FCC & IC TEST REPORT for Intentional Radiator

No. 170401455SHA-001

Applicant	:	Fender Musical Instruments 17600 N. Perimeter Drive Suite 100, Scottsdale, Arizona, 85255, United States
Manufacturing site	:	Hzsamko Technologies Co., Ltd. No.8, Jiaqi Road, Xianlin Street, Yuhang District, Hangzhou, China.
Product Name	:	Power Amplifier
Type/Model	:	Fighter 10, Fighter 12

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2016): Radio Frequency Devices

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 2 (Feb. 2017): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 4 (Nov. 2014): General Requirements for compliance of radio apparatus

Date of issue: June 16, 2017

Prepared by: Reviewed by:

Nemo Li (*Project Engineer*) Daniel Zhao (*Reviewer*)

Description of Test Facility

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IC Assigned Code: 2042B-1

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Content

1. General Information

1.1 Applicant Information

Applicant	:	Fender Musical Instruments 17600 N. Perimeter Drive Suite 100, Scottsdale, Arizona, 85255, United States
Name of contact	:	Larry Clauss
Tel	:	1-480-845--5203
Fax	:	/
Email	:	lclauss@fender.com
Sample received date	:	May 4, 2017
Date of test	:	May 1 – 29, 2017

1.2 Identification of the EUT

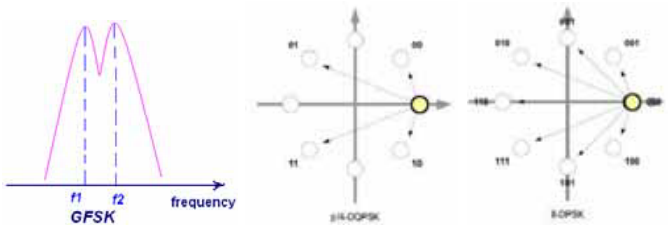
Equipment:	Power Amplifier
Type/model:	Fighter 10, Fighter 12
FCC ID:	XQW-FEN1714
IC:	8690A-FEN1714

1.3 Technical specification

Operation Frequency Band: 2402 - 2480 MHz

Modulation: GFSK, π /4 DQPSK, 8DPSK

Technology:



GFSK is different from π /4DQPSK and 8DPSK. 8DPSK is similar with π /4DQPSK but more complex, and with a bigger data rate. So all tests except dwell time and number of hopping frequencies were performed with GFSK modulation and 8DPSK modulation for representative.

Antenna Designation: PCB antenna, un-detachable

Gain of Antenna: 0dBi

Rating: 100-120V~, 50/60Hz, 350W, Class I

Description of EUT: EUT is a Power Amplifier, it has two models, they have the same electrical construction except the model of Fighter 12 has bigger loudspeaker. After pre-test, all the tests were performed on the models of Fighter 12 as representative and the data was listed in the report.

Channel Description: There are 79 channels in all. The designed channel spacing is 1MHz.

Channel Identifier	Frequency (MHz)
low	2402
middle	2441
high	2480

1.4 Mode of operation during the test / Test peripherals used

While testing the transmitter mode of the EUT, the internal modulation is applied.
All the functions of the host device except the BT module were set on stand-by mode.

2. Test Specification

2.1 Standards or specification

47CFR Part 15 (2016)
ANSI C63.10 (2013)
RSS-247 Issue 2 (Feb. 2017)
RSS-Gen Issue 4 (Nov. 2014)

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

The lowest, middle and highest channel were tested as representatives.

Freq. Band (MHz)	Modulation	Lowest (MHz)	Middle (MHz)	Highest (MHz)
2400-2483.5	GFSK	2402	2441	2480
2400-2483.5	8DPSK	2402	2441	2480

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	HP, EliteBook 2530P	-

2.5 Instrument list

Equipment	Type	Manu.	Internal no.	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2017-10-19
Test Receiver	ESIB 26	R&S	EC 3045	2017-10-19
Voltage Probe	ESH2-Z3	R&S	EC 3405	2018-03-09
Voltage Probe	TK9420	Schwarzbeck	EC 4888	2017-09-17
A.M.N.	ESH2-Z5	R&S	EC 3119	2017-12-01
A.M.N.	ENV 216	R&S	EC 3393	2017-07-27
Absorbing clamp	MDS 21	R&S	EC 2108	2018-04-12
Tri-loop	HXYZ 9170	Schwarzbeck	EC 3384	2017-06-02
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2017-06-01
Horn antenna	HF 906	R&S	EC 3049	2017-09-23
Horn antenna	3117	ETS	EC 4792-1	2017-08-24
Horn antenna	HAP18-26W	TOYO	EC 4792-3	2017-06-11
Pre-amplifier	Pre-amp 18	R&S	EC 5262	2017-06-29
Semi-anechoic chamber	-	Albatross project	EC 3048	2017-09-09
Fully-anechoic chamber	-	Albatross project	EC 3047	2017-09-09
Shielded room	-	Zhongyu	EC 2838	2018-01-08
Shielded room	-	Zhongyu	EC 2839	2018-01-08
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2018-01-09
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2018-01-09
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2018-01-09
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2018-01-09

2.6 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
20 dB Bandwidth	15.247(a)(1)	RSS-247 Issue 2 Clause 5	Tested
Carrier Frequency Separation	15.247(a)(1)	RSS-247 Issue 2 Clause 5	Pass
Maximum peak output power	15.247(b)(1)	RSS-247 Issue 2 Clause 5	Pass
Radiated Spurious Emissions	15.205 & 15.209	RSS-247 Issue 2 Clause 5	Pass
Conducted Spurious Emissions & Band Edge	15.247(d)	RSS-247 Issue 2 Clause 5	Pass
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	Pass
Number of Hopping Frequencies	15.247(a)(1)(iii)	RSS-247 Issue 2 Clause 5	Pass
Dwell time	15.247(a)(1)(iii)	RSS-247 Issue 2 Clause 5	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested
Antenna requirement	15.203	-	Pass

Notes: 1: NA =Not Applicable

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2.7 Measurement uncertainty

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

TEST ITEM	MEASUREMENT UNCERTAINTY
Maximum peak output power	± 0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	± 4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	± 5.02dB
Power line conducted emission	± 3.19dB

3. 20 dB Bandwidth

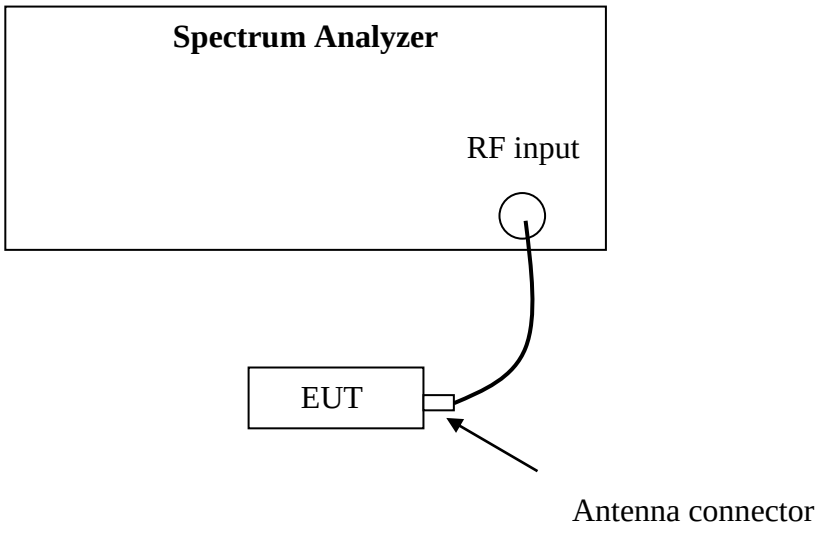
Test result: Tested

3.1 Limit

☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

3.2 Test Configuration



3.3 Test Procedure and test setup

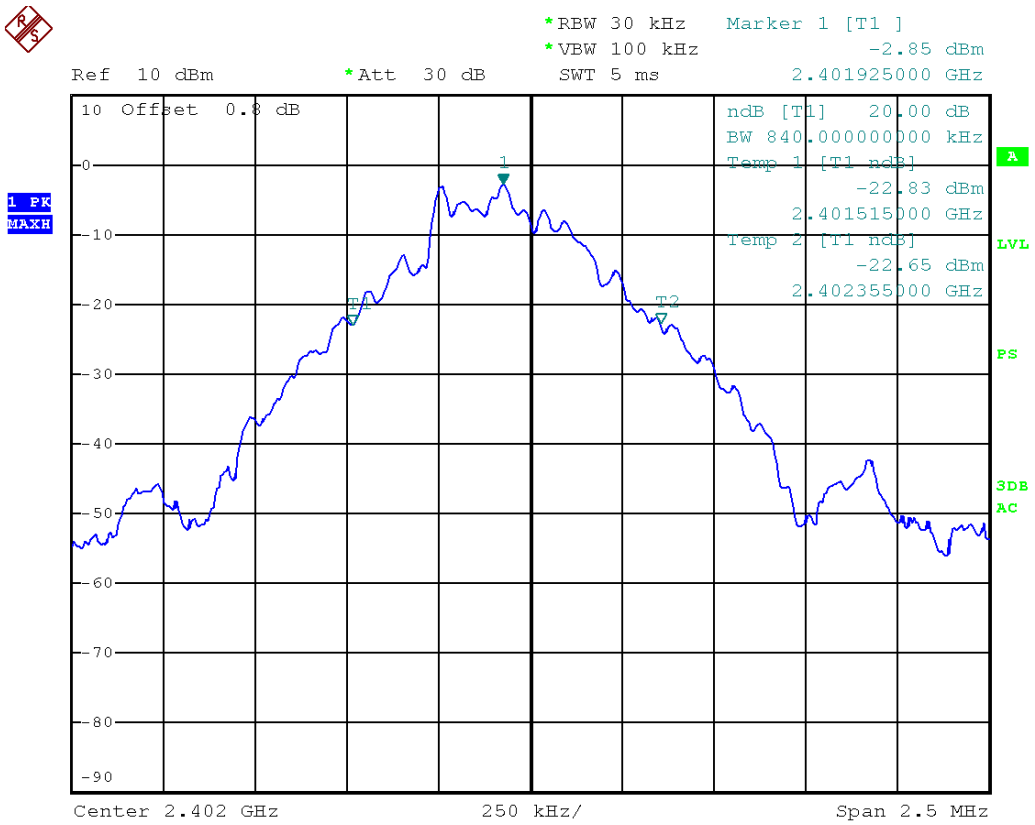
The 20 bandwidth per FCC § 15.247(a)(1) is measured using the Spectrum Analyzer with Span = 2 to 3 times the 20 dB bandwidth, RBW≥1% of the 20 dB bandwidth, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

3.4 Test Protocol

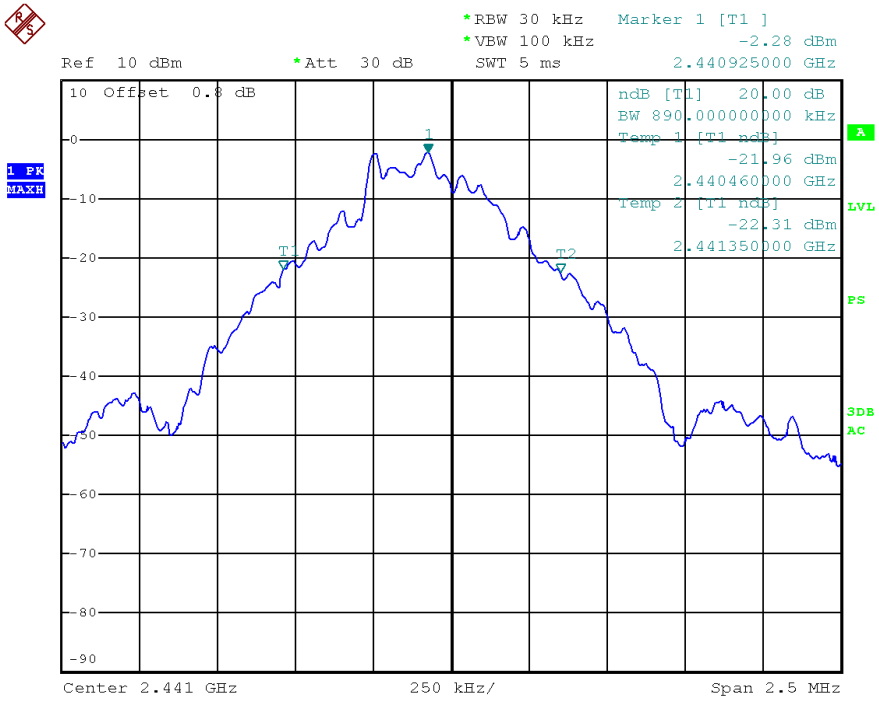
Temperature : 22°C
Relative Humidity : 45 %

Modulation	CH	Bandwidth (kHz)	Two-thirds of Bandwidth (kHz)
GFSK	L	840.00	560.00
	M	890.00	593.33
	H	890.00	593.33

