

FCC TEST REPORT

Report No.: JYTSZ-R12-2501042

Applicant: Shenzhen Troy Tenda Technology Co., Ltd

Address of Applicant: Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China

Equipment Under Test (EUT)

Product Name: Wireless Digital Full-duplex Real-time Two-way Voice Intercom System

Model No.: UT-001F

Trade Mark: Unitalk

FCC ID: 2BQFX-UT001

Applicable standards: FCC CFR Title 47 Part 15 Subpart D

Date of sample receipt: 19 Jun., 2025

Date of Test: 20 Jun., to 30 Jul., 2025

Date of report issued: 15 Aug., 2025

Test Result: PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Project by: Wang Zhang
Project Engineer

Reviewed by: Li Wei
Senior Engineer

Approved by: Janet. Wei
Manager

Date: 15 Aug., 2025

Date: 15 Aug., 2025

Date: 15 Aug., 2025

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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2 Version

Version No.	Date	Description
00	31 Jul., 2025	Original
01	13 Aug., 2025	Update Page5, 6, 11
02	15 Aug., 2025	Update Page 11

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4 Test Summary

Test Item	FCC Section	Result
Antenna requirement	§ 15.317, § 15.203	PASS
AC power line conducted emission	§ 15.315, § 15.207(a)	PASS
Emission bandwidth	§ 15.323(a)	PASS
Peak transmit power	§ 15.319(c)&(e)	PASS
Power spectral density	§ 15.319(d)	PASS
In-band and out-of-band emission	§ 15.323(d)	PASS
Carrier frequency stability	§ 15.323(f)	PASS
Frame repetition stability, period and jitter	§ 15.323(e)	PASS
Automatically discontinue transmission	§ 15.319(f)	PASS
Radiated spurious emission	§ 15.319(g), § 15.209(a)	N/A*
Specific requirements for devices Operating in the 1920–1930MHz sub-band.	§ 15.323(c)	PASS
Remark: 1. N/A*: Not required if Conducted Out-of-Band Emissions test is passed. 2. EUT support multi-antenna transmission, can be switched and the maximum antenna gain is calculated (ant 1 port).		

5 General Information

5.1 Client Information

Applicant:	Shenzhen Troy Tenda Technology Co., Ltd
Address of Applicant:	Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China
Manufacturer/Factory:	Shenzhen Troy Tenda Technology Co., Ltd
Address of Manufacturer:	Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China

5.2 General Description of E.U.T.

Product Name:	Wireless Digital Full-duplex Real-time Two-way Voice Intercom System
Model No.:	UT-001F
Power Supply:	Rechargeable Li-ion Battery DC3.7V, 2000mAh
Adapter:	Model: SK01T2-0500100U Input: AC100-240V, 50/60Hz, Max 0.2A Output: DC 5V, 1000mA
Remark:	The model No. UT-001F is for DECT Fixed Part, the model No. UT-001P is for DECT Portable Part.
Technical Parameter:	
Frequency Range:	1921.536 MHz~1928.448 MHz
Number of channels:	5
Maximum Output Power:	62.81mW(Peak)
Modulation:	GFSK
Antenna Type:	Internal Antenna
Antenna Gain:	ANT 1: 3.95 dBi (declare by Applicant) ANT 2: 3.95 dBi (declare by Applicant)

Channel List

UPCS Channel	Frequency(MHz)
Upper Band Edge	1930
0(Highest)	1928.448
1	1926.720
2(Middle)	1924.992
3	1923.264
4(Lowest)	1921.536
Lower Band Edge	1920

5.3 Related Submittal(s) / Grant (s)

The EUT is a portable device and is designed to be held to body when used. A test reports with the measured SAR values for both configurations are submitted with the application.

5.4 Test Methodology

ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.17-2013	American National Standard Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices

5.5 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

5.6 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

5.7 Test Instruments list

Radiated Emission(3m FAR):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m FAR	YUNYI	9m*6m*6m	WXJ097	06-15-2023	06-14-2028
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ097-2	04-24-2025	04-23-2026
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	07-01-2024	06-30-2027
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ097-3	05-23-2025	05-22-2026
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	12-25-2024	12-24-2025
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	12-25-2024	12-24-2025
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-6	12-25-2024	12-24-2025
Pre-amplifier (30MHz ~ 1GHz)	YUNYI	PAM-310N	WXJ097-5	04-21-2025	04-20-2026
Pre-amplifier (1GHz ~ 18GHz)	YUNYI	PAM-118N	WXJ097-6	04-21-2025	04-20-2026
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	12-16-2024	12-15-2025
EMI Test Receiver	Rohde & Schwarz	ESCI3	WXJ003	12-16-2024	12-15-2025
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	12-16-2024	12-15-2025
Spectrum Analyzer	KEYSIGHT	N9020B	WXJ081-1	05-08-2025	05-07-2026
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-13M	WXG097-1	07-30-2024	07-29-2025
				07-28-2025	07-29-2026
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG097-2	07-30-2024	07-29-2025
				07-28-2025	07-29-2026
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG097-3	07-30-2024	07-29-2025
				07-28-2025	07-29-2026
High Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Low Band Reject Filter Group	Tonscend	JS0806-F	WXJ097-4	N/A	
Test Software	Tonscend	TS+	Version: 5.0.0		

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	05-08-2025	05-07-2026
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	12-17-2024	12-16-2025
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	12-17-2024	12-16-2025
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	01-15-2025	01-14-2026
RF Switch	TOP PRECISION	RSU0301	WXG003	N/A	
Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Keysight	N9020B	WXJ081-1	09-10-2024	09-09-2025
Digital radio communication tester	Rohde & Schwarz	CMD60	WXJ010-1	03-17-2025	03-16-2026
Temperature Humidity Chamber	ZHONG ZHI	CZ-A-80D	WXJ032-3	12-17-2024	12-16-2026

