CE Simple Test Report

Product Name ： Sub-1GHz RF Transmitter Module

Model No. ： BCM-68F2130-X02

Applicant ： HOLTEK SEMICONDUCTOR INCORPORATION

Address ： No.3, CREATION RD. II, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN, R.O.C.

Date of Receipt ： Apr. 15, 2021

Issued Date ： Apr. 28, 2021

Report No. ： 2140457R-E3032160657

Report Version ： V1.0

Test Report

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Product Name	:	Sub-1GHz RF Transmitter Module
Applicant	:	HOLTEK SEMICONDUCTOR INCORPORATION
Address	:	No.3, CREATION RD. II, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN, R.O.C.
Model No.	:	BCM-68F2130-X02
Sub-1GHz RF Transmitter Module Voltage	:	DC 2.0V to 3.6V
EUT Voltage	:	DC 3V
Applicable Standard	:	ETSI EN 300 220-2 V3.2.1 (2018-06)
Laboratory Name	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Pass

Test Item		
Duty Cycle	☒ Pass	☐ Fail
Occupied Band Width	☒ Pass	☐ Fail
Transient Power	☒ Pass	☐ Fail
Transmitter Spurious emission	☒ Pass	☐ Fail
Transmitter unwanted emission in the out of band	☒ Pass	☐ Fail

Louis Hsu

(Louis Hsu / Deputy Manager)

Scott Chang

(Scott Chang / Senior Engineer)

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1. List of Test Equipment

Duty Cycle / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSV7	101650	2021/03/23	2022/03/22
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02

Occupied Channel Bandwidth / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSV7	101650	2021/03/23	2022/03/22
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02

Transient Power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSV7	101650	2021/03/23	2022/03/22
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02

Transmitter Spurious emission / CB3-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSVA40	101435	2020/06/24	2021/6/23
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Bilog Antenna	Teseq	CBL6112D	23191	2021/02/26	2022/02/25
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2020/11/30	2021/11/29
Band Reject Filter	Micro-Tronics	BRM50702	G257	2020/12/16	2021/12/15
Coaxial Cable(19m)	Suhner	SF104	CB3-H_1	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB3-H	NA	NA

Transmitter unwanted emission in the out of band / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSV7	101650	2021/03/23	2022/03/22
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

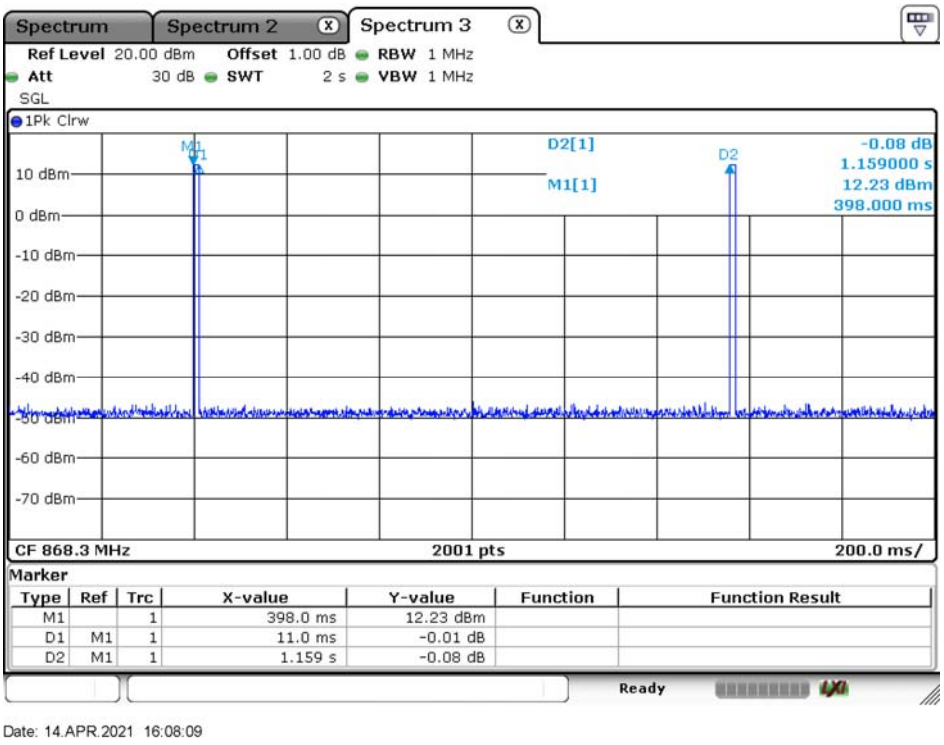
2. Duty Cycle

2.1. Test Result

Model No	BCM-68F2130-X02		
Test Item	Duty Cycle		
Test Mode	Mode 1: Transmit		
Date of Test	2021/04/14	Test Site	SR12-H
Temperature (°C)	22	Test Humidity (%)	67

Frequency (MHz)	T-On (ms)	T-On+T-Off (ms)	Duty Cycle (%)	Limit (%)	Result
868.3	11	1159	0.949%	<1	Pass

868.3 MHz



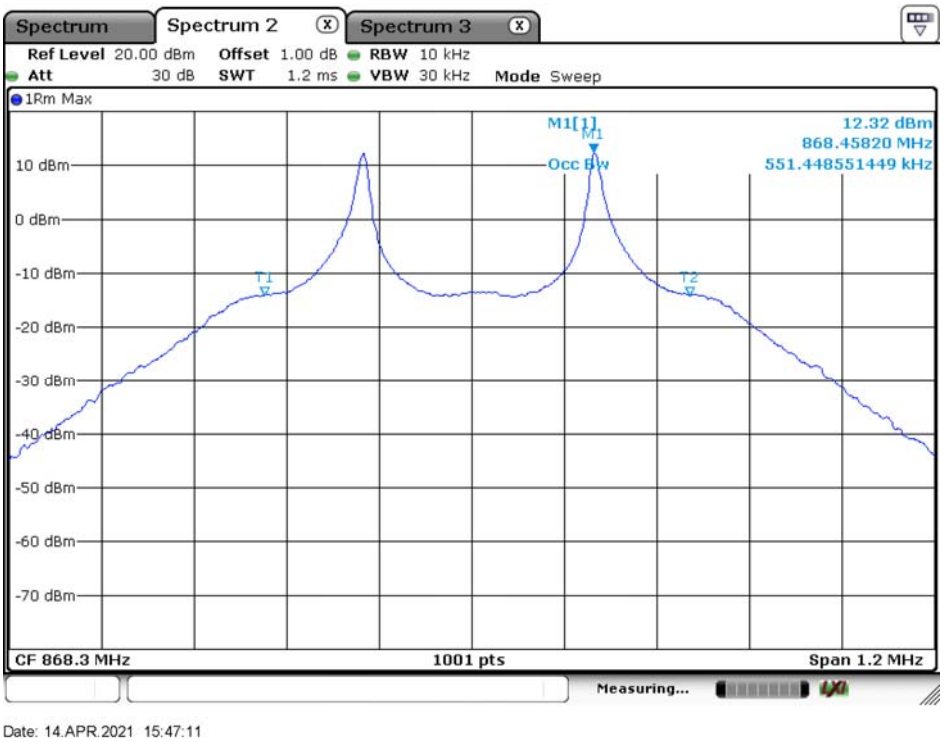
3. Occupied Channel Bandwidth

3.1. Test Result

Product	Sub-1GHz RF Transmitter Module		
Test Item	Occupied Channel Bandwidth		
Test Mode	Mode1: Transmit		
Date of Test	2021/04/14	Test Site	SR12-H
Temperature (℃)	22	Test Humidity (%)	67

