TEST REPORT

Report No.	CISRR25032724301
Project No.	CISR250327243
Applicant	Echo Water LLC
Address	875 E 1950 N, Spanish Fork, UT 84660, US
Manufacturer	Echo Water LLC
Address	875 E 1950 N, Spanish Fork, UT 84660, US
Product Name	Echo Flask Hydrogen Water Bottle
Trademark	Echo
Model/Type reference	Echo Flask
Listed Model(s)	N/A
Standard	ETSI EN 300 328 V2.2.2 (2019-07)
Test date	March 27, 2025 to April 2, 2025
Issue date	April 3, 2025
Test result	**Complied**

Prepared by: Rory Huang

Approved by: Genry Long

The test results relate only to the tested samples.

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Contents

1. REPORT VERSION

Version No.	Issue date	Description
00	April 3, 2025	Original

2. TEST DESCRIPTION

No.	Test Item	Standard Requirement	Result
1	RF Power	Clause 4.3.1.2.1	Pass
2	Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	Clause 4.3.1.4.1	Pass
3	Hopping Frequency Separation	Clause 4.3.1.5.1	Pass
4	Occupied Channel Bandwidth	Clause 4.3.1.8.1	Pass
5	Transmitter unwanted emissions in the out-of-band domain	Clause 4.3.1.9.1	Pass
6	Transmitter unwanted emissions in the spurious domain, conducted	Clause 4.3.1.10.1	Pass
7	Receiver spurious emissions, conducted	Clause 4.3.1.11.1	Pass
8	Transmitter unwanted emissions in the spurious domain (30MHz to 1GHz)	Clause 4.3.1.10.1	Pass
9	Transmitter unwanted emissions in the spurious domain (above 1GHz)	Clause 4.3.1.10.1	Pass
10	Receiver spurious emissions (30MHz to 1GHz)	Clause 4.3.1.11.1	Pass
11	Receiver spurious emissions (above 1GHz)	Clause 4.3.1.11.1	Pass
12	Receiver Blocking	Clause 4.3.1.12.1	Pass

Note:

– The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Product Description

Main unit information:	
Product Name:	Echo Flask Hydrogen Water Bottle
Trade Mark:	Echo
Model No.:	Echo Flask
Listed Model(s):	N/A
Model difference:	Input: DC 5V
Power supply:	N/A
Hardware version:	N/A
Software version:	N/A
Accessory unit information:	
Battery information:	DC 3.7V

3.2. Radio Specification Description

Modulation type:	GFSK, π/4 DQPSK, 8DPSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Chip
Antenna gain:	0dBi
Receiver Category:	2

Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (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	-	-

3.3. Modification of EUT

No modifications are made to the EUT during all test items.

3.4. Deviation from standards

None

3.5. Testing Site

Laboratory Name	Shenzhen Bangce Testing Technology Co., Ltd.
Laboratory Location	101, building 10, Yunli Intelligent Park, Shutianpu community, Matian Street, Guangming District, Shenzhen，Guangdong, China
Contact information	Tel: 86-755-2319 6848, email: service@cis-cn.net Website: http://www.cis-cn.net/

4. TEST CONFIGURATION

4.1. Test frequency list

Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
2402	2441	2480

4.2. Descriptions of test mode

No	Test mode	Description
TM1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation.
TM2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation.
TM3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation.
TM4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
TM5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
TM6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.
TM7	Receiving mode	Keep the EUT in receiving mode.
TM8	Normal mode	Keep the EUT in normal communication with pairing device mode.

4.3. Environmental conditions

Type	Requirement
Temperature:	15~35°C
Relative Humidity:	25~75%
Air Pressure:	860~1060mbar

4.4. Equipment Used during the Test

Accumulated Transmit Time, Frequency Occupation and Hopping Sequence
Hopping Frequency Separation
Occupied Channel Bandwidth
Transmitter unwanted emissions in the out-of-band domain
Transmitter unwanted emissions in the spurious domain, conducted
Receiver spurious emissions, conducted
Receiver Blocking
RF Power

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	MXG RF Signal Generator	Agilent	N5181A	MY50145362	2025-01-08	2026-01-07
2	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
3	Vector Signal Generator	Agilent	N5182A	MY50142364	2025-01-08	2026-01-07
4	Power Meter	WCS	WCS-PM	WCSPM230405A	2025-01-08	2026-01-07

Transmitter unwanted emissions in the spurious domain (above 1GHz)
Receiver spurious emissions (30MHz to 1GHz)
Receiver spurious emissions (above 1GHz)
Transmitter unwanted emissions in the spurious domain (30MHz to 1GHz)

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025-01-08	2026-01-07
2	Amplifier	Tonscend	TAP9K3G40	AP23A8060270	2025-01-08	2026-01-07
3	Prime amplifier	Tonscend	TAP01018050	AP23A8060280	2025-01-08	2026-01-07
4	9*6*6 anechoic chamber	SKET	9.3*6.3*6	N/A	2024-09-02	2027-09-01
5	Spectrum analyzer	Agilent	N9020A	MY50530263	2025-01-08	2026-01-07
6	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
7	Bilog Antenna	Schwarzbeck	VULB 9163	1463	2023-01-09	2026-01-08
8	Horn Antenna	SCHWARZBECK	BBHA 9120 D	2487	2023-01-09	2026-01-08
9	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	2023-01-09	2026-01-08
10	RF Cable	Tonscend	Cable 1	/	2025-01-08	2026-01-07
11	RF Cable	Tonscend	Cable 2	/	2025-01-08	2026-01-07
12	RF Cable	SKET	Cable 3	/	2025-01-08	2026-01-07
13	L.I.S.N.#1	Schwarzbeck	NSLK8127	/	2025-01-08	2026-01-07
14	L.I.S.N.#2	ROHDE&SCHWA	ENV216	/	2025-01-08	2026-01-07

		RZ				
15	Horn Antenna	SCHWARZBECK	BBHA9170	1130	2023-01-09	2026-01-08
16	Preamplifier	Tonscend	TAP18040048	AP21C806126	2025-01-08	2026-01-07
17	Variable-frequency power source	Pinhong	PH1110	/	2025-01-08	2026-01-07
18	6dB Attenuator	SKET	DC-6G	/	2025-01-08	2026-01-07
19	Antenna tower	SKT	Bk-4AT-BS	AT2021040101-V1	2025-01-08	2026-01-07

5. TEST RESULTS

5.1. Radio Spectrum Matter Test Results (RF)

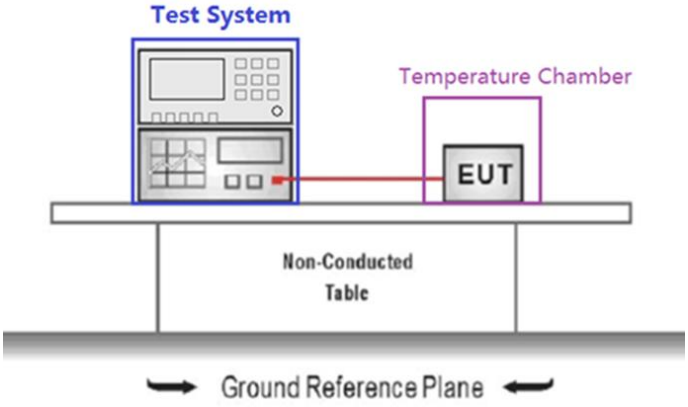
5.1.1. RF Power

Test Requirement:	Clause 4.3.1.2.1
Test Limit:	<=20dBm
Test Method:	Clause 5.4.2.2.1
Procedure:	Clause 5.4.2.2.1.2

5.1.1.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.1.1.2. Test Setup Diagram



5.1.1.3. Test Result

Pass

5.1.1.4. Test Data

Please Refer to Appendix for Details.

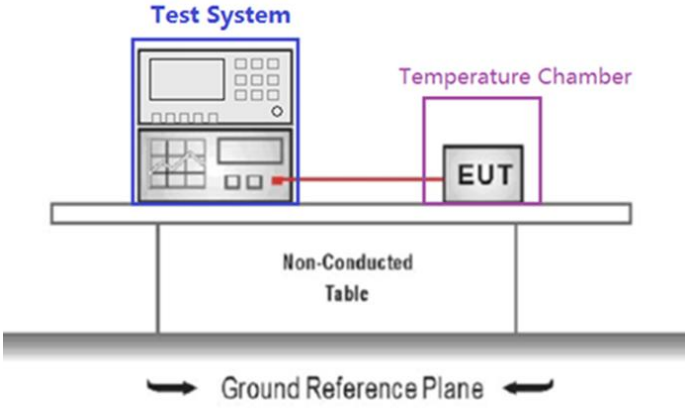
5.1.2. Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

Test Requirement:	Clause 4.3.1.4.1
Test Limit:	Adaptive FHSS equipment shall be capable of operating over a minimum of 70 % of the band specified in table 1. The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used. In order for the FHSS equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options: Option 1: Each hopping frequency of the Hopping Sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use. Option 2: The occupation probability for each frequency shall be between ((1 / U) 25 %) and 77 % where U is the number of hopping frequencies in use. The Hopping Sequence(s) shall contain at least N hopping frequencies at all times, where N is either 15 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater. NOTE: See also clause 4.3.1.5.3.2 for the Hopping Frequency Separation applicable to adaptive FHSS equipment. For Adaptive FHSS equipment, from the N hopping frequencies defined above, the equipment shall consider at least one hopping frequency for its transmissions. Providing that there is no interference present on this hopping frequency with a level above the detection threshold defined in clause 4.3.1.7.2.2, point 5 or clause 4.3.1.7.3.2, point 5, then the equipment shall have transmissions on this hopping frequency. For Adaptive FHSS equipment using LBT, if a signal is detected during the CCA, the equipment may jump immediately to the next hopping frequency in the Hopping Sequence (see clause 4.3.1.7.2.2, point 2) provided the limit for Accumulated Transmit Time on the new hopping frequency is respected.
Test Method:	Clause 5.4.4.2.1
Procedure:	Clause 5.4.4.2.1

5.1.2.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.1.2.2. Test Setup Diagram



5.1.2.3. Test Result

Pass

5.1.2.4. Test Data

Please Refer to Appendix for Details.

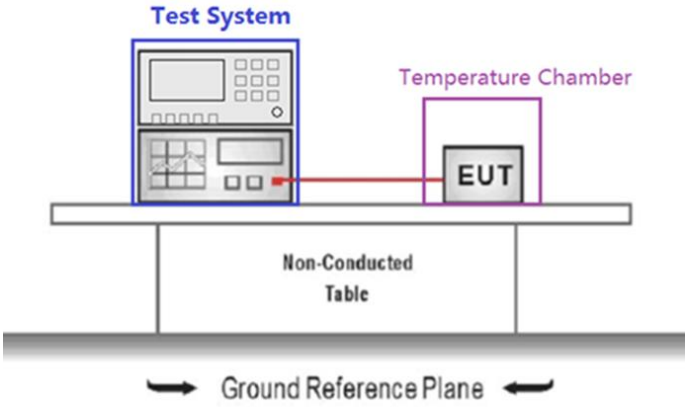
5.1.3. Hopping Frequency Separation

Test Requirement:	Clause 4.3.1.5.1
Test Limit:	For adaptive FHSS equipment, the minimum Hopping Frequency Separation shall be 100 kHz. Adaptive FHSS equipment that switched to a non-adaptive mode for one or more hopping frequencies because interference was detected on each of these hopping frequencies with a level above the threshold level defined in clause 4.3.1.7.2.2, point 5 or clause 4.3.1.7.3.2, point 5, does not have to comply with the Hopping Frequency Separation provided in clause 4.3.1.5.3.1 for non-adaptive FHSS equipment. If the Hopping Frequency Separation is below the Occupied Channel Bandwidth but greater than 100 kHz, the equipment is allowed to continue to operate with this Hopping Frequency Separation as long as the interference remains present on these hopping frequencies. As this relaxed Hopping Frequency Separation only applies to adaptive FHSS equipment, the FHSS equipment shall continue to operate in an adaptive mode on all other hopping frequencies. Adaptive FHSS equipment which decided to operate in a non-adaptive mode on one or more hopping frequencies without the presence of interference, shall comply with the limit for Hopping Frequency Separation for non-adaptive FHSS equipment defined in clause 4.3.1.5.3.1 (first paragraph) for these hopping frequencies.
Test Method:	Clause 5.4.5.2.2
Procedure:	Clause 5.4.5.2.1

5.1.3.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.1.3.2. Test Setup Diagram



5.1.3.3. Test Result

Pass

5.1.3.4. Test Data

Please Refer to Appendix for Details.

