

FCC TEST REPORT

FCC ID:2A2R8-E08

Report Number..... : ZKT-210726L3661E

Date of Test..... July 25, 2021 to Aug. 13, 2021

Date of issue..... : Aug. 13, 2021

Total number of pages..... 29

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 : WENZHOU JUXIN ELECTRONIC TECHNOLOGY CO., LTD

Address : No. 55, Xinwang Road, Tangxia International Auto and Motorcycle Parts Industrial Park, Ruian City, Wenzhou City

Manufacturer's name : WENZHOU JUXIN ELECTRONIC TECHNOLOGY CO., LTD

Address : No. 55, Xinwang Road, Tangxia International Auto and Motorcycle Parts Industrial Park, Ruian City, Wenzhou City

Test specification:Standard..... : FCC CFR Title 47 Part 15 Subpart C Section 15.231
ANSI C63.10:2013

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.

This report shall not be reproduced except in full, without the written approval of ZKT, this document may be altered or revised by ZKT, personal only, and shall be noted in the revision of the document.

Product name..... : Tire pressure monitoring sensor

Trademark : N/A

Model/Type reference..... : E08,E03,E05,E08,E13,E15,E18,E19,E20,E23,E24,E25,E26,E27,
E28,E29,E34,E36,E37,E39,E41,E42,E43,E44,E45,E53,E54,E73,
E77,E81,E82,E83,E84,E85,E86,E87,E88,E89,E90

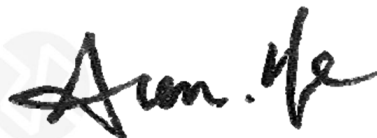
Ratings..... : DC 3V

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).....: Alen He



Reviewer (name + signature).....: Joe Liu



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 DESCRIPTION OF TEST MODES.....	9
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED.....	9
3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE).....	9
3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS.....	10
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.....	12
4.1.3 DEVIATION FROM TEST STANDARD.....	12
4.1.4 TEST SETUP.....	12
4.1.5 EUT OPERATING CONDITIONS.....	12
4.1.6 TEST RESULTS.....	12
4.2 RADIATED EMISSION MEASUREMENT.....	13
4.2.1 RADIATED EMISSION LIMITS.....	14
4.2.2 TEST PROCEDURE.....	15
4.2.3 TEST SETUP.....	16
4.2.4 EUT OPERATING CONDITIONS.....	17
4.2.5 TEST RESULTS	17
5.1 APPLIED PROCEDURES / LIMIT.....	21
5.2 TEST PROCEDURE.....	21
5.3 DEVIATION FROM STANDARD.....	21
5.4 TEST SETUP.....	21
5.5 EUT OPERATION CONDITIONS.....	21
5.6 TEST RESULTS.....	22
6. CALCULATION OF AVERAGE FACTOR.....	23
7. DWELL TIME.....	25
7.1 APPLICABLE STANDARD.....	25
7.2 TEST PROCEDURE.....	25
7.5 EUT OPERATION CONDITIONS.....	26
7.6 TEST RESULTS.....	27

Table of Contents

Page

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

1. VERSION

Report No.	Version	Description	Approved
ZKT-210726L3661E	Rev.01	Initial issue of report	Aug. 13, 2021

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	Conducted Emission	N/A	
15.209,15.231b	Fundamental &Radiated Spurious Emission Measurement	PASS	
15.231c	Occupy Bandwidth	PASS	
15.231a	Transmitting time out	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: 692225

Designation Number: CN1299

IC Registered No.: 27033

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(30MHz-1GHz)	$U=4.3\text{dB}$
2	3m chamber Radiated spurious emission(1GHz-18GHz)	$U=4.5\text{dB}$
3	3m chamber Radiated spurious emission(18GHz-40GHz)	$U=3.34\text{dB}$
4	Conducted Adjacent channel power	$U=1.38\text{dB}$
5	Conducted output power uncertainty Above 1G	$U=1.576\text{dB}$
6	Conducted output power uncertainty below 1G	$U=1.28\text{dB}$
7	humidity uncertainty	$U=5.3\%$
8	Temperature uncertainty	$U=0.59^{\circ}\text{C}$
9	Radiated disturbance(30MHz-1000MHz)	$U=4.8\text{dB}$
10	Radiated disturbance(1GHz-6GHz)	$U=4.9\text{dB}$
11	Radiated disturbance(1GHz-18GHz)	$U=5.0\text{dB}$

