TEST REPORT

No.I16D00008-RFB

For

Client : LENOVO (SHANGHAI) ELECTRONICS TECHNOLOGY CO LTD

Production : Portable Tablet Computer

Brand Name : Lenovo

Model Name : Lenovo TB3-730F

FCC ID: O57TB3730F

IC ID 10407A-TB3730F

Standard: FCC Part15 / ANSI C63.10

RSS-247

Issued date: 2016-03-16

Note:

Hardware and software version see page 8

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

About EUT

EUT Description	Portable Tablet Computer
Model name	Lenovo TB3-730F
Bluetooth Frequency	2402MHz-2480MHz
BLE Frequency	2402MHz-2480MHz
WLAN Frequency	2412MHz-2462MHz
GPS Frequency Band	1575.42MHz(L1)
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.4V

Revision Version

Report Number	Revision	Date	Memo
I16D00008-RFB	00	2016-03-07	Initial creation of test report
I16D00008-RFB	01	2016-03-15	Second creation of test report
I16D00008-RFB	02	2016-03-16	Third creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

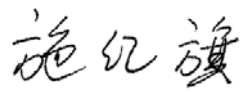
1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

1.3. Project data

Project Leader:	Wang Yaqiong
Testing Start Date:	2016-01-19
Testing End Date:	2016-03-05

1.4. Signature



Shi Hongqi
(Prepared this test report)

Liu Jianquan
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	LENOVO (SHANGHAI) ELECTRONICS TECHNOLOGY CO LTD
Address:	NO 68 BUILDING 199 FENJU RD, CHINA (SHANGHAI) PILOT FREE TRADE ZONE, SHANGHAI, 200131CHINA
Telephone:	+86 186 1669 0577
Postcode:	200131

2.2. Manufacturer Information

Company Name:	Lenovo PC HK Limited
Address:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong
Telephone:	+86 186 1669 0577
Postcode:	N/A

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Portable Tablet Computer
Model name	Lenovo TB3-730F
Bluetooth Frequency	2402MHz-2480Mhz
Bluetooth Channel	Channel0-Channel78
Bluetooth Modulation	GMSK;π/4 DQPSK;8DPSK
Extreme Temperature	-10/+55℃
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.4V

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N02 (Main Supply)	N/A	98999_1_13M14	TB3-730F_S009_160120_ROW	2016-01-19
N06 (Main Supply)	HZC2KG25	98999_1_13M14	TB3-730F_S009_160120_ROW	2016-01-19
N16 (Secondary Supply)	HZC2M754	98999_1_13M14	TB3-730F_S009_160120_ROW	2016-01-19

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---
AE2	---	---

*AE ID: is used to identify the test sample in the lab internally.

3.4. The difference between two provide EUT

Main Supply

Part Name	Model Name	supplier	Remark
LCD	TV070WSM-TL1-38P0	BOE TECHNOLOGY GROUP CO.LTD	7''color TFT-LCD
Flash	KMQ820013M-B419	SAMSUNG	eMMC+DDR3;16GByte+16Gb;B221;11.5*13*1mm

Speaker	XHB181331B08-09-B-RH	JiaShan Haosheng Electronic CO.,LTD	P98999AA1 SPEAKER BOX module
Front Camera	BLX2508W	Brodsands Electronice(ShenZhen)Co.,Ltd.	200WFF,GC2355C CSP,6.5*6.5*4.37,82°wide viewing angles
Back Camera	L545A00	NanChang O-Film TECH CO.,LTD	500WAF, SENSOR HI-545，8.5*8.5*5.1mm，67
Vibrator	HZF1027A-P02L12	ShenZhen Hongzhifa Machinery&Electronic CO.,LTD	Cylindrical motor, diameter 4, size 4.7*4.7*11.4, lead wire, swing hammer radius
Back cover	P98999AA1	ShenZhen Lianmao Plastic CO.,LTD	
Battery	L13D1P31	Sunwoda Electronic CO.,LTD	3450mAh
USB Cable	XJ-007056	SHIN AN WIRE&CABLE CO.,LTD	MIC USB，1m，black/REACH
Charger	EU：C-P57 US：C-P56	Acbel Electronic (Dongguan) CO., LTD	OUTPUT: 5V1A

Secondary Supply

Part Name	Model Name	supplier	Remark
LCD	P070ACB-DB6	Innolux corporation	7''color TFT-LCD
Flash	H9TQ17ABJTMCUR-KUM	Hynix	eMMC+DDR3;16GByte+16Gb;B221;11.5*13*1mm
Speaker	DS1813DO-01-ASM4-FPC	Jiangsu Midi Acoustics Technology CO.,LTD	P98999AA1 SPEAKER BOX module
Front Camera	GV5968A1D	Shenzhen E-welly Electronic Co., LTD	200W FF,SP2508,6.5*6.5*4.35MM,3Plens, wide angle of view
Back Camera	FH545AB	Q Technology Limited	500WAF, SENSOR HI-545，8.5*8.5*5.1mm，67
Vibrator	Y0408L-400930072-4423	ChongQing LingLong Electronic CO.,LTD	Cylindrical motor, diameter 4, size 4.7*4.7*11.4, lead wire, swing hammer radius
Back cover	P98999AA1	Wingtech Mobile Communications Co.,Ltd	
Battery	L13D1P31	Scud(Fujian)Electronic CO.,LTD	3450mAh

USB Cable	SWT-A039A	SAIBO ELECTRON TECHNOLOGY（HK）CO.,LTD	MIC USB，1m，black/REACH
Charger	EU：C-P57 US：C-P56	ShenZhen Huntkey Electric CO., LTD	OUTPUT: 5V1A

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15,Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	Oct,2009 Edition
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems	2013
RSS-247	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	2015

5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247(b)	RSS-247 5.4	P
Peak Power Spectral Density	15.247(e)	RSS-247 5.2	NA
20dB Occupied Bandwidth	15.247(c)	RSS-247 5.2	P
Band Edges Compliance	15.247(d)	RSS-247 5.5	P
Transmitter Spurious Emission-Conducted	15.247	RSS-247 5.5	P
Transmitter Spurious Emission-Radiated	15.247,15.209,	RSS-247 5.5	P
AC Powerline Conducted Emission	15.107,15.207	RSS-247 Gen 3.2	P

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity

Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	22℃
Voltage	Vnom	3.8V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

Note:

a. All the test data for each data were verified, but only the worst case was reported.

b.The GFSK, π/4 DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for π/4 DQPSK, 3-DH1 for 8DPSK.

c.The DC and low frequency voltages' measurement uncertainty is ±2%.

5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

5.2. Statements

The product name Lenovo TB3-730F, supporting WLAN/BT/BLE/GPS, manufactured by Lenovo PC HK Limited, is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

6. Test result

6.1. Peak Output Power-Conducted

6.1.1 Measurement Limit

Standard	Limit (dBm)
FCC Part 15.247(b)(1)	< 30

6.1.2 Test Condition:

Hopping Mode	RBW	VBW	Span	Sweeptime
Hopping OFF	3MHz	10MHz	9MHz	Auto

6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

1. The output power of EUT was connected to the spectrum analyzer and CBT32 by cable and divide. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Measure the conducted output power and record the results it.

6.1.4 Measurement Results:

For GFSK

Channel	Ch0 2402 MHz	Ch39 2441 MHz	CH78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	7.151	8.486	7.571	P
	Fig.1	Fig.2	Fig.3	

For π/4 DQPSK

Channel	Ch0 2402 MHz	Ch39 2441 MHz	CH78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	5.686	7.174	6.281	P
	Fig.4	Fig.5	Fig.6	

For 8DPSK

Channel	Ch0 2402 MHz	Ch39 2441 MHz	CH78 2480 MHz	Conclusion

Peak Conducted Output Power (dBm)	5.648	7.105	6.213	P
	Fig.7	Fig.8	Fig.9	

Conclusion: PASS

Test graphs an below

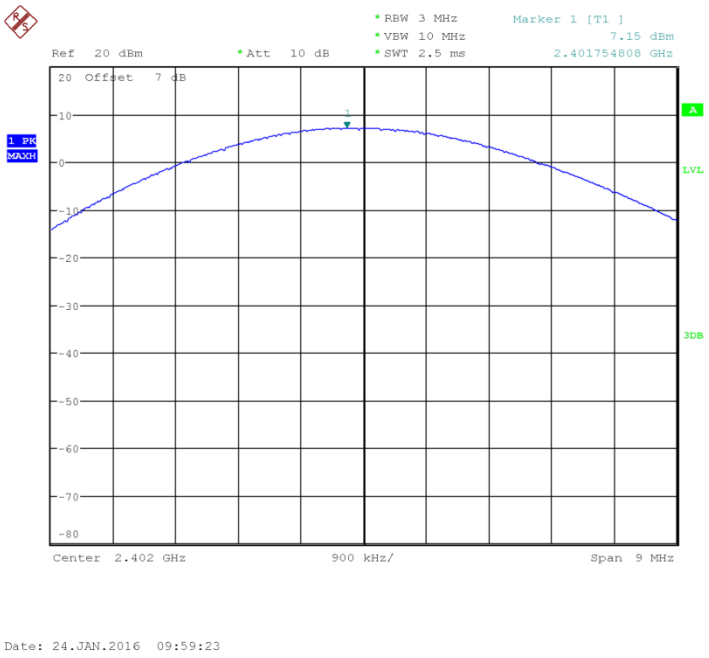


Fig.1 Peak Conducted Output Power CH0, DH1

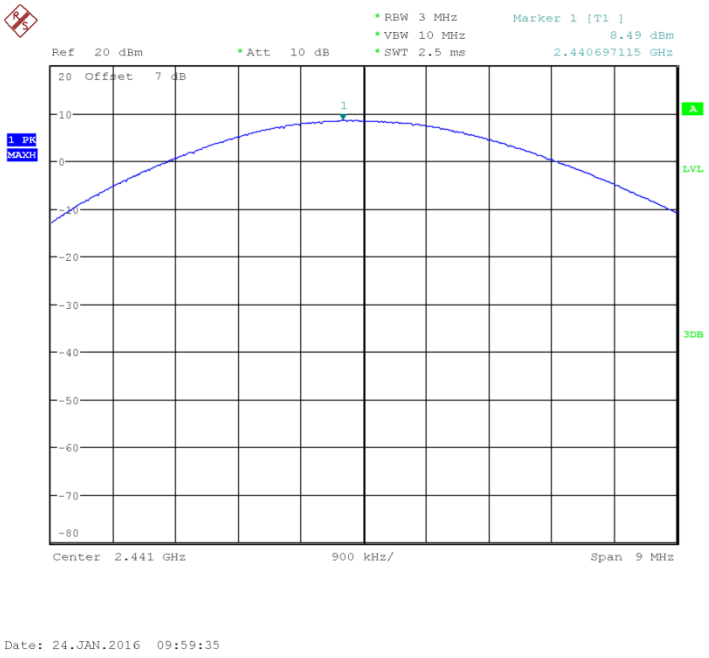


Fig.2 Peak Conducted Output Power CH39, DH1

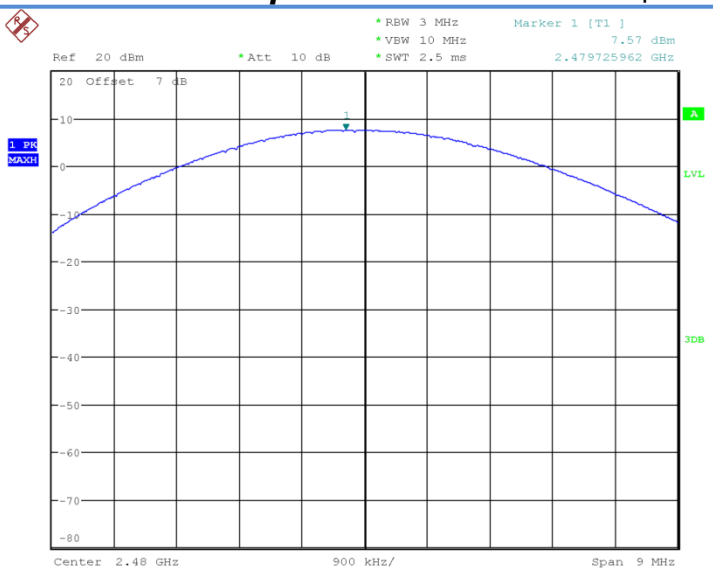


Fig.3 Peak Conducted Output Power CH78, DH1

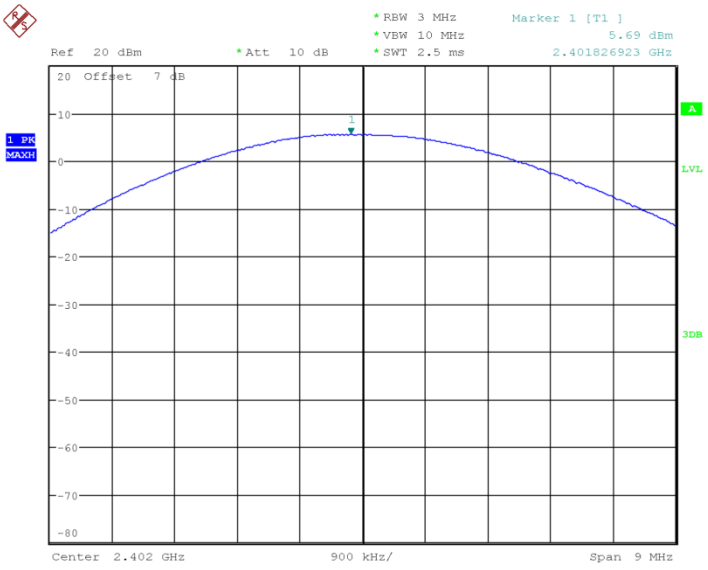


Fig.4 Peak Conducted Output Power CH0, 2DH1

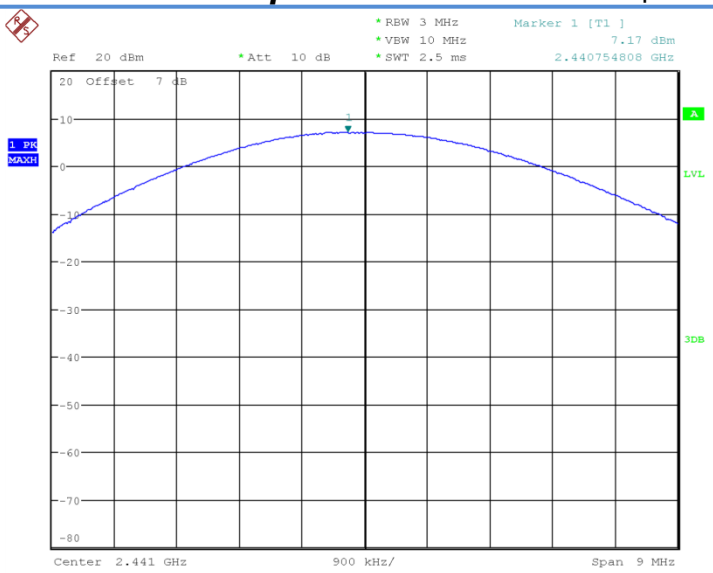


Fig.5 Peak Conducted Output Power CH39, 2DH1

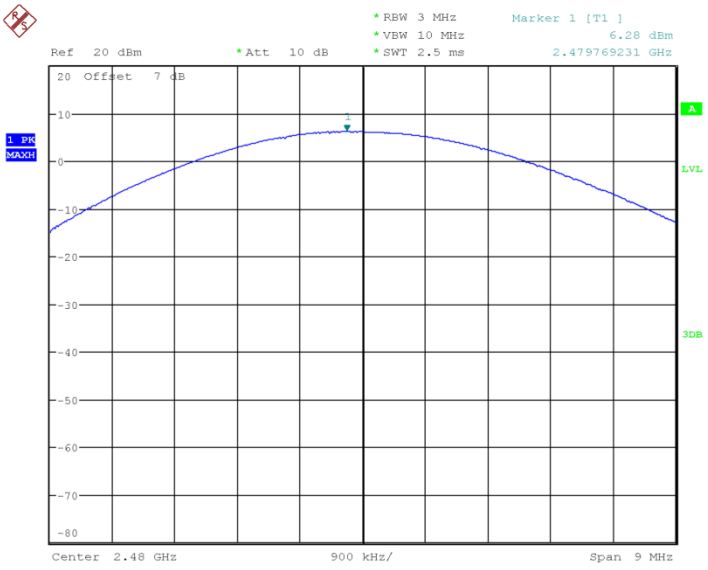


Fig.6 Peak Conducted Output Power CH78, 2DH1

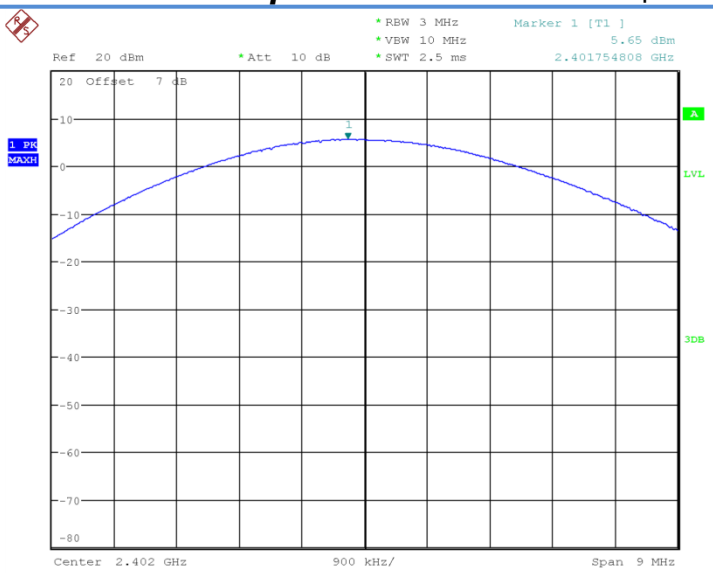


Fig.7 Peak Conducted Output Power CH0, 3DH1

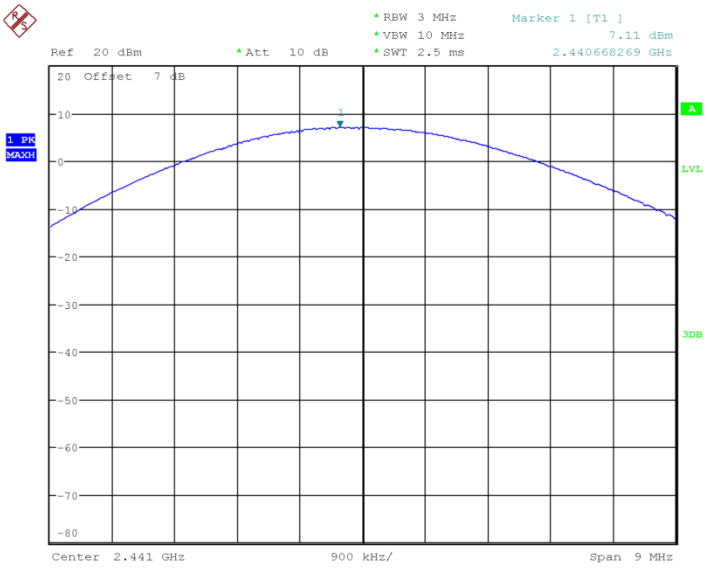


Fig.8 Peak Conducted Output Power CH39, 3DH1

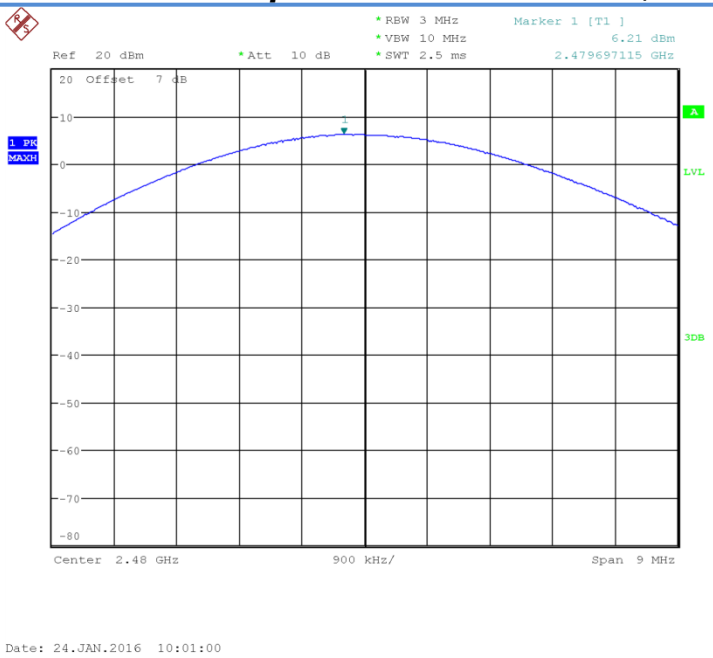


Fig.9 Peak Conducted Output Power CH78, 3DH1

6.2. Frequency Band Edges-Conducted

6.2.1 Measurement Limit:

Standard	Limited(dBc)
FCC 47 CFR Part 15.247(d)	>20

6.2.2 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.6.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
3. Detector =peak, sweep time=auto couple, trace mode=max hold.
4. Allow sweep to continue until the trace stabilizes.

