



# TEST REPORT FOR BLE TESTING

Report No.: SRTC2024-9004(F)-24051402(E)

Product Name: WiFi/BT Module

Product ID: MWH640S

Brand Name: Hisense

Applicant: Qingdao Intelligent & Precise Electronics Co., Ltd.

Manufacturer: Qingdao Intelligent & Precise Electronics Co., Ltd.

Specification: FCC Part 15 Subpart C (2023)

FCC ID: 2AJVQ-MWH640S

The State Radio\_monitoring\_center Testing Center (SRTC) 15th Building, No.30Shixing Street, Shijingshan District, Beijing, P.R.China Tel: 86-10-57996183 Fax: 86-10-57996388



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# **1. GENERAL INFORMATION**

#### 1.1 Notes of the test report

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#### 1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)			
Test Site 1:	15th Building, No.30 Shixing Street, Shijingshan District			
Test Site 2:	No.80, Zhaojiachang, Beizang, Daxing District			
City:	Beijing			
Country or Region:	P.R.China			
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Registration number:	239125			

## 1.3 Applicant's details

Company:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological
Address: Development Zone, Qingdao City, Shandong Province, P. F	
City:	Qingdao
Country or Region:	CHINA
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#### 1.4 Manufacturer's details

Company:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological
Address: Development Zone, Qingdao City, Shandong Province, F	
City:	Qingdao
Country or Region:	CHINA
Contacted person:	wanghaining
Tel:	013381232625
Email:	wanghaining@hisense.com

#### **1.5 Test Environment**

Date of Receipt of test sample at SRTC:	2024/5/14
Testing Start Date:	2024/5/15
Testing End Date:	2024/6/11

Environmental Data:	Temperature (°C)	Humidity (%)	
Ambient	25	40	
Maximum Extreme	70		
Minimum Extreme	-10		
	1		
Normal Supply Voltage (V d.c.):	3.3		
Maximum Extreme Supply Voltage (V d.c.):	3.5		
Minimum Extreme Supply Voltage (V d.c.):	3.1		

# **2 DESCRIPTION OF THE DEVICE UNDER TEST**

## 2.1Final Equipment Build Status

Frequency Range:	2.402GHz~2.480GHz		
Number of Channel:	40		
Modulation Type:	GFSK		
Equipment Class:	DTS		
Channel Spacing:	2MHz		
Data Rate:	LE 1Mbps/2Mbps LE Coded 125kbps/500kbps		
Power Supply:	DC supply		
Software Revision:	NA		
Hardware Revision:	V1.00		
IMEI:	NA		
Antenna type:	Refer to Note		
Antenna connector:	Refer to Note		



#### Antenna requirement (FCC Part 15.203)

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna(s) of the EUT is permanently attached.

•There are no provisions for connection to an external antenna.

Note: The antenna provides to the EUT, please refer to the following table:

Brand	Model	Antenna gain	Frequency band	Antenna type	Connecter Type
N/A	N/A	1.06dBi(max)	2.4GHz~2.4835GHz	PIFA antenna	NA

The antenna gain is provided by the customer and involved in the calculation and influence of the test results. Our laboratory takes the value declared by the customer as the criterion, and the customer is responsible for the antenna gain value. Manufacturers ensure that their designs will not be modified by the user or third party's arbitrary antenna parameters and performance.

#### 2.2Description of Test Modes

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

40 channels are provided to this EUT:

## 2.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	l A	APPLICABL	E TO		DESCRIPTION
EUT CONFIGURE MODE	RE ≥ 1G	RE<1G	PLC	APCM	-
GFSK					-

Where

RE  $\geq$  1G: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with



antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	19	GFSK	1

Radiated Emission Test (Below 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	19	GFSK	1

Power Line Conducted Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	19	GFSK	1

Antenna Port Conducted Measurement:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

#### 2.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.

Modulation Type	Duty Cycle	Correction factor(dB)
GFSK (LE 1Mbps)	86.20%	0.64
GFSK (LE 2Mbps)	60.00%	2.22
GFSK (Coded 125K)	97.70%	0.10
GFSK (Coded 500K)	91.30%	0.40



## 2.4 EUT Operating conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 2.5 Support Equipment

The following support equipment was used to exercise the DUT during testing:N/A

# **<u>3 REFERENCE SPECIFICATION</u>**

Specification	Version	Title
FCC Part15 Subpart C	2023	Intentional radiators
ANSI C63.10	2013	Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074D01 v05r02	April 2, 2019	Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules

## **4 KEY TO NOTES AND RESULT CODES**

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
N/T	Test case is not tested.



# **5 RESULT SUMMARY**

No.	Test case	Reference	Verdict	Test Site
1	6dB Bandwidth	15.247(a)(2)	Pass	1
2	Transmitter Output Power	15.247(b)(3) )	Pass	1
3	Transmitter Power Spectral Density	15.247(e) )	Pass	1
4	Conducted Out of band emission measurement	15.247(d)	Pass	1
5	Band-edge	15.247(d)	Pass	1
6	Antenna requirement	15.203	Pass(refer to section 2.1)	1

Test Site 1: 15th Building, No.30 Shixing Street, Shijingshan District

This Test Report Is Approved by:	Review by:
Mr. Peng Zhen	Mr. Li Bin [
影板	(A THK)
Tested and Issued by:	Approved date:
Mr. LiangXisheng	
VA TAZ	20240611



No.	Test case	Reference	Verdict	Test Site
7	Band-edge	15.247(d)	Pass	2
8	Spurious Radiated Emissions	15.205/15.209/15.247(d)	Pass	2
9	AC Power line Conducted Emission	15.207	Pass	2

Test Site 2: No.80, Zhaojiachang, Beizang, Daxing District

This Test Report Is Approved by: Mr. Liu Wei	Review by: Mr. Guo Yu
Tested and Issued by: Mr. Dong Qifeng	Approved date:
董奇峰	20240611



# 6 TEST RESULT

## 6.1 6dB Bandwidth

#### 6.1.1 Test limit

Part15.247 (a) (2) The minimum permissible 6dB bandwidth is 500 kHz

#### 6.1.2 Test Procedure Used

ANSI C63.10-2013 – Section 11.8.2 Option 2 KDB 558074 D01 v05r02 – Section 8.2

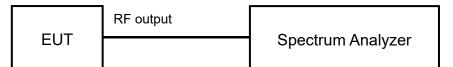
#### 6.1.3 Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

- 2. RBW = 100 kHz
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize

#### 6.1.4 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



#### 6.1.5 Test result

The test results are shown in Appendix A.



