

Annex 1: Measurement diagrams to
TEST REPORT
 No.: 16-1-0014701T25a

According to:
FCC Regulations
 Part 15.247

Robert Bosch Car Multimedia GmbH
 LCN2K70D10
 Radio Navigation System

FCC-ID: YBN-LCN2K70D10







Laboratory Accreditation and Listings			
 <p>DAkks Deutsche Akkreditierungsstelle D-PL-12047-01-01</p>	 <p>FEDERAL COMMUNICATIONS COMMISSION FCC USA MRA US-EU 0003</p>	 <p>Industry Canada Reg. No.: 3462D-2 Reg. No.: 3462D-3</p>	 <p>Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301</p>
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1. Conducted EMI measurements on AC-mains port according 15.207, class B

Not applicable since powered from 24V car equipment

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

2.1. Magnetic field measurements f<30MHz

2.01_BT-TX_Ch0_DH5

Common Information

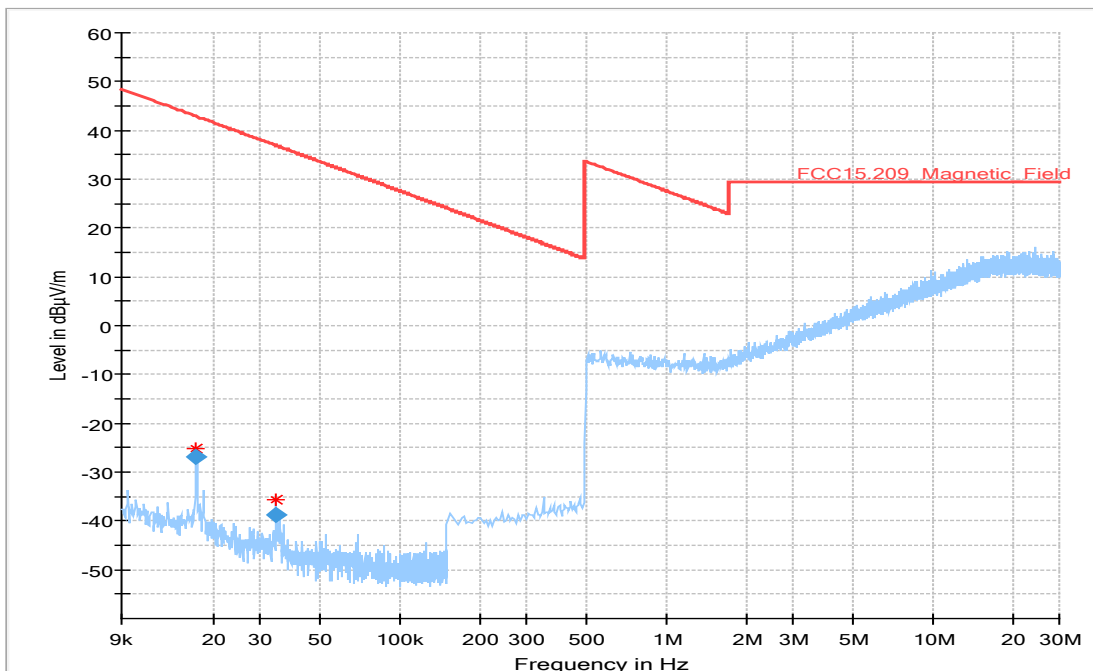
Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V8.51.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	RIs
Operating conditions:	Humidity: 42%rH; Temperature: 20°C
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum



Final Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.017160	-26.81	42.91	69.71	1000.0	0.200	100.0	H	252.0	-58.7
0.034280	-38.87	36.90	75.76	1000.0	0.200	100.0	H	123.0	-59.5

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

Frequency (MHz)	Comment
0.017160	20:27:12 - 30.08.2016
0.034280	20:20:09 - 30.08.2016

2.02_BT-TX_Ch39_2DH5

Common Information

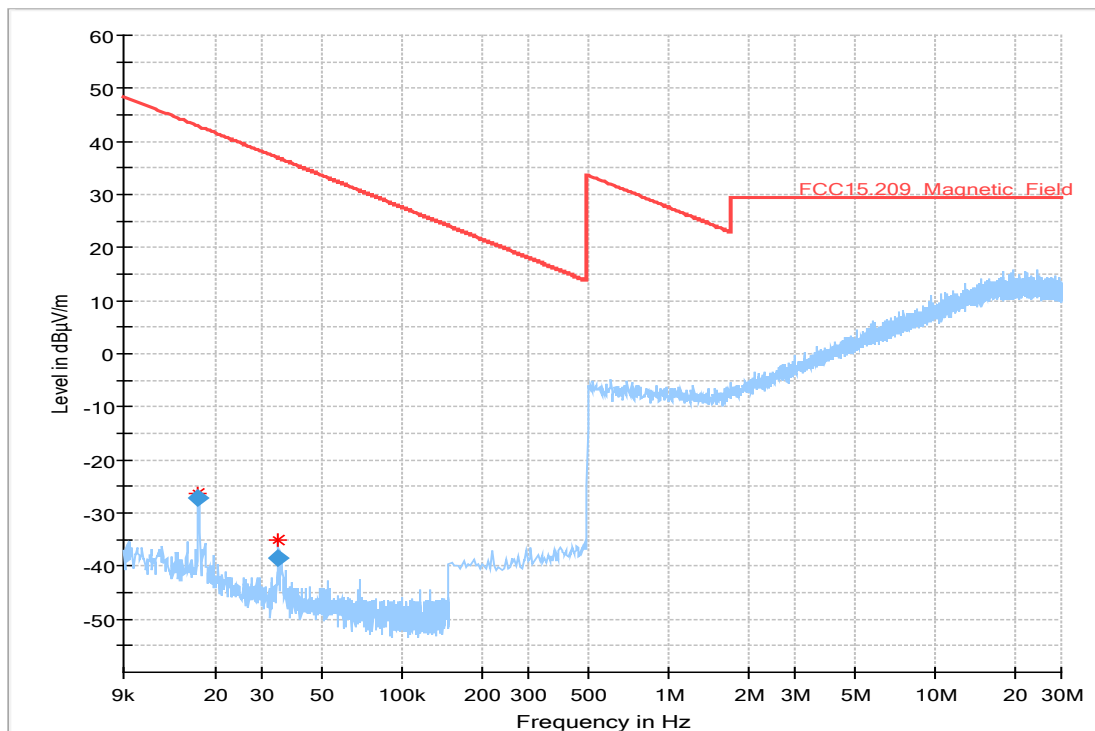
Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V8.51.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	RIs
Operating conditions:	Humidity: 42%rH; Temperature: 20°C
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum



Final Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.017160	-27.28	42.91	70.18	1000.0	0.200	100.0	H	61.0	-58.7
0.034360	-38.50	36.88	75.37	1000.0	0.200	100.0	H	177.0	-59.5

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

Frequency (MHz)	Comment
0.017160	19:17:22 - 30.08.2016
0.034360	19:23:49 - 30.08.2016

2.03_BT-TX_Ch78_3DH5

Common Information

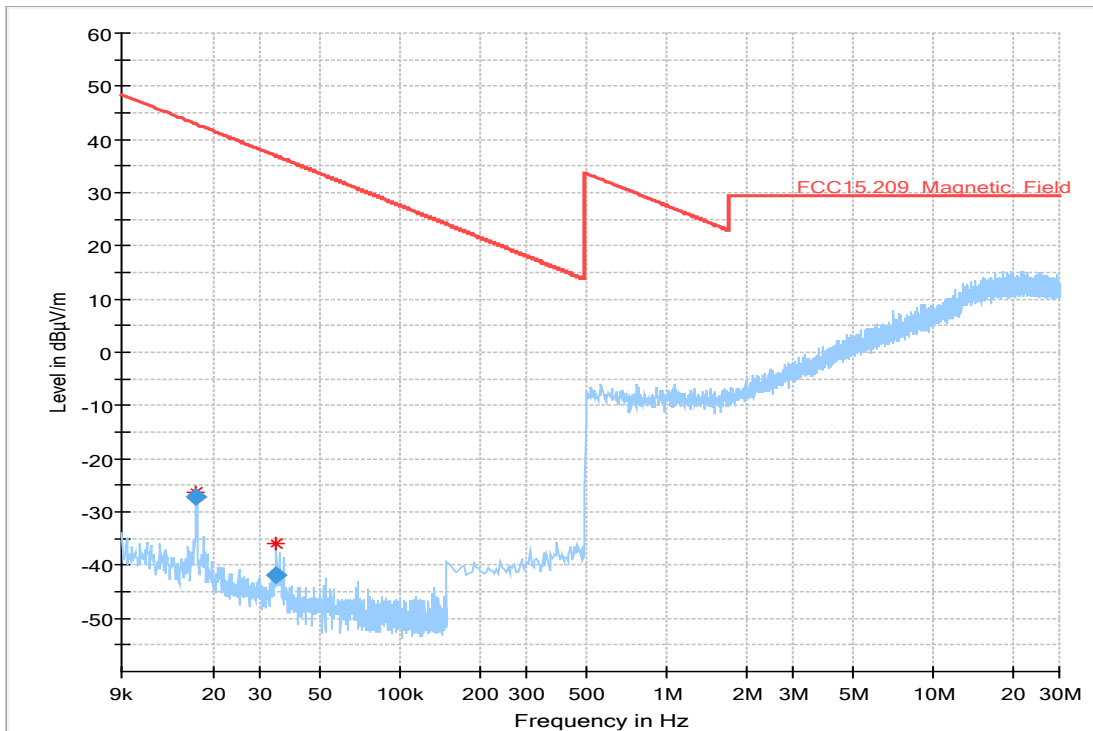
Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V8.51.0
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	Rls
Operating conditions:	Humidity: 42%rH; Temperature: 20°C
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum



Final Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.017160	-27.28	42.91	70.18	1000.0	0.200	100.0	H	217.0	-58.7
0.034280	-41.82	36.90	78.71	1000.0	0.200	100.0	H	58.0	-59.5

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

Frequency (MHz)	Comment
0.017160	18:14:34 - 30.08.2016
0.034280	18:08:27 - 30.08.2016

2.2. Field strength measurements 30MHz <math><f < 1\text{GHz}</math>

Diagram 3.01_BT-TX_Ch 0_DH5

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
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209; RSS-Gen. Issue 4
Operator:	RIs
Operating conditions:	BT TX ch0 DH5
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum

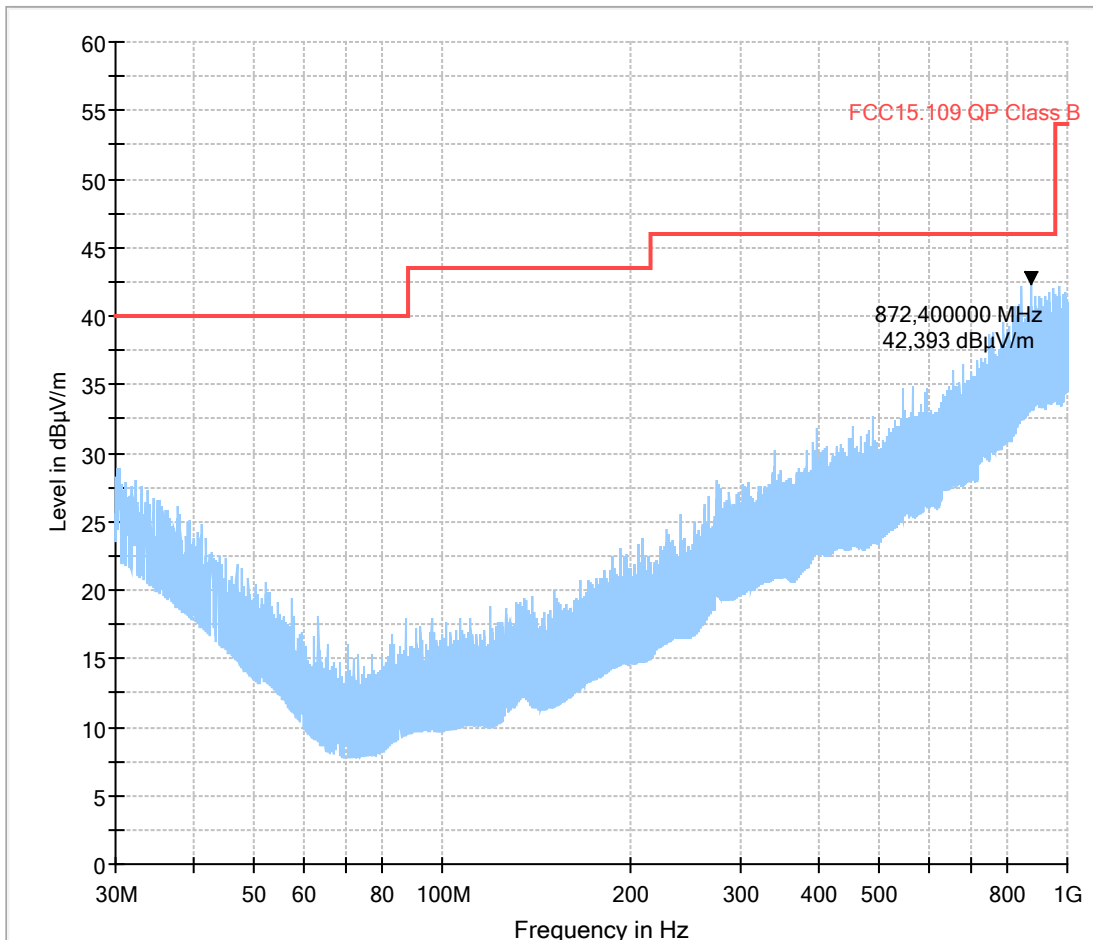


Diagram 3.02_BT-TX_Ch39_2DH5

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
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209; RSS-Gen. Issue 4
Operator:	RI
Operating conditions:	BT TX ch39 2DH5
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum

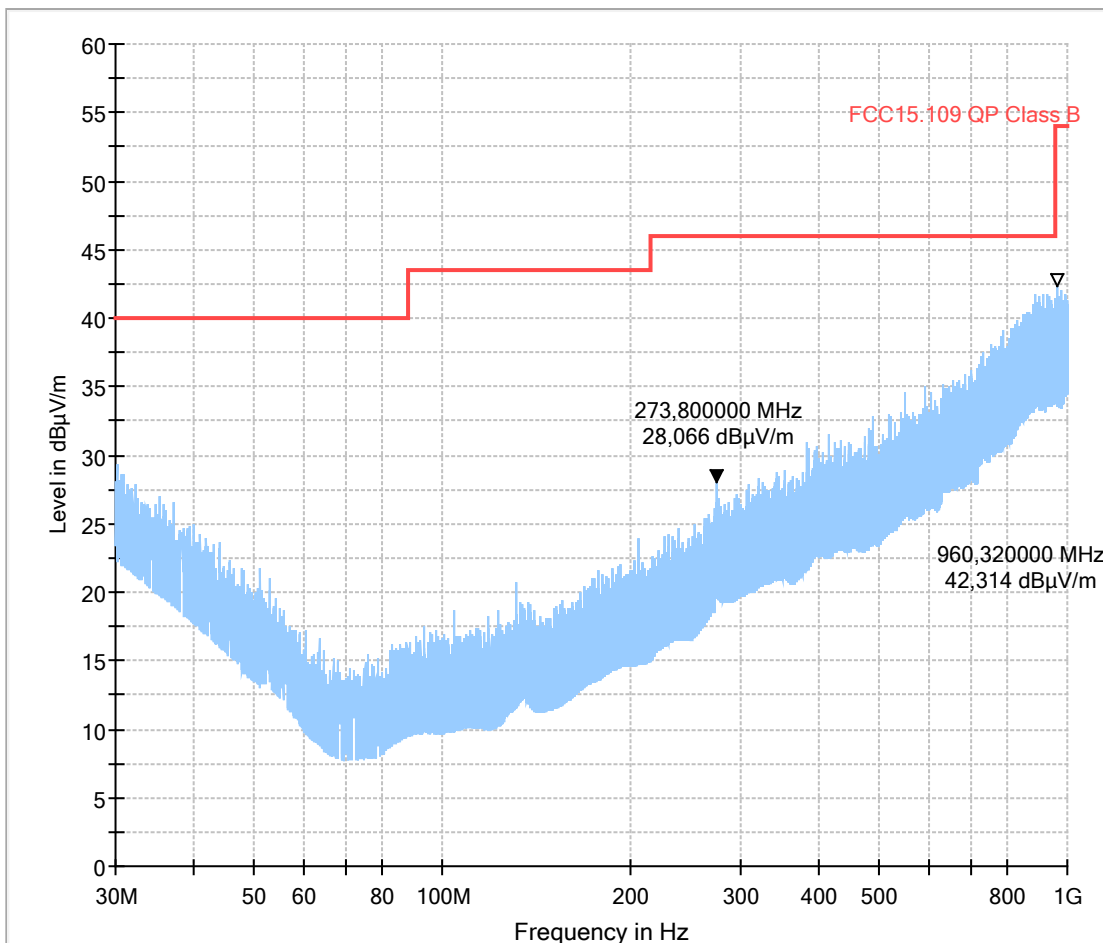


Diagram 3.03_BT-TX_Ch78_3DH5

Common Information

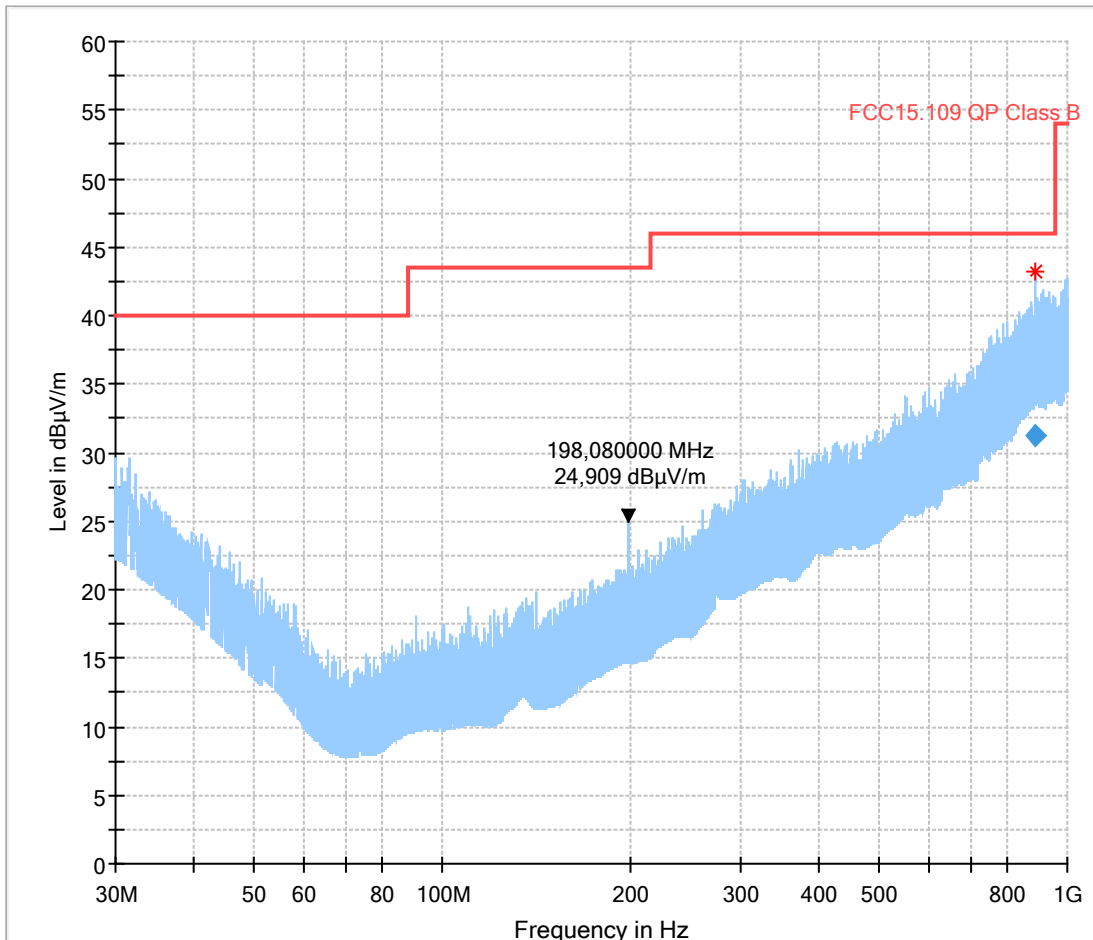
Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.209; RSS-Gen. Issue 4
Operator:	RIs
Operating conditions:	BT TX ch78 3DH5
Power during tests:	13.5VDC

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

Full Spectrum



2.3. Field strength measurements f < 18GHz

Diagram No.: 4.01_BT_TX_Ch0_DH5

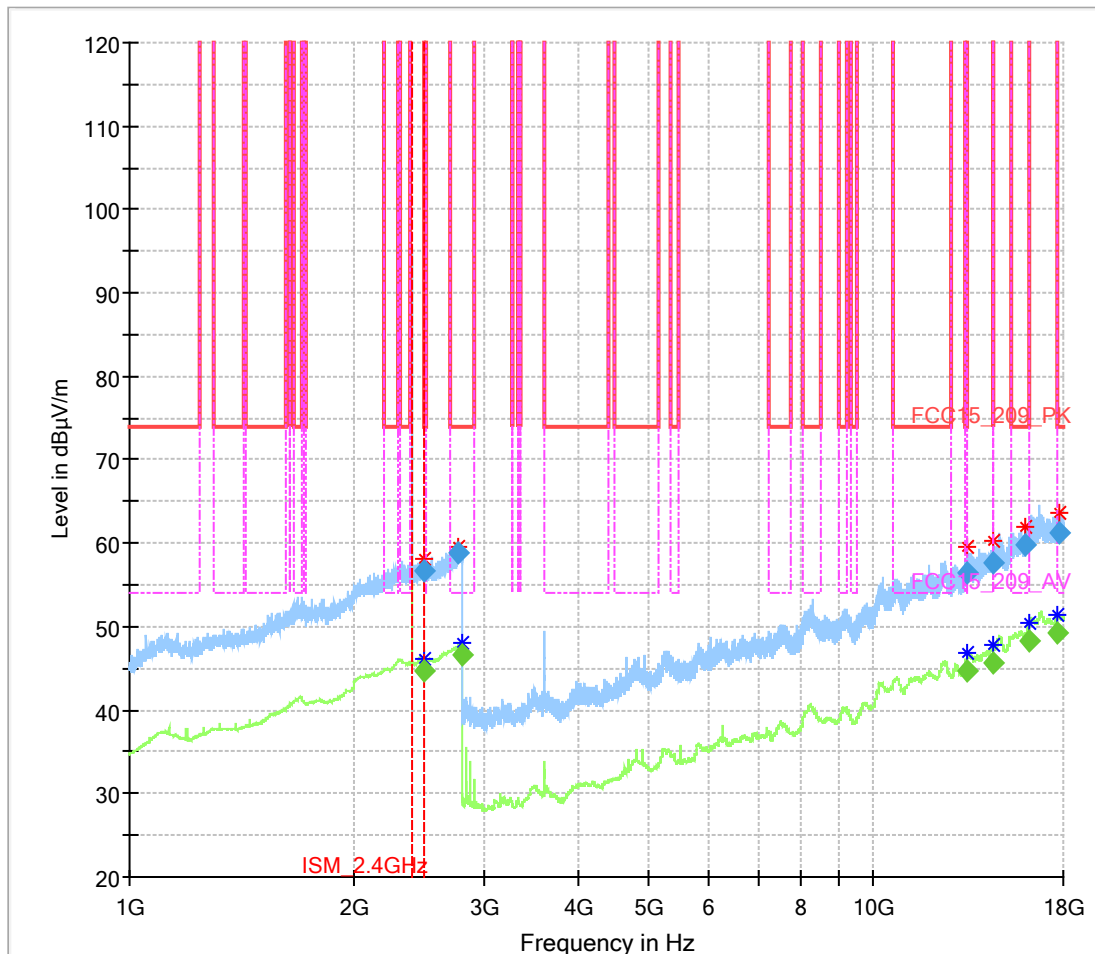
Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247&15.209 Intentional Radiator / RSS-Gen, Issue 4
Antenna polarisation:	horizontal/vertical
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel no. 0
Comment2:	Data Rate: DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2484.000000	56.69	---	74.00	17.31	100.0	1000.000	155.0	V	66.0
2487.200000	---	44.66	54.00	9.34	100.0	1000.000	155.0	V	330.0
2757.600000	58.76	---	74.00	15.24	100.0	1000.000	155.0	V	-15.0
2796.000000	---	46.56	54.00	7.44	100.0	1000.000	155.0	V	247.0
13387.600000	56.34	---	74.00	17.66	100.0	1000.000	155.0	V	1.0
13396.800000	---	44.59	54.00	9.41	100.0	1000.000	155.0	V	90.0
14480.800000	---	45.76	54.00	8.24	100.0	1000.000	155.0	V	86.0
14482.800000	57.58	---	74.00	16.42	100.0	1000.000	155.0	V	308.0
16044.400000	59.71	---	74.00	14.29	100.0	1000.000	155.0	V	272.0
16194.000000	---	48.36	54.00	5.64	100.0	1000.000	155.0	V	87.0
17700.000000	---	49.37	54.00	4.63	100.0	1000.000	155.0	V	103.0
17787.200000	61.35	---	74.00	12.65	100.0	1000.000	155.0	V	298.0

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Elevation (deg)	Corr. (dB)	Comment
2484.000000	0.0	35.6	16:06:32 - 31.08.2016
2487.200000	0.0	35.6	16:08:25 - 31.08.2016
2757.600000	0.0	37.6	16:05:31 - 31.08.2016
2796.000000	0.0	38.1	16:07:32 - 31.08.2016
13387.600000	0.0	20.1	16:35:09 - 31.08.2016
13396.800000	0.0	20.1	16:39:58 - 31.08.2016
14480.800000	0.0	22.3	16:41:05 - 31.08.2016
14482.800000	0.0	22.3	16:37:29 - 31.08.2016
16044.400000	0.0	24.1	16:36:29 - 31.08.2016
16194.000000	0.0	24.8	16:42:12 - 31.08.2016
17700.000000	0.0	25.6	16:43:17 - 31.08.2016
17787.200000	0.0	25.9	16:38:36 - 31.08.2016

Diagram No.: 4.01a_BT_TX_Ch0_DH5

Common Information

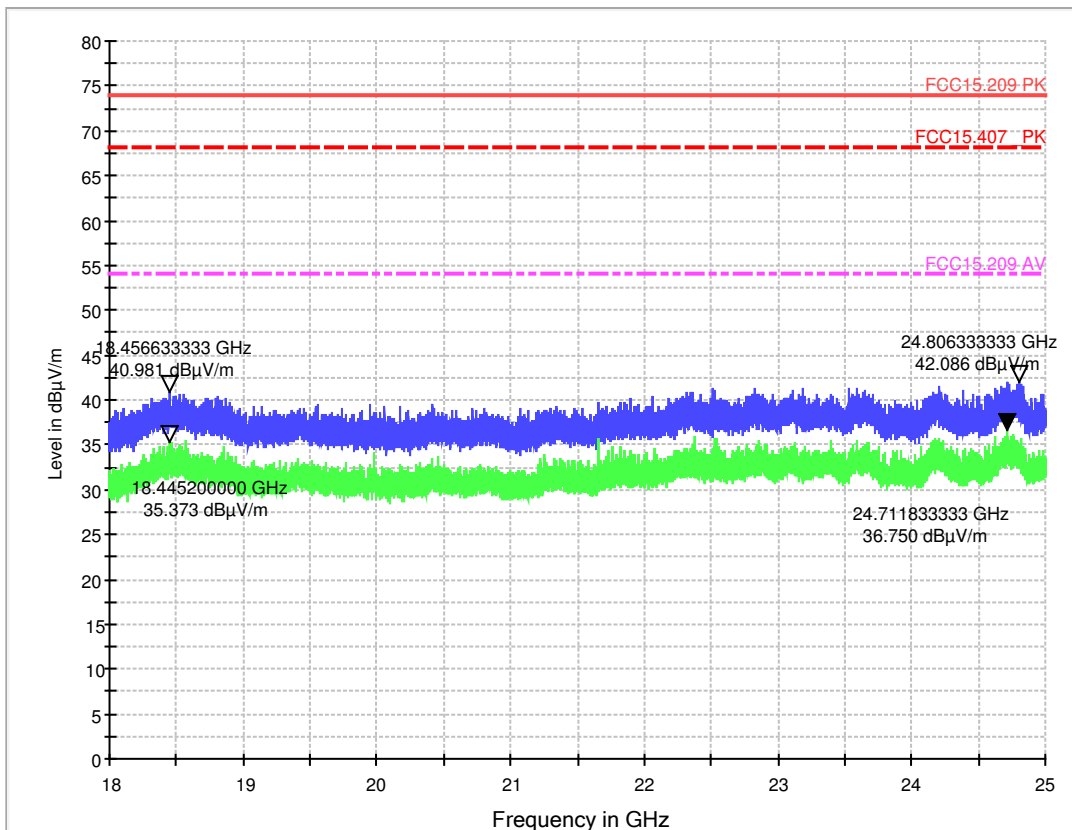
Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	BT TX mode on Ch00, DH5
Operator Name:	Klv/TFr
Comment:	Channel low, 2402MHz

