distance:	Magnetic Field Strength Measurement related to 30/300 m distance
Version of Testsoftware:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	EMC32 V9.25.0
Technical Data:	used accord. table, pls. see test report
Rec. antenna (pre-scan):	Please see page 2 for detailed data of measurement setup
Used filter:	height 1.00 m, parallel and 90° to EUT polarisation
Test specification:	bypass
	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	MKh
Operating conditions:	TX-on
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Comment 1:	Channel low/middle/high
Comment 2:	

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC



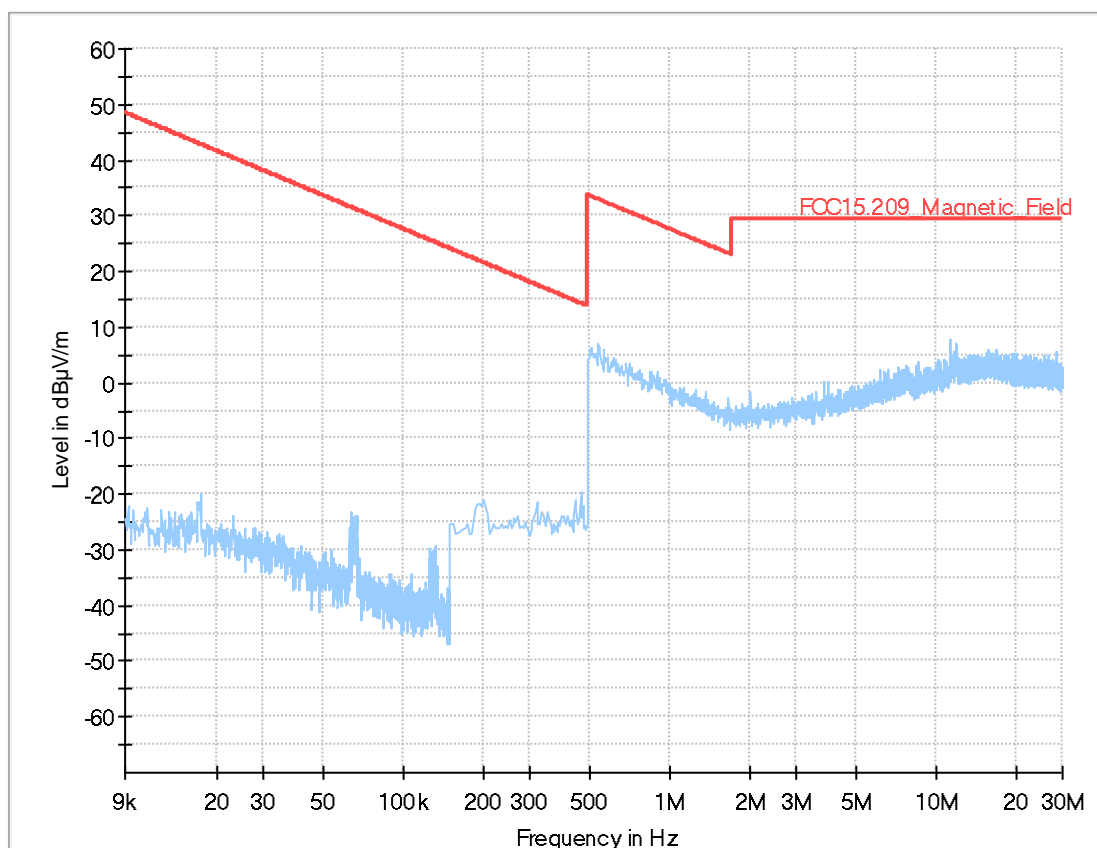
2.02b_BT_LE_mid_standing

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
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Rls
Operating conditions:	Bluetooth LE
Power during tests:	120V AC
Comment 1:	Channel.middle

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC



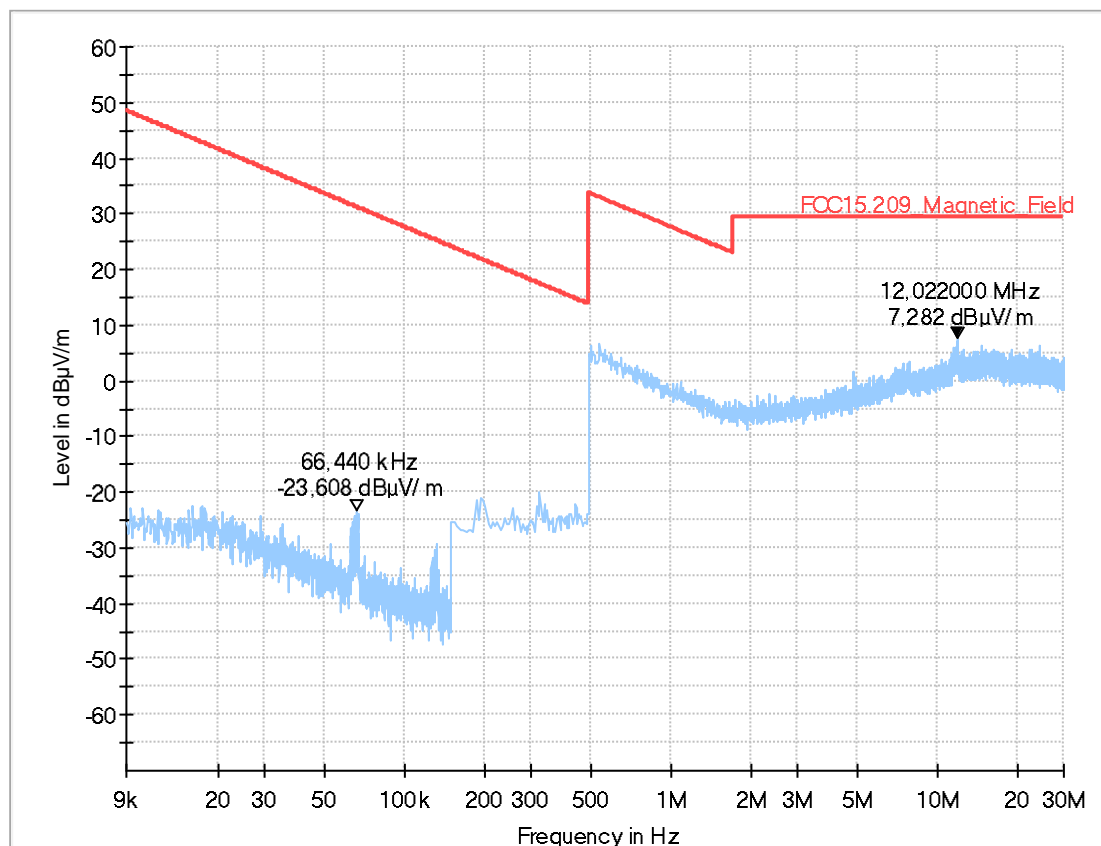
2.03b_BT_LE_high_standing

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
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	RIs
Operating conditions:	Bluetooth LE
Power during tests:	120V AC
Comment 1:	Channel.high

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC



2.2. Radiated Field Strength Emissions – 30 MHz to 1 GHz

3.01b_BT_LE_low_standing

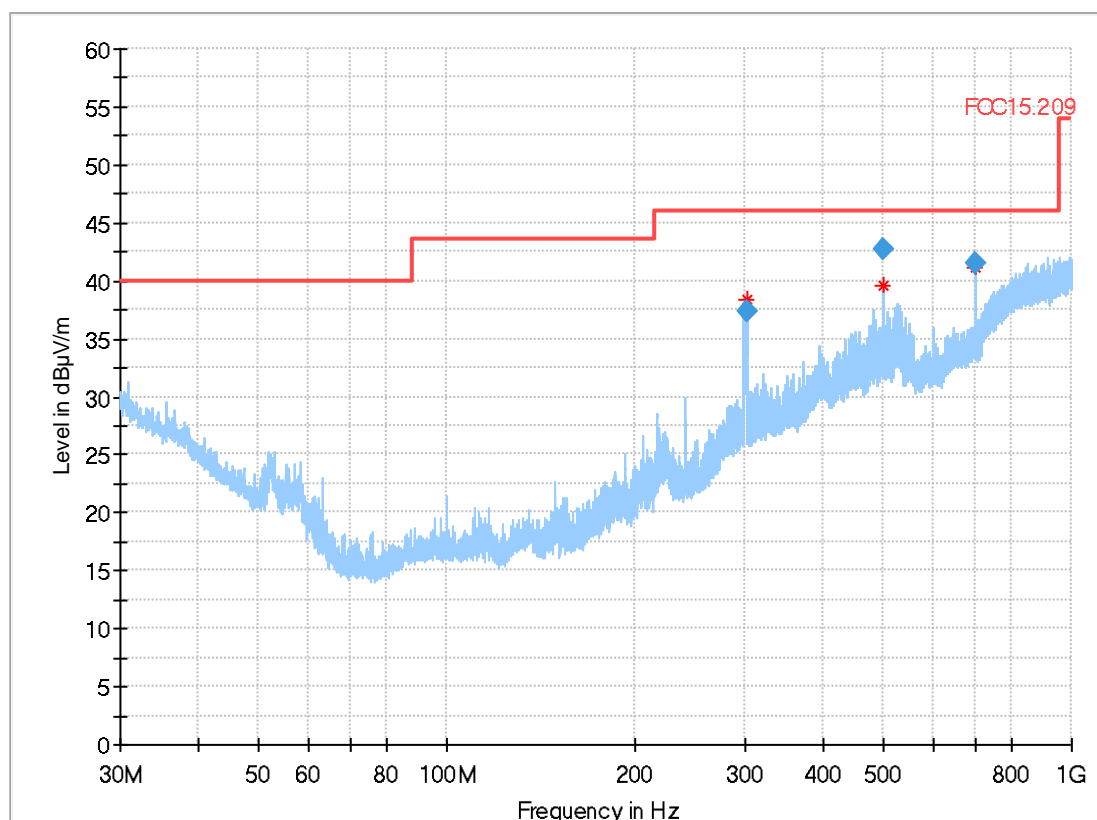
Common Information

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
Test specification.:	FCC 15.209; RSS-Gen: Issue 3
Operator:	RLs
Operating conditions:	BT LE
Power during tests:	120V AC
Comment 1:	Ch. Low

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Correction (dB)
301.580000	37.29	46.00	8.71	1000.0	120.000	113.0	H	280.0	15.2
499.936000	42.75	46.00	3.25	1000.0	120.000	161.0	H	12.0	19.5
699.908000	41.51	46.00	4.49	1000.0	120.000	112.0	H	339.0	24.1

3.02b_BT_LE_mid_standing

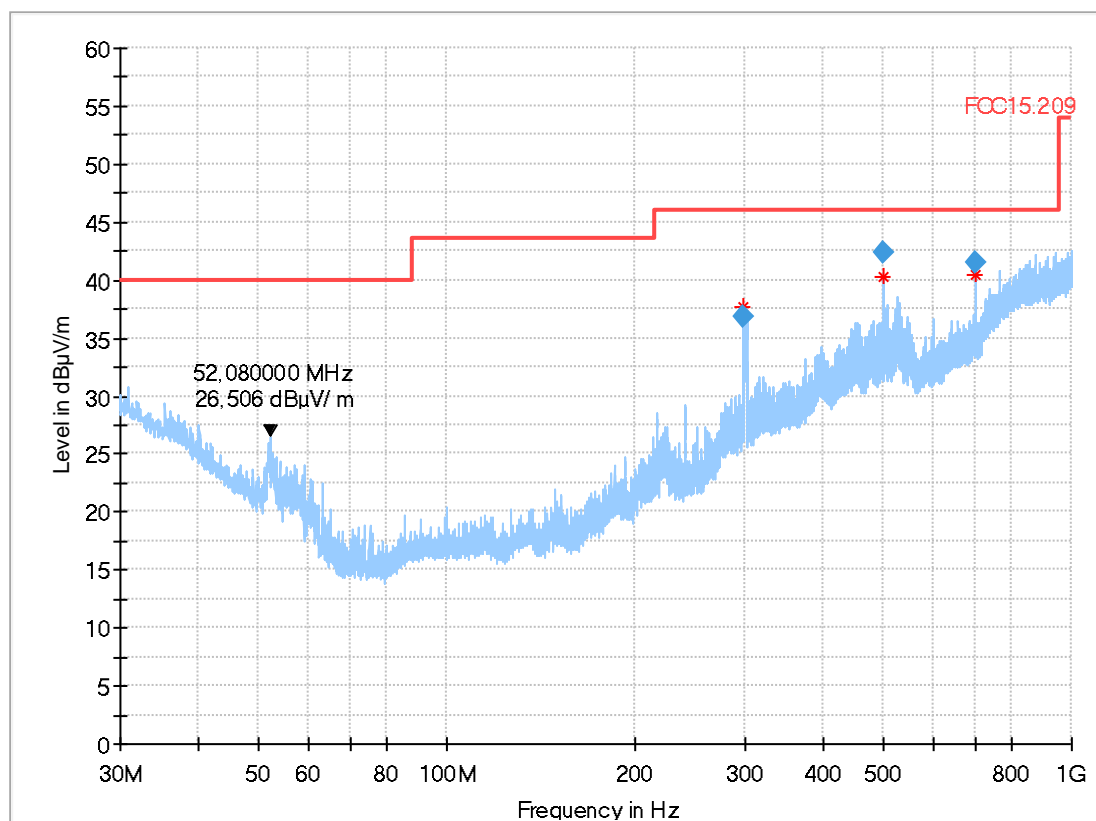
Common Information

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
Test specification.:	FCC 15.209; RSS-Gen: Issue 3
Operator:	RLs
Operating conditions:	BT LE
Power during tests:	120V AC
Comment 1:	

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
298.384000	36.87	46.00	9.13	1000.0	120.000	105.0	H	274.0	15.0
499.936000	42.40	46.00	3.60	1000.0	120.000	165.0	H	6.0	19.5
699.908000	41.53	46.00	4.47	1000.0	120.000	109.0	H	338.0	24.1

3.03a_BT_LE_high_standing

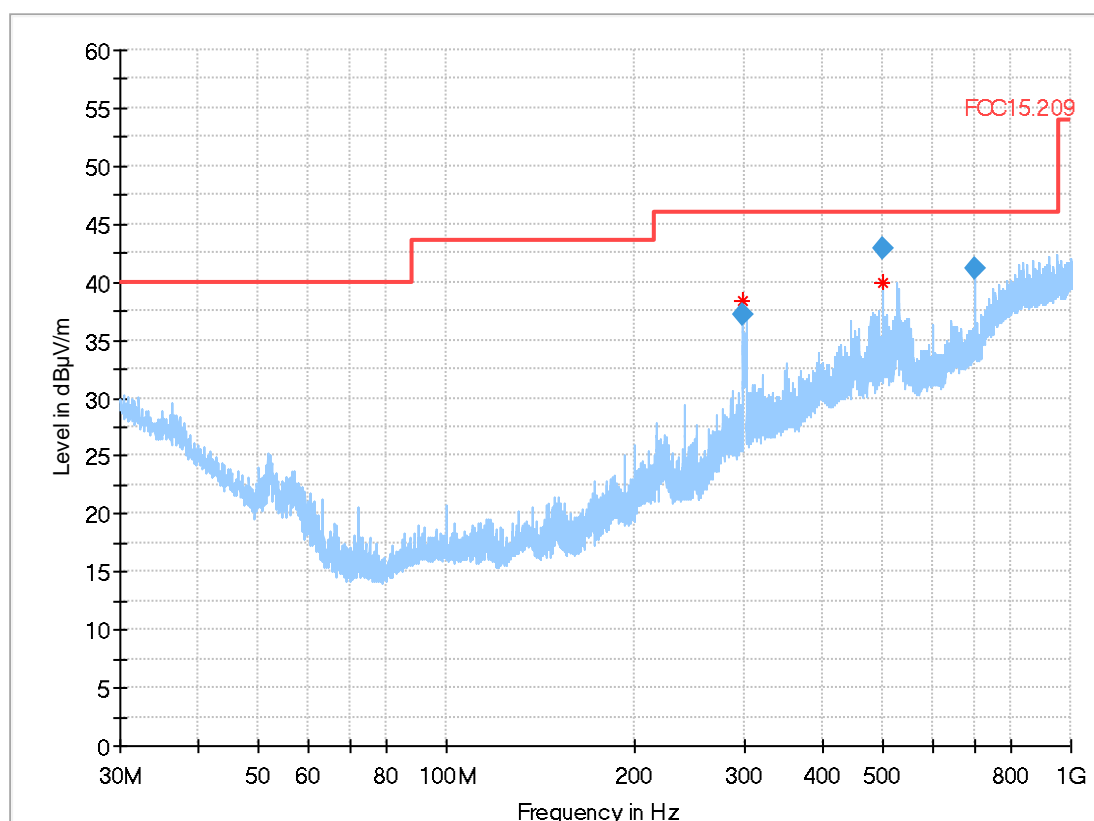
Common Information

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
Test specification.:	FCC 15.209; RSS-Gen: Issue 3
Operator:	Rls
Operating conditions:	BT LE
Power during tests:	120V AC
Comment 1:	

