TEST REPORT

Report No.:	BCTC2304514234E
Applicant:	Chengdu Meross Technology Co., Ltd.
Product Name:	Smart Door and Window Sensor
Model/Type Ref.:	MS200
Tested Date:	2023-04-03 to 2023-04-14
Issued Date:	2023-04-14

Shenzhen BCTC Testing Co., Ltd.

FCC ID:2AMUU-MS200

Product Name:	Smart Door and Window Sensor
Trademark:	Meross, Refoss, Flysocks
Model/Type Ref.:	MS200 MS200H, MS200P, MS200PH
Prepared For:	Chengdu Meross Technology Co., Ltd.
Address:	Floor 3, Building A5, Shijicheng Road No 1129, Gaoxin, Free Trade Trial Zone, Chengdu, Sichuan, China.
Manufacturer:	Chengdu Meross Technology Co., Ltd.
Address:	Floor 3, Building A5, Shijicheng Road No 1129, Gaoxin, Free Trade Trial Zone, Chengdu, Sichuan, China.
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2023-04-03
Sample tested Date:	2023-04-03 to 2023-04-14
Issue Date:	2023-04-14
Report No.:	BCTC2304514234E
Test Standards:	FCC Part15.231 ANSI C63.10-2013
Test Results:	PASS

Tested by:

Jeff.Fu/Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2304514234E	2023-04-14	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Conducted Emission	§15.207	N/A
2	Fundamental &Radiated Spurious Emission Measurement	15.209,15.231b	PASS
3	Occupy Bandwidth	15.231c	PASS
4	Dwell time	15.231a	PASS
5	Antenna Requirement	15.203	PASS

Note:
"N/A" means not applicable.

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission(150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59℃

4. Product Information And Test Setup

4.1 Product Information

Model/Type Ref.:	MS200 MS200H, MS200P, MS200PH
Model differences:	All the model are the same circuit and RF module, except model names.
Hardware Version:	V4
Software Version:	V4
Operation Frequency:	434-434.75MHz
Type of Modulation:	FSK
Number Of Channel	4CH
Antenna installation:	Spring antenna
Antenna Gain:	0dBi
Ratings:	DC 3V From Battery

4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.
Radiated Spurious Emission

E-1
EUT

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Smart Door and Window Sensor	Meross, Refoss, Flysocks	MS200	N/A	EUT

Notes:
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

CH	Frequency (MHz)
1	434
2	434.25
3	434.50
4	434.75

4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Test mode	Low channel	Middle channel	High channel
1	Transmitting(FSK)	434MHz	434.50MHz	434.75MHz
2	Transmitting (Radiated emission)			

Note:
(1) The measurements are performed at the highest, middle, lowest available channels.
(2) Fully-charged battery is used during the test

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.
FCC Test Firm Registration Number: 712850
A2LA certificate registration number is: CN1212
ISED Registered No.: 23583
ISED CAB identifier: CN0017

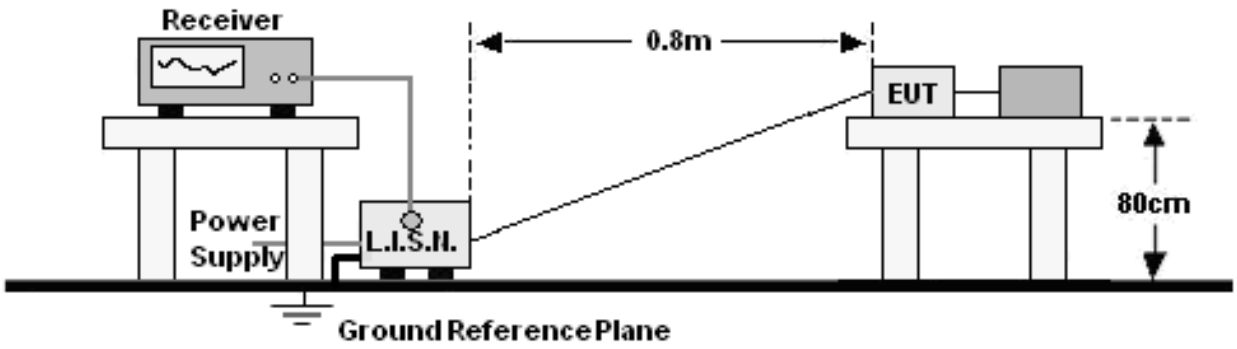
5.2 Test Instrument Used

RF Conducted Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Power Metter	Keysight	E4419	\	May 24, 2022	May 23, 2023
Power Sensor (AV)	Keysight	E9300A	\	May 24, 2022	May 23, 2023
Signal Analyzer20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 24, 2022	May 23, 2023
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	100363	May 24, 2022	May 23, 2023

Radiated Emissions Test (966 Chamber01)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
Receiver	R&S	ESRP	101154	May 24, 2022	May 23, 2023
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 24, 2022	May 23, 2023
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 26, 2022	May 25, 2023
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 26, 2022	May 25, 2023
Amplifier	SKET	LAPA_01G18G-45dB	\	May 24, 2022	May 23, 2023
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 06, 2022	Jun. 05, 2023
Amplifier(18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	May 26, 2022	May 25, 2023
Horn Antenna(18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 06, 2022	Jun. 05, 2023
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	100363	May 24, 2022	May 23, 2023
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)	
	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00
Notes: 1. *Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

6.3 Test Procedure

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

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

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

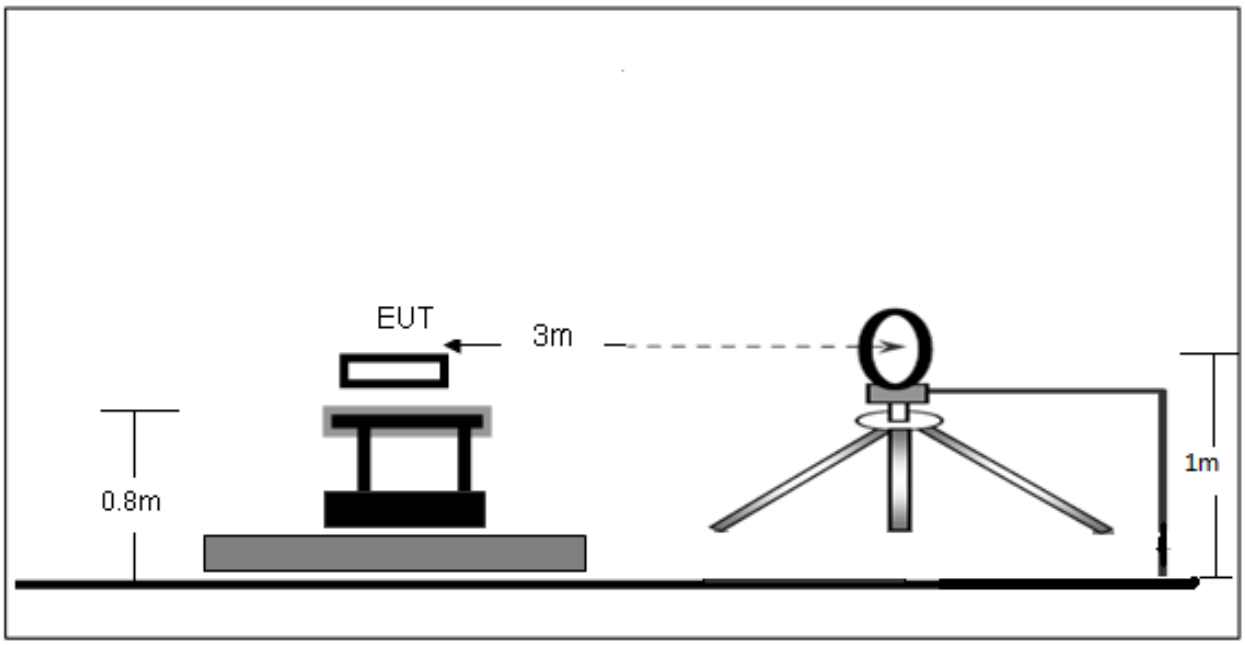
6.5 Test Result

The EUT is powered by the DC only, the test item is not applicable.

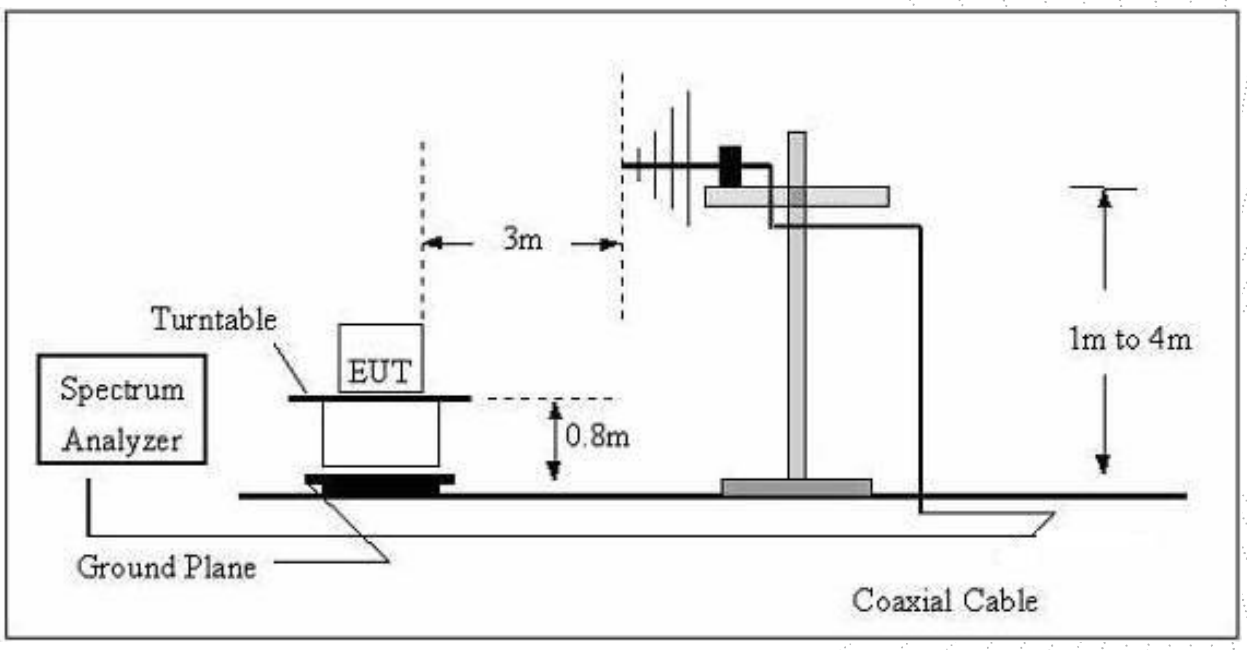
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

