FCC CERTIFICATION TEST REPORT

For

FCC ID:2AECWMM8B

Report Reference No. ..... :	16FBB03035 11
FCC 2.948 No ..... :	923232
Date of issue ..... :	2016-05-18
Testing Laboratory ..... :	DongGuan ShuoXin Electronic Technology Co., Ltd.
Address ..... :	No. 3, ChangLianShan Industrial Park, ChangAn Town, DongGuan City, GuangDong, China.
Applicant's name ..... :	Bonfire Acoustic
Address ..... :	302 222 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Manufacturer ..... :	Bonfire Acoustic

Test specification:

Test item description ..... :	MULTI MEDIA BLUETOOTH SPEAKER SYSTEM
Trade Mark ..... :	--
Model/Type reference ..... :	MM8B
Ratings ..... :	I/P: 3.7Vdc

Responsible Engineer : Smile Wang

Smile Wang

Approved by: Brown Lu

Brown Lu

Authorized Signatory: king wang

King Wang

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TEST REPORT DECLARE

Applicant	:	Bonfire Acoustic
Address	:	302 222 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi- do, Korea
Equipment under Test	:	MULTI MEDIA BLUETOOTH SPEAKER SYSTEM
Test Model No	:	MM8B
FCC ID	:	2AECWMM8B
Manufacturer	:	Bonfire Acoustic
Address	:	302 222 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi- do, Korea

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2015.

Test procedure used: ANSI C63.4: 2014, ANSI C63.10-2013 , DA 00-705.

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	16FBB03035 11		
Date of Test:	2016-04-29 To 2016-05-19	**Date of Report**:	2016/05/18

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of DongGuan ShuoXin Electronic Technology Co., Ltd.

1. SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
20dB Bandwidth	FCC Part 15: 15.247(a)(1)	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(1)	PASS
Number Of Hopping Frequency	FCC Part 15: 15.247(a)(1)(iii)	PASS
Dwell Time Test	FCC Part 15: 15.247(a)(1)(iii)	PASS
Maximum Output Power	FCC Part 15: 15.247(b)(1)	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247	PASS
Radiated Spurious Emissions	FCC Part 15.205 / 15.209	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Conducted Emission	FCC Part 15.207	PASS

2. GENERAL TEST INFORMATION

2.1. DESCRIPTION OF EUT

EUT* Name	:	MULTI MEDIA BLUETOOTH SPEAKER SYSTEM
Model Number	:	MM8B
EUT function description	:	Please reference user manual of this device
Power supply	:	3.7Vdc
Radio Technology	:	V4.0 （without BLE mode）
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, π/4DQPSK,8DPSK
Antenna Type	:	PIFA antenna, maximum PK gain: 0 dBi
Date of Receipt	:	2016/04/29
Sample Type	:	Single production

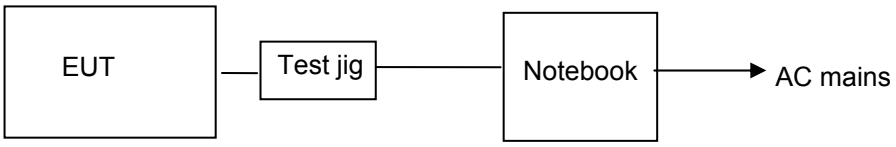
2.2. ACCESSORIES OF EUT

Description of Accessories	Manufacturer	Model number or Type	Output.
/	/	/	/

2.3. ASSISTANT EQUIPMENT USED FOR TEST

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
Notebook	acer	Aspire E1-472G	FCC DoC	/

2.4. BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST



EUT was connected to control to a special test jig provided by manufacturer which has a Micro USB connector to connect to Notebook, and the Notebook will run a special test software to control EUT work in Continuous TX mode, and select test channel, wireless mode and data rate.

Remark: GFSK,8DPSK, π /4DQPSK all these modulation all have been tested , GFSK is found as worst case and only reported for radiated emission.

Tested mode, channel, and data rate information			
Mode	data rate (Mpbs) (see Note)	Channel	Frequency (MHz)
GFSK (Worst)	1	Low :CH0	2402
	1	Middle: CH39	2441
	1	High: CH78	2480
π/4DQPSK	2	Low :CH0	2402
	2	Middle: CH39	2441
	2	High: CH78	2480
8DPSK	3	Low :CH0	2402
	3	Middle: CH39	2441
	3	High: CH78	2480
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.			

2.5. TEST ENVIRONMENT CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (9KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

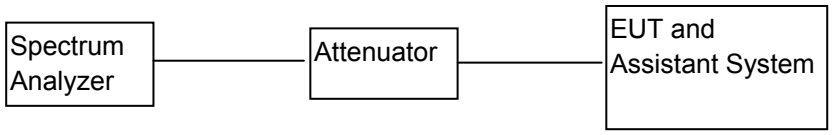
Note：This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 20dB BANDWIDTH

3.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. LIMITS

No limit requirement.

3.4. TEST PROCEDURE

(1) Configure EUT and assistant system according clause 2.4 and 3.2.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable.

(3) Configure EUT work in test mode as stated in clause 2.4.

(4) Set the spectrum analyzer as follows:

RBW:	30KHz
VBW:	100KHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode:	Max hold

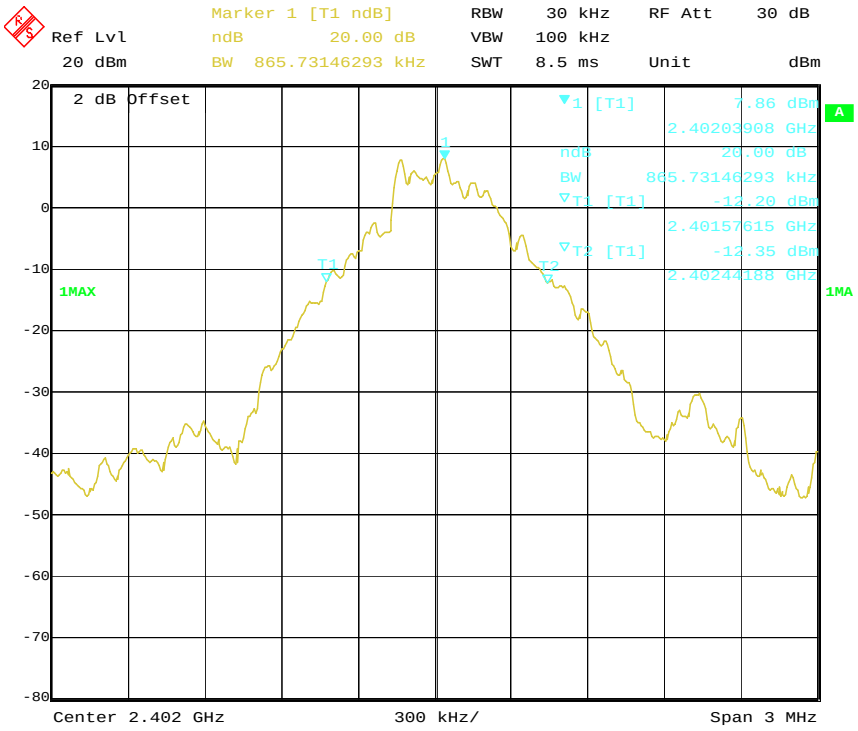
(5) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

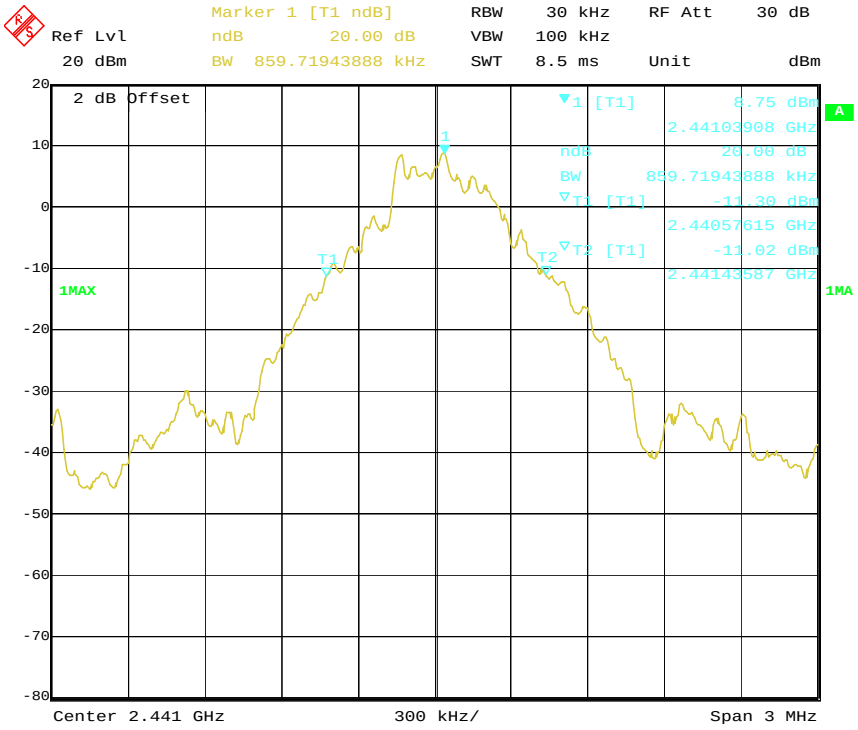
3.5. TEST RESULT

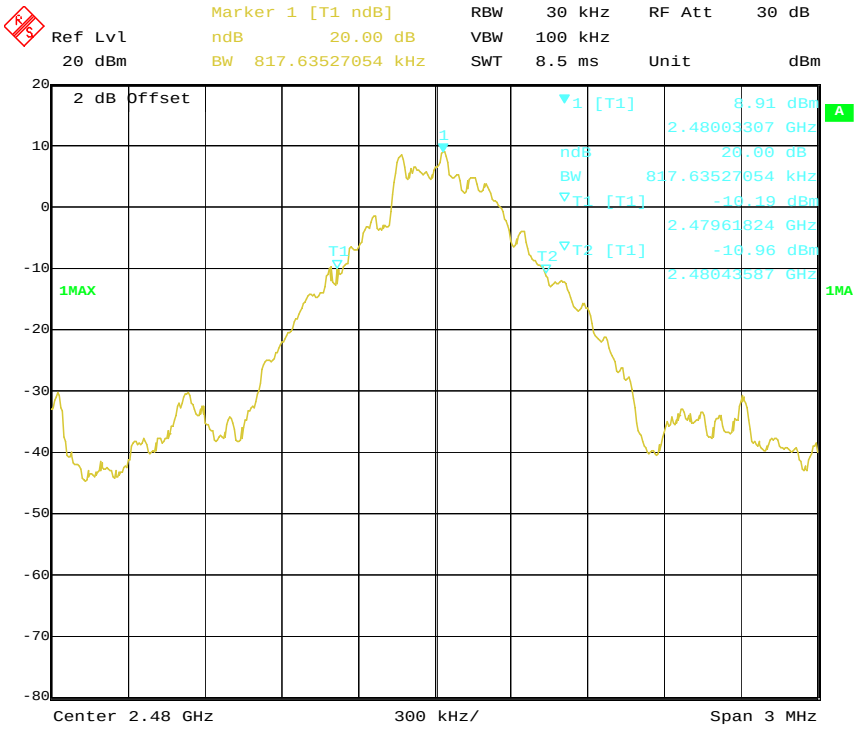
Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	π /4DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.87	1.22	1.21	Pass
Middle	2441	0.86	1.23	1.21	Pass
High	2480	0.82	1.23	1.23	Pass

3.6. ORIGINAL TEST DATA

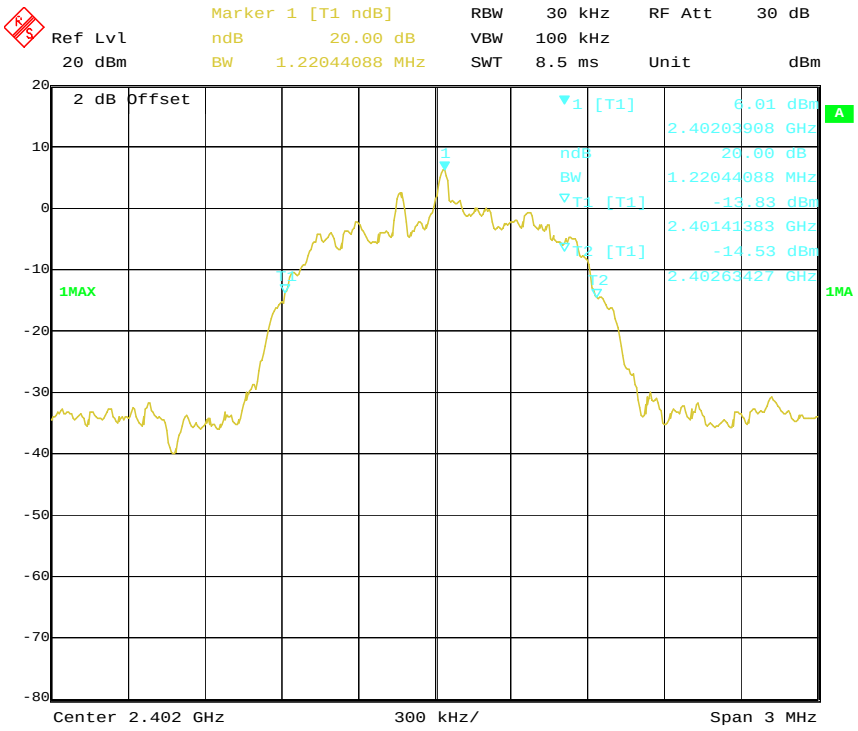
GFSK

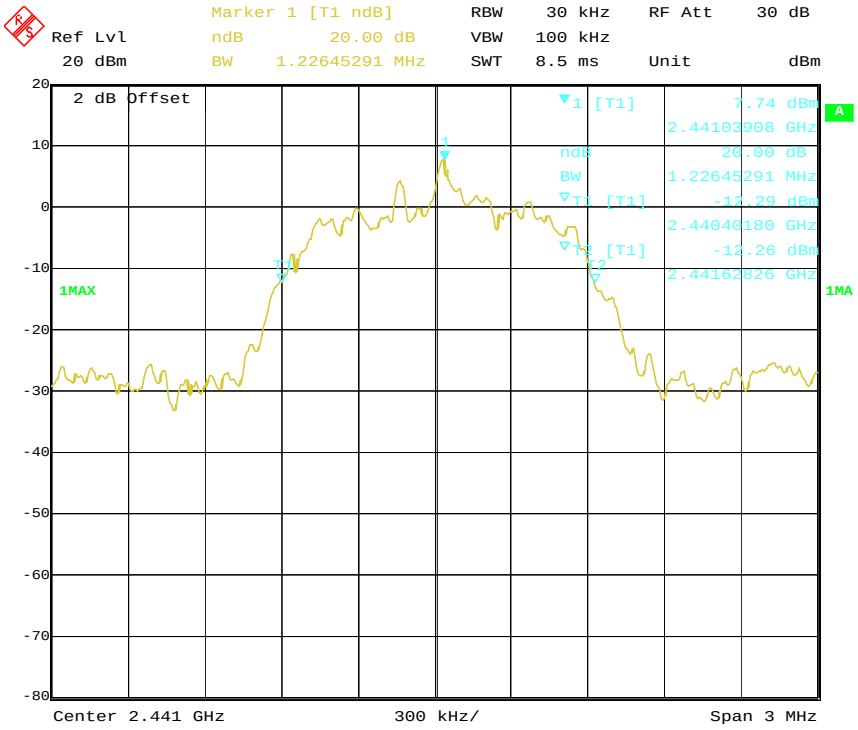


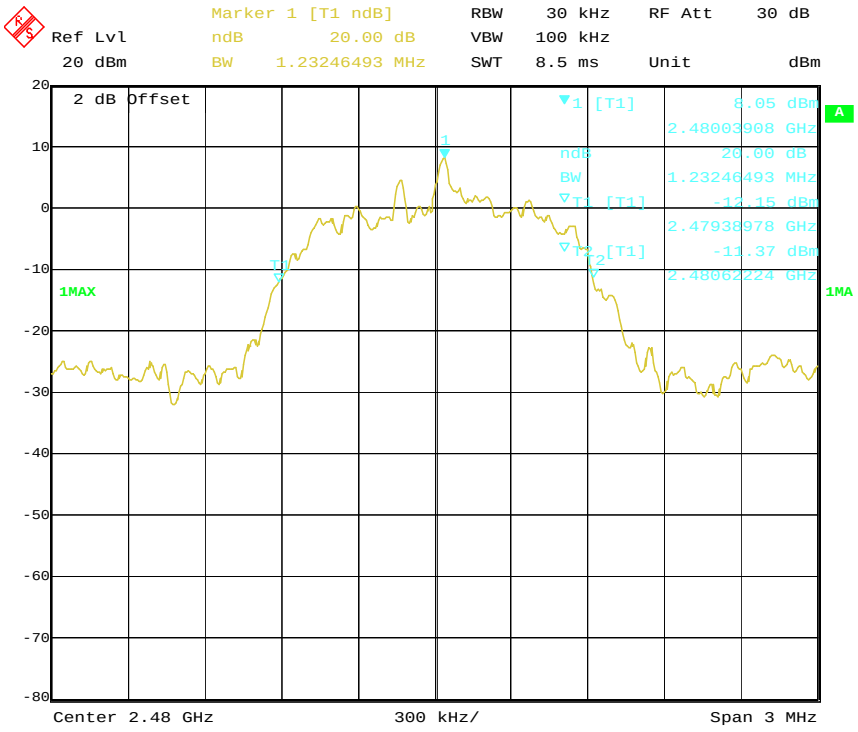

Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 859.71943888 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 8.75 dBm
2.44103908 GHz
ndB 20.00 dB
BW 859.71943888 kHz
T1 [T1] -11.30 dBm
2.44057615 GHz
T2 [T1] -11.02 dBm
2.44143587 GHz
1MAX
1MA
A
Center 2.441 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 817.63527054 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 8.91 dBm
2.48003307 GHz
ndB 20.00 dB
BW 817.63527054 kHz
T1 [T1] -10.19 dBm
2.47961824 GHz
T2 [T1] -10.96 dBm
2.48043587 GHz
1MAX
1MA
A
Center 2.48 GHz
300 kHz/
Span 3 MHz

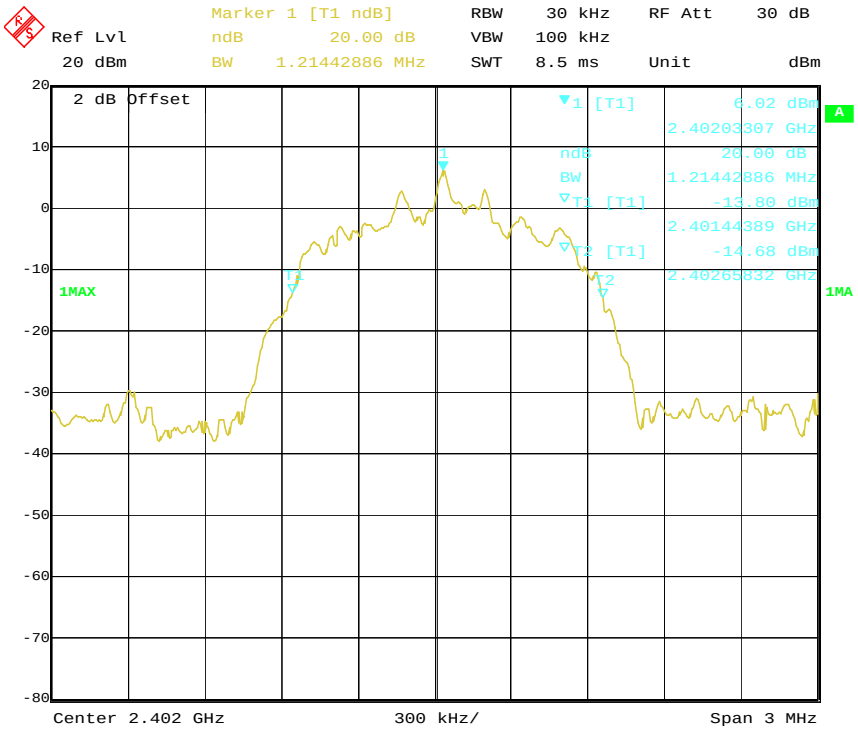
π /4DQPSK

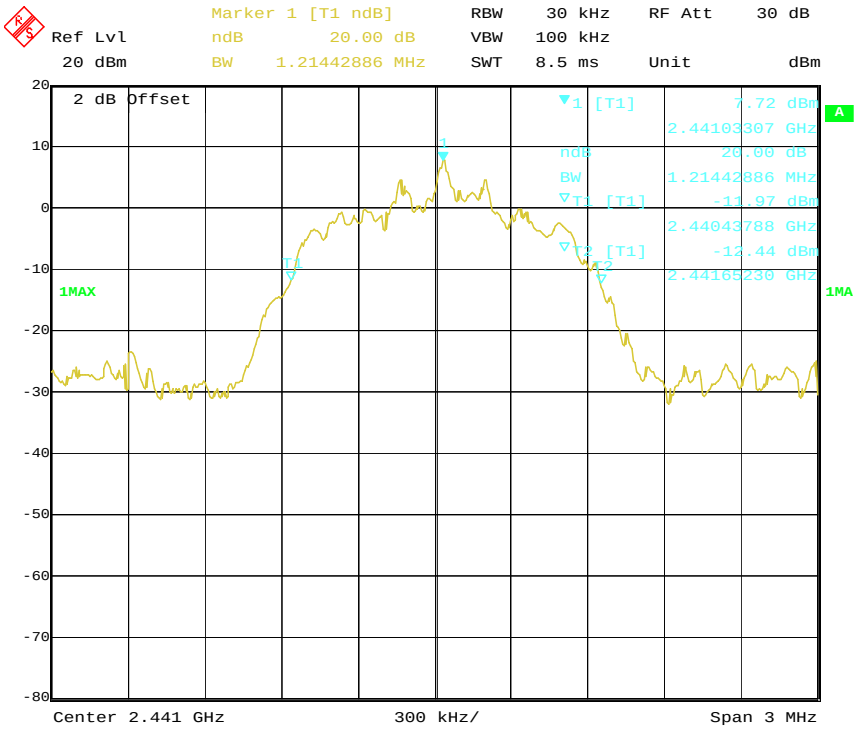

Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.22044088 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 6.01 dBm
2.40203908 GHz
ndB 20.00 dB
BW 1.22044088 MHz
T1 [T1] -13.83 dBm
2.40141383 GHz
T2 [T1] -14.53 dBm
2.40263427 GHz
1MAX
1MA
A
Center 2.402 GHz
300 kHz/
Span 3 MHz

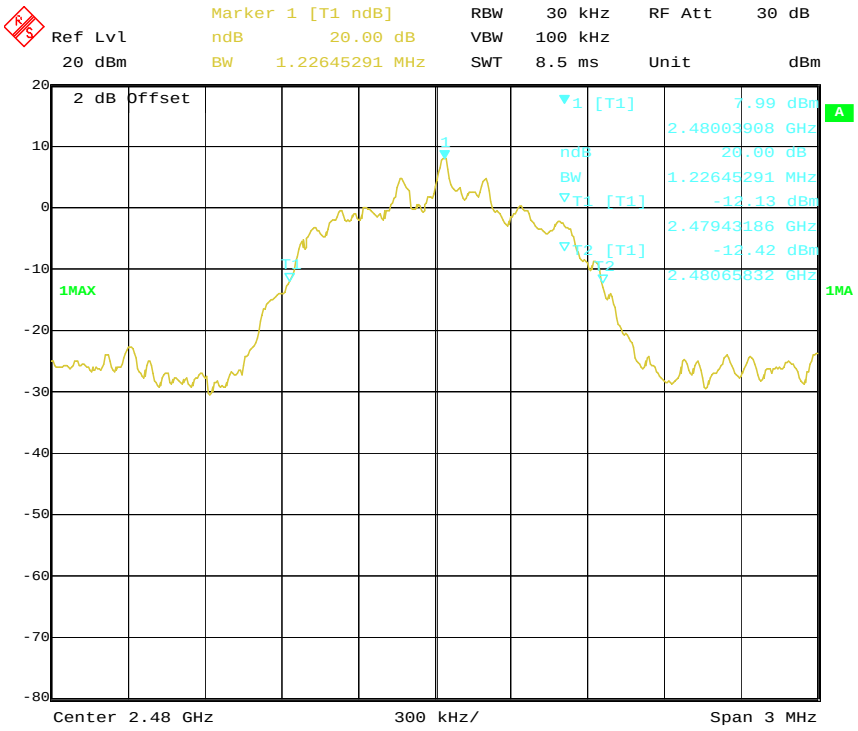

Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.22645291 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 7.74 dBm
2.44103908 GHz
ndB 20.00 dB
BW 1.22645291 MHz
T1 [T1] -12.29 dBm
2.44040180 GHz
T2 [T1] -12.26 dBm
2.44162826 GHz
1MAX
1MA
A
Center 2.441 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.23246493 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 8.05 dBm
2.48003908 GHz
ndB 20.00 dB
BW 1.23246493 MHz
T1 [T1] -12.15 dBm
2.47938978 GHz
T2 [T1] -11.37 dBm
2.48062224 GHz
1MAX
1MA
A
Center 2.48 GHz
300 kHz/
Span 3 MHz

8DPSK


Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.21442886 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 6.02 dBm
2.40203307 GHz
ndB 20.00 dB
BW 1.21442886 MHz
T1 [T1] -13.80 dBm
2.40144389 GHz
T2 [T1] -14.68 dBm
2.40265832 GHz
1MAX
1MA
A
Center 2.402 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.21442886 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 7.72 dBm
2.44103307 GHz
ndB 20.00 dB
BW 1.21442886 MHz
T1 [T1] -11.97 dBm
2.44043788 GHz
T2 [T1] -12.44 dBm
2.44165230 GHz
1MAX
1MA
A
Center 2.441 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1 ndB]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
ndB 20.00 dB
VBW 100 kHz
20 dBm
BW 1.22645291 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 7.99 dBm
2.48003908 GHz
ndB 20.00 dB
BW 1.22645291 MHz
T1 [T1] -12.13 dBm
2.47943186 GHz
T2 [T1] -12.42 dBm
2.48065832 GHz
1MAX
1MA
A
Center 2.48 GHz
300 kHz/
Span 3 MHz

4. CARRIER FREQUENCY SEPARATION TEST

4.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

4.2. THE REQUIREMENT FOR SECTION 15.247(A)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly

ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

4.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 6.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

4.5. TEST PROCEDURE

（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 3 MHz.

