



FCC TEST REPORT

FCC ID:2A4KA-JSM19

Report Number..... : ZKT-2603273352E

Date of Test..... Apr. 07, 2026 to Apr. 29, 2026

Date of issue..... : Apr. 29, 2026

Total number of pages..... : 32

Test Result : PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Dongguan Tunling Electronic Technology Co.,Ltd.

Address : 802,Floor 8,55A Shayong Road, Shatou Community,Chang'an Town, Dongguan City, China

Manufacturer's name : Dongguan Tunling Electronic Technology Co.,Ltd.

Address : 802,Floor 8,55A Shayong Road, Shatou Community,Chang'an Town, Dongguan City, China

Test specification:

Standard..... : FCC CFR Title 47 Part 15 Subpart C Section 15.231
ANSI C63.10-2020+Cor 1-2023

Test procedure..... : /

Non-standard test method : N/A

Test Report Form No..... : TRF-EL-108_V0

Test Report Form(s) Originator..... : ZKT Testing

Master TRF : Dated: 2020-01-06

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

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Product name..... : Chicken Coop Door 19

Trademark : N/A

Model/Type reference..... : JSM19
JSM20, JSM21

Ratings..... : Input: 5V---2A
Battery: DC 3.7V, 1000mAh, 3.7Wh



Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Jim Liu

Jim Liu

Reviewer (name + signature).....: Jackson Fang

Jackson Fang

Approved (name + signature).....: Lake Xie





Table of Contents	Page
1. VERSION	5
2. SUMMARY OF TEST RESULTS	6
2.1 TEST FACILITY	7
2.2 MEASUREMENT UNCERTAINTY	7
3. GENERAL INFORMATION	8
3.1 GENERAL DESCRIPTION OF EUT	8
3.2 TEST CHANNEL	9
3.3 DESCRIPTION OF TEST MODES	9
3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
3.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	9
3.6 EQUIPMENTS LIST FOR ALL TEST ITEMS	10
4. EMC EMISSION TEST	12
4.1 CONDUCTED EMISSION MEASUREMENT	12
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
4.1.2 TEST PROCEDURE	13
4.1.3 DEVIATION FROM TEST STANDARD	13
4.1.4 TEST SETUP	13
4.1.5 EUT OPERATING CONDITIONS	13
4.1.6 TEST RESULTS	14
4.2 RADIATED EMISSION MEASUREMENT	16
4.2.1 RADIATED EMISSION LIMITS	16
4.2.2 TEST PROCEDURE	18
4.2.3 TEST SETUP	18
4.2.4 EUT OPERATING CONDITIONS	19
4.2.5 TEST RESULTS	19
5. 20DB OCCUPIED BANDWIDTH	24
5.1 APPLIED PROCEDURES / LIMIT	24
5.2 TEST PROCEDURE	24
5.3 DEVIATION FROM STANDARD	24
5.4 TEST SETUP	24
5.5 EUT OPERATION CONDITIONS	24
5.6 TEST RESULTS	25
6. CALCULATION OF AVERAGE FACTOR	26
7. DWELL TIME	27
7.1 APPLICABLE STANDARD	27
7.2 TEST PROCEDURE	27
7.5 EUT OPERATION CONDITIONS	27



Table of Contents

Page

7.6 TEST RESULTS	28
8. ANTENNA REQUIREMENT	29
9. TEST SETUP PHOTO	30
10. EUT CONSTRUCTIONAL DETAILS	30



1. VERSION

Report No.	Version	Description	Approved
ZKT-2604020150E	Rev.01	Initial issue of report	Apr. 29, 2026



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.231) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emission	PASS	
15.209 & 15.231(e)	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.231(c)	20dB Occupied Bandwidth	PASS	
15.231(e)	Dwell Time	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 927491

Designation Number: CN1431

IC Registered No.: 27033

CAB identifier: CN0110

Designation Number: CN0110

2.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber 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 Occupied Bandwidth	U=1.8MHz
10	RF Power Spectral Density	U=1.75dB
11	Dwell Time	U=0.02ms
12	Humidity Uncertainty	U=5.3%
13	Temperature Uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment Name:	Chicken Coop Door 19
Trademark:	N/A
Model Name.:	JSM19
Serial Model:	JSM20, JSM21
Model Difference:	All the model are the same circuit and RF module, Only the model name different.
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	421.00MHz
Modulation Type:	FSK
Antenna Type:	Spring Antenna
Antenna Gain:	2dBi
Power Supply:	Input: 5V---2A
Battery:	DC 3.7V, 1000mAh, 3.7Wh



3.2 TEST CHANNEL

Channel List	
Channel	Frequency
01	421.00 MHz

3.3 DESCRIPTION OF TEST MODES

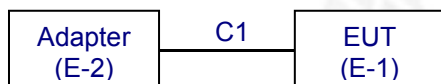
For All Emission	
Final Test Mode	Description
Transmitting Mode	Keep the EUT in transmitter activated automatically mode.
Charging Mode	Keep the EUT in Charging mode.
Test Software	When the EUT is powered on, simply press and hold any key to start the transmission without the need for test software control
Power level setup	Default

Note:

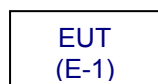
- (1) Fully-charged battery is used during the test.
- (2) For battery operated equipment, the equipment tests shall be performed using a new battery.

