

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	50041195 003	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	238543987	Seite 1 von 24 Page 1 of 24
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2022-05-26	
<b>Auftraggeber:</b> <i>Client:</i>	Microchip Technology Inc., 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Bluetooth Module			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	BM64SPKS1MC1			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC Part 15C / ISED RSS-247 Test report (BT)			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247 ISED RSS-247 Issue 2 March 2017			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2022-01-12			
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A003199127-005 A003199127-004			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2022-10-07 - 2022-10-19			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	Taipei Testing Laboratories			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>überprüft von:</b> <i>compiled by:</i>	<b>genehmigt von:</b> <i>authorized by:</i>			
<b>Datum:</b> <i>Date:</i> 2022-11-02	 Ryan Chen		 Brenda Chen	
<b>Stellung / Position:</b>	Senior Project Manager		Senior Project Manager	
<b>Sonstiges / Other:</b>	This report (C2PC) is to cover the 2nd source crystal change. Only the conducted power, RSE and Mains Conducted Emission tests were evaluated. The other test results are referred to the original report no.: 50041195 002.			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <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
<b>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.</b> <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>				

## TEST SUMMARY

Report Section	FCC Clause	ISED Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	RSS-Gen	Antenna Requirement	Pass
5.1.2	15.247(b)(1)	RSS-247 5.4(d)	Peak Output Power	Pass
5.1.3	15.247(d) & 15.205 & 15.209	RSS-247 5.5	Radiated Spurious Emissions and Band Edges	Pass
5.2.1	15.207	RSS-Gen	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.

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**APPENDIX A - TEST RESULT OF RADIATED EMISSIONS & MAINS CONDUCTED EMISSION**

**APPENDIX SP - PHOTOGRAPHS TEST SETUP**

**APPENDIX EP - PHOTOGRAPHS OF EUT**

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## HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
50041195 003	Original Release	2022-11-02

## 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 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)	$\pm 1.15$ dB
Radiated Emission (30 MHz ~ 200 MHz)	$\pm 1.30$ dB
Radiated Emission (200 MHz ~ 1 GHz)	$\pm 1.30$ dB
Radiated Emission (1 GHz ~ 18 GHz)	$\pm 1.54$ dB
Radiated Emission (18 GHz ~ 40 GHz)	$\pm 2.52$ dB
Mains Conducted Emission	$\pm 1.65$ dB



### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a Bluetooth Module. 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	Bluetooth Module
Type Identification	BM64SPKS1MC1
FCC ID	A8TBM64S1
IC	12246A-BM64S1
HVIN	BM64SPKS1MC1

##### Technical Specification of EUT

Item	EUT information
Operating Frequency	2402 MHz ~ 2480 MHz
Channel Number	79
Operation Voltage	3.2Vdc ~ 4.2Vdc (Tested at 3.3Vdc)
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
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	8DPSK
2402	Max-5	Max-5
2441	Max-5	Max-5
2480	Max-5	Max-5

### 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 data 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	ISRT_V2.1.32.5667
---------------	-------------------

The samples were used as follows:

A003199127-005

A003199127-004

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

EUT Configure Mode	Applicable To				Description
	Output Power	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.

#### Output Power

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 (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	2402	GFSK	1DH5

**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	2402	GFSK	1DH5

**Test Condition**

Test Item	Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement	18-23 °C	58-69 %	Nick Hsu
Radiated Spurious Emissions above 1 GHz	23.7-24.5 °C	55-56 %	Ivan Chiang
Radiated Spurious Emissions below 1 GHz	23.7-24.5 °C	55-56 %	Ivan Chiang
Mains Conducted Emission	21.9 °C	59 %	Ray Huang