（3）Set the adjacent channel of the EUT maxhold another trace.

（4）Measurement the channel separation

4.6. TEST RESULT

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.028	>(25KHz or 2/3*20dB Bandwidth)	PASS
Middle	2441	1.16	>(25KHz or 2/3*20dB Bandwidth)	PASS
High	2479	0.998	>(25KHz or 2/3*20dB Bandwidth)	PASS

π/4DQPSK

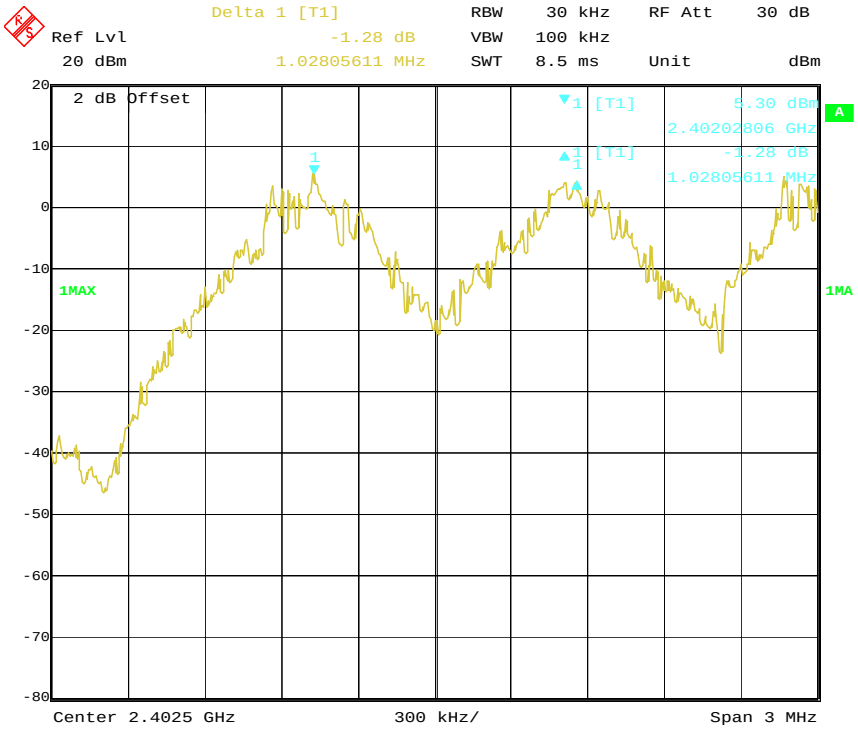
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	0.98	>(25KHz or 2/3*20dB Bandwidth)	PASS
Middle	2441	0.998	>(25KHz or 2/3*20dB Bandwidth)	PASS
High	2479	0.998	>(25KHz or 2/3*20dB Bandwidth)	PASS

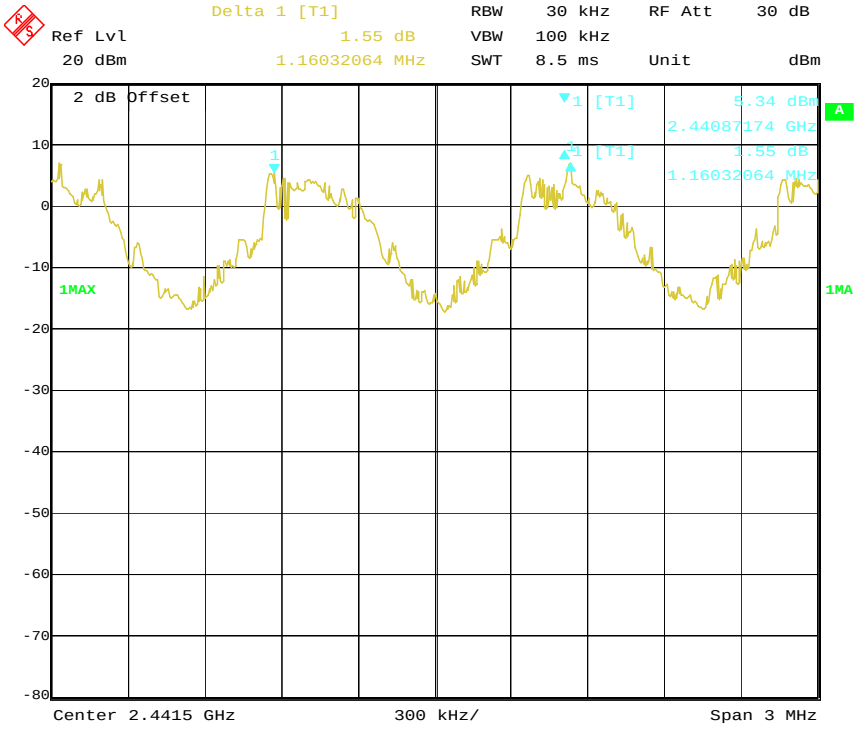
8DPSK

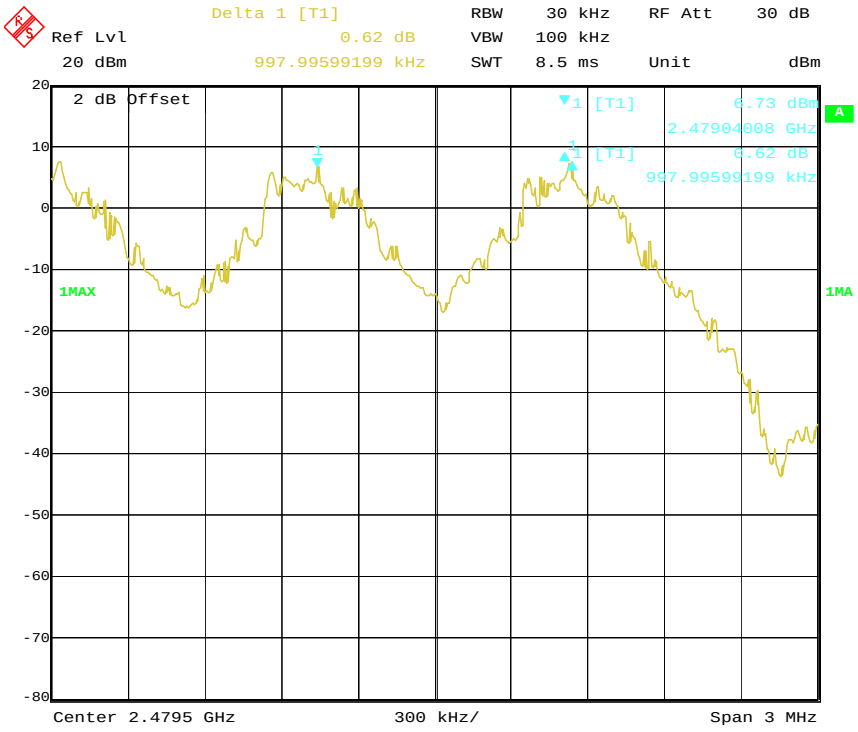
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.01	>(25KHz or 2/3*20dB Bandwidth)	PASS
Middle	2441	1.01	>(25KHz or 2/3*20dB Bandwidth)	PASS
High	2479	1.03	>(25KHz or 2/3*20dB Bandwidth)	PASS

The spectrum analyzer plots are attached as below.

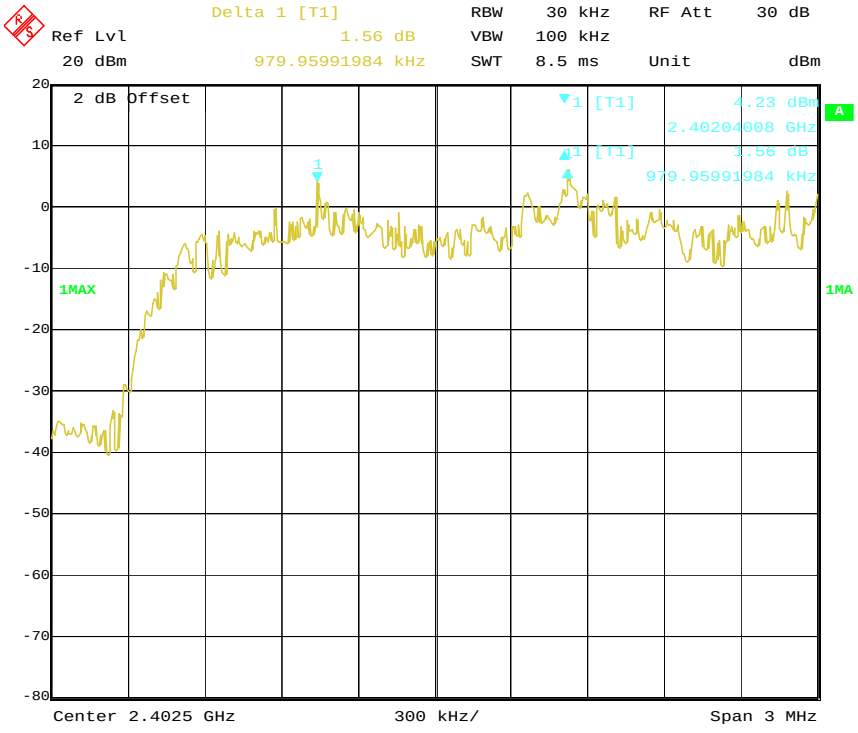
GFSK

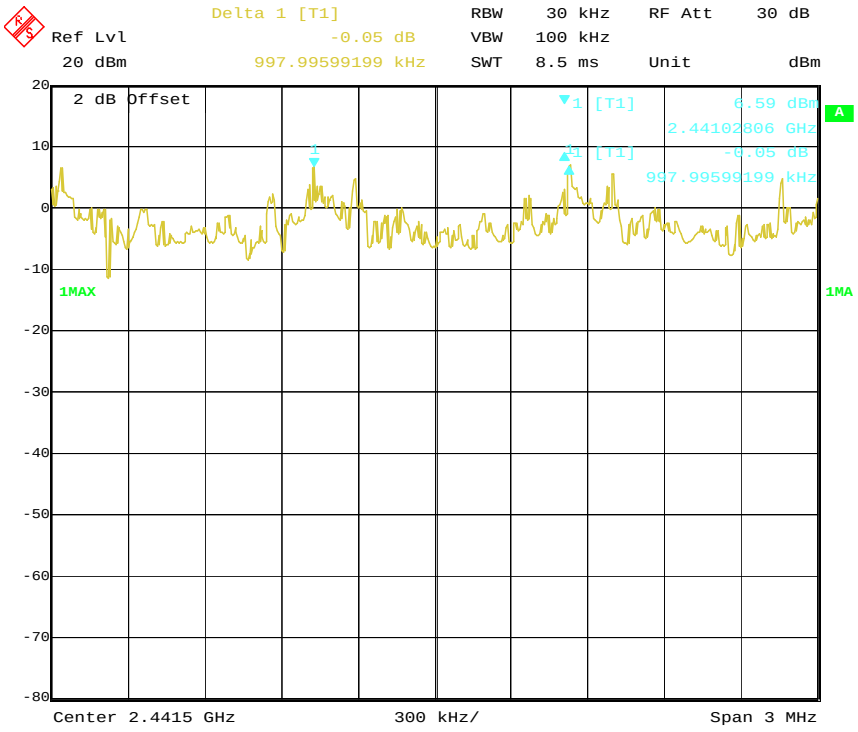

Delta 1 [T1]
Ref Lvl
20 dBm
-1.28 dB
1.02805611 MHz
RBW 30 kHz
VBW 100 kHz
SWT 8.5 ms
RF Att 30 dB
Unit dBm
2 dB Offset
1 [T1] 5.30 dBm
2.40202806 GHz
1 [T1] -1.28 dB
1.02805611 MHz
1MAX
1MA
A
Center 2.4025 GHz
300 kHz/
Span 3 MHz

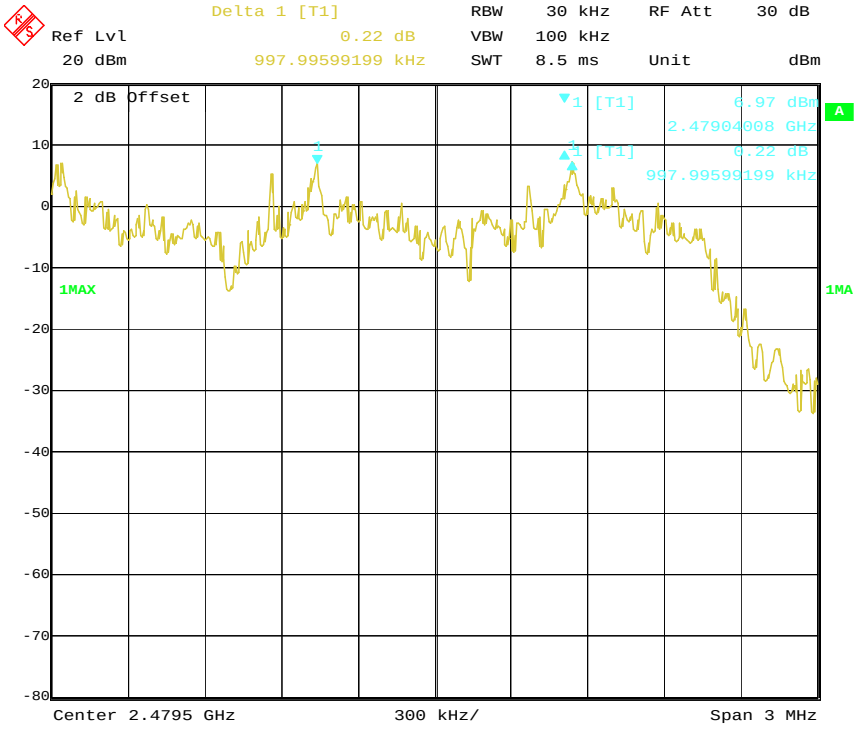

Delta 1 [T1]
Ref Lvl
20 dBm
1.55 dB
1.16032064 MHz
RBW 30 kHz
VBW 100 kHz
SWT 8.5 ms
RF Att 30 dB
Unit dBm
2 dB Offset
1 [T1] 5.34 dBm
2.44087174 GHz
1 [T1] 1.55 dB
1.16032064 MHz
1MAX
1MA
A
Center 2.4415 GHz
300 kHz/
Span 3 MHz


Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
0.62 dB
VBW 100 kHz
20 dBm
997.99599199 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 6.73 dBm
2.47904008 GHz
1 [T1] 0.62 dB
997.99599199 kHz
1MAX
1MA
A
Center 2.4795 GHz
300 kHz/
Span 3 MHz

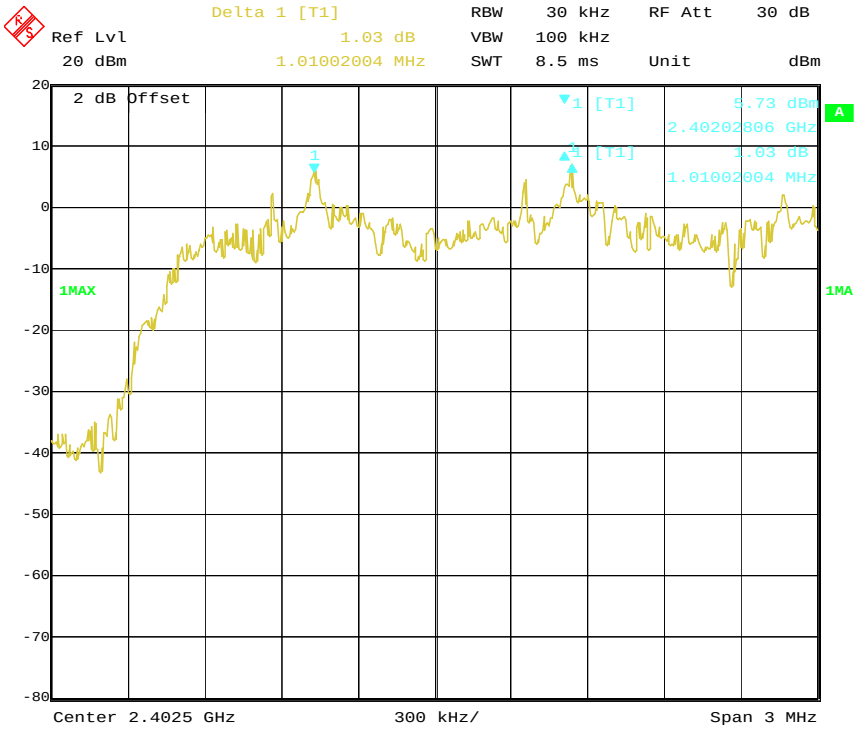
Π/4-DQPSK

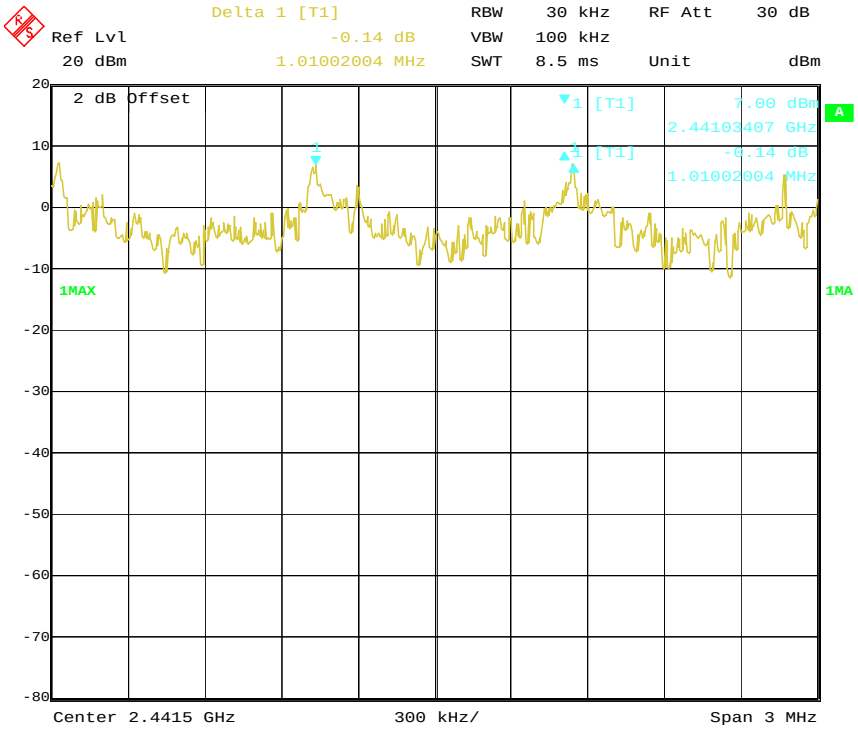

Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
1.56 dB
VBW 100 kHz
20 dBm
979.95991984 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 4.23 dBm
2.40204008 GHz
1 [T1] 1.56 dB
979.95991984 kHz
1MAX
1MA
A
Center 2.4025 GHz
300 kHz/
Span 3 MHz

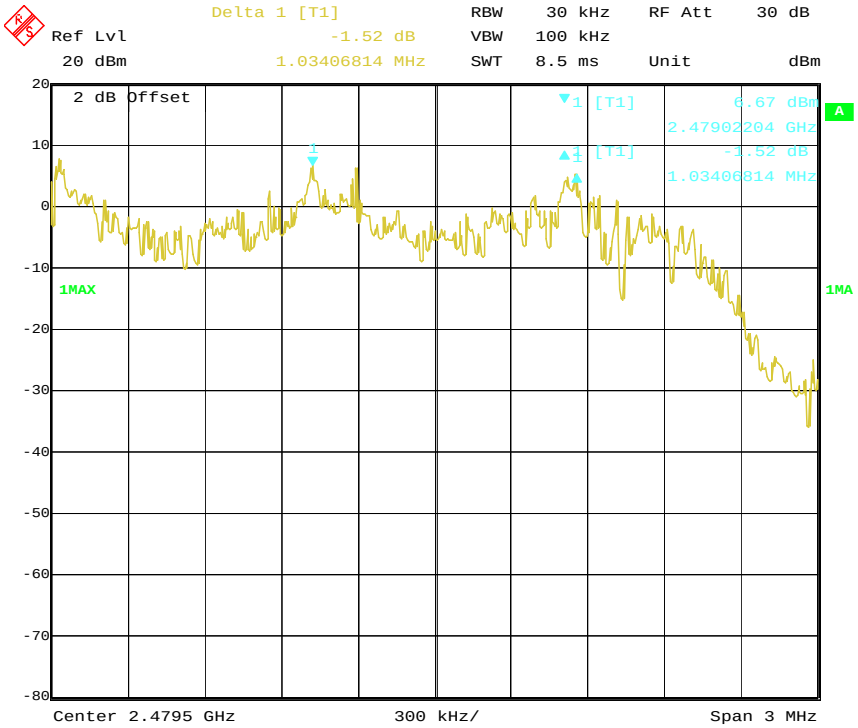

Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
-0.05 dB
VBW 100 kHz
20 dBm
997.99599199 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 6.59 dBm
2.44102806 GHz
1 [T1] -0.05 dB
997.99599199 kHz
1MAX
1MA
A
Center 2.4415 GHz
300 kHz/
Span 3 MHz


Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
0.22 dB
VBW 100 kHz
20 dBm
997.99599199 kHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 6.97 dBm
2.47904008 GHz
1 [T1] 0.22 dB
997.99599199 kHz
1MAX
1MA
A
Center 2.4795 GHz
300 kHz/
Span 3 MHz

8DPSK


Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
1.03 dB
VBW 100 kHz
20 dBm
1.01002004 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 5.73 dBm
2.40202806 GHz
1 [T1] 1.03 dB
1.01002004 MHz
1MAX
1MA
A
Center 2.4025 GHz
300 kHz/
Span 3 MHz


Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
-0.14 dB
VBW 100 kHz
20 dBm
1.01002004 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1] 7.00 dBm
2.44103407 GHz
1 [T1] -0.14 dB
1.01002004 MHz
1MAX
1MA
A
Center 2.4415 GHz
300 kHz/
Span 3 MHz


Delta 1 [T1]
RBW 30 kHz
RF Att 30 dB
Ref Lvl
-1.52 dB
VBW 100 kHz
20 dBm
1.03406814 MHz
SWT 8.5 ms
Unit dBm
2 dB Offset
1 [T1]
6.67 dBm
2.47902204 GHz
1 [T1]
-1.52 dB
1.03406814 MHz
A
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4795 GHz
300 kHz/
Span 3 MHz

5. NUMBER OF HOPPING FREQUENCY TEST

5.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

5.2. THE REQUIREMENT FOR SECTION 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

5.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 7.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it.

