

Prüfbericht-Nr.: <i>Test report no.:</i>	CN24HTHL 001	Auftrags-Nr.: <i>Order no.:</i>	48244035	Seite 1 von 31 Page 1 of 31
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2024-02-19	
Auftraggeber: <i>Client:</i>	Edimax Technology Co., Ltd. No.278, Xinhu 1st Rd., Neihu Dist., Taipei City, Taiwan			
Prüfgegenstand: <i>Test item:</i>	2-in-1 Wi-Fi 6 & Bluetooth 5.3 USB Adapter			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	EW-7611UXB			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (BT)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2024-02-22			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003662532-002 A003662532-003			
Prüfzeitraum: <i>Testing period:</i>	2024-03-11 - 2024-03-20			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>compiled by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i> 2024-04-11	 Ethan Shao	Ausstellungsdatum: <i>Issue date:</i> 2024-04-11	 Brenda Chen	
Stellung / Position:	Assistant Project Engineer	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Prüfbericht-Nr.:
Test report no.:

CN24HTHL 001

Seite 2 von 31
Page 2 of 31

Anmerkungen
Remarks

1	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</p> <p>Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
2	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature</p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature</i></p>
3	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</p> <p>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i></p> <p><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
4	<p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p>

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	Antenna Requirement	Pass
5.1.2	15.247(b)(1)	Peak Output Power	Pass
5.1.3	15.247(a)(1)	20 dB Bandwidth	Note 1
5.1.3	2.1049	99% Occupied Bandwidth	Pass
5.1.4	15.247(d)	Conducted Spurious Emission and Band Edges	Pass
5.1.5	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
5.1.6	15.247(a)(1)	Hopping Channel Separation	Pass
5.1.7	15.247(a)(1) (iii)	Number of Hopping Frequency Used	Pass
5.1.8	15.247(a)(1) (iii)	Dwell Time on Each Channel	Pass
5.2.1	15.207	Mains Conducted Emission	Pass

Note:

1. If the Frequency Hopping Systems operating in 2400-2483.5 MHz band and the output power less than 125 mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of hopping channel whichever is greater.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

Contents

HISTORY OF THIS TEST REPORT	6
1. GENERAL REMARKS.....	7
1.1 COMPLEMENTARY MATERIALS	7
1.2 DECISION RULE OF CONFORMITY.....	7
2. TEST SITES.....	8
2.1 TEST LABORATORY.....	8
2.2 TEST FACILITY	8
2.3 TRACEABILITY.....	9
2.4 CALIBRATION.....	9
2.5 MEASUREMENT UNCERTAINTY	9
3. GENERAL PRODUCT INFORMATION	10
3.1 PRODUCT FUNCTION AND INTENDED USE.....	10
3.2 SYSTEM DETAILS AND RATINGS	10
3.3 NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	11
3.4 SUBMITTED DOCUMENTS.....	11
4. TEST SET-UP AND OPERATION MODES.....	12
4.1 PRINCIPLE OF CONFIGURATION SELECTION.....	12
4.2 CARRIER FREQUENCY AND CHANNEL.....	12
4.3 TEST OPERATION AND TEST SOFTWARE.....	13
4.4 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	14
4.5 TEST SETUP DIAGRAM.....	15
5. TEST RESULTS.....	16
5.1 TRANSMITTER REQUIREMENT & TEST SUITES.....	16
5.1.1 <i>Antenna Requirement.....</i>	<i>16</i>
5.1.2 <i>Peak Output Power</i>	<i>17</i>
5.1.3 <i>20 dB Bandwidth and 99% Occupied Bandwidth</i>	<i>20</i>
5.1.4 <i>Conducted Spurious Emissions and Frequency Band Edges Measured in 100kHz Bandwidth</i>	<i>21</i>
5.1.5 <i>Radiated Spurious Emissions and Band Edges</i>	<i>22</i>
5.1.6 <i>Hopping Channel Separation</i>	<i>27</i>
5.1.7 <i>Number of Hopping Frequency.....</i>	<i>28</i>
5.1.8 <i>Dwell Time.....</i>	<i>29</i>
5.2 MAINS EMISSION	30
5.2.1 <i>Mains Conducted Emission.....</i>	<i>30</i>

Prüfbericht - Nr.: **CN24HTHL 001**
Test Report No.

Seite 5 von 31
Page 5 of 31

APPENDIX A - TEST RESULT OF CONDUCTED

APPENDIX B - TEST RESULT OF RADIATED EMISSIONS & MAINS CONDUCTED EMISSION

APPENDIX SP - PHOTOGRAPHS TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

Prüfbericht - Nr.: **CN24HTHL 001**
Test Report No.

Seite 6 von 31
Page 6 of 31

HISTORY OF THIS TEST REPORT

Revision	Description	Date Issued
R01	Original Release	2024-04-11

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A - Test Result of Conducted

Appendix B - Test Result of Radiated Emissions & Mains Conducted Emission

Appendix SP - Photographs Test Setup

Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247
FCC 47CFR Part 2: Subpart J Section 2.1049
ANSI C63.10:2013
KDB 558074 D01 15.247 Meas Guidance v05r02

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of k=2 to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.54 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.52 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a 2-in-1 Wi-Fi 6 & Bluetooth 5.3 USB Adapter. It contains a Bluetooth compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	2-in-1 Wi-Fi 6 & Bluetooth 5.3 USB Adapter
Type Identification	EW-7611UXB
FCC ID	NDD9576112401

Technical Specification of EUT

Item	EUT information
Operating Frequency	2402 MHz ~ 2480 MHz
Channel Number	79
Operation Voltage	5 Vdc
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
Maximum Output Power (mW)	5.689
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.4

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output expected by the customer and is going to be fixed on the firmware of the final end product.

Table for Parameters of Test Software Setting

Frequency (MHz)	Power Setting		
	GFSK	$\pi/4$ -DQPSK	8DPSK
2402	Default	Default	Default
2441	Default	Default	Default
2480	Default	Default	Default

4.2 Carrier Frequency and Channel

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

4.3 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	RTLBTAPP_V 5.2.3.71
---------------	---------------------

The samples were used as follows:

A003662532-002

A003662532-003

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To				Description
	Antenna Port Conducted Measurement	Radiated Spurious Emissions above 1 GHz	Radiated Spurious Emissions below 1 GHz	Mains Conducted Emission	
-	√	√	√	√	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on **Z-plane**.
2. "-" means no effect.

Antenna Port Conducted Measurement

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type	Packet Type
-	2402 to 2480	2402, 2441, 2480	GFSK	1DH5
-	2402 to 2480	2402, 2441, 2480	$\pi/4$ -DQPSK	2DH5
-	2402 to 2480	2402, 2441, 2480	8DPSK	3DH5

Radiated Spurious Emissions (Above 1 GHz)

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type	Packet Type
-	2402 to 2480	2402, 2441, 2480	GFSK	1DH5
-	2402 to 2480	2402, 2441, 2480	8DPSK	3DH5

Radiated Spurious Emissions (Below 1 GHz)

- Pre-Scan full test was applied on all test modes, but only worst case was shown.
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type	Packet Type
-	2402 to 2480	2441	GFSK	1DH5

Prüfbericht - Nr.: CN24HTHL 001
Test Report No.

 Seite 14 von 31
 Page 14 of 31

Mains Conducted Emission Test
 Pre-Scan full test was applied on all test modes, but only worst case was shown.

 Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type	Packet Type
-	2402 to 2480	2441	GFSK	1DH5

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement	21.5-25.4 °C	54-62 %	Nick Guan / Zeke Wang
Radiated Spurious Emissions above 1 GHz	24.5-26.7 °C	52-57 %	Chuan Chu
Radiated Spurious Emissions below 1 GHz	24.5-26.7 °C	52-57 %	Chuan Chu
Mains Conducted Emission	21.2 °C	59 %	Chuan Chu

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

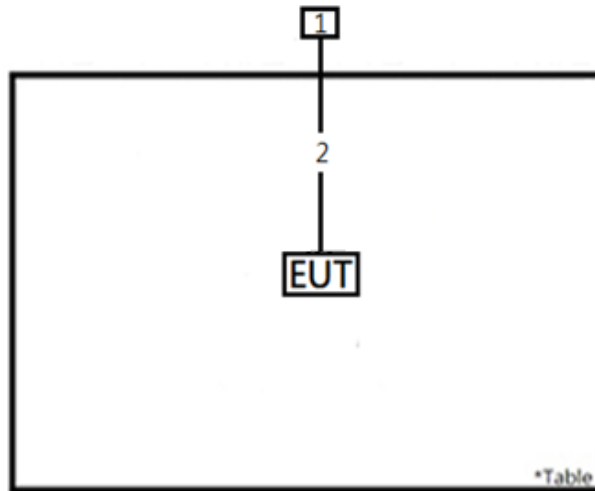
None

Support Unit

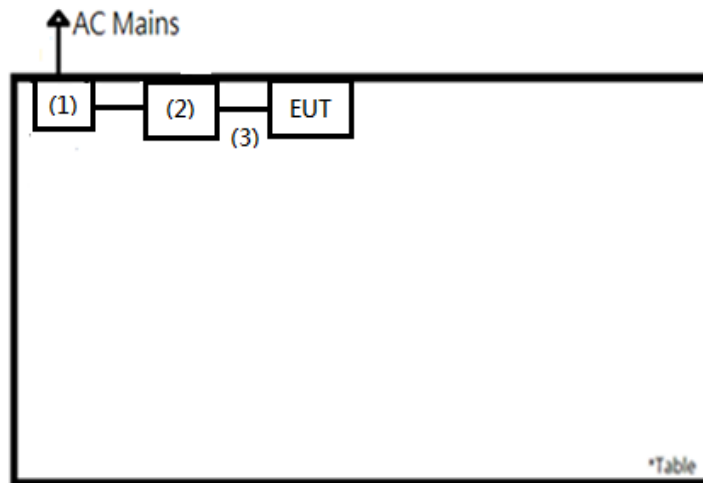
Support Unit								
No	Description	Brand	Model	S/N	Shielded	Ferrite Core (Qty)	Length (cm)	Remark
1	Notebook	HP	15s-da1046TX	CND9111RJB	-	-	-	Radiated
2	USB Cable	TUV	TUV-01	N/A	NO	NO	300	
1	Adapter	HP	HSTNN-DA40	N/A	-	-	-	Mains Conducted
2	Notebook	HP	15s-du0007TX	CND93662VF	-	-	-	
3	USB Cable	TUV	TUV-02	N/A	NO	NO	150	

4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



<Mains Conducted Emission mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 3 dBi. The antenna is PIFA antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

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.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Power Meter	Anritsu	ML2495A	1901008	2023/03/17	2024/03/16	2024/3/11	2024/3/15
Power Sensor	Anritsu	MA2411B	1725269	2023/03/17	2024/03/16	2024/3/11	2024/3/15

Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

Test Result
Peak Output Power
<GFSK>

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	2402	5.58	3.614	125
Middle Channel	2441	5.63	3.656	125
High Channel	2480	5.48	3.532	125

< $\pi/4$ -DQPSK>

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	2402	7.23	5.284	125
Middle Channel	2441	7.48	5.598	125
High Channel	2480	7.12	5.152	125

<8DPSK>

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	2402	7.49	5.610	125
Middle Channel	2441	7.55	5.689	125
High Channel	2480	7.38	5.470	125

Average Power
<GFSK>

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	5.35	3.428
Middle Channel	2441	5.40	3.467
High Channel	2480	5.22	3.327

< $\pi/4$ -DQPSK>

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	5.30	3.388
Middle Channel	2441	5.34	3.420
High Channel	2480	5.16	3.281

<8DPSK>

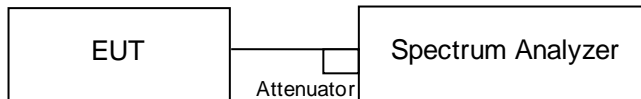
Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	5.32	3.404
Middle Channel	2441	5.36	3.436
High Channel	2480	5.20	3.311

Prüfbericht - Nr.: CN24HTHL 001
Test Report No.

 Seite 20 von 31
 Page 20 of 31

5.1.3 20 dB Bandwidth and 99% Occupied Bandwidth

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101513	2023/05/11	2024/05/10	2024/3/11	2024/3/15

Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.
- The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

Test Results

Please refer to Appendix A.

Prüfbericht - Nr.: CN24HTHL 001
Test Report No.

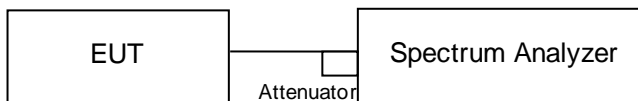
 Seite 21 von 31
 Page 21 of 31

5.1.4 Conducted Spurious Emissions and Frequency Band Edges Measured in 100kHz Bandwidth

Limit

20dB (below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.)

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101513	2023/05/11	2024/05/10	2024/3/11	2024/3/15

Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

Test Results

Please refer to Appendix A.

5.1.5 Radiated Spurious Emissions and Band Edges

Limit

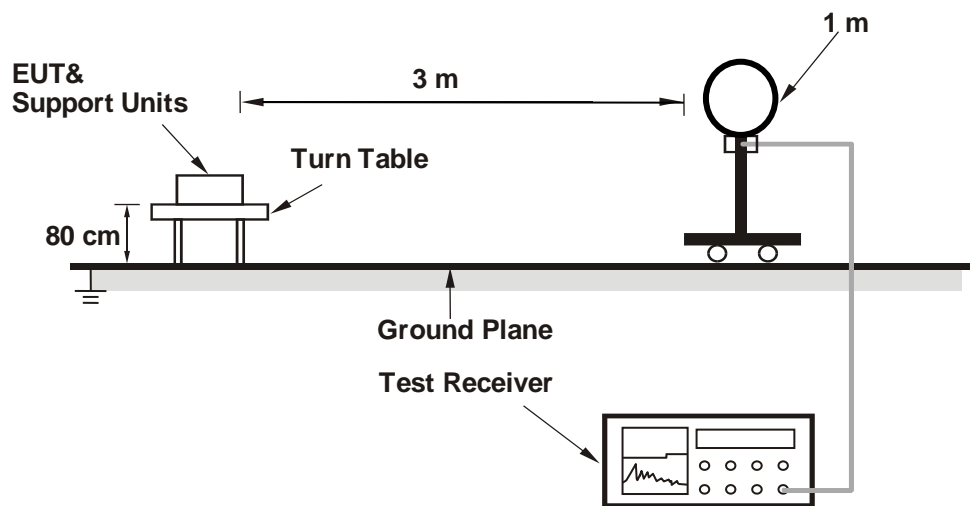
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Emissions radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in §15.247(d).

