

FCC PART 15C&RSS-210
Measurement and Test Report
For
Shenzhen wanmai technology innovation Co.,LTD

FCC ID :2BHLY-WC165A

FCC/RSS Rule(s)/Methods:	FCC CFR Title 47 Part 15 Subpart C Section 15.249 RSS-210 Issue 11, June 25, 2024 RSS-Gen Issue 5, February 2021 ANSI C63.10:2020
Product Description:	Digital Wall Clock
Trademark	/
Model/Type reference.:	AC-WC165A, AC-WC120A, AC-WC120S, AC-WC130A, AC-WC130S, AC-WC165S, AC-WC260A, AC-WC260S, AC-WC360A, AC-WC360S
Report No.:	MAX25021402750021F
Date of receipt of test item	: Feb. 07, 2025
Date of sampling	: Feb. 07, 2025
Tested Date:	Feb. 07, 2025 to Feb. 17, 2025
Issued Date:	Feb. 17, 2025
Tested By:	Lris Yao/ Engineer
Reviewed By:	Levi Xiao/ EMC Manager
Approved & Authorized By:	Salon Ouyang / PSQ Manager
MAXLAB Testing Co., Ltd. 1/F, Building B, Xinshidai GR Park, Shiyan Street, Bao'an District, Shenzhen, Shiyan Street, Bao'an District, Shenzhen, Guangdong, 518052, People' s Republic of China Tel: 400-882-9628 Fax: 86- 755-26508703	

Table of Contents	Page
1.VERSION	3
2. SUMMARY OF TEST RESULTS	4
2.1 TEST FACILITY	5
2.2 MEASUREMENT UNCERTAINTY	5
3. GENERAL INFORMATION	6
3.1 GENERAL DESCRIPTION	6
3.2 DESCRIPTION OF TEST MODES	8
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	8
3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	8
3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	9
4. EMC EMISSION TEST	11
4.1 CONDUCTED EMISSION MEASUREMENT	11
4.1.1 POWER LINE CONDUCTED EMISSION Limits	11
4.1.2 TEST PROCEDURE	11
4.1.3 DEVIATION FROM TEST STANDARD	11
4.1.4 TEST SETUP	12
4.1.5 EUT OPERATING CONDITIONS	12
4.2.1 RADIATED EMISSION LIMITS	15
4.2.2 TEST PROCEDURE	16
4.2.3 DEVIATION FROM TEST STANDARD	16
4.2.4 TEST SETUP	16
4.2.5 EUT OPERATING CONDITIONS	17
5. CHANNEL BANDWIDTH	24
5.1 APPLIED PROCEDURES / LIMIT	24
5.3 DEVIATION FROM STANDARD	24
5.4 TEST SETUP	24
5.5 EUT OPERATION CONDITIONS	24
5.6 TEST RESULT	25
6.ANTENNA REQUIREMENT	27
7. TEST SETUP PHOTO	28
8. EUT CONSTRUCTIONAL DETAILS	28

1.VERSION

Report No.	Version	Description	Approved
MAX25021402750021F-1	Rev.01	Initial issue of report	Feb. 17, 2025

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C RSS-210 Issue 11, June 25, 2024/RSS-Gen Issue 5, February 2021			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203/15.249 (c) RSS-Gen Section 6.8	Antenna requirement	PASS	
FCC part 15.207 RSS-Gen Section 8.8	AC Power Line Conducted Emission	PASS	
FCC part 15.15.249 (a) RSS-210 B.10(a)	Field strength of the fundamental signal	PASS	
FCC part 15.15.249 (a) (d)/15.209 RSS-210 B.10(b) RSS GEN 8.10	Spurious emissions	PASS	
FCC part 15.249 (d)/15.205 RSS-210 B.10(b) RSS GEN 8.9	Band edge	PASS	
FCC part 15.215 (c) RSS-Gen Section 6.7	20dB Occupied Bandwidth	PASS	

NOTE:

(1)“N/A” denotes test is not applicable in this Test Report

2.1 TEST FACILITY

MAXLAB Testing Co., Ltd.

Add. : 1/F, Building B, Xinshidai GR Park, Shiyan Street, Bao'an District, Shenzhen, Shiyan Street, Bao'an District, Shenzhen, Guangdong, 518052, People's Republic of China

FCC Test Firm Registration Number: 562200

Designation Number: CN1338

IC Registered No.: 11093A

Designation Number: CN0019

2.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Power Spectral Density	U=1.75dB
10	humidity uncertainty	U=5.3%
11	Temperature uncertainty	U=0.59°C
12	OBW uncertainty	$U \pm 0.02\text{KHz}$

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION

Applicant:	Shenzhen wanmai technology innovation Co.,LTD
Address of applicant(FCC):	4#501, Pingshan MinQi TechnoPark, Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, China
Address of applicant(ISED):	4#501, Pingshan MinQi TechnoPark, Lishan Road, Taoyuan Street, Nanshan District Shenzhen Guangdong 518000 China
Manufacturer:	Shenzhen Tingrui Technology Co., Ltd
Address of manufacturer:	A808, Jieshun Technology Center, No. 5, Guansheng Second Road, Luhua Community, Guanhu Street, Longhua District, Shenzhen China
Product Name:	Digital Wall Clock
HVIN.:	AC-WC165A
Model Different.:	Only the model names are different.
Hardware version	V1.0
Software version	V1.0
Serial No.:	N/A
Sample(s) Status:	Engineer sample
Sample number.:	MAX20250123154
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	PCB antenna
Antenna gain:	-0.58dBi
Power supply:	DC 5V from USB port
SWITCHING POWER ADAPTER:	N/A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

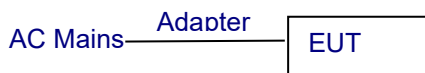
Test Software	BLE Test Tool
Power level setup	<0dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious



3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
/	ADAPTER	anker	ADS-5002000C	/	DC 5V/2A

