
FCC Test Report

Report No.: AGC07266170701FE03

FCC ID : 2AM87-HY82

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : BLUETOOTH FM TRANSMITTER

BRAND NAME : N/A

MODEL NAME : HY82, BT08, HY82S, BT08S, HY88

CLIENT : INTRO UNION ELECTRONICS CO, LIMITED

DATE OF ISSUE : July 10, 2017

STANDARD(S) : FCC Part 15 Rules

TEST PROCEDURE(S)

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 10, 2017	Valid	Original Report

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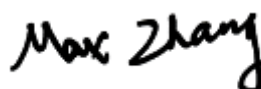
1. VERIFICATION OF CONFORMITY

Applicant	INTRO UNION ELECTRONICS CO, LIMITED
Address	6F, F BUILDING, EAST AREA NO.8, SHANGXUE TECH-CITY, BANTIAN, LONGGANG, SHENZHEN, CHINA
Manufacturer	INTRO UNION ELECTRONICS CO, LIMITED
Address	6F, F BUILDING, EAST AREA NO.8, SHANGXUE TECH-CITY, BANTIAN, LONGGANG, SHENZHEN, CHINA
Product Designation	BLUETOOTH FM TRANSMITTER
Brand Name	N/A
Test Model	HY82
Series Model	BT08, HY82S, BT08S, HY88
Declaration of Difference	All the same except for the model name and appearance.
Date of test	July 08, 2017 to July 10, 2017
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

Tested by



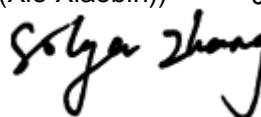
Max Zhang(Zhang Yi) July 10, 2017

Reviewed by



Bart Xie(Xie Xiaobin)) July 10, 2017

Approved by



Solger Zhang(Zhang Hongyi)
Authorized Officer July 10, 2017

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Maximum field strength	89.64dBuV/m(AV)@3m
Bluetooth Version	V4.0
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK for BR/EDR GFSK for BLE
Number of channels	79 for BR/EDR 39 for BLE
Antenna Gain	0dBi
Antenna Designation	Integrated Antenna (Met 15.203 Antenna requirement)
Hardware Version	V1.0
Software Version	V1.0
Power Supply	DC 12V/24V

2.2. TABLE OF CARRIER FREQUENCY

BR/EDR channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

BLE channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2404MHZ
	:	:
	19	2440 MHZ
	20	2442 MHZ
	:	:
	38	2478 MHZ
	39	2480 MHZ

3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended 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	Conducted Emission Test	$\pm 3.18\text{dB}$
2	All emissions, radiated	$\pm 3.91\text{dB}$
3	Temperature	$\pm 0.5^\circ\text{C}$
4	Humidity	$\pm 2\%$

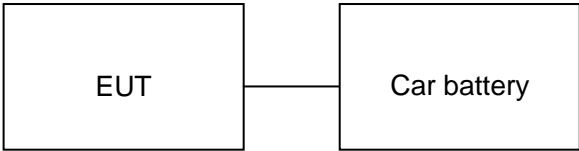
4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel $\pi/4$ -DQPSK
5	Middle channel $\pi/4$ -DQPSK
6	High channel $\pi/4$ -DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Low channel for BLE
11	Middle channel for BLE
12	High channel for BLE
13	BT Link with charging
Note: 1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases. 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.	

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	BLUETOOTH FM TRANSMITTER	HY82	2AM87-HY82	EUT
2	Car battery	N/A	N/A	Support

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249&15.209	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.215	20dB bandwidth	Compliant

6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014.

ALL TEST EQUIPMENT LIST

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 2, 2017	July 1, 2018
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 2, 2017	July 1, 2018
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 2, 2017	July 1, 2018
RF Cable	SCHWARZBECK	AK9515E	96221	July 2, 2017	July 1, 2018
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 2, 2017	June 1, 2018
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 2, 2017	June 1, 2018
Spectrum analyzer	Agilent	E4407B	MY46185649	June 2, 2017	June 1, 2018
Power Sensor	Agilent	U2021XA	MY55050474	June 2, 2017	June 1, 2018
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	June 2, 2017	June 1, 2018
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 2, 2017	June 1, 2018

7. RADIATED EMISSION

7.1 TEST LIMIT

Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μ V)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other: 74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average)	

Remark:

- (1) Emission level dB μ V = 20 log Emission level μ V/m
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use minimum resolution bandwidth of 1 MHz. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

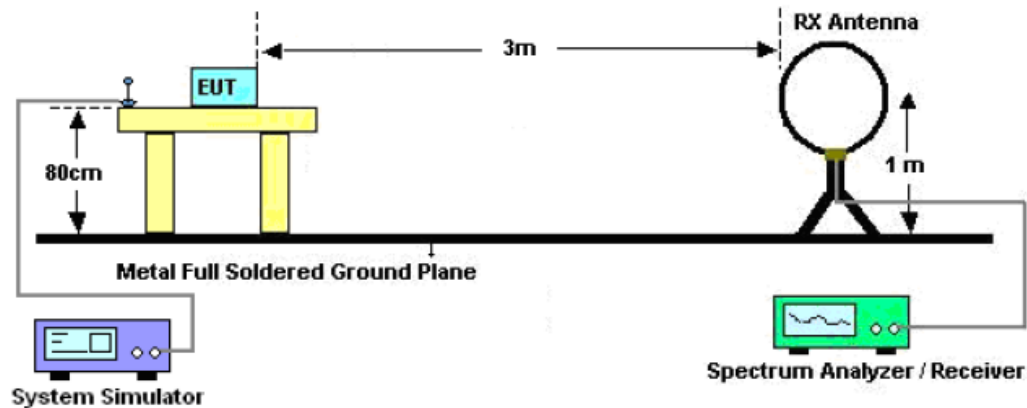
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
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
Start ~Stop Frequency	1GHz~26.5GHz RBW 1.5MHz/ VBW 5MHz for Peak, RBW 1.5MHz/10Hz for Average

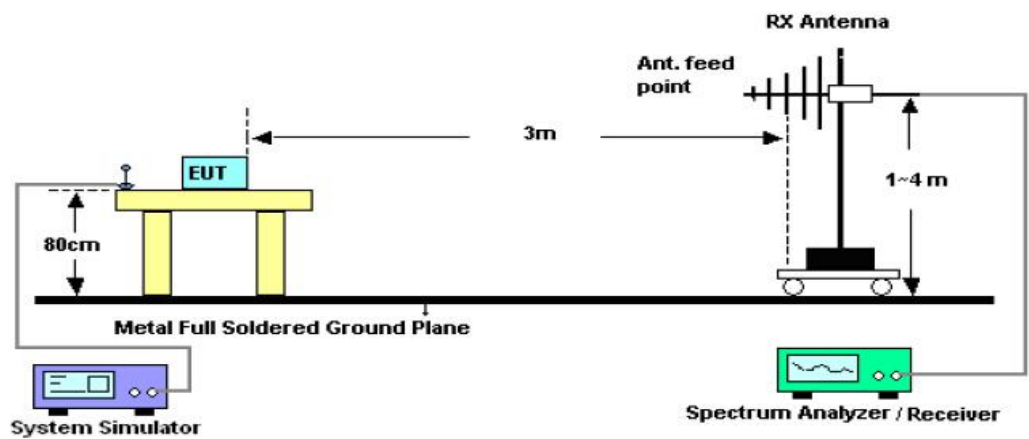
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

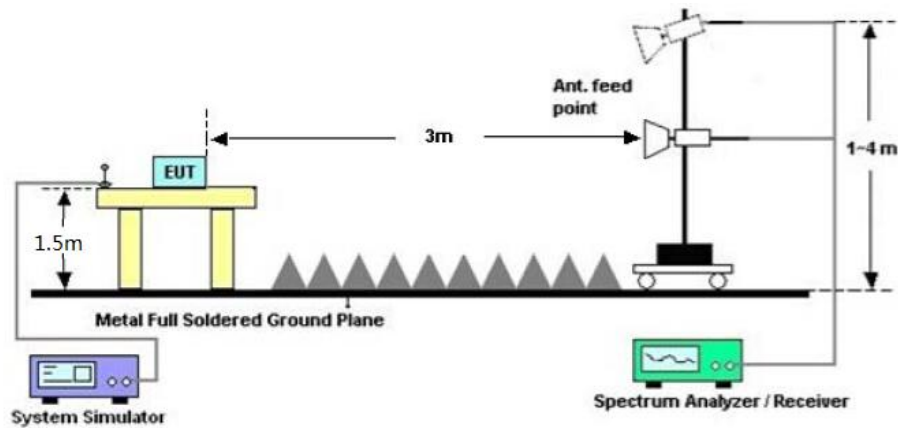
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



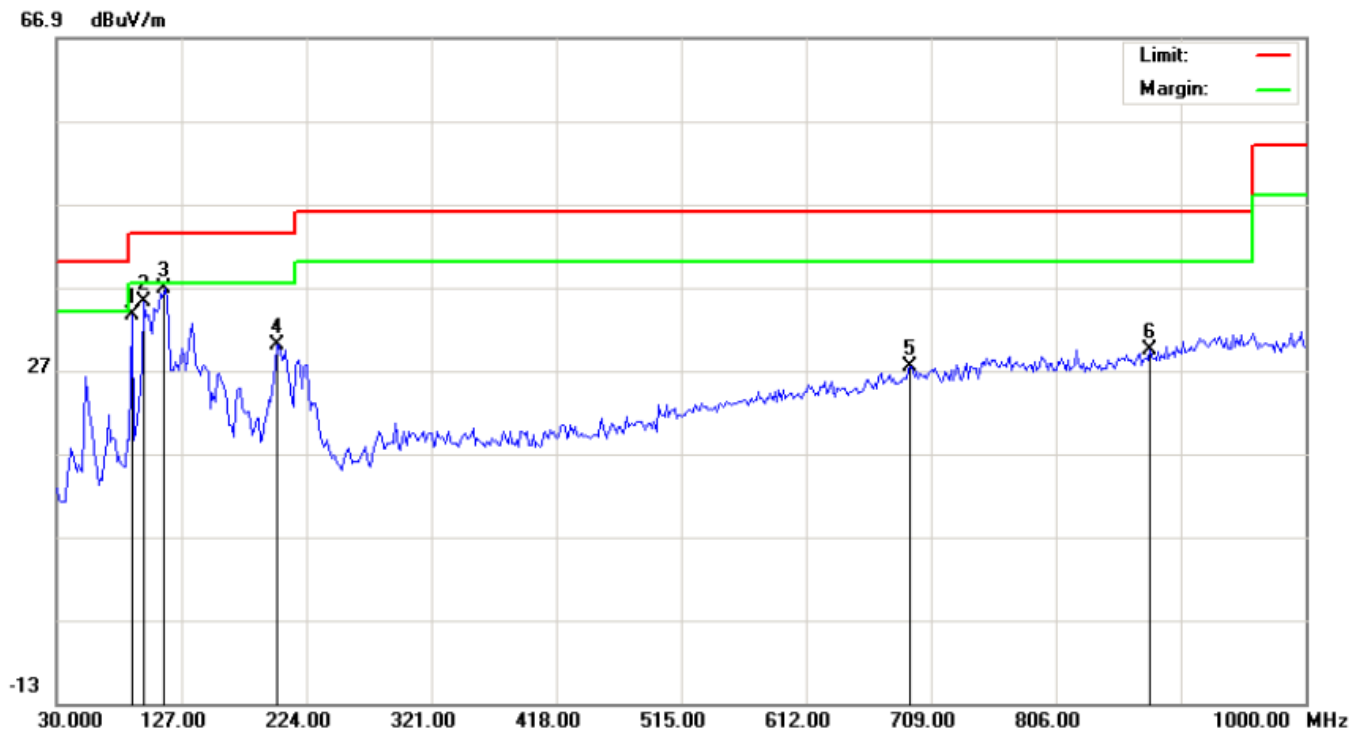
7.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