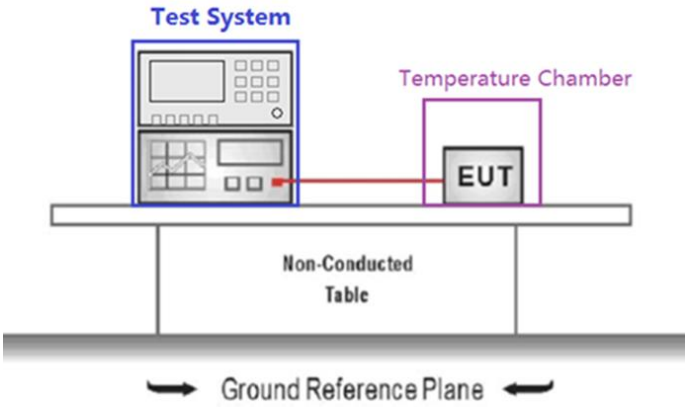
5.1.4. Occupied Channel Bandwidth

Test Requirement:	Clause 4.3.1.8.1
Test Limit:	Clause 4.3.1.8.3
Test Method:	Clause 5.4.7.2.1
Procedure:	Clause 5.4.7.2

5.1.4.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.1.4.2. Test Setup Diagram



5.1.4.3. Test Result

Pass

5.1.4.4. Test Data

Please Refer to Appendix for Details.

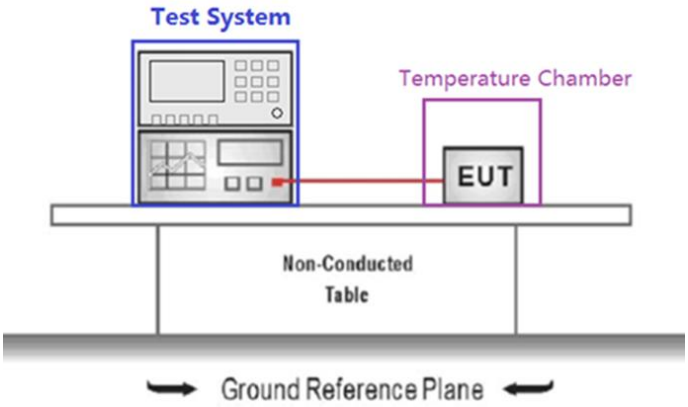
5.1.5. Transmitter unwanted emissions in the out-of-band domain

Test Requirement:	Clause 4.3.1.9.1
Test Limit:	Clause 4.3.1.9.3
Test Method:	Clause 5.4.8.2.1
Procedure:	Clause 5.4.8.2.1

5.1.5.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.1.5.2. Test Setup Diagram



5.1.5.3. Test Result

Pass

5.1.5.4. Test Data

Please Refer to Appendix for Details.

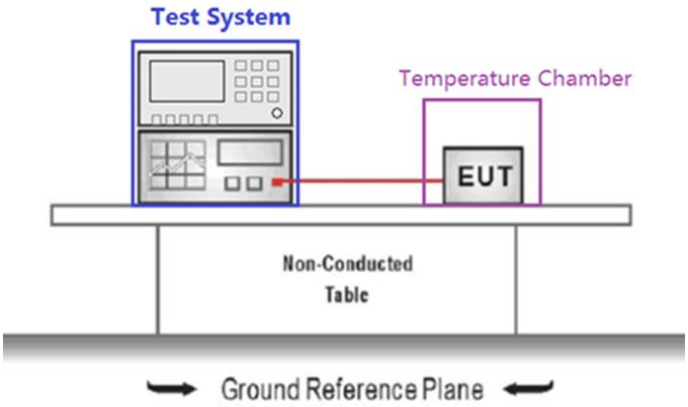
5.1.6. Transmitter unwanted emissions in the spurious domain, conducted

Test Requirement:	Clause 4.3.1.10.1
Test Limit:	Clause 4.3.1.10.3
Test Method:	Clause 5.4.9.2.1
Procedure:	Clause 5.4.9.2.1

5.1.6.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.1.6.2. Test Setup Diagram



5.1.6.3. Test Result

Pass

5.1.6.4. Test Data

Please Refer to Appendix for Details.

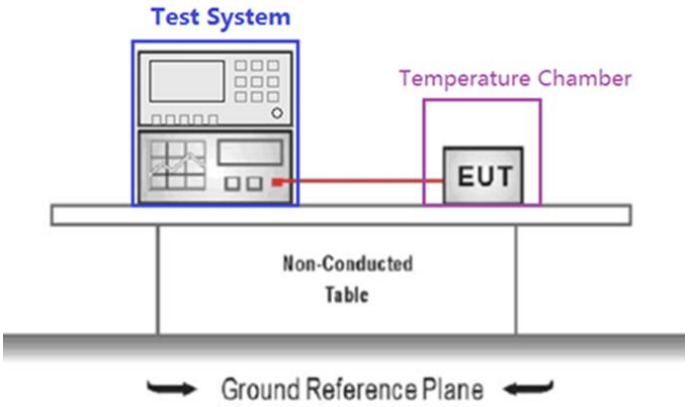
5.1.7. Receiver spurious emissions, conducted

Test Requirement:	Clause 4.3.1.11.1
Test Limit:	Clause 4.3.1.11.3
Test Method:	Clause 5.4.10.2.1
Procedure:	Clause 5.4.10.2.1

5.1.7.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM7				
Final test mode:	TM7				

5.1.7.2. Test Setup Diagram



5.1.7.3. Test Result

Pass

5.1.7.4. Test Data

Please Refer to Appendix for Details.

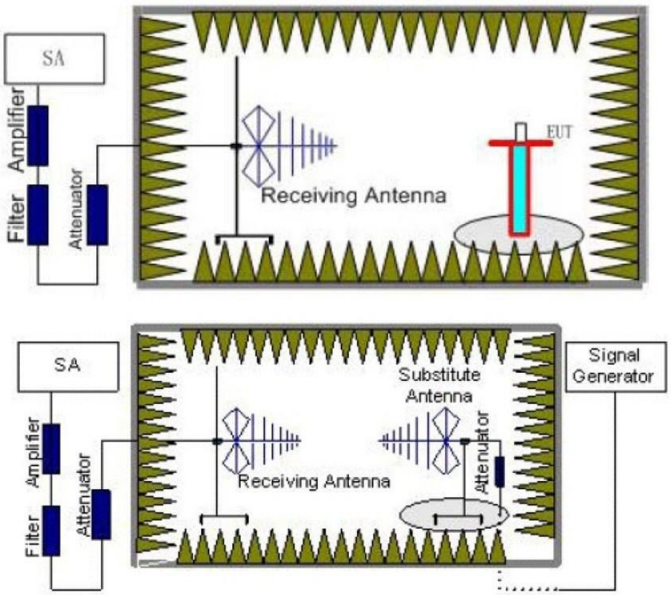
5.1.8. Transmitter unwanted emissions in the spurious domain (30MHz to 1GHz)

Test Requirement:	Clause 4.3.1.10.1
Test Limit:	Clause 4.3.1.10.3
Test Method:	Clause 5.4.9.2.2
Procedure:	Clause 5.4.9.2.2

5.1.8.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.1 °C	Humidity:	56.8 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.1.8.2. Test Setup Diagram



5.1.8.3. Test Result

Pass

All the test data for each data rate were verified, found GFSK Modulation which is worse case mode, so only the worse case data on this report.

Note:

Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor

Margin=Emission Level - Limit

GFSK_CH00

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
139.33	H	-70.22	-6.009	-76.23	-36	-40.23
161.25	H	-65.32	-8.805	-74.12	-54	-20.12
357.30	H	-68.98	2.576	-66.40	-36	-30.40
425.14	H	-74.10	2.492	-71.61	-36	-35.61
566.89	H	-69.23	2.374	-66.86	-54	-12.86
828.99	H	-72.32	3.585	-68.73	-36	-32.73
127.01	V	-83.418	-2.329	-85.75	-36	-49.75
227.21	V	-81.703	-7.758	-89.46	-54	-35.46
452.52	V	-80.413	1.128	-79.28	-36	-43.28
598.68	V	-83.070	2.323	-80.75	-54	-26.75
631.88	V	-73.584	2.866	-70.72	-54	-16.72
827.79	V	-82.502	3.516	-78.99	-36	-42.99

GFSK_CH78

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
139.61	H	-70.15	-6.099	-76.25	-36	-40.25
161.15	H	-65.00	-8.696	-73.70	-54	-19.70
357.48	H	-69.32	2.674	-66.64	-36	-30.64
424.96	H	-74.12	2.544	-71.58	-36	-35.58
567.12	H	-68.91	2.290	-66.62	-54	-12.62
828.72	H	-72.27	3.542	-68.73	-36	-32.73
126.70	V	-83.448	-2.418	-85.87	-36	-49.87
226.86	V	-81.722	-7.764	-89.49	-54	-35.49
452.36	V	-80.524	1.095	-79.43	-36	-43.43
598.77	V	-83.117	2.439	-80.68	-54	-26.68
632.23	V	-73.615	2.758	-70.86	-54	-16.86
827.59	V	-82.528	3.536	-78.99	-36	-42.99

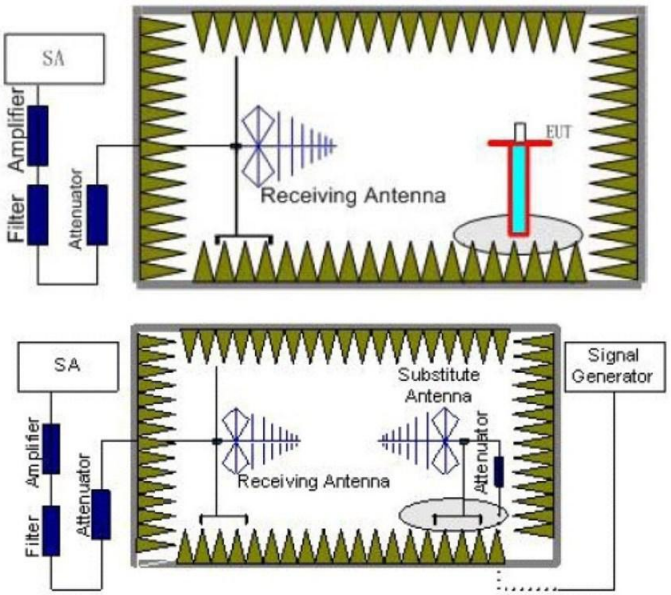
5.1.9. Transmitter unwanted emissions in the spurious domain (above 1GHz)

Test Requirement:	Clause 4.3.1.10.1
Test Limit:	Clause 4.3.1.10.3
Test Method:	Clause 5.4.9.2.2
Procedure:	Clause 5.4.9.2.2

5.1.9.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.5 °C	Humidity:	55.1 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.1.9.2. Test Setup Diagram



5.1.9.3. Test Result

Pass

All the test data for each data rate were verified, found GFSK Modulation which is worse case mode, so only the worse case data on this report.

