

Prüfbericht-Nr.: Test report no.:	CN22BXOF(P15C-BT) 001	Auftrags-Nr.: Order no.:	238542281	Seite 1 von 23 Page 1 of 23
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2022-04-14	
Auftraggeber: Client:	Microchip Technology Inc. 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States.			
Prüfgegenstand: Test item:	IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth			
Bezeichnung / Typ-Nr.: Identification / Type no.:	ATWILC3000-MR110UA			
Auftrags-Inhalt: Order content:	FCC Part 15C Test report (BT)			
Prüfgrundlage: Test specification:	FCC 47CFR Part 15: Subpart C Section 15.247			
Wareneingangsdatum: Date of sample receipt:	2022-05-20			
Prüfmuster-Nr.: Test sample no.:	A003264661-001			
Prüfzeitraum: Testing period:	2022-05-31 - 2022-07-15			
Ort der Prüfung: Place of testing:	EMC/RF Taipei Testing Site			
Prüflaboratorium: Testing laboratory:	Taipei Testing Laboratories			
Prüfergebnis*: Test result*:	Pass			
zusammengestellt von: compiled by:	genehmigt von: authorized by:			
Datum: Date:	2022-07-20	Ausstellungsdatum: Issue date:	2022-07-20	
Stellung / Position:	Project Manager	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:	This is an updated reprot for 2 nd source crystal and 2 nd source RF inductors change, so we only evaluate and verify the output power and RSE tests. The other test results are all referred to the original report no. 50141802 001.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
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. 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.				

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
-	15.247(a)(1)	20 dB Bandwidth	Refer to report no. 50141802 001
-	2.1049	99% Occupied Bandwidth	
-	15.247(d)	Conducted Spurious Emission and Band Edges	
5.1.3	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
-	15.247(a)(1)	Hopping Channel Separation	Refer to report no. 50141802 001
-	15.247(a)(1) (iii)	Number of Hopping Frequency Used	
-	15.247(a)(1) (iii)	Dwell Time on Each Channel	
-	15.207	Mains Conducted Emission	

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 B - TEST RESULT OF RADIATED Emissions for Ant No. 6

APPENDIX C - TEST RESULT OF RADIATED Emissions for Ant No. 9

APPENDIX SP - Photographs of Test Setup

APPENDIX EP - Photographs of EUT

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN22BXOF(P15C-BT) 001	Original Release	2022-07-20

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 for Ant No. 4

Appendix B - Test Result of Radiated Emissions for Ant No. 6

Appendix C - Test Result of Radiated Emissions for Ant No. 9

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.: 226631
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 an IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth . 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	IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth
Type Identification	ATWILC3000-MR110UA
FCC ID	2ADHKWILC3000U

Technical Specification of EUT

Item	EUT information
Operating Frequency	2402 MHz ~ 2480 MHz
Channel Spacing	1 MHz
Channel Number	79
Operation Voltage	2.5Vdc to 4.2Vdc (Typical = 3.3Vdc)
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
Maximum Output Power (mW)	7.244
Antenna Information	Refer to Note 1
Accessory Device	Refer to 4.4

Note 1: External Antenna List

Antennas no. 4, 6 and 9 selected for testing as worst case antennas

Antenna No.	P/N	Vendor	Antenna Gain @ 2.4GHz Band	Antenna type	Remarks
1	W3525B039	Pulse Electronics Corporation	2 dBi	PCB	Cable length 100mm
2	RN-SMA-4	Microchip	2.2 dBi	Dipole	
3	RFDP A870920IMLB 301	WALSIN	1.84 dBi	Dipole-DB	Dual Band
4	RFMTA331215IMAB 701	WALSIN	3.8 dBi	Metal Stamp	Cable length 150mm
5	RFMTA331240IMAB 701	WALSIN	3.0 dBi	Metal Stamp	Antenna same as S1No.4, cable length 400 mm
6	RFPCA381013IMAB 701	WALSIN	4.50 dBi	PCB	Cable length 130mm
7	RFPCA381035IMAB 701	WALSIN	2.7 dBi	PCB	Antenna same as S1No.6, cable length 350mm
8	RFA-02-3-C5H1	Aristotle	3 dBi	Dipole	
9	RFA-02-5-C7H1	Aristotle	5 dBi	Dipole-Long	
10	RFA-02-P33	Aristotle	2 dBi	PCB	Cable length 150mm
11	1461530100	Molex	3 dBi	PCB/Flexi	Cable length 100mm Dual Band
12	RN-SMA-S	Microchip	0.56 dBi	Dipole-short	
13	RN-SMA-7	Microchip	5 dBi	Dipole-Long	
14	RFA-02-5-F7H1	Aristotle	5 dBi	Dipole-Long	
15	RFA-02-D3	Aristotle	2 dBi	Dipole-no encl.	
16	RFA-02-G03	Aristotle	2 dBi	Metal Stamp	Cable length 150mm
17	RFA-02-L2H1	Aristotle	2 dBi	Dipole	
18	RFA-02-P05	Aristotle	2 dBi	PCB	Cable length 150mm
19	RFA-02-C2M2	Aristotle	2 dBi	Dipole	

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 an I2C to USB Adaptor and UART Interface which makes it possible to control them through the 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	ATWILC3000_ChcGUI.exe
---------------	-----------------------

The samples were used as follows:

A003264661-001

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	
Ant No. 4	-	√	√	-	-
Ant No. 6	-	√	√	-	-
Ant No. 9	√	√	√	-	-
Ant No. 12	√	-	-	-	-

Note:

- For Radiated emission test, pre-tested GFSK, $\pi/4$ -DQPSK, 8DPSK modulation type and found GFSK was the worse, therefore chosen for the final test and presented in the test report.
- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on Z-plane.
- "-" 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
Ant No. 9, 12	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
Ant No. 4, 6, 9	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
Ant No. 4, 6, 9	2402 to 2480	2402	GFSK	1DH5

Test Condition

Test Item		Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement		18-23 °C	58-67 %	Nick Hsu
Radiated Spurious Emissions above 1 GHz	Ant No. 4	24.3-25.6 °C	54-57 %	Ivan Chiang
	Ant No. 6	23.3-24.1 °C	55-59 %	
	Ant No. 9	23.3-24.1 °C	55-59 %	
Radiated Spurious Emissions below 1 GHz	Ant No. 4	24.3-25.6 °C	54-57 %	
	Ant No. 6	23.3-24.1 °C	55-59 %	
	Ant No. 9	23.3-24.1 °C	55-59 %	

4.4 Special Accessories and Auxiliary Equipment

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

Accessory of EUT

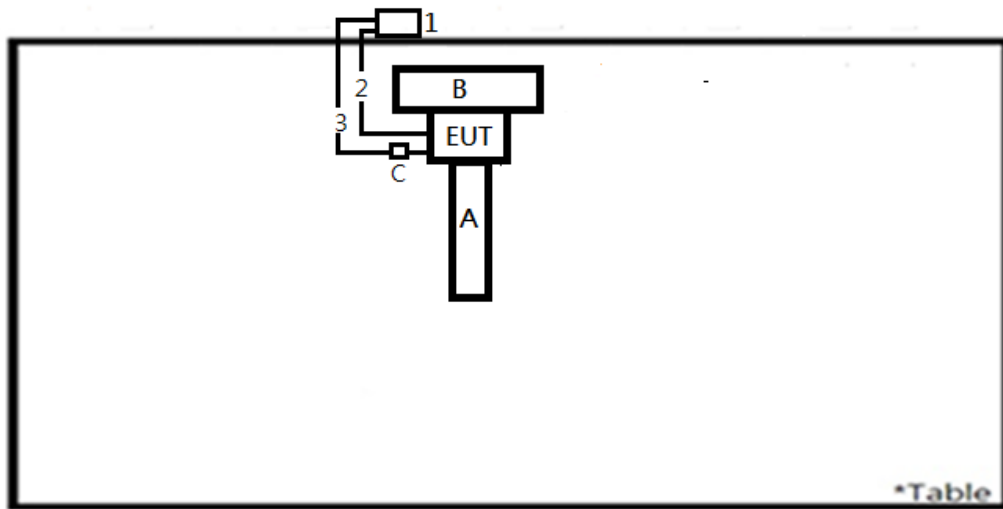
None.

Support Unit

No.	Description	Brand	Model	S/N	Remark
Radiated Test					
1	Notebook	HP	15-da1OTX	CND9111RJB	-
2	USB Cable	TUV	TUV-001	-	200 cm non-shielded cable w/o core
3	USB Cable	TUV	TUV-002	-	300 cm non-shielded cable w/o core
A	Antenna	Microchip	Refer to Antenna list no. 4, 6, 9	-	-
B	Fixture 3000	Microchip	-	-	-
C	BT Fixture	Total Phase	Aardvark I2C/SPI	-	-
Conducted Test					
-	Notebook	LENOVO	TP00094A	PF-1GT015	-

4.5 Test Setup Diagram

<Radiated Spurious Emissions 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 Max directional gain of 5dBi (refer to External Antenna List). The antenna is connected through a proprietary connector with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Antenna No.	P/N	Vendor	Antenna Gain @ 2.4GHz Band	Antenna type	Remarks
1	W3525B039	Pulse Electronics Corporation	2 dBi	PCB	Cable length 100mm
2	RN-SMA-4	Microchip	2.2 dBi	Dipole	--
3	RFDP A870920IMLB301	WALSIN	1.84 dBi	Dipole-DB	Dual Band
4	RFMTA331215IMAB701	WALSIN	3.8 dBi	Metal Stamp	Cable length 150mm
5	RFMTA331240IMAB701	WALSIN	3.0 dBi	Metal Stamp	Antenna same as S1No.4, cable length 400 mm
6	RFPCA381013IMAB701	WALSIN	4.50 dBi	PCB	Cable length 130mm
7	RFPCA381035IMAB701	WALSIN	2.7 dBi	PCB	Antenna same as S1No.6, cable length 350mm
8	RFA-02-3-C5H1	Aristotle	3 dBi	Dipole	--
9	RFA-02-5-C7H1	Aristotle	5 dBi	Dipole-Long	--
10	RFA-02-P33	Aristotle	2 dBi	PCB	Cable length 150mm
11	1461530100	Molex	3 dBi	PCB/Flexi	Cable length 100mm Dual Band
12	RN-SMA-S	Microchip	0.56 dBi	Dipole-short	--
13	RN-SMA-7	Microchip	5 dBi	Dipole-Long	--
14	RFA-02-5-F7H1	Aristotle	5 dBi	Dipole-Long	--
15	RFA-02-D3	Aristotle	2 dBi	Dipole-no encl.	--
16	RFA-02-G03	Aristotle	2 dBi	Metal Stamp	Cable length 150mm
17	RFA-02-L2H1	Aristotle	2 dBi	Dipole	--
18	RFA-02-P05	Aristotle	2 dBi	PCB	Cable length 150mm
19	RFA-02-C2M2	Aristotle	2 dBi	Dipole	--