3.GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Tire pressure monitoring sensor
Trade Name	N/A
Model Name	E08,E03,E05,E08,E13,E15,E18,E19,E20,E23,E24,E25,E26,E27,E28,E29,E34,E36,E37,E39,E41,E42,E43,E44,E45,E53,E54,E73, E77,E81,E82,E83,E84,E85,E86,E87,E88,E89,E90
Serial Model	N/A
Model Difference	PCB board, circuit, structure and internal of these model(s) are the same, only model name is different for these models.
Hardware version	V1.0
Software version	V1.0
Operation Frequency:	315.0MHz
Modulation Type:	ASK
Antenna Type:	sheetmetal Antenna
Antenna Gain:	0dBi
Ratings	DC 3V

3.2 DESCRIPTION OF TEST MODES

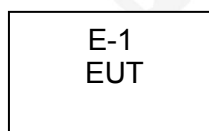
For All Emission	
Final Test Mode	Description
Transmitting mode	Keep the EUT in continuously transmitting mode

Note:

- (1) new battery is used during the test

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Spurious emissions



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
E-1	Tire pressure monitoring sensor	N/A	E08	N/A	EUT

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) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY45109572	Sep. 22, 2020	Sep. 21, 2021
2	Test Receiver (9kHz-7GHz)	R&S	ESC17	101169	Sep. 22, 2020	Sep. 21, 2021
3	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 22, 2020	Sep. 21, 2021
4	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Sep. 22, 2020	Sep. 21, 2021
5	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2020	Sep. 21, 2021
6	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2020	Sep. 21, 2021
7	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2020	Sep. 21, 2021
8	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Sep. 22, 2020	Sep. 21, 2021
9	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 22, 2020	Sep. 21, 2021
10	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
11	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
12	CMW500 Test	R&S	CMW500	106504	Sep. 22, 2020	Sep. 21, 2021
13	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 22, 2020	Sep. 21, 2021
14	Signal Generator	Agilent	N5182A	MY47420215	Sep. 22, 2020	Sep. 21, 2021
15	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
16	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2020	Sep. 21, 2021
2	LISN	CYBERTEK	EM5040A	E1850400149	Sep. 22, 2020	Sep. 21, 2021
3	Test Cable	N/A	C01	N/A	Sep. 22, 2020	Sep. 21, 2021
4	Test Cable	N/A	C02	N/A	Sep. 22, 2020	Sep. 21, 2021
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2020	Sep. 21, 2021
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2020	Sep. 21, 2021
7	Power Meter	Anritsu	ML2495A	N/A	Sep. 22, 2020	Sep. 21, 2021

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
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

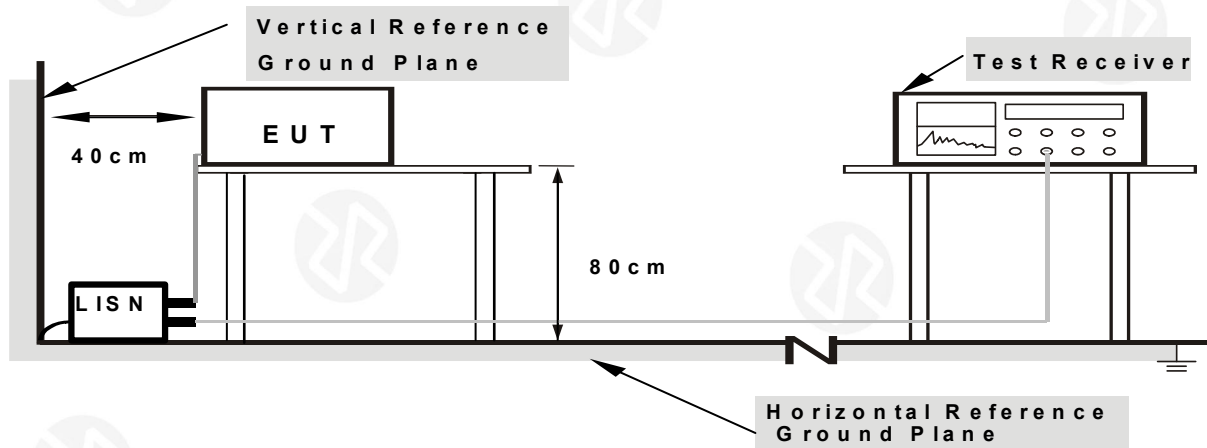
4.1.2 TEST PROCEDURE

- 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 continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 TEST RESULTS: N/A

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Phase :	/
Test Voltage :	/	Test Mode :	/

Remark:EUT powered by button battery.

4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
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

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 emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ linear interpolations

[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 = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 93 Section 15.209, whichever limit permits a higher field strength.

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.

