FCC Test Report

Report No.: AGC03329190303FE03

FCC ID	:	2AAXO-ISM398BTYY
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	PORTABLE KARAOKE PLAYER
BRAND NAME	:	Singing Machine
MODEL NAME	:	See page 4
CLIENT	:	The Singing Machine Company, Inc.
DATE OF ISSUE	:	Mar. 21, 2019
STANDARD(S)	:	FCC Part 15 Subpart C Section 15.247
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	/	Mar. 21, 2019	Valid	Initial release

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1. VERIFICATION OF CONFORMITY

Applicant	The Singing Machine Company, Inc.
Address	6301 NW 5th Way, Suite 2900, Fort Lauderdale, FL 33309, USA
Manufacturer	SHENZHEN JUNLAN ELECTRONIC LTD
Address	No.277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China
Factory	SHENZHEN JUNLAN ELECTRONIC LTD
Address	No.277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China
Product Designation	PORTABLE KARAOKE PLAYER
Brand Name	Singing Machine
Test Model	iSM398BT
Series Model	Tabeoke, iSM397BT, iSM399BT, iSM398BT, iSM398BG, iSM398PP, iSM398PB, iSM398GY, iSM398XX, iSM398BTYY, iSM398BTXX (XX means unit color, it can be A to Z or N/A)
Difference Description	All the same except for the appearance color
Date of test	Mar. 12, 2019 to Mar. 21, 2019
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.247. The test results of this report relate only to the tested sample identified in this report.

Tested By sky dong

Sky Dong(Dong Huihui) Mar. 21, 2019

Reviewed By Bart Xie

Bart Xie(Xie Xiaobin) Mar. 21, 2019

Approved By Forrest Lei

Forrest Lei(Lei Yonggang) Authorized Officer Mar. 21, 2019

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is “PORTABLE KARAOKE PLAYER” designed as a “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	5.017dBm(Max)
Bluetooth Version	V5.0
Modulation	GFSK, π /4-DQPSK for BR/EDR
Number of channels	79 for BR/EDR
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	PCB Antenna
Antenna Gain	0dBi
Power Supply(by battery)	DC 6V by battery
Power Supply(by adapter)	MODEL:GKYPS0100056UL1 INPUT:100-240V~50/60Hz 0.5A OUTPUT:5.6V⎓1A
Note: 1. The USB port only used for charging and can’t be used to transfer data with PC. 2. The EUT didn’t support 8DPSK and BLE. 3. The EUT was supplied by battery and adapter. Only the worst mode test data of adapter mode recorded in the test report.	

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2402~2480MHz	00	2402MHz
	01	2403MHz
	:	:
	38	2440 MHz
	39	2441 MHz
	40	2442 MHz
	:	:
	77	2479 MHz
	78	2480 MHz

2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHZ,In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode:
40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01, 51, 03, 55, 05, 04

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection.
2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about one day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire. LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations)are performed to generate te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.

The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter) than the minimum resolution of the clock(312.5us).The hopping sequence will always Differ from the first one.

2.6. TEST METHOD

All measurements contained in this report were conducted with ANSI C63.10-2013.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±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 %

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

4. DESCRIPTION OF TEST MODES

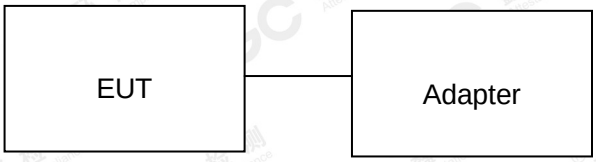
NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π /4-DQPSK
5	Middle channel π /4-DQPSK
6	High channel π /4-DQPSK
7	BT Link with charging

Note: 1. 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.
3. The EUT used fully-charged battery when tested.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

5. SYSTEM TEST CONFIGURATION

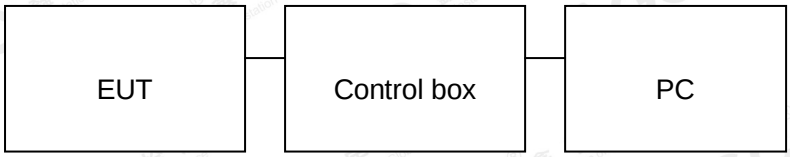
5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



Note: Owing to the EUT can power supply by battery or adapter, testing may be performed while adapter removed.

Configure 2: (Control continuous TX)



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	PORTABLE KARAOKE PLAYER	Singing Machine	iSM398BT	EUT
2	IPOD	APPLE	A1367	A.E
3	Control box	GZUT	N/A	A.E
4	Adapter	GUANGKAIYUAN	GKYPS0100056UL1	Accessory
5	battery	N/A	N/A	A.E

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247 b(1)	Peak Output Power	Compliant
§15.247 a(1)	20 dB Bandwidth	Compliant
§15.247 d	Conducted Spurious Emission	Compliant
§15.247 d §15.209	Radiated Emission	Compliant
§15.247 d	Band Edges	Compliant
§15.247 a(1)(iii)	Number of hopping frequency	Compliant
§15.247 a(1)(iii)	Time of Occupancy	Compliant
§15.247 a(1)	Frequency Separation	Compliant
§15.207	Line conduction Emission	Compliant

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

7. TEST EQUIPMENT LIST

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 12, 2018	Jun. 11, 2019
LISN	R&S	ESH2-Z5	100086	Aug. 28, 2018	Aug. 27, 2019

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2018	Jun. 11, 2019
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 12, 2018	Jun. 11, 2019
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2018	Jun. 11, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 28, 2017	Sep. 27, 2019

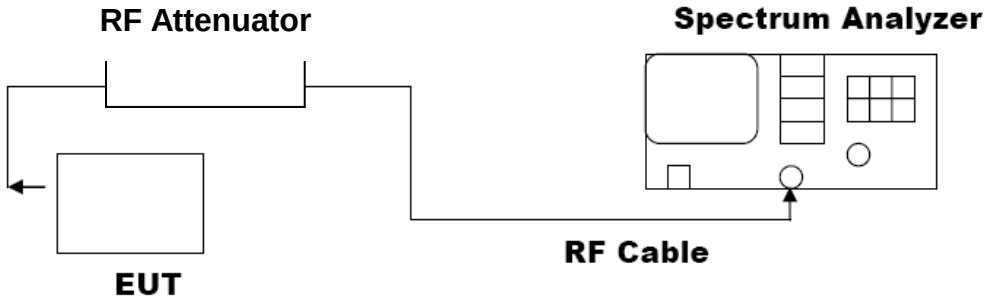
8. PEAK OUTPUT POWER

8.1. MEASUREMENT PROCEDURE

For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
3. RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW.
4. Record the maximum power from the Spectrum Analyzer.
5. The maximum peak power shall be less 21dBm.

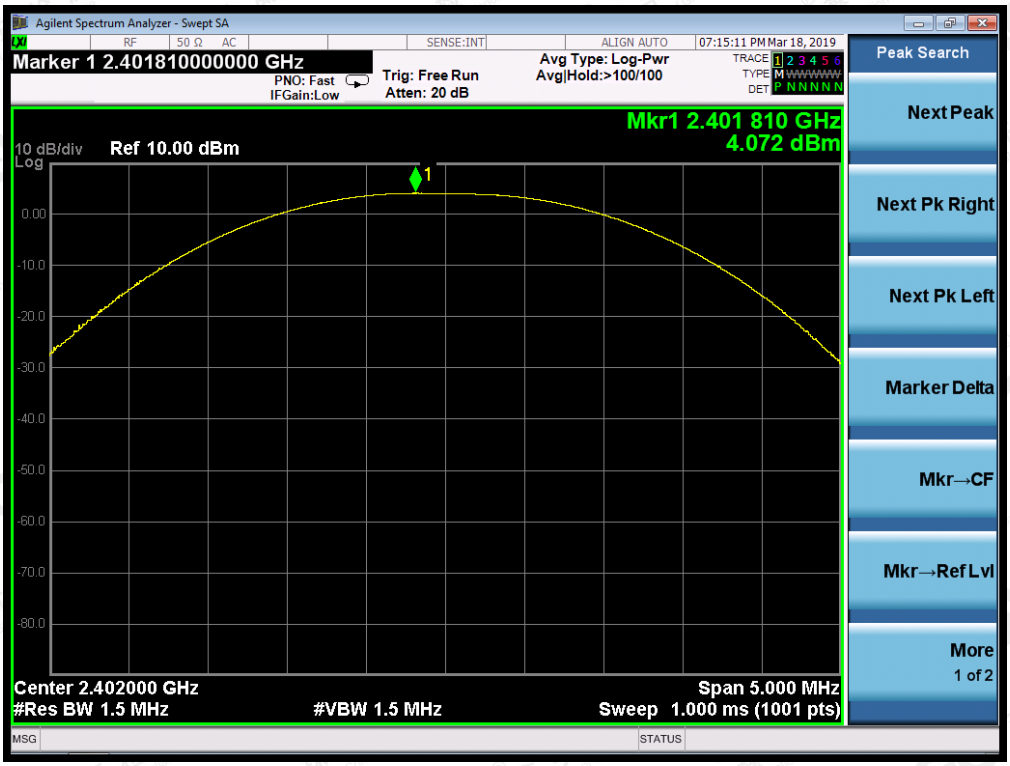
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



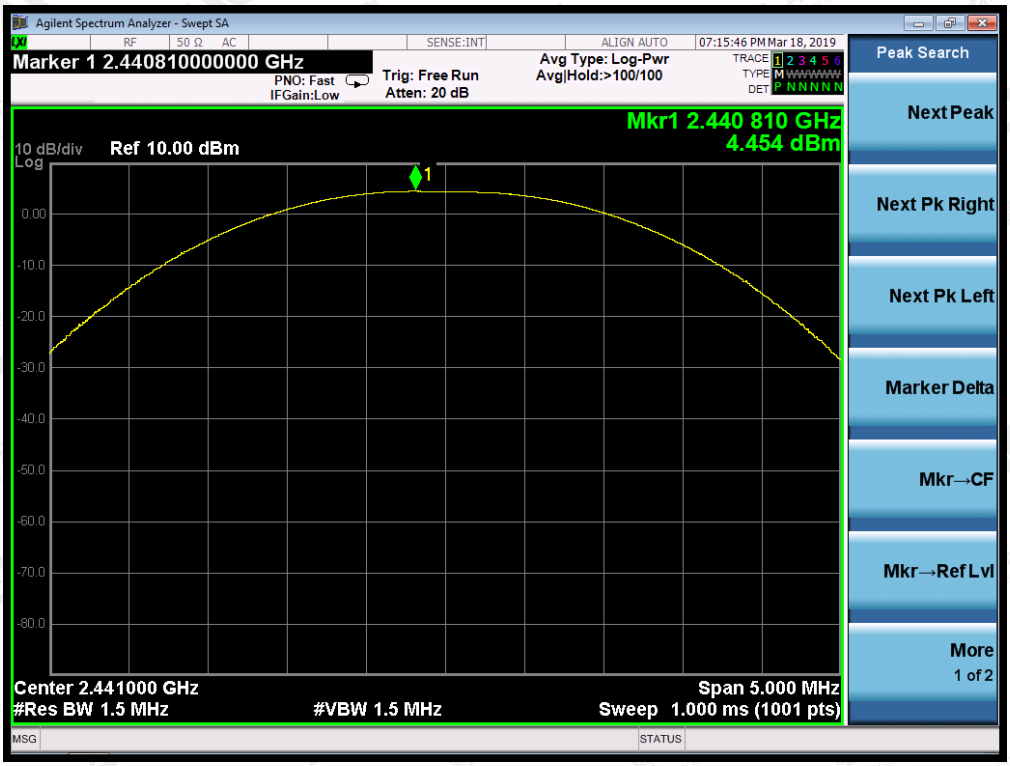
8.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION			
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	4.072	21	Pass
2.441	4.454	21	Pass
2.480	4.301	21	Pass

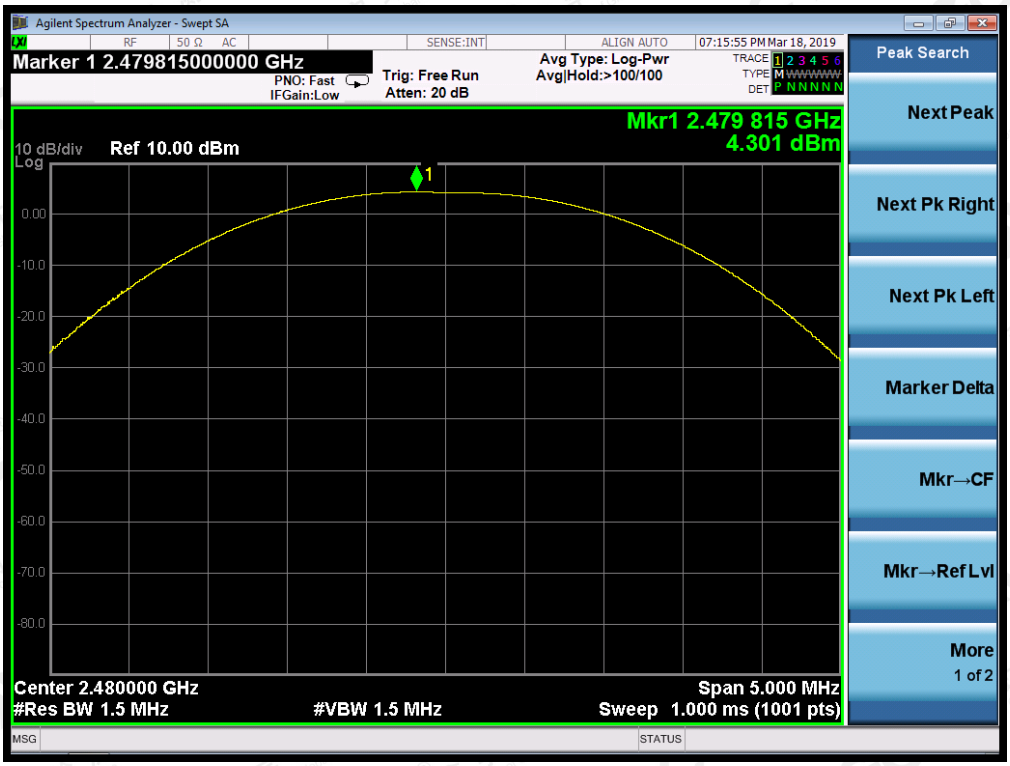
CH00



CH39

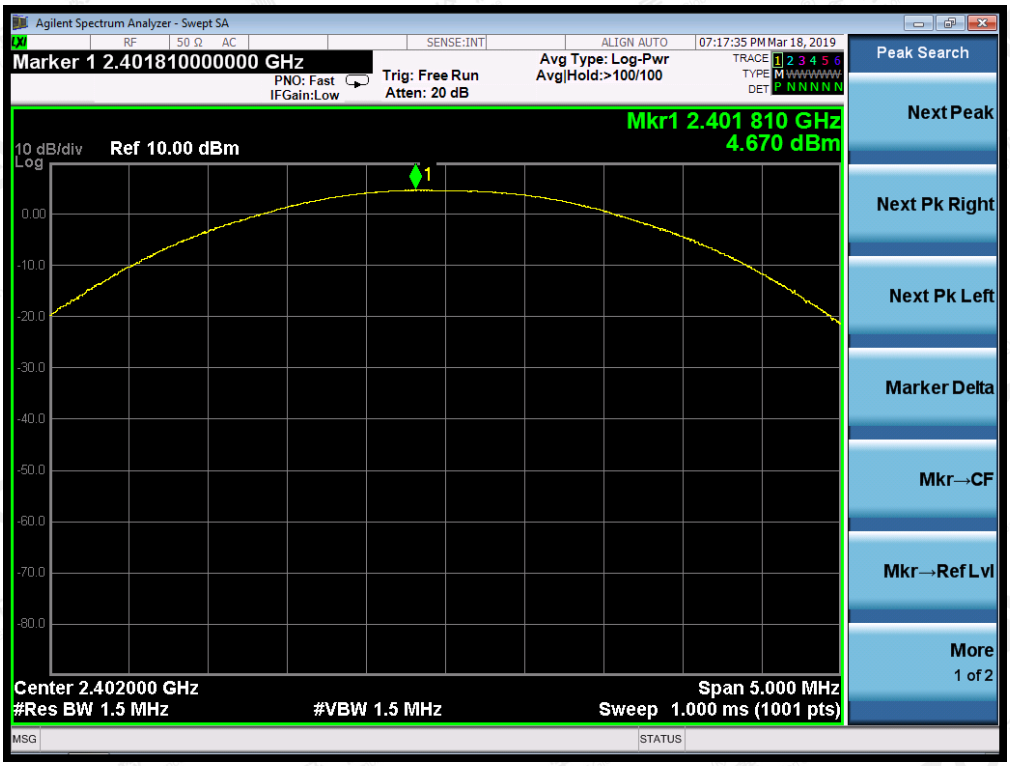


CH78



PEAK OUTPUT POWER MEASUREMENT RESULT FOR Ⅱ /4-DQPSK MODULATION			
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	4.670	21	Pass
2.441	5.017	21	Pass
2.480	4.900	21	Pass