5.5. TEST PROCEDURE

（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

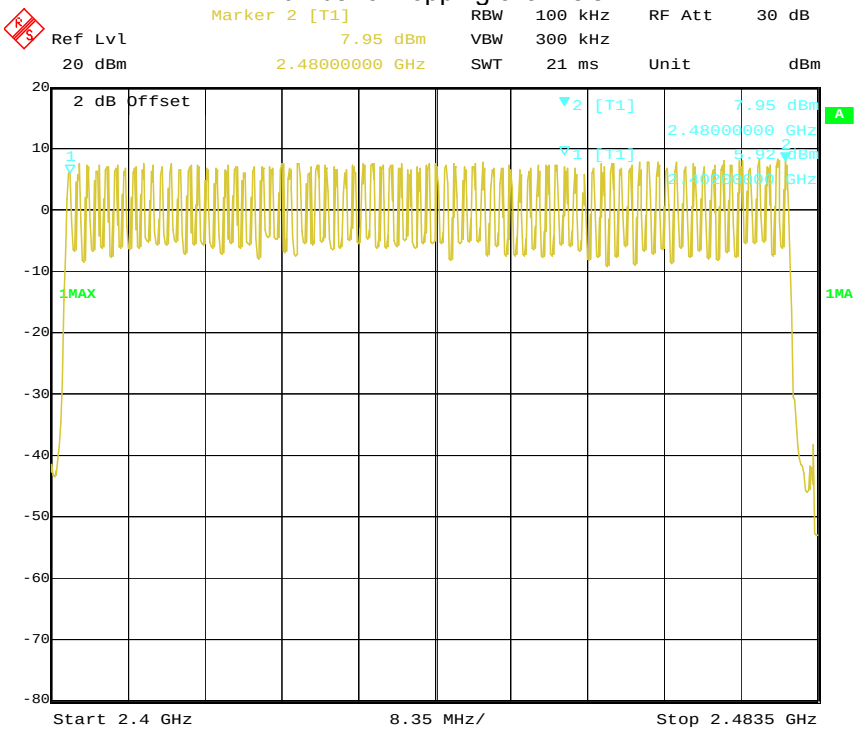
（3）Max hold, view and count how many channel in the band.

5.6. TEST RESULT

Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	≥15

The spectrum analyzer plots are attached as below

Number of hopping channels



Channle information									
CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency
0	2402	16	2418	32	2434	48	2450	64	2466
1	2403	17	2419	33	2435	49	2451	65	2467
2	2404	18	2420	34	2436	50	2452	66	2468
3	2405	19	2421	35	2437	51	2453	67	2469
4	2406	20	2422	36	2438	52	2454	68	2470
5	2407	21	2423	37	2439	53	2455	69	2471
6	2408	22	2424	38	2440	54	2456	70	2472
7	2409	23	2425	39	2441	55	2457	71	2473
8	2410	24	2426	40	2442	56	2458	72	2474
9	2411	25	2427	41	2443	57	2459	73	2475
10	2412	26	2428	42	2444	58	2460	74	2476
11	2413	27	2429	43	2445	59	2461	75	2477
12	2414	28	2430	44	2446	60	2462	76	2478
13	2415	29	2431	45	2447	61	2463	77	2479
14	2416	30	2432	46	2448	62	2464	78	2480
15	2417	31	2433	47	2449	63	2465	-	-

6. DWELL TIME TEST

6.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

6.2. THE REQUIREMENT FOR SECTION 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

6.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 8.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

6.5. TEST PROCEDURE

（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）Set center frequency of spectrum analyzer = operating frequency.

（3）Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 20ms. Get the pulse time.

6.6. TEST RESULT

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.44	140.8	400
	2441	0.45	144	400
	2480	0.44	140.8	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79)) ×31.6				
DH3	2402	1.73	276.8	400
	2441	1.73	276.8	400
	2480	1.73	276.8	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79)) ×31.6				
DH5	2402	3.01	321.1	400
	2441	3.01	321.1	400
	2480	3.01	321.1	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79)) ×31.6				

Π/4-DQPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.45	144	400
	2441	0.46	147.2	400
	2480	0.46	147.2	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79)) ×31.6				
DH3	2402	1.75	280	400
	2441	1.79	286.4	400
	2480	1.75	280	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79)) ×31.6				
DH5	2402	3.00	320	400
	2441	3.00	320	400
	2480	3.05	325.3	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79)) ×31.6				

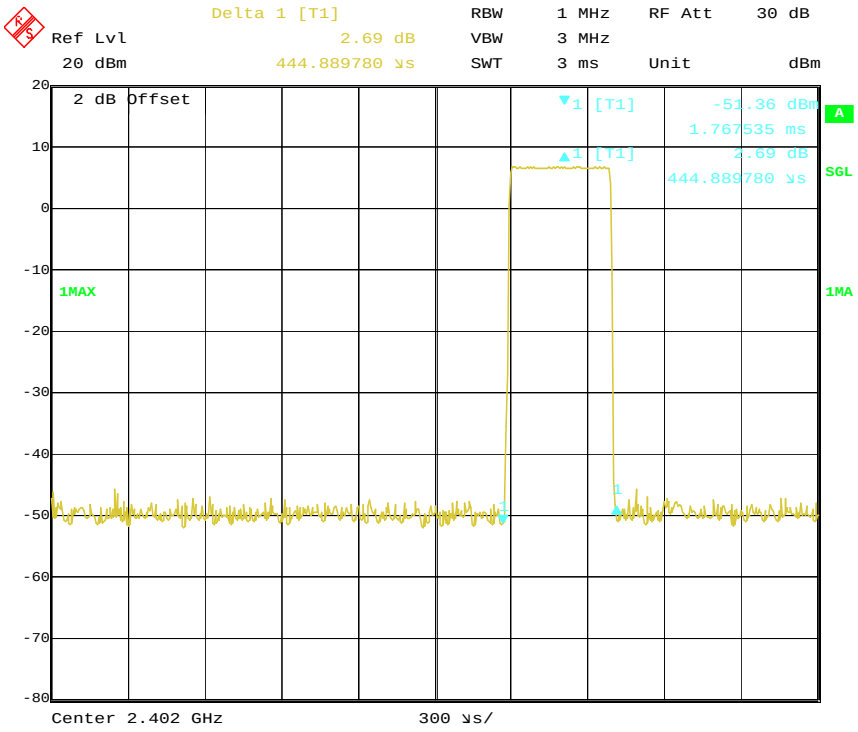
8DPSK Mode

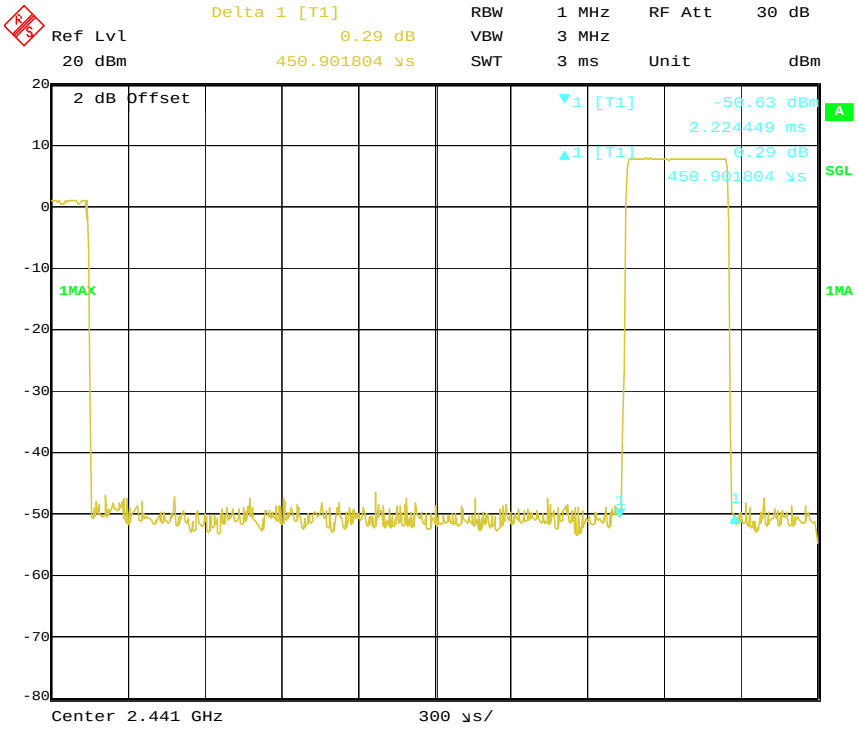
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.47	150.4	400
	2441	0.47	150.4	400
	2480	0.46	147.2	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79)) ×31.6				
DH3	2402	1.73	276.8	400
	2441	1.75	280	400
	2480	1.75	280	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79)) ×31.6				
DH5	2402	3.00	320	400
	2441	3.05	325.3	400
	2480	3.05	325.3	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79)) ×31.6				

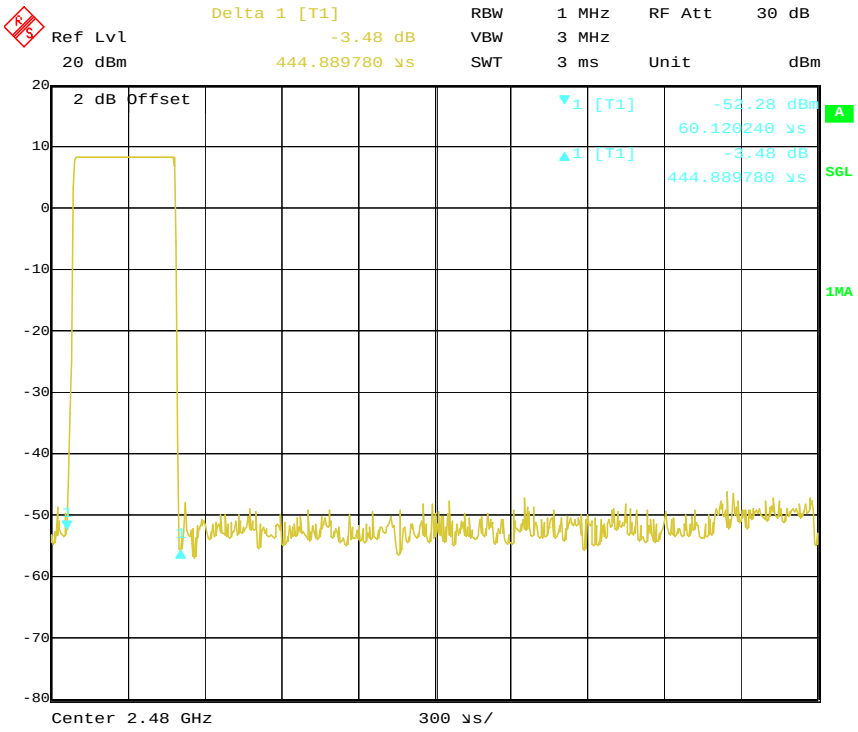
The spectrum analyzer plots are attached as below:

GFSK Mode

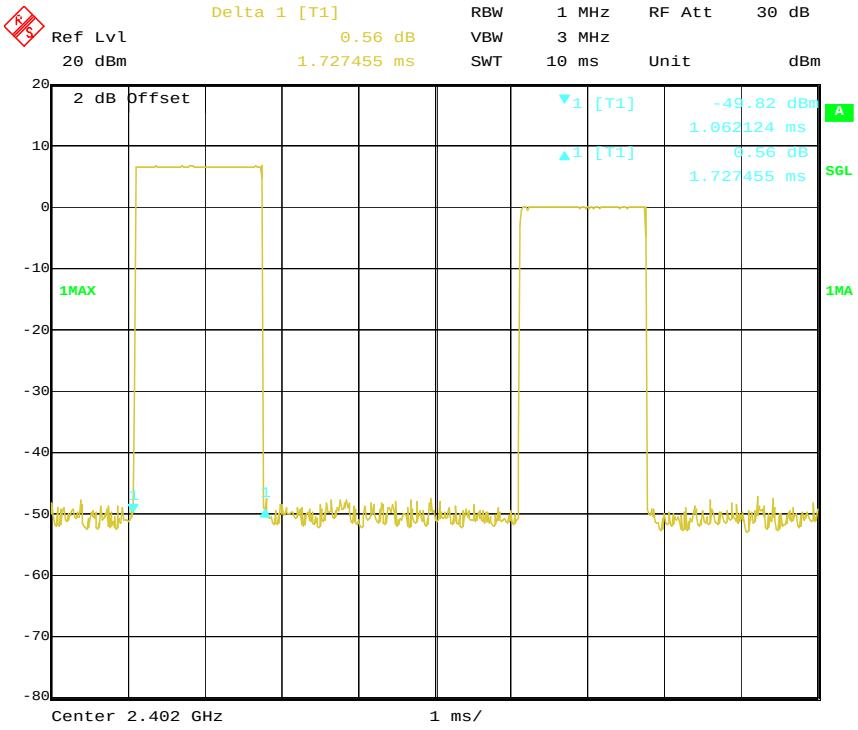
DH1

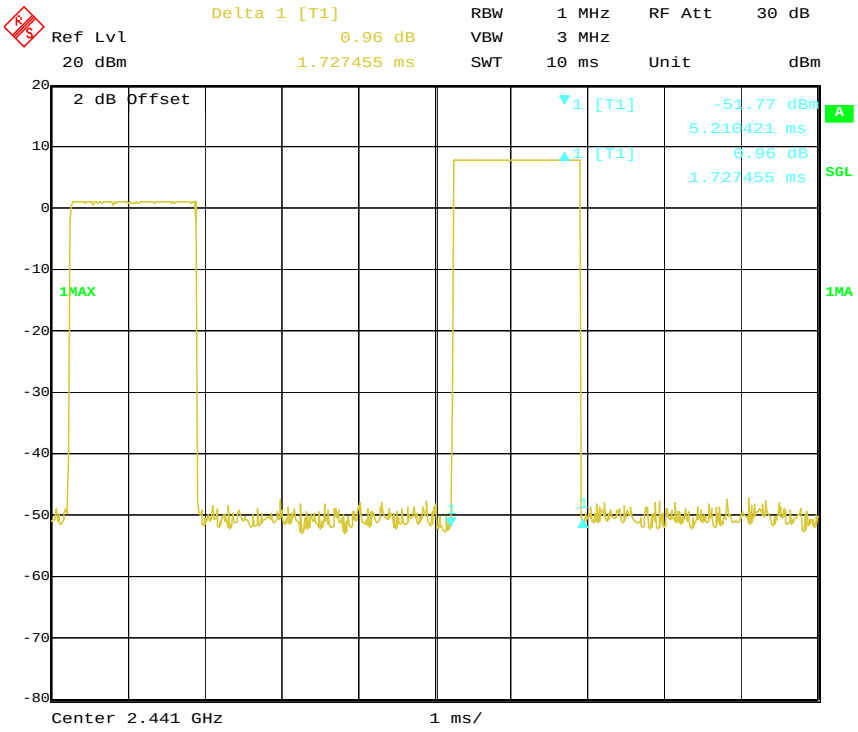


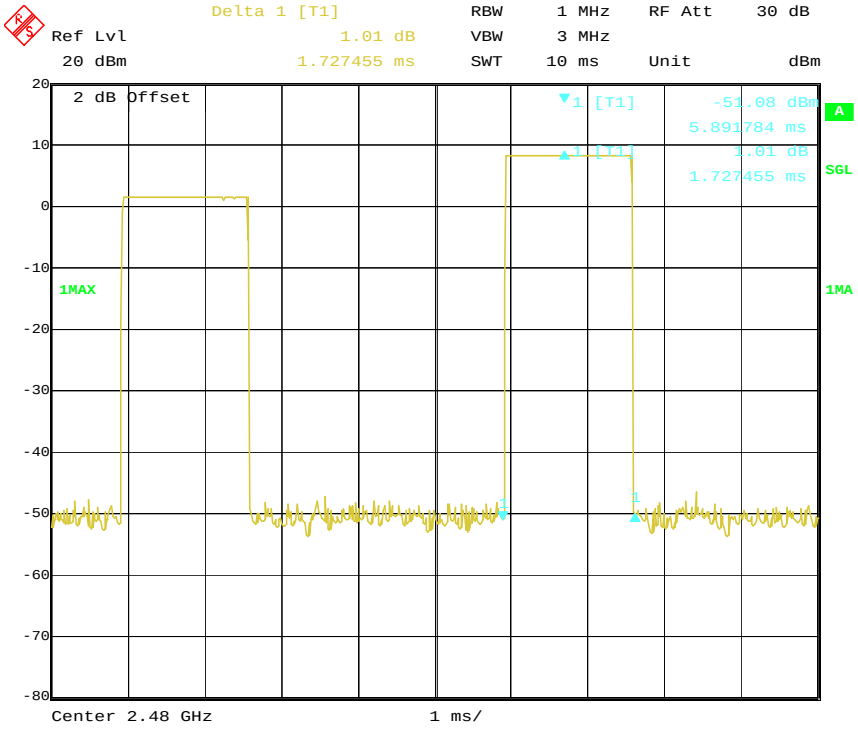



Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-3.48 dB
VBW 3 MHz
20 dBm
444.889780 µs
SWT 3 ms
Unit dBm
2 dB Offset
1 [T1]
-52.28 dBm
60.120240 µs
1 [T1]
-3.48 dB
444.889780 µs
A
SGL
1MA
Center 2.48 GHz
300 µs/

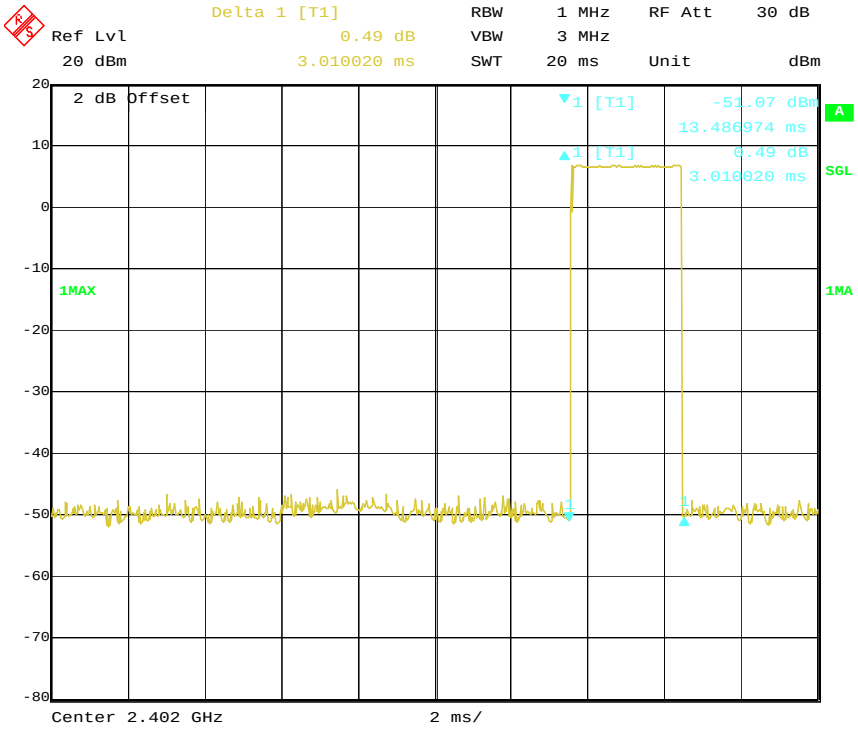
DH3

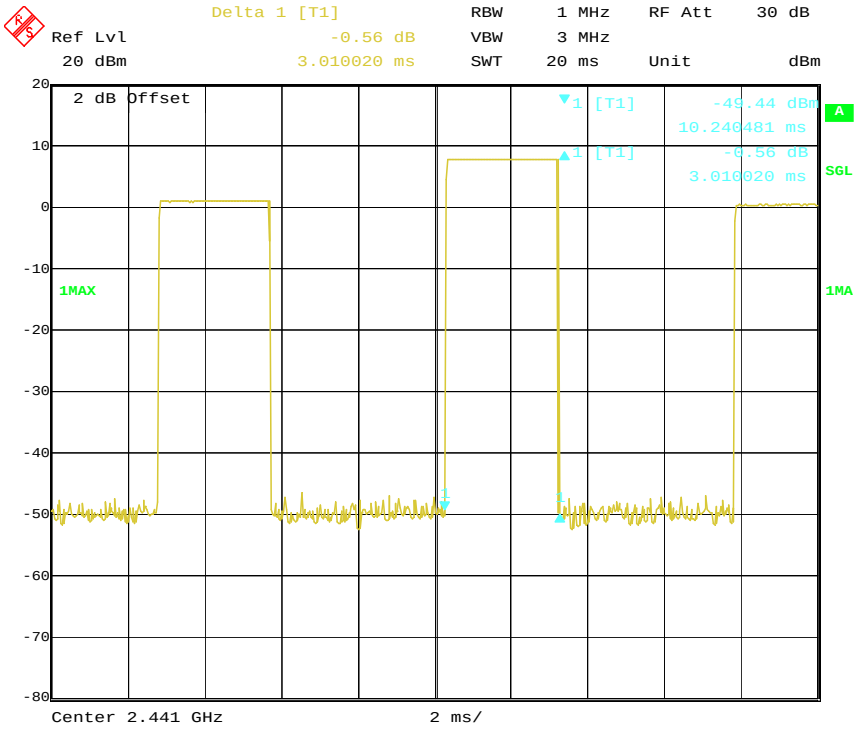

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.56 dB
VBW 3 MHz
20 dBm
1.727455 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-49.82 dBm
1.062124 ms
1 [T1]
0.56 dB
1.727455 ms
A
SGL
1MAX
1MA
Center 2.402 GHz
1 ms/

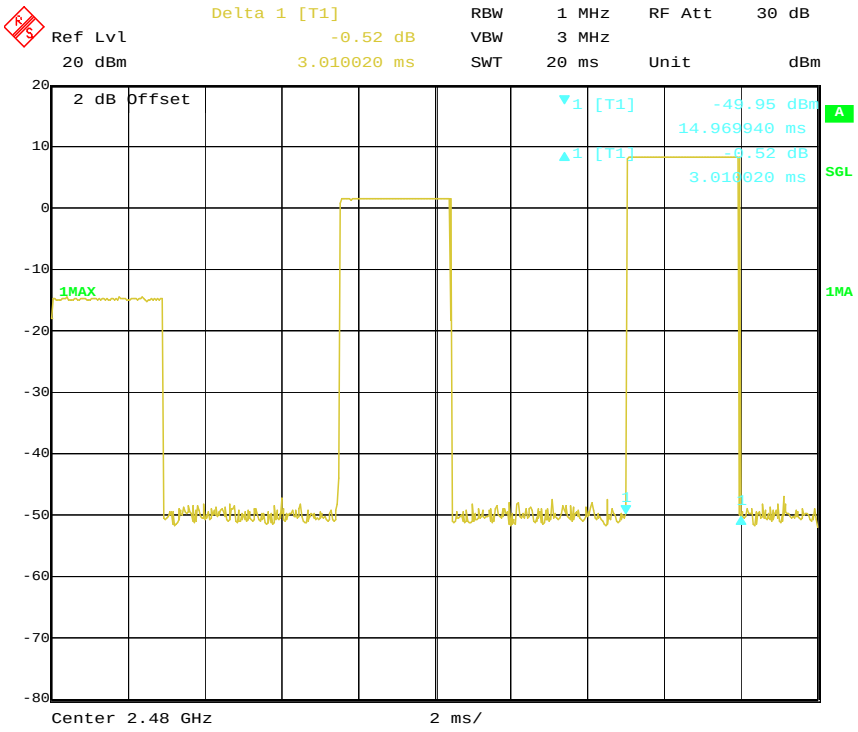

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.96 dB
VBW 3 MHz
20 dBm
1.727455 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-51.77 dBm
5.210421 ms
1 [T1]
0.96 dB
1.727455 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
1 ms/


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
1.01 dB
VBW 3 MHz
20 dBm
1.727455 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-51.08 dBm
5.891784 ms
1 [T1]
1.01 dB
1.727455 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 ms/