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	2022/5/31	2022/5/31
Power Sensor	Anritsu	MA2411B	1725269	2022/3/15	2023/3/14	2022/5/31	2022/5/31

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	8.60	7.244	125
Middle Channel	2441	8.49	7.063	125
High Channel	2480	8.50	7.079	125

<8DPSK>

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	2402	8.55	7.161	125
Middle Channel	2441	8.46	7.015	125
High Channel	2480	8.47	7.031	125

Average Power
<GFSK>

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	8.09	6.442
Middle Channel	2441	8.00	6.310
High Channel	2480	7.98	6.281

<8DPSK>

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	2402	6.11	4.083
Middle Channel	2441	6.01	3.990
High Channel	2480	5.97	3.954

5.1.3 Radiated Spurious Emissions and Band Edges

Limit

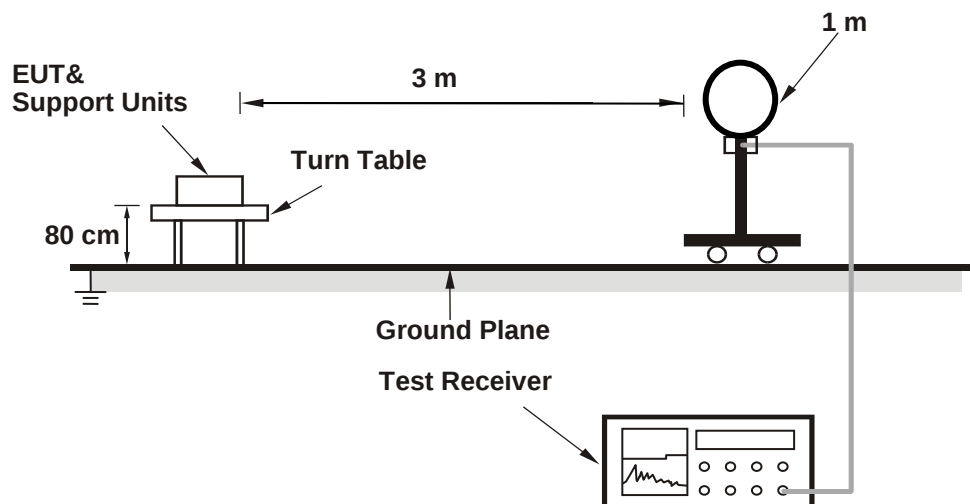
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

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).

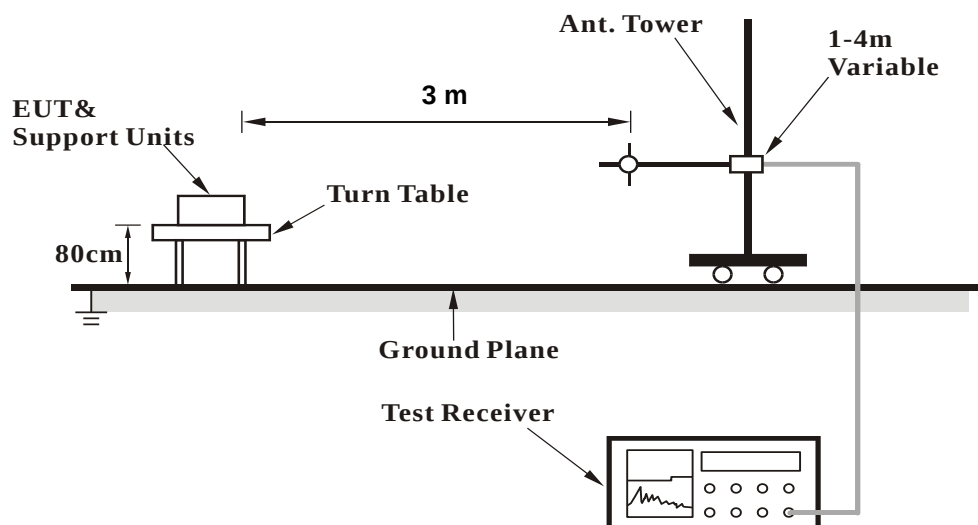
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

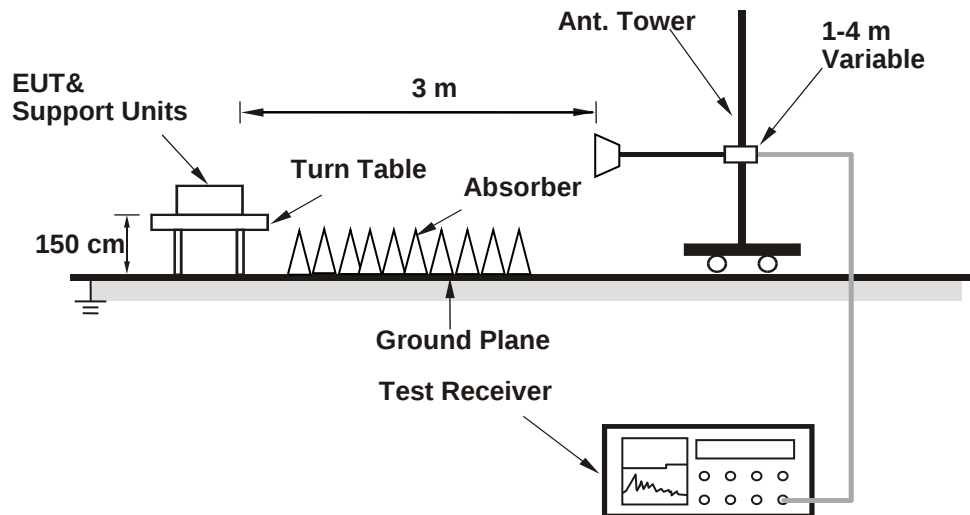
<Radiated Emissions below 30 MHz>



<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).

Test Instruments

Ant No. 4 (Test Date: 2022/7/11~2022/7/13)

Ant No. 6 (Test Date: 2022/7/13~2022/7/15)

Ant No. 9 (Test Date: 2022/7/13~2022/7/15)

Below 30MHz					
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Microwave Cable	SUCOFLEX 104EA	800056/4EA	804680/4	2022/3/22	2023/3/21
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2021/12/8	2022/12/7
30MHz-1GHz					
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2022/4/6	2023/4/5
LF-AMP	Agilent	8447D	2944A107722	2022/3/22	2023/3/21
Above 1GHz					
Signal Analyzer	R&S	FSV40	101508	2022/4/13	2023/4/12
Horn Antenna	ETS-Lindgren	3117	00218930	2021/12/20	2022/12/19
HF-AMP + AC source	EMCI	EMC051845SE	980633	2022/2/16	2023/2/15
HF-AMP + AC source	EMCI	EMC184045SE	980657	2022/2/16	2023/2/15
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2022/3/29	2023/3/28

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: $20\log(\text{Duty cycle}) = 20\log(\text{dwell time} / 100\text{ms}) = 20\log(3.125 / 100) = -30.1 \text{ dB}$
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.

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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 for Ant 4, Appendix B for Ant 6 and Appendix C for Ant 9.

Appendix A:

Test Results of Radiated Spurious Emissions for Ant No. 4

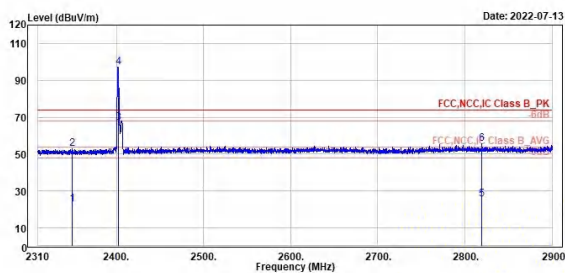
Band Edges, 2.31GHz ~ 2.9GHz

GFSK

Low Channel (Horizontal) Peak & Average



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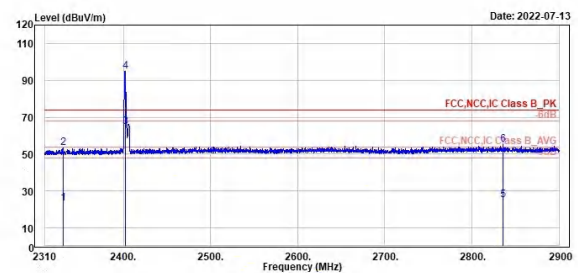


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2349.65	22.92	-14.45	37.37	54.00	-31.08		279	19	Average	Horizontal	CF
2	2349.65	53.02	15.65	37.37	74.00	-20.98		279	19	Peak	Horizontal	
3 *	2402.00	67.09	29.46	37.63	54.00	13.09		279	19	Average	Horizontal	CF
4 *	2402.00	97.19	59.56	37.63	74.00	23.19		279	19	Peak	Horizontal	
5	2819.05	25.41	-12.78	38.19	54.00	-28.59		279	19	Average	Horizontal	CF
6	2819.05	55.51	17.32	38.19	74.00	-18.49		279	19	Peak	Horizontal	

Low Channel (Vertical) Peak & Average



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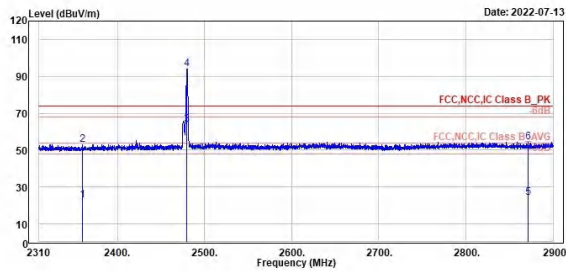
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2331.12	23.20	-14.11	37.31	54.00	-30.80		357	339	Average	Vertical	CF
2	2331.12	53.30	15.99	37.31	74.00	-20.70		357	339	Peak	Vertical	
3 *	2402.00	64.06	27.23	37.63	54.00	10.06		357	339	Average	Vertical	CF
4 *	2402.00	94.96	57.33	37.63	74.00	20.96		357	339	Peak	Vertical	
5	2835.34	24.96	-13.22	38.18	54.00	-29.04		357	339	Average	Vertical	CF
6	2835.34	55.06	16.88	38.18	74.00	-18.94		357	339	Peak	Vertical	

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High Channel (Horizontal) Peak & Average



