

TEST REPORT

PERFORMANCE EVALUATION TEST

Report No.:	22110137HKG-001R1
Applicant:	Sonetics Corporation
Address:	17600 SW 65th Ave Lake Oswego, OR 97035, United States.
Product Description:	Wireless Base Station
Model No.:	SON151
Number of Tested Sample:	1 unit
Brand Name:	Sonetics
Serial Number:	PROTO2
Sample Receipt Date:	November 04, 2022
Test Conducted Date:	September 27, 2022 to February 03, 2023
Issue Date:	March 6, 2023
Test Site Location:	Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China.
Test Method/Item:	FCC Part 15, October 1, 2021 Edition RSS-213 Issue 3, March 2015 RSS-Gen Issue 5 Amendment 2, February 2021
Test Result:	Pass
Comment:	N/A
Summary:	See attached sheets
Total Page:	44 pages (Including this page)

1. This report supersedes previous report with report number 22110137HKG-001 dated March 6, 2023.
2. Please refer ICT-S23-0007 Letter issued on March 29, 2023 for amendment/ supersede notification.

Prepared and Checked by:

Approved by:

Signed on File

Leung Chiu Kuen, Stanley/sc
Engineer

Lee Shui Tim, Tim
Assistant Manager

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TEST REPORT

TABLE OF CONTENTS

1.0	TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE	3
1.1	Summary of Test Results.....	3
1.2	Statement of Compliance	4
2.0	GENERAL DESCRIPTION.....	5
2.1	Product Description	5
2.2	Test Methodology	5
2.3	Test Facility.....	5
3.0	SYSTEM TEST CONFIGURATION.....	6
3.1	Justification	6
3.2	Radiated Emission Test Setup	7
3.3	AC Line Conducted Emission Test Setup.....	8
3.4	Conducted Emission Test Configuration.....	8
3.5	Conducted Monitoring and Operational Test Configuration	9
3.6	EUT Exercising Software.....	9
3.7	Details of EUT and Description of Accessories	10
3.8	Measurement Uncertainty.....	10
4.0	MEASUREMENT RESULTS.....	11
4.1	Antenna Requirement.....	11
4.2	Digital Modulation Techniques	11
4.3	Emission Bandwidth.....	11
4.4	Directional Gain of the Antenna	13
4.5	Peak Transmit Power	14
4.6	Automatic Discontinuation of Transmission.....	16
4.7	Emissions Outside the Sub-Band	17
4.8	Frame Repetition Stability	25
4.9	Frame Period and Jitter.....	26
4.10	Carrier Frequency Stability.....	27
4.11	Monitoring Threshold Limit	28
4.12	Least Interfered Channel, LIC.....	30
4.13	Monitoring Time	33
4.14	Maximum Transmit Period	34
4.15	System Acknowledgement.....	35
4.16	Random Waiting.....	36
4.17	Monitoring Bandwidth	37
4.18	Maximum Reaction Time	38
4.19	Monitoring Antenna.....	39
4.20	Duplex Connections	40
4.21	Alternative Monitoring Interval for Co-located Device	41
4.22	Fair Access.....	42
5.0	EQUIPMENT LIST	43

TEST REPORT

1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.1 Summary of Test Results

Test Items	General Technical Requirements			Results	Details See Section
	RSS-213 / RSS-Gen# Clause	FCC Part 15 Section	ANSI C63.17 / ANSI C63.4*		
Antenna Requirement	6.8#	15.317	---	Pass	4.1
Digital Modulation Techniques	5.1	15.319(b)	6.1.4	NP	4.2
Occupied/Emission Bandwidth	5.5	15.323(a)	6.1.3	Pass	4.3
Directional Gain of the Antenna	4	15.319(e)	4.3.1	Pass	4.4
Peak Transmit Power	5.6	15.319(c)	6.1.2	Pass	4.5
Power Spectral Density	5.7	15.319(d)	6.1.5	NP	--
Automatic Discontinuation of Transmission	5.2	15.319(f)	---	Pass	4.6
AC Power Line Conducted Emissions from EUT	5.4	15.315	7 *	NP	--

Notes:

NP – The test item was not performed because it was not at the applicant's request.

AMENDMENT HISTORY

Report No.	Issued Date	Content
22110137HKG-001	March 6, 2023	Original Report
22110137HKG-001R1	March 29, 2023	P.5 Revised Section 2.3 Information "FCC designation no."HK0005" and IC CABID "HKAP01".
		P.23 Revised Subject "DECT Transmission below 1GHz with Antenna 1"
		P.24 Revised Subject "DECT Transmission below 1GHz with Laird Antenna 2".
		P.44 Added Equipment List – 2-Way Power Splitter/Combiner and Coaxial Directional Coupler with Insertion Loss.

TEST REPORT

1.1 Summary of Test Results (Cont'd)

Test Items	Specific Requirements for UPCS Device			Results	Details See Section
	RSS-213 Clause	FCC Part 15 Section	ANSI C63.17		
Unwanted Emission Inside the Sub-Band	5.8.2	15.323(d)	6.1.6.1	NP	--
Emissions Outside the Sub-Band	5.8.1	15.323(d)	6.1.6.2	Pass	4.7
Frame Repetition Stability	5.2(13)	15.323(e)	6.2.2	Pass	4.8
Frame Period and Jitter	5.2(13)	15.323(e)	6.2.3	Pass	4.9
Carrier Frequency Stability	5.3	15.323(f)	6.2.1	Pass	4.10
Monitoring Threshold Limit	5.2(2&9)	15.323(c2&c9)	7.3.1	N/A	4.11
Least Interfered Channel (LIC) Selection	5.2(5)	15.323(c)(5)	7.3.2	Pass	4.12.1
Least Interfered Channel (LIC) Confirmation	5.2(5)	15.323(c)(5)	7.3.2	Pass	4.12.2
Maximum Spectrum Occupancy	5.2(5)	15.323(c)(5)	---	Pass	4.12.3
Monitoring Time	5.2(1)	15.323(c)(1)	7.3.3	Pass	4.13
Maximum Transmit Period	5.2(3)	15.323(c)(3)	8.2.2	Pass	4.14
System Acknowledgement	5.2(4)	15.323(c4)	8.1 or 8.2	Pass	4.15
Random Waiting	5.2(6)	15.323(c)(6)	8.1.2 or 8.1.3	Pass	4.16
Monitoring Bandwidth	5.2(7)	15.323(c)(7)	7.4	Pass	4.17
Maximum Reaction Time	5.2(7)	15.323(c)(7)	7.5	Pass	4.18
Monitoring Antenna	5.2(8)	15.323(c)(8)	4	Pass	4.19
Duplex Connections	5.2(10)	15.323(c)(10)	8.3	N/A	4.20
Alternative Monitoring Interval for Co-located Device	5.2(11)	15.323(c)(11)	8.4	N/A	4.21
Fair Access	5.2(12)	15.323(c)(12)	---	Pass	4.22

Notes:

NP – The test item was not performed because it was not at the applicant's request.

N/A – Not Applicable.

1.2 Statement of Compliance

The equipment under test was tested against the following standards:

FCC Part 15, October 1, 2021 Edition

RSS-213 Issue 3, March 2015

RSS-Gen Issue 5 Amendment 2, February 2021

TEST REPORT

2.0 GENERAL DESCRIPTION

2.1 Product Description

The SON151 is a Wireless Base Station. It operates at frequency range of 1921.536MHz to 1928.448MHz with 5 channels (1921.536MHz, 1923.264MHz, 1924.992MHz, 1926.720MHz and 1928.448MHz). The Base Unit is powered by an adaptor 100-240VAC 50/60Hz 0.5A.

The Base Station has an external reverse polarity type, RP-SMA female connector [SMA straight crimp jack (Male pin)] which is for connecting external antenna with SMA female connector. Only one external antenna could be connected. The test sample is a prototype.

