TEST REPORT

No. 2014RFB002302

For

Client : TCT Mobile Limited

Production: Bluetooth headset

Model Name : one touch BH50+

Hardware Version: V1.0

Software Version: onetouch_BH50+_V05_20140117_ Released_final

FCC ID: RAD485

IC ID: 9238A-0029

Issued date: 2014-04-17

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

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

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

CONTENTS

1. General Information

1.1 Notes

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

1.2 Statements

The product Bluetooth headset , supporting BT, manufactured by TCL COMMUNICATION TECHNOLOGY HOLDINGS 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.

1.3 Testing Laboratory information

1.3.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	86-21-63843300
Fax:	86-21-63843301
FCC Registration NO.:	489729

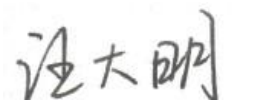
1.3.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	N/A
Relative Humidity:	20-75%

1.3.3. Project data

Project Leader:	Wangyaqiong
Testing Start Date:	2014-02-21
Testing End Date:	2014-02-24

1.3.4. Signature



Wang Daming

(Prepared this test report)

Liu Jianquan

(Reviewed this test report)

Zheng Zhongbin

Director of the laboratory

(Approved this test report)

1.4 Details of applicant or manufacturer

1.4.1. Applicant Information for FCC

Company Name:	TCT Mobile Limited
Address /Post:	5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203
Country:	China

1.4.2. Manufacturer Information for FCC

Company Name:	TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED
Address /Post:	70 Huifeng 4rd, ZhongKai Hi-tech Development District , Huizhou, Guangdong 516006 P.R.China
Country:	China

1.4.3. Applicant Information for IC

Company Name:	TCT Mobile Multinational Limited
Address /Post:	Room 1910-12A, Tower 3, China HK City 33 Canton Road Tsimshatsui Kowloon Hong Kong
Country:	China

1.4.4. Manufacturer Information for IC

Company Name:	TCT Mobile Multinational Limited
Address /Post:	Room 1910-12A, Tower 3, China HK City 33 Canton Road Tsimshatsui Kowloon Hong Kong
Country:	China

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

2.1. About EUT

EUT Description	Bluetooth headset
Model name	one touch BH50+
Bluetooth Frequency	2402MHz-2480MHz
Bluetooth Channel	Channel0-Channel78
Bluetooth Modulation	GMSK;π/4 DQPSK;8DPSK
Extreme Temperature	N/A
Nominal Voltage	3.7V
Extreme High Voltage	4.2V
Extreme Low Voltage	3.0V

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

2.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N04	---	V1.0	onetouch_BH50+_V05_20140117_Released_final	2014-02-20

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

2.3. Internal Identification of AE used during the test

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

3. Reference Documents

3.1. 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, generalrequirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2014
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz	2009
DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems	2013
RSS210-i8	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment	2010

4. Summary of Test Results

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

Measurement Items	Sub-clause of Part15C	Verdict
Maximum Peak Output Power	15.247(b)	P
Peak Power Spectral Density	15.247(e)	NA
Occupied 6dB Bandwidth	15.247(a)	P
Occupied 20dB Bandwidth	15.247(a)	NA
Band Edges Compliance	15.247(d)	P
Transmitter Spurious Emission-Conducted	15.247	P
Transmitter Spurious Emission-Radiated	15.247,15.209,	P
AC Powerline Conducted Emission	15.107,15.207	P

Measurement Items	Sub-clause of IC Rule	Verdict
Maximum Peak Output Power	RSS-210 A8.4	P
Peak Power Spectral Density	RSS-210 A8.2	NA
Occupied 6dB Bandwidth	RSS-210 A8.2	P
Occupied 20dB Bandwidth	RSS-210 A8.1(a)	NA
Band Edges Compliance	RSS-210 A8.5	P
Transmitter Spurious Emission-Conducted	RSS-210 A8.5	P
Transmitter Spurious Emission-Radiated	RSS-210 A8.5	P
AC Powerline Conducted Emission	RSS-210 Gen 7.2.4	P

Please refer to part 5 for detail.

The measurements are according to Public notice DA 00-705 and ANSI C63.4.

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	3.7V
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. Test result

5.1. Peak Output Power-Conducted

Measurement Limit

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

The measurement is according to Public notice DA 00-705 and ANSI C63.4.

Test Condition:

Hopping Mode	RBW	VBW	Span	Sweeptime
Hopping OFF	3MHz	10MHz	5MHz	2.5ms

Measurement Results:

For GFSK

Channel	Ch0 2402 MHz	Ch39 2441 MHz	CH78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	-1.36	-1.30	-0.90	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)	-1.23	-1.14	-0.46	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)	-1.04	-0.94	-0.48	P
	Fig.7	Fig.8	Fig.9	

Conclusion: PASS

Test graphs an below

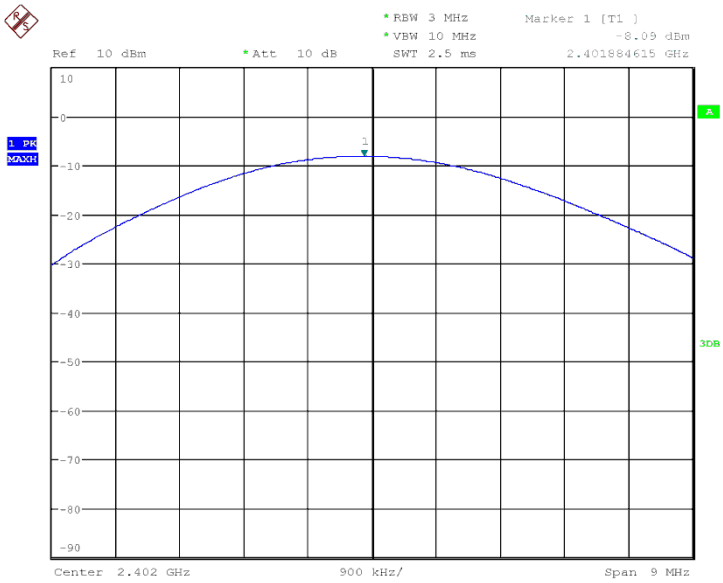


Fig.1 Peak Conducted Output Power CH0, DH1

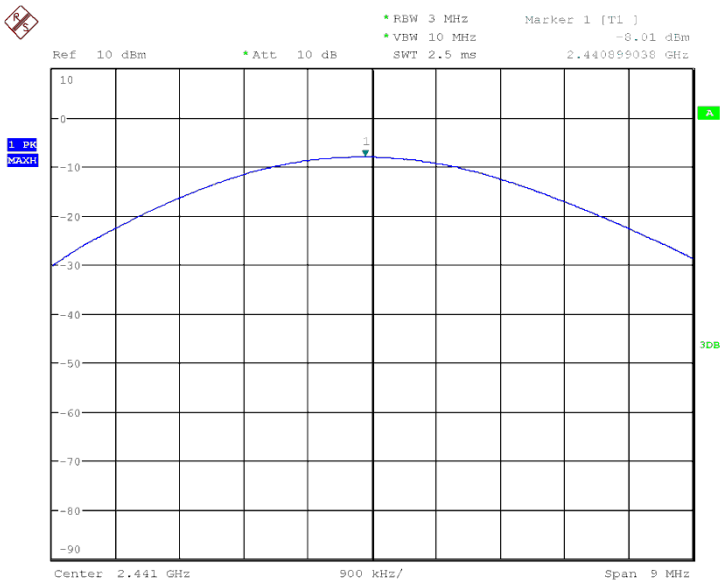


Fig.2 Peak Conducted Output Power CH39, DH1

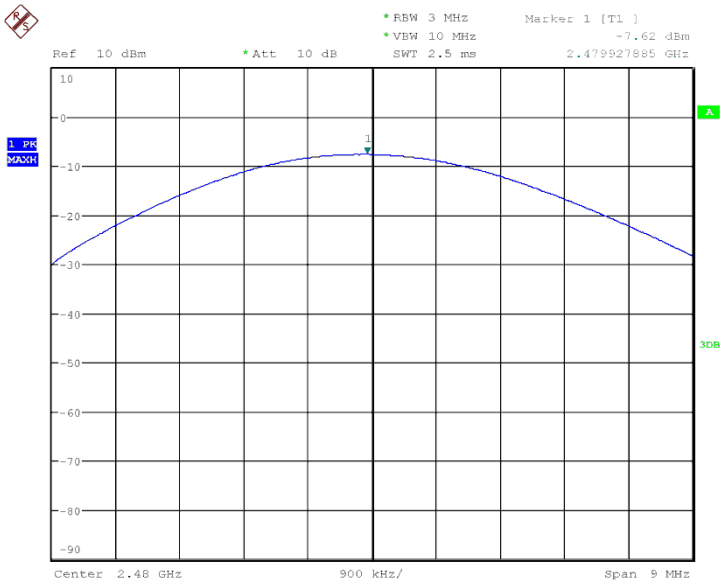


Fig.3 Peak Conducted Output Power CH78, DH1

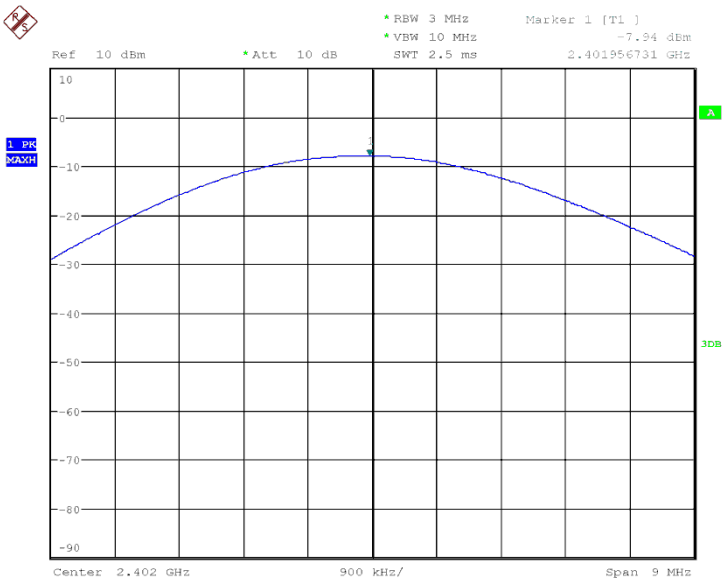


Fig.4 Peak Conducted Output Power CH0, 2DH1

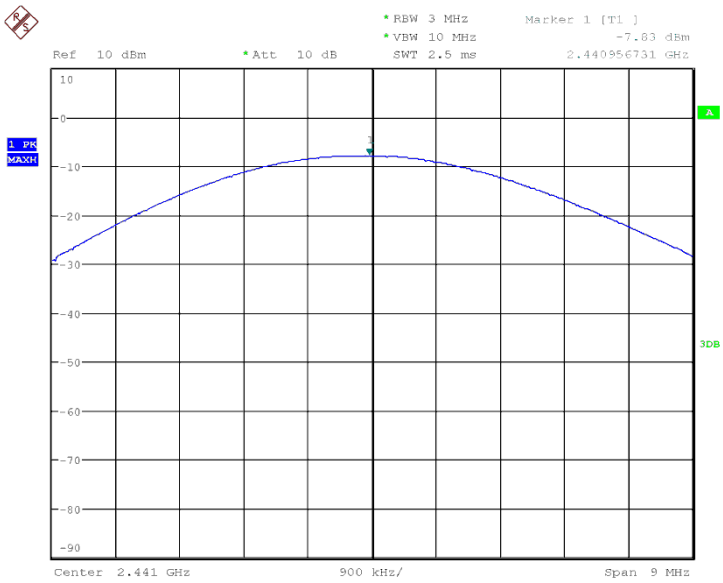


Fig.5 Peak Conducted Output Power CH39, 2DH1

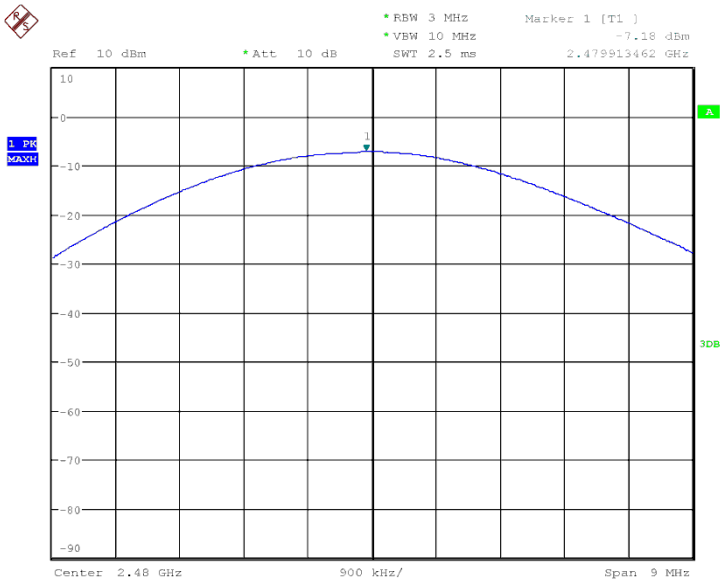


Fig.6 Peak Conducted Output Power CH78, 2DH1

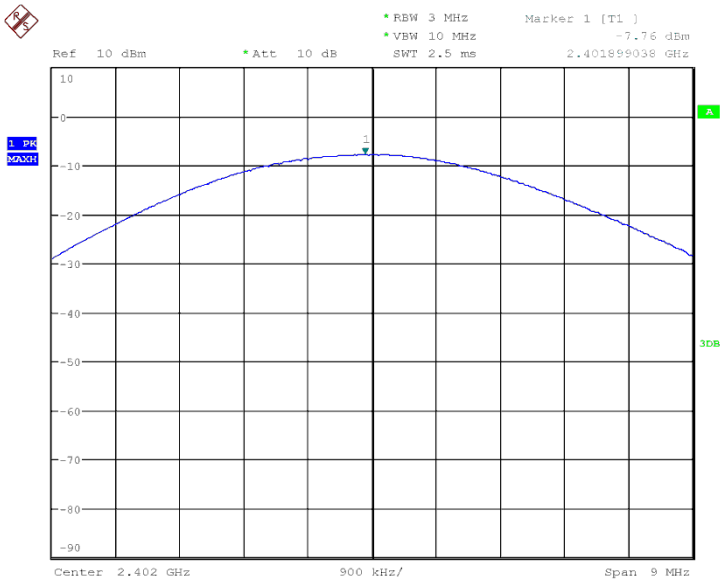


Fig.7 Peak Conducted Output Power CH0, 3DH1

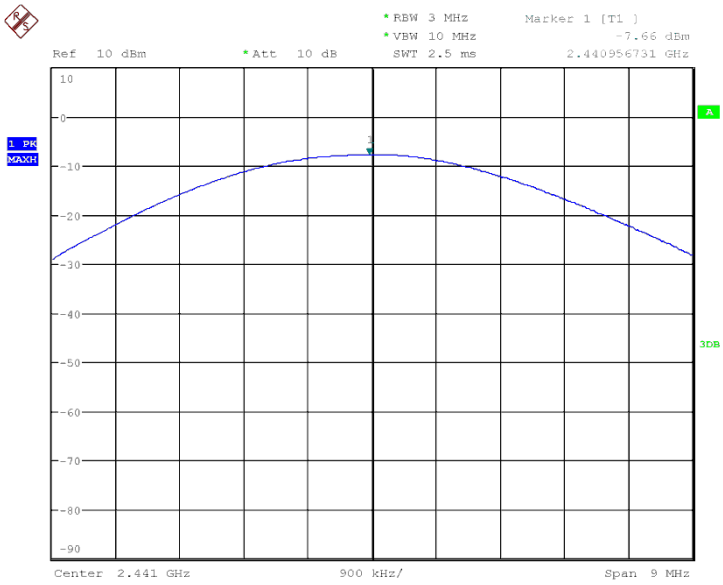


Fig.8 Peak Conducted Output Power CH39, 3DH1

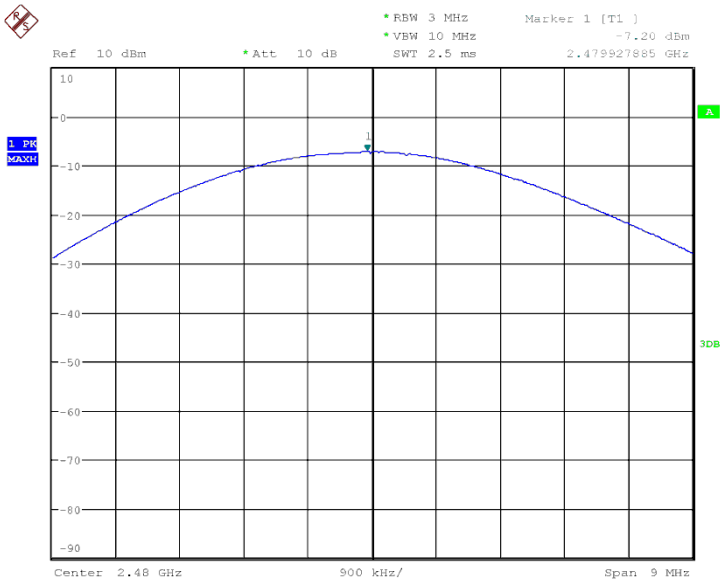


Fig.9 Peak Conducted Output Power CH78, 3DH1

5.2. Frequency Band Edges-Conducted

Test Condition:

RBW	VBW	Span
100KHz	100KHz	10MHz

Measurement result:

For GFSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.10	-63.809	P
	Hopping ON	Fig.11	-62.604	P
78	Hopping OFF	Fig.12	-63.629	P
	Hopping ON	Fig.13	-63.148	P

For π/4 DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.14	-63.749	P
	Hopping ON	Fig.15	-62.534	P
78	Hopping OFF	Fig.16	-62.396	P

	Hopping ON	Fig.17	-61.562	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.18	-63.055	P
	Hopping ON	Fig.19	-63.205	P
78	Hopping OFF	Fig.20	-63.376	P
	Hopping ON	Fig.21	-62.8	P

