

FCC RADIO TEST REPORT

FCC ID: 2A8P4-K1

Sample : 5.8G digital wireless monitoring headset

Trade Name : N/A

Main Model : K1

Additional Model : K2, K3, K5, K8, K9, K10, K11, K12, A2, R1,
IEM POCKET, M1, T9

Report No. : UNIA22082324ER-61

Prepared for

Guangdong Xinpinle Intelligent Technology Co., Ltd

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Prepared by

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TEST RESULT CERTIFICATION

Applicant : Guangdong Xinpinle Intelligent Technology Co., Ltd
Address : No.C3-1, zone 2, Enping Park, Jiangmen IND. transfer IND. park,
 Enping, Jiangmen, China
Manufacturer : Guangdong Xinpinle Intelligent Technology Co., Ltd
Address : No.C3-1, zone 2, Enping Park, Jiangmen IND. transfer IND. park,
 Enping, Jiangmen, China

Product description

Product..... : 5.8G digital wireless monitoring headset
Trade Name..... : N/A
Model Name : K1, K2, K3, K5, K8, K9, K10, K11, K12, A2, R1, IEM POCKET,
 M1, T9
Test Methods..... : FCC Rules and Regulations Part 15 Subpart C Section 15.249,
 ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test..... :
Date (s) of performance of tests..... : Aug. 23, 2022 ~ Sep. 20, 2022
Date of Issue..... : Sep. 28, 2022
Test Result..... : Pass

Prepared by:

kahn.yang

Kahn yang/Supervisor



Reviewer:

Kelly Cheng/Supervisor



Approved & Authorized Signer:

Liuze/Manager

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1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

ITEM	STANGARD	RESULT
CONDUCTED EMISSION	FCC Part 15.207	COMPLIANT
RADIATED EMISSION	FCC Part 15.209/15.249	COMPLIANT
BAND EDGE	FCC Part 15.249/15.205	COMPLIANT
OCCUPIED BANDWIDTH	FCC Part 15.215	COMPLIANT
ANTENNA REQUIREMENT	FCC Part 15.203	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.
Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 150kHz	2.96	
		150kHz ~ 30MHz	2.44	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 30MHz	2.50	
		30MHz ~ 1000MHz	4.80	
		Above 1000MHz	4.13	

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product:	5.8G digital wireless monitoring headset
Trade Name:	N/A
Main Model:	K1
Additional Model:	K2, K3, K5, K8, K9, K10, K11, K12, A2, R1, IEM POCKET, M1, T9
Model Difference:	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: K1.
FCC ID:	2A8P4-K1
Operation Frequency:	5729MHz~5839MHz
Number of Channels:	56CH
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	2dBi
Battery:	DC 3.7V, 1250mAh
Adapter:	N/A
Power Source:	DC 3.7V from Li-battery or DC 5.0V/40mA from adapter with AC 120(240)V/60Hz

2.2 CARRIER FREQUENCY OF CHANNELS

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	5729	15	5757	29	5785	43	5813
02	5731	16	5759	30	5787	44	5815
03	5733	17	5761	31	5789	45	5817
04	5735	18	5763	32	5791	46	5819
05	5737	19	5765	33	5793	47	5821
06	5739	20	5767	34	5795	48	5823
07	5741	21	5769	35	5797	49	5825
08	5743	22	5771	36	5799	50	5827
09	5745	23	5773	37	5801	51	5829
10	5747	24	5775	38	5803	52	5831
11	5749	25	5777	39	5805	53	5833
12	5751	26	5779	40	5807	54	5835
13	5753	27	5781	41	5809	55	5837
14	5755	28	5783	42	5811	56	5839

2.3 TEST MODE

The EUT was programmed to be in continuously transmitting mode.

Channel List		
Test Channel	EUT Channel	Test Frequency (MHz)
Low	CH01	5729
Middle	CH29	5785
High	CH56	5839

2.4 TEST SETUP

Operation of EUT during Conducted testing:



Operation of EUT during Radiation testing:



2.5 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	5.8G digital wireless monitoring headset	N/A	K1	EUT
E-2	Adapter	XIAOMI	MDY-08-EF	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

1. The support equipment was authorized by Declaration of Confirmation.
2. For detachable type I/O cable should be specified the length in cm in 『Length』 column.
3. “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
Conduction Emissions Measurement					
1	Conducted Emission Test Software	EZ-EMC	Ver.CCS-3A1-CE	N/A	N/A
2	AMN	Schwarzbeck	NNLK8121	8121370	2023.09.22
3	AAN	TESEQ	T8-Cat6	38888	2023.09.22
4	Pulse Limiter	CYBRTEK	EM5010	E115010056	2023.05.30
5	EMI Test Receiver	Rohde&Schwarz	ESCI	101210	2023.09.22
Radiated Emissions Measurement					
1	Radiated Emission Test Software	EZ-EMC	Ver.CCS-03A1	N/A	N/A
2	Horn Antenna	Sunol	DRH-118	A101415	2023.09.22
3	Broadband Hybrid Antenna	Sunol	JB1	A090215	2024.02.26
4	PREAMP	HP	8449B	3008A00160	2023.09.22
5	PREAMP	HP	8447D	2944A07999	2023.05.30
6	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2023.09.22
7	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2023.09.22
8	Signal Generator	Agilent	E4421B	MY4335105	2023.09.22
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2023.09.22
10	MXA Signal Analyzer	Keysight	N9020A	MY51110104	2023.09.22
11	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2023.05.30
12	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2023.05.30
13	RF power divider	Anritsu	K241B	992289	2023.09.22
14	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2023.09.22
15	Active Loop Antenna	Com-Power	AL-130R	10160009	2023.05.30
16	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2023.09.22
17	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2023.05.30
18	Horn Antenna	A-INFOMW	LB-180400-KF	J211060660	2023.09.22
19	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2023.09.22
20	Signal Generator	Agilent	N5183A	MY47420153	2023.09.22
21	Spectrum Analyzer	Rohde&Schwarz	FSP 40	100501	2023.09.22
22	Power Meter	KEYSIGHT	N1911A	MY50520168	2023.09.22
23	Frequency Meter	VICTOR	VC2000	997406086	2023.09.22
24	DC Power Source	HYELEC	HY5020E	055161818	2023.09.22