EUT Information

EUT Name:	thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
298.288000	37.16	46.00	8.84	1000.0	120.000	109.0	H	279.0	15.0
499.936000	42.95	46.00	3.05	1000.0	120.000	152.0	H	23.0	19.5
699.908000	41.08	46.00	4.92	1000.0	120.000	109.0	H	0.0	23.7

2.3. Radiated Field Strength Emissions – 1 GHz to 18 GHz

4.01a_BT_LE_low

Common Information

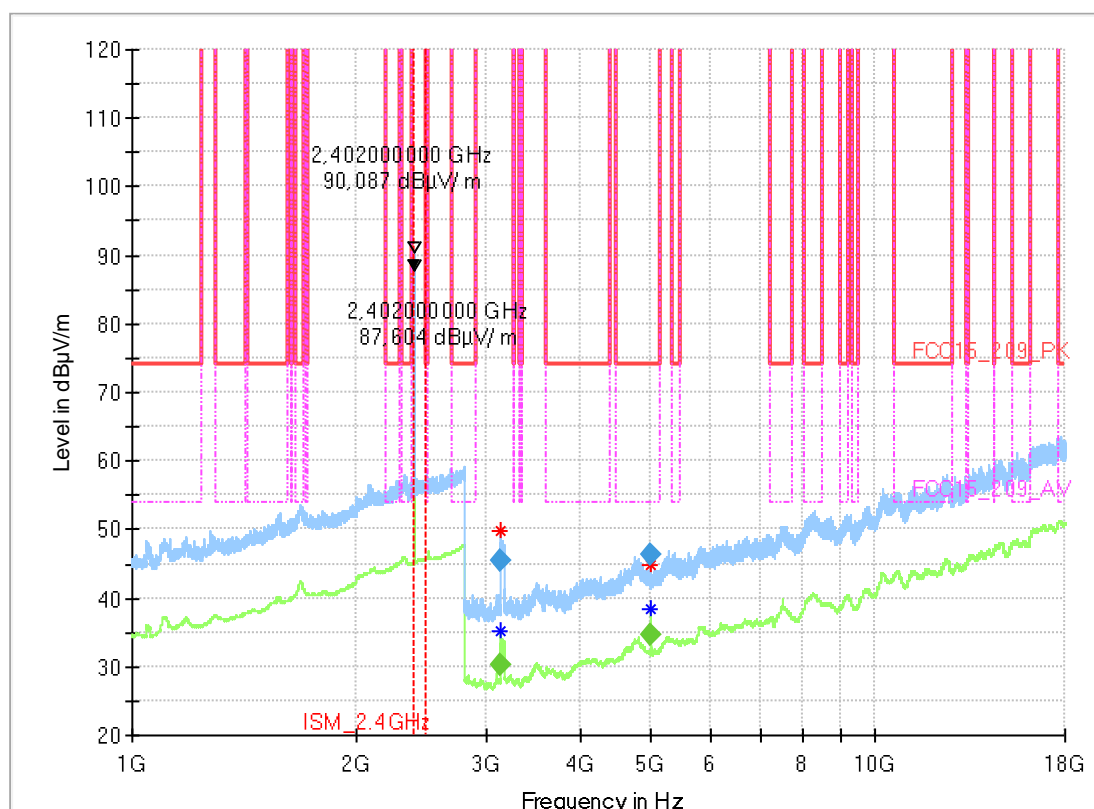
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operation mode:	BT LE
Operator Name:	RI's

EUT Information

Manufacturer:	Vorwerk Elektroware GmbH + Co. KG
Model:	Thermomix
Type:	Household equipment with WLAN

HW version:	NWOT
SW version:	0.18.109-201808300615
Serial number:	18434212024100415
Power Supply:	120 VAC 60 Hz

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)
3130.400000	45.30	150.00	104.70	100.0	1000.000	V	166.0	0.0	-0.5
3130.800000	---	150.00	119.63	100.0	1000.000	V	178.0	0.0	-0.5
4999.200000	---	54.00	19.28	100.0	1000.000	V	312.0	0.0	3.7
4999.200000	46.20	74.00	27.80	100.0	1000.000	H	314.0	0.0	3.7

4.02a_BT_LE_mid

Common Information

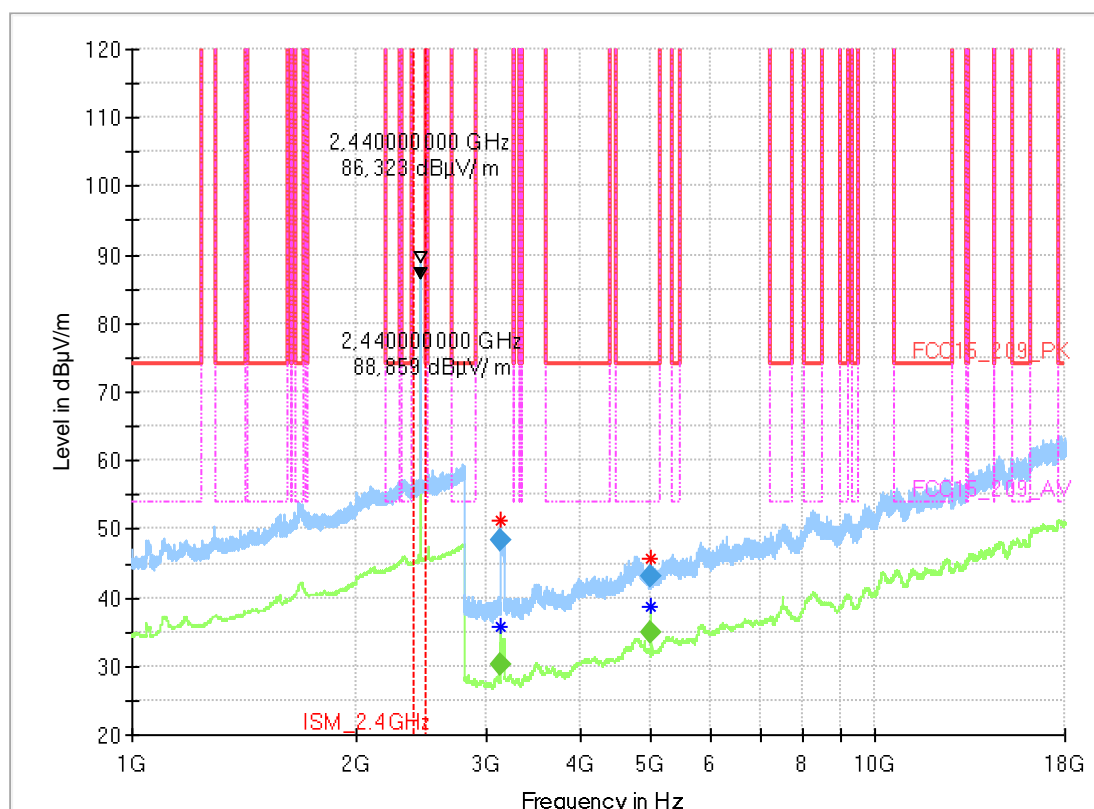
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operation mode:	BT LE
Operator Name:	RI's

EUT Information

Manufacturer:	Vorwerk Elektroware GmbH + Co. KG
Model:	Thermomix
Type:	Household equipment with WLAN

HW version:	NWOT
SW version:	0.18.109-201808300615
Serial number:	18434212024100415
Power Supply:	120 VAC 60 Hz

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)
3130.800000	---	150.00	119.82	100.0	1000.000	V	180.0	0.0	-0.5
3130.800000	48.43	150.00	101.57	100.0	1000.000	V	171.0	0.0	-0.5
4999.200000	42.97	74.00	31.03	100.0	1000.000	H	293.0	0.0	3.7
4999.200000	---	54.00	19.00	100.0	1000.000	V	309.0	0.0	3.7

4.03a_BT_LE_high

Common Information

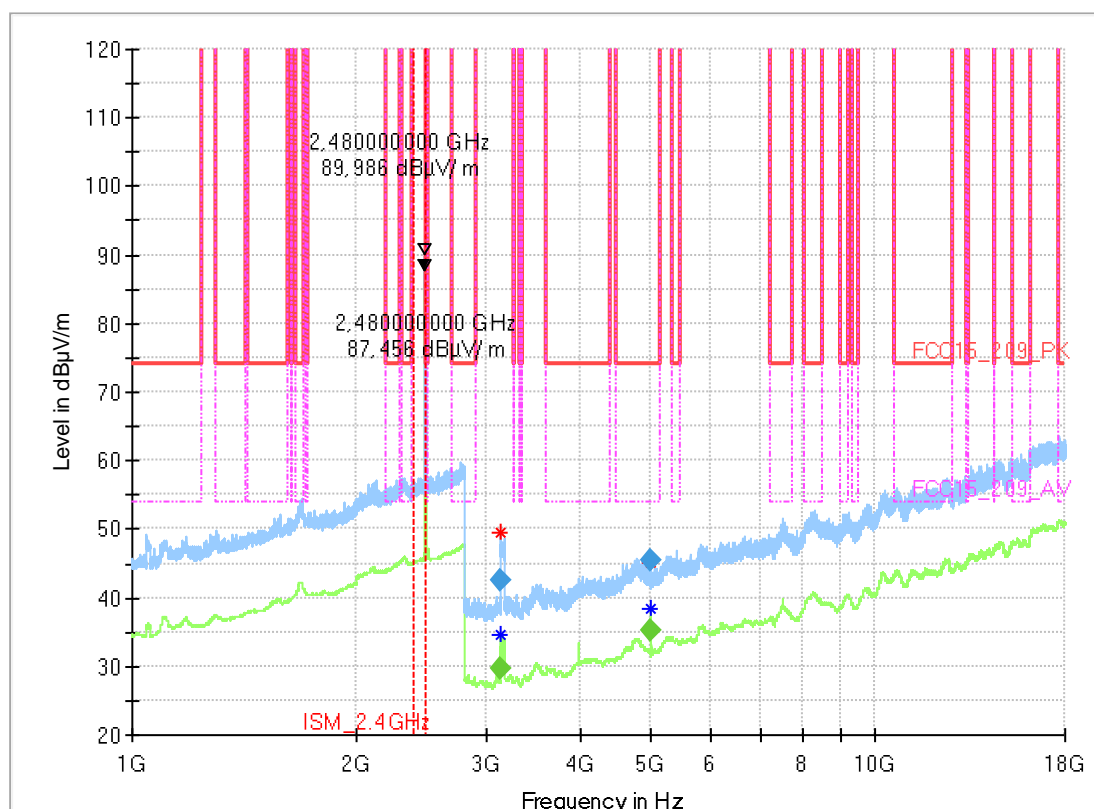
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 5
Antenna polarisation:	horizontal/vertical
Operation mode:	BT LE
Operator Name:	RI

EUT Information

Manufacturer:	Vorwerk Elektroware GmbH + Co. KG
Model:	Thermomix
Type:	Household equipment with WLAN

HW version:	NWOT
SW version:	0.18.109-201808300615
Serial number:	18434212024100415
Power Supply:	120 VAC 60 Hz