Conclusion: PASS

Test graphs an below

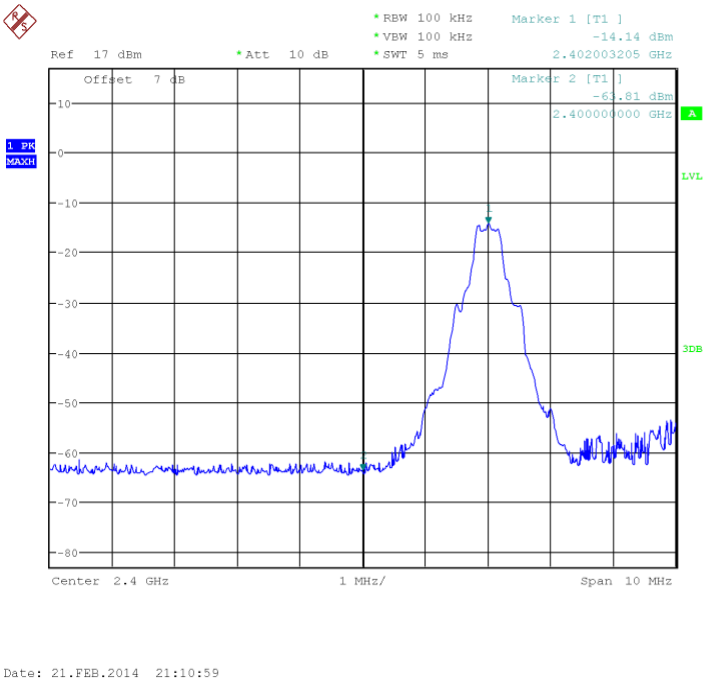


Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

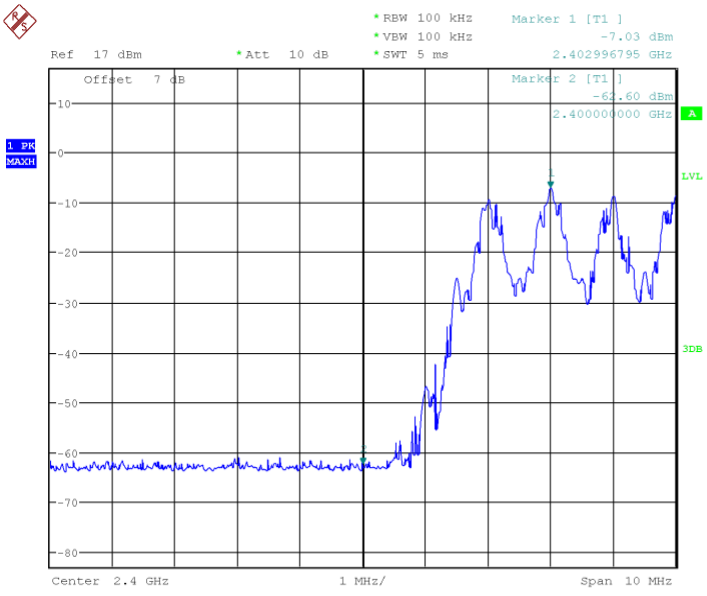


Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

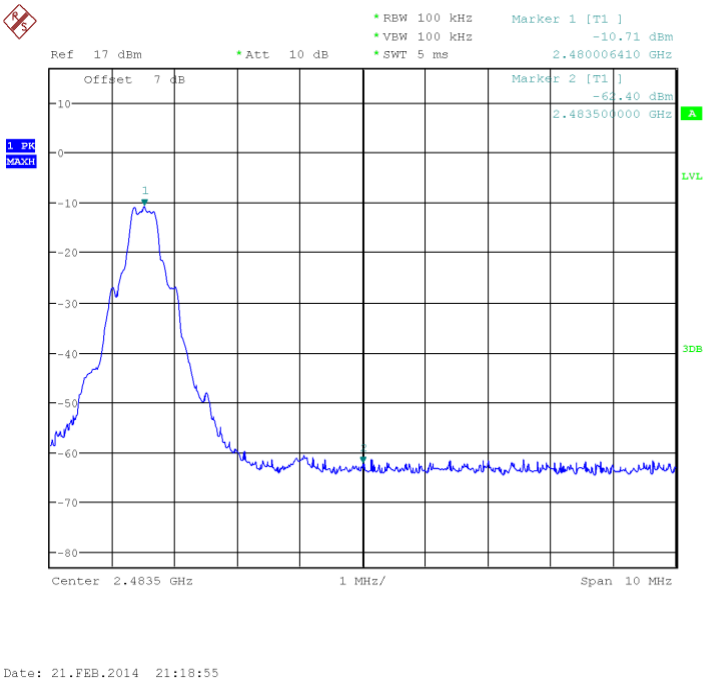


Fig.12 Frequency Band Edge: GFSK, Ch78, Hopping OFF

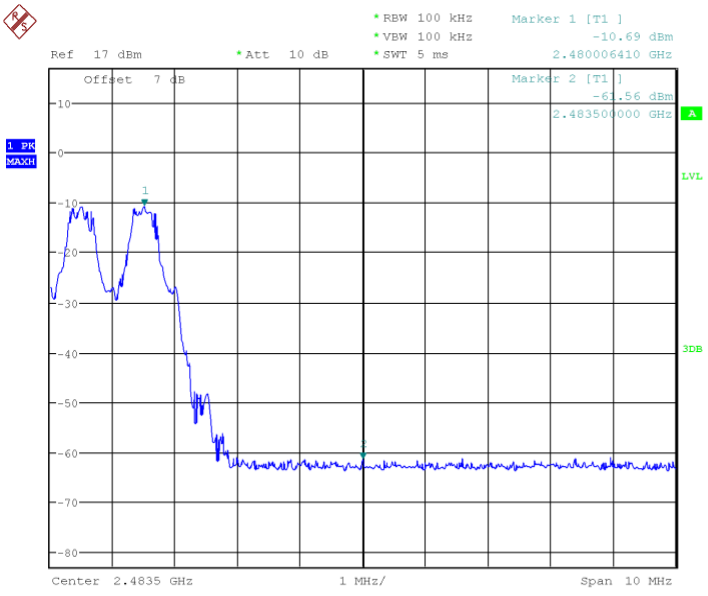


Fig.13 Frequency Band Edge: GFSK, Ch78, Hopping ON

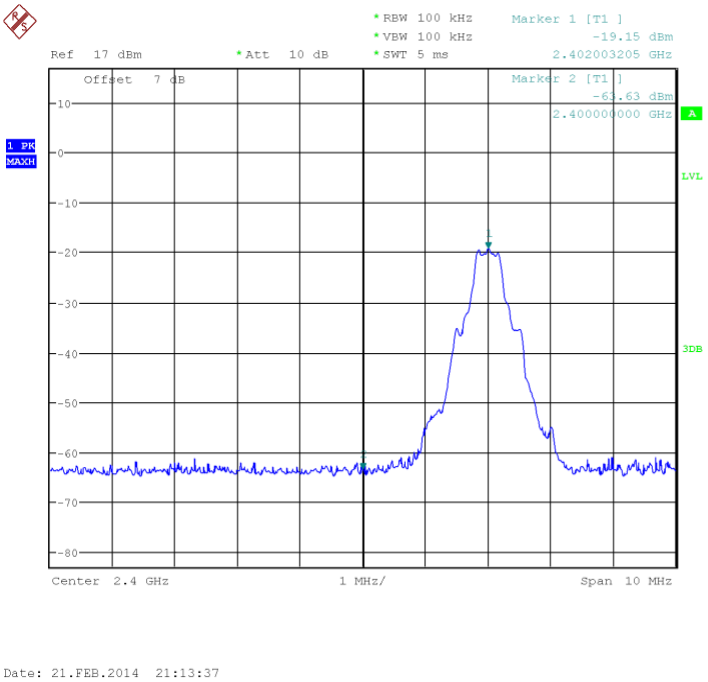


Fig.14 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping OFF

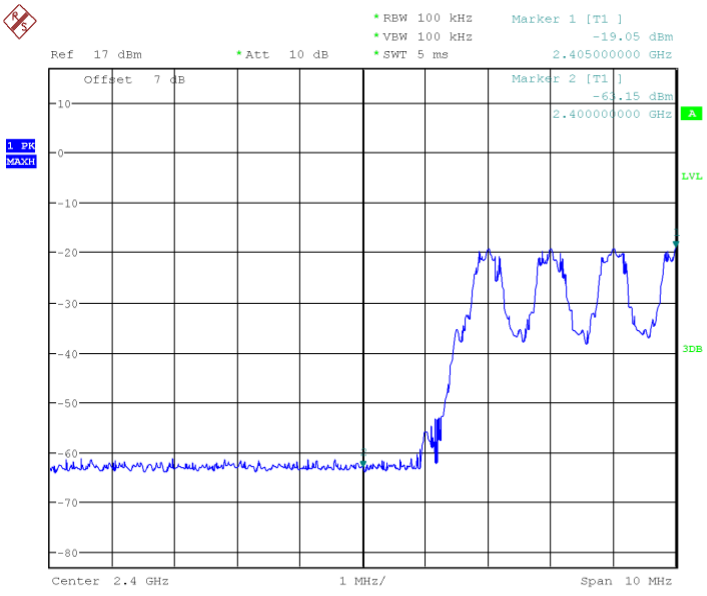


Fig.15 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping ON

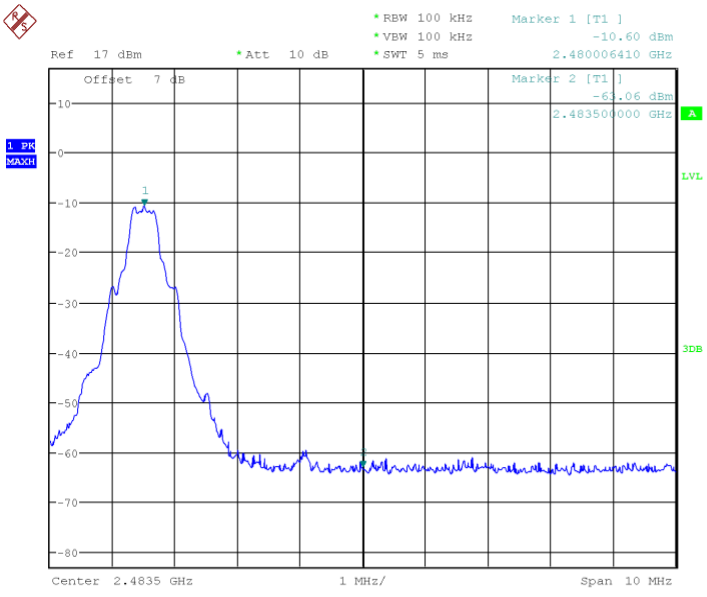


Fig.16 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping OFF

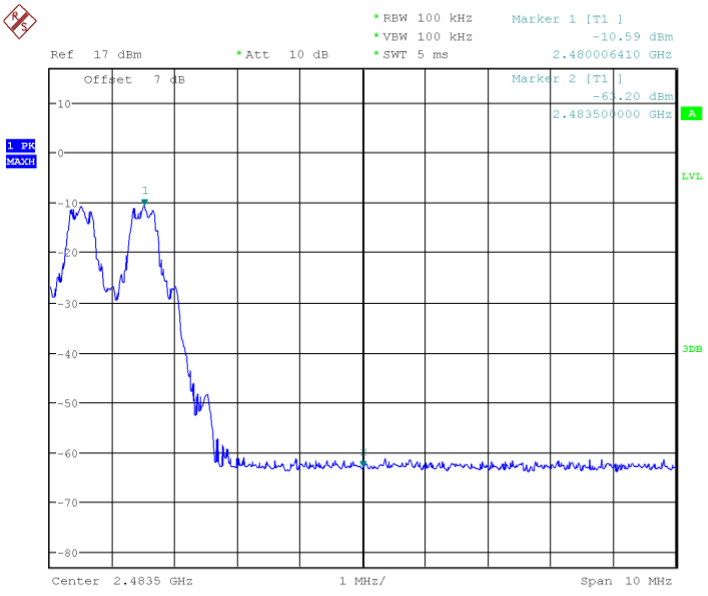


Fig.17 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping ON

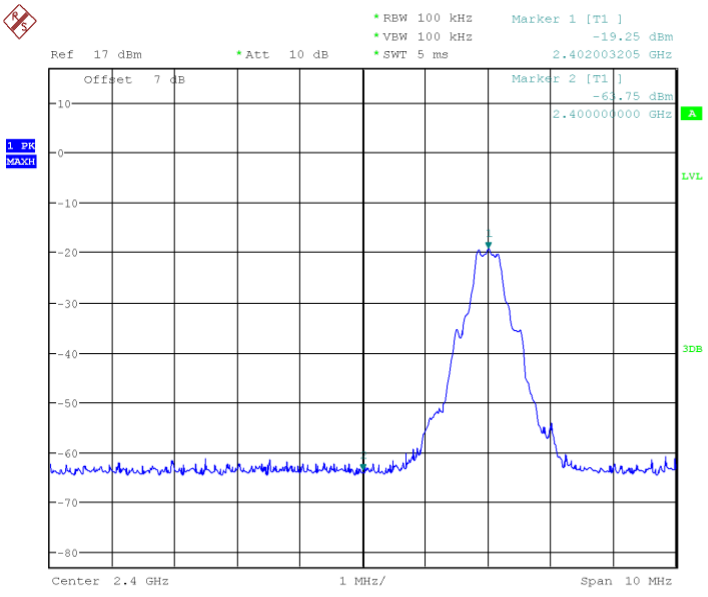


Fig.18 Frequency Band Edge: 8DPSK, Ch0, Hopping OFF

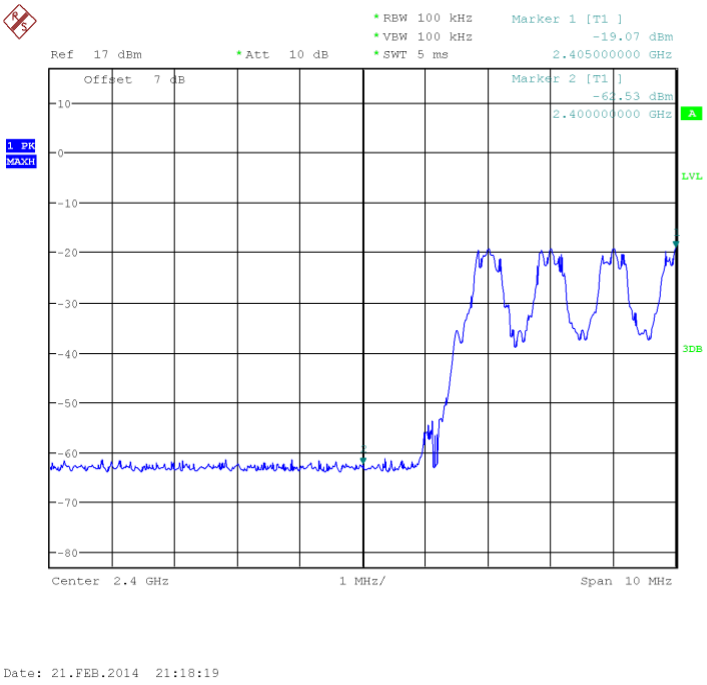


Fig.19 Frequency Band Edge: 8DPSK, Ch0, Hopping ON

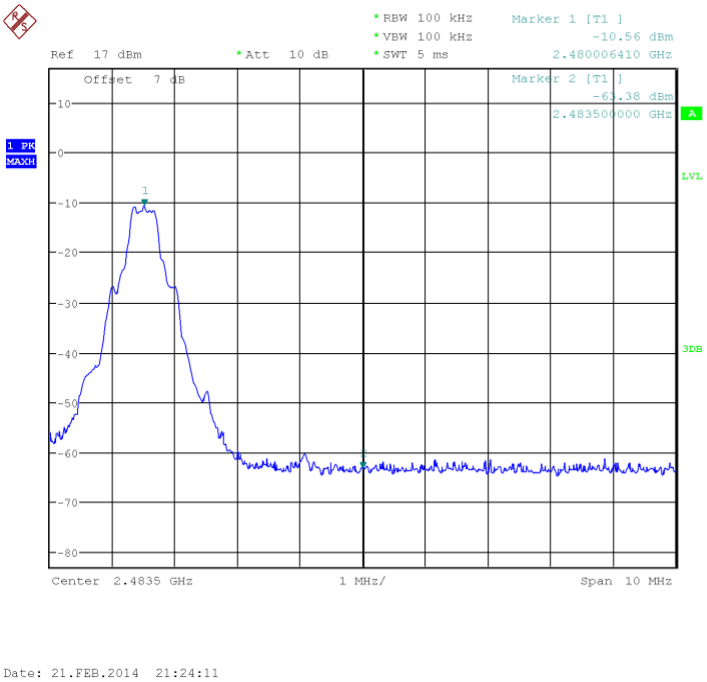


Fig.20 Frequency Band Edge: 8DPSK, Ch78, Hopping OFF

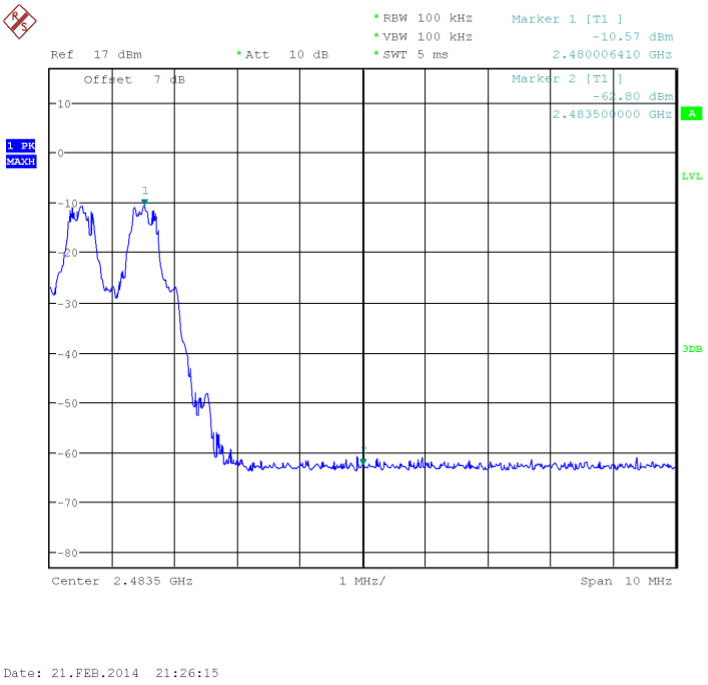


Fig.21 Frequency Band Edge: 8DPSK, Ch78, Hopping ON

5.3. Conducted Emission

Measurement Limit:

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

The measurement is according to Public notice DA 00-705 and ANSI C63.4

Test Condition:

RBW	VBW	Span
100KHz	100KHz	Manual

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

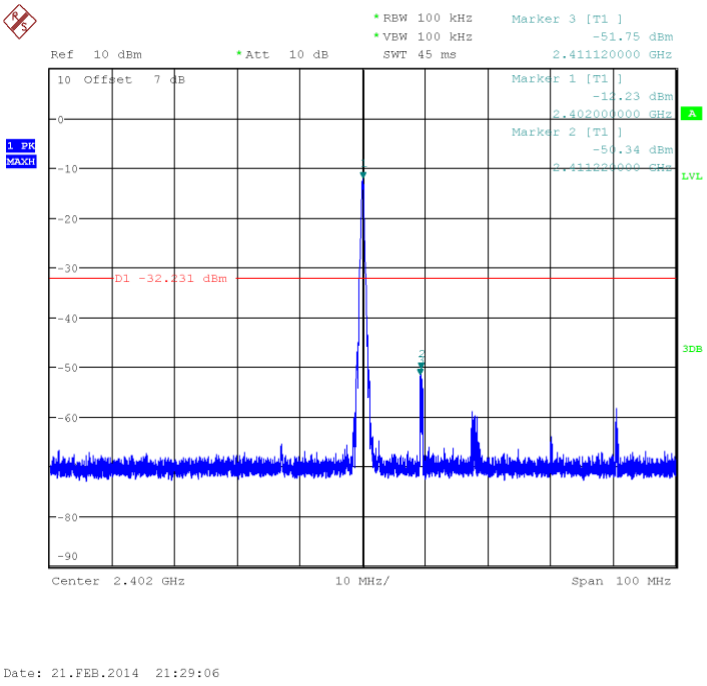


Fig.22 Conducted spurious emission: GFSK, Ch0, 2402MHz

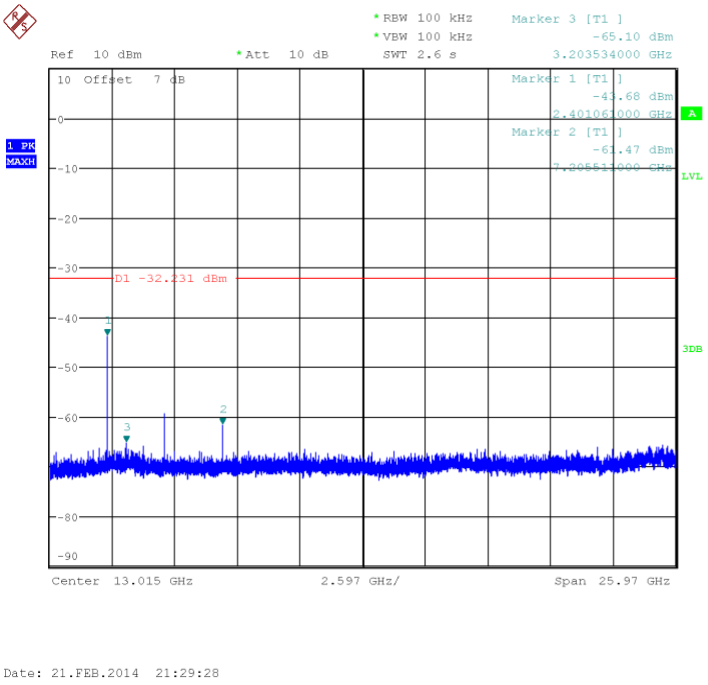


Fig.23 Conducted spurious emission: GFSK, Ch0, 30MHz~26GHz

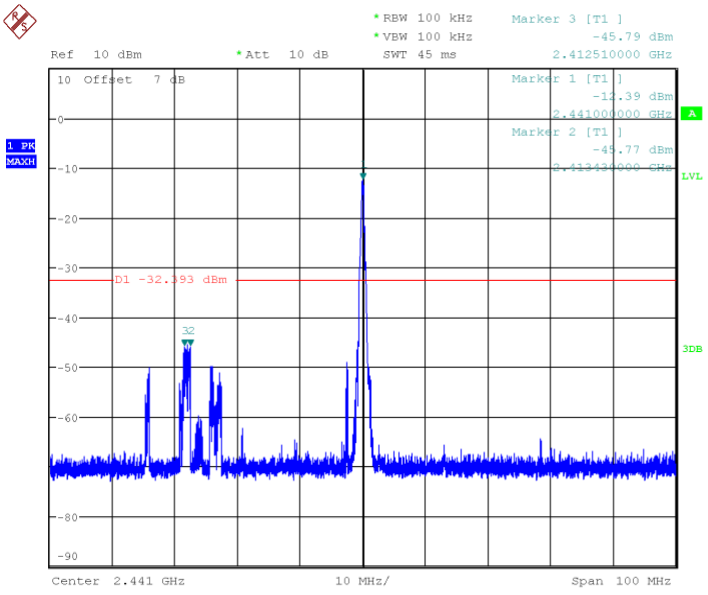


Fig.24 Conducted spurious emission: GFSK, Ch39, 2441MHz

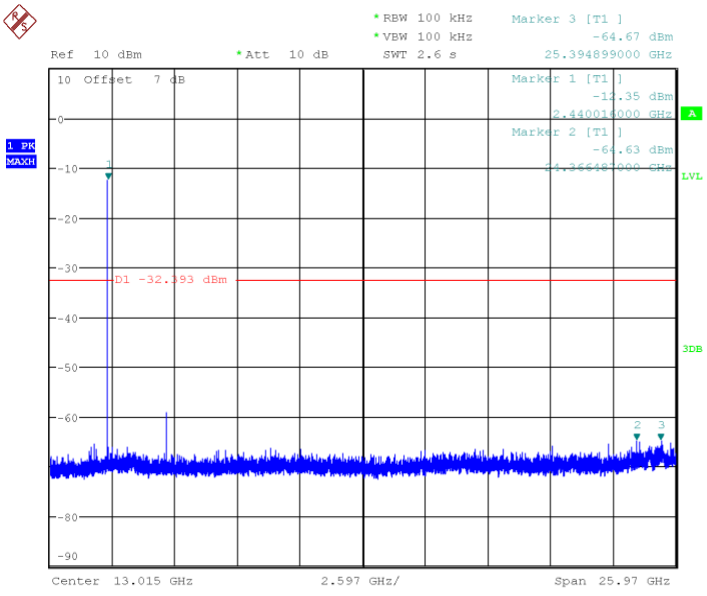


Fig.25 Conducted spurious emission: GFSK, Ch39, 30MHz~26GHz

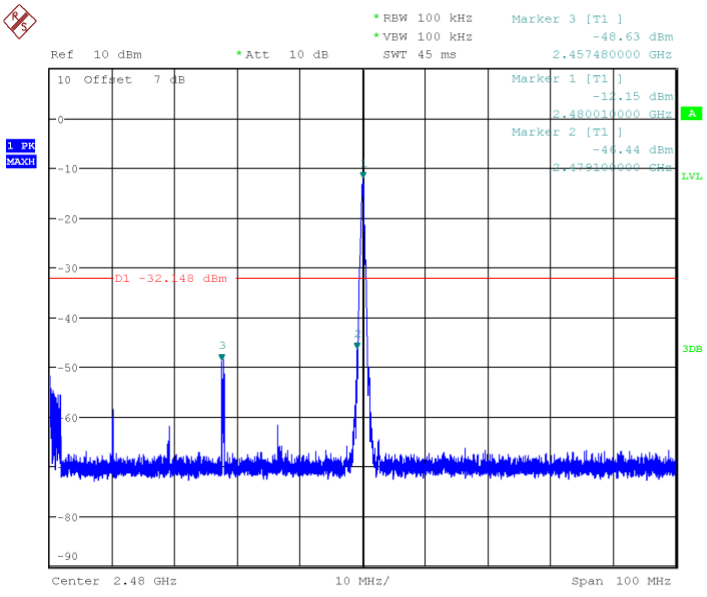


Fig.26 Conducted spurious emission: GFSK, Ch78, 2480MHz

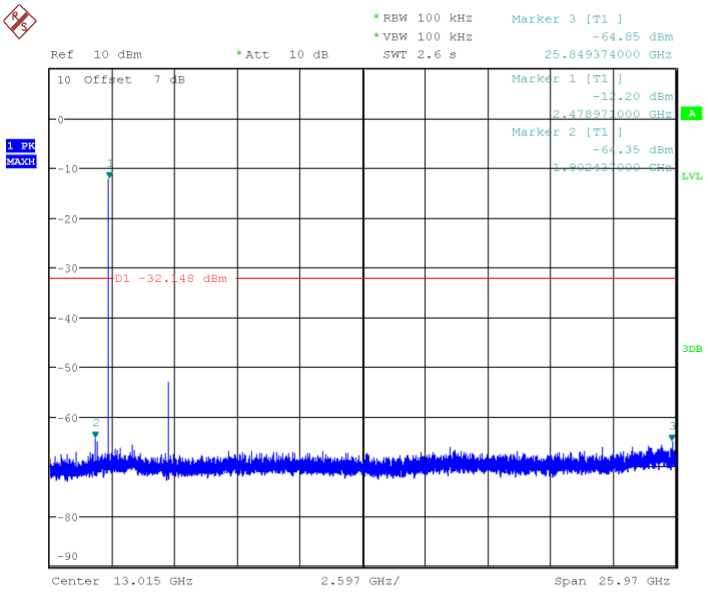


Fig.27 Conducted spurious emission: GFSK, Ch78, 30MHz~26GHz

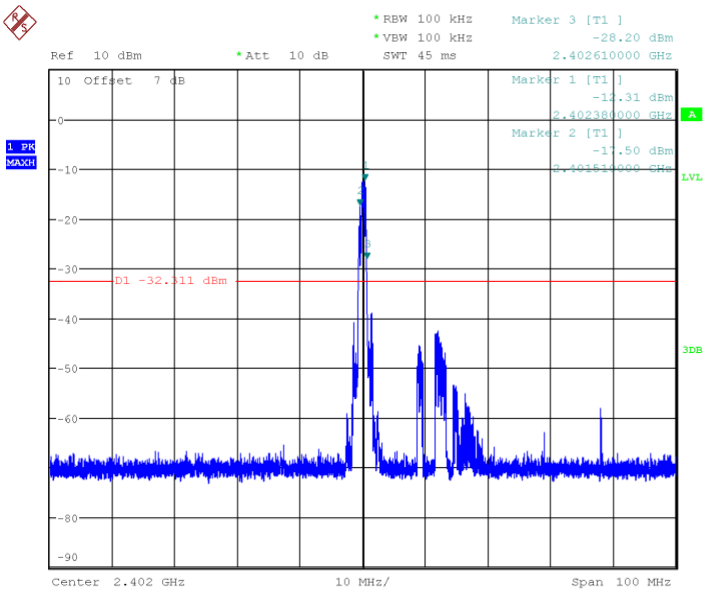


Fig.28 Conducted spurious emission: π/4 DQPSK, Ch0, 2402MHz

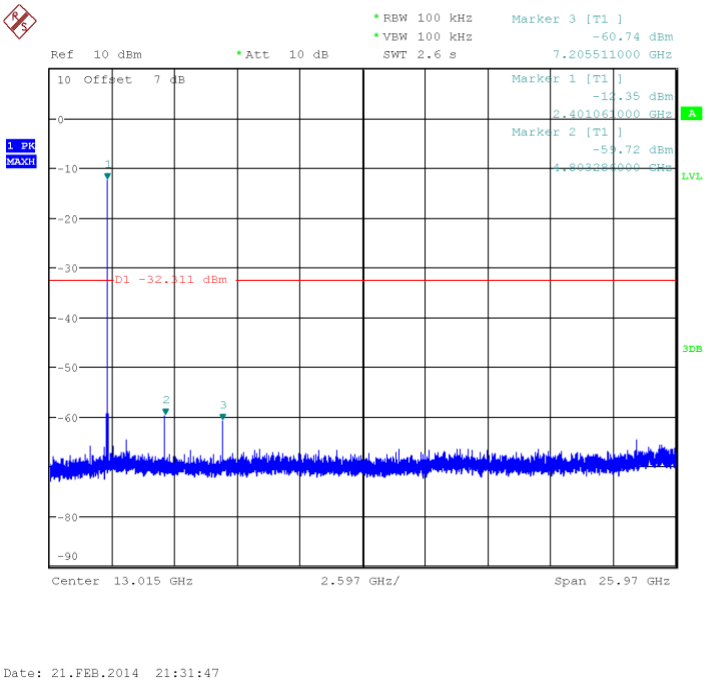


Fig.29 Conducted spurious emission: π/4 DQPSK, Ch0, 30MHz~26GHz

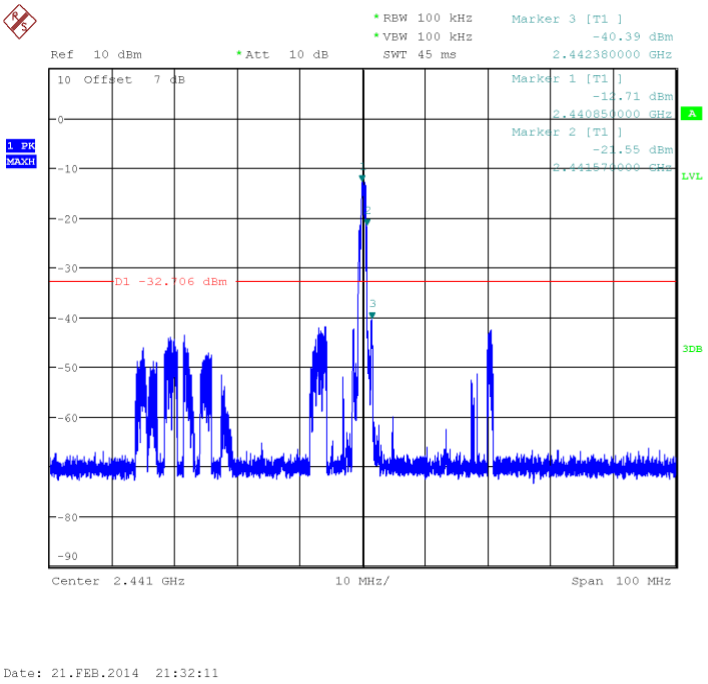


Fig.30 Conducted spurious emission: π/4 DQPSK, Ch39, 2441MHz

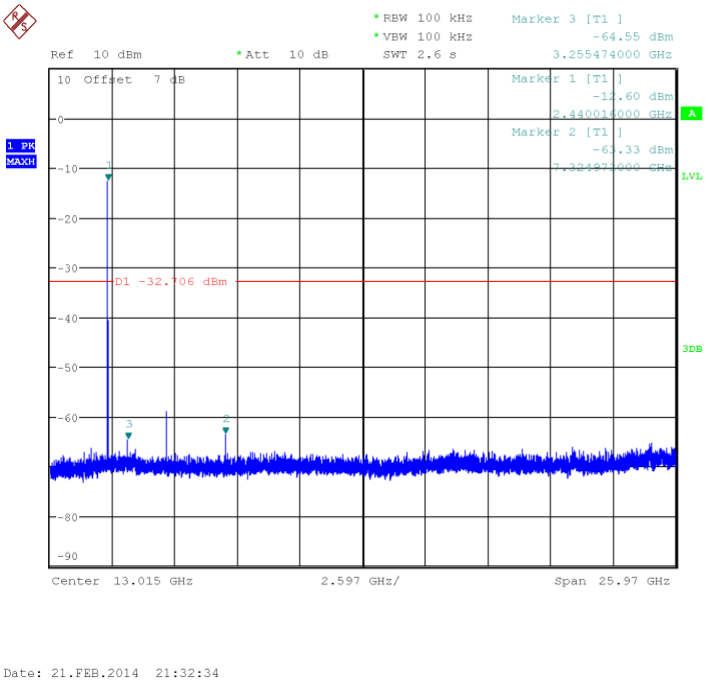


Fig.31 Conducted spurious emission: π/4 DQPSK, Ch39, 30MHz~26GHz

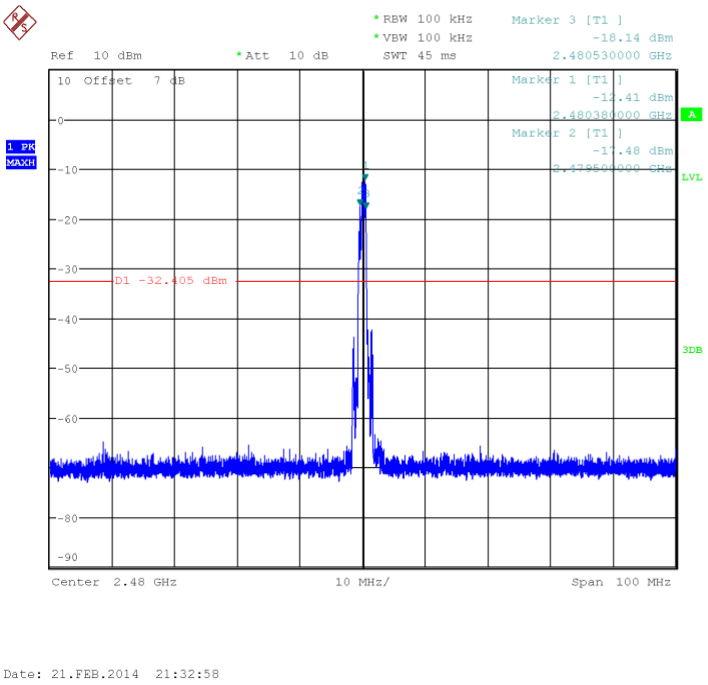


Fig.32 Conducted spurious emission: π/4 DQPSK, Ch78, 2480MHz

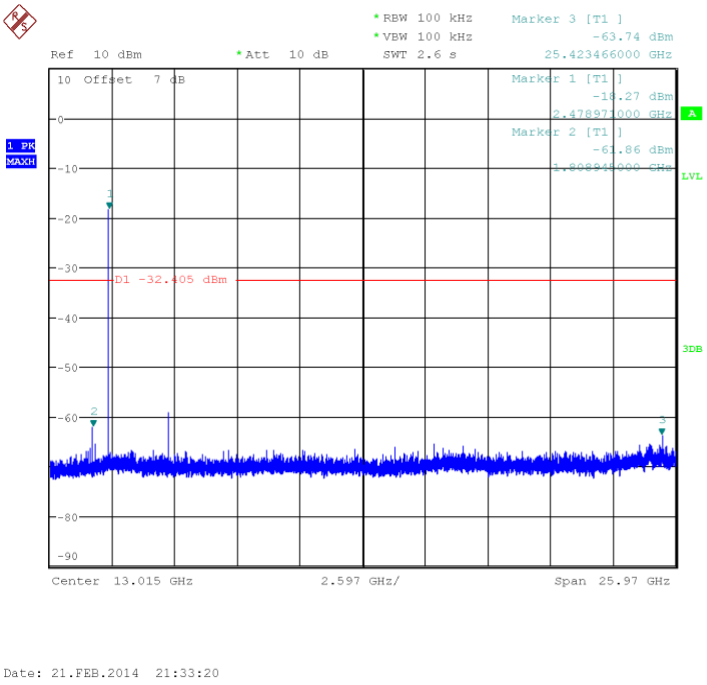


Fig.33 Conducted spurious emission: π/4 DQPSK, Ch78, 30MHz~26GHz

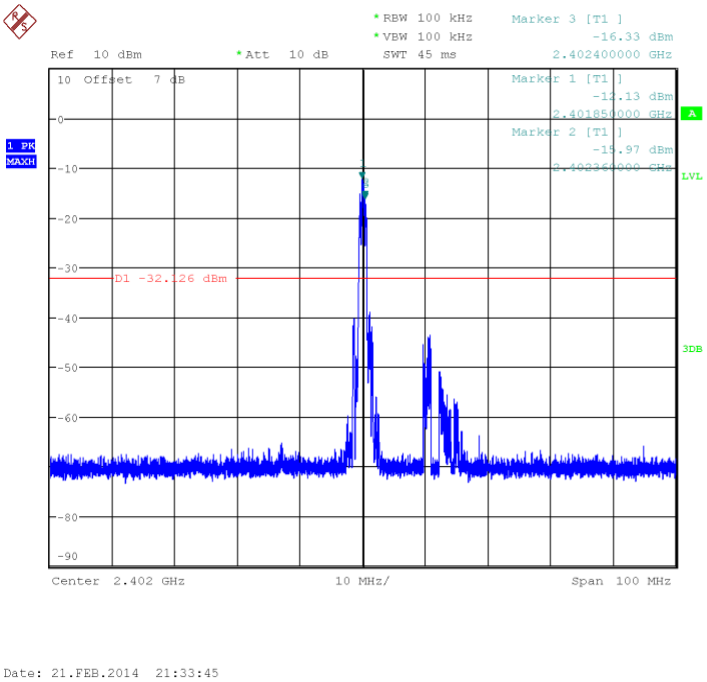


Fig.34 Conducted spurious emission: 8DPSK, Ch0, 2402MHz

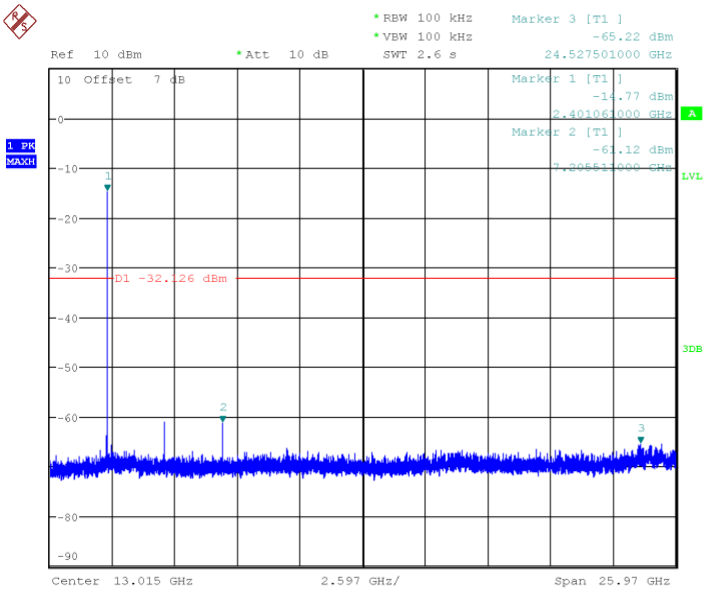


Fig.35 Conducted spurious emission: 8DPSK, Ch0, 30MHz~26GHz

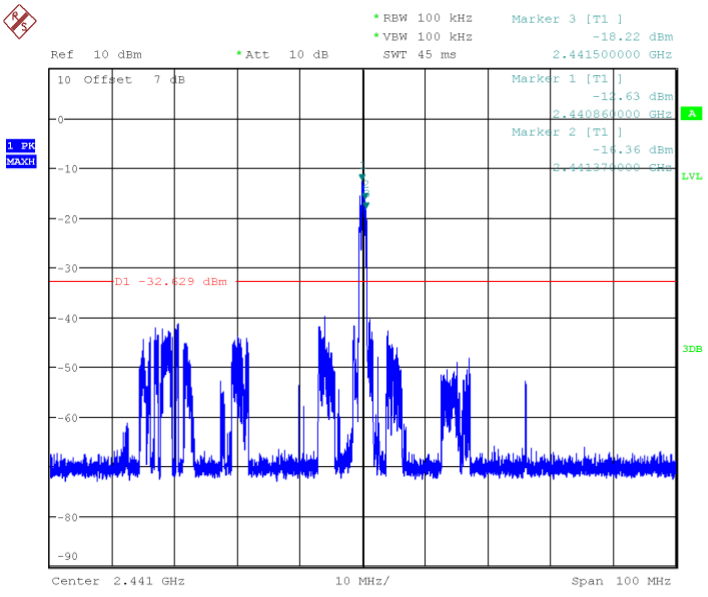


Fig.36 Conducted spurious emission: 8DPSK, Ch39, 2441MHz

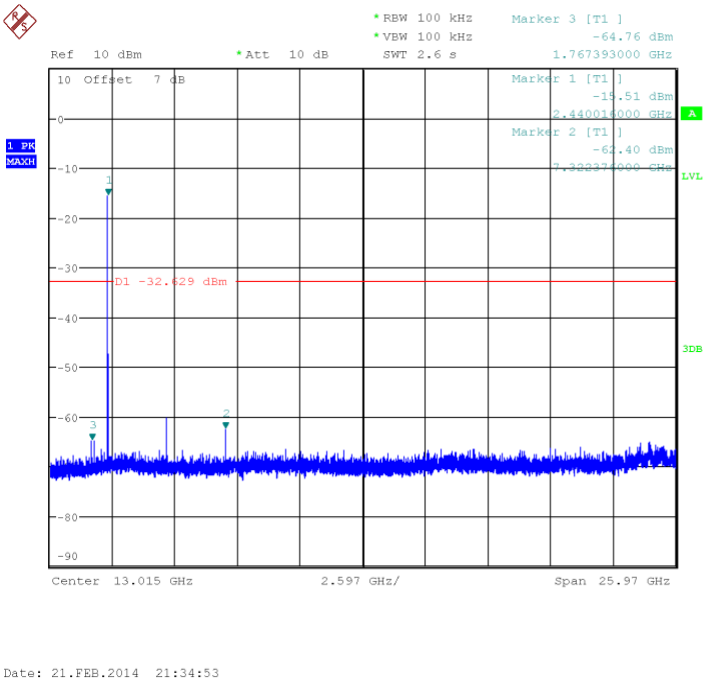


Fig.37 Conducted spurious emission: 8DPSK, Ch39, 30MHz~26GHz

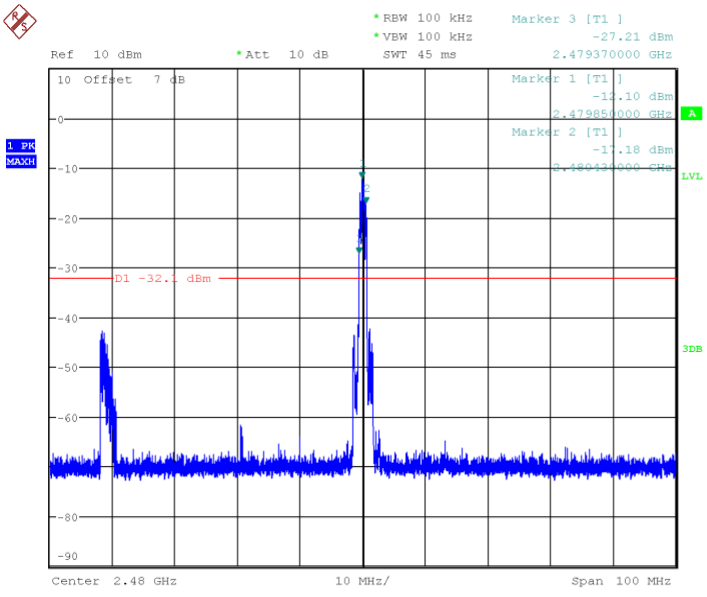


Fig.38 Conducted spurious emission: 8DPSK, Ch78, 2480MHz

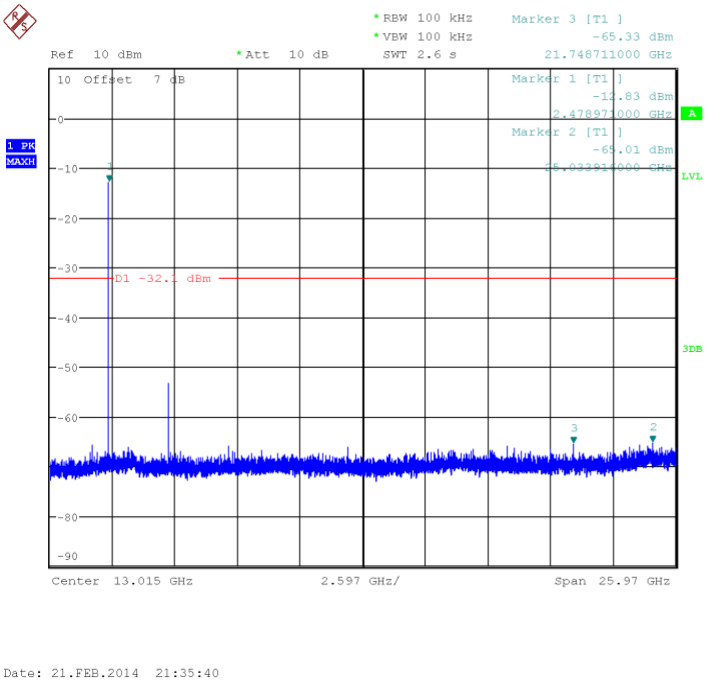


Fig.39 Conducted spurious emission: 8DPSK, Ch78, 30MHz~26GHz

5.4. Radiated Emission