3 CONDUCTED EMISSION

3.1 TEST LIMIT

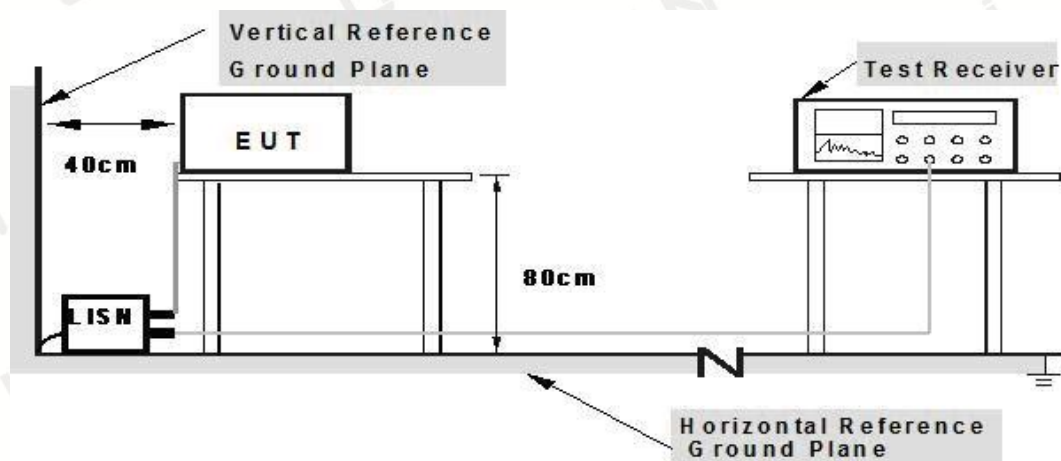
For unintentional device, according to § 15.207(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is placed on a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

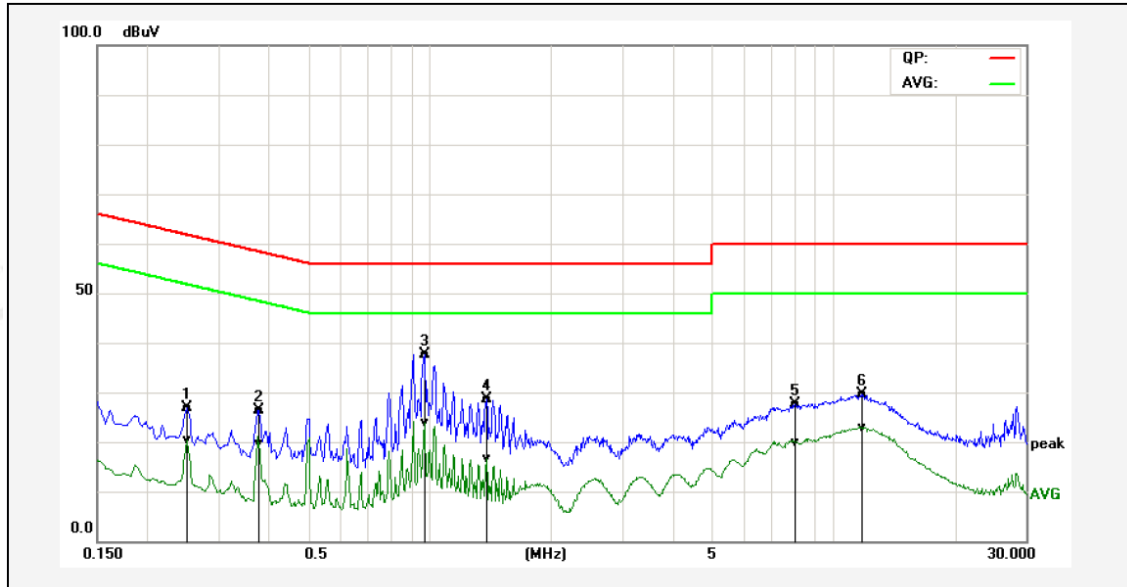
3.4 TEST RESULT

PASS

Remark:

1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. All modes were test at Low, Middle, and High channel, only the worst result of GFSK Low Channel was reported.
3. All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 5729MHz is the worst case and recorded in the report; the worst case Antenna 1 has more than 3dB margins, so the MIMO mode also compliance the limit.

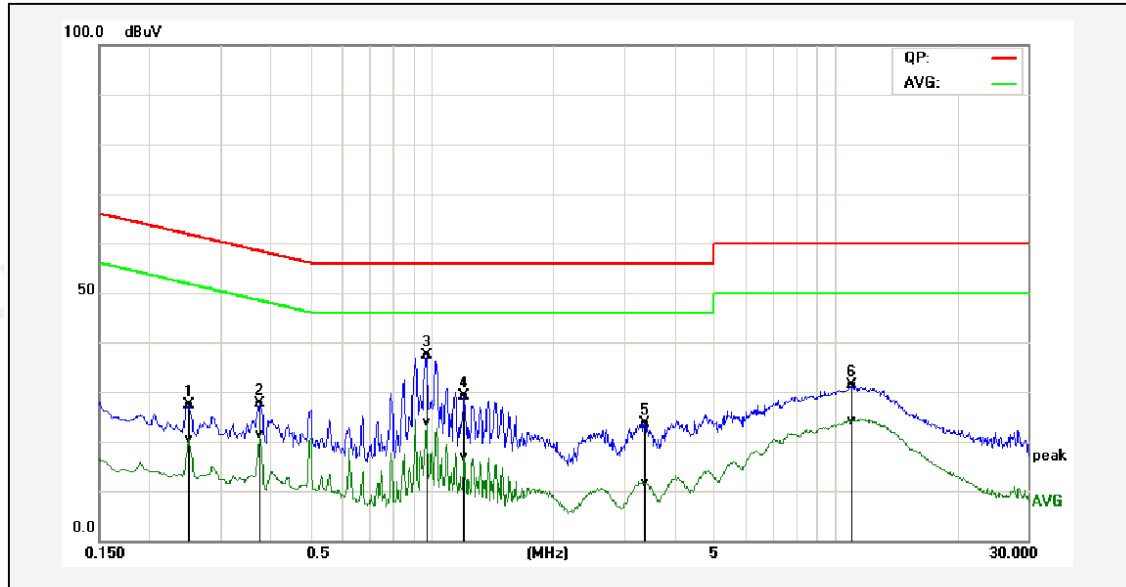
Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Line
Test Mode:	Transmitting mode of GFSK 5729MHz (ANT 1)		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.2500	16.88	10.38	10.12	27.00	20.50	61.76	51.76	-34.76	-31.26	Pass
2P	0.3780	16.39	9.63	10.10	26.49	19.73	58.32	48.32	-31.83	-28.59	Pass
3*	0.9700	27.55	13.84	10.12	37.67	23.96	56.00	46.00	-18.33	-22.04	Pass
4P	1.3820	18.54	6.40	10.15	28.69	16.55	56.00	46.00	-27.31	-29.45	Pass
5P	8.0540	17.40	9.71	10.14	27.54	19.85	60.00	50.00	-32.46	-30.15	Pass
6P	11.8060	19.43	12.65	10.19	29.62	22.84	60.00	50.00	-30.38	-27.16	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of GFSK 5729MHz (ANT 1)		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.2500	17.31	10.31	10.12	27.43	20.43	61.76	51.76	-34.33	-31.33	Pass
2P	0.3740	17.61	11.32	10.10	27.71	21.42	58.41	48.41	-30.70	-26.99	Pass
3*	0.9700	27.19	13.79	10.12	37.31	23.91	56.00	46.00	-18.69	-22.09	Pass
4P	1.2060	19.12	6.73	10.10	29.22	16.83	56.00	46.00	-26.78	-29.17	Pass
5P	3.3660	13.45	1.37	10.19	23.64	11.56	56.00	46.00	-32.36	-34.44	Pass
6P	10.9940	21.15	13.92	10.15	31.30	24.07	60.00	50.00	-28.70	-25.93	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