Full Spectrum

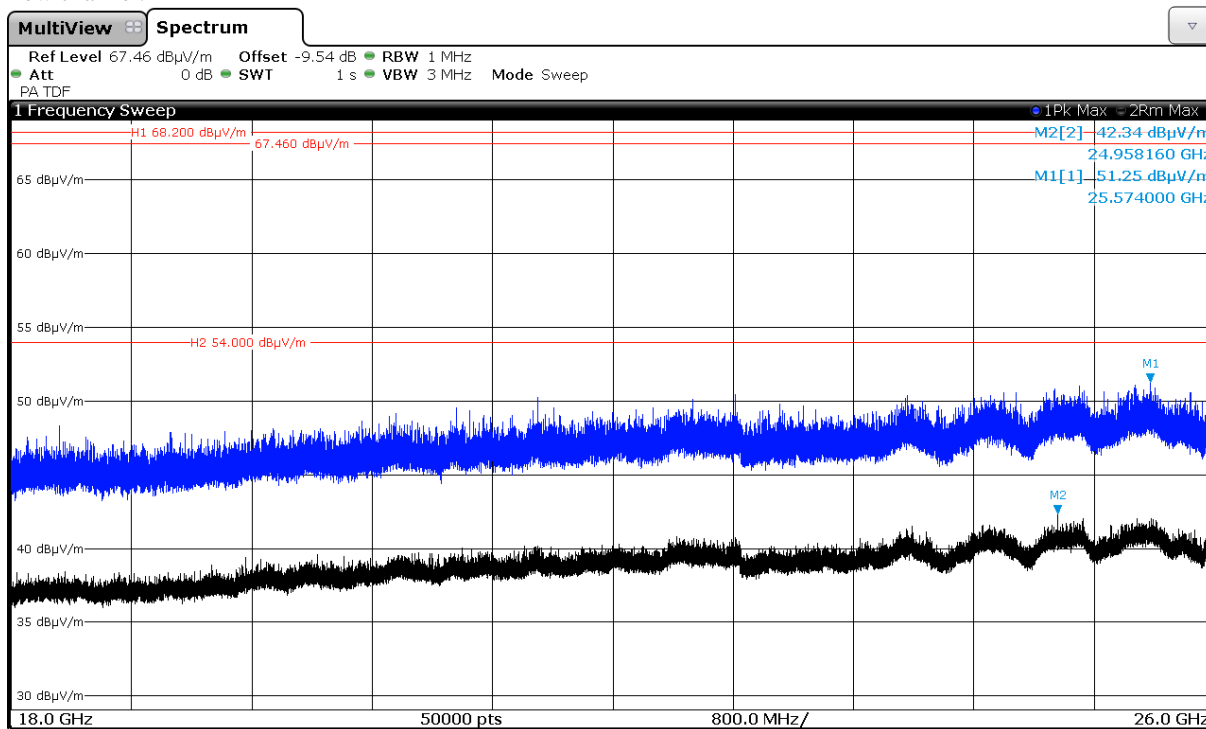


Final_Result

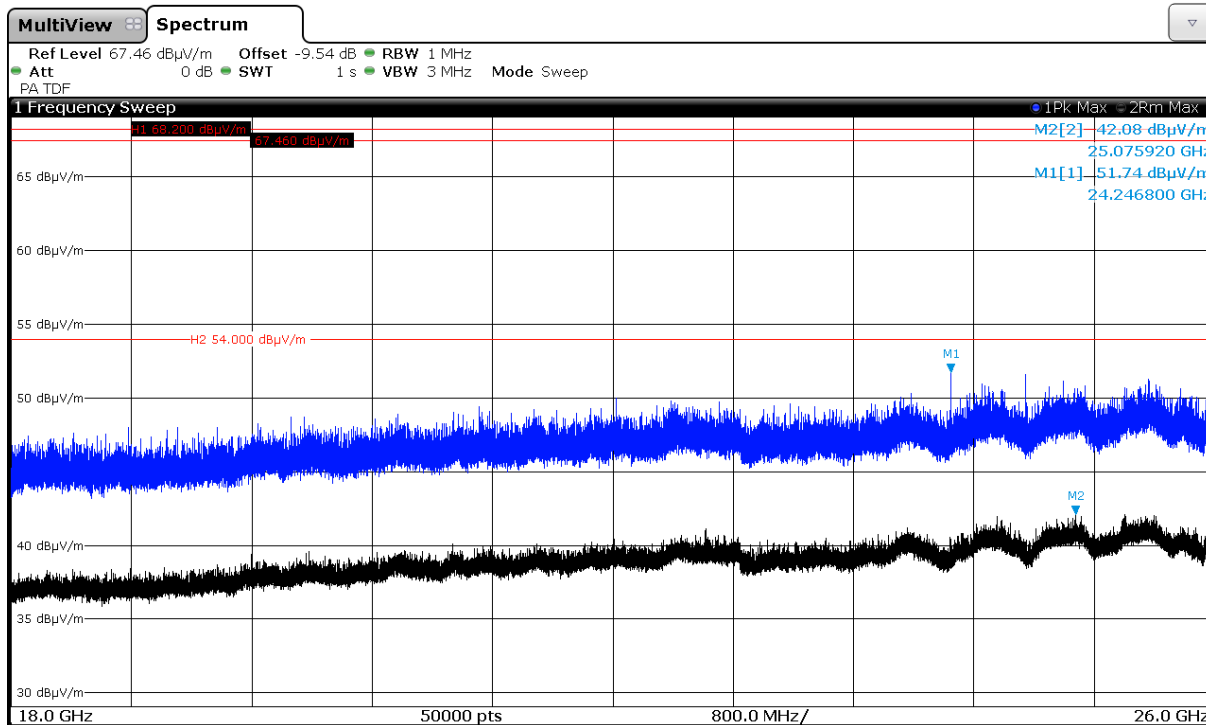
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
3130.400000	42.39	150.00	107.61	100.0	1000.000	V	166.0	0.0	-0.5
3130.800000	---	150.00	120.26	100.0	1000.000	V	177.0	0.0	-0.5
4999.200000	---	54.00	18.87	100.0	1000.000	V	309.0	0.0	3.7
4999.600000	45.47	74.00	28.53	100.0	1000.000	H	312.0	0.0	3.7

2.4. Radiated Field Strength Emissions – 18 GHz to 25 GHz

Low channel:

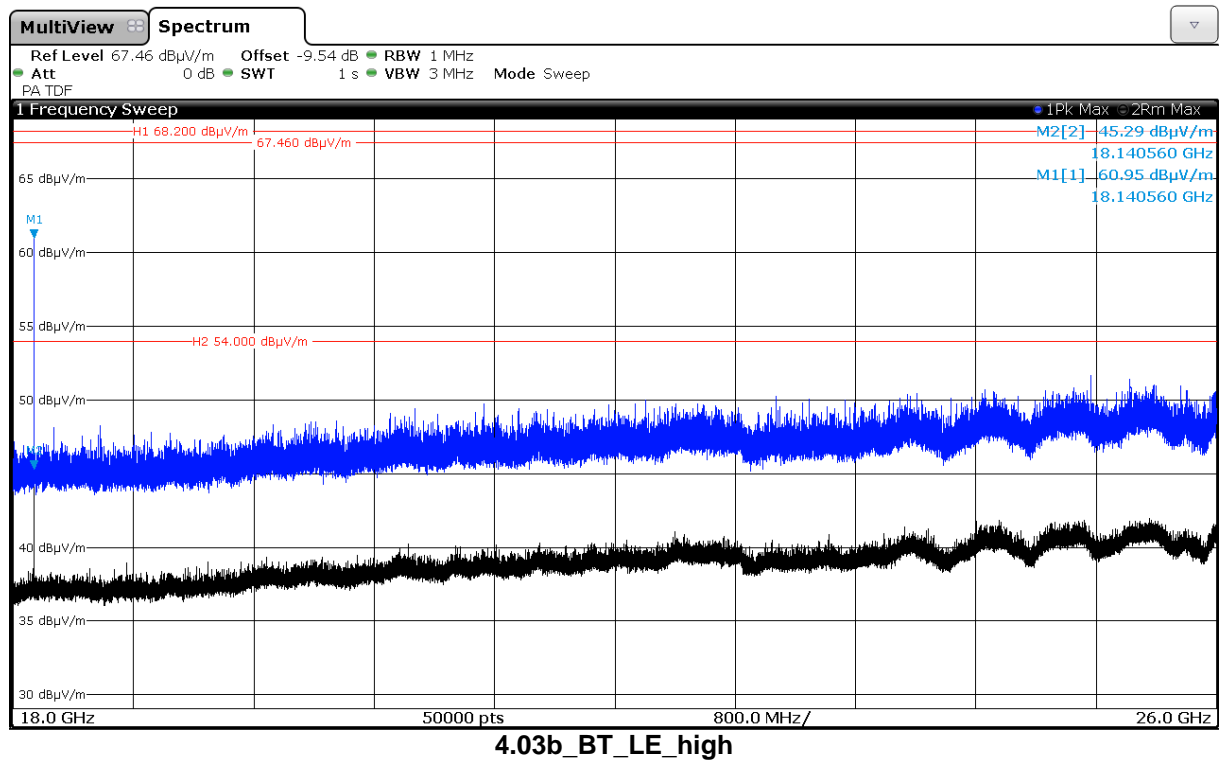


4.01b_BT_LE_low



4.02b_BT_LE_mid

High channel:



3. Radiated Band-Edge Measurements

3.1. BTLE-GFSK-Low Channel 2402 MHz (2.4 GHz ISM: left band edge)

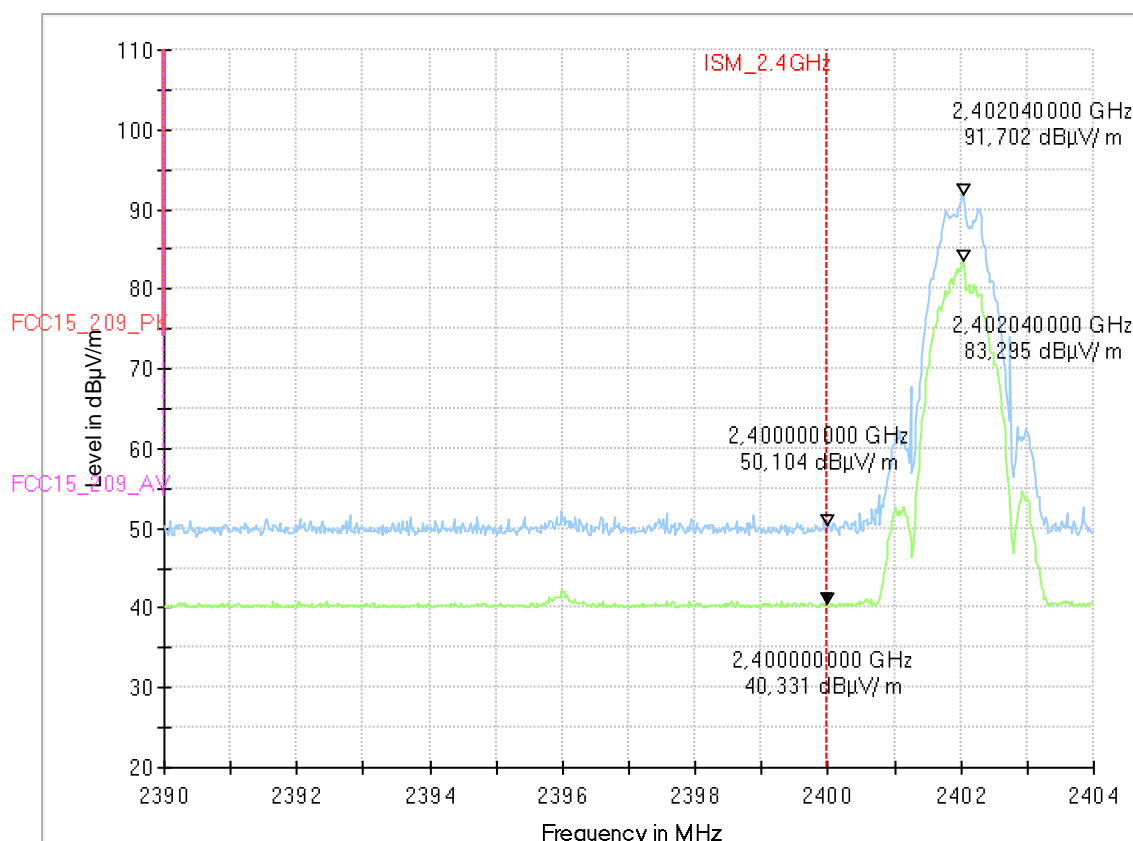
9.01_BE_BT_LE_low

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 5
Antenna polarisation:	horizontal/vertical
Operation mode:	TX, continuous/ BT LE
Operator Name:	MKh
Comment:	Channel no. low
Comment2:	Measurement Dwell Time 2ms
Verdict:	Passed

EUT Information

EUT Name:	Thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC



3.2. BTLE-GFSK-High Channel 2480 MHz (2.4 GHz ISM: right band edge)

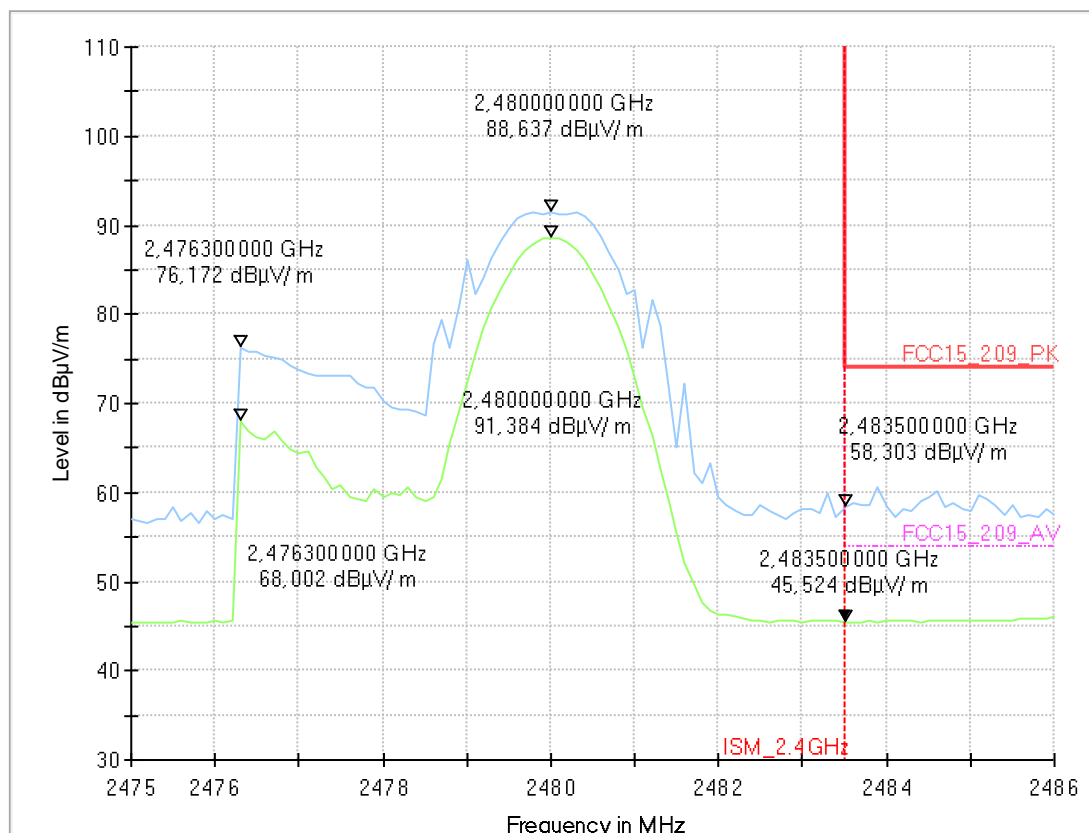
9.02_BE_BT_LE_high

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 5
Antenna polarisation:	horizontal/vertical
Operation mode:	TX, continuous/ BT LE
Operator Name:	MKh
Comment:	Channel no. high
Comment2:	Measurement Dwell Time 2ms
Verdict:	Passed

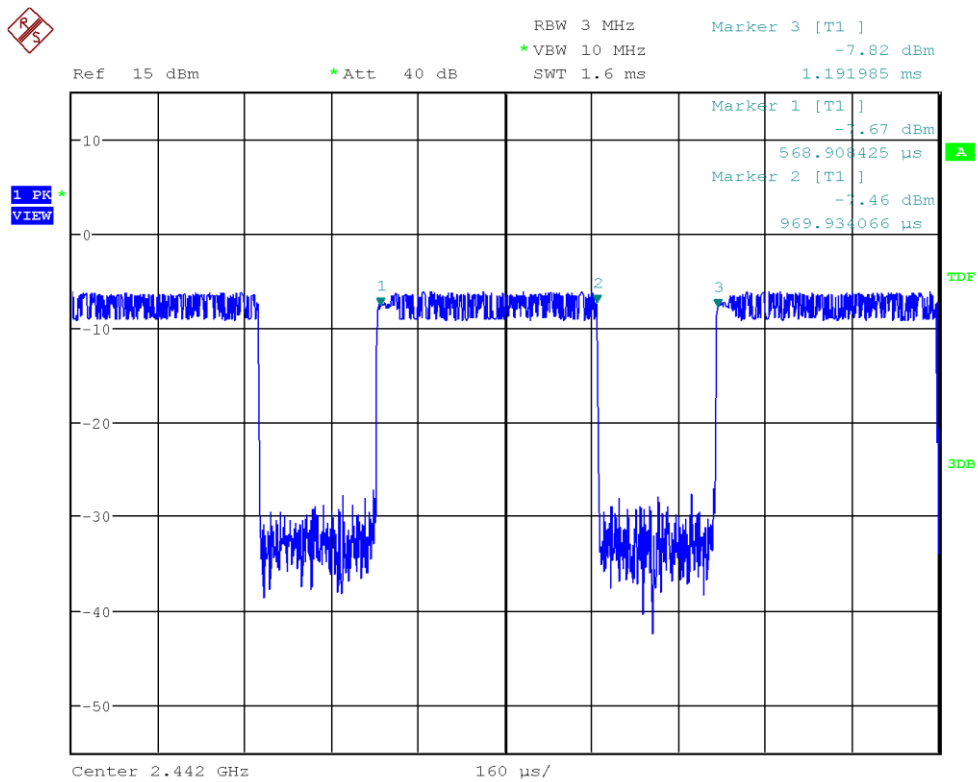
EUT Information

EUT Name:	Thermomix
Manufacturer:	Vorwerk Elektroware GmbH & Co KG.
Serial Number:	18434212024100415
Hardware Rev:	NWOT
Software Rev:	0.18.109-201808300615
Comment:	120V AC



