FCC PART 15C
TEST REPORT

No.25T04Z200103-009

for

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN

SM-A075M/DS, SM-A075M

FCC ID:ZCASMA075M

with

Hardware Version: REV1.0

Software Version: A075M.001

Issued Date: 2025-06-09

Note:

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 CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No.52, HuayuanNorth Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512,Fax:+86(0)10-62304633-2504

Email:cttl_terminals@caict.ac.cn, website: www.chinattl.com

©Copyright. All rights reserved by CTTL.

REPORT HISTORY

Report Number	Revision	Description	Issue Date
25T04Z200103-009	Rev.0	1st edition	2025-06-09

Note: the latest revision of the test report supersedes all previous version.

©Copyright. All rights reserved by CTTL.

CONTENTS

©Copyright. All rights reserved by CTTL.

©Copyright. All rights reserved by CTTL.

1. Test Laboratory

1.1. Introduction &Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website

1.2. Testing Location

Conducted testing Location:CTTL(Gaolizhang Road)

Address: Cuihu Cloud Center, No.1, Gaolizhang Road, Wenquan, Haidian District, Beijing, China

Radiated testing Location: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

©Copyright. All rights reserved by CTTL.

1.3. Testing Environment

Normal Temperature: 20-27℃

Relative Humidity: 20-50%

1.4. Project data

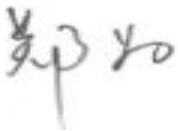
Testing Start Date: 2025-05-07

Testing End Date: 2025-06-09

1.5. Signature

Yao Xingyu

(Prepared this test report)



Zheng Wei

(Reviewed this test report)

Pang Shuai

(Approved this test report)

©Copyright. All rights reserved by CTTL.

2. Client Information

2.1 Applicant Information

Company Name:	Samsung Electronics Co., Ltd.
Address:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact:	Jenni Chun
Email:	j1.chun@samsung.com
Telephone:	+1-201-937-4203
Fax:	/

2.1. Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea
Contact:	Kobe Cho
Email:	ggobi.cho@samsung.com
Telephone:	+82 - 10 - 2722 - 4159
Fax:	/

©Copyright. All rights reserved by CTTL.

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

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN
Model Name	SM-A075M/DS, SM-A075M
FCC ID	ZCASMA075M
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Power Supply	3.88V DC by Battery
Antenna gain	-0.8dBi

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT11a	2504200103UT11a	REV1.0	A075M.001	2025-05-07
UT01a	2504200103UT01a	REV1.0	A075M.001	2025-05-07

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

3.3. Internal Identification of AE

AE ID*	Name	Model	Manufacturer
AE1	Battery	HQ-7160SD	SCUD(Fujian) Electronics Co., Ltd.
AE2*	Adapter	EP-TA800	SOLUM
AE3-1	Date Cable C-C	EP-DN980BWE	Cresyn
AE3-2	Date Cable C-C	EP-DN980BWE	Luxshare

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

*AE2 is not the AE for EUT, provided by the lab for relevant tests.

3.4. Normal Accessory setting

Fully charged battery is used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN with integrated antenna. It consists of normal options: lithium battery and USB cable. Manual and specifications of the EUT were provided to fulfill the test. Samples undergoing test were selected by the Client.

©Copyright. All rights reserved by CTTL.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. 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, 2400–2483.5 MHz, and 5725–5850 MHz.	2024
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	June,2013

©Copyright. All rights reserved by CTTL.

5. Test Results

5.1. Summary of Test Results

Abbreviations used in this clause:

P Pass, The EUT complies with the essential requirements in the standard.

F Fail, The EUT does not comply with the essential requirements in the standard

NA Not Applicable, The test was not applicable

NP Not Performed, The test was not performed by CTTL

SUMMARY OF MEASUREMENT RESULTS	Sub-clause	Verdict
Peak Output Power	15.247 (b)(1)	**P**
Frequency Band Edges- Conducted	15.247 (d)	**P**
Transmitter Spurious Emission - Conducted	15.247 (d)	**P**
Radiated Unwanted Emission	15.247, 15.205, 15.209	**P**
Time of Occupancy (Dwell Time)	15.247 (a) (1)(iii)	**P**
20dB Bandwidth	15.247 (a)(1)	**NA**
Carrier Frequency Separation	15.247 (a)(1)	**P**
Number of hopping channels	15.247 (a)(iii)	**P**
AC Powerline Conducted Emission	15.107, 15.207	**P**
Antenna Requirement	15.203	**P**

Please refer to **ANNEX A** for detail.

The measurement is made according to ANSI C63.10.

5.2. Statements

CTTL has evaluated the test cases requested by the applicant /manufacturer as listed in section 5.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2

©Copyright. All rights reserved by CTTL.

6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2026-06-09
2	Base Station Simulator	CMW500	159384	Rohde & Schwarz	1 year	2025-11-10
3	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	R&S	1 year	2025-06-06
2	Test Receiver	ESW44	103015	R&S	1 year	2026-01-15
3	Test Receiver	FSV40	101047	R&S	1 year	2025-06-25
4	Loop Antenna	HFH2-Z2	829324/007	R&S	2 years	2026-01-04
5	EMI Antenna	VULB9163	235	Schwarzbeck	1 year	2025-08-27
6	EMI Antenna	3117	00058888	ETS-Lindgren	1 year	2025-09-18
7	EMI Antenna	LB-180400 -25-C-KF	J211060826	A-INFO	1 year	2025-08-29
8	Universal Radio Communication Tester	CMW500	159408	R&S	1 year	2026-02-16

AC Power Line Conducted Emission

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	LISN	ENV216	101459	R&S	1 year	2026-05-07
2	Test Receiver	ESCI7	100948	R&S	1 year	2025-12-10
3	Universal Radio Communication Tester	CMW500	159408	R&S	1 year	2026-02-16

Note: The Test Receiver with series number of 100376 did not exceed the CAL.DUE.DATE when used.

©Copyright. All rights reserved by CTTL.

7. Measurement Uncertainty

7.1. Peak Output Power - Conducted

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.66dB

7.2. Frequency Band Edges - Conducted

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.66dB

7.3. Transmitter Spurious Emission - Conducted

Measurement Uncertainty:

Frequency Range	Uncertainty (k=2)
30 MHz ~ 8 GHz	1.22dB
8 GHz ~ 12.75 GHz	1.51dB
12.7GHz ~ 26 GHz	1.51dB

7.4. Transmitter Spurious Emission - Radiated

Measurement Uncertainty:

Frequency Range	Uncertainty(dBm) (k=2)
9kHz-30MHz	3.96
30MHz ≤ f ≤ 1GHz	5.73
1GHz ≤ f ≤18GHz	5.62
18GHz ≤ f ≤40GHz	3.52

7.5. Time of Occupancy (Dwell Time)

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.88ms

7.6. 20dB Bandwidth

Measurement Uncertainty:

Measurement Uncertainty (k=2)	61.936Hz

©Copyright. All rights reserved by CTTL.

7.7. Carrier Frequency Separation

Measurement Uncertainty:

Measurement Uncertainty (k=2)	61.936Hz

7.8. AC Powerline Conducted Emission

Measurement Uncertainty:

Measurement Uncertainty (k=2)	3.10dB

©Copyright. All rights reserved by CTTL.

ANNEX A: EUT parameters

Disclaimer: The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

©Copyright. All rights reserved by CTTL.

ANNEX B: Detailed Test Results

B.1. Measurement Method

B.1.1. Conducted Measurements

The measurement is made according to ANSI C63.10.

1). Connect the EUT to the test system correctly.

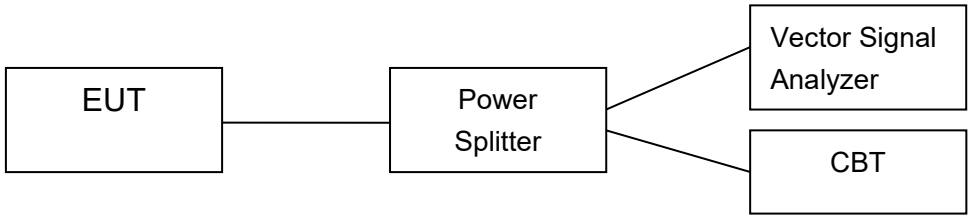
2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).

3). Set the EUT to the required channel.

4). Set the EUT hopping mode (hopping or hopping off).

5). Set the spectrum analyzer to start measurement.

6). Record the values. Vector Signal Analyzer



B.1.2. Radiated Emission Measurements

The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The EUT was placed on a non-conductive table with 80cm above the ground plane for measurement below 1GHz and 1.5m above the ground plane for measurement above 1GHz. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated from 0° to 360°and the measurement antenna is moved from 1m to 4m to get the maximization result. The maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

©Copyright. All rights reserved by CTTL.

B.2. Peak Output Power

B.2.1. Peak Output Power – Conducted

Method of Measurement: See ANSI C63.10-clause 7.8.5

a) Use the following spectrum analyzer settings:

- Span: 6MHz
- RBW: 3MHz
- VBW: 3MHz
- Sweep time: 2.5ms
- Detector function: peak
- Trace: max hold

b) Allow trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission.

d) The indicated level is the peak output power.

Measurement Limit:

Standard	Limits	
FCC Part 15.247 (b)(1)	Bandwidth≤1MHz	30dBm (1W)
	Bandwidth＞1MHz	21dBm (125mW)

Measurement Results:

For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	10.21	10.17	9.63	P

For π/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	9.16	9.33	8.68	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	9.06	9.23	8.49	P

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

B.2.2. E.I.R.P.

The radiated E.I.R.P. is listed below:

Antenna gain = -0.8dBi

For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
E.I.R.P (dBm)	9.41	9.37	8.83	P

Forπ/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
E.I.R.P (dBm)	8.36	8.53	7.88	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
E.I.R.P (dBm)	8.26	8.43	7.69	P

Note: E.I.R.P. are calculated with the antenna gain.

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

B.3. Frequency Band Edges – Conducted

Method of Measurement: See ANSI C63.10-clause 7.8.6

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

– Span: 10 MHz
– Resolution Bandwidth: 100 kHz
– Video Bandwidth: 300 kHz
– Sweep Time:Auto
– Detector: Peak
– Trace: max hold

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	< -20

Measurement Result:

TestMode	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Low	2402	9.23	-46.22	≤-10.77	PASS
	High	2480	8.25	-46.28	≤-11.75	PASS
	Low	Hop_2402	8.94	-46.35	≤-11.06	PASS
	High	Hop_2480	7.93	-46.2	≤-12.07	PASS
2DH5	Low	2402	8.31	-45.56	≤-11.69	PASS
	High	2480	7.40	-45.66	≤-12.6	PASS
	Low	Hop_2402	6.96	-46.3	≤-13.04	PASS
	High	Hop_2480	6.73	-46.24	≤-13.27	PASS
3DH5	Low	2402	8.28	-45.71	≤-11.72	PASS
	High	2480	7.39	-46.29	≤-12.61	PASS
	Low	Hop_2402	6.91	-46.3	≤-13.09	PASS
	High	Hop_2480	7.25	-45.09	≤-12.75	PASS

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

Test graphs as below

DH5_Low_2402

13:38:38 03.06.2025

DH5_High_2480

13:41:42 03.06.2025

DH5_Low_Hop_2402

©Copyright. All rights reserved by CTTL.