4 RADIATED EMISSION

4.1 TEST LIMIT

For unintentional device, according to § 15.209(a), except for Class B digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	Quasi-peak	300
0.490MHz-1.705MHz	24000/F (kHz)	-	Quasi-peak	30
1.705MHz-30MHz	30	-	Quasi-peak	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3
		74.0	Peak	3

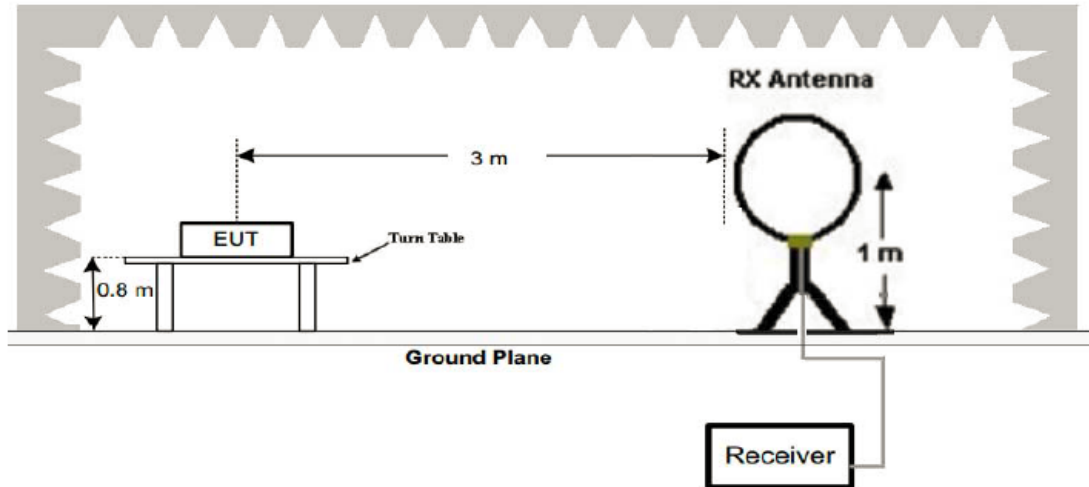
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

Limit: (Field strength of the fundamental signal)

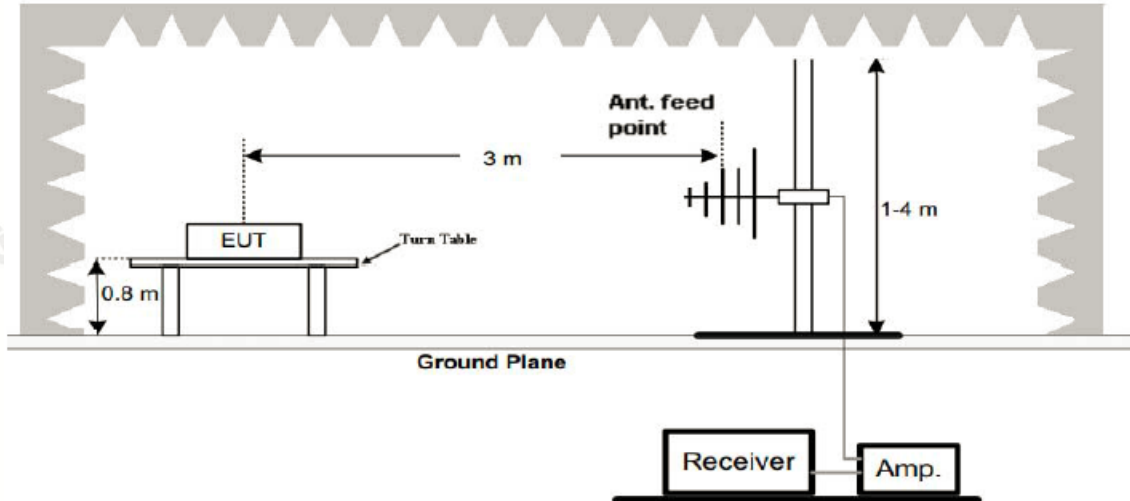
Limit (dBuV/m @3m)	Remark
94.0	Average Value
114.0	Peak Value