## 4.4 Special Accessories and Auxiliary Equipment

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

**Accessory of EUT**

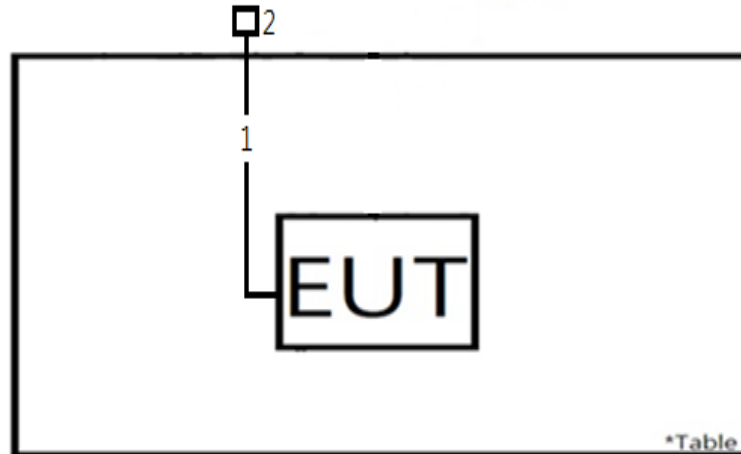
None

**Support Unit**

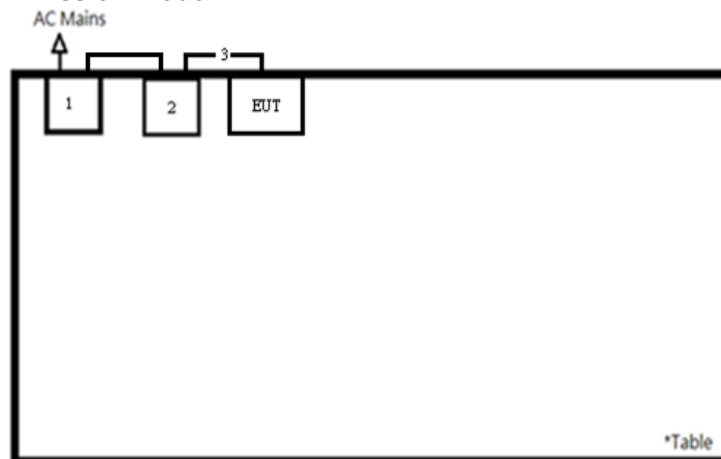
Support Unit								
No	Description	Brand	Model	S/N	Shielded	Ferrite Core (Qty)	Length (cm)	Remark
1	LAN Cable	TUV	TUV-001	NO	YES	NO	300	Radiated
2	Notebook	HP	15s-du0007TX	CND93662WV	-	-	-	
1	Adapter	HP	PPP009D	N/A	YES	NO	179	Mains Conducted
2	Notebook	Lenovo	81BL	MP1DCD6Y	-	-	-	
3	USB to Mirco	TUV	TUV-001	N/A	-	-	-	

### 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 1.927 dBi. The antenna is a PCB 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	2022/3/15	2023/3/14	2022/10/7	2022/10/7
Power Sensor	Anritsu	MA2411B	1725269	2022/3/15	2023/3/14	2022/10/7	2022/10/7

### 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	17.30	53.703	125
Middle Channel	2441	16.90	48.978	125
High Channel	2480	16.38	43.451	125

**<8DPSK>**

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	2402	18.37	68.707	125
Middle Channel	2441	18.01	63.241	125
High Channel	2480	17.32	53.951	125

**Average Power (For Reference)**
**<GFSK>**

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	17.04	50.582
Middle Channel	2441	16.68	46.559
High Channel	2480	16.12	40.926

**<8DPSK>**

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	16.02	39.994
Middle Channel	2441	15.65	36.728
High Channel	2480	15.03	31.842

### 5.1.3 Radiated Spurious Emissions and Band Edges

#### Limit

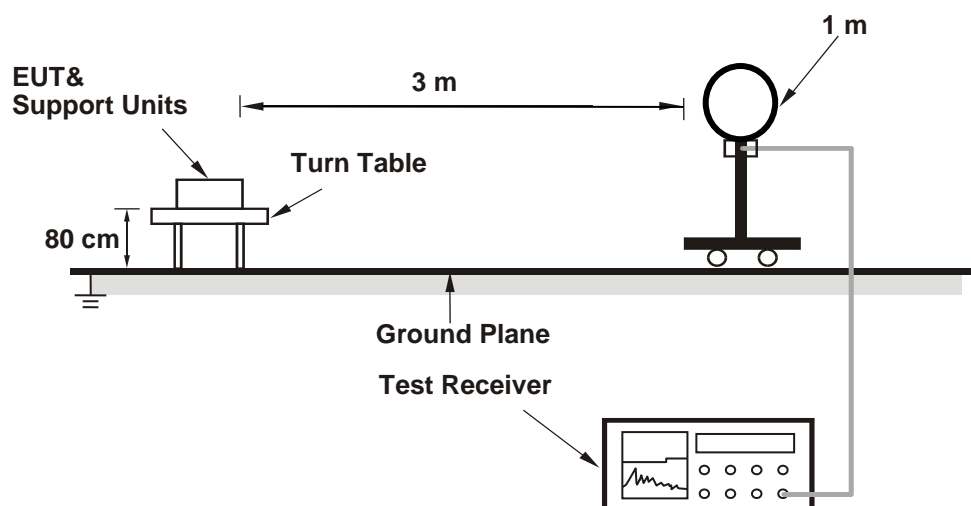
Radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen i5, 8.10 (Table 7), must comply with the radiated emission limits specified in §15.209(a) and RSS-Gen i5, 8.9 (Table 5 and 6).

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) and RSS-247 i2, 5.5.

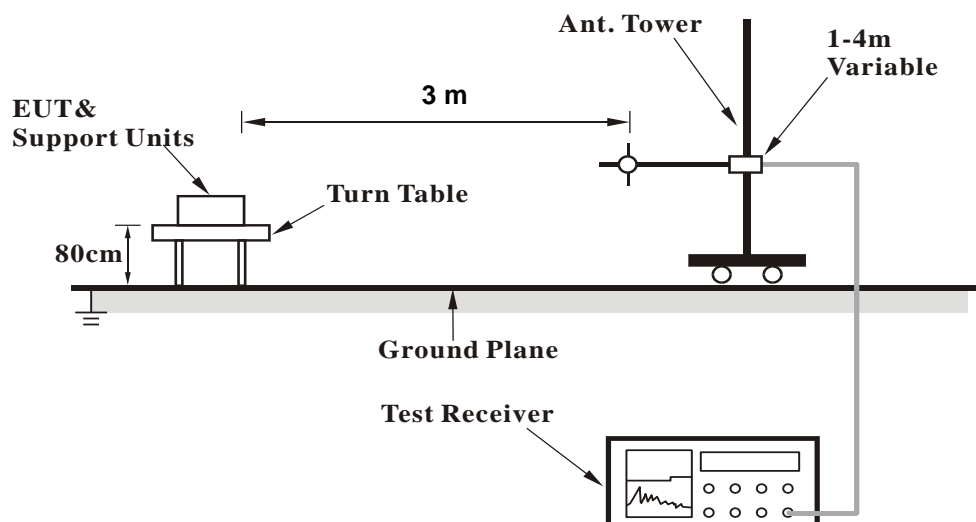
**Kind of Test Site**                      3m Semi-Anechoic Chamber