6.2.3 Measurement results

For GFSK

Channel	Hopping	Band Edge Power (dBc)	Conclusion
0	Hopping OFF	Fig.10	P
	Hopping ON	Fig.11	P
78	Hopping OFF	Fig.12	P

	Hopping ON	Fig.13	P

For π/4 DQPSK

Channel	Hopping	Band Edge Power (dBc)	Conclusion
0	Hopping OFF	Fig.14	P
	Hopping ON	Fig.15	P
78	Hopping OFF	Fig.16	P
	Hopping ON	Fig.17	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)	Conclusion
0	Hopping OFF	Fig.18	P
	Hopping ON	Fig.19	P
78	Hopping OFF	Fig.20	P
	Hopping ON	Fig.21	P

Conclusion: PASS

Test graphs an below

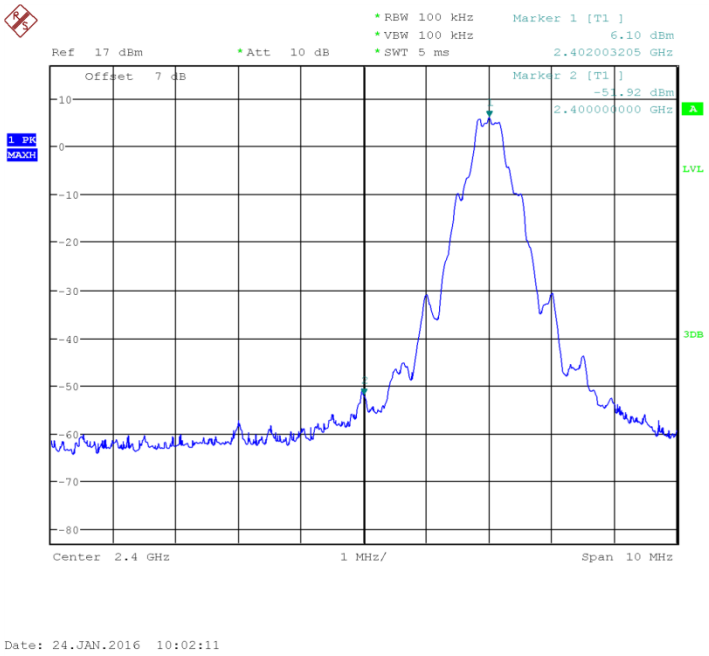


Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

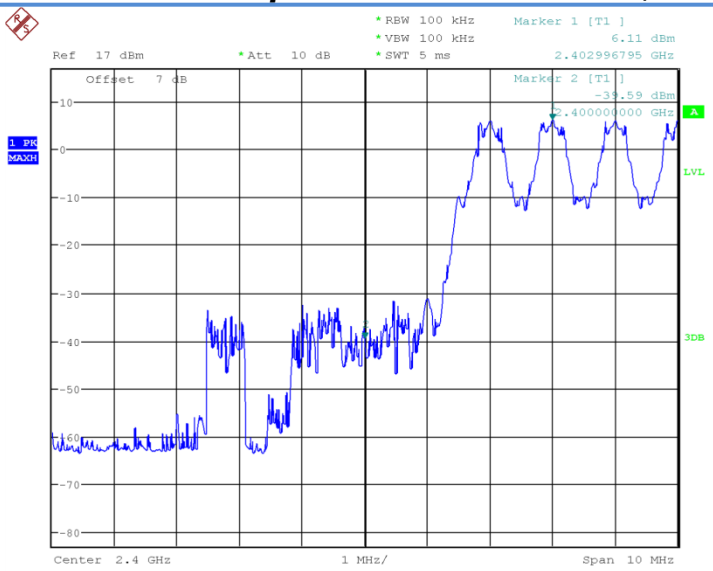


Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

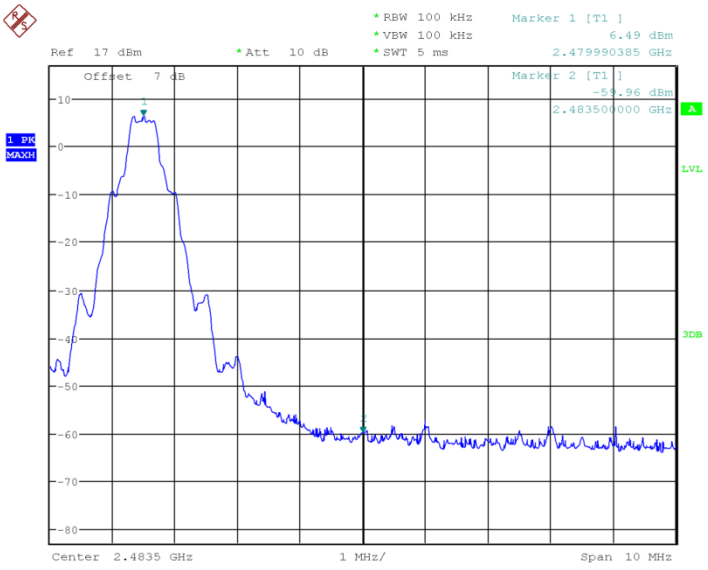


Fig.12 Frequency Band Edge: GFSK, Ch78, Hopping OFF

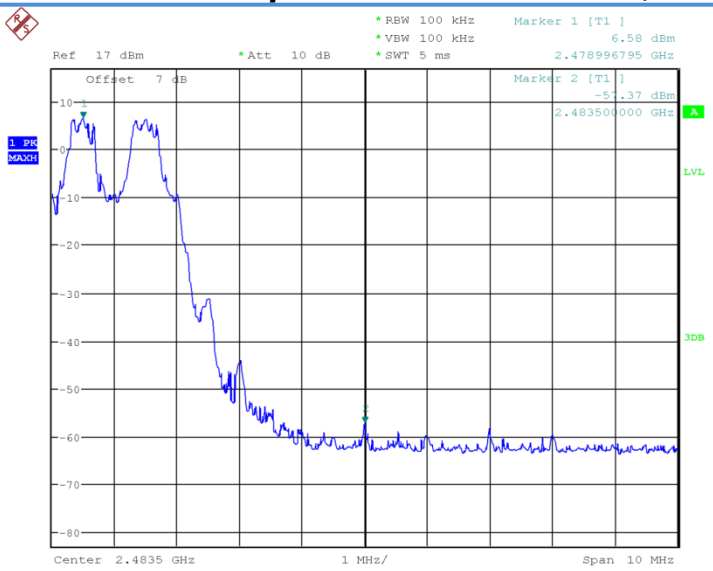


Fig.13 Frequency Band Edge: GFSK, Ch78, Hopping ON

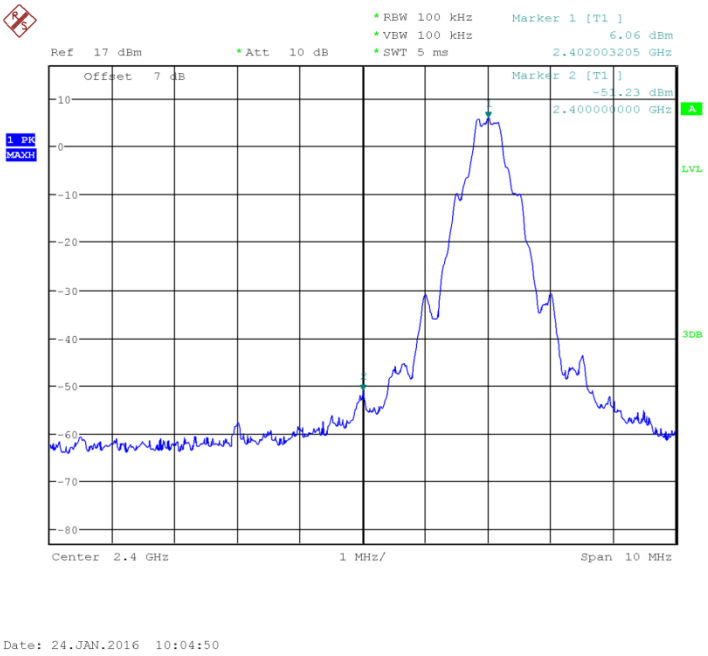


Fig.14 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping OFF

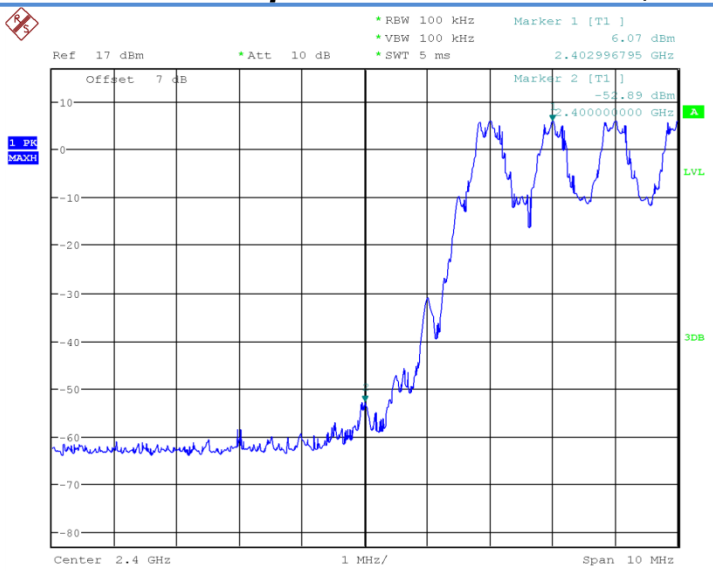


Fig.15 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping ON

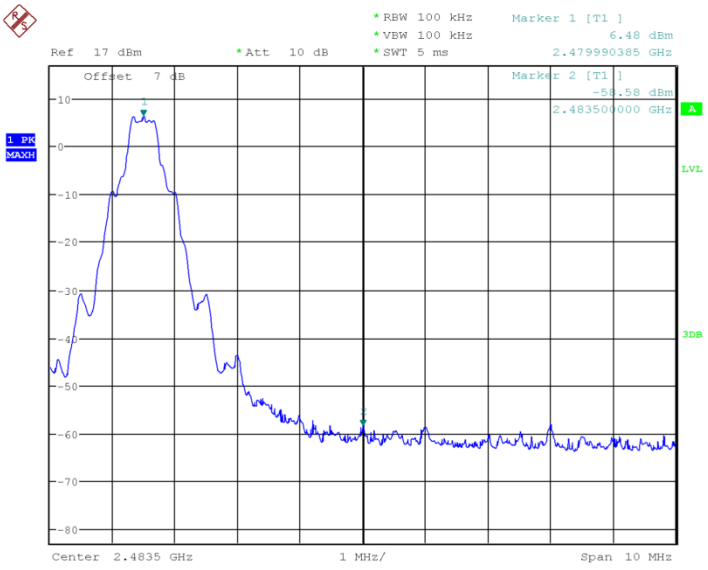


Fig.16 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping OFF

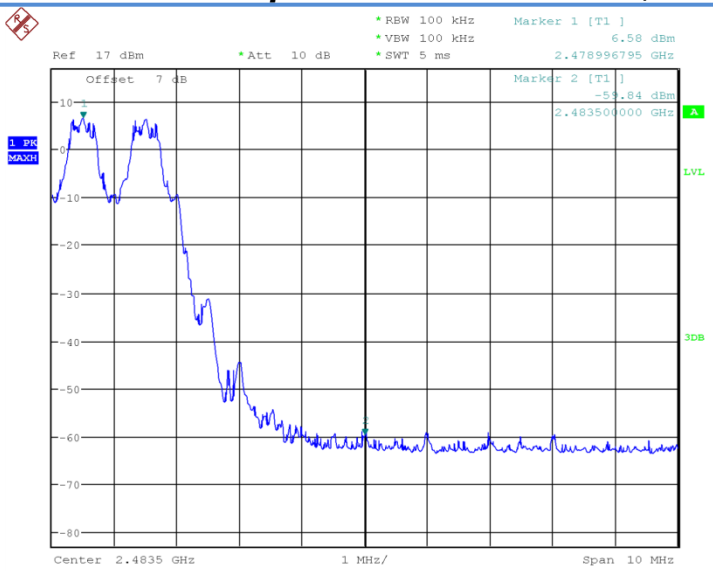


Fig.17 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping ON

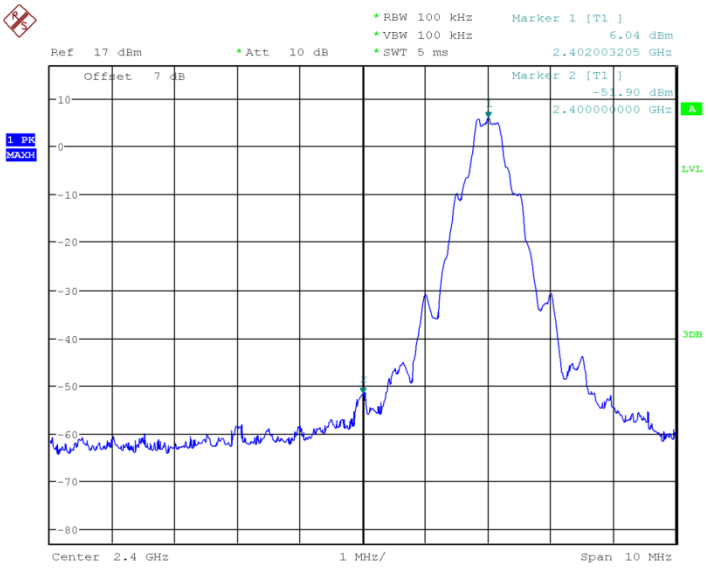


Fig.18 Frequency Band Edge: 8DPSK, Ch0, Hopping OFF

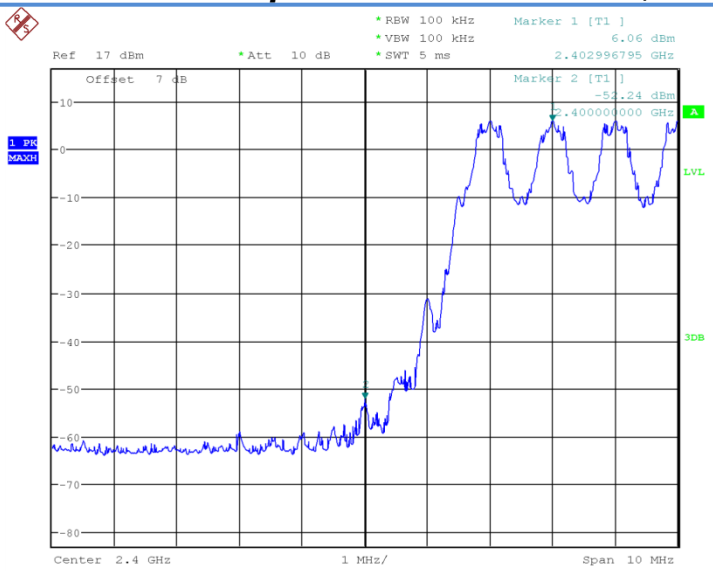


Fig.19 Frequency Band Edge: 8DPSK, Ch0, Hopping ON

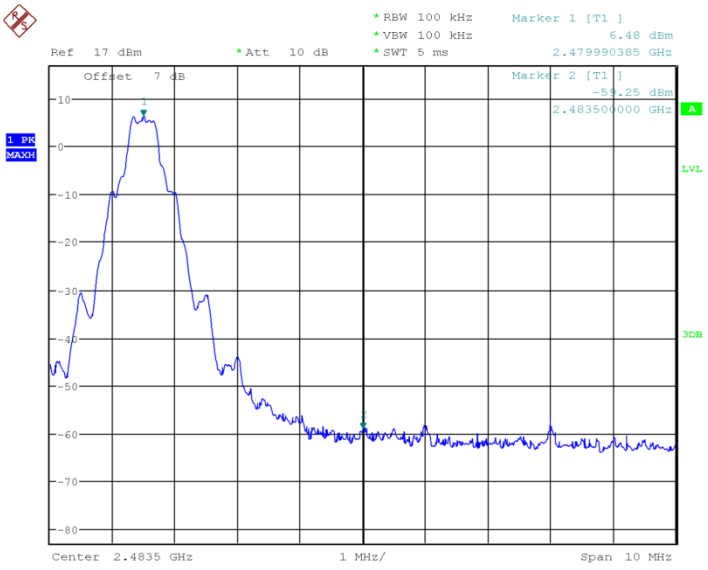


Fig.20 Frequency Band Edge: 8DPSK, Ch78, Hopping OFF

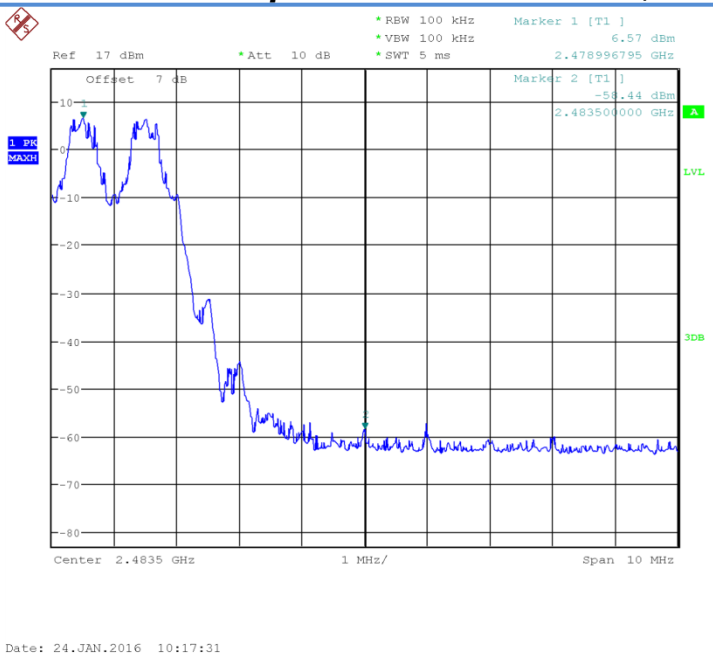


Fig.21 Frequency Band Edge: 8DPSK, Ch78, Hopping ON

6.3. Conducted Emission

6.3.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

6.3.3 Measurement Results:

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	Center Freq.	Fig.22	P
	30MHz~26GHz	Fig.23	P
Ch39 2441MHz	Center Freq.	Fig.24	P
	30MHz~26GHz	Fig.25	P
Ch78 2480MHz	Center Freq.	Fig.26	P

	30MHz~26GHz	Fig.27	P

For π/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	Center Freq.	Fig.28	P
	30MHz~26GHz	Fig.29	P
Ch39 2441MHz	Center Freq.	Fig.30	P
	30MHz~26GHz	Fig.31	P
Ch78 2480MHz	Center Freq.	Fig.32	P
	30MHz~26GHz	Fig.33	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	Center Freq.	Fig.34	P
	30MHz~26GHz	Fig.35	P
Ch39 2441MHz	Center Freq.	Fig.36	P
	30MHz~26GHz	Fig.37	P
Ch78 2480MHz	Center Freq.	Fig.38	P
	30MHz~26GHz	Fig.39	P