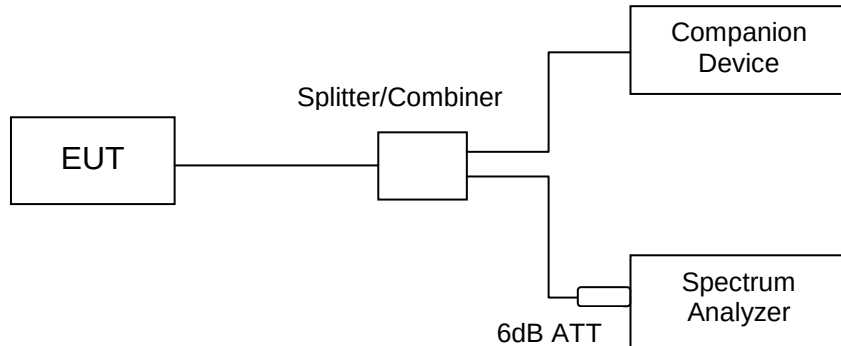
6 TEST CONFIGURATION AND CONDITIONS

6.1 EUT Configuration

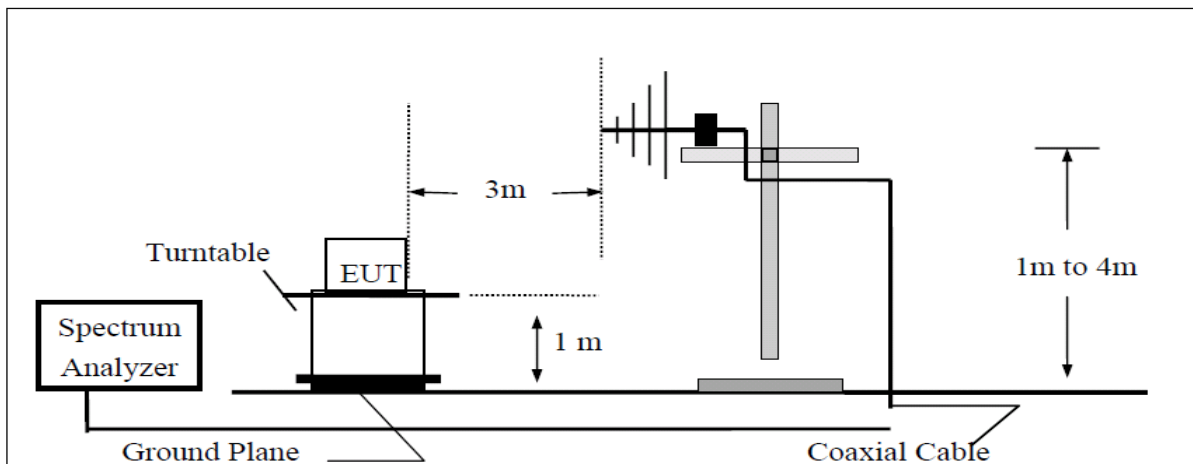
The EUT is DECT fixed part (FP), and is designed to operate together with a DECT portable part (PP). In order to meet the testing requirements, the EUT was set to the test mode (TBR6 mode).

6.2 Configuration of Tested System

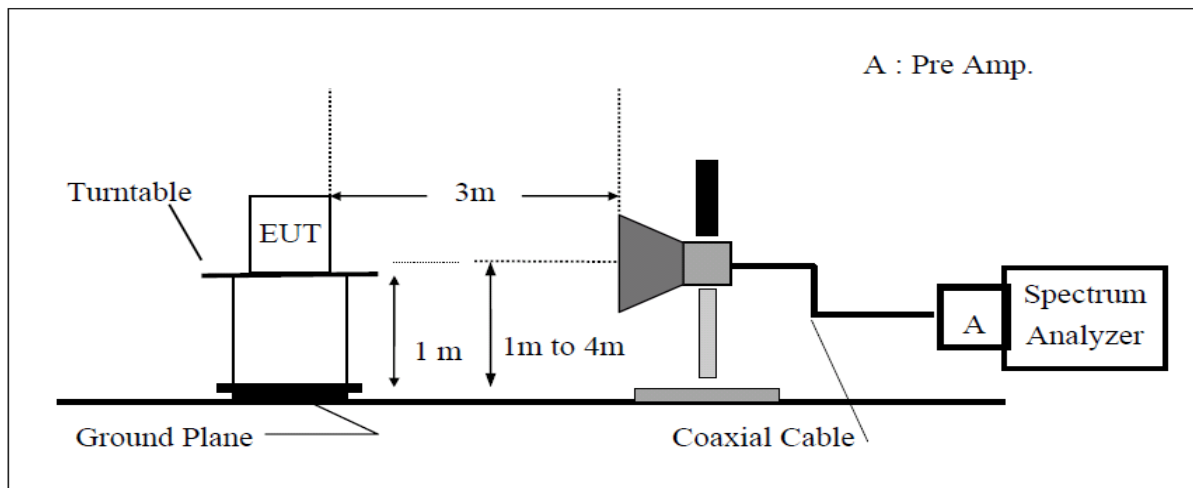
(A) RF Output Power, Power spectral density, Occupied Bandwidth, Conducted spurious emissions etc. conducted method items test setup



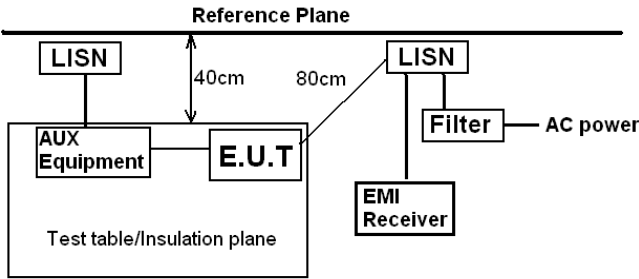
(B) Radiated emission test setup, Frequency below 1000MHz



(C) Radiated Emission test setup Frequency over 1 GHz

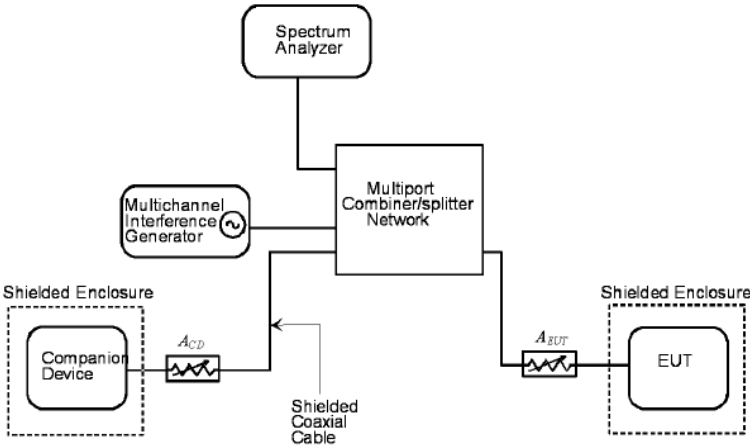


(D) AC Power line conducted emissions test setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

(E) Monitor test setup



6.3 Test Environments

Condition	Minimum value	Maximum value
Barometric pressure	86 kPa	106 kPa
Temperature	15°C	30°C
Relative Humidity	25 %	75 %
Power supply range	±5% of rated voltages	
Normal Test Condition	1. Temperature: +15 °C to +30 °C; 2. Voltage is AC 120V	
Extreme Test Conditions	1. Temperatures: -20°C to +55°C. 2. Voltages: AC 102V to AC138V.	

6.4 Description of test modes

Test mode	Detail description of the test mode
TX mode	Keep the EUT in continuously transmitting mode

6.5 Test uncertainty

Test items	Uncertainty
AC power line conducted emission	±3.28 dB
Conducted method items	±0.96dB
Radiated method items	±4.88 dB

7 Test results and Measurement Data

7.1 Antenna Requirement

7.1.1 Standard Applicable

According to FCC part 15.203 and RSS-GEN section 7.1.2.

7.1.2 Requirement

According to FCC § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.1.3 Description of Antenna Construction

The antennas of EUT are integral antenna which permanently attached, and the best case gain of the antenna: ANT1: 3.95 dBi, ANT2: 3.95 dBi. Details please refer to product internal photos.

7.1.4 Result

Meet the requirements.