3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



3.5 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
E-1	Chicken Coop Door 19	N/A	JSM19	N/A	EUT
E-2	AC/DC Adapter	UGREEN	X569	E63003923231	Auxiliary
	AC/DC Adapter Input: 100-240V ~ 50/60Hz, 1A Max; Output: 5V/9V/12V/15V/20V/28V				

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	0.3M	USB Cable

Note:

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



3.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conduction Emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Sep. 23, 2025	Sep. 22, 2026
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Sep. 19, 2025	Sep. 18, 2026
3	Test Cable	N/A	C-01	N/A	N/A	May. 22, 2025	May. 21, 2026
4	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Oct. 24, 2025	Oct. 23, 2026
5	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Emissions & Radiation Spurious Emissions Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Oct. 24, 2025	Oct. 23, 2026
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	00877	N/A	Sep. 20, 2025	Sep. 19, 2026
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Sep. 20, 2025	Sep. 19, 2026
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Sep. 30, 2025	Sep. 29, 2026
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Sep. 20, 2025	Sep. 19, 2026
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Sep. 19, 2025	Sep. 18, 2026
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Sep. 19, 2025	Sep. 18, 2026
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Oct. 24, 2025	Oct. 23, 2026
11	Test Cable	N/A	R-01	N/A	N/A	May. 25, 2025	May. 24, 2026
12	Test Cable	N/A	R-02	N/A	N/A	May. 25, 2025	May. 24, 2026
13	Test Cable	N/A	R-03	N/A	N/A	May. 25, 2025	May. 24, 2026
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802BS	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\



RF Conducted Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	N9020A	MY55370835	A.17.05	Sep. 20, 2025	Sep. 19, 2026
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Sep. 20, 2025	Sep. 19, 2026
3	Test Cable	N/A	RF-01	N/A	N/A	May. 25, 2025	May. 24, 2026
4	Test Cable	N/A	RF-02	N/A	N/A	May. 25, 2025	May. 24, 2026
5	Test Cable	N/A	RF-03	N/A	N/A	May. 25, 2025	May. 24, 2026
6	ESG Signal Generator	Agilent	E4421B	GB40051203	B.03.84	Sep. 19, 2025	Sep. 18, 2026
7	Signal Generator	Agilent	N5182A	MY47420215	A.01.87	Sep. 20, 2025	Sep. 19, 2026
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Sep. 25, 2025	Sep. 24, 2026
9	SHIELD BOX	TESCOM	TC-5970C	5970C015553	N/A	Dec. 18, 2025	Dec. 17, 2026
10	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Sep. 28, 2025	Sep. 27, 2026
11	MWRF Power Meter Test system	MW	MW100-R FCB	10371	N/A	Sep. 19, 2025	Sep. 18, 2026
12	MWRF Power Sensor	MW	MW100-P SB	10371	N/A	Sep. 19, 2025	Sep. 18, 2026
13	Power Meter	KEYSIGHT	N1912AP	926431	A.05.00	Sep. 19, 2025	Sep. 18, 2026
14	D.C. Power Supply	LongWei	TPR-6405 D	GQ7516	N/A	Sep. 19, 2025	Sep. 18, 2026
15	Attenuators	XINQY	XQY-SMAJ KS-12-2W	N/A	N/A	Sep. 19, 2025	Sep. 18, 2026
16	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020+Cor 1-2023
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS

(Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-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) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



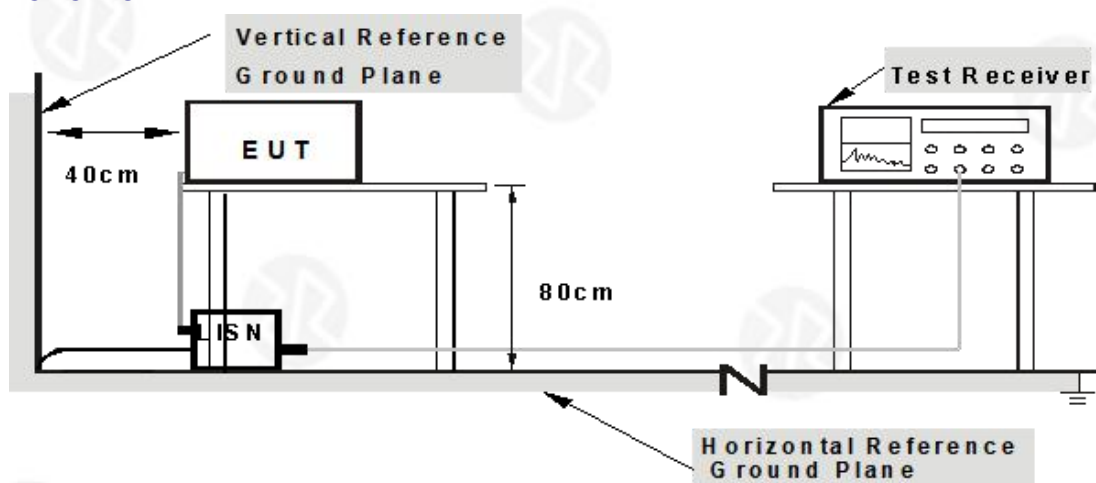
4.1.2 TEST PROCEDURE

- 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 from other units and other metal planes