4.2 TEST SETUP

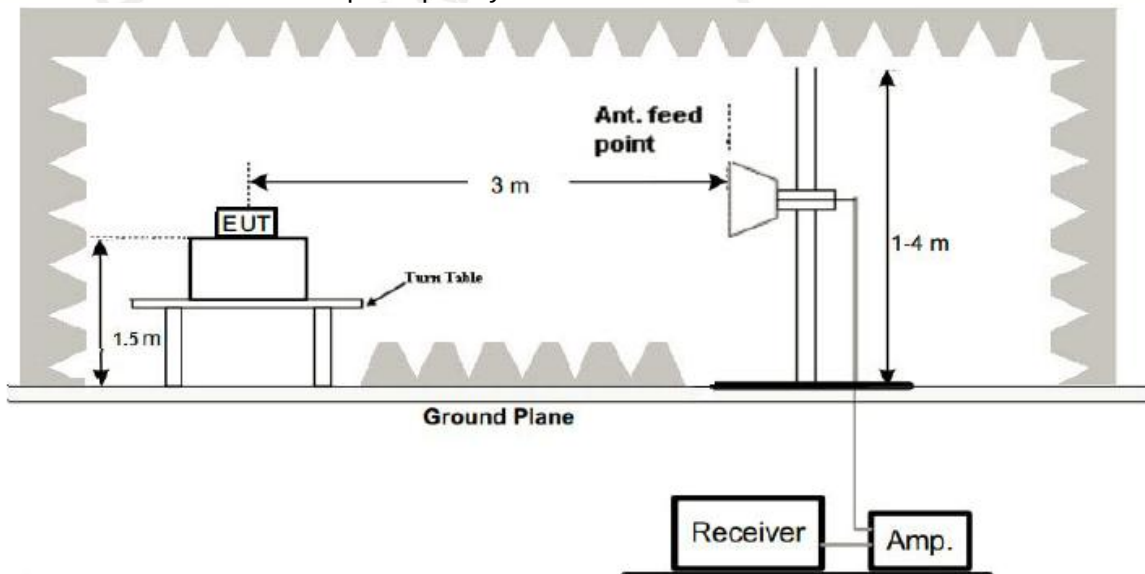
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 TEST PROCEDURE

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane.
And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9kHz to 40GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 TEST RESULT

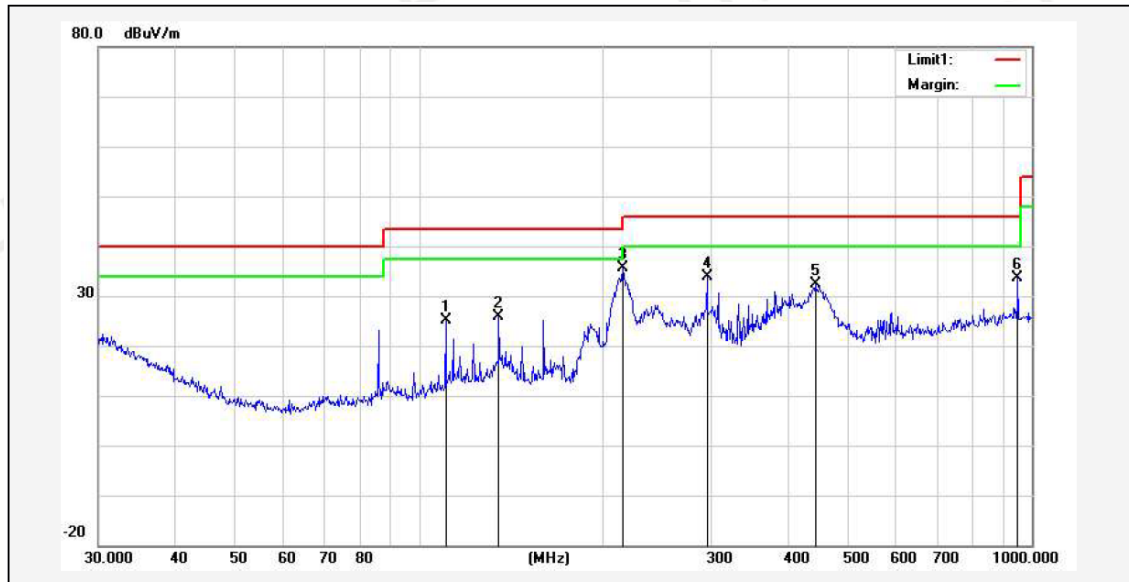
PASS

Remark:

1. All modes were test at Low, Middle, and High channel, only the worst result of GFSK Low Channel was reported for below 1GHz test.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, and test data recorded in this report.
3. Radiated emission test from 9kHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9kHz to 30MHz and not recorded in this report.

Below 1GHz Test Results:

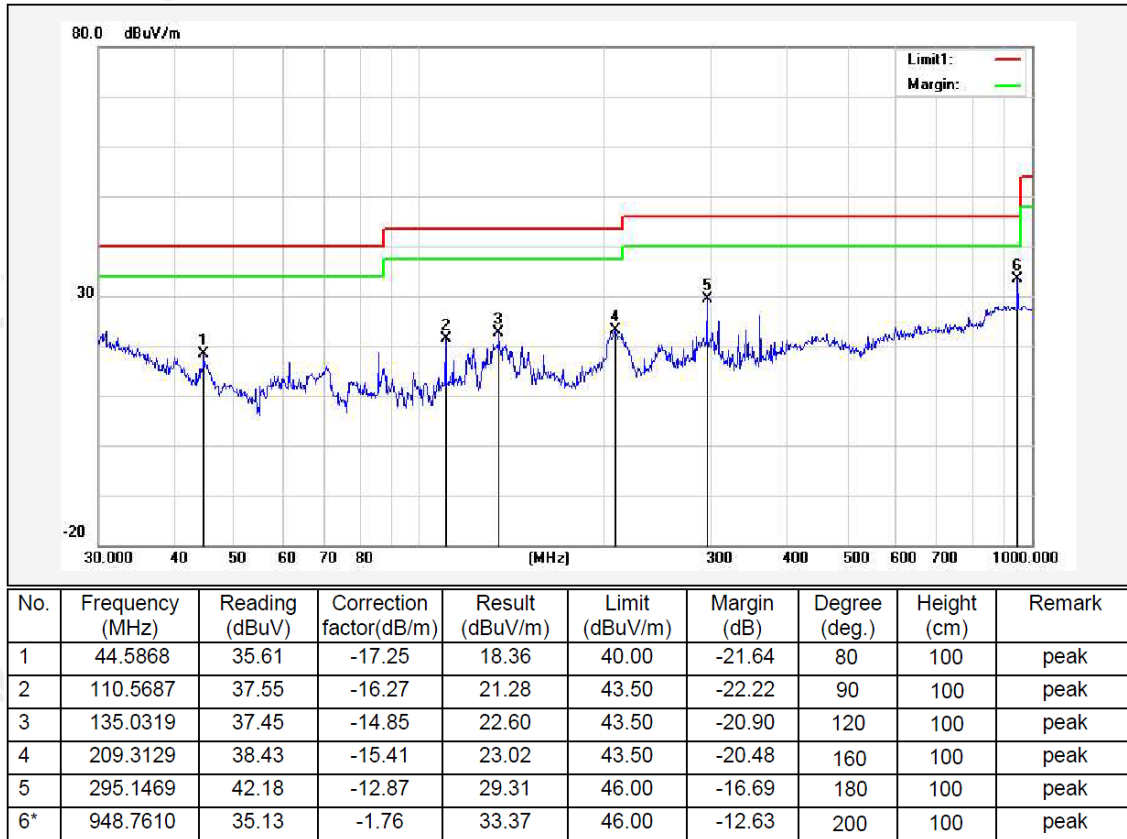
Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Transmitting mode of GFSK 5729MHz (ANT 1)		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	110.5687	42.53	-17.30	25.23	43.50	-18.27	70	100	peak
2	135.0320	41.85	-16.01	25.84	43.50	-17.66	80	100	peak
3*	215.2678	52.77	-17.24	35.53	43.50	-7.97	100	100	peak
4	295.1470	48.68	-14.71	33.97	46.00	-12.03	120	100	peak
5	443.2943	44.51	-12.14	32.37	46.00	-13.63	150	100	peak
6	948.7610	38.91	-5.20	33.71	46.00	-12.29	180	100	peak