4. Conducted Measurements

4.1. Duty Cycle measurement



BTLE-DutyCycle-CH17

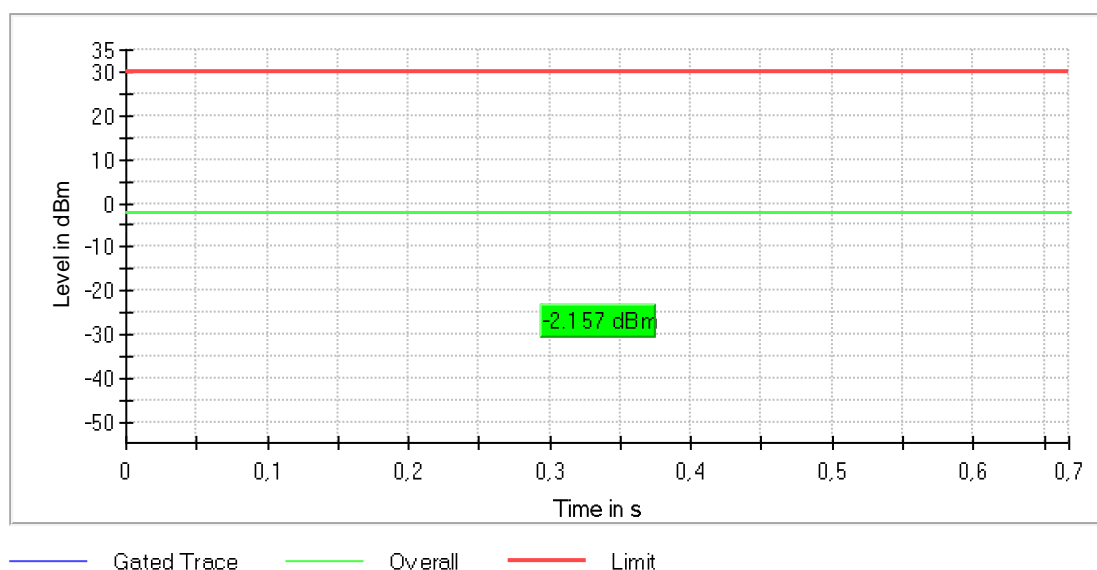
4.2. RF output power measurements

RF output power (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2402.000000	-2.2	30.0	-4.6	66.650	PASS

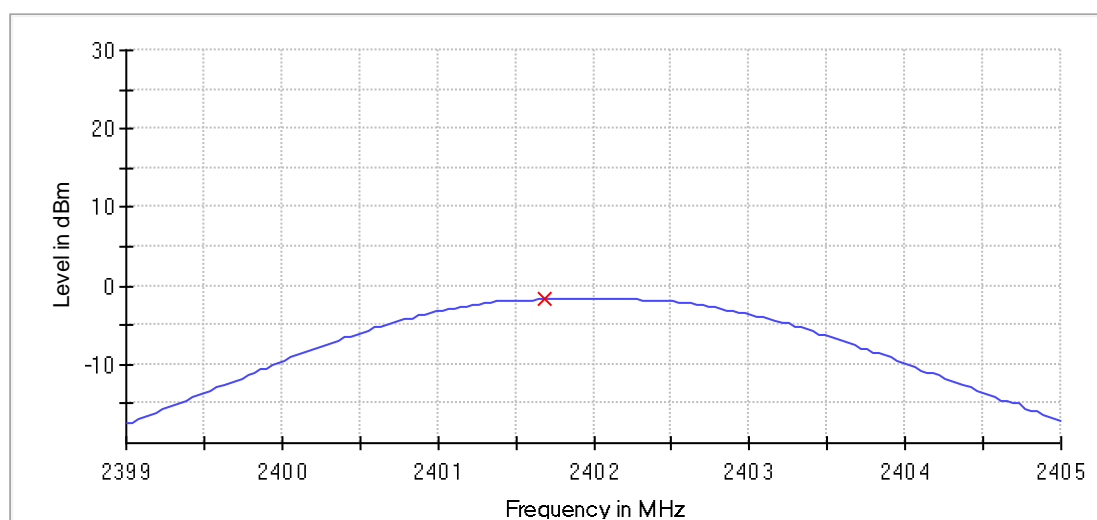


Peak output power (Sweep) (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402.000000	-1.7	30.0	PASS



— Connector 1 × Peak Connector 1

Measurement

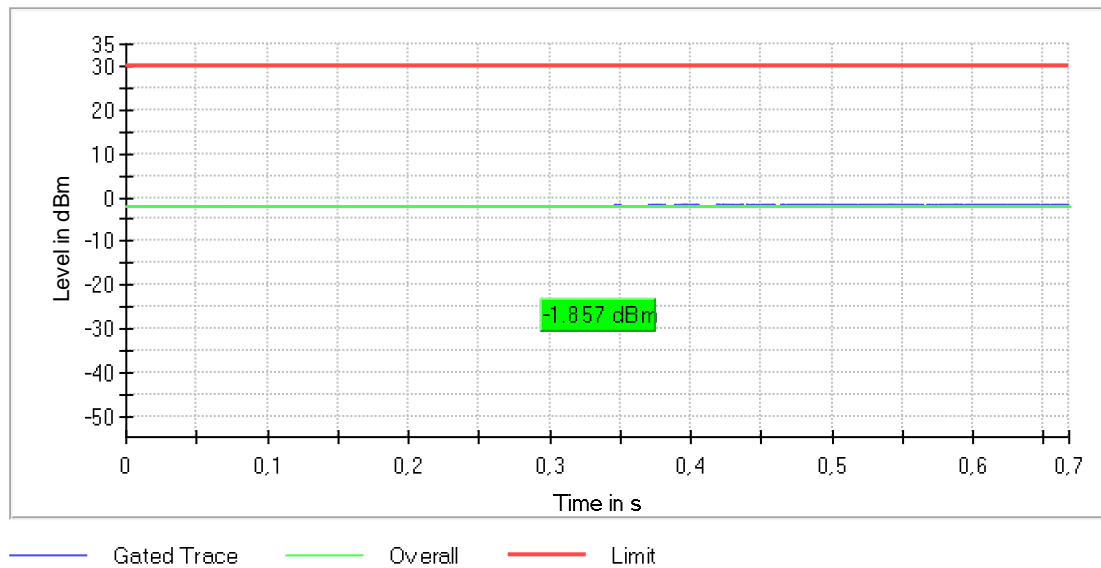
Setting	Instrument Value	Target Value
Start Frequency	2.39900 GHz	2.39900 GHz
Stop Frequency	2.40500 GHz	2.40500 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	>= 1.000 MHz
VBW	10.000 MHz	>= 6.000 MHz
SweepPoints	155	~ 101
SweepTime	2.500 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
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	0.11 dB	0.50 dB

RF output power (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2440.000000	-1.9	30.0	-4.3	66.672	PASS

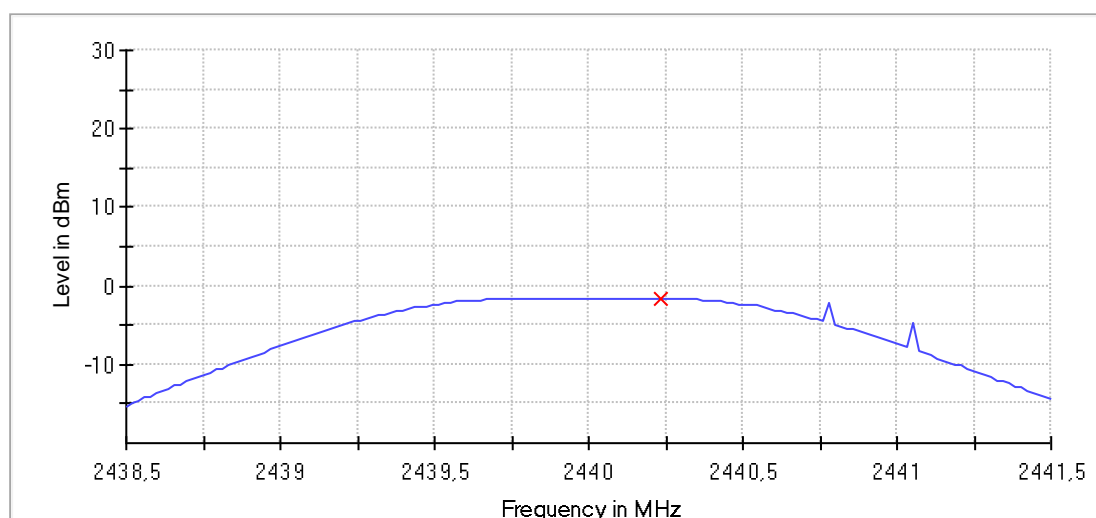


Peak output power (Sweep) (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2440.000000	-1.6	30.0	PASS



— Connector 1 × Peak Connector 1

Measurement

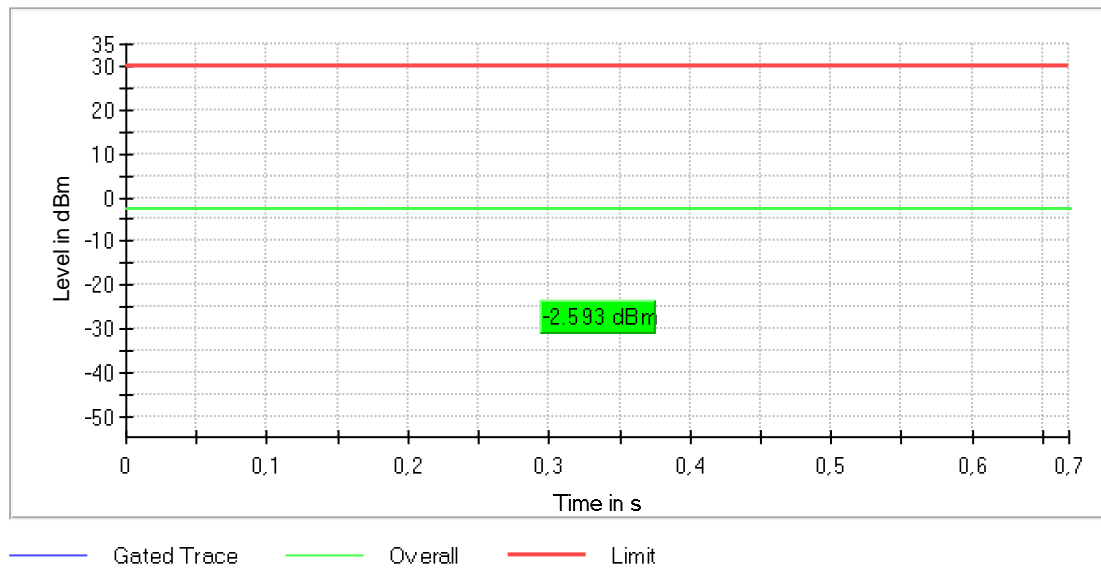
Setting	Instrument Value	Target Value
Start Frequency	2.43850 GHz	2.43850 GHz
Stop Frequency	2.44150 GHz	2.44150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	>= 701.299 kHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	155	~ 101
SweepTime	2.500 ms	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
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	0.00 dB	0.50 dB

RF output power (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2480.000000	-2.6	30.0	-5.0	66.746	PASS

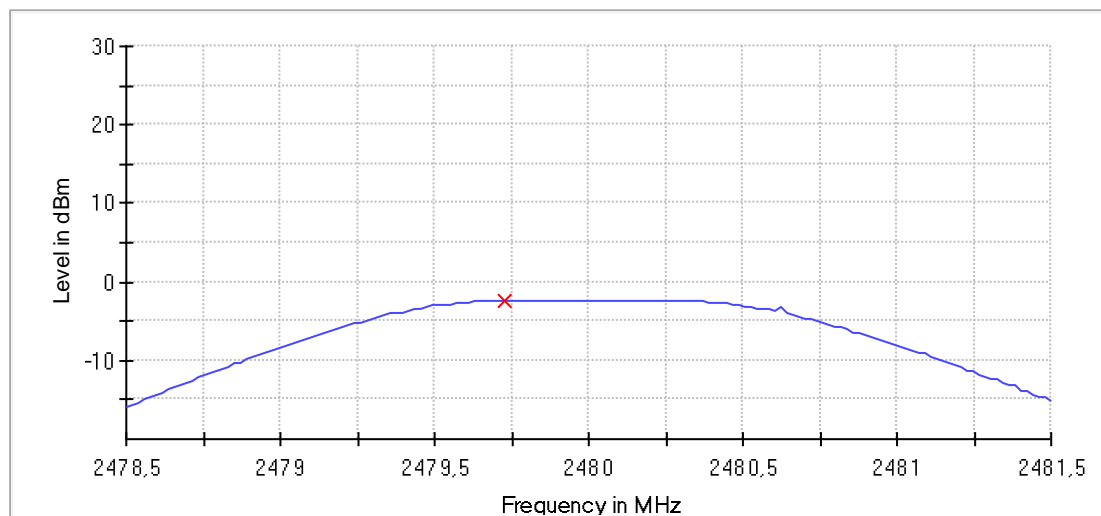


Peak output power (Sweep) (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	-2.3	30.0	PASS



— Connector 1 × Peak Connector 1

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47850 GHz	2.47850 GHz
Stop Frequency	2.48150 GHz	2.48150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	>= 701.299 kHz
VBW	3.000 MHz	>= 3.000 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
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	0.00 dB	0.50 dB

4.3. 6dB Minimum Emission Bandwidth 6 dB

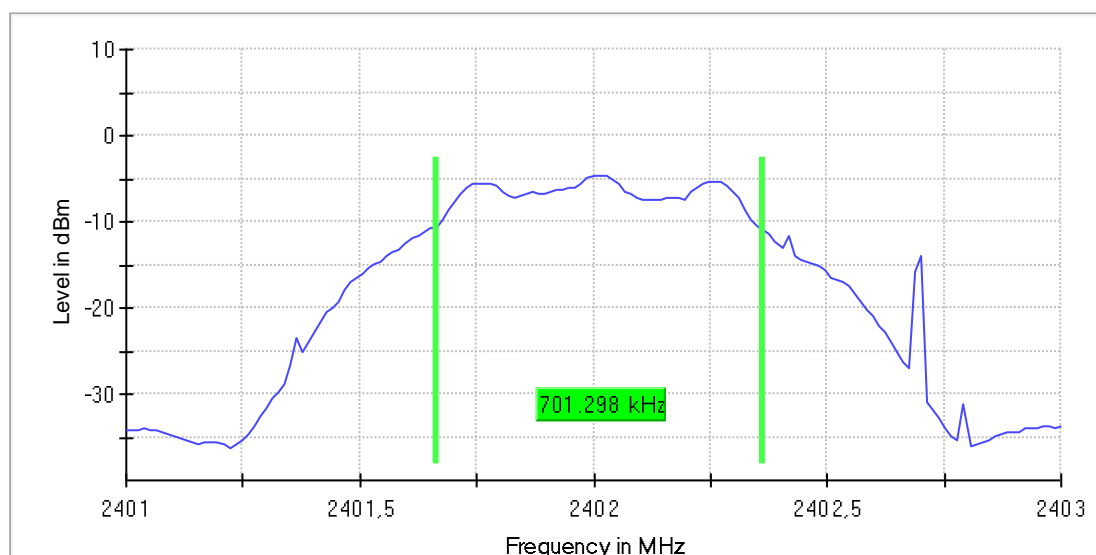
Minimum Emission Bandwidth 6 dB (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.701298	0.500000	---	2401.662338	2402.363636

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	-4.6	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	155	~ 20
Sweptime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	7 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.04 dB	0.50 dB