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Emission					
Test Equipment	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	BSL252	2024-10-27	2025-10-26
EMI Test Receiver	R&S	ESCI 7	BSL552	2024-10-27	2025-10-26
Coaxial Switch	ANRITSU CORP	MP59B	BSL225	2024-10-27	2025-10-26
ENV216 2-L-V-NETZNACH B.DE	ROHDE&SCHWARZ	ENV216	BSL226	2024-10-27	2025-10-26
Coaxial Cable	BSL	N/A	BSL227	N/A	N/A
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Thermo meter	KTJ	TA328	BSL233	2024-10-27	2025-10-26
Absorbing clamp	Elektronik-Feinmechanik	MDS21	BSL229	2024-10-27	2025-10-26
LISN	R&S	ENV216	308	2024-10-27	2025-10-26
LISN	R&S	ENV216	314	2024-10-27	2025-10-26

Radiation Test equipment					
Test Equipment	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	BSL250	2024-10-27	2025-10-26
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	BSL251	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	BSL203	2024-10-27	2025-10-26
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	BSL214	2024-10-27	2025-10-26
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	BSL208	2024-10-27	2025-10-26
Horn Antenna	ETS-LINDGREN	3160	BSL217	2024-10-27	2025-10-26
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Coaxial Cable	BSL	N/A	BSL213	2024-10-27	2025-10-26
Coaxial Cable	BSL	N/A	BSL211	2024-10-27	2025-10-26
Coaxial cable	BSL	N/A	BSL210	2024-10-27	2025-10-26
Coaxial Cable	BSL	N/A	BSL212	2024-10-27	2025-10-26

Amplifier(100kHz-3 GHz)	HP	8347A	BSL204	2024-10-27	2025-10-26
Amplifier(2GHz-20 GHz)	HP	84722A	BSL206	2024-10-27	2025-10-26
Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	BSL218	2024-10-27	2025-10-26
Band filter	Amindeon	82346	BSL219	2024-10-27	2025-10-26
Power Meter	Anritsu	ML2495A	BSL540	2024-10-27	2025-10-26
Power Sensor	Anritsu	MA2411B	BSL541	2024-10-27	2025-10-26
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	BSL575	2024-10-27	2025-10-26
Splitter	Agilent	11636B	BSL237	2024-10-27	2025-10-26
Loop Antenna	ZHINAN	ZN30900A	BSL534	2024-10-27	2025-10-26
Breitband hornantenne	SCHWARZBECK	BBHA 9170	BSL579	2024-10-27	2025-10-26
Amplifier	TDK	PA-02-02	BSL574	2024-10-27	2025-10-26
Amplifier	TDK	PA-02-03	BSL576	2024-10-27	2025-10-26
PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	BSL578	2024-10-27	2025-10-26

RF Conducted Test:					
Test Equipment	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
MXA Signal Analyzer	Agilent	N9020A	BSL566	2024-10-27	2025-10-26
EMI Test Receiver	R&S	ESCI 7	BSL552	2024-10-27	2025-10-26
Spectrum Analyzer	Agilent	E4440A	BSL533	2024-10-27	2025-10-26
MXG vector Signal Generator	Agilent	N5182A	BSL567	2024-10-27	2025-10-26
ESG Analog Signal Generator	Agilent	E4428C	BSL568	2024-10-27	2025-10-26
USB RF Power Sensor	DARE	RPR3006W	BSL569	2024-10-27	2025-10-26
RF Switch Box	Shongyi	RFSW3003328	BSL571	2024-10-27	2025-10-26
Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-88 0	BSL572	2024-10-27	2025-10-26

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207&RSS-Gen Section 8.8
Test Method:	ANSI C63.10:2020
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quas-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

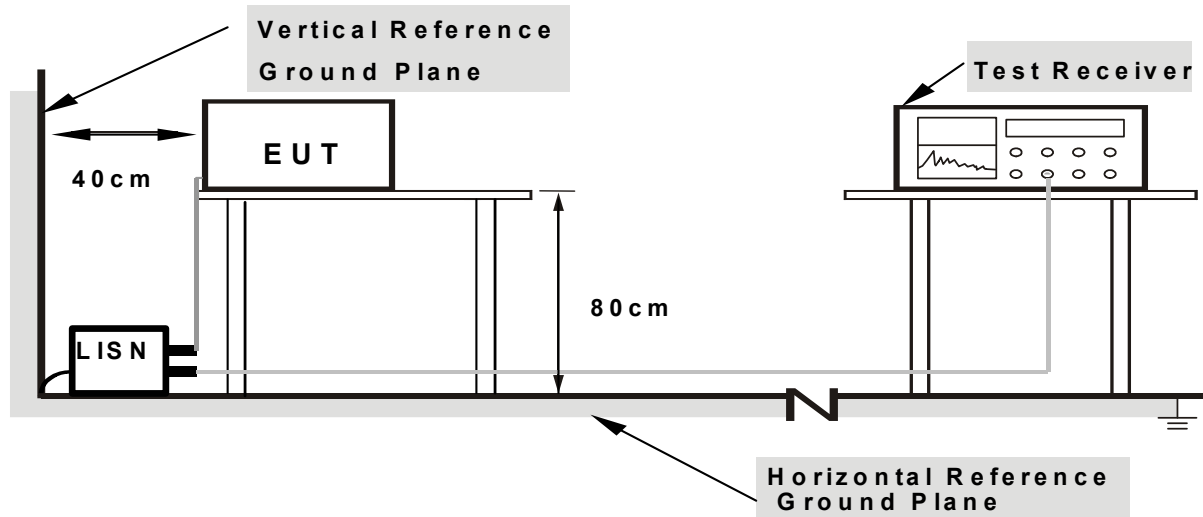
4.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



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

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

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to Charging during test. This operating condition was tested and used to collect the included data.