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)). The measurement is according to Public notice DA 00-705 and ANSI C63.4

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
2390	500	54
2483.5	500	54

Test condition:

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 nonconducting 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 C63.4-2009 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

Test Condition:

RBW	VBW	Span	Detector
1MHz	3MHz	Manual	Peak

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:

Result=P_{Mea} + A_{Rpi}

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
47.249780	21.6	0.61	20.99	V
58.769200	19.2	0.86	18.34	V
96.547004	16.8	1.91	14.89	V
296.087352	12.9	3.27	9.63	H

GFSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1300.172800	40.1	12.82	27.28	V
1821.045600	46.2	12.64	33.56	V
2483.5	52.64	12.99	39.65	V

2489.213	52.73	13.93	38.8	V

GFSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4803.955667	49.4	7.1	42.3	H
6400.136533	42.0	11.93	35.57	V

π/4 DQPSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.754944	19.0	0.61	18.39	V
55.342696	20.1	0.86	19.24	H

π/4 DQPSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1356.046400	40.7	12.82	27.88	V
2323.98200	51.9	12.64	39.26	V
2483.501	51.216	12.99	38.226	H
2487.444	52.561	13.93	38.631	V

π/4 DQPSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4803.874722	48.9	7.1	41.8	H
7912.901933	43.8	10.73	33.07	V

8DPSK 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
38.793712	23.2	0.61	22.59	V
50.821732	21	0.86	20.14	V
100.032852	18.7	1.91	16.79	V

8DPSK 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1226.6784	39.6	12.82	26.78	V
1683.306	44.3	12.64	31.66	V
2487.1884	52.232	12.99	39.242	V
2493.1948	52.701	13.93	38.771	H

8DPSK 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
3509.983667	38.9	7.1	31.8	H
4803.773267	48.1	8.72	39.38	V

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	42.05	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 test results were set in fixed frequency.

Conclusion: PASS

Test graphs as below:

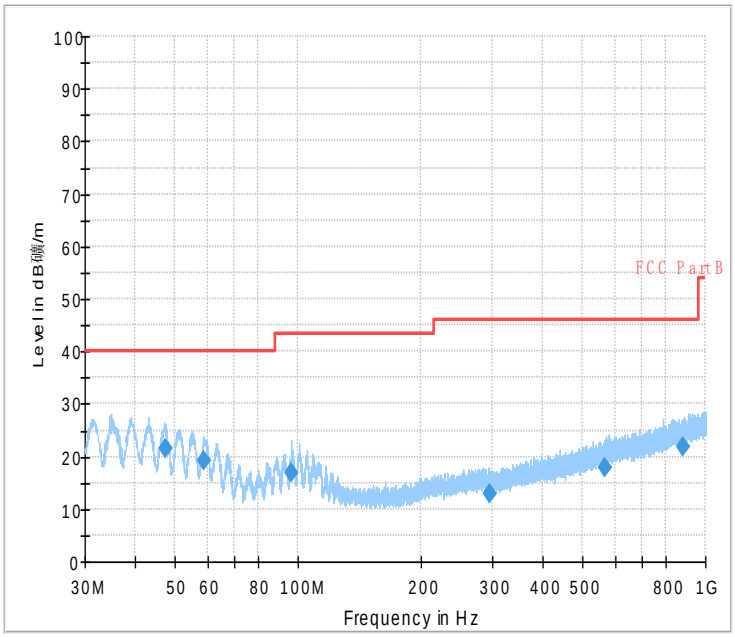


Fig.40 Radiated emission: GFSK, Ch0, 30MHz~1GHz

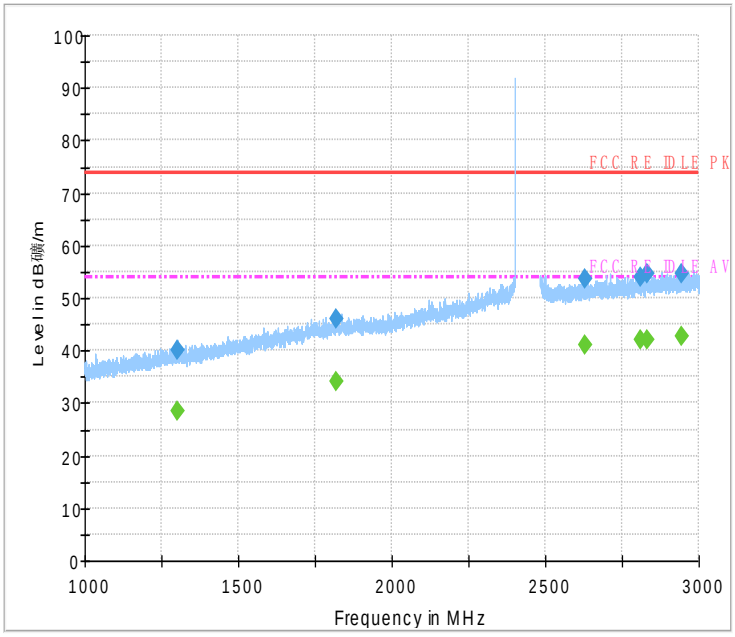


Fig.41 Radiated emission: GFSK, Ch0, 1GHz~3GHz

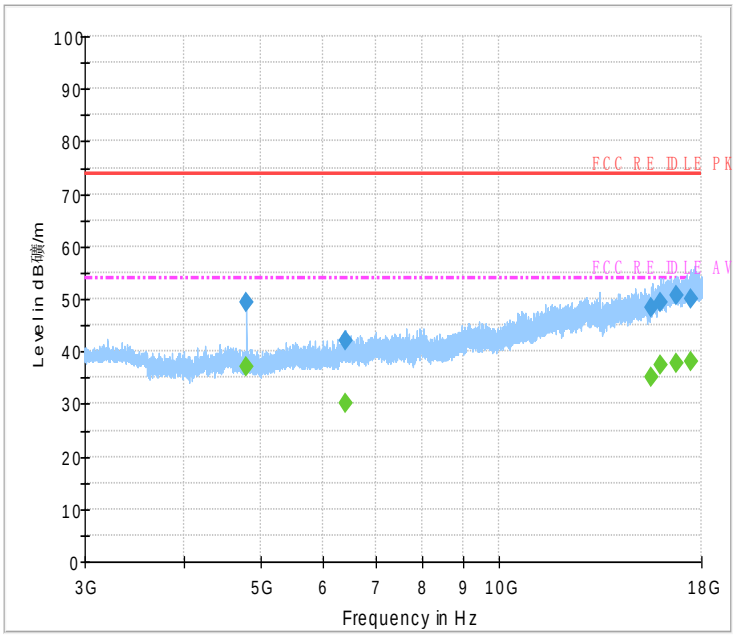


Fig.42 Radiated emission: GFSK, Ch0, 3GHz~18GHz

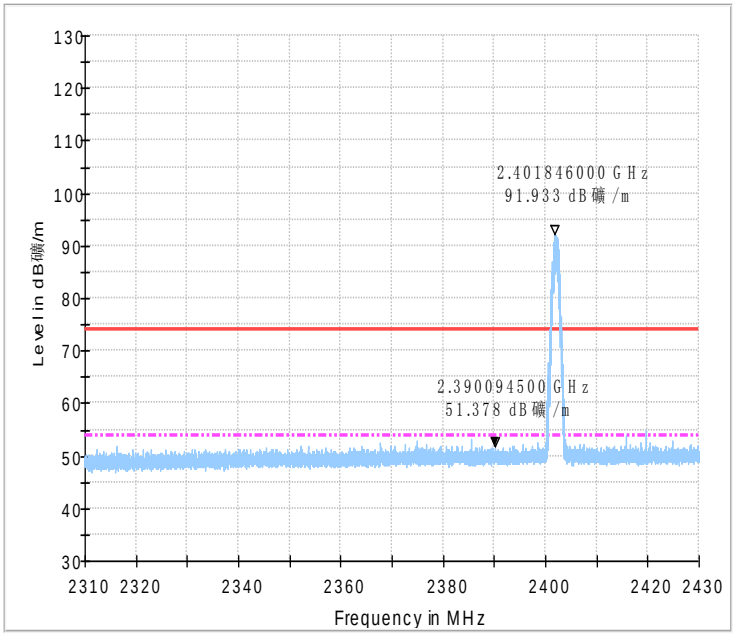


Fig.43 Radiated emission (Power): GFSK, low channel

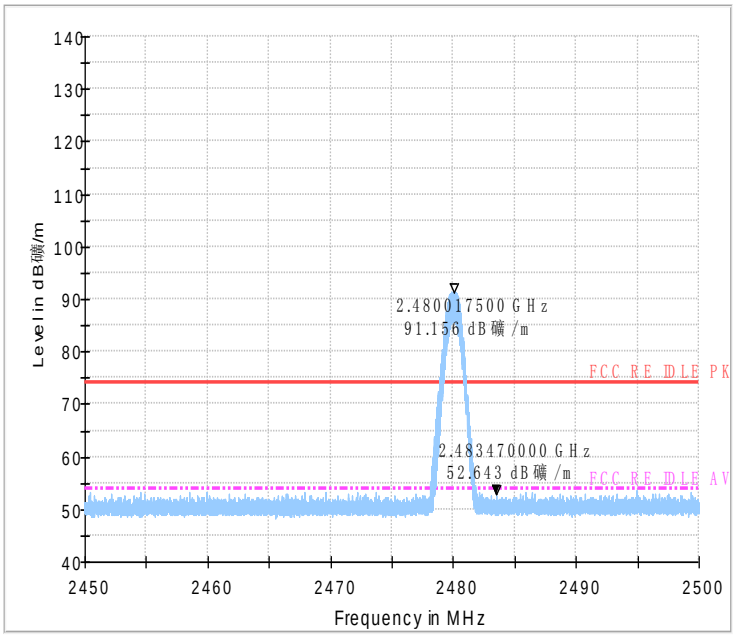


Fig.44 Radiated emission (Power): GFSK, high channel

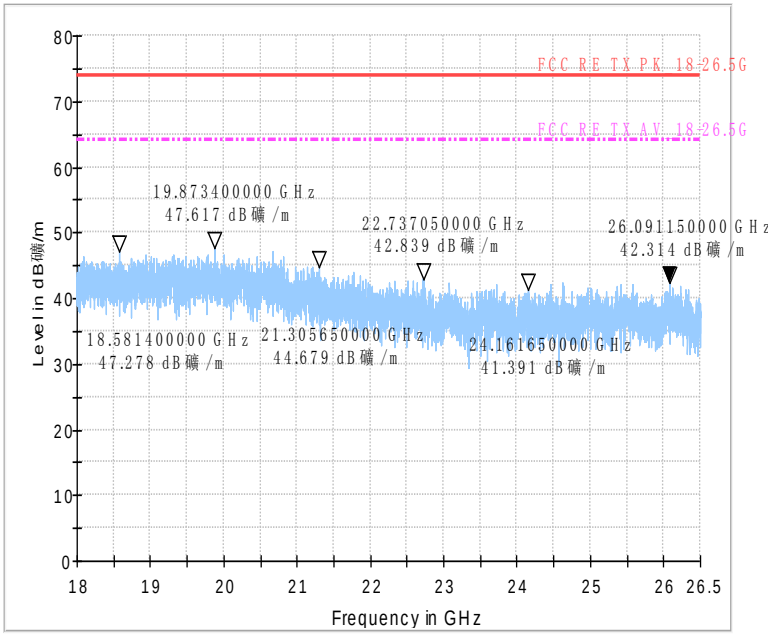


Fig.45 Radiated emission: GFSK, 18 GHz - 26 GHz

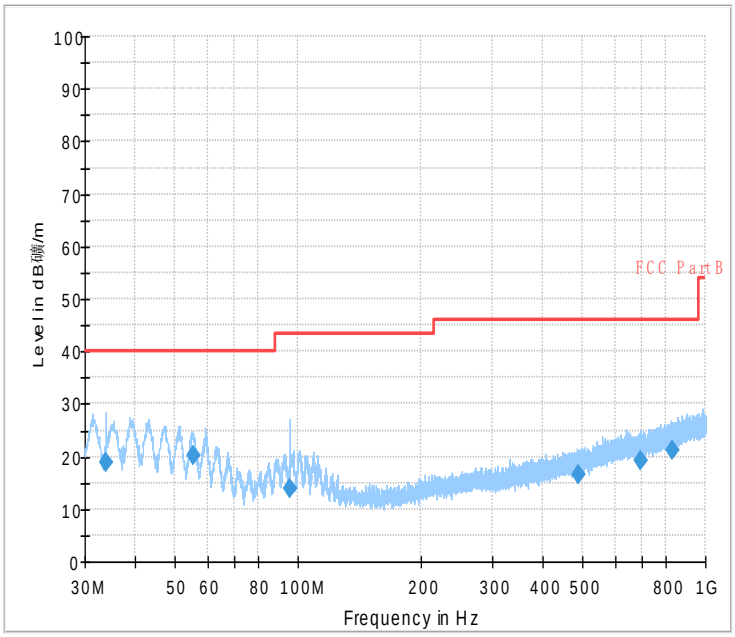


Fig.46 Radiated emission: π/4 DQPSK, Ch0, 30MHz~1GHz

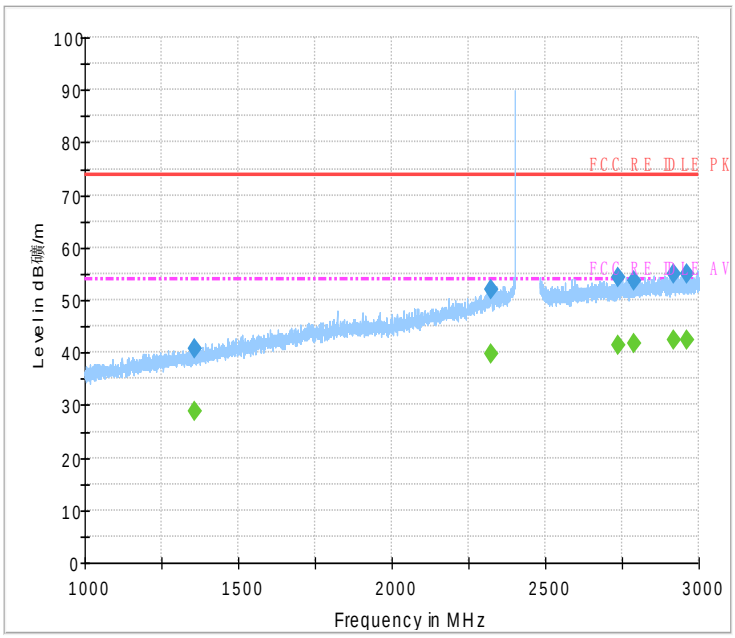


Fig.47 Radiated emission: π/4 DQPSK, Ch0, 1GHz~3GHz

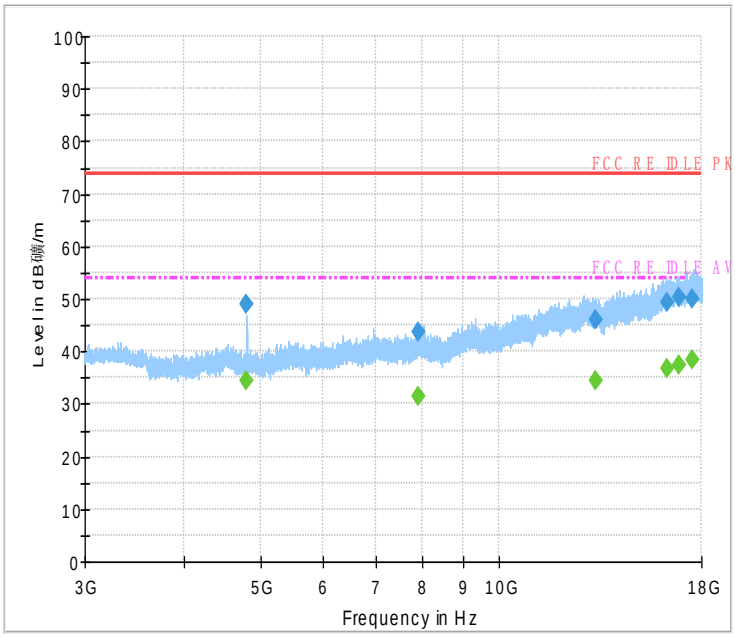


Fig.48 Radiated emission: π/4 DQPSK, Ch0, 3GHz~18GHz

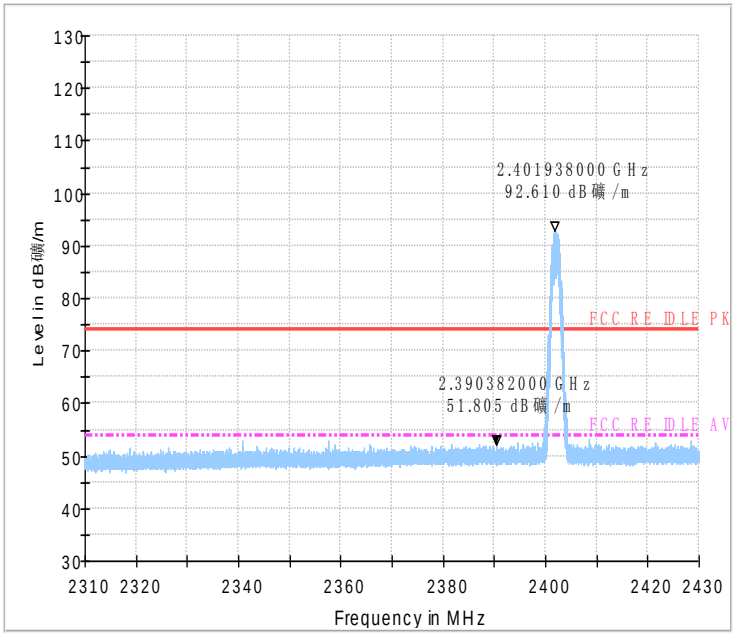


Fig.49 Radiated emission (Power): π/4 DQPSK, low channel

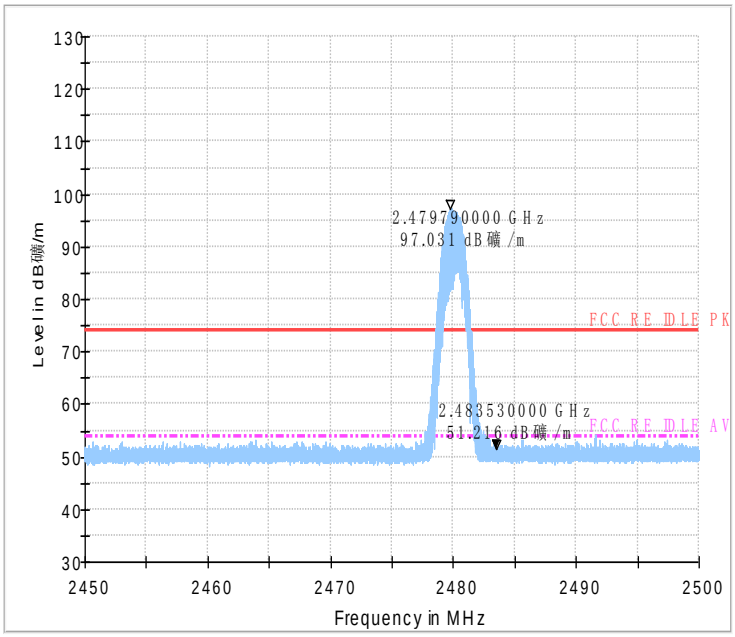


Fig.50 Radiated emission (Power): π/4 DQPSK, high channel

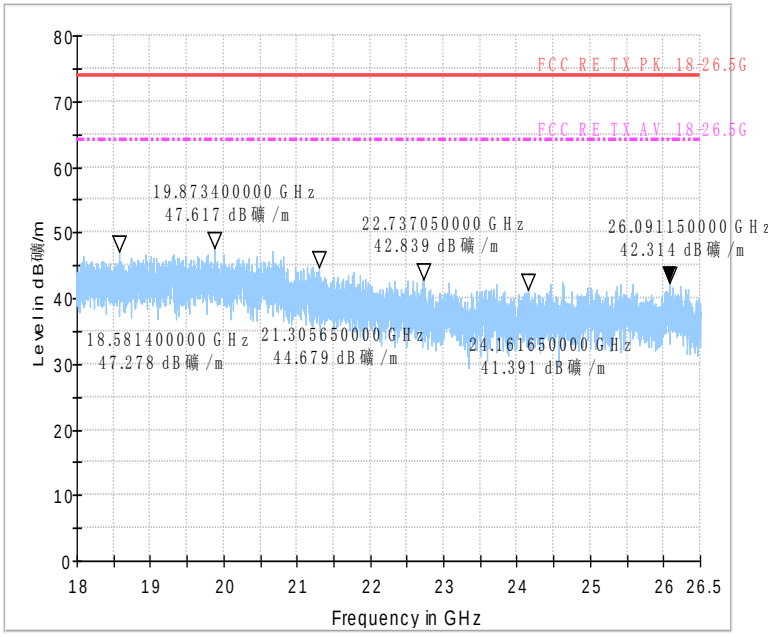


Fig.51 Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz

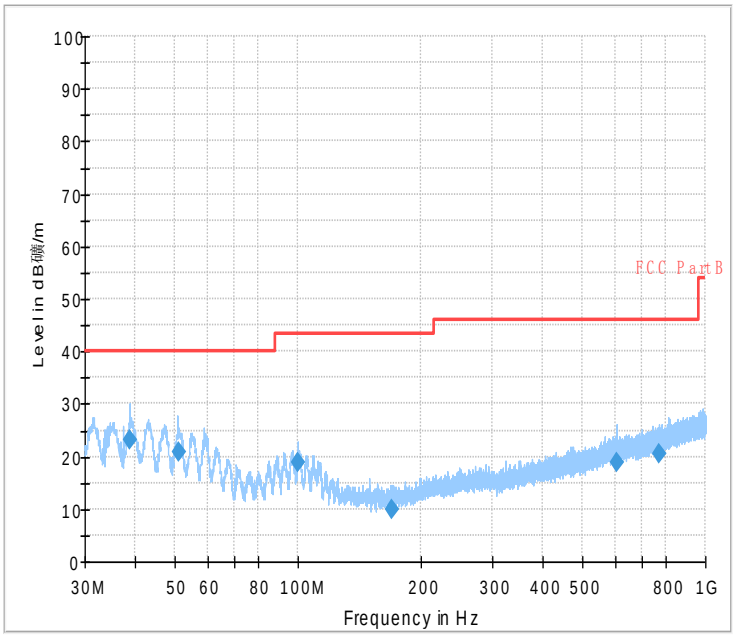


Fig.52 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

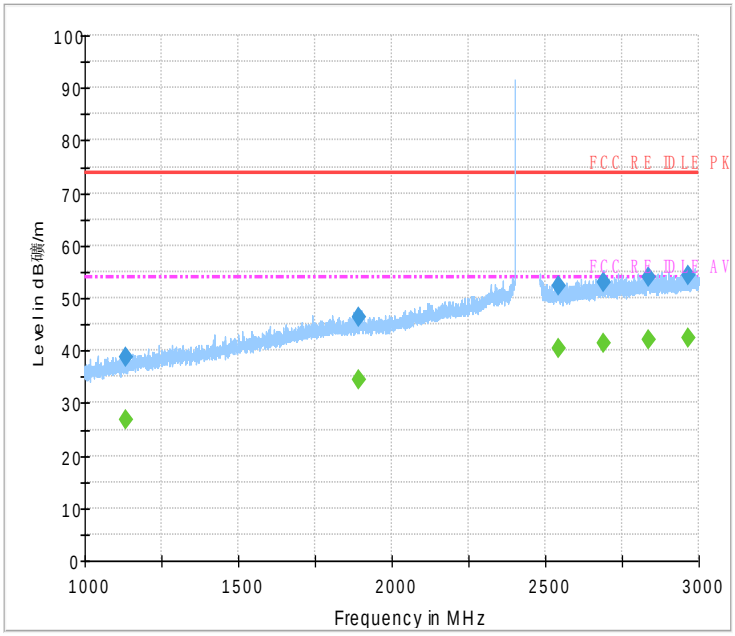


Fig.53 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

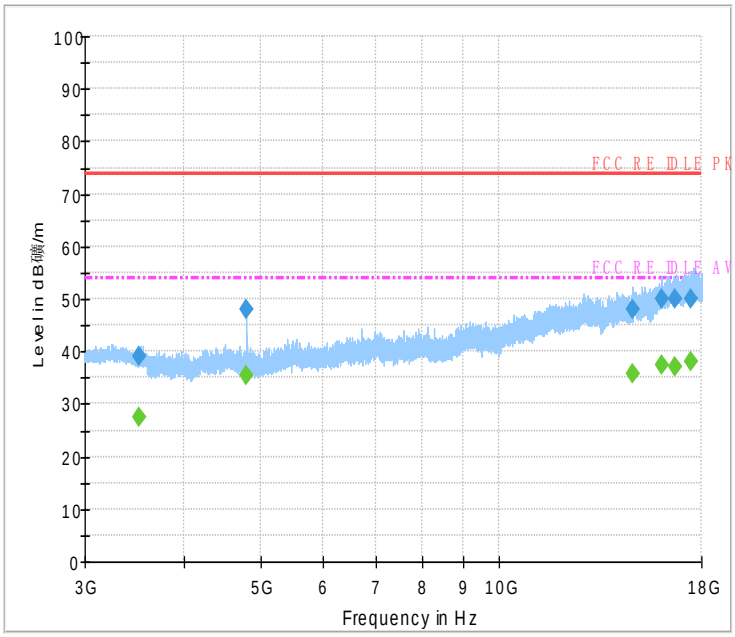


Fig.54 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz

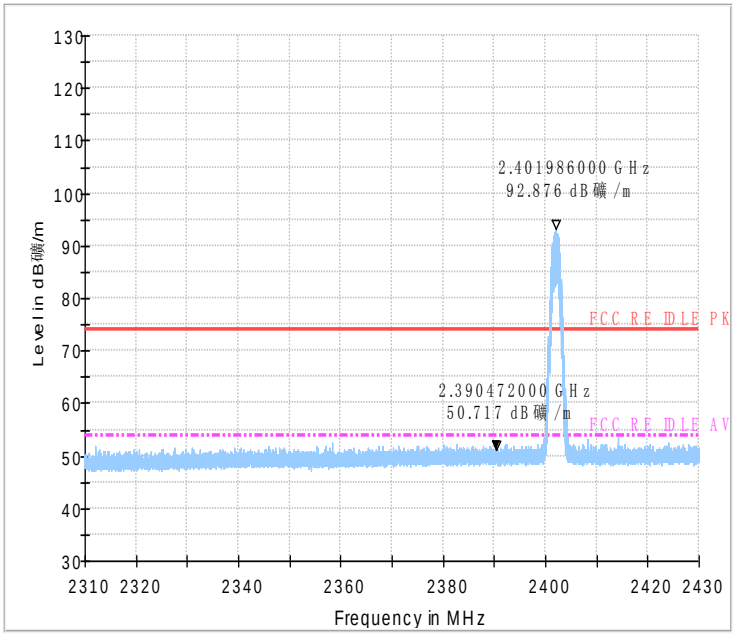


Fig.55 Radiated emission (Power): 8DPSK, low channel

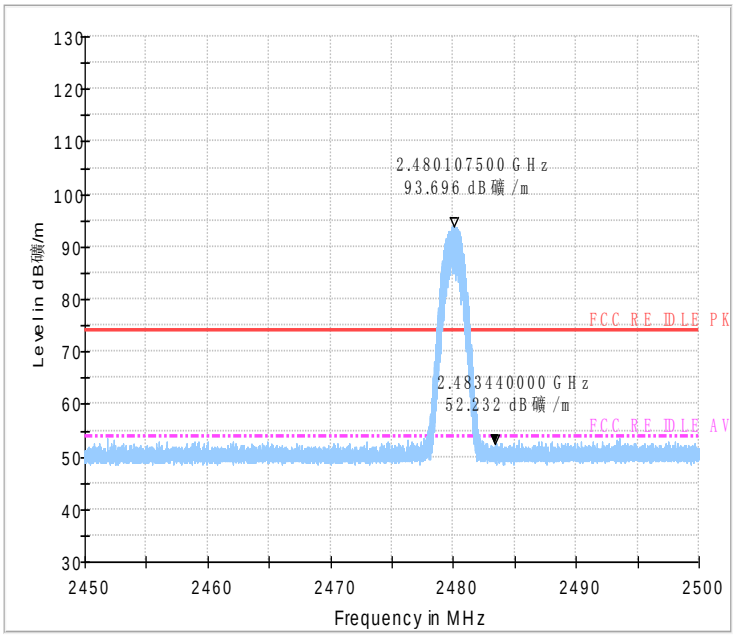


Fig.56 Radiated emission (Power): 8DPSK, high channel

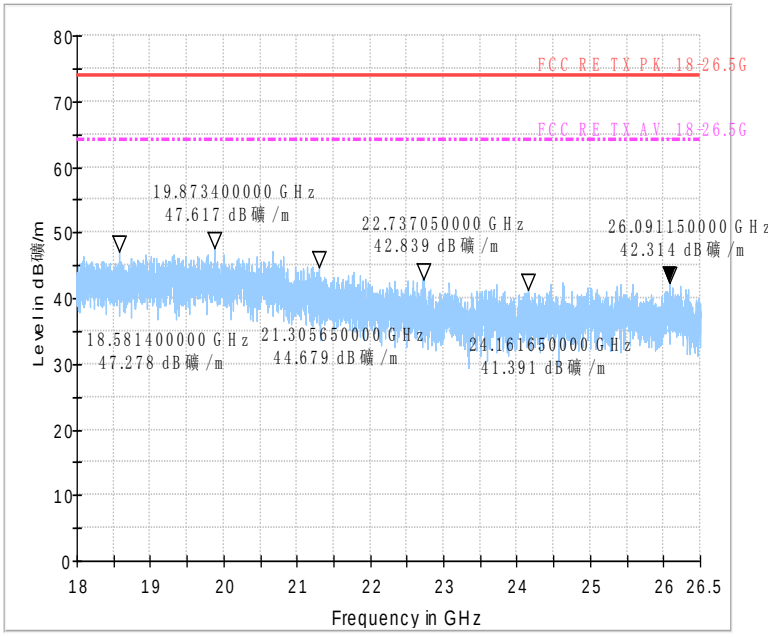


Fig.57 Radiated emission: 8DPSK, 18 GHz - 26 GHz

5.5. Time Of Occupancy (Dwell Time)

Measurement Limit:

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

The measurement is according to Public notice DA 00-705 and ANSI C63.4

Measurement Result:

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.58	159.04	P
		Fig.59		
	DH3	Fig.60	281.92	P
		Fig.61		
	DH5	Fig.62	320.213	P
		Fig.63		

For π/4 DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	2DH1	Fig.64	160.96	P
		Fig.65		
	2DH3	Fig.66	280.32	P
		Fig.67		
	2DH5	Fig.68	321.067	P
		Fig.69		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	3DH1	Fig.70	160.96	P
		Fig.71		
	3DH3	Fig.72	280.32	P
		Fig.73		
	3DH5	Fig.74	320.213	P
		Fig.75		

Note: the dwell time is Calculated of the sum of test time about 31.6 seconds.

Equation: dwell time = pusletime *(1600/N)/79*T .

N is the number of timeslot, for example DH5, which is 5 timeslots and Interval, so N is equal to 6; For DH1, N=2; For DH3, N=4;

T is the time about 31.6s.

Just as:

The time of DH5=3.002*(1600/6)/79*31.6=320.213ms.

Conclusion: PASS

Test graphs as below:

As fig.58(DH1) pulsetime=MKR4-MKR3+MKR2=496.794us. The method used for all fig.