7.2 AC Power Line Conducted Emission

7.2.1 Standard Applicable

According to FCC part 15.315, 15.207(a)

7.2.2 Test Procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

7.2.3 Limits

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

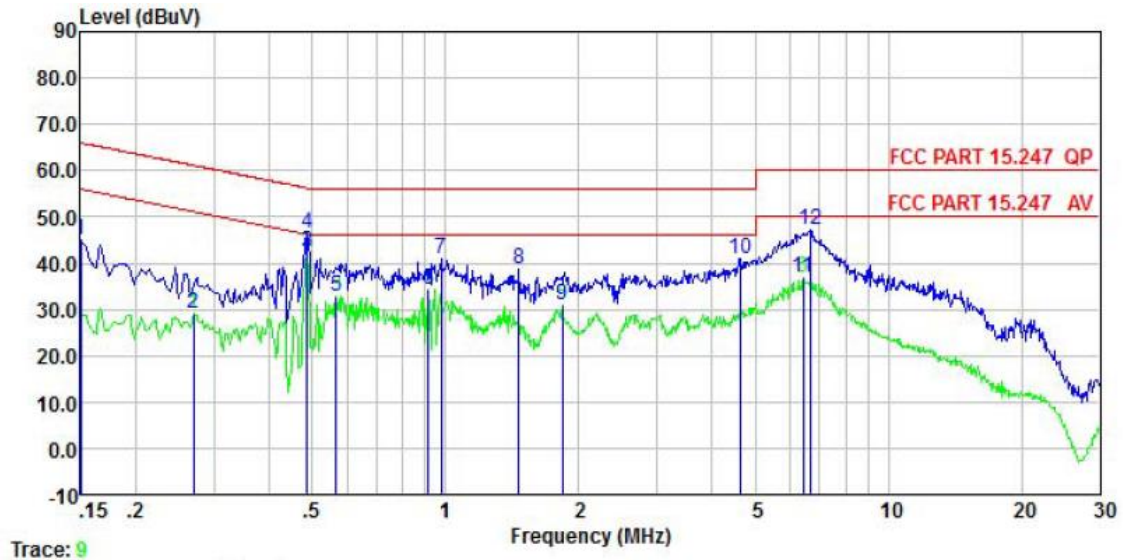
7.2.4 Results

Meet the requirements

7.2.5 Measurement Data

See plots as below

Product name:	Wireless Digital Full-duplex Real-time Two-way Voice Intercom System	Product model:	UT-001F
Test by:	Mike	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 24.2℃ Humi: 49%

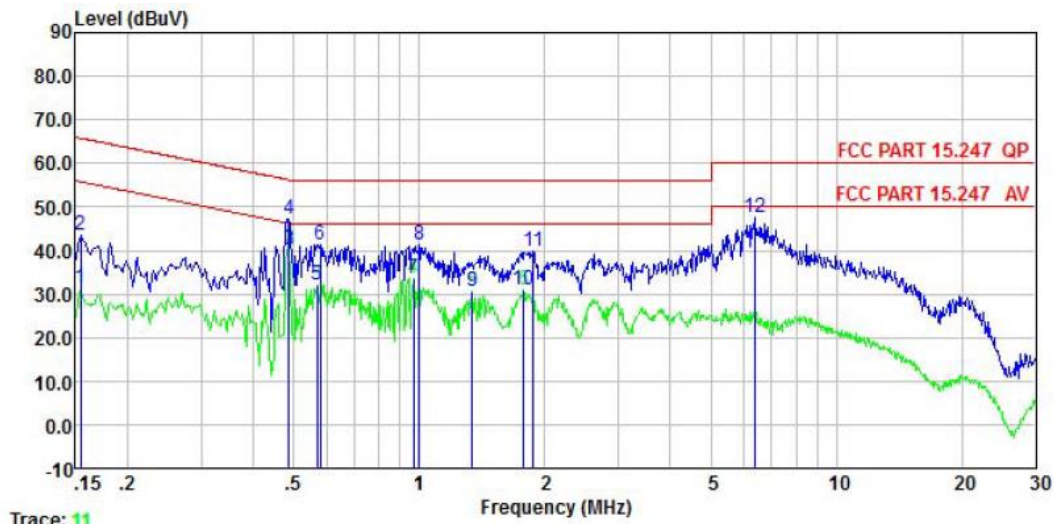


	Freq	Read Level	LISN Factor	Aux Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB	
1	0.150	35.10	-0.10	0.00	9.88	0.00	44.88	66.00	-21.12	QP
2	0.270	19.39	-0.10	0.00	9.88	0.00	29.17	51.12	-21.95	Average
3	0.486	32.57	-0.10	0.00	9.88	0.00	42.35	46.23	-3.88	Average
4	0.486	36.57	-0.10	0.00	9.88	0.00	46.35	56.23	-9.88	QP
5	0.567	23.00	-0.10	0.00	9.88	0.00	32.78	46.00	-13.22	Average
6	0.914	24.54	-0.10	0.00	9.88	0.00	34.32	46.00	-11.68	Average
7	0.979	31.22	-0.10	0.00	9.88	0.00	41.00	56.00	-15.00	QP
8	1.464	28.86	-0.16	0.00	9.88	0.00	38.58	56.00	-17.42	QP
9	1.839	21.13	-0.19	0.00	9.88	0.00	30.82	46.00	-15.18	Average
10	4.647	31.16	-0.20	0.00	9.89	0.00	40.85	56.00	-15.15	QP
11	6.420	27.24	-0.35	0.00	9.90	0.00	36.79	50.00	-13.21	Average
12	6.662	37.76	-0.37	0.00	9.90	0.00	47.29	60.00	-12.71	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Aux Factor + Cable Loss.

Product name:	Wireless Digital Full-duplex Real-time Two-way Voice Intercom System	Product model:	UT-001F
Test by:	Mike	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 24.2°C Humi: 49%



Trace: 11

	Freq	Read Level	LISN Factor	Aux Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB	
1	0.154	21.57	-0.10	0.00	9.88	0.00	31.35	55.78	-24.43	Average
2	0.154	33.61	-0.10	0.00	9.88	0.00	43.39	65.78	-22.39	QP
3	0.486	30.52	-0.10	0.00	9.88	0.00	40.30	46.23	-5.93	Average
4	0.486	37.48	-0.10	0.00	9.88	0.00	47.26	56.23	-8.97	QP
5	0.570	22.26	-0.10	0.00	9.88	0.00	32.04	46.00	-13.96	Average
6	0.579	31.63	-0.10	0.00	9.88	0.00	41.41	56.00	-14.59	QP
7	0.968	23.67	-0.10	0.00	9.88	0.00	33.45	46.00	-12.55	Average
8	1.000	31.67	-0.10	0.00	9.88	0.00	41.45	56.00	-14.55	QP
9	1.338	20.88	-0.14	0.00	9.88	0.00	30.62	46.00	-15.38	Average
10	1.781	21.27	-0.18	0.00	9.88	0.00	30.97	46.00	-15.03	Average
11	1.878	29.95	-0.19	0.00	9.88	0.00	39.64	56.00	-16.36	QP
12	6.352	37.92	-0.37	0.00	9.90	0.00	47.45	60.00	-12.55	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Aux Factor + Cable Loss.