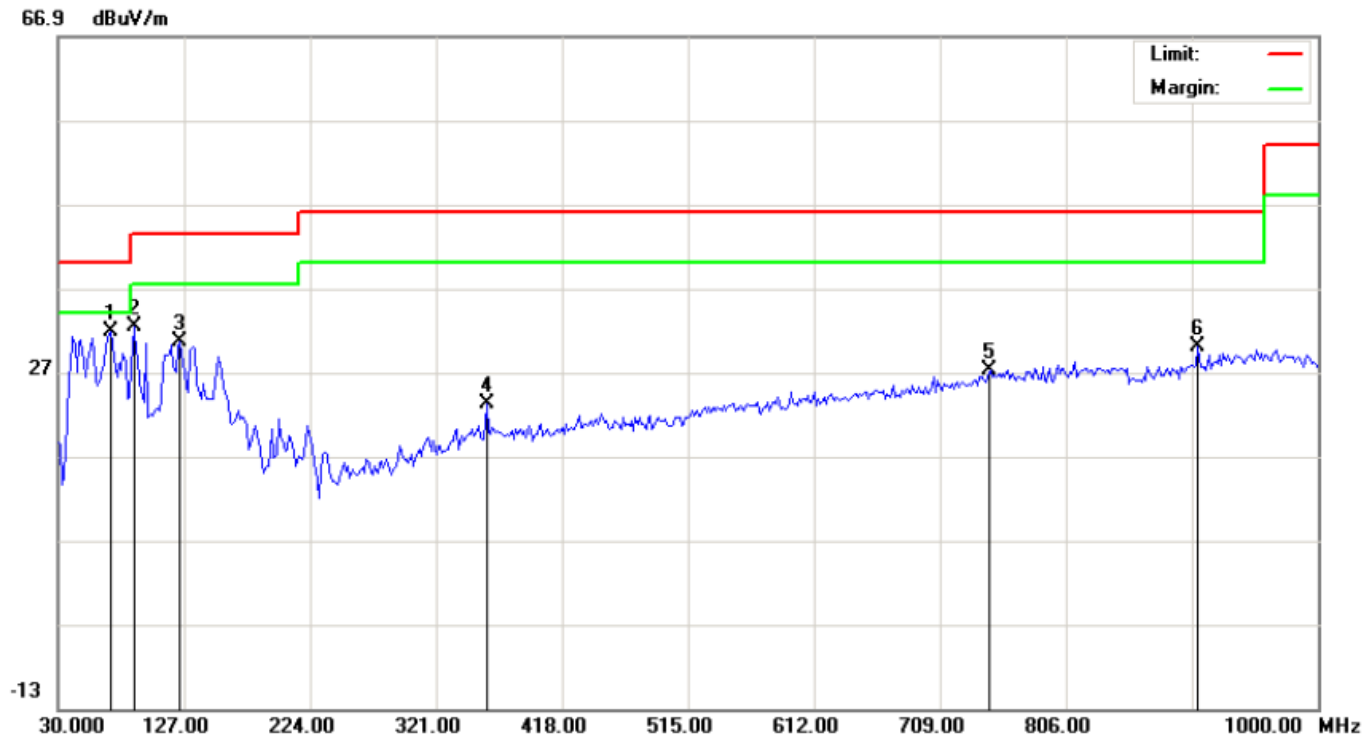
RADIATED EMISSION 30MHz- 1GHZ

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 13	Polarization :	Horizontal



RESULT: PASS

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 13	Polarization :	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	70.4167	27.68	4.16	31.84	40.00	-8.16	peak			
2		88.2000	27.62	4.74	32.36	43.50	-11.14	peak			
3		123.7667	22.16	8.43	30.59	43.50	-12.91	peak			
4		359.8000	4.43	18.80	23.23	46.00	-22.77	peak			
5		747.7998	0.71	26.57	27.28	46.00	-18.72	peak			
6		907.8500	1.25	28.83	30.08	46.00	-15.92	peak			

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

The mode 13 is the worst case, and only the data of the worst case recorded in this test report.

FIELD STRENGTH OF FUNDAMENTAL FOR BR/EDR

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	GFSK	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	102.85	-9.37	93.48	114	-20.52	peak
2402.013	98.78	-9.37	89.41	94	-4.59	AVG
2440.016	102.74	-9.63	93.11	114	-20.89	peak
2440.016	98.51	-9.63	88.88	94	-5.12	AVG
2480.021	103.38	-9.61	93.77	114	-20.23	peak
2480.021	99.25	-9.61	89.64	94	-4.36	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	GFSK	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	100.78	-9.37	91.41	114	-22.59	peak
2402.013	96.69	-9.37	87.32	94	-6.68	AVG
2440.016	100.84	-9.63	91.21	114	-22.79	peak
2440.016	96.52	-9.63	86.89	94	-7.11	AVG
2480.021	101.41	-9.61	91.8	114	-22.2	peak
2480.021	97.24	-9.61	87.63	94	-6.37	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	π /4-DQPSK	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	102.04	-9.37	92.67	114	-21.33	peak
2402.013	97.52	-9.37	88.15	94	-5.85	AVG
2440.016	102.14	-9.63	92.51	114	-21.49	peak
2440.016	97.52	-9.63	87.89	94	-6.11	AVG
2480.021	102.84	-9.61	93.23	114	-20.77	peak
2480.021	97.75	-9.61	88.14	94	-5.86	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	$\pi/4$ -DQPSK	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	99.84	-9.37	90.47	114	-23.53	peak
2402.013	95.42	-9.37	86.05	94	-7.95	AVG
2440.016	100.04	-9.63	90.41	114	-23.59	peak
2440.016	95.48	-9.63	85.85	94	-8.15	AVG
2480.021	100.79	-9.61	91.18	114	-22.82	peak
2480.021	95.81	-9.61	86.2	94	-7.8	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	8DPSK	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	101.54	-9.37	92.17	114	-21.83	peak
2402.013	97.04	-9.37	87.67	94	-6.33	AVG
2440.016	101.38	-9.63	91.75	114	-22.25	peak
2440.016	97.05	-9.63	87.42	94	-6.58	AVG
2480.021	101.54	-9.61	91.93	114	-22.07	peak
2480.021	97.15	-9.61	87.54	94	-6.46	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	8DPSK	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	99.47	-9.37	90.1	114	-23.9	peak
2402.013	95.01	-9.37	85.64	94	-8.36	AVG
2440.016	99.37	-9.63	89.74	114	-24.26	peak
2440.016	94.85	-9.63	85.22	94	-8.78	AVG
2480.021	99.61	-9.61	90	114	-24	peak
2480.021	95.28	-9.61	85.67	94	-8.33	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

FIELD STRENGTH OF FUNDAMENTAL FOR BLE

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	GFSK for BLE	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	100.24	-9.37	90.87	114	-23.13	peak
2402.013	94.68	-9.37	85.31	94	-8.69	AVG
2440.016	100.85	-9.63	91.22	114	-22.78	peak
2440.016	95.12	-9.63	85.49	94	-8.51	AVG
2480.021	101.14	-9.61	91.53	114	-22.47	peak
2480.021	95.52	-9.61	85.91	94	-8.09	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Modulation :	GFSK for BLE	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402.013	98.25	-9.37	88.88	114	-25.12	peak
2402.013	92.71	-9.37	83.34	94	-10.66	AVG
2440.016	98.75	-9.63	89.12	114	-24.88	peak
2440.016	93.08	-9.63	83.45	94	-10.55	AVG
2480.021	99.15	-9.61	89.54	114	-24.46	peak
2480.021	93.54	-9.61	83.93	94	-10.07	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ FOR BR/EDR

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 1	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.026	49.79	3.74	53.53	74	-20.47	peak
4804.026	43.47	3.74	47.21	54	-6.79	AVG
7206.039	42.54	8.14	50.68	74	-23.32	peak
7206.039	35.68	8.14	43.82	54	-10.18	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 1	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.026	47.85	3.74	51.59	74	-22.41	peak
4804.026	42.45	3.74	46.19	54	-7.81	AVG
7206.039	41.54	8.14	49.68	74	-24.32	peak
7206.039	34.61	8.14	42.75	54	-11.25	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 2	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.032	50.15	3.76	53.91	74	-20.09	peak
4880.032	44.75	3.76	48.51	54	-5.49	AVG
7320.048	42.15	8.17	50.32	74	-23.68	peak
7320.048	36.74	8.17	44.91	54	-9.09	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 2	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.032	49.28	3.76	53.04	74	-20.96	peak
4880.032	44.85	3.76	48.61	54	-5.39	AVG
7320.048	42.34	8.17	50.51	74	-23.49	peak
7320.048	37.02	8.17	45.19	54	-8.81	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 3	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.042	51.71	3.83	55.54	74	-18.46	peak
4960.042	46.34	3.83	50.17	54	-3.83	AVG
7440.063	42.57	8.21	50.78	74	-23.22	peak
7440.063	37.42	8.21	45.63	54	-8.37	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 3	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.042	51.21	3.83	55.04	74	-18.96	peak
4960.042	45.64	3.83	49.47	54	-4.53	AVG
7440.063	42.39	8.21	50.6	74	-23.4	peak
7440.063	37.18	8.21	45.39	54	-8.61	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ FOR BLE

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 10	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.026	47.04	3.74	50.78	74	-23.22	peak
4804.026	41.85	3.74	45.59	54	-8.41	AVG
7206.039	41.74	8.14	49.88	74	-24.12	peak
7206.039	36.82	8.14	44.96	54	-9.04	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 10	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.026	46.58	3.74	50.32	74	-23.68	peak
4804.026	41.25	3.74	44.99	54	-9.01	AVG
7206.039	41.55	8.14	49.69	74	-24.31	peak
7206.039	36.51	8.14	44.65	54	-9.35	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 11	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.032	48.75	3.76	52.51	74	-21.49	peak
4880.032	41.26	3.76	45.02	54	-8.98	AVG
7320.048	39.85	8.17	48.02	74	-25.98	peak
7320.048	34.24	8.17	42.41	54	-11.59	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 ℃	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 11	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.032	48.52	3.76	52.28	74	-21.72	peak
4880.032	41.02	3.76	44.78	54	-9.22	AVG
7320.048	39.75	8.17	47.92	74	-26.08	peak
7320.048	34.02	8.17	42.19	54	-11.81	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 12	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.042	48.52	3.83	52.35	74	-21.65	peak
4960.042	43.05	3.83	46.88	54	-7.12	AVG
7440.063	41.25	8.21	49.46	74	-24.54	peak
7440.063	35.74	8.21	43.95	54	-10.05	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 12	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.042	47.51	3.83	51.34	74	-22.66	peak
4960.042	42.65	3.83	46.48	54	-7.52	AVG
7440.063	40.74	8.21	48.95	74	-25.05	peak
7440.063	35.21	8.21	43.42	54	-10.58	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.
The GFSK modulation was the worst case and only the data of worst recorded in this report.