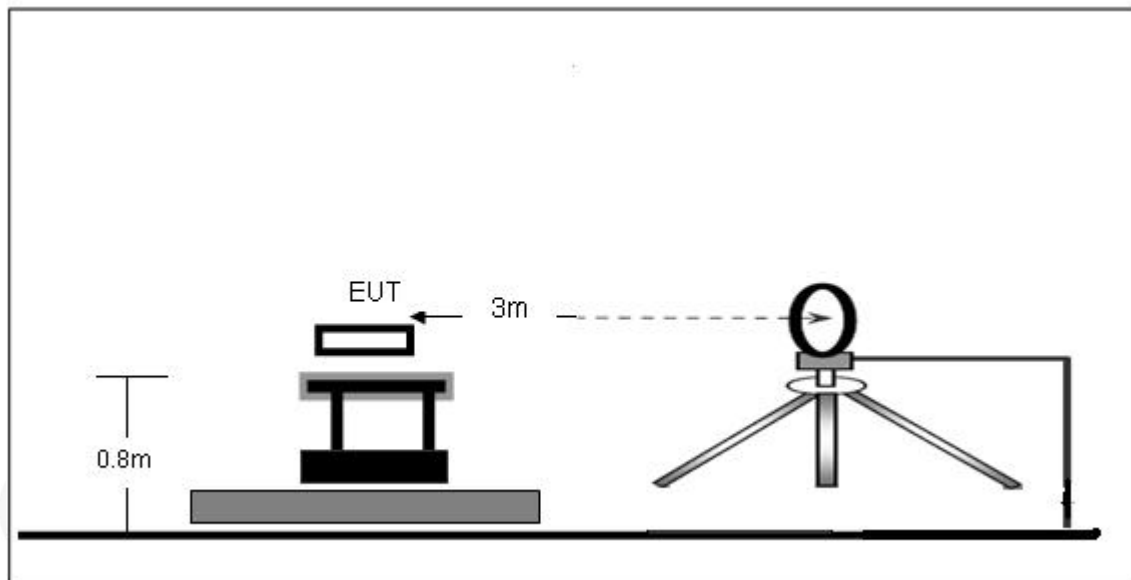
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting 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.

Note:

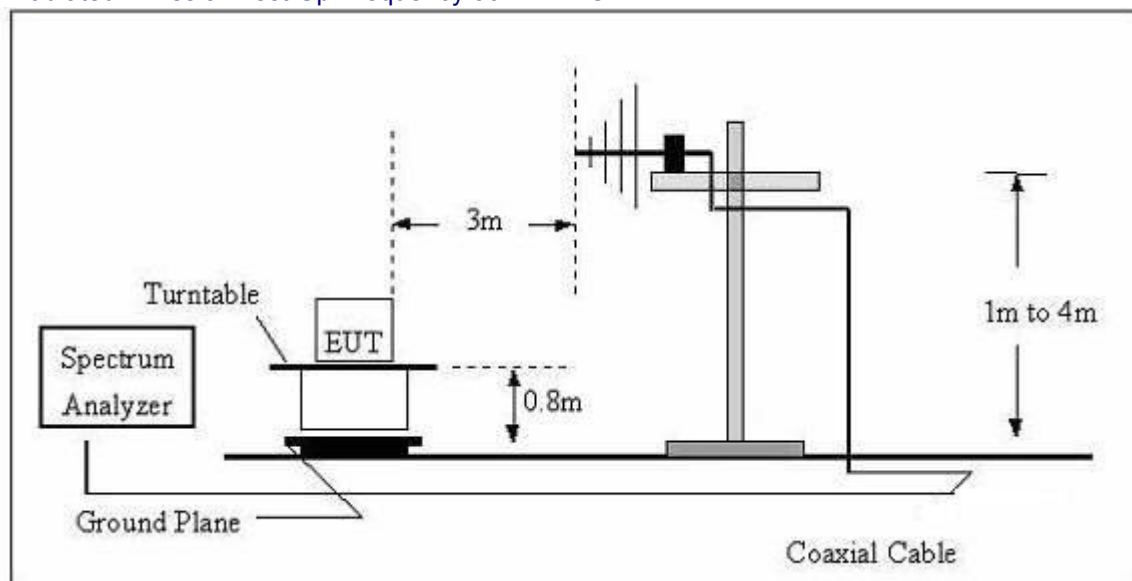
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case was X axis and the emissions were reported