Frequency (MHz)	Test conditions	OBW (kHz)	Result
868.3	NT_NV	551.449	---

868.3MHz

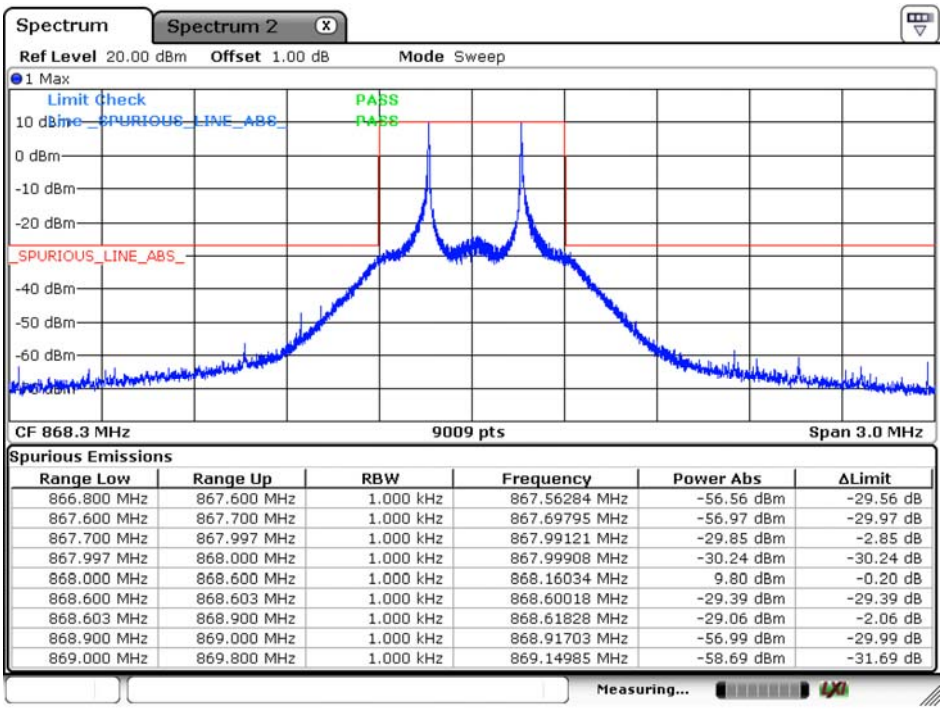


4. Transient Power

4.1. Test Result

Product	Sub-1GHz RF Transmitter Module		
Test Item	Transient Power		
Test Mode	Mode1: Transmit		
Date of Test	2021/04/14	Test Site	SR12-H
Temperature (℃)	22	Test Humidity (%)	67

Measurement Frequency (MHz)	ReadingLevel (dBm)	Limit (dBm)	Result
867.997	-30.24	0	Pass
868.603	-29.39	0	Pass
867.700	-29.85	-27	Pass
868.900	-29.06	-27	Pass
867.600	-56.97	-27	Pass
869.000	-56.99	-27	Pass
866.800	-56.56	-27	Pass
869.800	-58.69	-27	Pass

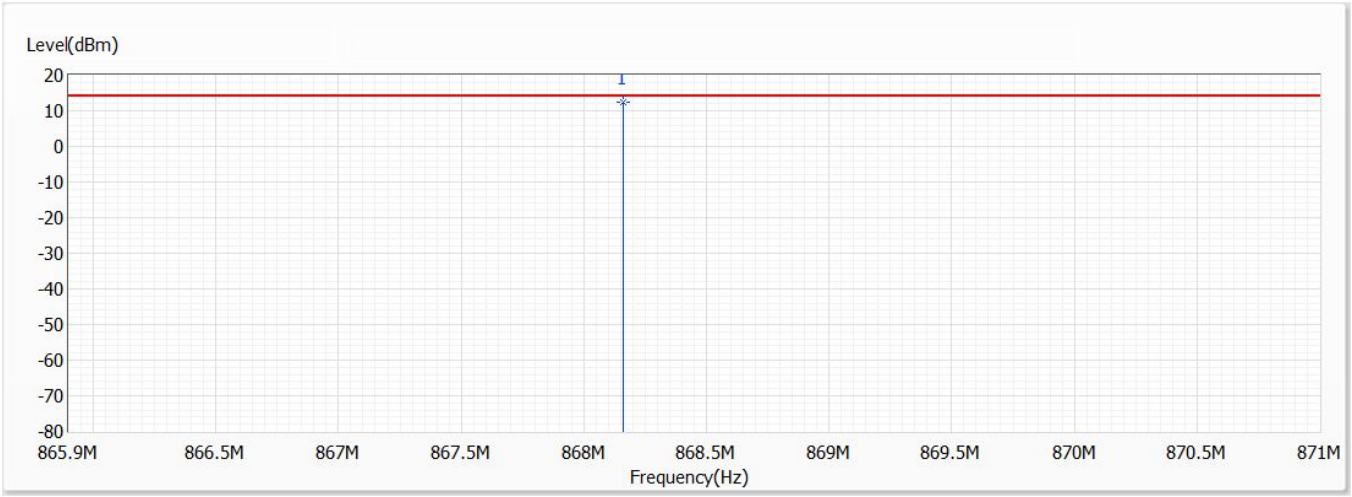


5. Transmitter Spurious emission

5.1. Test Result

Fundamental

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Horizontal	Temperature (℃)	25.1
Test Condition	FSK,Y axis,10dBm_Level3,868.3M	Humidity (%RH)	56.0

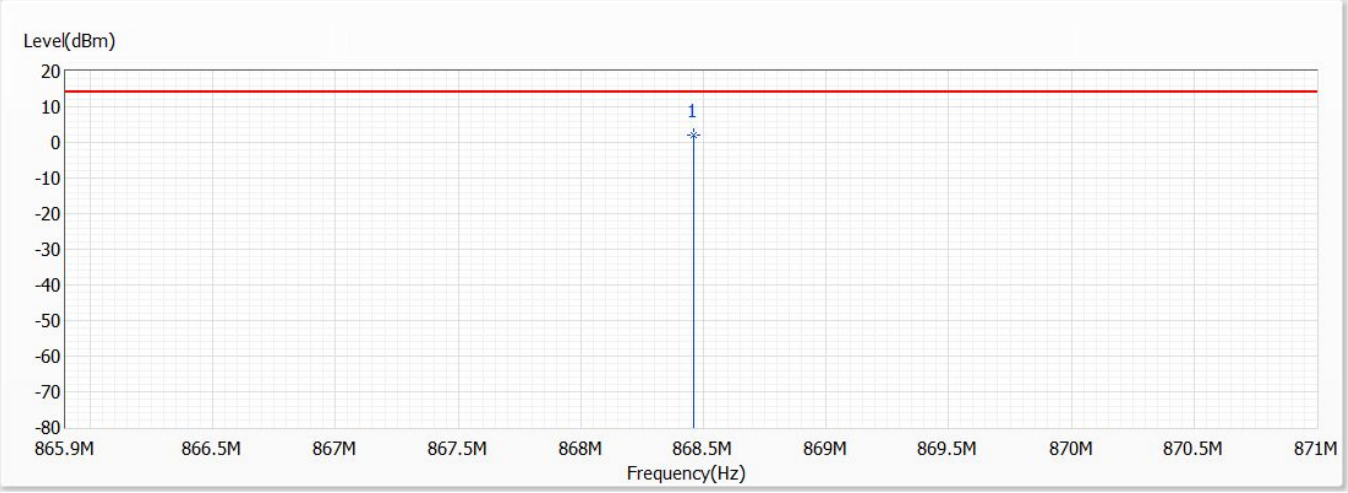


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
* 1	868.162	12.39	13.98	-1.59	-30.82	43.21	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. ERP = Reading Level + Correct Factor.