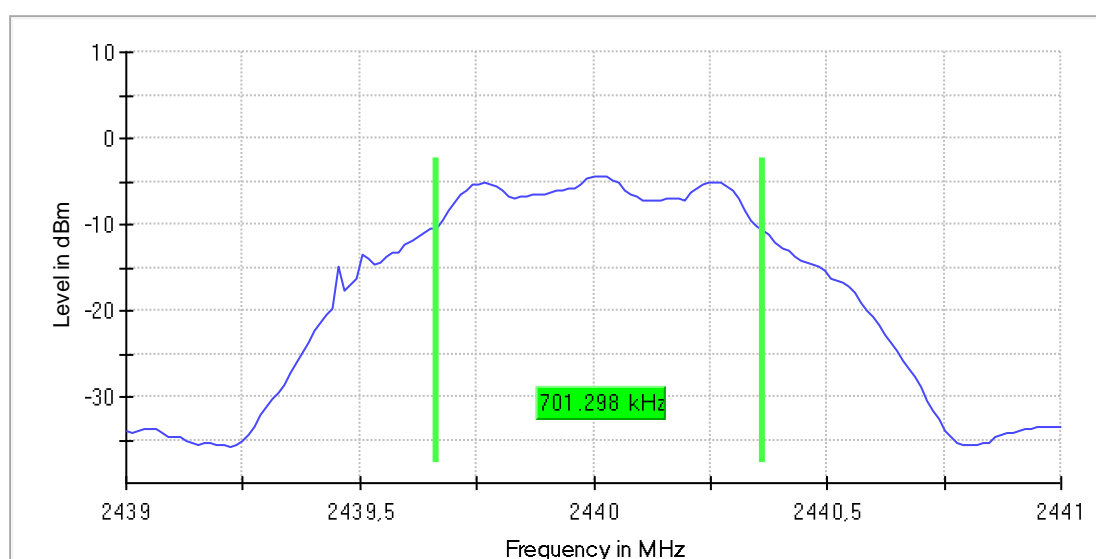
Minimum Emission Bandwidth 6 dB (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.701298	0.500000	---	2439.662338	2440.363636

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	-4.3	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	155	~ 20
SweepTime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	5 / 5	5
Max Stable Difference	0.09 dB	0.50 dB

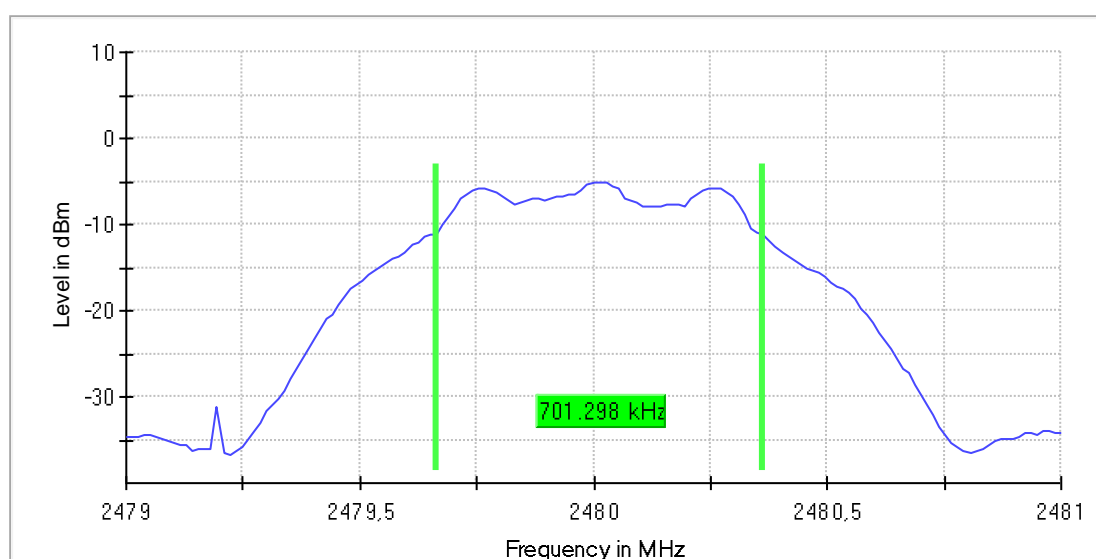
Minimum Emission Bandwidth 6 dB (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.701298	0.500000	---	2479.662338	2480.363636

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-5.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	155	~ 20
SweepTime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	5 / 5	5
Max Stable Difference	0.14 dB	0.50 dB

4.4. 20dB Emission Bandwidth

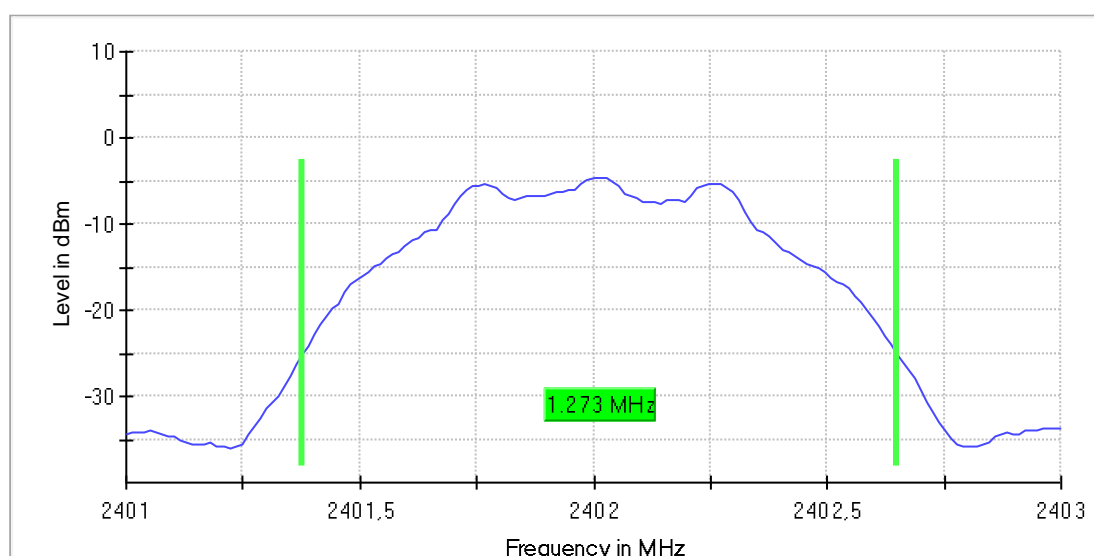
Emission Bandwidth 20 dB (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.272728	---	---	2401.376623	2402.649351

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	-4.6	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	5 / 5	5
Max Stable Difference	0.06 dB	0.50 dB

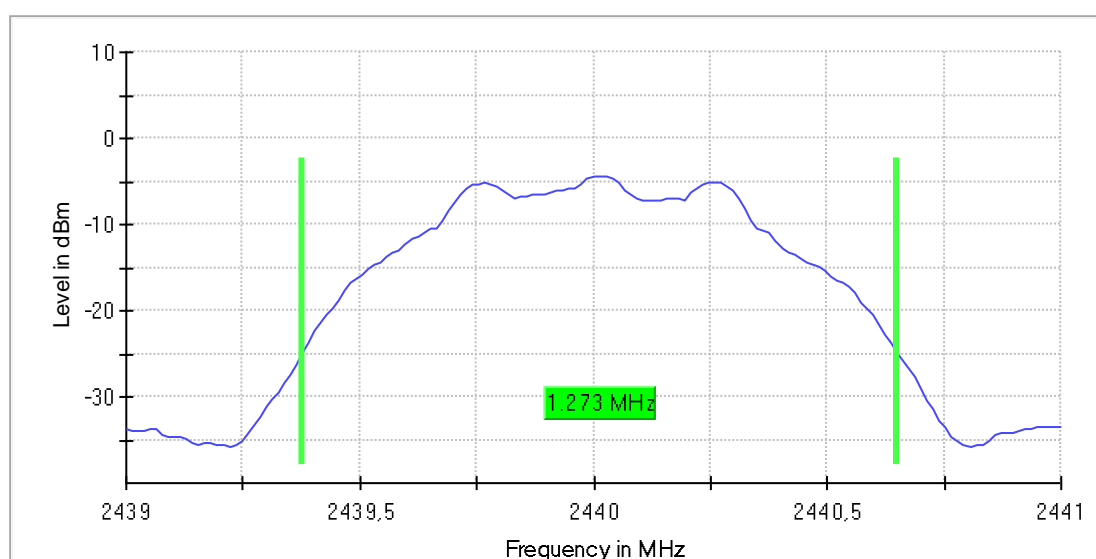
Emission Bandwidth 20 dB (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	1.272728	---	---	2439.376623	2440.649351

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	-4.3	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	6 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.03 dB	0.50 dB

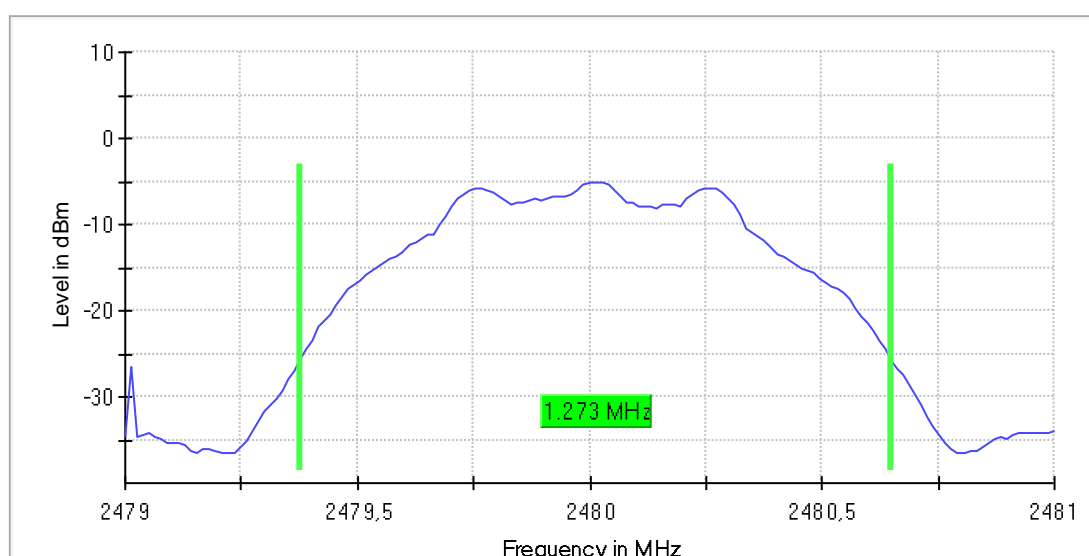
Emission Bandwidth 20 dB (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.272728	---	---	2479.376623	2480.649351

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-5.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 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	5 / 5	5
Max Stable Difference	0.23 dB	0.50 dB

4.5. 99% Occupied Bandwidth

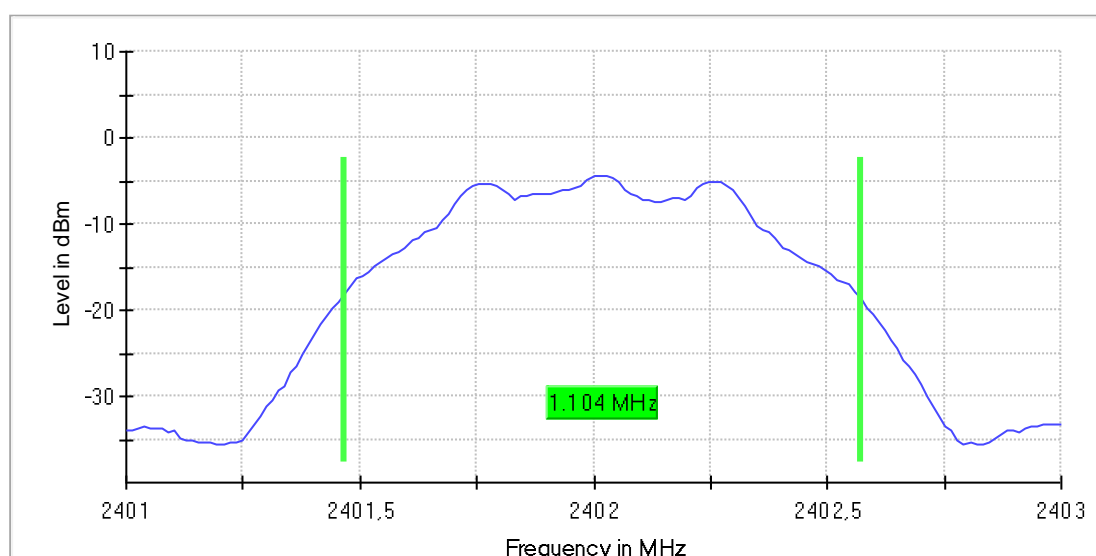
99% Occupied Bandwidth (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.103897	---	---	2401.467532	2402.571429

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	-4.4	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	25.000 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	6 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.04 dB	0.50 dB

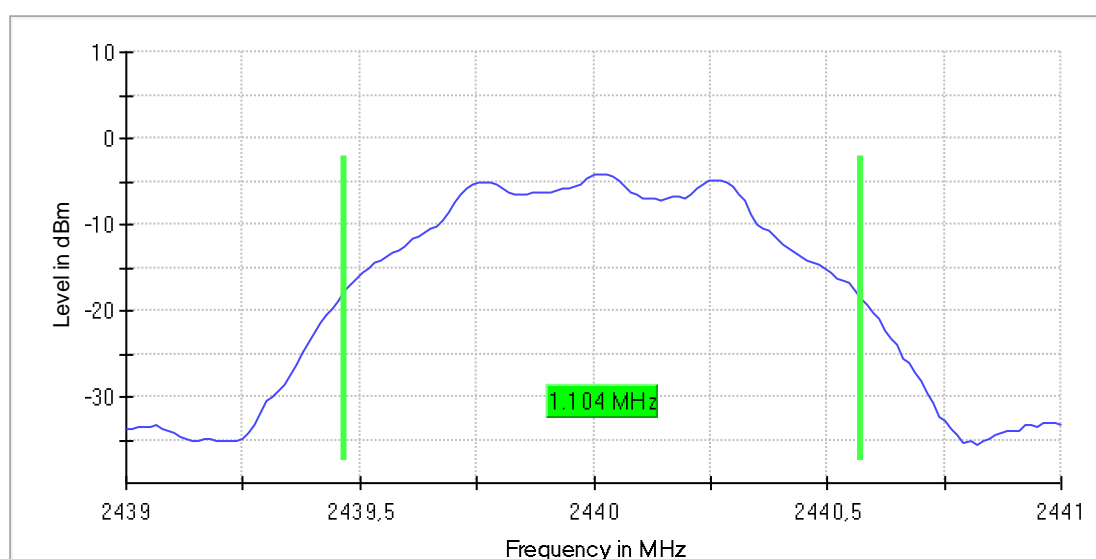
99% Occupied Bandwidth (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	1.103897	---	---	2439.467532	2440.571429

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	-4.1	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	25.000 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	9 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.02 dB	0.50 dB