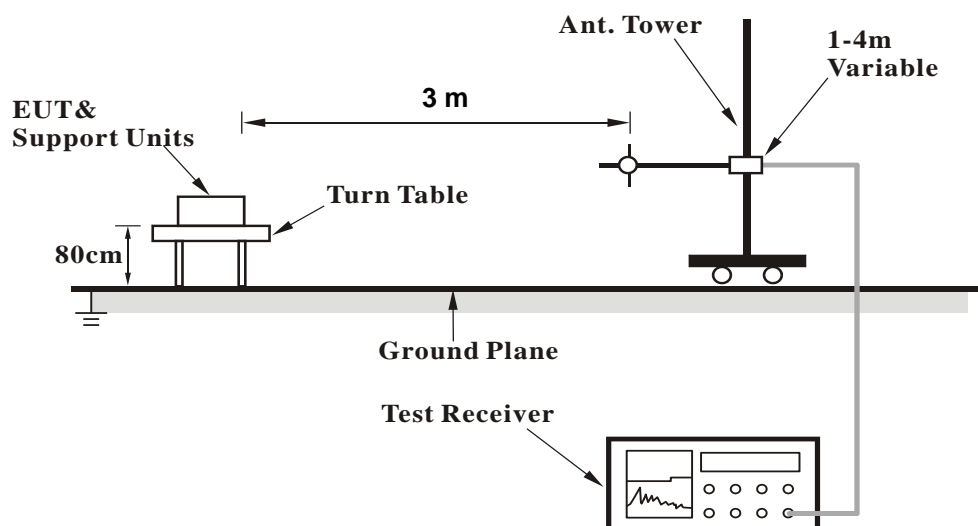
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

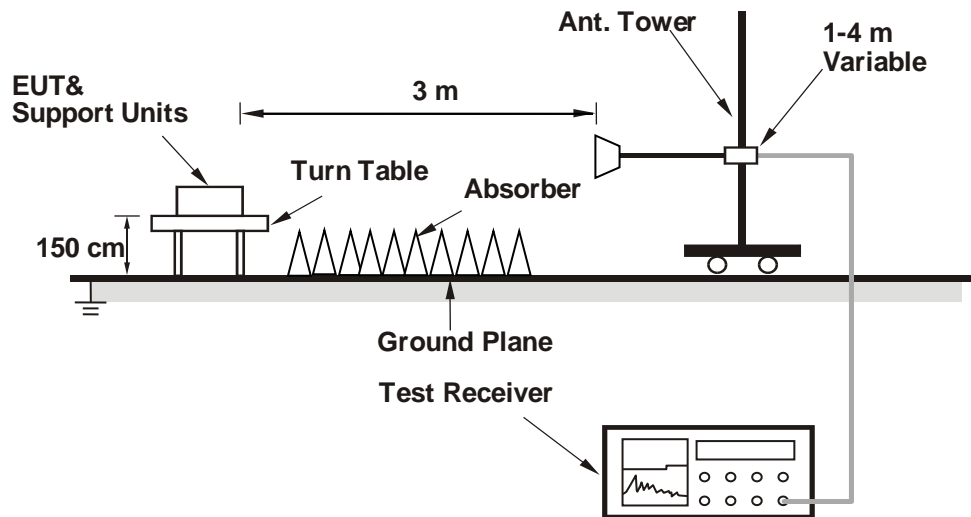
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Prüfbericht - Nr.: CN24HTHL 001
Test Report No.
Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz					
Signal Analyzer	R&S	FSV40	101509	2023/4/26	2024/4/24
Horn Antenna	ETS-Lindgren	3117	00218930	2023/12/7	2024/12/5
HF-AMP + AC source	EMCI	EM01G18GA	980633	2024/1/24	2025/1/22
HF-AMP + AC source	EMCI	EMC184045SE	980657	2024/1/24	2025/1/22
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
30 MHz ~ 1 GHz					
Receiver	R&S	ESR7	102109	2024/2/22	2025/2/20
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/29
LF-AMP	Agilent	8447D	2944A107722	2023/3/22	2024/3/20
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
Below 30 MHz					
Receiver	R&S	ESR7	102109	2024/2/22	2025/2/20
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2024/1/4	2025/1/3
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A

Test Procedures**For Radiated Emissions below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
4. For fundamental frequency: The average value is "Average = Peak value + 20log(Duty cycle)
Where the duty factor is calculated from following formula for DH5 packet type which has worst duty factor:
 $20\log(\text{Duty cycle}) = 20\log(\text{dwell time} / 100\text{ms}) = 20\log(3.125 / 100) = -30.1 \text{ dB}$

Prüfbericht - Nr.: **CN24HTHL 001**
Test Report No.

Seite 26 von 31
Page 26 of 31

5. All modes of operation were investigated and the worst-case emissions are reported.
6. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.
7. The emission levels of other frequencies (including the 10th harmonic of the highest fundamental frequency) are very lower than the limit and are not shown in the test report.

Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix B.

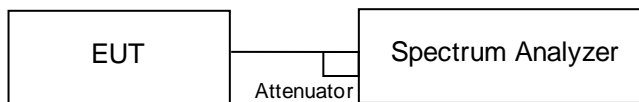
Prüfbericht - Nr.: CN24HTHL 001
Test Report No.

 Seite 27 von 31
 Page 27 of 31

5.1.6 Hopping Channel Separation

Limit ≥ 25 kHz or $2/3$ of 20 dB bandwidth, whichever is greater

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101513	2023/05/11	2024/05/10	2024/3/11	2024/3/15

Test Procedure

Measurement Procedure REF

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

Test Results

Please refer to Appendix A.

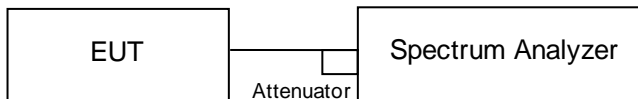
Prüfbericht - Nr.: CN24HTHL 001
Test Report No.

 Seite 28 von 31
 Page 28 of 31

5.1.7 Number of Hopping Frequency

Limit ≥ 15 non-overlapping channels

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101513	2023/05/11	2024/05/10	2024/3/11	2024/3/15

Test Procedure

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

Test Results

Please refer to Appendix A.

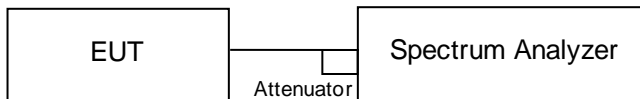
Prüfbericht - Nr.: **CN24HTHL 001**
Test Report No.

 Seite 29 von 31
 Page 29 of 31

5.1.8 Dwell Time

Limit 0.4s

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101513	2023/05/11	2024/05/10	2024/3/11	2024/3/15

Test Procedures

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.

Test Results

Please refer to Appendix A.

5.2 Mains Emission

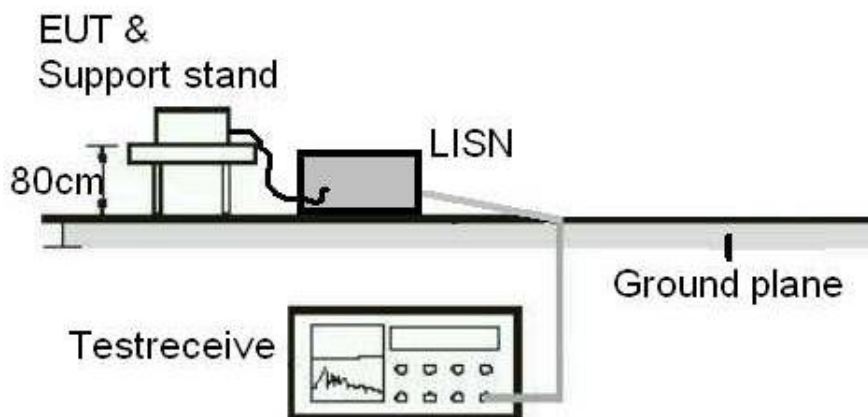
5.2.1 Mains Conducted Emission

Limit

Mains Conducted Emission as defined in §15.207 must comply with the mains conducted emission limits.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Two-Line V-Network	Rohde & Schwarz	ENV216	101938	2023/10/23	2024/10/21
EMI Test Receiver	R&S	ESCI	101094	2023/11/27	2024/11/25

Prüfbericht - Nr.: **CN24HTHL 001**
Test Report No.

Seite 31 von 31
Page 31 of 31

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

Test Results

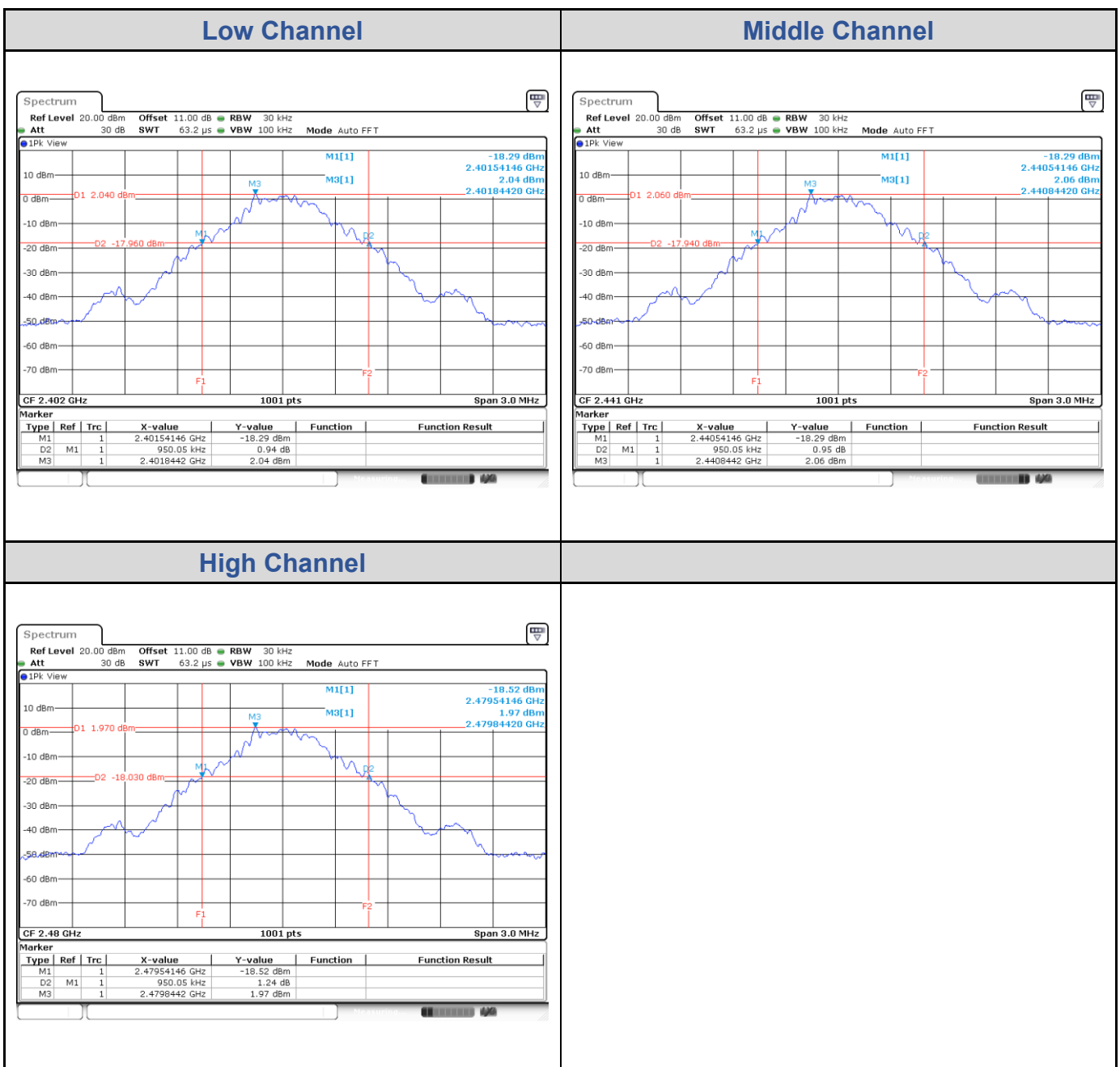
Please refer to Appendix B.