Two external antennas (Antenna 1 and Antenna 2) were tested. The antenna photographs are shown on the filename: external photos.pdf

Antenna 1, model no.: HG1903RD-RSP, Antenna Gain: 3dBi (declared by applicant).

Laird Antenna 2, model no.: TRA6927M3NW-001, Antenna Gain: 3dBi (declared by applicant).

2.2 Test Methodology

The radiated emission measurements for unintentional radiator was performed according to the test procedures specified in ANSI C63.4 (2014). The radiated emission measurements for intentional radiator contained in UPCS device, conducted emission measurements, Listen Before Transmit (LBT) tests were performed according to the test procedures specified in ANSI C63.17 (2013). All radiated measurements were performed in radiated emission test site. Preliminary scans were performed in the radiated emission test site only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data, and conductive data are at Intertek Testing Services Hong Kong Limited, which is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been fully placed on file with FCC designation no. "HK0005" and IC CABID "HKAP01".

TEST REPORT

3.0 SYSTEM TEST CONFIGURATION

3.1 Justification

For emissions testing, the equipment under test (EUT) was set up to transmit continuously in burst mode with pseudo-random data to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst-case emissions.

The Base Unit was powered by a 100-240VAC 50/60Hz 0.5A to 12VDC 500mA adaptor.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT is attached to accessories, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Detector function was in peak mode. Radiated emissions are taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For UPCS transmitter radiated measurement, the spectrum analyzer resolution bandwidth was approximately 1% of EUT emission bandwidth, unless otherwise specified.

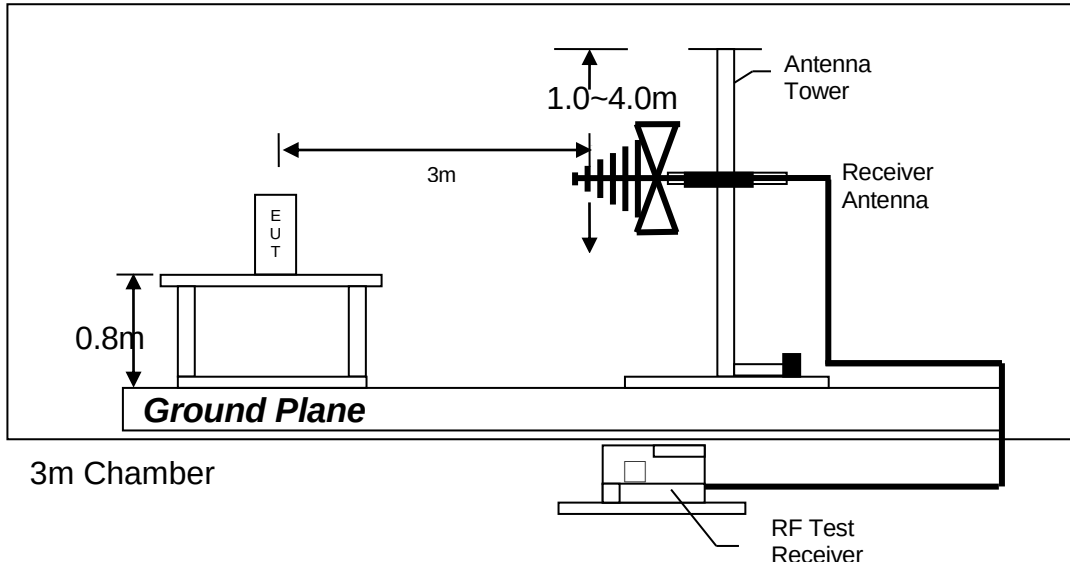
Radiated emission measurements for UPCS transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

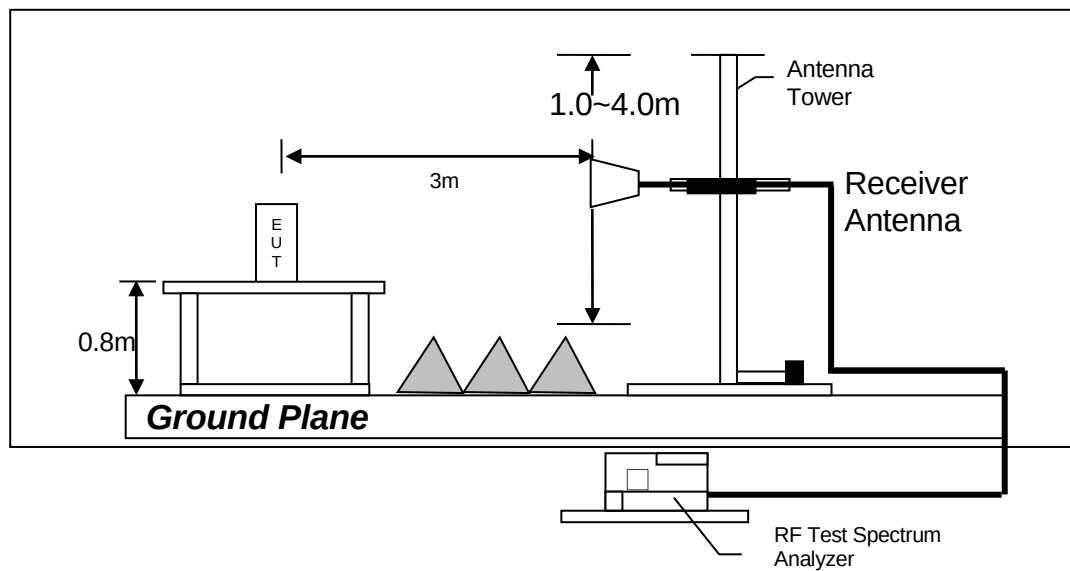
TEST REPORT

3.2 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

Figure 3.2.1

TEST REPORT

3.3 AC Line Conducted Emission Test Setup

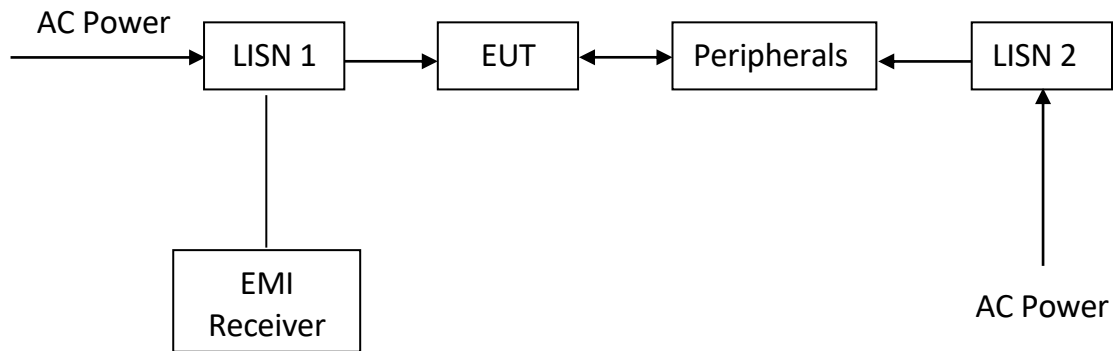


Figure 3.3.1

3.4 Conducted Emission Test Configuration

The setup and equipment setting were made in accordance with ANSI C63.17. The antenna of EUT transmitter was replaced by a coaxial cable. The impedance matching of connection, cable loss and external RF attenuator are taken into account. The EUT was arranged to communicate via a fixed carrier frequency between its transmitter and a companion device. The transmission was configured in burst mode with pseudo-random data as typical as normal operation.