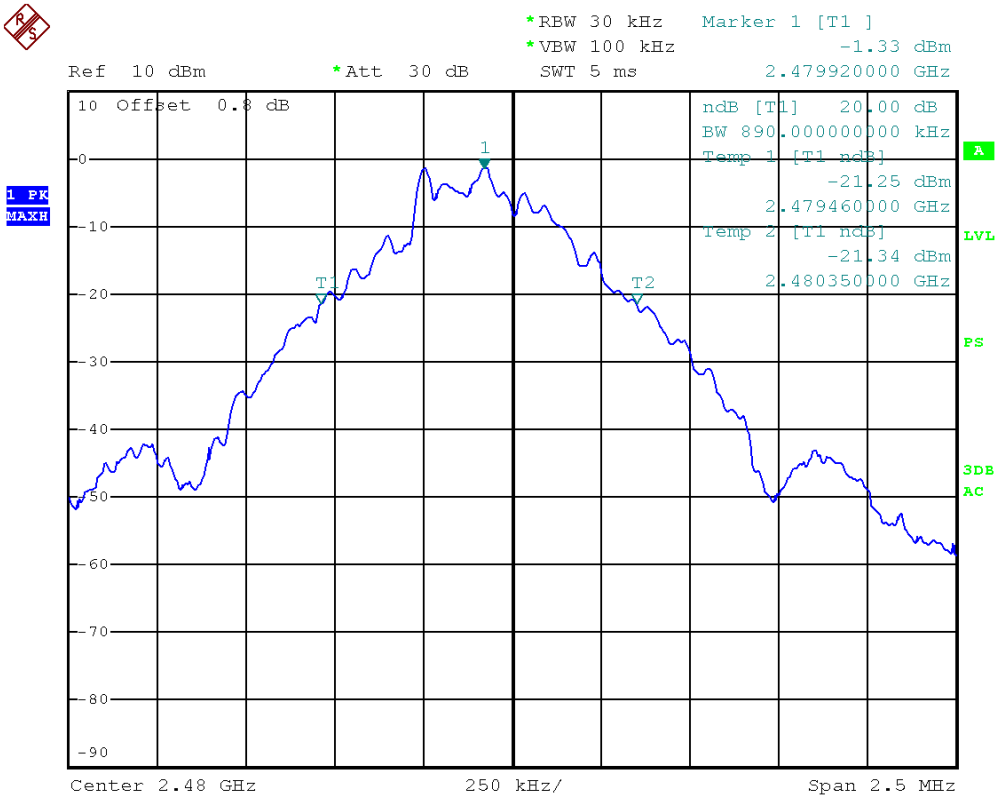
Channel L



Channel M

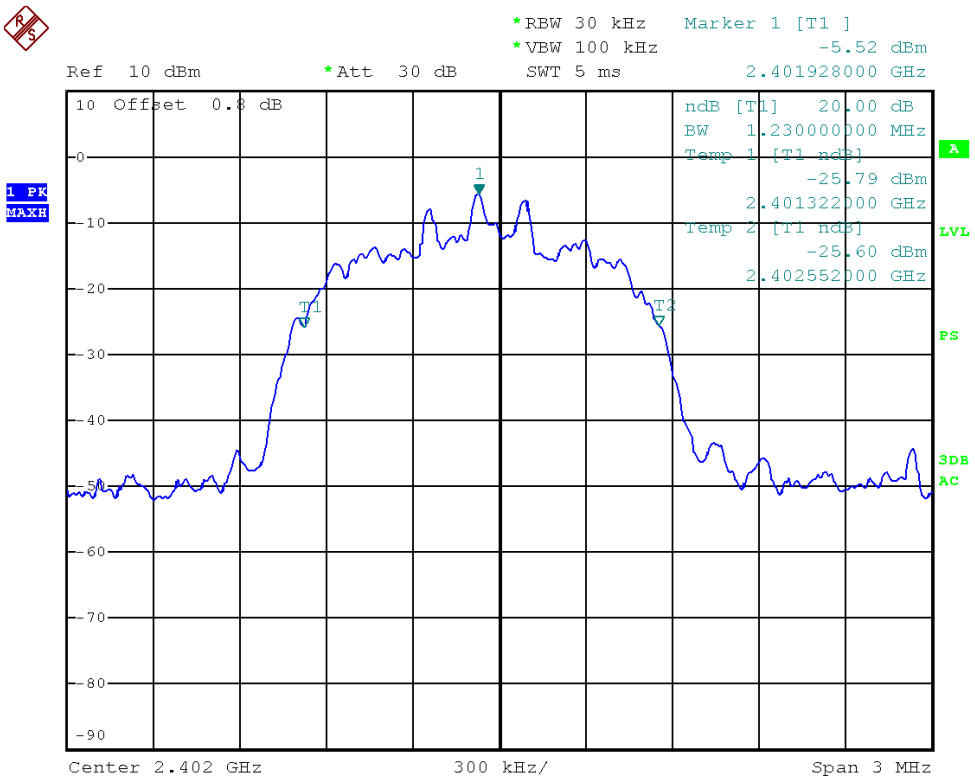


Channel H

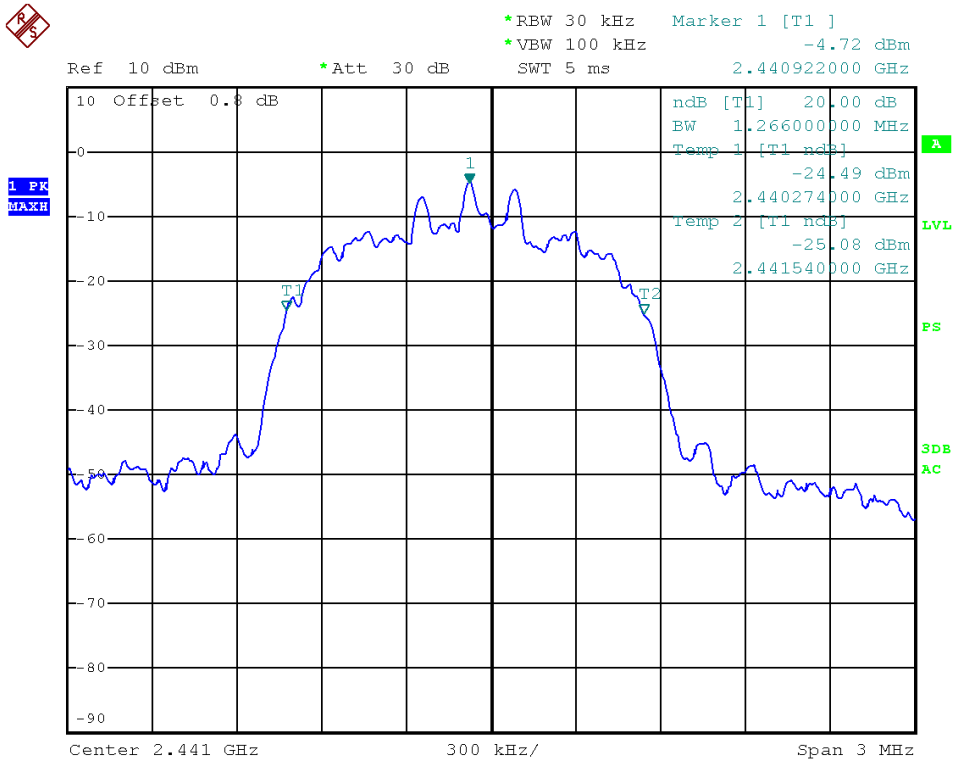


Modulation	CH	Bandwidth (kHz)	Two-thirds of Bandwidth (kHz)
8DPSK	L	1230.00	820.00
	M	1266.00	844.00
	H	1260.00	840.00

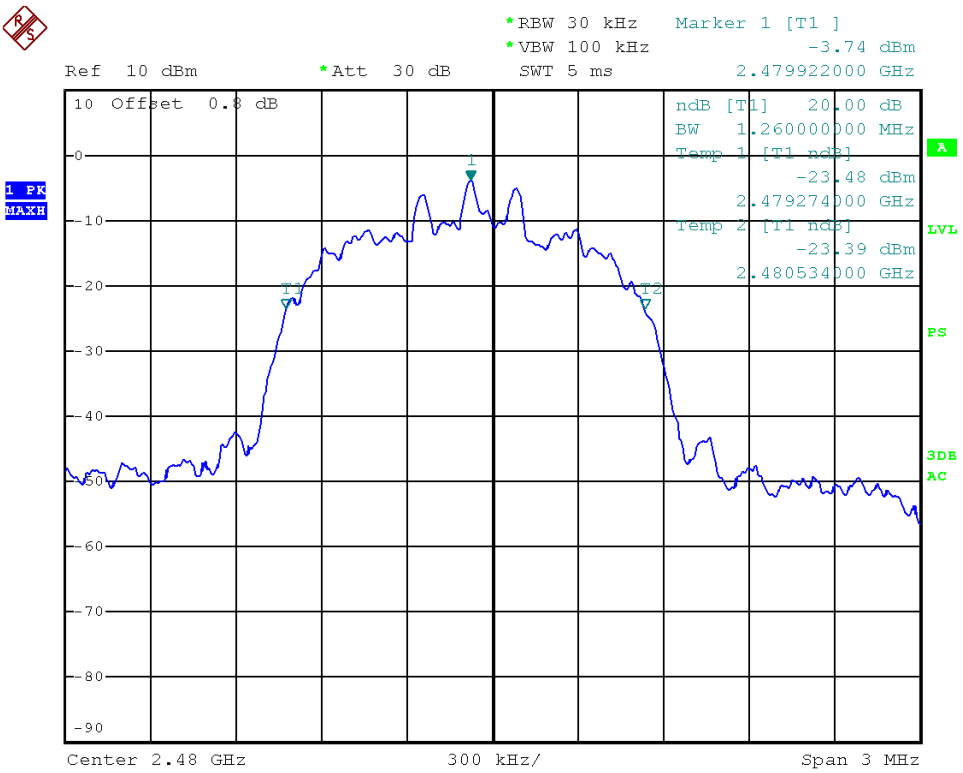
Channel L



Channel M



Channel H



4. Carrier Frequency Separation

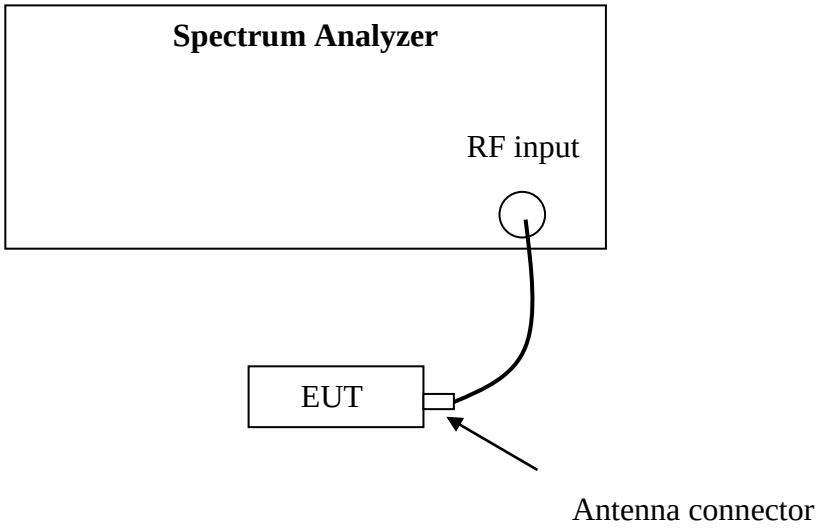
Test result: Pass

4.1 Limit

☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

4.2 Test Configuration



4.3 Test Procedure and test setup

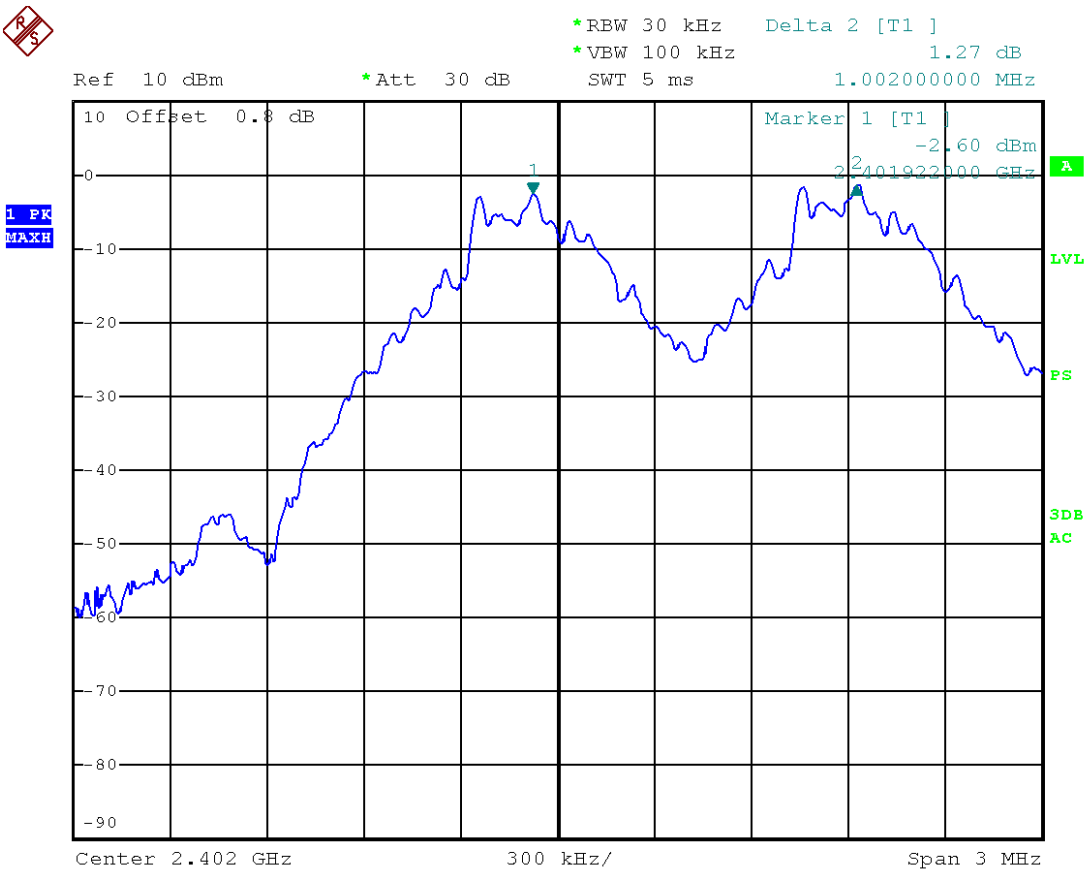
The Carrier Frequency Separation per FCC § 15.247(a)(1) is measured using the Spectrum Analyzer with Span can capture two adjacent channels, RBW≥1% of the span, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

4.4 Test Protocol

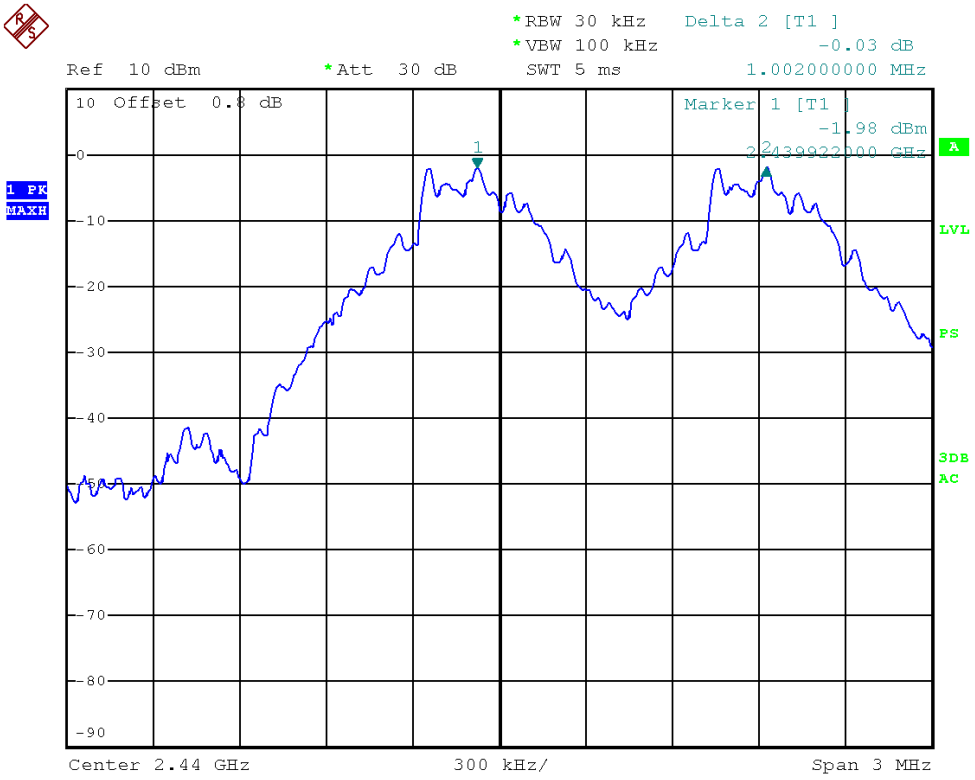
Temperature : 22°C
Relative Humidity : 45 %

Mode	CH	Frequency Separation (kHz)	Limit (kHz)
GFSK	L	1002.00	≥560.00
	M	1002.00	≥593.33
	H	1002.00	≥593.33