CH00



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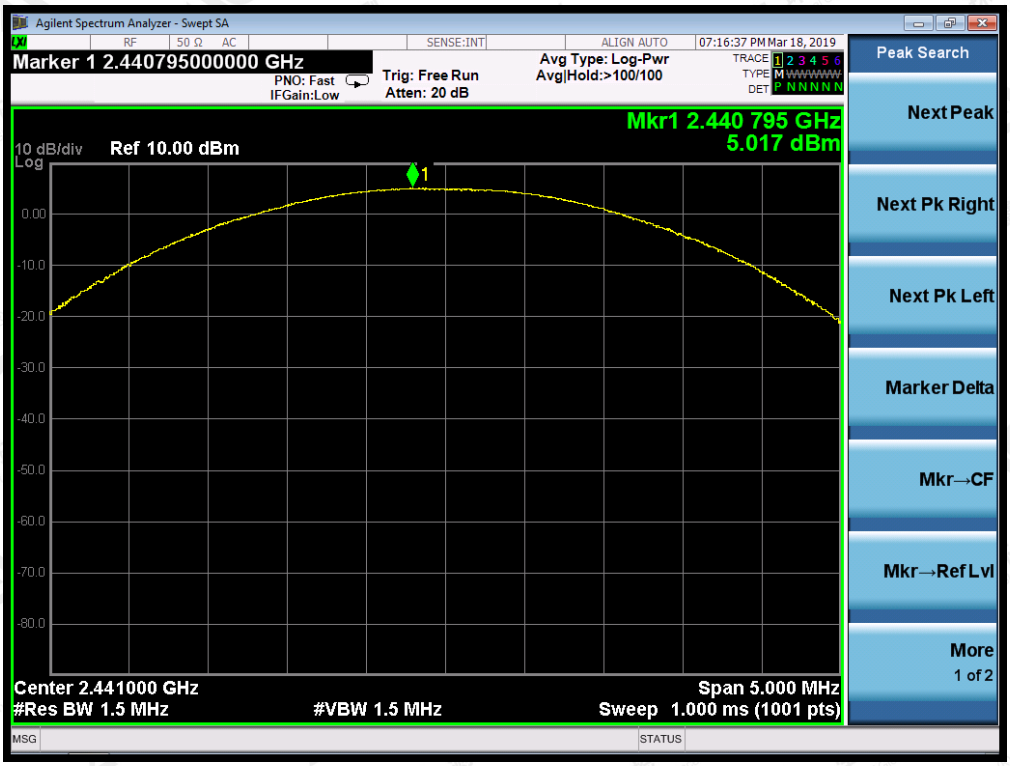
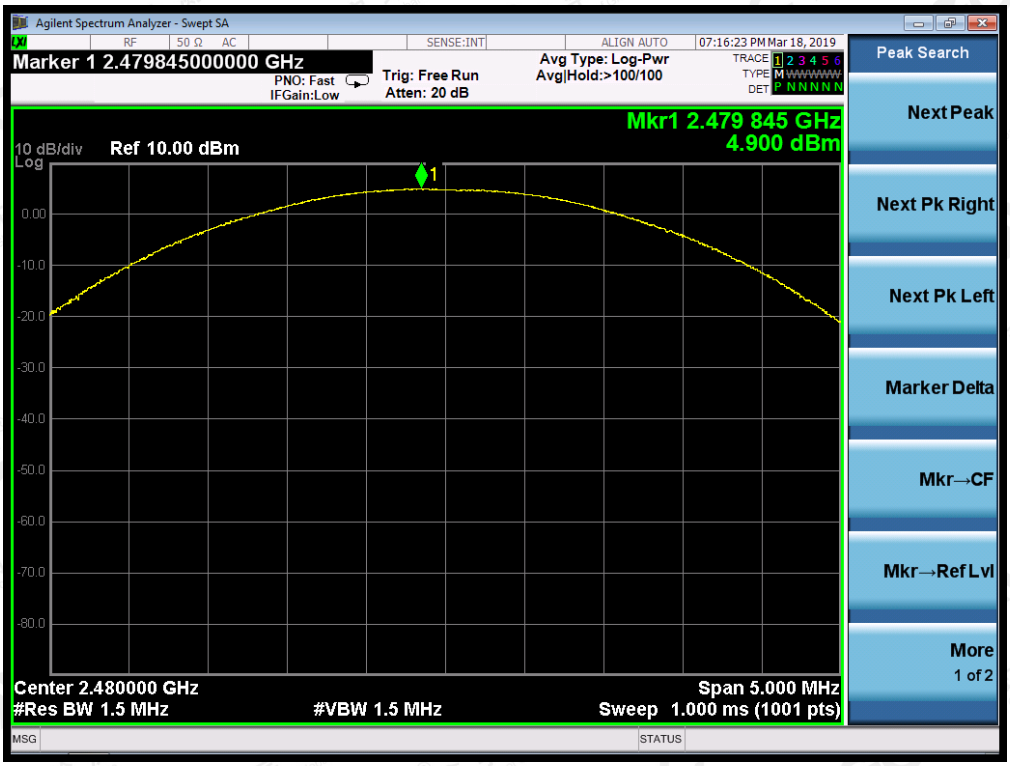


CH78

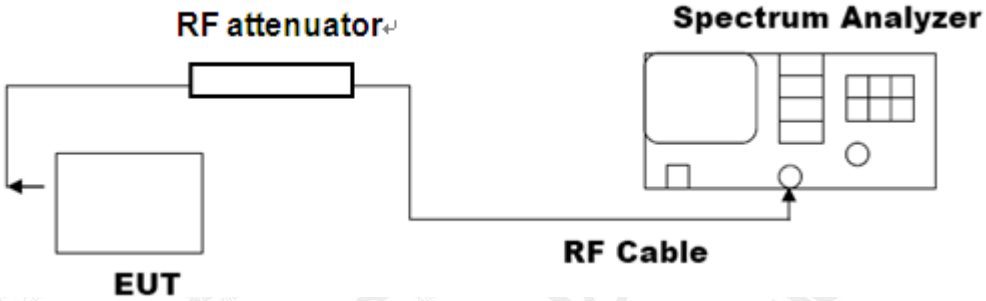


9. BANDWIDTH

9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel
   RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ 3RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

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



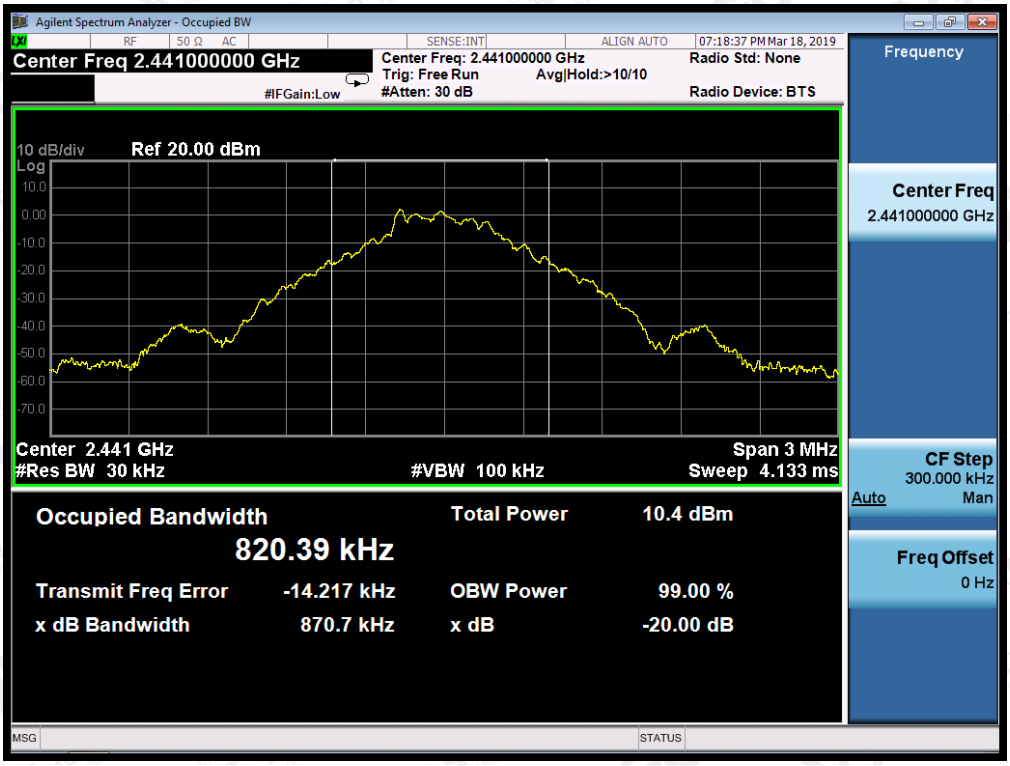
Note: The EUT has been used temporary antenna connector for testing.

9.3. LIMITS AND MEASUREMENT RESULTS

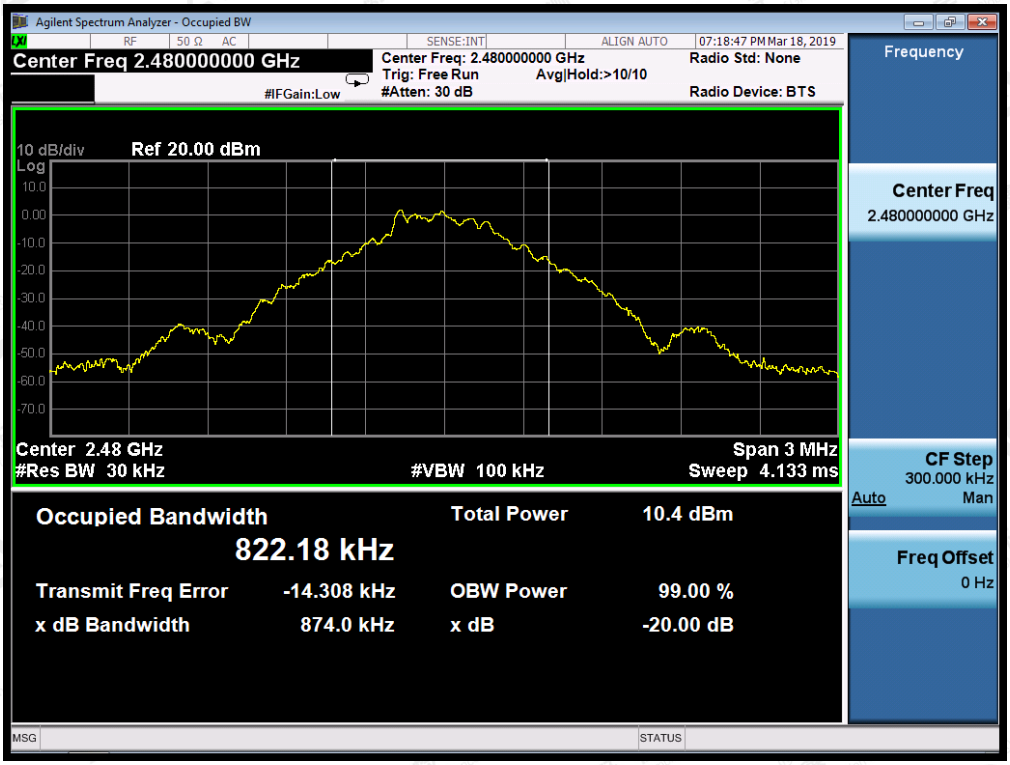
BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHz)	
N/A	Low Channel	0.819	0.871	PASS
	Middle Channel	0.820	0.871	PASS
	High Channel	0.822	0.874	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

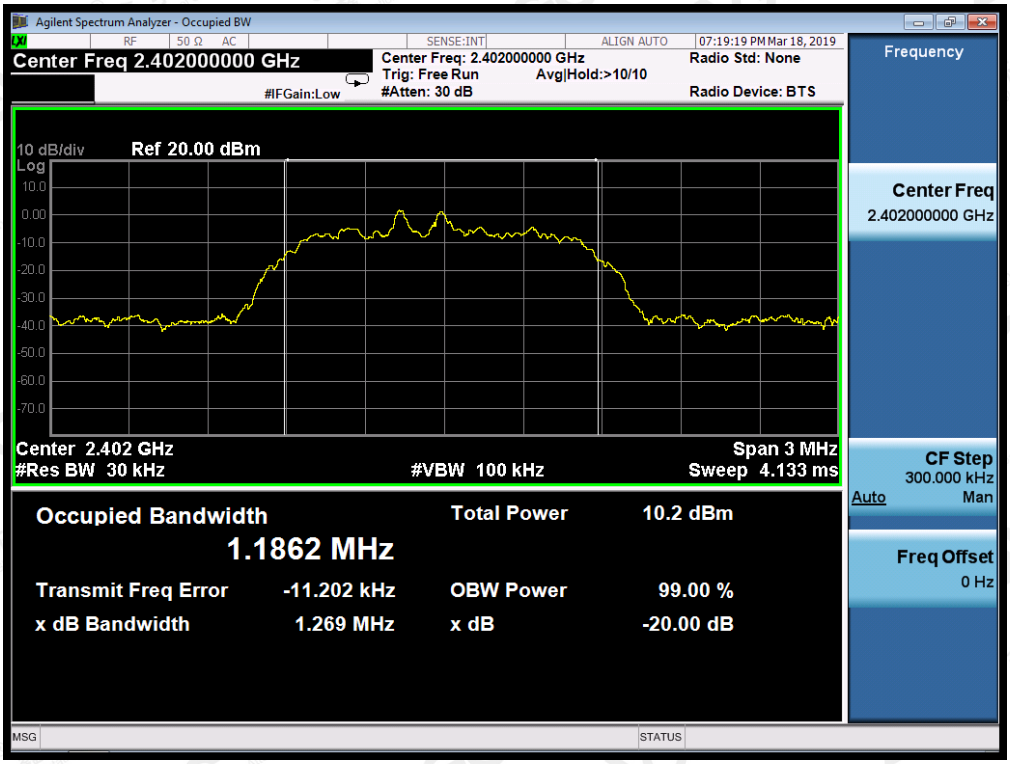


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

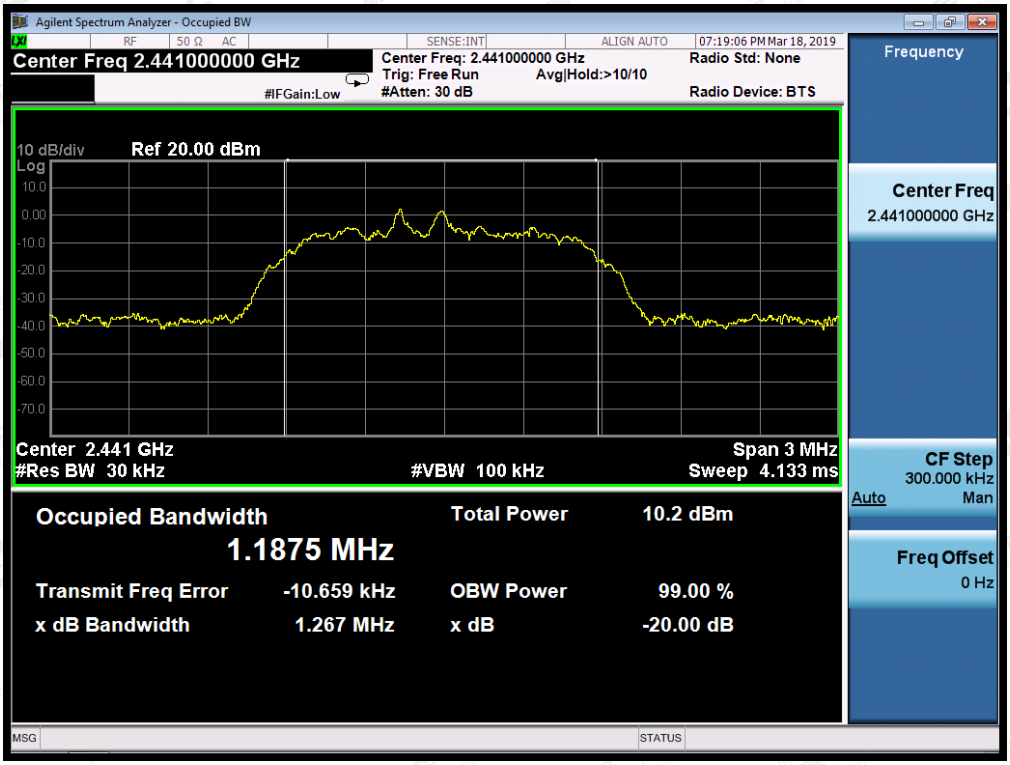


BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHz)	
N/A	Low Channel	1.186	1.269	PASS
	Middle Channel	1.188	1.267	PASS
	High Channel	1.192	1.270	PASS

