FCC Test Report

FCC ID	:	**2AJ4H-T813**
Equipment	:	**TPMS Sensor 433M**
Model No.	:	**TIY-081003**
Brand Name	:	**TYC-TIY**
Applicant	:	**I YUAN PRECISION INDUSTRIAL CO., LTD.**
Address	:	**NO.24, Dinghu Rd., Guishan Dist., Taoyuan City 33378, Taiwa(R.O.C.)**
Standard	:	**47 CFR FCC Part 15.231**
Received Date	:	**Oct. 19, 2016**
Tested Date	:	**Sep. 30 ~ Oct. 03, 2017**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR6O1902	Rev. 01	Initial issue	Nov. 03, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	Note[1]	N/A
15.231(e)	Field Strength of Fundamental emissions	Meet the requirement of limit	Pass
15.231(b) 15.209	Unwanted Emissions	Meet the requirement of limit	Pass
15.231(a) 15.231(e)	Transmission and Deactivation Time	Meet the requirement of limit	Pass
15.231(c)	20dB bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass
N/A means Not Applicable. Note[1]: The EUT consumes DC power from battery, so the test is not required.			

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information			
Frequency Range (MHz)	**Modulation**	**Ch. Freq. (MHz)**	**Channel Number**
433.92	ASK	433.92	1
433.92	FSK	433.92	1
Note: The device supports below 3 modes: 1) Rotating mode 2) Stationary mode 3) Alert mode			

1.1.2 Antenna Details

Ant. No.	Type
1	Loop

1.1.3 EUT Operational Condition

Power Supply Type	3Vdc from battery

Note: The equipment tests are performed using a new battery.

1.2 Test Setup Chart

Test Setup Diagram

1.3 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Nov. 15, 2016	Nov. 14, 2017
Receiver	Agilent	N9038A	MY53290044	Sep. 26, 2017	Sep. 25, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 04, 2017	Feb. 03, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 04, 2017	Feb. 03, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 04, 2017	Feb. 03, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.4 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.231
ANSI C63.10-2013

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH03-WS	24°C / 66%	Aska Huang
RF Conducted	TH01-WS	24°C / 66%	Aska Huang

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Test Configuration
Field Strength of Fundamental emissions	ASK, FSK	433.92	a
Unwanted Emissions	ASK, FSK	433.92	a
Deactivation Time	ASK, FSK	433.92	a / b / c
20dB bandwidth	ASK, FSK	433.92	a

Note:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** results were found as the worst case and were shown in this report.
2. Three test configurations are listing as follows:
   Configuration a: Rotating mode.
   Configuration b: Stationary mode.
   Configuration c: Alert mode.
3. The output power of above 3 configurations is same thus only one mode (Configuration a) is selected to perform emission and 20 dB bandwidth test item.

3 Transmitter Test Results

3.1 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

3.1.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
40.66~40.70	1000	100
70 -130	500	50
130 – 174	500 to 1500 Note	50 to 150 Note
174 – 260	1500	150
260 – 470	1500 to 5000 Note	150 to 500 Note
above 470	5000	500
Note: Linear interpolations.		

3.1.2 Limit of Unwanted Emissions

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 §15.209, whichever limit permits a higher field strength.

Radiated emission limits			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3
Note 1: Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:** Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.			

3.1.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

1. Radiated emission below 1GHz
   120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission Peak value for harmonics
   RBW=1MHz, VBW=3MHz and Peak detector
3. Radiated emission Peak value for fundamental
   RBW=1MHz, VBW=3MHz and Peak detector

   Radiated emission Average value for field strength of fundamental and harmonics
   The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
4. ASK mode

$$20\log(\text{Duty cycle}) = 20\log\frac{18.043\text{ ms}}{100\text{ ms}} = -14.87\text{dB}$$

Please see page 17 for plotted duty

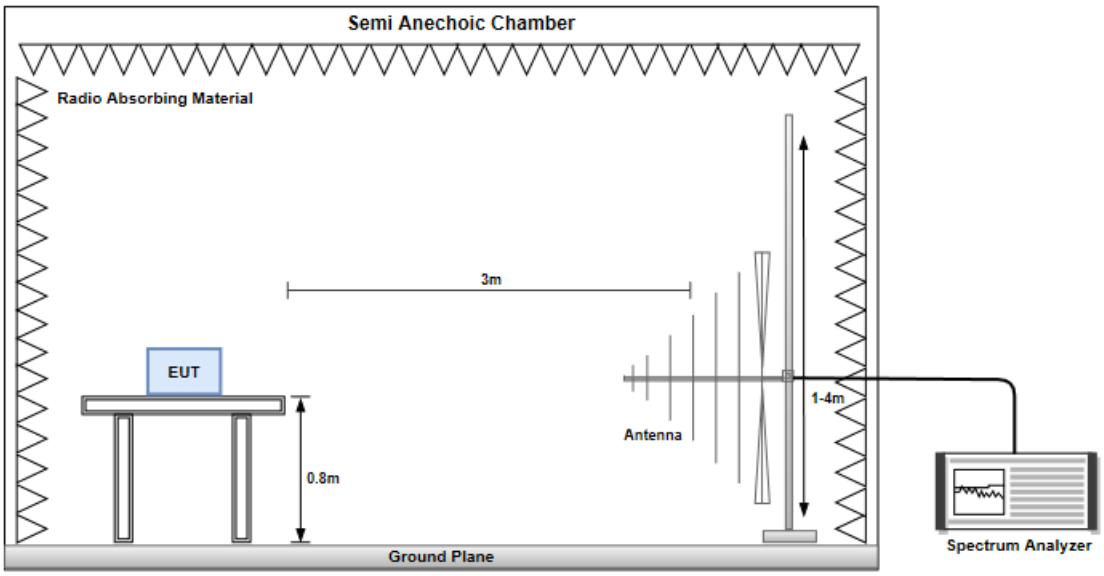
FSK mode

$$20\log(\text{Duty cycle}) = 20\log\frac{10.58\text{ ms}}{100\text{ ms}} = -19.51\text{dB}$$