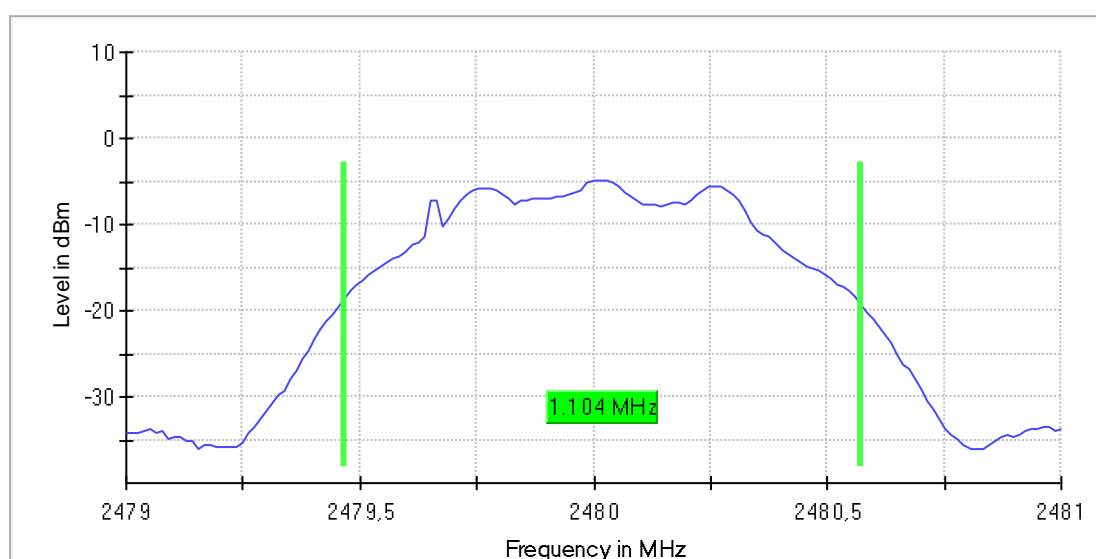
99% Occupied Bandwidth (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.103897	---	---	2479.467532	2480.571429

(continuation of the "20 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-4.8	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	155	~ 40
SweepTime	2.500 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	25.000 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	12 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.09 dB	0.50 dB

4.6. Frequency Stability

4.6.1. T_{min} – V_{nom}

Modulation	Channel	99% OBW	T _{nom} - V _{nom}		T _{min} - V _{nom}	
			left Bandedge	right Bandedge	left Bandedge	right Bandedge
	MHZ	in MHZ	in HZ	in HZ	in HZ	in HZ
GFSK	2402	1,10400	2401467532	2402571429	2401480519	2402610390
	2440	1,10400	2439467532	2440571429	2439454545	2440584416
	2481	1,10400	2479467532	2480571429	2479480519	2480584416

4.6.2. T_{max} – V_{nom}

Modulation	Channel	99% OBW	T _{nom} - V _{nom}		T _{max} - V _{nom}	
			left Bandedge	right Bandedge	left Bandedge	right Bandedge
	MHZ	in MHZ	in HZ	in HZ	in HZ	in HZ
GFSK	2402	1,10400	2401467532	2402571429	2401415584	2402545455
	2440	1,10400	2439467532	2440571429	2439441558	2440545455
	2480	1,10400	2479467532	2480571429	2479441558	2480454545

4.6.3. T_{nom} – V_{min}

Modulation	Channel	99% OBW	T _{nom} - V _{nom}		T _{nom} - V _{min}	
			left Bandedge	right Bandedge	left Bandedge	right Bandedge
	MHZ	in MHZ	in HZ	in HZ	in HZ	in HZ
GFSK	2402	1,10400	2401467532	2402571429	2401467532	2402571429
	2440	1,10400	2439467532	2440571429	2440467532	2441571429
	2480	1,10400	2479467532	2480571429	2479467532	2480571429

4.6.4. T_{nom} – V_{max}

Modulation	Channel	99% OBW	T _{nom} - V _{nom}		T _{nom} - V _{max}	
			left Bandedge	right Bandedge	left Bandedge	right Bandedge
	MHZ	in MHZ	in HZ	in HZ	in HZ	in HZ
GFSK	2402	1,10400	2401467532	2402571429	2401467532	2402571429
	2440	1,10400	2439467532	2440571429	2439467532	2440571429
	2480	1,10400	2479467532	2480571429	2479467532	2480593403

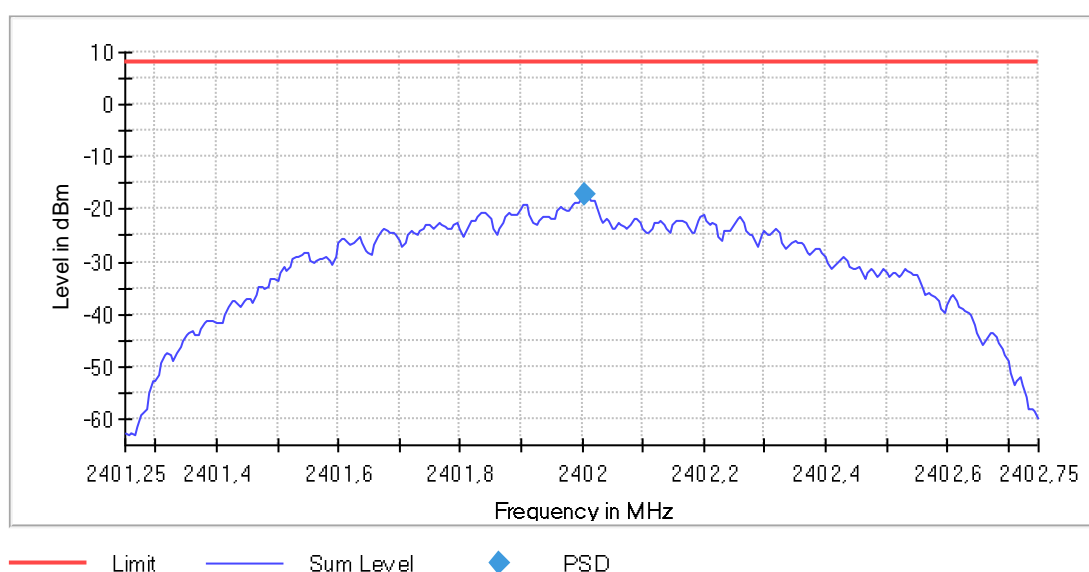
4.7. Power Spectral Density

Power Spectral Density (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2402.005000	-17.286	8.0	PASS



Measurement

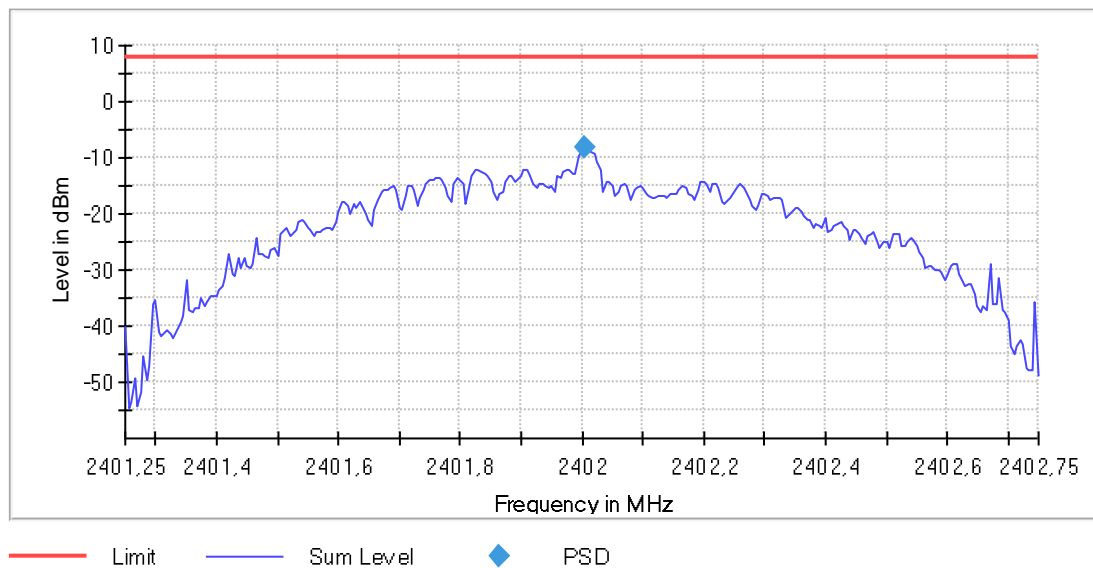
Setting	Instrument Value	Target Value
Start Frequency	2.40125 GHz	2.40125 GHz
Stop Frequency	2.40275 GHz	2.40275 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
Sweeptime	1.550 s	1.505 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
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	0.38 dB	0.50 dB

Peak Power Spectral Density (2402 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2402.005000	-8.184	8.0	PASS



Measurement

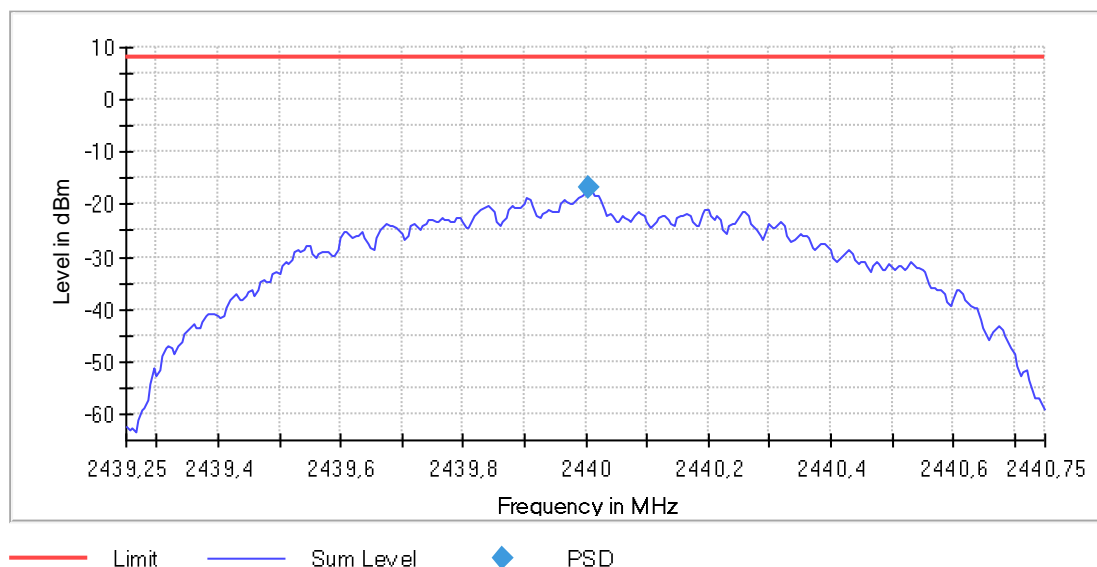
Setting	Instrument Value	Target Value
Start Frequency	2.40125 GHz	2.40125 GHz
Stop Frequency	2.40275 GHz	2.40275 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
SweepTime	60.000 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.08 dB	0.50 dB

Power Spectral Density (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2440.005000	-16.852	8.0	PASS



Measurement

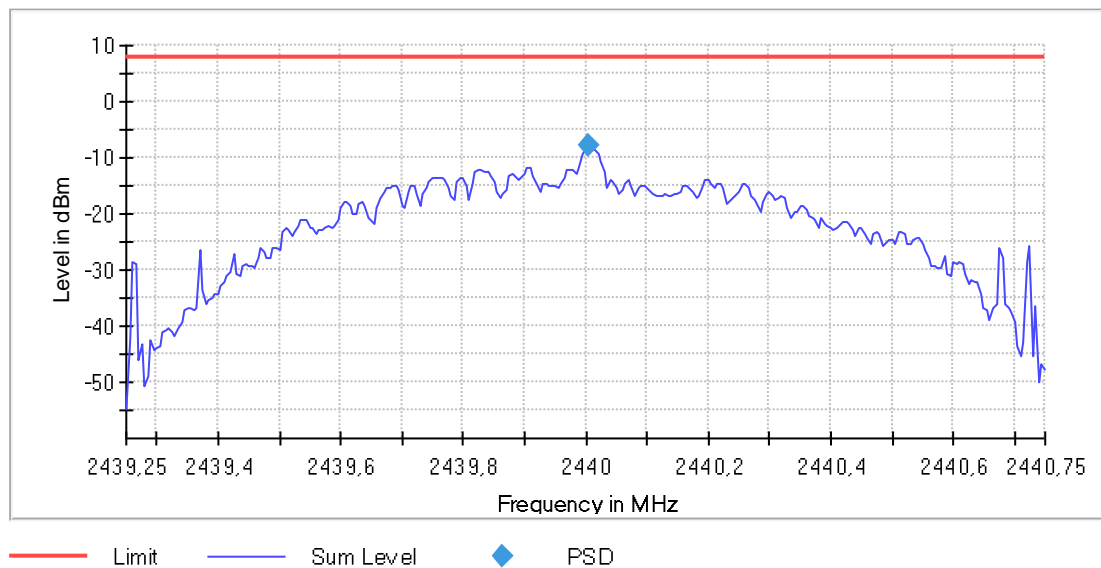
Setting	Instrument Value	Target Value
Start Frequency	2.43925 GHz	2.43925 GHz
Stop Frequency	2.44075 GHz	2.44075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
Sweptime	1.550 s	1.505 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
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	0.42 dB	0.50 dB

Peak Power Spectral Density (2440 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2440.005000	-7.961	8.0	PASS



Measurement

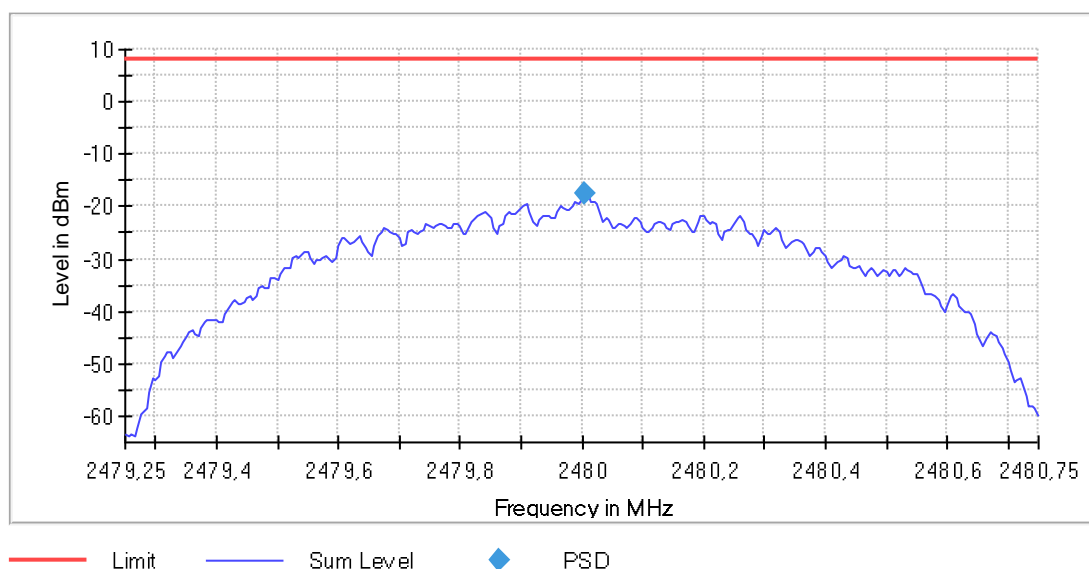
Setting	Instrument Value	Target Value
Start Frequency	2.43925 GHz	2.43925 GHz
Stop Frequency	2.44075 GHz	2.44075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
SweepTime	60.000 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	3 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.44 dB	0.50 dB

Power Spectral Density (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.005000	-17.510	8.0	PASS