Conclusion: PASS

Test graphs as below

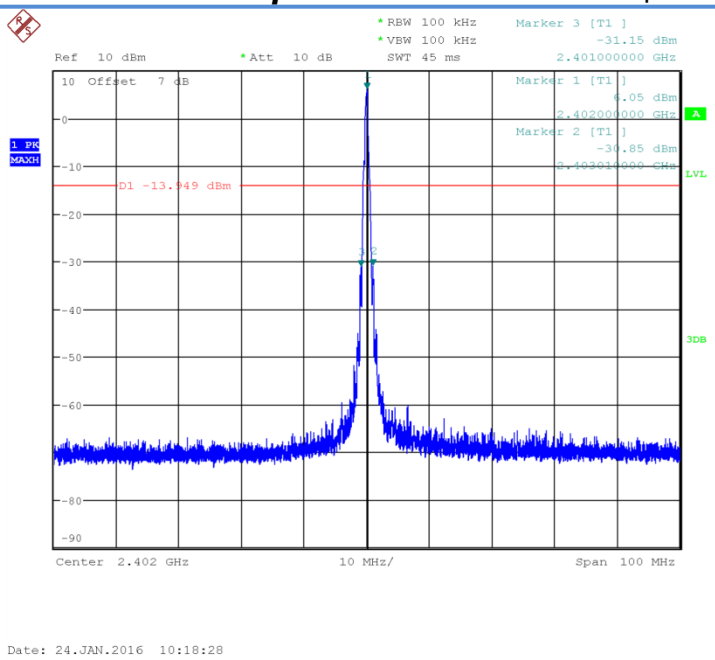


Fig.22 Conducted spurious emission: GFSK, Ch0, 2402MHz

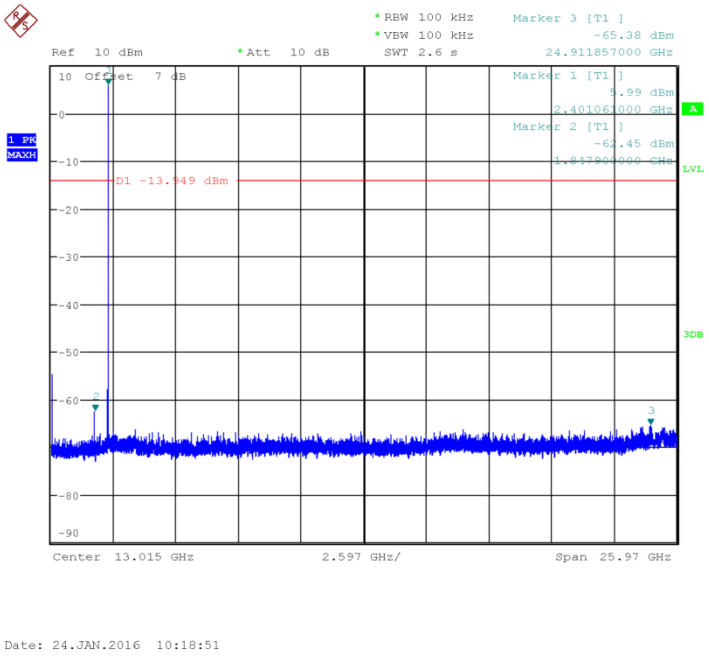


Fig.23 Conducted spurious emission: GFSK, Ch0, 30MHz~26GHz

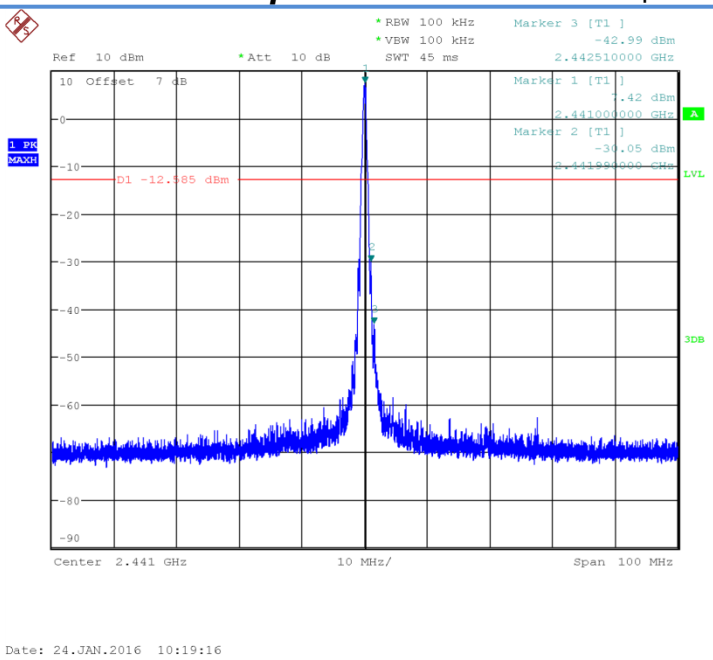


Fig.24 Conducted spurious emission: GFSK, Ch39, 2441MHz

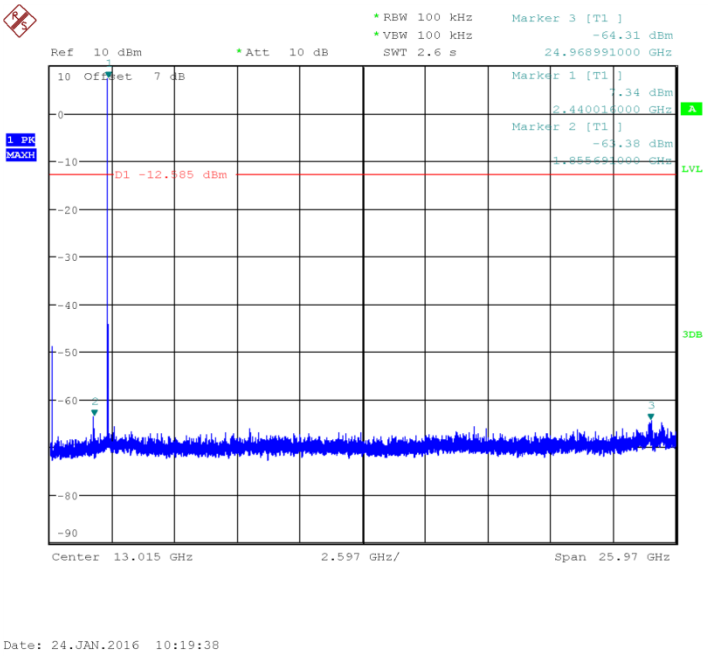


Fig.25 Conducted spurious emission: GFSK, Ch39, 30MHz~26GHz

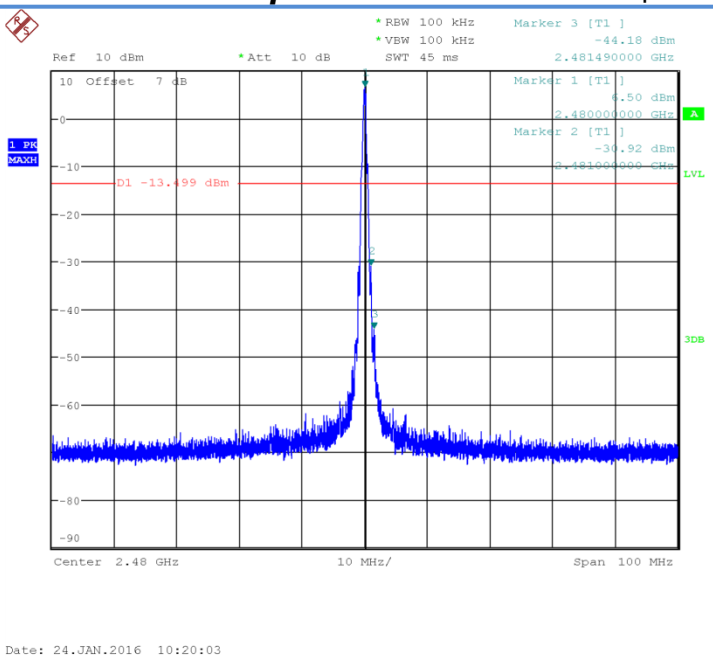


Fig.26 Conducted spurious emission: GFSK, Ch78, 2480MHz

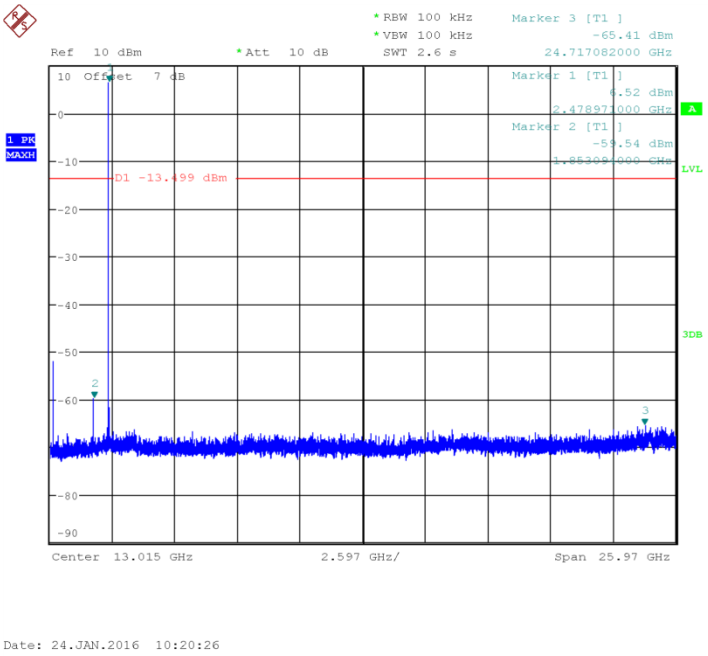


Fig.27 Conducted spurious emission: GFSK, Ch78, 30MHz~26GHz

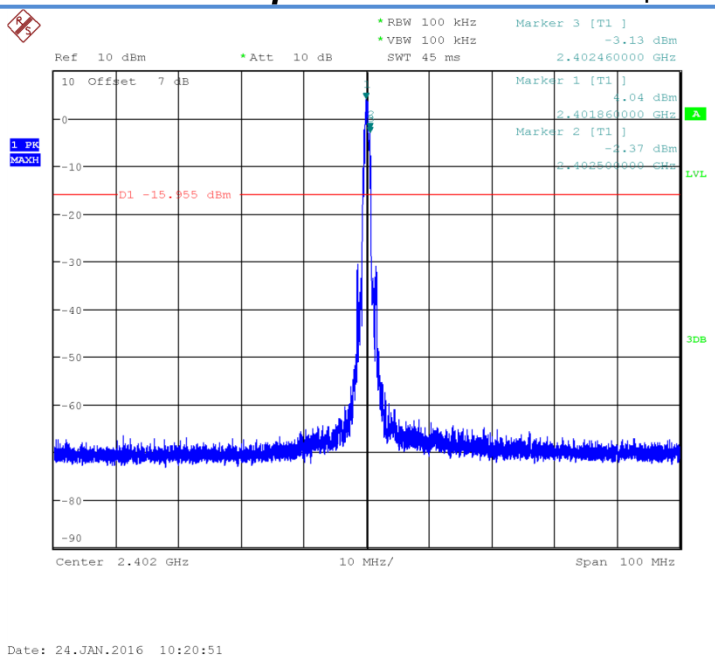


Fig.28 Conducted spurious emission: π/4 DQPSK, Ch0, 2402MHz

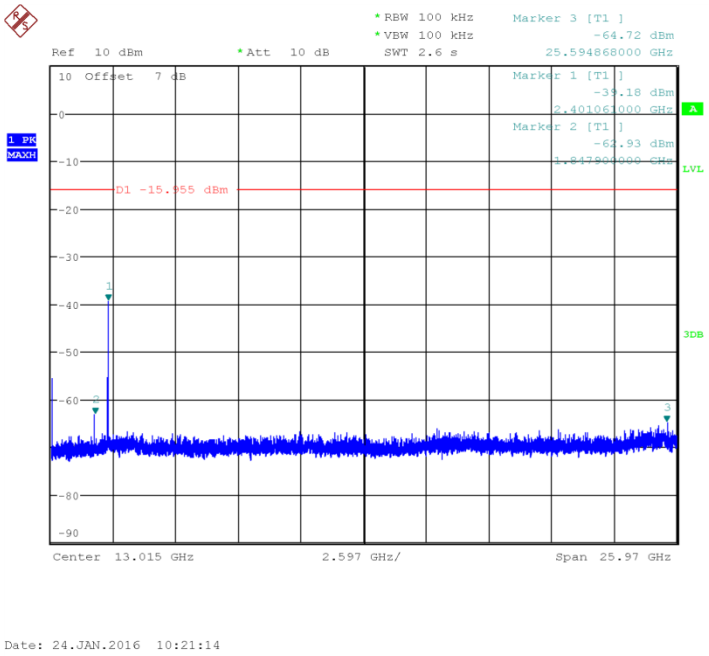


Fig.29 Conducted spurious emission: π/4 DQPSK, Ch0, 30MHz~26GHz

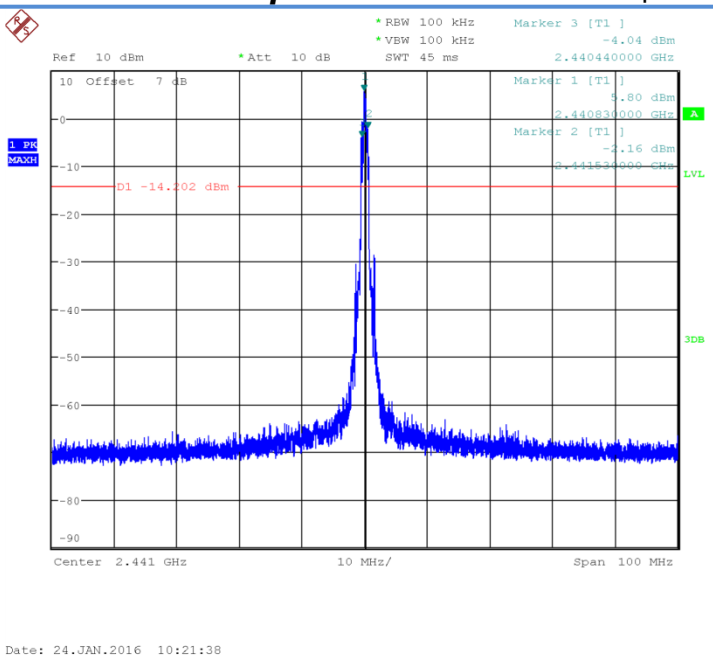


Fig.30 Conducted spurious emission: π/4 DQPSK, Ch39, 2441MHz

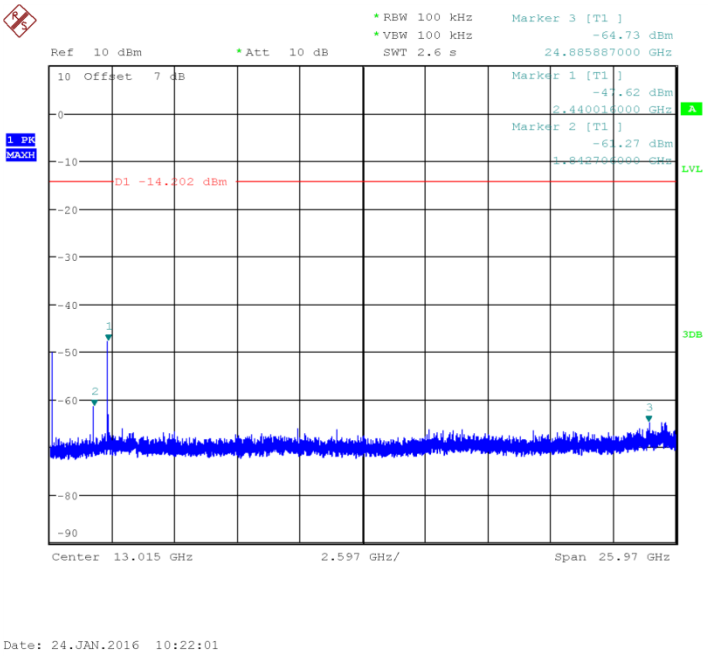


Fig.31 Conducted spurious emission: π/4 DQPSK, Ch39, 30MHz~26GHz

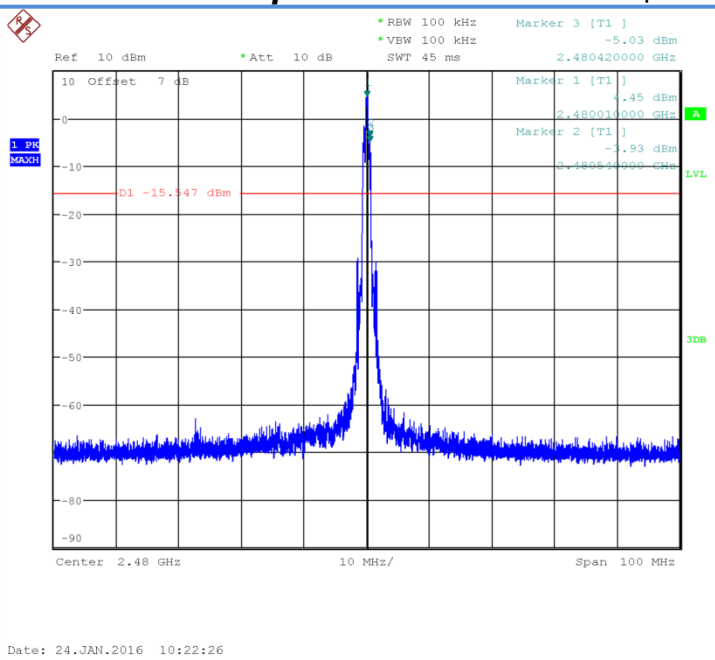


Fig.32 Conducted spurious emission: π/4 DQPSK, Ch78, 2480MHz

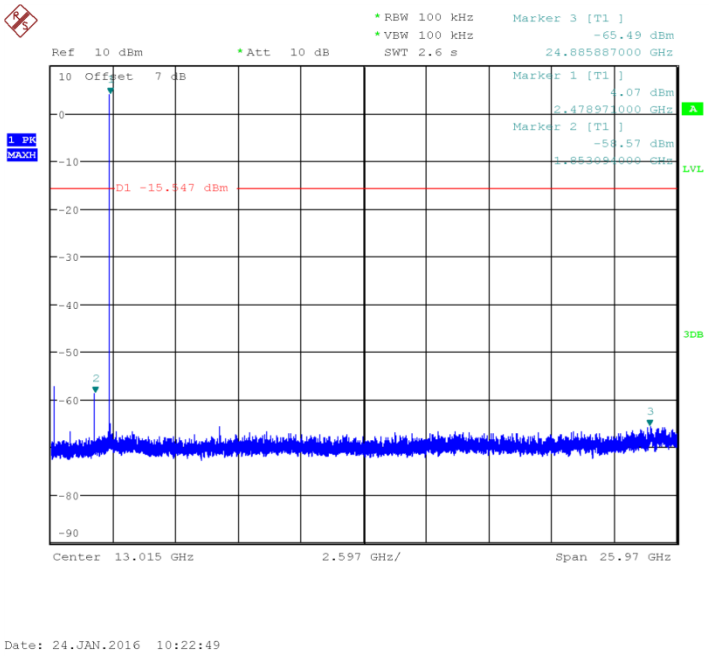


Fig.33 Conducted spurious emission: π/4 DQPSK, Ch78, 30MHz~26GHz

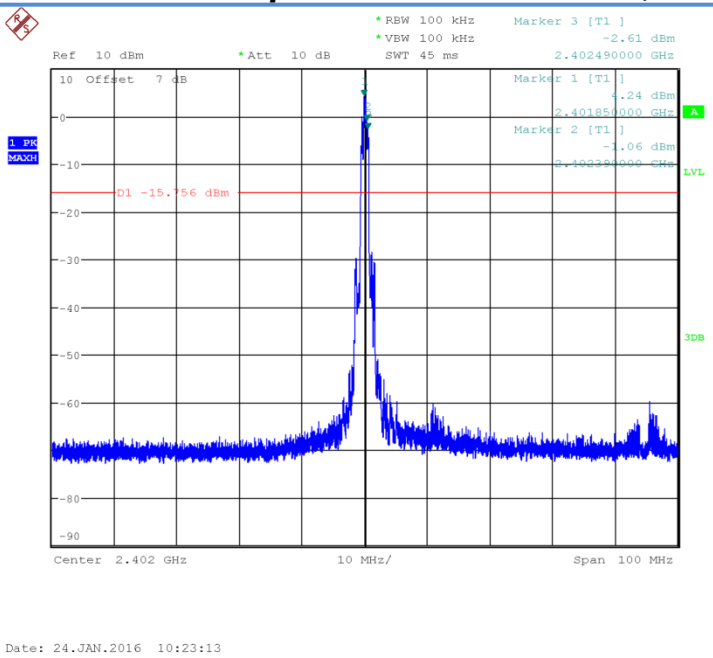


Fig.34 Conducted spurious emission: 8DPSK, Ch0, 2402MHz

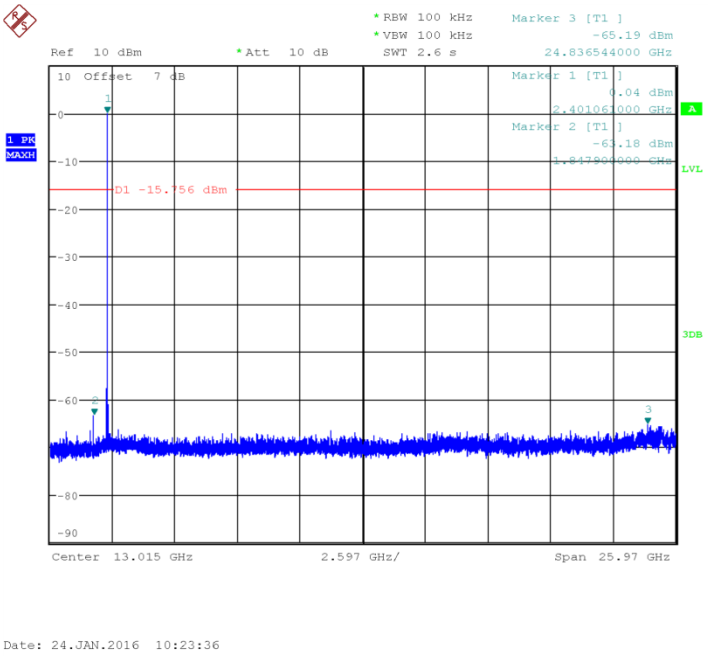


Fig.35 Conducted spurious emission: 8DPSK, Ch0, 30MHz~26GHz

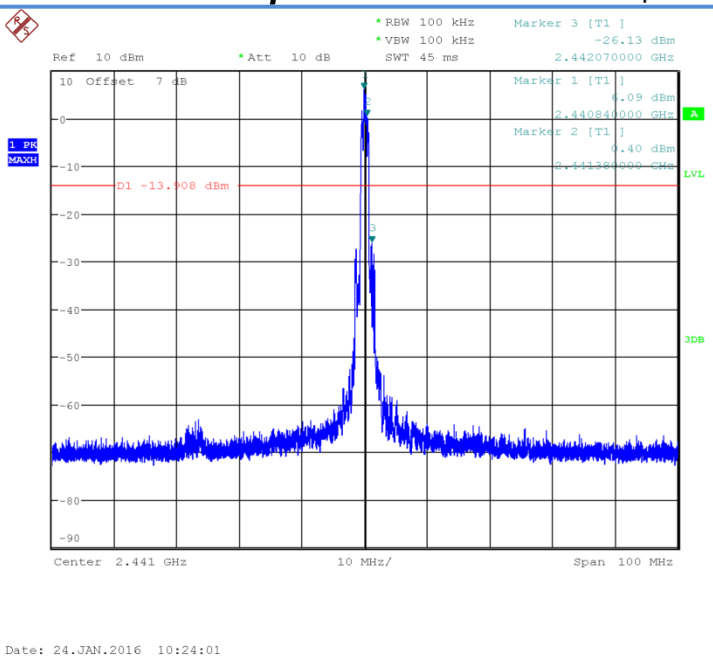


Fig.36 Conducted spurious emission: 8DPSK, Ch39, 2441MHz

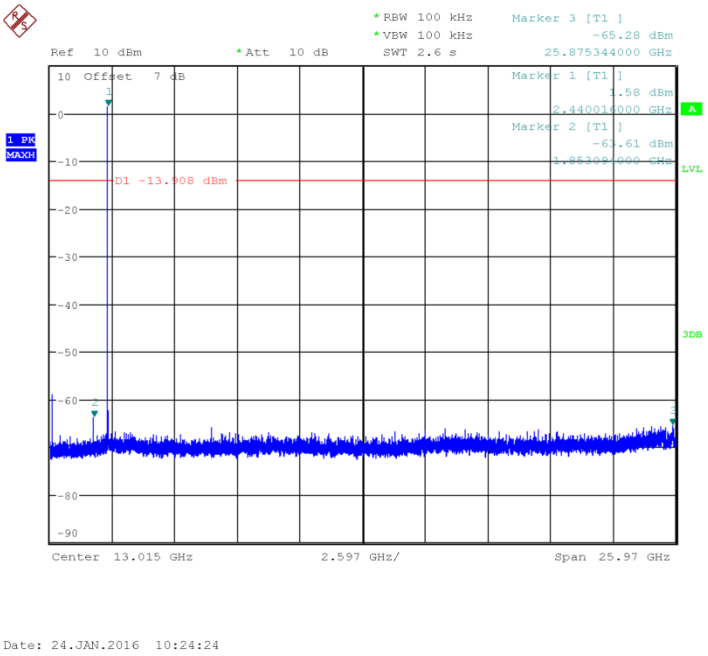


Fig.37 Conducted spurious emission: 8DPSK, Ch39, 30MHz~26GHz

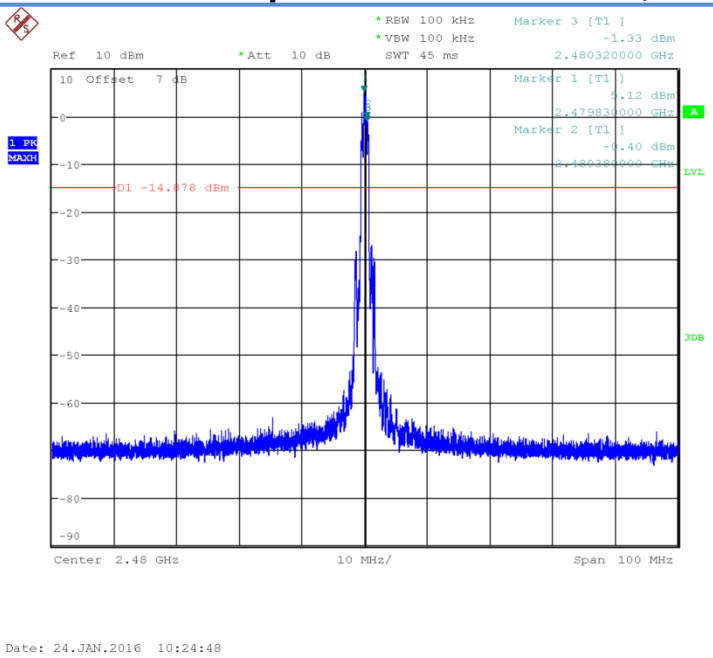


Fig.38 Conducted spurious emission: 8DPSK, Ch78, 2480MHz

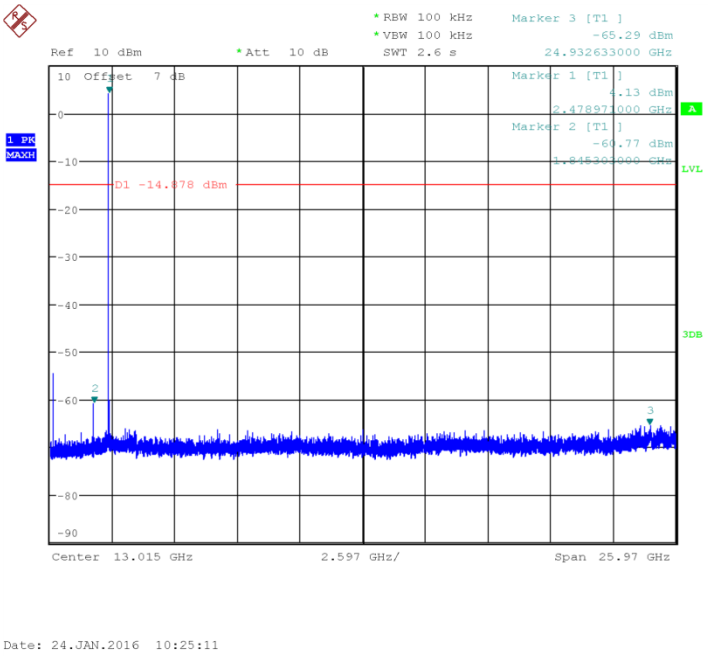


Fig.39 Conducted spurious emission: 8DPSK, Ch78, 30MHz~26GHz

6.4. Radiated Emission

6.4.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

6.4.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

6.4.3 Measurement Results:

A "reference path loss" is established and A_{Rpi} is the attenuation of "reference path loss", and including the gain of receive antenna , the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

A_{Rpi} = Cable loss + Antenna Gain-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

Main Supply(N06)

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.40	P
	1GHz~3GHz	Fig.41	P
	3GHz~18GHz	Fig.42	P
Power	2.38GHz~2.4GHz	Fig.43	P
Power	2.45GHz~2.5GHz	Fig.44	P
All channels	18GHz~26GHz	Fig.45	P

For π/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.46	P
	1GHz~3GHz	Fig.47	P
	3GHz~18GHz	Fig.48	P
Power	2.38GHz~2.4GHz	Fig.49	P
Power	2.45GHz~2.5GHz	Fig.50	P
All channels	18GHz~26GHz	Fig.51	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.52	P
	1GHz~3GHz	Fig.53	P
	3GHz~18GHz	Fig.54	P
Power	2.38GHz~2.4GHz	Fig.55	P