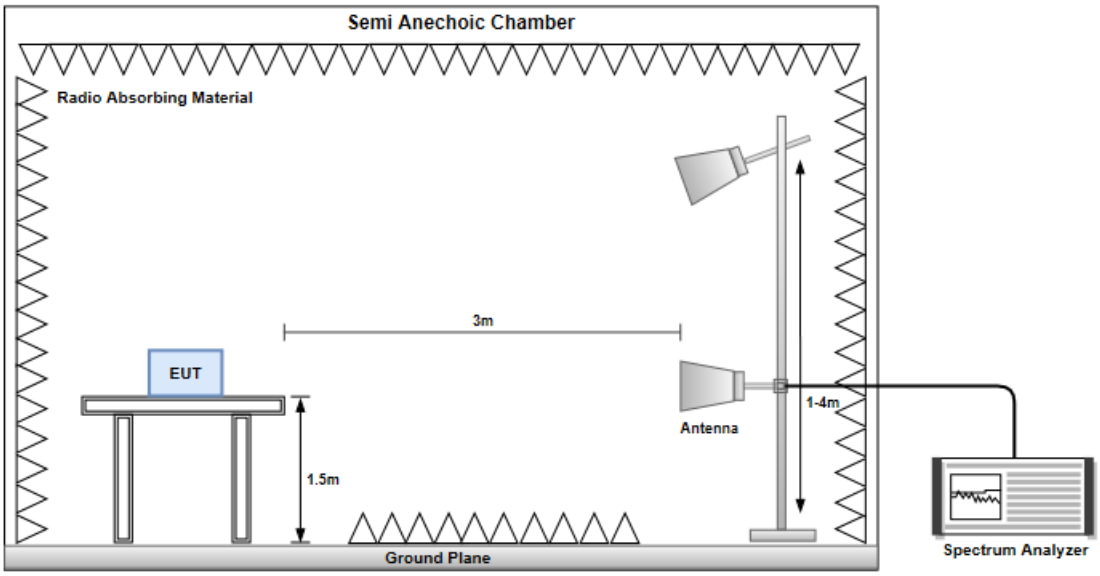
Please see page 24 for plotted duty

3.1.4 Test Setup

Radiated Emissions below 1 GHz



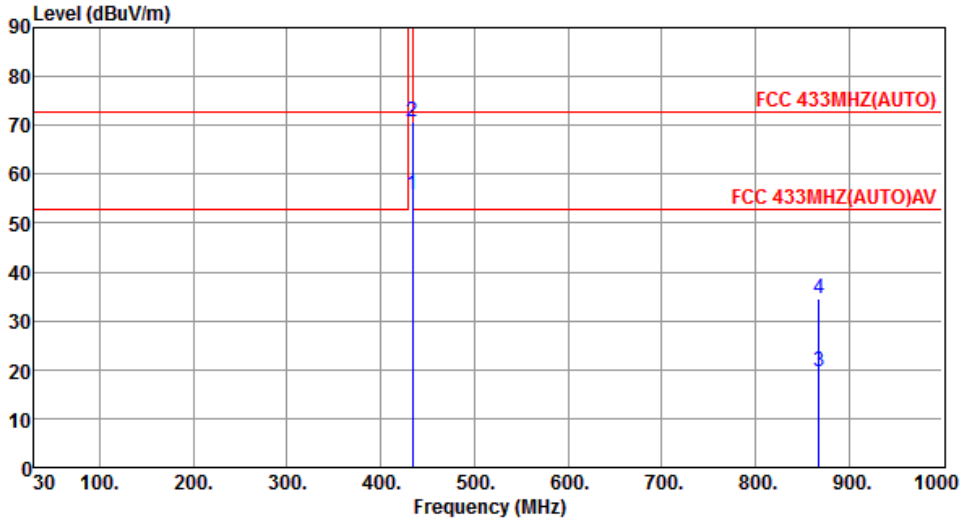
Radiated Emissions above 1 GHz



ASK mode

3.1.5 Transmitter Field strength of fundamental emissions and harnonics

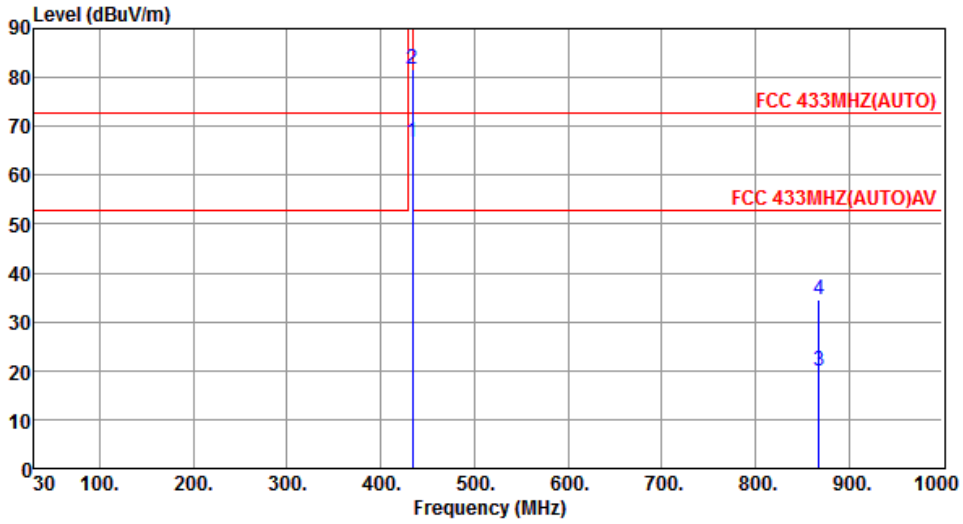
Modulation	ASK	Test Freq. (MHz)	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	433.92	55.92	72.87	-16.95	60.52	-4.60	Average	100	152
2	433.92	70.79	92.87	-22.08	75.39	-4.60	Peak	100	152
3	867.84	19.53	52.87	-33.34	16.64	2.89	Average	100	163
4	867.84	34.40	72.87	-38.47	31.51	2.89	Peak	100	163

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	ASK	Test Freq. (MHz)	433.92
Polarization	Vertical		

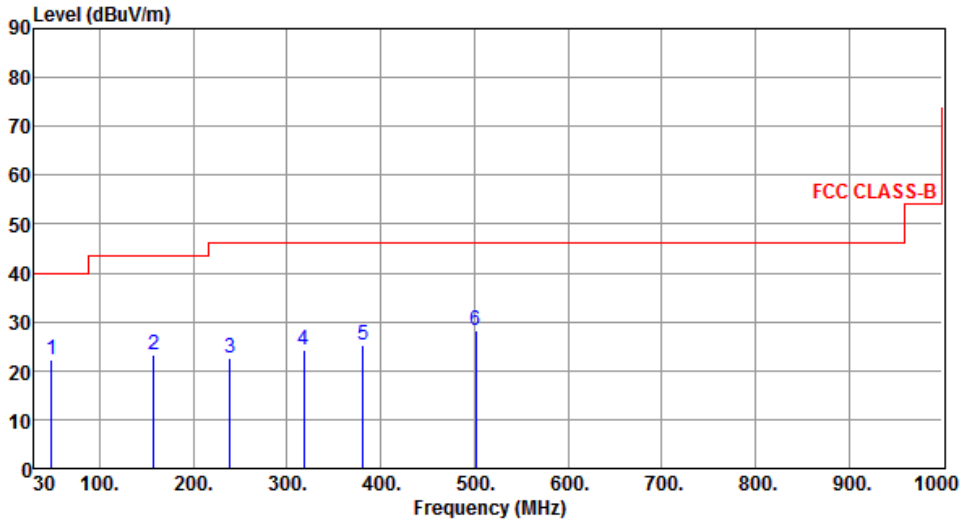


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	433.92	66.91	72.87	-5.96	71.36	-4.45	Average	135	326
2	433.92	81.78	92.87	-11.09	86.23	-4.45	Peak	135	326
3	867.84	19.80	52.87	-33.07	16.69	3.11	Average	100	305
4	867.84	34.67	72.87	-38.20	31.56	3.11	Peak	100	305

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.1.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

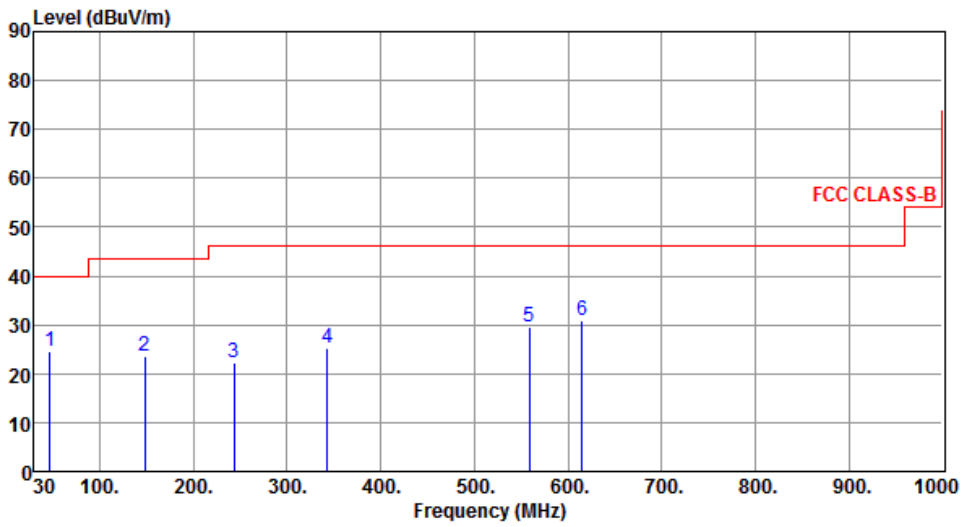
Modulation	ASK	**Test Freq. (MHz)**	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	48.43	22.32	40.00	-17.68	30.54	-8.22	Peak	---	---
2	158.04	23.36	43.50	-20.14	31.67	-8.31	Peak	---	---
3	239.52	22.52	46.00	-23.48	32.16	-9.64	Peak	---	---
4	318.09	24.15	46.00	-21.85	31.61	-7.46	Peak	---	---
5	381.14	25.33	46.00	-20.67	31.19	-5.86	Peak	---	---
6	501.42	28.34	46.00	-17.66	31.66	-3.32	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	ASK	Test Freq. (MHz)	433.92
Polarization	Vertical		