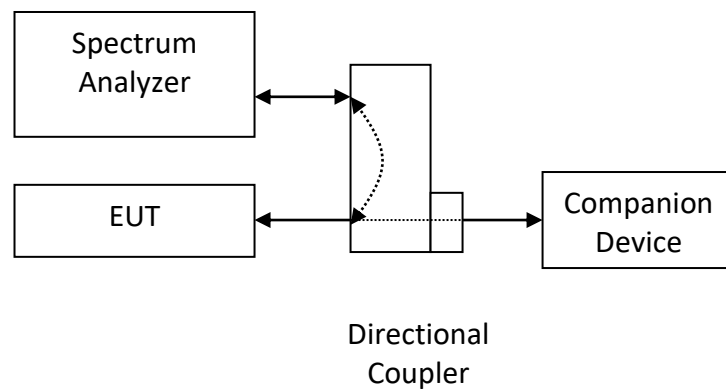


Figure 3.4.1

TEST REPORT

3.5 Conducted Monitoring and Operation Test Configuration

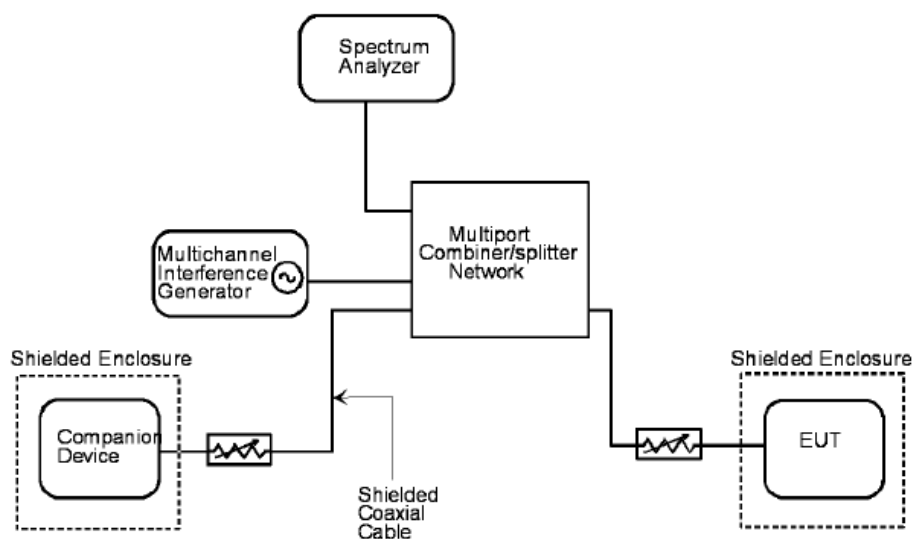


Figure 3.5.1

3.6 EUT Exercising Software

The EUT exercise program (RTX EAI Port Server and version 1.50) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

TEST REPORT

3.7 Details of EUT and Description of Accessories

Details of EUT:

The AC adaptor (powered with the unit) was used to power the device. The description is listed below:

- (1) AC adaptor (100-240VAC 50/60Hz 0.5A to 12VDC 500mA, Model: YMC06-3U)
(Provided by Applicant)

Description of Accessories:

- (1) Headset, Model: APX379, FCC ID: V9N950325200V1 (Provided by Applicant)
- (2) 1 x CAT5 LAN cable with 1.5m long for termination (Provided by Intertek)

3.8 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044. For these excepted or not mentioned standards, Cl 4.2.2 of ILAC-G8:09/2019 decision rules will be reference and guard band will be equal to our measurement uncertainty with 95% confidence level ($k=2$). In case, the measured value is within guard band region, undetermined decision will be used. The values of the Measurement uncertainty for radiated emission test and RF conducted test are $\pm 5.3\text{dB}$, $\pm 1\text{dB}$ respectively.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

TEST REPORT

4.0 MEASUREMENT RESULTS

4.1 Antenna Requirement, FCC Rule 15.317 / RSS-Gen Clause 7.1.2:

EUT must meet the antenna requirement of FCC Rule 15.203 / RSS-Gen Clause 7.1.2.

[] EUT uses permanently attached antenna(s) which is considered sufficient to comply with the provisions of this rule. Please refer to internal photos.pdf for more details.

[x] EUT uses unique antenna jack(s) or electrical connector(s) which is considered sufficient to comply with the provisions of this rule. Please refer to external photos.pdf for more details.

4.2 Digital Modulation Techniques, FCC Rule 15.319(b) / RSS-213 Clause 5.1:

All transmissions must use only digital modulation techniques.

The requirements are made in accordance with ANSI C63.17 sub-clause 6.1.4.

Note:

This test item was not performed because it was not at the applicant's request.

4.3 Emission Bandwidth, FCC Rule 15.323(a) / RSS-213 Clause 5.5:

Operation shall be contained within the 1920 – 1930 MHz band. The emission bandwidth (B) shall be less than 2.5 MHz and greater than 50 kHz.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.3 and RSS-Gen clause 6.7. Test setup is shown in section 3.4 Figure 3.4.1.

Test Results:

Date: November 09, 2022 to January 11, 2023

I. Base Unit - Traffic Carrier

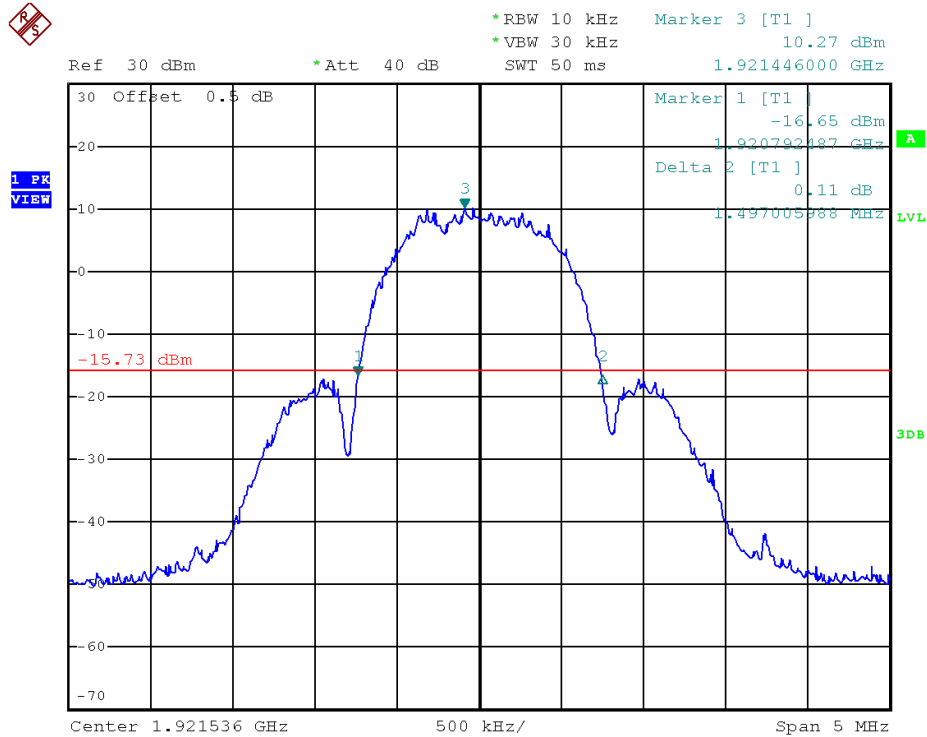
Channel	Channel Frequency (MHz)	Measuring Signal Level	Measured Emission Bandwidth (MHz)	Results
Lowest	1921.536	26 dB down	1.50	Pass
Highest	1928.448	26 dB down	1.51	Pass

The plots of emission bandwidth are saved as below.