Note:

Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor

Margin=Emission Level - Limit

GFSK_CH00

Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
1687.04	H	-60.74	-4.49	-65.22	-30	-35.22
4804.49	H	-56.27	-4.39	-60.66	-30	-30.66
7206.23	H	-56.27	-4.39	-60.66	-30	-30.66
9752.36	H	-58.17	-2.40	-60.57	-30	-30.57
10809.36	H	-58.51	-5.35	-63.86	-30	-33.86
12250.38	H	-58.51	-5.35	-63.86	-30	-33.86
1843.71	V	-62.28	-1.41	-63.69	-30	-33.69
4804.13	V	-59.81	-1.46	-61.27	-30	-31.27
6725.79	V	-56.69	-1.78	-58.47	-30	-28.47
7398.60	V	-58.11	-1.80	-59.91	-30	-29.91
9608.12	V	-60.45	-2.51	-62.96	-30	-32.96
11721.97	V	-60.36	-2.43	-62.80	-30	-32.80

GFSK_CH78

Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
1680.72	H	-60.20	-4.42	-64.62	-30	-34.62
4962.15	H	-56.16	-4.39	-60.54	-30	-30.54
7459.84	H	-56.13	-4.39	-60.52	-30	-30.52
9929.82	H	-57.07	-2.40	-59.48	-30	-29.48
10659.48	H	-58.51	-5.35	-63.86	-30	-33.86
11651.21	H	-58.11	-5.35	-63.46	-30	-33.46
1863.12	V	-60.10	-1.45	-61.55	-30	-31.55
4811.68	V	-59.14	-1.46	-60.60	-30	-30.60
7437.20	V	-56.10	-1.75	-57.85	-30	-27.85
7688.20	V	-58.67	-1.79	-60.45	-30	-30.45
9786.52	V	-58.81	-2.49	-61.30	-30	-31.30
11110.41	V	-59.39	-2.52	-61.91	-30	-31.91

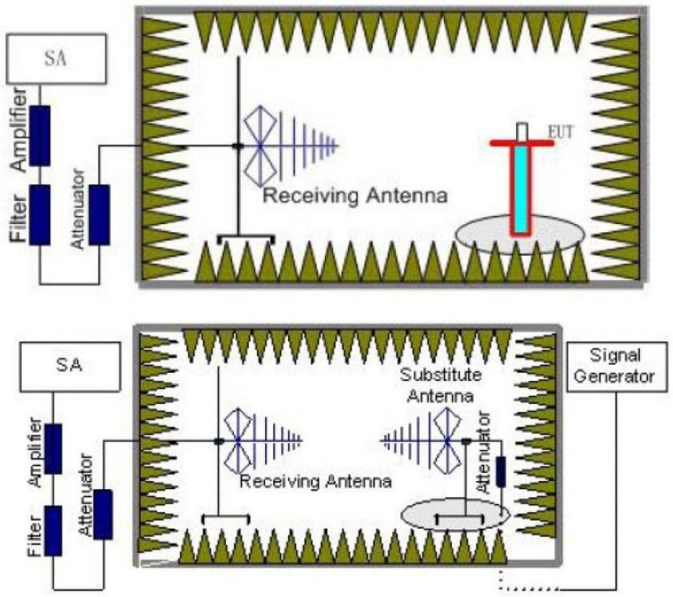
5.1.10. Receiver spurious emissions (30MHz to 1GHz)

Test Requirement:	Clause 4.3.1.11.1
Test Limit:	Clause 4.3.1.11.3
Test Method:	Clause 5.4.10.2.2
Procedure:	Clause 5.4.10.2.2

5.1.10.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.1 °C	Humidity:	56.2 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM7				
Final test mode:	TM7				

5.1.10.2. Test Setup Diagram



5.1.10.3. Test Result

Pass

All the test data for each data rate were verified, found GFSK Modulation which is worse case mode, so only the worse case data on this report.

Note:

Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor

Margin=Emission Level - Limit

GFSK_CH00

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
32.50	H	-78.50	-6.10	-84.61	-57	-27.61
98.79	H	-78.20	-6.58	-84.78	-57	-27.78
136.68	H	-76.36	-9.28	-85.64	-57	-28.64
332.78	H	-76.48	-3.41	-79.89	-57	-22.89
566.55	H	-75.22	1.04	-74.18	-57	-17.18
629.38	H	-79.37	2.49	-76.88	-57	-19.88
32.78	V	-79.54	-6.44	-85.98	-57	-28.98
98.35	V	-78.85	-5.69	-84.54	-57	-27.54
137.07	V	-76.05	-9.64	-85.69	-57	-28.69
331.44	V	-76.14	-3.13	-79.27	-57	-22.27
730.46	V	-76.54	2.73	-73.82	-57	-16.82
989.06	V	-76.66	5.38	-71.28	-57	-14.28

GFSK_CH78

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
32.63	H	-78.43	-6.05	-84.47	-57	-27.47
98.99	H	-78.18	-6.66	-84.84	-57	-27.84
136.51	H	-76.49	-9.36	-85.85	-57	-28.85
332.63	H	-76.40	-3.23	-79.64	-57	-22.64
566.53	H	-75.38	0.97	-74.41	-57	-17.41
629.57	H	-79.35	2.53	-76.82	-57	-19.82
33.25	V	-79.58	-6.29	-85.87	-57	-28.87
98.32	V	-78.98	-5.68	-84.66	-57	-27.66
137.28	V	-76.03	-9.56	-85.59	-57	-28.59
331.34	V	-76.25	-3.11	-79.36	-57	-22.36
730.53	V	-76.66	2.68	-73.98	-57	-16.98
989.01	V	-76.60	5.41	-71.19	-57	-14.19

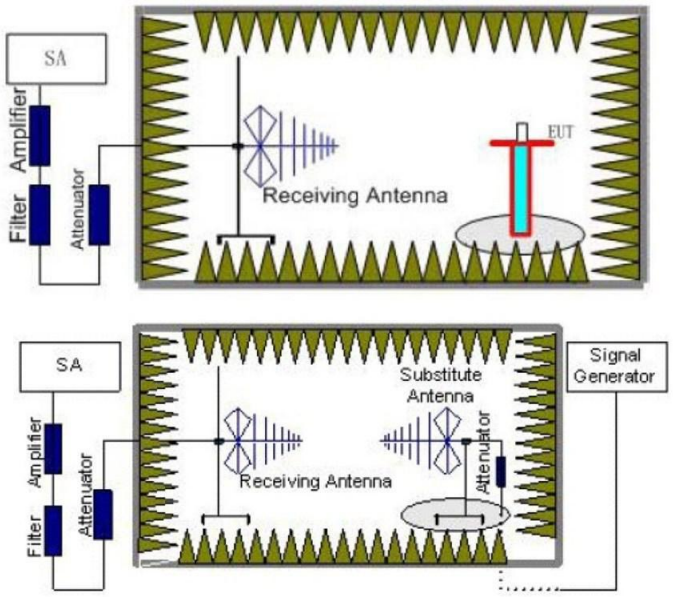
5.1.11. Receiver spurious emissions (above 1GHz)

Test Requirement:	Clause 4.3.1.11.1
Test Limit:	Clause 4.3.1.11.3
Test Method:	Clause 5.4.10.2.2
Procedure:	Clause 5.4.10.2.2

5.1.11.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.1 °C	Humidity:	56.2 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM7				
Final test mode:	TM7				

5.1.11.2. Test Setup Diagram



5.1.11.3. Test Result

Pass

All the test data for each data rate were verified, found GFSK Modulation which is worse case mode, so only the worse case data on this report.

Note:

Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor

Margin=Emission Level - Limit

GFSK_CH00

Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
1652.84	H	-62.44	-13.72	-76.16	-47	-29.16
1998.79	H	-61.35	-14.49	-75.85	-47	-28.85
2336.32	H	-61.69	-13.39	-75.08	-47	-28.08
3332.78	H	-61.15	-10.03	-71.18	-47	-24.18
4566.54	H	-63.07	-7.97	-71.05	-47	-24.05
5629.14	H	-58.77	-7.51	-66.27	-47	-19.27
1333.21	V	-61.32	-14.07	-75.39	-47	-28.39
1998.40	V	-65.50	-13.72	-79.22	-47	-32.22
2336.94	V	-60.89	-10.34	-71.23	-47	-24.23
3331.51	V	-63.86	-10.91	-74.77	-47	-27.77
4730.68	V	-64.14	-10.13	-74.27	-47	-27.27
5689.21	V	-64.68	-9.45	-74.13	-47	-27.13

GFSK_CH78

Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Antenna	Meter Reading	Factor	Emission Level	Limits	Margin
(MHz)	Polarization	(dBm)	(dB)	(dBm)	(dBm)	(dB)
1652.70	H	-58.19	-13.90	-72.09	-47	-25.09
1998.85	H	-64.01	-14.82	-78.83	-47	-31.83
2336.53	H	-61.47	-13.37	-74.84	-47	-27.84
3332.49	H	-58.87	-10.09	-68.96	-47	-21.96
4566.72	H	-61.24	-7.97	-69.21	-47	-22.21
5629.35	H	-58.14	-7.22	-65.36	-47	-18.36
1332.81	V	-63.70	-14.41	-78.11	-47	-31.11
1998.33	V	-65.40	-13.26	-78.67	-47	-31.67
2336.93	V	-61.05	-10.44	-71.49	-47	-24.49
3331.58	V	-61.69	-10.93	-72.62	-47	-25.62
4730.60	V	-63.60	-10.54	-74.14	-47	-27.14
5689.05	V	-68.05	-9.21	-77.26	-47	-30.26

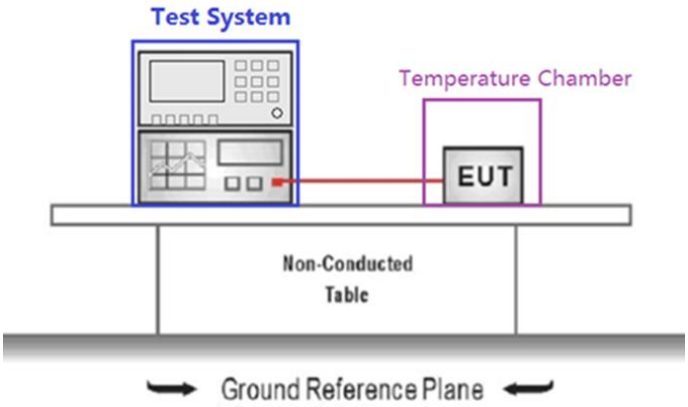
5.1.12. Receiver Blocking

Test Requirement:	Clause 4.3.1.12.1
Test Limit:	Clause 4.3.1.12.4
Test Method:	Clause 5.4.11.2.1
Procedure:	Clause 5.4.11.2.1

5.1.12.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM8				
Final test mode:	TM8				