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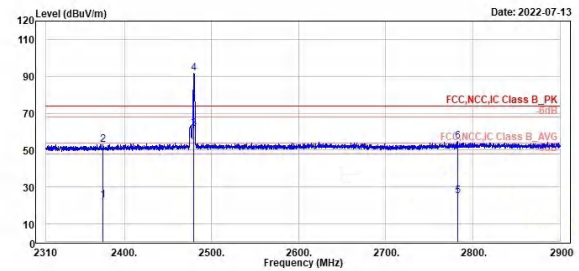


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2359.68	22.96	-14.46	37.42	54.00	-31.04		298	18	Average	Horizontal	CF
2	2359.68	53.06	15.64	37.42	74.00	-20.94		298	18	Peak	Horizontal	
3 *	2480.00	63.95	26.16	37.79	54.00	9.95		298	18	Average	Horizontal	CF
4 *	2480.00	94.95	56.26	37.79	74.00	20.95		298	18	Peak	Horizontal	
5	2870.97	24.39	-13.88	38.27	54.00	-29.61		298	18	Average	Horizontal	CF
6	2870.97	54.49	16.22	38.27	74.00	-19.51		298	18	Peak	Horizontal	

High Channel (Vertical) Peak & Average

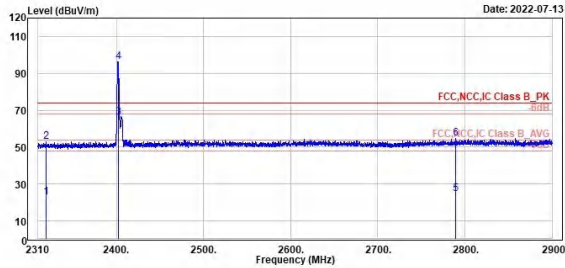


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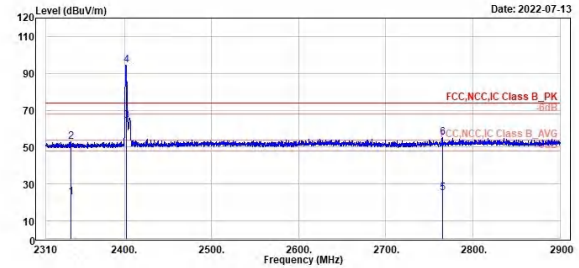
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	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2375.73	22.96	-14.54	37.50	54.00	-31.04		378	324	Average	Vertical	CF
2	2375.73	53.06	15.56	37.50	74.00	-20.94		378	324	Peak	Vertical	
3 *	2480.00	61.43	23.64	37.79	54.00	7.43		378	324	Average	Vertical	CF
4 *	2480.00	91.53	53.74	37.79	74.00	17.53		378	324	Peak	Vertical	
5	2782.83	24.87	-13.31	38.18	54.00	-29.13		378	324	Average	Vertical	CF
6	2782.83	54.97	16.79	38.18	74.00	-19.03		378	324	Peak	Vertical	

8DPSK
Low Channel (Horizontal) Peak & Average

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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2319.20	22.97	-14.31	37.28	54.00	-31.03		353		1 Average	Horizontal	CF
2	2319.20	53.07	15.79	37.28	74.00	-20.93		353		1 Peak	Horizontal	
3 *	2402.00	66.20	20.57	37.63	54.00	12.20		353		1 Average	Horizontal	CF
4 *	2402.00	96.30	58.67	37.63	74.00	22.30		353		1 Peak	Horizontal	
5	2789.67	24.51	-13.68	38.19	54.00	-29.49		353		1 Average	Horizontal	CF
6	2789.67	54.61	16.42	38.19	74.00	-19.39		353		1 Peak	Horizontal	

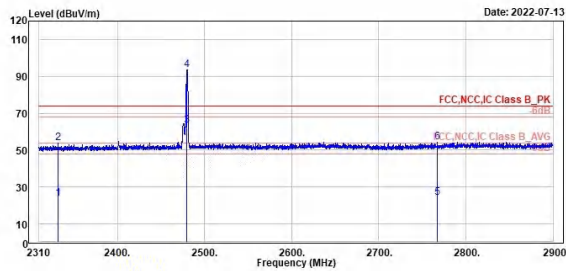
Low Channel (Vertical) Peak & Average

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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2338.91	22.77	-14.57	37.34	54.00	-31.23		357	340	Average	Vertical	CF
2	2338.91	52.87	15.53	37.34	74.00	-21.13		357	340	Peak	Vertical	
3 *	2402.00	64.49	26.86	37.63	54.00	10.49		357	340	Average	Vertical	CF
4 *	2402.00	94.59	56.96	37.63	74.00	20.59		357	340	Peak	Vertical	
5	2764.77	24.95	-13.21	38.16	54.00	-29.05		357	340	Average	Vertical	CF
6	2764.77	55.05	16.89	38.16	74.00	-18.95		357	340	Peak	Vertical	

8DPSK
High Channel (Horizontal) Peak & Average

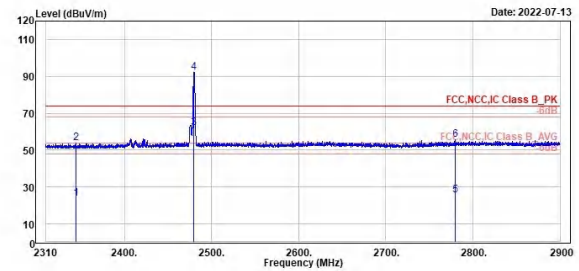

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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2332.18	23.67	-13.64	37.31	54.00	-30.33	298	19	Average	Horizontal	CF	
2	2332.18	53.77	16.46	37.31	74.00	-20.23	298	19	Peak	Horizontal		
3 *	2480.00	63.43	25.64	37.79	54.00	9.43	298	19	Average	Horizontal	CF	
4 *	2480.00	93.53	55.74	37.79	74.00	19.53	298	19	Peak	Horizontal		
5	2767.25	24.14	-14.03	38.17	54.00	-29.86	298	19	Average	Horizontal	CF	
6	2767.25	54.24	16.07	38.17	74.00	-19.76	298	19	Peak	Horizontal		

High Channel (Vertical) Peak & Average


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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2344.22	23.75	-13.61	37.36	54.00	-30.25	376	329	Average	Vertical	CF	
2	2344.22	53.85	16.49	37.36	74.00	-20.15	376	329	Peak	Vertical		
3 *	2480.00	62.00	24.29	37.79	54.00	8.00	376	329	Average	Vertical	CF	
4 *	2480.00	92.18	54.39	37.79	74.00	18.18	376	329	Peak	Vertical		
5	2779.29	25.41	-12.77	38.18	54.00	-28.59	376	329	Average	Vertical	CF	
6	2779.29	55.51	17.33	38.18	74.00	-18.49	376	329	Peak	Vertical		

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

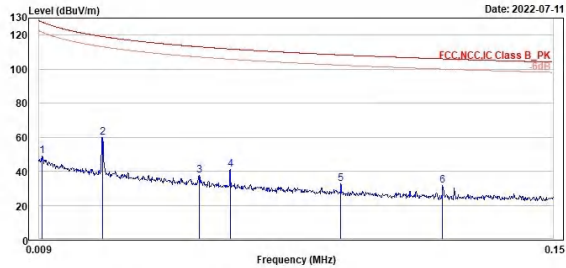
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Low Channel(Open) 9kHz~150kHz

Low Channel(Open) 150kHz~30MHz



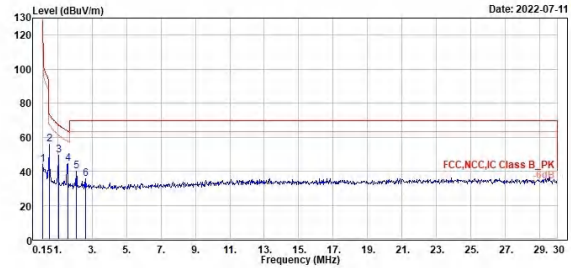
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.01	48.77	31.01	17.76	127.72	-78.95	100	173	QP	Open		
2	0.03	59.80	40.61	19.19	119.13	-59.33	100	358	QP	Open		
3	0.05	37.81	18.57	19.24	113.11	-75.30	100	235	QP	Open		
4	0.06	41.27	22.21	19.06	111.62	-70.55	100	280	QP	Open		
5	0.09	32.62	14.23	18.39	106.34	-75.72	100	179	QP	Open		
6	0.12	31.64	13.35	18.29	106.04	-74.40	100	184	QP	Open		



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.15	43.90	25.50	18.40	104.08	-60.18	100	85	QP	Open		
2	0.51	55.84	36.89	18.95	73.48	-17.64	100	313	QP	Open		
3	1.05	49.52	30.25	19.27	67.22	-17.70	100	166	QP	Open		
4	1.58	44.60	25.25	19.35	63.62	-19.02	100	188	QP	Open		
5	2.09	40.18	20.76	19.42	69.50	-29.32	100	187	QP	Open		
6	2.63	35.84	16.36	19.48	69.50	-33.66	100	186	QP	Open		

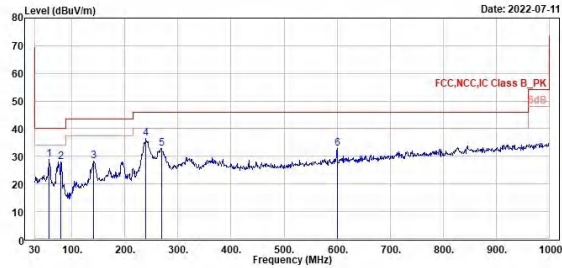
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

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Low Channel (Horizontal)



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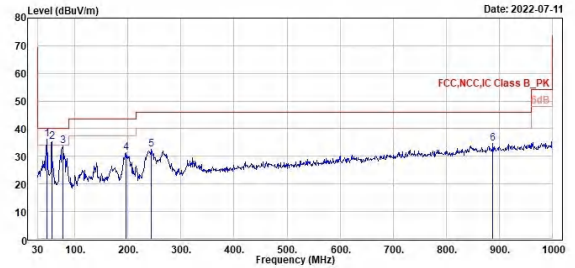


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	56.19	28.98	35.66	-6.68	40.00	-11.02	100	349	QP	Horizontal		
2	79.47	28.10	38.37	-10.27	40.00	-11.90	200	196	QP	Horizontal		
3	140.58	28.37	34.69	-6.32	43.50	-15.13	200	305	QP	Horizontal		
4	239.52	36.38	43.12	-6.74	46.00	-9.62	100	282	QP	Horizontal		
5	268.62	32.71	38.57	-5.86	46.00	-13.29	100	139	QP	Horizontal		
6	608.36	32.95	32.75	0.20	46.00	-13.05	400	258	QP	Horizontal		