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC

FCC_Sweep_15.247_18_25GHz_Pre



4.02_BT-TX_Ch39_2DH5

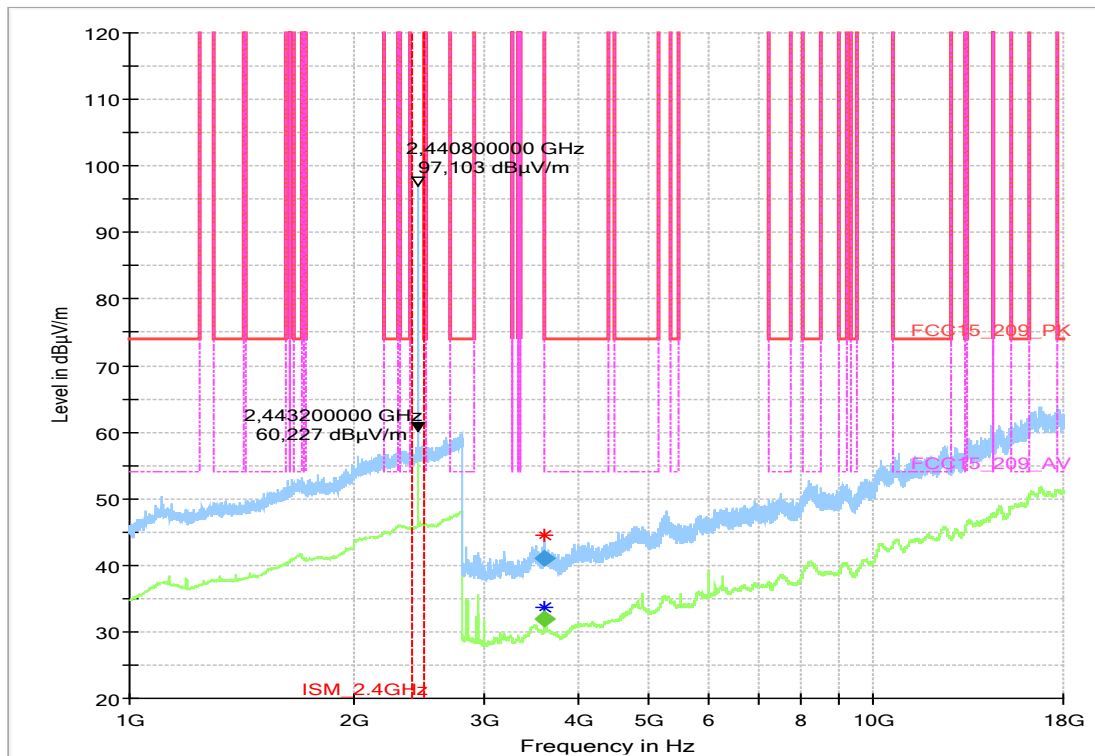
Common Information

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
 Operation mode: TX, continuous
 Operator Name: RIs
 Comment: Channel 39. middle

EUT Information

Manufacturer: Robert Bosch Car Multimedia
 Model: LCN2K70D10
 Type: Infotainment unit with BT

EUT: -
 HW version: 051
 SW version: F061
 PCB version: -
 Config: -
 Part number: 7153750240
 Connected Interfaces: --
 Power Supply: 13.5 V DC
 Comments: -



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
3612.400000	---	31.92	54.00	22.08	100.0	1000.000	155.0	H	215.0	0.0
3615.600000	41.11	---	74.00	32.89	100.0	1000.000	155.0	H	196.0	0.0

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

Frequency (MHz)	Corr. (dB)	Comment
3612.400000	0.5	18:18:07 - 31.08.2016
3615.600000	0.5	18:17:04 - 31.08.2016

Diagram No.: 4.02a_BT_TX_Ch39_2DH5

Common Information

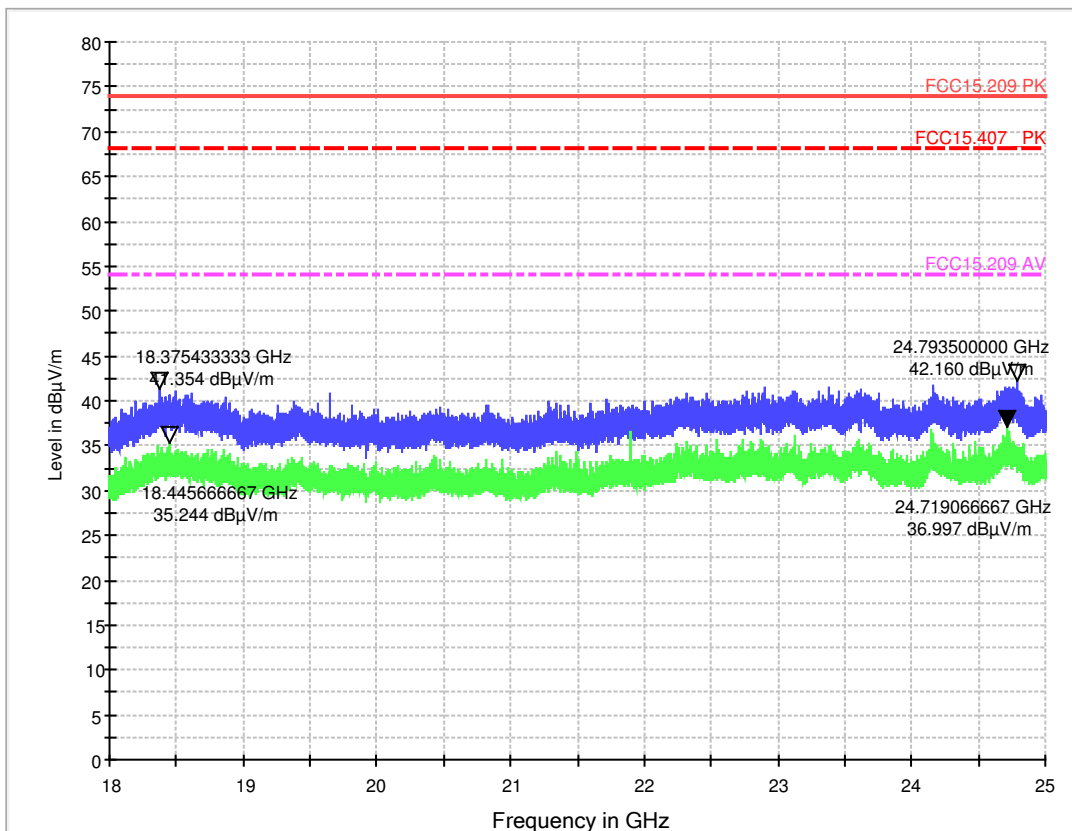
Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	BT TX mode on Ch39, 2-DH5
Operator Name:	Klv/TFr
Comment:	Channel no. middle, 2441MHz

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC

FCC_Sweep_15.247_18_25GHz_Pre



4.03_BT-TX_Ch78_3DH5

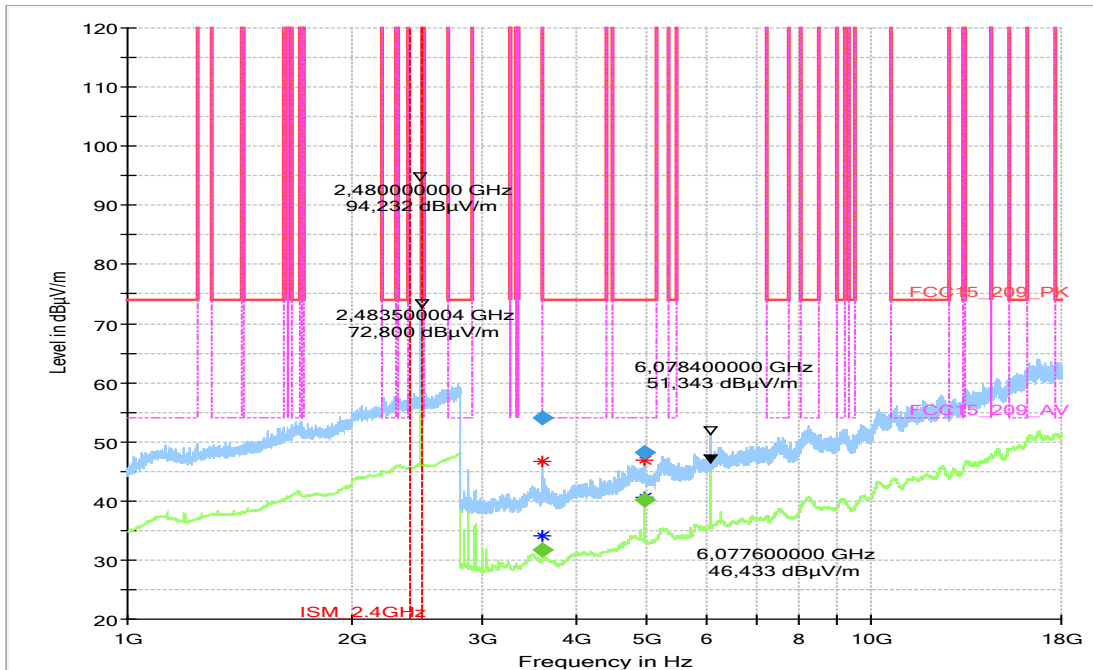
Common Information

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
 Operation mode: TX, continuous
 Operator Name: RIs
 Comment: Channel 78. high

EUT Information

Manufacturer: Robert Bosch Car Multimedia
 Model: LCN2K70D10
 Type: Infotainment unit with BT

EUT: -
 HW version: 051
 SW version: F061
 PCB version: -
 Config: -
 Part number: 7153750240
 Connected Interfaces: --
 Power Supply: 13.5 V DC
 Comments: -



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
3612.000000	54.00	---	74.00	20.00	100.0	1000.000	155.0	V	-29.0	0.0
3612.400000	---	31.80	54.00	22.20	100.0	1000.000	155.0	V	196.0	0.0
4960.000000	---	40.12	54.00	13.88	100.0	1000.000	155.0	V	0.0	0.0
4960.000000	48.16	---	74.00	25.84	100.0	1000.000	155.0	V	1.0	0.0

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

Frequency (MHz)	Corr. (dB)	Comment
3612.000000	0.5	19:32:40 - 31.08.2016
3612.400000	0.5	19:34:58 - 31.08.2016
4960.000000	4.3	19:36:19 - 31.08.2016
4960.000000	4.3	19:33:45 - 31.08.2016

Diagram No.: 4.03a_BT_TX_Ch78_3DH5

Common Information

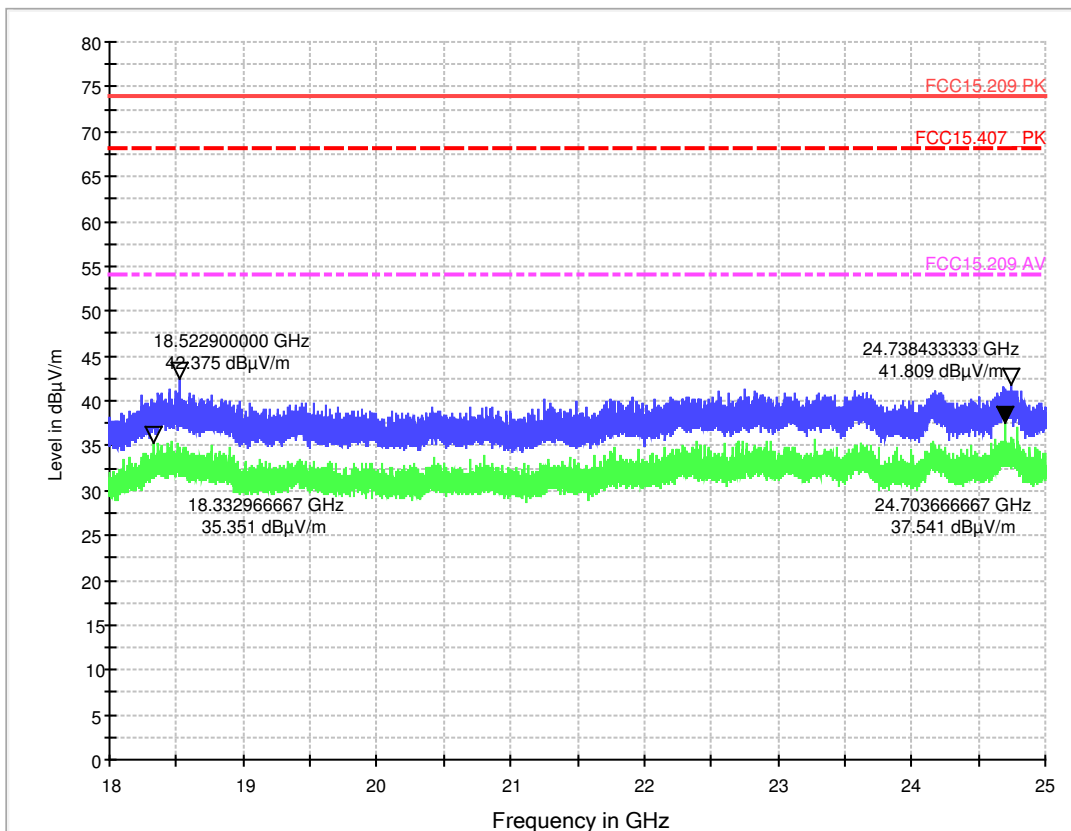
Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.247, 15.205&15.209 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	BT TX mode on Ch78, 3-DH5
Operator Name:	Klv/TFr
Comment:	Channel no. high, 2480 MHz

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC

FCC_Sweep_15.247_18_25GHz_Pre



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

3.1. Channel 0 (low band-edge)

Diagram No.: 9.01_BT-TX_CH0_DH5

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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel no.0
Comment2:	Data Rate: DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

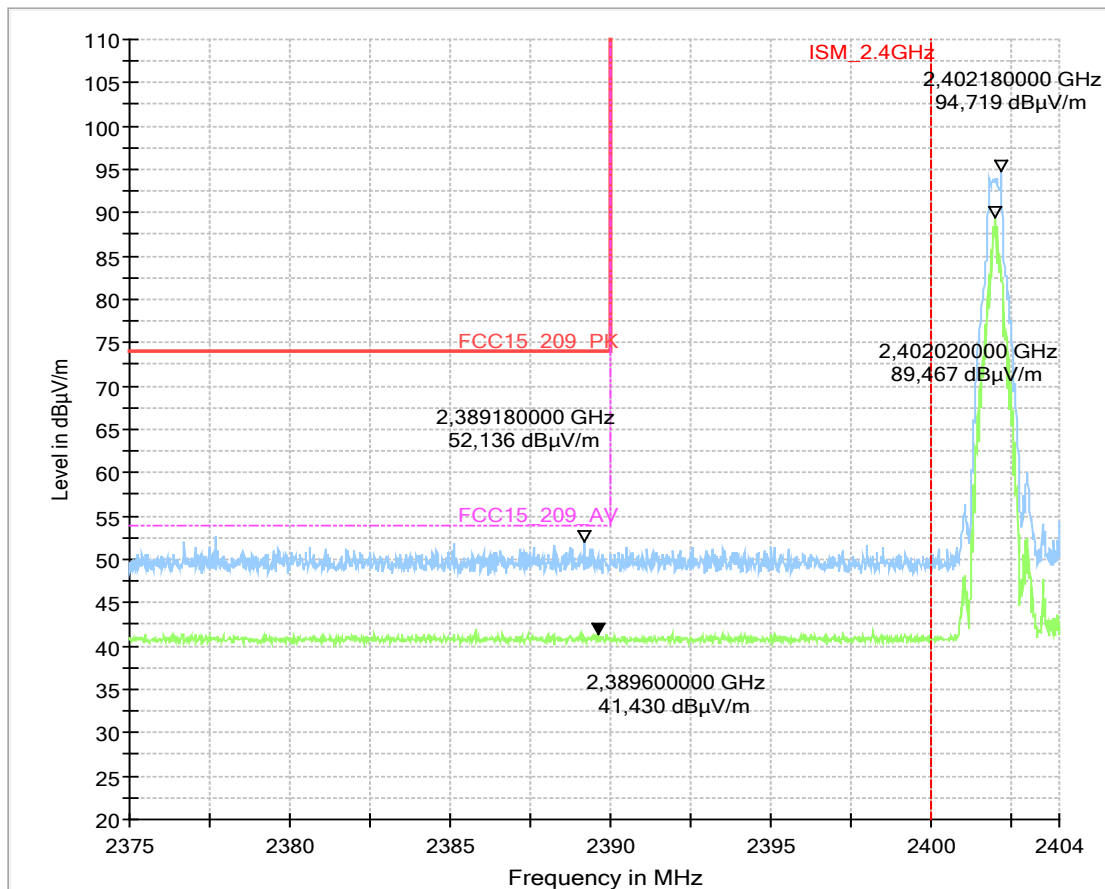


Diagram No.: 9.03_BE_BT-TX_CH0_2DH5

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
Operation mode:	TX, continuous
Operator Name:	Lor
Comment:	Channel no.0
Comment2:	Data Rate:

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

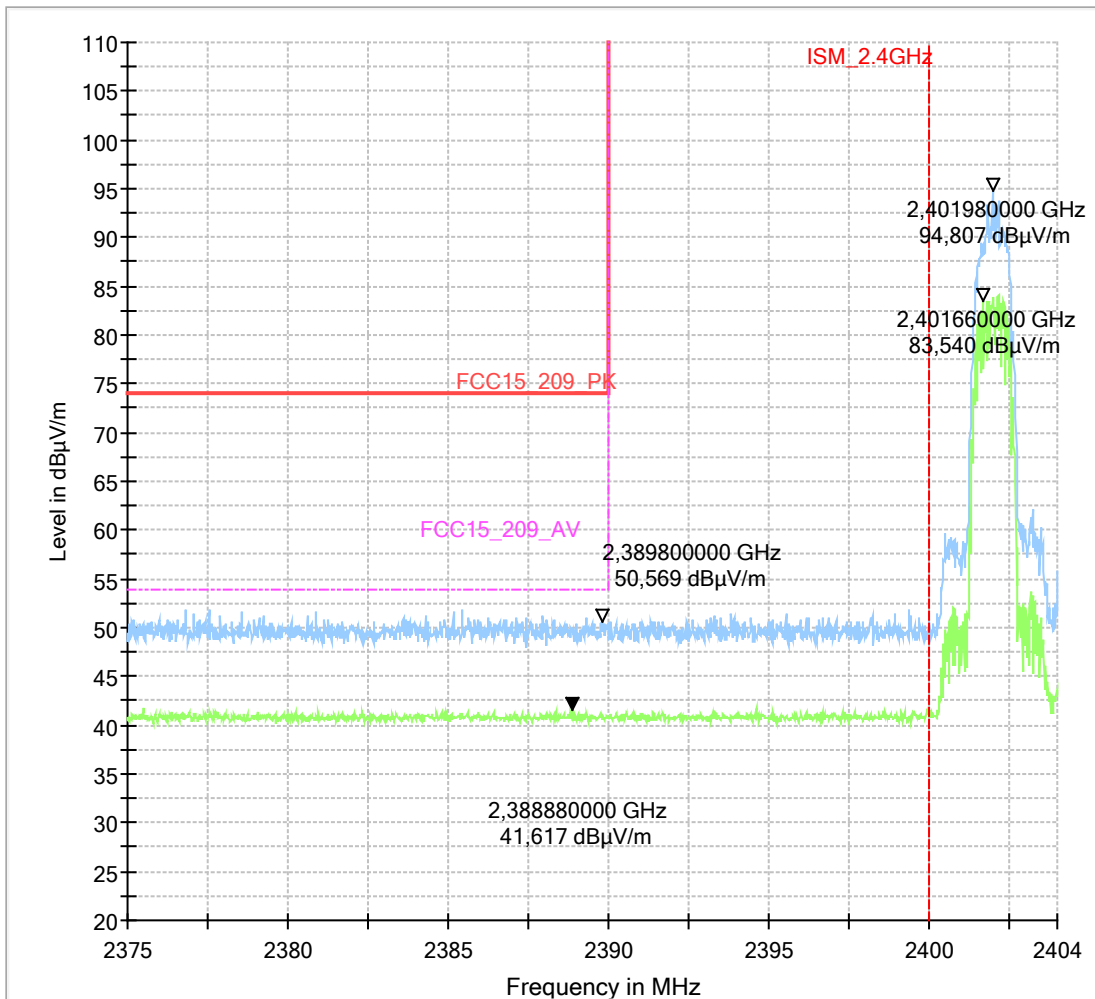


Diagram No.: 9.05_BE_Low_CH0_3DH5

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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel no.0
Comment2:	Data Rate: 3DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

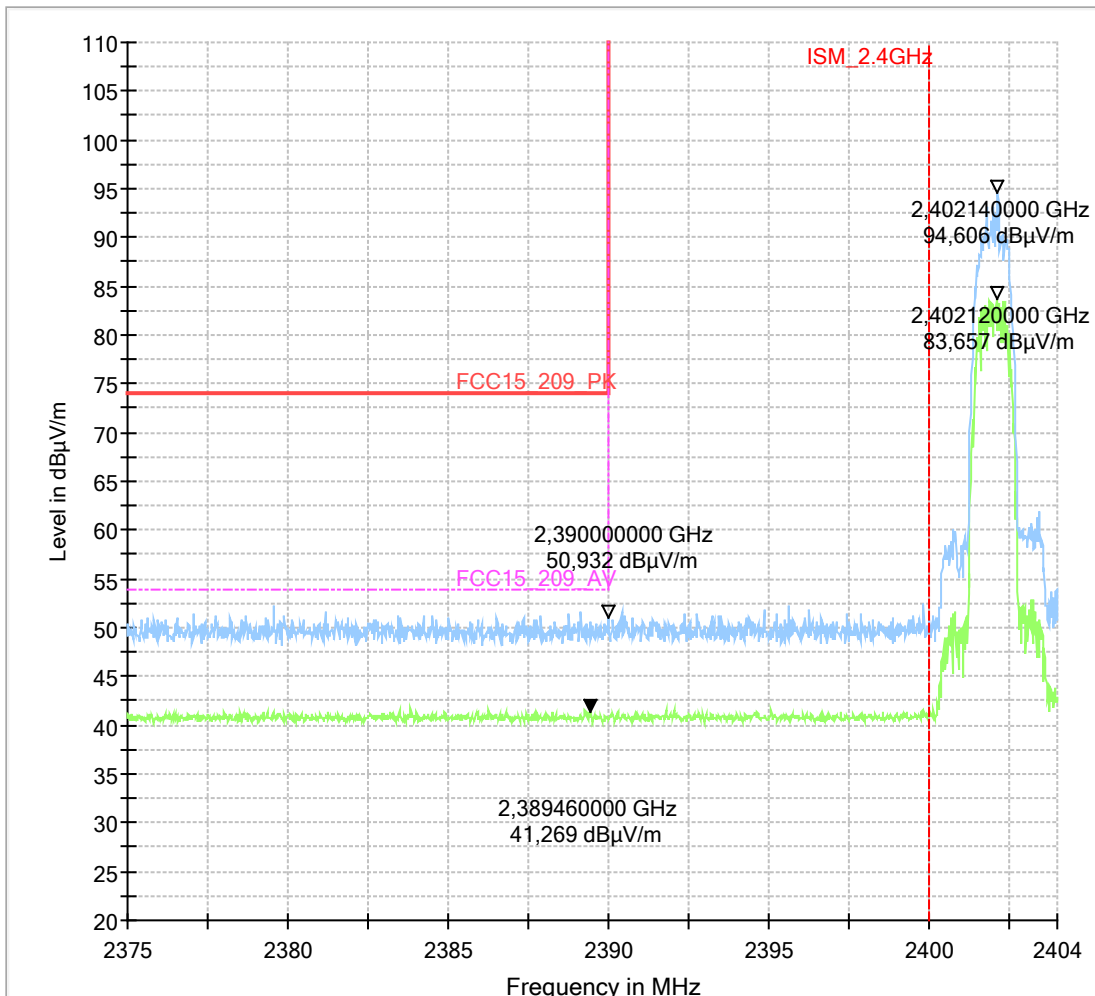


Diagram No.: 9.07_BE_Low_Hopping_DH5

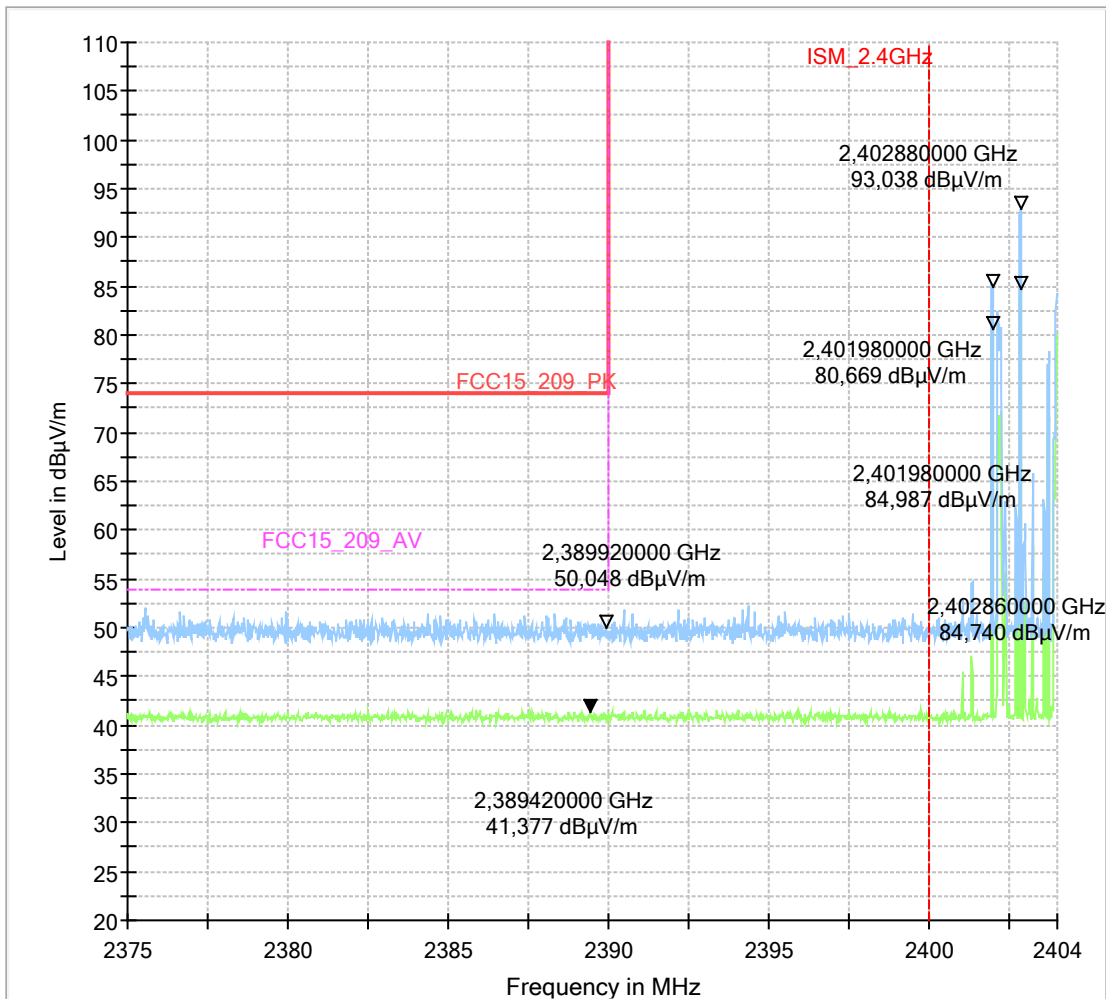
Common Information

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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel low
Comment2:	Data Rate: DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-



3.2. Channel 78 (band band-edge)

Diagram No.: 9.02_BE_High_CH78_DH5

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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel high
Comment2:	Data Rate: DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

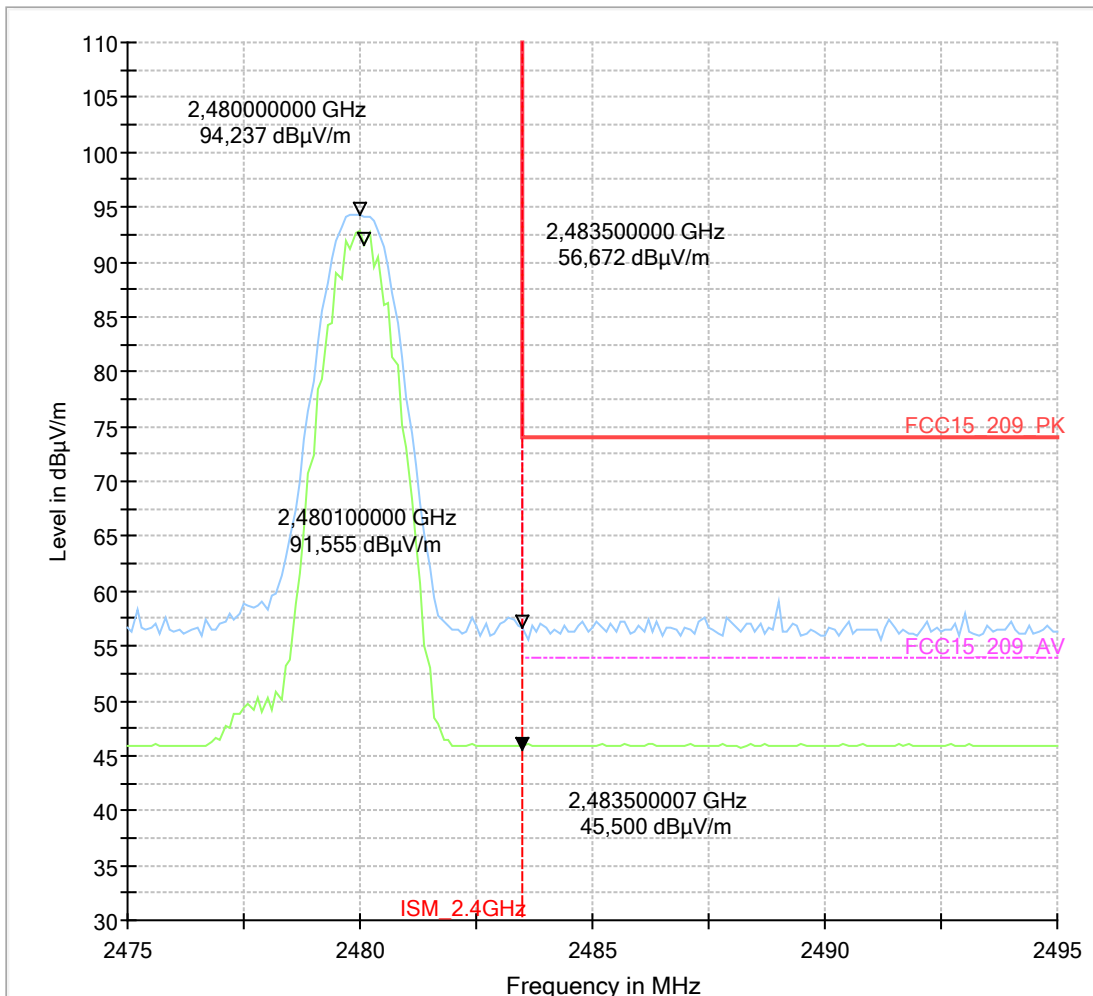


Diagram No.: 9.04_BE_High_CH78_2DH5

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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel high
Comment2:	Data Rate: 2DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