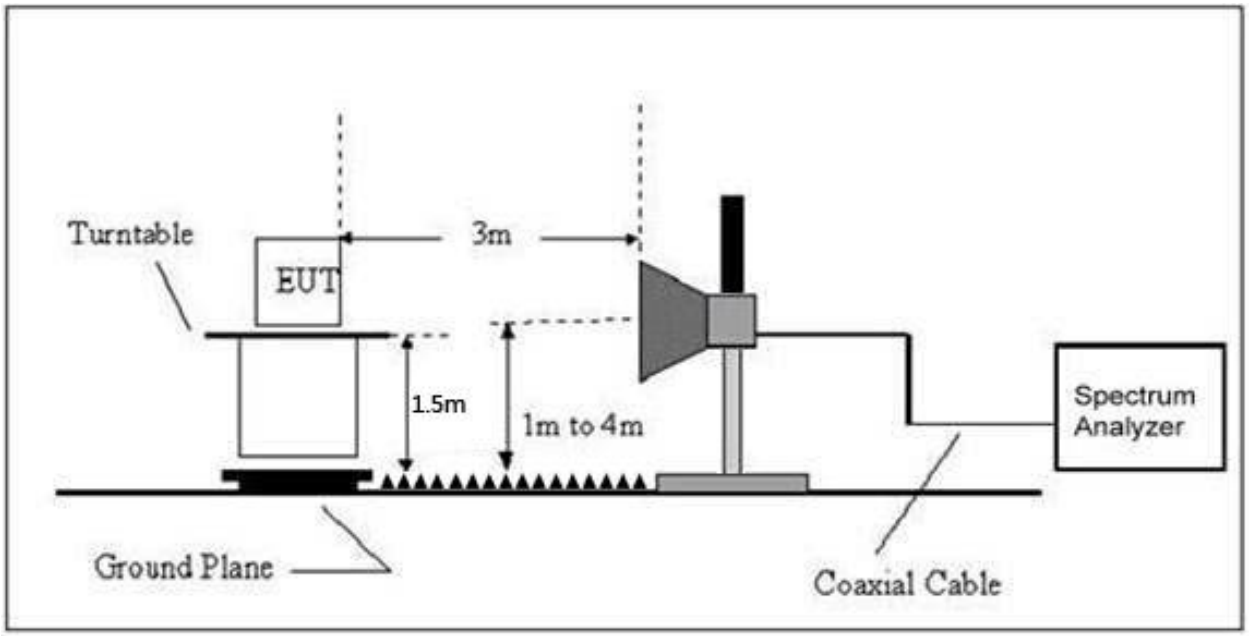
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



7.2 Limit

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 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance	
(MHz)	uV/m	(m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Fundamental Frequency (MHz)	Filed Strength of Fundamental (dBμV/m)	Filed Strength of Spurious Emission(dBμV/m)
434	80.83	60.83
434.50	80.84	60.84
434.75	80.85	60.85

Note:

1. *Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions.*
2. *According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits Shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test.*
3. *According to 15.231(b), The limits on the field strength of the spurious emissions in the above table is 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 Section 15.209, whichever limit permits one higher field strength.*

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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).

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	5th harmonic of the highest frequency or 40 GHz, whichever is lower

7.3 Test Procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting
1-6GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Above 1GHz test procedure as below:
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel, the middle channel ,the Highest channel.

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

Above 1GHz test procedure as below:
a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
g. Test the EUT in the lowest channel, the Highest channel.
Note:
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

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

7.5 Test Result

Below 30MHz

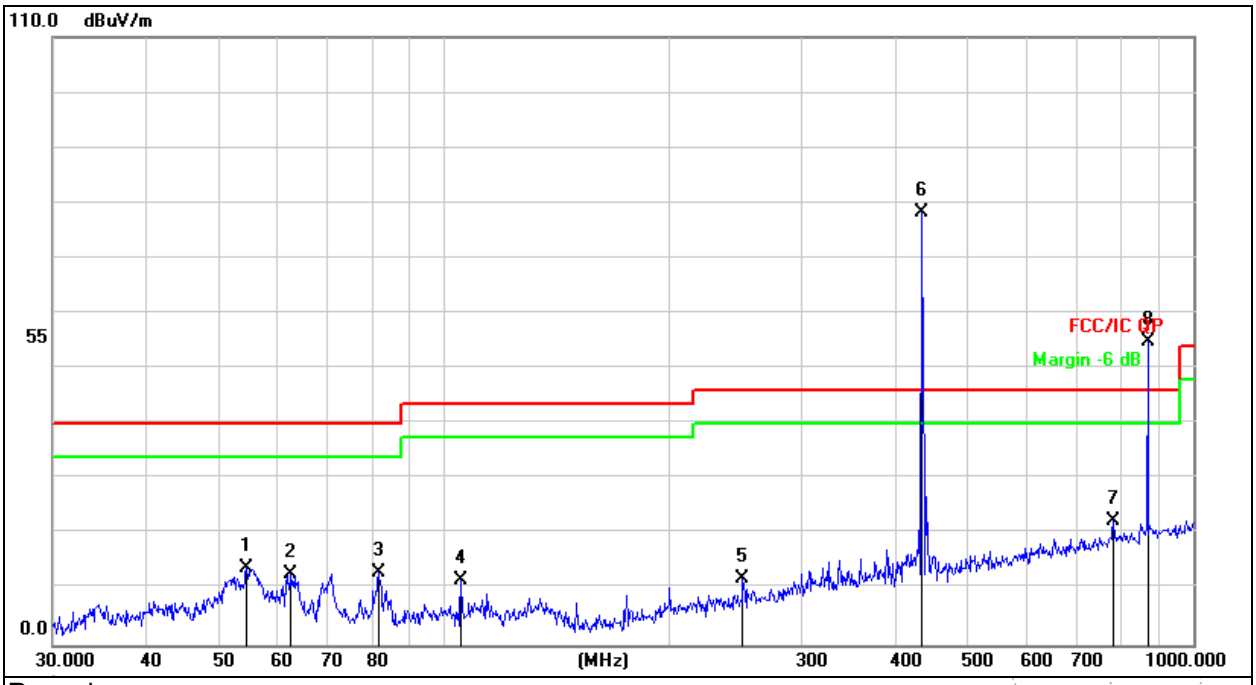
Temperature：	26℃	Relative Humidity：	24%
Pressure：	101 kPa	Test Voltage ：	DC 3V
Test Mode ：	Mode 2	Polarization :	--

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 (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

434MHz
Between 30MHz – 1GHz

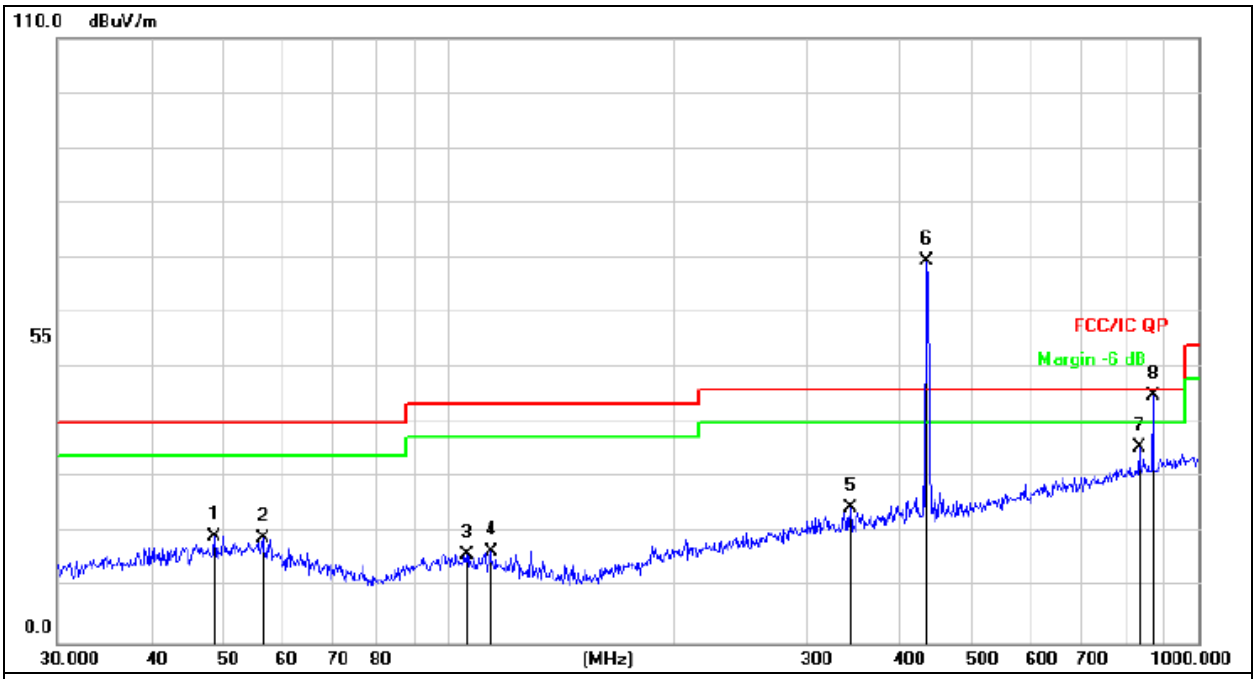
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		54.4515	29.66	-15.79	13.87	40.00	-26.13	QP
2		62.4313	30.18	-17.32	12.86	40.00	-27.14	QP
3		81.7832	33.32	-20.32	13.00	40.00	-27.00	QP
4		105.2717	28.85	-17.06	11.79	43.50	-31.71	QP
5		250.3011	26.16	-14.18	11.98	46.00	-34.02	QP
6	*	434.0650	87.66	-9.51	78.15	100.83	-22.68	peak
7		782.3452	24.86	-2.58	22.28	46.00	-23.72	QP
8	X	869.1300	56.14	-1.40	54.74	80.83	-26.09	peak

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		48.6719	34.55	-15.20	19.35	40.00	-20.65	QP
2		56.3947	35.31	-16.12	19.19	40.00	-20.81	QP
3		105.6414	33.30	-17.08	16.22	43.50	-27.28	QP
4		113.7142	34.13	-17.59	16.54	43.50	-26.96	QP
5		343.1800	35.73	-11.08	24.65	46.00	-21.35	QP
6	*	434.0649	78.92	-9.51	69.41	100.83	-31.42	peak
7		833.3170	37.48	-1.92	35.56	46.00	-10.44	QP
8	!	869.1300	46.45	-1.40	45.05	80.83	-35.78	peak

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434	78.15	-3.07	75.08	80.83	-5.75	Horizontal
868	54.74	-3.07	51.67	60.83	-9.16	Horizontal

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

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434	69.41	-3.07	66.34	80.83	-14.49	Vertical
868	45.05	-3.07	41.98	60.83	-18.85	Vertical