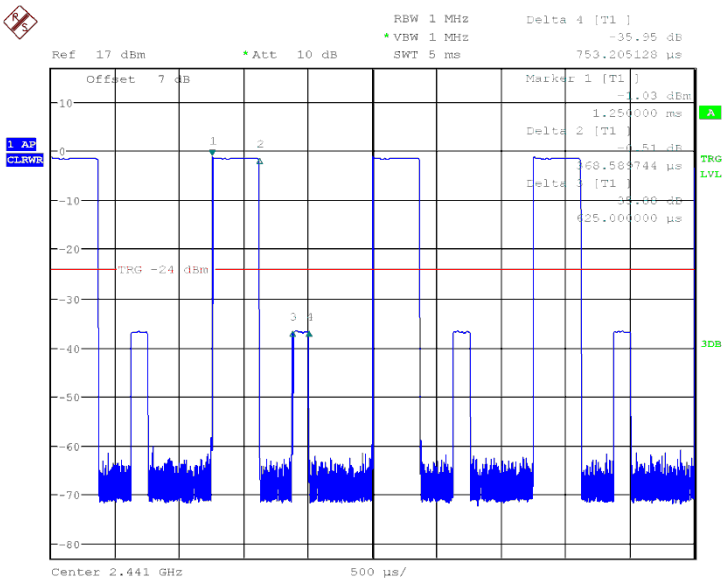


Fig.58 Time of occupancy (Dwell Time): Ch39, Packet DH1

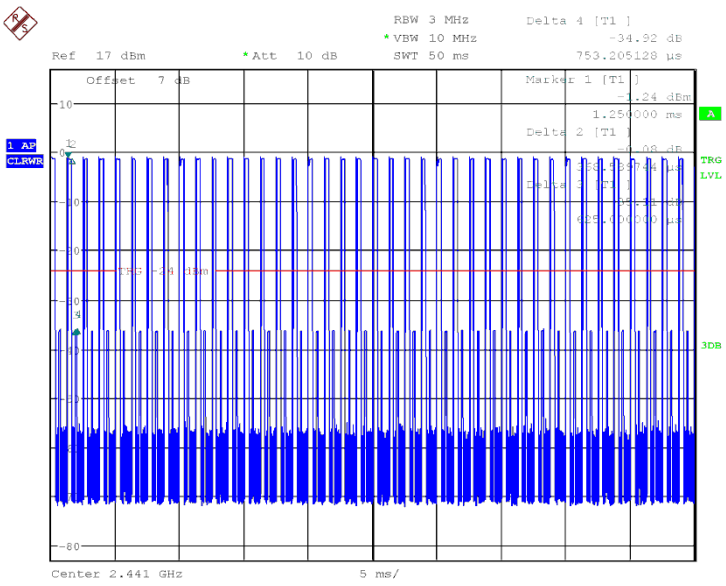


Fig.59 Number of Transmissions Measurement: Ch39, Packet DH1

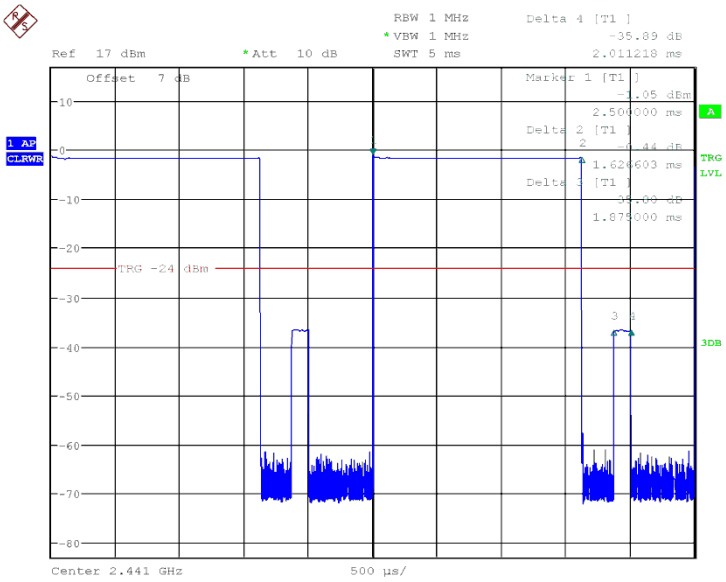


Fig.60 Time of occupancy (Dwell Time): Ch39, Packet DH3

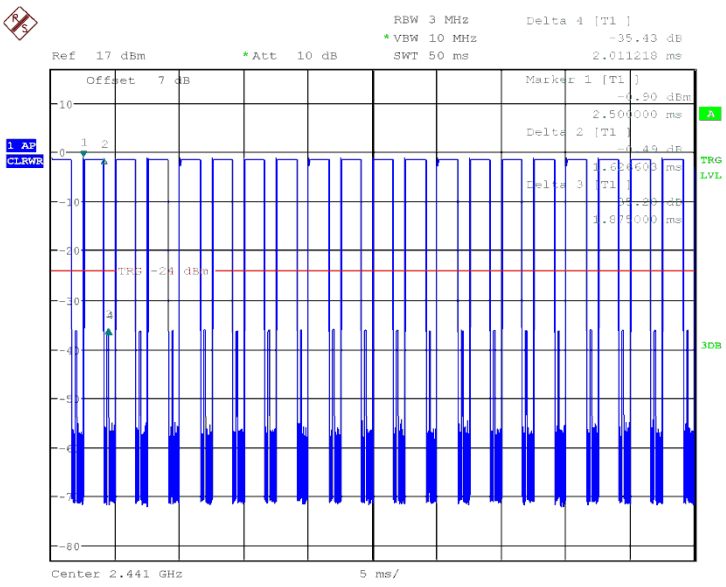


Fig.61 Number of Transmissions Measurement: Ch39, Packet DH3

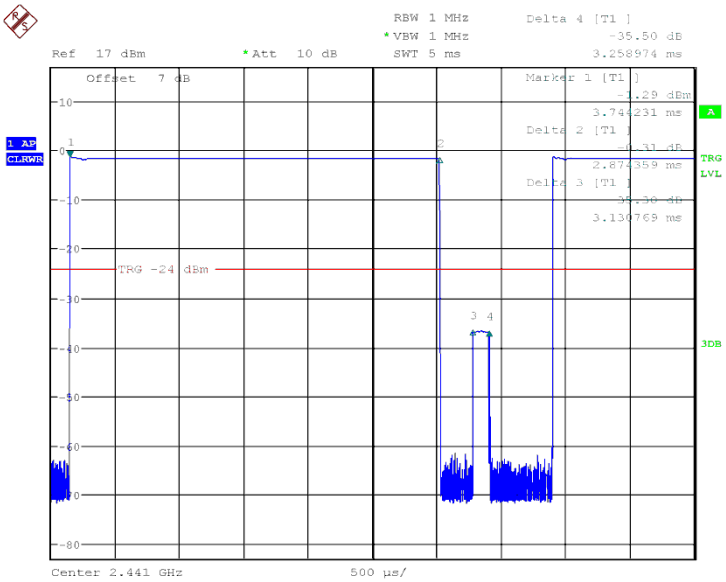


Fig.62 Time of occupancy (Dwell Time): Ch39,Packet DH5

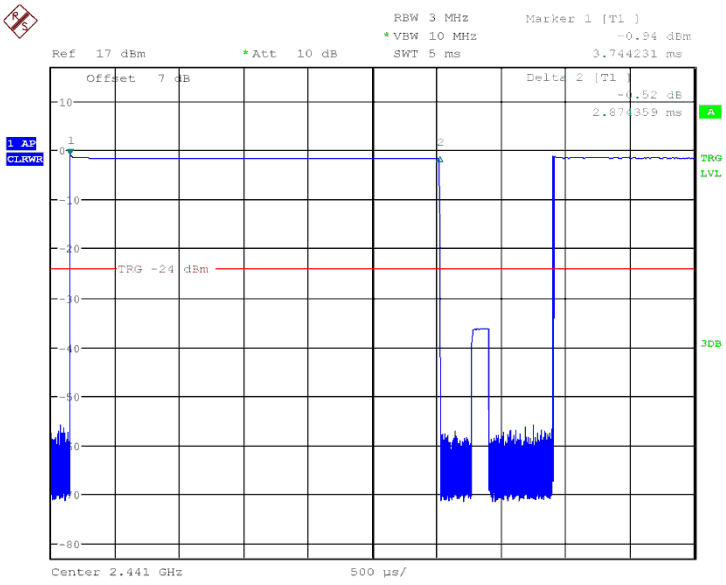


Fig.63 Number of Transmissions Measurement: Ch39, Packet DH5

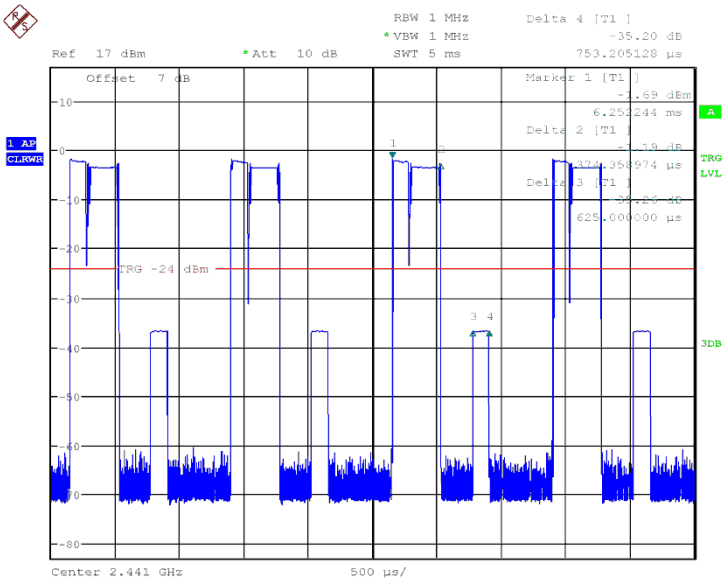


Fig.64 Time of occupancy (Dwell Time): Ch39,Packet 2-DH1

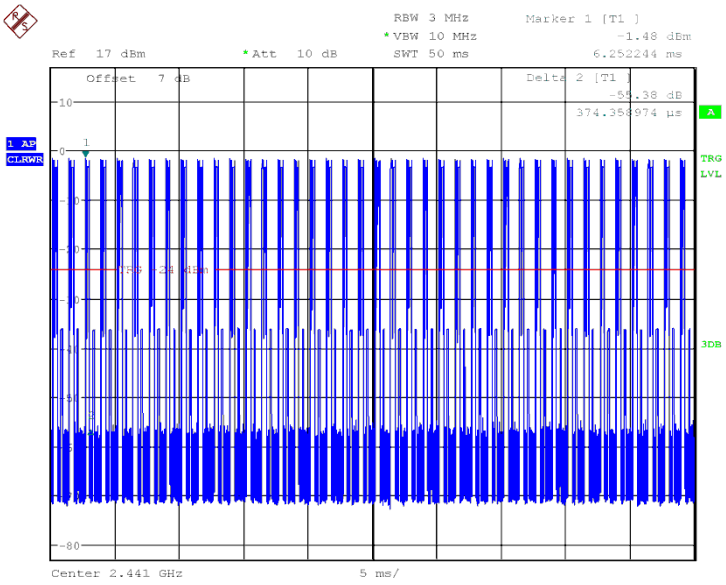


Fig.65 Number of Transmissions Measurement: Ch39, Packet 2-DH1

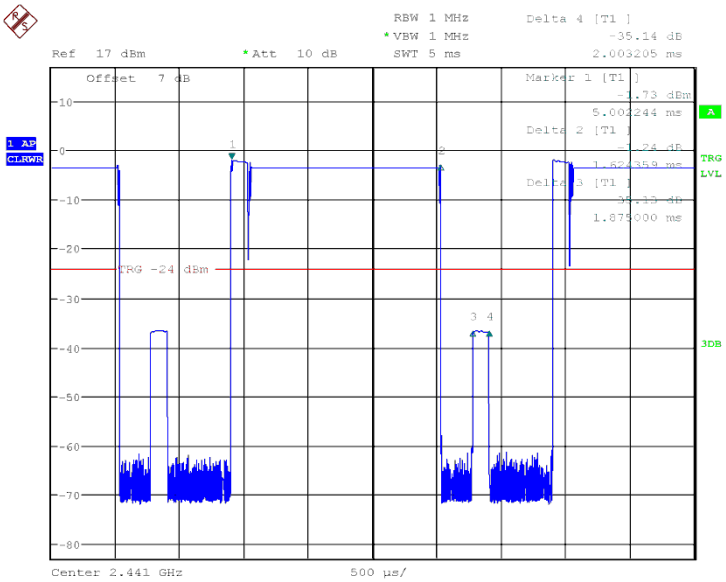


Fig.66 Time of occupancy (Dwell Time): Ch39,Packet 2-DH3

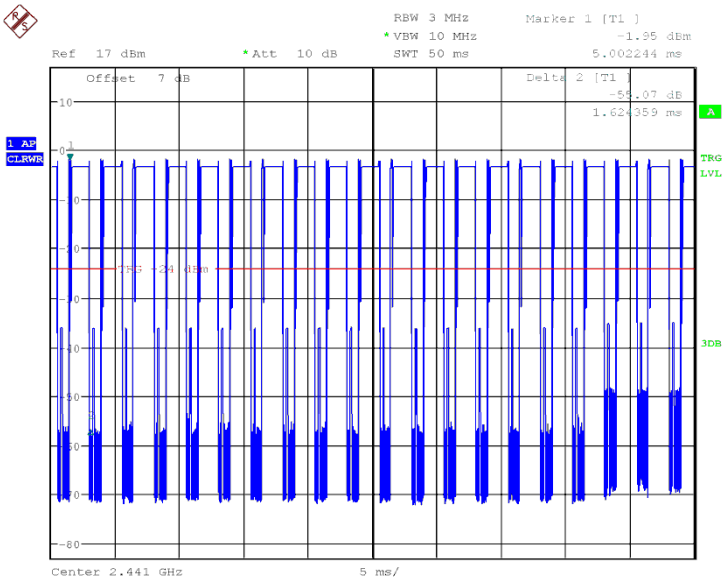


Fig.67 Number of Transmissions Measurement: Ch39, Packet 2-DH3

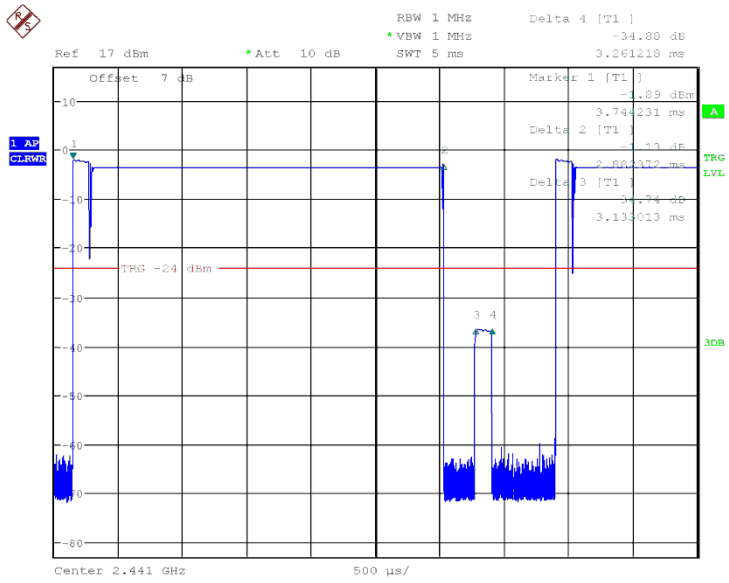


Fig.68 Time of occupancy (Dwell Time): Ch39,Packet 2-DH5

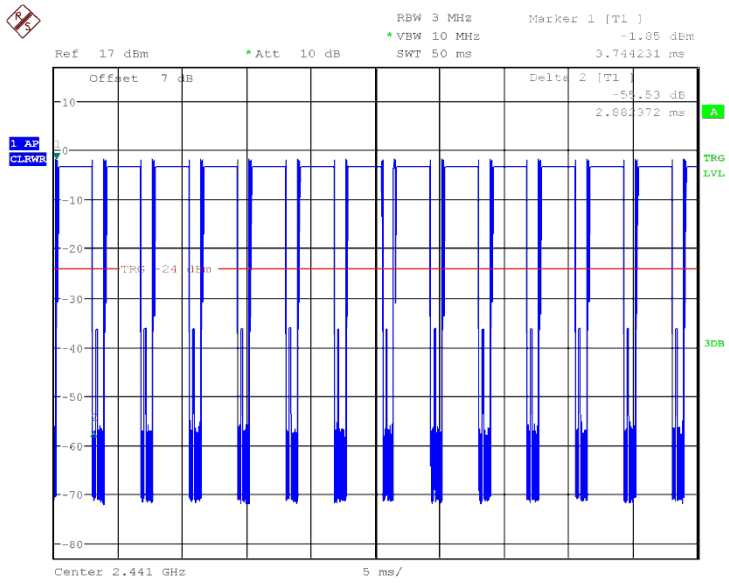


Fig.69 Number of Transmissions Measurement: Ch39, Packet 2-DH5

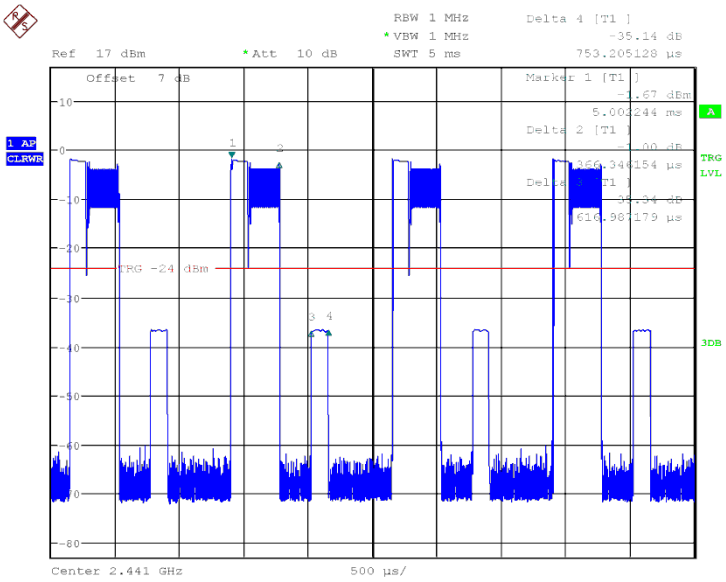


Fig.70 Time of occupancy (Dwell Time): Ch39,Packet 3-DH1

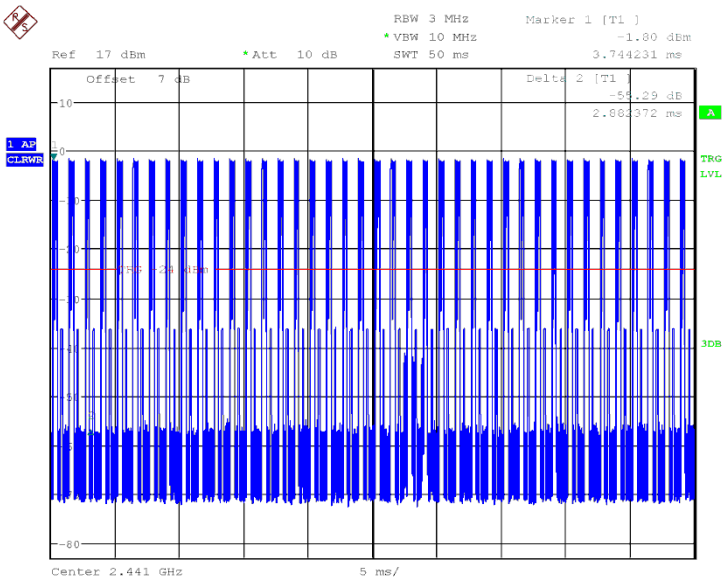


Fig.71 Number of Transmissions Measurement: Ch39, Packet 3-DH1

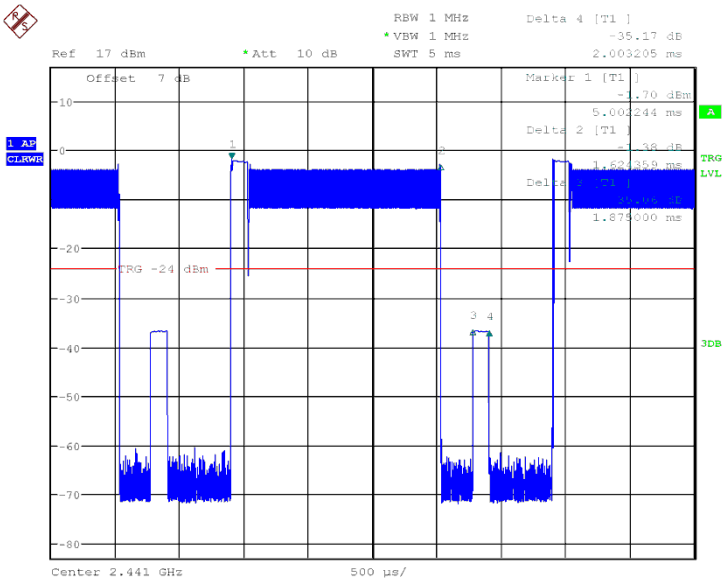


Fig.72 Time of occupancy (Dwell Time): Ch39,Packet 3-DH3

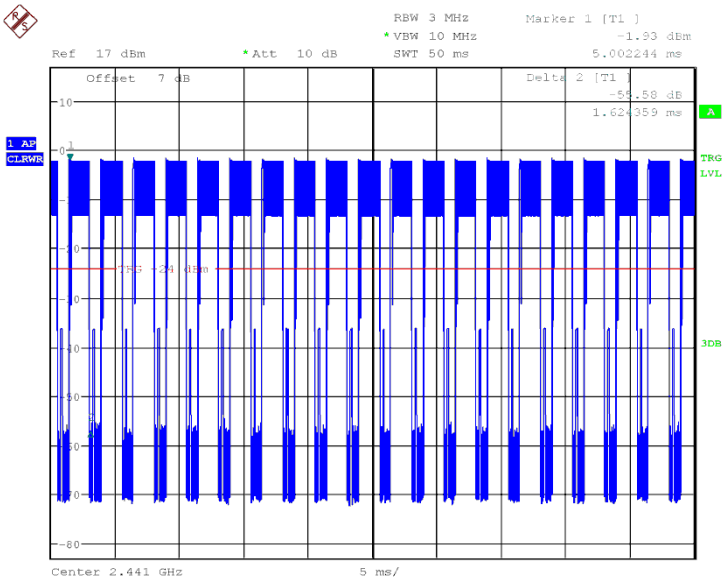


Fig.73 Number of Transmissions Measurement: Ch39, Packet 3-DH3