Low Channel (Vertical)



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	46.49	36.29	42.16	-5.87	40.00	-3.71	100	181	QP	Vertical		
2	56.19	35.19	41.87	-6.68	40.00	-4.81	100	9	QP	Vertical		
3	76.56	33.69	43.47	-9.78	40.00	-6.31	342	177	QP	Vertical		
4	195.87	31.21	39.86	-8.65	43.50	-12.29	100	230	QP	Vertical		
5	244.37	32.52	39.23	-6.71	46.00	-13.48	100	96	QP	Vertical		
6	888.45	34.81	30.29	4.52	46.00	-11.19	300	32	QP	Vertical		

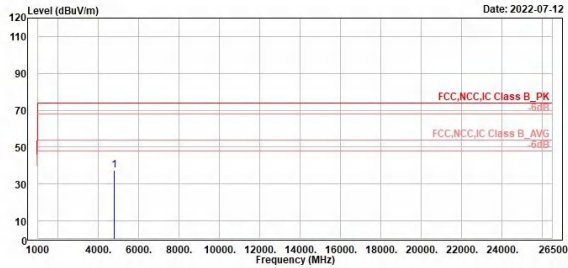
Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

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Low Channel (Horizontal)



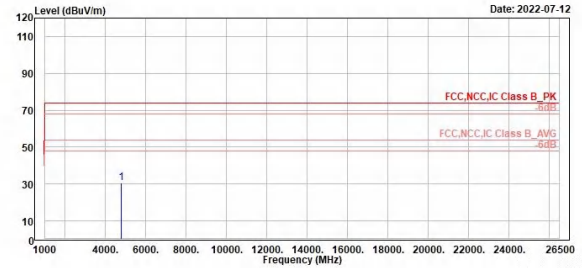
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4804.00	37.28	47.15	-9.87	74.00	-36.72		400	173	Peak	Horizontal	



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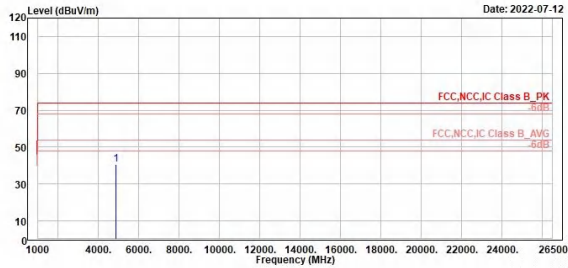
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4804.00	30.46	40.33	-9.87	74.00	-43.54		285	188	Peak	Vertical	

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Middle Channel (Horizontal)



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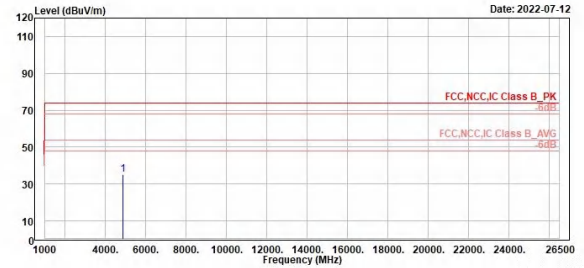


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4882.00	40.58	50.36	-9.78	74.00	-33.42	300	124	Peak	Horizontal	

Middle Channel (Vertical)



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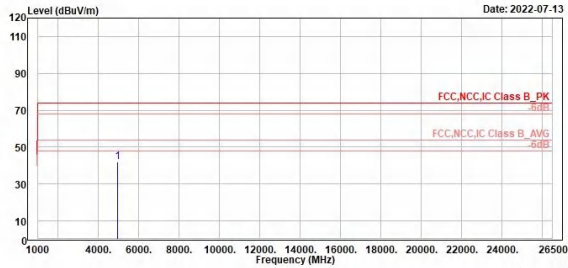
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4882.00	34.99	44.77	-9.78	74.00	-39.01	328	43	Peak	Vertical	

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High Channel (Horizontal)



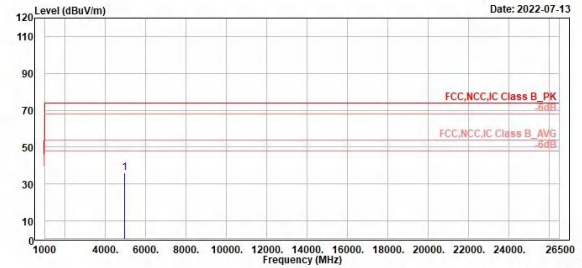
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4968.00	41.92	51.46	-9.54	74.00	-32.08		100	100	Peak	Horizontal	



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4968.00	35.93	45.47	-9.54	74.00	-38.07		300	164	Peak	Vertical	

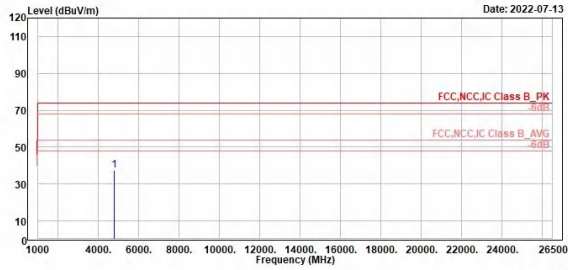
8DPSK

Low Channel (Horizontal)

Low Channel (Vertical)



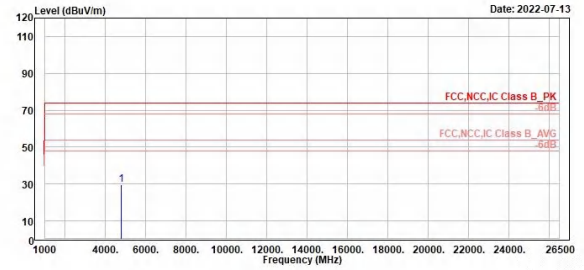
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1 4804.00	37.40	47.27	-9.87	74.00	-36.60	300	149	Peak	Horizontal		



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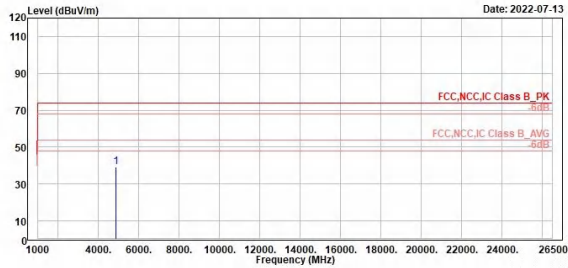
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1 4804.00	29.50	39.37	-9.87	74.00	-44.50	300	360	Peak	Vertical		

8DPSK

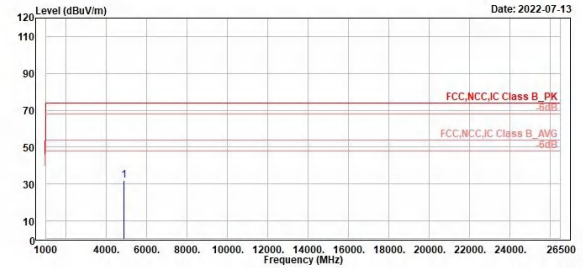
Middle Channel (Horizontal)



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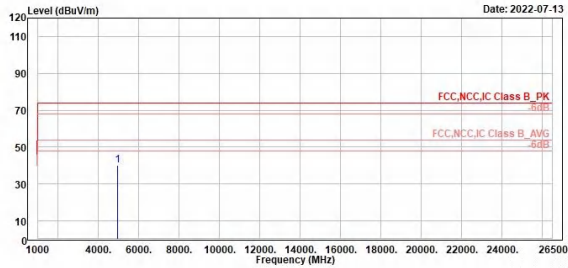
8DPSK

High Channel (Horizontal)

High Channel (Vertical)



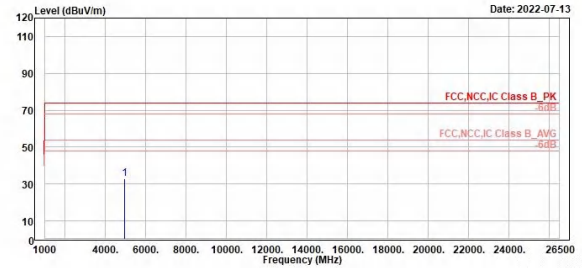
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4960.00	40.09	49.63	-9.54	74.00	-33.91		200	93	Peak	Horizontal	



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4960.00	33.03	42.57	-9.54	74.00	-40.97		400	160	Peak	Vertical	

Appendix B:

Test Results of Radiated Spurious Emissions for Ant No. 6

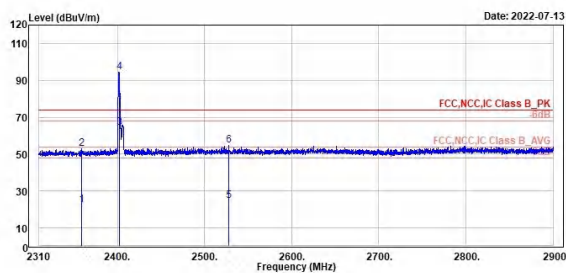
Band Edges, 2.31GHz ~ 2.9GHz

GFSK

Low Channel (Horizontal) Peak & Average



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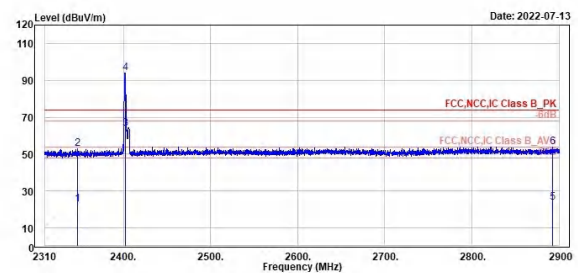


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2359.44	22.13	-15.29	37.42	54.00	-31.87		280	153	Average	Horizontal	CF
2	2359.44	52.71	15.29	37.42	74.00	-21.29		280	153	Peak	Horizontal	
3 *	2402.00	64.30	26.67	37.63	54.00	10.30		280	153	Average	Horizontal	CF
4 *	2402.00	94.40	56.77	37.63	74.00	20.40		280	153	Peak	Horizontal	
5	2527.83	24.78	-13.10	37.88	54.00	-29.22		280	153	Average	Horizontal	CF
6	2527.83	54.88	17.00	37.88	74.00	-19.12		280	153	Peak	Horizontal	