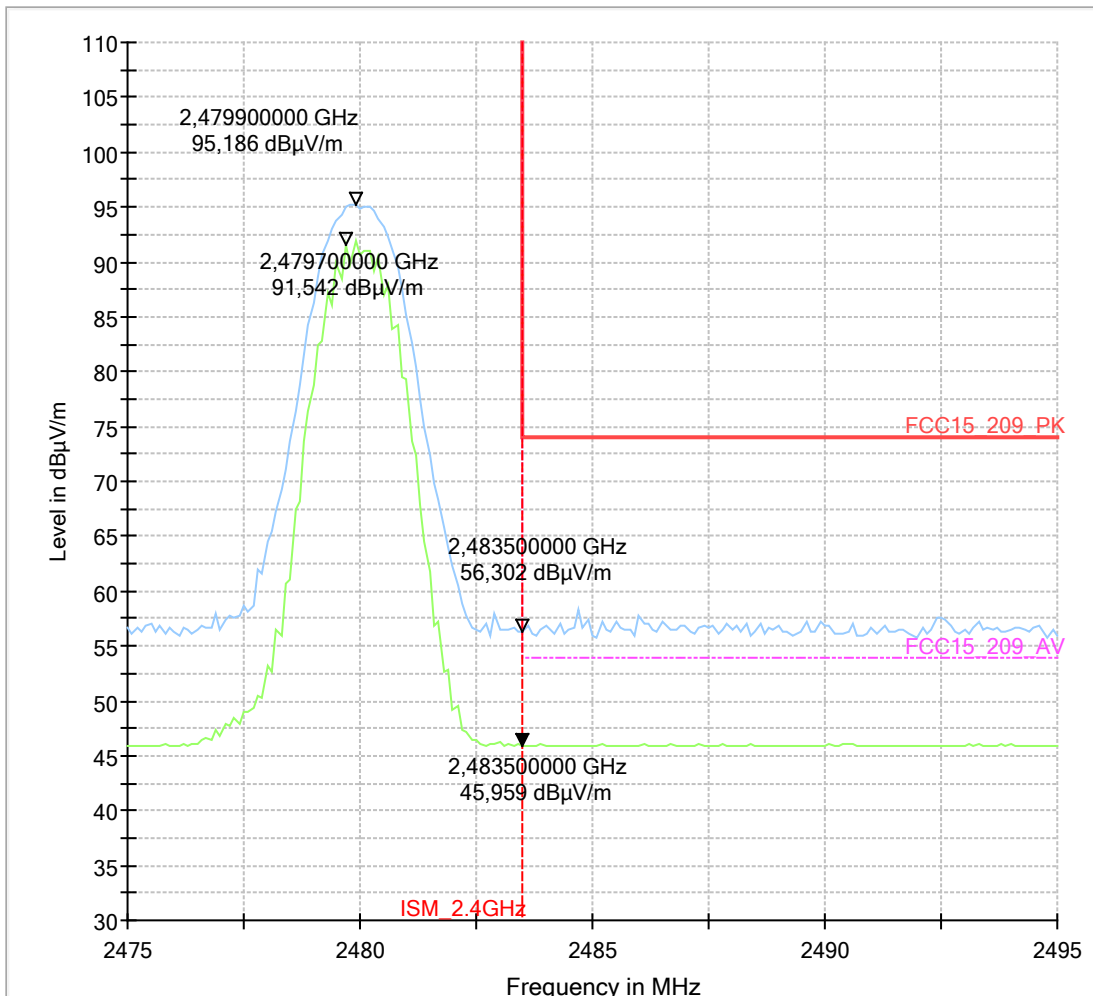


Diagram No.: 9.06_BE_High_CH78_3DH5

Common Information

Test Description:	Band-Edge: Radiated Field Strength 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
Operation mode:	TX, continuous
Operator Name:	Klv
Comment:	Channel high
Comment2:	Data Rate: 3DH5

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-

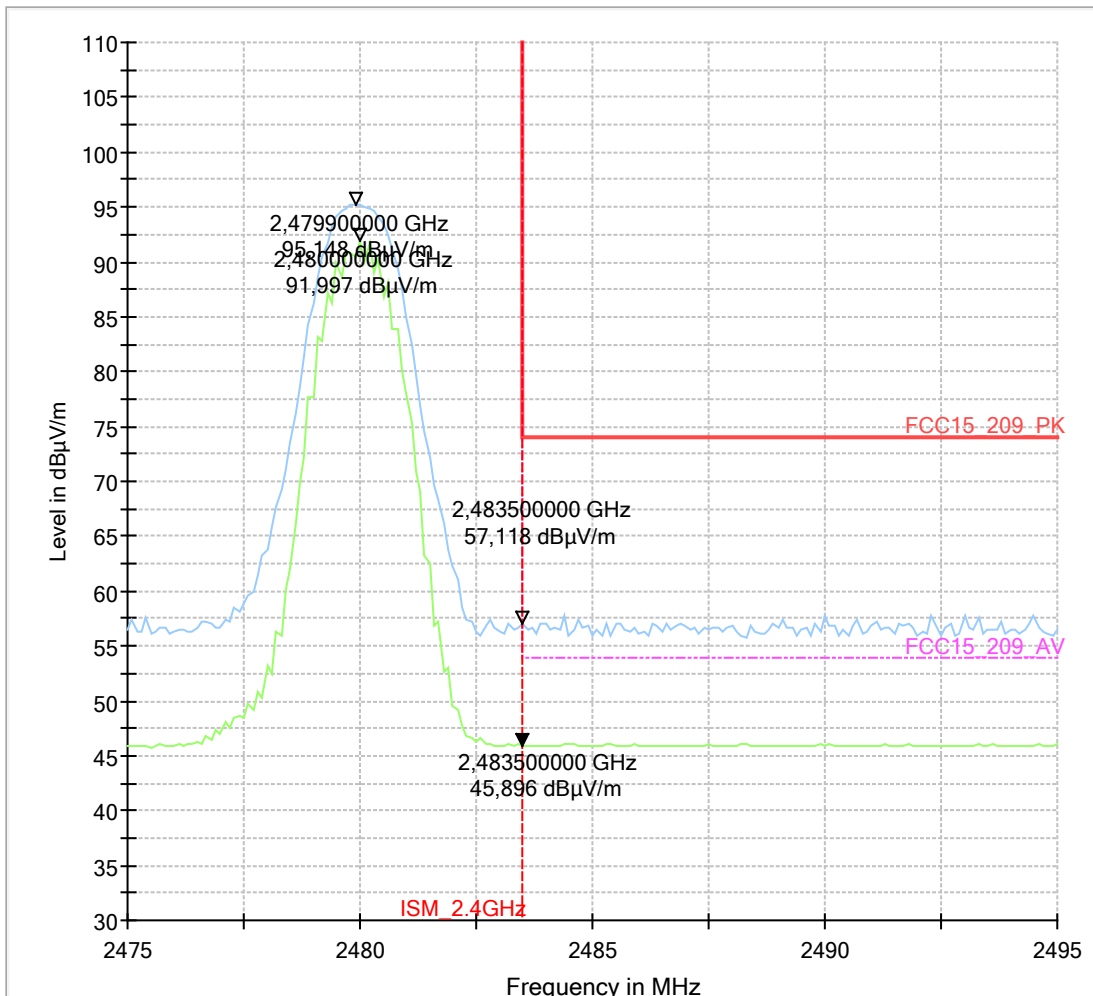


Diagram No.: 9.08_BE_High_Hopping_DH5

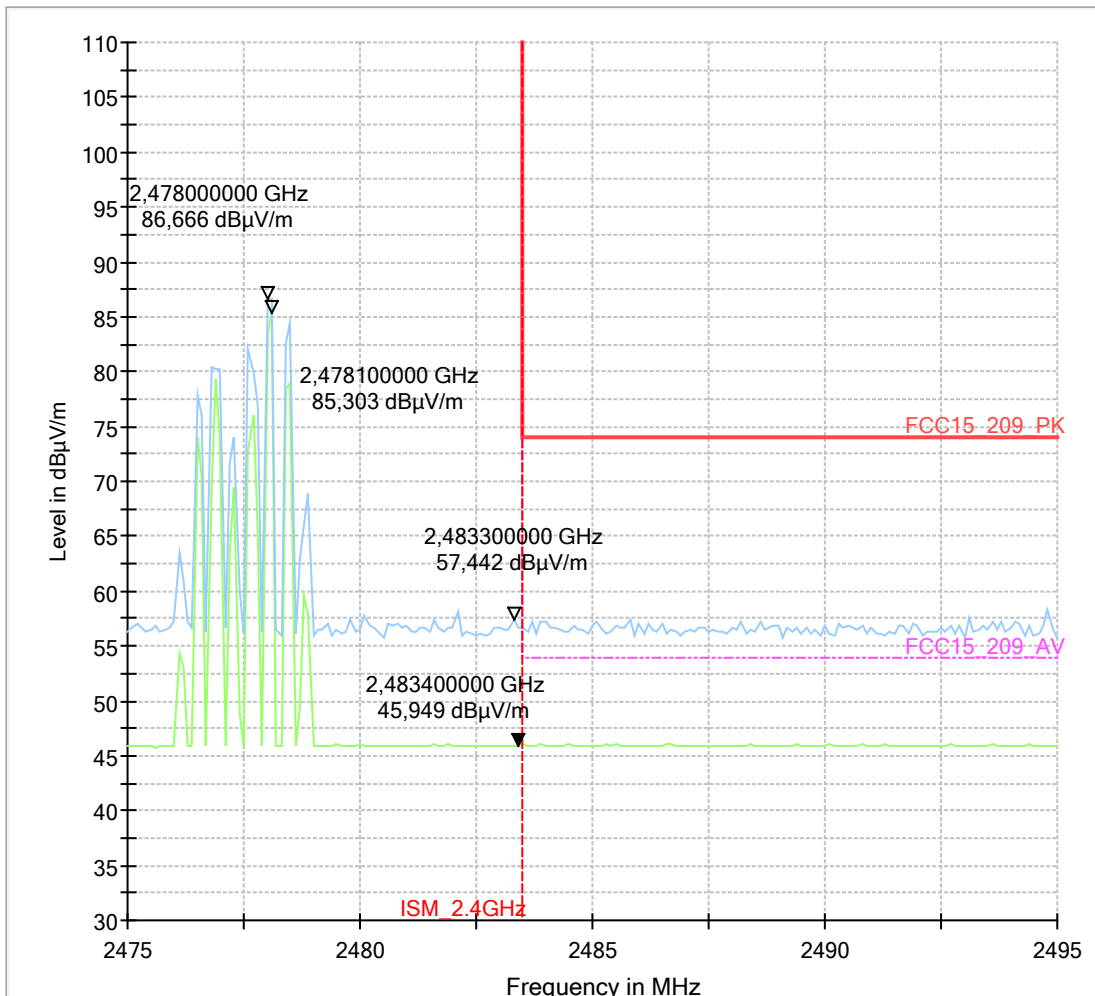
Common Information

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
Operation mode:	TX, continuous
Operator Name:	Lor
Comment:	Channel no. low/high
Comment2:	Modulation Type: xxx Data Rate: yyy

EUT Information

Manufacturer:	Robert Bosch Car Multimedia
Model:	LCN2K70D10
Type:	Infotainment unit with BT

EUT:	-
HW version:	051
SW version:	F061
PCB version:	-
Config:	-
Part number:	7153750240
Connected Interfaces:	--
Power Supply:	13.5 V DC
Comments:	-



4. Conducted RF-measurements on antenna port

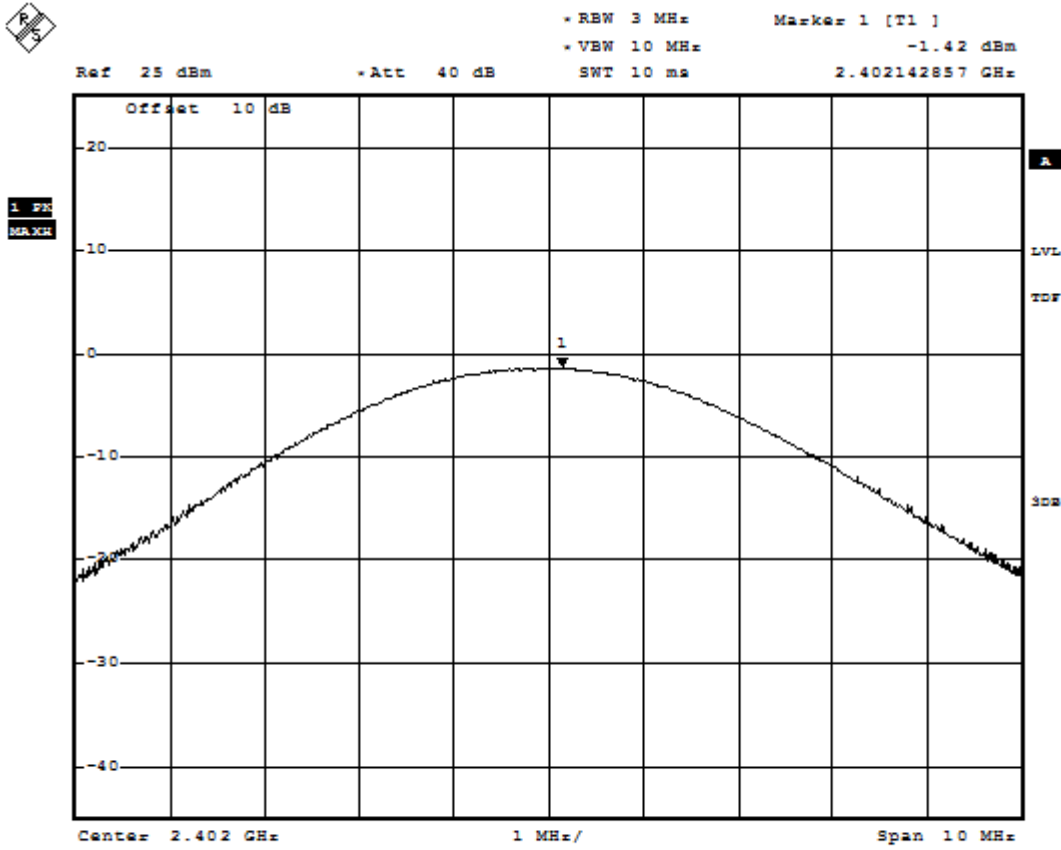
4.1. Summary conducted RF-power

Modulation Packet type	Nominal Ch 0 =2402 MHz	Nominal Ch 39 =2441MHz	Nominal Ch 79 =2480MHz	Maximum value over Modulation schemes [dBm]	Max Value [dBm]	Max Value [mW]
DH1 DH3 DH5	-1,42 -1,55 -1,42	-0,82 -0,79 -1,27	-1,50 -0,99 -1,31	-0,79	-0,13	0,971
2DH1 2DH3 2DH5	-0,97 -0,91 -1,52	-0,13 -0,23 -1,20	-0,99 -0,99 -1,46	-0,13		
3DH1 3DH3 3DH5	-0,77 -0,78 -1,38	-0,13 -0,30 -1,13	-0,92 -0,87 -1,40	-0,13		

4.2. Diagrams to conducted RF-power

4.2.1. Modulation GFSK

PW_CH0_DH1

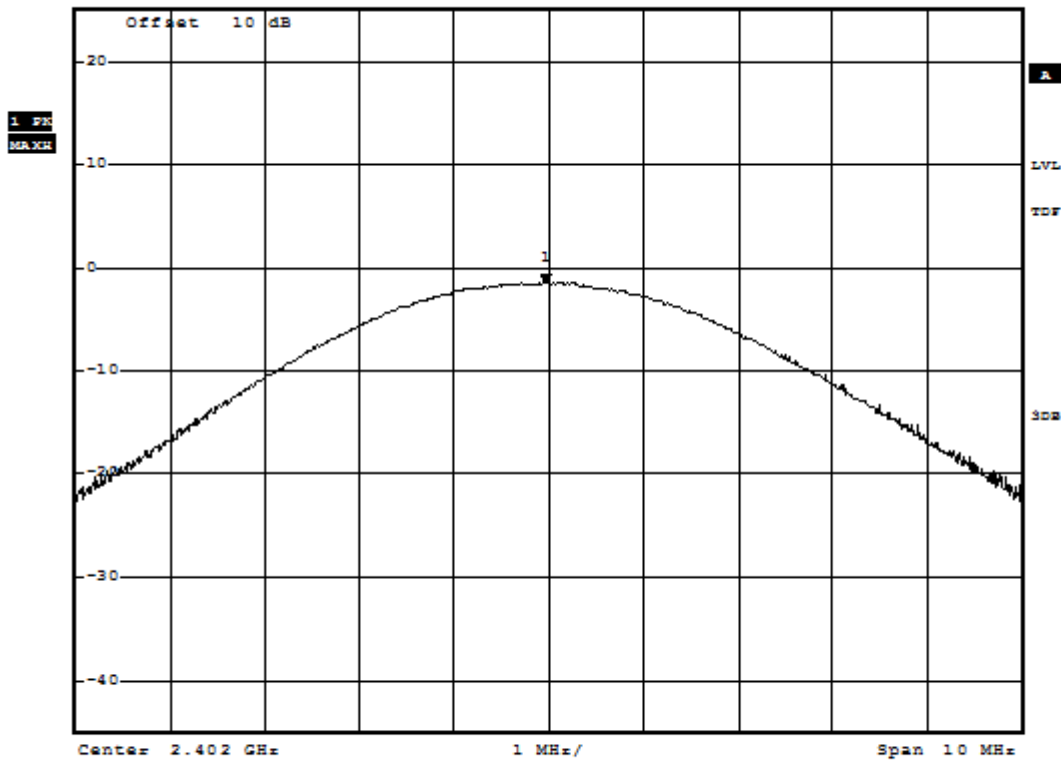


Date: 2.SEP.2016 11:31:56

PW_CH0_DH3



Ref 25 dBm -Att 40 dB RBW 3 MHz Marker 1 [T1] -1.55 dBm
SWT 10 ms 2.401971429 GHz



Date: 2.SEP.2016 11:37:03

PW_CH0_DH5

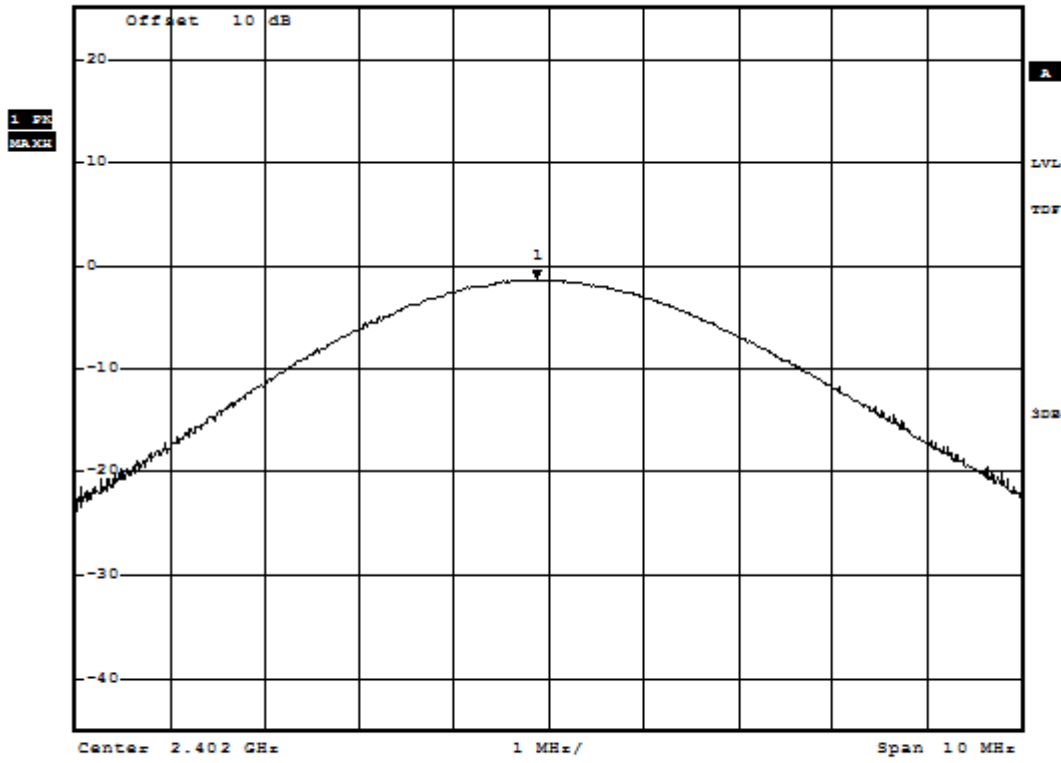


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.42 dBm
SWT 10 ms 2.401871429 GHz

Ref 25 dBm

• Att 40 dB

2.401871429 GHz



Date: 31.AUG.2016 10:48:25

PW_CH39_DH1

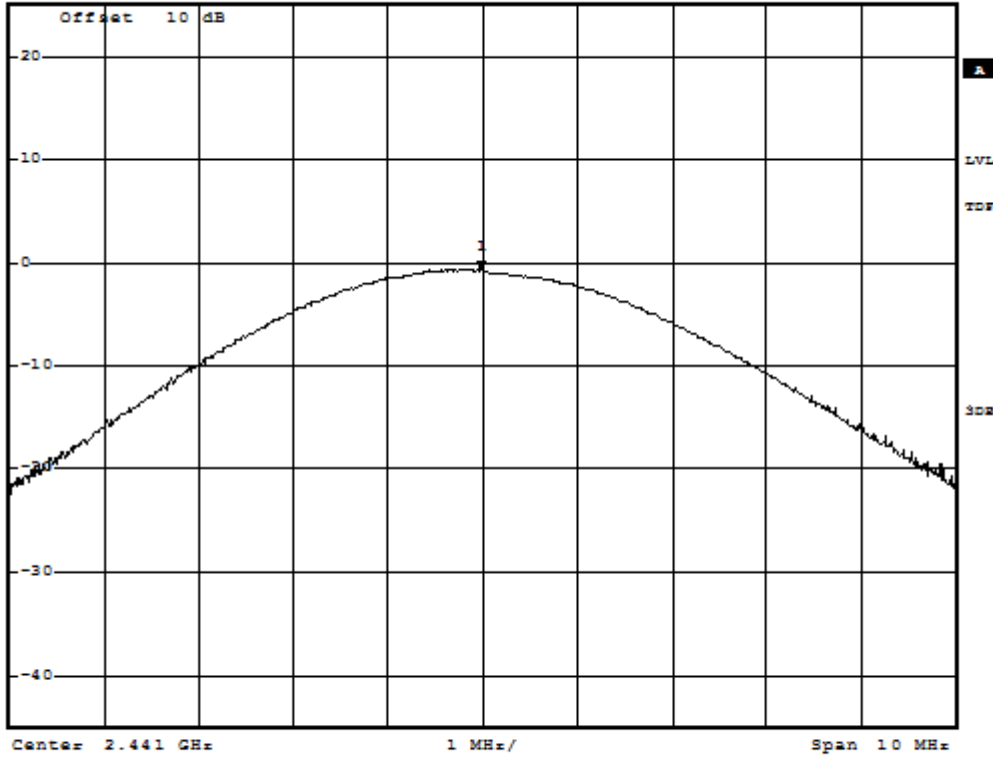


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.82 dBm
SWT 10 ms 2.440990476 GHz

Ref 25 dBm

• Att 40 dB

2.440990476 GHz



Date: 2.SEP.2016 12:01:32

PW_CH39_DH3

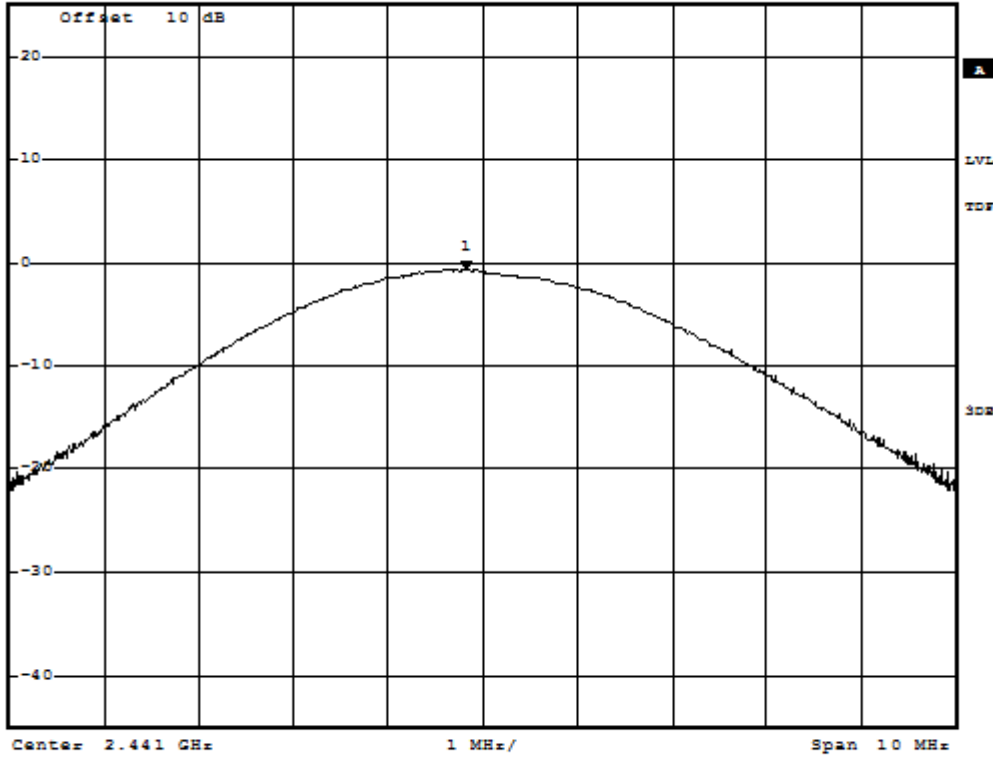


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.79 dBm
SWT 10 ms 2.440823810 GHz

Ref 25 dBm

• Att 40 dB

2.440823810 GHz



Date: 2.SEP.2016 12:09:26

PW_CH39_DH5

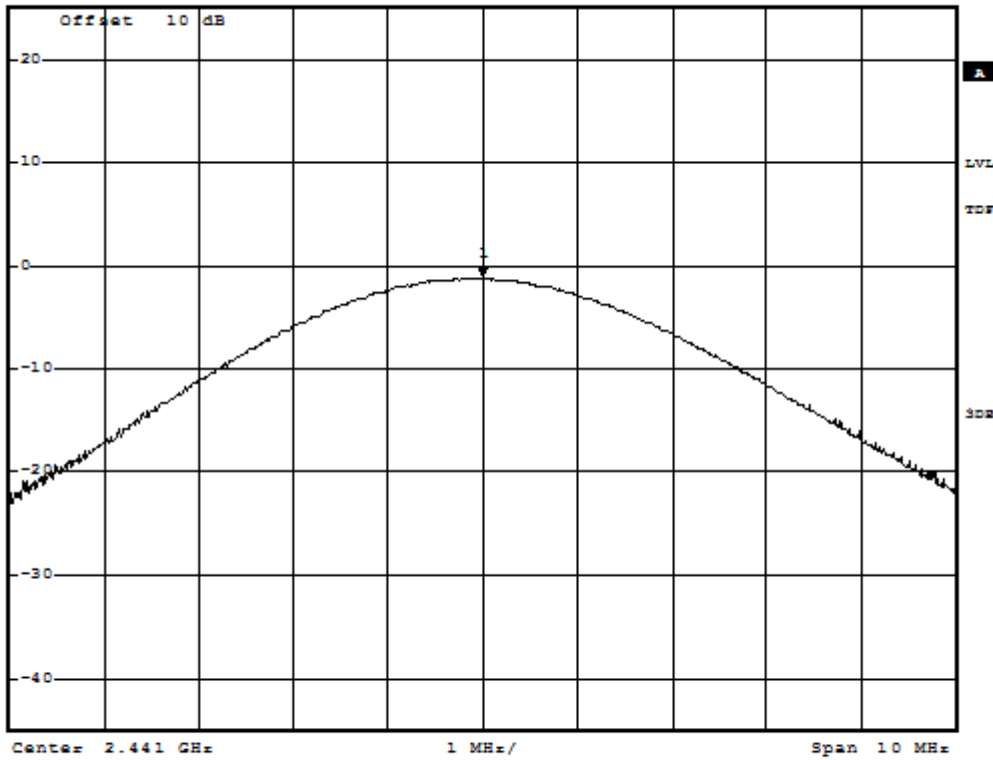


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.27 dBm
SWT 10 ms 2.441000000 GHz