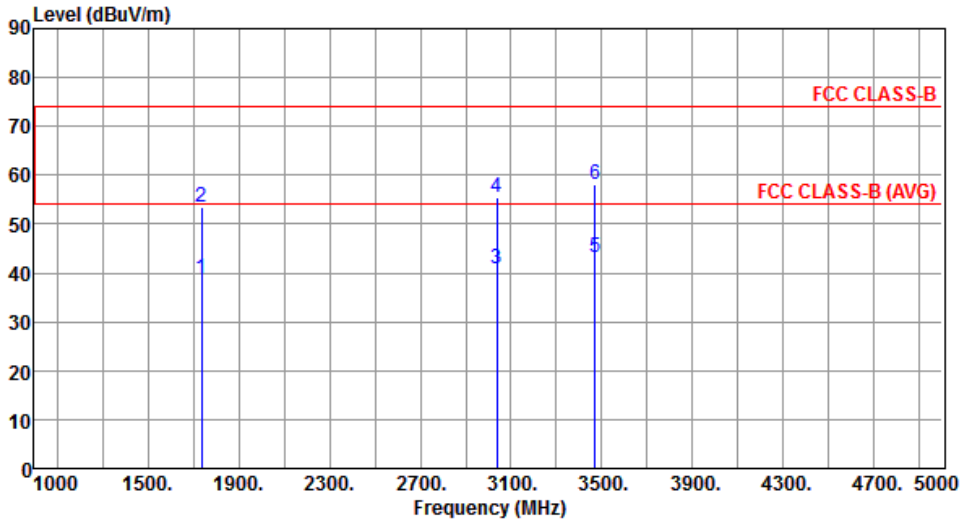


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.49	24.62	40.00	-15.38	32.93	-8.31	Peak	---	---
2	148.34	23.61	43.50	-19.89	32.08	-8.47	Peak	---	---
3	243.40	22.26	46.00	-23.74	31.78	-9.52	Peak	---	---
4	343.31	25.24	46.00	-20.76	32.13	-6.89	Peak	---	---
5	558.65	29.52	46.00	-16.48	31.60	-2.08	Peak	---	---
6	614.91	30.93	46.00	-15.07	31.76	-0.83	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.1.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

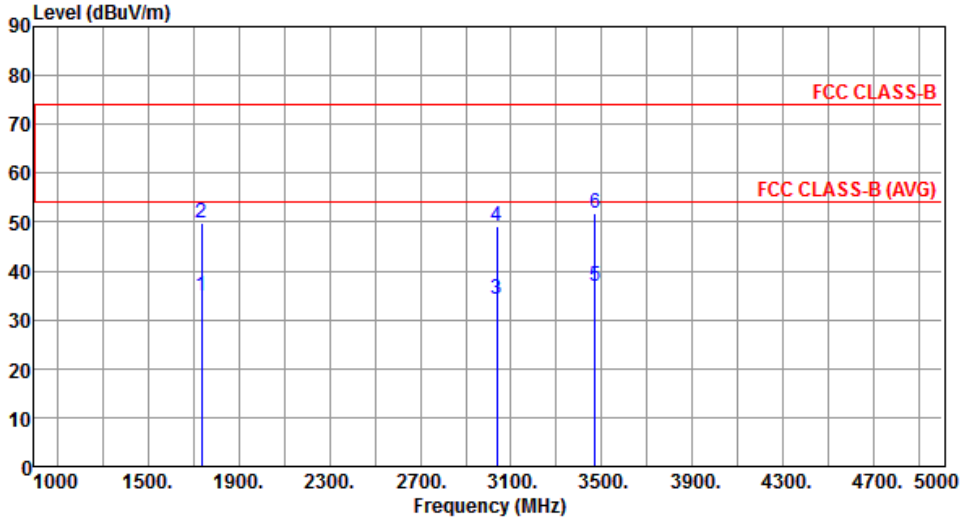
Modulation	ASK	**Test Freq. (MHz)**	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1735.68	38.74	54.00	-15.26	43.02	-4.28	Average	232	16
2	1735.68	53.61	74.00	-20.39	57.89	-4.28	Peak	232	16
3	3037.44	40.71	54.00	-13.29	40.42	0.29	Average	216	223
4	3037.44	55.58	74.00	-18.42	55.29	0.29	Peak	216	223
5	3471.36	43.19	54.00	-10.81	42.19	1.00	Average	207	343
6	3471.36	58.06	74.00	-15.94	57.06	1.00	Peak	207	343

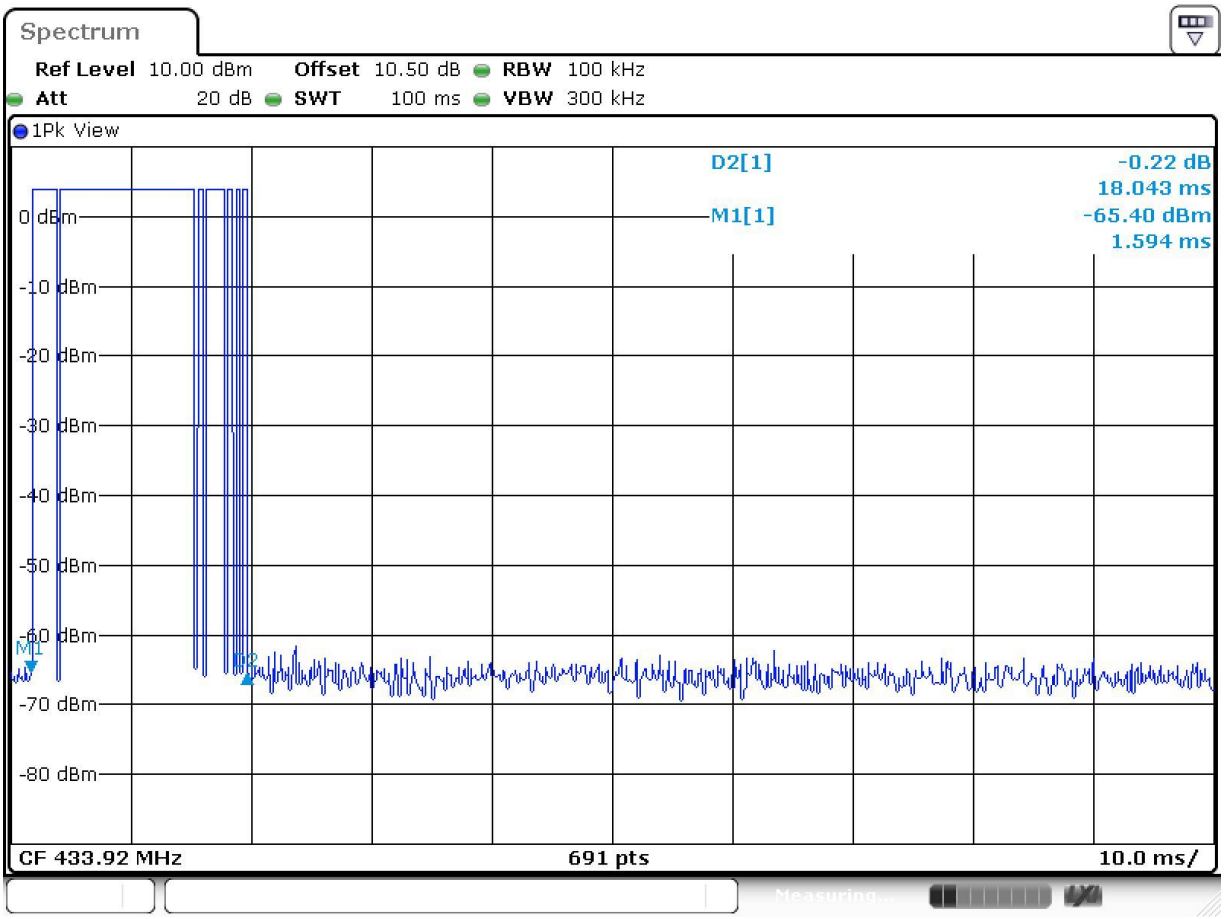
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	ASK	Test Freq. (MHz)	433.92
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1735.68	35.01	54.00	-18.99	39.29	-4.28	Average	269	312
2	1735.68	49.88	74.00	-24.12	54.16	-4.28	Peak	269	312
3	3037.44	34.14	54.00	-19.86	33.85	0.29	Average	294	41
4	3037.44	49.01	74.00	-24.99	48.72	0.29	Peak	294	41
5	3471.36	36.91	54.00	-17.09	35.91	1.00	Average	100	89
6	3471.36	51.78	74.00	-22.22	50.78	1.00	Peak	100	89