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

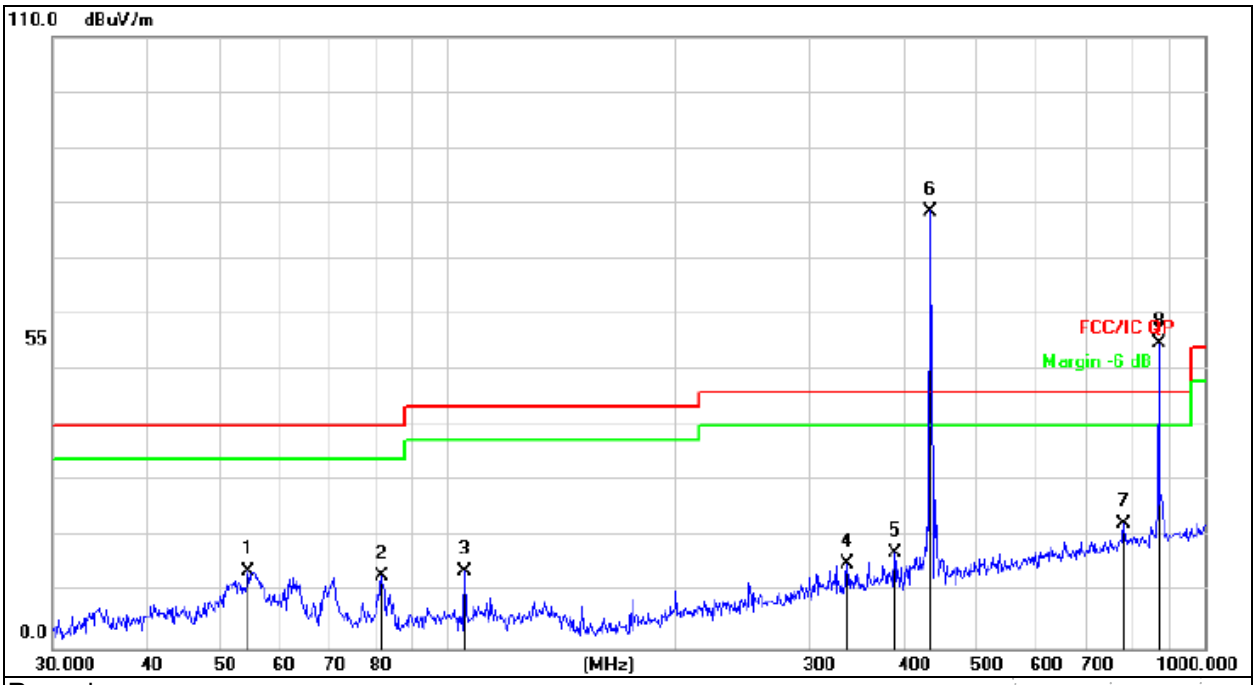
Radiated Spurious Emission (1GHz to 10th harmonics)

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1301.76	51.23	-3.07	48.16	74.00	54.00	-22.77	-5.84	Vertical
1735.68	52.52	-3.07	49.45	80.83	60.83	-28.31	-11.38	Vertical
2603.52	51.12	-3.07	48.05	80.83	60.83	-29.71	-12.78	Vertical
3037.44	52.76	-3.07	49.69	80.83	60.83	-28.07	-11.14	Vertical
3471.36	50.66	-3.07	47.59	80.83	60.83	-30.17	-13.24	Vertical
3905.28	47.42	-3.07	44.35	74.00	54.00	-26.58	-9.65	Vertical
1301.76	46.93	-3.07	43.86	74.00	54.00	-27.07	-10.14	Horizontal
1735.68	46.76	-3.07	43.69	80.83	60.83	-34.07	-17.14	Horizontal
2603.52	49.42	-3.07	46.35	80.83	60.83	-31.41	-14.48	Horizontal
3037.44	49.59	-3.07	46.52	80.83	60.83	-31.24	-14.31	Horizontal
3471.36	47.15	-3.07	44.08	80.83	60.83	-33.68	-16.75	Horizontal
3905.28	48.32	-3.07	45.25	74.00	54.00	-25.68	-8.75	Horizontal

Notes: 1. Average emission Level = Peak Level + Duty cycle factor
2.Duty cycle level please see clause 5.
3. Pulse Desensitization Correction Factor
Pulse Width (PW) =70.20ms
RBW=1 MHz
PW(70.20 ms) > 1/RBW (1us)
Therefore PDCF is not needed
4.Other harmonics emissions are lower than 20dB below the allowable limit.

434.50MHz
Between 30MHz – 1GHz

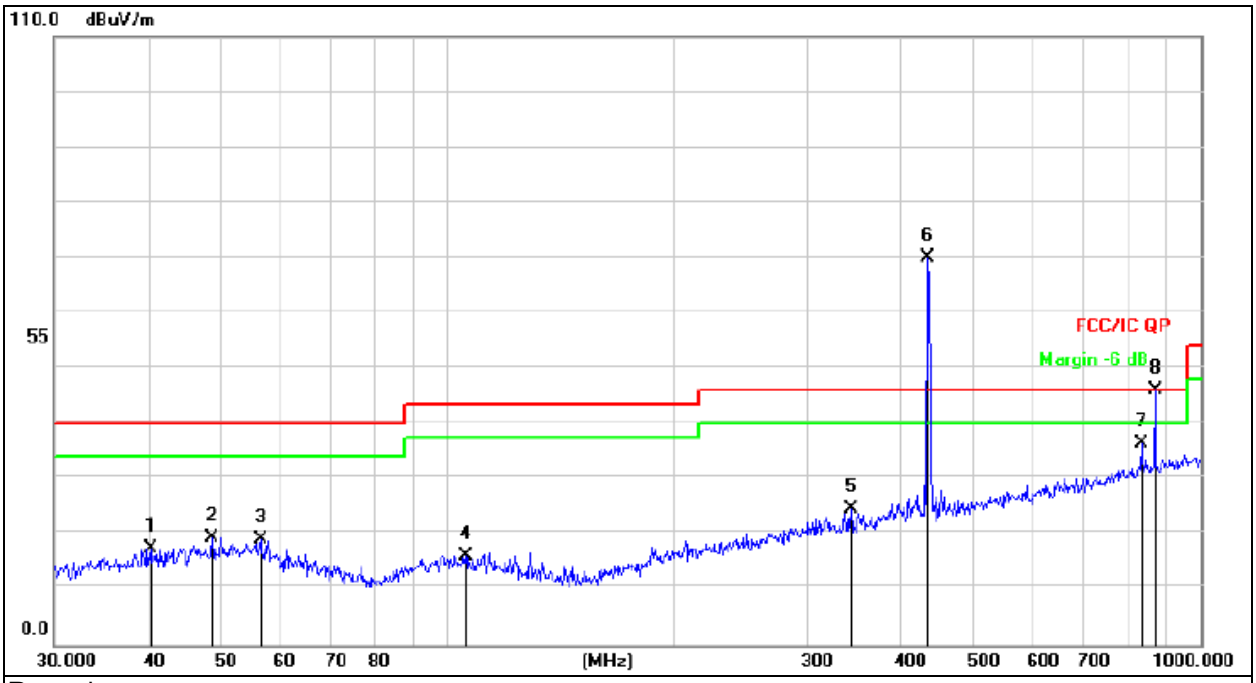
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		54.4515	29.66	-15.79	13.87	40.00	-26.13	QP
2		81.7831	33.32	-20.32	13.00	40.00	-27.00	QP
3		105.2716	30.85	-17.06	13.79	43.50	-29.71	QP
4		337.2155	26.52	-11.20	15.32	46.00	-30.68	QP
5		389.3548	27.40	-10.26	17.14	46.00	-28.86	QP
6	*	434.4960	88.16	-9.51	78.65	100.84	-22.19	peak
7		782.3451	24.86	-2.58	22.28	46.00	-23.72	QP
8	X	868.9920	56.14	-1.40	54.74	80.84	-26.10	peak

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		40.2757	33.70	-16.22	17.48	40.00	-22.52	QP
2		48.6719	34.55	-15.20	19.35	40.00	-20.65	QP
3		56.3947	35.31	-16.12	19.19	40.00	-20.81	QP
4		105.6414	33.30	-17.08	16.22	43.50	-27.28	QP
5		343.1800	35.73	-11.08	24.65	46.00	-21.35	QP
6	*	434.0649	79.42	-9.51	69.91	100.84	-30.93	peak
7		833.3170	38.48	-1.92	36.56	46.00	-9.44	QP
8	X	868.9920	47.45	-1.40	46.05	80.84	-34.79	peak

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434.50	78.65	-3.07	75.58	80.84	-5.26	Horizontal
869	54.74	-3.07	51.67	60.84	-9.17	Horizontal

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

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434.50	69.91	-3.07	66.84	80.84	-14.00	Vertical
869	46.05	-3.07	42.98	60.84	-17.86	Vertical

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

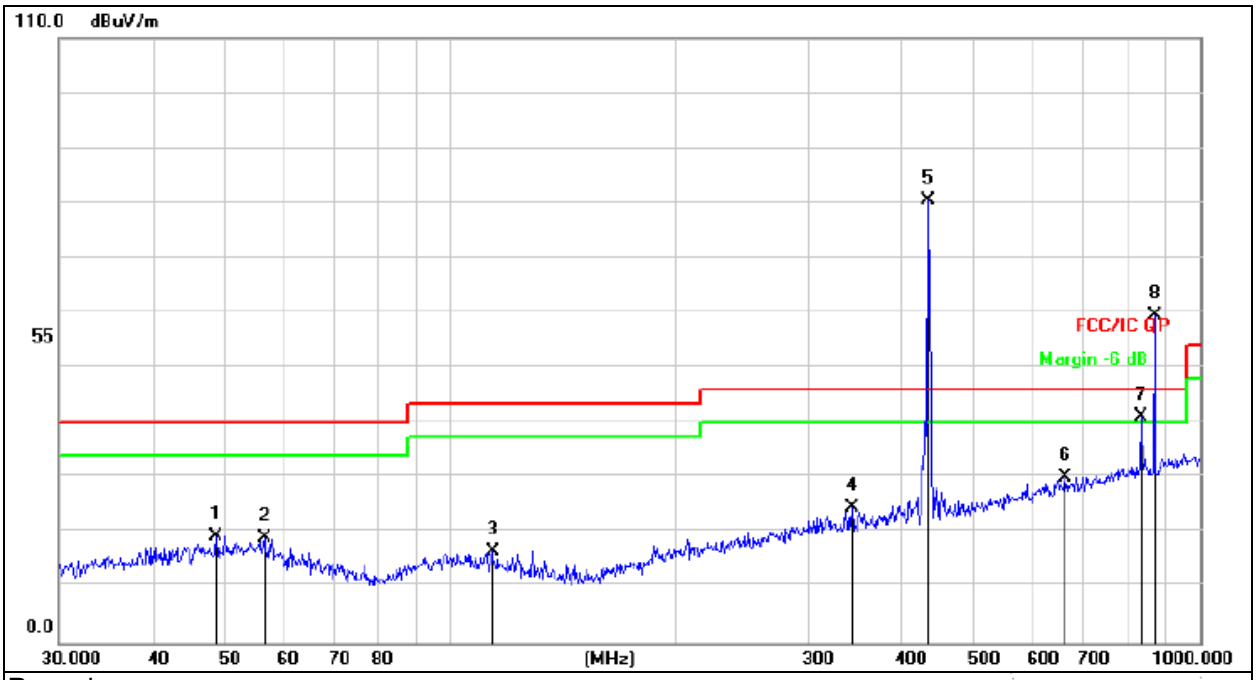
Radiated Spurious Emission (1GHz to 10th harmonics)