Power	2.45GHz~2.5GHz	Fig.56	P

All channels	18GHz~26GHz	Fig.57	P

GFSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
31.240536	7.14	-26	33.14	V
34.322004	11.12	-25.9	37.02	V
59.375872	8.4	-25.1	33.5	V
91.113748	5.76	-25.2	30.96	V
141.47104	2.76	-27.3	30.06	V
325.337412	10.06	-19.1	29.16	V

GFSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2537.527884	52.3	8.8	43.5	H
2620.022308	53.09	9.6	43.49	H
2699.952116	53.31	10.1	43.21	V
2835.882885	54.09	10.8	43.29	V
2897.448846	54.18	11.3	42.88	V
2992.700962	54.12	11.7	42.42	H

GFSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
12817.465	51.64	16.7	34.94	V
14344.55593	54.31	20.3	34.01	H
14939.43287	56.84	22	34.84	V
15765.11813	57.7	24.4	33.3	H
16760.11253	59.17	26.4	32.77	H
17520.3484	61.22	29.2	32.02	H

π/4 DQPSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.525656	10.55	-25.9	36.45	V
49.165836	8.87	-24.9	33.77	V
58.883508	6.02	-25	31.02	V
65.97214	10.55	-27	37.55	V
108.240736	7.81	-23.7	31.51	H
875.1193	20.83	-8	28.83	V

π/4 DQPSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2560.235192	52.11	9	43.11	V
2694.491538	52.81	10.1	42.71	V
2748.829039	52.72	10.1	42.62	H
2812.598269	53.37	10.5	42.87	H
2906.839808	53.61	11.3	42.31	H
2958.758846	54.53	11.3	43.23	H

π/4 DQPSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13339.3042	52.94	17.4	35.54	H
14273.12687	54.88	20.4	34.48	V
14902.6524	56.36	22.2	34.16	V
16195.1304	58.32	25.7	32.62	V
16824.55953	60.7	27.3	33.4	V
17574.16733	62.44	29.5	32.94	H

8DPSK 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
35.335776	5.91	-25.8	31.71	V

38.031184	8.81	-25.3	34.11	V
44.432268	8.97	-24.9	33.87	V
54.558776	5.96	-25	30.96	V
83.354044	3.41	-27.2	30.61	V
132.468832	2.66	-27.2	29.86	V

8DPSK 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2643.042885	52.27	9.9	42.37	V
2721.940577	53.39	10.1	43.29	V
2800.5475	53.34	10.4	42.94	H
2841.704423	53.42	10.8	42.62	H
2953.830385	54.45	11.3	43.15	H
2986.826539	55.11	11.7	43.41	H

8DPSK 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13831.2848	53.64	18.2	35.44	V
14427.4826	54.7	19.6	35.1	V
15097.44233	55.12	21.2	33.92	V
16277.5912	58.71	25.2	33.51	H
16910.74307	60.22	27.1	33.12	V
17590.40473	62.22	29.5	32.72	H

All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97	42.03	V
20684.980000	47.7	6.97	40.73	H
22119.789000	45.3	3.05	42.25	V

23627.899000	43.8	3.05	40.75	H
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	H

Note: all the test data shown was peak detected.

Conclusion: PASS

Test graphs as below(Main Supply):

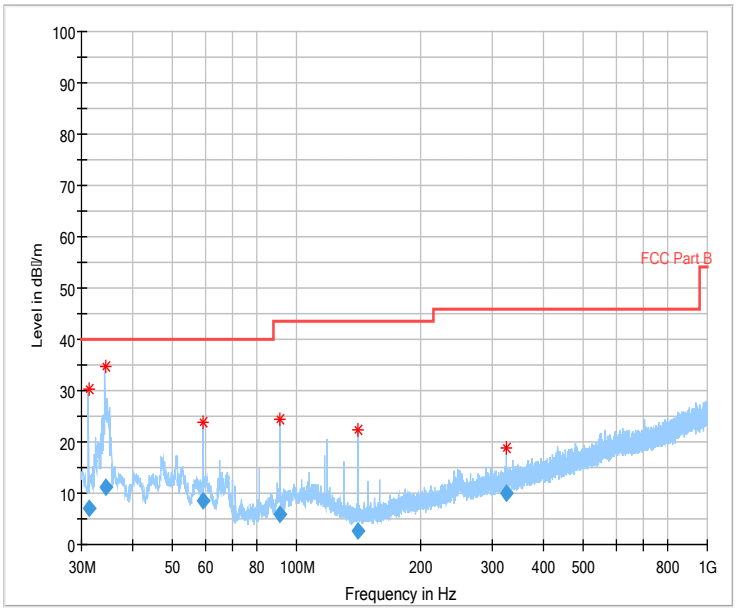


Fig.40 Radiated emission: GFSK, Ch0, 30MHz~1GHz

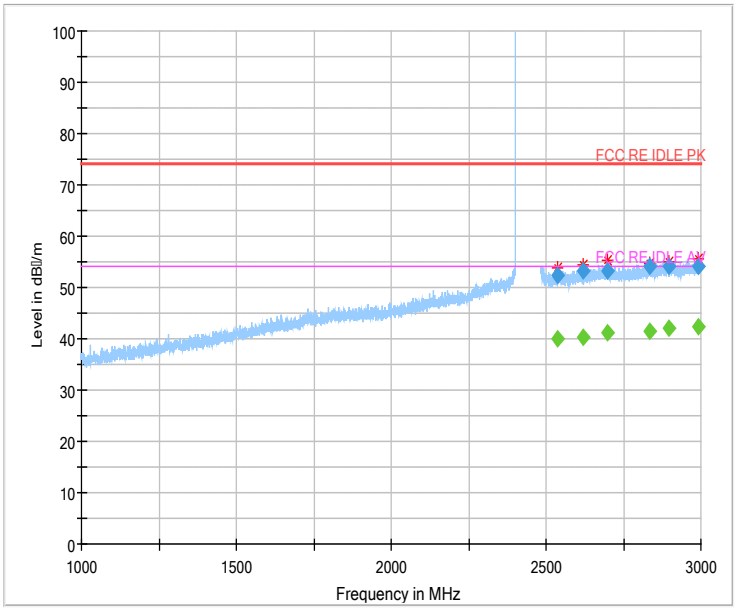


Fig.41 Radiated emission: GFSK, Ch0, 1GHz~3GHz

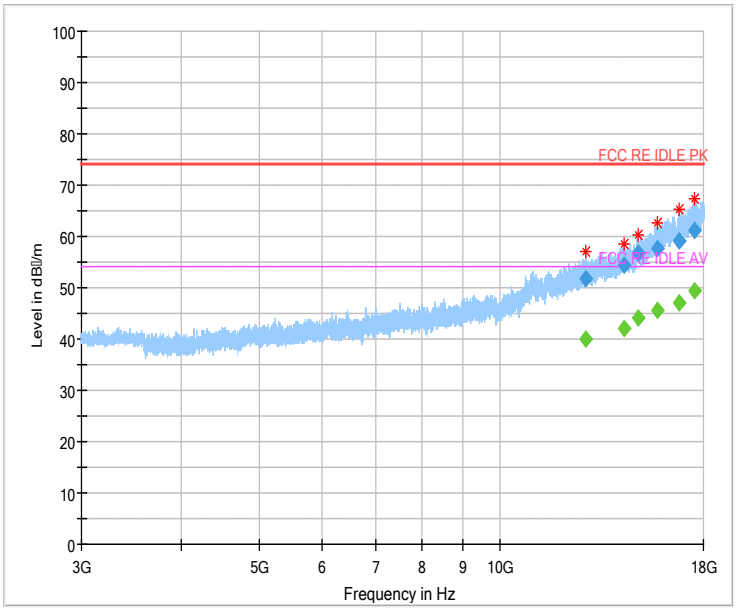


Fig.42 Radiated emission: GFSK, Ch0, 3GHz~18GHz

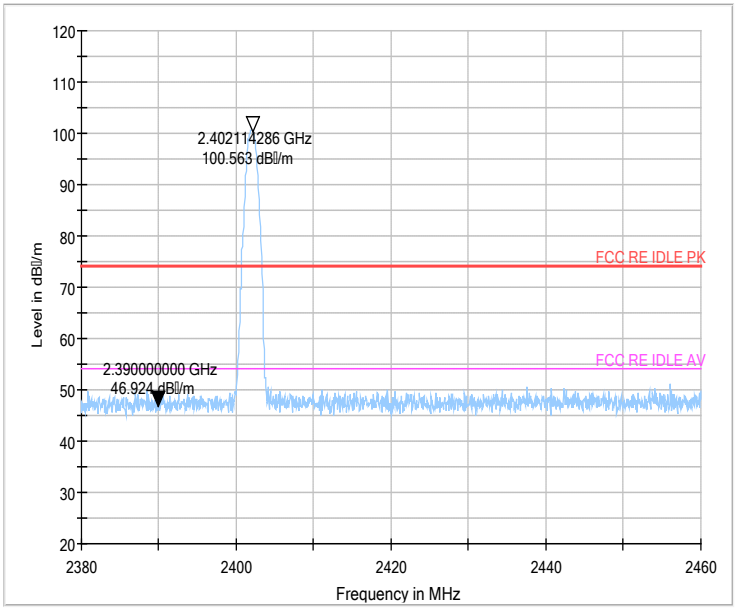


Fig.43 Radiated emission (Power): GFSK, low channel

(peak)