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

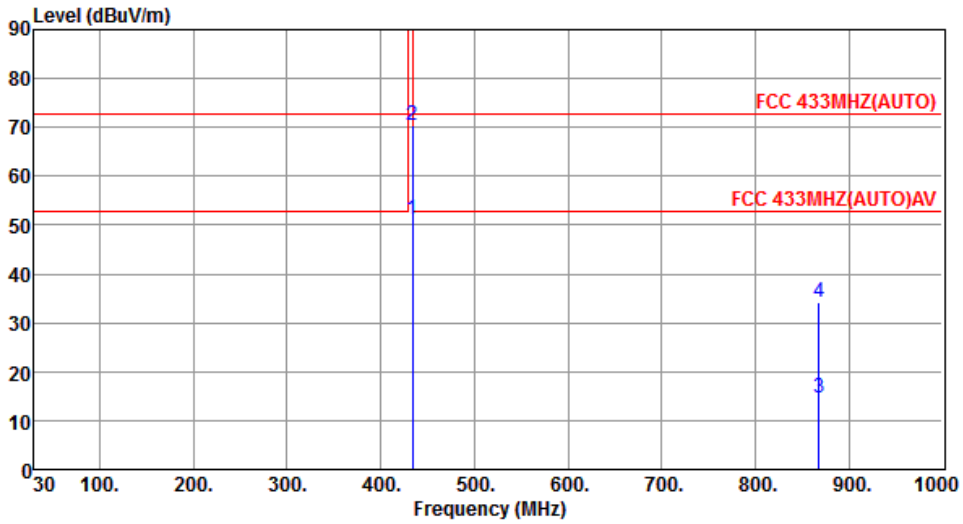


$$20\log(\text{Duty cycle}) = 20\log\frac{18.043\text{ ms}}{100\text{ ms}} = -14.87\text{dB}$$

FSK mode

3.1.8 Transmitter Field strength of fundamental emissions

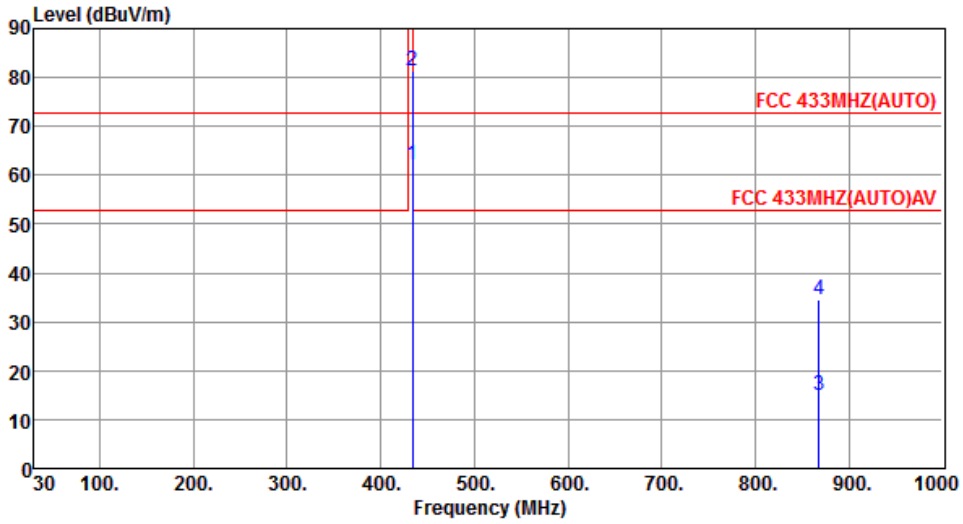
Modulation	FSK	Test Freq. (MHz)	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	433.92	51.02	72.87	-21.85	55.62	-4.60	Average	100	149
2	433.92	70.53	92.87	-22.34	75.13	-4.60	Peak	100	149
3	867.84	14.70	52.87	-38.17	11.81	2.89	Average	100	168
4	867.84	34.21	72.87	-38.66	31.32	2.89	Peak	100	168

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	FSK	Test Freq. (MHz)	433.92
Polarization	Vertical		

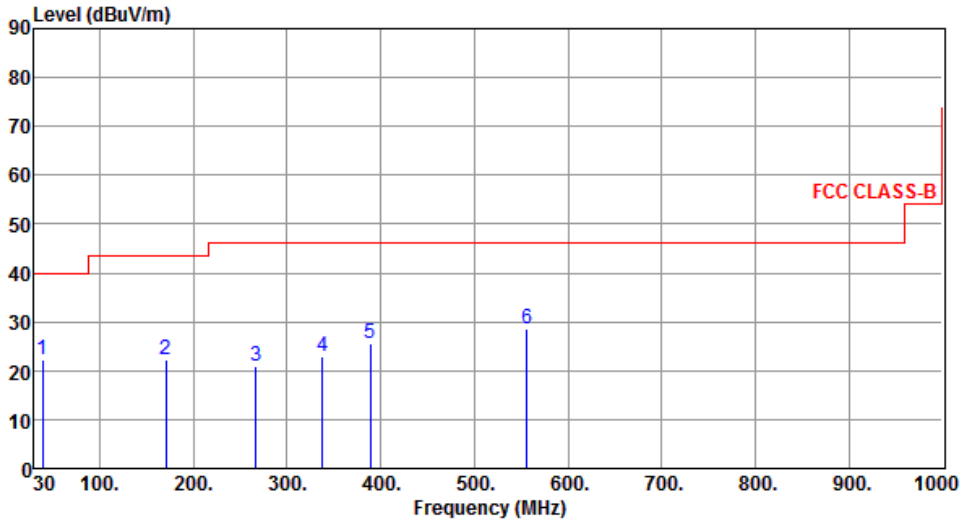


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	433.92	62.01	72.87	-10.86	66.46	-4.45	Average	132	321
2	433.92	81.52	92.87	-11.35	85.97	-4.45	Peak	132	321
3	867.84	14.97	52.87	-37.90	11.86	3.11	Average	100	301
4	867.84	34.48	72.87	-38.39	31.37	3.11	Peak	100	301

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.1.9 Transmitter Radiated Unwanted Emissions (Below 1GHz)