#### Test Setup

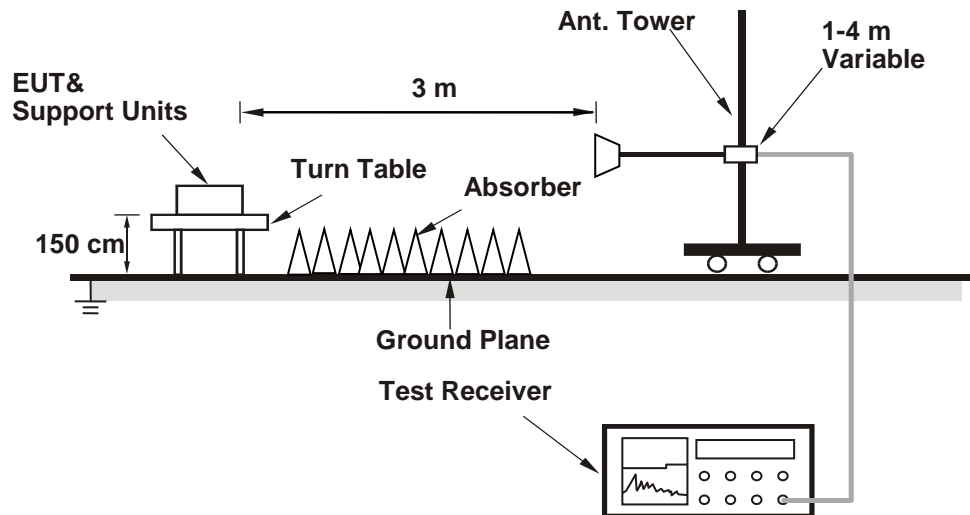
##### <Radiated Emissions below 30 MHz>



##### <Radiated Emissions 30 MHz to 1 GHz>



## &lt;Radiated Emissions above 1 GHz&gt;



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

**Test Instruments**

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
<b>Above 1 GHz</b>					
Signal Analyzer	R&S	FSV40	101508	2022/4/13	2023/4/12
Horn Antenna	ETS-Lindgren	3117	00218929	2021/11/25	2022/11/24
HF-AMP + AC source	EMCI	EMC051845SE	980635	2022/1/20	2023/1/19
HF-AMP + AC source	EMCI	EMC184045SE	980656	2022/1/20	2023/1/19
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2022/3/29	2023/3/28
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
<b>30 MHz ~ 1 GHz</b>					
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Bilog Antenna	SCHWARZBECK	VULB-9168	00950	2022/4/6	2023/4/5
LF-AMP	Agilent	8447D	2944A107722	2022/3/22	2023/3/21
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
<b>Below 30 MHz</b>					
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2021/12/8	2022/12/7
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  $\geq 98$  %) 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:  
 $20\log(\text{Duty cycle}) = 20\log(\text{dwell time} / 100\text{ms}) = 20\log(3.125 / 100) = -30.1 \text{ dB}$
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.

**Test Results**

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

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

Please refer to Appendix A.

## 5.2 Mains Emission

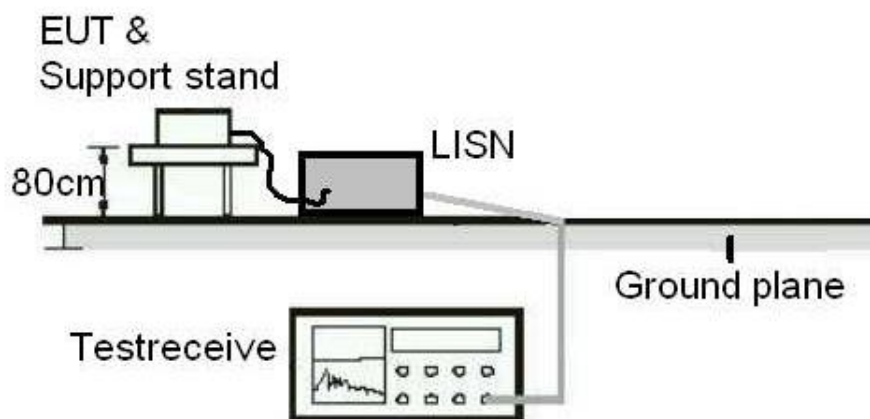
### 5.2.1 Mains Conducted Emission

#### Limit

Mains Conducted Emission as defined in §15.207 and RSS-Gen 8.8 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	2022/9/22	2023/9/21
EMI Test Receiver	R&S	ESCI	1816063	2021/11/15	2022/11/14