Measurement

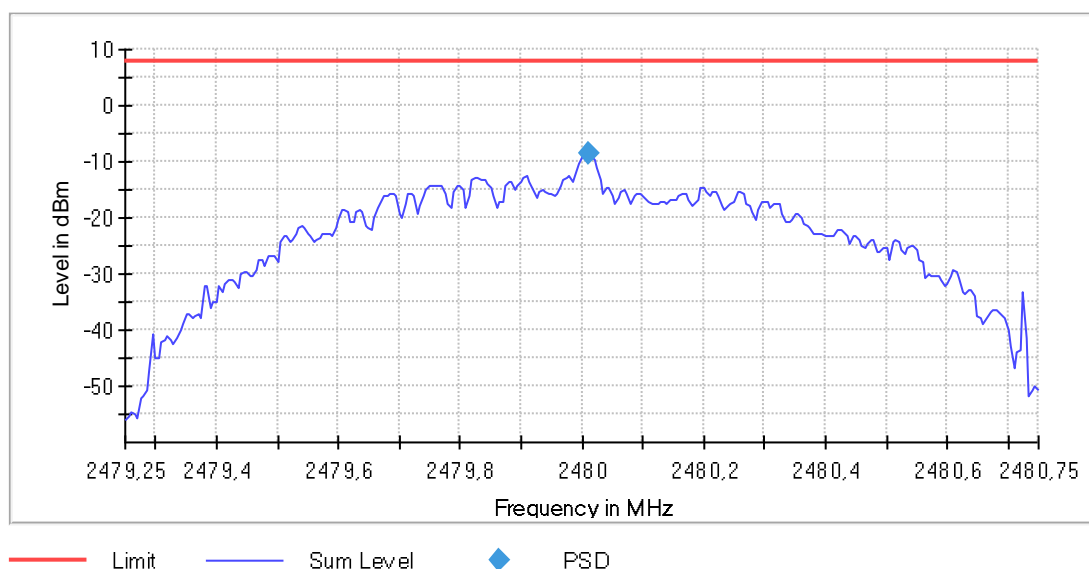
Setting	Instrument Value	Target Value
Start Frequency	2.47925 GHz	2.47925 GHz
Stop Frequency	2.48075 GHz	2.48075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
SweepTime	1.550 s	1.505 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
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	0.16 dB	0.50 dB

Peak Power Spectral Density (2480 MHz; 7,000 dBm; 1 MHz)

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.010000	-8.649	8.0	PASS

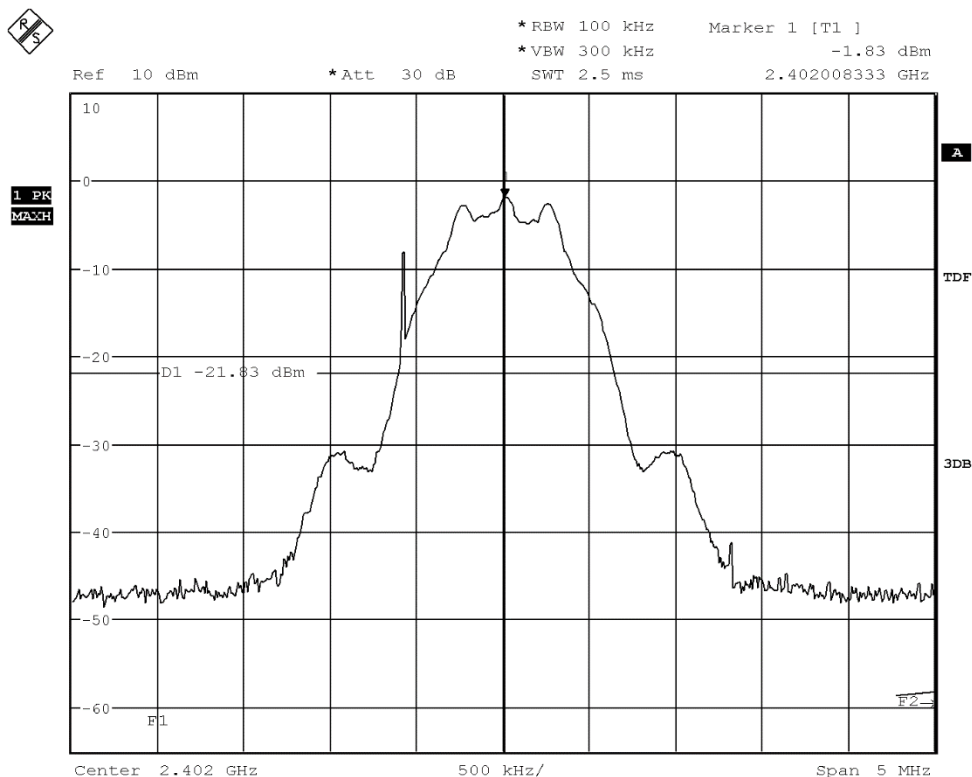


Measurement

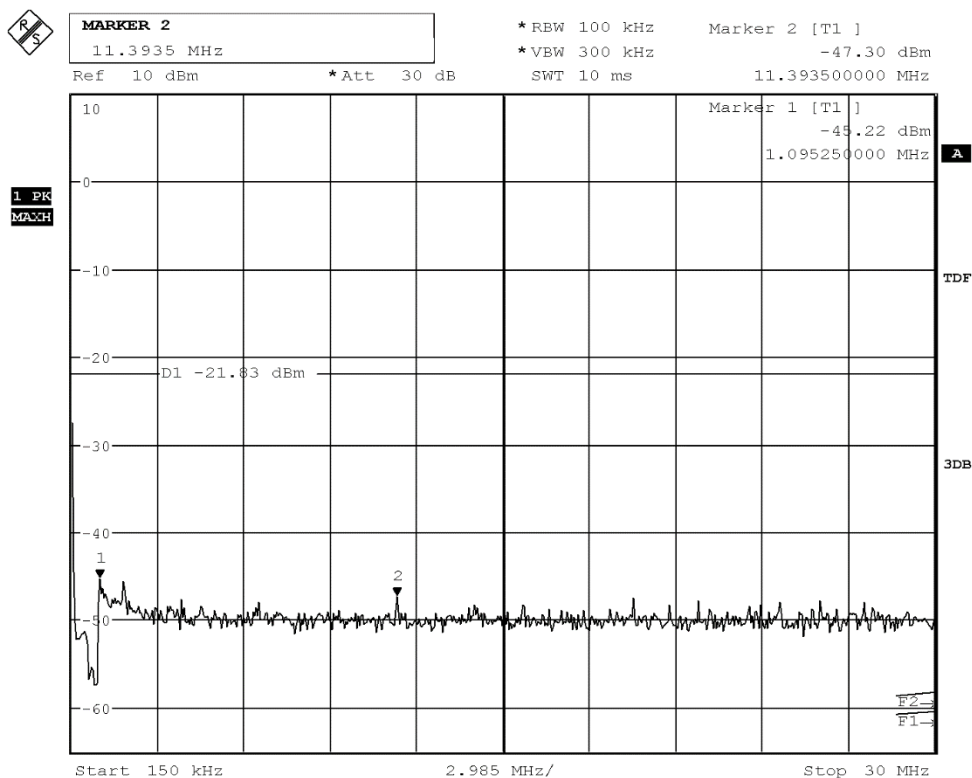
Setting	Instrument Value	Target Value
Start Frequency	2.47925 GHz	2.47925 GHz
Stop Frequency	2.48075 GHz	2.48075 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	301	~ 300
SweepTime	60.000 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	15.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	3 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.32 dB	0.50 dB

4.8. 20 dB Conducted Emissions

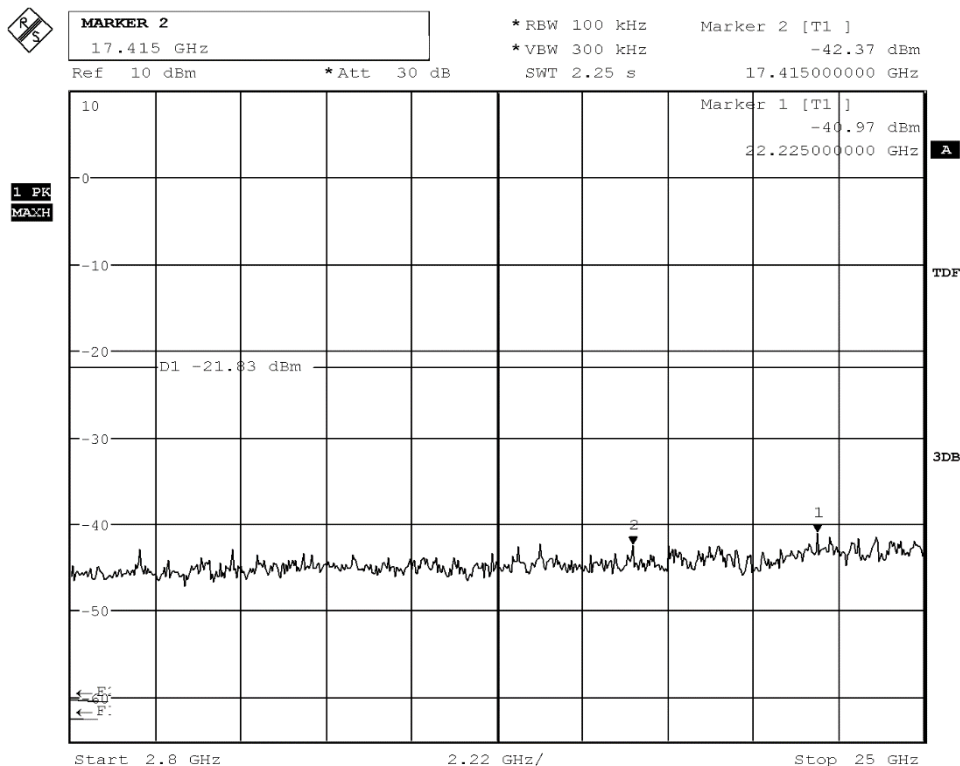
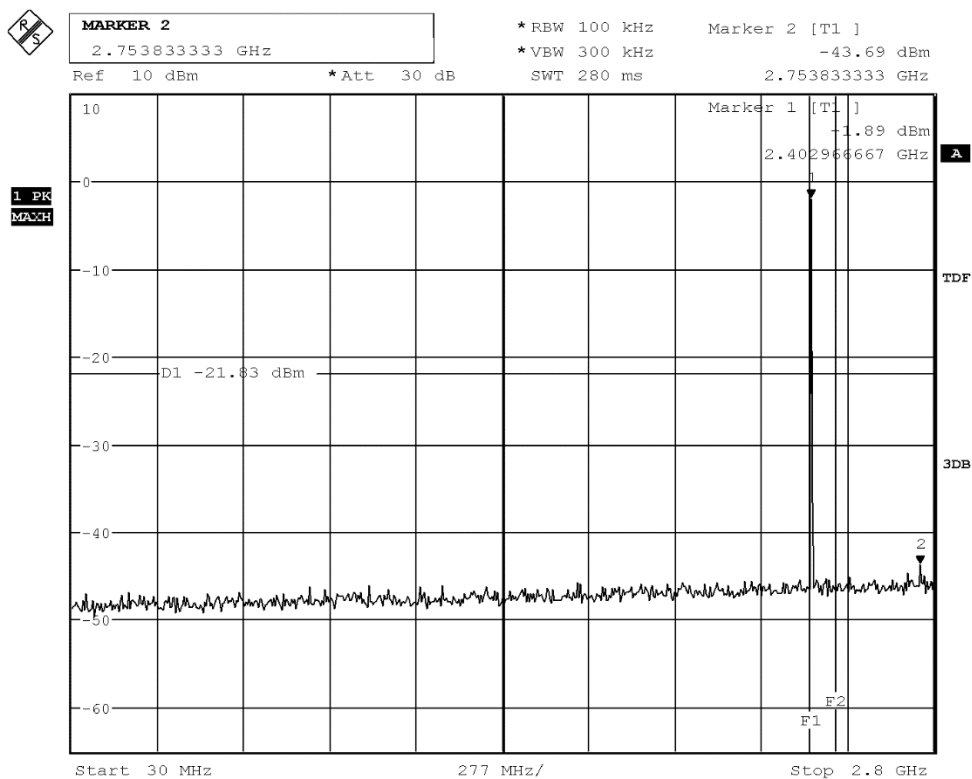
3.6.1 Low channel