13:52:16 03.06.2025

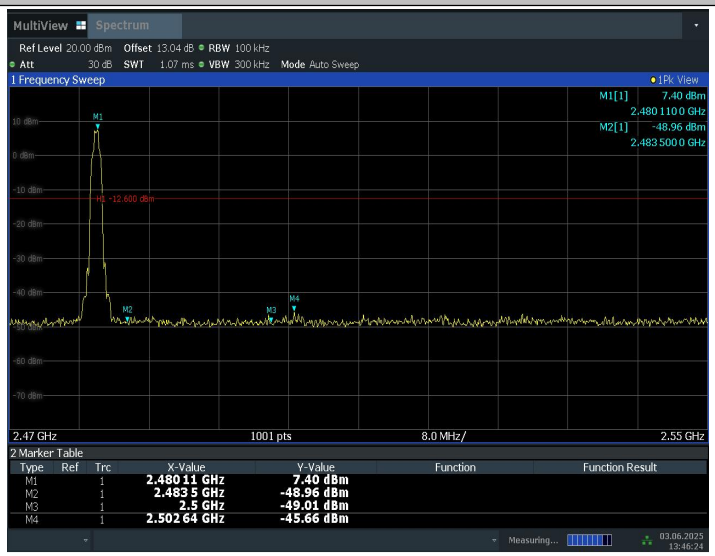
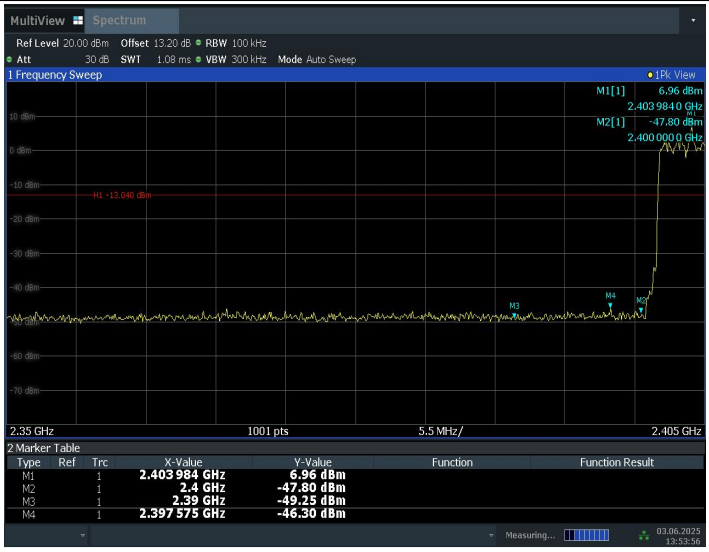
DH5_High_Hop_2480

13:53:46 03.06.2025

2DH5_Low_2402

13:43:20 03.06.2025

©Copyright. All rights reserved by CTTL.

2DH5_High_2480
 13:46:24 03.06.2025
2DH5_Low_Hop_2402
 13:53:57 03.06.2025
2DH5_High_Hop_2480

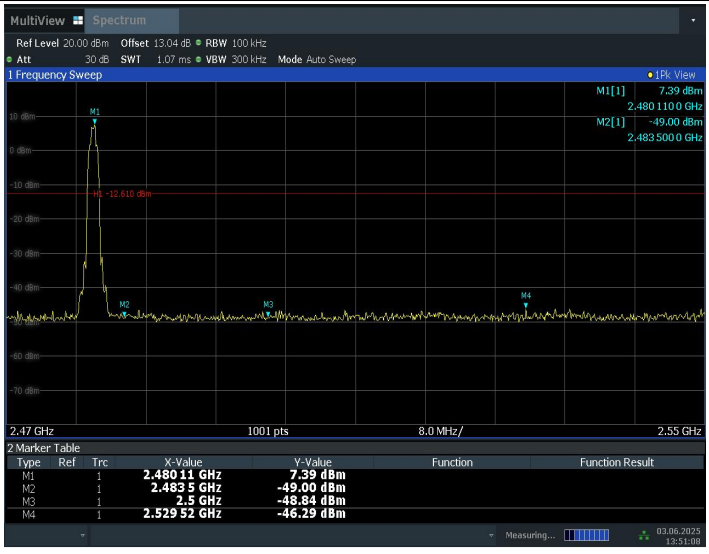
©Copyright. All rights reserved by CTTL.

13:55:27 03.06.2025

3DH5_Low_2402

13:48:04 03.06.2025

3DH5_High_2480



13:51:08 03.06.2025

©Copyright. All rights reserved by CTTL.

3DH5_Low_Hop_2402
 13:55:38 03.06.2025
3DH5_High_Hop_2480
 13:57:08 03.06.2025

©Copyright. All rights reserved by CTTL.

B.4. Transmitter Spurious Emission - Conducted

Method of Measurement: See ANSI C63.10-clause 7.8.8

Measurement Procedure – Reference Level

1. Set the RBW = 100 kHz.

2. Set the VBW = 300 kHz.

3. Set the span to 5-30 % greater than the EBW.

4. Detector = peak.

5. Sweep time = auto couple.

6. Trace mode = max hold.

7. Allow trace to fully stabilize.

8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

Measurement Procedure - Unwanted Emissions

1. Set RBW = 100 kHz.

2. Set VBW = 300 kHz.

3. Set span to encompass the spectrum to be examined.

4. Detector = peak.

5. Trace Mode = max hold.

6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified above.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

©Copyright. All rights reserved by CTTL.

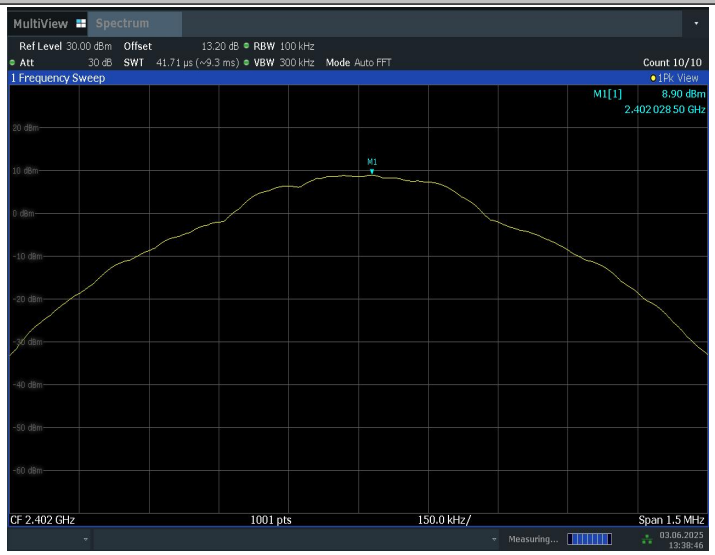
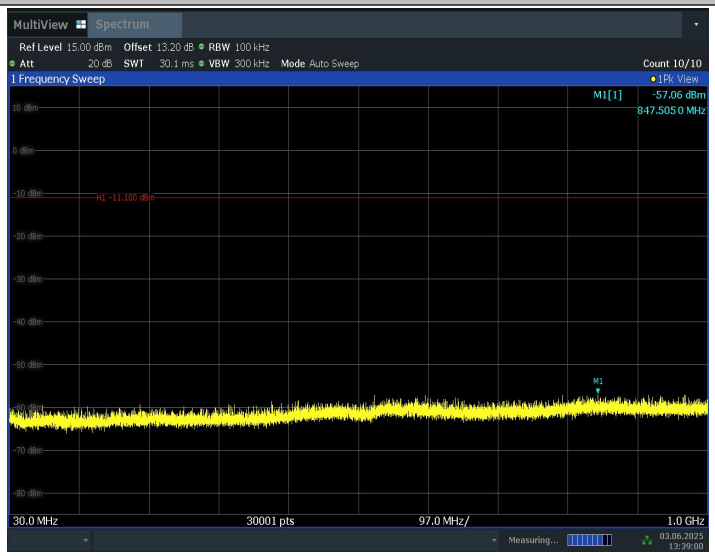
Measurement Results:

TestMode	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	2402	Reference	8.90	8.90	---	PASS
		30~1000	8.90	-57.06	≤-11.1	PASS
		1000~26500	8.90	-43.84	≤-11.1	PASS
	2441	Reference	8.38	8.38	---	PASS
		30~1000	8.38	-56.8	≤-11.62	PASS
		1000~26500	8.38	-44.1	≤-11.62	PASS
	2480	Reference	7.99	7.99	---	PASS
		30~1000	7.99	-56.69	≤-12.01	PASS
		1000~26500	7.99	-43.92	≤-12.01	PASS
2DH5	2402	Reference	7.26	7.26	---	PASS
		30~1000	7.26	-56.75	≤-12.74	PASS
		1000~26500	7.26	-44.36	≤-12.74	PASS
	2441	Reference	7.12	7.12	---	PASS
		30~1000	7.12	-56.88	≤-12.88	PASS
		1000~26500	7.12	-43.85	≤-12.88	PASS
	2480	Reference	6.35	6.35	---	PASS
		30~1000	6.35	-57.25	≤-13.65	PASS
		1000~26500	6.35	-44.51	≤-13.65	PASS
3DH5	2402	Reference	7.09	7.09	---	PASS
		30~1000	7.09	-56.59	≤-12.91	PASS
		1000~26500	7.09	-44.03	≤-12.91	PASS
	2441	Reference	6.96	6.96	---	PASS
		30~1000	6.96	-56.81	≤-13.04	PASS
		1000~26500	6.96	-44.56	≤-13.04	PASS
	2480	Reference	6.19	6.19	---	PASS
		30~1000	6.19	-56.51	≤-13.81	PASS
		1000~26500	6.19	-43.72	≤-13.81	PASS

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

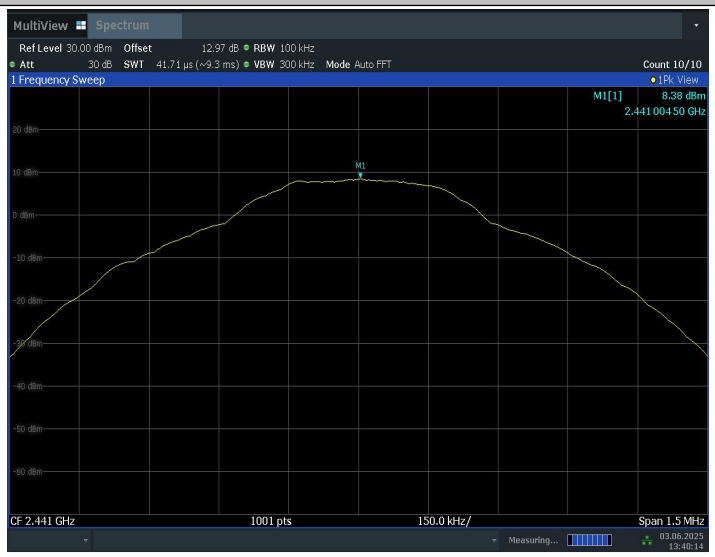
Test graphs as below

DH5_2402_0~Reference
 13:38:47 03.06.2025
DH5_2402_30~1000
 13:39:00 03.06.2025
DH5_2402_1000~26500

©Copyright. All rights reserved by CTTL.