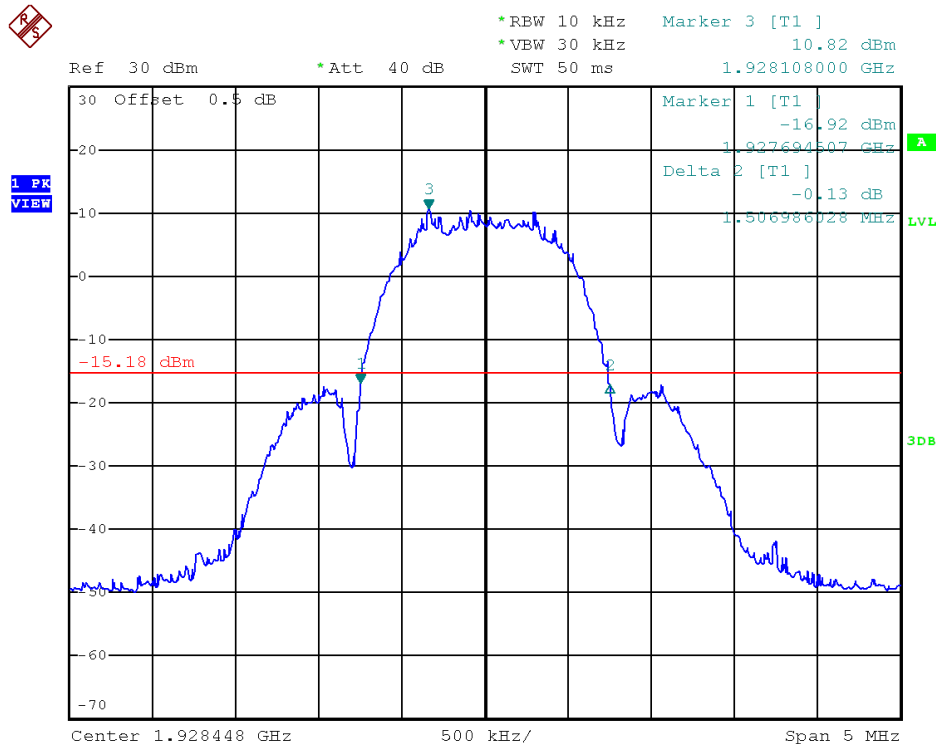
TEST REPORT

PLOTS OF EMISSION BANDWIDTH

Base unit, Lowest Channel, Traffic Carrier



Base unit, Highest Channel, Traffic Carrier



TEST REPORT

4.4 Directional Gain of the Antenna, FCC Rule FCC 15.319(e) / RSS-213 Clause 4:

The peak transmit power shall be reduced by the amount in dB that the maximum directional gain of the antenna exceeds 3 dBi.

The requirements are made in accordance with ANSI C63.17 sub-clause 4.3.1.

- ☒ Manufacturer declares that the directional gain of the antenna is less than or equal to 3dBi. No peak transmit power reduction is required.
- ☐ Manufacturer declares that the directional gain of the antenna is greater than 3dBi. The peak transmit power shall be reduced by _____ dB.

TEST REPORT

4.5 Peak Transmit Power, FCC Rule 15.319(c) / RSS-213 Clause 5.6:

The peak transmit power (P_{EUT}) shall not exceed $100\mu W$ multiplied by the square root of the emission bandwidth (B) in Hz or $5 \log_{10} B - 10$ dBm. The peak transmit power shall be reduced by the amount in dB that the maximum directional gain of the antenna exceeds 3 dBi.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.2. Test setup is shown in section 3.4 Figure 3.4.1. The cable loss and/or external attenuation are included in OFFSET function of spectrum analyzer.

Calculation of Peak Transmit Power Limit (P_{max}):

$$\begin{aligned} [x] \quad P_{max} &= 5 \log_{10} B - 10 \text{ dBm} && \text{when } G_A \leq 3 \text{ dBi} \\ [] \quad P_{max} &= 5 \log_{10} B - 10 \text{ dBm} - (G_A - 3 \text{ dBi}) && \text{when } G_A > 3 \text{ dBi} \end{aligned}$$

Where G_A = EUT Antenna Gain: 3 dBi for Base Unit
 B = Measured Emission Bandwidth

Test Results:

Date: November 09, 2022 to January 11, 2023

I. Base Unit - Traffic Carrier

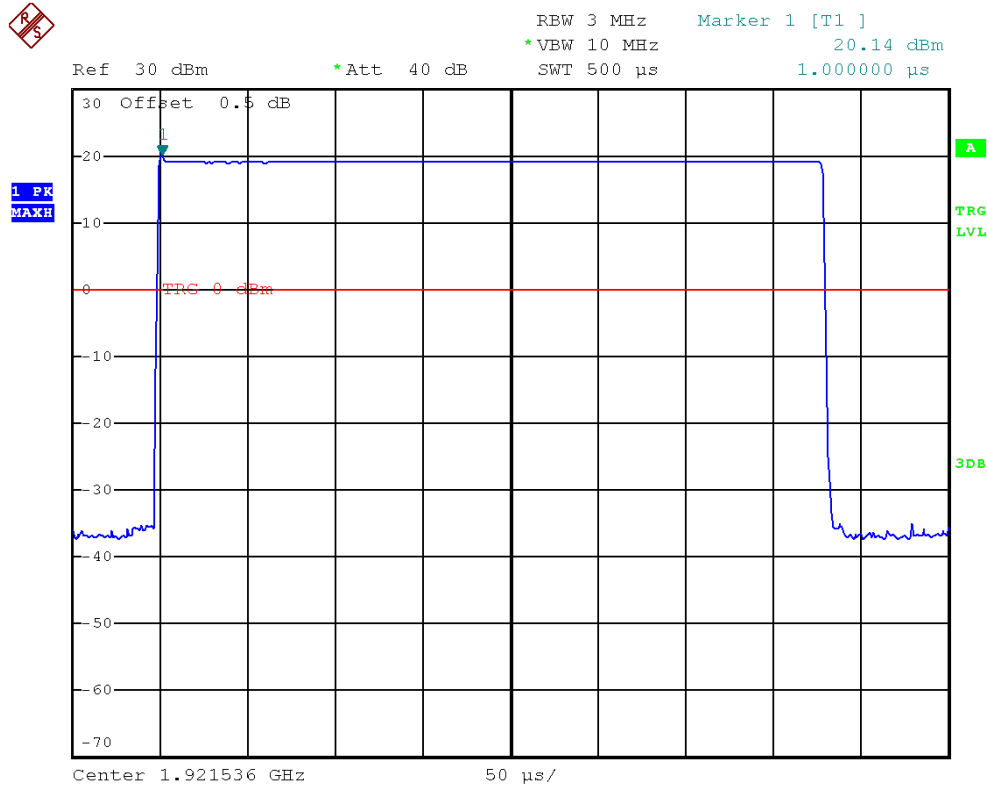
Channel	Channel Frequency (MHz)	Measured Peak Transmit Power (dBm)	Limit (dBm)	Results
Lowest	1921.536	20.14	20.88	Pass
Highest	1928.448	20.20	20.89	Pass

The plots of peak transmit power are saved as below.