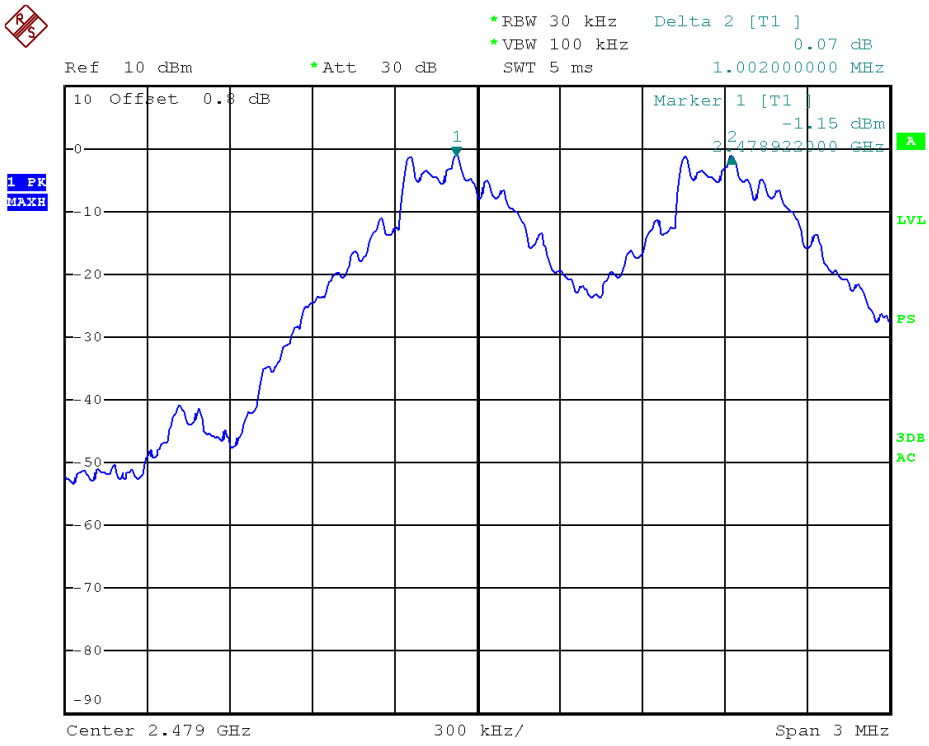
Channel L



Channel M

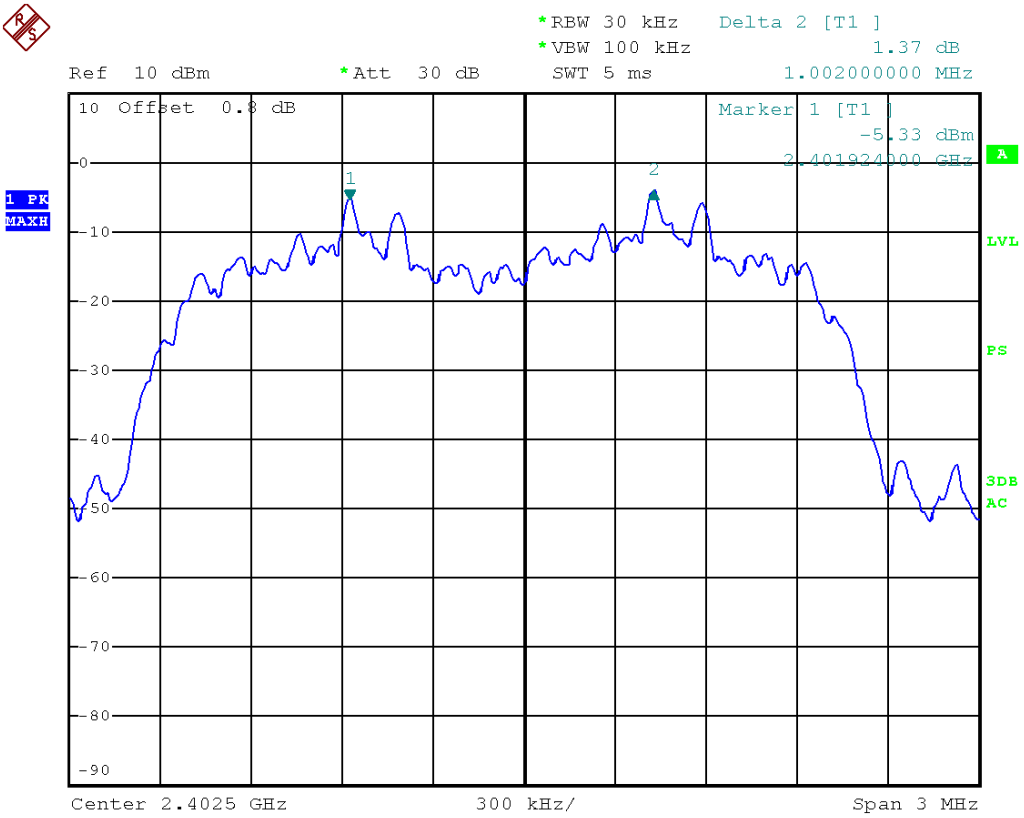


Channel H

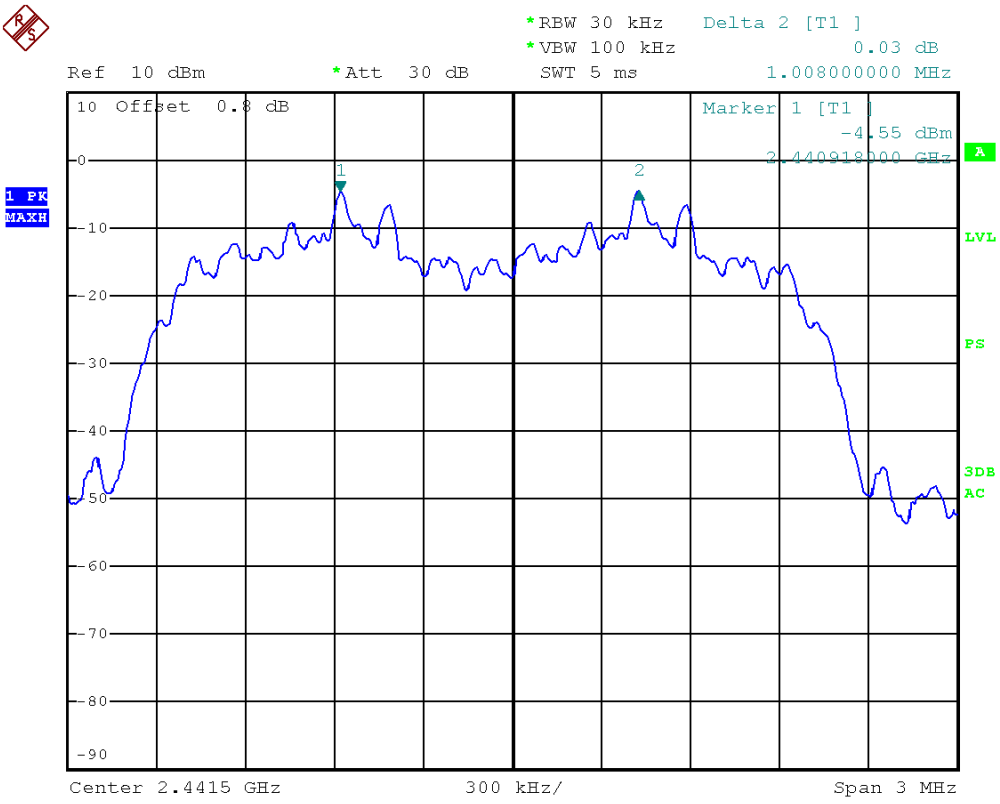


Mode	CH	Frequency Separation (kHz)	Limit (kHz)
8DPSK	L	1002.00	≥820.00
	M	1008.00	≥844.00
	H	1002.00	≥840.00

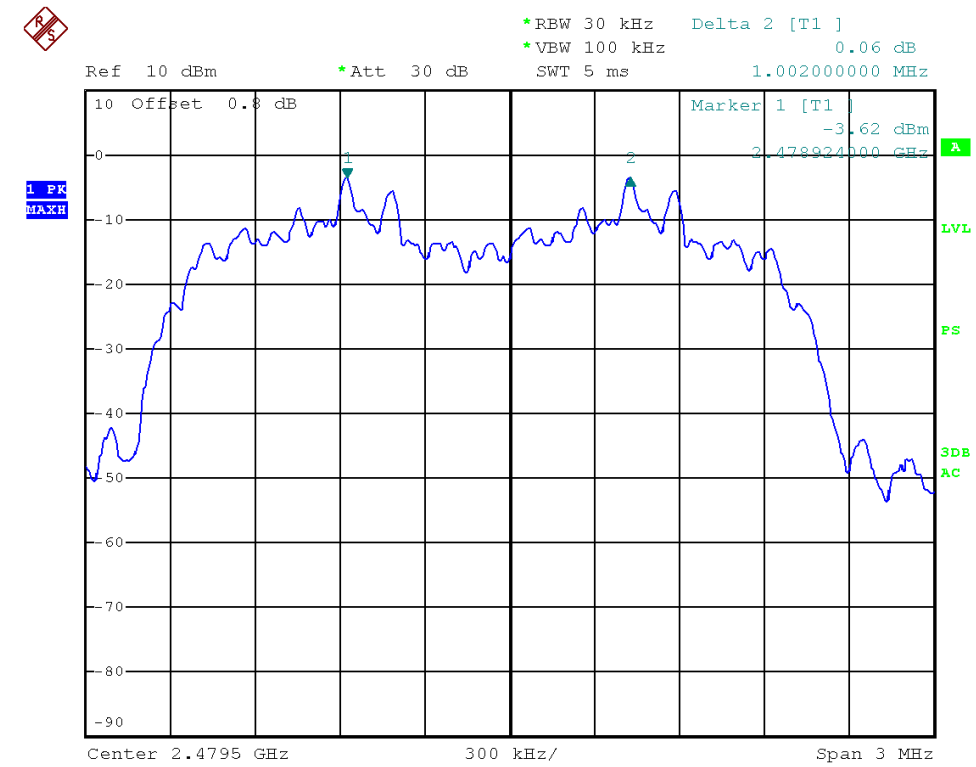
Channel L



Channel M



Channel H



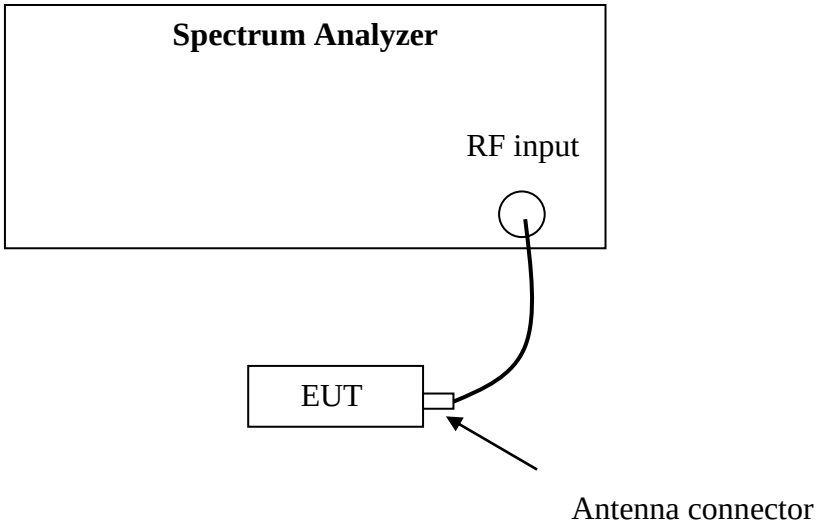
5. Maximum peak output power

Test result: Pass

5.1 Test limit

☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt
☒ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
☐For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

5.2 Test Configuration



5.3 Test procedure and test setup

The power output per FCC § 15.247(b) is measured using the Spectrum Analyzer with Span = 5 times the 20 dB bandwidth, RBW≥ the 20 dB bandwidth, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

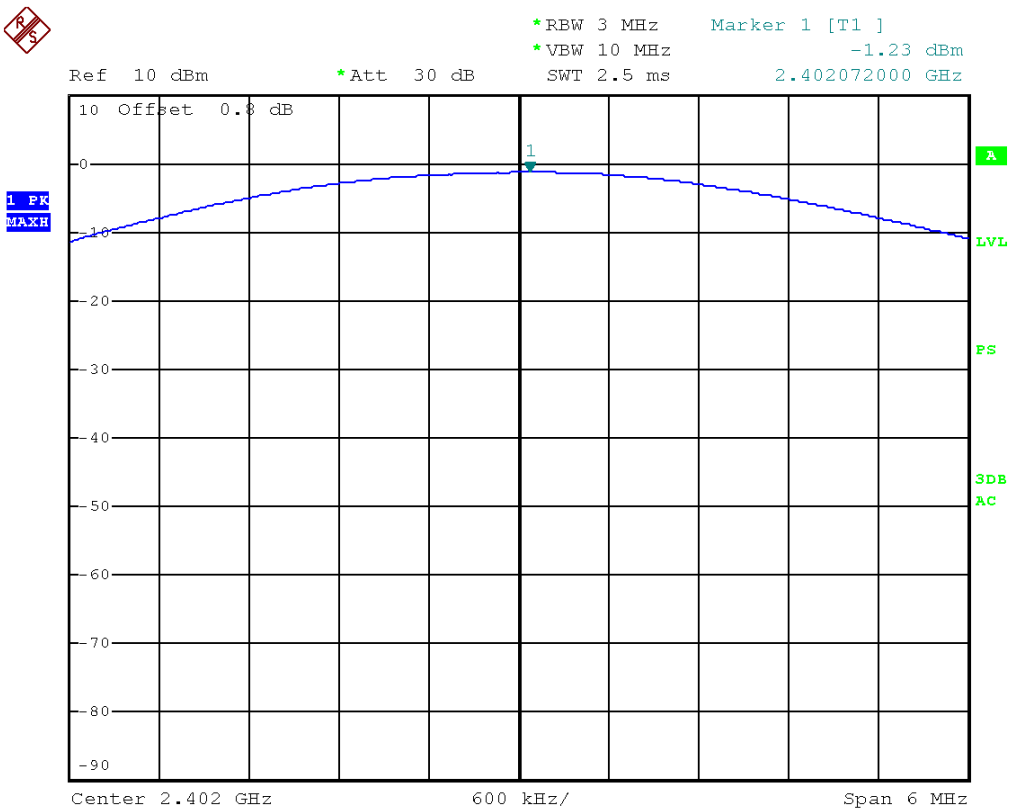
5.4 Test protocol

Temperature : 22 °C
Relative Humidity : 45 %

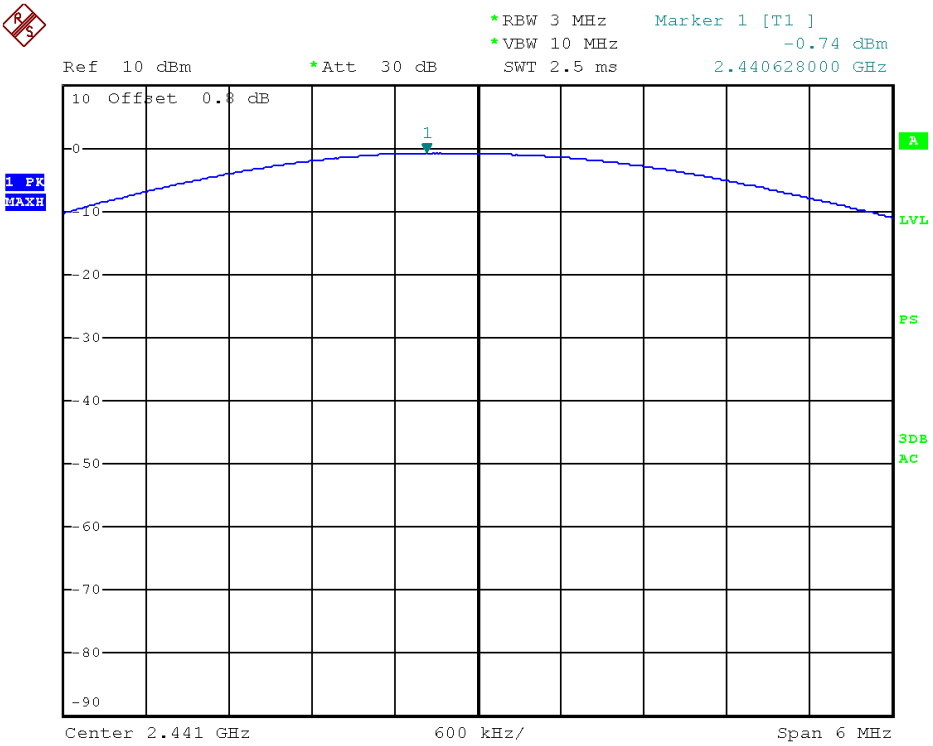
Mode	CH	Cable loss (dB)	Corrected reading (dBm)	Limit (dBm)
GFSK	L	0.80	-1.23	≤21.00
	M	0.80	-0.74	
	H	0.80	0.08	

Conclusion: The maximum EIRP = 0.08dBm = 1.019mW which is lower than the limit of 4W listed in RSS-247.