### 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 A.



# Appendix A: Test Results of Radiated Spurious Emissions & Mains Conducted Emission Test

## Band Edges, 2.31GHz ~ 2.9GHz

GFSK																																																																																																																																																																	
Low Channel (Horizontal) Peak & Average	Low Channel (Vertical) Peak & Average																																																																																																																																																																
<p style="text-align: right;">Date: 2022-10-13</p> <table border="1"> <thead> <tr> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>Level</th> <th>Line</th> <th>Limit</th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <th>Factor</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>24.89</td> <td>54.00</td> <td>-29.11</td> <td>243</td> <td>109</td> <td>Average</td> <td>Horizontal</td> <td>CF</td> </tr> <tr> <td>17.42</td> <td>74.00</td> <td>-19.01</td> <td>243</td> <td>109</td> <td>Peak</td> <td>Horizontal</td> <td>CF</td> </tr> <tr> <td>45.50</td> <td>54.00</td> <td>29.13</td> <td>243</td> <td>109</td> <td>Average</td> <td>Horizontal</td> <td>CF</td> </tr> <tr> <td>75.60</td> <td>74.00</td> <td>39.23</td> <td>243</td> <td>109</td> <td>Peak</td> <td>Horizontal</td> <td>CF</td> </tr> <tr> <td>25.61</td> <td>54.00</td> <td>-28.39</td> <td>243</td> <td>109</td> <td>Average</td> <td>Horizontal</td> <td>CF</td> </tr> <tr> <td>17.86</td> <td>74.00</td> <td>-18.29</td> <td>243</td> <td>109</td> <td>Peak</td> <td>Horizontal</td> <td>CF</td> </tr> </tbody> </table>	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note	Level	Line	Limit						Factor								dB/m	dBuV/m	dB	cm	deg				24.89	54.00	-29.11	243	109	Average	Horizontal	CF	17.42	74.00	-19.01	243	109	Peak	Horizontal	CF	45.50	54.00	29.13	243	109	Average	Horizontal	CF	75.60	74.00	39.23	243	109	Peak	Horizontal	CF	25.61	54.00	-28.39	243	109	Average	Horizontal	CF	17.86	74.00	-18.29	243	109	Peak	Horizontal	CF	<p style="text-align: right;">Date: 2022-10-13</p> <table border="1"> <thead> <tr> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>Level</th> <th>Line</th> <th>Limit</th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <th>Factor</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>24.33</td> <td>54.00</td> <td>-29.67</td> <td>395</td> <td>143</td> <td>Average</td> <td>Vertical</td> <td>CF</td> </tr> <tr> <td>16.87</td> <td>74.00</td> <td>-19.57</td> <td>395</td> <td>143</td> <td>Peak</td> <td>Vertical</td> <td>CF</td> </tr> <tr> <td>43.76</td> <td>54.00</td> <td>27.39</td> <td>395</td> <td>143</td> <td>Average</td> <td>Vertical</td> <td>CF</td> </tr> <tr> <td>73.86</td> <td>74.00</td> <td>37.49</td> <td>395</td> <td>143</td> <td>Peak</td> <td>Vertical</td> <td>CF</td> </tr> <tr> <td>26.28</td> <td>54.00</td> <td>-27.72</td> <td>395</td> <td>143</td> <td>Average</td> <td>Vertical</td> <td>CF</td> </tr> <tr> <td>18.51</td> <td>74.00</td> <td>-17.62</td> <td>395</td> <td>143</td> <td>Peak</td> <td>Vertical</td> <td>CF</td> </tr> </tbody> </table>	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note	Level	Line	Limit						Factor								dB/m	dBuV/m	dB	cm	deg				24.33	54.00	-29.67	395	143	Average	Vertical	CF	16.87	74.00	-19.57	395	143	Peak	Vertical	CF	43.76	54.00	27.39	395	143	Average	Vertical	CF	73.86	74.00	37.49	395	143	Peak	Vertical	CF	26.28	54.00	-27.72	395	143	Average	Vertical	CF	18.51	74.00	-17.62	395	143	Peak	Vertical	CF
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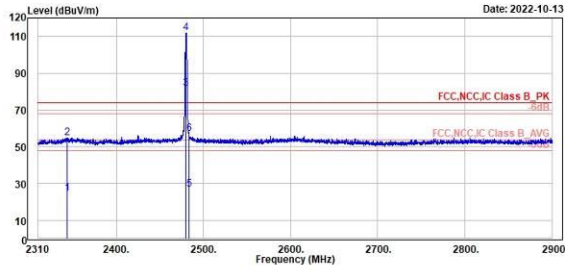
GFSK

High Channel (Horizontal) Peak & Average

High Channel (Vertical) Peak & Average



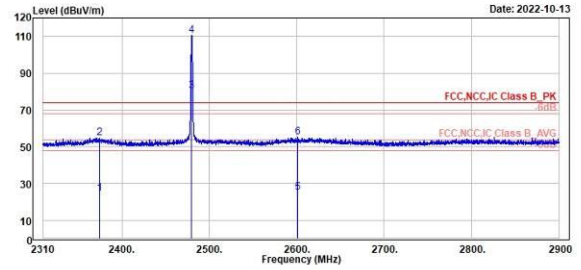
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2343.98	24.85	-12.51	37.36	54.00	-29.15	260	110 Average	Horizontal	CF
2	2343.98	54.95	17.59	37.36	74.00	-19.05	260	110 Peak	Horizontal	
3	2480.00	51.67	43.88	37.79	54.00	27.67	260	110 Average	Horizontal	CF
4	2480.00	111.77	73.98	37.79	74.00	37.77	260	110 Peak	Horizontal	
5	2483.46	26.90	-10.90	37.80	54.00	-27.10	260	110 Average	Horizontal	CF
6	2483.46	57.00	19.20	37.80	74.00	-17.00	260	110 Peak	Horizontal	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2374.78	24.83	-12.67	37.50	54.00	-29.17	323	159 Average	Vertical	CF
2	2374.78	54.93	17.43	37.50	74.00	-19.07	323	159 Peak	Vertical	
3	2480.00	80.35	42.56	37.79	54.00	26.35	323	159 Average	Vertical	CF
4	2480.00	110.45	72.66	37.79	74.00	36.45	323	159 Peak	Vertical	
5	2601.34	25.09	-12.88	37.97	54.00	-28.91	323	159 Average	Vertical	CF
6	2601.34	55.19	17.22	37.97	74.00	-18.81	323	159 Peak	Vertical	