Ref 25 dBm

• Att 40 dB

2.441000000 GHz



Date: 31.AUG.2016 10:57:43

PW_CH78_DH1

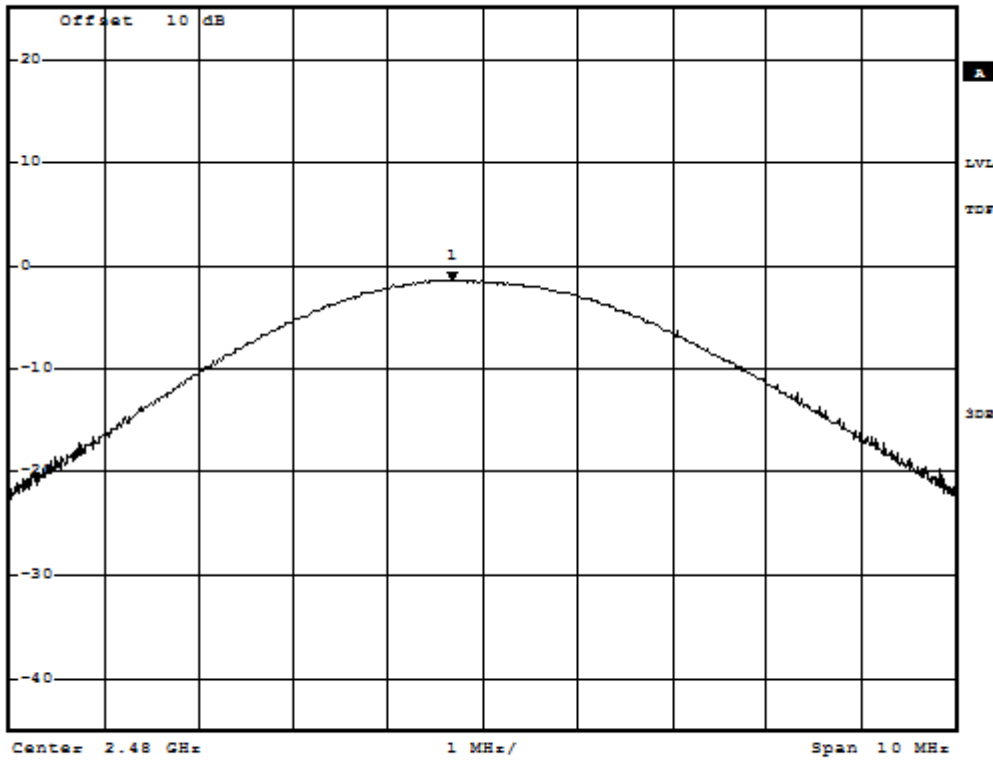


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.50 dBm
SWT 10 ms 2.479685714 GHz

Ref 25 dBm

• Att 40 dB

2.479685714 GHz



Date: 2.SEP.2016 12:11:57

PW_CH78_DH3

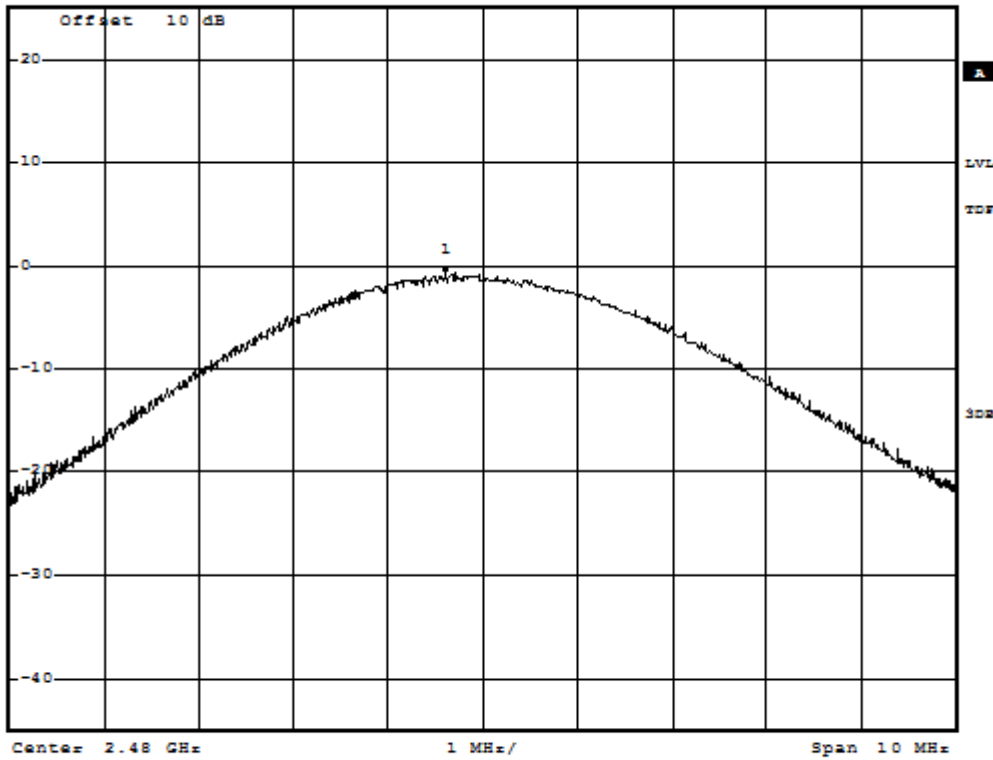


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.99 dBm
SWT 10 ms 2.479595238 GHz

Ref 25 dBm

• Att 40 dB

2.479595238 GHz



Date: 2.SEP.2016 12:15:26

PW_CH78_DH5

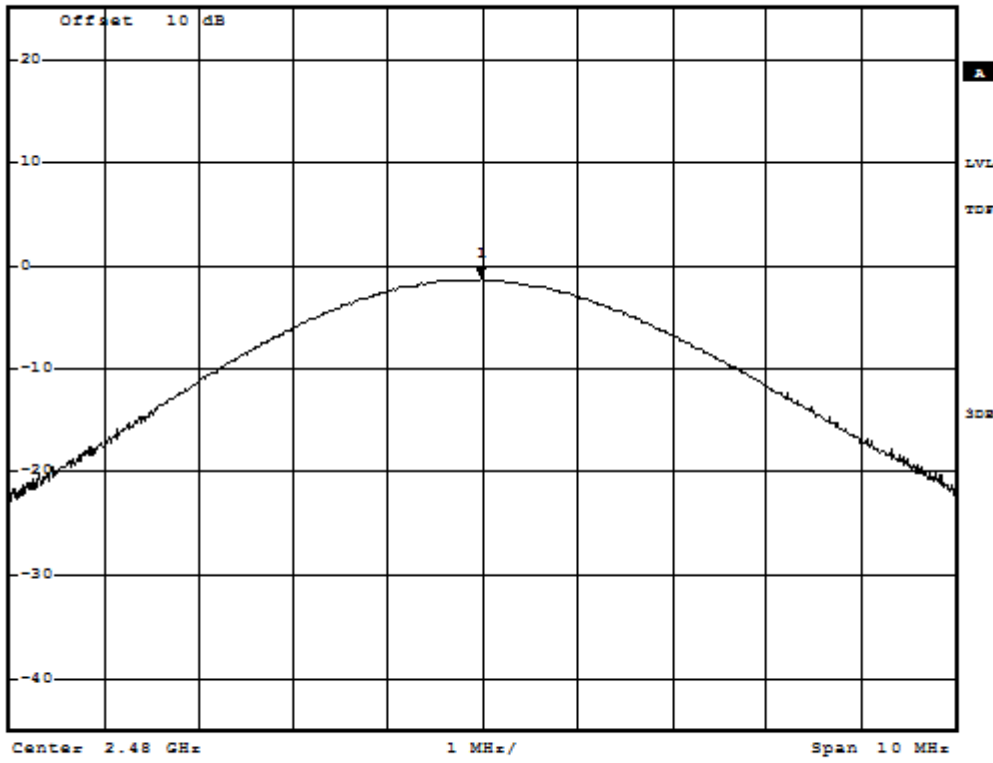


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.31 dBm
SWT 10 ms 2.479990476 GHz

Ref 25 dBm

• Att 40 dB

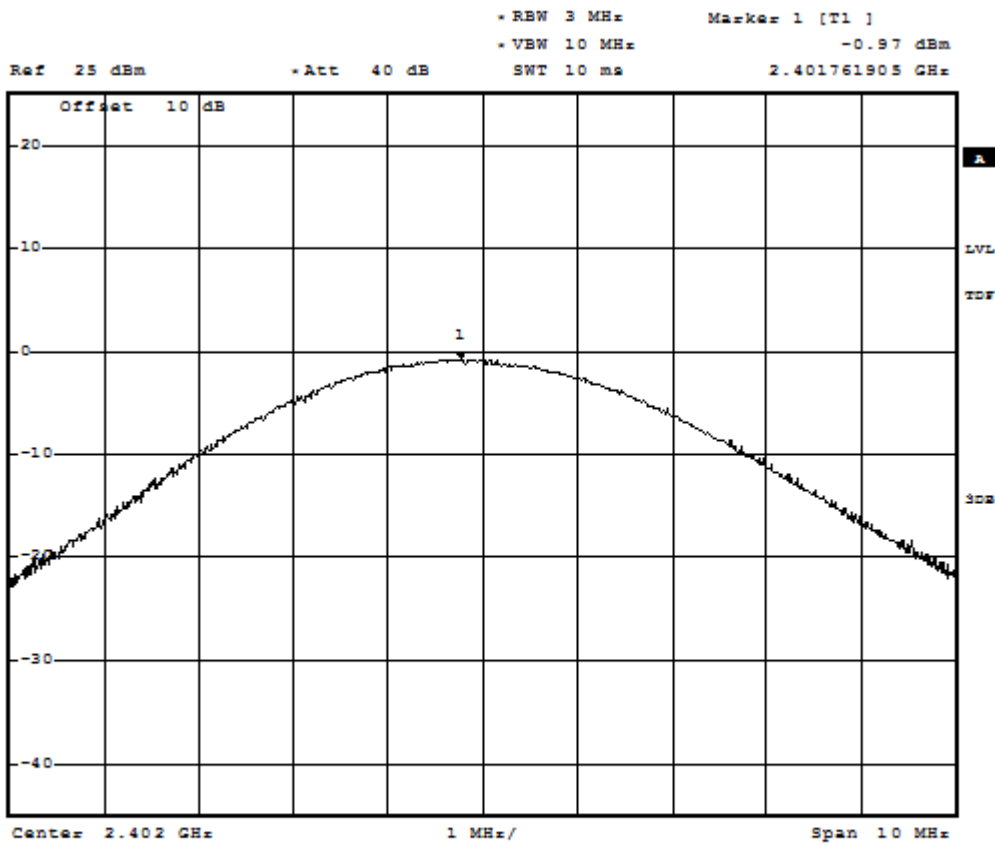
2.479990476 GHz



Date: 31.AUG.2016 11:04:12

4.2.2. Modulation Pi/4 QPSK

PW_CH0_2DH1



Date: 2.SEP.2016 11:33:14

PW_CH0_2DH3

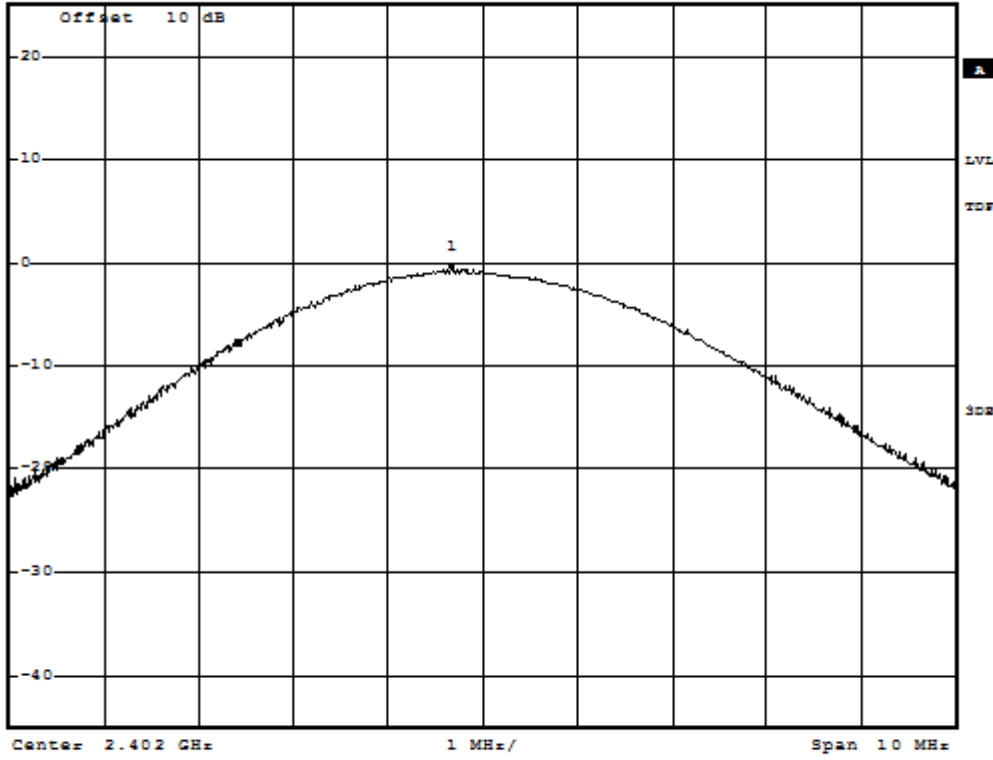


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.91 dBm
SWT 10 ms 2.401661905 GHz

Ref 25 dBm

• Att 40 dB

2.401661905 GHz

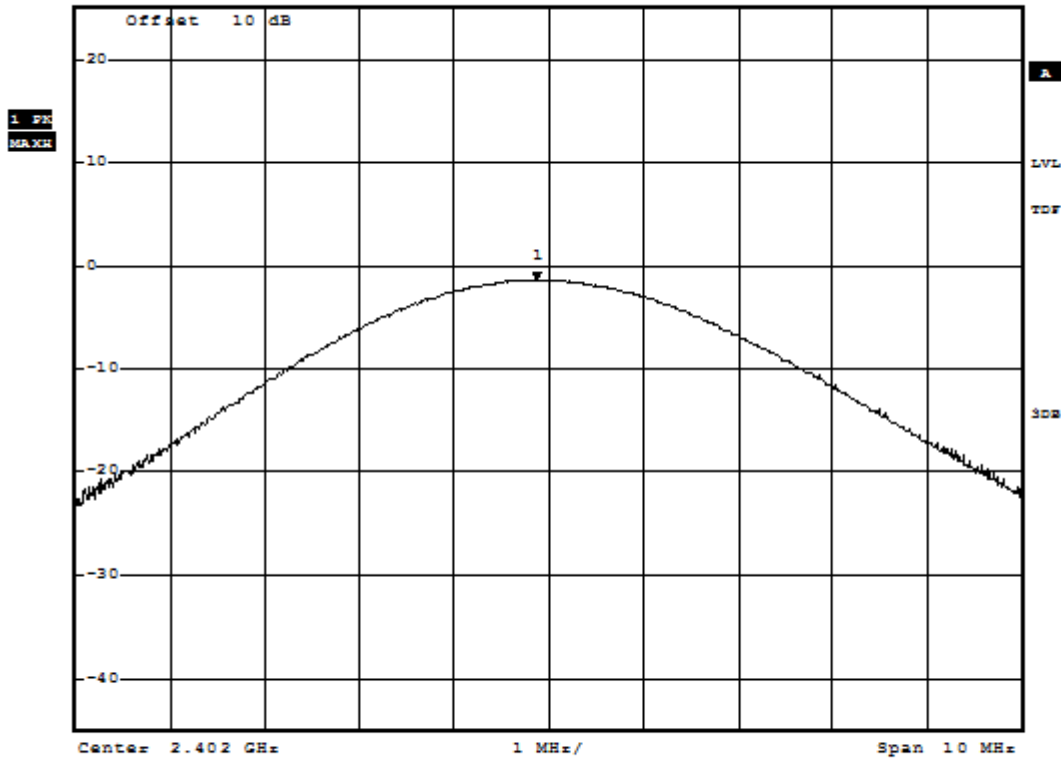


Date: 2.SEP.2016 11:36:23

PW_CH0_2DH5



Ref 25 dBm +Att 40 dB RBW 3 MHz Marker 1 [T1] -1.52 dBm
+VW 10 MHz SWT 10 ms 2.401871429 GHz



Date: 31.AUG.2016 10:51:42

PW_CH39_2DH1

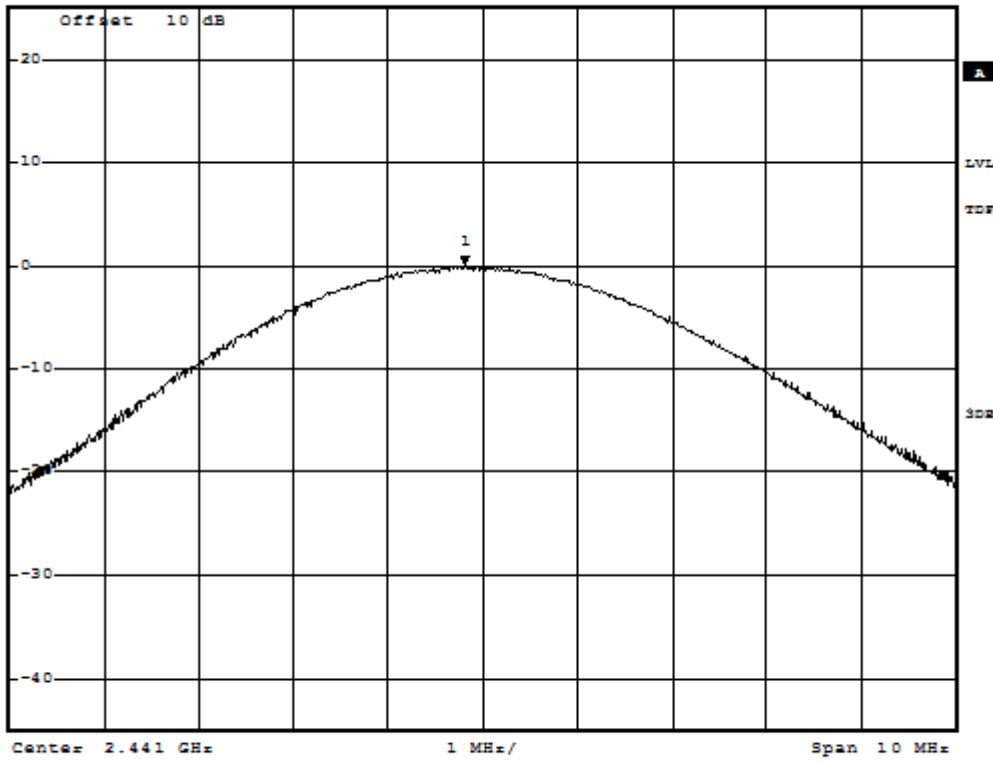


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.13 dBm
SWT 10 ms 2.440814286 GHz

Ref 25 dBm

• Att 40 dB

2.440814286 GHz



Date: 2.SEP.2016 12:04:18

PW_CH39_2DH3

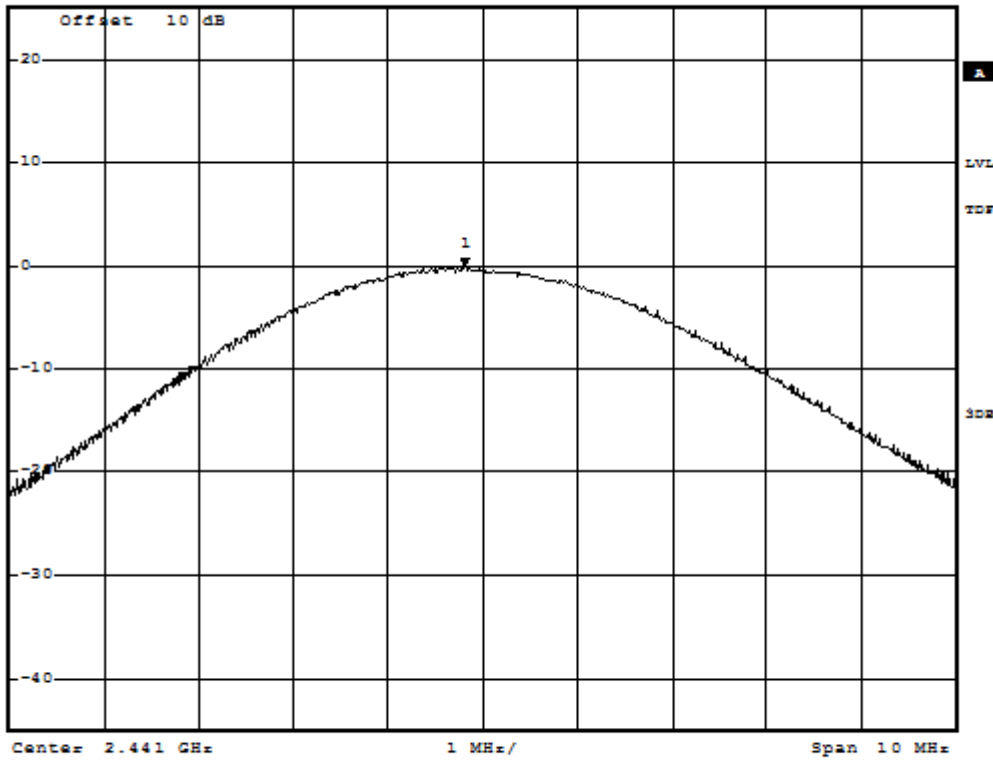


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.23 dBm
SWT 10 ms 2.440804762 GHz

Ref 25 dBm

• Att 40 dB

2.440804762 GHz



Date: 2.SEP.2016 12:06:55

PW_CH39_2DH5

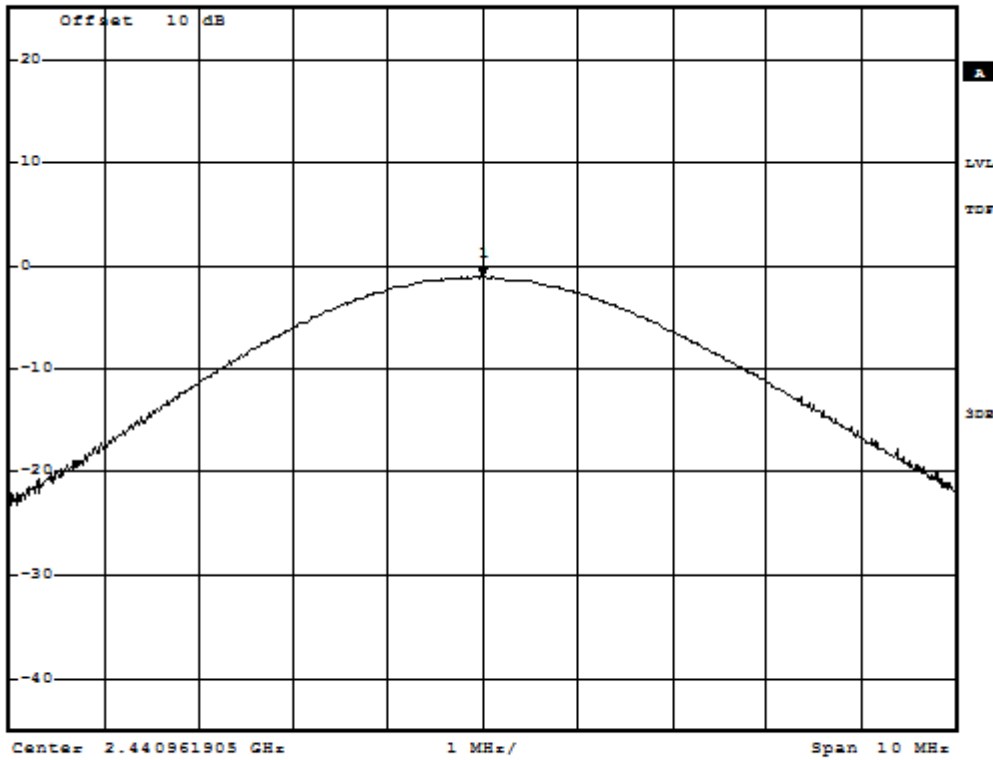


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.20 dBm
SWT 10 ms 2.440961905 GHz

Ref 25 dBm

• Att 40 dB

2.440961905 GHz



Date: 31.AUG.2016 11:00:16

PW_CH78_2DH1

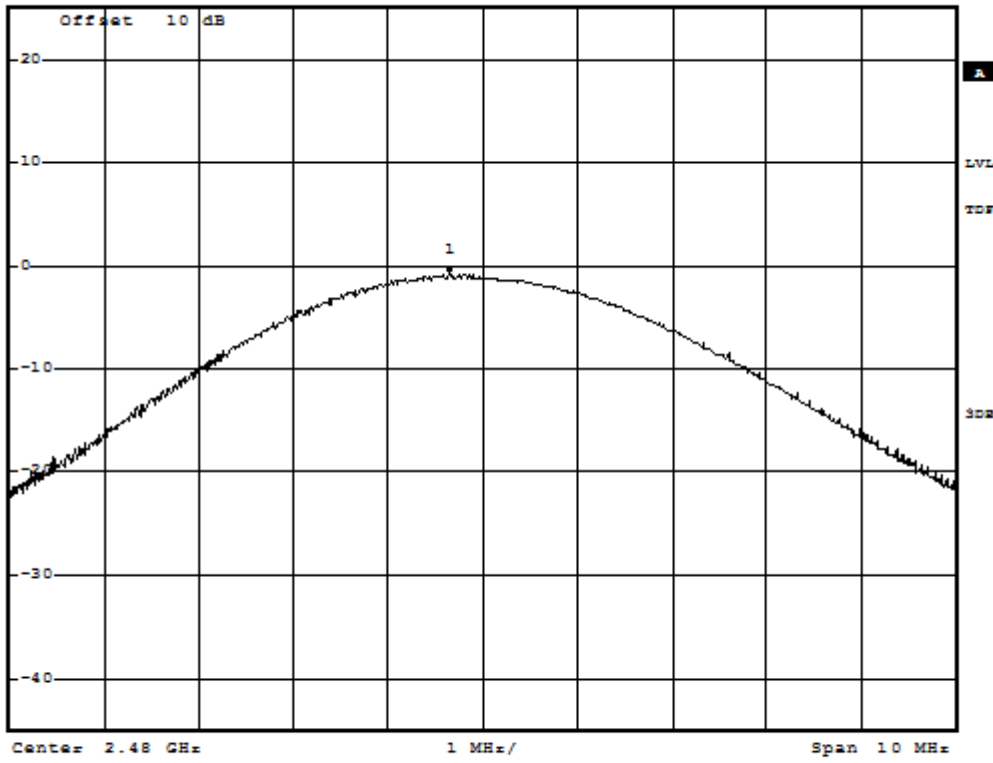


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.99 dBm
SWT 10 ms 2.479642857 GHz

Ref 25 dBm

• Att 40 dB

2.479642857 GHz



Date: 2.SEP.2016 12:13:00

PW_CH78_2DH3

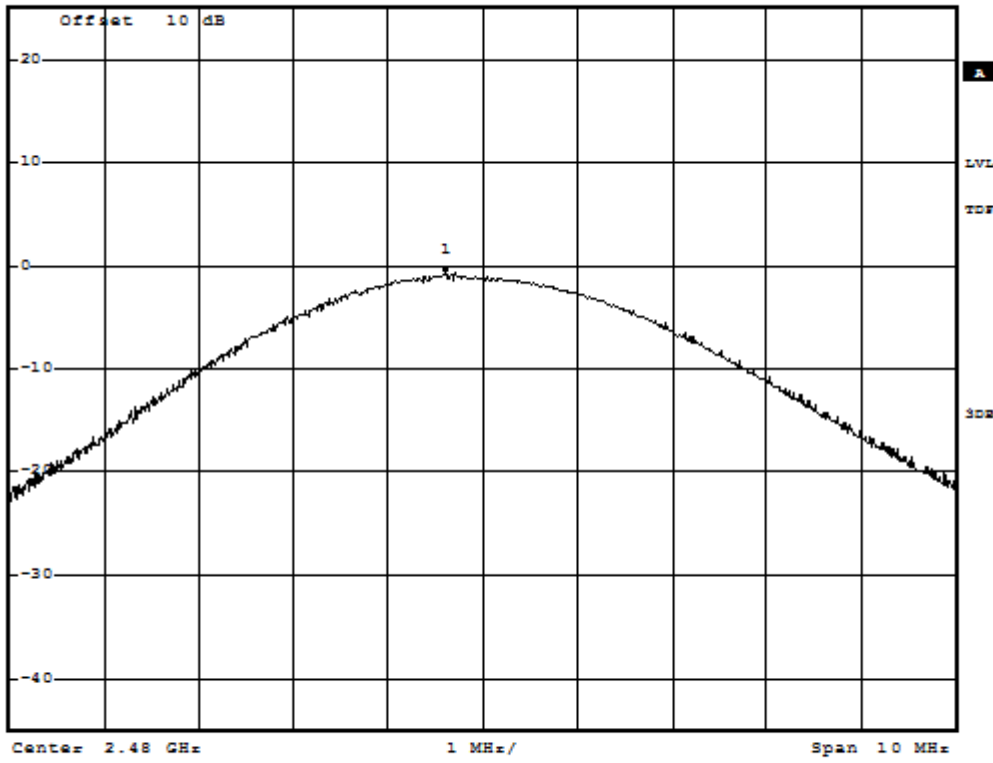


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.99 dBm
SWT 10 ms 2.479595238 GHz