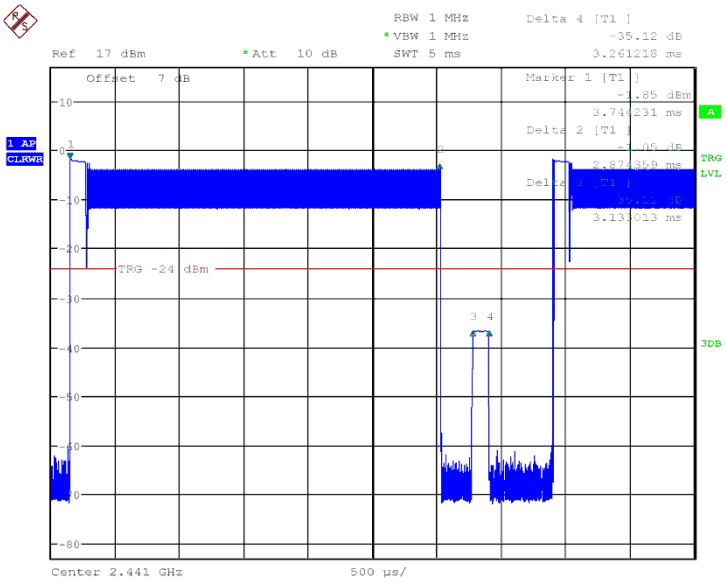


Fig.74 Time of occupancy (Dwell Time): Ch39,Packet 3-DH5

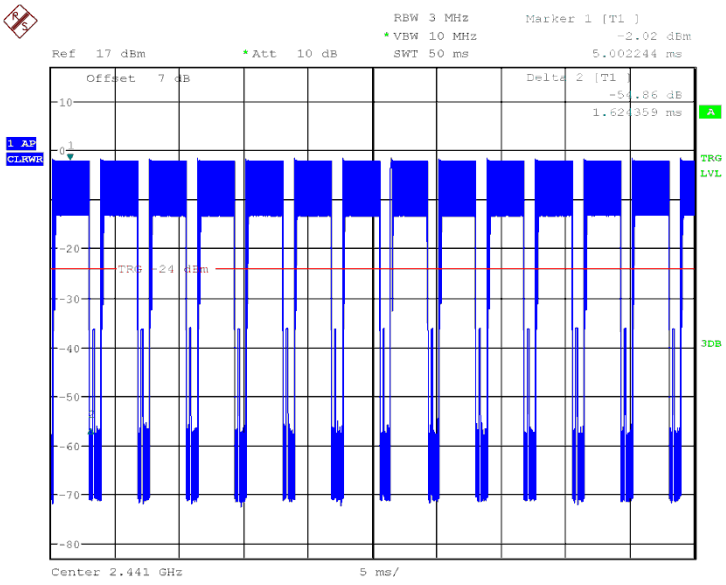


Fig.75 Number of Transmissions Measurement: Ch39, Packet 3-DH5

5.6. 20dB Bandwidth

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a) (1)	N/A

The measurement is according to Public notice DA 00-705 and ANSI C63.4.

Measurement Result:

For GFSK

Channel	20dB Bandwidth (KHz)		Conclusion
0	Fig.76	1034	P
39	Fig.77	1029	P
78	Fig.78	1034	P

For π/4 DQPSK

Channel	20dB Bandwidth (KHz)		Conclusion
0	Fig.79	1192	P
39	Fig.80	2091	P
78	Fig.81	1192	P

For 8DPSK

Channel	20dB Bandwidth (KHz)		Conclusion
0	Fig.82	1183	P
39	Fig.83	1423	P
78	Fig.84	1192	P

Conclusion: PASS

Test graphs as below:

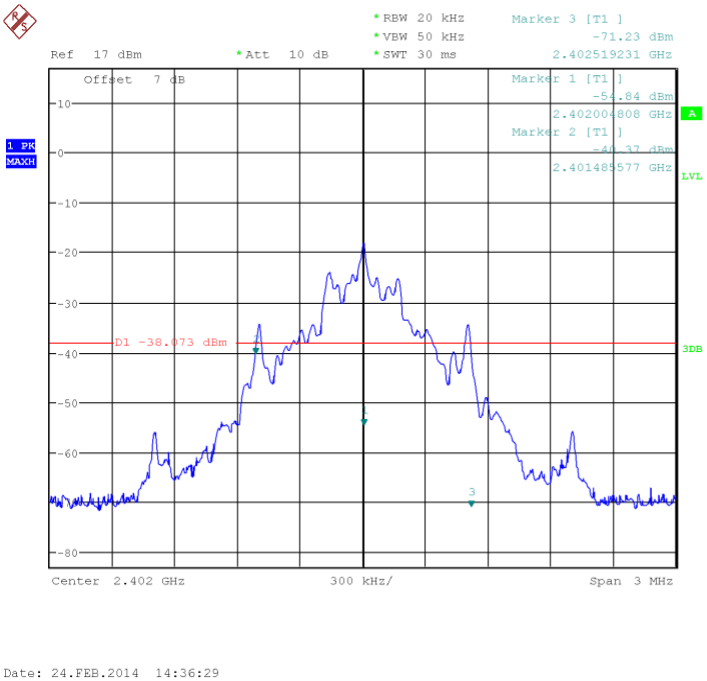


Fig.76 20dB Bandwidth: GFSK, Ch0

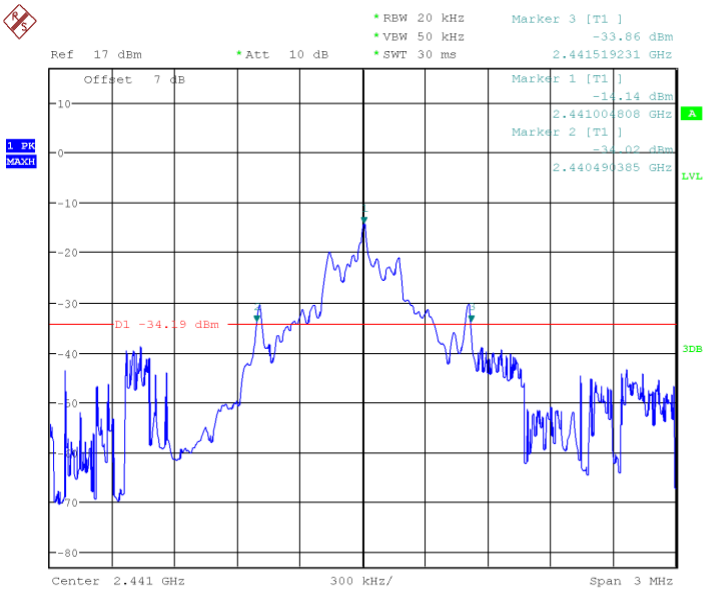


Fig.77 20dB Bandwidth: GFSK, Ch39

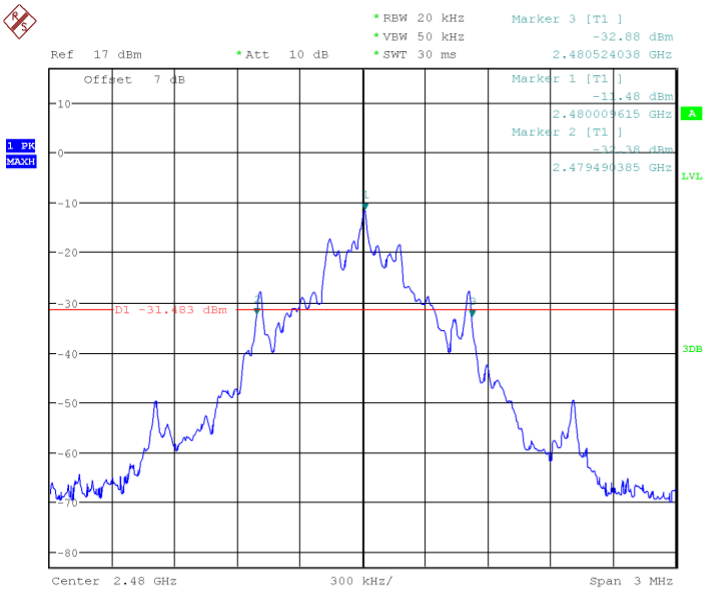


Fig.78 20dB Bandwidth: GFSK, Ch78

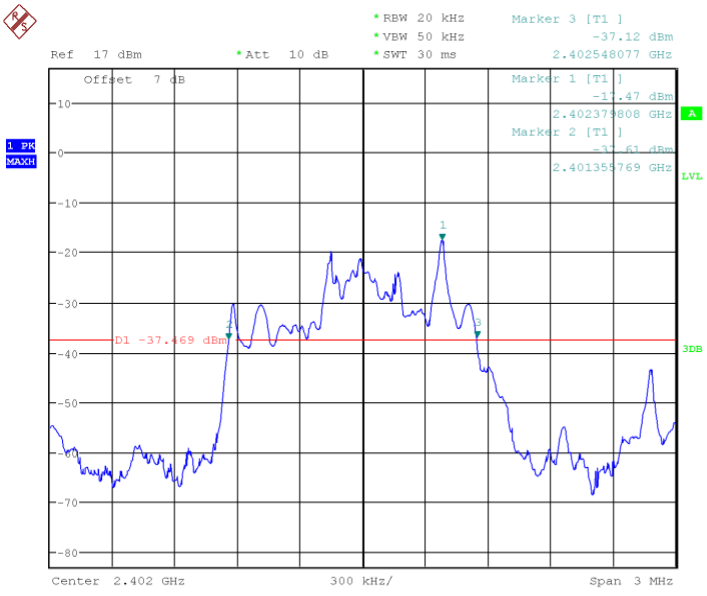


Fig.79 20dB Bandwidth: π/4 DQPSK, Ch0

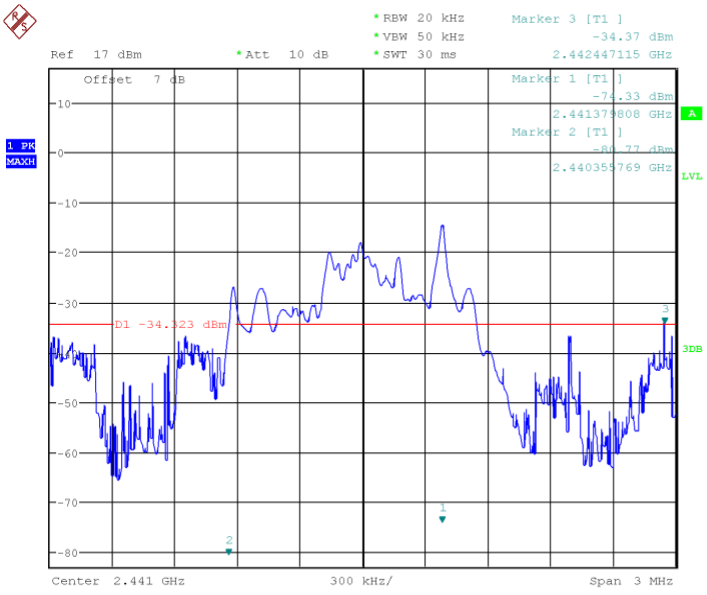


Fig.80 20dB Bandwidth: π/4 DQPSK, Ch39

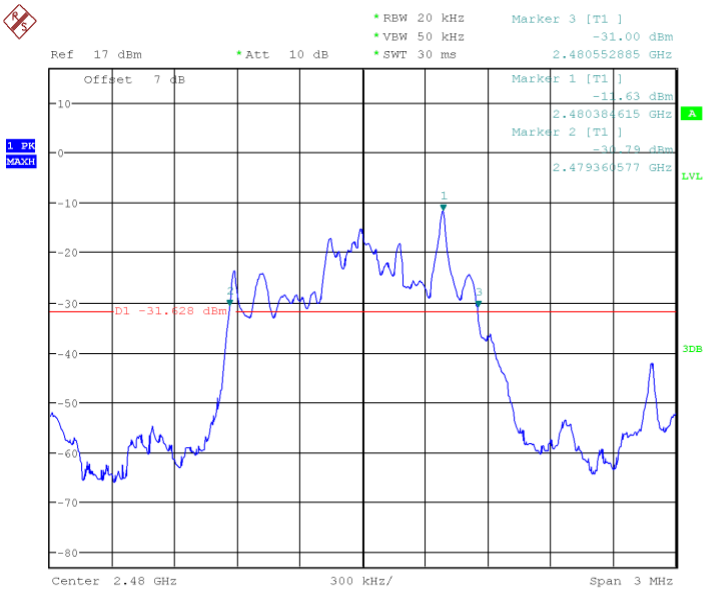


Fig.81 20dB Bandwidth: π/4 DQPSK, Ch78

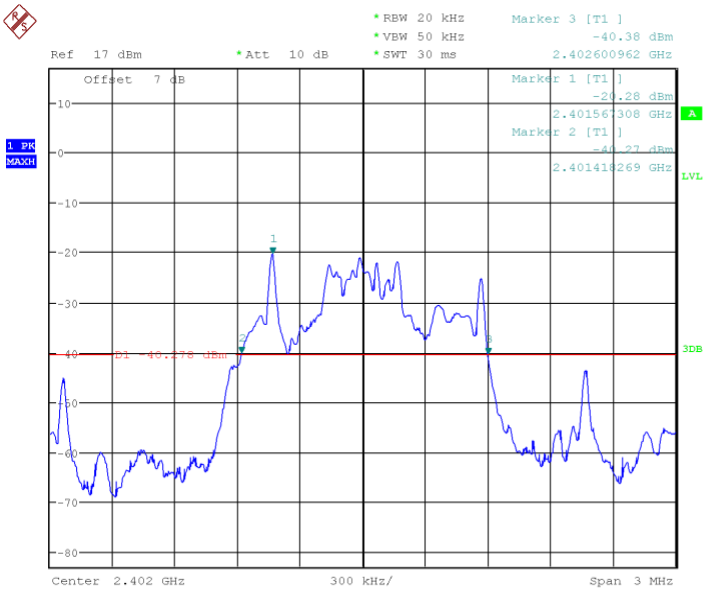


Fig.82 20dB Bandwidth: 8DPSK, Ch0

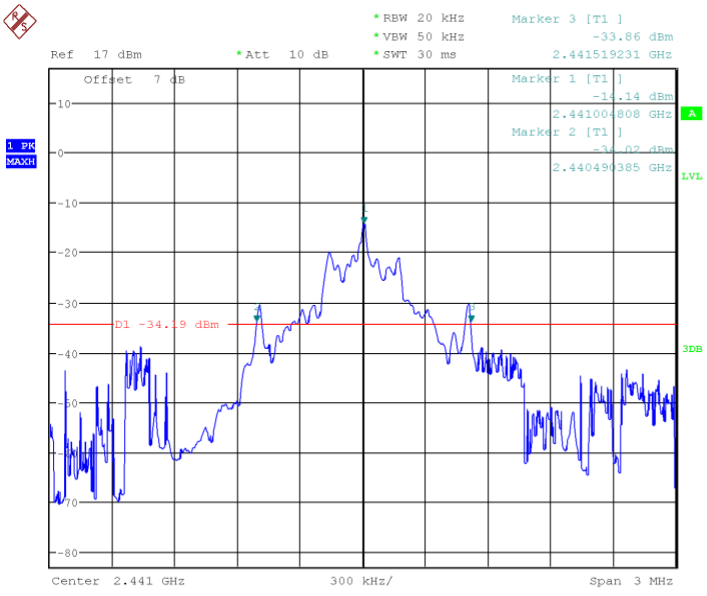


Fig.83 20dB Bandwidth: 8DPSK, Ch39

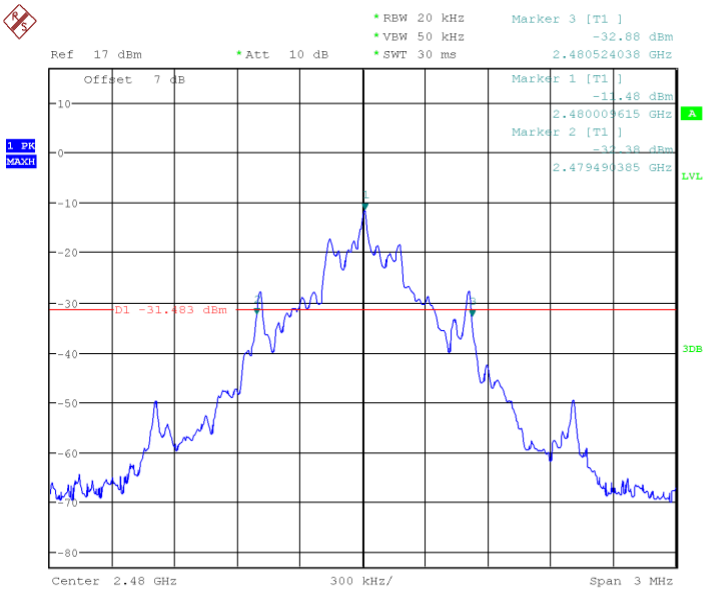


Fig.84 20dB Bandwidth: 8DPSK, Ch78

5.7. Carrier Frequency Separation

Measurement Limit:

Standard	Limit (KHz)
FCC 47 CFR Part 15.247 (a) (1)	Over 25KHz or (2/3)*20dB bandwidth

The measurement is according to Public notice DA 00-705 and ANSI C63.4.