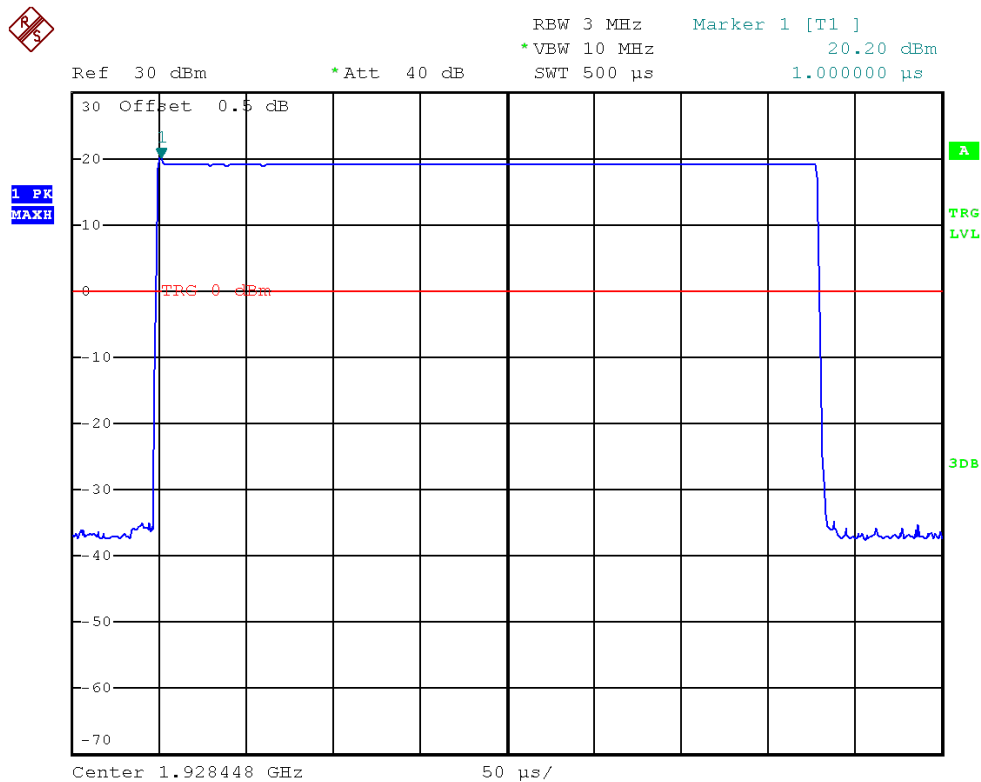
TEST REPORT

PLOTS OF PEAK TRANSMIT POWER

Base unit, Lowest Channel, Traffic Carrier



Base unit, Highest Channel, Traffic Carrier



TEST REPORT

4.6 Automatic Discontinuation of Transmission, FCC Rule 15.319(f) / RSS-213 Clause 5.2:

The EUT shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions 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.

The manufacturer declares that the EUT can automatically discontinue transmission in case of either absent information to transmit or operational failure. Please refer to the declaration letter for details, which is saved with filename: declaration.pdf.

TEST REPORT

4.7 Emissions Outside the Sub-Band, FCC Rule 15.323(d) / RSS-213 Clause 5.8.1:

Emissions outside the sub-band shall be attenuated below a reference power of 112 mW (20.5 dBm) as follows:

- (1) 30 dB between the band edge and 1.25 MHz above or below the band;
- (2) 50 dB between 1.25 and 2.5 MHz above or below the band; and
- (3) 60 dB at 2.5 MHz or greater above or below the band, or shall meet the requirement of FCC Rule 15.319(g) which shall not exceed the limits of FCC Rule 15.209 / RSS-Gen Clause 8.9.

Example:

Calculation of Limit for emissions between the band edge and 1.25 MHz (1920.000 – 1918.750 MHz)

The emissions shall not exceed the Limit: 20.5 dBm – 30 dB = -9.5 dBm

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.6.2. Radiated emissions test method is used. Emissions that are directly caused by digital circuits in the transmit path and transmitter portion are measured.

Test setup is shown in section 3.2 Figure 3.2.1

Test Results:

Date: January 11, 2023 to February 03, 2023

Channel	Carrier Frequency (MHz)	Measured Band (MHz)	Limit (dBm)	Results
Lowest	1921.536	1920.000 - 1918.750	-9.5	Pass
		1918.750 - 1917.500	-29.5	Pass
		0.009 - 1917.500 & 1932.500 - 19300.000	-39.5 / FCC Rule 15.209 / RSS-Gen Clause 8.9	Pass
		1930.000 - 1931.250	-9.5	Pass
Highest	1928.448	1931.250 - 1932.500	-29.5	Pass
		0.009 – 1917.500 & 1932.500 - 19300.000	-39.5 / FCC Rule 15.209 / RSS-Gen Clause 8.9	Pass

TEST REPORT

4.7.1 Radiated Emissions Configuration Photographs:

Worst Case Radiated Emission at

5785.344 MHz with Antenna 1

3843.072 MHz with Antenna 2

The worst case radiated emission configuration photographs are saved with filename:
config photos.pdf

4.7.2 Radiated Emissions Data:

Data are included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data in table 1-6 list the significant emission frequencies, the limit and the margin of compliance.

Judgement:

Passed by 1.0 dB margin with Antenna 1

Passed by 0.5 dB margin with Antenna 2

TEST REPORT

RADIATED EMISSIONS DATA

Mode: Transmission with Antenna 1

Table 1

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Lowest Channel

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
H	1917.344	-63.0	-39.5	-23.5
H	1918.582	-60.5	-29.5	-31.0
H	1919.804	-46.0	-9.5	-36.5
V	3843.072	-58.8	-39.5	-19.3
H	5764.608	-41.2	-39.5	-1.7
V	7686.144	-48.0	-39.5	-8.5
V	9607.680	-68.4	-39.5	-28.9
H	11529.216	-58.2	-39.5	-18.7

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

RADIATED EMISSIONS DATA

Mode: Transmission with Antenna 1

Table 2

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Highest Channel

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
H	1930.183	-44.9	-9.5	-35.4
H	1931.391	-59.1	-29.5	-29.6
H	1932.566	-61.0	-39.5	-21.5
H	3856.896	-57.0	-39.5	-17.5
H	5785.344	-40.5	-39.5	-1.0
V	7713.792	-45.6	-39.5	-6.1
V	9642.240	-67.9	-39.5	-28.4
H	11570.688	-57.5	-39.5	-18.0

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

RADIATED EMISSIONS DATA

Mode: Transmission with Laird Antenna 2

Table 3

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Lowest Channel

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	1917.354	-61.0	-39.5	-21.5
V	1918.728	-58.9	-29.5	-29.4
V	1919.800	-41.8	-9.5	-32.3
H	3843.072	-40.0	-39.5	-0.5
H	5764.608	-45.6	-39.5	-6.1
V	7686.144	-53.4	-39.5	-13.9
V	9607.680	-67.9	-39.5	-28.4
V	11529.216	-67.9	-39.5	-28.4

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

RADIATED EMISSIONS DATA

Mode: Transmission with Laird Antenna 2

Table 4

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Highest Channel

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	1930.272	-48.0	-9.5	-38.5
V	1931.372	-60.4	-29.5	-30.9
V	1932.882	-63.9	-39.5	-24.4
H	3856.896	-44.9	-39.5	-5.4
V	5785.344	-50.5	-39.5	-11.0
V	7713.792	-50.1	-39.5	-10.6
H	9642.240	-67.6	-39.5	-28.1
V	11570.688	-66.6	-39.5	-27.1

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

RADIATED EMISSIONS DATA

Mode: DECT Transmission below 1GHz with Antenna 1

Table 5

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	30.849	-78.6	-39.5	-39.1
V	132.578	-76.8	-39.5	-37.3
H	160.465	-76.5	-39.5	-37.0
V	392.780	-71.9	-39.5	-32.4
H	426.488	-70.4	-39.5	-30.9
V	562.045	-66.7	-39.5	-27.2
V	942.043	-61.8	-39.5	-22.3

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

RADIATED EMISSIONS DATA

Mode: DECT Transmission below 1GHz with Laird Antenna 2

Table 6

Pursuant to FCC Part 15 Section 15.323(d) / RSS-213 Clause 5.8.1 Emissions Requirements

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	35.214	-79.3	-39.5	-39.8
V	68.800	-82.1	-39.5	-42.6
V	100.810	-81.6	-39.5	-42.1
V	120.695	-78.9	-39.5	-39.4
V	133.669	-78.2	-39.5	-38.7
V	181.320	-79.4	-39.5	-39.9
H	459.346	-66.9	-39.5	-27.4
H	803.575	-63.5	-39.5	-24.0

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative value in the margin column shows emission below limit.

TEST REPORT

4.8 Frame Repetition Stability, FCC Rule 15.323(e) / RSS-213 Clause 5.2(13):

- [] EUT implements Time Division Duplex (TDD) (not include TDMA) in order to support duplex connection on a given frequency carrier shall maintain a frame repetition rate whereby 3 x standard deviation of the frequency stability shall not exceed 50 ppm, not including a shift of the mean.
- [×] EUT uses Time Division Multiple Access (TDMA) in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate whereby 3 x standard deviation of the frequency stability shall not exceed 10 ppm, not including a shift of the mean.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.2. Test setup is shown in section 3.4 Figure 3.4.1. A spectrum analyzer measures the time duration between rising edges of two consecutive frames over a time period of at least 1000 frame periods. These measurement values are used to compute the 3 x standard deviation of the frequency stability.