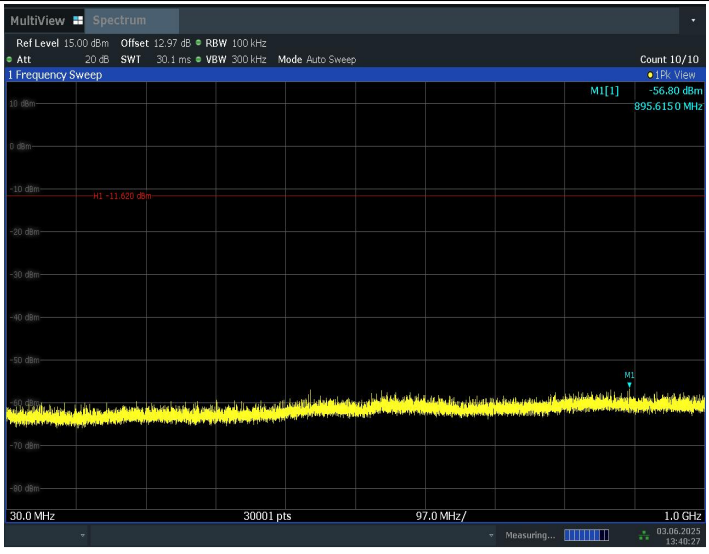
13:39:36 03.06.2025

DH5_2441_0~Reference



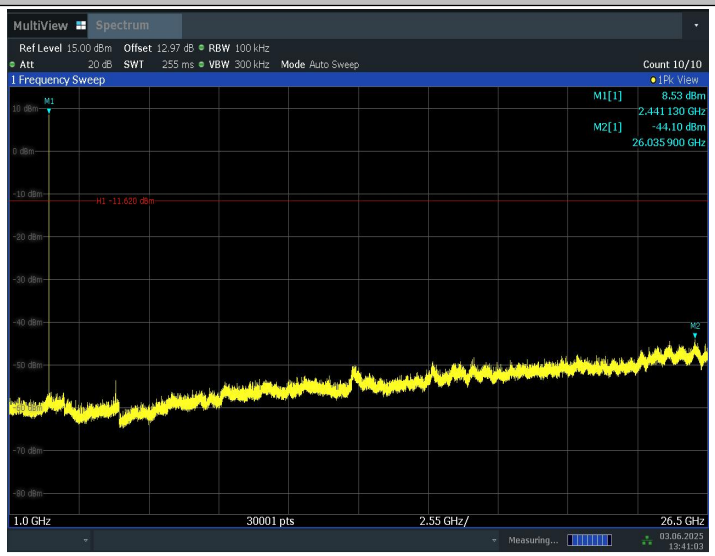
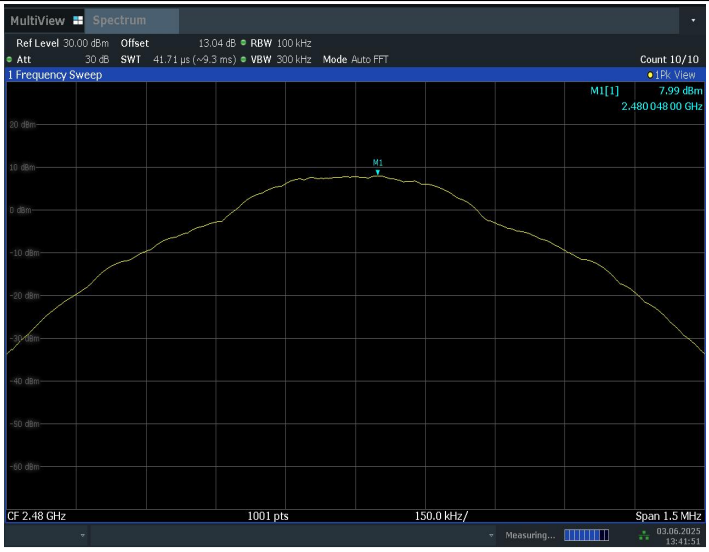
13:40:14 03.06.2025

DH5_2441_30~1000

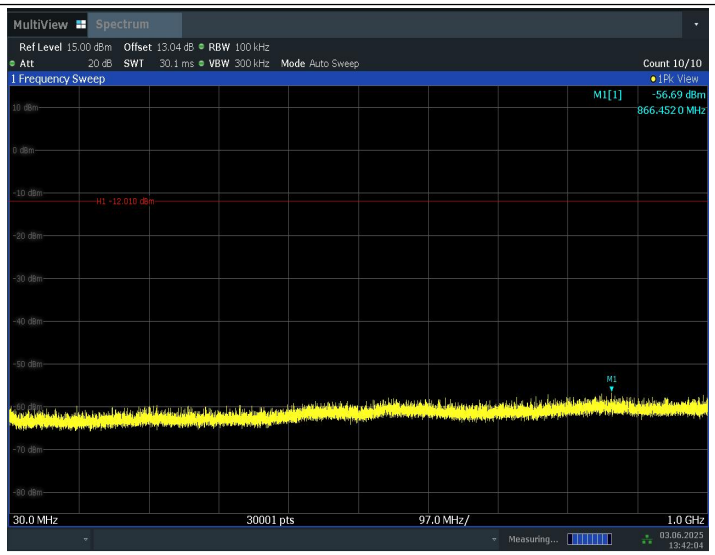


13:40:27 03.06.2025

©Copyright. All rights reserved by CTTL.

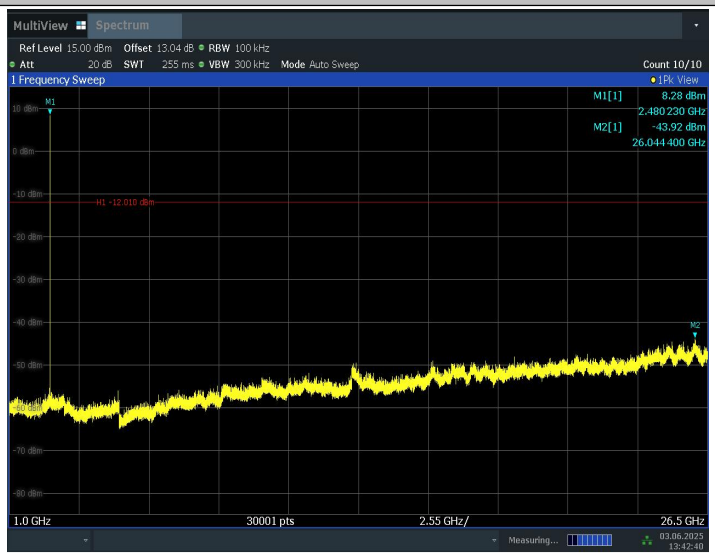
DH5_2441_1000~26500
 13:41:03 03.06.2025
DH5_2480_0~Reference
 13:41:51 03.06.2025
DH5_2480_30~1000

©Copyright. All rights reserved by CTTL.



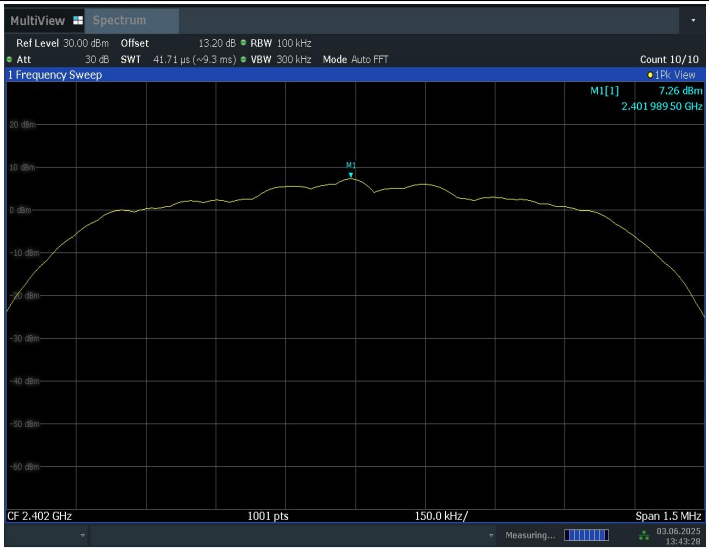
13:42:04 03.06.2025

DH5_2480_1000~26500



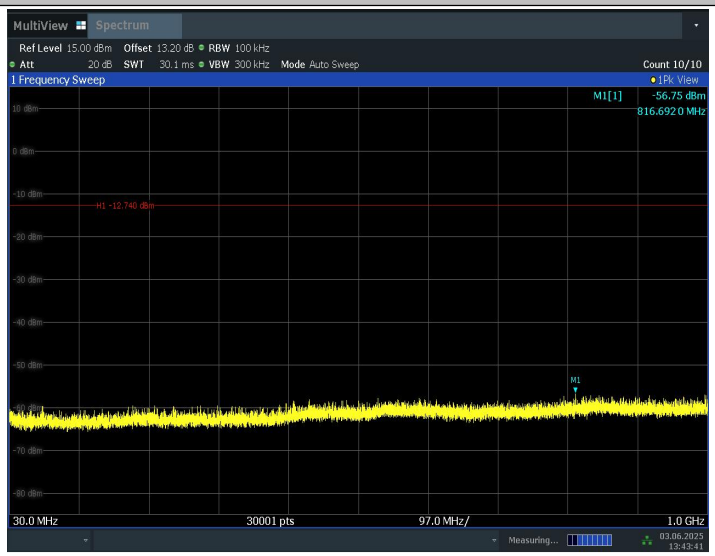
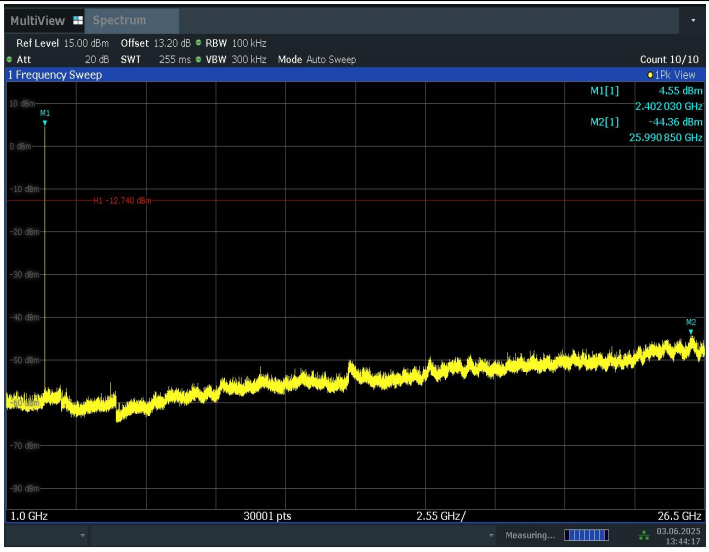
13:42:40 03.06.2025