4.2.3 TEST SETUP

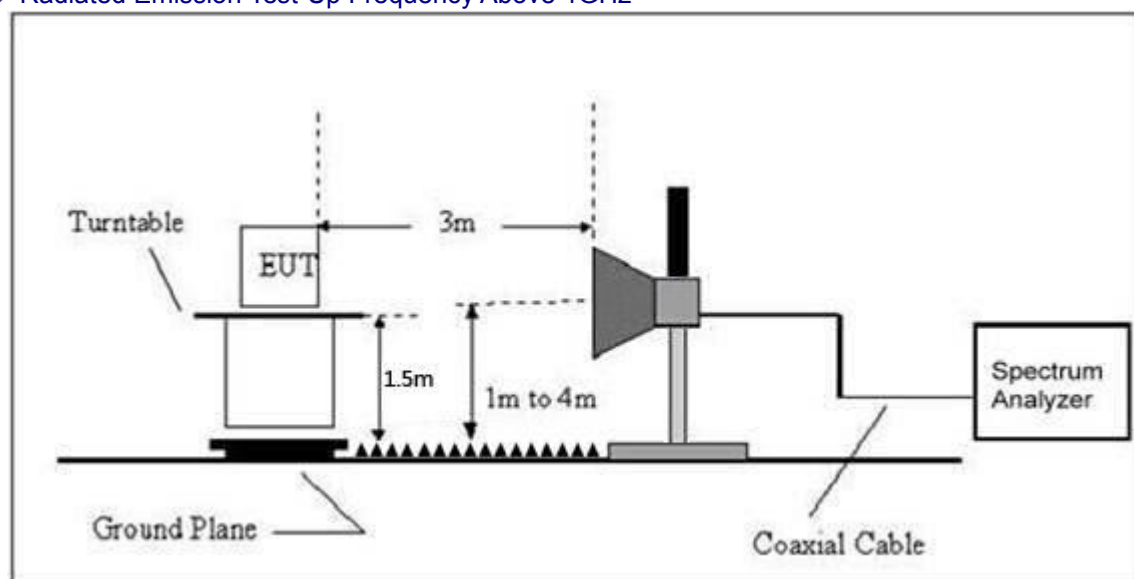
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



4.2.4 EUT OPERATING CONDITIONS

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

4.2.5 TEST RESULTS

Radiated Spurious Emission (Below 9KHz – 30MHz)

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101 kPa	Polarization :	---
Test Voltage :	DC 3V		
Test Mode :	TX Mode		

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

NOTE:

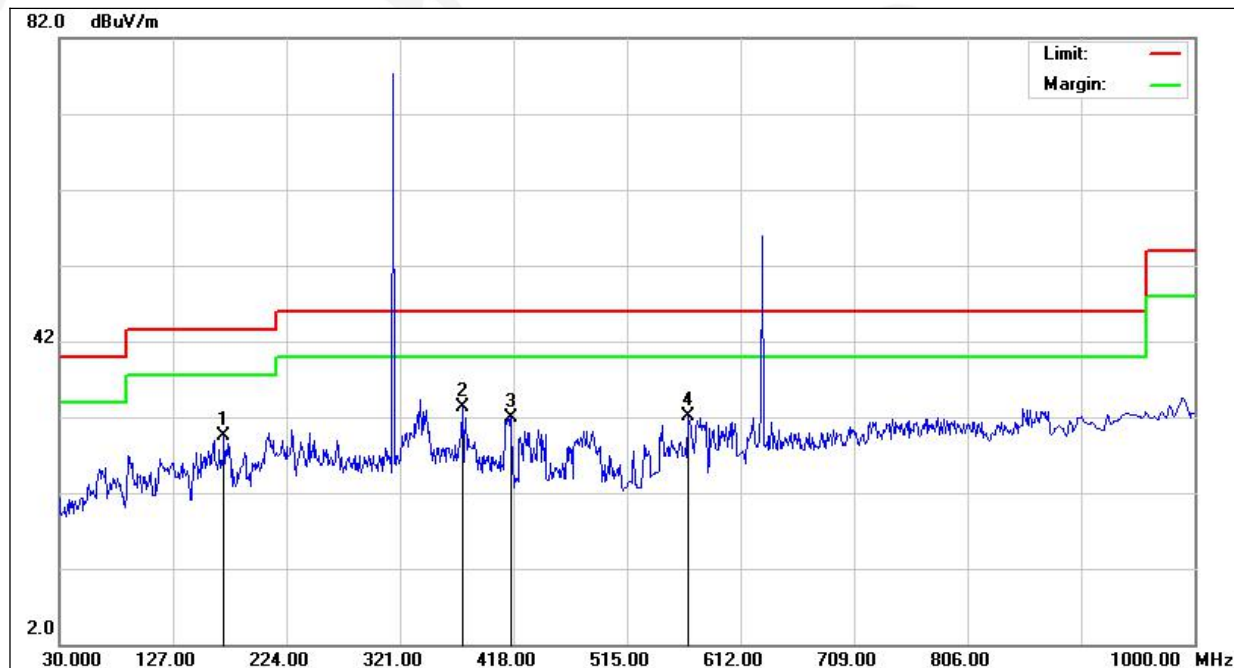
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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 3V		
Test Mode :	TX Mode		