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Vertical	Temperature (℃)	25.1
Test Condition	FSK,Y axis,10dBm_Level3,868.3M	Humidity (%RH)	56.0



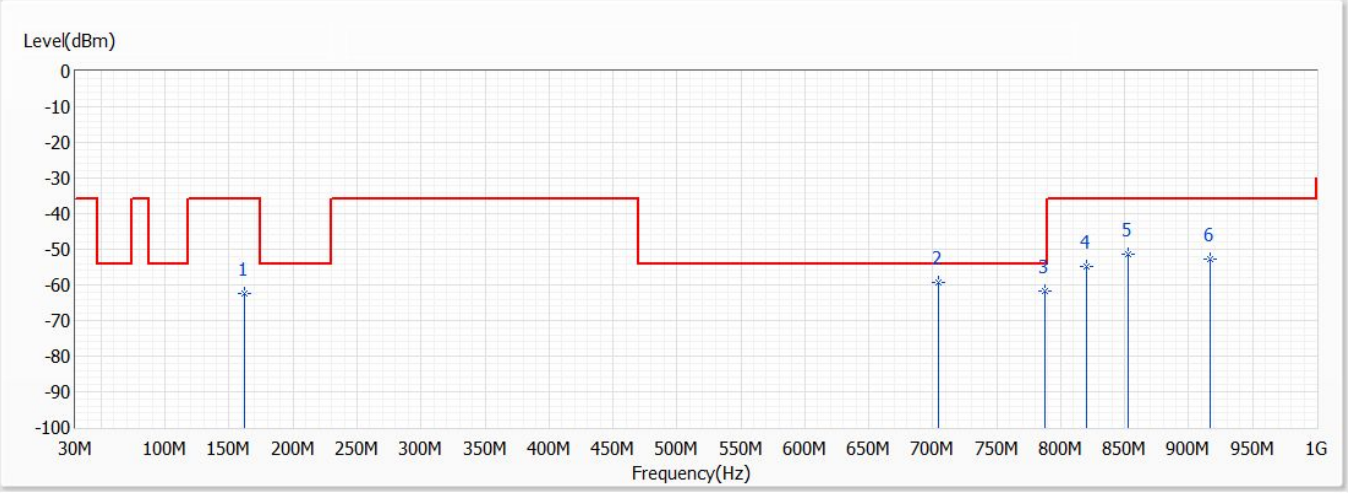
No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
* 1	868.460	2.06	13.98	-11.92	-40.74	42.80	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. ERP = Reading Level + Correct Factor.

30MHz-1GHz Spurious:

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Horizontal	Temperature (℃)	25.1
Test Condition	FSK,Y axis,13dBm,868.3M	Humidity (%RH)	56.0

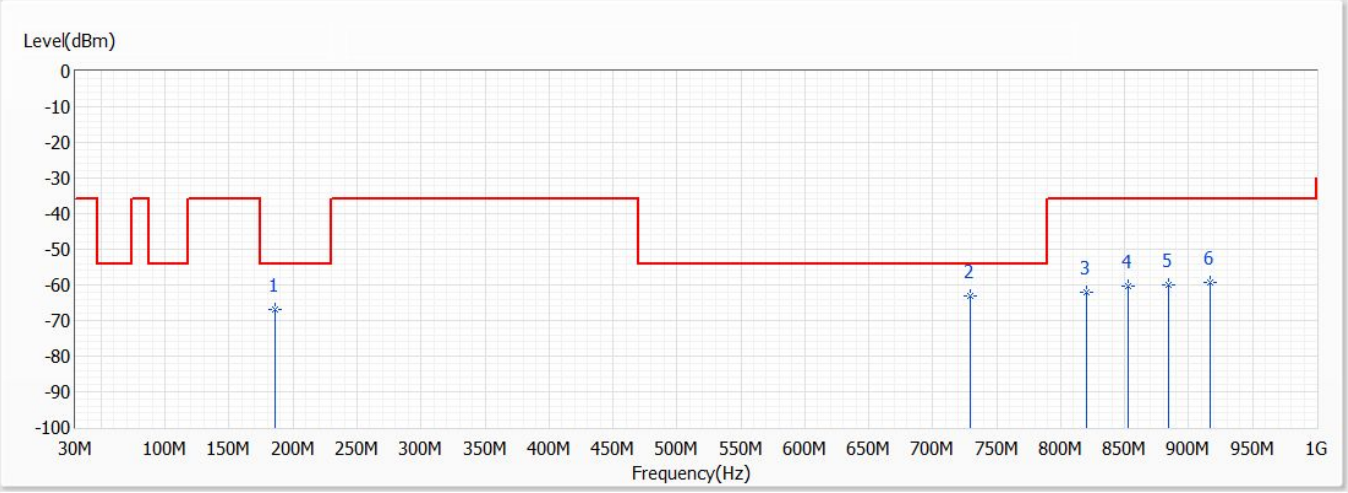


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
1	161.920	-62.37	-36.00	-26.37	-51.96	-10.41	PK
* 2	704.150	-59.30	-54.00	-5.30	-59.19	-0.11	PK
3	788.055	-61.89	-54.00	-7.89	-62.54	0.65	PK
4	820.550	-54.71	-36.00	-18.71	-55.70	0.99	PK
5	852.560	-51.28	-36.00	-15.28	-52.65	1.37	PK
6	916.580	-52.90	-36.00	-16.90	-53.90	1.00	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. ERP = Reading Level + Correct Factor.