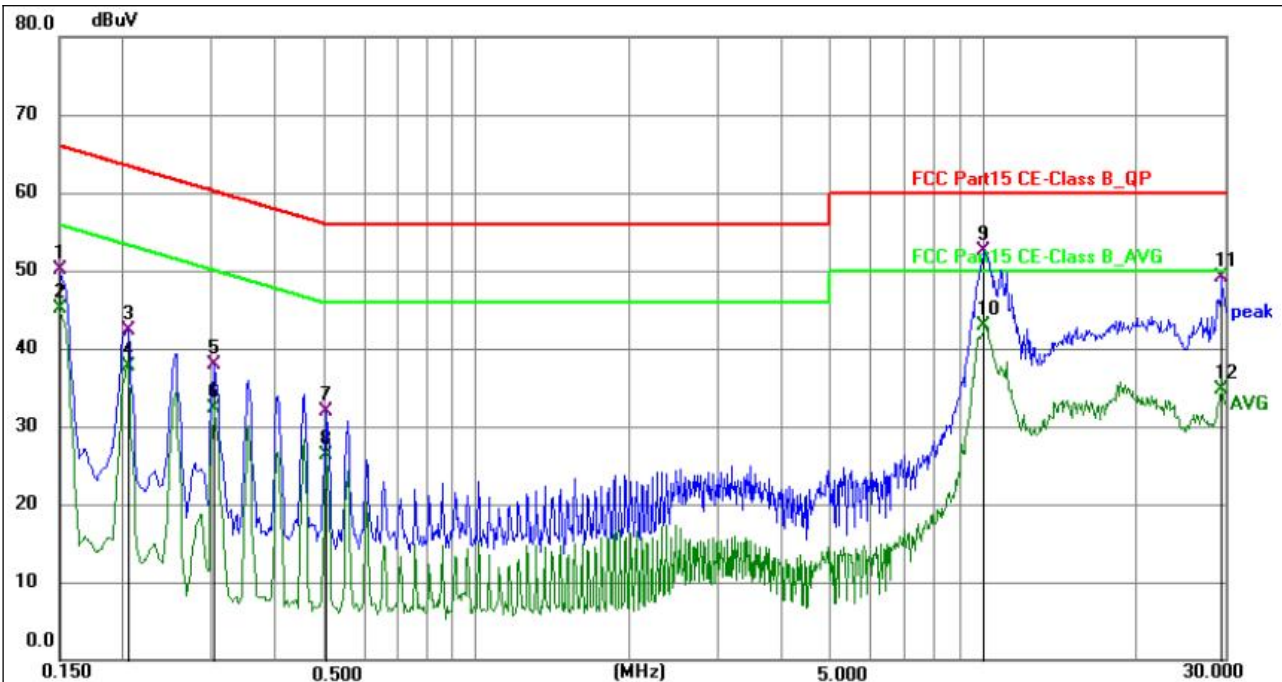
We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