7.3 Emission Bandwidth

7.3.1 Standard Applicable

According to FCC part 15.323(a)

7.3.2 Test Procedure

According to ANSI 63.17 clause 6.1.3

7.3.3 Limits

The 26 dB and 99% Bandwidth B shall be larger than 50 kHz and less than 2.5 MHz

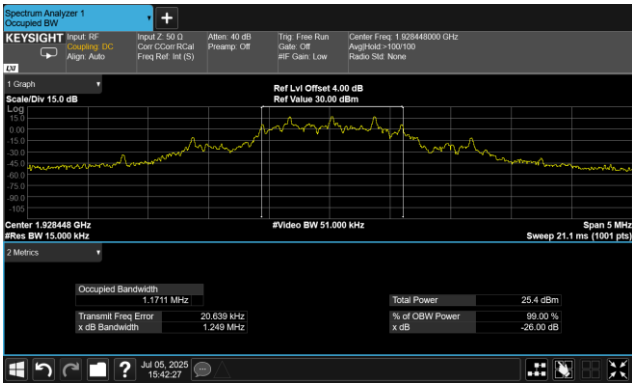
7.3.4 Results

Meet the requirements

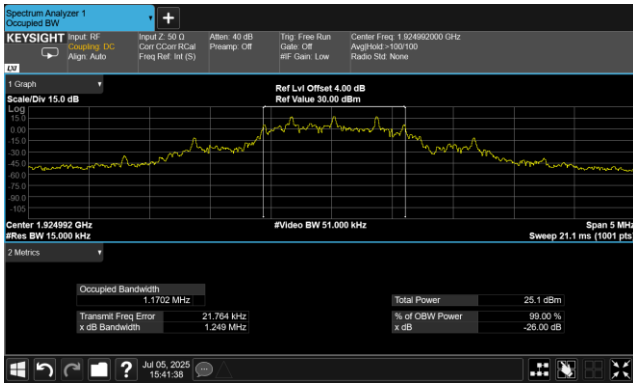
7.3.5 Measurement Data

Test CH	Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit	Result
Lowest	1.249	1.1711	50 kHz <EB<2.5 MHz	Pass
Middle	1.249	1.1702		
Highest	1.298	1.1705		

Test plot as follows:



Lowest channel



Middle channel



Highest channel

7.4 Peak transmit power

7.4.1 Standard Applicable

According to FCC part 15.319(c) (e)

7.4.2 Test Procedure

According to ANSI 63.17 clause 6.1.2

7.4.3 Limits

Conducted: $100 \mu\text{W} \times \text{SQRT}(B)$ where B is the measured Emission Bandwidth in Hz

FCC 15.319(c)(e): 20.8dBm (121.34)

The antenna gain is below 0 dBi, no reduction in transmit power is necessary

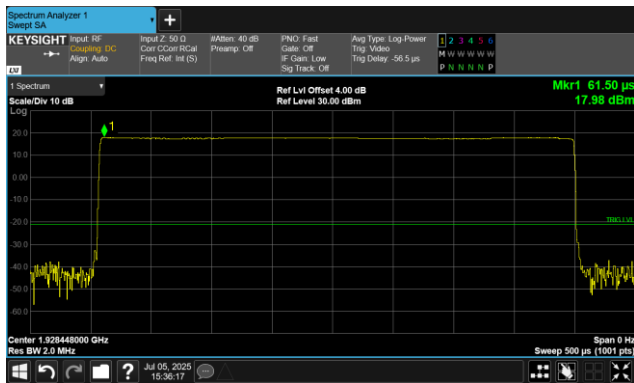
7.4.4 Results

Meet the requirements

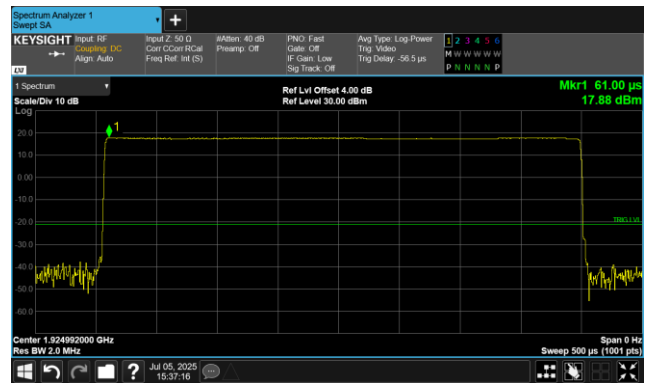
7.4.5 Measurement Data

Test CH	Peak transmit power (dBm)	Limit(dBm)	Result
Lowest	17.98	20.8	Pass
Middle	17.88		
Highest	17.77		

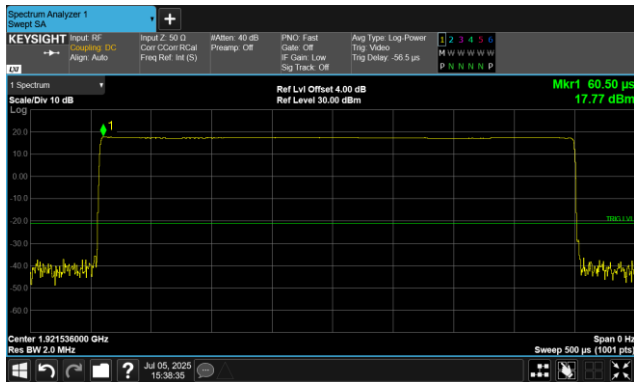
Test plot as follows:



Lowest channel



Middle channel



Highest channel

7.5 Power spectral density

7.5.1 Standard Applicable

According to FCC part 15.319(d)

7.5.2 Test Procedure

According to ANSI 63.17 clause 6.1.5

7.5.3 Limits

The Power Spectral Density shall be less than 3 mW (4.77 dBm) when averaged over at least 100 sweeps.

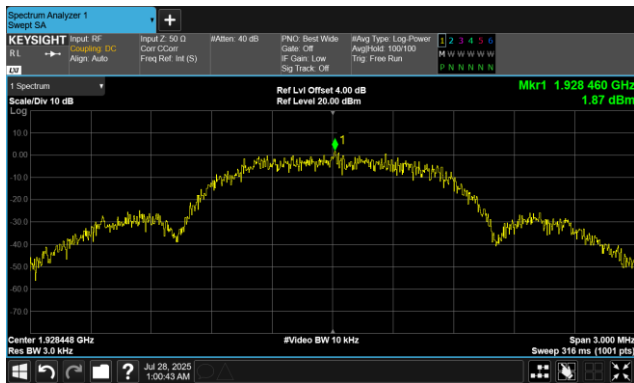
7.5.4 Results

Meet the requirements

7.5.5 Measurement Data

Test CH	Power spectral density (dBm)	Limit(dBm)	Result
Lowest	-5.70	4.77	Pass
Middle	-5.67		
Highest	-6.64		