#### 6.2 Transmitter Output Power

## 6.2.1 Test limit

Part15.247 (b) (3) The maximum permissible conducted output power is 1 Watt.

#### 6.2.2 Test Procedure Used

ANSI C63.10-2013 – Section 11.9.1.3 ANSI C63.10-2013 – Section 11.9.2.2.4 KDB 558074 D01 v05r02 – Section 8.3.1.3

#### 6.2.3Test Settings

Peak Power Measurement

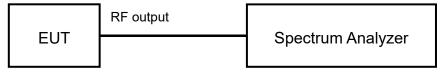
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

#### 6.2.4Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



#### 6.2.5Test result

The test results are shown in Appendix A.



#### 6.3 Transmitter Power Spectral Density

## 6.3.1Test limit

Part15.247 (e) The maximum permissible power spectral density is 8.0dBm in any 3 kHz band.

## 6.3.2 Test Procedure Used

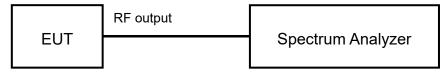
ANSI C63.10-2013 – Section 11.10.2 Method PKPSD KDB 558074 D01 v05r02 – Section 8.4

## 6.3.3 Test Settings

- 1. Analyzer was set to the center frequency of the DTS channel under investigation
- 2. Span = 1.5 times the DTS channel bandwidth
- 3.  $\overrightarrow{RBW} = 3 \text{ kHz}$
- 4. VBW = 10 kHz
- 5. Detector = peak
- 6. Sweep time = auto couple
- 7. Trace mode = max hold
- 8. Trace was allowed to stabilize

## 6.3.4Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



## 6.3.5 Test result

The test results are shown in Appendix A.



## 6.4 Conducted Out of band emission measurement

#### 6.4.1Test limit

Part 15.247(d): The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth.

#### 6.4.2 Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3 KDB 558074 D01 v05r02 – Section 8.5

#### 6.4.3 Reference level measurement Settings

Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to  $\geq$  1.5 MHz
- c) Set the RBW = 100 kHz.
- d) Set the VBW  $\geq$  300 kHz.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

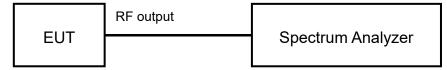
#### 6.4.4Test Settings

a) Set the center frequency and span to encompass frequency range to be measured.

- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq$  300 kHz.
- d) Detector = peak.
- e) Set span to encompass the spectrum to be examined
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level.

## 6.4.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



#### 6.4.6Test result

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement. The test results are shown in Appendix A.



#### 6.5 Band-edge measurement

## 6.5.1Test limit

Part 15.247(d): The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth.

#### 6.5.2 Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3 KDB 558074 D01 v05r02 – Section 8.7.2

#### 6.5.3 Reference level measurement Settings

Establish a reference level by using the following procedure:

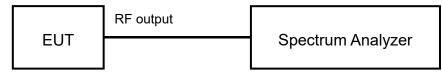
- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 MHz
- c) Set the RBW = 100 kHz.
- d) Set the VBW  $\geq$  300 kHz.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

#### 6.5.4Test Settings

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq$  300 kHz.
- d) Detector = peak.
- e) Set span to encompass the spectrum to be examined
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level.

## 6.5.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



#### 6.5.6Test result

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement. The test results are shown in Appendix A.



#### 6.6 Spurious Radiated Emissions

#### 6.6.1 Test Description

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

#### 6.6.2 Test limit

#### Part15.205, 15.209, 15.247(d)

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in below Table per Section 15.209. The spectrum shall be investigated from the lowest radio frequency signal generated in the device

	Field strength	Measured Distance		
Frequency [MHz]	[ µV/m ]	[meters]		
0.009~0.490	2400/F(kHz)	300		
0.490~1.705	24000/F(kHz)	30		
1.705~30.0	30	30		
30~88	100	3		
88~216 150 3				
216~960 200 3				
Above 960	500	3		
Radiated Limits				

#### Part15.35(b):

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit

#### Used conversion factor: Limit $(dB\mu V/m) = 20 \log (Limit (\mu V/m)/1\mu V/m)$

Frequency [MHz]	Detector	Unit (dBµV/m)
30~88	Quasi-peak	40.0
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46.0
960~1000	Quasi-peak	54.0
1000 $\sim$ 5th harmonic of the highest frequency	Average	54.0
or 40GHz, whichever is lower	Peak	74.0

#### **Conversion Radiated limits**



#### 6.6.3 Test Procedure Used

KDB 558074 D01 DTS Meas Guidance v05r02– Section 12.2.7

#### For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and recorded the reading with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer complied the following setting:

Frequency	RBW
9-150kHz	200-300Hz
0.15-30MHz	9-10kHz

2. Signals below 30MHz are not recorded in the report because they are lower than the limits by more than 20dB.

#### For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for  $30MHz \sim 1GHz$ ) / 1.5 meters (for above 1GHz) above the ground in chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and recorded the reading with Maximum Hold Mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detector and recorded the reading with Maximum Hold Mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.



#### For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Average detection (AV) at frequency above 1GHz. If duty cycle of test signal is < 98%, the duty factor need added to measured value.

4. All modes of operation were investigated and the worst-case emissions are reported.

## 6.6.4Test Settings

#### Average Field Strength Measurements per Section 12.2.7 of KDB 558074 (Part 15.35)

Frequency	Detector			
<1000MHz	Quasi-peak			
>1000MHz	Peak and average			

#### Peak Field Strength Measurements per Section 12.2.7of KDB 558074 (Part 15.35)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW is set depending on measurement frequency, as specified in following table

Frequency	RBW			
9-150kHz	200-300Hz			
0.15-30MHz	9-10kHz			
30-1000MHz	100-120kHz			
>1000MHz	1MHz			