DH5

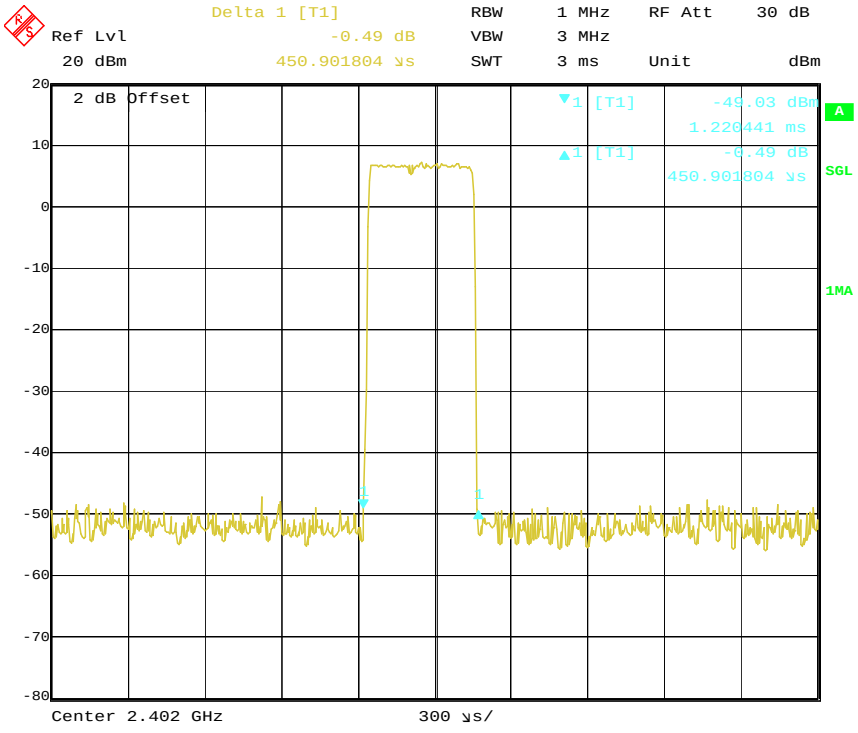

Delta 1 [T1]
0.49 dB
3.010020 ms
RBW 1 MHz
VBW 3 MHz
SWT 20 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
2 dB Offset
1 [T1] -51.07 dBm
13.486974 ms
1 [T1] 0.49 dB
3.010020 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
2 ms/

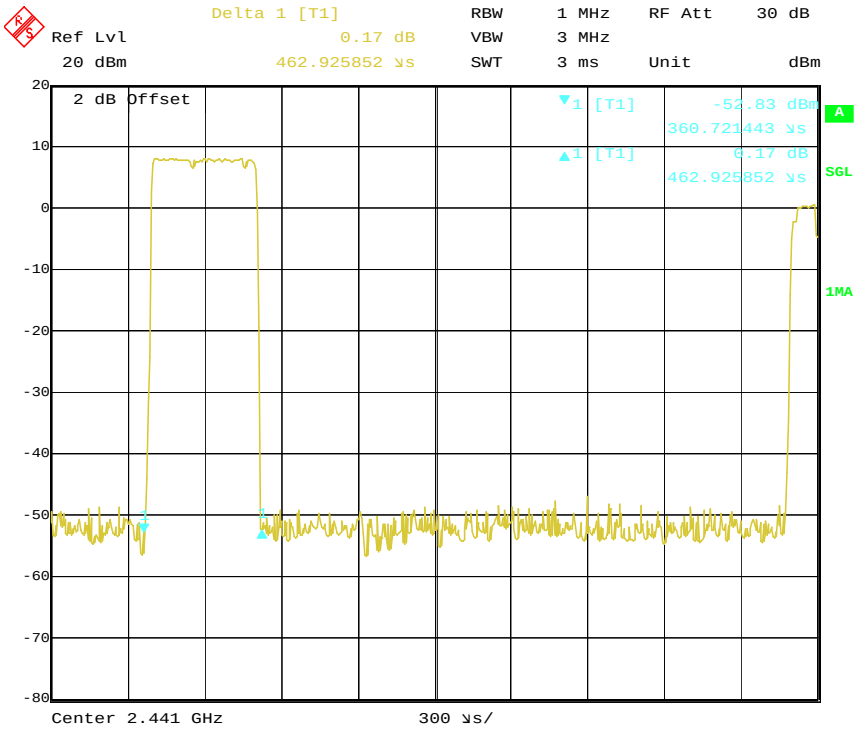

Delta 1 [T1]
-0.56 dB
3.010020 ms
RBW 1 MHz
VBW 3 MHz
SWT 20 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
2 dB Offset
1 [T1] -49.44 dBm
10.240481 ms
1 [T1] -0.56 dB
3.010020 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
2 ms/

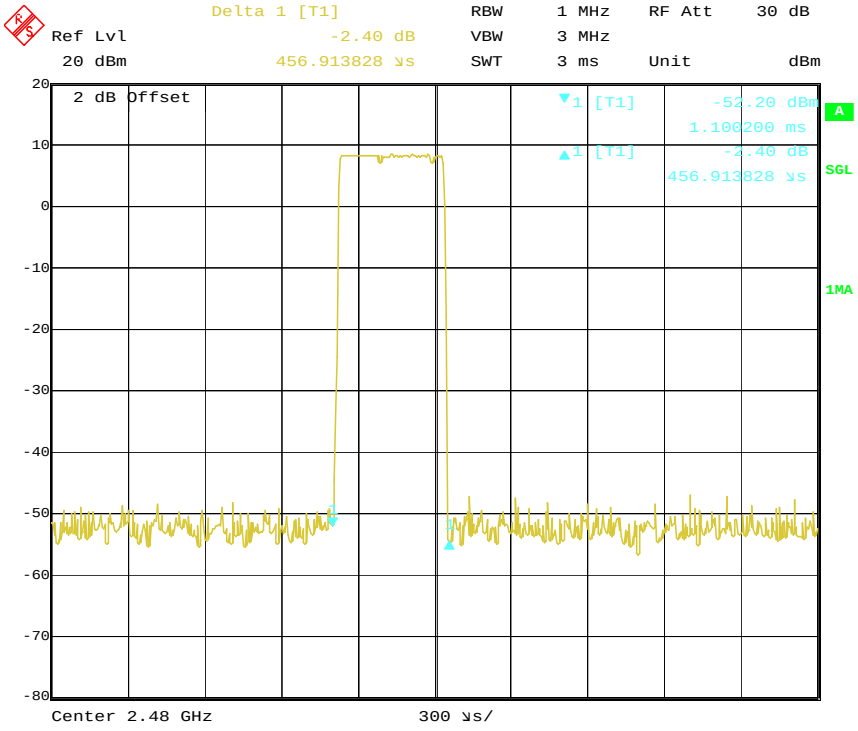


Π/4-DQPSK Mode

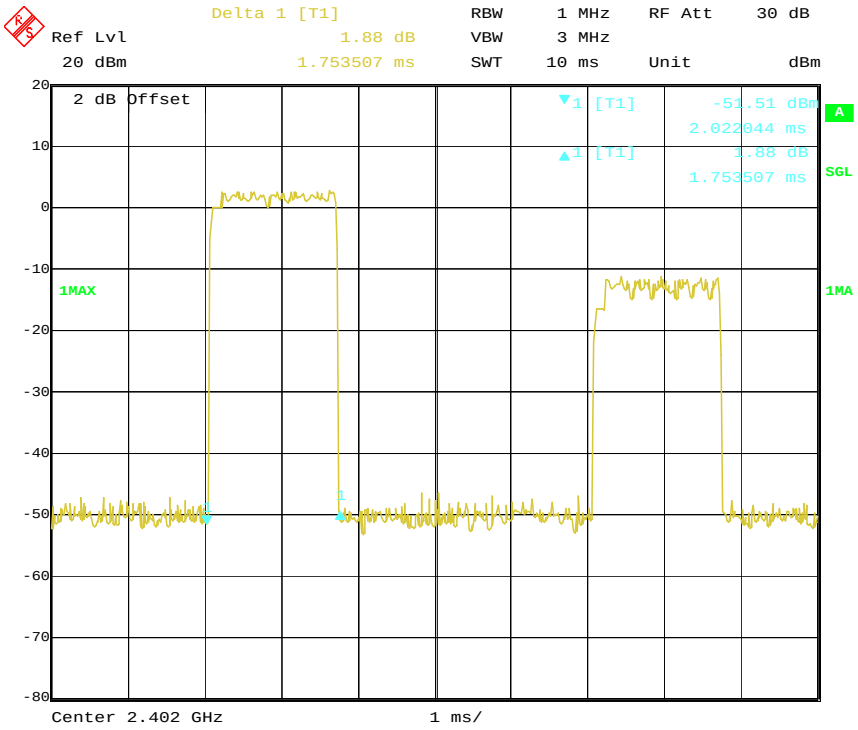
DH1

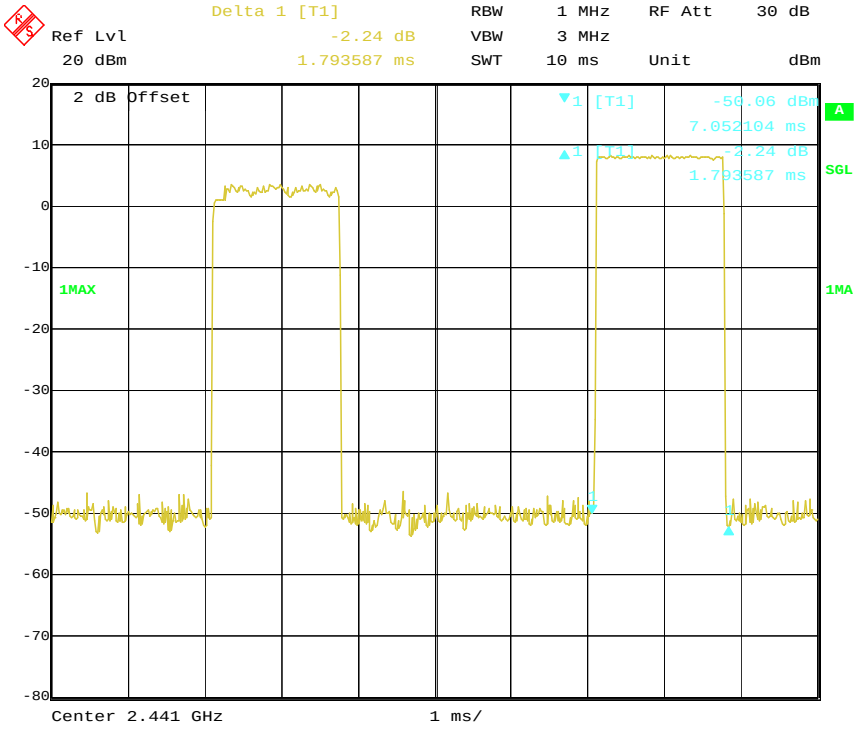


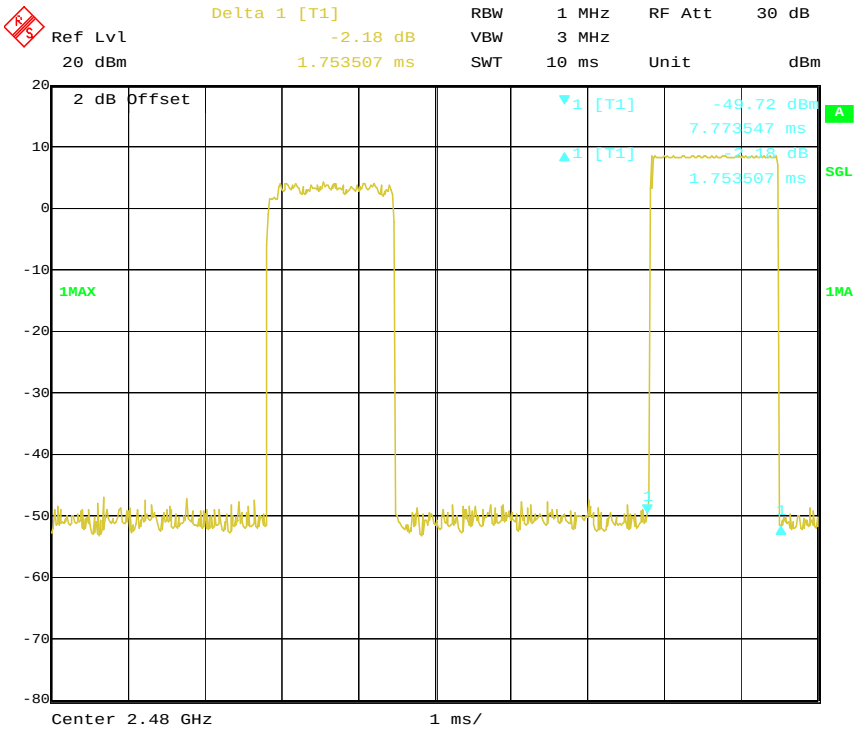

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.17 dB
VBW 3 MHz
20 dBm
462.925852 µs
SWT 3 ms
Unit dBm
2 dB Offset
1 [T1] -52.83 dBm
360.721443 µs
1 [T1] 0.17 dB
462.925852 µs
A
SGL
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
300 µs/


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-2.40 dB
VBW 3 MHz
20 dBm
456.913828 µs
SWT 3 ms
Unit dBm
2 dB Offset
1 [T1] -52.20 dBm
1.100200 ms
1 [T1] -2.40 dB
456.913828 µs
A
SGL
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
300 µs/

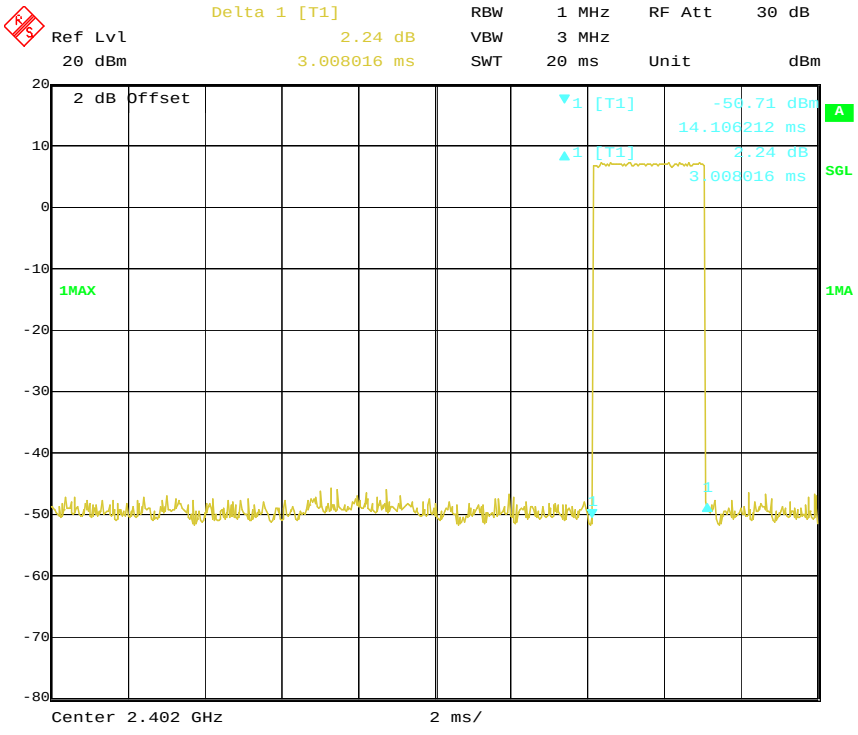
DH3

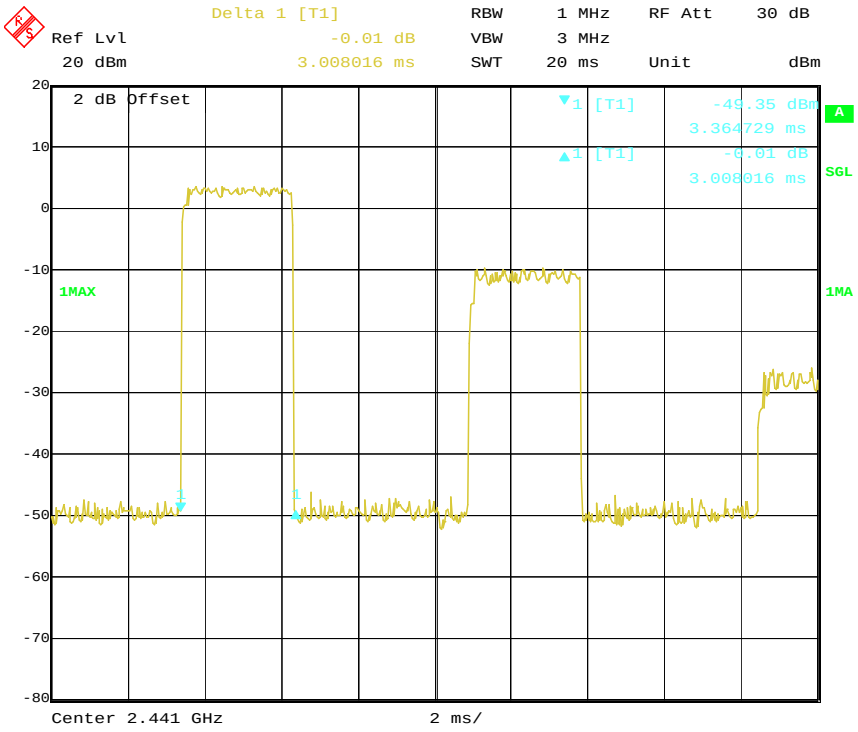

Delta 1 [T1]
1.88 dB
1.753507 ms
RBW 1 MHz
VBW 3 MHz
SWT 10 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
2 dB Offset
1 [T1] -51.51 dBm
2.022044 ms
1 [T1] 1.88 dB
1.753507 ms
A
SGL
1MAX
1MA
Center 2.402 GHz
1 ms/

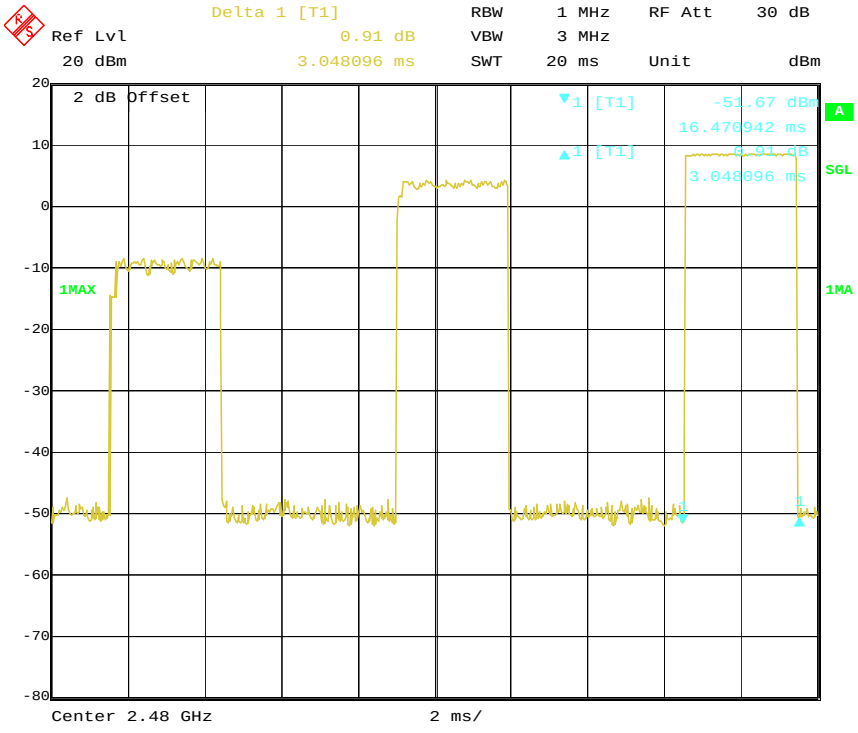

Delta 1 [T1]
-2.24 dB
1.793587 ms
RBW 1 MHz
VBW 3 MHz
SWT 10 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
2 dB Offset
1 [T1] -56.06 dBm
7.052104 ms
1 [T1] -2.24 dB
1.793587 ms
A
SGL
1MAX
1MA
Center 2.441 GHz
1 ms/


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-2.18 dB
VBW 3 MHz
20 dBm
1.753507 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1] -49.72 dBm
7.773547 ms
1 [T1] 2.18 dB
1.753507 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 ms/

DH5

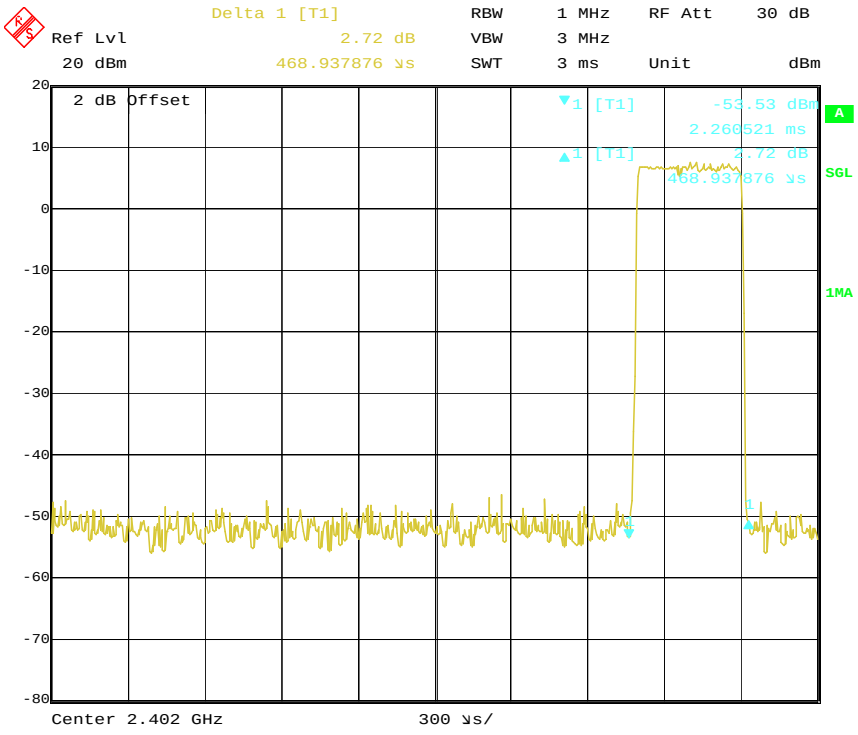

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
2.24 dB
VBW 3 MHz
20 dBm
3.008016 ms
SWT 20 ms
Unit dBm
2 dB Offset
1 [T1] -50.71 dBm
14.106212 ms
1 [T1] 2.24 dB
3.008016 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
2 ms/

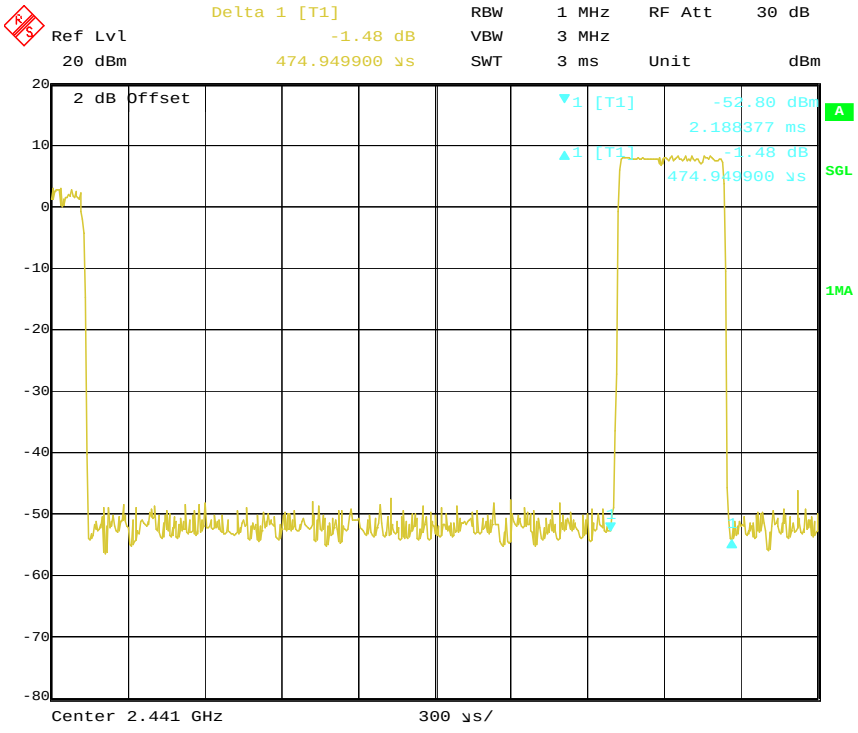

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-0.01 dB
VBW 3 MHz
20 dBm
3.008016 ms
SWT 20 ms
Unit dBm
2 dB Offset
1 [T1] -49.35 dBm
3.364729 ms
1 [T1] -0.01 dB
3.008016 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
2 ms/