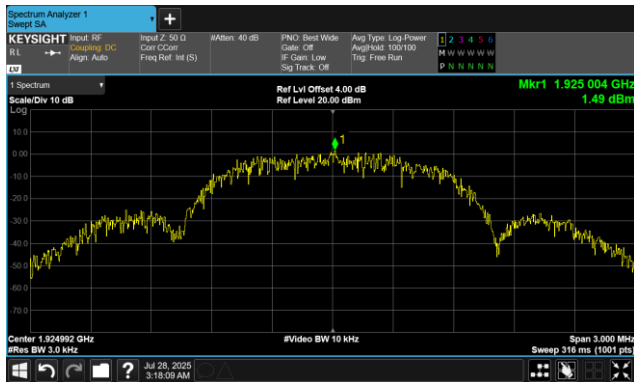
Test plot as follows:



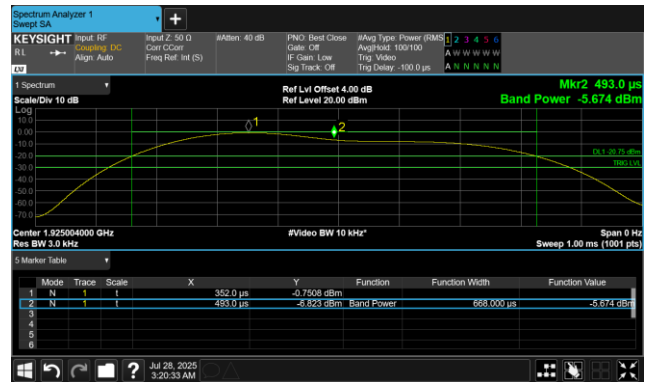
Lowest channel



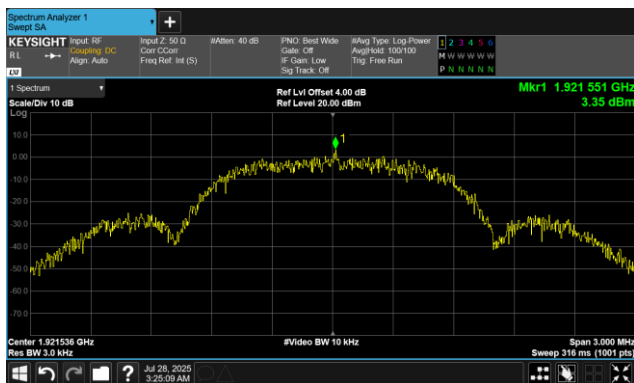
Lowest channel



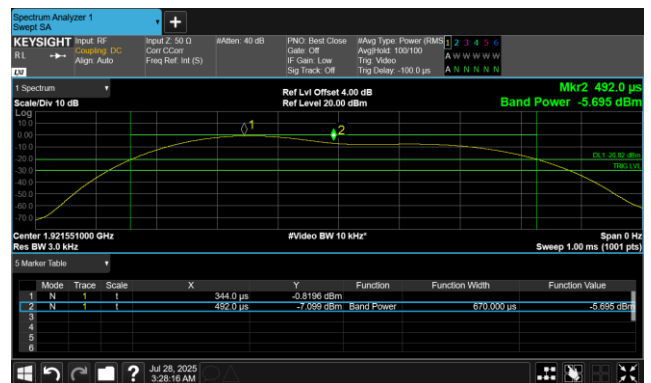
Middle channel



Middle channel



Highest channel



Highest channel

7.6 In-band and Out-of-band emissions**7.6.1 Standard Applicable**

According to FCC part 15.323(d), RSS-213 section 6.7.1 and 6.7.2

7.6.2 Test Procedure

According to ANSI 63.17 clause 6.1.6

7.6.3 Limits

In-Band Emissions:

$B < f \leq 2B$: at least 30 dB below max. permitted peak power

$2B < f \leq 3B$: at least 50 dB below max. permitted peak power

$3B < f \leq$ UPCS Band Edge: at least 60 dB below max. permitted peak power

Out-of-Band Emissions:

$f \leq 1.25\text{MHz}$ outside UPCS band: $\leq -9.5\text{dBm}$

$1.25\text{MHz} \leq f \leq 2.5\text{MHz}$ outside UPCS band: $\leq -29.5\text{ dBm}$