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1303.53	50.12	-3.07	47.05	74.00	54.00	-23.88	-6.95	Vertical
1738.55	53.76	-3.07	50.69	80.83	60.84	-27.08	-10.15	Vertical
2607.36	52.43	-3.07	49.36	80.83	60.84	-28.41	-11.48	Vertical
3041.49	51.39	-3.07	48.32	80.83	60.84	-29.45	-12.52	Vertical
3476.36	48.97	-3.07	45.9	80.83	60.84	-31.87	-14.94	Vertical
3910.77	47.88	-3.07	44.81	74.00	54.00	-26.12	-9.19	Vertical
1303.53	45.87	-3.07	42.8	74.00	54.00	-28.13	-11.2	Horizontal
1738.55	47.65	-3.07	44.58	80.83	60.84	-33.19	-16.26	Horizontal
2607.36	48.31	-3.07	45.24	80.83	60.84	-32.53	-15.6	Horizontal
3041.49	48.62	-3.07	45.55	80.83	60.84	-32.22	-15.29	Horizontal
3476.36	46.39	-3.07	43.32	80.83	60.84	-34.45	-17.52	Horizontal
3910.77	48.73	-3.07	45.66	74.00	54.00	-25.27	-8.34	Horizontal

Notes: 1. Average emission Level = Peak Level + Duty cycle factor
2.Duty cycle level please see clause 5.
3. Pulse Desensitization Correction Factor
Pulse Width (PW) =70.20ms
RBW=1 MHz
PW(70.20 ms) > 1/RBW (1us)
Therefore PDCF is not needed
4.Other harmonics emissions are lower than 20dB below the allowable limit.

434.75MHz
Between 30MHz – 1GHz

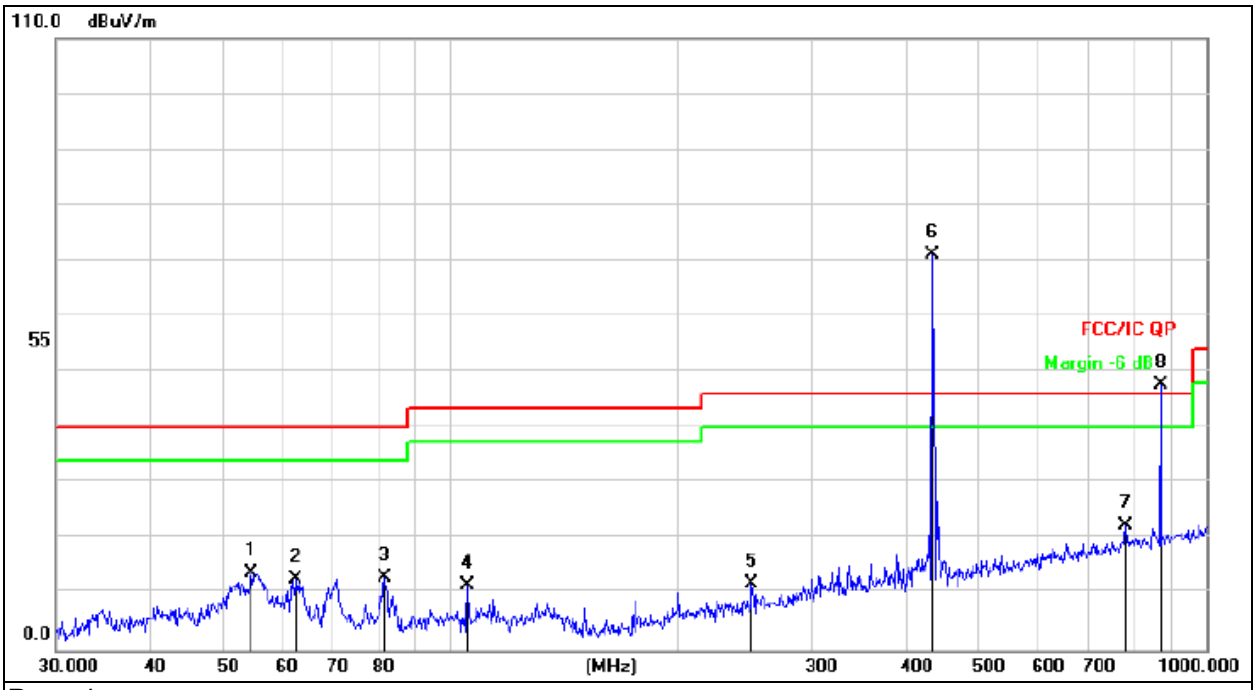
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		48.6719	34.55	-15.20	19.35	40.00	-20.65	QP
2		56.3947	35.31	-16.12	19.19	40.00	-20.81	QP
3		113.7142	34.13	-17.59	16.54	43.50	-26.96	QP
4		343.1800	35.73	-11.08	24.65	46.00	-21.35	QP
5	*	434.8650	89.92	-9.51	80.41	100.85	-20.44	peak
6		661.1504	34.73	-4.56	30.17	46.00	-15.83	QP
7	!	833.3170	42.98	-1.92	41.06	46.00	-4.94	QP
8	X	869.1301	60.95	-1.40	59.55	80.85	-21.30	peak

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 2	Remark:	N/A



Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		54.4515	29.66	-15.79	13.87	40.00	-26.13	QP
2		62.4313	30.18	-17.32	12.86	40.00	-27.14	QP
3		81.7832	33.32	-20.32	13.00	40.00	-27.00	QP
4		105.2717	28.85	-17.06	11.79	43.50	-31.71	QP
5		250.3011	26.16	-14.18	11.98	46.00	-34.02	QP
6	*	434.8650	80.66	-9.51	71.15	100.85	-29.10	peak
7		782.3452	24.86	-2.58	22.28	46.00	-23.72	QP
8	X	869.1301	49.14	-1.40	47.74	80.85	-33.11	peak

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434.75	80.41	-3.07	77.34	80.85	-3.51	Horizontal
869.50	59.55	-3.07	56.48	60.85	-4.37	Horizontal

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

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
434.75	71.15	-3.07	68.08	80.85	-12.77	Vertical
869.50	47.74	-3.07	44.67	60.85	-16.18	Vertical

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

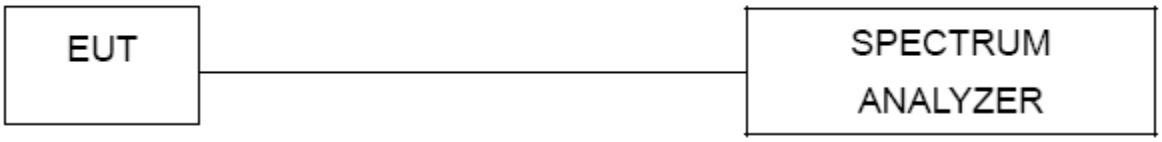
Radiated Spurious Emission (1GHz to 10th harmonics)

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1304.25	51.23	-3.07	46.27	74.00	54.00	-24.66	-7.73	Vertical
1739.07	52.52	-3.07	48.34	80.85	60.85	-29.44	-12.51	Vertical
2608.59	51.12	-3.07	47.79	80.85	60.85	-29.99	-13.06	Vertical
3043.31	52.76	-3.07	49.46	80.85	60.85	-28.32	-11.39	Vertical
3478.12	50.66	-3.07	47.6	80.85	60.85	-30.18	-13.25	Vertical
3912.75	47.42	-3.07	45.56	74.00	54.00	-25.37	-8.44	Vertical
1304.25	46.93	-3.07	44.85	74.00	54.00	-26.08	-9.15	Horizontal
1739.07	46.76	-3.07	45.67	80.85	60.85	-32.11	-15.18	Horizontal
2608.59	49.42	-3.07	45.62	80.85	60.85	-32.16	-15.23	Horizontal
3043.31	49.59	-3.07	46.52	80.85	60.85	-31.26	-14.33	Horizontal
3478.12	47.15	-3.07	44.48	80.85	60.85	-33.30	-16.37	Horizontal
3912.75	48.32	-3.07	45.71	74.00	54.00	-25.22	-8.29	Horizontal

Notes: 1. Average emission Level = Peak Level + Duty cycle factor
2.Duty cycle level please see clause 5.
3. Pulse Desensitization Correction Factor
Pulse Width (PW) =70.20ms
RBW=1 MHz
PW(70.20 ms) > 1/RBW (1us)
Therefore PDCF is not needed
4.Other harmonics emissions are lower than 20dB below the allowable limit.

8. Bandwidth Test

8.1 Block Diagram Of Test Setup



8.2 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(MHz) = 0.25% * 434MHz = 1.0848MHz
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 434.50MHz = 1.08625MHz
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 434.75MHz = 1.086875MHz

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30kHz
VB	≥RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3 Test Procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 30kHz, VBW≥ RBW, Sweep time = Auto.