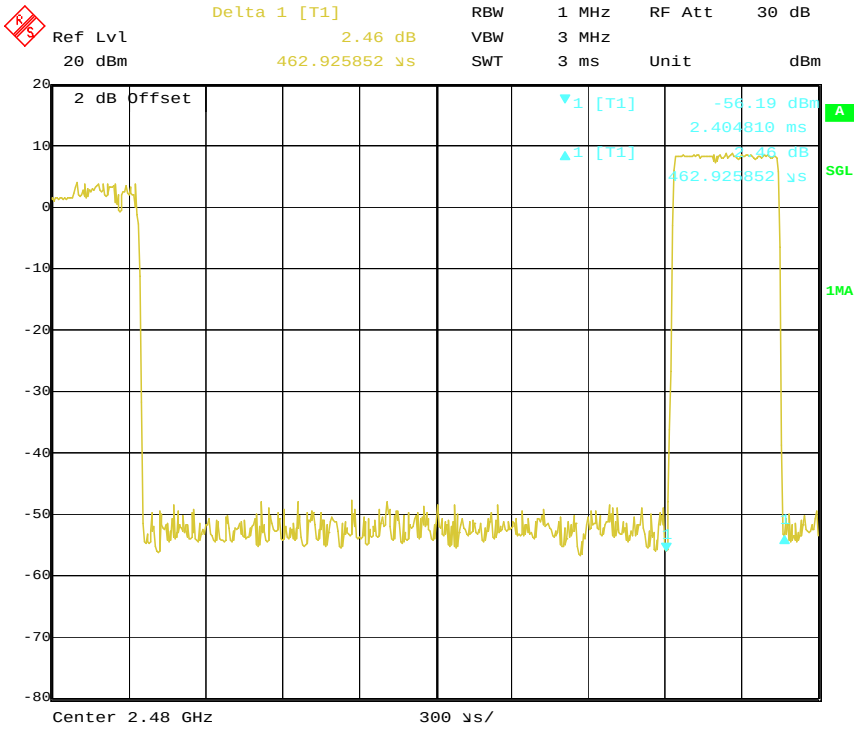

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.91 dB
VBW 3 MHz
20 dBm
3.048096 ms
SWT 20 ms
Unit dBm
2 dB Offset
1 [T1] -51.67 dBm
16.470942 ms
1 [T1] 0.91 dB
3.048096 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
2 ms/

8DPSK Mode

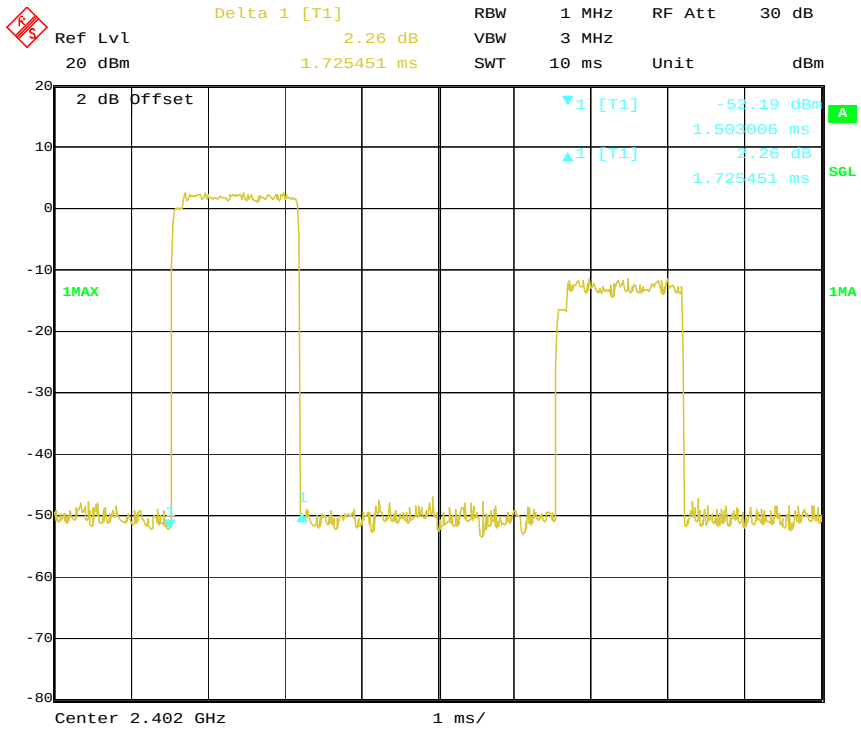
DH1

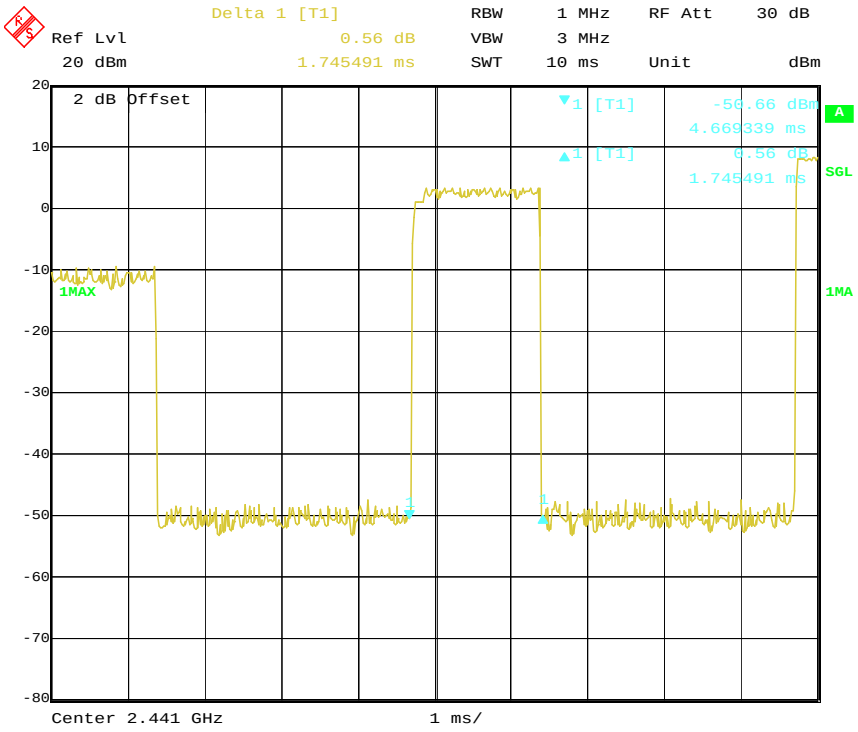


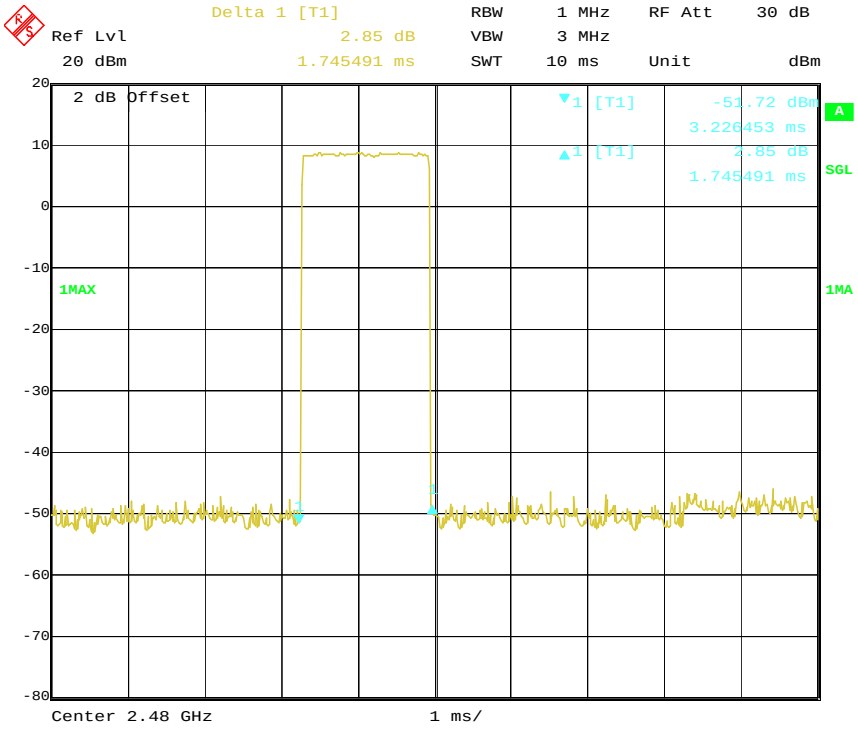



Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
2.46 dB
VBW 3 MHz
20 dBm
462.925852 µs
SWT 3 ms
Unit dBm
2 dB Offset
1 [T1]
-56.19 dBm
2.404810 ms
1 [T1]
2.46 dB
462.925852 µs
A
SGL
1MA
Center 2.48 GHz
300 µs/

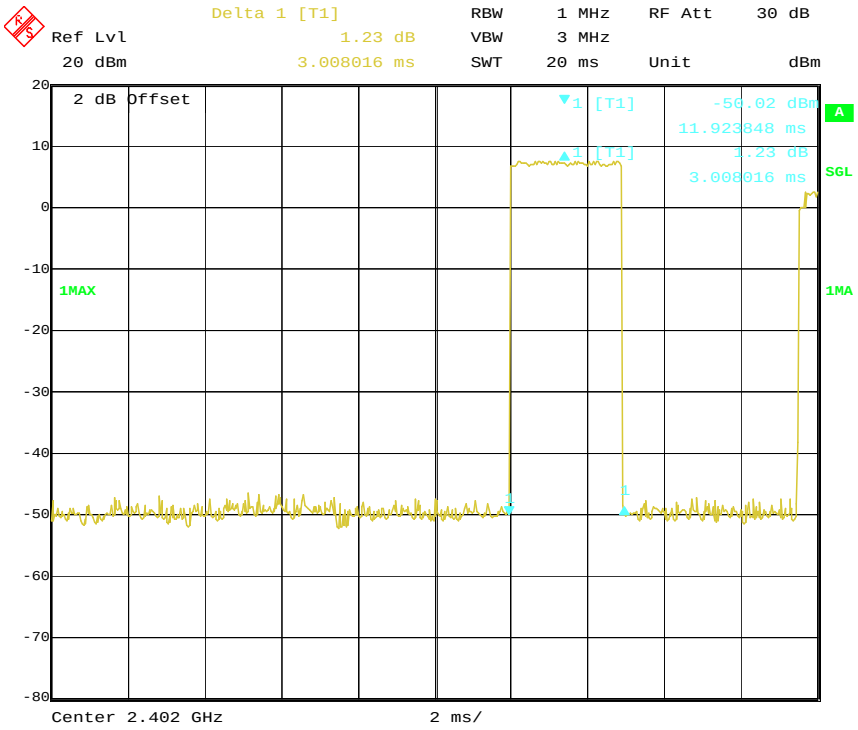
DH3

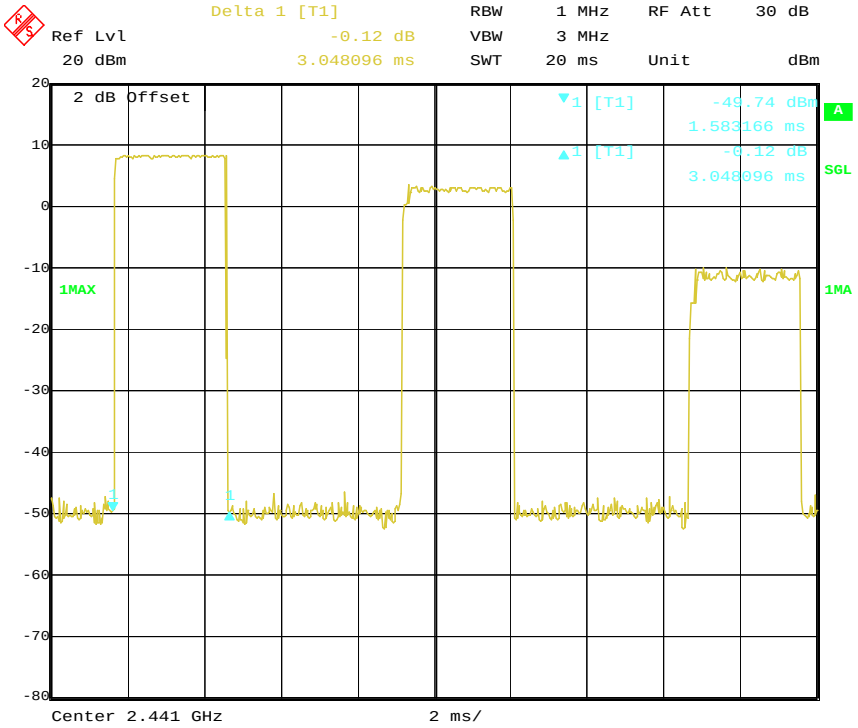

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
2.26 dB
VBW 3 MHz
20 dBm
1.725451 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-52.19 dBm
1.503006 ms
1 [T1]
2.26 dB
1.725451 ms
A
SGL
1MAX
1MA
Center 2.402 GHz
1 ms/

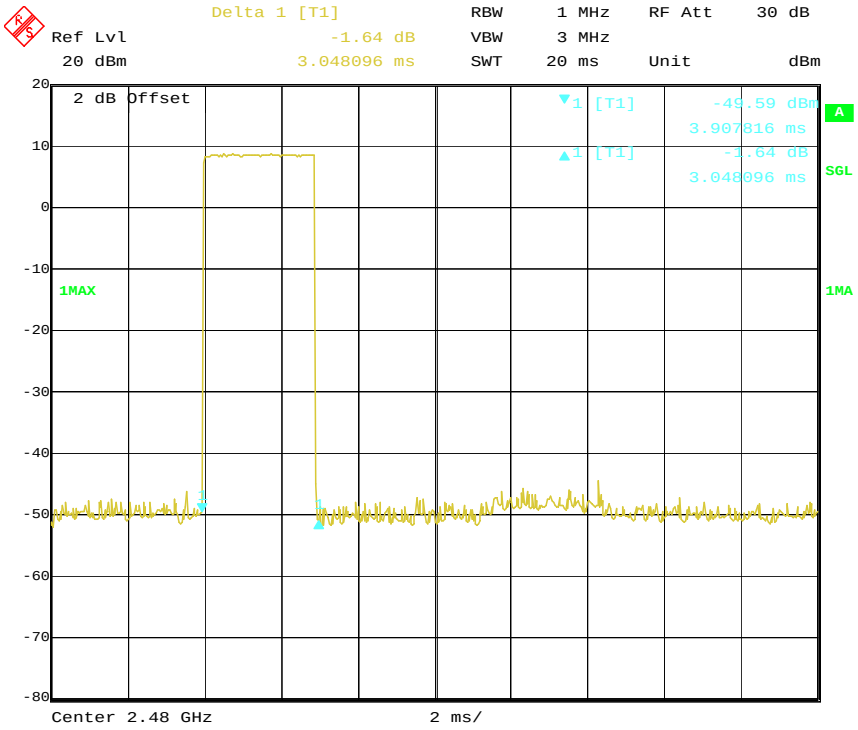

Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.56 dB
VBW 3 MHz
20 dBm
1.745491 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-50.66 dBm
4.669339 ms
1 [T1]
0.56 dB
1.745491 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
1 ms/


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
2.85 dB
VBW 3 MHz
20 dBm
1.745491 ms
SWT 10 ms
Unit dBm
2 dB Offset
1 [T1]
-51.72 dBm
3.226453 ms
1 [T1]
2.85 dB
1.745491 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 ms/

DH5


Delta 1 [T1]
Ref Lvl
20 dBm
1.23 dB
3.008016 ms
RBW 1 MHz
VBW 3 MHz
SWT 20 ms
RF Att 30 dB
Unit dBm
2 dB Offset
1 [T1] -50.02 dBm
11.923848 ms
1 [T1] 1.23 dB
3.008016 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
2 ms/


Delta 1 [T1]
Ref Lvl
20 dBm
-0.12 dB
3.048096 ms
RBW 1 MHz
VBW 3 MHz
SWT 20 ms
RF Att 30 dB
Unit dBm
2 dB Offset
1 [T1] -49.74 dBm
1.583166 ms
1 [T1] -0.12 dB
3.048096 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
2 ms/


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-1.64 dB
VBW 3 MHz
20 dBm
3.048096 ms
SWT 20 ms
Unit dBm
2 dB Offset
1 [T1]
-49.59 dBm
3.907816 ms
1 [T1]
-1.64 dB
3.048096 ms
A
SGL
1MAX
1MA
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
2 ms/

7. CONDUCTED EMISSION MEASUREMENT

7.1. POWER LINE CONDUCTED EMISSION

(Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

7.2. MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/19/2016
2	EMI Test Receiver	R&S	ESCI	101308	12/19/2016
3	LISN	AFJ	LS16	16011103219	12/19/2016
4.	LISN	Schwarzbeck	NSLK 8127	8127-432	12/19/2016

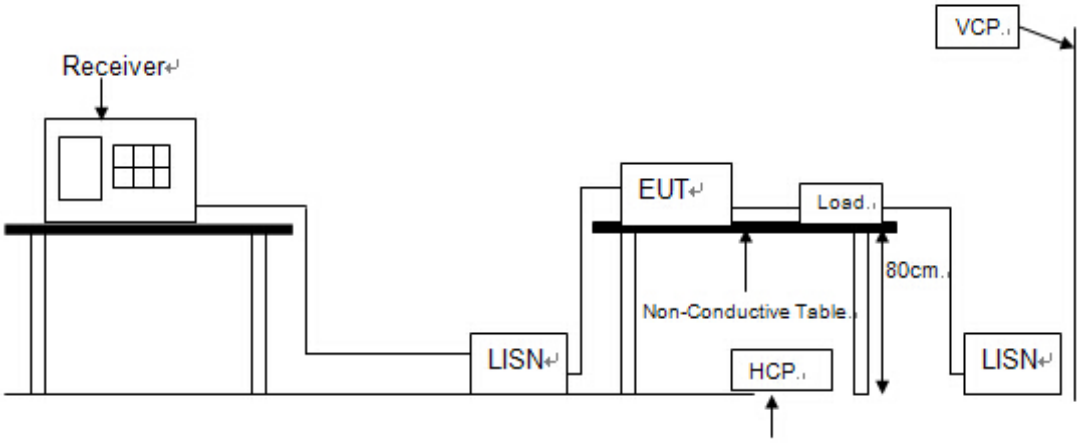
7.3. TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal reference ground plane and 0.4meters from vertical reference ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

7.4. DEVIATION FROM TEST STANDARD

No deviation

7.5. TEST SETUP

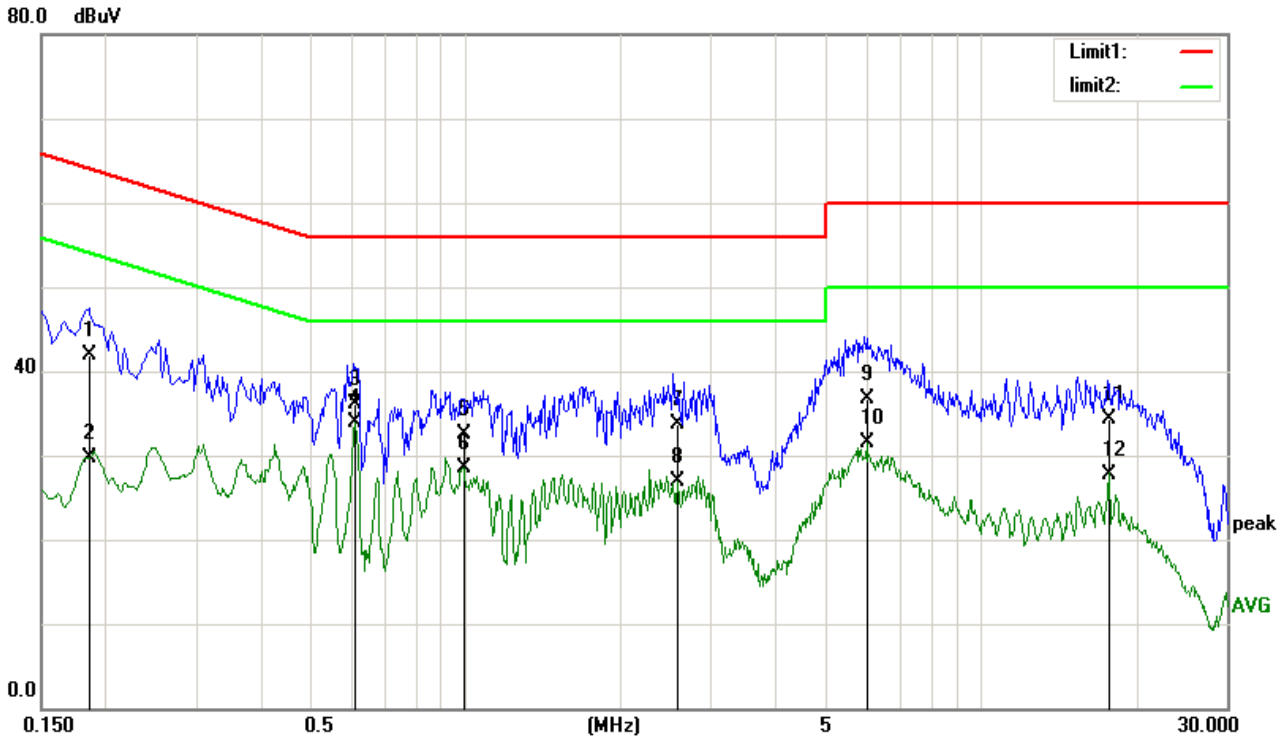


7.6. EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

7.7. TEST RESULT

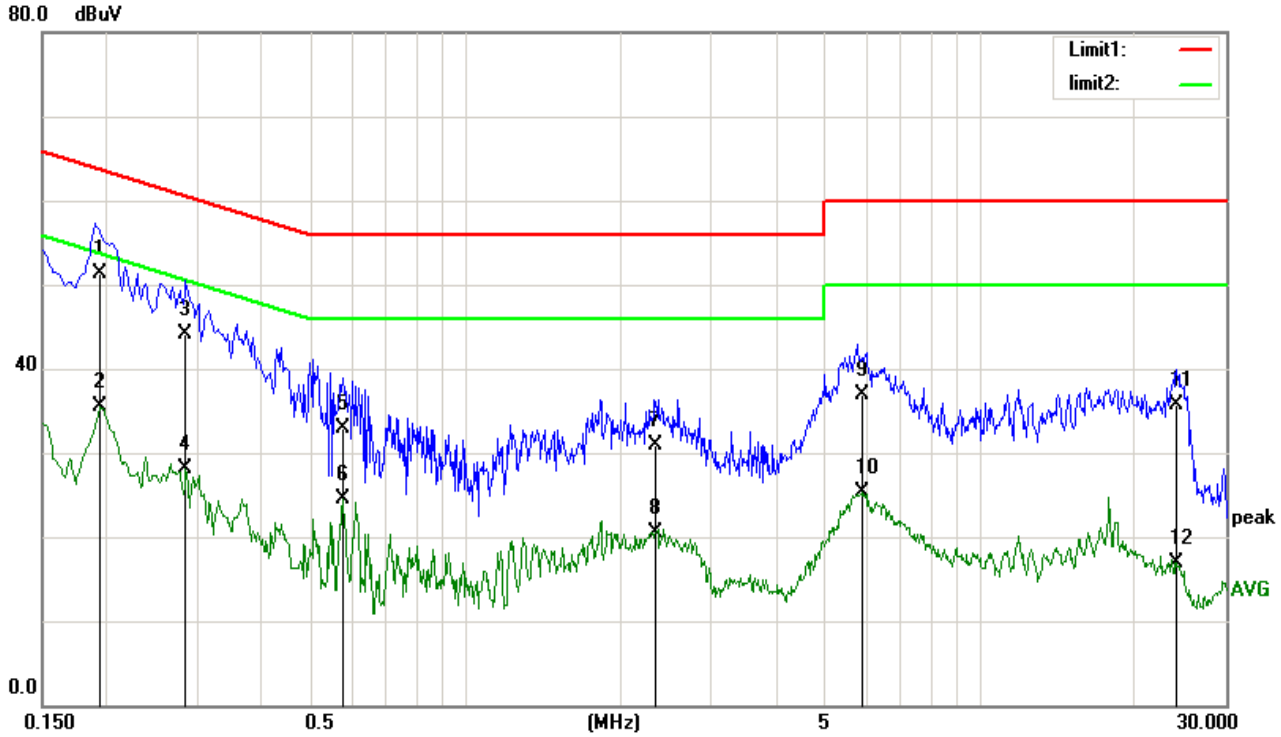
EUT:	Multi media Bluetooth Speaker system	Model No.:	MM8B
Temperature:	24℃	Relative Humidity:	55%
Probe:	L1	Test Power:	3.7Vdc
Standard:	FCC PART 15 Class C	Test Result:	Pass
Test Mode:	TX	Test By:	Smile
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1864	30.77	11.22	41.99	64.19	-22.20	QP
2	0.1864	18.47	11.22	29.69	54.19	-24.50	AVG
3	0.6100	25.91	10.15	36.06	56.00	-19.94	QP
4	0.6100	23.80	10.15	33.95	46.00	-12.05	AVG
5	0.9860	22.44	10.10	32.54	56.00	-23.46	QP
6	0.9860	18.40	10.10	28.50	46.00	-17.50	AVG
7	2.5860	23.59	10.13	33.72	56.00	-22.28	QP
8	2.5860	16.81	10.13	26.94	46.00	-19.06	AVG
9	6.0060	26.68	10.11	36.79	60.00	-23.21	QP
10	6.0060	21.32	10.11	31.43	50.00	-18.57	AVG
11	17.7780	24.09	10.16	34.25	60.00	-25.75	QP
12	17.7780	17.60	10.16	27.76	50.00	-22.24	AVG

Measurement result=Reading + Correct;Margin=Result-Limit.