Appendix A: Test Results of Conducted Test

Test Result of 20 dB Bandwidth

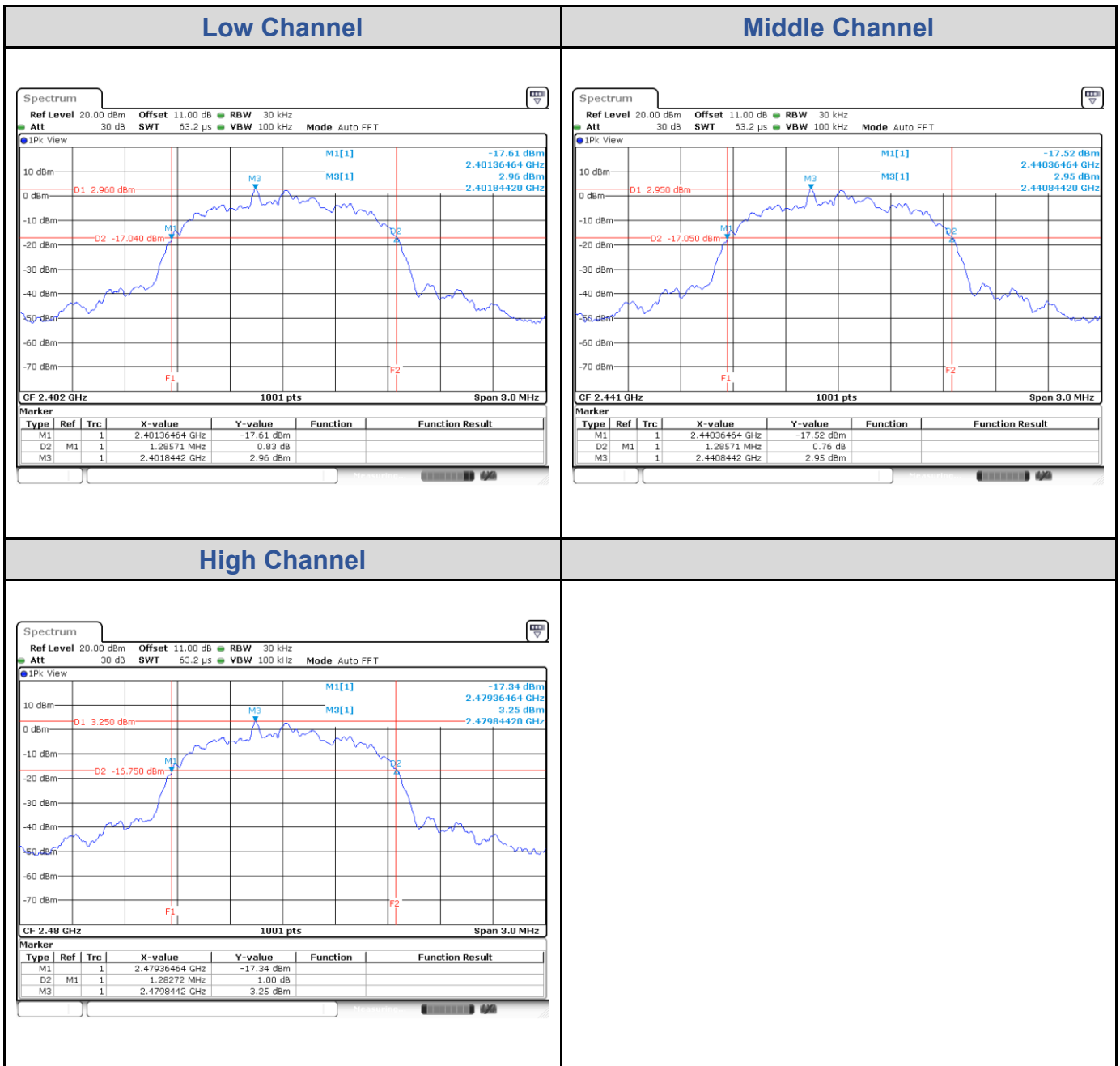
GFSK

Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)
Low Channel	2402	950.05
Middle Channel	2441	950.05
High Channel	2480	950.05



8DPSK

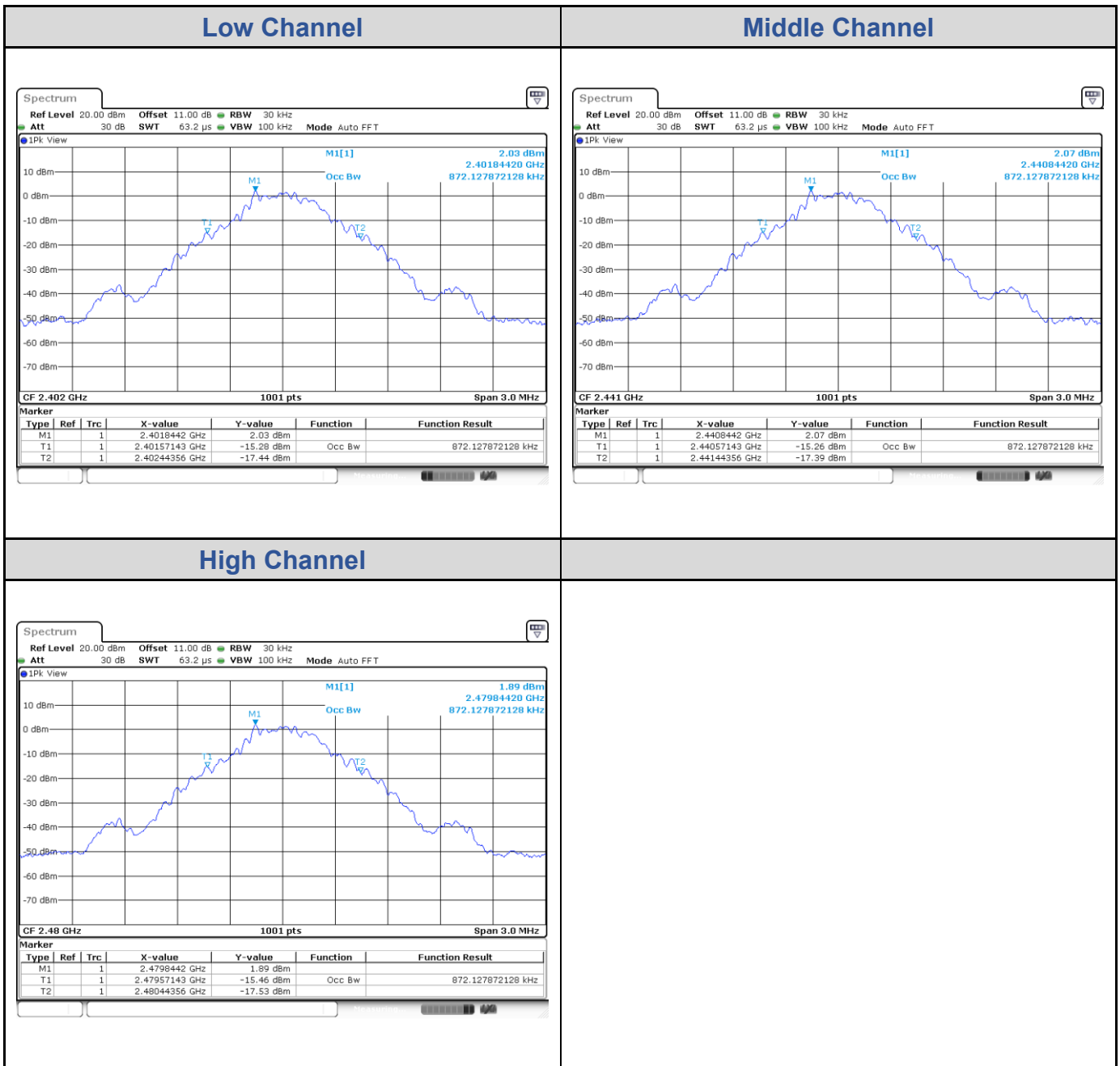
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)
Low Channel	2402	1285.71
Middle Channel	2441	1285.71
High Channel	2480	1282.72



Test Result of 99% Occupied Bandwidth

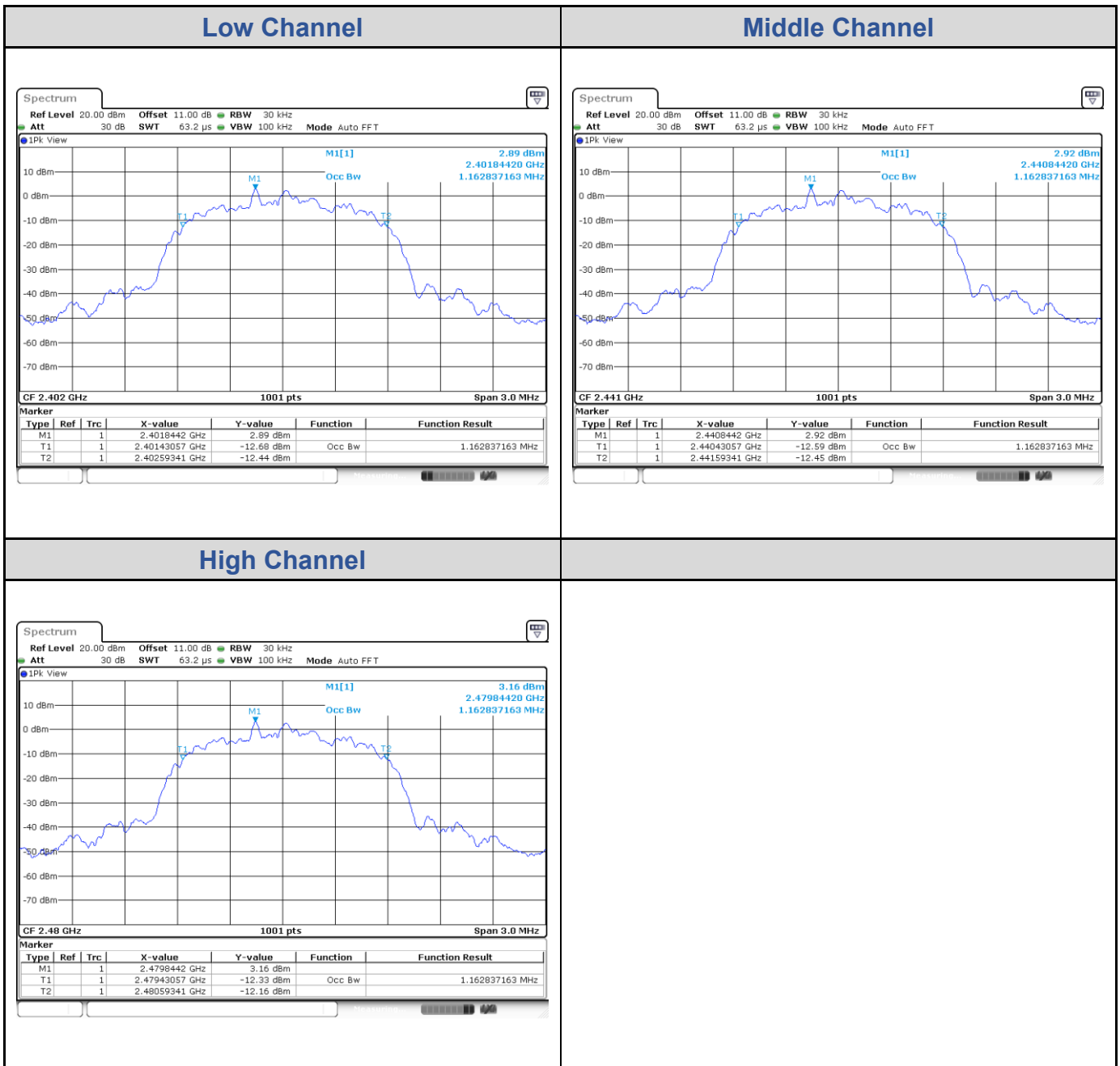
GFSK

Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)
Low Channel	2402	872.13
Middle Channel	2441	872.13
High Channel	2480	872.13