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Transmitting mode of GFSK 5729MHz (ANT 1)		



Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Remark:

1. Measuring frequencies from 9 kHz to the 1 GHz, Radiated emission test from 9kHz to 30MHz was verified, and no any emission was found except system noise floor.
2. * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
3. The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120kHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10kHz.
4. All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 5729MHz is the worst case and recorded in the report; the worst case Antenna 1 has more than 3dB margins, so the MIMO mode also compliance the limit.

Above 1 GHz Test Results: CH01 (5729MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5729	112.47	-5.84	106.63	114	-7.37	PK
5729	82.56	-5.84	76.72	94	-17.28	AV
11458	60.24	-3.64	56.60	74	-17.40	PK
11458	50.29	-3.64	46.65	54	-7.35	AV
17187	57.22	-0.95	56.27	74	-17.73	PK
17187	47.45	-0.95	46.50	54	-7.50	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5729	112.44	-5.84	106.60	114	-7.40	PK
5729	82.52	-5.84	76.68	94	-17.32	AV
11458	60.20	-3.64	56.56	74	-17.44	PK
11458	50.14	-3.64	46.50	54	-7.50	AV
17187	57.15	-0.95	56.20	74	-17.80	PK
17187	47.38	-0.95	46.43	54	-7.57	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH29 (5785MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5785	112.27	-5.71	106.56	114	-7.44	PK
5785	82.26	-5.71	76.55	94	-17.45	AV
11570	59.71	-3.51	56.20	74	-17.80	PK
11570	50.04	-3.51	46.53	54	-7.47	AV
17355	56.70	-0.82	55.88	74	-18.12	PK
17355	46.92	-0.82	46.10	54	-7.90	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5785	112.19	-5.71	106.48	114	-7.52	PK
5785	82.21	-5.71	76.50	94	-17.50	AV
11570	59.65	-3.51	56.14	74	-17.86	PK
11570	50.01	-3.51	46.50	54	-7.50	AV
17355	56.65	-0.82	55.83	74	-18.17	PK
17355	46.90	-0.82	46.08	54	-7.92	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

CH56 (5839MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5839	112.10	-5.65	106.45	114	-7.55	PK
5839	81.80	-5.65	76.15	94	-17.85	AV
11678	59.42	-3.43	55.99	74	-18.01	PK
11678	49.73	-3.43	46.30	54	-7.70	AV
17517	56.55	-0.75	55.80	74	-18.20	PK
17517	46.60	-0.75	45.85	54	-8.15	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5839	112.08	-5.65	106.43	114	-7.57	PK
5839	81.73	-5.65	76.08	94	-17.92	AV
11678	59.35	-3.43	55.92	74	-18.08	PK
11678	49.67	-3.43	46.24	54	-7.76	AV
17517	56.53	-0.75	55.78	74	-18.22	PK
17517	46.50	-0.75	45.75	54	-8.25	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Remark:

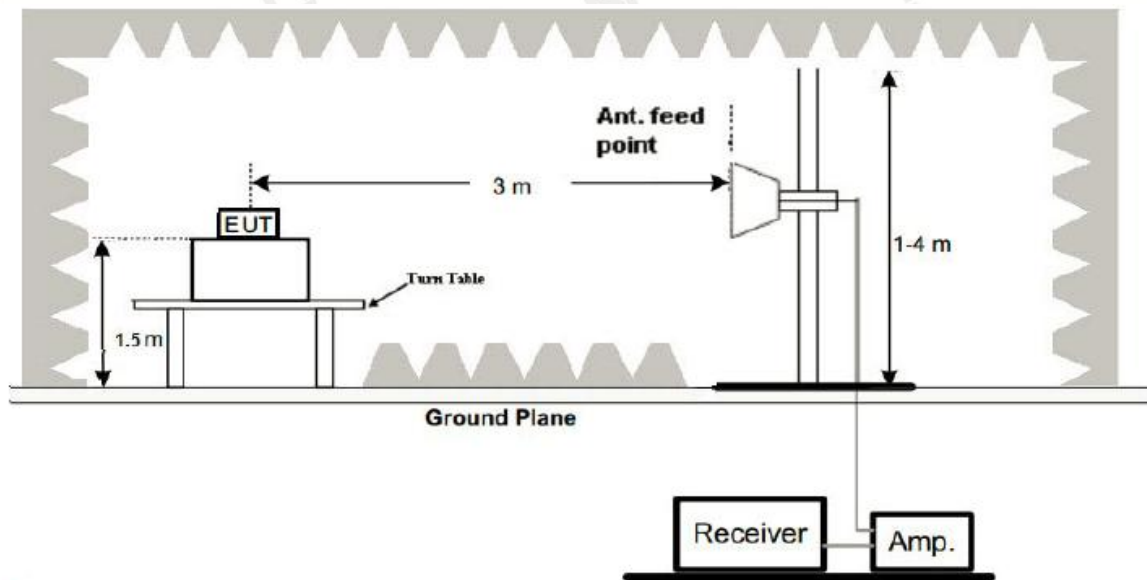
1. Measuring frequencies from 1 GHz to the 40 GHz.
2. "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
3. * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120kHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10kHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
6. When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
7. For fundamental frequency, RBW >20dB BW, VBW>=3XRBW, PK detector for PK value, AV detector for AV value.
8. 18GHz-40GHz the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
9. All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 is the worst case and recorded in the report; the worst case Antenna 1 has more than 3dB margins, so the MIMO mode also compliance the limit.