4.1.6 Test Result

PASS

4.1.6 Test Result (Worst case GFSK 2402MHz)

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		

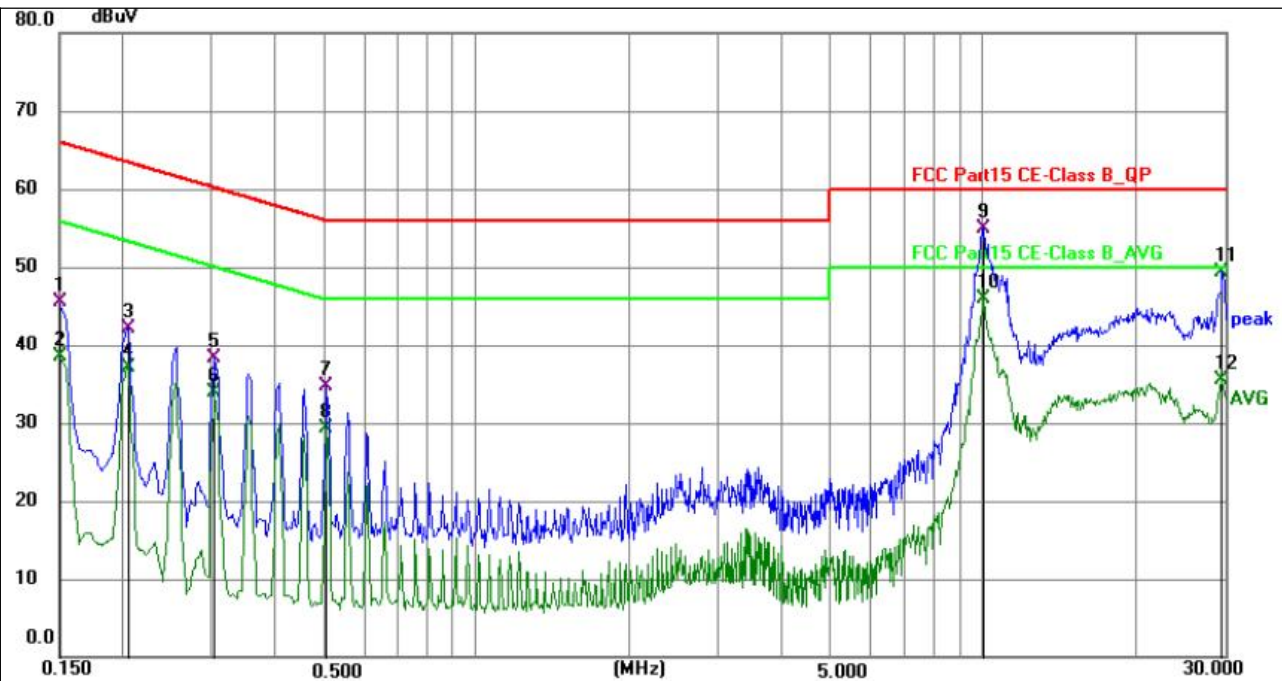


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	40.58	9.51	50.09	66.00	-15.91	QP	P	
2	0.1500	35.61	9.51	45.12	56.00	-10.88	AVG	P	
3	0.2040	32.61	9.71	42.32	63.45	-21.13	QP	P	
4	0.2040	28.02	9.71	37.73	53.45	-15.72	AVG	P	
5	0.3030	28.24	9.68	37.92	60.16	-22.24	QP	P	
6	0.3030	22.62	9.68	32.30	50.16	-17.86	AVG	P	
7	0.5055	22.30	9.62	31.92	56.00	-24.08	QP	P	
8	0.5055	16.65	9.62	26.27	46.00	-19.73	AVG	P	
9	10.0410	42.82	9.76	52.58	60.00	-7.42	QP	P	
10 *	10.0410	33.16	9.76	42.92	50.00	-7.08	AVG	P	
11	29.6565	39.30	9.72	49.02	60.00	-10.98	QP	P	
12	29.6565	24.92	9.72	34.64	50.00	-15.36	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	36.05	9.51	45.56	66.00	-20.44	QP	P	
2	0.1500	29.08	9.51	38.59	56.00	-17.41	AVG	P	
3	0.2040	32.37	9.71	42.08	63.45	-21.37	QP	P	
4	0.2040	27.35	9.71	37.06	53.45	-16.39	AVG	P	
5	0.3030	28.71	9.68	38.39	60.16	-21.77	QP	P	
6	0.3030	24.13	9.68	33.81	50.16	-16.35	AVG	P	
7	0.5055	25.08	9.62	34.70	56.00	-21.30	QP	P	
8	0.5055	19.63	9.62	29.25	46.00	-16.75	AVG	P	
9	10.0590	45.15	9.76	54.91	60.00	-5.09	QP	P	
10	10.0590	36.17	9.76	45.93	50.00	-4.07	AVG	P	
11 *	29.6070	39.68	9.72	49.40	60.00	-10.6	QP	P	
12	29.6070	25.83	9.72	35.55	50.00	-14.45	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. Measurement Level = Reading level + Correct Factor

4.2 Radiated Spurious Emissions, Restrict band and Field Strength of The Fundamental Signal

Test Requirement:	FCC CFR47 Part 15 Section 15.209 & 15.205&15.249 RSS-210 B.10(a)& RSS-210 B.10(b)&RSS GEN 8.10&RSS-210 B.10(b)&RSS GEN 8.9				
Test Method:	ANSI C63.10:2020				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

4.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (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

LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. 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:

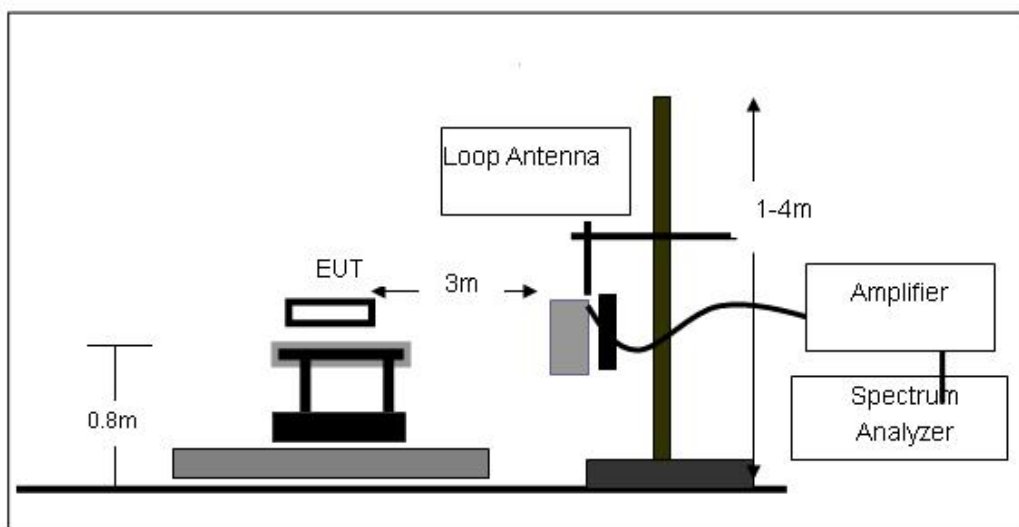
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