Low Channel (Vertical) Peak & Average



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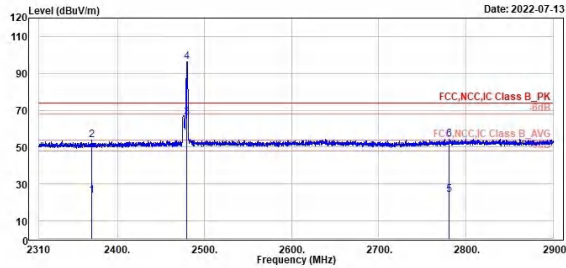
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2347.41	22.84	-14.52	37.36	54.00	-31.16		346	263	Average	Vertical	CF
2	2347.41	52.94	15.58	37.36	74.00	-21.06		346	263	Peak	Vertical	
3 *	2402.00	63.77	26.14	37.63	54.00	9.77		346	263	Average	Vertical	CF
4 *	2402.00	93.87	56.24	37.63	74.00	19.87		346	263	Peak	Vertical	
5	2892.80	23.79	-14.59	38.38	54.00	-30.21		346	263	Average	Vertical	CF
6	2892.80	53.89	15.51	38.38	74.00	-20.11		346	263	Peak	Vertical	

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High Channel (Horizontal) Peak & Average



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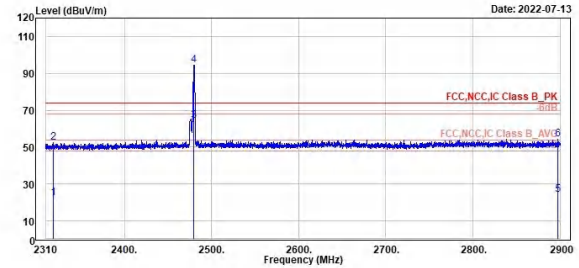


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2378.89	23.54	-13.94	37.48	54.00	-30.46		297	155	Average	Horizontal	CF
2	2378.89	53.64	16.16	37.48	74.00	-20.36		297	155	Peak	Horizontal	
3 *	2480.00	66.14	28.35	37.79	54.00	12.14		297	155	Average	Horizontal	CF
4 *	2480.00	96.24	58.45	37.79	74.00	22.24		297	155	Peak	Horizontal	
5	2780.23	24.23	-13.95	38.18	54.00	-29.77		297	155	Average	Horizontal	CF
6	2780.23	54.33	16.15	38.18	74.00	-19.67		297	155	Peak	Horizontal	

High Channel (Vertical) Peak & Average

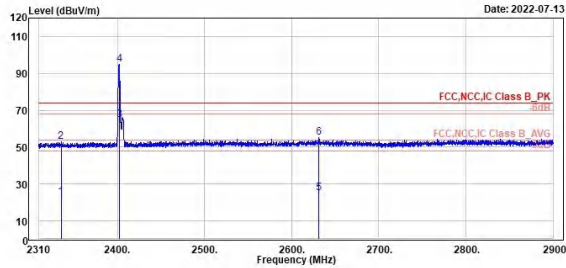


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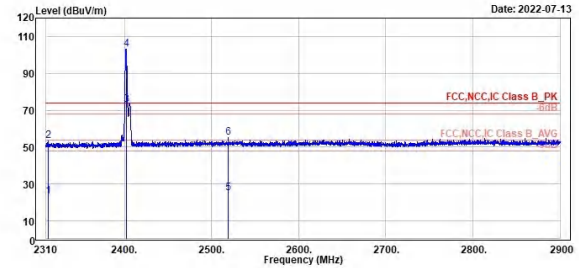
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2318.61	22.17	-15.11	37.28	54.00	-31.83		331	322	Average	Vertical	CF
2	2318.61	52.28	15.00	37.28	74.00	-21.72		331	322	Peak	Vertical	
3 *	2480.00	64.48	26.69	37.79	54.00	10.48		331	322	Average	Vertical	CF
4 *	2480.00	94.58	56.79	37.79	74.00	20.58		331	322	Peak	Vertical	
5	2897.64	24.38	-14.03	38.41	54.00	-29.62		331	322	Average	Vertical	CF
6	2897.64	54.48	16.07	38.41	74.00	-19.52		331	322	Peak	Vertical	

8DPSK
Low Channel (Horizontal) Peak & Average

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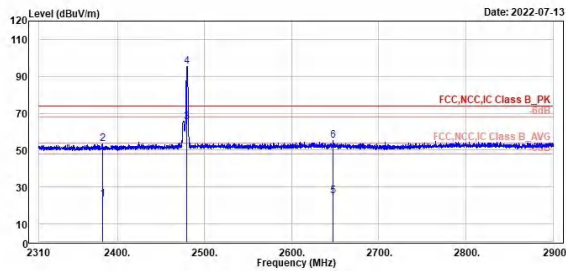
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2335.37	23.04	-14.29	37.33	54.00	-30.96		279	155	Average	Horizontal	CF
2	2335.37	53.14	15.81	37.33	74.00	-20.86		279	155	Peak	Horizontal	
3 *	2402.00	64.65	27.02	37.63	54.00	10.65		279	155	Average	Horizontal	CF
4 *	2402.00	94.75	57.12	37.63	74.00	20.75		279	155	Peak	Horizontal	
5	2631.31	24.89	-13.11	38.00	54.00	-29.11		279	155	Average	Horizontal	CF
6	2631.31	54.99	16.99	38.00	74.00	-19.01		279	155	Peak	Horizontal	

Low Channel (Vertical) Peak & Average

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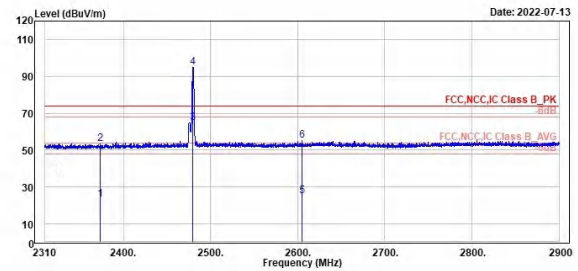
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1	2312.71	23.45	-13.81	37.26	54.00	-30.55		400	354	Average	Vertical	CF
2	2312.71	53.55	16.29	37.26	74.00	-20.45		400	354	Peak	Vertical	
3 *	2402.00	73.20	35.57	37.63	54.00	19.20		400	354	Average	Vertical	CF
4 *	2402.00	103.30	65.67	37.63	74.00	29.30		400	354	Peak	Vertical	
5	2519.45	24.99	-12.88	37.87	54.00	-29.01		400	354	Average	Vertical	CF
6	2519.45	55.09	17.22	37.87	74.00	-18.91		400	354	Peak	Vertical	

8DPSK
High Channel (Horizontal) Peak & Average

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	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	2382.92	23.26	-14.28	37.54	54.00	-30.74		271	26	Average	Horizontal	CF
2	2382.92	53.36	15.82	37.54	74.00	-20.64		271	26	Peak	Horizontal	
3 *	2480.00	65.35	27.56	37.79	54.00	11.35		271	26	Average	Horizontal	CF
4 *	2480.00	95.45	57.66	37.79	74.00	21.45		271	26	Peak	Horizontal	
5	2647.24	24.95	-13.07	38.02	54.00	-29.05		271	26	Average	Horizontal	CF
6	2647.24	55.05	17.03	38.02	74.00	-18.95		271	26	Peak	Horizontal	

High Channel (Vertical) Peak & Average

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	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	2373.37	23.42	-14.07	37.49	54.00	-30.58		331	324	Average	Vertical	CF
2	2373.37	53.52	16.03	37.49	74.00	-20.48		331	324	Peak	Vertical	
3 *	2480.00	64.64	26.05	37.79	54.00	10.64		331	324	Average	Vertical	CF
4 *	2480.00	94.74	56.95	37.79	74.00	20.74		331	324	Peak	Vertical	
5	2604.76	25.15	-12.82	37.97	54.00	-28.85		331	324	Average	Vertical	CF
6	2604.76	55.25	17.28	37.97	74.00	-18.75		331	324	Peak	Vertical	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

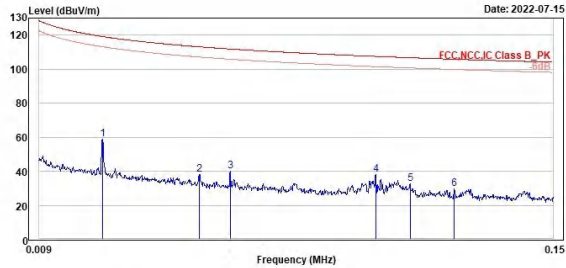
GFSK

Low Channel(Open) 9kHz~150kHz

Low Channel(Open) 150kHz~30MHz



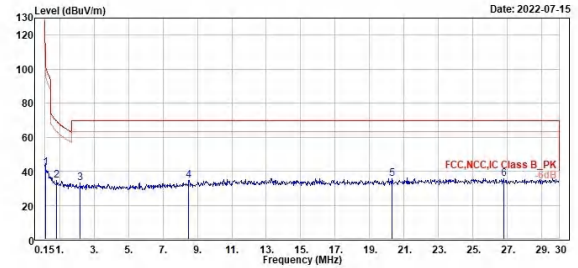
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.03	58.67	39.48	19.19	119.13	-60.46	100	298	QP	Open		
2	0.05	38.26	19.02	19.24	113.11	-74.85	100	323	QP	Open		
3	0.06	39.97	20.91	19.06	111.82	-71.85	100	56	QP	Open		
4	0.10	38.11	19.89	18.22	107.48	-69.37	100	77	QP	Open		
5	0.11	32.58	14.32	18.26	106.71	-74.13	100	256	QP	Open		
6	0.12	29.74	11.44	18.30	105.80	-76.06	100	201	QP	Open		



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.21	42.20	23.60	18.60	101.17	-58.97	100	240	QP	Open		
2	0.84	34.42	15.26	19.16	69.15	-34.73	100	144	QP	Open		
3	2.21	32.93	13.50	19.43	69.50	-36.57	100	85	QP	Open		
4	8.51	34.51	13.70	20.61	69.50	-34.99	100	269	QP	Open		
5	20.30	35.73	13.52	22.21	69.50	-33.77	100	130	QP	Open		
6	26.78	35.51	13.01	22.50	69.50	-33.99	100	140	QP	Open		

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

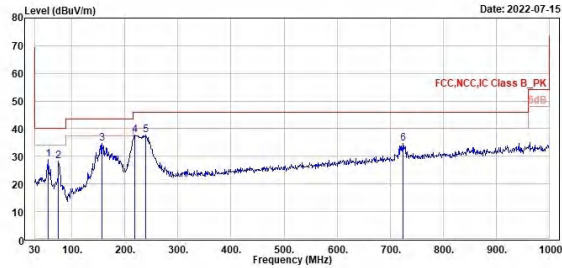
GFSK

Low Channel (Horizontal)

Low Channel (Vertical)