Ref 25 dBm

• Att 40 dB

2.479595238 GHz



Date: 2.SEP.2016 12:15:55

PW_CH78_2DH5

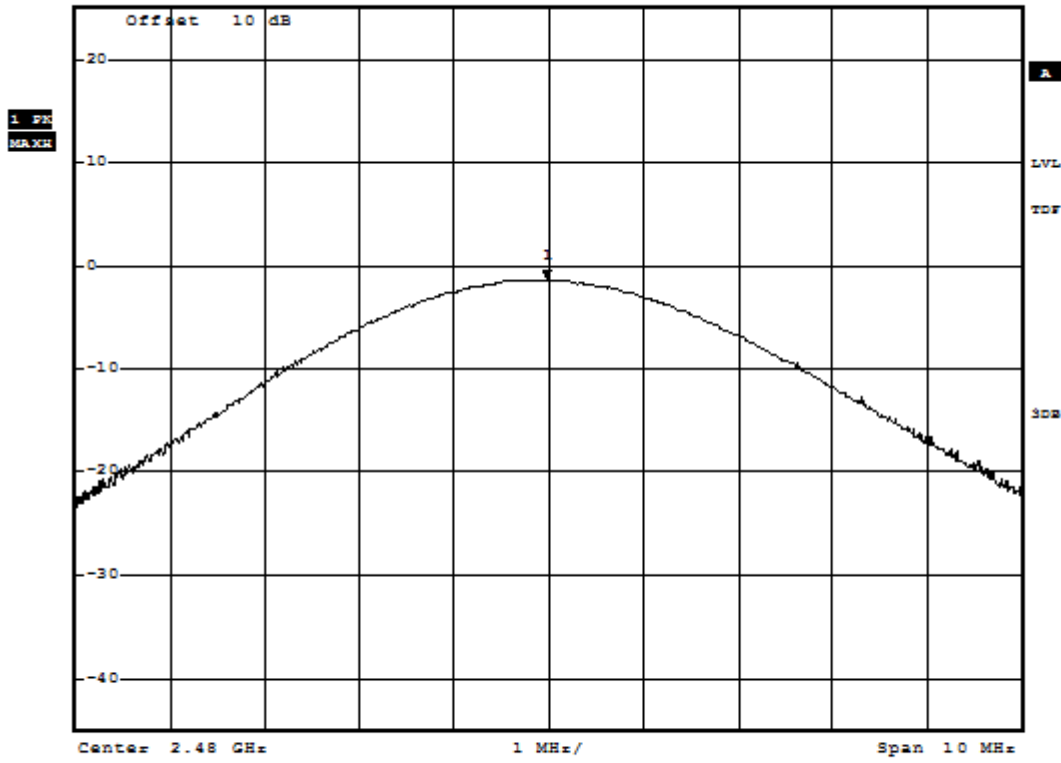


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.46 dBm
SWT 10 ms 2.479990476 GHz

Ref 25 dBm

• Att 40 dB

2.479990476 GHz



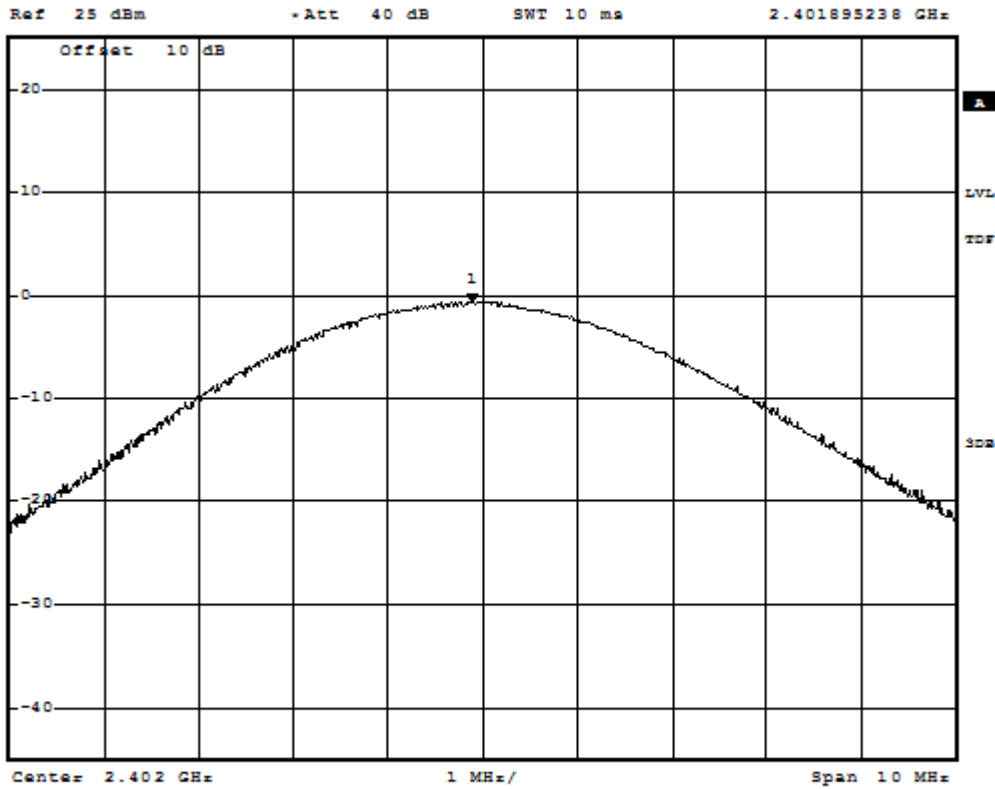
Date: 31.AUG.2016 11:09:15

4.2.3. Modulation 8DPSK

PW_CH0_3DH1



• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.77 dBm
SWT 10 ms 2.401895238 GHz



Date: 2.SEP.2016 11:34:44

PW_CH0_3DH3

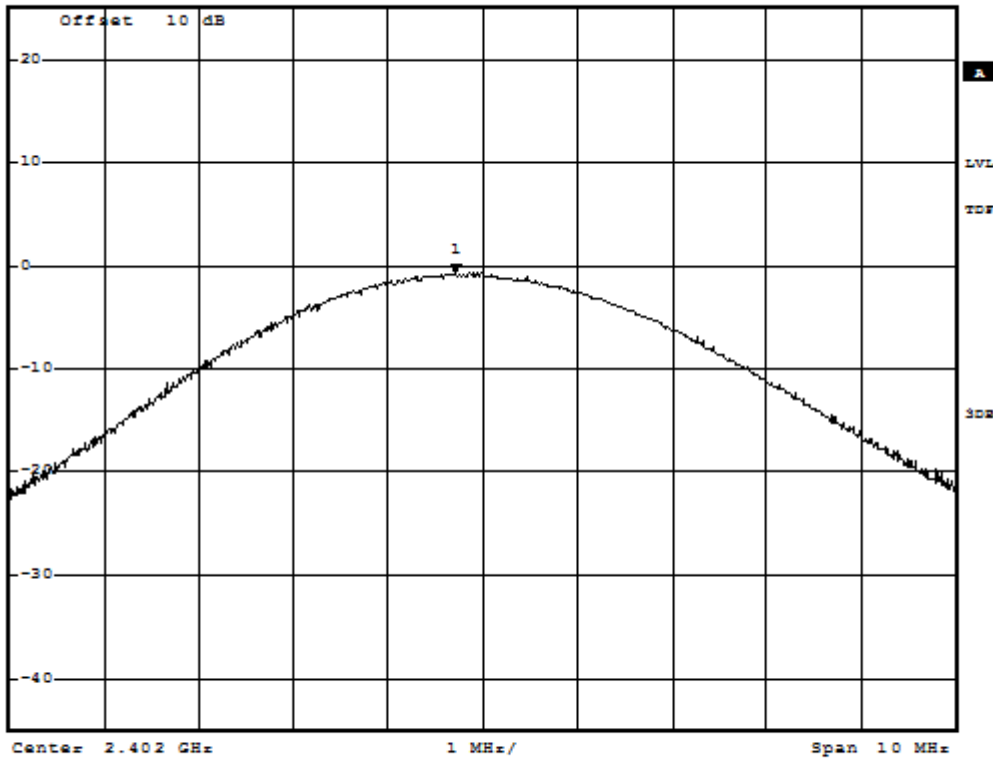


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.78 dBm
SWT 10 ms 2.401709524 GHz

Ref 25 dBm

• Att 40 dB

2.401709524 GHz



Date: 2.SEP.2016 11:39:13

PW_CH0_3DH5

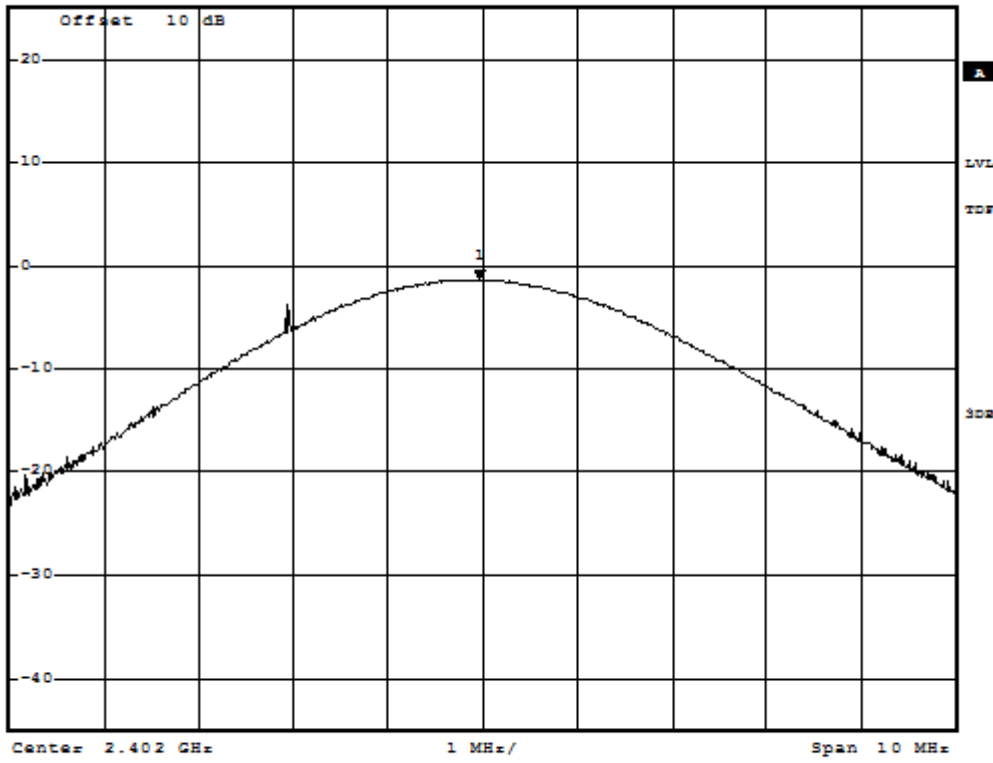


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.38 dBm
SWT 10 ms 2.401961905 GHz

Ref 25 dBm

• Att 40 dB

2.401961905 GHz



Date: 31.AUG.2016 10:54:57

PW_CH39_3DH1

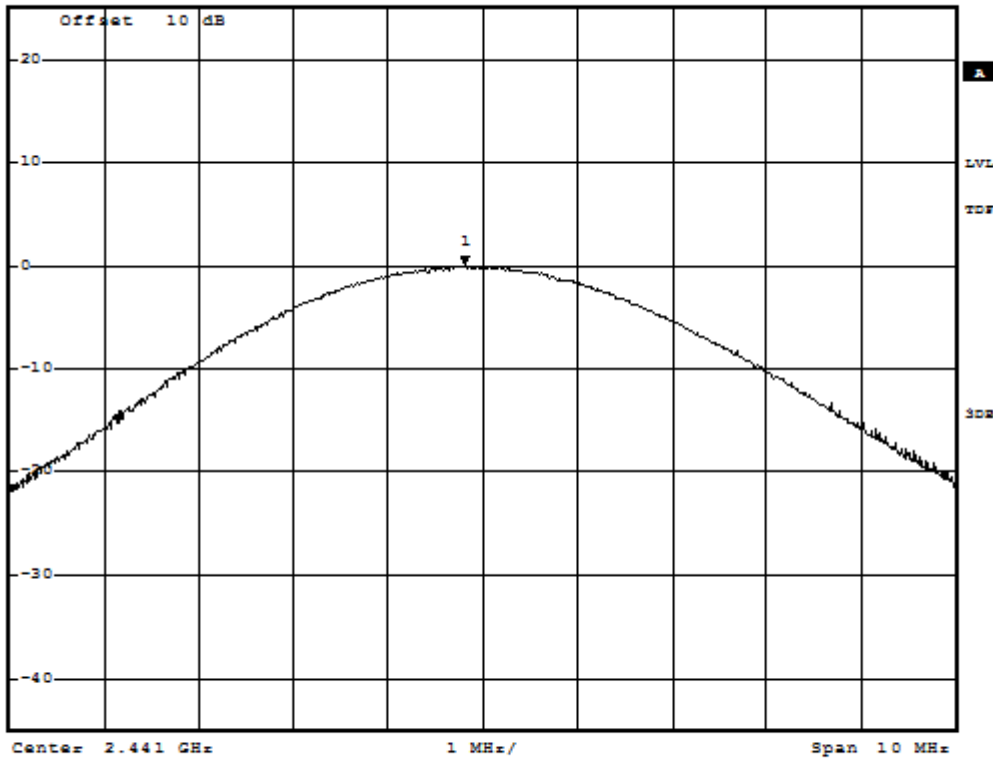


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.13 dBm
SWT 10 ms 2.440814286 GHz

Ref 25 dBm

• Att 40 dB

2.440814286 GHz



Date: 2.SEP.2016 12:05:48

PW_CH39_3DH3

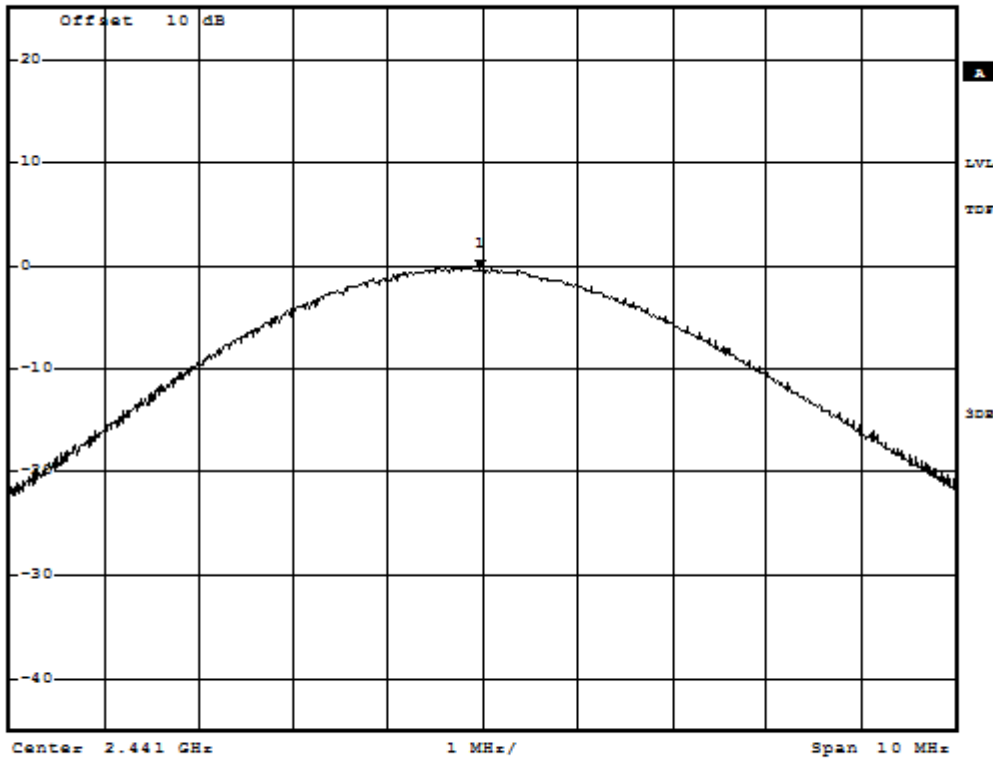


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.30 dBm
SWT 10 ms 2.440971429 GHz

Ref 25 dBm

• Att 40 dB

2.440971429 GHz



Date: 2.SEP.2016 12:10:55

PW_CH39_3DH5

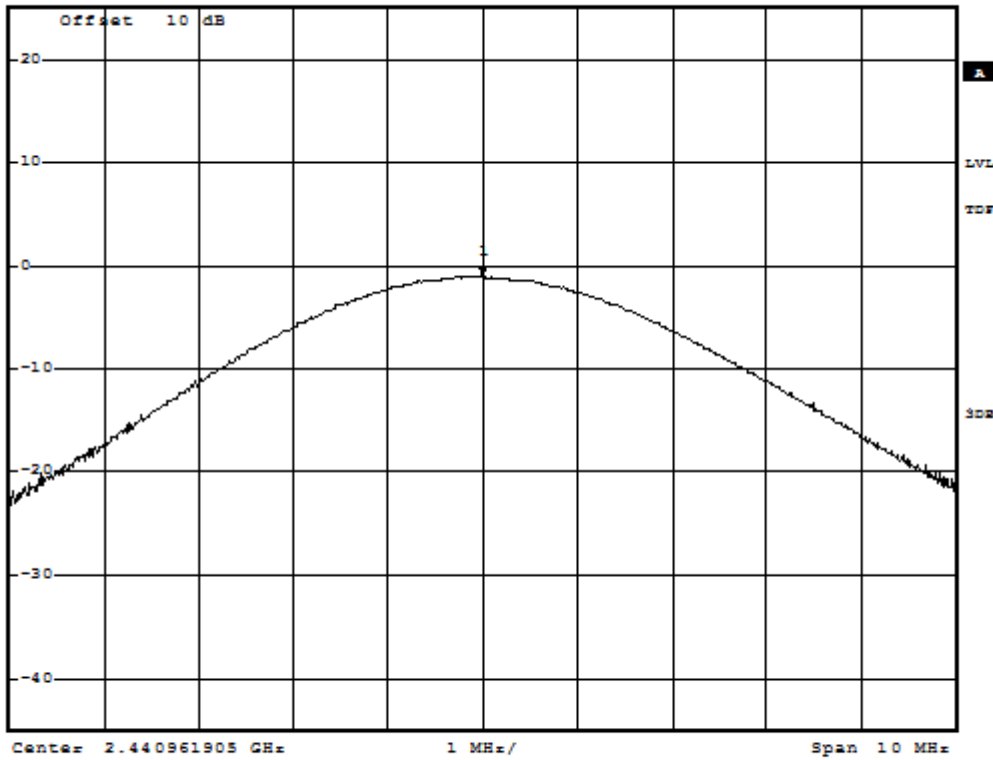


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.13 dBm
• SWT 10 ms 2.440961905 GHz

Ref 25 dBm

• Att 40 dB

2.440961905 GHz



Date: 31.AUG.2016 11:03:16

PW_CH78_3DH1

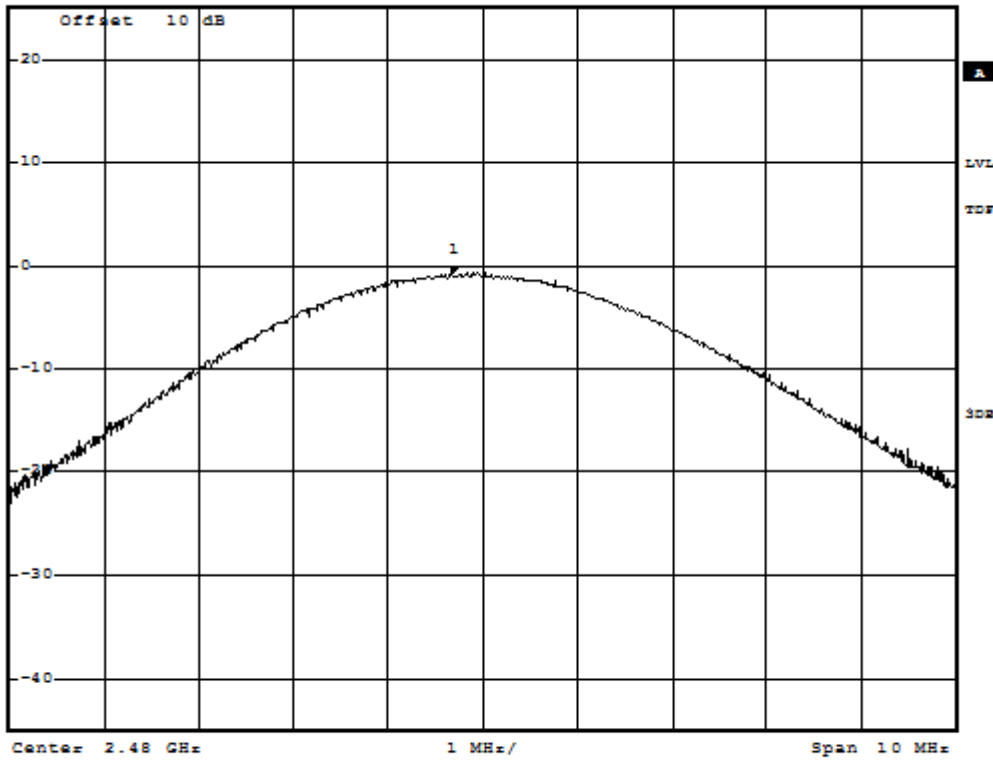


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.92 dBm
SWT 10 ms 2.479700000 GHz

Ref 25 dBm

• Att 40 dB

2.479700000 GHz



Date: 2.SEP.2016 12:14:20

PW_CH78_3DH3

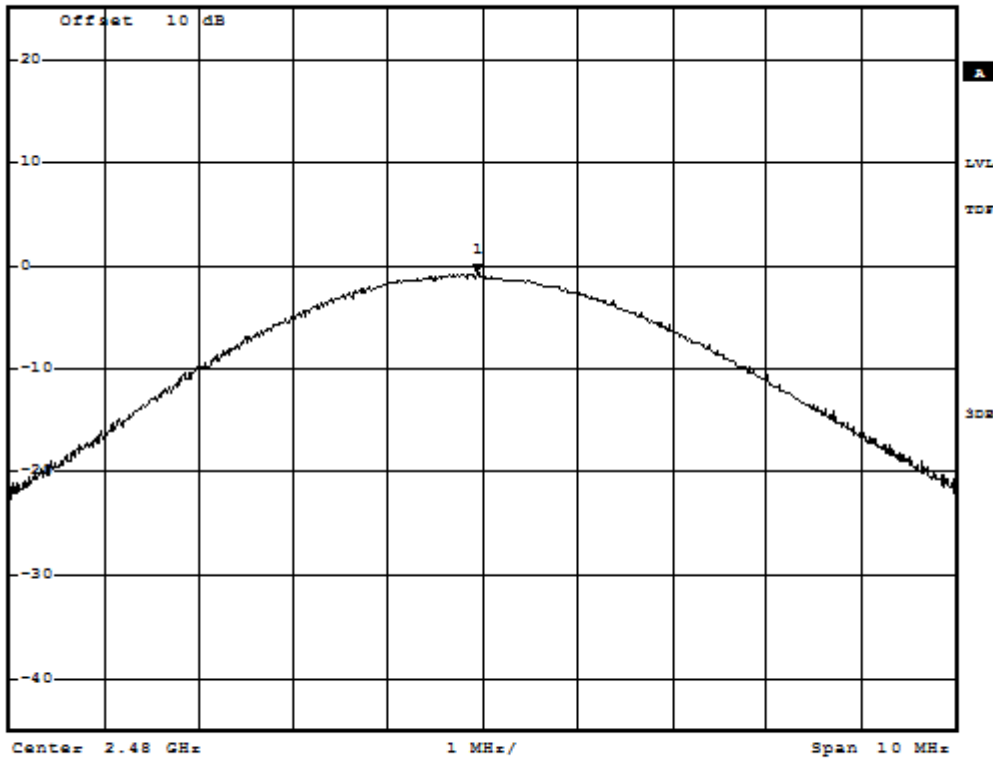


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -0.87 dBm
SWT 10 ms 2.479933333 GHz

Ref 25 dBm

• Att 40 dB

2.479933333 GHz



Date: 2.SEP.2016 12:18:37

PW_CH78_3DH5

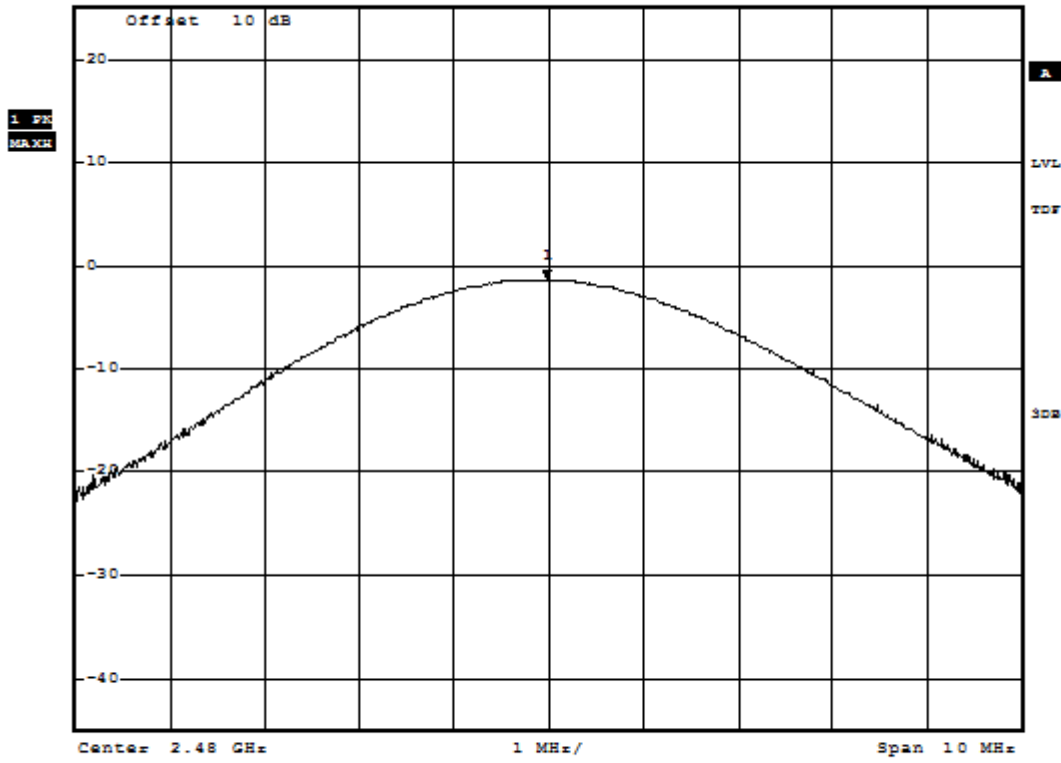


• RBW 3 MHz Marker 1 [T1]
• VBW 10 MHz -1.40 dBm
SWT 10 ms 2.479990476 GHz

Ref 25 dBm

• Att 40 dB

2.479990476 GHz



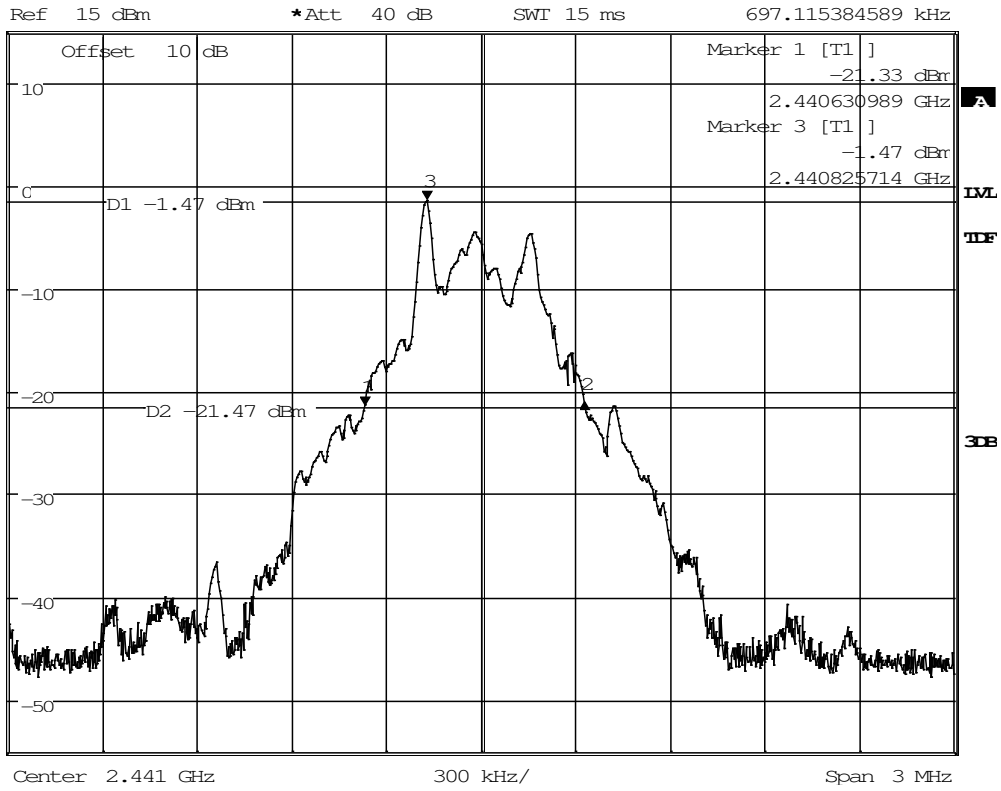
Date: 31.AUG.2016 11:07:50

4.3. 20-dB Bandwidth

4.3.1. Modulation GFSK



*REW 30 kHz Delta 2 [T1]
 *VEW 100 kHz 0.30 dB
 SWT 15 ms 697.115384589 kHz

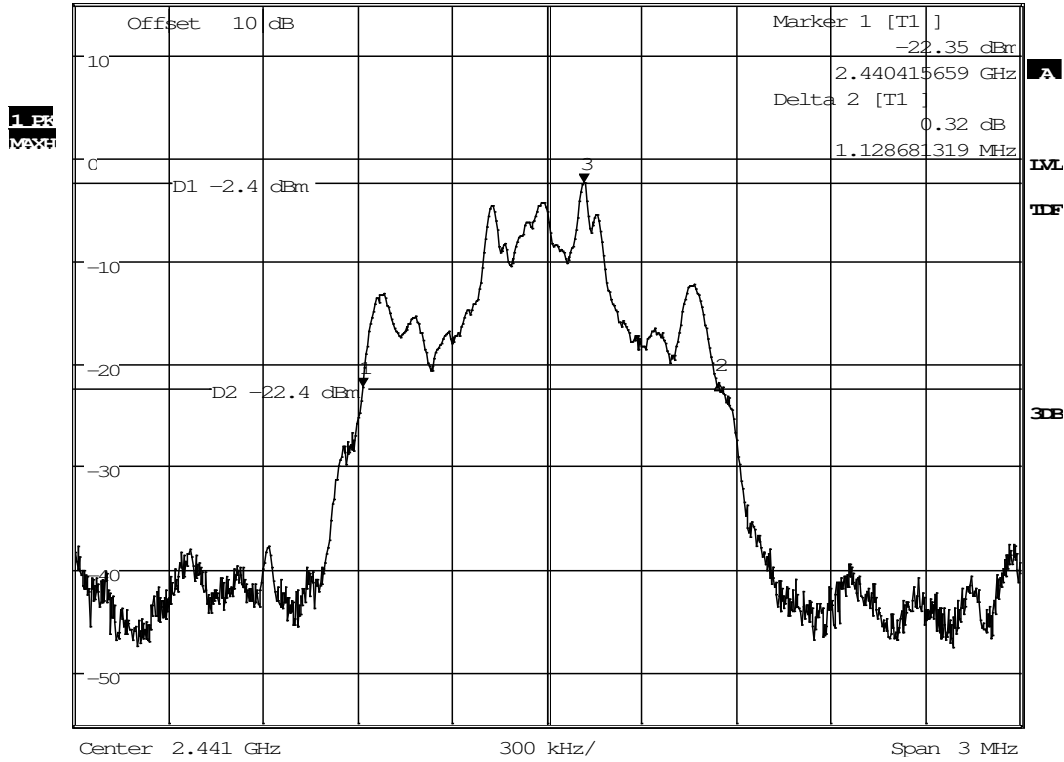


Date: 2.SEP.2016 11:25:42

4.3.2. Modulation Pi/4 QPSK



*REW 30 kHz Marker 3 [T1]
 *VEW 100 kHz -2.40 dBm
 Ref 15 dBm *Att 40 dB SWI 15 ms 2.441115714 GHz