2DH5_2402_0~Reference

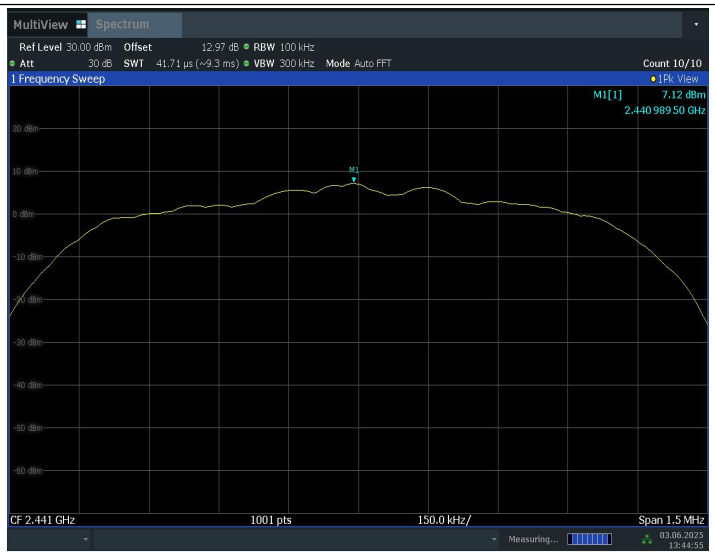


13:43:28 03.06.2025

©Copyright. All rights reserved by CTTL.

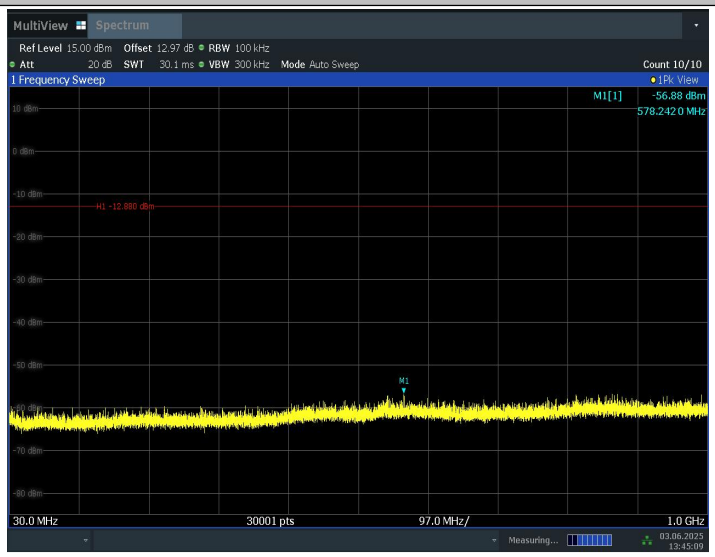
2DH5_2402_30~1000
 13:43:42 03.06.2025
2DH5_2402_1000~26500
 13:44:18 03.06.2025
2DH5_2441_0~Reference

©Copyright. All rights reserved by CTTL.



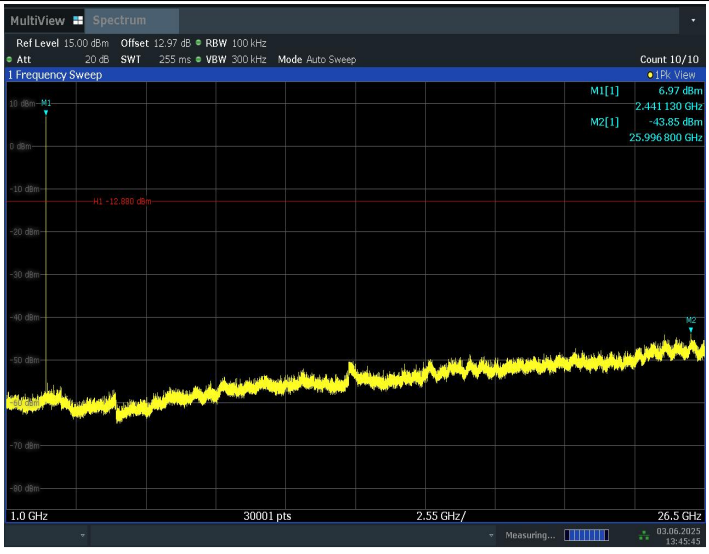
13:44:56 03.06.2025

2DH5_2441_30~1000



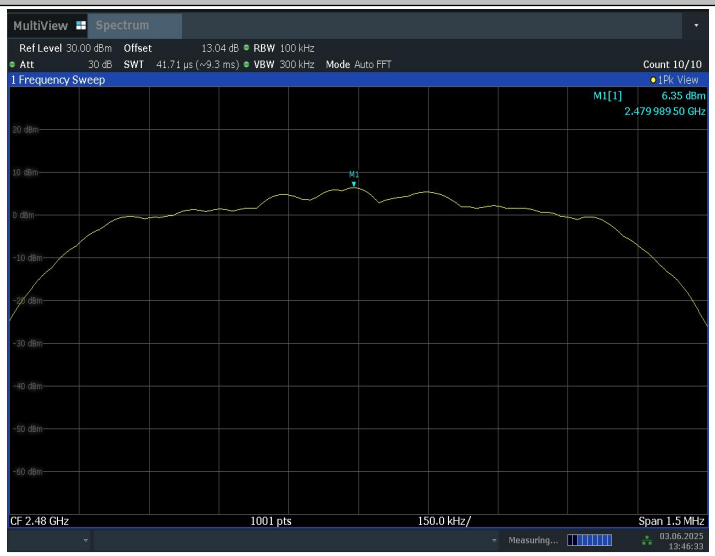
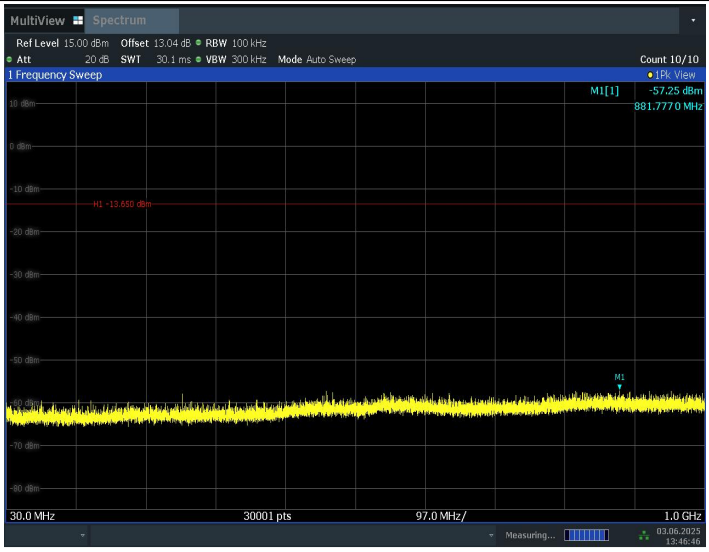
13:45:09 03.06.2025

2DH5_2441_1000~26500

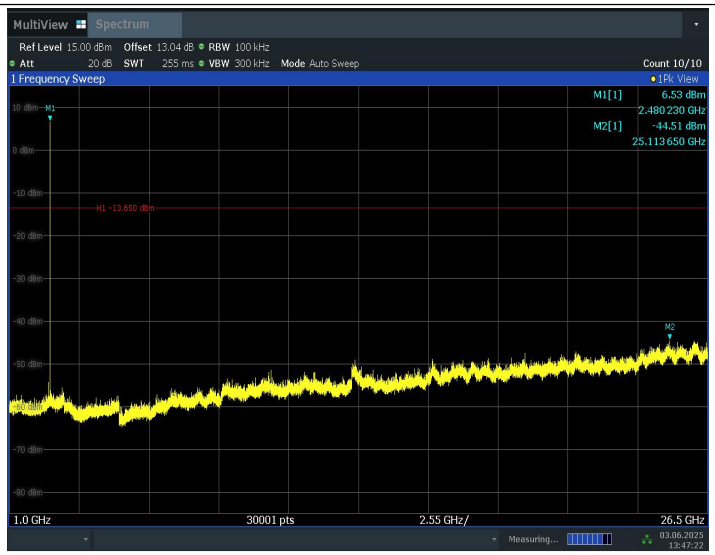


13:45:45 03.06.2025

©Copyright. All rights reserved by CTTL.

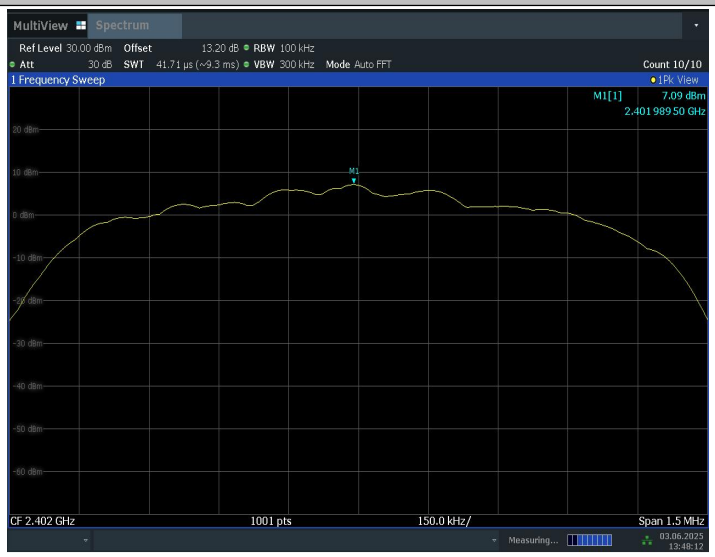
2DH5_2480_0~Reference
 13:46:33 03.06.2025
2DH5_2480_30~1000
 13:46:46 03.06.2025
2DH5_2480_1000~26500

©Copyright. All rights reserved by CTTL.