5 BAND EDGE

5.1 TEST LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

5.2 TEST SETUP



5.3 TEST PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode. The band edge compliance of RF radiated emission should be measured by following the guidance in ANSIC63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz, VBW=3MHz / Sweep=AUTO

5.4 TEST RESULT

PASS

Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz		
Test Mode:	Transmitting mode of GFSK 5729MHz (ANT 1)		

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5635	57.09	-5.81	51.28	74	-22.72	PK
5635	/	-5.81	/	54	/	AV
5715	57.24	-5.84	51.40	74	-22.60	PK
5715	/	-5.84	/	54	/	AV
5725	57.29	-5.84	51.45	74	-22.55	PK
5725	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5635	57.51	-5.81	51.70	74	-22.30	PK
5635	/	-5.81	/	54	/	AV
5715	57.34	-5.84	51.50	74	-22.50	PK
5715	/	-5.84	/	54	/	AV
5725	57.18	-5.84	51.34	74	-22.66	PK
5725	/	-5.84	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 30, 2022	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz		
Test Mode:	Transmitting mode of GFSK 5839MHz (ANT 1)		

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5845	57.21	-5.65	51.56	74	-22.44	PK
5845	/	-5.65	/	54	/	AV
5860	57.34	-5.72	51.62	74	-22.38	PK
5860	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5845	57.15	-5.65	51.50	74	-22.50	PK
5845	/	-5.65	/	54	/	AV
5860	57.02	-5.72	51.30	74	-22.70	PK
5860	/	-5.72	/	54	/	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark:

1. Factor=Antenna Factor + Cable Loss – Pre-amplifier. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.
3. All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 is the worst case and recorded in the report; the worst case Antenna 1 has more than 3dB margins, so the MIMO mode also compliance the limit.

6 OCCUPIED BANDWIDTH

6.1 TEST SETUP

Same as Radiated Emission Measurement.

6.2 TEST PROCEDURE

1. Set the EUT Work on the low, the middle and the high operation frequency individually.
2. Set SPA Centre Frequency=Operation Frequency, RBW=100kHz, VBW $\geq$ 3 $\times$ RBW.
3. Set SPA Trace 1 Max hold, then View.

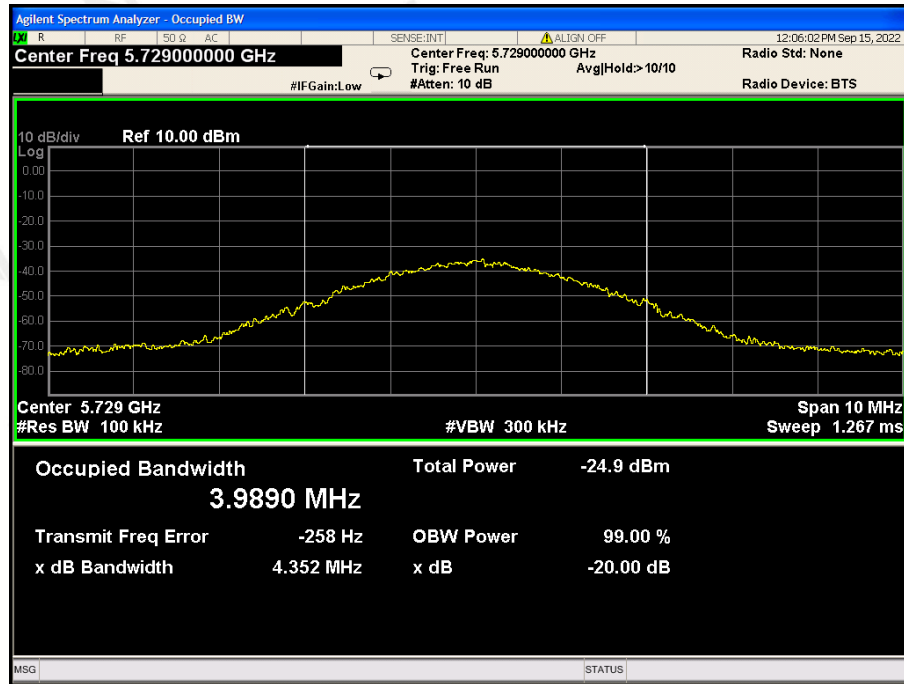
6.4 TEST RESULT

PASS

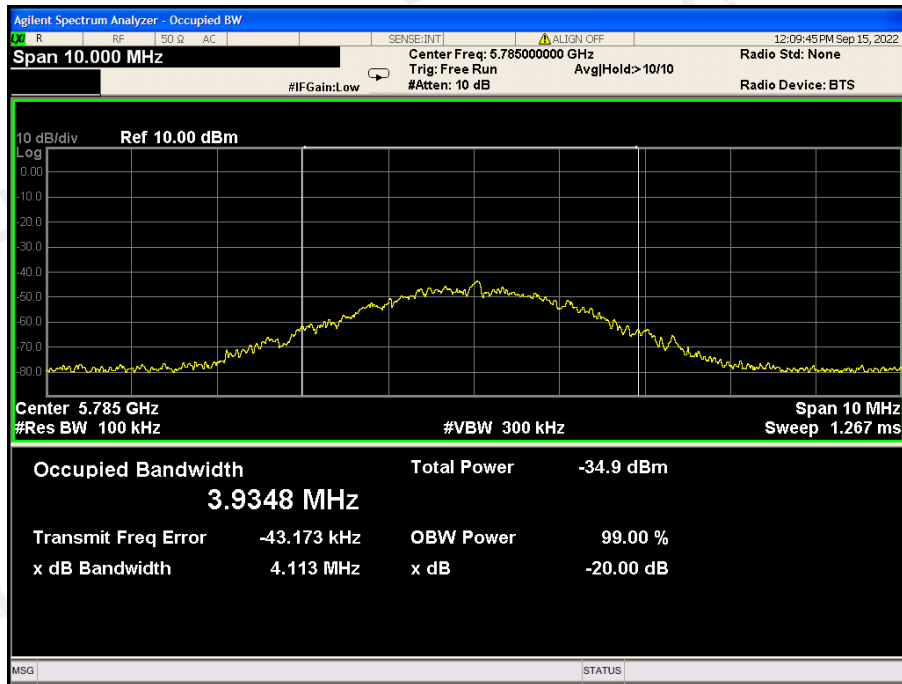
GFSK Modulation (ANT 1):

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
CH01	5729	4.352	PASS
CH29	5785	4.113	PASS
CH56	5839	4.886	PASS