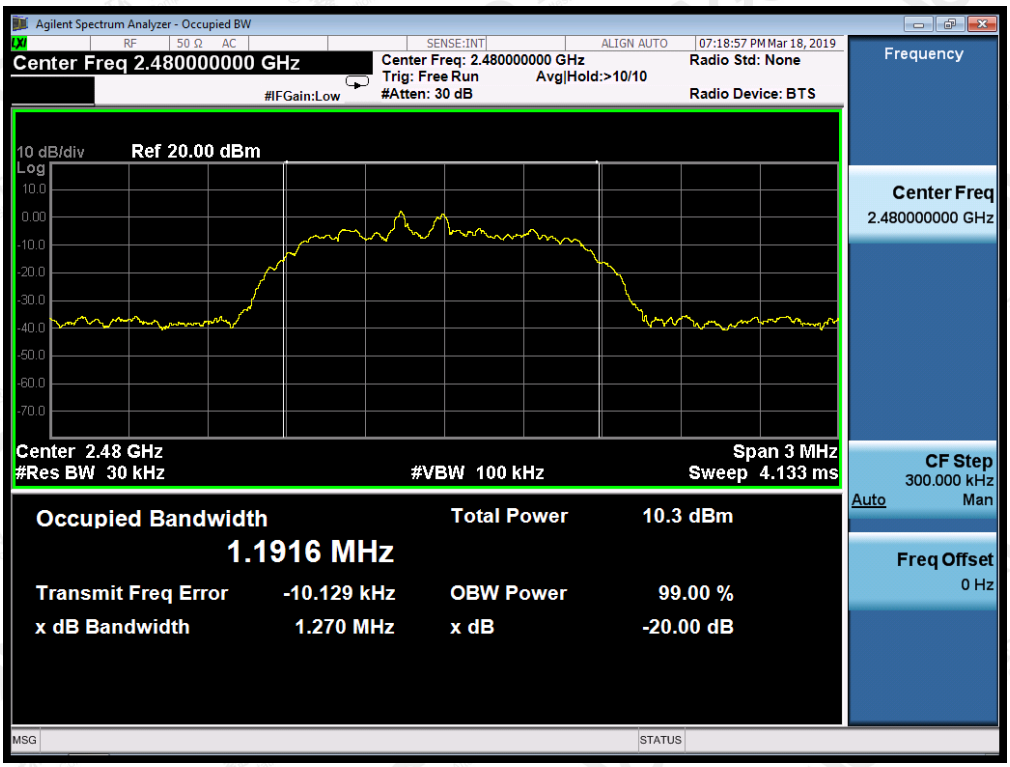
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

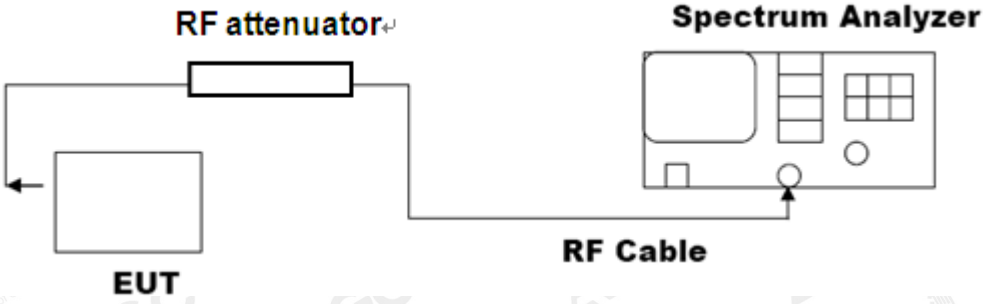


10. CONDUCTED SPURIOUS EMISSION

10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
   RBW = 100 kHz; VBW = 300kHz; Sweep = auto; Detector function = peak.
4. Set SPA Trace 1 Max hold, then View.

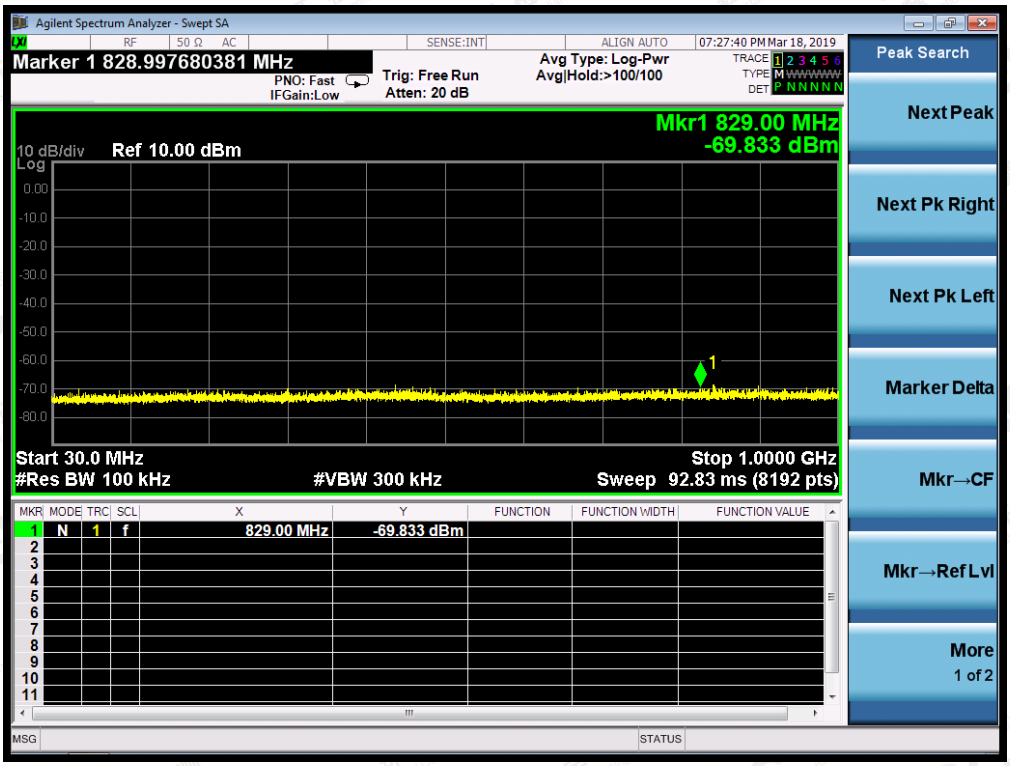
10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

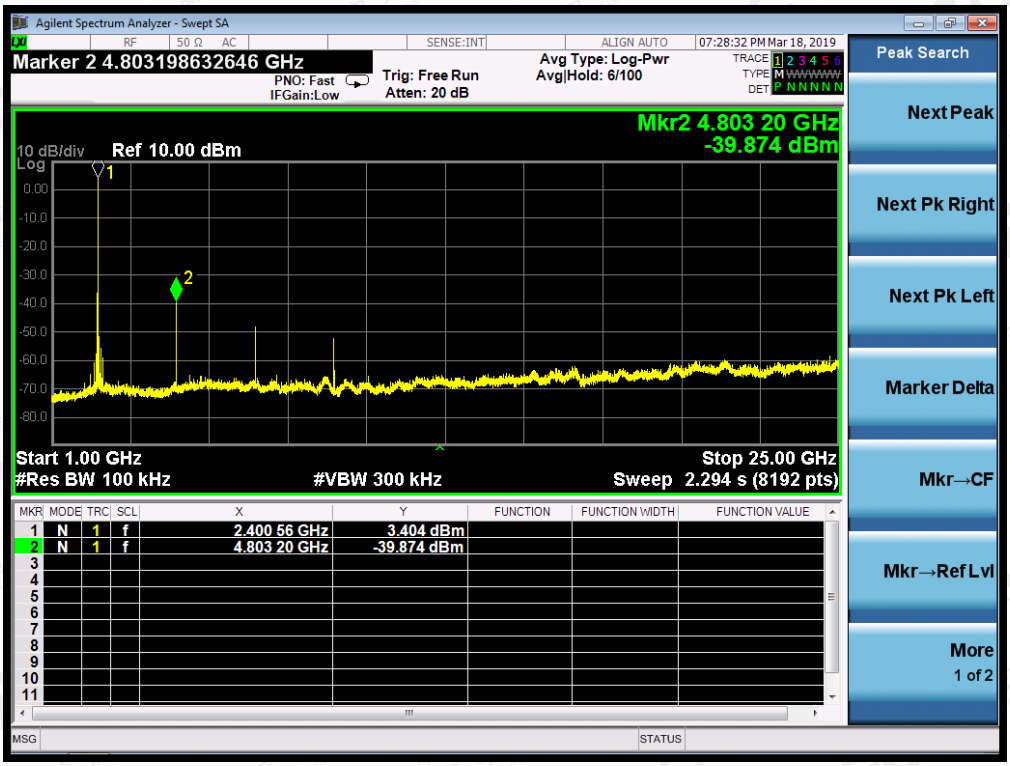


10.3. LIMITS AND MEASUREMENT RESULT

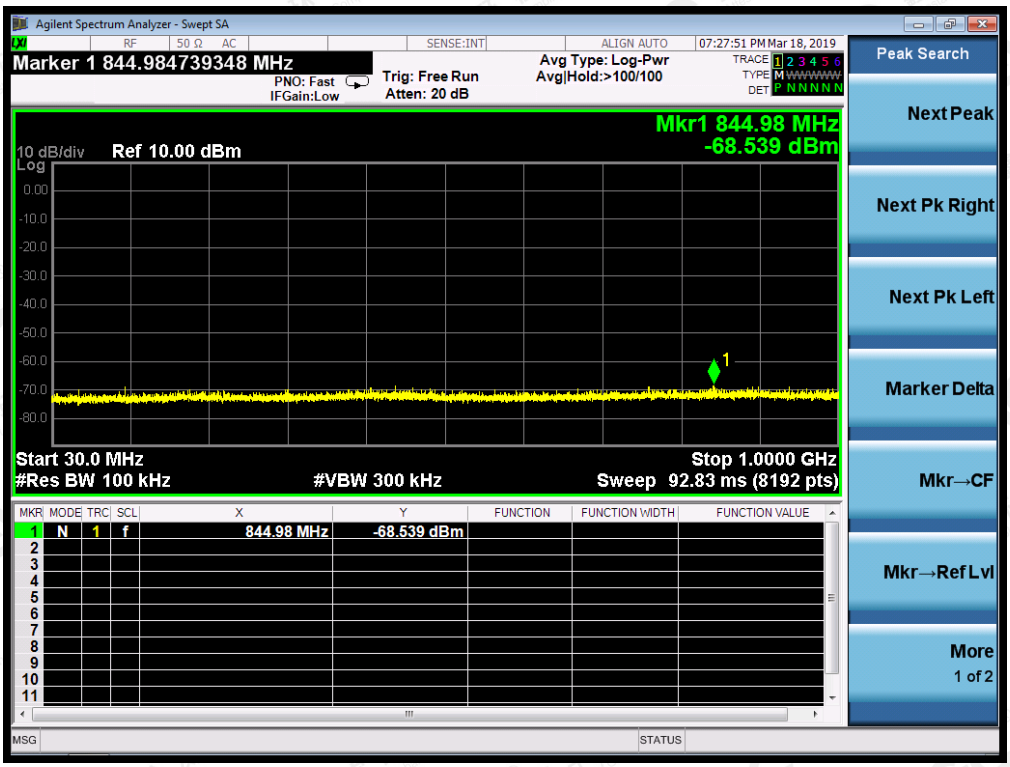
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	**Measurement Result**	
	Test Data	**Result**
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
	At least -20dBc than the limit Specified on the TOP Channel	PASS

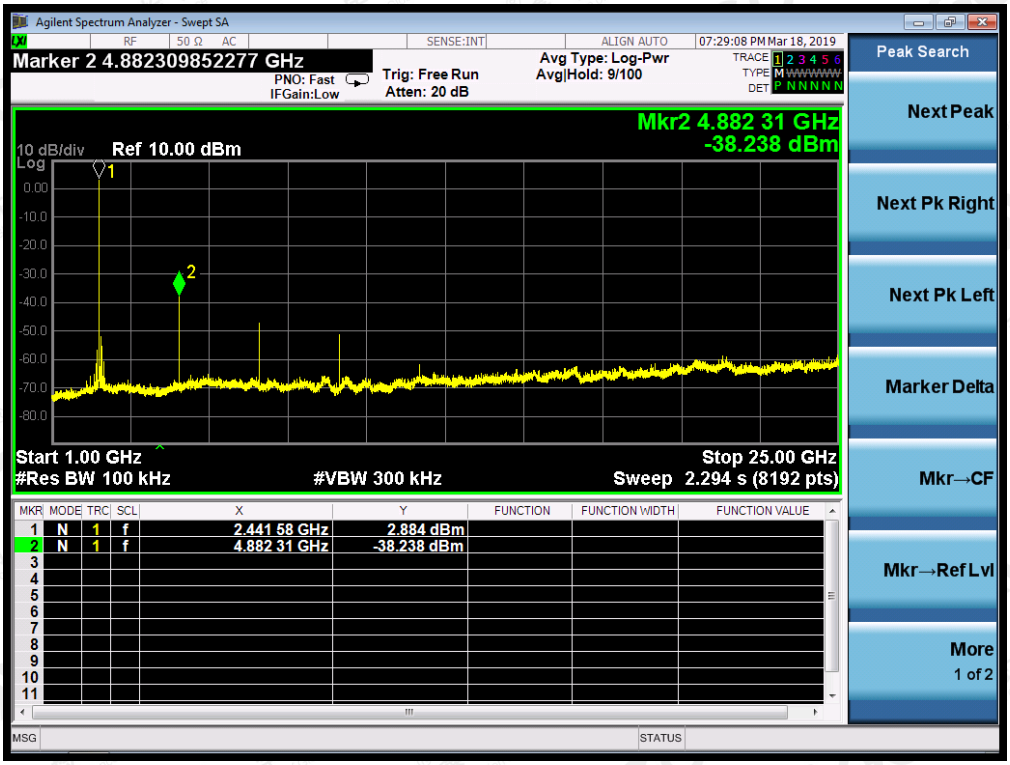
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF π /4-DQPSK MODULATION IN LOW CHANNEL