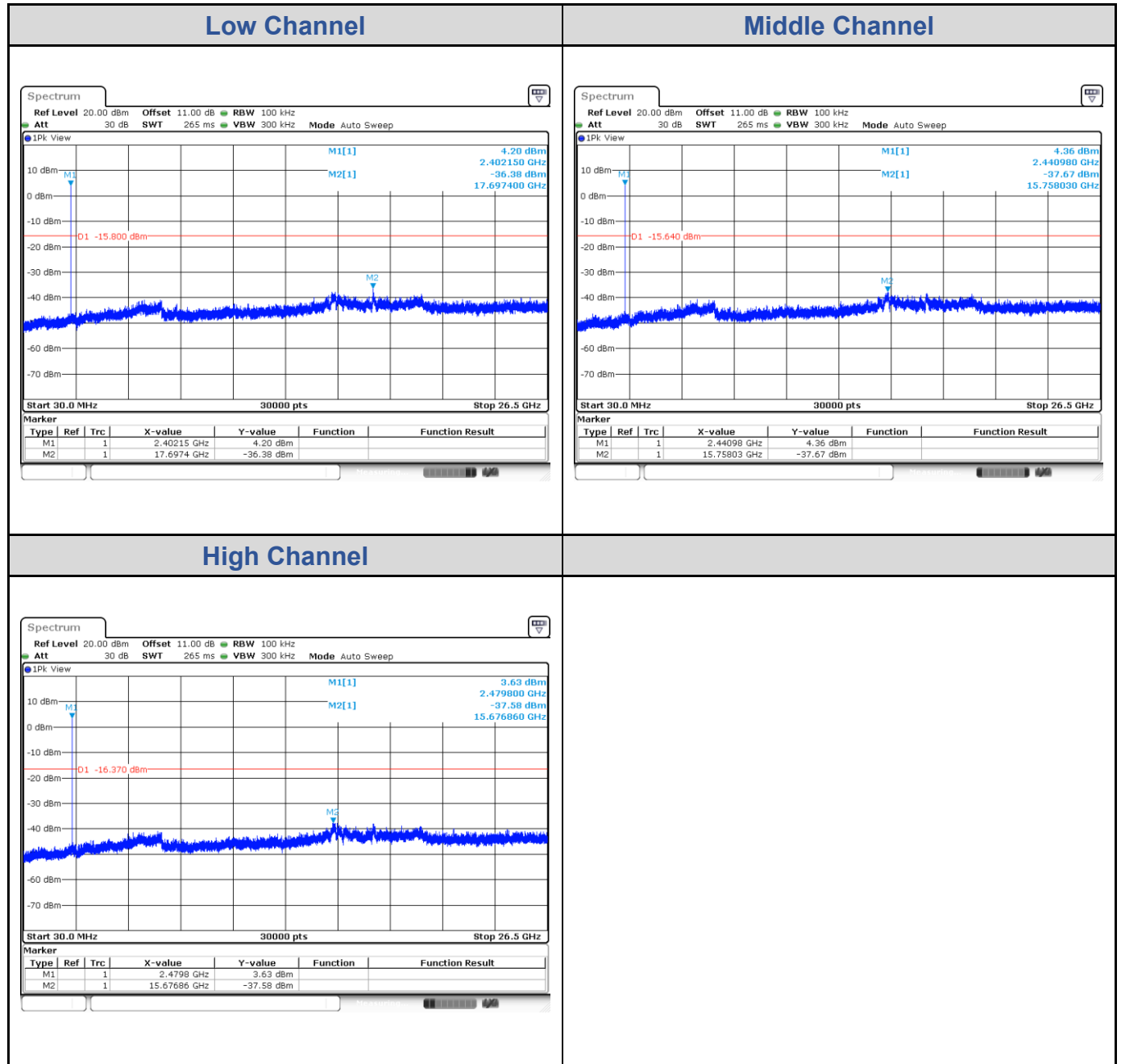
8DPSK

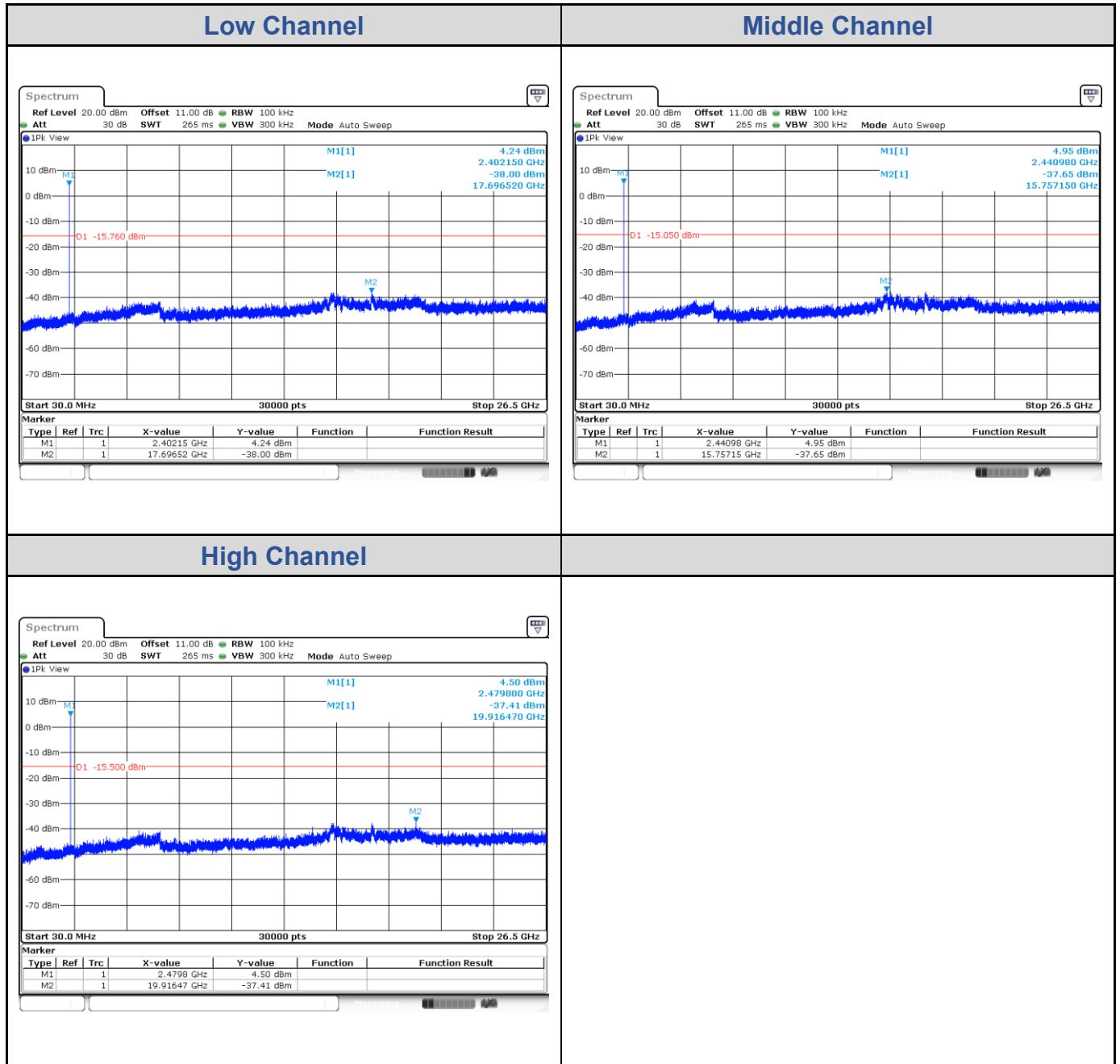
Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)
Low Channel	2402	1162.84
Middle Channel	2441	1162.84
High Channel	2480	1162.84