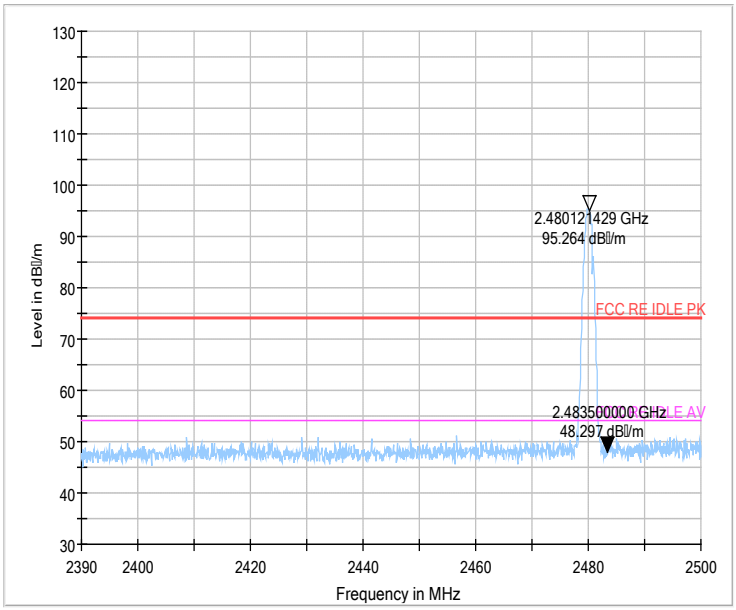


Fig.44 Radiated emission (Power): GFSK, high channel

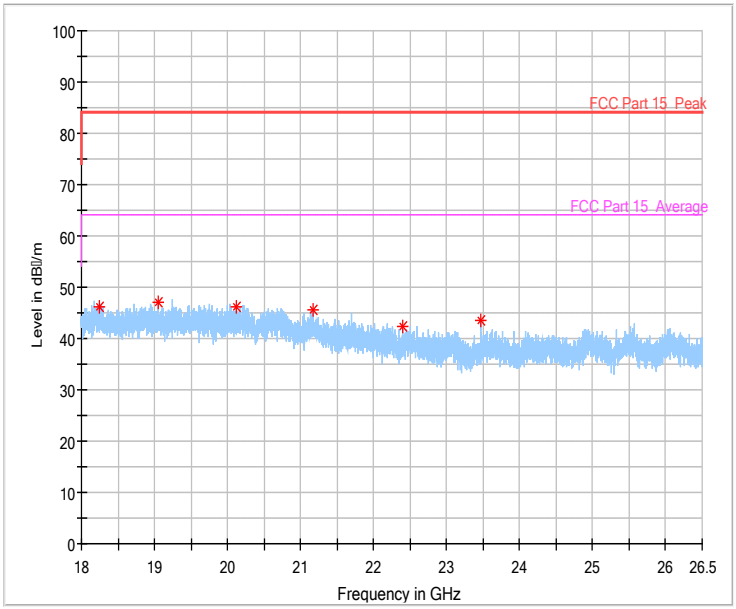


Fig.45 Radiated emission: GFSK, 18 GHz - 26 GHz

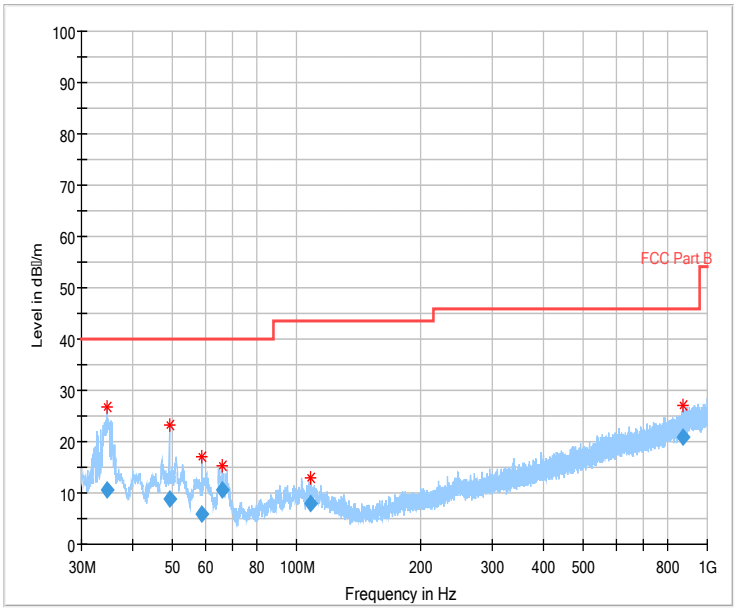


Fig.46 Radiated emission: π/4 DQPSK, Ch0, 30MHz~1GHz

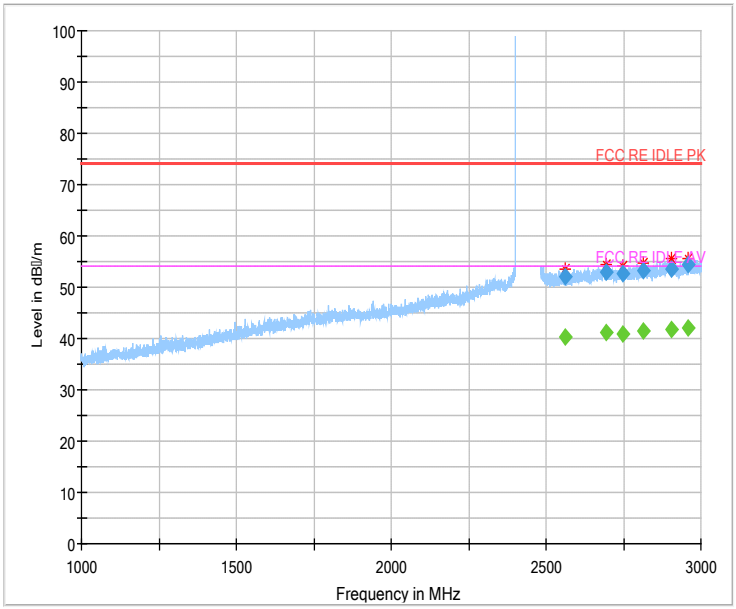


Fig.47 Radiated emission: π/4 DQPSK, Ch0, 1GHz~3GHz

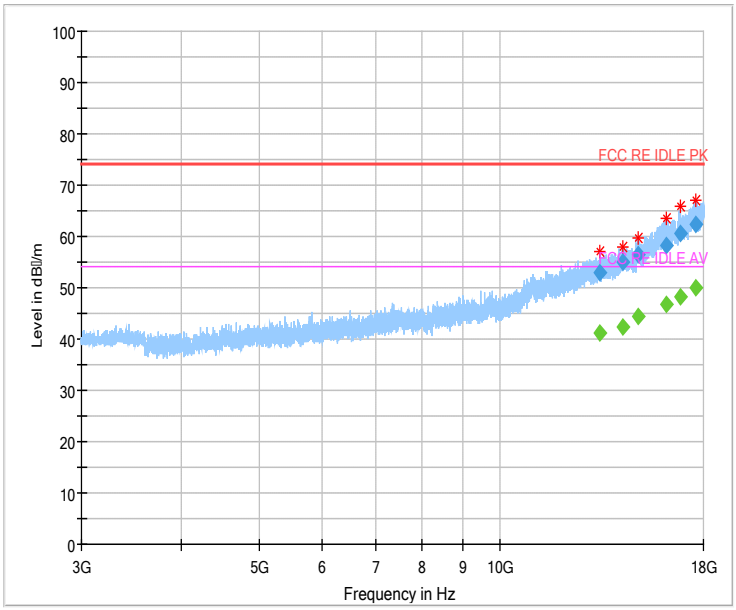


Fig.48 Radiated emission: π/4 DQPSK, Ch0, 3GHz~18GHz

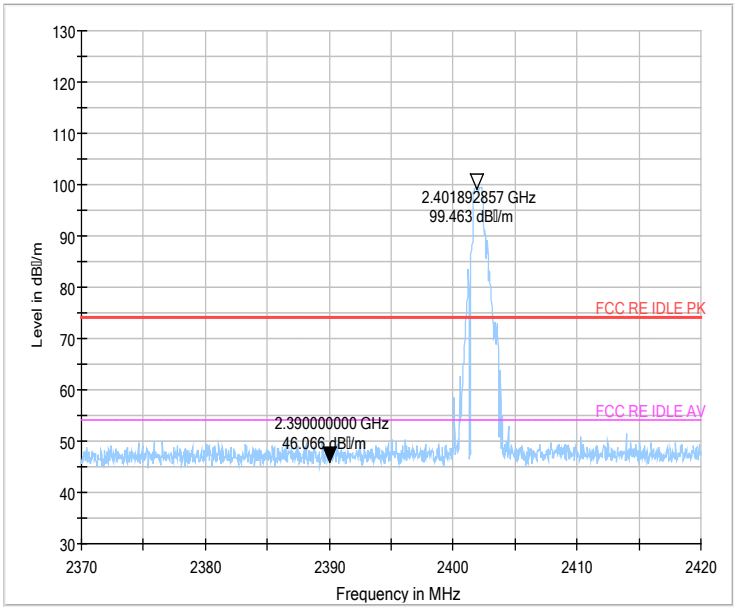
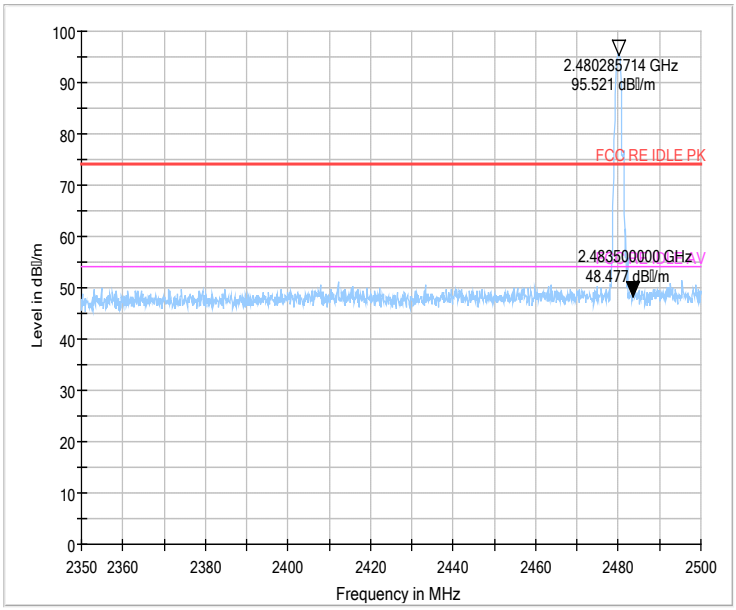


Fig.49 Radiated emission (Power): π/4 DQPSK, low channel



（peak）

Fig.50 Radiated emission (Power): π/4 DQPSK, high channel

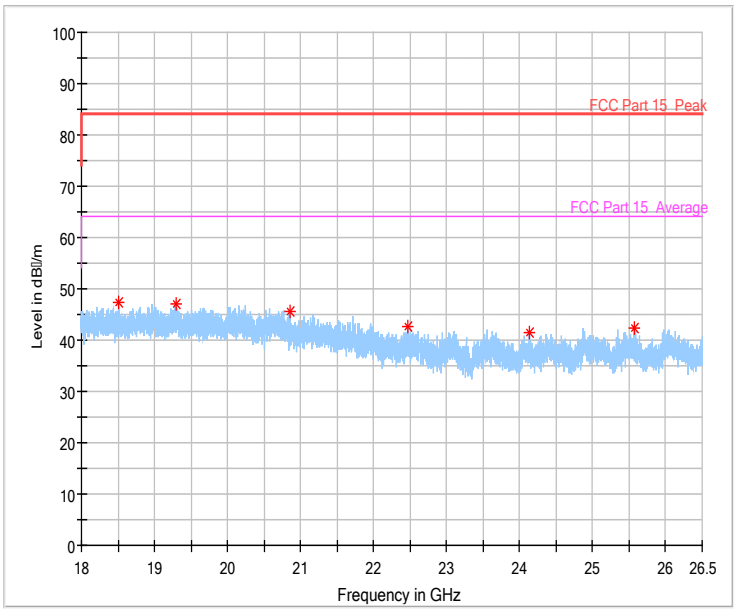


Fig.51 Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz

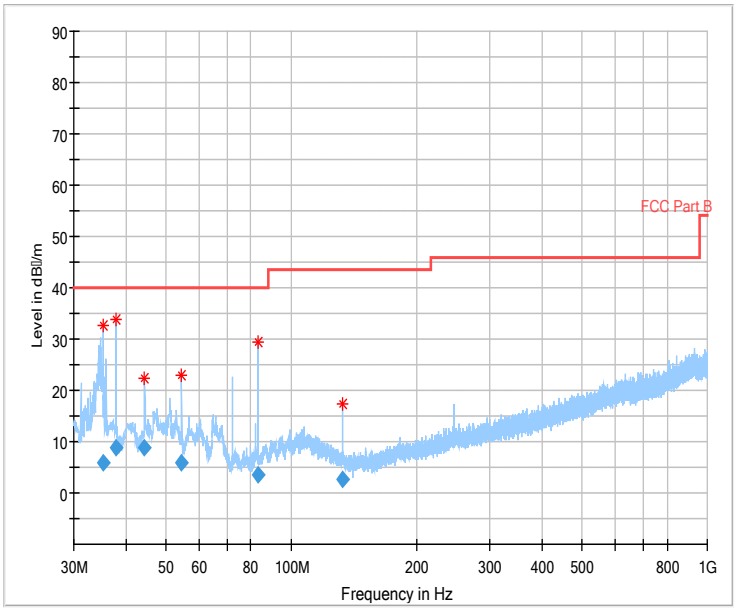


Fig.52 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

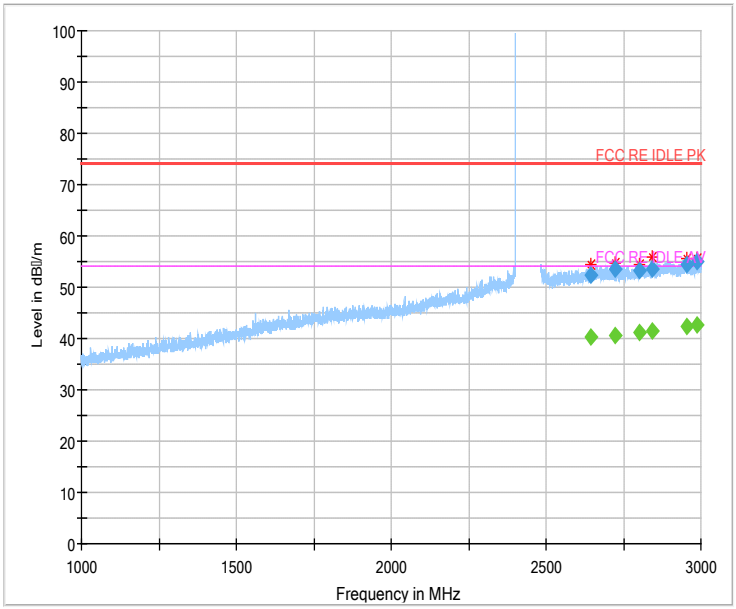


Fig.53 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

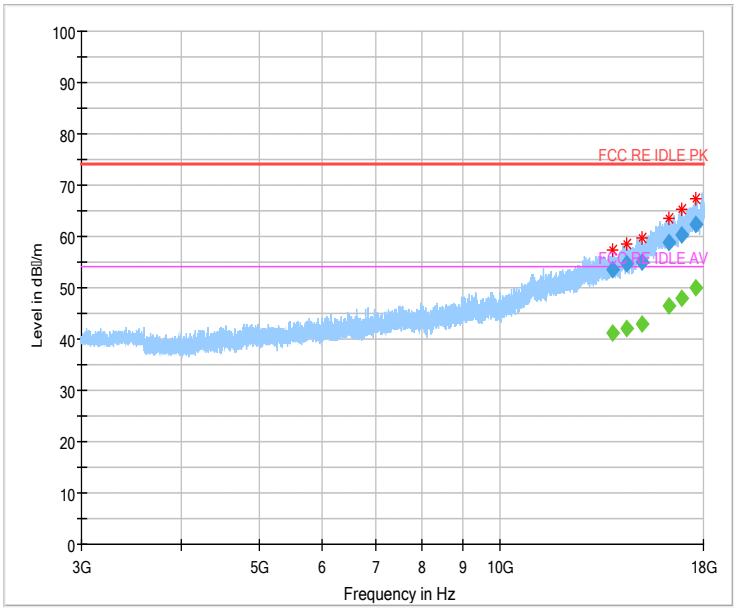


Fig.54 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz

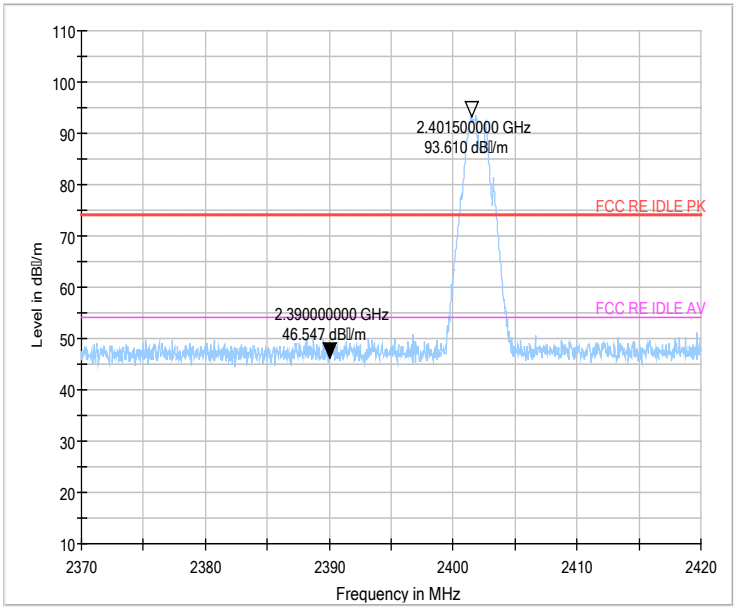
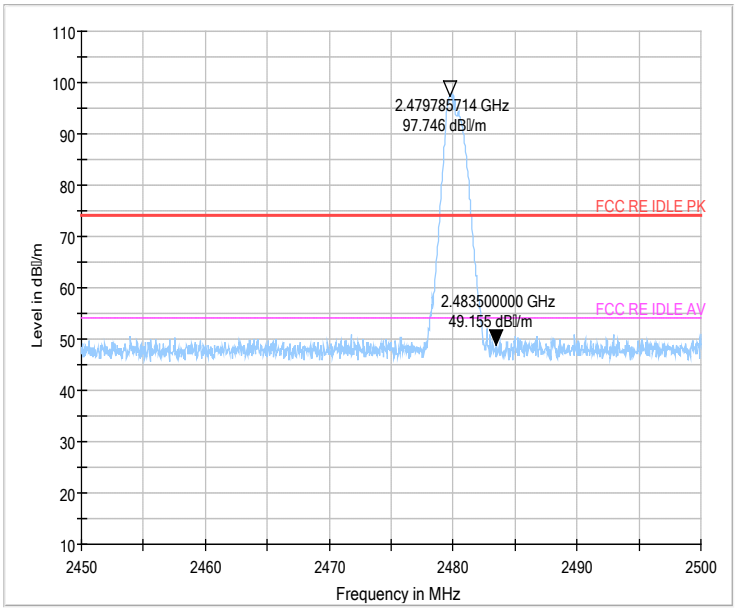


Fig.55 Radiated emission (Power): 8DPSK, low channel



（peak）

Fig.56 Radiated emission (Power): 8DPSK, high channel

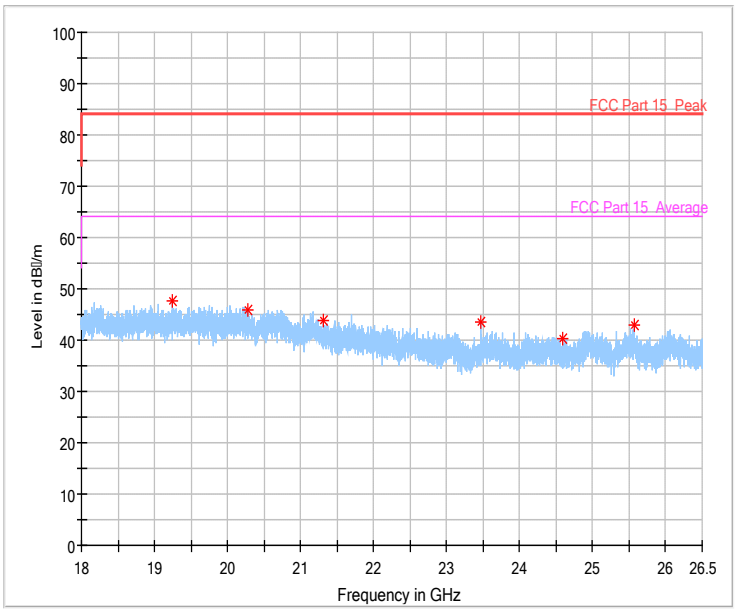


Fig.57 Radiated emission: 8DPSK, 18 GHz - 26 GHz

secondary Supply(N16)

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.58	P
	1GHz~3GHz	Fig.59	P

	3GHz~18GHz	Fig.60	P
Power	2.38GHz~2.4GHz	Fig.61	P
Power	2.45GHz~2.5GHz	Fig.62	P
All channels	18GHz~26GHz	Fig.63	P

For π/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.64	P
	1GHz~3GHz	Fig.65	P
	3GHz~18GHz	Fig.66	P
Power	2.38GHz~2.4GHz	Fig.67	P
Power	2.45GHz~2.5GHz	Fig.68	P
All channels	18GHz~26GHz	Fig.69	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.70	P
	1GHz~3GHz	Fig.71	P
	3GHz~18GHz	Fig.72	P
Power	2.38GHz~2.4GHz	Fig.73	P
Power	2.45GHz~2.5GHz	Fig.74	P
All channels	18GHz~26GHz	Fig.75	P

GFSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.83692	10.53	-25.9	36.43	V
38.751932	7.25	-25.1	32.35	V
60.242468	17.56	-25.1	42.66	V
64.63456	5.88	-26.6	32.48	V
68.420072	8.48	-27.8	36.28	V

195.811728	5.31	-24.8	30.11	V

GFSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2561.768846	52.39	9	43.39	V
2678.894038	52.7	10	42.7	V
2747.766539	53.04	10.1	42.94	V
2823.130962	53.73	10.6	43.13	V
2903.210769	54.98	11.3	43.68	H
2972.477885	54.69	11.5	43.19	H

GFSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
16074.35453	58.73	24.9	33.83	H
16506.5096	59.35	26.9	32.45	H
16827.18933	59.96	27.3	32.66	V
17292.15453	61.19	28.2	32.99	H
17523.38567	61.65	29.2	32.45	V
17872.0104	62.12	29.3	32.82	V

π/4 DQPSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.840452	12.35	-25.9	38.25	V
40.118184	9.46	-24.9	34.36	V
55.052804	5.06	-25	30.06	V
58.43956	7.29	-25	32.29	V
74.975864	3.21	-28.2	31.41	V
126.52074	3.75	-26.6	30.35	H

π/4 DQPSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2590.631731	52.75	9.2	43.55	H
2674.154808	53.11	10	43.11	H
2719.854038	52.96	10.1	42.86	V
2810.028077	53.7	10.5	43.2	H
2888.445961	55.01	11.2	43.81	V
2947.866539	54.97	11.2	43.77	H

π/4 DQPSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14898.1008	56.73	22.2	34.53	H
15735.00027	57.19	24.1	33.09	H
16156.27933	58.82	25.3	33.52	V
16805.18033	59.66	27.4	32.26	V
17588.28513	61.92	29.5	32.42	H
17921.5832	62.58	29.9	32.68	V

8DPSK 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.35336	10.8	-25.9	36.7	V
34.77134	12.48	-25.9	38.38	V
36.114624	9.45	-25.7	35.15	V
46.997648	15.35	-24.9	40.25	V
69.547384	4.73	-28.1	32.83	V
339.999724	18.37	-18.7	37.07	V

8DPSK 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2704.255385	53.14	10.1	43.04	H

2762.543654	53.02	10.2	42.82	H
2826.130961	53.79	10.7	43.09	H
2906.480192	53.96	11.3	42.66	H
2938.732692	54.11	11.2	42.91	H
2994.968077	54.4	11.8	42.6	V

8DPSK 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14318.32073	54.7	20.6	34.1	V
14895.48313	56.08	22.1	33.98	H
16032.80047	58.6	25.1	33.5	V
16460.65493	58.22	26.4	31.82	H
16883.7836	60.67	27.1	33.57	V
17636.398	61.78	29.2	32.58	H

All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19022.55	44.76	-5.5	50.26	V
20546.6	45.68	-4.3	49.98	V
21615.9	45.94	-3.4	49.34	V
22745.55	44.13	-2.9	47.03	V
23615.1	45.62	-2.8	48.42	H
25463.85	46.18	-2.9	49.08	V

Note: all the test data shown was peak detected.