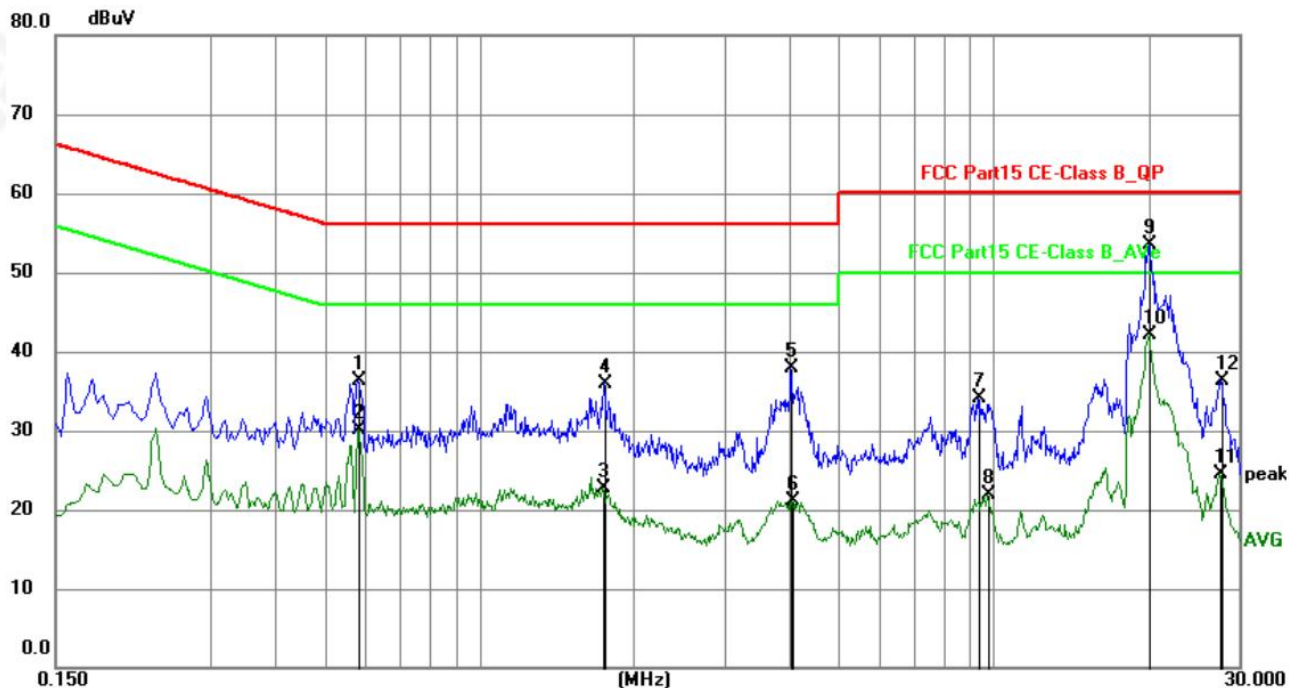
4.1.5 EUT OPERATING CONDITIONS

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.



4.1.6 TEST RESULTS

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



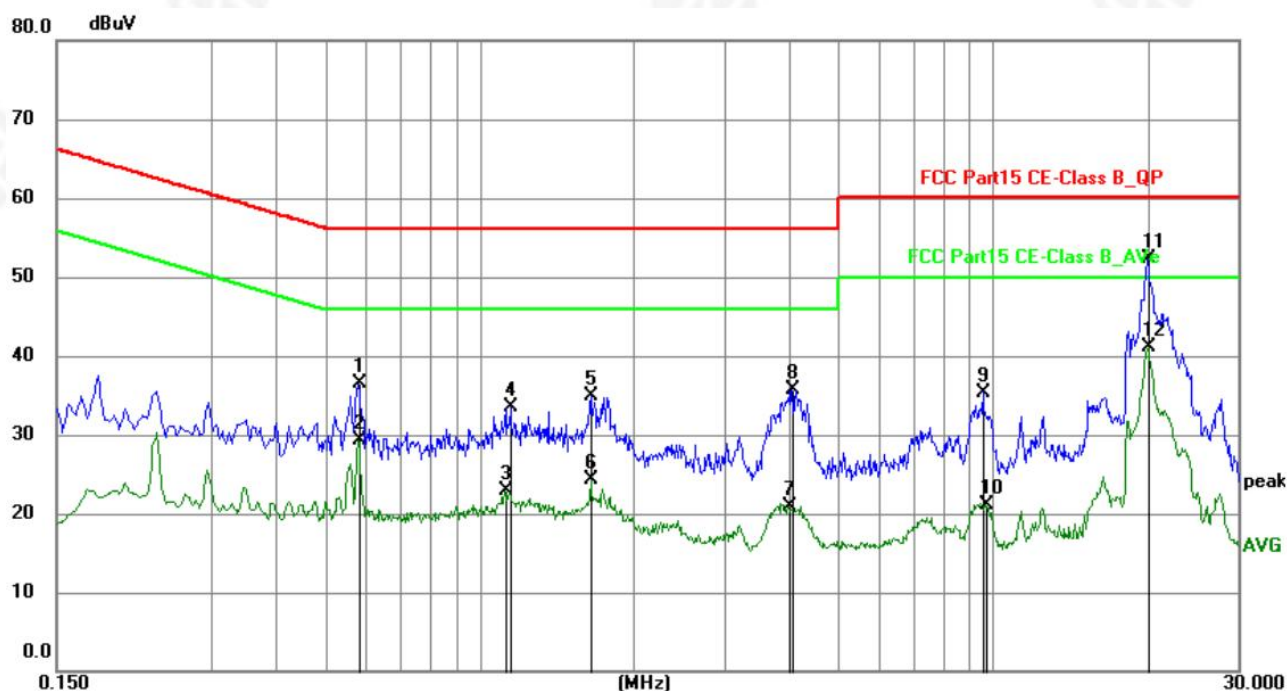
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5820	16.74	19.63	36.37	56.00	-19.63	QP	P	
2	0.5820	10.41	19.63	30.04	46.00	-15.96	AVG	P	
3	1.7430	3.06	19.67	22.73	46.00	-23.27	AVG	P	
4	1.7475	16.33	19.67	36.00	56.00	-20.00	QP	P	
5	4.0470	18.14	19.71	37.85	56.00	-18.15	QP	P	
6	4.0695	1.46	19.71	21.17	46.00	-24.83	AVG	P	
7	9.3255	14.31	19.76	34.07	60.00	-25.93	QP	P	
8	9.7350	2.08	19.76	21.84	50.00	-28.16	AVG	P	
9	20.0895	33.66	19.80	53.46	60.00	-6.54	QP	P	
10	20.0895	22.25	19.80	42.05	50.00	-7.95	AVG	P	
11	27.5550	4.72	19.76	24.48	50.00	-25.52	AVG	P	
12	27.7305	16.50	19.76	36.26	60.00	-23.74	QP	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. Final Level = Reading level + Correct Factor.
4. Correct Factor = Lism factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The EUT cannot be charged and operated at the same time.