Test Result of Conducted Spurious Emissions, Tx Mode

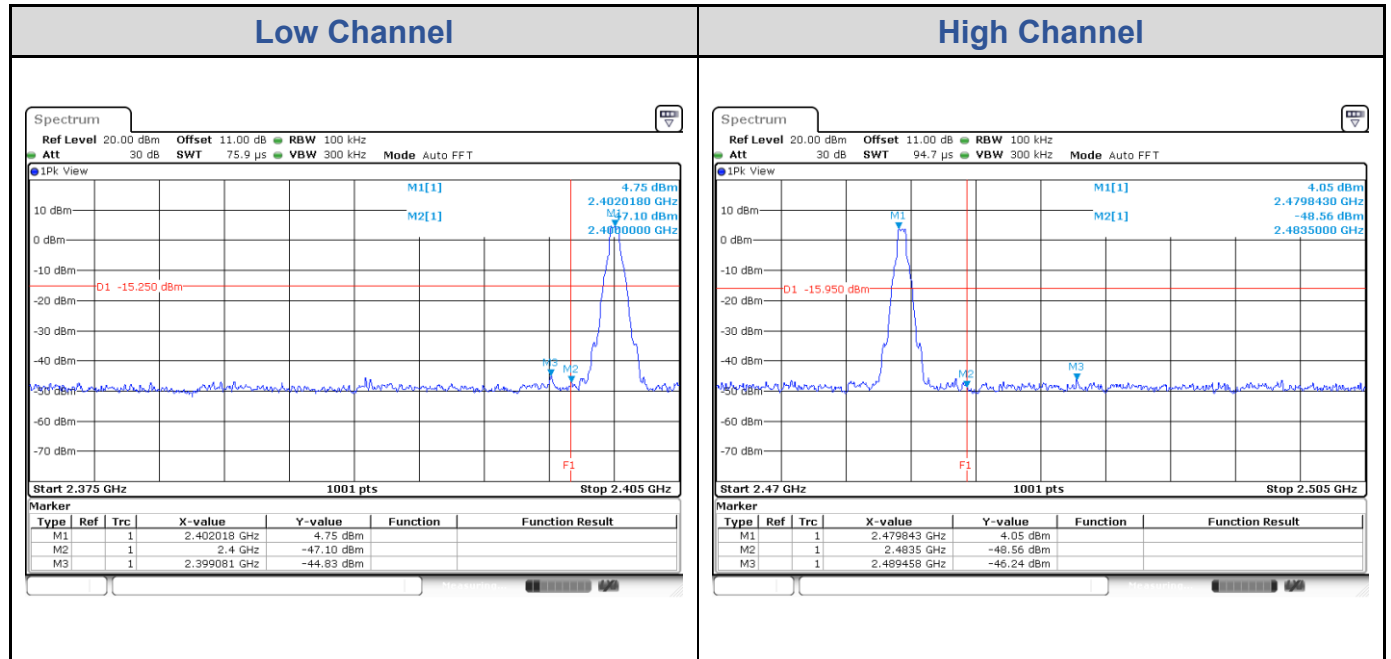
GFSK



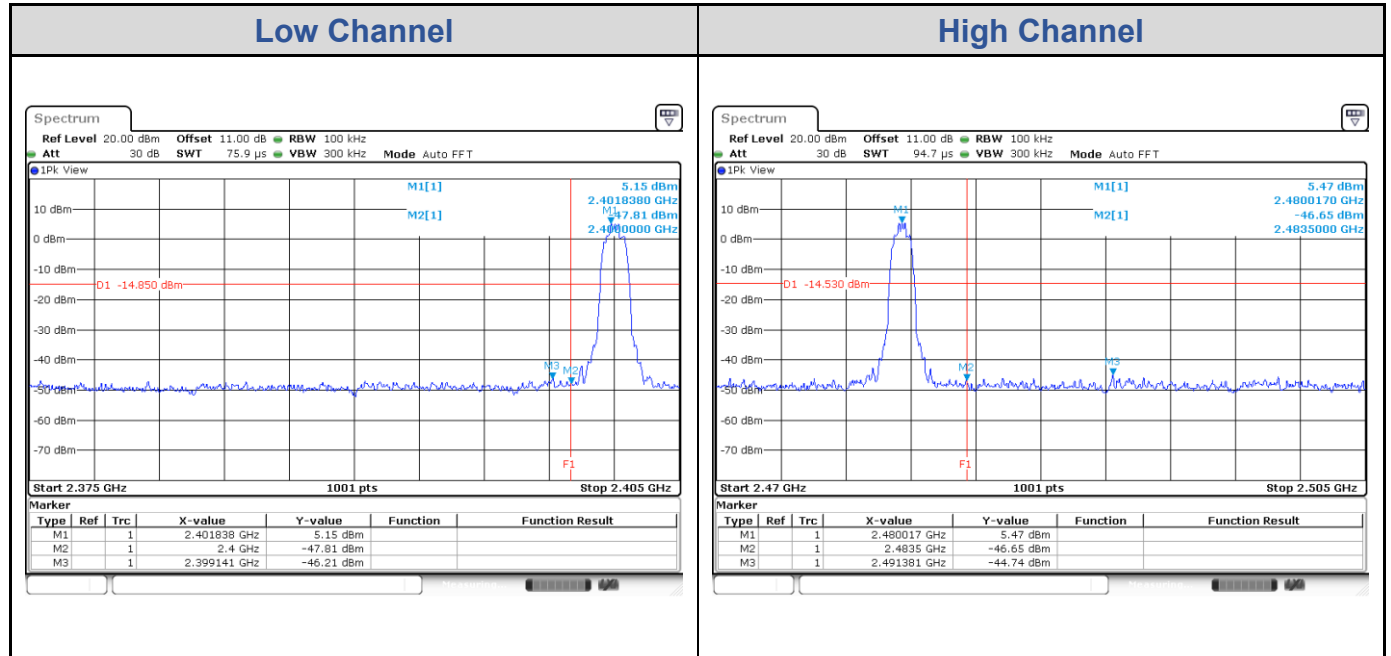
8DPSK


Test Result of Conducted Band Edge, Tx Mode

GFSK

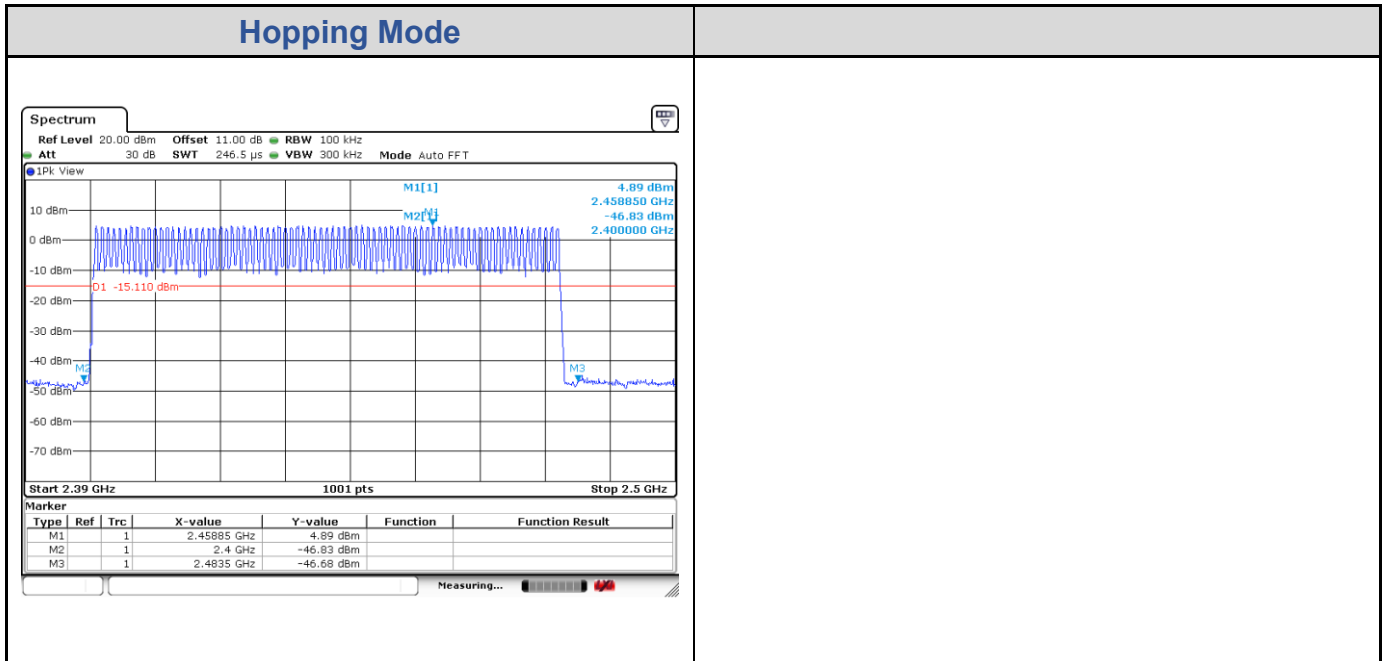


8DPSK

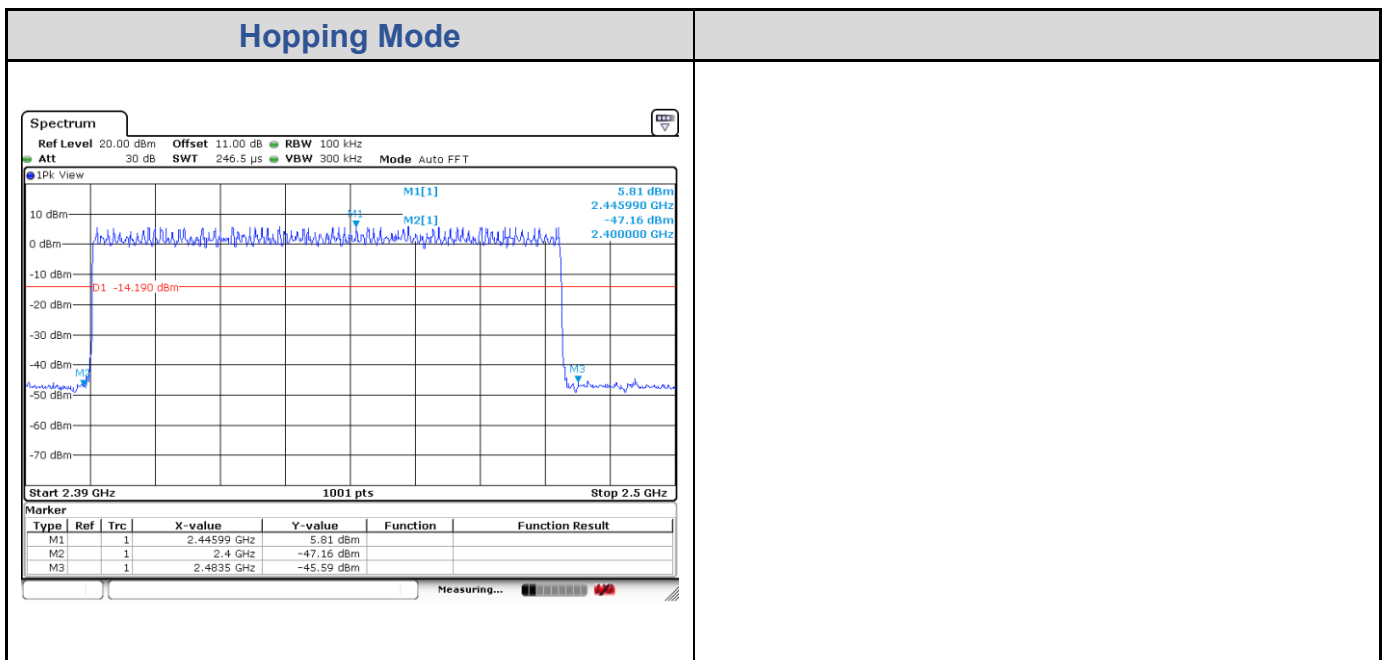


Test Result of Hopping Band Edge

GFSK



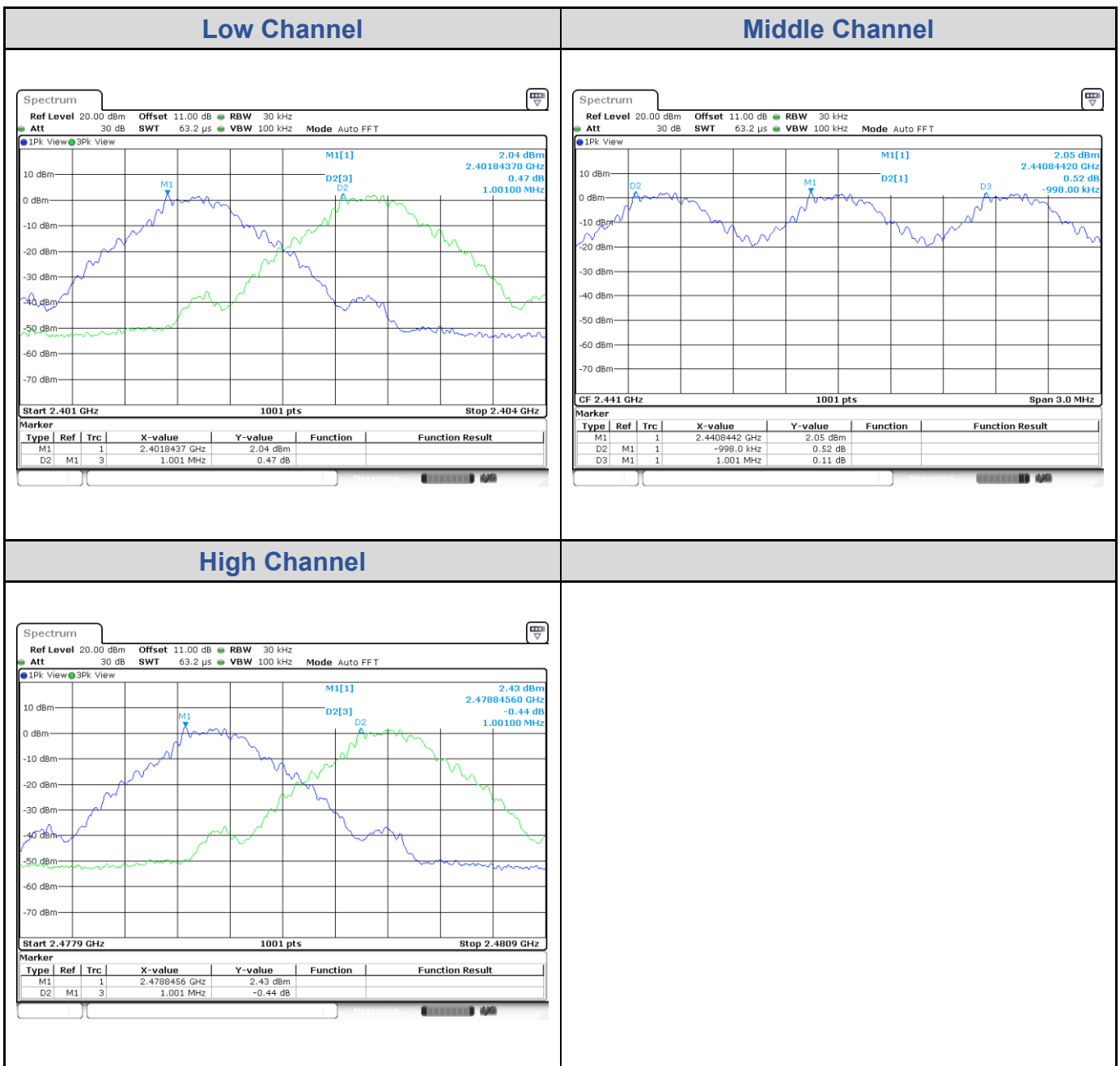
8DPSK



Test Result of Hopping Channel Separation

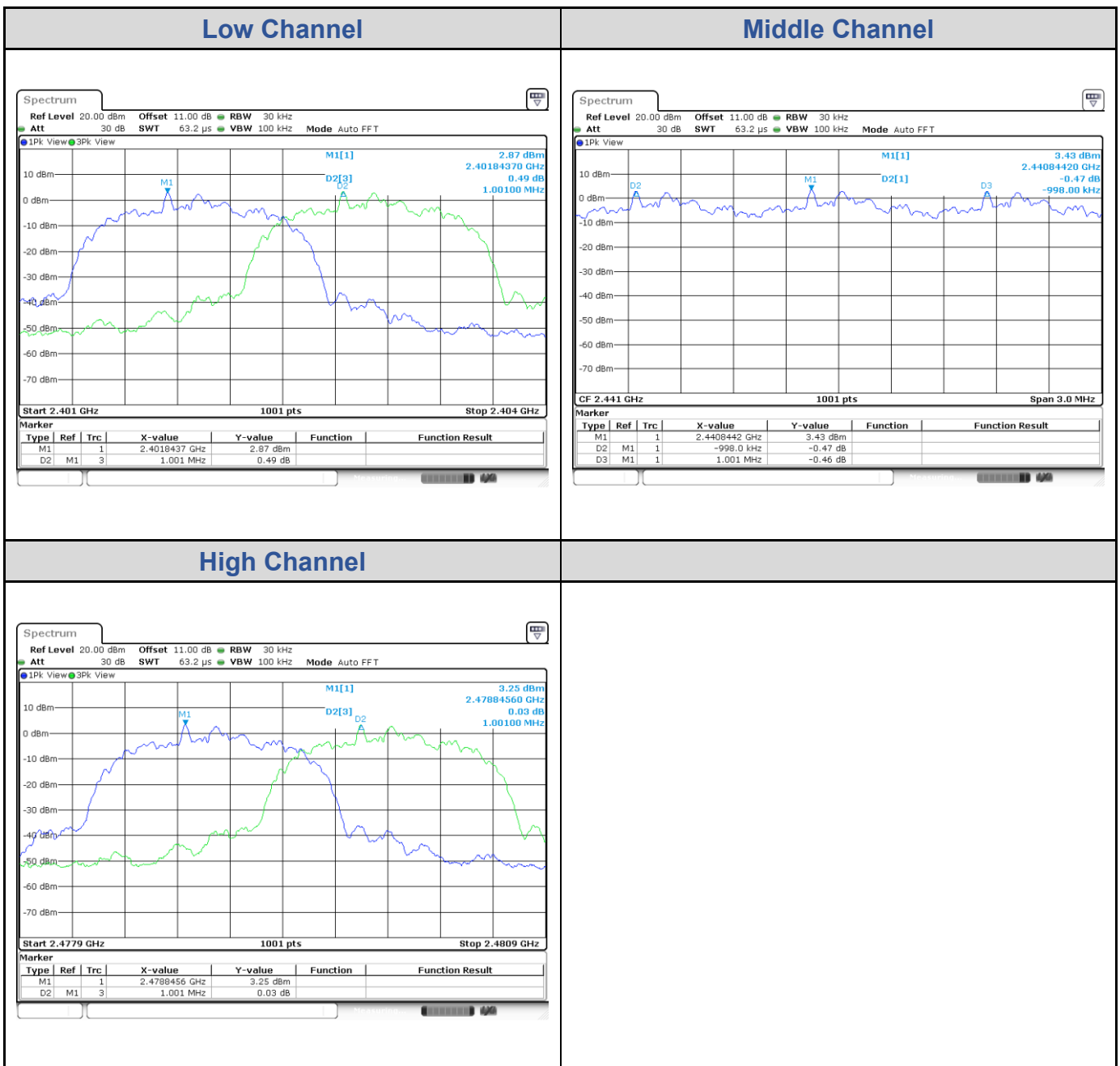
GFSK

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (kHz)	Minimum Limit (MHz)	Result
0	2402	1.00	950.05	0.633	Pass
39	2441	1.00	950.05	0.633	Pass
78	2480	1.00	950.05	0.633	Pass



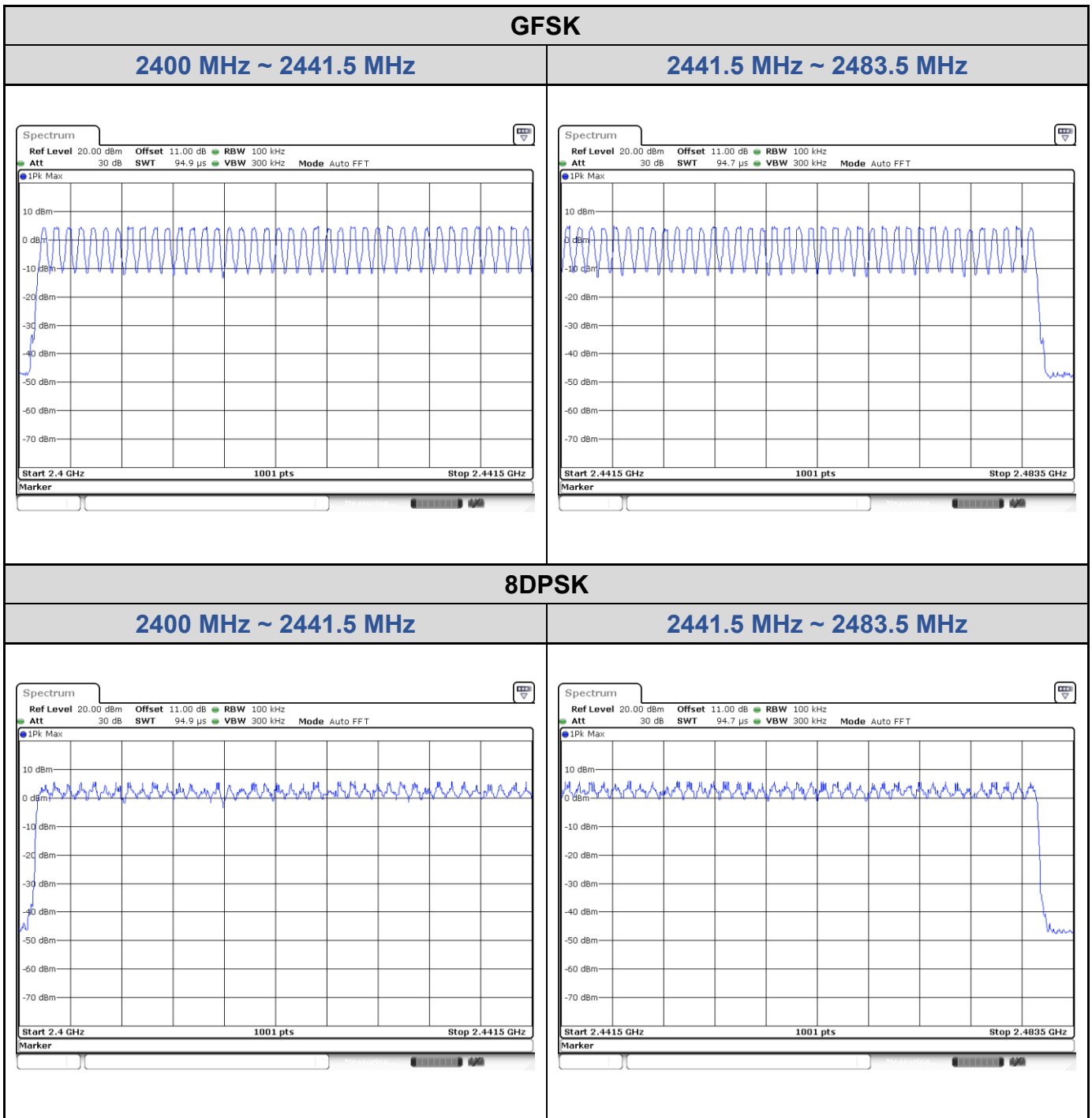
8DPSK

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (kHz)	Minimum Limit (MHz)	Result
0	2402	1.00	1285.71	0.857	Pass
39	2441	1.00	1285.71	0.857	Pass
78	2480	1.00	1282.72	0.855	Pass