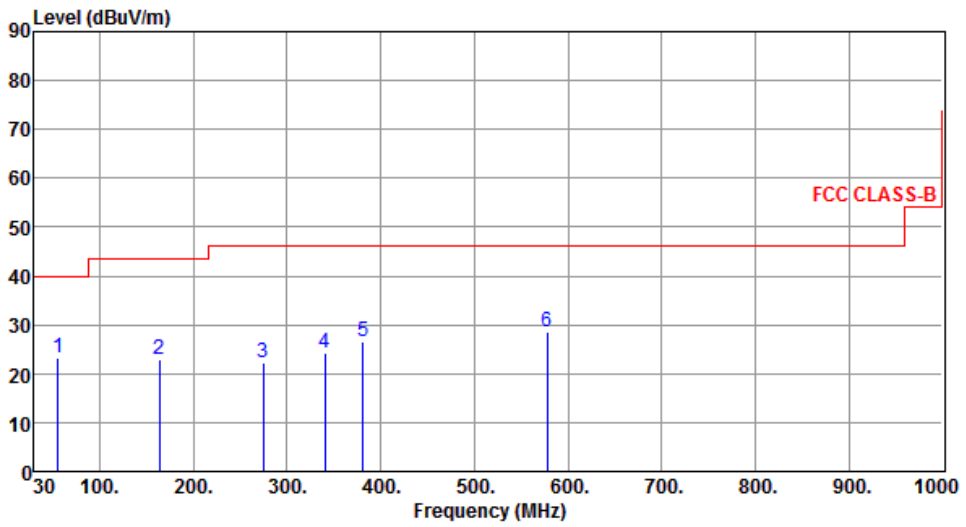
Modulation	FSK	**Test Freq. (MHz)**	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.73	22.30	40.00	-17.70	31.19	-8.89	Peak	---	---
2	170.65	22.23	43.50	-21.27	30.87	-8.64	Peak	---	---
3	266.68	21.04	46.00	-24.96	29.91	-8.87	Peak	---	---
4	337.49	22.97	46.00	-23.03	30.00	-7.03	Peak	---	---
5	388.90	25.50	46.00	-20.50	31.13	-5.63	Peak	---	---
6	555.74	28.40	46.00	-17.60	30.56	-2.16	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	FSK	Test Freq. (MHz)	433.92
Polarization	Vertical		

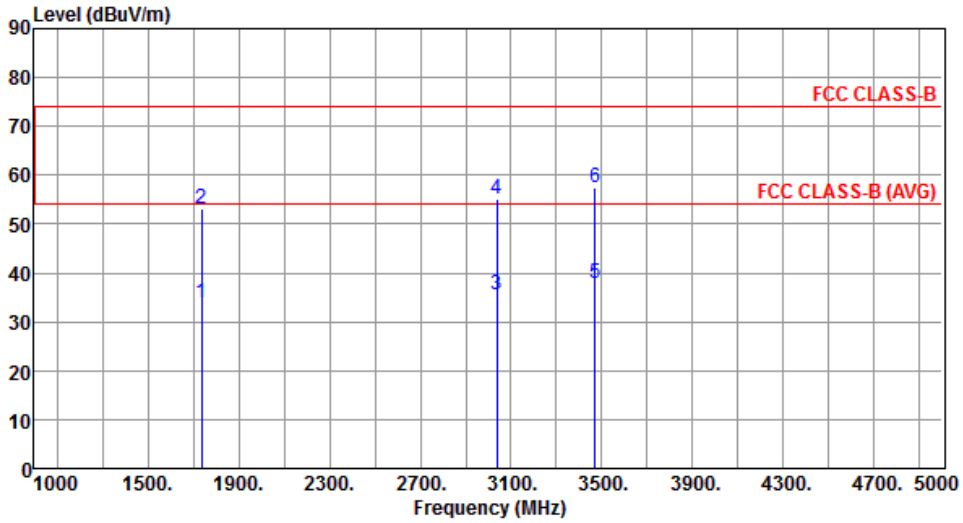


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	55.22	23.14	40.00	-16.86	31.69	-8.55	Peak	---	---
2	163.86	22.92	43.50	-20.58	31.31	-8.39	Peak	---	---
3	274.44	22.22	46.00	-23.78	30.76	-8.54	Peak	---	---
4	340.40	24.22	46.00	-21.78	31.18	-6.96	Peak	---	---
5	381.14	26.55	46.00	-19.45	32.41	-5.86	Peak	---	---
6	578.05	28.45	46.00	-17.55	30.03	-1.58	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.1.10 Transmitter Radiated Unwanted Emissions (Above 1GHz)

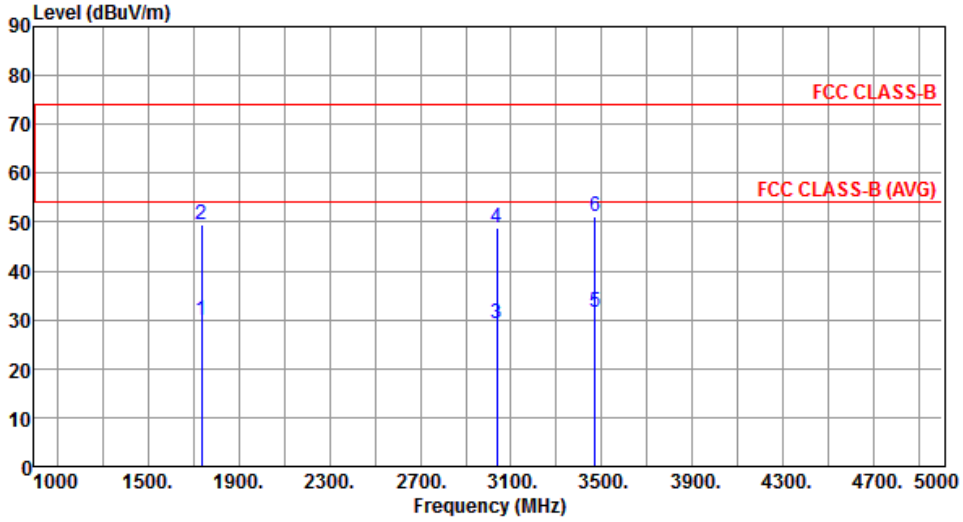
Modulation	FSK	**Test Freq. (MHz)**	433.92
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1735.68	33.73	54.00	-20.27	38.01	-4.28	Average	230	21
2	1735.68	53.24	74.00	-20.76	57.52	-4.28	Peak	230	21
3	3037.44	35.64	54.00	-18.36	35.35	0.29	Average	205	221
4	3037.44	55.15	74.00	-18.85	54.86	0.29	Peak	205	221
5	3471.36	37.83	54.00	-16.17	36.83	1.00	Average	202	341
6	3471.36	57.34	74.00	-16.66	56.34	1.00	Peak	202	341

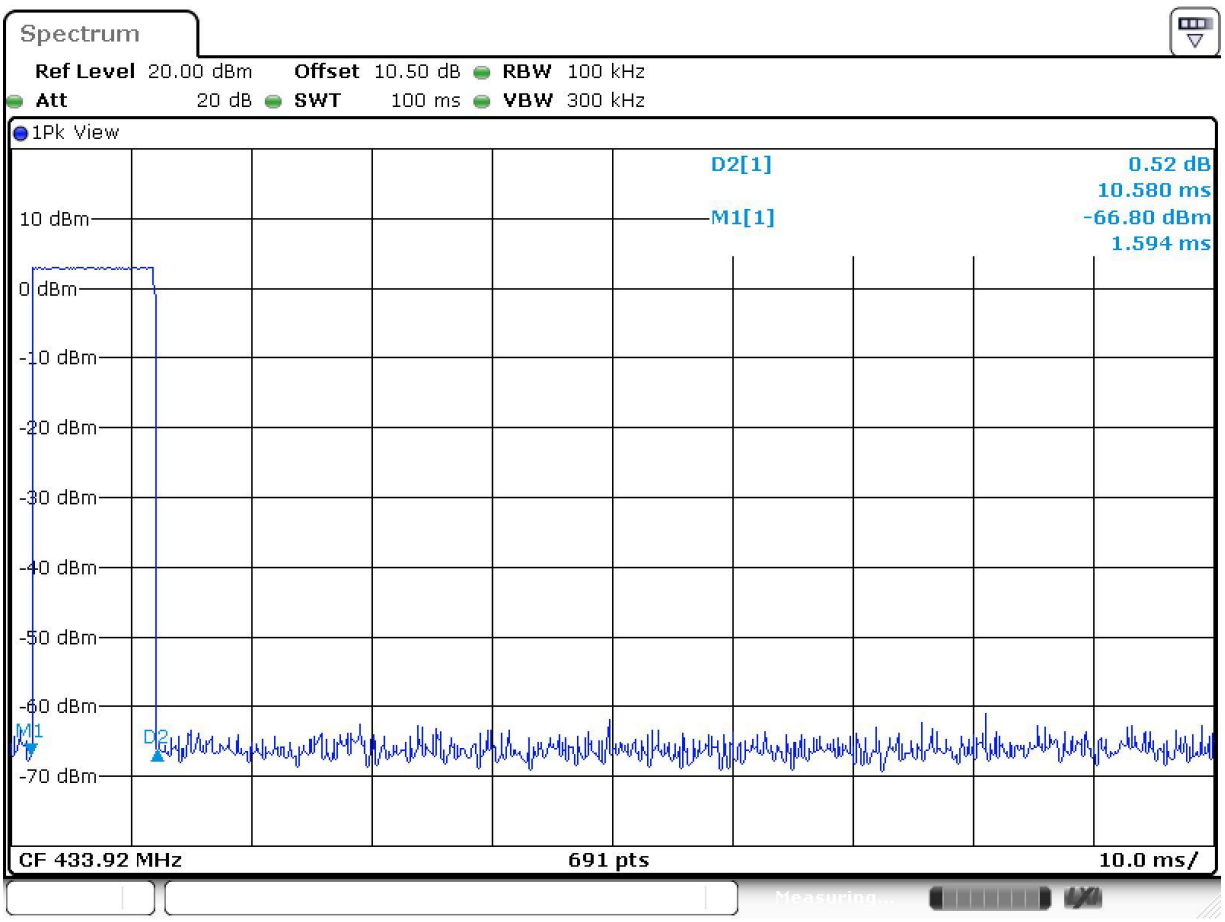
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	FSK	Test Freq. (MHz)	433.92
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1735.68	29.95	54.00	-24.05	34.23	-4.28	Average	262	310
2	1735.68	49.46	74.00	-24.54	53.74	-4.28	Peak	262	310
3	3037.44	29.34	54.00	-24.66	29.05	0.29	Average	292	38
4	3037.44	48.85	74.00	-25.15	48.56	0.29	Peak	292	38
5	3471.36	31.60	54.00	-22.40	30.60	1.00	Average	100	75
6	3471.36	51.11	74.00	-22.89	50.11	1.00	Peak	100	75