3. VBW = 3MHz

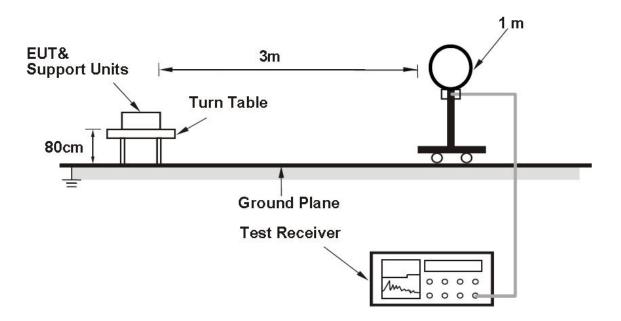
4. Detector = peak

5. Sweep time = auto couple

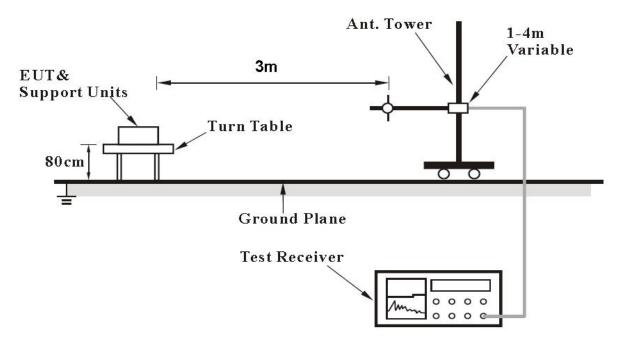
- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize



#### For Radiated emission below 30MHz

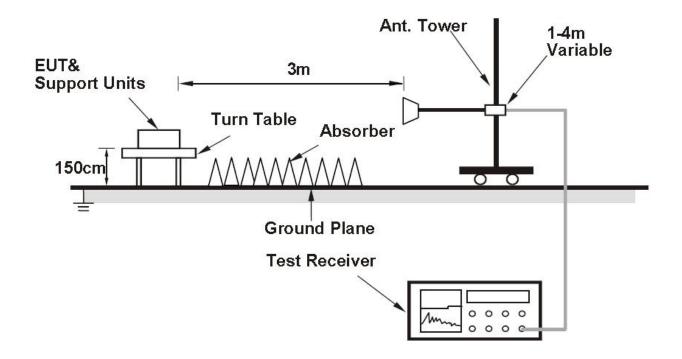


#### For Radiated emission 30MHz to 1GHz





#### For Radiated emission above 1GHz



#### 6.6.6 Test result

The test results are shown in Appendix B.



6.7 AC Power line Conducted Emission

## 6.7.1Test limit

FCC Part15.207

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

\* Decreases with the logarithm of the frequency.

The measurement is made according to ANSI C63.10-2013

#### 6.7.2 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

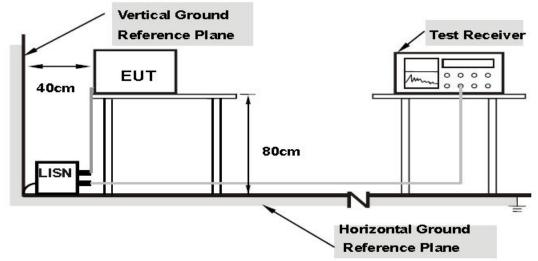
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

The EUT shall test under the power AC120V/60Hz.





For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 6.7.4 Test result

The test results are shown in AppendixB.



# **7 MEASUREMENT UNCERTAINTIES**

Items	Uncertainty					
6dB Bandwidth	3kHz					
Peak power output	0.67	′dB				
Transmitter Power Spectral Density	0.75dB					
Band edge compliance	1.20dB					
	30MHz~1GHz	2.83dB				
Conducted Out of band emission measurement	1GHz $\sim$ 12.75GHz	2.50dB				
medediement	12.75GHz $\sim$ 25GHz	2.75dB				
	$30$ MHz $\sim$ $200$ MHz	4.88dB				
Spurious Radiated Emissions	200MHz $\sim$ 1GHz	4.87dB				
Spurious Radiated Emissions	1GHz $\sim$ 18GHz	4.58dB				
	18GHz~40GHz	4.35dB				
AC Power line Conducted Emission	3.92dB					



# **8 TEST EQUIPMENTS**

No.	Name/ Model	Manufacturer	S/N	Cal date	Cal Due date		
1.	Spectrum Analyzer / FSV	ROHDE & SCHWARZ	101065	2023.06.21	2024.06.20		
2.	Signal Analyzer / N9020A	Agilent	MY48010771	2024.03.06	2025.03.05		
3.	Bluetooth Test Set / MT8852B	Anritsu	1329003	2023.06.21	2024.06.20		
4.	Power Divider / 11667A	HP	19632	2023.06.21	2024.06.20		
5.	Signal Generator / SMBV100A	R&S	260910	2023.06.21	2024.06.20		
6.	Temperature chamber / SH241	ESPEC	92013758	2023.06.21	2024.06.20		
7.	Fully-Anechoic Chamber / 12.65m×8.03m×7.50m	FRANKONIA					
8.	Semi-Anechoic/Chamber / 23.18m×16.88m×9.60m	FRANKONIA					
9.	Turn table Diameter:1m	FRANKONIA					
10.	Turn table Diameter:5m	FRANKONIA					
11.	Antenna master FAC(MA4.0)	MATURO					
12.	Antenna master SAC(MA4.0)	MATURO					
13.	Shielding room / 9.080m×5.255m×3.525m	FRANKONIA					
14.	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100512	2023.06.21	2024.06.20		
15.	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100513	2023.06.21	2024.06.20		
16.	Ultra log antenna / HL562	R&S	100016	2023.06.21	2024.06.20		
17.	Receive antenna /3160-09	SCHWARZ-BECK	002058-002	2023.06.21	2024.06.20		
18.	EMI test receiver / ESI 40	R&S	100015	2023.06.21	2024.06.20		
19.	EMI test receiver / ESCS30	R&S	100029	2023.06.21	2024.06.20		
20.	Receive antenna / HL562	R&S	100167	2023.06.21	2024.06.20		
21.	AMN / ENV216	R&S	3560.6550.12	2023.06.21	2024.06.20		
22.	WLAN AP WIA3300-20	SKSpruce	8152017060700339				
23.	Notebook E470c	Lenovo	PF10UZW7				
24.	Loop Antenna	R&S	100340	2023.08.21	2024.08.20		
25.	FCC auto test system / RT9200BW-2	Radiosky	V2.05	/	/		
26.	EMI test software / EMC32	R&S	V10.20.01	/	/		