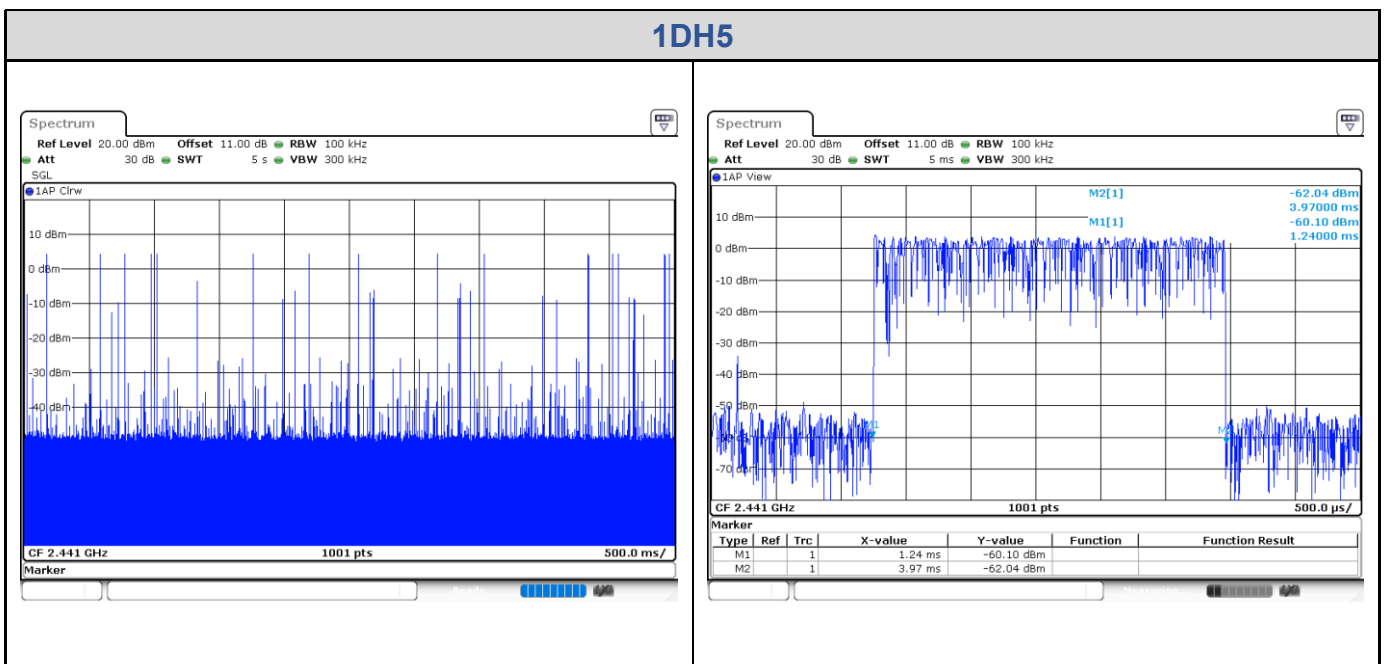
Test Result of Number of Hopping Frequency

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
2400 to 2483.5 MHz	79	≥15	Pass



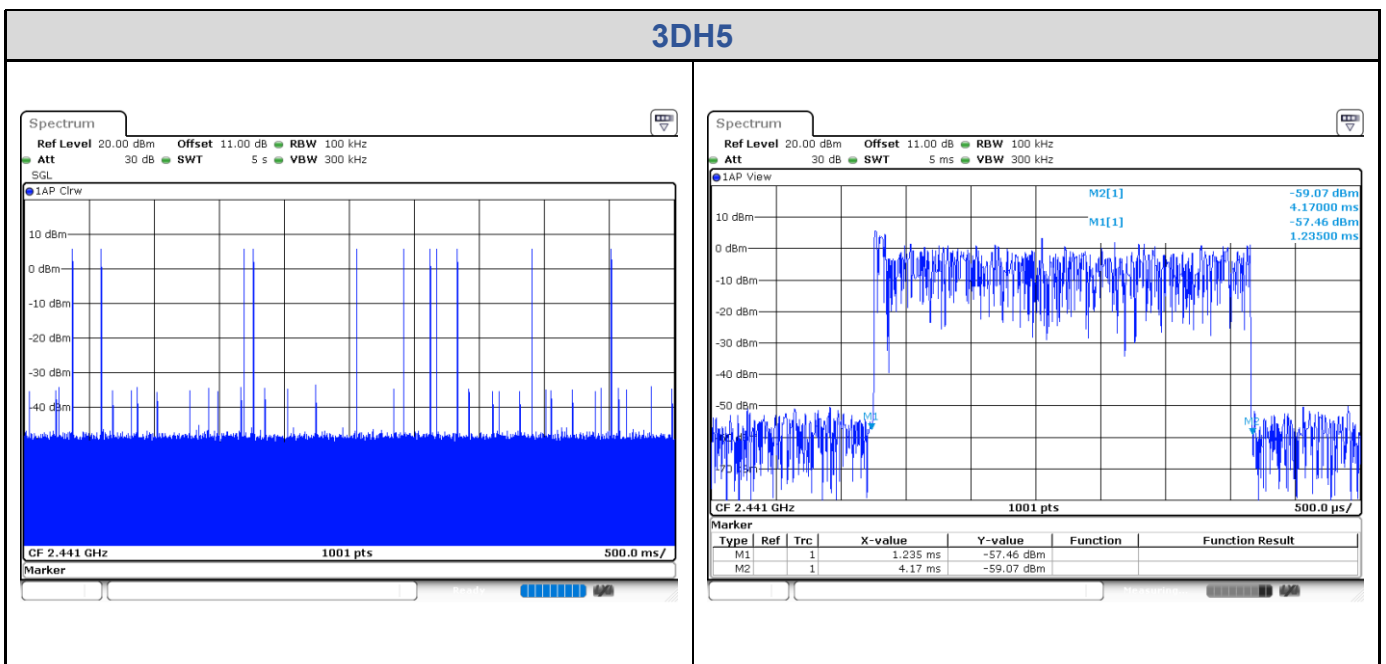
Test Result of Dwell Time
GFSK

Data Mode	Number of transfer in a 31.6 (79Hopping*0.4s)	Package transfer time (msec)	Dwell time (s)	Limit (s)	Result
1DH5	15 (times / 5 sec) * 6.32 = 94.8 times	3.97	0.376356	0.4	Pass



8DPSK

Data Mode	Number of transfer in a 31.6 (79Hopping*0.4s)	Package transfer time (msec)	Dwell time (s)	Limit (s)	Result
3DH5	11 (times / 5 sec) * 6.32 = 69.52 times	4.17	0.2898984	0.4	Pass



Appendix B: Test Results of Radiated Spurious Emissions & Mains

Conducted Emission Test

Band Edges, 2.31GHz ~ 2.9GHz

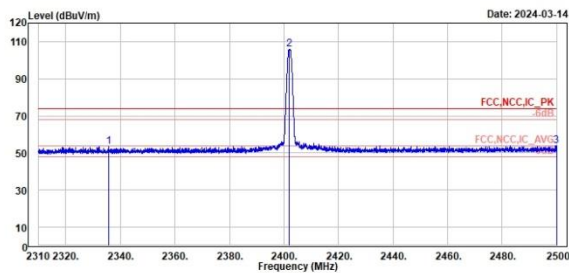
GFSK

Low Channel (Horizontal) Peak

Low Channel (Vertical) Peak



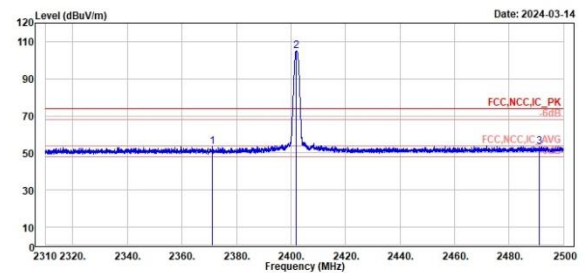
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2	3
2335.73	2402.00	2499.92
53.57	105.88	53.94
16.42	68.49	16.27
37.15	37.39	37.67
74.00	74.00	74.00
-20.43	31.88	-20.06
120	120	120
196	196	196
Peak	Peak	Peak
Horizontal	Horizontal	Horizontal



TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2	3
2371.07	2402.00	2491.15
53.46	104.76	53.47
16.17	67.37	15.81
37.29	37.39	37.66
74.00	74.00	74.00
-20.54	30.76	-20.53
268	268	268
170	170	170
Peak	Peak	Peak
Vertical	Vertical	Vertical

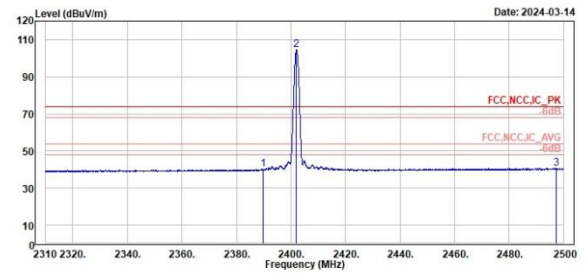
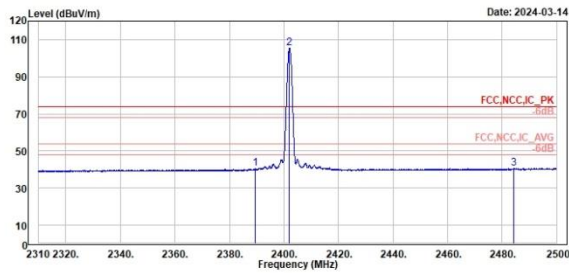
GFSK

Low Channel (Horizontal) Average

Low Channel (Vertical) Average

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2	3
Level	Level	Level
Factor	Factor	Factor
Line	Line	Line
Limit	Limit	Limit
Over	Over	Over
Limit	Limit	Limit
Apos	Apos	Apos
TPos	TPos	TPos
Remark	Remark	Remark
Pol/Phase	Pol/Phase	Pol/Phase
Note	Note	Note
2389.34	2402.00	2484.12
40.40	105.44	40.62
3.06	68.85	2.97
37.34	37.39	37.65
54.00	54.00	54.00
-13.60	51.44	-13.38
120	120	120
196	196	196
Average	Average	Average
Horizontal	Horizontal	Horizontal

1	2	3
Level	Level	Level
Factor	Factor	Factor
Line	Line	Line
Limit	Limit	Limit
Over	Over	Over
Limit	Limit	Limit
Apos	Apos	Apos
TPos	TPos	TPos
Remark	Remark	Remark
Pol/Phase	Pol/Phase	Pol/Phase
Note	Note	Note
2389.00	2402.00	2497.34
40.21	104.30	40.56
2.87	66.91	2.89
37.34	37.39	37.67
54.00	54.00	54.00
-13.79	50.30	-13.44
268	268	268
170	170	170
Average	Average	Average
Vertical	Vertical	Vertical

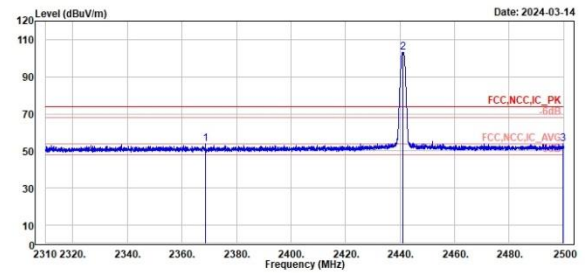
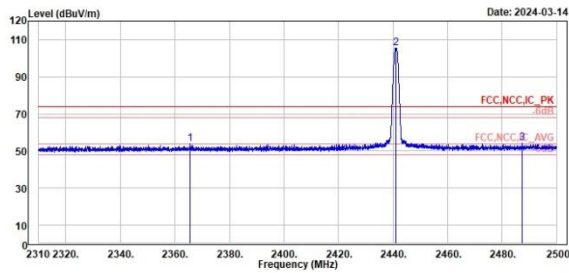
GFSK

Middle Channel (Horizontal) Peak

Middle Channel (Vertical) Peak

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2365.48	53.69	16.42	37.27	74.00	-20.31	120	198	Peak	Horizontal	
2 *	2441.00	105.24	67.67	37.57	74.00	31.24	120	198	Peak	Horizontal	
3	2487.35	54.09	16.43	37.66	74.00	-19.91	120	198	Peak	Horizontal	

Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2368.71	54.01	16.73	37.28	74.00	-19.99	265	171	Peak	Vertical	
2 *	2441.00	103.24	65.67	37.57	74.00	29.24	265	171	Peak	Vertical	
3	2499.66	53.62	15.95	37.67	74.00	-20.38	265	171	Peak	Vertical	

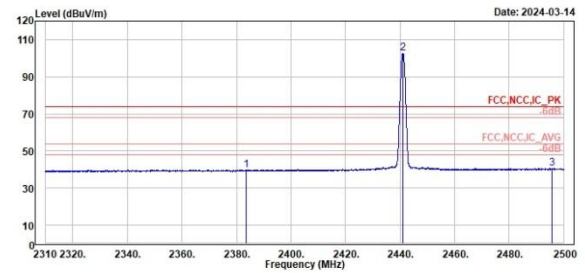
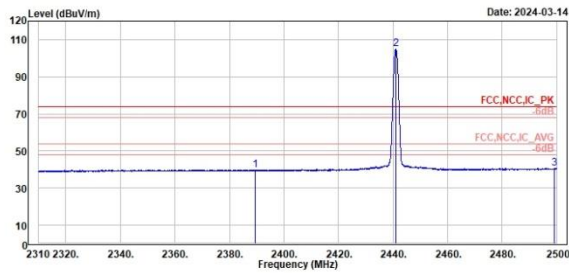
GFSK

Middle Channel (Horizontal) Average

Middle Channel (Vertical) Average

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



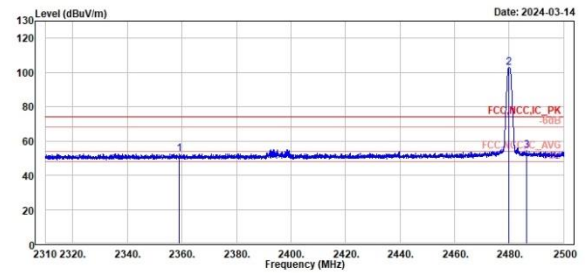
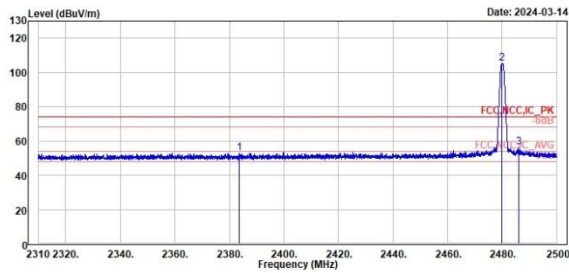
Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	2389.34	39.07	2.53	37.34	54.00	-14.13	120	198 Average	Horizontal	
2 *	2441.00	104.04	67.27	37.57	54.00	50.04	120	198 Average	Horizontal	
3	2499.20	40.70	3.03	37.67	54.00	-13.30	120	198 Average	Horizontal	

Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	2383.45	39.00	2.47	37.33	54.00	-14.20	265	171 Average	Vertical	
2 *	2441.00	102.78	65.21	37.57	54.00	48.78	265	171 Average	Vertical	
3	2495.59	40.54	2.87	37.67	54.00	-13.46	265	171 Average	Vertical	