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Vertical	Temperature (℃)	25.1
Test Condition	FSK,Y axis,13dBm,868.3M	Humidity (%RH)	56.0



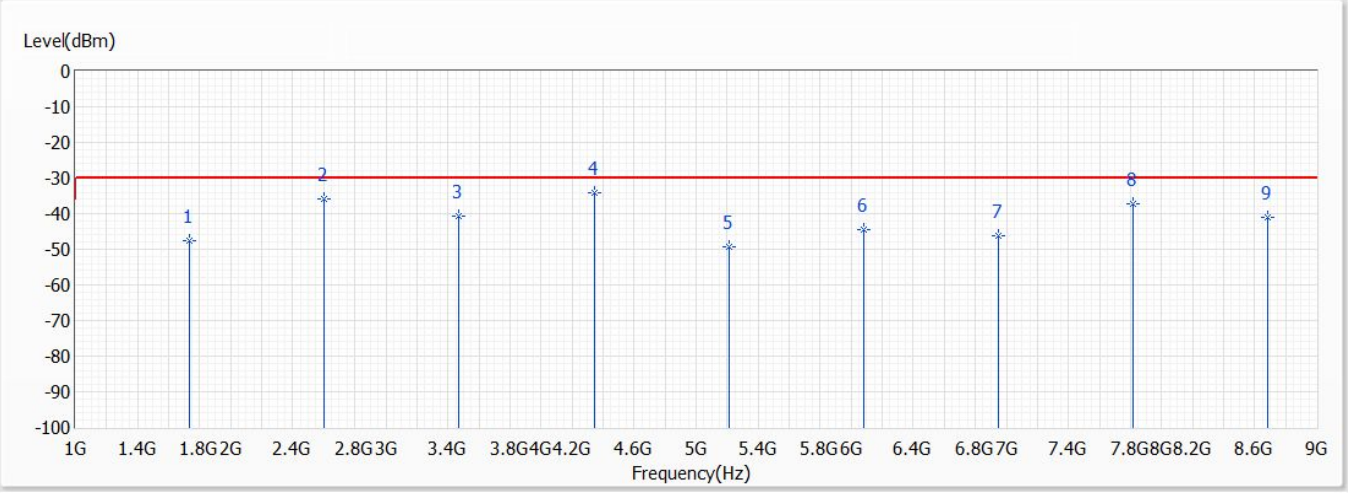
No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
1	186.170	-67.01	-54.00	-13.01	-56.47	-10.54	PK
* 2	729.370	-63.19	-54.00	-9.19	-63.33	0.14	PK
3	820.550	-61.93	-36.00	-25.93	-62.40	0.47	PK
4	852.560	-60.19	-36.00	-24.19	-60.99	0.80	PK
5	884.570	-60.12	-36.00	-24.12	-60.85	0.73	PK
6	916.580	-59.41	-36.00	-23.41	-60.27	0.86	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. ERP = Reading Level + Correct Factor.

Above 1GHz Spurious:

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Horizontal	Temperature (℃)	25.1
Test Condition	FSK,Y axis,10dBm_Level3,868.3M	Humidity (%RH)	56.0

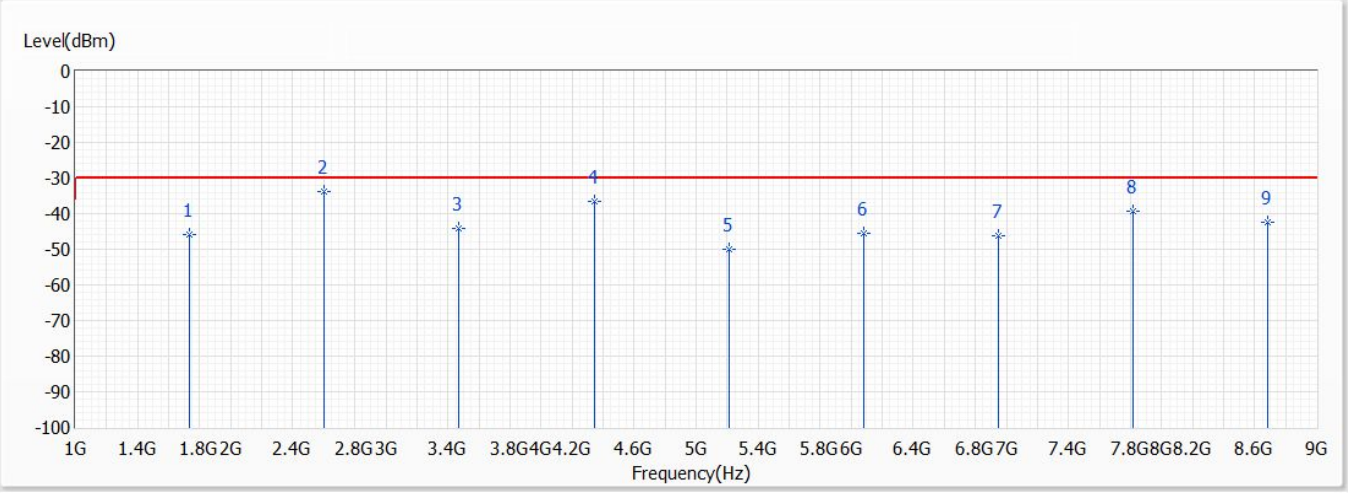


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
1	1736.600	-47.66	-30.00	-17.66	-55.67	8.01	PK
2	2604.900	-35.69	-30.00	-5.69	-46.47	10.78	PK
3	3473.200	-40.58	-30.00	-10.58	-53.32	12.74	PK
* 4	4341.500	-34.07	-30.00	-4.07	-47.62	13.55	PK
5	5209.800	-49.39	-30.00	-19.39	-65.19	15.80	PK
6	6078.100	-44.50	-30.00	-14.50	-61.55	17.05	PK
7	6946.400	-46.16	-30.00	-16.16	-66.37	20.21	PK
8	7817.000	-37.14	-30.00	-7.14	-59.40	22.26	PK
9	8683.000	-40.95	-30.00	-10.95	-64.41	23.46	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BCM-68F2130-X02	Site	CB3-H
Test Voltage	DC 3V	Test Date	2021/4/14
Test Mode	Mode1: Transmit	Engineer	Scott Chang
Polarity	Vertical	Temperature (℃)	25.1
Test Condition	FSK,Y axis,10dBm_Level3,868.3M	Humidity (%RH)	56.0



No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB)	Detector Type
1	1736.600	-45.71	-30.00	-15.71	-53.60	7.89	PK
* 2	2604.900	-33.83	-30.00	-3.83	-44.99	11.16	PK
3	3473.200	-44.24	-30.00	-14.24	-57.10	12.86	PK
4	4341.500	-36.68	-30.00	-6.68	-50.46	13.78	PK
5	5209.800	-50.11	-30.00	-20.11	-66.07	15.96	PK
6	6078.100	-45.43	-30.00	-15.43	-62.58	17.15	PK
7	6946.400	-46.37	-30.00	-16.37	-66.08	19.71	PK
8	7814.700	-39.18	-30.00	-9.18	-60.89	21.71	PK
9	8683.000	-42.46	-30.00	-12.46	-65.59	23.13	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