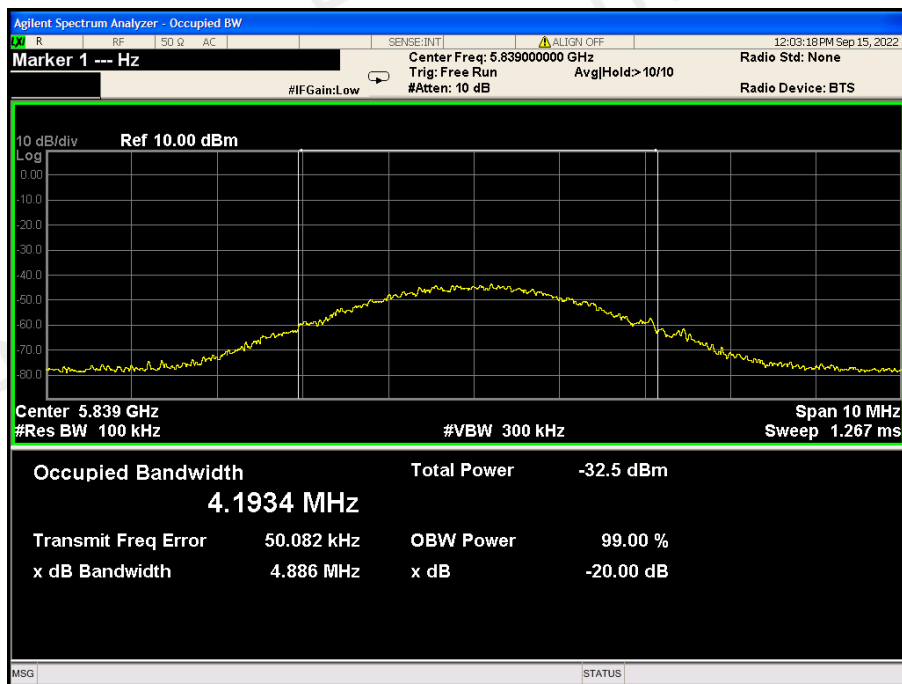
CH01: 5729MHz



CH29: 5785MHz



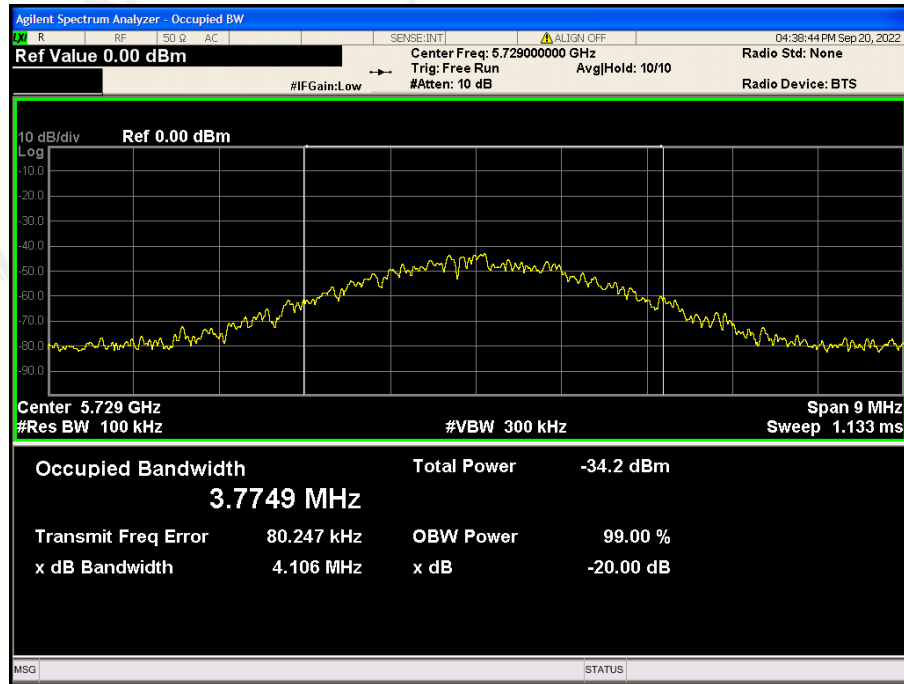
CH56: 5839MHz



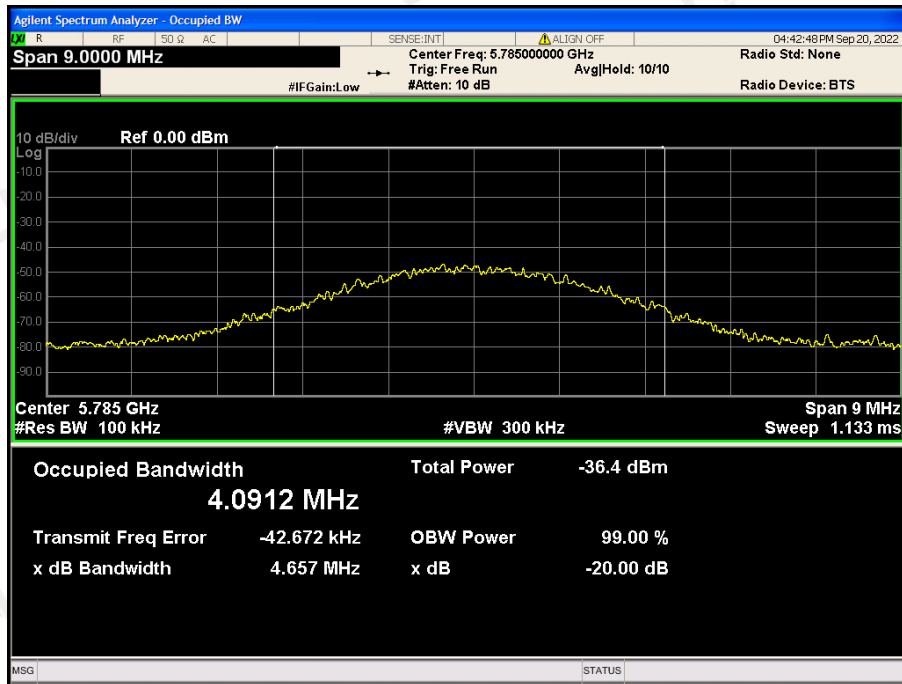
GFSK Modulation (ANT 2):

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
CH01	5729	4.106	PASS
CH29	5785	4.657	PASS
CH56	5839	4.701	PASS