GFSK

High Channel (Horizontal) Peak

High Channel (Vertical) Peak



Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2383.68	52.95	15.62	37.33	74.00	-21.05	178	192	Peak	Horizontal	
2 *	2486.08	105.12	67.47	37.65	74.00	31.12	178	192	Peak	Horizontal	
3	2486.21	56.13	18.47	37.66	74.00	-17.87	178	192	Peak	Horizontal	

Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2358.98	52.59	15.34	37.25	74.00	-21.41	182	164	Peak	Vertical	
2 *	2486.08	102.79	65.14	37.65	74.00	28.79	182	164	Peak	Vertical	
3	2486.47	54.23	16.57	37.66	74.00	-19.77	182	164	Peak	Vertical	

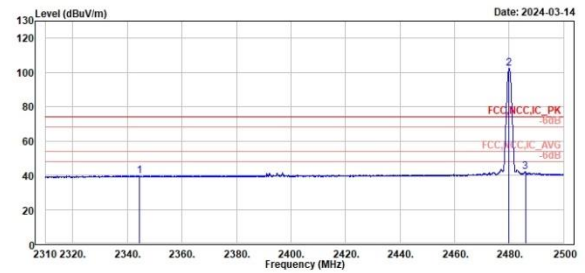
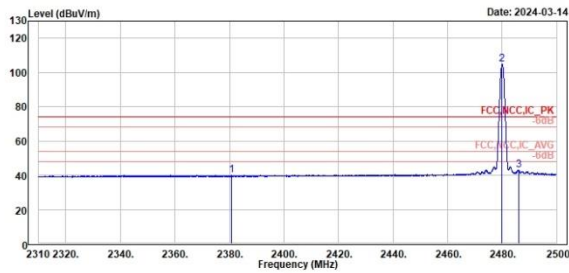
GFSK

High Channel (Horizontal) Average

High Channel (Vertical) Average

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

TÜVRheinland
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



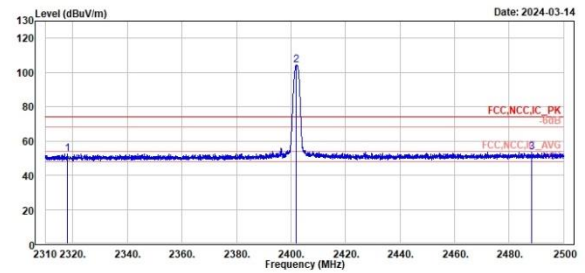
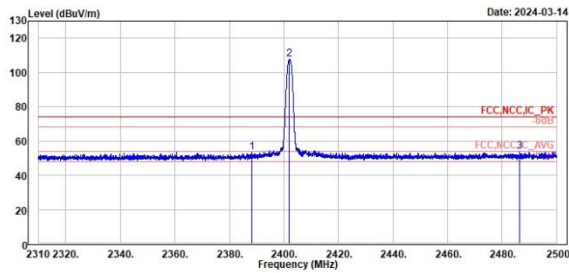
1	2	3							
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
2380.79	39.90	2.50	37.32	54.00	-14.10	178	192 Average	Horizontal	
2488.00	104.67	67.02	37.65	54.00	50.67	178	192 Average	Horizontal	
2486.02	43.05	5.39	37.66	54.00	-10.95	178	192 Average	Horizontal	

1	2	3							
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
2344.39	39.75	2.55	37.20	54.00	-14.25	102	164 Average	Vertical	
2488.00	102.33	64.68	37.65	54.00	48.33	102	164 Average	Vertical	
2485.94	41.94	4.28	37.66	54.00	-12.06	102	164 Average	Vertical	

8DPSK

Low Channel (Horizontal) Peak

Low Channel (Vertical) Peak



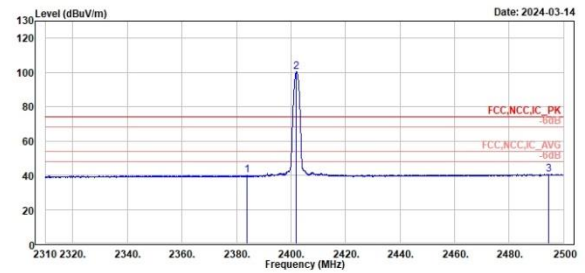
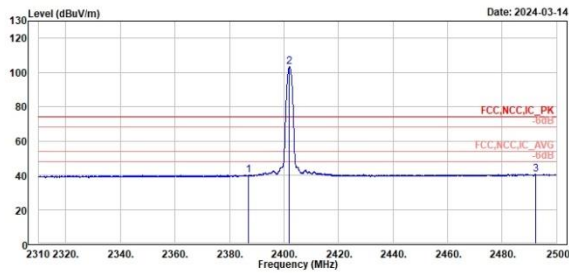
Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2388.09	53.27	15.93	37.34	74.00	-20.73	117	194	Peak	Horizontal	
2 *	2402.00	107.52	70.13	37.39	74.00	33.52	117	194	Peak	Horizontal	
3	2486.43	53.67	16.01	37.66	74.00	-20.33	117	194	Peak	Horizontal	

Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2318.02	52.49	15.42	37.07	74.00	-21.51	267	165	Peak	Vertical	
2 *	2402.00	104.49	67.10	37.39	74.00	30.49	267	165	Peak	Vertical	
3	2488.37	53.29	15.63	37.66	74.00	-20.71	267	165	Peak	Vertical	

8DPSK

Low Channel (Horizontal) Average

Low Channel (Vertical) Average



1	2	3									
Level	Level	Level									
Factor	Factor	Factor									
Line	Line	Line									
Limit	Limit	Limit									
Apos	Apos	Apos									
TPos	TPos	TPos									
Remark	Remark	Remark									
Pol/Phase	Pol/Phase	Pol/Phase									
Note	Note	Note									
Freq	Level	Read									
MHz	dBuV/m	Level									
		Factor									
		dB/m									
		dBuV/m									
		dB									
		cm									
		deg									
1	2387.10	40.21	2.80	37.33	54.00	-13.79	117	194	Average	Horizontal	
2 *	2402.00	103.23	65.84	37.39	54.00	49.23	117	194	Average	Horizontal	
3	2492.17	40.47	2.81	37.66	54.00	-13.53	117	194	Average	Horizontal	

1	2	3									
Level	Level	Level									
Factor	Factor	Factor									
Line	Line	Line									
Limit	Limit	Limit									
Apos	Apos	Apos									
TPos	TPos	TPos									
Remark	Remark	Remark									
Pol/Phase	Pol/Phase	Pol/Phase									
Note	Note	Note									
Freq	Level	Read									
MHz	dBuV/m	Level									
		Factor									
		dB/m									
		dBuV/m									
		dB									
		cm									
		deg									
1	2304.02	39.84	2.51	37.33	54.00	-14.16	267	165	Average	Vertical	
2 *	2402.00	100.28	62.89	37.39	54.00	46.28	267	165	Average	Vertical	
3	2494.41	40.48	2.82	37.66	54.00	-13.52	267	165	Average	Vertical	

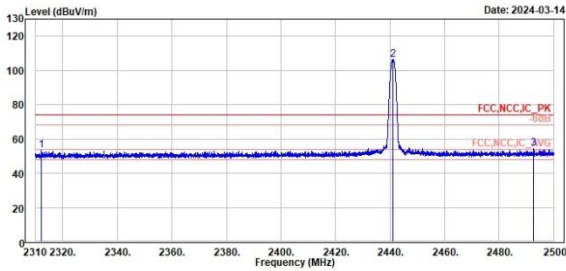
8DPSK

Middle Channel (Horizontal) Peak

Middle Channel (Vertical) Peak



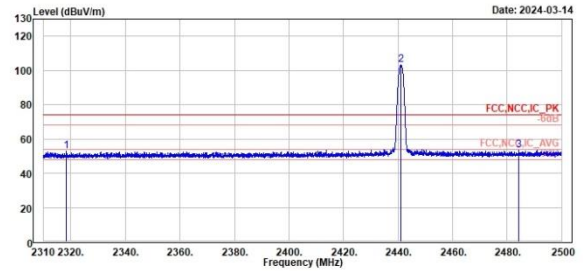
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2	3	Read Level	Read Level Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2312.01	53.39	16.35	37.04	74.00	-20.61	118	191	Peak	Horizontal	
2 *	2441.00	106.38	69.81	37.57	74.00	32.38	118	191	Peak	Horizontal	
3	2492.51	54.49	16.83	37.66	74.00	-19.51	118	191	Peak	Horizontal	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

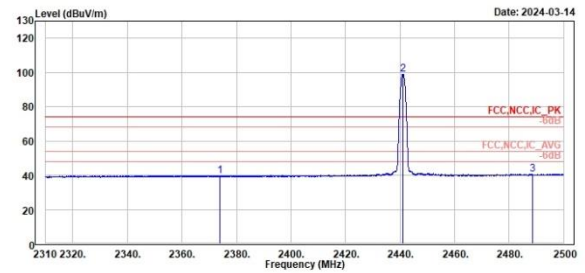
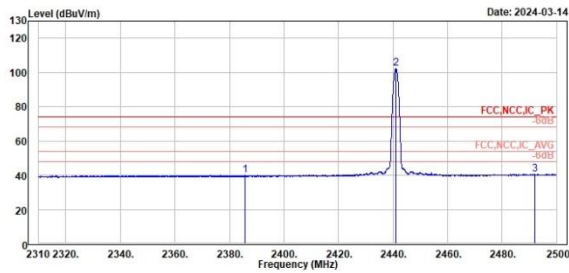


1	2	3	Read Level	Read Level Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2318.44	52.86	15.79	37.07	74.00	-21.14	100	197	Peak	Vertical	
2 *	2441.00	103.31	65.74	37.57	74.00	29.31	100	197	Peak	Vertical	
3	2484.34	53.28	15.63	37.65	74.00	-20.72	100	197	Peak	Vertical	

8DPSK

Middle Channel (Horizontal) Average

Middle Channel (Vertical) Average



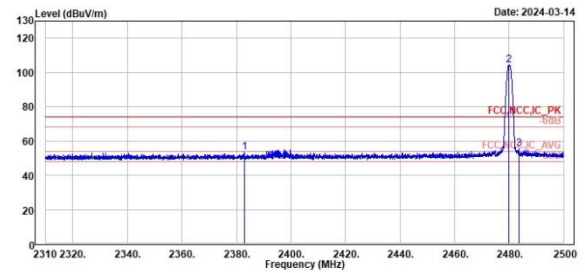
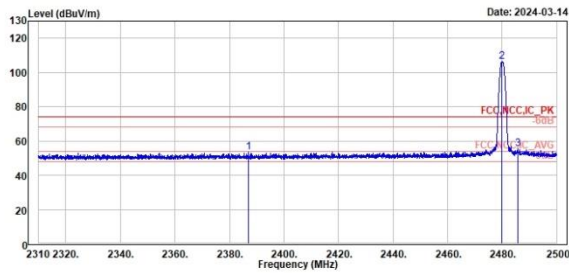
1	2	3
Level	Level	Level
Factor	Factor	Factor
Line	Line	Line
Limit	Limit	Limit
APos	APos	APos
TPos	TPos	TPos
Remark	Remark	Remark
Pol/Phase	Pol/Phase	Pol/Phase
Note	Note	Note
2385.77	2441.00	2491.98
39.04	102.08	40.60
2.51	64.51	2.94
37.33	37.57	37.66
54.00	54.00	54.00
-14.16	48.08	-13.40
118	118	118
191	191	191
Average	Average	Average
Horizontal	Horizontal	Horizontal

1	2	3
Level	Level	Level
Factor	Factor	Factor
Line	Line	Line
Limit	Limit	Limit
APos	APos	APos
TPos	TPos	TPos
Remark	Remark	Remark
Pol/Phase	Pol/Phase	Pol/Phase
Note	Note	Note
2373.95	2441.00	2488.45
39.79	99.01	40.57
2.49	61.44	2.91
37.30	37.57	37.66
54.00	54.00	54.00
-14.21	45.01	-13.43
100	100	100
197	197	197
Average	Average	Average
Vertical	Vertical	Vertical

8DPSK

High Channel (Horizontal) Peak

High Channel (Vertical) Peak



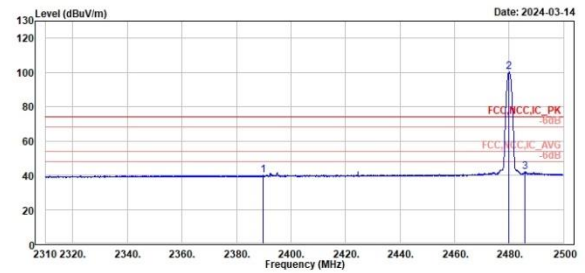
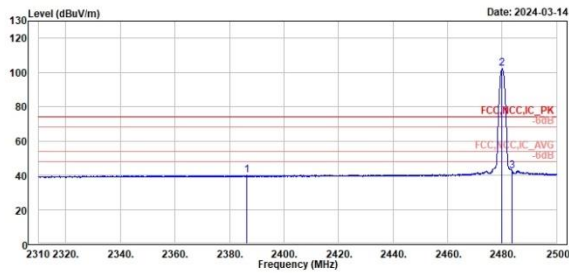
Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2386.95	53.30	15.97	37.33	74.00	-20.70	176	191	Peak	Horizontal	
2 *	2480.00	106.43	68.78	37.65	74.00	32.43	176	191	Peak	Horizontal	
3	2485.75	55.28	17.62	37.66	74.00	-18.72	176	191	Peak	Horizontal	

Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	2382.92	53.18	15.85	37.33	74.00	-20.82	100	165	Peak	Vertical	
2 *	2480.00	104.42	66.77	37.65	74.00	30.42	100	165	Peak	Vertical	
3	2483.51	55.37	17.72	37.65	74.00	-18.63	100	165	Peak	Vertical	

8DPSK

High Channel (Horizontal) Average

High Channel (Vertical) Average



1	2	3							
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
2386.42	39.07	2.54	37.33	54.00	-14.13	176	191 Average	Horizontal	
2488.00	102.08	64.43	37.65	54.00	48.08	176	191 Average	Horizontal	
2483.51	42.61	4.96	37.65	54.00	-11.39	176	191 Average	Horizontal	