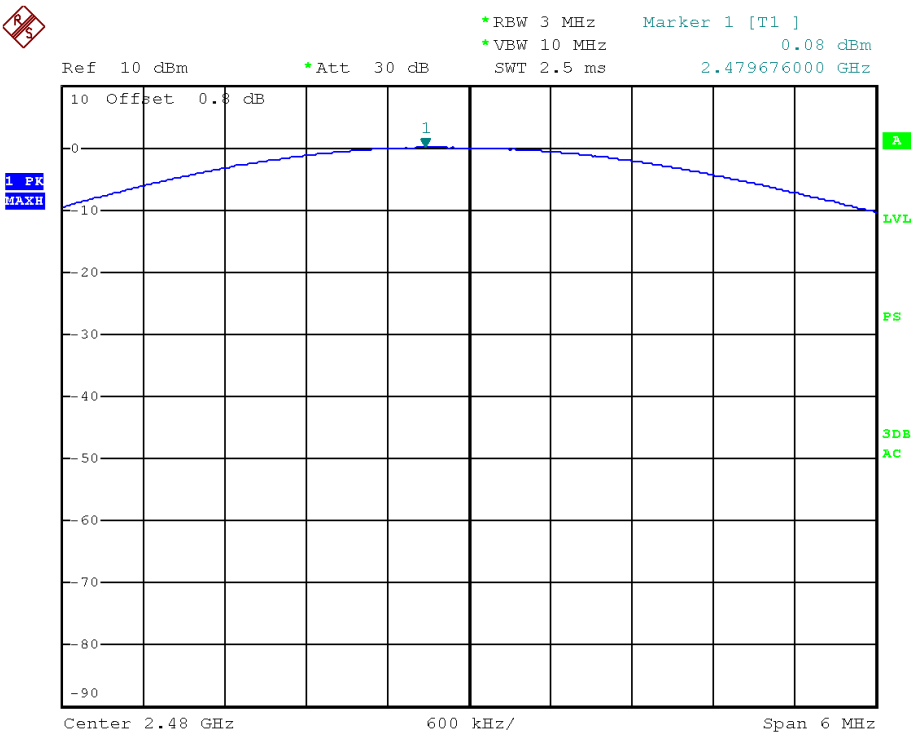
Channel L



Channel M



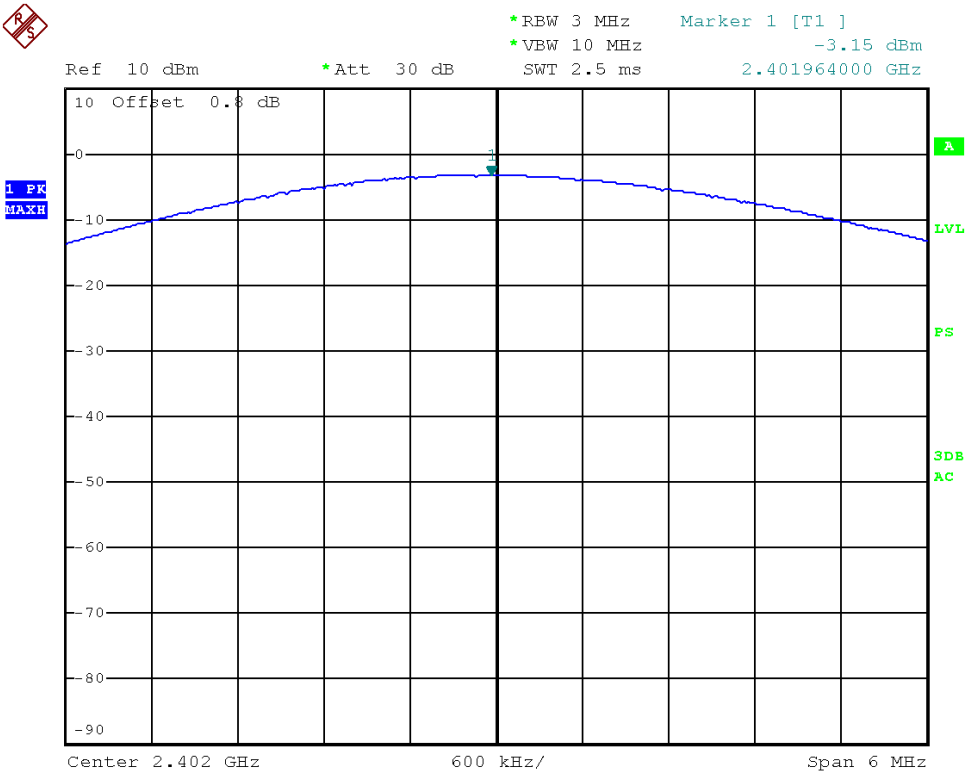
Channel H



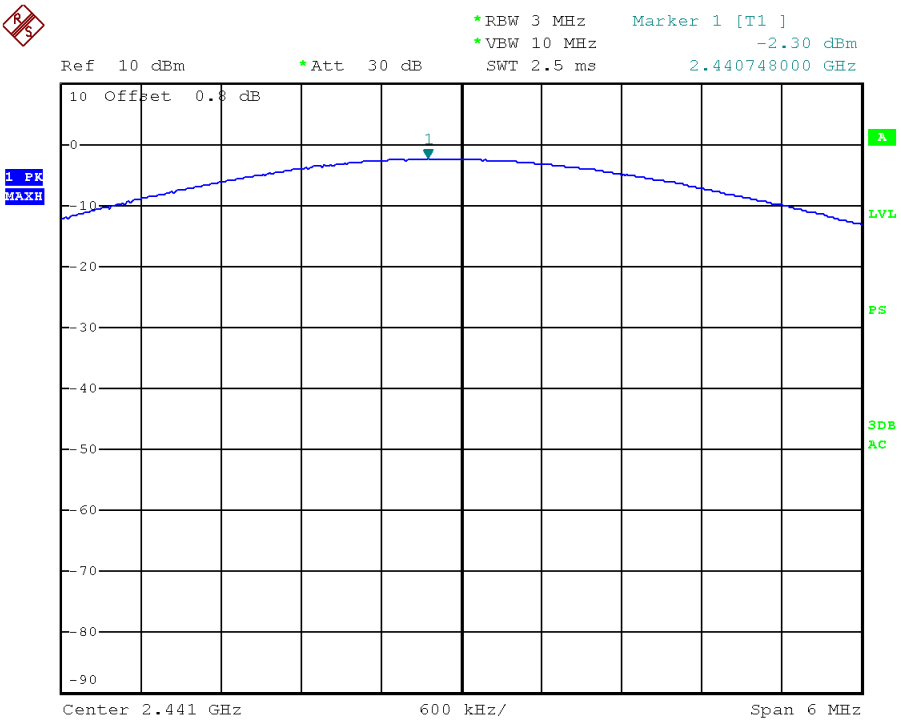
Mode	CH	Cable loss (dB)	Corrected reading (dBm)	Limit (dBm)
8DPSK	L	0.80	-3.15	≤21.00
	M	0.80	-2.30	
	H	0.80	-1.35	

Conclusion: The maximum EIRP = -1.35dBm = 0.733mW which is lower than the limit of 4W listed in RSS-247.

Channel L

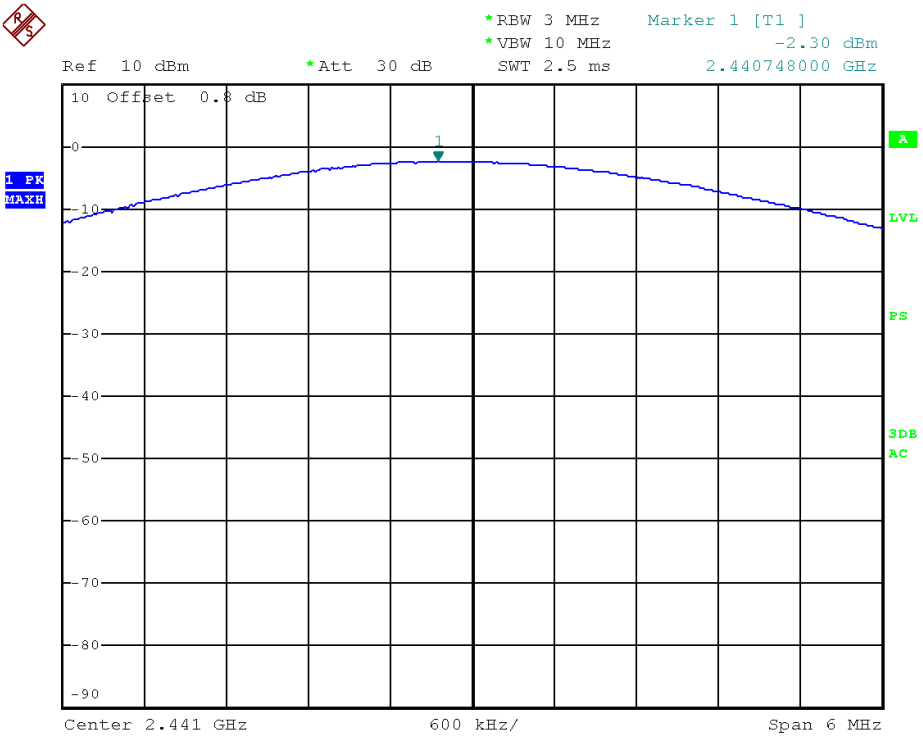


Channel M



Date: 13.MAR.2014 14:05:33

Channel H



6. Radiated Spurious Emissions

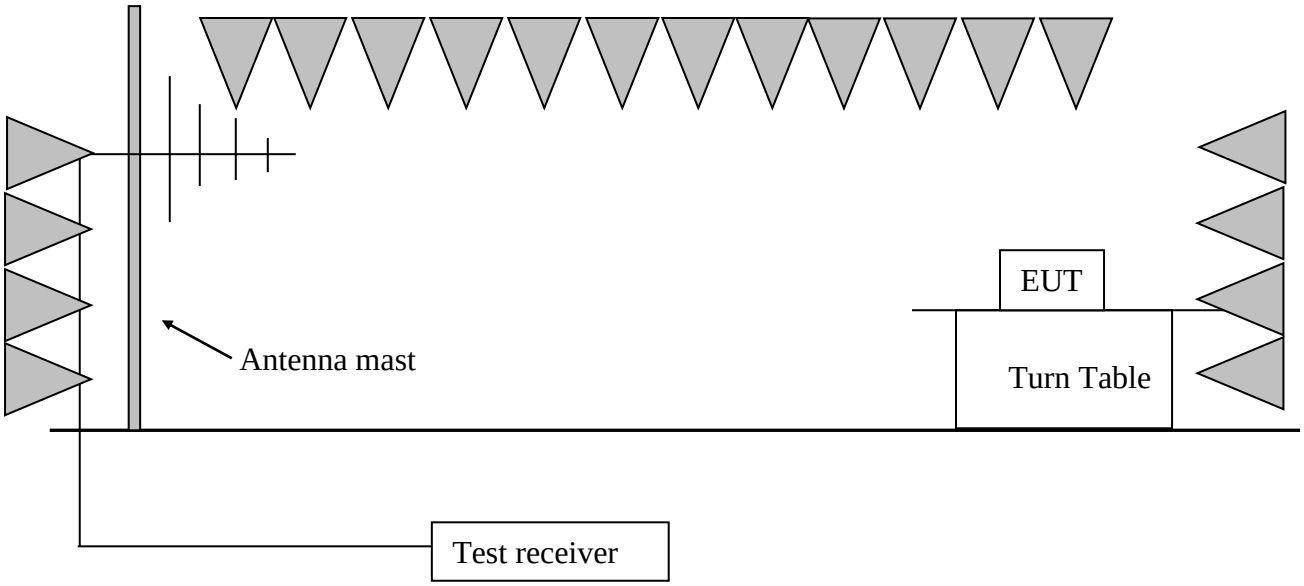
Test result: PASS

6.1 Test limit

The 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) showed as below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

6.2 Test Configuration



6.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.
The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz)
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”.

6.4 Test protocol

GFSK Modulation:

CH	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402.20	30.70	88.30	Fundamental	/	PK
	H	119.42	15.30	29.50	43.50	14.00	PK
	H	129.14	15.00	32.30	43.50	11.20	PK
	V	329.36	16.00	34.80	46.00	11.20	PK
	V	480.98	19.50	32.20	46.00	13.80	PK
	H	1599.19	-10.20	50.90	54.00	3.10	PK
	H	2390.00	-8.00	40.60	54.00	13.40	PK
	H	4806.18	-1.50	54.10	74.00	19.90	PK
	H	4805.87	-1.50	36.60	54.00	17.40	AV
M	H	2441.07	30.70	88.90	Fundamental	/	PK
	H	119.42	15.30	29.50	43.50	14.00	PK
	H	129.14	15.00	32.30	43.50	11.20	PK
	V	329.36	16.00	34.80	46.00	11.20	PK
	V	480.98	19.50	32.20	46.00	13.80	PK
	H	1625.25	-10.10	51.20	54.00	2.80	PK
	H	4885.77	-1.10	54.60	74.00	19.40	PK
	H	4885.23	-1.10	36.80	54.00	17.20	AV
H	H	2479.83	30.70	89.80	Fundamental	/	PK
	H	119.42	15.30	29.50	43.50	14.00	PK
	H	129.14	15.00	32.30	43.50	11.20	PK
	V	329.36	16.00	34.80	46.00	11.20	PK
	V	480.98	19.50	32.20	46.00	13.80	PK
	H	1651.30	-9.90	50.40	54.00	3.60	PK
	H	2483.50	-7.80	40.20	54.00	13.80	PK
	H	4961.54	-0.80	54.30	74.00	19.70	PK
	H	4960.79	-0.80	36.50	54.00	17.50	AV

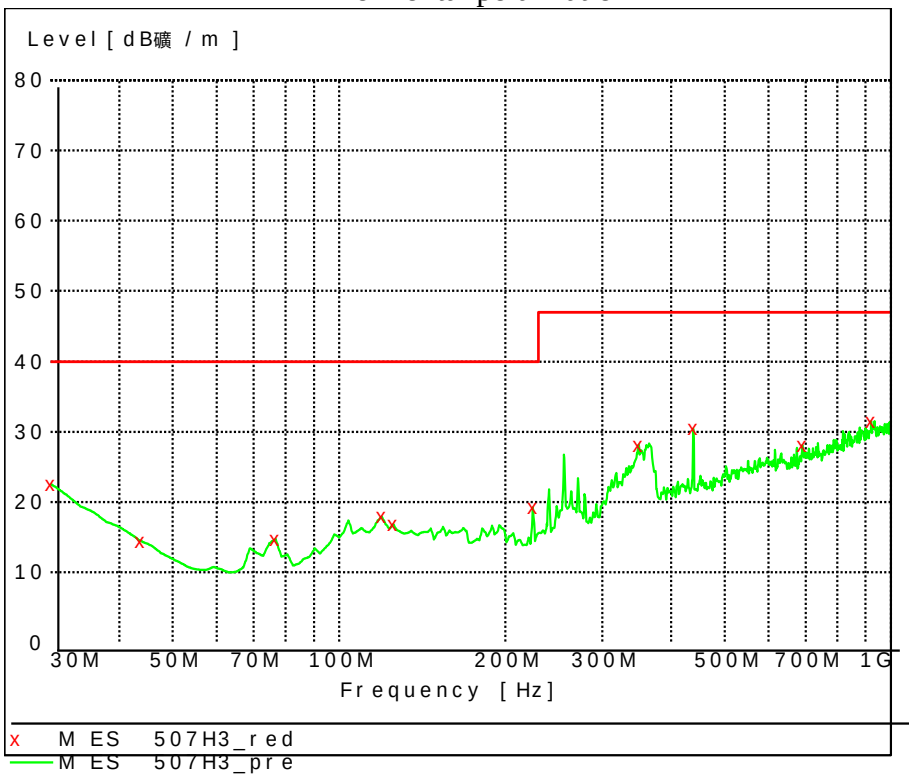
8DPSK Modulation:

CH	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402.20	30.70	86.30	Fundamental	/	PK
	H	101.93	12.40	17.20	43.50	25.8	PK
	H	131.08	13.50	16.70	43.50	26.8	PK
	V	348.80	17.10	27.40	46.00	18.6	PK
	V	352.69	17.20	28.90	46.00	17.1	PK
	H	1599.19	-10.20	50.90	54.00	3.10	PK
	H	2390.00	-8.00	38.60	54.00	13.40	PK
	H	4806.18	-1.50	52.10	74.00	19.90	PK
	H	4805.87	-1.50	35.60	54.00	17.40	AV
M	H	2441.07	30.70	86.80	Fundamental	/	PK
	H	101.93	12.40	17.20	43.50	25.8	PK
	H	131.08	13.50	16.70	43.50	26.8	PK
	V	348.80	17.10	27.40	46.00	18.6	PK
	V	352.69	17.20	28.90	46.00	17.1	PK
	H	1625.25	-10.10	51.20	54.00	2.80	PK
	H	4885.77	-1.10	53.60	74.00	19.40	PK
	H	4885.23	-1.10	35.80	54.00	17.20	AV
H	H	2479.83	30.70	87.80	Fundamental	/	PK
	H	101.93	12.40	17.20	43.50	25.8	PK
	H	131.08	13.50	16.70	43.50	26.8	PK
	V	348.80	17.10	27.40	46.00	18.6	PK
	V	352.69	17.20	28.90	46.00	17.1	PK
	H	1651.30	-9.90	50.40	54.00	3.60	PK
	H	2483.50	-7.80	39.70	54.00	13.80	PK
	H	4961.54	-0.80	53.50	74.00	19.70	PK
	H	4960.79	-0.80	35.80	54.00	17.50	AV

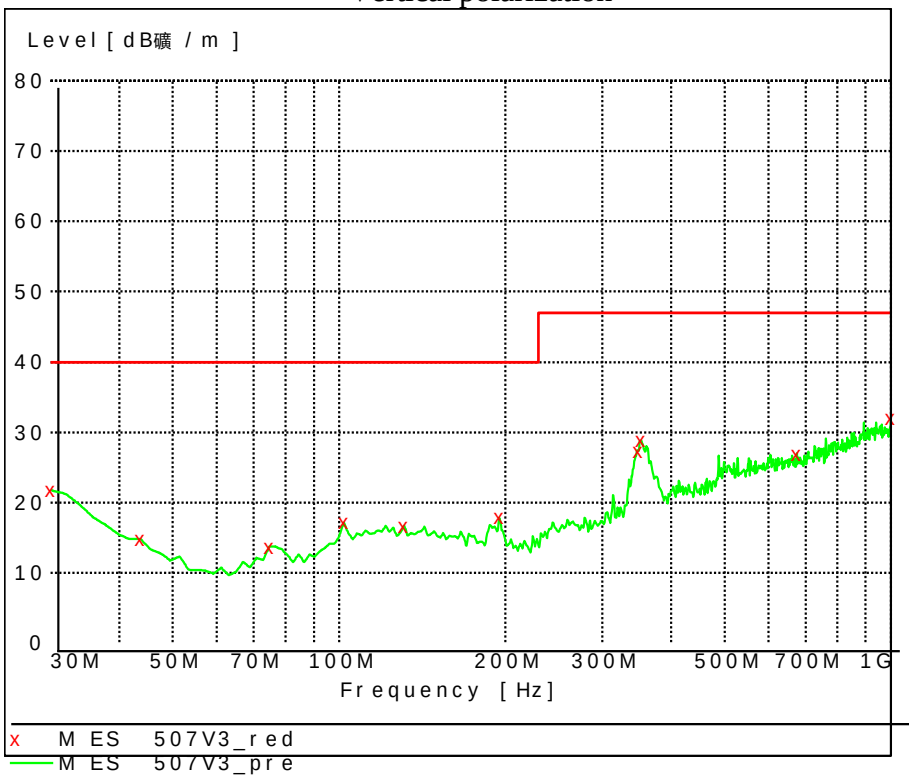
Remark: 1. For fundamental emission, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.
6. The emission was conducted from 30MHz to 25GHz.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