8.4 EUT Operating Conditions

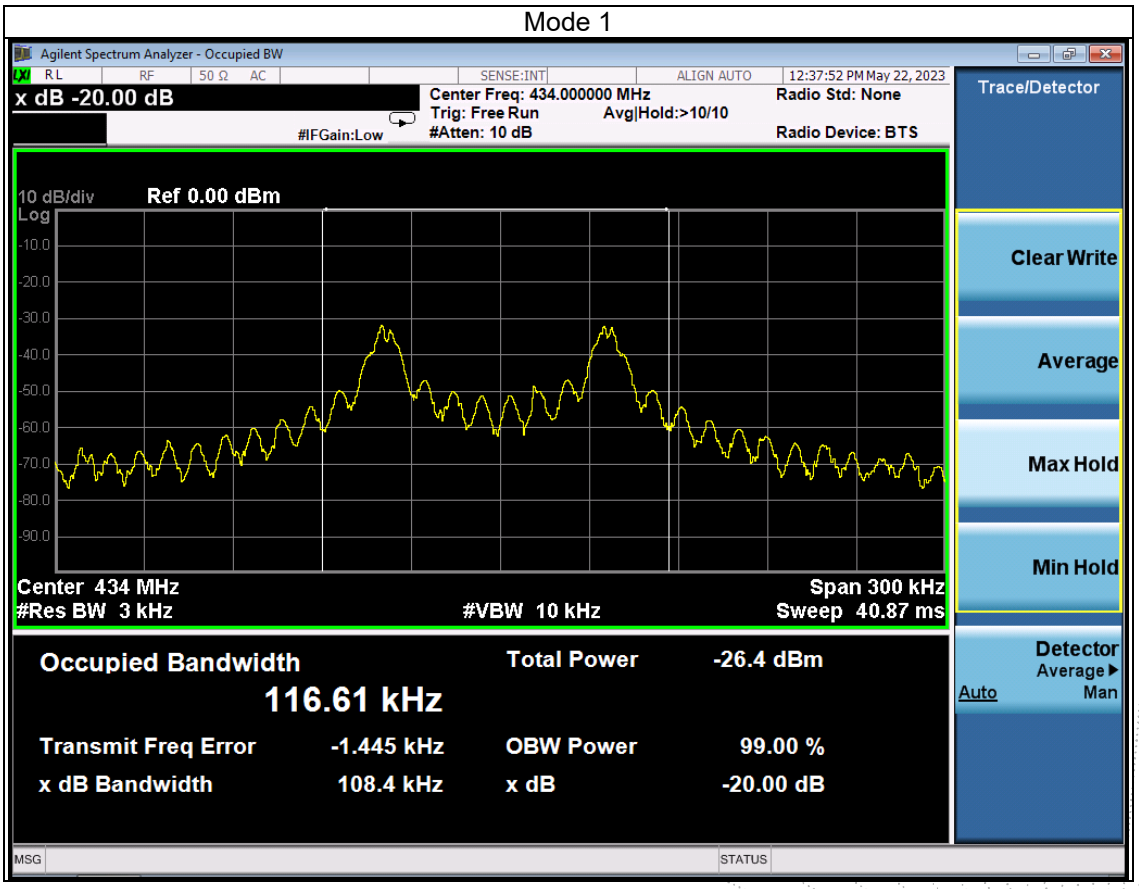
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.5 Test Result

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 3V
Test Mode ：	Mode 1		

Frequency	20dB Bandwidth (kHz)	Limit (MHz)	Result
434MHz	108.4	1.0850	PASS

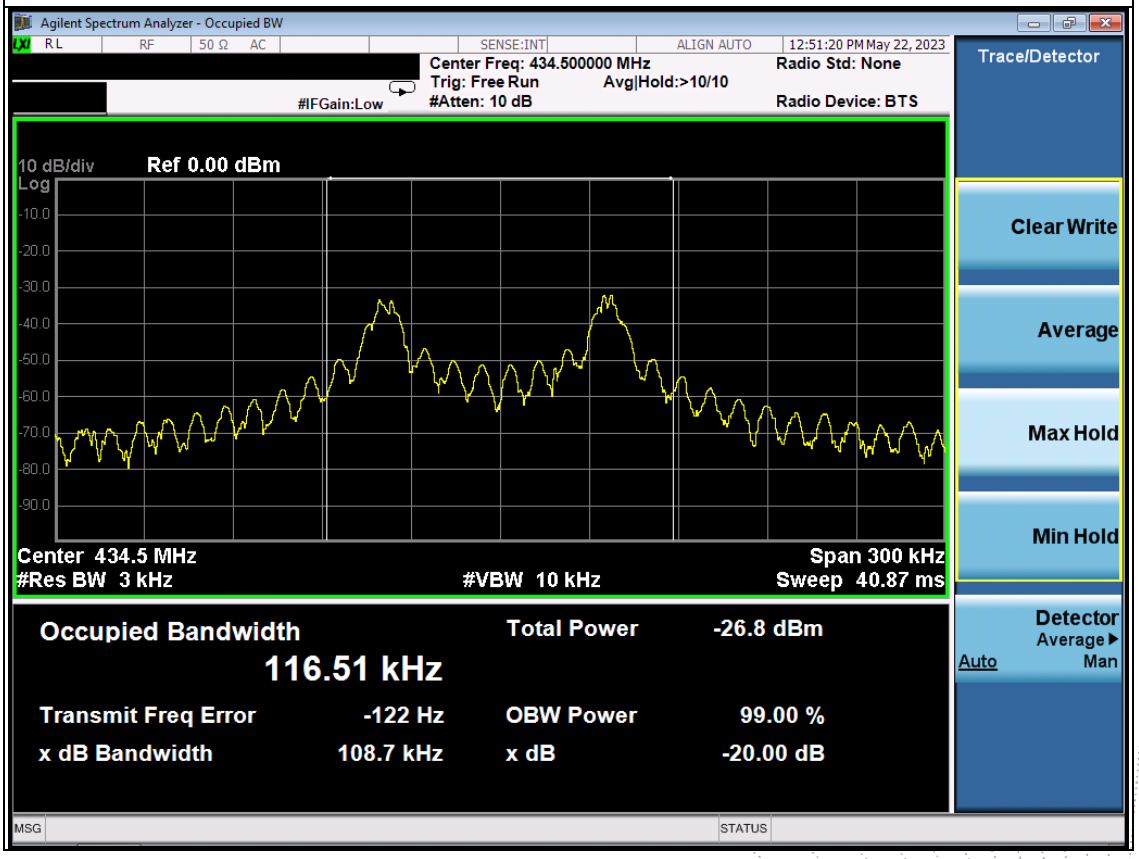
Mode 1



Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3V
Test Mode :	Mode 1		

Frequency	20dB Bandwidth (kHz)	Limit (MHz)	Result
434.50MHz	108.7	1.08625	PASS

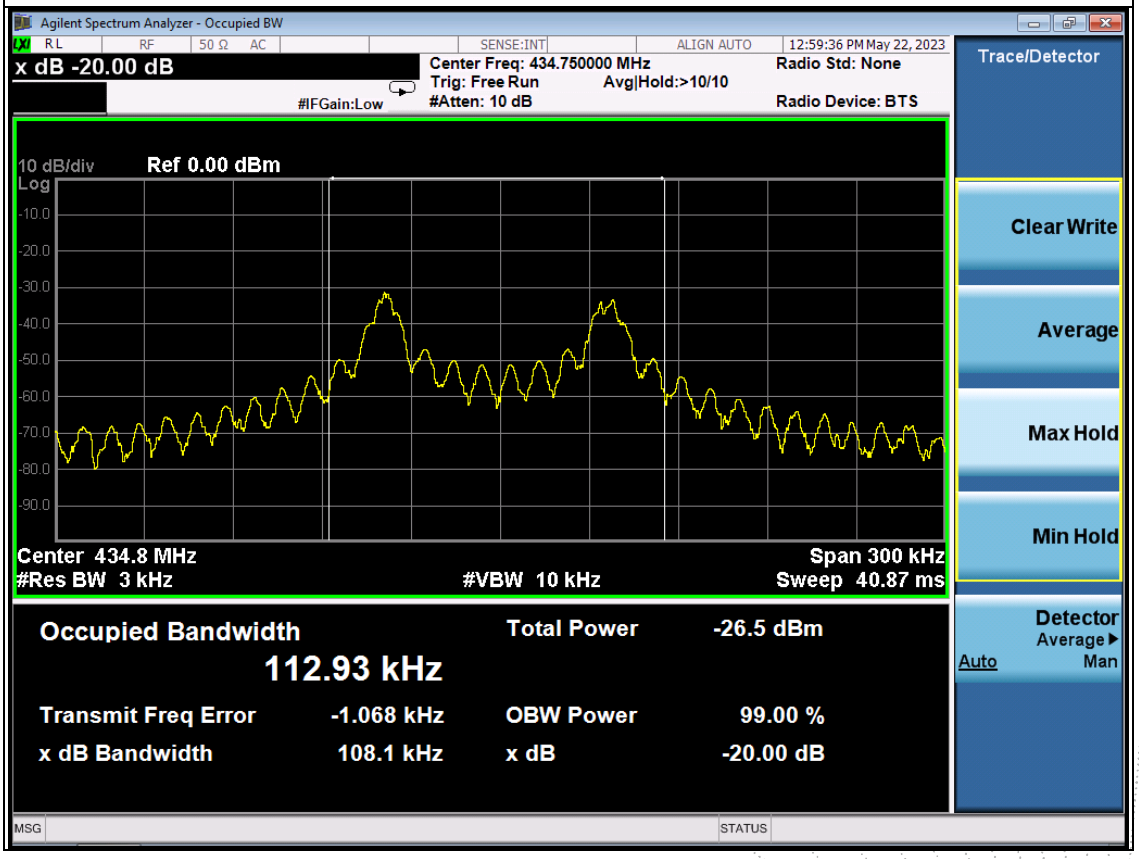
Mode 1



Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3V
Test Mode :	Mode 1		

Frequency	20dB Bandwidth (kHz)	Limit (MHz)	Result
434.75MHz	108.10	1.086875	PASS

Mode 1



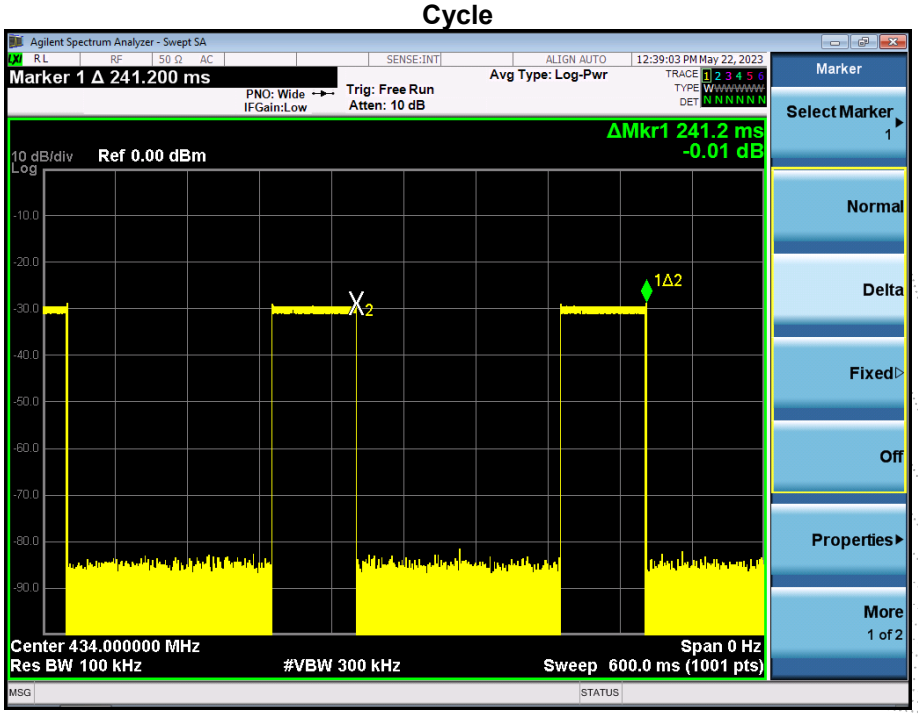
9. Calculation Of Average Factor

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)