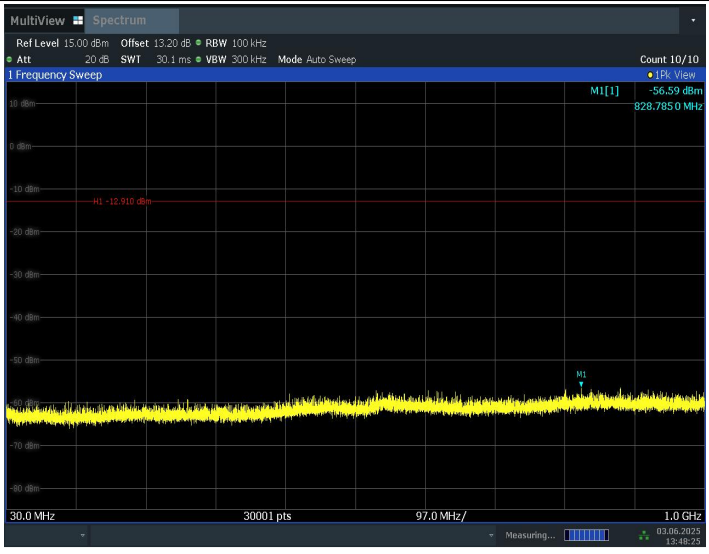
13:47:23 03.06.2025

3DH5_2402_0~Reference



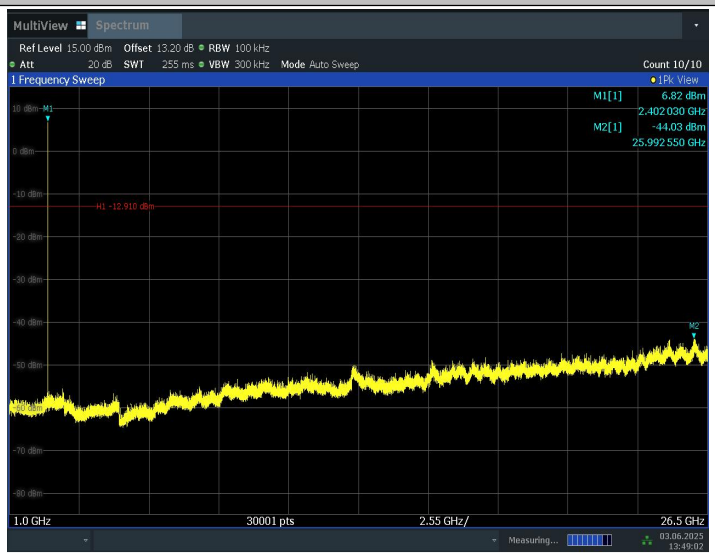
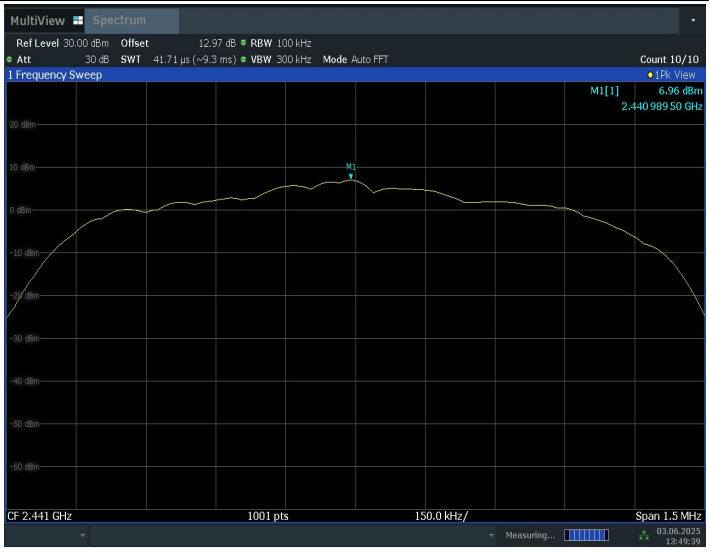
13:48:13 03.06.2025

3DH5_2402_30~1000

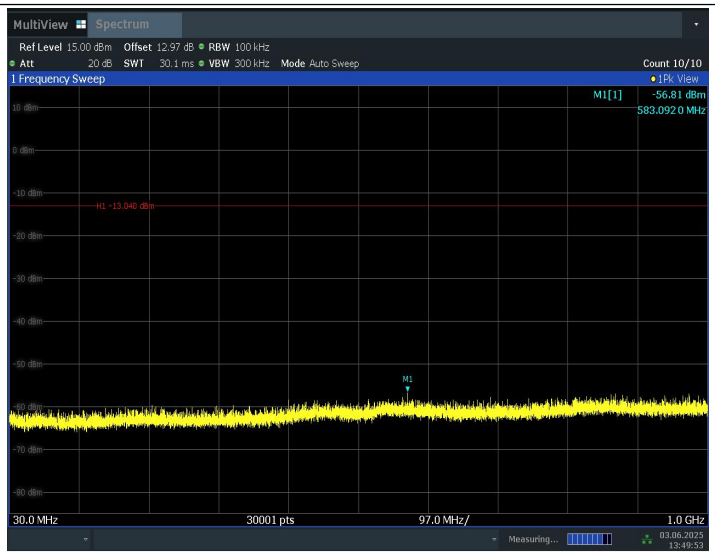


13:48:26 03.06.2025

©Copyright. All rights reserved by CTTL.

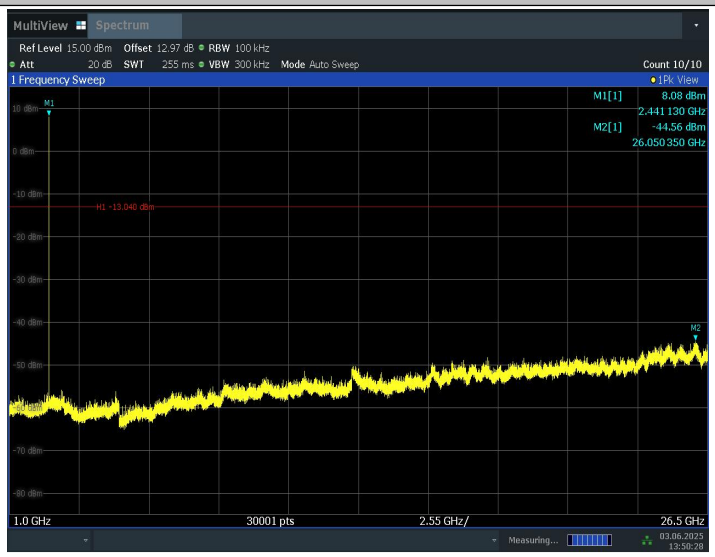
3DH5_2402_1000~26500
 13:49:02 03.06.2025
3DH5_2441_0~Reference
 13:49:40 03.06.2025
3DH5_2441_30~1000

©Copyright. All rights reserved by CTTL.



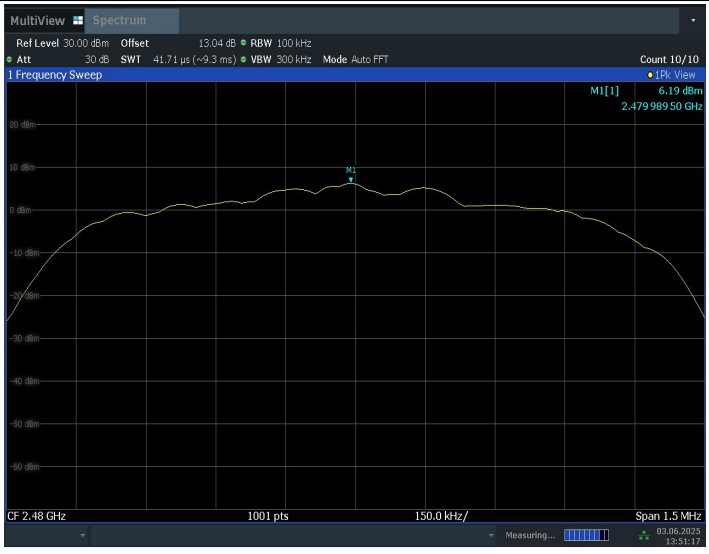
13:49:53 03.06.2025

3DH5_2441_1000~26500



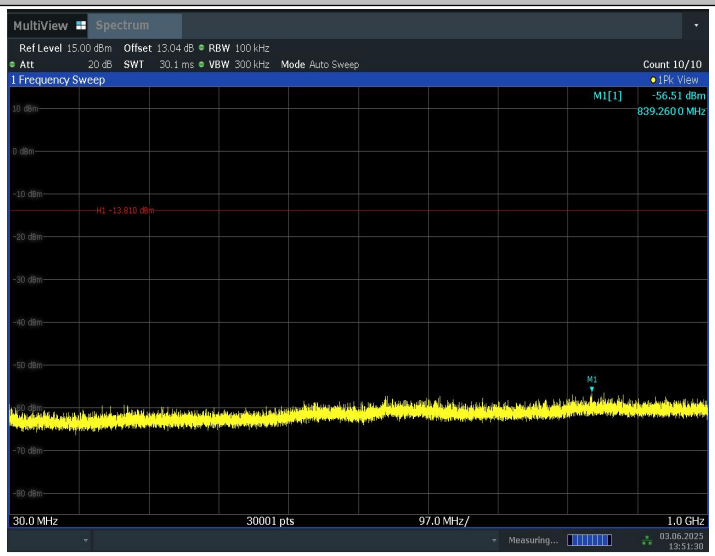
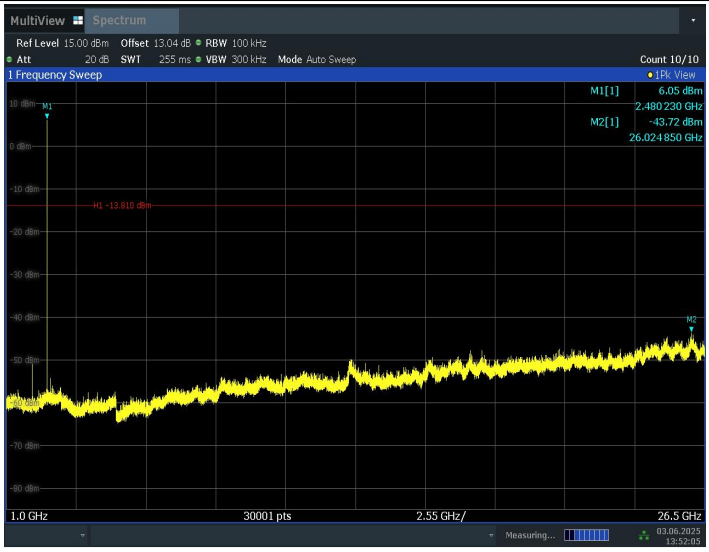
13:50:29 03.06.2025

3DH5_2480_0~Reference



13:51:17 03.06.2025

©Copyright. All rights reserved by CTTL.