#### **APPENDIX A – TEST DATA OF CONDUCTED EMISSION** BLE

#### 1 **Duty Cycle and Antenna Gain**

Test Mode	Frequency (MHz)	Plot	Duty Cycle	Correction Factor(dB)	Antenna Gain(dBi)
GFSK (LE 1Mbps)	2402	Fig.1	86.20%	0.64	1.06

Note: Correction Factor=10\*log(1/Duty Cycle)

Test Mode	Frequency (MHz)	Plot	Duty Cycle	Correction Factor(dB)	Antenna Gain(dBi) 1.06	
GFSK (LE 2Mbps)	2402	Fig.2	60.00%	2.22		

Note: Correction Factor=10\*log(1/Duty Cycle)

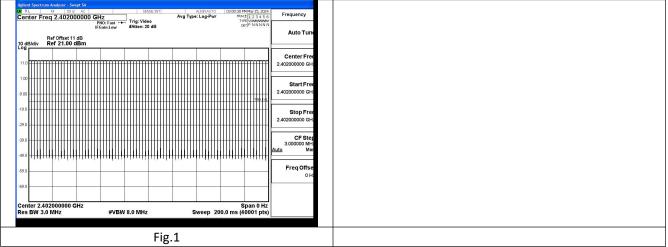
Test Mode	Frequency (MHz)	Plot	Duty Cycle	Correction Factor(dB)	Antenna Gain(dBi)					
Coded 125K	2402	Fig.3	97.70%	0.10	1.06					
Note: Correction Factor=10*log(1/Puty Cyclo)										

Note: Correction Factor=10\*log(1/Duty Cycle)

Test Mode	Frequency (MHz)	Plot	Duty Cycle	Correction Factor(dB)	Antenna Gain(dBi)					
Coded 500K	2402	Fig.4	91.30%	0.40	1.06					
Note: Correction Factor=10*log(1/Duty Cycle)										

Note: Correction Factor=10\*log(1/Duty Cycle)

#### Test Mode: GFSK (LE 1Mbps)



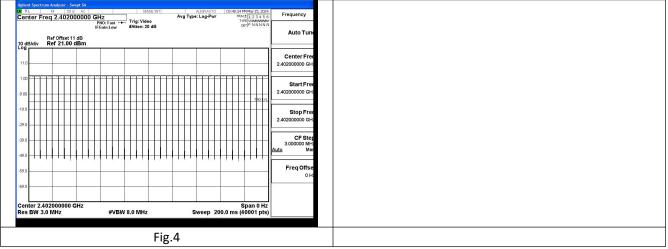


Test Mode. GFSR (LE ZMDPS)		
Aller System Analyzer. Surg VA         State Intri         AUXIAITO         C01431487Mar / 12,205           Center Freq 2.402000000 GHz PROF.tat. w         Trig: Video #Atten: 20 of B         Avg Type: Log-Rwr         Widt 2,33 + 5 0 Widt 2,33 + 5	Auto Tun Center Free 2.402000000 GH Start Free 2.40200000 GH 2.40200000 GH CF Step 2.00000 GH	
	3.000000 MH: Auto Mar Freq Offse	
490	0 H:	
Center 2.40200000 GHz Span 0 Hz Res BW 3.0 MHz #VBW 8.0 MHz Sweep 200.0 ms (40001 pts)		
Fig.2		

#### Test Mode: Coded 125K

	nt Spect																		
Cen	nter F	RF req	2.40	50 Q 2000	AC	GHz			Trim	SENSE	INT	,	vg Typ	e: Log-F	лто Pwr	04:48:50	6 PM May 15 VACE 1 2 3 TYPE WWW DET P N P	5, 2024 3 4 5 6	Frequency
10 di	nter F			et 11 c 00 di		PNC IFGa	I: Fast in:Low	+	#Atten	10e0 20 di	3						DET P N P	NNNN	Auto Tune
Log 11.0																			Center Free 2.402000000 GH:
1.00		T							T			T			T			Γ	Start Free 2.402000000 GH:
-19.0					-		+		╞					-	⋕		TF	786 L.VL	Stop Free
-29.0 -39.0							1												CF Step 3.000000 MH
-49.0		+			-		+	-	+		2	ł		-	+			ł	<u>Auto</u> Mar
-59.0 -69.0																			Freq Offse 0 H
Cen	nter 2.4	4020	0000	)0 Gł	łz		- 100										Span (40001	0 Hz	
Res	s BW 3	3.0 M	Hz				#VE	BW 8	8.0 MI	lz				Sweep	200.	.0 ms	(40001	l pts)	
											Fig	<u>;</u> .3							

#### Test Mode: Coded 500K





## Conducted Power

Madulation type	Conducted Peak Power(dBm)								
Modulation type	2402MHz	2440MHz	2480MHz						
GFSK (LE 1Mbps)	2.99	2.68	2.11						
GFSK (LE 2Mbps)	2.93	2.57	1.98						
Coded 125K	2.99	2.66	2.09						
Coded 500K	3.03	2.68	2.12						

Medulation type	Co	onducted Average Power(dB	m)
Modulation type	2402MHz	2440MHz	2480MHz
GFSK (LE 1Mbps)	2.14	2.46	1.33
GFSK (LE 2Mbps)	2.27	2.25	1.65
Coded 125K	2.51	2.19	1.49
Coded 500K	2.60	2.47	1.53

#### EIRP

Madulation type		Peak EIRP(dBm)	
Modulation type	2402MHz	2440MHz	2480MHz
GFSK (LE 1Mbps)	4.05	3.74	3.17
GFSK (LE 2Mbps)	3.99	3.63	3.04
Coded 125K	4.05	3.72	3.15
Coded 500K	4.09	3.74	3.18

Modulation type		Average EIRP(dBm)	
Modulation type	2402MHz	2440MHz	2480MHz
GFSK (LE 1Mbps)	3.20	3.52	2.39
GFSK (LE 2Mbps)	3.33	3.31	2.71
Coded 125K	3.57	3.25	2.55
Coded 500K	3.66	3.53	2.59

EIRP (dBm)=Conducted Power(dBm)+Antenna Gain(dBi)



#### 3 Occupied Bandwidth 6dB Bandwidth

Test Mode	Carrier frequency (MHz)	6dB Bandwidth(KHz)
GFSK (LE 1Mbps)	2402	712.8
GFSK (LE 1Mbps)	2440	717.5
GFSK (LE 1Mbps)	2480	718.4