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



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5820	16.82	19.62	36.44	56.00	-19.56	QP	P	
2	0.5820	9.59	19.62	29.21	46.00	-16.79	AVG	P	
3	1.1174	3.17	19.65	22.82	46.00	-23.18	AVG	P	
4	1.1490	13.91	19.65	33.56	56.00	-22.44	QP	P	
5	1.6485	15.31	19.66	34.97	56.00	-21.03	QP	P	
6	1.6485	4.61	19.66	24.27	46.00	-21.73	AVG	P	
7	3.9930	1.29	19.69	20.98	46.00	-25.02	AVG	P	
8	4.0515	15.94	19.69	35.63	56.00	-20.37	QP	P	
9	9.5685	15.65	19.75	35.40	60.00	-24.60	QP	P	
10	9.7035	1.44	19.75	21.19	50.00	-28.81	AVG	P	
11	20.0175	32.57	19.77	52.34	60.00	-7.66	QP	P	
12	20.0895	21.28	19.77	41.05	50.00	-8.95	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. Final Level = Reading level + Correct Factor.
4. Correct Factor = Liss factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. The EUT cannot be charged and operated at the same time.



4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209 & 15.231(e)				
Test Method:	ANSI C63.10-2020+Cor 1-2023				
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	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	3MHz	Average

4.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.231(b) limit in the table below has to be followed.

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).



FUNDAMENTAL AND HARMONICS EMISSION LIMITS

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1000	100
70-130	500	50
130-174	500-1500 ¹	50-150 ¹
174-260	1500	150
260-470	1500-5000 ¹	150-500 ¹
Above 470	5000	500

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818 \cdot (F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667 \cdot (F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

Frequency	Limit (dB $\mu\text{V/m}$ @3m)	Remark
421.00MHz	80.39	Average Value
	100.39	Peak Value

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW setting	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP



4.2.2 TEST PROCEDURE

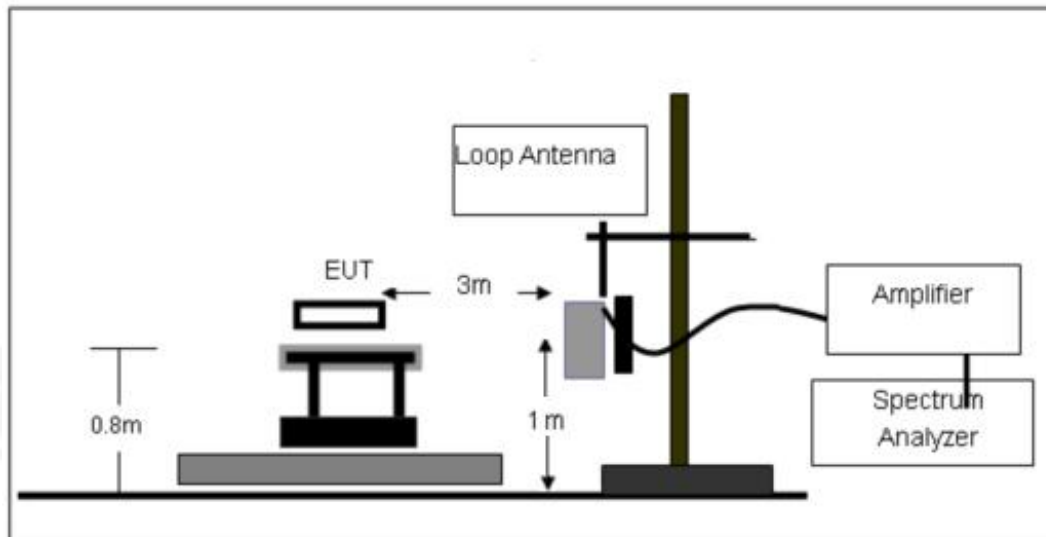
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; 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.
- 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.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

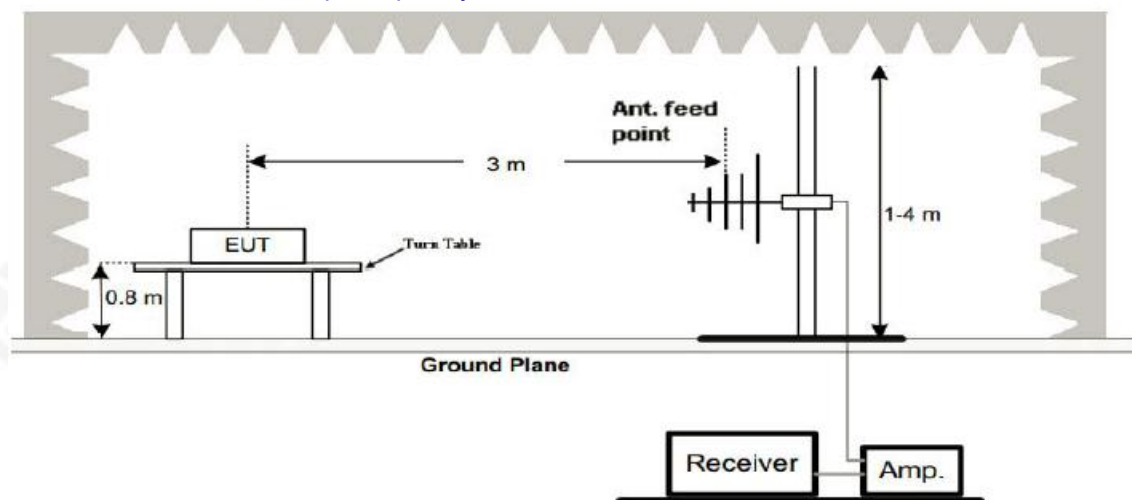
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case was X axis and the emissions were reported