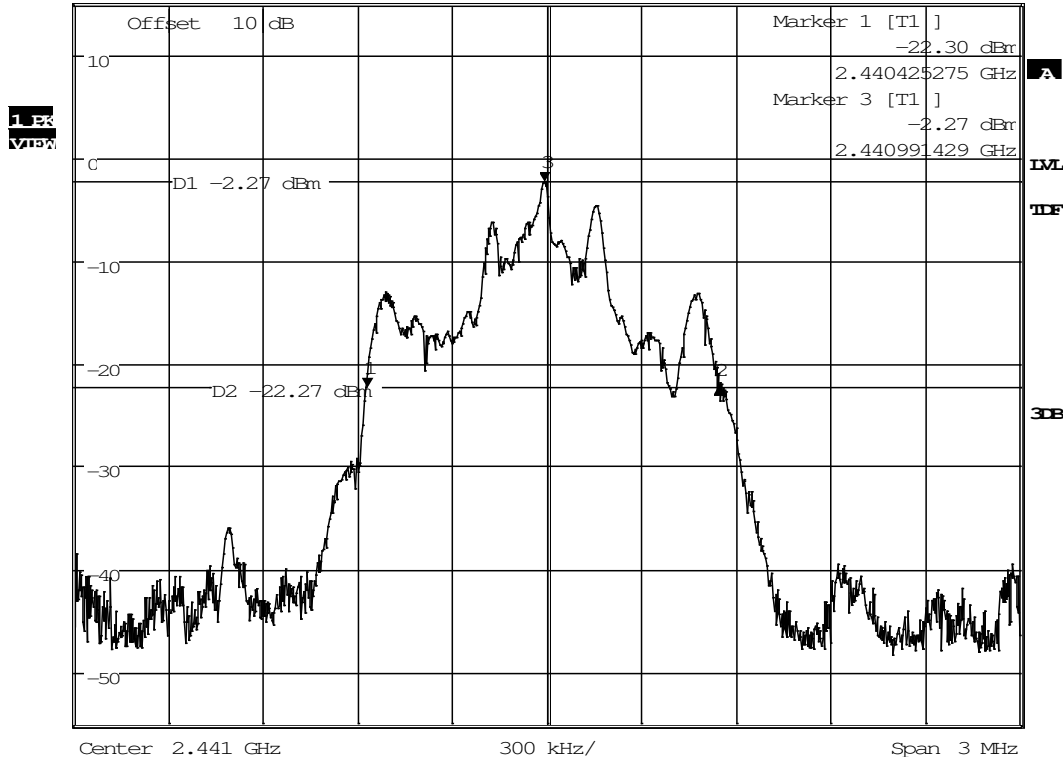


Date: 2.SEP.2016 11:24:00

4.3.3. Modulation 8DPSK



*REW 30 kHz Delta 2 [T1]
 *VEW 100 kHz -0.07 dB
 Ref 15 dBm *Att 40 dB SWI 15 ms 1.119065934 MHz



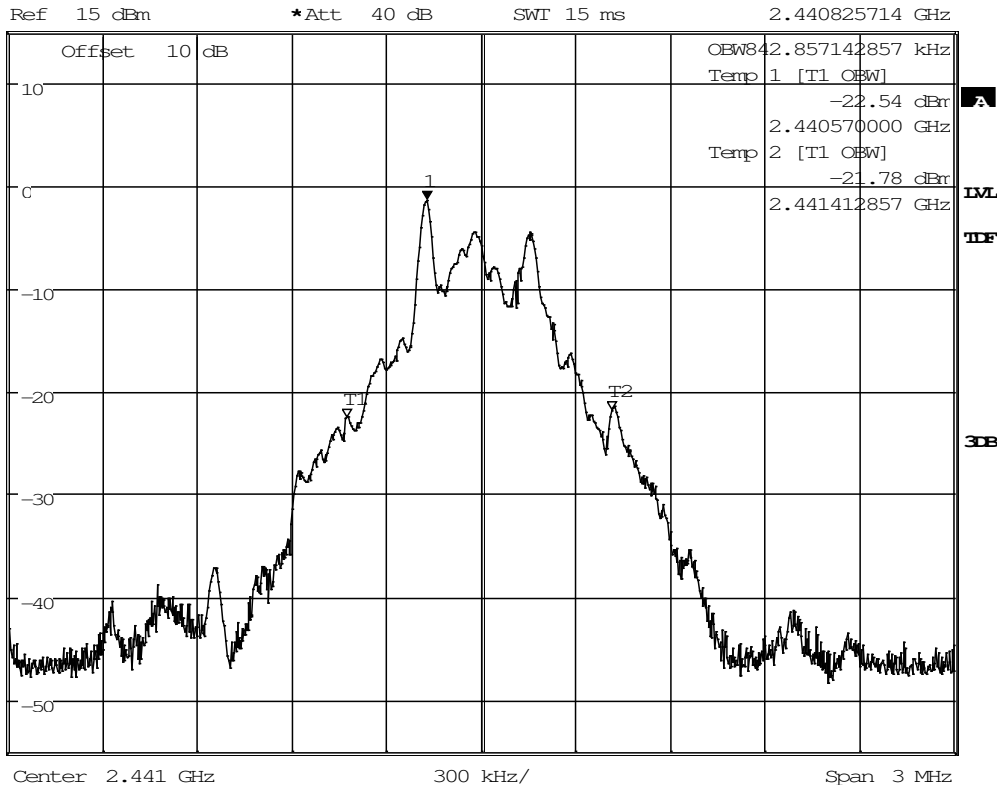
Date: 2.SEP.2016 11:21:40

4.4. 99% Occupied Bandwidth

4.4.1. Modulation GFSK



*REW 30 kHz Marker 1 [T1]
 *VEW 100 kHz -1.44 dBm
 SWT 15 ms 2.440825714 GHz

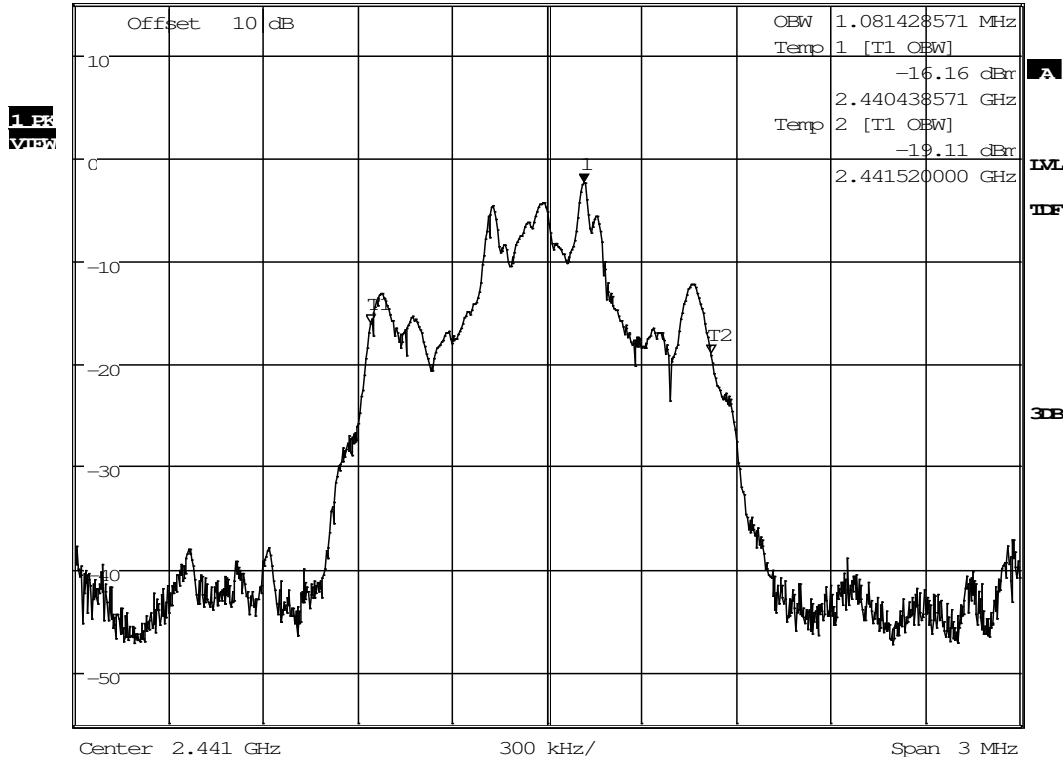


Date: 2.SEP.2016 11:14:53

4.4.2. Modulation Pi/4 QPSK



*REW 30 kHz Marker 1 [T1]
 *VEW 100 kHz -2.40 dBm
 Ref 15 dBm *Att 40 dB SWI 15 ms 2.441115714 GHz

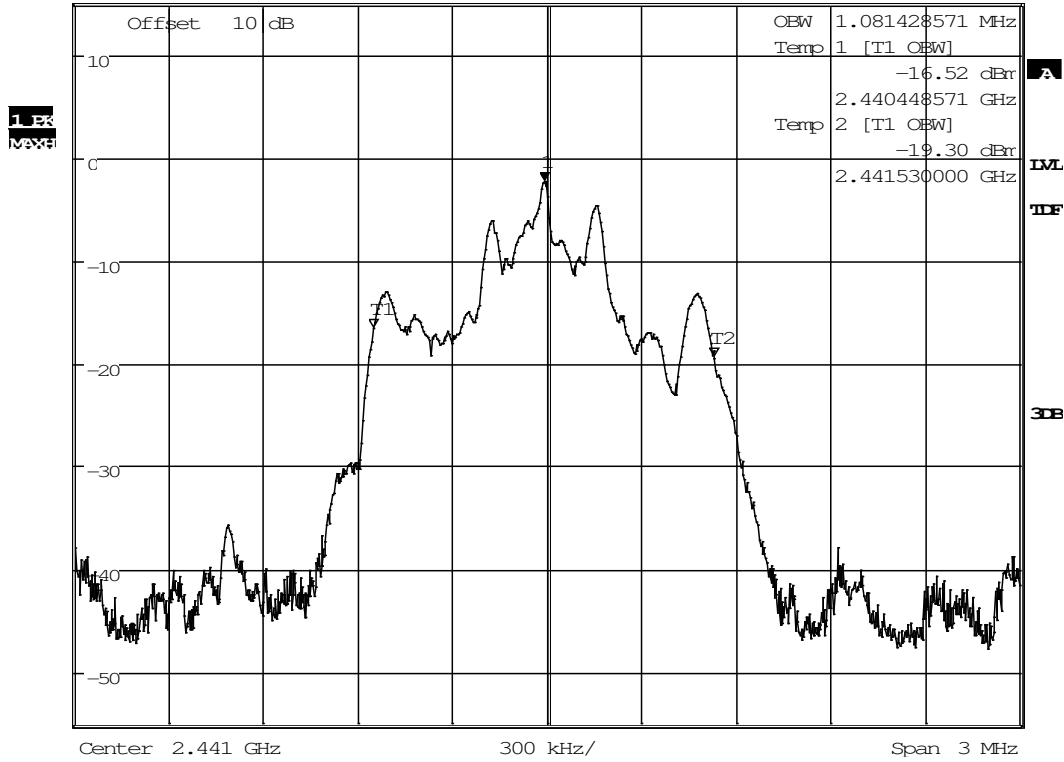


Date: 2.SEP.2016 11:17:41

4.4.3. Modulation 8DPSK



*REW 30 kHz Marker 1 [T1]
 *VIEW 100 kHz -2.26 dBm
 Ref 15 dBm *Att 40 dB SWI 15 ms 2.440991429 GHz

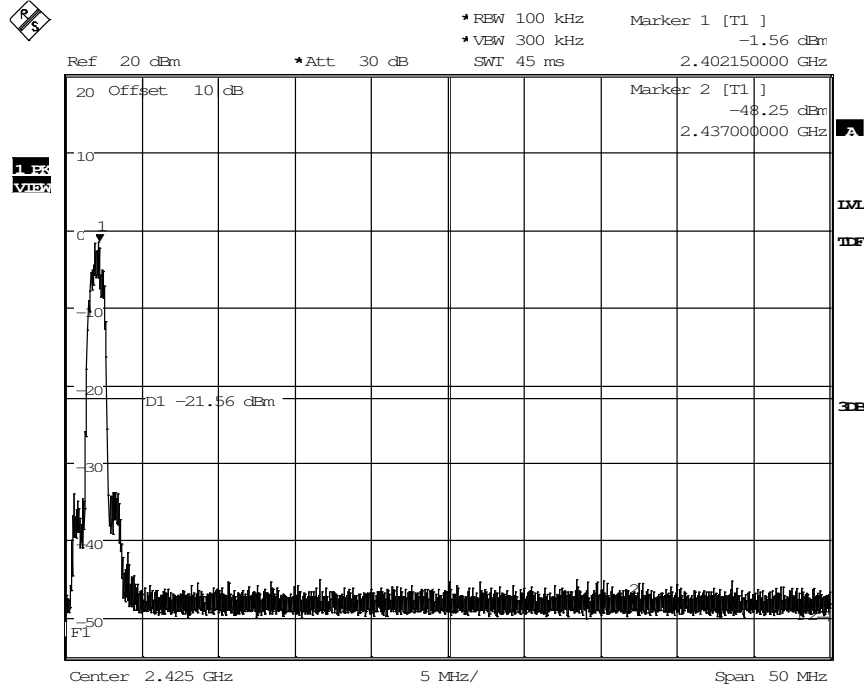


Date: 2.SEP.2016 11:19:08

4.5. 20dBc Emissions

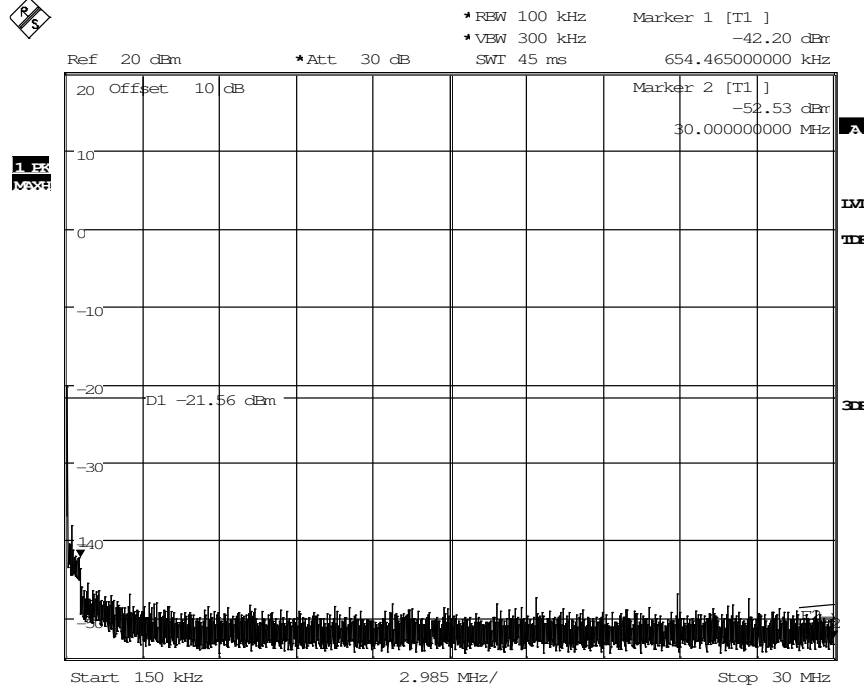
4.5.1. Modulation 8DPSK – fixed channel mode

Channel 0 Reference



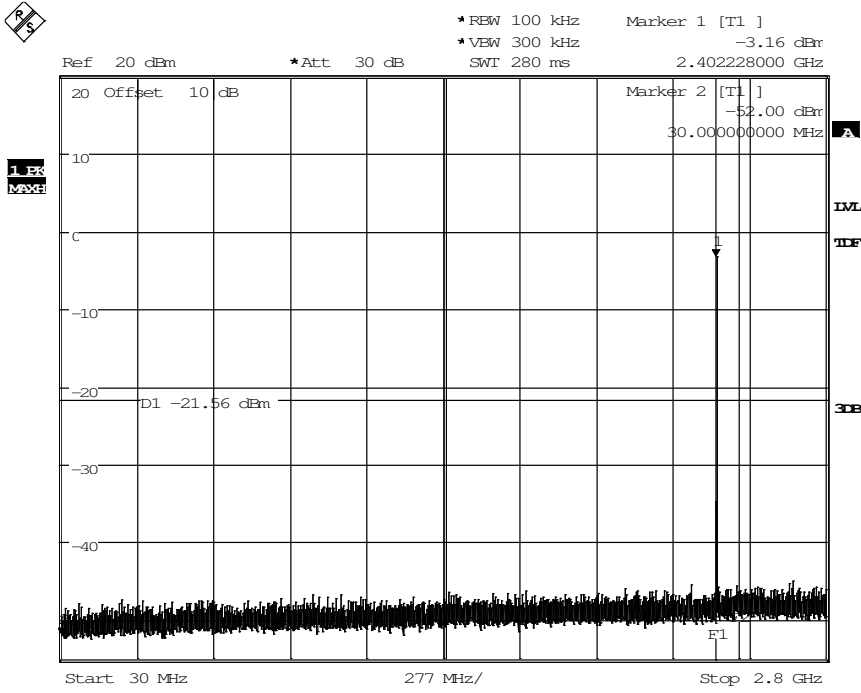
Date: 2.SEP.2016 10:05:59

Sweep 1: 150kHz to 30MHz



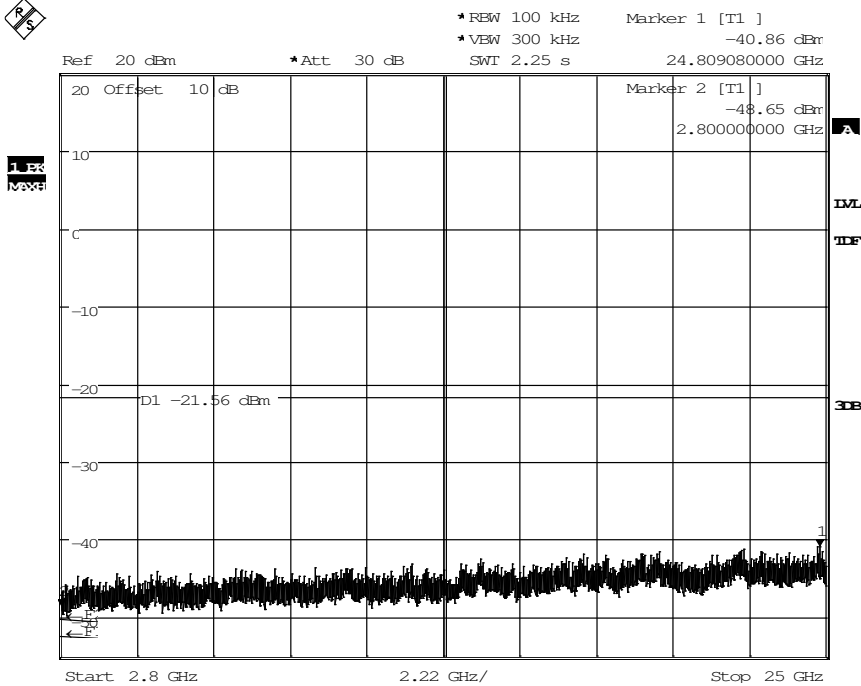
Date: 2.SEP.2016 10:08:08

Sweep 2: 30MHz to 2.8GHz



Date: 2.SEP.2016 10:09:30

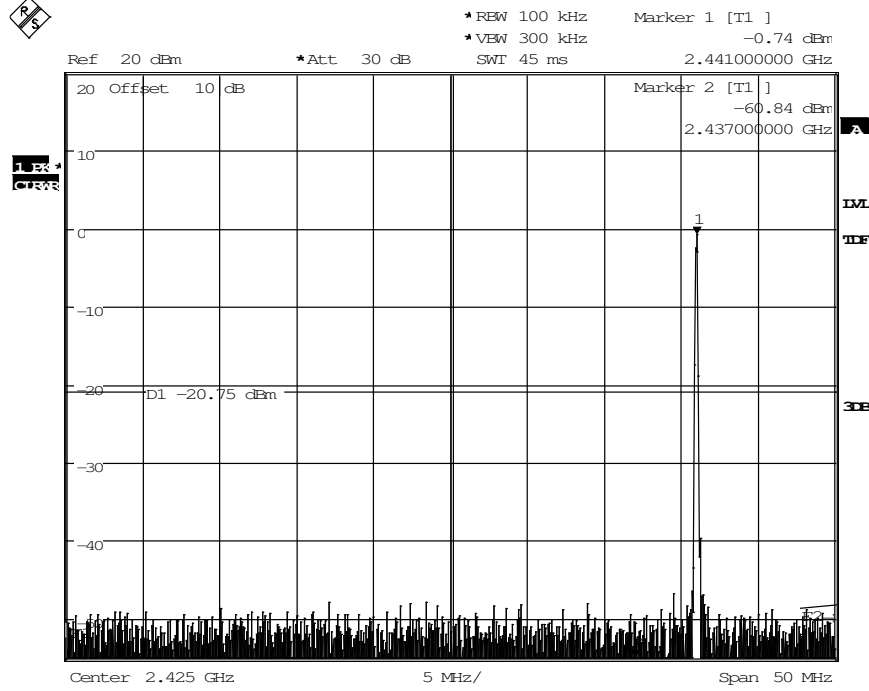
Sweep3: 2.8GHz to 25GHz



Date: 2.SEP.2016 10:10:39

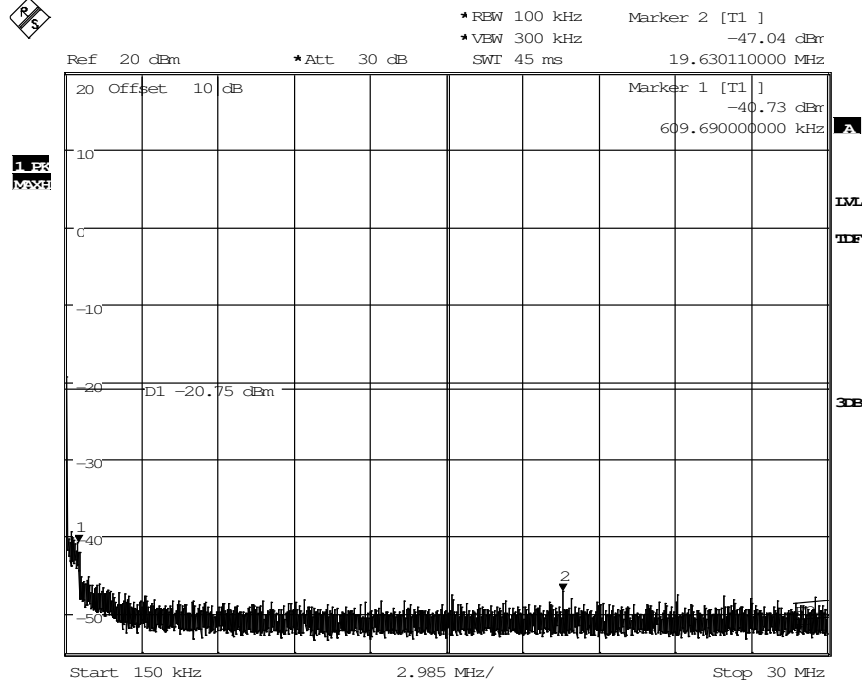
4.5.2. Modulation Pi/4 QPSK – fixed channel mode

Channel 39 Reference



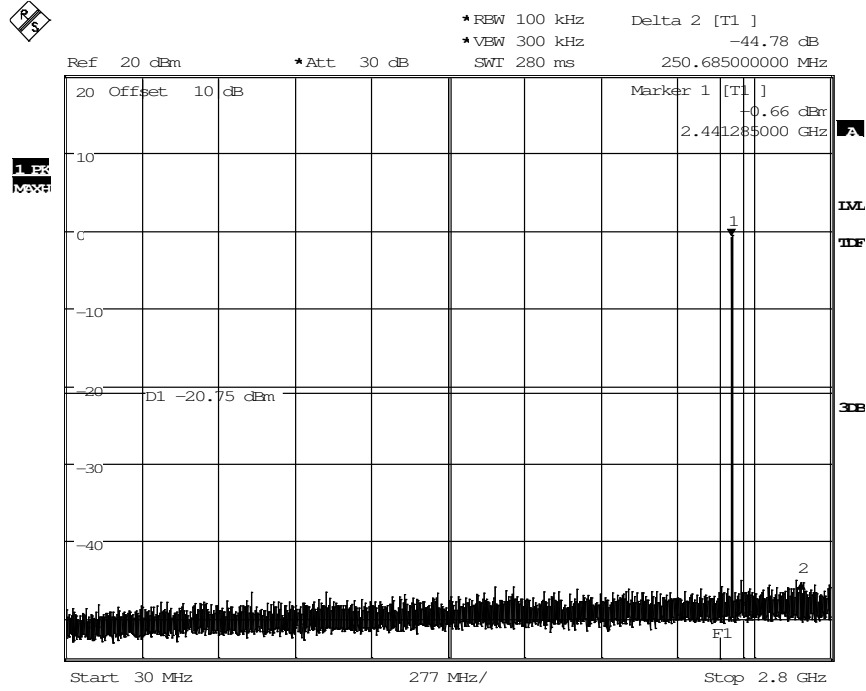
Date: 2.SEP.2016 10:16:07

Sweep 1: 150kHz to 30MHz



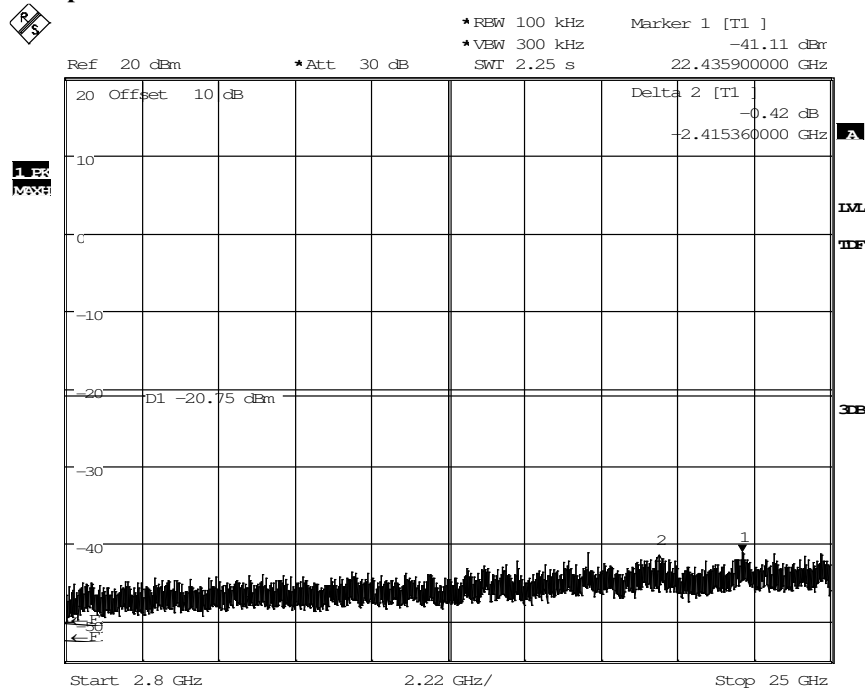
Date: 2.SEP.2016 10:17:41

Sweep 2: 30MHz to 2.8GHz



Date: 2.SEP.2016 10:18:33

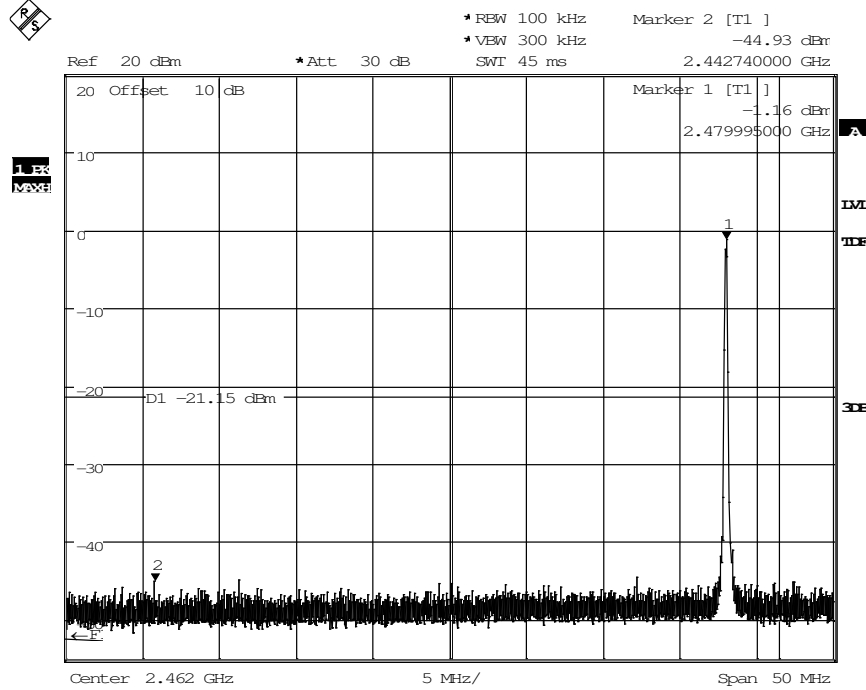
Sweep 3: 2.8GHz to 25GHz



Date: 2.SEP.2016 10:19:35

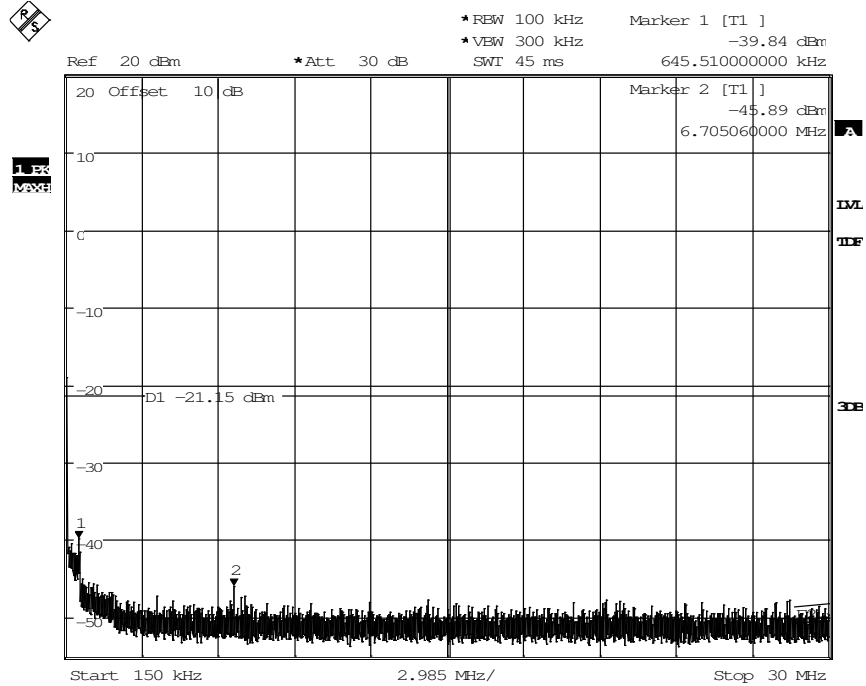
4.5.3. Modulation GFSK – fixed channel mode