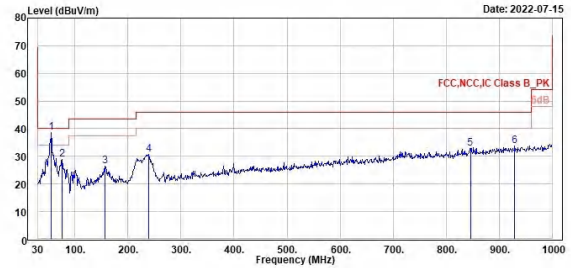
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	55.22	28.95	35.47	-6.52	40.00	-11.05	300	110	QP		Horizontal	
2	74.62	28.44	37.94	-9.50	40.00	-11.56	100	180	QP		Horizontal	
3	156.10	34.57	40.65	-6.08	43.50	-8.93	200	157	QP		Horizontal	
4	219.15	37.77	45.82	-8.05	46.00	-8.23	100	266	QP		Horizontal	
5	239.52	37.79	44.53	-6.74	46.00	-8.21	100	272	QP		Horizontal	
6	724.52	34.55	32.78	1.77	46.00	-11.45	100	171	QP		Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	55.22	38.49	45.01	-6.52	40.00	-1.51	100	342	QP		Vertical	
2	75.59	28.80	38.38	-9.58	40.00	-11.20	100	170	QP		Vertical	
3	157.07	26.31	32.30	-5.99	43.50	-17.19	294	360	QP		Vertical	
4	238.55	30.70	37.46	-6.76	46.00	-15.30	294	362	QP		Vertical	
5	845.77	32.84	29.11	3.73	46.00	-13.16	200	326	QP		Vertical	
6	929.19	33.62	28.33	5.29	46.00	-12.38	200	357	QP		Vertical	

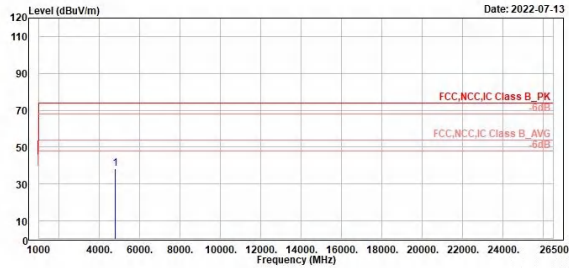
Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

GFSK

Low Channel (Horizontal)



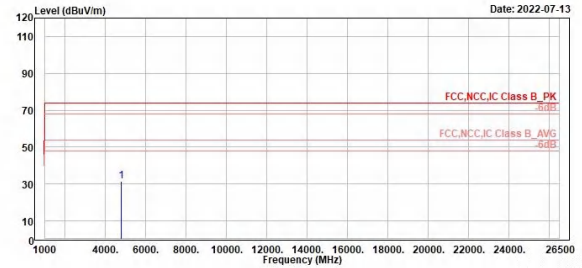
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1 4804.00	38.46	48.33	-9.87	74.00	-35.54	100	66	Peak	Horizontal		



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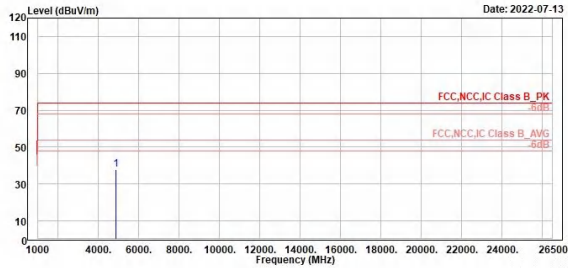
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1 4804.00	31.67	41.54	-9.87	74.00	-42.33	400	54	Peak	Vertical		

GFSK

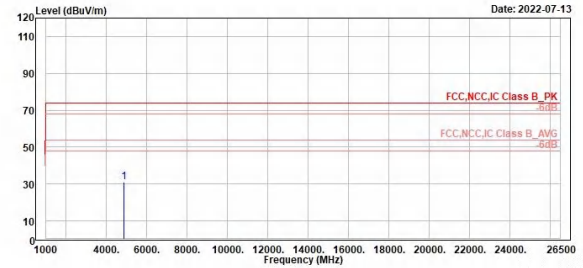
Middle Channel (Horizontal)



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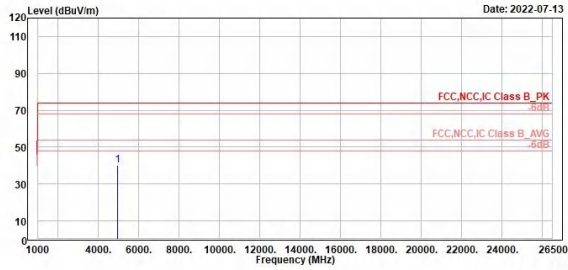


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High Channel (Horizontal)



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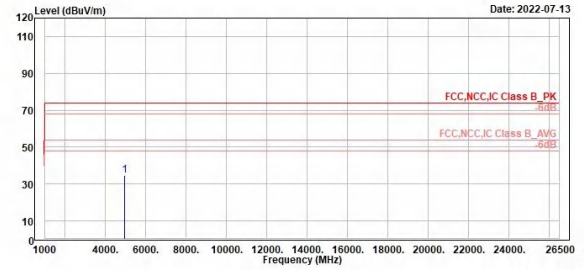


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4960.00	40.35	49.89	-9.54	74.00	-33.65	200	173	Peak	Horizontal	

High Channel (Vertical)



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4960.00	34.61	44.15	-9.54	74.00	-39.39	300	143	Peak	Vertical	

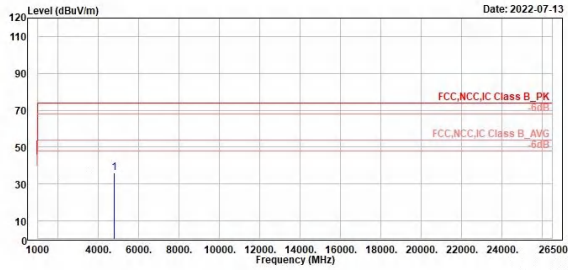
8DPSK

Low Channel (Horizontal)

Low Channel (Vertical)



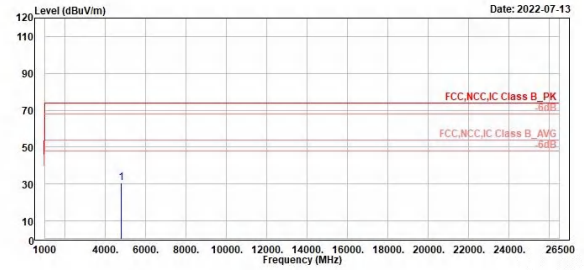
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4804.00	36.19	46.06	-9.87	74.00	-37.81	100	360	Peak	Horizontal	



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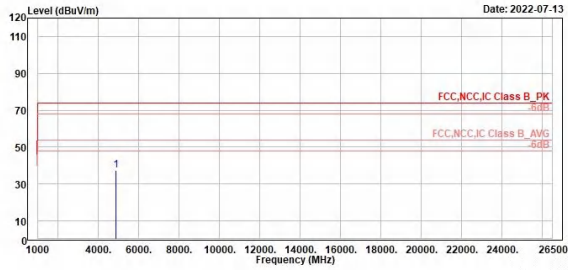
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MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4804.00	30.56	40.43	-9.87	74.00	-43.44	248	305	Peak	Vertical	

8DPSK

Middle Channel (Horizontal)



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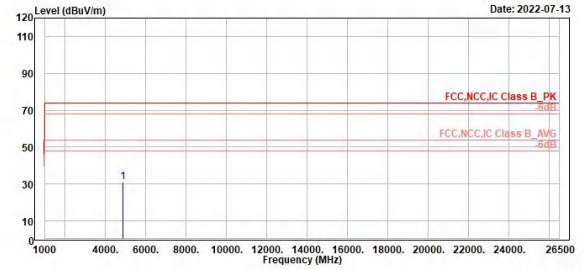


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4882.00	37.29	47.07	-9.78	74.00	-36.71		300	226	Peak	Horizontal	

Middle Channel (Vertical)



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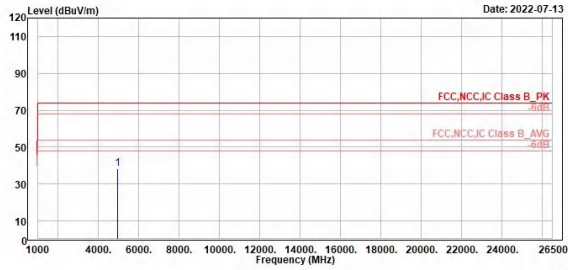
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MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4882.00	30.87	40.65	-9.78	74.00	-43.13		298	176	Peak	Vertical	

8DPSK

High Channel (Horizontal)



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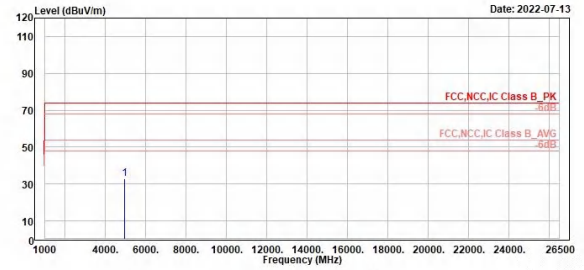


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4960.00	38.44	47.98	-9.54	74.00	-35.56		137	360	Peak	Horizontal	

High Channel (Vertical)



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4960.00	32.65	42.19	-9.54	74.00	-41.35		100	100	Peak	Vertical	

Appendix C:

Test Results of Radiated Spurious Emissions for Ant No. 9

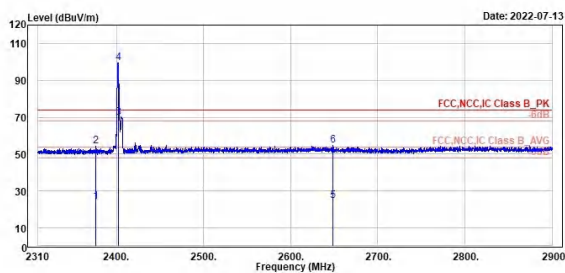
Band Edges, 2.31GHz ~ 2.9GHz

GFSK

Low Channel (Horizontal) Peak & Average



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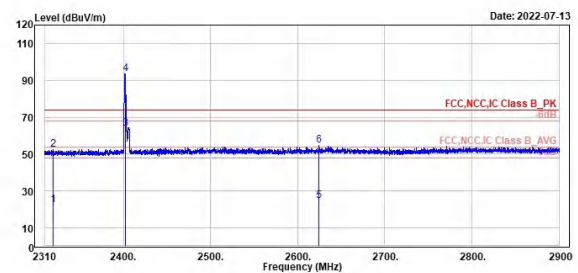