1	2	3							
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
2389.76	39.82	2.48	37.34	54.00	-14.18	100	165 Average	Vertical	
2488.00	100.12	62.47	37.65	54.00	46.12	100	165 Average	Vertical	
2485.83	42.11	4.45	37.66	54.00	-11.89	100	165 Average	Vertical	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

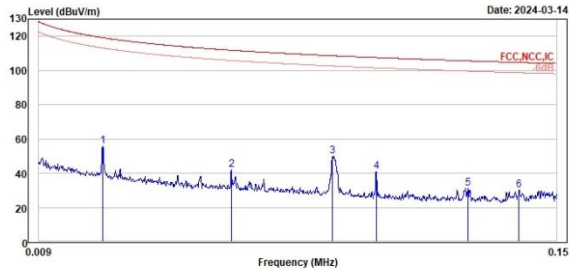
GFSK

Middle Channel(Open) 9kHz~150kHz

Middle Channel(Open) 150kHz~30MHz



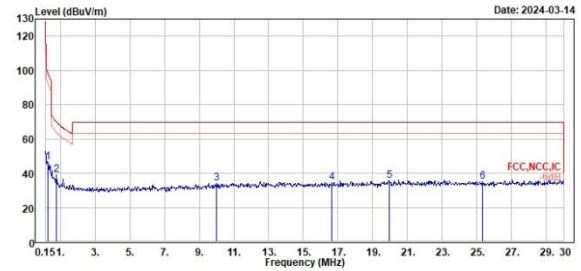
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.03	55.94	36.39	19.55	119.13	-63.19	100	230	Peak	Open	
2	0.06	42.14	22.85	19.29	111.82	-69.68	100	42	Peak	Open	
3	0.09	50.10	31.36	18.74	108.61	-58.51	100	153	Peak	Open	
4	0.10	40.79	22.26	18.53	107.52	-66.73	100	6	Peak	Open	
5	0.13	31.34	12.75	18.59	105.60	-74.26	100	284	Peak	Open	
6	0.14	30.36	11.73	18.63	104.69	-74.33	100	288	Peak	Open	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Level Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.30	46.44	27.40	19.04	98.00	-51.64	100	148	Peak	Open	
2	0.78	39.00	19.89	19.11	69.80	-30.80	100	121	Peak	Open	
3	10.00	34.23	12.97	21.26	69.50	-35.27	100	144	Peak	Open	
4	16.66	34.79	12.68	22.11	69.50	-34.71	100	166	Peak	Open	
5	19.94	35.69	13.16	22.53	69.50	-33.81	100	249	Peak	Open	
6	25.34	35.02	12.27	22.75	69.50	-34.48	100	307	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

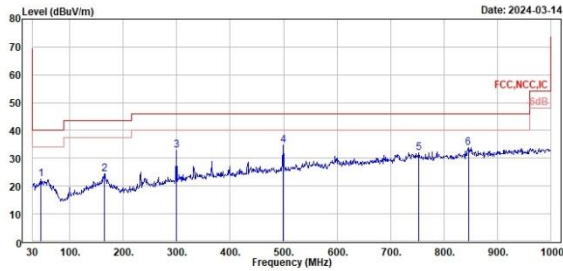
GFSK

Middle Channel (Horizontal)

Middle Channel (Vertical)



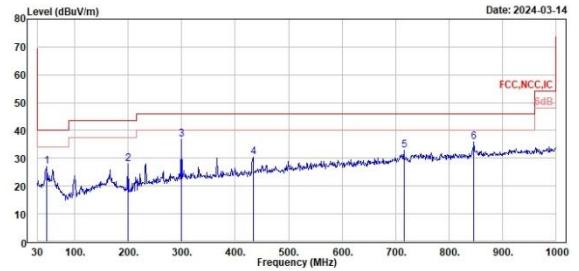
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	45.52	22.55	28.40	-5.93	40.00	-17.45	300	51 Peak	Horizontal	
2	163.86	24.37	30.07	-5.70	43.50	-19.13	200	241 Peak	Horizontal	
3	299.66	32.83	37.63	-4.80	46.00	-13.17	100	282 Peak	Horizontal	
4	498.51	34.72	36.39	-1.67	46.00	-11.28	100	168 Peak	Horizontal	
5	753.62	31.89	28.63	3.26	46.00	-14.11	200	117 Peak	Horizontal	
6	845.77	33.78	29.69	4.09	46.00	-12.22	271	0 Peak	Horizontal	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Peak	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	47.46	27.22	33.05	-5.83	40.00	-12.78	100	88 Peak	Vertical	
2	198.78	28.11	36.72	-8.61	43.50	-15.39	100	281 Peak	Vertical	
3	299.66	36.76	41.56	-4.80	46.00	-9.24	100	181 Peak	Vertical	
4	433.52	30.39	32.78	-2.39	46.00	-15.61	100	192 Peak	Vertical	
5	715.79	33.00	30.93	2.07	46.00	-13.00	200	254 Peak	Vertical	
6	846.74	35.98	31.90	4.08	46.00	-10.02	200	137 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

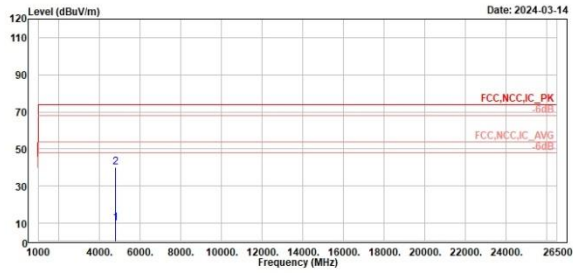
GFSK

Low Channel (Horizontal)

Low Channel (Vertical)



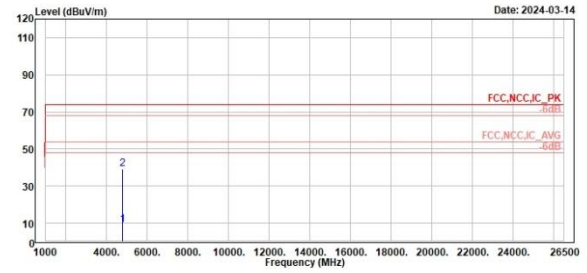
TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
Level	Line	Line	cm	deg			
Factor	Limit	Limit					
dB/m	dB	dB					
9.93	54.00	-44.07	280	188	Average	Horizontal	CF
50.03	74.00	-33.97	280	188	Peak	Horizontal	



TUV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
Level	Line	Line	cm	deg			
Factor	Limit	Limit					
dB/m	dB	dB					
9.09	54.00	-44.91	128	360	Average	Vertical	CF
49.19	74.00	-34.81	128	360	Peak	Vertical	

GFSK

High Channel (Horizontal)

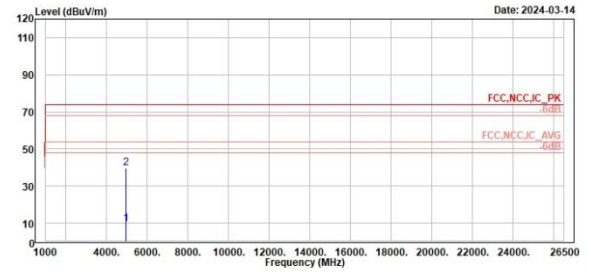
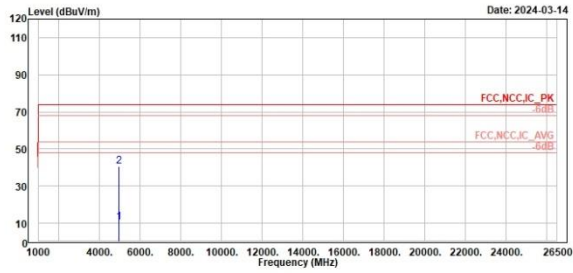
High Channel (Vertical)



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4968.00	10.52	20.00	-9.56	54.00	-43.48	137	360 Average	Horizontal	CF
2	4968.00	40.62	50.18	-9.56	74.00	-33.38	137	360 Peak	Horizontal	

Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4968.00	9.54	19.10	-9.56	54.00	-44.46	400	181 Average	Vertical	CF
2	4968.00	39.74	49.30	-9.56	74.00	-34.26	400	181 Peak	Vertical	

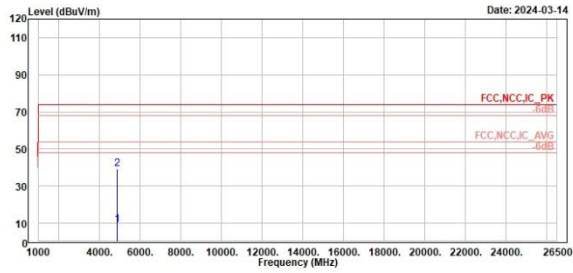
8DPSK

Middle Channel (Horizontal)

Middle Channel (Vertical)



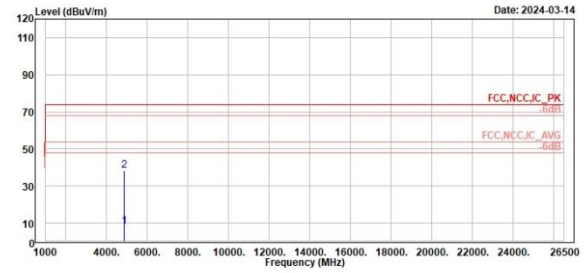
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2
Level	Level
Factor	Factor
Line	Line
Limit	Limit
Over	Over
Limit	Limit
APos	APos
TPos	TPos
Remark	Remark
Pol/Phase	Pol/Phase
Note	Note
Freq	Freq
MHz	MHz
Level	Level
dBuV/m	dBuV/m
Factor	Factor
dB	dB
Line	Line
Limit	Limit
Over	Over
Limit	Limit
APos	APos
TPos	TPos
Remark	Remark
Pol/Phase	Pol/Phase
Note	Note
1	2
4882.00	4882.00
9.12	39.22
18.98	49.08
-9.86	-9.86
54.00	74.00
-44.88	-34.78
380	380
227	227
Average	Peak
Horizontal	Horizontal
CF	CF



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



1	2
Level	Level
Factor	Factor
Line	Line
Limit	Limit
Over	Over
Limit	Limit
APos	APos
TPos	TPos
Remark	Remark
Pol/Phase	Pol/Phase
Note	Note
Freq	Freq
MHz	MHz
Level	Level
dBuV/m	dBuV/m
Factor	Factor
dB	dB
Line	Line
Limit	Limit
Over	Over
Limit	Limit
APos	APos
TPos	TPos
Remark	Remark
Pol/Phase	Pol/Phase
Note	Note
1	2
4882.00	4882.00
8.41	38.51
18.27	48.37
-9.86	-9.86
54.00	74.00
-45.59	-35.49
180	180
161	161
Average	Peak
Vertical	Vertical
CF	CF

Mains Conducted Emission, 150kHz ~ 30MHz

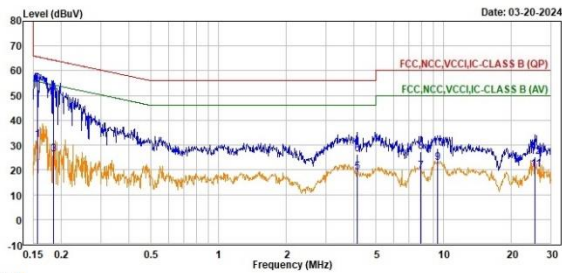
Worst Band

(Line)

(Neutral)



TUV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

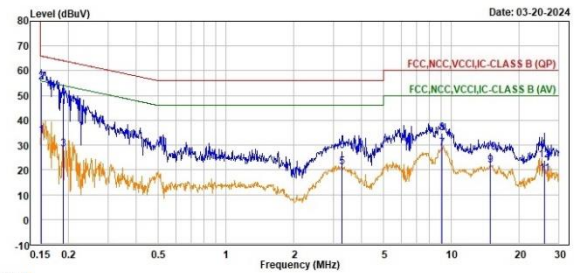


Trace: 1

Line	Freq (MHz)	Level (dBuV)	Read Level (dBuV)	Factor (dB)	Limit Line (dBuV)	Over Limit (dB)	Remark	Pol/Phase
1	0.16	32.05	22.43	9.62	55.63	-23.58	Average	line1
2	0.16	54.79	45.17	9.62	65.63	-10.84	QP	line1
3	0.18	25.23	16.61	9.62	54.30	-28.07	Average	line1
4	0.18	50.77	41.15	9.62	64.30	-13.53	QP	line1
5	4.15	18.94	9.26	9.68	46.00	-27.06	Average	line1
6	4.15	26.11	16.43	9.68	56.00	-29.89	QP	line1
7	7.93	19.45	9.71	9.74	50.00	-30.55	Average	line1
8	7.93	27.23	17.49	9.74	60.00	-32.77	QP	line1
9	9.44	22.95	13.19	9.76	50.00	-27.05	Average	line1
10	9.44	28.71	18.95	9.76	60.00	-31.29	QP	line1
11	25.58	20.21	10.47	9.74	50.00	-29.79	Average	line1
12	25.58	25.39	15.65	9.74	60.00	-34.61	QP	line1



TUV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenhiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Trace: 1

Line	Freq (MHz)	Level (dBuV)	Read Level (dBuV)	Factor (dB)	Limit Line (dBuV)	Over Limit (dB)	Remark	Pol/Phase
1	0.15	33.88	24.26	9.62	55.96	-22.08	Average	neutral
2	0.15	55.47	45.85	9.62	65.96	-10.49	QP	neutral
3	0.19	28.40	18.86	9.62	54.05	-25.57	Average	neutral
4	0.19	48.72	39.10	9.62	64.05	-15.33	QP	neutral
5	3.28	21.23	11.55	9.68	46.00	-24.77	Average	neutral
6	3.28	27.57	17.89	9.68	56.00	-28.43	QP	neutral
7	9.12	28.64	18.87	9.77	50.00	-21.36	Average	neutral
8	9.12	34.76	24.99	9.77	60.00	-25.24	QP	neutral
9	14.93	21.82	11.99	9.83	50.00	-28.18	Average	neutral
10	14.93	27.08	17.25	9.83	60.00	-32.92	QP	neutral
11	25.83	18.45	8.58	9.87	50.00	-31.55	Average	neutral
12	25.83	23.91	14.04	9.87	60.00	-36.09	QP	neutral