EUT:	Multi media Bluetooth Speaker system	Model No.:	MM8B
Temperature:	24℃	Relative Humidity:	55%
Probe:	N	Test Power:	3.7Vdc
Standard:	FCC PART 15 Class C	Test Result:	Pass
Test Mode:	TX	Test By:	Smile
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1940	40.06	11.17	51.23	63.86	-12.63	QP
2	0.1940	24.37	11.17	35.54	53.86	-18.32	AVG
3	0.2860	33.54	10.53	44.07	60.64	-16.57	QP
4	0.2860	17.58	10.53	28.11	50.64	-22.53	AVG
5	0.5780	22.69	10.16	32.85	56.00	-23.15	QP
6	0.5780	14.43	10.16	24.59	46.00	-21.41	AVG
7	2.3340	20.84	10.12	30.96	56.00	-25.04	QP
8	2.3340	10.41	10.12	20.53	46.00	-25.47	AVG
9	5.8900	26.78	10.11	36.89	60.00	-23.11	QP
10	5.8900	15.24	10.11	25.35	50.00	-24.65	AVG
11	24.1060	25.47	10.19	35.66	60.00	-24.34	QP
12	24.1060	6.75	10.19	16.94	50.00	-33.06	AVG

Measurement result=Reading + Correct;Margin=Result-Limit.

8. MAXMUM OUTPUT POWER

8.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

8.2. BLOCK DIAGRAM OF TEST SETUP

Same with 3.2

8.3. LIMITS

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz bands: 0.125 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.4. TEST PROCEDURE

(1) Configure EUT and assistant system according clause 2.4 and 3.2

(2) Connect EUT's antenna output to spectrum analyzer by RF cable.

(3) Configure EUT work in test mode as stated in clause 2.4.

(4) Set the spectrum analyzer as follows:

GFSK	RBW:	1MHz
	VBW:	3MHz
π/4DQPSK	RBW:	3MHz
	VBW:	10MHz
8DPSK	RBW:	3MHz
	VBW:	10MHz
Span		>1.5x 20dB bandwidth
Detector Mode:		Peak
Sweep time:		auto
Trace mode		Max hold

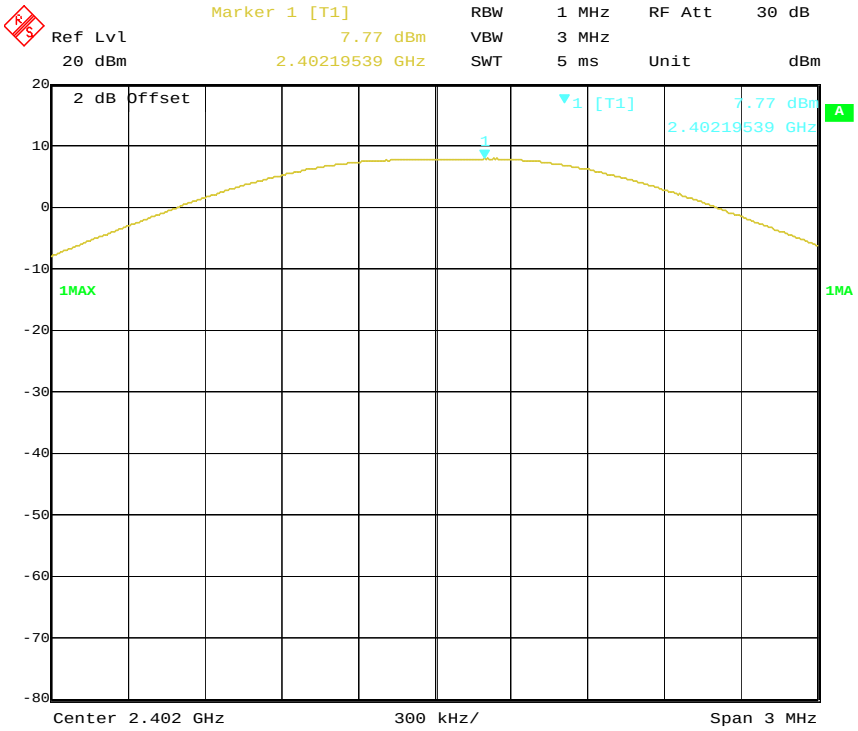
(5) Allow the trace to stabilize, Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges measure out the Average and PK output power.

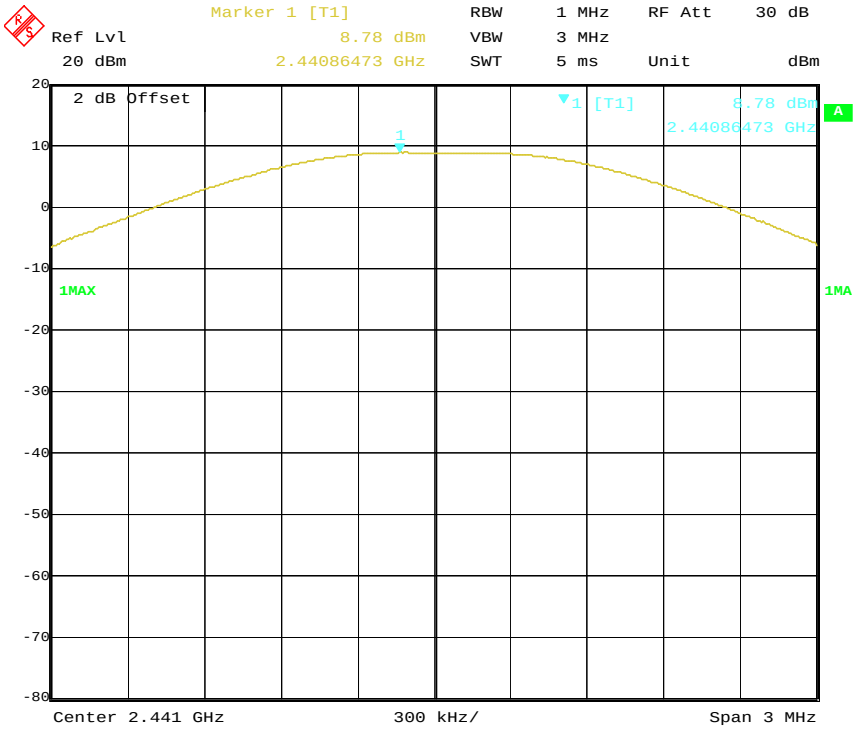
8.5. TEST RESULT

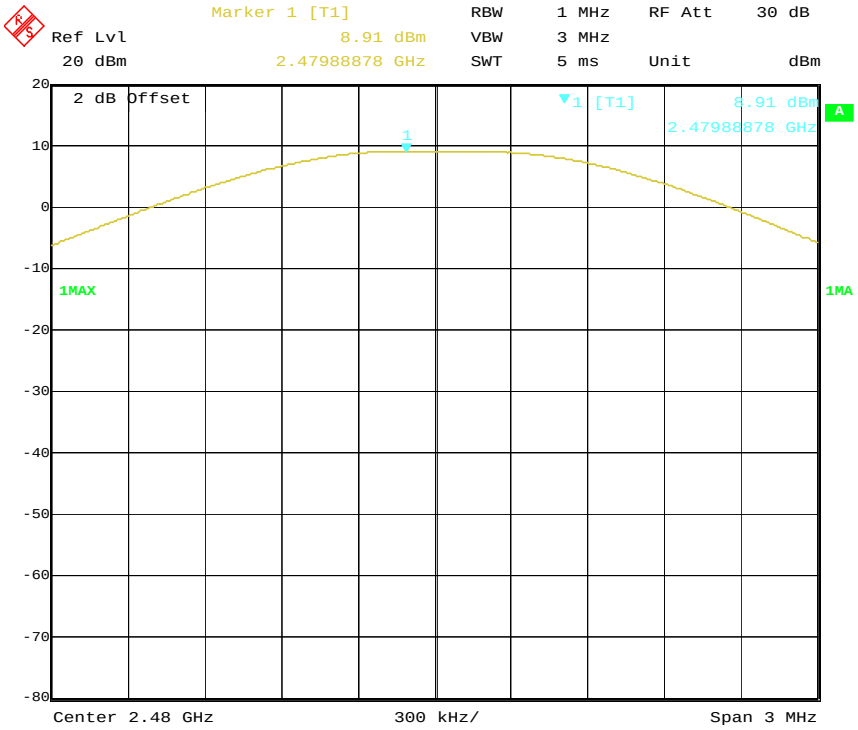
EUT Set Mode	Data Rate (Mbp/s)	Frequency (MHz)	Result(dBm)
			Peak
GFSK	1	2402	7.77
		2441	8.78
		2480	8.91
π/4DQPSK	2	2402	6.94
		2441	6.94
		2480	6.94
8DPSK	3	2402	7.96
		2441	7.81
		2480	6.82
Limit: 21dBm		Conclusion: PASS	

8.6. ORIGINAL TEST DATA

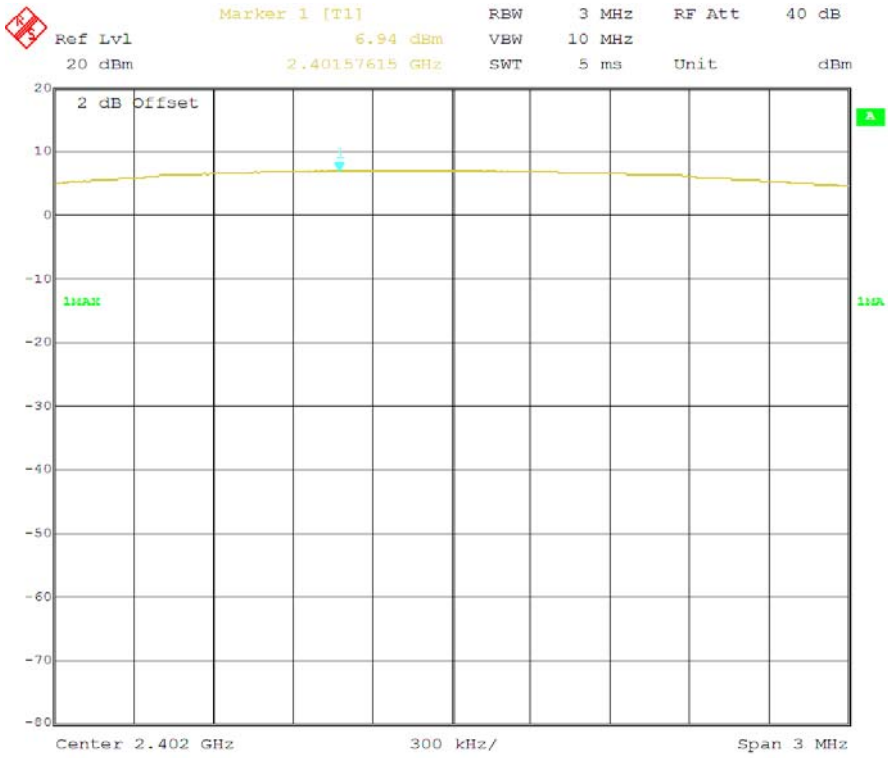
GFSK

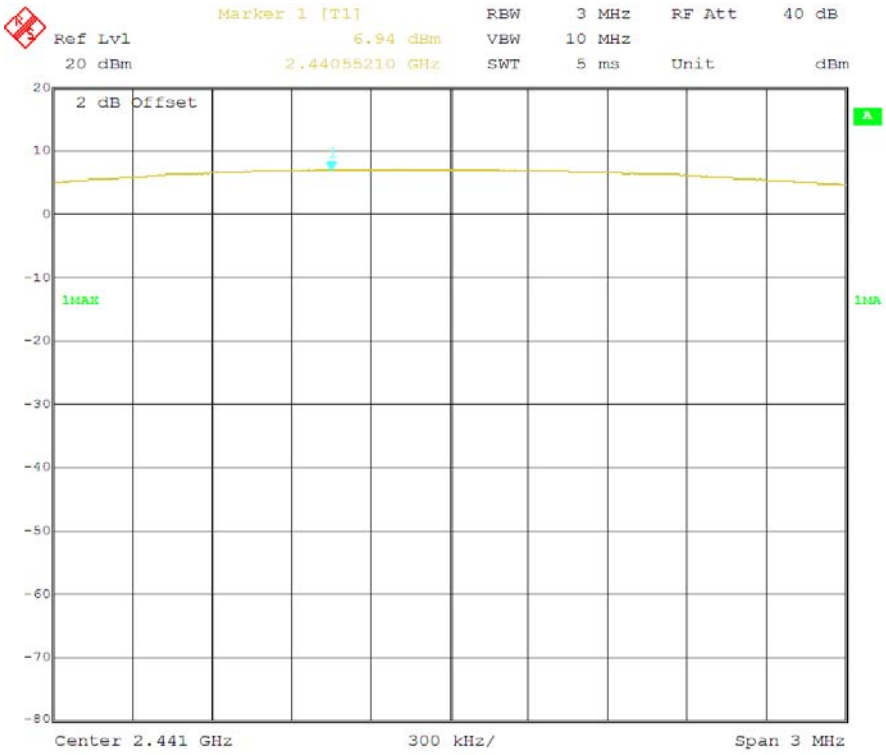


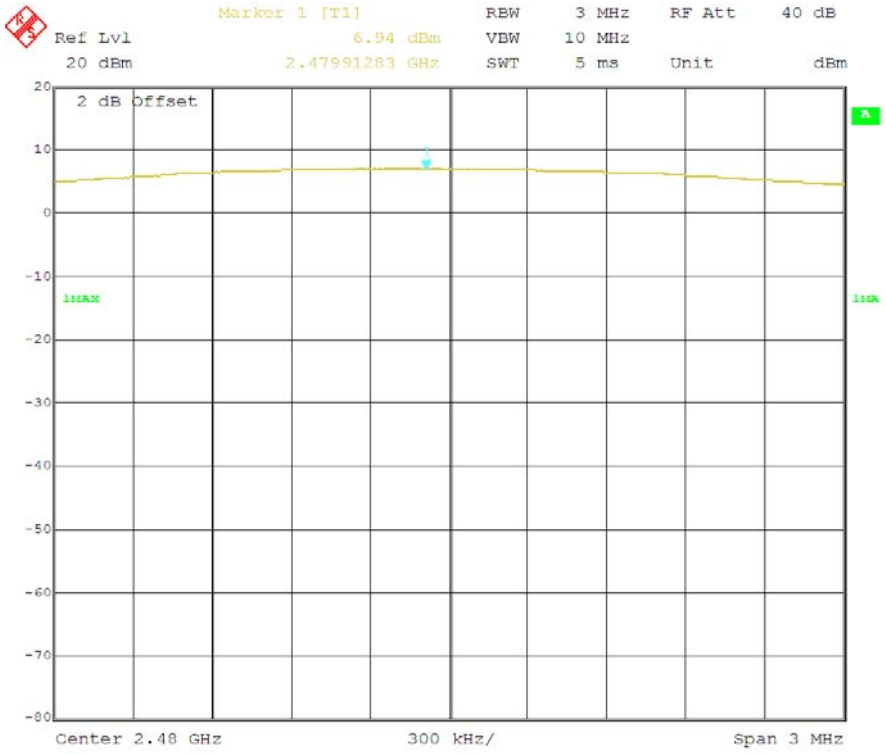



Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
8.91 dBm
VBW 3 MHz
20 dBm
2.47988878 GHz
SWT 5 ms
Unit dBm
2 dB Offset
1 [T1]
8.91 dBm
2.47988878 GHz
1MAX
1MA
Center 2.48 GHz
300 kHz/
Span 3 MHz

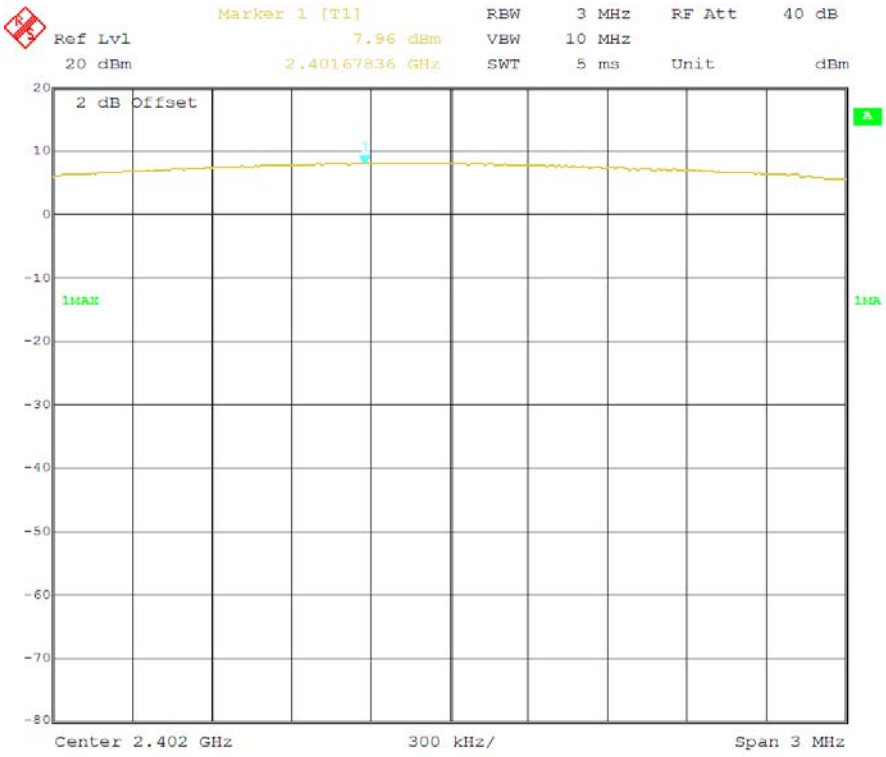
π /4DQPSK

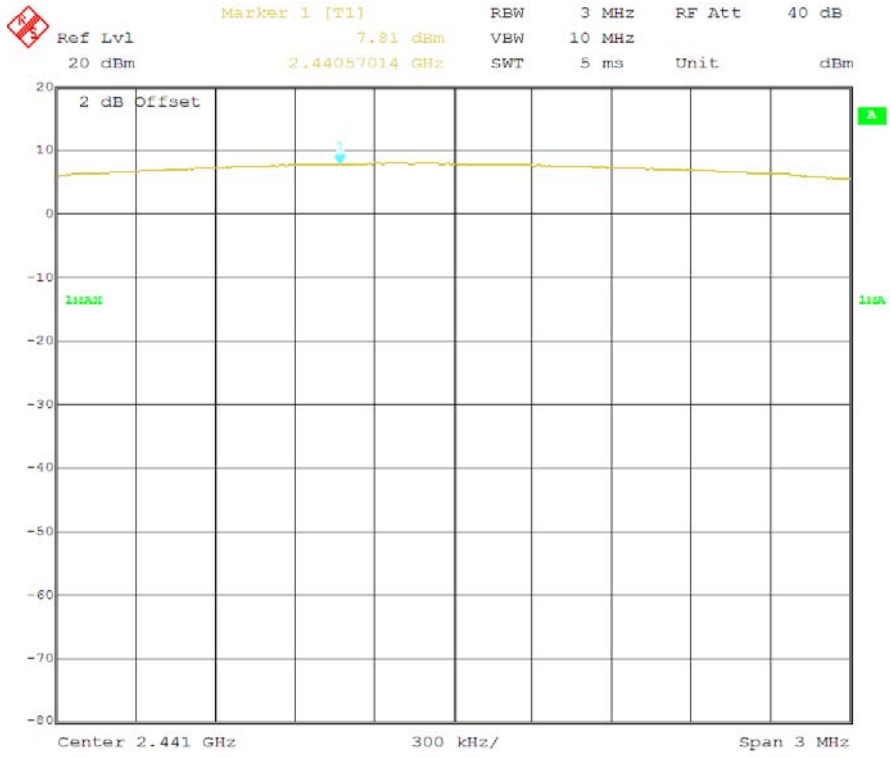

Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
6.94 dBm
VBW 10 MHz
20 dBm
2.40157615 GHz
SWT 5 ms
Unit dBm
2 dB Offset
Center 2.402 GHz
300 kHz/
Span 3 MHz

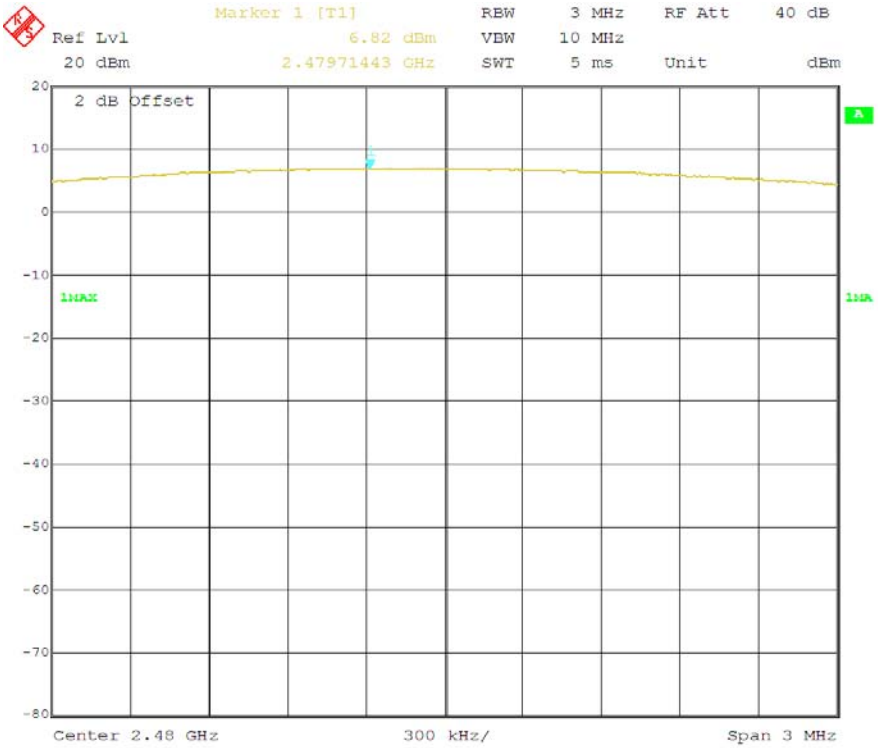

Marker 1 [T1]
Ref Lvl
20 dBm
6.94 dBm
2.44055210 GHz
RBW 3 MHz
VBW 10 MHz
SWT 5 ms
RF Att 40 dB
Unit dBm
2 dB Offset
1MAX
1MA
Center 2.441 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
6.94 dBm
2.47991283 GHz
RBW 3 MHz
VBW 10 MHz
SWT 5 ms
RF Att 40 dB
Unit dBm
2 dB Offset
1MAX
1MA
Center 2.48 GHz
300 kHz/
Span 3 MHz

8DPSK


Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
7.96 dBm
VBW 10 MHz
20 dBm
2.40167836 GHz
SWT 5 ms
Unit dBm
2 dB Offset
1MAX
1MA
Center 2.402 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
7.81 dBm
VBW 10 MHz
20 dBm
2.44057014 GHz
SWT 5 ms
Unit dBm
2 dB Offset
1MAX
1MA
Center 2.441 GHz
300 kHz/
Span 3 MHz


Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
6.82 dBm
VBW 10 MHz
20 dBm
2.47971443 GHz
SWT 5 ms
Unit dBm
2 dB Offset
1MAX
1MA
Center 2.48 GHz
300 kHz/
Span 3 MHz