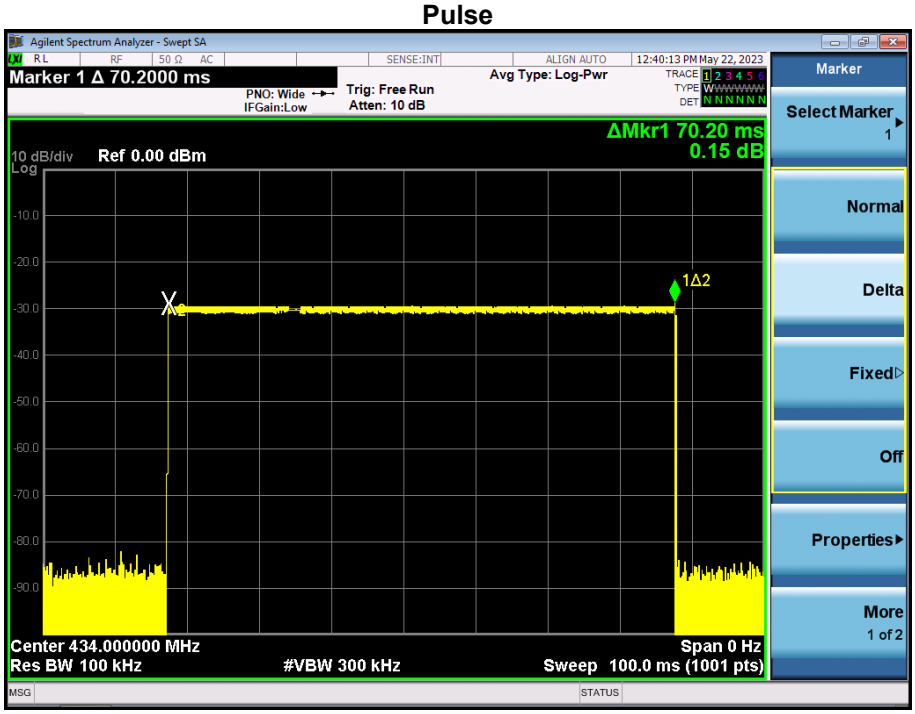
434MHz
The duration of one cycle =100ms
The duty cycle is simply the on-time divided the duration of one cycle
Duty Cycle = 70.20ms/100ms
=0.702
Therefore, the averaging factor is found by 20log0.702=-3.07dB

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

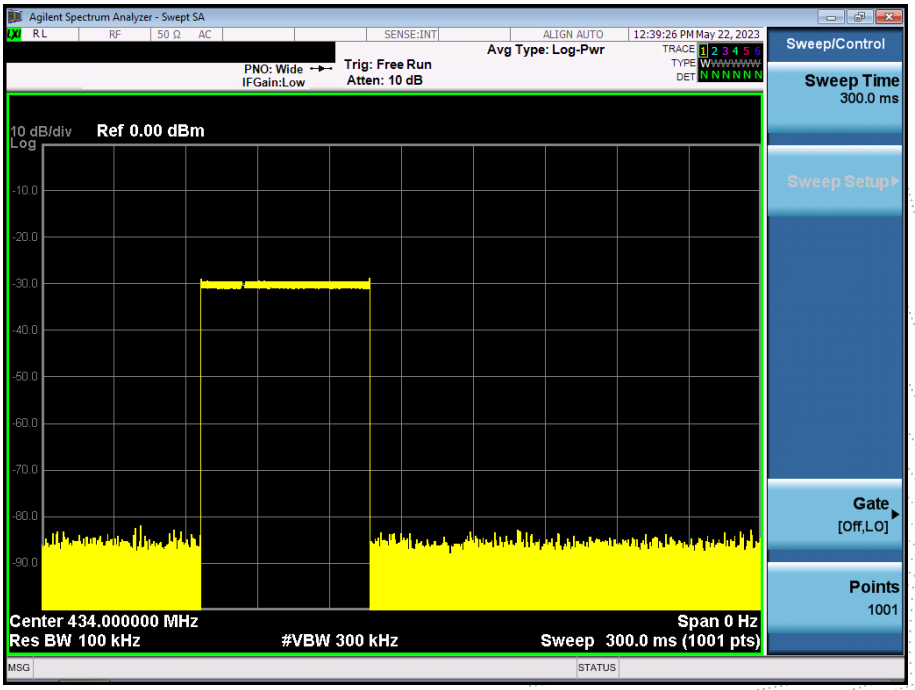
Cycle



Pulse



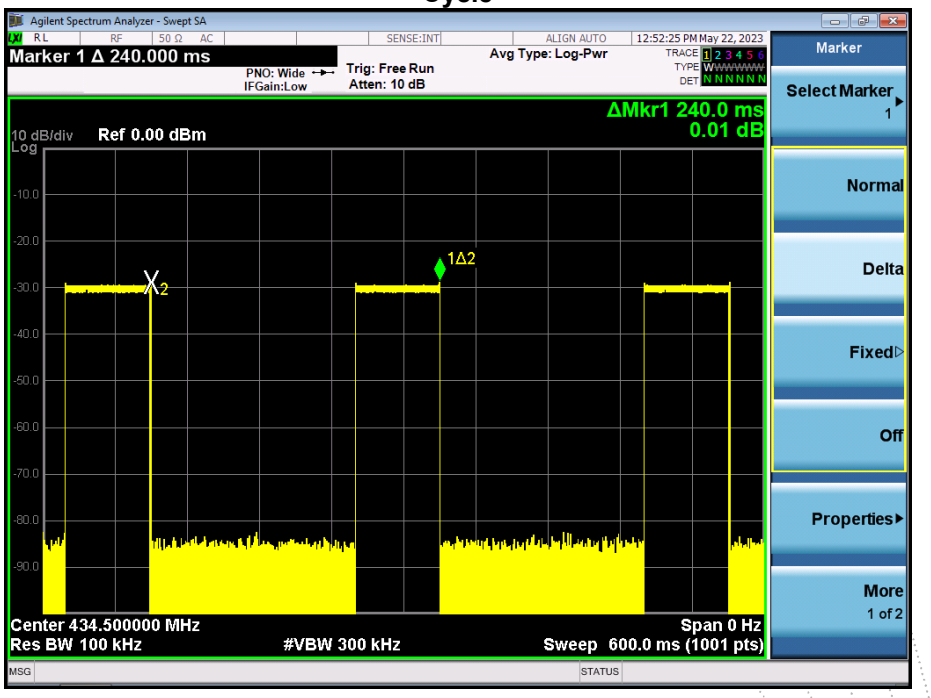
On-time



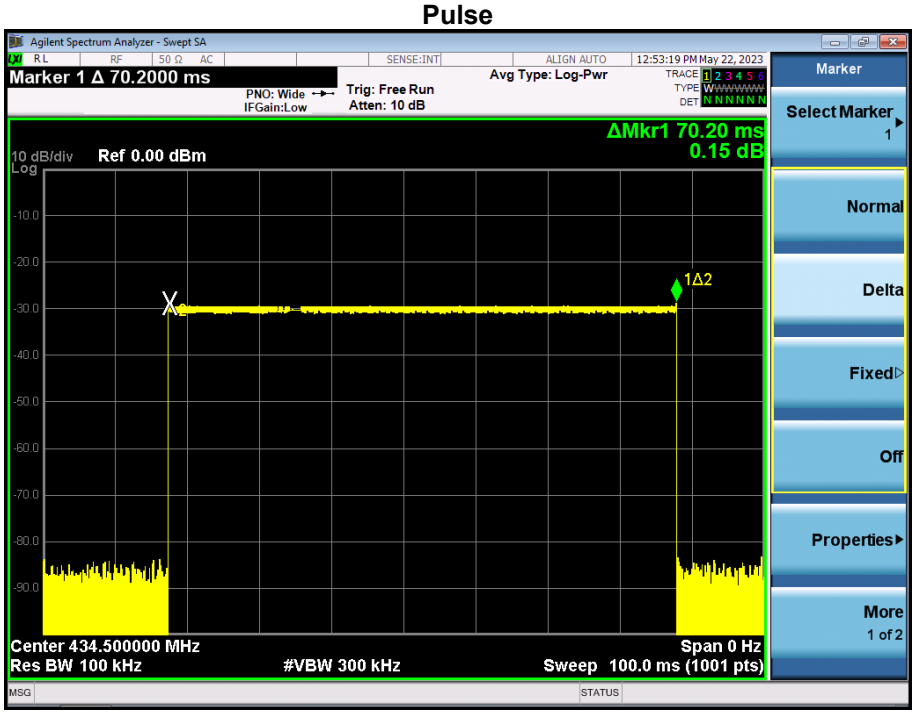
434.50MHz
The duration of one cycle =100ms
The duty cycle is simply the on-time divided the duration of one cycle
Duty Cycle = 70.20ms/100ms
=0.702
Therefore, the averaging factor is found by 20log0.702=-3.07dB