Conclusion: PASS

Test graphs as below(Secondary Supply):

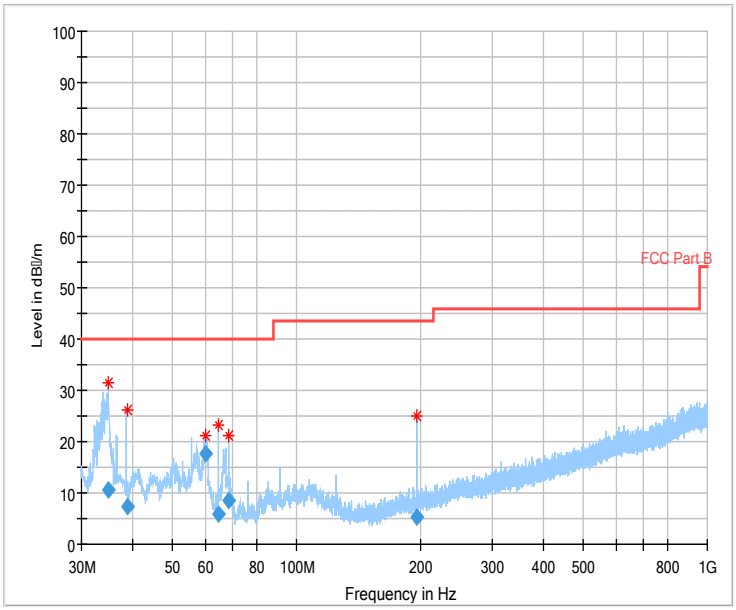


Fig.58 Radiated emission: GFSK, Ch0, 30MHz~1GHz

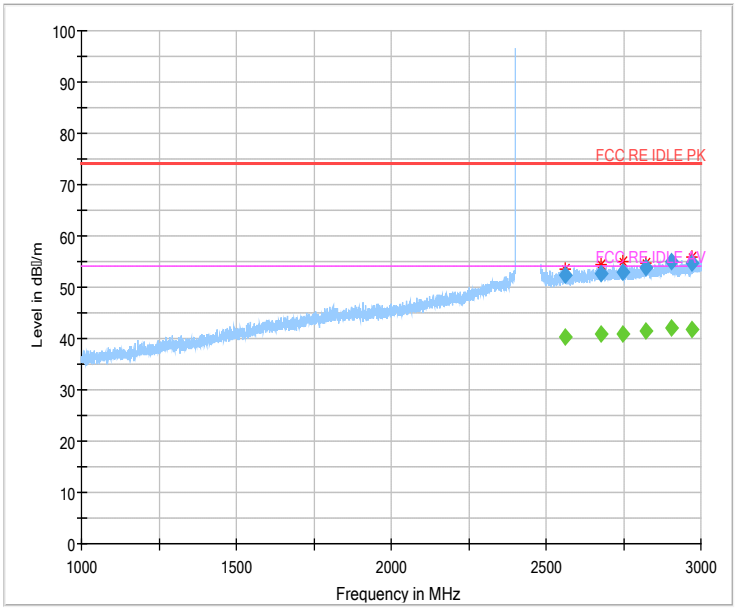


Fig.59 Radiated emission: GFSK, Ch0, 1GHz~3GHz

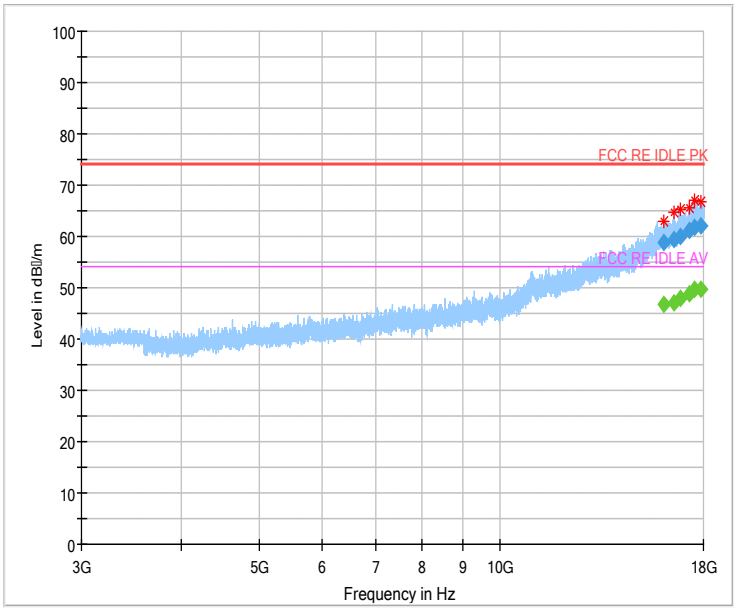


Fig.60 Radiated emission: GFSK, Ch0, 3GHz~18GHz

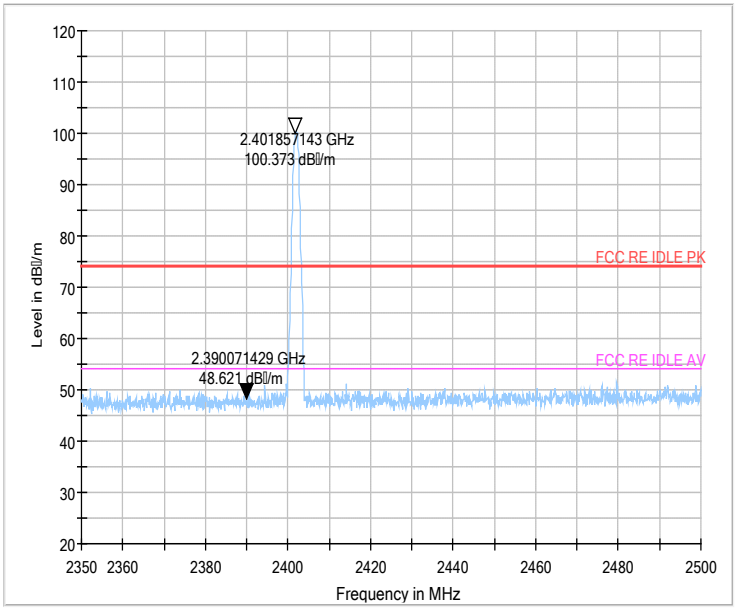


Fig.61 Radiated emission (Power): GFSK, low channel

(peak)

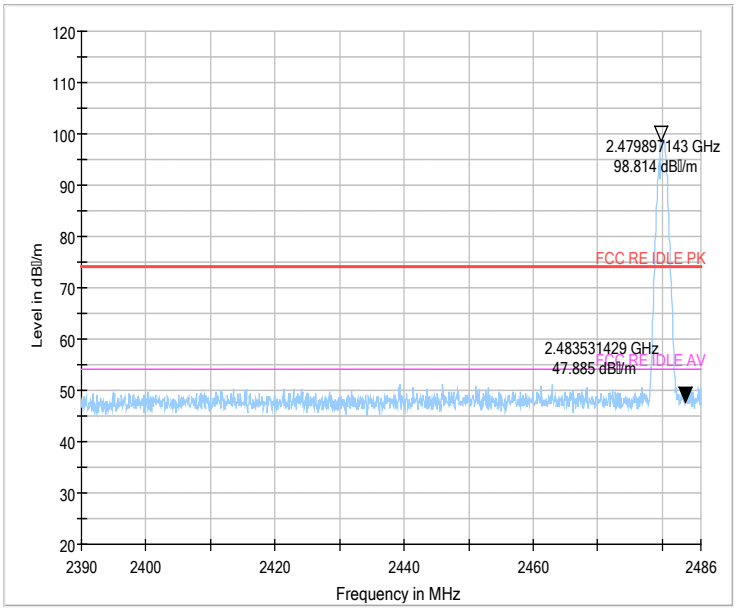


Fig.62 Radiated emission (Power): GFSK, high channel

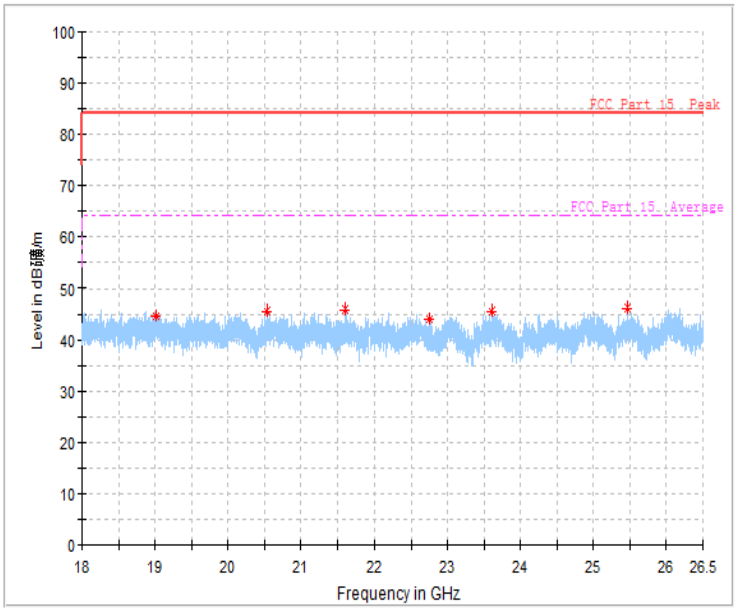


Fig.63 Radiated emission: GFSK, 18 GHz - 26 GHz

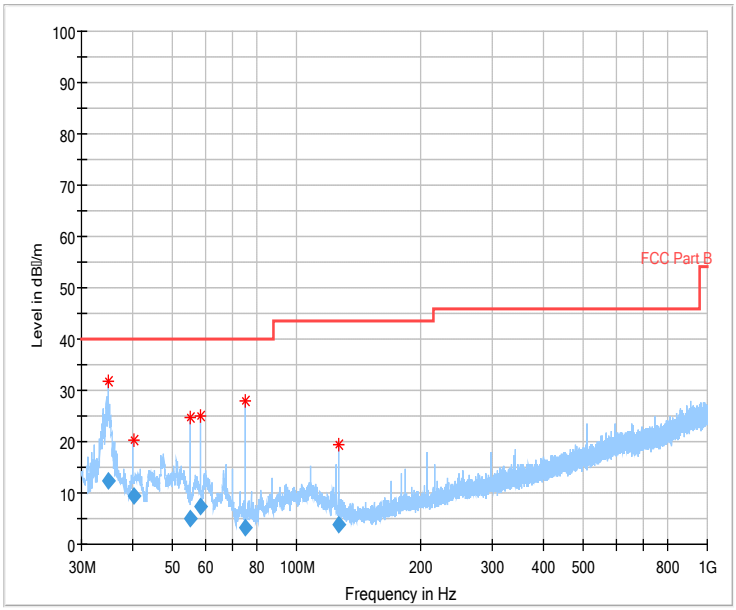


Fig.64 Radiated emission: π/4 DQPSK, Ch0, 30MHz~1GHz

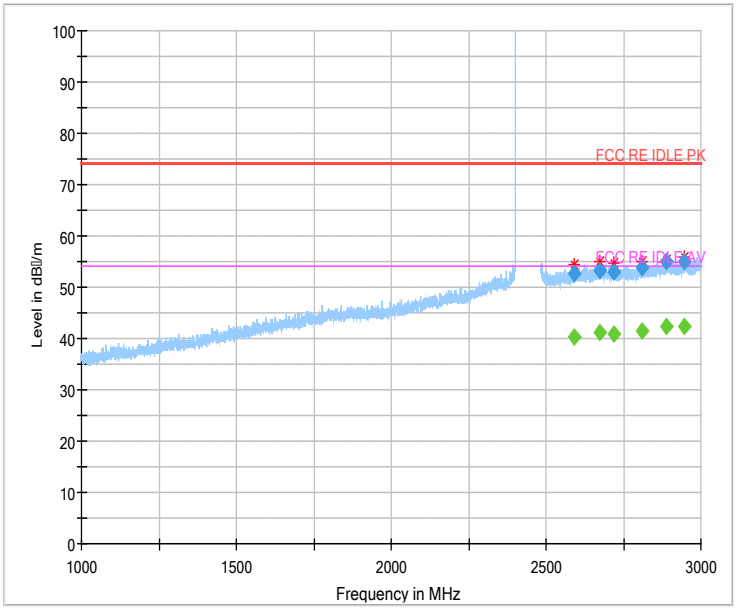


Fig.65 Radiated emission: π/4 DQPSK, Ch0, 1GHz~3GHz

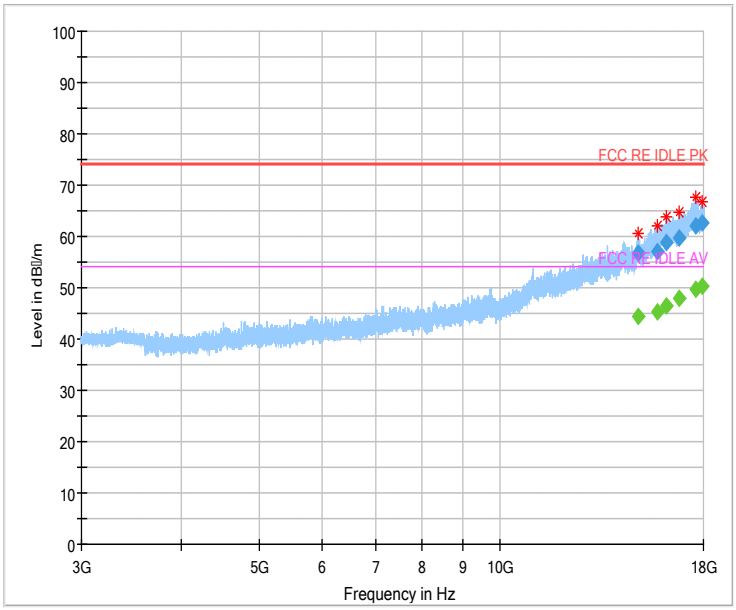


Fig.66 Radiated emission: π/4 DQPSK, Ch0, 3GHz~18GHz

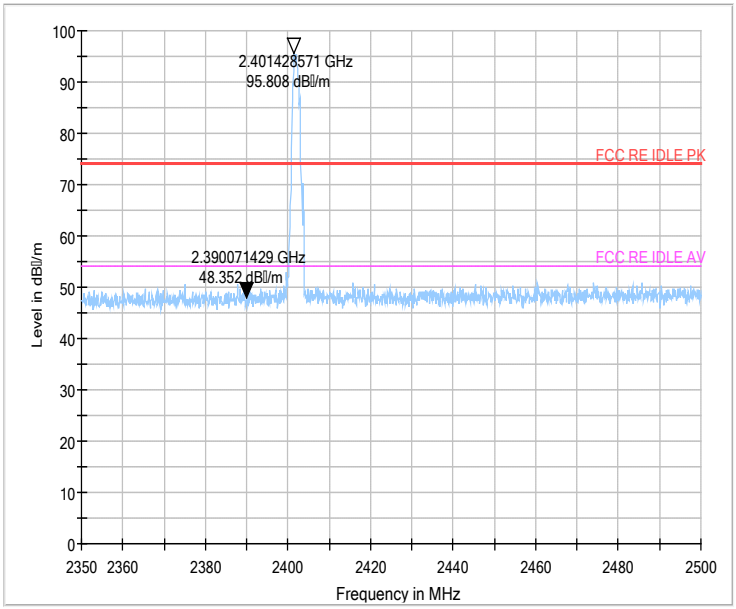
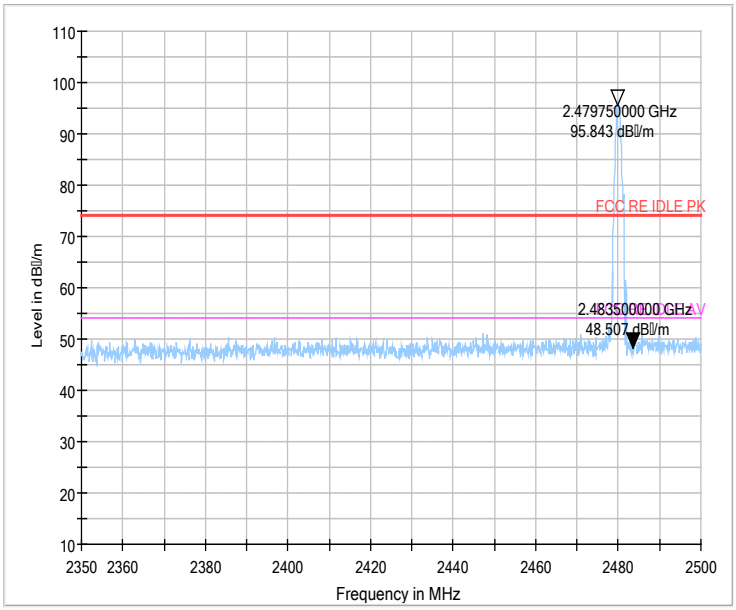