Horizontal polarization



Vertical polarization



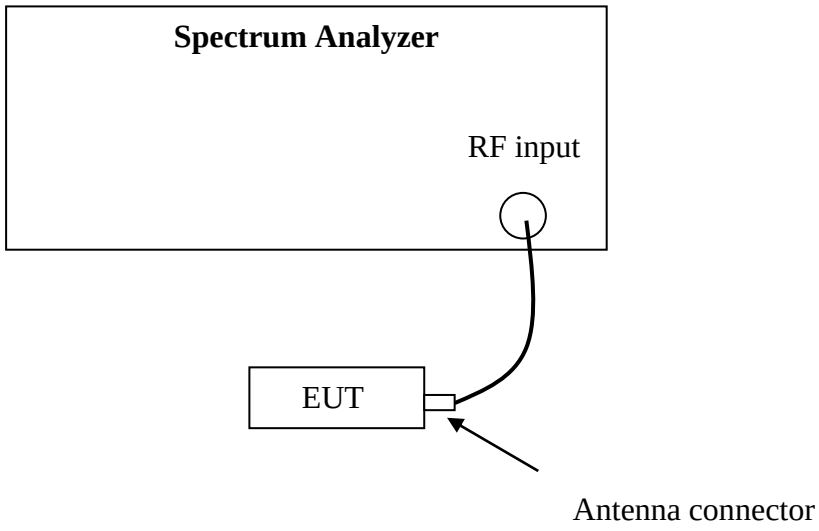
7. Conducted Spurious Emissions & Band Edge

Test result: **PASS**

7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

7.2 Test Configuration



7.3 Test procedure and test setup

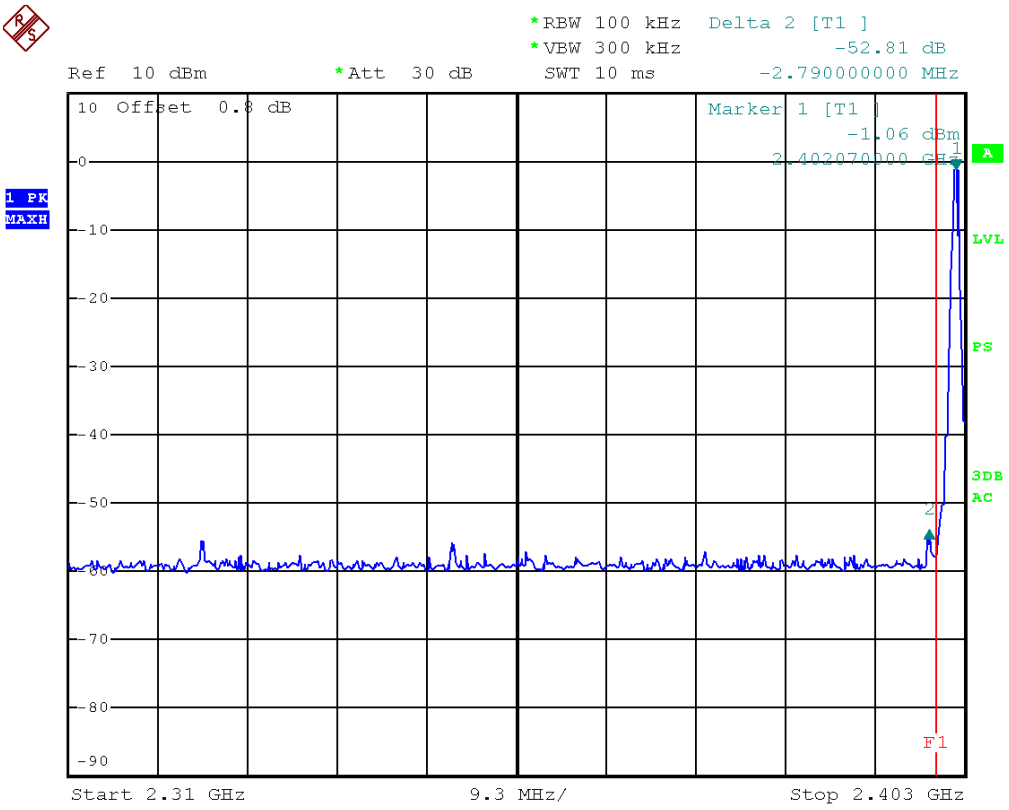
The Conducted Spurious Emissions per FCC § 15.247(d) is measured using the Spectrum Analyzer with Span wide enough capturing all spurious from the lowest emission frequency of the EUT up to 10th harmonics, RBW = 100kHz, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

7.4 Test protocol

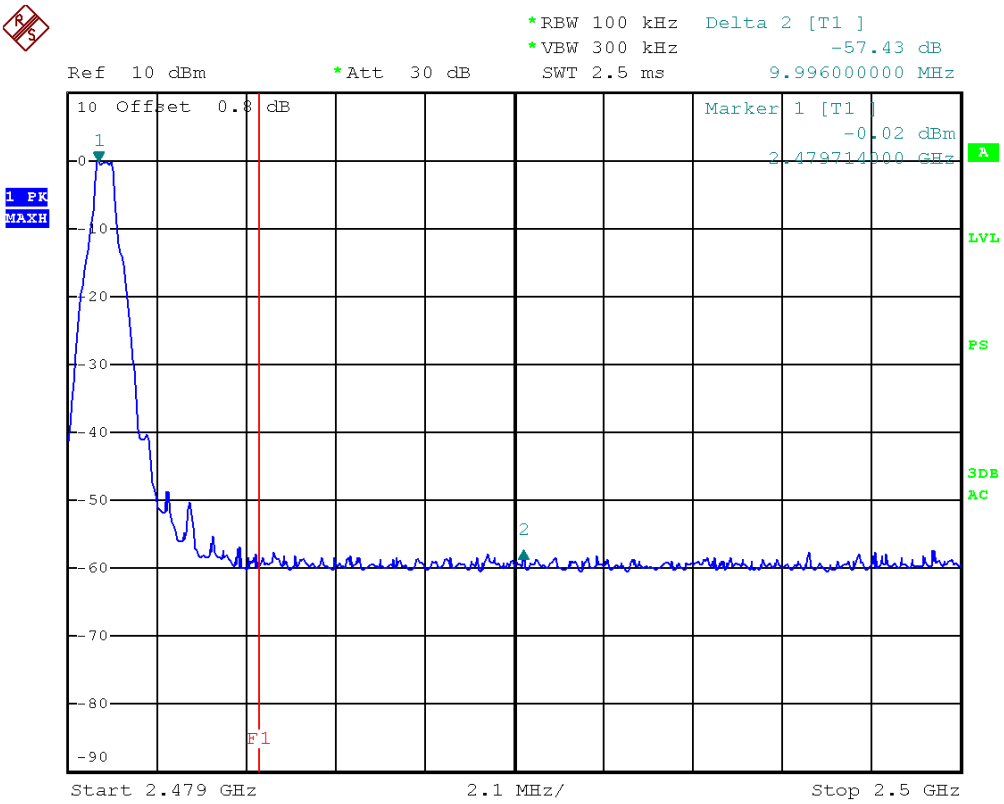
Model	CH	Max reading among band (dBm)	The most restrict Attenuation outside band (dB)	Limit (dB)
GFSK	L	-1.06	52.81	≥20
	M	-0.50	51.56	
	H	-0.02	57.43	

Note: The test was performed from 9kHz to 26GHz and the worst data is listed here.

Channel L



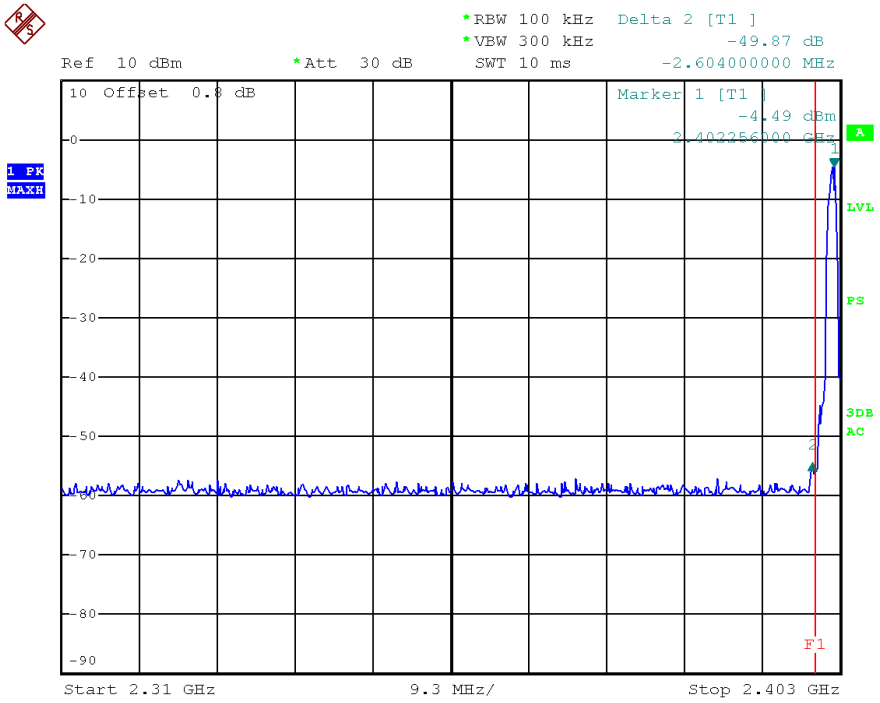
Channel H



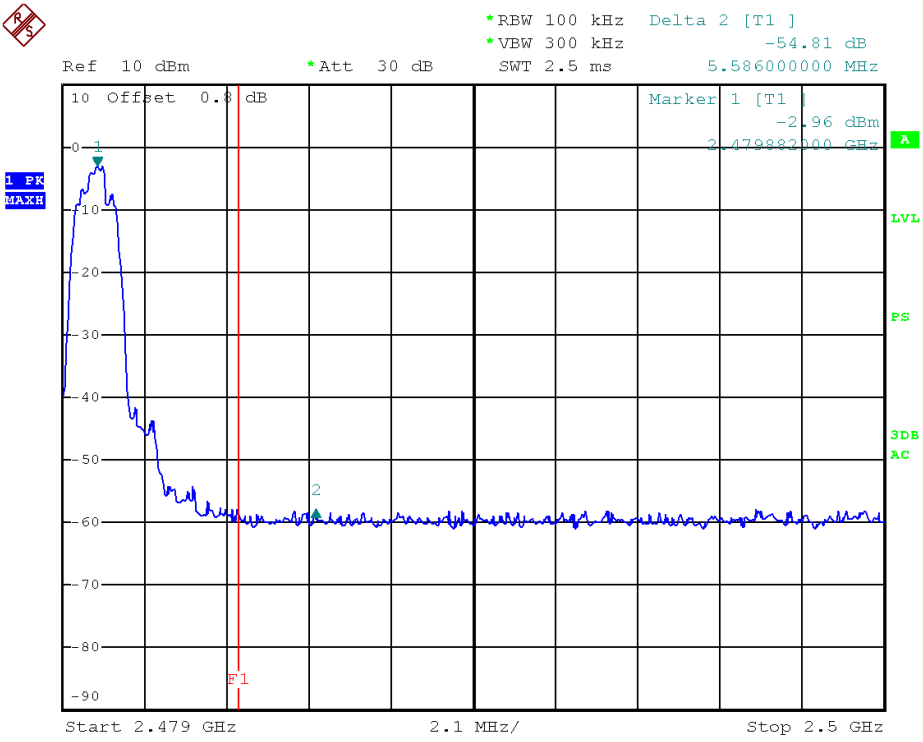
Model	CH	Max reading among band (dBm)	The most restrict Attenuation outside band (dB)	Limit (dB)
8DPSK	L	-4.49	49.87	≥20
	M	-3.72	52.00	
	H	-2.96	54.81	

Note: The test was performed from 9kHz to 26GHz and the worst data is listed here.

Channel L



Channel H



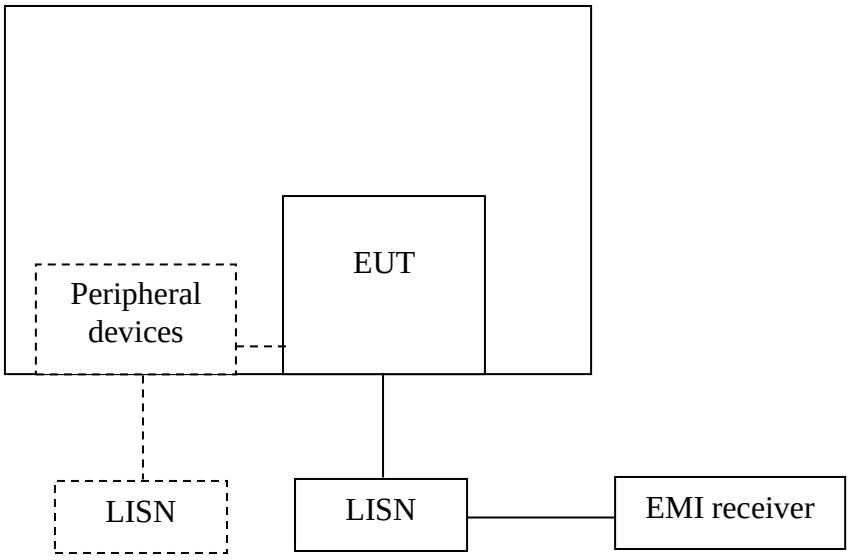
8. Power line conducted emission

Test result: **Pass**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.		

8.2 Test configuration



☐ For table top equipment, wooden support is 0.8m height table

☒ For floor standing equipment, wooden support is 0.12m height rack.

8.3 Test procedure and test set up

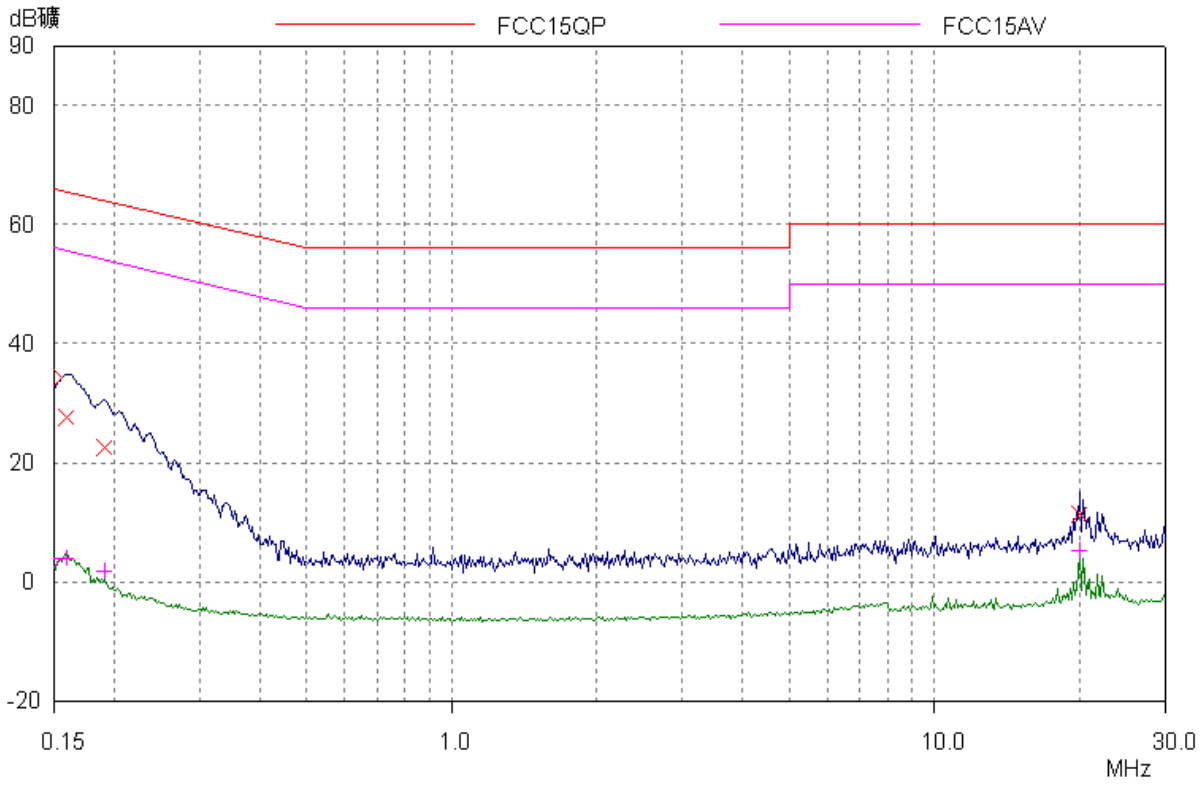
The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
The bandwidth of the test receiver is set at 9 kHz.
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

8.4 Test protocol

L&N:

Frequency	Correct Factor (dB)	Corrected Reading (dBuV)		Limit (dBuV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15 (L)	0.27	27.65	3.99	65.54	55.54	37.89	51.55
0.19 (L)	0.14	22.49	1.68	64.01	54.01	41.52	52.33
19.87 (L)	0.94	11.41	5.30	60.00	50.00	48.59	44.70
0.16 (N)	0.27	27.53	4.04	65.54	55.54	38.01	51.50
0.19 (N)	0.14	22.26	1.68	64.01	54.01	41.75	52.33
19.87 (N)	0.94	9.75	5.40	60.00	50.00	50.25	44.60
Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading.							