3DH5_2480_30~1000
 13:51:30 03.06.2025
3DH5_2480_1000~26500
 13:52:06 03.06.2025

©Copyright. All rights reserved by CTTL.

B.5. Radiated Unwanted Emission

Limits

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 (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

Test setup

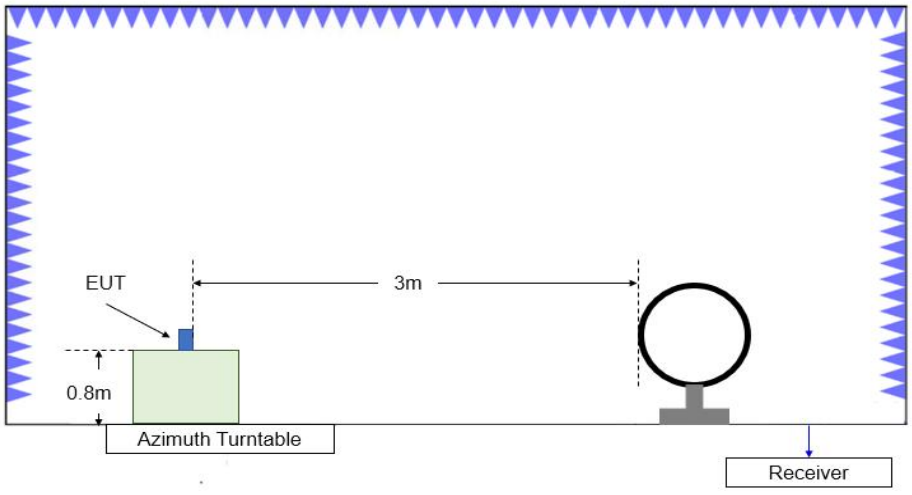


Figure B.5.1. Test Site Diagram (9kHz-30MHz)

©Copyright. All rights reserved by CTTL.

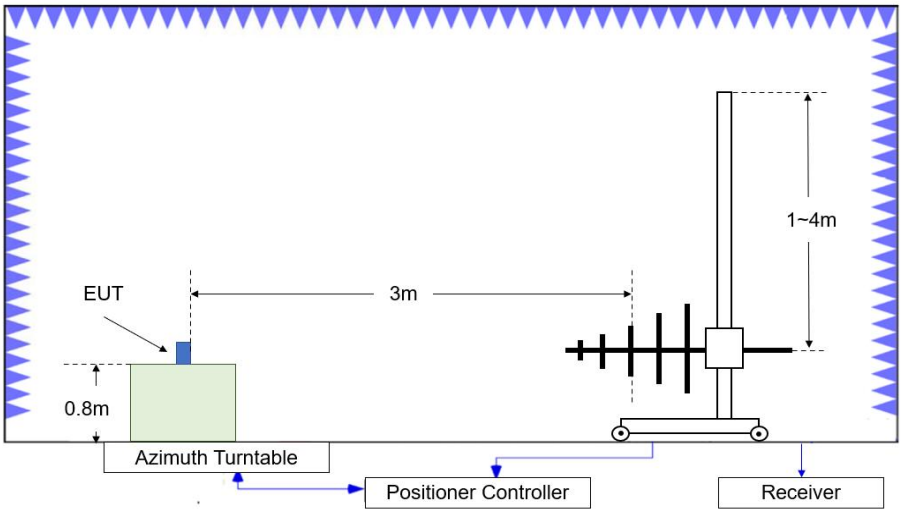


Figure B.5.2. Test Site Diagram (30MHz-1GHz)

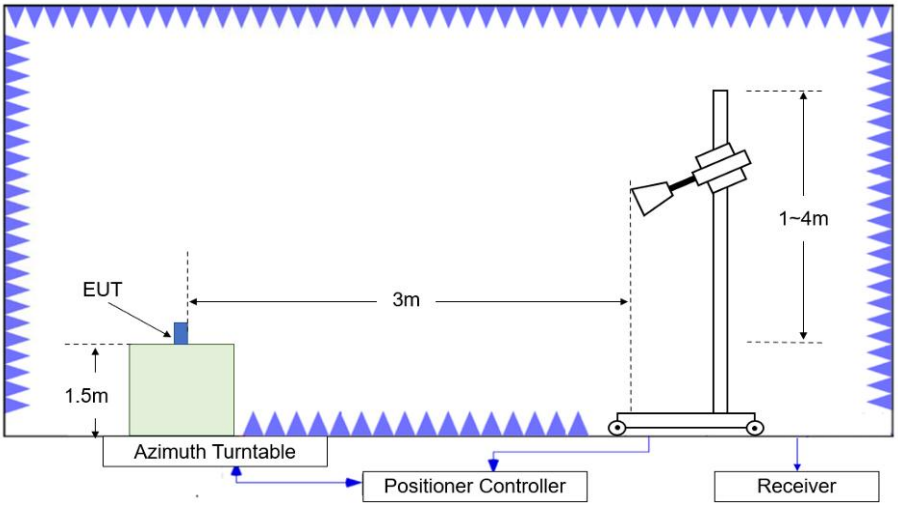


Figure B.5.3. Test Site Diagram (1GHz-40GHz)

Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10.

Test setting

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-3000	1MHz/3MHz	15
3000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Sample Calculation

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

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

©Copyright. All rights reserved by CTTL.

Test note

1. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

2. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB

3. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency.

Test Result

EUT ID: UT01a

Peak Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2378.000	53.09	-20.5	31.9	41.66	74.0	20.9	H
2387.800	53.31	-20.5	32.0	41.85	74.0	20.7	H
4804.000	42.55	-32.0	34.3	40.26	74.0	31.5	V
7206.000	43.02	-29.7	35.6	37.14	74.0	31.0	V
9608.000	43.63	-27.1	36.7	33.99	74.0	30.4	H
12010.000	45.86	-23.7	38.6	30.96	74.0	28.1	H

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2427.200	52.50	-20.5	32.1	40.88	74.0	21.5	V
2453.600	52.98	-20.5	32.2	41.27	74.0	21.0	V
4881.500	43.59	-32.0	34.2	41.36	74.0	30.4	H
7323.000	41.06	-30.0	35.8	35.27	74.0	32.9	V
9764.000	44.16	-27.4	37.1	34.49	74.0	29.8	H
12205.000	46.38	-23.4	38.7	31.06	74.0	27.6	V

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2484.800	53.50	-20.5	32.2	41.79	74.0	20.5	H
2485.500	53.58	-20.5	32.2	41.87	74.0	20.4	V
4959.500	44.33	-31.3	34.1	41.52	74.0	29.7	H
7440.000	42.05	-29.3	35.7	35.62	74.0	32.0	H
9920.000	42.44	-27.2	37.3	32.30	74.0	31.6	H
12400.000	46.15	-23.8	38.7	31.29	74.0	27.8	V

©Copyright. All rights reserved by CTTL.

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2382.600	53.49	-20.5	31.9	42.05	74.0	20.5	V
2386.200	53.27	-20.5	31.9	41.81	74.0	20.7	H
4804.000	40.03	-32.0	34.3	37.75	74.0	34.0	H
7206.000	42.63	-29.7	35.6	36.75	74.0	31.4	H
9608.000	44.03	-27.1	36.7	34.39	74.0	30.0	V
12010.000	46.93	-23.7	38.6	32.04	74.0	27.1	V

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2435.600	52.75	-20.5	32.1	41.10	74.0	21.2	V
2449.200	52.57	-20.5	32.2	40.86	74.0	21.4	V
4882.000	41.31	-32.0	34.2	39.07	74.0	32.7	H
7323.000	41.98	-30.0	35.8	36.19	74.0	32.0	H
9764.000	43.17	-27.4	37.1	33.50	74.0	30.8	V
12205.000	47.05	-23.4	38.7	31.74	74.0	27.0	H

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.800	53.13	-20.5	32.2	41.42	74.0	20.9	H
2484.950	54.09	-20.5	32.2	42.37	74.0	19.9	V
4960.000	41.05	-31.3	34.1	38.24	74.0	33.0	H
7440.000	42.00	-29.3	35.7	35.57	74.0	32.0	V
9920.000	42.05	-27.2	37.3	31.91	74.0	32.0	H
12400.000	45.61	-23.8	38.7	30.75	74.0	28.4	V

©Copyright. All rights reserved by CTTL.

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2380.050	53.59	-20.5	31.9	42.16	74.0	20.4	H
2385.800	52.85	-20.5	31.9	41.39	74.0	21.2	V
4804.000	39.97	-32.0	34.3	37.69	74.0	34.0	H
7206.000	42.01	-29.7	35.6	36.13	74.0	32.0	V
9608.000	44.05	-27.1	36.7	34.41	74.0	30.0	H
12010.000	46.07	-23.7	38.6	31.18	74.0	27.9	H

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2423.600	52.76	-20.5	32.1	41.15	74.0	21.2	V
2451.600	53.25	-20.5	32.2	41.54	74.0	20.7	H
4882.000	39.39	-32.0	34.2	37.15	74.0	34.6	V
7323.000	41.71	-30.0	35.8	35.92	74.0	32.3	V
9764.000	44.29	-27.4	37.1	34.62	74.0	29.7	H
12205.000	46.89	-23.4	38.7	31.58	74.0	27.1	H

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2484.550	53.73	-20.5	32.2	42.01	74.0	20.3	V
2487.300	54.72	-20.5	32.2	43.01	74.0	19.3	H
4960.500	42.64	-31.3	34.1	39.83	74.0	31.4	H
7439.500	42.60	-29.3	35.7	36.20	74.0	31.4	V
9918.500	43.74	-27.2	37.3	33.57	74.0	30.3	H
12400.000	46.20	-23.8	38.7	31.34	74.0	27.8	V

©Copyright. All rights reserved by CTTL.