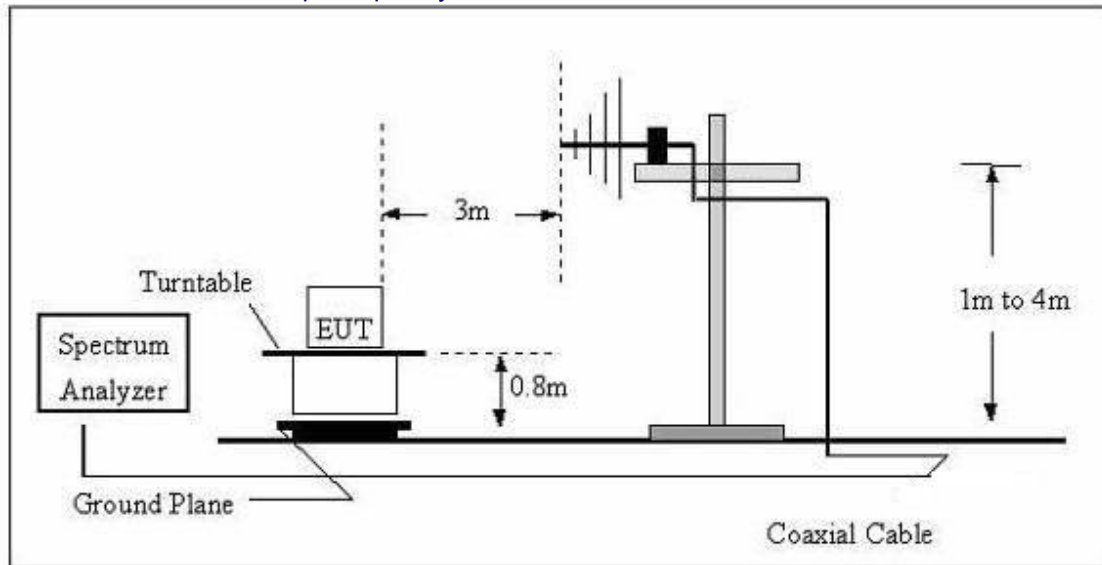
No deviation

4.2.4 TEST SETUP

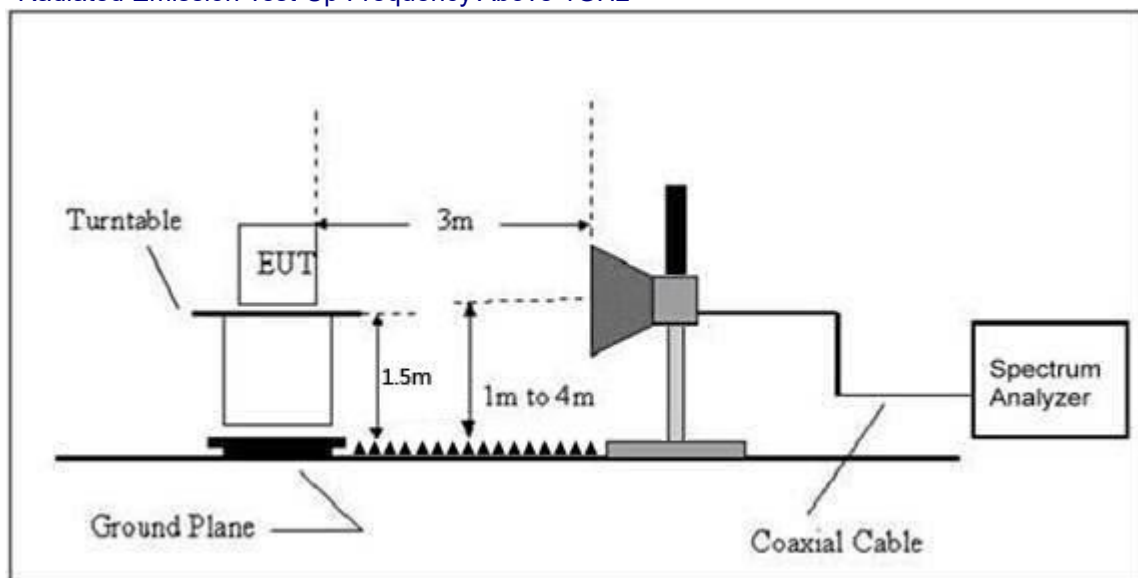
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

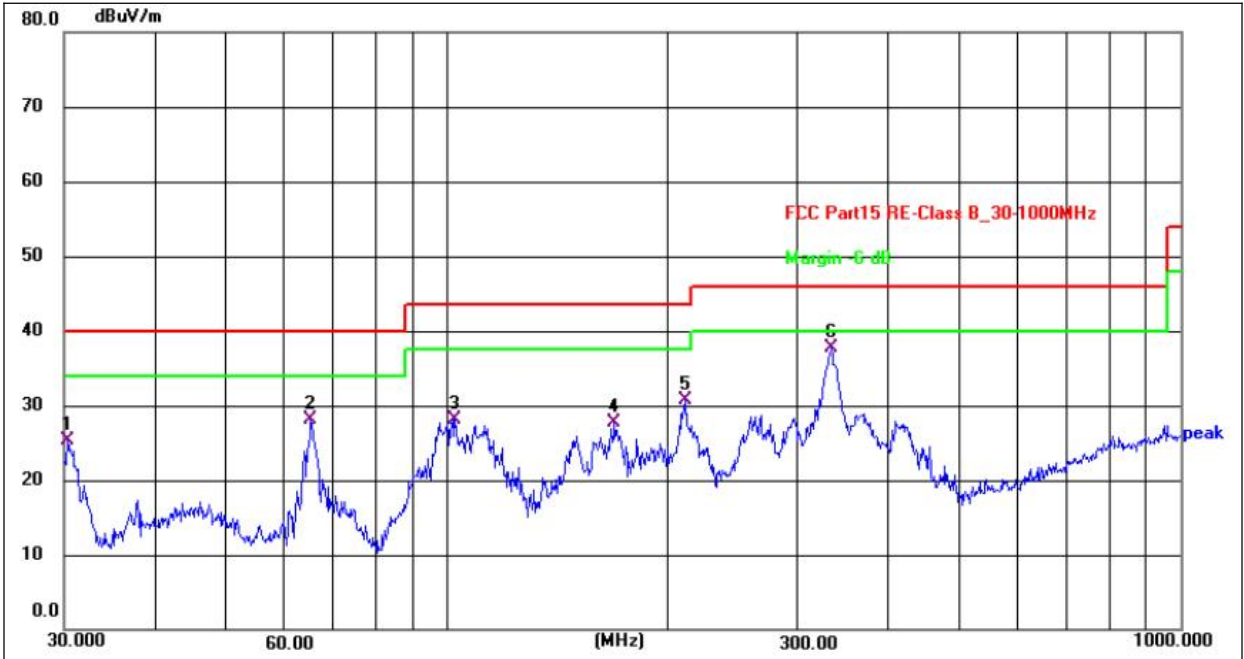
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