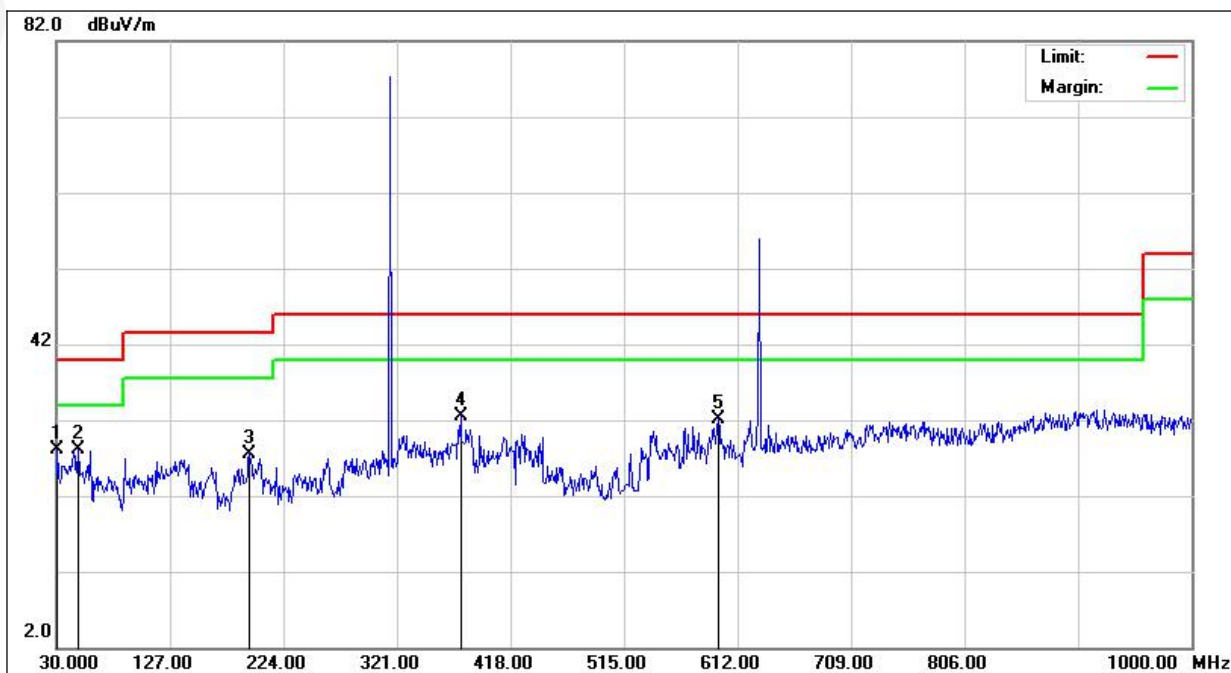


Frequency MHz	Reading dBuV	Factor dB/m	Level DBuV/m	Limit DBuV/m	Margin dB	Detector
171.3925	47.9	-18.4	29.5	43.5	-14	QP
374.6225	50.24	-16.94	33.3	46	-12.7	QP
416.1791	53.41	-21.41	32	46	-14	QP
567.3799	34.32	-2.22	32.1	46	-13.9	QP

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.

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101 kPa	Polarization :	Vertical
Test Voltage :	DC 3V		
Test Mode :	TX Mode		



Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit DBuV/m	Margin dB	Detector
31.0703	42.33	-14.13	28.2	40	-11.8	QP
49.1865	42.64	-14.44	28.2	40	-11.8	QP
195.822	43.82	-16.22	27.6	43.5	-15.9	QP
375.9384	41.07	-8.47	32.6	46	-13.4	QP

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.

Radiated Spurious Emission (fundamental and harmonics)

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
315	75.92	-8.4	67.52	95.62	75.62	-19.7	-8.1	Vertical
630	57.35	-8.4	48.95	75.62	55.62	-18.27	-6.67	Vertical
945	54.12	-8.4	45.72	75.62	55.62	-21.5	-9.9	Vertical
1260	53.26	-8.4	44.86	74	54	-20.74	-9.14	Vertical
1575	52.14	-8.4	43.74	74	54	-21.86	-10.26	Vertical
1890	51.37	-8.4	42.97	74	54	-22.63	-11.03	Vertical
2205	50.76	-8.4	42.36	74	54	-23.24	-11.64	Vertical
2520	49.76	-8.4	41.36	74	54	-24.24	-12.64	Vertical
315	76.19	-8.4	67.79	95.62	75.62	-19.43	-7.83	Horizontal
630	59.47	-8.4	51.07	75.62	55.62	-16.15	-4.55	Horizontal
945	45.62	-8.4	37.22	75.62	55.62	-30	-18.4	Horizontal
1260	44.36	-8.4	35.96	74	54	-29.64	-18.04	Horizontal
1575	43.75	-8.4	35.35	74	54	-30.25	-18.65	Horizontal
1890	42.35	-8.4	33.95	74	54	-31.65	-20.05	Horizontal
2205	41.12	-8.4	32.72	74	54	-32.88	-21.28	Horizontal
2520	40.35	-8.4	31.95	74	54	-33.65	-22.05	Horizontal

Notes: 1.Average emission Level = Peak Level + Duty cycle factor

2.Duty cycle level please see clause 6.