Test Results:

Date: September 27, 2022 to October 27, 2022

I. Base Unit

Maximum Frame Repetition Stability (ppm)	Limit (ppm)	Result
0.0701	±10	Pass

TEST REPORT

4.9 Frame Period and Jitter, FCC Rule 15.323(e) / RSS-213 Clause 5.2(13):

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of EUT operating in these sub-bands shall be 20 ms or 10 ms/X where X is a positive whole number.

The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 μ s for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for EUT.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.3. Test setup is shown in section 3.4 Figure 3.4.1. A spectrum analyzer measures the time duration between the rising edges of two consecutive frames. The measurements are taken over 100,000 frames. These measurement values are used to compute mean value and the difference between any two consecutive frame periods. The mean value is the frame period.

Test Results:

Date: September 27, 2022 to October 27, 2022

I. Base Unit

Measured Maximum Jitter (μ s)	Limit (μ s)	Result
-0.1444	± 25	Pass

TEST REPORT

4.10 Carrier Frequency Stability, FCC Rule 15.323(f) / RSS-213 Clause 5.3:

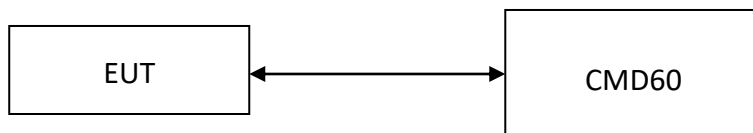
The carrier frequency stability of EUT shall be maintained within +/-10 ppm at the following conditions:

- Over 1 hour at nominal supply voltage and a temperature of +20 °C;
- Over a variation in the primary supply voltage of 85 % to 115 % of nominal supply voltage at a temperature of +20 °C. This test does not apply to an EUT that is only powered by battery for operation;
- Over a temperature variation of -20 °C to +50 °C or at extreme temperatures as declared by manufacturer, and at nominal supply voltage.

For Base Unit:

The nominal supply voltage: 115VAC and the extreme temperatures of -20°C to +50°C are declared by manufacturer.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.1 The EUT and CMD60 is connected with shielded coaxial cable. The EUT is controlled by DECT Radio Communication Tester, CMD60, to use a fixed frequency channel during test as well as record the frequency offset. The transmission of EUT is in burst mode with pseudo-random data. Test setup is shown as follows.



Test Results:

Date: September 27, 2022 to October 27, 2022

I. Carrier Frequency Stability Over Time - Base Unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset Over an hour (ppm)		Limit (ppm)	Result
		Max.	Min.		
Nominal	+20°C	0.78	-0.26	±10	Pass

II. Carrier Frequency Stability Over Power Supply Voltage - Base Unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Result
85%	+20°C	0.26	±10	Pass
115%	+20°C	0.26	±10	Pass

III. Carrier Frequency Stability Over Temperature - Base Unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Result
Nominal	-20°C	-1.81	±10	Pass
Nominal	+50°C	0.26	±10	Pass

TEST REPORT

4.11 Monitoring Threshold Limit, FCC Rule 15.323(c)(2) / RSS-213 Clause 5.2(2):

Monitoring threshold can be relaxed according to FCC Rule 15.323(c)(9) / RSS-213 Clause 5.2(9). EUT that has a power output lower than the maximum permitted under FCC Rule 15.319(c) / RSS-213 Clause 5.6 may increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

Calculation of Monitoring Threshold Limit:

$$\begin{aligned} \text{Monitoring Threshold (T)} &\leq -174 + 10 \log_{10} B + M_L + P_{\max} - P_{\text{EUT}} \text{ dBm} \\ &\leq 15 \log_{10} B - 184 + M_L - P_{\text{EUT}} \text{ dBm} \end{aligned}$$

Where B = Measured Emission Bandwidth of base unit – 1.51 $\times 10^6$ Hz
 M_L = Specified by the manufacturer declared in declaration.pdf for Monitoring Threshold (T_L)
 $P_{\max}$ = $5 \log_{10} B - 10$ dBm
 P_{EUT} = Measured Peak Transmit Power of base unit - 20.20dBm

Test Results:

I. Base Unit

Monitoring Threshold ($T_L + U_M$) in dBm NA

NA – Not Applicable

TEST REPORT

4.11 Monitoring Threshold Limit, FCC Rule 15.323(c)(2) / RSS-213 Clause 5.2(2): (Cont'd)

- [x] Not Applicable – EUT supports at least of 20 duplex system access channels and implements Least Interfered Channel (LIC) algorithm. Please refer to the section 4.14.2 for more details.
- [] 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 EUT.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.3.1. Test setup is shown in section 3.5 Figure 3.5.1. The test is performed on the carrier closest to center of the band. RF signal generators apply uniform CW interference on all EUT carriers each at level $T_L + U_M + 10$ dB. Then, the interference level is reduced uniformly on all carriers until the EUT can transmit. The interference level shall be lower than or equal to the threshold limit.

Test Results:

I. Base Unit

Measured Maximum Interference Level (dBm)	Monitoring Threshold Limit (dBm) ($T_L + U_M$)	Results
NA	NA	NA

NA – Not Applicable

The EUT will not monitor its intended channel (time and spectrum window) prior to transmission to sense RF energy in the channel. The EUT will not defer transmission even the channel is not clear.

TEST REPORT

4.12 Least Interfered Channel, LIC, FCC Rule 15.323(c)(5) / RSS-213 Clause 5.2(5):

- ☐ Not implemented – EUT met monitoring threshold requirements. Please refer to the section 4.14.1 for more details.
- ☒ If access to spectrum is not available as determined by section 4.14.1 and a minimum of 20 duplex system access channels are defined for the EUT, the time and spectrum windows with the lowest power level may be accessed.

Number of Duplex Channels Per Frequency Channel	= 12
Number of Frequency Channel	= 5
Total Duplex Channels	= 60

TEST REPORT

4.12.1 Least Interfered Channel (LIC) Selection, FCC Rule 15.323(c)(5) / RSS-213 Clause 5.2(5):

The criteria are specified in section 4.14.2. In addition, the power measurement resolution for this comparison must be accurate to within 6 dB.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.3.2. Test setup is shown in section 3.5 Figure 3.5.1. RF signal generators apply uniform CW interference on all EUT carriers except two carriers (designated f_1 and f_2), each at level $T_L + U_M + 14\text{dB}$ (cases 1 and 2) and $T_L + U_M + 8\text{dB}$ (cases 3 and 4). EUT can only transmit on f_2 carrier (cases 1 and 3) and f_1 carrier (cases 2 and 4).

Test Descriptions and Results:

Date: November 09, 2022 to January 11, 2023

I. LIC Procedure – Base unit

	Test Descriptions	EUT Transmits on	Results
1	Apply interference on f_1 at level $T_L + U_M + 7\text{ dB}$. Apply interference on f_2 at level $T_L + U_M$. Initiate transmission. Verify transmission on f_2 . Terminate transmission. Repeat 5 times.	f_2	Pass
2	Apply interference on f_1 at level $T_L + U_M$. Apply interference on f_2 at level $T_L + U_M + 7\text{ dB}$. Initiate transmission. Verify transmission on f_1 . Terminate transmission. Repeat 5 times.	f_1	Pass
3	Apply interference on f_1 at level $T_L + U_M + 1\text{ dB}$. Apply interference on f_2 at level $T_L + U_M - 6\text{ dB}$. Initiate transmission. Verify transmission on f_2 . Terminate transmission. Repeat 5 times.	f_2	Pass
4	Apply interference on f_1 at level $T_L + U_M - 6\text{ dB}$. Apply interference on f_2 at level $T_L + U_M + 1\text{ dB}$. Initiate transmission. Verify transmission on f_1 . Terminate transmission. Repeat 5 times.	f_1	Pass

NA – Not Applicable

TEST REPORT

4.12.2 Least Interfered Channel (LIC) Confirmation, FCC Rule 15.323(c)(5) / RSS-213 Clause 5.2(5):

EUT utilizing the provision of FCC Rule 15.323(c)(5) / RSS-213 Clause 5.2(5) must have monitored all access channels defined for its system within the last 10 s and must verify, within the 20 ms (40 ms for EUT designed to use a 20 ms frame period) immediately preceding actual channel access that the detected power of the selected time and spectrum windows is no higher than the previously detected value.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.3.3. This test is performed in section 4.14.2 and 4.15.