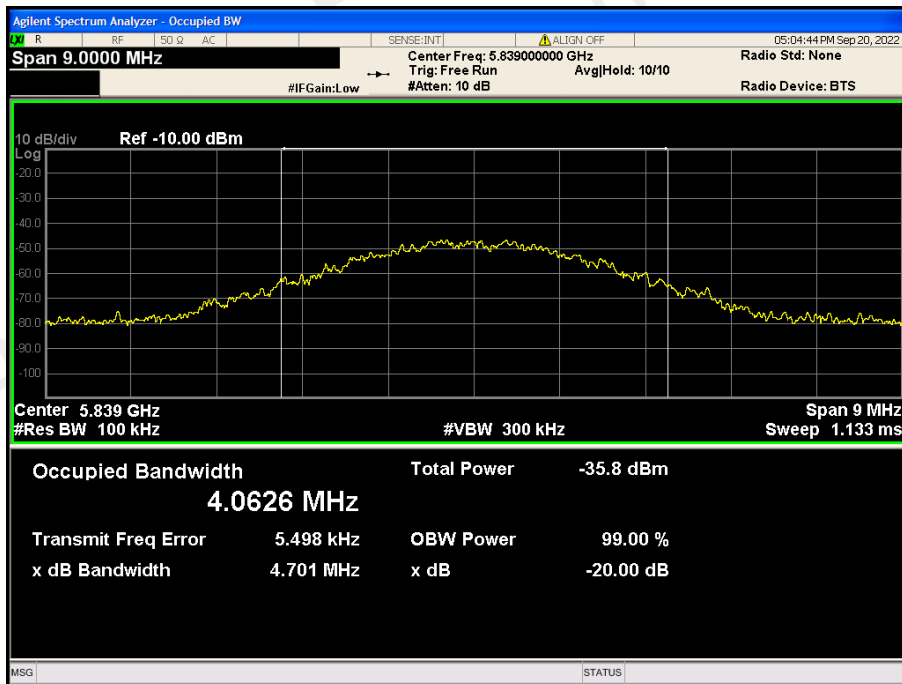
CH01: 5729MHz



CH29: 5785MHz



CH56: 5839MHz



7 ANTENNA REQUIREMENT

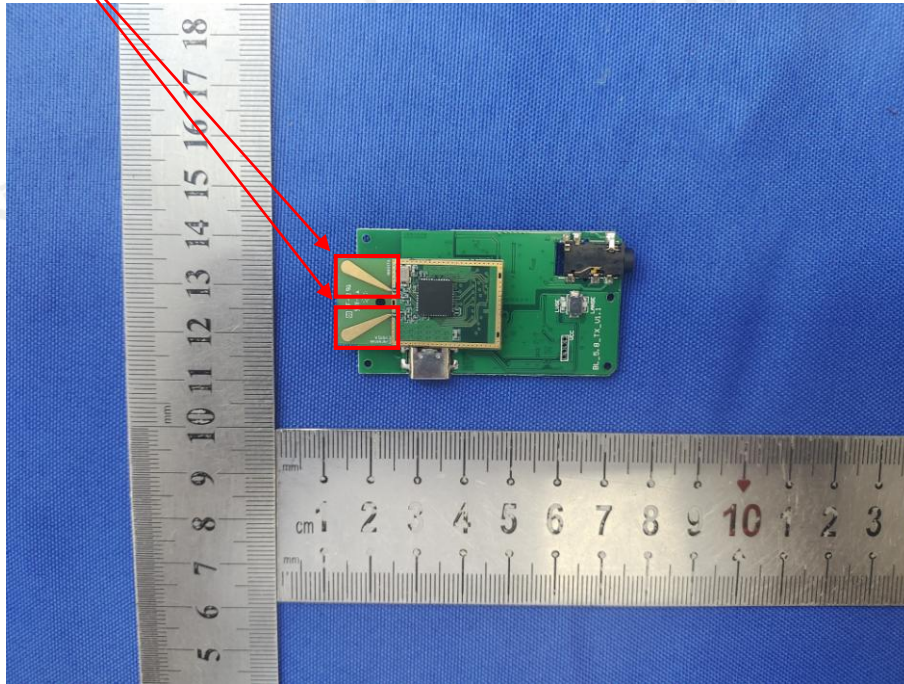
Standard Applicable:

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Connected Construction

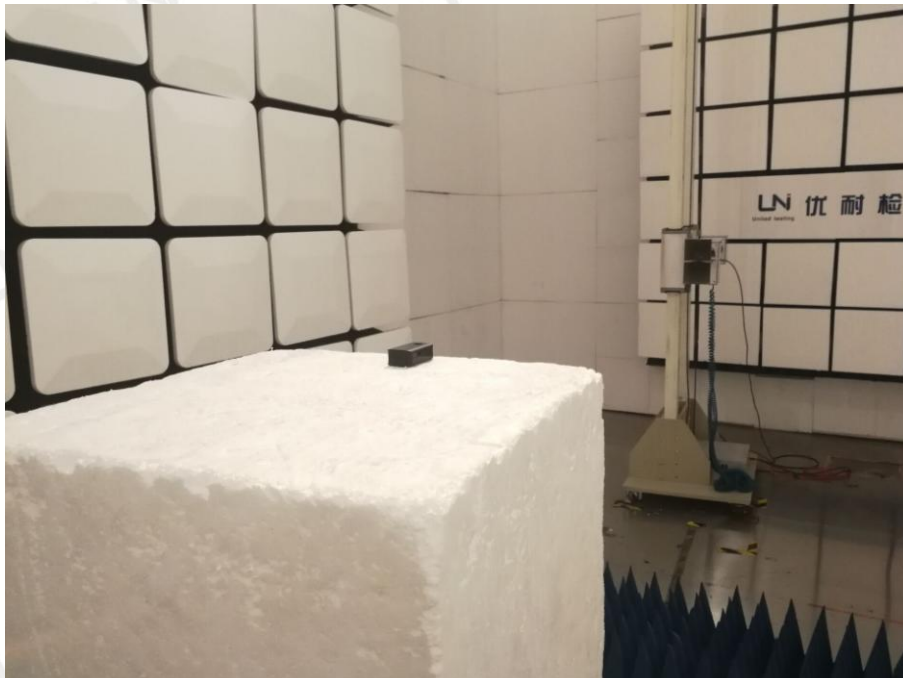
The antenna used in this product is PCB Antenna, The directional gains of antenna used for transmitting is 2dBi.

ANTENNA:



8 PHOTO OF TEST

8.1 RADIATED EMISSION



8.2 CONDUCTED EMISSION



End of Report