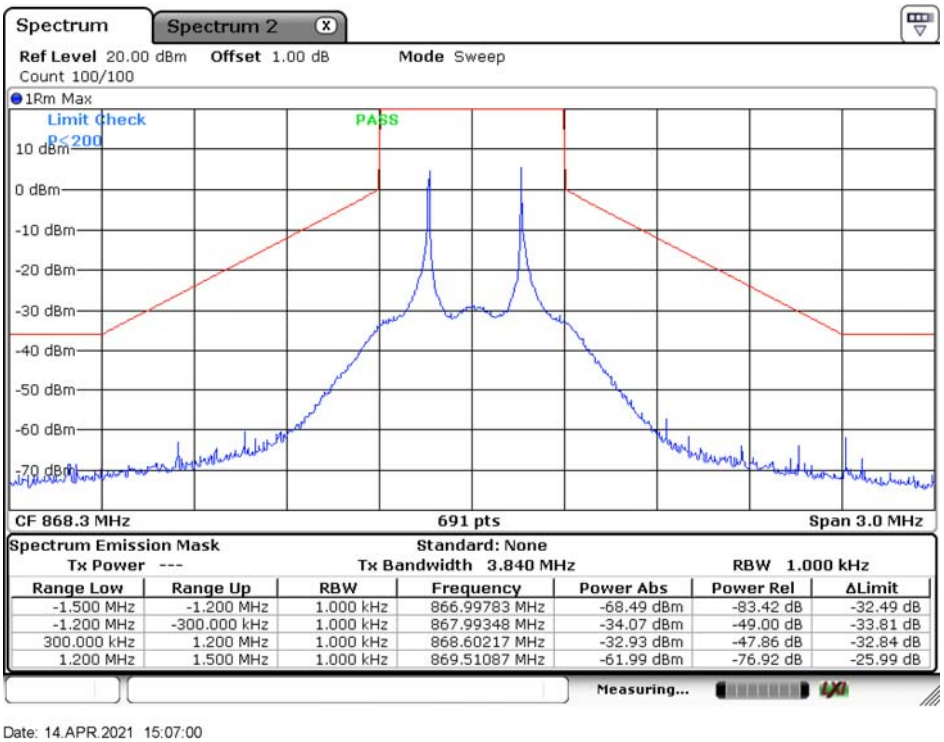
6. Transmitter unwanted emission in the out of band

6.1. Test Result

Product	Sub-1GHz RF Transmitter Module		
Test Item	Transmitter unwanted emission in the out of band		
Test Mode	Mode1: Transmit		
Date of Test	2021/04/14	Test Site	SR12-H
Temperature (°C)	22	Test Humidity (%)	67

For Channel

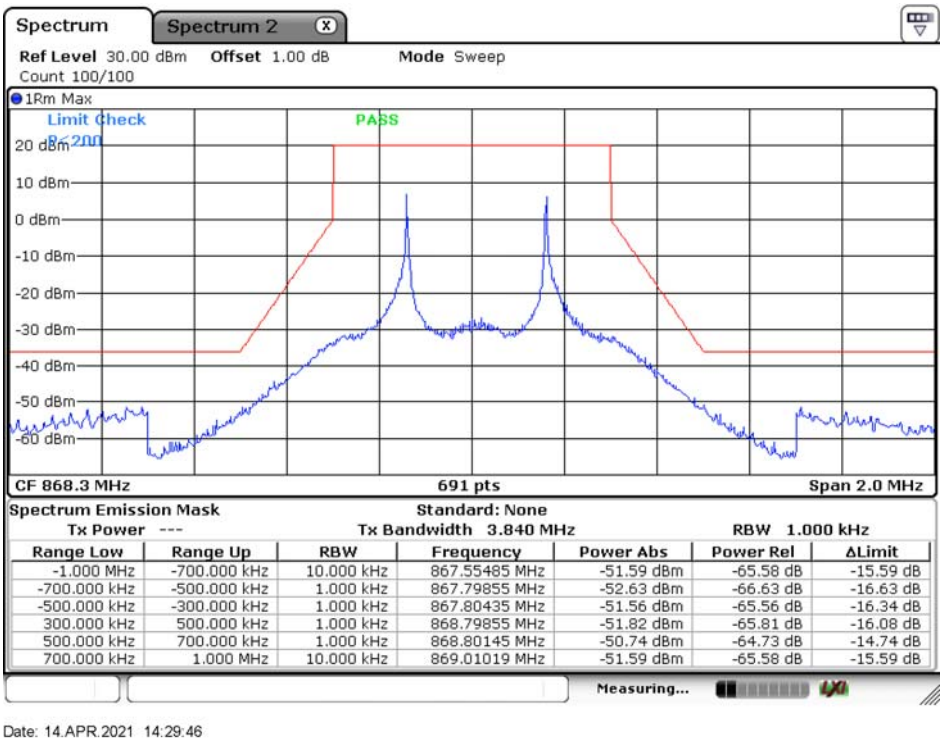
Rang Low (MHz)	Rang up (MHz)	Test conditions	Reading Level (dBm)	Margin (dB)	Result
868.050	866.800	NT_NV	-83.42	-68.49	Pass
866.800	868.000	NT_NV	-49	-34.07	Pass
868.600	869.800	NT_NV	-47.86	-32.93	Pass
869.800	868.550	NT_NV	-76.92	-61.99	Pass



Product	Sub-1GHz RF Transmitter Module		
Test Item	Transmitter unwanted emission in the out of band		
Test Mode	Mode1: Transmit		
Date of Test	2021/04/14	Test Site	SR12-H
Temperature (°C)	22	Test Humidity (%)	67

For Band

Rang Low (MHz)	Rang up (MHz)	Test conditions	Reading Level (dBm)	Margin (dB)	Result
867.300	867.600	NT_NV	-65.58	-51.59	Pass
867.600	867.800	NT_NV	-66.63	-52.63	Pass
867.800	868.000	NT_NV	-65.56	-51.56	Pass
868.600	868.800	NT_NV	-65.81	-51.82	Pass
868.800	869.000	NT_NV	-64.73	-50.74	Pass
869.000	869.300	NT_NV	-65.58	-51.59	Pass



Attachment 1

➢ Test Setup Photograph

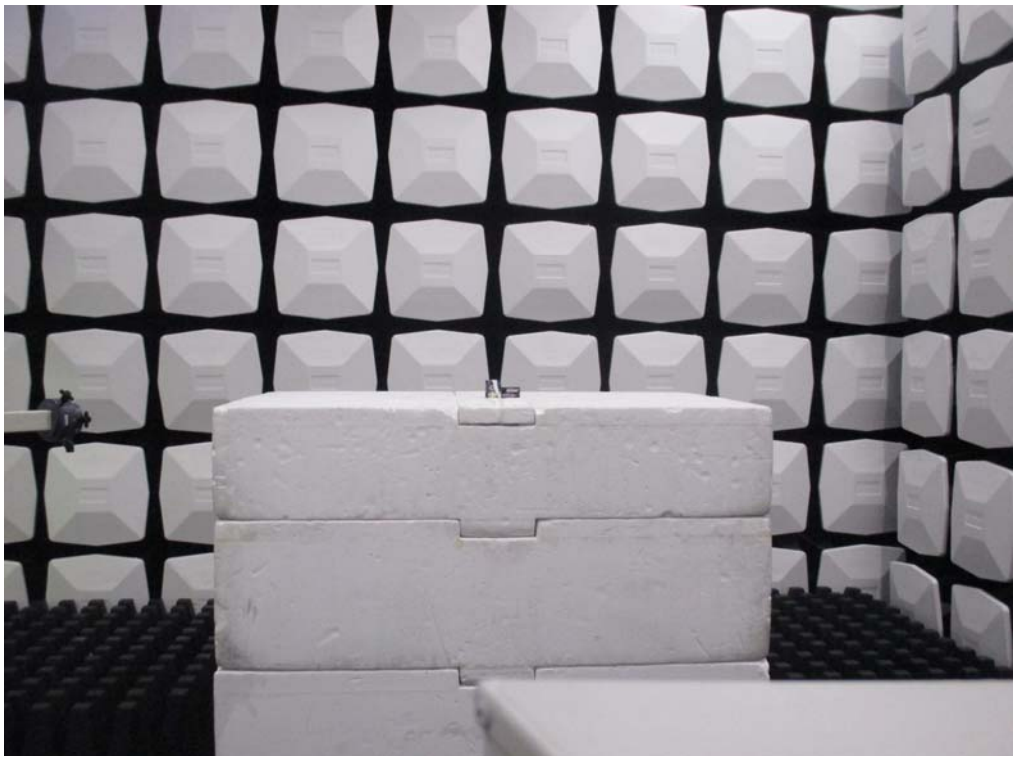
Description： Front View of Radiated Emissions Test Setup