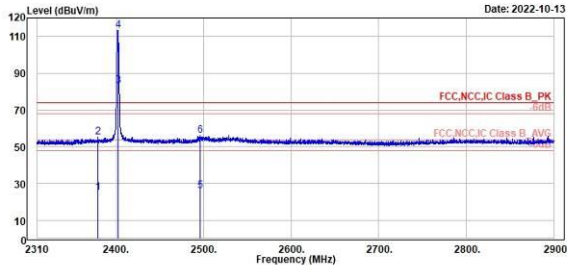
8DPSK

Low Channel (Horizontal) Peak & Average

Low Channel (Vertical) Peak & Average



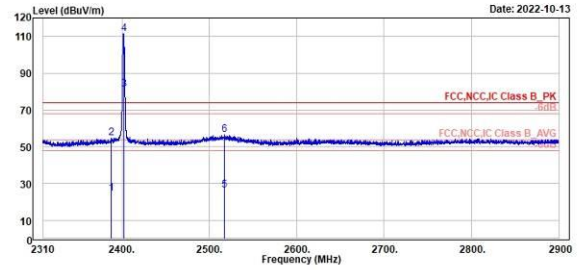
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	Freq	Level	Read Level Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2379.03	25.27	-12.26	37.53	54.00	-28.73	243	109 Average	Horizontal	CF
2	2379.03	55.37	17.84	37.53	74.00	-18.63	243	109 Peak	Horizontal	
3	2402.00	83.14	45.51	37.63	54.00	29.14	243	109 Average	Horizontal	CF
4	2402.00	113.24	75.61	37.63	74.00	39.24	243	109 Peak	Horizontal	
5	2496.20	26.02	-11.82	37.84	54.00	-27.98	243	109 Average	Horizontal	CF
6	2496.20	56.12	18.28	37.84	74.00	-17.88	243	109 Peak	Horizontal	



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	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	2387.88	24.70	-12.87	37.57	54.00	-29.30	395	144 Average	Vertical	CF
2	2387.88	54.80	17.23	37.57	74.00	-19.20	395	144 Peak	Vertical	
3	2402.00	81.28	43.65	37.63	54.00	27.28	395	144 Average	Vertical	CF
4	2402.00	111.30	73.75	37.63	74.00	37.38	395	144 Peak	Vertical	
5	2517.56	26.34	-11.53	37.87	54.00	-27.66	395	144 Average	Vertical	CF
6	2517.56	56.44	18.57	37.87	74.00	-17.56	395	144 Peak	Vertical	

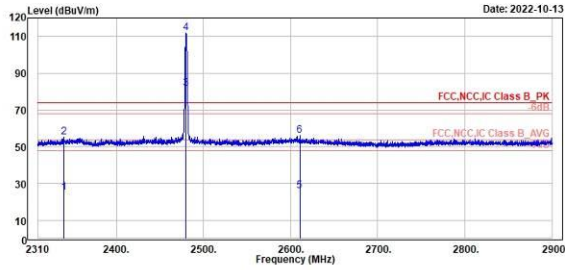
8DPSK

High Channel (Horizontal) Peak & Average

High Channel (Vertical) Peak & Average



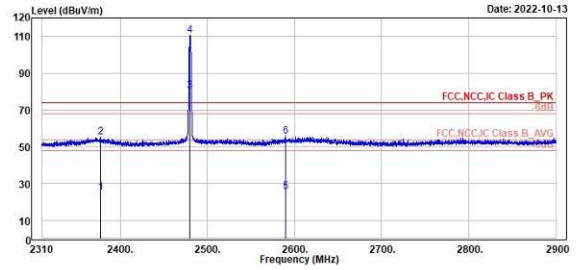
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2339.26	25.00	-12.34	37.34	54.00	-29.00	260	110 Average	Horizontal	CF
2	2339.26	55.10	17.76	37.34	74.00	-18.90	260	110 Peak	Horizontal	
3	2480.00	61.51	43.72	37.79	54.00	27.51	260	110 Average	Horizontal	CF
4	2480.00	111.61	73.82	37.79	74.00	37.61	260	110 Peak	Horizontal	
5	2610.31	25.83	-12.15	37.98	54.00	-28.17	260	110 Average	Horizontal	CF
6	2610.31	55.93	17.95	37.98	74.00	-18.07	260	110 Peak	Horizontal	



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2376.91	25.29	-12.22	37.51	54.00	-28.71	323	159 Average	Vertical	CF
2	2376.91	55.39	17.88	37.51	74.00	-18.61	323	159 Peak	Vertical	
3	2480.00	80.28	42.49	37.79	54.00	25.28	323	159 Average	Vertical	CF
4	2480.00	110.38	72.59	37.79	74.00	36.38	323	159 Peak	Vertical	
5	2589.42	25.41	-12.55	37.96	54.00	-28.59	323	159 Average	Vertical	CF
6	2589.42	55.51	17.55	37.96	74.00	-18.49	323	159 Peak	Vertical	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

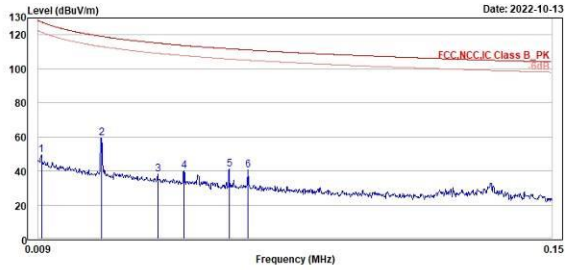
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Low Channel(Open) 9kHz~150kHz