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



$$20\log(\text{Duty cycle}) = 20\log\frac{10.58\text{ ms}}{100\text{ ms}} = -19.51\text{dB}$$

3.2 Transmission and Deactivation Time

3.2.1 Limit of Transmission and Deactivation Time

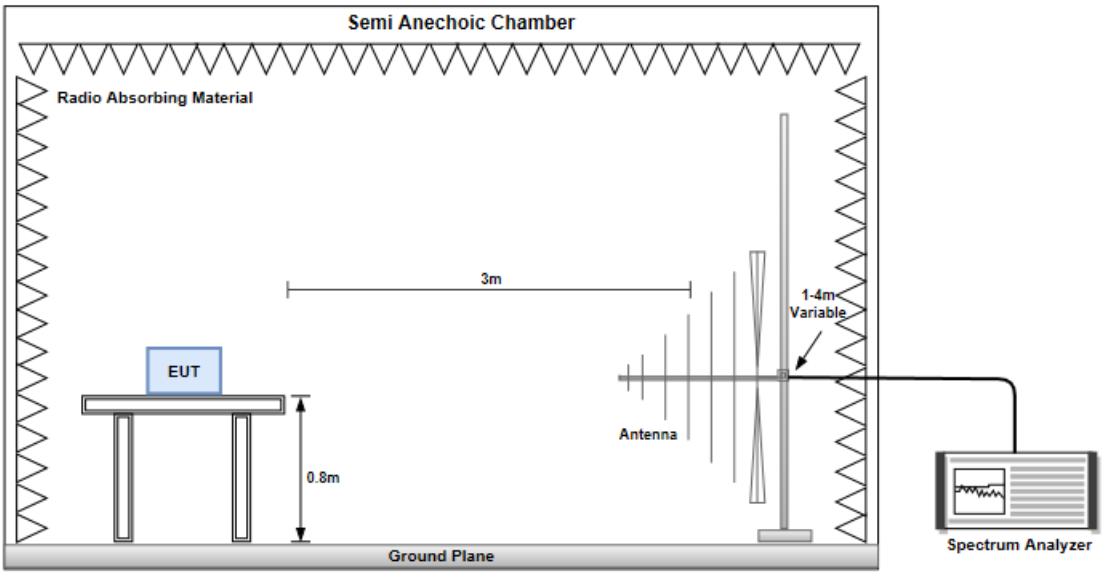
15.231(a): A transmitter activated automatically shall cease transmission within 5 seconds after activation.

15.231(e): Devices operated 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.

3.2.2 Test Procedures

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Set Sweep = fitting time as shown on plots of next pages, Allow the trace to stabilize.
4. Set the EUT to operates at operation modes then record the transmission and deactivation time.

3.2.3 Test Setup

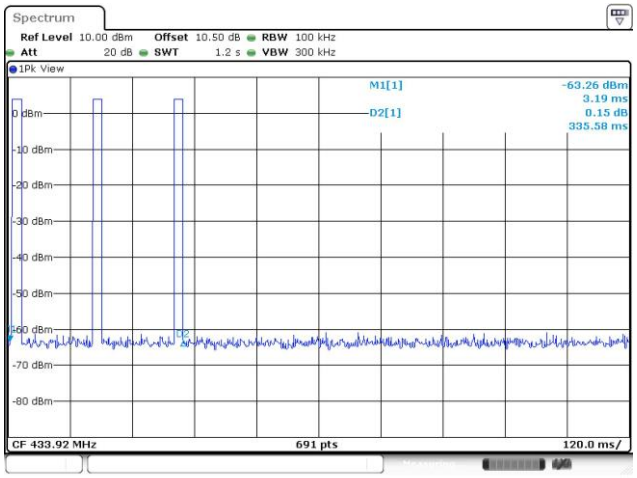
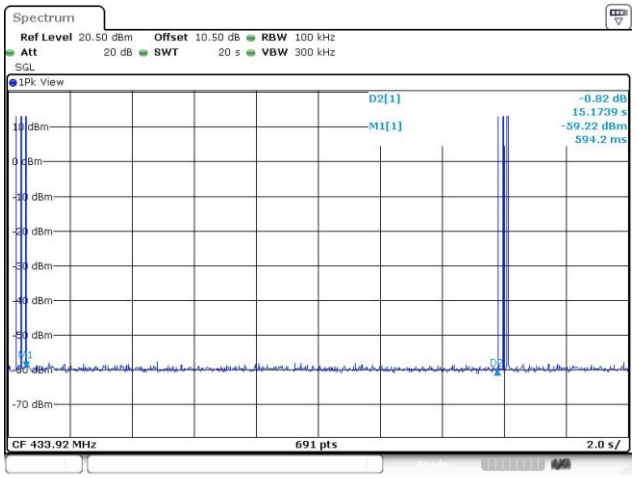


3.2.4 Test Result of Rotating mode

ASK mode

Rotating mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.336	1.0	PASS
Frequency(MHz)	**Deactivation Time (S)**	**Limit (s)**	**Pass/Fail**
433.92	15.174	10.067	PASS

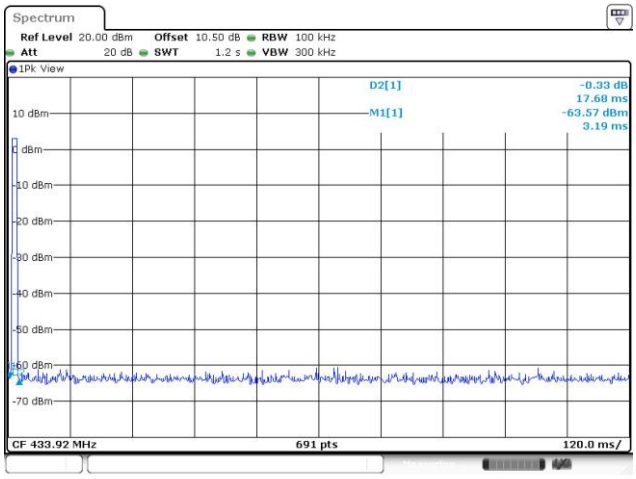
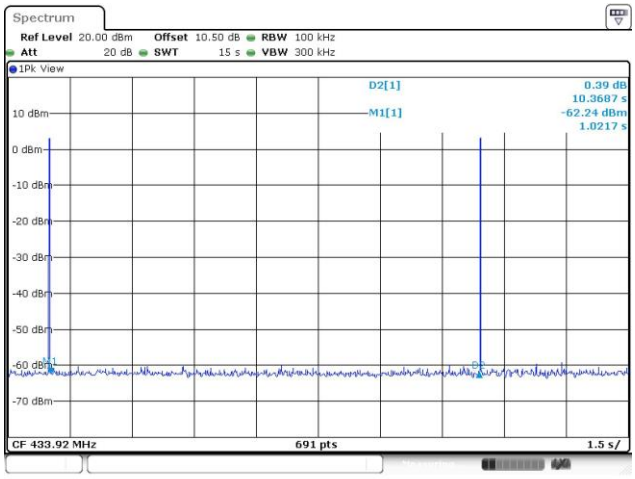
Note: The limit is longer than 10 seconds and is not shorter than transmission time multiplied by 30 (0.33558 s * 30 = 10.067 s)