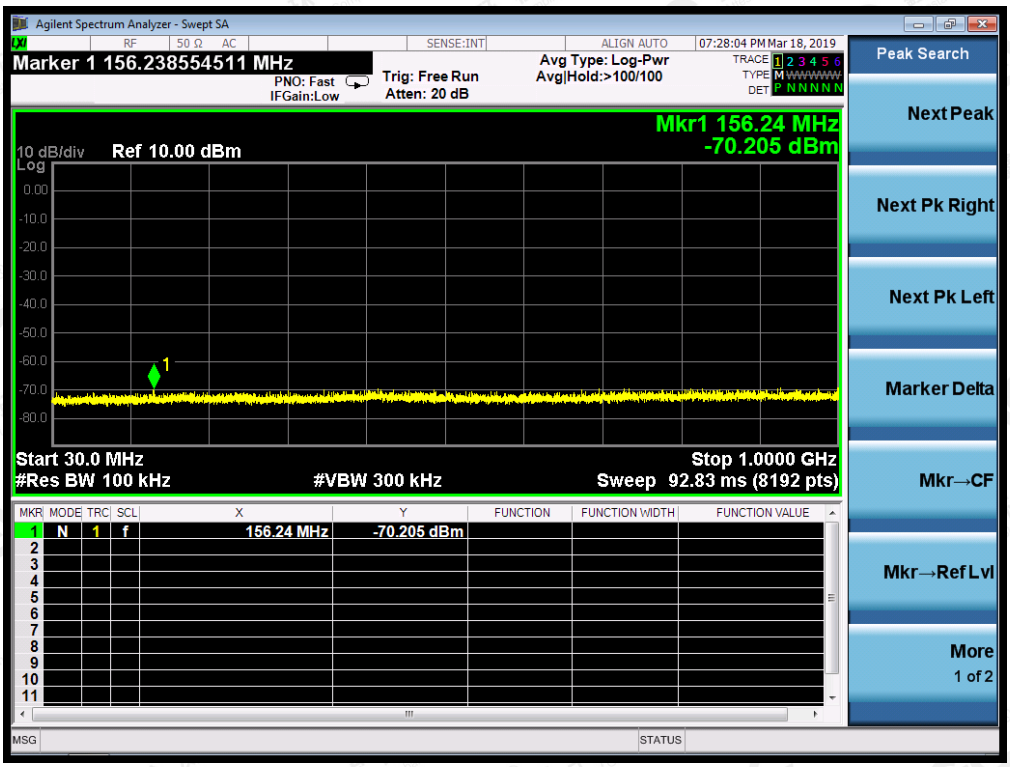


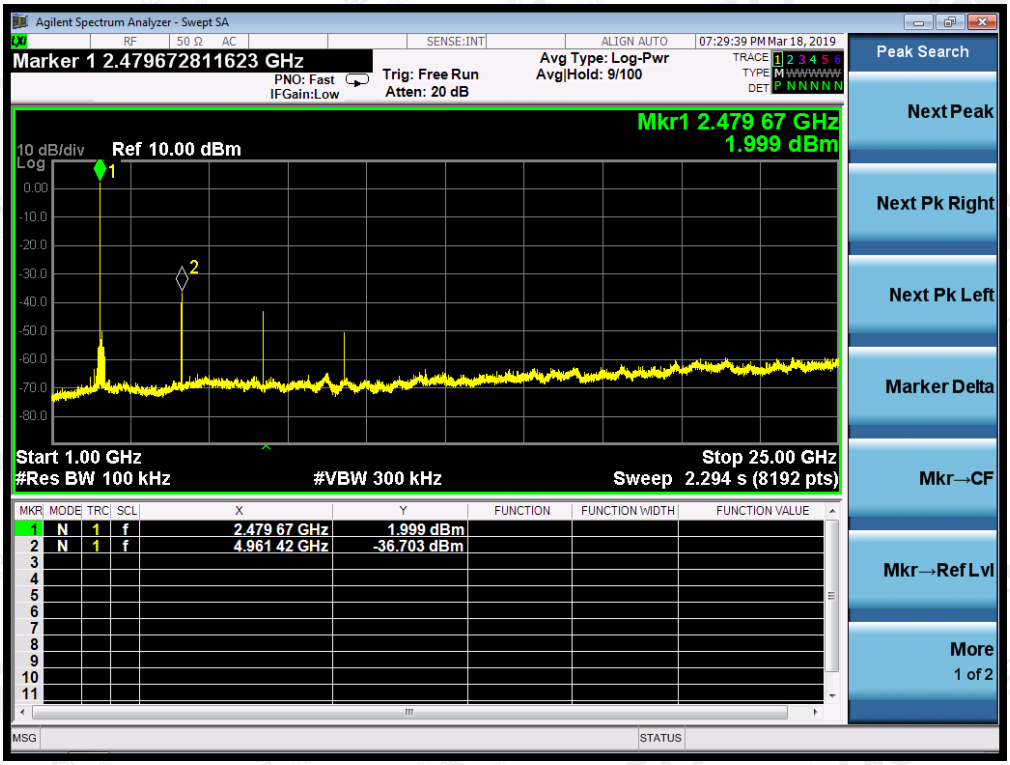
TEST PLOT OF OUT OF BAND EMISSIONS
OF π /4-DQPSK MODULATION IN MIDDLE CHANNEL





TEST PLOT OF OUT OF BAND EMISSIONS
OF π /4-DQPSK MODULATION IN HIGH CHANNEL





11. RADIATED EMISSION

11.1. TEST LIMIT

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μV)/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(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark: (1) Emission level dBμ 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.

11.2. MEASUREMENT PROCEDURE

1. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
2. The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
5. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)
6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak&AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

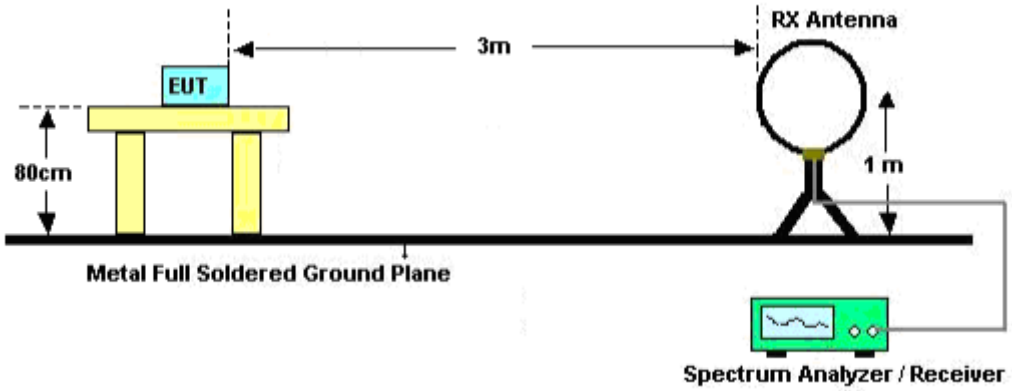
The following table is the setting of spectrum analyzer and receiver.

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 1MHz/ VBW 3MHz for Peak, RBW 1MHz/ VBW 10Hz for Average

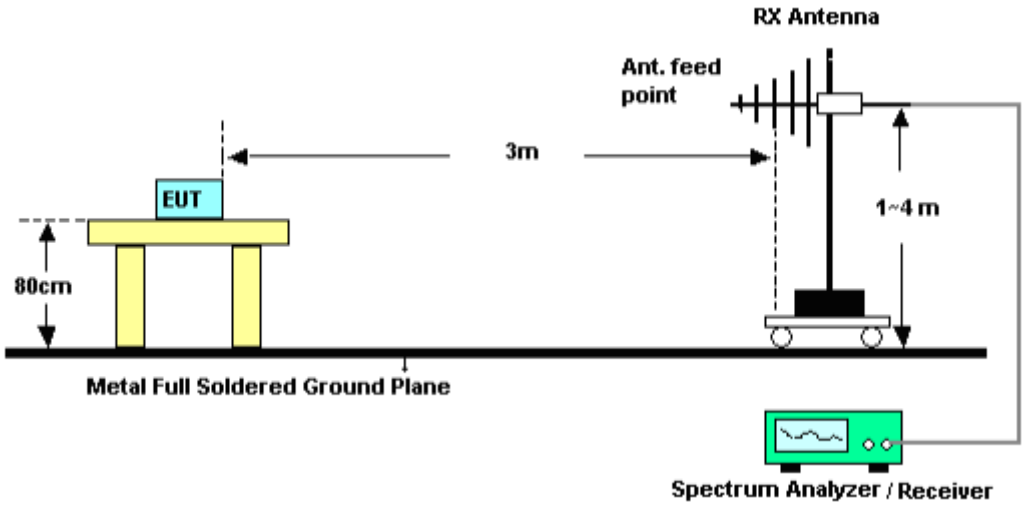
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

11.3. TEST SETUP

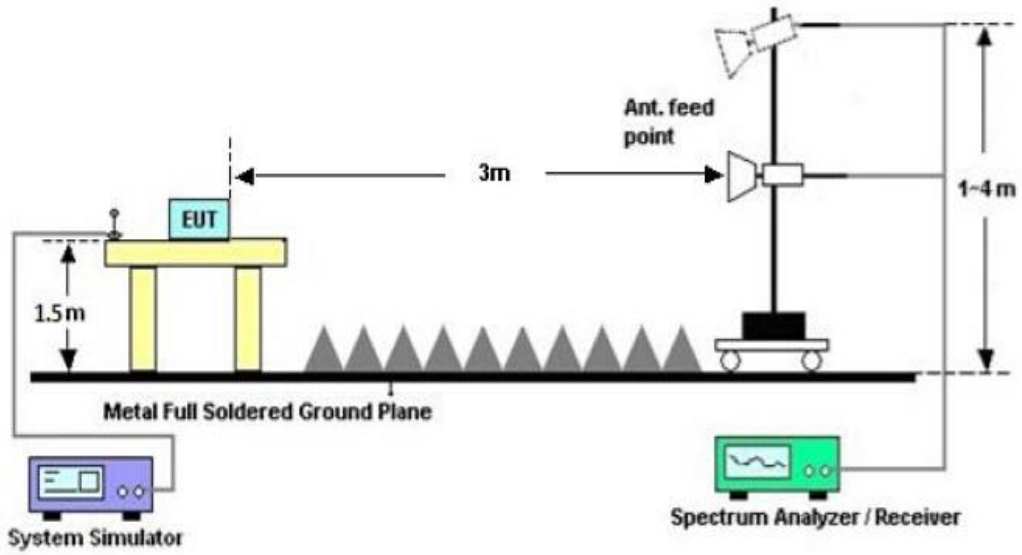
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



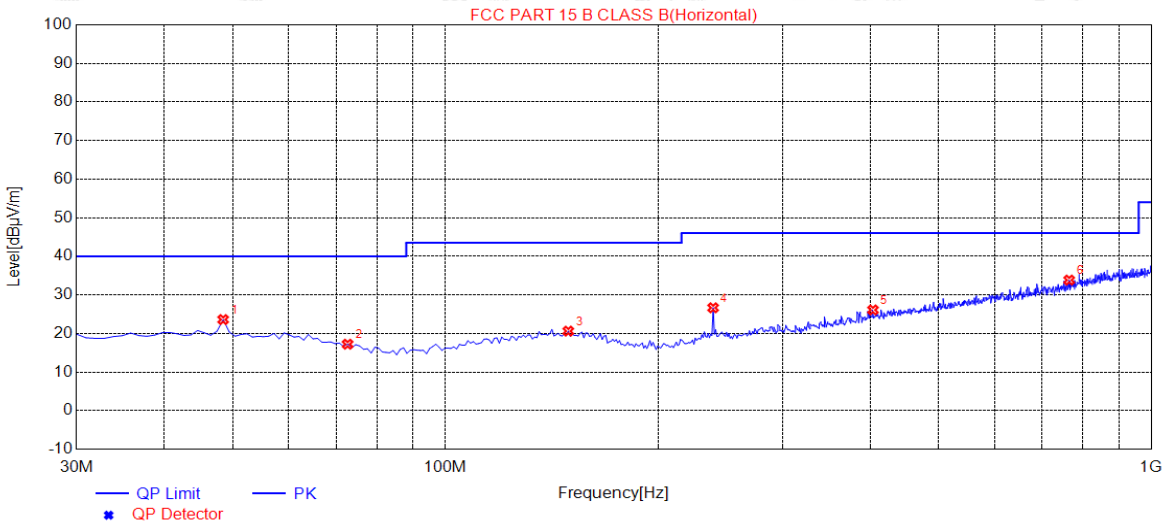
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHz

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

RADIATED EMISSION BR/EDR BELOW 1GHz

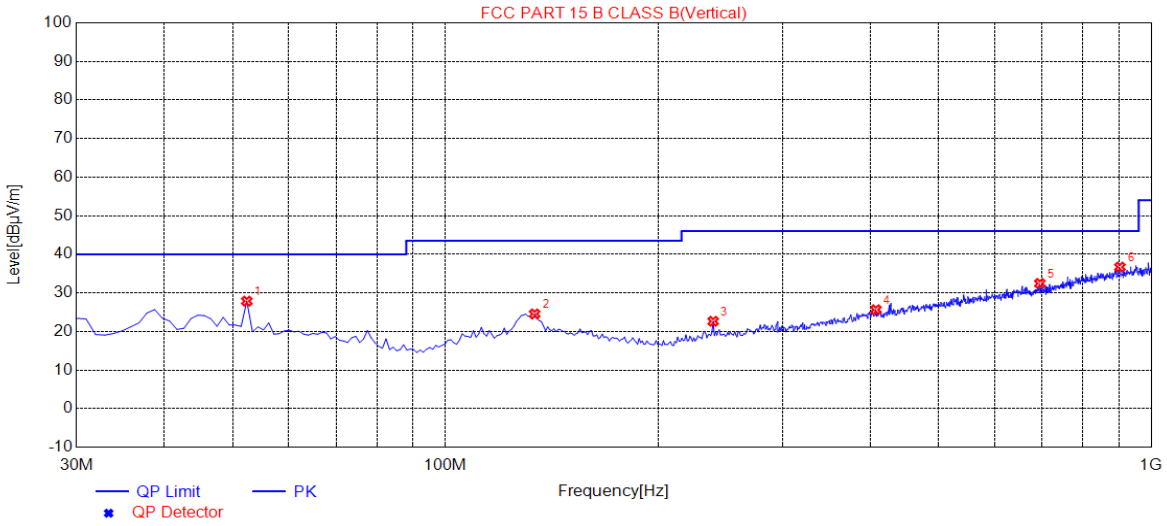
RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL



Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.4300	23.60	14.71	40.00	16.40	100	310	Horizontal
2	72.6800	17.21	11.67	40.00	22.79	200	10	Horizontal
3	149.310	20.60	14.88	43.50	22.90	100	350	Horizontal
4	239.520	26.65	14.81	46.00	19.35	200	310	Horizontal
5	403.450	26.09	19.90	46.00	19.91	150	80	Horizontal
6	765.260	33.83	27.58	46.00	12.17	100	130	Horizontal

RESULT: PASS

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERTICAL



Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	52.3100	27.86	14.49	40.00	12.14	100	210	Vertical
2	133.790	24.54	14.42	43.50	18.96	100	150	Vertical
3	239.520	22.64	14.81	46.00	23.36	100	10	Vertical
4	407.330	25.63	19.98	46.00	20.37	100	10	Vertical
5	695.420	32.45	25.90	46.00	13.55	200	230	Vertical
6	903.000	36.69	30.16	46.00	9.31	150	280	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

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

3. All test modes had been pre-tested. The low channel TX with π/4-DQPSK modulation is the worst case and only those data recorded in the report.