Description： Back View of Radiated Emissions Test Setup

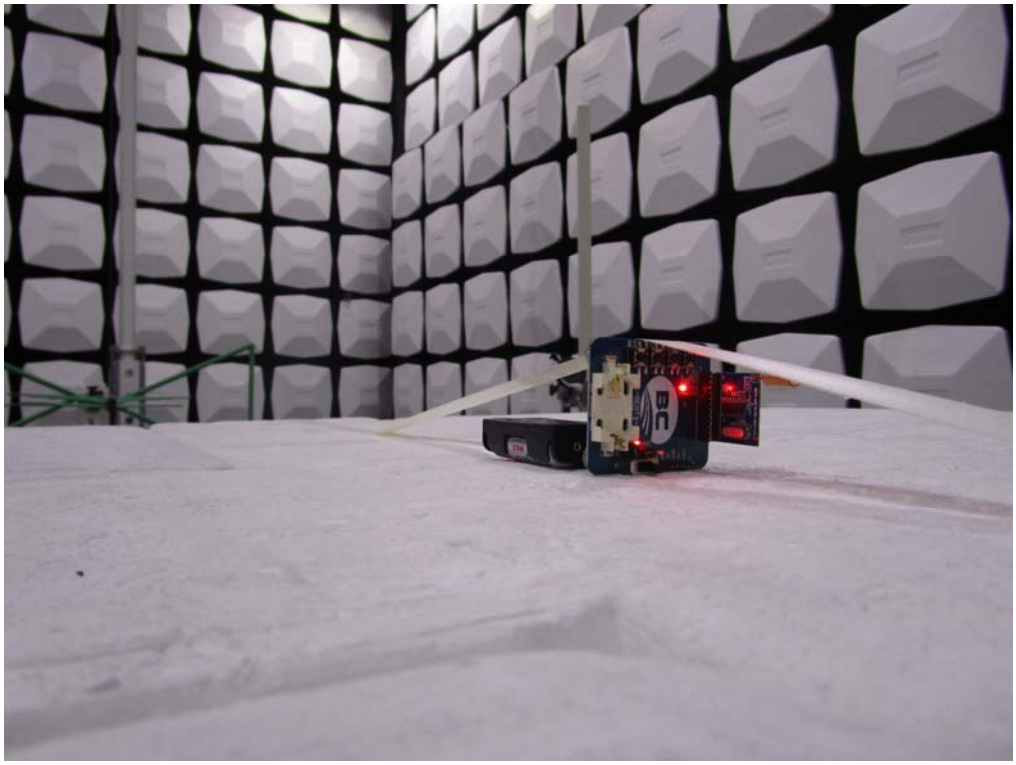
Test Mode ： Mode1: Transmit

Description： Front View of Radiated Emissions Test Setup (Horn)

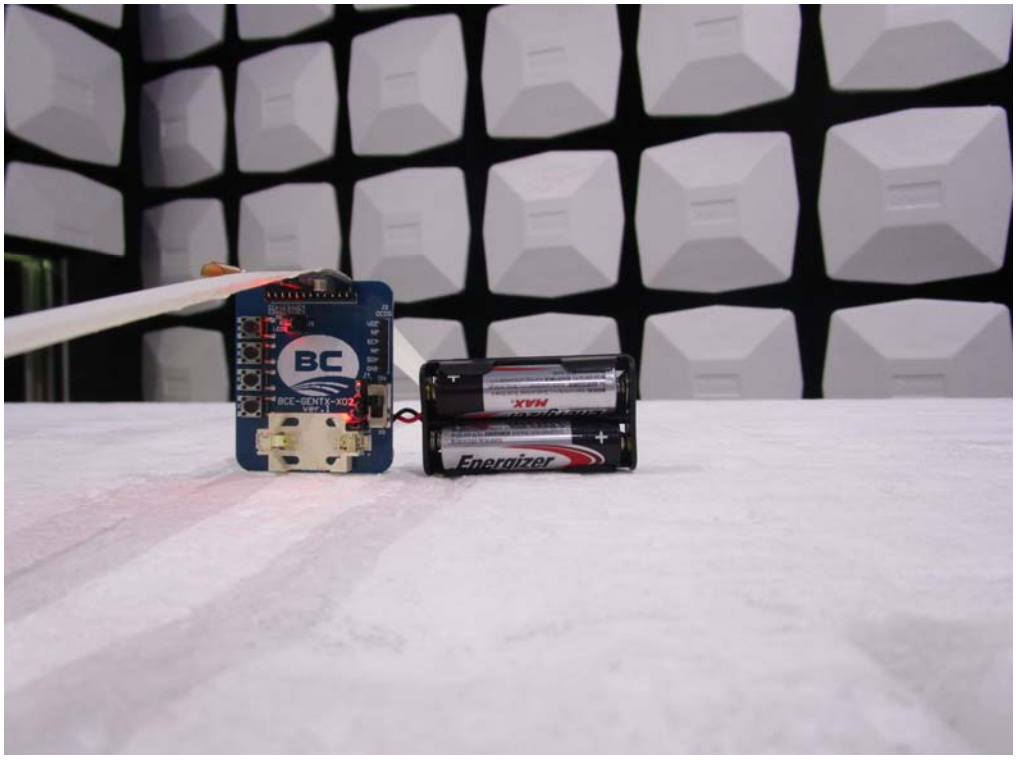
Description： Back View of Radiated Emissions Test Setup (Horn)