L&N:



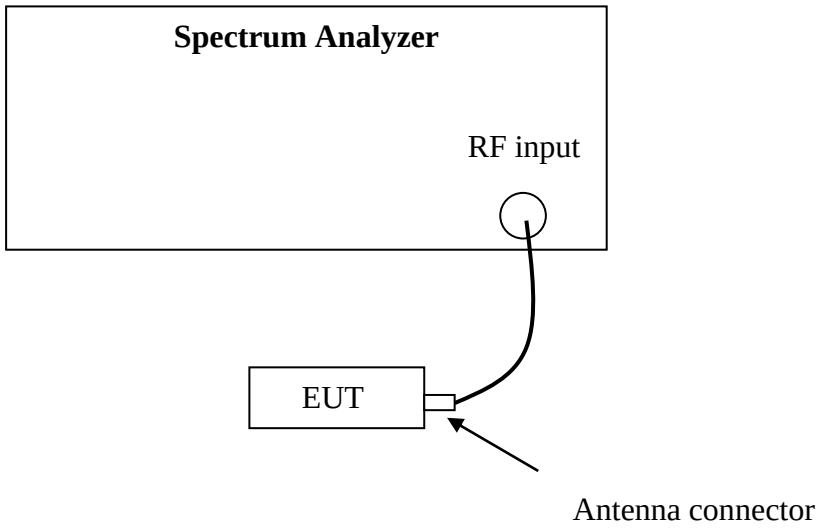
9. Number of Hopping Frequencies

Test result: **Pass**

9.1 Limit

Number of Hopping Frequencies in the 2400-2483.5 MHz band shall use at least 15 channels.

9.2 Test Configuration

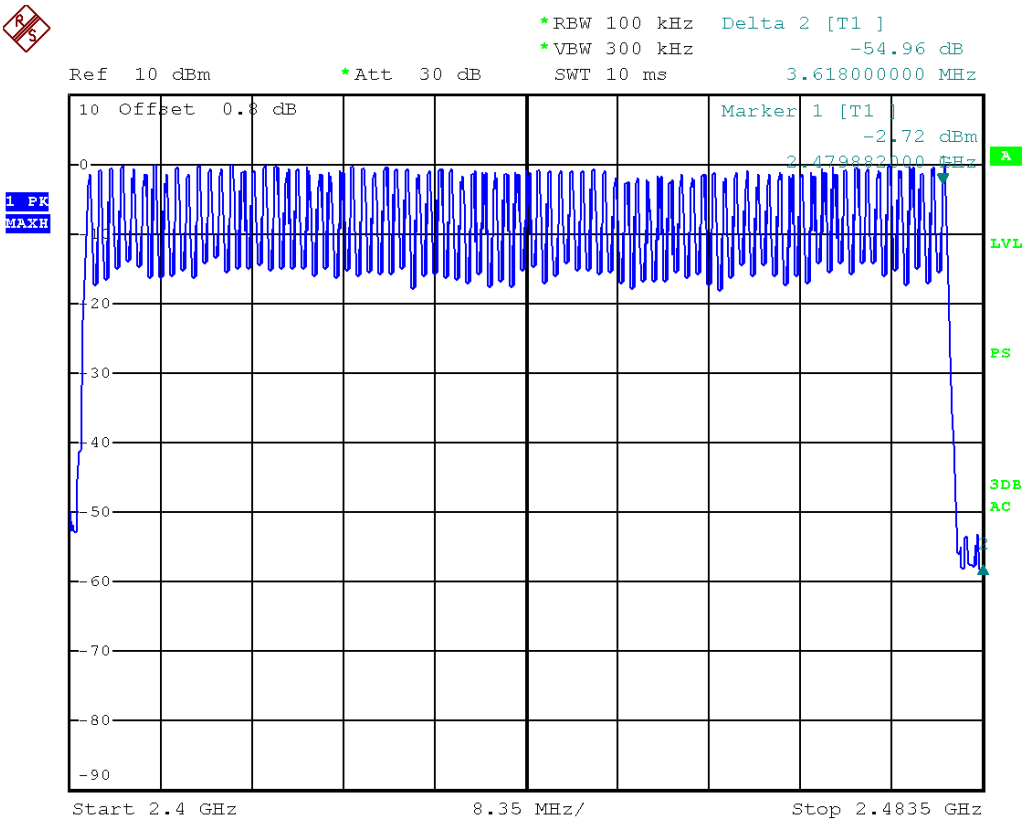


9.3 Test procedure and test setup

The channel number per FCC §15.247(a)(1)(iii) is measured using the Spectrum Analyzer with RBW=100kHz, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold. The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

9.4 Test protocol

Channel Number	Limit
79	≥15



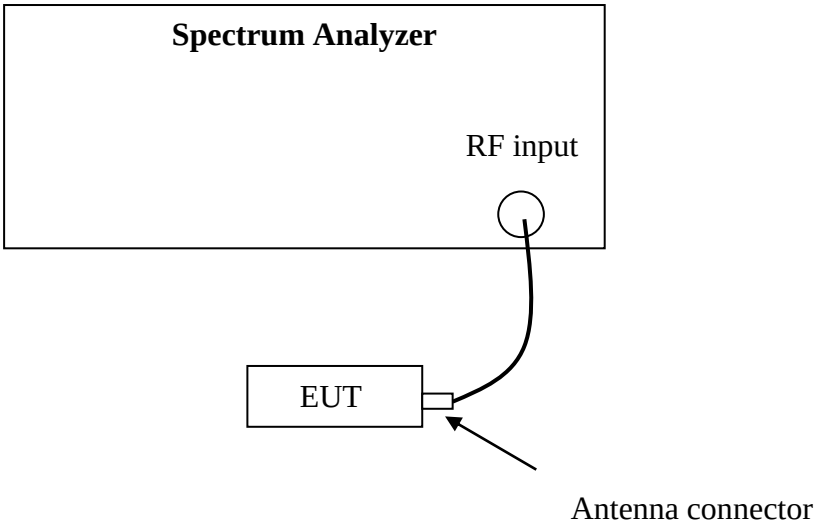
10. Dwell Time

Test result: **Pass**

10.1 Limit

The dwell time on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

10.2 Test Configuration



10.3 Test procedure and test setup

Dwell time per FCC § 15.247(a)(1)(iii) is measured using the Spectrum Analyzer with Span = 0, RBW=1MHz, VBW≥RBW, Sweep can capture the entire dwell time, Detector = peak, Trace = max hold.
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

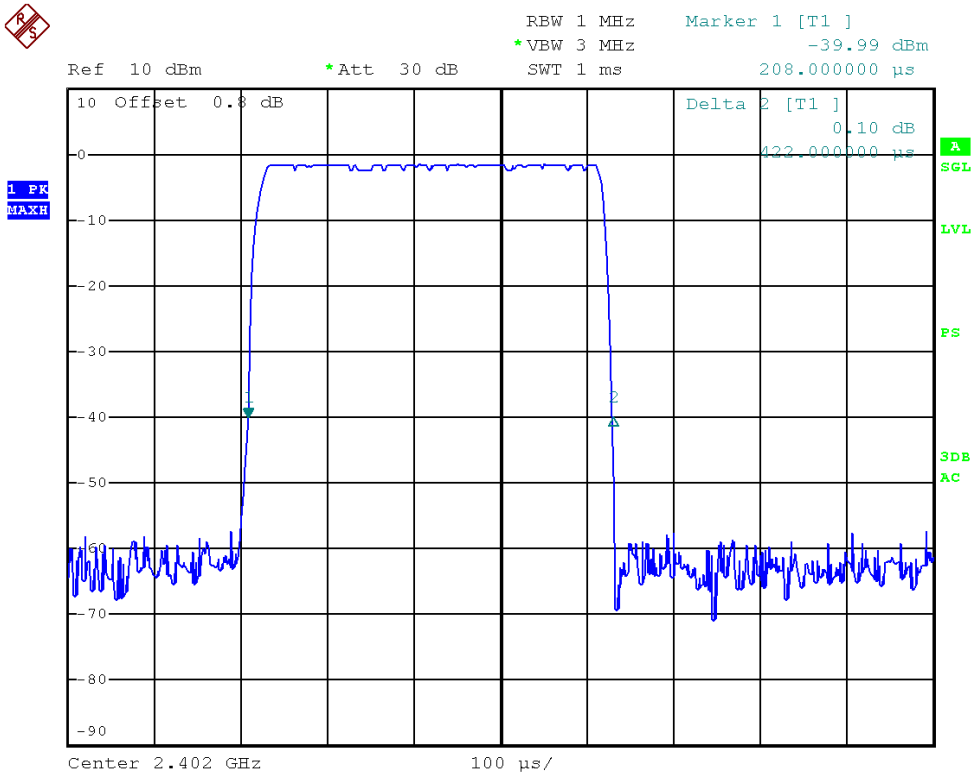
10.4 Test protocol

Packet	Occupancy time for single hop (ms) **O**	CH	Real observed period (s) **P**	Hops among Observed period **I**	Dwell time (s) **T**	Limit (s)
DH1	0.422	L	3.16	33	0.14	≤0.4
		M	3.16	33	0.14	
		H	3.16	33	0.14	
DH3	1.688	L	3.16	17	0.29	
		M	3.16	17	0.29	
		H	3.16	17	0.29	
DH5	2.924	L	3.16	11	0.32	
		M	3.16	11	0.32	
		H	3.16	11	0.32	

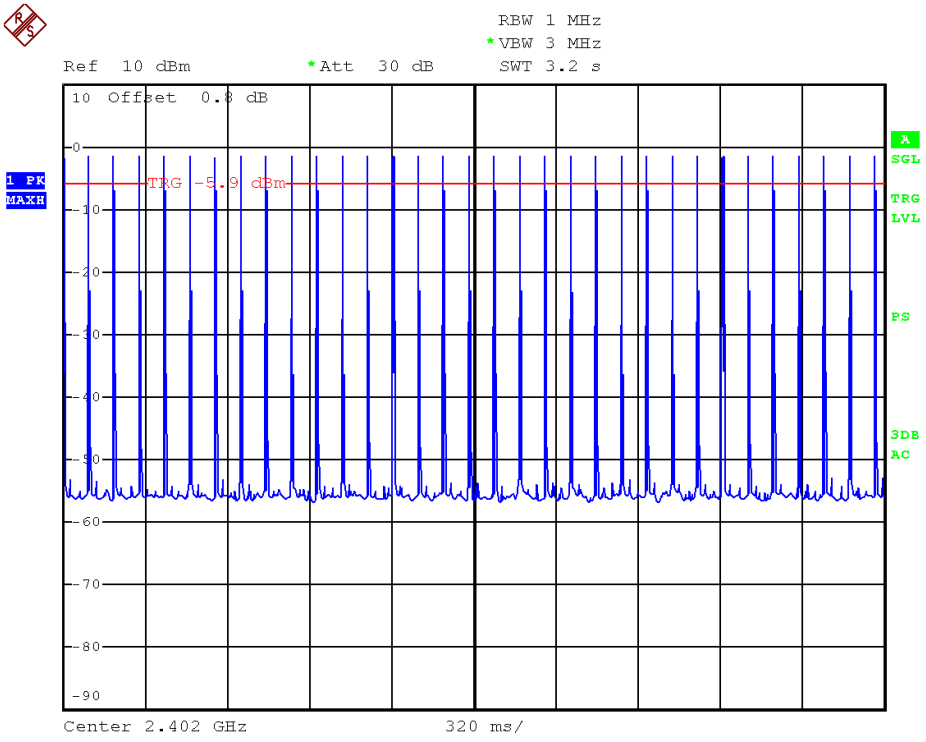
Remark: 1. There are 79 channels in all. So the complete observed period P = 0.4 * 79 = 31.6 s.