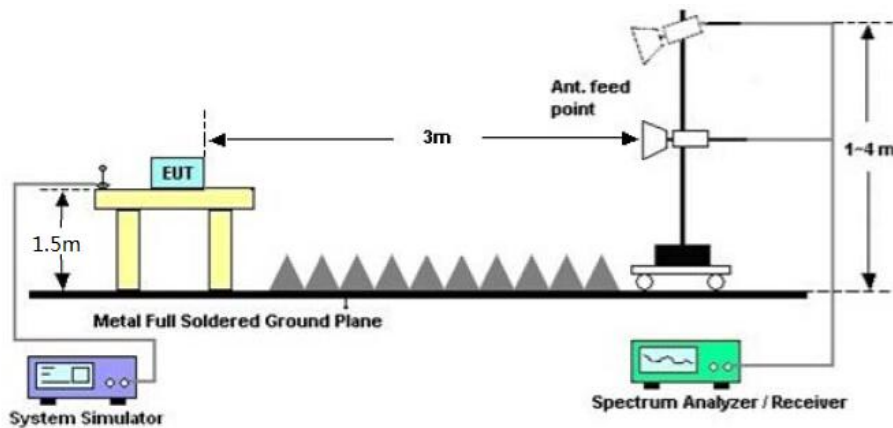
8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO
3. Other procedures refer to clause 7.2.

8.2 TEST SETUP

RADIATED EMISSION TEST SETUP



8.3 RADIATED TEST RESULT

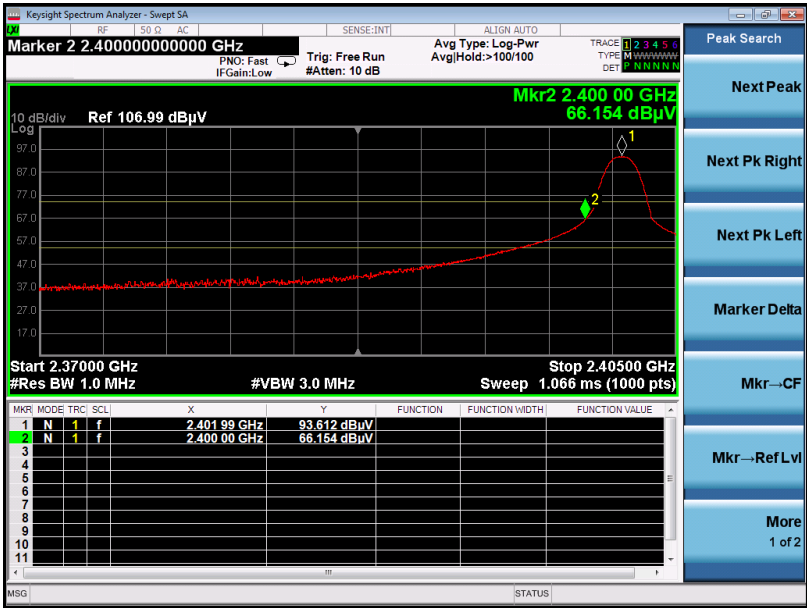
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μ V) to represent the Amplitude. Use the F dB(μ V/m) to represent the Field Strength. So A=F.

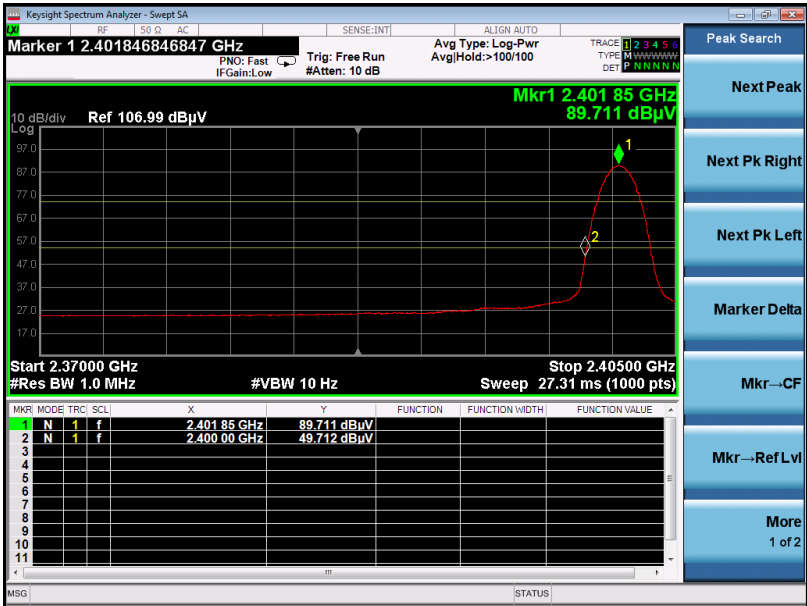
FOR BR/EDR:

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 1	Polarization :	Horizontal

PK Value

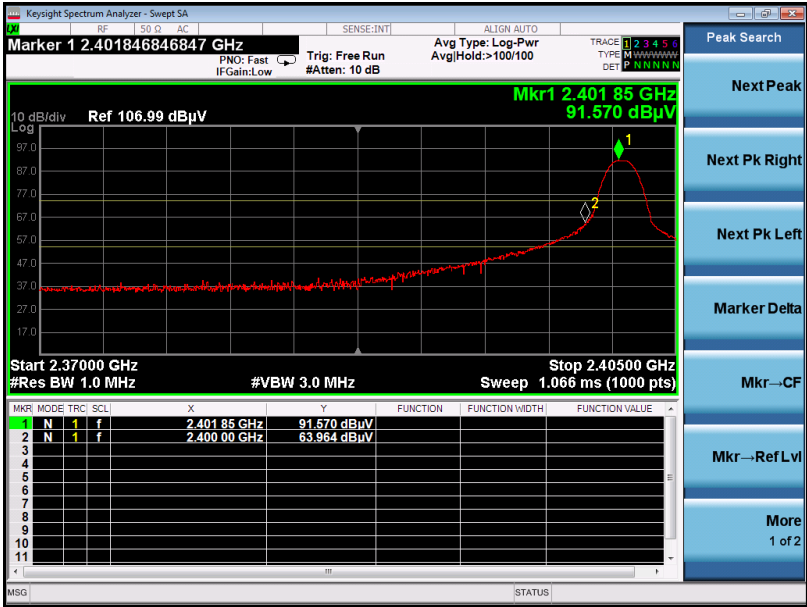


AV Value

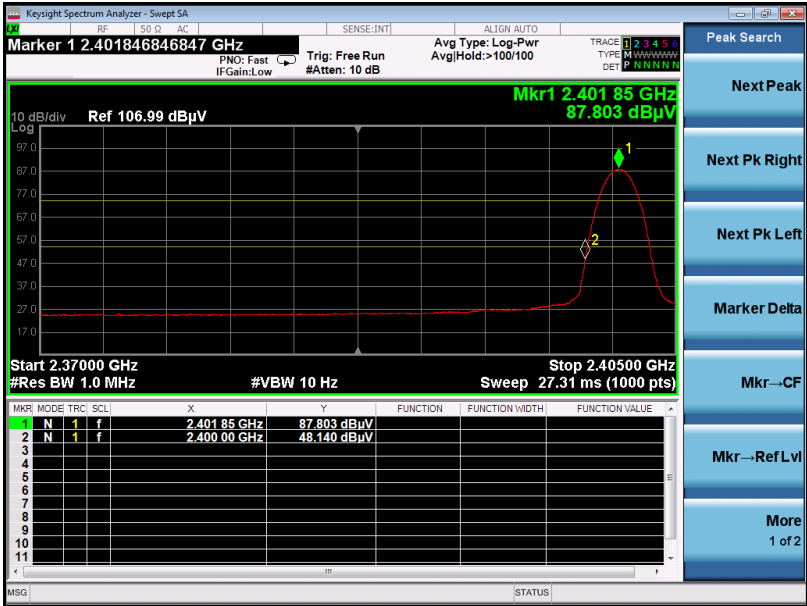


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 1	Polarization :	Vertical

PK Value



AV Value

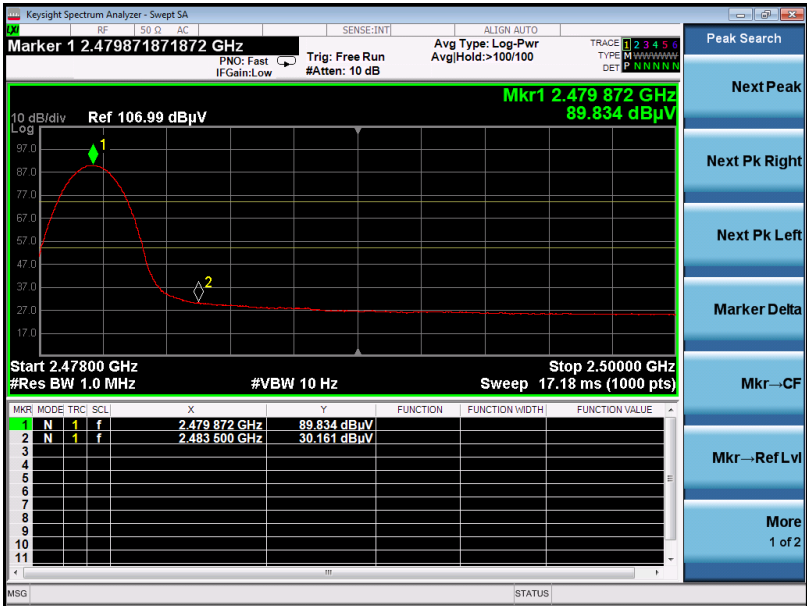


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 3	Polarization :	Horizontal