Low Channel(Open) 150kHz~30MHz



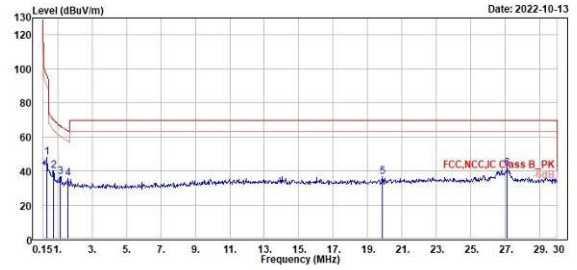
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Peak	Freq (MHz)	Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit Line (dBuV/m)	Over Limit (dB)	APos (cm)	TPos (deg)	Remark	Pol/Phase	Note
1	0.01	49.37	31.66	17.71	127.60	-78.23	100	47	QP	Open	
2	0.03	59.42	40.23	19.19	119.13	-59.71	100	23	QP	Open	
3	0.04	38.14	15.75	19.39	115.16	-77.02	100	318	QP	Open	
4	0.05	39.00	20.58	19.32	113.78	-73.80	100	210	QP	Open	
5	0.06	41.03	21.97	19.06	111.82	-70.79	100	164	QP	Open	
6	0.07	40.75	21.81	18.94	111.12	-70.37	100	193	QP	Open	



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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	0.39	47.98	29.03	18.95	95.81	-47.83	100	166	QP	Open	
2	0.78	40.21	21.08	19.13	69.00	-29.59	100	166	QP	Open	
3	1.16	36.65	17.35	19.30	66.28	-29.63	100	166	QP	Open	
4	1.61	35.68	16.33	19.35	63.45	-27.77	100	231	QP	Open	
5	19.85	36.58	14.39	22.19	69.50	-32.92	100	211	QP	Open	
6	27.10	41.37	18.85	22.52	69.50	-28.13	100	290	QP	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

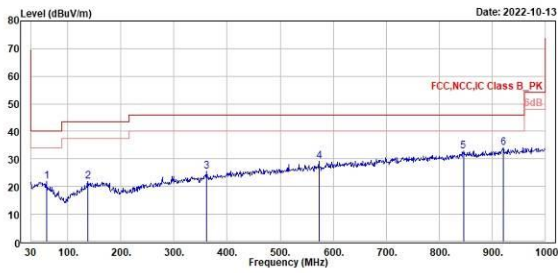
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Low Channel (Horizontal)

Low Channel (Vertical)



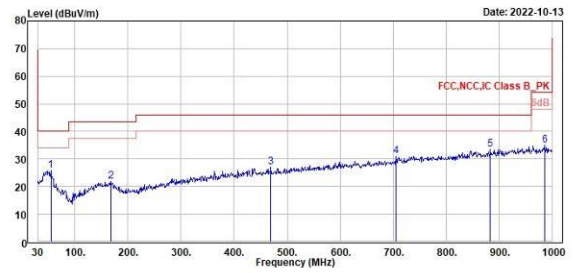
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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	59.10	21.93	28.92	-6.99	40.00	-18.07	100	113	QP	Open
2	137.67	21.77	28.24	-6.47	43.50	-21.73	300	258	QP	Open
3	361.74	25.48	29.16	-3.68	46.00	-20.52	400	176	QP	Open
4	573.20	29.26	29.59	-0.33	46.00	-16.74	400	206	QP	Open
5	845.77	32.77	29.04	3.73	46.00	-13.23	100	185	QP	Open
6	921.43	34.17	29.12	5.05	46.00	-11.83	100	196	QP	Open



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	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	54.25	25.97	32.37	-6.40	40.00	-14.03	100	11	QP	Open
2	167.74	21.97	27.96	-5.99	43.50	-21.53	200	360	QP	Open
3	469.41	27.14	29.24	-2.10	46.00	-18.86	100	353	QP	Open
4	706.00	31.17	29.45	1.72	46.00	-14.83	400	104	QP	Open
5	883.60	33.48	29.15	4.33	46.00	-12.52	200	241	QP	Open
6	985.45	34.85	28.84	6.01	54.00	-19.15	300	199	QP	Open

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

GFSK																																																													
Low Channel (Horizontal)	Low Channel (Vertical)																																																												
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="font-size: 8px;">                     TÜV Rheinland Taiwan Ltd.                      No. 458-18, Sec 2, Fongfiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)                      Tel: +886-2172-1000 Fax: +886-2172-1322                 </div> </div> <div style="text-align: right; margin-top: 10px;">Date: 2022-10-13</div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px; margin-top: 10px;"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV</th> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1 4884.00</td> <td>47.73</td> <td>57.60</td> <td>-9.87</td> <td>74.00</td> <td>-26.27</td> <td>0</td> <td>0 Peak</td> <td>Horizontal</td> <td></td> </tr> </tbody> </table>	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			1 4884.00	47.73	57.60	-9.87	74.00	-26.27	0	0 Peak	Horizontal		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="font-size: 8px;">                     TÜV Rheinland Taiwan Ltd.                      No. 458-18, Sec 2, Fongfiao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)                      Tel: +886-2172-1000 Fax: +886-2172-1322                 </div> </div> <div style="text-align: right; margin-top: 10px;">Date: 2022-10-13</div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px; margin-top: 10px;"> <thead> <tr> <th>Freq</th> <th>Level</th> <th>Read</th> <th>Limit</th> <th>Over</th> <th>APos</th> <th>TPos</th> <th>Remark</th> <th>Pol/Phase</th> <th>Note</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV</th> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>cm</th> <th>deg</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1 4884.00</td> <td>45.56</td> <td>55.43</td> <td>-9.87</td> <td>74.00</td> <td>-28.44</td> <td>400</td> <td>243 Peak</td> <td>Vertical</td> <td></td> </tr> </tbody> </table>	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			1 4884.00	45.56	55.43	-9.87	74.00	-28.44	400	243 Peak	Vertical	
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note																																																				
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg																																																						
1 4884.00	47.73	57.60	-9.87	74.00	-26.27	0	0 Peak	Horizontal																																																					
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MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg																																																						
1 4884.00	45.56	55.43	-9.87	74.00	-28.44	400	243 Peak	Vertical																																																					