Average Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2382.000	42.04	-20.5	31.9	30.61	54.0	12.0	V
2386.400	41.80	-20.5	31.9	30.34	54.0	12.2	V
4803.500	35.55	-32.0	34.3	33.27	54.0	18.4	V
7206.000	32.59	-29.7	35.6	26.71	54.0	21.4	H
9608.000	34.20	-27.1	36.7	24.56	54.0	19.8	V
12010.000	37.83	-23.7	38.6	22.94	54.0	16.2	V

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2434.400	43.09	-20.5	32.1	31.44	54.0	10.9	V
2449.600	43.86	-20.5	32.2	32.15	54.0	10.1	V
4882.000	34.10	-32.0	34.2	31.86	54.0	19.9	H
7323.000	32.66	-30.0	35.8	26.87	54.0	21.3	H
9764.000	34.20	-27.4	37.1	24.53	54.0	19.8	V
12205.000	36.70	-23.4	38.7	21.39	54.0	17.3	H

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2492.000	44.22	-20.5	32.2	32.51	54.0	9.8	V
2496.800	43.95	-20.5	32.2	32.24	54.0	10.1	V
4959.500	34.55	-31.3	34.1	31.74	54.0	19.5	H
7440.000	31.70	-29.3	35.7	25.28	54.0	22.3	V
9920.000	33.62	-27.2	37.3	23.48	54.0	20.4	V
12400.000	36.01	-23.8	38.7	21.15	54.0	18.0	V

©Copyright. All rights reserved by CTTL.

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2384.400	41.87	-20.5	31.9	30.42	54.0	12.1	V
2389.200	41.86	-20.5	32.0	30.39	54.0	12.1	V
4803.500	32.47	-32.0	34.3	30.19	54.0	21.5	H
7206.000	32.56	-29.7	35.6	26.69	54.0	21.4	H
9608.000	34.22	-27.1	36.7	24.58	54.0	19.8	V
12010.000	36.92	-23.7	38.6	22.03	54.0	17.1	V

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2433.600	43.61	-20.5	32.1	31.97	54.0	10.4	V
2454.000	44.31	-20.5	32.2	32.60	54.0	9.7	V
4882.000	30.59	-32.0	34.2	28.35	54.0	23.4	V
7323.000	32.13	-30.0	35.8	26.34	54.0	21.9	H
9764.000	33.84	-27.4	37.1	24.16	54.0	20.2	V
12205.000	36.60	-23.4	38.7	21.29	54.0	17.4	V

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2485.600	44.08	-20.5	32.2	32.37	54.0	9.9	V
2491.600	44.15	-20.5	32.2	32.43	54.0	9.9	V
4960.000	34.66	-31.3	34.1	31.86	54.0	19.3	V
7440.000	32.03	-29.3	35.7	25.61	54.0	22.0	H
9920.000	34.10	-27.2	37.3	23.96	54.0	19.9	V
12400.000	36.70	-23.8	38.7	21.84	54.0	17.3	H

©Copyright. All rights reserved by CTTL.

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2386.800	41.88	-20.5	31.9	30.42	54.0	12.1	V
2388.800	41.91	-20.5	32.0	30.45	54.0	12.1	V
4804.000	31.74	-32.0	34.3	29.45	54.0	22.3	V
7206.000	32.58	-29.7	35.6	26.71	54.0	21.4	H
9608.000	34.00	-27.1	36.7	24.36	54.0	20.0	V
12010.000	36.96	-23.7	38.6	22.06	54.0	17.0	V

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2434.000	42.78	-20.5	32.1	31.13	54.0	11.2	V
2448.400	43.97	-20.5	32.2	32.27	54.0	10.0	V
4882.000	31.18	-32.0	34.2	28.94	54.0	22.8	H
7323.000	32.09	-30.0	35.8	26.30	54.0	21.9	H
9764.000	33.55	-27.4	37.1	23.87	54.0	20.5	H
12205.000	36.79	-23.4	38.7	21.48	54.0	17.2	H

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2488.000	43.79	-20.5	32.2	32.07	54.0	10.2	V
2503.600	44.39	-20.5	32.2	32.66	54.0	9.6	V
4960.000	34.35	-31.3	34.1	31.54	54.0	19.7	H
7440.000	32.62	-29.3	35.7	26.20	54.0	21.4	H
9920.000	34.24	-27.2	37.3	24.09	54.0	19.8	V
12400.000	36.35	-23.8	38.7	21.48	54.0	17.7	V

Conclusion: Pass

Note: the spurious emission above 18G is noise only and did not show on the report.

©Copyright. All rights reserved by CTTL.

Band edge compliance

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.31GHz ~2.43GHz	Fig.1	P
	78	2.45GHz ~2.5GHz	Fig.2	P

Mode	Channel	Frequency Range	Test Results	Conclusion
π/4 DQPSK	0	2.31GHz ~2.43GHz	Fig.3	P
	78	2.45GHz ~2.5GHz	Fig.4	P

Mode	Channel	Frequency Range	Test Results	Conclusion
8DPSK	0	2.31GHz ~2.43GHz	Fig.5	P
	78	2.45GHz ~2.5GHz	Fig.6	P

Conclusion: PASS

Test graphs as below

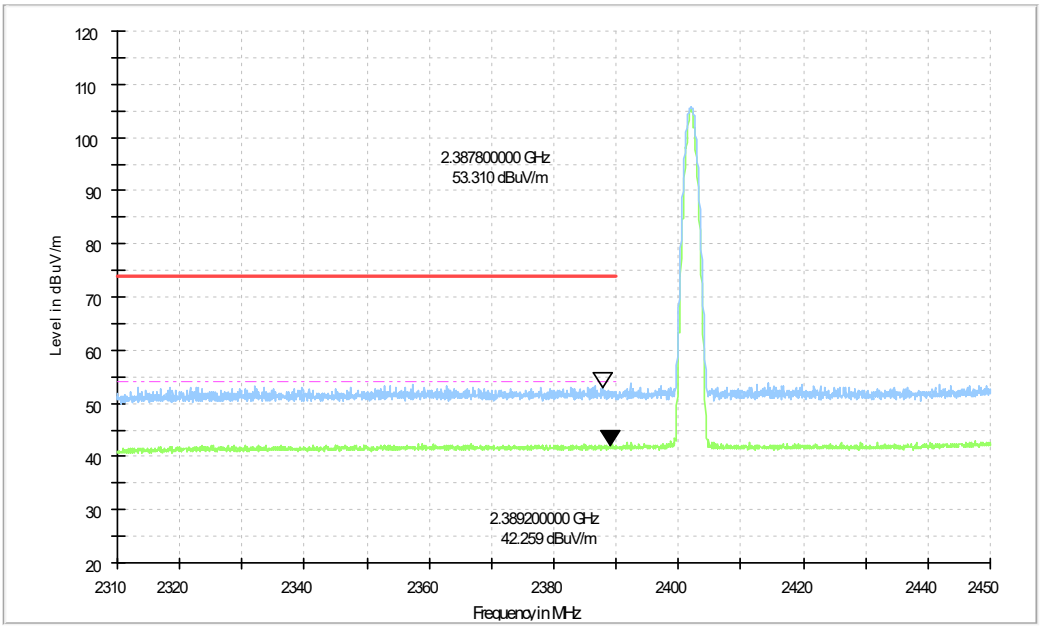


Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off, 2.31 GHz – 2.45GHz

©Copyright. All rights reserved by CTTL.

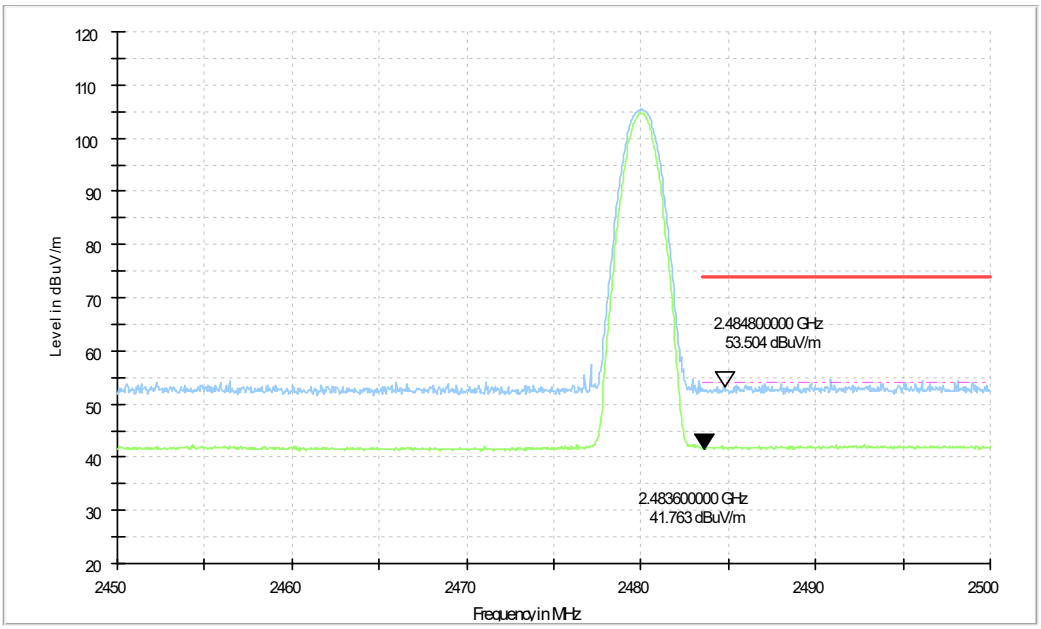


Fig.2. Frequency Band Edges: GFSK, Channel 78, Hopping Off, ch11, 2.45 GHz - 2.50GHz

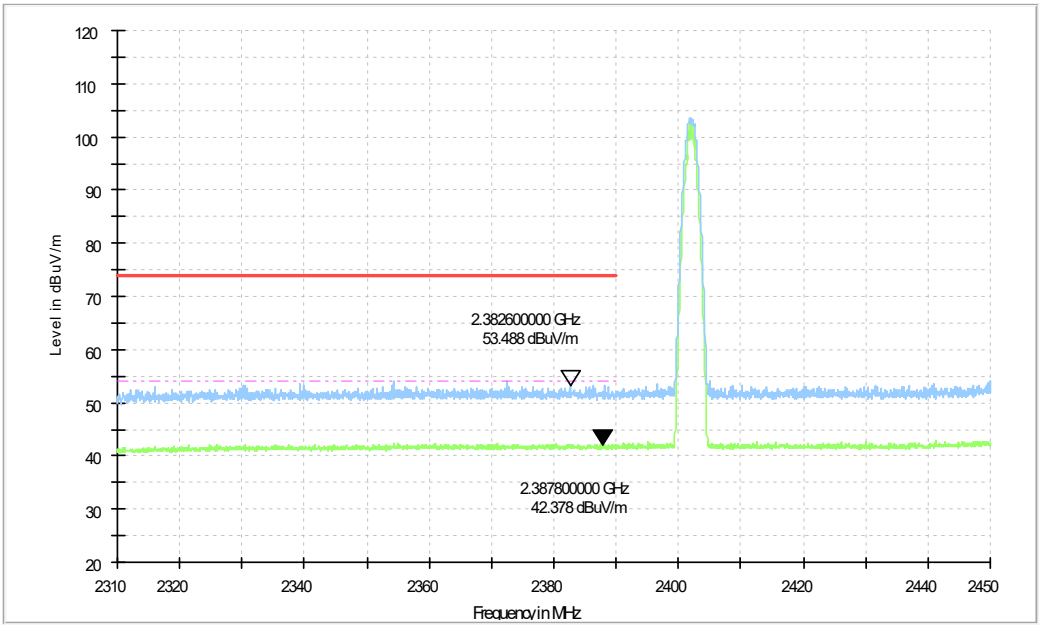


Fig.3. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping Off, 2.31 GHz - 2.45GHz

©Copyright. All rights reserved by CTTL.