$f \geq 2.5\text{MHz}$ outside UPCS band: $\leq -39.5\text{ dBm}$

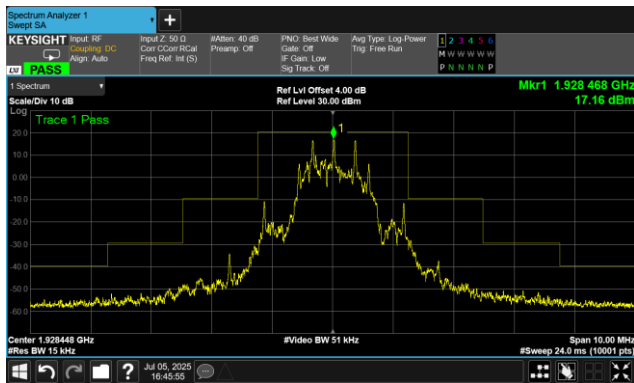
7.6.4 Test Result

Meet the requirements

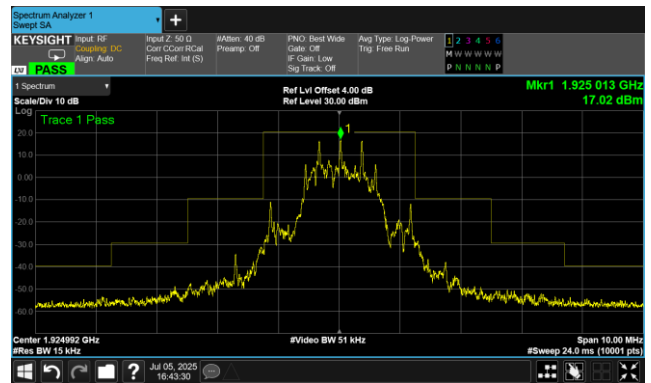
7.6.5 Measurement Data

See plots as below

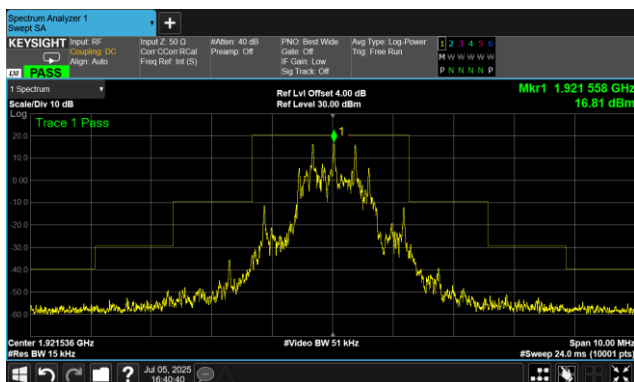
In-band emissions



Lowest channel

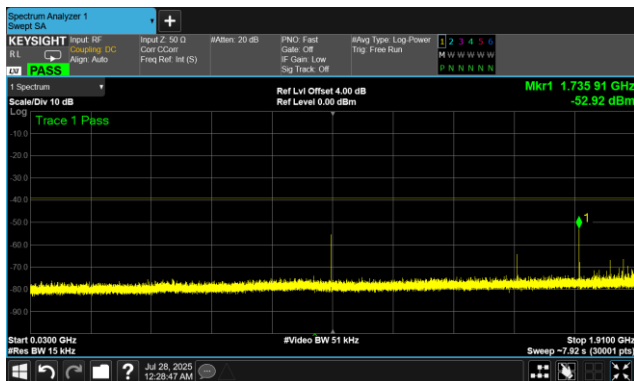


Middle channel

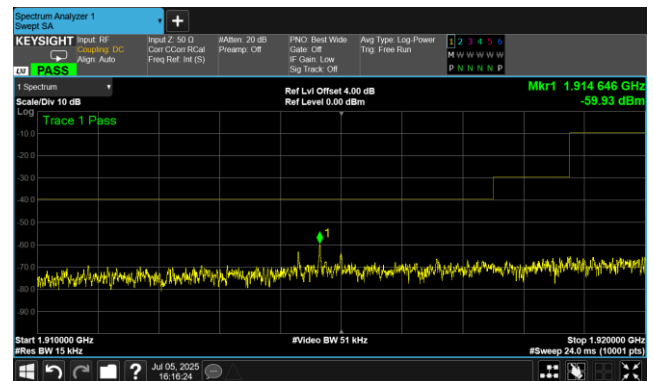


Highest channel

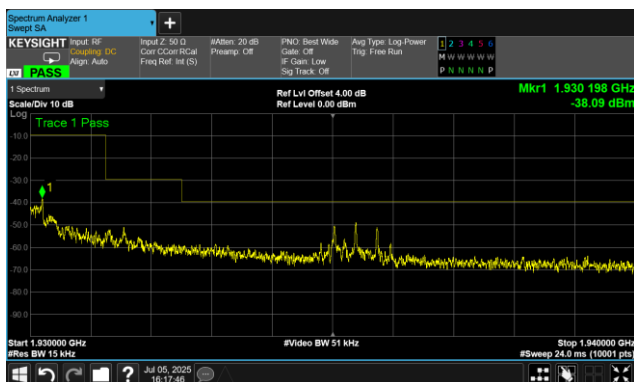
Out-of-band emissions Lowest Channel



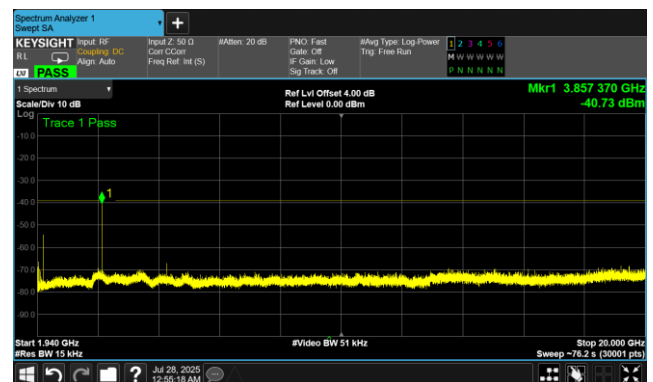
30MHz-1910MHz



1910MHz-1920MHz

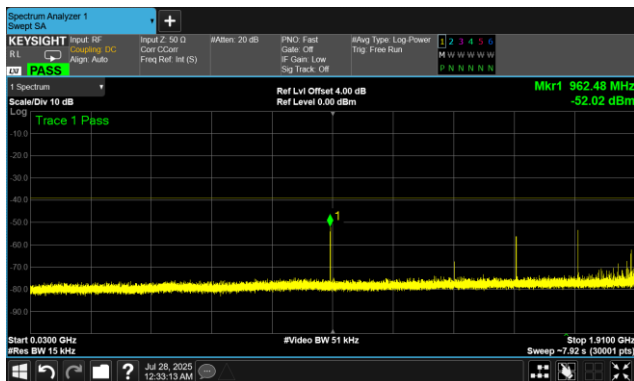


1930MHz-1940MHz

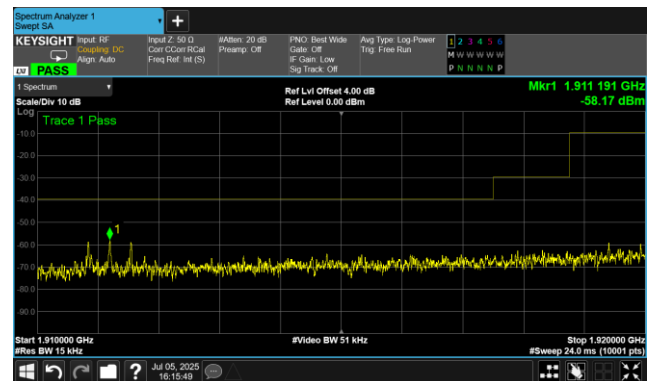


1940MHz-20GHz

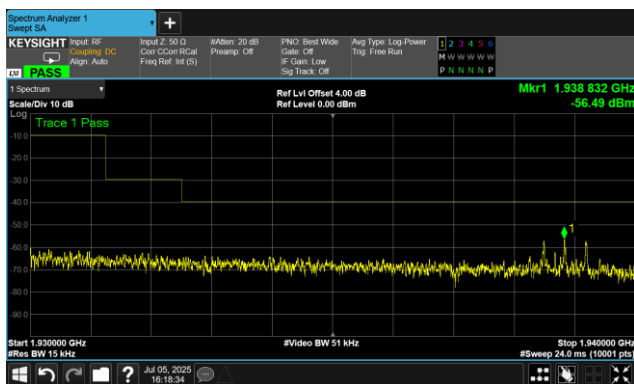
Out-of-band emissions Middle Channel



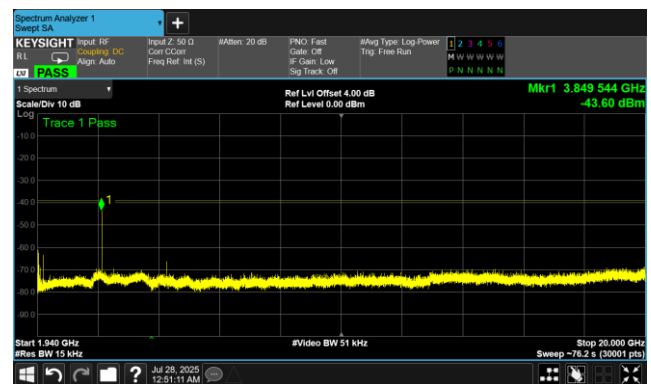
30MHz-1910MHz



1910MHz-1920MHz

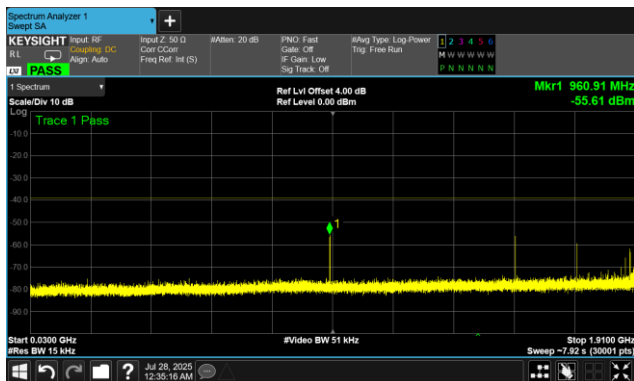


1930MHz-1940MHz

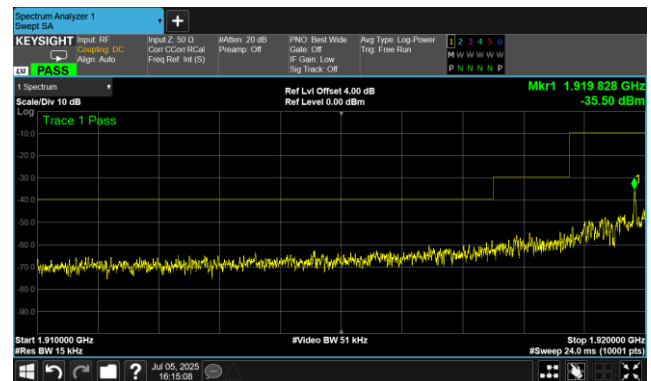


1940MHz-20GHz

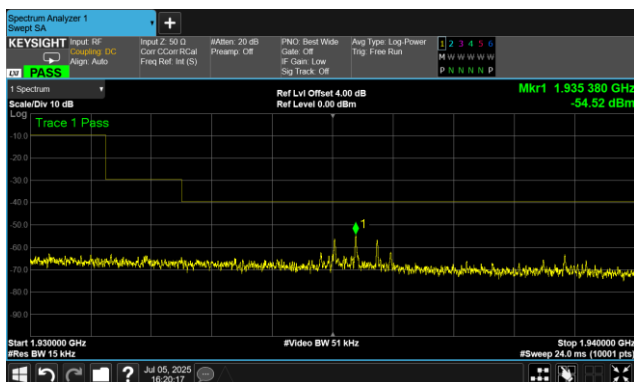
Out-of-band emissions Highest Channel



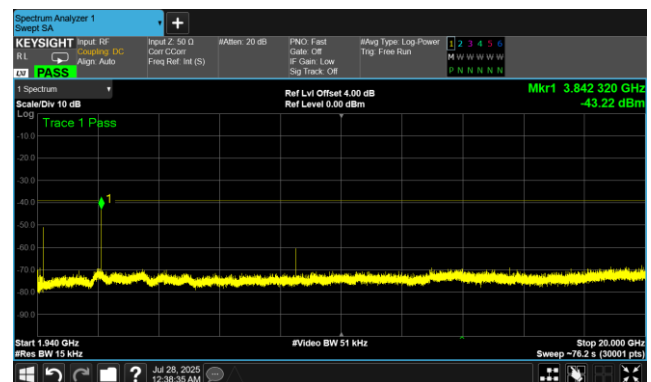
30MHz-1910MHz



1910MHz-1920MHz



1930MHz-1940MHz



1940MHz-20GHz

7.7 Carrier Frequency Stability

7.7.1 Standard Applicable

According to FCC part 15.323(f)

7.7.2 Test Procedure

According to ANSI 63.17 clause 6.2.1

7.7.3 Limits

±10 ppm

7.7.4 Test Result

Meet the requirements

7.7.5 Measurement Data

Frequency Stability over Power Supply Voltage at Nominal Temperature

Voltage	Channel Frequency	Difference	Deviation	Limits
V _{nom}	1924.992	/	/	±10 ppm
85% of V _{nom}	1924.992	/	/	
115% of V _{nom}	1924.992	/	/	

Note:

Deviation ppm = ((Mean – Measured Frequency) / Mean) x 10⁶

This test does not apply to an EUT that is capable only of operating from a battery.

Frequency Stability over Temperature

Temp.	Channel Frequency	Difference	Deviation	Limits
+20°C	1924.992	6 kHz	3.1	±10 ppm
-20°C	1924.992	-8 kHz	-4.2	
+55°C	1924.992	3 kHz	1.6	

Note:

Deviation ppm = ((Mean – Measured Frequency) / Mean) x 10⁶

7.8 Frame repetition Stability, period and jitter**7.8.1 Standard Applicable**

According to FCC part 15.323(e)

7.8.2 Test Procedure

According to ANSI 63.17 clause 6.2.2

7.8.3 Limits

±10 ppm for Frame Repetition Stability, 20 or 10 ms for frame period, 25 µs for max jitter.

7.8.4 Test Result

Meet the requirements

7.8.5 Measurement Data

Carrier Frequency (MHz)	Frame repetition (ppm)	Frame period (ms)	Max. jitter (µs)
1924.448	2.3	10	0.19

7.9 Automatically discontinue transmission

7.9.1 Standard Applicable

According to FCC part 15.319(f)

7.9.2 Requirements

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. The provisions in this section are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

7.9.3 Results

Meet the requirements

7.9.4 Measurement Data