RADIATED EMISSION ABOVE 1GHZ FOR BR/EDR

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 4	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.026	50.55	7.12	57.67	74	-16.33	peak
4804.026	44.81	7.12	51.93	54	-2.07	AVG
7206.039	46.27	9.84	56.11	74	-17.89	peak
7206.039	40.32	9.84	50.16	54	-3.84	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 4	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.026	49.36	7.12	56.48	74	-17.52	peak
4804.026	42.3	7.12	49.42	54	-4.58	AVG
7206.039	43	9.84	52.84	74	-21.16	peak
7206.039	37.02	9.84	46.86	54	-7.14	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 5	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.032	50.15	7.12	57.27	74	-16.73	peak
4882.032	44.36	7.12	51.48	54	-2.52	AVG
7323.048	46.6	9.84	56.44	74	-17.56	peak
7323.048	40.71	9.84	50.55	54	-3.45	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 5	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.032	49.02	7.12	56.14	74	-17.86	peak
4882.032	42.72	7.12	49.84	54	-4.16	AVG
7323.048	42.63	9.84	52.47	74	-21.53	peak
7323.048	36.48	9.84	46.32	54	-7.68	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 6	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.042	49.89	7.12	57.01	74	-16.99	peak
4960.042	44.12	7.12	51.24	54	-2.76	AVG
7440.063	45.92	9.84	55.76	74	-18.24	peak
7440.063	40.05	9.84	49.89	54	-4.11	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 6	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.042	48.88	7.12	56	74	-18	peak
4960.042	42.56	7.12	49.68	54	-4.32	AVG
7440.063	41.74	9.84	51.58	74	-22.42	peak
7440.063	36.58	9.84	46.42	54	-7.58	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

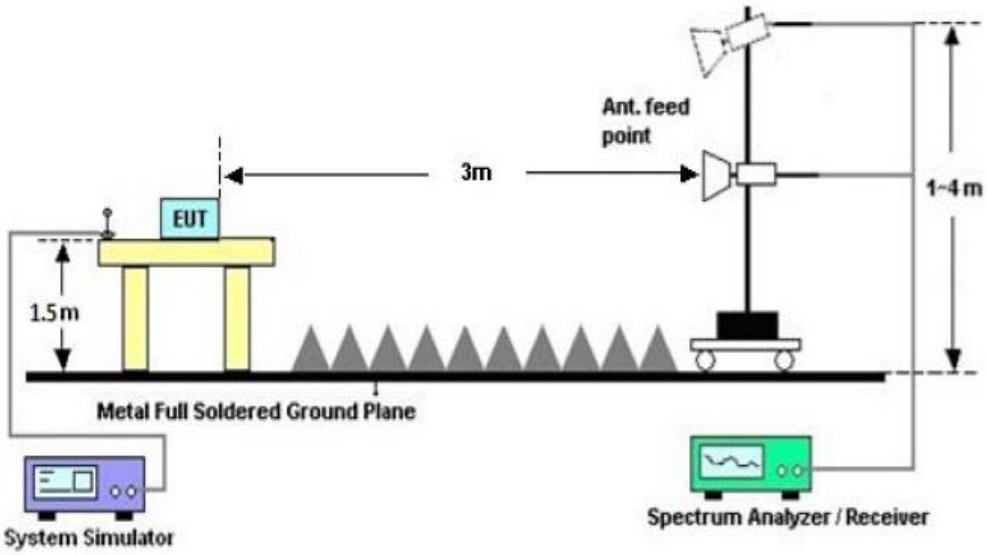
Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.
The π /4-DQPSK modulation was the worst case and only the data of worst recorded in this report.

12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency=Operation Frequency,
   For unrestricted band: RBW=100kHz, VBW=300kHz
   For restricted band: RBW=1MHz, VBW=3*RBW
   Center frequency =Operation frequency
3. The band edges was measured and recorded.

12.2. TEST SETUP

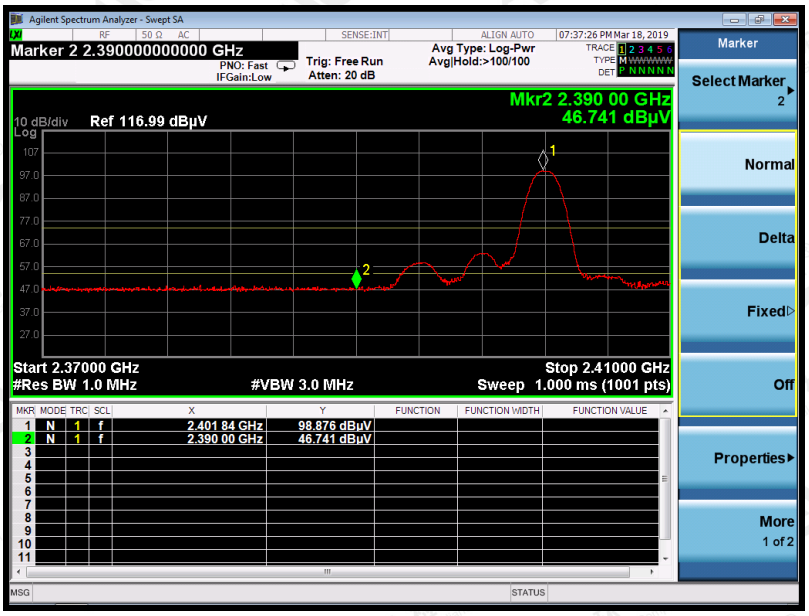


12.3. TEST RESULT

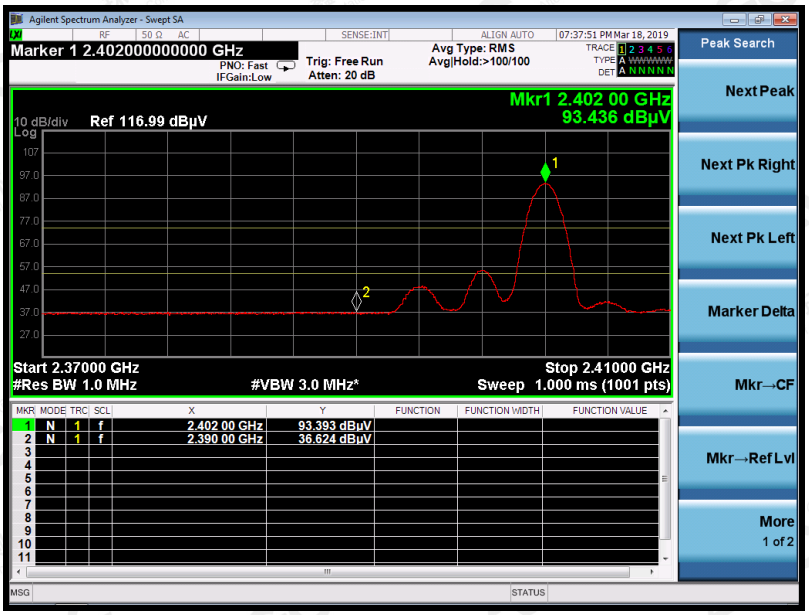
FOR BR/EDR

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 4	Polarization：	Horizontal

PK Value



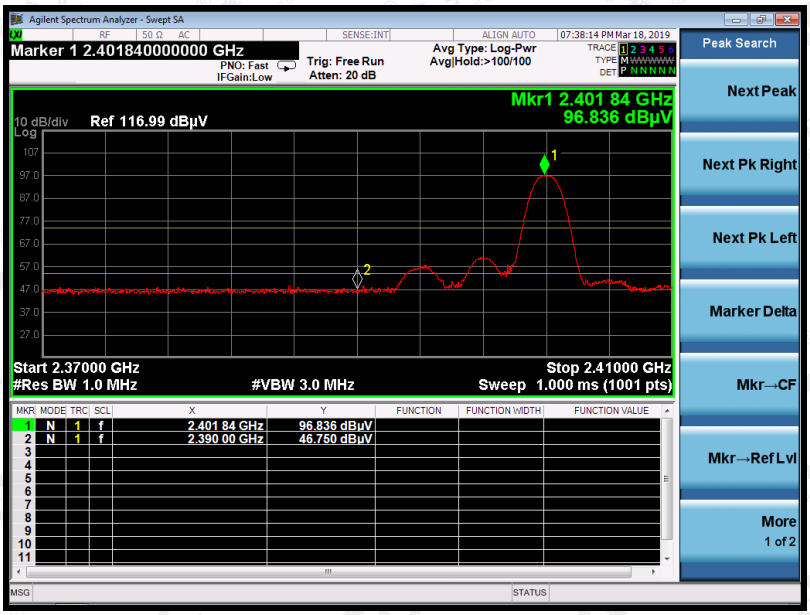
AV Value



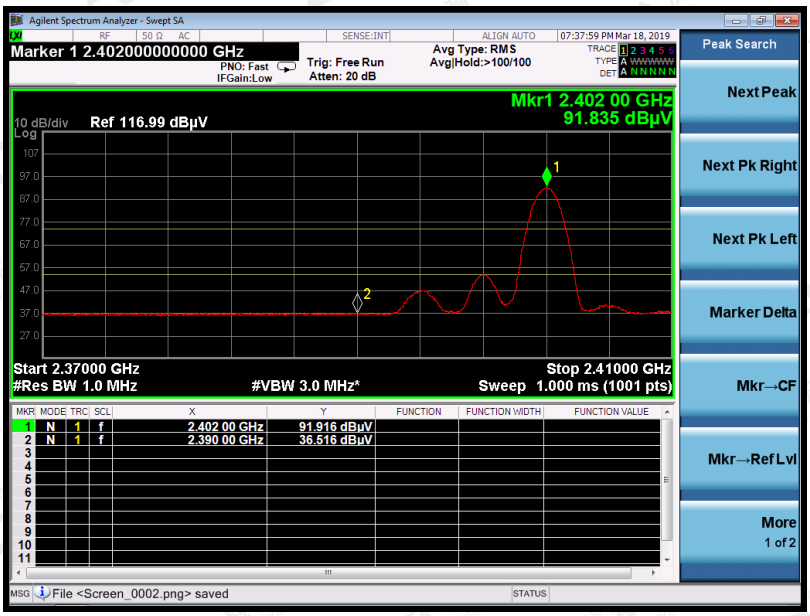
RESULT: PASS

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 4	Polarization：	Vertical

PK Value



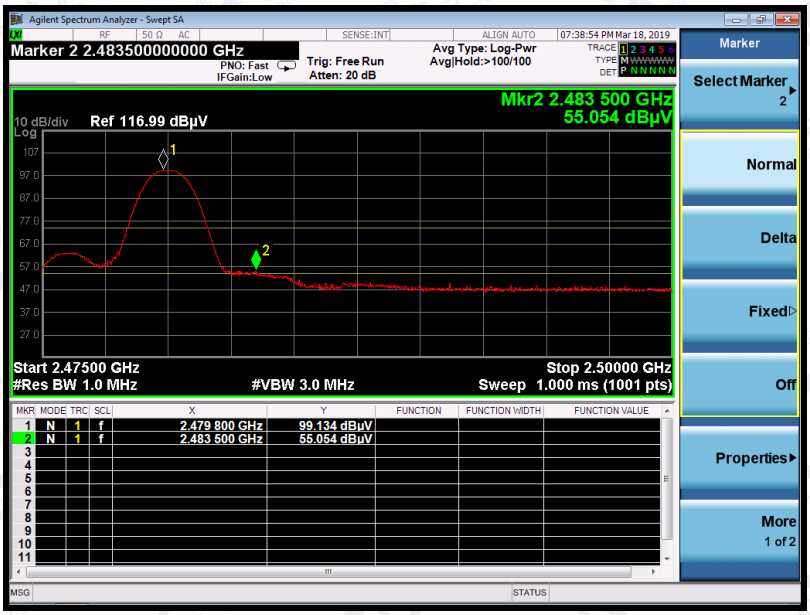
AV Value



RESULT: PASS

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 6	Polarization：	Horizontal

PK Value

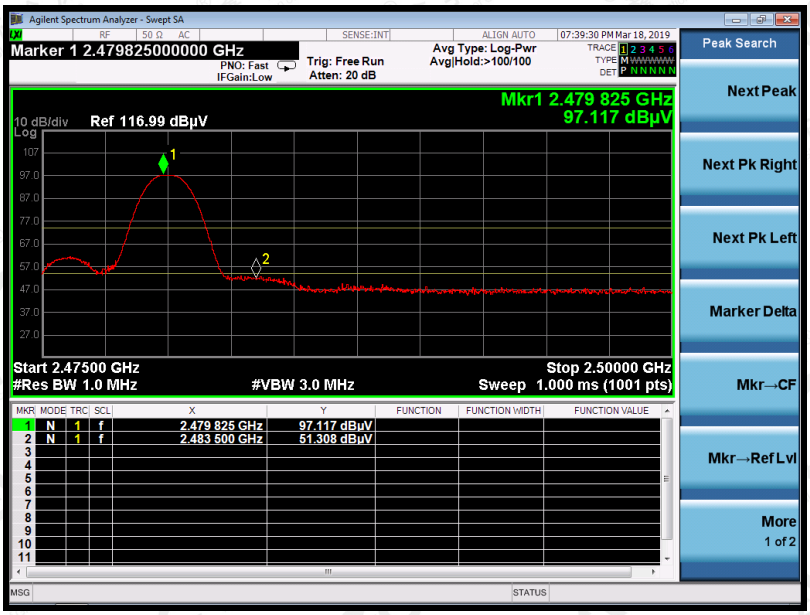


AV Value

RESULT: PASS

EUT：	PORTABLE KARAOKE PLAYER	Model Name. ：	iSM398BT
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5.6V
Test Mode ：	Mode 6	Polarization：	Vertical

PK Value



AV Value

RESULT: PASS

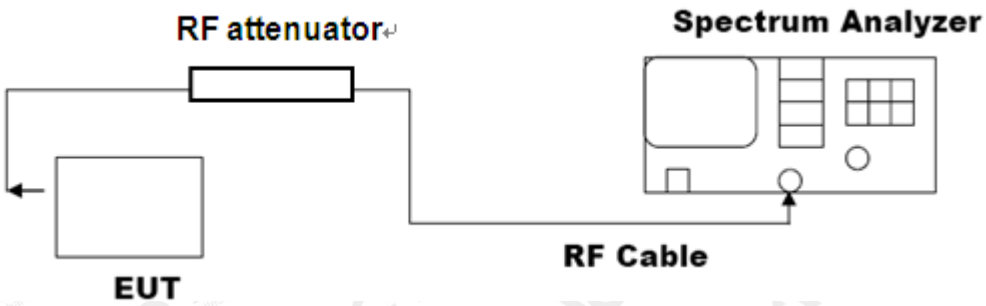
Note: The π /4-DQPSK modulation was the worst case and only the data of worst recorded in this report.

13. NUMBER OF HOPPING FREQUENCY

13.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=3RBW.

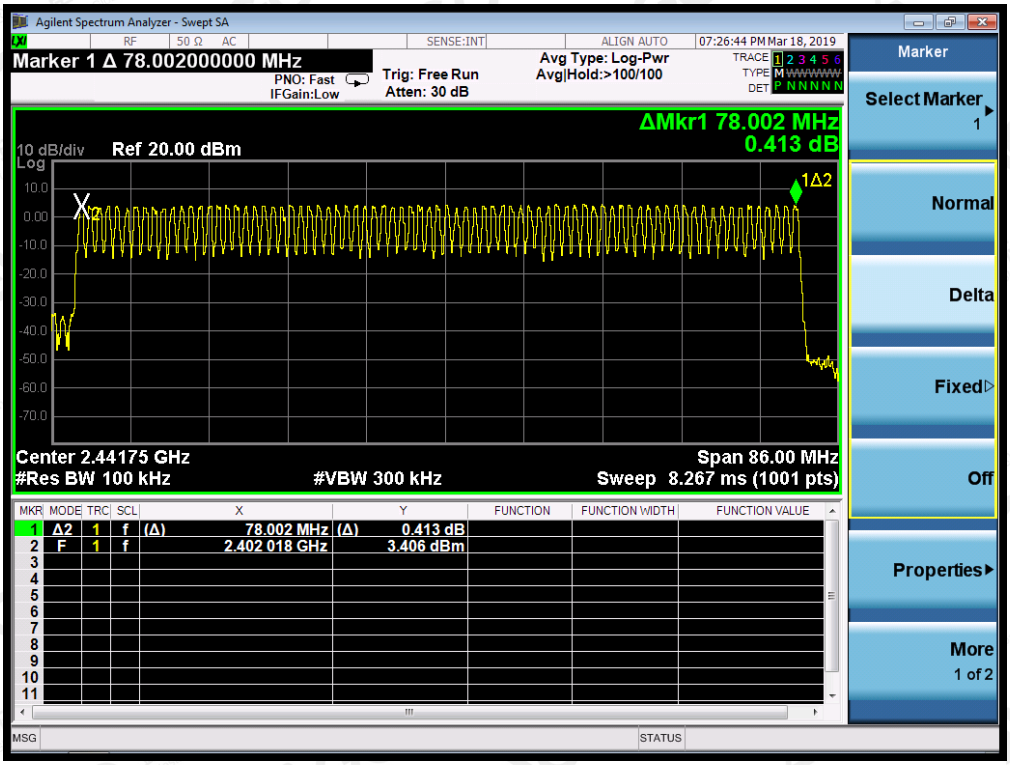
13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



13.3. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=15	79	PASS

TEST PLOT FOR NO. OF TOTAL CHANNELS



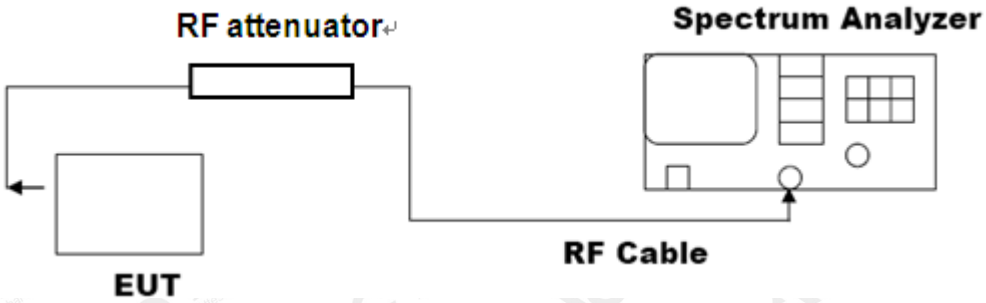
Note: The π /4-DQPSK modulation was the worst case and only the data of worst recorded in this report.