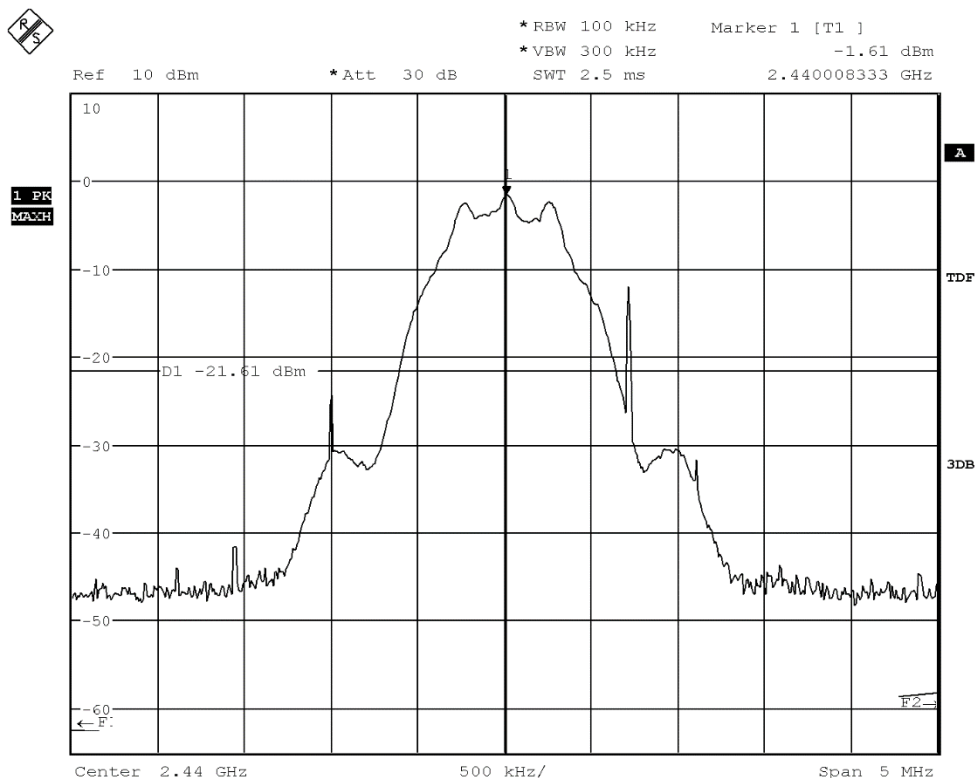
BTLE-Low-20dB-Ref



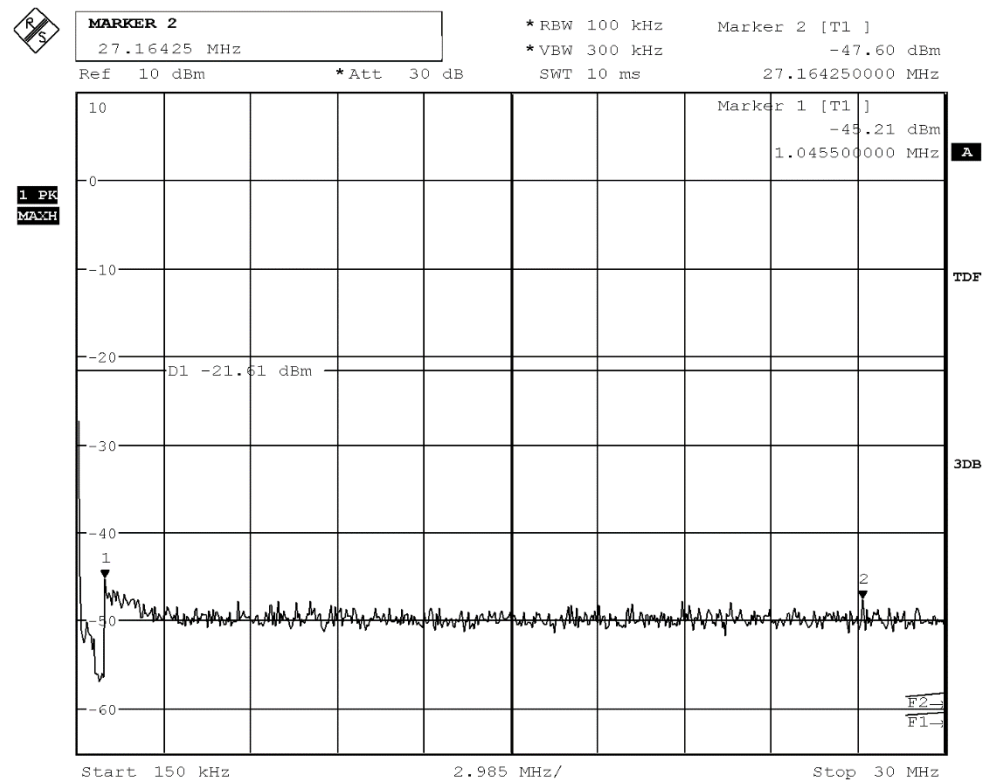
BTLE-Low-20dB-150k-30M



3.4.1 Mid channel

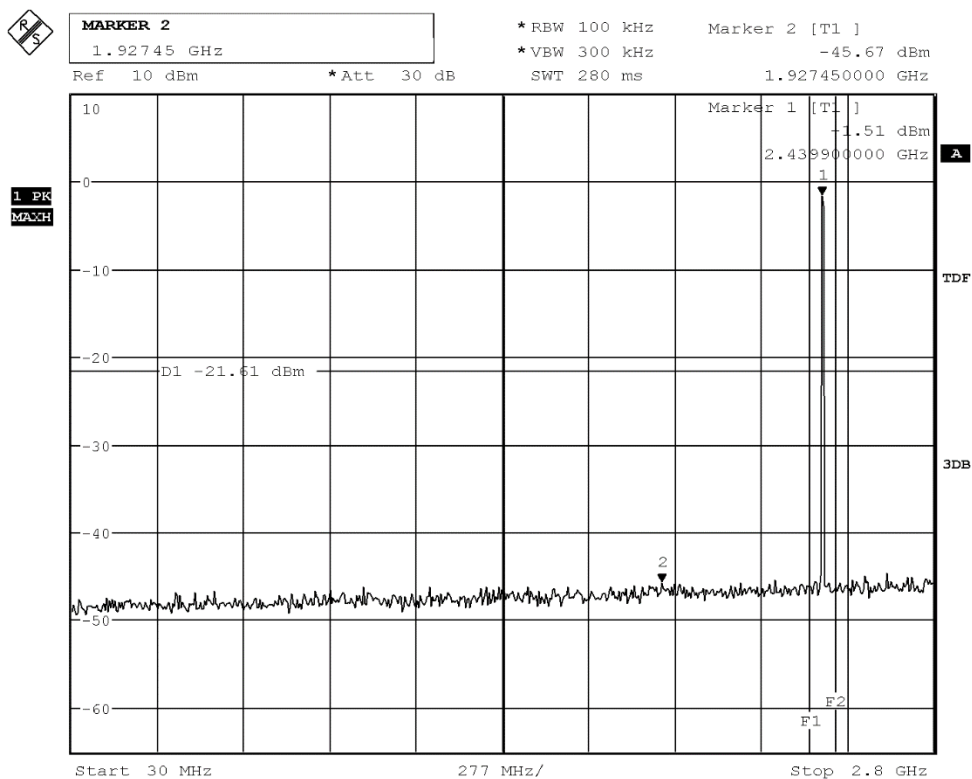


BTLE-Mid-20dB-Ref

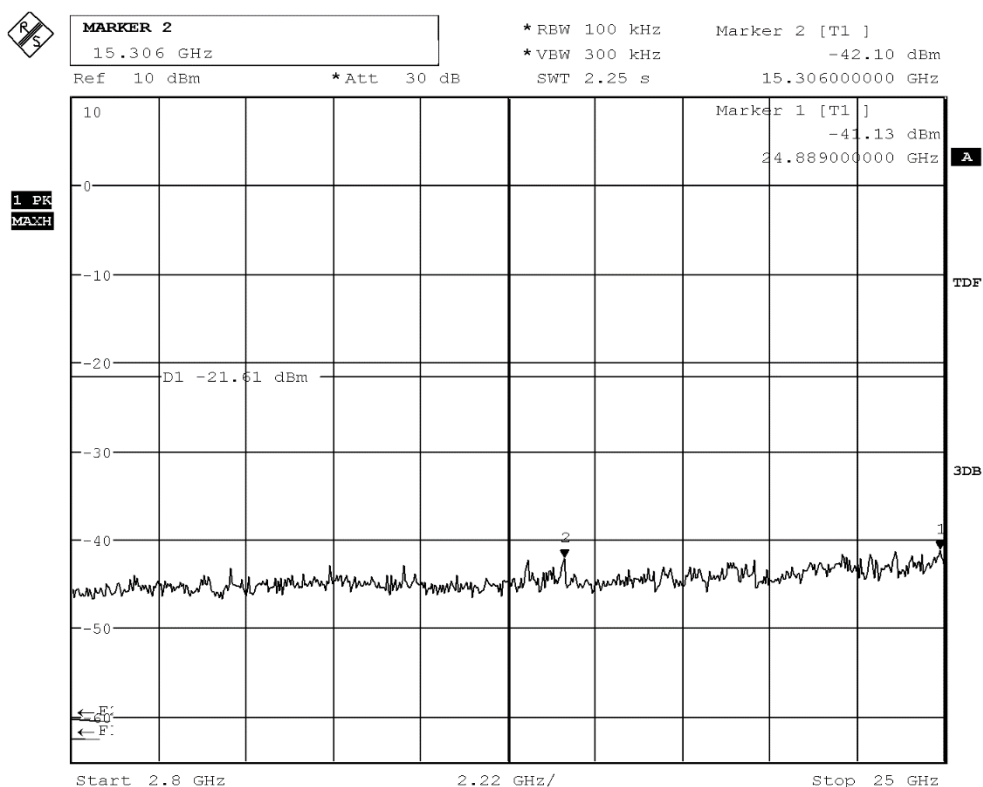


1

BTLE-Mid-20dB-150k-30M

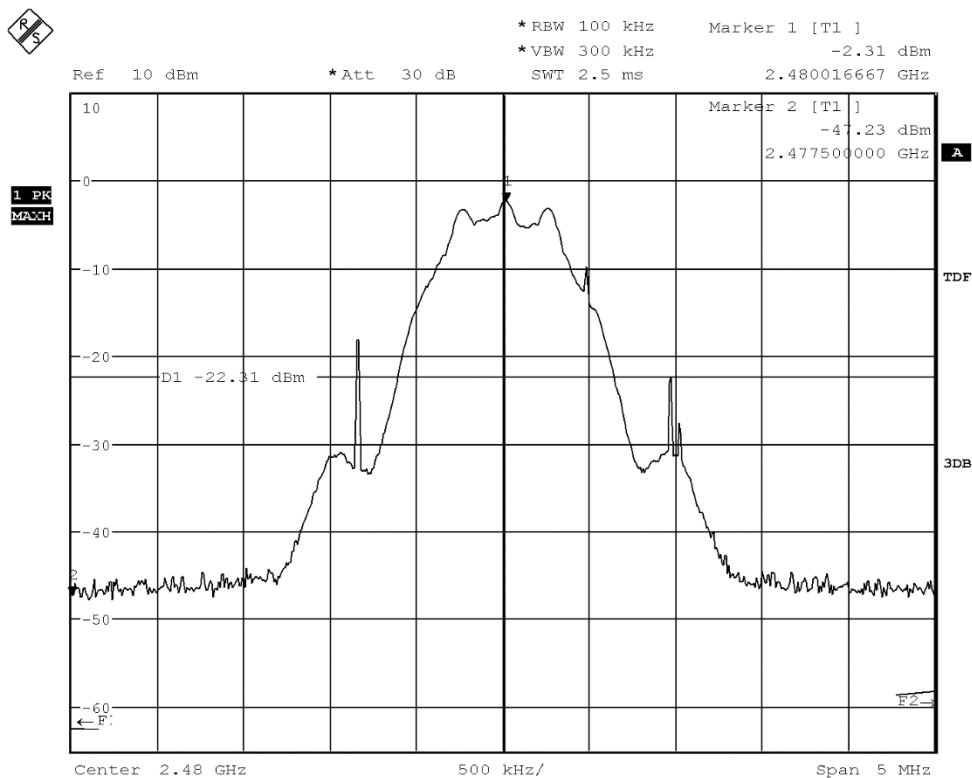


BTLE-Mid-20dB-30M-2.8G

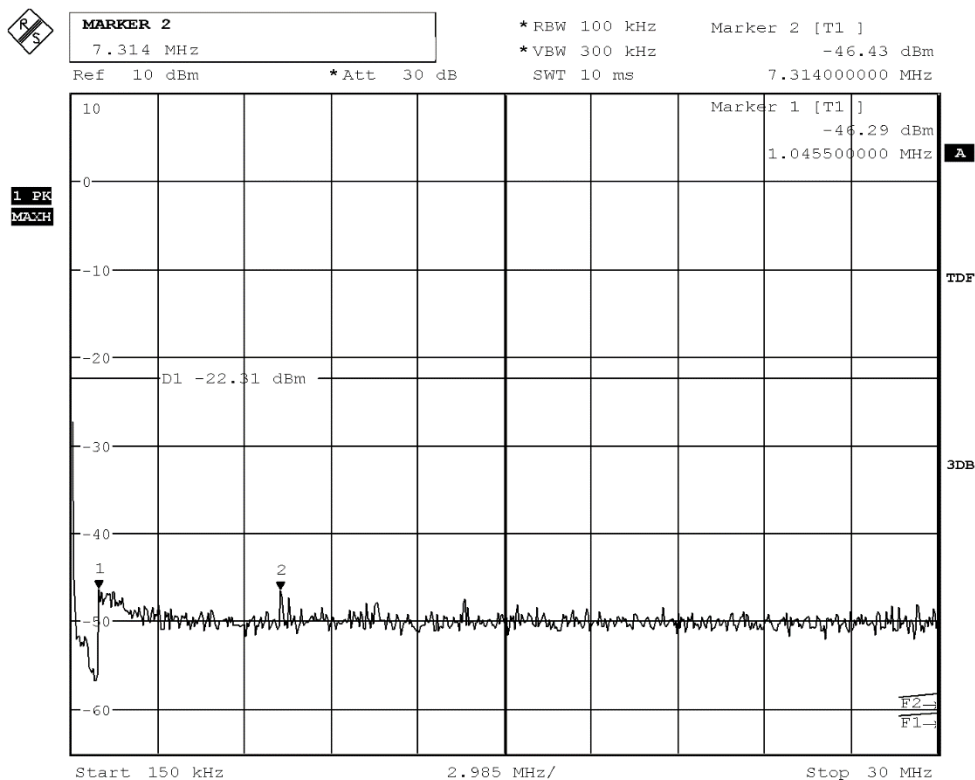


BTLE-Mid-20dB-2.8-25G

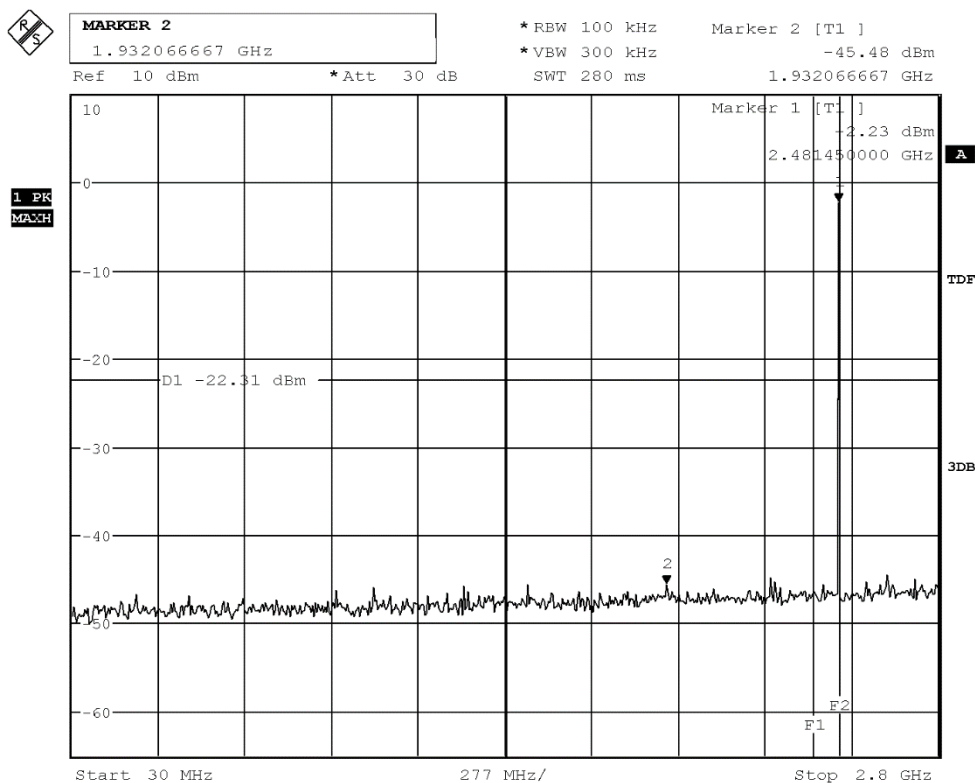
3.4.1 High channel



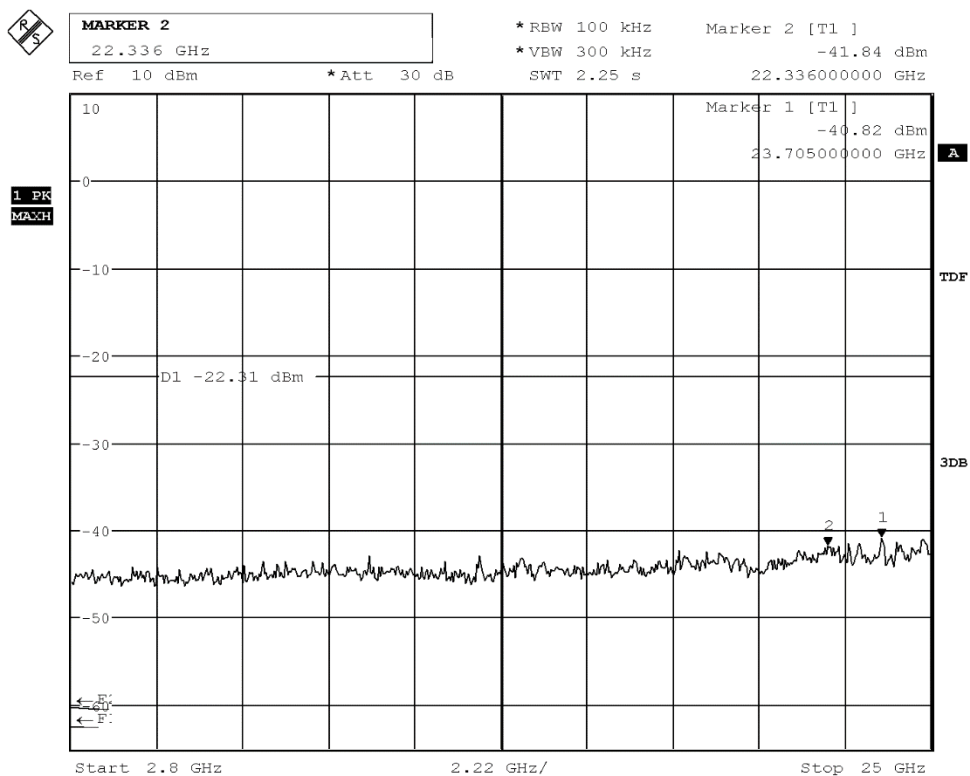
BTLE-High-20dB-Ref



BTLE-High-20dB-150k-30M



BTLE-High-20dB-30M-2.8G



BTLE-High-20dB-2.8-25G