The EUT is a initiating device, and cannot transmits contrl and signaling information.

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established.

Number	Test	EUT Reaction	Verdict
1	Power removed from EUT	C	Pass
2	Switch off EUT	C	Pass
3	Hook-on by EUT	C	Pass
4	Power removed from companion device	A	Pass
5	Switchoff companion device	N/A	Pass
6	Hook-on by companion device	N/A	Pass

A - Connection breakdown, cease of all transmissions

B - Connection breakdown, EUT transmits control and signaling information

C - Connection breakdown, companion device transmits control and signaling information

N/A - Not Applicable (Companion device does not have On/ Off switch and cannot perform Hook-on)

7.10 Specific requirements for devices operating in the 1920-1930MHz sub-band

7.10.1 Monitoring time

Standard Applicable

According to FCC part 15.323(c)(1)

Requirement

Immediately prior to initiating transmission, devices must monitor the combined time and spectrum windows in which they intend to transmit for a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period.

Test Procedure

According to ANSI 63.17 clause 7.3.4

Result

Meet the requirements

Measurement Data

EUT monitors the combined time and spectrum window prior to initiation of transmission. The observation results as below

Channel Selection	Observation result	Verdict
1. Apply the interference on f_1 at level $T_U + U_M$, and no interference on f_2 . Initiate transmission and verify the transmission on f_2 .	EUT transmission on f_2	Pass
2. Apply interference on f_2 at a level of $TU + UM$, in-band, and immediately remove all interference from f_1 and immediately (but not sooner than 20 ms after the interference on f_2 is applied) cause the EUT to attempt transmission.	EUT transmission on f_1	Pass

7.10.2 Monitoring Threshold, Lease Interfered Channel

Standard Applicable

According to FCC part 15.323(c)(2)(5)

Requirement

The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.

If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed.

Test procedure

Measurement method according to ANSI C63.17 clause 7.3.1, 7.3.2, 7.3.3 and 7.3.4

Test result

Meet the requirements

Measurement Data

Lower threshold: $TL = -174 + 10\log_{10}B + M_U + P_{MAX} \cdot P_{EUT}$ (dBm)

Upper threshold: $TU = -174 + 10\log_{10}B + M_U + P_{MAX} \cdot P_{EUT}$ (dBm)

Where: B=Emission bandwidth (Hz)

M_U =dB the threshold may exceed thermal noise (30 for TL & 50 for TU)

Calculated values

Threshold	FCC part 15D
Lower threshold	N/A
Upper threshold	N/A

The Lower Threshold is applicable for systems which have defined less than 40 duplex system access channels. The Upper Threshold is applicable for systems with more than 40 duplex system access channels and that implements the Least Interfered Channel Procedure (LIC).