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

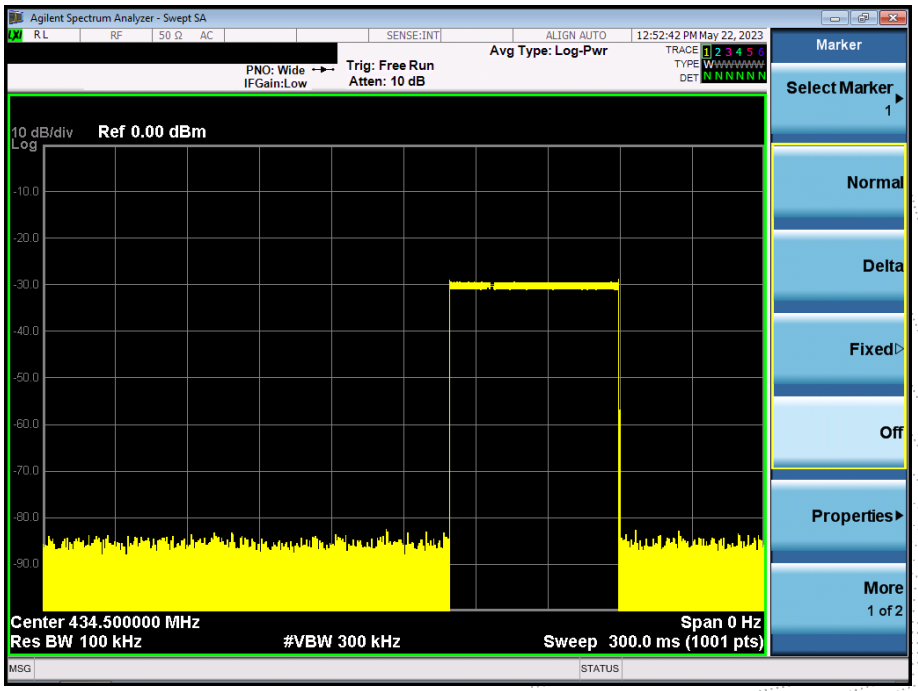
Cycle



Pulse



On-time

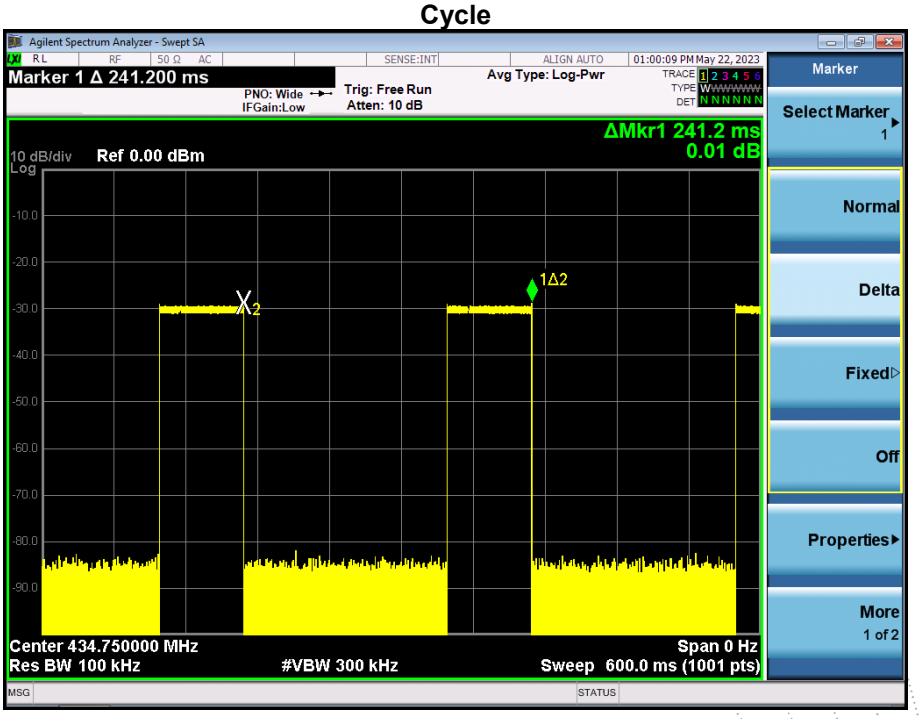


434.75MHz

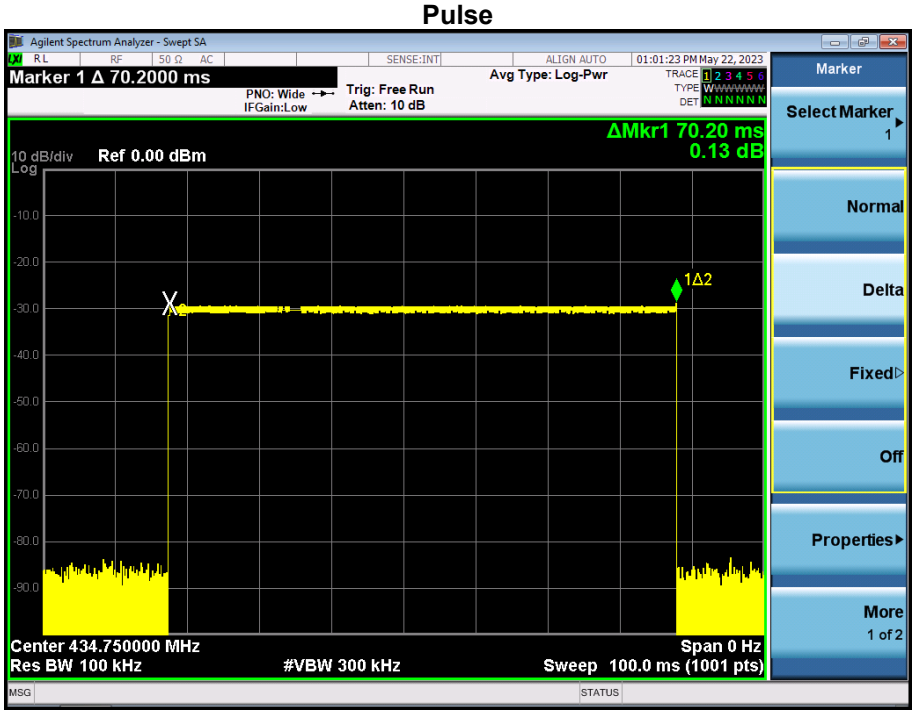
The duration of one cycle =100ms
The duty cycle is simply the on-time divided the duration of one cycle
Duty Cycle = 70.20ms/100ms
=0.702
Therefore, the averaging factor is found by 20log0.702=-3.07dB

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

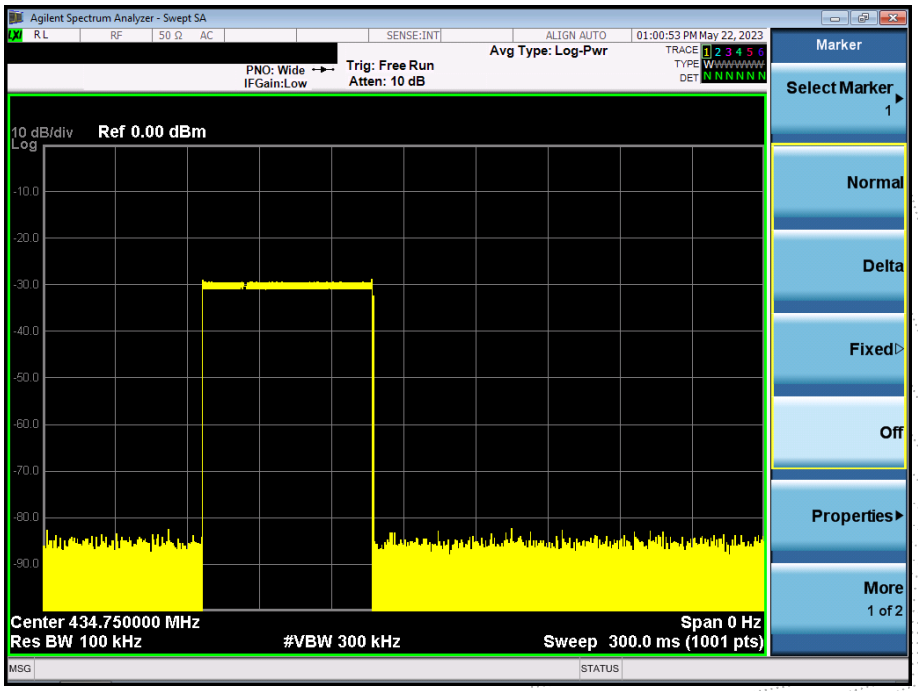
Cycle



Pulse

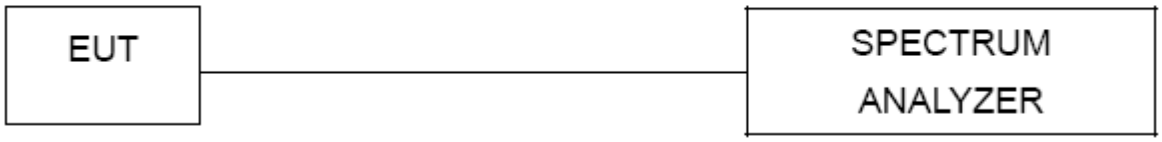


On-time



10. Dwell Time

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC 15.231(a) requirement:
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

10.3 Test Procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) 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.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) 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.
e) Repeat above procedures until all measured frequencies were complete.

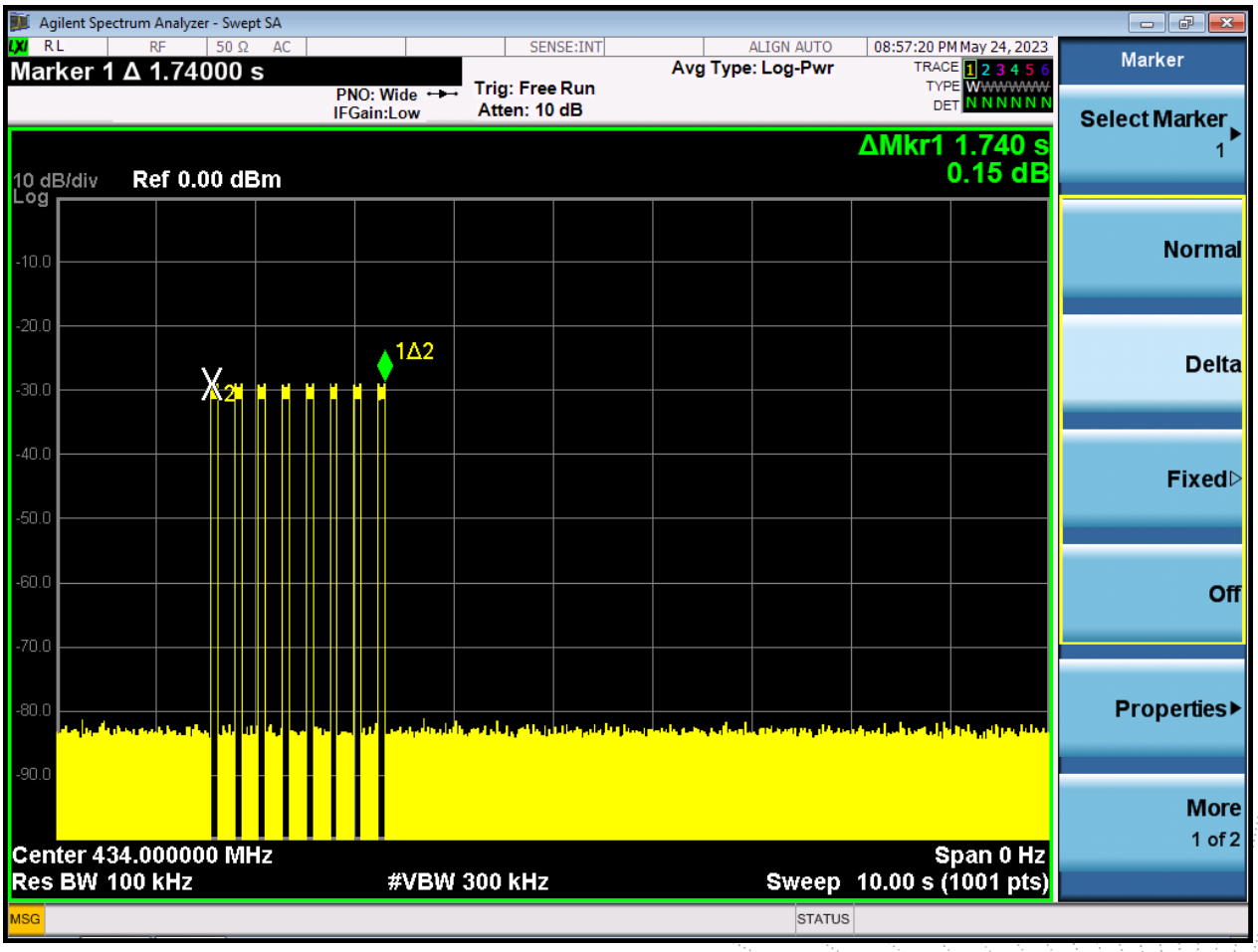
.