PK Value



AV Value

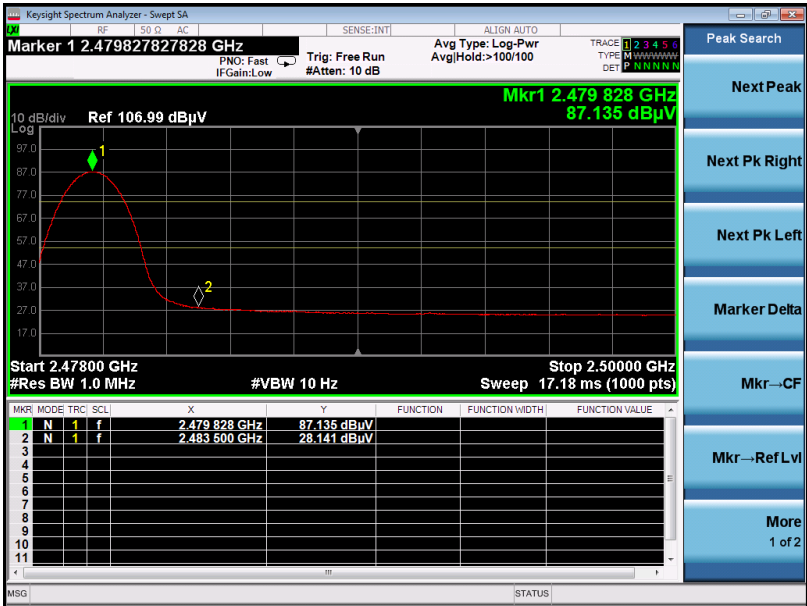


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 3	Polarization :	Vertical

PK Value



AV Value

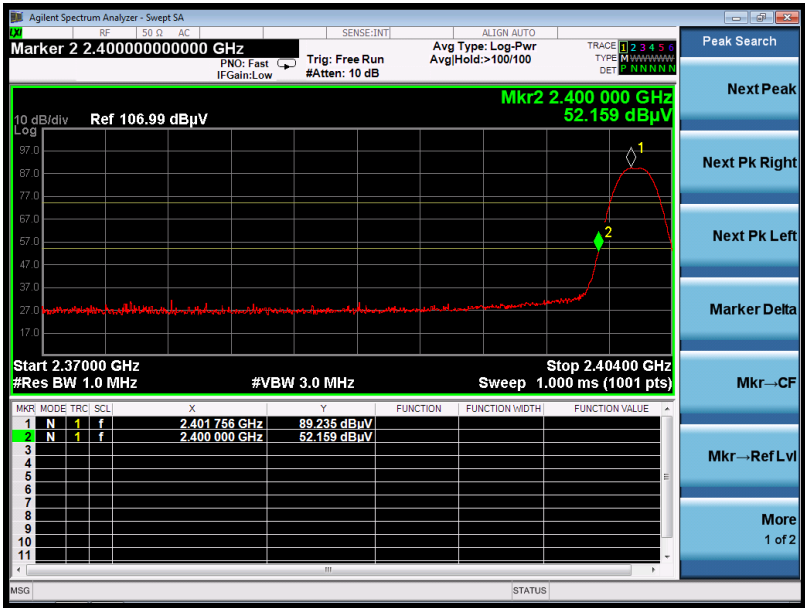


Note: The GFSK modulation was the worst case and only the data of worst recorded in this report.

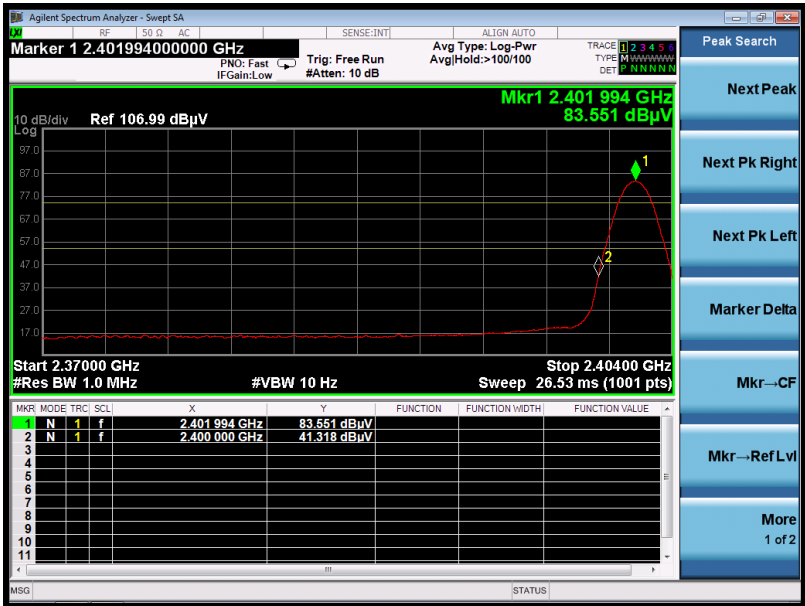
FOR BLE:

EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 10	Polarization :	Horizontal

PK Value

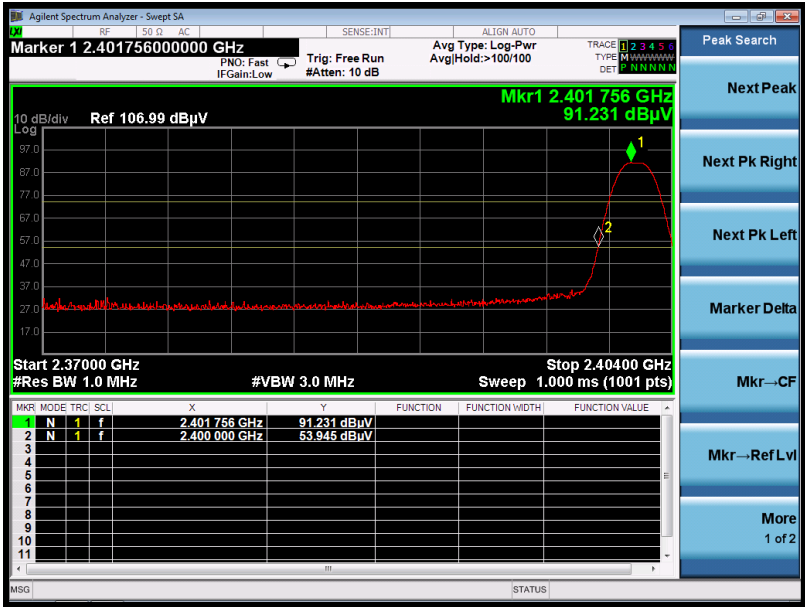


AV Value

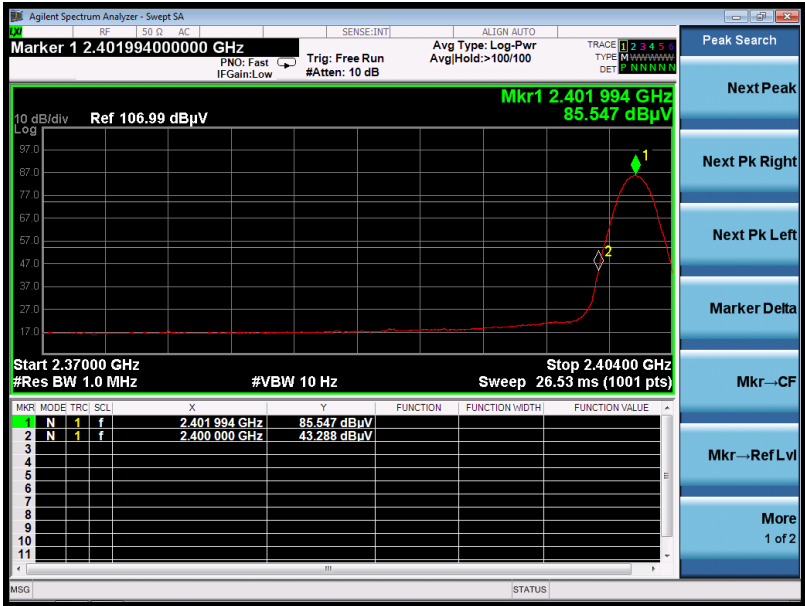


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 10	Polarization :	Vertical

PK Value

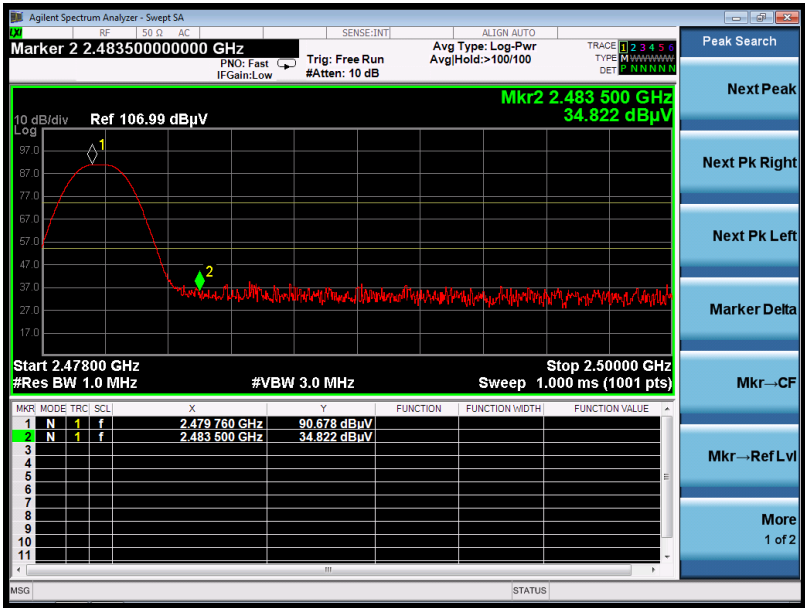


AV Value

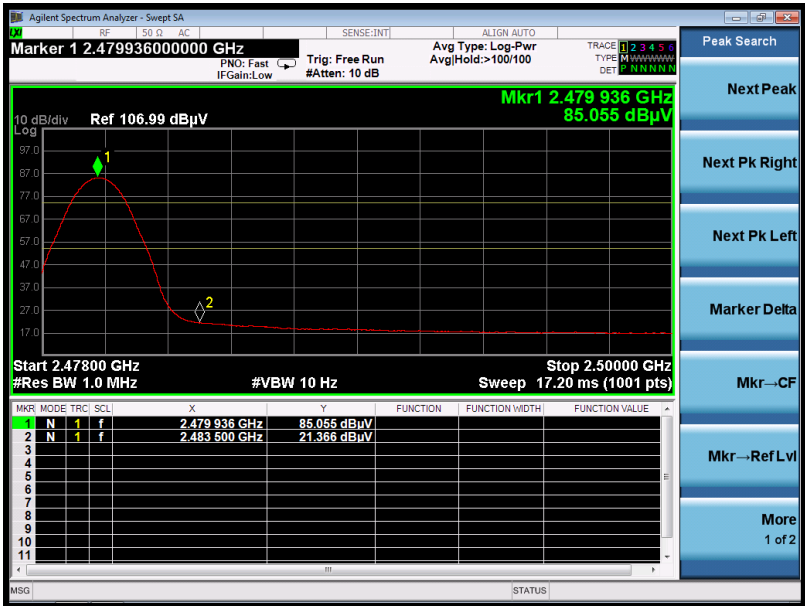


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 12	Polarization :	Horizontal