Channel 78 Reference



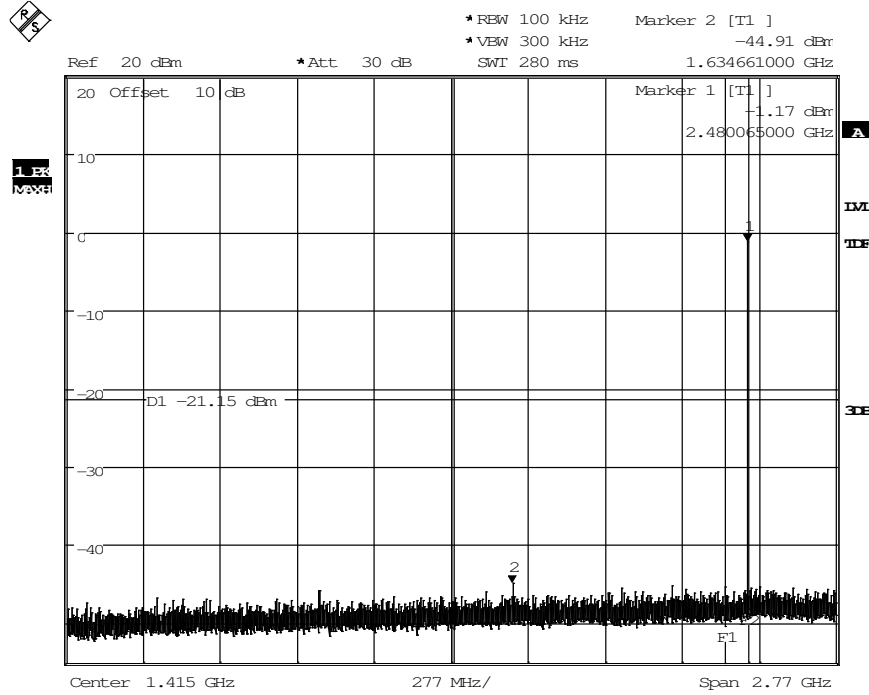
Date: 2.SEP.2016 10:23:49

Sweep 1: 150kHz to 30MHz



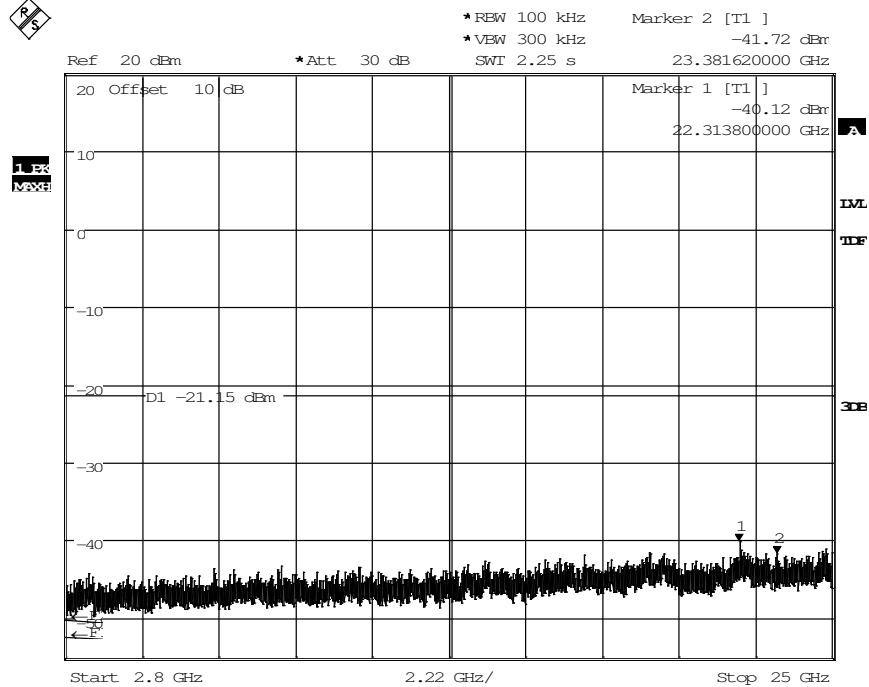
Date: 2.SEP.2016 10:25:40

Sweep 2: 30MHz to 2.8GHz



Date: 2.SEP.2016 10:27:05

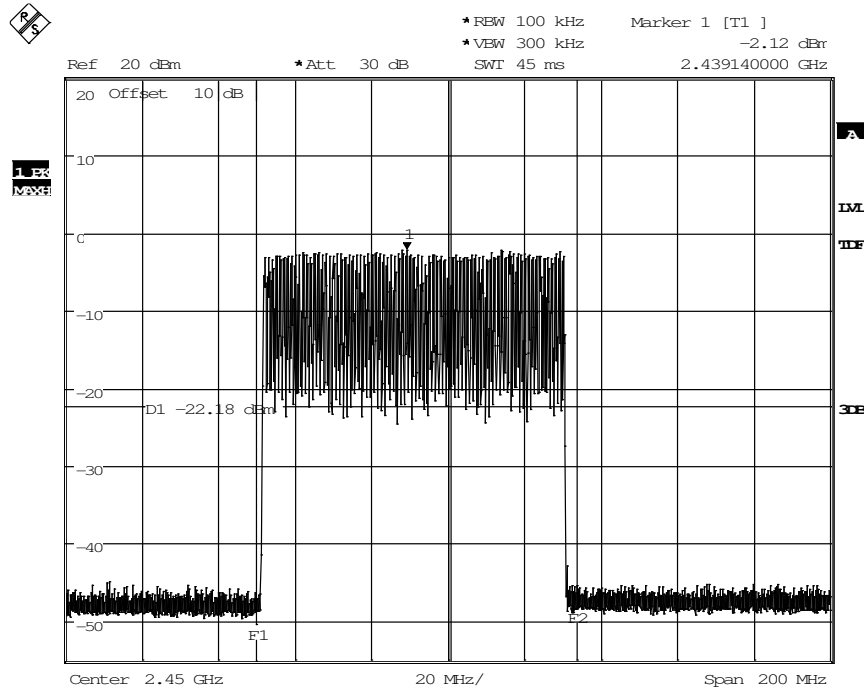
Sweep 3: 2.8GHz to 25GHz



Date: 2.SEP.2016 10:28:11

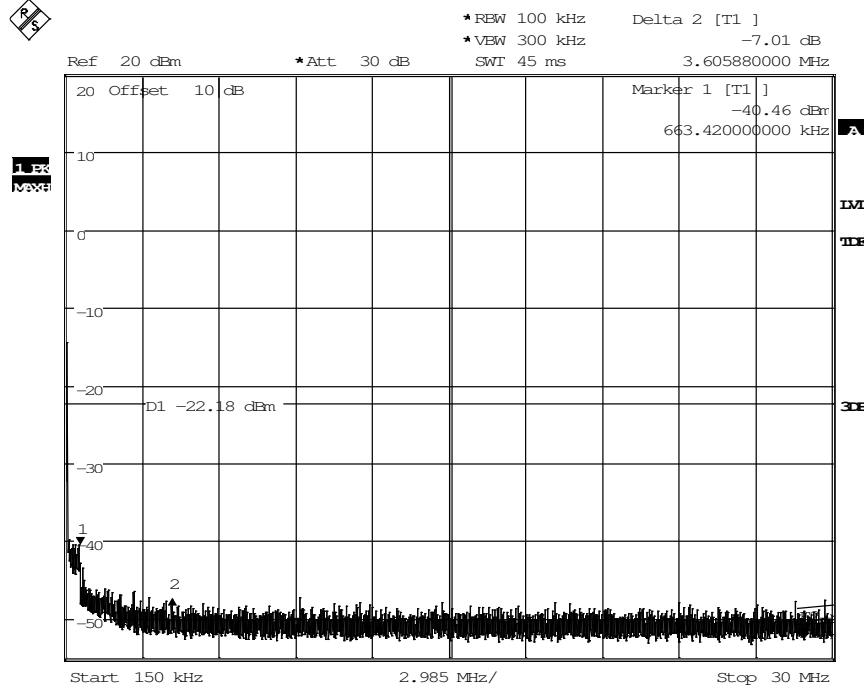
4.5.4. Modulation GFSK – hopping mode activated

Search of reference



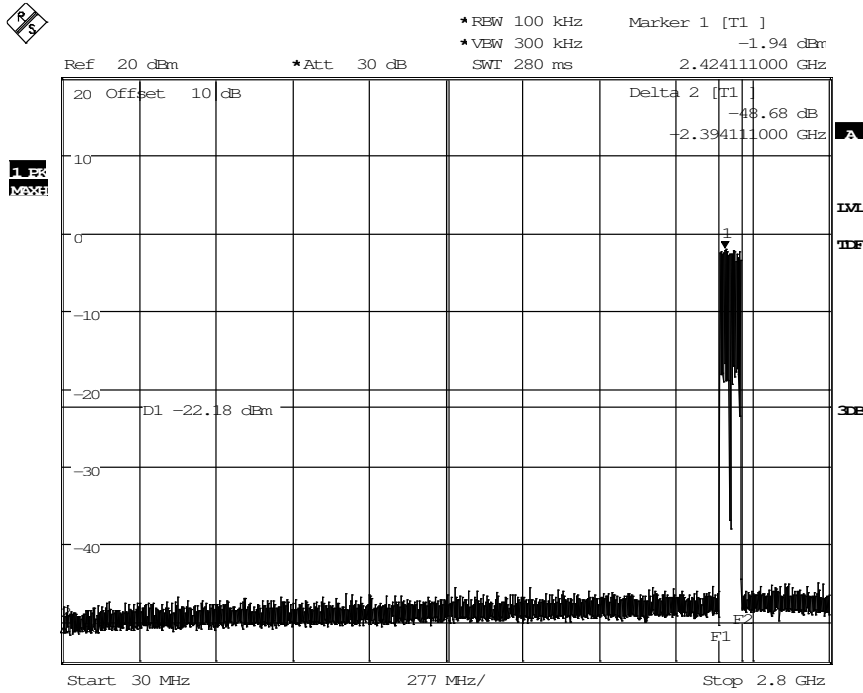
Date: 31.AUG.2016 13:58:44

Sweep 1: 150kHz to 30MHz



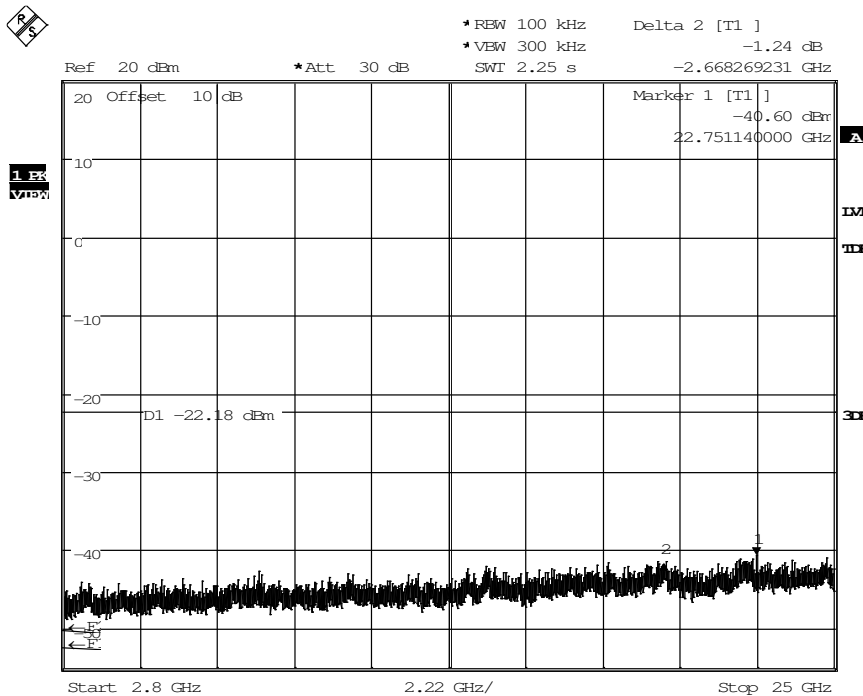
Date: 31.AUG.2016 14:00:38

Sweep 2: 30MHz to 2.8GHz



Date: 31.AUG.2016 14:02:34

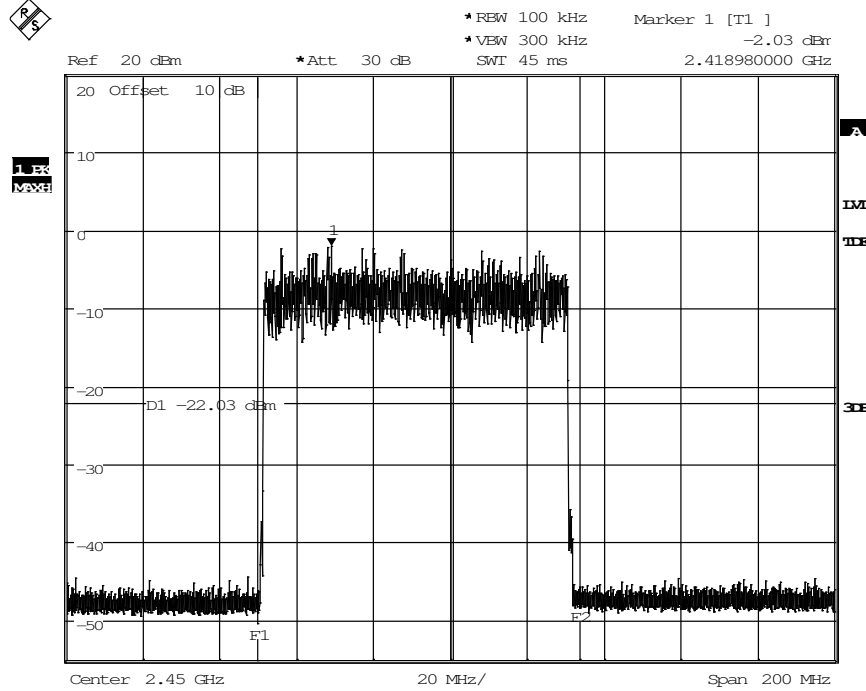
Sweep 3: 2.8GHz to 25GHz



Date: 31.AUG.2016 14:05:09

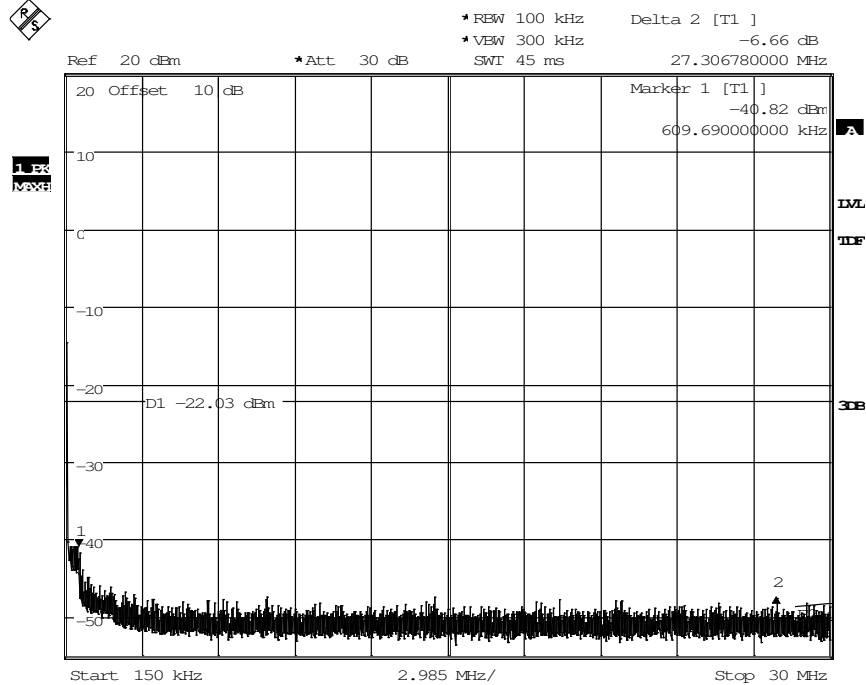
4.5.5. Modulation 8DPSK – hopping mode activated