10.4 Test Result

434MHz

Dwell time (second)	Limit (second)	Result
1.740	<5s	Pass

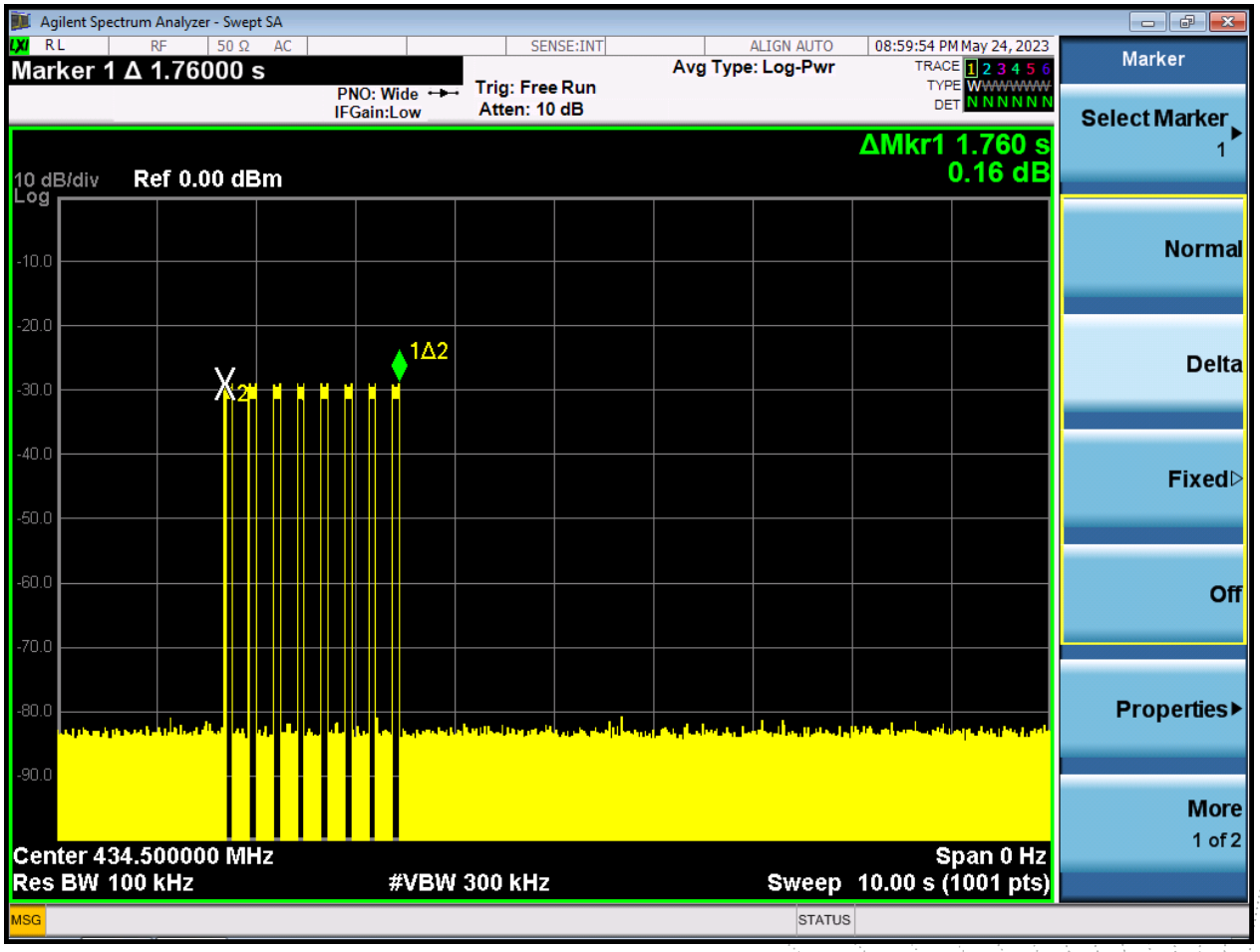
Test plot as follows:



434.50MHz

Dwell time (second)	Limit (second)	Result
1.760	<5s	Pass

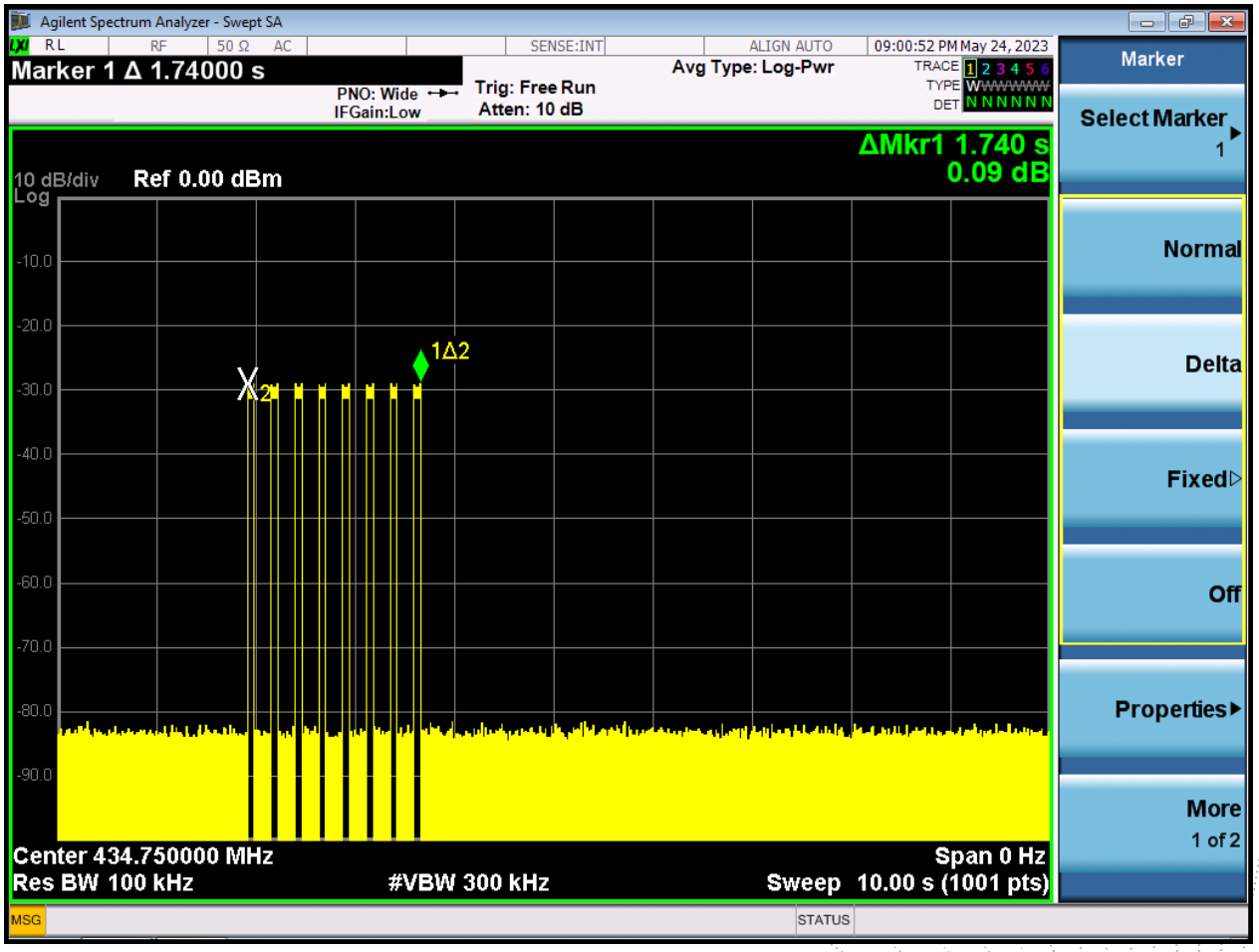
Test plot as follows:



434.75MHz

Dwell time (second)	Limit (second)	Result
1.740	<5s	Pass

Test plot as follows:



11. Antenna Requirement

11.1 Standard Requirement

15.203 requirement: For intentional device, according to 15.203: 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.

11.2 EUT Antenna

The EUT antenna is the Spring antenna. The antenna gain is 0 dBi, It comply with the standard requirement.

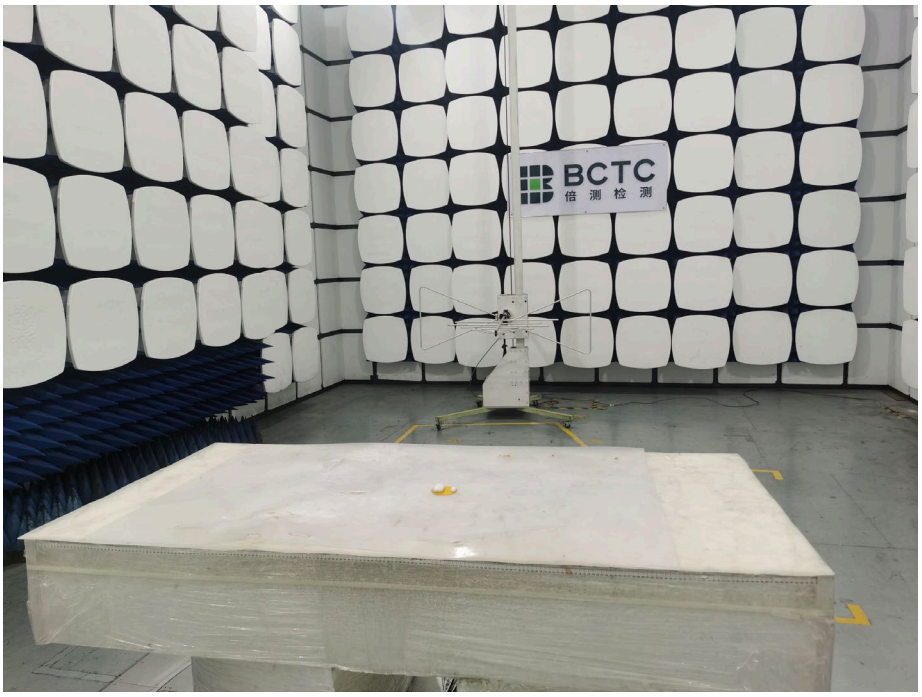
12. EUT Photographs

EUT Photo 1

EUT Photo 2

13. EUT Test Setup Photographs

Radiated Measurement Photos



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

8. The quality system of our laboratory is in accordance with ISO/IEC17025.

9. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
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※※※※※ **END** ※※※※※