PK Value

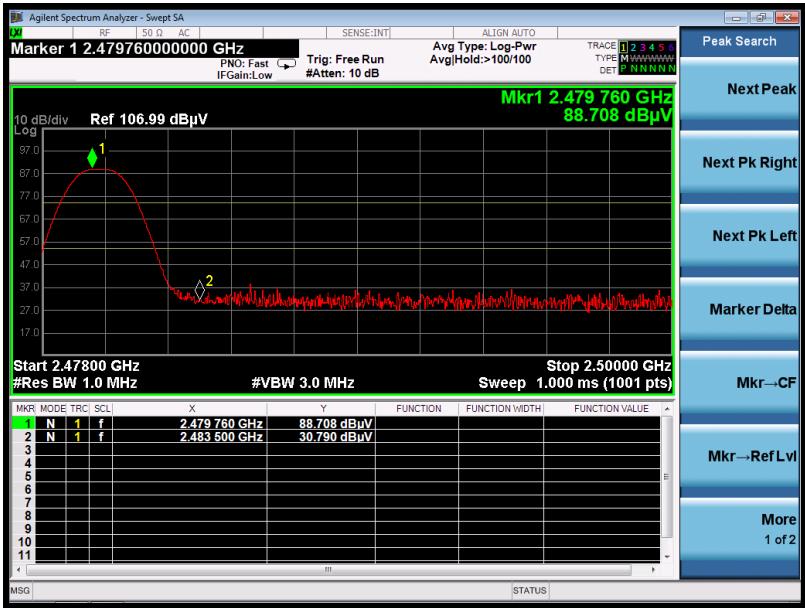


AV Value

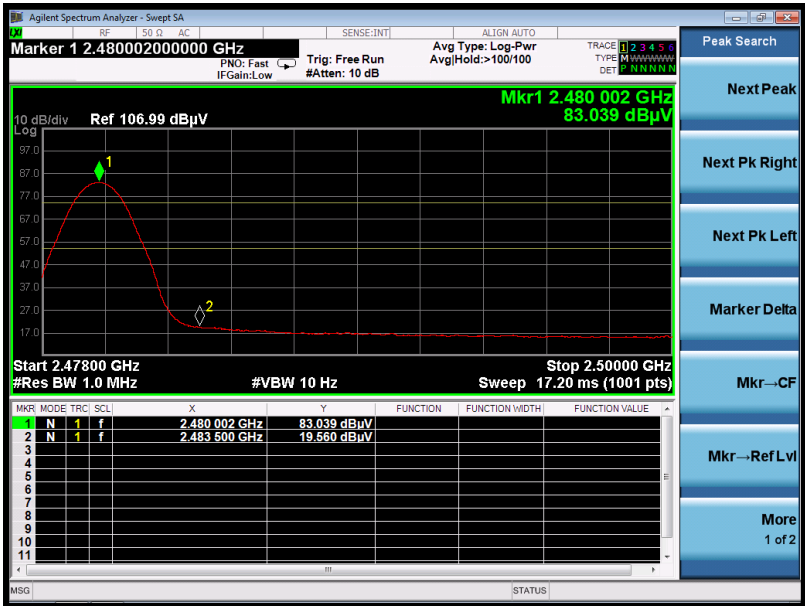


EUT :	BLUETOOTH FM TRANSMITTER	Model Name. :	HY82
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC12V
Test Mode :	Mode 12	Polarization :	Vertical

PK Value



AV Value

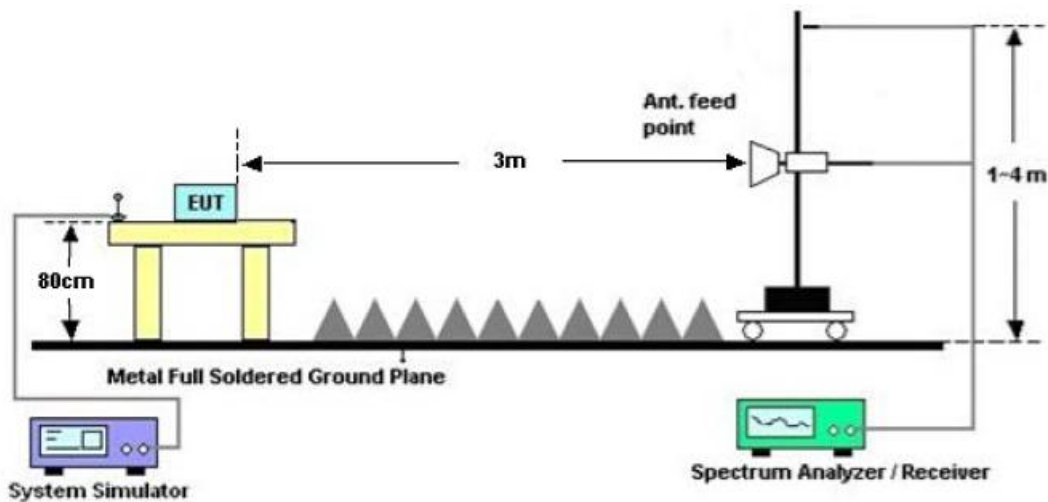


9. 20DB BANDWIDTH

9.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

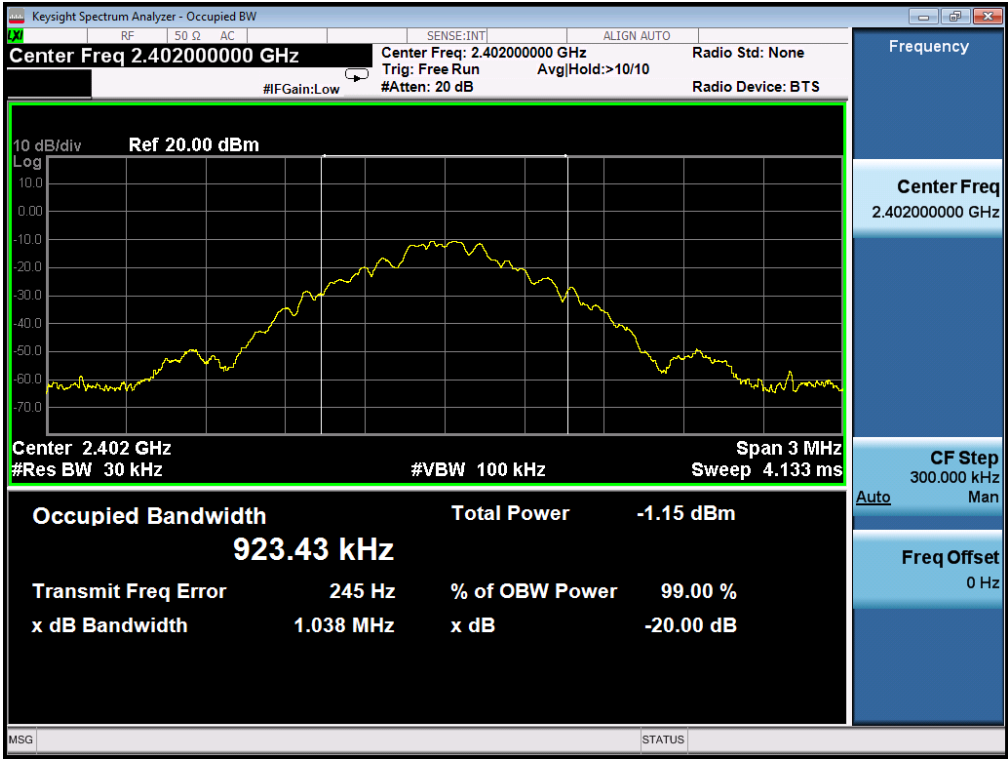


9.3. MEASUREMENT RESULTS

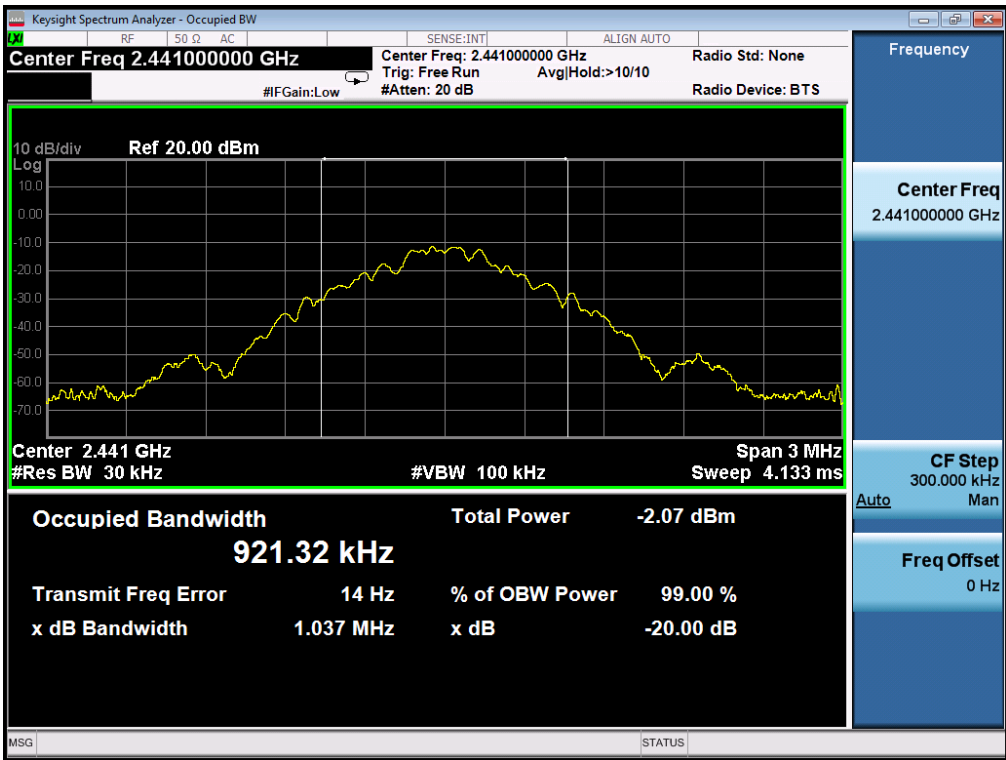
TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK for BR/EDR