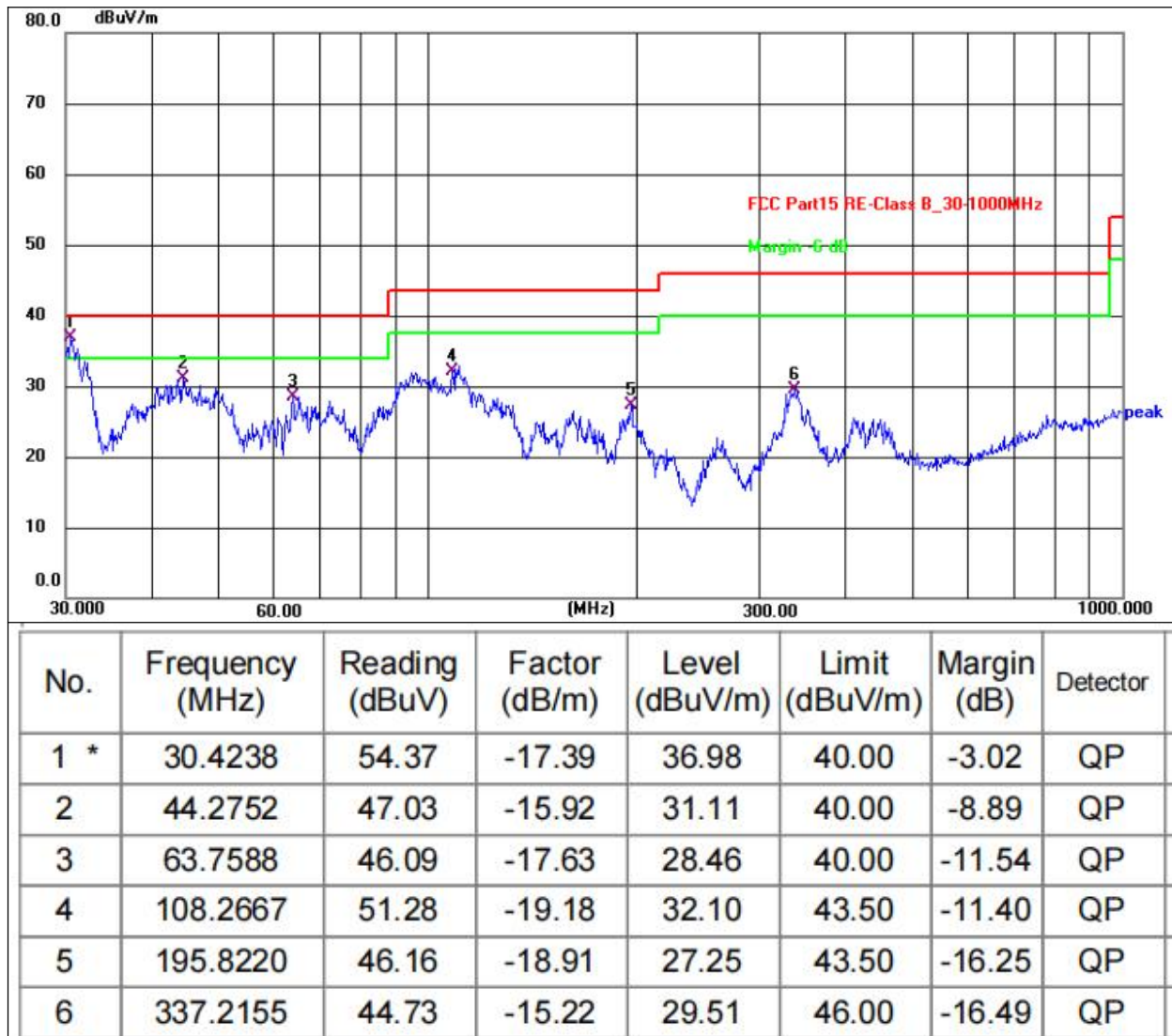
Between 30MHz – 1GHz (Worst case GFSK 2402MHz)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.3173	42.79	-17.41	25.38	40.00	-14.62	QP
2	65.1145	45.85	-17.75	28.10	40.00	-11.90	QP
3	102.3597	47.89	-19.80	28.09	43.50	-15.41	QP
4	169.0054	43.99	-16.36	27.63	43.50	-15.87	QP
5	211.5265	49.85	-19.18	30.67	43.50	-12.83	QP
6 *	333.6867	52.91	-15.25	37.66	46.00	-8.34	QP

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The test data shows only the worst case GFSK mode

1GHz~25GHz

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2402MHz									
V	4804.00	51.56	30.55	5.77	24.66	51.44	74.00	-22.56	Pk
V	4804.00	43.88	30.55	5.77	24.66	43.76	54.00	-10.24	AV
V	7206.00	52.69	30.33	6.32	24.55	53.23	74.00	-20.77	Pk
V	7206.00	43.27	30.33	6.32	24.55	43.81	54.00	-10.19	AV
V	9608.00	53.68	30.85	7.45	24.69	54.97	74.00	-19.03	Pk
V	9608.00	43.34	30.85	7.45	24.69	44.63	54.00	-9.37	AV
V	12010.00	54.66	31.02	8.99	25.57	58.20	74.00	-15.80	Pk
V	12010.00	43.15	31.02	8.99	25.57	46.69	54.00	-7.31	AV
H	4804.00	54.18	30.55	5.77	24.66	54.06	74.00	-19.94	Pk
H	4804.00	43.30	30.55	5.77	24.66	43.18	54.00	-10.82	AV
H	7206.00	51.12	30.33	6.32	24.55	51.66	74.00	-22.34	Pk
H	7206.00	43.99	30.33	6.32	24.55	44.53	54.00	-9.47	AV
H	9608.00	50.28	30.85	7.45	24.69	51.57	74.00	-22.43	Pk
H	9608.00	43.33	30.85	7.45	24.69	44.62	54.00	-9.38	AV
H	12010.00	50.34	31.02	8.99	25.57	53.88	74.00	-20.12	Pk
H	12010.00	43.99	31.02	8.99	25.57	47.53	54.00	-6.47	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2440MHz									
V	4880.00	52.74	30.55	5.77	24.66	52.62	74.00	-21.38	Pk
V	4880.00	43.08	30.55	5.77	24.66	42.96	54.00	-11.04	AV
V	7320.00	51.27	30.33	6.32	24.55	51.81	74.00	-22.19	Pk
V	7320.00	43.61	30.33	6.32	24.55	44.15	54.00	-9.85	AV
V	9760.00	53.52	30.85	7.45	24.69	54.81	74.00	-19.19	Pk
V	9760.00	43.90	30.85	7.45	24.69	45.19	54.00	-8.81	AV
V	12200.00	51.50	31.02	8.99	25.57	55.04	74.00	-18.96	Pk
V	12200.00	43.84	31.02	8.99	25.57	47.38	54.00	-6.62	AV
H	4880.00	52.15	30.55	5.77	24.66	52.03	74.00	-21.97	Pk
H	4880.00	43.27	30.55	5.77	24.66	43.15	54.00	-10.85	AV
H	7320.00	52.93	30.33	6.32	24.55	53.47	74.00	-20.53	Pk
H	7320.00	43.58	30.33	6.32	24.55	44.12	54.00	-9.88	AV
H	9760.00	51.47	30.85	7.45	24.69	52.76	74.00	-21.24	Pk
H	9760.00	43.62	30.85	7.45	24.69	44.91	54.00	-9.09	AV
H	12200.00	53.65	31.02	8.99	25.57	57.19	74.00	-16.81	Pk
H	12200.00	43.71	31.02	8.99	25.57	47.25	54.00	-6.75	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	50.07	30.55	5.77	24.66	49.95	74.00	-24.05	Pk
V	4960.00	43.89	30.55	5.77	24.66	43.77	54.00	-10.23	AV
V	7440.00	51.72	30.33	6.32	24.55	52.26	74.00	-21.74	Pk
V	7440.00	43.11	30.33	6.32	24.55	43.65	54.00	-10.35	AV
V	9920.00	54.73	30.85	7.45	24.69	56.02	74.00	-17.98	Pk
V	9920.00	43.49	30.85	7.45	24.69	44.78	54.00	-9.22	AV
V	12400.00	54.20	31.02	8.99	25.57	57.74	74.00	-16.26	Pk
V	12400.00	43.40	31.02	8.99	25.57	46.94	54.00	-7.06	AV
H	4960.00	54.54	30.55	5.77	24.66	54.42	74.00	-19.58	Pk
H	4960.00	43.70	30.55	5.77	24.66	43.58	54.00	-10.42	AV
H	7440.00	50.62	30.33	6.32	24.55	51.16	74.00	-22.84	Pk
H	7440.00	43.39	30.33	6.32	24.55	43.93	54.00	-10.07	AV
H	9920.00	50.75	30.85	7.45	24.69	52.04	74.00	-21.96	Pk
H	9920.00	43.09	30.85	7.45	24.69	44.38	54.00	-9.62	AV
H	12400.00	54.68	31.02	8.99	25.57	58.22	74.00	-15.78	Pk
H	12400.00	43.13	31.02	8.99	25.57	46.67	54.00	-7.33	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Spurious Emission in Restricted Band 2310-2400 and 2483.5-2500MHz

	Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Detec tor Type	Result
GFSK	Low Channel: 2402MHz									
	H	2390.00	54.12	30.22	4.85	23.98	52.73	74.00	Pk	PASS
	H	2390.00	44.37	30.22	4.85	23.98	42.98	54.00	AV	PASS
	H	2400.00	53.18	30.22	4.85	23.98	51.79	74.00	Pk	PASS
	H	2400.00	44.58	30.22	4.85	23.98	43.19	54.00	AV	PASS
	V	2390.00	53.41	30.22	4.85	23.98	52.02	74.00	Pk	PASS
	V	2390.00	44.64	30.22	4.85	23.98	43.25	54.00	AV	PASS
	V	2400.00	53.25	30.22	4.85	23.98	51.86	74.00	Pk	PASS
	V	2400.00	44.13	30.22	4.85	23.98	42.74	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	53.87	30.22	4.85	23.98	52.48	74.00	Pk	PASS
	H	2483.50	44.15	30.22	4.85	23.98	42.76	54.00	AV	PASS
	H	2500.00	53.68	30.22	4.85	23.98	52.29	74.00	Pk	PASS
	H	2500.00	44.84	30.22	4.85	23.98	43.45	54.00	AV	PASS
	V	2483.50	54.60	30.22	4.85	23.98	53.21	74.00	Pk	PASS
	V	2483.50	44.94	30.22	4.85	23.98	43.55	54.00	AV	PASS
	V	2500.00	54.15	30.22	4.85	23.98	52.76	74.00	Pk	PASS
	V	2500.00	44.61	30.22	4.85	23.98	43.22	54.00	AV	PASS

Remark:

Emission Level = Meter Reading + Antenna Factor + Cable Loss - Pre-amplifier, Margin= Emission Level - Limit
 . The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Field Strength of The Fundamental Signal Data

GFSK

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
Low Channel: 2402MHz									
2402	103.17	PK	230	1.8	V	-1.06	102.11	114.00	-11.89
2402	90.58	Ave	289	1.9	V	-1.06	89.52	94.00	-4.48
2402	102.66	PK	130	1.4	H	-1.06	101.60	114.00	-12.40
2402	89.88	Ave	130	1.4	H	-1.06	88.82	94.00	-5.18

Mid CH

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
Middle Channel:2440MHz									
2440	102.12	PK	229	1.3	V	-1.32	100.80	114.00	-13.20
2440	89.05	Ave	229	1.3	V	-1.32	87.73	94.00	-6.27
2440	102.88	PK	156	1.6	H	-1.32	101.56	114.00	-12.44
2440	90.77	Ave	156	1.6	H	-1.32	89.45	94.00	-4.55

High CH

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
High Channel: 2480MHz									
2480	102.07	PK	164	1.7	V	-1.78	100.29	114.00	-13.71
2480	90.65	Ave	164	1.7	V	-1.78	88.87	94.00	-5.13
2480	102.98	PK	264	1.9	H	-1.78	101.20	114.00	-12.80
2480	91.68	Ave	264	1.9	H	-1.78	89.90	94.00	-4.10

5. CHANNEL BANDWIDTH

Test Requirement:	FCC CFR47 Part 15 Section 15.215&RSS-Gen Section 6.7
Test Method:	ANSI C63.10:2020

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.215) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.215	Bandwidth	(-20dB bandwidth)	2400-2483.5	PASS

5.2 TEST PROCEDURE

1. Set the spectrum analyzer: RBW = 1%-5% OBW
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by -20 dB relative to the maximum level measured in the fundamental emission.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