2. Average time of occupancy **T = O *I * 31.6 / P**

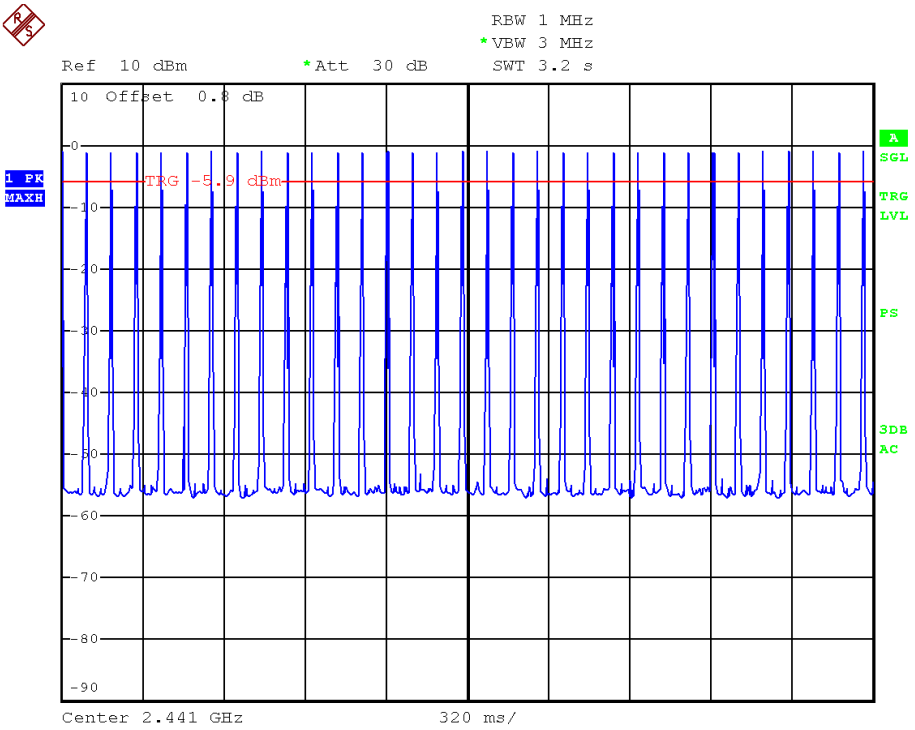
DH1



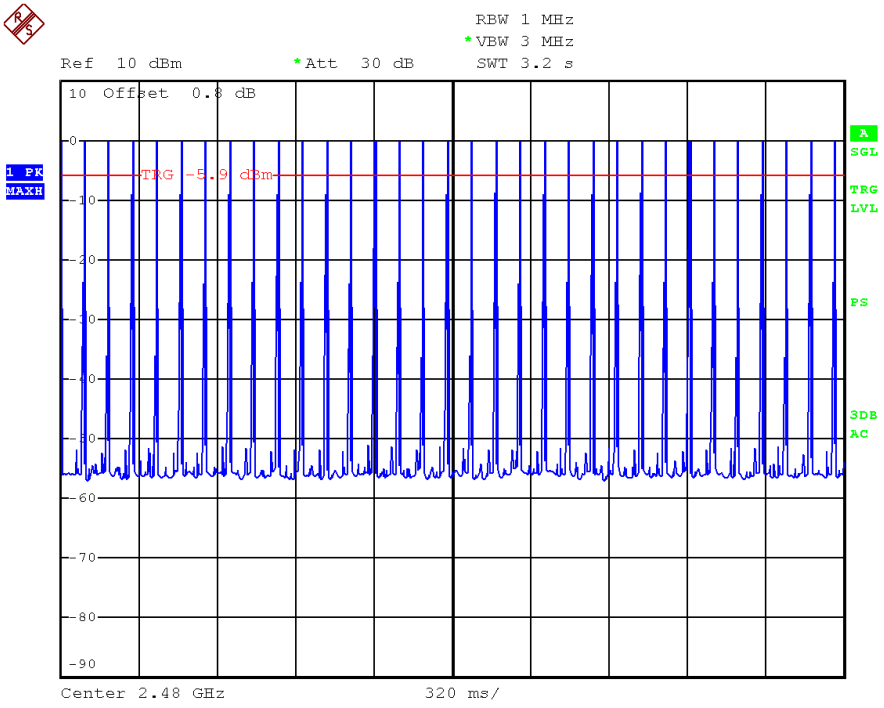
Channel L



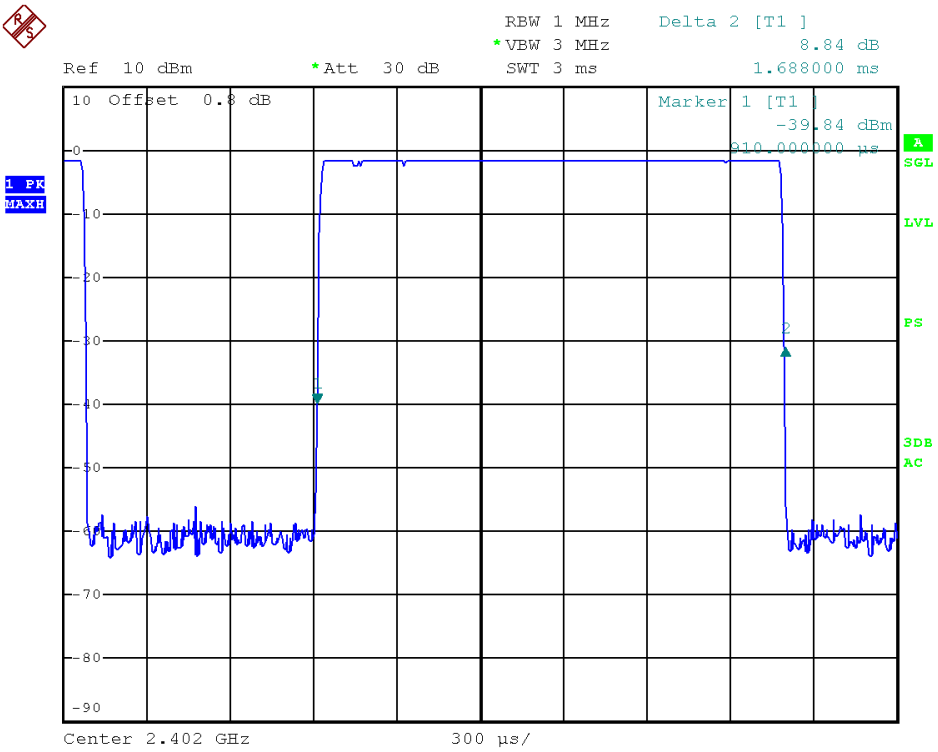
Channel M



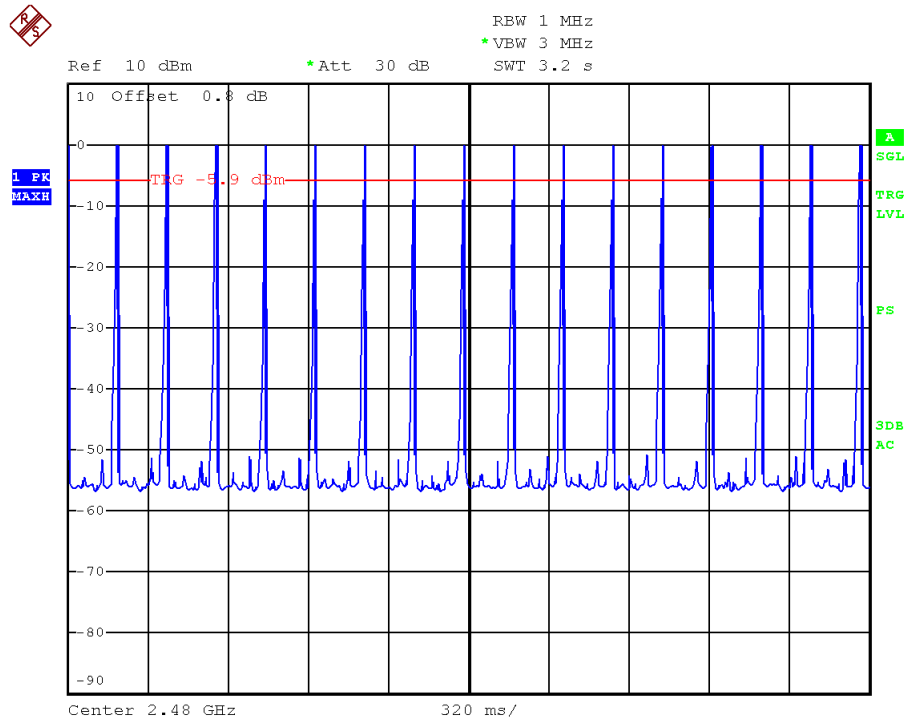
Channel H



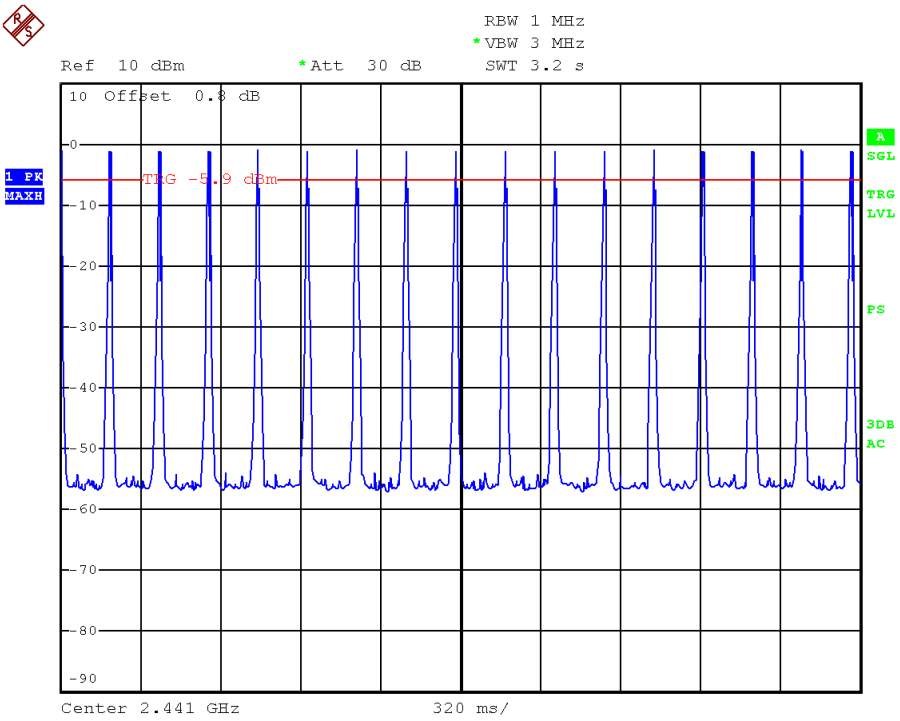
DH3



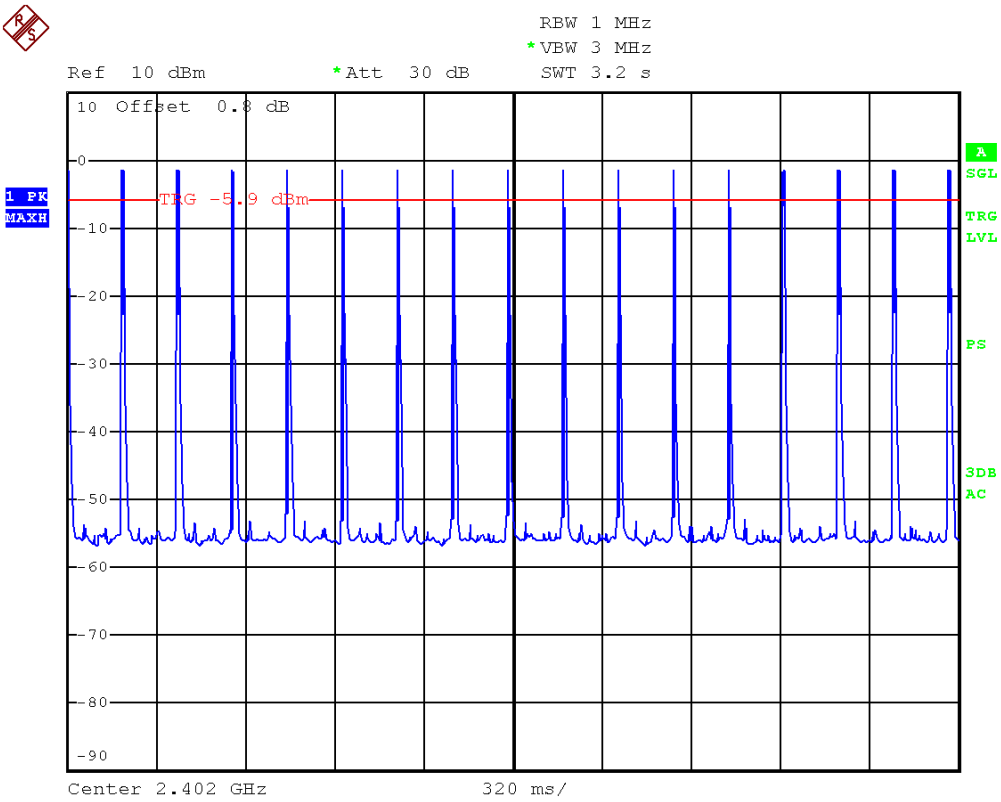
Channel L



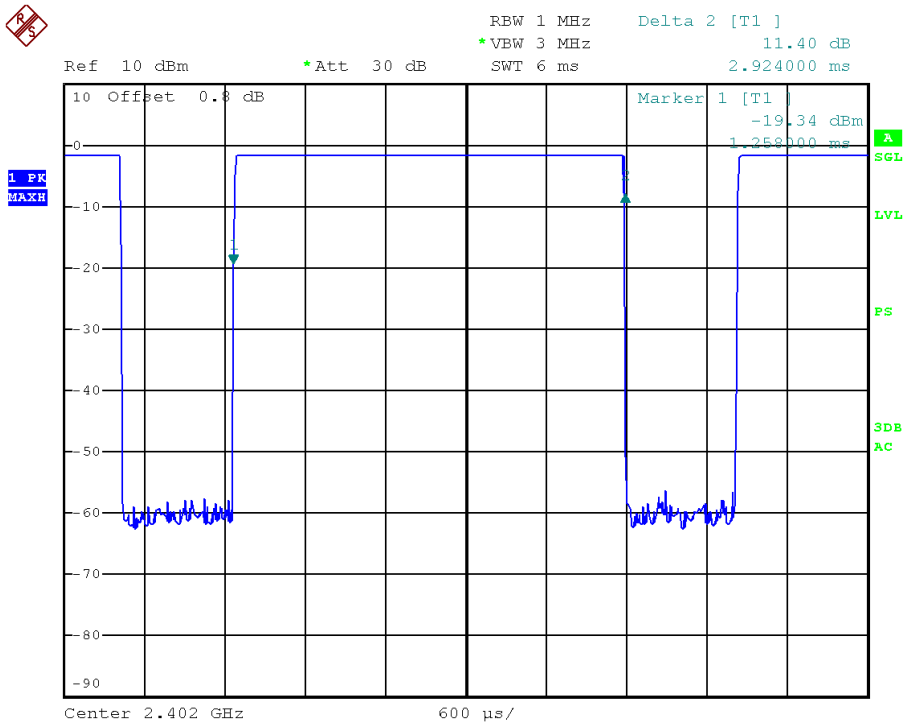
Channel M



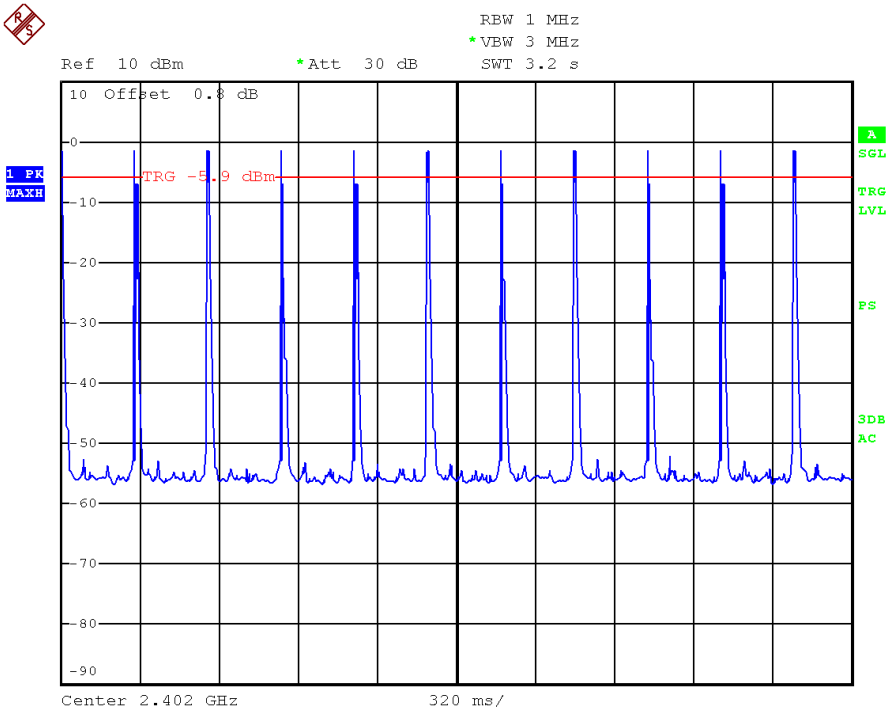
Channel H



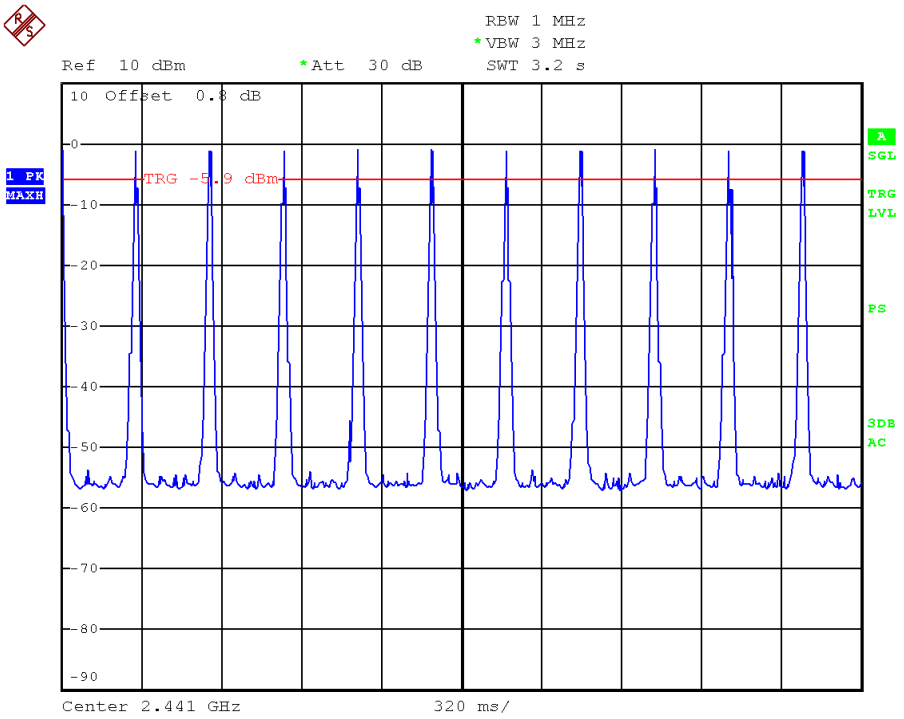
DH5



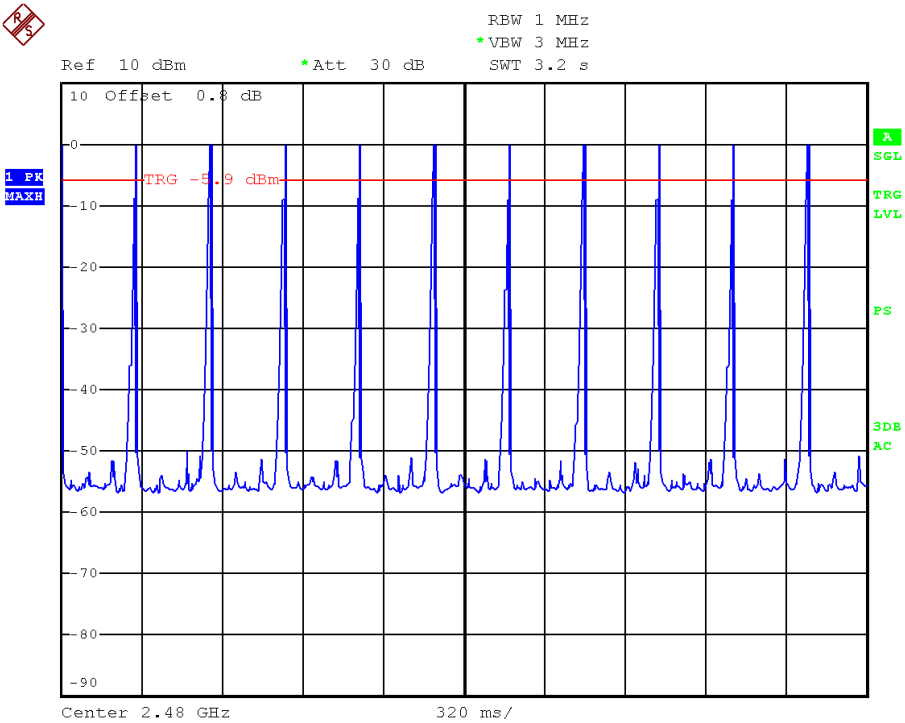
Channel L



Channel M



Channel H



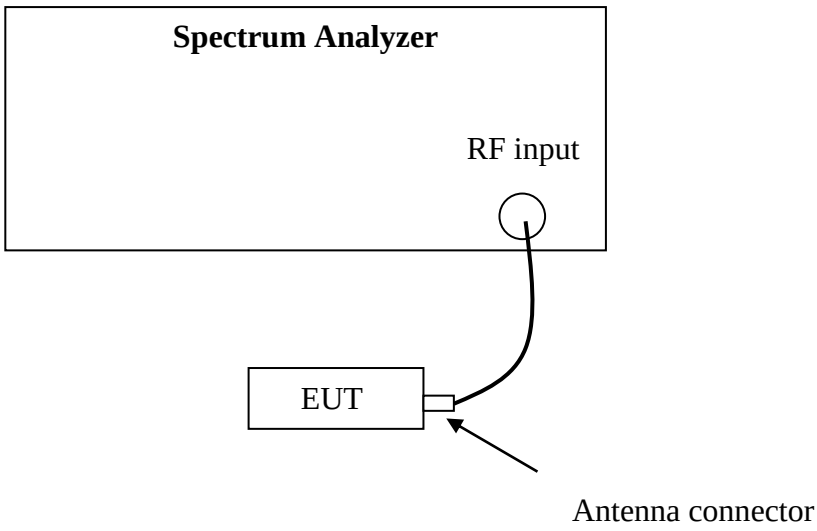
11. Occupied Bandwidth

Test Status: Tested

11.1 Test limit

None

11.2 Test Configuration



11.3 Test procedure and test setup