5.1.12.2. Test Setup Diagram



5.1.12.3. Test Result

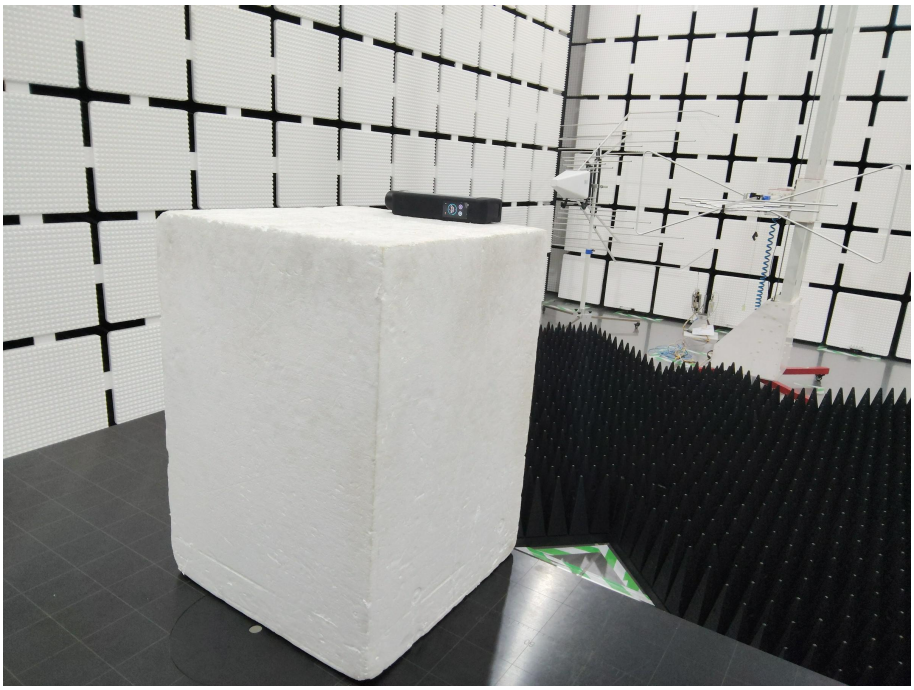
Pass

5.1.12.4. Test Data

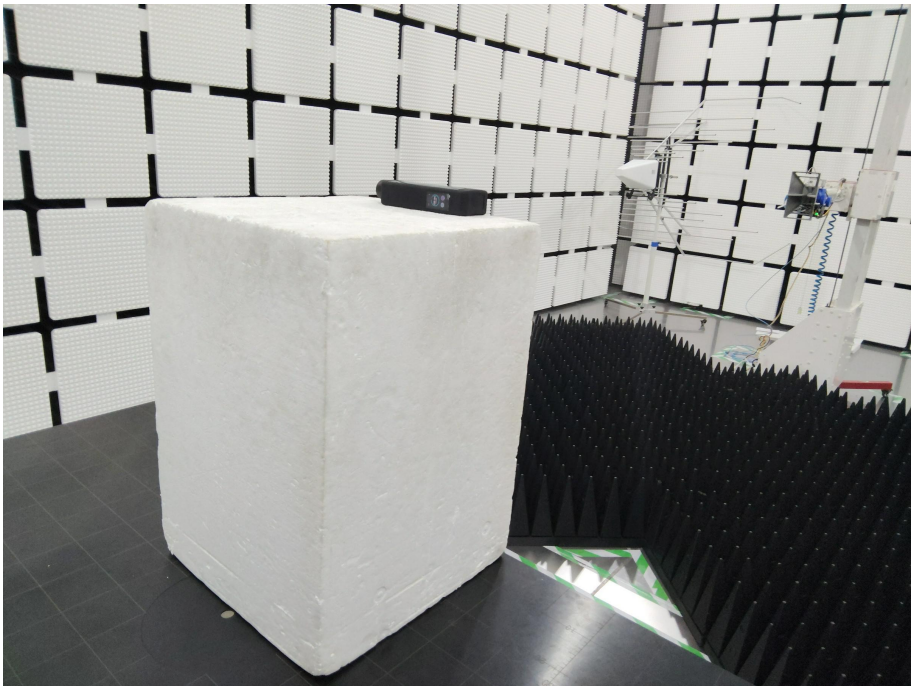
Please Refer to Appendix for Details.

6. TEST SETUP PHOTOS

Transmitter unwanted emissions in the spurious domain (30MHz to 1GHz)
Receiver spurious emissions (30MHz to 1GHz)

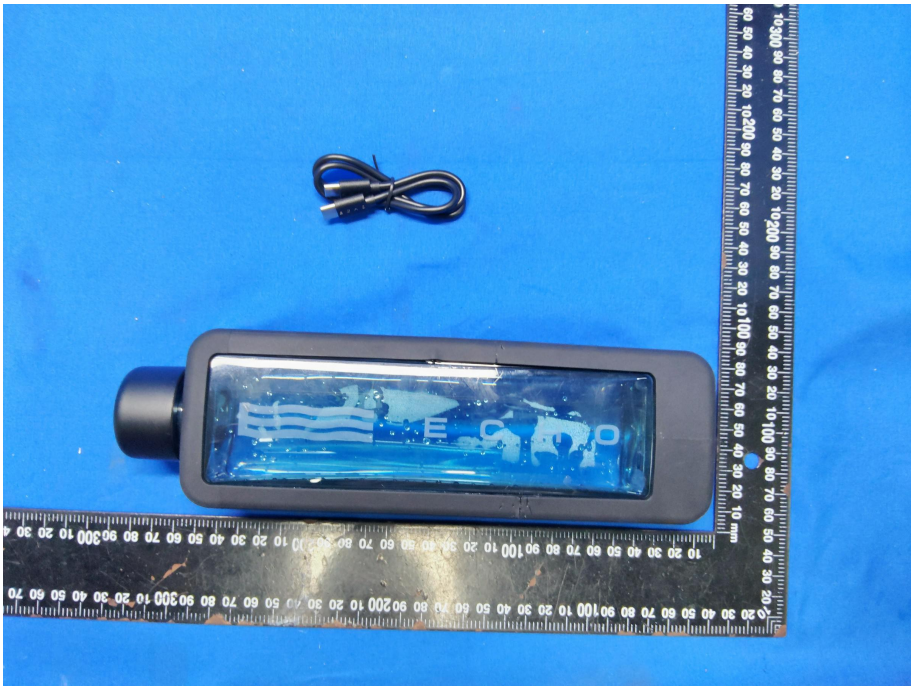


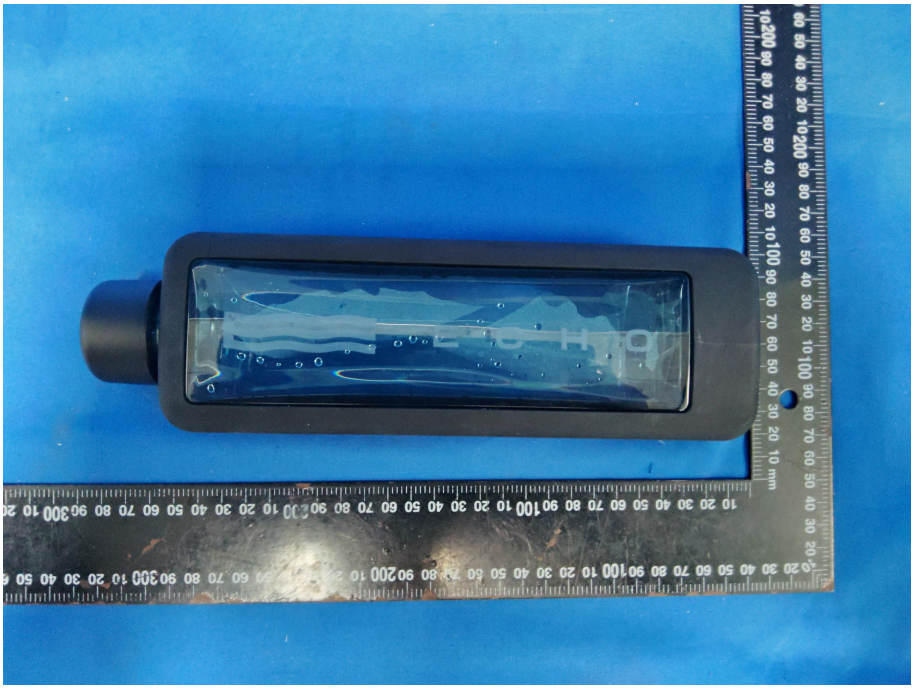
Transmitter unwanted emissions in the spurious domain (above 1GHz)
Receiver spurious emissions (above 1GHz)