Rotating mode-1	Rotating mode-2
	

FSK mode

Rotating mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.01768	1.0	PASS
Frequency(MHz)	**Deactivation Time (S)**	**Limit (s)**	**Pass/Fail**
433.92	10.369	10.0	PASS

Note: The limit is longer than 10 seconds and is not shorter than transmission time multiplied by 30 (0.01768 s * 30 = 0.5304 s)

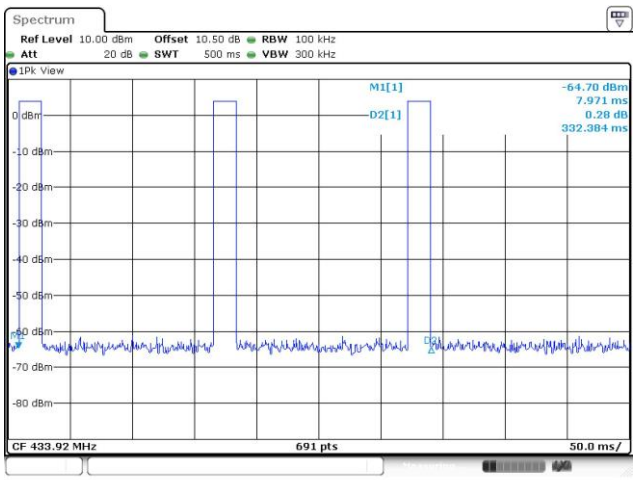
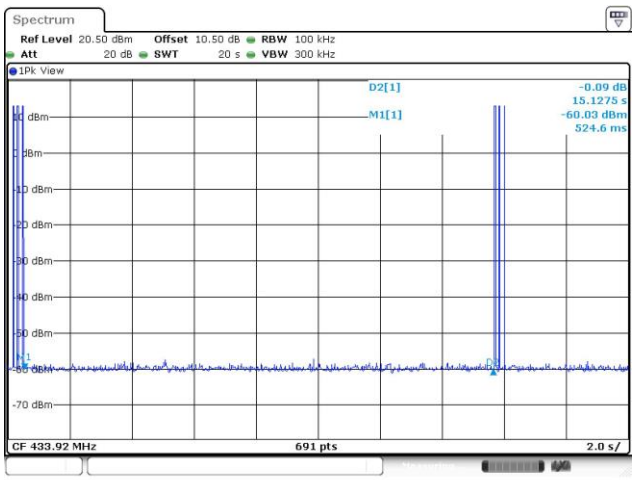
Rotating mode-1	Rotating mode-2
	

3.2.5 Test Result of Stationary mode

ASK mode

Stationary mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.332	1.0	PASS
Frequency(MHz)	**Deactivation Time (S)**	**Limit (s)**	**Pass/Fail**
433.92	15.128	10.0	PASS

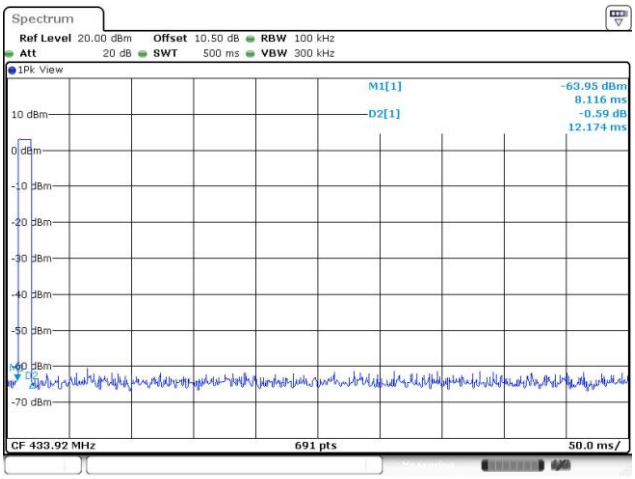
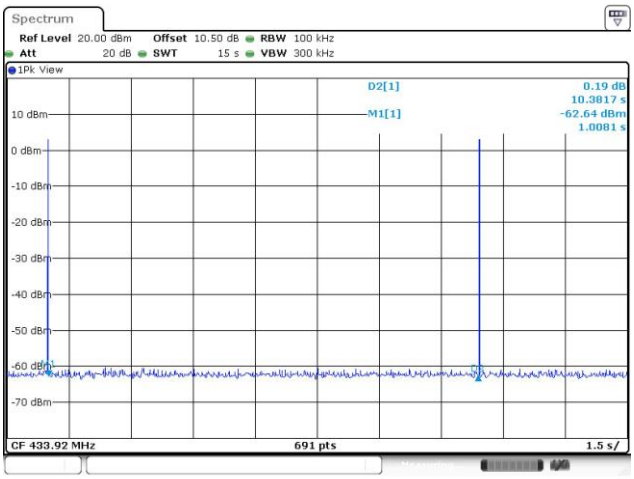
Note: The limit is longer than 10 seconds and is not shorter than transmission time multiplied by 30 (0.3324 s * 30 = 9.972 s)

Stationary mode-1	Stationary mode-2
	

FSK mode

Stationary mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.012174	1.0	PASS
Frequency(MHz)	**Deactivation Time (S)**	**Limit (s)**	**Pass/Fail**
433.92	10.382	10.0	PASS

Note: The limit is longer than 10 seconds and is not shorter than transmission time multiplied by 30 (0.012174 s * 30 = 0.36522 s)

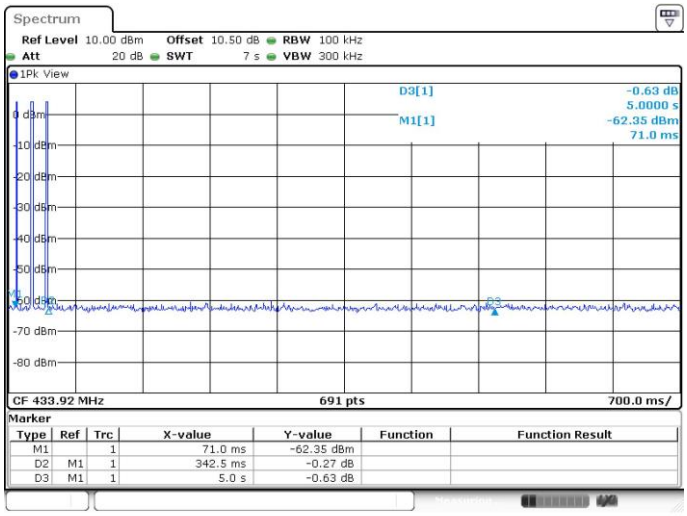
Stationary mode-1	Stationary mode-2
	

3.2.6 Test Result of Alert mode

ASK mode

Transmission Time Alert mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.343	5.0	PASS