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2376.20	24.27	-13.23	37.50	54.00	-29.73	273	268	Average	Horizontal	CF	
2	2376.20	54.36	16.86	37.50	74.00	-19.64	273	268	Peak	Horizontal	CF	
3 *	2402.00	69.58	31.95	37.63	54.00	15.58	273	268	Average	Horizontal	CF	
4 *	2402.00	99.60	62.05	37.63	74.00	25.60	273	268	Peak	Horizontal	CF	
5	2645.90	24.59	-13.44	38.03	54.00	-29.41	273	268	Average	Horizontal	CF	
6	2648.90	54.69	16.66	38.03	74.00	-19.31	273	268	Peak	Horizontal	CF	

Low Channel (Vertical) Peak & Average



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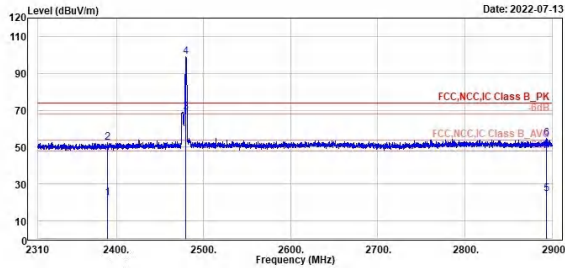
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2319.32	22.53	-14.75	37.28	54.00	-31.47	282	171	Average	Vertical	CF	
2	2319.32	52.63	15.35	37.28	74.00	-21.37	282	171	Peak	Vertical	CF	
3 *	2402.00	63.66	26.03	37.63	54.00	9.66	282	171	Average	Vertical	CF	
4 *	2402.00	93.76	56.13	37.63	74.00	19.76	282	171	Peak	Vertical	CF	
5	2624.71	24.62	-13.38	38.00	54.00	-29.38	282	171	Average	Vertical	CF	
6	2624.71	54.72	16.72	38.00	74.00	-19.28	282	171	Peak	Vertical	CF	

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High Channel (Horizontal) Peak & Average



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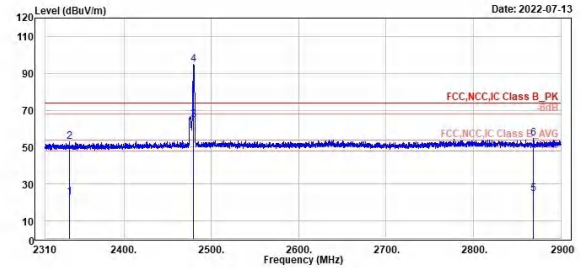


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2389.77	22.30	-15.28	37.58	54.00	-31.70	262	266	Average	Horizontal	CF	
2	2389.77	52.40	14.82	37.58	74.00	-21.60	262	266	Peak	Horizontal	CF	
3 *	2480.00	68.71	30.92	37.79	54.00	14.71	262	266	Average	Horizontal	CF	
4 *	2480.00	98.81	61.02	37.79	74.00	24.81	262	266	Peak	Horizontal	CF	
5	2893.75	24.44	-13.94	38.38	54.00	-29.56	262	266	Average	Horizontal	CF	
6	2893.75	54.53	16.15	38.38	74.00	-19.47	262	266	Peak	Horizontal	CF	

High Channel (Vertical) Peak & Average



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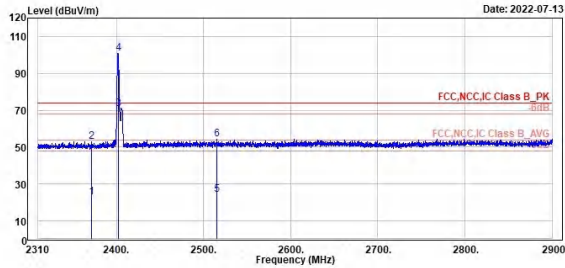
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2337.49	22.61	-14.72	37.33	54.00	-31.39	295	172	Average	Vertical	CF	
2	2337.49	52.71	15.38	37.33	74.00	-21.29	295	172	Peak	Vertical	CF	
3 *	2480.00	64.62	26.83	37.79	54.00	10.62	295	172	Average	Vertical	CF	
4 *	2480.00	94.72	56.93	37.79	74.00	20.72	295	172	Peak	Vertical	CF	
5	2868.85	24.57	-13.70	38.27	54.00	-29.43	295	172	Average	Vertical	CF	
6	2868.85	54.68	16.41	38.27	74.00	-19.32	295	172	Peak	Vertical	CF	

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Low Channel (Horizontal) Peak & Average



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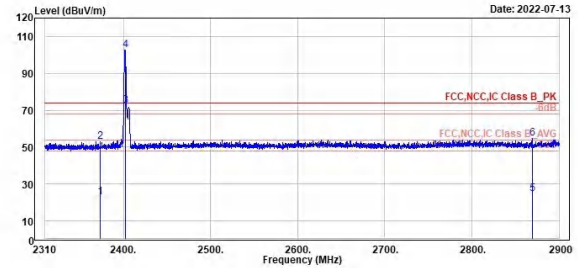


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2371.24	22.91	-14.57	37.48	54.00	-31.09		245	94	Average	Horizontal	CF
2	2371.24	53.01	15.53	37.48	74.00	-20.99		245	94	Peak	Horizontal	
3 *	2402.00	70.81	33.18	37.63	54.00	16.81		245	94	Average	Horizontal	CF
4 *	2402.00	100.91	63.28	37.63	74.00	26.91		245	94	Peak	Horizontal	
5	2515.44	24.21	-13.66	37.87	54.00	-29.79		245	94	Average	Horizontal	CF
6	2515.44	54.31	16.44	37.87	74.00	-19.69		245	94	Peak	Horizontal	

Low Channel (Vertical) Peak & Average



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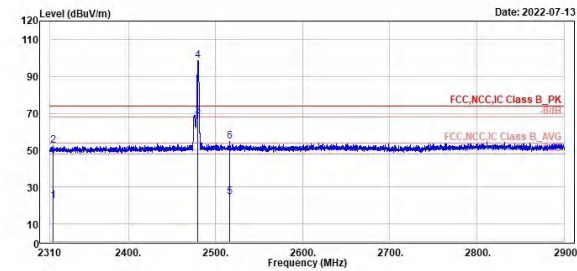
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2373.13	22.79	-14.70	37.49	54.00	-31.21		393	211	Average	Vertical	CF
2	2373.13	52.89	15.40	37.49	74.00	-21.11		393	211	Peak	Vertical	
3 *	2402.00	72.73	35.10	37.63	54.00	18.73		393	211	Average	Vertical	CF
4 *	2402.00	102.83	65.20	37.63	74.00	28.83		393	211	Peak	Vertical	
5	2868.97	24.47	-13.00	38.27	54.00	-29.53		393	211	Average	Vertical	CF
6	2868.97	54.58	16.31	38.27	74.00	-19.42		393	211	Peak	Vertical	

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High Channel (Horizontal) Peak & Average



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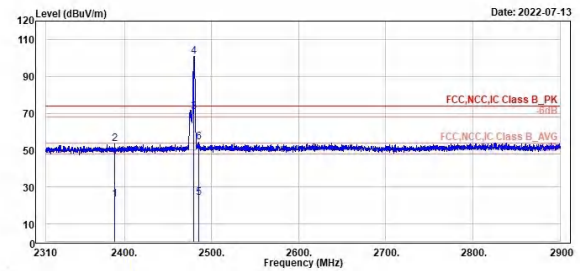


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2313.54	22.58	-14.68	37.26	54.00	-31.42	262	266	Average	Horizontal	CF	
2	2313.54	52.68	15.42	37.26	74.00	-21.32	262	266	Peak	Horizontal		
3 *	2480.00	68.55	30.76	37.79	54.00	14.55	262	266	Average	Horizontal	CF	
4 *	2480.00	98.65	60.86	37.79	74.00	24.65	262	266	Peak	Horizontal		
5	2516.15	24.57	-13.30	37.87	54.00	-29.43	262	266	Average	Horizontal	CF	
6	2516.15	54.67	16.80	37.87	74.00	-19.33	262	266	Peak	Horizontal		

High Channel (Vertical) Peak & Average



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2388.94	23.07	-14.51	37.58	54.00	-30.93	378	360	Average	Vertical	CF	
2	2388.94	53.18	15.60	37.58	74.00	-20.82	378	360	Peak	Vertical		
3 *	2480.00	70.63	32.84	37.79	54.00	16.63	378	360	Average	Vertical	CF	
4 *	2480.00	100.73	62.94	37.79	74.00	26.73	378	360	Peak	Vertical		
5	2485.58	24.19	-13.61	37.80	54.00	-29.81	378	360	Average	Vertical	CF	
6	2485.58	54.29	16.49	37.80	74.00	-19.71	378	360	Peak	Vertical		

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

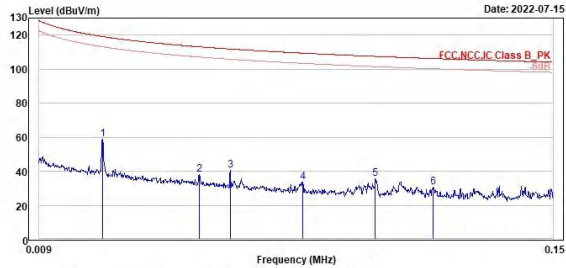
GFSK

Low Channel(Open) 9kHz~150kHz

Low Channel(Open) 150kHz~30MHz



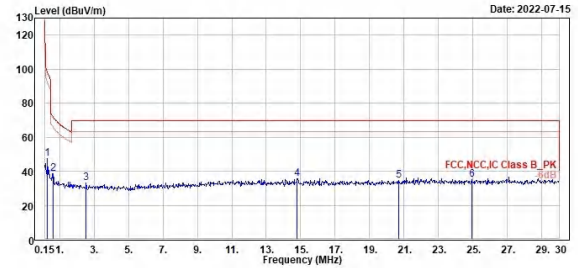
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.03	58.73	39.54	19.19	119.13	-60.40	100	71	QP	Open		
2	0.05	37.91	18.67	19.24	113.11	-75.20	100	320	QP	Open		
3	0.06	40.64	21.58	19.06	111.82	-71.18	100	89	QP	Open		
4	0.08	33.65	15.83	18.62	109.39	-75.74	100	246	QP	Open		
5	0.10	35.41	17.19	18.22	107.49	-72.08	100	64	QP	Open		
6	0.12	30.73	12.45	18.28	106.22	-75.49	100	135	QP	Open		