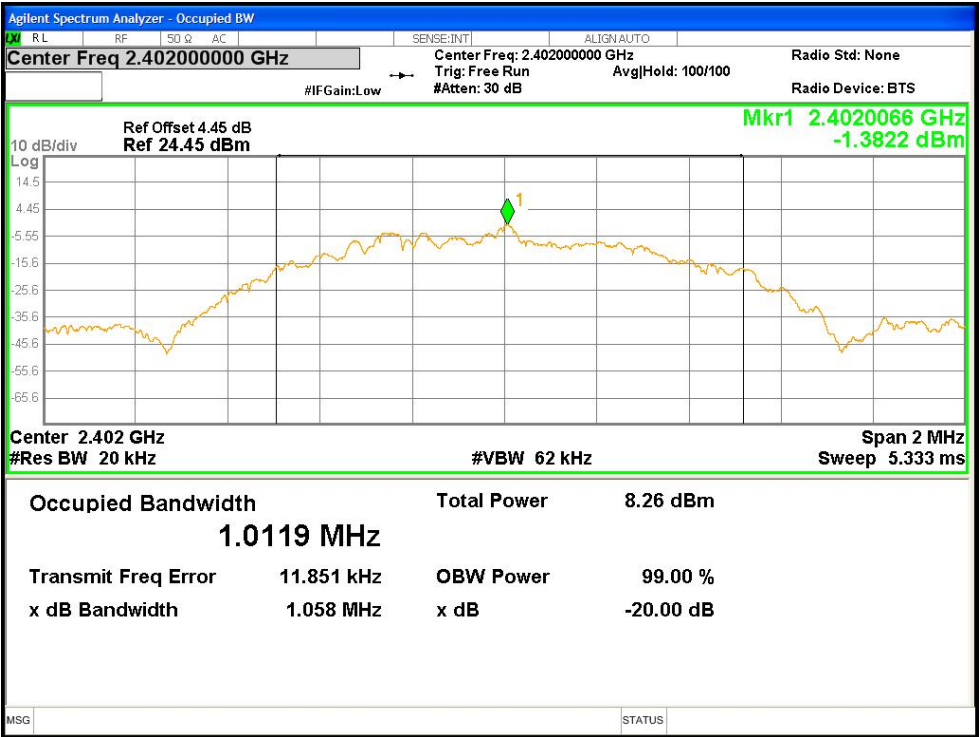


5.5 EUT OPERATION CONDITIONS

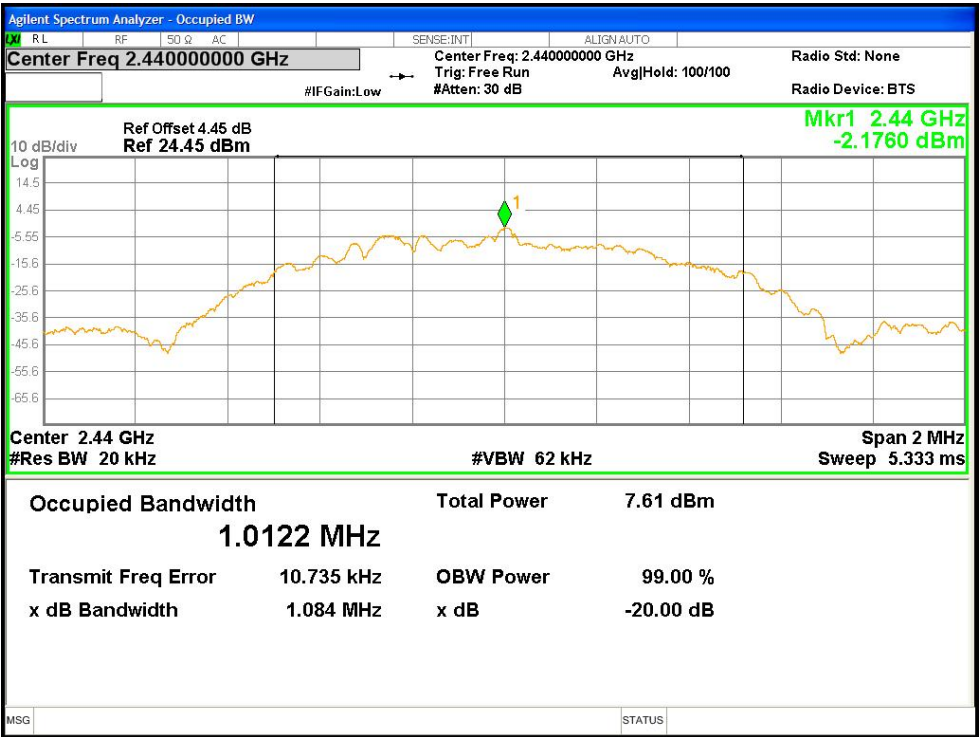
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULT

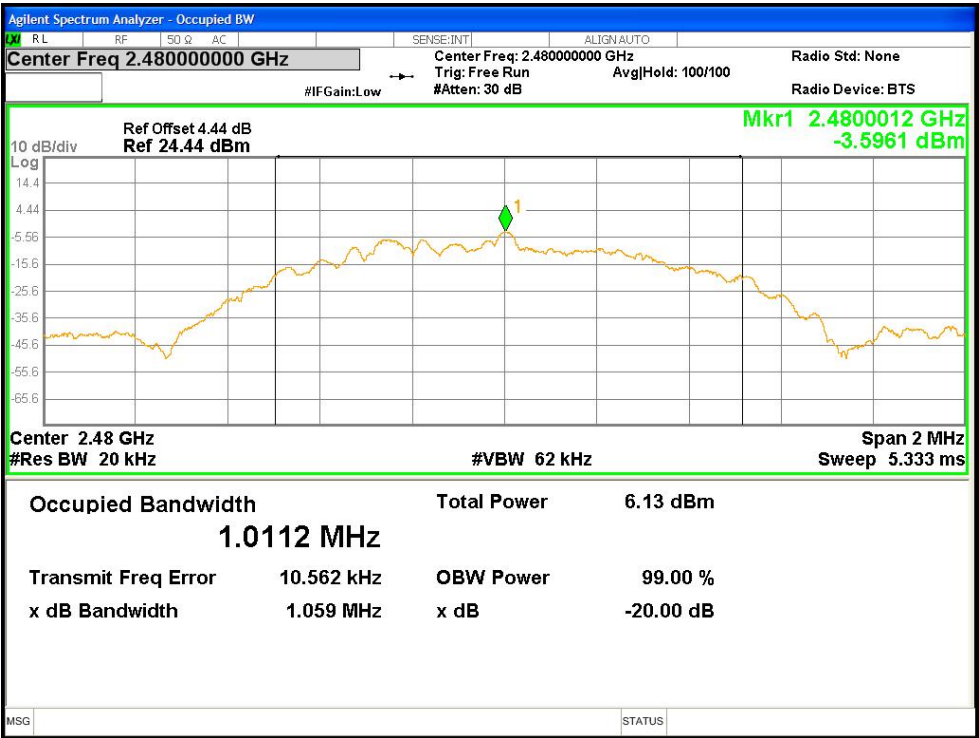
Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20dB OBW (MHz)
BLE 1M	2402	Ant1	1.012	1.058
BLE 1M	2440	Ant1	1.012	1.084
BLE 1M	2480	Ant1	1.011	1.059



OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2440MHz Ant1



OBW NVNT BLE 1M 2480MHz Ant1

6.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203&RSS-Gen Section 6.8
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. According to the RSS-GEN section 6.8, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has an PCB antenna fulfil the requirement of this section	
EUT Antenna:	
The antenna is PCB ANT, the best case gain of the antennas is -0.58dBi, reference to the appendix II for details	

7. TEST SETUP PHOTO

Reference to the appendix I for details.

8. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

******* END OF REPORT *******