14. TIME OF OCCUPANCY (DWELL TIME)

14.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set Span = zero span, centered on a hoping channel
4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz

14.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



14.3. LIMITS AND MEASUREMENT RESULT

The Worst Case (2Mbps)

Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.867	31.6	305.81	400
Middle	2.883	31.6	307.52	400
High	2.883	31.6	307.52	400

Low Channel Time

2.867*(1600/6)/79*31.6=305.81ms

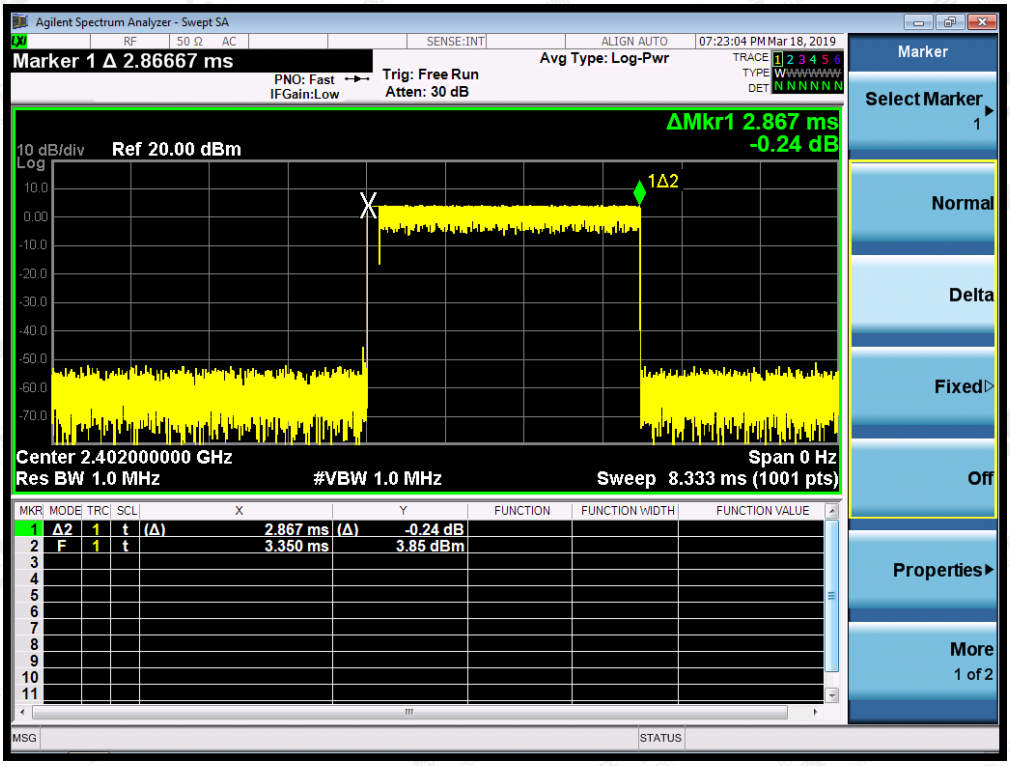
Middle Channel Time

2.883*(1600/6)/79*31.6=307.52ms

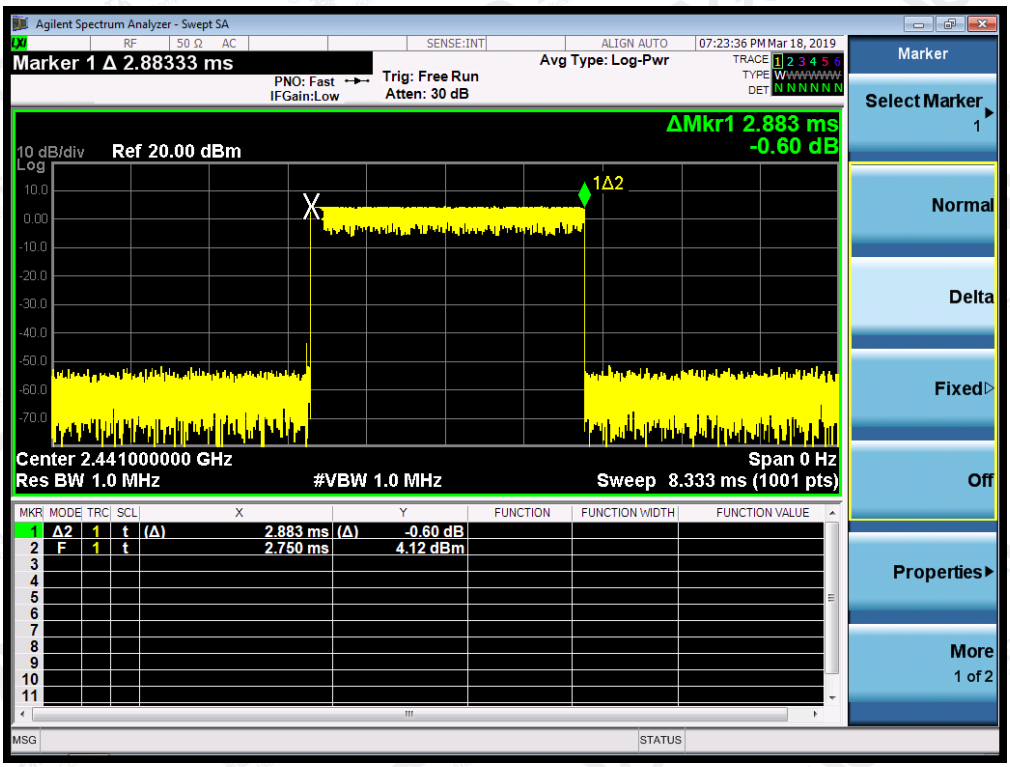
High Channel Time

2.883*(1600/6)/79*31.6=307.52ms

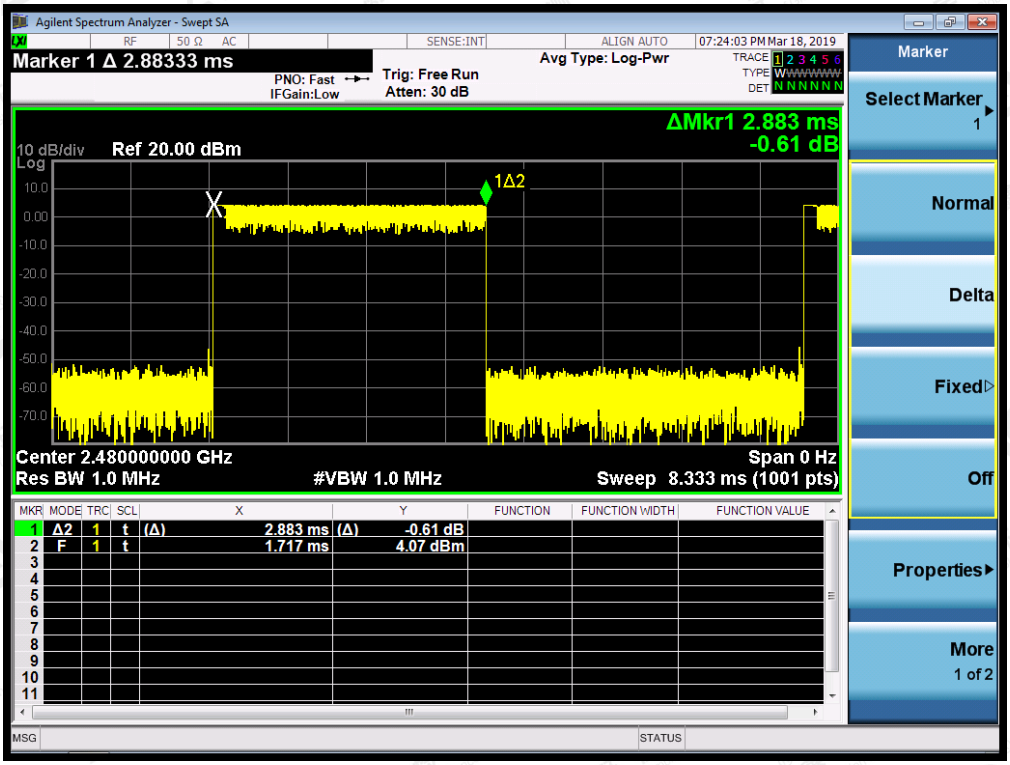
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL

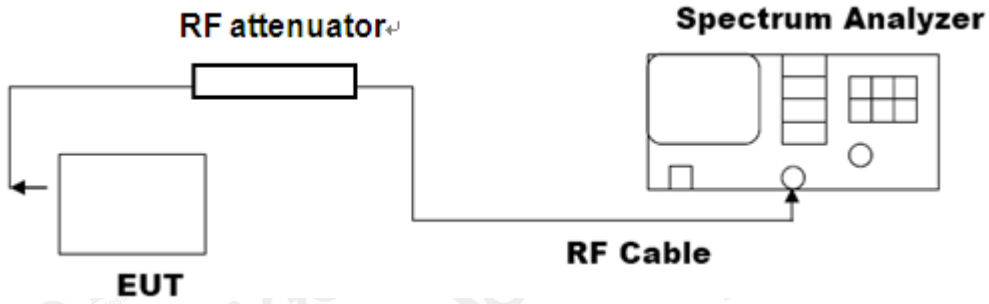


15. FREQUENCY SEPARATION

15.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

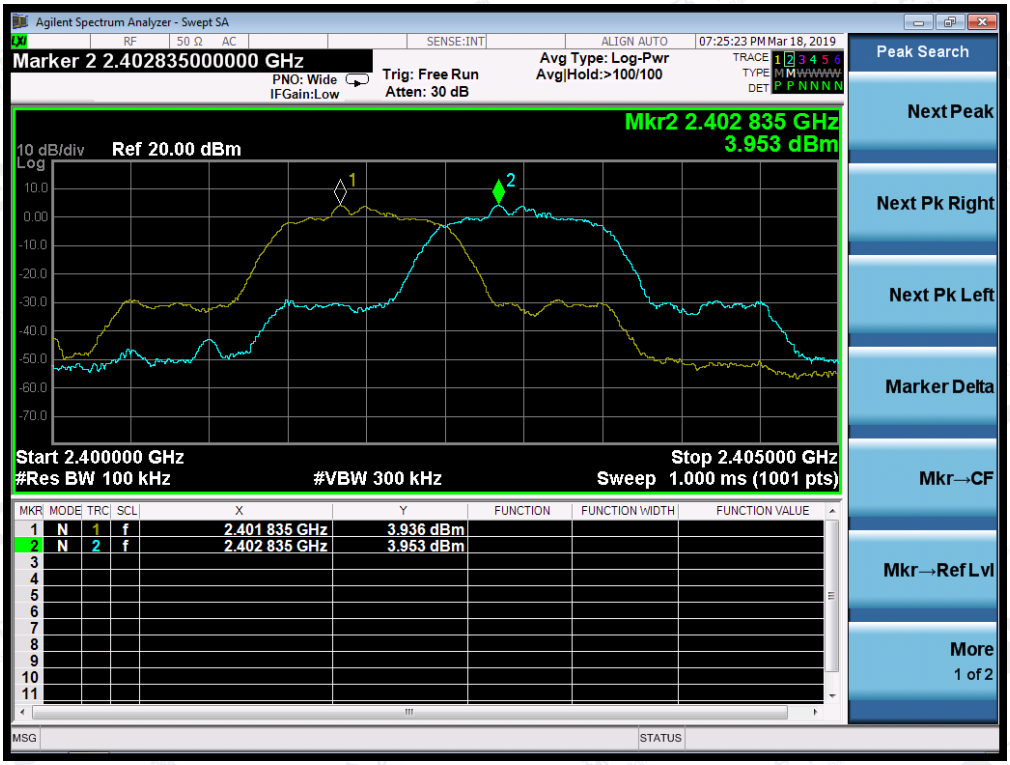
15.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



15.3. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	
CH00-CH01	1000	>=25 KHz or 2/3 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION（2Mbps）



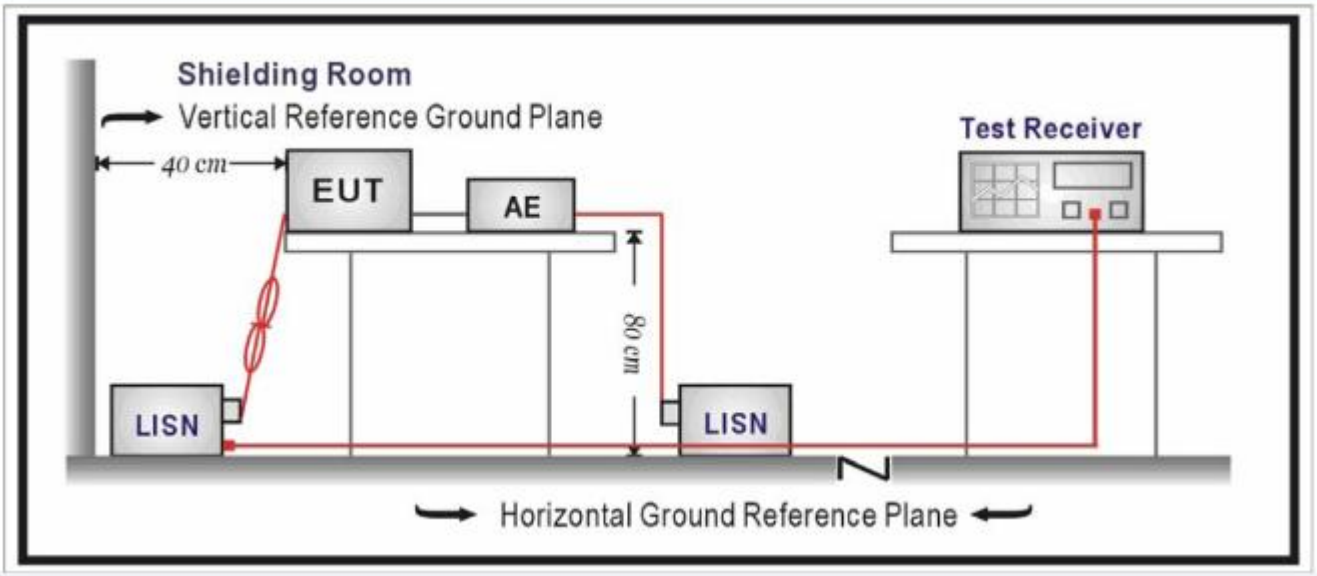
16. LINE CONDUCTED EMISSION TEST

16.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

16.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



16.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received voltage by adapter which received 120V/60Hzpower by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