Test Mode	Carrier frequency (MHz)	6dB Bandwidth(KHz)
GFSK (LE 2Mbps)	2402	1386.7
GFSK (LE 2Mbps)	2440	1390.8
GFSK (LE 2Mbps)	2480	1371.0

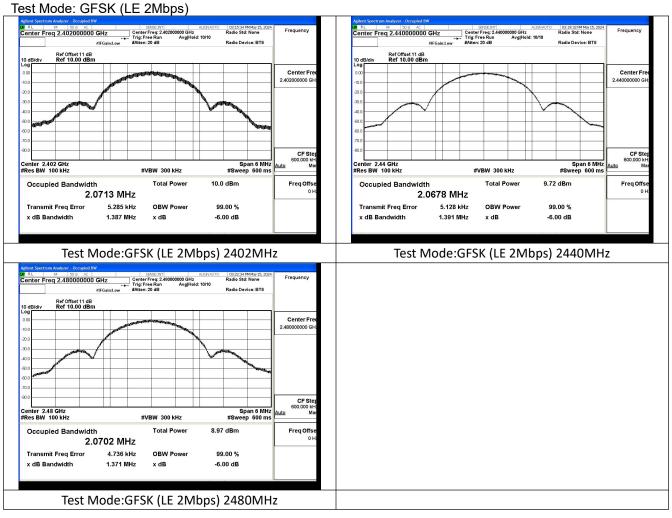
Test Mode	Carrier frequency (MHz)	6dB Bandwidth(KHz)
Coded 125K	2402	650.2
Coded 125K	2440	648.7
Coded 125K	2480	650.1

Test Mode	Carrier frequency (MHz)	6dB Bandwidth(KHz)
Coded 500K	2402	709.2
Coded 500K	2440	708.6
Coded 500K	2480	713.7



enter Freq 2.402000000 GHz #IFGain:Lov	Center Freq: 2.402000000 GHz Trig: Free Run Avg Hold: 1 #Atten: 20 dB	Radio Std: None 10/10 Radio Device: BTS	Ce	nter Freq 2.44000000	- Trig: F	rFreq: 2.440000000 GHz ree Run Avg Holo : 20 dB	d: 10/10 Radio Der	vice: BTS	
Ref Offset 11 dB 0 dB/div Ref 10.00 dBm			10	Ref Offset 11 dB IB/div Ref 10.00 dBm					
			Center Freq 0.0		And Bridgers Bridgers and	Profileral life of the office	700.		Center Fre
1.0			2.402000000 GH:		and the second sec		and the state of t		2.440000000 GH
			-20.1 -30.1				and the second second	The shift and the state of the	
.0			-40.1						
.0			-60.1						
.0			-70.0						
.0			CF Step 200.000 kH;						CF Ste 200.000 ki
enter 2.402 GHz Res BW 100 kHz	#VBW 300 kHz	Span 2 MHz #Sweep 600 ms	uto Mar	nter 2.44 GHz es BW 100 kHz	#	VBW 300 kHz	Sp #Swee	p 600 ms	<u>ito</u> Mi
Occupied Bandwidth 1.0538	Total Power MHZ	11.7 dBm	Freq Offse (	Occupied Bandwidth 1.(	, 0 <b>522</b> MHz	Total Power	11.4 dBm		Freq Offs 0 F
Transmit Freq Error 3.50	2 kHz OBW Power	99.00 %		ransmit Freq Error	3.283 kHz	OBW Power	99.00 %		
x dB Bandwidth 712	8 kHz x dB	-6.00 dB			717.5 kHz	x dB	-6.00 dB		
ř.				dBBandwidth				0MHz	
Test Mode	:GFSK (LE 1Mb	ps) 2402MHz				K (LE 1M		0MHz	
Test Mode Inter Spectrum Analyzer Occupied BW RL BP 500 AC Inter Freq 2.4800000000 GHz Inter Freq 3.480000000 GHz Inter Growth 11 dB Ref Offred 11 dB	:GFSK (LE 1Mb	ps) 2402MHz						0MHz	
Test Mode Herd Spectrum Analyzer: Obsequed DW 10 00 00 00 00 00 enter Freq 2.480000000 GHz erf offset 11 dB vdB/ddw Ref 10.00 dBm	:GFSK (LE 1Mb	ps) 2402MHz	Frequency					0MHz	
Test Mode Iter Systum Autyr: Ocupied BV RL EP 100 AC enter Freq 2.480000000 GHz efformet 11 dB Ref 00fest 11 dB gg allow	:GFSK (LE 1Mb	ps) 2402MHz	Frequency					0MHz	
Test Mode	:GFSK (LE 1Mb	ps) 2402MHz	Frequency					0MHz	
Test Mode Ind System Analyses Decapted DV RL 10 1000 about the Inter Freq 2.480000000 GHz BEGORE THE REFORMED TO BE BEGORE THE REFORMED TO BE BEFORE THE REFORE THE REFORE THE RE	:GFSK (LE 1Mb	ps) 2402MHz	Frequency					0MHz	
Test Mode	:GFSK (LE 1Mb	ps) 2402MHz	Frequency					0MHz	
Test Model	:GFSK (LE 1Mb	ps) 2402MHz	Center Free 2.48000000 GH					0MHz	
Test Model	:GFSK (LE 1Mb	ISPANTO Radio Suc None Radio Suc None Radio Device: BTS	Center Free 2.46000000 GH					0MHz	
Test Mode Test States (Constraints) Test State	:GFSK (LE 1Mb	Pps) 2402MHz	Center Free 2.46000000 GH					0MHz	
Test Mode Test States (Constraints) Test State	SGFSK (LE 1Mb)	sps) 2402MHz	Center Free 2.46000000 GH					0MHz	
Cocupied Bandwidth Res BW 100 kHz Cocupied Bandwidth Transmit Freq Error 2,496	SUBURIES OF SUBURI	In the second se	Center Free 2.480000000 GH					0MHz	
Cocupied Bandwidth Cocupied Bandwidth Transmit Freq Error 2,458	SGFSK (LE 1Mb)	Span 2 MHz Static Std: None Radio Device: BTS Span 2 MHz #Sweep 600 ms 10.7 dBm	Center Free 2.480000000 GH					0MHz	