Test Data (MHz)		Criteria
Low Channel	1.038	PASS
Middle Channel	1.037	PASS
High Channel	1.037	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



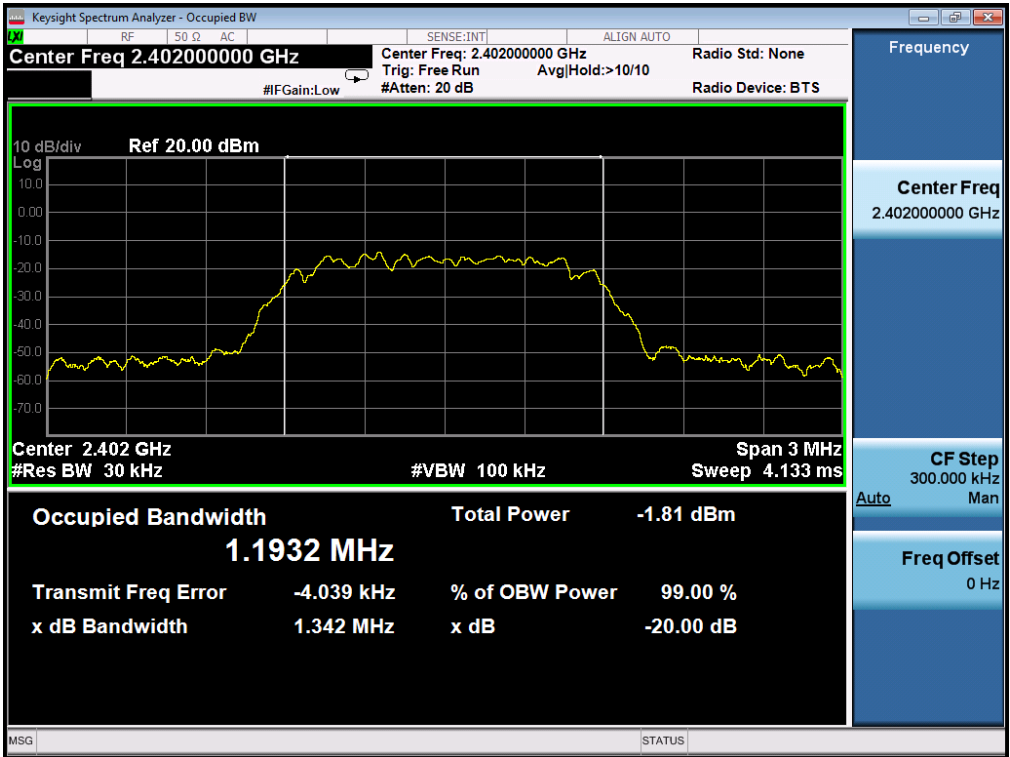
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



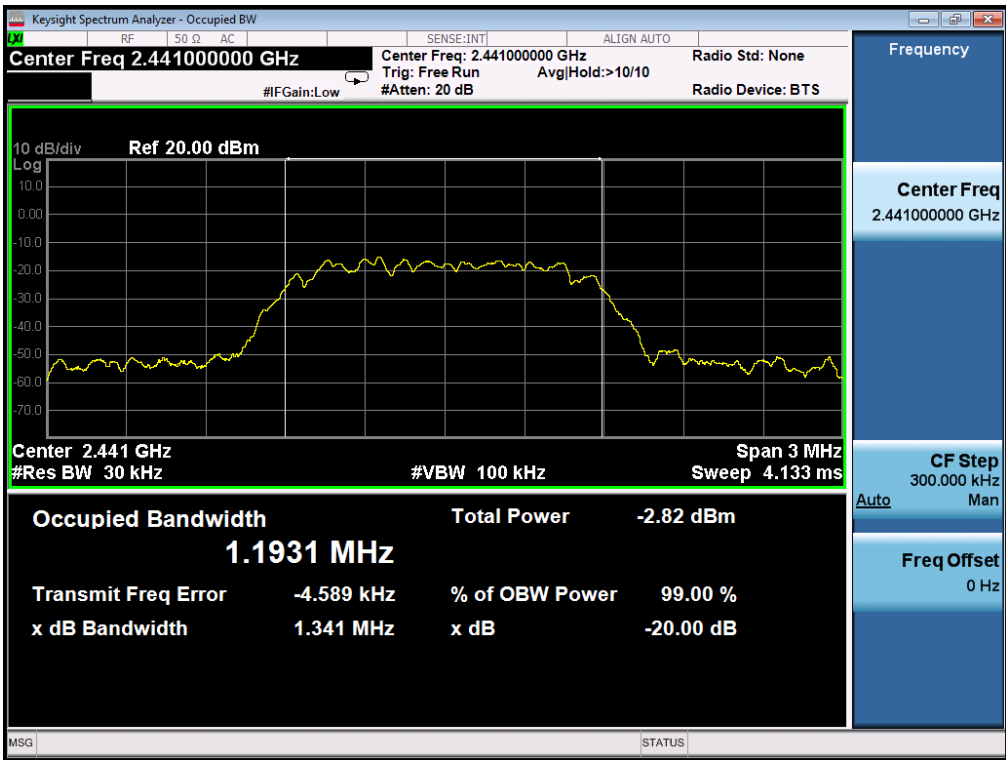
TEST ITEM	20DB BANDWIDTH
TEST MODULATION	π /4-DQPSK for BR/EDR

Test Data (MHz)		Criteria
Low Channel	1.342	PASS
Middle Channel	1.341	PASS
High Channel	1.344	PASS

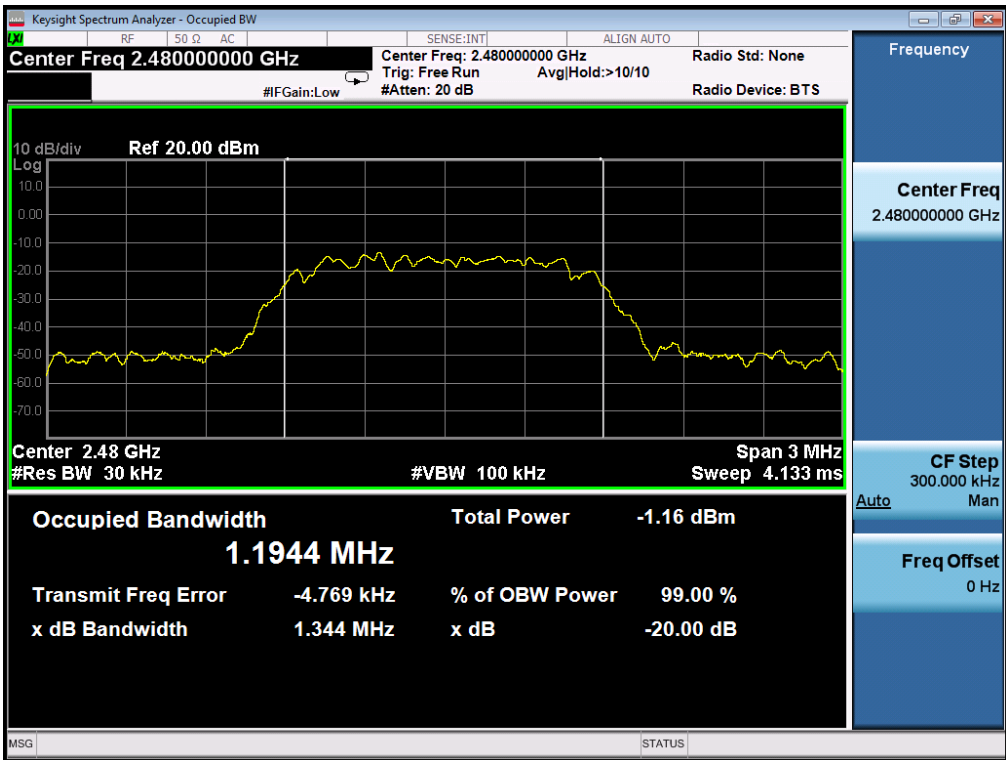
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



TEST ITEM	20DB BANDWIDTH
TEST MODULATION	8DPSK for BR/EDR

Test Data (MHz)		Criteria
Low Channel	1.366	PASS
Middle Channel	1.364	PASS
High Channel	1.366	PASS

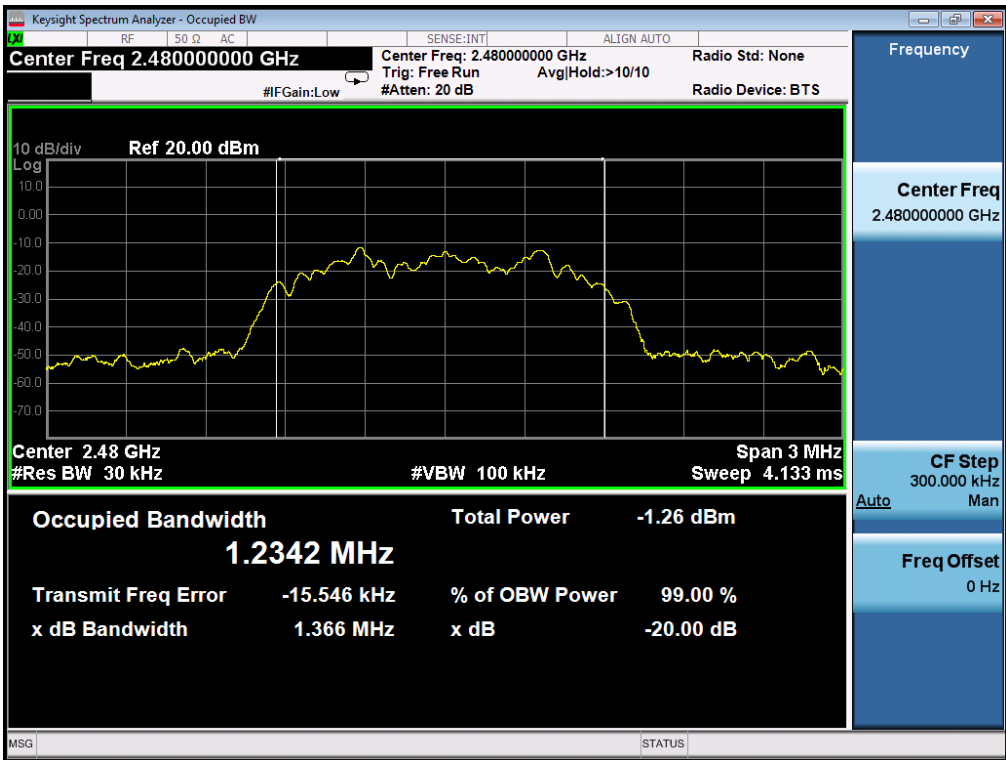
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK for BLE