Results:

The tests are reported in section 4.14.2 and 4.15.

4.12.3 Maximum Spectrum Occupancy, FCC Rule 15.323(c)(5) / RSS-213 Clause 5.2(5):

No EUT or group of co-operating EUTs located within 1 meter of each other shall during any frame period occupy more than 6 MHz of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the EUT.

Attestation:

According to the technical description provided, the total number of the time and spectrum windows defined by the system is $5 \times 12 = 60$.

During any frame period, the maximum number of time and spectrum windows occupied by the system will be 12, which is less than one third of the time and spectrum windows defined by the system.

TEST REPORT

4.13 Monitoring Time, FCC Rule 15.323(c)(1) / RSS-213 Clause 5.2(1):

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

Measurements are made in accordance with ANSI C63.17 sub-clause 7.3.3. Test setup is shown in section 3.5 Figure 3.5.1. RF signal generators apply uniform CW interference on all system carriers except two carriers (designated f_1 and f_2), each at level $T_L + U_M + 20\text{dB}$. EUT can only transmit on these two carriers.

Test Descriptions and Results:

Date: November 09, 2022 to January 11, 2023

I. Base unit

	Test Descriptions	EUT Transmits on	Results
1	Apply interference on f_1 at level $T_L + U_M + 20\text{dB}$, and no interference on f_2 . Initiate transmission. Verify transmission on f_2 . Then, terminate transmission.	f_2	Pass
2	Apply interference on f_2 at level $T_L + U_M + 20\text{dB}$, and remove interference from f_1 immediately. Also immediately initiate transmission but is at least 20 ms after interference on f_2 is applied. Verify transmission on f_1 .	f_1	Pass

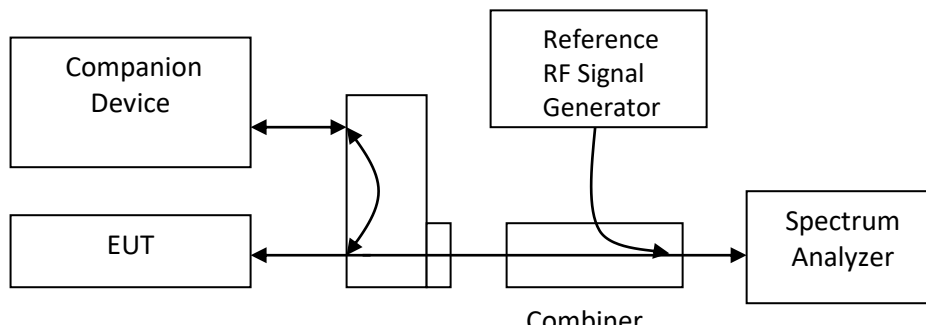
TEST REPORT

4.14 Maximum Transmit Period, FCC Rule 15.323(c)(3) / RSS-213 Clause 5.2(3):

If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a EUT or group of co-operating EUTs continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

EUT establishes a communication channel with its companion device, which occupies the duplex pair combined time and spectrum windows. Reference RF signal generator synchronized with the sample and then generated a pulse as a time frame reference. The centre frequency of spectrum analyzer was set to the carrier frequency and the SPAN was set to ZERO. The spectrum analyzer was used to monitor the time (reference to the time signal) and spectrum of the communication channel. The occupied time or spectrum of the communication channel shall be changed over a period of time no longer than 8 hours. For a EUT with a frame period of 10/X ms, no more than 2,880,000 X frames should be transmitted without a break.

Test setup is shown as follows:



Test Results:

Date: November 09, 2022 to January 11, 2023

I. Base Unit

Measured Maximum Transmission Duration (minutes)	Limit (minutes)	Results
450	480	Pass

TEST REPORT

4.15 System Acknowledgement, FCC Rule 15.323(c)(4) / RSS-213 Clause 5.2(4):

Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments 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 acknowledgment, at which time the access criteria must be repeated.

Measurements are made in accordance with ANSI C63.17 sub-clause 8.1.1 or 8.2.1. Test setup is shown in section 3.5 Figure 3.5.1.

Test Results:

Date: November 09, 2022 to January 11, 2023

I. Base Unit

[x] Timing for EUTs using control and signaling channel type transmissions:

Conditions	Transmission Duration (seconds)	Limit (seconds)	Results
Time needed to repeat access criteria	1.25	30	Pass

[x] Timing for EUTs using communications channel type transmissions:

Conditions	Transmission Duration (seconds)	Limit (seconds)	Results
Activate EUT w/ companion device off	NA	1	N/A
Time needed to cease Traffic Channel	7	30	Pass

NA – Not Applicable

TEST REPORT

4.16 Random Waiting, FCC Rule 15.323(c)(6) / RSS-213 Clause 5.2(6):

If the selected combined time and spectrum windows are unavailable, the EUT 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 ms, commencing when the channel becomes available.

Measurements are made in accordance with ANSI C63.17 sub-clause 8.1.2 or 8.1.3. Test setup is shown in section 3.5 Figure 3.5.1.

Test Results:

Date: November 09, 2022 to January 11, 2023

I. Base Unit

[x] Random Waiting is not implemented in the EUT:

Conditions	Transmit Channel	Results
Interference applied at operating Channel, f_1	f_2	Pass

[] Random Waiting is implemented in the EUT:

Maximum Time Interval from the End of Interference to the Start of the Control Channel	The Distribution of the Measured Time Intervals	Results
NA	NA	NA

NA – Not Applicable

TEST REPORT

4.17 Monitoring Bandwidth, FCC Rule 15.323(c)(7) / RSS-213 Clause 5.2(7):

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

Measurements are made in accordance with ANSI C63.17 sub-clause 7.4. Test setup is shown in section 3.5 Figure 3.5.1.

Attestation:

[x] Monitoring bandwidth of the EUT is equal to the occupied bandwidth of the intended transmission. Monitoring is made through the radio receiver used by the EUT for communication. Please refer to the section 2.2 Technical Description for more details. Designed bandwidth refers to section 4.3 Emission Bandwidth.

[] Compliance is demonstrated by Monitoring Bandwidth Tests as shown below.

Test Results:

Ia. Simple Compliance Test Results – Base Unit

Interference from Carrier	Reaction of EUT	Results
-30% EBW	NA	NA
+30% EBW	NA	NA

Ib. Detailed Compliance Test Results – Base Unit

Interference from Carrier	Reaction of EUT	Results
+ 6 dB	NA	NA
+ 12 dB	NA	NA
- 6 dB	NA	NA
- 12 dB	NA	NA

- A – Could Transmit
- B – Could Not Transmit
- NA – Not Applicable

*Remarks: Detailed Compliance Test was used to show the compliance of the EUT.

TEST REPORT

4.18 Maximum Reaction Time, FCC Rule 15.323(c)(7) / RSS-213 Clause 5.2(7):

The monitoring system bandwidth must have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth } B \text{ in MHz}) \mu\text{s}$ for signals at the applicable threshold level but shall not be required to be less than $50 \mu\text{s}$. If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth } B \text{ in MHz}) \mu\text{s}$ but shall not be required to be less than $35 \mu\text{s}$.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.5. Test setup is shown in section 3.5 Figure 3.5.1.