3.All other emissions are attenuated 20dB below the limit, so it does not record.

5. BANDWIDTH TEST

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.

$$B.W (20dBc) \text{ Limit} = 0.25\% * f(\text{MHz}) = 0.25\% * 315.0\text{MHz} = 0.7875\text{MHz}$$

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100kHz
VB	≥RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



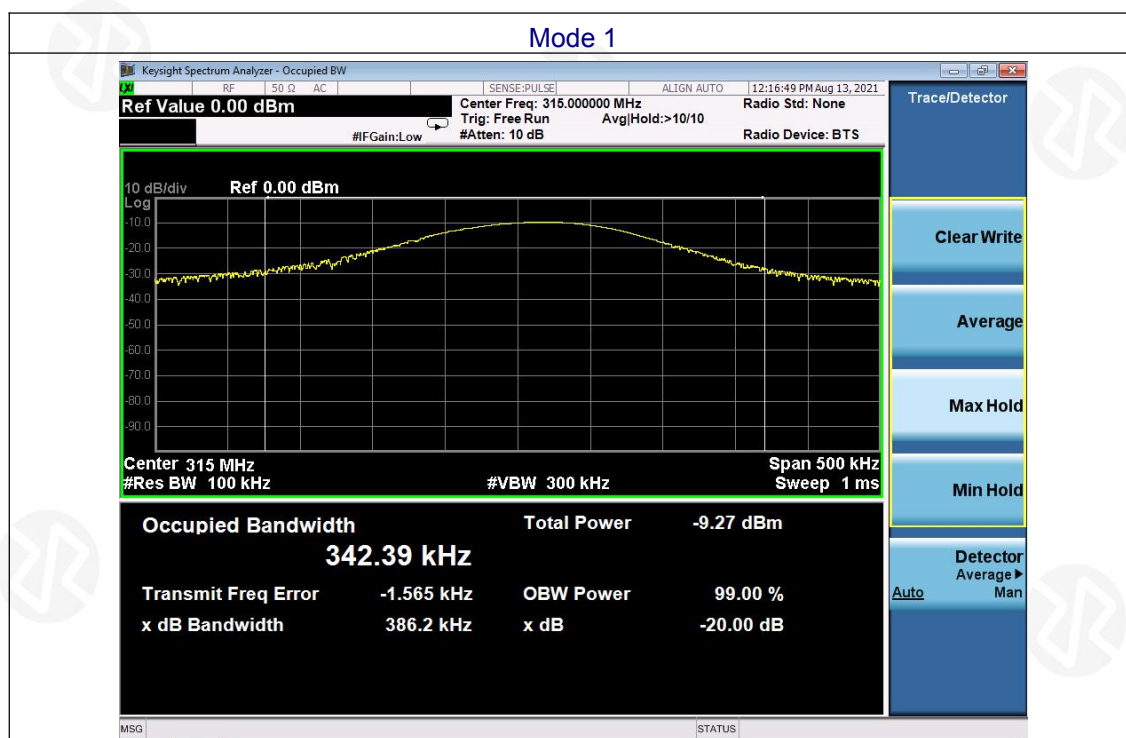
5.5 EUT OPERATION CONDITIONS

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 RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.0V
Test Mode :	TX Mode		

Frequency	20dB Bandwidth (kHz)	Limit (MHz)	Result
315.0MHz	386.2	0.7875	PASS



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 1MHz RBW/3MHz VBW.