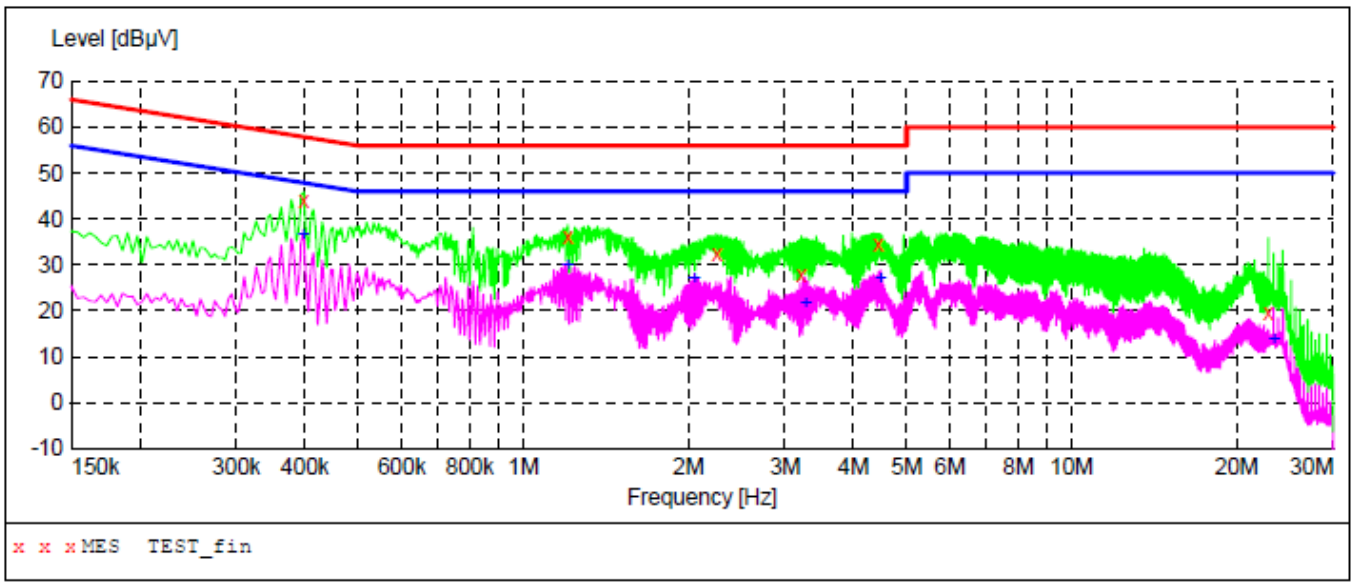
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

16.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

16.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "TEST_fin"

3/19/2019 5:01PM

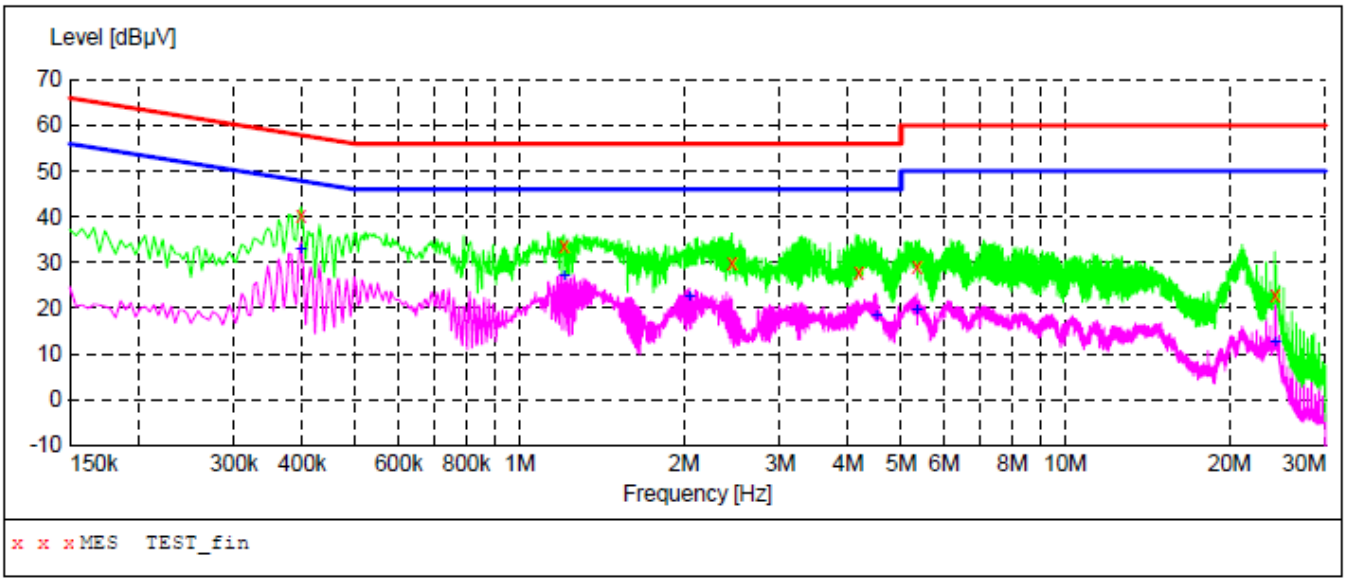
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.398000	43.90	10.3	58	14.0	QP	L1	FLO
1.206000	36.20	10.4	56	19.8	QP	L1	FLO
2.258000	32.50	10.4	56	23.5	QP	L1	FLO
3.214000	28.00	10.4	56	28.0	QP	L1	FLO
4.430000	34.40	10.4	56	21.6	QP	L1	FLO
22.858000	19.40	11.1	60	40.6	QP	L1	FLO

MEASUREMENT RESULT: "TEST_fin2"

3/19/2019 5:01PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.398000	36.50	10.3	48	11.4	AV	L1	FLO
1.206000	29.90	10.4	46	16.1	AV	L1	FLO
2.050000	27.00	10.4	46	19.0	AV	L1	FLO
3.270000	21.50	10.4	46	24.5	AV	L1	FLO
4.482000	26.90	10.4	46	19.1	AV	L1	FLO
23.342000	13.90	11.1	50	36.1	AV	L1	FLO

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "TEST_fin"

3/19/2019 4:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.398000	40.10	10.3	58	17.8	QP	N	FLO
1.206000	33.60	10.4	56	22.4	QP	N	FLO
2.450000	30.10	10.4	56	25.9	QP	N	FLO
4.186000	28.00	10.4	56	28.0	QP	N	FLO
5.346000	29.20	10.4	60	30.8	QP	N	FLO
24.226000	22.70	11.1	60	37.3	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

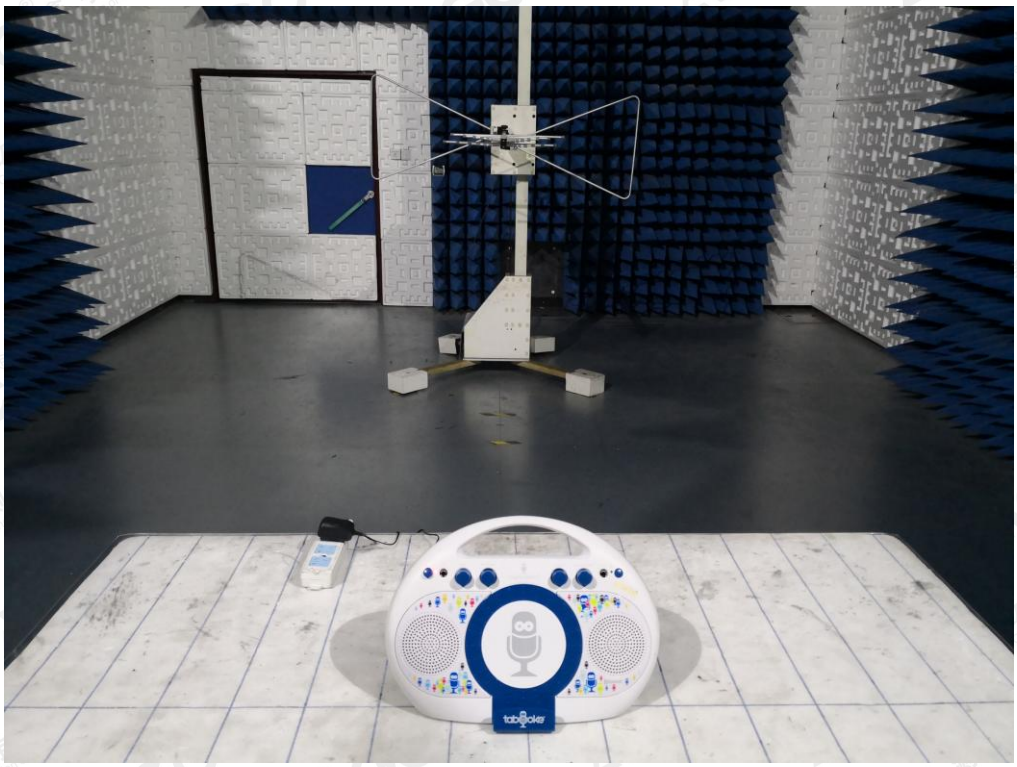
3/19/2019 4:52PM

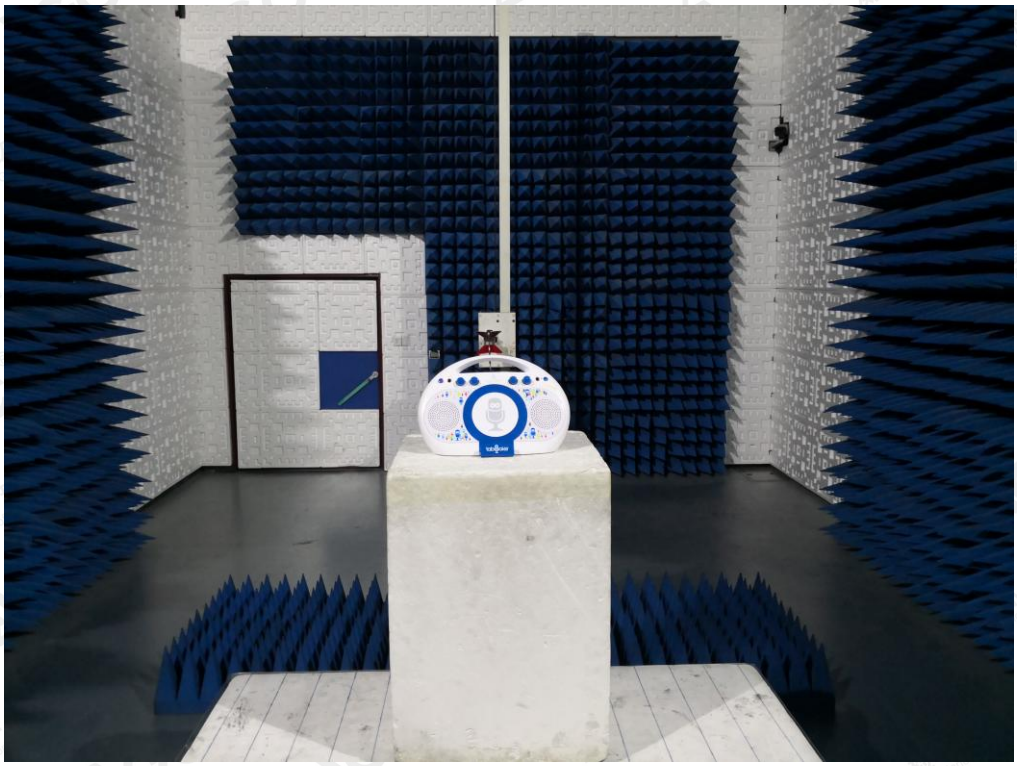
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.398000	32.60	10.3	48	15.3	AV	N	FLO
1.206000	27.20	10.4	46	18.8	AV	N	FLO
2.046000	22.50	10.4	46	23.5	AV	N	FLO
4.502000	18.40	10.4	46	27.6	AV	N	FLO
5.346000	19.70	10.4	50	30.3	AV	N	FLO
24.226000	12.70	11.1	50	37.3	AV	N	FLO