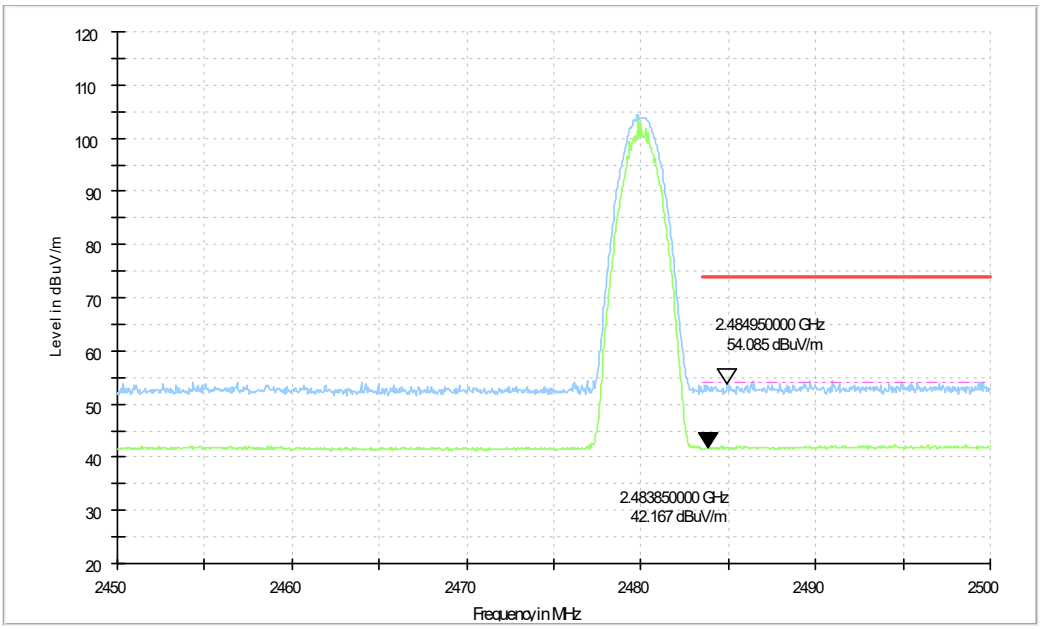


Fig.4. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping Off, 2.45 GHz - 2.50GHz

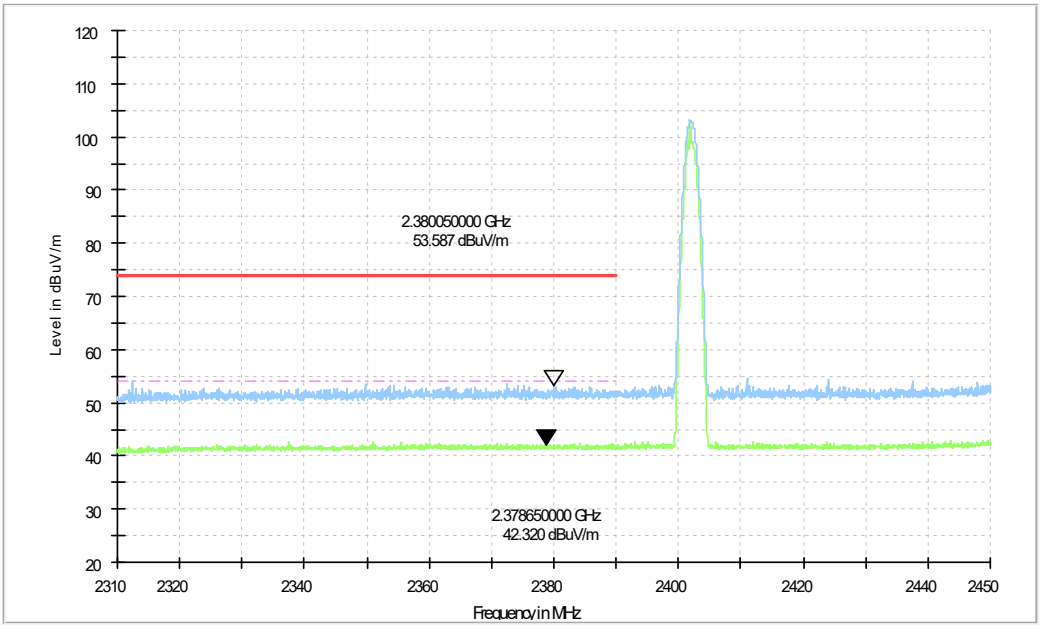


Fig.5. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off, 2.31 GHz - 2.45GHz

©Copyright. All rights reserved by CTTL.

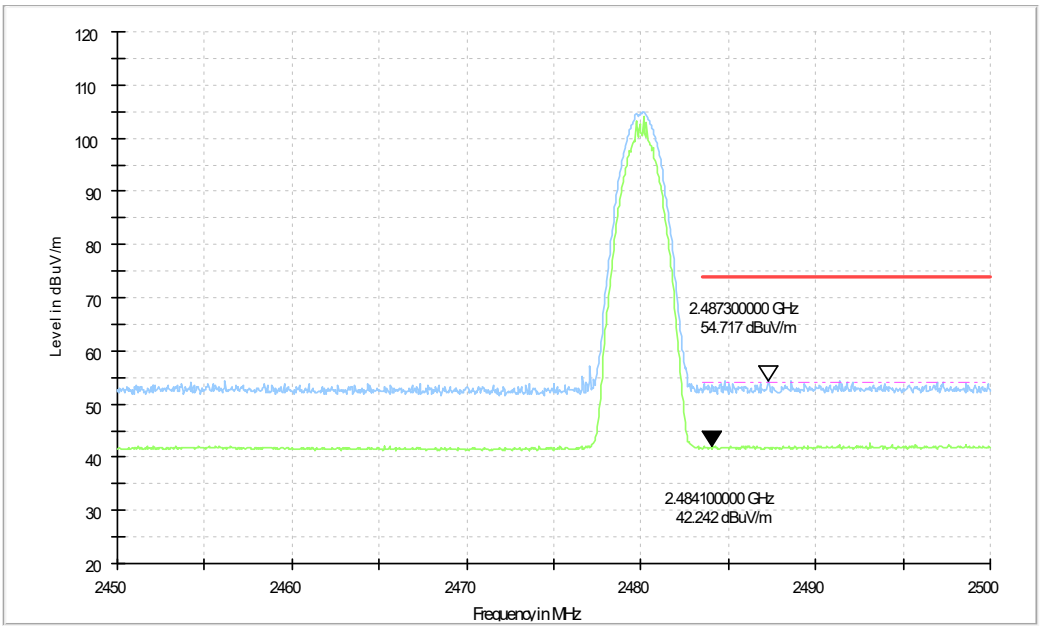


Fig.6. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off, 2.45 GHz - 2.50GHz

©Copyright. All rights reserved by CTTL.

B.6. Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.8.4

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW ≥ RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

Measurement Limit:

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

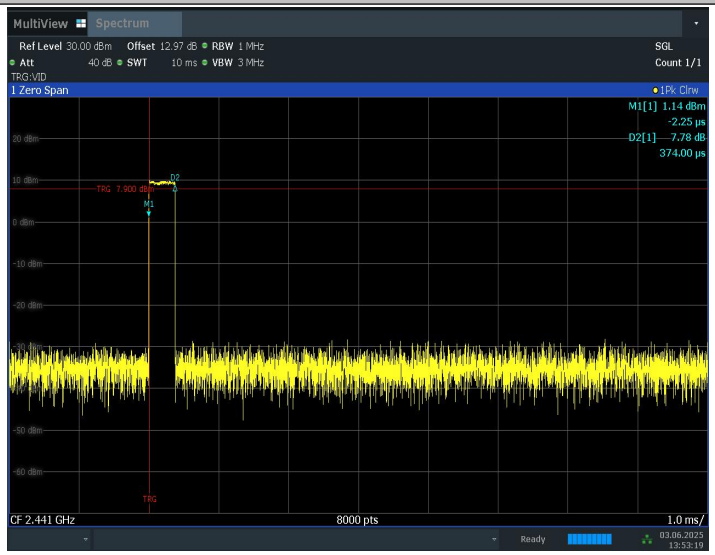
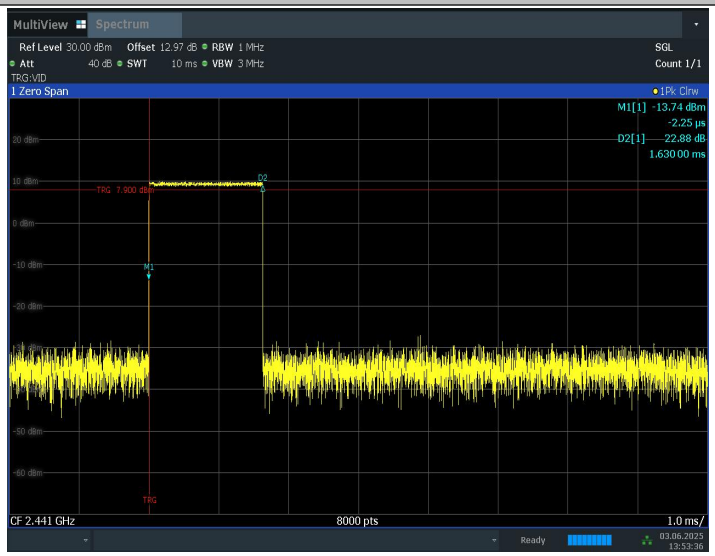
Measurement Result:

TestMode	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Hop	0.374	320	0.12	≤0.4	PASS
DH3	Hop	1.630	160	0.261	≤0.4	PASS
DH5	Hop	2.879	106.67	0.307	≤0.4	PASS
2DH1	Hop	0.381	320	0.122	≤0.4	PASS
2DH3	Hop	1.634	160	0.261	≤0.4	PASS
2DH5	Hop	2.882	106.67	0.307	≤0.4	PASS
3DH1	Hop	0.381	320	0.122	≤0.4	PASS
3DH3	Hop	1.633	160	0.261	≤0.4	PASS
3DH5	Hop	2.885	106.67	0.308	≤0.4	PASS

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

Test graphs as below:

DH1_Hop
 13:53:20 03.06.2025
DH3_Hop
 13:53:36 03.06.2025
DH5_Hop

©Copyright. All rights reserved by CTTL.