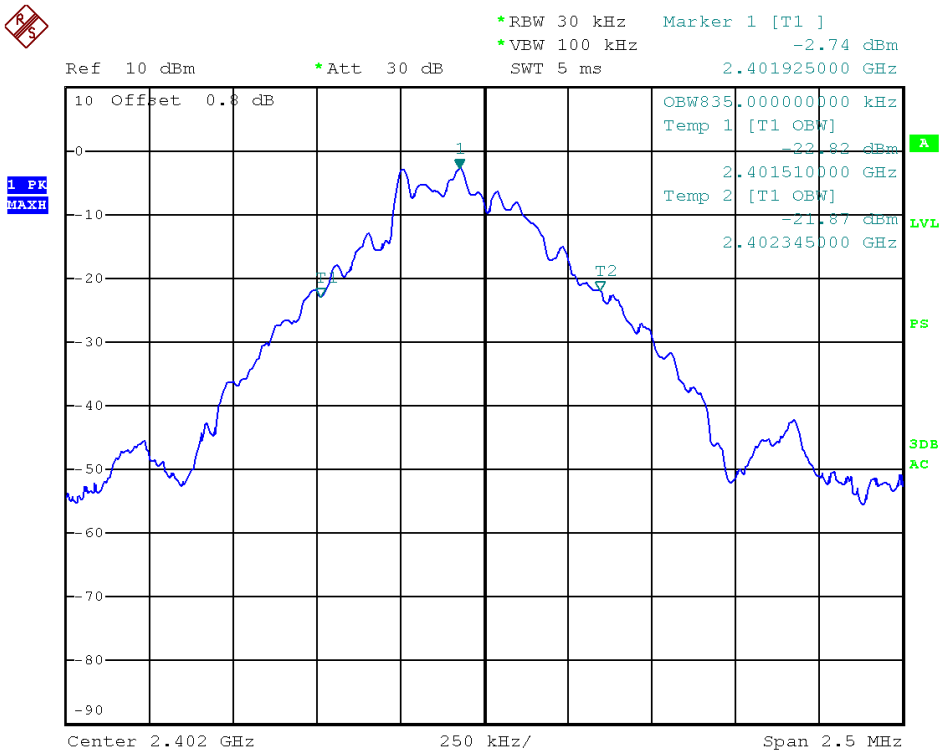
The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the RBW close to 1% of the selected span, VBW = 3 * RBW Detector = Sample, Sweep = Auto.

11.4 Test protocol

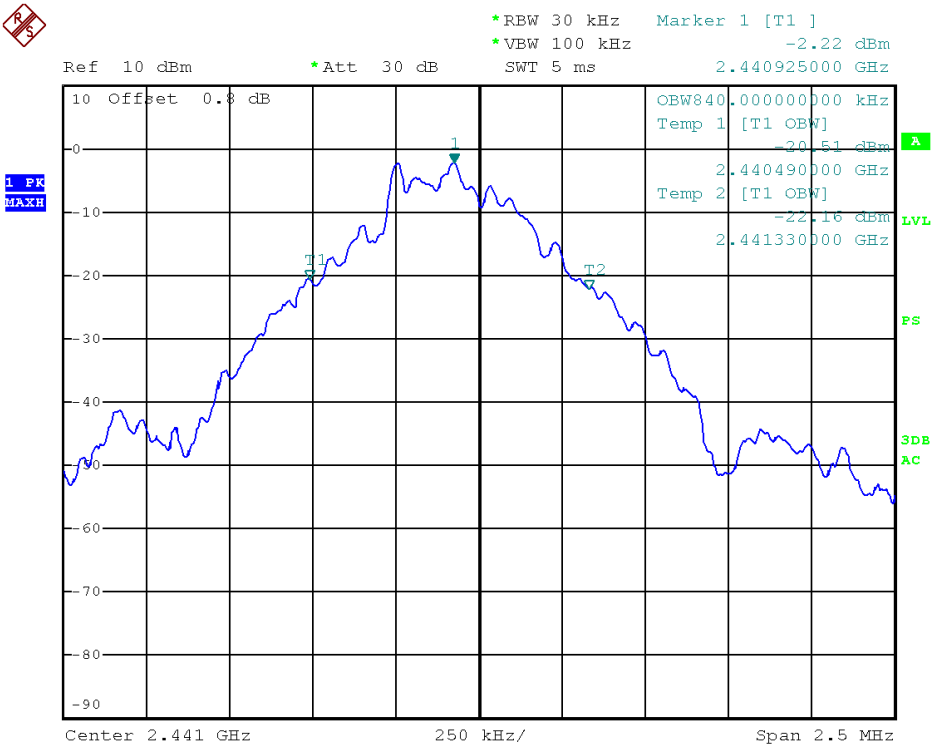
Temperature : 22 °C
Relative Humidity : 45 %

Modulation	Channel	Occupied Bandwidth (kHz)
GFSK	L	835.00
	M	840.00
	H	840.00

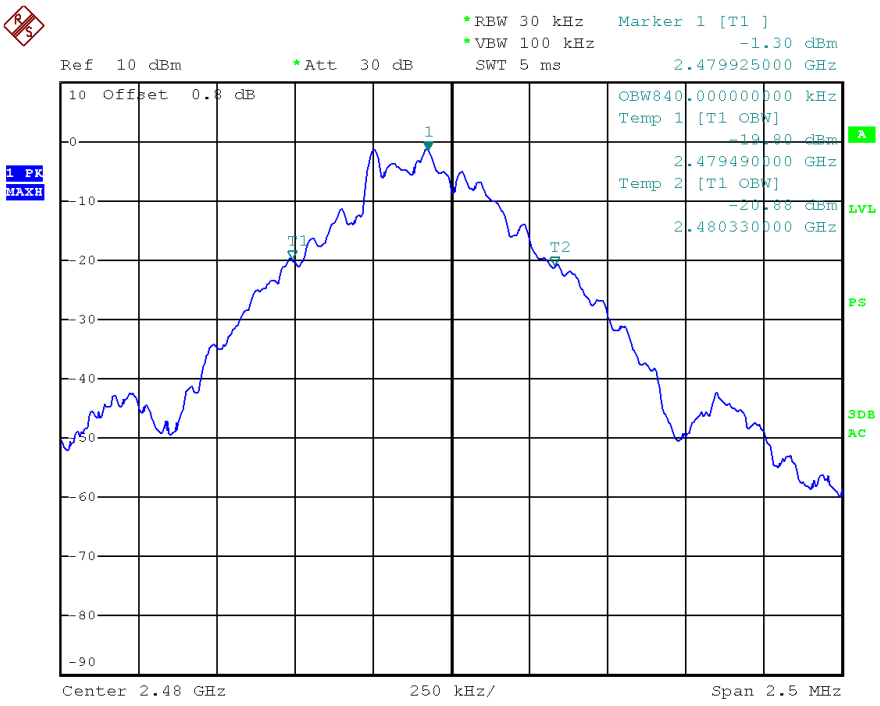
Channel L



Channel M

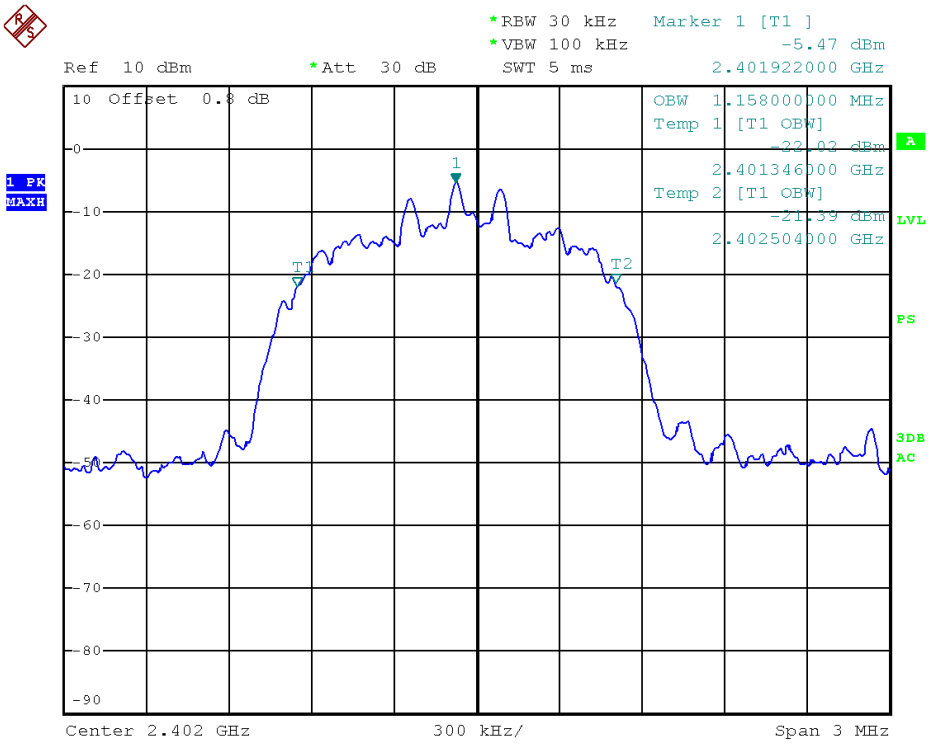


Channel H

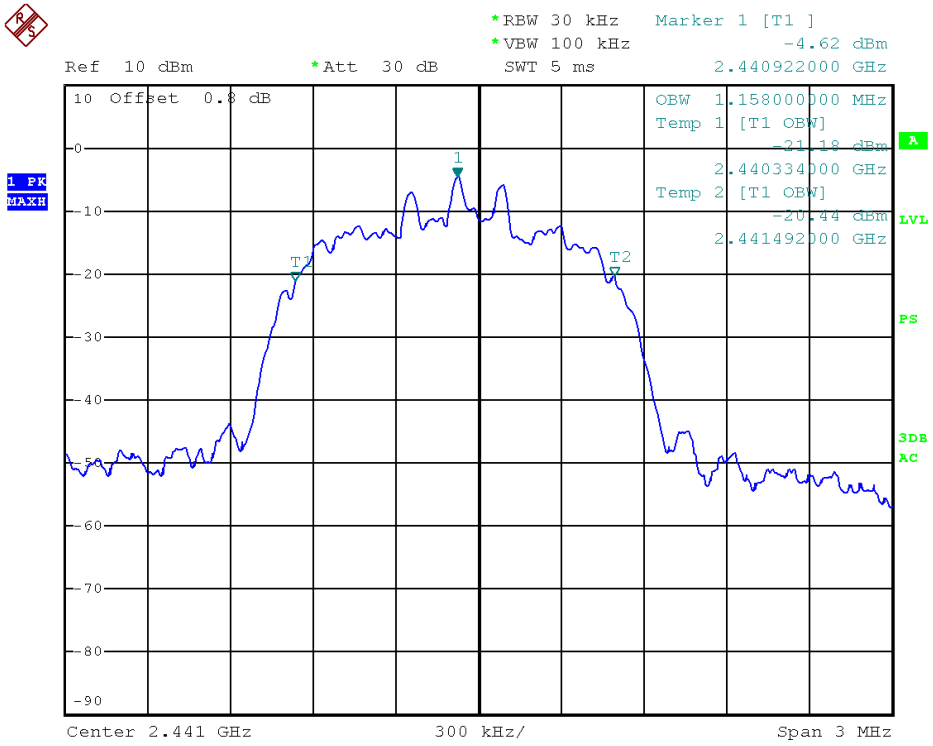


Modulation	Channel	Occupied Bandwidth (kHz)
8DPSK	L	1158.00
	M	1158.00
	H	1158.00

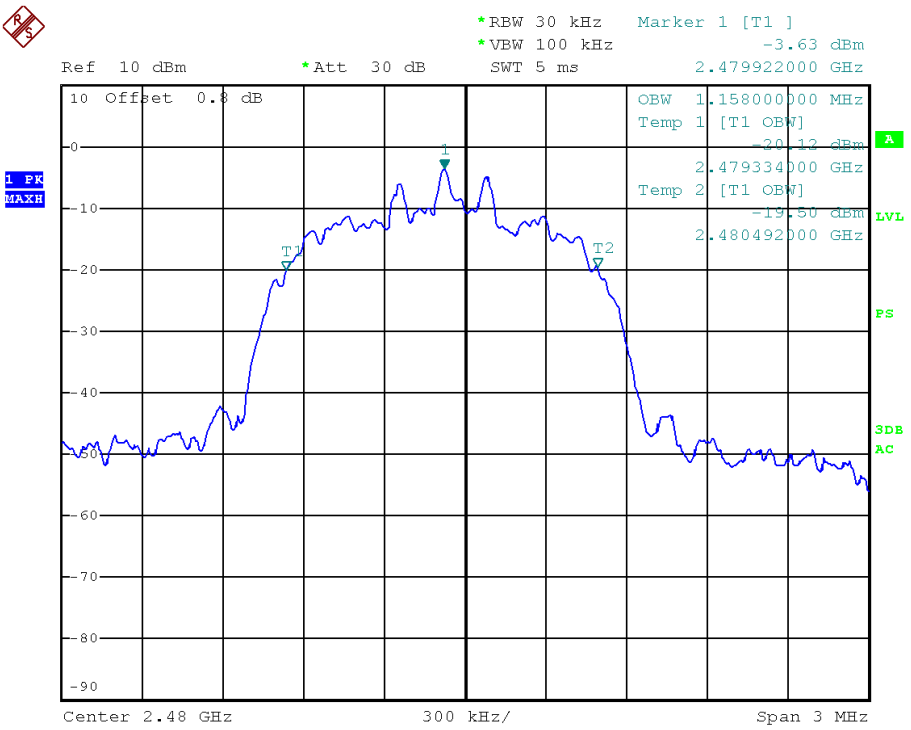
Channel L



Channel M



Channel H



12.Antenna requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.