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP



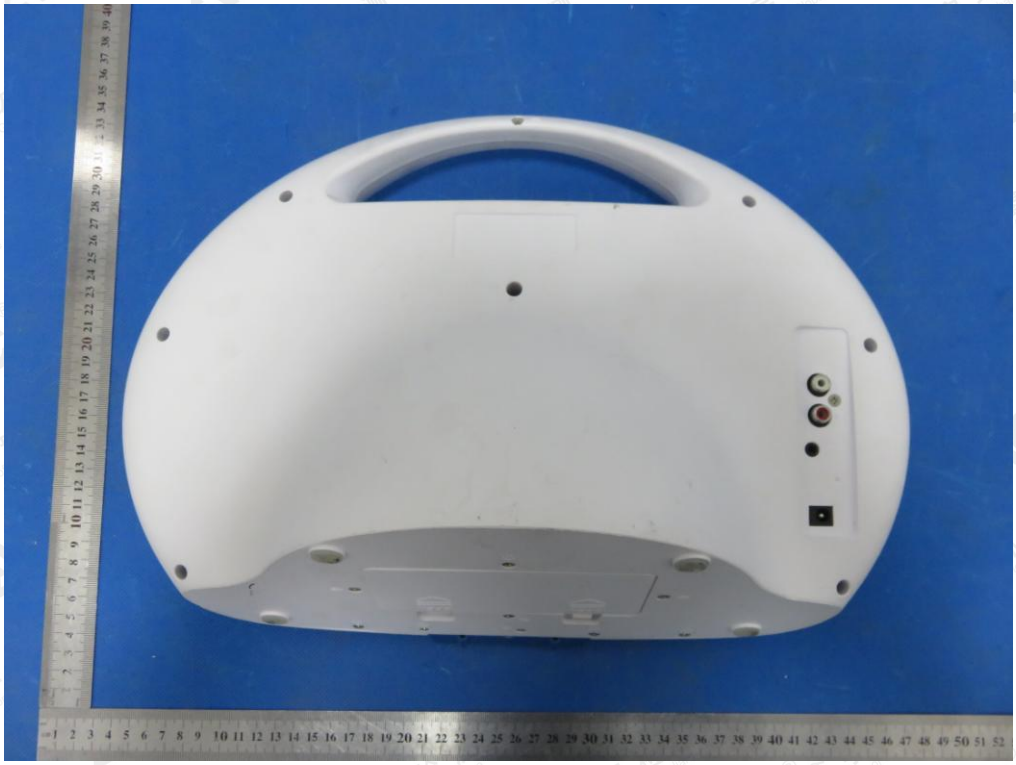


APPENDIX B: PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

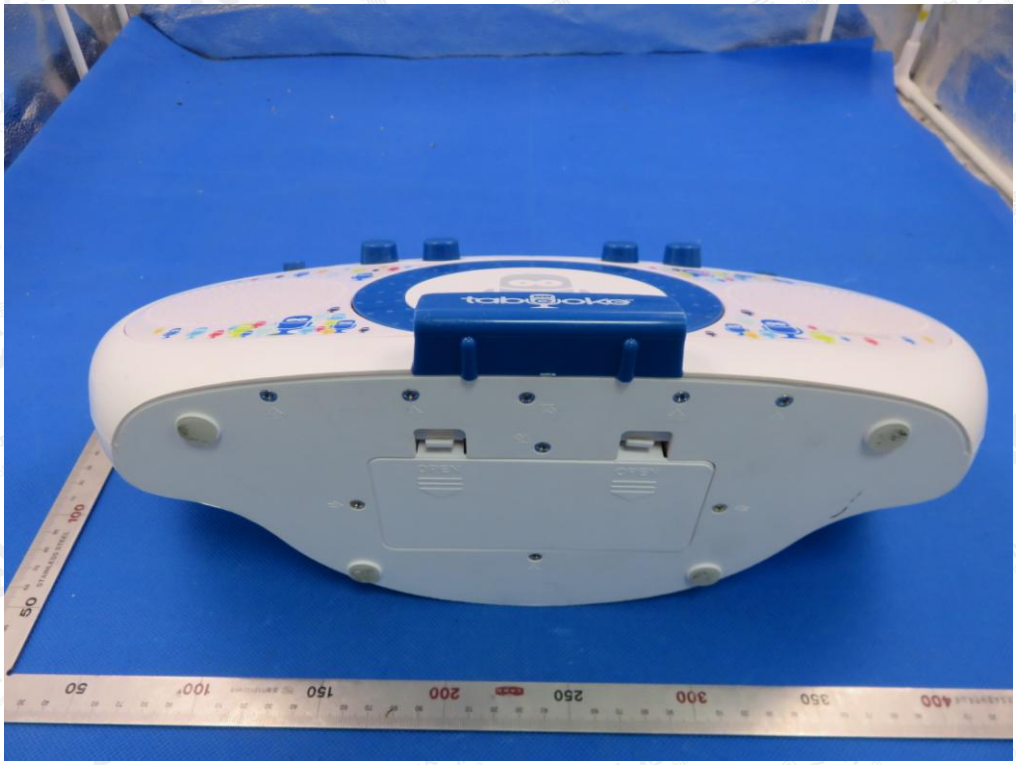
TOP VIEW OF EUT

BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

BACK VIEW OF EUT

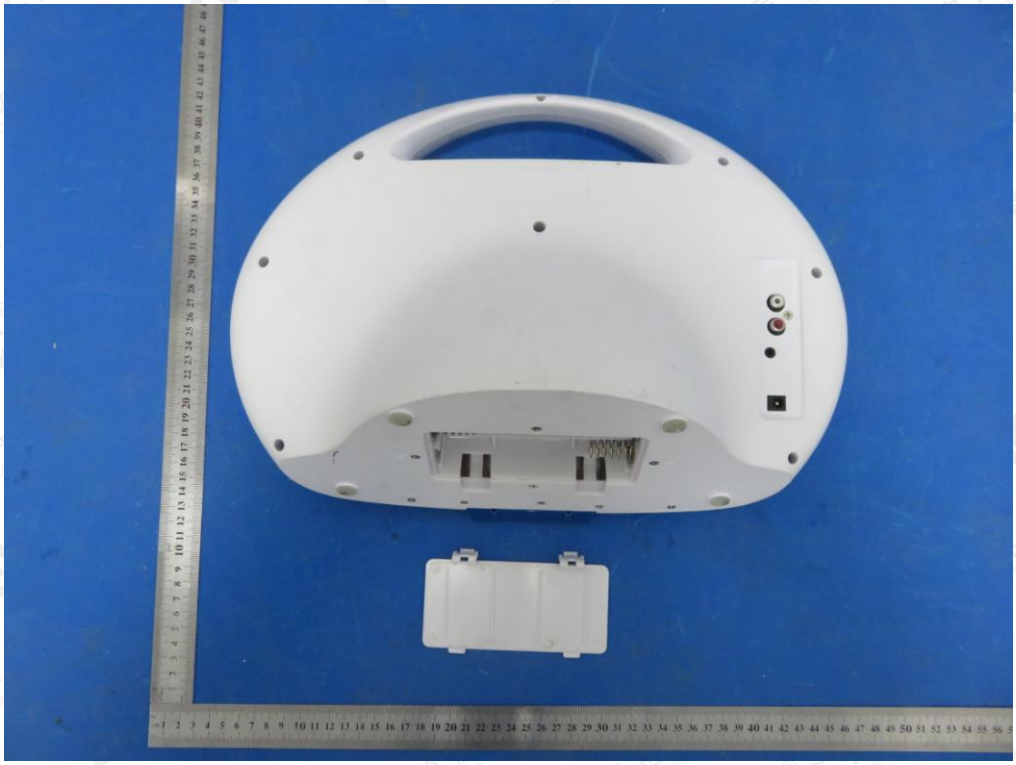


LEFT VIEW OF EUT

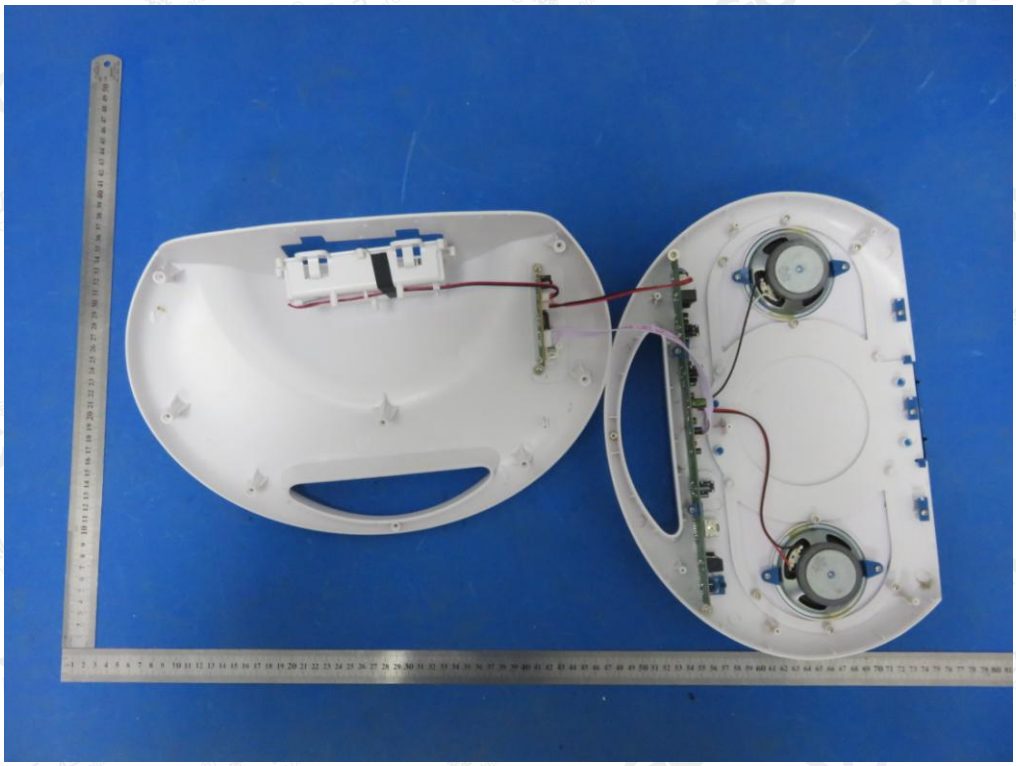
RIGHT VIEW OF EUT

VIEW OF EUT (PORT)-1

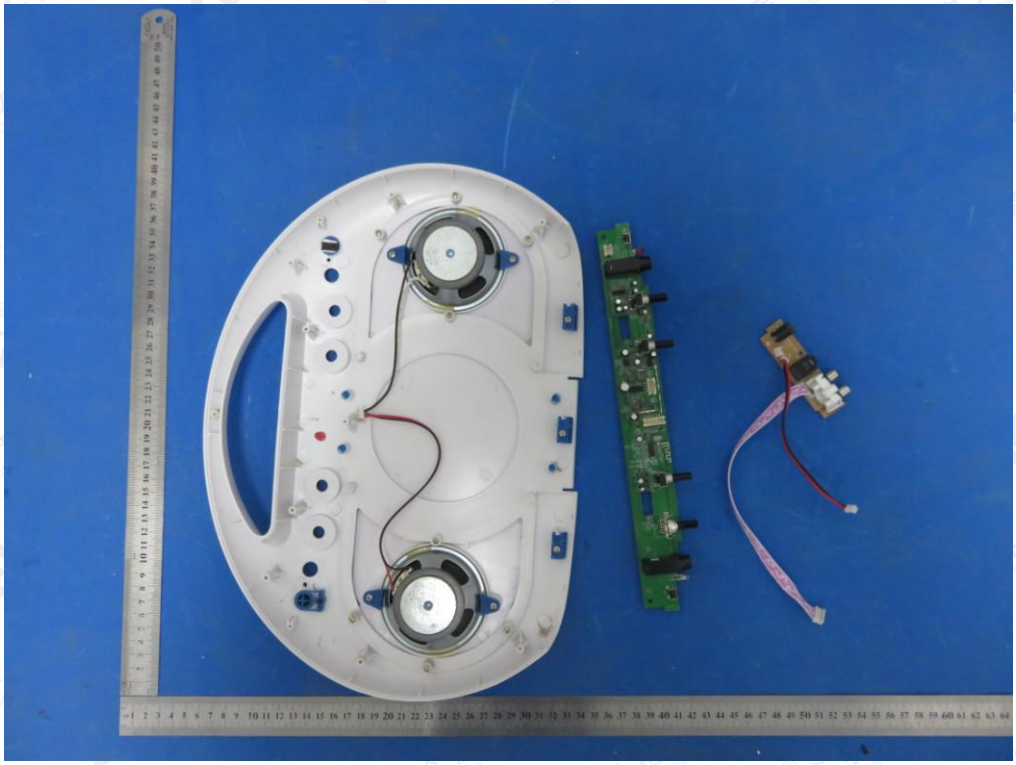
VIEW OF EUT (PORT)-2



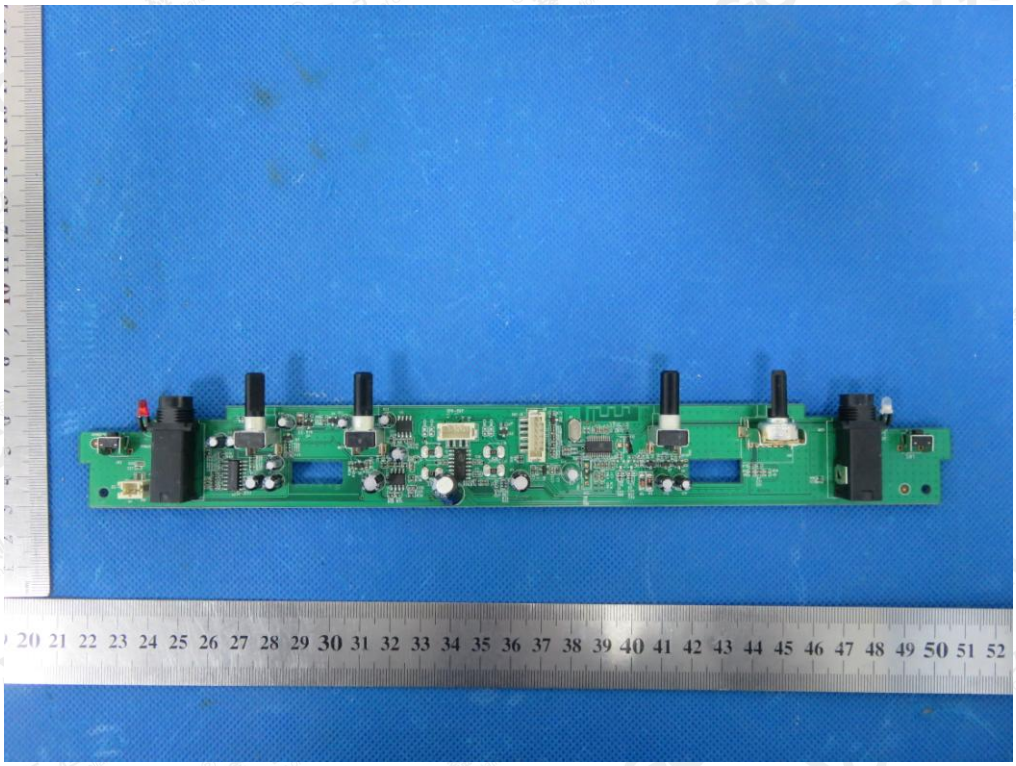
OPEN VIEW OF EUT-1



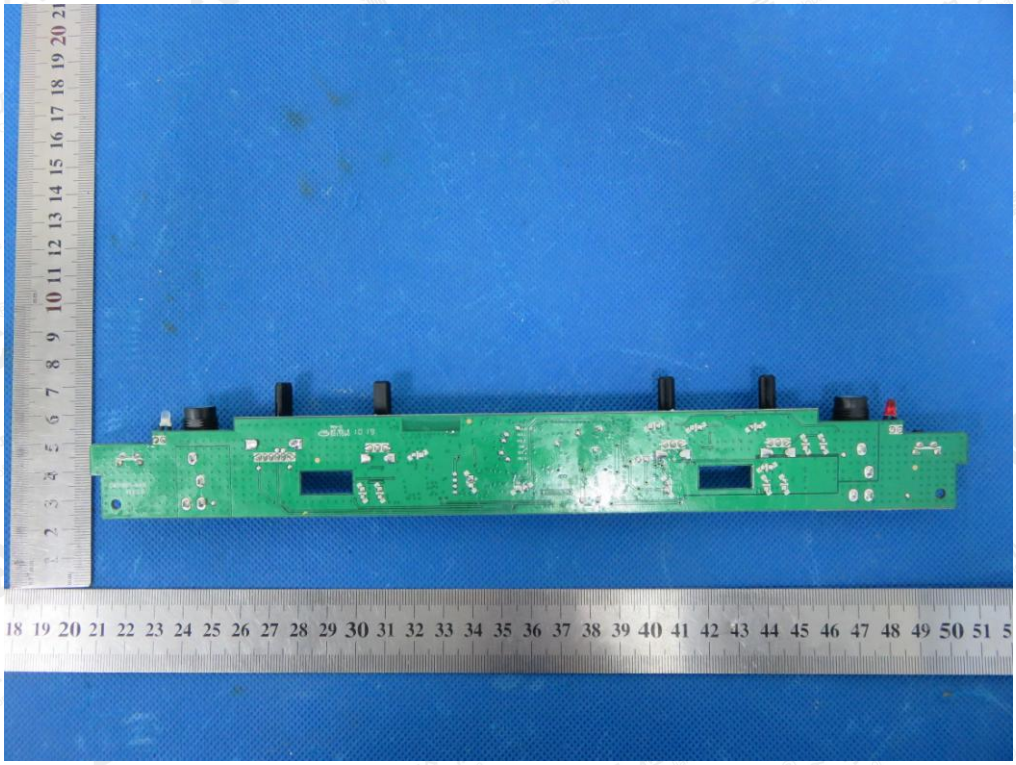
OPEN VIEW OF EUT-2



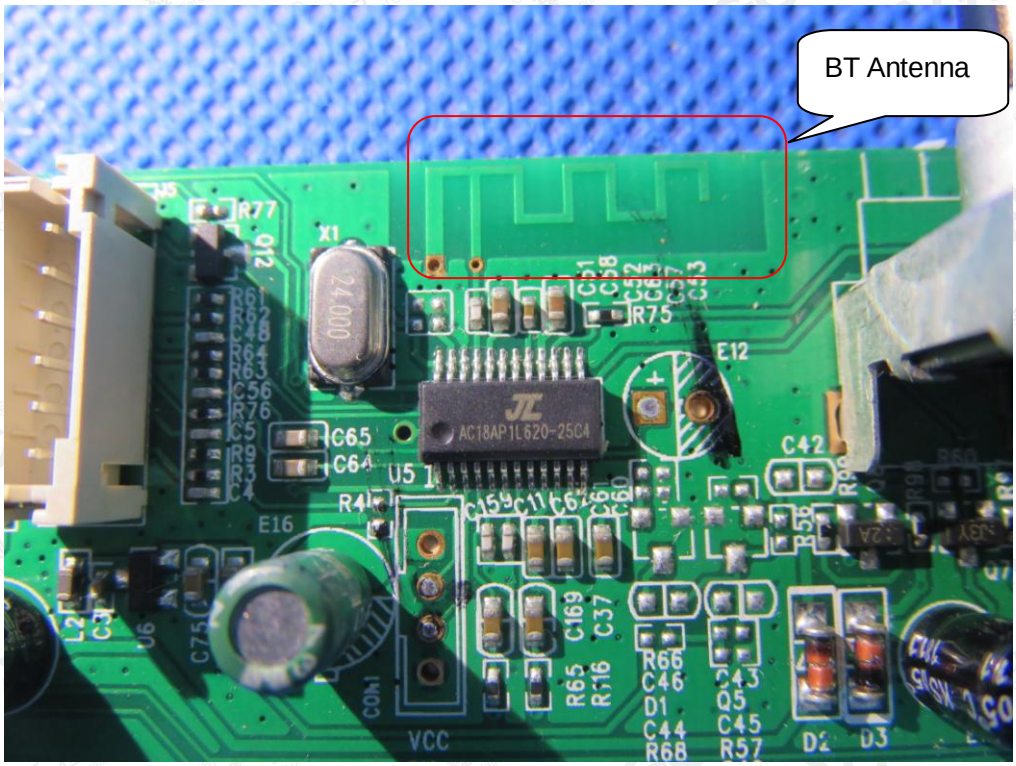
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



ADAPTER

----END OF REPORT----