Search of reference



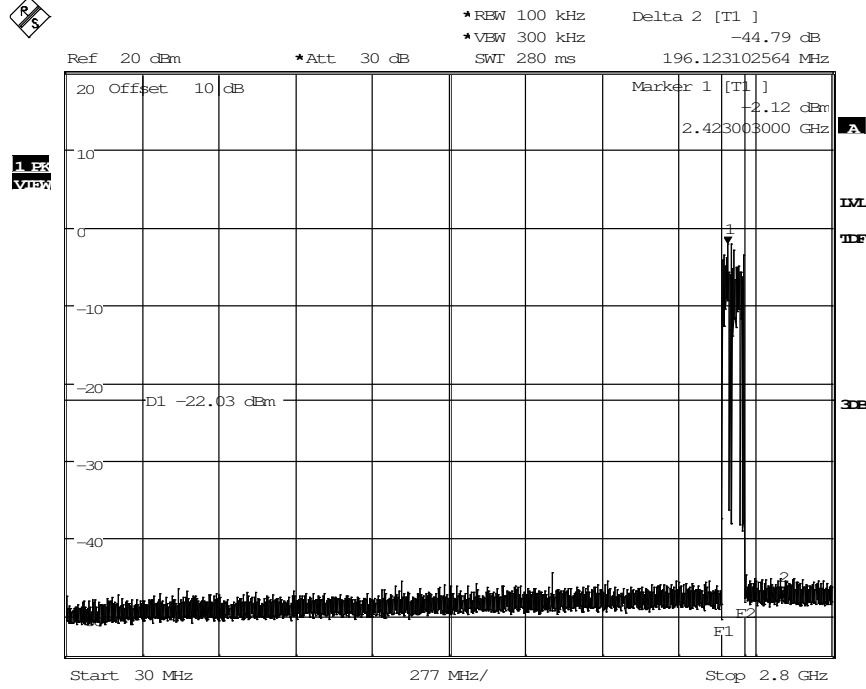
Date: 31.AUG.2016 14:33:45

Sweep 1: 150kHz to 30MHz



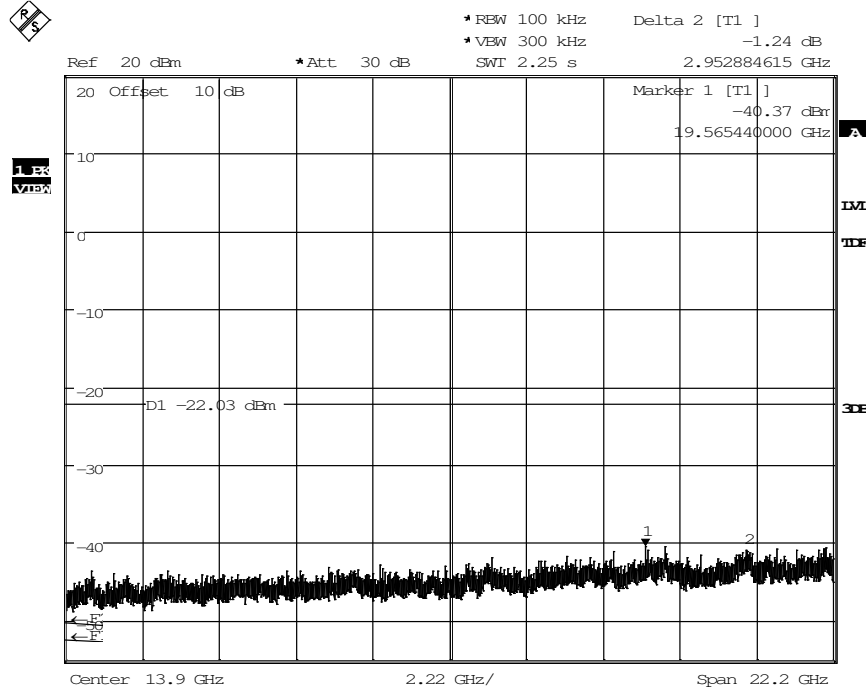
Date: 31.AUG.2016 14:35:11

Sweep 2: 30MHz to 2.8GHz



Date: 31.AUG.2016 14:38:02

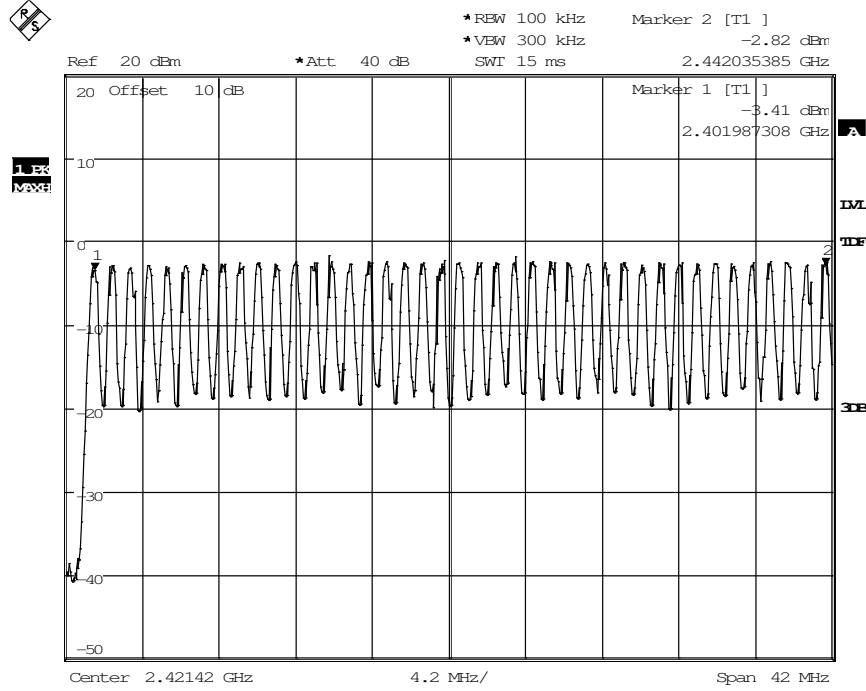
Sweep 3: 2.8GHz to 25GHz



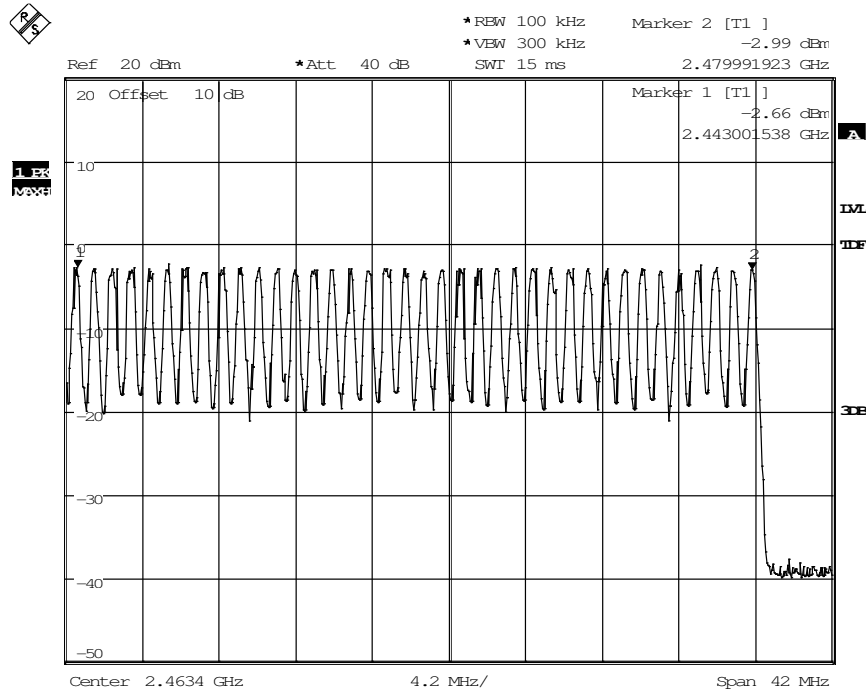
Date: 31.AUG.2016 14:40:17

4.6. Number of hopping frequencies

4.6.1. Modulation GFSK

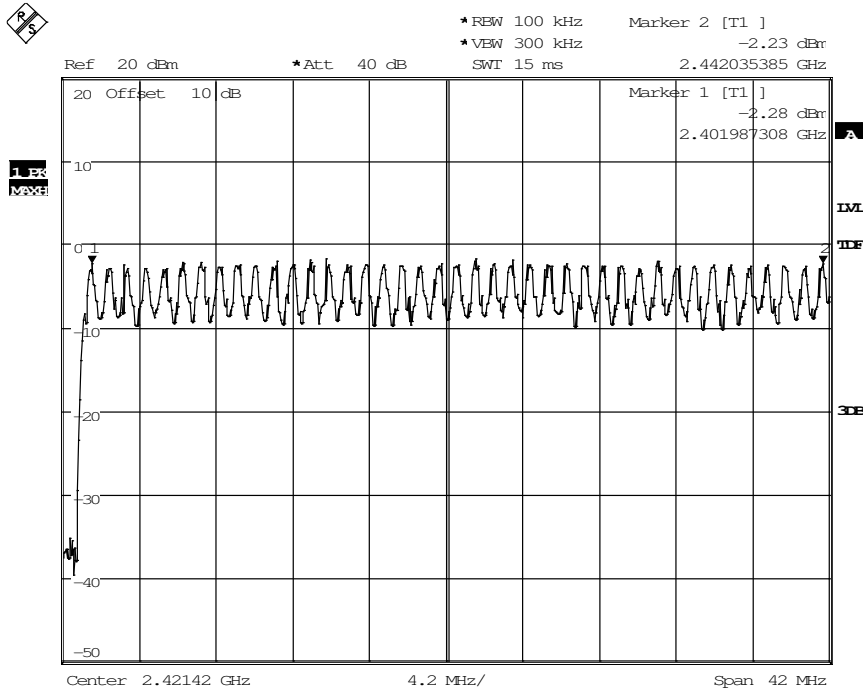


Date: 31.AUG.2016 11:18:51

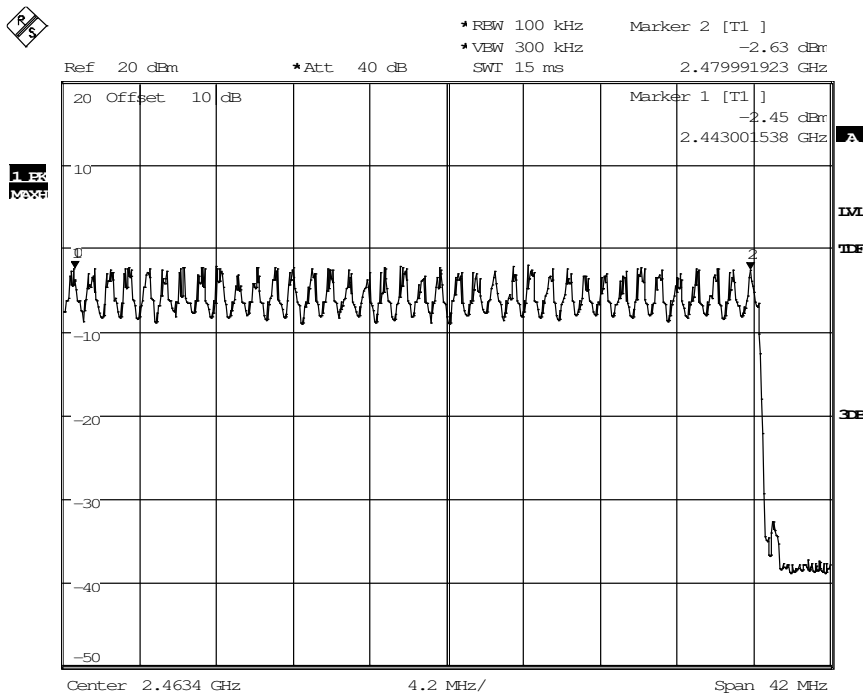


Date: 31.AUG.2016 11:34:38

4.6.2. Modulation Pi/4 QPSK

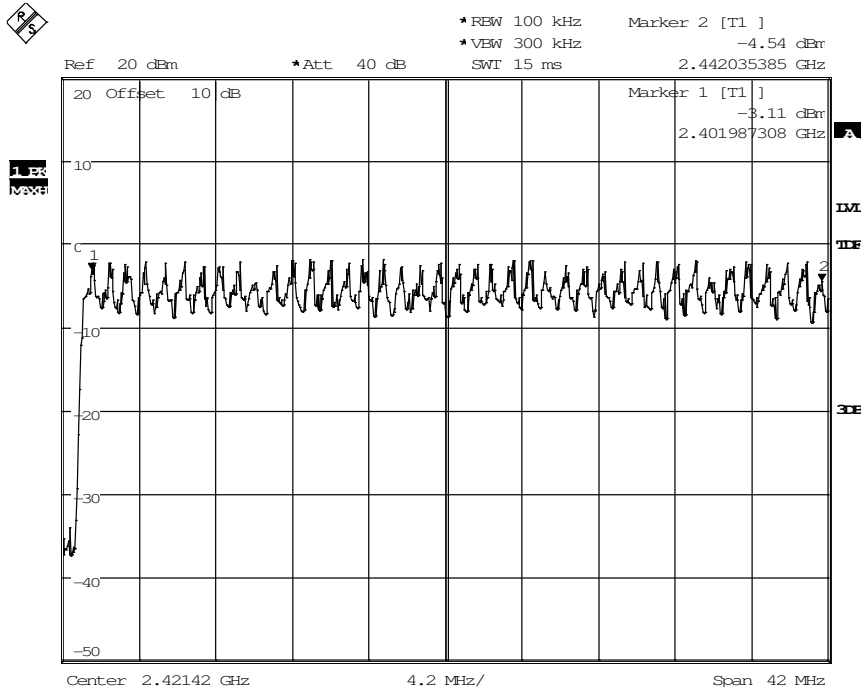


Date: 31.AUG.2016 11:20:43

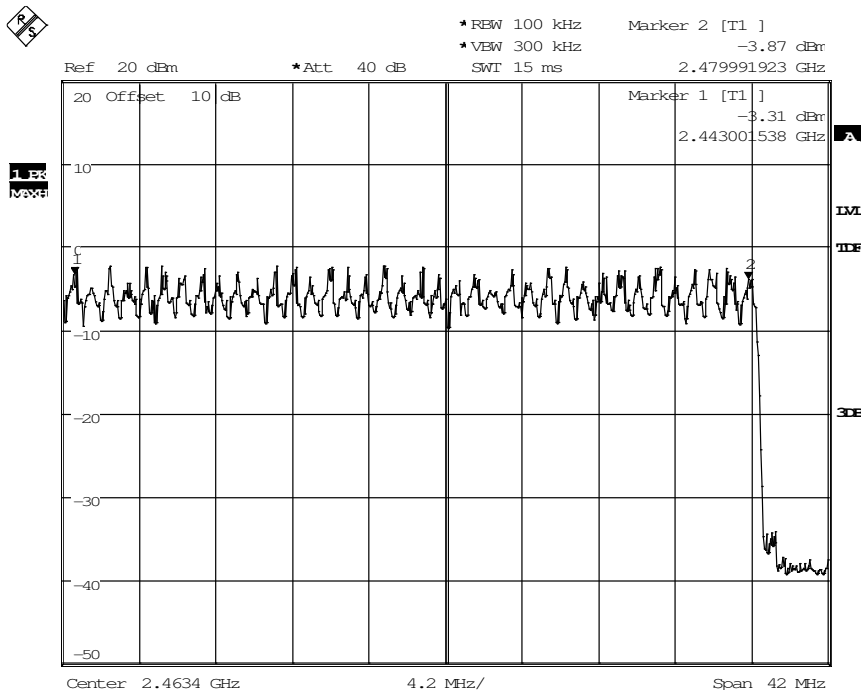


Date: 31.AUG.2016 11:54:21

4.6.3. Modulation 8DPSK



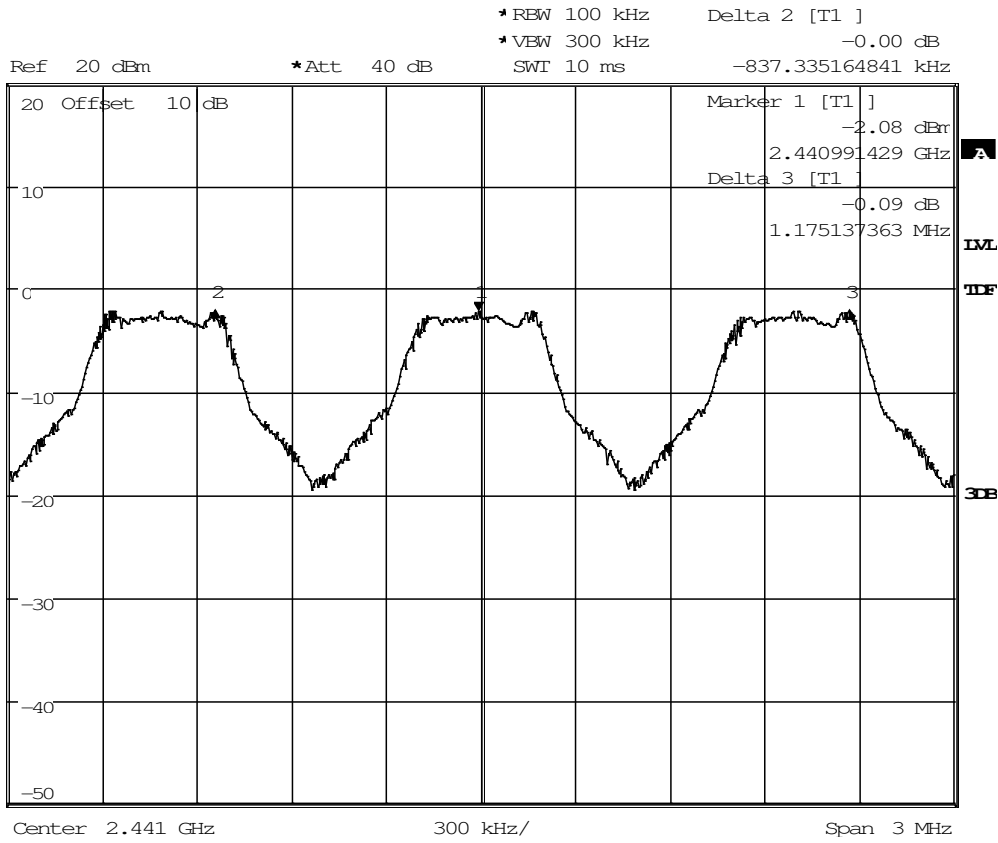
Date: 31.AUG.2016 11:30:09



Date: 31.AUG.2016 12:01:03

4.7. Channel separation (hopping mode)

4.7.1. Modulation GFSK



Date: 31.AUG.2016 12:15:46

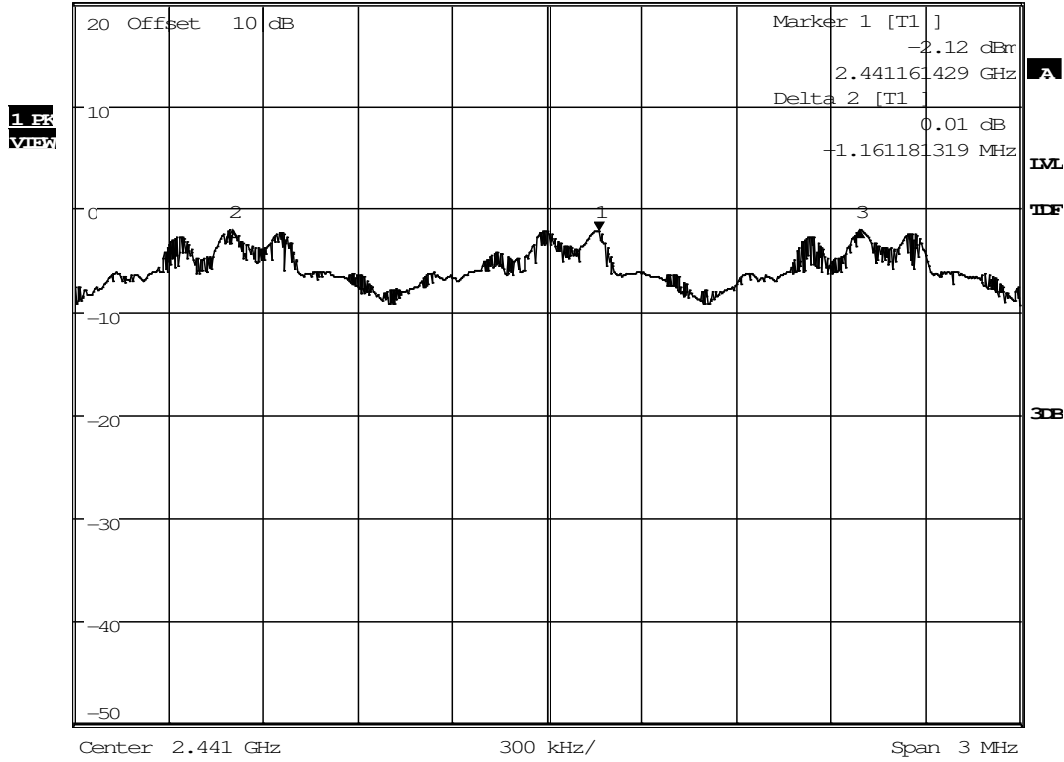
4.7.2. Modulation Pi/4 QPSK



*REW 100 kHz Delta 3 [T1]
 *VEW 300 kHz 0.00 dB
 SWI 10 ms 827.252747253 kHz

Ref 20 dBm

*Att 40 dB

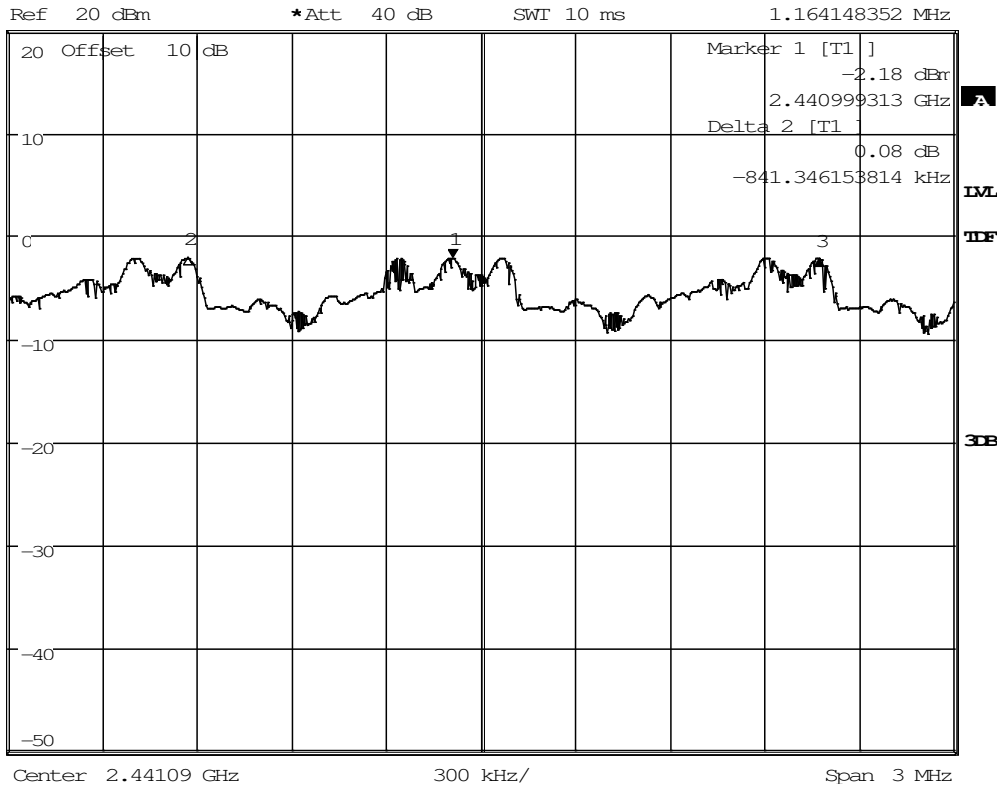


Date: 31.AUG.2016 12:40:56

4.7.3. Modulation 8DPSK



*REW 100 kHz Delta 3 [T1]
 *VIEW 300 kHz -0.07 dB
 *Att 40 dB SWI 10 ms 1.164148352 MHz



Date: 31.AUG.2016 13:12:58

4.8. Time of occupancy

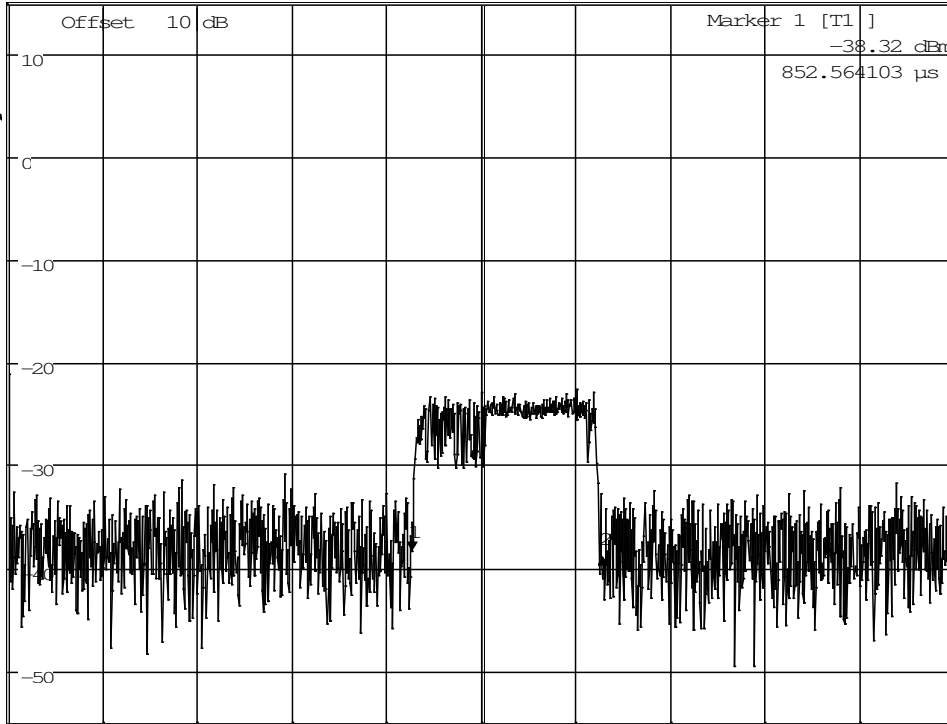
4.8.1. DH1 Packet length



REW 1 MHz Delta 2 [T1]
 *VEW 3 MHz -0.78 dB
 SWT 2 ms 403.846154 μs

Ref 15 dBm *Att 40 dB

1 ER
 VIEW



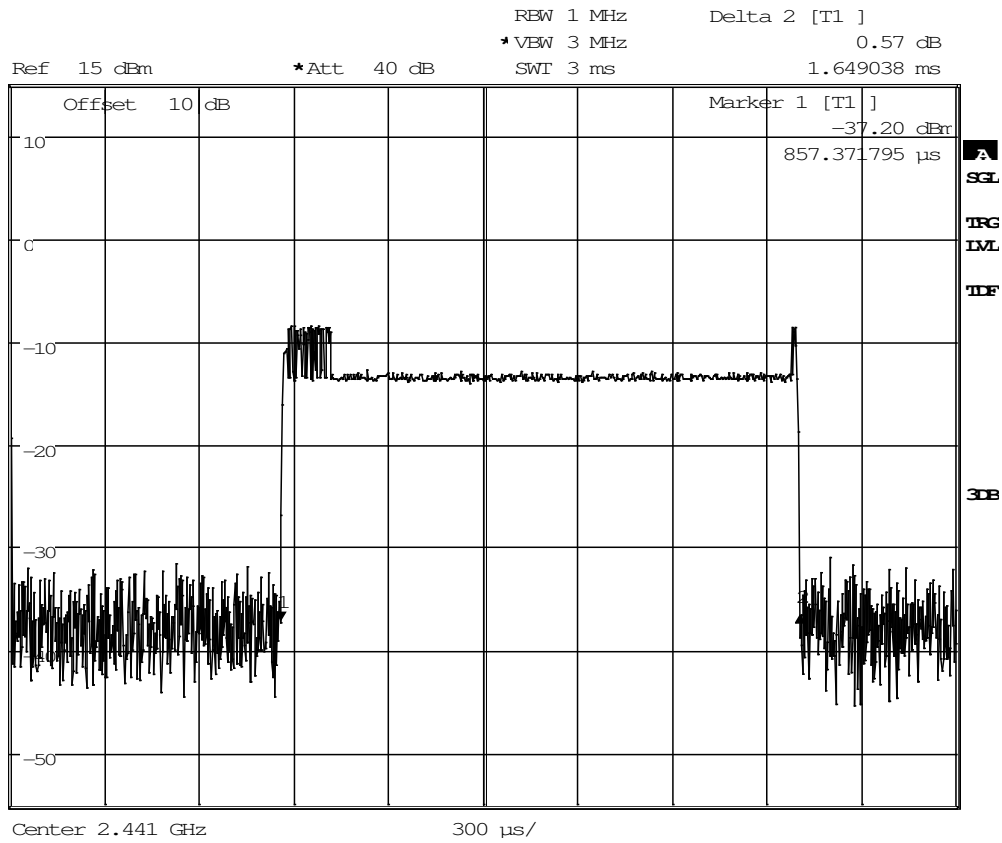
Center 2.441 GHz 200 μs/

A
 SEL
 TRG
 LVL
 TDF

3DB

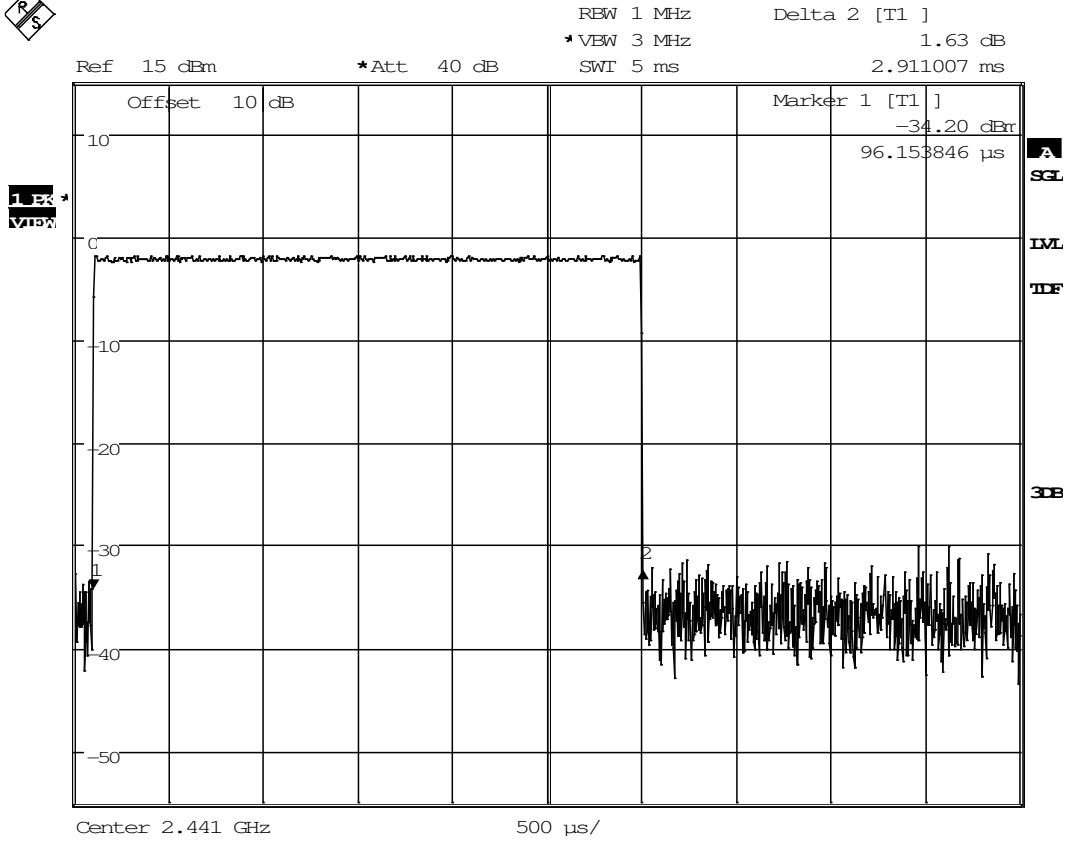
Date: 2.SEP.2016 11:08:30

4.8.2. DH3 Packet length



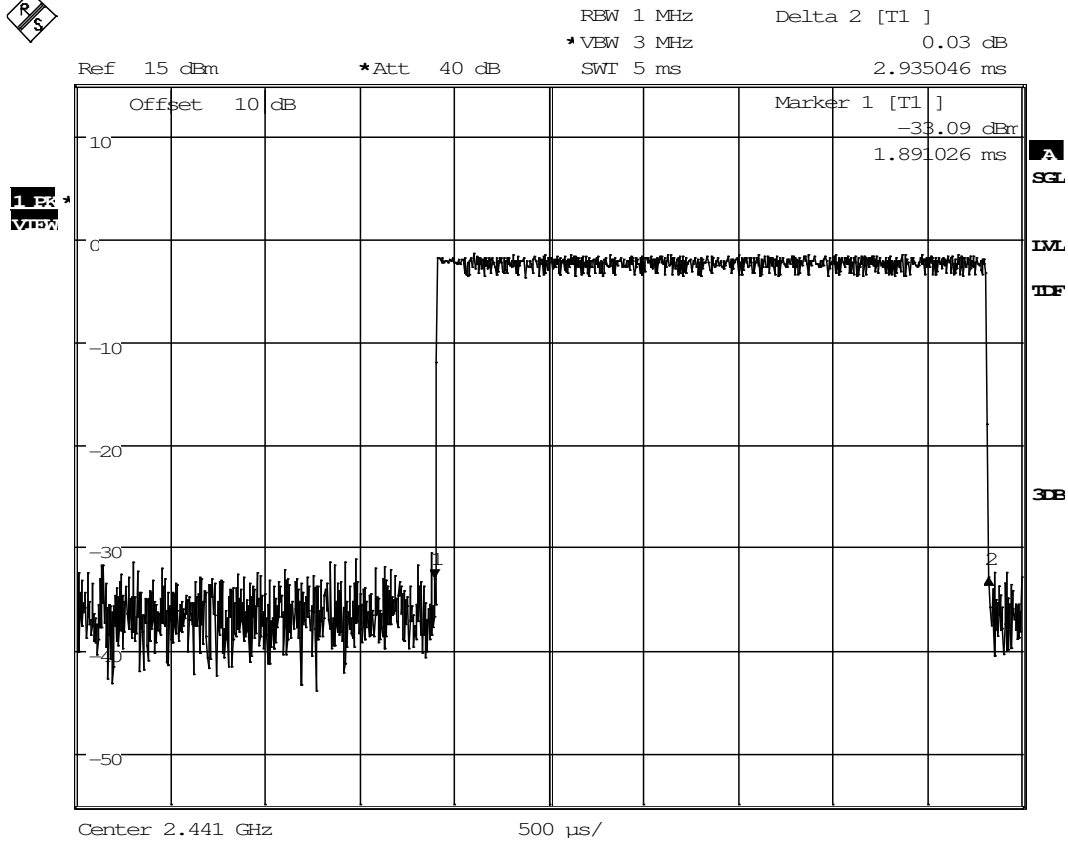
Date: 2.SEP.2016 11:11:48

4.8.3. DH5 Packet length



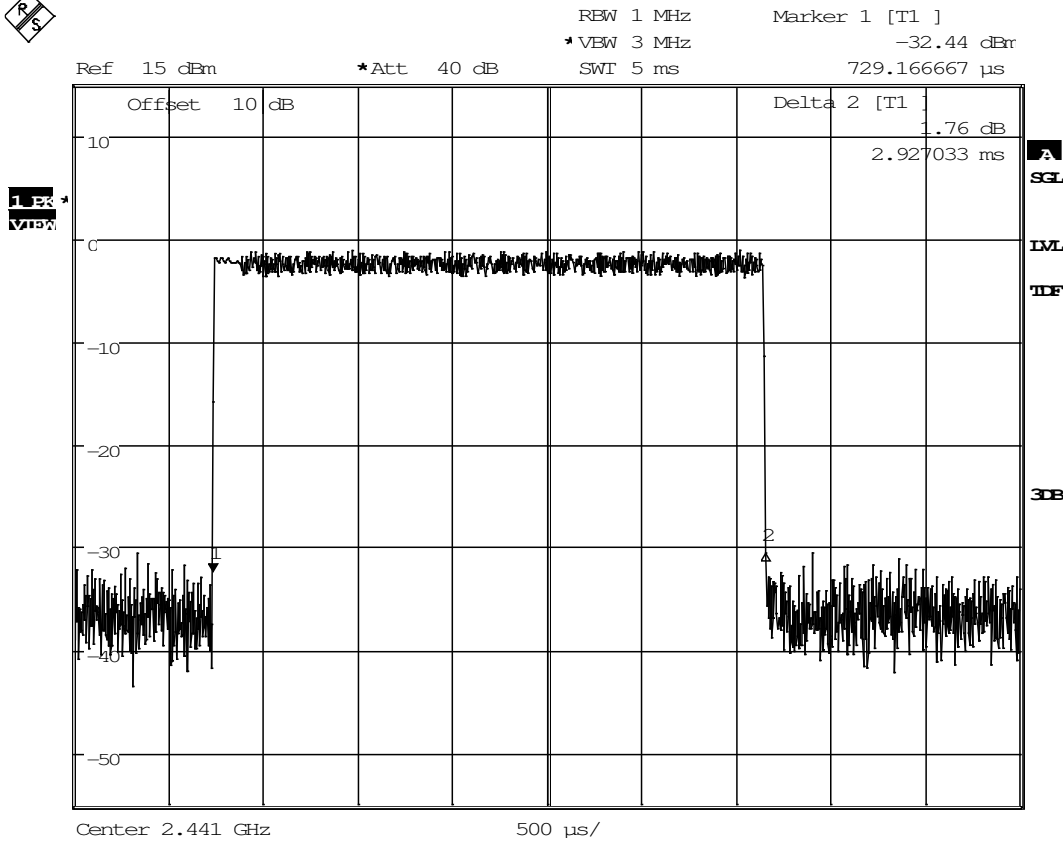
Date: 31.AUG.2016 13:53:23

4.8.4. 2DH5 Packet length



Date: 31.AUG.2016 13:49:28

4.8.5. 3DH5 Packet length



Date: 31.AUG.2016 13:50:57

5. RF-Exposure Evaluation

separation distance user to RF-radiating element greater 20cm

Distance	20	cm										
Operation Mode	Frequency on channel	Declared maximum conducted output power	Antenna Gain	Declared maximum EIRP (Measured+ Tune-up)	Duty cycle	Declared Maximum conducted output power	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit accord. Table 1	MPE-Value	Margin to Limit:	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
	(MHz)	(dBm)	(dBi)	(dBm)	%	(W)		(mW/cm ²)	(mW/cm ²)			
Bluetooth 2.4GHz	2402,0	-0,8	2,0	1,2	100%	0,0013	1,3	1,0000	0,0003	0,9997	0,000264	0,0003060
	2441,0	-0,1	2,0	1,9		0,0015	1,5	1,0000	0,0003	0,9997	0,000306	
	2480,0	-0,9	2,0	1,1		0,0013	1,3	1,0000	0,0003	0,9997	0,000258	

Maximum calculated MPE value:		
Lowest MPE-Limit:	1,0000	[mW/cm ²]
Highest MPE value:	0,0003	[mW/cm ²]
Lowest Margin to limit:	0,9997	[mW/cm ²]