Test Results:

Date: November 09, 2022 to January 11, 2023

	Test	Reaction of EUT	Results
1	Apply Interference Pulse $50\mu\text{s}$ on f_1 at pulsed level $T_L + U_m$, then apply a CW signal on f_2 at the level T_L	f_2	Pass
2	Change Interference Pulse to $35\mu\text{s}$ on f_1 at pulsed level $T_L + U_m + 6\text{dB}$	f_2	Pass

TEST REPORT

4.19 Monitoring Antenna, FCC Rule 15.323(c)(8) / RSS-213 Clause 5.2(8):

The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

- ☒ [X] EUT uses the same antenna used for transmission and monitoring that is in compliance meet above provision.
- ☐ [] EUT uses difference antenna used for transmission and monitoring. It must be verified that the monitoring antenna provides coverage equivalent to that of the transmitting antenna. Measurements are made in accordance with ANSI C63.17 sub-clause 4.

TEST REPORT

4.20 Duplex Connections, FCC Rule 15.323(c)(10) / RSS-213 Clause 5.2(10):

An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit (Tx) and receive (Rx) 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.

Attestation:

[X] The Headset is the initiating device of the duplex connection.

Measurements are made in accordance with ANSI C63.17 sub-clause 8.3. Test setup is shown in section 3.5 Figure 3.5.1.

Test Results:

Ia. Base Unit

[] Dual Access Criteria Check for EUT not implemented the LIC algorithm and do not offer at least 20 duplex communications channels:

Interference	Reaction of EUT	Results
All Tx and Rx Window, except one for Rx Window	NA	NA
All Tx and Rx Window, except one for Tx Window	NA	NA

Ib. Base Unit

[X] Dual Access Criteria Check for EUT implemented the LIC algorithm and offer at least 20 duplex communications channels:

Interference	Reaction of EUT	Results
All Tx windows with level $T_L + U_M$ & Rx windows with level $T_L + U_M + 7\text{dB}$, except one for Tx window & one for Rx window, which are not duplex.	NA	NA
All Tx windows with level $T_L + U_M + 7\text{dB}$ & Rx windows with level $T_L + U_M$, except one for Tx window & one for Rx, which are not duplex	NA	NA

- A – Could be connected on the target Rx window and its duplex mate
- B – Could be connected on the target Tx window and its duplex mate
- C – Connected on window which is not the target Tx/Rx window
- D – Could not be connected
- NA – Not Applicable

TEST REPORT

4.21 Alternative Monitoring Interval for Co-located Device, FCC Rule 15.323(c)(11) / RSS-213 Clause 5.2(11):

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 ms. The monitored time and spectrum window must total at least 50 % of the 10 ms frame interval and the monitored spectrum must be within the 1.25 MHz frequency 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.

Measurements are made in accordance with ANSI C63.17 sub-clause 8.4.

Attestation:

- ☐ [] Appropriate as it is co-located device, in which the monitoring system will be blocked from the transmissions of a co-located (Within one meter) transmitter of the same system. Please refer to attachment, FCC Rule 15.323(c)(11).pdf / RSS-213 Clause 5.2(11).pdf, for details.
- ☒ [X] Not appropriate, as the system always monitor both the transmit and receive time/spectrum windows, it is not a co-located device.

TEST REPORT

4.22 Fair Access, FCC Rule 15.323(c)(12) / RSS-213 Clause 5.2(12):

The provisions of FCC Rule 15.323(c)(10) or FCC Rule 15.323(c)(11) / RSS-213 Clause 5.2(10) or RSS-213 Clause 5.2(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.

Attestation:

The manufacturer declares that the device does not use any mechanisms as provided by Part FCC Rule 15.323(c)(10) or FCC Rule 15.323(c)(11) / RSS-213 Clause 5.2(10) or RSS-213 Clause 5.2(11) to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.

Please refer to the declaration letter which is saved with filename: declaration.pdf.

TEST REPORT

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Pyramidal Horn Antenna (18.0 - 26.5) GHz	EMI Test Receiver	BiConiLog Antenna (30MHz - 6GHz)
Registration No.	EW-0905	EW-3481	EW-3061
Manufacturer	EMCO	ROHDESCHWARZ	EMCO
Model No.	3160-09	ESR7	3142E
Calibration Date	July 20, 2021	December 21, 2021	August 02, 2022
Calibration Due Date	February 20, 2023	March 21, 2023	February 02, 2024

Equipment	Double Ridged Guide Antenna	14m Double Shield RF Cable (1GHz - 26GHz)	14m Double Shield RF Cable (20MHz to 6GHz)
Registration No.	EW-1133	EW-2781	EW-2074
Manufacturer	EMCO	RADIAL	RADIAL
Model No.	3115	SMA(m)-SHF5MPU- SMA(m) R.A 14m,26G	N(m)-RG142-BNC(m) L= 14M
Calibration Date	May 26, 2021	December 12, 2022	December 10, 2021
Calibration Due Date	February 26, 2023	December 12, 2023	March 10, 2023

Equipment	Log Periodic Antenna (200MHz - 2GHz)	Biconical Antenna (30MHz – 300MHz)	RF Pre-Amplifier (9kHz to 40GHz)
Registration No.	EW-3243	EW-3241	EW-3006
Manufacturer	EMCO	EMCO	SCHWARZBECK
Model No.	3148B	3110C	BBV 9718
Calibration Date	June 30, 2021	May 26, 2021	February 15, 2022
Calibration Due Date	March 30, 2023	May 26, 2023	February 15, 2023

Equipment	Signal and Spectrum Analyzer (10Hz to 40GHz)	1.9GHz Notch Filter
Registration No.	EW-3016	EW-3434
Manufacturer	ROHDESCHWARZ	Microwave
Model No.	FSV40	N0319501
Calibration Date	January 29, 2022	December 12, 2022
Calibration Due Date	April 29, 2023	December 12, 2023

TEST REPORT

5.0 EQUIPMENT LIST (CONT'D)

2) Conductive Measurement Test

Equipment	Signal and Spectrum Analyzer (10Hz to 40GHz)	Digital Radiocommunication Tester for DECT
Registration No.	EW-3016	EW-2460
Manufacturer	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	FSV40	CMD60
Calibration Date	January 29, 2022	December 13, 2021
Calibration Due Date	April 29, 2023	December 13, 2022

Equipment	Digital Radiocommunication Tester for DECT	Temperature & Humidity Chamber (with Digital Thermometer)	Digital Thermometer
Registration No.	EW-2250	EW-2134	EW-3046
Manufacturer	ROHDESCHWARZ	GIANT FORCE	OREGON
Model No.	CMD60	GTH-750-40-CP-SD	THG312
Calibration Date	December 13, 2022	Nil*	December 02, 2022
Calibration Due Date	December 13, 2023	Nil*	December 02, 2023

Equipment	RF Cable SMA-SMA (18GHZ)	RF Cable SMA-SMA (18GHZ)	Vector Signal Generator
Registration No.	EW-3272	EW-3126c	EW-2320
Manufacturer	GREATBILLION	GREATBILLION	R&S
Model No.	SMA m /blue cable/SMAM 18G 1m	SMAM st - SMA m ra 0.6m 18GHz	SMU-200A
Calibration Date	November 24, 2021	December 12, 2022	October 26, 2022
Calibration Due Date	November 24, 2022	December 12, 2023	October 26, 2023

Equipment	Vector Signal Generator	Digital Multimeter	Network Analyzer
Registration No.	EW-3457	EW-1017	EW-3192b
Manufacturer	R&S	FLUKE	R&S
Model No.	SMBV100B	87-IV	ZVL
Calibration Date	January 19, 2022	April 04, 2022	December 20, 2022
Calibration Due Date	January 19, 2023	April 04, 2023	December 20, 2023

Equipment	2-Way Power Splitter/ Combiner	Coaxial Directional Coupler
Registration No.	EW-3067	EW-2337
Manufacturer	MINICIRCUITS	MAGNA
Model No.	ZESC-2-11	4222-16
Insertion Loss (dB)@1920-1930MHz Measured by Network Analyzer	3.5	0.29
Test Conducted Date	September 27, 2022 to February 03, 2023	September 27, 2022 to February 03, 2023

END OF TEST REPORT