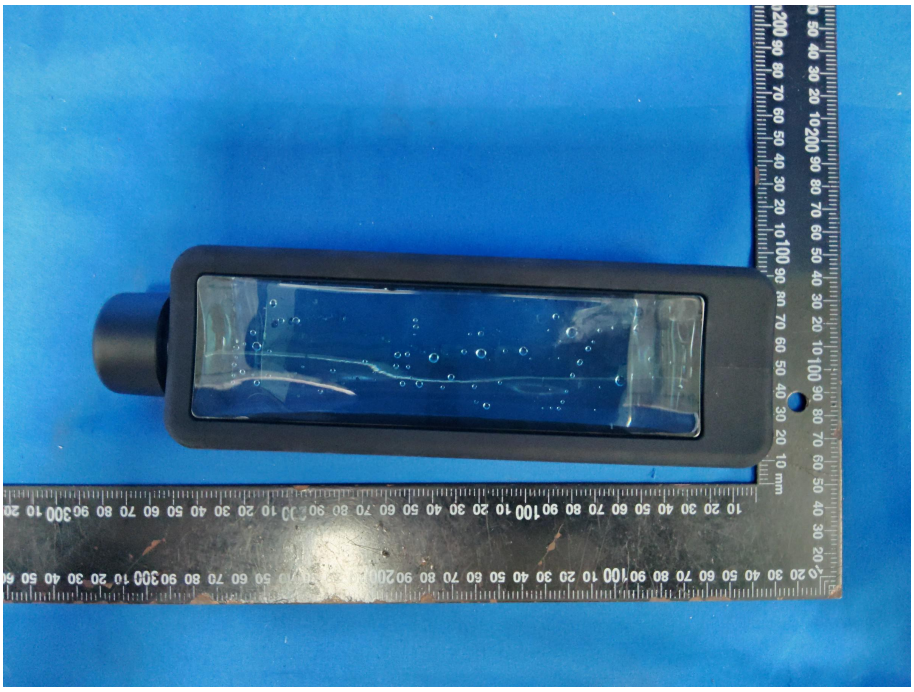


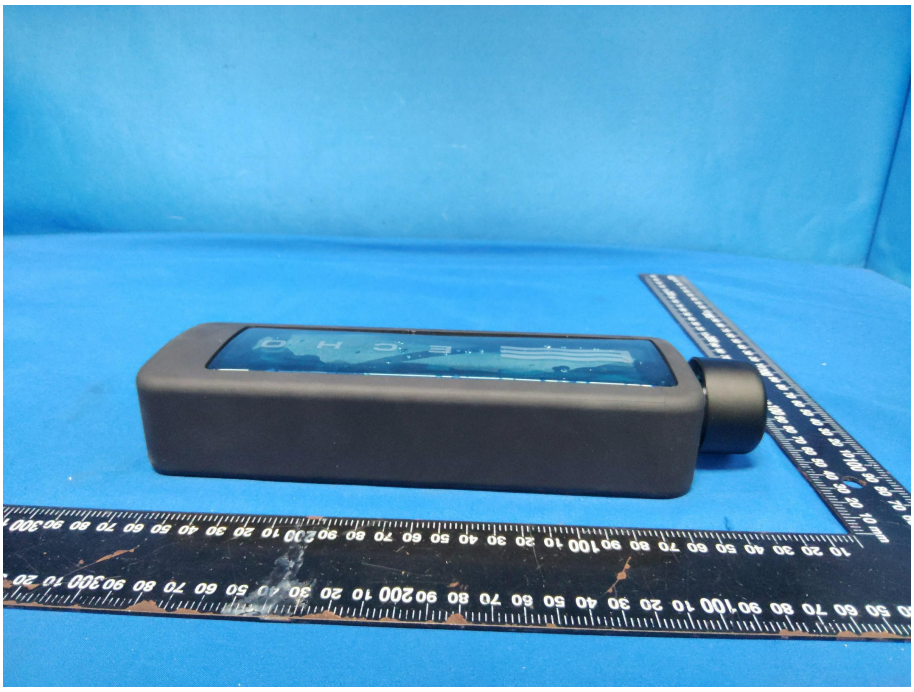
7. EXTERNAL AND INTERNAL PHOTOS

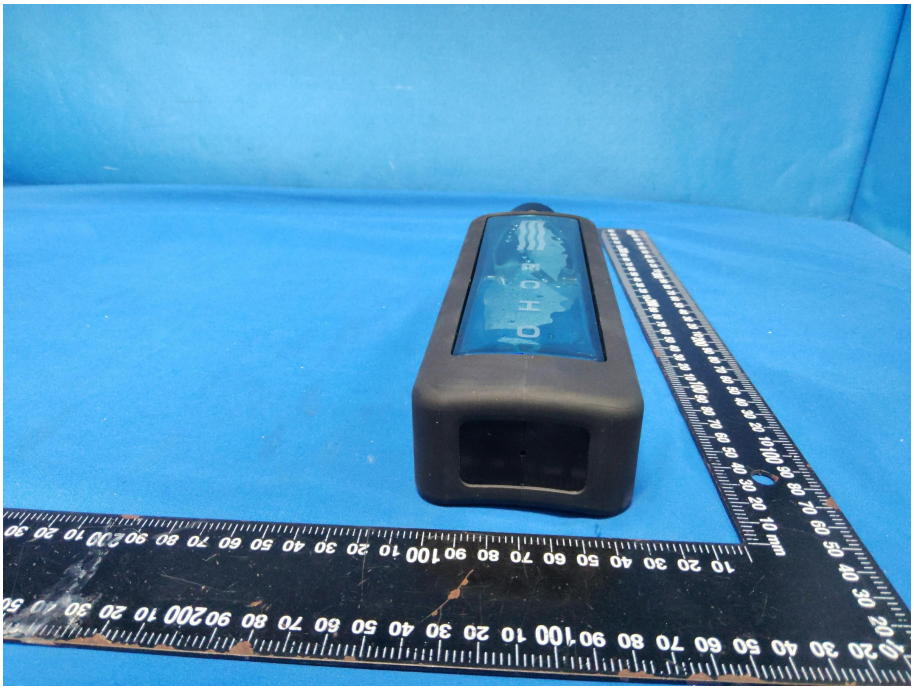
7.1. External Photos

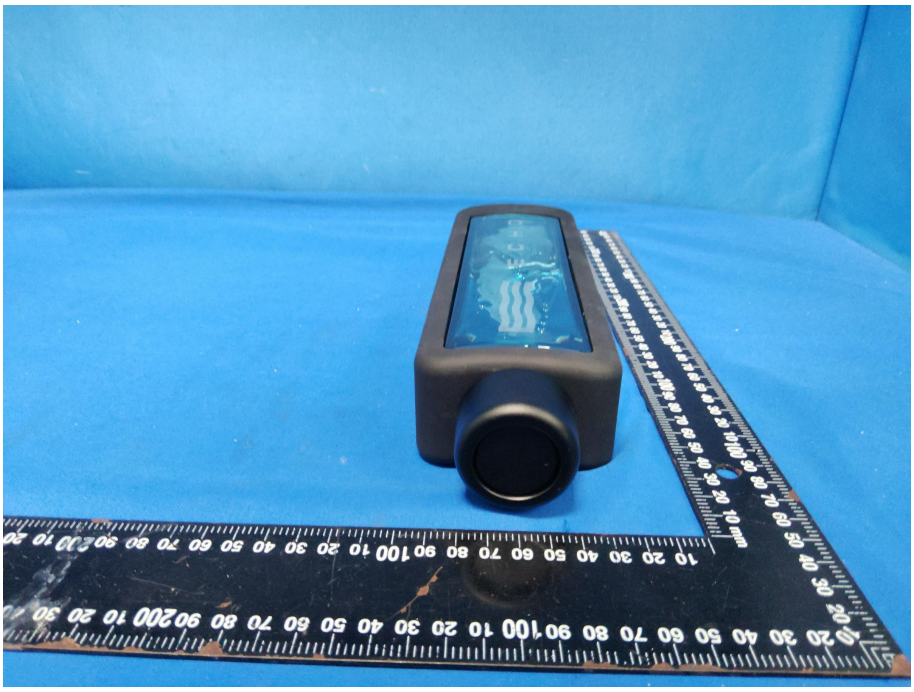




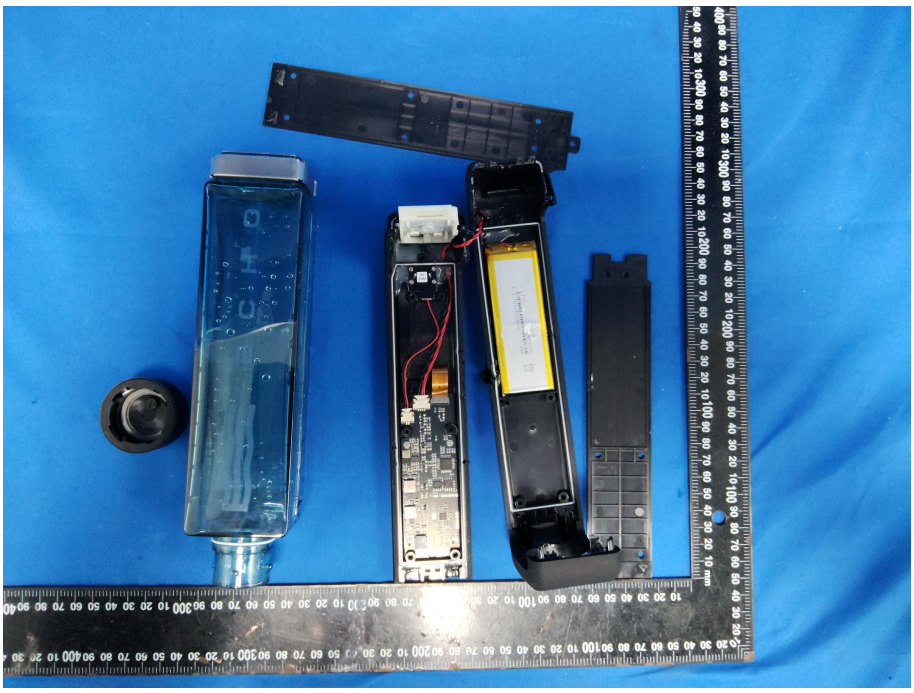


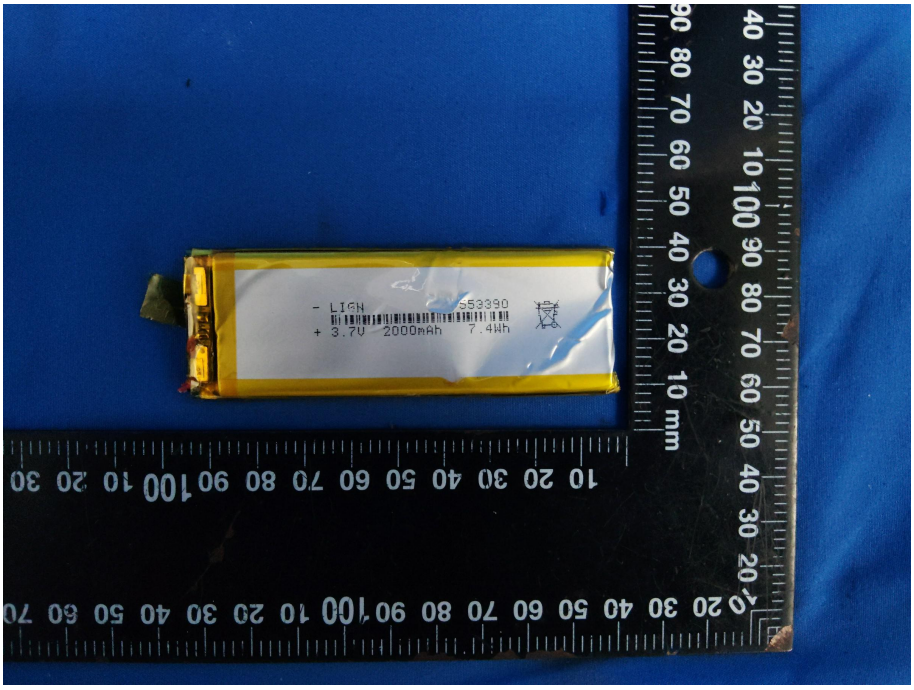


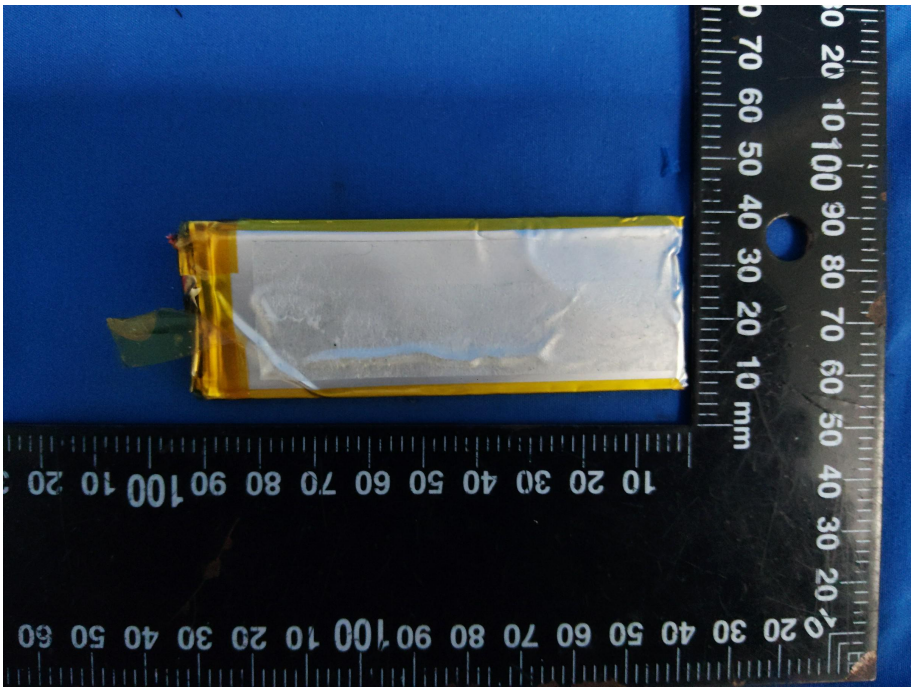


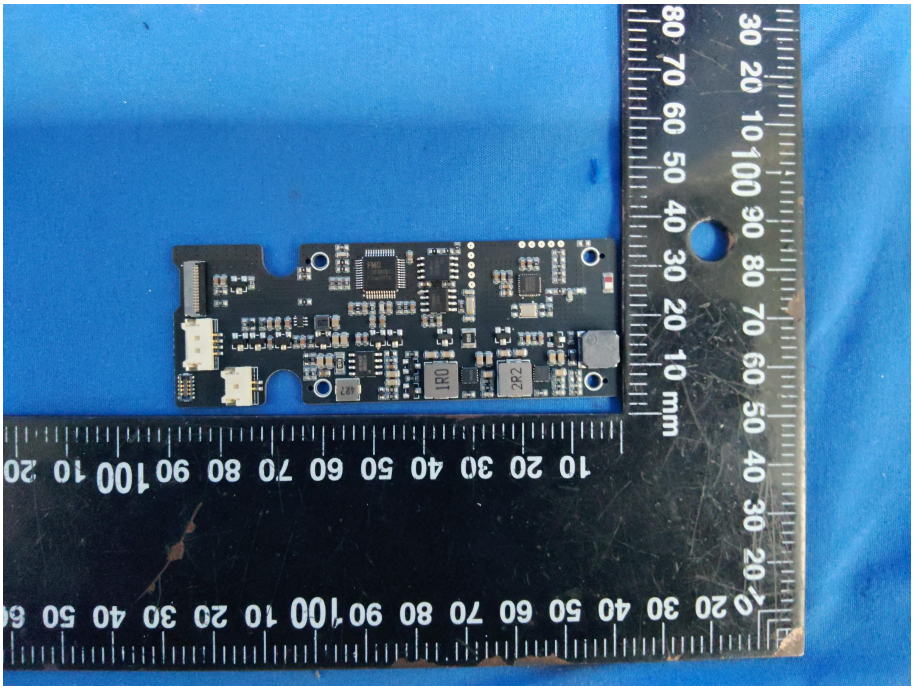


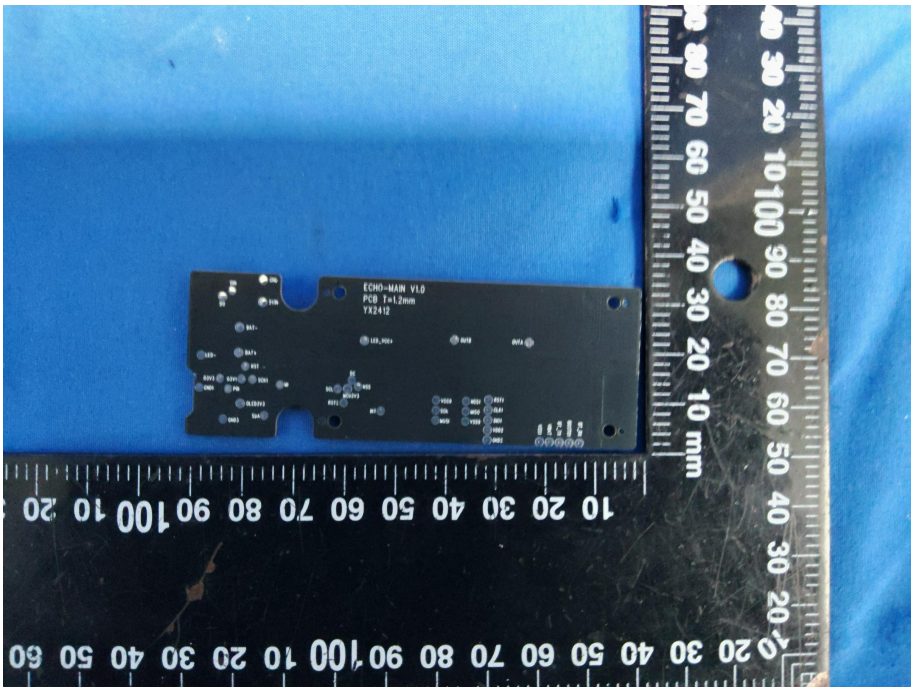
7.2. Internal Photos

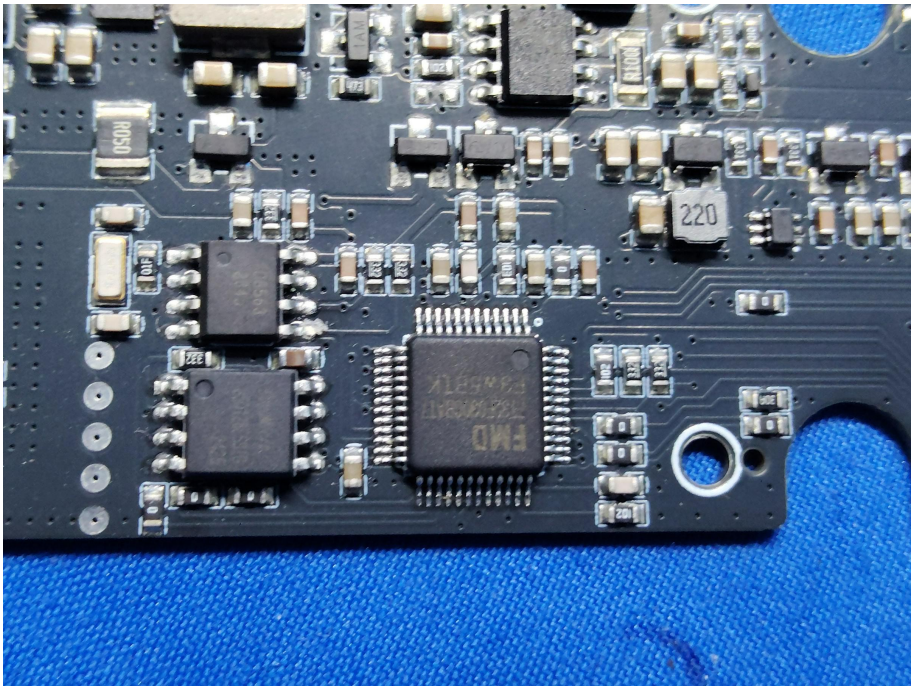


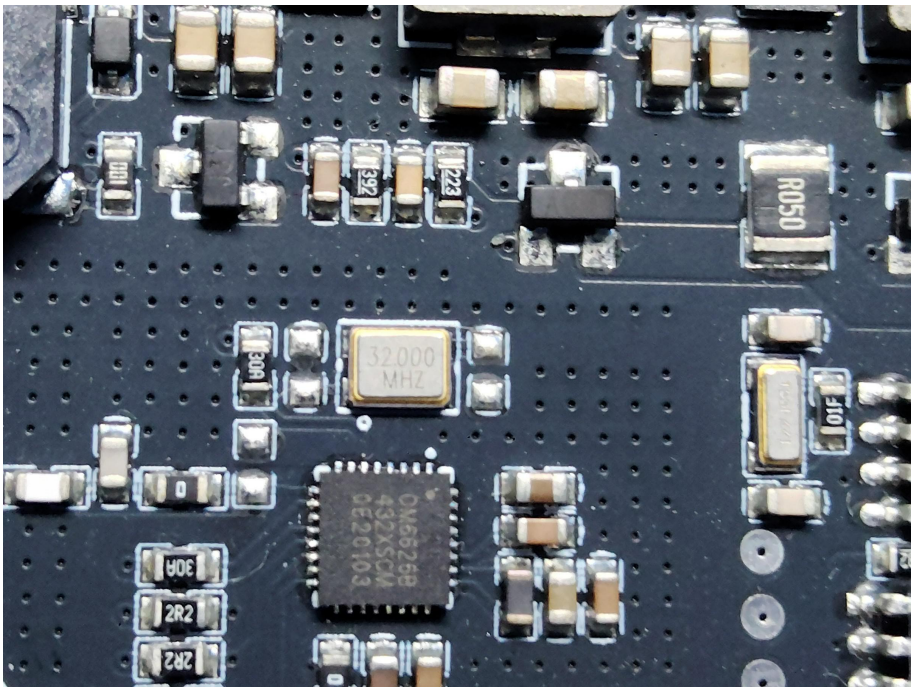


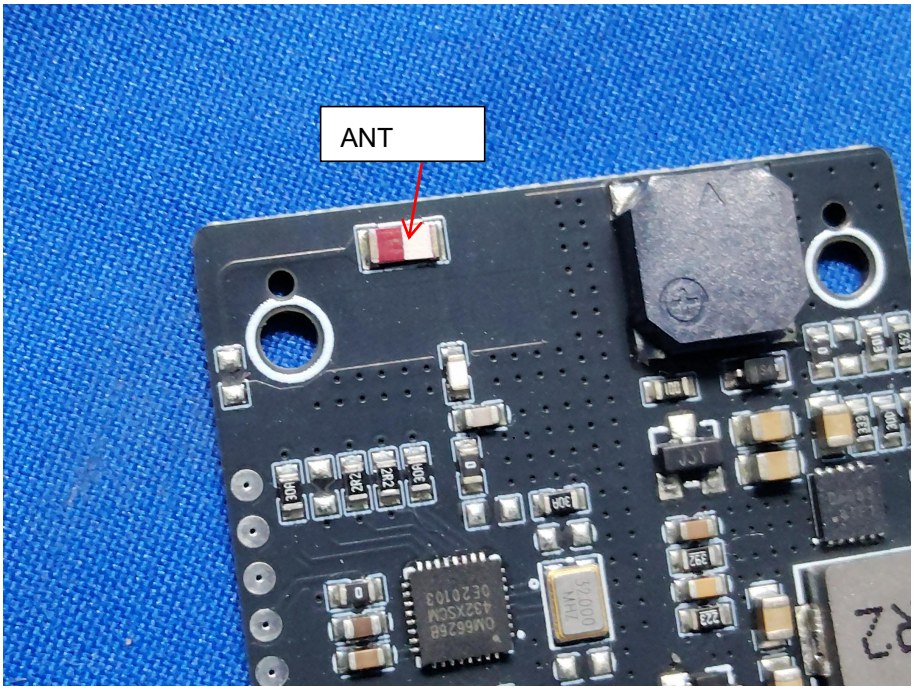





ECHO-MAIN V1.0
PCB T=1.2mm
YX2412


R050
220





8. Appendix Report

Appendix Report

Project No.:	CISR250327243
Test Engineer:	James Wang
Supervised by:	Rory Huang

1) RF Output Power

Test Result

Condition	Modulation	Packet Type	Channel	Max EIRP (dBm)	Limit (dBm)	Result
NT/NV	GFSK	DH5	0	2.95	20	PASS
			39	3.10		PASS
			78	2.91		PASS
	π/4DQPSK	2-DH5	0	2.60		PASS
			39	2.32		PASS
			78	2.53		PASS
	8DPSK	3-DH5	0	1.97		PASS
			39	2.15		PASS
			78	2.18		PASS
LT/NV	GFSK	DH5	0	2.93	20	PASS
			39	3.08		PASS
			78	2.89		PASS
	π/4DQPSK	2-DH5	0	2.58		PASS
			39	2.30		PASS
			78	2.51		PASS
	8DPSK	3-DH5	0	1.95		PASS
			39	2.13		PASS
			78	2.16		PASS
HT/NV	GFSK	DH5	0	2.92	20	PASS
			39	3.07		PASS
			78	2.88		PASS
	π/4DQPSK	2-DH5	0	2.57		PASS
			39	2.29		PASS
			78	2.50		PASS
	8DPSK	3-DH5	0	1.94		PASS
			39	2.12		PASS
			78	2.15		PASS

2) Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

Test Result

Accumulated Transmit Time

Modulation	Packet Type	Channel	Dwell Time (ms)	Number of data points	Acc. Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	0	2.83	101	302.07	400	PASS
		78	2.83	102	303.13		PASS
π/4DQPSK	2-DH5	0	2.84	102	300.35		PASS
		78	2.85	99	302.64		PASS
8DPSK	3-DH5	0	2.85	102	260.65		PASS
		78	2.84	103	263.40		PASS

Note:
Test Period: 400ms * Minimum number of hopping frequencies (N)
Accumulated Transmit Time = Time slot length (Dwell Time) * Number of data points within a test period

Frequency Occupation

Modulation	Packet Type	Channel	Result [Num.]	Limit [Num.]	Result
GFSK	DH5	0	1	1	True
		78	1	1	True
π/4DQPSK	2-DH5	0	2	1	True
		78	1	1	True
8DPSK	3-DH5	0	1	1	True
		78	2	1	True

Hopping Sequence

Modulation	Frequency Band	Number of Hopping Frequencies (N)	Limit	-20dB Points Occupied Bandwidth	Limit	Result
GFSK	2400 MHz to 2483.5 MHz	79	15	80.076	58.45MHz = 70% * 83.5MHz	PASS
π/4DQPSK		79		79.743		PASS
8DPSK		79		80.571		PASS

3) Hopping Frequency Separation

Test Result

Modulation	Packet	Test Frequency (MHz)	Adjacent Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
GFSK	DH5	2440	2441	1.04	≥ 0.1	PASS
π/4DQPSK	2-DH5	2440	2441	1.05	≥ 0.1	PASS
8DPSK	3-DH5	2440	2441	1.01	≥ 0.1	PASS

4) Occupied Channel Bandwidth

Test Result

Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	FL (MHz)	FH (MHz)	Limit	Result
GFSK_DH5	0	2402	0.944	2400.64	2402.39	2400 MHz to 2483.5 MHz	PASS
	39	2441	0.945	2440.51	2441.47		PASS
	78	2480	0.948	2479.11	2480.40		PASS
π/4DQPSK_2-DH5	0	2402	1.248	2400.56	2402.54		PASS
	39	2441	1.242	2440.34	2441.45		PASS
	78	2480	1.247	2479.14	2480.54		PASS
8DPSK_3-DH5	0	2402	1.253	2400.82	2402.31		PASS
	39	2441	1.253	2440.44	2441.37		PASS
	78	2480	1.251	2479.51	2480.37		PASS

5) Transmitter unwanted emissions in the out-of-band domain

Test Result

Mode	Channel	Test Freq. (MHz)	OOB Emission (dBm)	Segments	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	Hopping	2399.5	-46.60	2 400 MHz - BW to 2 400 MHz	-10	-36.60	PASS
		2398.5	-46.67	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-26.67	PASS
		2484	-46.73	2 483,5 MHz to 2 483,5 MHz + BW	-10	-36.73	PASS
		2485	-36.36	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-16.36	PASS
π/4DQPSK_2-DH5		2399.5	-36.50	2 400 MHz - BW to 2 400 MHz	-10	-26.50	PASS
		2398.5	-36.63	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-16.63	PASS
		2484	-36.82	2 483,5 MHz to 2 483,5 MHz + BW	-10	-26.82	PASS
		2485	-36.83	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-16.83	PASS
8DPSK_3-DH5		2399.5	-36.37	2 400 MHz - BW to 2 400 MHz	-10	-26.37	PASS
		2398.5	-46.98	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-26.98	PASS
		2484	-46.89	2 483,5 MHz to 2 483,5 MHz + BW	-10	-36.89	PASS
		2485	-46.73	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-26.73	PASS

6) Transmitter unwanted emissions in the spurious domain

Test Result

Mode	Ch.	Start Frequency (MHz)	Stop Frequency (MHz)	Mark Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	0	30	47	35.94	-64.87	-36	-28.87	PASS
		47	74	69.99	-67.76	-54	-13.76	PASS
		74	87.5	79.70	-62.01	-36	-26.01	PASS
		87.5	118	89.97	-67.78	-54	-13.78	PASS
		118	174	149.76	-62.79	-36	-26.79	PASS
		174	230	229.67	-64.27	-54	-10.27	PASS
		230	470	249.89	-62.09	-36	-26.09	PASS
		470	694	570.03	-61.61	-54	-7.61	PASS
		694	1000	959.85	-66.58	-36	-30.58	PASS
		1000	12750	6975.96	-64.64	-30	-34.64	PASS
	78	30	47	36.04	-66.73	-36	-30.73	PASS
		47	74	69.94	-66.61	-54	-12.61	PASS
		74	87.5	79.73	-68.15	-36	-32.15	PASS
		87.5	118	89.95	-63.99	-54	-9.99	PASS
		118	174	149.76	-60.91	-36	-24.91	PASS
		174	230	220.05	-65.73	-54	-11.73	PASS
		230	470	249.85	-60.28	-36	-24.28	PASS
		470	694	499.82	-68.43	-54	-14.43	PASS
		694	1000	741.67	-62.19	-36	-26.19	PASS
		1000	12750	6949.32	-62.75	-30	-32.75	PASS
π/4DQPSK_2-DH5	0	30	47	35.86	-67.65	-36	-31.65	PASS
		47	74	69.96	-64.95	-54	-10.95	PASS
		74	87.5	79.79	-63.13	-36	-27.13	PASS
		87.5	118	99.85	-68.64	-54	-14.64	PASS
		118	174	149.89	-65.81	-36	-29.81	PASS
		174	230	209.80	-66.72	-54	-12.72	PASS
		230	470	249.93	-62.08	-36	-26.08	PASS
		470	694	499.94	-61.28	-54	-7.28	PASS
		694	1000	959.97	-62.73	-36	-26.73	PASS
		1000	12750	6981.42	-61.67	-30	-31.67	PASS
	78	30	47	36.02	-68.56	-36	-32.56	PASS
		47	74	69.91	-64.48	-54	-10.48	PASS
		74	87.5	79.88	-65.30	-36	-29.30	PASS
		87.5	118	90.01	-67.79	-54	-13.79	PASS
		118	174	150.02	-64.05	-36	-28.05	PASS
		174	230	229.83	-69.22	-54	-15.22	PASS
		230	470	249.96	-62.58	-36	-26.58	PASS

		470	694	499.91	-63.59	-54	-9.59	PASS
		694	1000	988.45	-70.00	-36	-34.00	PASS
		1000	12750	6966.34	-60.30	-30	-30.30	PASS
8DPSK_3-DH5	0	30	47	35.99	-65.92	-36	-29.92	PASS
		47	74	69.92	-65.40	-54	-11.40	PASS
		74	87.5	79.78	-61.76	-36	-25.76	PASS
		87.5	118	89.92	-64.59	-54	-10.59	PASS
		118	174	149.77	-69.78	-36	-33.78	PASS
		174	230	229.74	-63.44	-54	-9.44	PASS
		230	470	249.89	-68.00	-36	-32.00	PASS
		470	694	499.89	-68.35	-54	-14.35	PASS
		694	1000	728.10	-60.05	-36	-24.05	PASS
		1000	12750	6895.45	-60.72	-30	-30.72	PASS
	78	30	47	35.99	-60.96	-36	-24.96	PASS
		47	74	69.99	-67.58	-54	-13.58	PASS
		74	87.5	79.68	-60.81	-36	-24.81	PASS
		87.5	118	89.87	-67.28	-54	-13.28	PASS
		118	174	149.72	-68.19	-36	-32.19	PASS
		174	230	229.96	-67.60	-54	-13.60	PASS
		230	470	249.72	-68.46	-36	-32.46	PASS
		470	694	499.76	-61.73	-54	-7.73	PASS
		694	1000	959.93	-63.25	-36	-27.25	PASS
		1000	12750	6966.00	-62.49	-30	-32.49	PASS

7) Receiver spurious emissions

Test Result

Mode	Ch.	Start Frequency (MHz)	Stop Frequency (MHz)	Mark Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	0	30	1000	69.91	-63.33	-57	-6.33	PASS
		1000	12750	1750.16	-63.57	-47	-16.57	PASS
	78	30	1000	69.95	-62.69	-57	-5.69	PASS
		1000	12750	1764.64	-64.80	-47	-17.80	PASS
π/4DQPSK_2-DH5	0	30	1000	249.87	-68.08	-57	-11.08	PASS
		1000	12750	2413.24	-61.18	-47	-14.18	PASS
	78	30	1000	249.87	-67.19	-57	-10.19	PASS
		1000	12750	2414.08	-60.06	-47	-13.06	PASS
8DPSK_3-DH5	0	30	1000	249.78	-69.51	-57	-12.51	PASS
		1000	12750	2413.40	-65.87	-47	-18.87	PASS
	78	30	1000	69.77	-67.99	-57	-10.99	PASS
		1000	12750	1761.11	-61.95	-47	-14.95	PASS

8) Receiver Blocking

Test Result

Test Mode	Test Channel (MHz)	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)		Type of Blocking Signal	PER(%)		Test Result
				Test Value	Limit		Test Value	Limit	
DH5	2402	-69	2380	-25	⩾-34	CW	0.51	10	Pass
			2504	-30	⩾-34	CW	0.11	10	Pass
			2300	-24	⩾-34	CW	0.14	10	Pass
			2584	-29	⩾-34	CW	0.14	10	Pass
	2480	-69	2380	-29	⩾-34	CW	0.24	10	Pass
			2504	-26	⩾-34	CW	0.39	10	Pass
			2300	-31	⩾-34	CW	0.10	10	Pass
			2584	-27	⩾-34	CW	0.33	10	Pass
2DH5	2402	-70	2380	-25	⩾-34	CW	0.47	10	Pass
			2504	-30	⩾-34	CW	0.17	10	Pass
			2300	-24	⩾-34	CW	0.30	10	Pass
			2584	-29	⩾-34	CW	0.39	10	Pass
	2480	-70	2380	-29	⩾-34	CW	0.16	10	Pass
			2504	-26	⩾-34	CW	0.24	10	Pass
			2300	-31	⩾-34	CW	0.42	10	Pass
			2584	-27	⩾-34	CW	0.16	10	Pass
3DH5	2402	-70	2380	-25	⩾-34	CW	0.14	10	Pass
			2504	-30	⩾-34	CW	0.33	10	Pass
			2300	-24	⩾-34	CW	0.50	10	Pass
			2584	-29	⩾-34	CW	0.42	10	Pass
	2480	-70	2380	-29	⩾-34	CW	0.25	10	Pass
			2504	-26	⩾-34	CW	0.28	10	Pass
			2300	-31	⩾-34	CW	0.60	10	Pass
			2584	-27	⩾-34	CW	0.57	10	Pass

------End of the report-----

Appendix Report

Project No.:	CISR250327243
Test Engineer:	James Wang
Supervised by:	Rory Huang

1) RF Output Power

Test Result

Condition	Modulation	Packet Type	Channel	Max EIRP (dBm)	Limit (dBm)	Result
NT/NV	GFSK	DH5	0	2.95	20	PASS
			39	3.10		PASS
			78	2.91		PASS
	π/4DQPSK	2-DH5	0	2.60		PASS
			39	2.32		PASS
			78	2.53		PASS
	8DPSK	3-DH5	0	1.97		PASS
			39	2.15		PASS
			78	2.18		PASS
LT/NV	GFSK	DH5	0	2.93	20	PASS
			39	3.08		PASS
			78	2.89		PASS
	π/4DQPSK	2-DH5	0	2.58		PASS
			39	2.30		PASS
			78	2.51		PASS
	8DPSK	3-DH5	0	1.95		PASS
			39	2.13		PASS
			78	2.16		PASS
HT/NV	GFSK	DH5	0	2.92	20	PASS
			39	3.07		PASS
			78	2.88		PASS
	π/4DQPSK	2-DH5	0	2.57		PASS
			39	2.29		PASS
			78	2.50		PASS
	8DPSK	3-DH5	0	1.94		PASS
			39	2.12		PASS
			78	2.15		PASS

2) Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

Test Result

Accumulated Transmit Time

Modulation	Packet Type	Channel	Dwell Time (ms)	Number of data points	Acc. Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	0	2.83	101	302.07	400	PASS
		78	2.83	102	303.13		PASS
π/4DQPSK	2-DH5	0	2.84	102	300.35		PASS
		78	2.85	99	302.64		PASS
8DPSK	3-DH5	0	2.85	102	260.65		PASS
		78	2.84	103	263.40		PASS

Note:
Test Period: 400ms * Minimum number of hopping frequencies (N)
Accumulated Transmit Time = Time slot length (Dwell Time) * Number of data points within a test period

Frequency Occupation

Modulation	Packet Type	Channel	Result [Num.]	Limit [Num.]	Result
GFSK	DH5	0	1	1	True
		78	1	1	True
π/4DQPSK	2-DH5	0	2	1	True
		78	1	1	True
8DPSK	3-DH5	0	1	1	True
		78	2	1	True

Hopping Sequence

Modulation	Frequency Band	Number of Hopping Frequencies (N)	Limit	-20dB Points Occupied Bandwidth	Limit	Result
GFSK	2400 MHz to 2483.5 MHz	79	15	80.076	58.45MHz = 70% * 83.5MHz	PASS
π/4DQPSK		79		79.743		PASS
8DPSK		79		80.571		PASS

3) Hopping Frequency Separation

Test Result

Modulation	Packet	Test Frequency (MHz)	Adjacent Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
GFSK	DH5	2440	2441	1.04	≥ 0.1	PASS
π/4DQPSK	2-DH5	2440	2441	1.05	≥ 0.1	PASS
8DPSK	3-DH5	2440	2441	1.01	≥ 0.1	PASS

4) Occupied Channel Bandwidth

Test Result

Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	FL (MHz)	FH (MHz)	Limit	Result
GFSK_DH5	0	2402	0.944	2400.64	2402.39	2400 MHz to 2483.5 MHz	PASS
	39	2441	0.945	2440.51	2441.47		PASS
	78	2480	0.948	2479.11	2480.40		PASS
π/4DQPSK_2-DH5	0	2402	1.248	2400.56	2402.54		PASS
	39	2441	1.242	2440.34	2441.45		PASS
	78	2480	1.247	2479.14	2480.54		PASS
8DPSK_3-DH5	0	2402	1.253	2400.82	2402.31		PASS
	39	2441	1.253	2440.44	2441.37		PASS
	78	2480	1.251	2479.51	2480.37		PASS

5) Transmitter unwanted emissions in the out-of-band domain

Test Result

Mode	Channel	Test Freq. (MHz)	OOB Emission (dBm)	Segments	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	Hopping	2399.5	-46.60	2 400 MHz - BW to 2 400 MHz	-10	-36.60	PASS
		2398.5	-46.67	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-26.67	PASS
		2484	-46.73	2 483,5 MHz to 2 483,5 MHz + BW	-10	-36.73	PASS
		2485	-36.36	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-16.36	PASS
π/4DQPSK_2-DH5		2399.5	-36.50	2 400 MHz - BW to 2 400 MHz	-10	-26.50	PASS
		2398.5	-36.63	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-16.63	PASS
		2484	-36.82	2 483,5 MHz to 2 483,5 MHz + BW	-10	-26.82	PASS
		2485	-36.83	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-16.83	PASS
8DPSK_3-DH5		2399.5	-36.37	2 400 MHz - BW to 2 400 MHz	-10	-26.37	PASS
		2398.5	-46.98	2 400 MHz - 2 BW to 2 400 MHz - BW	-20	-26.98	PASS
		2484	-46.89	2 483,5 MHz to 2 483,5 MHz + BW	-10	-36.89	PASS
		2485	-46.73	2 483,5 MHz + BW to 2 483,5 MHz + 2 BW	-20	-26.73	PASS

6) Transmitter unwanted emissions in the spurious domain

Test Result

Mode	Ch.	Start Frequency (MHz)	Stop Frequency (MHz)	Mark Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	0	30	47	35.94	-64.87	-36	-28.87	PASS
		47	74	69.99	-67.76	-54	-13.76	PASS
		74	87.5	79.70	-62.01	-36	-26.01	PASS
		87.5	118	89.97	-67.78	-54	-13.78	PASS
		118	174	149.76	-62.79	-36	-26.79	PASS
		174	230	229.67	-64.27	-54	-10.27	PASS
		230	470	249.89	-62.09	-36	-26.09	PASS
		470	694	570.03	-61.61	-54	-7.61	PASS
		694	1000	959.85	-66.58	-36	-30.58	PASS
		1000	12750	6975.96	-64.64	-30	-34.64	PASS
	78	30	47	36.04	-66.73	-36	-30.73	PASS
		47	74	69.94	-66.61	-54	-12.61	PASS
		74	87.5	79.73	-68.15	-36	-32.15	PASS
		87.5	118	89.95	-63.99	-54	-9.99	PASS
		118	174	149.76	-60.91	-36	-24.91	PASS
		174	230	220.05	-65.73	-54	-11.73	PASS
		230	470	249.85	-60.28	-36	-24.28	PASS
		470	694	499.82	-68.43	-54	-14.43	PASS
		694	1000	741.67	-62.19	-36	-26.19	PASS
		1000	12750	6949.32	-62.75	-30	-32.75	PASS
π/4DQPSK_2-DH5	0	30	47	35.86	-67.65	-36	-31.65	PASS
		47	74	69.96	-64.95	-54	-10.95	PASS
		74	87.5	79.79	-63.13	-36	-27.13	PASS
		87.5	118	99.85	-68.64	-54	-14.64	PASS
		118	174	149.89	-65.81	-36	-29.81	PASS
		174	230	209.80	-66.72	-54	-12.72	PASS
		230	470	249.93	-62.08	-36	-26.08	PASS
		470	694	499.94	-61.28	-54	-7.28	PASS
		694	1000	959.97	-62.73	-36	-26.73	PASS
		1000	12750	6981.42	-61.67	-30	-31.67	PASS
	78	30	47	36.02	-68.56	-36	-32.56	PASS
		47	74	69.91	-64.48	-54	-10.48	PASS
		74	87.5	79.88	-65.30	-36	-29.30	PASS
		87.5	118	90.01	-67.79	-54	-13.79	PASS
		118	174	150.02	-64.05	-36	-28.05	PASS
		174	230	229.83	-69.22	-54	-15.22	PASS
		230	470	249.96	-62.58	-36	-26.58	PASS

		470	694	499.91	-63.59	-54	-9.59	PASS
		694	1000	988.45	-70.00	-36	-34.00	PASS
		1000	12750	6966.34	-60.30	-30	-30.30	PASS
8DPSK_3-DH5	0	30	47	35.99	-65.92	-36	-29.92	PASS
		47	74	69.92	-65.40	-54	-11.40	PASS
		74	87.5	79.78	-61.76	-36	-25.76	PASS
		87.5	118	89.92	-64.59	-54	-10.59	PASS
		118	174	149.77	-69.78	-36	-33.78	PASS
		174	230	229.74	-63.44	-54	-9.44	PASS
		230	470	249.89	-68.00	-36	-32.00	PASS
		470	694	499.89	-68.35	-54	-14.35	PASS
		694	1000	728.10	-60.05	-36	-24.05	PASS
		1000	12750	6895.45	-60.72	-30	-30.72	PASS
	78	30	47	35.99	-60.96	-36	-24.96	PASS
		47	74	69.99	-67.58	-54	-13.58	PASS
		74	87.5	79.68	-60.81	-36	-24.81	PASS
		87.5	118	89.87	-67.28	-54	-13.28	PASS
		118	174	149.72	-68.19	-36	-32.19	PASS
		174	230	229.96	-67.60	-54	-13.60	PASS
		230	470	249.72	-68.46	-36	-32.46	PASS
		470	694	499.76	-61.73	-54	-7.73	PASS
		694	1000	959.93	-63.25	-36	-27.25	PASS
		1000	12750	6966.00	-62.49	-30	-32.49	PASS

7) Receiver spurious emissions

Test Result

Mode	Ch.	Start Frequency (MHz)	Stop Frequency (MHz)	Mark Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
GFSK_DH5	0	30	1000	69.91	-63.33	-57	-6.33	PASS
		1000	12750	1750.16	-63.57	-47	-16.57	PASS
	78	30	1000	69.95	-62.69	-57	-5.69	PASS
		1000	12750	1764.64	-64.80	-47	-17.80	PASS
π/4DQPSK_2-DH5	0	30	1000	249.87	-68.08	-57	-11.08	PASS
		1000	12750	2413.24	-61.18	-47	-14.18	PASS
	78	30	1000	249.87	-67.19	-57	-10.19	PASS
		1000	12750	2414.08	-60.06	-47	-13.06	PASS
8DPSK_3-DH5	0	30	1000	249.78	-69.51	-57	-12.51	PASS
		1000	12750	2413.40	-65.87	-47	-18.87	PASS
	78	30	1000	69.77	-67.99	-57	-10.99	PASS
		1000	12750	1761.11	-61.95	-47	-14.95	PASS

8) Receiver Blocking

Test Result

Test Mode	Test Channel (MHz)	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)		Type of Blocking Signal	PER(%)		Test Result
				Test Value	Limit		Test Value	Limit	
DH5	2402	-69	2380	-25	⩾-34	CW	0.51	10	Pass
			2504	-30	⩾-34	CW	0.11	10	Pass
			2300	-24	⩾-34	CW	0.14	10	Pass
			2584	-29	⩾-34	CW	0.14	10	Pass
	2480	-69	2380	-29	⩾-34	CW	0.24	10	Pass
			2504	-26	⩾-34	CW	0.39	10	Pass
			2300	-31	⩾-34	CW	0.10	10	Pass
			2584	-27	⩾-34	CW	0.33	10	Pass
2DH5	2402	-70	2380	-25	⩾-34	CW	0.47	10	Pass
			2504	-30	⩾-34	CW	0.17	10	Pass
			2300	-24	⩾-34	CW	0.30	10	Pass
			2584	-29	⩾-34	CW	0.39	10	Pass
	2480	-70	2380	-29	⩾-34	CW	0.16	10	Pass
			2504	-26	⩾-34	CW	0.24	10	Pass
			2300	-31	⩾-34	CW	0.42	10	Pass
			2584	-27	⩾-34	CW	0.16	10	Pass
3DH5	2402	-70	2380	-25	⩾-34	CW	0.14	10	Pass
			2504	-30	⩾-34	CW	0.33	10	Pass
			2300	-24	⩾-34	CW	0.50	10	Pass
			2584	-29	⩾-34	CW	0.42	10	Pass
	2480	-70	2380	-29	⩾-34	CW	0.25	10	Pass
			2504	-26	⩾-34	CW	0.28	10	Pass
			2300	-31	⩾-34	CW	0.60	10	Pass
			2584	-27	⩾-34	CW	0.57	10	Pass

------End of the report-----