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.30	47.47	28.53	18.94	98.08	-50.61	100	328	QP	Open		
2	0.63	38.70	19.67	19.03	71.65	-32.95	100	311	QP	Open		
3	2.54	33.18	13.71	19.47	69.50	-36.32	100	174	QP	Open		
4	14.61	35.44	13.60	21.84	69.50	-34.06	100	153	QP	Open		
5	20.69	34.68	12.45	22.23	69.50	-34.82	100	324	QP	Open		
6	24.93	35.10	12.68	22.42	69.50	-34.40	100	286	QP	Open		

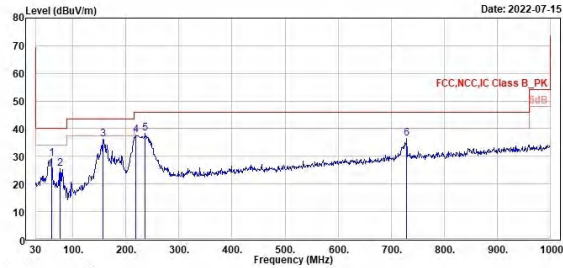
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

GFSK

Low Channel (Horizontal)



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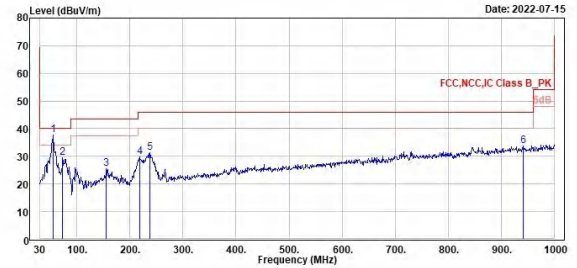


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	59.18	29.21	36.20	-6.99	40.00	-10.79		100	360	QP	Horizontal	
2	75.59	25.63	35.21	-9.58	40.00	-14.37		100	134	QP	Horizontal	
3	157.07	36.23	42.22	-5.99	43.50	-7.27		200	107	QP	Horizontal	
4	219.15	37.77	45.62	-8.05	46.00	-8.23		100	253	QP	Horizontal	
5	236.61	38.19	45.00	-6.81	46.00	-7.81		100	237	QP	Horizontal	
6	729.37	36.36	34.41	1.95	46.00	-9.64		100	192	QP	Horizontal	

Low Channel (Vertical)



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	55.22	37.68	44.20	-6.52	40.00	-2.32		100	11	QP	Vertical	
2	72.68	29.40	38.42	-9.02	40.00	-10.60		100	122	QP	Vertical	
3	155.13	25.51	31.60	-6.09	43.50	-17.99		300	7	QP	Vertical	
4	218.18	29.70	37.78	-8.08	46.00	-16.30		200	168	QP	Vertical	
5	237.58	31.30	38.09	-6.79	46.00	-14.70		200	169	QP	Vertical	
6	941.80	33.72	28.47	5.25	46.00	-12.28		300	319	QP	Vertical	

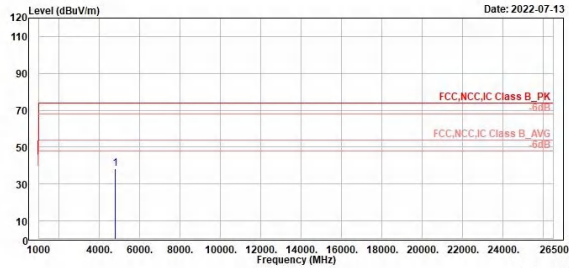
Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

GFSK

Low Channel (Horizontal)



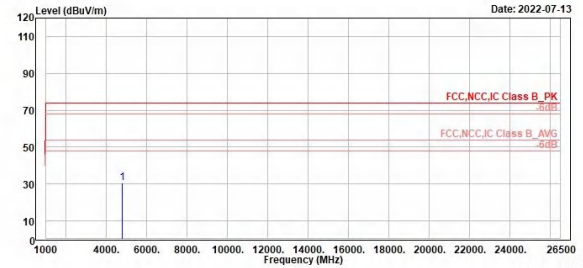
TÜV Rheinland Taiwan Ltd.
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	4804.00	38.14	48.01	-9.87	74.00	-35.86	300	255	Peak	Horizontal	



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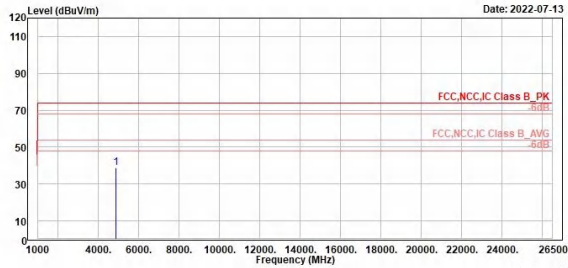
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	4804.00	30.72	40.59	-9.87	74.00	-43.28	400	27	Peak	Vertical	

GFSK

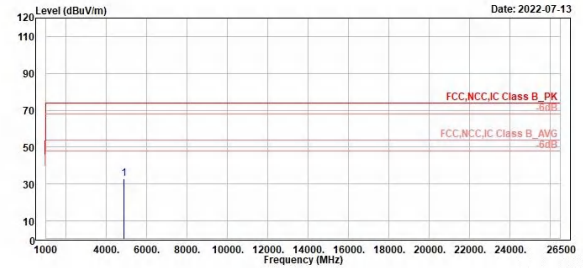
Middle Channel (Horizontal)



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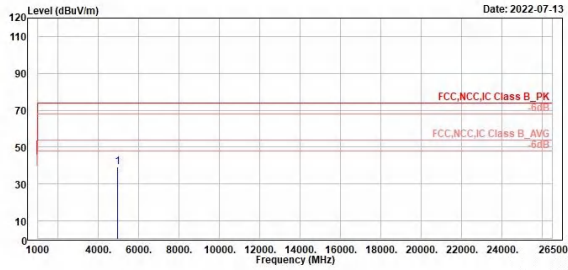


GFSK

High Channel (Horizontal)



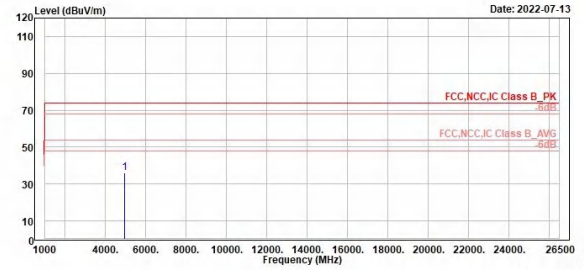
TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4960.00	39.12	48.66	-9.54	74.00	-34.88		236	33	Peak	Horizontal	



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4960.00	36.12	45.66	-9.54	74.00	-37.88		378	360	Peak	Vertical	

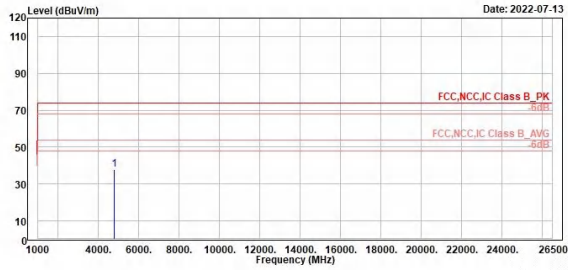
8DPSK

Low Channel (Horizontal)

Low Channel (Vertical)



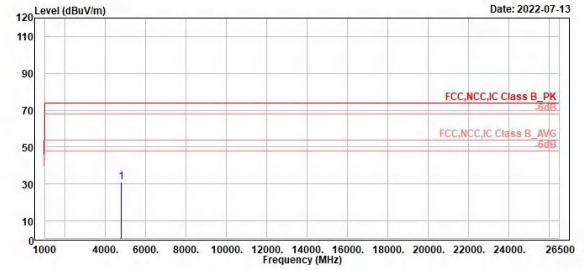
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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1 4804.00	37.97	47.84	-9.87	74.00	-36.03	400	307	Peak	Horizontal		



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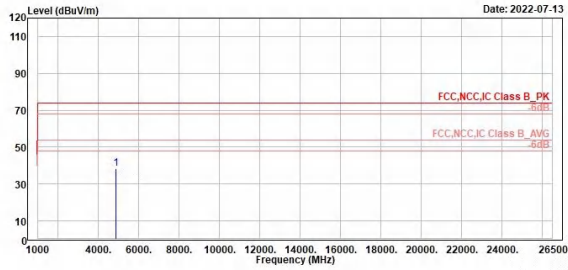
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1 4804.00	31.25	41.12	-9.87	74.00	-42.75	400	2	Peak	Vertical		

8DPSK

Middle Channel (Horizontal)



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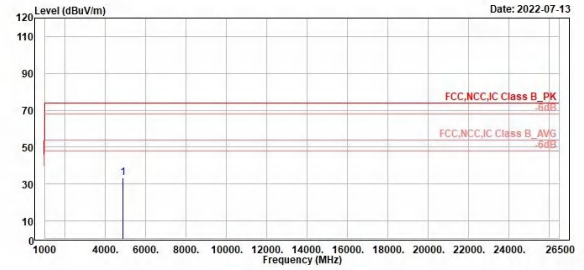


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4882.00	38.33	48.11	-9.78	74.00	-35.67		300	142	Peak	Horizontal	

Middle Channel (Vertical)



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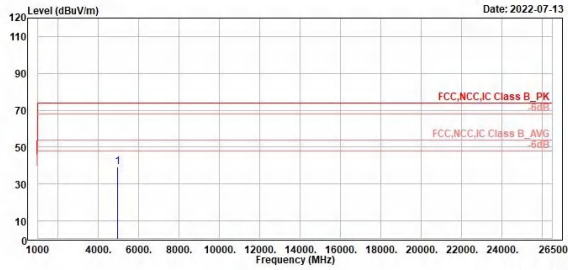
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4882.00	33.31	43.09	-9.78	74.00	-40.69		400	360	Peak	Vertical	

8DPSK

High Channel (Horizontal)



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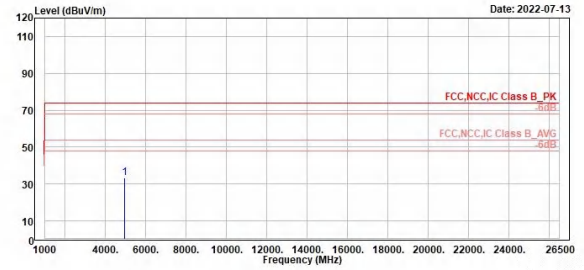


Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4968.00	39.39	48.93	-9.54	74.00	-34.61	100	264	Peak	Horizontal		

High Channel (Vertical)



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Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1 4968.00	33.37	42.91	-9.54	74.00	-40.63	258	33	Peak	Vertical		