4.2.3 TEST SETUP

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

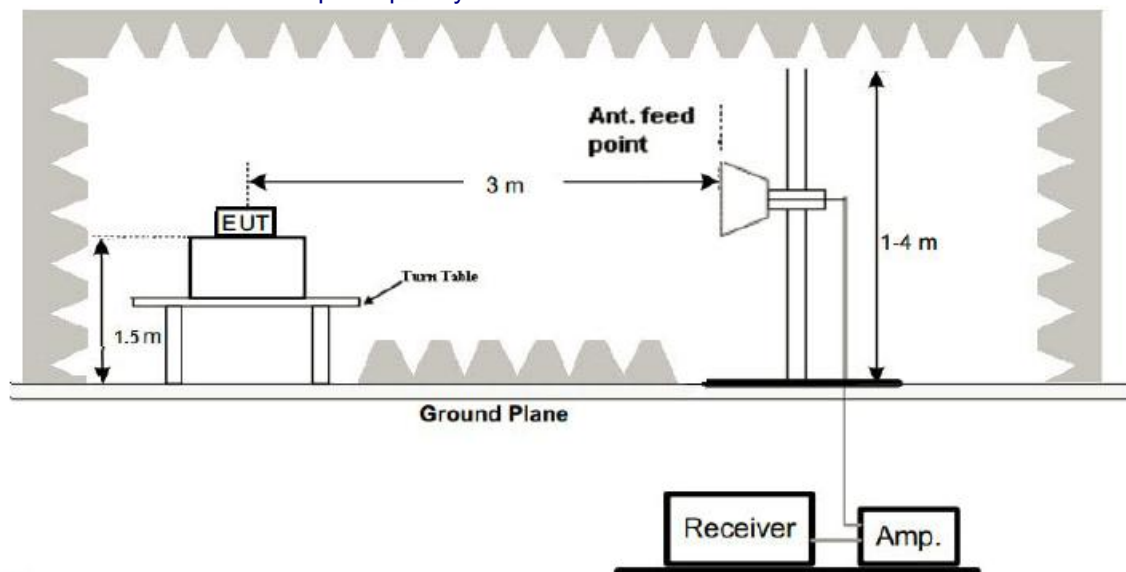


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





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



4.2.4 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 transmitter activated automatically during test. This operating condition was tested and used to collect the included data.

4.2.5 TEST RESULTS

Radiated Spurious Emission (Below 9KHz – 30MHz)

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization :	---
Test Voltage :	DC 3.7V		
Test Mode :	TX Mode		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

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

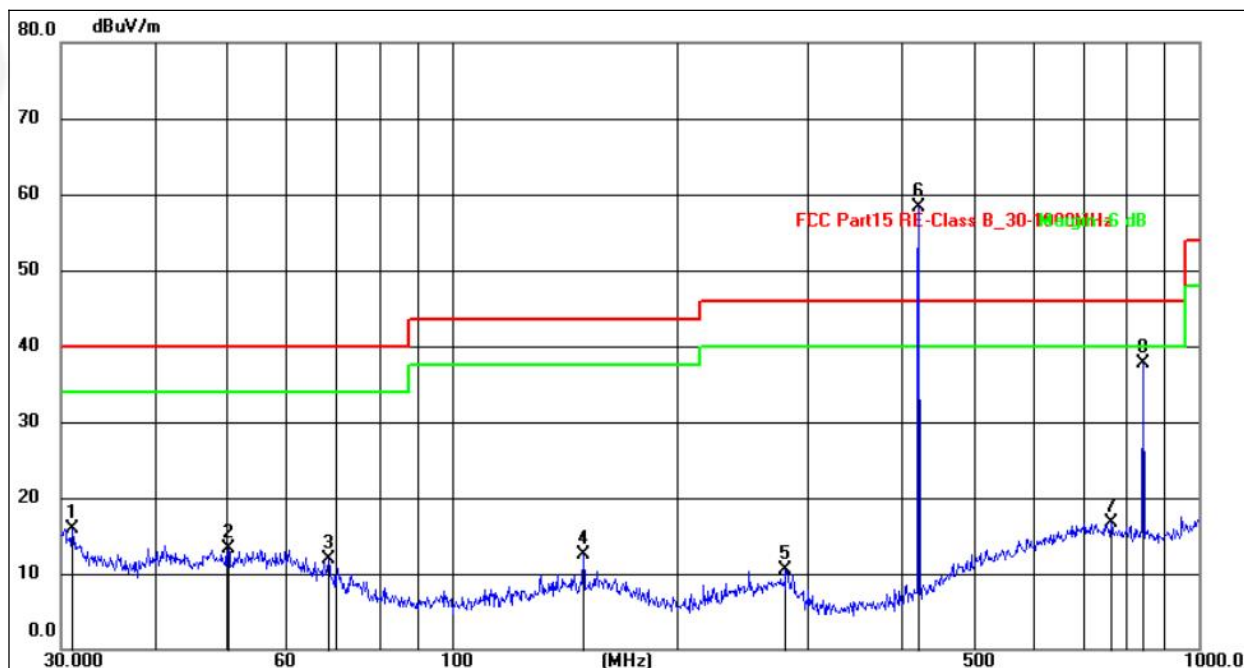
Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V	Test Mode :	TX Mode