#IFGain:Low	Trig: Free Run Avg Hold: 10/ #Atten: 20 dB	Radio Device: BTS		#IFGain:Low #Atter	Free Run Avg Hold: 10/10 n: 20 dB	Radio Device: BTS	
Ref Offset 11 dB 0 dB/div Ref 10.00 dBm			Ref 10 dB/div Ref Log	Offset 11 dB 10.00 dBm			
			Center Fred 000 2000000 GH				Center Fr 2.440000000 G
enter 2.402 GHz Res BW 100 kHz	#VBW 300 kHz	Span 6 MHz #Sweep 600 ms	CF Ster 600.000 kH May #Res BW 100 kH	z #	VBW 300 kHz	Span 6 MHz #Sweep 600 ms	CF Ste 600.000 ki Auto M
1.0420 N Transmit Freq Error 4.40		99.00 %	0 H:	1.0409 MHz a Error 4.443 kHz	OBW Power	99.00 %	01
x dB Bandwidth 650. Test Mo	de:Coded 125K	-6.00 dB	Transmit Fre x dB Bandwid	•	x dB	-6.00 dB	
x dB Bandwidth 650.	≧kHz x dB	2402MHz		Ith 648.7 kHz	x dB	-6.00 dB	
x dB Bandwidth 650.	2 kHz x dB de:Coded 125K	2402MHz	requency Center Free	Ith 648.7 kHz	x dB	-6.00 dB	



enter Freq 2.402000000 GHz	Center Freq: 2.402000000 GHz Trig: Free Run Avg Hold: 10			Center Freq 2.440000000	Trig: Free Run	Avg Hold: 10/10		
#IFGain:Low		Radio Device: BTS			#FGain:Low #Atten: 20 dB		Radio Device: BTS	
Ref Offset 11 dB dB/div Ref 10.00 dBm				Ref Offset 11 dB 10 dB/div Ref 10.00 dBm Log				
00			Center Free	0.00				Center Fre
.0			2.402000000 GH:	-10.0		M.		2.440000000 GH
0				-30.0				
0				-40.0				
				-60.0			~	
0				-70.0				
.0			CF Step	-80.0				CF Ste
enter 2.402 GHz Res BW 100 kHz	#VBW 300 kHz	Span 6 MHz #Sweep 600 ms	600.000 kH: uto Mar	Center 2.44 GHz #Res BW 100 kHz	#VBW 3	300 kHz	Span 6 MHz #Sweep 600 ms	600.000 kł <u>Auto</u> Mi
Occupied Bandwidth	Total Power	2.18 dBm	FreqOffse	Occupied Bandwidth			.86 dBm	FreqOffs
1.0522 N			0 H:		528 MHz			01
Transmit Freq Error 3.15	4 kHz OBW Power	99.00 %		Transmit Freq Error	4.236 kHz OB	W Power	99.00 %	
x dB Bandwidth 709.	2 kHz x dB	-6.00 dB		x dB Bandwidth	708.6 kHz x d	в .	-6.00 dB	
	de:Coded 500K	( 2402MHz		Test	Mode:Code	ed 500K 2	440MHz	
RL         RF         SO Q         AC           enter Freq 2.480000000 GHz         AC         AC         AC	SENSE:INT ALU Center Freq: 2.480000000 GHz	IGNAUTO 04:15:31 PM May 15, 2024 Radio Std: None 0/10	Frequency	Test	Mode:Code	ed 500K 2	2440MHz	
Nent Spectrum Analyzer - Occupied BW           RL         BF         50.9         AC           enter Freq 2.480000000 GHz         #FGaincl.ow	SENSE:INT ALU Center Freq: 2.480000000 GHz	10VAUTO 04:15:31 PM May 15, 2024 Radio Std: None	Frequency	Test	Mode:Code	ed 500K 2	2440MHz	
Ierd Spectrum Analyzer - Occupied BW RL BF 1500 AC enter Freq 2.4800000000 GHz #FGain.Low Ref Offset11 dB dB/div Ref 10.00 dBm	SENSE:INT ALU Center Freq: 2.480000000 GHz	IGNAUTO 04:15:31 PM May 15, 2024 Radio Std: None 0/10	Frequency	Test	Mode:Code	ed 500K 2	2440MHz	
Iterd Spectrum Analyzer - Decupied BW RL BP 509 AC enter Freq 2,4800000000 GHz effGainLow effGainLow aB/didv Ref 10.00 dBm 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS		Test	Mode:Code	ed 500K 2	2440MHz	
Iterd Spectrum Analyzer - Decupied BW AL BP 100 AC Denter Freq 2.480000000 GHZ BFGainLaw BFG064V Ref 10.00 dBm 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS	Center Free	Test	Mode:Code	ed 500K 2	2440MHz	
Ind Spectrum Audyor - Decembel BW R. 17 500 x 41 17 500 x 100 18 60000000 GHz 18 Golinct w 19 60 x 100 dBm 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS	Center Free	Test	Mode:Code	ed 500K 2	2440MHz	
Int Spectrum Justyver - Occupied BW RL BF 500 AC Inter Freq 2.4800000000 HZ #FGainLew Biology Ref 10.00 dBm 9 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS	Center Free	Test	Mode:Code	ed 500K 2	2440MHz	
Int Spectrum Autyrer - Decepted BW R_ training to the second sec	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS	Center Free	Test	Mode:Code	ed 500K 2	2440MHz	
Int Spectrum Autyrer - Decupied BW RL BP 500 x del INTER Freq 2.480000000 GHZ INFGainLaw BUGW Ref 000 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE:INT ALU Center Freq: 2.480000000 GHz	327AUTO 041531 PMMay15, 3224 Radio Std: None Radio Device: BTS	Center Free 2.46000000 GH	Test	Mode:Code	ed 500K 2	2440MHz	
Int Spectrum Autyper - Decupied BW RL IF 500 AC Inter Freq 2.480000000 GHz BFGInLow	Center Free 2 4600000 OHz Trig Free Ron Argited: 10 Arten: 20 dS	1974U/TO DOLES 31 PM May 15 2024 Radio Std: None Padio Device: BTS	Center Free 2.48000000 GH	Test	Mode:Code	ed 500K 2	440MHz	
Inter Spectrum Analyzer - Occupied BW Rt BF 1900 ac anter Freq 2.4800000000 GHz #FGaind.ew Ref Offset 11 dB dB/div Ref 10.00 dBm 99	1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000	194.070 (04.155.3) PM May 15.2024 Radio Std: None Radio Device: BTS	Center Free 2.48000000 GH	Test	Mode:Code	ed 500K 2	440MHz	
A DECEMBENT DECEMBENT ALL DECEMBENTAL DE	1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000 2010     1 2000	190.070 [DL153] PMMer 15 2004 Radio Std: None Radio Device: BTS	Center Free 2.48000000 GH 2.48000000 GH 600.000 KH do Mar Freq Offse	Test	Mode:Code	ed 500K 2	2440MHz	
AL DE LOS ALLANCE DE LOS ALLANCES DE LOS ALLAN	#UBUELINI LANDARD	DALES I MANAYS 2004     Radio Std: None     Radio Device: BTS     Span 6 MHz Au     Span 6 MHz Au     Syan 6 MHz Au     Source 500 ms     1.30 dBm	Center Free 2.48000000 GH 2.48000000 GH 600.000 KH do Mar Freq Offse	Test	Mode:Code	ed 500K 2	2440MHz	