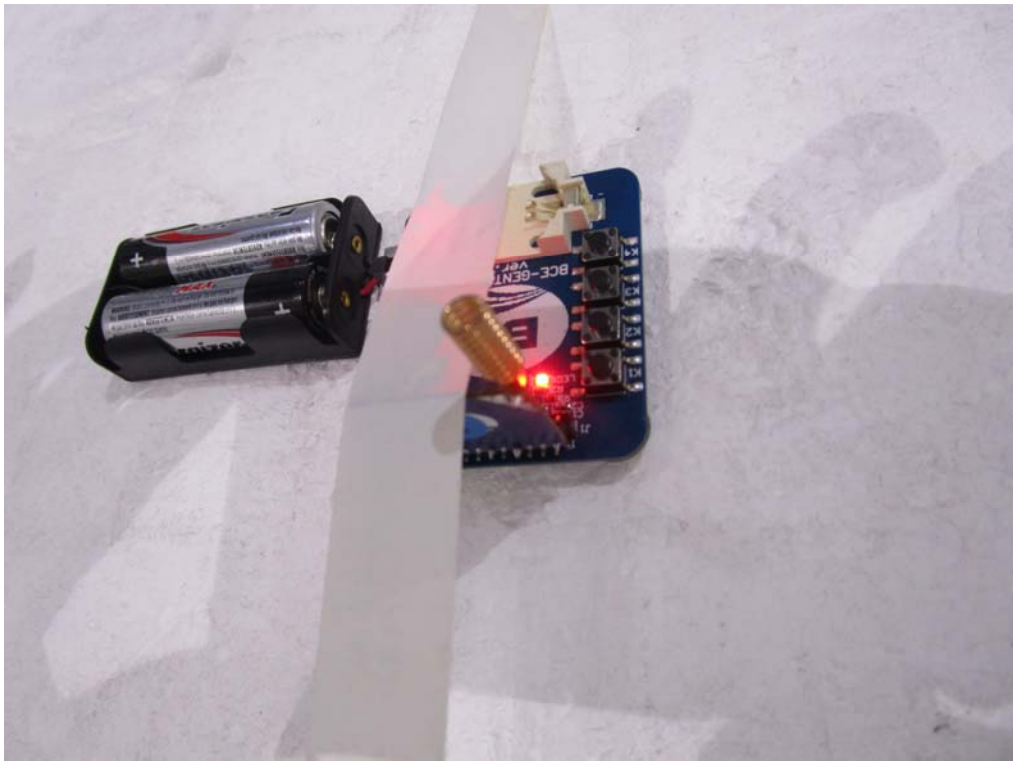
X-axis



Y-axis



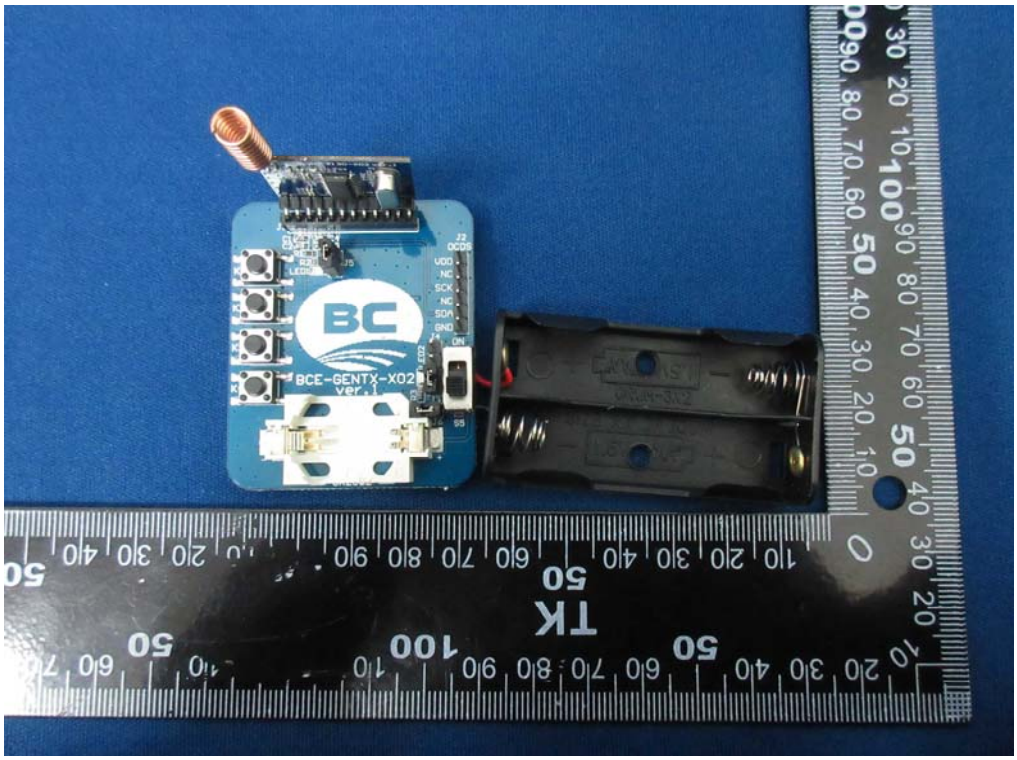
Z-axis



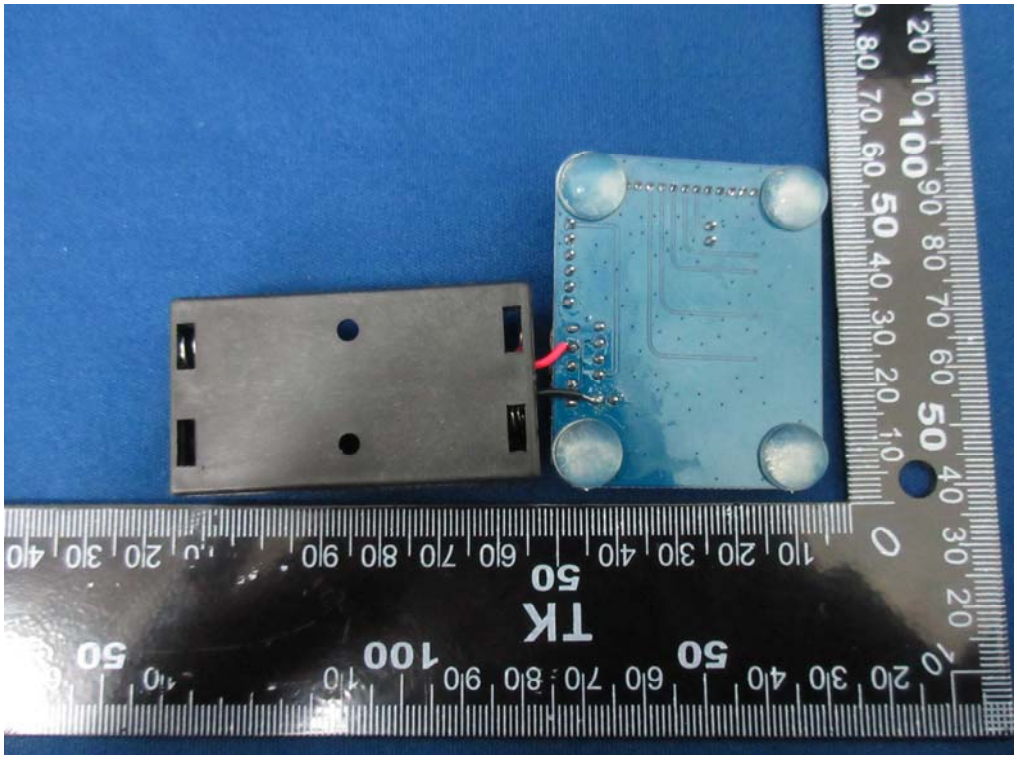
Attachment 2

➢ EUT Photograph

(1) EUT Photo



(2) EUT Photo