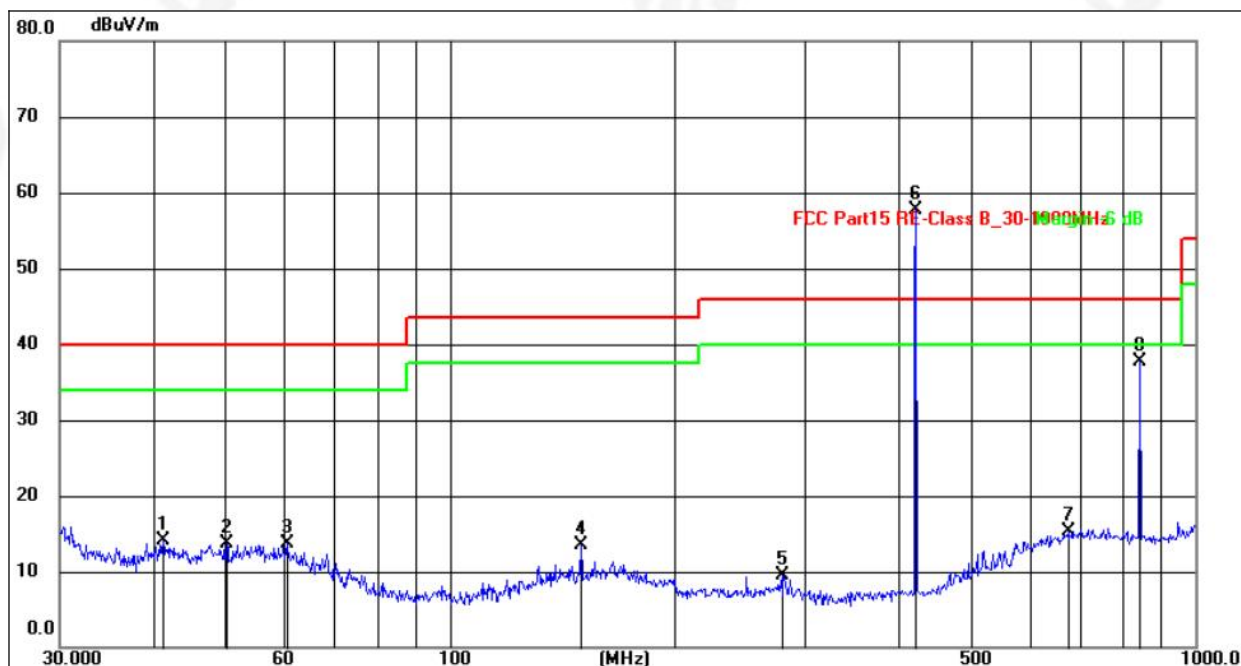
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.0706	31.56	-15.58	15.98	40.00	-24.02	QP
2	50.2324	28.62	-15.35	13.27	40.00	-26.73	QP
3	68.3906	29.76	-17.88	11.88	40.00	-28.12	QP
4	150.0108	31.45	-18.94	12.51	43.50	-30.99	QP
5	280.0237	29.06	-18.63	10.43	46.00	-35.57	QP
6	421.0000	78.60	-20.37	58.23	100.39	-42.16	peak
7	763.3757	29.59	-12.83	16.76	46.00	-29.24	QP
8	842.0000	50.87	-13.20	37.67	80.39	-42.72	peak

Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization :	Vertical
Test Voltage :	DC 3.7V	Test Mode :	TX Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	41.2764	29.54	-15.38	14.16	40.00	-25.84	QP
2	50.2323	29.12	-15.35	13.77	40.00	-26.23	QP
3	60.4917	29.41	-15.73	13.68	40.00	-26.32	QP
4	150.0107	32.45	-18.94	13.51	43.50	-29.99	QP
5	280.0237	28.06	-18.63	9.43	46.00	-36.57	QP
6	421.0000	78.10	-20.37	57.73	100.39	-42.66	peak
7	675.2078	28.30	-12.91	15.39	46.00	-30.61	QP
8	842.0000	50.80	-13.20	37.60	80.39	-42.79	peak

Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.



For Average Emission								
Frequency (MHz)	Reading (dBuV)	Factor (dB)	Peak Level (dBuV/m)	Duty cycle Factor (dB)	Average Level (dBuV/m)	Limit AV (dBuV/m)	Margin (dB)	Polarization
421.00	78.60	-20.37	58.23	-7.70	50.53	80.39	-29.86	Horizontal
842.00	50.87	-13.20	37.67	-7.70	29.97	60.39	-30.42	Horizontal
421.00	78.10	-20.37	57.73	-7.70	50.03	80.39	-30.36	Vertical
842.00	50.80	-13.20	37.60	-7.70	29.90	60.39	-30.49	Vertical
Notes: 1. Peak Level = Reading level + Correct Factor 2. Average emission Level = Peak Level + Duty cycle factor 3. Duty cycle level please see clause 5.								



Radiated Spurious Emission (1GHz to 10th harmonics)

Frequency (MHz)	Reading (dBuV)	Factor (dB)	Peak Level (dBuV/m)	Duty cycle Factor (dB)	Average Level (dBuV/m)	Limit (dBuV/m)		Margin (dB)		Polarization
						PK	AV	PK	AV	
1301.83	38.03	7.63	45.66	-7.70	37.96	74.00	54.00	-28.34	-16.04	Horizontal
1735.45	38.42	8.19	46.61	-7.70	38.91	80.39	60.39	-33.78	-21.48	Horizontal
2603.77	39.00	9.07	48.07	-7.70	40.37	80.39	60.39	-32.32	-20.02	Horizontal
3037.57	39.24	9.79	49.03	-7.70	41.33	80.39	60.39	-31.36	-19.06	Horizontal
3471.57	39.56	11.99	51.55	-7.70	43.85	80.39	60.39	-28.84	-16.54	Horizontal
3905.50	39.84	12.57	52.41	-7.70	44.71	74.00	54.00	-21.59	-9.29	Horizontal
1301.93	38.02	7.63	45.65	-7.70	37.95	74.00	54.00	-28.35	-16.05	Vertical
1735.37	38.39	8.19	46.58	-7.70	38.88	80.39	60.39	-33.81	-21.51	Vertical
2603.64	39.01	9.07	48.08	-7.70	40.38	80.39	60.39	-32.31	-20.01	Vertical
3037.53	39.39	9.79	49.18	-7.70	41.48	80.39	60.39	-31.21	-18.91	Vertical
3471.53	39.58	11.99	51.57	-7.70	43.87	80.39	60.39	-28.82	-16.52	Vertical
3905.45	39.96	12.57	52.53	-7.70	44.83	74.00	54.00	-21.47	-9.17	Vertical

Notes: 1. Peak Level = Reading level + Correct Factor
2. Average emission Level = Peak Level + Duty cycle factor
3. Duty cycle level please see clause 5.