Test Mode	Carrier frequency (MHz)	99% Bandwidth(kHz)
GFSK (LE 1Mbps)	2402	1044.4
GFSK (LE 1Mbps)	2440	1029.8
GFSK (LE 1Mbps)	2480	1030.7

Test Mode	Carrier frequency (MHz)	99% Bandwidth(kHz)
GFSK (LE 2Mbps)	2402	2059.6
GFSK (LE 2Mbps)	2440	2056.9
GFSK (LE 2Mbps)	2480	2057.6

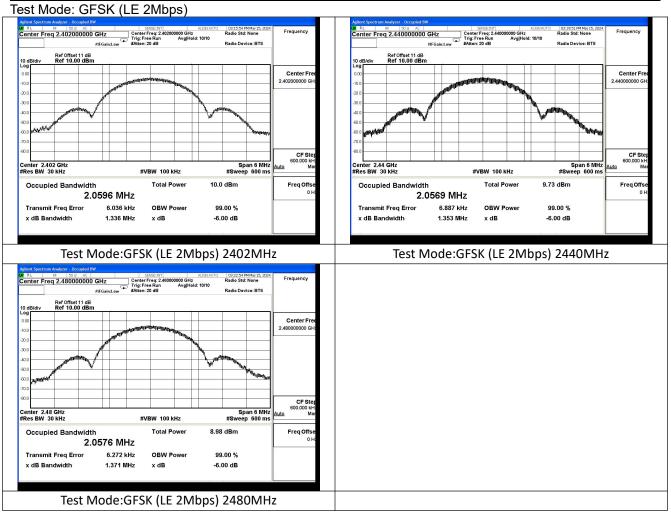
Test Mode	Carrier frequency (MHz)	99% Bandwidth(kHz)
Coded 125K	2402	1021.2
Coded 125K	2440	1020.0
Coded 125K	2480	1024.7

Test Mode	Carrier frequency (MHz)	99% Bandwidth(kHz)
Coded 500K	2402	1029.3
Coded 500K	2440	1031.2
Coded 500K	2480	1033.8



#IFGain:Lo Ref Offset 11 dB I0 dB/div Ref 10.00 dBm	Trig: Free Run Avg Hold: 10 #Atten: 20 dB	Radio Device: BTS		Ref Offset 11 dB	IFGain:Low #Atten: :	ee Run Avg Hold: 20 dB	Radio Device: BTS	
		2	Center Freq :402000000 GHz					Center Fre 2.440000000 GH
2000 Center 2.402 GHz Res BW 30 kHz	#VBW 100 kHz	Span 2 MHz #Sweep 600 ms	CF Step 200.000 kHz to Man	-800 Center 2.44 GHz #Res BW 30 kHz	#V	'BW 100 kHz	Span 2 MH: #Sweep 600 ms	CF Ste 200.000 kł Auto Ma
Occupied Bandwidth 1.0444	Total Power	8.90 dBm	Freq Offset 0 Hz	Occupied Bandwidth		Total Power	11.4 dBm	Freq Offs 01
101100 (10100) (10100) (10100) (10100)	22 kHz OBW Power	99.00 %		Transmit Freq Error	4.271 kHz	OBW Power	99.00 %	
x dB Bandwidth 68	22 kHz OBW Power 4.7 kHz x dB e:GFSK (LE 1Mb)	-6.00 dB		x dB Bandwidth	692.0 kHz	x dB	99.00 % -6.00 dB	z
x dB Bandwidth 68	4.7 KHz x dB e:GFSK (LE 1Mb)	-6.00 dB	Frequency	x dB Bandwidth	692.0 kHz	x dB	-6.00 dB	lz
x dB Bandwidth 68	4.7 KHz x dB e:GFSK (LE 1Mb)	-6.00 dB	Frequency Center Free 480000000 GH	x dB Bandwidth	692.0 kHz	x dB	-6.00 dB	Iz
x dB Bandwidth 68	4.7 KHz x dB e:GFSK (LE 1Mb)	-6.00 dB	Center Free 480000000 CH	x dB Bandwidth	692.0 kHz	x dB	-6.00 dB	Iz
x dB Bandwidth 68	4.7 KHz x dB e:GFSK (LE 1Mb)	-6.00 dB	Center Free .48000000 GH	x dB Bandwidth	692.0 kHz	x dB	-6.00 dB	lz
x dB Bandwidth 68	4.7 kHz x dB e:GFSK (LE 1Mb) Creater Fres: 2.400000 dHz Treater Rom AvgHold: 10 #Atten: 20 dB	e6.00 dB	Center Free .48000000 GH	x dB Bandwidth	692.0 kHz	x dB	-6.00 dB	Iz