Upper Threshold has been removed from FCC 15D but still exists in the current Industry Canada RSS-213.

Limit

Threshold	FCC part 15D
Lower threshold + 6 dB	N/A
Upper threshold + 6 dB	N/A

The Upper or Lower Threshold is found by the procedure defined in ANSI C63.17 clause 7.3.1 or 7.3.2.

Monitor Threshold	Measured level	FCC part 15D
Lower threshold	N/A	-75.8
Upper threshold	-61.3	N/A

For the EUT which support LIC there is no need to measure lower threshold because it is automatically met by LIC procedure

Least Interfered Channel (LIC) Procedure Test, FCC 15.323(c)(2) and (c)(5)

ANSI C63.17 clause 7.3.3 ref.	Observation	Verdict
b) $f_1 T_L + 13$ dB, f_2 at $T_L + 6$ dB	Transmission always on f_2	Pass
c) $f_1 T_L + 6$ dB, f_2 at $T_L + 13$ dB	Transmission always on f_1	Pass
d) $f_1 T_L + 7$ dB, f_2 at T_L	Transmission always on f_1	Pass
e) $f_1 T_L$, f_2 at $T_L + 7$ dB	Transmission always on f_1	Pass

7.10.3 Monitoring Threshold Bandwidth

Standard Applicable

According to FCC part 15.323(c)(7)

Requirement

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission.

Test procedure

Measurement method according to ANSI C63.17 clause 7.4

Test result

Meet the requirements

Measurement Data

This test is only required if a dedicated monitoring receiver is used. However, if the test is not carried out the manufacturer shall declare and provide proper evidence that the monitoring is made through the radio receiver used for communication.

Test performed	Observation	Verdict
Simple Compliance test, at $\pm 30\%$ of B	No transmissions	Pass
More Detailed Test, at -6 dB points	N/A	N/A
More Detailed Test, at -12 dB points	N/A	N/A

Notes:

1. The more detailed test must be pass at both the -6 and -12 dB points if the Simple Compliance test fails.
2. The Simple Compliance Test was performed with the level at $T_U + U_M + 10$ dB to check that the EUT did not transmit at all.
3. The tested EUT uses the same receiver for monitoring and communication, this test is therefore not required. However the test has been performed nonetheless and the test is passed.

7.10.4 Reaction Time and Monitoring Interval

Standard Applicable

According to FCC part 15.323(c)(1)(5)(7)

Requirement

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds.

If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds but shall not be required to be less than 35 microseconds.

Test procedure

Measurement method according to ANSI C63.17 clause 7.5

Test result

Meet the requirements

Measurement Data

By administrative commands and out-of-operating region interference, the EUT is restricted to operate on a single carrier frequency.

Time-synchronized pulsed interference was then applied on the carrier at pulsed levels $T_U + U_M$ to check that the EUT does not transmit at all. The level was raised 6 dB for part d) with 35 μs pulses.

The pulses are synchronized with the EUT timeslots and applied centered within all timeslots.

Pulse Width, ref. to ANSI C63.17 clause 7.5	Observation	Verdict
c) > largest of 50 μs and $50 \times \text{SQRT}(1.25/B)$	No transmissions	Pass
d) > largest of 35 μs and $35 \times \text{SQRT}(1.25/B)$, and with interference level raised 6 dB	No transmissions	Pass

Notes:

Since B is larger than 1.25 MHz the test was performed with pulse lengths of 50 μs and 35 μs .

7.10.5 Time and Spectrum Window Access Procedure

Standard Applicable

According to FCC part 15.323(c)(4)(6)

Requirement

FCC 15.323(c)(4):

Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgements must be received at least every 30 seconds or transmission must cease.

Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.

FCC 15.323(c)(6):

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available

Test procedure

Measurement method according to ANSI C63.17 clause 8.1

Test result

Meet the requirements

Measurement Data

This requirement is only for EUTs which transmit unacknowledged control and signaling information.

Access Criteria, ref. to ANSI C63.17 clause 8.1.1	Observation	Verdict
b) Check that the EUT transmits on the interference free time-slot	N/A	N/A
b) The EUT must terminate or pause in its repetitive transmission of the control and signaling channel on the open channel to repeat the access criteria not less frequently than every 30 s	N/A	N/A

If FCC 15.323(c)(6) option, **If Random Waiting Interval is NOT implemented**

Access Criteria, ref. to ANSI C63.17 clause 8.1.1	Observation	Verdict
b) Check that the EUT changes to an interference-free slot when interference is introduced on the time slot in use	N/A	N/A

If FCC 15.323(c)(6) option, **Only if Random Waiting Interval is implemented**

Access Criteria, ref. to ANSI C63.17 clause 8.1.1	Observation	Verdict
b-d) Check that the EUT uses random waiting interval before continuing transmission on an interfered time slot	N/A	N/A

Notes:

The tested EUT does not transmit unacknowledged control and signaling information.

7.10.6 Acknowledgements and Transmission Duration

Standard Applicable

According to FCC part 15.323(c)(3)(4)

Requirement

Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria. Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease.

Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.

Test procedure

Measurement method according to ANSI C63.17 clause 8.2

Test result

Meet the requirements

Measurement Data

During the test **Initial transmission without acknowledgements** the signal from the EUT to the companion device is blocked by circulators in addition to the tunable attenuator.

The test **Transmission time after loss of acknowledgements** is performed by cutting-off the signal from the companion device by a RF switch and measuring the time until the EUT stops transmitting.

The **Transmission Duration** test is performed by monitoring the slot in use and measuring the time until the EUT changes to a different slot.

Acknowledgements

Test ref. to ANSI C63.17 clause 8.2.1	Observation	Verdict
a) Initial transmission without acknowledgements	0.52s	Pass
c) Transmission time after loss of acknowledgements	8s	Pass

Transmission Duration

Test ref. to ANSI C63.17 clause 8.2.2	Observation	Verdict
b) Transmission duration on same time and frequency window	1.0 hour	Pass

7.10.7 Dual Access Criteria Check**Standard Applicable**

According to FCC part 15.323(c)(10)

Requirement

An initiating device may attempt to establish a duplex connection by monitoring both its intended transmits and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

Test procedure

Measurement method according to ANSI C63.17 clause 8.3

Test result

Not tested. The manufacturer declares that this provision is not utilized by the EUT.

7.10.8 Alternative Monitoring Interval**Standard Applicable**

According to FCC part 15.323(c)(11)

Requirement

An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

Test procedure

Measurement method according to ANSI C63.17 clause 8.4

Test result

Not tested. The manufacturer declares that this provision is not utilized by the EUT.

7.10.9 Fair Access**Standard Applicable**

According to FCC part 15.323(c)(12)

Requirement

The provisions of (c)(10) or (c)(11) shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.

Test result

The manufacturer declares that this device does not use any mechanisms as provided by Part 15.323 (c) (10) or (c) (11) to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other device.

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