5. 20DB OCCUPIED BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

According to FCC 15.231(c) requirement:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating between 70 MHz to 900 MHz. Those devices operating above 900 MHz, the emission spurious shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

B.W (20dBc) Limit = $0.25\% * f(\text{MHz}) = 0.25\% * 421.00\text{MHz} = 1.0525\text{MHz}$

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5*OBW ~ 5*OBW
RBW	1%~5%OBW
VBW	3*RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 1%~5%OBW, VBW $\geq$ 3*RBW, Sweep time = Auto.

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 Chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.

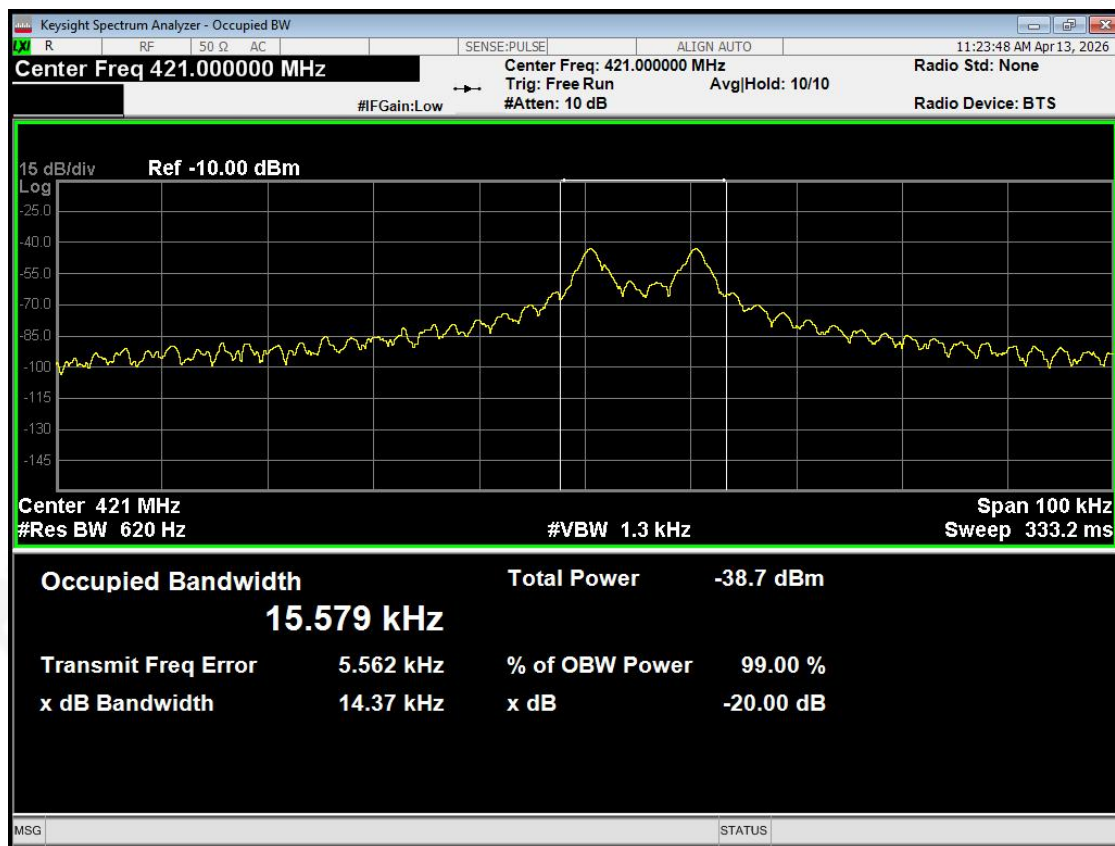


5.6 TEST RESULTS

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode		

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (MHz)	Result
421.00	14.37	$0.25\% \times 421.00 = 1.0525$	PASS

Mode 1





6. CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

Averaging factor in dB = 20log (duty cycle)

The duration of one cycle = 41.20ms

The duty cycle is simply the on-time divided the duration of one cycle

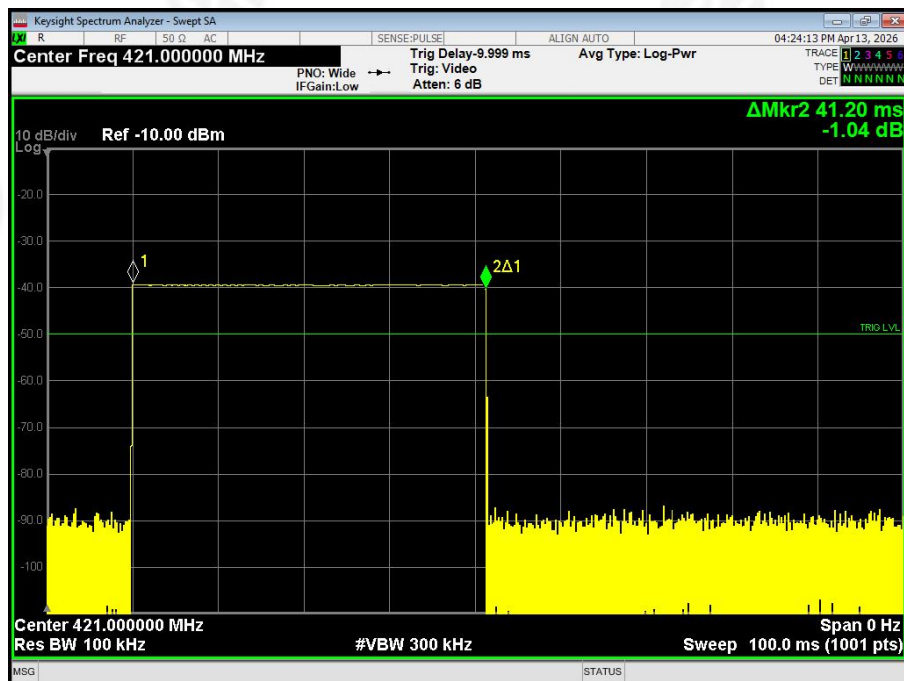
$$\text{Duty Cycle} = 41.20\text{ms} / 100\text{ms} \\ = 0.412$$

Therefore, the averaging factor is found by $20 \cdot \log(0.412) = -7.70\text{dB}$

Test plot as follows:

Note: During the 100ms, the amount of pulse and on-time of pulse are the same for every pulse train.