RL         RF         50 Ω         AC           center Freq 2.402000000 GHz         Control = 100000000000000000000000000000000000	Center Freq: 2.402000000 GHz Trig: Free Run Avg Hold: 10/1 #Atten: 20 dB	Radio Std: None 10 Radio Device: BTS	Frequency	Center Freq 2.4400000	Trig: Fr		Radio Std: None 0 Radio Device: BTS	Frequency
Ref Offset 11 dB	#Atten: 20 dB	Radio Device: BTS		Ref Offset 11 d	B	20 dB	Radio Device: BTS	
0 dB/div Ref 10.00 dBm	Δ		Contex Error	10 dB/div Ref 10.00 dE	3m A	Δ		Conton Fre
			Center Free 2.402000000 GH:	-10.0				Center Fre 2.440000000 GF
0.0				-20.0	A			
				-30.0				
10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		~		-50.0				
10 martine all marine		- marine marine		60.0 and American American			and some marked and	
.0				-70.0				
enter 2.402 GHz		Span 6 MHz A	CF Step 600.000 kH uto Mar	Center 2.44 GHz			Span 6 MHz	CF Ste 600.000 ki Auto Ma
Res BW 30 kHz	#VBW 100 kHz	#Sweep 600 ms		#Res BW 30 kHz	#V	/BW 100 kHz	#Sweep 600 ms	
Occupied Bandwidth 1.0212 N	Total Power	12.4 dBm	Freq Offse 0 H;	Occupied Bandwic	ith .0200 MHz	Total Power	12.1 dBm	Freq Offs 0 F
Transmit Freg Error 4.253		99.00 %		Transmit Freg Error	3.878 kHz	OBW Power	99.00 %	
· · · · · · · · · · · · · · · · · · ·					543.6 kHz	x dB	-6.00 dB	
X dB Bandwidth 542.0	škHz xdB	-6.00 dB		x dB Bandwidth	343.0 KHZ			
Test Mod	de:Coded 125K	2402MHz				oded 125K		
Test Moo Inter Spectrum Analyser - Decupied BW RL BP 500 - AC enter Freq 2.4800000000 GHz #IFGain.Low		2402MHz	Frequency					
Test Moo RE Spectrum Analyser - Decayled BW RL BF 500 AC enter Freq 2.4800000000 GHz effGalautow Ref Offset 11 dB Ref Offset 11 dB		2402MHz Radio Std: None	Frequency					
Test Moo		2402MHz Radio Std: None	Center Free					
Test Mol Ited Spectrum Audyrer - Decupied BW RL BP 500 AC enter Freq 2.480000000 GHz #FGalactow Ref 10.00 dBm gg ab/didw		2402MHz Radio Std: None						
Test Mool		2402MHz Radio Std: None	Center Free					
Test Moo	de:Coded 125K	2402MHz Radio Std: None	Center Free					
Test Mol	de:Coded 125K	2402MHz Radio Std: None	Center Free					
Test Moo	de:Coded 125K	2402MHz Radio Std: None	Center Free					
Test Moo	de:Coded 125K	2402MHz	Center Free 2.48000000 GH					
Test Mod	de:Coded 125K	2402MHz Radio Std: None	Center Free 2.48000000 GH					
Test Mod	de:Coded 125K	2402MHz	Center Free 2.48000000 GH					
Cocupied Bandwidth Res BW 30 KHz Cocupied Bandwidth 1.0.247 M 1.0.247 M 1.0.247 M 1.0.247 M	de:Coded 125K	2402MHz	Center Fred 2.480000000 GH CF Step 600.000 kH uto Mar					
Cocupied Bandwidth 12 Cocupied Bandwidth 12 Cocupied Bandwidth 12 Cocupied Bandwidth	de:Coded 125K	2402MHz	Center Fred 2.480000000 GH CF Step 600.000 kH uto Mar					



glent Spectrum Analyzer - Occupied BW RL RF SOR AC enter Freq 2.402000000 GHz	SENSE:INT ALIG Center Freq: 2.402000000 GHz Trig: Free Run Avg Hold: 10/1	VAUTO 03:52:52 PM May 15, 2024 Radio Std: None Frequer 10	CXI RL	eq 2.440000000 GHz	SENSE:INT ALL Center Freq: 2.440000000 GHz Trig: Free Run Avg Hold: 10	IGNAUTO 04:11:59 PM May 15, 2024 Radio Std: None 0/10	Frequency
#IFGain:Low Ref Offset 11 dB D dB/div Ref 10.00 dBm	₩ #Atten: 20 dB	Radio Device: BTS	10 dB/div	#IFGain:Low ** Ref Offset 11 dB Ref 10.00 dBm	#Atten: 20 dB	Radio Device: BTS	
		Cente 24020000	Log           000 GH         -10.0           -20.0				Center Fre 2.44000000 Gł
00 00 enter 2.402 GHz Res BW 30 kHz	#VBW 100 kHz	Span 6 MHz #Sweep 600 ms	CF Step 0.000 kH: Mar KRes BW		#VBW 100 kHz	Span 6 MHz #Sweep 600 ms	CF Ste 600.000 kH Auto Ma
• Department ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	イHZ 9 kHz OBW Power 7 kHz x dB	99.00 % -6.00 dB	0 H: Transm	1.0312 MH it Freq Error 4.066 kl indwidth 652.7 kl	Hz OBW Power	99.00 % -6.00 dB	01
Test Mo		2402MHz	ency		e:Coded 500k	( 2440MHz	
Construction Const		2402MHz	ency ter Free		e:Coded 500k	( 2440MHz	
Test Mo	de:Coded 500K	2402MHz	ency ter Free		e:Coded 500k	( 2440MHz	
Transmit Freq Error Status	de:Coded 500K	2402MHz	ency ter Frec 0000 GH		e:Coded 500k	( 2440MHz	



#### 4 Transmitter Power Spectral Density

Test Mode	Carrier frequency (MHz)	Channel No.	Power Density (dBm/3kHz)
GFSK (LE 1Mbps)	2402	0	-13.9
GFSK (LE 1Mbps)	2440	19	-14.1
GFSK (LE 1Mbps)	2480	39	-14.7

Test Mode	Carrier frequency (MHz)	Channel No.	Power Density (dBm/3kHz)
GFSK (LE 2Mbps)	2402	0	-17.0
GFSK (LE 2Mbps)	2440	19	-17.3
GFSK (LE 2Mbps)	2480	39	-19.3

Test Mode	Carrier frequency (MHz)	Channel No.	Power Density (dBm/3kHz)
Coded 125K	2402	0	-3.5
Coded 125K	2440	19	-3.9
Coded 125K	2480	39	-4.5

Test Mode	Carrier frequency (MHz)	Channel No.	Power Density (dBm/3kHz)
Coded 500K	2402	0	-3.7
Coded 500K	2440	19	-5.7
Coded 500K	2480	39	-5.2



#### Test Mode: GFSK (LE 1Mbps)