Averaging factor in dB = $20\log(\text{duty cycle})$

The duration of one cycle = 83.60ms

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

Duty Cycle = $(1.065\text{ms} \times 21 + 0.330\text{ms} \times 25) / 83.60$

= $30.615\text{ms} / 83.60\text{ms}$

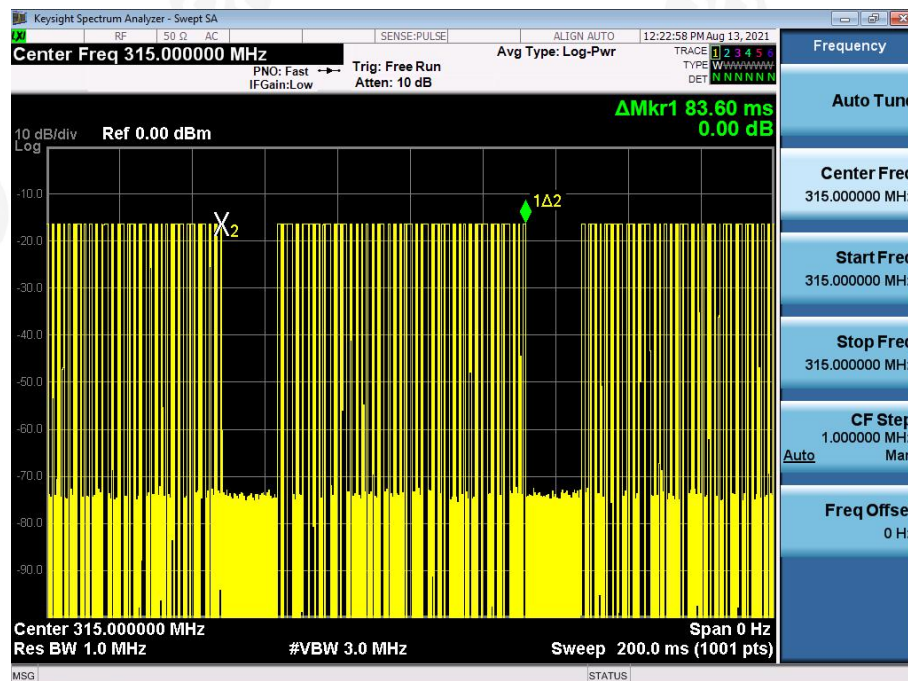
= 0.380

Therefore, the averaging factor is found by $20\log 0.380 = -8.40\text{dB}$

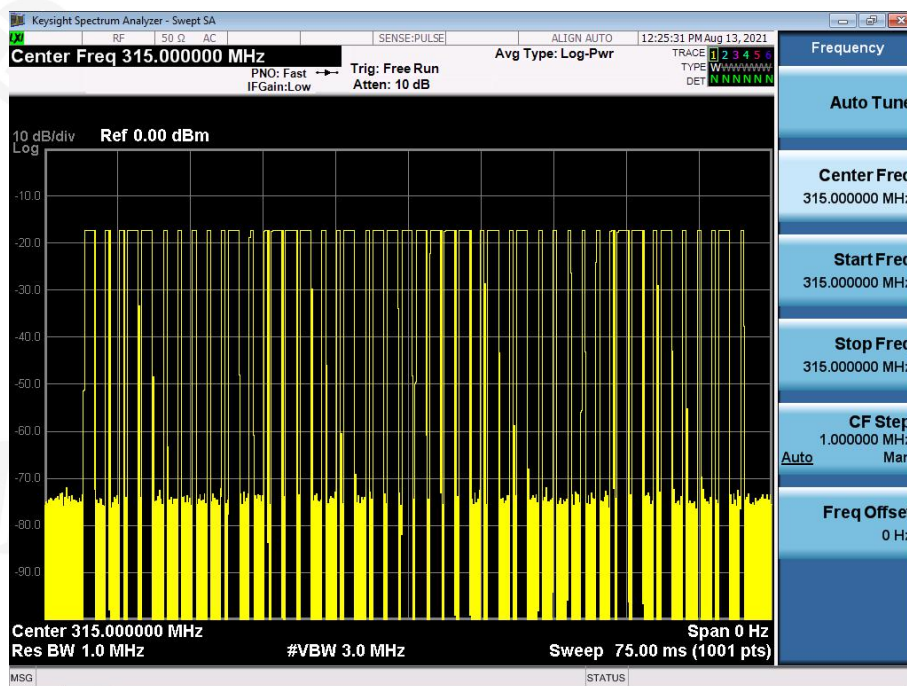
Test plot as follows:

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

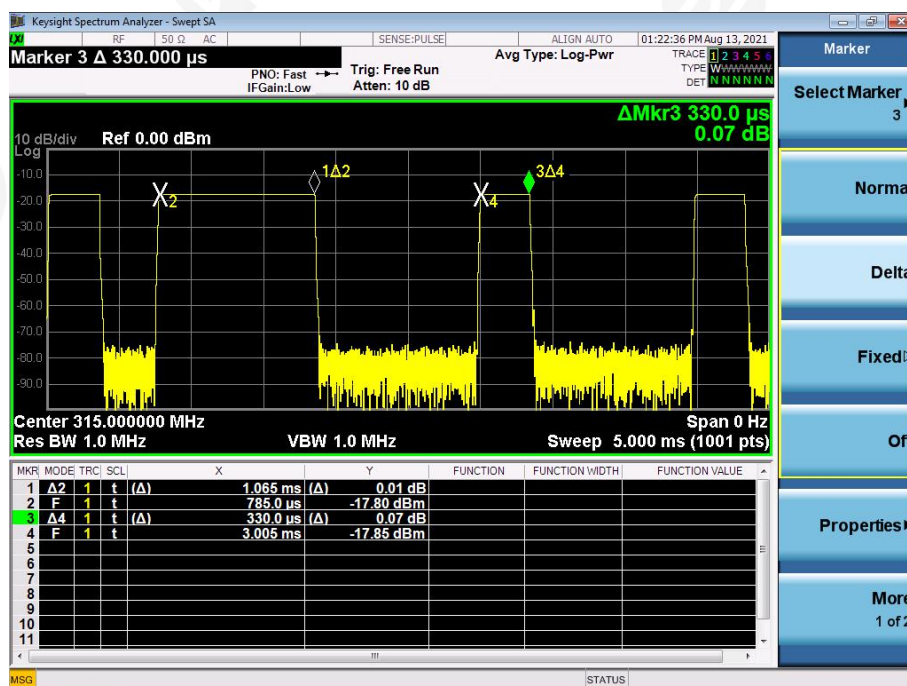
Cycle



Pulse



On-time



7. TRANSMITTER TIMEOUT

7.1 APPLICABLE STANDARD

According to FCC 15.231(a) requirement:

A activated automatically operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

7.2 REQUIREMENTS

- 1 A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result: The EUT does not a manually activated transmitter.

- 2 A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Result: The EUT does not have a automatically activated transmitter

The EUT has a automatically activated transmitter, please refer to below detail data

- 3 Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Result:The EUT does not employ periodic transmission.

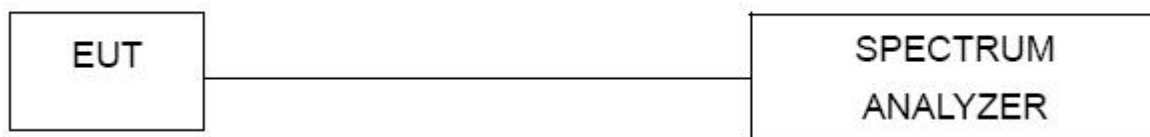
- 4 Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

Result:The section is not applicable to EUT.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



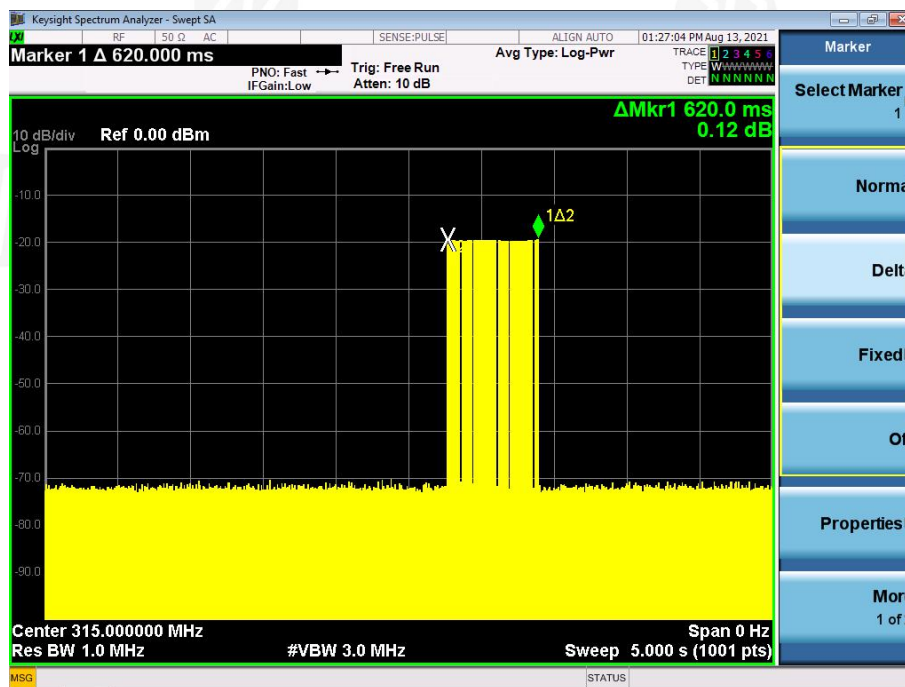
7.5 EUT OPERATION CONDITIONS

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

7.6 TEST RESULTS

Dwell time (second)	Limit (second)	Result
620.0ms	<5s	Pass

Test plot as follows:



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 antennas are internal permanent antenna, the best case gain of the antennas are 0dBi, 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 *****