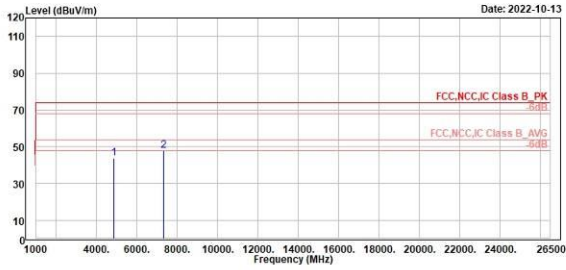
GFSK

Middle Channel (Horizontal)

Middle Channel (Vertical)



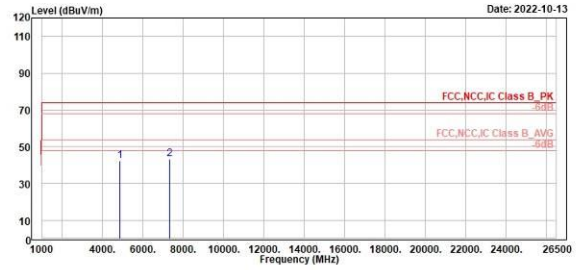
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note										
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg												
4882.00	43.73	53.51	-9.78	74.00	-30.27	294	33 Peak	Horizontal											
7323.00	48.08	55.56	-7.48	74.00	-25.92	302	112 Peak	Horizontal											

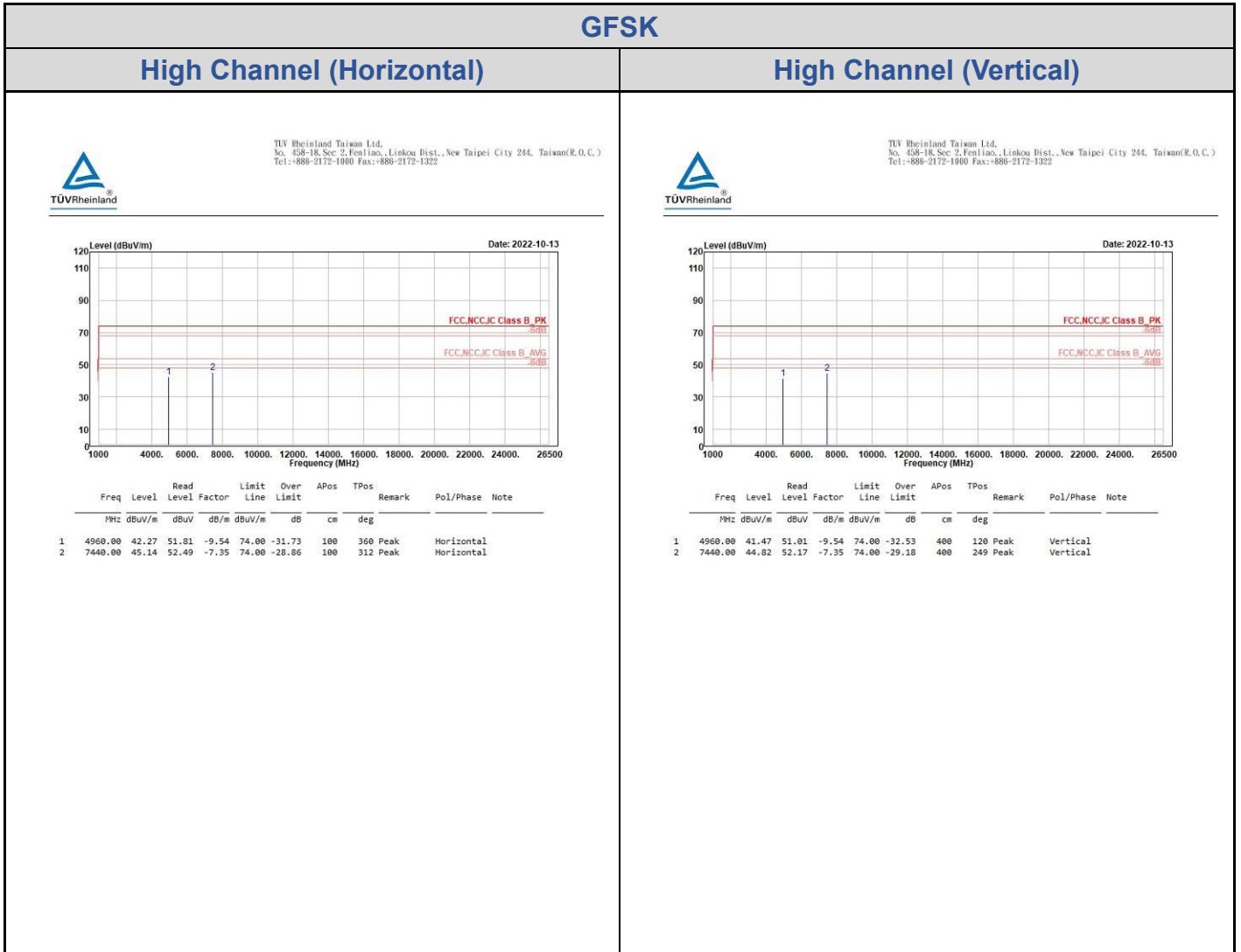


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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note										
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg												
4882.00	42.38	52.16	-9.78	74.00	-31.62	300	237 Peak	Vertical											
7323.00	43.27	50.75	-7.48	74.00	-30.73	400	107 Peak	Vertical											