Test Data (MHz)		Criteria
Low Channel	1.131	PASS
Middle Channel	1.130	PASS
High Channel	1.129	PASS

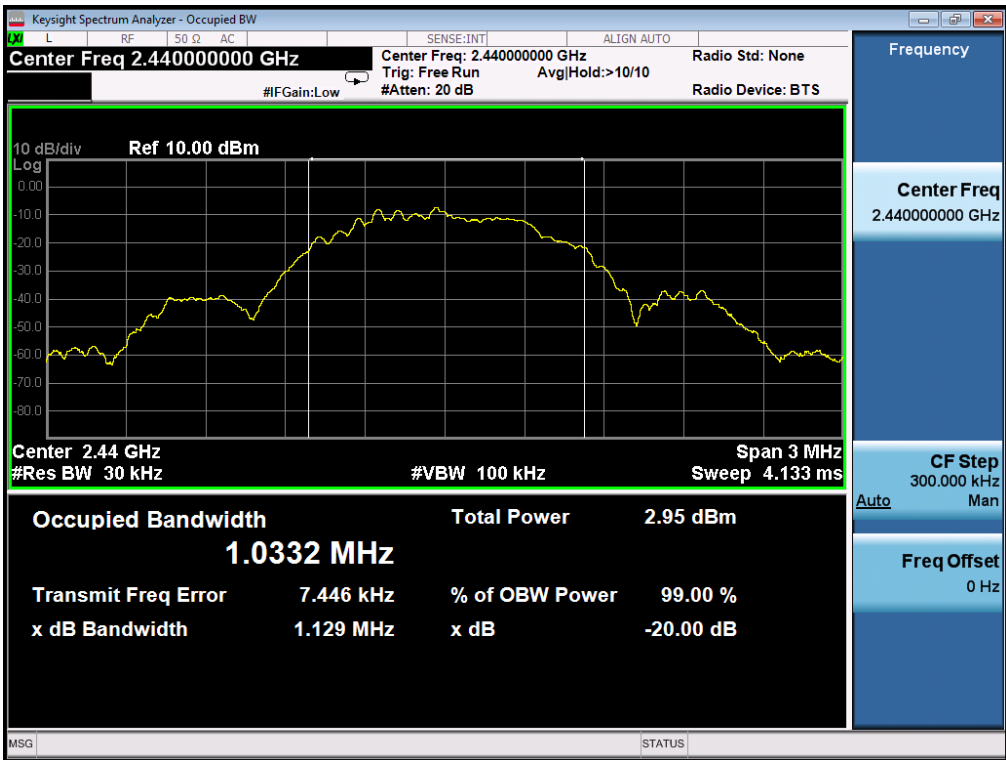
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



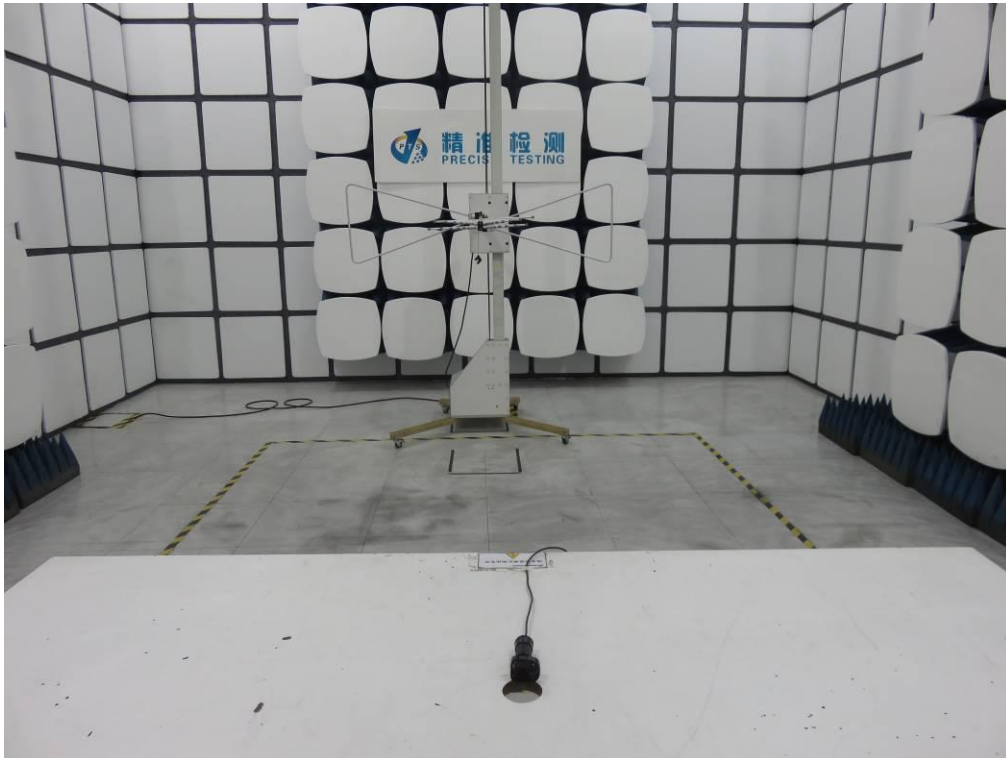
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



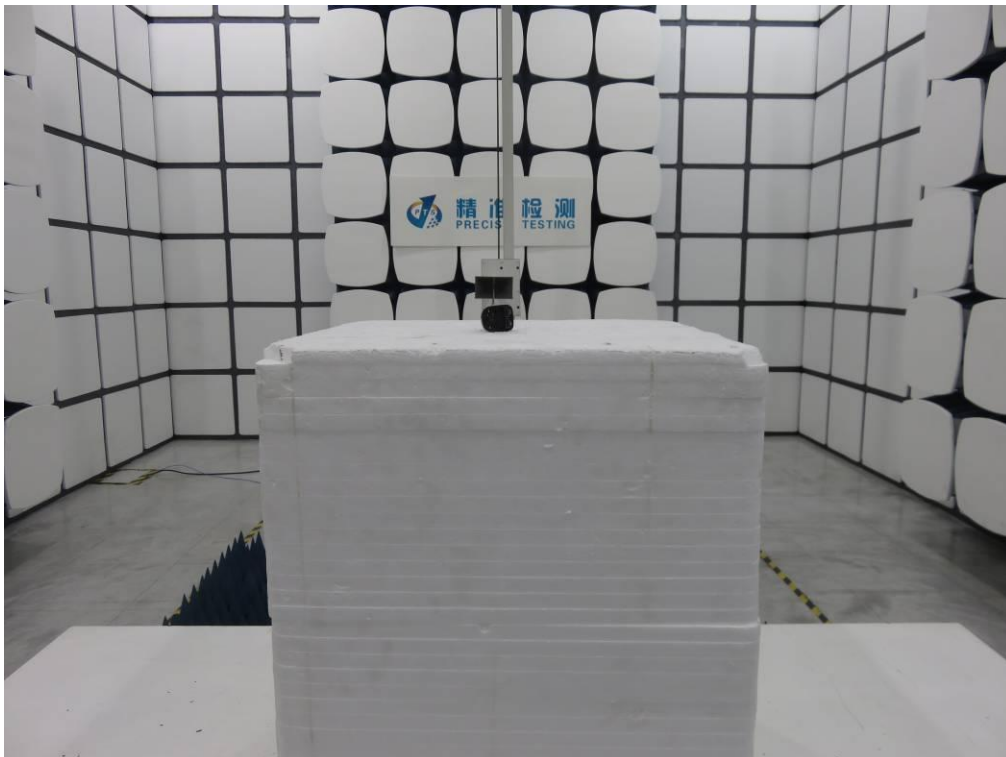
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



APPENDIX A: PHOTOGRAPHS OF TEST SETUP
FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ



APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



LEFT VIEW OF EUT



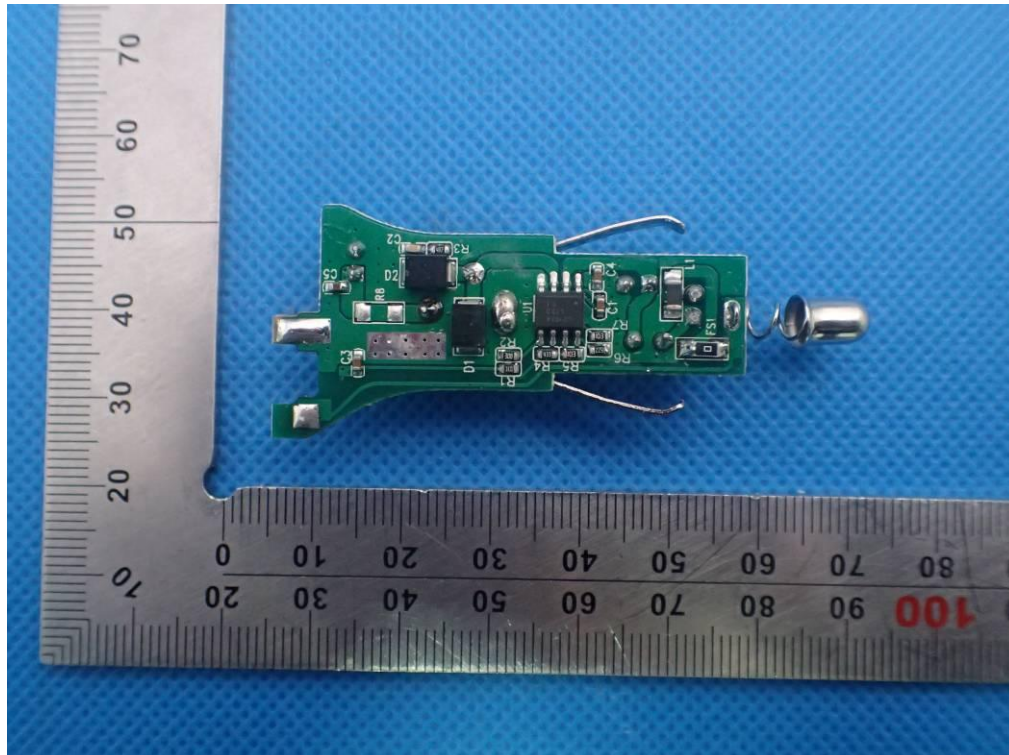
RIGHT VIEW OF EUT



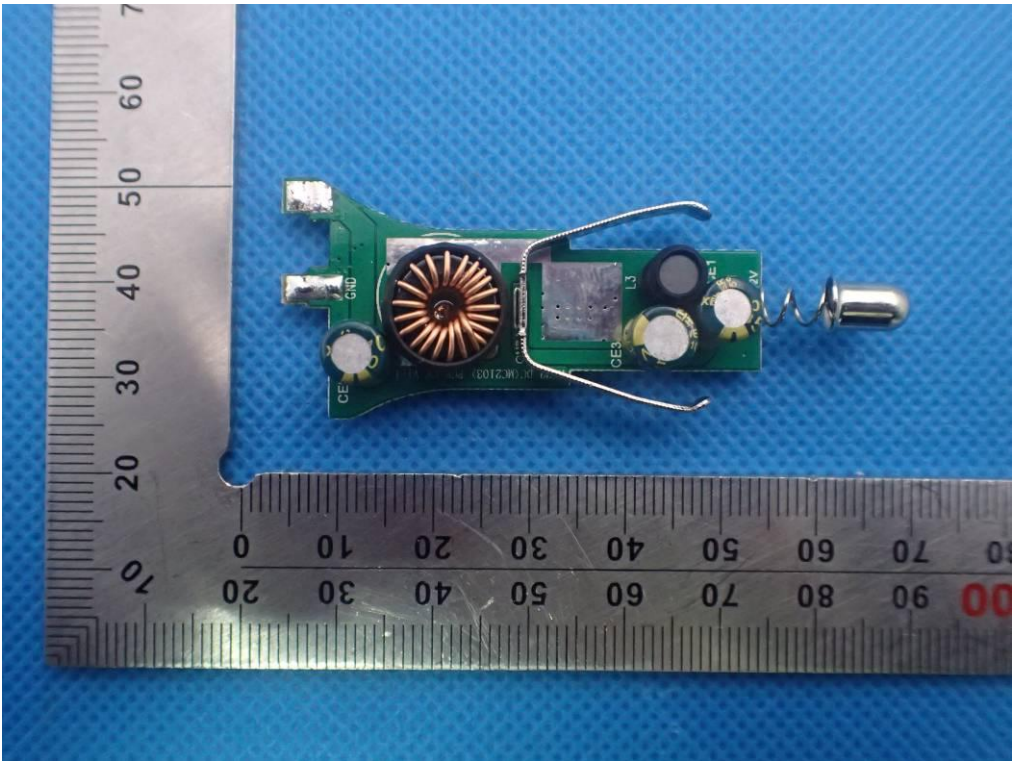
OPEN VIEW OF EUT



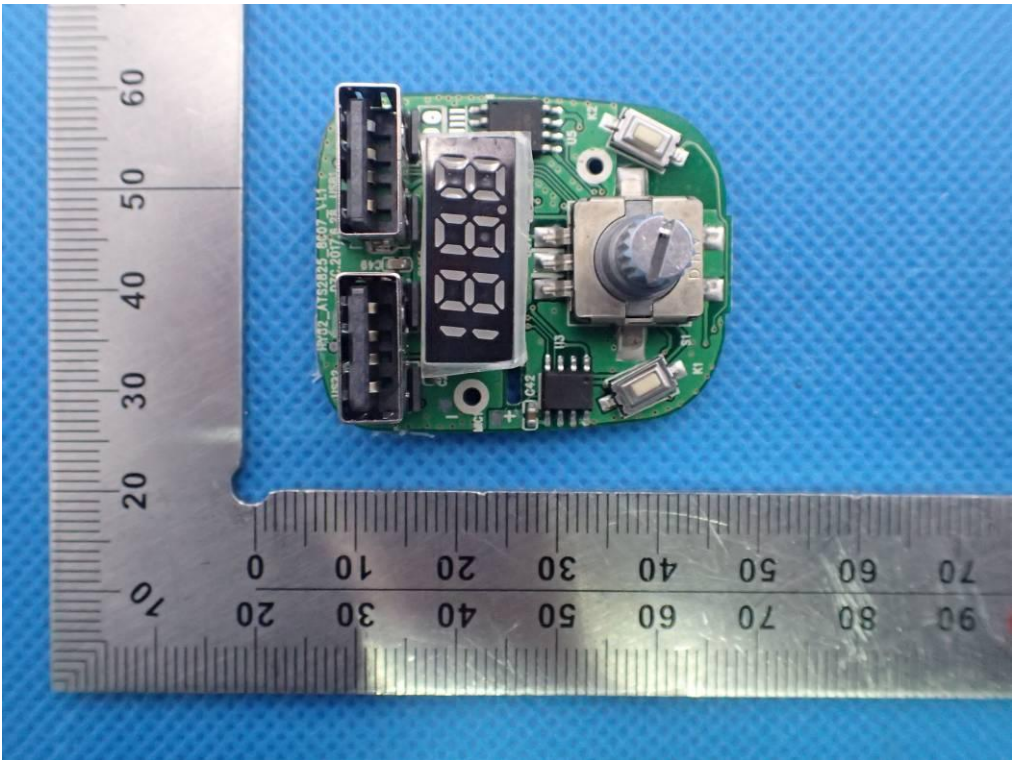
INTERNAL VIEW OF EUT-1



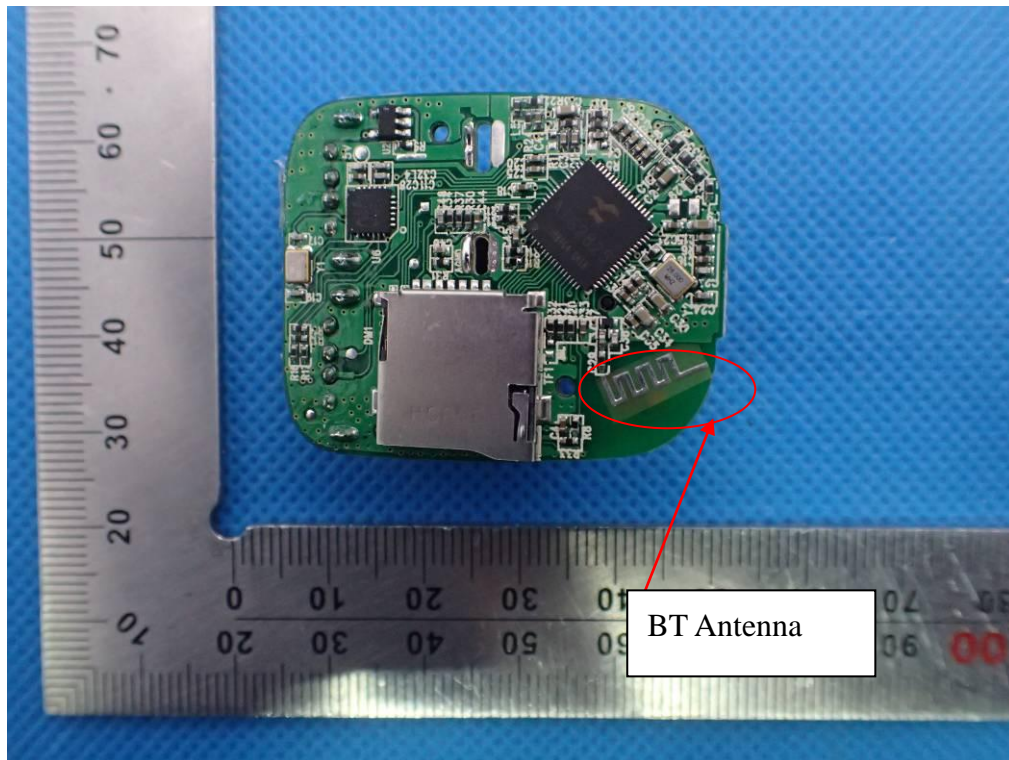
INTERNAL VIEW OF EUT-2



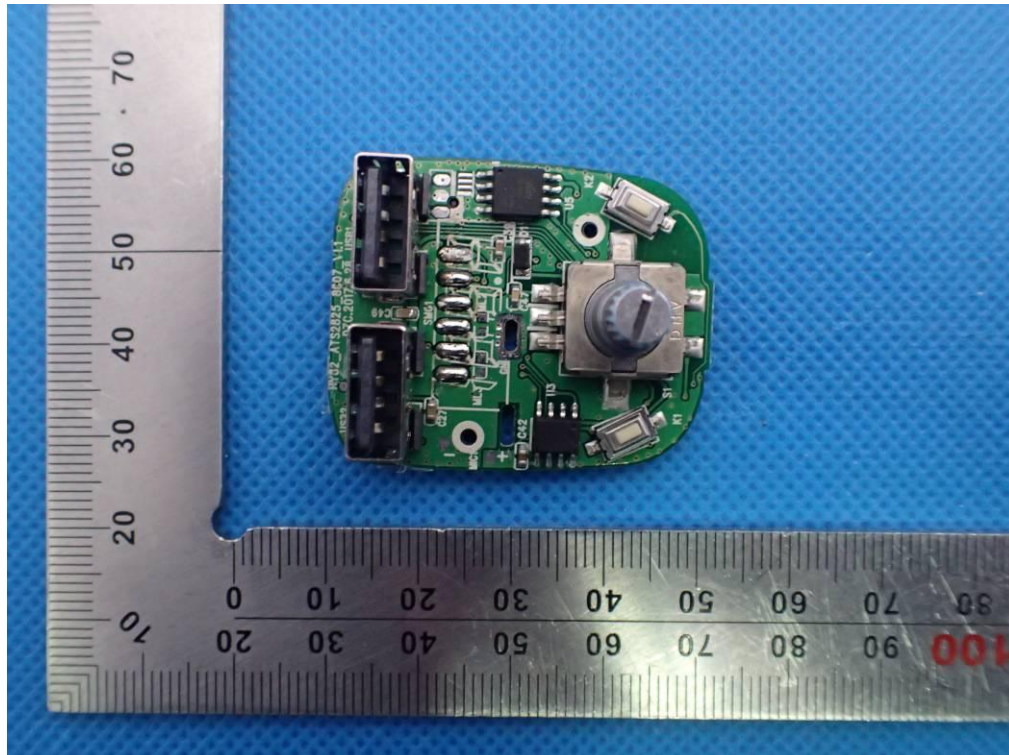
INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



----END OF REPORT----