Cycle





7. DWELL TIME

7.1 APPLICABLE STANDARD

According to FCC 15.231(e) requirement:

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

7.2 TEST PROCEDURE

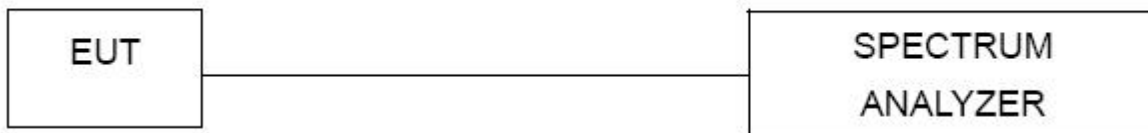
Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

- 1.Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 2.Set RBW to 100kHz and VBW of spectrum analyzer to 300kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 3.Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 4.Repeat above procedures until all measured frequencies were complete.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



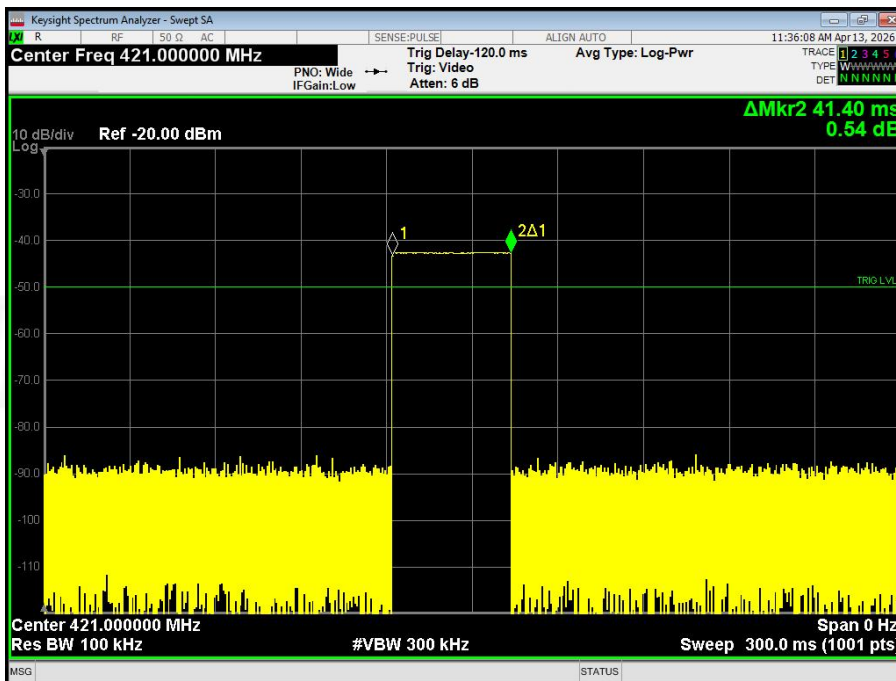
7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of Chapter 3, Unless otherwise a special operating condition is specified in the follows during the testing.

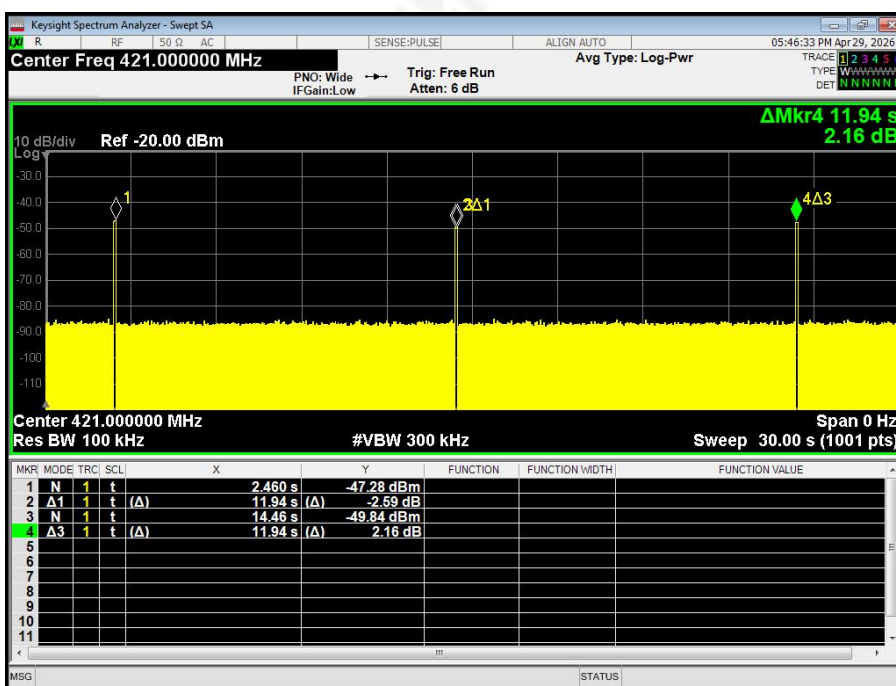


7.6 TEST RESULTS

Each transmisspn duration (second)	Limit (second)	Result
0.0414	<1	Pass



Silent Period (second)	Limit for minimum silent period (second)	Result
11.94	>10 and > 0.0414*30=1.242	Pass



Note: Limit for minimum silent period=each transmission duration*30, in no case less than 10 seconds.



8. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
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.	
EUT Antenna:	
The antenna is Spring Antenna, the best case gain of the antennas are 2dBi, reference to the appendix II for details.	



9. TEST SETUP PHOTO

Reference to the appendix I for details.

10. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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