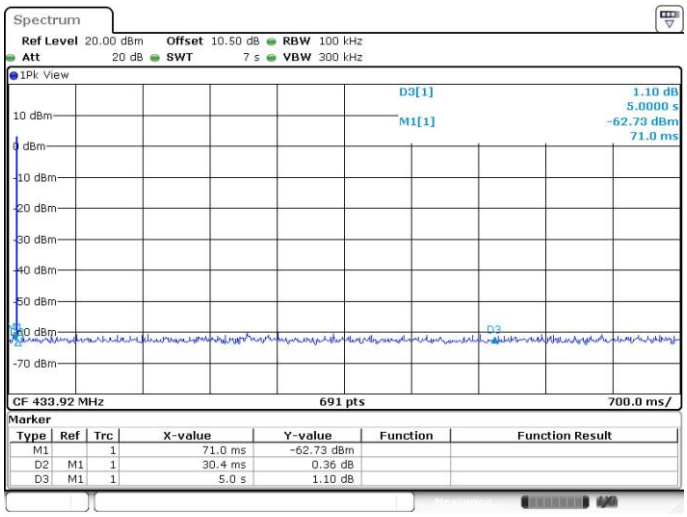
alert mode



FSK mode

Transmission Time Alert mode			
Frequency(MHz)	**Transmission time (S)**	**Limit (s)**	**Pass/Fail**
433.92	0.030	5.0	PASS

alert mode



3.3 20dB and Occupied Bandwidth

3.3.1 Limit of 20 dB Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

3.3.2 Test Procedures

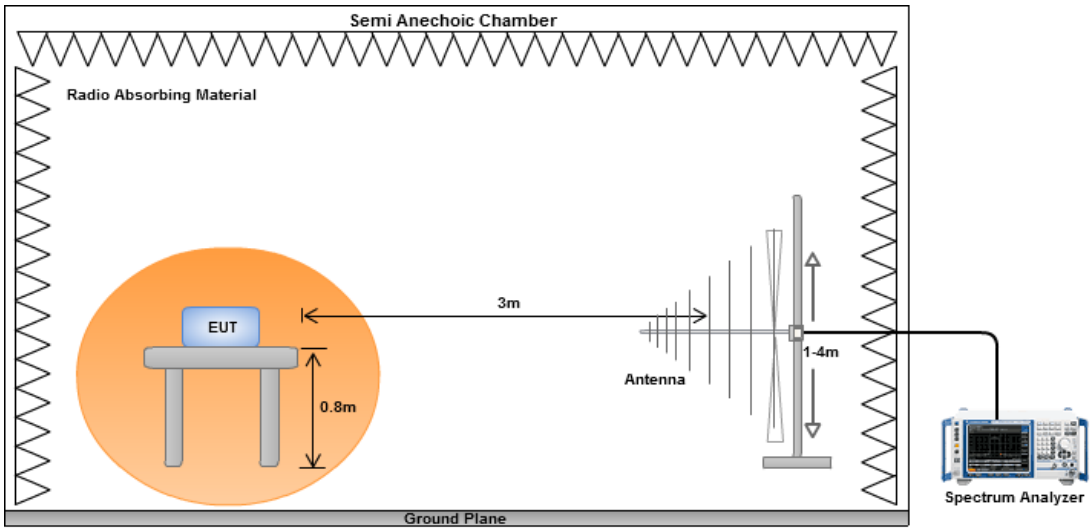
For 20dB bandwidth

1. Set resolution bandwidth (RBW) = 10 kHz, Video bandwidth = 30 kHz
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.

For Occupied bandwidth

1. Set resolution bandwidth (RBW) = 1 kHz, Video bandwidth = 3 kHz
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the occupied measurement function of specturm analyzer to measure 99% occupied bandwidth

3.3.3 Test Setup

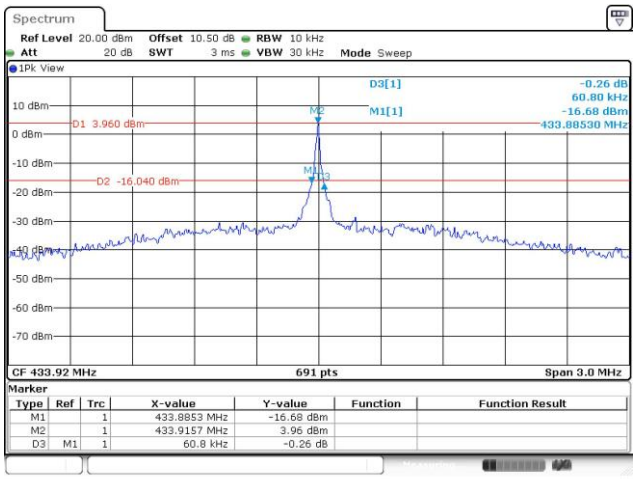
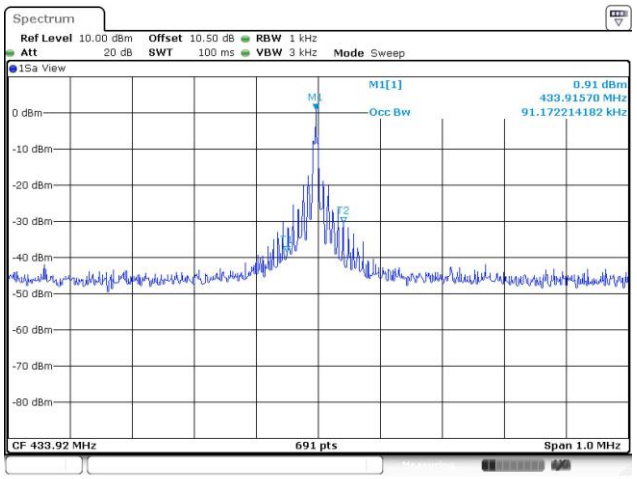


3.3.4 20dB and Occupied Bandwidth

ASK mode

20dB and Occupied Bandwidth				
Frequency(MHz)	**20dB Bandwidth (MHz)**	**20dB BW Limit (MHz)**	**99% BW (MHz)**	**Pass/Fail**
433.92	0.061	1.0848	0.091	PASS

Worst Plots

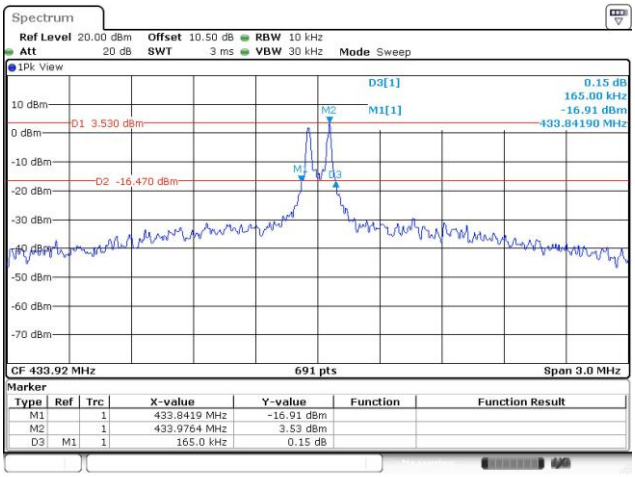
20dB BW	99% BW
	

FSK mode

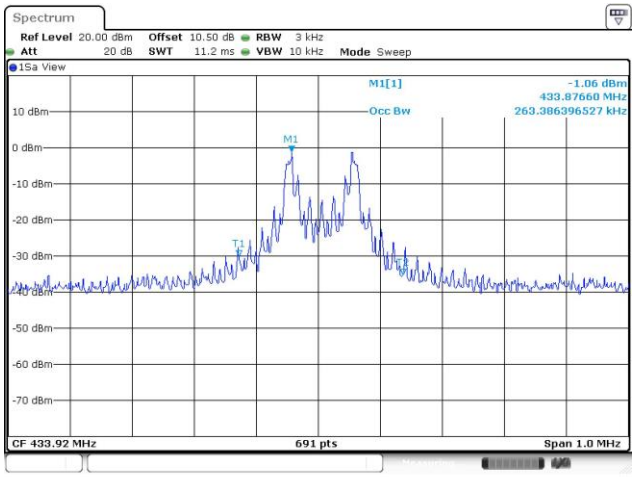
20dB and Occupied Bandwidth				
Frequency(MHz)	**20dB Bandwidth (MHz)**	**20dB BW Limit (MHz)**	**99% BW (MHz)**	**Pass/Fail**
433.92	0.165	1.0848	0.263	PASS

Worst Plots

20dB BW



99% BW



4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

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