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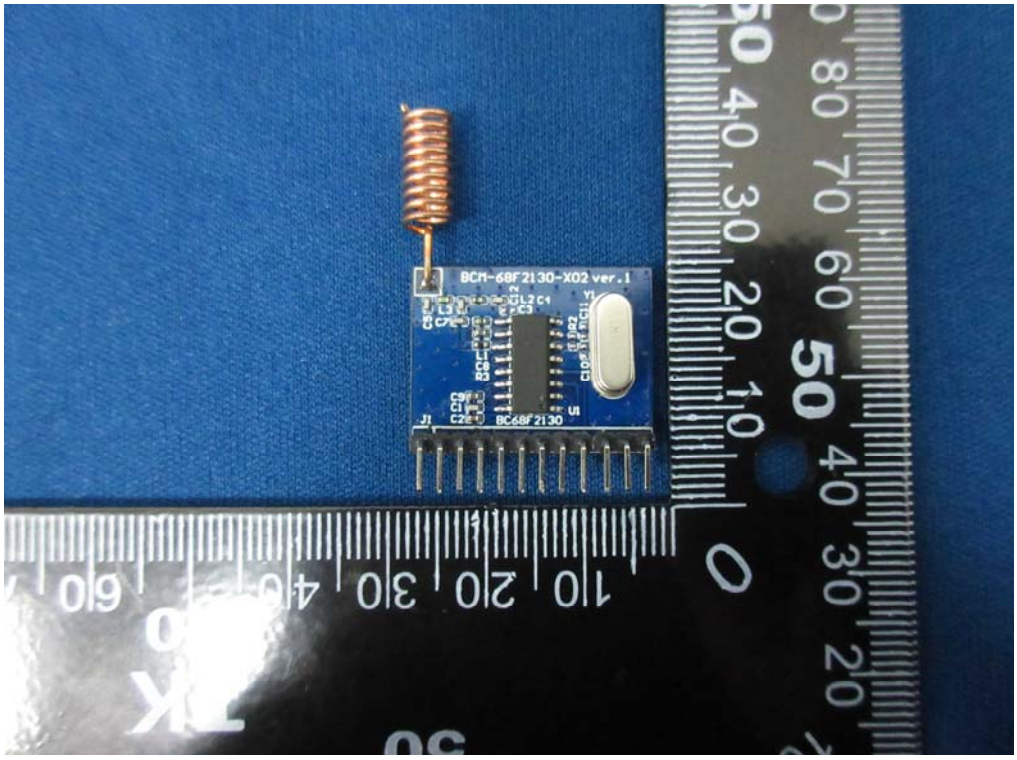
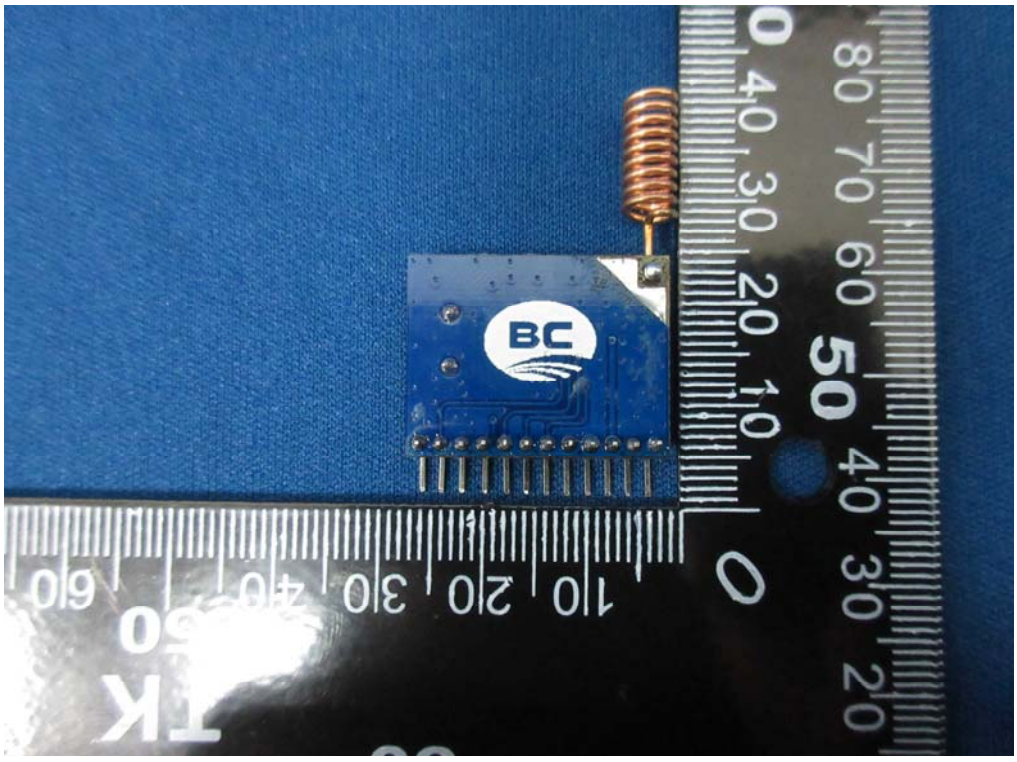
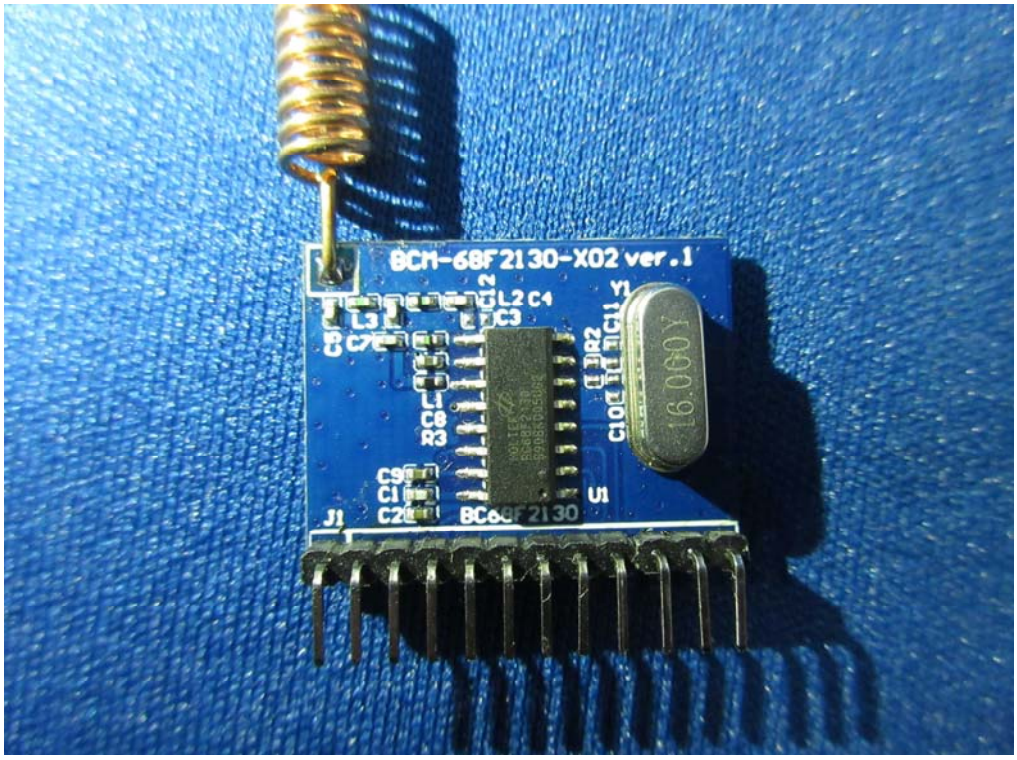


(4) EUT Photo



(5) EUT Photo



(6) EUT Photo (ANT)