Fig.67 Radiated emission (Power): π/4 DQPSK, low channel



（peak）

Fig.68 Radiated emission (Power): π/4 DQPSK, high channel

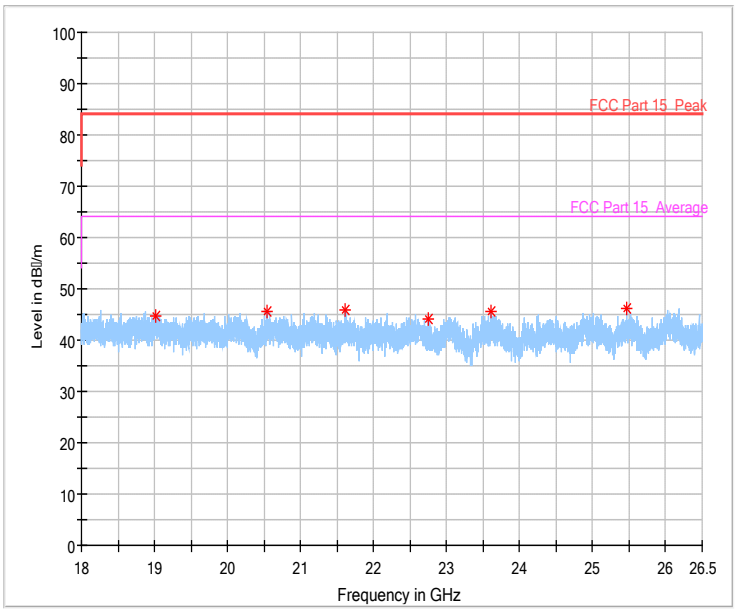


Fig.69 Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz

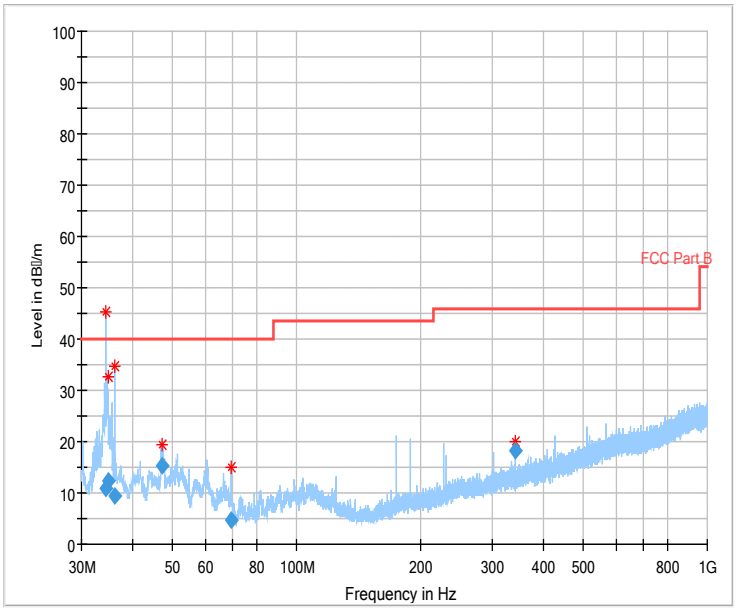


Fig.70 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

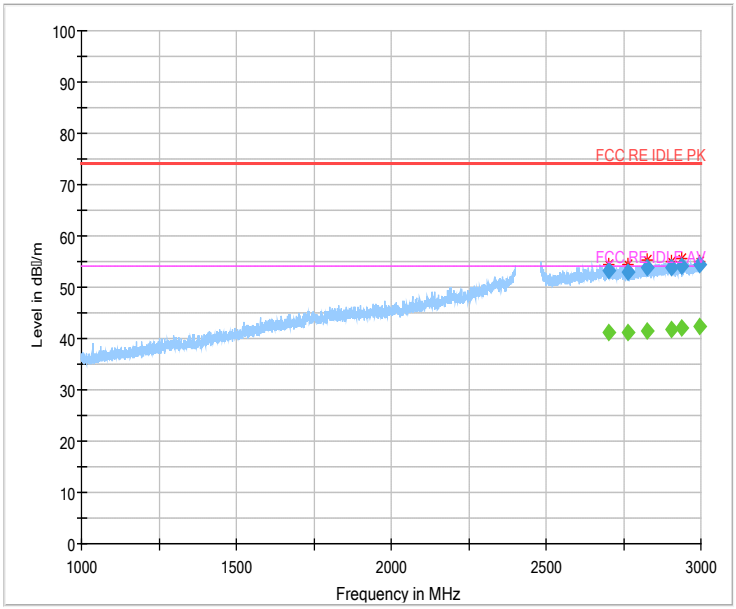


Fig.71 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

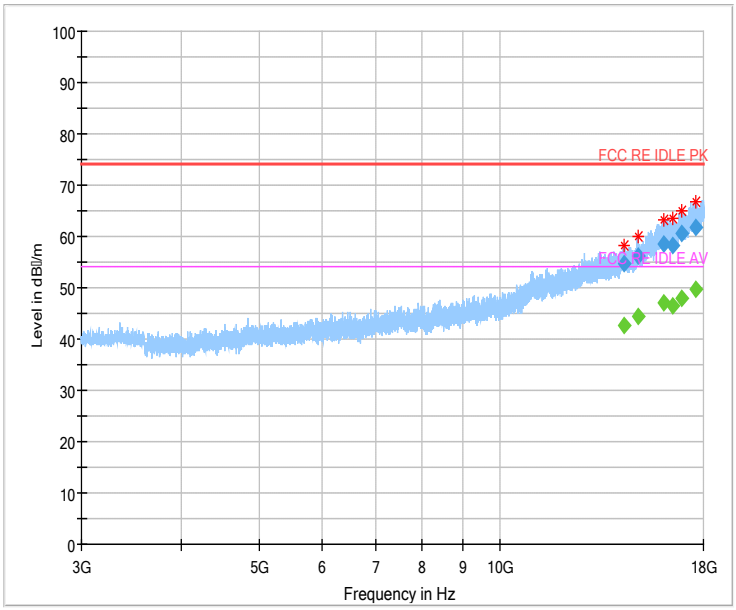


Fig.72 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz

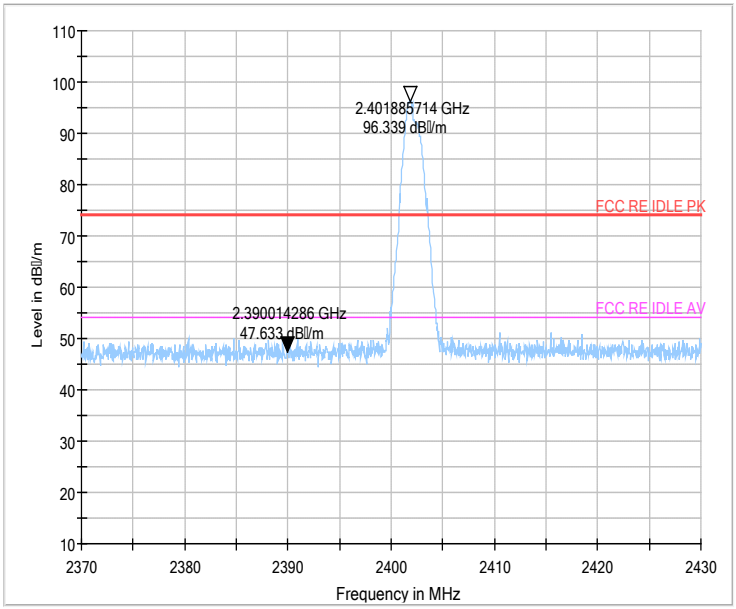
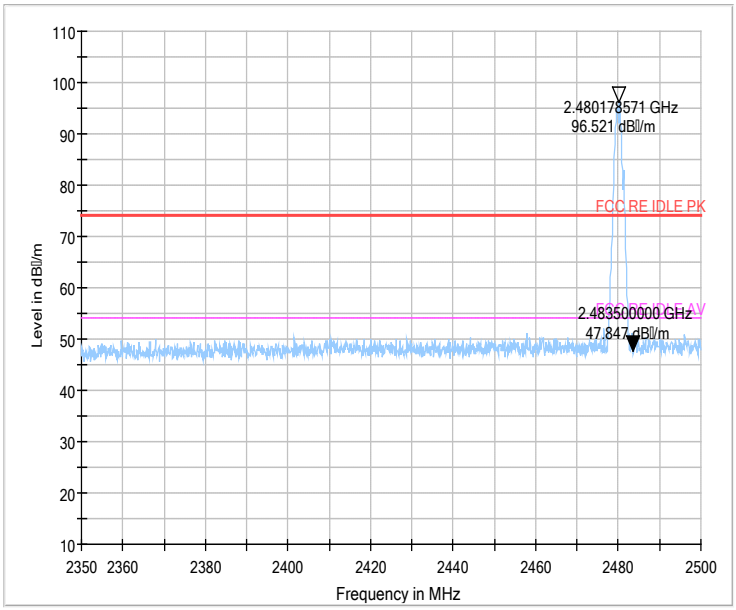


Fig.73 Radiated emission (Power): 8DPSK, low channel



（peak）

Fig.74 Radiated emission (Power): 8DPSK, high channel

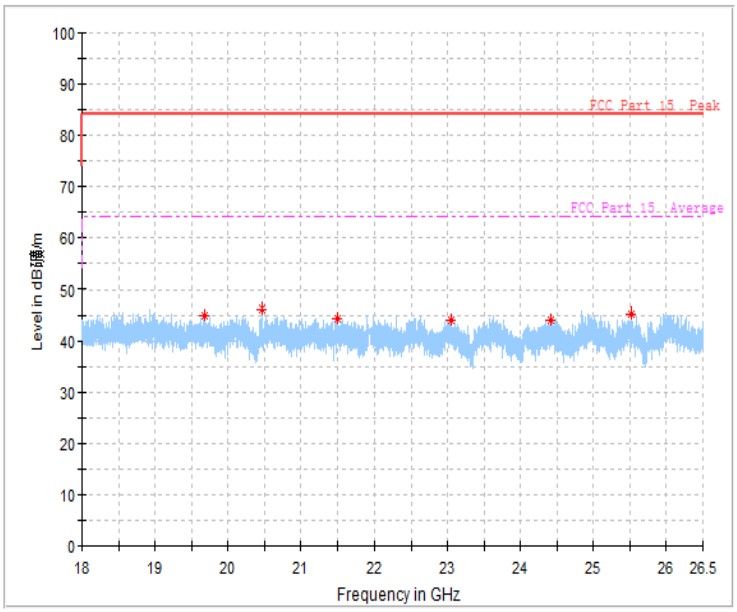


Fig.75 Radiated emission: 8DPSK, 18 GHz - 26 GHz

6.3.4 The Result of AC Conducted Emission

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz) Conducted limit (dBμV)
Quasi-peak Average

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Main supply(N06)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)
0.172388	54.65	9.6	45.05
0.344025	45.55	9.6	35.95
0.840281	39.11	9.7	29.41

0.941025	37.92	9.6	28.32
4.735706	39.89	9.7	30.19
5.090175	40.4	9.7	30.7

Secondary supply(N016)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)
0.153731	35.21	9.6	25.61
0.336562	37.39	9.6	27.79
0.952219	34.37	9.6	24.77
1.336538	38.13	9.6	28.53
2.773069	30.42	9.6	20.82
23.436731	34.92	9.6	25.32

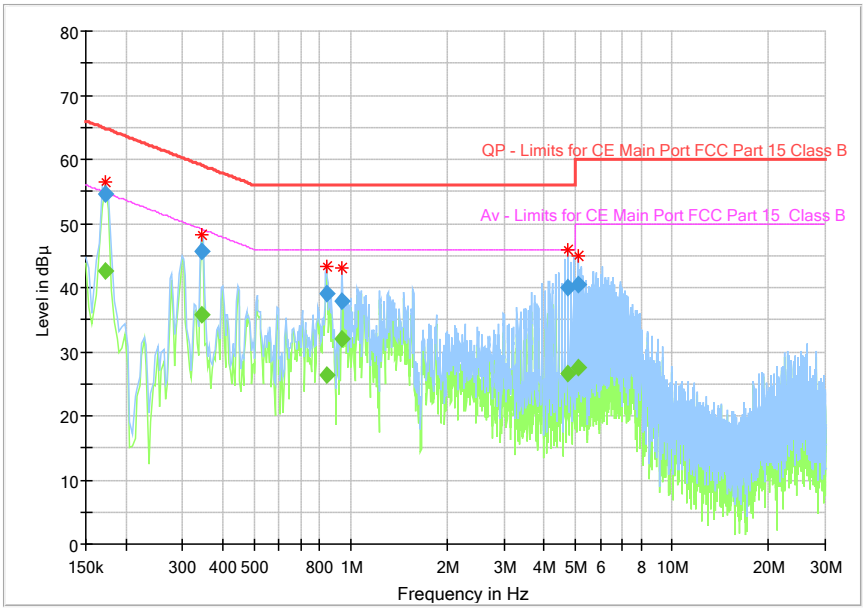


Fig.76 AC Conducted Emission

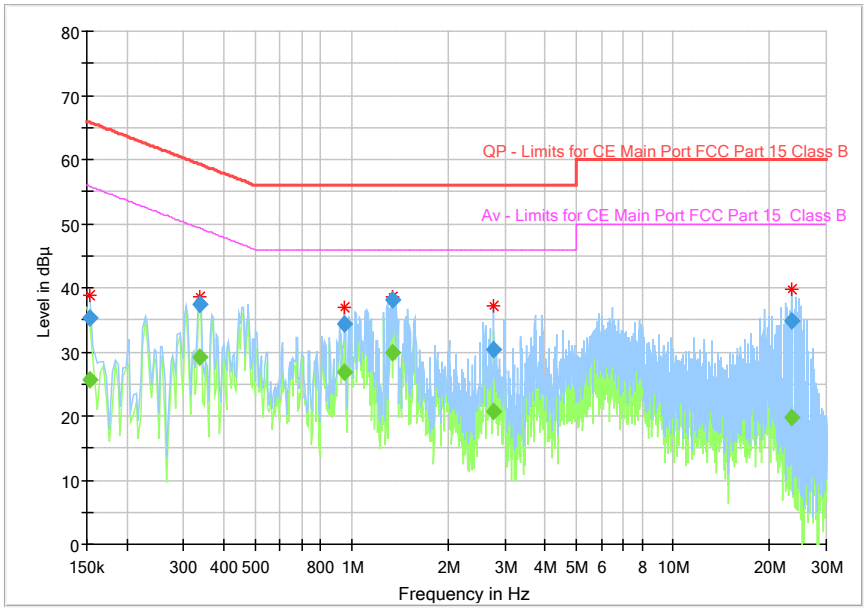


Fig.77 AC Conducted Emission

6.5. Time Of Occupancy (Dwell Time)

6.5.1 Measurement Limit:

Standard	Limit (ms)
FCC 47CFR Part 15.247 (a) (1) (iii)	< 400

6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.4

1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
2. Enable the EUT transmit maximum power.
3. Set the spectrum analyzer as step 4 to step 8.
4. Span: Zero span, centered on a hopping channel.
5. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
6. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to showtwo successive hops on a channel.
7. Detector function: Peak.
8. Trace: Max hold.
9. Use the marker-delta function, and record it.

6.5.3 Measurement Result

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig 78.	163.200	P
		Fig 79.		
	DH3	Fig 80.	281.600	P
		Fig 81.		
	DH5	Fig 82.	321.066	P
		Fig 83.		

For π/4 DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	2DH1	Fig 84.	163.200	P
		Fig 85.		
	2DH3	Fig 86.	281.600	P
		Fig 87.		
	2DH5	Fig 88.	321.066	P
		Fig 89.		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	3DH1	Fig 90.	166.400	P
		Fig 91.		
	3DH3	Fig 92.	281.600	P
		Fig 93.		
	3DH5	Fig 94.	321.066	P
		Fig 95.		

Note: the dwell time is Calculated of the sum of test time about 31.5 seconds.

Equation: dwell time = pusletime *(1600/N)/79*T . N is the number of timeslot; T is the time about 31.5s.

The time of DH5=3.005*(1600/6)/79*31.6=319.519ms.

Conclusion: PASS

Test graphs as below:

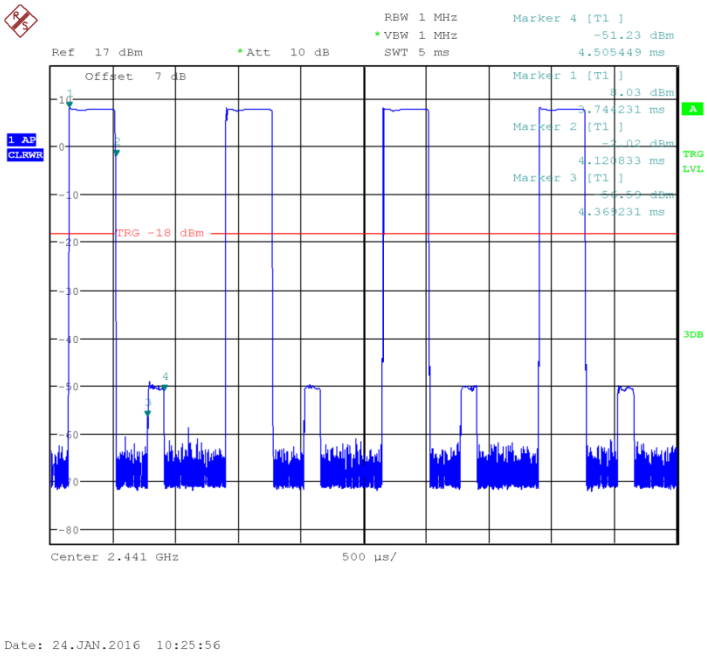


Fig 78. Time of occupancy (Dwell Time): Ch39, Packet DH1

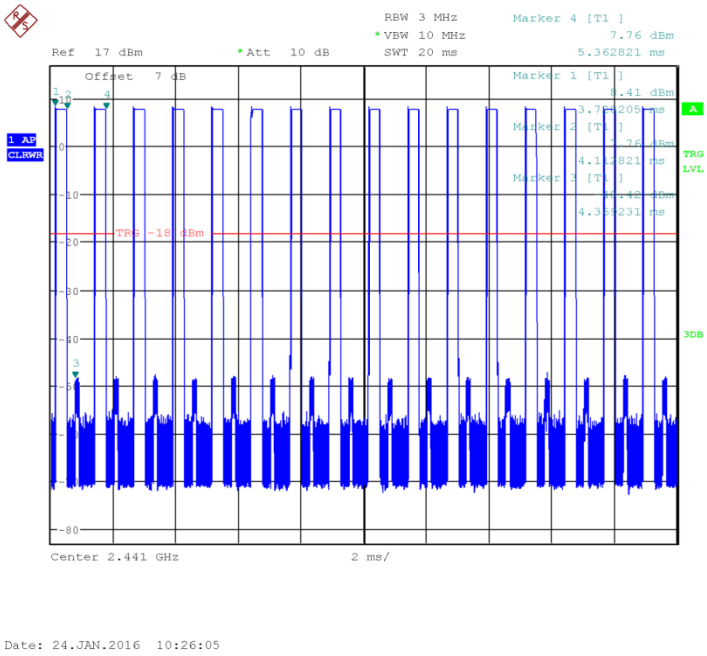


Fig 79. Number of Transmissions Measurement: Ch39, Packet DH1

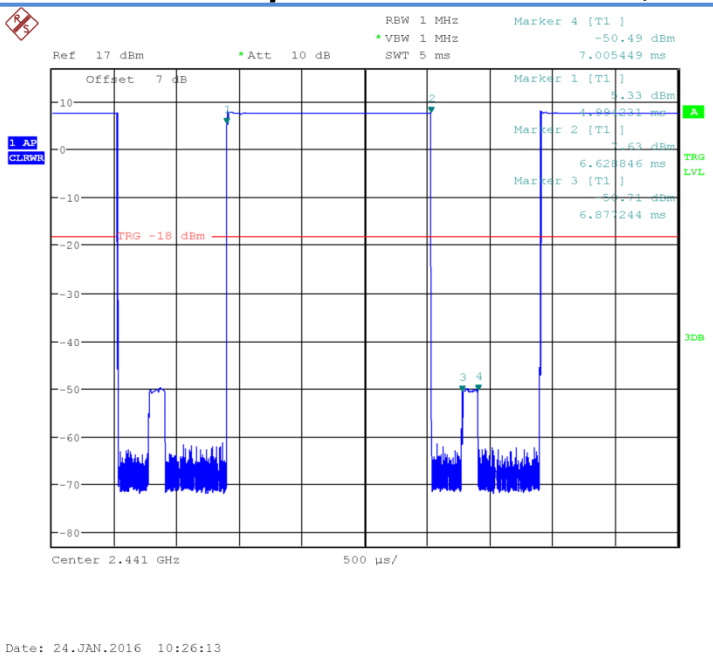


Fig 80. Time of occupancy (Dwell Time): Ch39, Packet DH3

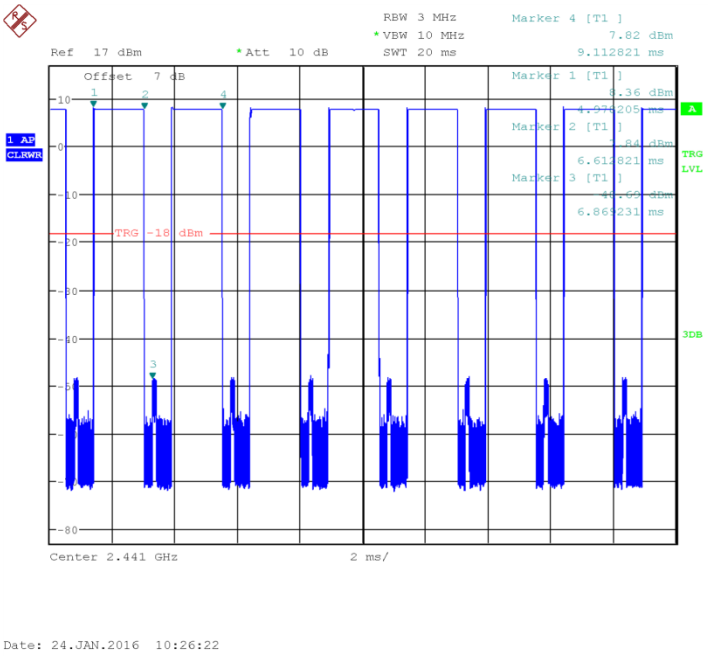


Fig 81. Number of Transmissions Measurement: Ch39, Packet DH3

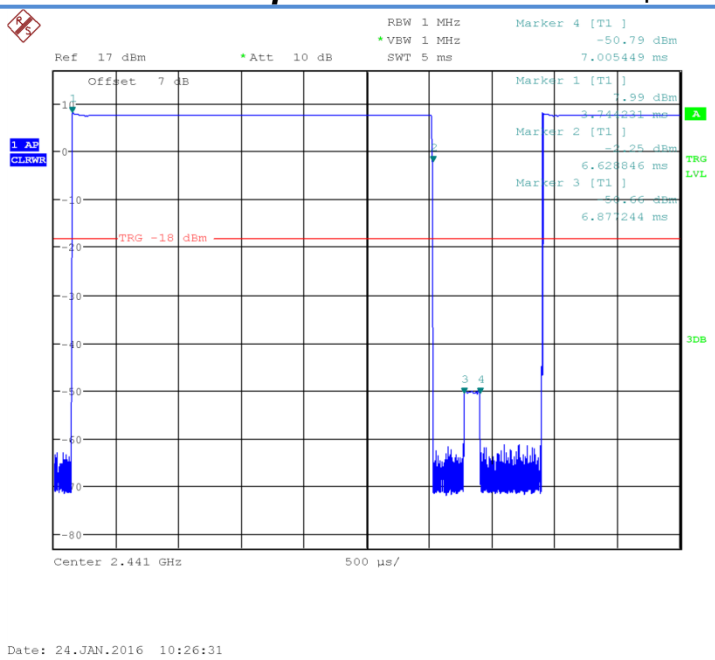


Fig 82. Time of occupancy (Dwell Time): Ch39,Packet DH5

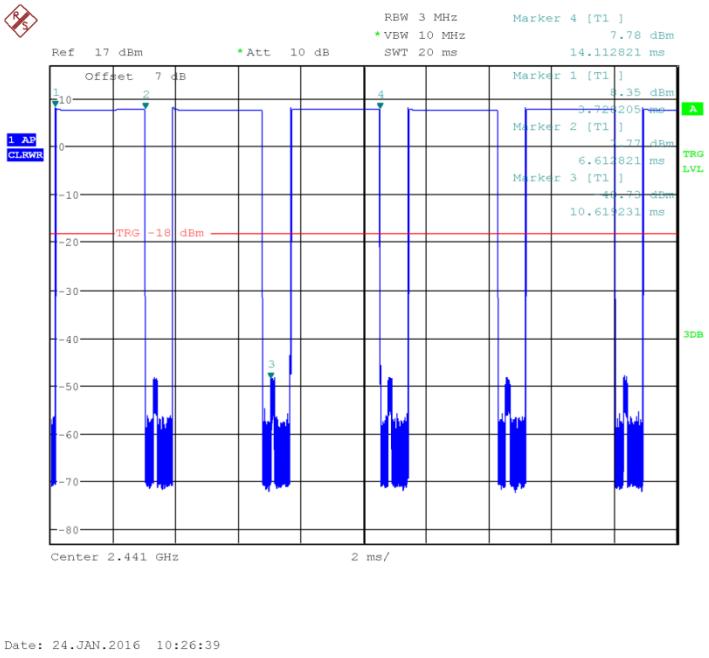


Fig 83. Number of Transmissions Measurement: Ch39, Packet DH5

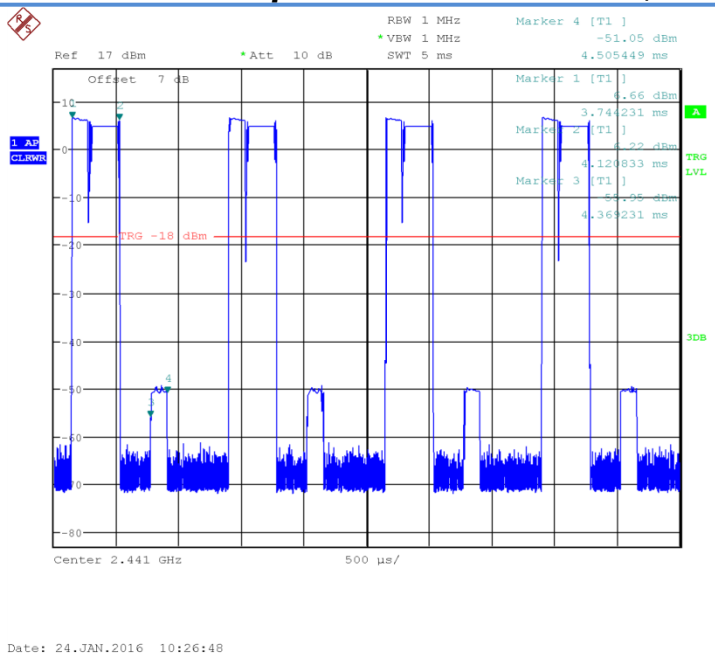


Fig 84. Time of occupancy (Dwell Time): Ch39,Packet 2-DH1

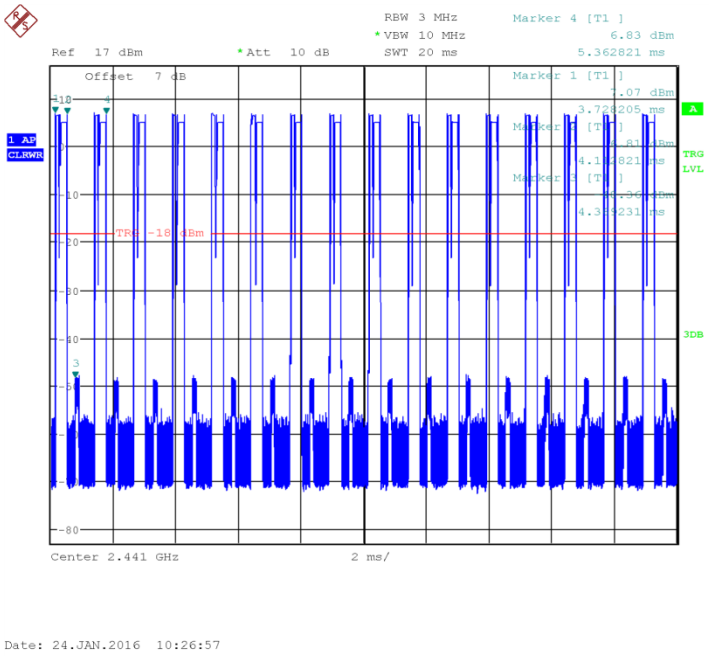


Fig 85. Number of Transmissions Measurement: Ch39, Packet 2-DH1

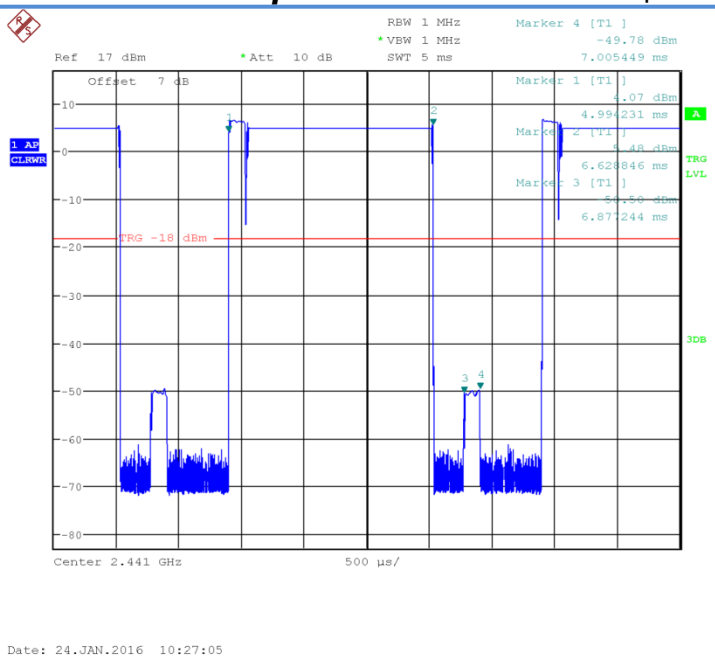


Fig 86. Time of occupancy (Dwell Time): Ch39,Packet 2-DH3

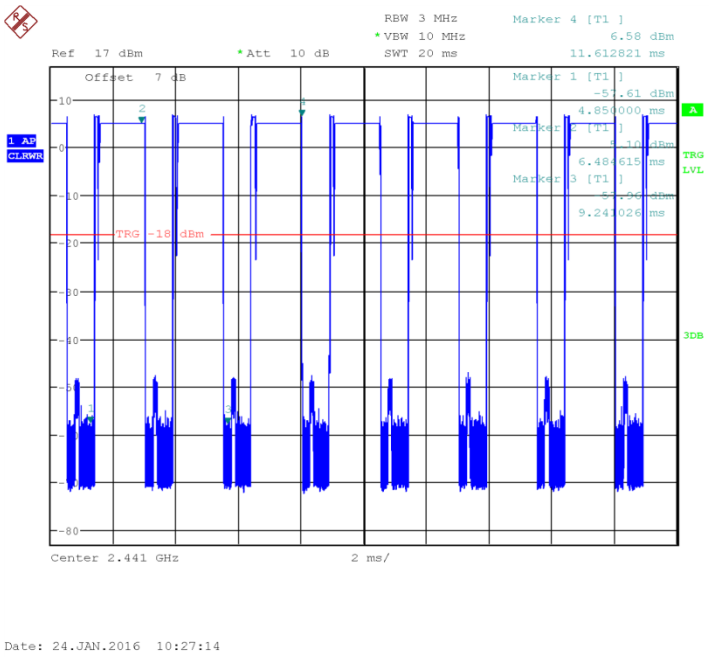


Fig 87. Number of Transmissions Measurement: Ch39, Packet 2-DH3

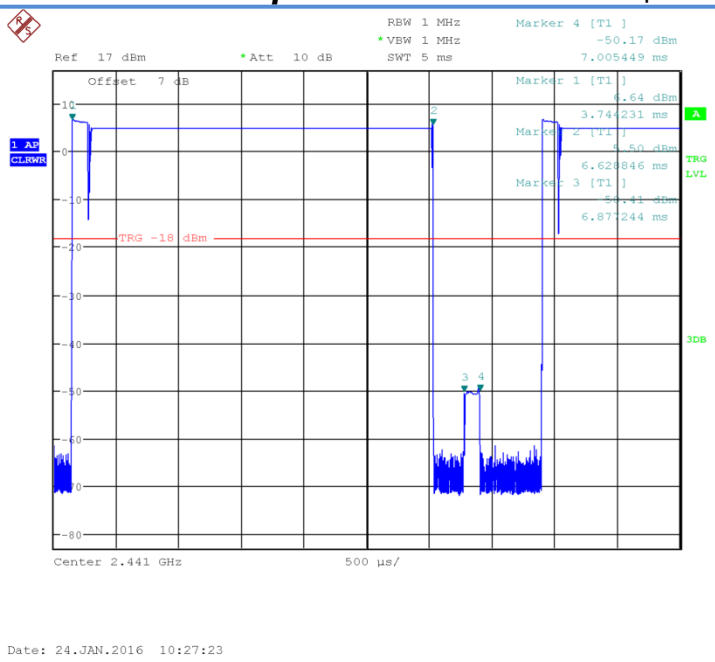


Fig 88. Time of occupancy (Dwell Time): Ch39,Packet 2-DH5

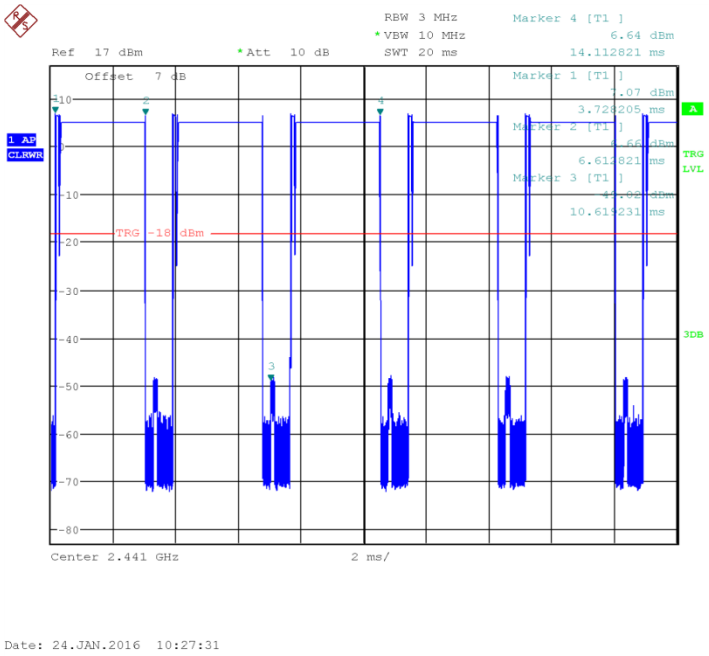


Fig 89. Number of Transmissions Measurement: Ch39, Packet 2-DH5

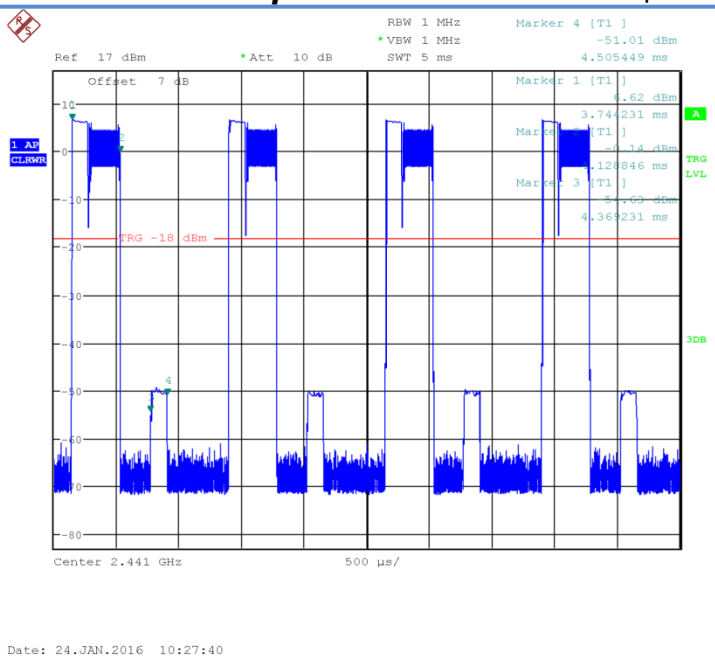


Fig 90. Time of occupancy (Dwell Time): Ch39,Packet 3-DH1

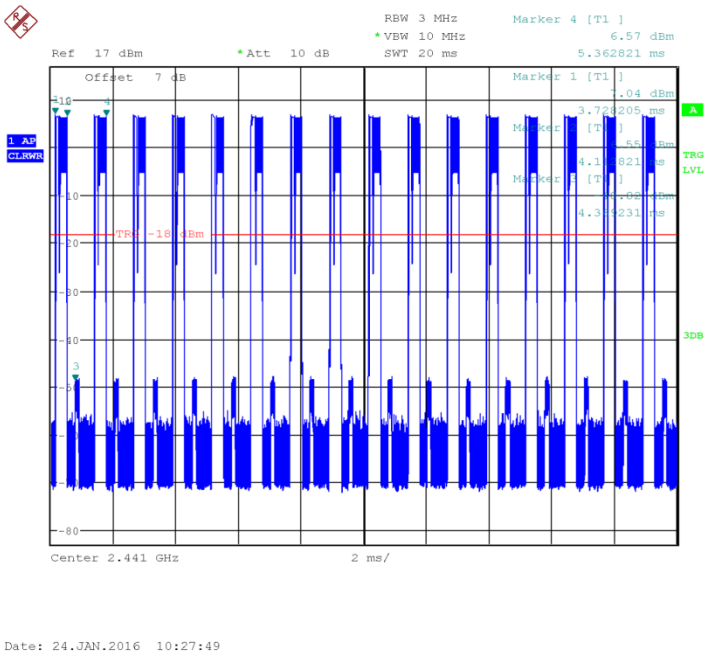


Fig 91. Number of Transmissions Measurement: Ch39, Packet 3-DH1

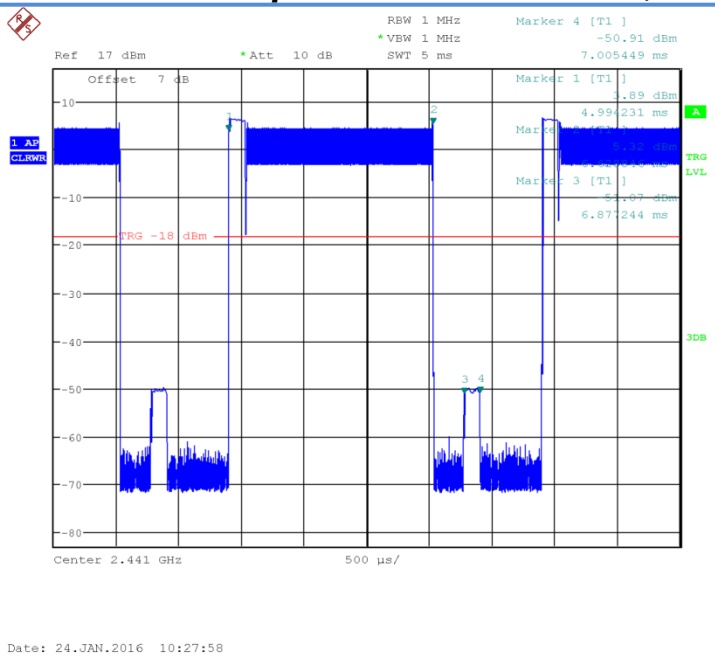


Fig 92. Time of occupancy (Dwell Time): Ch39,Packet 3-DH3

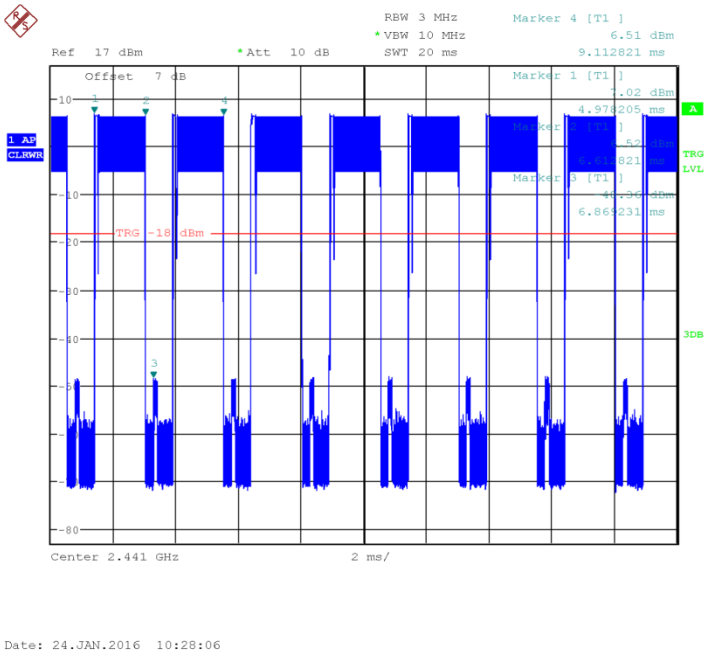


Fig 93. Number of Transmissions Measurement: Ch39, Packet 3-DH3