Measurement Result:

For GFSK

Channel	Carrier separation (KHz)		Conclusion
39	Fig.85	971.1538	P

For π/4 DQPSK

Channel	Carrier separation (KHz)		Conclusion
39	Fig.86	980.7692	P

For 8DPSK

Channel	Carrier separation (KHz)		Conclusion
39	Fig.87	1000	P

Conclusion: PASS

Test graphs as below:

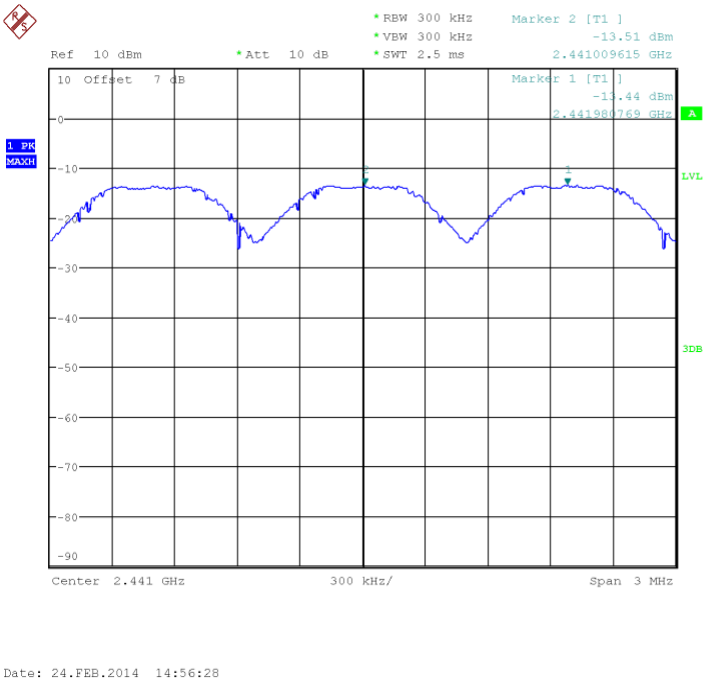


Fig.85 Carrier separation measurement: GFSK, Ch39

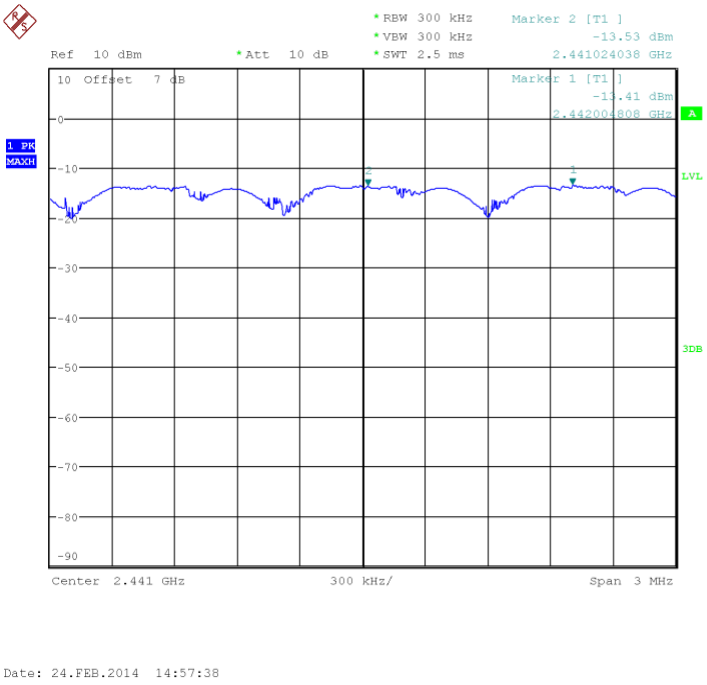


Fig.86 Carrier separation measurement: π/4 DQPSK, Ch39

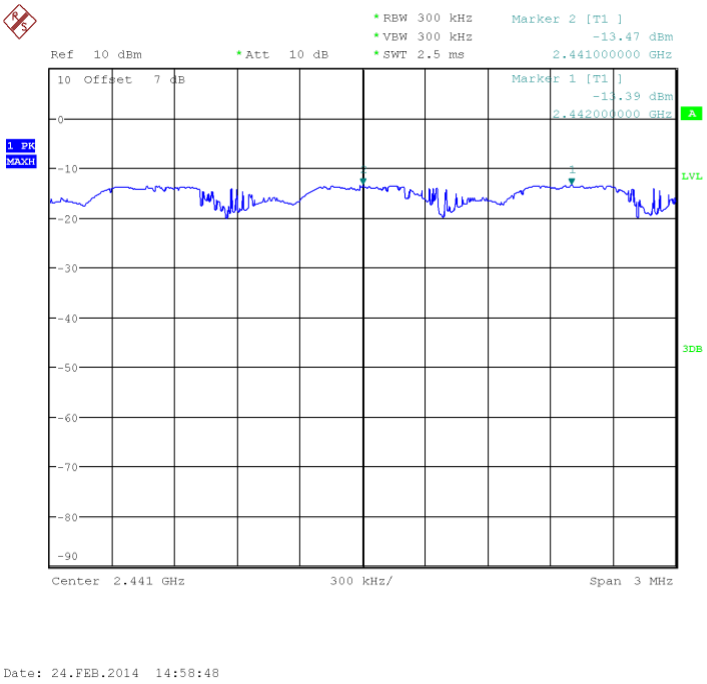


Fig.87 Carrier separation measurement: 8DPSK, Ch39

5.8. Number Of Hopping Channels

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a)(1)(iii)	At least 15 non-overlapping channels

The measurement is according to Public notice DA 00-705 and ANSI C63.4.

Measurement Result:

For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.88	79	P
40~78	Fig.89		P

For π/4 DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.90	79	P
40~78	Fig.91		P

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.92	79	P
40~78	Fig.93		P

Conclusion: PASS

Test graphs as below:

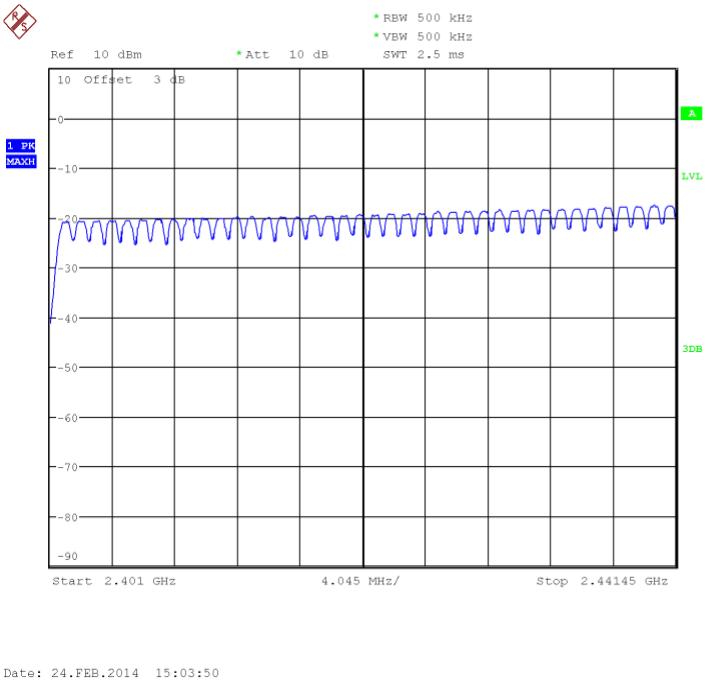


Fig.88 Number of hopping frequency: GFSK, Ch0~39

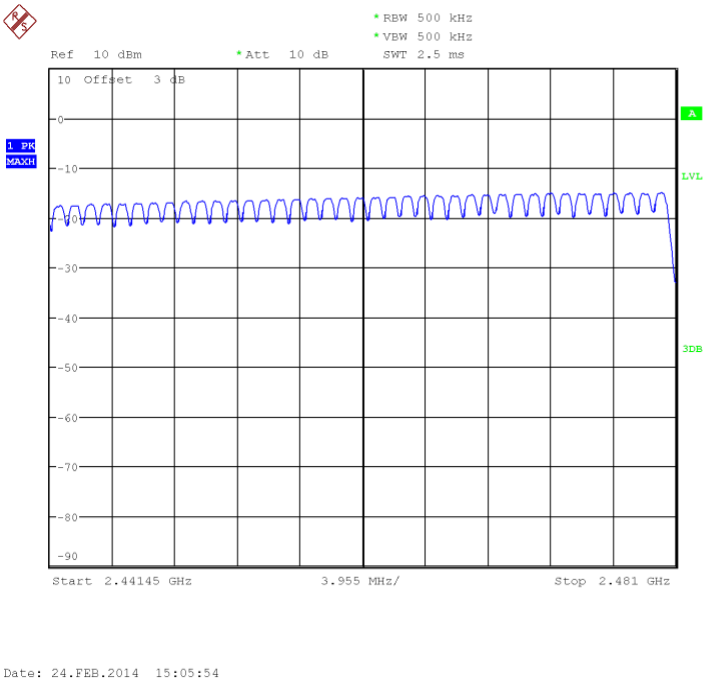


Fig.89 Number of hopping frequency: GFSK, Ch40~78

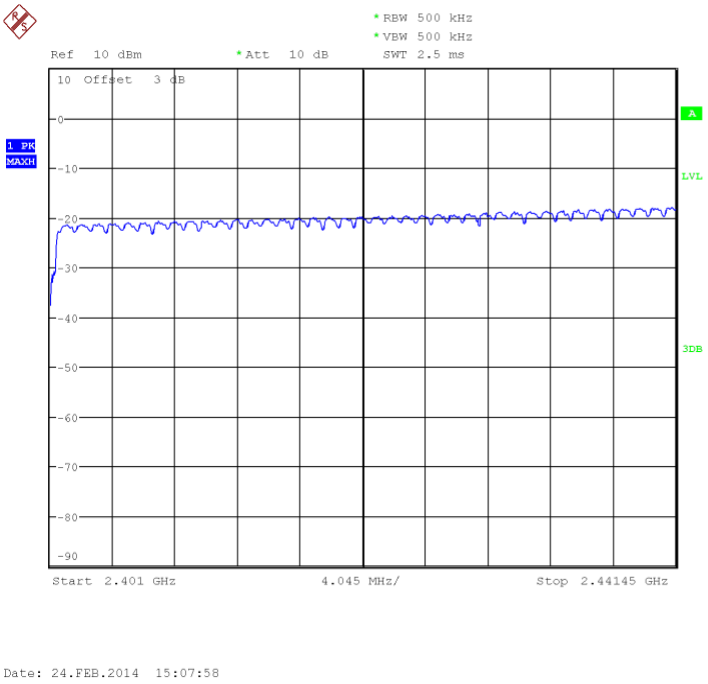


Fig.90 Number of hopping frequency: π/4 DQPSK, Ch0~39

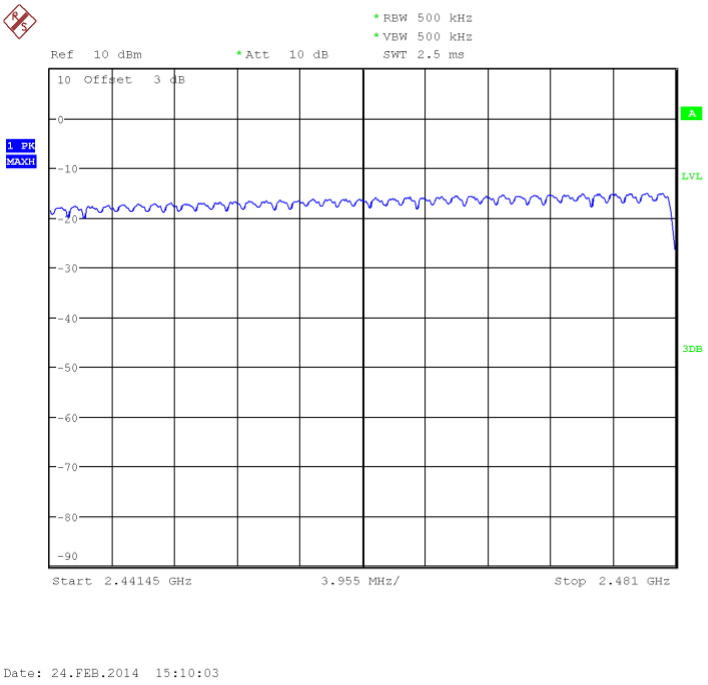


Fig.91 Number of hopping frequency: π/4 DQPSK, Ch40~78

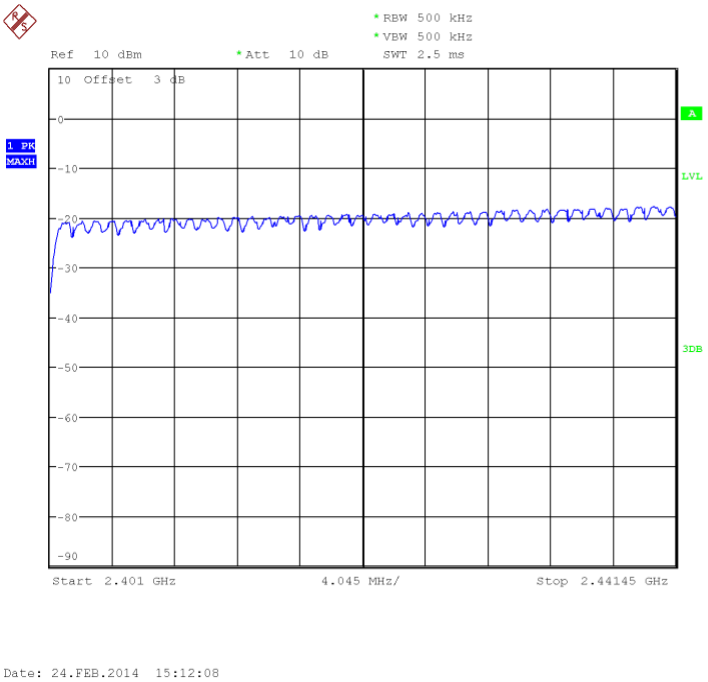


Fig.92 Number of hopping frequency: 8DPSK, Ch0~39

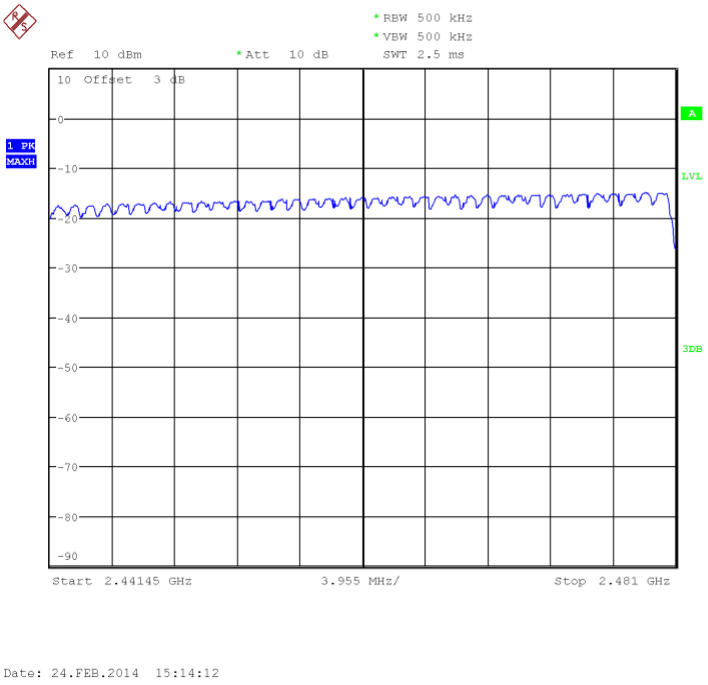


Fig.93 Number of hopping frequency: 8DPSK, Ch40~78

5.9. AC Powerline Conducted Emission

Test Condition

Voltage (V)	Frequency (Hz)
120V	60

Measurement Result and Limit:

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBuV)	Result (dBuV)	Conclusion
0.15 to 0.5	66 to 56	With Charger	
0.5 to 5	56	Fig.94	P
5 to 30	60		
NOTE: The limit decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.			

Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dBuV)	Result (dBuV)	Conclusion
0.15 to 0.5	66 to 56	With Charger	
0.5 to 5	56	Fig.94	P

5 to 30	60		
NOTE: The limit decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.			

The measurement is according to Public notice DA 00-705 and ANSI C63.4.

Conclusion: PASS

Test graphs as below:

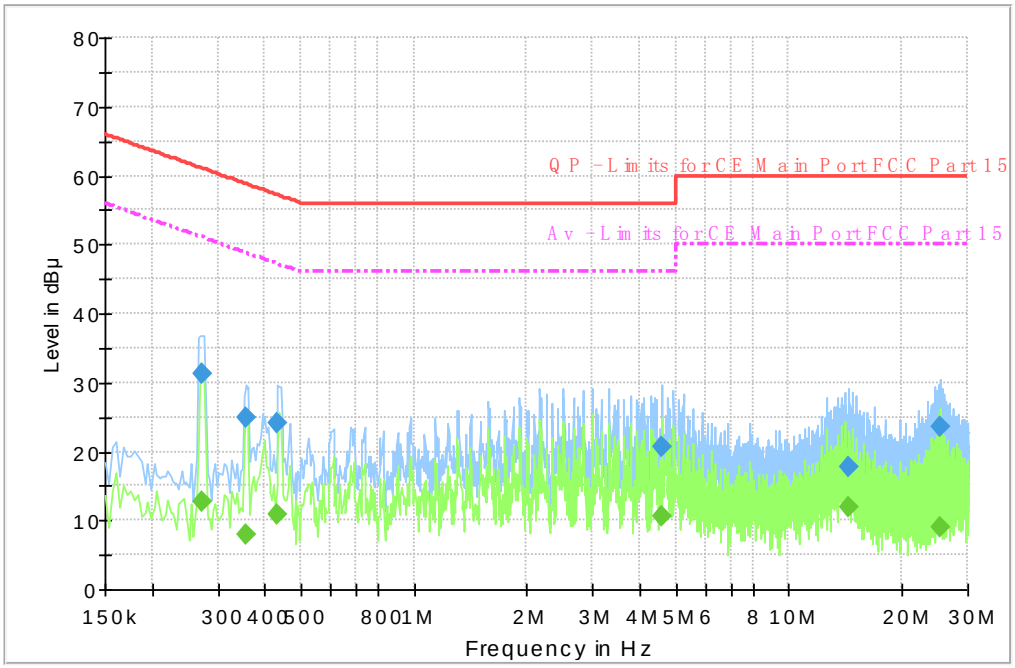


Fig.94 AC powerline Conducted Emission

Final Result1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit(dBuV)
0.273131	31.2	1000.0	9.000	On	L1	10.0	29.9	61.0
0.355219	24.8	1000.0	9.000	On	N	10.0	34.1	58.8
0.433575	24.0	1000.0	9.000	On	L1	10.1	33.2	57.2
4.597650	20.6	1000.0	9.000	On	L1	9.8	35.4	56.0
14.448150	17.8	1000.0	9.000	On	L1	9.9	42.2	60.0
25.276238	23.5	1000.0	9.000	On	N	10.0	36.5	60.0

Final Result2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit(dBuV)
0.273131	12.8	1000.0	9.000	On	L1	10.0	38.2	51.0
0.355219	8.0	1000.0	9.000	On	N	10.0	40.8	48.8
0.433575	10.8	1000.0	9.000	On	L1	10.1	36.4	47.2
4.597650	10.7	1000.0	9.000	On	L1	9.8	35.3	46.0
14.448150	12.0	1000.0	9.000	On	L1	9.9	38.0	50.0
25.276238	9.0	1000.0	9.000	On	N	10.0	41.0	50.0

6. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSQ26	101096	Rohde&Schwarz	2014-08-30
2	DC Power Supply	ZUP60-14	LOC-220Z006	TDL-Lambda	2014-08-30
3	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2014-08-30
4	AC Adapter	C-P15	207-890100001	lenovo	--

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Universal Radio Communication Tester	CMU200	123102	R&S	2014-08-30
2	Test Receiver	ESCI	101235	R&S	2014-08-30
3	Test Receiver	ESU40	100307	R&S	2014-10-29
4	Trilog Antenna	VULB9163	19-162515	Schwarzbeck	2014-11-11
5	Double Ridged Guide Antenna	ETS-3117	135885	ETS	2014-04-28

6	2-Line V-Network	ENV216	101380	R&S	2014-10-30
7	Single Phase Harmonic & Flicker	DPA500N	V1126109988	EM Test	2014-10-28
8	Multifunction AC/DC Power Source	Netwave7	V1126109989	EM Test	2014-10-28
9	Ultra Compact Simulator	UCS 500N7	V1126109983	EM Test	2014-07-22
10	Motorized Variac	MV 2616	V1126109987	EM Test	2014-07-22
11	Telecom Surge Module	TSurge7	V0902104582	EM Test	2014-07-22
12	Audio Analyzer	UPV	101950	R&S	2014-08-30
13	Power Meter	NRP2	101804	R&S	2014-08-30
14	Signal Generator	SMB 100A	105563	R&S	2014-08-30
15	ESD Test Simulator	Dito	V1126109982	EM Test	2014-10-31

Anechoic chamber

Fully anechoic chamber by Frankonia German.

7. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Fully-anechoic chamber2 (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to 40000MHz

ANNEX A Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

************END OF REPORT************