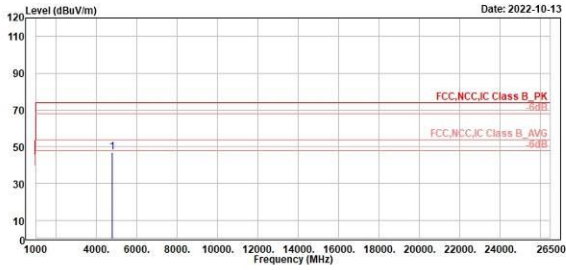
8DPSK

Low Channel (Horizontal)

Low Channel (Vertical)



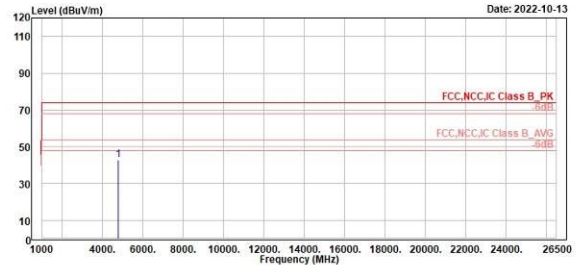
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1	4884.00	47.06	56.93	-9.87	74.00	-26.94	300	28	Peak	Horizontal
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1	4884.00	43.00	52.87	-9.87	74.00	-31.00	400	226	Peak	Vertical
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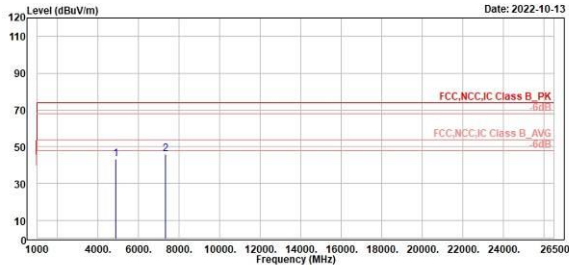
8DPSK

Middle Channel (Horizontal)

Middle Channel (Vertical)



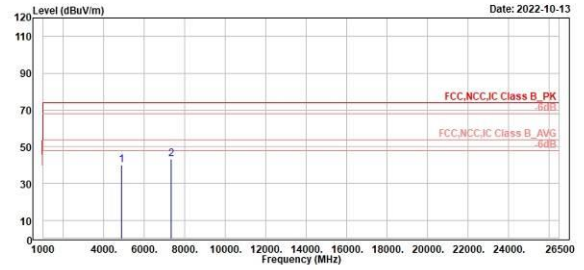
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note																																																																																								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg																																																																																												
1	4882.00	43.42	53.20	-9.78	74.00	-30.58	100	18	Peak	Horizontal																																																																																									
2	7323.00	45.98	53.46	-7.48	74.00	-28.02	111	360	Peak	Horizontal																																																																																									



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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note																																																																																								
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg																																																																																												
1	4882.00	39.95	49.73	-9.78	74.00	-34.05	200	116	Peak	Vertical																																																																																									
2	7323.00	43.30	50.78	-7.48	74.00	-30.70	400	198	Peak	Vertical																																																																																									

8DPSK

High Channel (Horizontal)

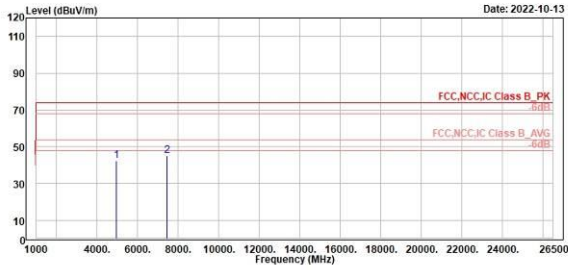
High Channel (Vertical)



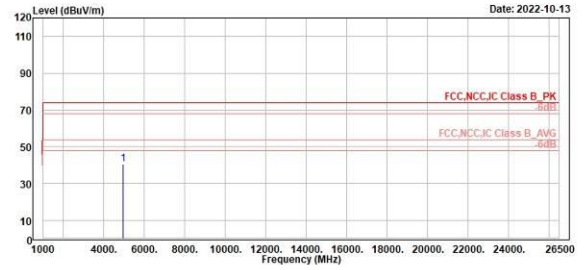
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MHz	Level	Read Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note									
dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg													
4968.00	42.34	51.88	-9.54	74.00	-31.66	101	360	Peak	Horizontal										
7440.00	45.12	52.47	-7.35	74.00	-28.88	200	273	Peak	Horizontal										



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MHz	Level	Read Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note									
dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg													
4968.00	40.46	50.00	-9.54	74.00	-33.54	100	325	Peak	Vertical										

Mains Conducted Emission, Tx Mode, 150kHz ~ 30MHz