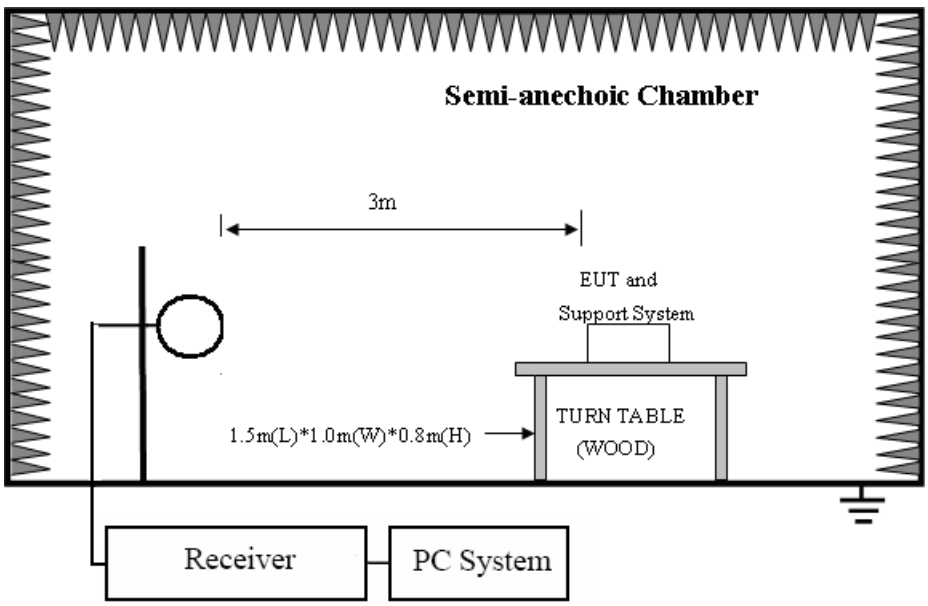
9. SPURIOUS EMISSION

9.1. Test equipment

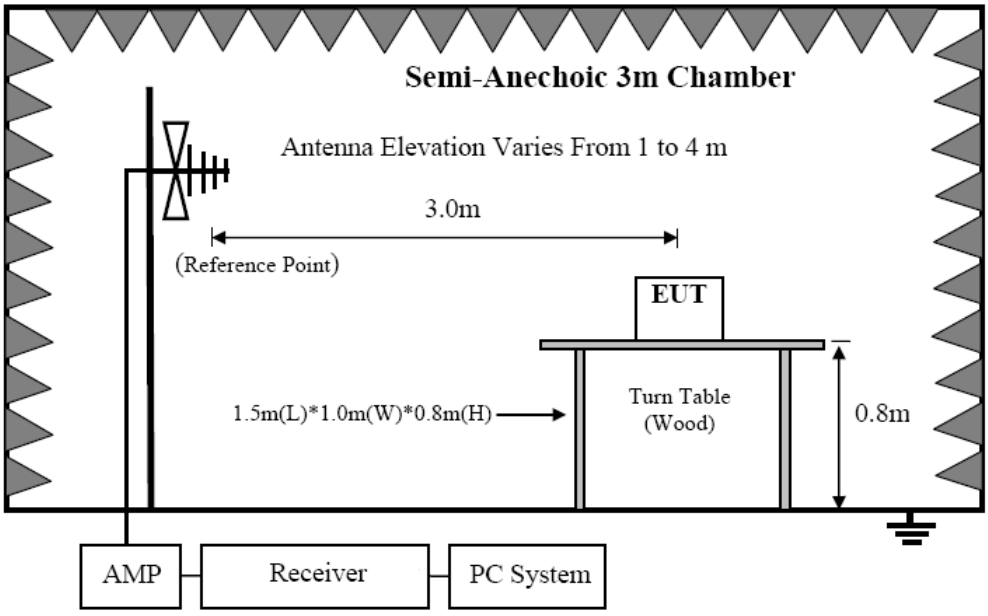
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2016/12/19	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
3	Loop antenna	TESEQ	HLA6120	20129	2016/12/19	1 Year
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2016/12/19	1 Year
5	Double Ridged Horn Antenna	Schwarzbeck	BBHA9120D	9120D 1065	2016/12/19	1 Year
6	Horn Antenna	Schwarzbeck	BBHA 9170	9170 1248	2016/12/19	1 Year
7	Pre-amplifier	A.H.	PAM-1840VH	562	2016/12/19	1 Year
8	Pre-amplifier	R&S	AFS33-18002650-30-8P-44	SEL0080	2016/12/19	1 Year
9	Pre-Amplifier	HP	8449B	3274A06298	2016/12/19	1 Year
10	RF Cable	R&S	R01	10403	2016/12/19	1 Year
11	RF Cable	R&S	R02	10512	2016/12/19	1 Year

9.2. Block diagram of test setup

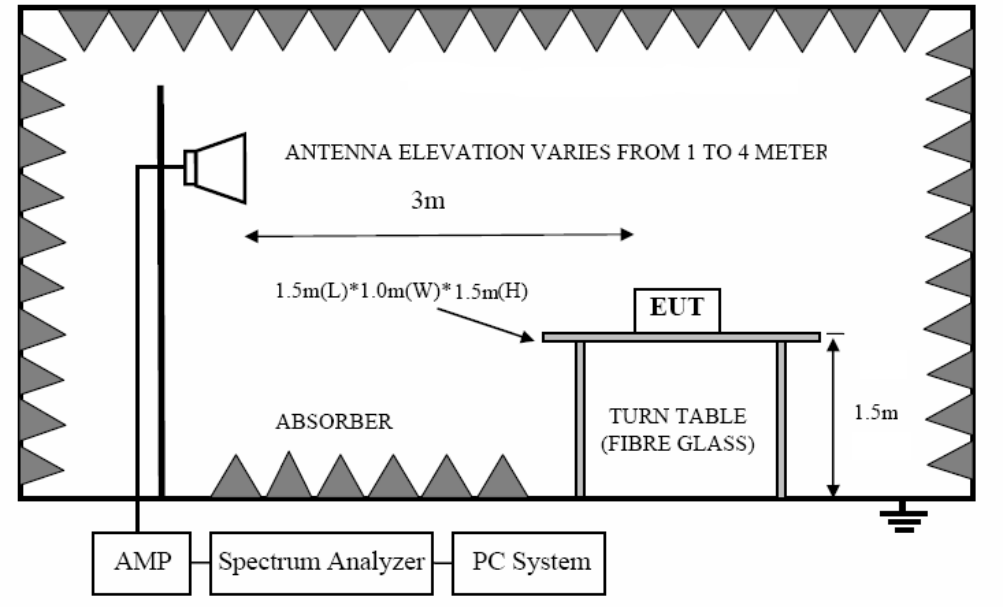
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

9.3. Limit

9.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

9.3.2. FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m)$

9.3.3. Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

9.4. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and assistant system according clause 2.4 and 7.2

(3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-26.5GHz	Double Ridged Horn Antenna(1GHz-26.5GHz)

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) new battery is used during testing

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

(5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(6) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz,110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(7) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

（8）For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure(according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure). Peak detector is used for Peak and AV measurement both.

9.5. Test result

Below 30M

EUT:	Wireless Fender Jaguar Guitar Controller for PlayStation 4	Model No.:	051-064
Temperature:	24℃	Relative Humidity:	55%
Distance:	3m	Test Power:	3 Vdc
Polarization:	--	Test Result:	Pass
Test Mode:	Keeping TX mode	Test By:	Smile

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

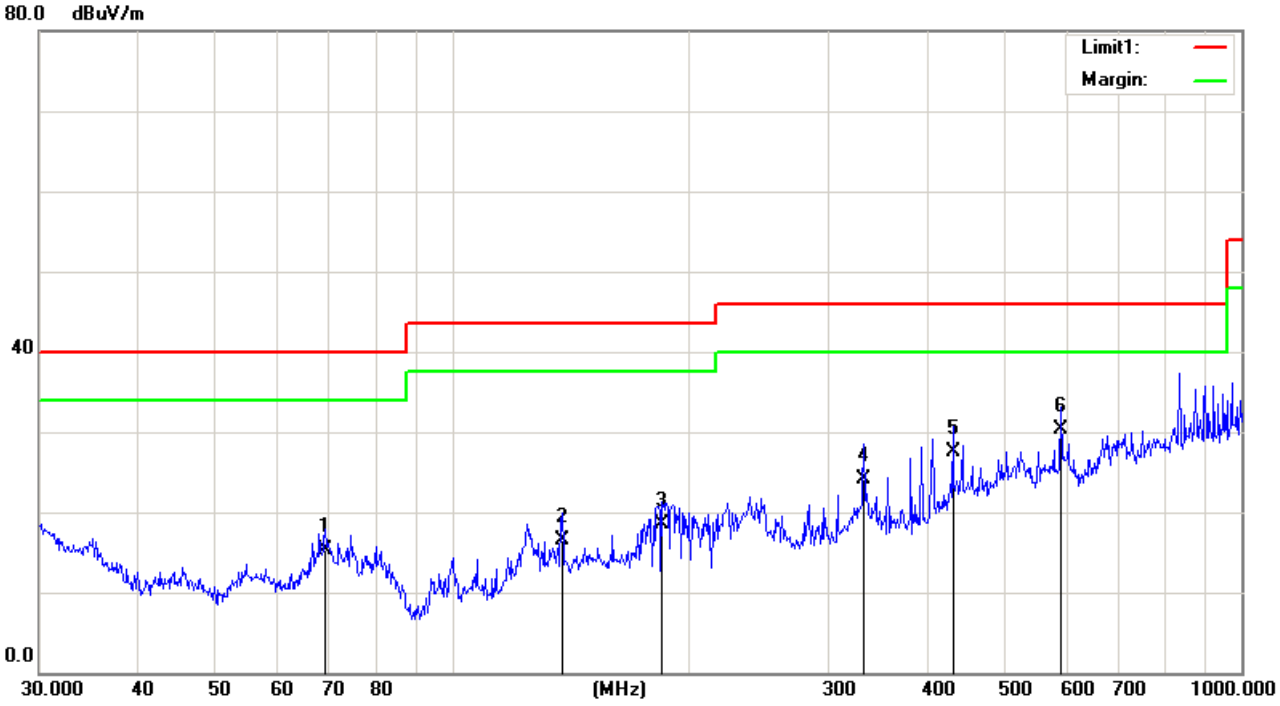
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =20 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor

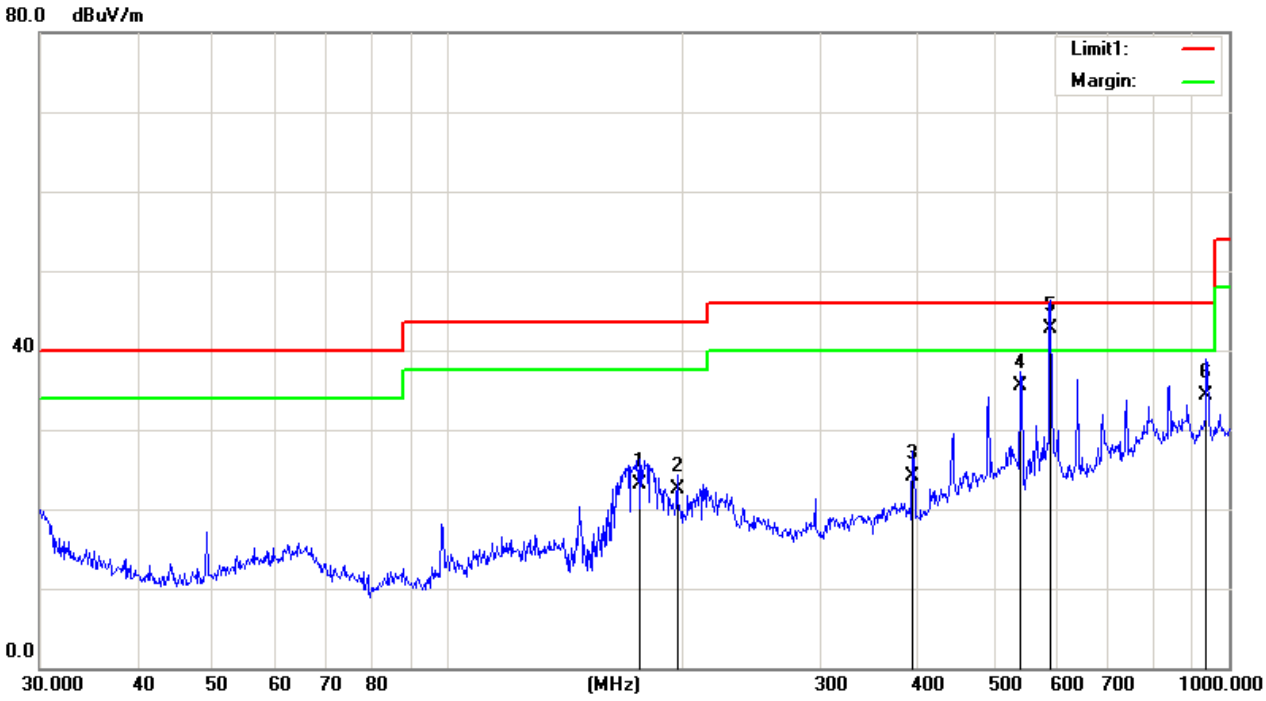
Between 30 MHz – 1000 MHz

EUT:	BONFIRE ACOUSTIC/USA INC	Model No.:	MM9B
Temperature:	24	Relative Humidity:	55%
Distance:	3m	Test Power:	DC 3.7V
Polarization:	Horizontal	Test Result:	Pass
Standard:	(RE)FCC PART 15 class C 3m	Test By:	Smile
Test Mode:	TX		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	69.1141	29.86	-14.50	15.36	40.00	-24.64	QP
2	137.9028	28.55	-12.03	16.52	43.50	-26.98	QP
3	184.4898	31.20	-12.64	18.56	43.50	-24.94	QP
4	332.5187	30.11	-6.03	24.08	46.00	-21.92	QP
5	431.0316	30.09	-2.68	27.41	46.00	-18.59	QP
6	590.9737	29.81	0.52	30.33	46.00	-15.67	QP

EUT:	**BONFIRE ACOUSTIC/USA INC**	**Model No.:**	**MM9B**
Temperature:	**24**	**Relative Humidity:**	**55%**
Distance:	**3m**	**Test Power:**	**DC 3.7V**
Polarization:	**Vertical**	**Test Result:**	**Pass**
Standard:	**(RE)FCC PART 15 class C 3m**	**Test By:**	**Smile**
Test Mode:	**TX**		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	175.6516	31.26	-8.23	23.03	43.50	-20.47	QP
2	196.5098	31.78	-9.20	22.58	43.50	-20.92	QP
3	393.4723	29.94	-5.75	24.19	46.00	-21.81	QP
4	541.3724	39.10	-3.65	35.45	46.00	-10.55	QP
5	589.1337	42.36	0.30	42.66	46.00	-3.34	QP
6	935.5462	28.29	6.10	34.39	46.00	-11.61	QP

Between 1000 MHz – 25000 MHz

Test Site	:	3m Chamber			
EUT	:	MULTI MEDIA BLUETOOTH SPEAKER SYSTEM	**Tested By**	:	Smile
Power Supply	:	3.7Vdc	**Model Number**	:	MM8B
Condition	:	Temp:24.5'C,Humi:55%, Press:100.1kPa	**Test Mode**	:	Tx mode
Memo	:	GFSK (worst case)	**Antenna/Distance**	:	VULB 9163 /3m

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	FCC 15.247	
(MHz)	Reading (dBμV)	PK/QP/AV	Polar (H/V)	Factor (dB)	(dB)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2402)									
4804	57.16	PK	H	32.3	5.91	31.78	63.59	74	-10.41
4804	39.42	AV	H	32.3	5.91	31.78	45.85	54	-8.15
4804	55.27	PK	V	32.3	5.91	31.78	61.7	74	-12.3
4804	39.04	AV	V	32.3	5.91	31.78	45.47	54	-8.53
7206	52.34	PK	H	36.3	6.34	30.97	64.01	74	-9.99
7206	34.57	AV	H	36.3	6.34	30.97	46.24	54	-7.76
7206	53.37	PK	V	36.3	6.34	30.97	65.04	74	-8.96
7206	35.61	AV	V	36.3	6.34	30.97	47.28	54	-6.72
9608	51.79	PK	H	37.9	8.01	30.86	66.84	74	-7.16
9608	32.64	AV	H	37.9	8.01	30.86	47.69	54	-6.31
9608	52.42	PK	V	37.9	8.01	30.86	67.47	74	-6.53
9608	34.18	AV	V	37.9	8.01	30.86	49.23	54	-4.77
Middle Channel (2441)									
4882	52.25	PK	H	32.9	6.34	31.78	59.71	74	-14.29
4882	35.47	AV	H	32.9	6.34	31.78	42.93	54	-11.07
4882	53.49	PK	V	32.9	6.34	31.78	60.95	74	-13.05
4882	36.48	AV	V	32.9	6.34	31.78	43.94	54	-10.06
7323	51.27	PK	H	37.1	6.72	30.97	64.12	74	-9.88
7323	33.41	AV	H	37.1	6.72	30.97	46.26	54	-7.74
7323	51.75	PK	V	37.1	6.72	30.97	64.6	74	-9.4
7323	34.53	AV	V	37.1	6.72	30.97	47.38	54	-6.62
9764	47.49	PK	H	38.6	8.43	30.86	63.66	74	-10.34
9764	29.67	AV	H	38.6	8.43	30.86	45.84	54	-8.16
9764	48.56	PK	V	38.6	8.43	30.86	64.73	74	-9.27

9764	30.14	AV	V	38.6	8.43	30.86	46.31	54	-7.69
High Channel (2480)									
4960	53.66	PK	H	33.1	6.39	31.78	61.37	74	-12.63
4960	36.19	AV	H	33.1	6.39	31.78	43.9	54	-10.1
4960	54.24	PK	V	33.1	6.39	31.78	61.95	74	-12.05
4960	35.78	AV	V	33.1	6.39	31.78	43.49	54	-10.51
7440	50.75	PK	H	37.2	6.77	30.97	63.75	74	-10.25
7440	32.29	AV	H	37.2	6.77	30.97	45.29	54	-8.71
7440	50.61	PK	V	37.2	6.77	30.97	63.61	74	-10.39
7440	33.74	AV	V	37.2	6.77	30.97	46.74	54	-7.26
9920	47.43	PK	H	38.7	8.48	30.86	63.75	74	-10.25
9920	29.81	AV	H	38.7	8.48	30.86	46.13	54	-7.87
9920	45.03	PK	V	38.7	8.48	30.86	61.35	74	-12.65
9920	29.54	AV	V	38.7	8.48	30.86	45.86	54	-8.14

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Radiated band edge:

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	FCC 15.247	
(MHz)	Reading (dBμV)	PK/QP/AV	Polar (H/V)	Factor (dB)	(dB)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
Lowest Channel (GFSK)									
2390	30.67	PK	H	27.8	3.57	0	62.04	74	-11.96
2390	12.49	AV	H	27.8	3.57	0	43.86	54	-10.14
2390	32.67	PK	V	27.8	3.57	0	64.04	74	-9.96
2390	14.85	AV	V	27.8	3.57	0	46.22	54	-7.78
2400	33.12	PK	H	28	3.57	0	64.69	74	-9.31
2400	14.32	AV	H	28	3.57	0	45.89	54	-8.11
2400	35.05	PK	V	28	3.57	0	66.62	74	-7.38
2400	15.12	AV	V	28	3.57	0	46.69	54	-7.31
Highest Channel (GFSK)									
2483.5	29.84	PK	H	28.7	3.72	0	62.26	74	-11.74
2483.5	15.39	AV	H	28.7	3.72	0	47.81	54	-6.19
2483.5	30.24	PK	V	28.7	3.72	0	62.66	74	-11.34
2483.5	16.12	AV	V	28.7	3.72	0	48.54	54	-5.46
Lowest Channel (π /4DQPSK)									
2390	30.02	PK	H	27.9	3.57	0	61.49	74	-12.51
2390	15.63	AV	H	27.9	3.57	0	47.1	54	-6.9
2390	31.01	PK	V	27.9	3.57	0	62.48	74	-11.52
2390	16.59	AV	V	27.9	3.57	0	48.06	54	-5.94
2400	26.11	PK	H	28	3.57	0	57.68	74	-16.32
2400	14.19	AV	H	28	3.57	0	45.76	54	-8.24
2400	27.76	PK	V	28	3.57	0	59.33	74	-14.67
2400	16.22	AV	V	28	3.57	0	47.79	54	-6.21

Highest Channel (π /4DQPSK)									
2483.5	24.37	PK	H	28.7	3.72	0	56.79	74	-17.21
2483.5	16.34	AV	H	28.7	3.72	0	48.76	54	-5.24
2483.5	26.18	PK	V	28.7	3.72	0	58.6	74	-15.4
2483.5	17.15	AV	V	28.7	3.72	0	49.57	54	-4.43

Lowest Channel (8DBSK)									
2390	29.11	PK	H	27.9	3.57	0	60.58	74	-13.42
2390	15.76	AV	H	27.9	3.57	0	47.23	54	-6.77
2390	30.29	PK	V	27.9	3.57	0	61.76	74	-12.24
2390	16.72	AV	V	27.9	3.57	0	48.19	54	-5.81
2400	26.62	PK	H	28	3.57	0	58.19	74	-15.81
2400	11.46	AV	H	28	3.57	0	43.03	54	-10.97
2400	27.53	PK	V	28	3.57	0	59.1	74	-14.9
2400	13.28	AV	V	28	3.57	0	44.85	54	-9.15
Highest Channel (8DBSK)									
2483.5	27.63	PK	H	28.7	3.72	0	60.05	74	-13.95
2483.5	11.94	AV	H	28.7	3.72	0	44.36	54	-9.64
2483.5	28.76	PK	V	28.7	3.72	0	61.18	74	-12.82
2483.5	13.62	AV	V	28.7	3.72	0	46.04	54	-7.96

Note: 1. Result Level = Read Level + Antenna Factor + Cable Loss- Amplifier Gain

2. After test and evaluation hopping off mode and hopping on mode, will record worst case (hopping off mode) in this report.

10. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

10.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/12/19	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2016/12/19	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2016/12/19	1 Year

10.2. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

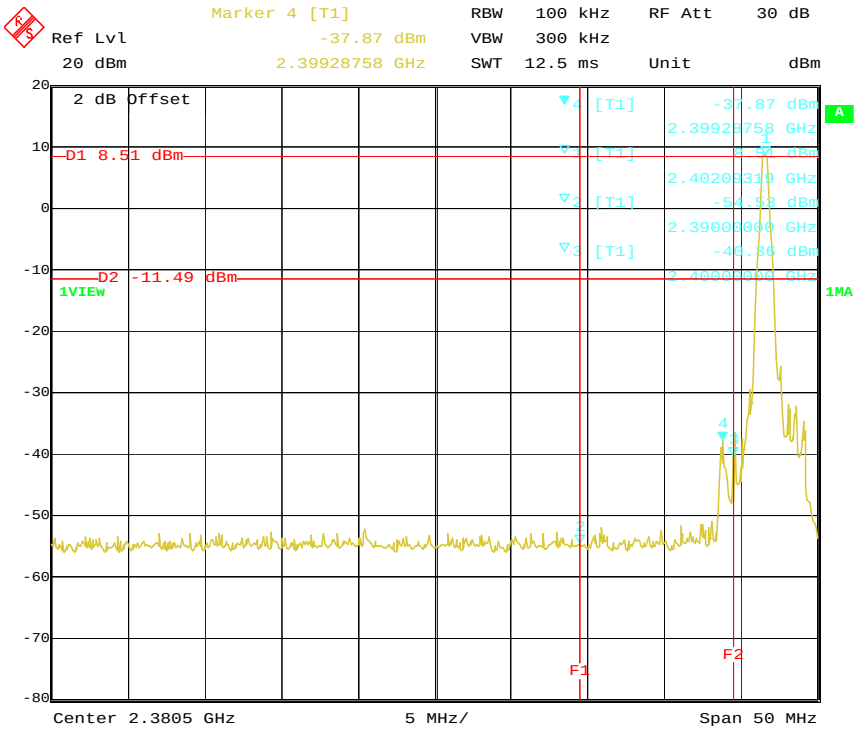
10.3. Test Procedure

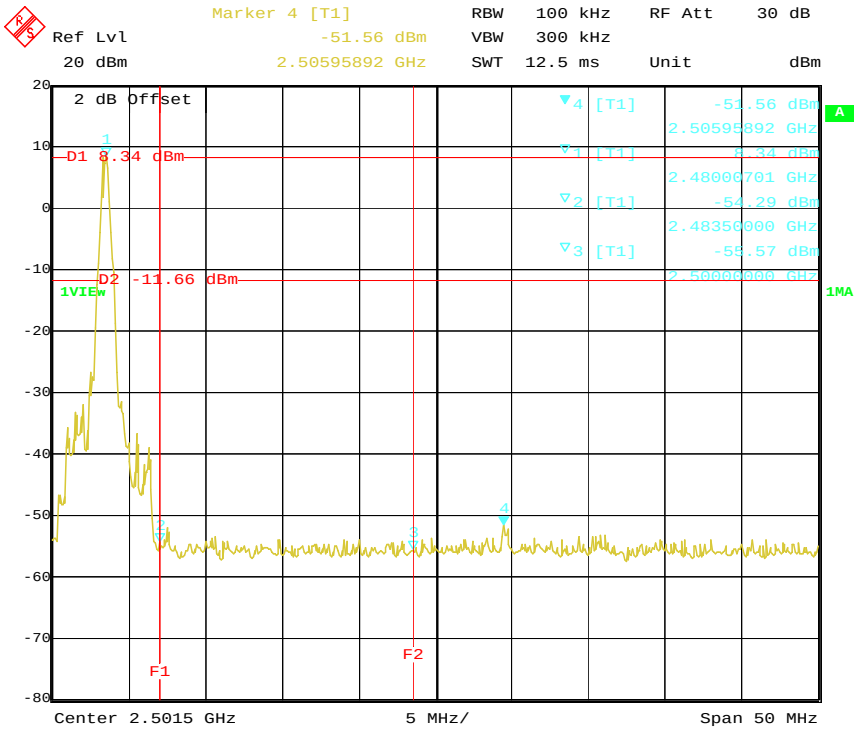
a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

10.4. Test result

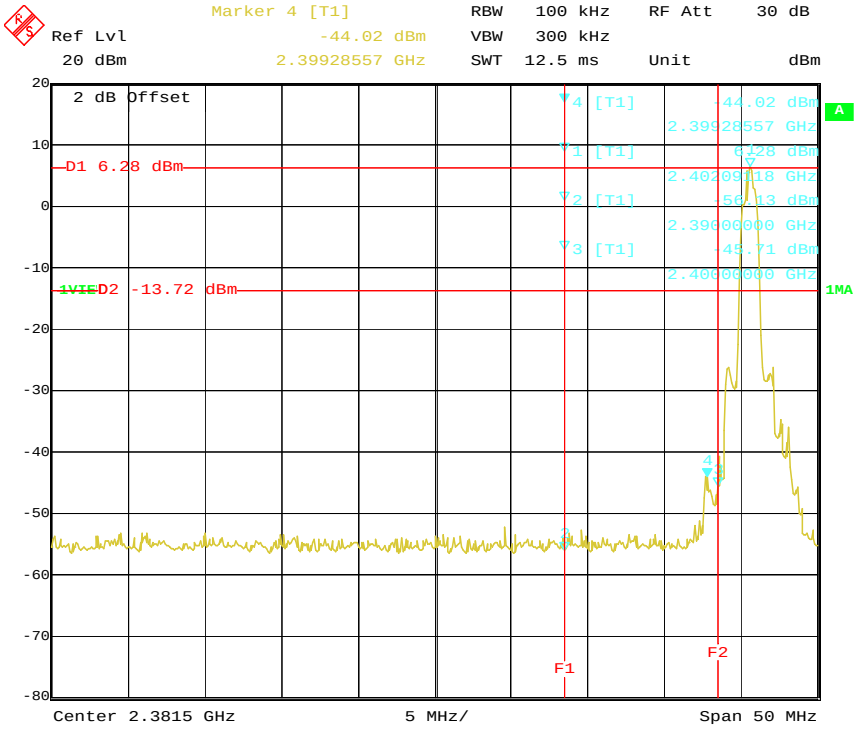
PASS (**See below detailed test result**.)

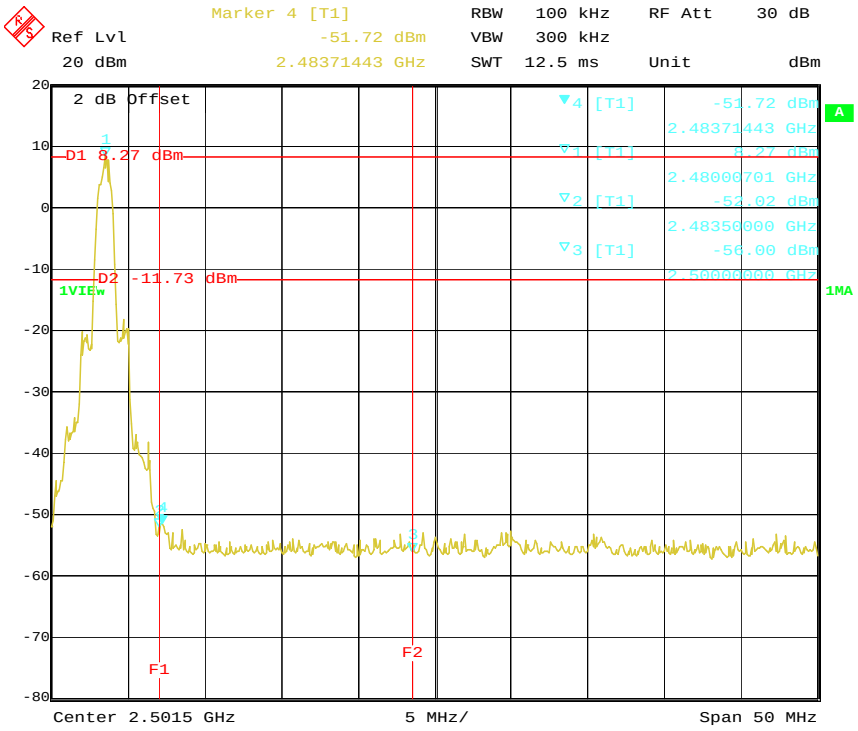
GFSK



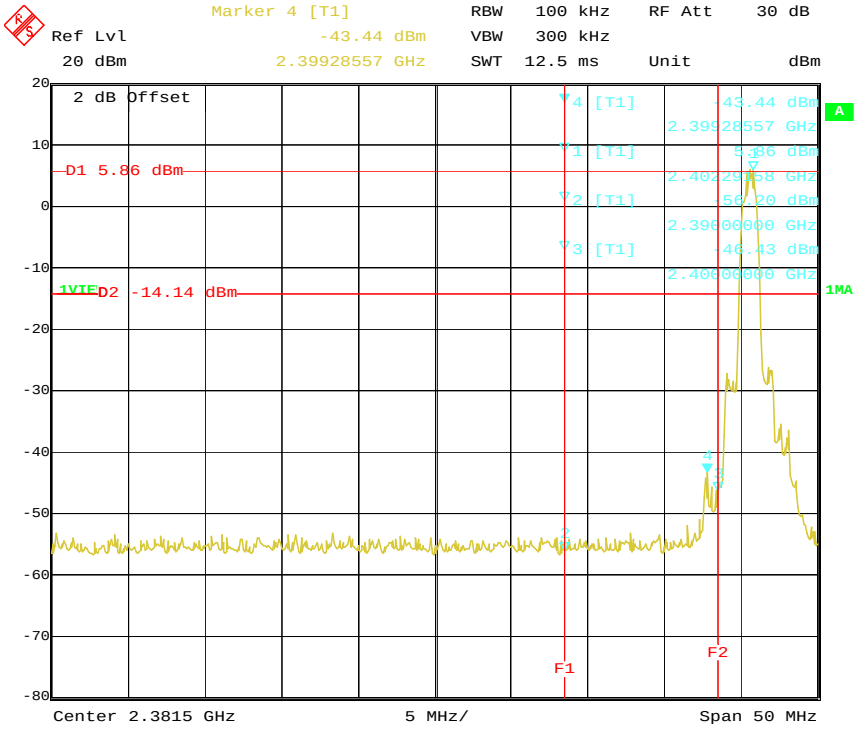


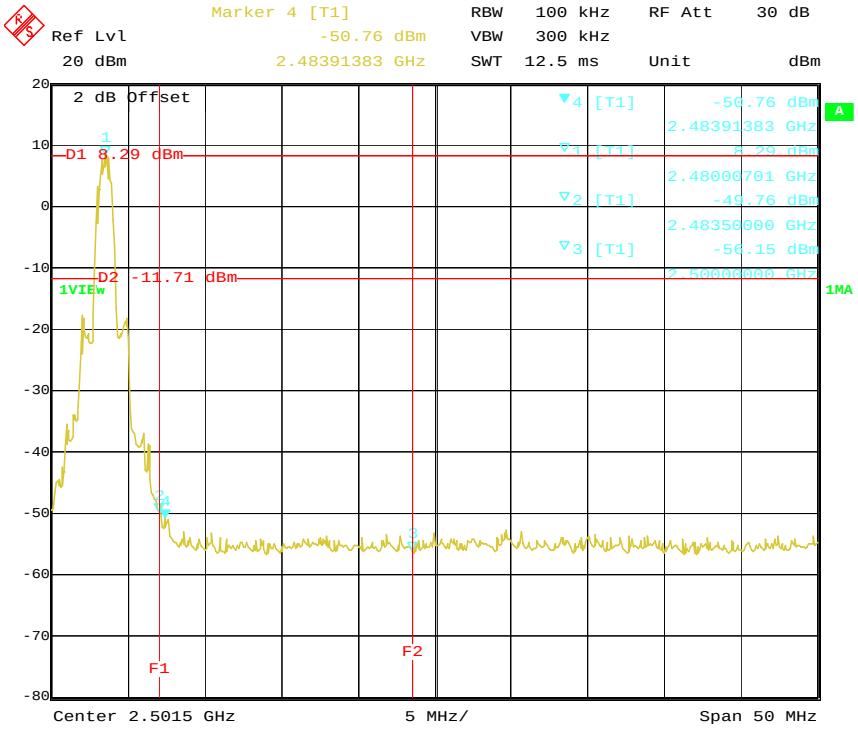
π /4DQPSK


Marker 4 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-44.02 dBm
VBW 300 kHz
20 dBm
2.39928557 GHz
SWT 12.5 ms
Unit dBm
2 dB Offset
D1 6.28 dBm
D2 -13.72 dBm
4 [T1] 44.02 dBm
2.39928557 GHz
1 [T1] 6.28 dBm
2.40209118 GHz
2 [T1] 50.13 dBm
2.39000000 GHz
3 [T1] 45.71 dBm
2.40000000 GHz
1MA
F1
F2
Center 2.3815 GHz
5 MHz/
Span 50 MHz

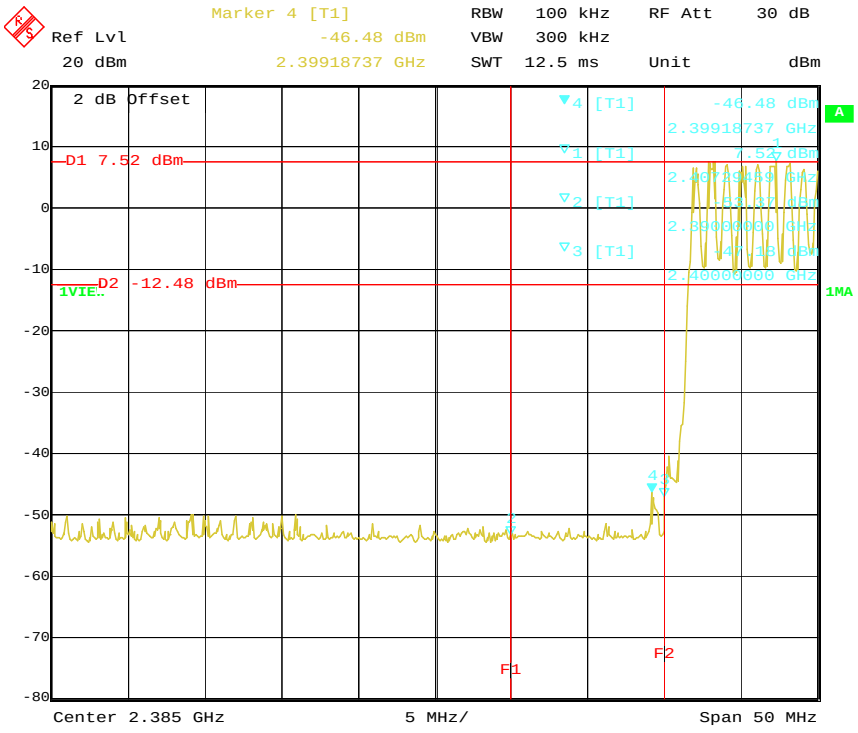

Marker 4 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-51.72 dBm
VBW 300 kHz
20 dBm
2.48371443 GHz
SWT 12.5 ms
Unit dBm
2 dB Offset
D1 8.27 dBm
D2 -11.73 dBm
4 [T1] -51.72 dBm
2.48371443 GHz
1 [T1] 8.27 dBm
2.48000701 GHz
2 [T1] -52.02 dBm
2.48350000 GHz
3 [T1] -56.00 dBm
2.50000000 GHz
1MA
F1
F2
Center 2.5015 GHz
5 MHz/
Span 50 MHz

8DPSK

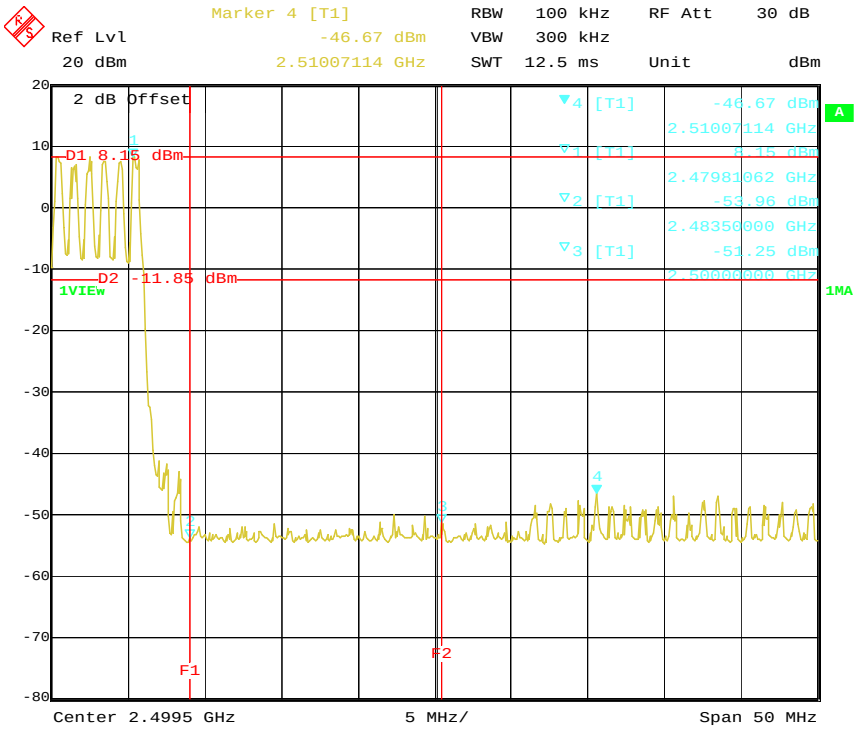

Marker 4 [T1]
Ref Lvl
20 dBm
-43.44 dBm
2.39928557 GHz
RBW 100 kHz
VBW 300 kHz
SWT 12.5 ms
RF Att 30 dB
Unit dBm
2 dB Offset
D1 5.86 dBm
D2 -14.14 dBm
4 [T1] 43.44 dBm
2.39928557 GHz
1 [T1] 5.86 dBm
2.40229458 GHz
2 [T1] 50.20 dBm
2.39000000 GHz
3 [T1] 46.43 dBm
2.40000000 GHz
1VIEw
A
1MA
F1
F2
Center 2.3815 GHz
5 MHz/
Span 50 MHz


Marker 4 [T1]
Ref Lvl
20 dBm
-50.76 dBm
2.48391383 GHz
RBW 100 kHz
VBW 300 kHz
SWT 12.5 ms
RF Att 30 dB
Unit dBm
2 dB Offset
D1 8.29 dBm
D2 -11.71 dBm
4 [T1] -50.76 dBm
2.48391383 GHz
1 [T1] 8.29 dBm
2.48000701 GHz
2 [T1] -49.76 dBm
2.48350000 GHz
3 [T1] -50.15 dBm
2.50000000 GHz
1VIEw
A
1MA
F1
F2
Center 2.5015 GHz
5 MHz/
Span 50 MHz

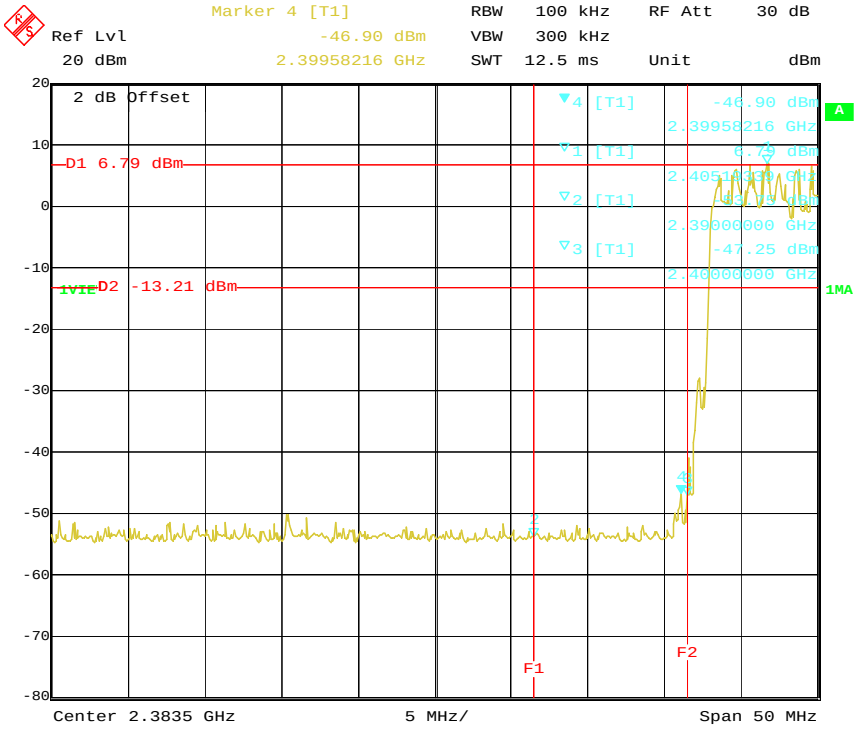
GFSK 2402MHz



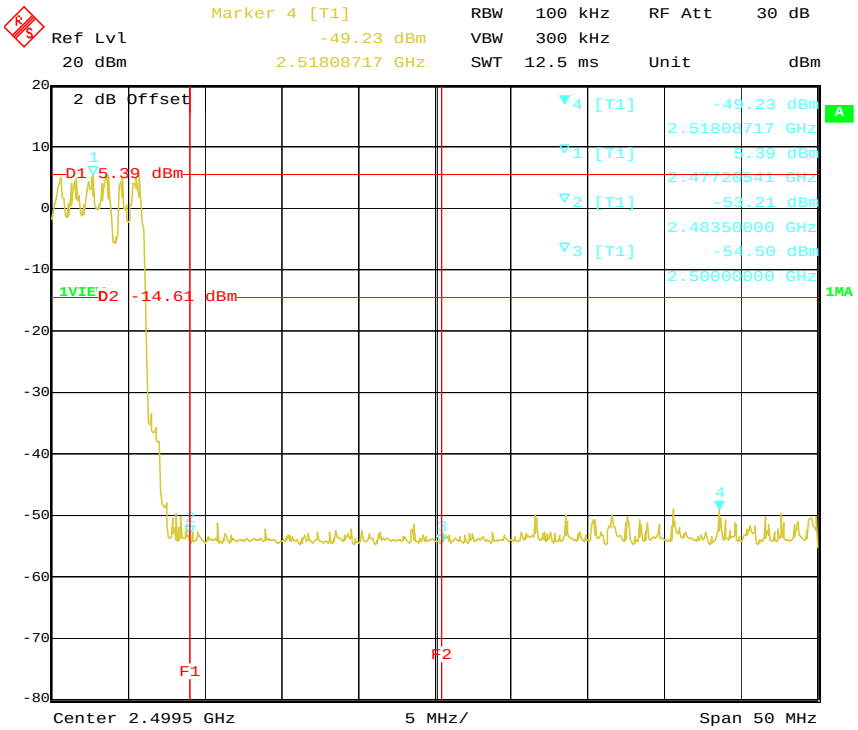
GFSK 2480MHz



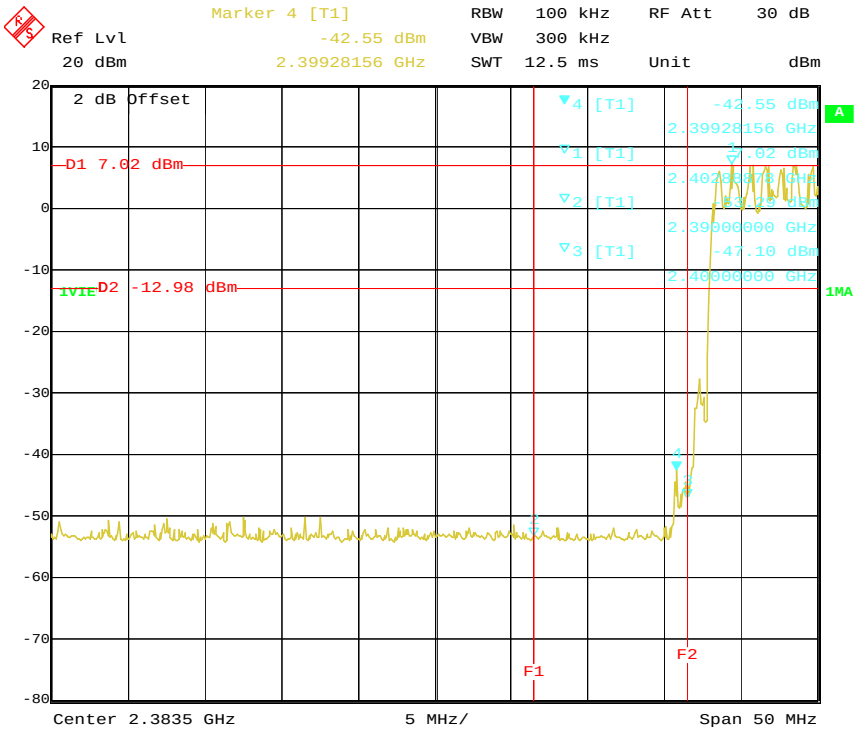
π /4DQPSK 2402MHz



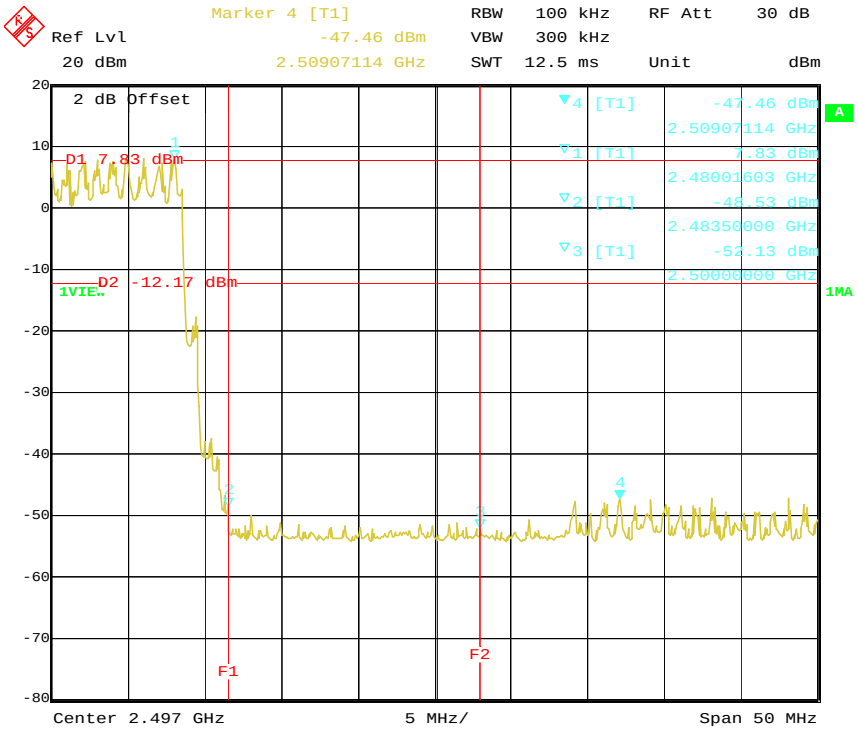
π /4DQPSK 2480MHz



8DPSK 2402MHz



8DPSK 2480MHz



11. ANTENNA REQUIREMENTS

11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2. EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.

END OF REPORT